

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name Kunzman 14N-8HZ

Location SESW SEC 5, T2N, R66W

State COLORADO

Country USA

API Number 05-123-37031

County WELD

Rig Number ENSIGN 132

Field WATTENBERG

Spud Date 8/16/2013

Drilling Completed 9/5/2013

Surface Coordinates 226' FSL & 1814' FWL
40.160463 -104.804131

Bottom Hole Coordinates 460'FSL & 2125' FWL
40.146618 -104.803695

Ground Elevation 4858'

K.B. Elevation 4871'

Logged Interval 6537' To 12202'

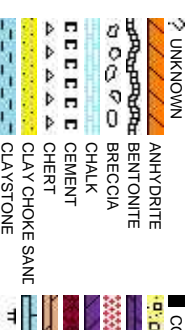
Total Depth 5665'

Formation NIOBRARA

Type of Drilling Fluid FSLN

Company ANADARKO PE
Address 1201 Lake Robt
The Woodlands

Name SHANA SWIRIN
Company COLUMBINE L
Address 2385 SOUTH L
DENVER, CO 8



Slide/Rotate

ROP
ROF
GAMMA

Columbine Logging Two Man
Rigged Up 1530hrs 08/31/2013
With Bloodhound Unit # 0313

Logging Began
0040hrs 09/01/2013
at 6537' MD

Total Gas & Chromatograph

GAS
C1
C2
C3
C4

Bit Data
Bit #: 02
Type: SMITH SD1611
Size: 8.75
Depth In: 926 '
Depth Out: 7,544 '
Jets: 6x16
S/N: JH2523

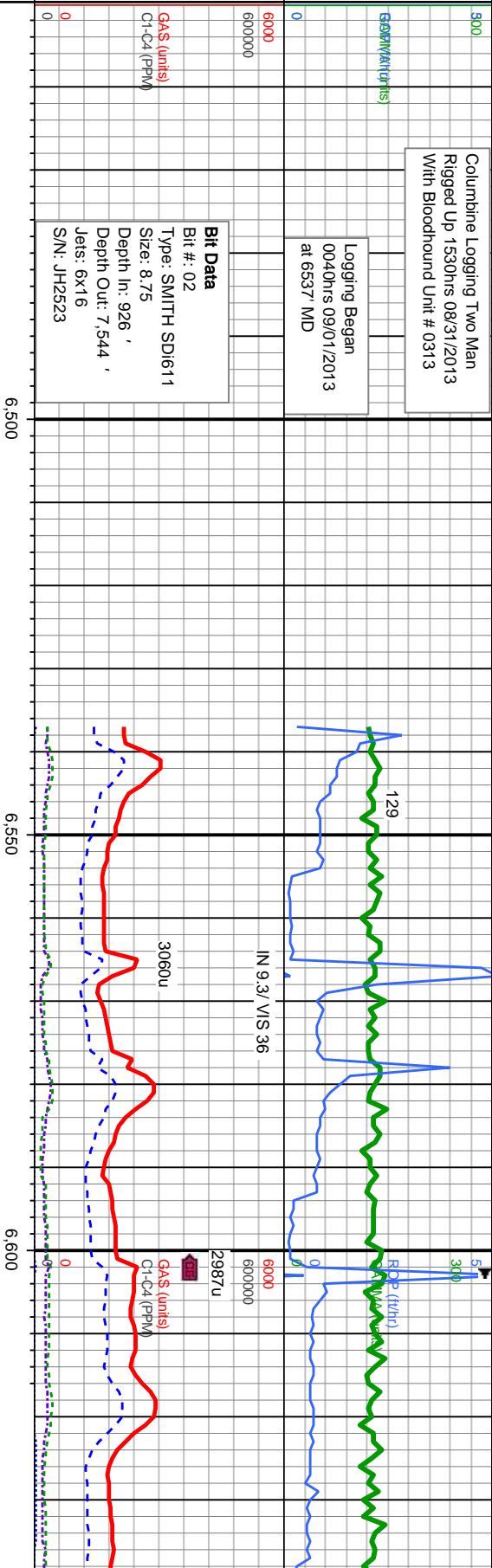
Depth Labels

% Lith

Well Bore
TVD

Oil Show

Images



Begin in Sussex Formation

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 judgement of brilliance, color and
longevity of the cut.

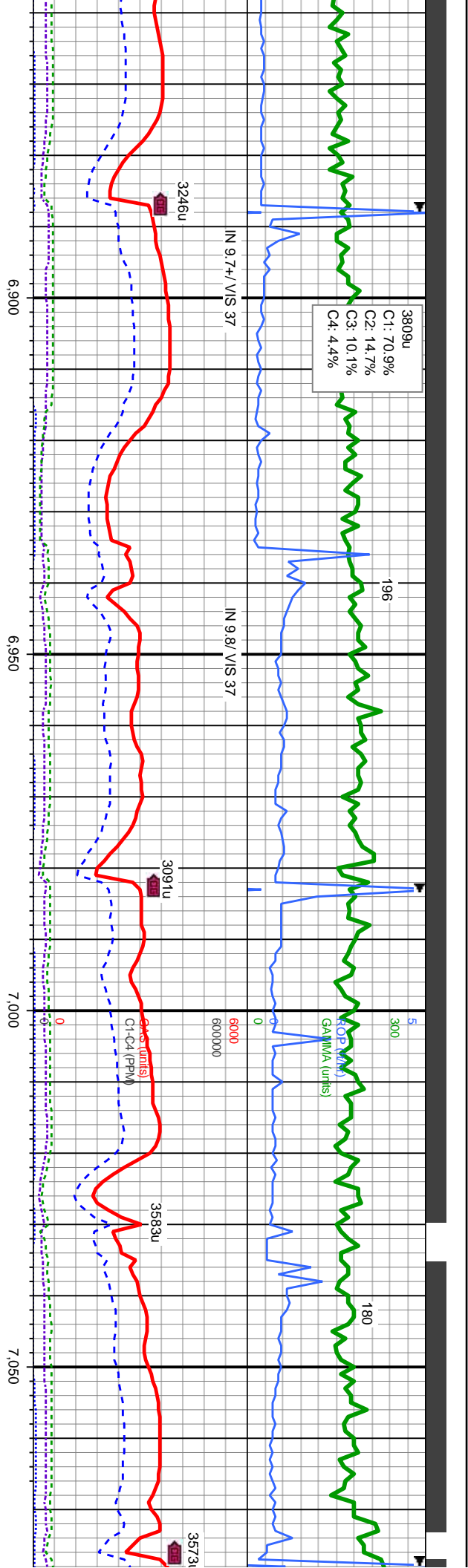
SLTY SH: lt-med gy, sb
ply-sb blk, mod sft-fr, w
srt, sr-sb ang, mod fri, tr
shy ss, stmg bl cut, dul yel
ring

SLTY SH: lt-med gy, sb
ply-sb blk, mod sft-fr, w
srt, sr-sb ang, mod fri, tr
shy ss, stmg bl cut, dul yel
ring

MD: 6,554'
TVD: 6,532.24'
Inclination: 2.27°
Azimuth: 168.05°
VS: 298.18°

MD: 6,602'
TVD: 6,580.03'
Inclination: 6.66°
Azimuth: 177.78°
VS: 294.47°

TR
P
FR
G
E



MD: 6.887'
TVD: 6.848.14'
Inclination: 31.45°
Azimuth: 181.57°
VS: -203.77°

MD: 6.934'
TVD: 6.867.1'
Inclination: 36.51°
Azimuth: 178.96°
VS: -177.52°

SLTY SH: lt-med gy, sb
ply-sb blkly, mod sft-frm, w
srt, sr-sb ang, mod fri, rr
shy ss, abnt bent, sting bl
cut, dul bl ring

SLTY SH: lt-med gy, sb
ply-sb blkly, mod sft-frm, w
srt, sr-sb ang, mod fri, rr
shy ss, sting bl cut, dul bl
ring

SLTY SH: lt-med gy, sb
ply-sb blkly, mod sft-frm, w
srt, sr-sb ang, mod fri, rr
shy ss, sting bl cut, dul bl
ring

SLTY SH: lt-med gy, sb
ply-sb blkly, mod sft-frm, w
srt, sr-sb ang, mod fri, rr
shy ss, sting bl cut, dul yel
ring

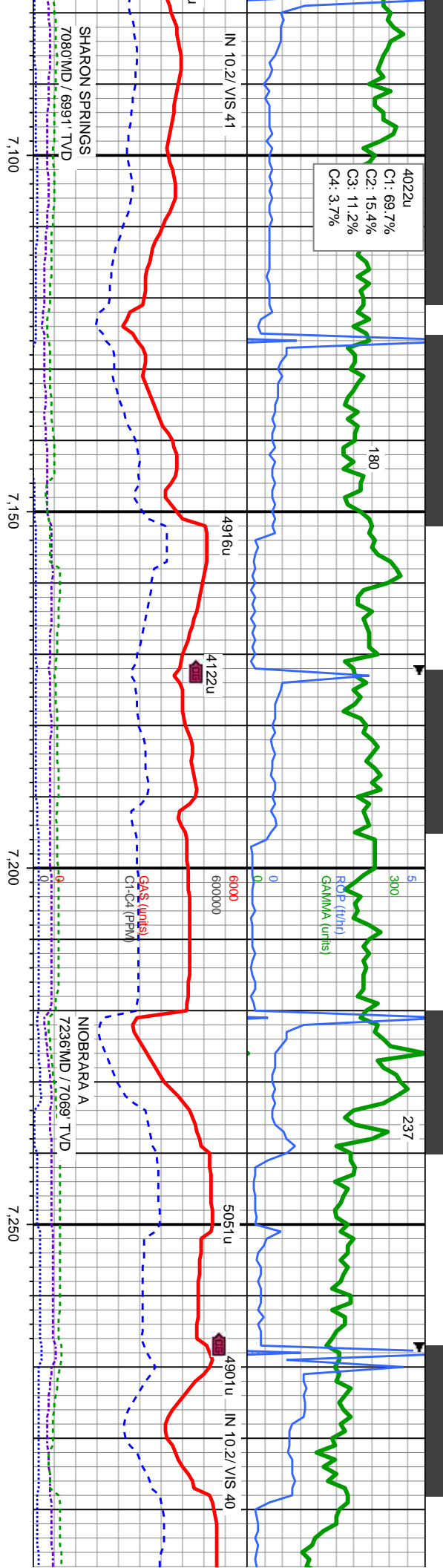
SLTY SH: lt-med gy, sb
ply-sb blkly, mod sft-frm, w
srt, sr-sb ang, mod fri, rr
sting bl cut, dul yel ring

MD: 6.982'
TVD: 6.924.3'
Inclination: 41.82°
Azimuth: 180.98°
VS: -147.22°

MD: 7.029'
TVD: 6.958.03'
Inclination: 46.43°
Azimuth: 182.63°
VS: -114.52°

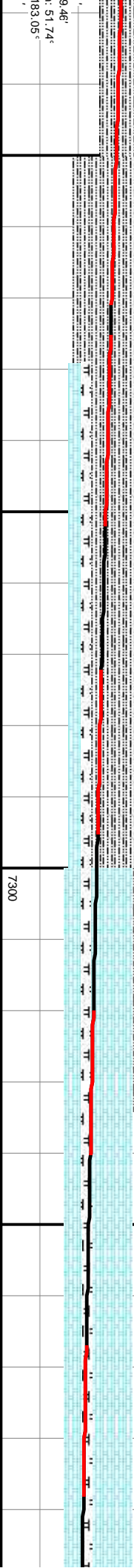
MD: 7.077'
TVD: 6.98
Inclination: 46.43°
Azimuth: 182.63°
VS: -78.31°





d gy, sb d sft-frn, w mod fri, rr t, dul bl ring	SLTY SH: lt-med gy, sb ply-sb blkly, mod sft-frn, w srt, sr-sb ang, mod fri, rr bent, sting bl cut, dul bl ring	SLTY SH: lt-med gy, sb ply-sb blkly, mod sft-frn, w srt, sr-sb ang, mod fri, occ bent, Chk: lt gy-brn, blkly-sb ply, sft-frn, sr-sb ang, mod fri, sting bl cut, bri bl ring	6300	CHK: lt gy-brn, blkly-sb ply, sft-frn, sb rd-sb ang, mod fri, MRLST: lt-med gy-brn, blkly-sb ply, sft-frn, sb rd-sb ang, mod fri, sting bl cut, bri bl ring	CHK: lt-dk gy-brn, blkly-sb ply, sft-frn, sb rd-sb ang, mod fri, MRLST: med-dk gy-brn, blkly-sb ply, sft-frn, sb rd-sb ang, mod fri, sting bl cut, bri bl ring
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MD: 7,124' TVD: 7,016.64' Inclination: 57.57° Azimuth: 182.82° VS: -40.04	MD: 7,172' TVD: 7,040.93' Inclination: 61.62° Azimuth: 182.29° VS: 1.3	MD: 7,219' TVD: 7,061.95' Inclination: 65.13° Azimuth: 181.45° VS: 43.29	MD: 7,267' TVD: 7,080.85' Inclination: 68.47° Azimuth: 179.72° VS: 87.4
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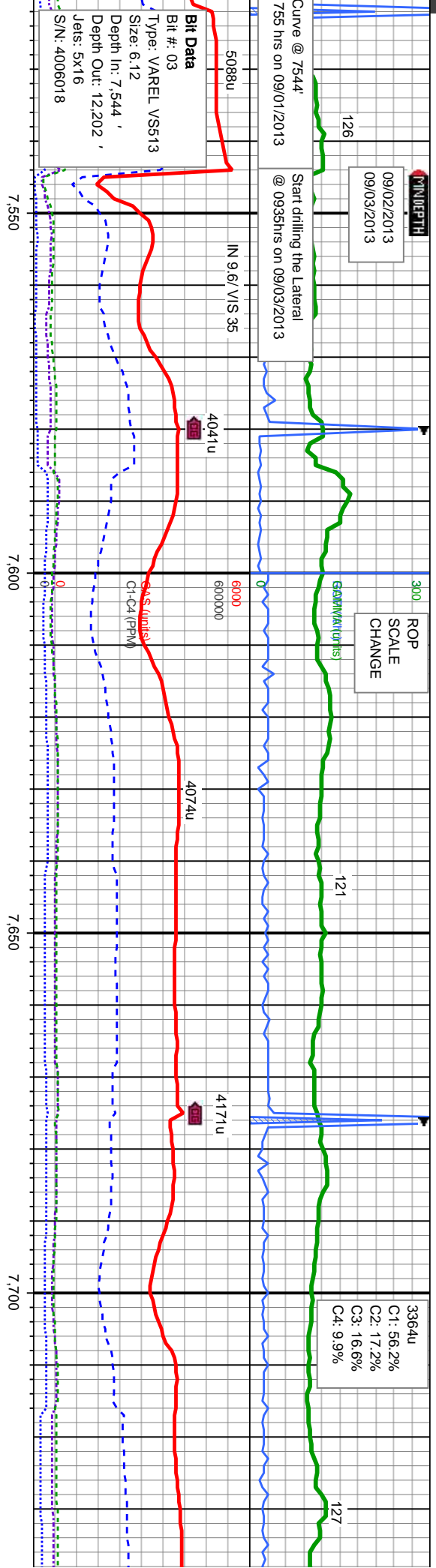


09/02/2013
09/03/2013

Start drilling the Lateral
@ 0935hrs on 09/03/2013

D Curve @ 7544'
1755 hrs on 09/01/2013

Bit Data
Bit #: 03
Type: VAREL VS513
Size: 6.12
Depth In: 7,544 '
Depth Out: 12,202 '
Jets: 5x16
S/N: 4006018



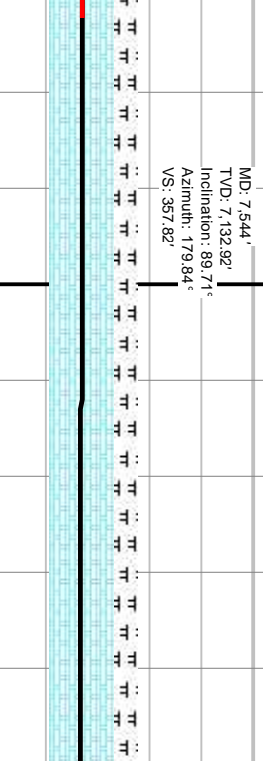
l-dk gy-brn, biky-sb
-frm, sb rd-sb ang,
, MRLST: med-dk
biky-sb pty, sft-frm,
b ang, mod fri, abnt
cl, tr fos frag, stmg bl
bl ring

CHK: lt-dk gy-brn, biky-sb
pty, sft-frm, sb rd-sb ang,
mod fri, MRLST: med-dk
gy-brn, biky-sb pty, sft-frm,
sb rd-sb ang, mod fri, abnt
calc incl, stmg bl cut, bri bl
ring

MD: 7,544 '
TVD: 7,132.92'
Inclination: 89.71°
Azimuth: 179.84°
VS: 357.82

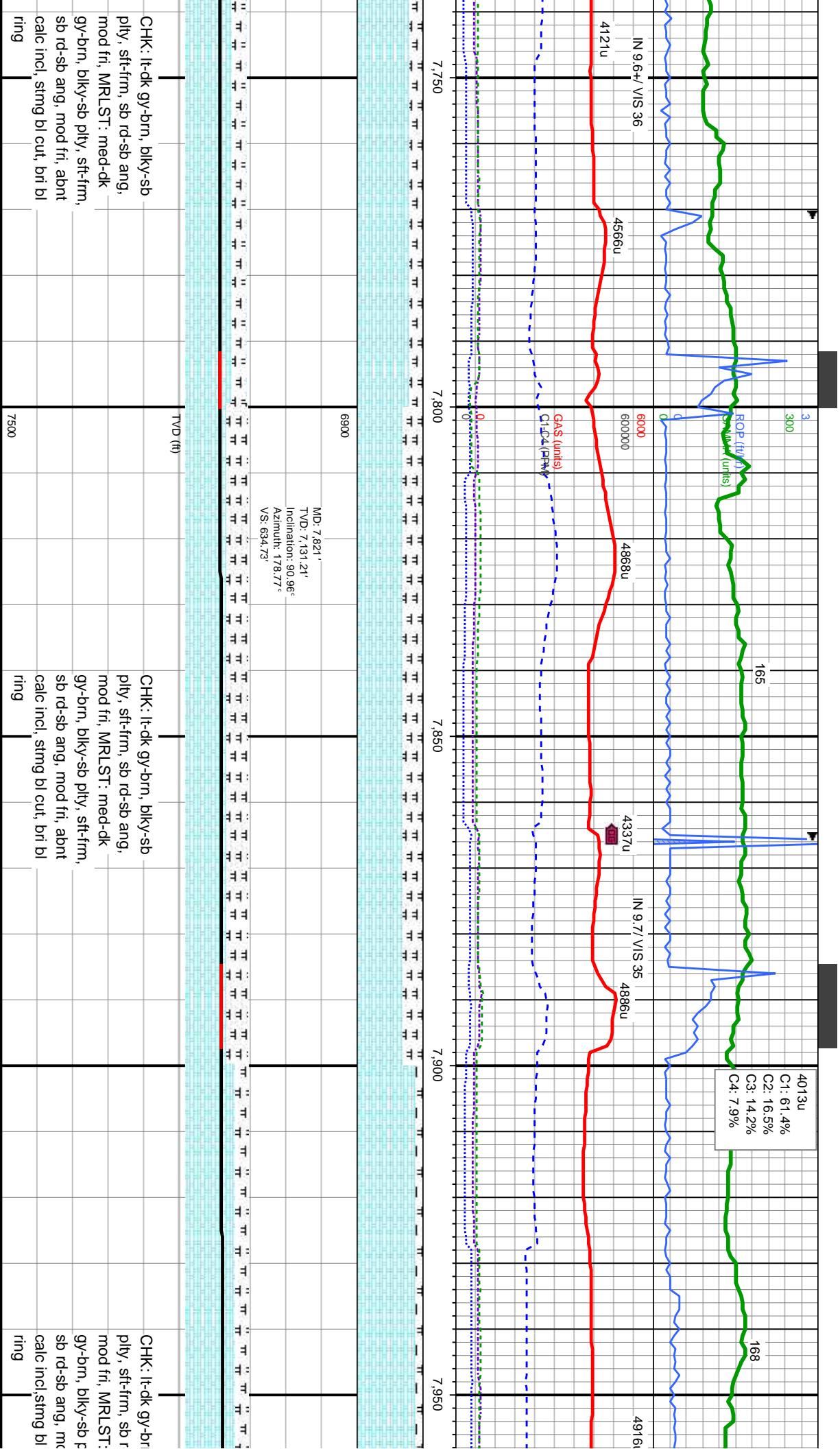
MD: 7,630 '
TVD: 7,134.87'
Inclination: 90.59°
Azimuth: 179.69°
VS: 443.76

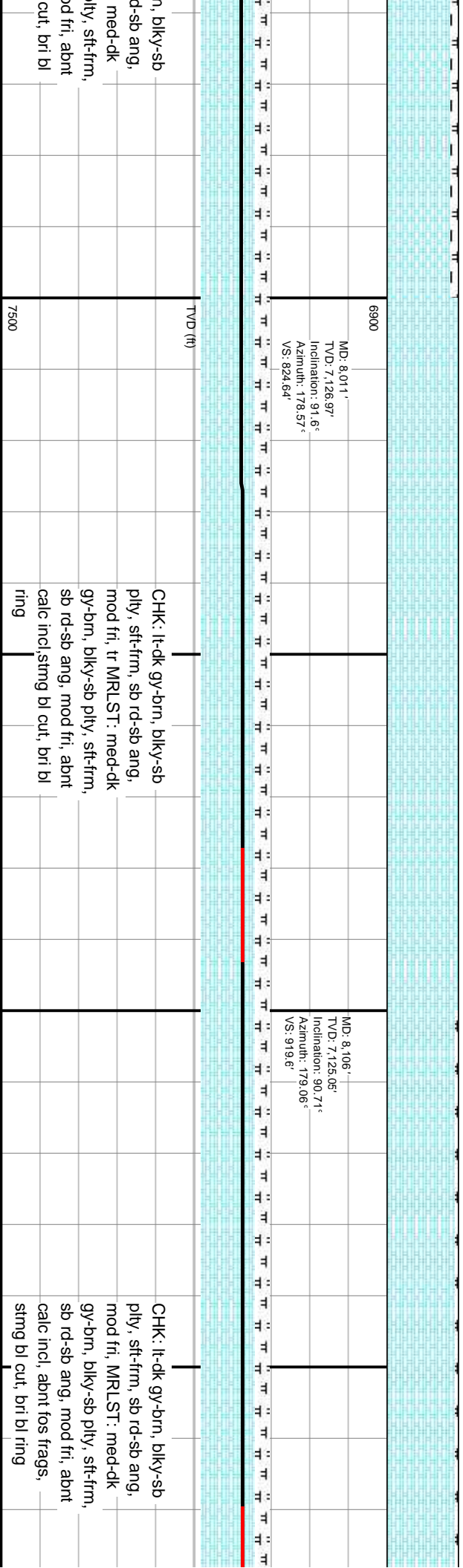
MD: 7,726 '
TVD: 7,133.18'
Inclination: 91.42°
Azimuth: 179.5°
VS: 538.76

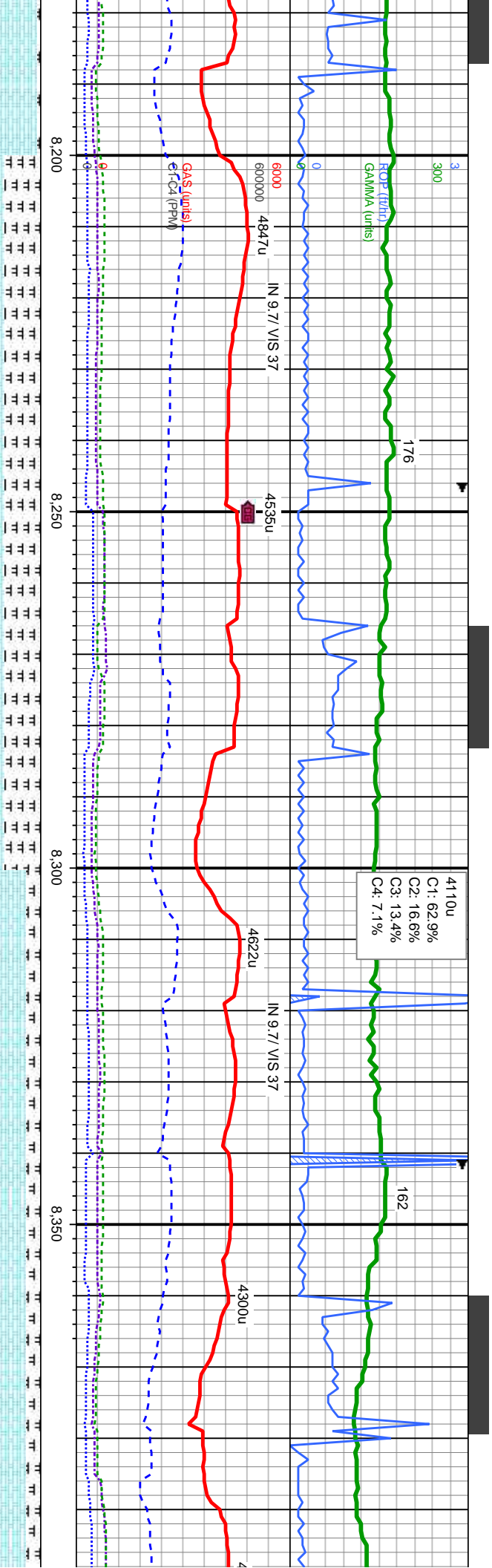


CHK: lt-dk gy-brn, biky-sb
pty, sft-frm, sb rd-sb ang,
mod fri, MRLST: med-dk
gy-brn, biky-sb pty, sft-frm,
sb rd-sb ang, mod fri, abnt
calc incl, stmg bl cut, bri bl
ring









MD: 8,201'
TVD: 7,124.65'
Inclination: 89.72°
Azimuth: 178.97°
VS: 1,014.5f'

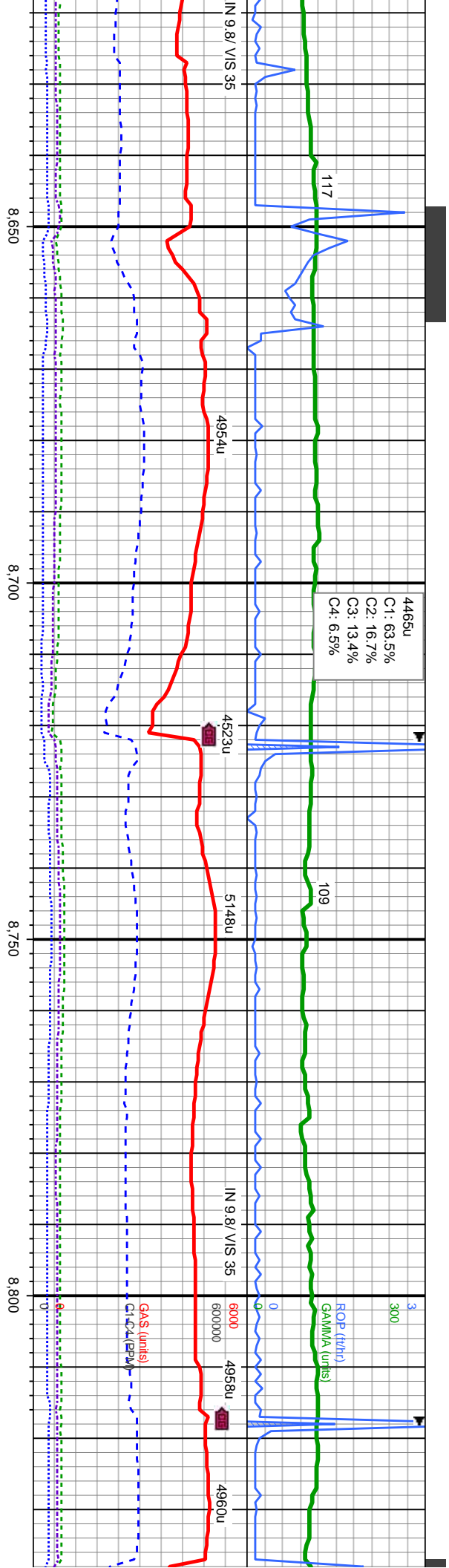
MD: 8,296'
TVD: 7,125.61'
Inclination: 89.17°
Azimuth: 180.12°
VS: 1,109.57'

MD: 8,391'
TVD: 7,127.68'
Inclination: 88.3°
Azimuth: 181.18°
VS: 1,204.5f'

6900	7500
TVD (ft)	
CHK: lt-dk gy-brn, blk-y-sb ply, sft-frn, sb rd-sb ang, mod fri, MRLST: med-dk gy-brn, blk-y-sb ply, sft-frn, sb rd-sb ang, mod fri, occ calc incl, abnt fos frags, tr shy ss, rr ss, stmg bl cut, bri bl ring	

CHK: lt-dk gy-brn, blk-y-sb
ply, sft-frn, sb rd-sb ang,
mod fri, MRLST: med-dk
gy-brn, blk-y-sb ply, sft-frn,
sb rd-sb ang, mod fri, abnt
calc incl, rr fos frags, rr shy
ss, stmg bl cut, bri bl ring





MD: 8,676'
TVD: 7,130.09'
Inclination: 90.18°
Azimuth: 181.54°
VS: 1,489.4ft

MD: 8,772'
TVD: 7,129.11'
Inclination: 90.99°
Azimuth: 180.98°
VS: 1,585.4ft

CHK: lt-med gy-brn, biky-sb
ply, sft-firm, sb rd-sb ang,
mod fri, tr MRLST: med-dk
gy-brn, biky-sb ply, sft-firm,
sb rd-sb ang, mod fri, abnt
calc incl, abnt fos frags,
stmg bl cut, bri bl ring

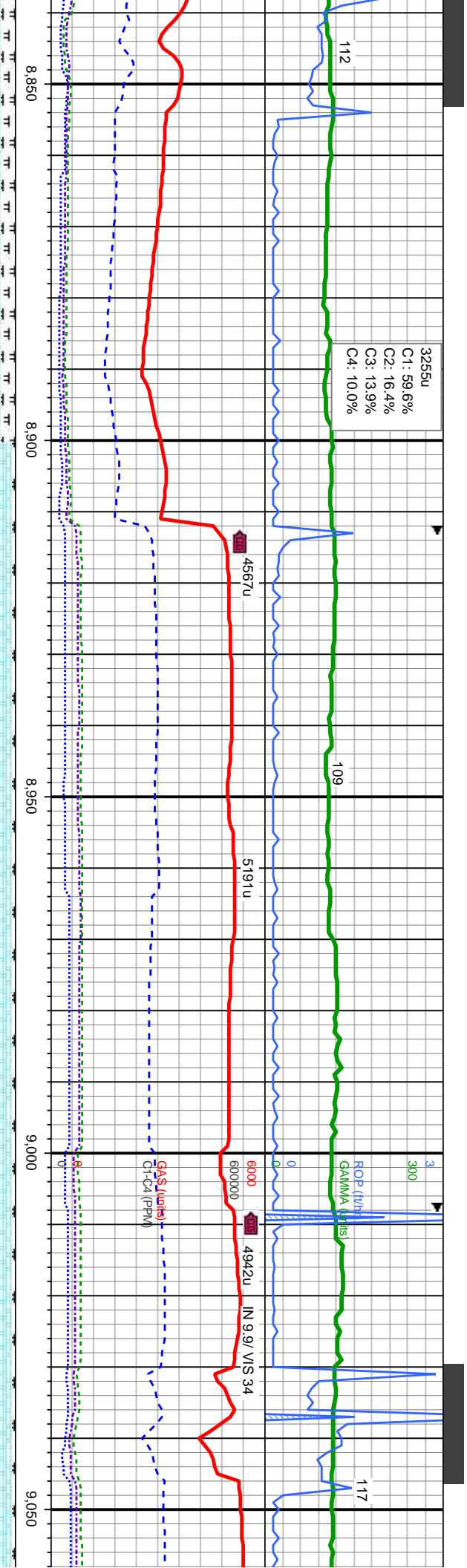
CHK: lt-med gy-brn, biky-sb
ply, sft-firm, sb rd-sb ang,
mod fri, tr MRLST: med-dk
gy-brn, biky-sb ply, sft-firm,
sb rd-sb ang, mod fri, abnt
calc incl, abnt fos frags,
stmg bl cut, bri bl ring

TVD (ft)

6900

7500





MD: 8.867
TVD: 7,128.63'
Inclination: 89.6°
Azimuth: 180.71°
VS: 1.680.42'

MD: 8.962
TVD: 7,128.01'
Inclination: 91.14°
Azimuth: 180.7°
VS: 1.775.42'

MD: 9.067
TVD: 7,112
Inclination:
Azimuth:
VS: 1.870

CHK: lt-med gy-brn, blk-y-sb
ply, sft-fm, sb rd-sb ang,
mod fri, MRLST: med-dk
gy-brn, blk-y-sb ply, sft-fm,
sb rd-sb ang, mod fri, abnt
calc incl, rr fos frag, stmg bl
cut, bri bl ring

CHK: lt-med gy-brn, blk-y-sb
ply, sft-fm, sb rd-sb ang,
mod fri, MRLST: med-dk
gy-brn, blk-y-sb ply, sft-fm,
sb rd-sb ang, mod fri, abnt
calc incl, tr fos frag, stmg bl
cut, bri bl ring

CHK: lt-med gy-brn, blk-y-sb
ply, sft-fm, sb rd-sb ang,
mod fri, MRLST: med-dk
gy-brn, blk-y-sb ply, sft-fm,
sb rd-sb ang, mod fri, abnt
calc incl, rr fos frag, stmg bl
cut, bri bl ring

TVD (ft)

6900

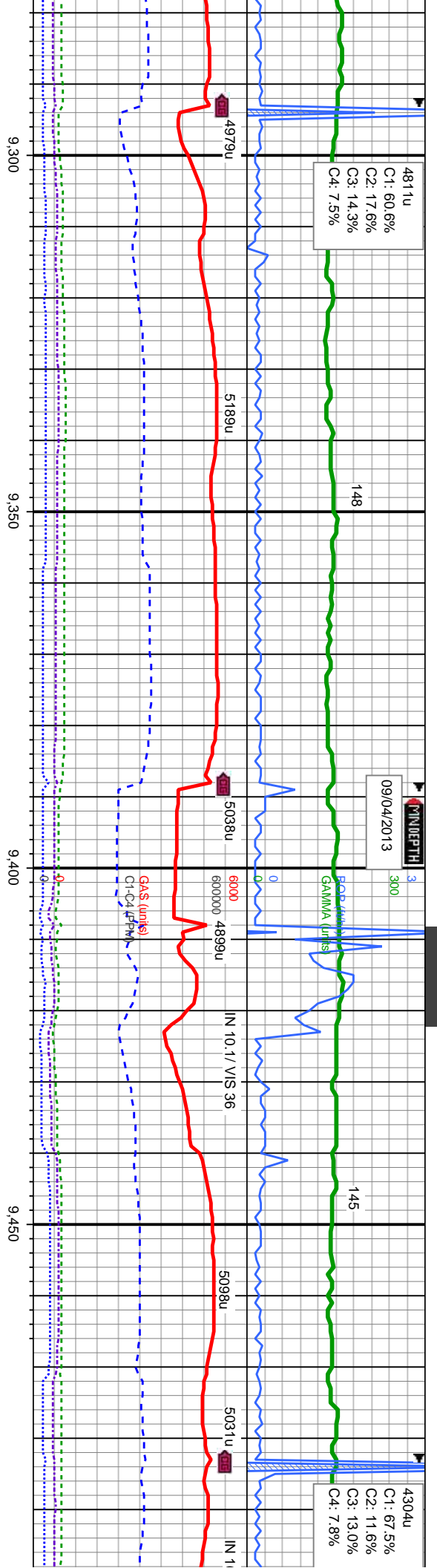
7500



4811u
C1: 60.6%
C2: 17.6%
C3: 14.3%
C4: 7.5%

09/04/2013

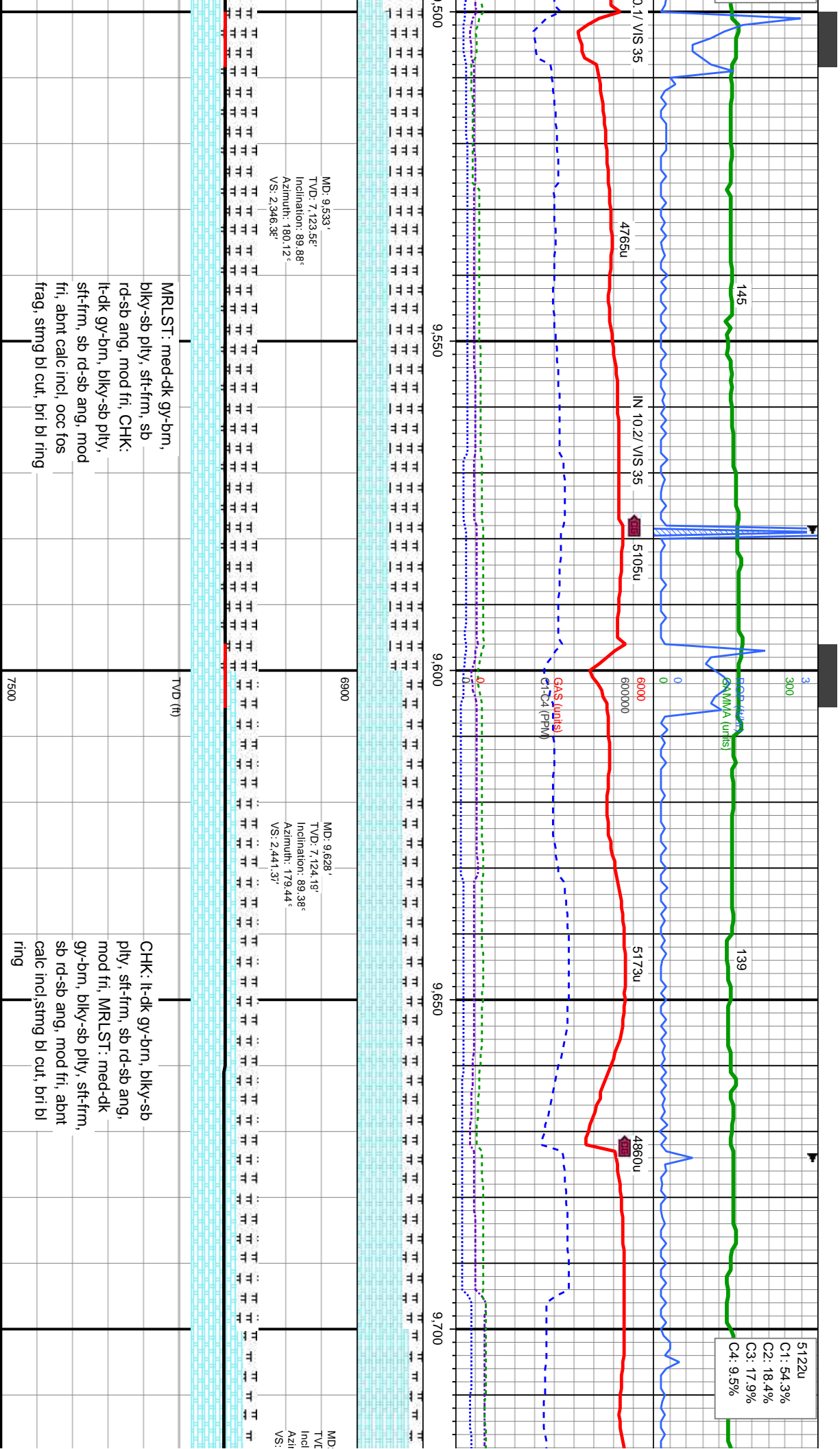
4304u
C1: 67.5%
C2: 11.6%
C3: 13.0%
C4: 7.8%

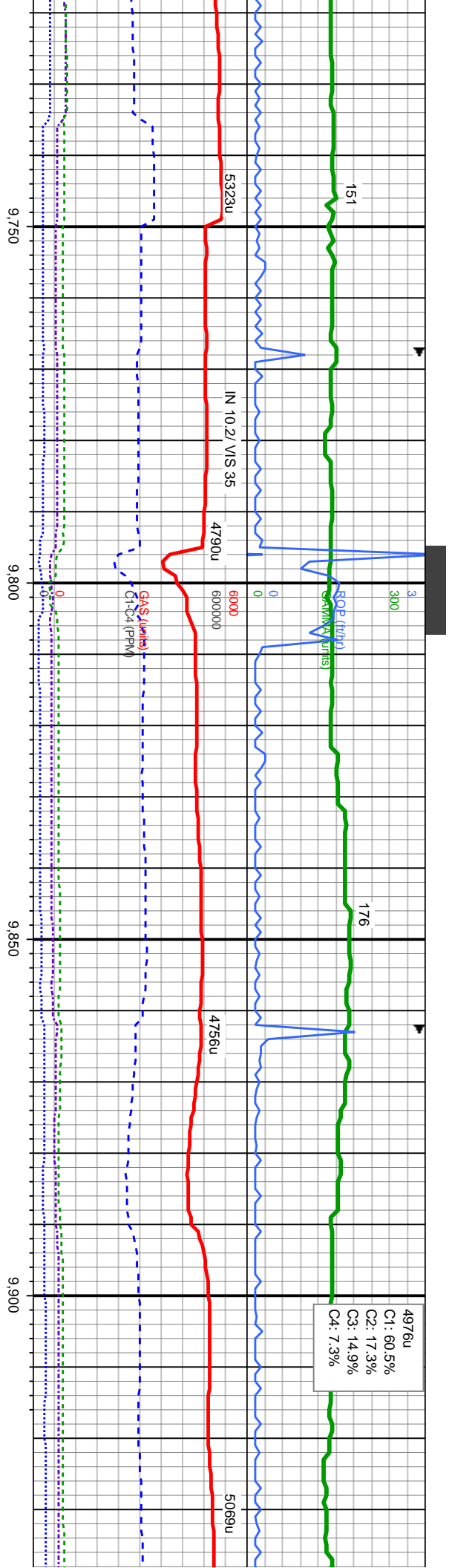


CHK: lt-dk gy-brn, blk-y-sb
ply, sft-frn, sb rd-sb ang,
mod fri, MRLST: med-dk
gy-brn, blk-y-sb ply, sft-frn,
sb rd-sb ang, mod fri, occ
calc incl, abnt fos frag,
sting bl cut, bri bl ring

MRLST: med-dk gy-brn,
blk-y-sb ply, sft-frn, sb
rd-sb ang, mod fri, CHK:
lt-dk gy-brn, blk-y-sb ply,
sft-frn, sb rd-sb ang, mod
fri, abnt calc incl, abnt fos
frag, sting bl cut, bri bl ring







4976u
C1: 60.5%
C2: 17.3%
C3: 14.9%
C4: 7.3%

9,723' MD: 9,818' TVD: 7,126.83' Inclination: 89.72° Azimuth: 179.09° VS: 2,536.34'

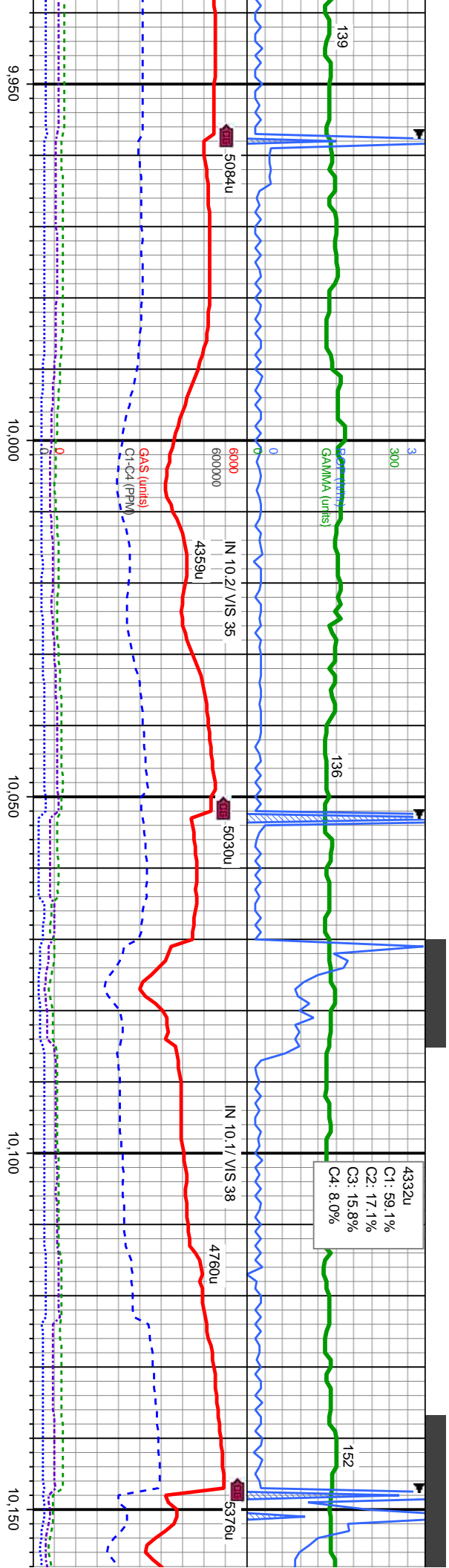
9,800 MD: 9,818' TVD: 7,126.83' Inclination: 89.2° Azimuth: 179.41° VS: 2,631.34'

9,913' MD: 9,913' TVD: 7,126.86' Inclination: 89.54° Azimuth: 179.29° VS: 2,726.34'

CHK: lt-med gy-brn, blk-ly-sb
ply, sft-fm, sb rd-sb ang,
mod fri, MRLST: med-dk
gy-brn, blk-ly-sb ply, sft-fm,
sb rd-sb ang, mod fri, abnt
calc incl, sting bl cut, bri bl
ring

CHK: lt-med gy-brn, blk-ly-sb
ply, sft-fm, sb rd-sb ang,
mod fri, tr MRLST: med-dk
gy-brn, blk-ly-sb ply, sft-fm,
sb rd-sb ang, mod fri, abnt
calc incl, sting bl cut, bri bl
ring



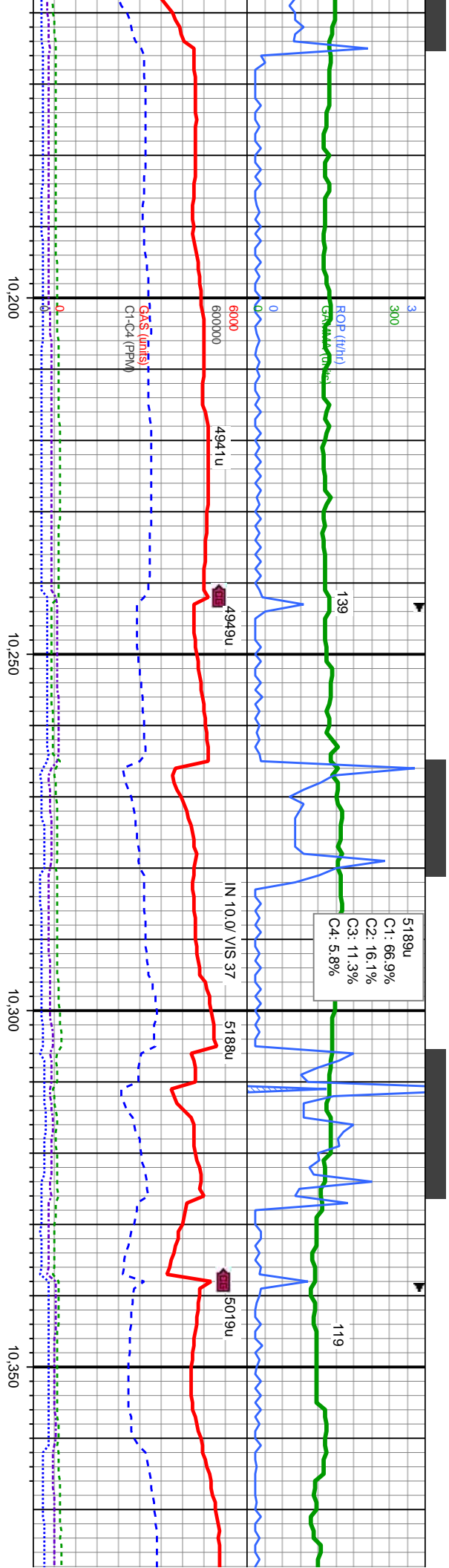


MD: 10,009'
TVD: 7,127.36'
Inclination: 89.88°
Azimuth: 178.66°
VS: 2,822.33'

MD: 10,104'
TVD: 7,127.65'
Inclination: 89.72°
Azimuth: 179.49°
VS: 2,917.31'

CHK: lt-med gy-brn, blk-y-sb pity, sft-fm, sb rd-sb ang, mod fri, tr MRLST: med-dk gy-brn, blk-y-sb pity, sft-fm, sb rd-sb ang, mod fri, abnt calc incl, sting bl cut, bri bl ring		TVD (ft)	CHK: lt-med gy-brn, blk-y-sb pity, sft-fm, sb rd-sb ang, mod fri, MRLST: med-dk gy-brn, blk-y-sb pity, sft-fm, sb rd-sb ang, mod fri, tr calc incl, sting bl cut, bri bl ring	
		7500		



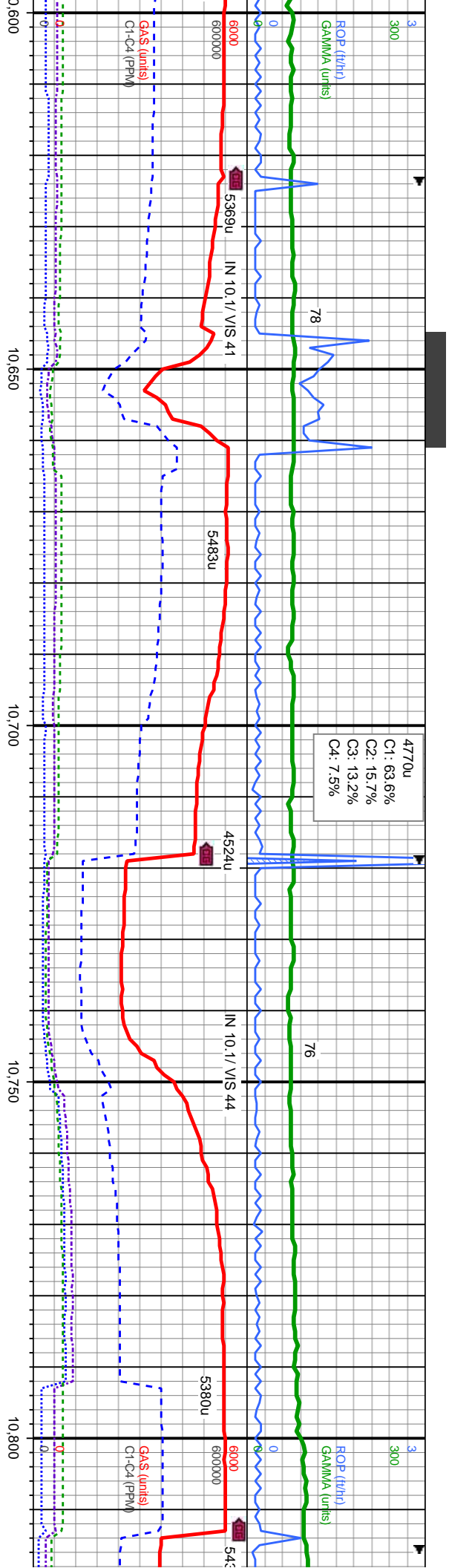


MD: 10,199'
TVD: 7,128.16'
Inclination: 89.72°
Azimuth: 179.79°
VS: 3.0123°

MD: 10,294'
TVD: 7,128.98'
Inclination: 89.29°
Azimuth: 180.45°
VS: 3.1073°

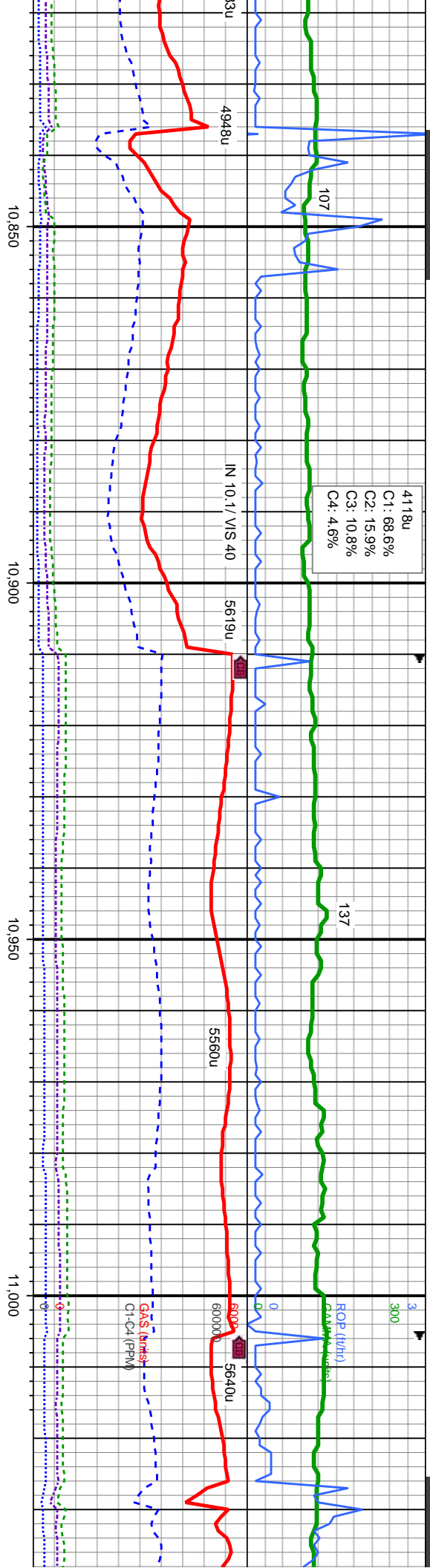
bn, bky-sb	CHK: lt-med gy-brn, bky-sb
d-sb ang,	ply, sft-fm, sb rd-sb ang,
med-dk	mod fri, MRLST: med-dk
bly, sft-fm,	gy-brn, bky-sb ply, sft-fm,
od fri, tr	sb rd-sb ang, mod fri, tr
cut, bri bl	calc incl, rr fos frag, sting bl
	cut, bri bl ring





6900	MD: 10.674' TVD: 7.135.83' Inclination: 89.54° Azimuth: 180.47° VS: 3.487.2°	6900	MD: 10.770' TVD: 7.135.72' Inclination: 90.59° Azimuth: 179.93° VS: 3.583.2°	6900
TVD (ft)		TVD (ft)		TVD (ft)
CHK: lt-med gy-brn, blk-y-sb ply, sft-frn, sb rd-sb ang, mod fri, tr MRLST: med-dk gy-brn, blk-y-sb ply, sft-frn, sb rd-sb ang, mod fri, sting bl cut, bri bl ring				
7500		7500		7500





MD: 10,865'
TVD: 7,134.9'
Inclination: 90.4°
Azimuth: 180.41°
VS: 3.678.1E'

MD: 10,960'
TVD: 7,133.52'
Inclination: 91.26°
Azimuth: 179.97°
VS: 3.773.1E'

CHK: lt-med gy-brn, blk-y-sb
ply, sft-frn, sb rd-sb ang,
mod fri, tr MRLST: med-dk
gy-brn, blk-y-sb ply, sft-frn,
sb rd-sb ang, mod fri, abnt
calc incl, sting bl cut, bri bl
ring

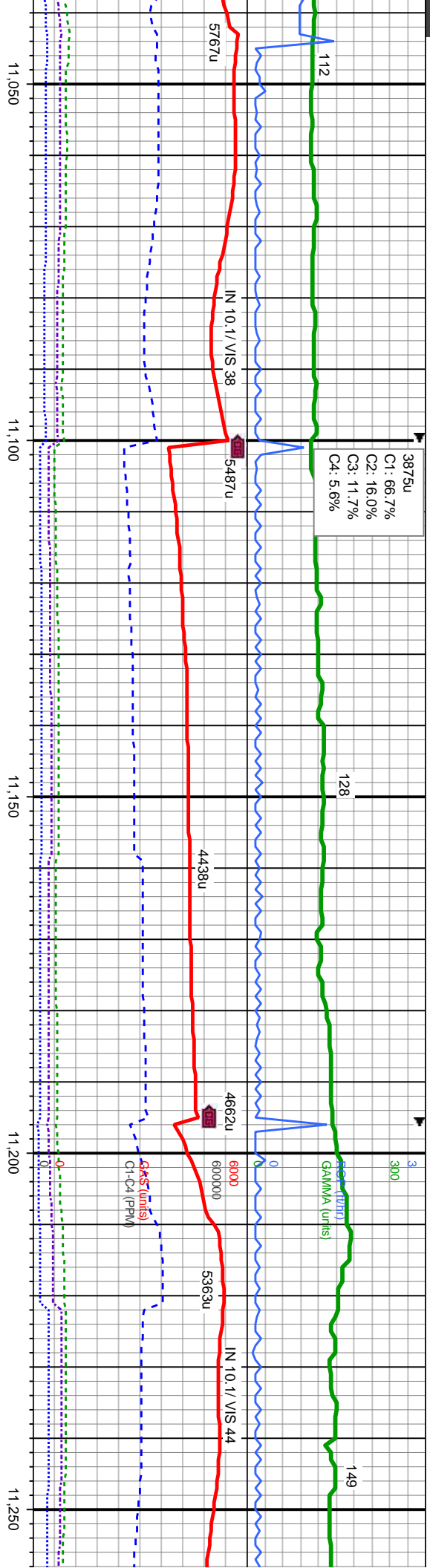
CHK: lt-med gy-brn, blk-y-sb
ply, sft-frn, sb rd-sb ang,
mod fri, tr MRLST: med-dk
gy-brn, blk-y-sb ply, sft-frn,
sb rd-sb ang, mod fri, occ
calc incl, sting bl cut, bri bl
ring

TVD (ft)

6900

7500





MD: 11,055'
TVD: 7,132.35'
Inclination: 90.18°
Azimuth: 180.59°
VS: 3,868.17'

MD: 11,150'
TVD: 7,131.86'
Inclination: 90.37°
Azimuth: 180.18°
VS: 3,963.16'

MD: 11,245'
TVD: 7,130.6'
Inclination: 91.17°
Azimuth: 179.71°
VS: 4,058.16'

CHK: lt-med gy-brn,
biky-sb pily, sft-frn, sb
rd-sb ang, mod fri,
MRLST: med-dk gy-brn,
biky-sb pily, sft-frn, sb
rd-sb ang, mod fri, occ
calc incl, rr fos frag, stmg
bl cut, bri bl ring

CHK: lt-med gy-brn, biky-sb
pily, sft-frn, sb rd-sb ang,
mod fri, rr MRLST: med-dk
gy-brn, biky-sb pily, sft-frn,
sb rd-sb ang, mod fri, occ
calc incl, occ fos frag, stmg
bl cut, bri bl ring

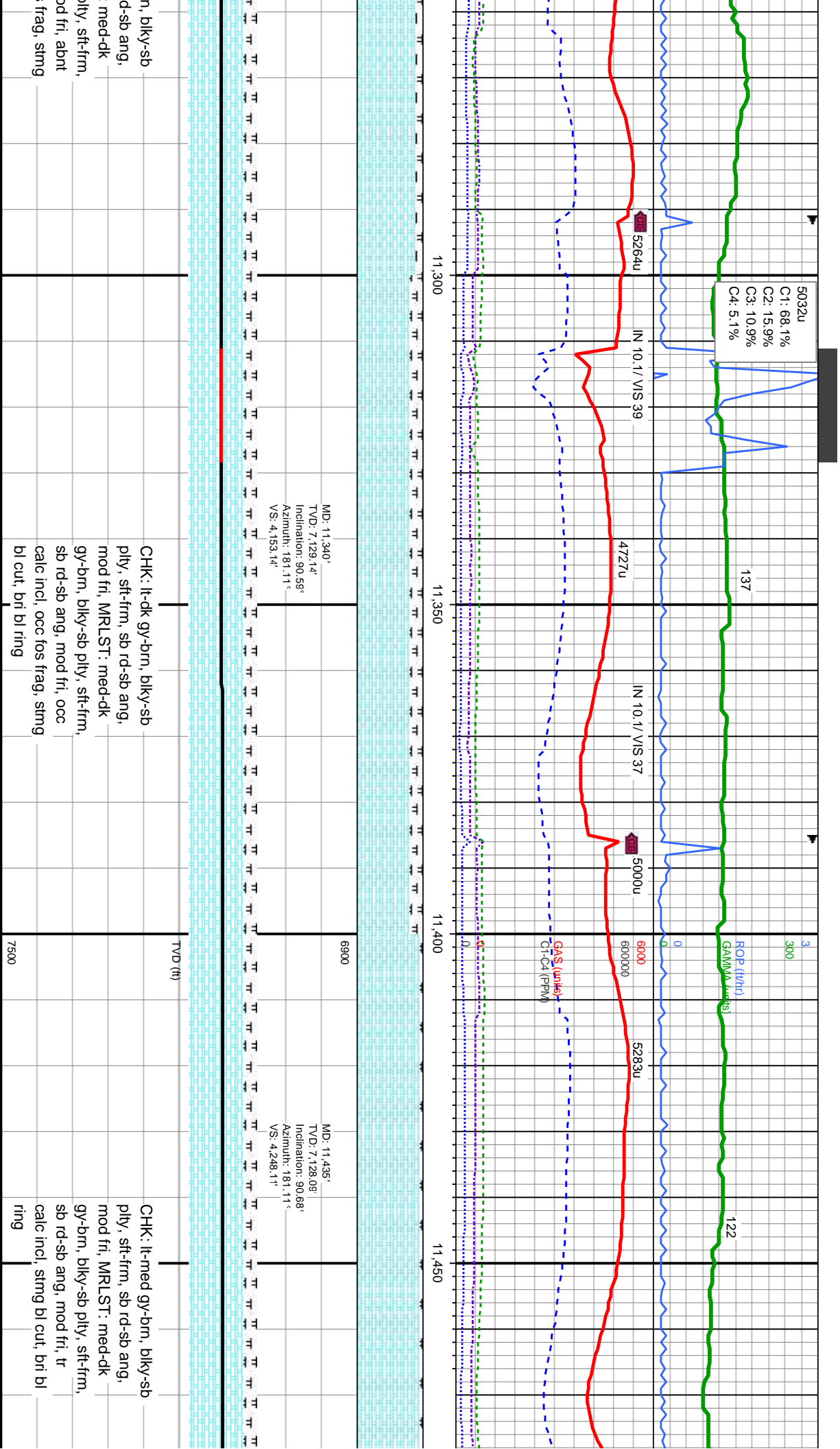
CHK: lt-dk gy-br
pily, sft-frn, sb r
mod fri, MRLST
gy-brn, biky-sb p
sb rd-sb ang, m
calc incl, occ fos
bl cut, bri bl ring

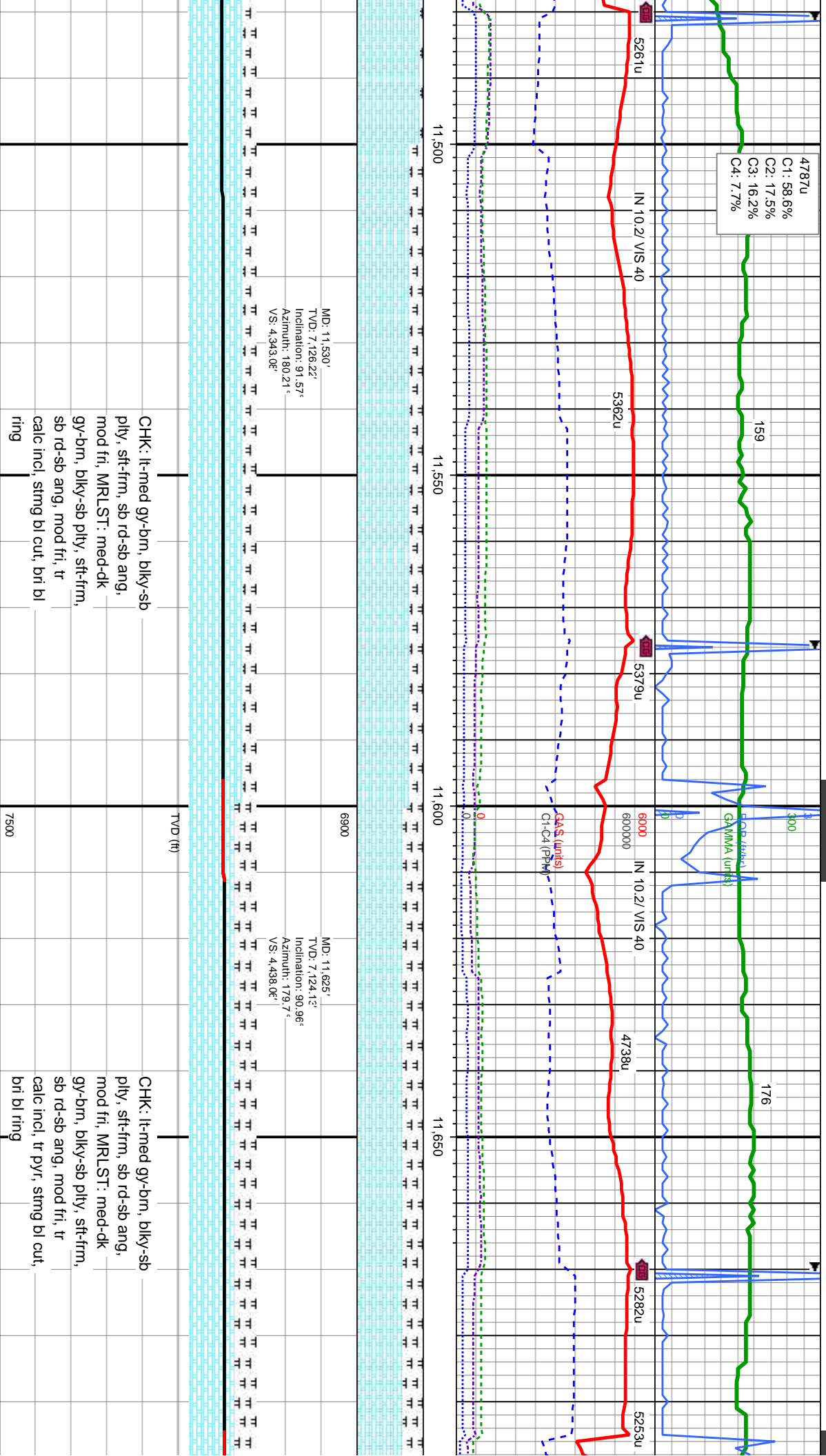
TVD (ft)

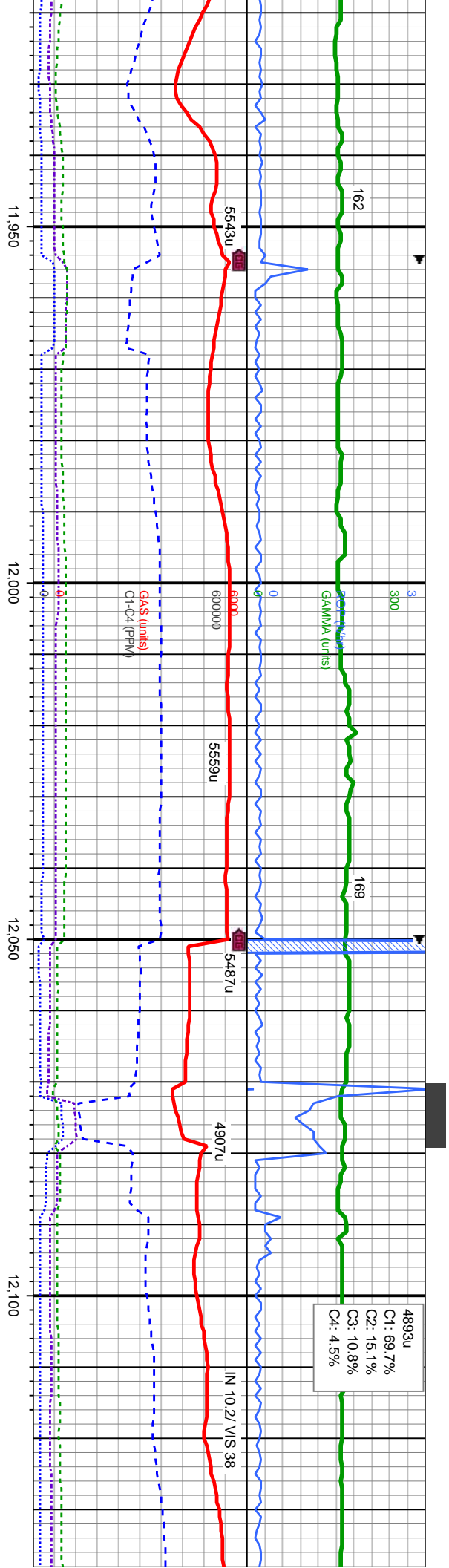
7500

6900









MD: 12,006'
TVD: 7,126.15'
Inclination: 90.74°
Azimuth: 178.58°
VS: 4.818.9c

MD: 12,101'
TVD: 7,124.97'
Inclination: 90.68°
Azimuth: 178.54°
VS: 4.913.9c

CHK: med-dk gy-brn,
biky-sb pily, sft-frm, sb
rd-sb ang, mod fri, MRLST:
med-dk gy-brn, biky-sb pily,
sft-frm, sb rd-sb ang, mod
fri, occ calc incl, string bl
cut, bri bl ring

CHK: med-dk gy-brn,
biky-sb pily, sft-frm, sb
rd-sb ang, mod fri, MRLST:
med-dk gy-brn, biky-sb pily,
sft-frm, sb rd-sb ang, mod
fri, tr calc incl, string bl cut,
bri bl ring



