

**JAMES C. MUSGROVE**

Petroleum Geologist  
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Mai Oil Operations  
Bender Trust #2  
NW-SE-NW-SE (1840' FSL & 1800' FEL)  
Section 23-15s-14w  
Russell County, Kansas  
Page 1

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

**Contractor:** Southwind Drilling Co. (Rig #3)  
**Commenced:** January 7, 2014  
**Completed:** January 15, 2014  
**Elevation:** 1911' K.B; 1909' D.F; 1903' G.L.  
**Casing program:** Surface; 8 5/8" @ 512'  
Production; 5 1/2" @ 3398'  
**Sample:** Samples saved and examined 2350' to the Rotary Total Depth.  
**Drilling time:** One (1) foot drilling time recorded and kept 2350 ft. to the Rotary Total Depth.  
**Measurements:** All depths measured from the Kelly Bushing.  
**Drill Stem Tests:** There were four (4) Drill Stem Tests ran by Trilobite Testing Co.  
**Electric Log:** By Nabors; Dual Induction, Compensated Density/Neutron Log and Micro.

<u>Formation</u>	<u>Log Depth</u>	<u>Sub-Sea Datum</u>
Anhydrite	919	+992
Base Anhydrite	930	+981
Grand Haven	2458	-547
1 <sup>st</sup> Tarkio Sand	2468	-557
Dover	2481	-570
2 <sup>nd</sup> Tarkio Sand	2490	-579
Tarkio Lime	2529	-618
Elmont	2591	-680
Howard	2731	-820
Topeka	2801	-890
Heebner	3031	-1120
Toronto	3049	-1138
Lansing	3096	-1185
Base Kansas City	3301	-1390
Arbuckle	3342	-1431
Rotary Total Depth	3399	-1488
Log Total Depth	3402	-1491

(All tops and zones corrected to Electric Log measurements).

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

930	981
2458	547
2468	557
2481	570
2490	579
2529	618
2591	680
2731	820
2801	890
3031	1120
3049	1138
3096	1185
3301	1390
3342	1431
3399	1488
3402	1491

**1<sup>ST</sup> TARKIO SECTION**

2468-2476' Sand; gray, highly shaley, poorly developed porosity, no shows.

**2<sup>ND</sup> TARKIO SECTION**

2490-2508' Sand; gray and white, very fine grained, micaceous, glauconitic, few friable, poor visible porosity, no shows.

**TOPEKA SECTION**

2996-3004' Limestone; gray, cream, finely crystalline, fossiliferous in part, chalky, trace black stain, no free oil and no odor in fresh samples.

**TORONTO SECTION**

3049-3062' Limestone; cream, finely crystalline, fossiliferous, slightly cherty, poor visible porosity, trace iron pyrite, no shows.

**LANSING SECTION**

3096-3106' Limestone; white, finely crystalline, fossiliferous in part, scattered porosity, no shows.

3115-3120' Limestone; cream, finely crystalline, fossiliferous, scattered porosity, light brown stain, show of free oil and no odor in fresh samples.

3129-3136' Limestone; cream, oolitic, oomoldic, friable oomoldic porosity, no shows.

**Drill Stem Test #1 3102-3170'**

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

**Blow: Strong**

**Recovery: 320' gas in pipe  
 130' oil cut mud  
 (30% oil, 70% mud)  
 120' muddy water**

**Pressures: ISIP 506 psi  
 FSIP 499 psi  
 IFP 26-66 psi  
 FFP 72-122 psi  
 HSH 1576-1562 psi**

3171-3176' Limestone; cream, finely crystalline, oolitic/fossiliferous in part, sub oomoldic, poor to fair vuggy type porosity, brown stain, trace of free oil and odor in fresh samples.

3188-3210' Limestone; tan, finely crystalline, oomoldic, good oomoldic porosity, light brown stain, show of free oil and no odor in fresh samples.

**Stem Test #2** **3180-3210'**

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

**Blow:** Weak

**Recovery:** 50' muddy water

**Pressures:** ISIP 452 psi  
 FSIP 452 psi  
 IFP 22-30 psi  
 FFP 29-37 psi  
 HSH 1635-1584 psi

- 3245-3254' Limestone; cream, finely crystalline, slightly fossiliferous, cherty, poor visible porosity, no shows.
- ????? Limestone; cream, fossiliferous/oolitic, slightly cherty, no shows.
- 3264-3268' Limestone; cream, finely crystalline, oolitic, fair porosity, good brown & black stain, show of free oil and no odor in fresh samples.
- 3280-3288' Limestone; cream, tan, oolitic, oomoldic, fair porosity, brown stain, show of free oil and faint odor in fresh samples.

**Stem Test #3** **3257-3300'**

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

**Blow:** Fair

**Recovery:** 25' gas in pipe  
 10' clean oil  
 30' muddy water

**Pressures:** ISIP 515 psi  
 FSIP 463 psi  
 IFP 26-28 psi  
 FFP 29-38 psi  
 HSH ??????? psi

**ARBUCKLE SECTION**

- 3342-3346' Dolomite; white, cream, finely crystalline, fair intercrystalline and pinpoint type porosity, brown/light brown stain, show of free oil and good odor in fresh samples.

**Blow:** Fair

**Recovery:** 25' gas in pipe  
 10' clean oil  
 30' muddy water

ISIP 515 psi  
 FSIP 463 psi  
 IFP 26-28 psi  
 FFP 29-38 psi  
 HSH ??????? psi

**Stem Test #4** **3300-3346'**

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

**Blow:** Strong

**Recovery:** 60' gas in pipe  
 70' muddy gassy oil  
 (15% gas, 80% oil, 5% mud)  
 190' oil and gas cut mud  
 (15% gas, 10% oil, 75% mud)  
 190' heavily oil and gas cut watery mud  
 (30% gas, 40% oil, 15% water, 15% mud)

**Pressures:** ISIP 1069 psi  
 FSIP 1064 psi  
 IFP 35-131 psi  
 FFP 134-204 psi  
 HSH 1720-1652 psi

3346-3360' Dolomite; white, cream, medium crystalline, good intercrystalline and vuggy type porosity, fair brown stain and saturation, show of free oil and good odor in fresh samples.

3360-3370' Dolomite; cream, white, finely crystalline, fair porosity, fair stain, show of free oil and strong odor in fresh samples.

3370-3402' Dolomite; as above, sandy in part, decreasing stain, trace of free oil and faint odor, trace white chert at base.

**Rotary Total Depth** 3399 (-1488)  
**Log Total Depth** 3399 (-1491)

**Recommendations:**  
 5 1/2" production casing was set and cemented on the Bender Trust #2.

Respectfully submitted;

*James C. Musgrove & Clint Musgrove*  
 James C. Musgrove and  
 Clint Musgrove,  
 Petroleum Geologists

Rotary Total Depth: 3399 (-1488)  
 Log Total Depth: 3399 (-1491)

5 1/2" production casing was set and cemented on the Bender Trust #2.

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**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

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

**23-15s-14w Russell,KS**  
**Bender Trust #2**  
Job Ticket: 55449      **DST#: 1**  
Test Start: 2014.01.13 @ 11:28:50

## GENERAL INFORMATION:

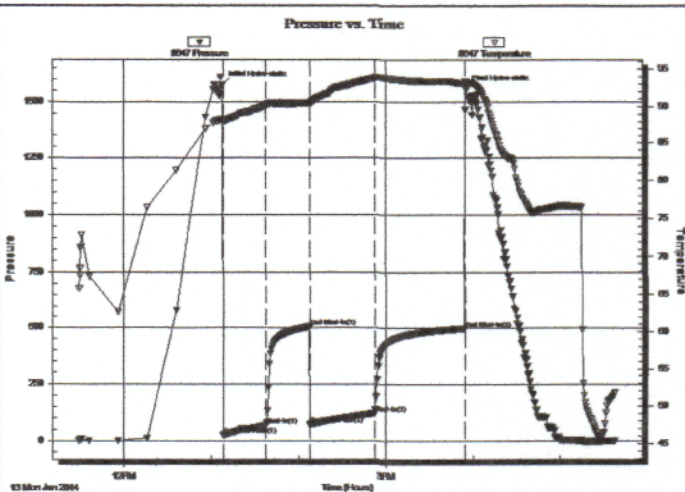
Formation: **LKC**  
Deviated: No Whipstock: ft (KB)  
Time Tool Opened: 13:08:00  
Time Test Ended: 17:38:10  
Interval: **3102.00 ft (KB) To 3170.00 ft (KB) (TVD)**  
Total Depth: 3170.00 ft (KB) (TVD)  
Hole Diameter: 7.88 inches Hole Condition: Fair  
Test Type: Conventional Bottom Hole (Initial)  
Tester: Brannan L  
Unit No: 68  
Reference Elevations: 1911.00 ft (KB)  
1903.00 ft (CF)  
KB to GR/CF: 8.00 ft

## Serial #: 8647

## Outside

Press@RunDepth: 121.50 psig @ 3103.00 ft (KB)      Capacity: 8000.00 psig  
Start Date: 2014.01.13      End Date: 2014.01.13      Last Calib.: 2014.01.13  
Start Time: 11:28:55      End Time: 17:38:10      Time On Btm: 2014.01.13 @ 13:07:40  
Time Off Btm: 2014.01.13 @ 15:55:10

TEST COMMENT: 30- IF- BOB 12mins  
30- IS- Built to .5"  
45- FF- BOB 9mins  
60- FS- Built to 1"



## PRESSURE SUMMARY

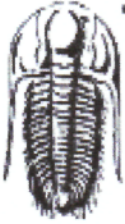
Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1576.29	88.35	Initial Hydro-static
1	26.10	87.83	Open To Flow (1)
30	65.91	90.20	Shut-In(1)
60	506.29	90.47	End Shut-In(1)
61	71.96	90.44	Open To Flow (2)
105	121.50	93.82	Shut-In(2)
167	498.73	93.09	End Shut-In(2)
168	1561.73	93.33	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
120.00	MW, 80%W	1.64
130.00	OCM, 70%M	1.78
0.00	320' GIP	0.00

## Gas Rates

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



**TRIBOLITE  
TESTING, INC**

# DRILL STEM TEST REPORT

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

**23-15s-14w Russell,KS**  
**Bender Trust #2**  
Job Ticket: 55450      **DST#: 2**  
Test Start: 2014.01.14 @ 00:48:21

**GENERAL INFORMATION:**

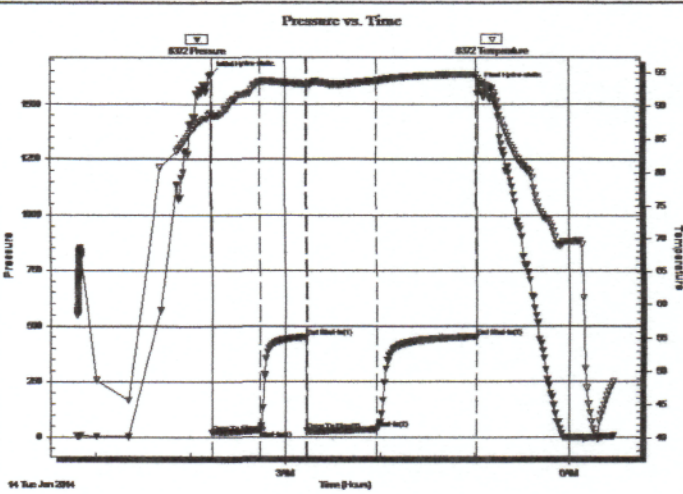
Formation: **LKC**  
Deviated: No Whipstock:                      ft (KB)  
Time Tool Opened: 02:13:51  
Time Test Ended: 06:27:51  
Interval: **3180.00 ft (KB) To 3210.00 ft (KB) (TVD)**  
Total Depth: 3210.00 ft (KB) (TVD)  
Hole Diameter: 7.88 inches Hole Condition: Fair  
Test Type: Conventional Bottom Hole (Reset)  
Tester: Brannan L  
Unit No: 68  
Reference Elevations: 1911.00 ft (KB)  
1903.00 ft (CF)  
KB to GR/CF: 8.00 ft

**Serial #: 8372**

**Inside**

Press@RunDepth: 36.70 psig @ 3181.00 ft (KB)      Capacity: 8000.00 psig  
Start Date: 2014.01.14      End Date: 2014.01.14      Last Calib.: 2014.01.14  
Start Time: 00:48:22      End Time: 06:27:51      Time On Btm: 2014.01.14 @ 02:13:21  
Time Off Btm: 2014.01.14 @ 05:02:51

TEST COMMENT: 30- IF- Built slowly to 3 1/2"  
30- IS- No blow  
45- FF- Built to 3"  
60- FS- No blow



**PRESSURE SUMMARY**

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1634.72	88.89	Initial Hydro-static
1	21.51	88.56	Open To Flow (1)
31	29.71	93.60	Shut-In(1)
60	452.05	93.34	End Shut-In(1)
61	29.32	93.26	Open To Flow (2)
105	36.70	93.80	Shut-In(2)
168	451.90	94.78	End Shut-In(2)
170	1583.61	93.72	Final Hydro-static

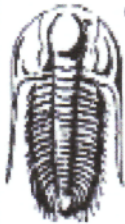
**Recovery**

Length (ft)	Description	Volume (bbl)
50.00	MW, 70%W	0.68

\* Recovery from multiple tests

**Gas Rates**

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



**TRILOBITE TESTING, INC.**

**DRILL STEM TEST REPORT**

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

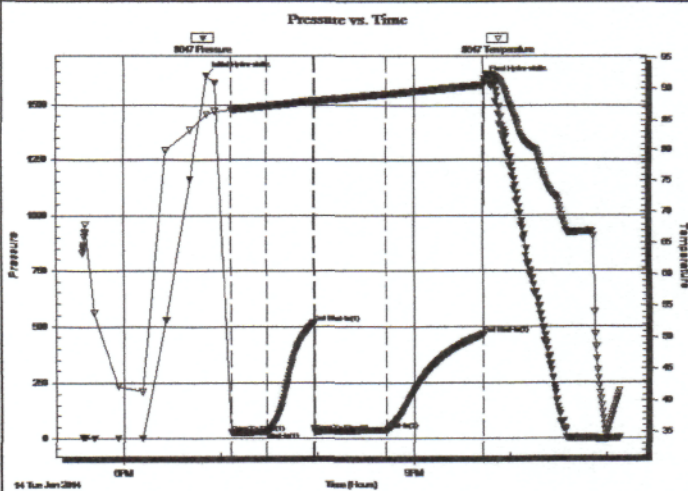
**23-15s-14w Russell,KS**  
**Bender Trust #2**  
 Job Ticket: 54888 **DST#: 3**  
 Test Start: 2014.01.14 @ 17:34:22

**GENERAL INFORMATION:**

Formation: **LKC**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 19:06:22  
 Time Test Ended: 23:07:52  
 Interval: **3256.00 ft (KB) To 3300.00 ft (KB) (TVD)**  
 Total Depth: 3300.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Fair  
 Test Type: Conventional Bottom Hole (Reset)  
 Tester: Brannan L  
 Unit No: 68  
 Reference Elevations: 1911.00 ft (KB)  
 1903.00 ft (CF)  
 KB to GR/CF: 8.00 ft

**Serial #: 8647 Outside**  
 Press@RunDepth: 38.00 psig @ 3257.00 ft (KB) Capacity: 8000.00 psig  
 Start Date: 2014.01.14 End Date: 2014.01.14 Last Calib.: 2014.01.14  
 Start Time: 17:34:27 End Time: 23:07:51 Time On Btm: 2014.01.14 @ 18:51:22  
 Time Off Btm: 2014.01.14 @ 21:43:32

**TEST COMMENT:** 30- IF- Built slowly to 6"  
 30- IS- No blow  
 45- FF- Built to 9"  
 60- FS- No blow



**PRESSURE SUMMARY**

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1632.44	85.79	Initial Hydro-static
15	26.05	86.56	Open To Flow (1)
38	28.45	87.21	Shut-In(1)
67	515.23	88.05	End Shut-In(1)
67	28.64	87.95	Open To Flow (2)
112	38.00	89.10	Shut-In(2)
172	463.21	90.56	End Shut-In(2)
173	1619.27	90.97	Final Hydro-static

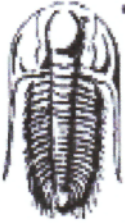
**Recovery**

Length (ft)	Description	Volume (bbl)
10.00	O	0.14
30.00	WM, 55%M	0.41
0.00	25' GIP	0.00

\* Recovery from multiple tests

**Gas Rates**

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



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

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

**23-15s-14w Russell,KS**  
**Bender Trust #2**  
 Job Ticket: 54889      **DST#: 4**  
 Test Start: 2014.01.15 @ 07:50:59

## GENERAL INFORMATION:

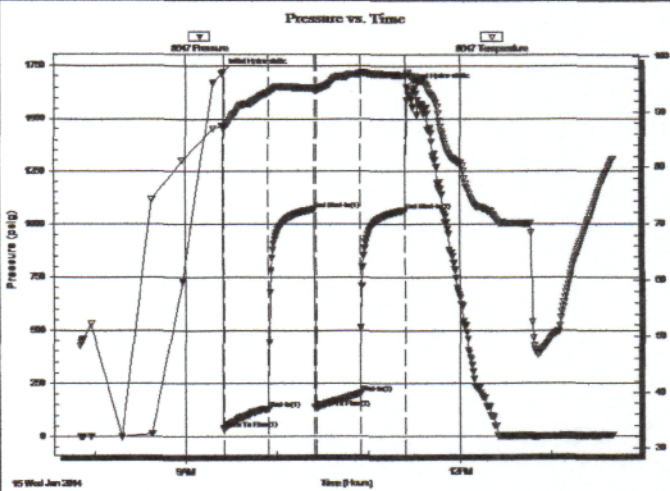
Formation: **Arbuckle**  
 Deviated: **No Whipstock**      ft (KB)      Test Type: **Conventional Bottom Hole (Reset)**  
 Time Tool Opened: 09:25:09      Tester: **Brannan L**  
 Time Test Ended: 13:40:29      Unit No: **68**  
 Interval: **3300.00 ft (KB) To 3346.00 ft (KB) (TVD)**      Reference Elevations:      1911.00 ft (KB)  
 Total Depth: **3346.00 ft (KB) (TVD)**      1903.00 ft (CF)  
 Hole Diameter: **7.88 inches** Hole Condition: **Fair**      KB to GR/CF:      8.00 ft

## Serial #: 8647

## Outside

Press@RunDepth: 203.62 psig @ 3301.00 ft (KB)      Capacity: 8000.00 psig  
 Start Date: 2014.01.15      End Date: 2014.01.15      Last Calib.: 2014.01.15  
 Start Time: 07:51:04      End Time: 13:40:28      Time On Btm: 2014.01.15 @ 09:24:39  
 Time Off Btm: 2014.01.15 @ 11:24:59

TEST COMMENT: 30- IF- BOB 5 mins  
 30- IS- No blow  
 30- FF- BOB 7 mins  
 30- FS- No blow



## PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1720.37	87.54	Initial Hydro-static
1	35.35	87.17	Open To Flow (1)
30	130.88	93.60	Shut-In(1)
60	1069.18	94.35	End Shut-In(1)
61	133.96	94.13	Open To Flow (2)
90	203.62	96.89	Shut-In(2)
120	1063.74	96.61	End Shut-In(2)
121	1651.68	96.77	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
70.00	GSMCO, 80%O 15%G	0.96
190.00	GOCM, 75%M 15%G	2.60
190.00	GVMCO, 40%O 30%G 15%W 15%M	2.60
0.00	60' GIP	0.00

\* Recovery from multiple tests

## Gas Rates

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



# 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. 7710

Date	1-10-14	Sec.	23	Twp.	15	Range	14	County	Russell	State	KS	On Location		Finish	2:45 Am.
Lease								Location		Russell 3 Stickney Rd NE Vinto					
Bender Trust								Well No.		2					
Contractor								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.					
Southwind #3															
Type Job								Charge To		Ma Oil					
Surface															
Hole Size				T.D.				Depth				Street			
12 1/4				512				511							
Csg.				Depth				City				State			
8 5/8															
Tbg. Size				Depth				City				State			
Tool				Depth				City				State			
Cement Left in Csg.				Shoe Joint				Cement Amount Ordered							
20								250				60/40 3/CC 2/62			
Meas Line				Displace				Cement							
				31 1/4 BCL											
<b>EQUIPMENT</b>								Common							
Pumptrk		No.		Cementer		Helper									
18				Craig											
Bulktrk		No.		Driver		Driver									
				Cody											
Bulktrk		No.		Driver		Driver									
3				Chris											
<b>JOB SERVICES &amp; REMARKS</b>								Hulls							
Remarks:								Salt							
Rat Hole								Flowseal							
Mouse Hole								Kol-Seal							
Centralizers								Mud CLR 48							
Baskets								CFL-117 or CD110 CAF 38							
D/V or Port Collar								Sand							
8 5/8 on bottom. Fast Circulation.								Handling							
Mix 250 60/40 3/CC 2/62								Mileage							
Cement Circulation 1								<b>FLOAT EQUIPMENT</b>							
								Guide Shoe							
								Centralizer 8 5/8 wooden Plug							
								Baskets							
								AFU Inserts							
								Float Shoe							
								Latch Down							
								Pumptrk Charge							
								Mileage							
								Tax							
								Discount							
								Total Charge							
Signature															
Chris															

# 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. 7683

Date	1-16-14	Sec.	23	Twp.	15	Range	14	County	Russell	State	KS	On Location		Finish	8:45 AM
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Location *Russell S to Stickney Rd, 1/2 E, Nn2*

Lease	<i>Bender Trust</i>	Well No.	<i>2</i>	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.
Contractor	<i>Southwind #3</i>			Charge To	<i>Mai Oil</i>
Type Job	<i>long string</i>	T.D.	<i>3399</i>	Street	
Hole Size	<i>7 7/8</i>	Depth	<i>3399</i>	City	
Csg. Size	<i>5 1/2 #14</i>	Depth		State	
Tbg. Size		Depth		The above was done to satisfaction and supervision of owner agent or contractor.	
Tool		Depth		Cement Amount Ordered	<i>160 60/40 10% salt 2% gel 1/4" Flow</i>
Cement Left in Csg.		Shoe Joint	<i>2137</i>		
Meas Line		Displace	<i>82.41 bbl</i>		

**EQUIPMENT**

Pumptrk	<i>17</i>	No.		Cementer		Common
				Helper	<i>Nick</i>	Poz. Mix
Bulktrk	<i>1</i>	No.		Driver	<i>Doug</i>	Gel.
Bulktrk	<i>14</i>	No.		Driver	<i>Travis</i>	Calcium

**JOB SERVICES & REMARKS**

Remarks:		Hulls	
Rat Hole	<i>30sx</i>	Salt	
Mouse Hole		Flowseal	
Centralizers	<i>1,2,3,4,5,6,7,8,9,10</i>	Kol-Seal	
Baskets	<i>4' x 2</i>	Mud CLR 48	<i>1000 gal</i>
D/V or Port Collar		CFL-117 or CD110 CAF	<i>38</i>
<i>Pipe on bottom broke circulation. Pumped 1000gal Mud CLR 48 with 10111 lbs behind + Plugged Rat hole with 30sx. Hooked to 5 1/2 Mixed 130sx 60/40 10% salt, 2% gel, 1/4" Flow. Shut down washed pump and lines. Released plug and displaced with 82.41 bbl fuc. Plug landed and held.</i>		Sand	
<i>lift pressure 750 psi</i>		Handling	
<i>Plug landed at 1400 psi</i>		Mileage	

**FLOAT EQUIPMENT**

		Guide Shoe	
		Centralizer	<i>10 turbo's</i>
		Baskets	<i>1 Red</i>
		AFU Inserts	
		Float Shoe	<i>1</i>
		Latch Down	<i>1</i>
		Pumptrk Charge	
		Mileage	

X Signature

*[Handwritten Signature]*

Tax  
Discount  
Total Charge