



## GEOLOGIST'S REPORT

OPERATOR **COBALT ENERGY, LLC**

LEASE **SD UNIT "A" # 1-19**

LOCATION **836 FSL & 2589 FEL**

SEC. **19** TWSP **6S** RGE **25W**

COUNTY **GRAHAM** STATE **KANSAS**

FIELD **ALLODIUM EAST**

CONTRACTOR **Murfin Drilling Company** RIG NO. **16**

COMMENCED **10 August 2013** COMPLETED **17 August 2013**

MUD DISPLACED **3106** MUD TYPE **Chemical**

DRILLING TIME KEPT FROM **3400** TO **3925**

SAMPLES SAVED FROM **3400** TO **3925**

SAMPLES EXAMINED FROM **3400** TO **3925**

GEOLOGICAL SUPERVISION FROM **3454** TO **3925**

GEOLOGIST ON WELL **Paul Gunzelman**

### ELEVATIONS

KB **2602 Ft.**

GL **2597 Ft.**

ALL MEASUREMENTS FROM K.B.

### CASING RECORD

Conductor **None**

Surface **8 5/8" @ 345'**

Production **5 1/2" @ 3919'**

### ELECTRICAL SURVEYS

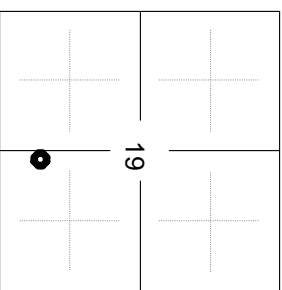
**Pioneer Energy Services**

Comp. Neutron Density

Dual Induction

Micro-resistivity

FORMATION NAME	LOG		SAMPLE	
	TOP DATUM	TOP DATUM	TOP DATUM	DATUM
Stone Corral	2170	+432	2172	+430
Base/Anhydrite	2203	+399	2205	+397
Topoka	3478	-876	3478	-876
Heebner Shale	3634	-1032	3636	-1034
Toronto	3656	-1054	3658	-1056
Lansing	3672	-1070	3674	-1072
Stark Shale	3826	-1224	3828	-1226
Base/Kansas City	3862	-1260	3864	-1262
Total Depth	3925	-1323	3925	-1323

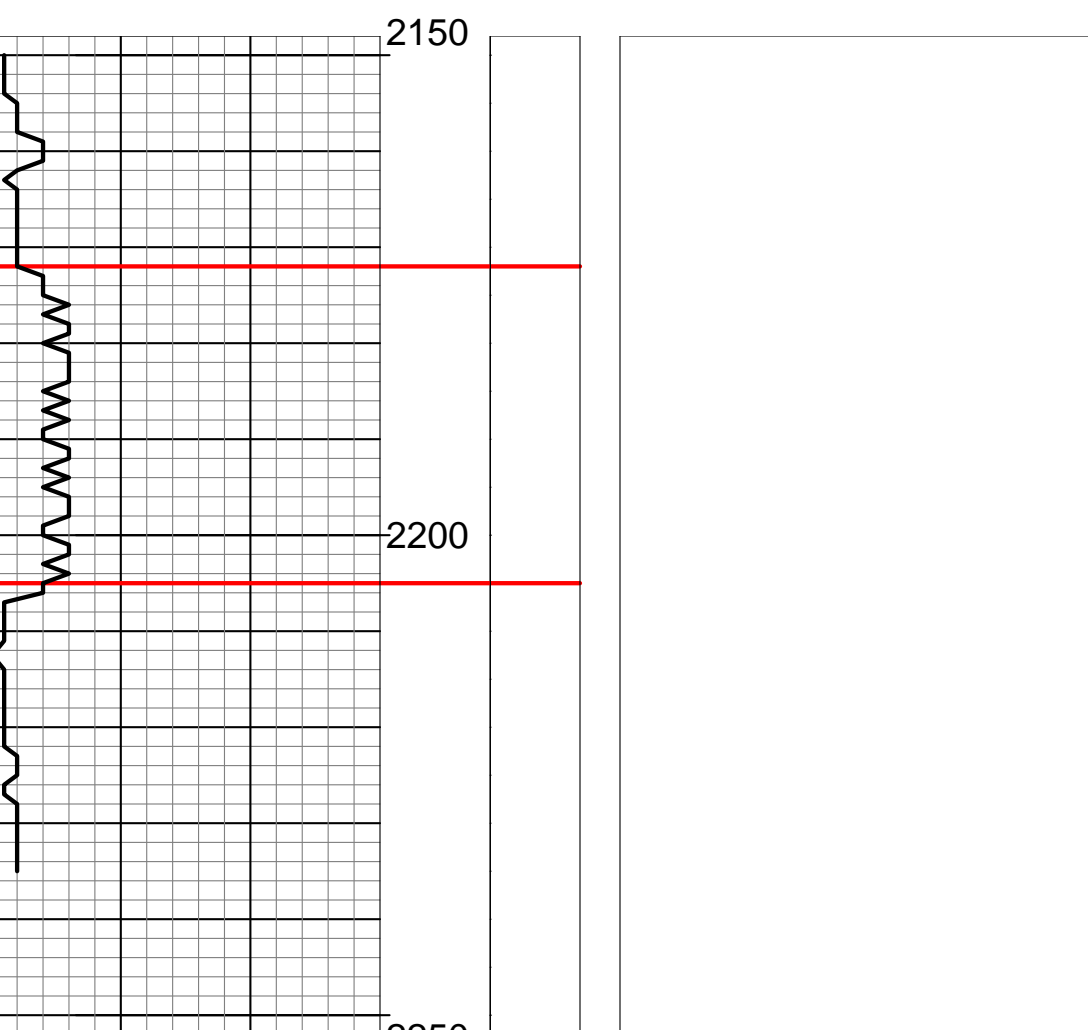


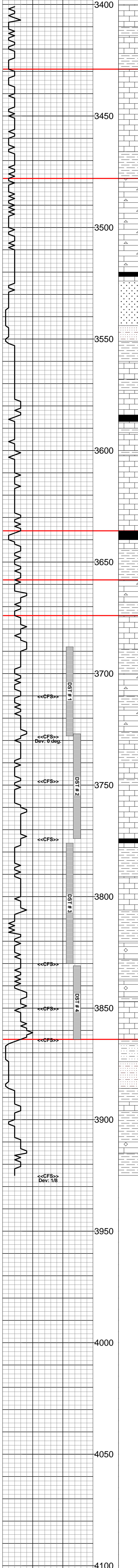
### REMARKS

API 15-065-23959-00-00  
 Drilling Fluids: Mud-Co./Service Mud, Inc. (Gary Schmidtberger, engineer)  
 Drill Stem Testing: Trilobite Testing, Inc. (Jeff Brown, tester)  
 Gas Trailer: No Gas Trailer  
 Reserve Pit Chlorides:

REMARKS	SAMPLE DESCRIPTIONS	SHOWS	LITHOLOGY	DEPTH	DRILL TIME (MIN/FT)
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STONE CORRAL 2172 (+430)
BASE/ANHYDRITE 2205 (+397)





Ls: Crm, fxln, foss, sli ool, tr sbchky, intbd gy fis occ slty sh.

Ls: Tn-gy, fn-vfxln, smwt arg, tr pyr, dns, n/s.

Sh: Rd-brn, fis-blky, ea, occ gum.

Ls: Crm-lt gy, fxln-gran, chky, sli ool, fr intgran por, n/s.

Ls: Crm-gy, fxln, sbchky, tr org rem, tr glauc, n/s.

Ls: Crm-v.lt gy, fxln-gran, v.chky, tr org rem, some arg, fr pp por, n/s.

Ls: Wh-crm, fxln-gran, tr lt yel ool, chky, occ dol, n/s.

Ls: Crm, fxln-gran, foss, some chky, intbd v.dk gy-blk fis sh, n/s.

Sh: Rd-brn, blky, ea occ gum.

Ls: Wh frag, ool, cons spr calc, n.v.p, n/s.

Ls: Crm-tn, tr v.lt gy, fxln, tr gran, sli foss, chky, cons lt gy wh & amb op vit cht, pr pp por, n/s.

Ls: Crm, fxln, foss (Fus) cons chk, some spr calc, fr pp por, n/s.

Ls: Crm, fxln, chky, tr org rem, some wh-crm op vit cht, bcm gy fn-vfxln & arg, n.v.p.

Sh: Blk, v.thn fis, carb, some tn-gy fxln ool dns Ls.

Sd: Gy & lt gy, wvfn, wlsrt sbrnd sli calc, some arg, sbfri-wlcm, occ slty, gd intgran por, n/s.

Slst: V.lt gy sli calc, arg in pt, some mica.

Sh: Lt rd-brn blky ea gum.

Ls: Crm, fxln-co gran, sbchky-chky, sli ool, tr org rem, cons amor calc, n/s.

Sh: Dk gy & gn-gy fis, some slty, tr carb mat.

Ls: Crm-gy, fxln, tr org rem, some sbchky, occ arg.

Sh: Blk fis carb.

Ls: Crm, fxln, sli chky, tr org rem, some arg-shly, n.v.p.

Ls: Crm, fxln-gran, chky, tr org rem & spr calc, some dolo, n/s.

Ls: Crm, fxln, ool, sbchky, some sec calc, pr intool por, n/s.

Ls: Crm-lt gy, fxln, sbchky, some rexldz, tr foss, pr-fr pp por, n/s.

Ls: Lt gy, fn-vfxln, sli arg-shly, foss (Brach) dns.

Sh: Blk & v.dk gy, thn fis, carb.

Ls: Tn, vfxln, tr foss, dns.

Sh: Gy gy-gn & dk gy, fis, tr carb mat, some lt rd-brn blky ea gum sh.

Ls: Wh-crm, fxln, sli ool, tr sbchky, some gran & dol, tr wh-tn op vit cht, pr intgran por, n/s.

Sh: Gy-gn lt gn, fis, some calc, tr slty.

Ls: Crm-v.lt gy, fn-vfxln, sbchky, tr org rem, n.v.p, n/s.

Ls: Crm, fxln, tr ool, some lt gy vfxln dns pyr Ls, tr wh-crm op cht, n.v.p.

Sh: Rd-brn mar & brn, thk fis-blky ea, some gum bcm gy-gn fis.

Ls: Wh-crm, fxln sli ool & foss, blk gy & blu-gy mott op cht, pr-fr pp & intool por, gd odor, sli shw med brn O, med brn spty-sbsat stn.

Sh: Gy-gn & lt gn, fis, some calc, occ slty, bcm rd-brn thk fis, ea, tr gum.

Ls: Crm-gy, fn-vfxln, smwt arg, tr foss (Brach) some crm op vit cht, n.v.p, n/s.

Ls: V.lt gy, vfxln, tr wthd-sbchky, dns, some arg, n/s.

Sh: Rd-brn tr yel, thk fis-blky, ea.

Ls: Crm-lt gy, fxln-gran, tr wthd, pr-fr pp & intgran por, fr odor, v.sli shw FO, spty med brn stn.

Ls: Crm, fn-vfxln, sbchky, tr spr calc, pr intxln por, no odor, no FO, tr lt brn edge stn, cons intbd gy-gn fis pyr sh.

Ls: Wh-crm, fxln-gran, sli ool, tr sbchky, some spr calc, fr intgran por, sli odor, no shw FO, lt spty stn.

Ls: Crm, fxln, sbchky, tr chky, occ v.lt gy & v.lt gy-gn arg Ls, n.v.p, n/s.

Ls: Crm, fxln, sbchky, tr org rem & spr calc, lt or wh & crm op-tmsl frs cht, n.v.p.

Sh: Blk thn fis, carb, bcm dk gy & gn-gy fis occ slty sh, some intbd tn-brn fxln sli arg dns Ls, tr org rem.

Sh: Lt gy gum, some rd-brn & mar fis-blky ea sh.

Ls: V.lt gy tr crm, fn-vfxln, sli ool, sbchky, occ arg, scat pr-fr pp por, pr intool & vug por, fr odor, fr shw FO, spty lt stn, tr sat stn.

Ls: Crm-tn tr gy, fxln, occ sbchky, sli foss (Fus) some amor calc, n.v.p.

Sh: Blk-v.dk gy, some carb, bcm gy-gn fis calc.

Sh: Rd-brn tr purp, fis, ea, tr gum intbd tn-brn frag foss (Fus) sli ool arg Ls, n/s.

Ls: Crm-tn, frag, tr fxln, ool, tr foss (Fus) some sbchky, fr-gd intool & pp por, pr foss cast & vug por, v.sli odor, sli shw med brn FO, sbsat-sat stn, cons blk dd O res.

Sh: Dk gy-gn fis-thk fis, tr carb mat, bcm rd-brn v.lt rd-brn & mar-gy mott, blky, occ slty, some gum.

Ls: Wh-v.lt gy, fn-vfxln tr sbchky, sli ool & foss (Fus), pr pp & intxln por, tr pr-fr vug por, fr odor, sli shw lt brn O, sli shw G, med brn patchy stn, tr blk asph res.

Ls: Crm-tn, fxln, some medxln, occ sbchky, r.org rem, pr pp & foss cast por, v.sli odor, no FO, spty lt stn.

Ls: Crm, fn-vfxln, sbchky, r.pyr, n.v.p, n/s.

Sh: Gy gy-gn gn brn, tr yel, fis, tr pyr, some rd-brn ea & lt rd-brn gum sh, intbd lt gn & lt gy sli calc arg slst.

Sh: Rd-brn thk fis-blky, ea, occ gum cons gy-gn fis sli pyr sh, intbd rd-brn arg sli mica slst.

Ls: V.lt gy, fn-vfxln, smwt arg, occ wthd-sbchky, tr glauc, n.v.p, n/s.

Sh: Rd-brn lt rd-brn some mar & brn, occ mott w/gy, fis-blky tr slty, occ gum.

Ls: Wh-crm, fxln-frag, ool, occ sbchky, cons sec calc, n.v.p, n/s.

Sh: Lt rd-brn blky, ea v.gum, some v.lt gy fxln frac Ls mott w/dk rd-brn sh, n/s.

11:00 am, 13 August 2013

**HOWARD**  
3429 (-827)

**TOPEKA**  
3478 (-876)

Mud-Co mud check @ 3728'  
Vis: 60, Wt: 9.0, WL: 6.8  
Chlor: 1,100 ppm, LCM: 2#

**HEEBNER SHALE**  
3636 (-1034)

**TORONTO**  
3658 (-1056)

**LANSING**  
3674 (-1072)

DST # 1 3688 - 3728  
30"-60"-60"-90"  
IF: 6d blow, BOB in 12 min.  
FF: 6d blow, BOB in 17 min.  
RECOVERY:  
283 Ft. Gas In Pipe  
25 Ft. Clean Oil  
(31 grav. API)  
63 Ft. Gas Cut Muddy Oil  
(5%Gas 40%Mud 55%Oil)  
63 Ft. Very Sli. Gas Oil & Wtr Cut Mud  
(8%Gas 2%Oil 20%Wtr  
20%Mud)Water, SO  
(Chlor: 42,000 ppm)  
IHP: 1824 psi. FHP: 1790 psi.  
IFP: 25-85 psi. ISIP: 1024 psi.  
FFP: 94-167 psi. FSIP: 1020 psi.  
BHT: 114 deg. F.

Mud-Co mud check @ 3781'  
Vis: 53, Wt: 9.1, WL: 7.8  
Chlor: 1,200 ppm, LCM: 2#

DST # 2 3727 - 3774  
30"-60"-60"-90"  
IF: Weak blow bldg to 3 1/4 inches  
FF: Weak blow bldg to 8 inches  
RECOVERY:  
79 Ft. Gas In Pipe  
75 Ft. Heavy Oil Cut Mud  
(10%Gas 25%Oil, 65%Mud)  
IHP: 1847 psi. FHP: 1766 psi.  
IFP: 18-41 psi. ISIP: 1107 psi.  
FFP: 40-51 psi. FSIP: 1096 psi.  
BHT: 110 deg. F.

Mud-Co mud check @ 3864'  
Vis: 53, Wt: 9.3, WL: 6.8  
Chlor: 900 ppm, LCM: 1 #

**BASE/KANSAS CITY**  
3864 (-1262)

DST # 3 3776 - 3830  
30"-60"-60"-90"  
IF: Strong blow, BOB in 1.5 min.  
ISI: Bled off, BOB blow in 5 min.  
FF: Strong blow, BOB in 2 min.  
FSI: Bled off, BOB in 22 min. GTS  
RECOVERY:  
123 Ft. Mud Cut Oil  
1588 Ft. Clean Gassy Oil  
(25% Gas, 75% Oil, 36 Grav. API)  
IHP: 1892 psi. FHP: 1799 psi.  
IFP: 110-338 psi. ISIP: 1172 psi.  
FFP: 368-676 psi. FSIP: 1131 psi.  
BHT: 116 deg. F.

**TOTAL DEPTH**  
3925 (-1323)  
7:40 PM, 16 August 2013

DST # 4 3831 - 3864  
30"-60"-60"-90"  
IF: Strong blow, BOB in 1.25 min.  
ISI: Bled off, BOB return in 18 min.  
FF: Strong blow, BOB in 2 min.  
FSI: Bled off, BOB return in 11 min.  
RECOVERY:  
1502 Ft. Gas In Pipe  
822 Ft. Clean Gassy Oil  
(30%Gas 70%Oil, 35 Grav. API)  
315 Ft. Mud & Water Cut Oil  
(15%Mud, 15%Wtr, 70%Oil)  
63 ft. Sli. Oil & Water Cut Mud  
(5%Oil, 45%Wtr, 50%Mud)  
60 Ft. Water, Show Oil  
(Chlor: 35,000 ppm)  
IHP: 1851 psi. FHP: 1851 psi.  
IFP: 94-283 psi. ISIP: 997 psi.  
FFP: 293-511 psi. FSIP: 974 psi.  
BHT: 117 deg. F.

Operator: **COBALT ENERGY, LLC**

Lease: **SD UNIT "A" # 1-19**

Location: **836 FSL & 2589 FEL SEC. 19 TWSP 6S RGE 25W**

County: **GRAHAM** State: **KANSAS**