











**Scale: 5" / 100'**  
**Measured Depth Log**

**Total Depth 9631'**

	UNKNOWN		ANHYDRITE
	BENTONITE		BRECCIA
	CHALK		CEMENT
	CHERT		CLAY CHOKER SAND
	CLAYSTONE		CLAYSTONE



Slide/Rotate

ROP  
ROF

ROP (1/min)  
ROF (1/min)

Total Gas & Chromatograph

GAS  
C1  
C2  
C3  
C4

COLUMBINE LOGGING INC.  
RIGGED UP ON 10/07/2013  
MANNED 2-PERSON LOGGING  
WITH BLOODHOUND GAS  
CHROMATOGRAPH UNIT #0298  
COLUMBINE BEGAN LOGGING  
ON 10/07/2013

41.24u  
C1: 96.7%  
C2: 1.9%  
C3: 0.8%  
C4: 0.0%

No flow to shaker

50' Overlap from vertical

WT IN 9.60 / OUT 9.55  
VIS IN 31 / OUT 32

Depth Labels

% Lith

Gamma  
GAMMA

Resume Drilling @ 4920' MD  
10/09/2013 @ 17:32 hrs

Bit Data  
Bit #: 2  
Type: PDC  
Size: 8.75  
Depth In: 4,920 '  
Depth Out: 6,062 '  
Jets: 5x14  
S/N: 12175683

MD: 4,966  
TVD: 4,949.65  
Inclination: 1.4  
Azimuth: 275.4  
VS: -180.55

Well Bore  
TVD

Acetone was used as the cutting  
agent with the dimple filled to the rim.

The ratings are based on 7 descriptors:  
None, Slight trace, Trace, Fair, Moderate,  
Good, and Excellent. The descriptor used  
is based on the loggers observations and  
best judgment of brilliance, color and  
longevity of the cut.

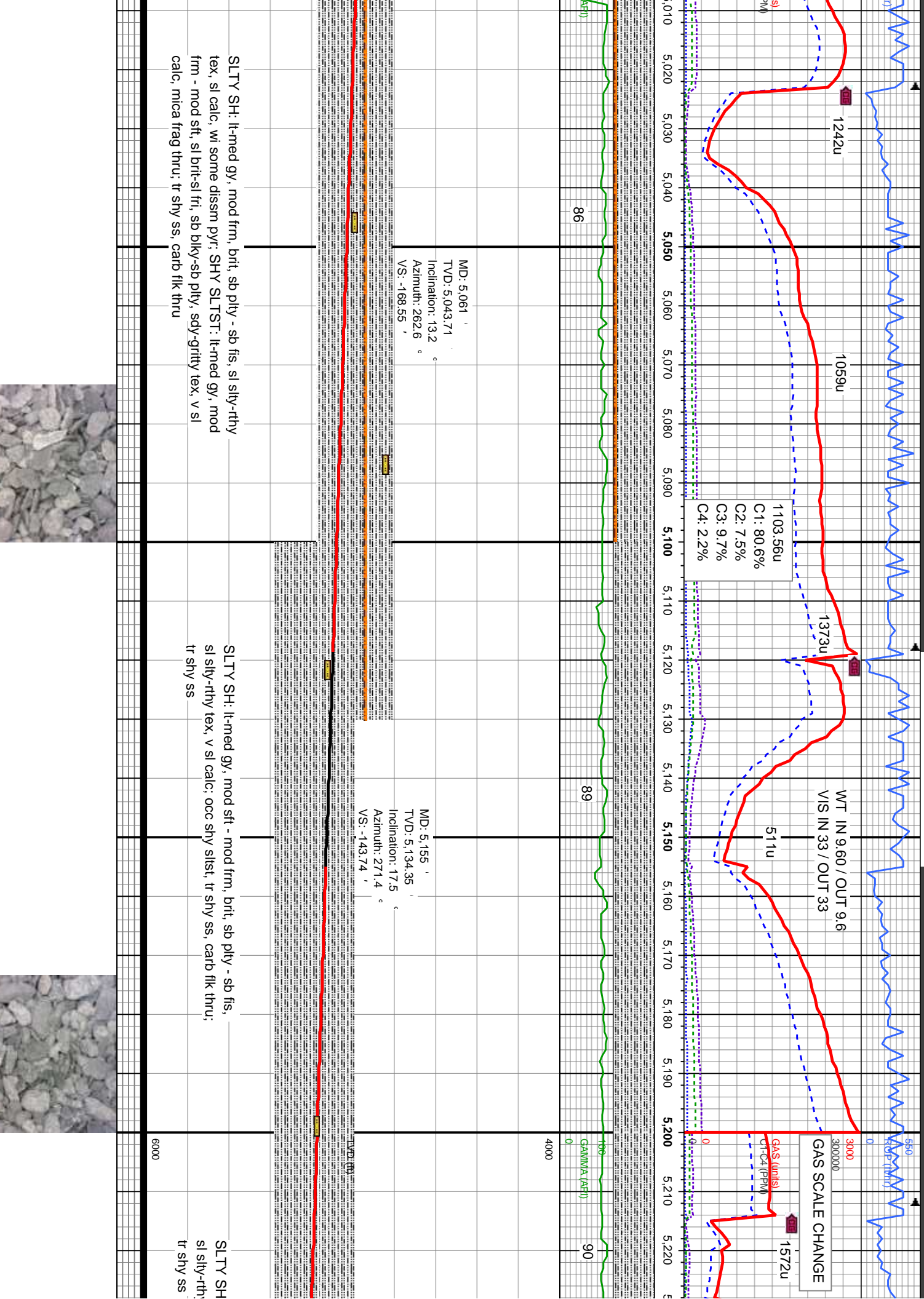
SLTY SH: lt-med gy,  
mod frm, brit, sb pty -  
sb fis, sl stly-rthy tex, sl  
calc, wi some diss  
pyr; tr shy slst

SLTY SH: lt-med gy, mod frm, brit, sb pty - sb fis, sl stly-rthy  
tex, sl calc, wi some diss pyr; SHY SLTST: lt-med gy, mod  
frm - mod sft, sl brit-sl fri, sb blkly-sb pty, sdy-gritty tex, v sl  
calc, mica frag thru; tr shy ss, carb flk thru

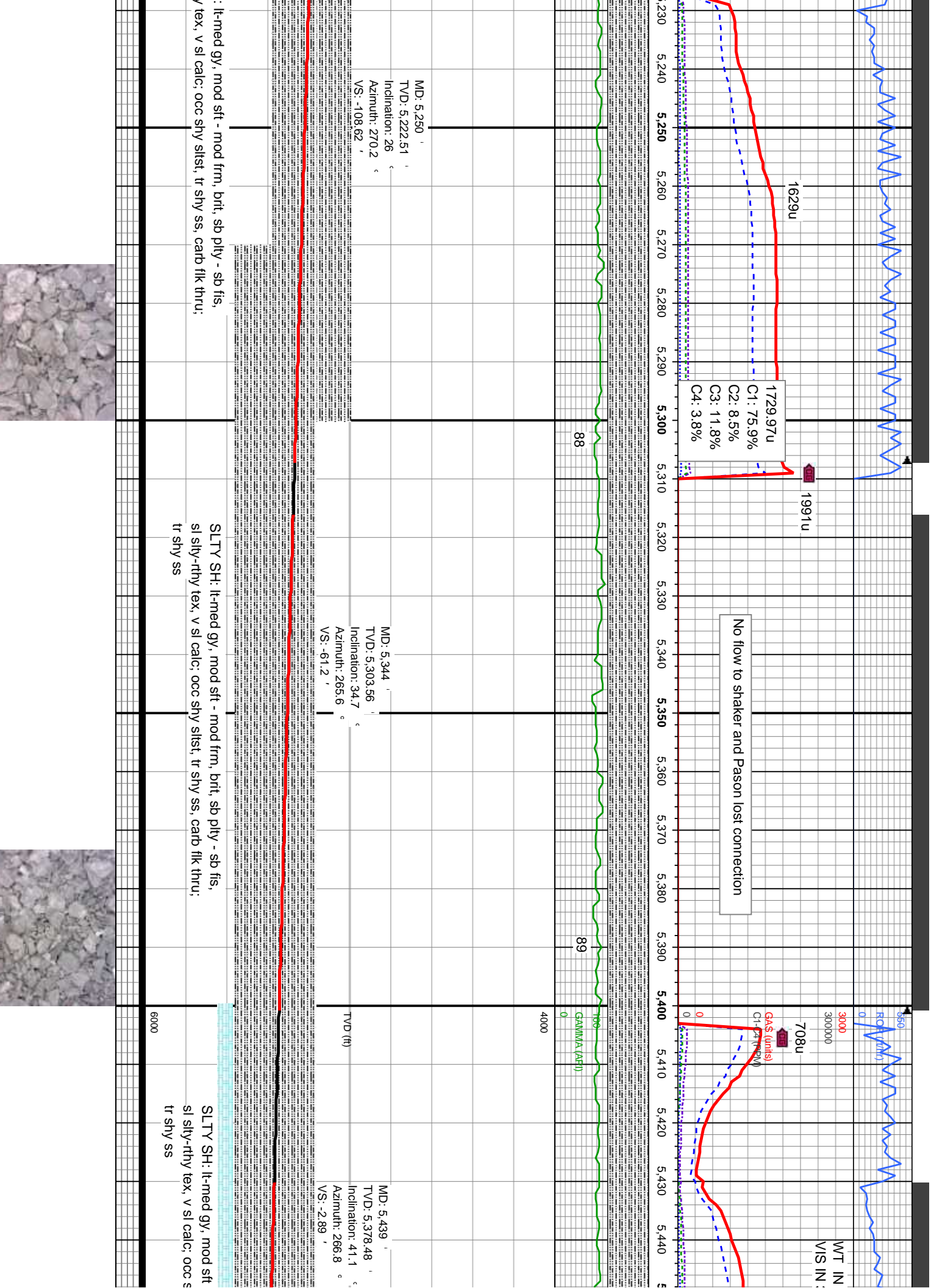
Oil Show

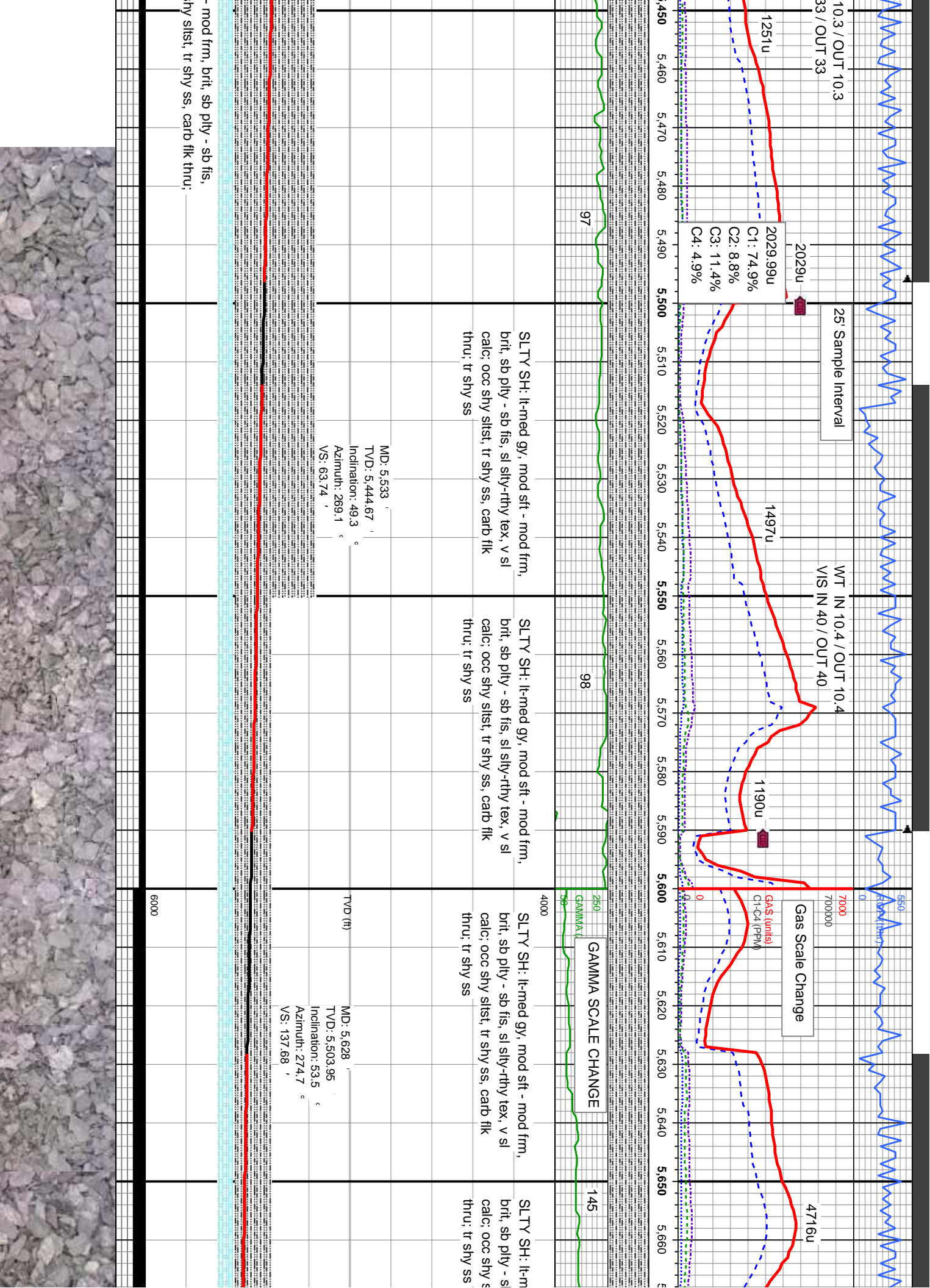
Images













10/10/2013

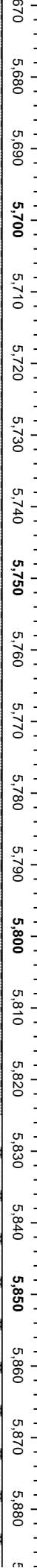
WT IN 10.45 / OUT 10.45  
VIS IN 39 / OUT 39

WT IN 10.5 / OUT 10.5  
VIS IN 38 / OUT 38

WT IN 11  
VIS IN 39

3247.13u  
C1: 66.7%  
C2: 10.8%  
C3: 14.6%  
C4: 7.9%

GAAS (wt%)  
C4C4 (PPM)



ed gy, mod sft - mod frm,  
o fis, sl silty-rthy tex, v sl  
tst, tr shy ss, carb flk

SLTY SH: lt-med gy, mod sft - mod frm,  
brit, sb pily - sb fis, sl stly-rthy tex, v sl  
calc, tr pyr, tr bent

SLTY SH: med - lt gy, occ drkgy,  
sft-mod frm, sb blkly-pily, rthy-arg mt, tr  
bent, non calc; MRLST: medgy-gy blk,  
occ dk brn, blkly-sb pily, sme fis, mod  
frm, rthy tex, sl mot, v calc, CHK: ltgy,  
occ medgy, mod sft - mod frm, sb  
pily-sb blkly, rthy tex - mot, v calc

CHK: ltgy, occ medgy, mod sft - mod  
frm, sb pily-sb blkly, rthy tex - mot, v  
calc; MRLST: medgy-gy blk, occ dk brn,  
blkly-sb pily, sme fis, mod frm, rthy tex,  
sl mot, v calc; SLTY SH: med - lt gy, occ  
drkgy, sft-mod frm, sb blkly-pily, rthy-arg  
mt, tr bent, non calc;

CHK: ltgy, occ medgy, mod sft - r  
sb pily-sb blkly, rthy tex - mot, v ca  
MRLST: medgy-gy blk, occ dk brn  
blkly-sb pily, sme fis, frm, rthy tex,  
v calc

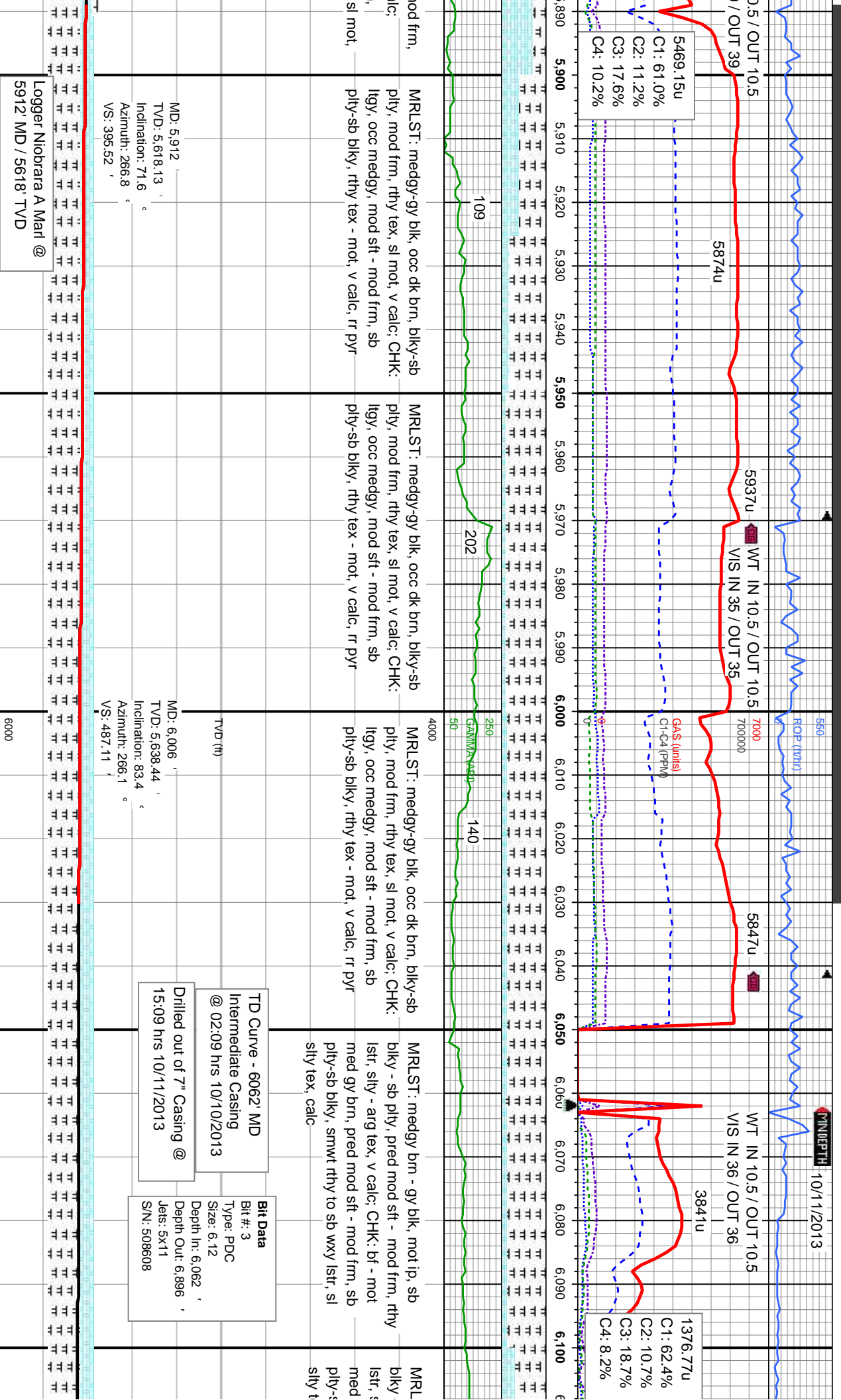
MD: 5,722 '  
TVD: 5,551.93 '  
Inclination: 65 °  
Azimuth: 273 °  
VS: 217.84 '

TVD (ft)  
MD: 5,817 '  
TVD: 5,587.59 '  
Inclination: 70.9 °  
Azimuth: 270.5 °  
VS: 305.6 '

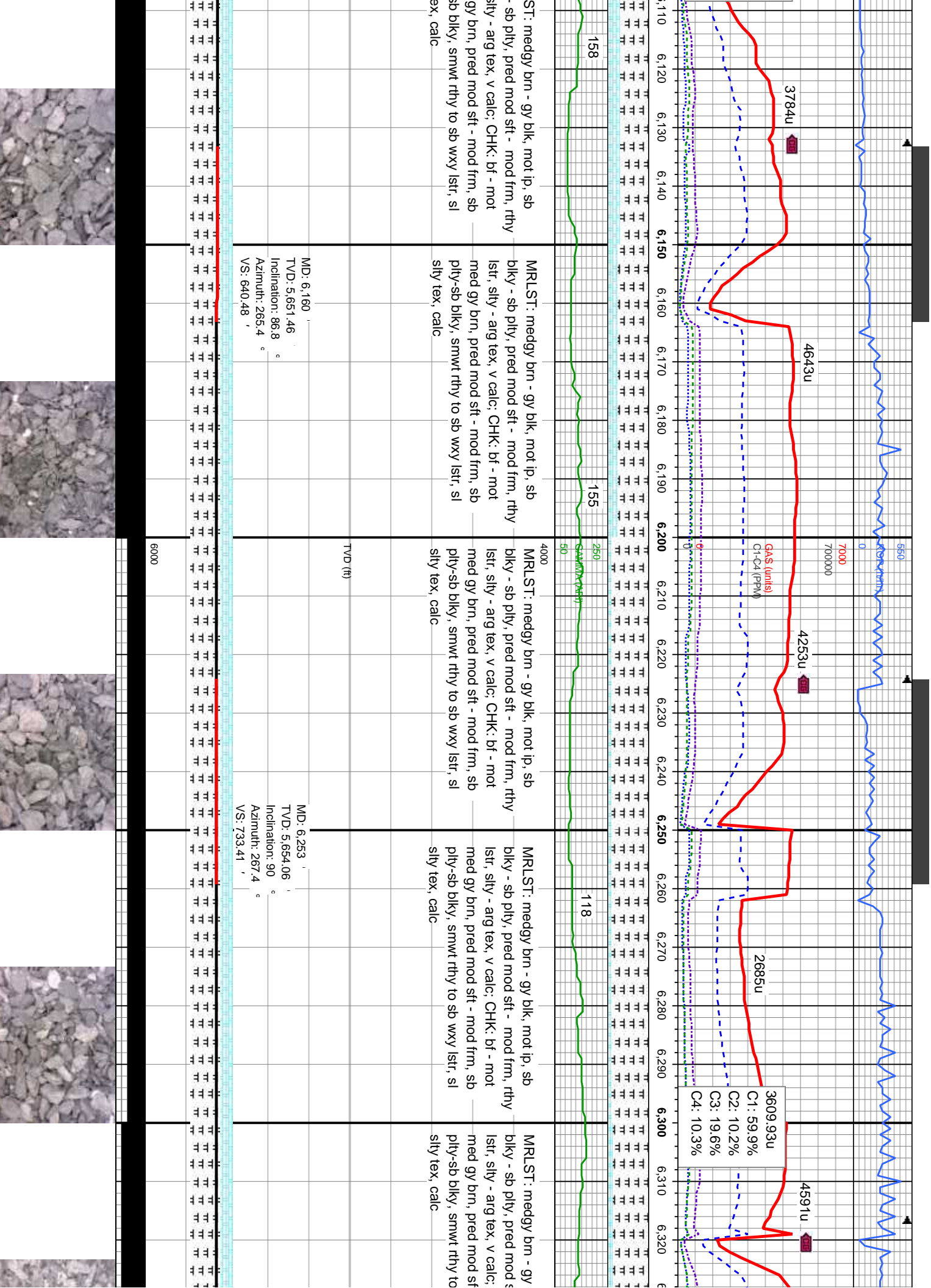
Logger Top Sharon Springs @  
5752' MD / 5563' TVD

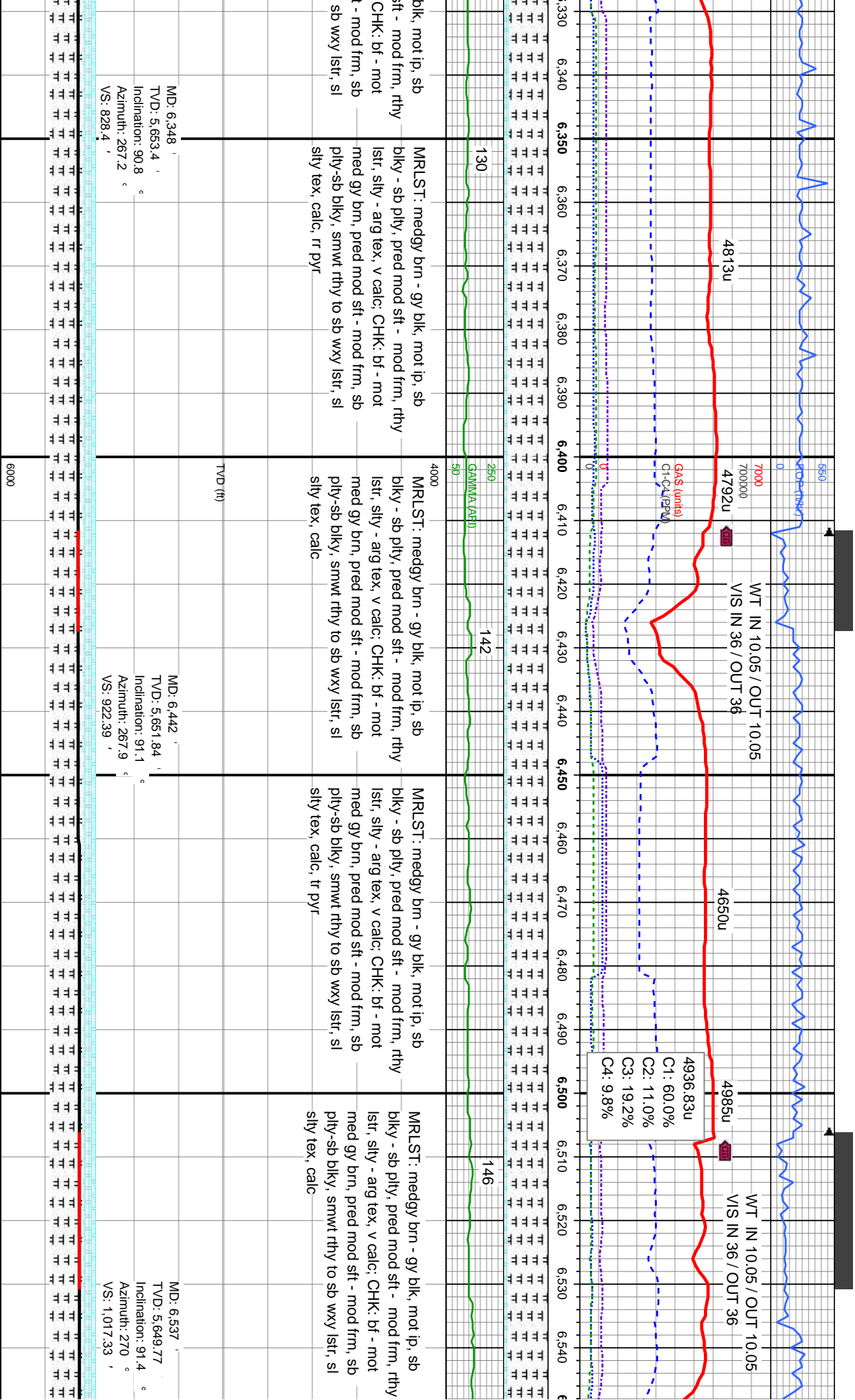
Logger Niobrara A Chalk @  
5826' MD / 5590' TVD











blky, mot ip, sb  
stf - mod frm, rthy  
CHK: bf - mot  
t - mod frm, sb  
sb wxy lst, sl

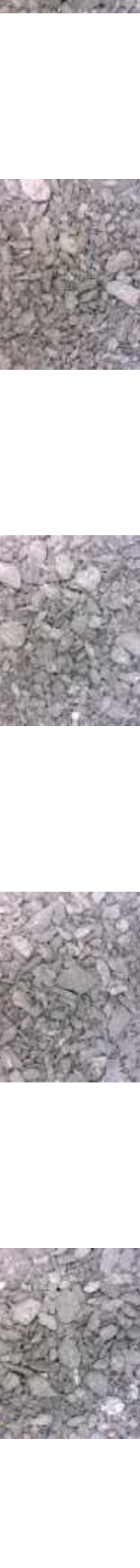
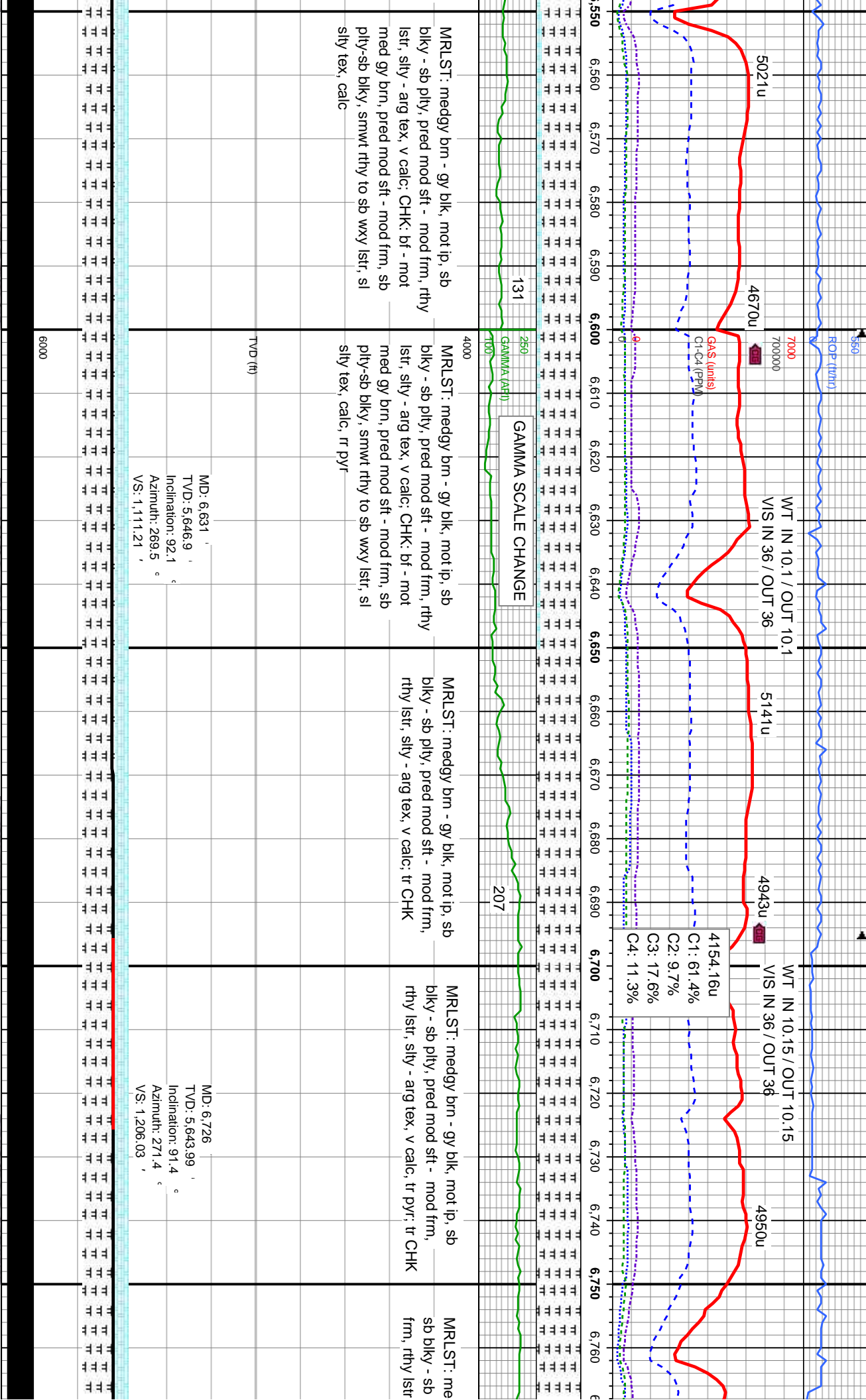
MRLST: medgy brn - gy blk, mot ip, sb  
blky - sb pty, pred mod stf - mod frm, rthy  
lst, stly - arg tex, v calc; CHK: bf - mot  
med gy brn, pred mod stf - mod frm, sb  
pty-sb blky, smwt rthy to sb wxy lst, sl  
sily tex, calc, rr pyr

MRLST: medgy brn - gy blk, mot ip, sb  
blky - sb pty, pred mod stf - mod frm, rthy  
lst, stly - arg tex, v calc; CHK: bf - mot  
med gy brn, pred mod stf - mod frm, sb  
pty-sb blky, smwt rthy to sb wxy lst, sl  
sily tex, calc

MRLST: medgy brn - gy blk, mot ip, sb  
blky - sb pty, pred mod stf - mod frm, rthy  
lst, stly - arg tex, v calc; CHK: bf - mot  
med gy brn, pred mod stf - mod frm, sb  
pty-sb blky, smwt rthy to sb wxy lst, sl  
sily tex, calc, tr pyr

MRLST: medgy brn - gy blk, mot ip, sb  
blky - sb pty, pred mod stf - mod frm, rthy  
lst, stly - arg tex, v calc; CHK: bf - mot  
med gy brn, pred mod stf - mod frm, sb  
pty-sb blky, smwt rthy to sb wxy lst, sl  
sily tex, calc







560 MNODEPTH

ROP (ft/hr) 10/12/2013

5438u  
WT IN 10.2 / OUT 10.2  
VIS IN 39 / OUT 39

7000  
7000000  
GAS (units)  
GAS (PPM)

799u

WT IN 10.1 / OUT 10.1  
VIS IN 36 / OUT 36

1175u

4466.79u  
C1: 46.6%  
C2: 6.5%  
C3: 25.1%  
C4: 21.9%

4507u

WT IN 10.15 / OUT 10.15  
VIS IN 34 / OUT 34

3991u

202

256  
100  
GAMMA (API)

194

189

medgy brn - gy blk, mot ip,  
ply, pred mod sft - mod  
sily - arg tex, v calc

MR.LST: medgy brn - gy blk, mot ip, sb  
bkly - sb ply, pred mod sft - mod frm,  
rthy lstr, sily - arg tex, v calc, rr pyr

MR.LST: gy brn - dk gy blk, sl mot ip, sb  
bkly - sb ply, pred frm - sme sft, rthy lstr,  
sily - arg tex, v calc, dissim pyr thru; tr gy  
brn chk

MR.LST: gy brn - dk gy blk, sl mot ip, sb  
bkly - sb ply, pred frm - sme sft, rthy lstr,  
sily - arg tex, v calc, dissim pyr thru; tr gy  
brn chk

MR.LST: gy brn - dk gy blk, sl mo  
bkly - sb ply, pred mod frm - sme  
rthy lstr, sily - arg tex, v calc, disse  
thru; tr gy brn chk

TOOH for MWD TOOL @ 6896' MD  
10/12/2013 @ 01:38 hrs

Resume Drilling @ 6896' MD  
10/12/2013 @ 11:06 hrs

Bit Data  
Bit #: 4  
Type: PDC  
Size: 6.12  
Depth In: 6.896 '  
Depth Out: 7.930 '  
Jets: 5x11  
S/N: JH4790

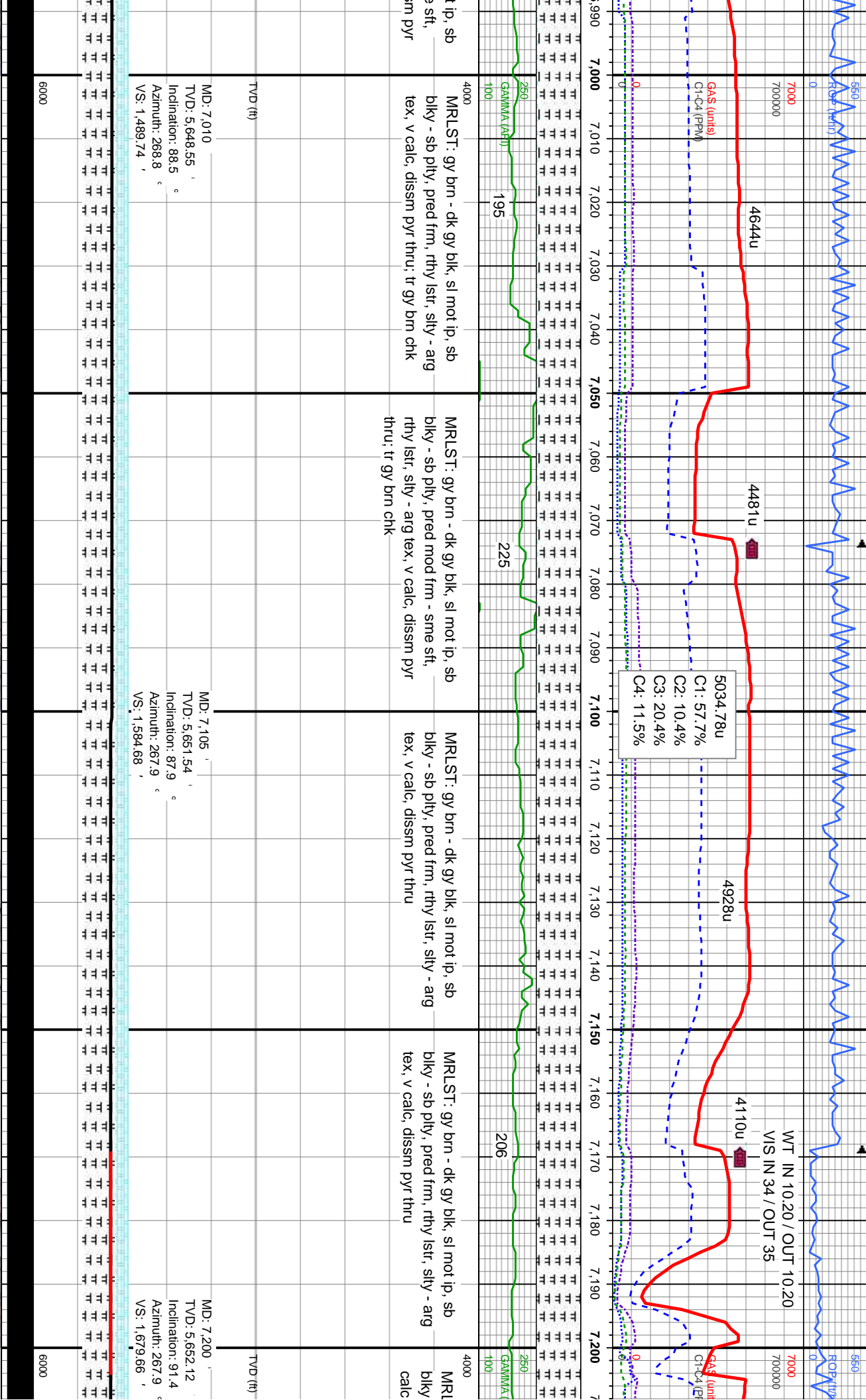
TVD (ft)

MD: 6.820 '  
TVD: 5.643.99 '  
Inclination: 88.6 °  
Azimuth: 269.5 °  
VS: 1.299.89 '

MD: 6.915 '  
TVD: 5.646.23 '  
Inclination: 88.7 °  
Azimuth: 269.5 °  
VS: 1.394.81 '

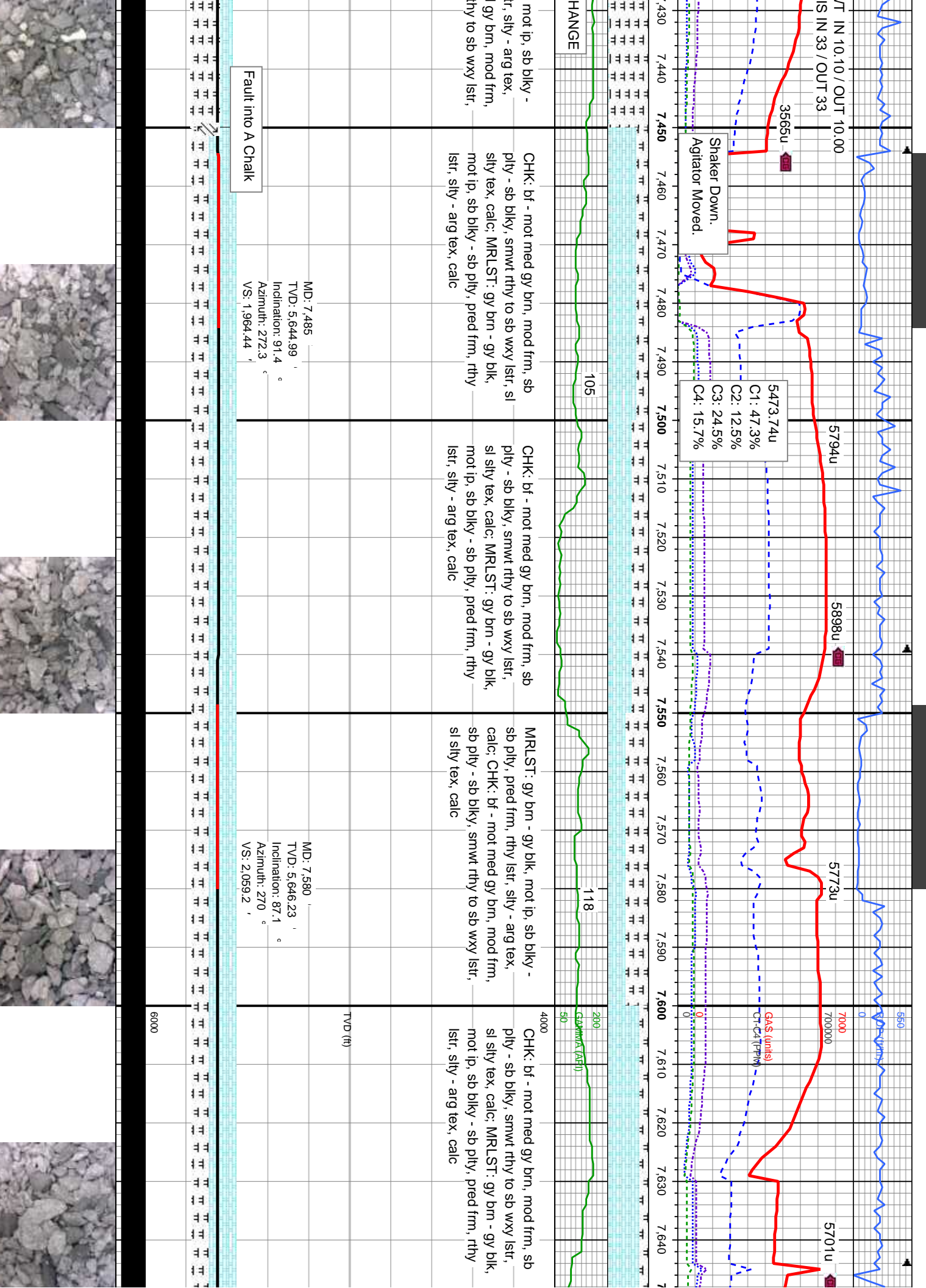
6000

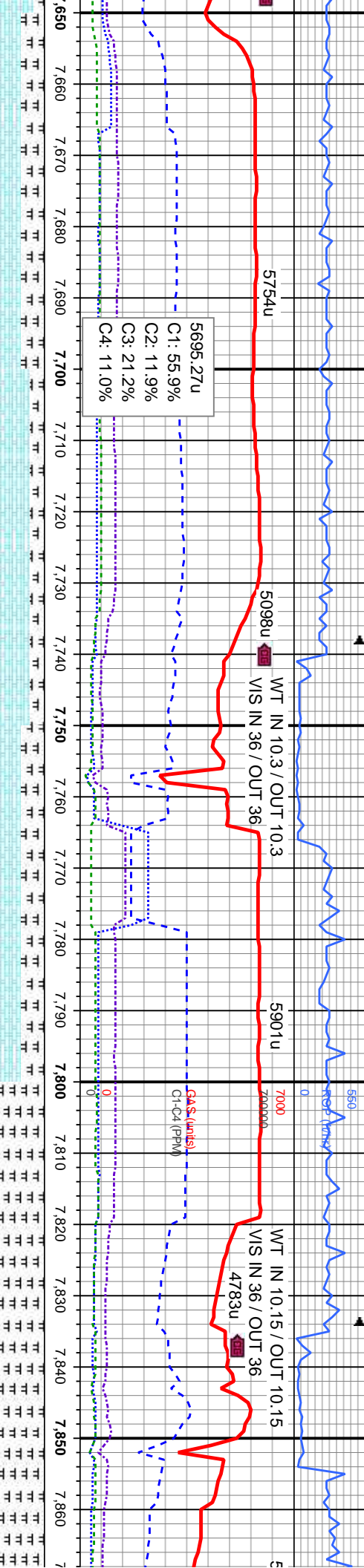






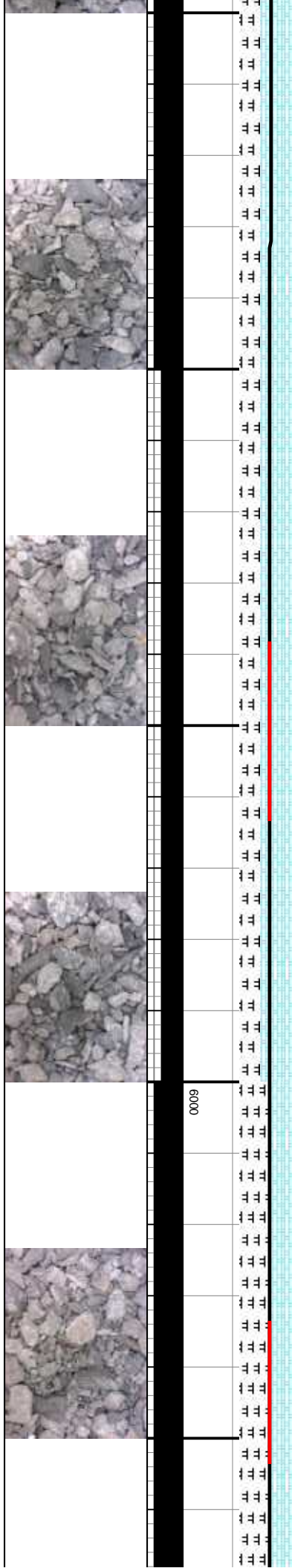


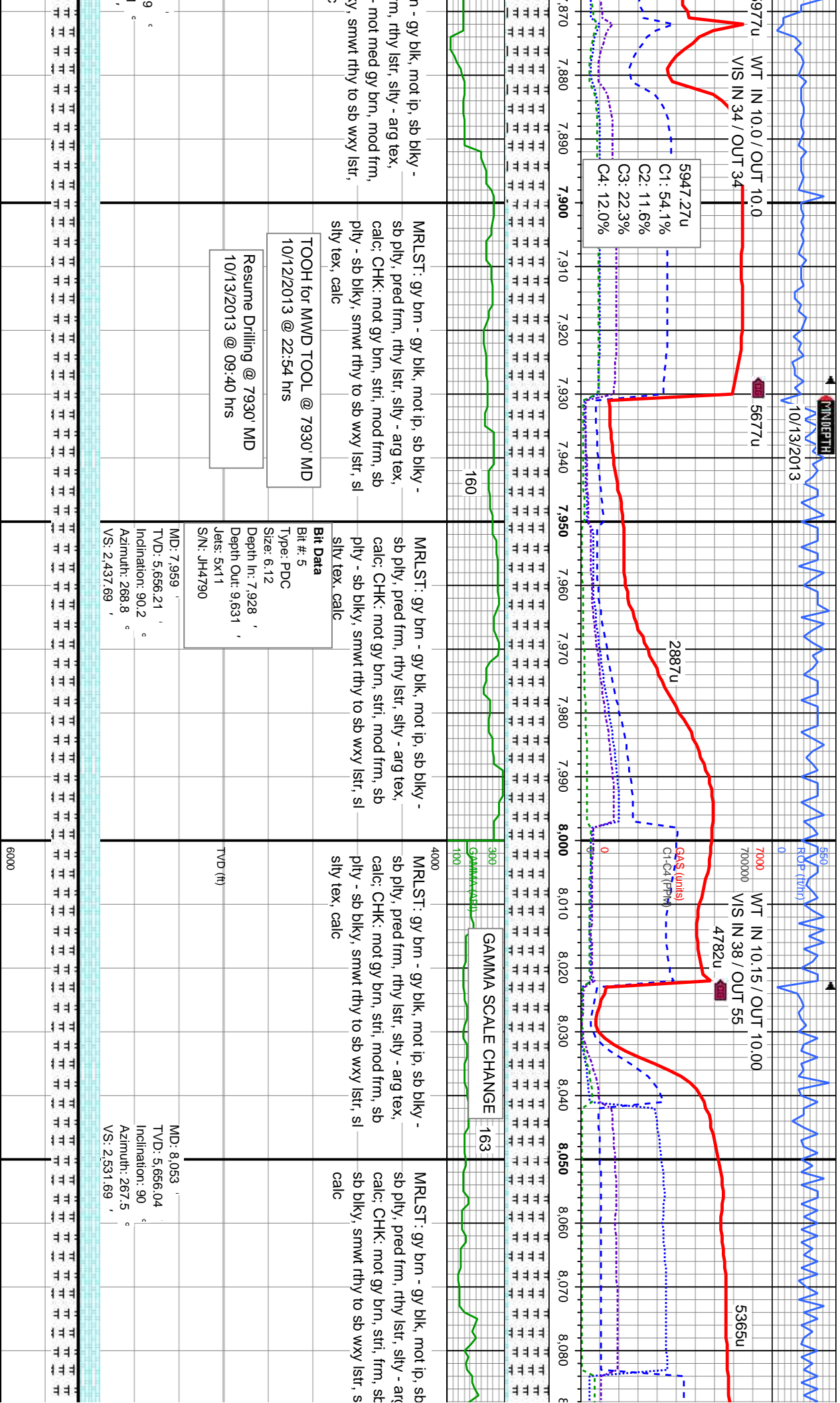




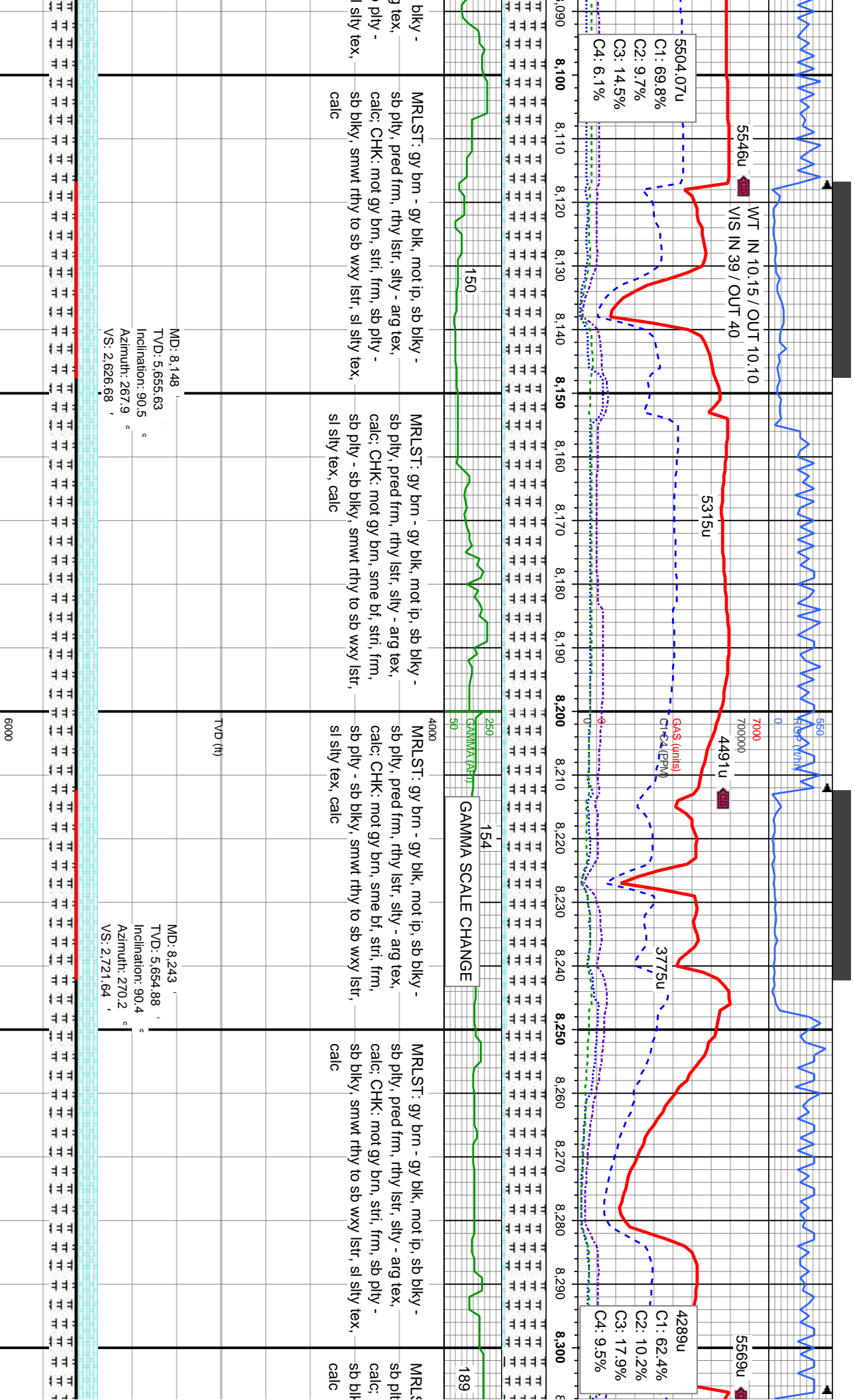
Depth (ft)	93	86	4000	91
7,650	CHK: bf - mot med gy brn, mod frm, sb pty - sb blk, smwt rthy to sb wxy lstr, sl stly tex, calc; MRLST: gy brn - gy blk, mot ip, sb blk - sb pty, pred frm, rthy lstr, stly - arg tex, calc	CHK: bf - mot med gy brn, mod frm, sb pty - sb blk, smwt rthy to sb wxy lstr, sl stly tex, calc; MRLST: gy brn - gy blk, mot ip, sb blk - sb pty, pred frm, rthy lstr, stly - arg tex, calc	CHK: bf - mot med gy brn, mod frm, sb pty - sb blk, smwt rthy to sb wxy lstr, sl stly tex, calc; MRLST: gy brn - gy blk, mot ip, sb blk - sb pty, pred frm, rthy lstr, stly - arg tex, calc	MRLST: gy brn - gy blk, mot ip, sb blk - sb pty, pred frm, rthy lstr, stly - arg tex, calc; CHK: bf - mot med gy brn, mod frm, sb pty - sb blk, smwt rthy to sb wxy lstr, sl stly tex, calc

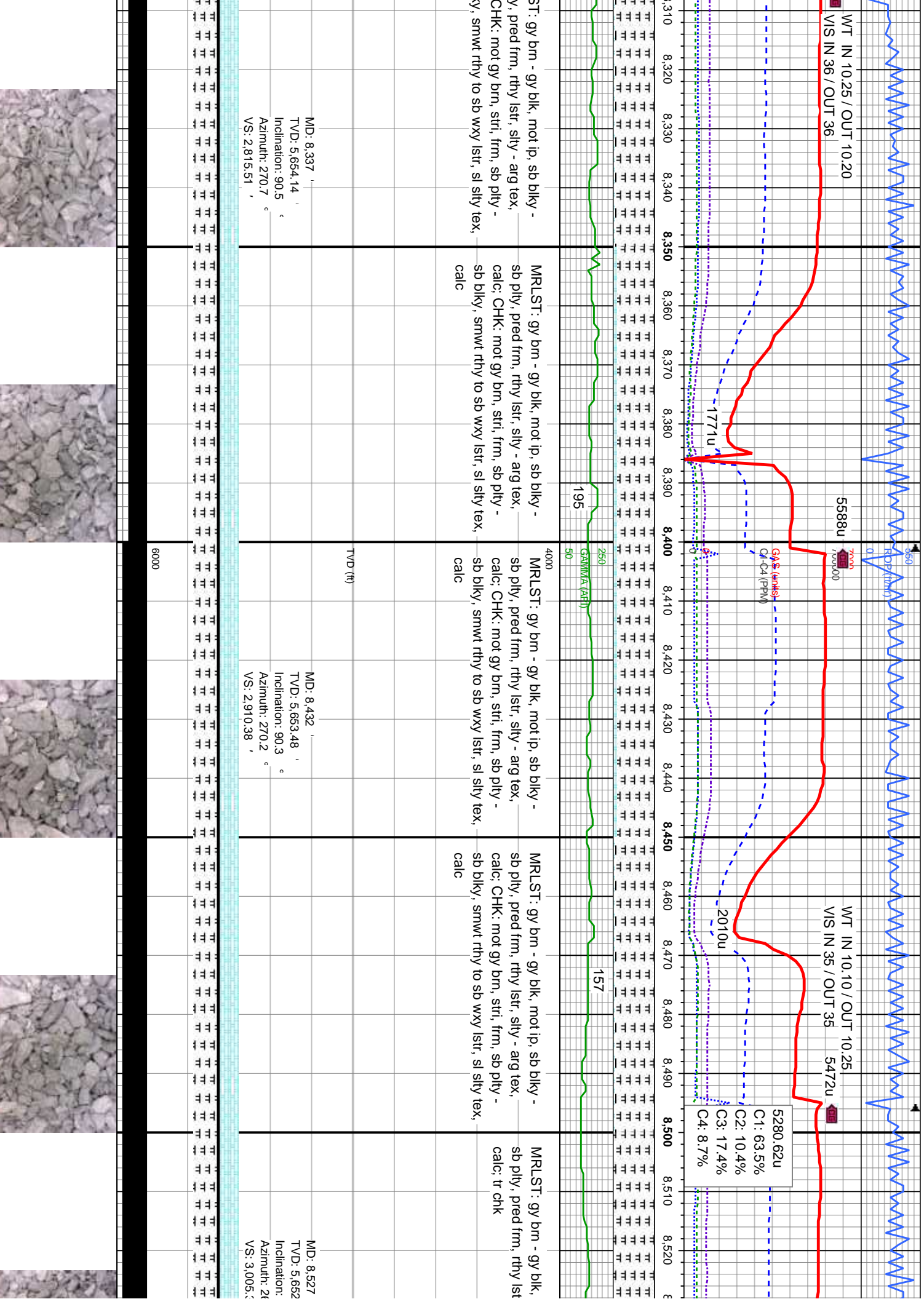
MD: 7,674	MD: 7,769	MD: 7,864
TVD: 5,651.07	TVD: 5,654.88	TVD: 5,656.29
Inclination: 87	Inclination: 88.4	Inclination: 89
Azimuth: 270.5	Azimuth: 269.6	Azimuth: 269
VS: 2,152.97	VS: 2,247.79	VS: 2,342.73

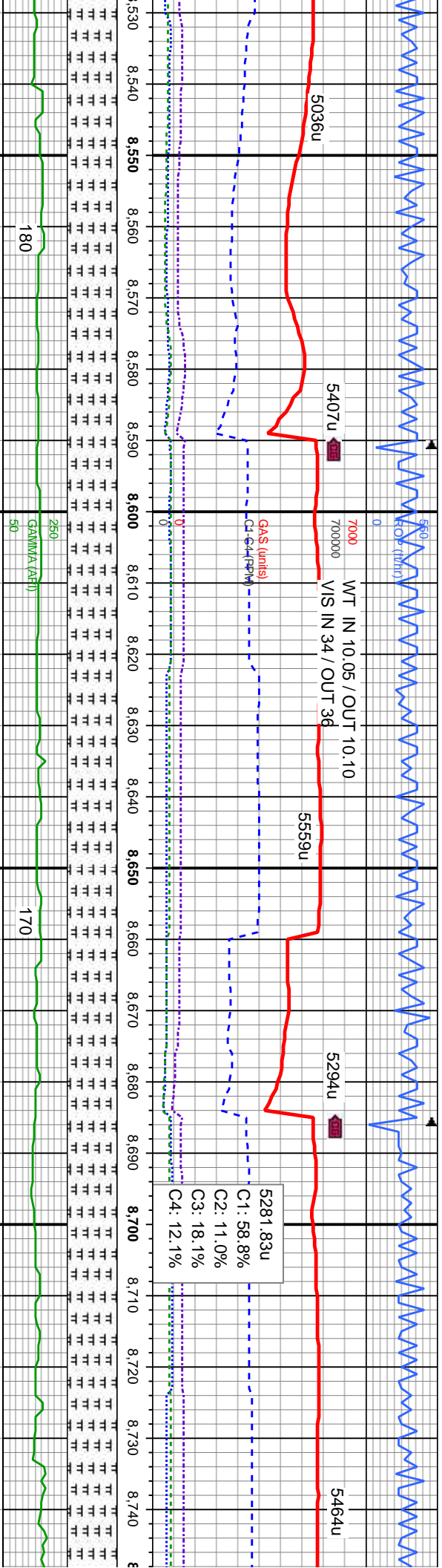
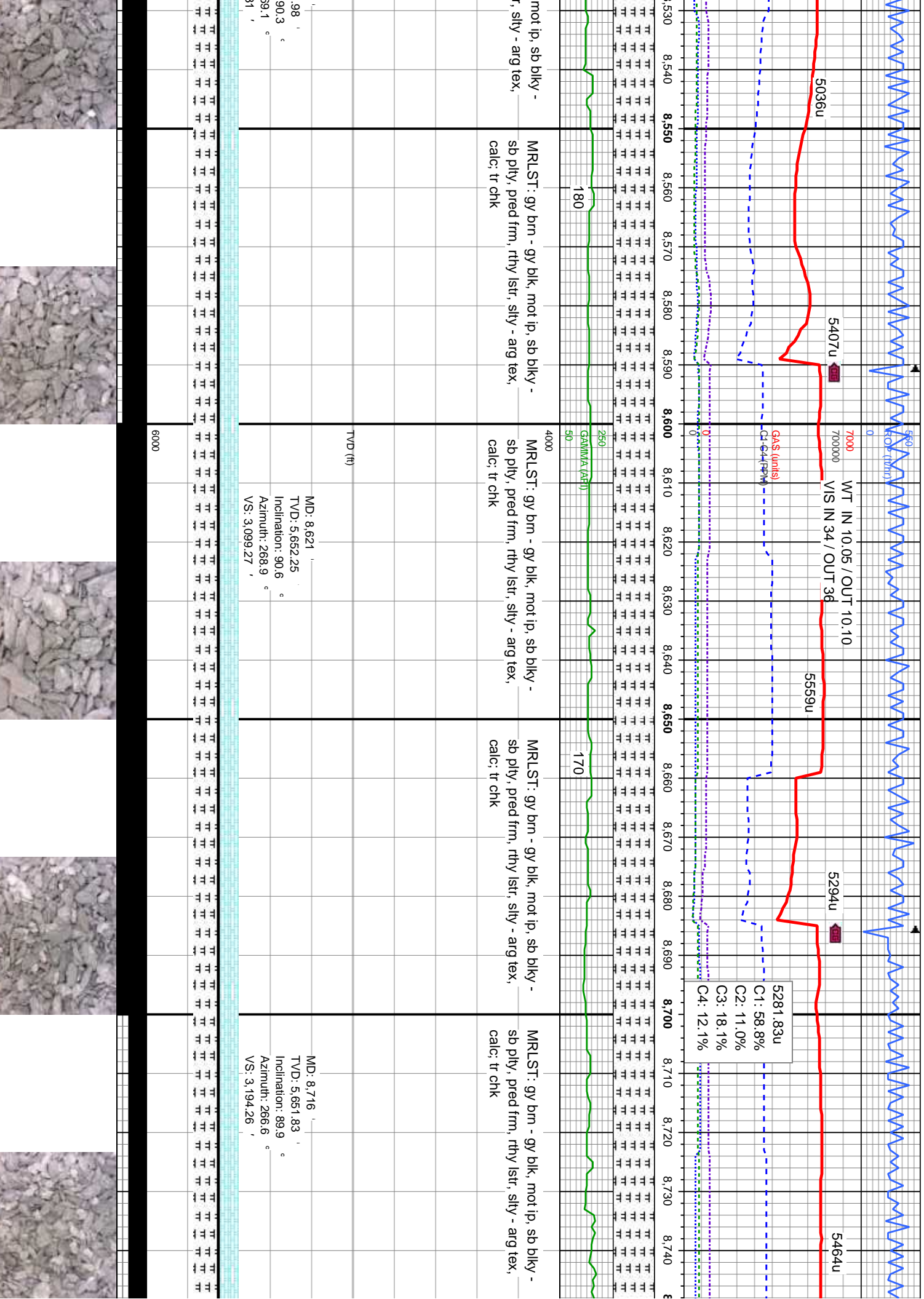












mot ip, sb blkly -  
sily - arg tex,  
MRSLT: gy brn - gy blk, mot ip, sb blkly -  
sb pily, pred frm, rthy lstr, sily - arg tex,  
calc: tr chk

MRSLT: gy brn - gy blk, mot ip, sb blkly -  
sb pily, pred frm, rthy lstr, sily - arg tex,  
calc: tr chk

MRSLT: gy brn - gy blk, mot ip, sb blkly -  
sb pily, pred frm, rthy lstr, sily - arg tex,  
calc: tr chk

MRSLT: gy brn - gy blk, mot ip, sb blkly -  
sb pily, pred frm, rthy lstr, sily - arg tex,  
calc: tr chk

MD: 8.621  
TVD: 5,652.25  
Inclination: 90.6  
Azimuth: 268.9  
VS: 3,099.27

MD: 8.716  
TVD: 5,651.83  
Inclination: 89.9  
Azimuth: 266.6  
VS: 3,194.26

