Geologists Report

Darrah Oil

#10 Bitter C

NW/SW/NE/NE of Sec. 18 T16S R13W

API# 15-009-25526

KB 1946' **GL** 1941' **T.D.** 3374'

Completed: March 22nd, 2011

Trapp Field; Barton Co. KS

Contractor: Mallard JV

The #10 Bitter C. was spudded on March 16th, 2011. Samples were examined from 2700' to T.D. Geologist was on site from 2903' to T.D. Sample tops encountered are as follows.

Topeka Lms 2821' (-875)

Lecompton Lms 2931' (-985)

Oread Lms 2971' (-1025)

Heebner Shale 3058' (-1112)

Douglas Shale 3089' (-1143)

Brown Lm 3129' (-1183)

Lansing 3142' (-1196)

LKC G zone 3221' (-1275)

LKC H zone 3279' (-1333)

LKC J zone 3313' (-1367)

BKC 3353' (-1407)

Solid Arbuckle 3366' (-1420)

Arbuckle Porosity 3368' (-1422)

RTD 3374' (-1428)

2700-10: Lms, off wht–tan-brwn, fn-med xtln, med-hrd res, many allochems, some hrd & shrp off wht-yellowish chert pr poro. Shale, mix of gry, blk grn & reddish, platy, brtl-sft. A few pcs gry sndy shale.

2710-20: Lms & shale as abv. Abnt gry-grn med xtln, ang qtz sandy shale, matrix vry shaly, pr-no poro.

2720-30: Lms gry-drk gry, sndy, fn xtln matrix, fn-med ang snd grains, hrd & res, no vis poro, also poss. sli micaceous, sndy shale as abv.

2730-40: Lms gry-drk gry, sndy, as abv. A few pcs pyritized, few pcs lt gry mushy, vry fn grained sndy/silty shale, few pcs drk brwn vry brtl lms.

2740-50: Lms brwn-drk brwn, med-crs xtln, allochemical, jagged edges, brtl, brks fairly easily, little-no vis poro.

2750-60: Shale gry, plty, rnd edgs, sft. Also gry sndy shale, mushy, vry fn grains. Sample has great increase in gry shale, decrease in vari-colored shale & lms.

2760-70: Lms gry, vry fn xtln, vry hrd res, few to no allochems, uniform color & text, rnd edges, no vis poro. Also shale as abv. Increase in red shales

2770-80: Lms as abv & lms off wht fn xtln, few allochems, hrd res, uniform text & color, rnd edges, no vis poro.

2780-90: Lms drk brwn, brtl, allochemical, Also slity shale, lt gry, mushy vry fn grains, blk speckled grains throughout.

2790-2800: Shaly lms & lmy shale, color& text as abv. Few pcs brwn, med xtln oolitic lms, jagged edges, no vis poro. Few pcs pyrite.

2800-10: Lms off wht-tan, fn xtln, bumpy text, vry fn chlky/shaly matrix, med res, pr poro, some allochemical, some sli sndy.

2810-20: Lms off wht-tan-lt gry & brwn, crs-vry crs xtln, hrd res, rough text, jagged & shrp edges, pr poro. Some allochemical

Topeka 2821' (-875)

2820-30: Shaly SS, lt gry, fn qtz, grains, shale matrix pr poro, few pcs, wht fn grained qtz SS. Also Lms cream-off wht, w/abndt blk ooids, hrd res.

2830-40: Lms off wht-cream-gry & brwn, abndt blk ooids, hrd res, fn xtln, vry fn xtln matrix, pr poro.

2840-50: Lms off wht-cream-lt brwn- lt gry, not ollitic, non allochemical, med-crs xtln, bmpy-semi bmpy text, poss spty brwn stain, pr flour, no odor, pr poro.

2850-60: Lms as abv, increase in gry crs xtln lms, vry hrd res, pr poro, few pcs shrp gry chert

2860-70: Lms gry-tan-crs xtln as abv, 1 pc, sndy lms, gry fn grn sub rnd, med res pr poro, more pcs, gry shrp chert.

2870-80: Lms tan-lt brwn, fn xtln, poss. sli sndy, mushy to med res, vry fn mud matrix, chlky to shaly, spty brwn stn, pr poro.

2880-90: Lms tan-off wht, hrd res, ome allochemical. Few pcs hrd res sndy lms similar to abv, Fn xtln pr poro, some spty brwn stn.

2890-2900: Lms, lt gry, fn xtln, med-hrd res, allochemical, bmpy text, pr poro, Presence of blk brtl fissil shale.

2900-10: Lms as abv, more med xtln, some fossiliferous, blk shale as abv.

2910-20: Lms, lt gry brwn-lt brwn, vry crs xtln, hrd res, shrp jagged edges, rough text, pr poro

2920-30: Lms off wht-bone, vry fn xtln, hrd res, shrp edges, smooth text, few allochems. Also Lms lt brwn-brwn allochemical, med xtln, hrd res, pr poro in both

Lecompton 2931' (-985)

2930-40: Lms as abv, vry hrd res

2940-50: Lms brwn, med xtln, crs text, some jagged eges, med res to brtl, pr poro

2950-60: Lms gry-gry brwn, fn-med xtln, hrd res, allochemical, abndt ammonoid fossils, pr poro

2960-70: Lms as abv, & lt gry-brwn, hrd res, crs xtln, non-fossiliferous Lms, pr-no vs poro

Oread 2971' (-1025)

2970-80: Lms, lt brwn-tan, med-crs xtln, some allochemical, med-hrd res

2980-90: Lms med-crs xtln, lt brwn-lt gry-tan, some tan pcs oolitic, med-hrd res, brtl brwn pcs, pr poro

2990-3000: Lms as abv & off wht vuggy lms w/inter xtln poro, fr vuggy poro, fn xtln, sft & brtl-med res, Blk bubbles of thick hvy FO upon break, hvy blk stn, weak odor, oil does not appear to fluoresce, FSFO

3000-10: Lms, drk brwn, shaly, brtl, med xtln, poss silty & laminated. Also a few pcs lt tan, fn xtln, hrd res, ollitic Lms. Some off wht vuggy Lms w/oil stain from abv, sli odor, NSFO

3010-20: Lms, tan, fn xtln, hrd res, jagged edges, oolitic as abv, pr-no vis poro

3020-30: Lms, tan, fn xtln, oolitic as abv, most hrd res. 1 pc shaly, mushy oolitic Lms w/ hvy blk stain & pr shw FO upon break. Oil is hvy, sticky & asphaltic, blk-drk brwn, sli odor, no flour. PSFO

3030-40: Lms tan-gry, oolitic as abv. Few pcs of sft shaly oolitic Lms w/hvy blk stn as abv, sli odor, NSFO

3040-50: Lms, wht-tan, fn grained, chlky matrix, few allochems, pr poro. Vari-colored shales, sft, platy, grn, red, gry & fissile blk shale

Heebner 3058' (-1112)

3050-60: Shale & Lms as abv. Also Lms tan-brwn, med-crs xtln, hrd res, pr poro, few allochems, jagged edges, rough text

3060-70: Shale vari-colored as abv. Much higher percentage. Some sndy shale pcs, gry & pyritized

3070-80: Vari-colored shale as abv, & Hrd blk platy carbonaceous shale

3080-90: Shale gry, platy, sft & Lms tan-gry, fn-med xtln, hrd res, ammonoid fossils in a few pcs, no vis poro

Douglas 3089' (-1143)

3090-3100: Lms wht-tan-lt grn-cream, fn xtln, hrd res, few allochems, no vis poro, shaly-chlky matrix, 1 pc shaly oolitic Lms w/blk dead oil stain

3100-10: Lms tan-off wht, pr poro as abv, fn xtln, uniform text

3110-20: Shale gry-lt gry, sli silty, vry fn grains, sft-med res, platy, 1 pc w/pyritized pelecypod fossil in drk gry shale

3120-30: Shale gry, platy, sli silty/sndy as abv, med-hrd res for shales

Brown Lime 3129' (-1183)

3130-40: Shale gry as abv

DST #1 3136-86'

Lansing 3142' (-1196)

3140-50: Lms off wht-tan-brwn, crs xtln, hrd res, some vry hrd res, pr poro, few if any allochems

3150-60: Lms off wht-lt brwn-lt gry, fn xtln, oolitic, mostly gry-blk ooids, med res, jagged edges, pr poro

3160-70: Lms tan-lt brwn, med xtln, hrd res, some ammoniod fossils. 1 pc crs grained sndy Lms, lrg rnd qtz grains, pr-no vis poro

3170-80: Lms tan, fn xtln, hrd res, some non-allochemical, some w/abndt ooids, well cemented, pr-no vis poro

3180-86: Lms lt brwn, titely cemented, hrd res, oolitic, no vis poro; grading to vuggy Lms, lt brwn, crs xtln matrix, pr-fr poro, sli odor, Pr-FSFO upon break, litely saturated

3186: Circulate For Samples

15min: Lms as described, drker brwn, looks better sat, some pcs crumble easily upon break, fr-gd odor, dull-gd yellow flour, fast streaming cut, FSFO

30min: As abv. liter brwn, not as well sat, fr-gd odor, retains sftr consistency, less sat. fr flour.

45min: Lms lt tan, less sat, hrdr res than abv. Minor shw FO, titly cemented, fr odor. Lms tan, presence of whole intact ooids, fn xtln matrix, pr poro.

3186-90: Lms as abv, hrd res, res vry titely cemented, fr-pr shw FO upon break, lt gry-tan oolitic lms hrd res, smooth surface, no vis poro. Most pcs lack good inter xtln poro and look barren

3190-3200: Lms off wht-gry-lt grn, fn xtln, hrd res, sli rough text, jagged edges, few allochems no vis poro

3200-10: Lms as abv. Also Lms tan-tan gry, oolitic, blk-gry ooids, some hrd res, fn xtln, smooth text, some shaly matrix, sft & crmbly, fewer ooids both pr vis poro.

3210-20: Lms wht, chlky, vuggy, fn xtln, w/chlky matrix sft-med res, pr inter xtln poro, fr vugular poro, vugs letter "S" shaped, not rnd oolitic vugs as abv. Fr brwn stain, fr odor, P-FSFO upon break. Slow streaming cut, bright yellow flour in 20% of pcs. Flour follows streaks/vugs in rock, overall pr-fr poro, probably low perm.

G zone 3221' (-1275)

3220-30: Lms off wht-cream, hrd res, fn xtln, some w/ brwn stain in fractures, SSFO, weak odor, pr inter xtln poro, frac poro in some pcs.

3230-40: Lms wht-cream, sft-med res, abndt rnd vugs, some ooids still intact, fn xtln, pr-fr inter xtln poro, some w/ vry chlky matrix, pr-fr inter xtln poro, fr-gd vugular poro, sli odor, VSSFO

3240-50: Lms as abv, sft & crmbly, vry lite stain, sli odor, few pcs w/ SSFO upon break, most pcs look barren. Overall weak show; weak, dull flour in a few pcs

3250-60: Lms as abv, more oolitic vugs as part of dissolved ooids, vry oolitic, mostly barren, oil stain in fractures of hrd res, fn xtln, non-oolitic pcs, med-hrd res, pr inter xtln poro, vry weak shw

3260-70: Lms gry, hrd res, rough text, jagged edges, fn-xtln, pr-no vis poro

3270-80: Lms gry-lt gry-tan, crs xtln, some hrd res & gry. Some sft, brtl-mushy & tan-cream. Few pcs gry fossiliferous Lms, shrp edges, crs text, pr-no vis poro. Blk, hrd carbonaceous shale. 1 pc hrd, shrp blk chrt

H zone 3279' (-1333)

3280-90: Lms gry-tan, crs xtln, med-hrd res, fn shaly matrix, sli oolitic, gry & grn inclusions, is ratty looking shaly lms. 1 pc Lms cream, med xtln, sft-med res, vuggy, pr-fr inter xtln poro, fr brwn stain in vugs, sli odor, few drops FO upon break

3290-3300: Lms wht-cream, hrd res, fn xtln, some oolitic, shrp edges, most non-allochemical. Few pcs wht fn xtln lms w/ dead blk flky stain, pr-no vis poro

3300-10: Lms cream, fn xtln, hrd res as abv. A few pcs uniform wht Lms w/ blk & brwn stain as abv

J zone 3313' (-1367)

3310-20: Lms lt gry-gry-cream, fn xtln, vry hrd res, jagged edges, pr-no vis poro, no allochems. 2 pcs tan-brwn, fn-med xtln lms, w/ vugular poro & oil stain

3320-30: Lms tan, vugular & stained as abv. SSFO, only a few pcs. Most of sample is Lms cream, fn xtln, hrd res, non-allochemical, pr-no vis poro, weak odor

3330-40: Shale vari-colored, gry, red, grn, lt grn, yellow, pink; platy. Gry shale fissile & sft

3340-50: Shale as abv & finely crushed mixed Lms (probably slough). A couple large pcs Lms lt brwn, med-crs xtln, hrd res, oolitic w/ calcite matrix, abndt ooids, pr vis poro

BKC 3353' (-1407)

3350-60: S.S. lt grn, fn qtz grains, vry shaly matrix, sft & crmbly. Also Shaly Lms grn-tan, hrd res, vry fn matrix, some w/ crs snd & ooliclastic grains, no vis poro. Possible conglomeritic zone

DST #2 3360-74'

3360-70: Shaly Lms, tan w/grn, glauconitic inclusions, vry fn xtln, ultra fn matrix, no vis poro. Also Sndy shale gry-grn, hrd res, pr poro. Also Shaly conglomeritic Lms tan, med xtln matrix, crs qtz snd grains, shale & calcite inclusions

Solid Arbuckle Dolomite 3366' (-1420)

Arbuckle Porosity 3368' (-1422)

3370: Circulate For Samples

15min: As abv. Few pcs Dolomite wht, med xtln, med-crs rhombic xtls, some w/brwn stain, sli odor, SSFO

30min: Dolo wht, med-hrd res crs rhombic xtls, close inter-growth of xtls, but fr inter xtln poro, fr brwn stain, fr odor, abndt dull yellow flour, vry slow streaming cut, FSFO

45min: Dolo wht, crs rhombic xtls, tighter cementing than abv, pr show, pr inter xtln poro, a few pcs w/ show & stain as abv

3374: Circulate For Samples

15min: Dolo wht, vry crs ang rhombic xtls, vry hrd res, tightly cemented. Spty brwn stain in inter xtln poro, pr inter xtln poro, spty dull flour, fr odor, vry slow streaming cut, weak show FO

30min: As abv. A few pcs, brtl, crs xtln, wht dolo w/spty brwn stain, sli odor, abndt yellow flour, faster cut than in 15min samp; but still slow & streaming. PSFO upon break

45min: Dolo wht, crs xtln, shaly & glauconitic, wht-lt grn color, sft & crmbly, pr matrix poro, No show. 1 pc wht crs xtln Dolo, hrd res, fr show of bubbles of FO upon break. Rest of sample has weak odor overall.

RTD 3374' (-1428)

Two drill stem tests were taken on the #10 Bitter C. The test interval was measured using the kelly bushing as the zero. All pressures are in pounds per square inch. Flow & Shut-in times are in minutes. The results of those tests are as follows.

Test #1: **3136' – 3186'**

Blow: IF Weak blow, built to ½ in. ISI Dead; no blow throughout remainder of test.

DST #1 continued:

OP 15; SI 30; OP 45; SI 60 **IHP:** 1587.8 **FHP:** 1489.33 **IFP:** 32.8 – 33.6 **ISIP:** 283.79 **FFP:** 33.59 – 34.51 **FSIP:** 248.95

BHT: 102 degrees F

Recovered: 3 ft. drilling mud.

Test #2 **3360' – 3374'**

Blow: IF Bottom of bucket in 45 sec. ISI Built back to 3 in. FF Bottom of bucket in 45 sec. FSI Built back to ½ in.

OP 15; SI 30; OP 15; SI 30 **IHP:** 1722.6 **FHP:** 1592.2 **IFP:** 259.3 – 564.5 **ISIP:** 1081.9 **FFP:** 604.73 – 781.7 **FSIP:** 1076.5

BHT: 114 degrees F

Recovered: 2021 ft. free sli gassy oil & 90 ft. frothy muddy oil

The following is a structural comparison of nearby wells and the #10 Bitter C.

#5 Bitter C	#8 Bitter C	#9 Bitter C	#1 Bitter C
Sec 18 S2/NE/NE; approx. 578ft E of #10 Bitter C	Sec. 18 100ft SE of NE/SW/NE; approx. 862ft SW of #10 Bitter C	Sec. 18 NE/NE/NE; approx. 1068ft NE of #10 Bitter C	Sec 18 NW/NW/NE; approx. 1236ft NW of #10 Bitter C
Lans: -1206 ft	Lans: -1180 ft	Lans: -1211 ft	Lans: -1188 ft
#10 Bitter C +10ft	#10 Bitter C -14ft	#10 Bitter C +15ft	#10 Bitter C -6ft
Arb: -1441 ft	Arb: Absent	Arb: -1430 ft	Arb: -1439 ft
#10 Bitter C +21ft	NA	#10 Bitter C +10ft	#10 Bitter C +19ft

It should be noted that the only well in the NE ¼ of Sec 18 to beat the #10 Bitter C in the Arbuckle, is the #7 Bitter C; SW/SE/NE. The #7 was a mere one foot higher at the top of the Arbuckle and located approx. 1421ft to the south, southeast.

Based upon seismic interpretation and structural comparison, it is believed that the #10 Bitter C resides on its own separate structure in the Arbuckle. This is not so in the Lansing. The A & B zones of the Lansing have been produced in structurally higher wells in the nearby vicinity, and this has likely depleted the pressure in the A & B of the #10. This could perhaps explain the under-pressured results and poor recovery of DST #1.

Due to the outstanding results of DST #2 casing was ran and set at 3366 ft. Eight feet off bottom for open hole completion in the Arbuckle.

It is recommended that the shows in the **Oread/Plattsmouth** and **Lansing A & B** as well as the **H & J zones** of the Kansas City be tested through perforations before future abandonment of this well. If future testing is warranted the G zone shows should be first evaluated via porosity & resistivity logging.

It may be important to note that once again the Arbuckle has given us a relatively poor sample show; for a producing well. This could possibly be due to washing out of the light, mobile oil; during the journey of the cuttings to the surface. The dolomite of the producing zone in this well does not appear to have very impressive porosity in the samples. I suspect fracture porosity (un-viewable in sample cuttings); and perhaps consistent and extensive permeability with-in the reservoir make up for the relatively poor inter-crystalline & vugular porosity of this dolomite. Assuming sufficient structure; I feel that experience with the #9 & #10 Bitter C urges stringent evaluation of the Arbuckle; even in the absence of a show, before future wells are abandoned in this area.

Respectfully submitted by,

Seth Evenson

Geologist

Darrah Oil LLC

April 21st, 2011