

Confidentiality Requested:

Yes No

KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION

Form ACO-1

January 2018

Form must be Typed

Form must be Signed

All blanks must be Filled

WELL COMPLETION FORM
WELL HISTORY - DESCRIPTION OF WELL & LEASE

OPERATOR: License # _____

Name: _____

Address 1: _____

Address 2: _____

City: _____ State: _____ Zip: _____ + _____

Contact Person: _____

Phone: (_____) _____

CONTRACTOR: License # _____

Name: _____

Wellsite Geologist: _____

Purchaser: _____

Designate Type of Completion:

New Well Re-Entry Workover

Oil WSW SWD

Gas DH EOR

OG GSW

CM (Coal Bed Methane)

Cathodic Other (Core, Expl., etc.): _____

If Workover/Re-entry: Old Well Info as follows:

Operator: _____

Well Name: _____

Original Comp. Date: _____ Original Total Depth: _____

Deepening Re-perf. Conv. to EOR Conv. to SWD

Plug Back Liner Conv. to GSW Conv. to Producer

Commingled Permit #: _____

Dual Completion Permit #: _____

SWD Permit #: _____

EOR Permit #: _____

GSW Permit #: _____

Spud Date or Date Reached TD Completion Date or Recompletion Date

API No.: _____

Spot Description: _____

_____ - _____ - _____ Sec. _____ Twp. _____ S. R. _____ East West

_____ Feet from North / South Line of Section

_____ Feet from East / West Line of Section

Footages Calculated from Nearest Outside Section Corner:

NE NW SE SW

GPS Location: Lat: _____, Long: _____
(e.g. xx.xxxxx) (e.g. -xxx.xxxxx)

Datum: NAD27 NAD83 WGS84

County: _____

Lease Name: _____ Well #: _____

Field Name: _____

Producing Formation: _____

Elevation: Ground: _____ Kelly Bushing: _____

Total Vertical Depth: _____ Plug Back Total Depth: _____

Amount of Surface Pipe Set and Cemented at: _____ Feet

Multiple Stage Cementing Collar Used? Yes No

If yes, show depth set: _____ Feet

If Alternate II completion, cement circulated from: _____

feet depth to: _____ w/ _____ sx cmt.

Drilling Fluid Management Plan

(Data must be collected from the Reserve Pit)

Chloride content: _____ ppm Fluid volume: _____ bbls

Dewatering method used: _____

Location of fluid disposal if hauled offsite:

Operator Name: _____

Lease Name: _____ License #: _____

Quarter _____ Sec. _____ Twp. _____ S. R. _____ East West

County: _____ Permit #: _____

AFFIDAVIT

I am the affiant and I hereby certify that all requirements of the statutes, rules and regulations promulgated to regulate the oil and gas industry have been fully complied with and the statements herein are complete and correct to the best of my knowledge.

Submitted Electronically

KCC Office Use ONLY

Confidentiality Requested

Date: _____

Confidential Release Date: _____

Wireline Log Received Drill Stem Tests Received

Geologist Report / Mud Logs Received

UIC Distribution

ALT I II III Approved by: _____ Date: _____

Operator Name: _____ Lease Name: _____ Well #: _____

Sec. _____ Twp. _____ S. R. _____ East West County: _____

INSTRUCTIONS: Show important tops of formations penetrated. Detail all cores. Report all final copies of drill stems tests giving interval tested, time tool open and closed, flowing and shut-in pressures, whether shut-in pressure reached static level, hydrostatic pressures, bottom hole temperature, fluid recovery, and flow rates if gas to surface test, along with final chart(s). Attach extra sheet if more space is needed.

Final Radioactivity Log, Final Logs run to obtain Geophysical Data and Final Electric Logs must be emailed to kcc-well-logs@kcc.ks.gov. Digital electronic log files must be submitted in LAS version 2.0 or newer AND an image file (TIFF or PDF).

Drill Stem Tests Taken <input type="checkbox"/> Yes <input type="checkbox"/> No <i>(Attach Additional Sheets)</i> Samples Sent to Geological Survey <input type="checkbox"/> Yes <input type="checkbox"/> No Cores Taken <input type="checkbox"/> Yes <input type="checkbox"/> No Electric Log Run <input type="checkbox"/> Yes <input type="checkbox"/> No Geologist Report / Mud Logs <input type="checkbox"/> Yes <input type="checkbox"/> No List All E. Logs Run:	<input type="checkbox"/> Log Formation (Top), Depth and Datum <input type="checkbox"/> Sample Name Top Datum
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CASING RECORD <input type="checkbox"/> New <input type="checkbox"/> Used							
Report all strings set-conductor, surface, intermediate, production, etc.							
Purpose of String	Size Hole Drilled	Size Casing Set (In O.D.)	Weight Lbs. / Ft.	Setting Depth	Type of Cement	# Sacks Used	Type and Percent Additives

ADDITIONAL CEMENTING / SQUEEZE RECORD				
Purpose:	Depth Top Bottom	Type of Cement	# Sacks Used	Type and Percent Additives
<input type="checkbox"/> Perforate <input type="checkbox"/> Protect Casing <input type="checkbox"/> Plug Back TD <input type="checkbox"/> Plug Off Zone				

1. Did you perform a hydraulic fracturing treatment on this well? Yes No *(If No, skip questions 2 and 3)*
2. Does the volume of the total base fluid of the hydraulic fracturing treatment exceed 350,000 gallons? Yes No *(If No, skip question 3)*
3. Was the hydraulic fracturing treatment information submitted to the chemical disclosure registry? Yes No *(If No, fill out Page Three of the ACO-1)*

Date of first Production/Injection or Resumed Production/Injection:	Producing Method: <input type="checkbox"/> Flowing <input type="checkbox"/> Pumping <input type="checkbox"/> Gas Lift <input type="checkbox"/> Other <i>(Explain)</i> _____			
Estimated Production Per 24 Hours	Oil Bbls.	Gas Mcf	Water Bbls.	Gas-Oil Ratio Gravity

DISPOSITION OF GAS: <input type="checkbox"/> Vented <input type="checkbox"/> Sold <input type="checkbox"/> Used on Lease <i>(If vented, Submit ACO-18.)</i>	METHOD OF COMPLETION: <input type="checkbox"/> Open Hole <input type="checkbox"/> Perf. <input type="checkbox"/> Dually Comp. <input type="checkbox"/> Commingled <i>(Submit ACO-5) (Submit ACO-4)</i>	PRODUCTION INTERVAL: Top Bottom
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Shots Per Foot	Perforation Top	Perforation Bottom	Bridge Plug Type	Bridge Plug Set At	Acid, Fracture, Shot, Cementing Squeeze Record <i>(Amount and Kind of Material Used)</i>

TUBING RECORD:	Size:	Set At:	Packer At:	
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Form	ACO1 - Well Completion
Operator	Mai Oil Operations, Inc.
Well Name	MORGENSTERN-HERRES UNIT 1
Doc ID	1372700

Tops

Name	Top	Datum
Anhydrite	777	+1098
Topeka	2745	-870
Heebner	3027	-1152
Toronto	3041	-1166
Brown Lime	3115	-1240
Lansing	3129	-1254
Base Kansas City	3343	-1468
Arbuckle	3354	-1479

JAMES C. MUSGROVE

Petroleum Geologist, LLC
212 Main Street
P.O. Box 215
Claflin, KS 67525

Office (620) 588-4250

Res. Claflin (620) 587-3444

Mai Oil Operations
Morgenstern-Herres Unit #1
NW-SW-SW-SW (438' FSL & 107' FWL)
Section 34-17s-13w
Barton County, Kansas

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5 1/2" Production Casing Set

Contractor: Southwind Drilling Co. (rig #3)

Commenced: September 18, 2017

Completed: September 24, 2017

Elevation: 1875' K.B., 1873' D.F., 1867' G.L.

Casing program: Surface; 8 5/8" @ 453'
Production, 5 1/2" @ 3434'

Sample: Samples saved and examined 2700' to the Rotary Total Depth.

Drilling time: One (1) foot drilling time recorded and kept 2700' 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 and Micro Log.

<u>Formation</u>	<u>Log Depth</u>	<u>Sub-Sea Datum</u>
Anhydrite	777	+1098
Base Anhydrite	801	+1074
Topeka	2745	-870
Heebner	3027	-1152
Toronto	3041	-1166
Douglas	3056	-1181
Brown Lime	3115	-1240
Lansing	3129	-1254
Base Kansas City	3343	-1468
Arbuckle	3354	-1479
Rotary Total Depth	3435	-1560
Log Total Depth	3435	-1560

(All tops and zones corrected to Electric Log Measurement)

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

TOPEKA SECTION

2906-2918' Limestone, gray, slightly cherty (dense)

2926-2930' Limestone, gray tan, fossiliferous, slightly cherty, plus abundant loose fossil fragments, no shows.

- 2948-2957' Limestone, tan, buff, finely crystalline, slightly cherty, poor visible porosity, no show.
- 2973-2980' Limestone, tan, fossiliferous, plus tan, fossiliferous, opaque, chert, no shows.
- 2988-3010' Limestone, tan, gray, fine to medium crystalline, fossiliferous in part, scattered porosity, plus gray boney chert.

TORONTO SECTION

- 3041-3050' Limestone, white, gray, chalky, few fossiliferous, no shows.

LANSING SECTION

- 3133-3140' Limestone, gray, slightly fossiliferous, chalky; poor visible porosity, brown edge staining, no free oil and no odor.
- 3149-3155' Limestone, as above, few with pinpoint type porosity, gray stain, show of free oil and no odor in fresh samples.
- 3160-3166' Limestone, gray, white, fine to medium crystalline, fossiliferous, poor visible porosity, brown and gray stain, trace of free oil and no odor in fresh samples.
- 3178-3181' Limestone, gray, white, oolitic, poor visible porosity, poor stain, no free oil and no odor.
- 3194-3200' Limestone, white, fossiliferous, scattered fossil cast porosity, brown and gray to black stain, show of free oil and faint odor in fresh samples.

Drill Stem Test #1

3118-3200

Times: 30-30-45-60

Blow: Strong; G.T.S. 45 mins into final flow; T.S.T.M.

**Recovery: 169' gassy muddy oil
(30% gas; 40% oil; 30% mud)
124' gassy muddy oil
(15% gas; 60% oil; 55% water; 25% mud)
124' gassy muddy oil
(25% gas; 65% oil; 10% mud)**

**Pressures: ISIP 772 psi
FSIP 782 psi
IFP 21-100 psi
FFP 112-174 psi
HSH 1501-1466 psi**

- 3203-3211' Limestone, tan, oolitic, chalky, trace stain, weak show of free oil and questionable odor in fresh samples.

- 3216-3226' Limestone, cream, white, oomoldic, chalky, poor to fair porosity, no shows.
- 3231-3246' Limestone, tan, brown, finely crystalline, slightly cherty, poorly developed porosity, no shows.
- 3255-3265' Limestone, tan, gray, oolitic, sub-oomoldic, golden brown and gray stain, show of free oil and faint odor in fresh samples.

Drill Stem Test #2 **3238-3276**

Times: 30-30-45-60

Blow: Strong

**Recovery: 390' gas in pipe
40' very heavily oil and gas cut mud
(20% gas; 30% oil; 50% mud)
62' heavily oil and gas cut watery mud
(20% gas; 30% oil; 40% mud' 10% water)
62' muddy water**

**Pressures: ISIP 681 psi
FSIP 630 psi
IFP 25-54 psi
FFP 58-85 psi
HSH 1558-1527 psi**

- 3276-3282' Limestone; white, gray, oolitic, scattered porosity; brown and dark brown spotty stain, trace of free oil and faint odor in fresh samples.
- 3285-3305' Limestone, white, gray fossiliferous, poor to fair vuggy type porosity, dark brown stain, trace of free oil and faint odor in fresh samples.
- 3321-3325' Limestone, gray, white, oolitic, fair porosity, good golden brown stain, show of free oil and faint odor in fresh samples.

Drill Stem Test #3 **3270-3325**

Times: 30-30-45-60

Blow: Strong

**Recovery: 340' gas in pipe
20' clean oil
72' very slightly oil water
(1% oil; 79% water; 20% mud)
124' water**

**Pressures: ISIP 718 psi
FSIP 683 psi
IFP 24-85 psi
FFP 89-149 psi
HSH 1571-1544 psi**

ARBUCKLE SECTION

3354-3361' Dolomite, cream, white, medium crystalline, fair inter-crystalline porosity, brown and black stain, (gilsonitic) show of free oil and fair to good odor in fresh samples.

3361-3365' Dolomite, as above, plus dolomite, tan, sucrosic, scattered pinpoint porosity, brown stain, show of free oil and fair to good odor in fresh samples.

Drill Stem Test #4 **3327-3365**

Times: 30-30-30-30

Blow: Weak

Recovery: 10' clean oil
10' very slightly oil cut mud
(6% oil; 94% mud)

Pressures: ISIP 909 psi
FSIP 875 psi
IFP 18-19 psi
FFP 23-25 psi
HSH 1605-1583 psi

3365-3376' Dolomite, as above, fair brown to black (gilsonitic stain) show of free oil and good odor in fresh samples.

Drill Stem Test #5 **3358-3376**

Times: 45-30-45-45

Blow: Fair

Recovery: 90' clean oil
60' heavily oil
(40% oil; 60% mud)

Pressures: ISIP 1039 psi
FSIP 1065 psi
IFP 16-37 psi
FFP 41-62 psi
HSH 1575-1575 psi

3326-3384' Dolomite, as above, plus yellow, white chert; trace black and brown stain, show of free oil and odor in fresh samples.

3384-3400' Dolomite, tan, gray, medium crystalline, slightly cherty, poor to fair inter-crystalline porosity, no show of free oil; and faint to fair odor in fresh samples.

Mai Oil Operations
Morgenstern-Herres Unit #1
NW-SW-SW-SW (438' FSL & 107' FWL)
Section 34-17s-13w
Barton County, Kansas

Page 5

3400-3420' Dolomite, as above, plus chert, white, clear, translucent, opaque; no shows.

3420-3435' Dolomite, as above, poor visible porosity, no shows.

Rotary Total Depth 3435
Log Total Depth 3435

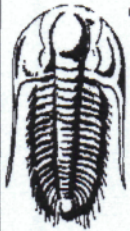
Recommendations:

5 1/2' production casing was set and cemented on the Mai Oil Operations, Morgenstern-Herres Unit #1.

Respectfully yours,

James C. Musgrove
James C. Musgrove
Petroleum Geologist





**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Mai Oil Operations Inc
8411 Preston Rd STE 800
Dallas TX 75225-5520
ATTN: Jim Musgrove

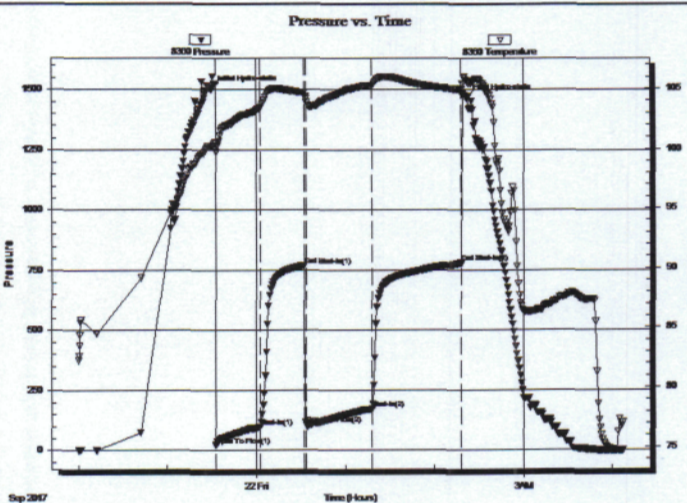
Morgenstern-Herres Unit #1
34-17s-13w Barton,KS
Job Ticket: 63080 **DST#: 1**
Test Start: 2017.09.21 @ 22:00:21

GENERAL INFORMATION:

Formation: **LKC A-E**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 23:32:46
Time Test Ended: 04:07:15
Interval: **3118.00 ft (KB) To 3200.00 ft (KB) (TVD)**
Total Depth: 3200.00 ft (KB) (TVD)
Hole Diameter: 7.88 inches Hole Condition: Fair
Test Type: Conventional Bottom Hole (Initial)
Tester: Ray Schwager
Unit No: 77
Reference Elevations: 1875.00 ft (KB)
1867.00 ft (CF)
KB to GR/CF: 8.00 ft

Serial #: 8360 **Inside**
Press@RunDepth: 174.46 psig @ 3120.00 ft (KB) Capacity: 8000.00 psig
Start Date: 2017.09.21 End Date: 2017.09.22
Start Time: 22:00:21 End Time: 04:07:15 Time On Btm: 2017.09.21 @ 23:30:16
Time Off Btm: 2017.09.22 @ 02:21:45

TEST COMMENT: 30-IFP-BOB in 3 min
30-ISIP-No bl bk
45-FFP-BOB in 4 min ,GTS in 45 min
60-FSIP-BOB in 5 min after bleeding off bl



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1501.65	100.20	Initial Hydro-static
3	21.08	99.69	Open To Flow (1)
33	100.00	103.37	Shut-In(1)
63	772.22	104.61	End Shut-In(1)
64	112.12	104.16	Open To Flow (2)
108	174.46	105.27	Shut-In(2)
168	782.29	104.92	End Shut-In(2)
172	1466.57	105.59	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
169.00	GMO 30%G30%M40%O	2.37
124.00	GMO 15%G25%M60%O	1.74
124.00	GMO 25%G10%M65%O	1.74
0.00	GTS No gauge	0.00

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 75225-5520
ATTN: Jim Musgrove

Morgenstern-Herres Unit #1
34-17s-13w Barton,KS
Job Ticket: 63080 **DST#: 1**
Test Start: 2017.09.21 @ 22:00:21

Tool Information

Drill Pipe:	Length: 3108.00 ft	Diameter: 3.80 inches	Volume: 43.60 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: 0.00 inches	Volume: 0.00 bbl	Weight to Pull Loose: 50000.00 lb
			<u>Total Volume: 43.60 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	11.00 ft			String Weight: Initial 31000.00 lb
Depth to Top Packer:	3118.00 ft			Final 33000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	82.00 ft			
Tool Length:	103.00 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			3098.00	
Shut In Tool	5.00			3103.00	
Hydraulic tool	5.00			3108.00	
Packer	5.00			3113.00	21.00 Bottom Of Top Packer
Packer	5.00			3118.00	
Stubb	1.00			3119.00	
Perforations	1.00			3120.00	
Recorder	0.00	8360	Inside	3120.00	
Recorder	0.00	8673	Outside	3120.00	
Blank Spacing	63.00			3183.00	
Perforations	14.00			3197.00	
Bullnose	3.00			3200.00	82.00 Bottom Packers & Anchor
Total Tool Length:		103.00			



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Mai Oil Operations Inc
8411 Preston Rd STE 800
Dallas TX 75225-5520
ATTN: Jim Musgrove

Morgenstern-Herres Unit #1
34-17s-13w Barton,KS
Job Ticket: 63080 **DST#: 1**
Test Start: 2017.09.21 @ 22:00:21

Mud and Cushion Information

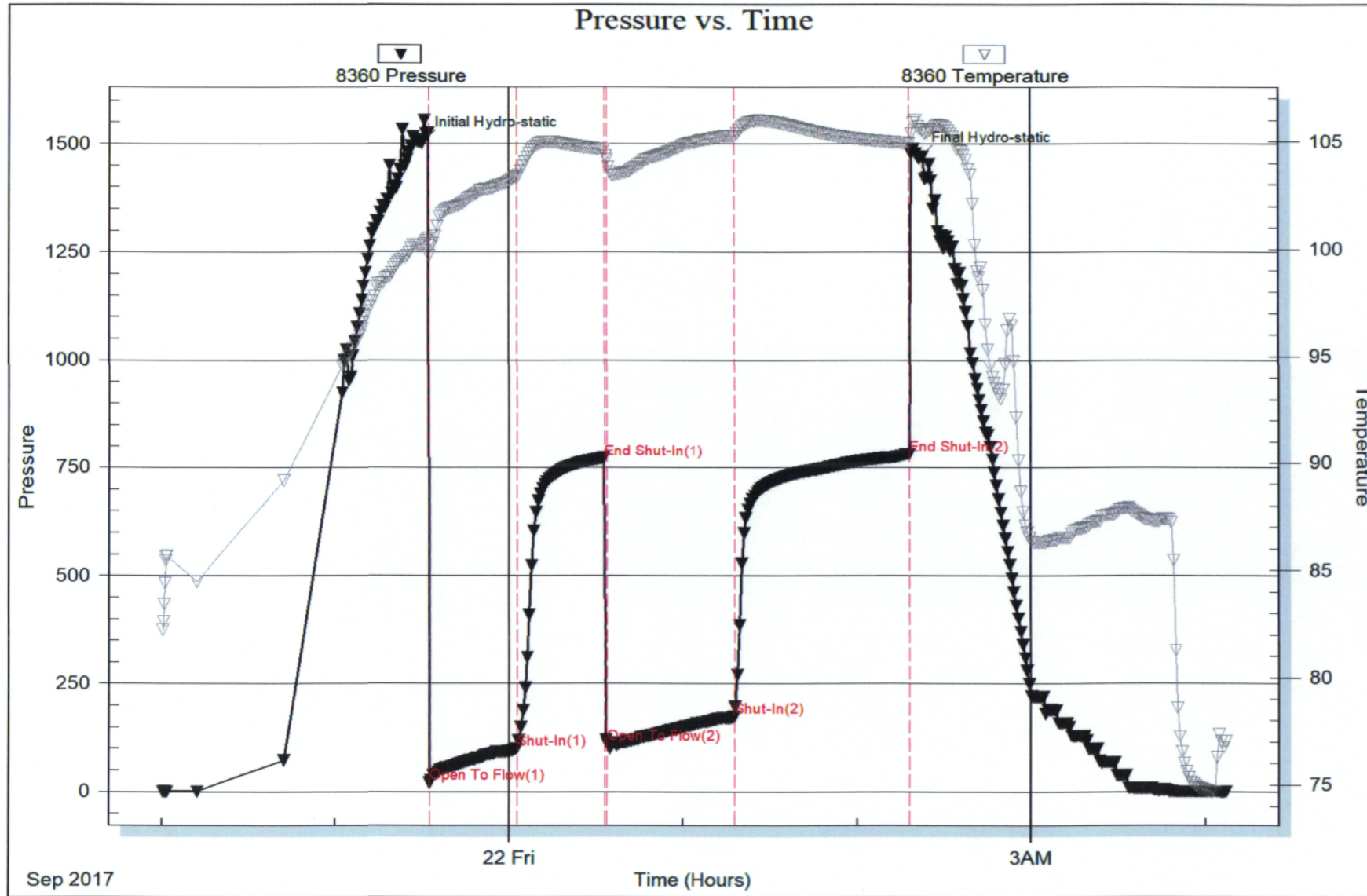
Mud Type: Gel Chem	Cushion Type:	Oil API: 40 deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity: ppm
Viscosity: 52.00 sec/qt	Cushion Volume: bbl	
Water Loss: 8.69 in ³	Gas Cushion Type:	
Resistivity: ohm.m	Gas Cushion Pressure: psig	
Salinity: 4600.00 ppm		
Filter Cake: 1.00 inches		

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
169.00	GMO 30%G30%M40%O	2.371
124.00	GMO 15%G25%M60%O	1.739
124.00	GMO 25%G10%M65%O	1.739
0.00	GTS No gauge	0.000

Total Length: 417.00 ft Total Volume: 5.849 bbl
Num Fluid Samples: 0 Num Gas Bombs: 0 Serial #:
Laboratory Name: Laboratory Location:
Recovery Comments:





TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Mai Oil Operations Inc
 8411 Preston Rd STE 800
 Dallas TX 75225-5520
 ATTN: Jim Musgrove

Morgenstern-Herres Unit #1
34-17s-13w Barton,KS
 Job Ticket: 63081 **DST#: 2**
 Test Start: 2017.09.22 @ 13:20:07

GENERAL INFORMATION:

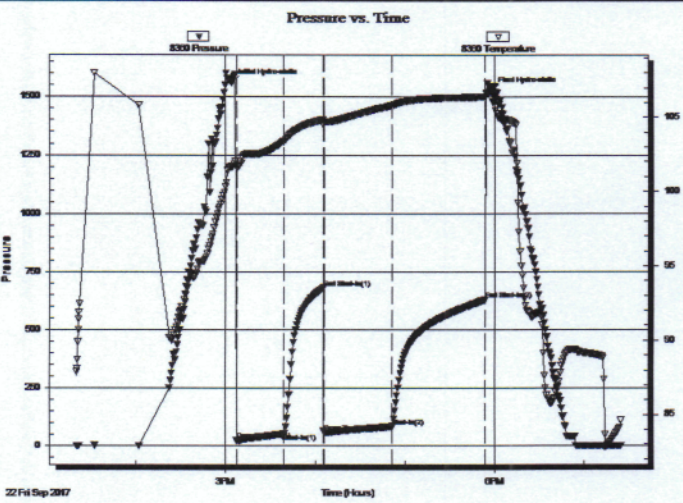
Formation: **LKC H**
 Deviated: **No** Whipstock: **ft (KB)**
 Time Tool Opened: 15:07:17
 Time Test Ended: 19:24:31
 Interval: **3238.00 ft (KB) To 3276.00 ft (KB) (TVD)**
 Total Depth: **3276.00 ft (KB) (TVD)**
 Hole Diameter: **7.88 inches** Hole Condition: **Fair**
 Test Type: **Conventional Bottom Hole (Reset)**
 Tester: **Ray Schwager**
 Unit No: **77**
 Reference Elevations: **1875.00 ft (KB)**
1867.00 ft (CF)
 KB to GR/CF: **8.00 ft**

Serial #: 8360

Inside

Press@RunDepth: **84.96 psig @ 3245.00 ft (KB)** Capacity: **8000.00 psig**
 Start Date: **2017.09.22** End Date: **2017.09.22** Last Calib.: **2017.09.22**
 Start Time: **13:20:07** End Time: **19:24:31** Time On Btm: **2017.09.22 @ 15:04:32**
 Time Off Btm: **2017.09.22 @ 17:57:46**

TEST COMMENT: 30-IFP-BOB in 7 min
 30-ISIP-1/2" bl bk
 45-FFP-1/4" to BOB in 14 min
 60-FSIP-no bl bk



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1558.48	101.68	Initial Hydro-static
3	25.06	101.60	Open To Flow (1)
35	53.86	103.41	Shut-In(1)
61	680.74	104.84	End Shut-In(1)
62	58.01	104.69	Open To Flow (2)
107	84.96	105.80	Shut-In(2)
170	629.71	106.39	End Shut-In(2)
174	1526.77	106.71	Final Hydro-static

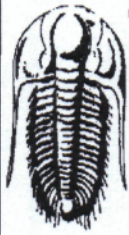
Recovery

Length (ft)	Description	Volume (bbl)
0.00	390' GIP	0.00
40.00	HO&GCM 20%G30%O50%M	0.56
62.00	HO&GCM 20%G10%W30%O40%M	0.87
62.00	MW 10%M90%W	0.87

* 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 75225-5520
ATTN: Jim Musgrove

Morgenstern-Herres Unit #1
34-17s-13w Barton,KS
Job Ticket: 63081 DST#: 2
Test Start: 2017.09.22 @ 13:20:07

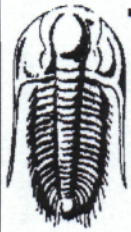
Tool Information

Drill Pipe:	Length: 3232.00 ft	Diameter: 3.80 inches	Volume: 45.34 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: 0.00 inches	Volume: 0.00 bbl	Weight to Pull Loose: 45000.00 lb
			<u>Total Volume: 45.34 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	15.00 ft			String Weight: Initial 31000.00 lb
Depth to Top Packer:	3238.00 ft			Final 32000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	38.00 ft			
Tool Length:	59.00 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			3218.00	
Shut In Tool	5.00			3223.00	
Hydraulic tool	5.00			3228.00	
Packer	5.00			3233.00	21.00 Bottom Of Top Packer
Packer	5.00			3238.00	
Stubb	1.00			3239.00	
Perforations	6.00			3245.00	
Recorder	0.00	8360	Inside	3245.00	
Recorder	0.00	8673	Outside	3245.00	
Perforations	28.00			3273.00	
Bullnose	3.00			3276.00	38.00 Bottom Packers & Anchor

Total Tool Length: 59.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Mai Oil Operations Inc
8411 Preston Rd STE 800
Dallas TX 75225-5520
ATTN: Jim Musgrove

Morgenstern-Herres Unit #1
34-17s-13w Barton,KS
Job Ticket: 63081 **DST#: 2**
Test Start: 2017.09.22 @ 13:20:07

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:	75000 ppm
Viscosity: 52.00 sec/qt	Cushion Volume: bbl		
Water Loss: 8.68 in ³	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 4600.00 ppm			
Filter Cake: 1.00 inches			

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
0.00	390' GIP	0.000
40.00	HO&GCM 20%G30%O50%M	0.561
62.00	HO&GCM 20%G10%W30%O40%M	0.870
62.00	MW 10%M90%W	0.870

Total Length: 164.00 ft Total Volume: 2.301 bbl
 Num Fluid Samples: 0 Num Gas Bombs: 0 Serial #:
 Laboratory Name: Laboratory Location:
 Recovery Comments: RW.11@65F

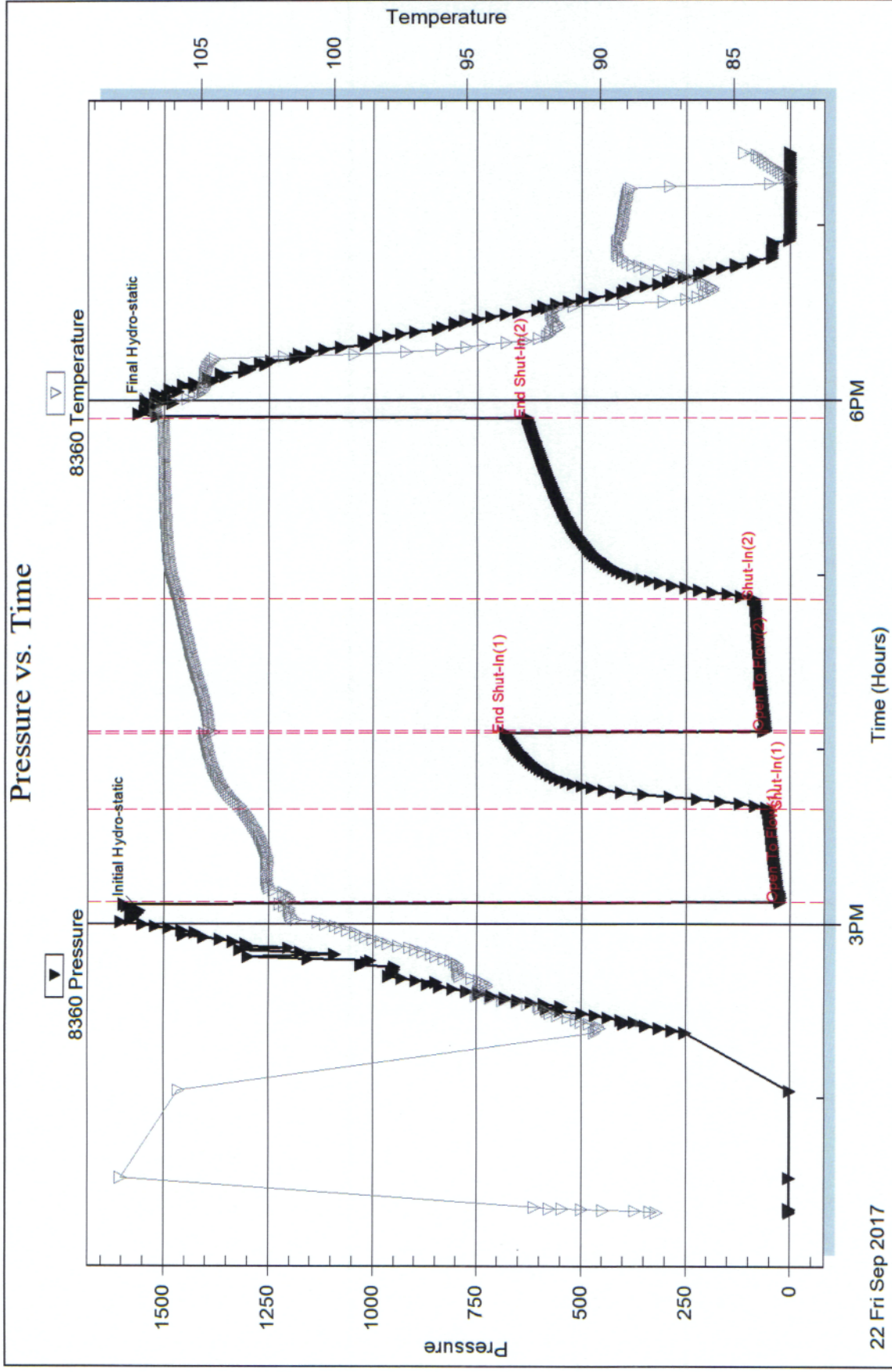
Serial #: 8360

Inside

Mai Oil Operations Inc

34-17s-13w Barton,KS

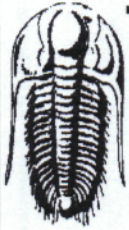
DST Test Number: 2



Trilobite Testing, Inc

Ref. No: 63081

Printed: 2017.09.25 @ 16:31:16



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Mai Oil Operations Inc
 8411 Preston Rd STE 800
 Dallas TX 75225-5520
 ATTN: Jim Musgrove

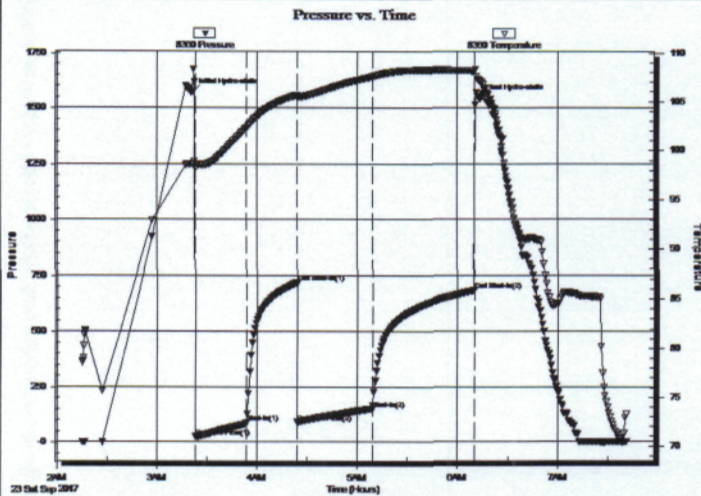
Morgenstern-Herres Unit #1
34-17s-13w Barton,KS
 Job Ticket: 63082 **DST#: 3**
 Test Start: 2017.09.23 @ 02:15:07

GENERAL INFORMATION:

Formation: **LKC I-K**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 03:23:17
 Time Test Ended: 07:41:46
 Interval: **3270.00 ft (KB) To 3325.00 ft (KB) (TVD)**
 Total Depth: 3325.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Fair
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Ray Schwager
 Unit No: 77
 Reference Elevations: 1875.00 ft (KB)
 1867.00 ft (CF)
 KB to GR/CF: 8.00 ft

Serial #: 8360 **Inside**
 Press@RunDepth: 149.97 psig @ 3272.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2017.09.23 End Date: 2017.09.23 Last Calib.: 2017.09.23
 Start Time: 02:15:07 End Time: 07:41:46 Time On Btm: 2017.09.23 @ 03:21:02
 Time Off Btm: 2017.09.23 @ 06:13:02

TEST COMMENT: 30-IFP-1/2" to BOB in 12 min
 30-ISIP-no bl bk
 45-FFP-1/4" to BOB in 20 min
 60-FSIP-no bl bk



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1570.44	98.65	Initial Hydro-static
3	24.23	98.27	Open To Flow (1)
33	85.80	102.30	Shut-In(1)
63	718.09	105.64	End Shut-In(1)
64	89.79	105.44	Open To Flow (2)
108	149.97	107.55	Shut-In(2)
169	683.03	108.15	End Shut-In(2)
172	1543.99	107.13	Final Hydro-static

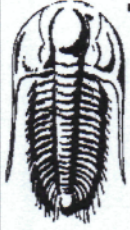
Recovery

Length (ft)	Description	Volume (bbl)
0.00	340' GIP	0.00
20.00	CO	0.28
72.00	SOCMW 1%O20%M79%W	1.01
124.00	Water	1.74

* 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 75225-5520
ATTN: Jim Musgrove

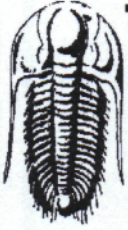
Morgenstern-Herres Unit #1
34-17s-13w Barton,KS
Job Ticket: 63082 **DST#: 3**
Test Start: 2017.09.23 @ 02:15:07

Tool Information

Drill Pipe:	Length: 3265.00 ft	Diameter: 3.80 inches	Volume: 45.80 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: 0.00 inches	Volume: 0.00 bbl	Weight to Pull Loose: 45000.00 lb
			<u>Total Volume: 45.80 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	16.00 ft			String Weight: Initial 31000.00 lb
Depth to Top Packer:	3270.00 ft			Final 33000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	55.00 ft			
Tool Length:	76.00 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			3250.00	
Shut In Tool	5.00			3255.00	
Hydraulic tool	5.00			3260.00	
Packer	5.00			3265.00	21.00 Bottom Of Top Packer
Packer	5.00			3270.00	
Stubb	1.00			3271.00	
Perforations	1.00			3272.00	
Recorder	0.00	8360	Inside	3272.00	
Recorder	0.00	8673	Outside	3272.00	
Blank Spacing	33.00			3305.00	
Perforations	17.00			3322.00	
Bullnose	3.00			3325.00	55.00 Bottom Packers & Anchor
Total Tool Length:	76.00				



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Mai Oil Operations Inc

Morgenstern-Herres Unit #1

8411 Preston Rd STE 800
Dallas TX 75225-5520

34-17s-13w Barton,KS

Job Ticket: 63082

DST#: 3

ATTN: Jim Musgrove

Test Start: 2017.09.23 @ 02:15:07

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

36 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

75000 ppm

Viscosity: 66.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 10.12 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 6300.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
0.00	340' GIP	0.000
20.00	CO	0.281
72.00	SOCMW 1%O20%M79%W	1.010
124.00	Water	1.739

Total Length: 216.00 ft Total Volume: 3.030 bbl

Num Fluid Samples: 0

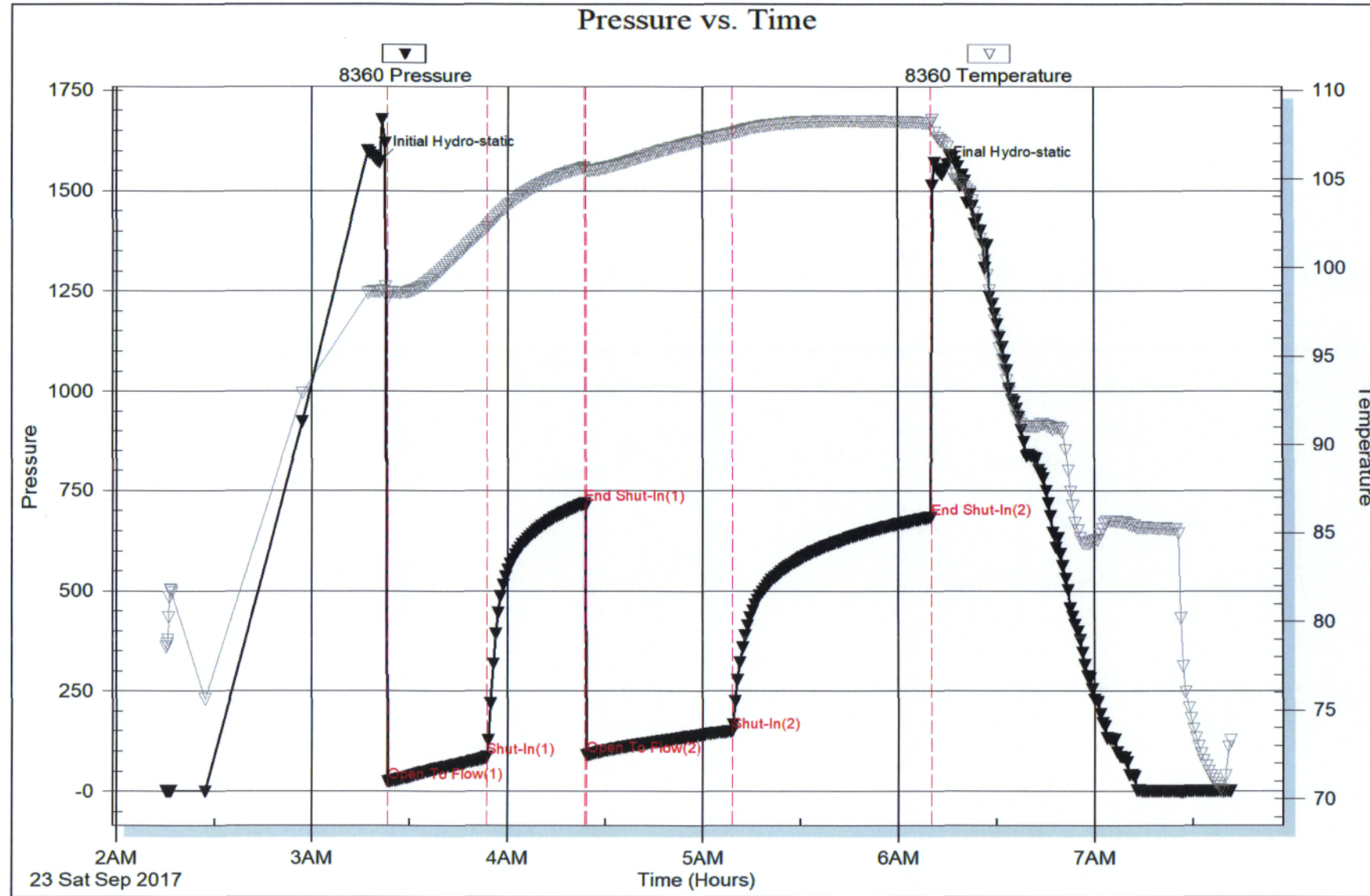
Num Gas Bombs: 0

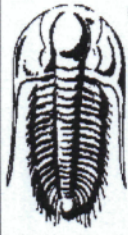
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: RW .1@70F





TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Mai Oil Operations Inc
 8411 Preston Rd STE 800
 Dallas TX 75225-5520
 ATTN: Jim Musgrove

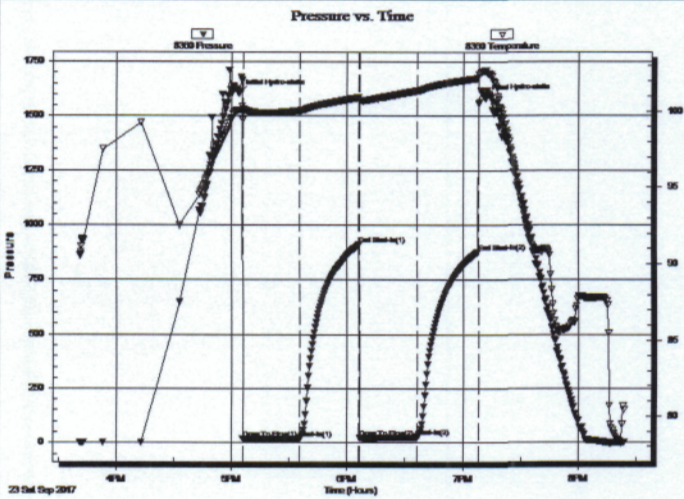
Morgenstern-Herres Unit #1
34-17s-13w Barton,KS
 Job Ticket: 63083 **DST#: 4**
 Test Start: 2017.09.23 @ 15:41:03

GENERAL INFORMATION:

Formation: **Arbuckle**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 17:05:43
 Time Test Ended: 20:23:57
 Interval: **3327.00 ft (KB) To 3365.00 ft (KB) (TVD)**
 Total Depth: 3365.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Fair
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Ray Schwager
 Unit No: 77
 Reference Elevations: 1875.00 ft (KB)
 1867.00 ft (CF)
 KB to GR/CF: 8.00 ft

Serial #: 8360 Inside
 Press@RunDepth: 25.97 psig @ 3334.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2017.09.23 End Date: 2017.09.23 Last Calib.: 2017.09.23
 Start Time: 15:41:03 End Time: 20:23:57 Time On Btm: 2017.09.23 @ 17:03:43
 Time Off Btm: 2017.09.23 @ 19:11:28

TEST COMMENT: 30-IFP-vy w k suface bl thru-out
 30-ISIP-no bl
 30-FFP-no bl, flushed tool, got surge
 30-FSIP-no bl



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1605.16	100.08	Initial Hydro-static
2	18.58	99.48	Open To Flow (1)
32	19.54	100.05	Shut-In(1)
62	909.44	100.92	End Shut-In(1)
63	23.83	100.70	Open To Flow (2)
93	25.97	101.35	Shut-In(2)
125	875.66	102.18	End Shut-In(2)
128	1583.17	102.67	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
10.00	CO	0.14
10.00	SOCM 6%O94%M	0.14

* 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 75225-5520
ATTN: Jim Musgrove

Morgenstern-Herres Unit #1
34-17s-13w Barton,KS
Job Ticket: 63083 **DST#: 4**
Test Start: 2017.09.23 @ 15:41:03

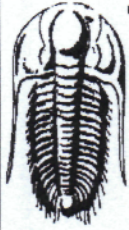
Tool Information

Drill Pipe:	Length: 3329.00 ft	Diameter: 3.80 inches	Volume: 46.70 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: 0.00 inches	Volume: 0.00 bbl	Weight to Pull Loose: 45000.00 lb
			<u>Total Volume: 46.70 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	23.00 ft			String Weight: Initial 32000.00 lb
Depth to Top Packer:	3327.00 ft			Final 32000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	38.00 ft			
Tool Length:	59.00 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			3307.00	
Shut In Tool	5.00			3312.00	
Hydraulic tool	5.00			3317.00	
Packer	5.00			3322.00	21.00 Bottom Of Top Packer
Packer	5.00			3327.00	
Stubb	1.00			3328.00	
Perforations	6.00			3334.00	
Recorder	0.00	8360	Inside	3334.00	
Recorder	0.00	8673	Outside	3334.00	
Perforations	28.00			3362.00	
Bullnose	3.00			3365.00	38.00 Bottom Packers & Anchor

Total Tool Length: 59.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Mai Oil Operations Inc
8411 Preston Rd STE 800
Dallas TX 75225-5520
ATTN: Jim Musgrove

Morgenstern-Herres Unit #1
34-17s-13w Barton, KS
Job Ticket: 63083 **DST#: 4**
Test Start: 2017.09.23 @ 15:41:03

Mud and Cushion Information

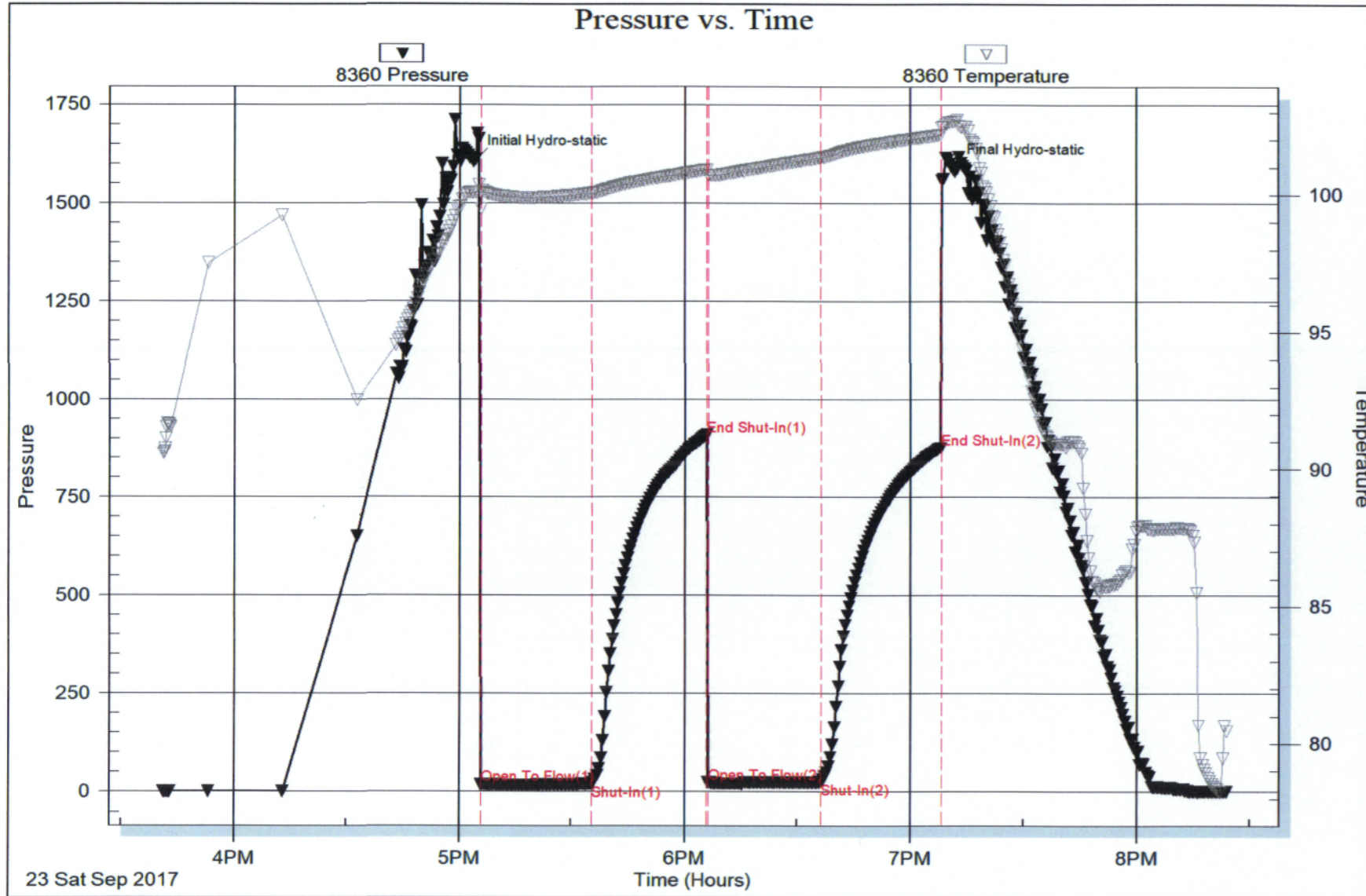
Mud Type: Gel Chem	Cushion Type:	Oil API:	deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity:	ppm
Viscosity: 56.00 sec/qt	Cushion Volume: bbl		
Water Loss: 11.14 in ³	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 6500.00 ppm			
Filter Cake: 1.00 inches			

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
10.00	CO	0.140
10.00	SOCM 6%O94%M	0.140

Total Length: 20.00 ft Total Volume: 0.280 bbl
 Num Fluid Samples: 0 Num Gas Bombs: 0 Serial #:
 Laboratory Name: Laboratory Location:
 Recovery Comments:





TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Mai Oil Operations Inc
 8411 Preston Rd STE 800
 Dallas TX 75225-5520
 ATTN: Jim Musgrove

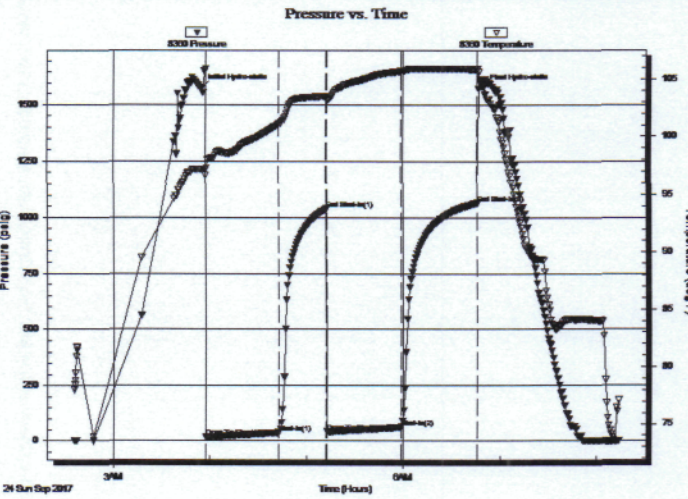
Morgenstern-Herres Unit #1
34-17s-13w Barton,KS
 Job Ticket: 63084 DST#: 5
 Test Start: 2017.09.24 @ 02:35:42

GENERAL INFORMATION:

Formation: **Arbuckle**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 03:57:37
 Time Test Ended: 08:13:51
 Interval: **3358.00 ft (KB) To 3376.00 ft (KB) (TVD)**
 Total Depth: 3376.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Fair
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Ray Schwager
 Unit No: 77
 Reference Elevations: 1875.00 ft (KB)
 1867.00 ft (CF)
 KB to GR/CF: 8.00 ft

Serial #: **8360** Inside
 Press@RunDepth: 62.14 psig @ 3359.00 ft (KB)
 Start Date: 2017.09.24 End Date: 2017.09.24 Capacity: 8000.00 psig
 Start Time: 02:35:42 End Time: 08:13:51 Last Calib.: 2017.09.24
 Time On Btm: 2017.09.24 @ 03:54:52
 Time Off Btm: 2017.09.24 @ 06:50:07

TEST COMMENT: 45-IFP-w k to a fr bl 1/4" to 5 1/2" bl
 30-ISIP-no bl bk
 45-FFP-surface to 2 1/2" bl
 45-FSIP-no bl bk



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1575.22	97.16	Initial Hydro-static
3	16.53	96.62	Open To Flow (1)
48	37.76	101.08	Shut-In(1)
78	1039.25	103.50	End Shut-In(1)
78	41.68	103.16	Open To Flow (2)
124	62.14	105.72	Shut-In(2)
172	1065.43	105.89	End Shut-In(2)
176	1575.33	104.64	Final Hydro-static

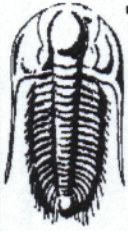
Recovery

Length (ft)	Description	Volume (bbl)
90.00	CO	1.26
62.00	HOCM 40%O60%M	0.87

* 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 75225-5520
ATTN: Jim Musgrove

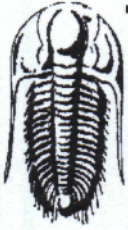
Morgenstern-Herres Unit #1
34-17s-13w Barton,KS
Job Ticket: 63084 **DST#: 5**
Test Start: 2017.09.24 @ 02:35:42

Tool Information

Drill Pipe:	Length: 3359.00 ft	Diameter: 3.80 inches	Volume: 47.12 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: 0.00 inches	Volume: 0.00 bbl	Weight to Pull Loose:	45000.00 lb
			<u>Total Volume: 47.12 bbl</u>	Tool Chased	0.00 ft
Drill Pipe Above KB:	22.00 ft			String Weight: Initial	32000.00 lb
Depth to Top Packer:	3358.00 ft			Final	34000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	18.00 ft				
Tool Length:	39.00 ft				
Number of Packers:	2	Diameter: 6.75 inches			
Tool Comments:					

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

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			3338.00	
Shut In Tool	5.00			3343.00	
Hydraulic tool	5.00			3348.00	
Packer	5.00			3353.00	21.00 Bottom Of Top Packer
Packer	5.00			3358.00	
Stubb	1.00			3359.00	
Recorder	0.00	8360	Inside	3359.00	
Recorder	0.00	8673	Outside	3359.00	
Perforations	14.00			3373.00	
Bullnose	3.00			3376.00	18.00 Bottom Packers & Anchor
Total Tool Length:	39.00				



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Mai Oil Operations Inc
8411 Preston Rd STE 800
Dallas TX 75225-5520
ATTN: Jim Musgrove

Morgenstern-Herres Unit #1
34-17s-13w Barton,KS
Job Ticket: 63084 DST#: 5
Test Start: 2017.09.24 @ 02:35:42

Mud and Cushion Information

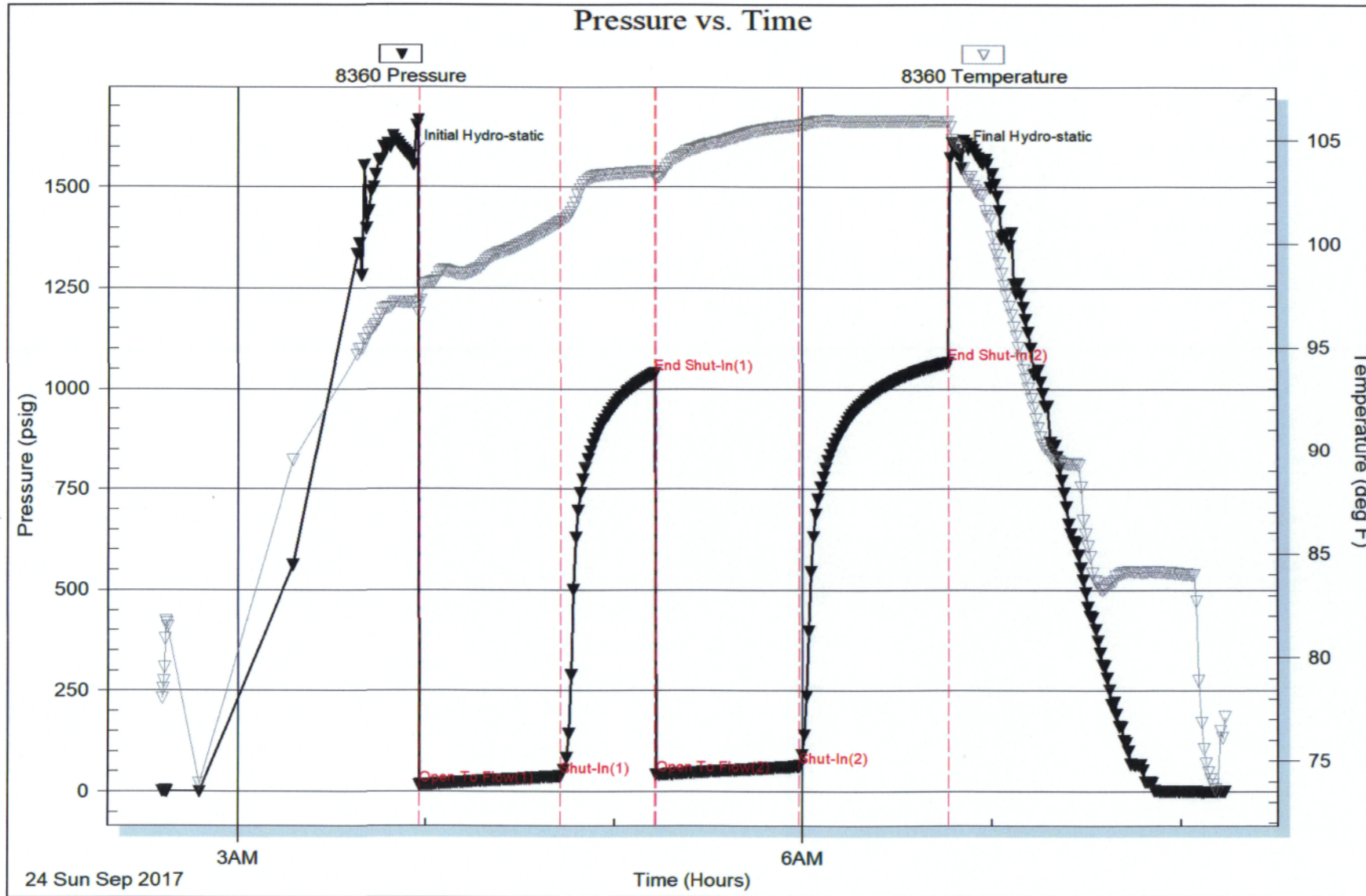
Mud Type: Gel Chem	Cushion Type:	Oil API:	deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity:	ppm
Viscosity: 56.00 sec/qt	Cushion Volume: bbl		
Water Loss: 11.16 in ³	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 6500.00 ppm			
Filter Cake: 1.00 inches			

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
90.00	CO	1.262
62.00	HOCM 40%O60%M	0.870

Total Length: 152.00 ft Total Volume: 2.132 bbl
 Num Fluid Samples: 0 Num Gas Bombs: 0 Serial #:
 Laboratory Name: Laboratory Location:
 Recovery Comments:



QUALITY OILWELL CEMENTING, INC.

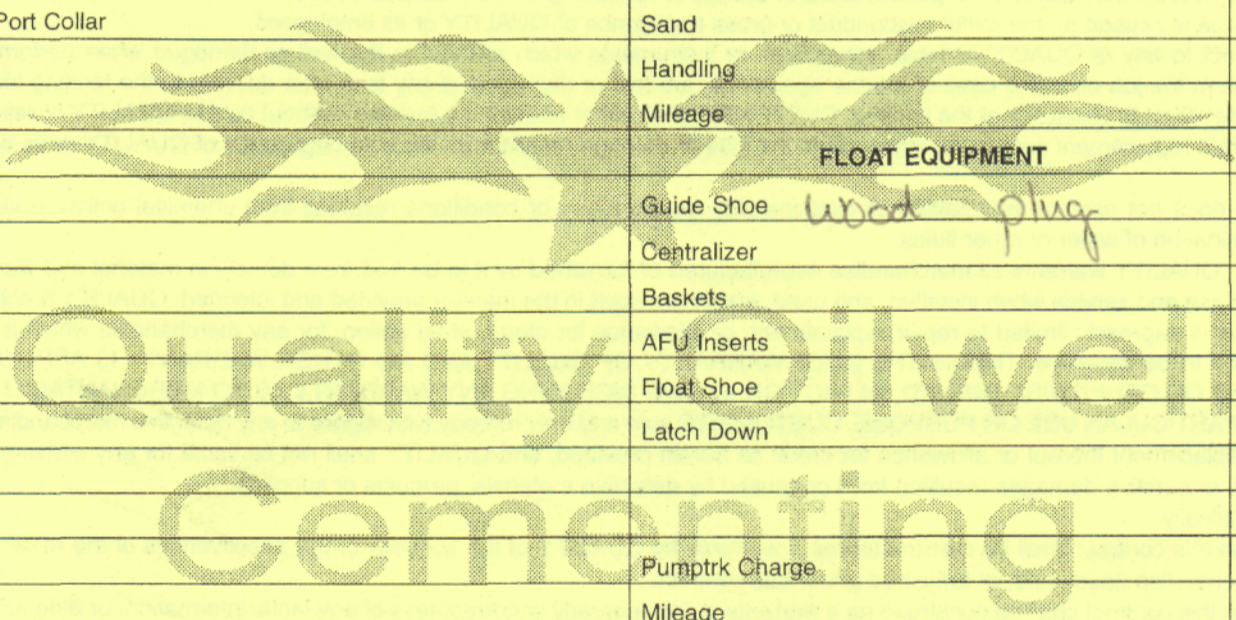
Federal Tax I.D.# 20-2886107

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

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

No. 412

Date	9-19-17	Sec.	34	Twp.	17	Range	13	County	Barton	State	Ks	On Location	Finish	3:00 AM
Lease								Location		Morgenstern - Herres unit Housington - IE, 100 yds N, E into				
Contractor								Well No.		Owner				
Southwind #3								#1		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.				
Type Job								T.D.		Charge To				
Surface								453'		Main oil operations				
Hole Size								Depth		Street				
12 1/4"								453'						
Csg.								Depth		City				
8 5/8"										State				
Tbg. Size								Depth		The above was done to satisfaction and supervision of owner agent or contractor.				
Tool								Depth		Cement Amount Ordered				
										225 60/40 4% CC 2% Gel				
Cement Left in Csg.								Shoe Joint		Cement Amount Ordered				
20'								20'						
Meas Line								Displace						
								27 1/2 BLS						
EQUIPMENT														
Pumptrk 16 No. Cementer												Common		
Helper Travis												Poz. Mix		
Bulktrk 14 No. Driver												Gel.		
Driver Tony												Calcium		
Bulktrk pu. No. Driver												Hulls		
Driver Rick												Salt		
JOB SERVICES & REMARKS														
Remarks: Cement did Circulate												Flowseal		
Rat Hole												Kol-Seal		
Mouse Hole												Mud CLR 48		
Centralizers												CFL-117 or CD110 CAF 38		
Baskets												Sand		
D/V or Port Collar												Handling		
												Mileage		
FLOAT EQUIPMENT														
												Guide Shoe wood plug		
												Centralizer		
												Baskets		
												AFU Inserts		
												Float Shoe		
												Latch Down		
												Pumptrk Charge		
												Mileage		
												Tax		
												Discount		
X Signature												Total Charge		
Joy Huser														



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. 417

Date	9-25-17	Sec.	34	Twp.	17	Range	13	County	Barton	State	Ks	On Location		Finish	3:30AM																								
Morgenstern - Herres unit								Location								Herington, Ks - 1E, 100 yds N, E/S																							
Lease				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.																							
Contractor				Southwind #3																																			
Type Job				Long string																																			
Hole Size				7 7/8"				T.D.				3435'				Charge To				Main oil operations																			
Csg.				5 1/2" used 14#				Depth				3434'				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.				33.14'				Shoe Joint				33.14'				Cement Amount Ordered				160 60% 10% Salt 2% Gel 1/4# Flow-seal																			
Meas Line				Displace				83 BLS				1000 gal Mud Clear 48																											
EQUIPMENT																																							
Pumptrk				16 No. Cementer				Travi's								Common																							
Bulktrk				9 No. Driver				Tony								Poz. Mix																							
Bulktrk				pu No. Driver				Rick								Gel.																							
Bulktrk																Calcium																							
JOB SERVICES & REMARKS																																							
Remarks:								Hulls																															
Rat Hole								Salt																															
Mouse Hole								Flowseal																															
Centralizers								1-9, 13								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 Rathok								w/ 130# cement shut down wash pump								Sand																							
+ lines Displaced plug								w/ 83 BLS								Handling																							
								Released & held								Mileage																							
FLOAT EQUIPMENT																																							
								Guide Shoe																															
Lift pressure								650 #								Centralizer								10															
Land plug to								1500 #								Baskets																							
																AFU Inserts																							
																Float Shoe																							
																Latch Down								1															
																Pumptrk Charge																							
																Mileage																							
																								Tax															
																								Discount															
																								Total Charge															
X Signature				[Signature]																																			