# CHARLES SCHMALTZ
CONSULTING GEOLOGIST
WICHITA, KANSAS

GEOLOGIC REPORT LOG

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|---|---|
| COMPANY | MURFIN DRILLING CO. |
| WELL | CLAYPOOL # 1-14 |
| FIELD | WILDCAT |
| LOCATION | 330' FNL 2310' FWL |
| SEC | 14 TWSP 23S RGE 12W |
| COUNTY | STAFFORD |
| STATE | KANSAS |
| API: | 15-185-23901 |
| MUD COMPANY | MUDCO/SERVICE MUD INC. |
| CONTRACTOR | MURFIN DRILLING CO RIG # 21 |
| COMMENCED | 28 AUG 2014 COMPLETED 5 SEPT 2014 |

CASING RECORD:
SURFACE 8 5/8 @ 644' PRODUCTION
TOTAL DEPTH DRLS. 3900
TOTAL DEPTH LOG 3896

PRODUCTION:

(Location plat: 23S, 12W, Sec. 14)

ELEVATION: KB 1845 DF GL 1834

DRILLING MEASURED FROM KB

| | |
|---|---|
| SAMPLES SAVED FROM | 10'-2700' TO RTD |
| DRILLING TIME KEPT FROM | 1'-2700' TO RTD |
| SAMPLES EXAMINED FROM | 2700' TO RTD |
| GEOLOGICAL SUPERVISION FROM | 2700' TO TOTAL DEPTH |
| DRILL STEM TESTS | TRILOBITE TESTING, INC |
| ELECTRICAL SURVEYS | PIONEER ENERGY SER. DIL CNL-CDL BHCS-MEL |

## FORMATION TOPS & STRUCTURAL POSITION

| FORMATION | SAMPLE TOP | ELECTRIC LOG TOP | SUB-SEA DATUM | STRUCTURAL POSITION |
|---|---|---|---|---|
| ANHYDRITE-TOP | 617 | 613 | +1232 | -3 |
| ANHYDRITE - BASE | 632 | 628 | +1217 | +2 |
| TOPEKA | 2807 | 2799 | -954 | +3 |
| OREAD | 3077 | 3072 | -1227 | +3 |
| HEEBNER | 3184 | 3178 | -1333 | +4 |
| TORONTO | 3200 | 3195 | -1350 | +5 |
| DOUGLAS | 3220 | 3214 | -1369 | +4 |
| LANSING | 3328 | 3322 | -1477 | +6 |
| STARK | 3545 | 3541 | -1696 | +5 |
| BKC | 3604 | 3599 | -1754 | +7 |
| VIOLA | 3682 | 3677 | -1832 | +7 |
| SIMPSON | 3724 | 3725 | -1880 | +28 |
| ARBUCKLE | 3787 | 3779 | -1934 | +11 |
| TOTAL DEPTH | 3900 | 3896 | -2051 | -16 |

REFERENCE WELL FOR STRUCTURE L.D. DRILLING INC, MARILYN # 1-14
1650' FSL, 660' FEL, SEC 14-T23S-R12W, STAFFORD CTY, KS

SCHM01-12

## DRILL STEM TESTS

| No. | Interval | IFP/Time | ISIP/Time | FFP/Time | FSIP/Time | IHH-FHH | RECOVERY |
|---|---|---|---|---|---|---|---|
| 1 | 3367-3445 LANS:'D,E,F' | 22#-51# 30" | 1084# 60" | 56#-106# 60" | 1084# 90" | 1650#-1600# 110°F | 145' VSGCM w/TR.OIL |
| 2 | 3475-3610 LANS:'H'-'L' | 29#-171# 30" | 1123# 60" | 175#-289# 60" | 1114# 90" | 1718#-1648# 112°F | 150' GIP, 150' VSOCWM 125' VSOCMW 315' MW w/ FEW SPKS OIL |
| 3 | 3582-3666 PAWNEE | 26#-31# 30" | 212# 60" | 34#-34# 30" | 119# 60" | 1779#-1763# 111°F | 25' MUD |
| 4 | 3648-3737 VIOLA | 54#-69# 30" | 878# 60" | 73#-89# 60" | 815# 90" | 1920#-1770# 112°F | 60' MUD w/ TR.OIL |
| 5 | 3712-3797 ARBUCKLE | 111#-546# 30" | 1341# 60" | 552#-1033# 60" | 1341# 90" | 1819#-1819# 117°F | 124' VSO&GCMW 124' VSGCWM w/ TR OIL 1172' MCW, 576' VSMCW |

## BIT RECORD

| NO | SIZE | MAKE | TYPE | DEPTH OUT | FEET | HOURS |
|---|---|---|---|---|---|---|
| 1 | 12 1/4 | HTC | VM1 | 645' | 645' | 7 |
| 2 | 7 7/8 | HTC | DP405 | 2684' | 2039' | 25 |
| 3 | 7 7/8 | HTC | GX20C | 3900' | 1216' | 34 |

PIPE STRAPS & DEV. SURVEYS

PIPE STRAPS:
@ 2684: 0.61 LONG
DEVIATION SURVEYS:
@ 645: 0.4° @ 2684': 0.4°
@ 1226: 0.3 @ 3737: 1.4°
@ 1732: 0.3 @ 3900: 1.7
@ 2208: 0.0

## DAILY PENETRATION

| DATE | DEPTH |
|---|---|
| 8-28 | MIRT |
| 8-29 | 645' |
| 8-30 | 2030' |
| 8-31 | 2720' |
| 9-1 | 3445' |
| 9-2 | 3610' |
| 9-3 | 3727' |
| 9-4 | 3797' |
| 9-5 | 3900' |

## MUD RECORD

MUD TYPE: PUMP SIZE: BPS:

| NO | DATE | DEPTH | ACTIVITY | WT | VIS | WL | YP | PH | GS | LCM | CHL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 8-31 | 2746' | DRLG | 9.1 | 58 | 8.8 | 15 | 10.5 | 19/81 | 0.5# | 10100 |
| 5 | 9-1 | 3445' | DST #1 | 9.3 | 57 | 7.2 | 18 | 11.5 | 13/56 | 1# | 7200 |
| 6 | 9-2 | 3610' | DST #2 | 9.4 | 62 | 8.0 | 19 | 11.0 | 12/52 | 1# | 8000 |
| 7 | 9-3 | 3737' | DST #4 | 9.5 | 62 | 9.2 | 19 | 10.5 | 14/68 | 0.5# | 8500 |
| 8 | 9-4 | 3797' | DST #5 | 9.4 | 66 | 9.2 | 21 | 11.0 | 13/68 | 1# | 8800 |

## LEGEND

Anhydrite | Salt | Sandstone | Shale | Carb sh | Limestone | Ool.Lime | Chert | Dolomite

DRILLING TIME IN MINUTES PER FOOT
Rate of Penetration Decreases

| DEPTH | SAMPLE DESCRIPTIONS | REMARKS |
|---|---|---|
| 617 | | ANHYDRITE-TOP 617 (+1228) |
| 632 | | ANHYDRITE-BASE 632 (+1213) |
| 2700 | sh: lt. grey, grey, green; some brown | |
| 2710 | ls: tan, brown, fn-medxtln, sli foss, no vis ø, no show; ls: grey, medxtln, foss, dense | |
| | ls: as above; scat pcs w/ interbedded grey, green sh. | |
| | ls: brown, grey, medxtln, detrital, foss, calcitic, v. scat pr interxtln ø, no show | |
| | sh: lt. grey, grey, sli silty; brown, rust | |
| 2750 | sh: as above, few pcs grey sltst to vfn grained, shaley ss; no vis ø no show | |
| | sh: lt. grey, grey, micaceous, silty; some brown | |
| | sh: as above | |
| | ls: brown, dk brown, fn-medxtln, foss, sli ool, no vis ø, no show | |
| | ls: brown, grey, medxtln, detrital, foss, sli calcitic, tr pr interxtln ø, NS. ls: tan, fnxtln, chalky in part | |
| 2800 | ls: tan, fnxtln, chalky in part; sh: grey, chalky, soft | TOPEKA 2807 (-962) |
| | ls: tan, fnxtln, sli foss, soft, chalky; grey, fnxtln, shaley | |
| | ls: as above no show | |
| | ls: as above; w/ ls: brown, vfnxtln, sli foss, no vis ø; no show | |
| | sh: lt. grey, grey, sli micaceous sh: brown | |
| 2850 | sh: as above, sli silty | |
| | sh: lt. grey, grey, silty, sandy in pt; sltst & vfn grained ss; grey, well sorted, friable, no vis ø, no show | |
| | sh; sltst, ss; as above | |
| | ls: tan, brown, grey-brown, fn-medxtln sli foss, no vis ø, no show | |
| | ls: as above w/ ls: tan, lt. grey, fnxtln, soft, chalky | |
| 2900 | ls: off-wh, tan, fnxtln, v. sli sandy, chalky in part | |
| | ls: tan, lt. brown, grey, fn-medxtln, foss, sli calcitic, tr. pr interxtln ø, no show | |
| | ls: as above, no show | |
| | ls: as above, considerable wh, lt. grey, chalk | |
| | ls: lt. brown, brown, tan, fn-medxtln, sli ool, sli foss, granular in part, tr pr interxtln ø; NS: wh chalk | |
| 2950 | ls: tan, brown, grey, fn-medxtln, sli foss, granular in part; scat pr interxtln ø, no show | |
| | ls: tan, brown, grey, fn-medxtln, foss, mottled in part, no vis ø; NS | |
| | ls: as above w/ ls: tan, fnxtln, granular, soft, no vis ø; no show; ls: wh, fnxtln, chalky/wh chalk | |
| | ls: as above | |
| | sh: grey, some w/ ls & foss inclusions | |
| 3000 | ls: tan, brown, vfn-some medxtln, sli foss, no vis ø, no show | |
| | ls: as above; w/ ls: tan, fnxtln, sli granular, scat pr interxtln ø; N.S. | |
| | ls: tan, fn-medxtln, calcitic, granular, pr-some fr interxtln ø, no show: ls: grey, brown, fn-medxtln, foss, mottled, tr pr interxtln ø; no show | |
| | ls: as above; w/ wh, fnxtln, chalky ls | |
| | ls: same as above; inc in wh chalk | |
| | ls: tan, lt. brown, fn-medxtln, granular, sli foss & calcitic, scat app pr interxtln ø, no show; wh, fnxtln chalk | |
| 3050 | ls: brown, grey-brown, fn-medxtln, foss, mottled, no vis ø; no show | |
| | ls: tan, fn-medxtln, sli calcitic, scat pr interxtln ø, no show | |
| | ls: as above; w/ brown, vfn-fnxtln, ls: no app ø; no show | OREAD 3077 (-1232) |
| | ls: brown, medxtln, granular in part, calcitic, app pr interxtln ø; no show; wh, fnxtln, chalky ls | |
| | ls: tan, lt. brown, fn-medxtln, sli foss, sli oolitic, pr-fr interxtln ø, no show | |
| 3100 | ls: brown, grey, fn-medxtln, foss, mottled; w/ ls: as above; wh fnxtln chalky | |
| | ls: offwh, tan, fn-medxtln, sli foss, scat pr interxtln ø; no show, w/ wh, fnxtln, chalky ls | |
| | ls: as above w/ grey, medxtln, sli foss, mottled, no vis ø, no show | |
| | ls: offwh, tan, fn-medxtln, scat pr interxtln & vuggy ø, no show; ls: wh, fnxtln, chalky/wh chalk | |
| | ls: tan, lt. brown, vfn-fnxtln, no vis ø; ls: wh, fnxtln, chalky | |
| 3150 | ls: tan, brown, grey, fn-medxtln, v sli foss, mottled, no vis ø, no show | |
| | ls: as above; w/ wh, fnxtln, chalky, ls & wh chalk | |
| | ls: tan, lt. grey, fn-medxtln, tr pr interxtln ø; most dense, no show | |
| | sh: black, dk grey | HEEBNER 3184 (-1339) |
| | ls: brown, grey, micro-fnxtln, dense; sh: lt. grey, grey, some green, brown | |
| 3200 | ls: tan, fnxtln, granular, scat app pr intergranular ø, 3-4 pcs/tray w/ few bright ppts fluor, no cut natural, fr crush cut, few minute ppts FO & cpl gas bubbles w/ fluor ring, NSO, no vis st, no odor, most of spl soft, chalky | TORONTO 3200 (-1355) |
| | 3 clusters ss: grey, vfn grained, well-sorted, friable, no vis ø; few scat ppts fluor, v ft crush cut, NSO, st, or odor | DOUGLAS 3220 (-1375) |
| | sh: lt grey, grey, micaceous in part; sli silty, few pcs brown, rust sh | |
| | sh: as above | |
| 3250 | sh: as above w/ few clusters siltstone to vfn grained ss: grey, well-sorted, shaley, no vis ø, no show | |
| | sh: as above: few pcs siltstone a.a. | |
| | sh & siltstone as above | |
| | sh: lt grey, med grey, micaceous, few pcs brown | |
| | sh: as above, sli inc brown sh | |
| 3300 | sh: lt. grey, grey, micaceous, v sli silty | |
| | sh: as above | |
| | sh: as above; few pcs green-grey | LANSING 3328 (-1483) |
| | ls: dk brown, dk grey-brown, fn-med xtln, no vis ø, no show | |
| | sh: grey, med grey; considerable brown, rust | DST #1 (3367-3445) 30"-60"-60"-90" IFP: 1/2" BLOW BLDG TO 2 1/2" ISIP: NO BLOW FFP: NO BLOW (8") BLDG TO 2" FSIP: NO BLOW RECOVERED: 145' VSGCM w/ TR OIL HSP: 1650#-1600# FP: 22#-51#/56#-106# SIP: 1084#-1084# BHT: 110°F |
| 3350 | sh: as above | |
| | ls: brown, grey, fn-medxtln, sli foss, mottled in part, few pcs w/ v pr interxtln ø; no show | |
| | ls: as above w/ ls: tan, lt. brown, vfn-fn xtln, dense | |
| | sh: lt. grey, grey | |
| | ls: tan, brown, fn-medxtln, sli ool, sli foss, tr pr interxtln ø, cpl pcs w/ minute ppts FO on break, tr lt. spotty st; no odor | |
| | ls: tan, lt. brown, vfn-fnxtln, dense sh: grey | |
| 3400 | ls: tan, offwh, fn-medxtln, v sli calcitic, granular in part, scat pr interxtln ø & v pr vuggy ø, VSSFO w/ pr lt st & tr pr sat; no odor. | |
| | ls: as above w/ dec in ø & show; ls: brown, grey-brown, medxtln, sli ool, mottled in part, dense, few pcs grey sh | |
| | sh: lt. grey, grey, greenish-grey ls: tan, brown, some grey, fn-medxtln, sli foss, sli ool, scat pr-fr ft interxtln ø, pr isolated vuggy ø, VSSFO w/ few gas bubbles w/ oil ring, scat pr stain & sat, ft. fleeting odor | |
| | ls: brown, medxtln, ooc, sli ool, gd ooc ø, barren, no fluor, cut, st, odor. | |
| | ls: as above, gd ooc ø, no show | |
| 3450 | ls: tan, lt. brown, fn-medxtln, sli ool, no vis ø, no show | |
| | ls: off-wh, tan, brown, fn-medxtln, sli ool, no vis ø; Δ: wh, lt grey, fresh, opaque | DST #2 (3475-3610) 30"-60"-60"-90" IFP: BOB IN 24" ISIP: NO BLOW FFP: BOB IN 35" FSIP: NO BLOW RECOVERED: 150' GIP 150' VSOCWM (3% O, 47% W, 50% M) 125' VSOCMW (2% O, 16% M, 82% W) 315' VSMCW w/ few oil spks (3% M, 97% W) CHL: 91000 PPM SYS: 7200 PPM HSP: 1718#-1648# FP: 29#-171#/175#-289# SIP: 1123#-1114# BHT: 112°F |
| | ls: as above; w/ Δ mostly wh, fresh, opaque | |
| | ls: tan, brown, grey, fn-medxtln, dense; no show, w/ sh: grey, dk grey | |
| | ls: brown, medxtln, ool & ooc, gd ooc ø, cpl pcs w/ few minute ppts FO in calcite matrix, vast majority barren, no vis st, no odor; ls: tan, brown, fn-medxtln, dense | |
| 3500 | sh: grey, greenish-grey | |
| | ls: tan, grey, mostly fn-some medxtln, ool in part, v sli ooc, scat v pr interxtln ø & ooc ø, no fluor, cut, st, odor; NSO | |
| | ls: offwh, beige, fn-some medxtln, ool & ooc (some fine), gd ooc & pr interxtln ø, scat spotty bright ppts fluor, wk crush cut, VSSFO & few gas bubbles w/ oil ring on break, pr spotty st, no odor, most of spl barren. | |
| | ls: tan, brown, vfn-fnxtln, v sli ool, no vis ø; no show | STARK 3545 (-1700) |
| 3550 | sh: grey, dk grey | |
| | ls: offwh, lt. grey, fn-medxtln, oolitic in part, sli foss, vpr-pr intercolite & interxtln ø, most barren, few pcs w/ tr FO & scat pr spotty st; no odor | |
| | ls: tan, brown, grey-brown, micro-fnxtln dense; few pcs brown, fn-medxtln, sli ool, dense | |
| | ls: as above no vis ø no show | |
| | ls: as above | |
| | ls: brown, grey, fn-medxtln, scat grey, green sh matrix; no vis ø, NS | |
| | sh: grey, dk grey; few pcs brown | |
| 3600 | ls: brown, fn-medxtln, sli foss, ool in part, vpr-pr interool & interxtln ø, P-cpl pcs FSFO & G, pr-fr st w/ scat sat, ft-fr odor. sh: lt. grey, grey, green-grey, w/ scat ls inclusions. | BKC 3604 (-1759) |
| | ls: tan, grey, fn-medxtln, few streaks green sh, no vis ø, no show | |
| | sh: lt. grey, grey, green, some w/ ls inclusions; sh: brown, sli dolo; rust. | DST #3 (3582-3666) 30"-60"-30"-60" IFP: STEADY 1/2" BLOW FFP: NO BLOW RECOVERED: 25' MUD HSP: 1779#-1763# FP: 26#-31#/34#-34# SIP: 212#-119# BHT: 111°F |
| | sh: as above - calc, w/ brown, fn-med xtln (w/ green red shale streaks) ls: no vis ø, no show | |
| | ls: tan, vfn-fnxtln, few pcs w/ vpr interxtln ø, scat dd oil residue/dk brown 'scummy' oil, few gas bubbles, NSO; w/ | |
| 3650 | ls: tan, pelletal, siliceous cement w/ pcs laminated ls/Δ, v pr interxtln ø, few globules FO & FSG, pr blk to med | |
| | brown st; Δ mostly wh, fresh, some sli weathered, w/ pr ppt ø, VSSFO & FSG on break, pr black/brown st & sat, ft odor | |
| | sh: grey, greenish-grey, brown, rust; ls: tan, medxtln, reddish-brown sh matrix; few pcs Δ as above | VIOLA 3682 (-1837) |
| | Δ: wh, fresh-sli weathered (80%/20%), opaque, scat v pr ppt ø, scat ppt fluor, ft wk cut (fr crush cut), scat blk st & pr med brown st, VSSFO & FSG (slow bleed), scat tripolitic Δ: pr ppt/fine vuggy ø, fr-gd even st & sat, SSFO & G, ft odor; dolo: brown, vfnxtln, no-tr vpr interxtln ø, fr dull fluor, ft halo cut, vry gd crush cut, VSSFO & G, on brk | DST #4 (3648-3737) 30"-60"-60"-90" IFP: 1/2" BLOW BLDG TO 1 1/2" FFP: NO BLOW (32") THEN SURF BLOW BLDG TO 1/4" RECOVERED: 60' MUD w/ TR OIL HSP: 1920#-1770# FP: 54#-69#/73#-89# SIP: 878#-815# BHT: 112°F |
| 3700 | Δ & few pcs dolo: as above | |
| | Δ as above; w/ sh: grey, green, brown; ss: clear, fn grained, sub-rnd, fr sorting, w/ siliceous &/or green sh matrix; no vis ø; NS; few clusters ss: clear, fn-med grained, sub rnd - sub L'lar, pr sorting, hard, app pr intergrained ø (some siliceous/sh matrix), gd show FO, fr st, ft odor | SIMPSON 3724 (-1879) |
| 3750 | ss: grey, vfn-fn grained, sub-round, fr sorting, hard-friable, vry scat pr intergrained ø (mostly tite), pr dull fluor, wk slow cut, w/ isolated ppt FO, scat dd oil residue, no vis st, no odor: sh: green, sandy, grey, brown | |
| | sh: grey, green (sandy, fn-med grnd), brown, reddish brown. | |
| | sh: as above | ARBUCKLE 3787 (-1942) |
| | dolo: tan, lt. grey, off-wh, vfn-fnxtln, few pcs medxtln, app pr interxtln ø, spotty fluor, wk cut, scat VSSFO, pr spotty st, vry ft odor | |
| 3800 | dolo: tan, lt. grey, fn-medxtln, pr-some fr interxtln ø, cpl pcs w/ spotty dull fluor, no cut, few minute ppts FO, no st, no odor | DST #5 (3712-3797) 30"-60"-60"-90" IFP: BOB IN 2 1/2" ISIP: NO BLOW FFP: BOB IN 3" FSIP: NO BLOW RECOVERED: 124' VSO & GCMW (1% O, 2% G, 25% M, 72% W) 124' VSGCWM w/ TR OIL (2% G 18% W 80% M) 1172' MCW (30% M, 70% W) 576' VSMCW (2% M 98% W) CHL: 19000 PPM SYS: 8500 PPM HSP: 1819#-1819# FP: 111#-546#/552#-1033# SIP: 1341#-1341# BHT: 117°F |
| | dolo: tan, lt. grey, fn-medxtln, pr-fr interxtln ø, no show | |
| | dolo: mostly tan, some lt. grey, fn-few pcs medxtln, app pr interxtln ø, no show | |
| | dolo: offwh, lt. grey, some tan, fn-medxtln, few pcs rhombic, pr-scat fr interxtln ø, no show | |
| | dolo: as above | |
| 3850 | dolo: tan, lt. grey, few pcs lt. brown, fn-some medxtln, pr-scat fr interxtln ø, no show; few pcs wh, fresh, opaque Δ | |
| | dolo: as above | |
| | dolo: tan, lt. grey, fn-few pcs medxtln, pr-fr interxtln ø, no show; | |
| | dolo: as above; dolo: lt. grey, vfn-fnxtln, dense | |
| | dolo: tan, lt. grey, few pcs brown, fn-med xtln, pr-fr interxtln ø, no show. * considerable brown, grey, green sh | LTD 3896 (-2051) |
| 3900 | | RTD 3900 (-2055) |

DEPTH | LITHOLOGY | SAMPLE DESCRIPTIONS | OIL SHOWS | REMARKS

DRILLING TIME Minutes/Foot
Rate of Penetration Decreases