

Operator

oration

it, Suite 2300
202

Geologist

oration

t, Suite 2300
202

Other

Senior Wellsite Geologist

Wellsite Geologist

Rock Types

CONGLOMERATE	NO SAMPLE	MARLSTONE	SHALY SANDSTONE
DOLOMITIC LIMESTONE	SALT	METAMORPHIC	SHALY SILTSTONE
DOLOMITIC LIMESTONE	SANDSTONE	NO SAMPLE	SILTSTONE
GRANITE	SALT-PEPPER SAND	SANDSTONE	TILL
GYPSUM	SHALE	SANDSTONE	TUFF
IGNEOUS	SIDERITE or LIMONITE	SHALE	WELDED TUFF
LIMESTONE	SHALE COLORED	SHALE GRAY	

Accessories

Fossils

GASTROPOD	ARGILLITE GRAIN	HEAVY MINERAL
INOCERAMUS	BENTONITE	KAOLIN
ALGAE	OOLITE	MARCASTITE
AMPHIPORA	OSTRACOD	BRECCIA FRAGMENTS
BELEMNITE	PELECYPOD	CALCAREOUS
BIOCLASTIC	PELLET	CARBONACEOUS FLAKES
BRACHIOPOD	PISOLITE	CHITDK
BRYOZOA	PLANT REMAINS	CHTLT
CEPHALOPOD	PLANT SPORES	COAL - THIN BEDS
CORAL	SCAPHOPOD	DOLOMITIC
CRINOID	STROMATOPOROID	FELDSPAR
ECHINOID		FERRUGINOUS PELLET

Minerals

FISH	FERRUGINOUS	SILICEOUS
FORAMINIFERA	ANHYDRITIC	SILTY
FOSSIL	ARGILLACEOUS	TUFFACEOUS

Stringer

ANHYDRITE STRINGER
BENTONITE STRINGER
COAL STRINGER
DOLOMITE STRINGER
GYPSUM STRINGER
LIMESTONE STRINGER
MARLSTONE (CALC) STRG
MARLSTONE (DOL) STRG
SANDSTONE STRINGER
SHALE STRINGER
SILTSTONE STRINGER

Other Symbols

Oil Show

PINPOINT
VUGGY

Engineering

DEAD
EVEN
QUESTIONABLE
SPOTTED STAINING

BIT

CONNECTION (UP)

Rounding

MUDSTONE

Porosity

CONNECTION GAS
CONNECTION GAS (LEFT)
TRIP GAS
TRIP GAS (LEFT)

FRACTURE

DOWN TIME GAS
DOWN TIME GAS (LEFT)
CORE - LOST
CORE - RECOVERED

INTERCRYSTALLINE

INTEROOLITIC
MOLDIC
ORGANIC

Textures

POOR
MODERATE

Sorting

WELL

Slide/Rotate

Columbine Logging 2-Manned
Geosteering Operational 5/28/2014
Bloodhound # 311

ROP
ROF
GAMMA

Log continues from
Anshutz 4-62-2-3228 CH2

Total Gas & Chromatograph

GAS
C1
C2
C3
C4

Depth Labels

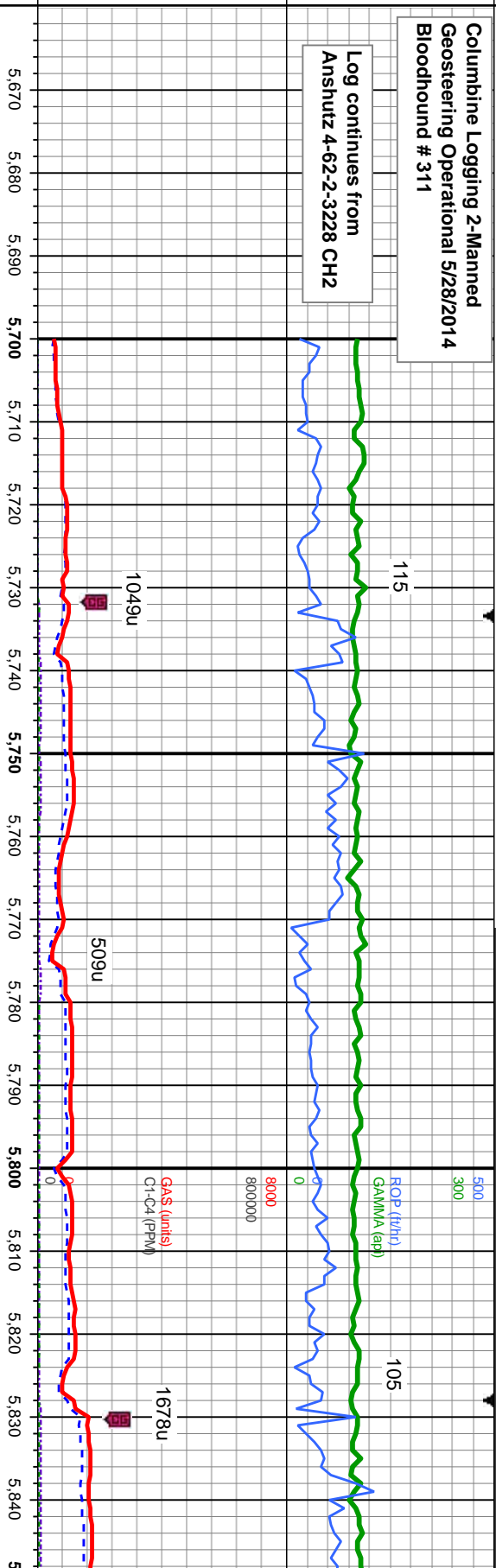
% Lith

Well Bore
TVD

Oil Show

EMFTST

Images



MD: 5,763'
TVD: 5,659.92'
Inclination: 0.8°
Azimuth: 123.8°
VS: -201.45'

SHY SLTST: lt - med gy, gy brn, mod frm, sb-pty -
sb blkly, rthy tex, vf occ f-med gr, w srt, non calc;
SLTY SH: med - dk gy, sft - frm, sb ply - sb blkly,
wxy tex, non calc, tr ss

SHY SLTST: lt - med gy, gy brn, mod frm, sb-pty -
sb blkly, rthy tex, vf occ f-med gr, w srt, non calc;
SLTY SH: med - dk gy, sft - frm, sb ply - sb blkly,
wxy tex, non calc, tr ss

SHY SLTST: lt - med gy, gy brn, mod frm, sb-pty -
sb blkly, rthy tex, vf occ f-med gr, w srt, non calc;
SLTY SH: med - dk gy, sft - frm, sb ply - sb blkly,
wxy tex, non calc, tr ss

TVD (ft)



In/Out Mud Wt: 10.1/10.1 Vis 55/55

MINDEPTH

In/Out Mud Wt: 10/10 Vis 43/43

300

179

116

5/31/2014

115

ROD (ft)
GAMMA (api)

Hole Depth Changed

2386u
C1 87.5%
C2 5.6%
C3 6.8%
C4 0.0%

2191u

GAS (units)
C1-C4 (PPM)

Hole Depth Changed

926u

0
8000
800000

651u

5,850 5,860 5,870 5,880 5,890 5,900 5,910 5,920 5,930 5,940 5,950 5,960 5,970 5,980 5,990 6,000 6,010 6,020 6,030 6,040 6,050 6,060

MD: 5.953'
TVD: 5.847.87'
Inclination: 14.5 °
Azimuth: 75.7 °
VS: -178.34'

MD: 6.000'
TVD: 5.892.82'
Inclination: 19.4 °
Azimuth: 73.1 °
VS: -165.09'

SHY SLTST: lt - med gy, gy brn, mod frm, sb-ply -
sb blkly, rthy tex, vf occ f-med gr, w srt, non calc;
SLTY SH: med - dk gy, sft - frm, sb ply - sb blkly,
wxy tex, non calc, tr ss

SHY SLTST: lt - m
sb blkly, rthy tex, vf
SLTY SH: med - dk
wxy tex, non calc, t
MARL: lt-dk gy, str
rr vf dissin pyr

MD: 5.858'
TVD: 5.754.71'
Inclination: 6.2 °
Azimuth: 81.3 °
VS: -195.82'

MD: 5.905'
TVD: 5.801.12'
Inclination: 11.7 °
Azimuth: 70 °
VS: -188.79'

Logger Top Sharon Springs
5950' MD/ 5843' TVD

MD: 6.048'
TVD: 5.937.34'
Inclination: 24.4 °
Azimuth: 72.4 °
VS: -147.91'

SHY SLTST: lt - med gy, gy brn, mod frm, sb-ply -
sb blkly, rthy tex, vf occ f-med gr, w srt, non calc;
SLTY SH: med - dk gy, sft - frm, sb ply - sb blkly,
wxy tex, non calc, tr ss

SHY SLTST: lt - med gy, gy brn, mod frm, sb-ply -
sb blkly, rthy tex, vf occ f-med gr, w srt, non calc;
SLTY SH: med - dk gy, sft - frm, sb ply - sb blkly,
wxy tex, non calc, tr ss

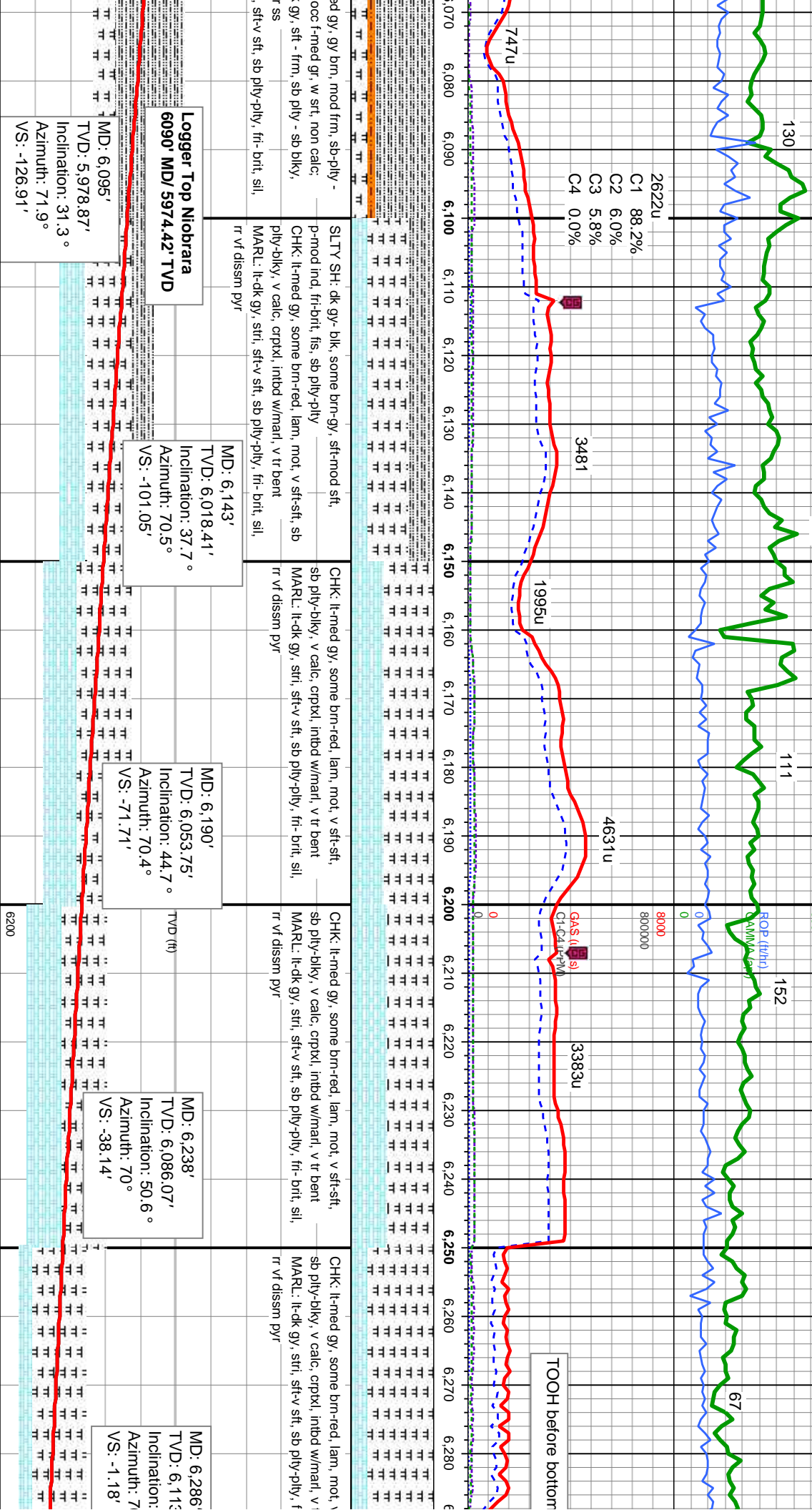
SHY SLTST: lt - med gy, gy brn, mod frm, sb-ply -
sb blkly, rthy tex, vf occ f-med gr, w srt, non calc;
SLTY SH: med - dk gy, sft - frm, sb ply - sb blkly,
wxy tex, non calc, tr ss

6200

MD: 6.048'
TVD: 5.937.34'
Inclination: 24.4 °
Azimuth: 72.4 °
VS: -147.91'

In/Out Mud Wt: 10.2/10 Vis 56/61

In/Out Mud Wt: 10.1/11



2622u
C1 88.2%
C2 6.0%
C3 5.8%
C4 0.0%

3481

4631u

3383u

TOOH before bottom

ed gy, gy brn, mod frm, sb-pty -
ooc f-med gr, w sft, non calc;
gy, sft - frm, sb ply - sb blkly,
ss
sft-v sft, sb ply-ply, fri- brt, sil,
tr vf dissn pyr

SILT Y SH: dk gy- blk, some brn-gy, sftmod sft,
p-mod ind, fri-brt, fis, sb ply-ply
CHK: lt-med gy, some brn-red, lam, mot, v sft-sft, sb
ply-blky, v calc, crpxl, intbd w/marl, v tr bent
MARL: lt-dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil,
tr vf dissn pyr

CHK: lt-med gy, some brn-red, lam, mot, v sft-sft,
sb ply-blky, v calc, crpxl, intbd w/marl, v tr bent
MARL: lt-dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil,
tr vf dissn pyr

CHK: lt-med gy, some brn-red, lam, mot, v sft-sft,
sb ply-blky, v calc, crpxl, intbd w/marl, v tr bent
MARL: lt-dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil,
tr vf dissn pyr

CHK: lt-med gy, some brn-red, lam, mot, v sft-sft,
sb ply-blky, v calc, crpxl, intbd w/marl, v tr bent
MARL: lt-dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil,
tr vf dissn pyr

Logger Top Niobrara
6090 MD/ 5974.42' TVD

MD: 6,095'
TVD: 5,978.87'
Inclination: 31.3°
Azimuth: 71.9°
VS: -126.91'

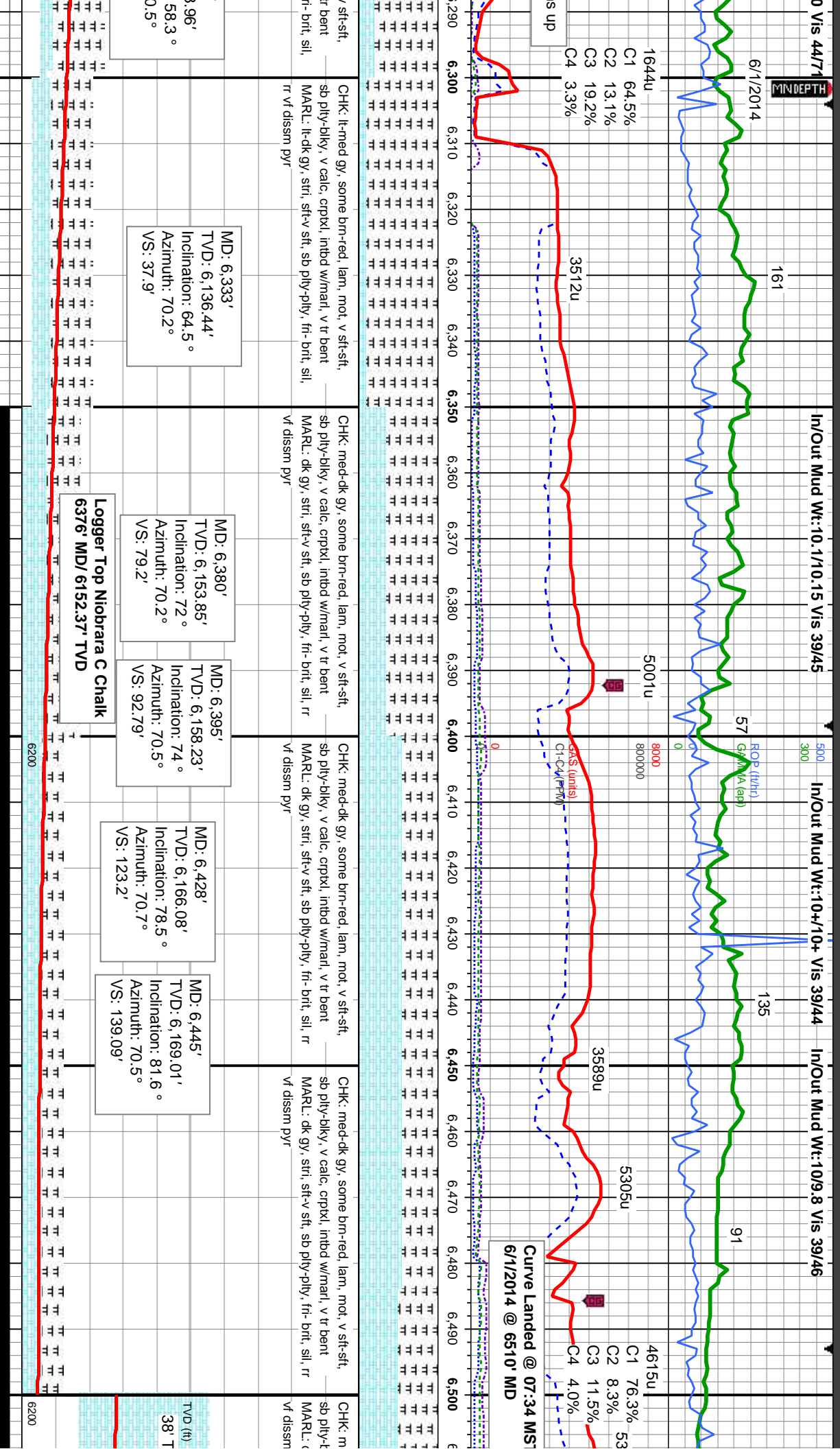
MD: 6,143'
TVD: 6,018.41'
Inclination: 37.7°
Azimuth: 70.5°
VS: -101.05'

MD: 6,190'
TVD: 6,053.75'
Inclination: 44.7°
Azimuth: 70.4°
VS: -71.71'

MD: 6,238'
TVD: 6,086.07'
Inclination: 50.6°
Azimuth: 70°
VS: -38.14'

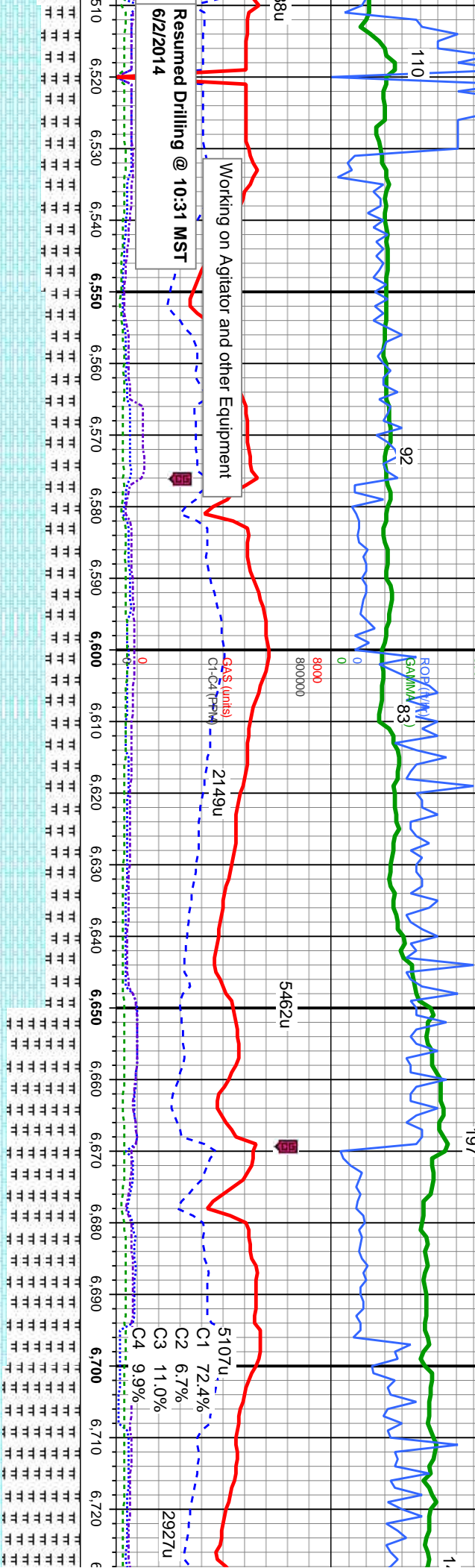
MD: 6,286'
TVD: 6,113.13'
Inclination: 7°
Azimuth: 7°
VS: -1.18'





In/Out Mud Wt:8.5H/8.6 Vis 28/28

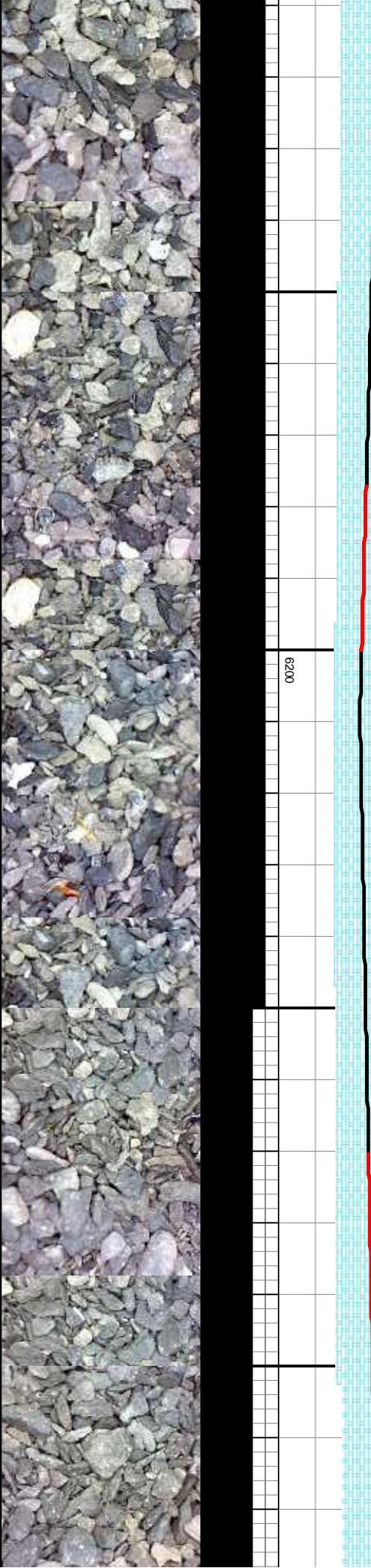
In/Out Mud V

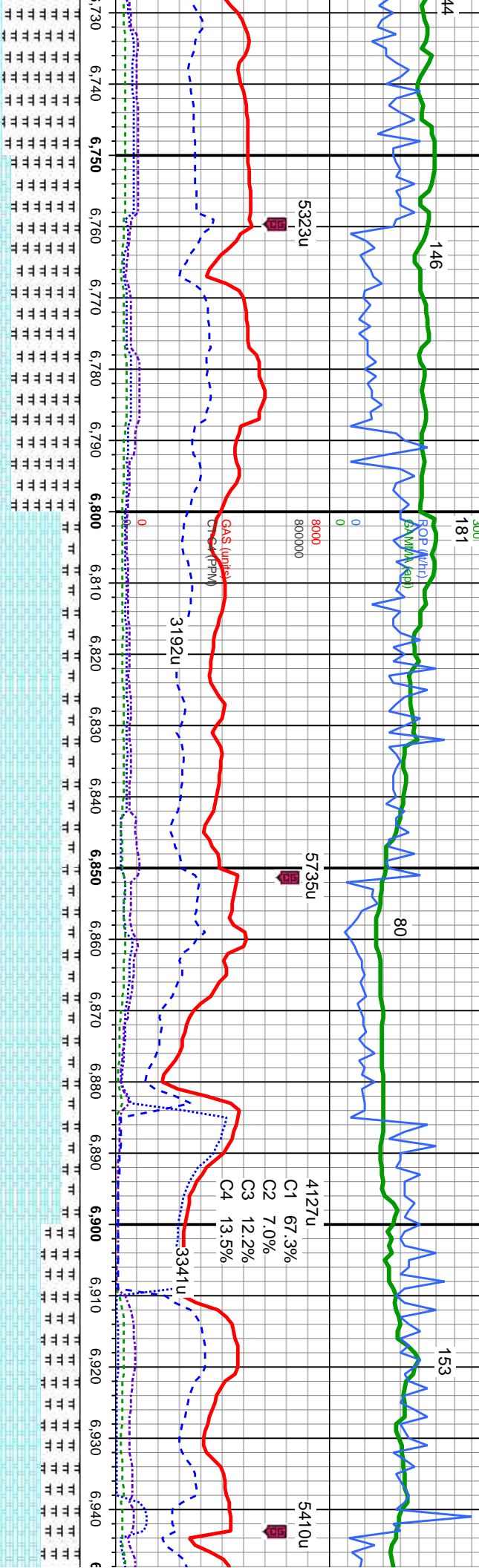


med-dk gy, some brn-red, lam, mot, v sft-sft, sb ply-bldy, v calc, crptxl, intbd w/marl, v tr bent	CHK: med-dk gy, some brn-red, lam, mot, v sft-sft, sb ply-bldy, v calc, crptxl, intbd w/marl, v tr bent	CHK: med-dk gy, some brn-red, lam, mot, v sft-sft, sb ply-bldy, v calc, crptxl, intbd w/marl, v tr bent	CHK: med-dk gy, some brn-red, lam, mot, v sft-sft, sb ply-bldy, v calc, crptxl, intbd w/marl, v tr bent
dk gy, stri, sft-v sft, sb ply-pty, fri- brn, sil, rr	MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brn, sil, rr	MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brn, sil, rr	MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brn, sil, rr
pyr	vf dissn pyr	vf dissn pyr	vf dissn pyr

MD: 6,609'
TVD: 6,177.87'
Inclination: 92.2 °
Azimuth: 73.4 °
VS: 295.44'

MD: 6,701'
TVD: 6,174.34'
Inclination: 92.2 °
Azimuth: 77 °
VS: 384.71'





CHK: med-dk gy, some brn-red, iam, mot, v sft-sft, sb pily-biky, v calc, crpxl, intbd w/marl, v tr bent
MARL: dk gy, stri, sft-v sft, sb pily-pily, fri- brn, sil, rr
v diss pyr

CHK: med-dk gy, some brn-red, iam, mot, v sft-sft, sb pily-biky, v calc, crpxl, intbd w/marl, v tr bent
MARL: dk gy, stri, sft-v sft, sb pily-pily, fri- brn, sil, rr
v diss pyr

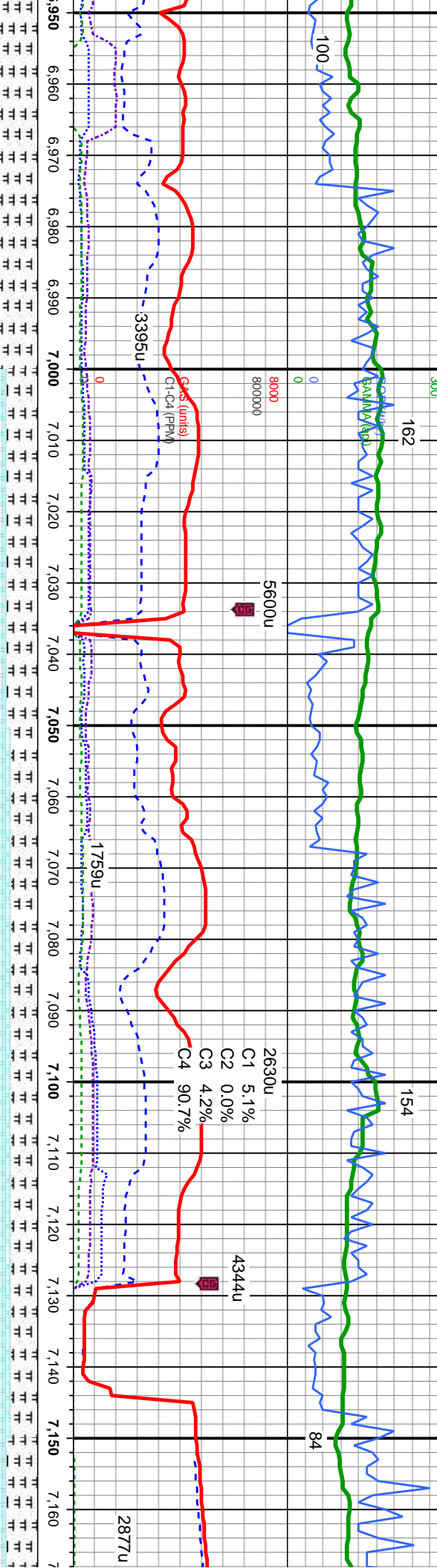
CHK: med-dk gy, some brn-red, iam, mot, v sft-sft, sb pily-biky, v calc, crpxl, intbd w/marl, v tr bent
MARL: dk gy, stri, sft-v sft, sb pily-pily, fri- brn, sil, rr
v diss pyr

MD: 6,793'
TVD: 6,171.53'
Inclination: 91.3°
Azimuth: 79.9°
VS: 475.11'

MD: 6,886'
TVD: 6,169.5'
Inclination: 91.2°
Azimuth: 83.9°
VS: 567.36'

6200





CHK: med-dk gy, some brn-red, lam, mot, v sft-sft, sb pily-dlky, v calc, crptxl, intbd w/marl, v tr bent MARL: dk gy, stri, sft-v sft, sb pily-pily, fri- brt, sil, rr vř dissn pyr

CHK: med-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pily-dlky, v calc, crptxl, intbd w/marl, v tr bent MARL: dk gy, stri, sft-v sft, sb pily-pily, fri- brt, sil, rr vř dissn pyr

CHK: med-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pily-dlky, v calc, crptxl, intbd w/marl, v tr bent MARL: dk gy, stri, sft-v sft, sb pily-pily, fri- brt, sil, rr vř dissn pyr

CHK: med-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pily-dlky, v calc, crptxl, lmy, intbd w/marl MARL: dk gy, stri, sft-v sft, sb pily-pily, fri- brt, sil, rr vř dissn pyr

CHK: med-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pily-dlky, v calc, crptxl, lmy, intbd w/marl MARL: dk gy, stri, sft-v sft, sb pily-pily, fri- brt, sil, rr vř dissn pyr

MD: 6,977'
TVD: 6,167.59'
Inclination: 91.2°
Azimuth: 88.1°
VS: 658.19'

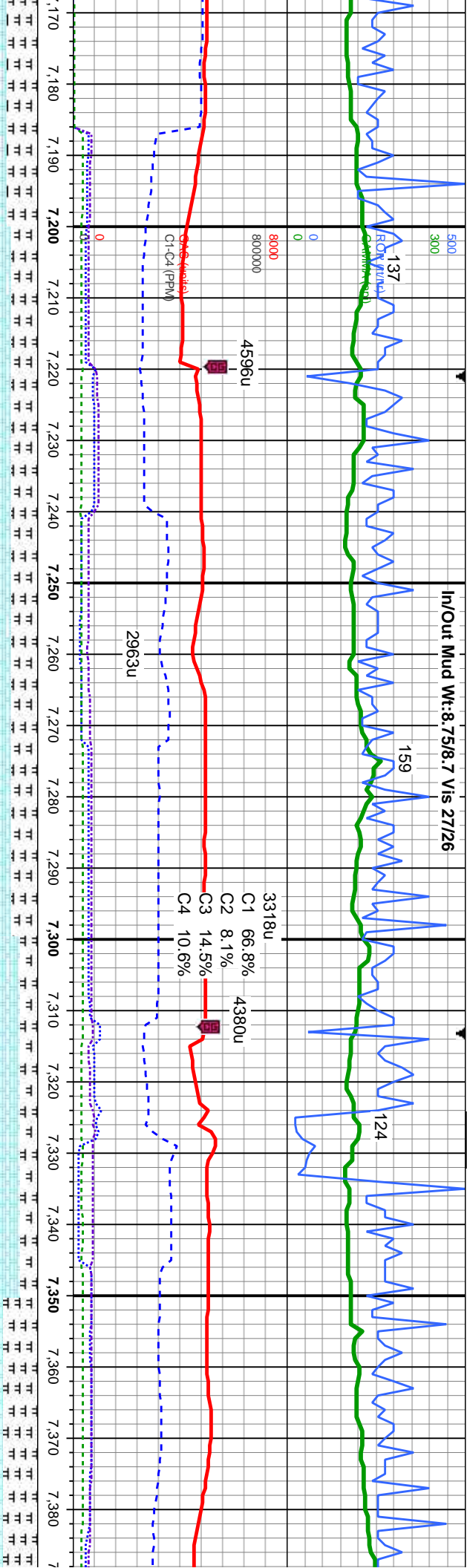
MD: 7,069'
TVD: 6,167.59'
Inclination: 88.8°
Azimuth: 91°
VS: 750.17'

MD: 7,161'
TVD: 6,167.59'
Inclination: 91.2°
Azimuth: 93.7°
VS: 842'

TVD (ft)

6200





In/Out Mud Wt: 8.75/8.7 Vis 27/26

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb pty-biky, v calc, crptl, lmy, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb pty-pty, fri- brt, sil, rr
vf dissim pyr

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb pty-biky, v calc, crptl, lmy, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb pty-pty, fri- brt, sil, rr
vf dissim pyr

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb pty-biky, v calc, crptl, lmy, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb pty-pty, fri- brt, sil, rr
vf dissim pyr

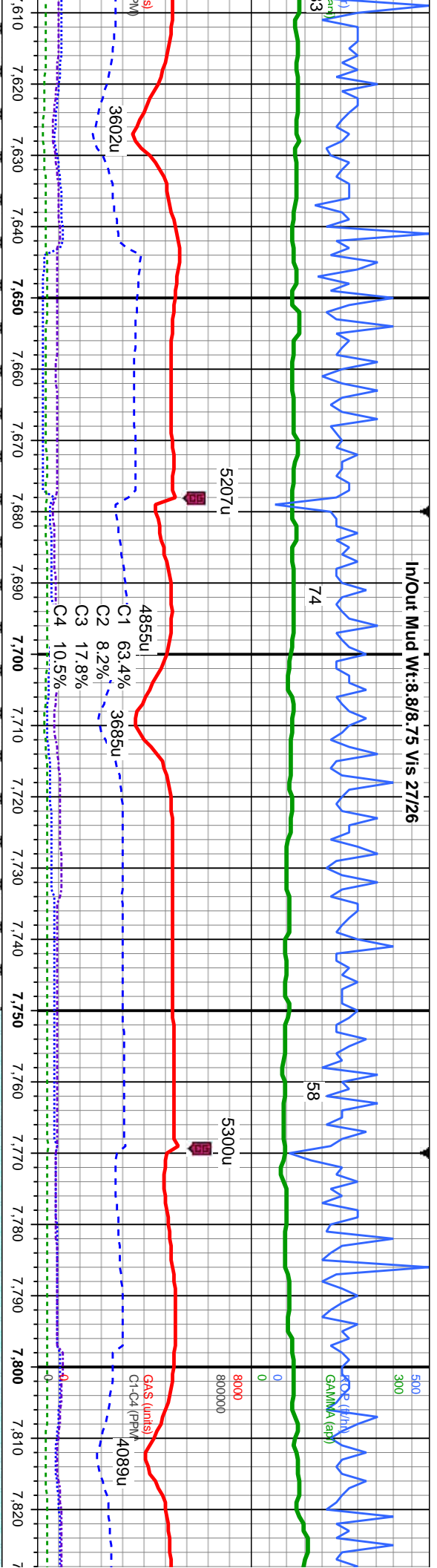
MD: 7,253'
TVD: 6,165.02'
Inclination: 92.0°
Azimuth: 93.6°
VS: 933.66'

MD: 7,343'
TVD: 6,162.75'
Inclination: 90.9°
Azimuth: 94.4°
VS: 1,023.28'

6200



In/Out Mud Wt:8.8/8.75 Vis 27/26



dk gy, gy brn, some red, iam, mot, v sft-sft, sb ply-biky, v calc, crptxl, MARL: dk gy, stri, sft-v
ply-ply, fri- brt, sil, calc

CHK: lt-dk gy, gy brn, some red, iam, mot, v sft-sft, sb ply-biky, v calc, crptxl, MARL: dk gy, stri, sft-v
sft, sb ply-ply, fri- brt, sil, calc

CHK: lt-dk gy, gy brn, some red, iam, mot, v sft-sft, sb ply-biky, v calc, crptxl, MARL: dk gy, stri, sft-v
sft, sb ply-ply, fri- brt, sil, calc

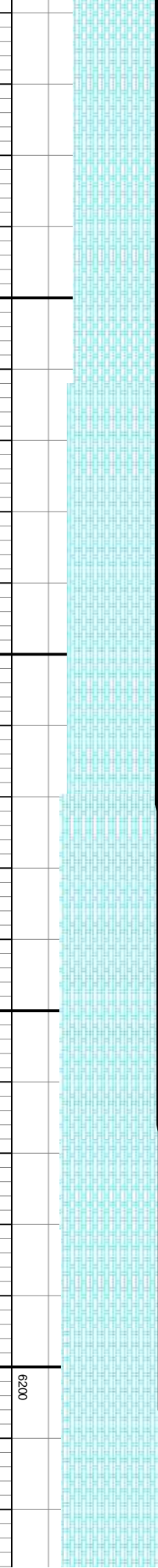
CHK: lt-dk gy, gy brn, some red, iam, mot, v sft-sft, sb ply-biky, v calc, crptxl, tr cal, tr marl

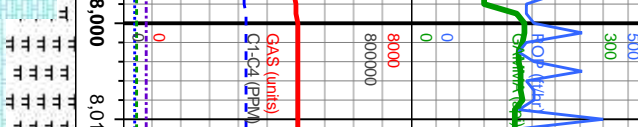
CHK: lt-dk gy, gy brn, some red, iam, mot, v sft-sft, sb ply-biky, v calc, crptxl, tr cal

MD: 7,619'
TVD: 6,160.5'
Inclination: 90.1 °
Azimuth: 95.2 °
VS: 1,297.84'

MD: 7,709'
TVD: 6,160.27'
Inclination: 90.2 °
Azimuth: 95.2 °
VS: 1,387.31'

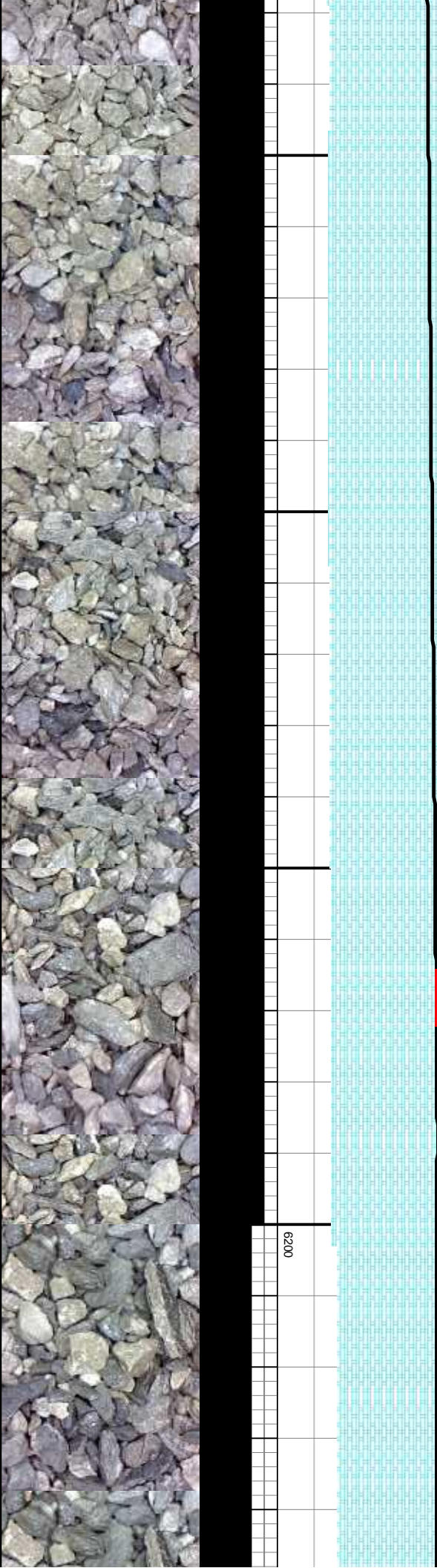
MD: 7,801'
TVD: 6,159.47'
Inclination: 90.8 °
Azimuth: 95.2 °
VS: 1,478.76'





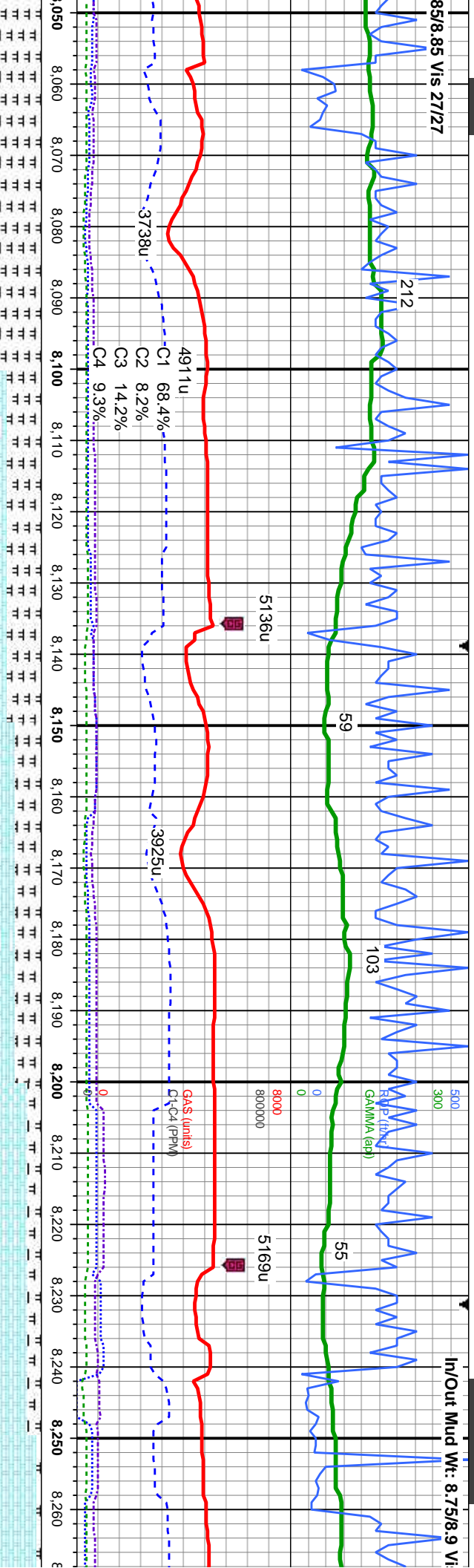
MD: 7,893'
TVD: 6,157.86'
Inclination: 91.2°
Azimuth: 95.3°
VS: 1,570.2'

TVD: 6,156.24'
 Inclination: 90.8 °
 Azimuth: 95.2 °
 VS: 1,662.62'



85/8.85 Vis 27/27

In/Out Mud Wt: 8.75/8.9 Vi



CHk: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb ply-bkly, v calc, crptxl, lmy, inbtd w/marl
MARL: dk gy, stri, sft-v sft, sb ply-ply, fri-bit, sil, r
v/dissm pyr

CHK: med-*dk*, *gy*, *gy* brn, some red, lam, mot, v
sft-sft, sb ply-bkly, v calc, crptxl, lmy, intbd w/mrat
MARL: *dk*, *gy*, sti, sft-v sft, sb ply-ply, fri- brlt, sil, tr
v dissim pyr

CHK: med- <i>dk</i> , <i>gy</i> , <i>gy</i> <i>brn</i> , some <i>red</i> , <i>lam</i> , <i>mot</i> , <i>v</i> sft-sft, sb <i>ply</i> - <i>dkly</i> , <i>v</i> <i>calc</i> , <i>crptxl</i> , <i>lmy</i> , <i>intbd</i> <i>w/marl</i> MARL: <i>dk</i> <i>gy</i> , <i>stri</i> , <i>sft-v</i> sft, sb <i>ply</i> - <i>ply</i> , <i>fr</i> - <i>brt</i> , <i>sil</i> , <i>rr</i> vř dissim	MD: 9 170,	
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CHK: It-*dk gy, gy brn, some red, lam, mot, v sft-sft, sb ply-biky, v calc, cpxpl, inbnd w/mat MAR*: dk gy, sti, sft-v sft, sb ply-ply, fri- brt, sil, tr v diss pyr

CHK: It-ak gy, gy br
sb pty-biky, v calc,
gy, stri, sft-v sft, sb

MD: 8,078'
TVD: 6,156.48'
Inclination: 88.9 °
Azimuth: 95 °
VS: 1,754.1'

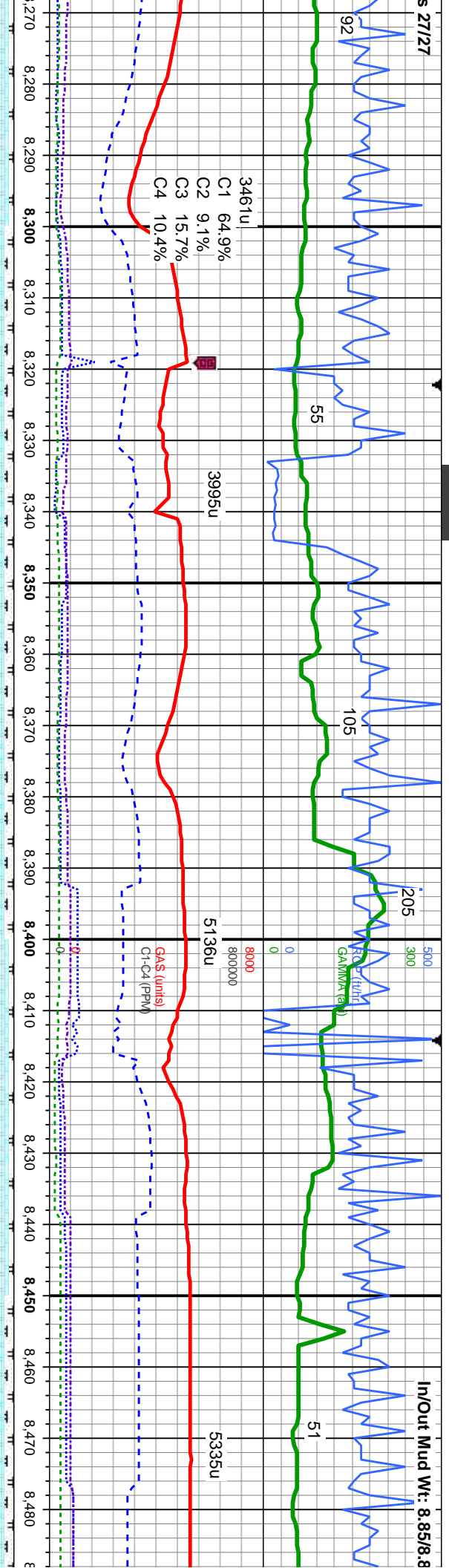
MD: 8,170'
TV D: 6,158.24'
Inclination: 88.9°
Azimuth: 94.7°
VS: 1,845.6'

TV_D (ft)

MD: 8,261'
TVD: 6,159.28'
Inclination: 89.8
Azimuth: 93.3°
VS: 1.936.24'

S 27127

In/Out Mud Wt: 8.85/8.8



ptly-ptly, fri-
brit, sil, rr
v f diissm

CHK: lt-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pty-bkly, v calc, crpxl, intbd w/meat MAR.: dk gy, sfti, sft-v sfti, sb pty-pty, fri-brt, sil, rr vf dissim

CHK: It-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pty-bkly, v calc, crptl, intbd w/manf MARL: dk gy, str, sft-v sft, sb pty-pty, fri- brit, sil, rr vf dissim

pyr	MD. 8. 444	<p>1st CHK: It-dk gy, gy brn, some red, lam, mot, v sft-sft sb pty-blyk, v calc, crptx, inbd w/marl MAR.: dk gy, strn, sft-v sft, sb pty-pty, fr- brt, sil, rr v² diss</p>
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CHK: It-dk gy, gy brn, some red, larn, mot, sb ply-bilky, v calc, crptxl, intbd w/marl MA gy, stri, sft-v sft, sb ply-pty, fri- brit, sil, r v

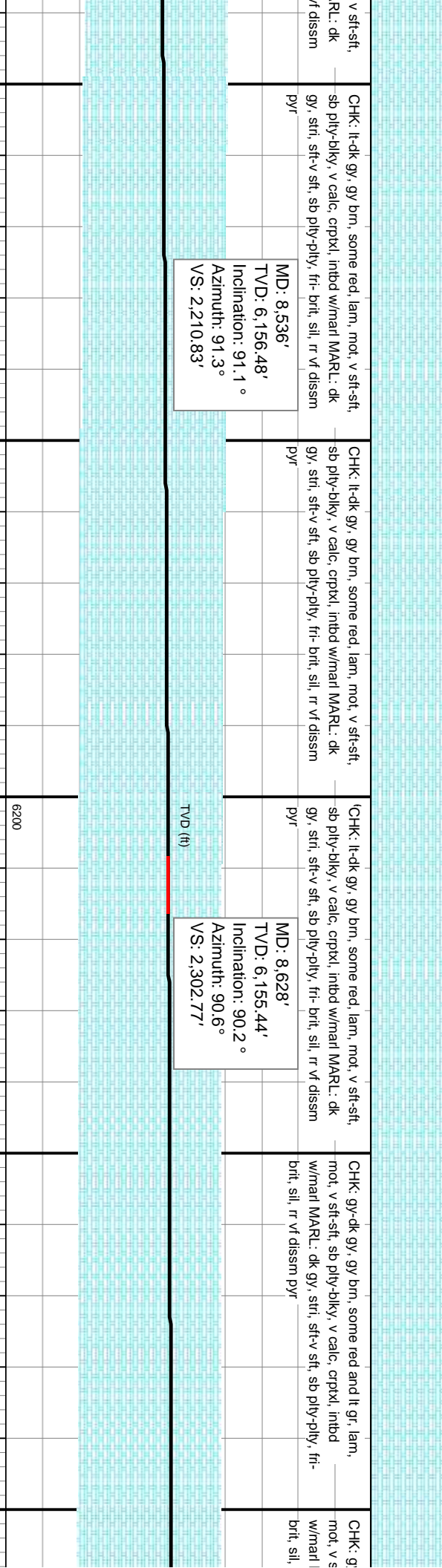
MD: 8,353'
TVD: 6,158.8'
Inclination: 90.8 °
Azimuth: 92 °
VS: 2,028.05'

MD: 8,444'
TVD: 6,157.76'
Inclination: 90.5°
Azimuth: 91.6°
VS: 2,118.93'

TVD (ft)

6200

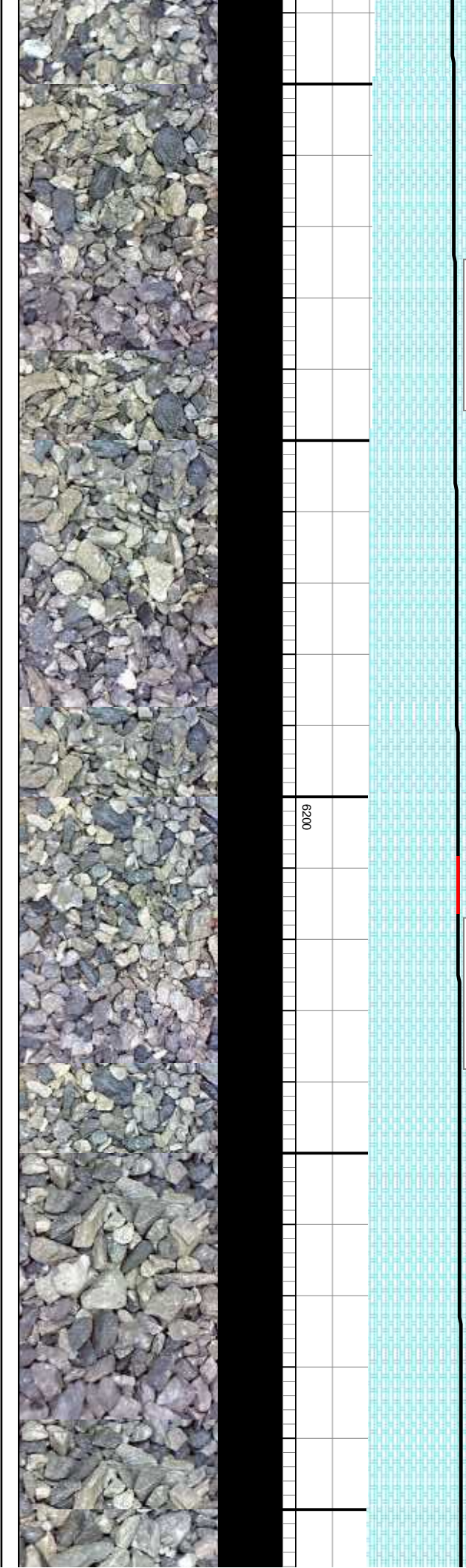
In/Out Mud Wt: 8.9/8.9 Vis 28/29



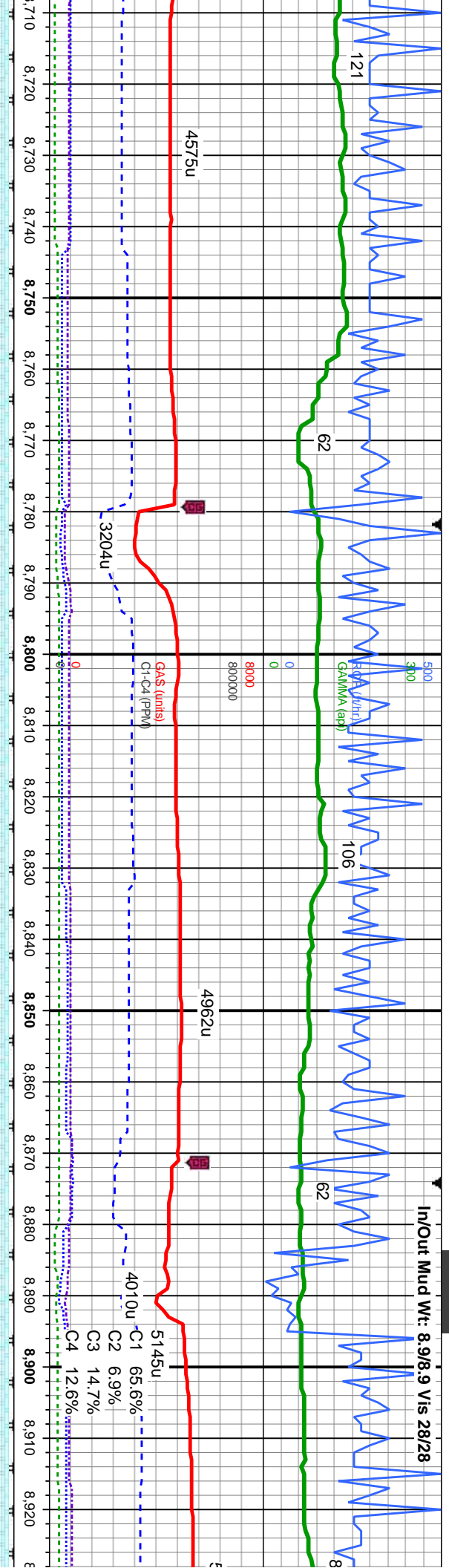
v sft-sft,	CHK: gy-dk gy, gy brn, some i
RL: dk	mot, v sft-sft, sb pty-biky, v ca
dissm	w/mar MARL: dk gy, stri, sft-v
	brit, sil, nr vf dissm pyr

pyr	MD: 8,628'
	TVD: 6,155.44'
	Inclination: 90.2°
	Azimuth: 90.6°
	VS: 2,302.77'

TVD (ft)



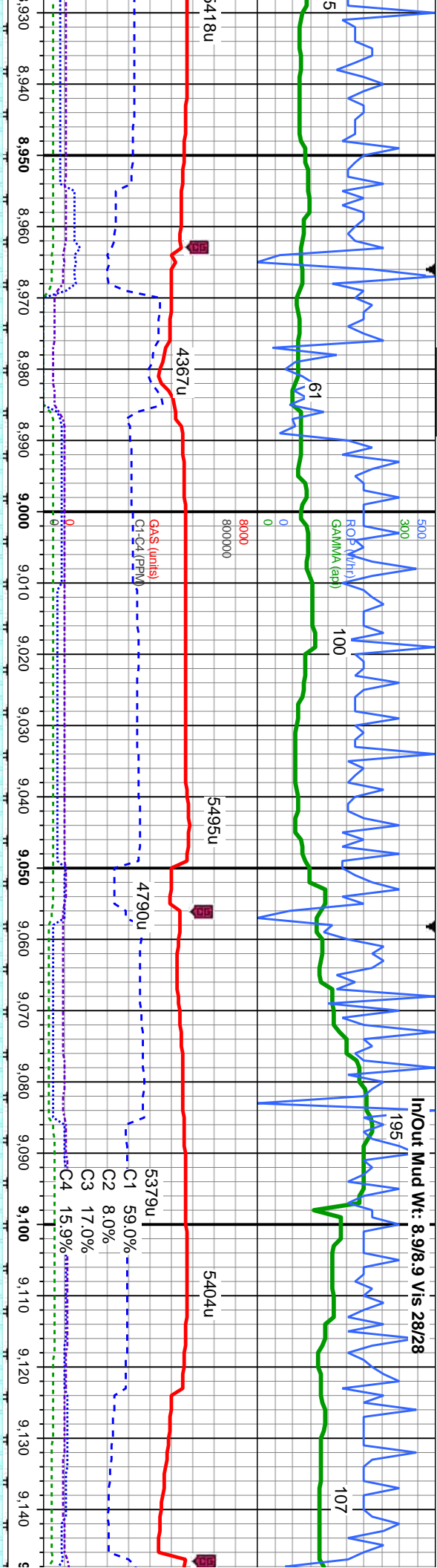
In/Out Mud Wt: 8.9/8.9 Vis 28/28



ft-sft, sb ply-biky, v calc, crptl, inbd	CHK: gy-dk gy, gy brn, some red and lt gr, lam, mot, v sft-sft, sb ply-biky, v calc, crptl, inbd w/marl MARL: dk gy, stri, sft-v sft, sb ply-pty, fr-brt, sil, rr v dissn pyr
ft-sft, sb ply-biky, v calc, crptl, inbd	CHK: gy-dk gy, gy brn, some red and lt gr, lam, mot, v sft-sft, sb ply-biky, v calc, crptl, inbd w/marl MARL: dk gy, stri, sft-v sft, sb ply-pty, fr-brt, sil, rr v dissn pyr
ft-sft, sb ply-biky, v calc, crptl, inbd	CHK: lt-gy, gy brn, some red and dk gy, lam, mot, v sft-sft, sb ply-biky, v calc, crptl, inbd w/marl MARL: dk gy, stri, sft-v sft, sb ply-pty, fr-brt, sil, rr v dissn pyr
ft-sft, sb ply-biky, v calc, crptl, inbd	CHK: lt-gy, gy brn, some red and dk gy, lam, mot, v sft-sft, sb ply-biky, v calc, crptl, inbd w/marl MARL: dk gy, stri, sft-v sft, sb ply-pty, fr-brt, sil, rr v dissn pyr

MD: 8,720' TVD: 6,154.71' Inclination: 90.7° Azimuth: 90.9° VS: 2,394.73'	MD: 8,812' TVD: 6,153.19' Inclination: 91.2° Azimuth: 91.9° VS: 2,486.63'	MD: 8,904' TVD: 6,151.82' Inclination: 90.5° Azimuth: 92.3° VS: 2,578.48'
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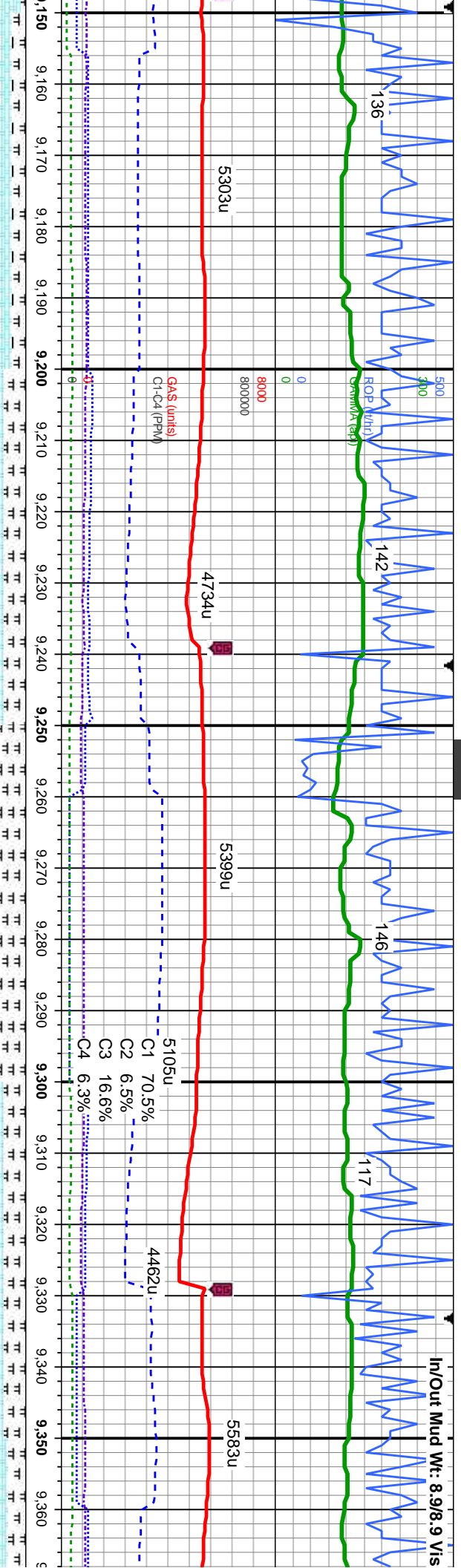


nd dk gy, lam, mot, v sft-sft, sb ply-dlky, v calc, crptl, intbd w/marl	CHK: lt-gy, gy brn, some red and dk gy, lam, mot, v sft-sft, sb ply-dlky, v calc, crptl, intbd w/marl	CHK: lt-gy, gy brn, some red and dk gy, lam, mot, v sft-sft, sb ply-dlky, v calc, crptl, intbd w/marl	CHK: lt-gy, gy brn, some red and dk gy, lam, mot, v sft-sft, sb ply-dlky, v calc, crptl, intbd w/marl
ply-pty, fri- brt, sil, rr	MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brt, sil, rr	MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brt, sil, rr	MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brt, sil, rr
	v dissn pyr	v dissn pyr	v dissn pyr

MD: 8,996'
TVD: 6,152.38'
Inclination: 88.8 °
Azimuth: 91.6°
VS: 2,670.35'

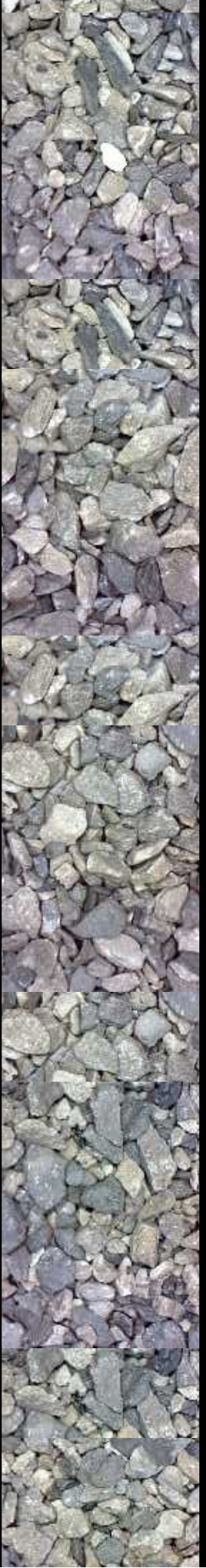
MD: 9,088'
TVD: 6,154.55'
Inclination: 88.5 °
Azimuth: 91.6°
VS: 2,762.23'

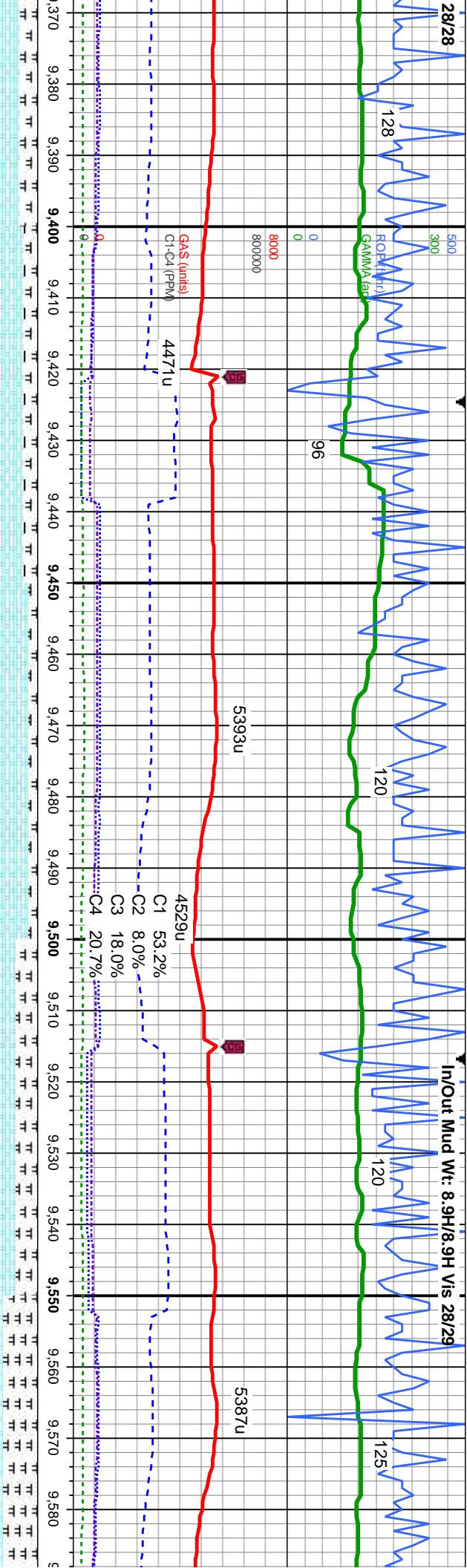




CHK: It-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pily-blky, v calc, crpxl, intbd w/mant MARL: dk gy, strl, sft-v sft, sb pily-pily, trl- brit, sil, r r vf dissn pyr	CHK: It-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pily-blky, v calc, crpxl, intbd w/mant MARL: dk gy, strl, sft-v sft, sb pily-pily, trl- brit, sil, r r vf dissn pyr	CHK: It-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pily-blky, v calc, crpxl, intbd w/mant MARL: dk gy, strl, sft-v sft, sb pily-pily, trl- brit, sil, r r vf dissn pyr	CHK: It-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pily-blky, v calc, crpxl, intbd w/mant MARL: dk gy, strl, sft-v sft, sb pily-pily, trl- brit, sil, r r vf dissn pyr	CHK: It-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pily-blky, v calc, crpxl, intbd w/mant MARL: dk gy, strl, sft-v sft, sb pily-pily, trl- brit, sil, r r vf dissn pyr
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MD: 9.180' TVD: 6,156.8' Inclination: 88.7° Azimuth: 91.9° VS: 2,854.1'	MD: 9.272' TVD: 6,157.92' Inclination: 89.9° Azimuth: 90.8° VS: 2,946.01'	MD: 9.363' TVD: 6,158' Inclination: 90° Azimuth: 90.1° VS: 3,036.98'
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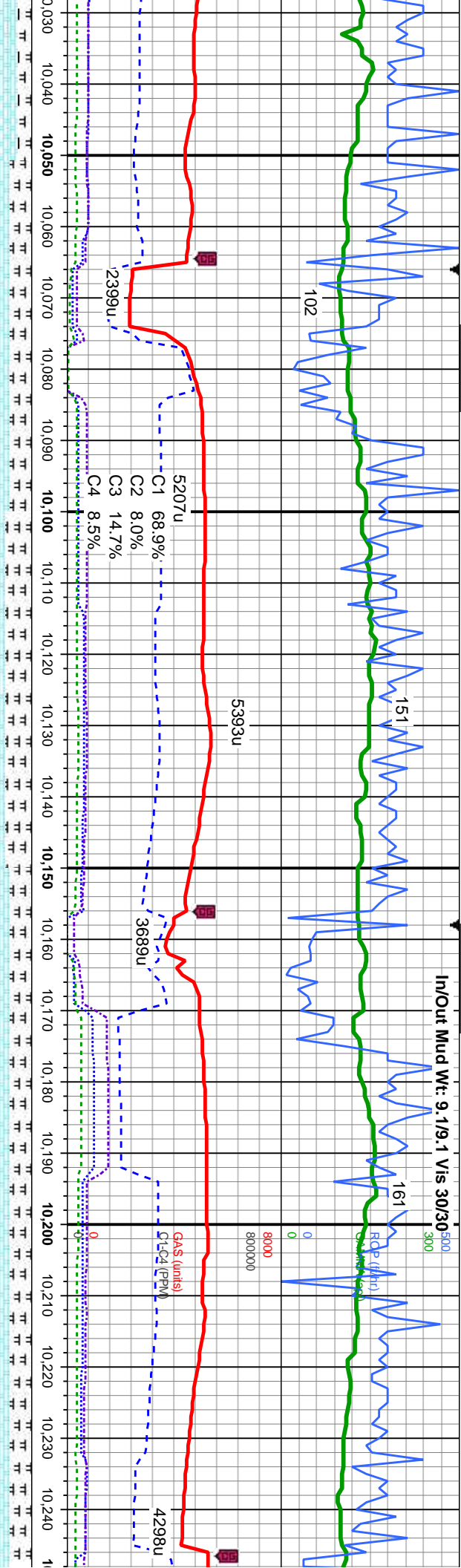




some red, lam, mot, v sft-sft, cpptxl, intbd w/marl MARL: dk pty-ppty, fri- brit, sil, r v f diss	CHK: It-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pty-blky, v calc, cpptxl, intbd w/marl MARL: dk gy, str, sft-v sft, sb pty-ppty, fri- brit, sil, r v f diss	CHK: It-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pty-blky, v calc, cpptxl, intbd w/marl MARL: dk gy, str, sft-v sft, sb pty-ppty, fri- brit, sil, r v f diss	CHK: It-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pty-blky, v calc, cpptxl, intbd w/marl MARL: dk gy, str, sft-v sft, sb pty-ppty, fri- brit, sil, r v f diss	CHK: It-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pty-blky, v calc, cpptxl, intbd w/marl MARL: dk gy, str, sft-v sft, sb pty-ppty, fri- brit, sil, r v f diss
pyr	pyr	pyr	pyr	pyr

TV D (ft)	MD: 9.455' TV D: 6,157.6' Inclination: 90.5 ° Azimuth: 90.6 ° VS: 3,128.95'	MD: 9.547' TV D: 6,157.04' Inclination: 90.2 ° Azimuth: 88.7 ° VS: 3,220.94'
6200		

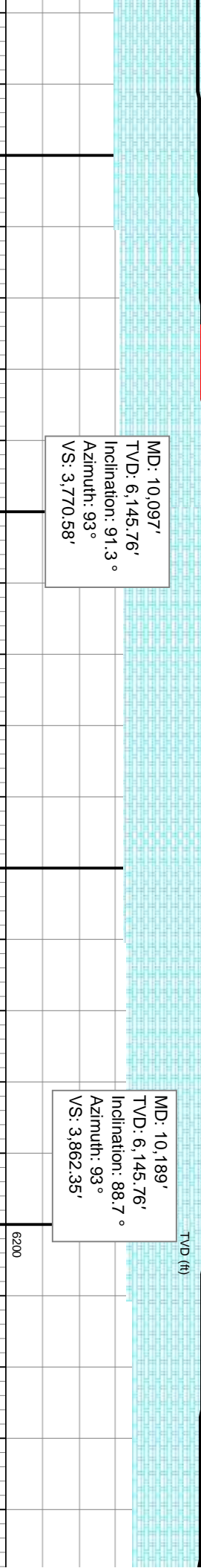


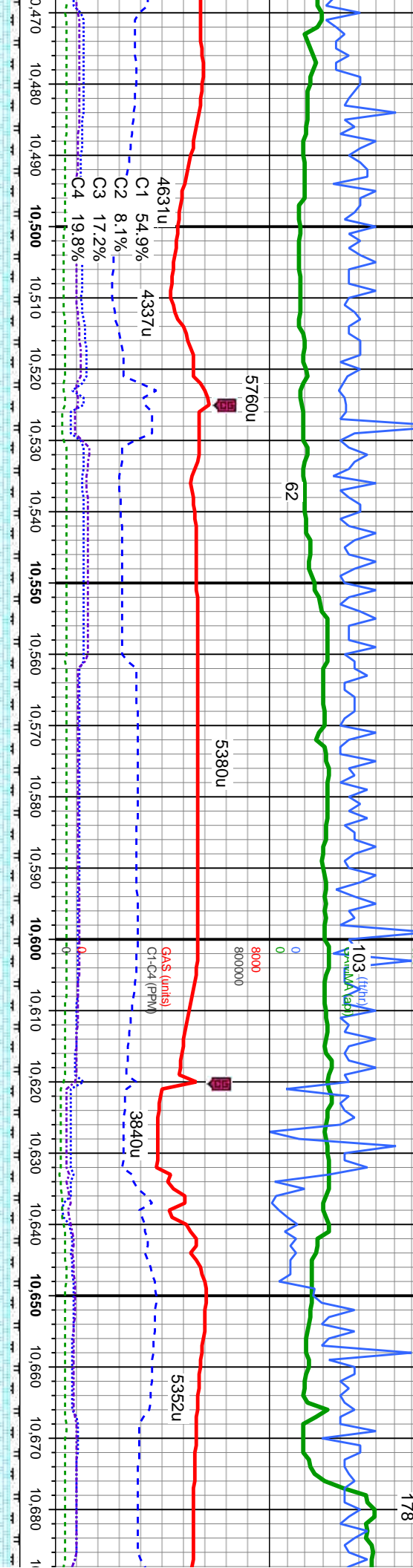


d, lam, mot, v sft-sft, w/marl MARL: dk bnti, sil, rr vř dissim	CHK: med-dk gy, gy brn, some red, lam, mot, v sft-sft, sb ply-blky, v calc, crptl, intbd w/marl MARL: dk gy, stri, sft-v sft, sb ply-pty, fr- bnti, sil, rr vř dissim pyr	CHK: med-dk gy, gy brn, some red, lam, mot, v sft-sft, sb ply-blky, v calc, crptl, intbd w/marl MARL: dk gy, stri, sft-v sft, sb ply-pty, fr- bnti, sil, rr vř dissim pyr	CHK: med-dk gy, gy brn, some red, lam, mot, v sft-sft, sb ply-blky, v calc, crptl, intbd w/marl MARL: dk gy, stri, sft-v sft, sb ply-pty, fr- bnti, sil, rr vř dissim pyr	CHK: med-dk gy, gy brn, some red, lam, mot, v sft-sft, sb ply-blky, v calc, crptl, intbd w/marl MARL: dk gy, stri, sft-v sft, sb ply-pty, fr- bnti, sil, rr vř dissim pyr
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MD: 10,097'
TVD: 6,145.76'
Inclination: 91.3 °
Azimuth: 93 °
VS: 3,770.58'

MD: 10,189'
TVD: 6,145.76'
Inclination: 88.7 °
Azimuth: 93 °
VS: 3,862.35'





some red, lam, mot, v sft-sft, crptxl, intbd w/marl MARL: dk pty-pty, fri- brt, sil, rr vf diss	CHK: lt-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pty-biky, v calc, crptxl, intbd w/marl MARL: dk gy, str, sft-v sft, sb pty-pty, fri- brt, sil, rr vf diss pyr	CHK: lt-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pty-biky, v calc, crptxl, intbd w/marl MARL: dk gy, str, sft-v sft, sb pty-pty, fri- brt, sil, rr vf diss pyr	CHK: lt-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pty-biky, v calc, crptxl, intbd w/marl MARL: dk gy, str, sft-v sft, sb pty-pty, fri- brt, sil, rr vf diss pyr
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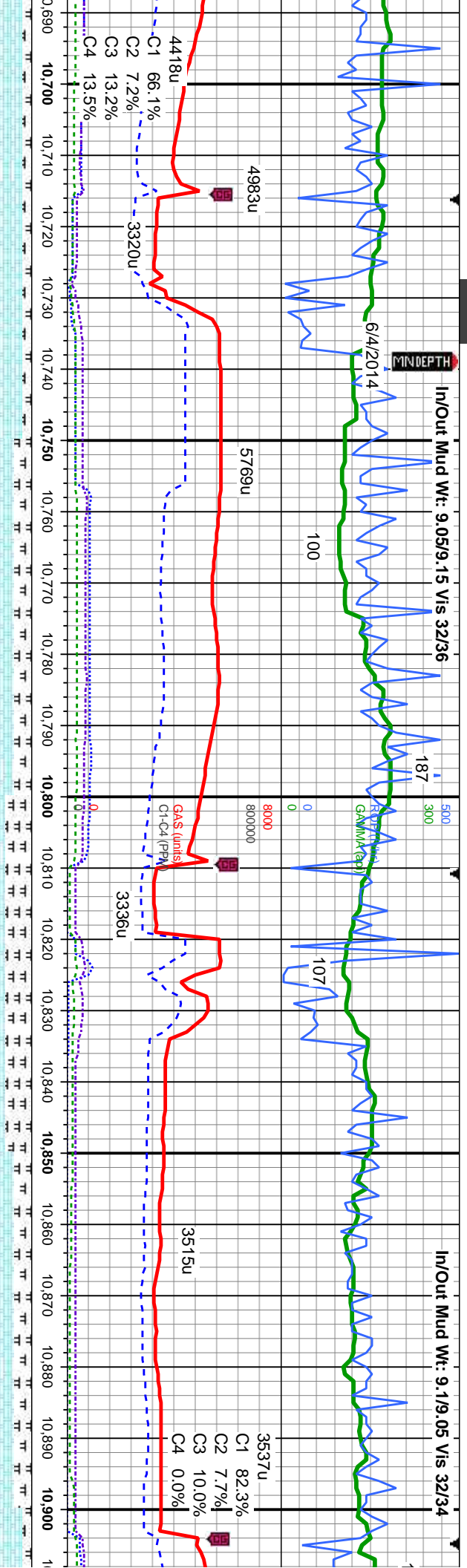
21' 1° 6° 5'	MD: 10,560' TVD: 6,146.81' Inclination: 91.9° Azimuth: 91.3° VS: 4,232.53'	MD: 10,655' TVD: 6,144.98' Inclination: 90.3° Azimuth: 90.8° VS: 4,327.45'
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14' fault

In/Out Mud Wt: 9.05/9.15 Vis 32/36

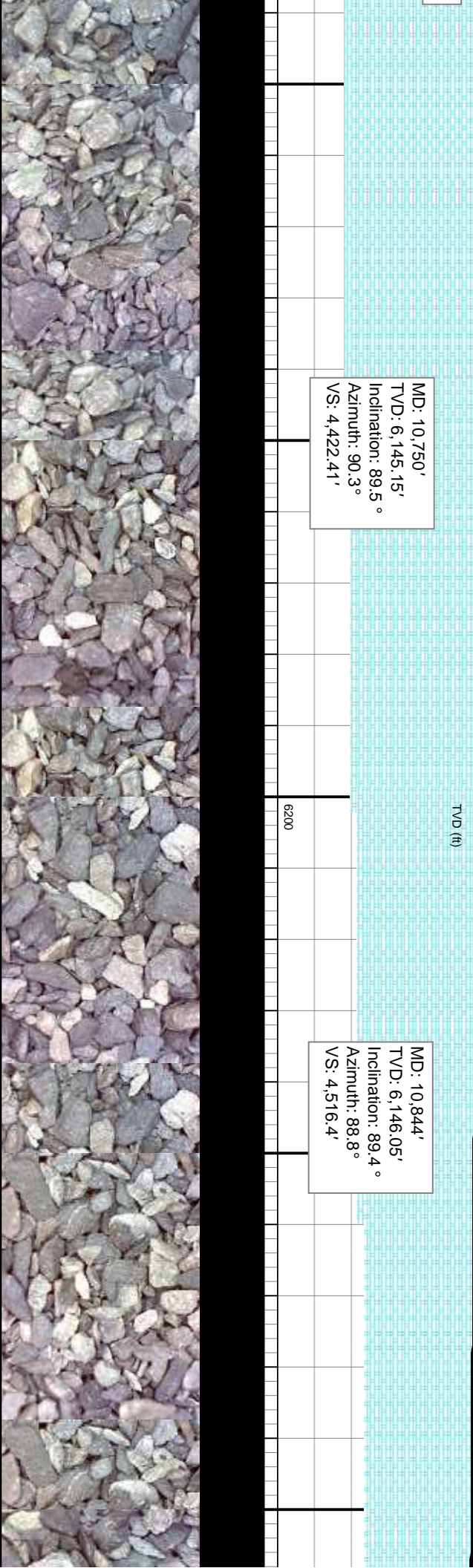
In/Out Mud Wt: 9.1/9.05 Vis 32/34

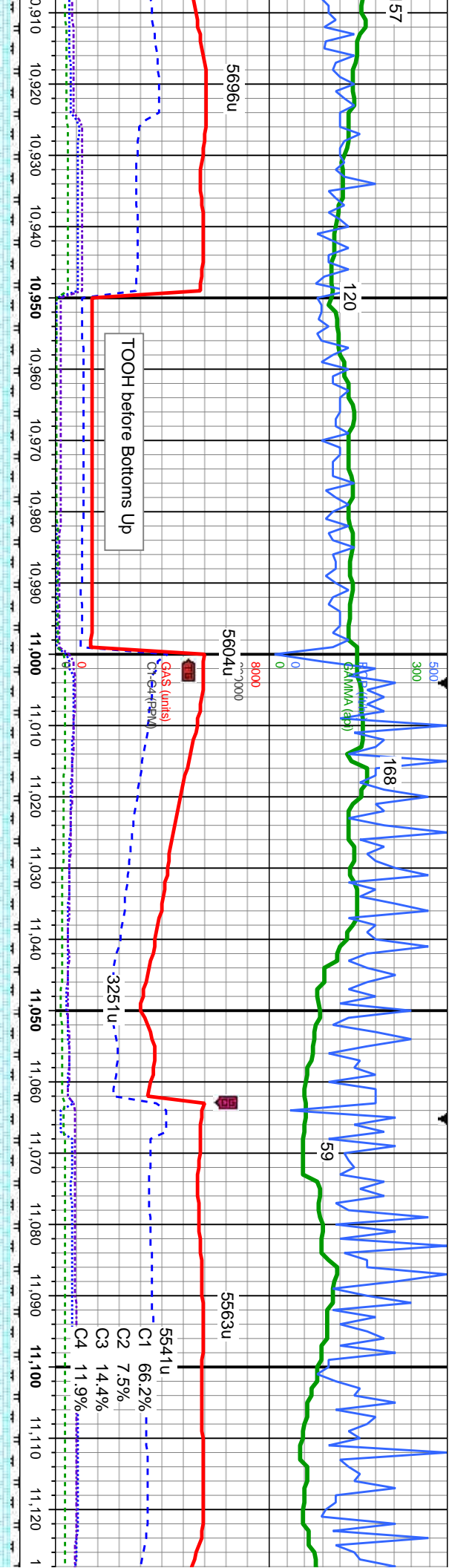


CHK: It-dk gy, gy brn, some red, iam, mot, v sft-sft, sb pty-blky, v calc, crptl, lntbd w/mat MARL: dk gy, str, sft-v sft, sb pty-pty, fri- brt, sil, r v dissim	CHK: It-dk gy, gy brn, some red, iam, mot, v sft-sft, sb pty-blky, v calc, crptl, lntbd w/mat MARL: dk gy, str, sft-v sft, sb pty-pty, fri- brt, sil, r v dissim	CHK: It-dk gy, gy brn, some red, iam, mot, v sft-sft, sb pty-blky, v calc, crptl, lntbd w/mat MARL: dk gy, str, sft-v sft, sb pty-pty, fri- brt, sil, r v dissim	CHK: It-dk gy, gy brn, some red, iam, mot, v sft-sft, sb pty-blky, v calc, crptl, lntbd w/mat MARL: dk gy, str, sft-v sft, sb pty-pty, fri- brt, sil, r v dissim
pyr	pyr	pyr	pyr

MD: 10,750'
TVD: 6,145.15'
Inclination: 89.5 °
Azimuth: 90.3 °
VS: 4,422.41'

MD: 10,844'
TVD: 6,146.05'
Inclination: 89.4 °
Azimuth: 88.8 °
VS: 4,516.4'



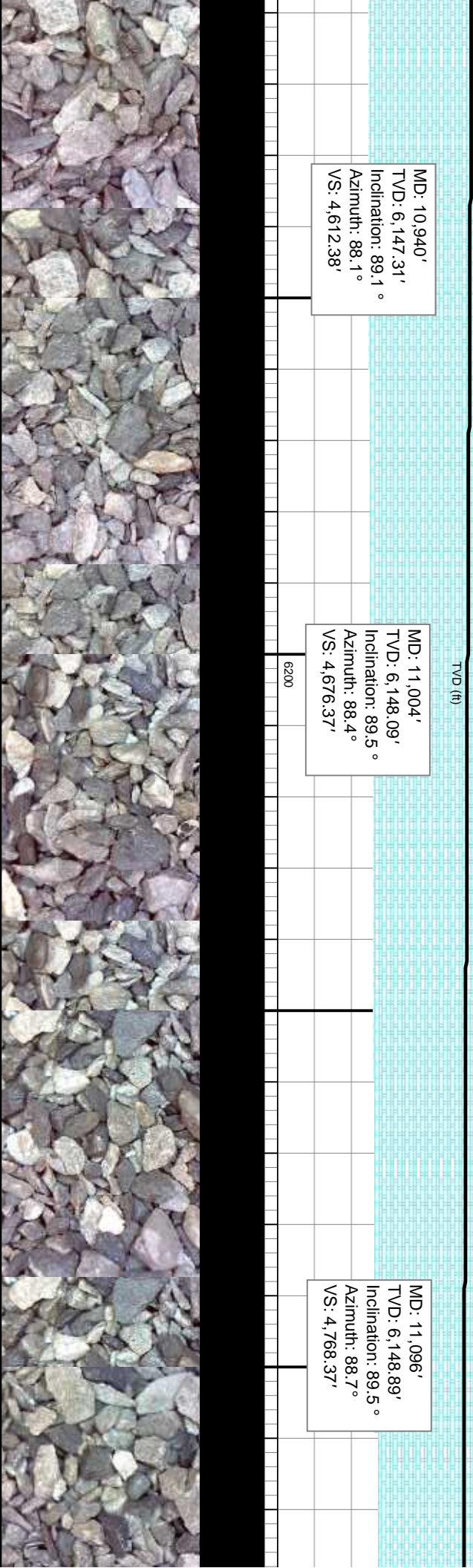


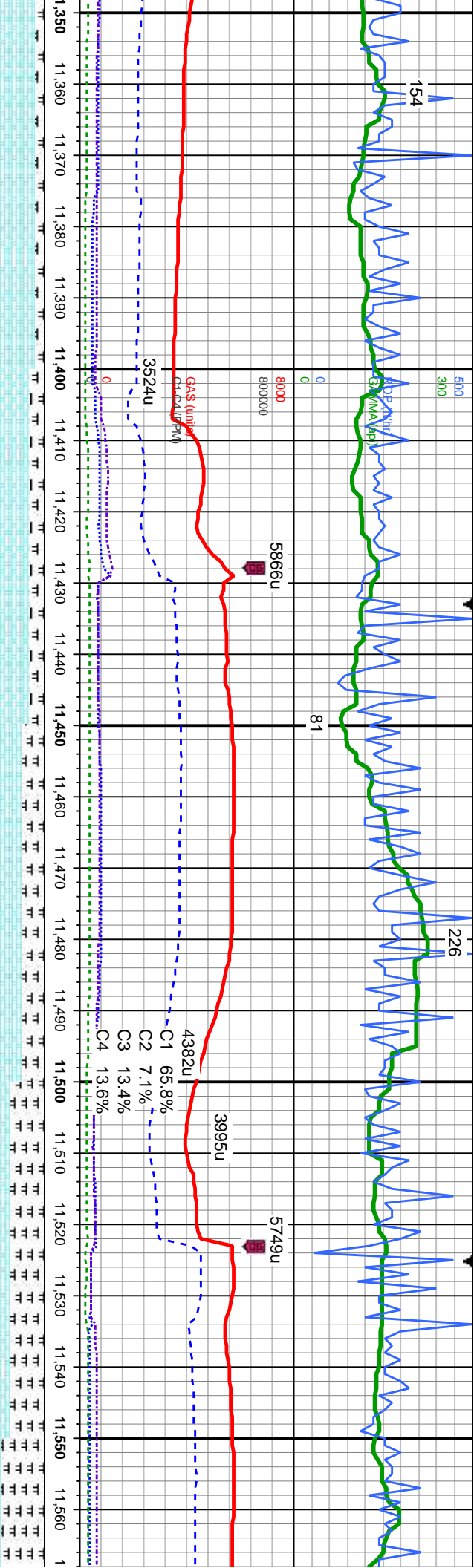
dk gy, gy brn, some red, lam, mot, v sft-sft, blkly, v calc, crptxl, lntbd w/mart MARL: dk sft-v sft, sb pty-pty, fri- brt, sil, r v diss	CHK: lt-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pty-blky, v calc, crptxl, lntbd w/mart MARL: dk gy, str, sft-v sft, sb pty-pty, fri- brt, sil, r v diss	CHK: lt-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pty-blky, v calc, crptxl, lntbd w/mart MARL: dk gy, str, sft-v sft, sb pty-pty, fri- brt, sil, r v diss	CHK: lt-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pty-blky, v calc, crptxl, lntbd w/mart MARL: dk gy, str, sft-v sft, sb pty-pty, fri- brt, sil, r v diss	CHK: lt-dk gy, gy brn, some red, lam, mot, v sft-sft, sb pty-blky, v calc, crptxl, lntbd w/mart MARL: dk gy, str, sft-v sft, sb pty-pty, fri- brt, sil, r v diss
pyr	pyr	pyr	pyr	pyr

MD: 10,940'
TVD: 6,147.31'
Inclination: 89.1°
Azimuth: 88.1°
VS: 4,612.38'

MD: 11,004'
TVD: 6,148.09'
Inclination: 89.5°
Azimuth: 88.4°
VS: 4,676.37'

MD: 11,096'
TVD: 6,148.89'
Inclination: 89.5°
Azimuth: 88.7°
VS: 4,768.37'





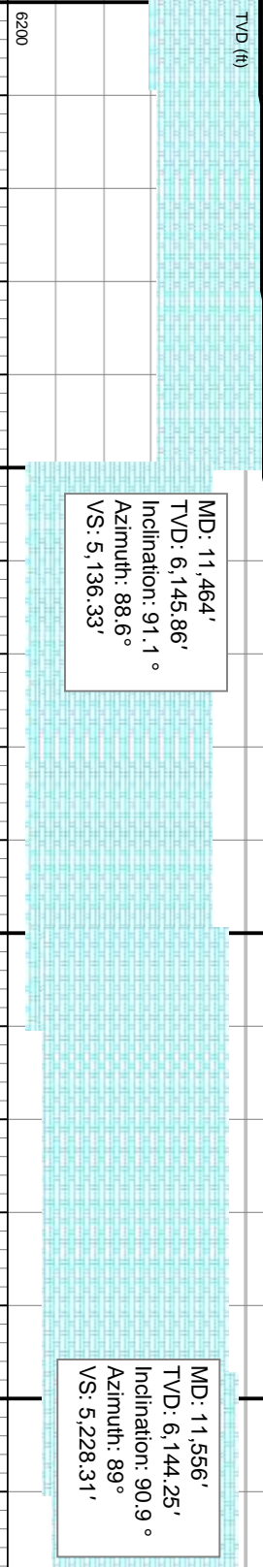
CHK: med-dk gy, gy brn, some red, lam, mot, v	CHK: med-dk gy, gy brn, some red, lam, mot, v	CHK: med-dk gy, gy brn, some red, lam, mot, v	CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb pty-biky, v calc, crptl, intbd w/marl	sft-sft, sb pty-biky, v calc, crptl, intbd w/marl	sft-sft, sb pty-biky, v calc, crptl, intbd w/marl	sft-sft, sb pty-biky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb pty-pty, fn- brt, sil, rr	MARL: dk gy, stri, sft-v sft, sb pty-pty, fn- brt, sil, rr	MARL: dk gy, stri, sft-v sft, sb pty-pty, fn- brt, sil, rr	MARL: dk gy, stri, sft-v sft, sb pty-pty, fn- brt, sil, rr
vf dissim pyr	vf dissim pyr	vf dissim pyr	vf dissim pyr

33 Fault

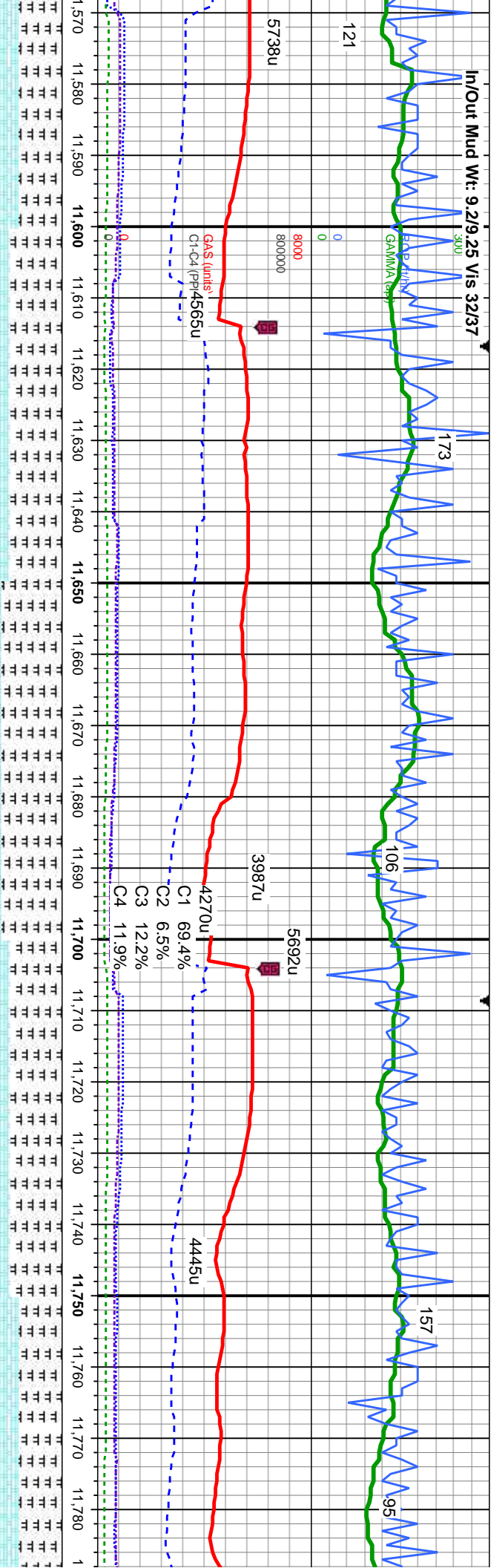
MD: 11,372'
TVD: 6,147.62'
Inclination: 91.1°
Azimuth: 88.7°
VS: 5,044.35'

MD: 11,464'
TVD: 6,145.86'
Inclination: 91.1°
Azimuth: 88.6°
VS: 5,136.33'

MD: 11,556'
TVD: 6,144.25'
Inclination: 90.9°
Azimuth: 89°
VS: 5,228.31'



In/Out Mud Wt: 9.2/9.25 Vis 32/37



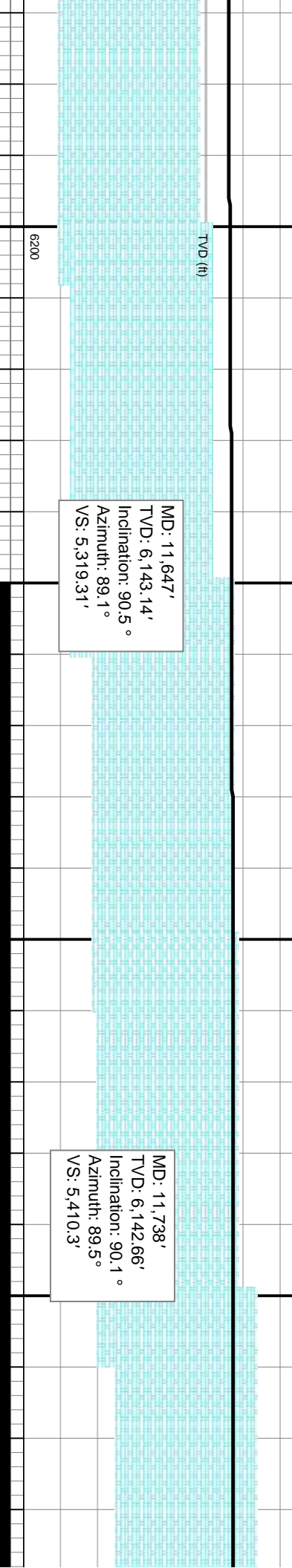
11,570 11,580 11,590 11,600 11,610 11,620 11,630 11,640 11,650 11,660 11,670 11,680 11,690 11,700 11,710 11,720 11,730 11,740 11,750 11,760 11,770 11,780 1

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb pty-blky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb pty-pty, fri- brt, sil, rr
vf dissim pyr, tr bent

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb pty-blky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb pty-pty, fri- brt, sil, rr
vf dissim pyr, tr bent

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb pty-blky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb pty-pty, fri- brt, sil, rr
vf dissim pyr, tr bent

CHK: med-dk gy, gy brn, some red, lam, n
sft-sft, sb pty-blky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb pty-pty, fri-
vf dissim pyr, tr bent

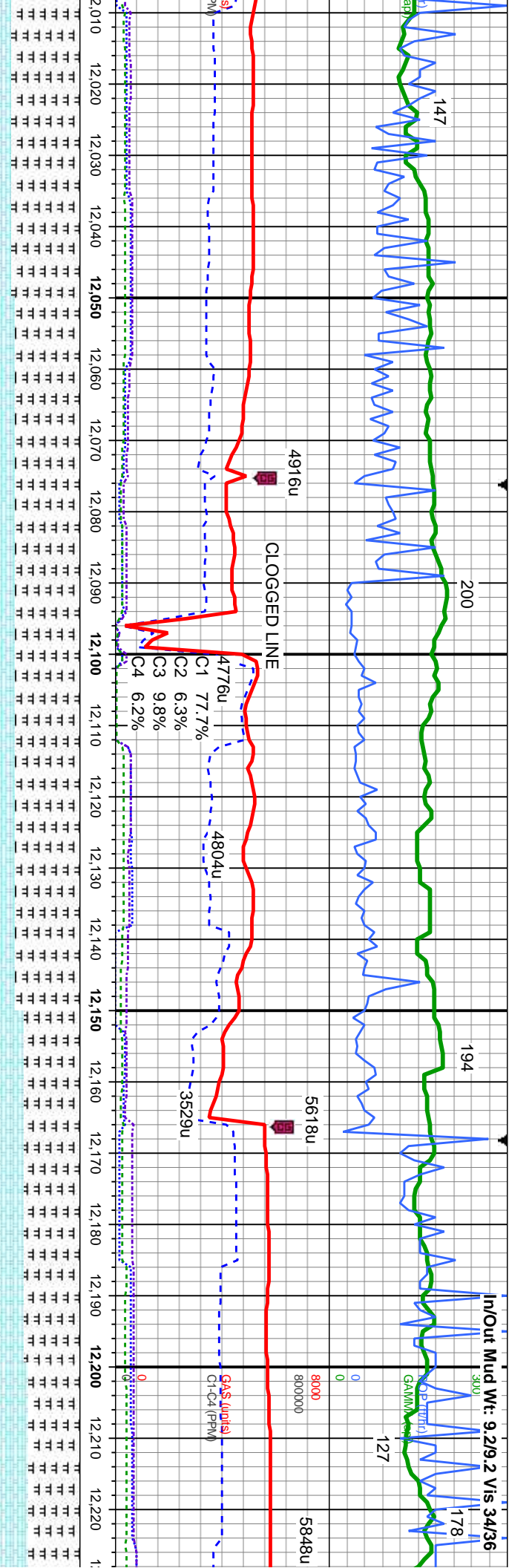


6200

MD: 11,647'
TVD: 6,143.14'
Inclination: 90.5°
Azimuth: 89.1°
VS: 5,319.31'

MD: 11,738'
TVD: 6,142.66'
Inclination: 90.1°
Azimuth: 89.5°
VS: 5,410.3'





med-dk gy, gy brn, some red, lam, mot, v	CHK: med-dk gy, gy brn, some red, lam, mot, v	CHK: med-dk gy, gy brn, some red, lam, mot, v	CHK: med-dk gy, gy brn, some red, lam, mot, v
b ply-blky, v calc, crptxl, intbd w/marl	sft-sft, sb ply-blky, v calc, crptxl, intbd w/marl	sft-sft, sb ply-blky, v calc, crptxl, intbd w/marl	sft-sft, sb ply-blky, v calc, crptxl, intbd w/marl
dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil, rr	MARL: dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil, rr	MARL: dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil, rr	MARL: dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil, rr
pyr, tr bent	vf dissim pyr, tr bent	vf dissim pyr, tr bent	vf dissim pyr, tr bent

93' Fault

70' From Top of Target Zone

67' From Top of Target Zone

60' From Top of Target Zone

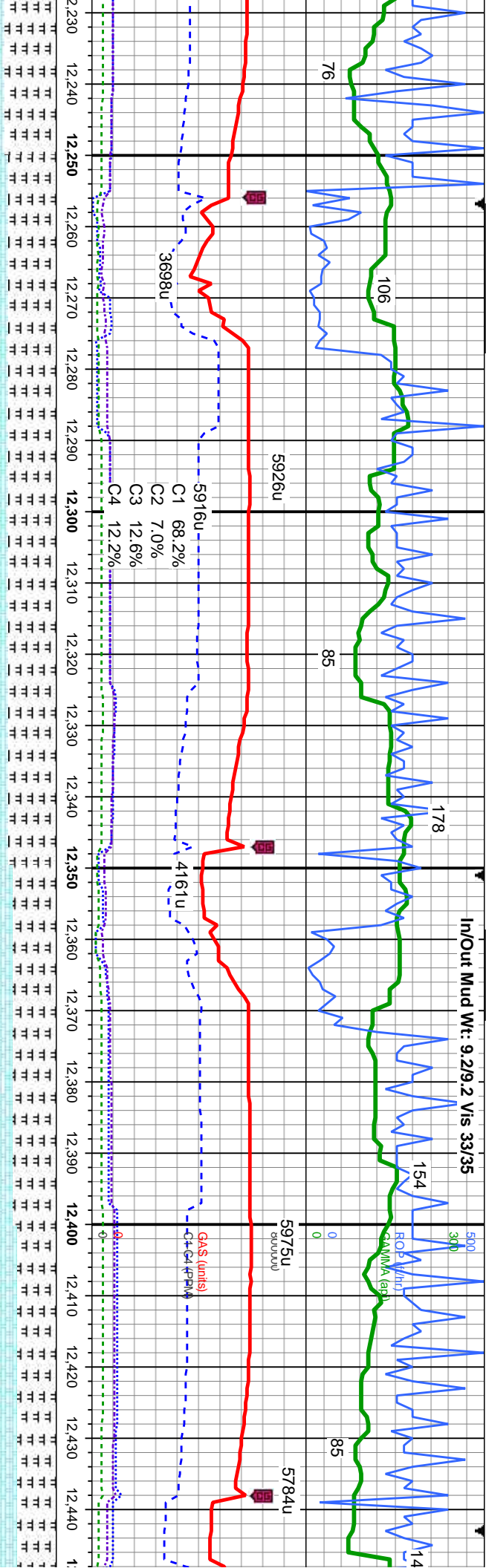
MD: 12,015'
VD: 6,141.46'
Inclination: 90 °
Azimuth: 88.9 °
S: 5,687.28'

MD: 12,107'
TVD: 6,141.86'
Inclination: 89.5 °
Azimuth: 88.1 °
VS: 5,779.28'

MD: 12,199'
TVD: 6,143.22'
Inclination: 88.8 °
Azimuth: 87.9 °
VS: 5,871.25'

6200





red, lam, mot, v	CHK: med-dk gy, gy brn, some red, lam, mot, v	CHK: med-dk gy, gy brn, some red, lam, mot, v	CHK: med-dk gy, gy brn, some red, lam, mot, v
— i, intbd w/marl	— sft-sft, sb ply-dlky, v calc, crptl, intbd w/marl	— sft-sft, sb ply-dlky, v calc, crptl, intbd w/marl	— sft-sft, sb ply-dlky, v calc, crptl, intbd w/marl
ply-pty, fri- brt, sil, rr	MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brt, sil, rr	MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brt, sil, rr	MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brt, sil, rr
	vf dissn pyr, tr bent	vf dissn pyr, tr bent	vf dissn pyr, tr bent

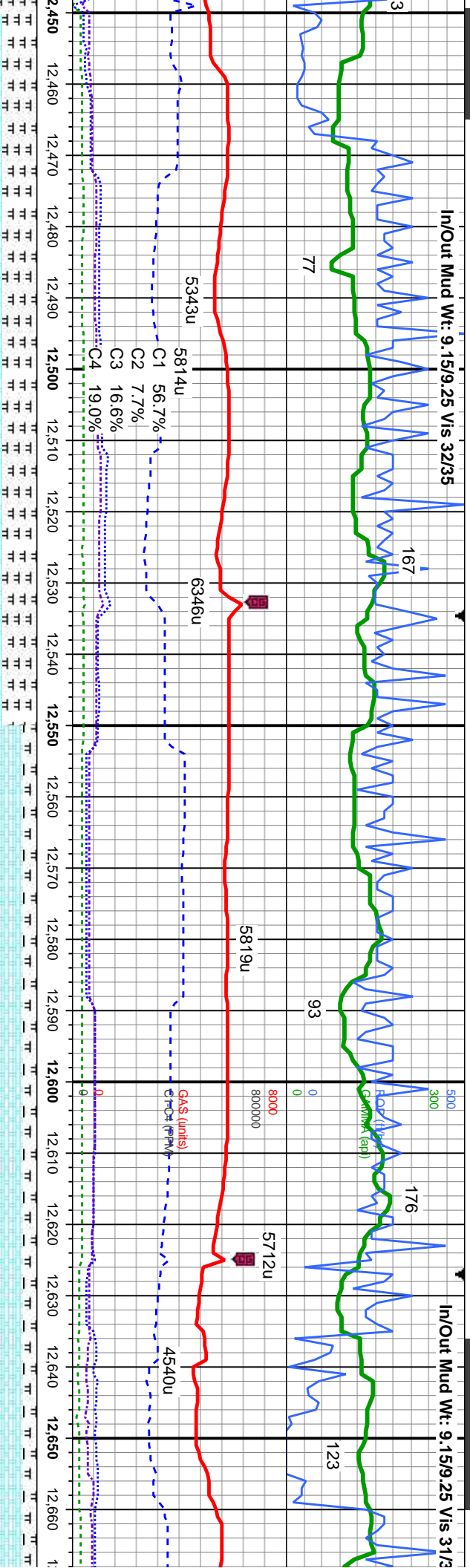
MD: 12,290'
TVD: 6,144.65'
Inclination: 89.4°
Azimuth: 88.4°
VS: 5,962.23'

MD: 12,382'
TVD: 6,145.37'
Inclination: 89.7°
Azimuth: 88.8°
VS: 6,054.23'

TVD (ft)

6200





In/Out Mud Wt: 9.15/9.35 Vis 33/35

MINDEPTH

175

5/6/2014

5617u

5618u

5670u

5684u

4735u

4357u

C1 63.9%

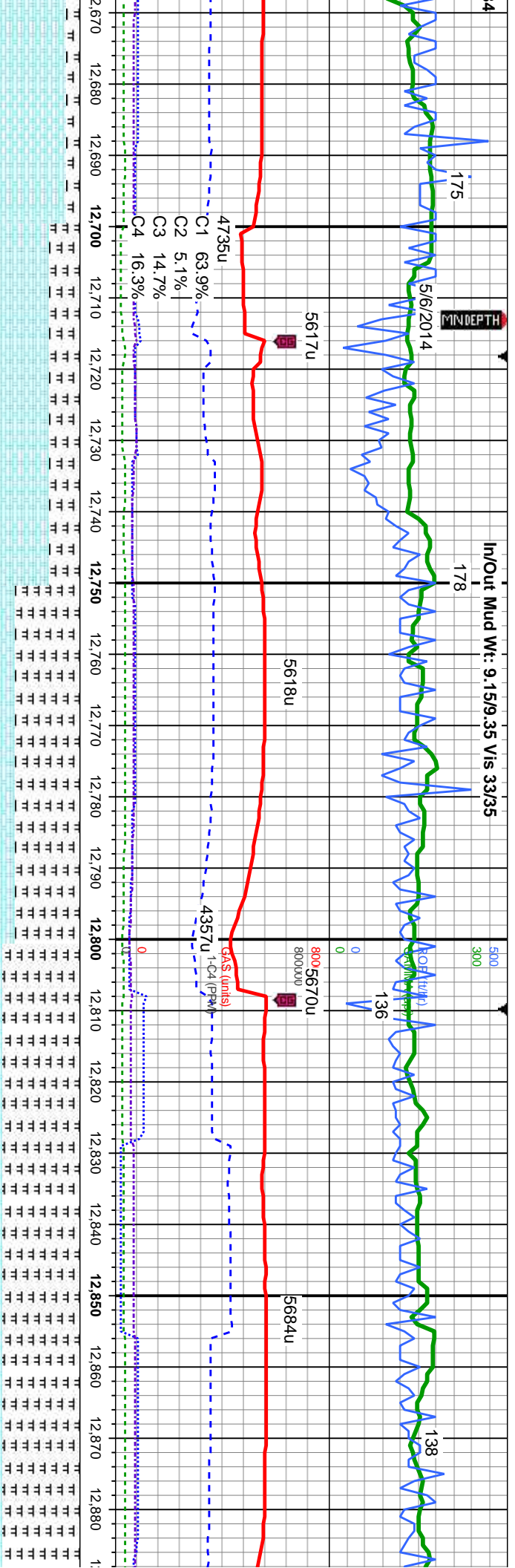
C2 5.1%

C3 14.7%

C4 16.3%

545 (units)

1-C4 (ppm)



CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb ply-dlky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil, rr
vf dissn pyr, tr bent

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb ply-dlky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil, rr
vf dissn pyr, tr bent, tr inoc fos

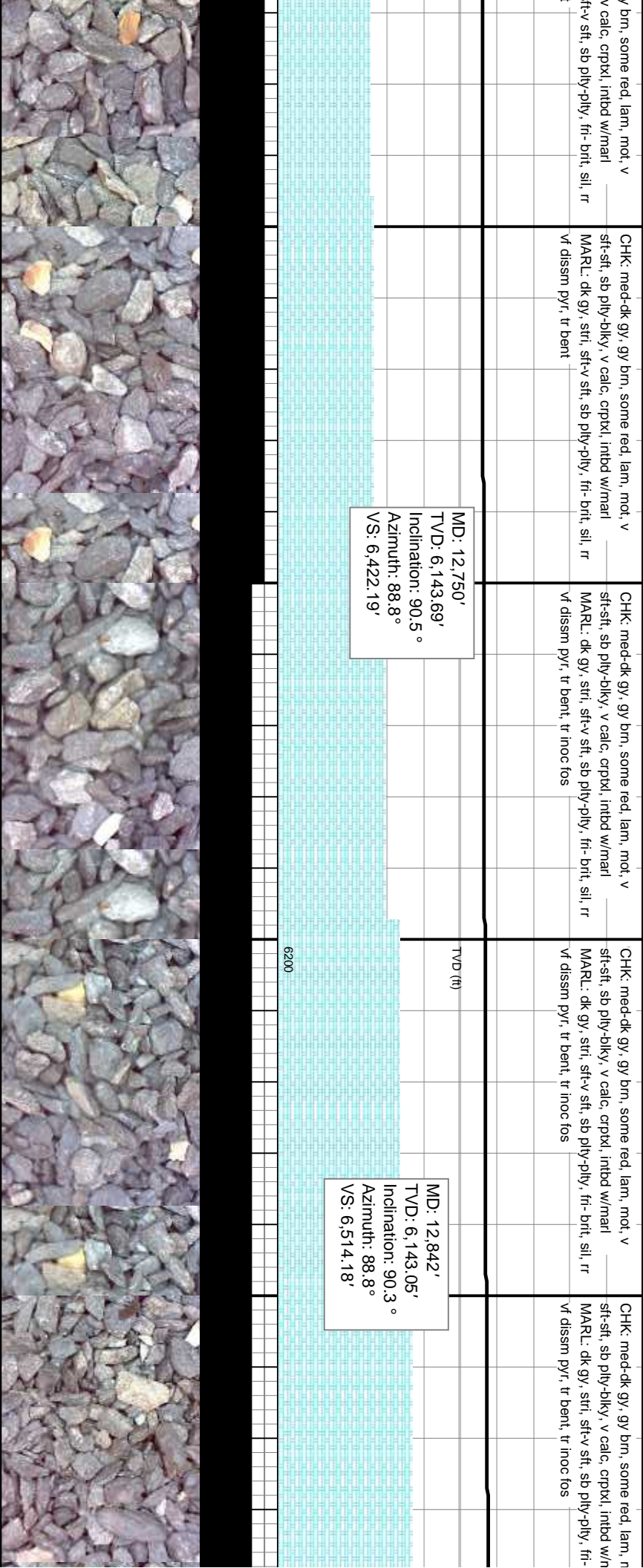
CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb ply-dlky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil, rr
vf dissn pyr, tr bent, tr inoc fos

CHK: med-dk gy, gy brn, some red, lam, n
sft-sft, sb ply-dlky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb ply-ply, fri-
vf dissn pyr, tr bent, tr inoc fos

MD: 12,750'
TVD: 6,143.69'
Inclination: 90.5°
Azimuth: 88.8°
VS: 6,422.19'

MD: 12,842'
TVD: 6,143.05'
Inclination: 90.3°
Azimuth: 88.8°
VS: 6,514.18'

6200



In/Out Mud Wt: 9.25/9.3 Vis 34/37

In/Out Mud Wt: 9.25/9.3 Vis 33/35

205

184

176

185

5226u

5583u

5029u

ROP (ft/hr)
GAMMA (cp)
GAS (units)
Cl-C4 (PPM)

C1 65.0%
C2 7.4%
C3 14.0%
C4 13.6%

C1 63.1%
C2 7.9%
C3 15.3%
C4 13.8%

4261u

4948u

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb ply-blky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb ply-pty, fn- brt, sil, rr
vf dissn pyr, tr bent

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb ply-blky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb ply-pty, fn- brt, sil, rr
vf dissn pyr, tr bent

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb ply-blky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb ply-pty, fn- brt, sil, rr
vf dissn pyr, tr bent, v tr inoc fos

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb ply-blky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb ply-pty, fn- brt, sil, rr
vf dissn

CHK: m
sft-sft, s
MARL: c
vf dissn

MD: 12,932'
TVD: 6,141.87'
Inclination: 91.2°
Azimuth: 89.2°
VS: 6,604.17'

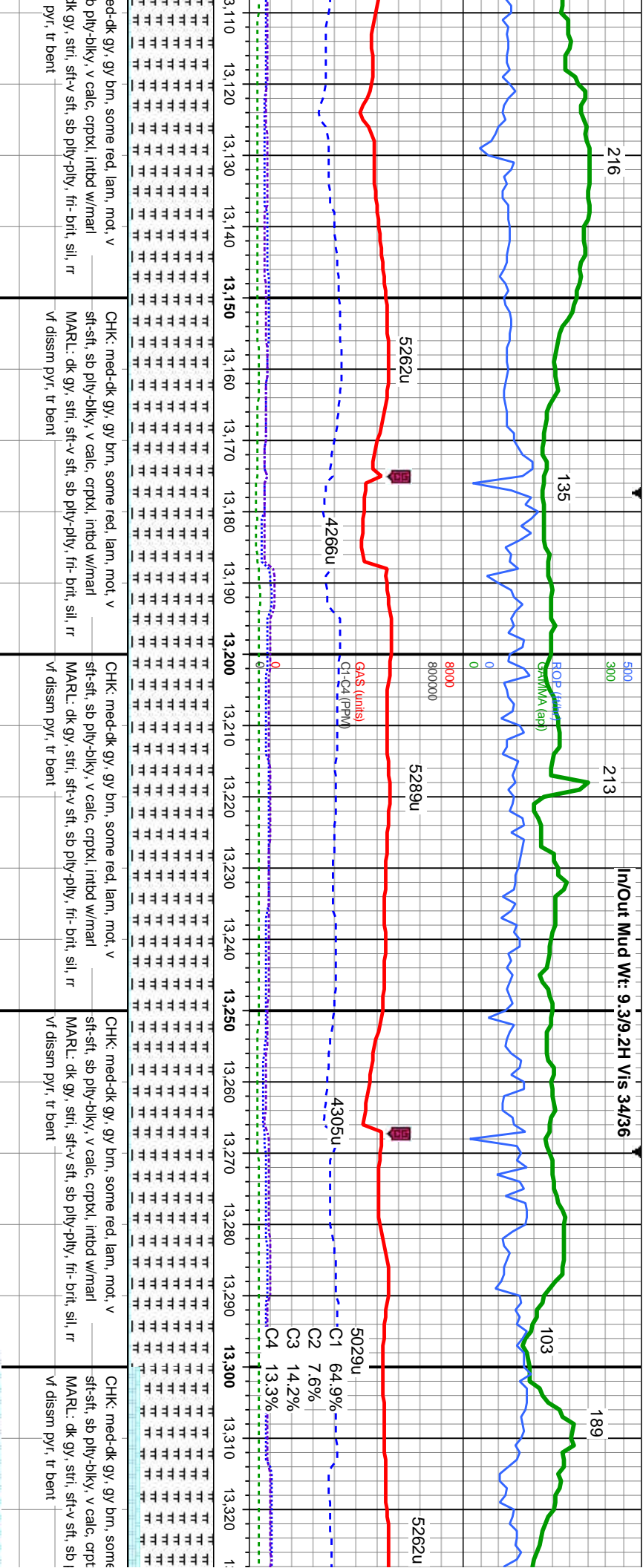
MD: 13,024'
TVD: 6,140.1'
Inclination: 91°
Azimuth: 89.1°
VS: 6,696.16'

TVD (ft)

6200



In/Out Mud Wt: 9.3/9.2H Vis 34/36



ID: 13,116'
VD: 6,138.82'
Inclination: 90.6 °
Azimuth: 88.7 °
VS: 6,788.15'

MD: 13,208'
TVD: 6,138.1'
Inclination: 90.3 °
Azimuth: 88.9 °
VS: 6,880.14'

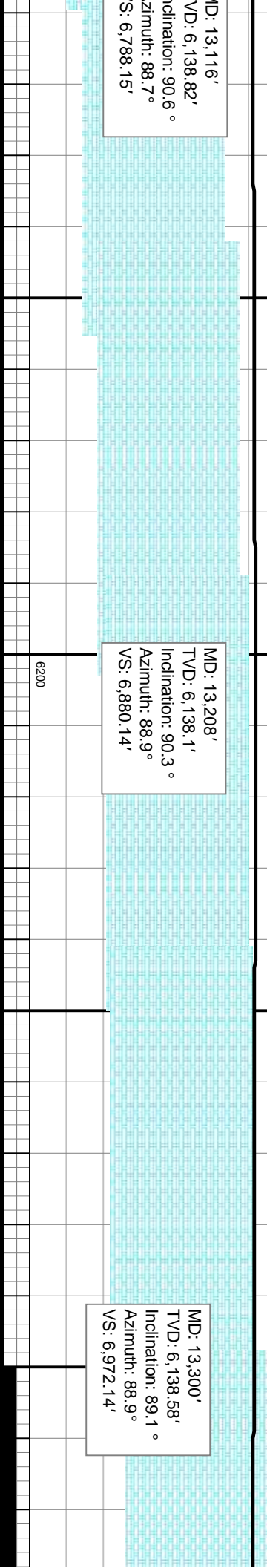
MD: 13,300'
TVD: 6,138.58'
Inclination: 89.1 °
Azimuth: 88.9 °
VS: 6,972.14'

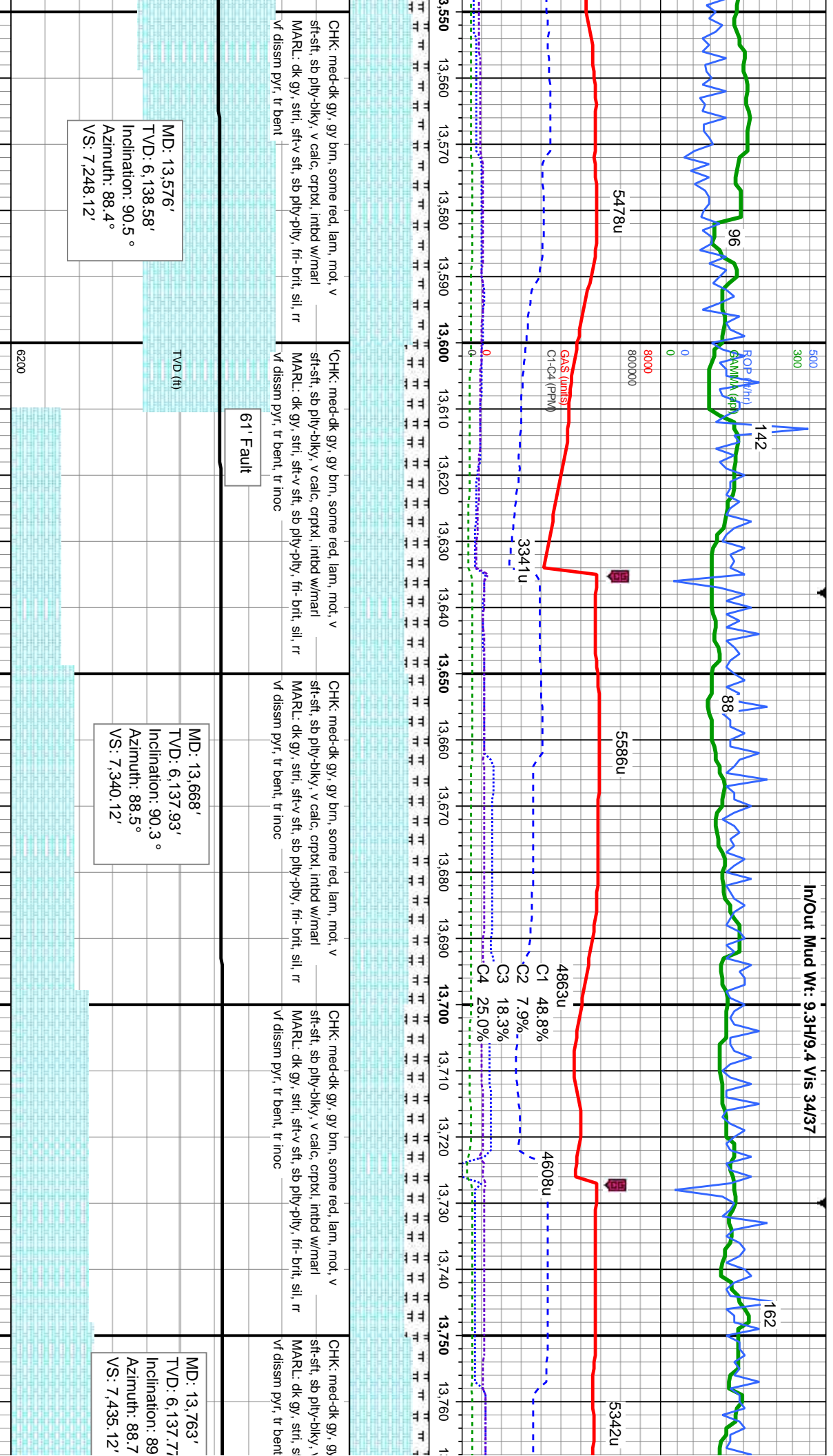
med-dk gy, gy brn, some red, lam, mot, v
b ply-blky, v calc, crptl, intbd w/marl
dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil, rr
pyr, tr bent

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb ply-blky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil, rr
vf dissn pyr, tr bent

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb ply-blky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil, rr
vf dissn pyr, tr bent

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb ply-blky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb ply-ply, fri- brt, sil, rr
vf dissn pyr, tr bent





CHK: med-dk gy, gy brn, some red, lam, mot, v sft-sft, sb ply-biky, v calc, crptl, intbd w/marl MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brt, sil, rr vf dissn pyr, tr bent	CHK: med-dk gy, gy brn, some red, lam, mot, v sft-sft, sb ply-biky, v calc, crptl, intbd w/marl MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brt, sil, rr vf dissn pyr, tr bent, tr inoc	CHK: med-dk gy, gy brn, some red, lam, mot, v sft-sft, sb ply-biky, v calc, crptl, intbd w/marl MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brt, sil, rr vf dissn pyr, tr bent, tr inoc	CHK: med-dk gy, gy brn, some red, lam, mot, v sft-sft, sb ply-biky, v calc, crptl, intbd w/marl MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brt, sil, rr vf dissn pyr, tr bent, tr inoc	CHK: med-dk gy, gy brn, some red, lam, mot, v sft-sft, sb ply-biky, v calc, crptl, intbd w/marl MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brt, sil, rr vf dissn pyr, tr bent
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In/Out Mud Wt: 9.4/9.4 Vis 34/37

300

162

89

In/Out Mud Wt: 9.4/9.4 Vis 34/36

186

ROP (111)
GAMMA (API)
0
8000
800000

5290u

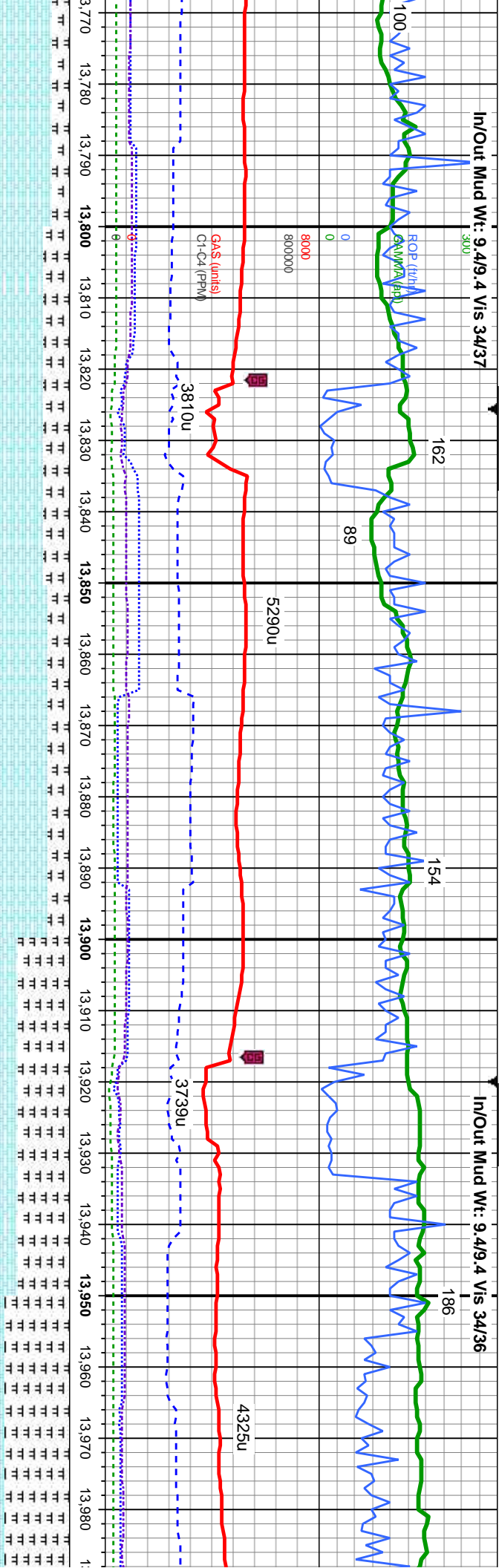
154

4325u

GAS (units)
C1-C4 (PPM)

3810u

3739u



brn, some red, lam, mot, v
calc, crptxl, inbd w/marl
t-v sft, sb pty-pty, fri- bnt, sil, rr
tr inoc

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb pty-pty, v calc, crptxl, inbd w/marl
MARL: dk gy, stri, sft-v sft, sb pty-pty, fri- bnt, sil, rr
vf dissim pyr, tr bent, tr inoc

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb pty-pty, v calc, crptxl, inbd w/marl
MARL: dk gy, stri, sft-v sft, sb pty-pty, fri- bnt, sil, rr
vf dissim pyr, tr bent, tr inoc

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb pty-pty, v calc, crptxl, inbd w/marl
MARL: dk gy, stri, sft-v sft, sb pty-pty, fri- bnt, sil, rr
vf dissim pyr, tr bent, tr inoc

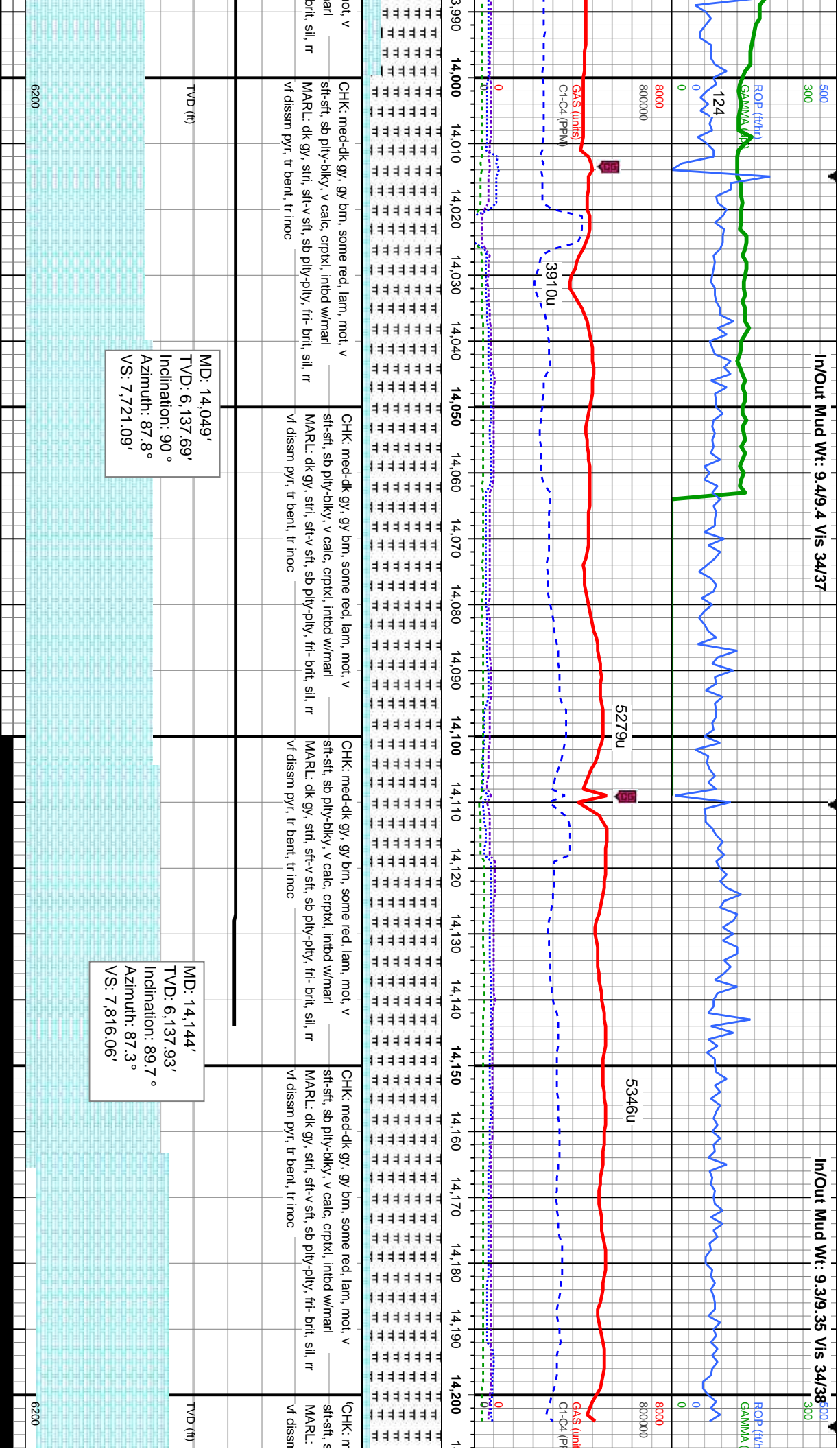
CHK: med-dk gy, gy brn, some red, lam, r
sft-sft, sb pty-pty, v calc, crptxl, inbd w/r
MARL: dk gy, stri, sft-v sft, sb pty-pty, fri-
vf dissim pyr, tr bent, tr inoc

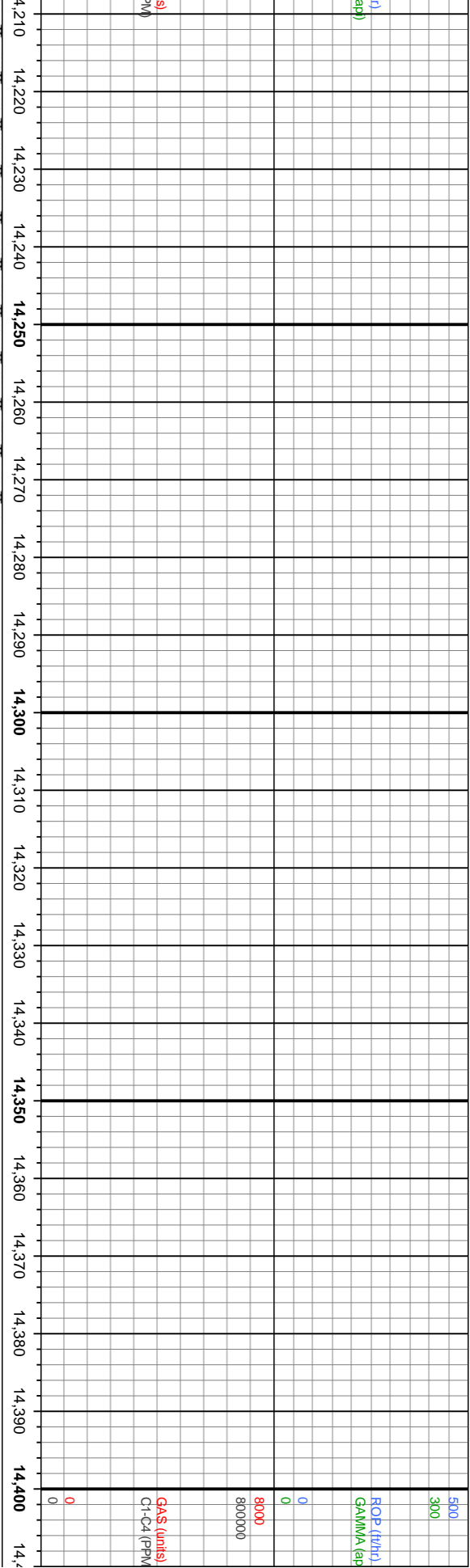
TVD (ft)

MD: 13,858'
TVD: 6,137.93'
Inclination: 89.9°
Azimuth: 89.1°
VS: 7,530.12'

MD: 13,954'
TVD: 6,137.85'
Inclination: 90.2°
Azimuth: 87.7°
VS: 7,626.11'

6200





led-dk gy, gy brn, some red, lam, mot, v
b ply-biky, v calc, crptl, intbd w/marl
dk gy, stri, sft-v sft, sb ply-pty, fri- brit, sil, rr
pyr, tr bent, tr inoc

CHK: med-dk gy, gy brn, some red, lam, mot, v
sft-sft, sb ply-biky, v calc, crptl, intbd w/marl
MARL: dk gy, stri, sft-v sft, sb ply-pty, fri- brit, sil, rr
vf dissim pyr, tr bent, tr inoc

TD @ 14275' on 6/6/2014
@ 20:00 MST

THANK YOU FOR CHOOSING
COLUMBINE LOGGING INC.

