



# Empirica

Scale: 5" / 100'  
Measured Depth Log

**Well Name** WAAG 24

**Location** Sec. 19 T7N R65W

**State** CO

**Country** USA

**API Number** 05-123-40352

**Region** DJ Basin

**Spud Date** 9/24/2015

**Surface Coordinates** Lat: 40°N 33' 15.156"

Lon: 104°W 42' 27.036"

**Bottom Hole Coordinates** Lat: 40°N 33' 14.941"

Lon: 104°W 42' 25.246"

**Ground Elevation** 4,868'

**K.B. Elevation** 4,883'

**Logged Interval** 5,000' **To** 11,810' MD

**Total Depth** 11,810' MD

**Formation** Niobrara

**Type of Drilling Fluid** Invert

## Operator

**Company** Extraction Oil & Gas

**Address** 1888 Sherman St., Suite 200  
Denver, CO 80203

## Geologist

**Name** Jared Rouse

**Company** Extraction Oil & Gas

**Address** 1888 Sherman St., Suite 200  
Denver, CO 80203



## Other

**Equipment** ML-197


**Comments** Start: 9-24-15  
TD: 9-26-15


**Services Provided** Brian Ferwerda / Mar


**Logger Names** 2-man Logging


**Address** Empirica, LLC.  
6360 W Sam Houston  
Suite 100  
Houston, TX 77041


Zone Color Coding


 Oil


 Note


 Error


 Condensate

 Core


 Water

 Gas


 Pressure


 Seal

Rock Types


 UNKNOWN

 ANHYDRITE


 GYPSUM


 SALT


 CHALK

 LIMESTONE

 DOLOMITE


 CHERT


 COAL

 MARLSTONE


 CLAYSTONE


 SHALE


 SHALE GRAY

 SHALE COLORED


 SILTSTONE


 SANDSTONE


 CONGLOMERATE

 BRECCIA

 TILL

 BENTONITE


 TUFF


 IGNEOUS


 METAMORPHIC


 CEMENT


Accessories


 F FOSSIL


 GASTROPOD


 OOLITE


 OSTRACOD


 PELECYPOD


 PELLET


 PISOLUTE


 PLANT REMAINS


 CORAL


 CRINOID


 STROMATOPOROID


 ECHINOID


 FISH


 FORAMINIFERA


 ARGILLACEOUS


 ARGILLITE GRAIN


 B BENTONITE


 BITUMENOUS SUBSTANCE


 BRECCIA FRAGMENTS


 CALCAREOUS


 CARBONACEOUS FLAKES


 CHTDK


 COAL - THIN BEDS


 DOLOMITIC


 FELDSPAR


 FERRUGINOUS PELLET


 FERRUGINOUS


 GLAUCONITE


 GYPSIFEROUS


 HEAVY MINERAL


 KAOLIN


 MARLSTONE


 MINERAL CRYSTALS


 NODULES


 PHOSPHATE PELLETS


 PYRITE

 SALT CAST


 SANDY


 SILICEOUS


 SILTY


 TUFFACEOUS


Stringer


 ANHYDRITE STRINGER


 BENTONITE STRINGER


 COAL STRINGER


 DOLOMITE STRINGER


 GYPSUM STRINGER


 LIMESTONE STRINGER

 MARLSTONE (CALC) STRG

 MARLSTONE (DOL) STRG

 SANDSTONE STRINGER

 SHALE STRINGER

 SILTSTONE STRINGER

Other S

 ORGANIC

 PINPOINT

 GAS

 DEAD

 VUGGY

 EVEN

 QUESTIONABLE

 SPOTTED STAINING

 ENGINEERING

 OIL

 OVER

 CASING

 REVE

 POROSITY

 CONNECTION (LEFT)

 SIDE

 E EARTHY

 F FENESTRAL

 F FRACTURE

 INTERCRYSTALLINE

 INTEROOLTIC

 MOLDIC

 CONNECTION (RIGHT)

 CONNECTION GAS

 CORE - LOST


 CORE - RECOVERED

 DST INTERVAL

 FAULT

 SIDE

 SLIDE

 SUN

 TRI

 WIRE

 WIRE

# Symbols

FORMATION TOP

L LITHOGRAPHIC

## Rounding

SHOW

 MICROCLN

MIN DEPTH

 ANGULAR

 MUDSTONE

WALL FAULT

 ROUNDED

 PACKSTONE

SHOW

 SUBANG

 WACKESTONE

RETURNED STRATA

 SUBRND

## Sorting

ERSE FAULT

## Textures

WALL CORE (LEFT)

 MODERATE


WALL CORE (RIGHT)  BOUNDSTONE

 POOR

 CHALKY

 WELL

RYEY

 CRYPTOXLN

P GAS

 EARTHY

LINE TESTED - LEFT

 FINELYXLN

LINE TESTED - RT

 GRANSTONE

ROP  
GAMMA  
GAS

**Extraction OG**  
Weld County, CO  
Spud Date: 9-24-15  
Surface Casing @ 850'  
2-man logging began: 9-25-15  
1% Methane = 100 Units  
100% Methane = 10000 units  
Depths Correspond to Driller's Pipe Tally

Waag 24



Slide/Rotate

Depth Labels

Total Gas & Chromatograph

GAS  
C1  
C2  
C3  
C4

Logarithmic Scale

Bit #: 1  
Type: E516-B29  
Size: 7 7/8  
Depth In: 850'  
Depth Out: 11,810'  
Hours: 22.8 hrs  
Avg Ft/Hr: 480.7'/h  
Jets: 7x10  
S/N: A192858

Well Bore  
TVD

MD: 6,834'  
TVD: 6,795.89'  
Inclination: 30.69°  
Azimuth: 269.46°  
VS: -353.95'

MD: 6,928'  
TVD: 6,873.27'  
Inclination: 38.37°  
Azimuth: 268.66°  
VS: -300.71'

Oil Show

100%

Images

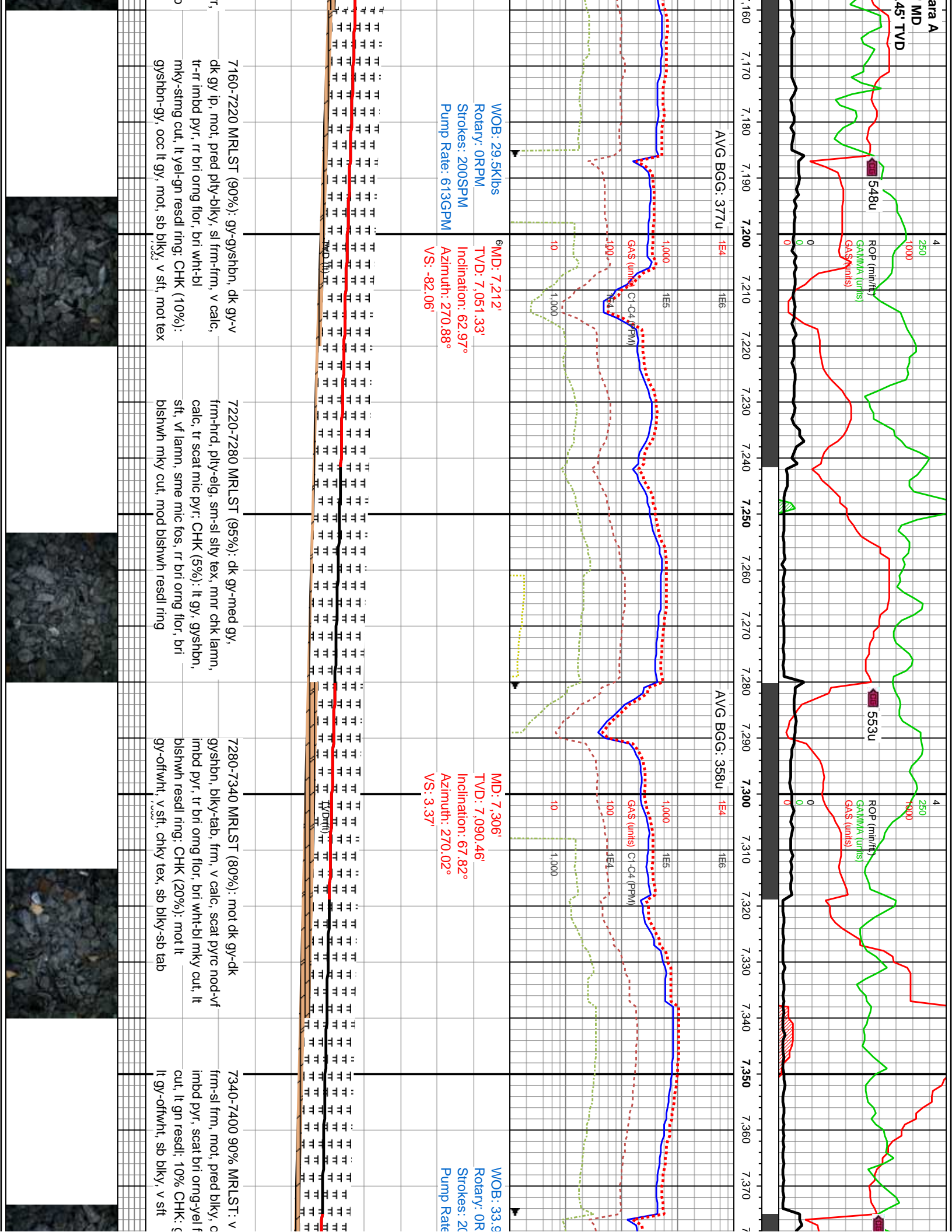
6800-6860 SLTST (70%): pred med-dk gy, ip sl brn, arg-v arg, sb blk-y-bkly, frm-sl hd, sl sdy ip, tr micmica, ip sl calc; SH (30%): pred med gy-dk gy, sft-sl frm, sme fis, sb pily-pily, sm-sily tex, rr sdy, sme f lam, scat pyrc nod

6860-6920 SLTST (60%): lt gy-med gy, gyshbn, arg, pily-tab, frm, tr micmica, non-sl calc; SH (40%): med gy-dk gy, gyshbn, sl frm-hrd, sme fis, sb blk-y-elg, sm-sl sily tex, mnr lamn, mod calc

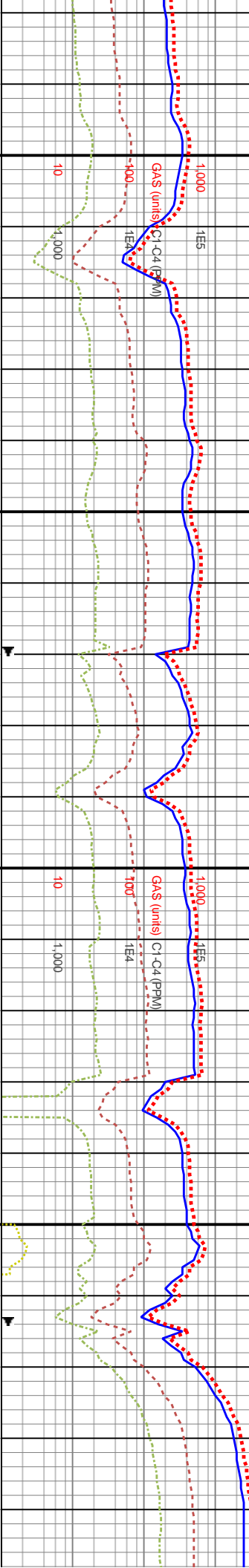
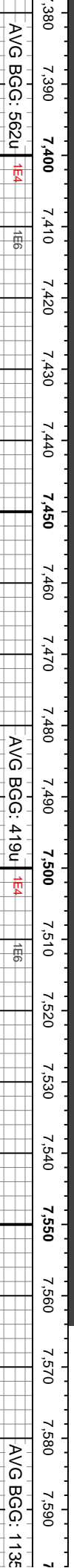
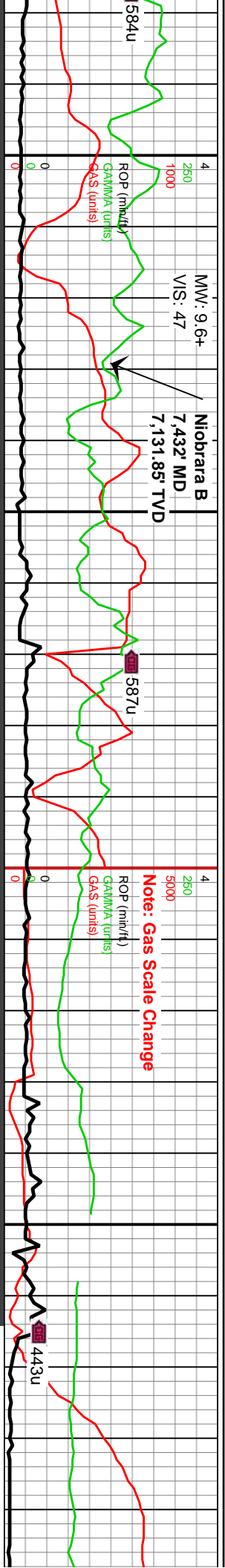
6920-6990 SLTST (50%): pred sb b lam, SH frm, sl hr











Klbs

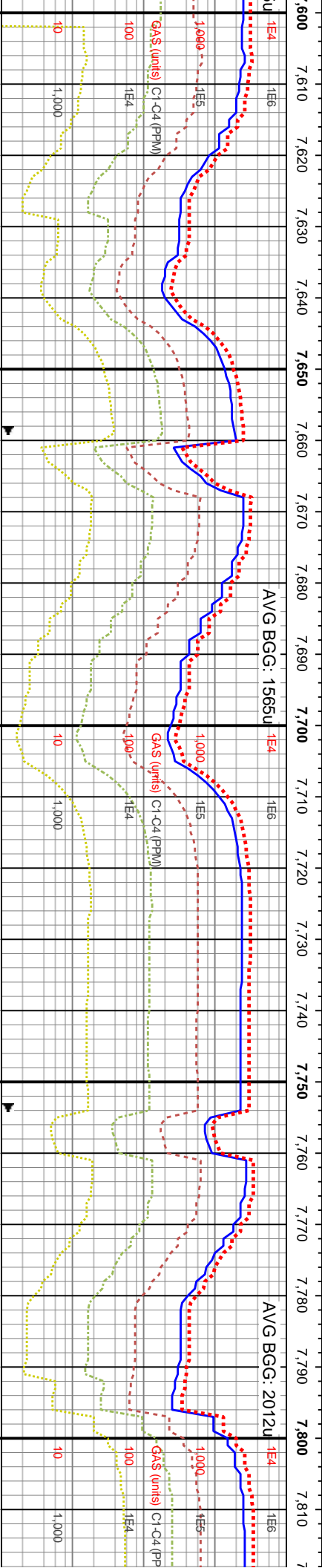
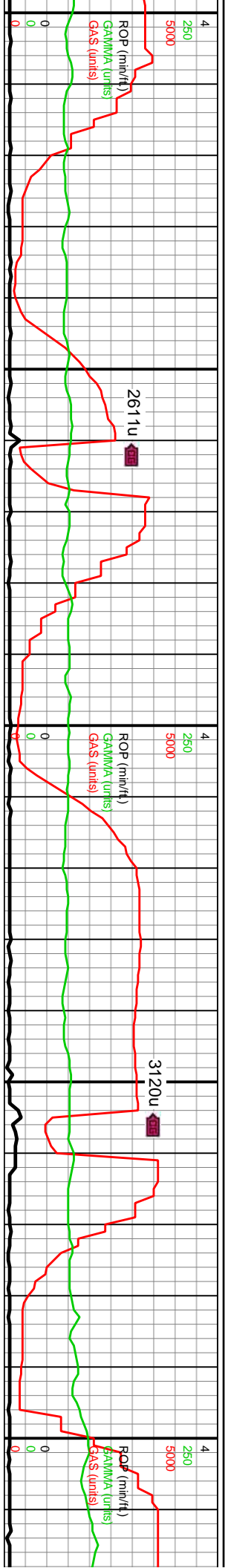
MD: 7,401'00  
TVD: 7,124.42'  
Inclination: 70.29°  
Azimuth: 268.16°  
VS: 92.08'

MD: 7,495'  
TVD: 7,147.69'  
Inclination: 81°  
Azimuth: 271.58°  
VS: 182.99'

MD: 7,590'  
TVD: 7,155.73'  
Inclination: 89.29°  
Azimuth: 273.66°  
VS: 277.41'

dk gy-gyshbn, pred occ ply, v calc, scat lor, bri wht-bl mky gyshbn-gy, mot, occ	7400-7460 MRLST (75%): dk gy-med gy, gyshbn, frm-sl hrd, blk, sm tex, v calc, scat imbd pyr; CHK (25%): lt gyshbn-offwht, crm-tn, chky tex, calc, tab, mnr mic fos, tr bri org flr, bri wht-bl stmg cut, bri bl resd ring	7460-7520 MRLST (60%): dk gy-med gy, frm-v frm, blk-tab, sl silty tex, v calc, mnr chk lamn,pp imbd pyr; CHK (40%): gyshbn-offwht, chky tex, calc, ply-tab, tr bri org flr, bri wht-bl stmg cut, bri bl resd ring	7520-7580 CHK (70%): lt gyshbn-crm, calc, sb blk, inbnd wi mrlst; MRLST (30%): mot dk gy-med gy, frm-sl hrd, blk, sl silty tex, v calc, scat pp pyr, tr bri org flr, bri wht-bl stmg cut, bri bl resd ring	7580-7600 chky te: blshwn gy-gystr tex, occ
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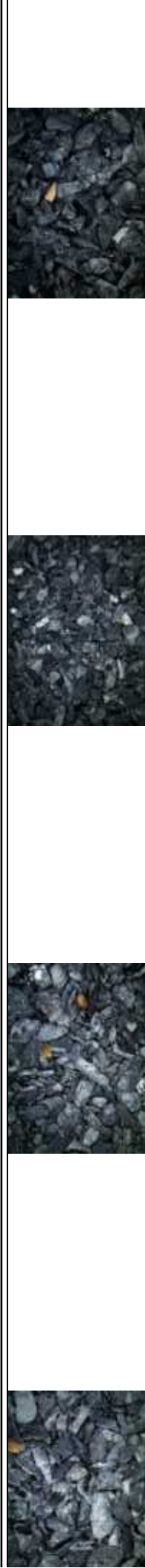


WOB: 41.8klbs  
Rotary: 40RPM  
Strokes: 220SPM  
Pump Rate: 673GPM

MD: 7,685'  
TVD: 7,156.5'  
Inclination: 89.78°  
Azimuth: 273.96°  
VS: 372.12'

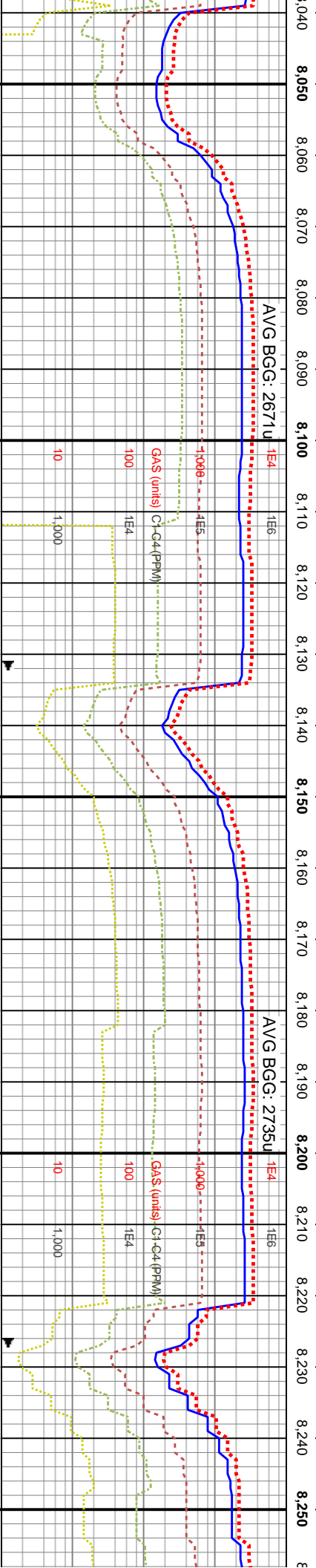
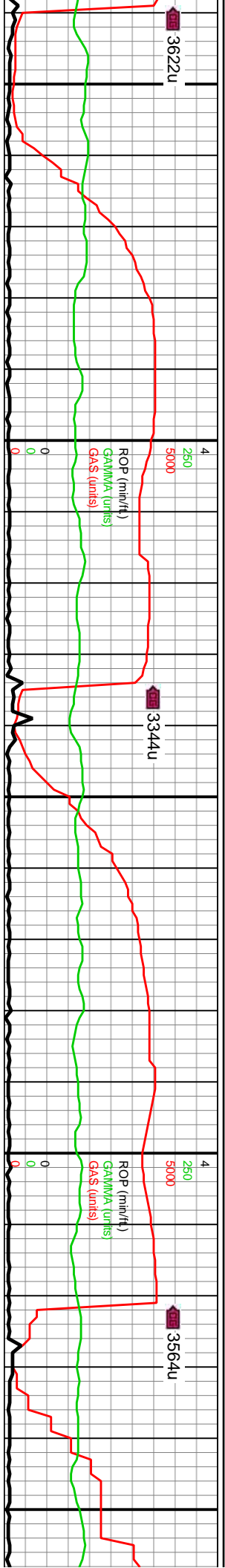
MD: 7,780'  
TVD: 7,156.42'  
Inclination: 90.31°  
Azimuth: 273.76°  
Pump Rate: 672GPM

7640-7700 CHK (75%): mot gysbhn-r oftwht, v sft, tr bri orng flor, dul mky cut, mod resd ring, MRLST (25%): pred dk bhn, blk gy, frm-sl hrd, plty-sb blk, sm sl sily, v calc, scat imbd pp pyr	7640-7700 CHK (75%): mot lt gy-offwht, lt brn, v sft, chky tex, sb plty-blky; MRLST (25%): mot med gy-gysbhn, dk gy, plty-tab, frm, v calc, scat mic pyr, frt orng flor, bri wht-bl mky cut, lt blshwn resd ring;	7700-7760 CHK (60%): lt gysbhn-crm, calc, sb blk, inbdd wi mist; MRLST (40%): mot dk gy-med gy, frm-sl hrd, blk, sl sily tex, v calc, scat pp pyr, tr bri orng flor, bri wht-bl simg cut, bri bl resd ring	7760-7820 MRLST (50%): mot med gy-gysbhn, dk gy, plty-tab, frm, v calc, scat m pyr, frt orng flor, bri wht-bl mky cut, blshwn resd ring; CHK (50%): mot lt gy-offwht, lt brn, v sft, chky tex, sb plty-blky
7600	7600	7600	7600









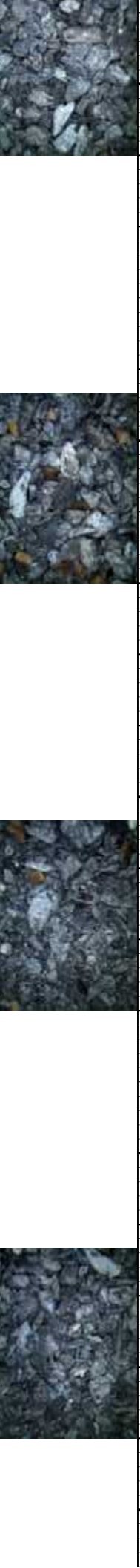
MD: 8,063'  
TVD: 7,155.66'  
Inclination: 89.69°  
Azimuth: 271.23°  
VS: 749.39'

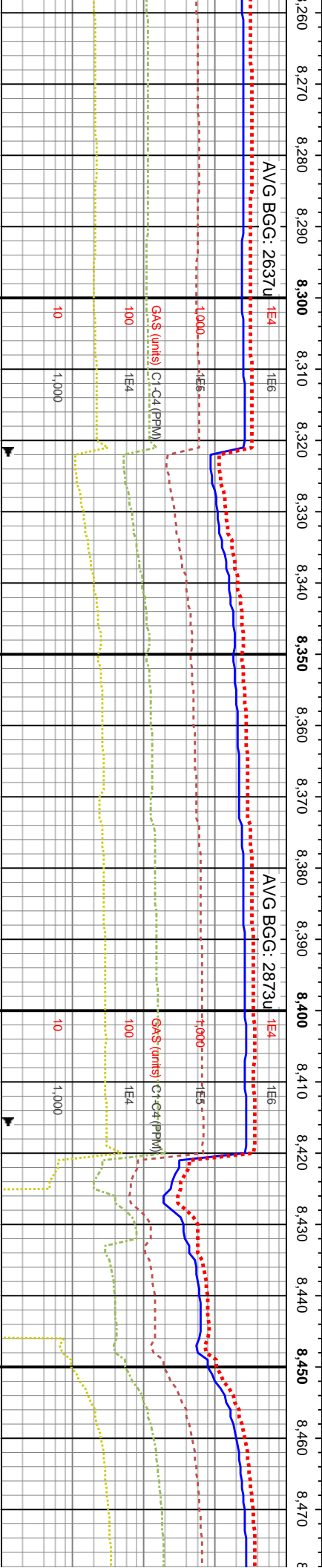
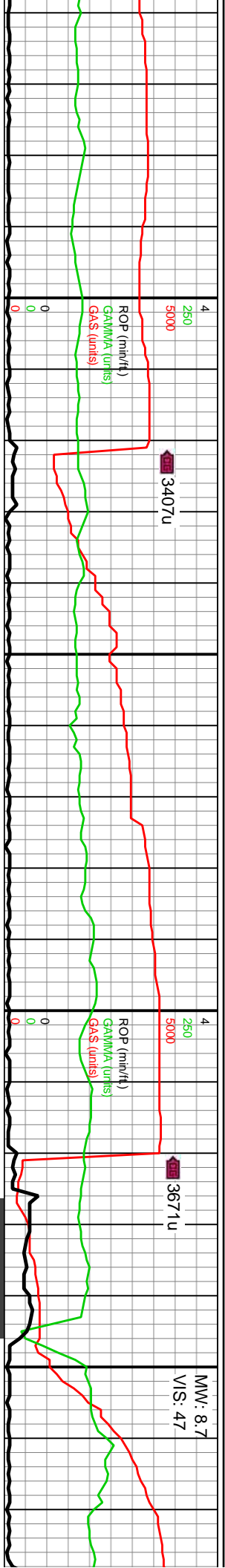
MD: 8,158'  
TVD: 7,155.91'  
Inclination: 90°  
Azimuth: 271.11°  
VS: 844.34'

WOB: 51.1Klbs  
Rotary: 65RPM  
Strokes: 220SPM  
Pump Rate: 673GPM

MD: 8,253'  
TVD: 7,156.34'  
Inclination: 89°  
Azimuth: 268°  
VS: 939.33'

med gy-dk	8060-8120 MRLST (50%): dk gy-gyshbn, v dk	8120-8180 CHK (55%): lt gyshbn-crm, calc,	8180-8240 CHK (60%): mot lt gy-softwht, v sft,	8240-83
med blk, frm, v calc, tr	gy ip, pred mot, sl frm, pred blk occ ply, v	sb blk, intbdd wi mlst; MRLST (45%): mot dk	chky tex, sb ply-sb blk; MRLST (40%): mot dk	sb blk,
bn-it gy, mot,	calc; CHK (50%): gyshbn-gy, mot lt gy ip, sb	gy-med gy, frm-sl hrd, blk, sl silty tex, v calc,	gy-dk gyshbn, ply-blk, frm-v frm, v calc, tr	gy-med
blk, fnt dul yeign flr,	blk, v sft, mot tex, com yeign flr, bri wht-bl	scat pp pyr, scat yeign flr, bri wht-bl string cut,	imbd pyr, scat yeign flr, bri wht-bl mky cut, fnt	scat pp l
h resd ring	mky cut, fnt yeign resd ring	bri bl resd ring	yeign resd ring	bri bl res



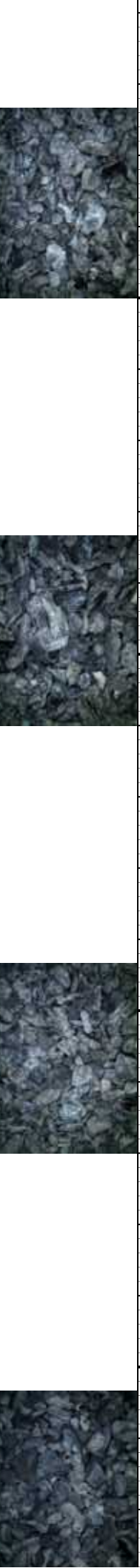


MD: 8,348'  
TVD: 7,158.03'  
Inclination: 88.49°  
Azimuth: 265.82°  
VS: 1,034.24'

WOB: 42.9Klbs  
Rotary: 65RPM  
Strokes: 220SPM  
Pump Rate: 674GPM

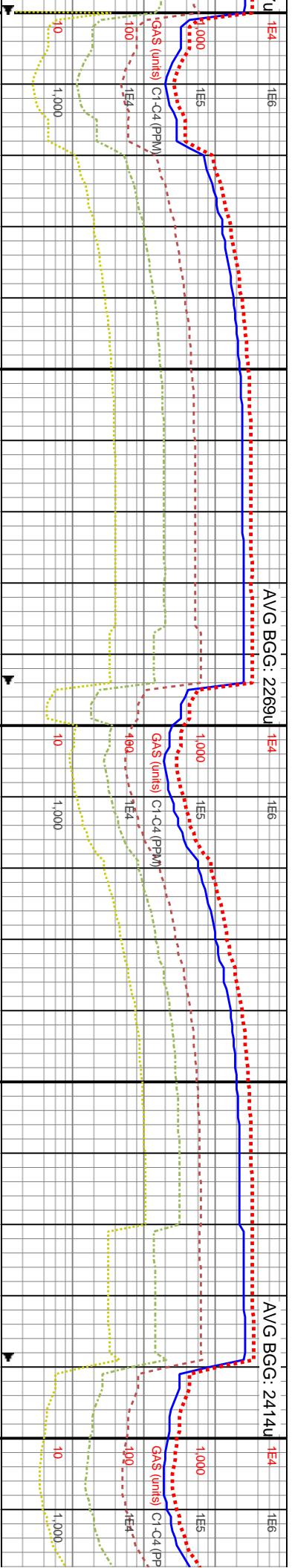
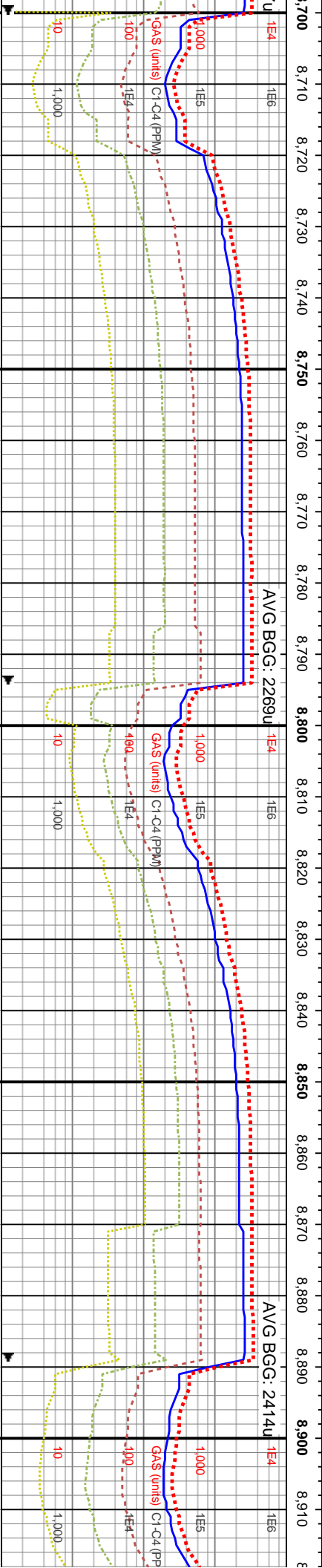
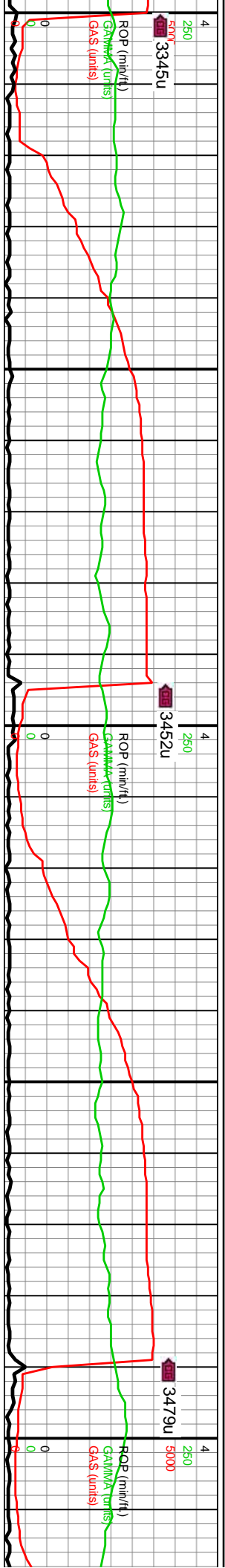
MD: 8,442'  
TVD: 7,157.04'  
Inclination: 92.71°  
Azimuth: 269.67°  
VS: 1,128.15'

8260	8270	8280	8290	8300	8310	8320	8330	8340	8350	8360	8370	8380	8390	8400	8410	8420	8430	8440	8450	8460	8470	8480
AVG BGG: 2637u																						
1E4 1E6																						
GAS (units) C1-C4 (PPM)																						
10 1,000																						
AVG BGG: 2873u																						
1E4 1E6																						
GAS (units) C1-C4 (PPM)																						
10 1,000																						
8300-8360 CHK (70%): mot brn-gyshbn, scat																						
8360-8420 CHK (65%): gyshbn-it gy, mot																						
8420-8480 MRLST (60%): dk gy-med gy, frm-																						









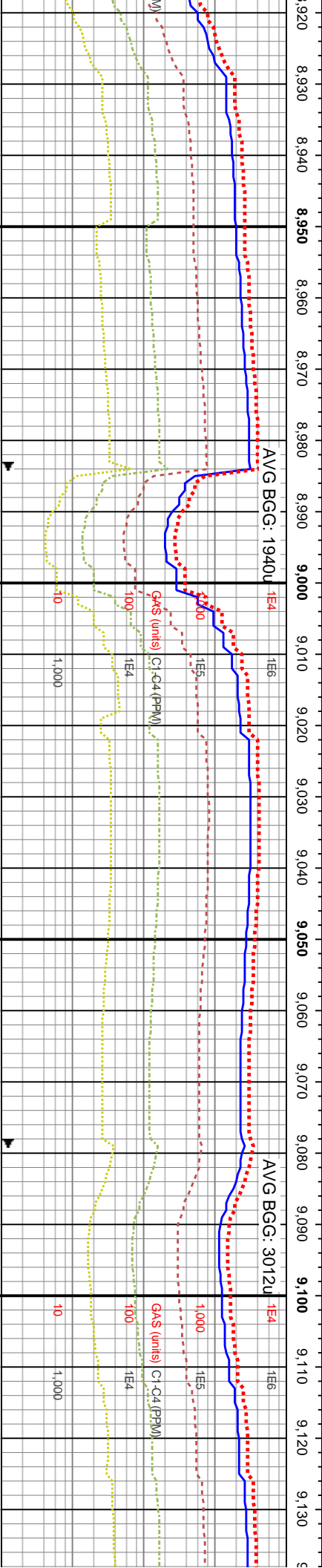
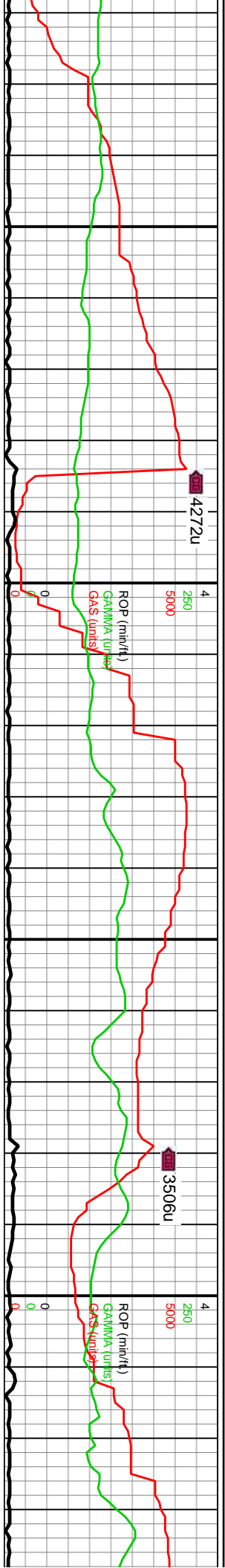
MD: 8,725'  
TVD: 7,152.91'  
Inclination: 89.05°  
Azimuth: 268.68°  
VS: 1,411.04'

WOB: 31.6Klbs  
Rotary: 35RPM  
Strokes: 220SPM  
Pump Rate: 674GPM  
MD: 8,820'  
TVD: 7,154.74'  
Inclination: 88.74°  
Azimuth: 268.09°  
VS: 1,506.01'

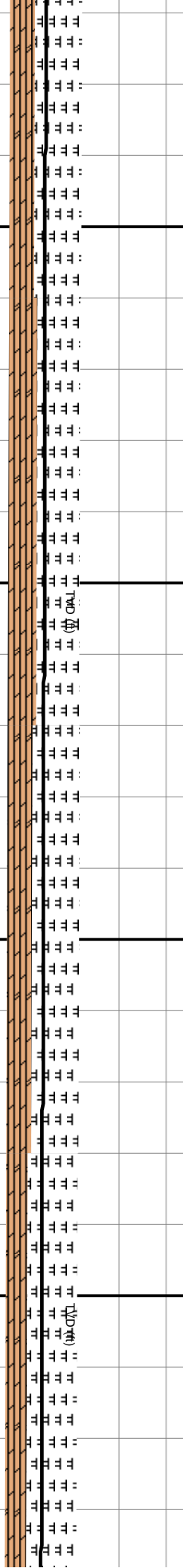
MD: 8,915'  
TVD: 7,151'  
Inclination:  
Azimuth: 2  
VS: 1,600.01'

6600	8720-8780 MRLST (55%): mot med gy-dk gy, gyshbn, ply-tab, frm, v calc, scat mic pyr; CHK (45%): mot lt gy-gyshbn, offwht, v sft, chky tex, sb blk-y-ply, bri yelgn flor, bri wht-bl mky cut, frnt lt gn resd ring	8780-8840 MRLST (60%): med gy-dk gy, com mot gyshbn, pred blk-y, occ sb ply, frm-sl frm, v calc; CHK (40%): mot lt gy-offwht, v sft, chky tex, sb ply-sb blk-y, scat yelgn flor, bri wht-bl mky cut, yelgn resd ring	8840-8900 MRLST (65%): med gy-dk gy-gyshbn, occ v dk gy, pred blk-y, frm, v calc, tr lmbd pyr; CHK (35%): gyshbn-lt gy, mot offwht, v sft, chky tex, sb blk-y, com yelgn flor, bri wht-bl mky cut, yelgn resd ring	8900-8960 MRLST (70%): med gy-dk gy-gyshbn, occ v dk gy, pred blk-y, frm, v calc, tr lmbd pyr; CHK (30%): gyshbn-lt gy, mot offwht, v sft, chky tex, sb blk-y, com yelgn flor, bri wht-bl mky cut, yelgn resd ring
7600				





WOB: 45.4Klbs<sup>x</sup> MD: 9,010'  
Rotary: 55RPM TVD: 7,161.33'  
Strokes: 220SPM Inclination: 87.32°  
Pump Rate: 673GPM Azimuth: 265.78°  
VS: 1,695.66'



60 MRLST (65%): mot med  
on, dk gy, pty-tab, frm, v calc, scat mic  
K (35%): mot gysbhn-it gy, mnr offwht,  
gy tex, sb blk, scat yelgn flr, bri wht-bl  
It gn resd ring

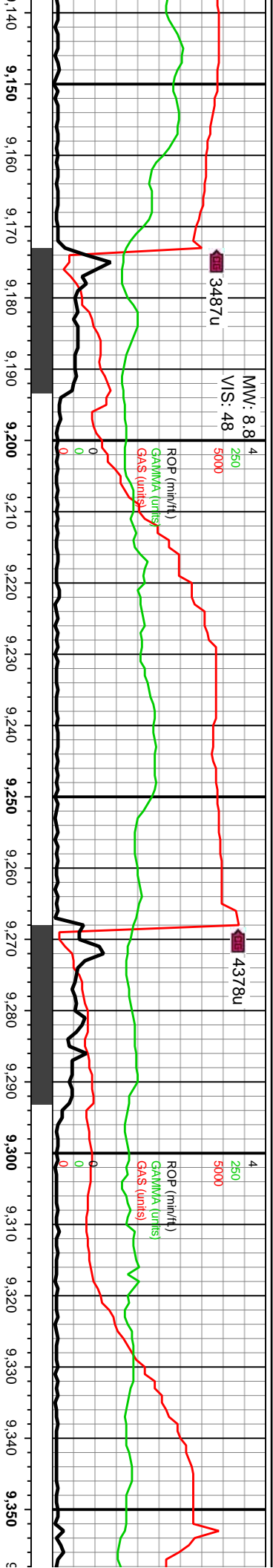
8960-9020 MRLST (60%): mot dk gy-med gy,  
frm-sl hrd, splt-blk, sl abrsv tex, v calc, scat  
pp pyr; CHK (40%): it gysbhn-cm, calc, sb  
blk, intbdd wi mst, dul yelgn flr, bl mky cut,  
dul bshwh resd ring

9020-9080 MRLST (65%): dk gy-med gy, mnr  
gysbhn, frm-sl hrd, pty-blk, v calc, mnr chk  
lam, scat pp pyr; CHK (35%): pred cm-it  
gysbhn, chk tex, calc, bshwh-dul yelgn flr,  
mky cut, dul bshwh resd ring

9080-9140 MRLST (70%): mot dk gy-dk  
gysbhn, pty-sb spl, frm-v frm, v calc, tr imbd  
pyr, dul onng flr, bri wht-bl mky cut, bshwh  
resd ring; CHK (30%): mot it gy-offwht, v sft,  
chk tex, sb blk-tab, mnr micios, mst intbds

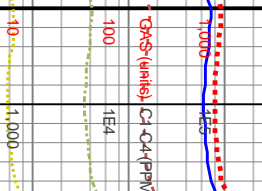
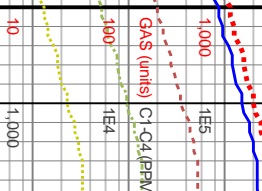






AVG BGG: 2632u

AVG BGG: 2514u



WOB: 31.4Klbs  
Rotary: 55RPM  
Strokes: 220SPM  
Pump Rate: 674GPM

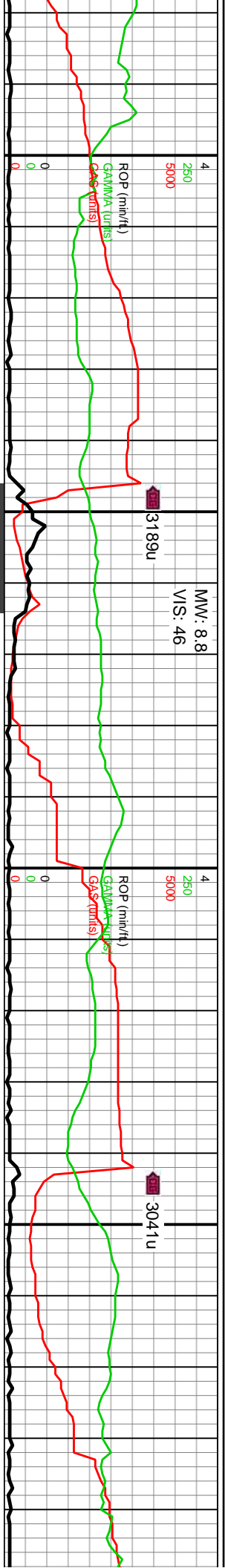
MD: 9,199'  
TVD: 7,170.63'  
Inclination: 88°  
Azimuth: 267.22°  
VS: 1,884.11'

MD: 9,294'  
TVD: 7,173.16'  
Inclination: 88.95°  
Azimuth: 269.73°  
VS: 1,979.05'

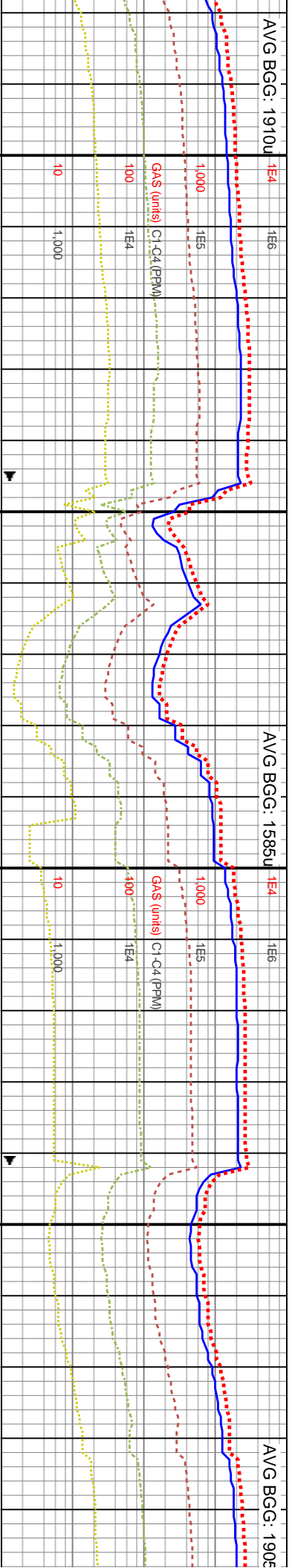
9140-9200 MRLST (55%): dk gy-med gy, frm-hrd, sb blk-y-pty, sl stly tex, v calc, mntr chk lam, scat pp pyr; CHK (45%): offwht-crm, gysbhn, chky tex, calc, sft, dul yelgn flor, mod mky cut, dul bishwh resd ring	7600	9200-9260 MRLST (65%): mot med gy-dk gy, gysbhn, tab-sb spl, frm, v calc, scat mic pyr, fnt omg flor, bri wht-bish mky cut, no resd ring; CHK (35%): mot crm-offwht, v sft, chky tex, sb pty-blky, bri bishwh flor, bish mky cut,	9260-9320 CHK (55%): mot lt gy-offwht, lt gysbhn, v sft, chky tex, sb tab, mntr micfos, bri bishwh flor.; MRLST (45%): mot med gy-dk gy, gysbhn, pty-sb blk-y, frm, v calc, scat mic pyr, fnt omg flor, bri wht-bl mky cut, no resd ring	9320-9380 MRLST (55%): frm-sl hrd, blk-y-pty, sl abrs lamn, pp mic pyr; CHK (45%): chky tex, calc, pty, bri bish dul mky cut, mod bishwh re



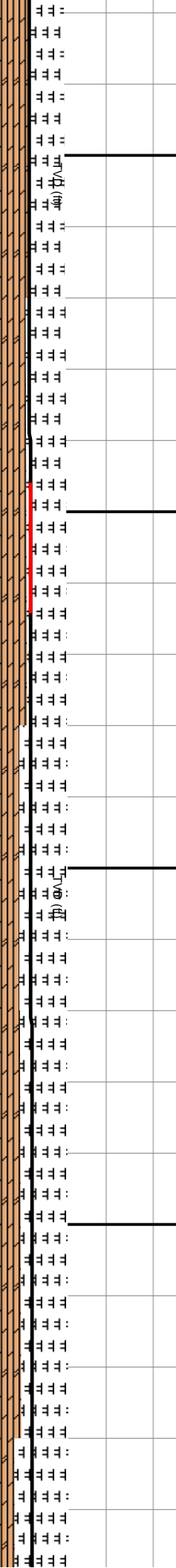




580 9,590 9,600 9,610 9,620 9,630 9,640 9,650 9,660 9,670 9,680 9,690 9,700 9,710 9,720 9,730 9,740 9,750 9,760 9,770 9,780 9,790 9,800

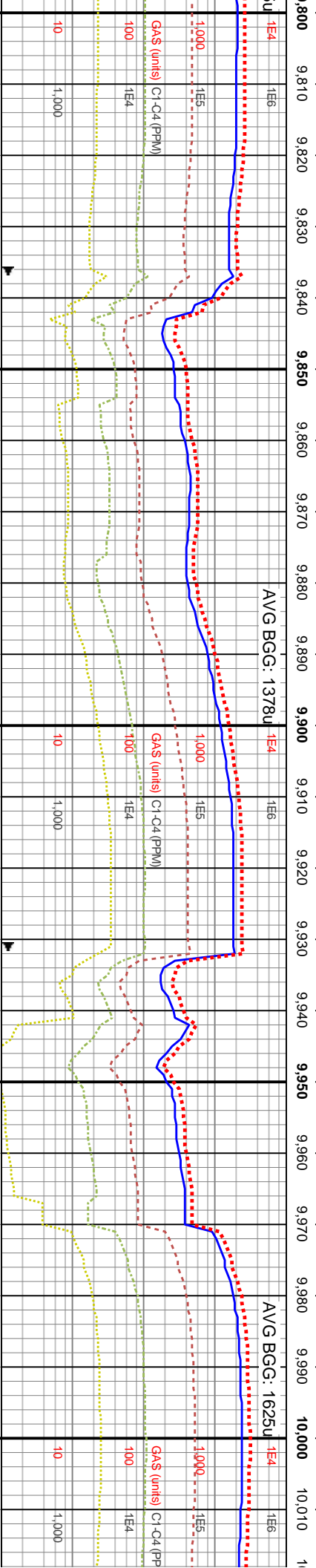
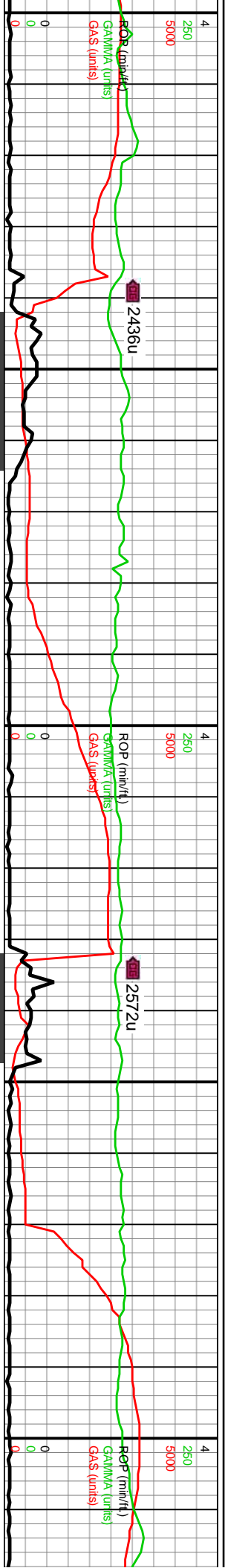


WOB: 43.3Klbs  
Rotary: 70RPM  
Strokes: 218SPM  
Pump Rate: 667GPM  
MD: 9,673'  
TVD: 7,163.25'  
Inclination: 91.54°  
Azimuth: 273.82°  
VS: 2,357.2'

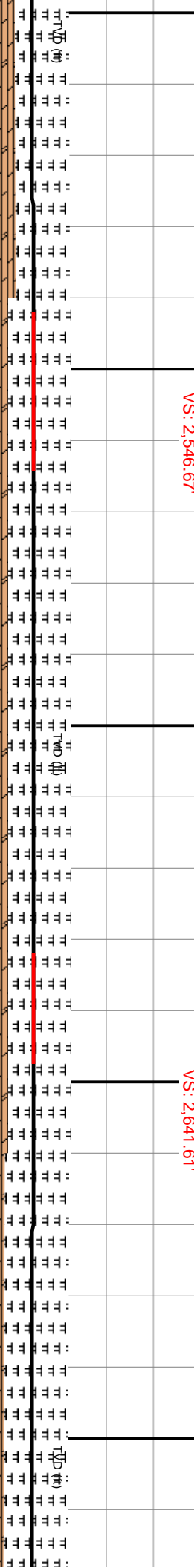


9620-9680 MRLST (55%): dk gy-med gy, frm-hrd, blk, sl abrsv tex, mnr mictos, v calc; CHK (45%): mot crm-lt gysbn, calc, sb blk, intbd w/ mrlst, chky tex, dul yeign flr, dul mky cut, mod bishwh resd ring  
9680-9720 MRLST (60%): dk gy-med gy, gysbn, frm-sl hrd, blk-sl elg, sl stly tex, intbd chk lamm, v calc; CHK (35%): lt gysbn-crm, chky tex, calc, pily, bishwh-dul yeign flr, mky cut, dul bishwh resd ring  
9720-9780 MRLST (65%): mot med gy-dk gy, blk-ty-tab, frm, v calc, scat mic pyr; CHK (35%): mot ofwnt-lt gysbn, sft, chky tex, sb tab-blky, bishwh-dul yeign flr, mky cut, bishwh resd ring

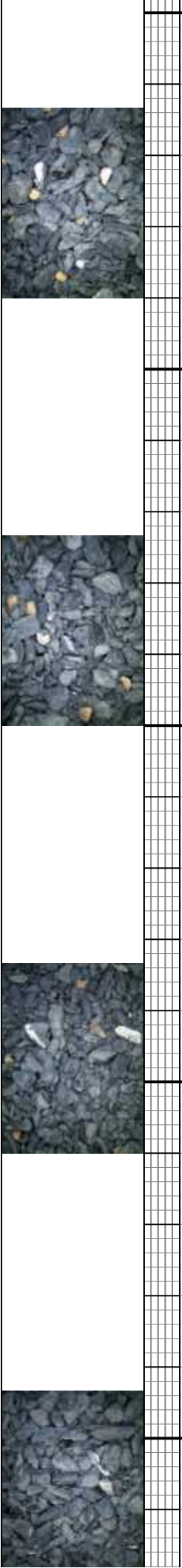




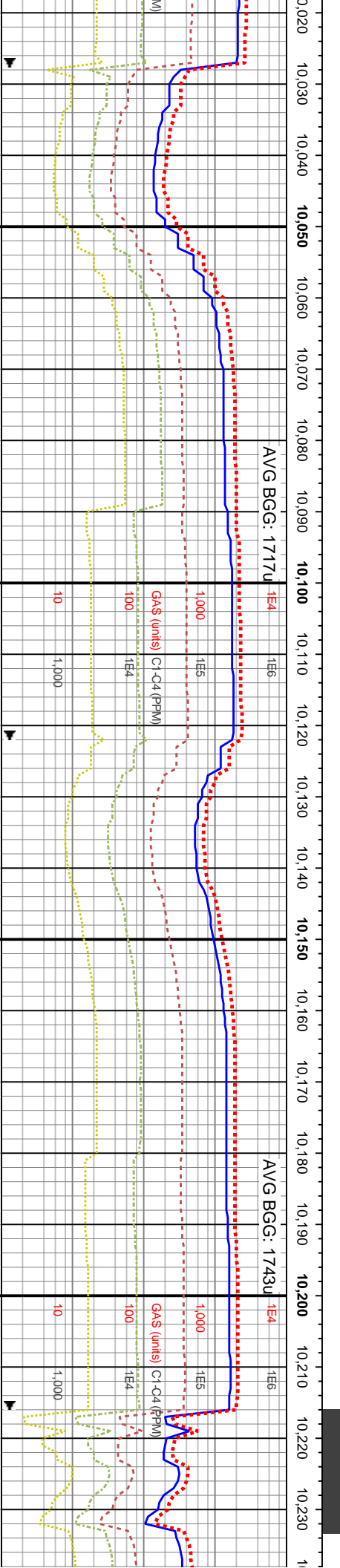
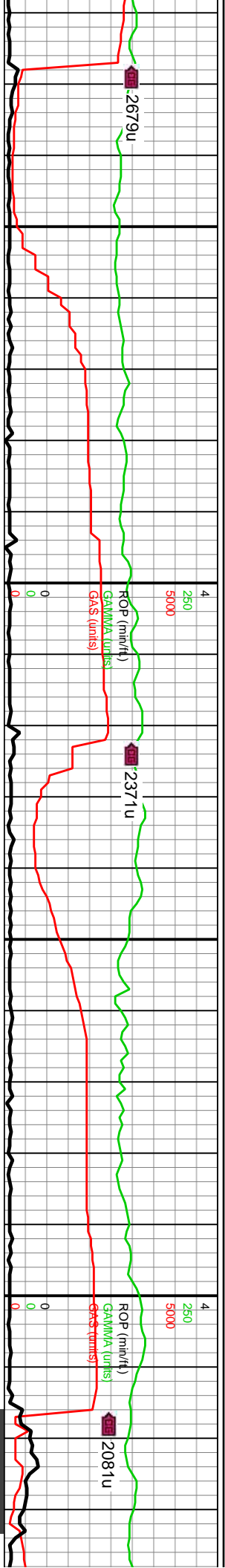
MD: 9,863'  
TVD: 7,157.57'  
Inclination: 90.31°  
Azimuth: 272.31°  
VS: 2,546.67'



MD: 9,958'  
TVD: 7,158.21'  
Inclination: 88.92°  
Azimuth: 270.04°  
VS: 2,641.61'







MD: 10,053'  
TVD: 7,160.05'  
Inclination: 88.86°  
Azimuth: 269.78°  
VS: 2,736.59'

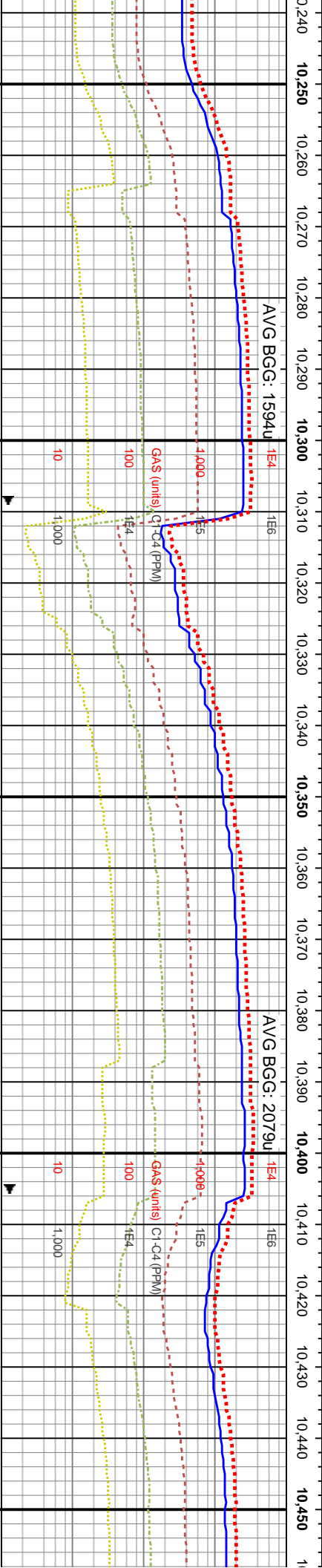
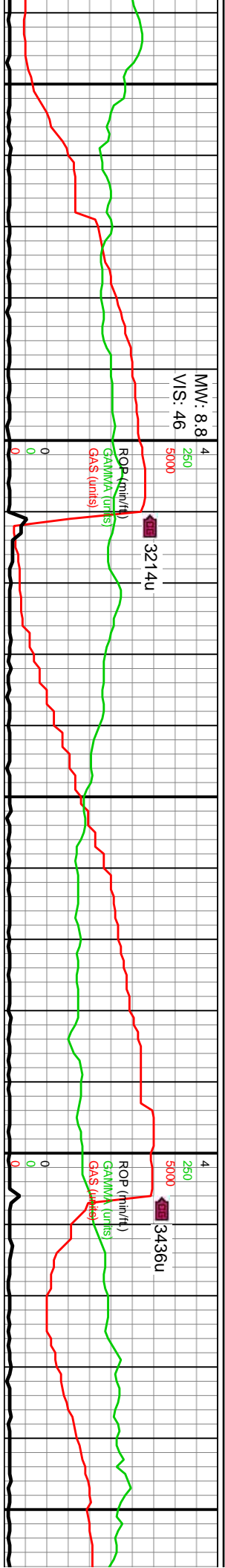
MD: 10,147'  
TVD: 7,161.03'  
Inclination: 89.94°  
Azimuth: 269.8°  
VS: 2,830.58'

WOB: 47.1Klbs  
Rotary: 60RPM  
Strokes: 218SPM  
Pump Rate: 668GPM

MD: 10,260'  
TVD: 7,161.03'  
Inclination: 89.94°  
Azimuth: 269.8°  
VS: 2,830.58'

10020-10080 MRLST (90%): mot med gy-dk gy, gysbhn, biky-pty, frm, v calc, scat pyrc nod, frt orng flr, bish mky cut, no resd ring; CHK (10%): mot lt gy-offwht, lt brn, v sft, chky tex, sb biky, bishwh flr, dul mky cut, bishwh resd ring	10080-10140 MRLST (85%): dk gy-med gy, mot blk gy, frm-sl hrd, pty-biky, v calc, intbdd chk lamm; CHK (15%): mot lt gysbhn-offwht, crm, chky tex, calc, pty-biky, mntr mic fos, dul yelgn flr, dul mky cut, mod bishwh resd ring	10140-10200 MRLST (85%): med gy-dk gy, frm-sl hrd, biky-sb spl, sl abrsv tex, intbdd chk lamm, v calc; CHK (15%): lt gysbhn-crm, chky tex, calc, biky, tr scat pp pyr, bishwh-dul yelgn flr, mky cut, dul bishwh resd ring	10200-10260 MRLST (65%): sb biky, frm, v calc, scat pp wht-bl mky cut, no resd rin lt gy-offwht, lt gysbhn, v sft, bishwh flr, mky cut, bishwh
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0.242'  
7,162.33'  
ation: 88.49°  
th: 271.03°  
925.55'

MD: 10,336'  
TVD: 7,164.65'  
Inclination: 88.68°  
Azimuth: 270.82°  
VS: 3,019.49'

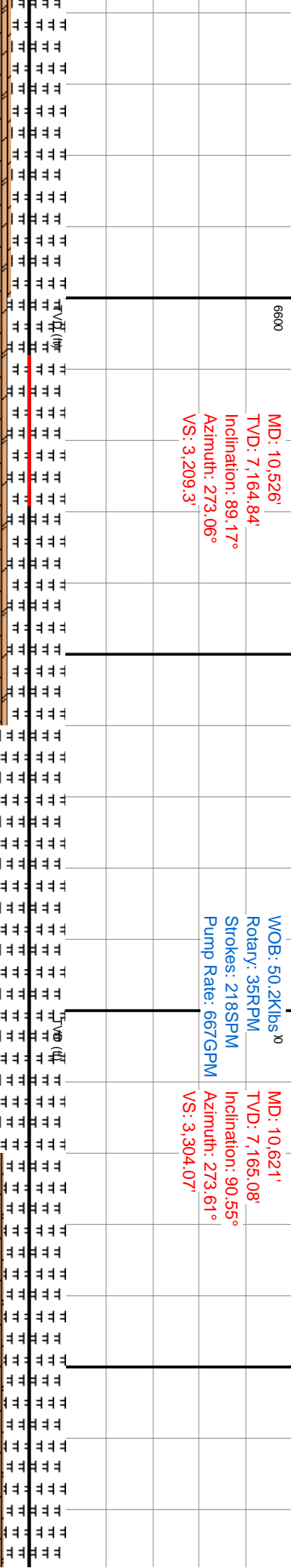
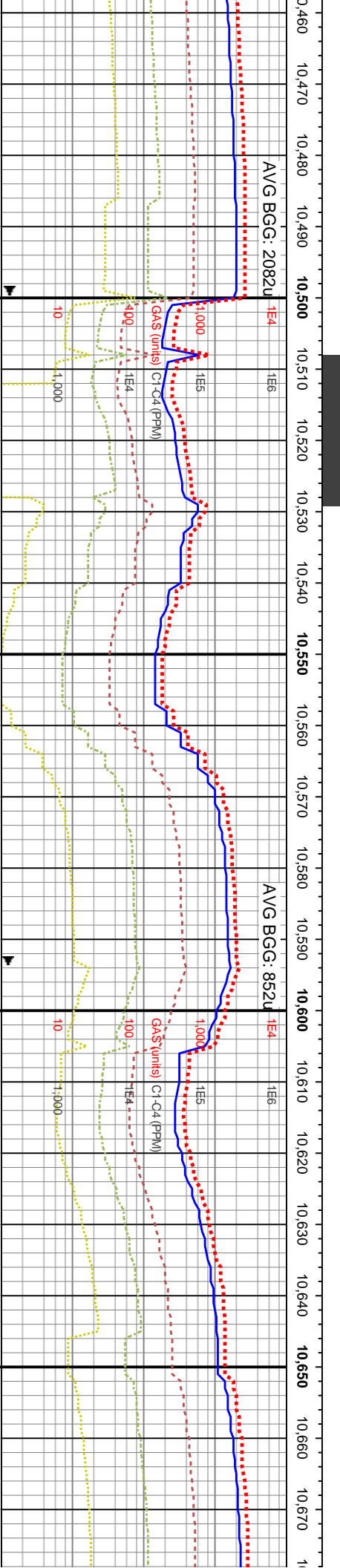
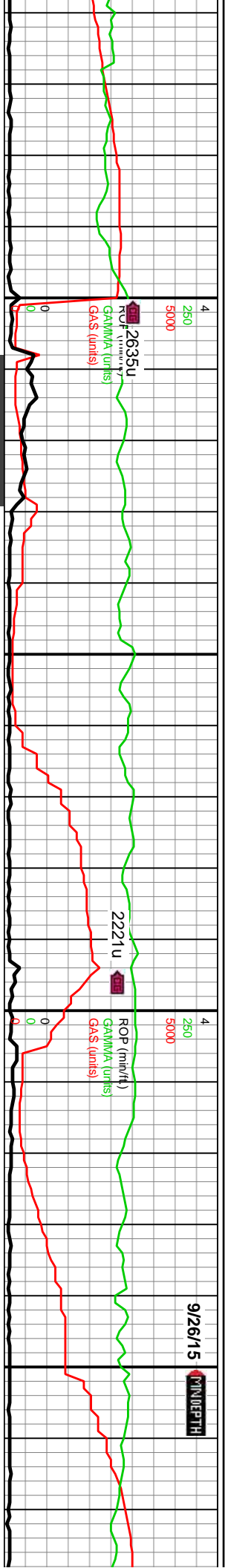
WOB: 45.3klbs  
Rotary: 70RPM  
Strokes: 218SPM  
Pump Rate: 667GPM

MD: 10,431'  
TVD: 7,164.95'  
Inclination: 90.96°  
Azimuth: 271.56°  
VS: 3,114.43'

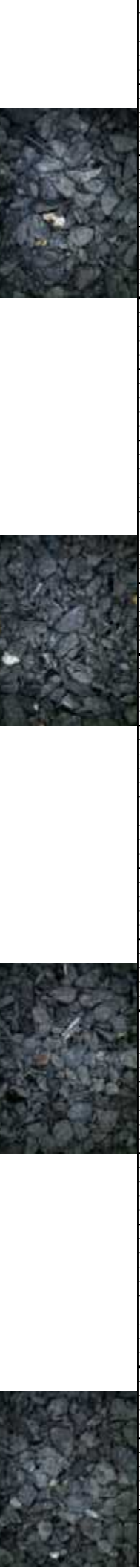
10260-10320 MRLST (70%): med gy-gyshbn, pred blk, frm, v calc, tr imbd pyr, fnt dul orng flr, bish mky cut, no resd ring; CHK (30%): mot gysbn-crm, v sft, chky tex, sb tab, mnr pyrc nod, bishwh flr, mky cut, bishwh resd ring	10320-10380 MRLST (55%): mot dk gy-med gy, frm-v frm, sb tab, sl abrv tex, v calc, mnr mic fos, pp imbd pyr; CHK (45%): mot lt gysbn-crm, chky tex, calc, ply-blky, bishwh flr, dul mky cut, mod bishwh resd ring	10380-10440 MRLST (60%): mot med gy-dk gy, sb tab, frm, v calc, scat mic pyr, fnt orng flr, bish mky cut, no resd ring; CHK (40%): crm-lt gysbn, ofwht, v sft, chky tex, sb blk, bishwh flr, dul mky cut, bishwh resd ring	10440-10450 MRLST (60%): mot med gy-dk gy, sb tab, frm, v calc, scat mic pyr, fnt orng flr, bish mky cut, no resd ring; CHK (40%): crm-lt gysbn, ofwht, v sft, chky tex, sb blk, bishwh flr, dul mky cut, bishwh resd ring
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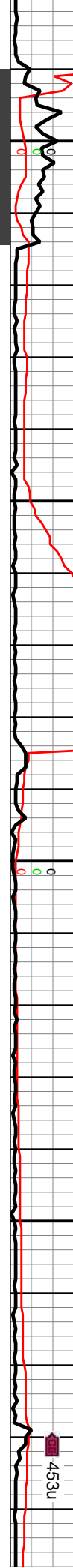


10500 MRLST (75%): mot dk gy-med fior, frm, v calc, pyrc nod-vf imbd pyr, tr fior, bish mky cut; CHK (25%): mot fior, v sft, chky tex, sb tab-sb biky, dul mky cut, bishwh resd ring	10500-10560 MRLST (80%): dk gy-med gy, frm-sl hrd, sb spl, sl sily tex, tr chk lamm, v calc, mnr pp pyr; CHK (20%): crm-gyshbn, sft, vf lamm, imbd wi mrist, calc, chky tex, dul yelgn fior, dul mky cut, mod bishwh resd ring	10560-10620 MRLST (90%): dk gy-med gy, frm-v frm, biky-sb tab, sl sily tex, v calc, mnr micos, pp imbd pyr; CHK (10%): crm-oftwrt, chky tex, calc, sb tab, bishwh-dul yelgn fior, dul mky cut, mod bishwh resd ring	10620-10680 MRLST (85%): mot med gy-dk gy, gyshbn, ply-tab, frm, v calc, scat mic pyr, fnt orng fior, bish mky cut; CHK (15%): mot crm-gyshbn, v sft, chky tex, sb biky, bishwh fior, dul mky cut, mod bishwh resd ring
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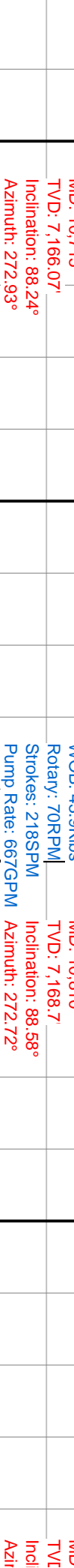
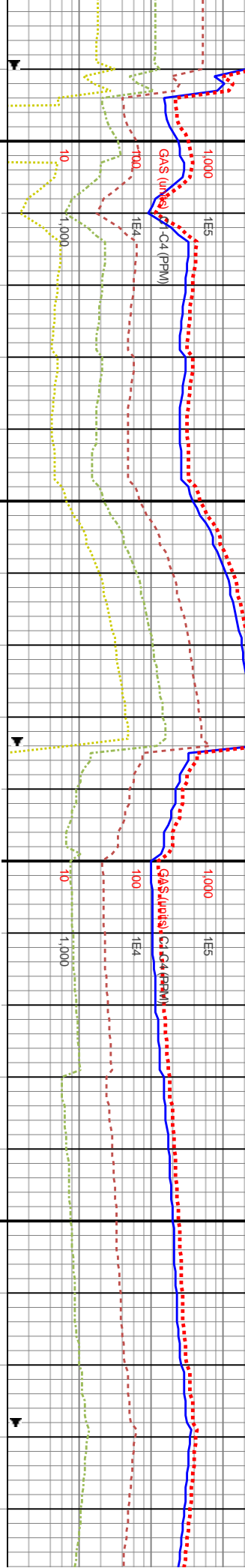


MW: 8.85  
VIS: 46

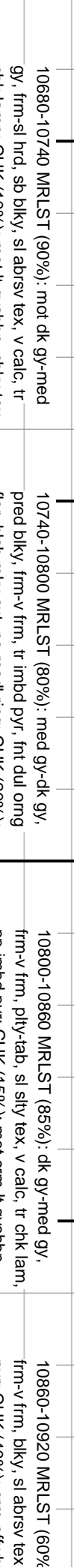
4  
250  
5000



10,680 10,690 10,700 10,710 10,720 10,730 10,740 10,750 10,760 10,770 10,780 10,790 10,800 10,810 10,820 10,830 10,840 10,850 10,860 10,870 10,880 10,890 10,900

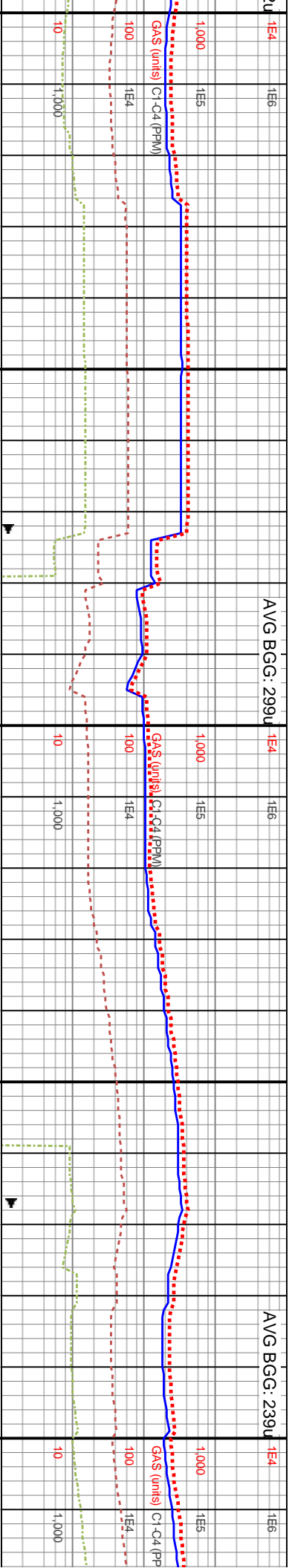


10,660 10,670 10,680 10,690 10,700 10,710 10,720 10,730 10,740 10,750 10,760 10,770 10,780 10,790 10,800 10,810 10,820 10,830 10,840 10,850 10,860 10,870 10,880 10,890 10,900



10,660 10,670 10,680 10,690 10,700 10,710 10,720 10,730 10,740 10,750 10,760 10,770 10,780 10,790 10,800 10,810 10,820 10,830 10,840 10,850 10,860 10,870 10,880 10,890 10,900

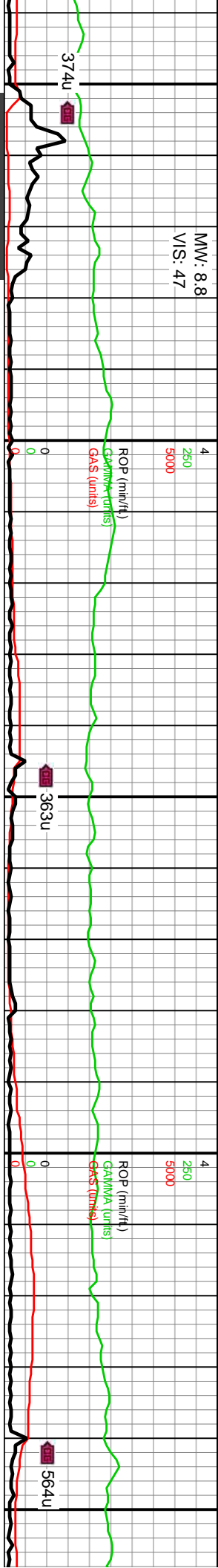
10680-10740 MRLST (90%): mot dk gy-med gy, frm-sl hnd, sb blk, sl abrsv tex, v calc, tr chk lamm; CHK (10%): mot lt gysbhn, chky tex, calc, pty-blky, inbnd wi mist, dul yeign flor, dul mky cut, mod bishwh resd ring	10740-10800 MRLST (80%): med gy-dk gy, pried blk, frm-v frm, tr imbd pyr, fnt dul org flor, bish mky cut, no resd ring; CHK (20%): mot gysbhn-crm, offwht, v sft, chky tex, sb blk, bishwh flor, dul mky cut, bishwh resd ring	10800-10860 MRLST (85%): dk gy-med gy, frm-v frm, pty-tab, sl sfty tex, v calc, tr chk lam, pp imbd pyr; CHK (15%): mot crm-lt gysbhn, chky tex, calc, pty-blky, dul yeign flor, dul mky cut, mod bishwh resd ring	10860-10920 MRLST (60%): frm-v frm, blk, sl abrsv tex pyr; CHK (40%): crm-offwh pty-tab, tr mictos, dul yeign mod bishwh resd ring





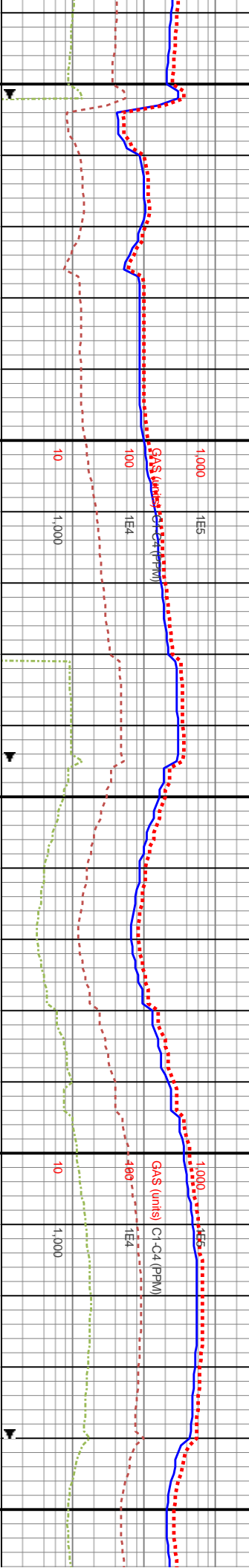


MW: 8.8  
VIS: 47



AVG BGG: 176u

AVG BGG: 210u



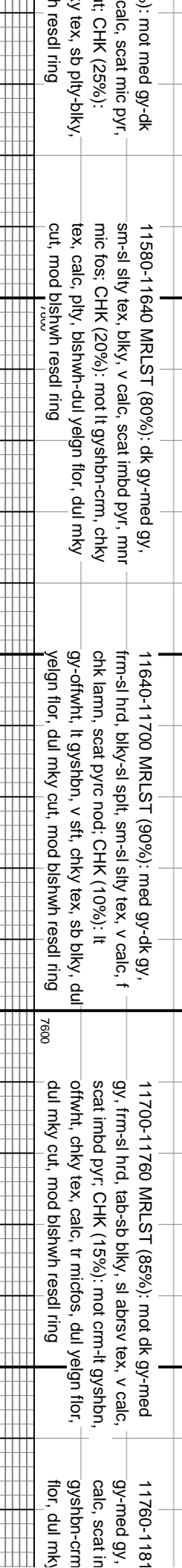
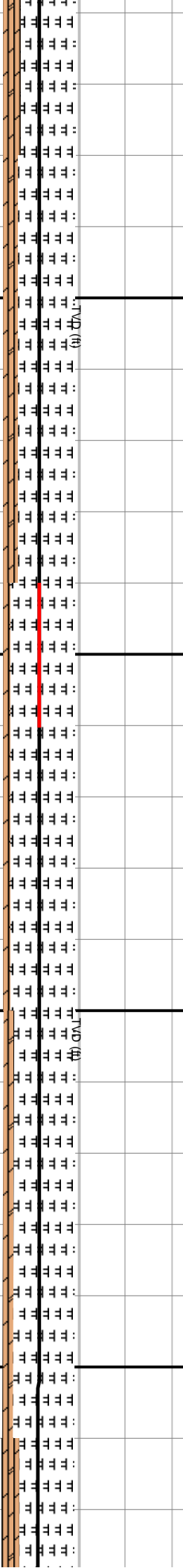
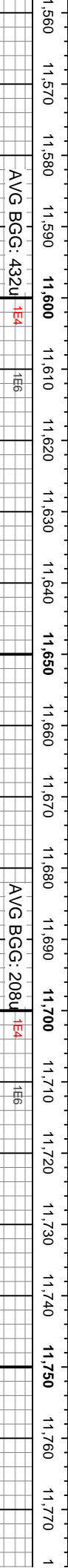
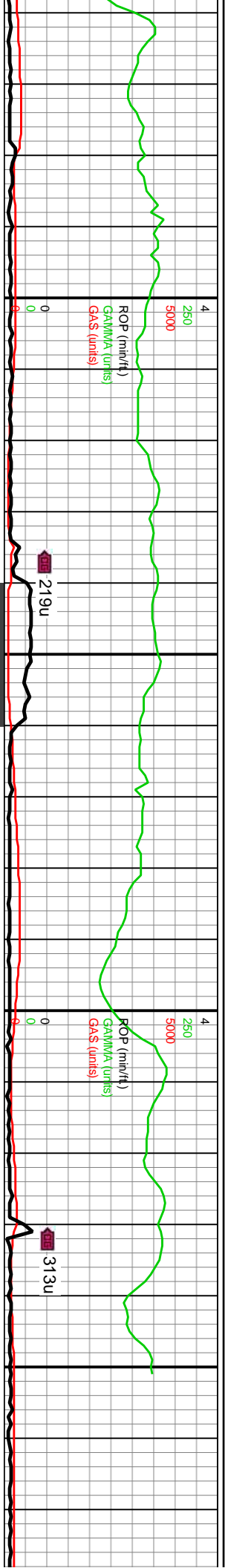
MD: 11,377'  
TVD: 7,187.95'  
Inclination: 90.03°  
Azimuth: 270.81°  
VS: 4,058.68'

WOB: 44.6Klbs  
Rotary: 45RPM  
Strokes: 216SPM  
Pump Rate: 661GPM

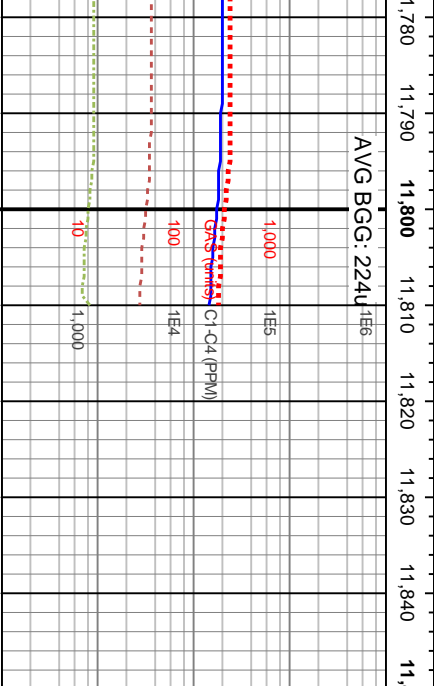
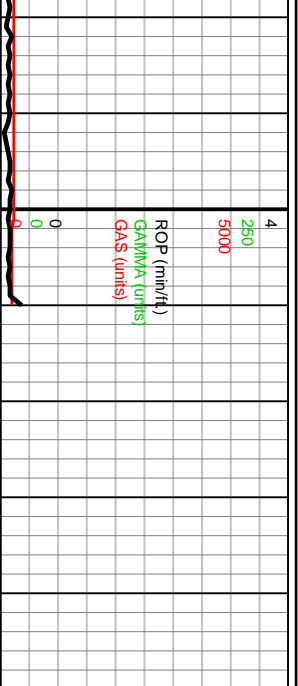
MD: 11,472'  
TVD: 7,187.03'  
Inclination: 91.08°  
Azimuth: 271.34°  
VS: 4,153.63'

11340-11400 MRLST (75%): dk gy-gyshbn, ply-splt, frm, v calc, scat pyrc nod-vf imbd pyr, orng flr, bish mky cut; CHK (25%): mot lt gy-offwht, v sft, chky tex, sb ply-blky, bishwn flr-dul yeign flr, mky cut, bishwn resd ring	11400-11460 MRLST (60%): mot dk gy-med gyshbn, sb spl-blky, frm-sl hrd, tr micnica, sl silty tex, v calc; CHK (40%): mot lt gyshbn, sl frm, blky-sl elg, v calc, mntr micfos, dul yeign flr, dul mky cut, bishwn resd ring	11460-11520 MRLST (50%): mot dk gy-med gy, frm-hrd, blky, sl silty tex, v calc, tr intbd chk lam, scat imbd pyr; CHK (50%): gyshbn-crm, chky tex, calc, sb tab, bishwn-dul yeign flr, dul mky cut, bishwn resd ring	11520-11580 MRLST (75%): gy, gyshbn, ply-tab, frm, v frnt orng flr, bishwn mky cut, gyshbn-crm, lt gy, v sft, chky bishwn flr, mky cut, bishw
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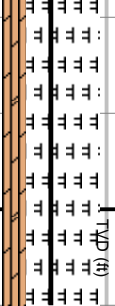








MD: 11,810'  
TVD: 7,187.26'  
Inclination: 88.89°  
Azimuth: 269.28°  
VS: 4,491.5'  
Projection to Bit  
Note: TD Well on 9/26/2015  
at 11810' MD



0 MRLST (75%): mot dk  
firm, tab-sb splt, sl silty tex, v  
bd pyr; CHK (25%): mot lt  
, chky tex, calc, biky, blshwh  
/ cut, mod blshwh resd ring

