

**JAMES C. MUSGROVE**

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Mai Oil Operations  
H. Morgenstern #6  
W/2-NW-NW (660' FNL & 330' FWL)  
Section 9-16s-13w  
Barton County, Kansas

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

**Contractor:** Southwind Drilling Co. (rig #3)  
**Commenced:** June 18, 2015  
**Completed:** June 23, 2015  
**Elevation:** 1945' K.B., 1943' D.F., 1937' G.L.  
**Casing program:** Surface; 8 5/8" @ 515'  
Production, 5 1/2" @ 3467'  
**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 two (2) Drill Stem Tests ran by Trilobite Testing Co.  
**Electric Log:** By Nabors, Dual Induction, Compensated Density/Neutron Log, Micro and Sonic.

<u>Formation</u>	<u>Log Depth</u>	<u>Sub-Sea Datum</u>
Anhydrite	883	+1062
Base Anhydrite	923	+1032
Heebner	3052	-1117
Toronto	3078	-1133
Douglas	3093	-1148
Lansing	3140	-1195
Base Kansas City	3337	-1392
Arbuckle	3388	-1443
Rotary Total Depth	3470	-1525
Log Total Depth	3468	-1523

All tops and zones corrected to Electric Log Measurement

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

**TOPEKA SECTION**

- 2850-2870' Limestone, cream, tan, finely crystalline, poor inter-crystalline porosity, trace brown edge staining, no free oil and no odor in fresh samples.
- 3000-3036' Limestone, cream, tan, finely crystalline, few fossiliferous, poor visible porosity, chalky in part, no shows.

**TORONTO SECTION**

- 3079-3088' Limestone, white, cream, finely oolitic, scattered inter-crystalline type porosity, chalky in part, no shows.

**LANSING SECTION**

- 3141-3146' Limestone, cream, buff, gray, finely crystalline, poor porosity, cherty in part, no shows.
- 3151-3160' Limestone, cream, white, tan, finely crystalline, oolitic, sub-oomoldic, scattered sub-oomoldic type porosity, trace of brown edge staining, no free oil and no odor in fresh samples.
- 3174-3181' Limestone, cream, tan, finely crystalline, oolitic/fossiliferous, poor porosity, cherty in part.
- 3200-3206' Limestone, cream, tan, finely crystalline, oolitic/fossiliferous, poor scattered sub oomoldic porosity, trace brown stain, trace of free oil (predominately dead) and no odor.
- 3215-3222' Limestone, white, gray, tan, finely crystalline, oolitic, poor visible porosity, chalky in part, no shows.
- 3225-3235' Limestone, white, cream, finely crystalline, highly oolitic, oomoldic, fair oomoldic porosity, no shows.
- 3235-3246' Limestone, gray, cream, tan, finely crystalline, oolitic, oomoldic, fair oomoldic porosity, chalky in part, no shows.
- 3256-3266' Limestone, cream, tan, gray, finely crystalline, oolitic, fossiliferous, poorly developed porosity, trace of spotty stain, no show of free oil and faint odor in fresh samples.
- 3280-3290' Limestone, tan, gray, finely crystalline, fossiliferous/oolitic, poor visible porosity, plus gray and tan chert, no shows.
- 3300-3310' Limestone, gray, cream, tan, finely crystalline, few fossiliferous/oolitic, poorly developed porosity, cherty in part, trace brown stain, trace of free oil and faint odor in fresh samples.
- 3310-3318' Limestone, gray, tan, finely crystalline, few fossiliferous, oolitic, poor scattered porosity, spotty golden brown stain, trace of free oil and fair odor in fresh samples.

3318-3330' Limestone, white, cream, tan, finely crystalline, poor to fair inter-crystalline type porosity, golden brown stain, fair to good show of free oil and good odor in fresh samples.

**Drill Stem Test #1** **3261-3342**  
**(Log Measurements 3259-3340)**

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

**Blow:** Strong

**Recovery:** 173' gas in pipe  
45' clean oil  
30' oil cut mud  
(10% oil; 90% mud)

**Pressures:** ISIP 260 psi  
FSIP 266 psi  
IFP 34-41 psi  
FFP 43-57 psi  
HSH 1678-1604 psi

**ARBUCKLE SECTION**

3388-3393' Dolomite, white, light gray, fine and medium crystalline, fair to good inter-crystalline porosity, golden brown to dark brown stain, show of free oil and good odor in fresh samples.

3393-3396' Dolomite, as above.

**Drill Stem Test #2** **3353-3398**  
**(Log Measurements 3351-3396)**

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

**Blow:** Strong

**Recovery:** 1575' oil cut mud  
(10% oil; 75% water; 15% mud)

**Pressures:** ISIP 1047 psi  
FSIP 1030 psi  
IFP 105-465 psi  
FFP 498-708 psi  
HSH 1625-1616 psi

3396-3410' Dolomite, white, light gray, medium crystalline, good inter-crystalline porosity, spotty dark brown stain, show of free oil and fair odor in fresh samples.

3410-3430' Dolomite, light gray, cream, fine to medium crystalline, fair inter-crystalline to finely vuggy type porosity, dark brown to black stain weak show of free oil and fair odor in fresh samples.

Mai Oil Operations  
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Barton County, Kansas

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3430-3450'	Dolomite, light gray, white, medium to coarse crystalline, poor to fair inter-crystalline porosity, dark brown spotty stain, trace of free oil and faint odor, chalky luster; trace of white/cream chert.
3450-3468'	Dolomite, light gray, white, fine to medium crystalline, poor to fair inter-crystalline porosity, trace stain, trace of tree oil and faint odor, few with chalky luster.

<b>Rotary Total Depth</b>	<b>3470</b>
<b>Log Total Depth</b>	<b>3468</b>

**Recommendations:**

The 5 ½" production casing was set and cemented on Mai Oil Operations Inc., H. Morgenstern #6.

Respectfully yours,



Kurt Talbott  
Petroleum Geologist



**TRILOBITE TESTING, INC.**

## DRILL STEM TEST REPORT

Mai Oil Operations  
 8411 Preston Road Suite 800  
 Dallas TX 75225+5520  
 ATTN: Kurt Talbott

**9-16s-13w Barton,KS**  
**H-Morgenstern #6**  
 Job Ticket: 63037 **DST#: 1**  
 Test Start: 2015.06.22 @ 02:24:00

### GENERAL INFORMATION:

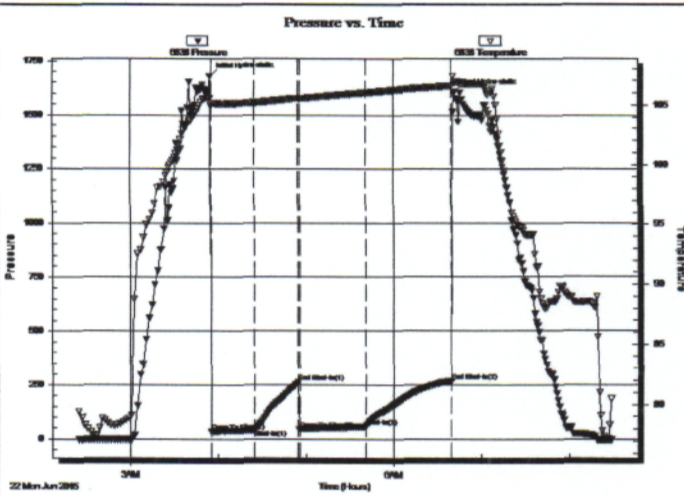
Formation: **LKC H-J**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 03:55:30  
 Time Test Ended: 08:28:30  
 Interval: **3261.00 ft (KB) To 33424.0 ft (KB) (TVD)**  
 Total Depth: 3342.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Fair  
 Test Type: Conventional Bottom Hole (Initial)  
 Tester: Ken Swinney  
 Unit No: 58  
 Reference Elevations: 1945.00 ft (KB)  
 1937.00 ft (CF)  
 KB to GR/CF: 8.00 ft

### Serial #: 6838

### Inside

Press@RunDepth: 57.30 psig @ 3338.26 ft (KB)  
 Start Date: 2015.06.22 End Date: 2015.06.22  
 Start Time: 02:25:00 End Time: 08:28:30  
 Capacity: 8000.00 psig  
 Last Calib.: 2015.06.22  
 Time On Btm: 2015.06.22 @ 03:54:30  
 Time Off Btm: 2015.06.22 @ 06:41:00

TEST COMMENT: FFP 30 Minutes BOB in 23 minutes  
 ISI 30 Minutes Slight surface blow back for 10 minutes  
 FFP 45 Minutes BOB in 22 minutes  
 FSI 60 Minutes Slight surface blow back



### PRESSURE SUMMARY

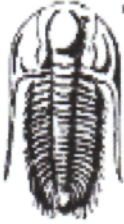
Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1678.85	105.53	Initial Hydro-static
1	34.71	104.89	Open To Flow (1)
31	41.85	105.17	Shut-in(1)
60	260.04	105.55	End Shut-in(1)
61	43.87	105.50	Open To Flow (2)
106	57.30	105.99	Shut-in(2)
165	266.25	106.57	End Shut-in(2)
167	1604.58	106.95	Final Hydro-static

### Recovery

Length (ft)	Description	Volume (bbl)
30.00	Oily Mud/Oil 10% Mud 90%	0.42
45.00	Clean Oil 100%	0.63
0.00	173' GIP	0.00

### Gas Rates

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



**TRILOBITE TESTING, INC.**

**DRILL STEM TEST REPORT**

Mai Oil Operations  
 8411 Preston Road Suite 800  
 Dallas TX 75225+5520  
 ATTN: Kurt Talbott

**9-16s-13w Barton,KS**  
**H-Morgenstern #6**  
 Job Ticket: 63038 **DST#: 2**  
 Test Start: 2015.06.22 @ 20:14:00

**GENERAL INFORMATION:**

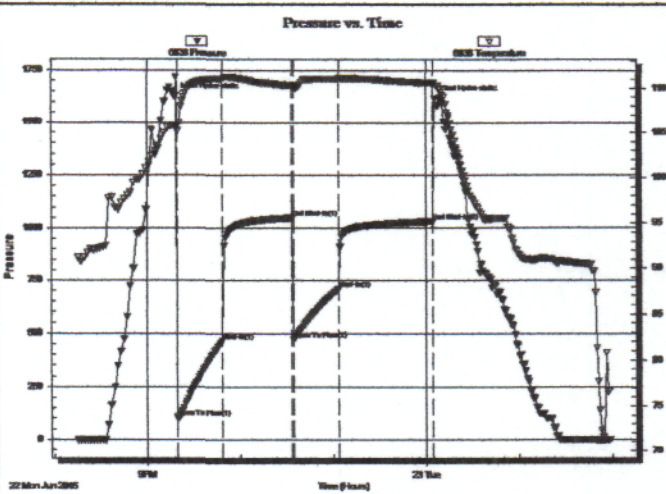
Formation: **Arbuckle**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 21:19:30  
 Time Test Ended: 01:59:00  
 Interval: **3353.00 ft (KB) To 3398.00 ft (KB) (TVD)**  
 Total Depth: 3398.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Fair  
 Test Type: Conventional Bottom Hole (Initial)  
 Tester: Ken Swinney  
 Unit No: 58  
 Reference Elevations: 1945.00 ft (KB)  
 1937.00 ft (CF)  
 KB to GR/CF: 8.00 ft

**Serial #: 6838**

**Inside**

Press@RunDepth: 708.89 psig @ 3394.00 ft (KB)  
 Start Date: 2015.06.22 End Date: 2015.06.23  
 Start Time: 20:15:00 End Time: 01:59:00  
 Capacity: 8000.00 psig  
 Last Calib.: 2015.06.23  
 Time On Btmr: 2015.06.22 @ 21:18:00  
 Time Off Btmr: 2015.06.23 @ 00:05:30

TEST COMMENT: IFP 30 Minutes BOB in 2 minutes  
 ISI 45 Minutes No blow back  
 FFP 30 Minutes BOB in 3 minutes  
 FSI 60 Minutes No blow back



**PRESSURE SUMMARY**

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1625.77	105.81	Initial Hydro-static
2	105.60	105.16	Open To Flow (1)
31	465.29	111.02	Shut-In(1)
76	1047.81	110.27	End Shut-In(1)
77	474.30	110.01	Open To Flow (2)
106	708.89	111.00	Shut-In(2)
166	1030.71	110.57	End Shut-In(2)
168	1616.90	110.62	Final Hydro-static

**Recovery**

Length (ft)	Description	Volume (bbl)
1575.00	OCMW Oil 10% Mud 15% Water 75%	22.09

**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. 1827

Date	6-18-15	Sec.	9	Twp.	16	Range	13	County	Barton	State	Ks	On Location	Finish	9:15 PM
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Location Susank, Ks - 3N, 1/2 E, S1 into

Lease <u>H Morgenstern</u>	Well No. <u>#6</u>	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 <u>Southwind #3</u>		
Type Job <u>Surface</u>		
Hole Size <u>12 1/4"</u>	T.D. <u>514'</u>	Charge To <u>Maag oil operations</u>
Csg. <u>8 5/8"</u>	Depth <u>514'</u>	Street
Tbg. Size	Depth	City State
Tool	Depth	The above was done to satisfaction and supervision of owner agent or contractor.
Cement Left in Csg. <u>15'</u>	Shoe Joint <u>15'</u>	Cement Amount Ordered <u>250 60/40 3% CC 2% Gel</u>
Meas Line	Displace <u>31 1/2</u>	

**EQUIPMENT**

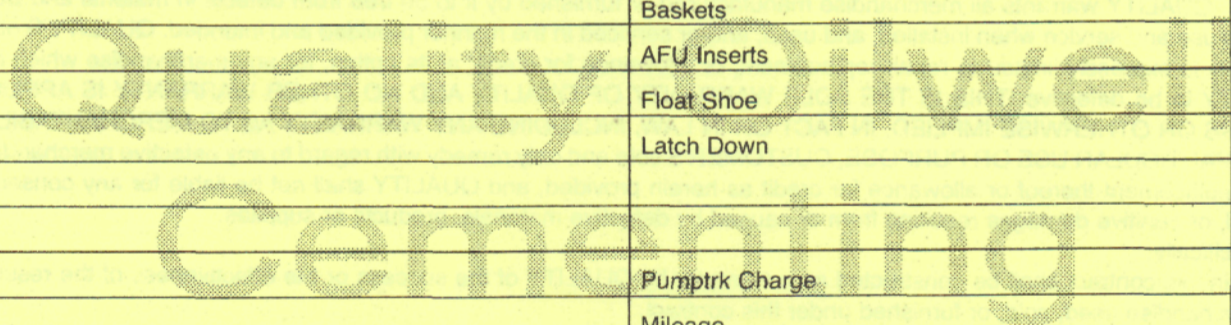
Pumptrk <u>17</u>	No.	Cementer <u>Travis</u>	Helper	Common
Bulktrk <u>3</u>	No.	Driver <u>David</u>	Driver	Poz. Mix
Bulktrk <u>piu</u>	No.	Driver <u>Rick</u>	Driver	Gel.
				Calcium

**JOB SERVICES & REMARKS**

Remarks: <u>Cement did - Circulate</u>	Hulls
Rat Hole	Salt
Mouse Hole	Flowseal
Centralizers	Kol-Seal
Baskets	Mud CLR 48
D/V or Port Collar	CFL-117 or CD110 CAF 38

**FLOAT EQUIPMENT**

Guide Shoe <u>Rubber plug</u>	Sand
Centralizer	Handling
Baskets	Mileage
AFU Inserts	
Float Shoe	
Latch Down	



Pumptrk Charge	Tax
Mileage	Discount
	Total Charge
X Signature <u>Jay Miller</u>	

# QUALITY OILWELL CEMENTING, INC.

Federal Tax I.D.# 20-2886107

Phone 785-483-2025

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

No. 1831

Cell 785-324-1041

Date	6-24-15	Sec.	9	Twp.	16	Range	13	County	Barber	State	Ks	On Location		Finish	12:45 AM
Lease								Location		Susank, Ks - 30 1/2 E S1 into					
H-Morgenstern								Well No.		6					
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		Main oil operations					
Longstring															
Hole Size								T.D.		3468'					
7 7/8"															
Csg.								Depth		3465'					
5 1/2" New 144															
Tbg. Size								City		State					
Tool								Depth		The above was done to satisfaction and supervision of owner agent or contractor.					
Cement Left in Csg.								Shoe Joint		Cement Amount Ordered					
20.31								20.31		160 60/40 10% Salt 2% Gel 1/4" Fluor					
Meas Line								Displace		1000 gal mud clear 48					
								84 BLS							
<b>EQUIPMENT</b>								Common							
Pumptrk								No.		Cementer					
18										Cody					
										Helper					
Bulktrk								No.		Driver					
14										Glen					
										Driver					
Bulktrk								No.		Driver					
pu										Rick					
										Driver					
<b>JOB SERVICES &amp; REMARKS</b>								Hulls							
Remarks:								Salt							
Rat Hole								Flowseal							
Mouse Hole								Kol-Seal							
Centralizers								Mud CLR 48							
1-10															
Baskets								CFL-117 or CD110 CAF 38							
pipe on bottom break Circulation															
D/V or Port Collar								Sand							
pump 1000 gal mud clear 48															
Plug Rathole with 2 1/2" Hook to casing								Handling							
+ mix 1300 cement shot down								Mileage							
wash pump lines released plug +								<b>FLOAT EQUIPMENT</b>							
Displaced plug w/ 50 lbs of H <sub>2</sub> O.								Guide Shoe							
Released + held.								Centralizer 10							
								Baskets							
Lift pressure 700 #								AFU Inserts							
								Float Shoe							
Load plug to 1500 #								Latch Down 1							
								Pumptrk Charge							
								Mileage							
								Tax							
								Discount							
X Signature								Total Charge							
[Signature]															