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2-30s-14w

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Mai Oil Operations Inc.  
Alexander #1  
90' East-C-SW; Section 2-30s-14w  
Barber County, Kansas  
Page No. 1

15-007-22791

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

**Contractor:** Sterling Drilling Company (Rig #4)

**Commenced:** January 20, 2004

**Completed:** February 3, 2004

**Elevation:** 1960' K.B.; 1958' D.F.; 1951' G. L.

**Casing Program:** Surface; 13 3/8" @ 225'  
Production; 5 1/2" @ 4680

**Samples:** Samples saved and examined 2000' to the Rotary Total Depth.

**Drilling Time:** One (1) foot drilling time recorded and kept 2000' to the Rotary Total Depth.

**Measurements:** All depths measured from the Kelly Bushing.

**Formation Testing:** There were eight (8) Drill Stem Test ran by Trilobite Testing Co.

**Electric Log:** By Eli Wireline Services; Dual Induction, Compensated Density/Neutron, and Sonic Log.

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<u>Formation</u>	<u>Log Depth</u>	<u>Sub-Sea Datum</u>
Herington	2179	-219
Krider	2191	-231
Winfield	2238	-278
Towanda	2303	-343
Ft. Riley	2360	-400
Florence	2396	-436
Wreford	2497	-537
Cottonwood	2677	-717
Red Eagle	2820	-860
Indian Cave Sand	2951	-971
<del>Wabaunsee</del>	<del>2991</del>	<del>-1031</del>
Langdon Sand	3054	-1094
Stotler	3131	-1171
Tarkio	3183	-1223
Howard	3304	-1344
Topeka	3429	-1469
Heebner	3802	-1842
Toronto	3819	-1859
Douglas	3841	-1881
Brown Lime	3980	-2020
Lansing	3991	-2031
Base Kansas City	4337	-2377
Pleasanton	4344	-2384
Marmaton	4384	-2424
Conglomerate	4445	-2485
Viola	4474	-2514
Simpson Shale	4515	-2555
Simpson Sand	4526	-2566

2 <sup>nd</sup> Simpson Sand	4570	-2610
Arbuckle	4628	-2668
Rotary Total Depth	4686	-2726
Log Total Depth	4685	-2725

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

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

**HERINGTON SECTION**

- 2179-2185' Dolomite; tan, sucrosic, scattered pinpoint porosity, trace gray shaley dolomite.
- 2185-2191' Dolomite; as above, trace gray white chert.

**KRIDER SECTION**

- 2191-2230' Dolomite; gray, finely crystalline, fair to good intercrystalline to vuggy type porosity, no shows.

**WINFIELD SECTION**

- 2238-2250' Dolomite; gray and tan, mottled, finely crystalline, few granular, scattered vuggy type porosity, few chalky, trace gray to dark gray boney chert, no shows.
- 2260-2280' Limestone; white and tan, highly dolomitic, scattered porosity, plus chert, as above.

**TOWANDA SECTION**

- 2303-2313' Limestone; gray, slightly dolomitic, scattered porosity, trace white anhydrite.
- 2313-2326' Chert; white and gray, boney, plus limestone, white and gray, fossiliferous/oolitic, chalky.
- Limestone and chert; as above.

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**FT RILEY SECTION**

- 2380-2394' Limestone; white, gray, fossiliferous, chalky, fair to good porosity, no shows.

**FLORENCE SECTION**

- 2396-2421' Limestone; gray, fossiliferous, oocastic, fair to good oocastic to fossil cast porosity, plus white and gray fossiliferous chert.

**WREFORD SECTION**

- 2497-2502 Limestone; white and gray, cream, highly fossiliferous, fair porosity, trace white fossiliferous chert.

**COTTONWOOD SECTION**

- 2677-2684' Limestone; white and cream, finely crystalline, few granular, fossiliferous, chalky in part, no shows.
- 2684-2700' Limestone; as above, sparry calcite cement.

**RED EAGLE SECTION**

- 2820-2831' Limestone; white, cream, slightly fossiliferous, few medium crystalline, chalky, (5 unit gas kick).
- 2835-2840' Limestone; as above, plus tan, sucrosic, dolomite, fair pinpoint porosity, no shows.

**INDIAN CAVE SECTION**

- 2951-2963' Sand; gray and white, very fine grained, micaceous, silty in part, calcareous, scattered intergranular porosity, trace gas bubbles (20 unit gas kick).
- 2972-2978' Sand; as above, fair intergranular porosity, trace gas bubbles, (100 unit gas kick).

**Drill Stem Test # 2936-3004'**

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

**Blow: Strong; gas to surface 6 ½ minutes, gas gauged as follows:**

**Initial Flow:**

6.5 minutes	gas to surface
10 minutes	185,000 cfgpd
20 minutes	298,000 cfgpd
30 minutes	327,000 cfgpd

**Final Flow**

10 minutes	386,000 cfgpd
20 minutes	386,000 cfgpd
30 minutes	398,000 cfgpd
45 minutes	411,000 cfgpd

**Recovery: 330' water mud  
(14% water, 86% mud)**

**Pressures: ISIP 1077 psi  
FSIP 1070 psi  
IFP 84-164 psi  
FFP 155-188 psi  
HSH 1458-1434 psi**

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**LANGDON SECTION**

3054-3075' Sand; gray and white, medium grained, micaceous, sub rounded, sub angular, friable, fair to good sorting, spotty bright fluorescence (25 unit gas kick).

**Drill Stem Test #2 3028-3075'**

**Times:** 30-45-15-75

**Blow:** Strong; gas to surface 4 ½ minutes, gas gauged as follows:

**Initial Flow:**

10 minutes 417,000 cfgpd

20 minutes fluid to surface

30 minutes fluid to surface

**Final Flow**

Gas to surface estimated 500,000 cfgpd, fluid surface 6 minutes

**Recovery:** 916' water

**Pressures:** ISIP 1117 psi  
FSIP 1117 psi  
IFP 183-802 psi  
FFP 585-816 psi  
HSH 1525-1487 psi

3075-3090' Sand; as above, good porosity.

**HOWARD SECTION**

3311-3330' Limestone; gray, cream to white, fine to medium crystalline, fair intercrystalline porosity, trace spotty golden brown stain, trace free oil (light gassy) and faint odor in fresh samples (35 unit gas kick).

3336-3350' Limestone; tan, gray, slightly fossiliferous, chalky, trace gas bubbles, questionable stain, no show of free oil, fresh odor.

**Drill Stem Test #3 3293-3355'**

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

**Blow:** Weak to fair

**Recovery:** 240' muddy water, few oil specks  
90' slightly oil cut muddy water

**Pressures:** ISIP 1080 psi  
FSIP 1016 psi  
IFP 23-133 psi  
FFP 135-169 psi  
HSH 1613-1611 psi

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**TOPEKA SECTION**

- 3625-3635' Limestone; white and gray, granular, chalky, poor visible porosity, trace spotty stain, no show of free oil or odor (no gas kick).
- 3680-3690' Limestone; gray and white, finely crystalline, granular, fair to good pinpoint, intercrystalline porosity, no shows.
- 3714-3726' Limestone; white, gray, finely crystalline, slightly granular, chalky, no shows.
- 3734-3738' Limestone; gray, tan, fine to medium crystalline, few fossiliferous, poor spotty stain, trace of free oil and no odor in fresh samples (30 unit gas kick).

**TORONTO SECTION**

- 3819-3830' Limestone; white and gray, tan, finely crystalline, chalky in part, poorly developed porosity, no shows.

**DOUGLAS SECTION**

- 3841-3859' Sand; gray, very fine and medium grained, sub rounded, sub angular, friable, micaceous, fair sorting, no shows.
- 3863-3872' Sand; as above, no shows.

**LANSING SECTION**

- 3991-3996' Limestone; white and gray, chalky, poorly developed pinpoint porosity, no shows.
- 4000-4020' Limestone; gray, tan, medium crystalline, chalky, trace gray fossiliferous, chert, no shows.
- 4028-4032' Limestone; tan, brown, finely crystalline, few fossiliferous, slightly cherty, dense.
- 4039-4046' Limestone; gray, white, slightly fossiliferous, chalky, trace dull gray and brown to golden brown stain, trace free oil and questionable odor in fresh samples. (46 unit gas kick).

**Drill Stem Test #4 4030-4060'**

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

**Blow:** Strong, gas to surface 30 minutes into final flow, t.s.t.m.

**Recovery:** 95' slightly oil cut gassy mud (20% gas, 4% oil, 76% mud)  
60' oil cut gassy mud (20% gas, 16% oil, 64% mud)

**Pressures:** ISIP 1235 psi  
FSIP 1162 psi  
IFP 25-45 psi  
FFP 42-69 psi  
HSH 1902-1899 psi

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4060-4070' Limestone; gray and white, medium crystalline, few granular, slightly chalky, trace pale yellow fluorescence, trace rare stain, show of free oil and no odor in fresh samples, trace gas bubbles, (86 unit kick).

4076-4082' Limestone; white, finely crystalline, granular, scattered pinpoint porosity, spotty golden brown stain, trace free oil, show of gas bubbles, (49 unit gas kick).

**Drill Stem Test #5** **4063-4096'**

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

**Blow:** Weak

**Recovery:** 100' gas in pipe  
90' gas cut mud (trace oil)

**Pressures:** ISIP 647 psi  
FSIP 658 psi  
IFP 26-39 psi  
FFP 45-60 psi  
HSH 1920-1920 psi

4104-4109' Limestone; cream and gray, fine to medium crystalline, scattered porosity, trace poor stain, trace free oil, odor samples broken.

4121-4129' Limestone; gray, white, finely crystalline, chalky, soft, trace gas bubbles, no stain, no free oil, no fluorescence, no odor in fresh samples.

4138-4151' Limestone; tan and beige, dolomitic, finely crystalline, scattered pinpoint and intercrystalline porosity, fair light brown to golden brown stain, show of free oil gassy and fair odor in fresh samples.

**Drill Stem Test #6** **4133-4150'**

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

**Blow:** Weak to strong

**Recovery:** 250' gas in pipe  
70' muddy water with oil spots  
240' water

**Pressures:** ISIP 1385 psi  
FSIP 1365 psi  
IFP 32-107 psi  
FFP 113-108 psi  
HSH 1951-1948 psi

4171-4175' Limestone; gray and buff, fossiliferous, sub oocastic, fair porosity, trace golden brown and brown stain, show of free oil and fair odor in fresh samples.

4188-4196' Limestone; white and gray, finely crystalline, slightly chalky, trace brown stain, no show of free oil and faint odor in fresh samples.

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- 4203-4207' Limestone; gray, oocastic/fossiliferous, fair fossil cast, oocastic and vuggy type porosity, trace brown and black stain, show of free oil and fair odor in fresh samples.
- 4210-4220' Limestone; tan, fossiliferous, slightly cherty, plus limestone, gray, oolitic, finely oocastic, fair porosity, trace white and gray chert, no shows.
- 4232-4246' Limestone; gray, white, fossiliferous, chalky, poor visible porosity, trace spotty light brown stain, no show of free oil or odor in fresh samples.
- 4262-4274' Limestone; tan, fossiliferous, poorly developed porosity, plus white and gray, fossiliferous, chert.
- 4305-4309' Limestone; gray to tan, fossiliferous, slightly chalky, trace poor spotty stain, weak show of free oil and no odor, trace gray chert.

**PLEASANTON SECTION**

- 4344-4360' Limestone; tan, fossiliferous, cherty, trace poor stain, trace tan chert.
- 4370-4376' Limestone; white, chalky, fossiliferous, trace dull gray to black stain, no show of free oil and faint odor in fresh samples.

**MARMATON SECTION**

- 4384-4391' Limestone; white, chalky, plus white fossiliferous, opaque chert.
- 4396-4408' Limestone; tan, fossiliferous, cherty increasingly chalky.
- 4410-4418' Limestone; white and gray, fossiliferous, chalky, trace black and dull gray stain, no show of free oil or odor in fresh samples.
- 4424-4440' Limestone; white and gray, few fossiliferous, chalky, black spotty stain, no show of free oil or odor in fresh samples.

**CONGLOMERATE SECTION**

- 4445-4462' Chert; white, gray, yellow, black spotty stain, few semi-tripolitic, weathered, scattered pinpoint and vuggy type porosity, trace free oil and no odor in fresh samples. (45 unit gas kick).
- 4462-4470' Chert; as above, plus limestone, white, cream, chalky, and rose, orange fresh chert.

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### VIOLA SECTION

4474-4492' Chert; tan, white, gray, boney, black edge staining, trace tan dolomitic chert, trace gas bubbles, limestone, tan, fine to medium crystalline, dolomitic, (110 unit gas kick increase to 144 units).

#### Drill Stem Test #7 4411-4492'

Times: 30-45-60-60

Blow: Strong

Recovery: 1200' gas pipe  
75' mud

Pressures: ISIP 815 psi  
FSIP 1163 psi  
IFP 41-50 psi  
FFP 70-63 psi  
HSH 2231-2205 psi

4492-4515' Chert; white, amber, boney, trace black edge staining, plus chert, tan, dolomitic, spotty brown stain.

### SIMPSON SECTION

4526-4534' Sand; quartzitic, medium grained, sub rounded, trace golden brown stain, trace free oil, loose unconsolidated quartz grains.

4534-4546' Sand; good intercrystalline porosity, white, clear, quartzitic, very fine grained, friable, trace light brown to golden brown stain, trace free oil, no odor in fresh samples.

#### Drill Stem Test #8 4501-4546'

Times: 30-30-30-45

Blow: Strong

Recovery: 180' watery mud  
2550' salt water

Pressures: ISIP 1278 psi  
FSIP 1283 psi  
IFP 626-1169 psi  
FFP 1187-1278 psi  
HSH 2248-2200 psi

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4546-4561' Sand; white and clear, gray, fine to medium, few coarse grained, fair sorting, friable, fair to good intergranular porosity, trace brown, dull gray stain, no show of free oil and faint odor in fresh samples.

4570-4576' Sand; gray to white, fine to medium grained, sub rounded to sub angular, friable, fair porosity, black gilsonitic stain, no show of free oil and no odor in fresh samples.

- 4606-4611' Sand; gray, very fine to medium grained, sub angular and sub rounded, friable, fair intergranular porosity, glauconitic, trace brown and gray stain, show of free oil and faint odor in fresh samples.
- 4614-4617' Sand; white, medium grained, scattered porosity, trace brown stain, show of free oil and faint odor in fresh samples.

**ARBUCKLE SECTION**

- 4628-4640' Dolomite; white, gray, sandy, plus tan, finely crystalline, dense, dolomitic, no shows.
- 4640-4650' Dolomite; gray, tan, finely crystalline, sucrosic, poor visible porosity, trace brown stain  
, no show of free oil and faint odor in fresh samples.
- 4650-4670' Dolomite; tan, fine to medium crystalline, scattered porosity, slightly chalky, trace spotty stain, no show of free and faint odor in fresh samples.
- 4670-4686' Dolomite; tan, gray, fine to medium crystalline, few sandy, trace tan, sucrosic dolomite, plus white chert, no shows.

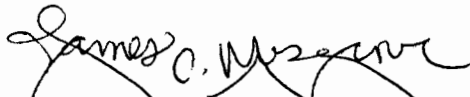
**Rotary Total Depth 4686 (-2726)**  
**Log Total Depth 4685 (-2725)**

**Recommendations:**

On the basis of the favorable structural position and positive results of the Drill Stem Tests, it was recommended by all parties involved to set and cement 5 1/2" production casing at 4680' and the following zones be perforated in the Alexander #1.

1. Viola 4474-4490
2. Conglomerate 4454-4462 & 4448-4451
3. Lansing 4305-4309
4. Lansing 4203-4207
5. Lansing 4171-4175
6. Lansing 4039-4046
7. Langdon Sand 3054-3056
8. Indian Cave 2972-2982 & 2952-2960

Respectfully submitted;

  
James C. Musgrove  
Petroleum Geologist

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