



GEOLOGIST'S REPORT

OPERATOR **MURFIN DRILLING COMPANY, INC.**

LEASE **PATTI # 2-10**

LOCATION **1980 FSL & 660 FWL**

SEC. **10** TWSP **1S** RGE **37W**

COUNTY **CHEYENNE** STATE **KANSAS**

FIELD **JONES CANYON SOUTHEAST**

CONTRACTOR **Murfin Drilling Company** RIG NO. **14**

COMMENCED **10 April 2013** COMPLETED **22 April 2013**

MUD DISPLACED **3301** MUD TYPE **Chemical**

DRILLING TIME KEPT FROM **3480** TO **4680**

SAMPLES SAVED FROM **3480** TO **4680**

SAMPLES EXAMINED FROM **3480** TO **4680**

GEOLOGICAL SUPERVISION FROM **3455** TO **4680**

GEOLOGIST ON WELL **Paul Gunzelman**

FORMATION NAME	LOG TOP DATUM	SAMPLE TOP DATUM
Stone Corral	3124 +52	3125 +51
Base/Anhydrite	3156 +20	3158 +18
Foraker	3688 -512	3689 -513
Topoka	3912 -736	3915 -739
Lansing	4124 -948	4125 -949
Stark Shale	4341 -1165	4344 -1168
Base/Kansas City	4398 -1222	4400 -1224
Pawnee	4518 -1342	4519 -1343
Cherokee	4607 -1431	4611 -1435
Total Depth	4680 -1504	4680 -1504

ELEVATIONS

KB **3176 Ft.**

GL **3166 Ft.**

ALL MEASUREMENTS FROM K.B.

CASING RECORD

Conductor **None**

Surface **8 5/8" @ 224'**

Production **5 1/2" @ 4679'**

ELECTRICAL SURVEYS:

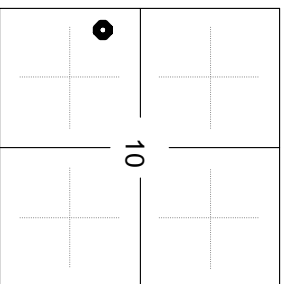
Pioneer Energy Services

Comp. Neutron Density

Dual Induction

Micro-resistivity

Comp. Sonic



REMARKS

API **15-023-21363-00-00**

Drilling Fluids: **Morgan Mud, Inc. (Mike Morgan, engineer)**

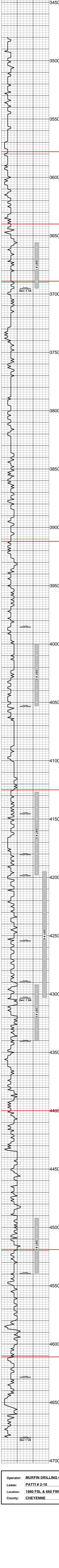
Drill Stem Testing: **Trilobite Testing, Inc. (Ryan Nichols, tester)**

Gas Trailer: **No Gas Trailer**

Reserve Pit Chlorides: **1,800 ppm.**

REMARKS	SAMPLE DESCRIPTIONS	SHOWS	LITHOLOGY	DEPTH	DRILL TIME (MIN/FT)
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Stst: Rd-brn rd-or, v. arg-shly, some sdy, tr v. lt gnc calc slst.

Stst: V. lt gy & gy-gn, sli calc, occ arg.

Sh: Rd-or & lt rd-brn, blkly, sily, some gum.

Stst: Rd-brn, v. arg-shly, some sdy, tr calc & chky.

Sh: Rd-brn & lt rd-brn, blkly, v. sily, some gum, tr brn arg slst.

Sh: Rd-brn lt rd-brn tr rd-or, blkly gum occ sily.

Sh: Rd-brn, blkly, v. gum, tr sily.

Stst: Rd-brn, tr rd-or, v. arg-shly, occ sdy.

Ls: Crm-v. lt gy, dol, fnly gran, tr amor calc, tr intgran por, n/s.

Ls: Crm, gran-frag, ool, sbchky, some arg, n/s.

Sh: Rd-brn, blkly, sily, occ gum, some sdy.

Sd: Rd-brn, arg, v. sily & arg, tr mica, n/s.

Sd: Rd-brn, v. arg, some sily, intbd rd-brn blkly sh.

Sh: Rd-brn, blkly, gum, much sily-sdy.

Sh: Dk gy, fis, sli pyr.

Ls: Crm-v. lt gy, fn-vfxln, tr microxin, some arg, tr amor calc.

Ls: Lt gy, fn-vfxln, occ amor calc, cons rd-or rd & dk rd-brn op cht, intbd gn sily calc sh, n/s.

Ls: Tr-brn, fn-vfxln, sli ool, tr org rem, some arg, n.v.p.

Stst: Rd-brn, arg sdy in pt, intbd rd-brn & lt rd-brn blkly occ gum sh.

Sh: Rd-brn & tn, fis-biky, much gum, occ sily-sdy.

Ls: Gy, gran-frag, ool, tr sbchky, pr-fr intgran & intool por, gd shw dk brn-blk FO, v. dk brn sbst stn, sli odor.

Stst: Dk rd-brn brn-mar, arg-shly, some calc-lmy, occ sdy.

Ls: Dk gy-brn, tr crm, fxln foss (Fus) tr amor calc, some arg-shly, intbd dk gy fis sh.

Ls: Crm, occ crm-lt gy, fxln foss, tr ool, some arg, n.v.p.

Ls: Lt gy, fxln, pry arg-shly in pt, intbd dk gy fis sh.

Ls: Crm-in, fxln-gran, dol, sli chky, tr ool, fr intgran & pp por, n/s.

Sh: Dk gy, fis, pyr, tr org rem, some v. dk gy carb sh.

Sh: Rd-brn, blkly, ea, some sily, tr gum, v. lt rd-brn lmy sh in pt.

Ls: Crm, fxln, ool, cons sec calc, tr sbchky, some crm-in op frs cht, n.v.p.

Stst: Gy lt gy-gn v. lt rd-brn, tr yel, arg some calc-lmy, rd-brn & mar intbd sh.

Sh: Rd-brn prk & lt rd-brn, blkly, ea occ sily, tr gum, few pcs rd-brn vfxln arg Ls, some lt gn sbwgy sh.

Ls: V. lt gy, tr yel gran sli arg, sily, n/s.

Sh: Rd-brn & lt rd-brn, blkly, ea occ sily, tr gum, few pcs rd-brn vfxln arg Ls, some lt gn sbwgy sh.

Ls: Crm, fxln, ool, foss, cons spr calc, sli glauc, n.v.p.

Stst: Lt gy & gn-gy arg, some calc-lmy, sli pyr, intbd dk gy & gn-gy fis sh, tr carb mat.

Ls: Crm, fxln, ool, cons sec calc, occ sbchky, tr pyr, cons blk dd O res, no odor, n.v.p.

Sh: Lt rd-brn, blkly sily, some gum.

Ls: Crm, fxln, cons org rem, v. chky-sbchky, some spr calc, n.v.p.

Ls: Crm-lt gy, occ lt gn yel & rd-brn, fxln sli ool, some arg-shly, n/s.

Ls: Crm-lt gy, fxln, ool, sbchky, some spr calc & pyr, tr blk dd O res.

Sh: Rd-brn ea occ gum, tr sily.

Ls: Crm-v. lt gy, occ lt gn-gy tr yel, fxln foss, sli ool, some arg, n.v.p.

Sh: Rd-brn, blkly, sily, occ calc-lmy, tr gum.

Sh: Lt rd-brn, blkly, gum, some dk brn & dk rd-brn sily calc sh.

Ls: V. lt gy, some crm & yel, fxln, sli ool & foss, tr sbchky, occ mott wrd-brn sh, n.v.p, n/s.

Ls: Lt gy-crm, much rd-brn prk yel & lt purp, fn-vfxln, tr ool, arg, some sbchky, n/s.

Sh: Rd-brn thk fis, ea, some sily, tr calc.

Ls: Crm & lt gy, fn-vfxln, sbchky, sli foss, much mott wrd-brn sh, tr crm & prk op cht, n/s.

Ls: V. lt gy fn-vfxln, sbchky, tr org rem, some lt gy-gn & arg, intbd lt rd-brn gum sh.

Sh: V. dk gy, fis-biky sily, tr carb, bcm rd-brn dk rd-brn & yel biky ea occ sily sh.

Ls: Wh-crm, fxln ool sbchky-chky, cons spr calc, n.v.p, n/s.

Ls: Crm fxln-gran, sbchky, sli ool & foss, some spr calc, fr pp & intgran por, n/s.

Ls: Crm-v. lt gy, fxln, chky, some arg, n/s.

Sh: V. lt gy-gn, fis, calc, some gum, bcm rd-brn blkly ea sily occ calc sh, lt rd-brn gum sh.

Sh: Rd-brn fis-biky, v. gum, tr sily some v. dk gy fis sh & crm fxln sli foss Ls.

Sh: Lt gy & lt gy-gn sily v. gum, some dk gy fis occ carb sh, crm-in fxln foss Ls, n/s.

Ls: Crm tr v. lt gy, fn-vfxln, some v. amtl ool, chky, sli pyr, pr-fr pp por, scat vug por, fr shw v. dk brn FO, sply dk stn, no odor.

Sh: Dk gy fis, some carb mat, cons rd-brn thk fis sh.

Ls: Crm, fxln, sli foss (Fus) sbchky, tr pyr, n/s.

Ls: Gy, some tn-gy fn-vfxln, chky, occ arg, gen dns, n/s.

Ls: Crm-gy, vfxln withd-sbchky in pt, n.v.p.

Stst: V. lt gy & lt gn, tr tn, occ arg-shly, some calc, cons blk dd O res, intbd v. lt gn gum sily sh.

Sh: Lt rd-brn ea gum, some rd-brn v. sily sh.

Sh: Rd-brn tr brn, thk fis-biky, sily, occ gum, some v. dk gy fis pyr sh.

Ls: V. lt gy, fxln, tr gran, pyr, tr spr calc, pr pp por, v. sli shw dk brn FO, sply-sbsat stn, no odor.

Ls: Crm-in, vfxln-microxin dns, tr frac, some withd, n/s.

Ls: Lt gy-in microxin, occ withd-sbchky, tr frac & spr calc, some intbd gn-gy fis calc sh, n/s.

Sh: Lt rd-brn ea gum, intbd crm-tn fxln sli foss withd Ls, tr pyr.

Stst: Rd-brn tr brn, v. arg-shly, some sdy.

Stst: Rd-brn dk rd-brn some sdy, v. arg, cons lt rd-brn gum sh, n/s.

Sh: Lt rd-brn v. gum & sft, some lt gn-gy calc-lmy arg slst w/blk dd O res, no FO, no odor.

Ls: V. lt gy, fxln, sli pyr, tr ool & org rem, some dru & spr calc, pr-fr pp por, scat fr vug por, gd shw blk FO, sply v. dk stn, no odor.

Ls: Wh-crm, fxln, tr microxin, sli pyr, occ sbchky, n.v.p, n/s.

Sh: Rd-brn thk fis-biky, ea.

Ls: Crm-in, fxln, sbchky, dns, n/s.

Sh: Dk gy & gy-gn, fis, occ calc, much rd-brn ea sh.

Sh: Rd-brn blkly, some gum tr lt gy-gn gum sh & gy-in v. calc foss sily sh.

Ls: Crm, tr v. lt gy, sli ool, r. pyr, pr pp por, v. sli shw FO, dk spty stn, no odor.

Ls: Crm-wh, fxln, tr pyr & ool, sbchky in pt, n.v.p.

Ls: Crm-gy, fxln, chky-sbchky, some lt gy-gn v. arg-shly, n.v.p.

Sh: V. lt gy & v. lt gn-gy calc gum, v. sft, tr dk gy fis smwt carb sh.

Sh: Rd-brn blkly, sily, some gum, cons lt gn-gy calc gum sh, intbd crm-brn mott arg Ls, n.v.p., blk dd O res, no FO.

Ls: Crm, fxln sbchky, tr foss (Fus) & spr calc, n.v.p, n/s.

Ls: Crm, fxln, tr pyr occ sbchky, bcm tn-gy fxln dns, n.v.p, n/s.

Ls: Dk gy-gn-gy fis, some calc.

Ls: Crm, fxln, some org rem, sbchky, pr pp por, r. shw blk O, v. spty stn, no odor, some blk asph res.

Sh: Rd-brn, thk fis-biky ea occ gum, intbd dk gy fis sh, gn & gy-gn sli pyr sh & gy-lt gn sli calc slst.

Sh: Rd-brn & dk rd-brn blkly sily.

Ls: Wh-crm, fxln, v. chky, r. org rem, tr pp por, fr v. dk brn FO, some blk dd O res, no odor.

Ls: Crm-v. lt gy-gn & arg, n.v.p.

Sh: V. dk gy, fis, sli pyr, some carb, bcm gn-gn & olv gn fis occ sily.

Sh: Rd-brn blkly ea cons rd-brn brn & gy v. arg mica slst.

Ls: Crm lt gy-gn mott wrd-brn sh, fxln, n.v.p.

Ls: Crm lt gy tr tn, fxln, some mott w/lt gn sh, tr foss.

Sh: Dk gy-brn dk gy-gn, fis-thk fis, bcm rd-brn rd-or & brn, fis-biky sily, occ sily.

Ls: Crm-v. lt gy, fxln, sli ool, tr spr calc, much mott wrd-brn sh, n.v.p.

Ls: V. lt gy, fxln pyr, tr sbchky.

Sh: Dk gy, fis, occ sily, cons rd-brn ea sh.

Ls: Crm-in, fxln, tr vfxln, withd-sbchky in pt, tr org rem, gen dns, n/s.

Sh: Rd-brn, thk fis, tr blkly & sily, much gum.

Ls: Lt gy & purp mott, vfxln, frac tr amor calc some tn & yel vfxln ool Ls, dns, n/s.

Sh: V. dk rd-brn purp mar & gy-brn, thk fis, tr v. dk gy fis sh, some crm-lt gy fxln-gran sbchky sily Ls, tr foss (Brach).

Sh: Rd-brn fis, occ sily, tr gum.

Sh: Lt rd-brn blkly sily, some gum.

Stst: Rd-brn blkly v. arg, intbd olv gn gy & dk gy fis sh, tr lt gn sbwgy sh.

Ls: Wh v. lt gy & crm, fn-vfxln, some mott w/ purp & v. dk mar sh, tr sbchky, dns, n/s.

Sh: Gy blkly gran v. calc-lmy chky sily.

Sh: Gy-brn med gy, blkly, calc-lmy intbd crm fxln sbchky Ls, n/s.

Sh: Rd-brn ea gum, tr sily.

Ls: Wh-v. lt gy, frag ool, cons chk, tr spr calc, fr intool por, fr shw FO, lt brn spty-sbsat stn, no odor.

Ls: Trn-gy, fxln, r. org rem, smwt arg, tr withd, n.v.p, n/s.

Ls: Gy-brn gy-gn, fxln, arg-shly, some chky, tr foss (Brach) occ silic, n/s.

Ls: Trn, occ tn-gy, fxln sli ool, some arg, n.v.p.

Sh: Gy-gn fis calc, occ lmy, some v. dk gy-bk thn fis carb sh.

Ls: Trn-gy & gy-brn fxln-gran, some withd-chky occ arg, n.v.p, n/s.

Ls: Gy, some crm-gy brn-gran, tr withd, occ arg, n.v.p, n/s.

Ls: Crm-gy tr gn-gy, fxln sli chky, tr org rem, n.v.p.

Sh: Blk, some v. dk gy-brn fis carb.

Sh: Gy-gn & gn-gy fis-biky pyr tr carb mat, intbd crm-in vfxln-chky Ls, n/s.

Ls: Crm, fxln-gran, tr ool & org rem, occ sbchky, pr intgran por, n/s.

Ls: Crm fxln, much sbchky, tr org rem, n.v.p.

Sh: Dk gy & dk gy-brn, fis, some carb, bcm gy-gn fis sli calc.

Ls: Crm, tr crm-in fxln sli foss, some sbchky, bcm crm-v. lt purp gran, aren, some spr calc, n/s.

Sd: Crm lt gy, vfn-fn wl-cmt, sli mica, cons or & brn inc, n/s.

Ls: Lt gy-in fxln sbchky, tr org rem, some mott w/amar & pyr sh, n.v.p, n/s.

Sh: Dk rd-brn, some purp dk gy & yel, tr sbwgy.

Ls: Trn-v. lt gy, fxln occ sbchky, n.v.p.

Sh: Rd-brn dk gy & yel, blkly, some wxy tr sdy, intbd crm-lt gy vfn-fn wl-srt sbfrl Sd clus, occ calc glauc & arg, n/s.

Ls: Crm-v. lt gy, some tn & lt yel, fxln sbchky, tr org rem, occ arg, n/s.

Sh: Dk rd-brn mar & dk brn, some yel & gy-gn wxy occ sdy, tr purp & rd-brn arg Ls, n/s.

6:20 PM, 14 April 2013

NEVA
3578 (-402)

RED EAGLE
3640 (-464)

Morgan Mud check @ 3695'
Vis: 64, Wt: 8.9, WL: 5.6
Chlor: 1,000 ppm, LCM: 4#

FORAKER
3689 (-513)

DST # 1 3656 - 3695
30°-60°-30°-90°
IF: Weak 3/4 inch blow
FF: No blow
RECOVERY:
5 Ft. Gas & Oil Cut Mud
(5%Gas, 35%Oil, 60%Mud)
IHP: 1848 psi. FHP: 1733 psi.
IFP: 16-19 psi. ISIP: 1002 psi.
FFP: 18-20 psi. FSIP: 1065 psi.
BHT: 124 deg. F.

TOPEKA
3912 (-736)

Morgan Mud check @ 3966'
Vis: 60, Wt: 9.5, WL: 8.0
Chlor: 1,000 ppm, LCM: 6#

DST # 2 4000 - 4053
30°-60°-30°-90°
IF: Very weak surface blow
FF: No blow
RECOVERY:
2 Ft. Oil Cut Mud
(25% Oil, 75% Mud)
IHP: 1986 psi. FHP: 1972 psi.
IFP: 16-17 psi. ISIP: 160 psi.
FFP: 17-17 psi. FSIP: 223 psi.
BHT: 129 deg. F.

LANSING
4125 (-949)

DST # 3 4127 - 4198
30°-60°-30°-90°
IF: Fair blow incr. to 6 1/4 inches
FF: No blow
RECOVERY:
120 Ft. Gas Cut Muddy Oil
(5%Gas, 45%Mud, 50%Oil)
IHP: 2031 psi. FHP: 1984 psi.
IFP: 34-45 psi. ISIP: 1288 psi.
FFP: 50-62 psi. FSIP: 1293 psi.
BHT: 131 deg. F.

DST # 4 4195 - 4303
30°-60°-30°-90°
IF: Very weak 1/2 inch blow
FF: No blow
RECOVERY:
2 Ft. Mud
IHP: 2151 psi. FHP: 2093 psi.
IFP: 18-21 psi. ISIP: 190 psi.
FFP: 21-23 psi. FSIP: 133 psi.
BHT: 129 deg. F.

Morgan Mud check @ 4289'
Vis: 51, Wt: 9.3, WL: 6.0
Chlor: 900 ppm, LCM: 6#

DST # 5 4292 - 4340
30°-60°-30°-60°
IF: Very weak 1/2 inch blow
FF: No blow
RECOVERY:
5 Ft. Mud
IHP: 2178 psi. FHP: 2142 psi.
IFP: 18-25 psi. ISIP: 1020 psi.
FFP: 23-35 psi. FSIP: 843 psi.
BHT: 130 deg. F.

BASE/KANSAS CITY
4400 (-1224)

Morgan Mud check @ 4539'
Vis: 68, Wt: 9.3, WL: 6.0
Chlor: 900 ppm, LCM: 4#

PAWNEE
4519 (-1343)

DST # 6 4492 - 4539
30°-60°-30°-90°
IF: Fair blow incr. to 7 inches
FF: Fair blow incr to 80B in 35 min.
RECOVERY:
50 Ft. Gas In Pipe
170 Ft. Clean Oil
(37 Gas, API)
(20%Gas, 30%Mud, 50%Oil)
IHP: 2168 psi. FHP: 2198 psi.
IFP: 18-51 psi. ISIP: 786 psi.
FFP: 52-103 psi. FSIP: 768 psi.
BHT: 141 deg. F.

CHEROKEE
4611 (-1435)

TOTAL DEPTH
4680 (11504)

5:04 AM, 21 April 2013

Operator: MURFIN DRILLING COMPANY, INC.
Lease: PATTI # 2-10
Location: 1980 FSL & 660 FWL SEC. 10 TWP 1S RGE 37W
County: CHEYENNE State: KANSAS