



# Empirica

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Fairview 9

**Location** Sec 5, T2N, R68W

**State** CO

**Country** USA

**API Number** 05-123-41520

**Geographic Region** DJ Basin

**Spud Date** 12/9/2015

**Surface Coordinates** Lat: 40° 9' 56.7612" N  
Long: 105° 2' 7.6848" W

**Bottom Hole Coordinates** Lat: 40° 10' 3.190" N  
Long: 104° 56' 19.448" W

**Ground Elevation** 4,948'

**Logged Interval** 6,700' **To** 14565' MD

**Formation** Coddell

**Type of Drilling Fluid** Invert

**K.B. Elevation** 4,963'

**Total Depth** 14565' MD

## 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

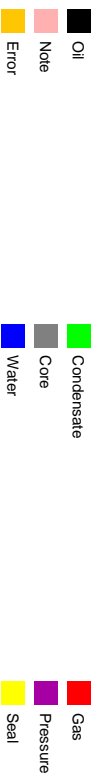
**Comments** Start: 12-26-15  
End: 12-29-15

**Services Provided** Mark Gross/ Brian Fe

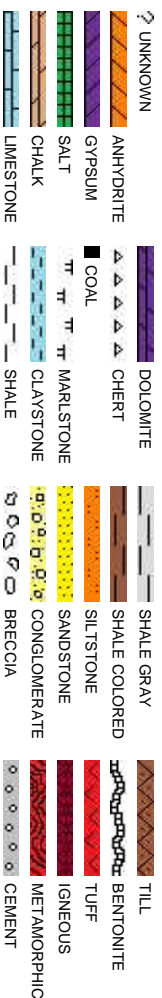
**Logger Names** 2-man logging

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

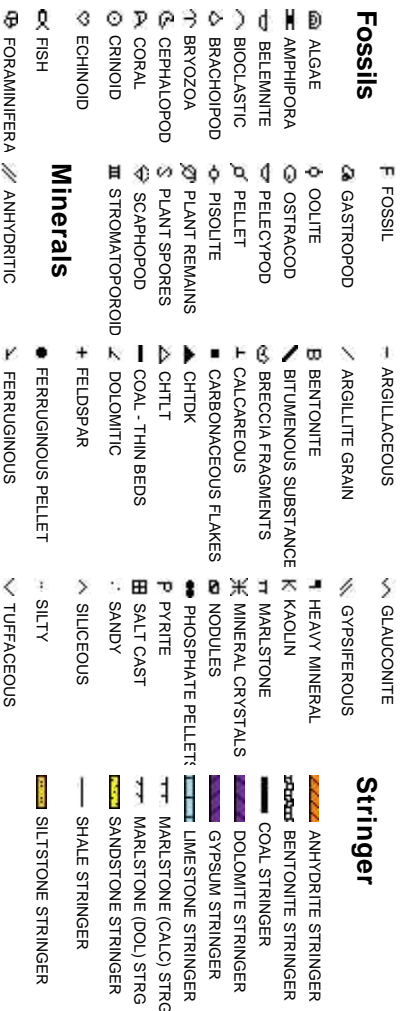
## Zone Color Coding



## Rock Types

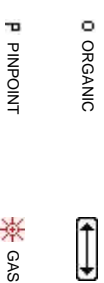


## Accessories



## Other S

### Oil Show



DEAD

VUGGY

EVEN

EVEN

QUESTIONABLE

QUESTIONABLE

SPOTTED STAINING

BIT

### Porosity



CONNECTION (LEFT)

SIDEV

E EARTHY

CONNECTION (RIGHT)

SIDEV

FENESTRAL

CONNECTION GAS

SLIDE

F FRACTURE

CORE - LOST

SURE

INTERCRYSTALLINE

CORE - RECOVERED

TRIP

INTEROOLITIC

DST INTERVAL

WIREL

MOLDIC

FAULT

WIREL

## Engineering

NORM

OIL S

OVER

REVE

SIDEV

SIDEV

SLIDE

SURE

TRIP

WIREL

WIREL

# Symbols

FORMATION TOP L LITHOGRAPHIC

## Rounding

SHOW M<sub>X</sub> MICROXLN

MIN DEPTH A<sub>1</sub> ANGULAR M<sub>S</sub> MUDSTONE

REAL FAULT R<sub>1</sub> ROUNDED P<sub>S</sub> PACKSTONE

HOW B<sub>1</sub> SUBANG M<sub>S</sub> WACKESTONE

TURNED STRATA T<sub>1</sub> SUBRND

## Sorting

IRSE FAULT

## Textures

VALL CORE (LEFT) M<sub>1</sub> MODERATE

VALL CORE (RIGHT) B<sub>S</sub> BOUNDSTONE P<sub>1</sub> POOR

C<sub>1</sub> CHALKY W<sub>1</sub> WELL

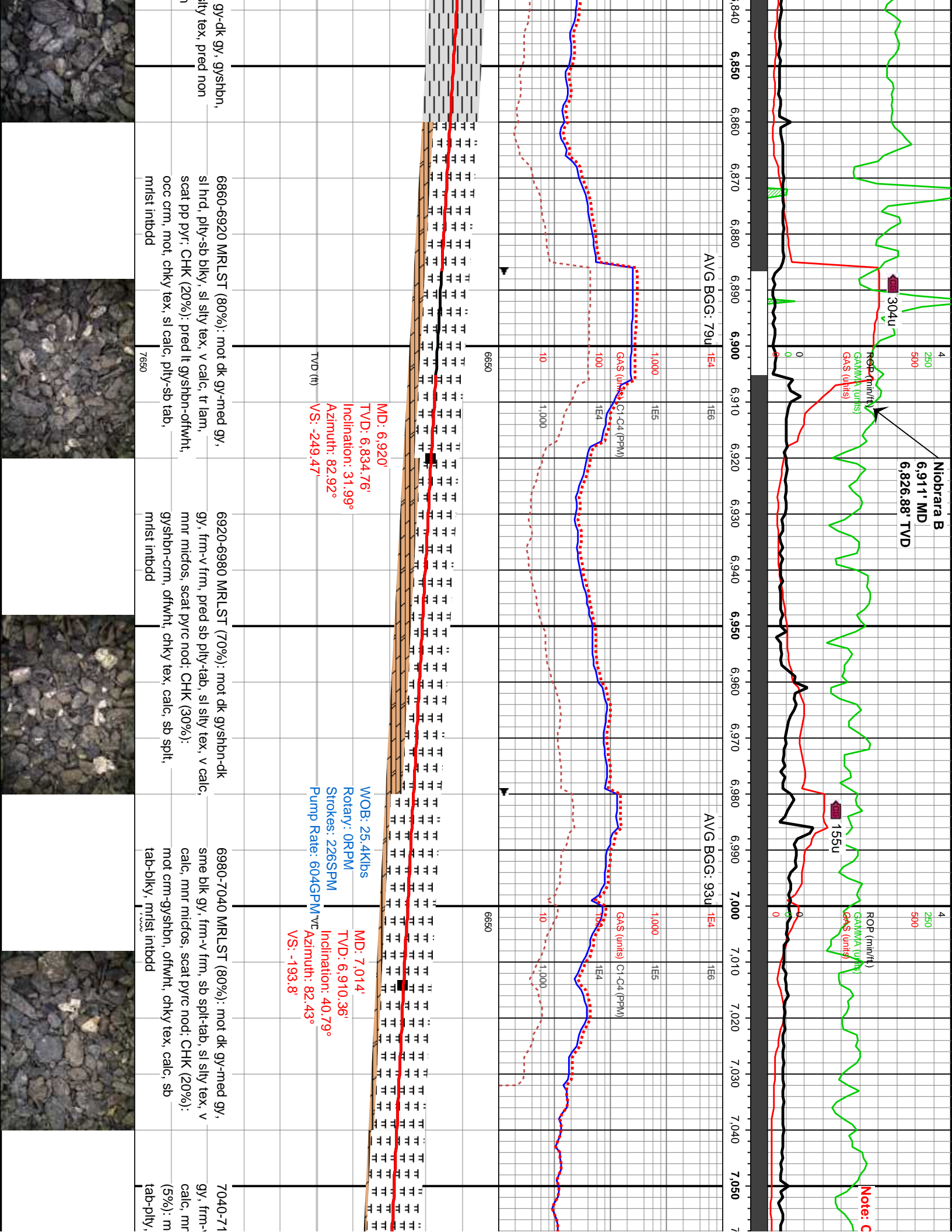
VEY C<sub>X</sub> CRYPTOXLN

GAS E<sub>1</sub> EARTHY

LINE TESTED - LEFT F<sub>X</sub> FINELYXLN

LINE TESTED - RT G<sub>S</sub> GRAINSTONE





MW 8.5  
VIS 44

Niobrara C  
7,136' MD  
6,994.56' TVD

MW 8.5  
VIS 44

Change Out Section of Frozen Gas Line

12u

129u

131u

ROP (inb/f)  
SAWMA (units)  
GAS (units)

ROP (inb/f)  
SAWMA (units)  
GAS (units)

ROP (inb/f)  
SAWMA (units)  
GAS (units)

AVG BGC: 21u

AVG BGC: 68u

GAS (units) C1-C4 (PPM)

GAS (units) C1-C4 (PPM)

GAS (units) C1-C4 (PPM)

1000

1000

1000

100

100

100

10

10

10

MD: 7,109'

TVD: 6,978.54'

Inclination: 47.42°

Azimuth: 80.32°

VS: -127.86'

WOB: 24.4Klbs

Rotary: 0RPM

Strokes: 226SPM

Pump Rate: 604GPM

MD: 7,203'

TVD: 7,034.41'

Inclination: 59.48°

Azimuth: 80.71°

VS: -52.71'

TVD (ft)

TVD (ft)

00 MRLST (95%): pred dk gysbhn-dk

v frm, pred pily-sb spl, sl silty tex, v

micfos, scauimb pyrc nod; CHK

ot gysbhn-crm, chky tex, calc, sb

mrst inbddd, bri org-dul yelgn flor

7100-7160 MRLST (60%): mot dk gy-dk

gysbhn, med gy, frm-v frm, pred sb pily, sl silty

tex, v calc, mnr micfos, scauimb mic pyr;

CHK (40%): gysbhn-crm, chky tex, calc, sb

splt, mrst inbddd

7160-7220 MRLST (75%): dk gy-med gy,

frm-sl hrd, pily-sl spl, sl silty tex, mnr chk

inbddd, v calc, scauimb mic pyr, tr cal frac fill;

CHK (25%): crm-rt gysbhn, sft, vf lamm, sme

mic fos, dul yelgn-bri org flor

7220-7280 MRLST (65%): dk gysbhn-dk gy,

med gy, frm-sl hrd, sl pily-splt, sm tex, v calc,

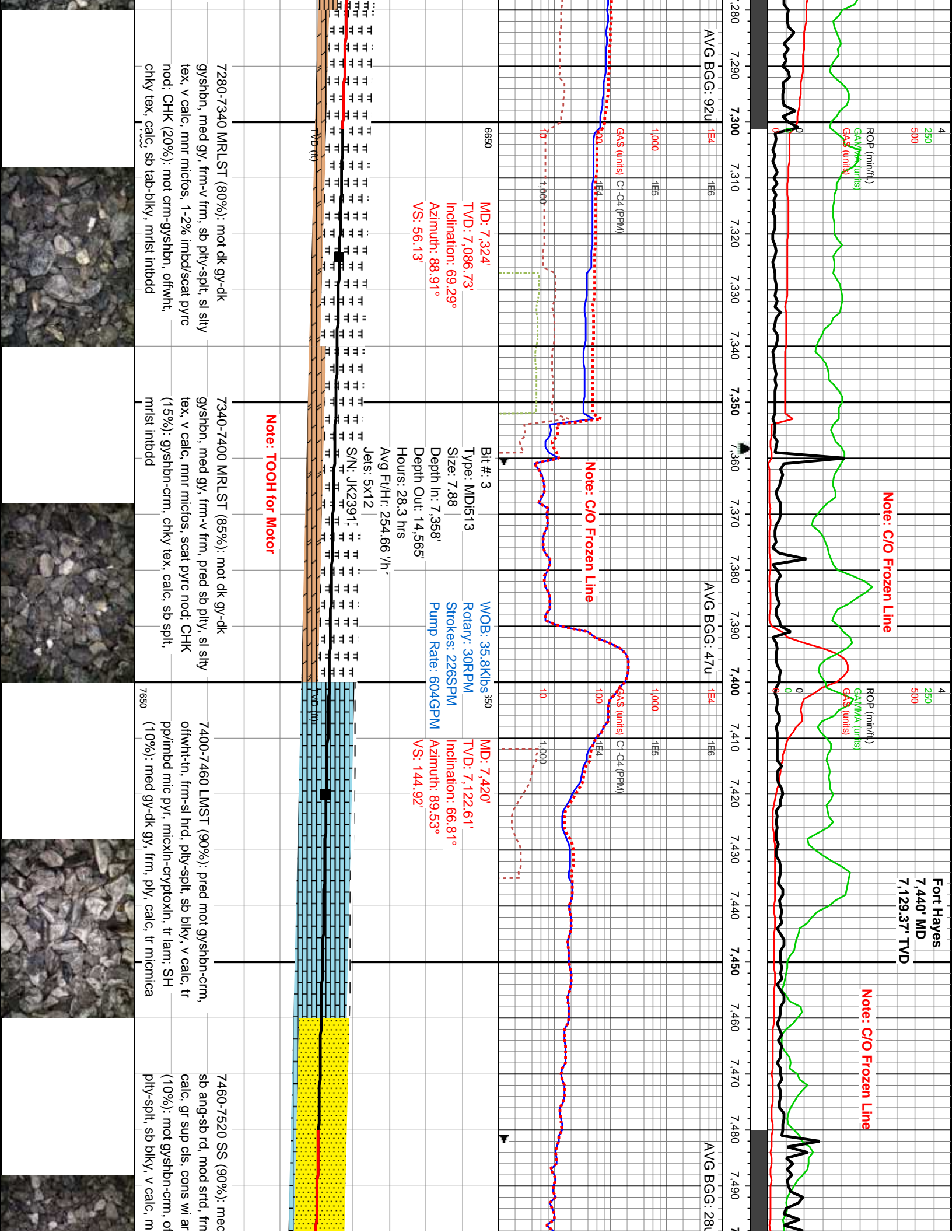
pp/imb mic pyr; CHK (35%): crm-gysbhn,

ofwht-tn, chky tex, calc, sb tab, mnr micfos,

inbddd, bri org-dul yelgn flor







Code

7,510' MD

7,154.54' TVD

NW: 8.35

V/S: 43

4

250

500

ROP (m/hr)

GAMMA (units)

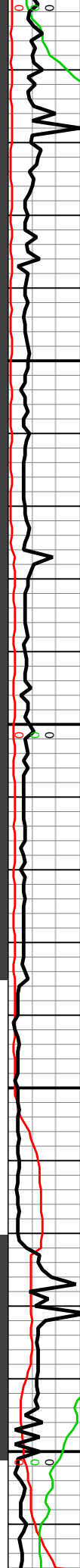
GA\$ (units)

Note: C/O Frozen Line

4

250

500



7,510

7,520

7,530

7,540

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

1E4

1E6

1,000

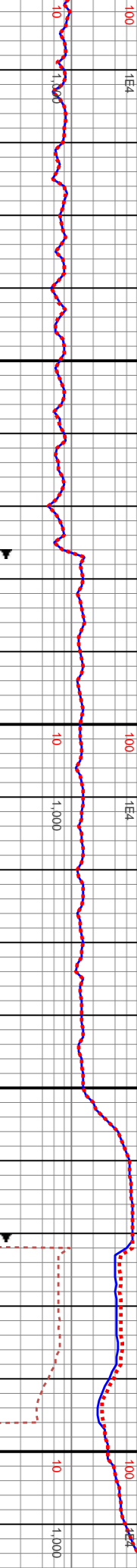
1E5

GA\$ (units)

C1-C4 (PPM)

100

1E4



MD: 7,515'

TVD: 7,156.41'

Inclination: 71.5°

Azimuth: 89.35°

VS: 233.41'

WOB: 33.4Klbs

Rotary: 0RPM

Strokes: 226SPM

Pump Rate: 604GPM

MD: 7,609'

TVD: 7,173.49'

Inclination: 87.5°

Azimuth: 90.94°

VS: 325.15'

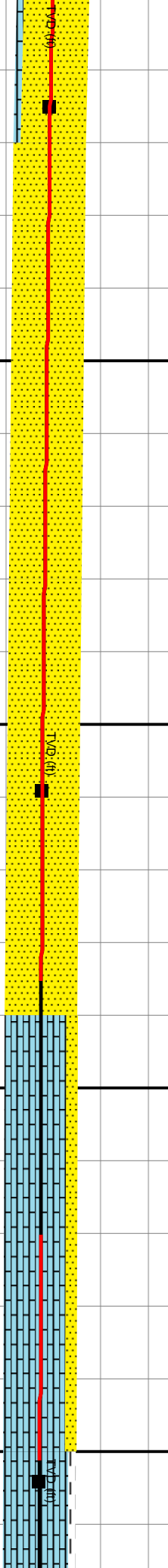
MD: 7,704'

TVD: 7,178.29'

Inclination: 86.7°

Azimuth: 91.33°

VS: 419.48'



gy-gyshbn, vf-f gr,

-sl fri, pred non-sl

g-silic cnt, LMST

fwht-tn, frm-sl hrd,

cxln

7520-7580 SS: dk gy-dk gyshbn, sme lt brn,

vf-f grs, mod strd, pred sb ang-sb rd, pred gr

sup cls, cons wi arg/silic cnt, sme sl calc, v rr

bri yeign flor, no-v wk tmstp cut, frt yeign ring

7580-7640 SS: pred gyshbn-med gy, sme dk

gy brn, mod strd, pred sb ang-sb rd, vf-f gr, fri

gr sup cls, cons wi arg/silic cnt, v rr bri yeign

flor, no-v wk tmstp cut, frt yeign ring

7640-7700 LMST (85%): mot crm-lt gy, lt

brn-gyshbn, blk-ty-tab, cryptoxln, hrd; SS (15%):

gyshbn-offwht, lt gy-med gy, vf-f grs, mod strd,

sb ang-sb rd, gr sup cls wi arg-silic cnt, sl

calc

7700-7770

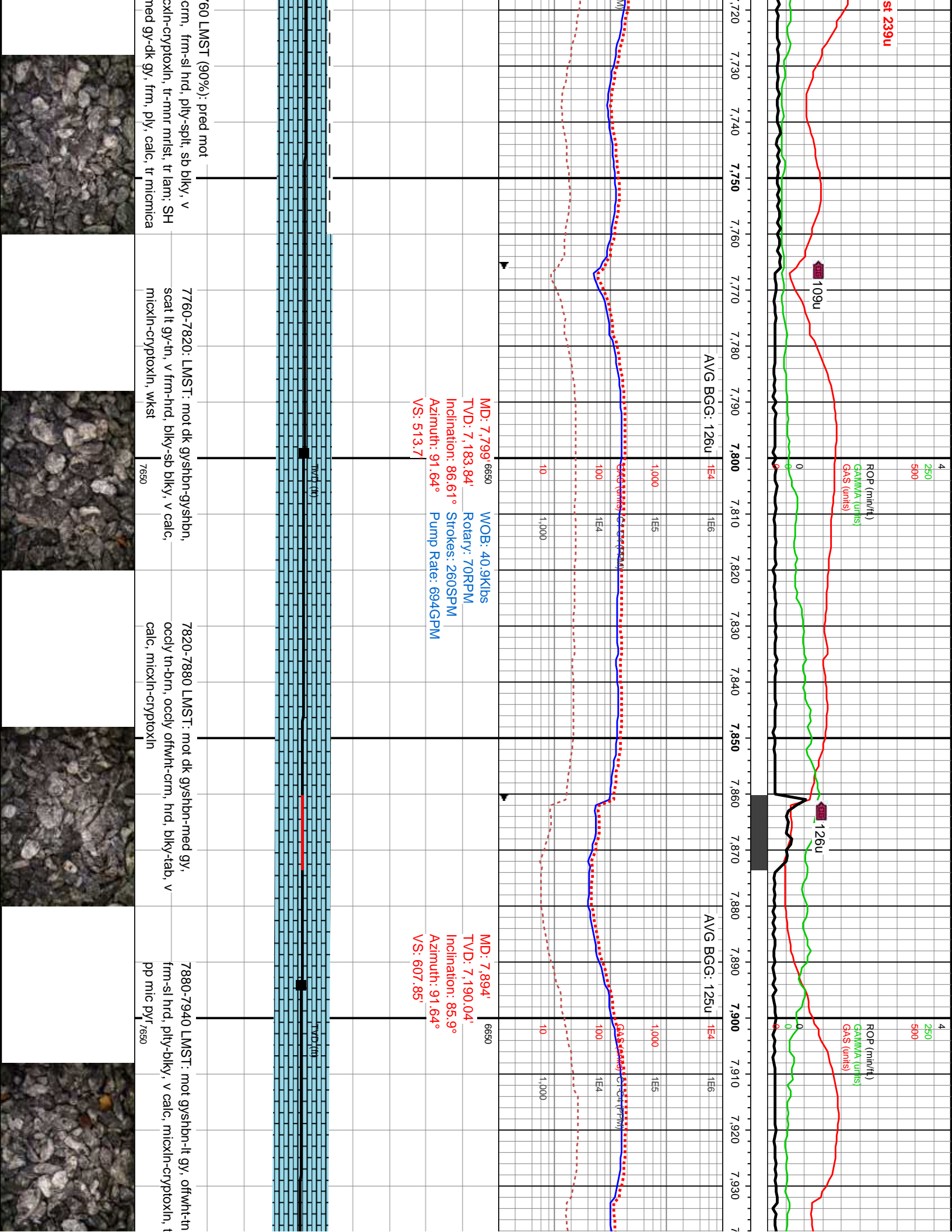
gyshbn-

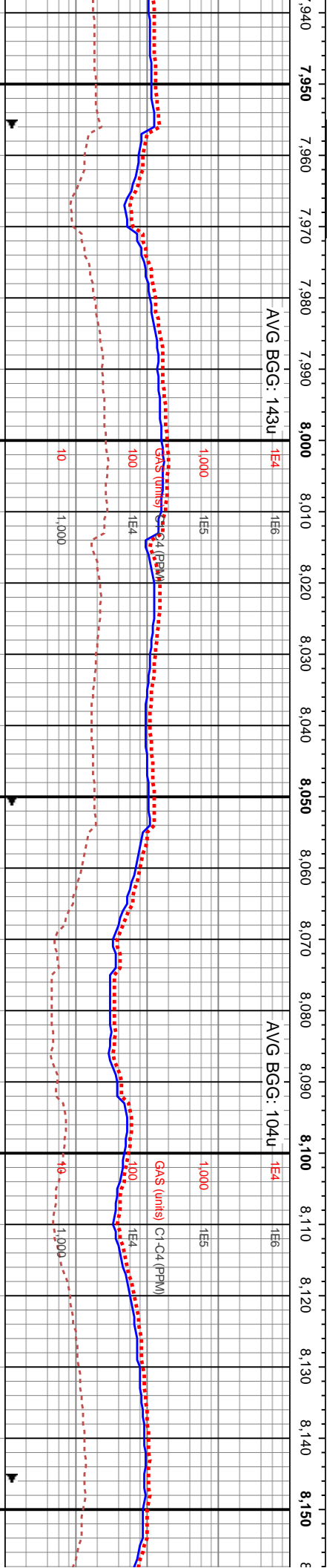
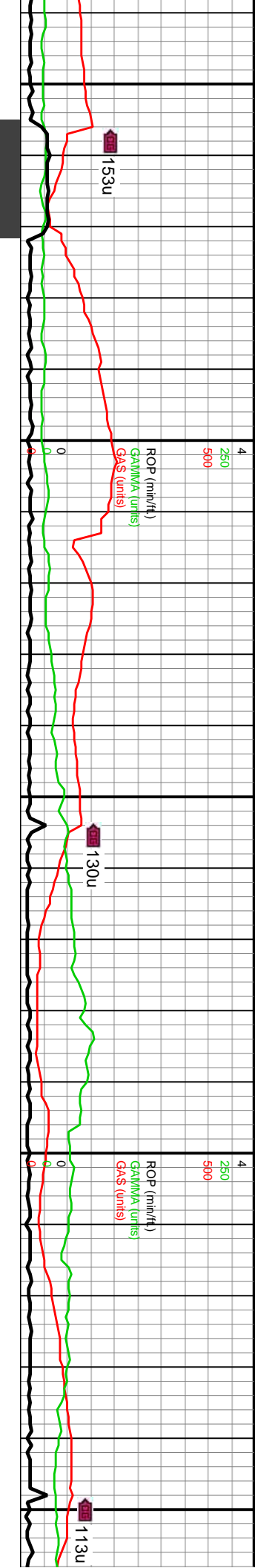
calc, mil-

(10%): r







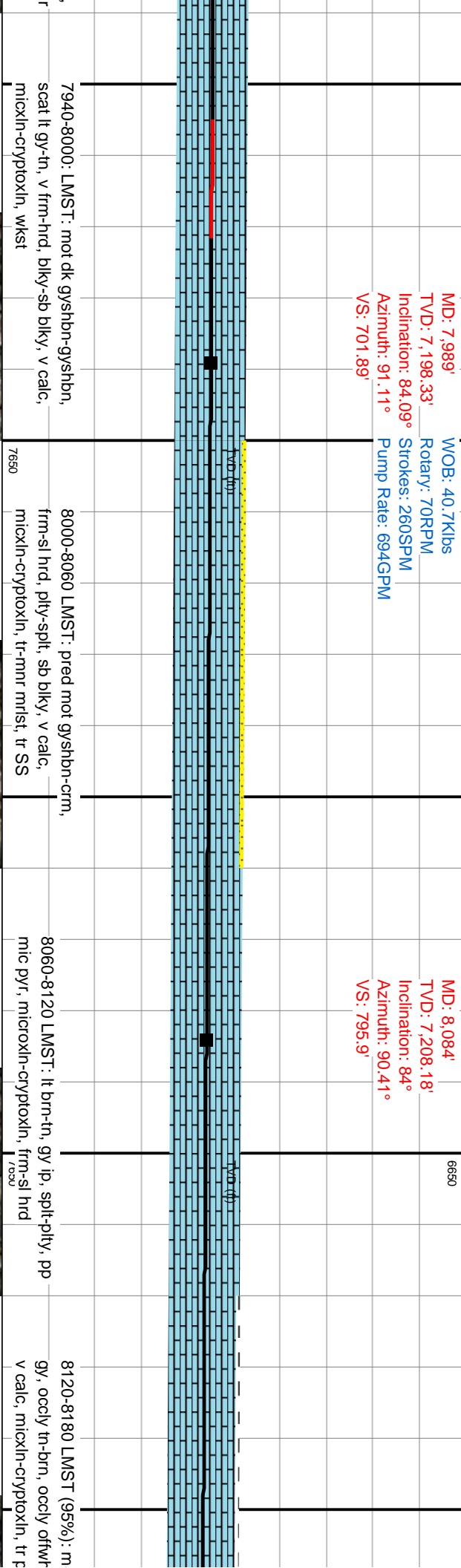


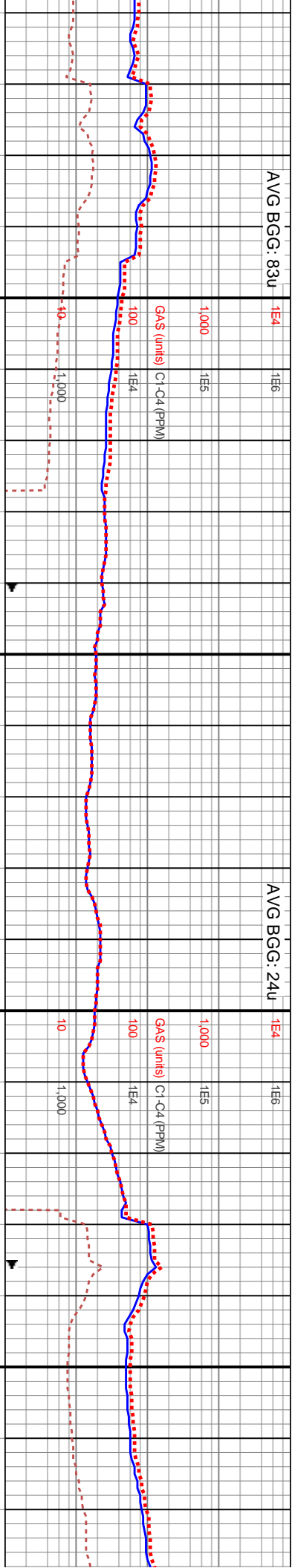
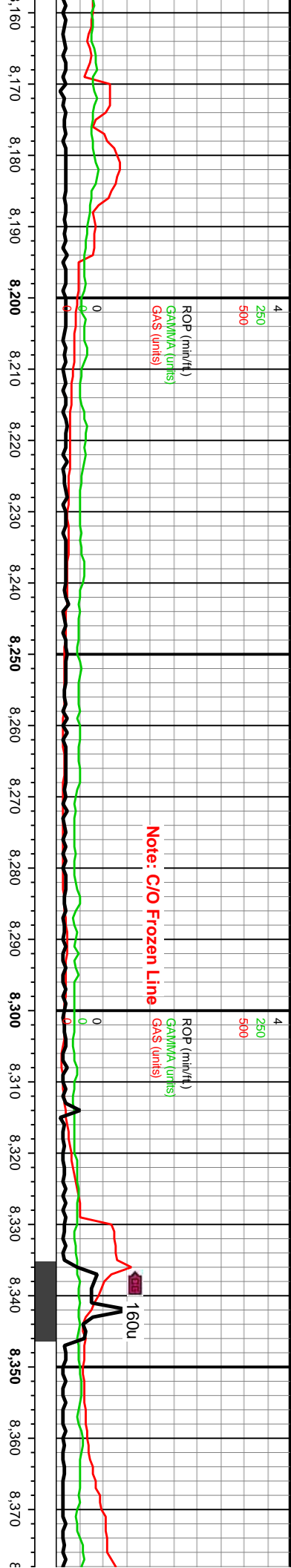
MD: 7,989'  
TVD: 7,198.33'  
Inclination: 84.09°  
Azimuth: 91.11°  
VS: 701.89'

WOB: 40.7Klbs  
Rotary: 70RPM  
Strokes: 260SPM  
Pump Rate: 694GPM

MD: 8,084'  
TVD: 7,208.18'  
Inclination: 84°  
Azimuth: 90.41°  
VS: 795.9'

6650





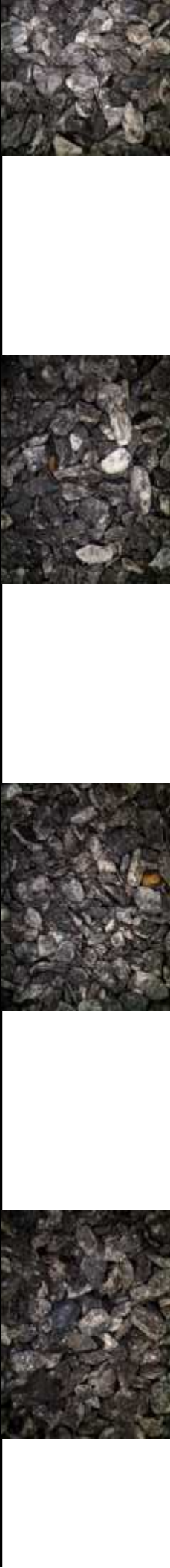
MD: 8,179'  
TVD: 7,217.86'  
Inclination: 84.31°  
Azimuth: 91.11°  
VS: 889.92'

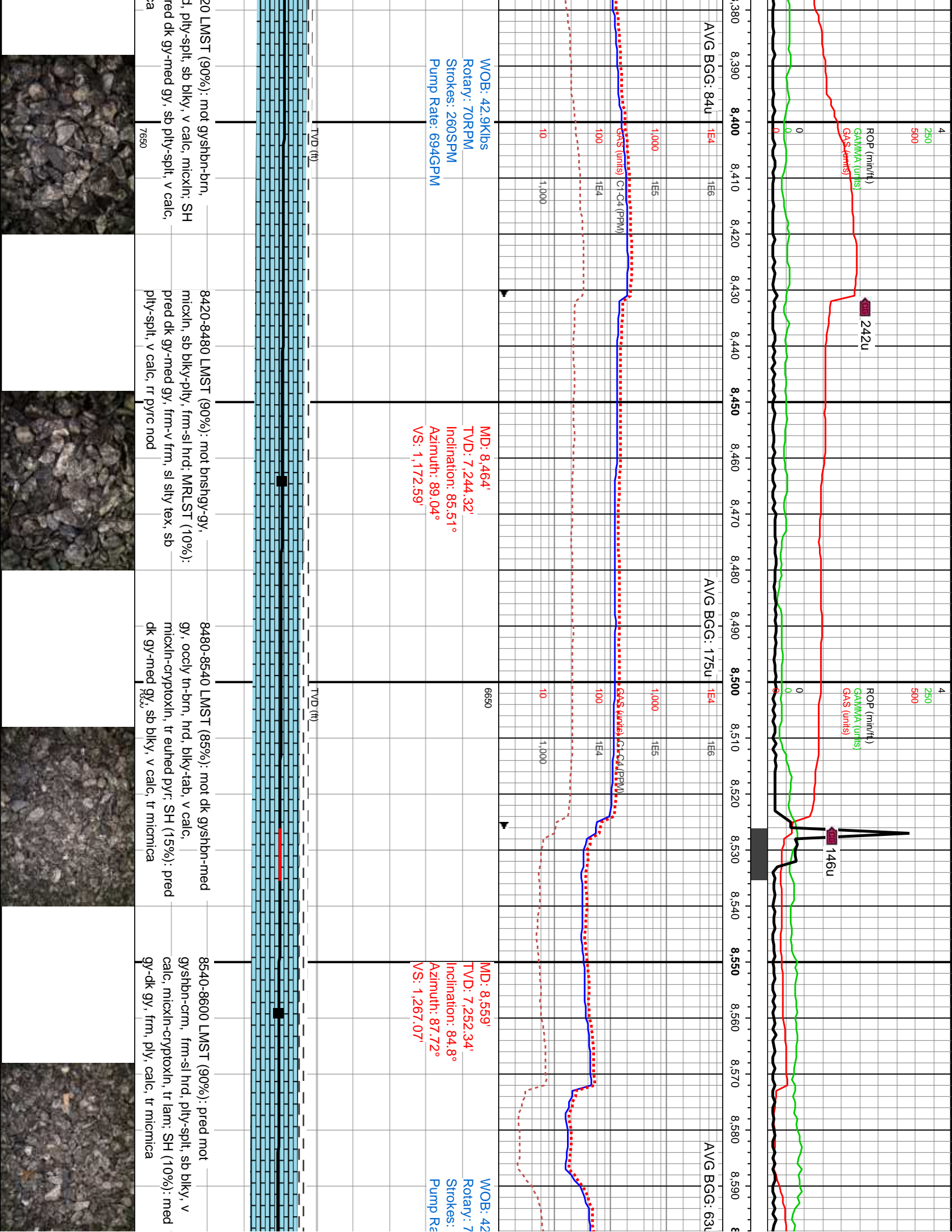
WOB: 41.8Klbs  
Rotary: 70RPM  
Strokes: 260SPM  
Pump Rate: 694GPM

MD: 8,274'  
TVD: 7,227.28'  
Inclination: 84.31°  
Azimuth: 88.51°  
VS: 984.1'

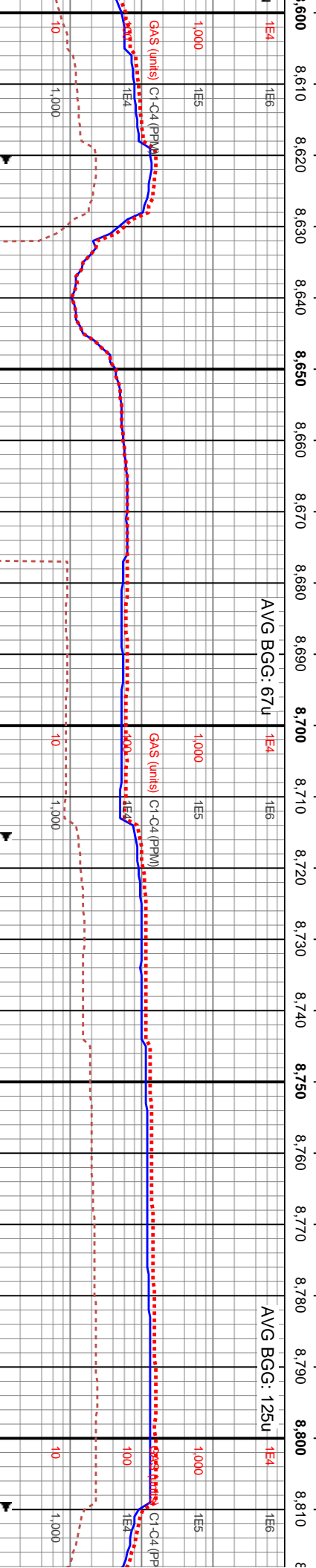
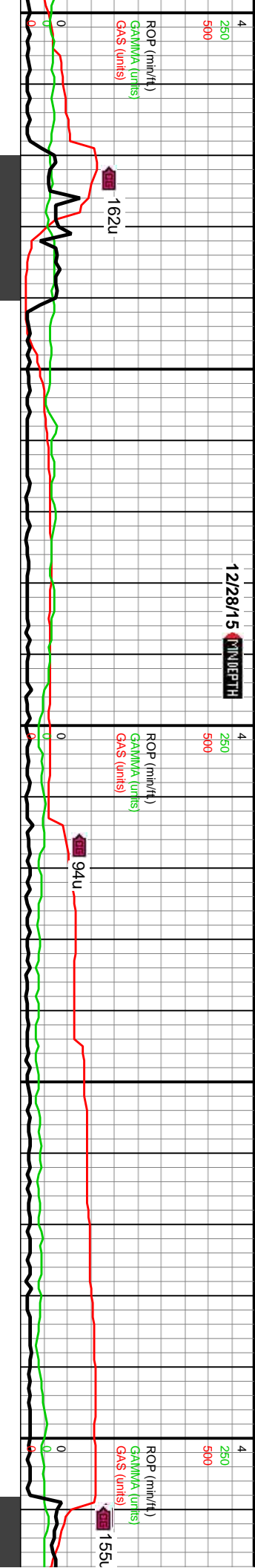
MD: 8,369'  
TVD: 7,236.3'  
Inclination: 84.8°  
Azimuth: 91.24°  
VS: 1,078.32'

8180-8240 LMST (90%): mot dk gysbhn-med gy, occly tn-brn, hrd, blk-tyab, v calc, micxn-cryptoxln, SH (10%): pred dk gy-med gy, sb blk, v calc, tr micnica, tr inst inbtd	8240-8300 LMST (90%): dk brn-gysbhn, gy ip, blk-pty, microxin, frm-sl hrd, SH (10%): mot dk gy-bnshgy, med gy, spl, frm, v calc	8300-8360 LMST (95%): bnshgy-lt gy, pty, microxin, sl hrd, mudst; SH (5%): mot dk gy-med gy, pty, frm, v calc, tr micnica, rgh tex	8360-84: frm-sl hrd (10%): p tr micnic
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MD: 8,654'  
TVD: 7,261.14'  
Inclination: 84.58°  
Azimuth: 90.63°  
VS: 1,361.4'

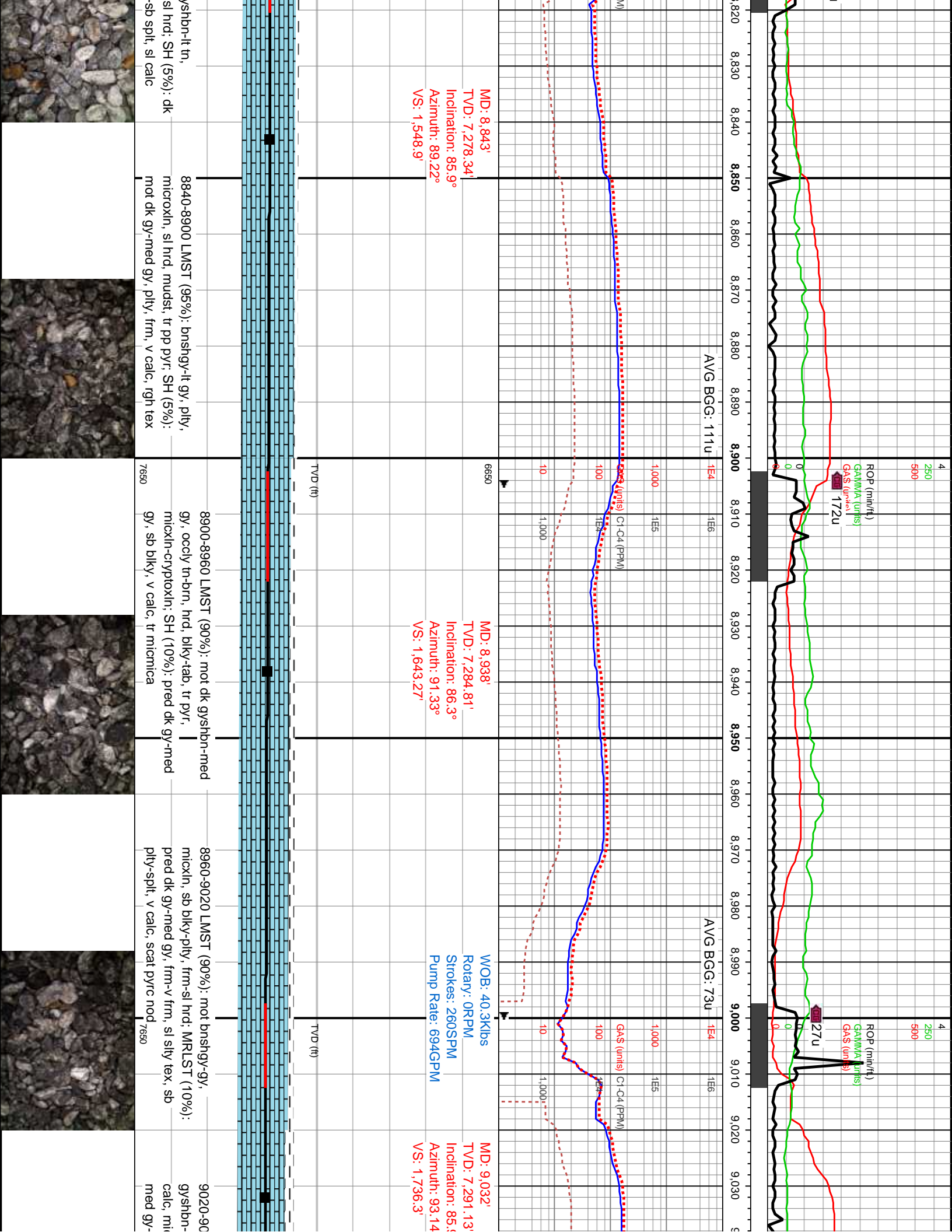
MD: 8,748'  
TVD: 7,270.24'  
Inclination: 84.31°  
Azimuth: 89.92°  
VS: 1,454.56'

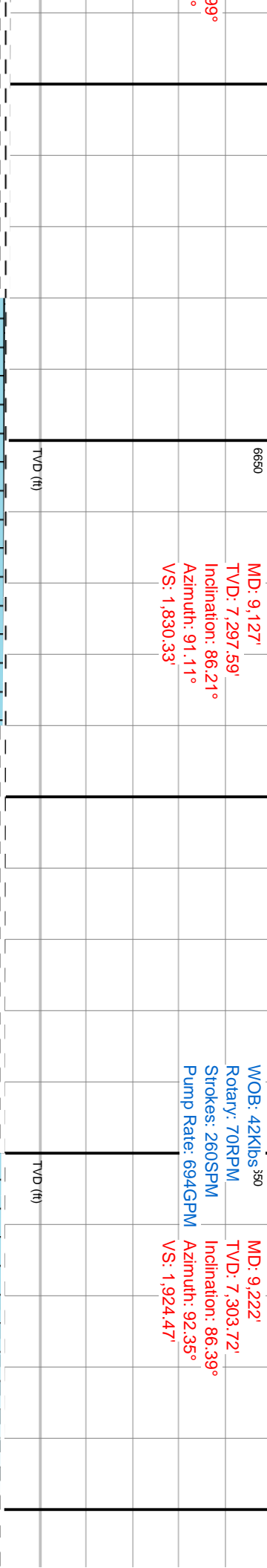
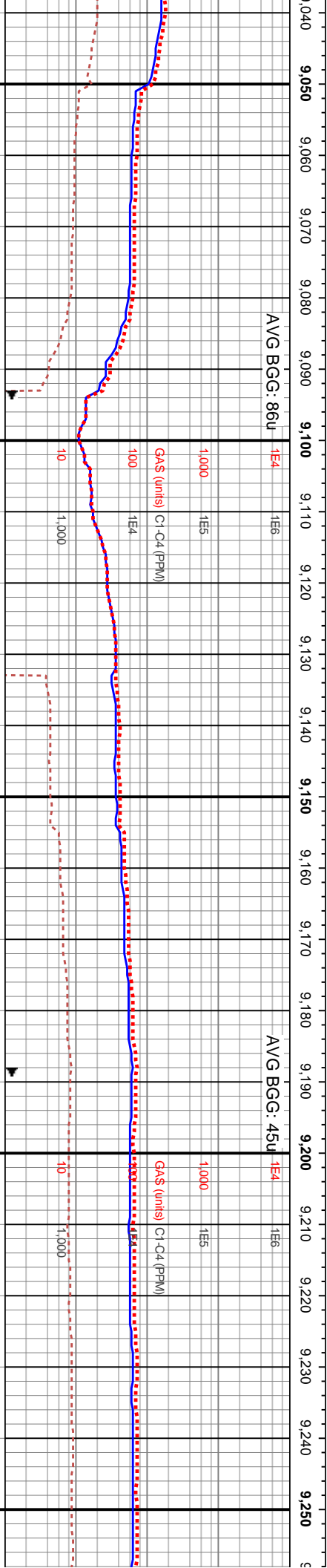
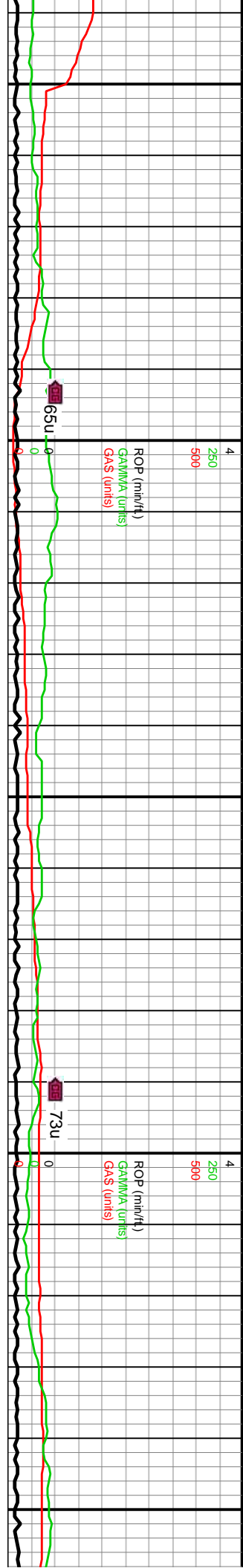
WOB: 40.7Klbs  
Rotary: 70RPM  
Strokes: 260SPM  
Pump Rate: 695GPM

8600-8660 LMST (90%): mot brn-gyshn, lt gy-offwht ip, blk-y-pty, microxln, frm-sl hrd; SH (10%): mot dk gy-bnshgy, med gy, splt, frm, v calc	8660-8720: LMST: mot dk gysn-gyshn, scat lt gy-tn, v frm-hrd, blk-y-sb blk-y, v calc, micxln-cryptoxln, wkst	8720-8780 LMST: lt brn-tn, gy ip, splt-pty, pp mic pyr, microxln-cryptoxln, frm-sl hrd; tr SH	8780-8840 LMST (95%): g pty-blky, cryptoxln-micxln, gy-med gy, frm-sl hrd, blk-y
7650	7650		



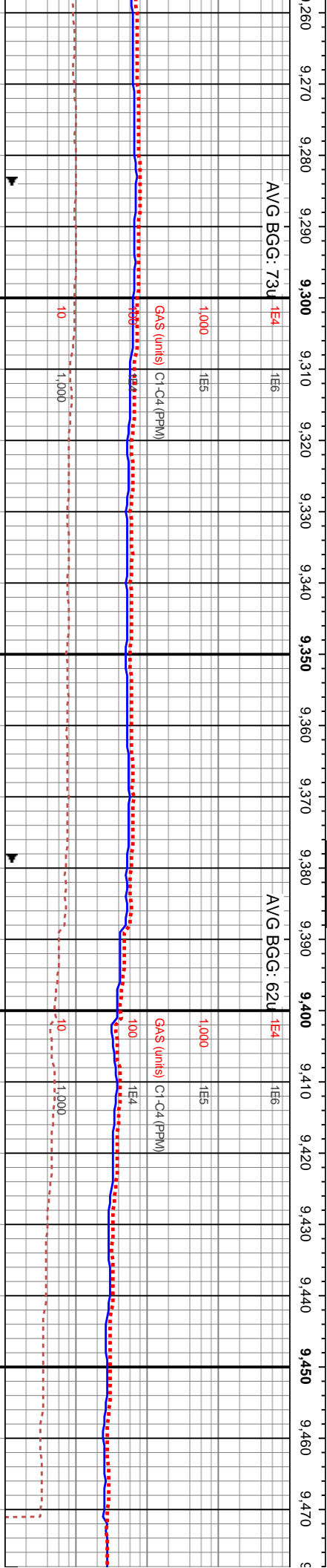
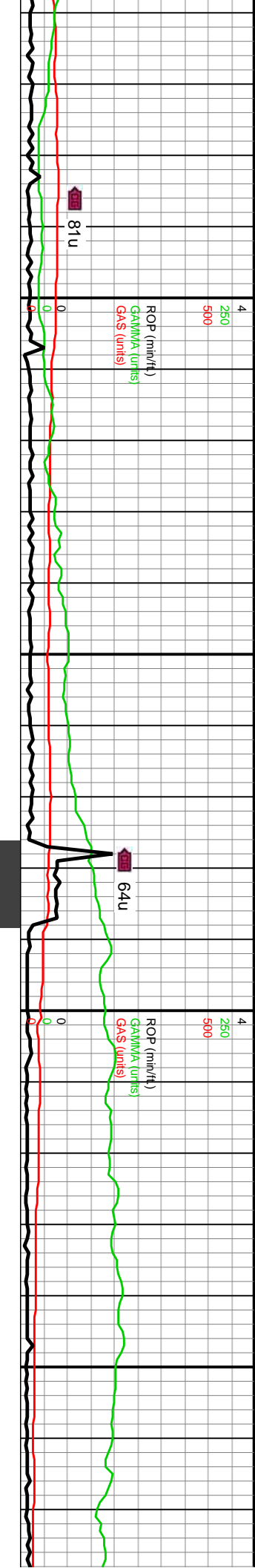






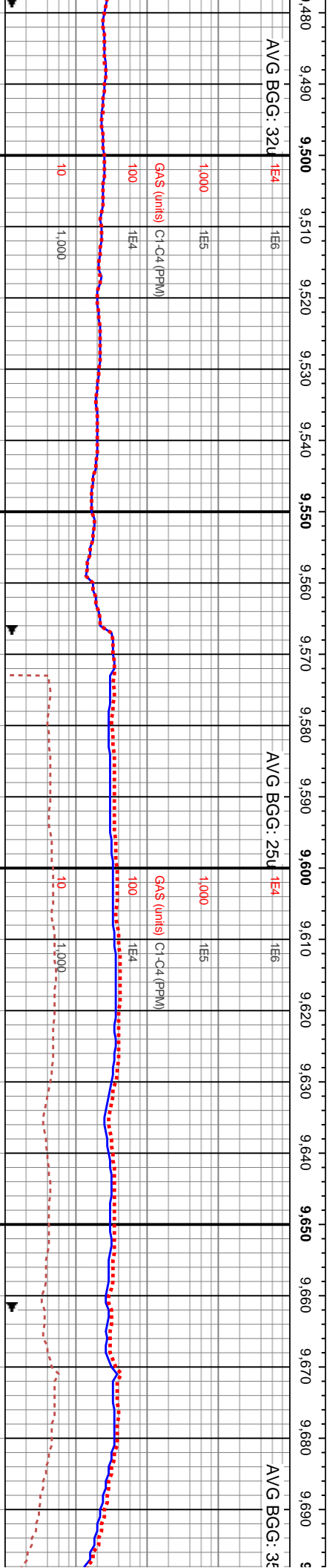
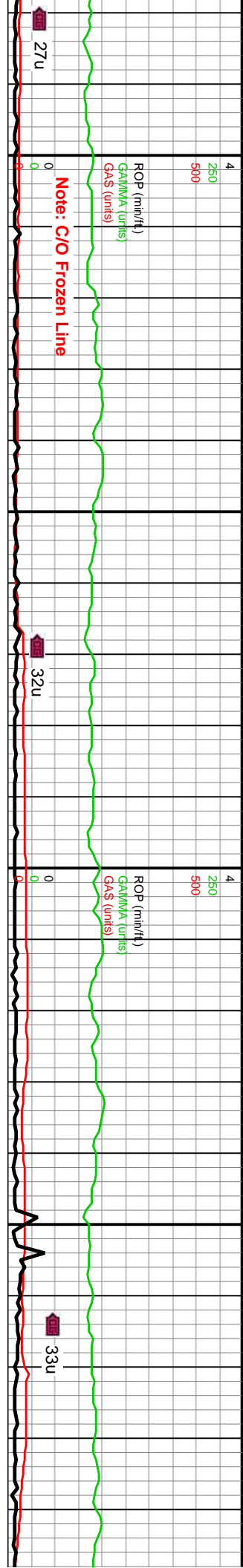
880 LMST (85%): pred mot cm, frm-sl hrd, pty-splt, sb blk, v xln-cryptoxln, tr pp pyr; SH (15%): dk gy, frm, ply, calc, tr micmica	9080-9140 LMST (95%): mot brn-gyshbn, lt gy-offwht ip, blk-pty, microxln, frm-sl hrd; SH (5%): mot dk gy-bnshgy, med gy, splt, frm, v calc	9140-9200 LMST (90%): mot dk gysbhn-med gy, occy tn-brn, hrd, micxln-cryptoxln, blk- tab, v calc, tr pp pyr; SH (10%): pred dk gy-med gy, sb blk, v calc, tr micmica	9200-9260 LMST (95%): gysbhn-lt tn, pty-blk, cryptoxln-micxln, sl hrd; SH (5%): dk gy-med gy, frm-sl hrd, blk-sb splt, sl calc





6650		MD: 9,317' TVD: 7,309.37' Inclination: 86.79° Azimuth: 91.73° VS: 2,018.58'	WOB: 28.7klbs Rotary: 70RPM Strokes: 260SPM Pump Rate: 694GPM		MD: 9,411' TVD: 7,315.29' Inclination: 85.99° Azimuth: 92.74° VS: 2,111.63'
9320-9380 SS (55%): gyshbn-med brn, lt brn clus, vf-f gr, mod srtld, frm, sb ang-sb rd, gr sup cls wi arg-silic cmt, sl calc, tr dul yelgn flor, no cut, fnt resdl ring; LMST (45%): bshgy-crm, blkly, micxln, v calc, tr pp mic pyr		9380-9440 SS (85%): gyshbn-offwht, lt gy-med gy, vf-f grs, mod srtld, sb ang-sb rd, gr sup cls wi arg-silic cmt, sl calc, tr dul yelgn flor, no-wk mky cut; LMST (15%): mot crn-lt gy, lt brn-gyshbn, blkly-tab, cryptoxln, hrd		9440-9500 SS (80%): dk gy med gy, vf-f grs, mod srtld, sup cls wi arg-silic cmt, sl calc, tr dul yelgn flor, no cut; LMST (20%): brn-gyshbn, blkly-tab, cryptoxln	
TVD (ft)					
9260-9320 LMST (80%): mot gyshbn-lt gy, lt brn-med gy, pily-sb spli, cryptoxln, sl hrd, mnr pyrc nod/pp mic pyr; SH (10%): dk gy-med gy, frm-sl hrd, blkly-sb spli, sl calc					
6650					
7650					
8650					





MD: 9,505'  
TVD: 7,321.68'  
Inclination: 86.21°  
Azimuth: 90.54°  
VS: 2,204.77'

WOB: 39.6Klbs  
Rotary: 70RPM  
Strokes: 260SPM  
Pump Rate: 695GPM

MD: 9,600'  
TVD: 7,327.48'  
Inclination: 86.79°  
Azimuth: 91.51°  
VS: 2,299.06'

MD: 9,694'  
TVD: 7,332.1'  
Inclination: 86.79°  
Azimuth: 94.1°  
VS: 2,391.9°

shbn-med brn,  
sb ang-sb rd, gr  
alc, tr dul yeign  
ot crm-lt gy, lt  
oxln, hrd

TVD (ft)

9500-9560 LMST (80%): lt brn-tn, med  
gy-gyshbn ip, splt-plt, pp mic pyr,  
microxln-cryptoxln, frm-sl hrd; SH (20%): pred  
dk gy-med gy, sb blk, v calc, tr micnica

9560-9620 LMST (85%): mot lt gyshbn-crm,  
tn, sb splt, frm-sl hrd, v calc, mnr intbdd SH,  
micxln, SH (15%): dk gy-med gy, splt-plt, sb  
blk, v calc, tr micnica, sl stly tex

9620-9680 LMST (75%): gyshbn-lt tn, lt gy,  
ply-blky, tr pp mic pyr, cryptoxln-micxln, sl hrd,  
mnr micnica, SH (25%): dk gy-med gy, frm-sl  
hrd, blk-sb splt, sl calc, intbdd ls

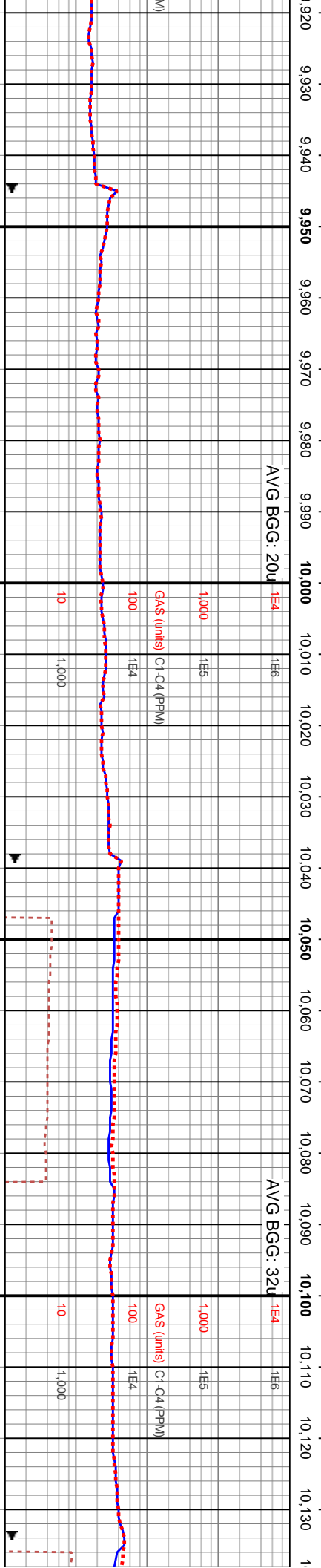
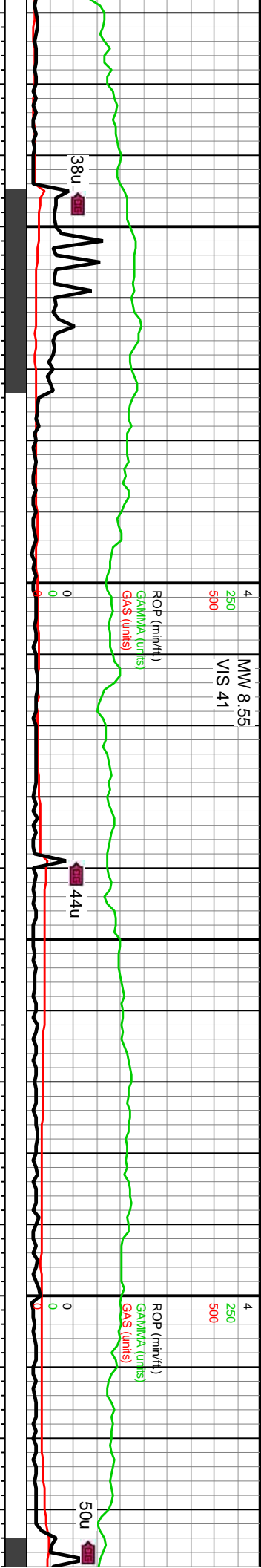
9680-9700 LMST (75%): mot dk gy-med gy, sb blk, v calc, tr micnica, sl stly tex







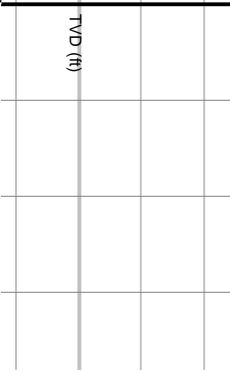
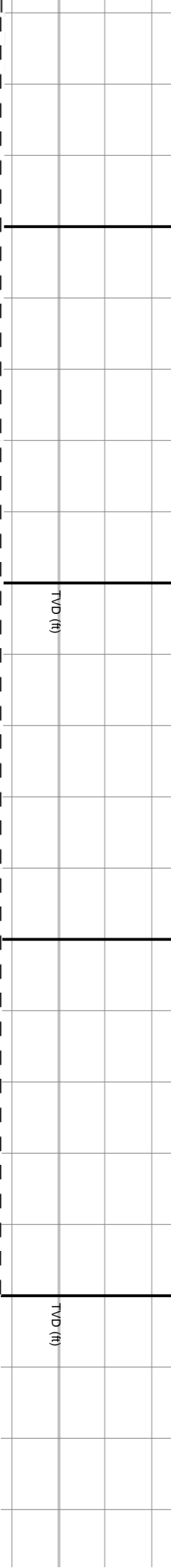




MD: 9,978'  
TVD: 7,346.62'  
Inclination: 86.79°  
Azimuth: 91.33°  
VS: 2,672.04'

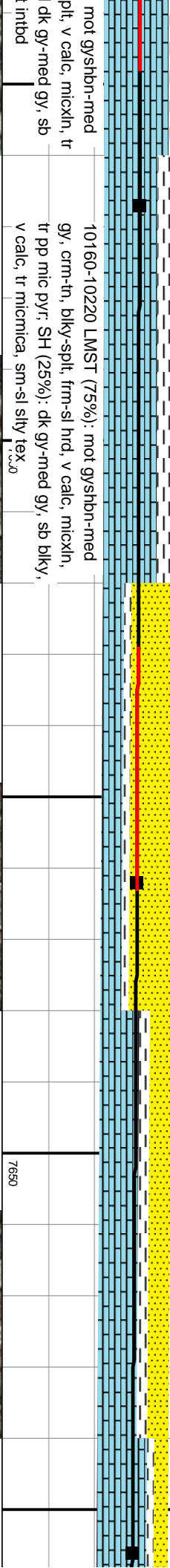
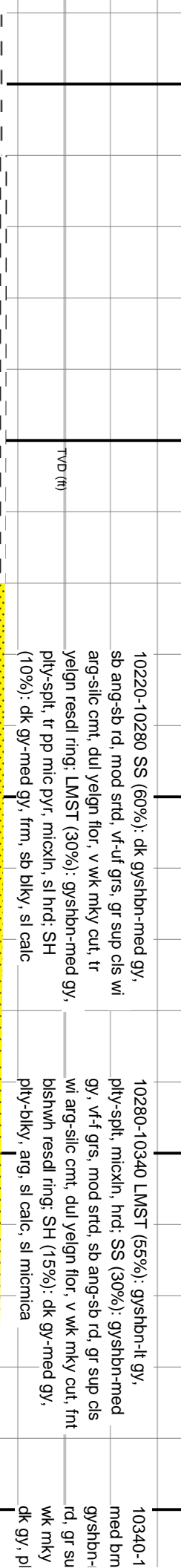
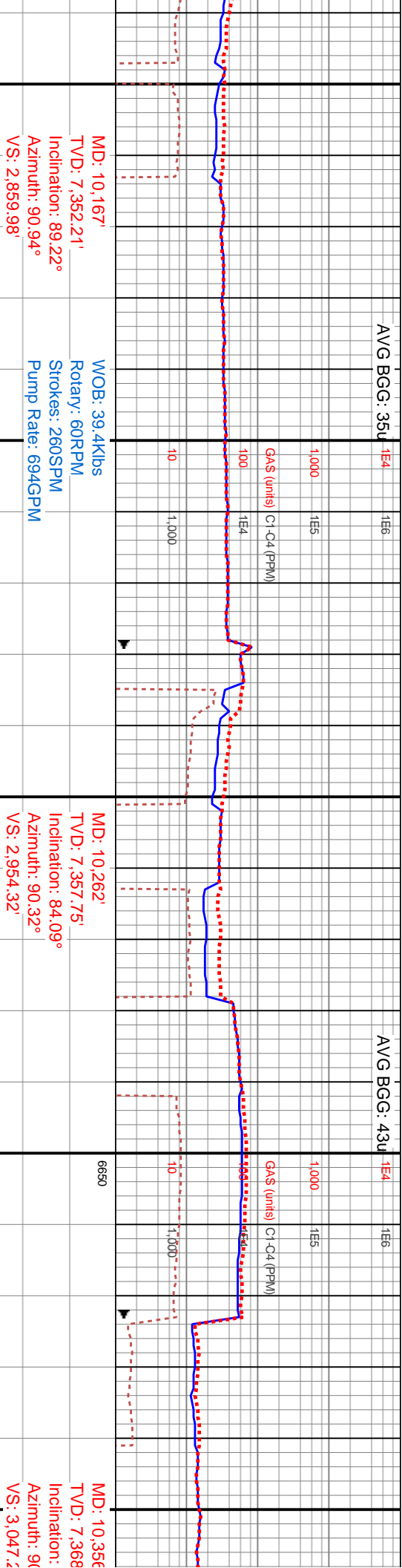
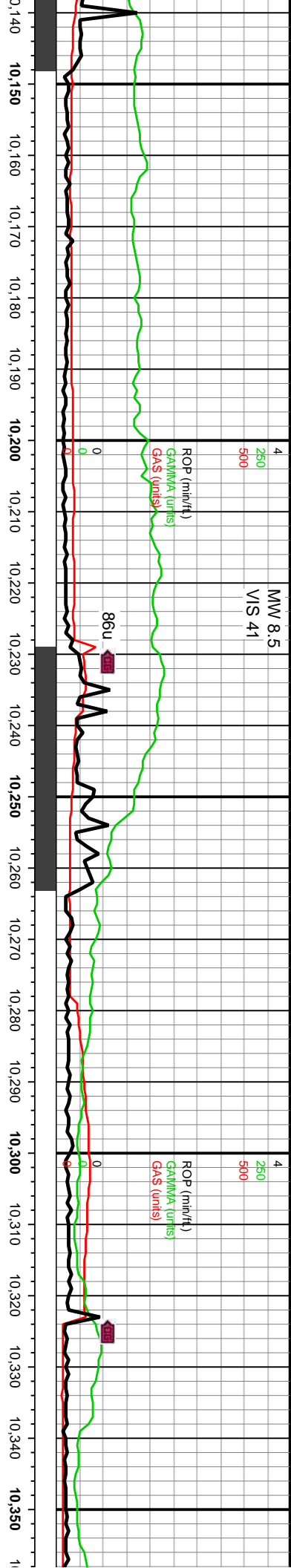
WOB: 42.4Klbs  
Rotary: 60RPM  
Strokes: 260SPM  
Pump Rate: 694GPM

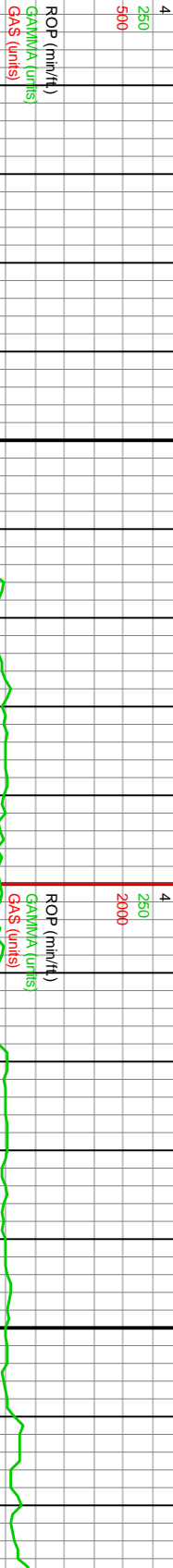
MD: 10,072'  
TVD: 7,350.41'  
Inclination: 88.6°  
Azimuth: 90.32°  
VS: 2,765.46'



9920-9980 LMST (80%): mot gysbhn-brn, frm-sl hrd, ply-splt, sb blkly, v calc, micxln; SH (20%): pried dk gy-med gy, sb ply-splt, v calc, tr micmica	9980-10040 LMST (85%): mot gysbhn-med gy, crm, frm-sl hrd, ply-splt, micxln-cryptoxln, sb blkly, v calc, tr-mm rmlst, tr lam; SH (15%): med gy-dk gy, frm, ply, calc, tr micmica, v calc	10040-10100 LMST (75%): gysbhn-med gy, lt tn, ply-sb blkly, tr pp mic pyr, cryptoxln-micxln, sl hrd; SH (25%): dk gy-med gy, frm-sl hrd, blkly-sb splt, v calc	10100-10160 LMST (90%): gy, oftwht, frm-sl hrd, ply-s-s pp mic pyr; SH (10%): pried ply, v calc, tr micmica, lms
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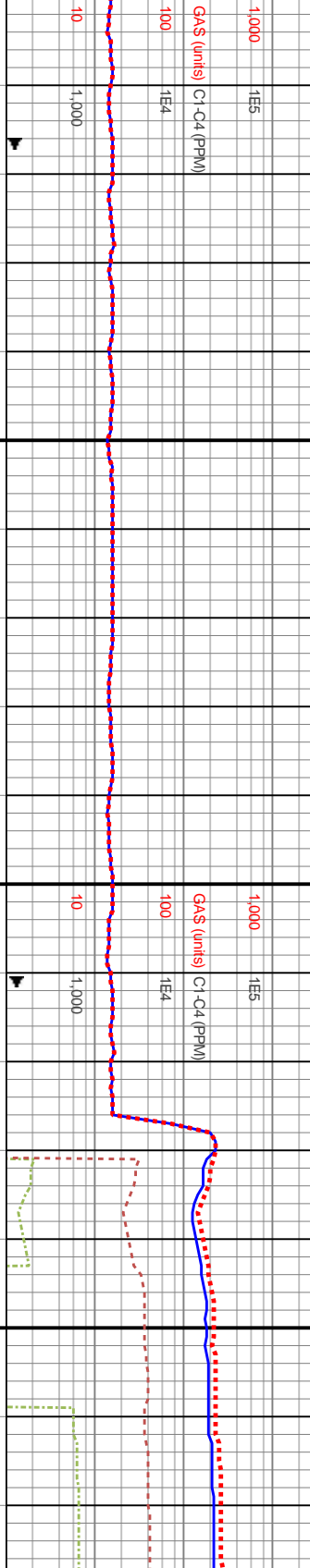






AVG BGG: 270

AVG BGG: 160



WOB: 40.1Klbs  
Rotary: 60RPM  
Strokes: 260SPM  
Pump Rate: 695GPM

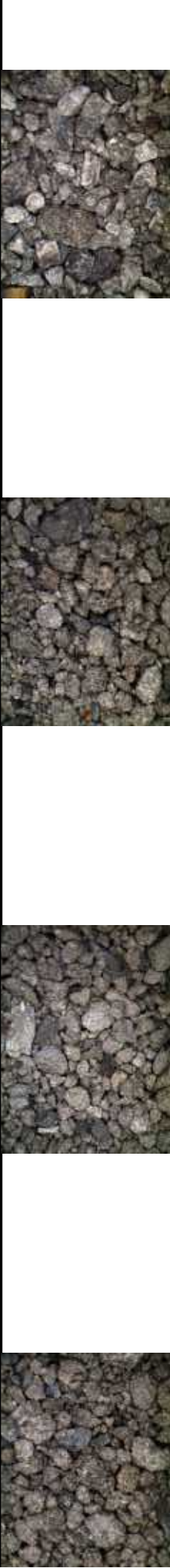
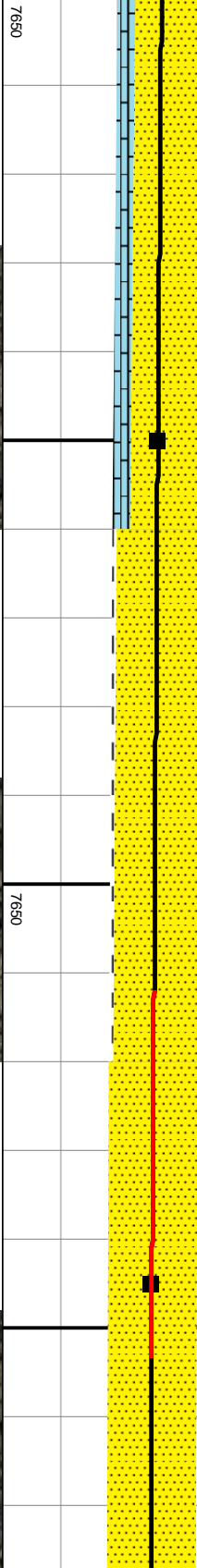
MD: 10,450'  
TVD: 7,380.27'  
Inclination: 82.41°  
Azimuth: 88.91°  
VS: 3,140.15'

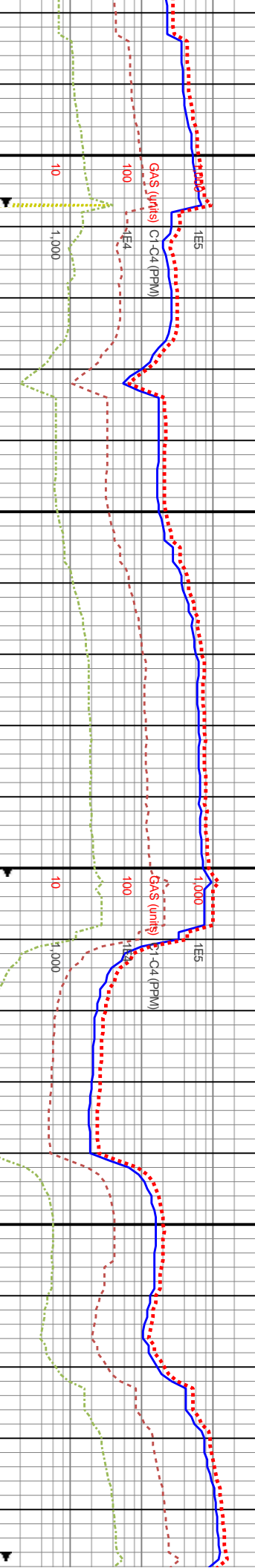
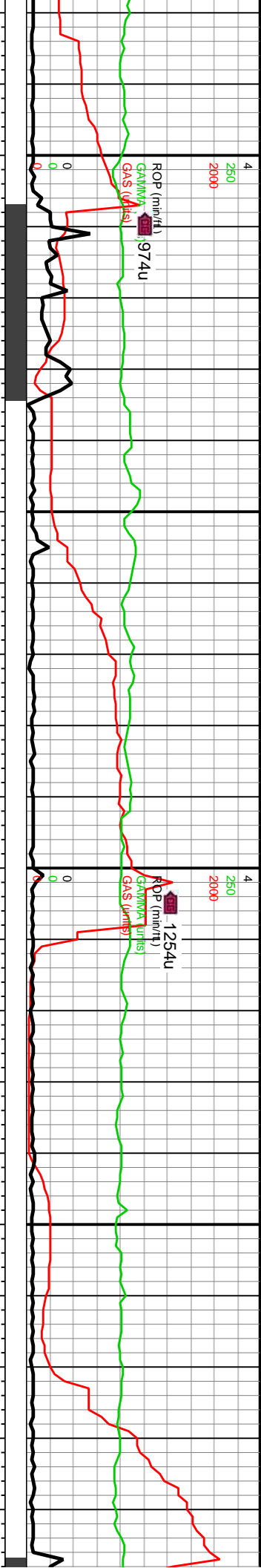
MD: 10,545'  
TVD: 7,390.45'  
Inclination: 85.29°  
Azimuth: 89.35°  
VS: 3,234.34'

10400-10460 SS (80%): gysbhn, lt gy-med gy, vf-uf grs, mod srted, sb ang-sb rd, gr sup cls wi arg-silic cnt, sl calc, dul yeign flr, v wk mky cut, mod yeign resd ring: LMST (20%): mot gysbhn-lt gy, lt brn-med gy, pty-sb spl, cryptoxln, sl hrd, mnr pyrc nod/pp mic pyr

10460-10520 SS (95%): med gy-gysbhn, dk gysbhn cls, clr-op grs, mod srted, sb ang-sb rd, vf-f gr, sl frm-fri, gr sup cls wi arg-silic cnt, pred non-sl calc, mod yeign flr, wk-mod mky cut, fnt-mod blshwh resd ring: SH (5%): dk gy, sl slty tex, pty-sb tab, frm, tr micmica

10520-10580 SS: med gy-dk gysbhn, trns-l-trasp, mod-p srted, sb ang-sb rd, vf-uf gr sd, sme sb ang qtz grs, gr sup cls cons wi arg/silic cnt, tr dul yeign flr, wk mky cut, mod blshwh resd ring





WOB: 40.1Klbs  
Rotary: 50RPM  
Strokes: 260SPM  
Pump Rate: 695GPM

MD: 10,640'  
TVD: 7,394.67'  
Inclination: 89.62°  
Azimuth: 89.04°  
VS: 3,328.97'

MD: 10,735'  
TVD: 7,395.63'  
Inclination: 89.22°  
Azimuth: 89.92°  
VS: 3,423.67'

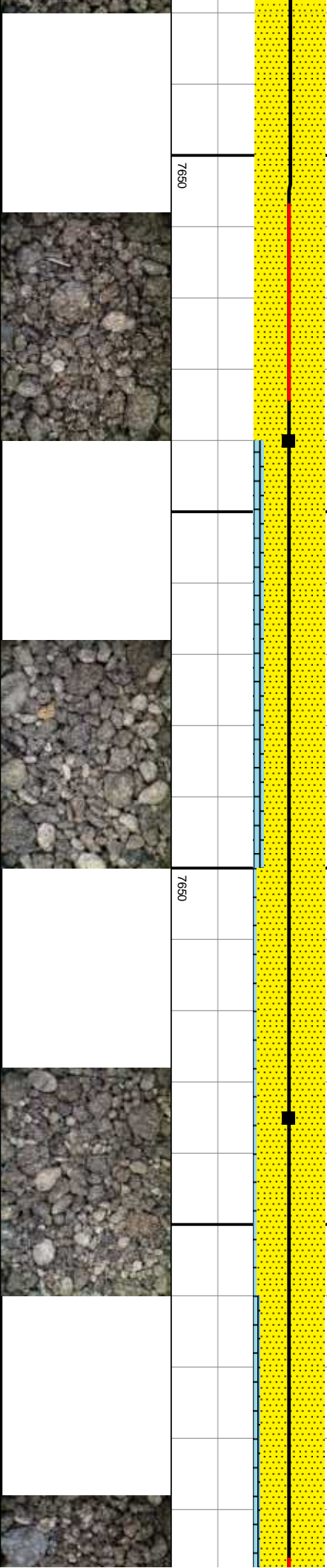
WOB: 43Klbs  
Rotary: 0RPM  
Strokes: 0SPM  
Pump Rate: 0GPM

10580-10640 SS: predy gysbhn, med gy-lt gy  
cls, com clr unconcs sd, vf-f gr, mod strd, sb  
ang-sb rd, frm-sl fri, gr sup cls wi arg-silic cmt,  
sl calc, dul yeign flor, wk mky cut, mod blshwh  
resdl ring

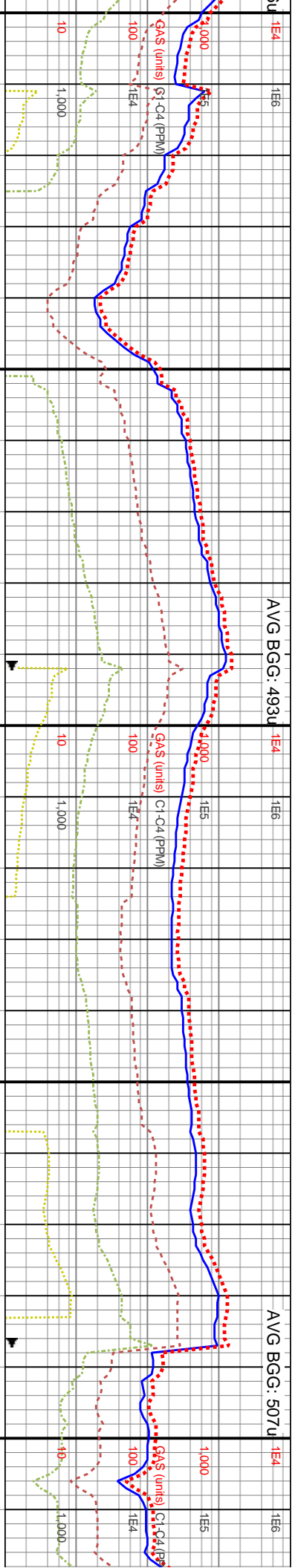
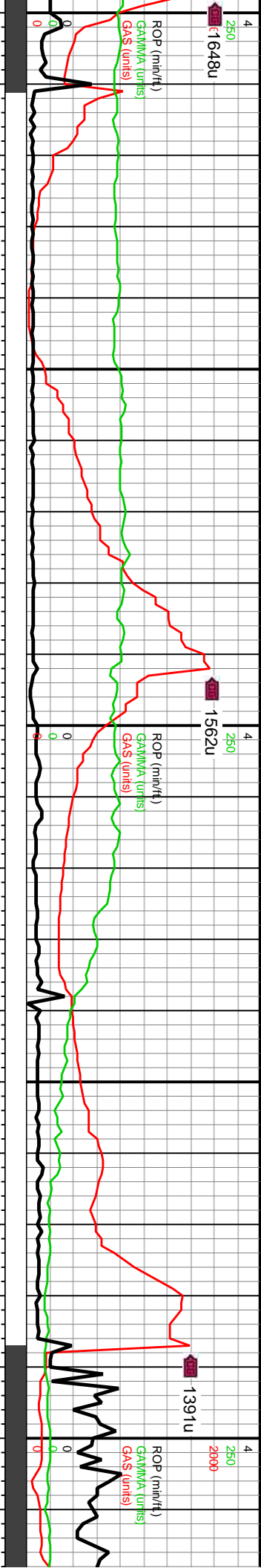
10640-10700 SS (85%): predy gysbhn-med  
gy, lt gy-med brn, vf-f grs, mod strd, sb ang-sb  
rd, gr sup cls wi arg-silic cmt, sl calc; LMST  
(15%): mot crm-lt gy, lt brn-gysbhn, blk-y-tab,  
cryptoxln, hrd

10700-10760 SS (90%): gysbhn-med brn, lt  
brn clus, vf-f gr, mod strd, frm, sb ang-sb rd,  
gr sup cls wi arg-silic cmt, sl calc, dul yeign  
flor, no cut, blshwh resdl ring; LMST (5%):  
bnshgy, crm-tn, blk-y, micxln, v calc, tr pp mic  
pyr

10760-10820 SS (90%): dk  
gy, vf-f grs, mod strd, sb ar  
wi arg-silic cmt, sl calc, mn  
pyr, dul yeign flor, wk mky  
ring; LMST (10%): mot gys  
splt, cryptoxln, sl hrd

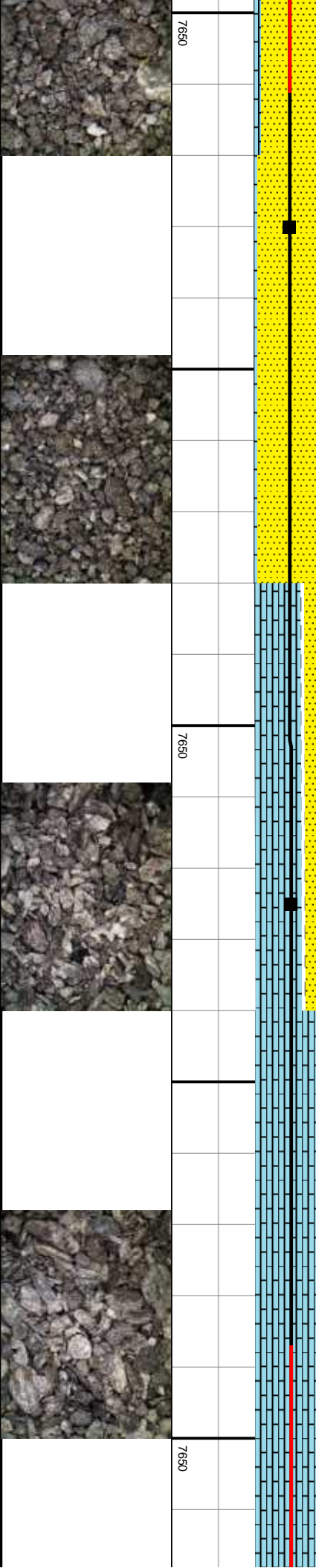




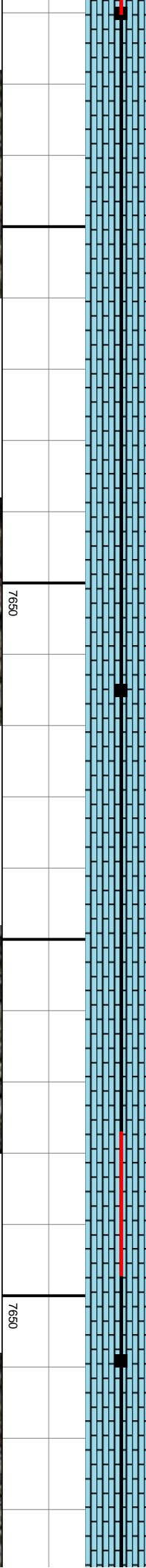
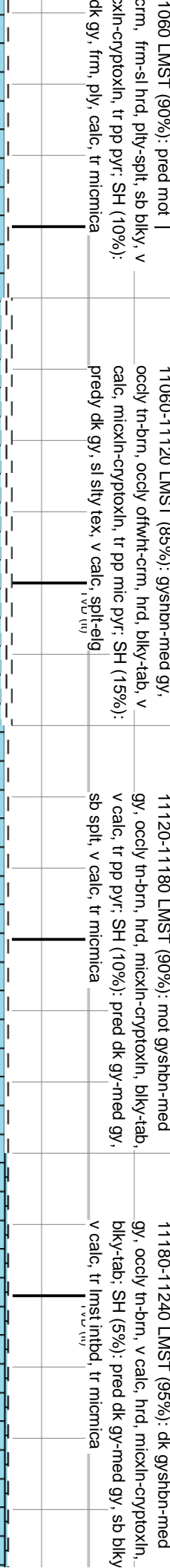
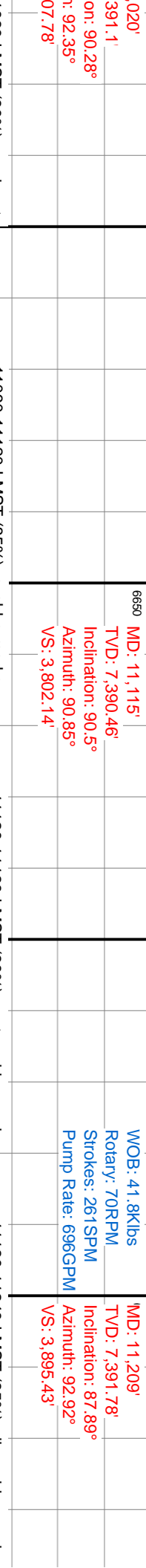
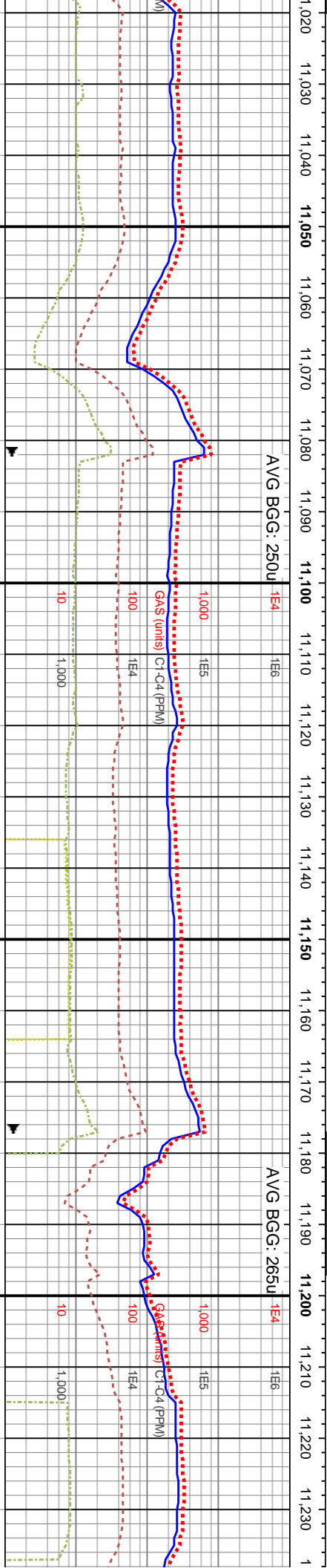
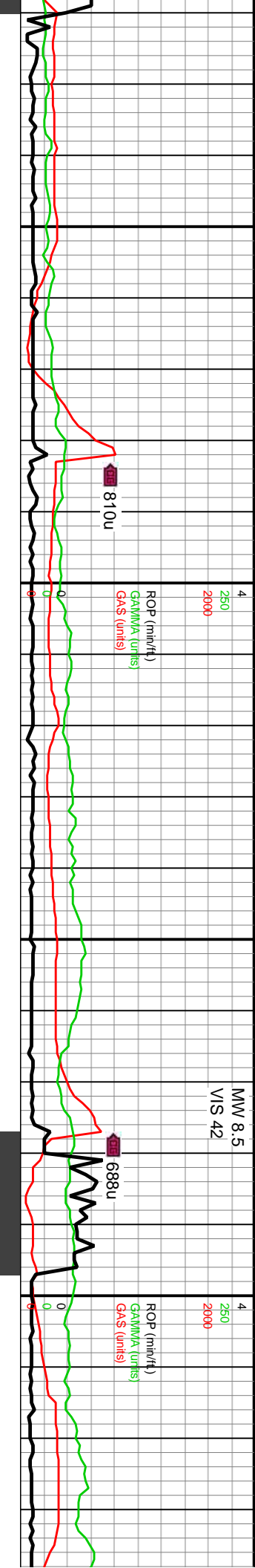


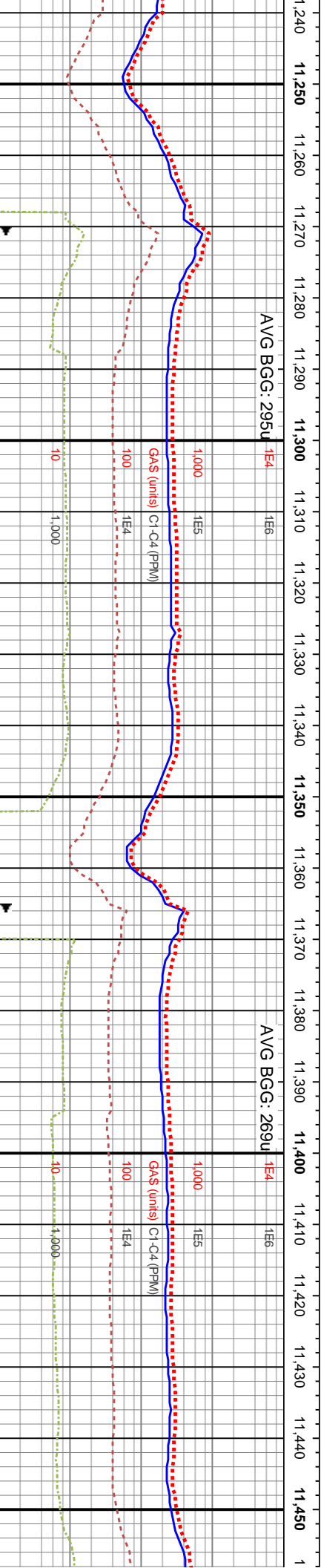
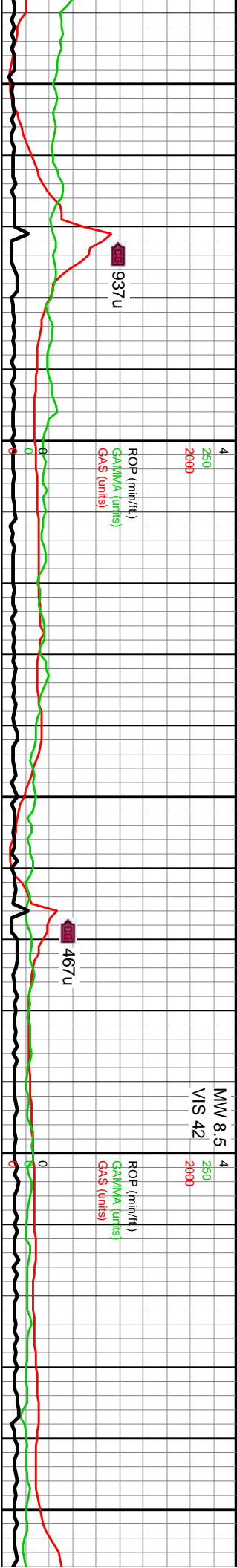
9kbs RPM 2260SPM ite: 694GPM	MD: 10,830' TVD: 7,394.95' Inclination: 91.6° Azimuth: 88.73° VS: 3,518.38'	6650	MD: 10,925' TVD: 7,392.48' Inclination: 91.38° Azimuth: 87.72° VS: 3,613.19'	6650	MD: 11 TVD: 7, Inclinati Azimuth VS: 3.7
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gyshbn-med gy, lt gy-sb rd, gr sup cls pyrc nod/pp mic cut, bishwh resd hbn-t brn, ply-sb	10820-10880 SS (95%): pred dk gyshbn-med gy, mod strd, vf-ur grs, ang-sb ang, sb rd, gr sup cls wi arg-silic cnt, sl calc, dul yeign fltor, no cut, bishwh resd ring; LMST(5%): mot gyshbn-lt gy, lt brn-tn, ply-sb tab, cryptoxln, sl hrd, tr pp mic pyr	10880-10940 LMST (65%): gyshbn-lt gy, sl hrd, ply-blky, tr pp mic pyr, micxln; SS (30%): med gy-lt gy, sb ang-sb rd, mod strd, vf-f grs, fri gr sup cls wi arg-silic cnt, mod yeign fltor, v wk mky cut, tr bishwh resd ring; SH (5%): dk gy-med gy, frm-sl hrd, sb spl, sl calc	10940-11000 LMST (85%): lt brn-tn, gy ip, spl-ply, pp mic pyr, microxln-cryptoxln, frm-sl hrd; SH (10%): dk gy, ply, frm, silty tex, calc; SS (5%): med gy-gyshbn, mod strd, sb ang-sb rd, vf-f grs, fri gr sup cls wi arg/silic cnt, sl calc	TVD (ft)
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MD: 11,304'  
TVD: 7,395.2'  
Inclination: 87.98°  
Azimuth: 93.62°  
VS: 3,989.37'

MD: 11,399'  
TVD: 7,398.11'  
Inclination: 88.51°  
Azimuth: 93.93°  
VS: 4,083.21'

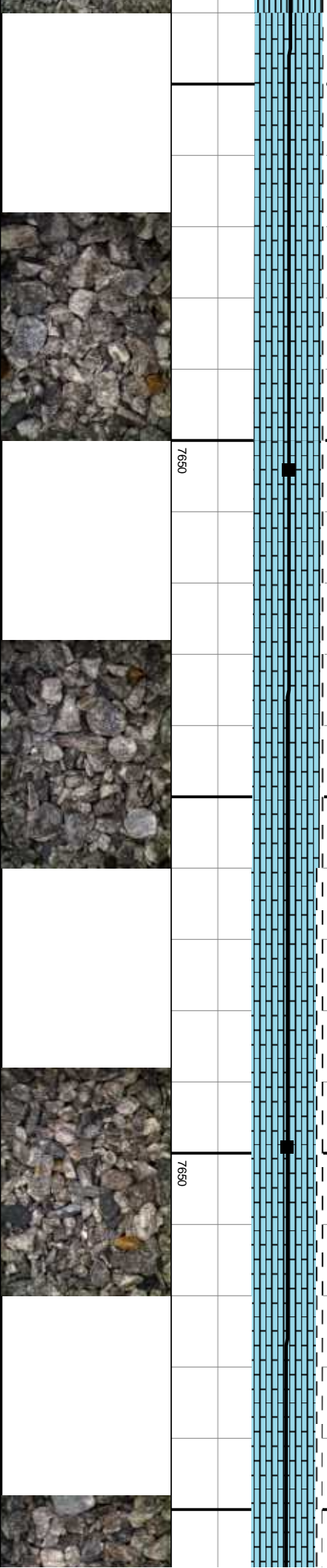
WOB: 43.1Klbs  
Rotary: 50RPM  
Strokes: 260SPM  
Pump Rate: 695GPM

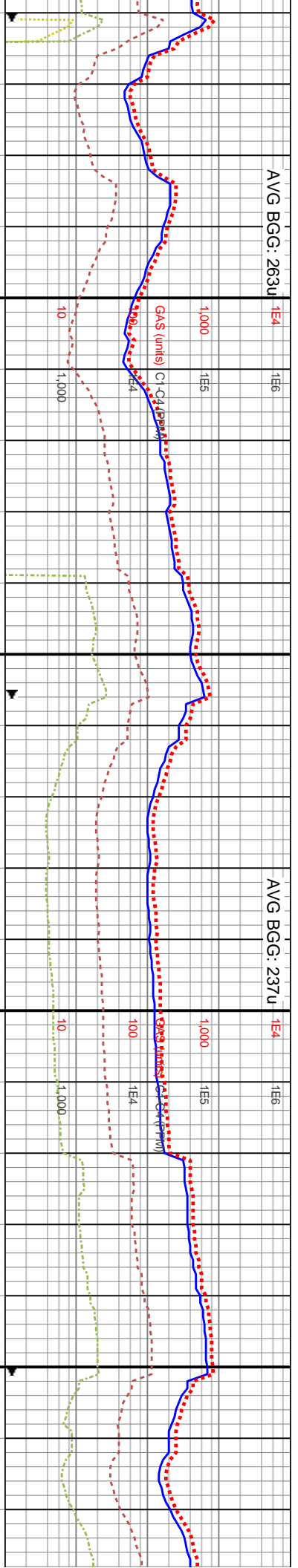
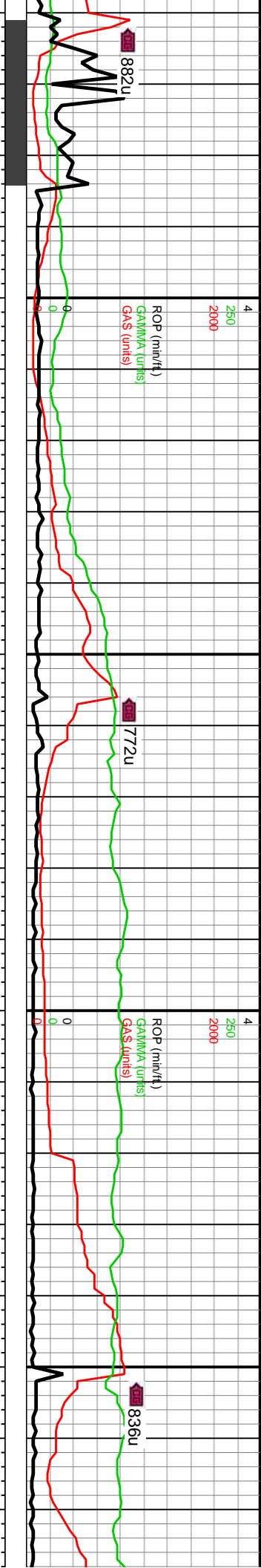
11240-11300 LMST (95%): gysbn-med gy, lt tn, ply-blky, cryptoxln-micxn, sl hrd; SH (5%): dk gy-med gy, frm-sl hrd, blky-sb splt, sl calc, tr micmica, tr mic pyr

11300-11360 LMST (95%): mot dk gysbn-med gy, occly tn-brn, hrd, blky-tab, v calc, micxn-cryptoxln, tr mic pyr; SH (5%): pred dk gy-med gy, sb blky, v calc, tr micmica, tr lnst intbd

11360-11420 LMST (90%): dk gysbn-med gy, occly tn-brn, hrd, tr pyr, micxn-cryptoxln, blky-tab; SH (10%): pred dk gy-med gy, sb blky, v calc, tr micmica

11420-11480 LMST (90%): gy, occly tn-brn, hrd, micxlr v calc, tr pp pyr; SH (10%): sb blky, v calc, tr micmica





MD: 11,494'  
TVD: 7,402.01'  
Inclination: 86.79°  
Azimuth: 88.73°  
VS: 4,177.51'

MD: 11,588'  
TVD: 7,407.6'  
Inclination: 86.39°  
Azimuth: 88.73°  
VS: 4,271.14'

MD: 11,660'  
TVD: 7,407.6'  
Inclination: 86.39°  
Azimuth: 88.73°  
VS: 4,271.14'

11480-11540 LMST (90%): gysbhn-it tn, lt gy, pily-biky, tr pp mic pyr, cryptoxln-micxn, sl hrd, mnr micmica; SH (10%): dk gy-med gy, frm-sl hrd, biky-sb spl, sl calc, inbdd ls

11540-11600 SS (85%): pred gysbhn-med gy, mod strd, vf-uf grs, ang-sb ang, sb rd, gr sup cls wi arg-silic cnt, sl calc; LMST(15%): mot gysbhn-it gy, lt brn-tn, pily-sb tab, cryptoxln, sl hrd, mnr pyrc nod/pp mic pyr

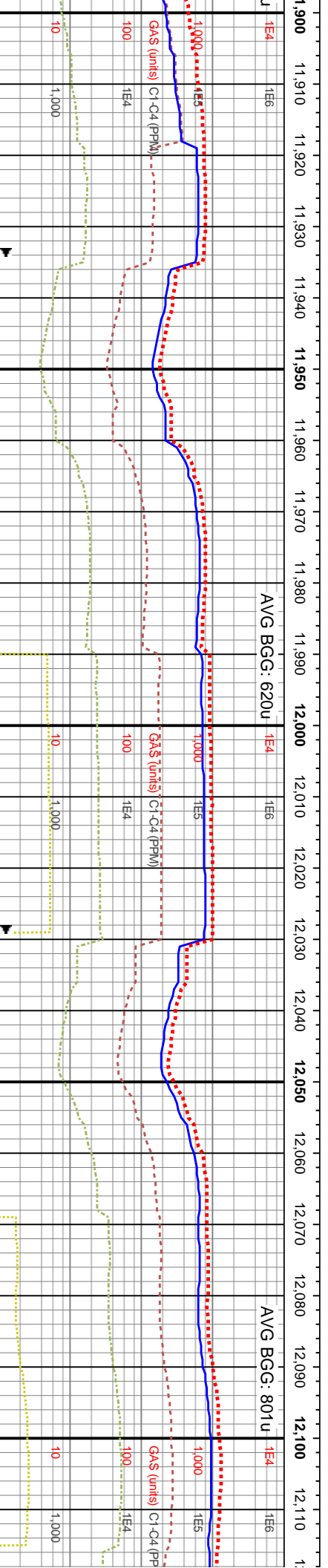
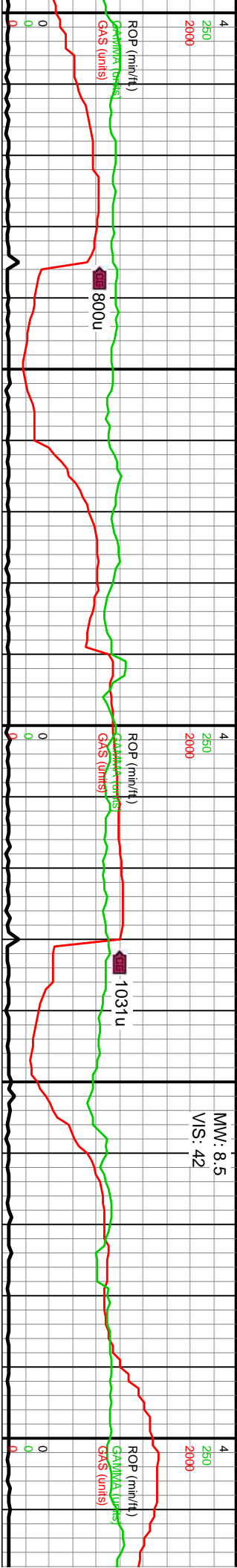
11600-11660 SS: pred med gy-gysbhn, lt gy, mod strd, vf-f grs, sb ang-sb rd, gr sup cls, cons wi arg-silic cnt, sl calc, sme lse grs, tr scat mic pyr, dul yelgn flor, mod mky cut, mod yelgn resd ring

11660-11670 SS: pred med gy-gysbhn, lt gy, mod strd, vf-f grs, sb ang-sb rd, gr sup cls, cons wi arg-silic cnt, sl calc, sme lse grs, tr scat mic pyr, dul yelgn flor, mod mky cut, mod yelgn resd ring



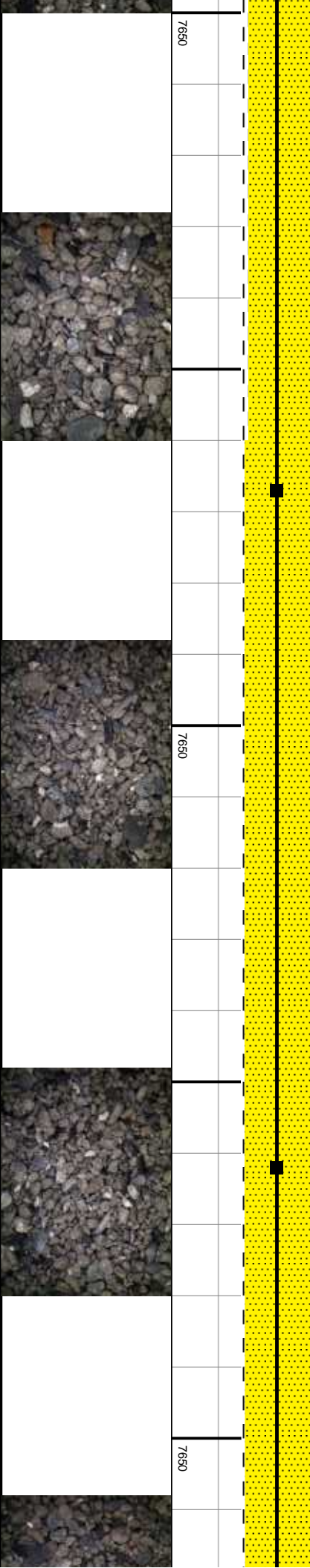




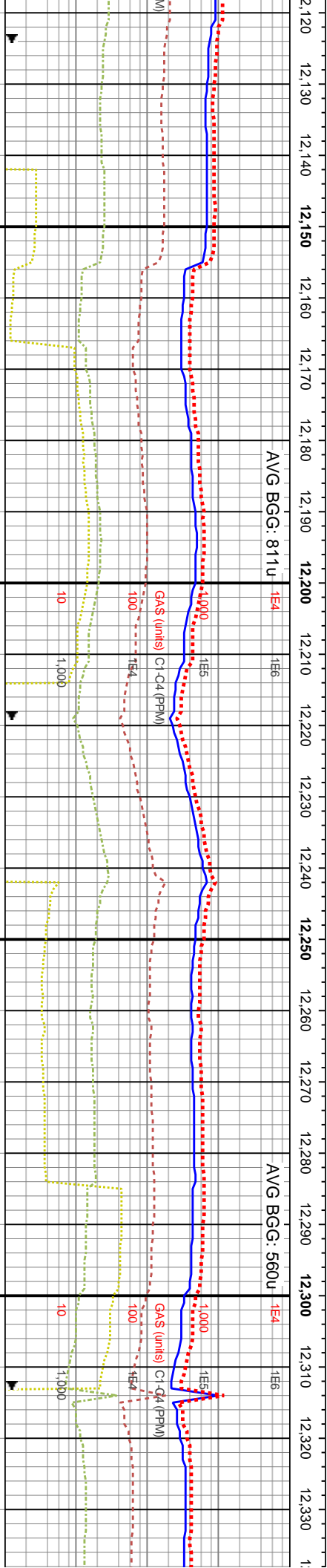
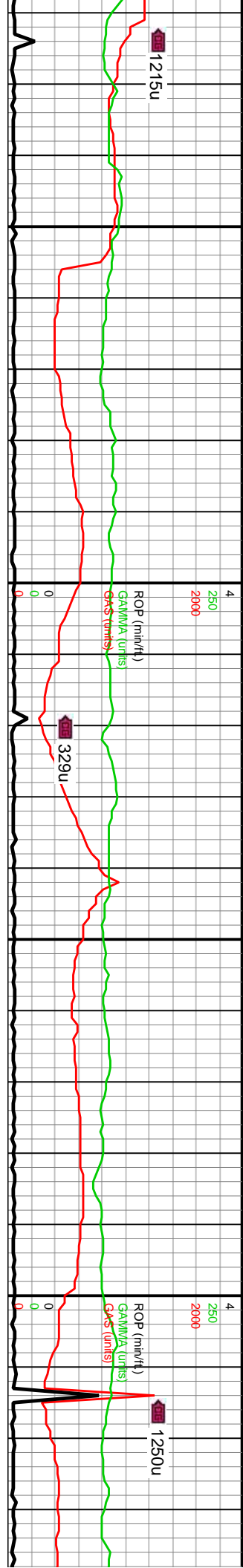


6650	MD: 11,967' TVD: 7,423.28' Inclination: 90.1° Azimuth: 91.33° VS: 4,648.38'	WOB: 42.2Klbs Rotary: 50RPM Strokes: 260SPM Pump Rate: 695GPM	6650
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11900-11960 S.S. predy med gy-gyshbn, lt gy, mod strd, vf-f grs, sb ang-sb rd, fri-si hrd, gr sup cls wi arg/silic cnt, sl calc lp, tr imbd mic pyr, tr yelgn flor, wk mky cut, wk bishwh resdl ring: scat non calc SH	11960-12020 S.S. predy med gy-gyshbn, vf-f grs, sb ang-sb rd, mod strd, frm-si fri, gr sup cls wi arg/silic cnt, pp/imbd mic pyr, dul yelgn flor, v wk mky cut, bishwh resdl ring: tr non calc SH	12020-12080 S.S. predy gyshbn-lt gy, mot med gy, vf-f grs, pred sb ang-sb rd, mod strd, gr sup cls wi arg/silic cnt, pred non-si calc, tr pyr, dul-mod yelgn flor, wk mky cut, bishwh resdl ring: tr SH	12080-12140 S.S. predy gy brn, vf-f grs, sb ang-sb rd, cls wi arg/silic cnt, sl calc, dul-mod yelgn flor, v wk mky cut, bishwh resdl ring: tr non calc SH
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MD: 12,157'  
TVD: 7,422.14'  
Inclination: 90.72°  
Azimuth: 90.23°  
VS: 4,837.62'

WOB: 45Klbs<sup>30</sup>  
Rotary: 60RPM  
Strokes: 260SPM  
Pump Rate: 693GPM

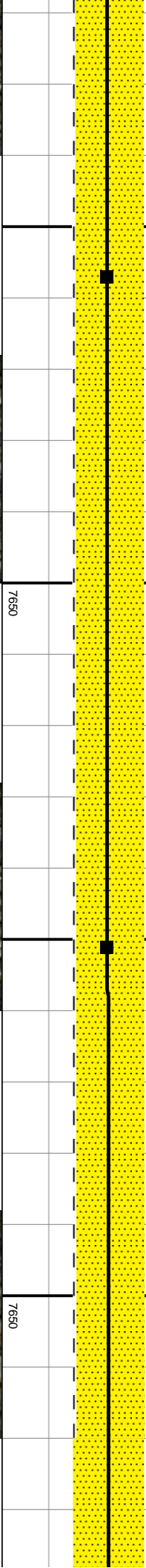
MD: 12,251'  
TVD: 7,420.88'  
Inclination: 90.81°  
Azimuth: 90.32°  
VS: 4,931.21'

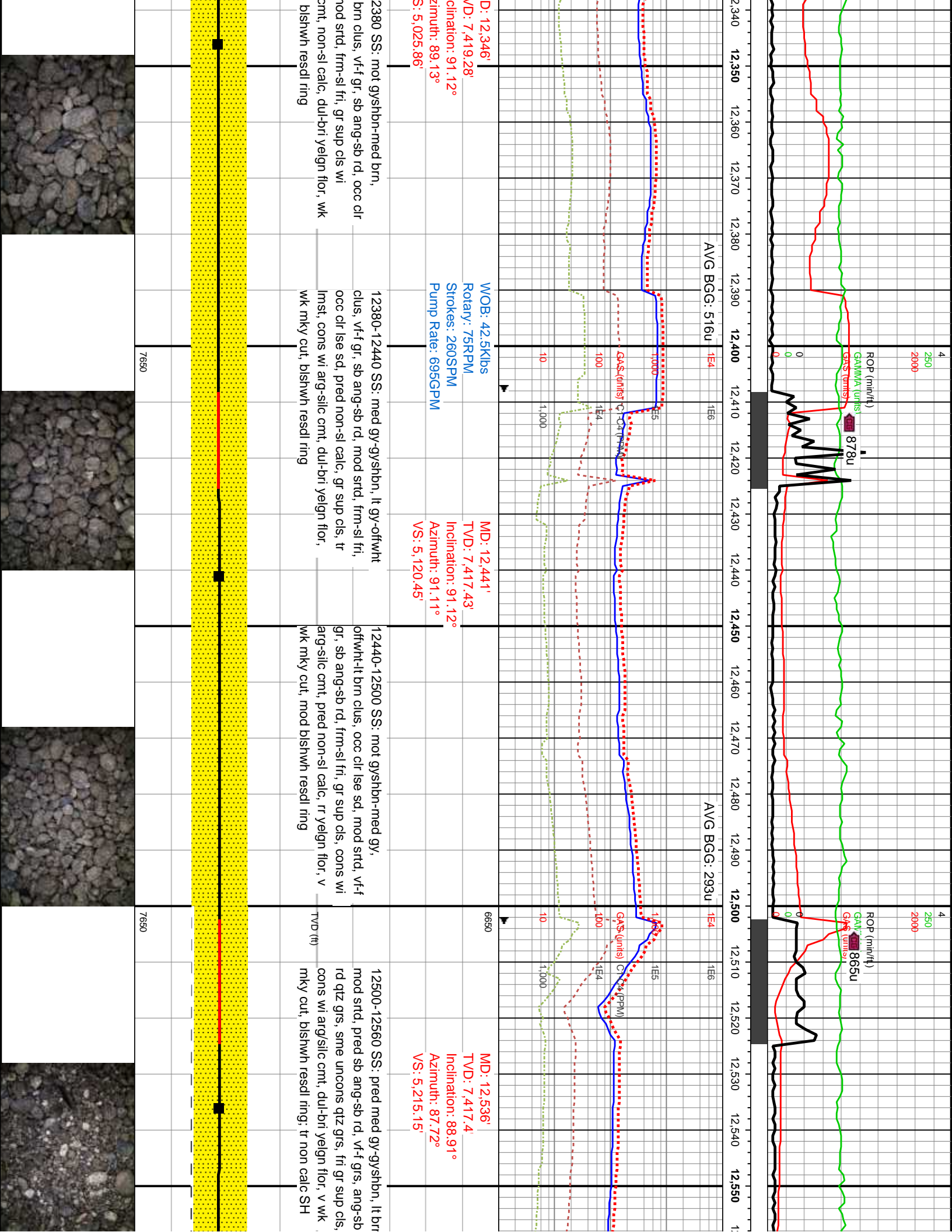
12140-12200 SS: predy med gysbhn, med gy-sl dk gy, vf-f grs, sb ang-sb rd, mod strd, gr sup cts wi arg/silic cnt, non-sl calc, tr mic pyr, dul yeign flor, wk mky cut, bishwh resdl ring, tr non calc SH

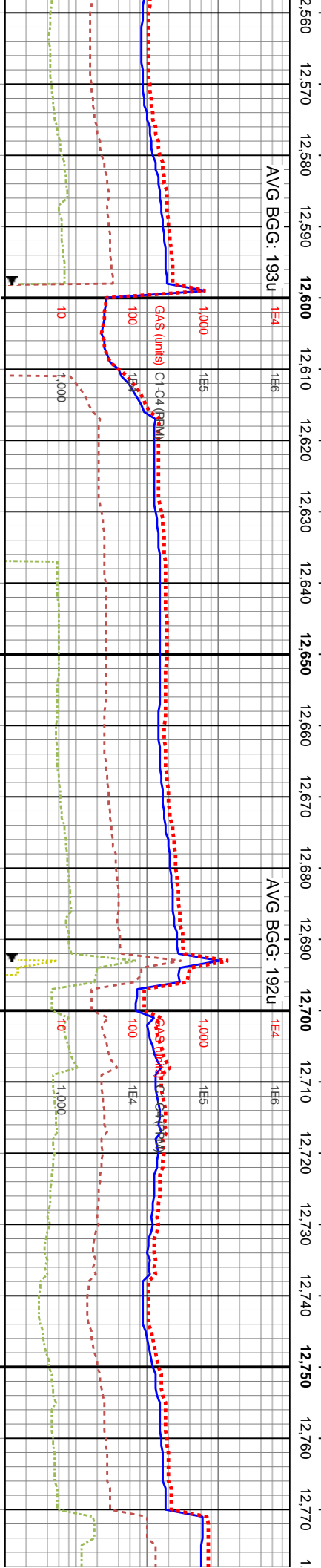
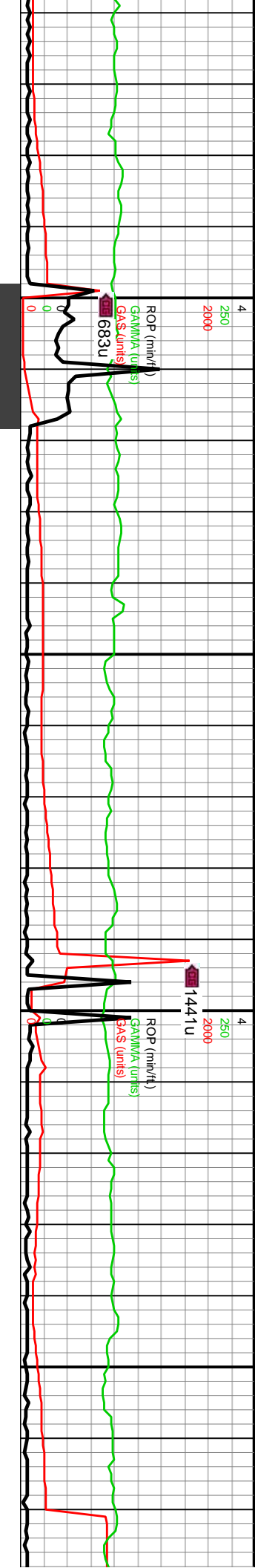
12200-12260 SS: predy med gysbhn-medgy, vf-f grs, sb ang-sb rd, mod strd, gr sup cts wi arg/silic cnt, non-sl calc, tr scat mic pyr, dul yeign flor, wk mky cut, bishwh resdl ring, tr non calc SH

12260-12320 SS: predy gysbhn, med gy-lt brn, mod strd, frm-sl fri, sb ang-sb rd, vf-f grs, pred gr sup cts wi arg/silic cnt, tr uncons, non-sl calc, dul-bri yeign flor, wk mky cut, bishwh resdl ring, tr non calc SH<sup>iv</sup>

12320-12330 offwhlt-lt lse sd, n arg-silic mky cut,







WOB: 47.8kbs  
Rotary: 0RPM  
Strokes: 260SPM  
Pump Rate: 695GPM

MD: 12,631'  
TVD: 7,419.8'  
Inclination: 88.2°  
Azimuth: 88.91°  
VS: 5,309.95'

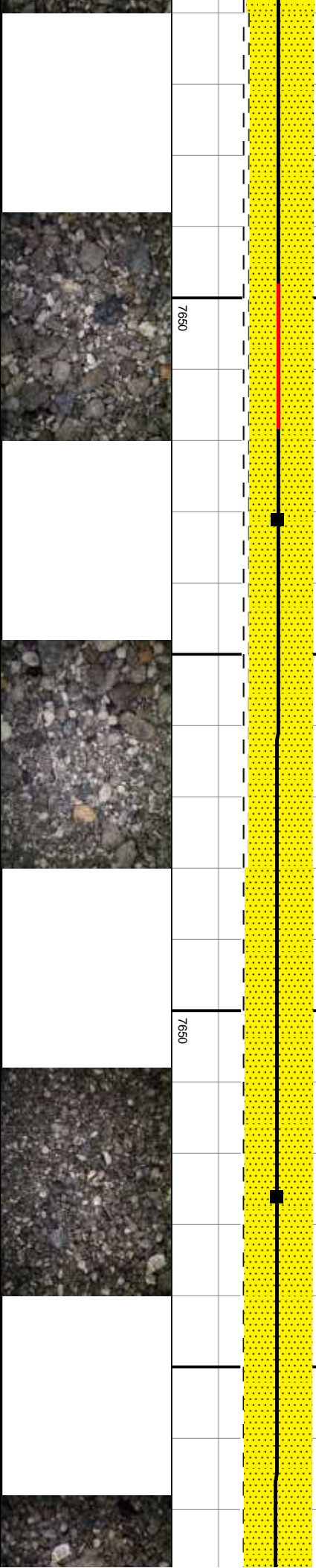
MD: 12,726'  
TVD: 7,422.78'  
Inclination: 88.2°  
Azimuth: 90.54°  
VS: 5,404.57'

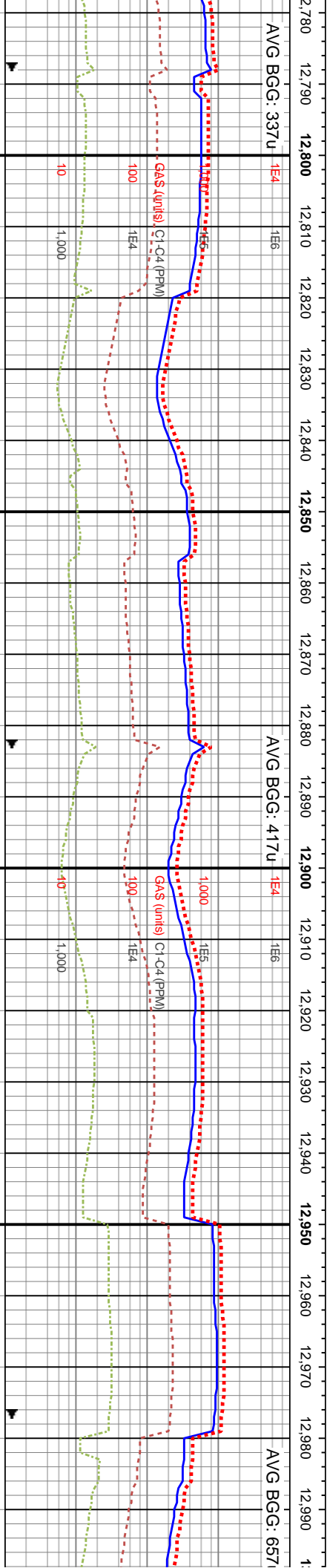
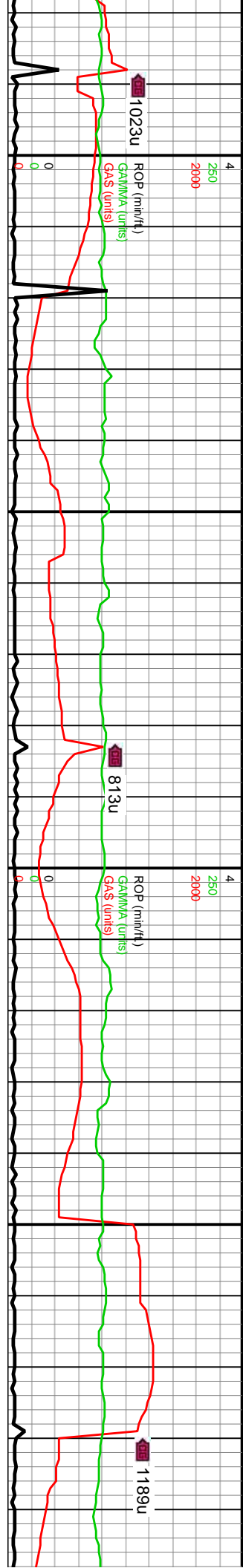
12560-12620 SS: predy med gy-gyshbn, occy  
lt brn, mod strd, pred sb ang-sb rd, vf-uf grs,  
ang-sb rd qtz grs, tr unconcs qtz grs, predy fri  
gr sup cls, cons wi arg/silic cnt, dul yelgn flr,  
v wk mky cut, fnt blshwh resdl ring; scat non  
calc SH

12620-12680 SS: mot gysbhn-med brn,  
offwht-lt brn, vf-f gr, sb ang-sb rd, gr sup cls  
cons wi arg-silic cnt, pred non-sl calc, dul  
yelgn flr, v wk mky cut, blshwh resdl ring;  
scat non calc SH

12680-12740 SS: pred gysbhn, med gy-dk  
gysbhn, mod strd, sb ang-sb rd, vf-f gr, fri gr  
sup cls wi arg/silic cnt, non-sl calc, dul-mod  
yelgn flr, wk mky cut, blshwh resdl ring; tr  
non calc SH

12740-12800 SS: predy gy  
brn, mod strd, frm-sl fri, sb  
pred gr sup cls wi arg/silic c  
non-sl calc, dul-bri yelgn flr  
blshwh resdl ring, tr non ce






WOB: 33.8Klbs <sup>30</sup>	
Rotary: 61RPM	
Strokes: 260SPM	
MD: 12,821'	
Pump Rate: 693GPM	
TV D: 7,425.36'	
Inclination: 88.69°	
Azimuth: 88.64°	
VS: 5,499.22'	

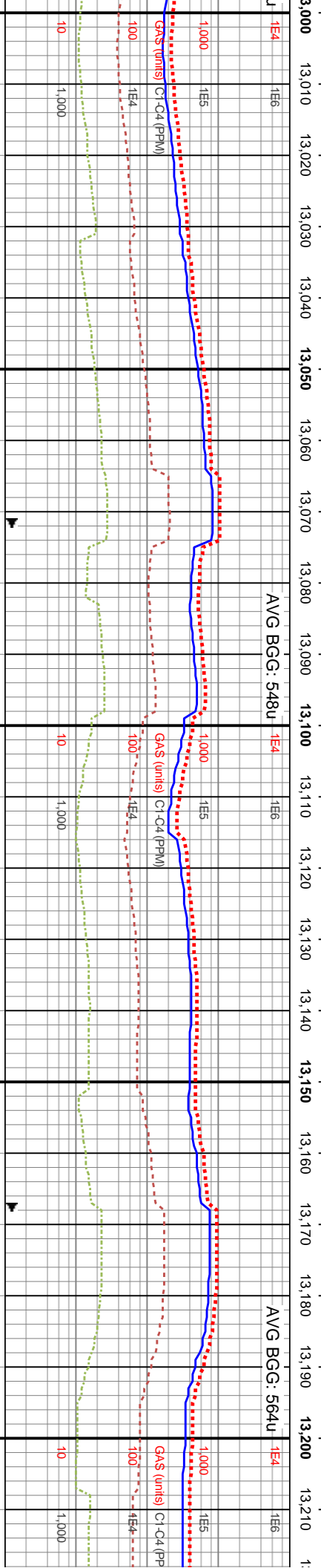
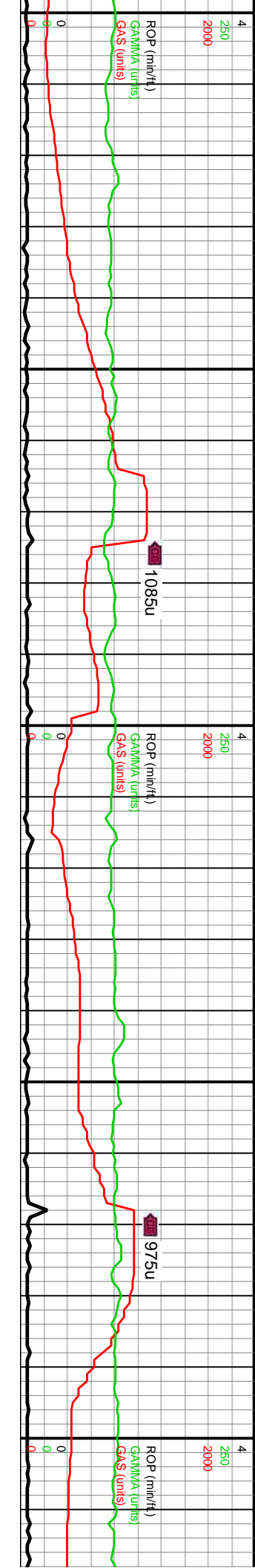
12800-12860 SS: mot gysbhn-med gy, sl dk brn, sme cil-op lse grs, mod srtcd, vf-f grs, sb ang-sb rd, gr sup cls wi arg/silic cmt, pred sl calc, tr micpyr, dul yelgn flor, wk mky cut, bishwh resdl ring	12860-12920 SS: pred gysbhn, med gy-brn, pred sb ang-sb rd, vf-f grs, mod srtcd, fri gr sup cls wi arg/silic cmt, sl calc, tr imbd/scat mic pyr, dul yelgn flor, wk mky cut, mod bishwh resdl ring
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6650	
MD: 12,915'	
TV D: 7,426.53'	
Inclination: 89.88°	
Azimuth: 89.13°	
VS: 5,592.99'	

12920-12980 SS (95%): predy gysbhn-med gy, med brn, mntr offwht, vf-f grs, com lse uf-l c sb ang qtz, mod srtcd, sb ang-sb rd, gr sup cls wi arg/silic cmt, sme sl calc, dul-mod yelgn flor, wk mky cut, bishwh resdl ring	12980-12990 SS (95%): predy gysbhn-med gy, med brn, mntr offwht, vf-f grs, com lse uf-l c sb ang qtz, mod srtcd, sb ang-sb rd, gr sup cls wi arg/silic cmt, sme sl calc, dul-mod yelgn flor, wk mky cut, bishwh resdl ring
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MD: 13,010'  
TVD: 7,426.62'  
Inclination: 90.01°  
Azimuth: 91.02°  
VS: 5,687.61'

MD: 13,106'  
TVD: 7,426.45'  
Inclination: 90.19°  
Azimuth: 88.64°  
VS: 5,783.26'

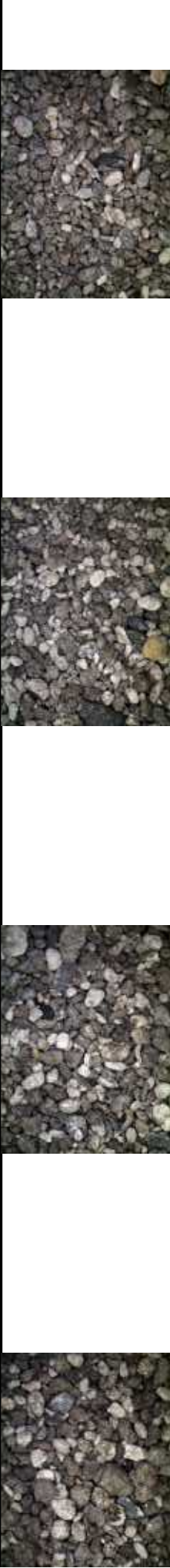
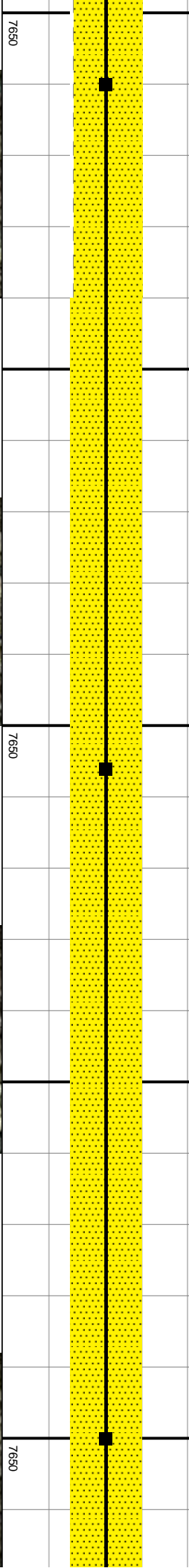
MD: 13,200'<sup>50</sup>  
TVD: 7,426.47'  
Inclination: 89.79°  
Azimuth: 89.13°  
VS: 5,877.04'

13040 SS: pred gysbhn-med gy, gys thru, sb ang-sb rd, mod srted, vf-uf sl frm, gr sup cls wi arg-silic cmt, tr pp sl calc lp, dul-mod yeign flor, wk mky bishwh resdl ring; tr non calc SH

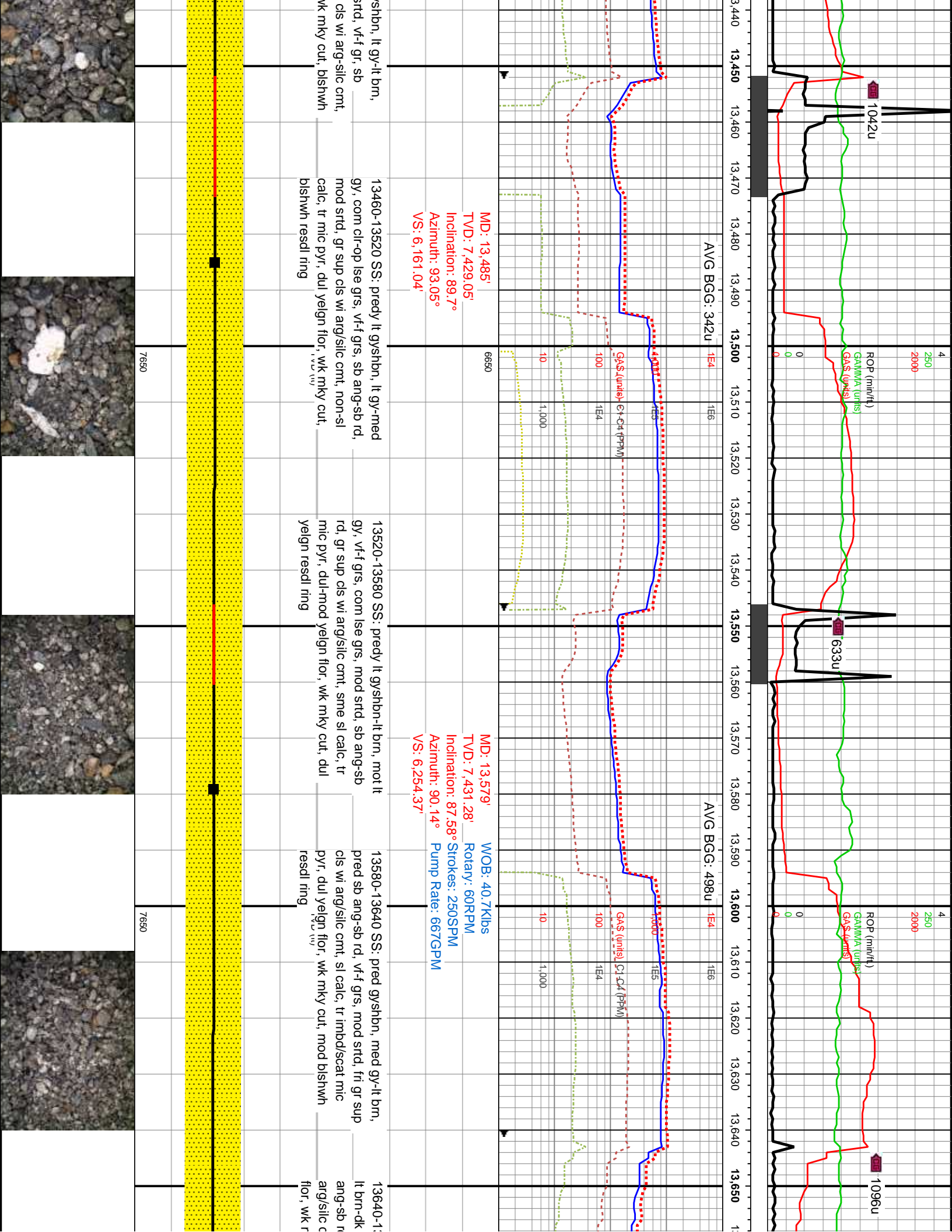
13040-13100 SS: mot gysbhn-med gy, offwnt-lt brn clus, occ clt lse sd, mod srted, vf-f gr, sb ang-sb rd, frm-sl frt, gr sup cls, cons wi arg-silic cmt, pred non-sl calc, tr yeign flor, v wk mky cut, mod bishwh resdl ring

13100-13160 SS: predy gysbhn-lt gy, mot med gy, frm-v frm, gr sup cls wi arg/silic cmt, mod srt, sb ang-sb rnd grms, vf-f gr, occ lse sd grms, tr pyrc nod, dul yeign flor, wk mky cut, bishwh resdl ring

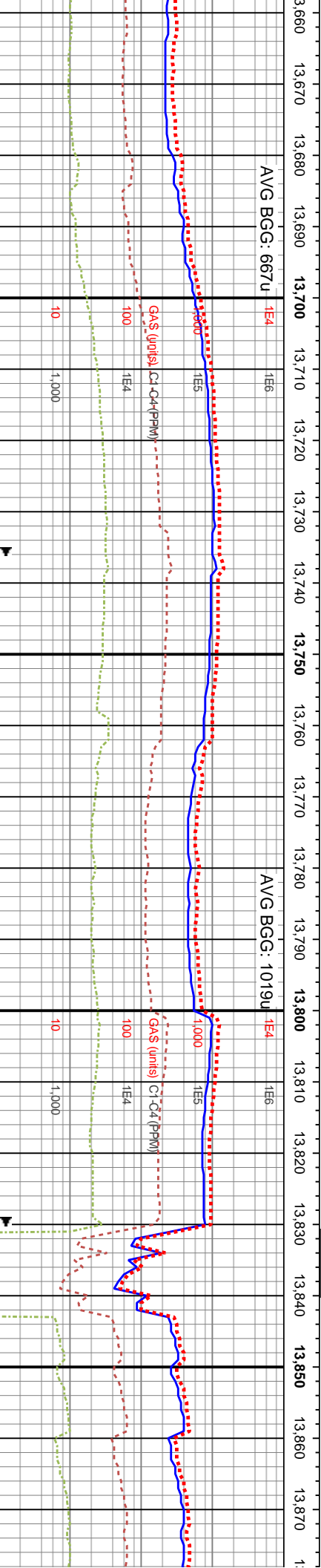
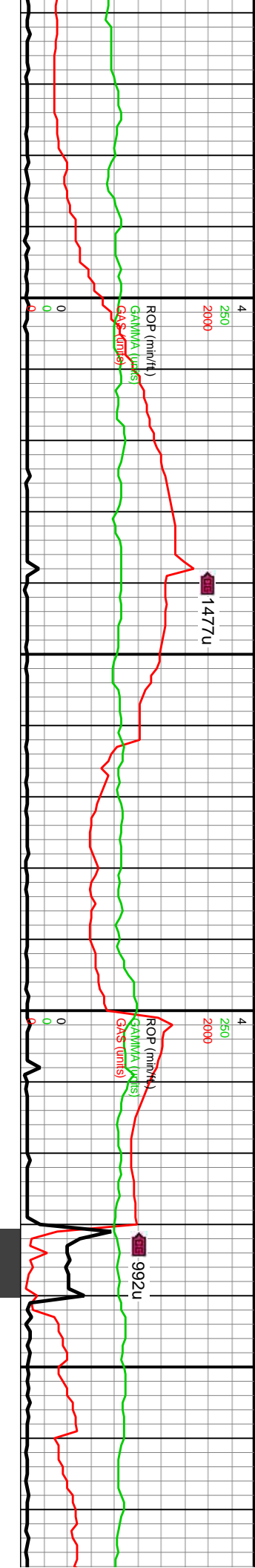
13160-13220 SS: predy gysbhn, med gy-lt brn, mod srted, frm-sl frt, sb ang-sb rd, vf-f gys pred gr sup cls wi arg/silic cmt, tr uncons, non-sl calc, duyelgn flor, wk mky cut, bishwh resdl ring





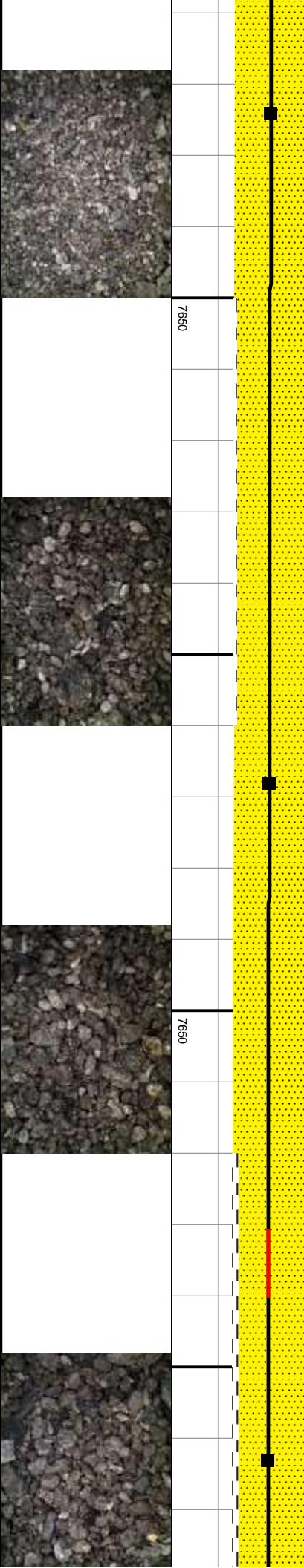




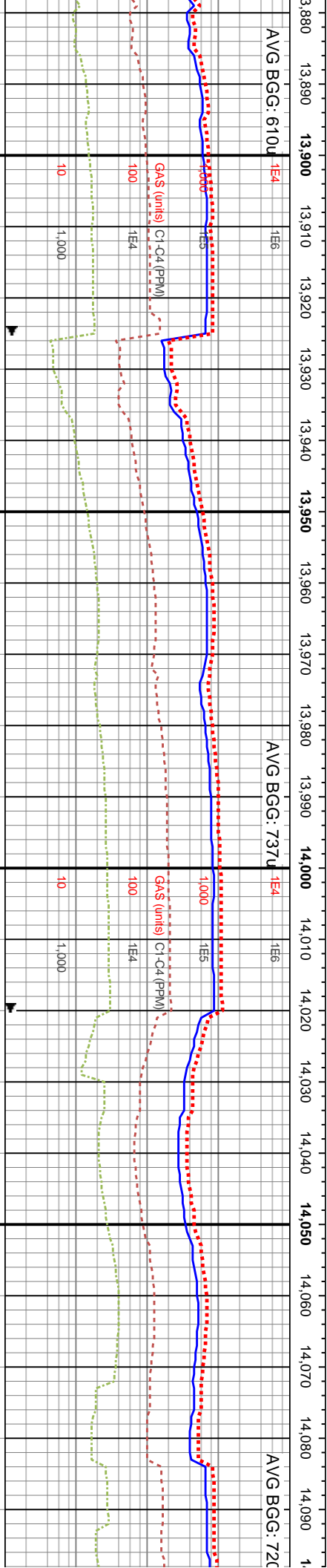
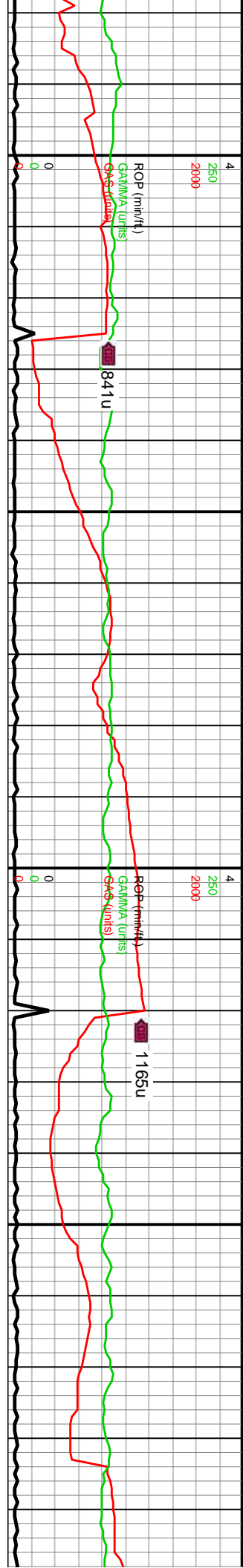


MD: 13,674' TVD: 7,435.18' Inclination: 87.72° Azimuth: 90.45° VS: 6,348.88'	6650	MD: 13,768' TVD: 7,438.85' Inclination: 87.8° Azimuth: 91.82° VS: 6,442.26'	13700-13760 SS(90%): predy dk gysbhn-dk gy, med brn, op grs thru, vf-f gr, mod strd, sb ang-sb rd, fri gr sup cls wi arg-silic cnt, sl calc ip, dul yelgn flor, wk mky cut, bishwh resdl ring; SH (5%): v dk gy, sl silty tex, tr micmica, splt-pty	13760-13820 SS: predy dk gysbhn-med gy, sme dk brn, tmsl grs thru, mod strd, pred sb ang-sb rd, vf-f gr, sb ang-sb rnd qtz grs, fri gr sup cls wi arg/silic cnt, dul yelgn flor, wk mky cut, bishwh resdl ring	13820-13880 SS (90%): mot gysbhn-med gy, med gy-it brn, mod w strd, vf-f gr, sb ang-sb rd, gr sup cls wi arg-silic cnt, sl calc, dul yelgn flor, wk mky cut, bishwh resdl ring; SH (10%) predy v dk gy, frm, sb blk, silty, non calc
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13700 SS: predy gysbhn-med gy, mot gy, com cl-op lse grs, vf-f grs, sb d, mod strd, gr sup cls, cons wi mky cut, bishwh resdl ring	13700-13760 SS(90%): predy dk gysbhn-dk gy, med brn, op grs thru, vf-f gr, mod strd, sb ang-sb rd, fri gr sup cls wi arg-silic cnt, sl calc ip, dul yelgn flor, wk mky cut, bishwh resdl ring; SH (5%): v dk gy, sl silty tex, tr micmica, splt-pty	13760-13820 SS: predy dk gysbhn-med gy, sme dk brn, tmsl grs thru, mod strd, pred sb ang-sb rd, vf-f gr, sb ang-sb rnd qtz grs, fri gr sup cls wi arg/silic cnt, dul yelgn flor, wk mky cut, bishwh resdl ring	13820-13880 SS (90%): mot gysbhn-med gy, med gy-it brn, mod w strd, vf-f gr, sb ang-sb rd, gr sup cls wi arg-silic cnt, sl calc, dul yelgn flor, wk mky cut, bishwh resdl ring; SH (10%) predy v dk gy, frm, sb blk, silty, non calc
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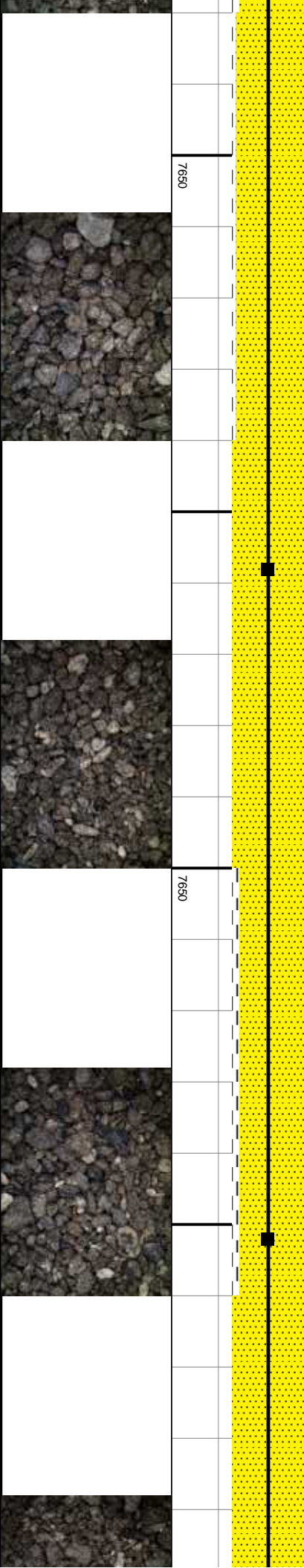


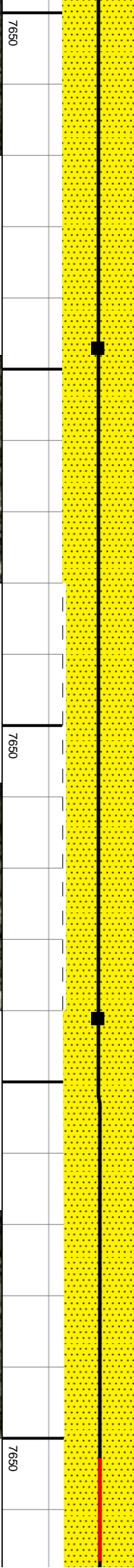
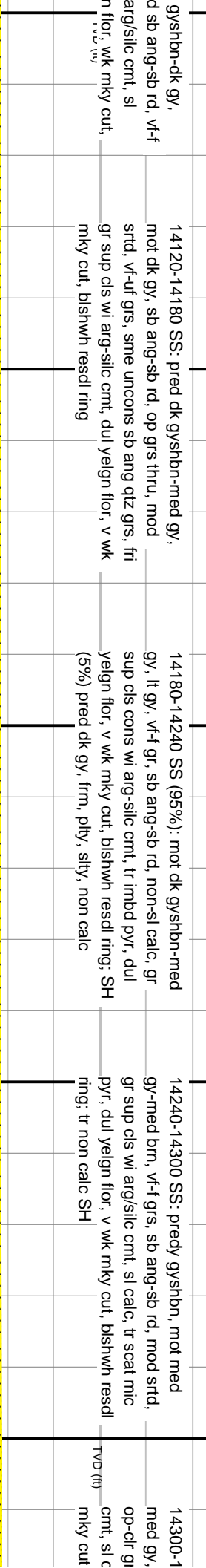
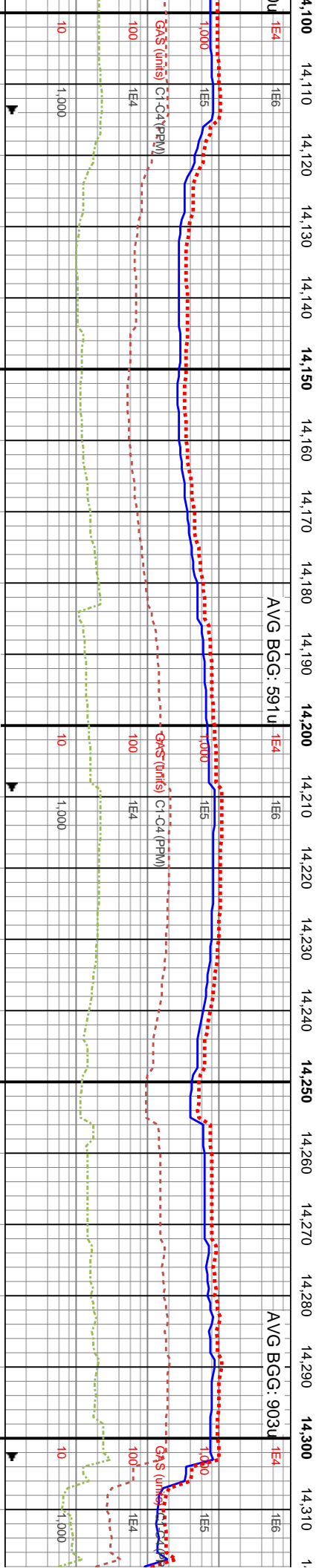
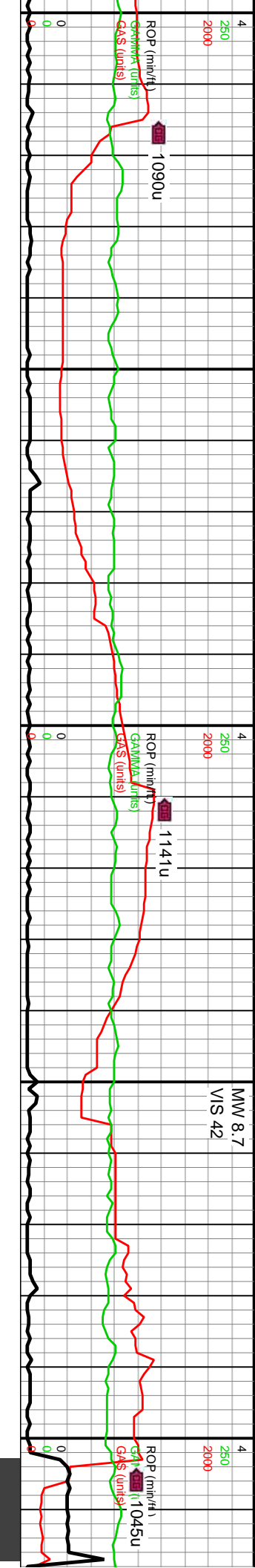


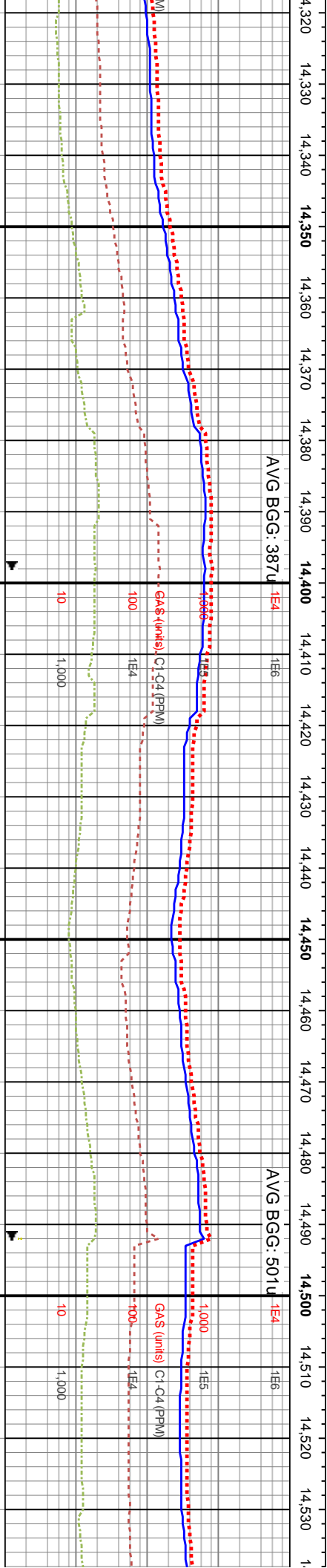
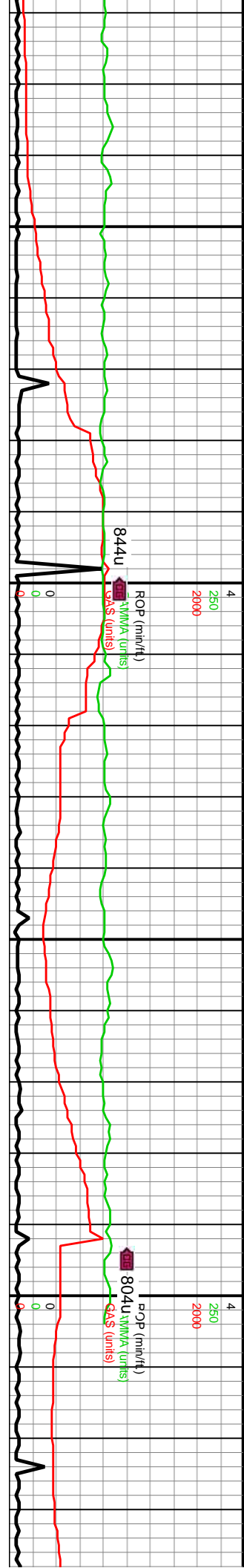


6650	MD: 13,958'		WOB: 41.4Klbs	
	TVD: 7,441.38'		Rotary: 60RPM	
	Inclination: 90.19°		Strokes: 250SPM	
	Azimuth: 90.54°		Pump Rate: 667GPM	
	VS: 6,631.32'			

13880-13940 SS: predy gysbhn-med gy, mot dk gy, com clr-op lse grs, vf-f grs, sb ang-sb rd, mod srt'd, gr sup cts wi arg/silic cnt, pred non-sl calc, tr pyr, dul yelgn flor, wk mky cut, bishwh resdl ring; tr SH	13940-14000 SS: predy dk gysbhn-med gy, sme dk brn, vf-f gr, sb ang-sb rd, mod srt'd, clr grs thru, free sb ang qtz grs, fri gr sup cts wi arg/silic cnt, tr mic pyr, dul yelgn flor, v wk mky cut, bishwh resdl ring	14000-14060 SS: pred dk gysbhn-dk gy, frm-v frm, gr sup cts cons wi arg/silic cnt, mod srt, sb ang-ang grns, vf-f gr, sb ang-ang, p-mod srt, dul yelgn flor, wk mky cut, bishwh resdl ring; SH (10%): dk gy, sl slty tex, sl hrd, sl calc	14060-14120 SS: predy dk gysbhn-med gy, sme med gy, mod srt'd, pre grs, fri-sl frm, gr sup cts wi arg/silic cnt, tr pp mic pyr, dul yelgn flor, wk mky cut, bishwh resdl ring
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MD: 14,336'  
TVD: 7,438.95'  
Inclination: 89.4°  
Azimuth: 88.51°  
VS: 7,007.56'

WOB: 20Klbs<sup>30</sup>  
Rotary: 70RPM  
Strokes: 250SPM  
Pump Rate: 667GPM

MD: 14,431'  
TVD: 7,440.02'  
Inclination: 89.31°  
Azimuth: 88.34°  
VS: 7,102.38'

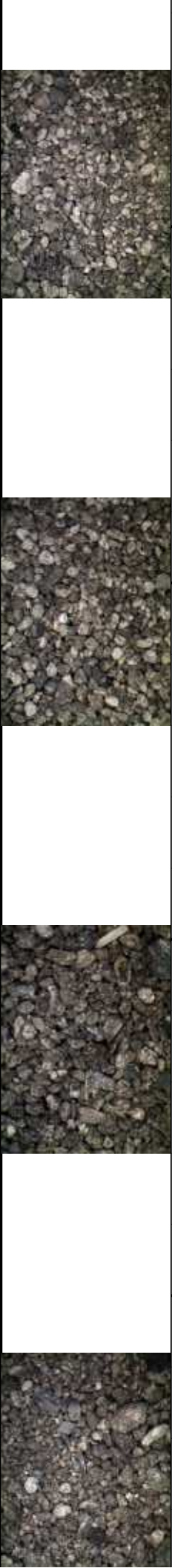
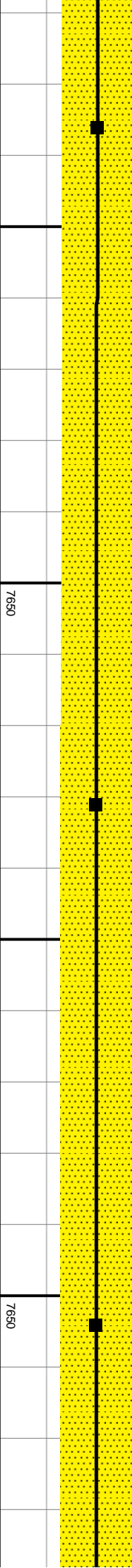
MD: 14,504'  
TVD: 7,441.21'  
Inclination: 88.82°  
Azimuth: 89.61°  
VS: 7,175.19'

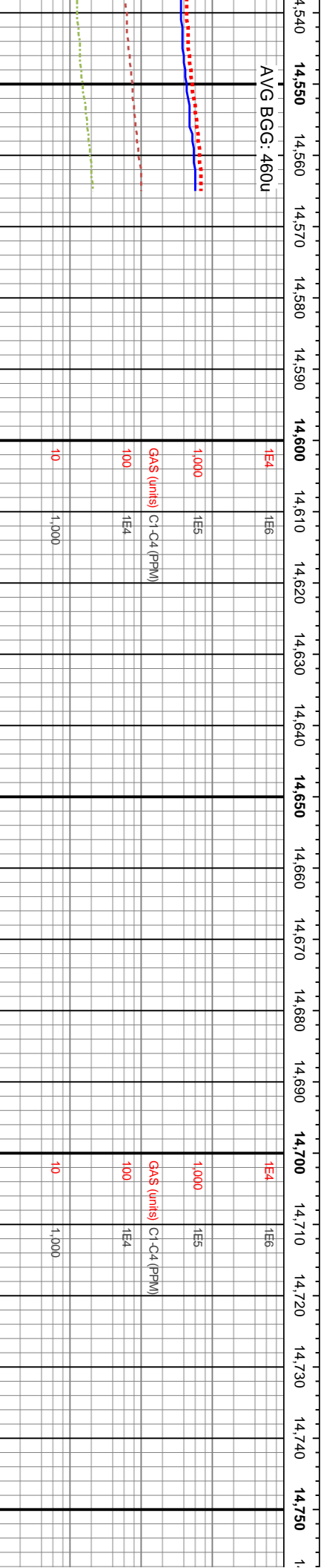
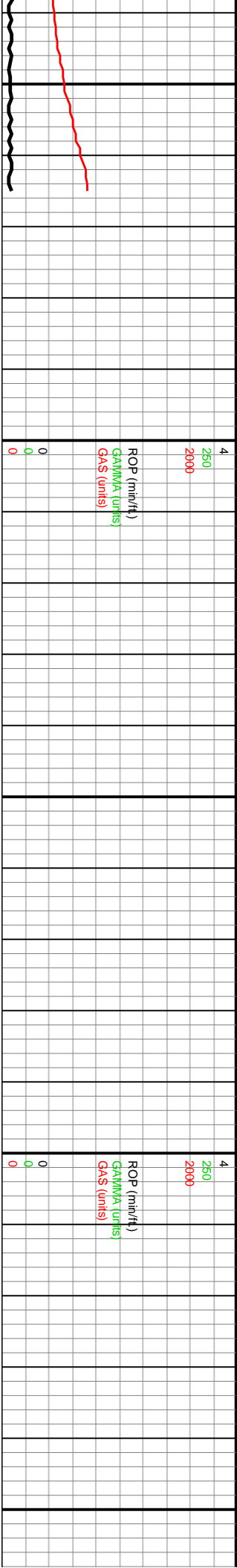
14360 SS: predy gysbhn-It brn, mot  
v-f grs, sb ang-sb rd, mod w strd,  
s, mod w cmt'd, gr sup cls w arg-silic  
a/c, tr pp/pyrc nod, du yelgn flr, wk  
blshwh resdl ring

14360-14420 SS: predy gysbhn, lt gy-med gy,  
offwht, mod strd, v-f-uf grs, sb ang-sb rd, fri gr  
sup cls w arg/silic cmt, tr pp mic pyr, sl calc ip,  
du yelgn flr, v wk mky cut, blshwh resdl ring:  
tr non calc SH

14420-14480 SS: pred dk gysbhn-med gy,  
mot gysbhn, sme tmsl grs thru, sb ang-sb rd,  
mod strd, v-f-uf grs, fri gr sup cls, cons w  
arg-silic cmt, sl calc ip, tr mic pyr, du yelgn  
flr, v wk mky cut, blshwh resdl ring

14480-14540 SS: predy gysbhn, dk  
gysbhn-med gy, op grs thru, v-f grs, mod strd  
sb ang-sb rd, fri gr sup cls w arg/silic cmt, tr  
pp mic pyr, sl calc ip, du yelgn flr, wk mky  
cut, blshwh resdl ring





MD: 14,565'  
TVD: 7,442.47'  
Inclination: 88.82°  
Azimuth: 89.61°  
VS: 7,235.98'  
\*\* Projection to Bit \*\*  
Note: TD Well @ 06:15 on 12/29/2015  
14565' MD (7441.63' TVD)

14,560		14,570	14,580	14,590	14,600	14,610	14,620	14,630	14,640	14,650	14,660	14,670	14,680	14,690	14,700	14,710	14,720	14,730	14,740	14,750
1E4		1E6																		
1,000		1E5																		
GAS (units)		C1-C4 (PPM)																		
100		1E4																		
10		1,000																		
6650		6650																		
TVD (ft)		TVD (ft)																		
7650		7650																		





