



Scale: 5" / 100'
Measured Depth Log

Well Name Crow Creek AA01-724_Horz

Location Sec. 1 T6N R63W

State Colorado

Country USA

API Number 05-123-40152

Region DJ Basin

Spud Date 12/13/2014

Surface Coordinates 290 FNL ; 1213 FEL
40.50832 ; -104.37811

Bottom Hole Coordinates 30 FNL ; 910 FEL
40.50832 ; -104.37811

Ground Elevation 4857'

Logged Interval 5946'

Formation Niobrara B chalk

Type of Drilling Fluid FW LSND

County Weld

Rig Number PD 829

AFE # 200448

Field Wattenberg

Drilling Completed 12/19/2014

K.B. Elevation 4873'

Total Depth 11598'

Company Noble Energy Inc
Address 1625 BROADWAY
DENVER, CO 80202

Name Emerson Palmer
Company Noble Energy, Inc
Address 1625 BROADWAY
DENVER, CO 80202

Columbine Logging, Inc.
Well Site Geologists

Operator

c
AY
2022

Geologist

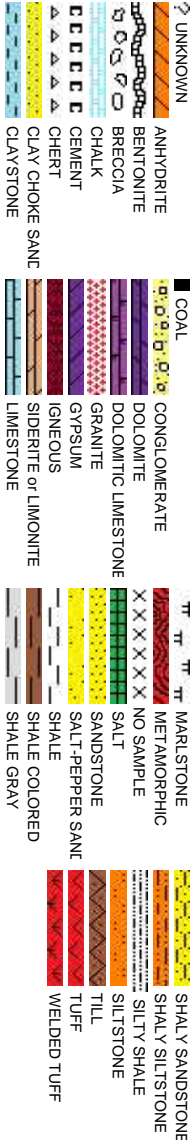
c.
AY
2022

Other

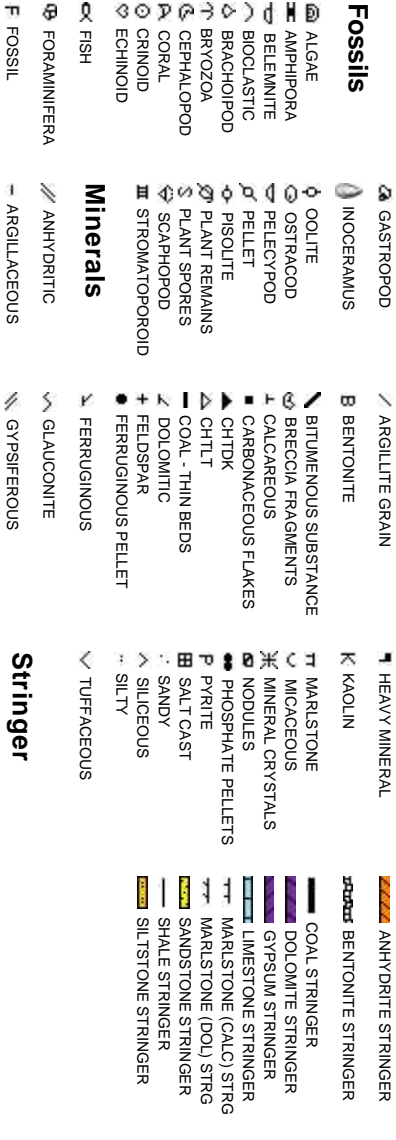
602 S. Lipan St.
Denver CO, 80223

Ryan Shilling
Ted Stockwell

Rock Types



Accessories



Other Symbols

Oil Show	P PINPOINT V VUGGY	DST INTERVAL FAULT	WIRELINE TESTED - LEFT WIRELINE TESTED - RT	E EARTHY FX FINELYXLN
D DEAD		FORMATION TOP	DRILL STEM TEST	GS GRAINSTONE
● EVEN	Engineering	GAS SHOW	MNDEPTH MN DEPTH	L LITHOGRAPHIC
○ QUESTIONABLE	BIT	OIL SHOW		MX MICROXLN
● SPOTTED STAINING	▲ CONNECTION (UP)		Rounding	MS MUDSTONE
		MNDEPTH UP MNDEPTH (DOWN)		
	▼ CONNECTION (DOWN)	▲ ANGULAR		PS PACKSTONE
Porosity	CONNECTION GAS	NORMAL FAULT	R ROUNDED	WS WACKESTONE
E EARTHY	CONNECTION GAS (LEFT)	OVERTURNED STRATA	B SUBANG	
F FENESTRAL	TRIP GAS	REVERSE FAULT	P SUBRND	
F FRACTURE	TRIP GAS (LEFT)	CASING		Sorting
X INTERCRYSTALLINE	DOWN TIME GAS	SIDEWALL CORE (LEFT)	Textures	M MODERATE
◊ INTEROOLITIC	DOWN TIME GAS (LEFT)	SIDEWALL CORE (RIGHT)	BS BOUNDSTONE	P POOR
Δ MOLDIC	CORE - LOST	SLIDE	C CHALKY	W WELL
○ ORGANIC	CORE - RECOVERED	SURVEY	CX CRYPTOXLN	

Slide/Rotate

ROP
ROF
GAMMA

ROP Scale
0 - 800 units

GAS (units)

Gamma Scale
0 - 200 units

Gas Scale
0 - 3000 units

KOP = 5946'

COLUMBINE LOGGING, INC. RIGGED UP
ON 12/14/2014 MANNED 2-PERSON
LOGGING WITH BLOODHOUND GAS
CHROMATOGRAPH UNIT # 0312

Total Gas & Chromatograph
GAS
C1
C2
C3
C4

Depth Labels

% Lith

TVD Scale
5800' - 6800'

Well Bore
TVD

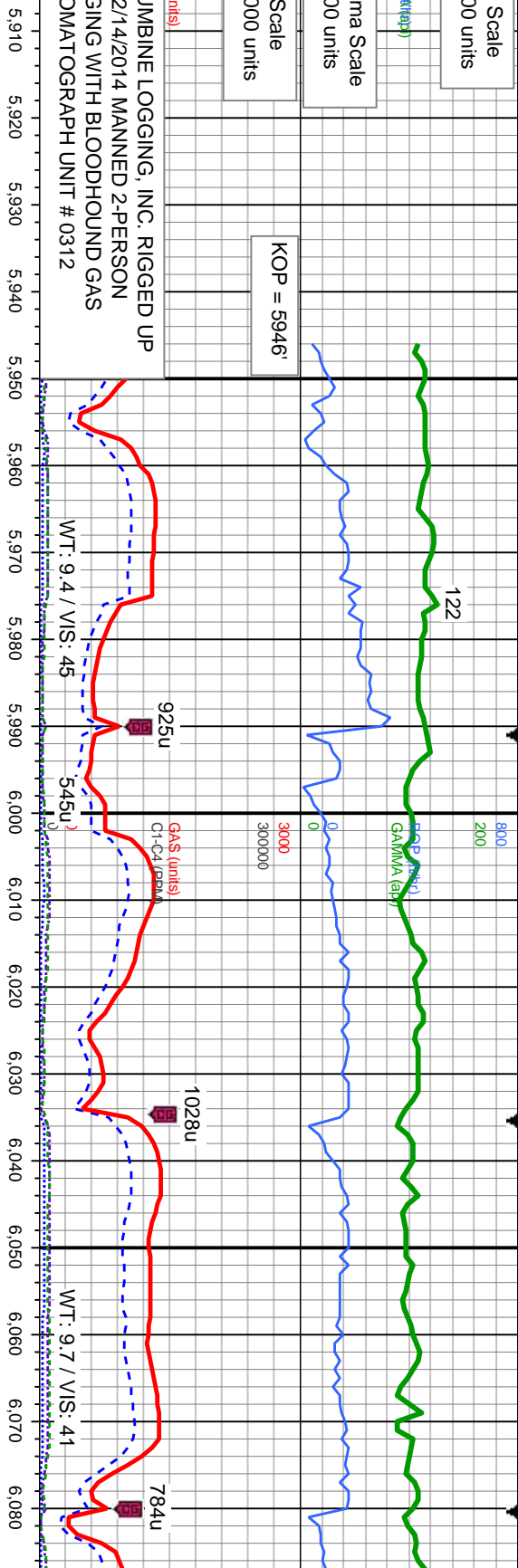
Bit Data
Bit #: 2
Type: SDI 519
Size: 8.75
Depth In: 698 '
Depth Out: 7,074 '
Jets: 7x16
S/N: JK1203

Log Continued from Crow Creek AA01-724

Oil Show

exc
mod
tr
st

Images



MD: 5.980
TVD: 5.955.95
Inclination: 2.3
Azimuth: 236.1
VS: -214.15

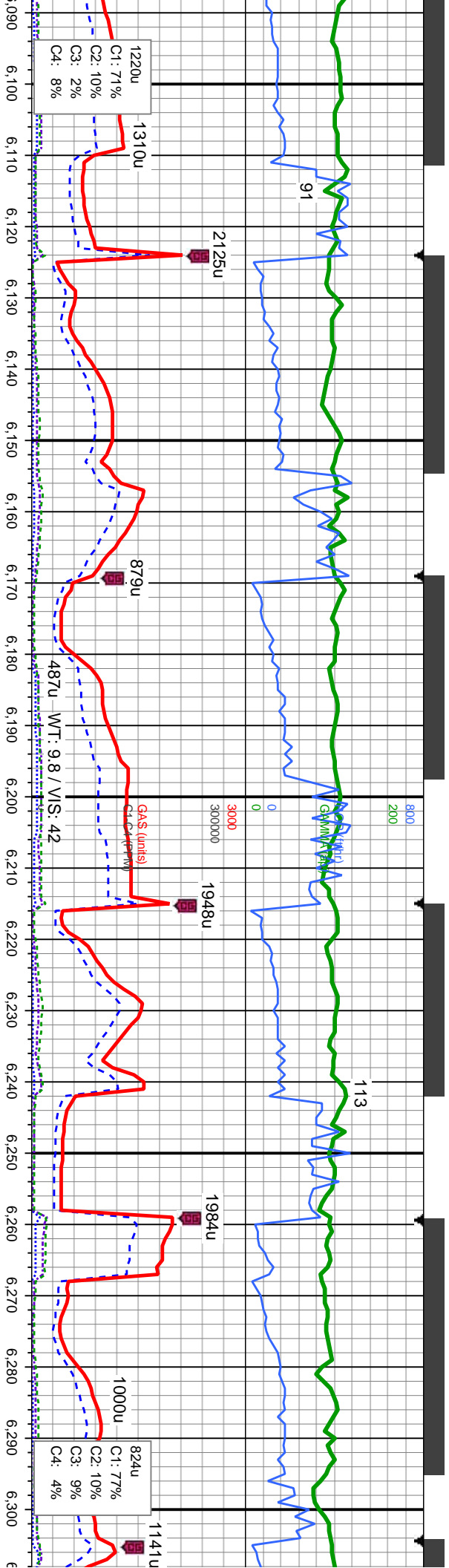
MD: 6.025
TVD: 6.000.8
Inclination: 6.9
Azimuth: 209.6
VS: -211.46

MD: 6.070
TVD: 6.045.2
Inclination: 11.7
Azimuth: 194.3
VS: -204.88

100% SLTY SH: lt-med gy, occ sl tan, sft-sl frm, sb
ply-sb blk, silty tex, sl sdy ip, sl calc, tr pyr, tr wh ss

100% SLTY SH: lt-med gy, occ sl tan, sft-sl frm, sb
ply-sb blk, silty tex, sl sdy ip, sl calc, tr wh ss

100% SLTY SH: lt-med gy, occ sl tan, sft-sl frm, sb
ply-sb blk, silty tex, sl sdy ip, sl calc, tr wh ss



1220u
C1: 71%
C2: 10%
C3: 2%
C4: 8%

2125u

879u

487u WT: 9.8 / VIS: 42

1948u

1984u

1000u
C1: 77%
C2: 10%
C3: 9%
C4: 4%

1141u

MD: 6,115
TVD: 6,088.86
Inclination: 16.3
Azimuth: 190.3
VS: -194.43

MD: 6,160
TVD: 6,131.66
Inclination: 19.6
Azimuth: 189.2
VS: -180.97

MD: 6,205
TVD: 6,173.65
Inclination: 22.5
Azimuth: 185.8
VS: -165.14

MD: 6,249
TVD: 6,213.88
Inclination: 25.3
Azimuth: 181.7
VS: -147.49

MD: 6,294
TVD: 6,254.03
Inclination: 28.4
Azimuth: 176.7
VS: -127.22

100% SLTY SH: lt-med gy, occ sl tan, sft-sl frm, sb
ply-sb blkly, silty tex, sl sdy ip, sl calc, tr shy ss, v tr
wh ss

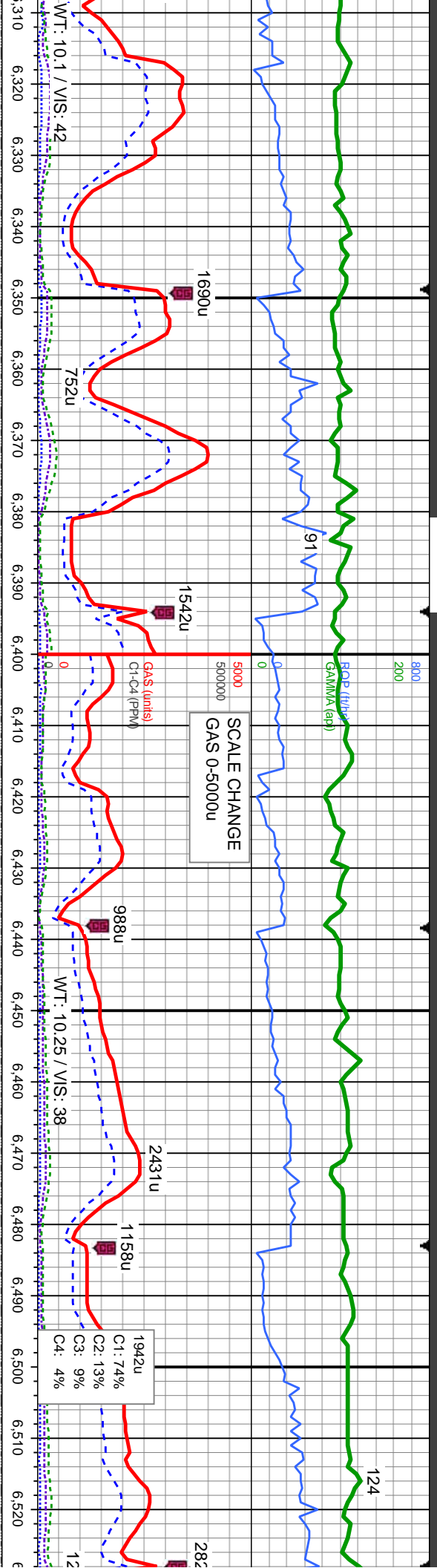
100% SLTY SH: lt-med gy, occ sl tan, sft-sl frm, sb
ply-sb blkly, silty tex, sl sdy ip, sl calc, tr shy ss, v tr
wh ss

100% SLTY SH: lt-med gy, occ sl tan, sft-sl frm,
sb ply-sb blkly, silty tex, sl sdy ip, sl calc, tr shy ss, v
tr wh ss

100% SLTY SH: lt-med gy, occ sl tan, sft-sl frm,
sb ply-sb blkly, silty tex, sl sdy ip, sl calc, tr shy ss

100% SLTY SH: lt-med gy, occ sl tan, sft-sl frm,
sb ply-sb blkly, silty tex, sl sdy ip, sl calc, tr shy ss





SLTY SH: lt-med gy, occ sl tan, sft-sl frm, sb blk'y, silty tex, sl sd'y lp, sl calc, tr shy ss
100% SLTY SH: lt-med gy, occ sl tan, sft-sl frm, sb blk'y, silty tex, sl sd'y lp, sl calc, tr shy ss
100% SLTY SH: lt-med gy, occ sl tan, sft-sl frm, sb blk'y, silty tex, sl sd'y lp, sl calc, tr shy ss
100% SLTY SH: lt-med gy, occ sl tan, sft-sl frm, sb blk'y, silty tex, sl sd'y lp, sl calc

MD: 6,339
TVD: 6,293.17
Inclination: 30.7
Azimuth: 177.5
VS: -105.04

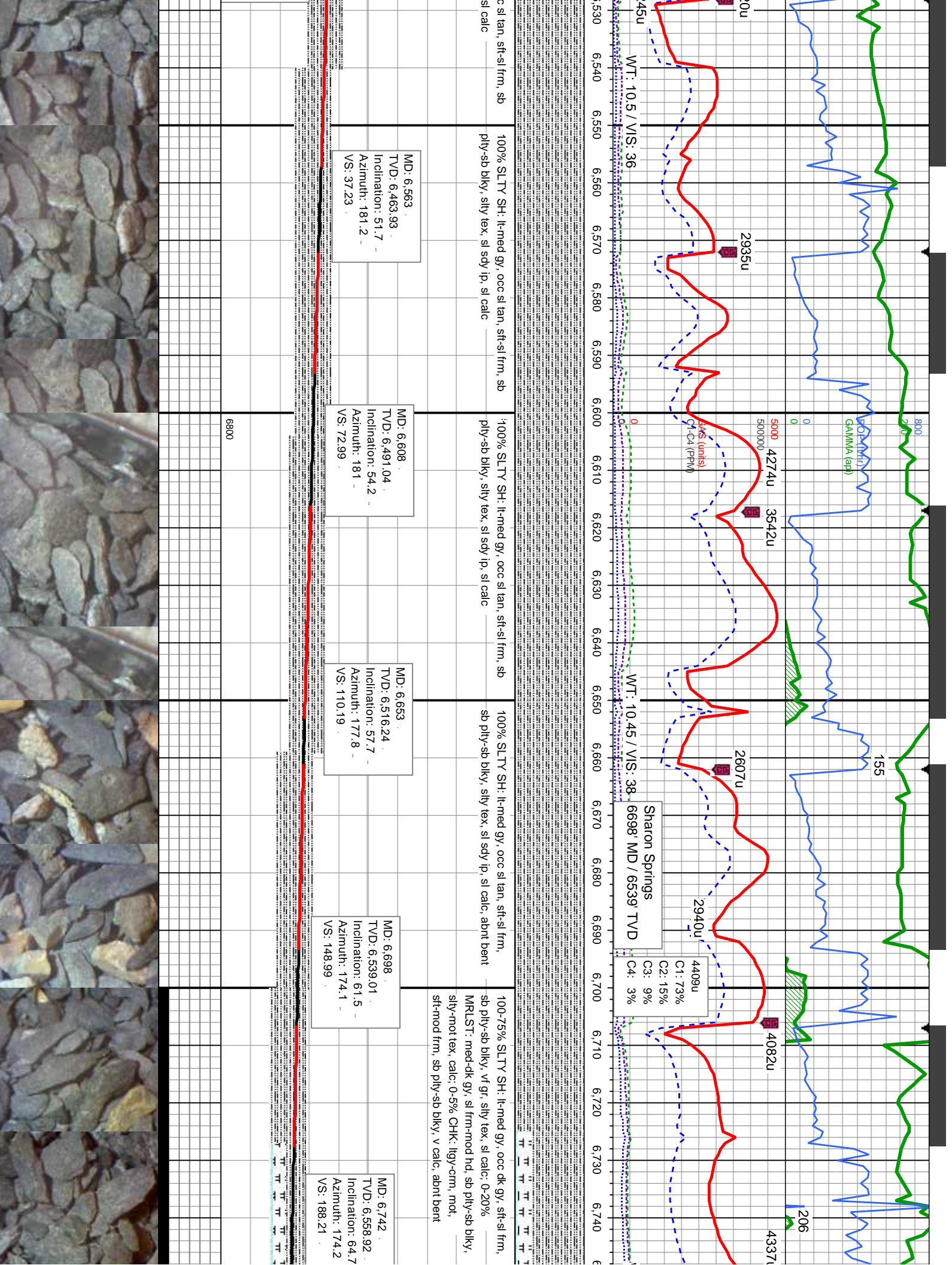
MD: 6,384
TVD: 6,331.29
Inclination: 33.5
Azimuth: 179.2
VS: -81.15

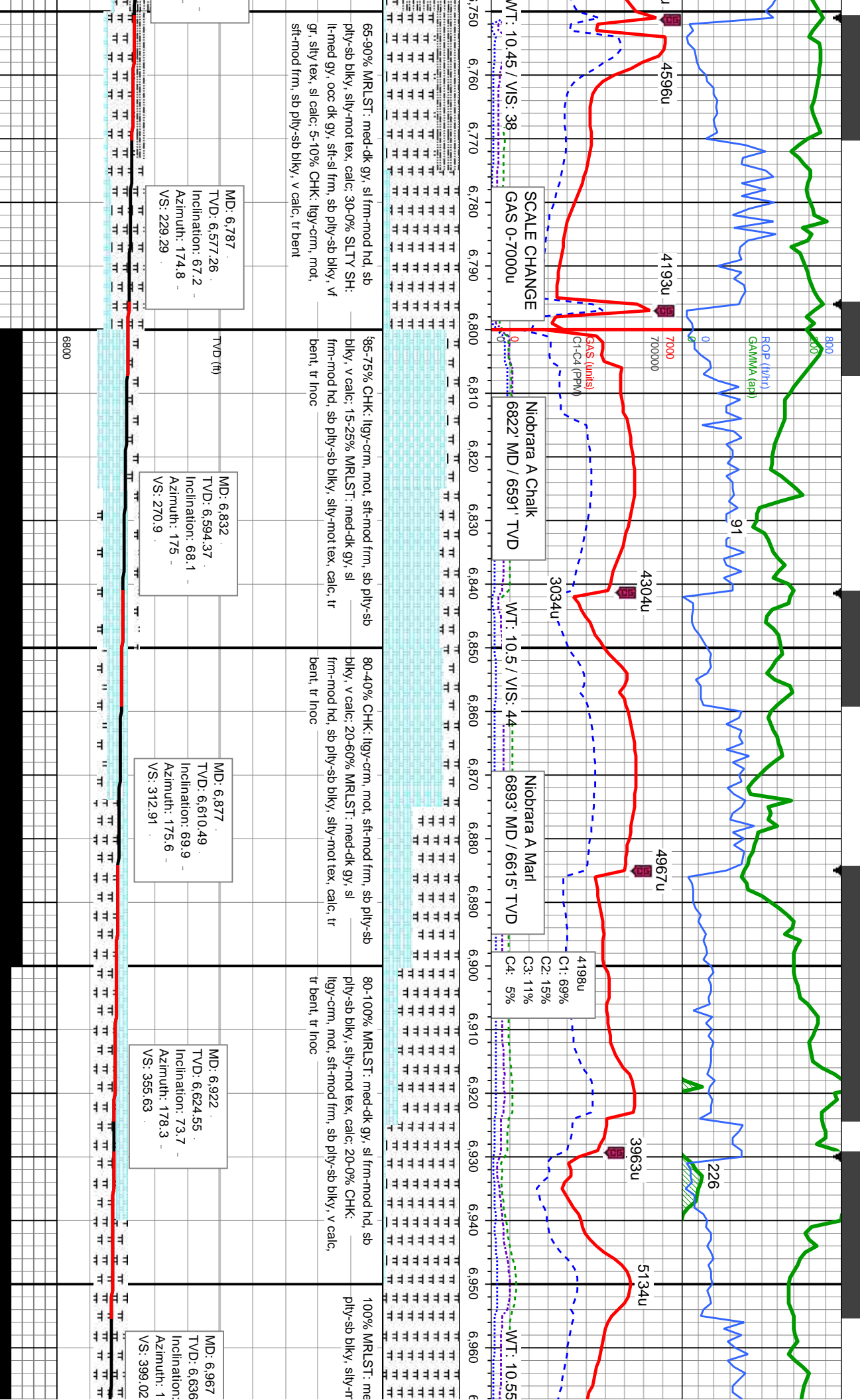
MD: 6,429
TVD: 6,368.2
Inclination: 36.3
Azimuth: 182.4
VS: -55.51

MD: 6,473
TVD: 6,402.53
Inclination: 41.1
Azimuth: 181.3
VS: -28.16

MD: 6,518
TVD: 6,434.74
Inclination: 47.4
Azimuth: 179.8
VS: 3.11







812
200
182
12/17-18/2014
MINDEPTH
154

ROP (ft/h)
GAMMA (api)

3949u

4118u

4013u

4294u

4719u

4705u

3967u

3949u

4118u

4013u

4294u

4719u

4705u

3967u

WT: 10.55 / VIS: 45
WT: 9.35 / VIS: 39

3949u

4118u

4013u

4294u

4719u

4705u

3967u

3949u

4118u

4013u

4294u

4719u

4705u

3967u

3949u

4118u

4013u

4294u

4719u

4705u

3967u

3949u

4118u

4013u

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4013u

4294u

4719u

4705u

3967u

3949u

4118u

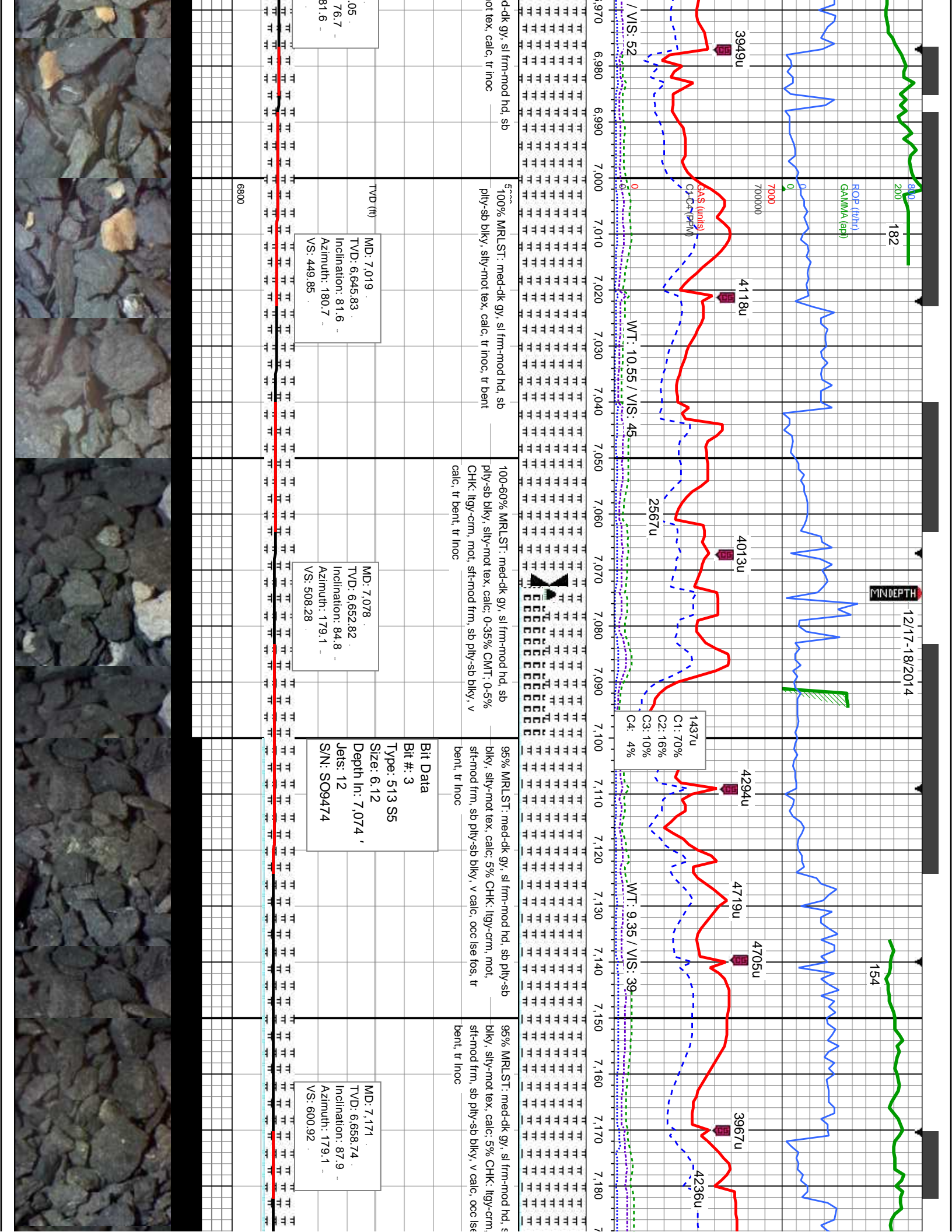
4013u

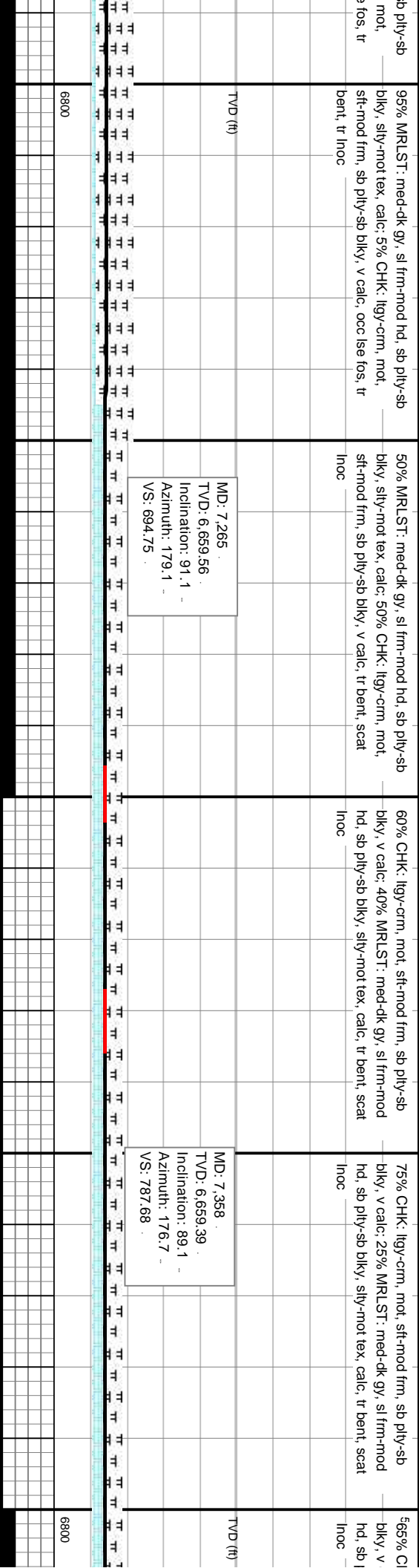
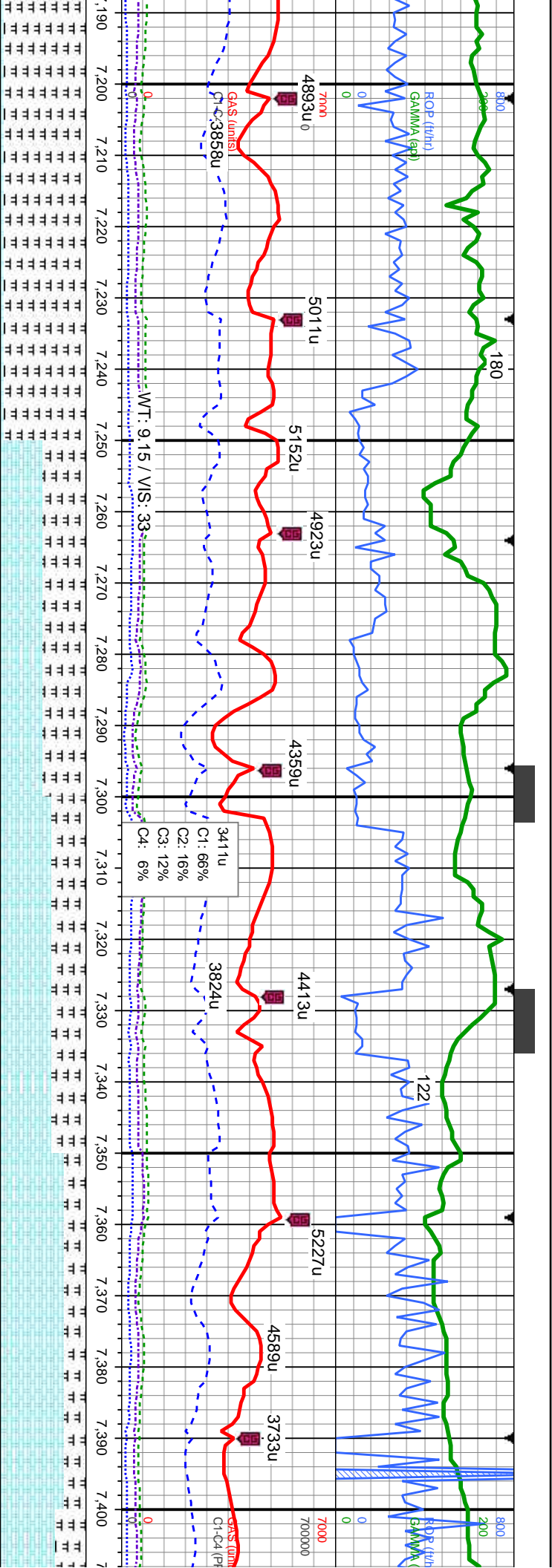
4294u

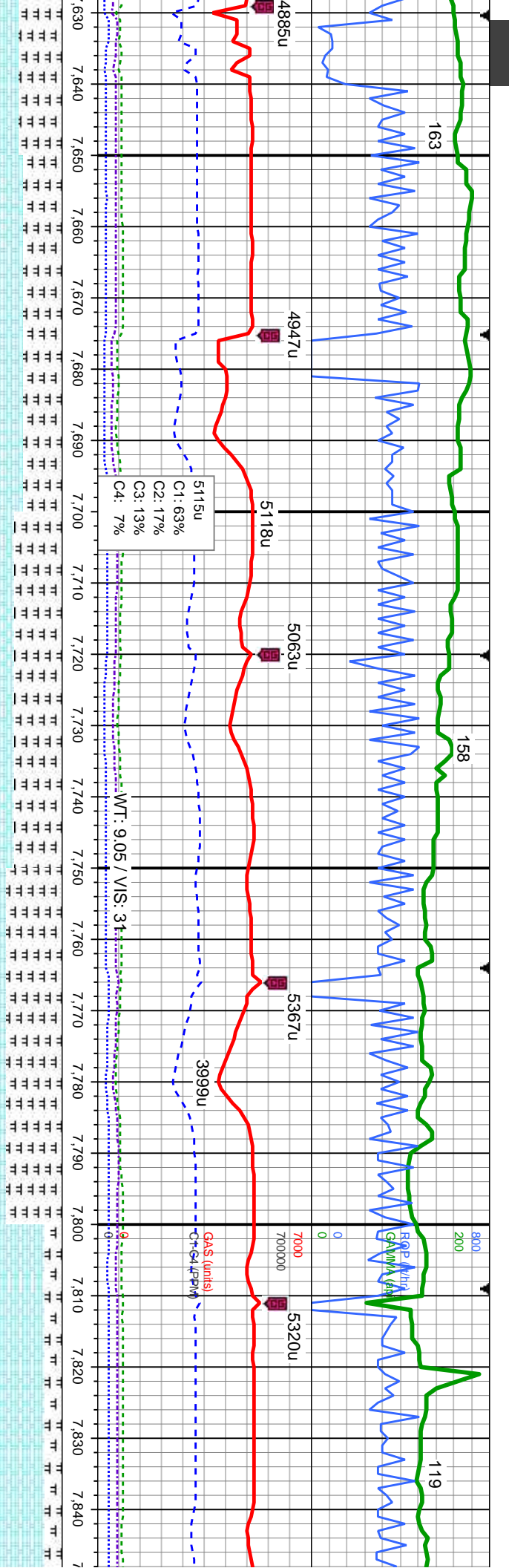
4719u

4705u

3967u





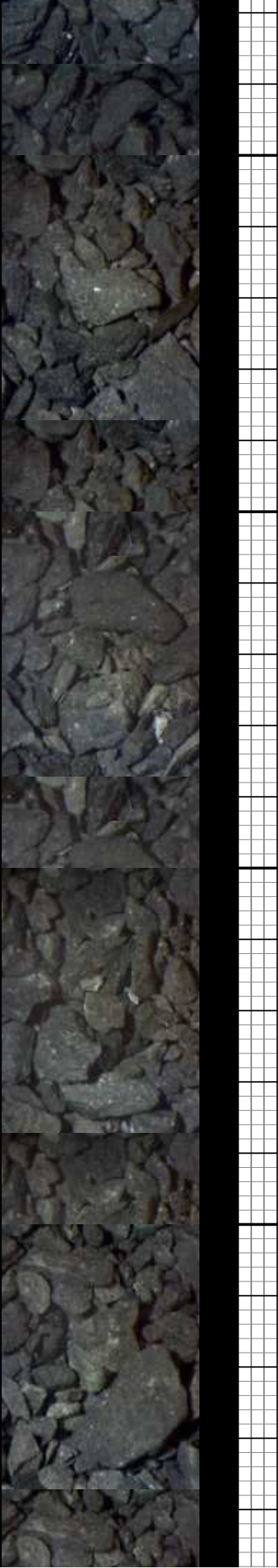


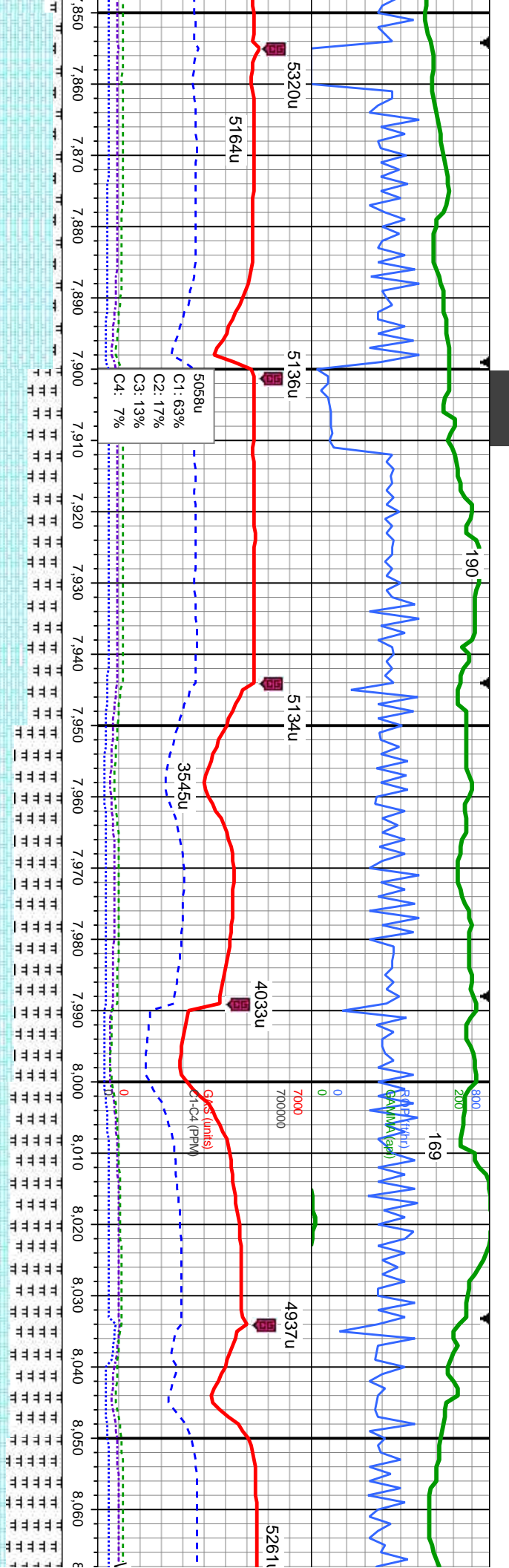
MD: 7.659
TVD: 6,663.99
Inclination: 89.1
Azimuth: 179.7
VS: 1,088.45

MD: 7.748
TVD: 6,665.15
Inclination: 89.4
Azimuth: 179.1
VS: 1,177.27

MD: 7.838
TVD: 6,666.02
Inclination: 89.5
Azimuth: 178.7
VS: 1,267.13

6800





90% CHK: lly-crm, mot, sft-mod frm, sb ply-sb
bly, v calc: 10% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb bly, silv-mot tex, calc, tr bent, tr
Inoc

60% CHK: lly-crm, mot, sft-mod frm, sb ply-sb
bly, v calc: 40% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb bly, silv-mot tex, calc, tr bent, tr
Inoc

55% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb
bly, silv-mot tex, calc: 45% CHK: lly-crm, mot,
sft-mod frm, sb ply-sb bly, v calc, tr bent, tr inoc

60% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb
bly, silv-mot tex, calc: 40% CHK: lly-crm, mot,
sft-mod frm, sb ply-sb bly, v calc, tr bent, tr inoc

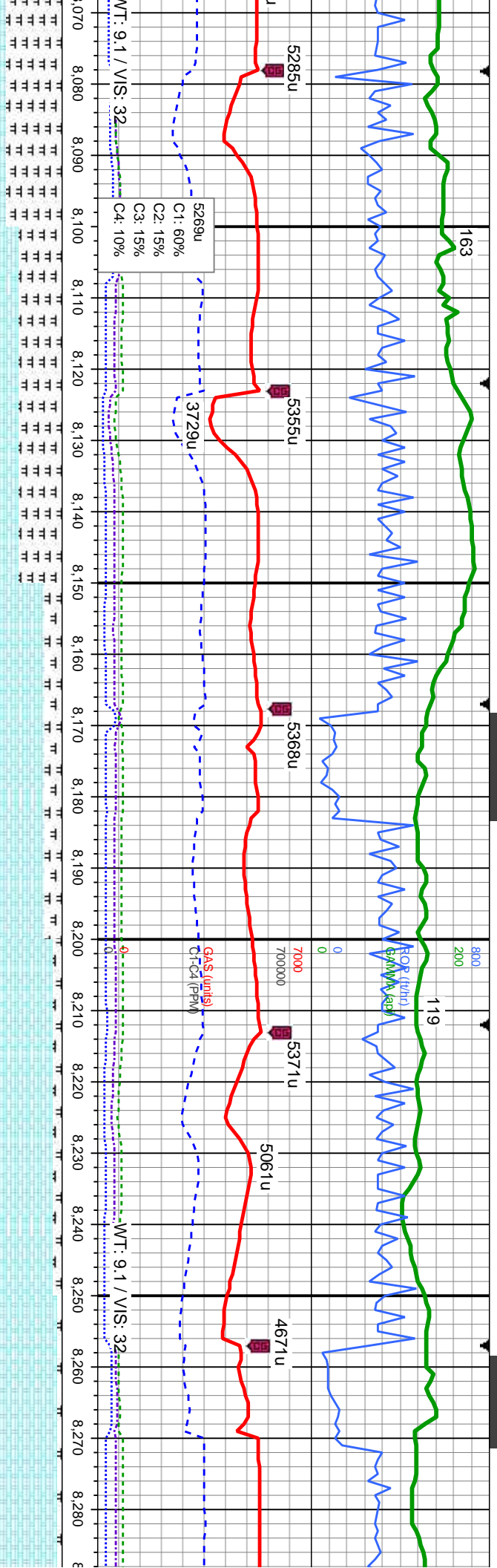
70% MRLST: med-dk
bly, silv-mot tex, calc
sft-mod frm, sb ply-sb
Inoc

MD: 7,926
TVD: 6,667.17
Inclination: 89
Azimuth: 180.1
VS: 1,354.95

MD: 8,015
TVD: 6,668.26
Inclination: 89.6
Azimuth: 179.3
VS: 1,443.74

6800





blk gy, sl frm-mod hd, sb ply-sb
—alc: 30% CHK: lly-crm, mot,
sb blk, v calc, tr bent, scat

50% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb
—bly, sly-mot tex, calc: 50% CHK: lly-crm, mot,
sft-mod frm, sb ply-sb blk, v calc, tr bent, scat
Inoc

80% CHK: lly-crm, mot, sft-mod frm, sb ply-sb
—blk, v calc: 20% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb blk, sly-mot tex, calc, tr bent, scat
Inoc

590% CHK: lly-crm, mot, sft-mod frm, sb ply-sb
—blk, v calc: 10% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb blk, sly-mot tex, calc, tr bent, scat
Inoc

95% CHK: lly-crm, mot, sft-mod frm, sb
—blk, v calc: 5% MRLST: med-dk gy, sl frm
hd, sb ply-sb blk, sly-mot tex, calc, tr bent, scat
Inoc

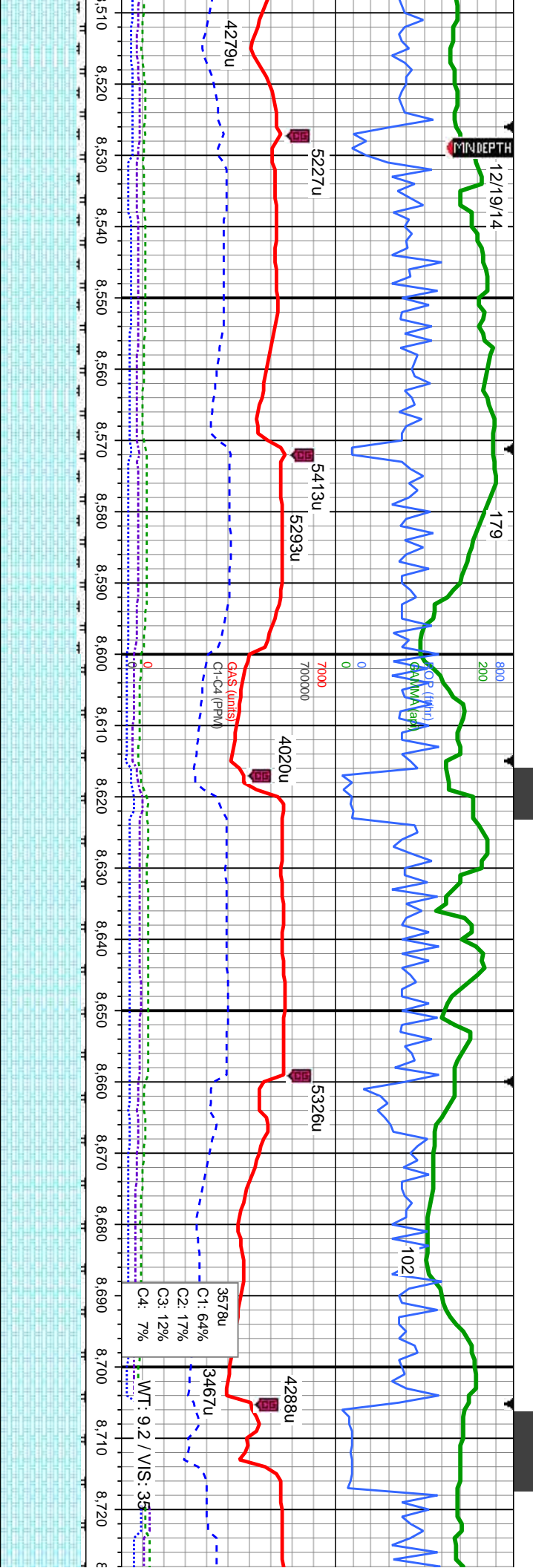
MD: 8,105
TVD: 6,668.26
Inclination: 90.4
Azimuth: 179.1
VS: 1,533.58

MD: 8,195
TVD: 6,668.18
Inclination: 90.1
Azimuth: 179.4
VS: 1,623.42

MD: 8,284
TVD: 6,669.26
Inclination: 88
Azimuth: 179.8
VS: 1,712.22

6800

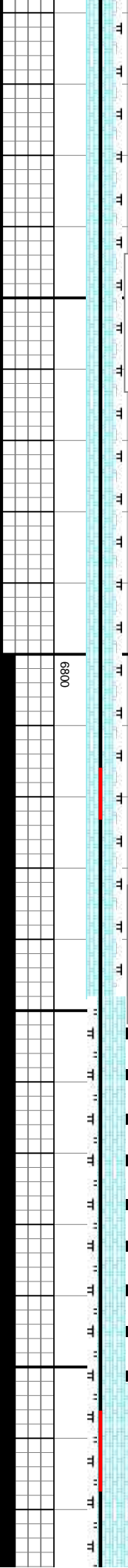


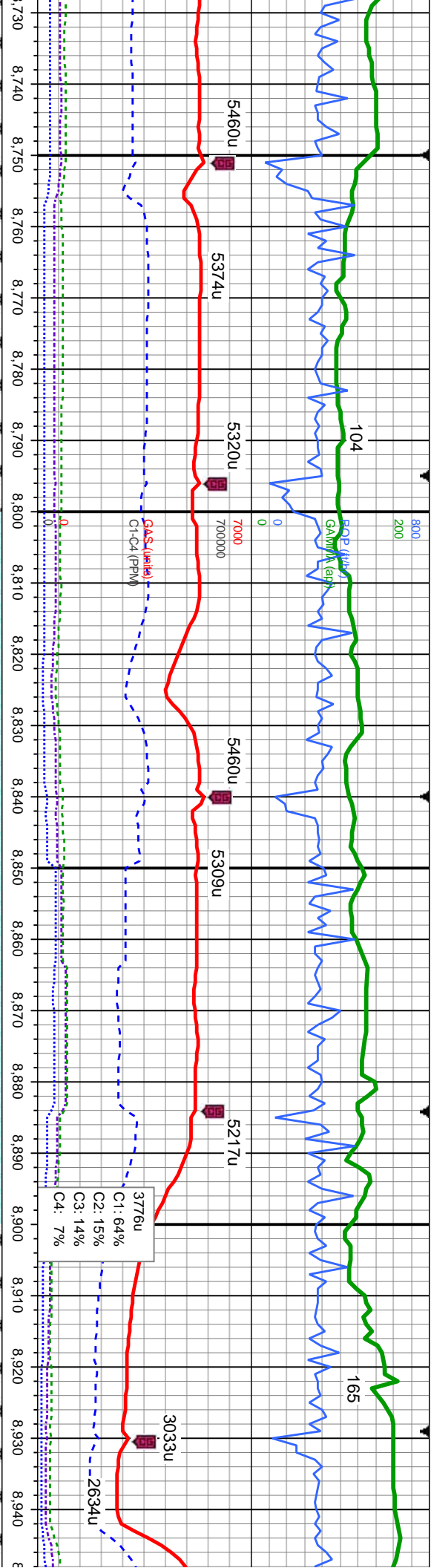


10% MRLST: med-dk gy, sl frm-mod
90% CHK: lgy-crm, mot, sft-mod frm, sb ply-sb
95% CHK: lgy-crm, mot, sft-mod frm, sb ply-sb
95% CHK: lgy-crm, mot, sft-mod frm, sb ply-sb
95% CHK: lgy-crm, mot, sft-mod frm, sb ply-sb

MD: 8.553
TVD: 6.672.86
Inclination: 90.3
Azimuth: 179.2
VS: 1.980.53

MD: 8.642
TVD: 6.672.47
Inclination: 90.2
Azimuth: 178.6
VS: 2.069.4





mod frm, sb ply-sb
chd gy, sl frm-mod
x, calc, occ inoc

95% CHK: ligy-crm, mot, sft-mod frm, sb ply-sb
biky, v calc, 5% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb biky, silty-mot tex, calc, occ inoc

5100% CHK: ligy-crm, mot, sft-mod frm, sb ply-sb
biky, v calc, occ inoc, tr marl

100% CHK: ligy-crm, mot, sft-mod frm, sb ply-sb
biky, v calc, occ inoc, tr marl

95% CHK: ligy-crm, mot, sft-mod frm, sb ply-sb
biky, v calc, 5% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb biky, silty-mot tex, calc, occ inoc

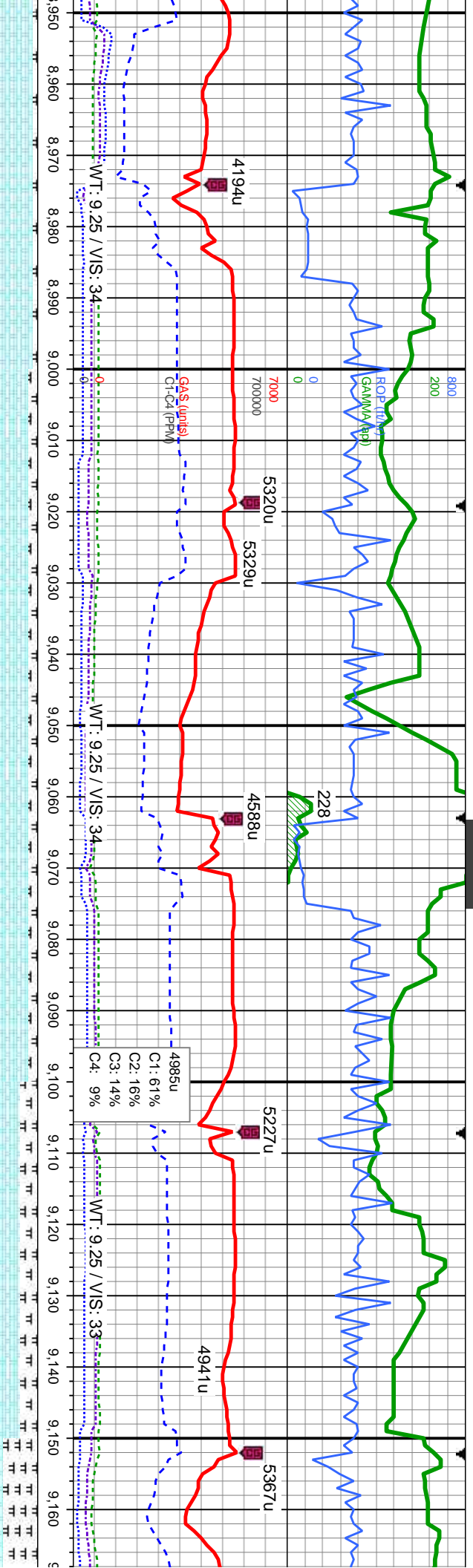
MD: 8,732
TVD: 6,672.47
Inclination: 89.4
Azimuth: 177
VS: 159.34

MD: 8,822
TVD: 6,673.34
Inclination: 89.5
Azimuth: 177.5
VS: 2,249.31

MD: 8,912
TVD: 6,673.89
Inclination: 89.8
Azimuth: 176.3
VS: 2,339.29

6800





95% CHK: lgy-crm, mot, sft-mod frm, sb ply-sb
bly, v calc: 5% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb bly, silty-mot tex, calc, occ inoc

90% CHK: lgy-crm, mot, sft-mod frm, sb ply-sb
bly, v calc: 10% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb bly, silty-mot tex, calc, occ inoc

90% CHK: lgy-crm, mot, sft-mod frm, sb ply-sb
bly, v calc: 10% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb bly, silty-mot tex, calc, occ inoc

80% CHK: lgy-crm, mot, sft-mod frm, sb ply-sb
bly, v calc: 20% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb bly, silty-mot tex, calc, tr inoc

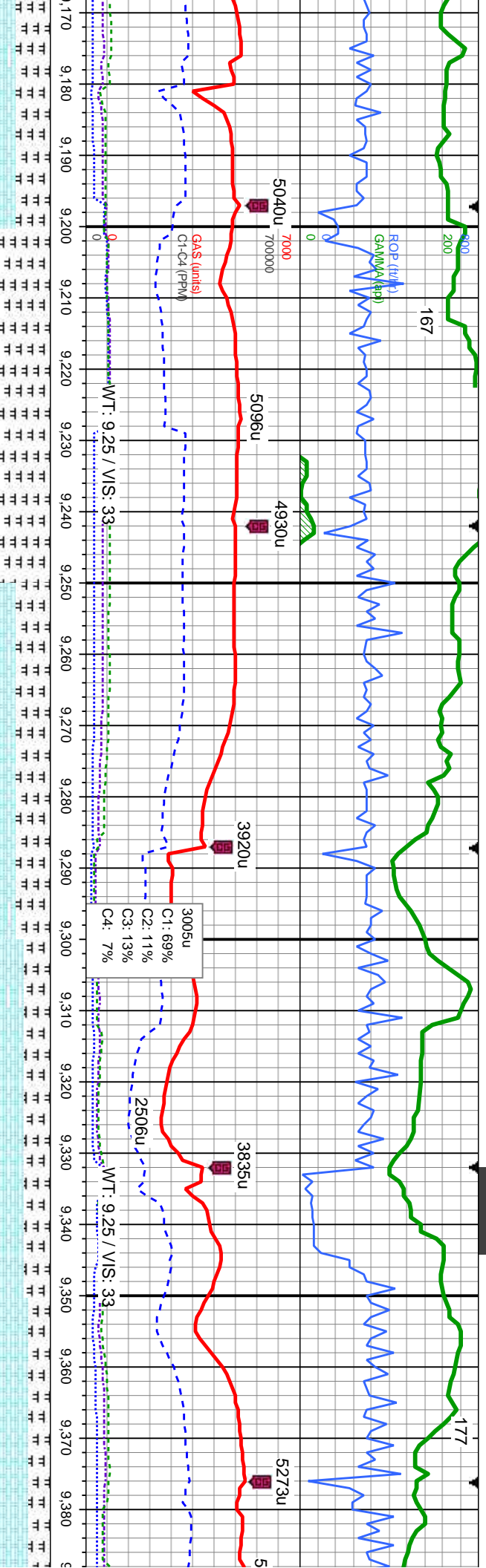
60% CHK: lgy-crm
bly, v calc: 40% M
hd, sb ply-sb bly,
bent, tr lse foss

MD: 9.001
TVD: 6,674.43
Inclination: 89.5
Azimuth: 178.8
VS: 2,428.24

MD: 9.091
TVD: 6,675.06
Inclination: 89.7
Azimuth: 180.2
VS: 2,518.05

6800





not, sft-mod frm, sb ply-sb
MRLST: med-dk gy, sl frm-mod
sily-mot tex, calc, tr inoc, tr
foss, tr bent

MD: 9.181
TVD: 6,674.82
Inclination: 90.6
Azimuth: 179.8
VS: 2,607.81

TVD (ft)

6800

60% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb
biky, v calc: 40% CHK: lgy-crm, mot,
sft-mod frm, sb ply-sb biky, v calc, tr inoc, tr lse
bent, tr lse foss

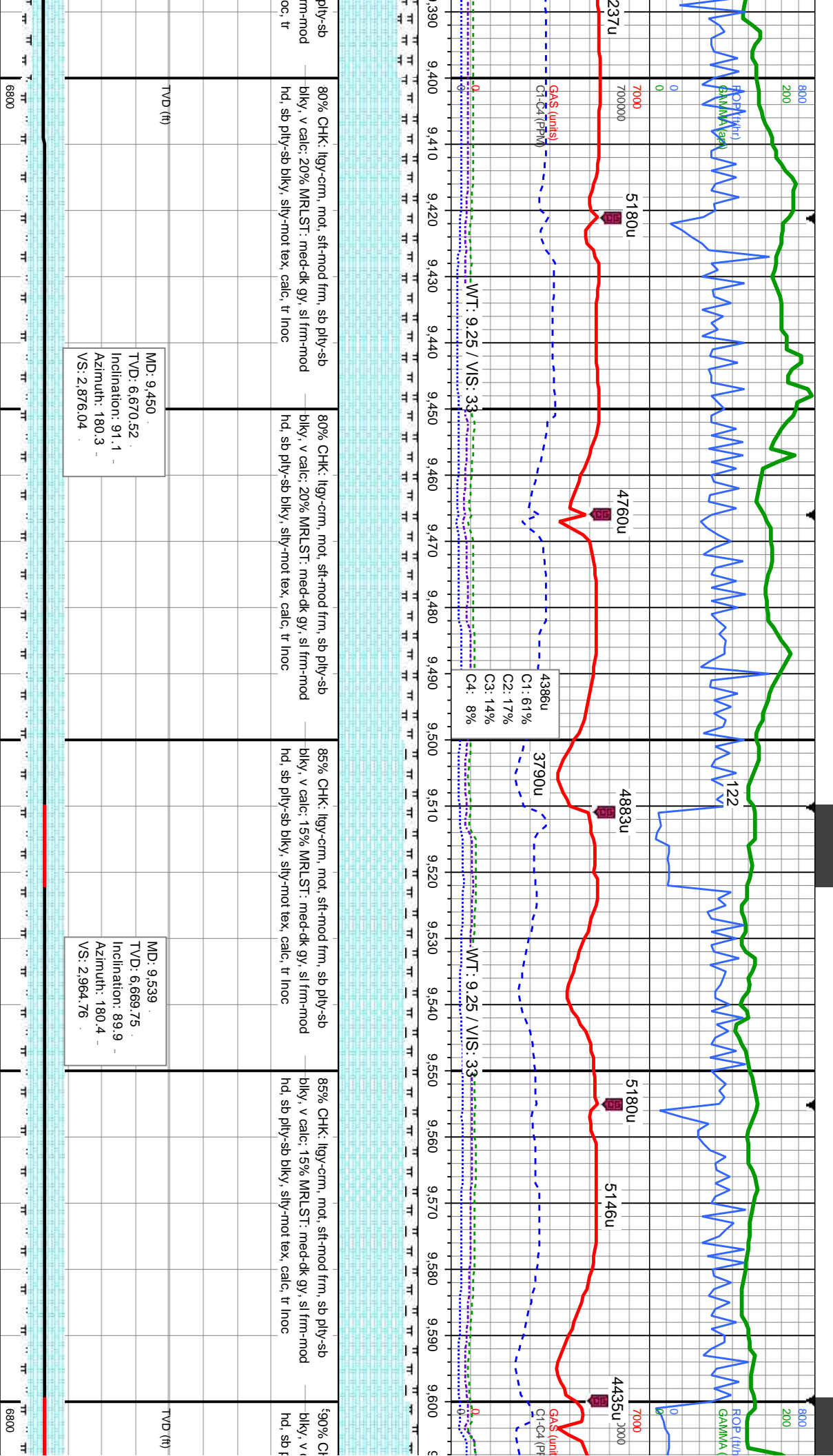
MD: 9.270
TVD: 6,673.27
Inclination: 91.4
Azimuth: 179.8
VS: 2,696.58

70% CHK: lgy-crm, mot, sft-mod frm, sb ply-sb
biky, v calc: 30% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb biky, sily-mot tex, calc, tr inoc, tr
bent, tr lse foss

MD: 9.360
TVD: 6,671.78
Inclination: 90.5
Azimuth: 180.3
VS: 2,786.32

75% CHK: lgy-crm, mot, sft-mod frm, sb
biky, v calc: 25% MRLST: med-dk gy, sl f
hd, sb ply-sb biky, sily-mot tex, calc, tr In
bent, tr lse foss

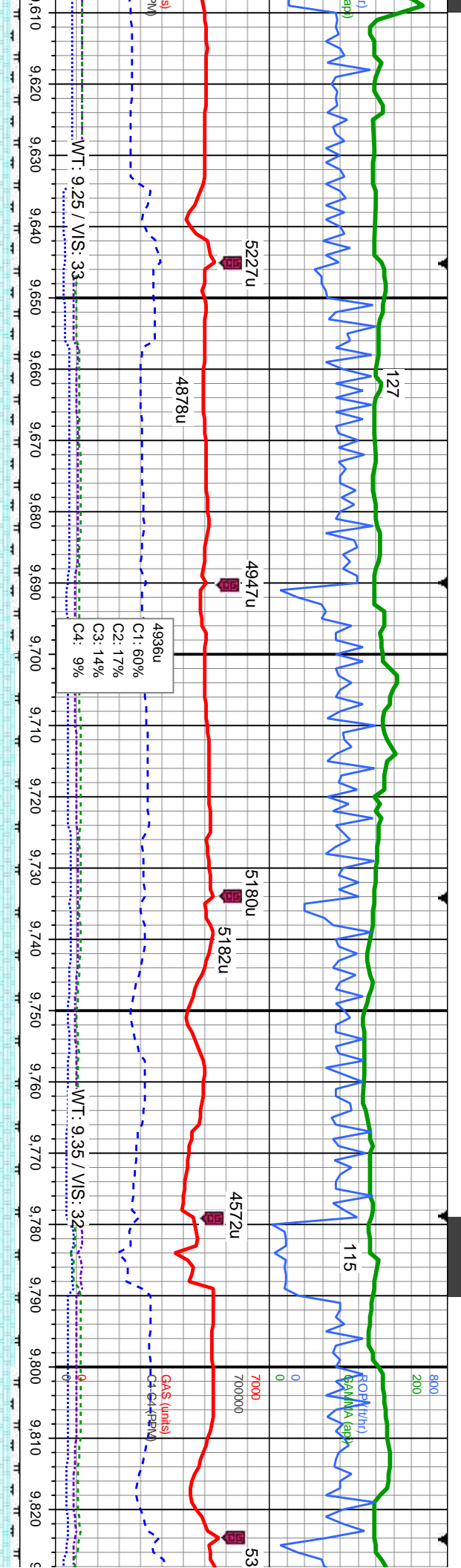




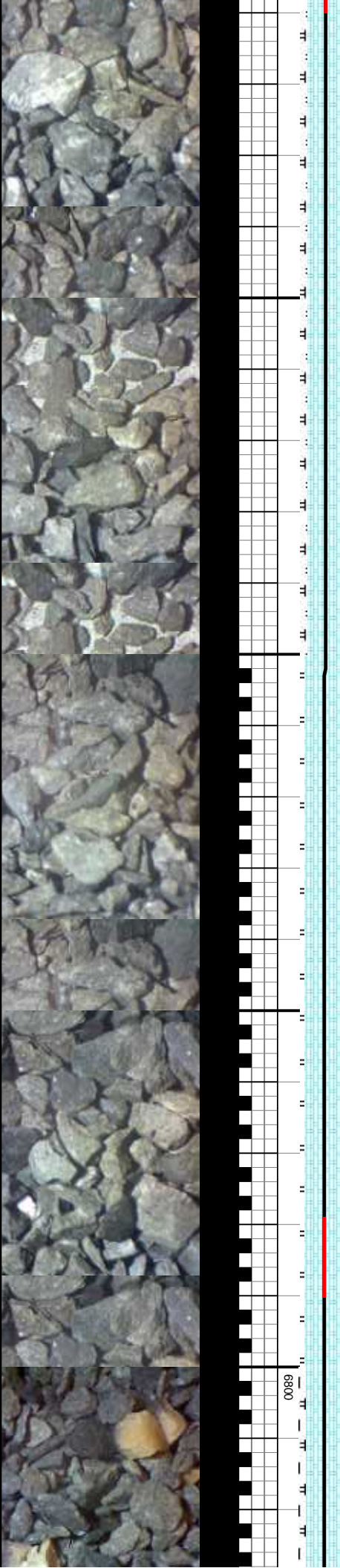
Depth (ft)	80% CHK: lgy-crm, mot, sft-mod frm, sb ply-sb bly, v calc: 20% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb bly, silv-mot tex, calc, tr inoc	80% CHK: lgy-crm, mot, sft-mod frm, sb ply-sb bly, v calc: 20% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb bly, silv-mot tex, calc, tr inoc	85% CHK: lgy-crm, mot, sft-mod frm, sb ply-sb bly, v calc: 15% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb bly, silv-mot tex, calc, tr inoc	85% CHK: lgy-crm, mot, sft-mod frm, sb ply-sb bly, v calc: 15% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb bly, silv-mot tex, calc, tr inoc
2237u				
5180u				
4760u				
4883u				
5180u				
5146u				
4435u				

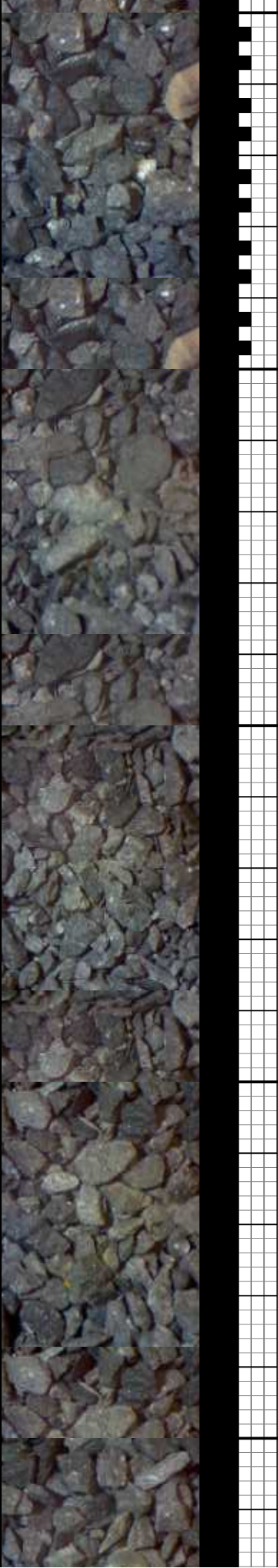
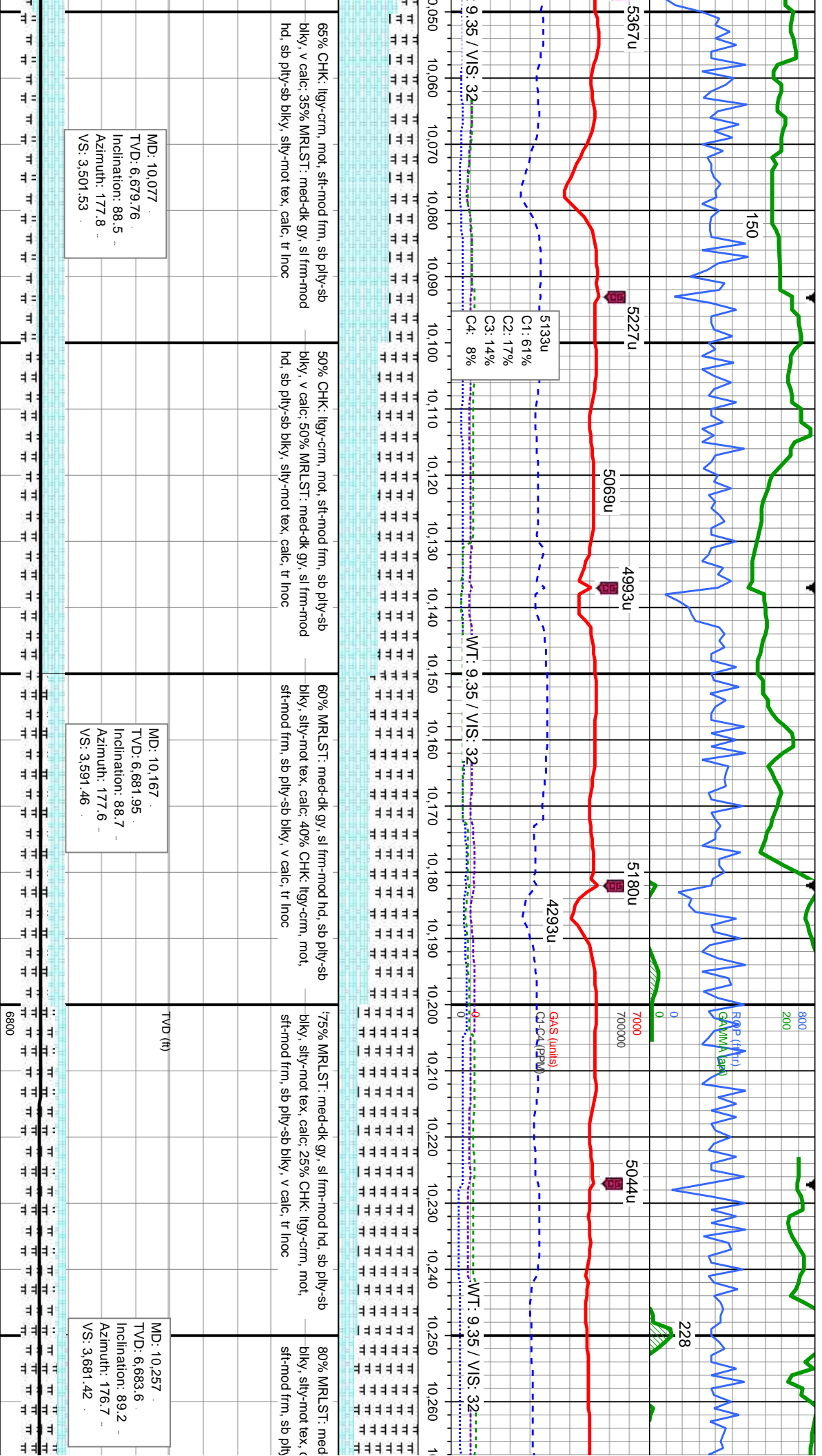
C1: 61%
C2: 17%
C3: 14%
C4: 8%

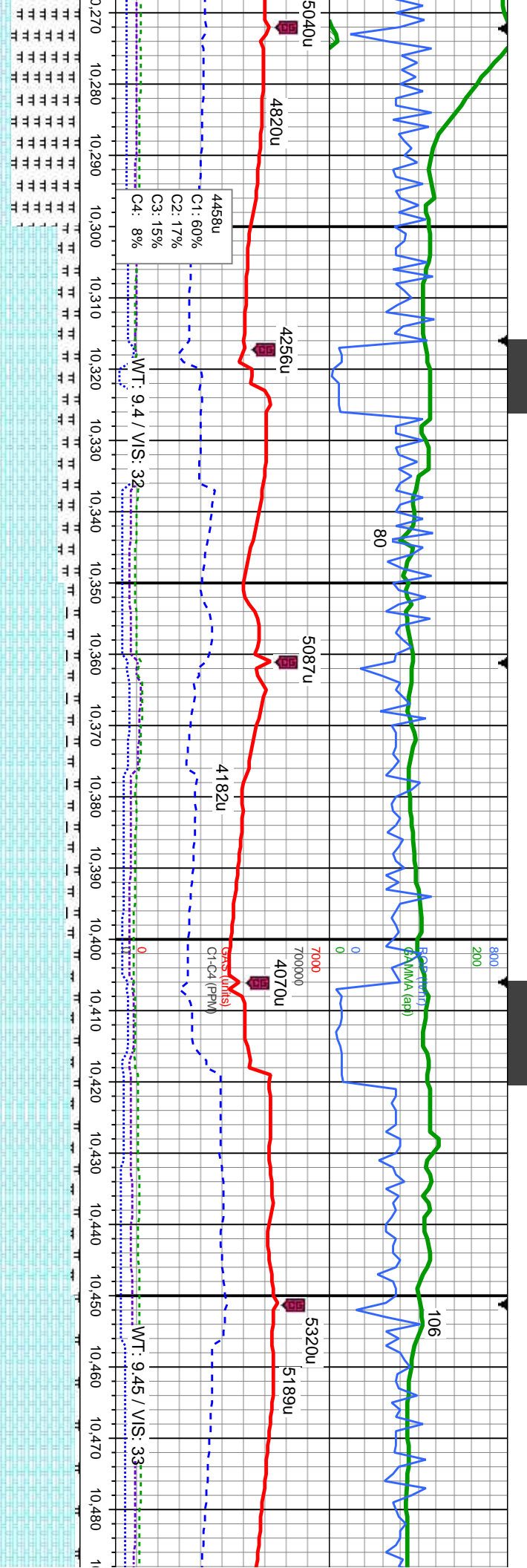




HK: lly-crm, mot, sft-mod frm, sb ply-sb calc, 10% MRLST: med-dk gy, sl frm-mod bly-sb blk, sly-mot tex, calc, tr inoc	90% CHK: lly-crm, mot, sft-mod frm, sb ply-sb blk, v calc, 10% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb blk, sly-mot tex, calc, tr inoc	95% CHK: lly-crm, mot, sft-mod frm, sb ply-sb bly, v calc, 5% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb blk, sly-mot tex, calc, tr inoc	95% CHK: lly-crm, mot, sft-mod frm, sb ply-sb blk, v calc, 5% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb blk, sly-mot tex, calc, tr inoc	590% CHK: lly-crm, mot, sft-mod frm, sb ply-sb blk, v calc, 10% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb blk, sly-mot tex, calc, tr inoc
MD: 9,629 TVD: 6,670.45 Inclination: 89.2 Azimuth: 180.5 VS: 3,054.46	MD: 9,719 TVD: 6,671.24 Inclination: 89.8 Azimuth: 180.2 VS: 3,144.18	MD: 9,808 TVD: 6,672.71 Inclination: 88.3 Azimuth: 179.5 VS: 3,232.94		

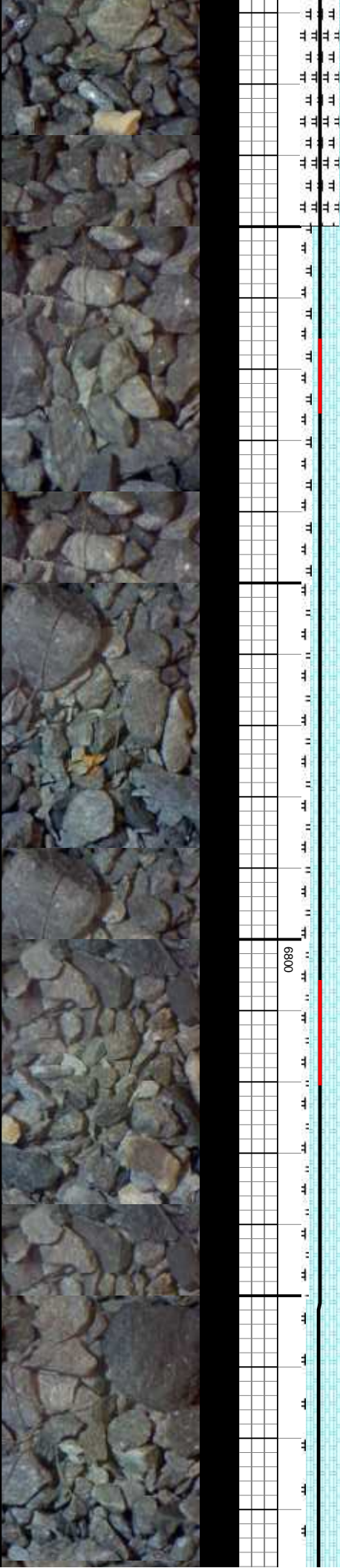


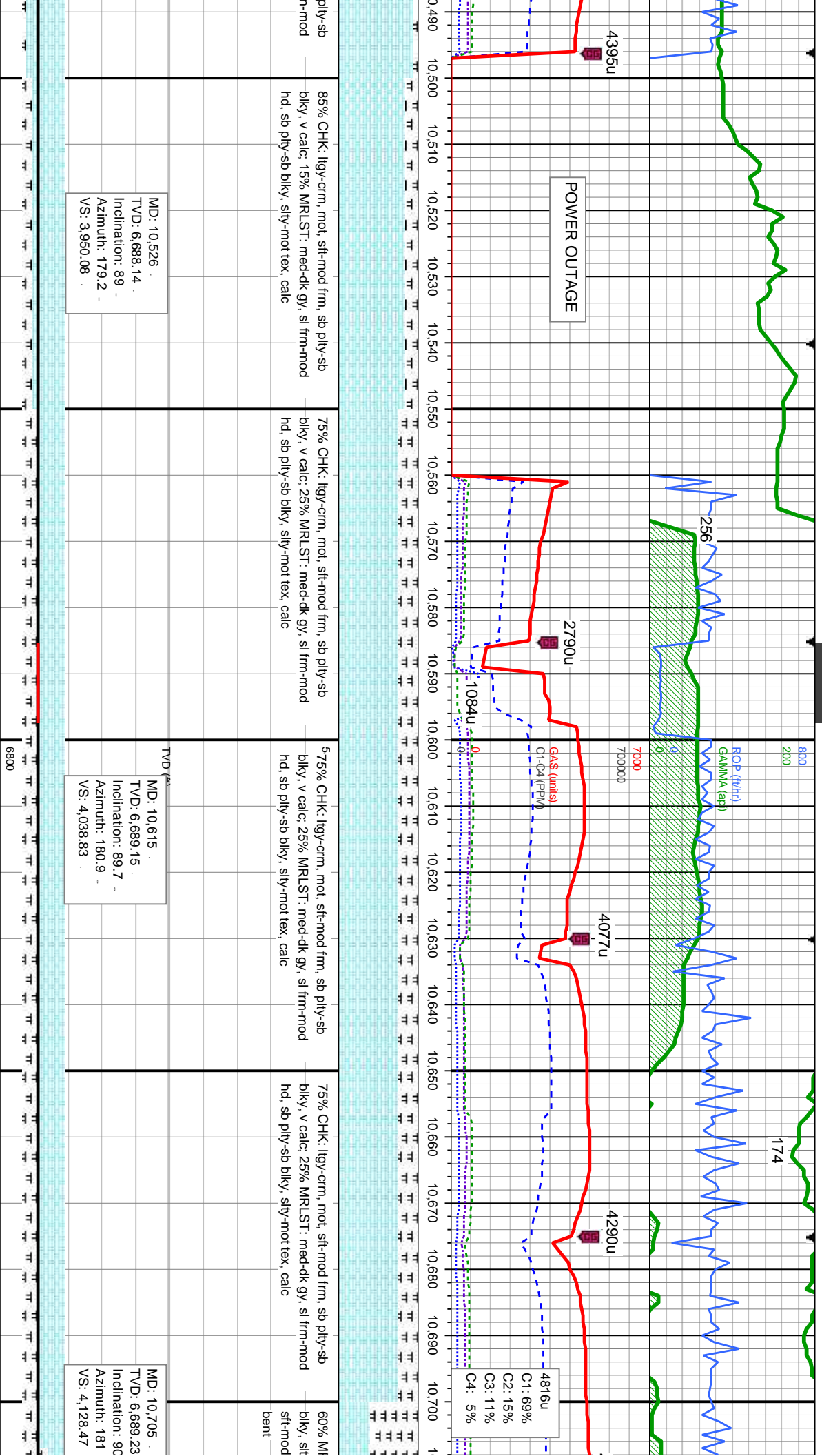




MD: 10,346
TVD: 6,684.85
Inclination: 89.2
Azimuth: 177.7
VS: 3,770.38

MD: 10,436
TVD: 6,686.42
Inclination: 88.8
Azimuth: 179.4
VS: 3,860.26



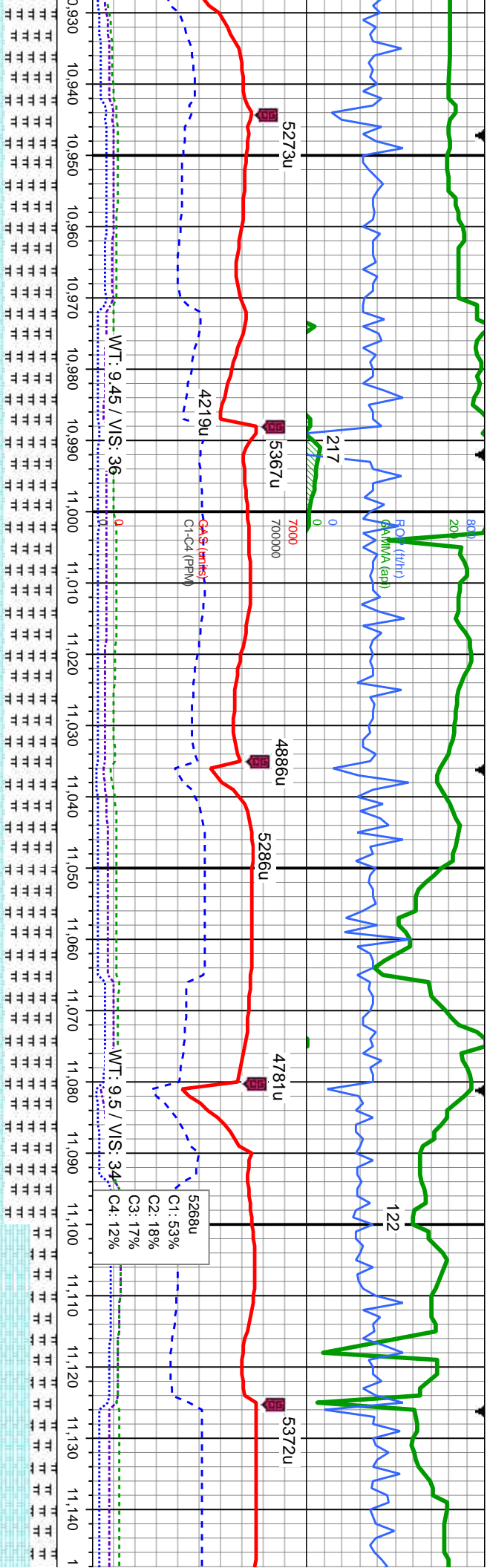


MD: 10,526
TVD: 6,688.14
Inclination: 89
Azimuth: 179.2
VS: 3,950.08

MD: 10,615
TVD: 6,689.15
Inclination: 89.7
Azimuth: 180.9
VS: 4,038.83

MD: 10,705
TVD: 6,689.23
Inclination: 90
Azimuth: 181
VS: 4,128.47





60% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb
bily, silty-mot tex, calc: 40% CHK: ilgy-crm, mot,
sft-mod frm, sb ply-sb bily, v calc, scat fos frag,
occ bent

60% MRLST: med-dk gy, sl frm-mod hd, sb ply-sb
bily, silty-mot tex, calc: 40% CHK: ilgy-crm, mot,
sft-mod frm, sb ply-sb bily, v calc, scat fos frag,
occ bent

70% CHK: ilgy-crm, mot, sft-mod frm, sb ply-sb
bily, v calc: 30% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb bily, silty-mot tex, calc, tr fos frag

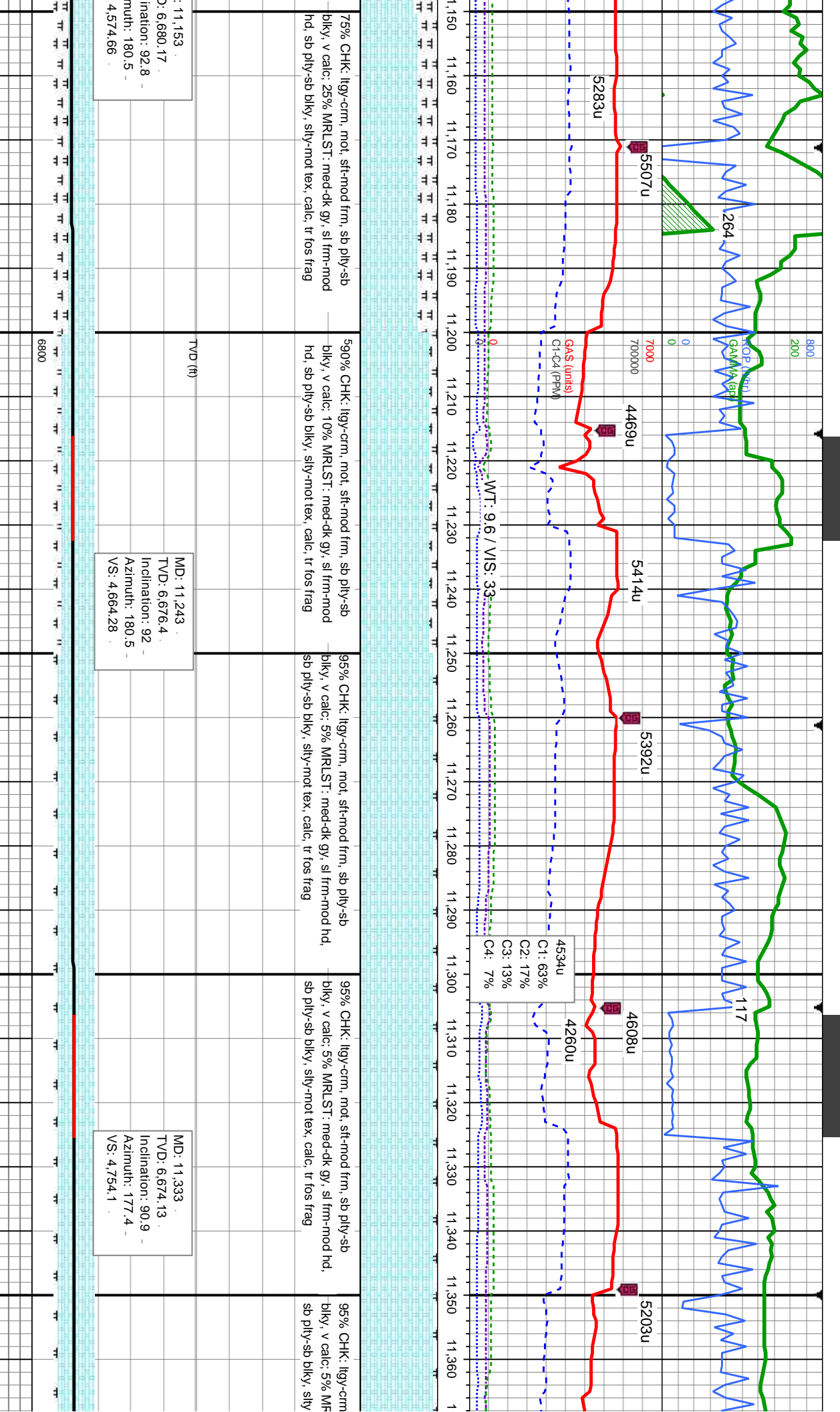
MD: 10.974
TVD: 6,686.88
Inclination: 91.6
Azimuth: 180.8
VS: 4,396.44

TVD (ft)

MD: 11.064
TVD: 6,683.98
Inclination: 92.1
Azimuth: 180.8
VS: 4,486.05

MD
TVD
Incl
Azi
VS

6800



75% CHK: lly-crm, mot, sft-mod frm, sb ply-sb
biky, v calc: 25% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb biky, sily-mot tex, calc, tr fos frag

590% CHK: lly-crm, mot, sft-mod frm, sb ply-sb
biky, v calc: 10% MRLST: med-dk gy, sl frm-mod
hd, sb ply-sb biky, sily-mot tex, calc, tr fos frag

95% CHK: lly-crm, mot, sft-mod frm, sb ply-sb
biky, v calc: 5% MRLST: med-dk gy, sl frm-mod hd,
sb ply-sb biky, sily-mot tex, calc, tr fos frag

95% CHK: lly-crm, mot, sft-mod frm, sb ply-sb
biky, v calc: 5% MRLST: med-dk gy, sl frm-mod hd,
sb ply-sb biky, sily-mot tex, calc, tr fos frag

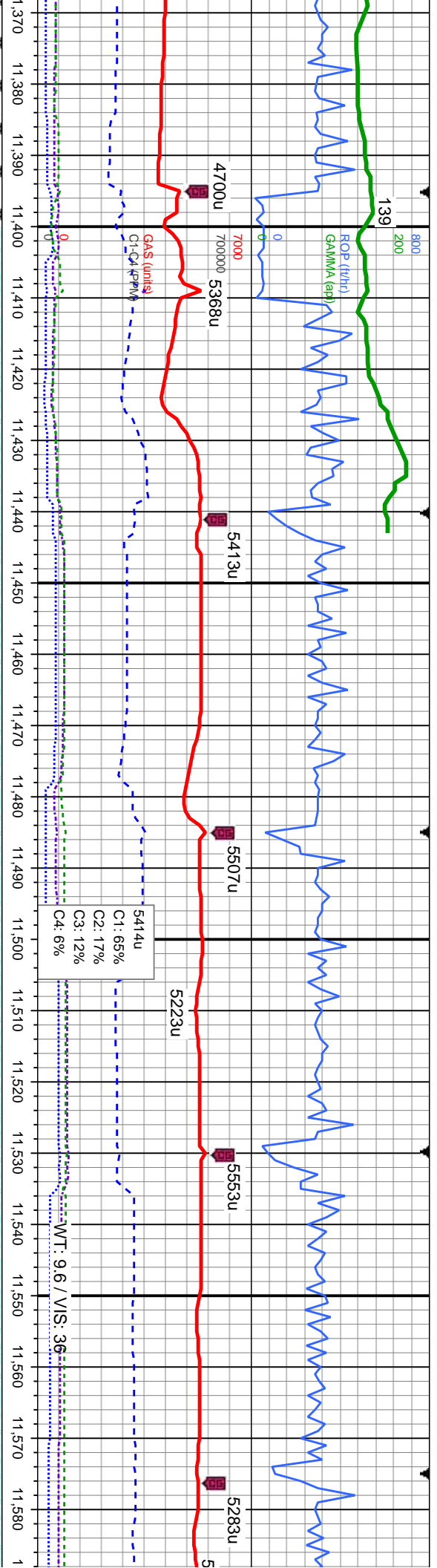
95% CHK: lly-crm, mot, sft-mod frm, sb ply-sb
biky, v calc: 5% MRLST: med-dk gy, sl frm-mod hd,
sb ply-sb biky, sily-mot tex, calc, tr fos frag

MD: 11,153
TVD: 6,680.17
Inclination: 92.8
Azimuth: 180.5
VS: 4,574.66

MD: 11,243
TVD: 6,676.4
Inclination: 92
Azimuth: 180.5
VS: 4,664.28

MD: 11,333
TVD: 6,674.13
Inclination: 90.9
Azimuth: 177.4
VS: 4,754.1





mot, sft-mod frm, sb ply-sb
LST: med-dk gy, sl frm-mod hd,
mot tex, calc, tr fos frag

100% CHK: lly-crm, mot, sft-mod frm, sb ply-sb
bly, v calc, tr fos frag

100% CHK: lly-crm, mot, sft-mod frm, sb ply-sb
bly, v calc, tr fos frag

100% CHK: lly-crm, mot, sft-mod frm, sb ply-sb
bly, v calc, tr fos frag

100% CHK: lly-crm, mot, sft-mod frm, sb ply-sb
bly, v calc, tr fos frag

MD: 11,423
TVD: 6,674.28
Inclination: 88.9
Azimuth: 176.4
VS: 4,844.08

MD: 11,536
TVD: 6,676.25
Inclination: 89.1
Azimuth: 175.6
VS: 4,957.06

6800



