

JAMES C. MUSGROVE

Petroleum Geologist

2021 FOREST

P. O. BOX 1162

GREAT BEND, KANSAS 67530

OFFICE PHONE (316) 792-7716

RES. CLAFLIN 587-3444

Hallwood Petroleum Inc.
J.A. Heffernan No. 2
Ne-Se-Nw; Section 4-15s-13w
Russell County, Kansas
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5 1/2" PRODUCTION CASING SET

CONTRACTOR: Allen Drilling Co., Inc. (rig #1)
COMMENCED: April 10, 1991
COMPLETED: April 17, 1991
ELEVATIONS: 1758' K.B., 1755' D.F., 1753' G.L.
CASING PROGRAM: Surface - 8 5/8" set @ 731'
Production - 5 1/2" set @ 3274'
SAMPLES: Samples examined from 2150' to rotary total depth
DRILLING TIME: One (1) ft. drilling time recorded & kept 2150' to the rotary total depth
MEASUREMENTS: All depths measured from the Kelly Bushing
ELECTRIC LOG: By Halliburton Logging Services, Inc. Dual induction laterolog, compensated density dual spaced neutron, micro log and computer analyzed log.
FORMATION TESTING: There were three (3) drill stem tests run by Trilobite Testers.

<u>FORMATION</u>	<u>ELECTRIC LOG DEPTH</u>	<u>SUB-SEA DATUM</u>
Anhydrite	724	+1034
Grand Haven	2279	- 521
1st Tarkio Sand (10')	2288	- 530
Dover	2303	- 545
2nd Tarkio Sand (5')	2313	- 555
Tarkio Lime	2351	- 593
3rd Tarkio Sand (8')	2388	- 630
Elmont	2422	- 664
Howard	2557	- 799
Severy	2610	- 852
Topeka	2626	- 868
Heebner	2854	-1096
Toronto	2873	-1115
Douglas	2890	-1132
Lansing	2923	-1165
Base Kansas City	3167	-1409
Conglomerate	3197	-1439
Arbuckle	3209	-1451
Rotary Total Depth	3275	-1517
Log Total Depth	3277	-1519

(All depths corrected to Electric Log Measurements)

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

TARKIO SECTION

1st Tarkio Sand

2288-2298' Sand very fine grained, grayish green; sub rounded to sub angular, fair sorting, micaeous, glauconitic, fair intergranular porosity, spotty fair stain and saturation, fair show of free oil, trace gas bubbles and no odor in fresh samples.

2nd Tarkio Sand

2313-2319' Sand, very fine grained, gray, sub rounded, fair sorting, friable, fair to good intergranular

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porosity, light brown spotty stain, weak show of free oil and faint odor in fresh samples.

Drill Stem Test # 1 2280-2325'

Open: I.F. 30"
F.F. 60"

Blow: Weak, building to strong

Recovery: 340' gas in pipe, 90' thin oil specked mud (1%oil, 99% mud)

Pressures: ISIP 367 psi (45")
FSIP 421 psi (120")
IFP 35-35 psi
FFP 43-54 psi
HSH 1050-1030 psi

3rd Tarkio Sand

2388-2396' Sand, gray, very fine to fine grained, sub rounded to sub angular, glauconitic, micaeous, fair sorting, fair to good intergranular porosity, poor spotty light brown stain, weak to poor show of free oil and questionable odor in fresh samples.

TOPEKA SECTION

2626-2630' Limestone, tan, finely crystalline, cherty increasingly chalky, poor porosity, no shows.

2658-2666' Limestone, tan to beige, finely crystalline, few granular, scattered porosity, poorly developed, no shows.

2696-2717' Limestone, tan, fossiliferous, sparry calcite replacement in some porosity, no shows.

2736-2744' Limestone, white to gray, chalky increasingly cherty, dense, no shows.

2748-2752' Limestone, gray, fossiliferous, chalky, poorly developed porosity, no shows.

2778-2884' Limestone, tan, highly oolitic, poor porosity, no shows.

2794-2800' Limestone, as above, trace spotty stain, trace free oil and no odor in fresh samples.

2807-2816' Limestone, tan, fossiliferous, chalky, spotty golden brown to dark brown stain, show of free oil and faint odor in fresh samples, trace white chert.

2821-2830' Limestone, tan to beige, chalky, poor visible porosity, no shows.

TORONTO SECTION

2873-2881' Limestone, tan to beige, chalky, poor visible porosity, no shows.

LANSING SECTION

2923-2930' Limestone, gray to tan, fossiliferous, oolitic, poorly developed porosity, no shows.

2944-2950' Limestone, gray to cream, fossiliferous, chalky, poor visible porosity, trace stain, poor show of

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free oil and no odor in fresh samples.

2953-2970' Limestone, cream to gray to tan, oocastic, few oolitic, fair to good oocastic porosity, spotty brown to golden brown stain, few good dark brown stain and saturation, weak to fair show of free oil, strong odor.

2970-2977' Limestone, as above, decreasing stain with depth.

Drill Stem Test # 2 2925-2978'

Open: I.F. 30"
F.F. 60"

Blow: Weak to strong

Recovery: 1200' gas in pipe, 64' heavy oil and gas cut mud (5% gas, 20% oil, 75% mud)

Pressures: ISIP 437 psi (45")
FSIP 545 psi (90")
IFP 41-41 psi
FFP 58-58 psi
HSH 1490-1414 psi

3001-3006' Limestone, tan, oolitic, poor visible porosity, trace spotty stain, no show of free oil or odor in fresh samples.

3011-3018' Limestone, tan, oolitic, slightly cherty, scattered porosity, spotty brown stain, trace free oil and no odor in fresh samples.

3026-3040' Limestone, white to cream, oolitic, oocastic, poorly developed porosity, poor spotty stain, no show of free oil or odor in fresh samples.

3074-3084' Limestone, gray, oolitic, oocastic, poor visible porosity, no shows.

3096-3104' Limestone, white, fossiliferous, poor visible porosity, few chalky, spotty stain, no show of free oil or odor in fresh samples.

3118-3124' Limestone, gray, fine to medium crystalline, slightly oolitic, fair intercrystalline to vuggy porosity, trace spotty brown stain, show of free oil and faint odor in fresh samples.

3152-3158' Limestone, tan to cream, fossiliferous, highly cherty, dense, plus trace tan fossiliferous chert.

Drill Stem Test # 3 3084-3162'

Open: I.F. 45"
F.F. 60"

Blow: Weak to good

Recovery: 130' gas in pipe
20' slightly oil cut mud
(10% oil, 90% mud)
good show free oil top of tool

Pressures: ISIP 274 psi (45")
FSIP 745 psi (60")
IFP 49-58 psi
FFP 66-72 psi
HSH 1640-1565 psi

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CONGLOMERATE SECTION

3197-3209' Abundant; maroon, brick-red shale and soft shale, plus trace cherty and chalky limestone, and white to orange chert.

ARBUCKLE SECTION

3209-3212' Dolomite, white to cream, finely crystalline, poor visible porosity, no shows.

3212-3220' Dolomite, as above, few sandy, no shows.

3220-3226' Dolomite, as above, plus cream to white, sucrosic dolomite, poor porosity, no shows.

3226-3230' Dolomite, tan to gray to pink, finely crystalline, sucrosic, few cherty in part, poor visible porosity, no shows.

3230-3240' Dolomite, as above, increasing in porosity, no shows.

3240-3275' Dolomite, gray to white, medium crystalline, scattered fair intercrystalline porosity, no shows.

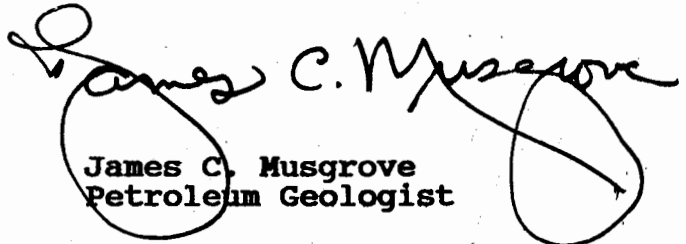
Rotary Total Depth 3275 (-1517)

Log Total Depth 3277 (-1519)

RECOMMENDATIONS: On the basis of the favorable structural position and the positive results of the drill stem tests, it was recommended by all parties involved, to set and cement 5 1/2" production casing at 3274' (one foot off bottom) to further test the following zones:

1) Lansing	3119-3124'	Perforate
2) Lansing	3096-3100'	Perforate
3) Lansing	2953-2975'	Perforate
4) Toronto	2876-2880'	Perforate
5) Topeka	2812-2816'	Perforate
6) Topeka	2794-2798'	Perforate
7) 3rd Tarkio Sand	2388-2396'	Perforate
8) 2nd Tarkio Sand	2313-2318'	Perforate
9) 1st Tarkio Sand	2288-2298'	Perforate

Respectfully submitted,


James C. Musgrove
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