

**JAMES C. MUSGROVE**

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Mai Oil Operations, Inc.  
Richard Family Partnership #1  
SW-SE-NW-SW (1350' FSL & 775' FWL)  
Section 35-17s-13w  
Barton County, Kansas

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**5 1/2" Production Casing Set**

**Contractor:** Southwind Drilling Co. (rig #3)  
**Commenced:** November 8, 2017  
**Completed:** November 15, 2017  
**Elevation:** 1832' K.B., 1830' D.F., 1824' G.L.  
**Casing program:** Surface; 8 5/8" @ 453'  
Production, 5 1/2" @ 3397'  
**Sample:** Samples saved and examined 2800' to the Rotary Total Depth.  
**Drilling time:** One (1) foot drilling time recorded and kept 2800' to the Rotary Total Depth.  
**Measurements:** All depths measured from the Kelly Bushing.  
**Drill Stem Tests:** There were five (5) Drill Stem Tests ran by Trilobite Testing Co.  
**Electric Log:** By Eli Wireline Services, Dual Induction, Compensated Density/Neutron;  
Micro Log

<u>Formation</u>	<u>Log Depth</u>	<u>Sub-Sea Datum</u>
Anhydrite	711	+1121
Base Anhydrite	738	+1094
Heebner	2992	-1160
Toronto	3008	-1176
Douglas	3021	-1189
Brown Lime	3084	-1252
Lansing	3095	-1263
Base Kansas City	3319	-1487
Conglomerate Chert	3322	-1490
Arbuckle	3328	-1496
Rotary Total Depth	3410	-1578
Log Total Depth	3411	-1579

(All tops and zones corrected to Electric Log Measurement)

**SAMPLE ANALYSIS, SHOWS OF OIL, TESTING DATA, ETC.**

**TOPEKA SECTION**

- 2912-2919' Limestone, white, gray, few fossiliferous, poor visible porosity; trace black stain, no free oil and no odor in fresh samples
- 2938-2946' Limestone, white, tan fossiliferous, fair fossil cast porosity, dark brown and black stain and saturation, show of free oil and questionable odor in fresh samples.

**Drill Stem Test #1 2926-2950**

**Times: 30-30-45-45**

**Blow: Weak**

**Recovery: 15' oil cut mud  
(15% oil; 85% mud)**

**Pressures: ISIP 50 psi  
FSIP 55 psi  
IFP 9-13 psi  
FFP 12-13 psi  
HSH 1386-1374 psi**

- 2950-2976' Limestone, gray, finely crystalline, chalky; poor to fair porosity, plus gray chert.

**TORONTO SECTION**

- 3008-3020' Limestone, white/cream, finely crystalline, chalky; few dolomitic at base, no shows.

**LANSING SECTION**

- 3095-3100' Limestone, tan oolitic/fossiliferous, chalky, no shows.
- 3102-3110' Limestone, tan; fossiliferous, chalky; brown and dark brown stain trace of free oil and no odor in fresh samples.
- 3128-3134' Limestone, white, gray fossiliferous, chalky, poor visible porosity, trace brown stain trace of free oil and faint odor in fresh samples.
- 3148-3156' Limestone, tan, oolitic in part, fossiliferous, chalky poor visible porosity trace brown stain, trace of free oil and no odor in fresh samples.

**Drill Stem Test #2** **3105-3166**

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**Times:** 30-30-45-45  
**Blow:** Weak  
**Recovery:** 15' slightly oil cut mud  
 (5% oil; 95% mud)  
**Pressures:** ISIP 77 psi  
 FSIP 80 psi  
 IFP 24-27 psi  
 FFP 25-29 psi  
 HSH 1524-1515 psi

- 3166-3180' Limestone, tan, finely crystalline, finely oolitic, slightly cherty (dense), no shows.
- 3183-3200' Limestone, gray white, oomoldic, chalky in part; fair porosity, now shows.
- 3226-3230' Limestone, gray, fossiliferous in part; poor visible porosity, trace gray stain, no free oil and no odor in fresh samples.
- 3244-3250' Limestone, gray, finely crystalline, finely oolitic, fair porosity, golden brown stain, show of free oil and faint odor in fresh samples.
- 3258-3270' Limestone, gray, tan, oolitic, few sub-oomoldic, chalky, trace dark brown stain, trace of free oil and no odor in fresh samples.
- 3240-3254' Limestone, tan, fine to medium crystalline, chalky, fossiliferous in part, trace brown and golden stain, show of free oil and no odor in fresh samples.
- 3265-3270' Limestone, gray, tan, finely crystalline; slightly cherty (dense)
- 3276-3290' Limestone, as above, increase in porosity, trace brown stain, trace of free oil and no odor in fresh samples.

**Drill Stem Test #3** **3214-3286**

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**Times:** 30-30-45-45  
**Blow:** Weak  
**Recovery:** 32' oil cut mud  
 (10% oil; 90% mud)  
**Pressures:** ISIP 119 psi  
 FSIP 177 psi  
 IFP 29-32 psi  
 FFP 31-34 psi  
 HSH 1583-1560 psi

- 3290-3300' Limestone, gray, white, tan, chalky in part, poor visible porosity; no shows.  
3311-3319' Limestone, tan, gray, fossiliferous, chalky, poor porosity, no shows.

**CONGLOMERATE SECTION**

- 3322-3326' Chert; white, cream, boney, black stain, no show of free oil and faint/fair odor in fresh samples.

**ARBUCKLE SECTION**

- 3328-3330' Dolomite, tan, sucrosic, poor visible porosity, trace brown stain, no free oil and faint odor in fresh samples.  
3331-3340' Dolomite, as above, fair inter-crystalline and pinpoint porosity, golden brown stain, show of free oil and fair odor in fresh samples.

**Drill Stem Test #4** **3301-3344**

**Times:** 45-30-45-60

**Blow:** Fair

**Recovery:** 80' clean oil  
63' muddy oil  
(65% oil; 35% mud)

**Pressures:** ISIP 995 psi  
FSIP 975 psi  
IFP 17-40 psi  
FFP 43-61 psi  
HSH 1634-1604 psi

- 3344-3355' Dolomite, tan; medium crystalline, fair porosity; brown stain, show of free oil and faint odor in fresh samples.

**Drill Stem Test #5** **3344-3355**

**Times:** 30-30-30-45

**Blow:** Good

**Recovery:** 205' muddy water

**Pressures:** ISIP 1019 psi  
FSIP 1019 psi  
IFP 30-82 psi  
FFP 84-124 psi  
HSH 1662-1637 psi

- 3355-3370' Dolomite, as above, plus white boney chert, no shows.  
3370-3390' Dolomite, white, gray, medium crystalline, good inter-crystalline porosity, trace white, chalk and white chert.

Mai Oil Operations, Inc.  
Richard Family Partnership #1  
SW-SE-NW-SW (1350' FSL & 775' FWL)  
Section 35-17s-13w  
Barton County, Kansas

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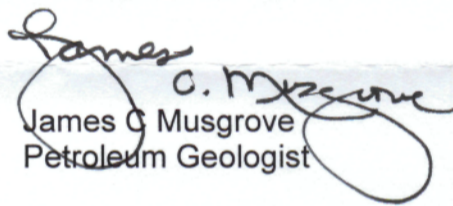
3390-3410' Dolomite, gray, white, tan, medium and coarse crystalline, fair to good inter-crystalline porosity, plus chert, white, oolitic, boney. Trace gray, white opaque chert.

**Rotary Total Depth            3410**  
**Log Total Depth                3411**

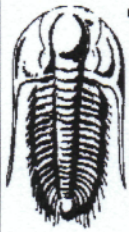
**Recommendations:**

5 ½' production casing was set and cemented on the Mai Oil Operations, Inc., Richard Family Partnership #1.

Respectfully yours,

  
James C. Musgrove  
Petroleum Geologist





**TRILOBITE TESTING, INC.**

**DRILL STEM TEST REPORT**

Mai Oil Operations, Inc.  
 8411 Preston Rd. Ste. 800  
 Dallas, TX 75225  
 ATTN: Jim Musgrove

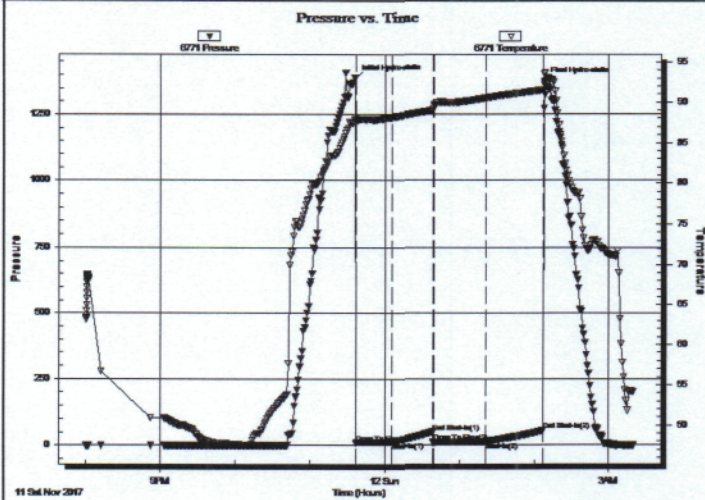
**Richard Family Partnership #1**  
**35-17S-13W Barton,KS**  
 Job Ticket: 63110      **DST#: 1**  
 Test Start: 2017.11.11 @ 19:59:57

**GENERAL INFORMATION:**

Formation: **Topeka**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 23:36:48  
 Time Test Ended: 03:20:18  
 Interval: **2926.00 ft (KB) To 2950.00 ft (KB) (TVD)**  
 Total Depth: 2950.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Fair  
 Test Type: Conventional Bottom Hole (Initial)  
 Tester: Brannan Lonsdale  
 Unit No: 73  
 Reference Elevations: 1832.00 ft (KB)  
 1824.00 ft (CF)  
 KB to GR/CF: 8.00 ft

**Serial #: 6771**      **Inside**  
 Press@RunDepth: 13.42 psig @ 2927.00 ft (KB)      Capacity: 8000.00 psig  
 Start Date: 2017.11.11      End Date: 2017.11.12      Last Calib.: 2017.11.12  
 Start Time: 19:59:58      End Time: 03:20:18      Time On Btm: 2017.11.11 @ 23:36:18  
 Time Off Btm: 2017.11.12 @ 02:08:18

TEST COMMENT: 30- IF- Built very slow ly to 1"  
 30- IS- No blow  
 45- FF- Built very slow ly to 1"  
 45- FS- No blow



**PRESSURE SUMMARY**

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1385.72	88.12	Initial Hydro-static
1	9.22	87.93	Open To Flow (1)
29	13.28	88.13	Shut-In(1)
62	50.21	89.02	End Shut-In(1)
63	11.78	89.62	Open To Flow (2)
105	13.42	90.55	Shut-In(2)
151	55.30	91.55	End Shut-In(2)
152	1374.03	93.50	Final Hydro-static

**Recovery**

Length (ft)	Description	Volume (bbl)
15.00	OCM, 15%O 85%M	0.21

**Gas Rates**

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



**TRILOBITE  
TESTING, INC.**

**DRILL STEM TEST REPORT**

**TOOL DIAGRAM**

Mai Oil Operations, Inc.  
8411 Preston Rd. Ste. 800  
Dallas, TX 75225  
ATTN: Jim Musgrove

**Richard Family Partnership #1**  
**35-17S-13W Barton,KS**  
Job Ticket: 63110      **DST#: 1**  
Test Start: 2017.11.11 @ 19:59:57

**Tool Information**

Drill Pipe:	Length: 2919.00 ft	Diameter: 3.82 inches	Volume: 41.38 bbl	Tool Weight: 2000.00 lb
Heavy Wt. Pipe:	Length: ft	Diameter: inches	Volume: - 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: 44000.00 lb
			<u>Total Volume: - bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	13.00 ft			String Weight: Initial 29000.00 lb
Depth to Top Packer:	2926.00 ft			Final 30000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	24.00 ft			
Tool Length:	44.00 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			2907.00	
Shut In Tool	5.00			2912.00	
Hydraulic tool	5.00			2917.00	
Packer	5.00			2922.00	20.00      Bottom Of Top Packer
Packer	4.00			2926.00	
Stubb	1.00			2927.00	
Recorder	0.00	6771	Inside	2927.00	
Recorder	0.00	8524	Outside	2927.00	
Perforations	20.00			2947.00	
Bullnose	3.00			2950.00	24.00      Bottom Packers & Anchor
<b>Total Tool Length:</b>	<b>44.00</b>				



**TRILOBITE  
TESTING, INC.**

**DRILL STEM TEST REPORT**

**FLUID SUMMARY**

Mai Oil Operations, Inc.  
8411 Preston Rd. Ste. 800  
Dallas, TX 75225  
ATTN: Jim Musgrove

**Richard Family Partnership #1**  
**35-17S-13W Barton,KS**  
Job Ticket: 63110      **DST#: 1**  
Test Start: 2017.11.11 @ 19:59:57

**Mud and Cushion Information**

Mud Type: Gel Chem	Cushion Type:	Oil API:	34 deg API
Mud Weight: 8.00 lb/gal	Cushion Length:	Water Salinity:	ppm
Viscosity: 51.00 sec/qt			
Water Loss: 8.57 in <sup>3</sup>	Cushion Volume:		
Resistivity: ohm.m	Gas Cushion Type:		
Salinity: 3800.00 ppm	Gas Cushion Pressure:		
Filter Cake: inches			

**Recovery Information**

Recovery Table

Length ft	Description	Volume bbl
15.00	OCM, 15%O 85%M	0.213

Total Length: 15.00 ft      Total Volume: 0.213 bbl  
 Num Fluid Samples: 0      Num Gas Bombs: 0      Serial #:  
 Laboratory Name:      Laboratory Location:  
 Recovery Comments:



Serial #: 6771

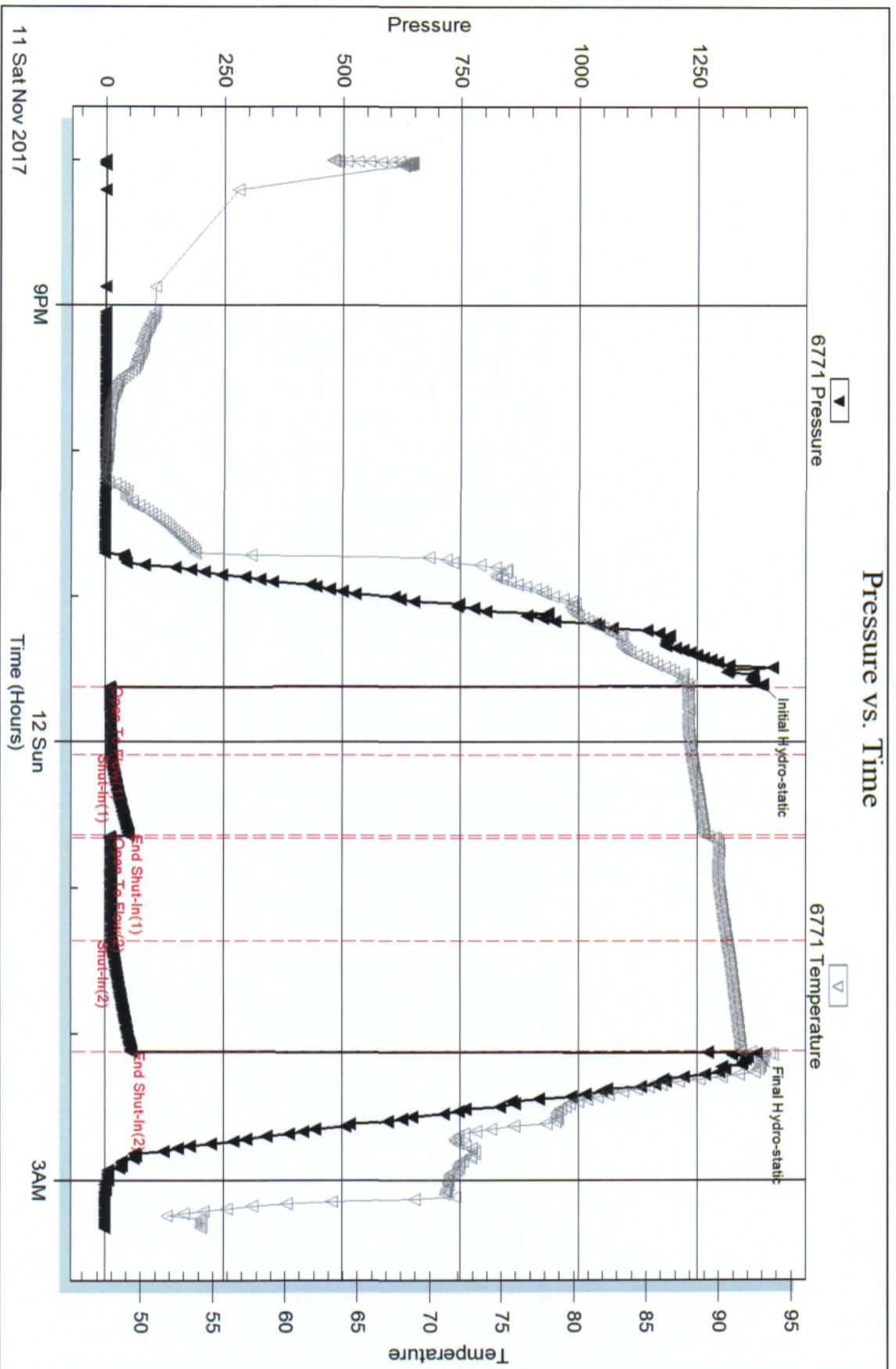
Inside

Mai Oil Operations, Inc.

35-17S-13W Barton,KS

DST Test Number: 1

### Pressure vs. Time



Tribolite Testing, Inc

Ref. No: 63110

Printed: 2017.11.15 @ 08:37:41



**TRILOBITE  
TESTING, INC.**

## DRILL STEM TEST REPORT

Mai Oil Operations, Inc.  
8411 Preston Rd. Ste. 800  
Dallas, TX 75225  
ATTN: Jim Musgrove

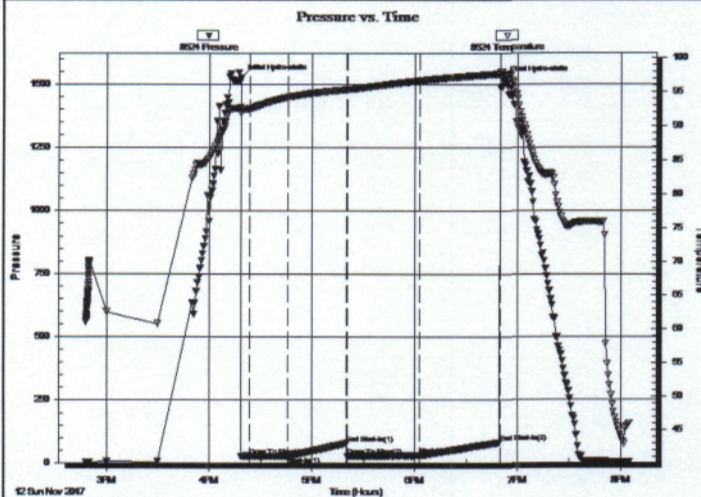
**Richard Family Partnership #1**  
**35-17S-13W Barton,KS**  
Job Ticket: 63111      **DST#: 2**  
Test Start: 2017.11.12 @ 14:47:36

### GENERAL INFORMATION:

Formation: **LKC "B-F"**  
Deviated: No Whipstock: ft (KB)  
Time Tool Opened: 16:23:27  
Time Test Ended: 20:05:12  
Test Type: Conventional Bottom Hole (Reset)  
Tester: Brannan Lonsdale  
Unit No: 73  
Interval: **3105.00 ft (KB) To 3166.00 ft (KB) (TVD)**  
Reference Elevations: 1832.00 ft (KB)  
Total Depth: 3166.00 ft (KB) (TVD)      1824.00 ft (CF)  
Hole Diameter: 7.88 inches Hole Condition: Fair      KB to GRVCF: 8.00 ft

**Serial #: 8524**      **Outside**  
Press@RunDepth: 28.90 psig @ 3106.00 ft (KB)      Capacity: 8000.00 psig  
Start Date: 2017.11.12      End Date: 2017.11.12      Last Calib.: 2017.11.12  
Start Time: 14:47:37      End Time: 20:05:12      Time On Btm: 2017.11.12 @ 16:18:12  
Time Off Btm: 2017.11.12 @ 18:51:12

TEST COMMENT: 30- IF- Built slow ly to 2"  
30- ISI- No blow  
45- FF- Built slow ly to 2"  
45- FSI- No blow



### PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1523.57	92.68	Initial Hydro-static
6	24.37	92.53	Open To Flow (1)
28	27.07	94.23	Shut-In(1)
62	77.45	95.39	End Shut-In(1)
63	25.20	95.39	Open To Flow (2)
105	28.90	96.68	Shut-In(2)
152	79.86	97.68	End Shut-In(2)
153	1515.43	97.56	Final Hydro-static

### Recovery

Length (ft)	Description	Volume (bbl)
15.00	SOCM, 5%O 95%M	0.21

\* Recovery from multiple tests

### Gas Rates

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



**TRILOBITE  
TESTING, INC.**

## DRILL STEM TEST REPORT

**TOOL DIAGRAM**

Mai Oil Operations, Inc.  
8411 Preston Rd. Ste. 800  
Dallas, TX 75225  
ATTN: Jim Musgrove

**Richard Family Partnership #1**  
**35-17S-13W Barton, KS**  
Job Ticket: 63111      **DST#: 2**  
Test Start: 2017.11.12 @ 14:47:36

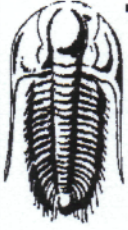
**Tool Information**

Drill Pipe:	Length: 3107.00 ft	Diameter: 3.82 inches	Volume: 44.04 bbl	Tool Weight: 2000.00 lb
Heavy Wt. Pipe:	Length:            ft	Diameter:            inches	Volume:            - 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: 41000.00 lb
			<u>Total Volume:            - bbl</u>	Tool Chased            0.00 ft
Drill Pipe Above KB:	22.00 ft			String Weight: Initial 31000.00 lb
Depth to Top Packer:	3105.00 ft			Final 31000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	61.00 ft			
Tool Length:	81.00 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			3086.00	
Shut In Tool	5.00			3091.00	
Hydraulic tool	5.00			3096.00	
Packer	5.00			3101.00	20.00      Bottom Of Top Packer
Packer	4.00			3105.00	
Stubb	1.00			3106.00	
Recorder	0.00	6771	Inside	3106.00	
Recorder	0.00	8524	Outside	3106.00	
Perforations	23.00			3129.00	
Change Over Sub	1.00			3130.00	
Drill Pipe	32.00			3162.00	
Change Over Sub	1.00			3163.00	
Bullnose	3.00			3166.00	61.00      Bottom Packers & Anchor

**Total Tool Length: 81.00**



**TRILOBITE  
TESTING, INC.**

**DRILL STEM TEST REPORT**

**FLUID SUMMARY**

Mai Oil Operations, Inc.  
8411 Preston Rd. Ste. 800  
Dallas, TX 75225  
ATTN: Jim Musgrove

**Richard Family Partnership #1**  
**35-17S-13W Barton,KS**  
Job Ticket: 63111      **DST#: 2**  
Test Start: 2017.11.12 @ 14:47:36

**Mud and Cushion Information**

Mud Type: Gel Chem	Cushion Type:	Oil API:	deg API
Mud Weight: 8.00 lb/gal	Cushion Length: ft	Water Salinity:	ppm
Viscosity: 51.00 sec/qt	Cushion Volume: bbl		
Water Loss: 8.56 in <sup>3</sup>	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 3800.00 ppm			
Filter Cake: inches			

**Recovery Information**

Recovery Table

Length ft	Description	Volume bbl
15.00	SOCM, 5%O 95%M	0.213

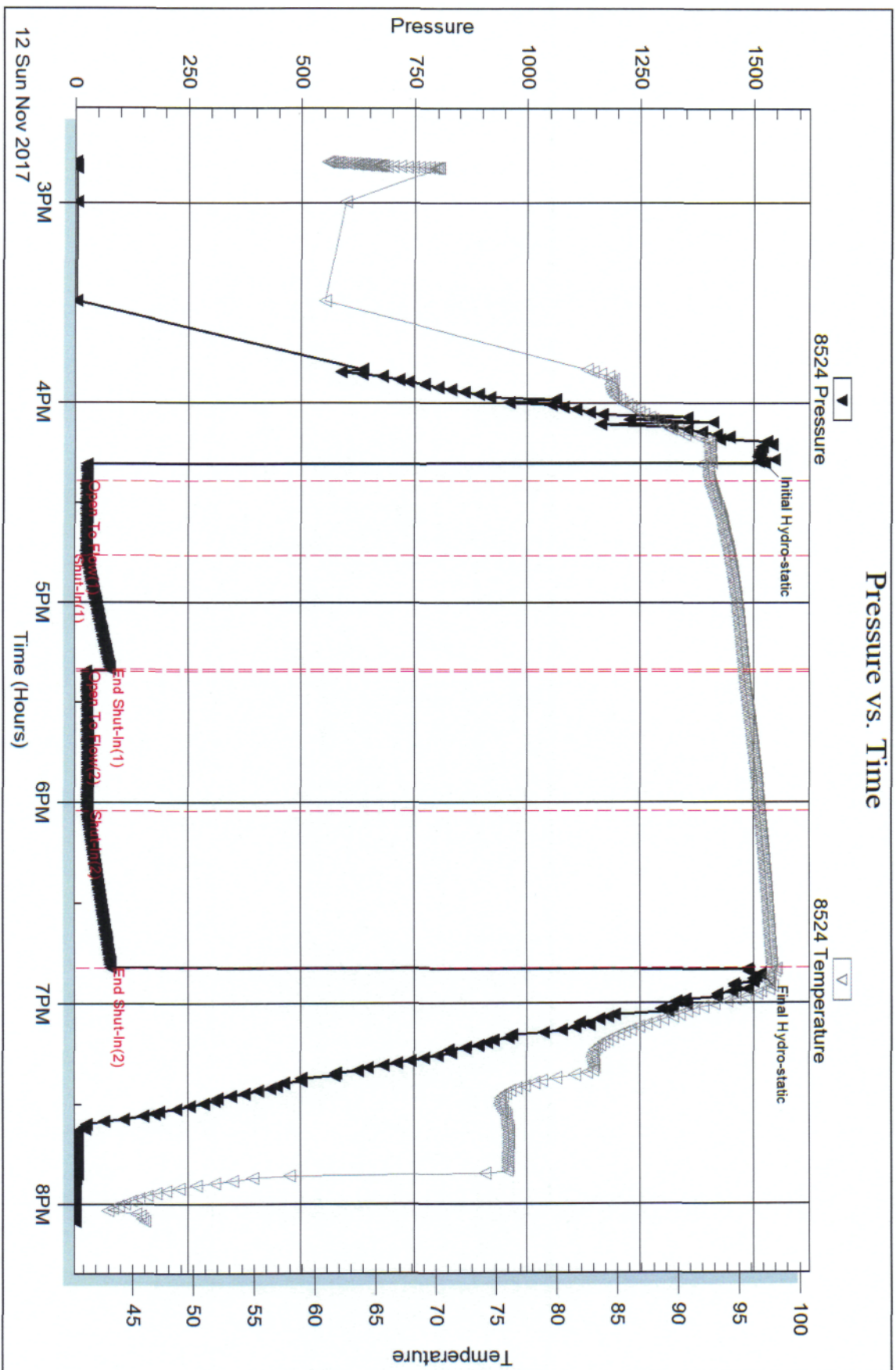
Total Length: 15.00 ft      Total Volume: 0.213 bbl  
 Num Fluid Samples: 0      Num Gas Bombs: 0      Serial #:  
 Laboratory Name:      Laboratory Location:  
 Recovery Comments:

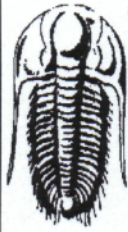
Serial #: 8524

Outside Mai Oil Operations, Inc.

35-17S-13W Barton, KS

DST Test Number: 2





**TRILOBITE  
TESTING, INC.**

## DRILL STEM TEST REPORT

Mai Oil Operations, Inc.  
8411 Preston Rd. Ste. 800  
Dallas, TX 75225  
ATTN: Jim Musgrove

**Richard Family Partnership #1**  
**35-17S-13W Barton,KS**  
Job Ticket: 63112      **DST#: 3**  
Test Start: 2017.11.13 @ 07:21:12

### GENERAL INFORMATION:

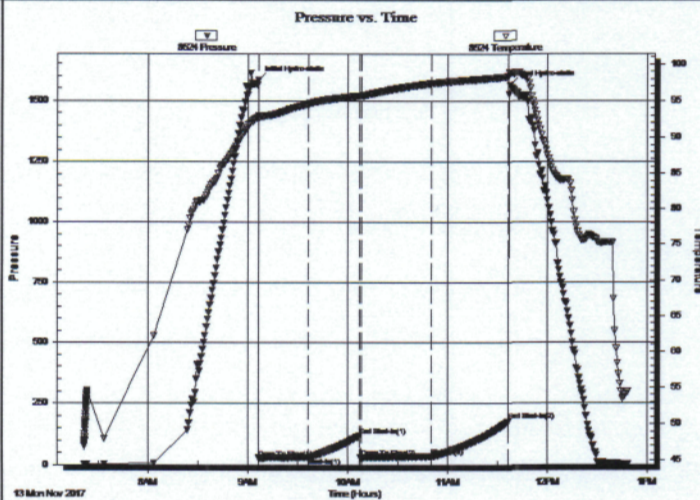
Formation: **LKC "H-J"**  
Deviated: No Whipstock: ft (KB)  
Time Tool Opened: 09:06:33  
Time Test Ended: 12:48:33  
Interval: **3214.00 ft (KB) To 3286.00 ft (KB) (TVD)**  
Total Depth: 3286.00 ft (KB) (TVD)  
Hole Diameter: 7.88 inches Hole Condition: Fair  
Test Type: Conventional Bottom Hole (Reset)  
Tester: Brannan Lonsdale  
Unit No: 73  
Reference Elevations: 1832.00 ft (KB)  
1824.00 ft (CF)  
KB to GR/CF: 8.00 ft

### Serial #: 8524

Outside

Press@RunDepth: 33.54 psig @ 3215.00 ft (KB) Capacity: 8000.00 psig  
Start Date: 2017.11.13 End Date: 2017.11.13 Last Calib.: 2017.11.13  
Start Time: 07:21:13 End Time: 12:48:33 Time On Btm: 2017.11.13 @ 09:06:18  
Time Off Btm: 2017.11.13 @ 11:37:48

TEST COMMENT: 30- IF- Slow ly built to 2"  
30- IS- No blow  
45- FF- Slow ly built to 3"  
45- FS- No blow



### PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1582.96	92.94	Initial Hydro-static
1	28.52	92.56	Open To Flow (1)
31	31.59	94.62	Shut-In(1)
61	119.25	95.68	End Shut-In(1)
62	30.71	95.70	Open To Flow (2)
104	33.54	97.36	Shut-In(2)
151	176.91	98.28	End Shut-In(2)
152	1560.44	98.74	Final Hydro-static

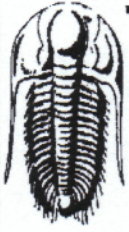
### Recovery

Length (ft)	Description	Volume (bbl)
32.00	OCM, 10%O 90%M	0.45

\* Recovery from multiple tests

### Gas Rates

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



**TRILOBITE  
TESTING, INC.**

**DRILL STEM TEST REPORT**

**TOOL DIAGRAM**

Mai Oil Operations, Inc.  
8411 Preston Rd. Ste. 800  
Dallas, TX 75225  
ATTN: Jim Musgrove

**Richard Family Partnership #1**  
**35-17S-13W Barton,KS**  
Job Ticket: 63112      **DST#: 3**  
Test Start: 2017.11.13 @ 07:21:12

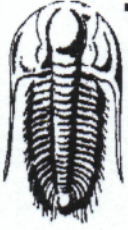
**Tool Information**

Drill Pipe:	Length: 3203.00 ft	Diameter: 3.82 inches	Volume: 45.40 bbl	Tool Weight: 2000.00 lb
Heavy Wt. Pipe:	Length:           ft	Diameter:           inches	Volume:       - 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: 47000.00 lb
			<u>Total Volume: - bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	9.00 ft			String Weight: Initial 33000.00 lb
Depth to Top Packer:	3214.00 ft			Final 33000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	72.00 ft			
Tool Length:	92.00 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			3195.00	
Shut In Tool	5.00			3200.00	
Hydraulic tool	5.00			3205.00	
Packer	5.00			3210.00	20.00      Bottom Of Top Packer
Packer	4.00			3214.00	
Stubb	1.00			3215.00	
Recorder	0.00	6771	Inside	3215.00	
Recorder	0.00	8524	Outside	3215.00	
Perforations	4.00			3219.00	
Change Over Sub	1.00			3220.00	
Drill Pipe	62.00			3282.00	
Change Over Sub	1.00			3283.00	
Bullnose	3.00			3286.00	72.00      Bottom Packers & Anchor

**Total Tool Length: 92.00**



**TRILOBITE  
TESTING, INC.**

**DRILL STEM TEST REPORT**

**FLUID SUMMARY**

Mai Oil Operations, Inc.  
8411 Preston Rd. Ste. 800  
Dallas, TX 75225  
ATTN: Jim Musgrove

**Richard Family Partnership #1**  
**35-17S-13W Barton,KS**  
Job Ticket: 63112      **DST#: 3**  
Test Start: 2017.11.13 @ 07:21:12

**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: 48.00 sec/qt	Cushion Volume: bbl		
Water Loss: 7.58 in <sup>3</sup>	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 7300.00 ppm			
Filter Cake: inches			

**Recovery Information**

Recovery Table

Length ft	Description	Volume bbl
32.00	OCM, 10%O 90%M	0.454

Total Length: 32.00 ft      Total Volume: 0.454 bbl  
 Num Fluid Samples: 0      Num Gas Bombs: 0      Serial #:  
 Laboratory Name:      Laboratory Location:  
 Recovery Comments:



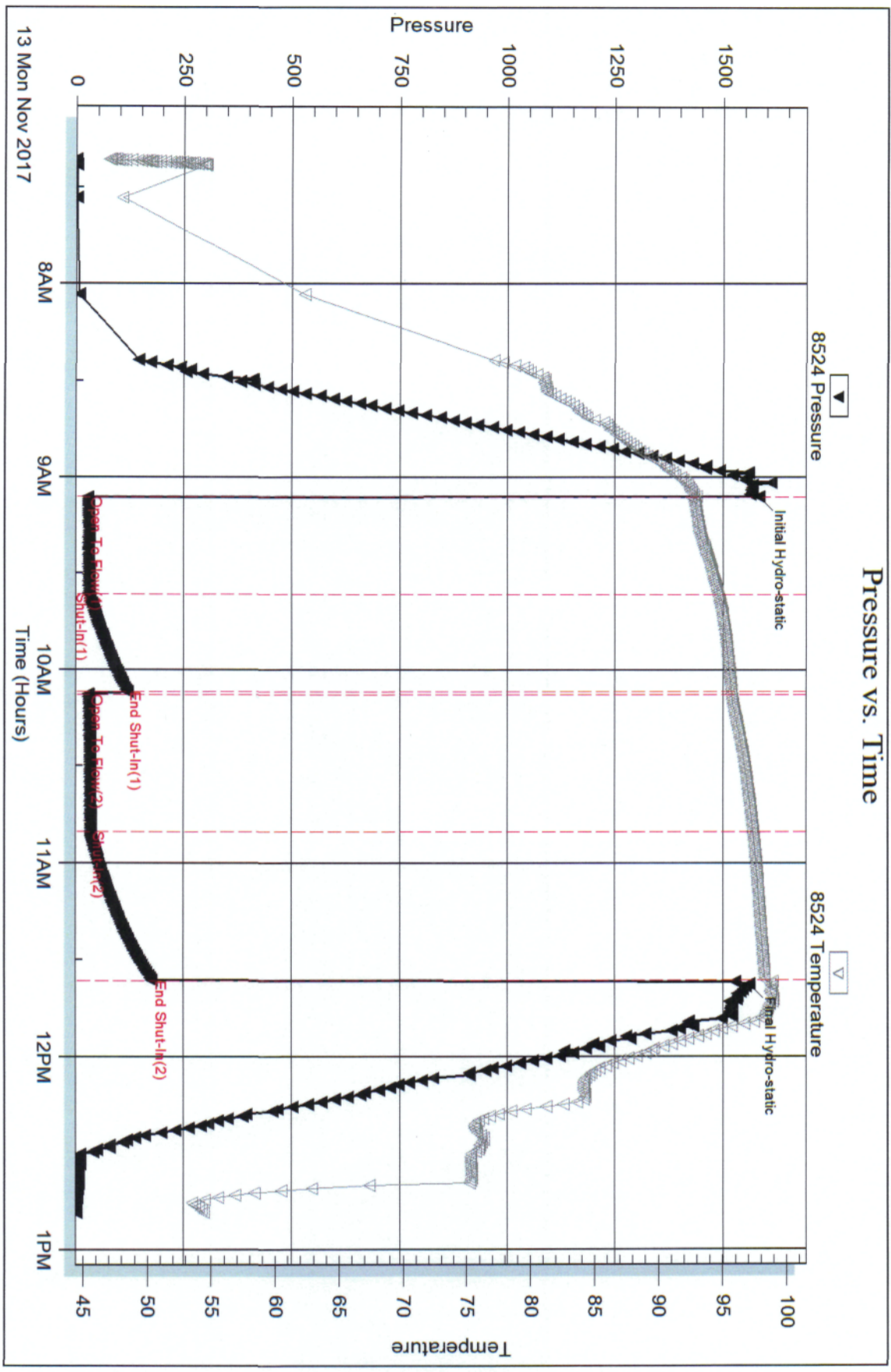
Serial #: 8524

Outside Mai Oil Operations, Inc.

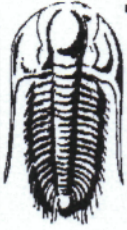
35-17S-13W Barton, KS

DST Test Number: 3

### Pressure vs. Time







**TRILOBITE  
TESTING, INC.**

**DRILL STEM TEST REPORT**

**TOOL DIAGRAM**

Mai Oil Operations, Inc.  
8411 Preston Rd. Ste. 800  
Dallas, TX 75225  
ATTN: Jim Musgrove

**Richard Family Partnership #1**  
**35-17S-13W Barton,KS**  
Job Ticket: 63113      **DST#: 4**  
Test Start: 2017.11.13 @ 22:36:57

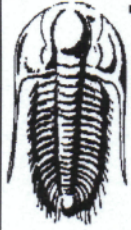
**Tool Information**

Drill Pipe:	Length: 3297.00 ft	Diameter: 3.82 inches	Volume: 46.74 bbl	Tool Weight: 2000.00 lb
Heavy Wt. Pipe:	Length: ft	Diameter: inches	Volume: - 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: 41000.00 lb
			<u>Total Volume: - bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	16.00 ft			String Weight: Initial 32000.00 lb
Depth to Top Packer:	3301.00 ft			Final 33000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	43.00 ft			
Tool Length:	63.00 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			3282.00	
Shut In Tool	5.00			3287.00	
Hydraulic tool	5.00			3292.00	
Packer	5.00			3297.00	20.00      Bottom Of Top Packer
Packer	4.00			3301.00	
Stubb	1.00			3302.00	
Recorder	0.00	6771	Inside	3302.00	
Recorder	0.00	8524	Outside	3302.00	
Perforations	5.00			3307.00	
Change Over Sub	1.00			3308.00	
Drill Pipe	32.00			3340.00	
Change Over Sub	1.00			3341.00	
Bullnose	3.00			3344.00	43.00      Bottom Packers & Anchor

**Total Tool Length: 63.00**



**TRILOBITE  
TESTING, INC.**

**DRILL STEM TEST REPORT**

**FLUID SUMMARY**

Mai Oil Operations, Inc.  
8411 Preston Rd. Ste. 800  
Dallas, TX 75225  
ATTN: Jim Musgrove

**Richard Family Partnership #1**  
**35-17S-13W Barton,KS**  
Job Ticket: 63113      **DST#: 4**  
Test Start: 2017.11.13 @ 22:36:57

**Mud and Cushion Information**

Mud Type: Gel Chem	Cushion Type:	Oil API: 34 deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity: ppm
Viscosity: 46.00 sec/qt	Cushion Volume: bbl	
Water Loss: 9.58 in <sup>3</sup>	Gas Cushion Type:	
Resistivity: ohm.m	Gas Cushion Pressure: psig	
Salinity: 7700.00 ppm		
Filter Cake: inches		

**Recovery Information**

Recovery Table

Length ft	Description	Volume bbl
63.00	MCO, 35%M 65%O	0.893
79.00	CO	1.120

Total Length: 142.00 ft      Total Volume: 2.013 bbl  
 Num Fluid Samples: 0      Num Gas Bombs: 0      Serial #:  
 Laboratory Name:      Laboratory Location:  
 Recovery Comments:

Serial #: 6771

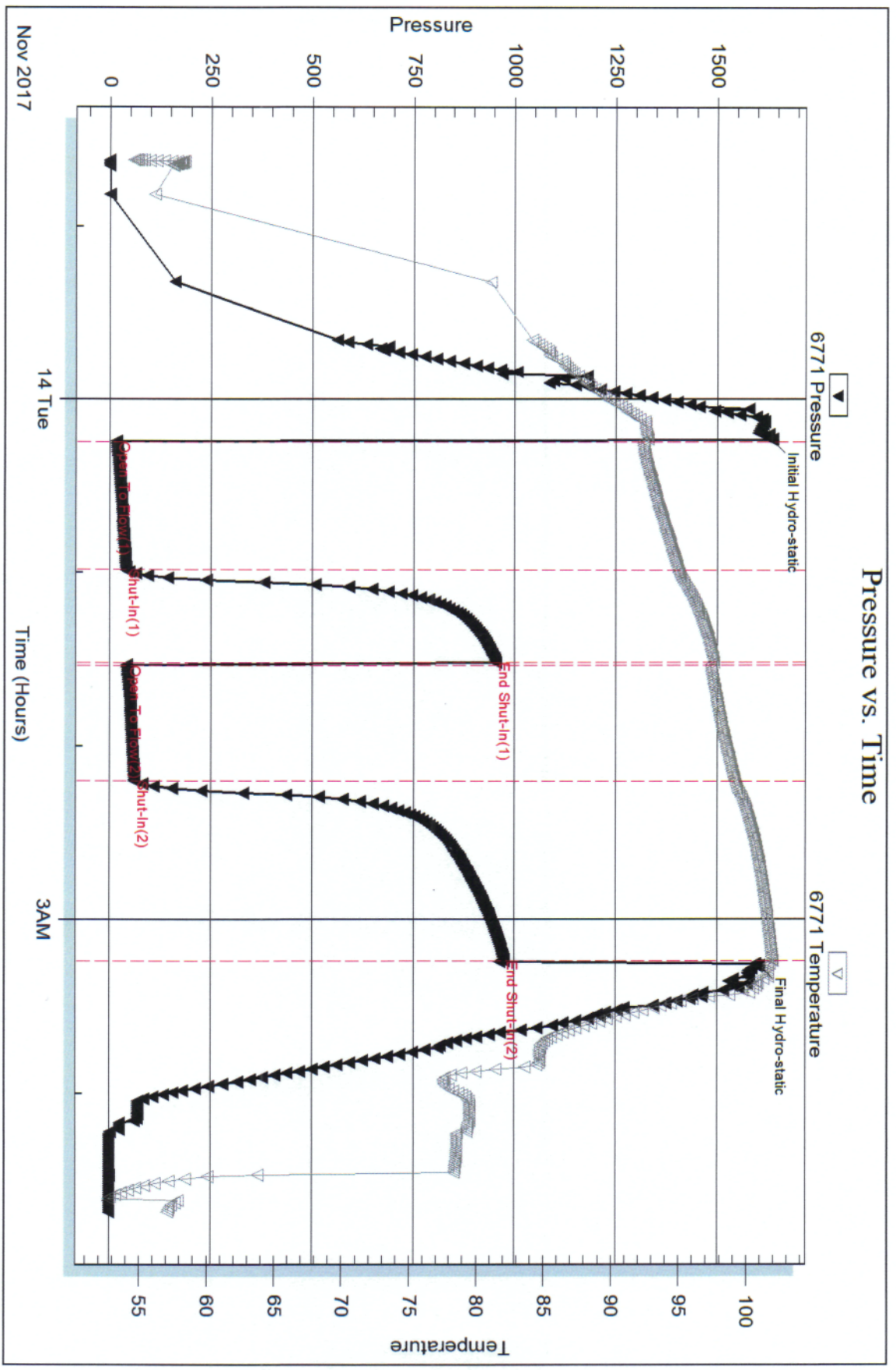
Inside

Mai Oil Operations, Inc.

35-17S-13W Barton, KS

DST Test Number: 4

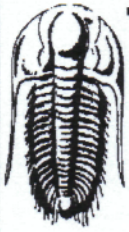
### Pressure vs. Time



Trilobe Testing, Inc

Ref. No: 63113

Printed: 2017.11.15 @ 08:33:04



**TRILOBITE  
TESTING, INC.**

**DRILL STEM TEST REPORT**

Mai Oil Operations, Inc.  
8411 Preston Rd. Ste. 800  
Dallas, TX 75225  
ATTN: Jim Musgrove

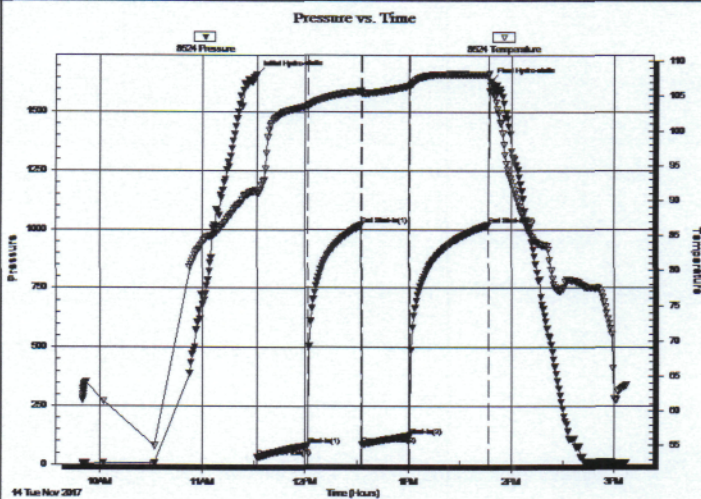
**Richard Family Partnership #1**  
**35-17S-13W Barton,KS**  
Job Ticket: 63114      **DST#: 5**  
Test Start: 2017.11.14 @ 09:50:06

**GENERAL INFORMATION:**

Formation: **Arbuckle**  
Deviated: No Whipstock:                      ft (KB)  
Time Tool Opened: 11:31:57  
Time Test Ended: 15:07:12  
Interval: **3344.00 ft (KB) To 3355.00 ft (KB) (TVD)**  
Total Depth: 3355.00 ft (KB) (TVD)  
Hole Diameter: 7.88 inches Hole Condition: Fair  
Test Type: Conventional Bottom Hole (Reset)  
Tester: Brannan Lonsdale  
Unit No: 73  
Reference Elevations: 1832.00 ft (KB)  
1824.00 ft (CF)  
KB to GRVCF: 8.00 ft

**Serial #: 8524**      **Outside**  
Press@RunDepth: 124.04 psig @ 3345.00 ft (KB)      Capacity: 8000.00 psig  
Start Date: 2017.11.14      End Date: 2017.11.14      Last Calib.: 2017.11.14  
Start Time: 09:50:07      End Time: 15:07:12      Time On Btm: 2017.11.14 @ 11:31:42  
Time Off Btm: 2017.11.14 @ 13:47:57

TEST COMMENT: 30- IF- BOB 19 mins  
30- IS- No blow  
30- FF- BOB 24 mins  
45- FS- No blow



**PRESSURE SUMMARY**

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1662.47	91.51	Initial Hydro-static
1	30.33	91.04	Open To Flow (1)
30	81.57	103.63	Shut-In(1)
61	1018.51	105.70	End Shut-In(1)
61	83.90	105.38	Open To Flow (2)
89	124.04	106.51	Shut-In(2)
135	1019.34	108.09	End Shut-In(2)
137	1632.87	106.59	Final Hydro-static

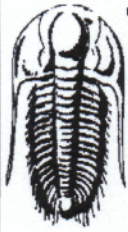
**Recovery**

Length (ft)	Description	Volume (bbl)
205.00	MW, 10%M 90%W	2.91

\* Recovery from multiple tests

**Gas Rates**

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



**TRILOBITE  
TESTING, INC.**

**DRILL STEM TEST REPORT**

**TOOL DIAGRAM**

Mai Oil Operations, Inc.  
8411 Preston Rd. Ste. 800  
Dallas, TX 75225  
ATTN: Jim Musgrove

**Richard Family Partnership #1**  
**35-17S-13W Barton,KS**  
Job Ticket: 63114      **DST#: 5**  
Test Start: 2017.11.14 @ 09:50:06

**Tool Information**

Drill Pipe:	Length: 3328.00 ft	Diameter: 3.82 inches	Volume: 47.18 bbl	Tool Weight: 2000.00 lb
Heavy Wt. Pipe:	Length:           ft	Diameter:           inches	Volume:       - 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: 37000.00 lb
			<u>Total Volume:       - bbl</u>	Tool Chased               0.00 ft
Drill Pipe Above KB:	4.00 ft			String Weight: Initial 32000.00 lb
Depth to Top Packer:	3344.00 ft			Final 34000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	11.00 ft			
Tool Length:	31.00 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			3325.00	
Shut In Tool	5.00			3330.00	
Hydraulic tool	5.00			3335.00	
Packer	5.00			3340.00	20.00      Bottom Of Top Packer
Packer	4.00			3344.00	
Stubb	1.00			3345.00	
Recorder	0.00	6771	Inside	3345.00	
Recorder	0.00	8524	Outside	3345.00	
Perforations	7.00			3352.00	
Bullnose	3.00			3355.00	11.00      Bottom Packers & Anchor
<b>Total Tool Length:</b>	<b>31.00</b>				



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Mai Oil Operations, Inc.  
8411 Preston Rd. Ste. 800  
Dallas, TX 75225  
ATTN: Jim Musgrove

**Richard Family Partnership #1**  
**35-17S-13W Barton,KS**  
Job Ticket: 63114      **DST#: 5**  
Test Start: 2017.11.14 @ 09:50:06

## 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:	28000 ppm
Viscosity: 47.00 sec/qt	Cushion Volume: bbl		
Water Loss: 8.78 in <sup>3</sup>	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 8000.00 ppm			
Filter Cake: inches			

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
205.00	MW, 10%M 90%W	2.906

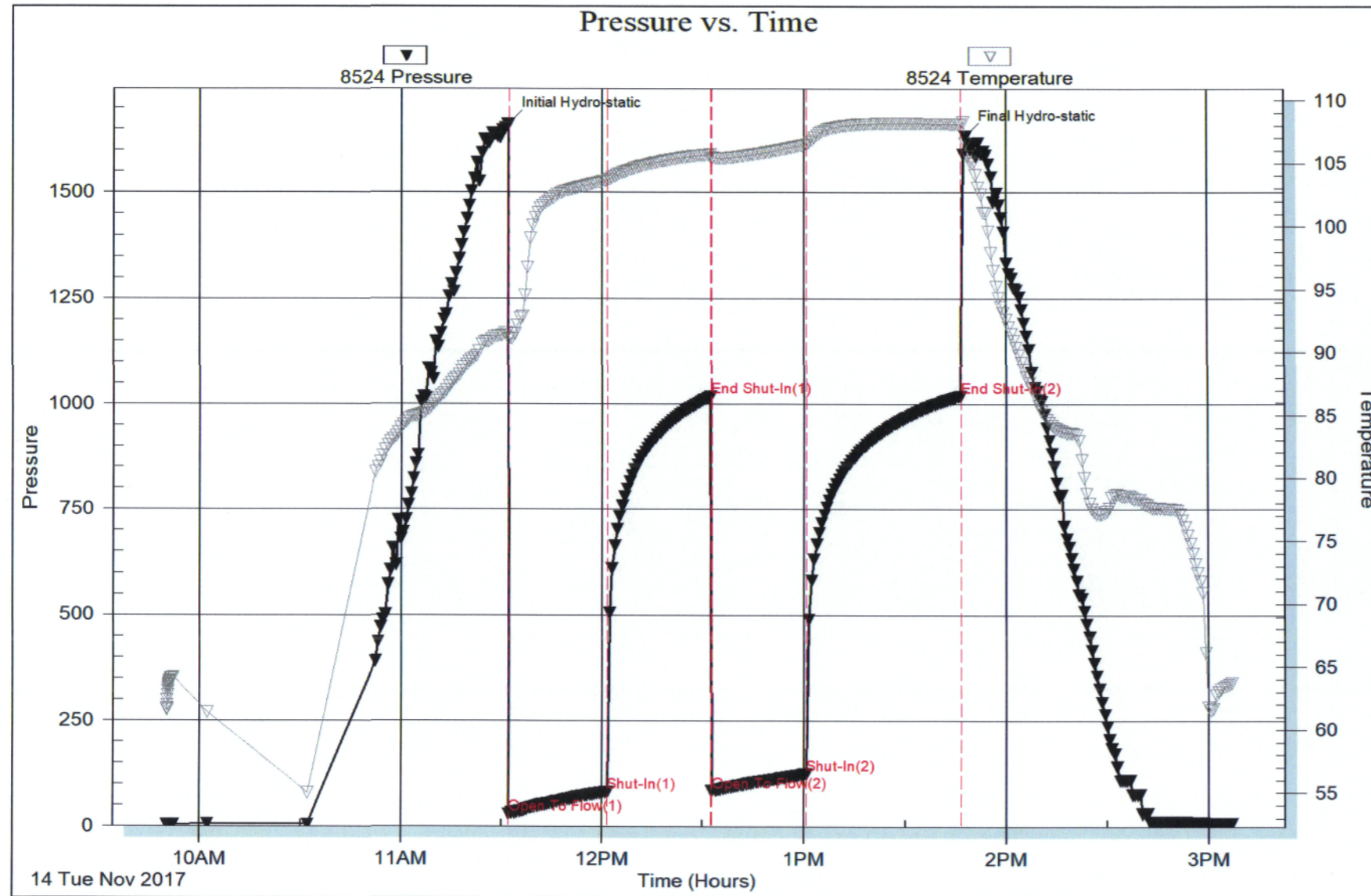
Total Length: 205.00 ft      Total Volume: 2.906 bbl

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

Laboratory Name:      Laboratory Location:

Recovery Comments: RW: .26@62deg





# QUALITY OILWELL CEMENTING, INC.

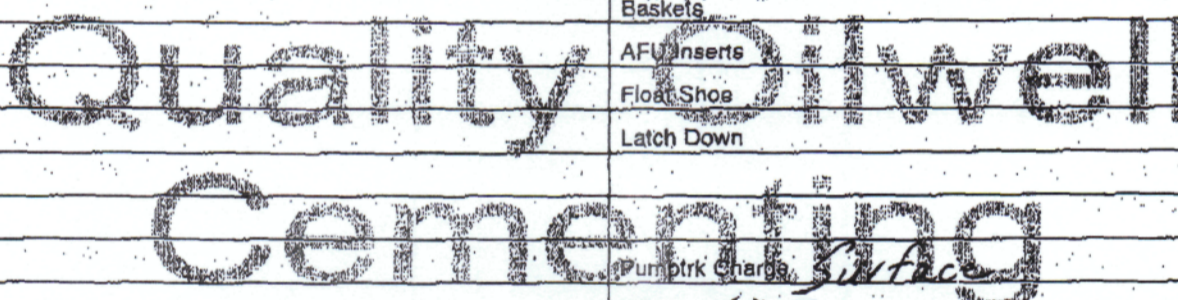
Federal Tax I.D.# 20-2886107

Phone 785-483-2025  
Cell 785-324-1041

Home Office P.O. Box 32 Russell, KS 67665

No. 443

Date	11-9-17	Sec	35	Twp.	17	Range	13	County	Barton	State	Ks	On Location		Finish	4:00 AM
Lease								Richard Family Partnership				Location: Haysington, Ks - 2E, 1/4 N, E1 into			
Contractor								Southwind #3				Owner			
Type Job								Surface				To Quality Oilwell Cementing, Inc. You are hereby requested to rent cementing equipment and furnish cementer and helper to assist owner or contractor to do work as listed.			
Hole Size								12 1/4"				Charge To			
Csg.								8 5/8"				Main oil operations			
Tbg. Size												Street			
Tool												City			
Cement Left in Csg.								20'				State			
Shoe Joint								20'				The above was done to satisfaction and supervision of owner agent or contractor.			
Meas Line								Displace 27 1/2 BUS				Cement Amount Ordered 225 60/40 4% CL 2% 60/			
EQUIPMENT															
Pumptrk 16								No. Cementer				Common 135'			
								Helper Travis				Poz. Mix 90			
Bulktrk 14								No. Driver				Gel. 5			
								Jordan				Calcium 10			
Bulktrk p.u.								No. Driver							
								Rick							
JOB SERVICES & REMARKS															
Remarks:								Cement d.d Circulate							
Rat Hole															
Mouse Hole															
Centralizers								Mud CLR 48							
Baskets								CFL-117 or CD110 CAF 38							
D/V or Port Collar								Sand							
								Handling 40							
								Mileage							
FLOAT EQUIPMENT															
								Wood plug							
								Centralizer							
								Baskets							
								AFU Inserts							
								Float Shoe							
								Latch Down							
								Pumptrk Charge Surface							
								Mileage 1.5							
								Tax							
								Discount							
								Total Charge							
Signature								<i>[Signature]</i>							



# QUALITY OILWELL CEMENTING, INC.

Federal Tax I.D.# 20-2886107

Phone 785-483-2025  
Cell 785-324-1041

Home Office P.O. Box 32 Russell, KS 67665

No. 448

Date	Sec.	Twp.	Range	County	State	On Location	Finish
11-15-17	35	17	13	Barton	Ks		9:45 AM

Lease	Richardson Family	Location	Harrison - 2E, 1/8 N, E1 into
-------	-------------------	----------	-------------------------------

Well No.	1	Owner	To Quality Oilwell Cementing, Inc. You are hereby requested to rent cementing equipment and furnish cementer and helper to assist owner or contractor to do work as listed.
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Contractor	Southwind #3	Charge To	mai oil operations
------------	--------------	-----------	--------------------

Type Job	Long string	Street	
----------	-------------	--------	--

Hole Size	7 7/8"	City	
-----------	--------	------	--

Csg. 5 1/2" 14#	Depth 3410'	State	
-----------------	-------------	-------	--

Tbg. Size	Depth	The above was done to satisfaction and supervision of owner agent or contractor.	
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Tool	Depth	Cement Amount Ordered	160 60/40 10% Salt 2% Gel 1/4" Fl. sol
------	-------	-----------------------	--

Cement Left in Csg. 27.74'	Shoe Joint 27.74'	1000 gal Mud Clear 48	
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Meas Line	Displace 82 1/4 BUS	Common	
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**EQUIPMENT**

Pumptrk 18	No. Cementer Helper Travis	Poz. Mix	
Bulktrk 9	No. Driver Jordan	Gel.	
Bulktrk pu	No. Driver Rick	Calcium	

**JOB SERVICES & REMARKS**

Remarks:	Hulls
Rat Hole	Salt
Mouse Hole	Flowseal
Centralizers 1-11, 12, 14, 16	Kol-Seal

Baskets pipe on bottom break Circulation	Mud CLR 48
--	------------

D/V or Port Collar pump 1000 gal mud Clear 48	CFL-117 or CD110 CAF 38
---	-------------------------

plug Rathide wt 2052 Cement 5 1/2"	Sand
------------------------------------	------

Casing wt 130 lbs. Shud down track	Handling
------------------------------------	----------

Pump 1120 Displace plug w/ 82 1/4 BUS	Mileage
---------------------------------------	---------

of 1120 Released + held	<b>FLOAT EQUIPMENT</b>
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Life pressure 700 #	Guide Shoe
---------------------	------------

Lead plug to 1500 #	Centralizer 14
---------------------	----------------

	Baskets
--	---------

	AFU Inserts
--	-------------

	Float Shoe
--	------------

	Latch Down
--	------------

	Pumptrk Charge
--	----------------

	Mileage
--	---------

	Tax
--	-----

	Discount
--	----------

	Total Charge
--	--------------

X Signature	<i>Kend</i>
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