



DRILL STEM TEST REPORT

Prepared For: **TDI**

1310 Bison Rd.
Hays KS 67601

ATTN: Herb Deines

Engel North #2

21-15s-18w Ellis,KS

Start Date: 2014.09.30 @ 08:19:38

End Date: 2014.09.30 @ 14:40:17

Job Ticket #: 60520 DST #: 1

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

Printed: 2014.10.03 @ 09:59:26

TDI
21-15s-18w Ellis,KS
Engel North #2
DST # 1
Arbuckle
2014.09.30



**TRILOBITE
TESTING, INC**

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Hays KS 67601
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21-15s-18w Ellis,KS
Engel North #2
Job Ticket: 60520 **DST#: 1**
Test Start: 2014.09.30 @ 08:19:38

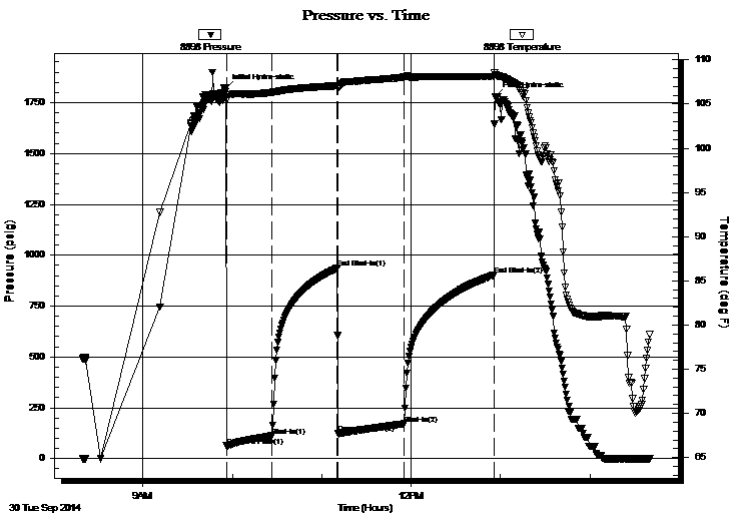
GENERAL INFORMATION:

Formation: **Arbuckle**
Deviated: No Whipstock: ft (KB) Test Type: Conventional Straddle (Initial)
Time Tool Opened: 09:55:58 Tester: Tate Lang
Time Test Ended: 14:40:17 Unit No: 77
Interval: **3530.00 ft (KB) To 3634.00 ft (KB) (TVD)** Reference Elevations: 2031.00 ft (KB)
Total Depth: 3634.00 ft (KB) (TVD) 2021.00 ft (CF)
Hole Diameter: 7.88 inches Hole Condition: Good KB to GR/CF: 10.00 ft

Serial #: 8898 Outside
Press@RunDepth: 170.95 psig @ 3527.00 ft (KB) Capacity: 8000.00 psig
Start Date: 2014.09.30 End Date: 2014.09.30 Last Calib.: 2014.09.30
Start Time: 08:19:39 End Time: 14:40:18 Time On Btm: 2014.09.30 @ 09:55:48
Time Off Btm: 2014.09.30 @ 12:56:38

TEST COMMENT: 30-B.O.B. in 15 mins
45-Weak surface blow
45-B.O.B. in 19 mins
60-Weak surface blow

PRESSURE SUMMARY



| Time (Min.) | Pressure (psig) | Temp (deg F) | Annotation |
|-------------|-----------------|--------------|----------------------|
| 0 | 1821.26 | 106.38 | Initial Hydro-static |
| 1 | 63.18 | 105.42 | Open To Flow (1) |
| 31 | 112.57 | 106.31 | Shut-In(1) |
| 75 | 935.67 | 107.06 | End Shut-In(1) |
| 75 | 123.37 | 106.75 | Open To Flow (2) |
| 120 | 170.95 | 108.06 | Shut-In(2) |
| 180 | 902.38 | 108.13 | End Shut-In(2) |
| 181 | 1781.37 | 108.31 | Final Hydro-static |

Recovery

| Length (ft) | Description | Volume (bbl) |
|-------------|---------------------|--------------|
| 136.00 | GO 25%G 75%O | 1.91 |
| 126.00 | MCO 50%M 50%O | 1.77 |
| 63.00 | MCGO 10%M 30%G 60%O | 0.88 |
| 0.00 | 175 GIP | 0.00 |
| | | |
| | | |

Gas Rates

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



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TOOL DIAGRAM

TDI
1310 Bison Rd.
Hays KS 67601
ATTN: Herb Deines

21-15s-18w Ellis,KS
Engel North #2
Job Ticket: 60520 **DST#: 1**
Test Start: 2014.09.30 @ 08:19:38

Tool Information

| | | | | |
|---------------------------|--------------------|-----------------------|--------------------------------|------------------------------------|
| Drill Pipe: | Length: 3524.00 ft | Diameter: 3.80 inches | Volume: 49.43 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: 0.00 ft | Diameter: 2.25 inches | Volume: 0.00 bbl | Weight to Pull Loose: 60000.00 lb |
| | | | <u>Total Volume: 49.43 bbl</u> | Tool Chased 0.00 ft |
| Drill Pipe Above KB: | 24.00 ft | | | String Weight: Initial 41000.00 lb |
| Depth to Top Packer: | 3520.00 ft | | | Final 44000.00 lb |
| Depth to Bottom Packer: | 3634.00 ft | | | |
| Interval between Packers: | 114.00 ft | | | |
| Tool Length: | 228.00 ft | | | |
| Number of Packers: | 3 | Diameter: 6.75 inches | | |

Tool Comments:

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

| | | | | | |
|-----------------|-------|------|---------|---------|-------------------------------|
| Shut In Tool | 5.00 | | | 3505.00 | |
| Hydraulic tool | 5.00 | | | 3510.00 | |
| Packer | 5.00 | | | 3515.00 | 20.00 Bottom Of Top Packer |
| Packer | 5.00 | | | 3520.00 | |
| Stubb | 1.00 | | | 3521.00 | |
| Perforations | 5.00 | | | 3526.00 | |
| Change Over Sub | 1.00 | | | 3527.00 | |
| Recorder | 0.00 | 8897 | Inside | 3527.00 | |
| Recorder | 0.00 | 8898 | Outside | 3527.00 | |
| Drill Pipe | 95.00 | | | 3622.00 | |
| Change Over Sub | 1.00 | | | 3623.00 | |
| Perforations | 6.00 | | | 3629.00 | |
| Blank Off Sub | 1.00 | | | 3630.00 | |
| Blank Spacing | 4.00 | | | 3634.00 | 114.00 Tool Interval |
| Packer | 5.00 | | | 3639.00 | |
| Stubb | 1.00 | | | 3640.00 | |
| Perforations | 21.00 | | | 3661.00 | |
| Recorder | 0.00 | 8354 | Below | 3661.00 | |
| Change Over Sub | 1.00 | | | 3662.00 | |
| Drill Pipe | 62.00 | | | 3724.00 | |
| Change Over Sub | 1.00 | | | 3725.00 | |
| Bullnose | 3.00 | | | 3728.00 | 94.00 Bottom Packers & Anchor |

Total Tool Length: 228.00



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FLUID SUMMARY

TDI **21-15s-18w Ellis,KS**
 1310 Bison Rd. **Engel North #2**
 Hays KS 67601 Job Ticket: 60520 **DST#: 1**
 ATTN: Herb Deines Test Start: 2014.09.30 @ 08:19:38

Mud and Cushion Information

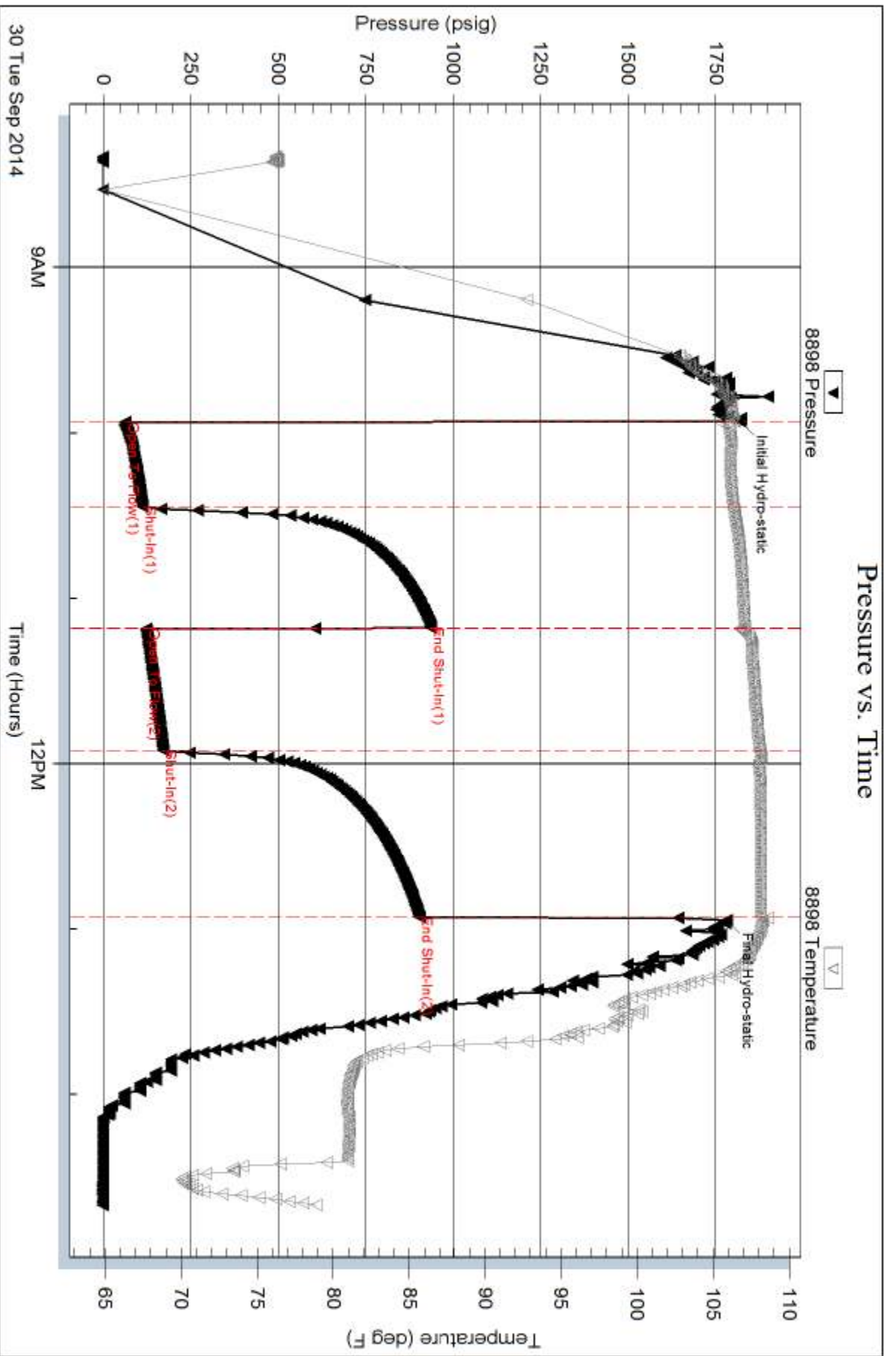
| | | |
|----------------------------------|----------------------------|---------------------|
| Mud Type: Gel Chem | Cushion Type: | Oil API: 29 deg API |
| Mud Weight: 9.00 lb/gal | Cushion Length: ft | Water Salinity: ppm |
| Viscosity: 54.00 sec/qt | Cushion Volume: bbl | |
| Water Loss: 7.59 in ³ | Gas Cushion Type: | |
| Resistivity: ohm.m | Gas Cushion Pressure: psig | |
| Salinity: 2300.00 ppm | | |
| Filter Cake: 1.00 inches | | |

Recovery Information

Recovery Table

| Length ft | Description | Volume bbl |
|--------------|---------------------|---------------|
| 136.00 | GO 25%G 75%O | 1.908 |
| 126.00 | MCO 50%M 50%O | 1.767 |
| 63.00 | MCGO 10%M 30%G 60%O | 0.884 |
| 0.00 | 175 GIP | 0.000 |

Total Length: 325.00 ft Total Volume: 4.559 bbl
 Num Fluid Samples: 0 Num Gas Bombs: 0 Serial #:
 Laboratory Name: Laboratory Location:
 Recovery Comments:

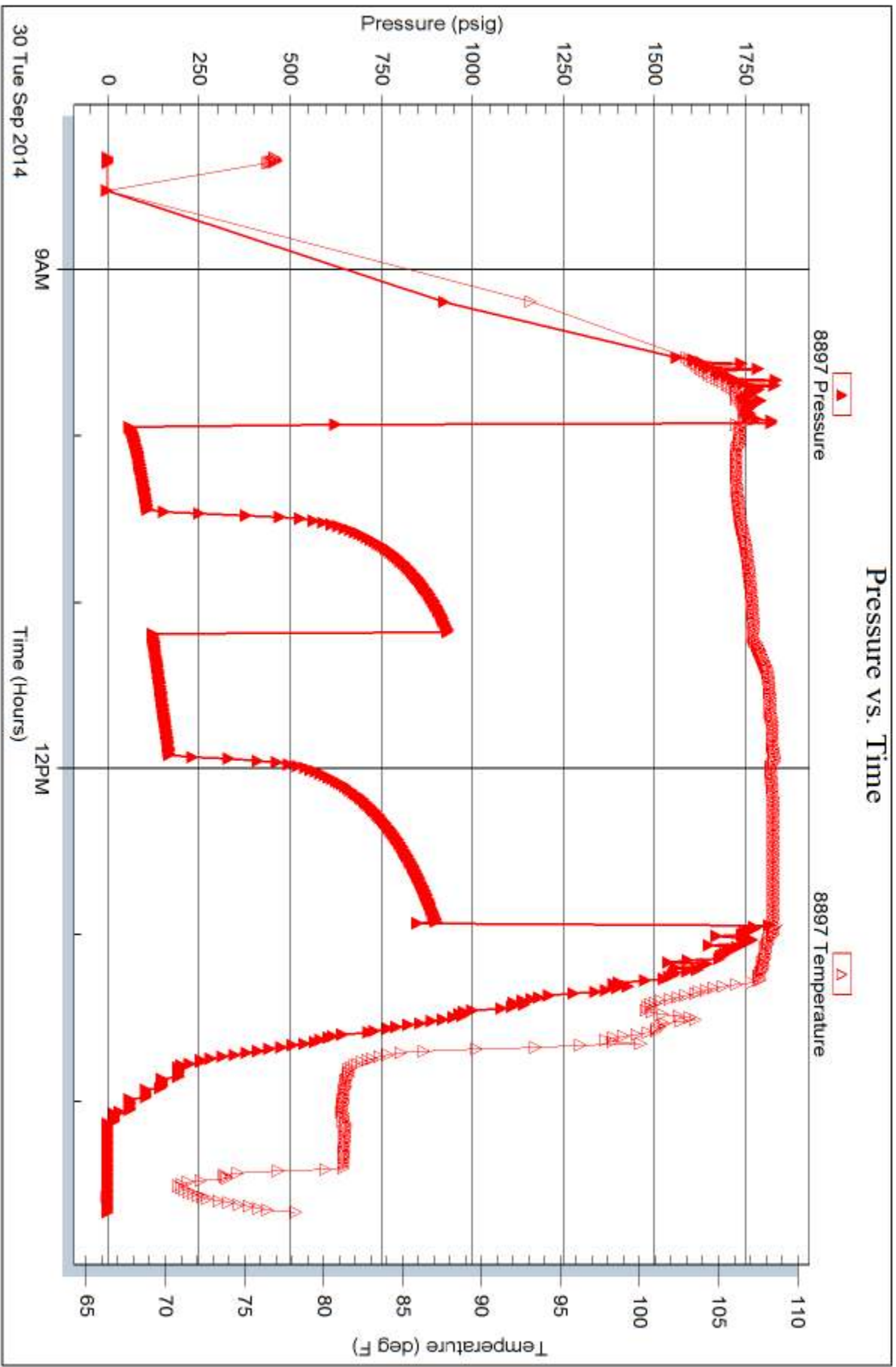


Serial #: 8897

Inside TDI

Engel North #2

DST Test Number: 1



30 Tue Sep 2014

9AM

Time (Hours)

12PM



TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 60520

Well Name & No. Engel North #2 Test No. 1 Date 9-30-14
 Company TDI INC Elevation 2021 KB 2021 GL
 Address 1310 Bison Rd Hays KS 67601
 Co. Rep / Geo. Herb Rig Southwind #21
 Location: Sec. 21 Twp. 15S Rge. 18 W Co. Ellis State KS

Interval Tested 3520 3634 Zone Tested Arbuckle
 Anchor Length 114 89 Tail Drill Pipe Run 3524 Mud Wt. 9.3
 Top Packer Depth 3515 Drill Collars Run 0 Vis 5E
 Bottom Packer Depth 3520 Wt. Pipe Run 0 WL 7.6
 Total Depth 3723 Chlorides 2300 ppm System LCM 2#

Blow Description B.O.B. IN 15 mins
Weak surface blow
B.O.B. IN 19 mins
Weak Surface blow

| Rec | Feet of | %gas | %oil | %water | %mud |
|----------------------|------------------------|-------------------|------------------|----------------|---------------------|
| Rec <u>136</u> | Feet of <u>GO</u> | <u>25</u> | <u>75</u> | | |
| Rec <u>126</u> | Feet of <u>MCO</u> | | <u>50</u> | | <u>50</u> |
| Rec <u>63</u> | Feet of <u>MCGO</u> | <u>30</u> | <u>60</u> | | <u>10</u> |
| Rec <u>0</u> | Feet of <u>175 GTP</u> | | | | |
| Rec Total <u>325</u> | BHT <u>168</u> | Gravity <u>29</u> | API RW <u>31</u> | @ <u>80</u> °F | Chlorides _____ ppm |

(A) Initial Hydrostatic 1821 Test 1150 T-On Location 0620
 (B) First Initial Flow 63 Jars _____ T-Started 0819
 (C) First Final Flow 113 Safety Joint _____ T-Open 0955
 (D) Initial Shut-In 936 Circ Sub _____ T-Pulled 1255
 (E) Second Initial Flow 123 Hourly Standby _____ T-Out 1440
 (F) Second Final Flow 171 Mileage 20RM 31 Comments _____
 (G) Final Shut-In 902 Sampler _____
 (H) Final Hydrostatic 1781 Straddle 600 Ruined Shale Packer _____
 Shale Packer _____ Ruined Packer _____
 Extra Packer _____ Extra Copies _____
 Initial Open 30 Extra Recorder _____ Sub Total 0
 Initial Shut-In 45 Day Standby _____ Total 1781
 Final Flow 45 Accessibility _____ MP/DST Disc't _____
 Final Shut-In 60 Sub Total 1781

Approved By _____ Our Representative [Signature]
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