



Empirica

Scale: 5" / 100'
Measured Depth Log

Well Name Bock 3-1H

Location Sec 3, T26S, R11W

State Kansas

County Pratt

Country United States

Rig Number HWD #14

API Number 15-151-22428-01-00

AFE # 131891

Spud Date 1/17/2014

Drilling Completed 2/5/2014

Surface Coordinates 278' from South Line & 153' from East Line

Ground Elevation 1839

K.B. Elevation 1854

Logged Interval 1920 To 8860'

Total Depth 8860'

Formation Mississippi Chat

Type of Drilling Fluid Water Based

Operator

Company Seneca Resources Corp.

Address McCandless Corporate Center
5800 Corporate Drive, Suite 300
Pittsburgh, PA 15237

Geologist

Name Paul Campbell/ Ed Knight

Company ALS Empirica

Address 609 Westland Drive
Edmond, Ok 73013

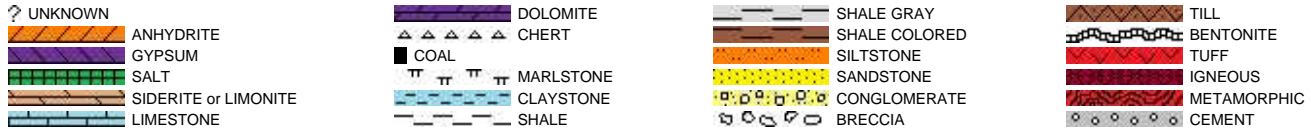
Other

Product Description Regular 2 Man Logging Services
Logging Began: 1-20-2014
Released: 2-6-2014

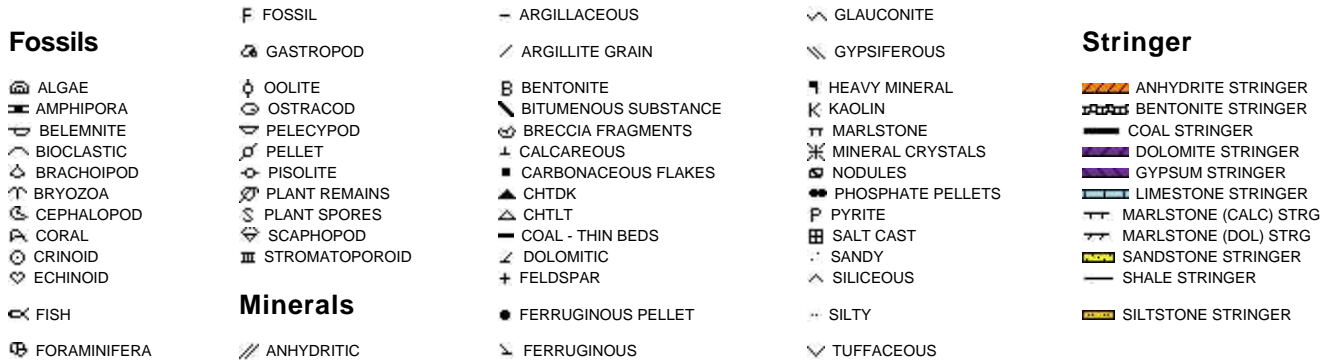
Equipment MLogger: # 364

Calibration Standard Calibration for Redbox
Total Gas & Chromatograph

Rock Types



Accessories



Other Symbols



- EVEN
- QUESTIONABLE
- SPOTTED STAINING

Porosity

- E EARTHY
- F FENESTRAL
- F FRACTURE
- X INTERCRYSTALLINE
- ◇ INTEROOLITIC
- MOLDIC

Engineering

- ▲ BIT
- ▬ CASING
- ◀ CONNECTION (LEFT)
- ▶ CONNECTION (RIGHT)
- ⬮ CONNECTION GAS
- ⬇ CORE - LOST
- CORE - RECOVERED
- ⋮ DST INTERVAL
- ⚡ FAULT

- ↘ NORMAL FAULT
- OIL SHOW
- ↕ OVERTURNED STRATA
- ↗ REVERSE FAULT
- ◀ SIDEWALL CORE (LEFT)
- ▶ SIDEWALL CORE (RIGHT)
- ▨ SLIDE
- DS SURVEY
- TRIP GAS
- ◀ WIRELINE TESTED - LEFT
- ▶ WIRELINE TESTED - RT

- R ROUNDED
- ▩ SUBANG
- ▩ SUBRND

Textures

- BS BOUNDSTONE
- C CHALKY
- CX CRYPTOXLN
- E EARTHY
- FX FINELYXLN
- GS GRAINSTONE

- PS PACKSTONE
- WS WACKESTONE

Sorting

- M MODERATE
- P POOR
- W WELL

ROP
 ROF ———
 GR - - - -

Slide/Rotate

Depth Labels

Interp Lith

% Porosity

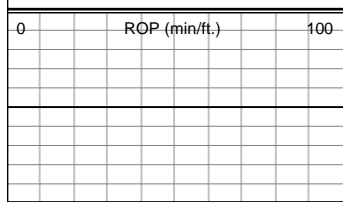
Oil Show

Lithology Descriptions

% Lith

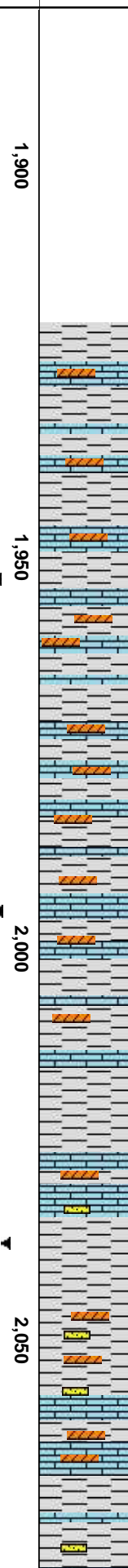
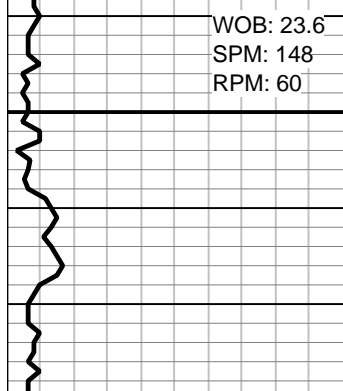
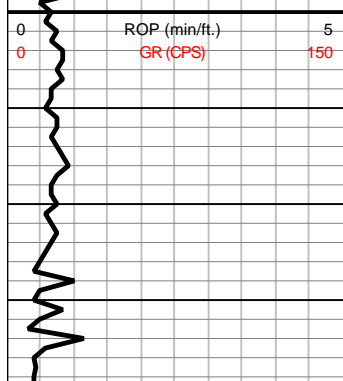
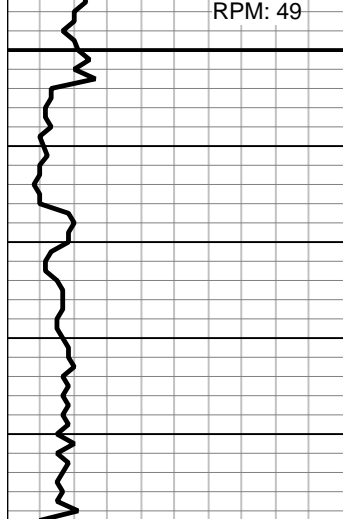
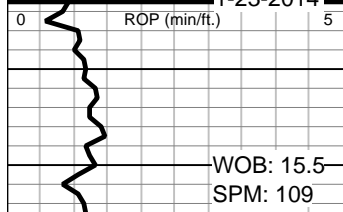
Images

Total Gas & Chromatograph
 GAS ———
 C1 ———
 C2 - - - -
 C3 - - - -
 C4 - - - -



BLACK = SLIDE

1-20-2014
 1-21-2014
 1-22-2014
 1-23-2014



Seneca Resources

Bock 3-1H
 Pratt County, KS
 Sec 3, T26S, R11W

Two Man Logging
 Began 1-20-2014

E. Knight @ 6PM

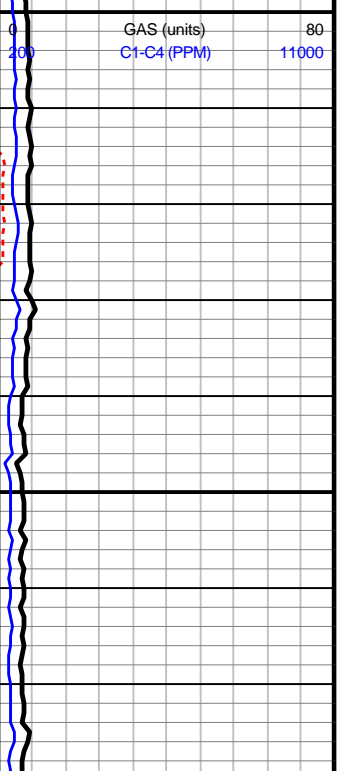
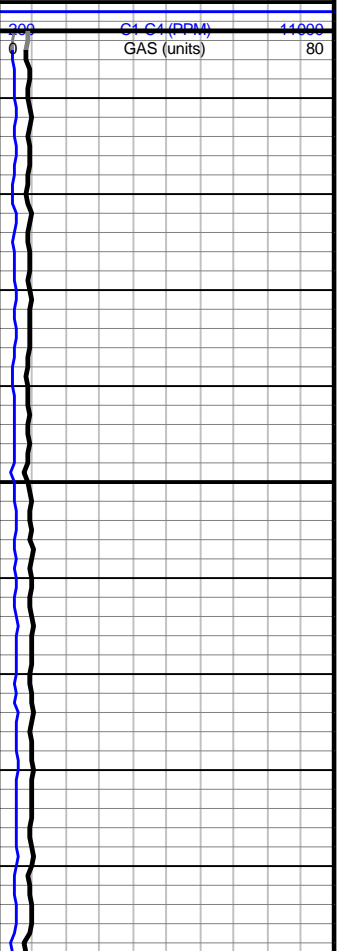
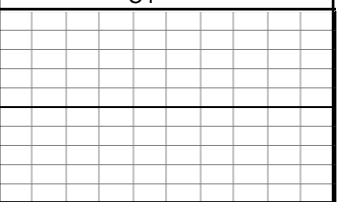
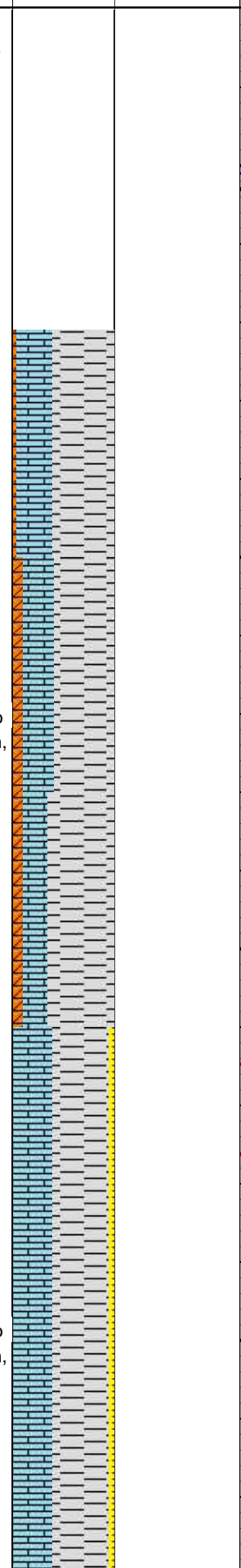
Bit #: 4
 Type: PDC HYBRID
 Size: 8.75"
 Depth In: 1,920 '
 Avg Ft/Hr: 82 '/hr
 Jets: 5x12s
 S/N: A163400

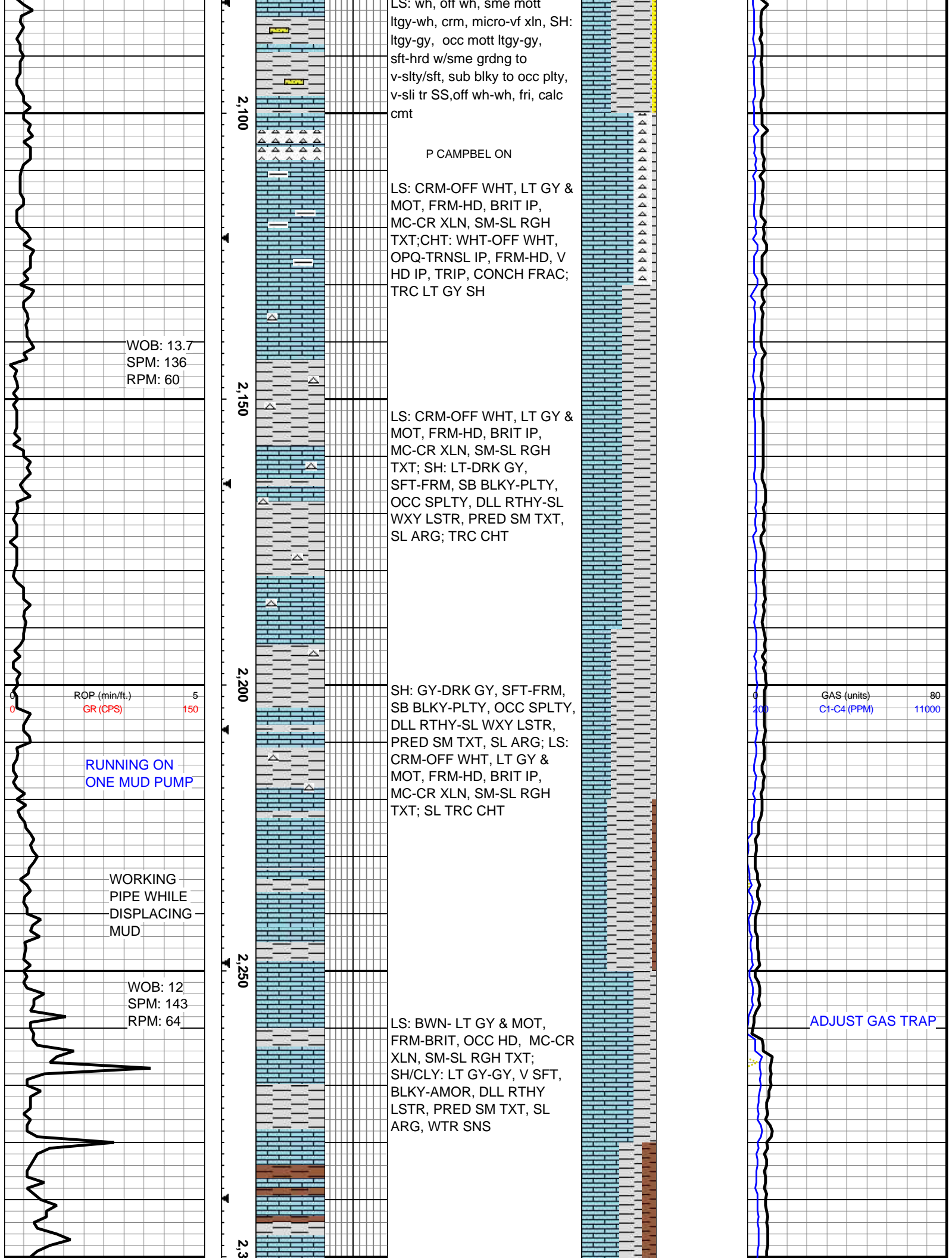
SH: Lt gy-gy, occ mott ltgy-gy, sft-hrd w/sme slty, sub blkly to occ plty, LS: off wh, wh, sme mott gywh, tr ltgy, microxls, dns mass, tr intbd anhyd

SH: Pred lt gy-gy, occ mott ltgy-gy, sft-hrd w/sme slty, sub blkly to occ plty, LS: off wh, wh, sme mott gywh, tr ltgy, microxls, dns mass, tr intbd anhyd

SH: Lt gy-gy mott ltgy-gy, sft-hrd w/sme slty, sub blkly to occ plty, LS: off wh, wh, sme mott gywh, tr ltgy, microxls, dns mass, tr intbd anhyd

SH: Pred lt gy-gy, occ mott ltgy-gy, sft-hrd w/sme slty, sub blkly to occ plty, LS: off wh, wh, sme mott gywh, tr ltgy, microxls, dns mass, tr intbd anhyd, tr SS, wh, off wh





LS: wh, off wh, sme mott
 ltgy-wh, crm, micro-vf xln, SH:
 ltgy-gy, occ mott ltgy-gy,
 sft-hrd w/sme grdng to
 v-slty/sft, sub blkly to occ plty,
 v-sli tr SS,off wh-wh, fri, calc
 cmt

P CAMPBEL ON

LS: CRM-OFF WHT, LT GY &
 MOT, FRM-HD, BRIT IP,
 MC-CR XLN, SM-SL RGH
 TXT;CHT: WHT-OFF WHT,
 OPQ-TRNSL IP, FRM-HD, V
 HD IP, TRIP, CONCH FRAC;
 TRC LT GY SH

WOB: 13.7
 SPM: 136
 RPM: 60

LS: CRM-OFF WHT, LT GY &
 MOT, FRM-HD, BRIT IP,
 MC-CR XLN, SM-SL RGH
 TXT; SH: LT-DRK GY,
 SFT-FRM, SB BLKY-PLTY,
 OCC SPLTY, DLL RTHY-SL
 WXY LSTR, PRED SM TXT,
 SL ARG; TRC CHT

ROP (min/ft.) 5
 GR (CPS) 150

RUNNING ON
 ONE MUD PUMP

WORKING
 PIPE WHILE
 DISPLACING
 MUD

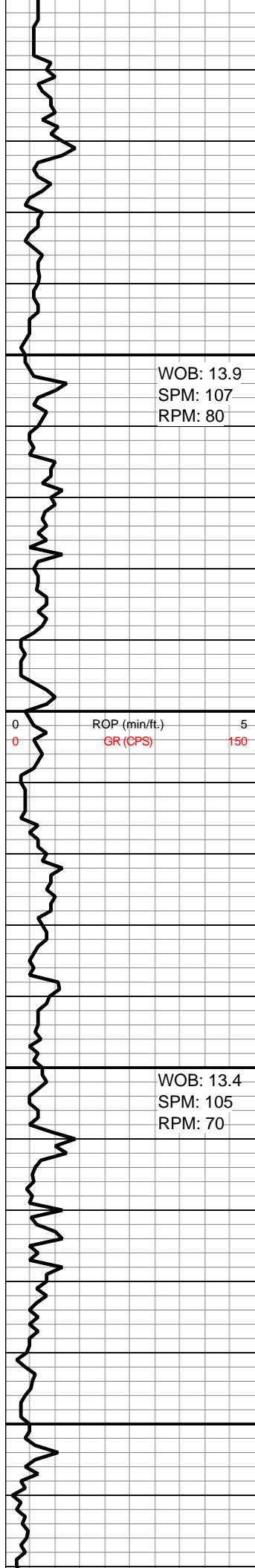
WOB: 12
 SPM: 143
 RPM: 64

SH: GY-DRK GY, SFT-FRM,
 SB BLKY-PLTY, OCC SPLTY,
 DLL RTHY-SL WXY LSTR,
 PRED SM TXT, SL ARG; LS:
 CRM-OFF WHT, LT GY &
 MOT, FRM-HD, BRIT IP,
 MC-CR XLN, SM-SL RGH
 TXT; SL TRC CHT

GAS (units) 80
 C1-C4 (PPM) 11000

ADJUST GAS TRAP

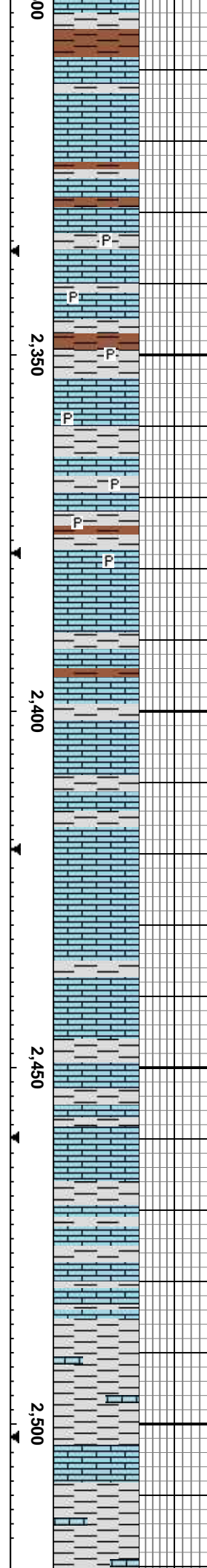
LS: BWN- LT GY & MOT,
 FRM-BRIT, OCC HD, MC-CR
 XLN, SM-SL RGH TXT;
 SH/CLY: LT GY-GY, V SFT,
 BLKY-AMOR, DLL RTHY
 LSTR, PRED SM TXT, SL
 ARG, WTR SNS



WOB: 13.9
 SPM: 107
 RPM: 80

ROP (min/ft.) 5
 GR (CPS) 150

WOB: 13.4
 SPM: 105
 RPM: 70



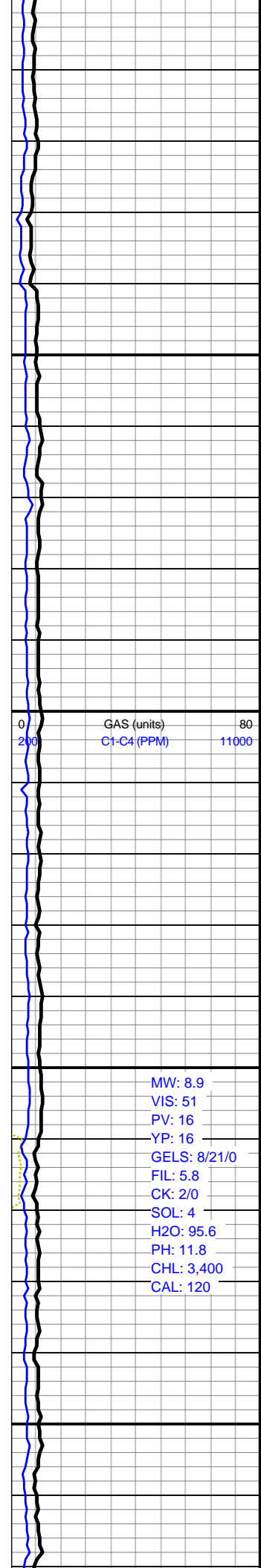
LS: CRM-OFF WHT, BWN- LT
 GY & MOT IP, FRM-OCC HD,
 MC-CR XLN, SM-SL RGH
 TXT; SH: LT GY-GY, LT
 BRN-TAN, V SFT,
 BLKY-AMOR, DLL RTHY
 LSTR, PRED SM TXT, SL
 ARG, WTR SNS, ABND CLY

LS: PRED CRM-OFF WHT,
 LT GY & MOT IP, FRM-OCC
 HD, MC-CR XLN, SM-SL
 RGH TXT; SH: LT GY-GY,
 OCC LT BRN-TAN, V SFT,
 BLKY-AMOR, DLL RTHY
 LSTR, PRED SM TXT, SL
 ARG, WTR SNS, ABND CLY,
 TRC FREE PYR

LS: CRM-LT TAN, LT GY &
 MOT IP, SFT-FRM, OCC HD,
 PRED CR XLN, SM TXT; SH:
 LT GY-GY, OCC LT
 BRN-TAN, V SFT,
 BLKY-AMOR, DLL RTHY
 LSTR, PRED SM TXT

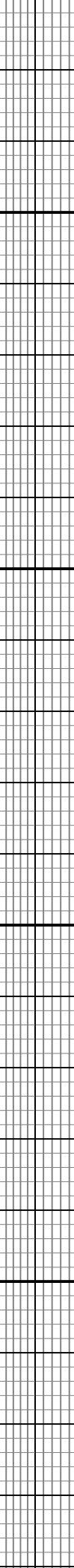
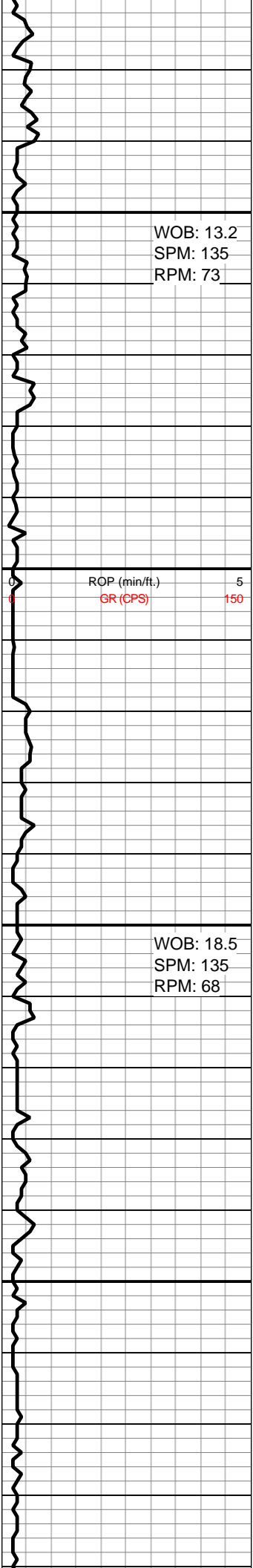
LS: CRM-LT TAN, LT GY-DRK
 BWN & MOT IP, SFT-FRM,
 OCC HD, PRED CR XLN, SM
 TXT; SH: LT GY-GY,
 SFT-BRIT, BLKY-AMOR, DLL
 RTHY LSTR, PRED SM TXT

SH: LT GY-GY, SFT-BRIT,
 BLKY-AMOR, DLL RTHY
 LSTR, PRED SM TXT; LS:



GAS (units) 80
 C1-C4 (PPM) 11000

MW: 8.9
 VIS: 51
 PV: 16
 YP: 16
 GELS: 8/21/0
 FIL: 5.8
 CK: 2/0
 SOL: 4
 H2O: 95.6
 PH: 11.8
 CHL: 3,400
 CAL: 120



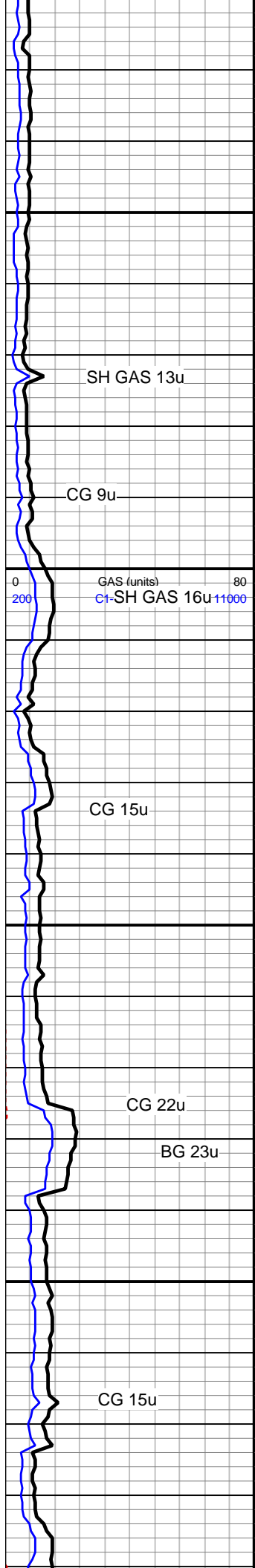
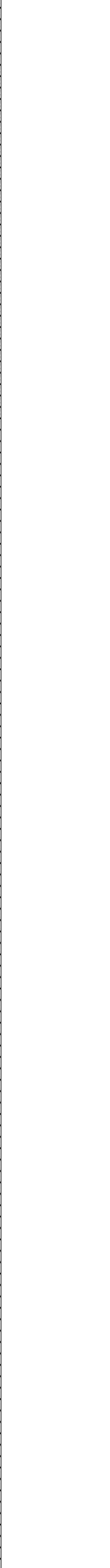
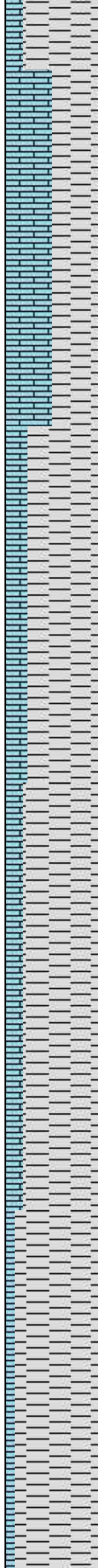
CRM-LT TAN, LT GY-DRK BWN & MOT IP, SFT-FRM, OCC HD, MC-CR XLN, SM TXT

SH: LT GY-GY, DRK GY-BLK IP, SFT-BRIT, OCC HD, SB BLKY-SB PLTY, SPLTY IP, DLL RTHY-SL METALIC LSTR, PRED SM TXT, CARB IP; LS: CRM-LT TAN, LT GY-DRK BWN & MOT IP, SFT-FRM, OCC HD, MC-CR XLN, SM TXT

SH: LT GY-GY, DRK GY-BLK IP, SFT-BRIT, OCC HD, SB BLKY-SB PLTY, SPLTY IP, DLL RTHY-METALIC LSTR, PRED SM TXT, CARB IP, SL SLTY IP; LS: CRM-OFF WHT, LT GY & MOT IP, SFT-FRM, OCC HD, MC-CR XLN, SM TXT

SH: LT GY-GY, DRK GY-BLK IP, SFT-BRIT, OCC HD, SB BLKY-SB PLTY, SPLTY IP, DLL RTHY-METALIC LSTR, PRED SM TXT, CARB IP, SL SLTY IP; LS: CRM-OFF WHT, LT GY & MOT IP, SFT-FRM, OCC HD, MC-CR XLN, SM TXT

SH: LT GY-GY, DRK GY-BLK IP, PRED BRIT, PLTY-SB PLTY, SPLTY IP, DLL RTHY-METALIC LSTR, PRED SM TXT, CARB IP; LS:



WOB: 13.2
SPM: 135
RPM: 73

ROP (min/ft.) 5
GR (CPS) 150

WOB: 18.5
SPM: 135
RPM: 68

SH: LT GY-GY, DRK GY-BLK IP, SFT-BRIT, OCC HD, SB BLKY-SB PLTY, SPLTY IP, DLL RTHY-SL METALIC LSTR, PRED SM TXT, CARB IP; LS: CRM-LT TAN, LT GY-DRK BWN & MOT IP, SFT-FRM, OCC HD, MC-CR XLN, SM TXT

SH: LT GY-GY, DRK GY-BLK IP, SFT-BRIT, OCC HD, SB BLKY-SB PLTY, SPLTY IP, DLL RTHY-METALIC LSTR, PRED SM TXT, CARB IP, SL SLTY IP; LS: CRM-OFF WHT, LT GY & MOT IP, SFT-FRM, OCC HD, MC-CR XLN, SM TXT

SH: LT GY-GY, DRK GY-BLK IP, SFT-BRIT, OCC HD, SB BLKY-SB PLTY, SPLTY IP, DLL RTHY-METALIC LSTR, PRED SM TXT, CARB IP, SL SLTY IP; LS: CRM-OFF WHT, LT GY & MOT IP, SFT-FRM, OCC HD, MC-CR XLN, SM TXT

SH: LT GY-GY, DRK GY-BLK IP, PRED BRIT, PLTY-SB PLTY, SPLTY IP, DLL RTHY-METALIC LSTR, PRED SM TXT, CARB IP; LS:

SH GAS 13u

CG 9u

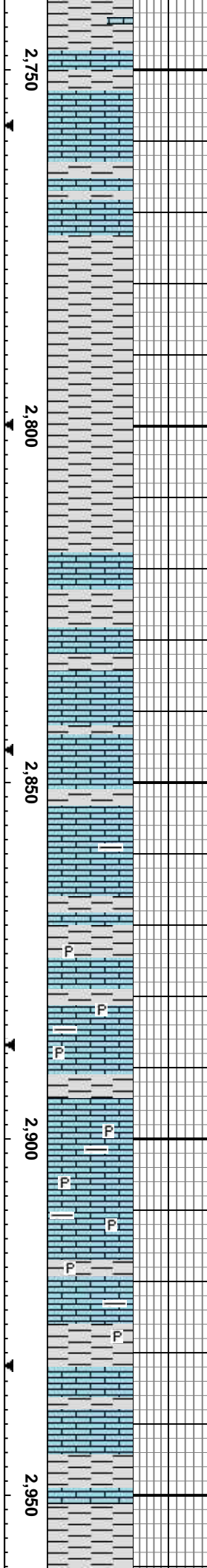
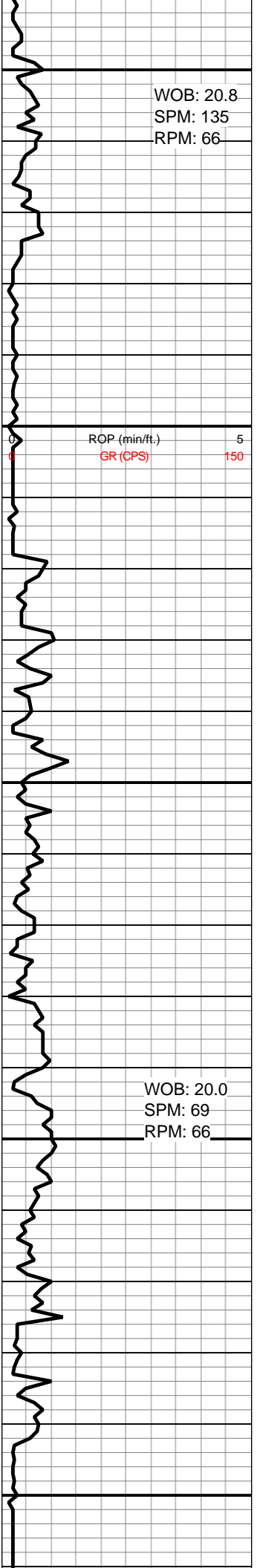
GAS (units) 80
C+ SH GAS 16u 11000

CG 15u

CG 22u

BG 23u

CG 15u



CRM-OFF WHT, LT GY & MOT IP, SFT-FRM, OCC HD, PRED CR XLN, SM TXT

SH/CLY: LT GY-GY, DRK GY-BLK IP, PRED BRIT, PLTY-SB PLTY, SPLTY IP, DLL RTHY-METALIC LSTR, PRED SM TXT; LS: CRM-OFF WHT, LT GY & MOT IP, SFT-FRM, OCC HD, PRED CR XLN, SM TXT

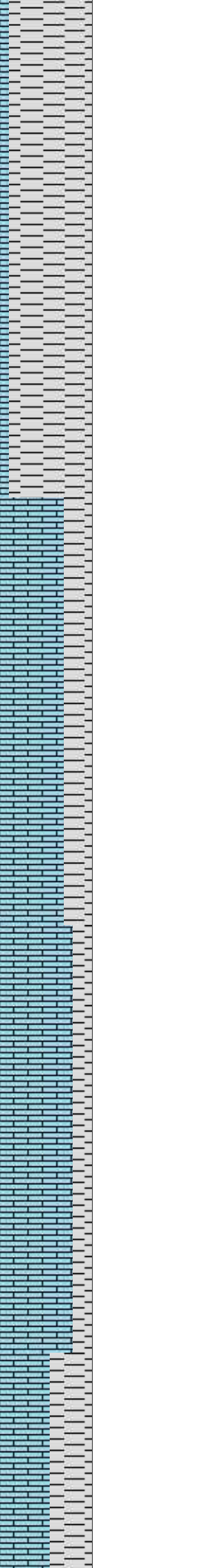
LS: CRM-OFF WHT, LT GY & MOT IP, SFT-FRM, OCC HD, PRED CR XLN, SM TXTSH: LT GY-GY, DRK GY-BLK IP, PRED BRIT, PLTY-SB PLTY, SPLTY IP, DLL RTHY-METALIC LSTR, PRED SM TXT, ARG & SL SLTY

LS: CRM-TAN, LT GY & MOT, SFT-FRM, OCC HD, PRED CR XLN, SM TXTSH: LT GY-GY, DRK GY-BLK IP, PRED BRIT, PLTY-SB PLTY, SPLTY IP, DLL RTHY-METALIC LSTR, PRED SM TXT, ARG, TRC EMBDD PYR

E. Knight on @ 6 PM

SURVEY @ 2948' INC 0.3, AZ 128.8

SH: GY-DRK GY, SFT-FRM, SB BLKY-PLTY, OCC SPLTY,



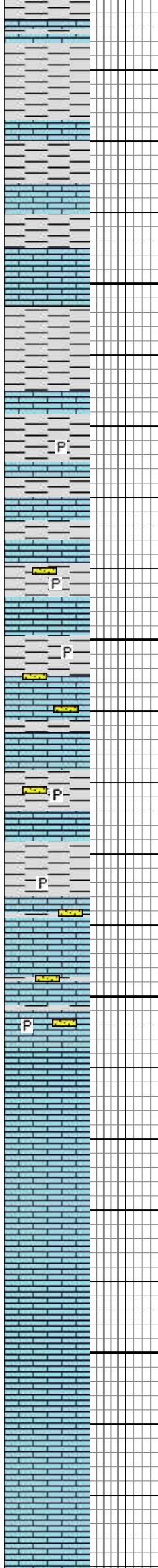
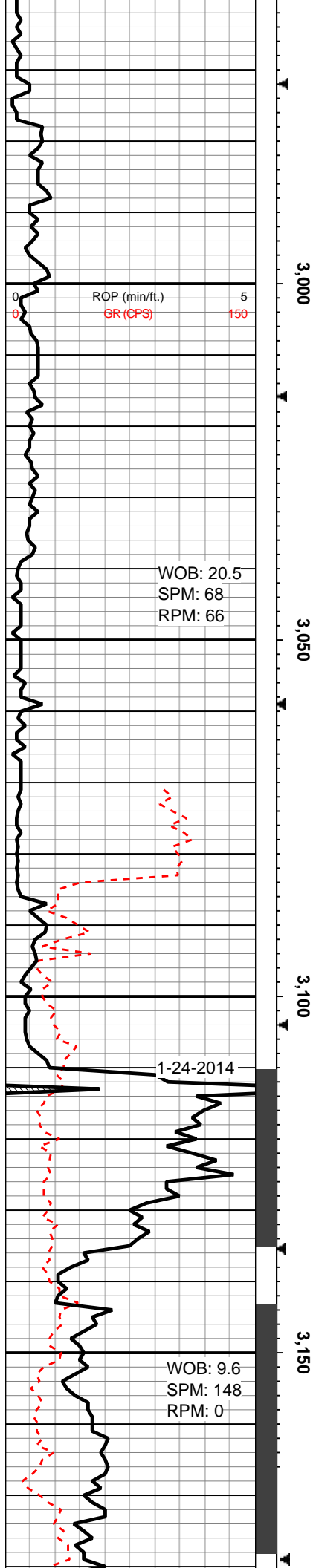
CG 15u

CG 26u

BG 24u

CG 15u

CG 17u



DLL RTHY-SL WXY LSTR,
 PRED SM TXT, SL ARG; LS:
 CRM-OFF WHT, LT GY &
 MOT, FRM-HD, BRIT IP,
 MC-CR XLN

LS: PRED OFF WH-LT TAN,
 LT GY-DRK BWN & MOT IP,
 SFT-FRM, OCC HD, CR
 XLN, SM TXT; SH: LT GY-GY,
 SFT-BRIT, BLKY-AMOR, DLL
 RTHY LSTR, PRED SM TXT,
 V-SLI TR SS: OFF WH, CALC
 CMT

SURVEY @ 3035' INC 0.1,
 AZ 122.6

WOB: 20.5
 SPM: 68
 RPM: 66

LS: OFF WH-WH, LT GY, SME
 MOTT LTGY-WH, SFT-FRM,
 OCC HRD, CR XLN, SM TXT,
 SH: PED GRY W/OCC LTGY,
 SFT TO FRM, SUB
 BLKY-BLKY, RTHY, SLI TR
 PYR MICRO XLS

SURVEY @ 3077' INC: 0.10 AZM:
 307.10 TVD: 3076.90 VS: -15.2 0

**TOPEKA LS @ 3,086'/
 3086.6'TVD**

**TOOH FOR DIR TOOLS @
 3110' MD**

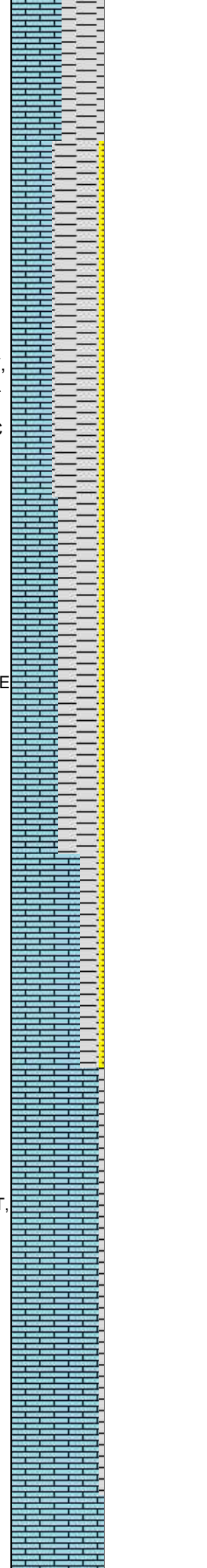
Bit #: 5
 Type: PDC
 Size: 8.75
 Depth In: 3,110 '
 Jets: 5x12S
 S/N: A166141
 P CAMPBELL ON

LS: OFF WHT-LT TAN & MOT,
 SFT-OCC FRM, CR XLN, SM
 TXT: TRC SH CAVINGS

SURVEY @ 3122' INC: 3.10 AZM:
 255.60 TVD: 3121.90 VS: -15.4 0

LS: PRED CRM-LT TAN &
 MOT, OCC WHT-OFF WHT,
 SFT-OCC FRM, MC XLN-CR
 XLN, SM TXT; TRC SH

SURVEY @ 3163' INC: 8.10 AZM:
 259.40 TVD: 3162.70 VS: -16.00



CG 22u

GAS (units) 80
 C1-C4 (PPM) 11000

CG 39u

CG 22u

TG 61u

MW: 9.2
 VIS: 52
 PV: 21
 YP: 20
 GELS: 8/24/0
 FIL: 5.2
 CK: 2/0
 SOL: 6.3
 H2O: 93.3
 PH: 11.5
 CHL: 3,200
 CAL: 80

E Knight On

LS: PRED CRM-LT TAN & MOT, OCC GY-OFF WHT, SFT-OCC FRM, MC XLN-CR XLN, SM TXT

SURVEY @ 3205' INC: 8.10
AZM: 259.40 TVD: 3204.00 VS: -16.60

LS: PRED CRM-LT TAN & MOT, OCC GY-OFF WHT, SFT-OCC FRM, MC XLN-CR XLN, SM TXT; TRC CARB SH & EMBDD PYR

SURVEY @ 3247' INC: 16.10
AZM: 264.10 TVD: 3244.70 VS: -17.10

LS: CRM-LT TAN & MOT, OCC GY-OFF WHT, SFT-OCC FRM, MC XLN-CR XLN, SM TXT; TRC CARB SH & PYR MICRO XLS

SURVEY @ 3289' INC: 20.00
AZM: 263.10 TVD: 3284.60 VS: -17.80

LS: PRED CRM-LT TAN & MOT, OCC GY-OFF WHT, SFT-OCC FRM, MC XLN-CR XLN, SM TXT; TRC CARB SH

SURVEY @ 3331' INC: 23.80
AZM: 264.00 TVD: 3323.60' VS: -18.80

LS: CRM-LT TAN & MOT, OCC GY-OFF WHT, SFT-OCC FRM, MC XLN-CR XLN, SM TXT; TRC CARB SH

SURVEY @ 3373' INC: 27.40
AZM: 269.10 TVD: 3361.40 VS: -18.80

LS: PRED CRM-LT TAN & MOT, OCC GY-OFF WHT, SFT-OCC FRM, MC XLN-CR XLN, SM TXT; TRC CARB SH; DRK GY, BLK, SUB BLKY-PLTY, MOD FRM-HRD,

ROP (min/ft.) 5
R (CPS) 150

WOB: 8.7
SPM: 107
RPM: 0

1-25-14

WOB: 12
SPM: 136
RPM: 39

3,200

3,250

3,300

3,350

3,4

GAS (units) 80
C1-C4 (PPM) 11000

CG 13u

24u

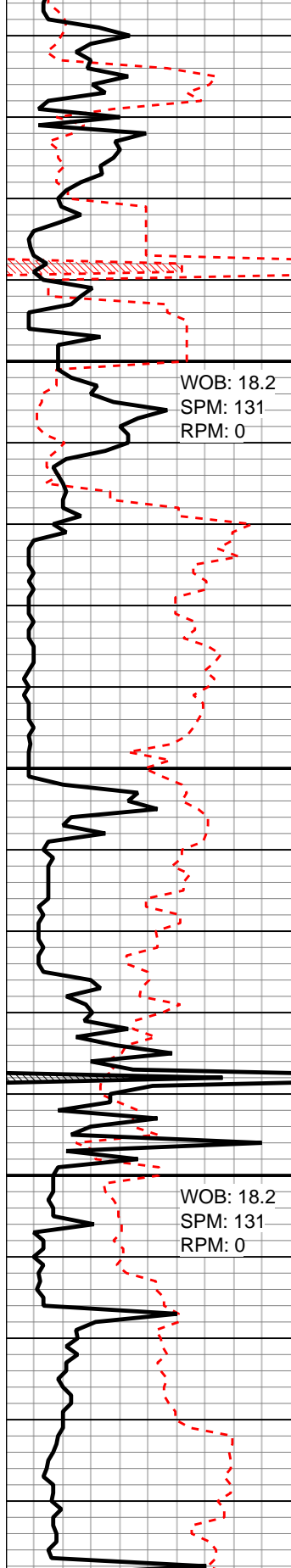
MUD WT:
IN: 9.1+
VIS: 53
OUT: 9.2
VIS: 49

MW IN/OUT 9.1+/9.2
VIS IN/OUT: 53/49

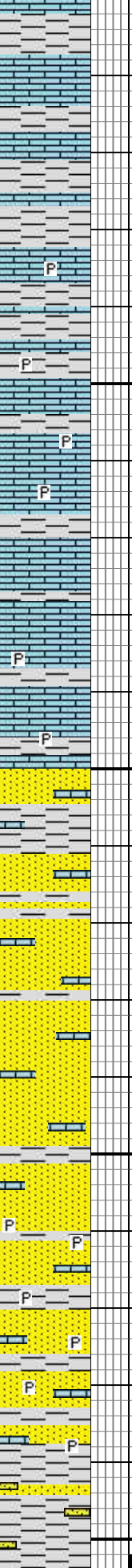
MW IN/OUT 9.2/9.3+
VIS IN/OUT: 51/49

SG/CG
93u

ROP (min/ft.) 0 5
GR (CPS) 0 150



00
3,450
3,500
3,550
3,600



V-CALC IP

HEEBNER BASE @ 3,438' MD/ 3417.5' TVD

SURVEY @ 3414' INC: 29.70
AZM: 276.00 TVD: 3397.50 VS: -16.90

SH: GY-DRK GY, SFT-FRM, SB BLKY-PLTY, OCC SPLTY, DLL RTHY-SL WXY LSTR, PRED SM TXT, SL ARG; SLI-V CALC IP LS: CRM-OFF WHT, LT GY & MOT, FRM-HD, BRIT IP, MC-CR XLN

TORONTO LS @ 3,450' MD/ 3427.6' TVD

SURVEY @ 3457' INC: 32.60
AZM: 280.10 TVD: 3434.30 VS: -12.50

LS: CRM-LT TN, OCC GY-OFF WH, SFT-OCC FRM, MC XLN, SH: DRK GY-BLK, V-CARB IP, SUB BLKY-PLTY, MOD FRM-HRD, V-CALC IP, TR PYR XLS

SURVEY @ 3499' INC: 33.90
AZM: 281.90 TVD: 3469.40 VS: -6.9

DOUGLAS SS @ 3,497' MD/ 3466' TVD

P CAMPBELL ON

SS: BWN-LT GY W/ DK INCL, F GR, FRM-BRIT, M SRTD, SB RNDD-RNDD, M CONS, M CMNT, UNCONS IP, SL CALC & ARG; LS: PRED CRM-LT TAN & MOT, OCC GY-OFF WHT, SFT-OCC FRM, MC XLN-CR XLN, SM TXT

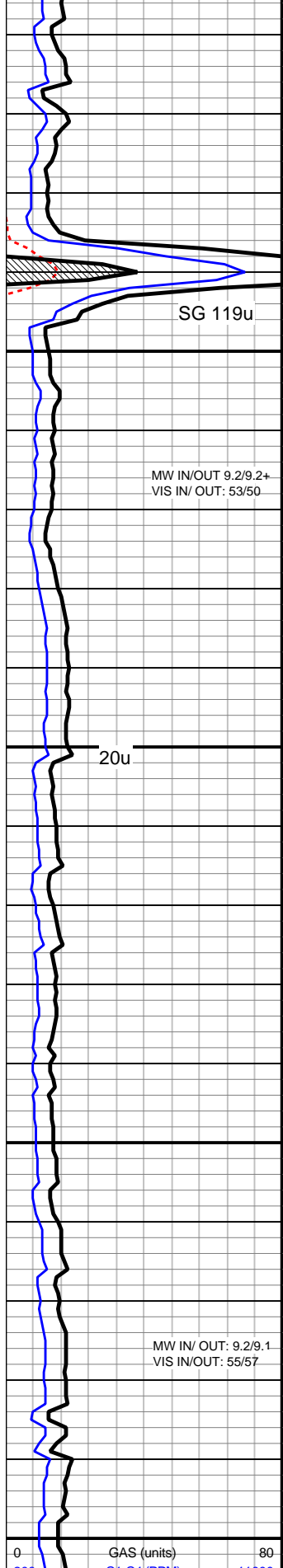
SURVEY @ 3540' INC: 35.90
AZM: 286.80 TVD: 3503 VS: 0.1

SS: BWN-LT GY W/ DK INCL, F GR, FRM-BRIT, M SRTD, SB RNDD-RNDD, M CONS, M CMNT, UNCONS IP, SL CALC & ARG; LS: PRED CRM-LT TAN & MOT, OCC GY-OFF WHT, SFT-OCC FRM, MC XLN-CR XLN, SM TXT; SH: LT GY, SFT-FRM, SB BLKY-PLTY, SL METALIC-DLL RTHY LSTR, SL RGH TXT, ARG, OCC EMBDD PYR

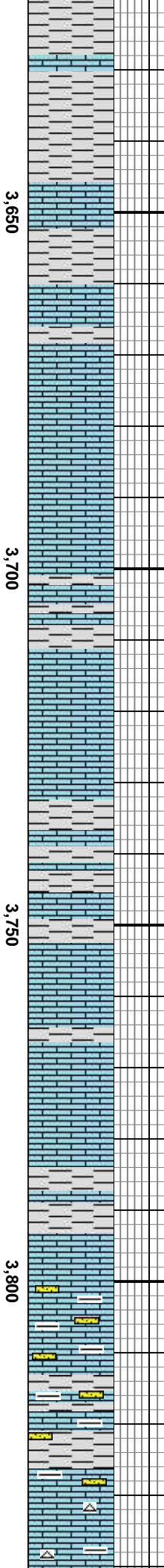
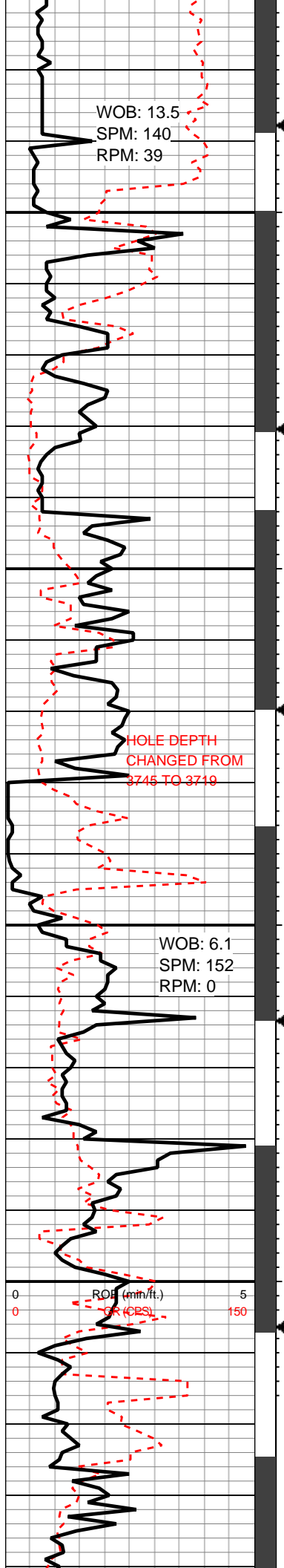
SURVEY @ 3583' INC: 37.00
AZM: 293.20 TVD: 3537.60 VS: 10.10

SH: LT GY-GY, SFT-FRM, SB BLKY-PLTY, PLTY IP, SL METALIC- RTHY LSTR, SL RGH TXT, ARG, SL TRC EMBDD PYR; LS: PRED CRM-OFF WHT & MOT.

GAS (units) 0 80
C1-C4 (PPM) 0 11000



00
200
0
200



LS: CRM-LT TAN, OCC BWN, PRED FRM, HD IP, CR XLN, SM TXT; SH: LT GY-GY, SFT-FRM, SB BLKY-PLTY, SPLTY IP, DLL RTHY LSTR, SL RGH TXT

LS: CRM-LT TAN, OCC BWN, PRED FRM, HD IP, CR XLN, SM TXT; SH: LT GY-GY, SFT-FRM, SB BLKY-PLTY, SPLTY IP, DLL RTHY LSTR, SL RGH TXT, SL CALC, SLTY IP

LS: CRM-TAN, OCC BWN & MOT, PRED FRM-BRIT, HD IP, CR XLN, SM TXT; SH: LT GY-GY, SFT-FRM, SB BLKY-PLTY, SPLTY IP, DLL RTHY LSTR, SL RGH TXT, SL CALC, SLTY IP

LS: CRM-TAN, OCC BWN & MOT, PRED FRM-BRIT, HD IP, CR XLN, SM TXT; SH: LT GY-GY, SFT-FRM, SB BLKY-PLTY, SPLTY IP, DLL RTHY LSTR, SL RGH TXT, SL CALC, SLTY IP

LS: BWN-LT GY & MOT, CRM IP, PRED FRM-BRIT, CR XLN, SM TXT; SH: LT GY-GY, SFT-FRM, SB BLKY-PLTY, DLL RTHY-METALIC LSTR, SL RGH TXT; TRC TRIP CHT

**SURVEY @ 3624' INC: 36.80
AZM: 299.80 TVD: 3570.40
VS: 22.30**

SH: LT GY-GY, SFT-FRM, SB BLKY-PLTY, SPLTY IP, SL METALIC- RTHY LSTR, SL RGH TXT, ARG, SL TRC EMBDD PYR; LS: PRED CRM-OFF WHT & MOT, SFT-OCC FRM, PRED CR XLN, SM TXT

**LANSING @ 3,675' MD/
3610' TVD**

**SURVEY @ 3667' INC: 38.20
AZM: 307.30 TVD: 3604.60
VS: 37.90**

LS: CRM-LT TAN, OCC BWN, PRED FRM, HD IP, CR XLN, SM TXT; SH: LT GY-GY, SFT-FRM, SB BLKY-PLTY, SPLTY IP, DLL RTHY LSTR, SL RGH TXT

**SURVEY @ 3710' INC: 40.00
AZM: 3150.30 TVD: 3637.90
VS: 56.80**

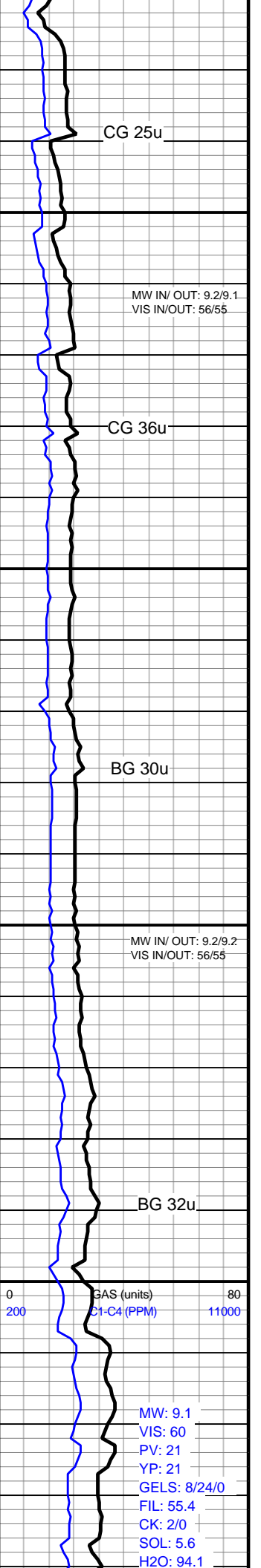
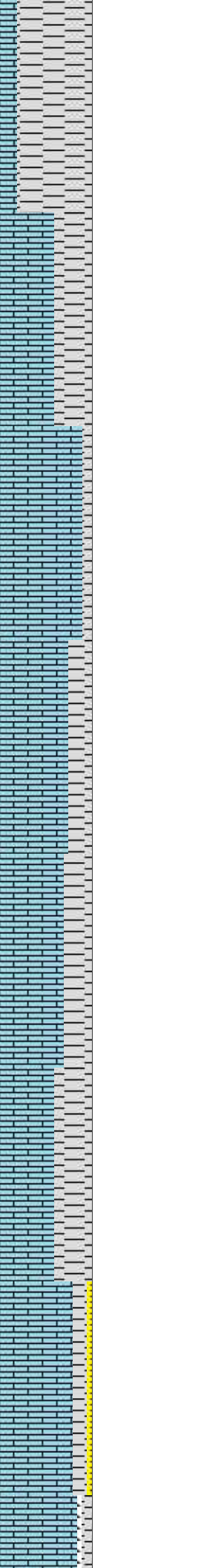
LS: CRM-LT TAN, OCC BWN, PRED FRM, HD IP, CR XLN, SM TXT SH: LT GY-GY, SFT-FRM, SB BLKY-PLTY, SPLTY IP, DLL RTHY LSTR, SL RGH TXT, SL CALC, SLTY IP

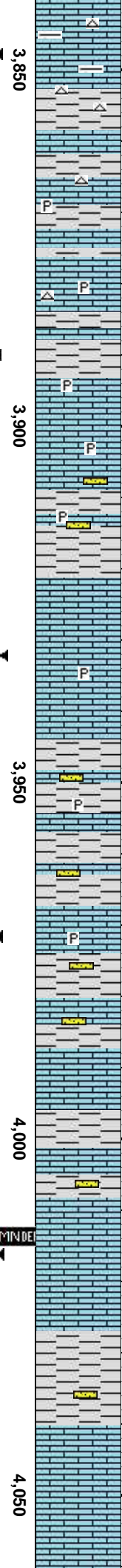
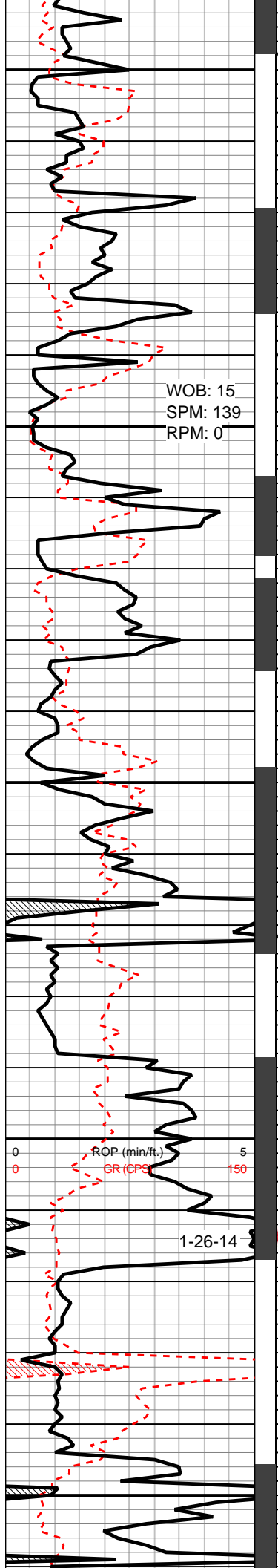
**SURVEY @ 3753 INC: 41.70
AZM: 322.80 TVD: 3670.50
VS: 79.00**

LS: CRM-TAN, OCC BWN & MOT, PRED FRM-BRIT, HD IP, CR XLN, SM TXT; SH: LT GY-GY, SFT-FRM, SB BLKY-PLTY, SPLTY IP, DLL RTHY LSTR, SL RGH TXT, SL CALC, SLTY IP

**SURVEY @ 3795 INC: 43.20
AZM: 328.90 TVD: 3701.50 VS:
103.3**

LS: CRM-TAN, OCC BWN & MOT, PRED FRM-BRIT, HD IP, CR XLN, SM TXT; SH: LT GY-GY, SFT-FRM, SB BLKY-SPLTY, PLTY IP, DLL RTHY LSTR, SL RGH TXT, SL CALC, SLTY IP





SURVEY @ 3838' INC: 43.90
AZM: 336.00 TVD: 3732.70 VS: 130.20

E Knight On

LS: OFF WH-LT CRM, OCC BWN & MOT, PRED FRM-BRIT, HD IP, CR XLN, SM TXT; SH: LT GY-GY, SFT-FRM, SB BLKY-SPLTY, PLTY IP, DLL RTHY LSTR, SL RGH TXT, SL CALC, SLTY IP, TR PYR, TR CHT

SURVEY @ 3880' INC: 45.30
AZM: 340.00 TVD: 3762.60 VS: 158.10

SH: LT GY-GY, SFT-FRM, BLKY-PLTY, W/SME SPLTY IP, SL RTHY LSTR, SL RGH TXT, ARG, SL TRC EMBDD PYR; LS: PRED CRM-OFF WHT & MOT, SFT-OCC FRM, PRED CR XLN, SM TXT

SURVEY @ 3922' INC: 47.80
AZM: 343.00 TVD: 3791.50 VS: 187.60

LS: OFF WH-LT CRM, OCC BWN & MOT, PRED FRM-BRIT, HD IP, CR XLN, SM TXT; SH: LT GY-GY, SFT-FRM, SB BLKY-SPLTY, PLTY IP, DLL RTHY LSTR, SL RGH TXT, SL CALC, SLTY IP, TR PYR

SURVEY @ 3965' INC: 51.20
AZM: 346.90 TVD: 3819.40 VS: 219.60

LS: PRED CRM, OFF WH-WH OCC BWN & MOT, FRM-BRIT, HD IP, CR XLN, SM TXT; SH: LT GY-GY, SFT-FRM, SB BLKY-SPLTY, PLTY IP, DLL RTHY LSTR, SL RGH TXT, SL CALC, SLTY IP

SURVEY @ 4007' INC: 55.30
AZM: 350.00 TVD: 3844.00 VS: 252.90

SH: LT GY-GY, SFT-FRM, BLKY-PLTY, W/SME SPLTY IP, SL RTHY LSTR, SL RGH TXT, ARG, LS: PRED CRM-OFF WHT & MOT, SFT-OCC FRM, PRED CR XLN, SM TXT

STARK SH @ 4029'
MD/ 3856' TVD

SWOPE LS @ 4048'
MD/ 3866' TVD

SURVEY @ 4050' INC: 59.40

PH: 11.1
CHL: 3,200
CAL: 80

MW IN/ OUT: 9.1+9.2
VIS IN/OUT: 54/54

0	GAS (units)	80
200	C1-C4 (PPM)	11000

MW IN/ OUT: 9.1/9.2
VIS IN/OUT: 58/59

40u

WOB: 16.8
SPM: 143
RPM: 0

AZM: 352.50 TVD: 3867.70 VS:
288.90

LS: OFF WH-LT CRM, OCC
BWN & MOT, PRED
FRM-BRIT, HD IP, CR XLN,
SM TXT; SH: LT GY-GY,
SFT-FRM, SB BLKY-SPLTY,
PLTY IP, DLL RTHY LSTR,
SL RGH TXT, CARB IP, SL
CALC, SLTY IP

**HUSHPUCKNEY SH @
4097' MD/ 4891' TVD**

SURVEY @ 4092 INC: 60.80
AZM: 353.90 TVD: 3887.70 VS:
325.20

**HERTHA LS 4108' MD
3896.3' TVD**

LS: PRED CRM, OFF
WH-WH OCC BWN & MOT,
FRM-BRIT, HD IP, CR XLN,
SM TXT; SH: LT GY-GY,
SFT-FRM, SB BLKY-SPLTY,
PLTY IP, DLL RTHY LSTR,
SL RGH TXT, SL CALC, SLTY
IP

SURVEY @ 4136 INC: 60.90
AZM: 353.50 TVD: 3910.10 VS:
363.60

LS: CRM-LT TAN & MOT,
FRM, CR XLN, SM TXT; SS:
LT GY-TAN, VFG, SBRNDD,
FRM, M SRTD, P CMNT,
UNCONS IP, TRC INTRG
POR, TRC DD OIL STN; SH:
LT GY, SFT, SB PLTY, RTHY
LSTR, SL RGH TXT, SLTY;
10% BGHT YL FLUOR;
FAIR-MOD MILKY BL FASH
CUT, TRC STRMG CUT, GD
LT BL RES RNG

SURVEY @ 4179 INC: 60.80
AZM: 354.20 TVD: 3931.0 VS:
401.10

LS: CRM-LT TAN & MOT,
FRM, CR XLN, SM TXT; SS:
LT GY-TAN, VFG, SBRNDD,
FRM, M SRTD, P CMNT,
UNCONS IP, TRC INTRG
POR, TRC DD OIL STN; SH:
LT GY, SFT, SB PLTY, RTHY
LSTR, SL RGH TXT; WK BL
FLASH CUT

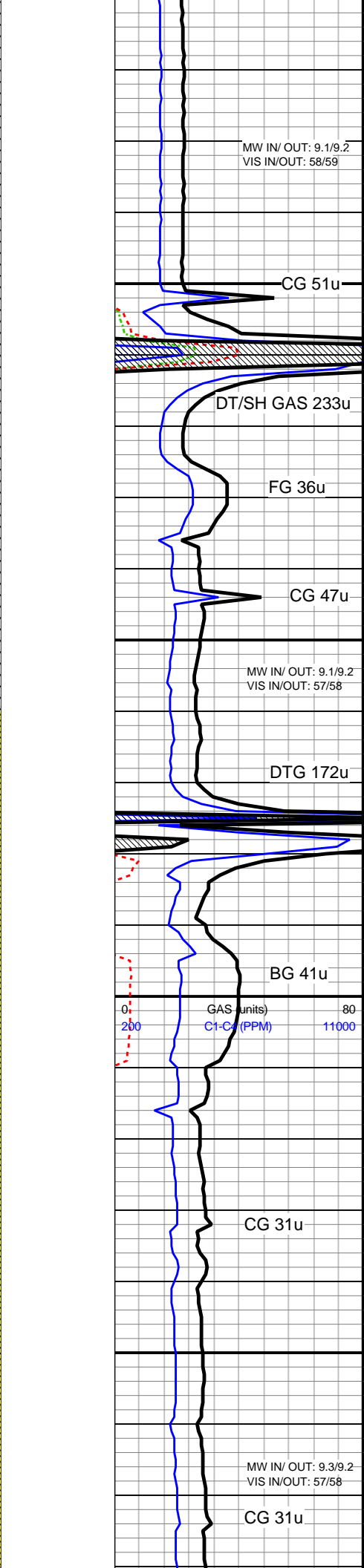
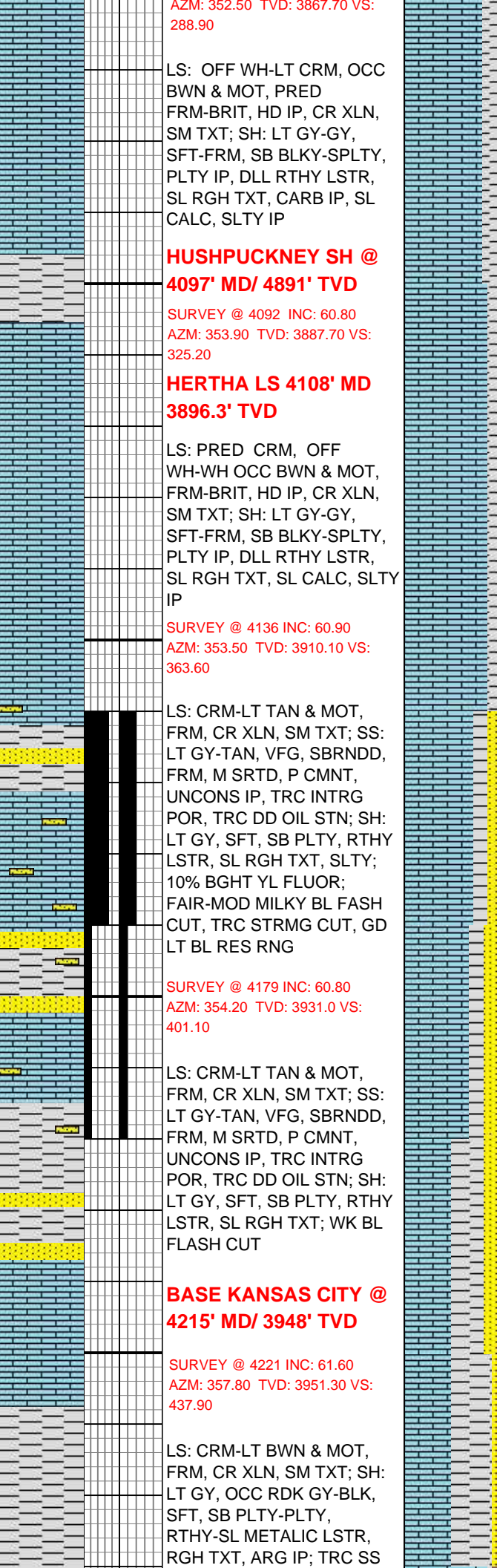
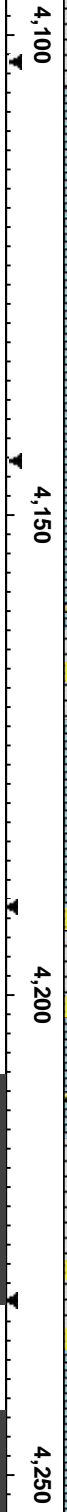
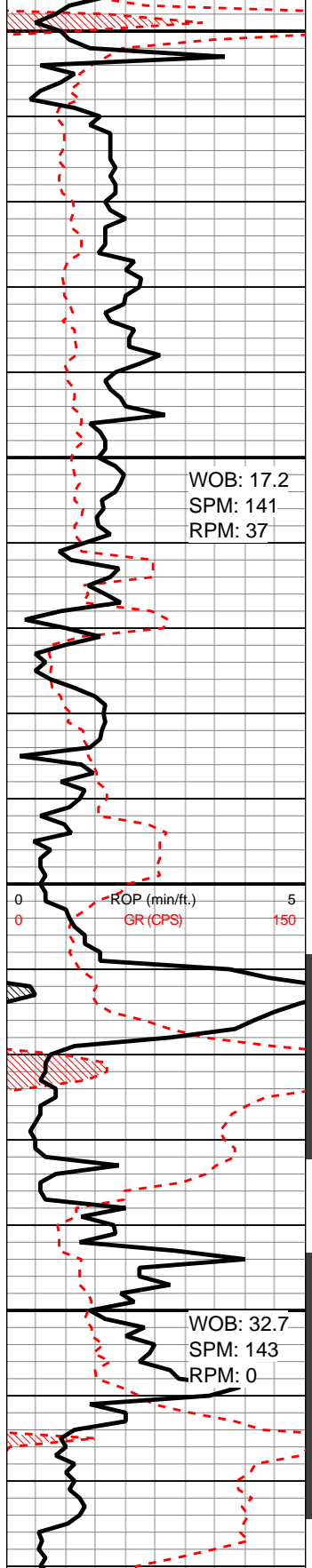
**BASE KANSAS CITY @
4215' MD/ 3948' TVD**

SURVEY @ 4221 INC: 61.60
AZM: 357.80 TVD: 3951.30 VS:
437.90

LS: CRM-LT BWN & MOT,
FRM, CR XLN, SM TXT; SH:
LT GY, OCC RDK GY-BLK,
SFT, SB PLTY-PLTY,
RTHY-SL METALIC LSTR,
RGH TXT, ARG IP; TRC SS

WOB: 17.2
SPM: 141
RPM: 37

WOB: 32.7
SPM: 143
RPM: 0



SURVEY @ 4264 INC: 63.60
AZM: 2.40 TVD: 3971.10 VS:
476.00

**MARMATON LS @
4283' MD/ 3979' TVD**

LS: CRM-LT BWN & MOT,
FRM-OCC HD, CR XLN,
PRED SM TXT; SH: LT
GY-GY, OCC RD, GY-BLK,
SFT, SB PLTY-PLTY, DLL
RTHY LSTR, RGH TXT, V
SLTY, SL ARG

SURVEY @ 4307 INC: 65.30
AZM: 6.8 TVD: 3989.6 VS:
514.4

LS: CRM-LT BWN & MOT,
FRM-HD, CR XLN, PRED SM
TXT; SH: LT GY, SFT, SB
PLTY-PLTY, RTHY LSTR,
RGH TXT, V SLTY; CHT: OFF
WHT-TRNSL, OPQ, HD-V
HD, MC XLN, DNS; TRC
UNCONS SS

SURVEY @ 4348 INC: 66.40
AZM: 10.20 TVD: 4006.40 VS:
551.00

LS: CRM-LT BWN & MOT,
FRM-HD, CR XLN, PRED SM
TXT; SH: LT GY, SFT, SB
PLTY-PLTY, RTHY LSTR,
RGH TXT, V SLTY; CHT: OFF
WHT-TRNSL, OPQ, HD-V
HD, MC XLN, DNS; SS:
CRM-OFF WHT, FG, FRM, M
SRTD, CALC CMNT,
UNCONS IP

SURVEY @ 4391 INC: 68.90
AZM: 11.30 TVD: 4022.80 VS:
589.70

LS: CRM-LT BWN & MOT,
FRM-HD, CR XLN, PRED SM
TXT; SH: LT GY, SFT, SB
PLTY-PLTY, RTHY LSTR,
RGH TXT, V SLTY; SS:
CRM-OFF WHT, FG-VFG,
FRM-BRIT, W SRTD, P
CMNT, UNCONS IP

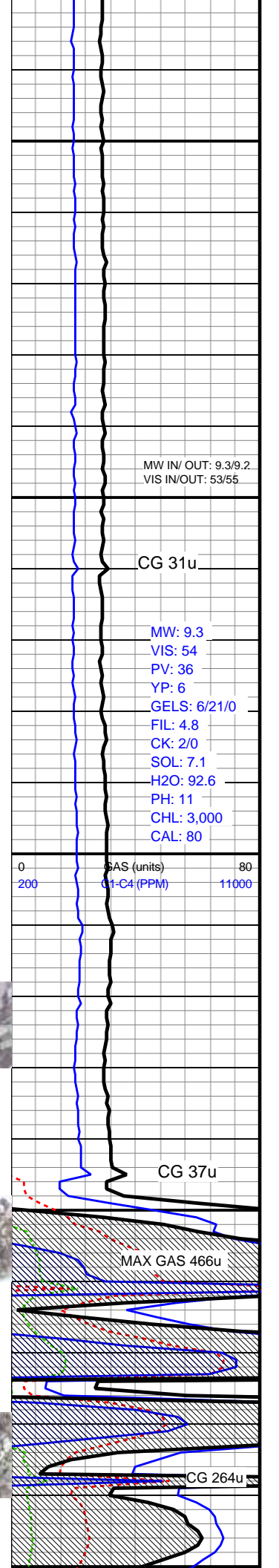
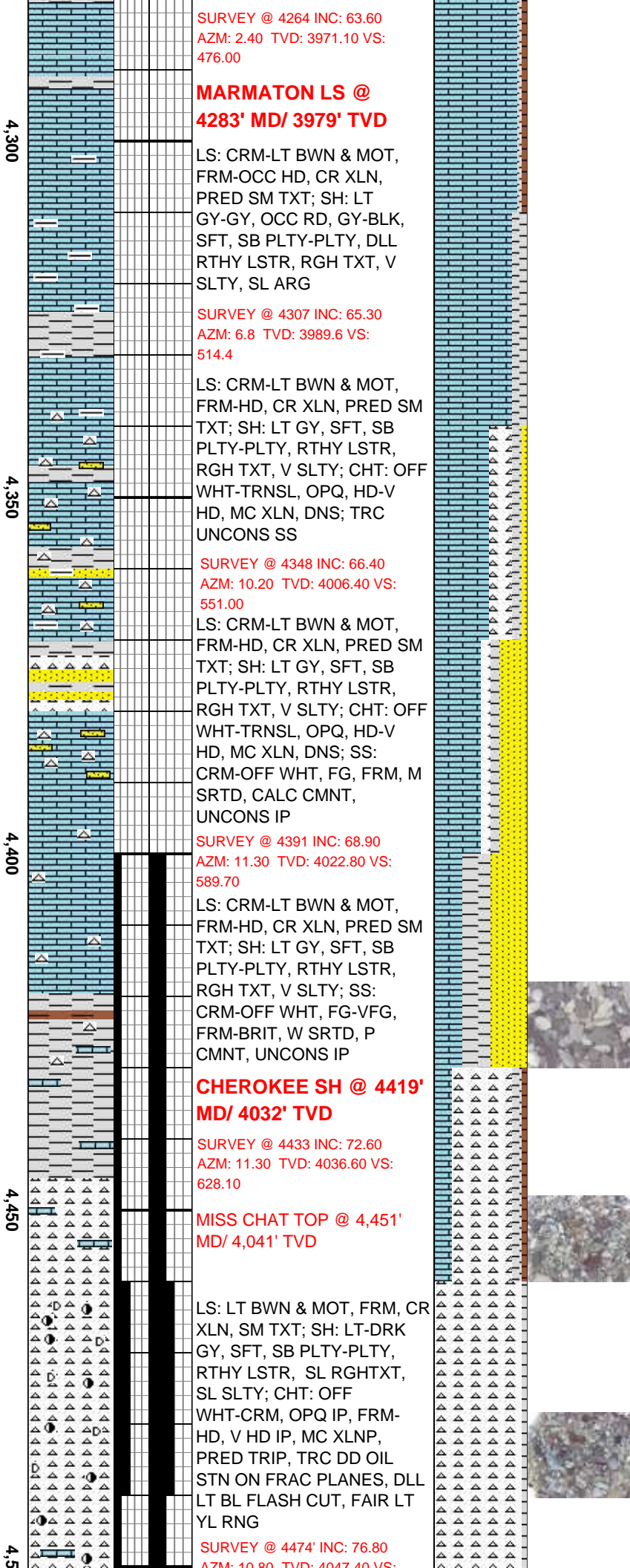
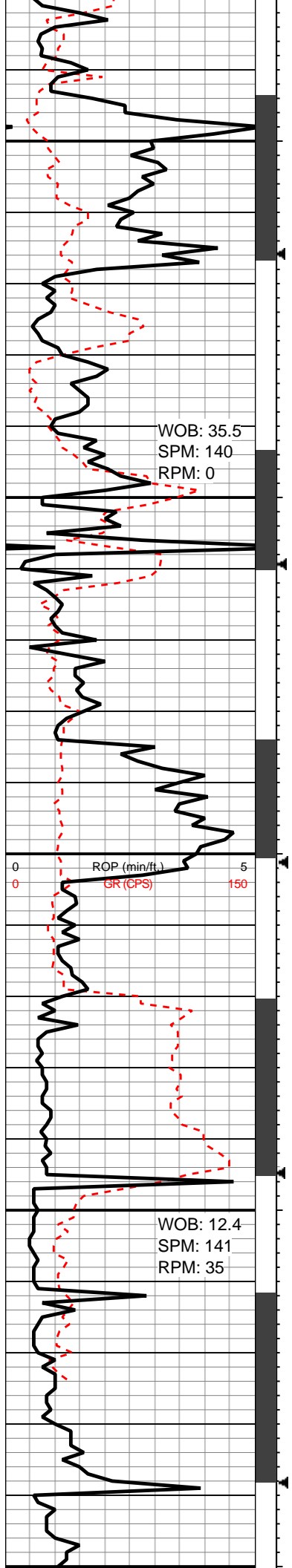
**CHEROKEE SH @ 4419'
MD/ 4032' TVD**

SURVEY @ 4433 INC: 72.60
AZM: 11.30 TVD: 4036.60 VS:
628.10

**MISS CHAT TOP @ 4,451'
MD/ 4,041' TVD**

LS: LT BWN & MOT, FRM, CR
XLN, SM TXT; SH: LT-DRK
GY, SFT, SB PLTY-PLTY,
RTHY LSTR, SL RGHXTX,
SL SLTY; CHT: OFF
WHT-CRM, OPQ IP, FRM-
HD, V HD IP, MC XLNP,
PRED TRIP, TRC DD OIL
STN ON FRAC PLANES, DLL
LT BL FLASH CUT, FAIR LT
YL RNG

SURVEY @ 4474 INC: 76.80
AZM: 10.80 TVD: 4047.40 VS:



MW IN/ OUT: 9.3/9.2
VIS IN/OUT: 53/55

CG 31u

MW: 9.3
VIS: 54
PV: 36
YP: 6
GELS: 6/21/0
FIL: 4.8
CK: 2/0
SOL: 7.1
H2O: 92.6
PH: 11
CHL: 3,000
CAL: 80

0 200 GAS (units) 80
0 11000 C1-C4 (PPM)

CG 37u

MAX GAS 466u

CG 264u

AZIM: 10.80 TVD: 4047.40 VS.

666.40

CHT: OFF WHT-CRM, OPQ
IP, FRM- HD, V HD IP, MC
XLNP, PRED TRIP, TRC DD
OIL STN ON FRAC PLANES,
DLL LT BL FLASH CUT, FAIR
LT YL RNG, TR SH, DK
GY-BLK, MOD FRM-HRD,
PRED SUB BLKY, SLI CARB,
SL TR LS, V-SLI TR SS

**PUMP SWEEP, CIRC BU,
TOOH FOR BIT/CASING @
4,527' MD/4,041' TVD**

TD ON 1-27-2014, THANK
YOU FOR USING ALS
EMPIRICA. PLEASE SEE
HORIZONTAL FILE FOR
CONTINUED LOGGING

