



**EMPIRICA**

*The Surface Logging Company*

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Greengroup 14A-1H Sidetrack 1

**Location** Sec 14, T27S, R12W

**State** Kansas

**Country** USA

**API Number** 15-151-22422

**Region** Gulf

**Spud Date** 11/21/2013

**Surface Coordinates** 156' FNL & 2338' FWL of Sec 14, T27s, R12W

**Ground Elevation** 1,861

**Logged Interval** 4,490'

**Formation** MISSISSIPPIAN

**Type of Drilling Fluid** Water Based

**County** Pratt

**Rig Number** HWD # 14

**AFE #** 131892

**Drilling Completed** 12/20/2013

**K.B. Elevation** 1,876

**Total Depth** 8030'

**Company** Seneca Resol

**Address** McCandless C  
5800 Corporat  
Pittsburgh, PA

**Name** Edward Revoll

**Company** Empirica

**Address** 609 Westland  
Edmond, OK 7

**Product Description**

**Equipment**

TW  
Log  
Uni  
ML  
Cal

## Operator

urces Corp.

Corporate Center  
te Drive, Suite 300  
15237

## Rock Types

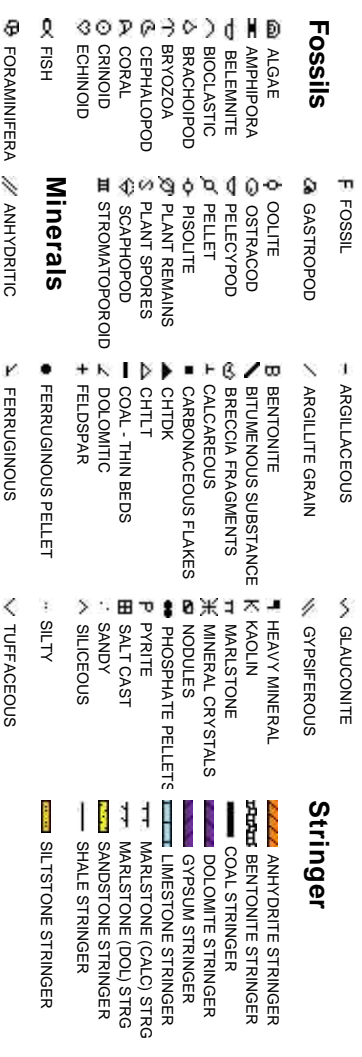


## Geologist

llo/Sam Morris

Drive  
73013

## Accessories



## Other

o man logging  
gging began: 11/23/2013  
it Released:  
ogger (160)  
libration: Standar Calibration of MLogger

## Other Symbols

### Oil Show

- MOLDIC
- ORGANIC
- PINPOINT
- VUGGY
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

### Engineering

- FAULT
- FORMATION TOP
- GAS SHOW
- MINDEPTH MN DEPTH
- NORMAL FAULT
- OIL SHOW
- OVERTURNED STRATA
- REVERSE FAULT
- SIDE WALL CORE (LEFT)
- SIDE WALL CORE (RIGHT)
- CONNECTION GAS
- CONNECTION (LEFT)
- CONNECTION (RIGHT)
- BIT
- CORE - LOST
- CORE - RECOVERED
- DST INTERVAL
- SLIDE
- SURVEY
- TRIP GAS

### Rounding

- WIRELINE TESTED - LEFT
- WIRELINE TESTED - RT
- FINELYXLN
- GRAINSTONE
- LITHOGRAPHIC
- ANGULAR
- ROUNDED
- SUBANG
- SUBRND
- MICROXLN
- MUDDSTONE
- PACKSTONE
- WACKESTONE

### Porosity

- EARTHY
- FENESTRAL
- FRACTURE
- INTERCRYSTALLINE
- INTEROOLITIC

### Textures

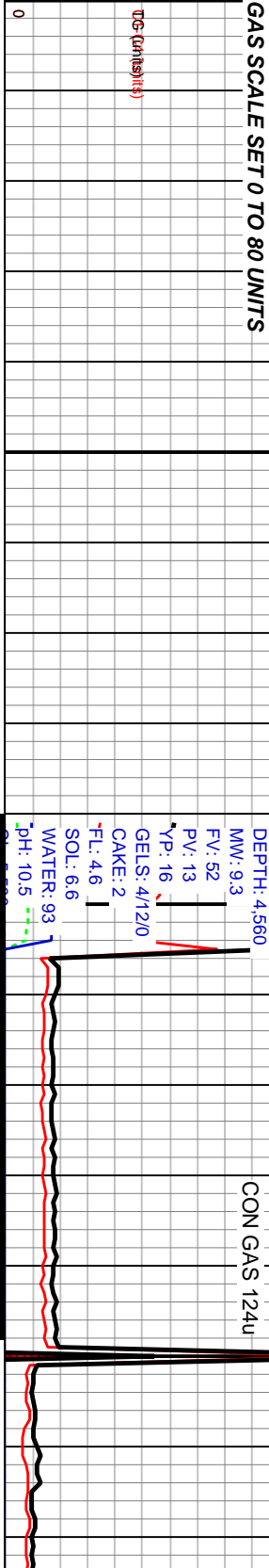
- BOUNDSTONE
- CHALKY
- CRYPTOXLN

### Sorting

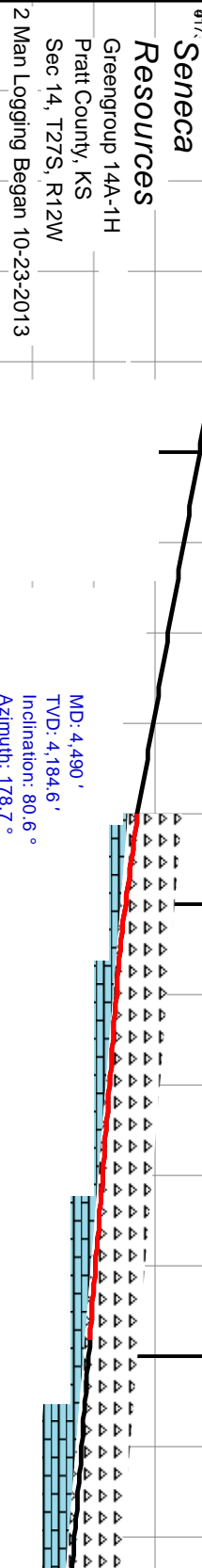
- MODERATE
- POOR
- WELL

**Total Gas & Chromatograph**

- TG
- C1
- C2
- C3
- C4



Slide/Rotate  
 Depth Labels  
 4,410 4,420 4,430 4,440 4,450 4,460 4,470 4,480 4,490 4,500 4,510 4,520 4,530 4,540 4,550 4,560 4,570



**Well Bore**  
 TVD (Survey Data Sideltrack 1 (ft))

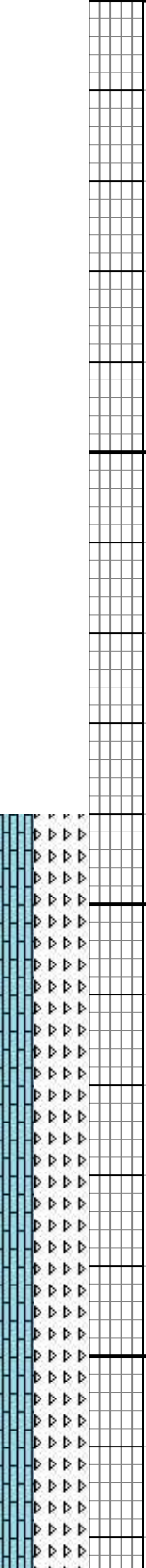
MD: 4,490'  
 TVD: 4,184.6'  
 Inclination: 80.6°  
 Azimuth: 178.7°  
 VS: 548.9'

MD: 4,504'  
 TVD: 4,187.1'  
 Inclination: 80.6°  
 Azimuth: 178.7°  
 VS: 562.7'

Bit #: 4  
 Type: E1202  
 Size: 8.75  
 Depth In: 3,40'  
 Depth Out: 4,56'  
 Hours: 32.5 hrs  
 Avg Ft/Hr: 46.1' /hr  
 Jets: 5X12  
 S/N: A163400

Bit #: 5  
 Type: REED  
 Size: 6.12  
 Depth In: 4,56'  
 Depth Out: 6,01'  
 Hours: 48 hrs  
 Avg Ft/Hr: 30.38' /hr  
 Jets: 3X20  
 S/N: D165149 Edward R. ON

CHT: WHT TO OFF WHT, TR BLK/GRY/MOTT, TR LT GY,  
 V/HRD, MOD FRM TO FRM, OCC CRMBLY, MICRO XLN, TR  
 V/FN XLN, OCC SUC TXT IP, TRIP CHRT, TR BLU/GY SHRP  
 ANG V/HD CHAL CHT, OCC PYR INC., TR TAN TO LT BRN  
 SPOT STAIN, NO ODOR, TR TO SCAT YEL FLOR, NO VIS  
 CUT

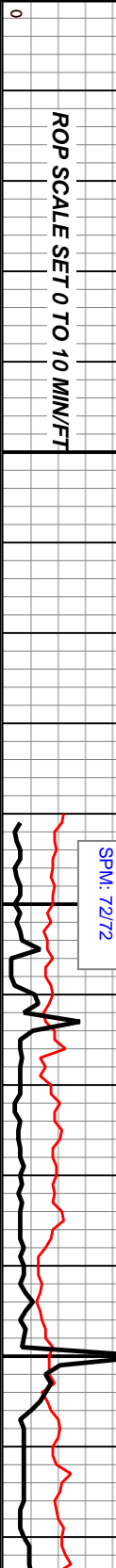


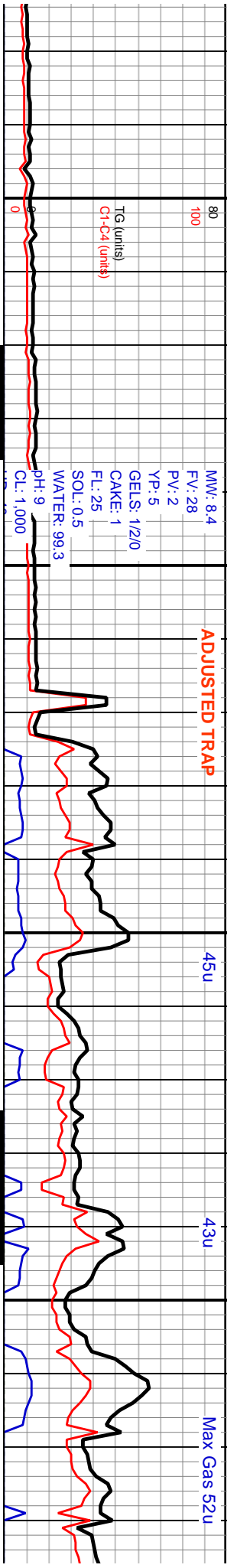
% Lith

Images  
 160  
 7" CASING SET @ 4,523' MD  
 4,189' TVD

ROP  
 ROF  
 GAMMA

GAMMA SCALE SET 0 TO 150 API  
 ROP SCALE SET 0 TO 10 MIN/FT





4,580 4,590 4,600 4,610 4,620 4,630 4,640 4,650 4,660 4,670 4,680 4,690 4,700 4,710 4,720 4,730 4,740 4,750 4,760 4,770 4,780

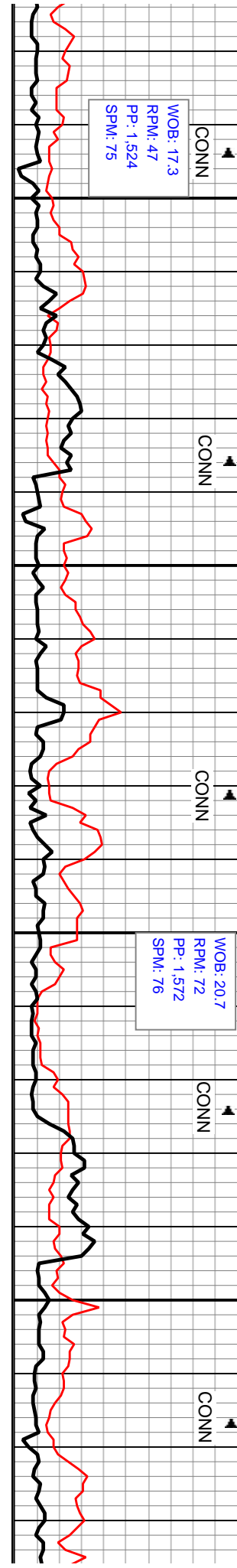


ID: 4.579' MD: 4.624' MD: 4.667' MD: 4.711' MD: 4.753'  
 VD: 4.194.71' TVD: 4.195.96' TVD: 4.196.3' TVD: 4.196' TVD: 4.195.5'  
 Inclination: 87.7° Inclination: 89.1° Inclination: 90.1° Inclination: 90.5° Inclination: 90.9°  
 Azimuth: 176.5° Azimuth: 177.7° Azimuth: 177.1° Azimuth: 177.4° Azimuth: 179.6°  
 VS: 637' VS: 681.89' VS: 724.8' VS: 758.7' VS: 810.6'

CHT: WHT TO OFF WHT, TR CRM TO TAN, TR LT GY, MOD FRM TO FRM, OCC V/HRD, OCC CRMBLY, MICRO XLN, TR V/FN XLN, OCC SUC TXT IP, TRIP CHRT, OCC LS: OFF WHT TO CRM, CHNKY, MOD FRM, SLI SIL, OCC PYR INC., TR TAN TO LT BRN SPOT STAIN, NO ODOR, TR TO SCAT YEL FLOR, NO VIS CUT

CHT: OFF WHT TO WHT, TRNSL, OCC LT GY, MOD FRM TO FRM, OCC V/HRD, MICRO XLN, TR V/FN XLN, OCC SUC TXT IP, OCC PYR INC., TR CONCH FRACS, OCC HL FRAC POR, TR TAN TO LT BRN SPOT STAIN, TR ASPHLTC SPOT STAIN, NO ODOR, V/FNT PAL YEL FLOR, NO VIS CUT

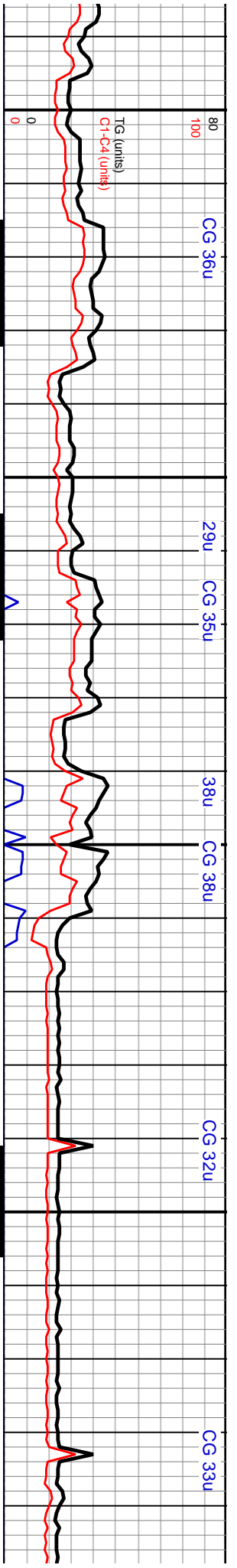
CHT: OFF WHT TO WHT, TRNSL, C FRM, OCC V/HRD, MICRO XLN, TR TXT IP, OCC PYR INC., TR CONCH POR, TR TAN TO LT BRN SPOT STAIN, NO ODOR, V/FNT PAL YEL



WOB: 17.3  
 RPM: 47  
 PP: 1.524  
 SPM: 75

WOB: 20.7  
 RPM: 72  
 PP: 1.572  
 SPM: 76

Sam M. ON



4,790 4,800 4,810 4,820 4,830 4,840 4,850 4,860 4,870 4,880 4,890 4,900 4,910 4,920 4,930 4,940 4,950 4,960 4,970 4,980 4,990 5



TVD (ft)  
TVD - Survey Data Sidetrack 1 (ft)

MD: 4,841'  
TVD: 4,194.2'  
Inclination: 90.8°  
Azimuth: 180.4°  
VS: 898.6'

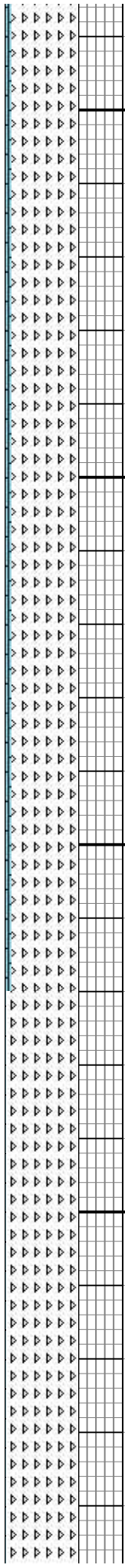
MD: 4,926'  
TVD: 4,194.6'  
Inclination: 88.7°  
Azimuth: 181.1°  
VS: 983.5'

OCC LT GY, MOD FRM TO  
; V/FN XLN, OCC SUC  
IFRACS, OCC HL FRAC  
AIN, TR ASPHLTC SPOT  
FLOR, NO VIS CUT

CHT: OFF WHT TO WHT, TRNSL TO OP, OCC LT GY, MOD  
FRM TO FRM, OCC V/HRD, MICRO XLN, TR V/FN XLN, OCC  
SUC TXT IP, OCC PYR INC, TR CONCH FRACS, OCC HL  
FRAC POR, TR TAN TO LT BRN SPOT STAIN, TR ASPHLTC  
SPOT STAIN, NO ODOR, V/FNT PAL YEL FLOR, NO VIS CUT

CHT: OFF WHT TO WHT, TRNSL TO OP, ANG TO SUB ANG,  
MOD FRM TO FRM, OCC V/HD, MICRO XLN, TR V/FN XLN,  
OCC SUC TXT IP, OCC HL FRAC POR, TR TAN TO LT BRN  
SPOT STAIN, NO ODOR, TRCLS CRM, TRC FLOR BRI YEL,  
V WEAK CUT.

Edward R. ON



WOB: 21  
RPM: 66  
PP: 1,565  
SPM: 75

CONN

CONN

Edward R. on

CONN

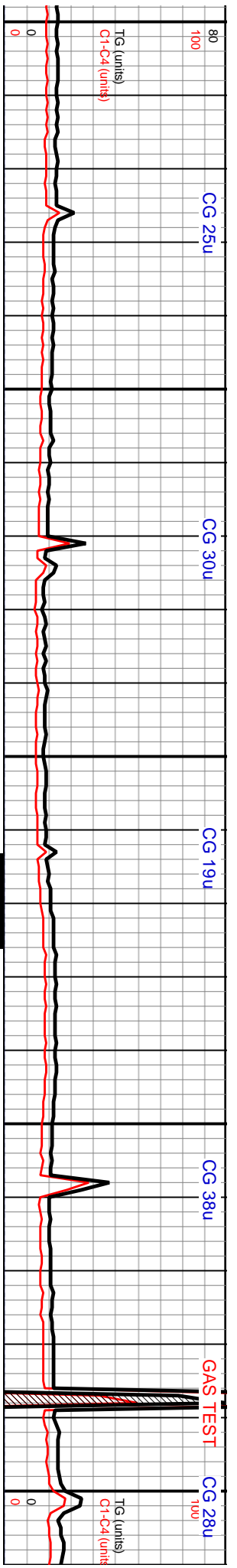
WOB: 20.7  
RPM: 68  
PP: 1,476  
SPM: 72

CONN

CONN

WOB: 20.5  
RPM: 68  
PP: 1,679  
SPM: 077





80  
100  
CG 25u  
CG 30u  
CG 19u  
CG 38u  
GAS TEST  
CG 28u



4173  
0  
4173  
0

MD: 5,014 '  
TVD: 4,195 '  
TVD Inclination: 90.8 °  
Azimuth: 181.9 °  
VS: 1,071.5 '

MD: 5,101 '  
TVD: 4,192.8 '  
Inclination: 92.1 °  
Azimuth: 181 °  
VS: 1,158.5 '

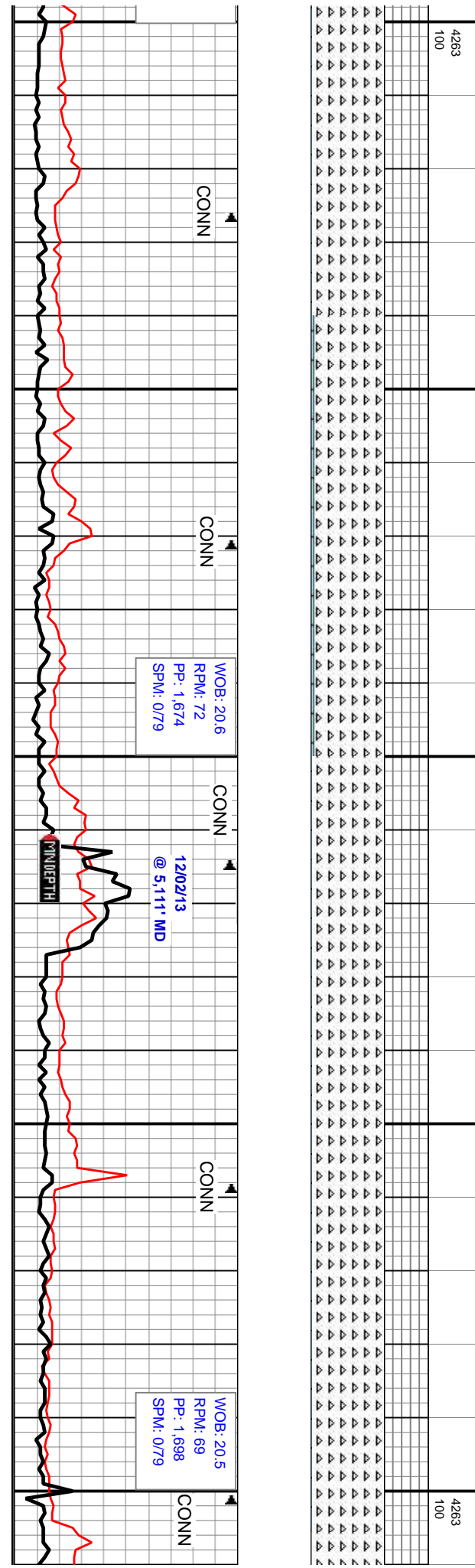
MD: 5,188 '  
TVD: 4,190.6 '  
Inclination: 90.8 °  
Azimuth: 180.8 °  
VS: 1,245.5 '

4263  
100  
4263  
100  
4263  
100

CHT: OFF WHT TO WHT, TRNSL TO OP, ANG TO SUB ANG, MOD FRM TO FRM, OCC V HD, MICRO XLN, TR V/FN XLN, OCC SUC TXT IP, OCC HL FRAC POR, TR TAN TO LT BRN SPOT STAIN, NO ODOR, TRC LS CRM, TRC FLOR BRI YEL, V WEAK CUT

CHT: OFF WHT TO WHT, TRNSL TO OP, ANG TO SUB ANG, MOD FRM TO FRM, OCC V HD, MICRO XLN, TR V/FN XLN, OCC SUC TXT IP, OCC HL FRAC POR, TRC BRN TO DK BRN SPOT STAIN, NO ODOR, TRC LS CRM, TRC FLOR YEL, NO CUT.

CHT: OFF WHT TO FRM TO FRM, OCC HL FRAC POR, TR TAN TO LT BRN SPOT STAIN, NO ODOR, TRC LS



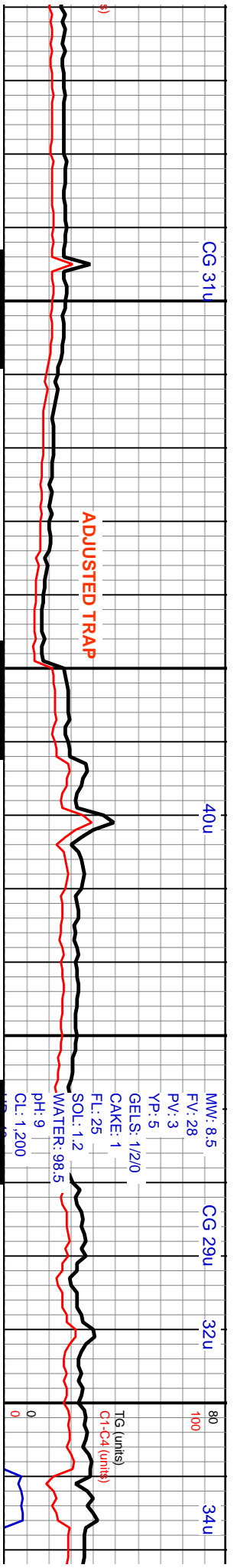
CONN  
CONN  
CONN  
CONN  
CONN

WOB: 20.6  
RPM: 72  
PP: 1.674  
SPM: 079

12/02/13  
@ 5,111' MD

TRC DEPTH

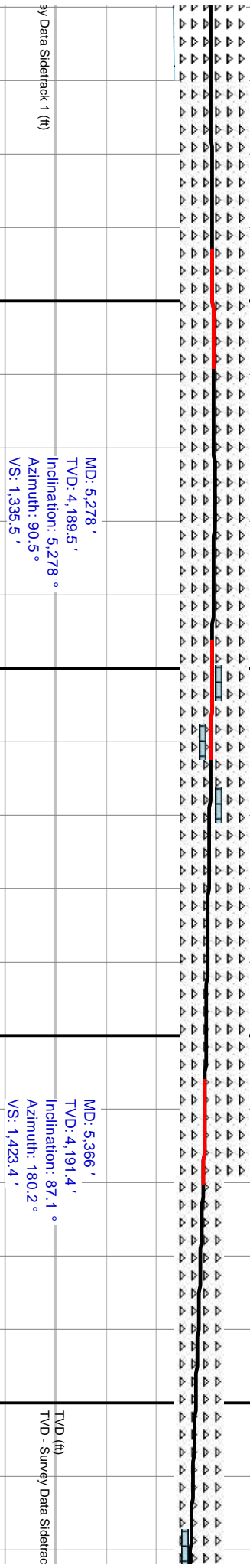
WOB: 20.5  
RPM: 69  
PP: 1.698  
SPM: 079



CG 31u  
40u  
CG 29u  
32u  
34u

MW: 8.5  
FV: 28  
PV: 3  
YP: 5  
GELS: 1/2/0  
CAKE: 1  
FL: 25  
SOL: 1.2  
WATER: 98.5  
pH: 9  
Cl: 1,200

TG (units)  
C4-C4 (units)



MD: 5,278'  
TVD: 4,189.5'  
Inclination: 5,278°  
Azimuth: 90.5°  
VS: 1,335.5'

MD: 5,366'  
TVD: 4,191.4'  
Inclination: 87.1°  
Azimuth: 180.2°  
VS: 1,423.4'

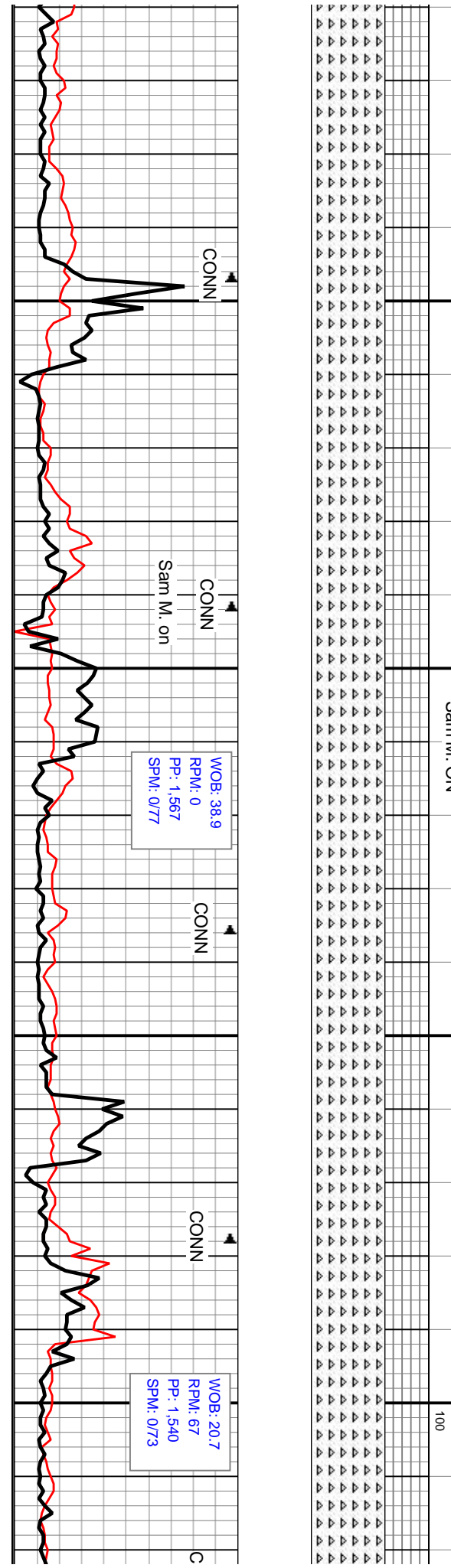
TVD (ft)  
TVD - Survey Data Siderack

WHT, TRNSL TO OP, ANG TO SUB ANG, MOD  
C V HD, MICRO XLN, TR V/FN XLN, OCC SUC  
RAC POR, TRC BRN TO DK BRN SPOT STAIN,  
3 CRM, TRC FLOF YEL, NO CUT.

CHT: WHT TO LT GY, SME OFF WHT, TRNSL TO OP, ANG  
TO SUB ANG, MOD FRM TO FRM, OCC V HD, MICRO XLN,  
TR V/FN XLN, OCC SUC TXT IP, OCC HL FRAC POR, TRC  
BRN TO DK BRN SPOT STAIN, NO ODOR, TRC FLOF YEL,  
NO CUT

CHT: OFF WHT TO WHT, TRNSL TO OP, OCC LT GY, MOD FRM  
FRM, OCC V/HRD, MICRO XLN, TR V/FN XLN, OCC SUC TXT IP,  
PYR INC., TR CONCH FRACS, OCC HL FRAC POR, TR TAN TO  
BRN SPOT STAIN, TR ASPHLTC SPOT STAIN, NO ODOR, OCC  
PAL YEL FLOF, NO VIS CUT

Sam M. ON  
Sam M. ON

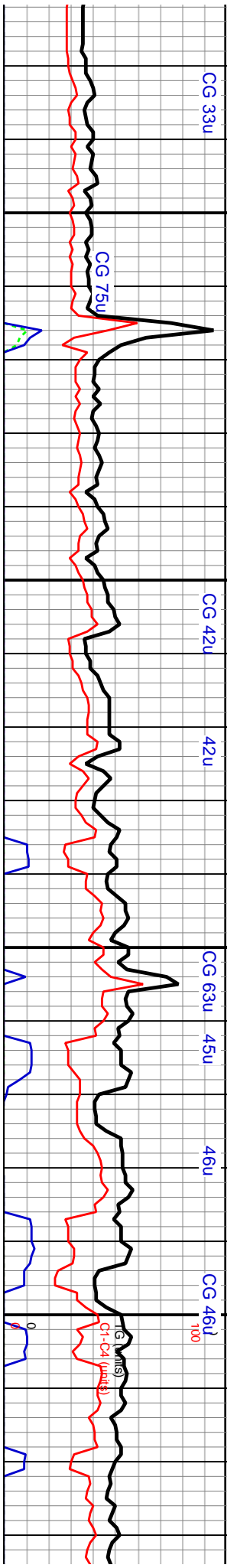


CONN  
CONN  
CONN  
CONN

WOB: 38.9  
RPM: 0  
PP: 1,567  
SPM: 0.777

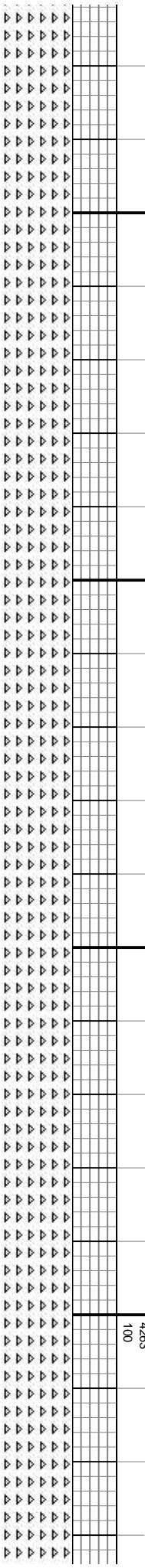
WOB: 20.7  
RPM: 67  
PP: 1,540  
SPM: 0.773



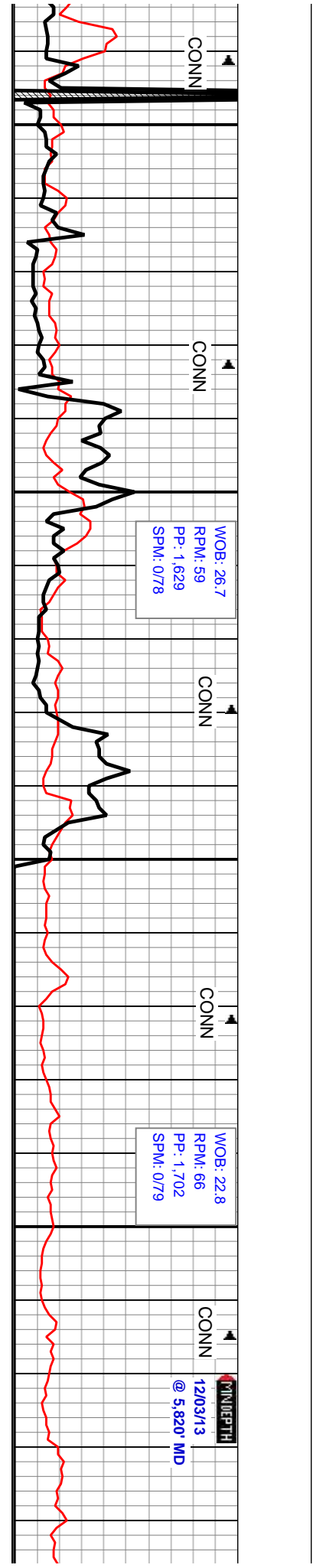
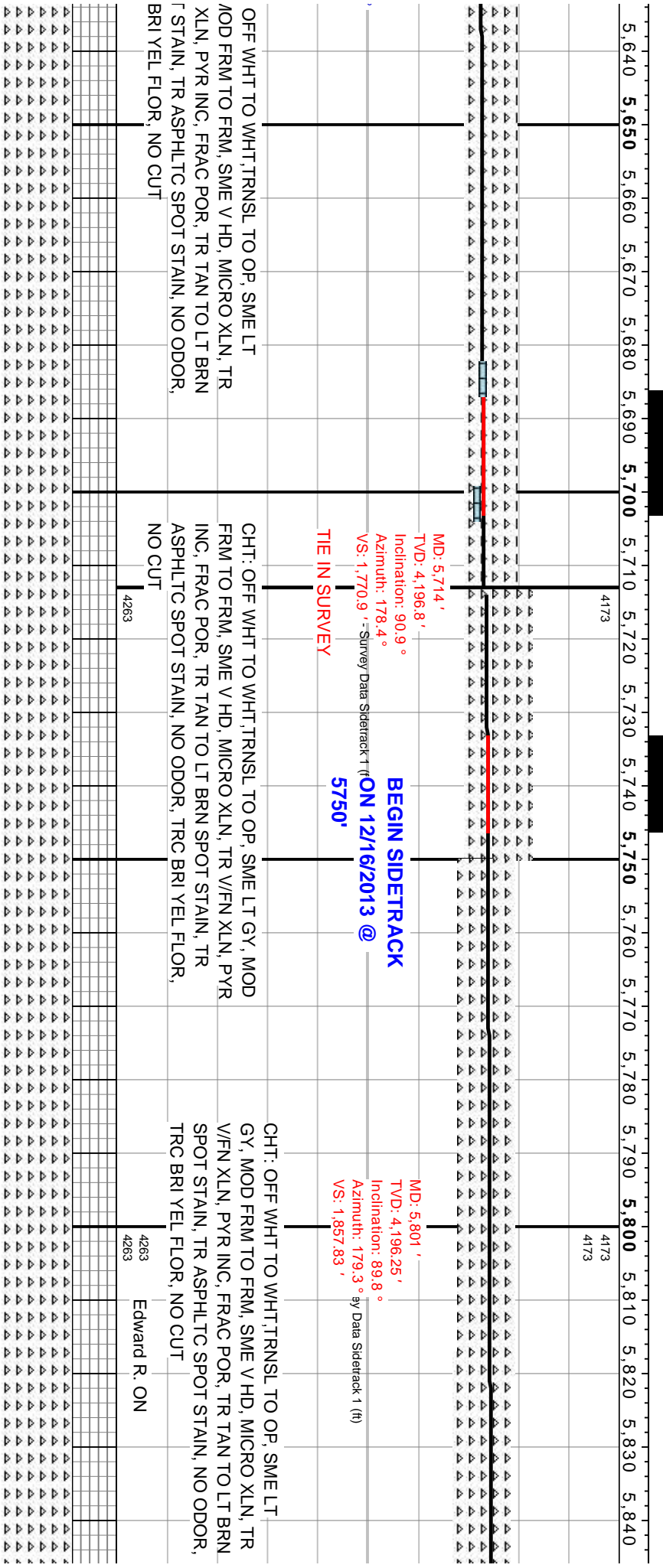
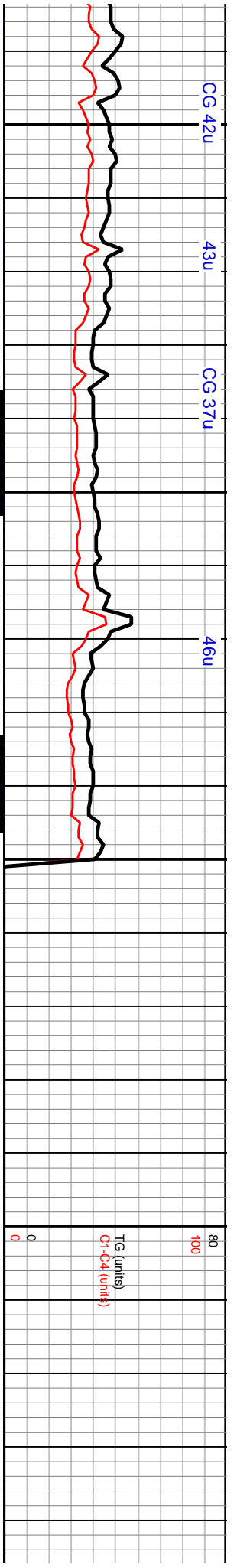


MD: 5,451'	MD: 5,539'	MD: 5,626'
TVD: 4,195.2'	TVD: 4,197.5'	TVD: 4,197.8'
Inclination: 87.8°	Inclination: 89.2°	Inclination: 90.4°
Azimuth: 179.7°	Azimuth: 179.1°	Azimuth: 177.9°
VS: 1,508.3'	VS: 1,596.2'	VS: 1,683.1'

A TO CHT: OFF WHT TO WHT,TRNSL TO OPQ, OCC LT GY, MOD FRM TO  
 , OCC FRM, OCC V/HRD, MICRO XLN, TR V/FN XLN, OCC SUC TXT IP, OCC  
 LT PYR INC., TR CONCH FRACS, OCC HL FRAC POR, TR TAN TO LT  
 V/FNT BRN SPOT STAIN, TR ASPHLTC SPOT STAIN, NO ODOR, OCC V/FNT  
 PAL YEL FLOR, NO VIS CUT



CONN	CONN	CONN	CONN
WOB: 22.7	WOB: 21.5		
RPM: 69	RPM: 75		
PP: 1,523	PP: 1,496		
SPM: 074	SPM: 073		



OFF WHT TO WHT, TRNSL TO OP, SME LT  
 MOD FRM TO FRM, SME V HD, MICRO XLN, TR  
 XLN, PYR INC, FRAC POR, TR TAN TO LT BRN  
 STAIN, TR ASPHLTC SPOT STAIN, NO ODOR,  
 BRI YEL FLOR, NO CUT

CHT: OFF WHT TO WHT, TRNSL TO OP, SME LT GY, MOD  
 FRM TO FRM, SME V HD, MICRO XLN, TR V/FN XLN, PYR  
 INC, FRAC POR, TR TAN TO LT BRN SPOT STAIN, TR  
 ASPHLTC SPOT STAIN, NO ODOR, TRC BRI YEL FLOR,  
 NO CUT

CHT: OFF WHT TO WHT, TRNSL TO OP, SME LT  
 GY, MOD FRM TO FRM, SME V HD, MICRO XLN, TR  
 V/FN XLN, PYR INC, FRAC POR, TR TAN TO LT BRN  
 SPOT STAIN, TR ASPHLTC SPOT STAIN, NO ODOR,  
 TRC BRI YEL FLOR, NO CUT

WOB: 26.7  
 RPM: 59  
 PP: 1.629  
 SPM: 078

WOB: 22.8  
 RPM: 66  
 PP: 1.702  
 SPM: 079

MINIFIT  
 1203/13  
 @ 5,820' MD

CONN

CONN

CONN

CONN

CONN

4263

4263

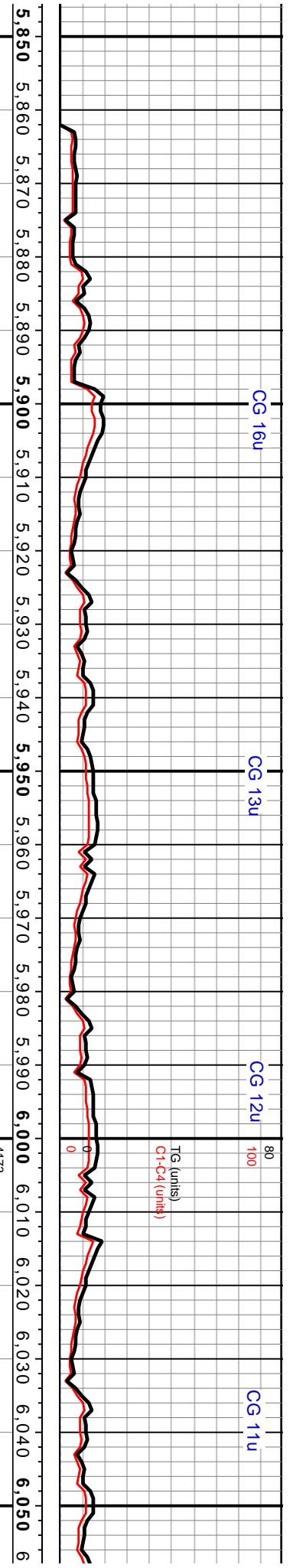
Edward R. ON

4173

4173

MD: 5,714'  
 TVD: 4,196.8'  
 Inclination: 90.9°  
 Azimuth: 178.4°  
 VS: 1,770.9' - Survey Data Sidetrack 1 (ft)  
**BEGIN SIDETRACK**  
**ON 12/16/2013 @**  
**5750'**  
**TIE IN SURVEY**

MD: 5,801'  
 TVD: 4,196.25'  
 Inclination: 89.8°  
 Azimuth: 179.3° by Data Sidetrack 1 (ft)  
 VS: 1,857.83'



CG 16u CG 13u CG 12u CG 11u

4173  
4173

MD: 5.889'  
 TVD: 4,195.86'  
 Inclination: 90.7°  
 Azimuth: 179.4°  
 VS: 1,945.76'

Bit #: 9  
 Type: REED R40  
 Size: 6.12  
 Depth In: 5.90'  
 Depth Out: 6.78'  
 Hours: 26.5 hrs  
 Avg Ft/Hr: 33.4 1/4hr  
 Jets: 5X12

MD: 5.977'  
 TVD: 4,192.03'  
 Inclination: 94.3°  
 Azimuth: 179.3°  
 VS: 2,033.6'

TVD (ft)  
 TVD - Survey Data Sidetrack 1 (ft)

CHT: OFF WHT TO WHT, TRNSL TO OP, SME LT GY, MOD  
 FRM TO FRM, SME V HD, MICRO XLN, TR V/FN XLN, PYR  
 INC, FRAC POR, TR TAN TO LT BRN SPOT STAIN, TR  
 ASPHLTC SPOT STAIN, NO ODOR, TRC BRI YEL FLOR,  
 NO CUT

CHT: OFF WHT TO WHT, TRNSL TO OP, SME LT GY, MOD  
 FRM TO FRM, SME V HD, MICRO XLN, TR V/FN XLN, PYR  
 INC, FRAC POR, TR TAN TO LT BRN SPOT STAIN, TR  
 ASPHLTC SPOT STAIN, NO ODOR, TRC BRI YEL FLOR,  
 NO CUT

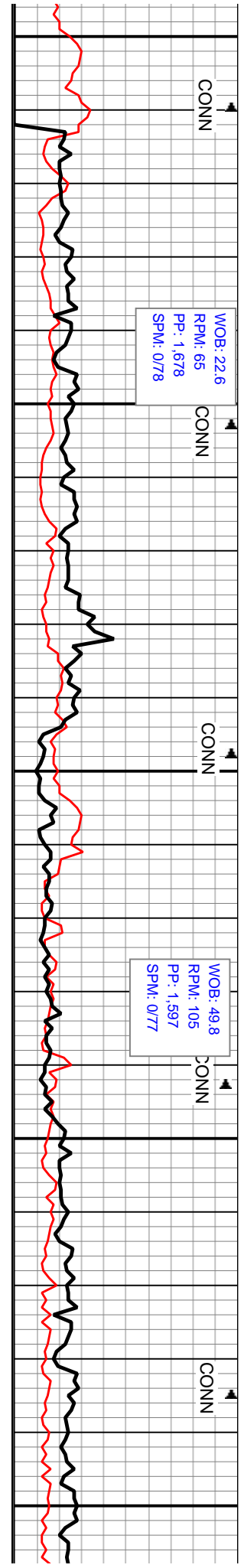
CHT: OFF WHT TO WHT, TRN;  
 MICRO XLN, TR V/FN XLN, PY  
 LAM CHAL CHT, TR LS: OFF \  
 XLN, TR SH: LT GY TO GY, M  
 TXT, OCC SLTY, TR FRAC PC  
 ASPHLTC SPOT STAIN, NO O

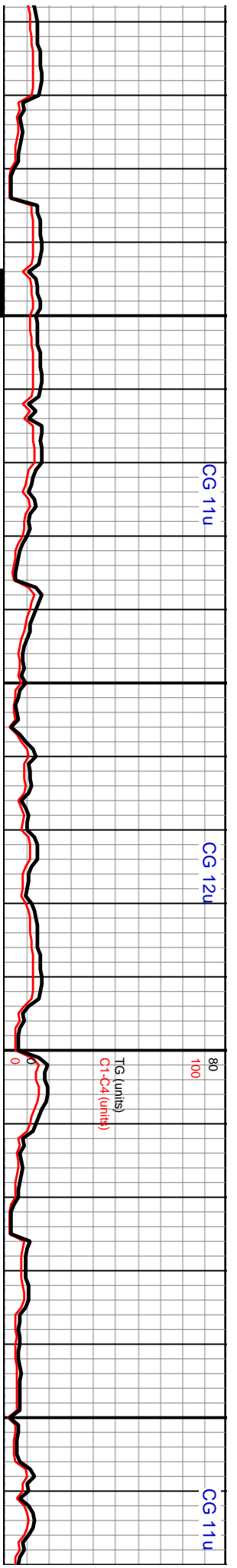
4263  
4263

Sam IV

WOB: 22.6  
 RPM: 65  
 PP: 1.678  
 SPM: 0.78

WOB: 49.8  
 RPM: 105  
 PP: 1.597  
 SPM: 0.777





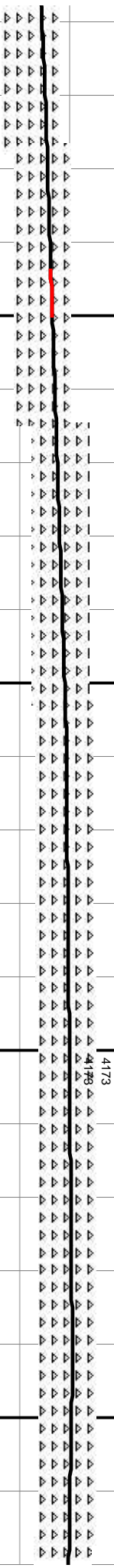
CG 11u

CG 12u

CG 11u

TG (units)  
C1-C4 (units)

6,060 6,070 6,080 6,090 6,100 6,110 6,120 6,130 6,140 6,150 6,160 6,170 6,180 6,190 6,200 6,210 6,220 6,230 6,240 6,250 6,260 6,2



MD: 6.068 '  
TVD: 4.186.55 '  
Inclination: 92.6 °  
Azimuth: 179.9 °  
VS: 2.124.38 '

MD: 6.156 '  
TVD: 4.182.71 '  
Inclination: 92.4 °  
Azimuth: 178.7 °  
VS: 2.212.23 '

TVD (ft)  
TVD - Survey Data Sidetrack 1 (ft)

MD: 6.243 '  
TVD: 4.181.57 '  
Inclination: 89.1 °  
Azimuth: 182.1 °  
VS: 2.299.18 '

SL TO OPG, MOD FRM TO FRM, SM V/HRD,  
'R INC, OCC BLUSH/GY V/HRD SHRP ANG  
WHT TO CRM, MOD FRM, CHNKY, MIC TO V/FN  
OD SFT TO MOD FRM, BRTL, MSTRLY SMTH  
)R, TR TAN TO LT BRN SPOT STAIN, TR  
IDOR, OCC PAL YEL TO YEL FLOR, NO CUT

CHT: WHT, WHT - OFF WHT, SOME WHT - V LT GY, TR  
SPECKL, OP - SL TRNSP, TRNSP IP, HD - V HD, DNS, CONCH  
FRACS, SOME DLL GLD - GLD FLOR, V SL RING CUT, V SL  
FLASH CUT, TR PIPE DOPE, OCC BRN - BLK STN ON  
CUTTINGS

CHT: WHT, WHT - OFF WHT, SOME WHT - V LT GY, TR  
SPECKL, OP - SL TRNSP, TRNSP IP, HD - V HD, DNS, C  
FRACS, SOME DLL GLD - GLD FLOR, V SL RING CUT, V  
FLASH CUT, TR PIPE DOPE, OCC BRN - BLK STN ON  
CUTTINGS

1. ON  
4263  
4263

CONN  
WOB: 45.6  
RPM: 73  
PP: 1.690  
SPM: 0.82

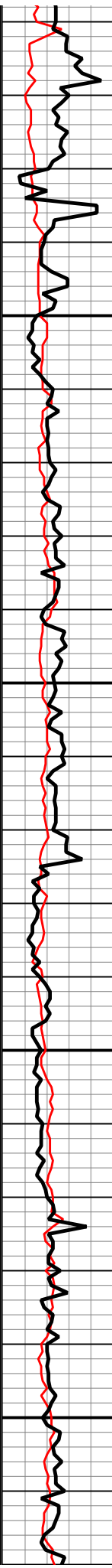
CONN

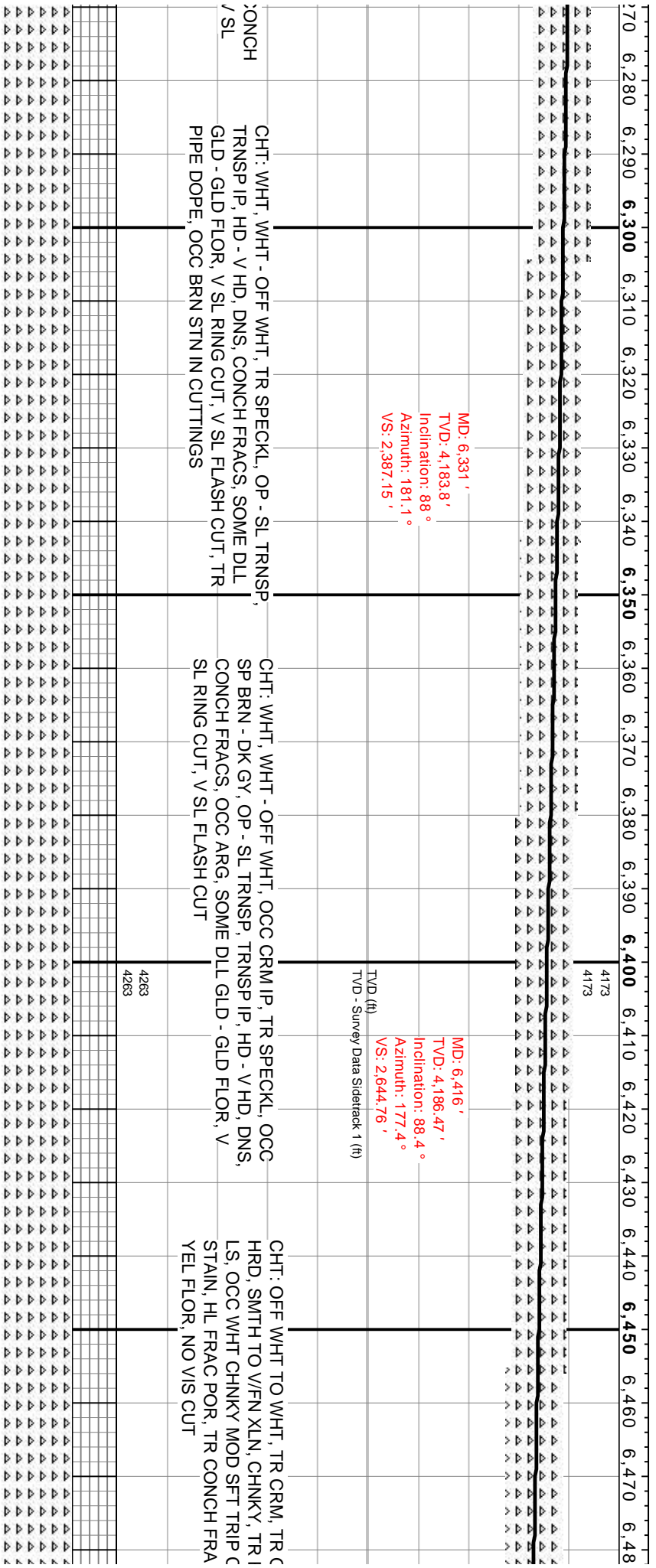
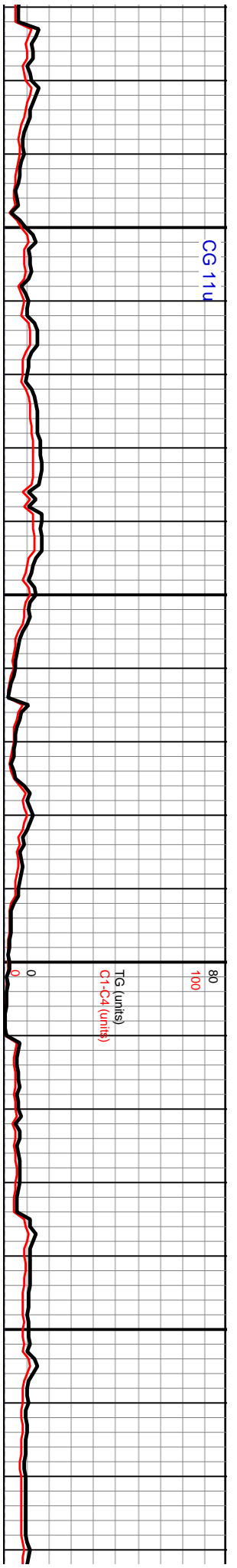
CONN

WOB: 11  
RPM: 71  
PP: 2.060  
SPM: 76

CONN

CONN





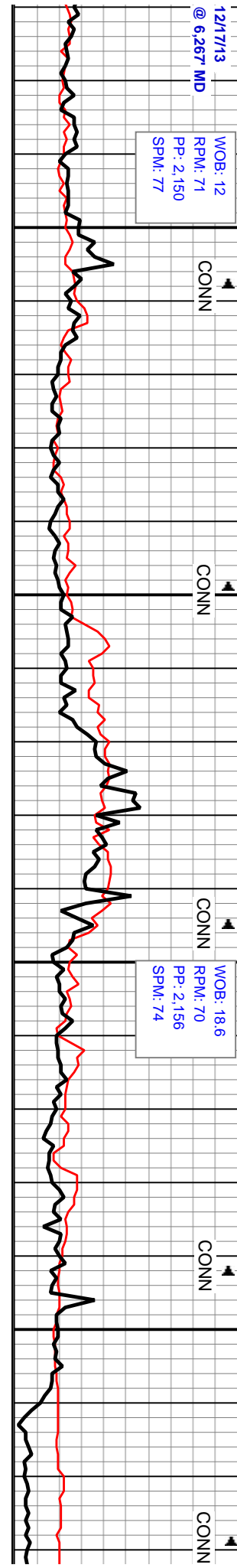
MD: 6.331 '  
 TVD: 4,183.8 '  
 Inclination: 88 °  
 Azimuth: 181.1 °  
 VS: 2,387.15 '

MD: 6.416 '  
 TVD: 4,186.47 '  
 Inclination: 88.4 °  
 Azimuth: 177.4 °  
 VS: 2,644.76 '  
 TVD (ft)  
 TVD - Survey Data Sidetrack 1 (ft)

CHT: WHT, WHT - OFF WHT, TR SPECKL, OP - SL TRNSP, TRNSP IP, HD - V HD, DNS, CONCH FRACS, SOME DLL GLD - GLD FLOR, V SL RING CUT, V SL FLASH CUT, TR PIPE DOPE, OCC BRN STN IN CUTTINGS

CHT: WHT, WHT - OFF WHT, OCC CRM IP, TR SPECKL, OCC SP BRN - DK GY, OP - SL TRNSP, TRNSP IP, HD - V HD, DNS, CONCH FRACS, OCC ARG, SOME DLL GLD - GLD FLOR, V SL RING CUT, V SL FLASH CUT

CHT: OFF WHT TO WHT, TR CRM, TR C HRD, SMTH TO V/FN XLN, CHNKY, TR I LS, OCC WHT CHNKY MOD SFT TRIP C STAIN, HL FRAC POR, TR CONCH FRA YEL FLOR, NO VIS CUT



1217/13  
 @ 6,267 MD  
 WOB: 12  
 RPM: 71  
 PP: 2,150  
 SPM: 77

WOB: 18.6  
 RPM: 70  
 PP: 2,156  
 SPM: 74

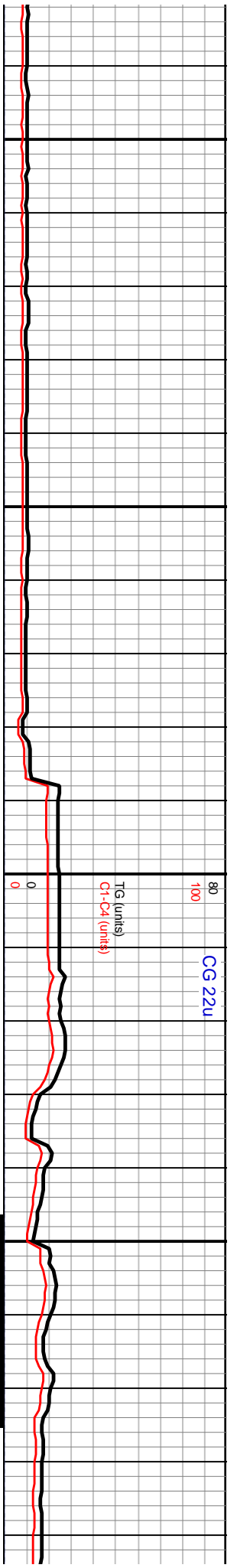
CONN

CONN

CONN

CONN

CONN



0 6,490 6,500 6,510 6,520 6,530 6,540 6,550 6,560 6,570 6,580 6,590 6,600 6,610 6,620 6,630 6,640 6,650 6,660 6,670 6,680 6,690



MD: 6.502 '  
 TVD: 4,188.95 '  
 Inclination: 88.3 °  
 Azimuth: 178.1 °  
 VS: 2.557.98 '

MD: 6.589 '  
 TVD: 4,191.3 '  
 Inclination: 88.6 °  
 Azimuth: 177.4 °  
 VS: 2.644.76 '

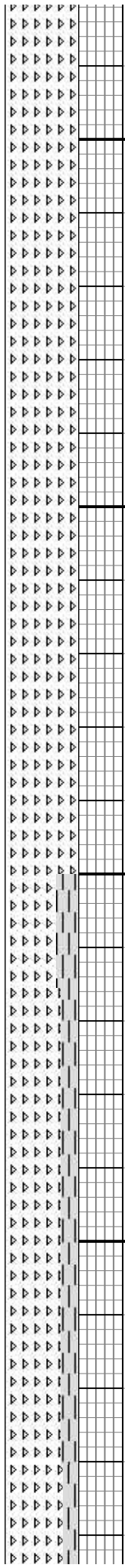
TVD (ft)  
 TVD - Survey Data Sidetrack 1 (ft)

MD: 6.691 '  
 TVD: 4,192 '  
 Inclination: 1  
 Azimuth: 1  
 VS: 2.746.6

JPOQ, MOD FRM TO FRM,  
 BLKY, OCC PLTY, OCC SIL  
 HT, OCC ASPHLTC SPOT  
 C OCC PAL YEL TO DULL

**ENTERED THE ORIGINAL BORE HOLE**

CHT: OFF WHT TO WHT, TR CRM, TR OPQ, MOD FRM TO FRI  
 HRD, SMTH TO V/FN XLN, CHNKY, TR BLKY, OCC PLTY, OCC  
 CHNKY MOD SFT TRIP CHT, TR SH: LT GY TO GY TR GRN CH  
 MOD FRM OCC PYR INC., OCC ASPHLTC SPOT STAIN, HL FR  
 POR, TR CONCH FRAC OCC PAL YEL TO DULL YEL FLOR, NC  
 CUT



WOB: 2.8  
 RPM: 73  
 PP: 2.356  
 SPM: 76

CONN

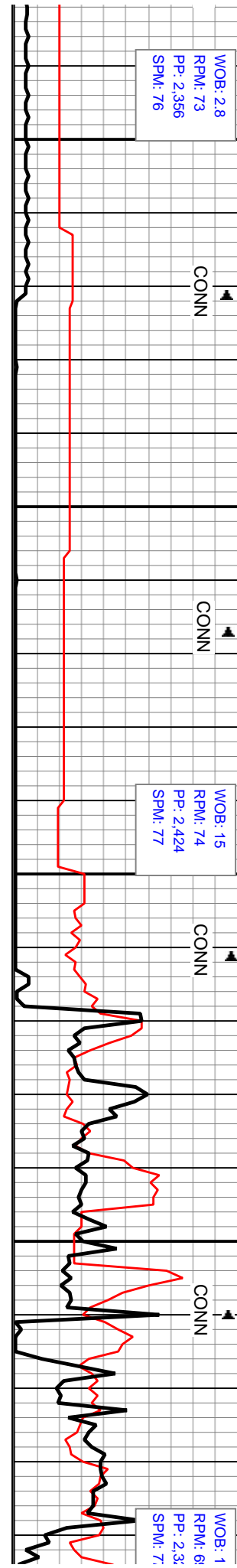
CONN

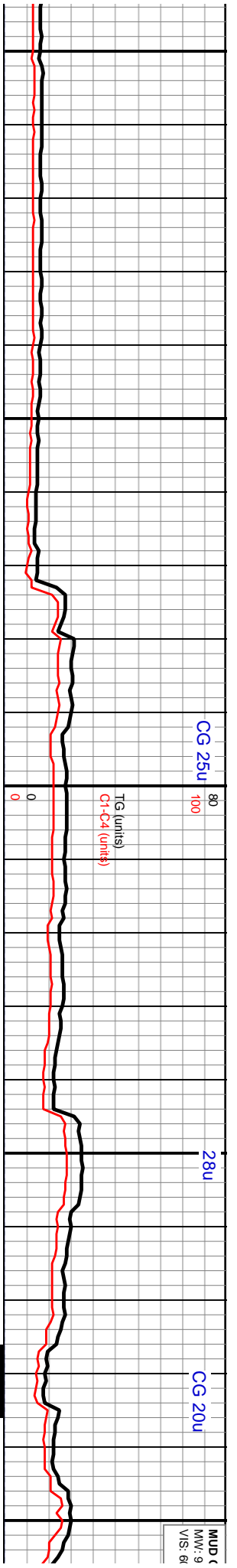
WOB: 15  
 RPM: 74  
 PP: 2.424  
 SPM: 77

CONN

CONN

WOB: 1  
 RPM: 6  
 PP: 2.3  
 SPM: 7





6,700 6,710 6,720 6,730 6,740 6,750 6,760 6,770 6,780 6,790 6,800 6,810 6,820 6,830 6,840 6,850 6,860 6,870 6,880 6,890 6,900

MD: 6,734' TVD: 4,191.9' Inclin: 89.7° Azimuth: 182° VS: 2,789.6'

Bit #: 10 Type: SEC MM64D Size: 6.12 Depth In: 6.78' Jets: 6X16

MD: 6,818' TVD: 4,192.1' Inclin: 90° Azimuth: 182.7° VS: 2,873.5' (ft)

MD: 6,902' TVD: 4,193' Inclin: Azimuth: VS: 2,957.4'

M, ;WHT -NKY C VIS

CHT: OFF WHT TO WHT, TR CRM, TR OPQ, MOD FRM TO FRM, HRD, SMTH TO V/FN XLN, CHNKY, TR BLKY, OCC PLTY, OCC LS OFF WHT TO CRM MOD FRM MIC TO V/FN XLN OCC PP POR, OCC WHT CHNKY MOD SFT TRIP CHT, OCC ASPHLTC SPOT STAIN, HL FRAC POR, TR CONCH FRAC OCC PAL YEL TO DULL YEL FLOR, NO VIS CUT

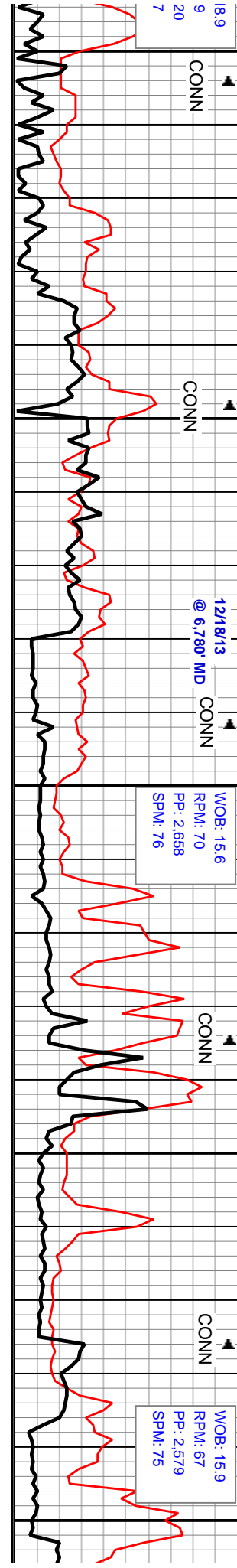
CHT: OFF WHT TO WHT, TR CRM, TR OPQ, MOD FRM TO FRM, HRD, SMTH TO V/FN XLN, CHNKY, TR BLKY, OCC PLTY, OCC LS OFF WHT TO CRM MOD FRM MIC TO V/FN XLN OCC PP POR, OCC WHT CHNKY MOD SFT TRIP CHT, OCC ASPHLTC SPOT STAIN, HL FRAC POR, TR CONCH FRAC OCC PAL YEL TO DULL YEL FLOR, NO VIS CUT

CHT: OFF WHT TO WHT, TR CRM, TR OPQ, MOD FRM TO FRM, HRD, SMTH TO V/FN XLN, CHNKY, TR BLKY, OCC PLTY, OCC LS OFF WHT TO CRM MOD FRM MIC TO V/FN XLN OCC PP POR, OCC WHT CHNKY MOD SFT TRIP CHT, OCC ASPHLTC SPOT STAIN, HL FRAC POR, TR CONCH FRAC OCC PAL YEL TO DULL YEL FLOR, NO VIS CUT

WOB: 15.6 RPM: 70 PP: 2.658 SPM: 76

WOB: 15.9 RPM: 67 PP: 2.579 SPM: 75

FL: 4.2 SOL: 7.1 WATER: 92.6 pH: 10.4 CL: 3,000



18.9 9 20 7

CONN CONN CONN CONN

@ 6,780' MD

WOB: 15.6 RPM: 70 PP: 2.658 SPM: 76

WOB: 15.9 RPM: 67 PP: 2.579 SPM: 75

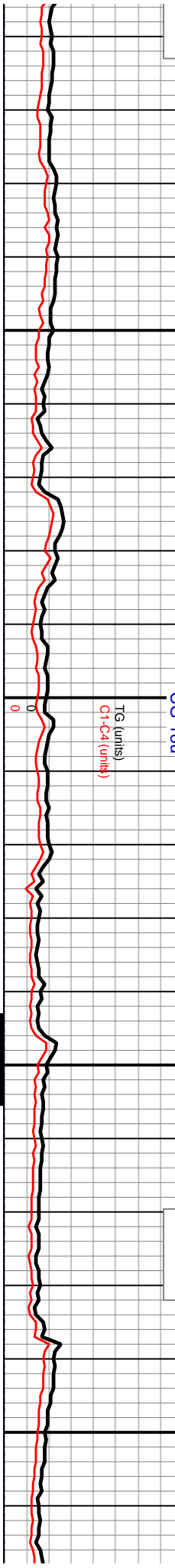
CHECK 1.3  
0

80  
100  
CG 18U

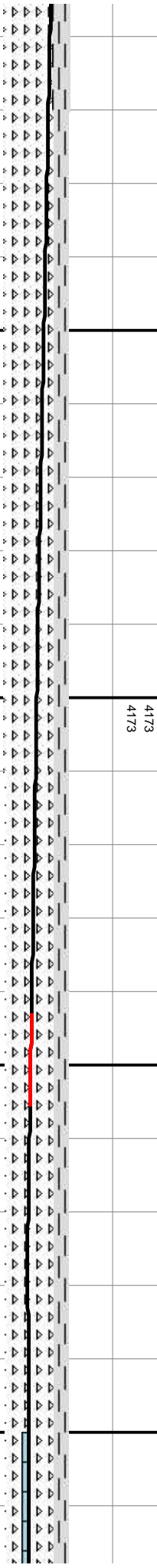
CG 19U

CG 21U

MUD CHECK MW: 9.1  
VIS: 53



6,910 6,920 6,930 6,940 6,950 6,960 6,970 6,980 6,990 7,000 7,010 7,020 7,030 7,040 7,050 7,060 7,070 7,080 7,090 7,100 7,110 7



MD: 6,986' TVD: 4,195.34' Inclination: 88.2° Azimuth: 182.6° VS: 3,041.48'

TVD (ft)  
TVD - Survey Data Sidetrack 1 (ft)

MD: 7,074' TVD: 4,197.26' Inclination: 89.3° Azimuth: 182.1° VS: 3,129.45'

T: WHT - OFF WHT, TR CRM IP, TR ECKL, OP - SL TRNSP, SOME TRNSP, HD - V HD, TR TRIP, OCC ARG, TR E DOPE IN SAMPLE, TR DLL GLD - D FLOR, NSOC

CHT: WHT - OFF WHT, TR CRM IP, TR SPECKL, OP - SL TRNSP, SOME TRNSP, SM, HD - V HD, OCC ARG, TR FOSS SHELL FRAG, POSS TR FORAM, TR PIPE DOPE IN SAMPLE, TR DLL GLD - GLD FLOR, NSOC

CHT: WHT - OFF WHT, TR LT TAN, TR SPECKL, OP - SL TRNSP, SOME TRNSP, SM, HD - V HD, OCC ARG, TR DLL GLD - GLD FLOR, NSOC; OCC SH W/ IMBD CHT

CHT: WHT - OFF WHT, OP - SL TRNSP, SOME TRNSP, SM, HD - V HD, OCC ARG, TR MIC FOSS, TR DLL GLD - GLD FLOR, NSOC; OCC SH W/ IMBD CHT

CHT: WHT - OFF WHT, SOME TRNSP TR MIC FOSS OCC SH W/ IN LS: OFF WHT, SM TEX, FRM

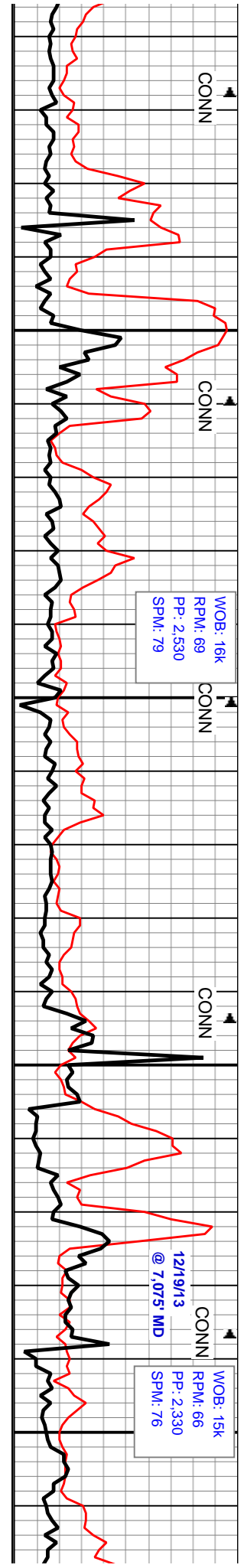
4263

4263

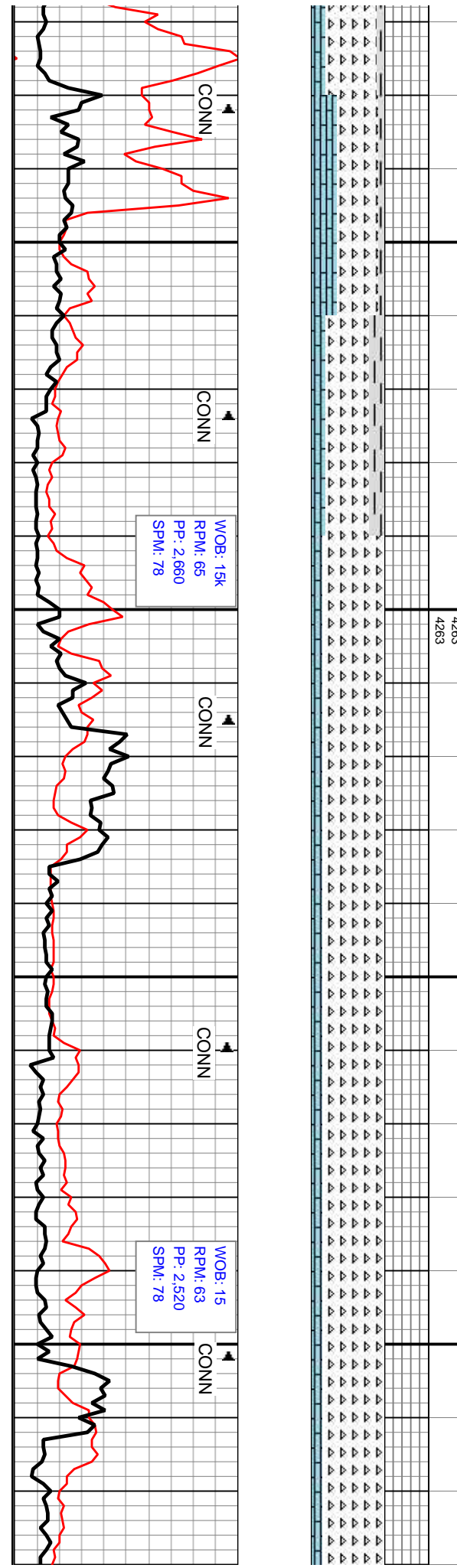
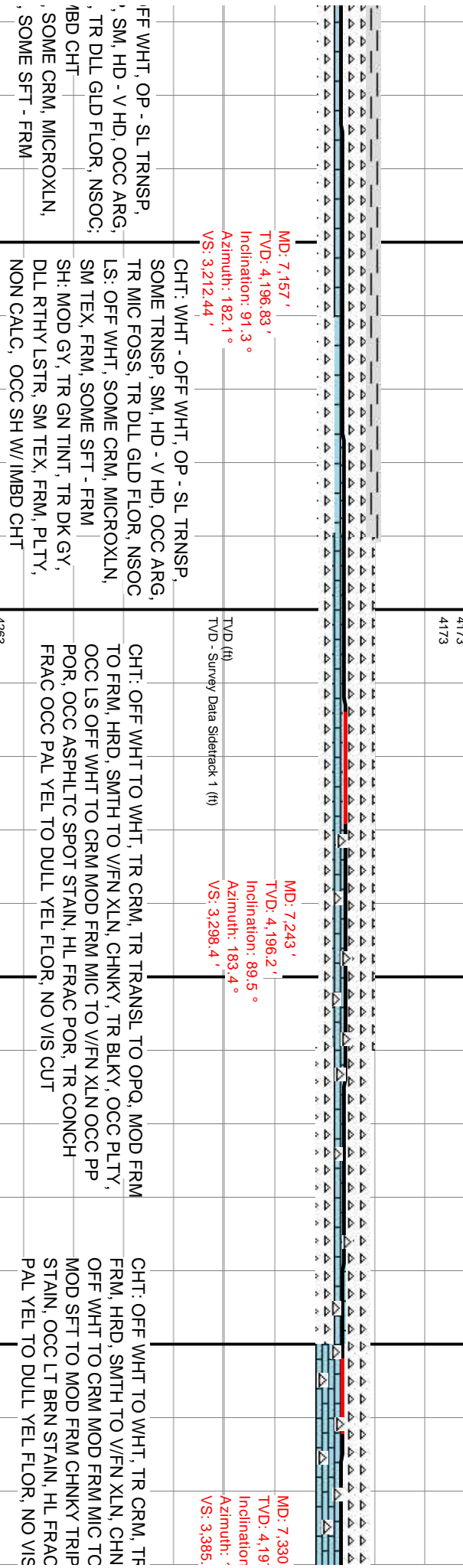
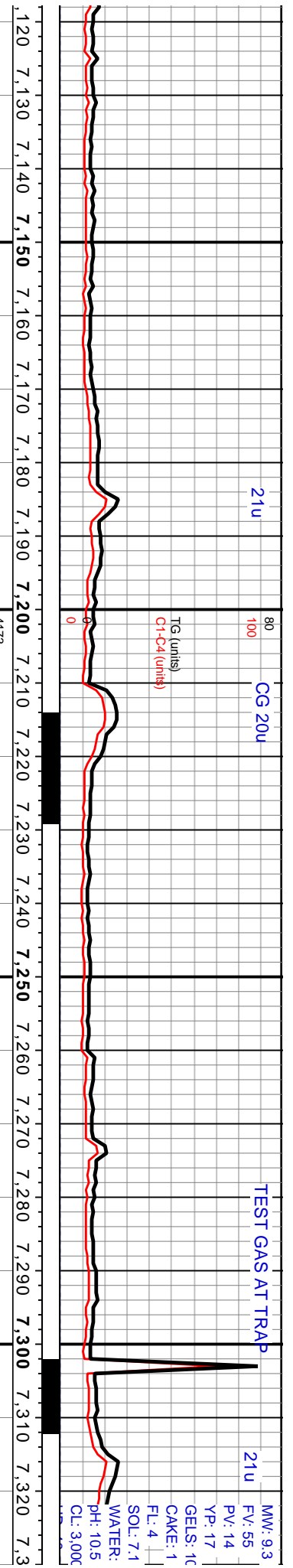
4263

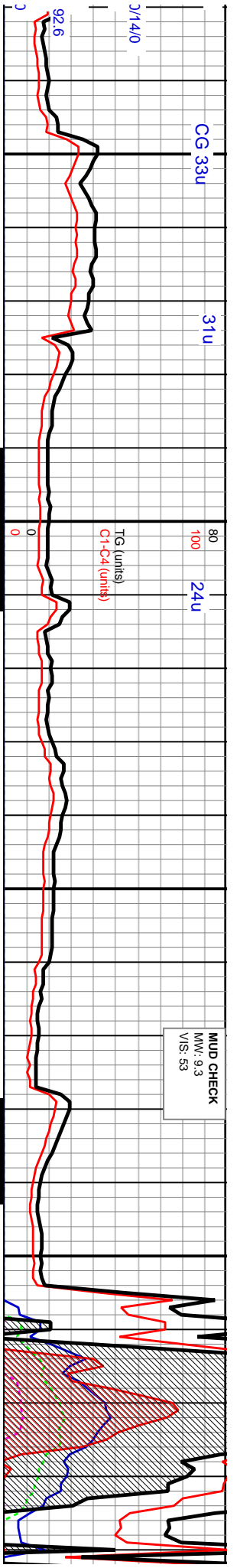
WOB: 16K  
RPM: 69  
PP: 2,530  
SPM: 79

12/19/13 @ 7:075' MD  
WOB: 15K  
RPM: 66  
PP: 2,330  
SPM: 76

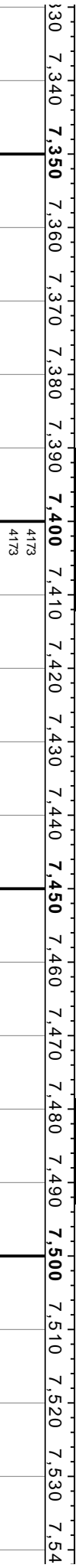








MUD CHECK  
MW: 9.3  
VIS: 53



7.1' MD: 7.414'  
 TVD: 4,198.3'  
 Inclination: 89.1°  
 183.3° Azimuth: 89.1°  
 TVD (Azimuth: 89.1°)  
 VS: 3,469.4' (Track 1 (ft))

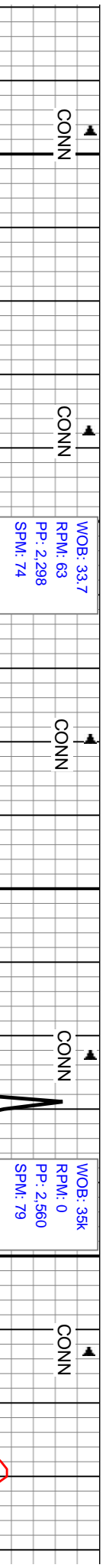
MD: 7.497'  
 TVD: 4,199.25'  
 Inclination: 89.6°  
 Azimuth: 179.4°  
 VS: 3,562.32'

TRANSLS TO OPQ, MOD FRM TO  
 KY, TR BLKY, OCC PLTY, OCC LS  
 V/FN XLN OCC PP POR, TR WHT  
 CHT, OCC ASPHLTC SPOT  
 POR, TR CONCH FRAC OCC  
 SCUT

4263  
4263

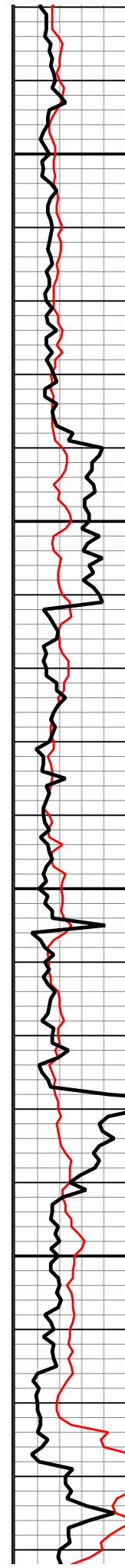
CHT: OFF WHT TO WHT, TR CRM, TR TRANSLS TO OPQ, MOD FRM TO  
 FRM, HRD, SMTH TO V/FN XLN, CHNKY, TR BLKY, OCC PLTY, OCC LS  
 OFF WHT TO CRM MOD FRM MIC TO V/FN XLN OCC PP POR, TR WHT  
 MOD SFT TO MOD FRM CHNKY TRIP CHT, OCC ASPHLTC SPOT  
 STAIN, OCC LT BRN STAIN, HL FRAC POR, TR CONCH FRAC, TR PAL  
 YEL TO DULL YEL FLOR, WK PAL YEL FNT MLKY CUT WHEN  
 CRUSHED

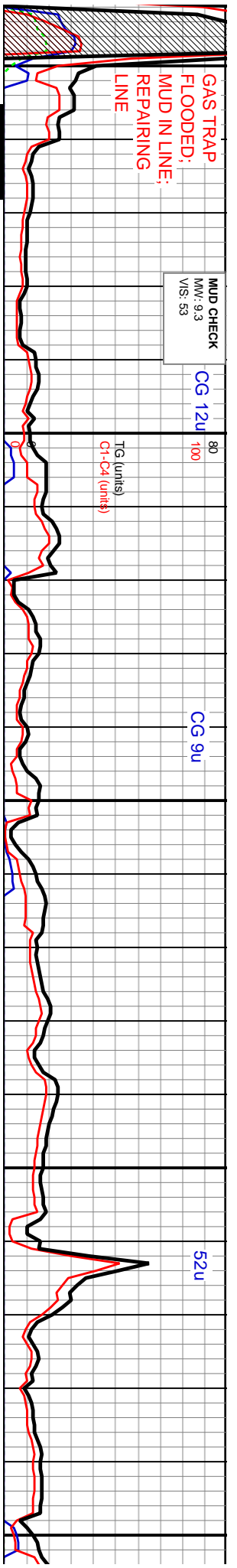
CHT: WHT - OFF WHT, OP, SOME OP - TRNSP,  
 SM TEX, HD - V HD, DNS, TR CONCH FRACS,  
 OCC DLL GLD - LT GLD FLOR, NSOC, TR LS;  
 OCC SH W/ INTBD CHT



WOB: 33.7  
 RPM: 63  
 PP: 2.298  
 SPM: 74

WOB: 35K  
 RPM: 0  
 PP: 2.560  
 SPM: 79





0 7,550 7,560 7,570 7,580 7,590 7,600 7,610 7,620 7,630 7,640 7,650 7,660 7,670 7,680 7,690 7,700 7,710 7,720 7,730 7,740 7,750

CG 12U	100	CG 9U	52u
4173	4173		

MD: 7,584'  
TVD: 4,198.95'  
Inclination: 90.8°  
Azimuth: 179.2°  
VS: 3,639.26'

TVD (ft)  
TVD - Survey Data Siderack 1 (ft)

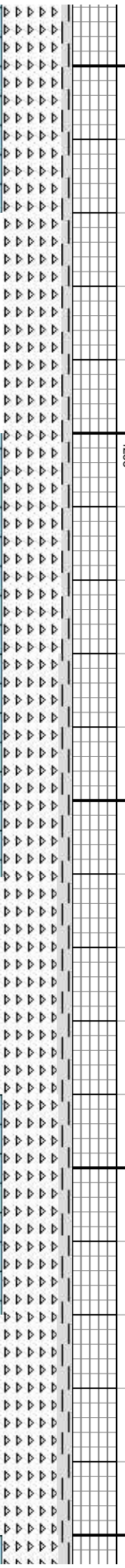
MD: 7,671'  
TVD: 4,197.66'  
Inclination: 90.9°  
Azimuth: 179.4°  
VS: 3,726.18'

MD: 7,7  
TVD: 4,  
Inclinat  
Azimut  
VS: 3.8

CHT: WHT - OFF WHT, OCC SPECKL, OP, SOME  
OP - TRNSP, SM TEX, HD - V HD, DNS, TR CONCH  
FRACS, TR DLL GLD - LT GLD FLOR, V SL THIN  
RING CUT; TR LS; OCC SH W/ INTBD CHT

CHT: WHT - OFF WHT, OCC SPECKL, OP, SOME  
OP - TRNSP, SM TEX, HD - V HD, DNS, TR CONCH  
FRACS, OCC DLL GLD - LT GLD FLOR, NSOC; TR  
LS; TR SH W/ INTBD CHT

CHT: WHT - OFF WHT, OCC SPECKL, OP - SL  
TRNSP, SM TEX, HD - V HD, DNS, TR CONCH  
FRACS, OCC DLL GLD - LT GLD FLOR, V SL - SL  
THIN RING CUT; TR SH W/ INTBD CHT



CONN

CONN

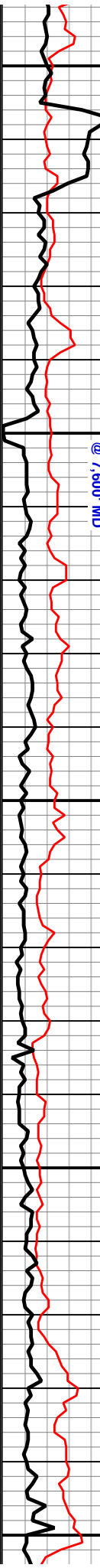
CONN

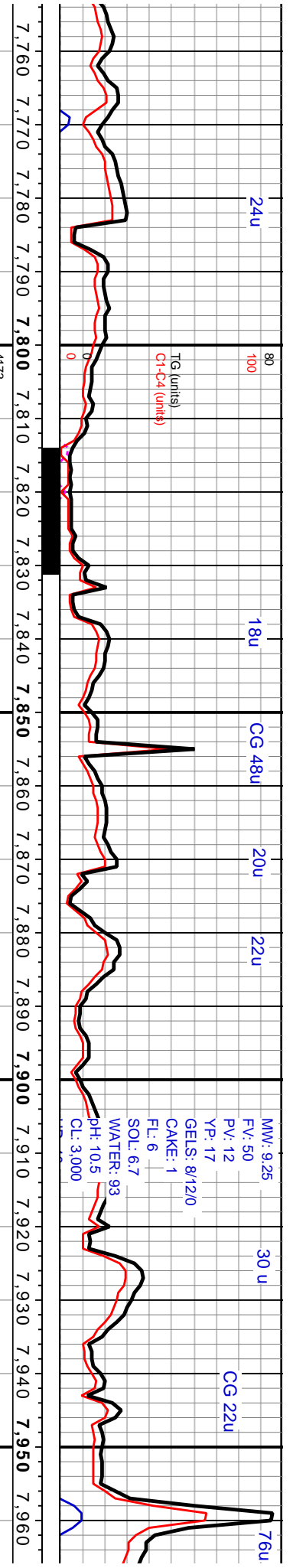
CONN

CONN

WOB: 15K  
RPM: 64  
PP: 2,900  
SPM: 82  
12/20/13  
@ 7,600' MD

WOB: 15K  
RPM: 64  
PP: 2,630  
SPM: 77





756' 195.8' 91.6° 179.1° 11.09'

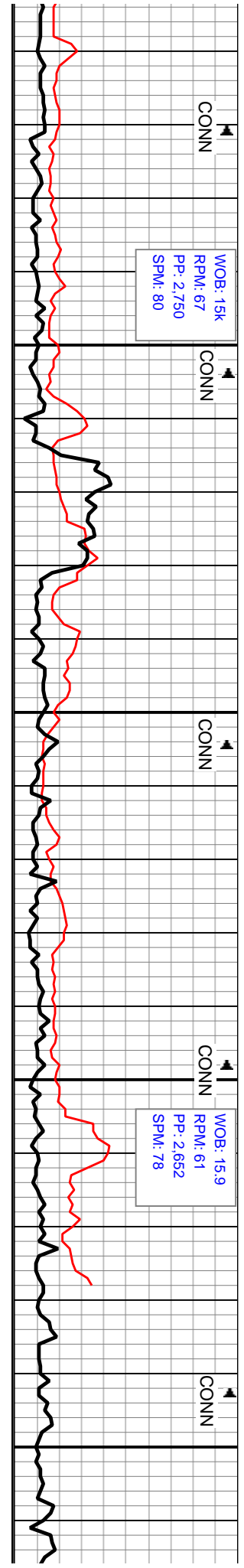
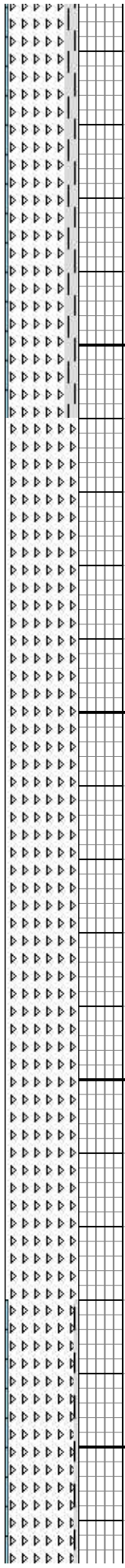
MD: 7,840'  
TVD: 4,195.1'  
Inclination: 89.3°  
Azimuth: 178.4°  
VS: 3,895'

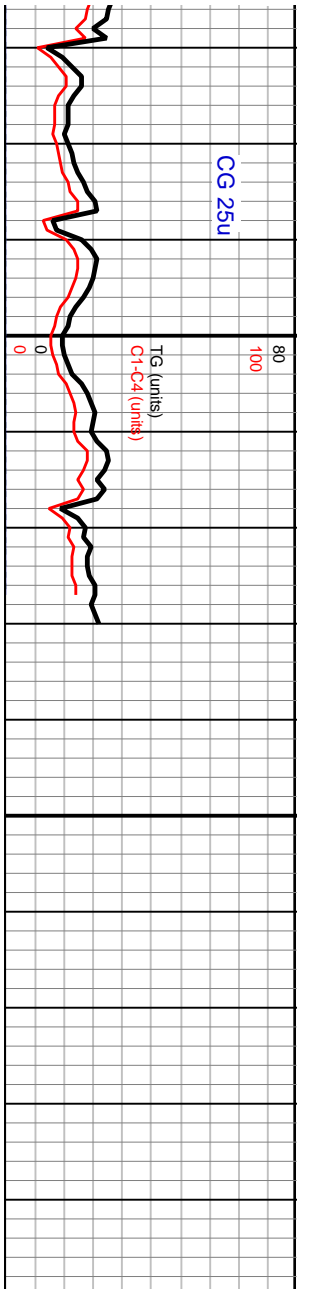
MD: 7,928'  
TVD: 4,196.4'  
Inclination: 89.1°  
Azimuth: 179.9°  
VS: 3,982.9'

CHT: WHT, OCC WHT - OFF WHT, OP - SL TRNSP,  
SM TEX, HD - V HD, DNS, TR CONCH FRACS, OCC  
DLL GLD - LT GLD FLOR, V SL - SL THIN RING  
CUT: TR SH W/ INTBD CHT

CHT: OFF WHT TO WHT, TR CRM, TR OPQ, MOD FRM TO FRM,  
HRD, SMTH TO V/FN XLN, CHNKY, TR BLKY, OCC PLTY, OCC WHT  
CHNKY MOD SFT TRIP CHT, OCC ASPH LTC SPOT STAIN, HL  
FRAC POR, TR CONCH FRAC, OCC PAL YEL TO DULL YEL FLOR,  
NO VIS CUT

CHT: OFF WHT TO WHT, T  
FRM, HRD, SMTH TO V/FN  
WHT CHNKY MOD SFT TR  
CHAL CHT, OCC LS OFF V  
OCC ASPH LTC SPOT STAI  
OCC PAL YEL TO DULL YE

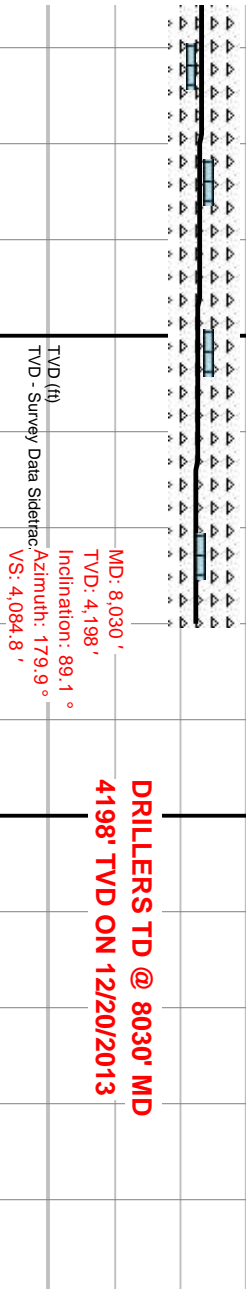




7,970 7,980 7,990 **8,000** 8,010 8,020 8,030 8,040 **8,050** 8,060 8,070 8,080 8,090 **8,100**

4173  
4173

89.1 AZM: 179.9 TVD: 4198.0 VS: 4084.8



**DRILLERS TD @ 8030' MD**  
**4198' TVD ON 12/20/2013**

TR CRM, TR TRNSL TO OPQ, MOD FRM TO  
I XLN, CHNKY, TR BLKY, OCC PLTY, OCC  
IP CHT, OCC BLUSH GY V/HRD V/ANG  
VHT TO CRM MOD FRM MIC TO V/FN XLN,  
IN, HL FRAC POR, TR CONCH FRAC,  
IL FLOR, NO VIS CUT

4263	
4263	

CONN

WOB: 15.6  
RPM: 63  
PP: 2.490  
SPM: 79

