

COLUMBINE LOGGING

Scale: 5.15" / 100'
Measured Depth Log

Well Name Wells Ranch AE30-67-1BHNA(HORZ)

Location SEC29,T6N;R62W

State COLORADO

Country USA

API Number 05-123-38650-0000

Region DJ BASIN

Spud Date 4/5/2014

County WELD

Rig Number H&P 322

APE # 141107

Field WATTENBERG

Drilling Completed 4/12/2014

Surface Coordinates PROJECTED:

LAT: 40.4598°N

LONG: 104.35608°W

1959' FSL

65' FWL

Bottom Hole Coordinates PROJECTED:

1815' FNL

385' FEL

Ground Elevation 4764'

K.B. Elevation 4788'

Logged Interval 5767' **To** 11885'

Total Depth 11885'

Formation NIOBRARA "A" MARL

Type of Drilling Fluid MUD;WATER;POLY

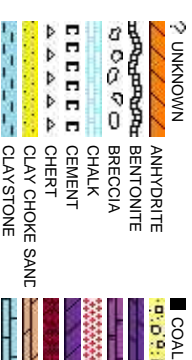
Company Noble Energy Inc.

Address 1625 BROADWAY
DENVER, CO 8020
(303) 228-4000

Name MIKE GREENE;MA

Company COLUMBINE LOGG

Address 2385 S. LIPAN ST
DENVER, COLORA
(303) 289-7764



Operator

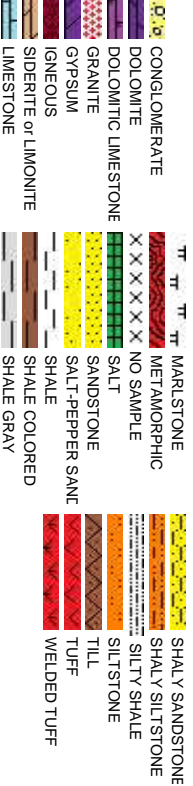
Geologist

MATTHEW HOPKINS; ELIZABETH STOREY

GING, INC.

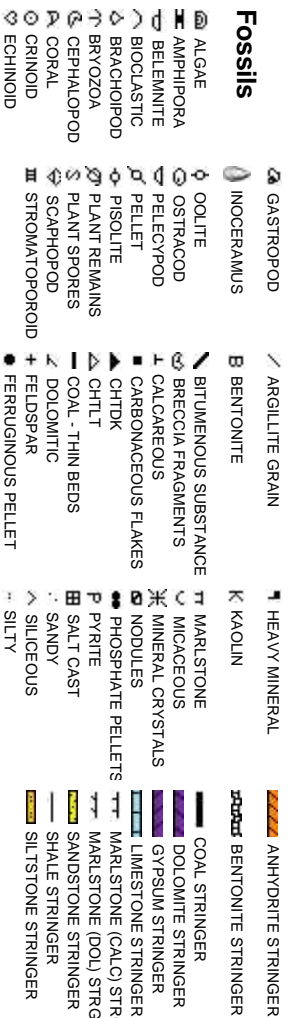
ADO 80223

Rock Types

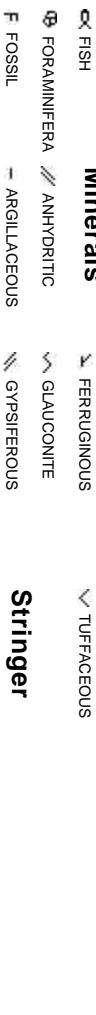


Accessories

Fossils



Minerals

**Springer**

Other Symbols

Oil Show



Engineering

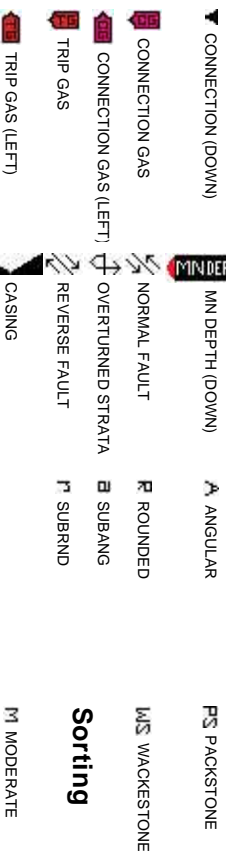


SPOTTED STAINING: CONNECTION (IIP)

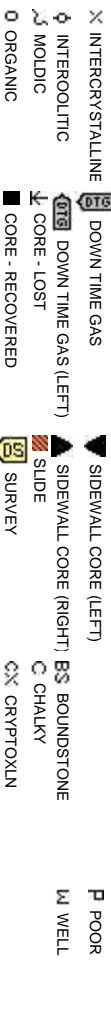
Rounding



Porosity



Textures



ROP
ROF
GAMMA

Total Gas & Chromatograph
GAS
C1
C2
C3
C4

Depth Labels

% Lith

Well Bore
TVD

Oil Show

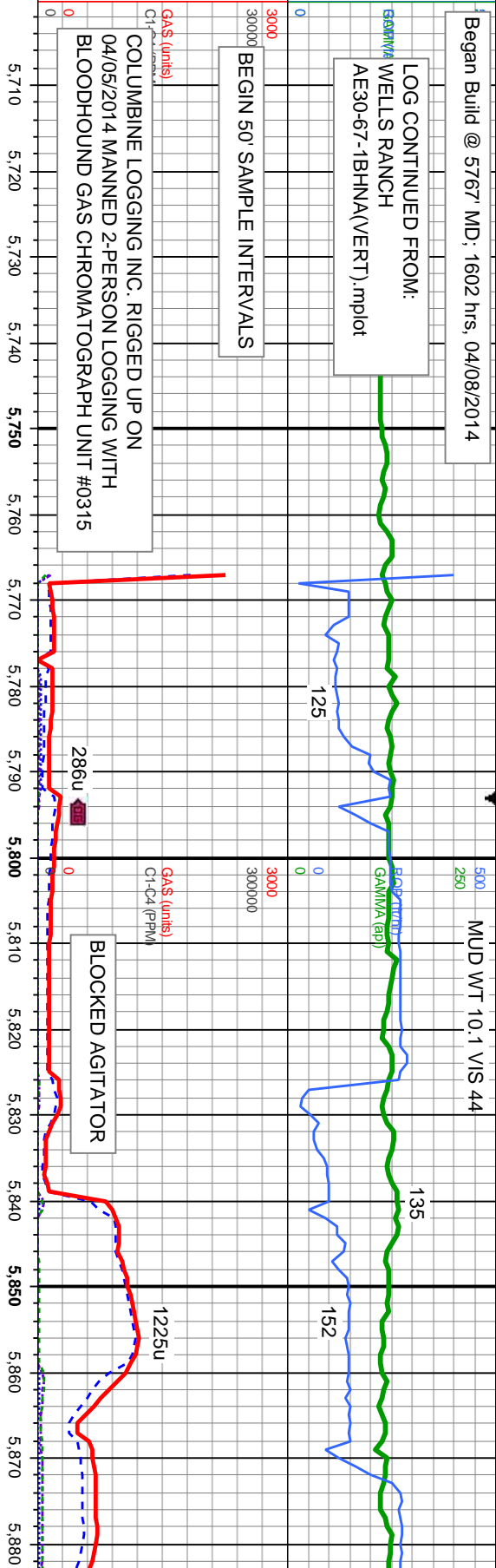
Images

Began Build @ 5767' MD; 1602 hrs, 04/08/2014

LOG CONTINUED FROM:
GAMMA WELLS RANCH
AE30-67-1BHNA(VERT).mplot

BEGIN 50' SAMPLE INTERVALS

COLUMBINE LOGGING INC. RIGGED UP ON
04/05/2014 MANNED 2-PERSON LOGGING WITH
BLOODHOUND GAS CHROMATOGRAPH UNIT #0315



100% SLTY SH: med-dk gy occ gy brn,
pity - sb pity firm-sf, rthy-sl slty

50% 100% SLTY SH: med-dk gy occ gy brn,
pity - sb pity firm-sf, rthy-sl slty

90% SLTY SH: med-dk gy occ
- sb pity, firm-sf, rthy-sl slty
10% SHY SS: wh - lt gy som
rd - sb ang, fr srt, fri, mod por

MD: 5,782 '
TVD: 5,769.95 '
Inclination: 0.13 °
Azimuth: 218.25 °
VS: 19.08 '

MD: 5,830 '
TVD: 5,817.94 '
Inclination: 1.38 °
Azimuth: 257.93 °
VS: 19.68 '

MD: 5,877 '
TVD: 5,864.84 '
Inclination: 5.87 °
Azimuth: 268.0 °
VS: 22.64 '

BHA #2
Bit Size: 8.750
Manufacturer: HDBS
Model: MMD55M
Serial Number: 12418246
Nozzles: 5x16
Motor Number: na
Manufacturer: Sperry Drilling
Model: Sperry Drill
Serial Number: 675-0140
Bend: 2.0

6600

excess
good
mod
fair
poor
slty

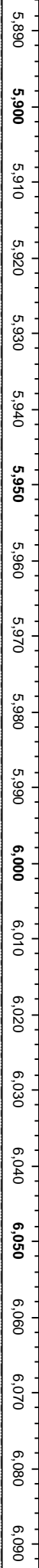
MUD WT 10.2 VIS 46

278

116

166u
C1: 67.0%
C2: 11.0%
C3: 14.0%
C4: 8.0%

448u



MUD WT 10.2 VIS 43

277

2169u
C1: 73.0%
C2: 13.0%
C3: 10.0%
C4: 4.0%

90% SLTY SH: med-dk gy occ gy brn, pily
- sb pily, firm-sl sft, rthy-sl sily
10% SHY SS: wh - lt gy some s&p, f gr, sb
rd- sb ang, fr srt, fri, mod por, arg cmt

90% SLTY SH: med-dk gy occ gy brn, pily
- sb pily, firm-sl sft, rthy-sl sily
10% SHY SS: wh - lt gy some s&p, f gr, sb
rd- sb ang, fr srt, fri, mod por, arg cmt

90% SLTY SH: med-dk gy occ gy brn, pily
- sb pily, firm-sl sft, rthy-sl sily
10% SHY SS: wh - lt gy some s&p, f gr, sb
rd- sb ang, fr srt, fri, mod por, arg cmt

95% SLTY SH: med-dk gy occ gy brn, pily
- sb pily, firm-sl sft, rthy-sl sily
5% SHY SS: wh - lt gy some s&p, f gr, sb
rd- sb ang, fr srt, fri, mod por, arg cmt

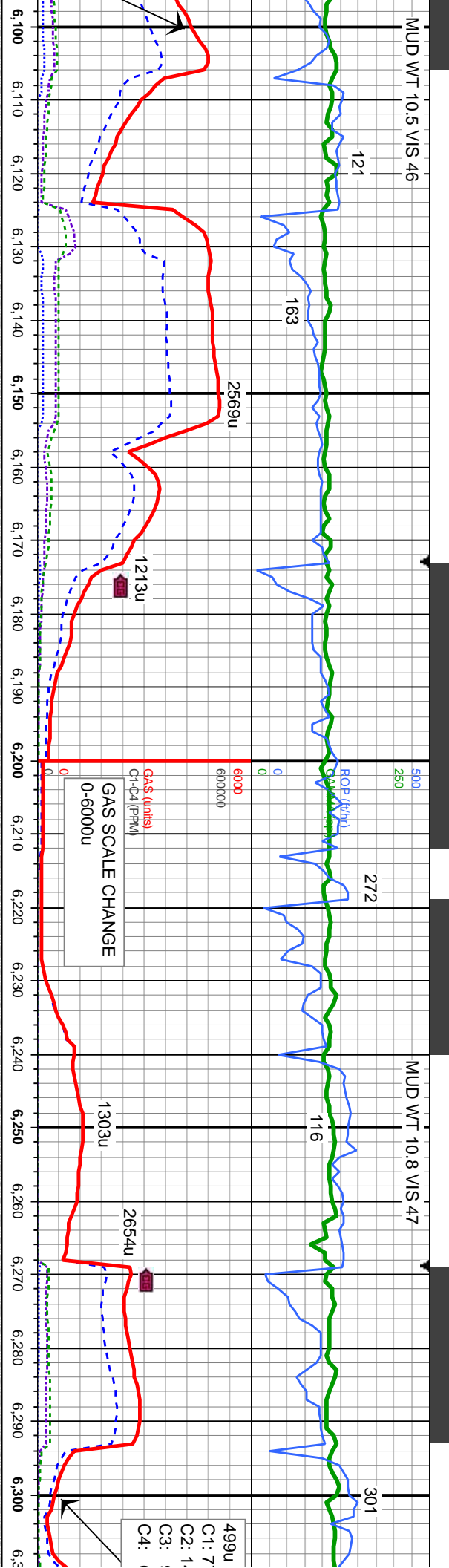
MD: 5.925 '
TVD: 5.912.31 '
Inclination: 10.94 °
Azimuth: 269.8 °
VS: 29.65 '

MD: 5.972 '
TVD: 5.957.92 '
Inclination: 16.76 °
Azimuth: 264.15 °
VS: 40.86 '

MD: 6.020 '
TVD: 6.003.52 '
Inclination: 19.66 °
Azimuth: 262.76 °
VS: 55.77 '

MD: 6.067 '
TVD: 6.047.81 '
Inclination: 19.4 °
Azimuth: 265.17 °
VS: 71.39 '





90% SLTY SH: med-dk gy occ gy brn, pty
- sb pty, firm-sl sft, rthy-sl sily
10% SHY SS: wh - lt gy some s&p, f gr, sb
rd- sb ang, fr srt, fri, mod por, arg cnt

90% SLTY SH: med-dk gy occ gy brn, pty
- sb pty, firm-sl sft, rthy-sl sily
10% SHY SS: wh - lt gy some s&p, f gr, sb
rd- sb ang, fr srt, fri, mod por, arg cnt

55% 90% SLTY SH: med-dk gy occ gy brn, pty
- sb pty, firm-sl sft, rthy-sl sily
10% SHY SS: wh - lt gy some s&p, f gr, sb
rd- sb ang, fr srt, fri, mod por, arg cnt

95% SLTY SH: med-dk gy occ gy brn, pty
- sb pty, firm-sl sft, rthy-sl sily
5% SHY SS: wh - lt gy some s&p, f gr, sb
rd- sb ang, fr srt, fri, mod por, arg cnt

100%
pty - s

MD: 6,114 '
TVD: 6,091.74 '
Inclination: 22.25 °
Azimuth: 265.18 °
VS: 88.05 '

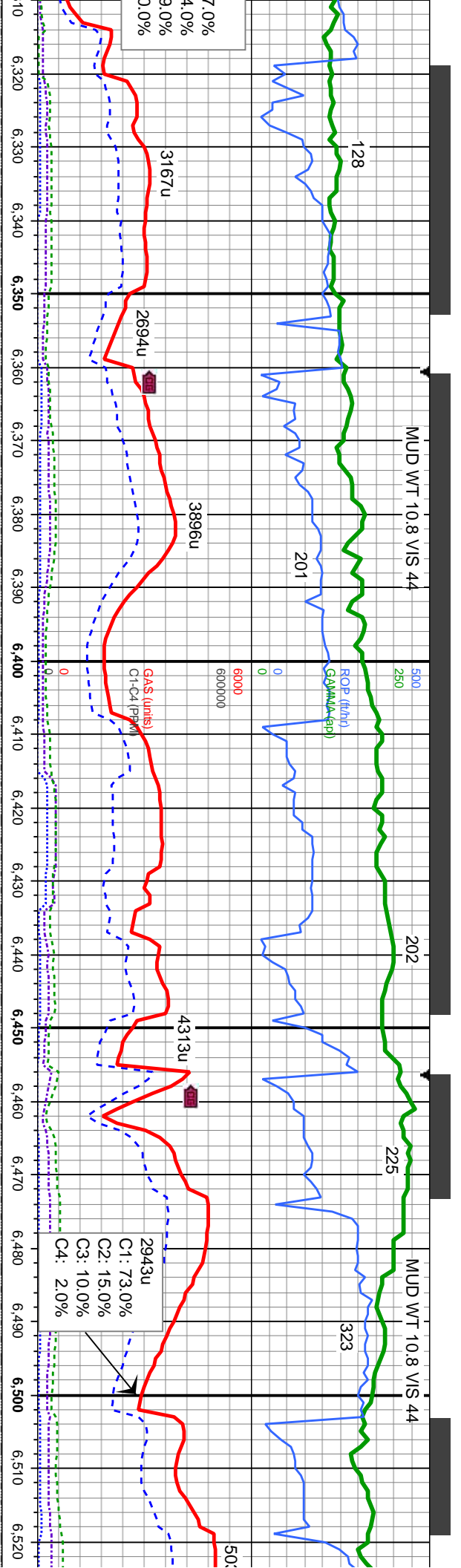
MD: 6,161 '
TVD: 6,134.21 '
Inclination: 28.33 °
Azimuth: 266 °
VS: 108.06 '

MD: 6,209 '
TVD: 6,174.9 '
Inclination: 35.61 °
Azimuth: 267.37 °
VS: 133.42 '

MD: 6,256 '
TVD: 6,212.45 '
Inclination: 38.33 °
Azimuth: 268.33 °
VS: 161.67 '

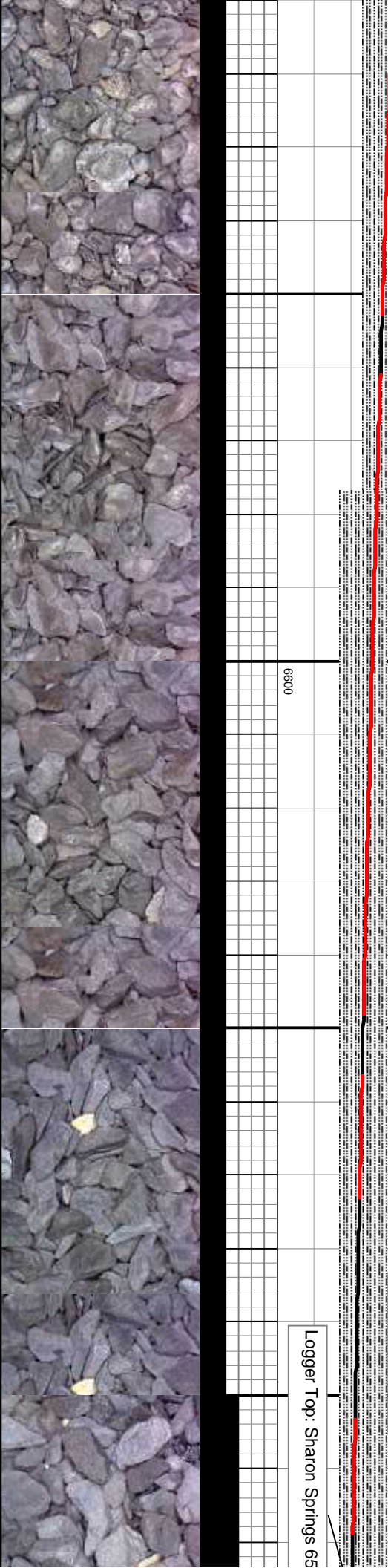
MD: 6,303 '
TVD: 6,248.71 '
Inclination: 40.6 °
Azimuth: 268.7 °
VS: 191.56 '

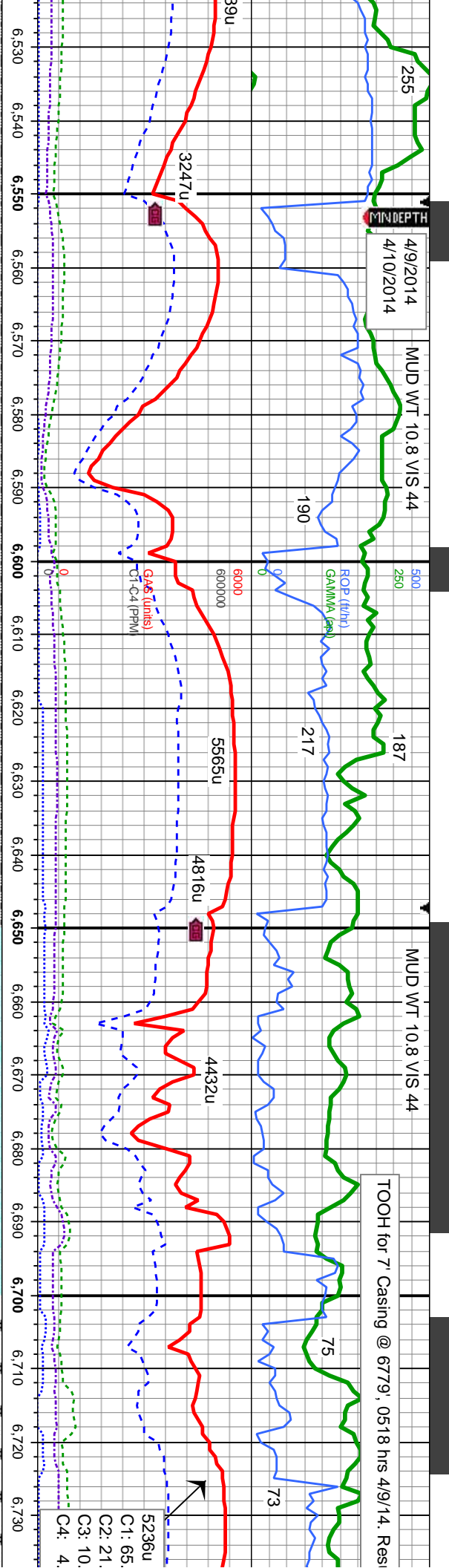




SLTY SH: med-dk gy occ gy brn, sb plty firm-slt, rthy-sltly	100% SLTY SH: med-dk gy occ gy brn, plty - sb plty firm-slt, rthy-sltly	550 100% SLTY SH: med-dk gy occ gy brn, plty - sb plty firm-slt, rthy-sltly	100% SLTY SH: med-dk gy occ gy brn, plty - sb plty firm-slt, rthy-sltly	100% SLTY SH: med-dk gy occ gy brn, plty - sb plty firm-slt
MD: 6,350 ' TVD: 6,283.17 ' Inclination: 44.99 ° Azimuth: 268.03 ° VS: 223.5 '	MD: 6,398 ' TVD: 6,314.65 ' Inclination: 52.97 ° Azimuth: 267.6 ° VS: 259.66 '	MD: 6,445 ' TVD: 6,340.23 ' Inclination: 61.02 ° Azimuth: 267.18 ° VS: 299.01 '	MD: 6,493 ' TVD: 6,362.22 ' Inclination: 64.44 ° Azimuth: 267.58 ° VS: 341.63 '	

Logger Top: Sharon Springs 65





med-dk gy occ gy brn, sft, rthy-sl silty	100% SLTY SH: med-dk gy occ gy brn, ply - sb ply firm-sl sft, rthy-sl silty	55% CHK: lt gy - gy-brn, sub-blky, fir-sft, occ clay like, mot-rthy tex, v calc	100% CHK: lt gy - gy-brn, sub-blky, fir-sft, occ clay like, mot-rthy tex, v calc	80% CHK: lt gy - gy-brn, sub-blky, clay like, mot-rthy tex, v calc
--	---	---	--	--

MD: 6,540' TVD: 6,381.54' Inclination: 67.02° Azimuth: 268.29° VS: 384.45'

MD: 6,588' TVD: 6,399.92' Inclination: 67.94° Azimuth: 269.66° VS: 428.78'

MD: 6,635' TVD: 6,417.22' Inclination: 68.86° Azimuth: 269.2° VS: 472.48'

MD: 6,683' TVD: 6,432.86' Inclination: 73.11° Azimuth: 267.51° VS: 517.83'

MD: 6,721' TVD: 6,442.92' Inclination: 76.17° Azimuth: 266.27° VS: 554.42'

Logger Top: A CHALK 6618' MD, 6410.96 TVD

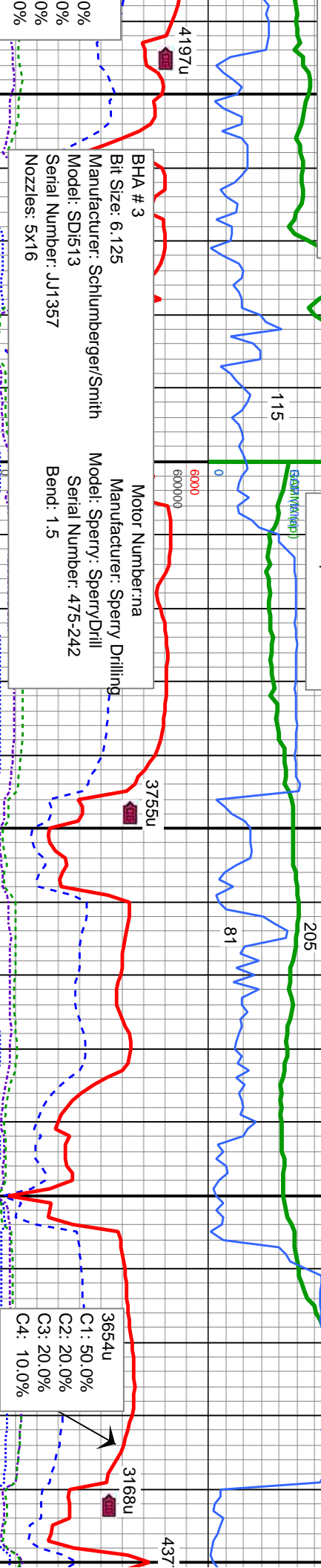
Logger Top: A MARL 6705' MD, 6438.95 TVD



MUD WT 10.8 VIS 42

Gamma Scale Change
0 - 400 api

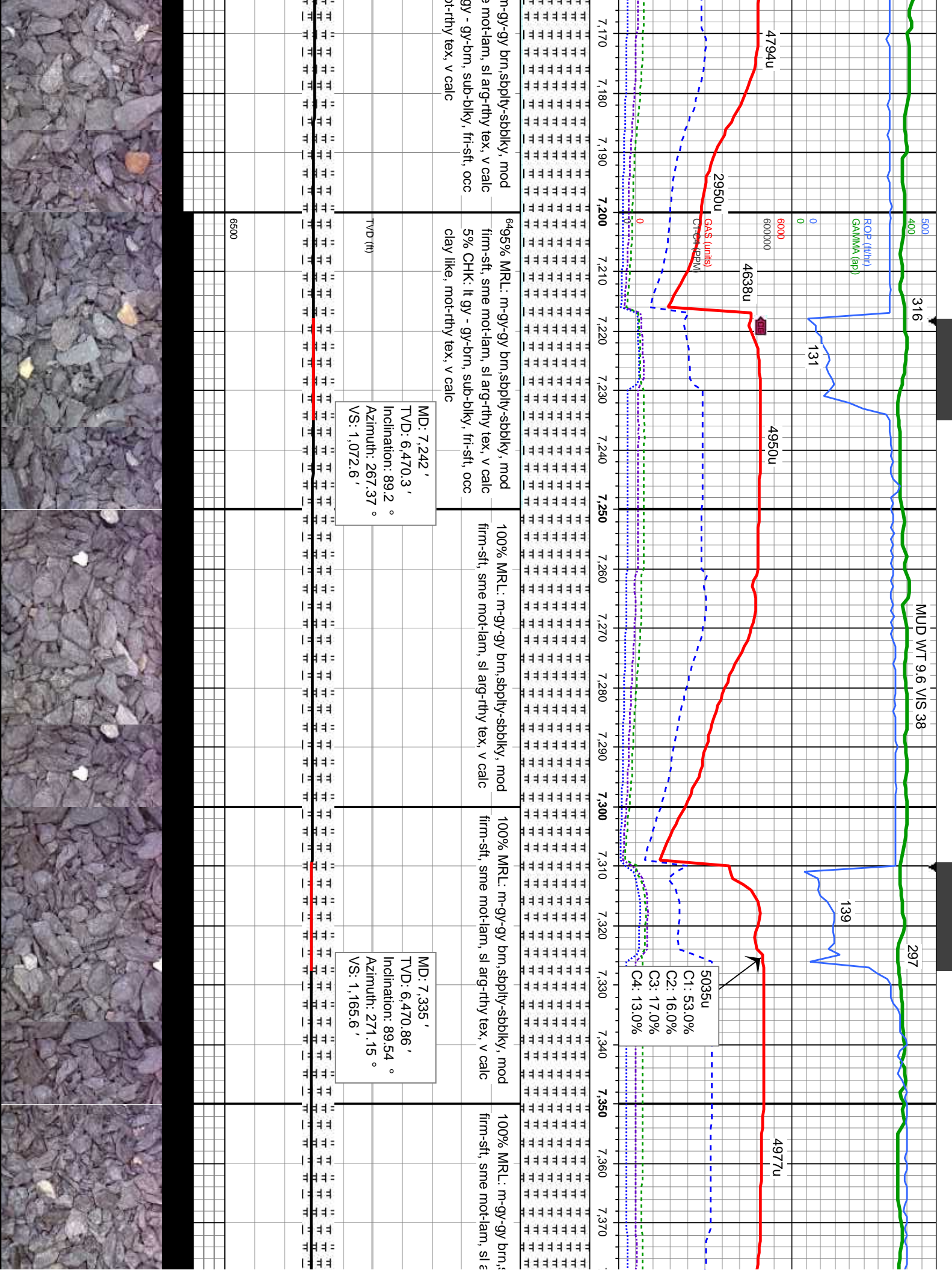
MUD WT 9.7 VIS 39



fri-sft, occ	650% CHK: lt gy - gy-brn, sub-bkly, fri-sft, occ clay like, mot-rthy tex, v calc	685% MRL: m-gy-gy brn, sbply-sbdkly, mod firm-sft, sme mot-lam, sl arg-rthy tex, v calc	95% MRL: m-gy-gy brn, sbply-sbdkly, mod firm-sft, sme mot-lam, sl arg-rthy tex, v calc	100% MRL: m-gy-gy brn, sbply-sbdkly, mod firm-sft, sme mot-lam, sl arg-rthy tex, v calc
clay, mod	50% MRL: m-gy-gy brn, sbply-sbdkly, mod	15% CHK: lt gy - gy-brn, sub-bkly, fri-sft, occ clay like, mot-rthy tex, v calc	5% CHK: lt gy - gy-brn, sub-bkly, fri-sft, occ clay like, mot-rthy tex, v calc	
ex, v calc	firm-sft, sme mot-lam, sl arg-rthy tex, v calc			
TVD SCALE CHANGE: 6400-6500				
MD: 6,822 ' TVD: 6,459.67 ' Inclination: 84.72 ° Azimuth: 265.91 ° VS: 653.72 '				
MD: 6,871 ' TVD: 6,463.67 ' Inclination: 85.93 ° Azimuth: 265.25 ° VS: 702.42 '				







MUD WT 9.6 VIS 38

297

ROP (ft/hr)
GAMMA (api)

131

139

4977u

4950u

4794u

5035u

C1: 53.0%
C2: 16.0%
C3: 17.0%
C4: 13.0%

CAS (units)
CHECKED

2950u

4638u

6495% MRL: m-gy-gy brn, sbply-sbblky, mod firm-sft, sme mot-lam, sl arg-rthy tex, v calc
5% CHK: lt gy - gy-brn, sub-blky, fir-sft, occ clay like, mot-rthy tex, v calc

100% MRL: m-gy-gy brn, sbply-sbblky, mod firm-sft, sme mot-lam, sl arg-rthy tex, v calc

100% MRL: m-gy-gy brn, sbply-sbblky, mod firm-sft, sme mot-lam, sl arg-rthy tex, v calc

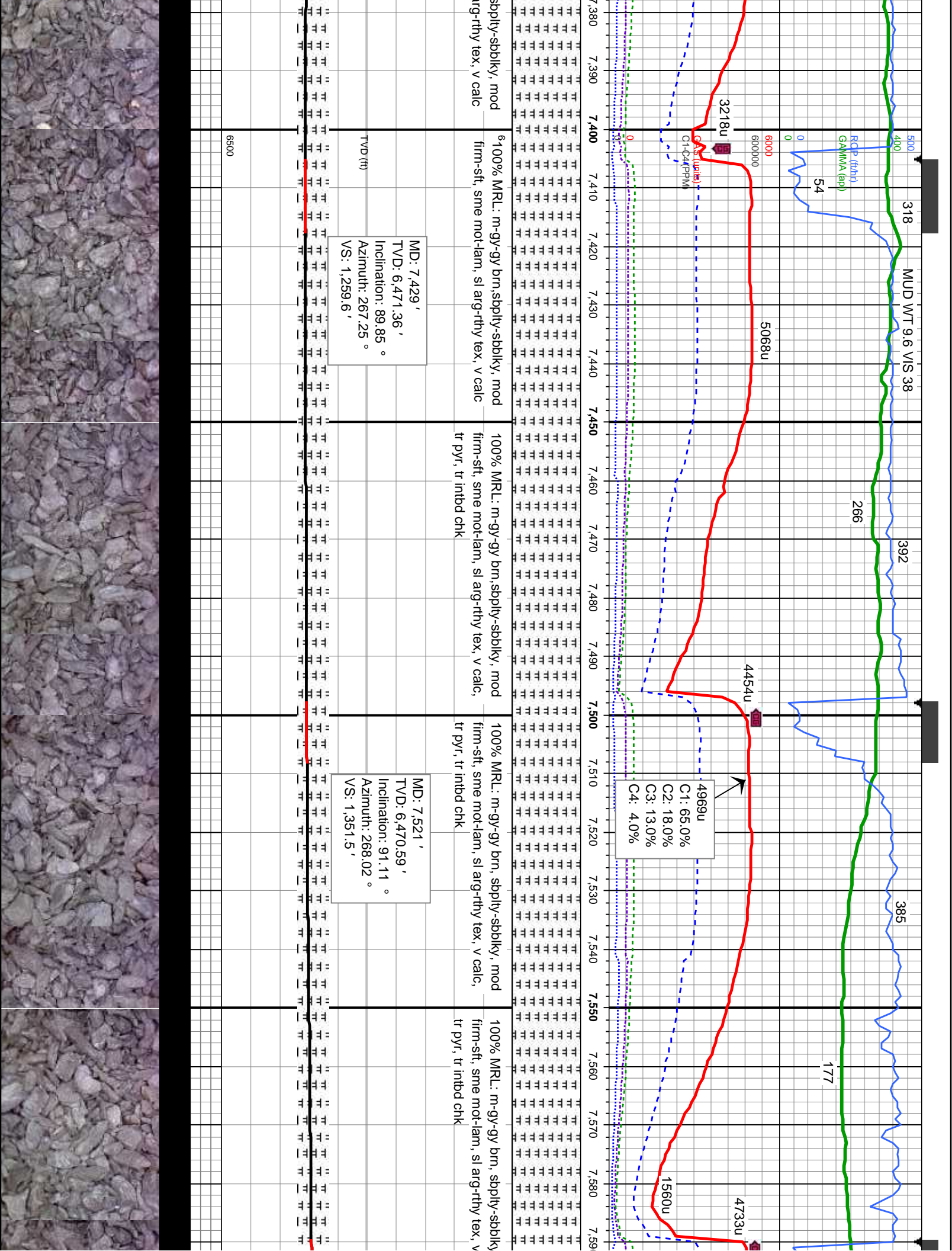
100% MRL: m-gy-gy brn, sbply-sbblky, mod firm-sft, sme mot-lam, sl arg-rthy tex, v calc

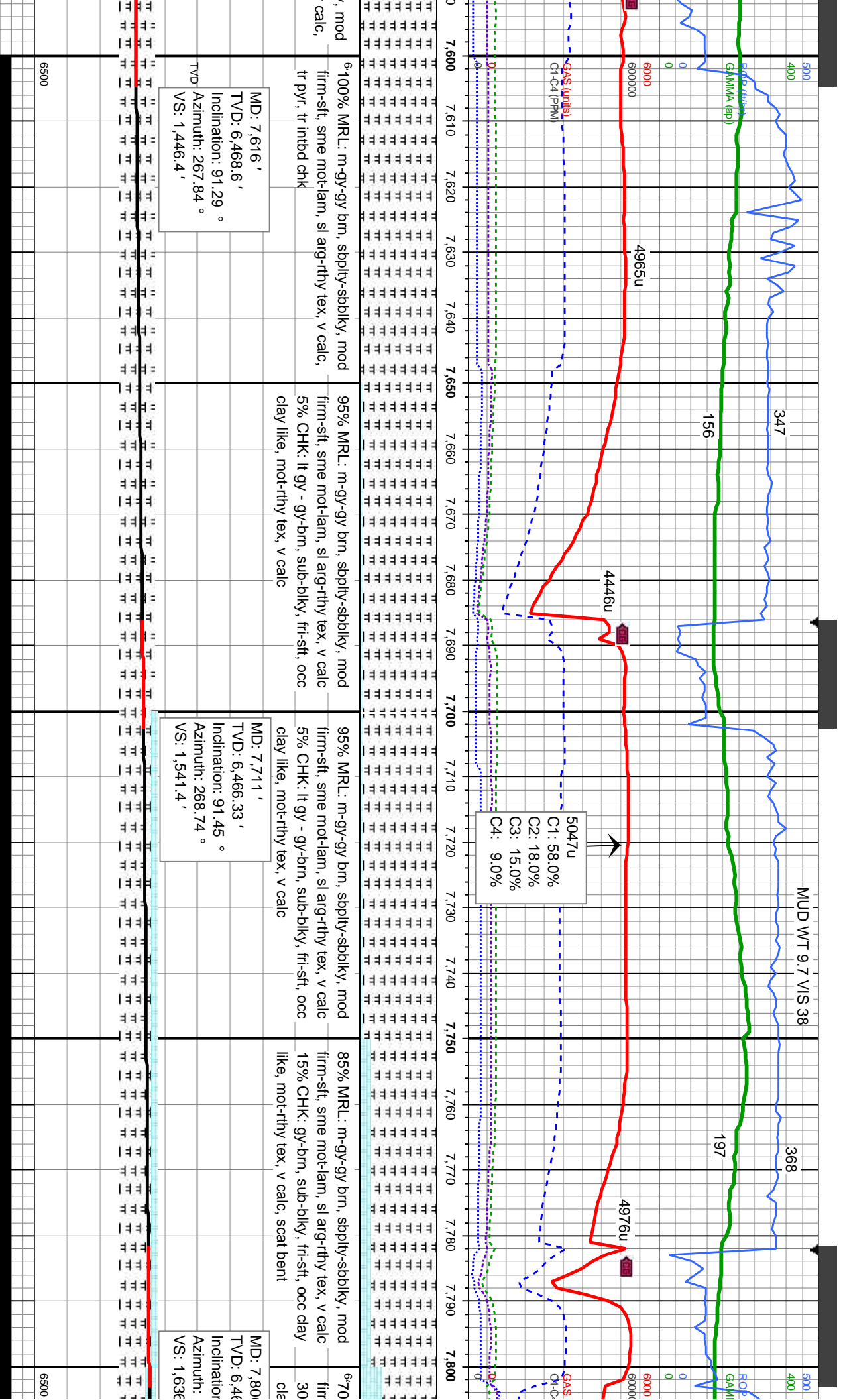
MD: 7,242'
TVD: 6,470.3'
Inclination: 89.2°
Azimuth: 267.37°
VS: 1,072.6'

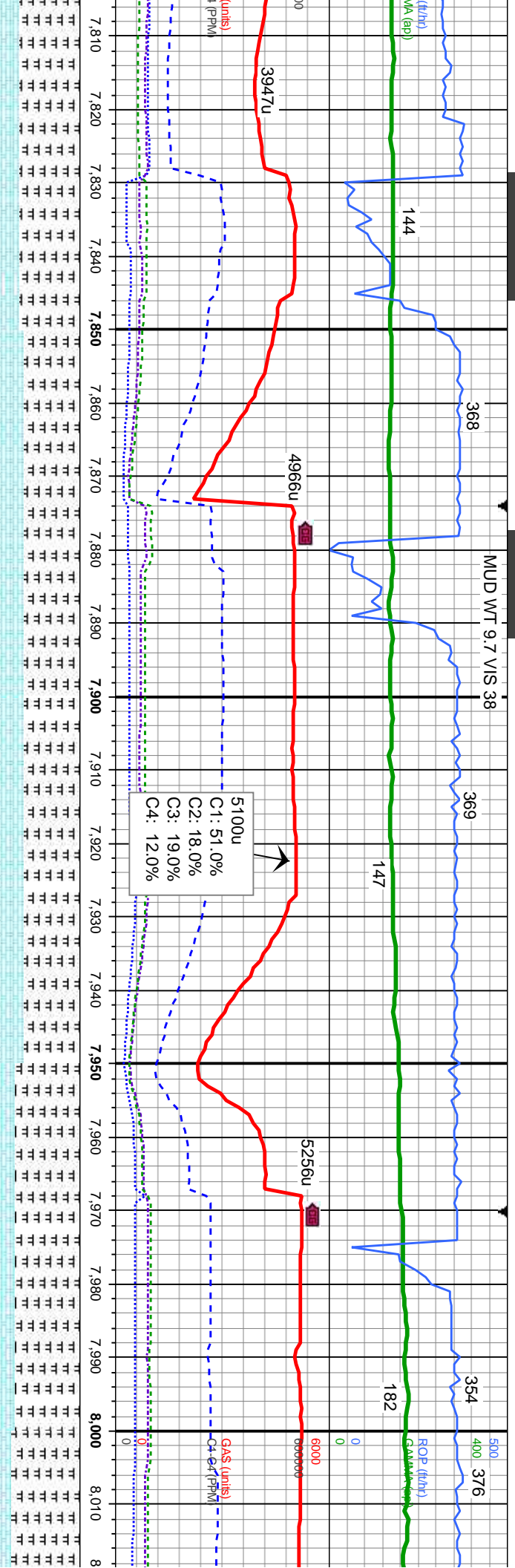
MD: 7,335'
TVD: 6,470.86'
Inclination: 89.54°
Azimuth: 271.15°
VS: 1,165.6'

TVD (ft)

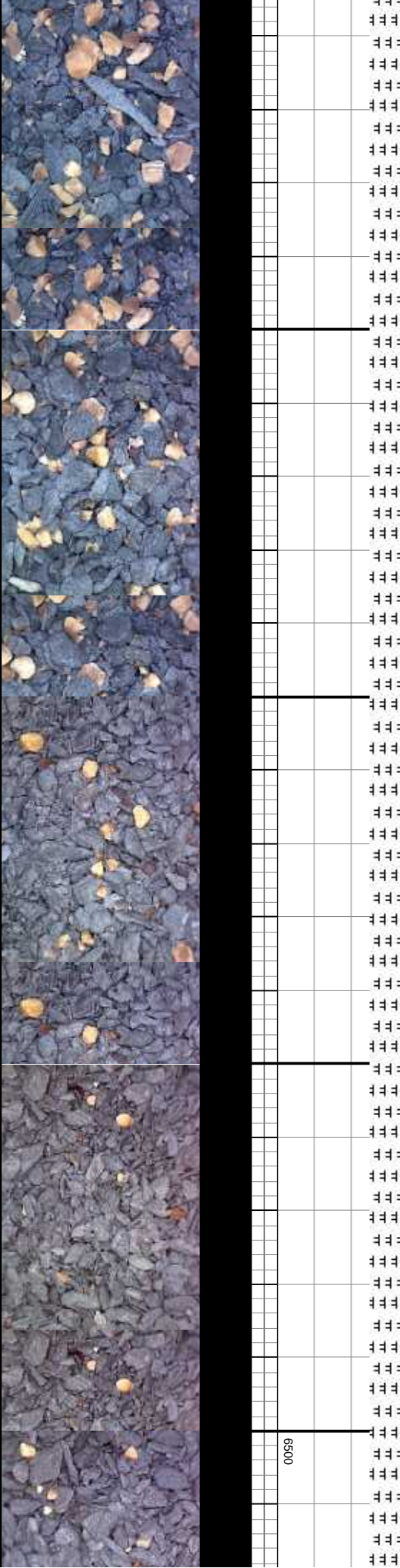
6500



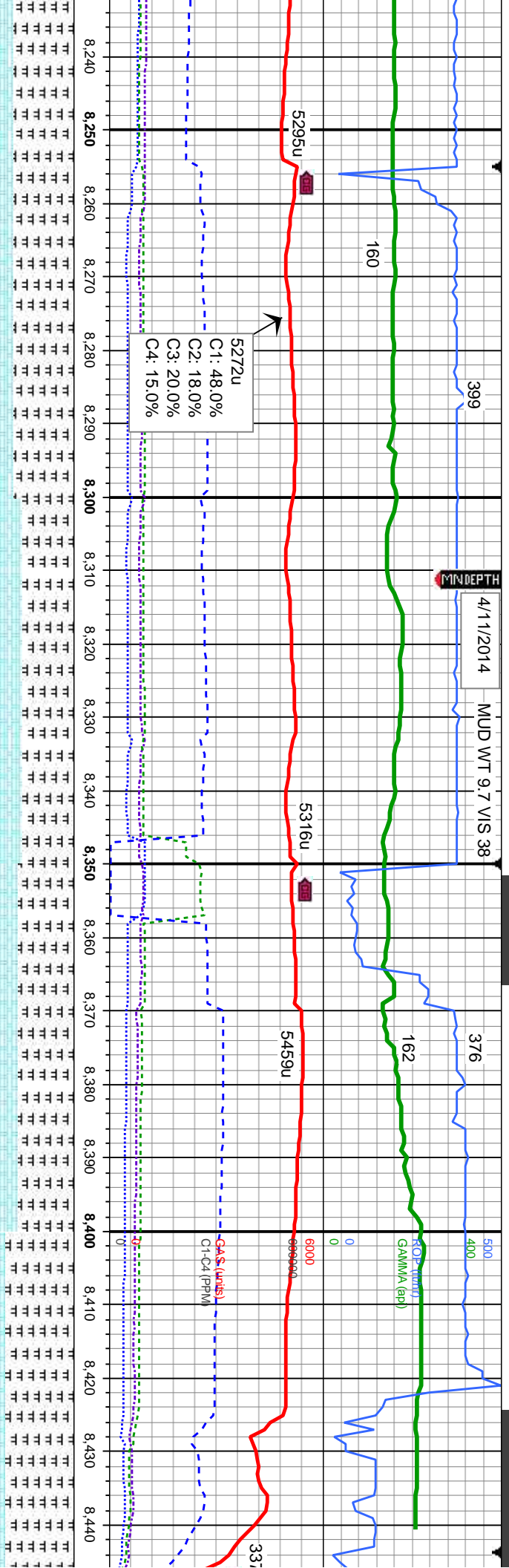




65% MRL: lt-gy-gy, sbply-sbbkly, mod firm-sft, mot-lam, sl arg-rthy tex, v calc 35% CHK: lt gy-gy-brn, sub-bkly, fri-sft, occ clay like, mot-rthy tex, v calc, scat bent, tr fos			65% MRL: lt-gy-gy, sbply-sbbkly, mod firm-sft, mot-lam, sl arg-rthy tex, v calc 35% CHK: lt gy-gy-brn, sub-bkly, fri-sft, occ clay like, mot-rthy tex, v calc, scat bent, tr fos			75% MRL: lt-gy-gy, sbply-sbbkly, mod firm-sft, mot-lam, sl arg-rthy tex, v calc 25% CHK: lt gy-gy-brn, sub-bkly, fri-sft, occ clay like, mot-rthy tex, v calc			80% MRL: lt-gy-gy, sbply-sbbkly, mod firm-sft, mot-lam, sl arg-rthy tex, v calc 20% CHK: lt gy-gy-brn, sub-bkly, fri-sft, occ clay like, mot-rthy tex, v calc		
MD: 7,901' TVD: 6,464.95' Inclination: 89.29° Azimuth: 269.76° VS: 1,731.3'			MD: 7,901' TVD: 6,464.95' Inclination: 89.29° Azimuth: 269.76° VS: 1,731.3'			MD: 7,997' TVD: 6,465.55' Inclination: 90° Azimuth: 268.6° VS: 1,827.3'			MD: 7,997' TVD: 6,465.55' Inclination: 90° Azimuth: 268.6° VS: 1,827.3'		

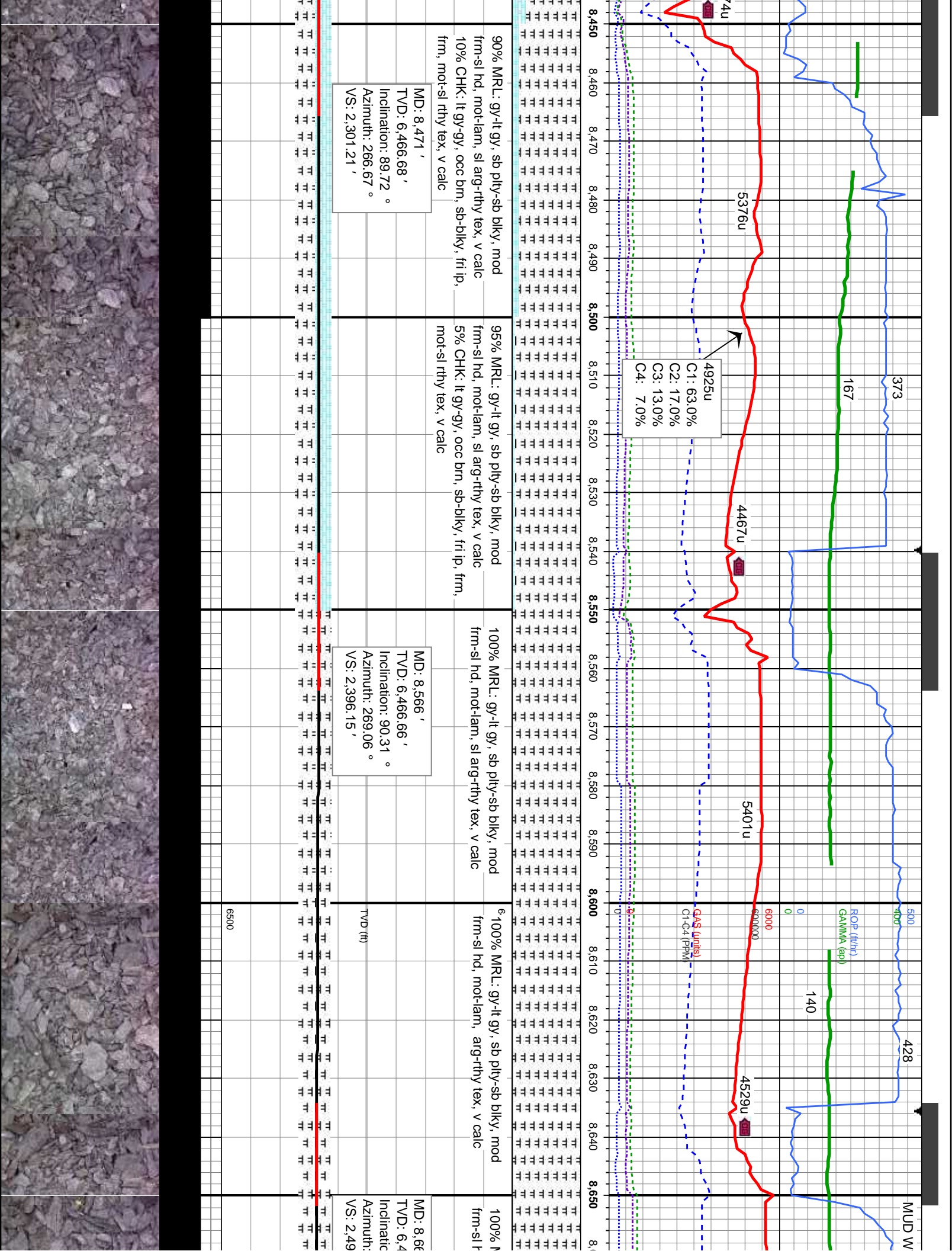


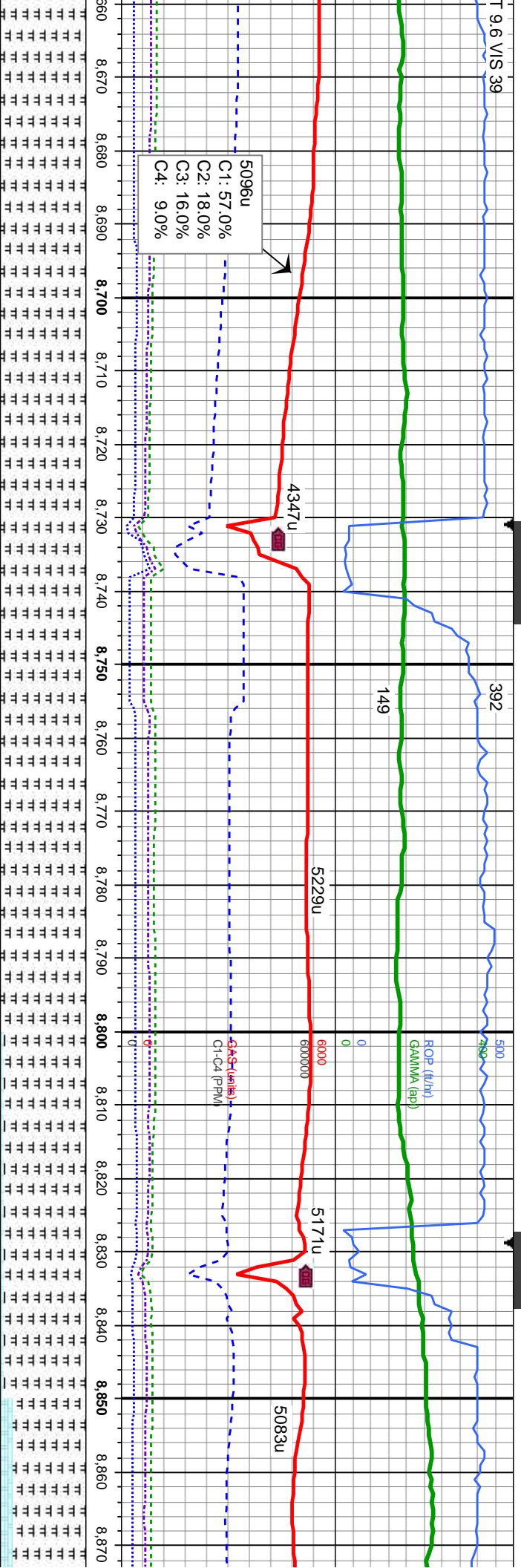
4/11/2014 MUD WT 9.7 VIS 38



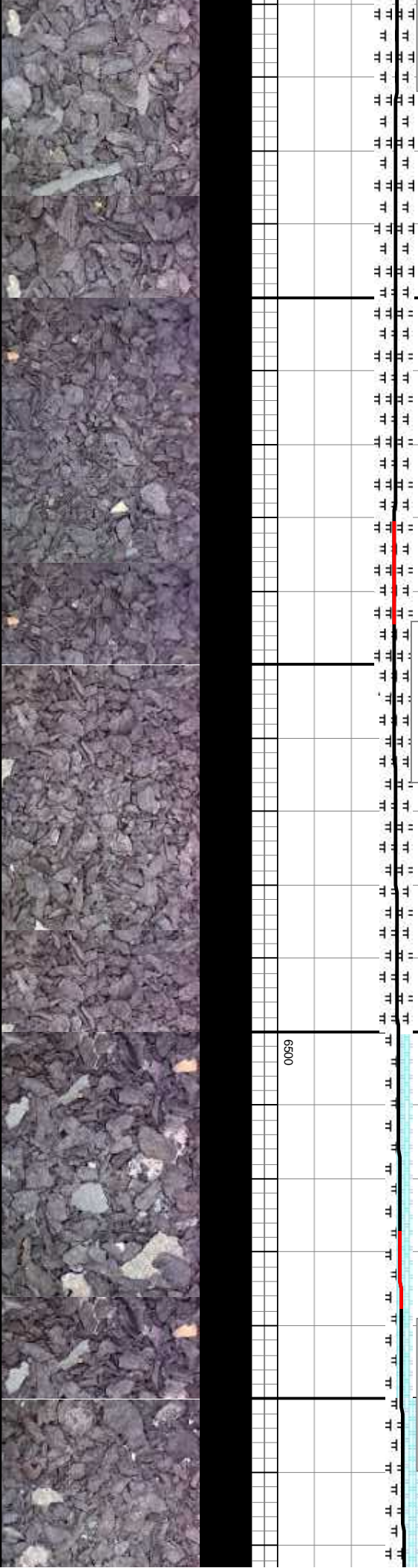
70% MRL: lt-gy-gy, sbply-sbply, mod firm-sft, mot-lam, sl arg-rthy tex, v calc 30% CHK: lt-gy-gy-brn, sub-biky, fri-sft, occ clay like, mot-rthy tex, v calc, tr fos	60% MRL: gy-lt-gy, sbply-sbply, mod firm-sft, mot-lam, sl arg-rthy tex, v calc 40% CHK: lt-gy-gy, sub-biky, fri-sft, occ clay like, mot-sl rthy tex, v calc, tr fos	65% MRL: gy-lt-gy, sb ply-sb biky, mod frm-sl hd, mot-lam, sl arg-rthy tex, v calc 35% CHK: lt-gy-gy, occ brn, sb-biky, fri ip, frm, mot-sl rthy tex, v calc, tr fos	80% MRL: gy-lt-gy, sb ply-sb biky, mod frm-sl hd, mot-lam, sl arg-rthy tex, v calc 20% CHK: lt-gy-gy, occ brn, sb-biky, fri ip, frm, mot-sl rthy tex, v calc
MD: 8,281 ' TVD: 6,467.52 ' Inclination: 90.99 ° Azimuth: 269.66 ° VS: 2,111.3 '		MD: 8,376 ' TVD: 6,466.57 ' Inclination: 90.15 ° Azimuth: 268.59 ° VS: 2,206.3 '	TVD (ft)

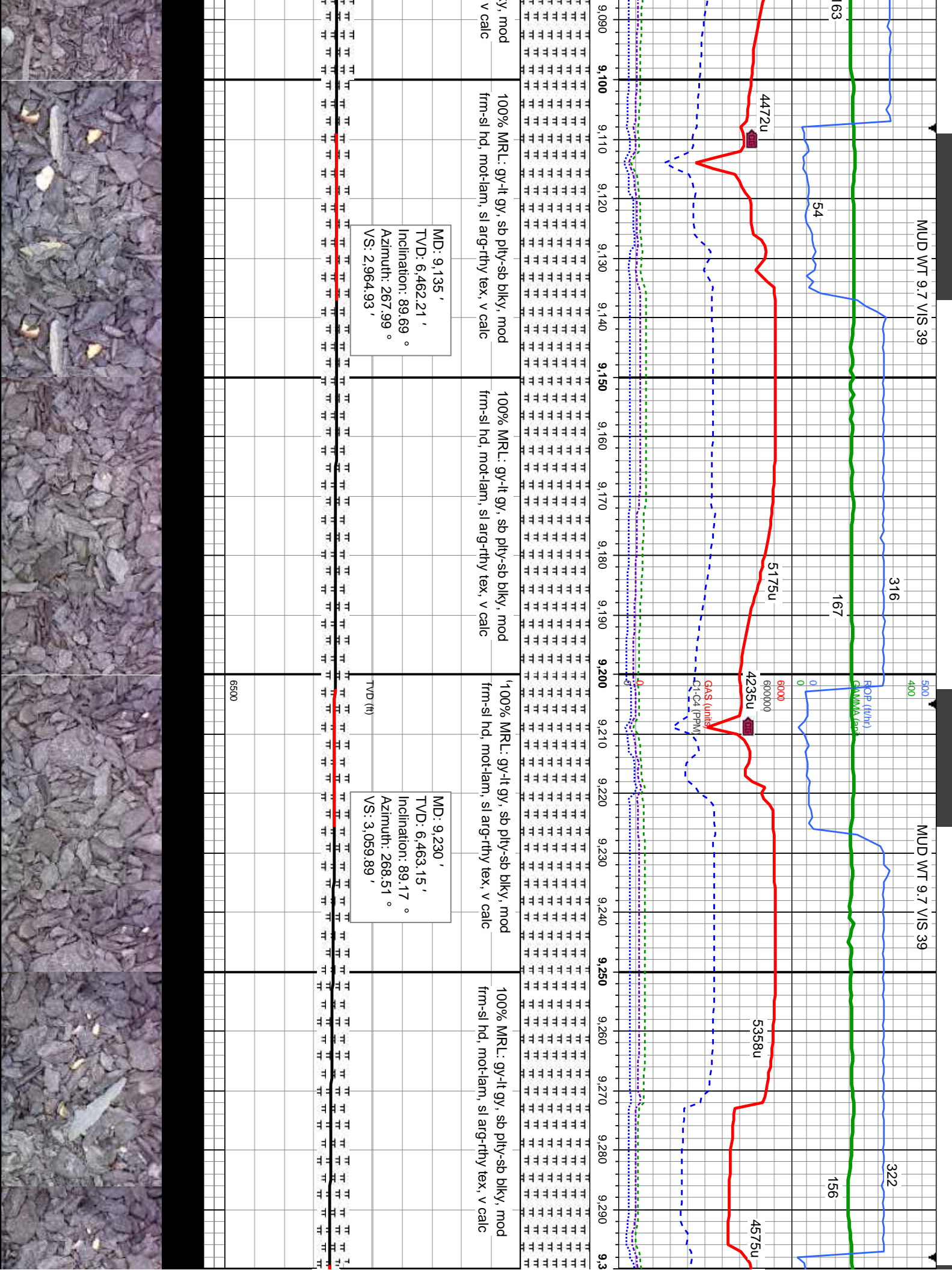


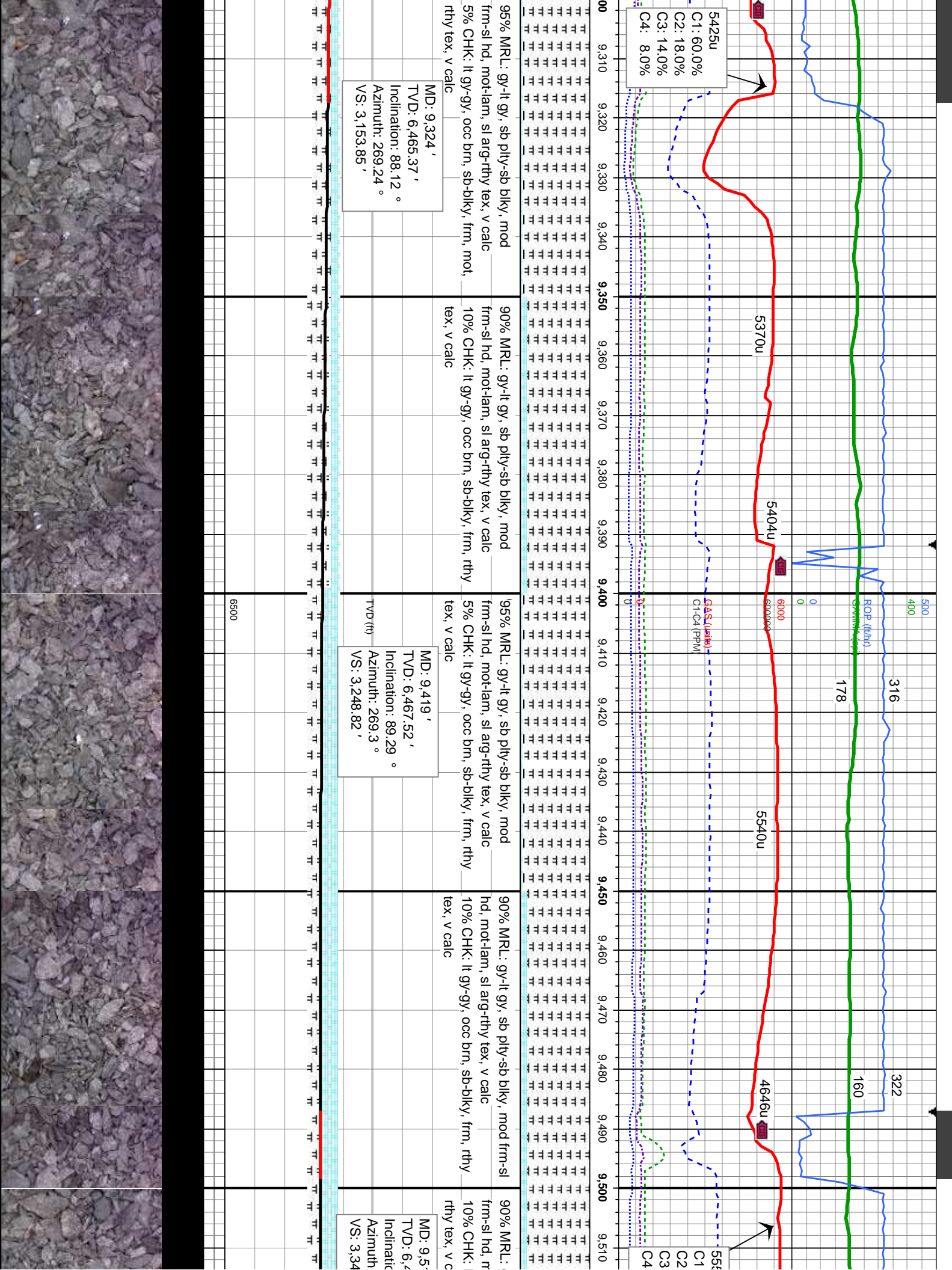


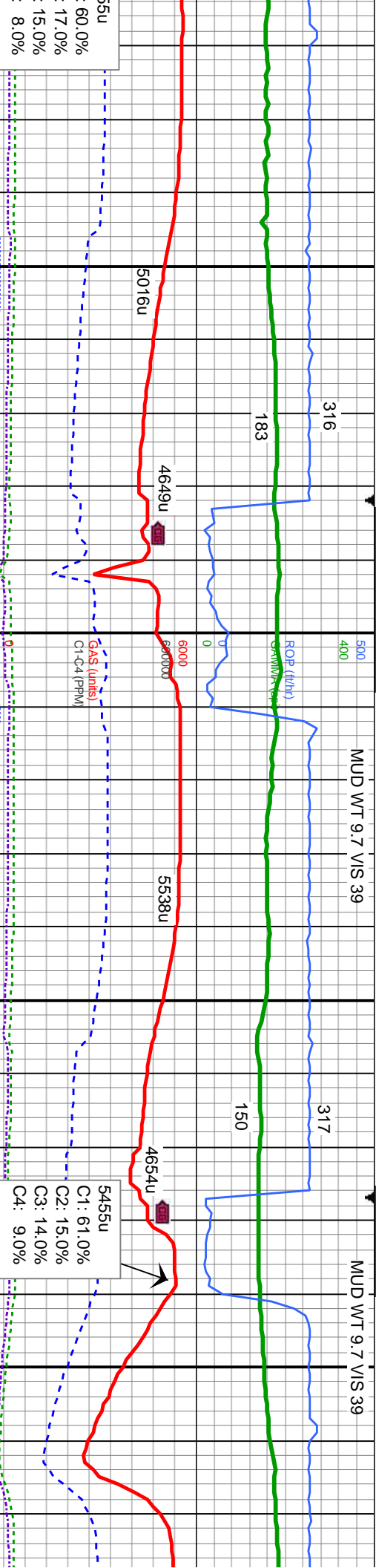


MRL: gy-lt gy, sb pty-sb blk, mod		100% MRL: gy-lt gy, sb pty-sb blk, mod	100% MRL: gy-lt gy, sb pty-sb blk, mod	64% MRL: gy-lt gy, sb pty-sb blk, mod	85% MRL: gy-lt gy, sb pty-sb blk, mod
d, mot-lam, arg-rthy tex, v calc		frm-sl hd, mot-lam, arg-rthy tex, v calc	frm-sl hd, mot-lam, arg-rthy tex, v calc	frm-sl hd, mot-lam, sl arg-rthy tex, v calc	frm-sl hd, mot-lam, sl arg-rthy tex, v calc
0.11'				5% CHK: lt gy-gy, occ brn, sb-blk, fin ip, frm, mot-sl rthy tex, v calc	15% CHK: lt gy-gy, occ brn, sb-blk, fin ip, frm, mot-sl rthy tex, v calc
MD: 8,755'		MD: 8,755'		MD: 8,850'	
TV: 6,468.15'		TV: 6,468.15'		TV: 6,466.06'	
Inclination: 90.52°		Inclination: 90.52°		Inclination: 92°	
Azimuth: 268.3°		Azimuth: 268.3°		Azimuth: 268.68°	
VS: 2,585.05'		VS: 2,585.05'		VS: 2,680'	
TVD (ft)		TVD (ft)		TVD (ft)	
6500		6500		6500	





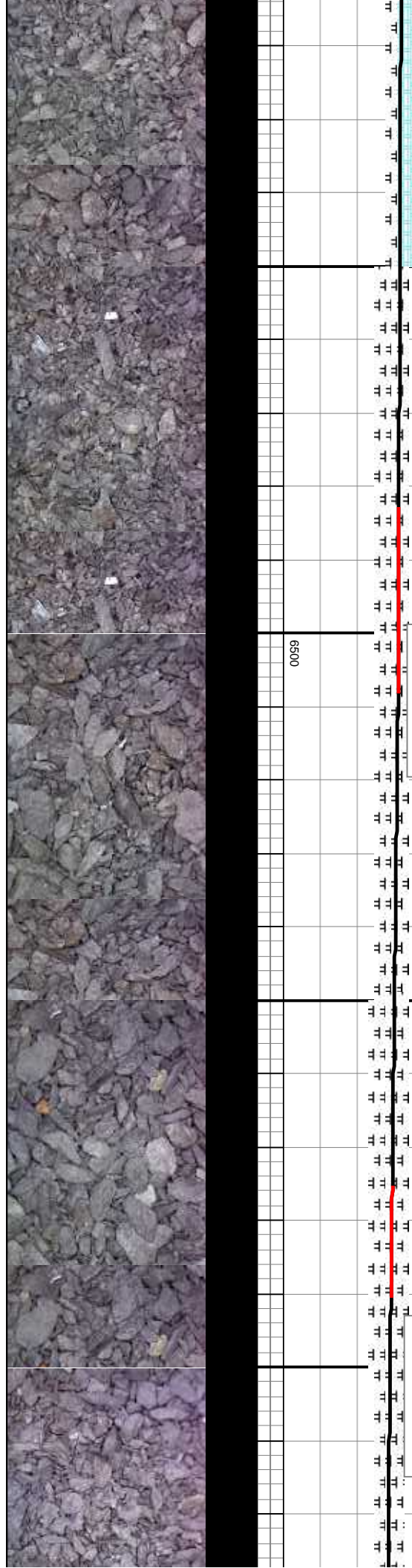


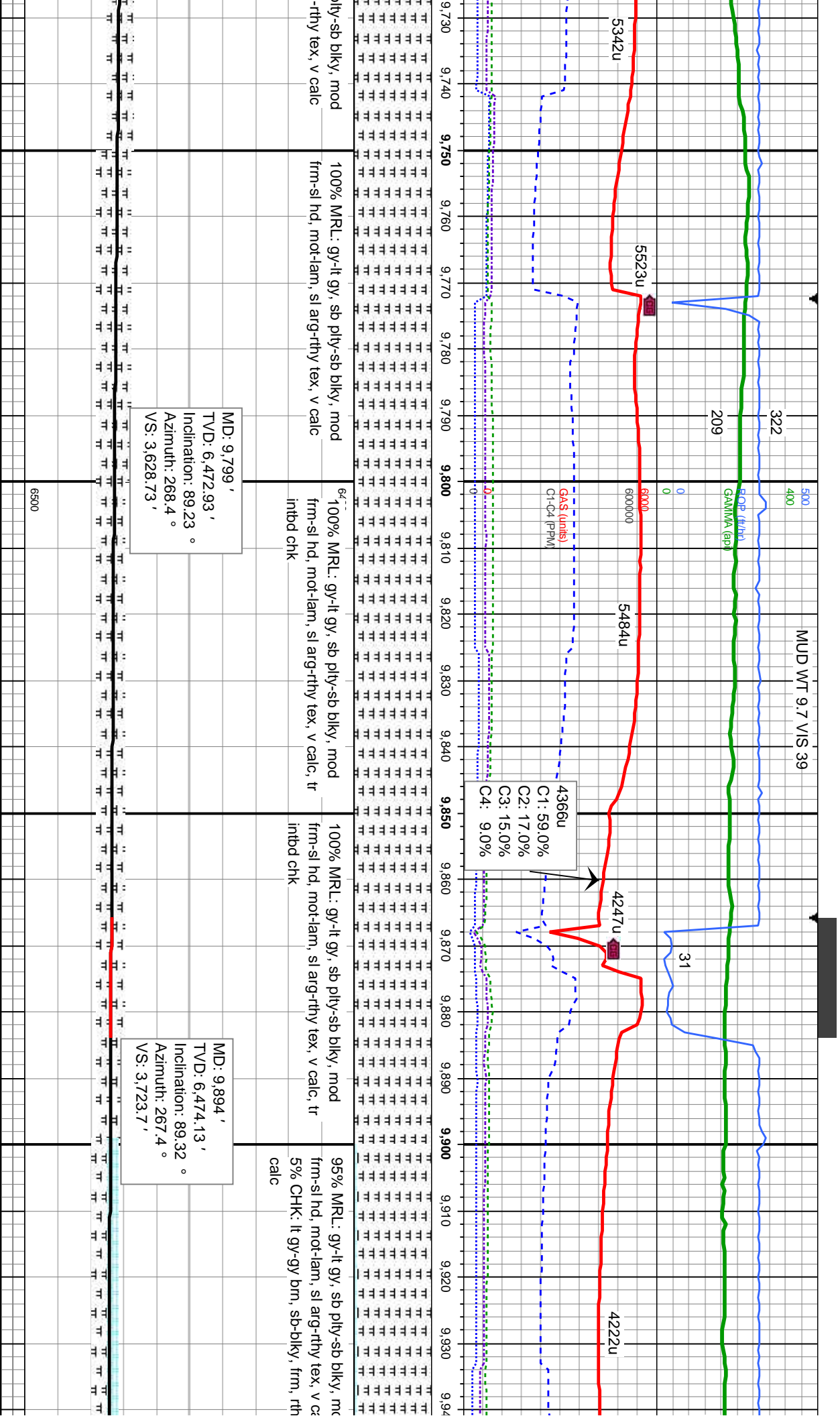


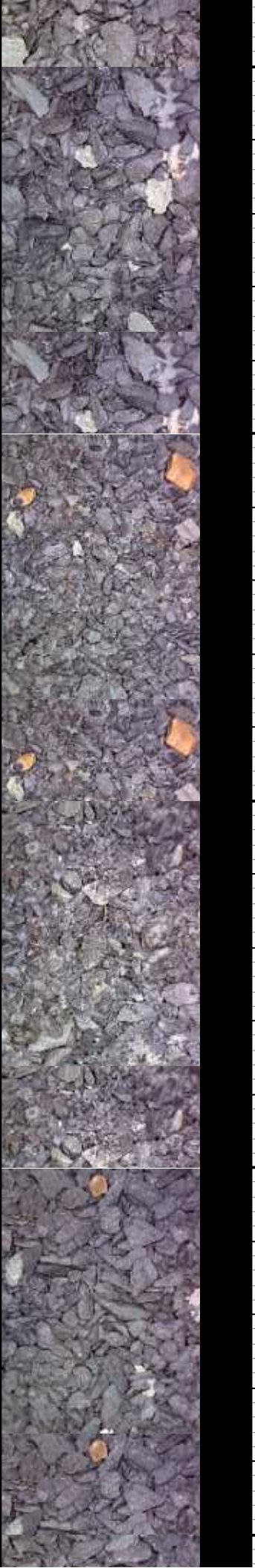
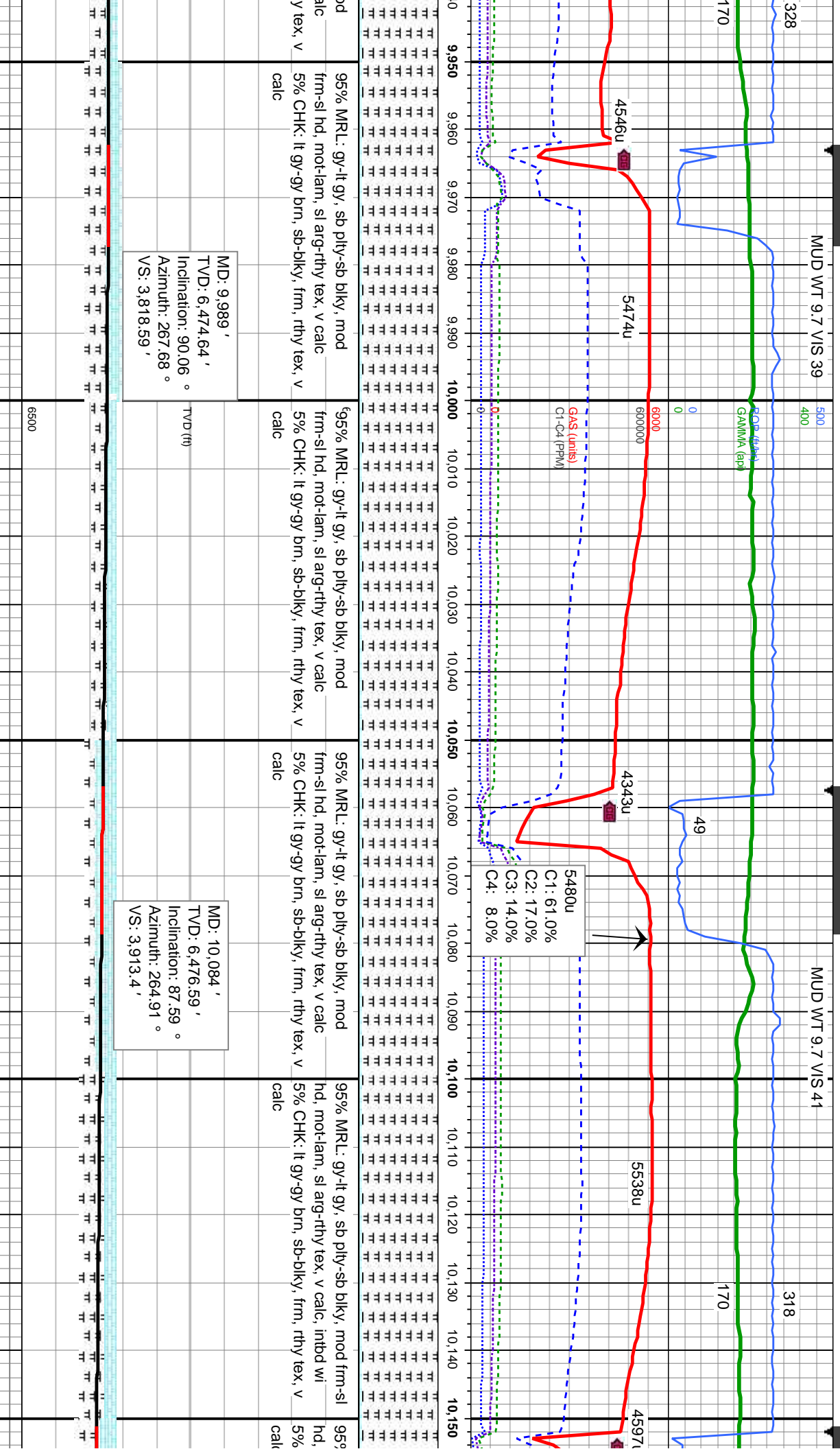
gy-It gy, sb pily-sb blk, mod	95% MRL: gy-It gy, sb pily-sb blk, mod	6100% MRL: gy-It gy, sb pily-sb blk, mod	100% MRL: gy-It gy, sb pily-sb blk, mod	100% MRL: gy-It gy, sb p
mot-lam, sl arg-rthy tex, v calc	frm-sl hd, mot-lam, sl arg-rthy tex, v calc	frm-sl hd, mot-lam, sl arg-rthy tex, v calc	frm-sl hd, mot-lam, sl arg-rthy tex, v calc	frm-sl hd, mot-lam, sl arg
It gy-gy, occ brn, sb-blky, frm, alc	5% CHK: It gy-gy, occ brn, sb-blky, frm, rthy tex, v calc			

MD: 9,609 '
TVD: 6,468.69 '
Inclination: 88.8 °
Azimuth: 269.27 °
VS: 3,438.81 '

MD: 9,704 '
TVD: 6,470.99 '
Inclination: 88.43 °
Azimuth: 268.78 °
VS: 3,533.77 '





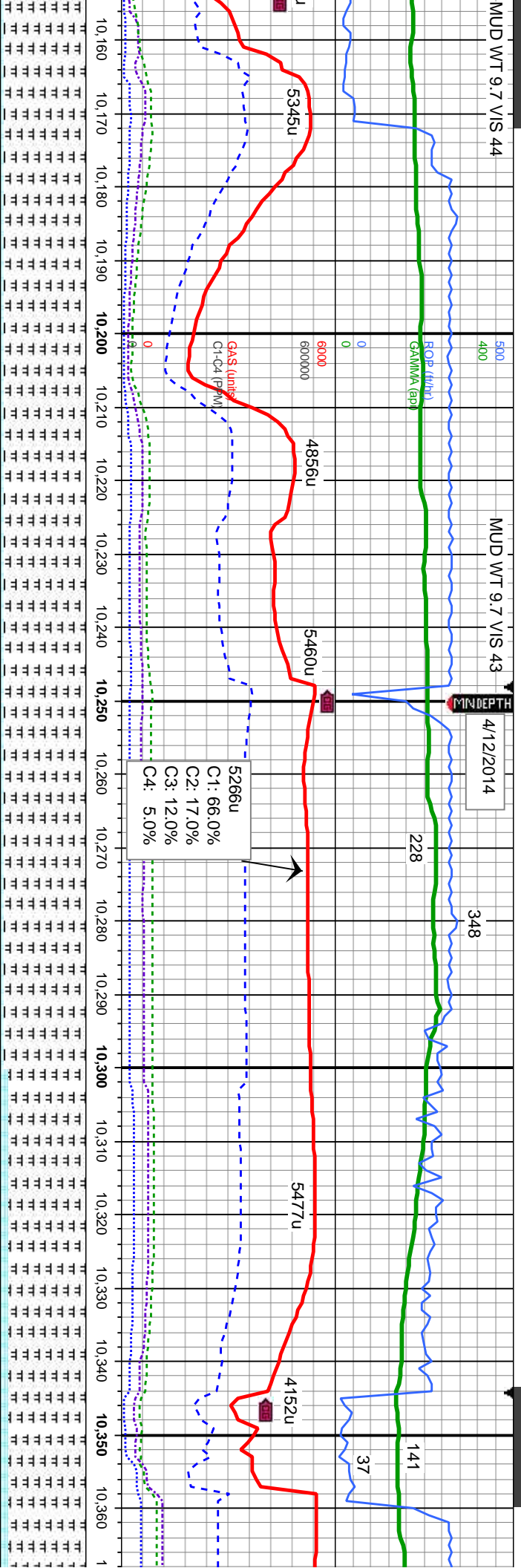


MUD WT 9.7 VIS 44

MUD WT 9.7 VIS 43

4/12/2014

MINDEPTH



95% MRL: gy-It gy, sb pily-sb biky, mod frm-sl
hd, mot-lam, sl arg-rthy tex, v calc, intbd wi
5% CHK: It gy-gy brn, sb-biky, frm, rthy tex, v
calc

95% MRL: gy-It gy, sb pily-sb biky, mod frm-sl
hd, mot-lam, sl arg-rthy tex, v calc, intbd wi
5% CHK: It gy-gy brn, sb-biky, frm, rthy tex, v
calc

90% MRL: gy-It gy, sb pily-sb biky, mod frm-sl
hd, mot-lam, sl arg-rthy tex, v calc, intbd wi
10% CHK: It gy-gy brn, sb-biky, frm, rthy tex, v
calc

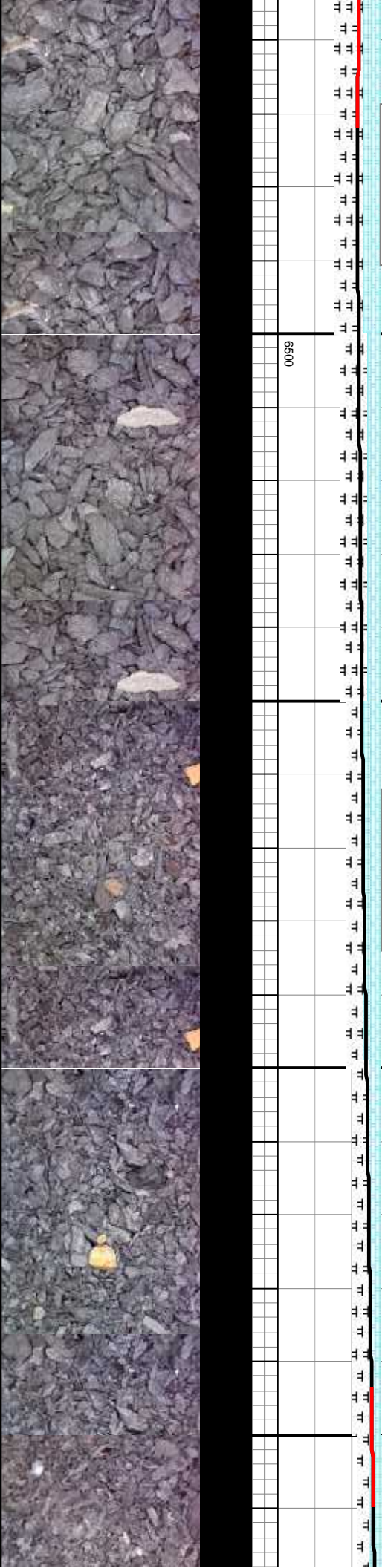
90% MRL: gy-It gy, sb pily-sb biky, mod frm-sl
hd, mot-lam, sl arg-rthy tex, v calc, intbd wi
10% CHK: It gy-gy brn, sb-biky, frm, rthy tex, v
calc

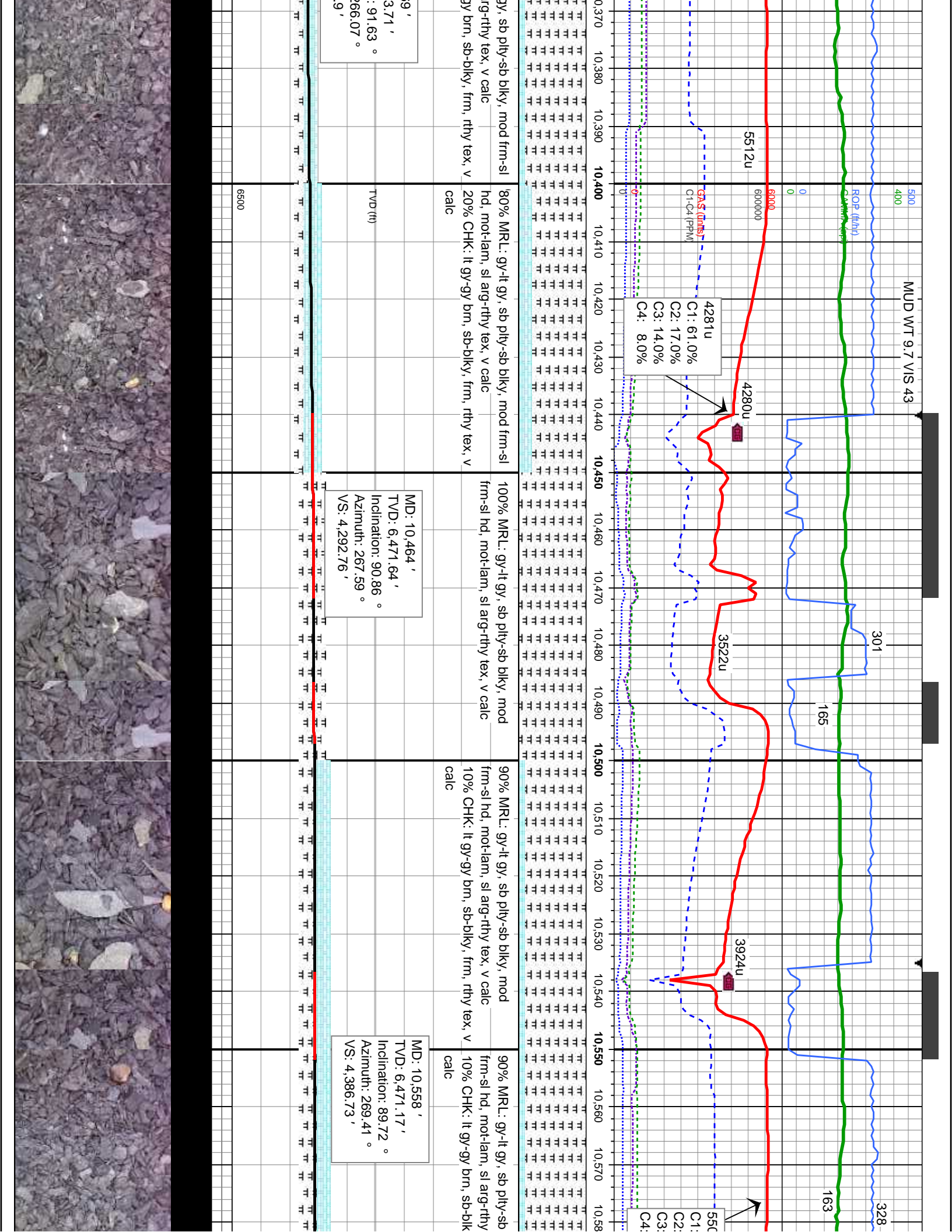
MD: 10,179 '
TVD: 6,478.41 '
Inclination: 90.22 °
Azimuth: 268.28 °
VS: 4,008.2 '

MD: 10,274 '
TVD: 6,476.64 '
Inclination: 91.91 °
Azimuth: 267.2 °
VS: 4,103.21 '

MD: 10,366 '
TVD: 6,47 '
Inclination: 91.91 °
Azimuth: 267.2 °
VS: 4,197 '

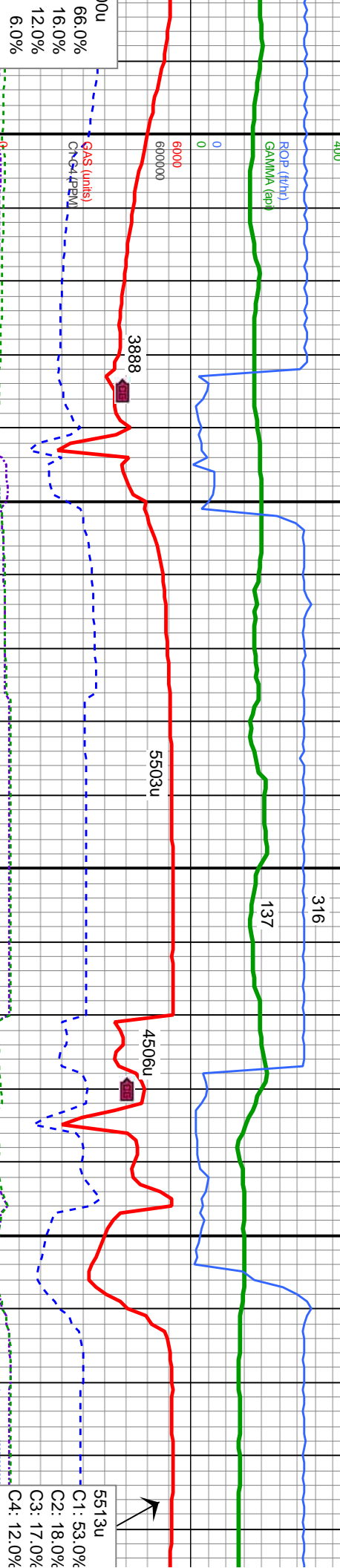
6500





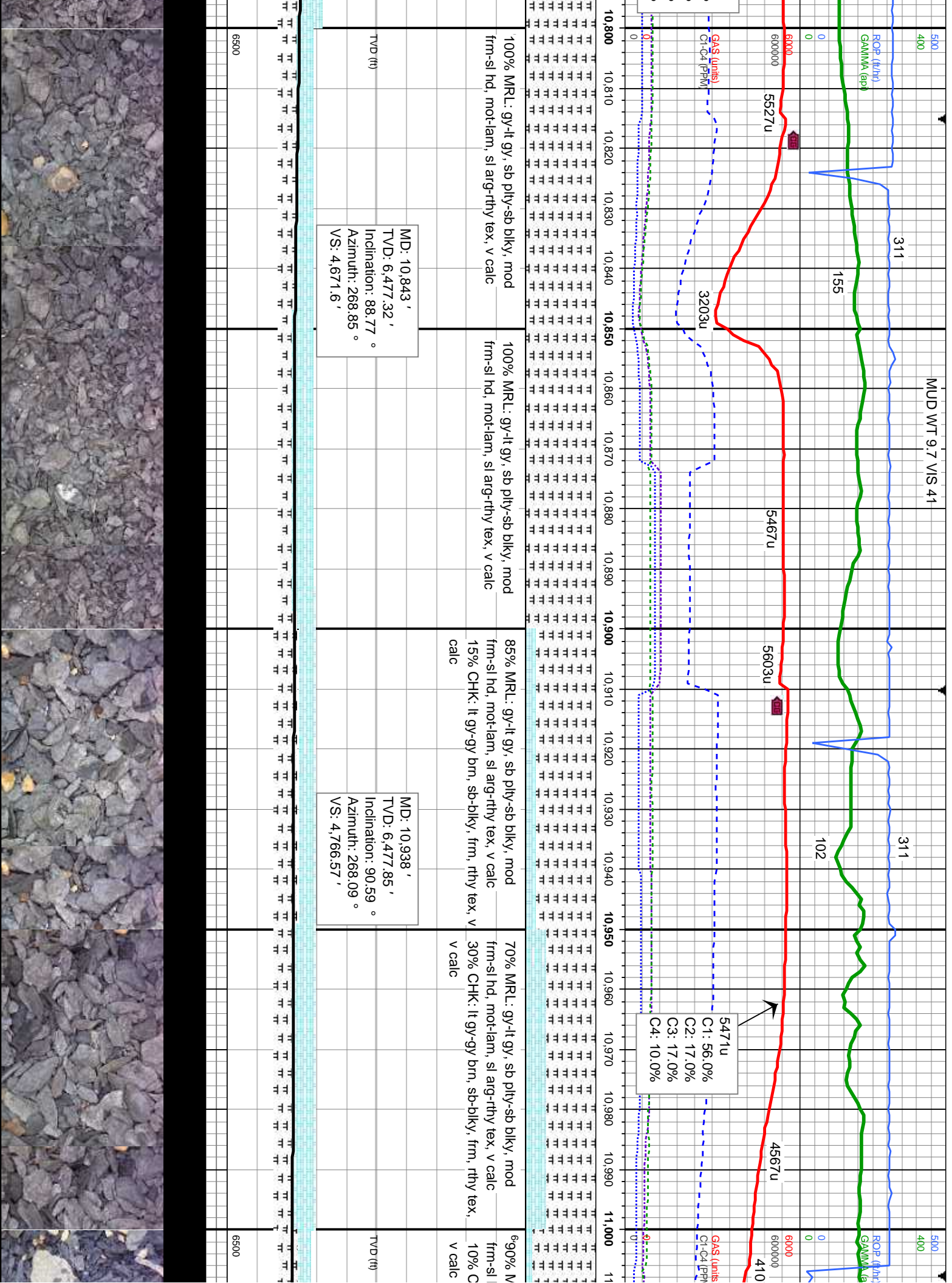
500 MUD WT 9.7 VIS 43

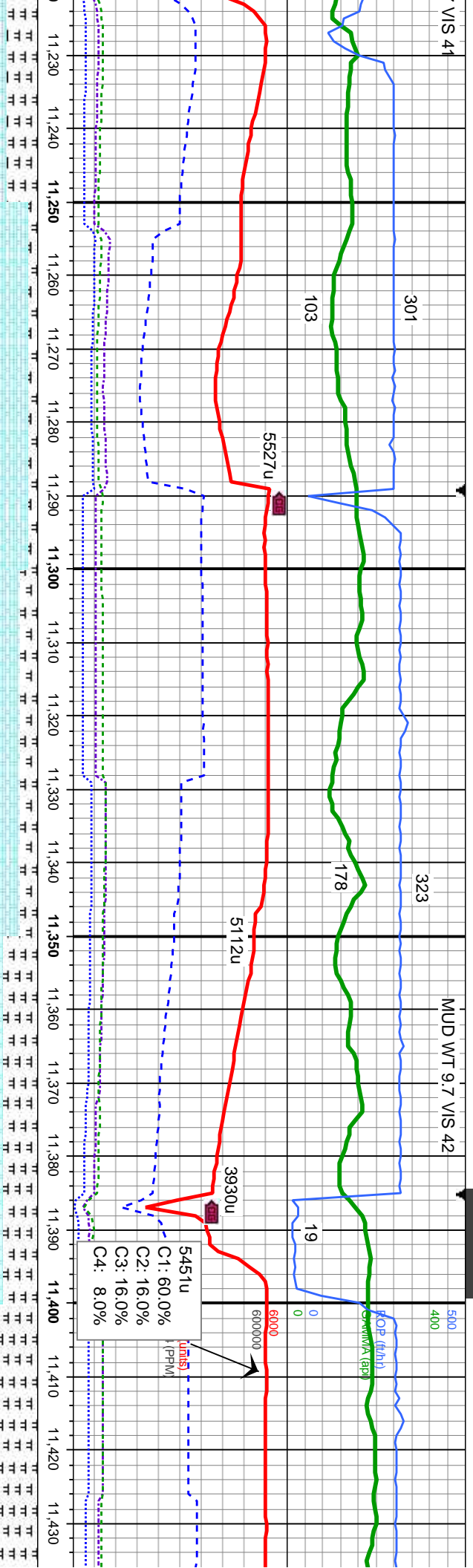
MUD WT 9.7 VIS 41



100% MRL: gy-lt gy, sb pty-sb blk, mod	100% MRL: gy-lt gy, sb pty-sb blk, mod	100% MRL: gy-lt gy, sb pty-sb blk, mod	100% MRL: gy-lt gy, sb pty-sb blk, mod
frm-sl hd, mot-lam, sl arg-rthy tex, v calc	frm-sl hd, mot-lam, sl arg-rthy tex, v calc	frm-sl hd, mot-lam, sl arg-rthy tex, v calc	frm-sl hd, mot-lam, sl arg-rthy tex, v calc
MD: 10,653 ' TVD: 6,471.65 ' Inclination: 89.69 ° Azimuth: 270.01 ° VS: 4,481.72 '		MD: 10,748 ' TVD: 6,474.11 ' Inclination: 87.35 ° Azimuth: 268.44 ° VS: 4,576.68 '	



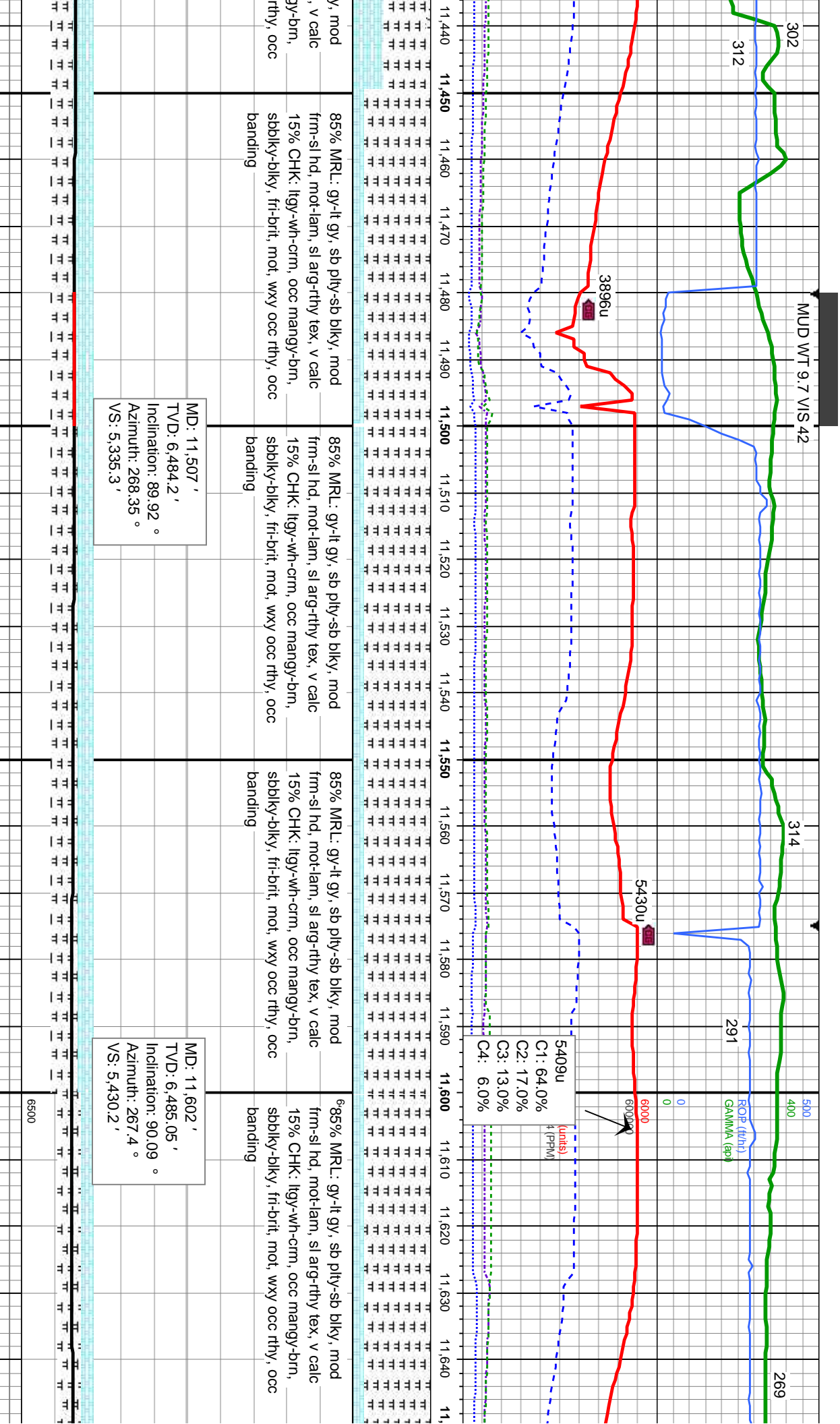


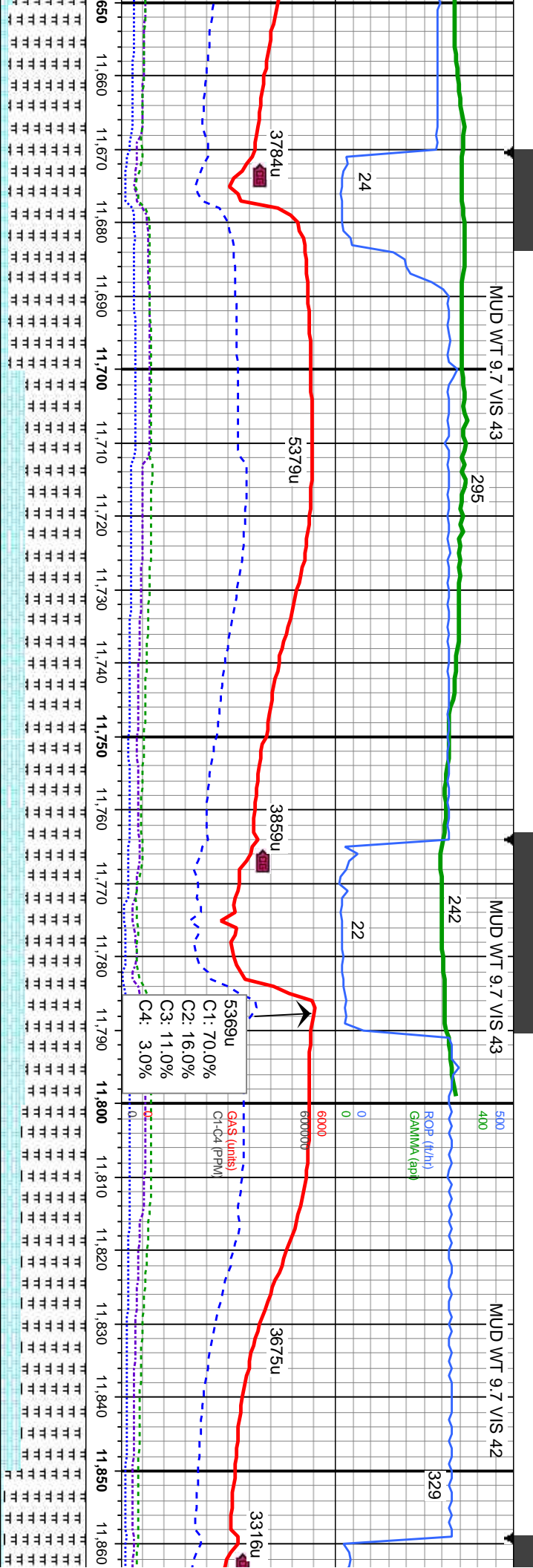


cm, occ mangy-brn, mot, wxy occ rthy, occ	90% CHK: ltgy-wh-crm, occ mangy-brn, sbblky-blky, fri-brit, mot, wxy occ rthy, occ banding	80% CHK: ltgy-wh-crm, occ mangy-brn, sbblky-blky, fri-brit, mot, wxy occ rthy, occ banding	60% CHK: ltgy-wh-crm, occ mangy-brn, sbblky-blky, fri-brit, mot, wxy occ rthy, occ banding	60% MRL: gy-it-gy, sb ply-sb blky, mod frm-sl hd, mot-lam, sl arg-rthy tex, v calc
b ply-sb blky, mod arg-rthy tex, v calc	10% MRL: gy-it-gy, sb ply-sb blky, mod frm-sl hd, mot-lam, sl arg-rthy tex, v calc	20% MRL: gy-it-gy, sb ply-sb blky, mod frm-sl hd, mot-lam, sl arg-rthy tex, v calc	40% MRL: gy-it-gy, sb ply-sb blky, mod frm-sl hd, mot-lam, sl arg-rthy tex, v calc	40% CHK: ltgy-wh-crm, occ mangy-brn, sbblky-blky, fri-brit, mot, wxy occ rthy, occ banding

2222'	MD: 11,317'	MD: 11,412'
882.91'	TVD: 6,484.24'	TVD: 6,483.77'
88.4°	Inclination: 90°	Inclination: 90.56°
268.36°	Azimuth: 267.58°	Azimuth: 267.83°
10.42'	VS: 5,145.35'	VS: 5,240.29'







90% MRL: gy-lt gy, sb pty-sb blk, mod
frm-sl hd, mot-lam, sl arg-rthy tex, v calc
10% CHK: ltgy-wh-crm, occ mangy-bm,
sbbiky-blky, fri-brit, mot, wxy occ rthy, occ
banding

70% MRL: gy-lt gy, sb pty-sb blk, mod
frm-sl hd, mot-lam, sl arg-rthy tex, v calc
30% CHK: ltgy-wh-crm, occ mangy-bm,
sbbiky-blky, fri-brit, mot, wxy occ rthy, occ
banding

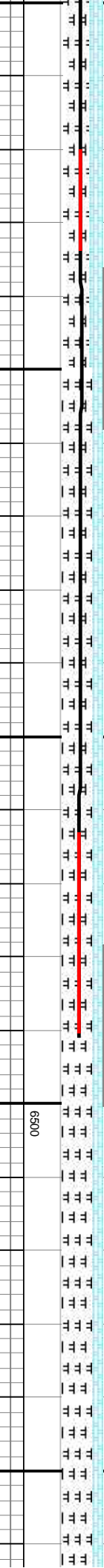
70% MRL: gy-lt gy, sb pty-sb blk, mod
frm-sl hd, mot-lam, sl arg-rthy tex, v calc
30% CHK: ltgy-wh-crm, occ mangy-bm,
sbbiky-blky, fri-brit, mot, wxy occ rthy, occ
banding

67.5% MRL: gy-lt gy, sb pty-sb blk, mod
frm-sl hd, mot-lam, sl arg-rthy tex, v calc
25% CHK: ltgy-wh-crm, occ mangy-bm,
sbbiky-blky, fri-brit, mot, wxy occ rthy, occ
banding

95% MRL: gy-lt gy, sb pty-sb blk, mod
frm-sl hd, mot-lam, sl arg-rthy tex, v calc
5% CHK: ltgy-wh-crm, occ mangy-bm,
sbbiky-blky, fri-brit, mot, wxy occ rthy, occ
banding

MD: 11,697 '
TVD: 6,484.31 '
Inclination: 90.77 °
Azimuth: 268.18 °
VS: 5,525.1 '

MD: 11,791 '
TVD: 6,485.02 '
Inclination: 88.36 °
Azimuth: 267.44 °
VS: 5,619.1 '

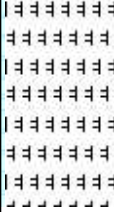


151

WELLBORE TD @ 11,885' MD
2132hrs 4/12/2014

Thank you for choosing
Columbine Logging Inc.

11,870 11,880 11,890 11,900 11,910 11,920 11,930 11,940



gy-lt gy, sb pily-sb blk, mod
not-lam, sl arg-rthy tex, v calc
lgy-wh-crm, occ mangy-bm,
/, fri-brit, mot, wxy occ rthy, occ
issm pyr

TT TT TT TT TT TT
TT TT TT TT TT TT
TT TT TT TT TT TT

