

Scale: 5" / 100'
Measured Depth Log

Drilling Completed 7/10/2013

| | |
|----------------|----------------------------------|
| Name | CHRIS SCAHE |
| Company | COLUMBINE LA |
| Address | 2385 S Lipan S Denver, CO 802 |

Operator

IC
Suite 2200
202

Geologist

L, MARK COLE
OGGING, INC

223

Rock Types

CHERT

CLAY CHOKE SAND

CLAYSTONE

CONGLOMERATE

DOLOMITE

GRANITE

GYPSUM

IGNEOUS

SIDERITE or LIMONITE

LIMESTONE

METAMORPHIC

NO SAMPLE

SALT

SANDSTONE

SALT-PEPPER SAND

SHALE

SHALE COLORED

SHALE GRAY

SHALY SANDSTONE

SILTSTONE

TILL

TUFF

WELDED TUFF

Accessories

Fossils

- F FOSSIL
- GASTROPOD
- ALGAE
- AMPHIPORA
- BELEMNITE
- BIOCLASTIC
- BRACHIOPOD
- BRYOZOA
- CEPHALOPOD
- CORAL
- CRINOID
- ECHINOID
- FISH
- FORAMINIFERA

Minerals

- ARGILLACEOUS
- ARGILLITE GRAIN
- B BENTONITE
- BITUMENOUS SUBSTANCE
- BRECCIA FRAGMENTS
- CALCAREOUS
- CARBONACEOUS FLAKES
- CHITDK
- CHTLT
- COAL - THIN BEDS
- DOLOMITIC
- FELDSPAR
- FERRUGINOUS PELLET
- FERRUGINOUS

Stringer

- TUFFACEOUS
- GLAUCONITE
- GYPSIFEROUS
- HEAVY MINERAL
- INOCERAMUS
- KAOLIN
- MARLSTONE
- MINERAL CRYSTALS
- NODULES
- PHOSPHATE PELLETS
- PYRITE
- SALT CAST
- SANDY
- SILICEOUS
- SILTY
- SHALE STRINGER
- SILTSTONE STRINGER

Other Symbols

Oil Show

- O ORGANIC
- P PINPOINT
- V VUGGY
- DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

Engineering

- BIT
- CONNECTION (DOWN)
- CONNECTION (UP)
- CONNECTION (LEFT)
- CONNECTION (RIGHT)
- CONNECTION GAS
- CORE - LOST
- CORE - RECOVERED
- DST INTERVAL
- MOLDIC

Textures

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

Rounding

- WIRELINE TESTED - RT
- L LITHOGRAPHIC
- MX MICROXLN
- ANGULAR
- SUBANG
- SUBRND

Sorting

- M MUDSTONE
- PS PACKSTONE
- W WACKSTONE
- MODERATE
- POOR
- WELL

connection (up)

Slide/Rotate

ROP

ROP (min/h)

Curves

GAMMA

Total Gas & Chromatograph

GAS

C1

C2

C3

C4

Depth Labels

% Lith

Well Bore

TV D

Oil Show

Images

07/07/2013, Mud Wt: 9.20, FV/s: 32
PV/s: 9, YP: 7, GELS: 3/6/13, API Fil: 12.0
CAKE: 1/0, pH: 9.5, Cl: 1.800, Ca: 160

Slide

MUD V
VIS: 3

171

99

84

1075u

2130u

1734u
C1: 72.8%
C2: 14.6%
C3: 9.5%
C4: 3.1%

MD: 6.003
TVD: 5.902.83
Inclination: 0.6 °
Azimuth: 192.12 °

50' Sample Interval @ 5.978 MD

Bit Data
Bit #: 200
Type: NOV/ReedHycalog
Size: 8.75
Jets: 5x14

SLTY SH: med gy - dk gy, blk, frm - mod hd,
sb pily - pily, slty - gritty tex, v sl calc

SLTY SH: med gy - dk gy, blk, frm - mod hd,
sb pily - pily, slty - gritty tex, v sl calc
SHY SLTST: lt gy - med gy, gy brn, sme wh,
fros ip, brit clus, sb ang - sb pily, calc cnt

MD: 6.114
TVD: 6.013.64
Inclination: 5.88 °
Azimuth: 79.95 °
SLTY SH: med gy - dk gy, blk, frm
sb pily - pily, slty - gritty tex, v sl calc
SHY SLTST: lt gy - med gy, gy brn
s&p, fros ip, brit clus, sb ang - sb p

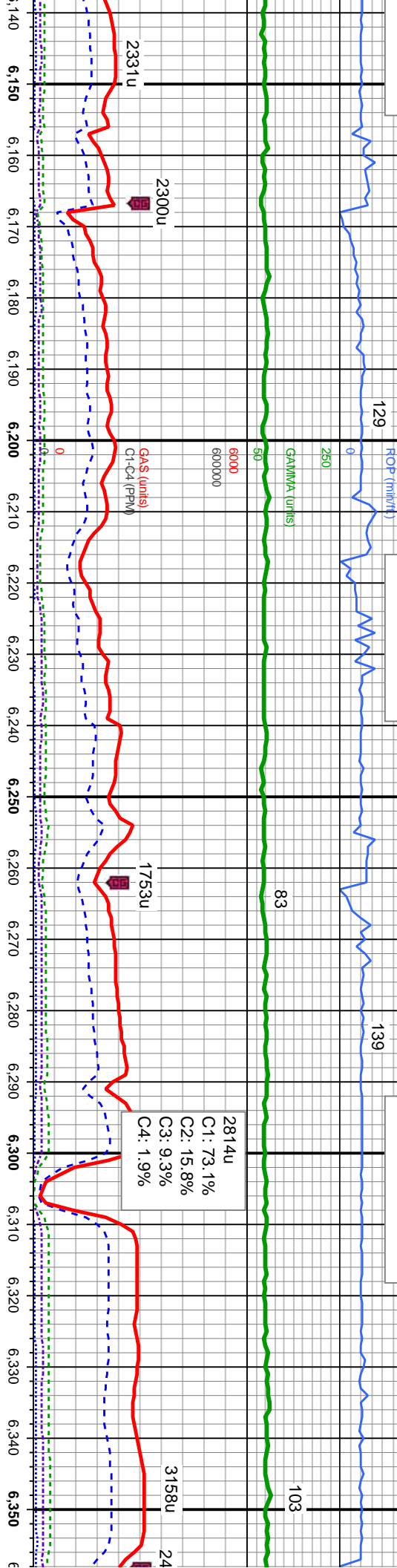


WT: 9.80/9.80
5/35 IN/OUT

Rotate

MUD WT: 9.85/9.70
VIS: 34/34 IN/OUT

MUD WT: 10.10/10.10
VIS: 35/35 IN/OUT



<<TVD Scale Change>>

MD: 6,162
TVD: 6,061.18
Inclination: 9.77 °
Azimuth: 83.59 °

MD: 6,209
TVD: 6,107.25
Inclination: 13 °
Azimuth: 87.37 °

MD: 6,257
TVD: 6,153.67
Inclination: 16.39 °
Azimuth: 90.07 °

MD: 6,304
TVD: 6,198.37
Inclination: 19.62 °
Azimuth: 90.04 °

MD: 6,352
TVD: 6,242.93
Inclination: 23.9 °
Azimuth: 89.46 °

mod hd,
alc
sme
sly, calc
SLTY SH: med gy - dk gy, brn, mod hd, sb
ply - ply, sily - gritty tex, v sl calc
SHY SLTST: lt gy - med gy, gy brn, sme
s&p, fros ip, brit clus, sb ang - sb ply, calc
cmt

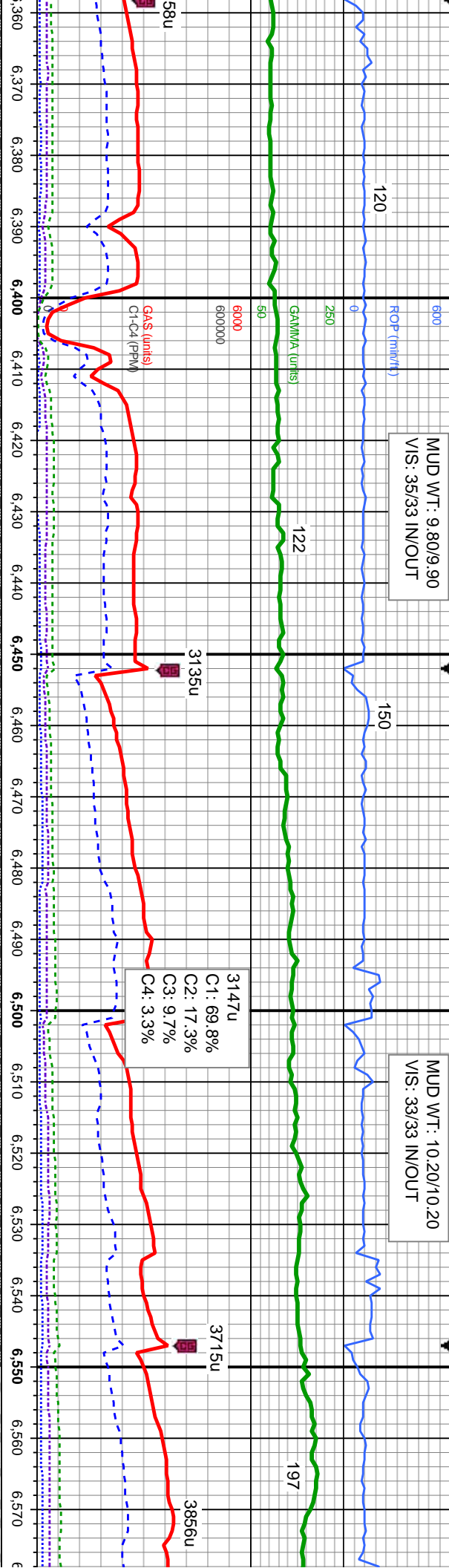
SLTY SH: med gy - dk gy, blk, frm - mod hd,
sb ply - ply, sily - gritty tex, v sl calc
SHY SLTST: lt gy - med gy, gy brn, sme wh,
fros ip, brit clus, sb ang - sb ply, calc cmt

SLTY SH: dk gy, blk, frm - mod hd, sb ply -
ply, sily - gritty tex, sl calc
SHY SLTST: lt gy - med gy, gy brn, sme wh,
fros ip, brit clus, sb ang - sb ply, calc cmt

SLTY SH: dk gy, blk, mod hd, sb ply - ply,
sily - gt tex, sl calc
SHY SLTST: lt gy - med gy, gy brn, s&p, fros
ip, brit

SLTY
sily - g
SHY S
ip, brit





<<TVD Scale Change>>

MD: 6,399
TVD: 6,285.03
Inclination: 28.73 °
Azimuth: 90.18 °

MD: 6,447
TVD: 6,325.73
Inclination: 35.18 °
Azimuth: 88.96 °

MD: 6,494
TVD: 6,362.56
Inclination: 41.58 °
Azimuth: 87.78 °

25' Sample Interval @ 6,600 MD
MD: 6,542
TVD: 6,397.37
Inclination: 45.43 °
Azimuth: 85.25 °

Sharon: 6,598 N

<<TVD

SH: dk gy, blk, mod hd, sb pty - pty,
t tex, sl calc
SLTST: lt gy - med gy, gy brn, s&p, fros
clus, sb ang - sb pty, calc cmt

SLTY SH: dk gy, blk, mod hd, sb pty - pty,
sily - gt tex, sl calc
SHY SLTST: lt gy - lt gy brn, s&p, fros ip, brit
clus, sb ang - sb pty, calc cmt

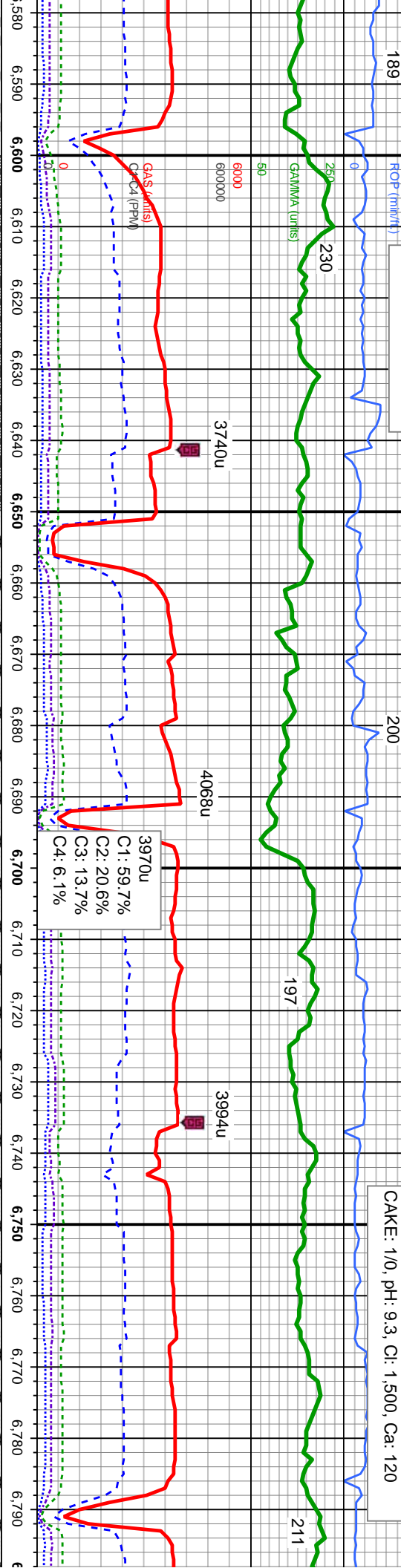
SLTY SH: dk gy, blk, mod hd, sb pty - pty,
sily - gt tex, sl calc
SHY SLTST: lt gy - lt gy brn, s&p, fros ip, hd,
brit clus, sb ang - sb pty, calc cmt

SLTY SH: dk gy, blk, mod hd, sb pty - pty,
sily - gt tex, incr calc
BENT: yel-orn, gy, olv gn
spt, wi dissn pyr and bri



MUD WT: 10.40/10.40
VIS: 34/33 IN/OUT

07/07/2013, Mud Wt: 10.35, FVIs: 36
PVIs: 9, YP: 7, GELS: 3.7/17, API Filtr: 11.0
CAKE: 1/0, pH: 9.3, Cl: 1.500, Ca: 120



SSprings Marker @
ID: 6,435' TVD

Niobrara Top @
6,629' MD: 6,455' TVD

Nio A Chalk Top @
6,660' MD: 6,473' TVD

Nio A Marl Top @
6,699' MD: 6,493' TVD

Scale Change>>

MD: 6,589
TVD: 6,429.36
Inclination: 48.78 °
Azimuth: 84.7 °

MD: 6,637
TVD: 6,459.28
Inclination: 54.08 °
Azimuth: 86.04 °

MD: 6,683
TVD: 6,484.67
Inclination: 58.9 °
Azimuth: 85.2 °

MD: 6,731
TVD: 6,508.24
Inclination: 62.28 °
Azimuth: 86.32 °

MD: 6,778
TVD: 6,528.75
Inclination: 65.95 °
Azimuth: 87.39 °

hd, sb ply - ply,
hd, v brit, ply -
ye-oring mnrl flr

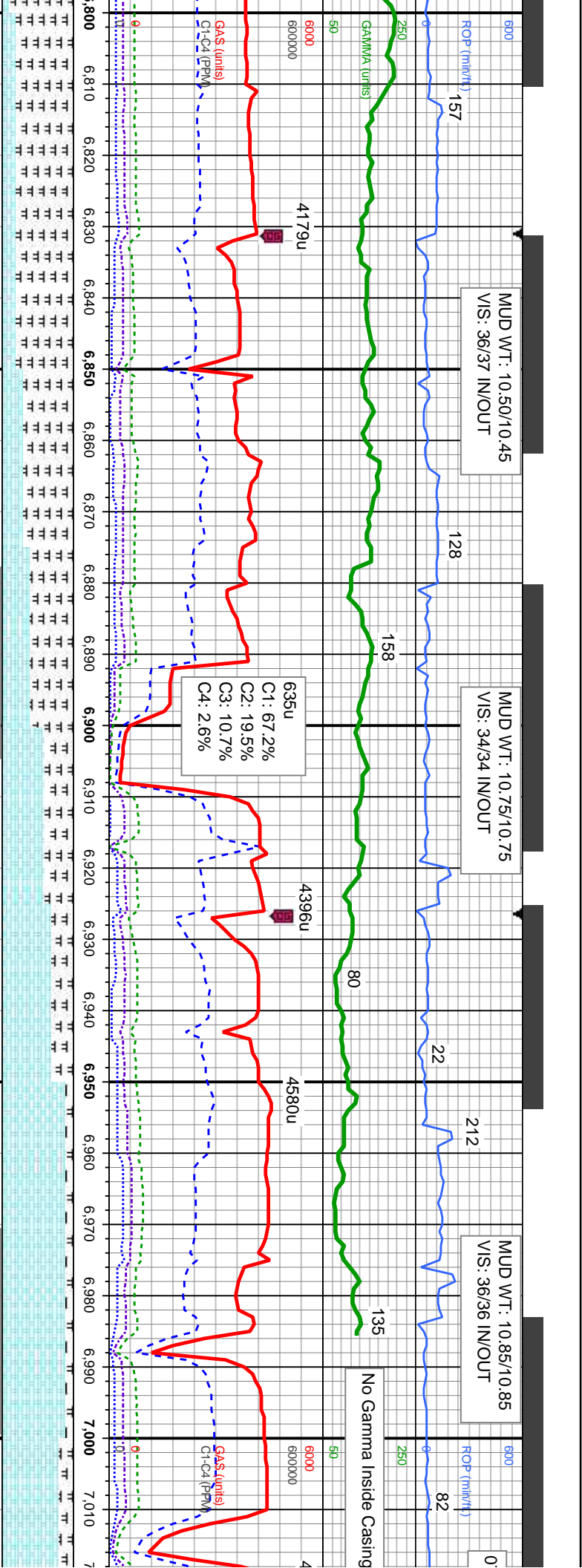
SLTY SH: dk gy, blk, mod hd - hd, sb ply -
ply, silty - gt tex, incr calc
MRL: lt gy-dk gy, gy brn, mot, sft - mod hd,
sb ply - ply, silty - gt tex, abnt bent

CHK: lt gy - med gy, wh, mot, v sft - sft, brit -
fri, sb ply - sb blk, rthy - gt tex, v calc
MRL: dk gy, gy brn, blk, mot, sft - mod hd,
brit - fri sb ply - ply, silty - gt tex, tr bent

CHK: lt gy, cm, off wh, mot, v sft - sft, brit -
fri, sb ply - sb blk, rthy - sb wxy tex, v calc
MRL: dk gy, gy brn, blk, mot, sft - mod hd,
brit - fri sb ply - ply, silty - gt tex, tr bent

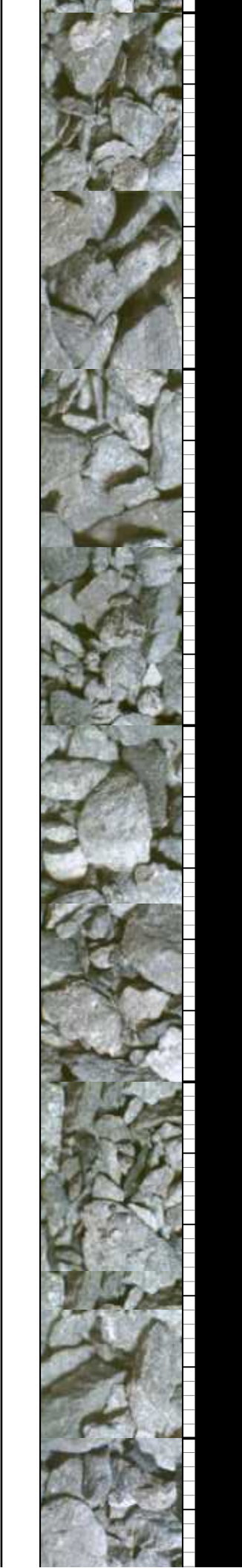
MRL: dk gy, gy brn, sme blk, sft - mod hd,
brit - fri, lam, sb ply - ply, silty - gt tex, abnt
bent wi dissim pyr
CHK: lt gy, cm - off wh, mot, v sft - sft, fri,
sb ply - sb blk, rthy tex, v calc, tr fos frag





| | | | | | | | | | |
|--|--|---|--|---|--|---|--|---|--|
| MD: 6,826 TVD: 6,547.02 Inclination: 69.32 ° Azimuth: 88.01 ° | | MD: 6,873 TVD: 6,562.17 Inclination: 73.06 ° Azimuth: 88.91 ° | | MD: 6,921 TVD: 6,574.01 Inclination: 78.37 ° Azimuth: 89.3 ° | | MD: 6,968 TVD: 6,582.04 Inclination: 81.95 ° Azimuth: 88.9 ° | | MD: 6,978 TVD: 6,583.39 Inclination: 82.61 ° Azimuth: 88.08 ° | |
| MRL: dk gy, gy brn, sme blk, sft - mod hd, brit - fri, lam, sb pty - pty, silty - gt tex, sme bent | | MRL: dk gy, gy brn, sme blk, sft - mod hd, brit - fri, lam, sb pty - pty, silty - gt tex, tr bent | | MRL: dk gy, gy brn, sme blk, sft - mod hd, brit - fri, lam, sb pty - pty, silty - gt tex, tr bent | | MRL: dk gy, gy brn, sme blk, sft - mod hd, brit - fri, lam, sb pty - pty, silty - gt tex, tr bent | | MRL: dk gy, gy brn, sme blk, sft - mod hd, brit - fri, lam, sb pty - pty, silty - gt tex, tr bent | |
| CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, tr fos frag | | CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, sme fos frag | | CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, sme fos frag | | CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, sme fos frag | | CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, sme fos frag | |

| | | | | | | | | | |
|--|--|---|--|---|--|---|--|---|--|
| MRL: dk gy, gy brn, sme blk, sft - mod hd, brit - fri, lam, sb pty - pty, silty - gt tex, sme bent | | MRL: dk gy, gy brn, sme blk, sft - mod hd, brit - fri, lam, sb pty - pty, silty - gt tex, tr bent | | MRL: dk gy, gy brn, sme blk, sft - mod hd, brit - fri, lam, sb pty - pty, silty - gt tex, tr bent | | MRL: dk gy, gy brn, sme blk, sft - mod hd, brit - fri, lam, sb pty - pty, silty - gt tex, tr bent | | MRL: dk gy, gy brn, sme blk, sft - mod hd, brit - fri, lam, sb pty - pty, silty - gt tex, tr bent | |
| CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, tr fos frag | | CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, sme fos frag | | CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, sme fos frag | | CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, sme fos frag | | CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, sme fos frag | |
| CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, tr fos frag | | CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, sme fos frag | | CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, sme fos frag | | CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, sme fos frag | | CHK: lt gy, crm - off wh, mot, v sft - sft, fri, sb pty - sb blk, rthy tex, v calc, sme fos frag | |

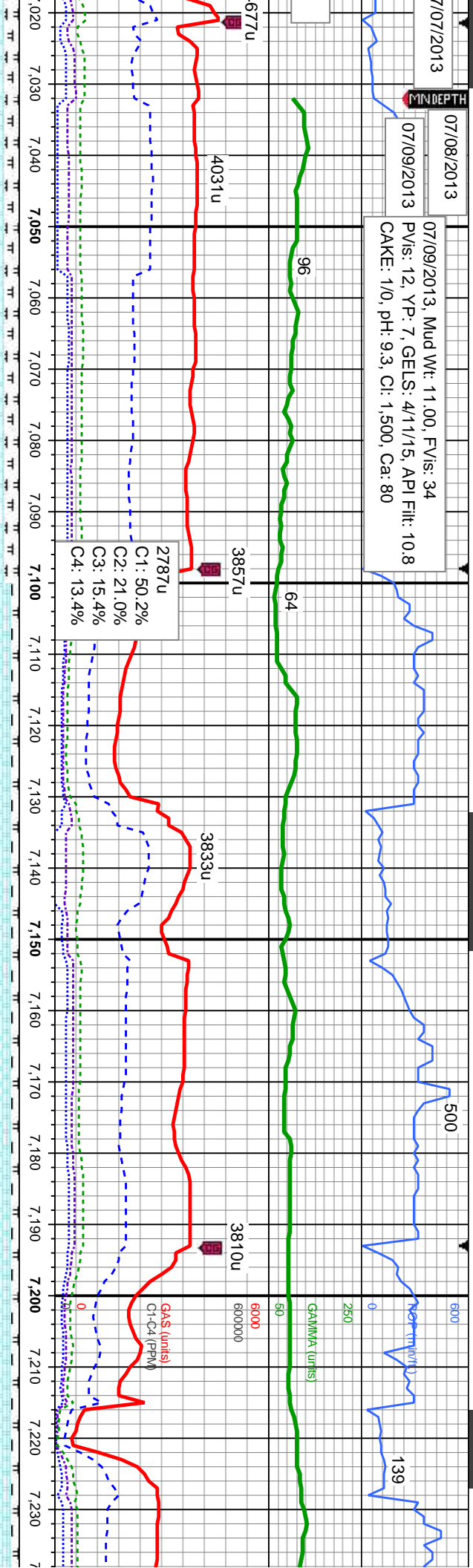


7/07/2013

07/08/2013

07/09/2013

07/09/2013, Mud Wt: 11.00, FV/Is: 34
PV/Is: 12, YP: 7, GELS: 4/11/15, API Filtr: 10.8
CAKE: 1/0, pH: 9.3, CI: 1,500, Ca: 80



TOOH @ 7.032 MD
to run 7" casing

50' Sample Interval @ 7,050' MD

MD: 7,067
TVD: 6,591.39
Inclination: 86.92 °
Azimuth: 86.65 °

Bit Data
Bit #: 300
Type: FXD54
Size: 6.13
Depth In: 7,032 '
Jets: 5x11

MD: 7,161
TVD: 6,595.79
Inclination: 87.71 °
Azimuth: 88.71 °

MD: 7,225
TVD: 6,598.17
Inclination: 88.03 °
Azimuth: 89.51 °

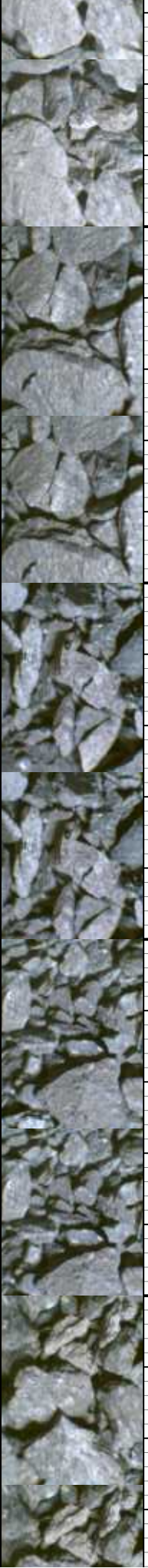
crm - off wh, mot, sft, fri, sb
y tex, v calc, sme fos frag
, gy brn, sme blk, sft - mod
sb pily - pily, silty - gt tex

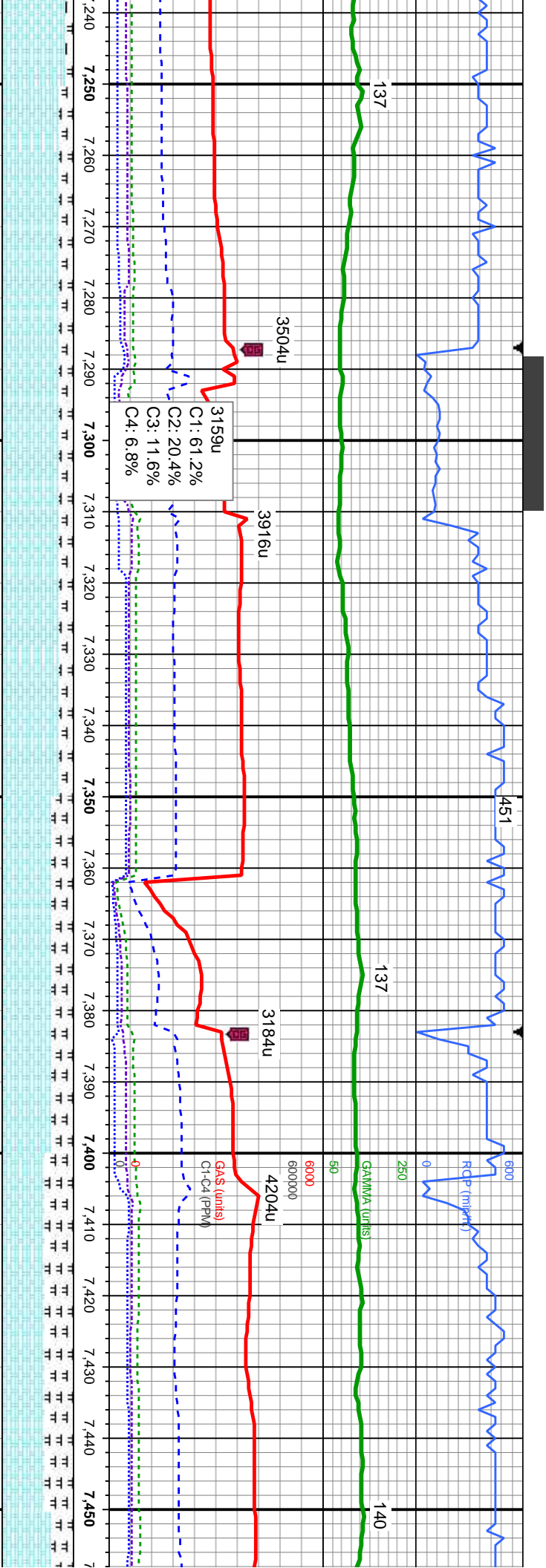
80% CHK: It gy-med gy, crm - off wh, mot,
sft, fri, sb pily - sb blk, rthy tex, v calc
20% MRL: dk gy, gy brn, sme blk, sft - mod
hd, brit - fri, lam, sb pily - pily, silty - gt tex,
scat fos frag, tr bent

90% CHK: It gy, brnd wi crm - off wh, sft, fri,
sb pily - sb blk, sb wxy, v calc
10% MRL: dk gy, gy brn, sme blk, sft - mod
hd, brit - fri, lam, sb pily - pily, silty - gt tex,
scat fos frag, tr bent wi dissim pyr

90% CHK: It gy, brnd wi crm - off wh, sft, fri,
sb pily - sb blk, sb wxy, v calc
10% MRL: dk gy, gy brn, sme blk, sft - mod
hd, brit - fri, lam, sb pily - pily, silty - gt tex, v
calc thru, scat fos frag, tr bent wi dissim pyr

90% CHK: It gy, brnd wi crm - off wh,
sb pily - sb blk, sb wxy, v calc
10% MRL: dk gy, gy brn, sme blk, s
hd, brit - fri, lam, sb pily - pily, silty -
calc thru, abnt fos frag, tr bent wi di

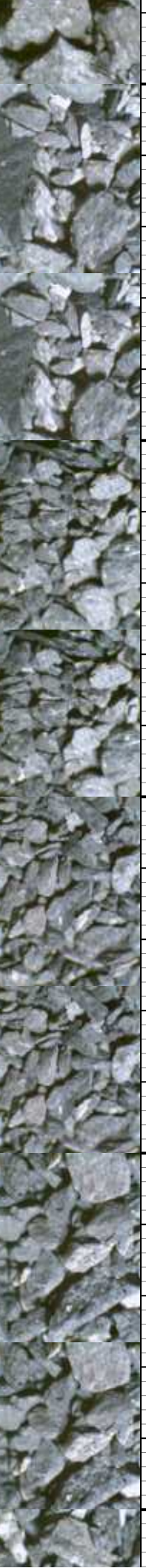


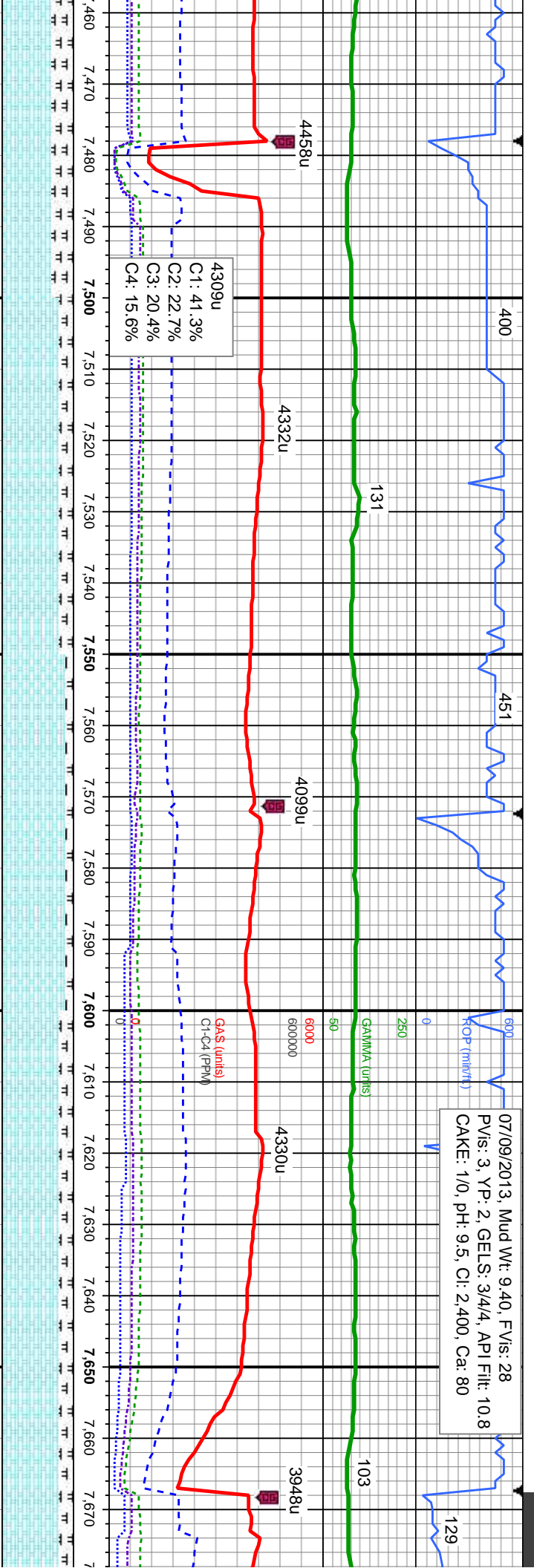


MD: 7,320
TVD: 6,598.68
Inclination: 91.36 °
Azimuth: 90.03 °

MD: 7,415
TVD: 6,596.61
Inclination: 91.14 °
Azimuth: 89.94 °

| | | | | | |
|--------------|---|--|--|--|----------|
| h, sft, fri, | 90% CHK: It gy, bnnd wi crm - off wh, sft, fri, | 80% CHK: It gy - med gy, bnnd wi crm - off wh, sft, fri, sb ply - sb blk, v calc | 70% CHK: It gy - med gy, bnnd wi crm - off wh, sft, fri, sb ply - sb blk, v calc | 60% CHK: It gy - med gy, bnnd wi crm - off wh, sft, fri, sb ply - sb blk, v calc | 70% C |
| ft - mod | 10% MRL: dk gy, gy brn, sme blk, sft - mod | 20% MRL: dk gy, gy brn, sme blk, sft - mod | 30% MRL: dk gy, brn, blk, sft - mod hd, brit - | 40% MRL: dk gy, brn, blk, sft - mod hd, brit - | 30% W |
| gt tex, v | hd, brit - fri, lam, sb ply - ply, sily - gt tex, v | hd, brit - fri, lam, sb ply - ply, sily - gt tex, v | fri, lam, sb ply - ply, sily - gt tex, v calc thru, | fri, lam, sb ply - ply, sily - gt tex, v calc thru, | fri, lam |
| sssm pyr | calc thru, abnt fos frag, tr bent wi dissm pyr | calc thru, abnt fos frag, tr bent wi dissm pyr | abnt fos frag, tr bent wi dissm pyr | abnt fos frag, scat bent wi dissm pyr | abnt fo |



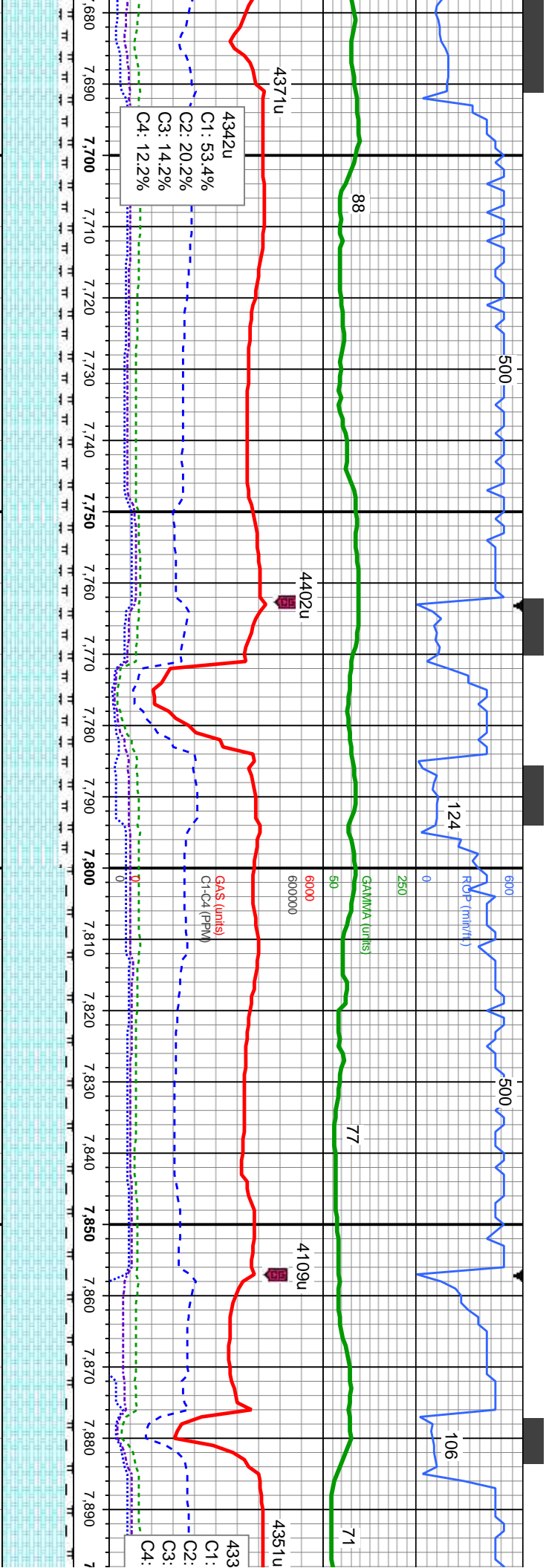


MD: 7.509
TVD: 6,594.95
Inclination: 90.89 °
Azimuth: 90.86 °

MD: 7.604
TVD: 6,595.1
Inclination: 88.92 °
Azimuth: 90.03 °

| | | | | |
|--|--|--|---|---|
| HK: It gy - med gy, bnnd wi crm - off fri, sb pily - sb blkly, sb wxy, v calc 20% MRL: dk gy, brn, blk, sft - mod hd, brit - s, sb pily - pily, stly - gt tex, v calc thru, s frag, abnt bent wi dissn pyr | 80% CHK: It gy - med gy, bnnd wi off wh, sft, fri, sb pily - sb blkly, sb wxy, v calc 20% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pily - pily, stly - gt tex, v calc thru, abnt fos frag, abnt bent wi dissn pyr | 90% CHK: It gy - med gy, bnnd wi crm-off wh, sft, fri, sb pily - sb blkly, sb wxy, v calc 10% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pily - pily, stly - gt tex, v calc thru, abnt fos frag, abnt bent wi dissn pyr | 80% CHK: It gy - med gy, bnnd wi crm-off wh, sft, fri, sb pily - sb blkly, sb wxy, v calc 20% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pily - pily, stly - gt tex, v calc thru, abnt fos frag, tr bent | 80% CHK: It gy - med gy, bnnd wi crm-off wh, sft, fri, sb pily - sb blkly, sb wxy, v calc 20% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pily - pily, stly - gt tex, v calc thru, abnt fos frag, tr bent |
|--|--|--|---|---|





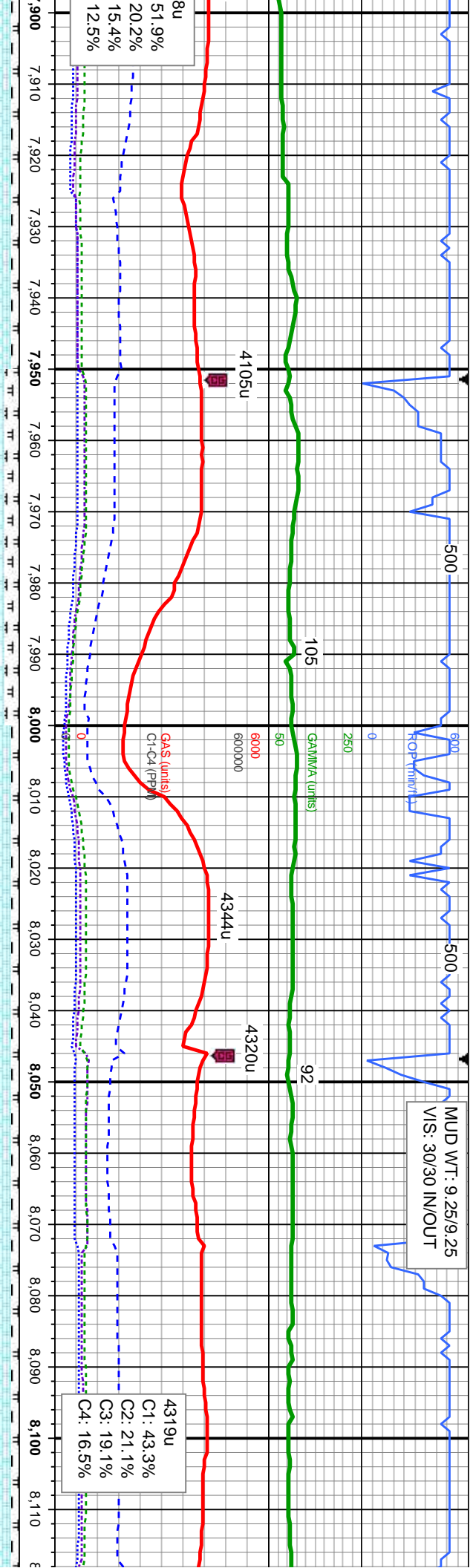
MD: 7.699
TVD: 6,594.95
Inclination: 91.26 °
Azimuth: 90.32 °

MD: 7.794
TVD: 6,592.14
Inclination: 92.13 °
Azimuth: 89.24 °

MD: 7.889
TVD: 6,589.23
Inclination: 91.39
Azimuth: 89.6 °

| 80% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pty - sb blk, sb wxy, v calc 20% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pty - pty, slty - gt tex, v calc thru, abnt fos frag, tr bent | 80% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pty - sb blk, sb wxy, v calc 20% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pty - pty, slty - gt tex, v calc thru, abnt fos frag, tr bent | 90% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pty - sb blk, sb wxy, v calc 10% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pty - pty, slty - gt tex, v calc thru, abnt fos frag, tr bent | 90% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pty - sb blk, sb wxy, v calc 10% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pty - pty, slty - gt tex, v calc thru, abnt fos frag, tr bent |
|--|--|--|--|
| 80% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pty - sb blk, sb wxy, v calc 20% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pty - pty, slty - gt tex, v calc thru, abnt fos frag, tr bent | 80% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pty - sb blk, sb wxy, v calc 20% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pty - pty, slty - gt tex, v calc thru, abnt fos frag, tr bent | 90% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pty - sb blk, sb wxy, v calc 10% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pty - pty, slty - gt tex, v calc thru, abnt fos frag, tr bent | 90% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pty - sb blk, sb wxy, v calc 10% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pty - pty, slty - gt tex, v calc thru, abnt fos frag, tr bent |

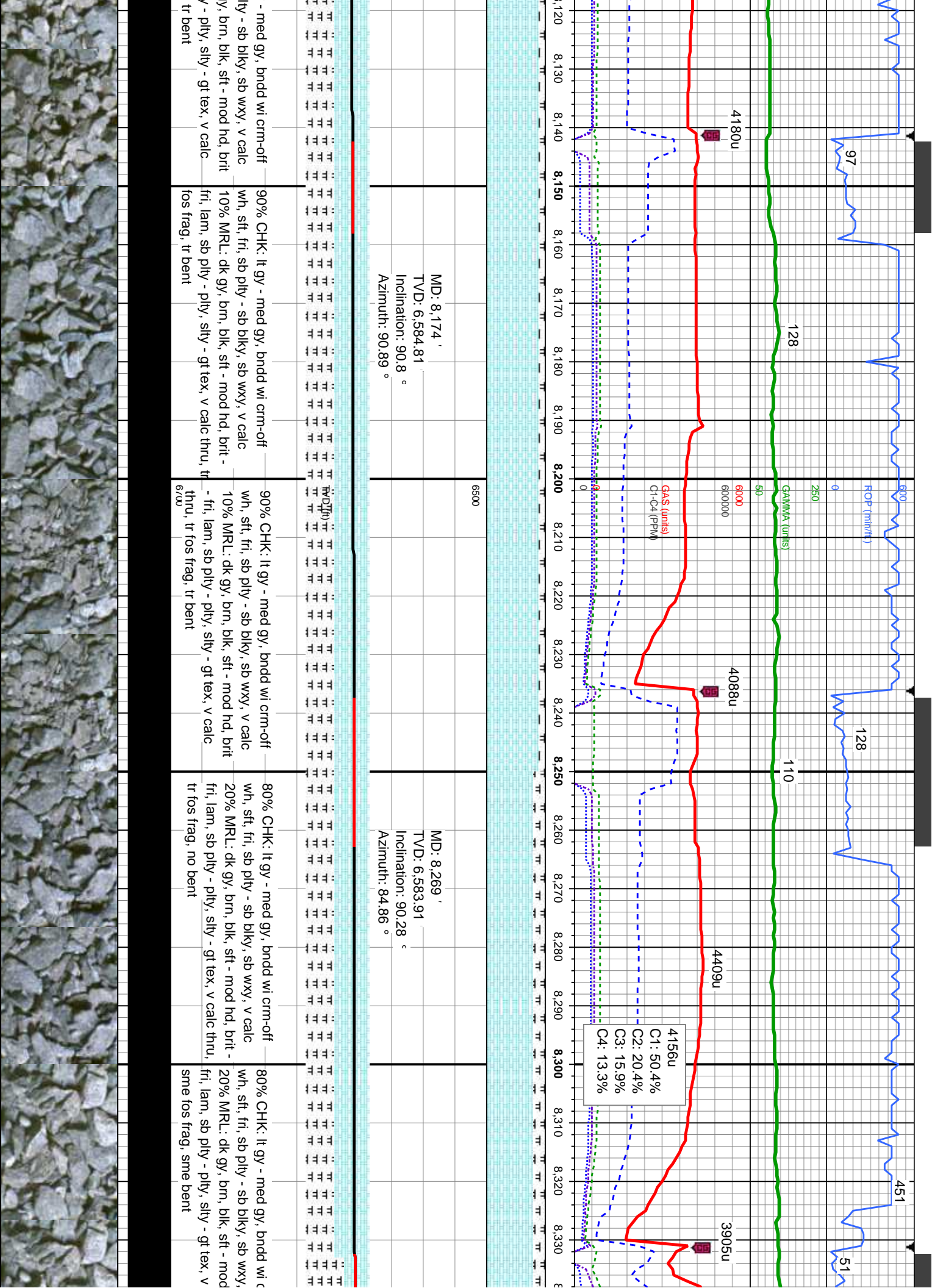




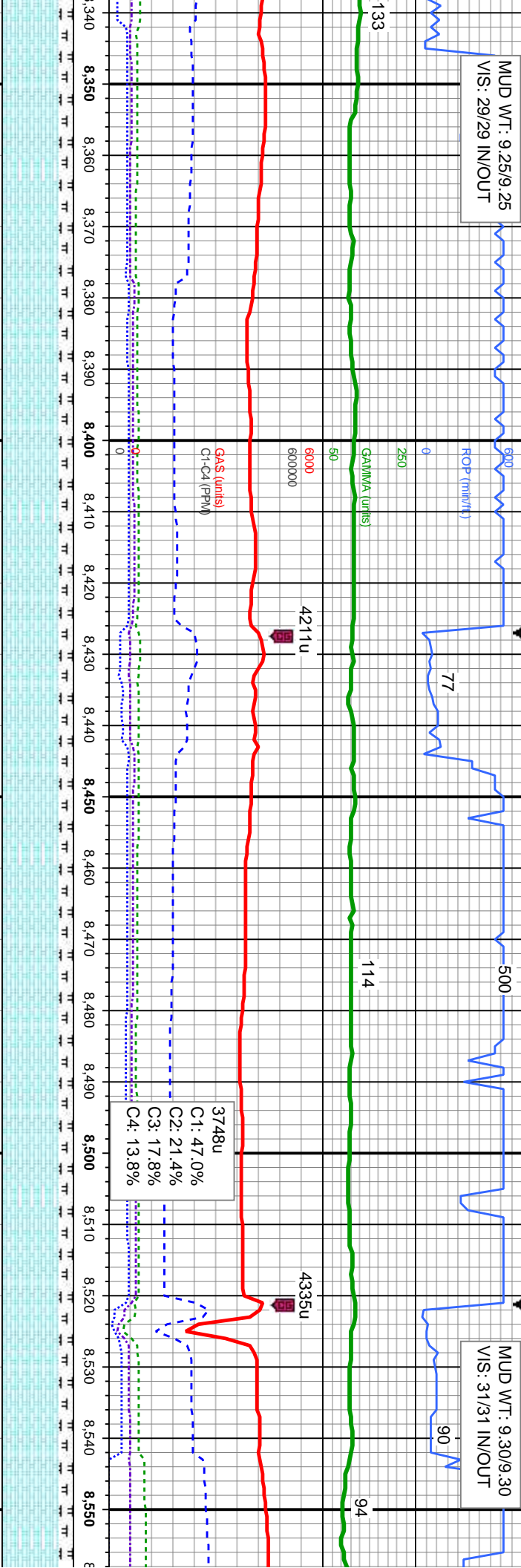
| | | | |
|---|--|------|--|
| MD: 7,984' TVD: 6,587.08' Inclination: 91.2° Azimuth: 89.26° | | 6500 | |
| MD: 8,079' TVD: 6,585.78' Inclination: 90.37° Azimuth: 91.4° | | | |

| | | | | |
|--|---|--|--|--|
| 90% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb ply - sb blk, sb wxy, v calc 10% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb ply - ply, silty - gt tex, v calc thru, sme fos frag, tr bent | 80% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb ply - sb blk, sb wxy, v calc 20% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb ply - ply, silty - gt tex, v calc thru, sme fos frag, sme bent | 90% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb ply - sb blk, sb wxy, v calc 10% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb ply - ply, silty - gt tex, v calc thru, sme fos frag, tr bent | 90% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb ply - sb blk, sb wxy, v calc 10% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb ply - ply, silty - gt tex, v calc thru, sme fos frag, tr bent | 90% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb ply - sb blk, sb wxy, v calc 10% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb ply - ply, silty - gt tex, v calc thru, sme fos frag, tr bent |
|--|---|--|--|--|





MUD WT: 9.25/9.25
VIS: 29/29 IN/OUT



MUD WT: 9.30/9.30
VIS: 31/31 IN/OUT

MD: 8,364
TVD: 6,583.6
Inclination: 90.09 °
Azimuth: 85.37 °

6500

MD: 8,459
TVD: 6,582.84
Inclination: 90.83 °
Azimuth: 85.1 °

MD: 8,554
TVD: 6,582.6
Inclination: 85 °
Azimuth: 85 °

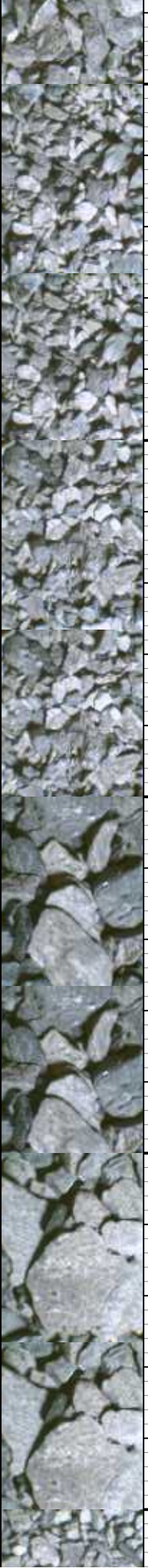
80% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pty - sb blk, sb wxy, v calc 20% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pty - pty, sily - gt tex, v calc thru, abnt fos frag, sme bent

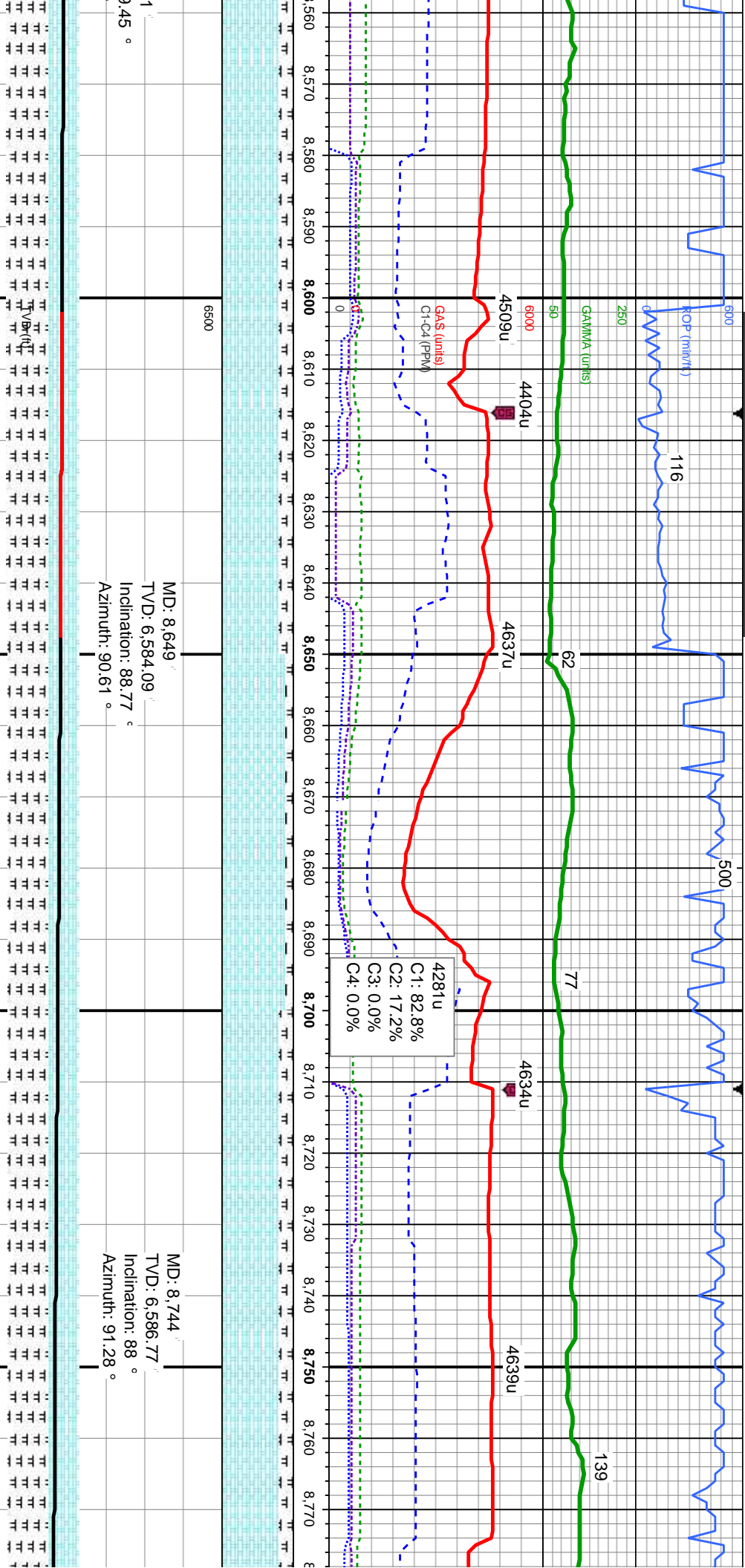
80% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pty - sb blk, sb wxy, v calc 20% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pty - pty, sily - gt tex, v calc thru, sme fos frag, tr bent

80% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pty - sb blk, sb wxy, v calc 20% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pty - pty, sily - gt tex, v calc thru, sme fos frag, tr bent

70% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pty - sb blk, sb wxy, v calc 30% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pty - pty, sily - gt tex, v calc thru, sme fos frag, tr bent

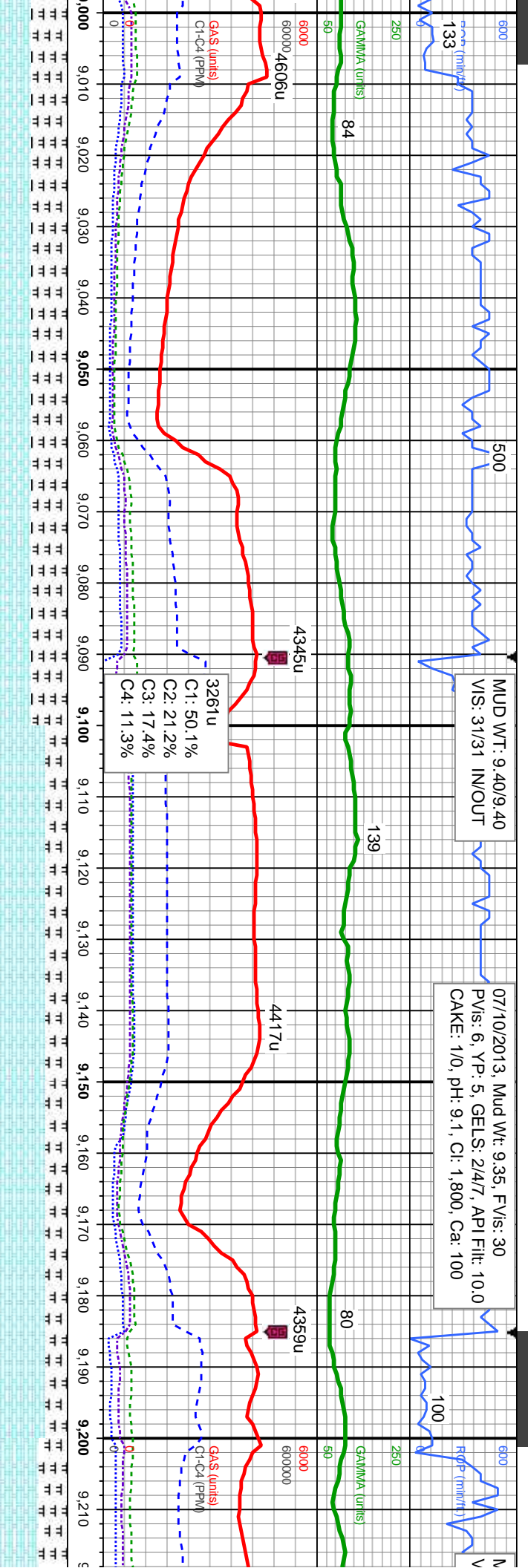
80% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pty - sb blk, sb wxy, v calc 20% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pty - pty, sily - gt tex, v calc thru, abnt fos frag, tr bent





MD: 8,649
TVD: 6,584.09
Inclination: 88.77 °
Azimuth: 90.61 °

MD: 8,744
TVD: 6,586.77
Inclination: 88 °
Azimuth: 91.28 °



MUD WT: 9.40/9.40
VIS: 31/31 IN/OUT

07/10/2013, Mud Wt: 9.35, FVIs: 30
PVIs: 6, YP: 5, GELS: 2/4/7, API Filtr: 10.0
CAKE: 1/0, pH: 9.1, CI: 1,800, Ca: 100

MD: 9,029'
TVD: 6,588.54'
Inclination: 92.1 °
Azimuth: 91.81 °

MD: 9,124'
TVD: 6,584.73'
Inclination: 92.5 °
Azimuth: 91.63 °

MD: 9,218'
TVD: 6,58
Inclination
Azimuth: 9

50% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pily - sb blk, sb wxy, v calc 50% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pily - pily, sily - gt tex, v calc thru, abnt fos frag, abnt bent

50% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pily - sb blk, sb wxy, v calc 50% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pily - pily, sily - gt tex, v calc thru, abnt fos frag, abnt bent

70% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pily - sb blk, sb wxy, v calc 30% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pily - pily, sily - gt tex, v calc thru, abnt fos frag, abnt bent

70% CHK: lt gy - med gy, bnnd wi crm-off wh, sft, fri, sb pily - sb blk, sb wxy, v calc 30% MRL: dk gy, brn, blk, sft - mod hd, brit - fri, lam, sb pily - pily, sily - gt tex, v calc thru, abnt fos frag, abnt bent

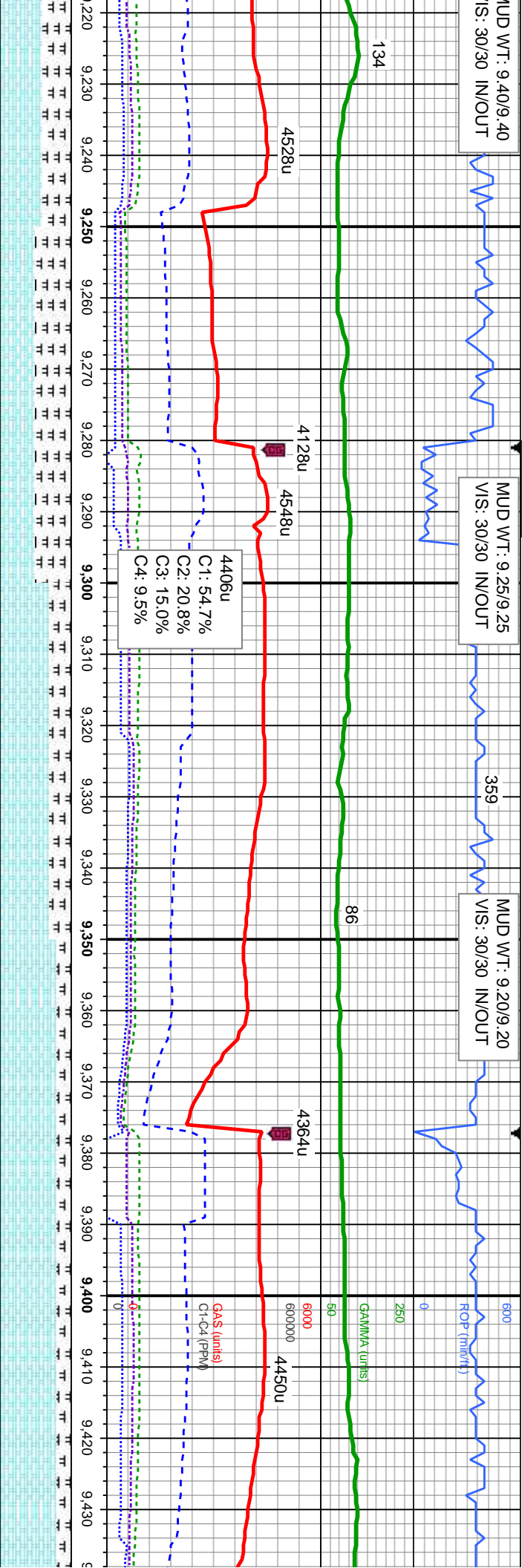
60% CHK: lt gy - wh, sft, brit-fri, st 40% MRL: dk gy - fri, lam, sb pily - abnt fos frag, ab



MUD WT: 9.40/9.40
VIS: 30/30 IN/OUT

MUD WT: 9.25/9.25
VIS: 30/30 IN/OUT

MUD WT: 9.20/9.20
VIS: 30/30 IN/OUT



MD: 9,313
TVD: 6,581.11
Inclination: 89.94 °
Azimuth: 89.44 °

MD: 9,408
TVD: 6,582.08
Inclination: 90.06 °
Azimuth: -99.25 °

med gy, bnnd wi crn-off
ply - sb blk, sb wxy
brn, blk, sft - mod hd, brit -
ply, sily - gt tex, v calc thru,
abt bent

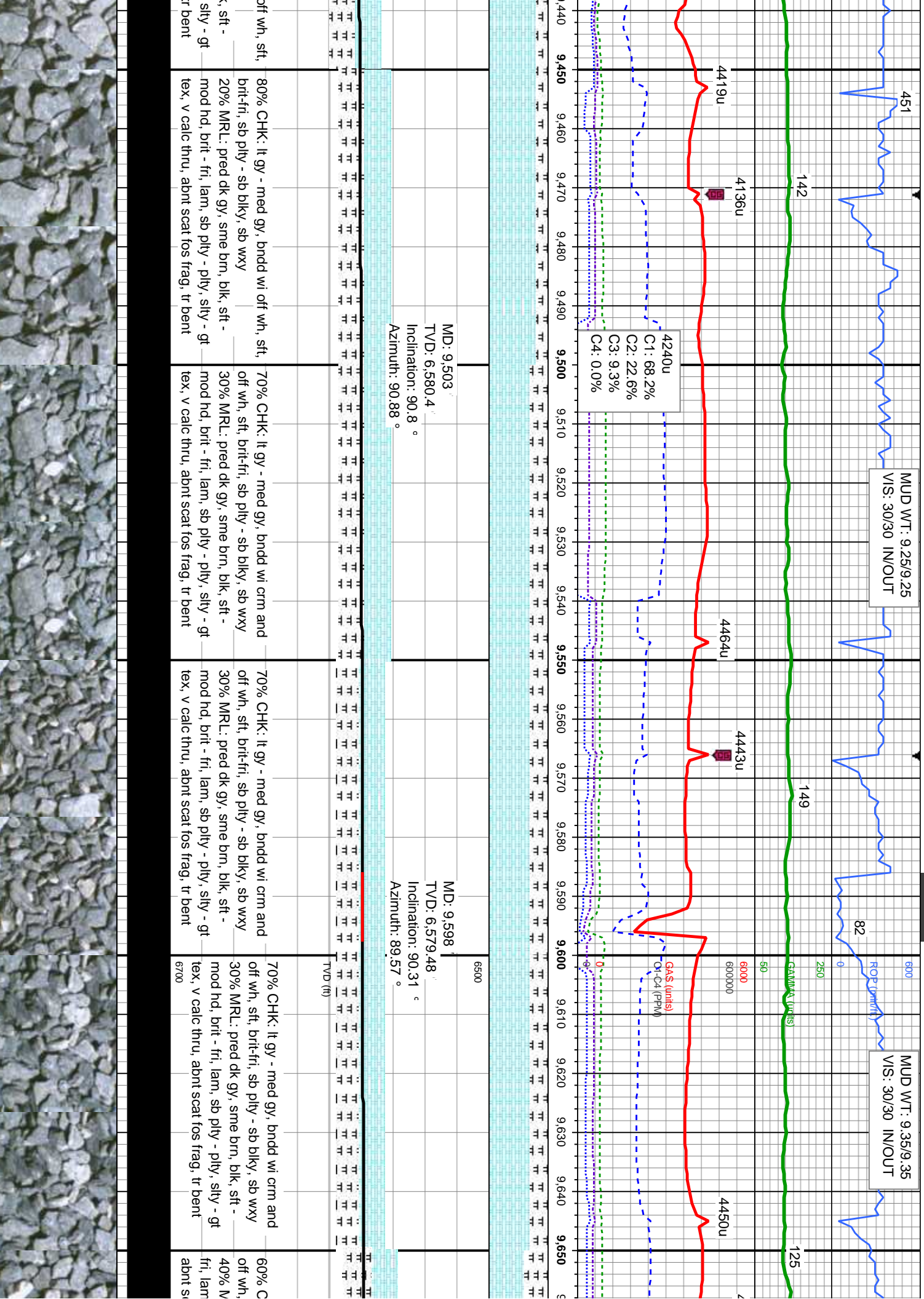
50% CHK: It gy - med gy, bnnd wi of wh, sft,
brit-fri, sb ply - sb blk, sb wxy
50% MRL: dk gy, brn, blk, sft - mod hd, brit -
fri, lam, sb ply - ply, sily - gt tex, v calc thru,
abt fos frag, abt bent

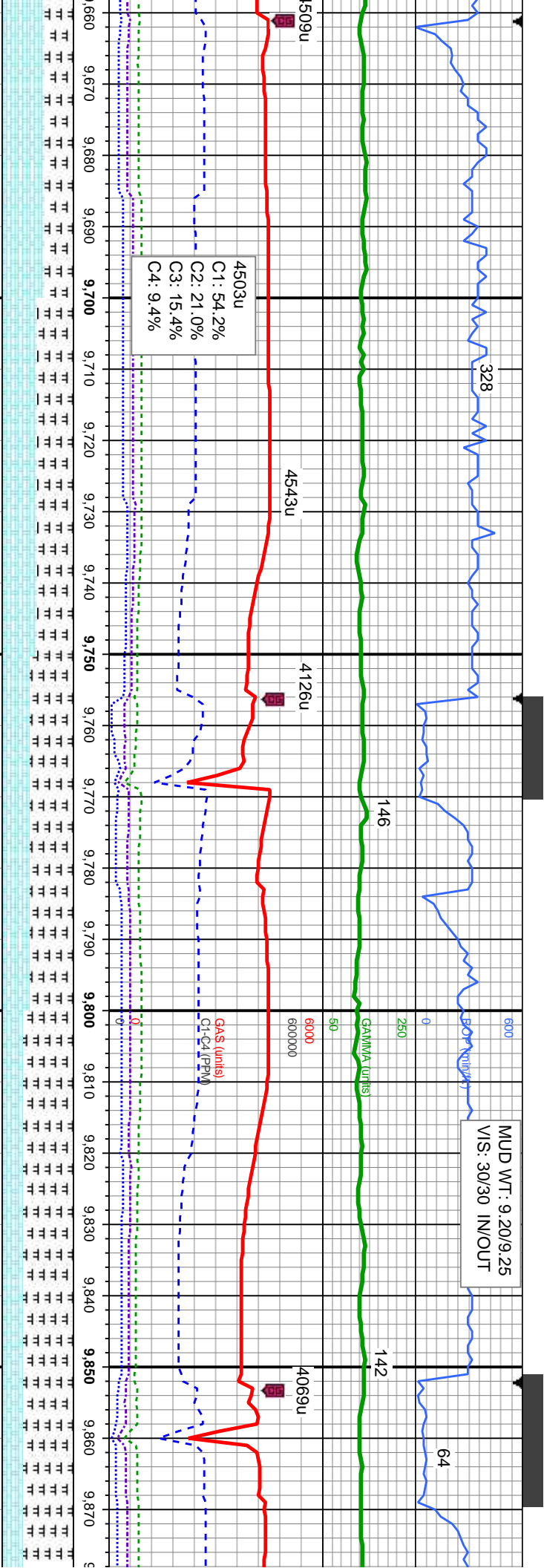
70% CHK: It gy - med gy, bnnd wi of wh, sft,
brit-fri, sb ply - sb blk, sb wxy
30% MRL: dk gy, brn, blk, sft - mod hd, brit -
fri, lam, sb ply - ply, sily - gt tex, v calc thru,
scat fos frag, tr bent

80% CHK: It gy - med gy, bnnd wi of wh, sft,
brit-fri, sb ply - sb blk, sb wxy
20% MRL: pred dk gy, sme brn, blk, sft -
mod hd, brit - fri, lam, sb ply - ply, sily - gt
tex, v calc thru, scat fos frag, tr bent

80% CHK: It gy - med gy, bnnd wi
brit-fri, sb ply - sb blk, sb wxy
20% MRL: pred dk gy, sme brn, blk
mod hd, brit - fri, lam, sb ply - ply,
tex, v calc thru, abt scat fos frag, t







MD: 9,693 '
TVD: 6,578.68 '
Inclination: 90.65 °
Azimuth: 91.34 °

MD: 9,788 '
TVD: 6,578.3 '
Inclination: 89.82 °
Azimuth: 91.74 °

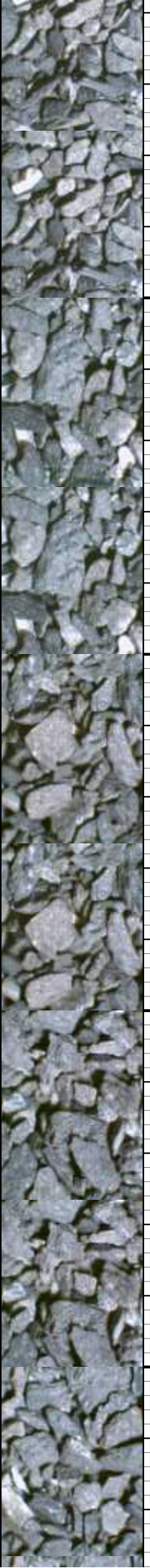
HK: lt gy - med gy, bnnd wi crm and
sft, brt-frt, sb pty - sb blk, sb wxy
RRL: dk gy, blk, brn, sft - mod hd, brt -
, sb pty - pty, slty - gt tex, v calc thru,
cat fos frag, tr bent

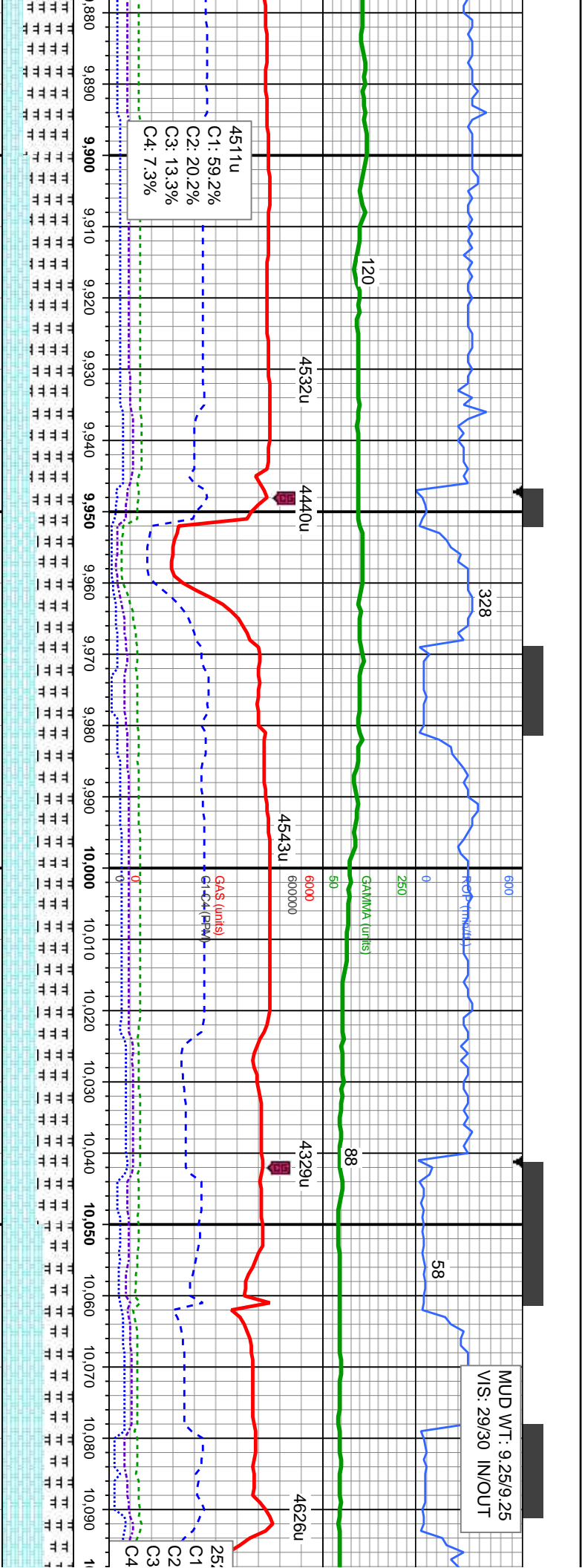
50% CHK: lt gy - med gy, bnnd wi crm and
off wh, sft, brt-frt, sb pty - sb blk, sb wxy
50% MRL: dk gy, blk, brn, sft - mod hd, brt -
fri, lam, sb pty - pty, slty - gt tex, v calc thru,
abt scat fos frag, tr bent

40% CHK: lt gy - med gy, bnnd wi crm and
off wh, sft, brt-frt, sb pty - sb blk, sb wxy
60% MRL: dk gy, blk, brn, mod hd-hd, brt -
fri, lam, sb pty - pty, slty - gt tex, v calc thru,
abt scat fos frag, tr bent

30% CHK: lt gy - med gy, bnnd wi crm and
off wh, sft, brt-frt, sb pty - sb blk, sb wxy
70% MRL: dk gy, blk, brn, mod hd-hd, brt -
lam, sb pty - pty, slty - gt tex, v calc thru,
abt scat fos frag, tr bent

30% CHK: lt gy - med gy,
off wh, sft, brt-frt, sb pty -
70% MRL: dk gy, blk, brn
lam, sb pty - pty, slty - gt
abt scat fos frag, tr bent





MD: 9,978' TVD: 6,577.05' Inclination: 91.39° Azimuth: 91.71°

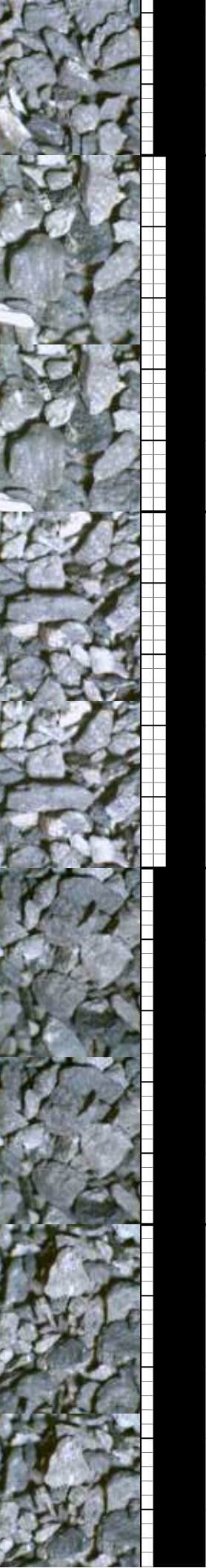
6500

40% CHK: lt gy - med gy, bnnd wi crm and off wh, sft, brit-fri, sb pily - sb blk, sb wxy 60% MRL: dk gy, blk, mod hd-hd, brit, lam, sb pily - pily, silty - gt tex, v calc thru, abnt scat fos frag, tr bent

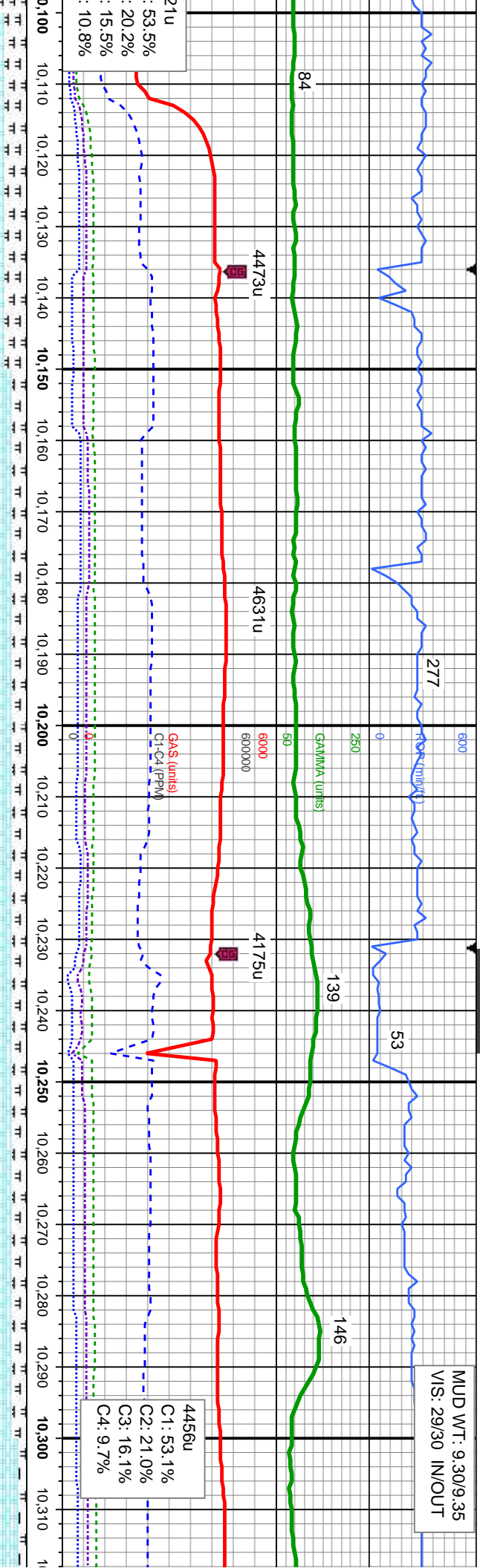
50% CHK: lt gy - med gy, bnnd wi crm and off wh, sft, brit-fri, sb pily - sb blk, sb wxy 50% MRL: dk gy, blk, mod hd-hd, brit, lam, sb pily - pily, silty - gt tex, v calc thru, abnt scat fos frag, tr bent

50% CHK: lt gy - med gy, bnnd wi crm and off wh, sft, brit-fri, sb pily - sb blk, sb wxy 50% MRL: dk gy, blk, mod hd-hd, brit, lam, sb pily - pily, silty - gt tex, v calc thru, abnt scat fos frag, tr bent

60% CHK: lt gy - med gy, bnnd wi crm and off wh, sft, brit-fri, sb pily - sb blk, sb wxy 40% MRL: dk gy, blk, brn, mod hd-hd, brit, lam, sb pily - pily, silty - gt tex, v calc thru, abnt scat fos frag, tr bent



MUD WT: 9.30/9.35
VIS: 29/30 IN/OUT



MD: 10,168
TVD: 6,574.85
Inclination: 90.83 °
Azimuth: 84.86 °

6500

MD: 10,263
TVD: 6,573.31
Inclination: 91.02 °
Azimuth: 87.16 °

70% CHK: lt gy - med gy, bnnd wi crm and off wh, sft, brt-frt, sb pty - sb blk, sb wxy
30% MRL: dk gy, blk, brn, mod hd-hd, brt-fis, lam, sb pty - pty, slty - gt tex, v calc thru, abnt scat fos frag, tr bent

80% CHK: lt gy - med gy, bnnd wi crm and off wh, sft, brt-frt, sb pty - sb blk, sb wxy
20% MRL: dk gy, blk, brn, mod hd-hd, brt-fis, sb pty - pty - thn lam, slty - gt tex, v calc thru, abnt scat fos frag, tr bent

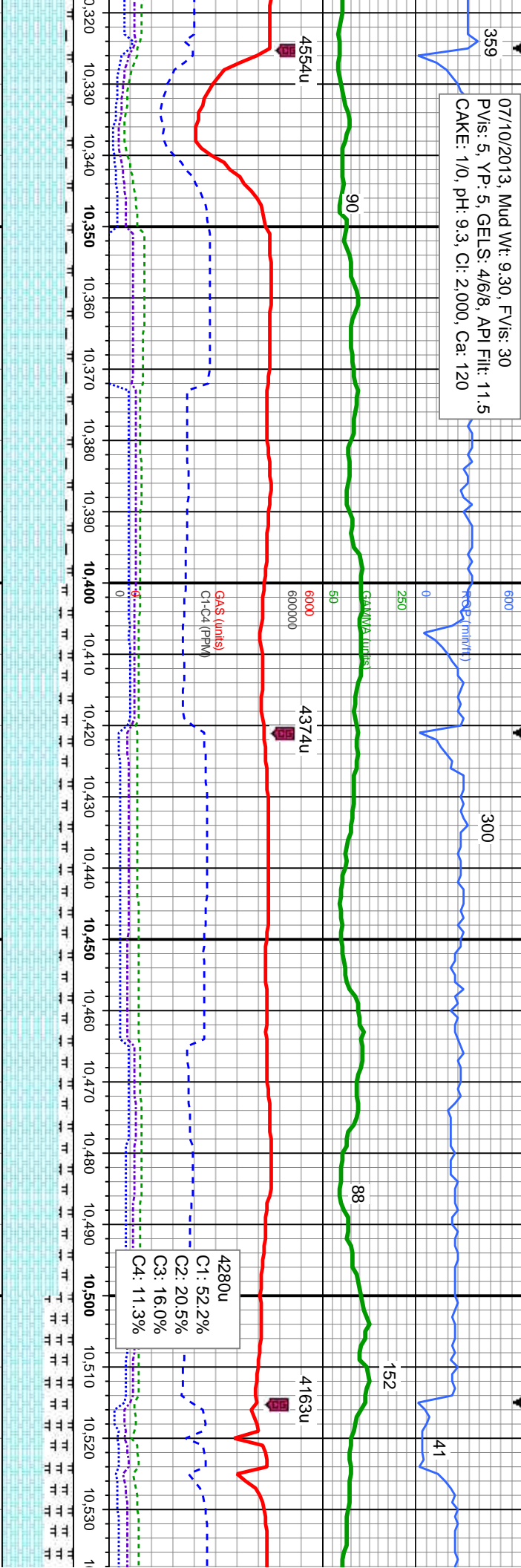
80% CHK: lt gy - med gy, bnnd wi crm and off wh, sft, brt-frt, sb pty - sb blk, sb wxy
20% MRL: dk gy, blk, brn, mod hd-hd, brt-fis, sb pty - pty - thn lam, slty - gt tex, v calc thru, abnt scat fos frag, tr bent

80% CHK: lt gy - med gy, bnnd wi crm and off wh, sft, brt-frt, sb pty - sb blk, sb wxy
20% MRL: pred dk gy, sme blk, brn, mod hd-hd, brt-fis, sb pty - pty - thn lam, slty - gt tex, v calc thru, abnt scat fos frag, tr bent

90% CHK: lt gy off wh, sft, brt-frt
10% MRL: prec hd-hd, brt-fis, s tex, v calc thru,



07/10/2013, Mud Wt: 9.30, FV/s: 30
PV/s: 5, YP: 5, GELS: 4/6/8, API Filtr: 11.5
CAKE: 1/0, pH: 9.3, Cl: 2.000, Ca: 120



MD: 10,358
TVD: 6,572.52
Inclination: 89.94
Azimuth: 87.5

MD: 10,453
TVD: 6,573.24
Inclination: 89.2
Azimuth: 88.04

- med gy, bnnd wi crm and
ri, sb pty - blk, sb wxy
dk gy, sme blk, brn, mod
b pty - pty - thn lam, silty - gt
abnt scat fos frag, tr bent

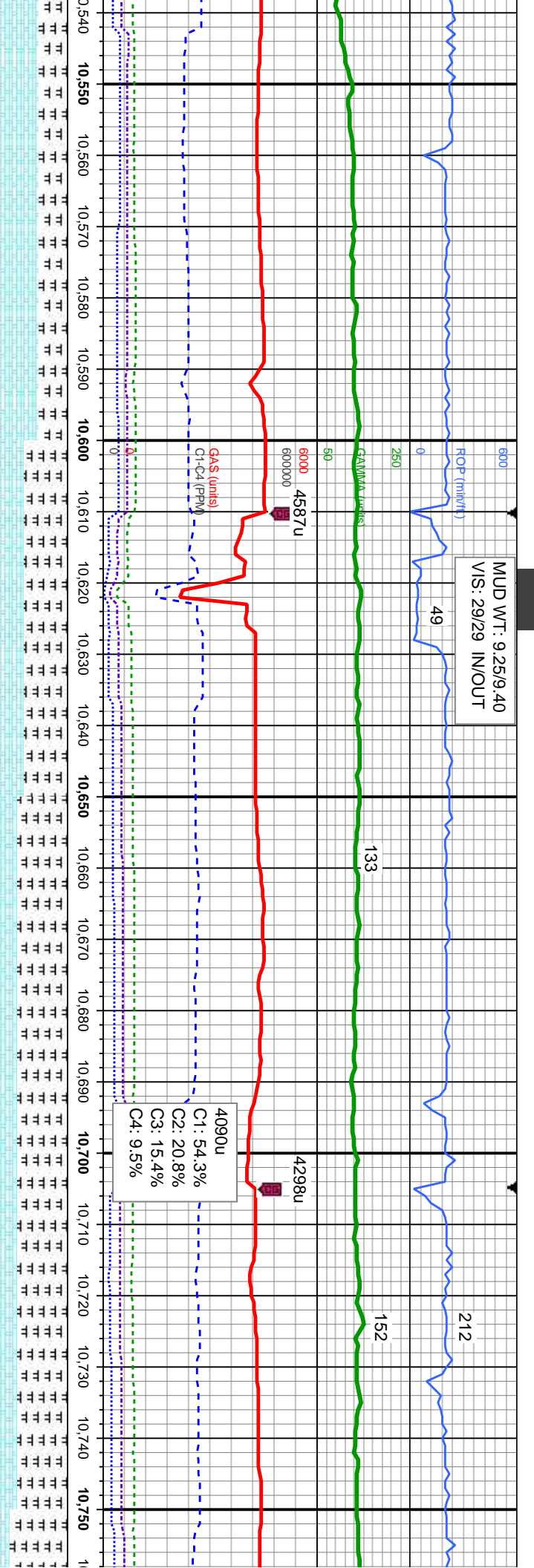
90% CHK: lt gy - med gy, bnnd wi crm and
off wh, sft, brit-fri, sb pty - blk, sb wxy - wxy
10% MRL: pred dk gy, sme blk, brn, mod
hd-hd, brit-fis, sb pty - pty - thn lam, silty - gt
tex, v calc thru, abnt scat fos frag, tr bent

80% CHK: lt gy - med gy, bnnd wi crm and
off wh, sft, brit-fri, sb pty - blk, sb wxy - wxy
20% MRL: pred dk gy, sme blk, brn, mod
hd-hd, brit-fis, sb pty - pty - thn lam, silty - gt
tex, v calc thru, abnt scat fos frag, sme bent

80% CHK: lt gy - med gy, bnnd wi crm and
off wh, sft, brit-fri, sb pty - blk, sb wxy - wxy
20% MRL: pred dk gy, sme blk, brn, mod
hd-hd, brit-fis, sb pty - pty - thn lam, silty - gt
tex, v calc thru, abnt scat fos frag, sme bent

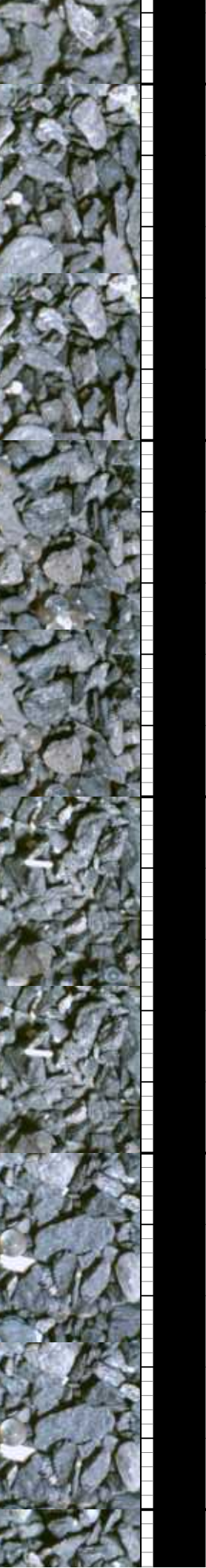
60% CHK: lt gy - med gy, bnnd wi crm and
off wh, sft, brit-fri, sb pty - blk, sb wxy
40% MRL: pred dk gy, sme blk, brn, mod
hd-hd, brit-fis, sb pty - pty - thn lam
tex, v calc thru, abnt scat fos frag, :

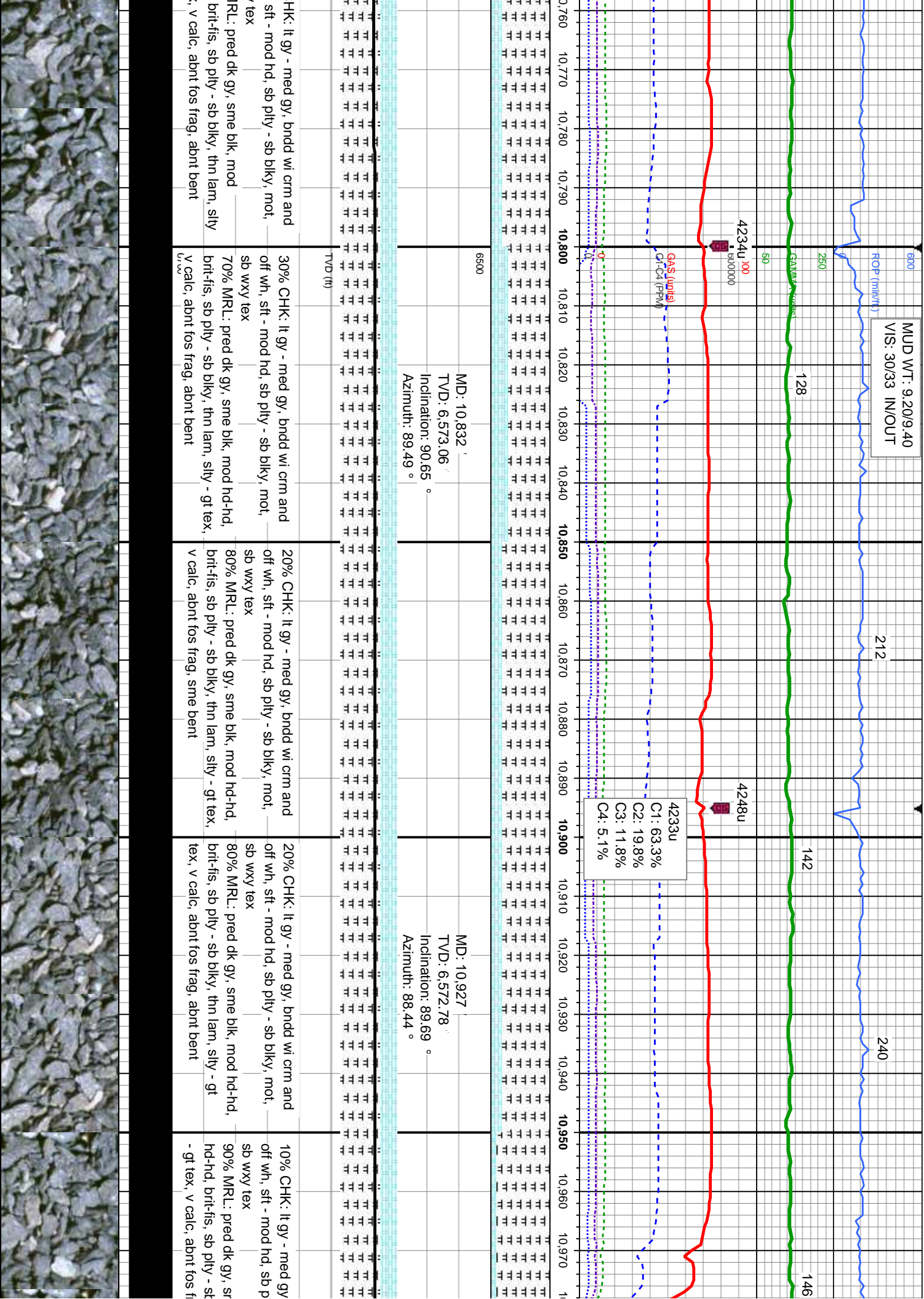


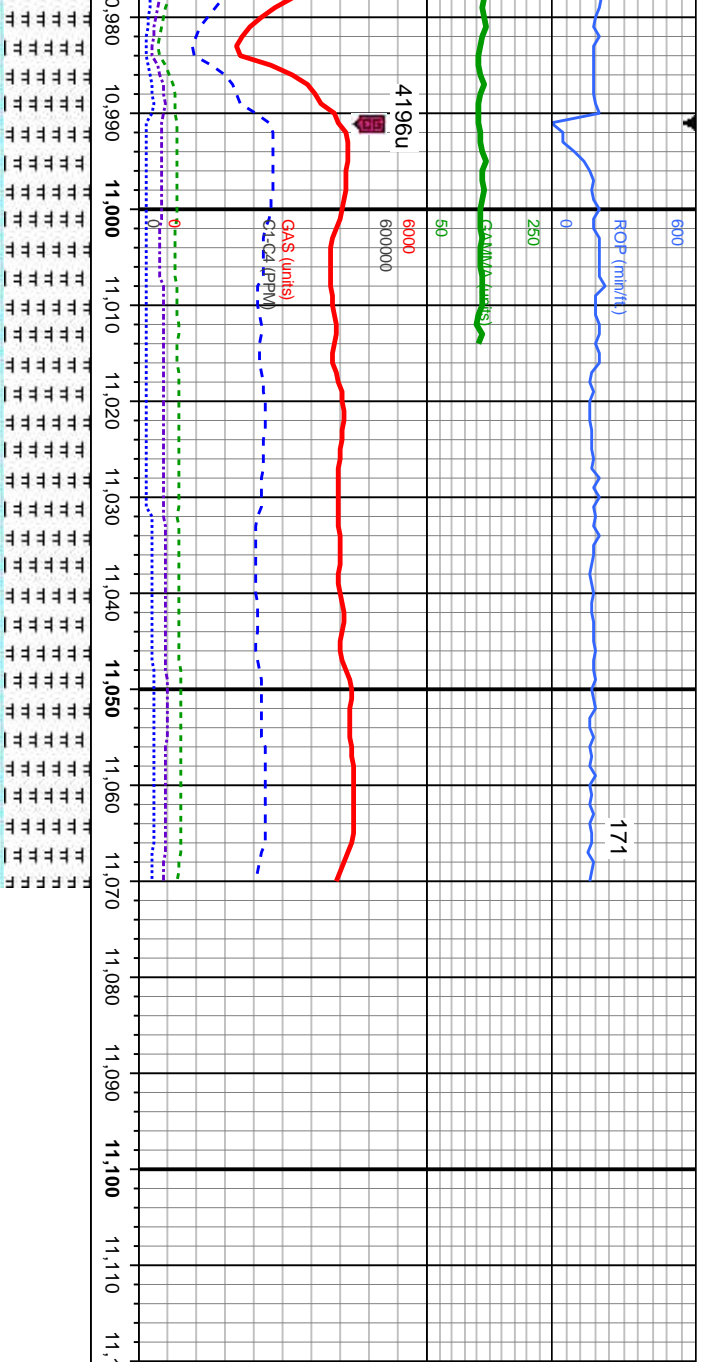


| | | | |
|---|------|---|--|
| MD: 10,548 TVD: 6,574.36 Inclination: 89.45 ° Azimuth: 89.14 ° | 6500 | MD: 10,643 TVD: 6,574.21 Inclination: 90.74 ° Azimuth: 88.81 ° | MD: 10,738 TVD: 6,573.59 Inclination: 90 ° Azimuth: 87.68 ° |
|---|------|---|--|

| | | | | | | | |
|------------------|--|---|---|---|---|---|---|
| cm and wxy - wxy | 60% CHK: lt gy - med gy, bnnd wi crm and off wh, sft, brit-fri, sb ply - blk, sb wxy - wxy | 40% CHK: lt gy - med gy, bnnd wi crm and off wh, sft - mod hd, sb ply - sb blk, sb wxy | 30% CHK: lt gy - med gy, bnnd wi crm and off wh, sft - mod hd, sb ply - sb blk, sb wxy | 70% MRL: pred dk gy, sme blk, mod hd-hd, brit-fis, sb ply - sb blk, thn lam, stly - gt tex, v calc, abnt fos frag, sme bent | 30% CHK: lt gy - med gy, bnnd wi crm and off wh, sft - mod hd, sb ply - sb blk, sb wxy | 70% MRL: pred dk gy, sme blk, mod hd-hd, brit-fis, sb ply - sb blk, thn lam, stly - gt tex, v calc, abnt fos frag, sme bent | 20% C |
| cm and wxy - wxy | 40% MRL: pred dk gy, sme blk, brn, mod hd-hd, brit-fis, sb ply - ply - thn lam, stly - gt tex, v calc thru, abnt scat fos frag, sme bent | 60% MRL: pred dk gy, sme blk, mod hd-hd, brit-fis, sb ply - sb blk, thn lam, stly - gt tex, v calc, abnt fos frag, sme bent | 70% MRL: pred dk gy, sme blk, mod hd-hd, brit-fis, sb ply - sb blk, thn lam, stly - gt tex, v calc, abnt fos frag, sme bent | 70% MRL: pred dk gy, sme blk, mod hd-hd, brit-fis, sb ply - sb blk, thn lam, stly - gt tex, v calc, abnt fos frag, sme bent | 70% MRL: pred dk gy, sme blk, mod hd-hd, brit-fis, sb ply - sb blk, thn lam, stly - gt tex, v calc, abnt fos frag, sme bent | 70% MRL: pred dk gy, sme blk, mod hd-hd, brit-fis, sb ply - sb blk, thn lam, stly - gt tex, v calc, abnt fos frag, sme bent | 80% MRL: pred dk gy, sme blk, mod hd-hd, brit-fis, sb ply - sb blk, thn lam, stly - gt tex, v calc, abnt fos frag, sme bent |







| | | |
|------|--------------------|--|
| 6500 | Projection to Bit: | MD: 11,070' |
| | | TVD: 6,572.63' |
| | | Inclination: 90.52 ° |
| | | Azimuth: 91.65 ° |
| | | TD @ 11,070' MD @ 20:53 hrs MDT on 07/10/2013 |
| | | Wellsite Geological Services Provided by Columbine Logging |

| | |
|---|---|
| 10% CHK: lt gy - med gy, bnnd wi crm and off wh, sft - mod hd, sb plty - sb blk, mot, sb wxy tex | 10% CHK: lt gy - med gy, bnnd wi crm and off wh, sft - mod hd, sb plty - sb blk, mot, sb wxy tex |
| 90% MRL: pred dk gy, sme blk, mod hd-hd, brit-fis, sb plty - sb blk, thn lam, stly - gt tex, v calc, abnt fos frag, abnt bent | 90% MRL: pred dk gy, sme blk, mod hd-hd, brit-fis, sb plty - sb blk, thn lam, stly - gt tex, v calc, abnt fos frag, abnt bent |