

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name Big Sandy 3-65 36-31 1DH

Location SEC 35 T3S-R65W

State COLORADO

County ADAMS

Country USA

Rig Number Nabors B16

API Number 05-001-10102

AFE # WAY.CDR.7014

Geographic Region DJ BASIN

Field WILDCAT

Spud Date 2/26/2018

Drilling Completed 4/5/2018

Surface Coordinates 2655' FSL & 465' FEL SEC 35 T3S-R65W

SL Lat:

39° 44' 47.68" N (NAD 83)

SL Long:

104° 37' 24.57" W (NAD 83)

Bottom Hole Coordinates Proposed BHL: 2192' FNL & 2451' FWL SEC 31 T3S-R64W

Ground Elevation 5524'

K.B. Elevation 5549'

Logged Interval 6000 To 15399

Total Depth 15399'

Formation Niobrara C Chalk

Type of Drilling Fluid OBM

Operator

Company Conoco Phillips

Address 600 N. Dairy Ashford Rd.
Houston, TX 77079-1175



Geologist

Name Dave Aldridge

Company Conoco Phillips Central Rockies Implement

Address Dave.E.Aldridge@conocophillips.com

Office:(832)486-3983

600 N Dairy Ashford EC3 14-W134

Houston, TX 77079



Other

Columbine Logging Inc. Mud Logging Company

Geologists/Geosteers on Location: Todd Thiesse, Haynes Burnside

Gas Detection: Bloodhound chromatograph gas unit #311

DD/MWD: Baker Hughes

Columbine Computer 87A

- Fossil**
- ALGAE
 - AMPHI
 - BELER
 - BIOCL
 - BRACH
 - BRYOZ
 - CEPHA
 - CORAL
 - CRINO
 - ECHIN
 - FISH
 - FORAM
 - F FOSSIL

Color Coding

- Oil
- Note
- Error
- Condensate
- Core
- Water
- Gas
- Pressure
- Seal

Rock Types

- UNKNOWN
- ANHYDRITE
- BENTONITE
- BRECCIA
- CHALK
- CEMENT
- CHERT
- CLAY CHOKE SANC
- CLAYSTONE
- COAL
- CONGLOMERATE
- DOLOMITE
- DOLOMITIC LIMESTONE
- GRANITE
- GYP SUM
- IGNEOUS
- SIDERITE or LIMONITE
- LIMESTONE
- MARLSTONE
- METAMORPHIC
- NO SAMPLE
- SALT
- SANDSTONE
- SALT-PEPPER SANC
- SHALE
- SHALE COLORED
- SHALE GRAY
- SHALY SANDSTONE
- SHALY SILTSTONE
- SILT SHALE
- SILTSTONE
- TILL
- TUFF
- WELDED TUFF

Poros

- EARTH
- FENES
- FRACT
- INTERC
- INTER
- MOLDID
- ORGAN

Oil Sh

- DEAD
- EVEN
- QUEST
- SPOTT

Accessories

S	GASTROPOD	ARGILLITE GRAIN	HEAVY MINERAL	Stringer
	INOCERAMUS	B BENTONITE	K KAOLIN	
	O OOLITE	B BITUMENOUS SUBSTANCE	M MARCASITE	ANHYDRITE STRINGER
	O OSTRACOD	BRECCIA FRAGMENTS	M MARLSTONE	BENTONITE STRINGER
	P PELECYPOD	C CALCAREOUS	M MICACEOUS	COAL STRINGER
	P PELLET	C CARBONACEOUS FLAKES	M MINERAL CRYSTALS	DOLOMITE STRINGER
	P PISOLITE	CHTDK	N NODULES	GYPSUM STRINGER
	P PLANT REMAINS	CHTL	P PHOSPHATE PELLETS	LIMESTONE STRINGER
	P PLANT SPORES	C COAL - THIN BEDS	P PYRITE	MARLSTONE (CALC) STRG
	S SCAPHOPOD	D DOLOMITIC	S SALT CAST	MARLSTONE (DOL) STRG
	S STROMATOPOROID	F FELDSPAR	S SANDY	SANDSTONE STRINGER
		F FERRUGINOUS PELLET	S SIDERITE	SHALE STRINGER
Minerals		F FERRUGINOUS	S SILICEOUS	SILTSTONE STRINGER
	A ANHYDRITIC	G GLAUCOSITE	S SILTY	
	A ARGILLACEOUS	G GYPSIFEROUS	T TUFFACEOUS	

Other Symbols

P PINPOINT	DST INTERVAL	WIRELINE TESTED - LEFT	E EARTHY
V VUGGY	FAULT	WIRELINE TESTED - RT	F FINELYXLN
	FORMATION TOP	DRILL STEM TEST	GS GRAINSTONE
Engineering	GAS SHOW	MN DEPTH	L LITHOGRAPHIC
	OIL SHOW		M MICROXLN
IONABLE	BIT		
ED STAINING	CONNECTION (UP)	MN DEPTH UP	M MUDSTONE
ity	CONNECTION (DOWN)	MN DEPTH (DOWN)	P PACKSTONE
	CONNECTION GAS	R ROUNDED	W WACKESTONE
Y	CONNECTION GAS (LEFT)	O OVERTURNED STRATA	
TRIAL	TRIP GAS	R REVERSE FAULT	
IRE	TRIP GAS (LEFT)	C CASING	M MODERATE
CRYSTALLINE	DOWN TIME GAS	S SIDEWALL CORE (LEFT)	P POOR
OUTLIC	DOWN TIME GAS (LEFT)	S SIDEWALL CORE (RIGHT)	W WELL
IC	CORE - LOST	S SLIDE	
	CORE - RECOVERED	S SURVEY	
		CX CRYPTOXLN	
		Textures	

COLUMBINE LOGGING

ROP
ROP
GAMMA

Columbine Logging Inc. Rigged Up 2 man logging 4/1/2018 Chromatograph Gas Unit #0311, began logging from 6000' MD at 2:15 PM, MDT on 4/2/18.

Gamma Data and Survey Data Provided by Baker Hughes

Total Gas & Chromatograph

GAS
C1
C2
C3
C4

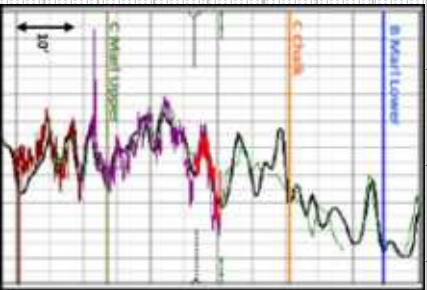
Gas Data From Bloodhound Unit #0311, data imported via Rig Watch and Gaschart

Depth Labels

% Lith

Well Bore
TVD

Target Formation/Member:
Niobrara C Chalk



Bit Data
Bit #: 2

Type: HCC AT505F

Size: 8.5

Depth In: 2090'

Depth Out: 15399'

Jets: 5X14's

S/N:

138

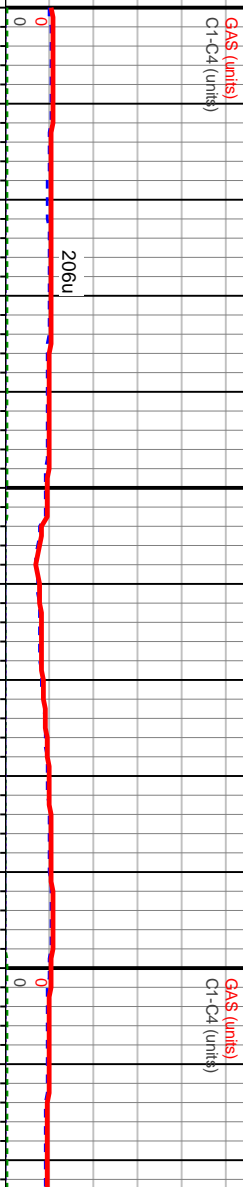
ROP (ft/hr)
GAMMA (units)



ROP: 288 ft/hr
RPM: 101
SP: 3533
STRK 1: 103 SPM
STRK 2: 103 SPM
WOB: 7 klbs

209u
C1: 95.3%
C2: 3%
C3: 1.7%
C4: 0%

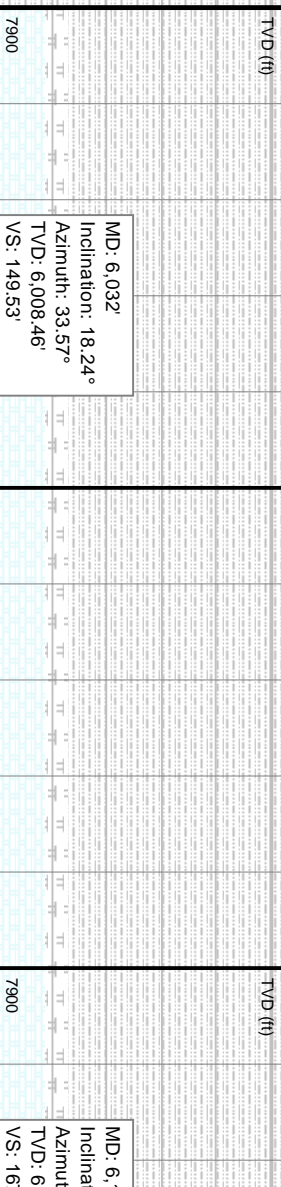
GAS (units)
C1-C4 (units)



SLTY SH: gy-dk gy, occ lt gy, v sft - sft, sb
ply-pty, silty to rthy tex, tr grd to sft in pt, sl
calc with some tr SLTST: med gy- gy, sl frm, sb
biky- occ sb ply, rthy-silty tex, sl calc.

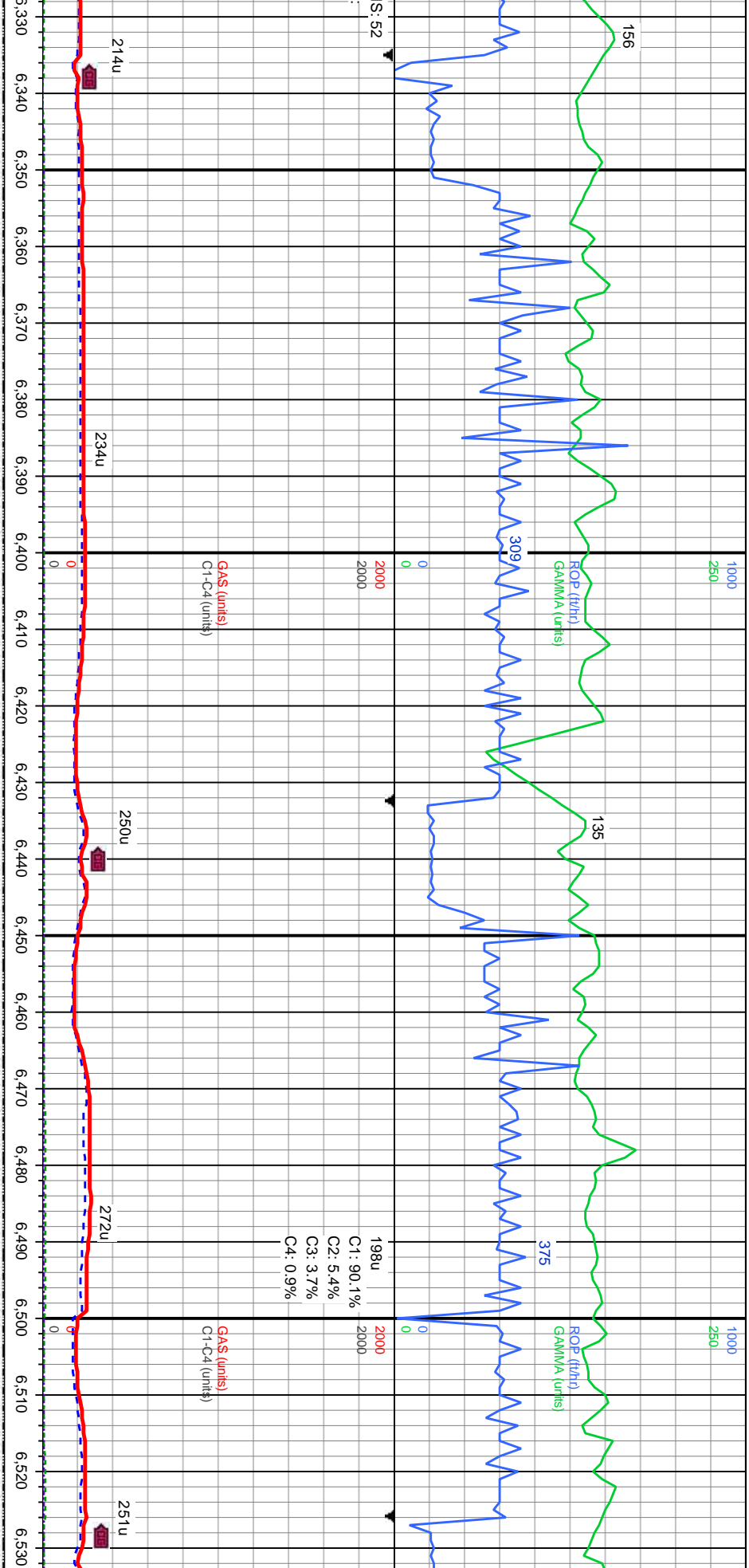
SLTY SH: lt gy-gy, occ dk gy, v sft-sft, sb
ply-pty, silty in pt, rthy tex, occ wxy istr,
sl-non calc.

SLTY SH: lt gy-gy, occ
silty in pt, rthy tex, occ



MD: 6.032'
Inclination: 18.24°
Azimuth: 33.57°
TVD: 6.008.46'
VS: 149.53'

MD: 6.1
Inclination: 18.24°
Azimuth: 33.57°
TVD: 6.008.46'
VS: 149.53'



gy, sb plty-plty, v
x, occ wxy lstr,

SLTY SH: It-med gy, occ dk gy, sb plty-plty, v
sft-sft, occ slty in pt, rthy tex, occ wxy lstr,
sl-non calc. w tr Bent

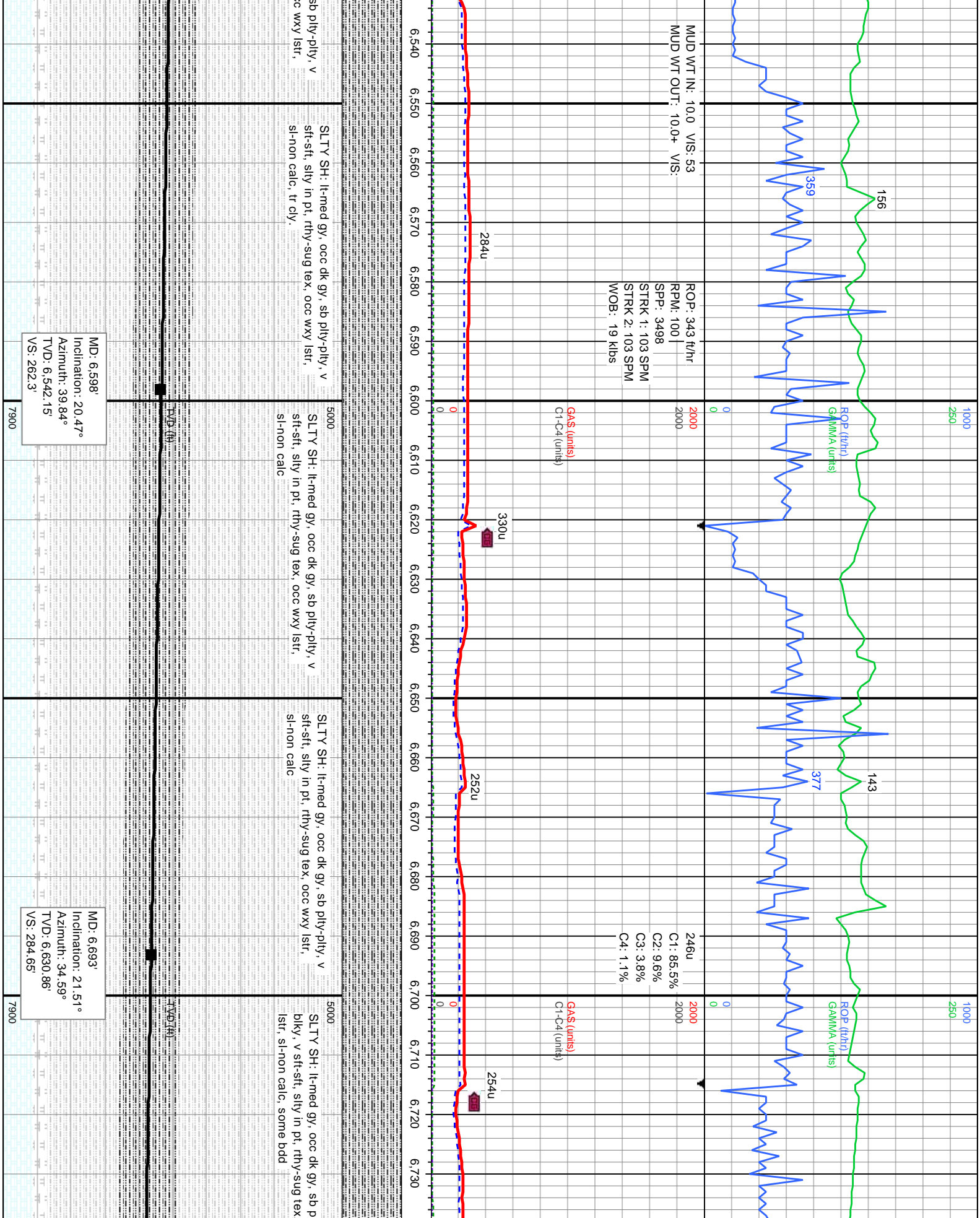
SLTY SH: lt-med gy, occ dk gy, sb plty-plty, v
sft-sft, silty in pt, rthy tex, occ wxy lstr, sl-non
calc.

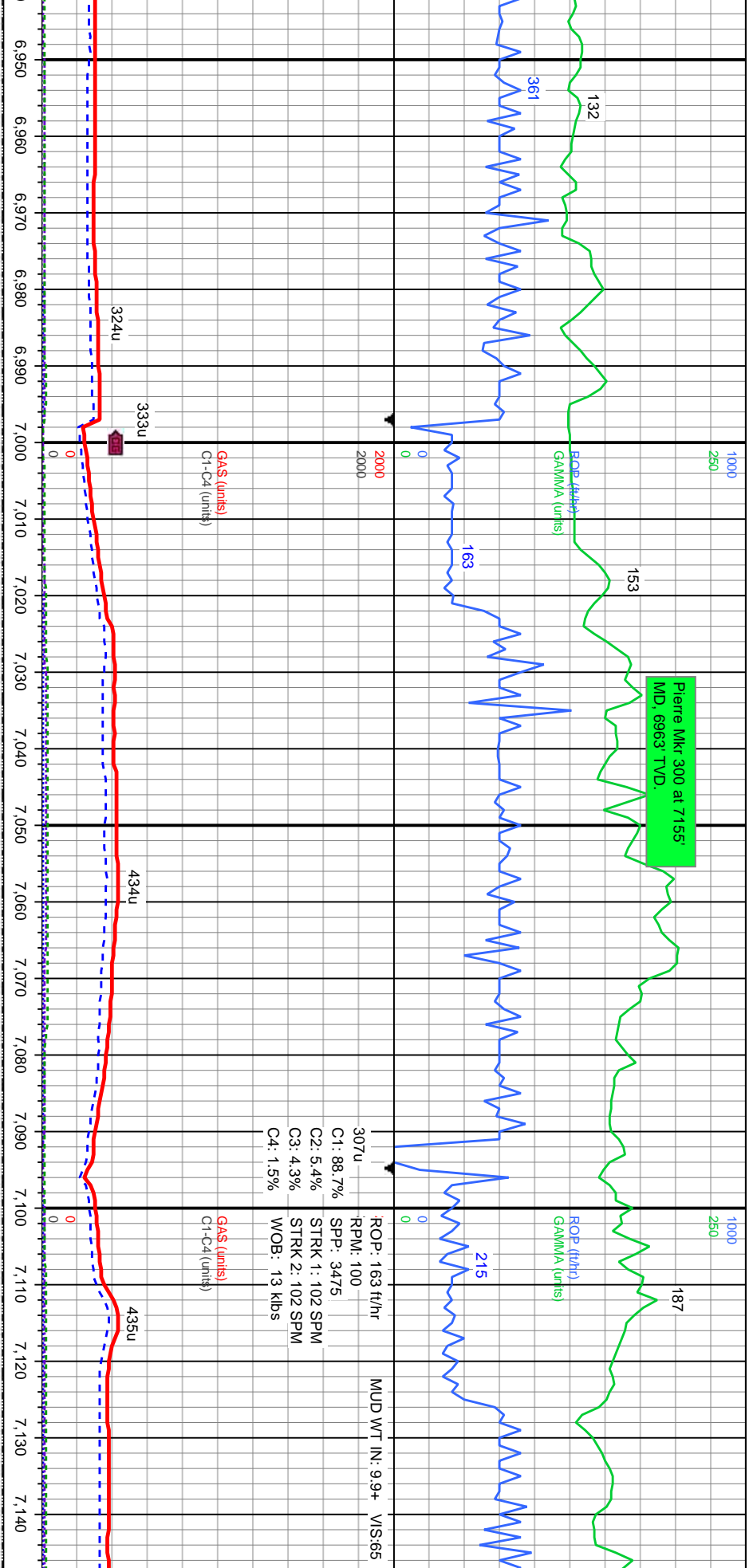
SLTY SH: It-med gy, occ dk gy, sb plty-plty, v sft-sft, slty in pt, rthy tex, occ wxy lstr, sl-non calc.

SLTY SH: lt-med gy, occ dk gy, s;
sft-sft, silty in pt, rthy-sug tex, oo
sl-non calc, tr cly.

MD: 6,410'
Inclination: 17.83°
Azimuth: 40.68°
TVD: 6,364.61'
VS: 216.47'

MD: 6,503'
Inclination: 19.25°
Azimuth: 47.73°
TVD: 6,452.79'
VS: 238.51'





SLTY SH: lt-med gy, sb pily-sb blk, v sft-sft, silty in pt, rthy-sug tex, occ wxy lstr, sl-non calc, some bdd

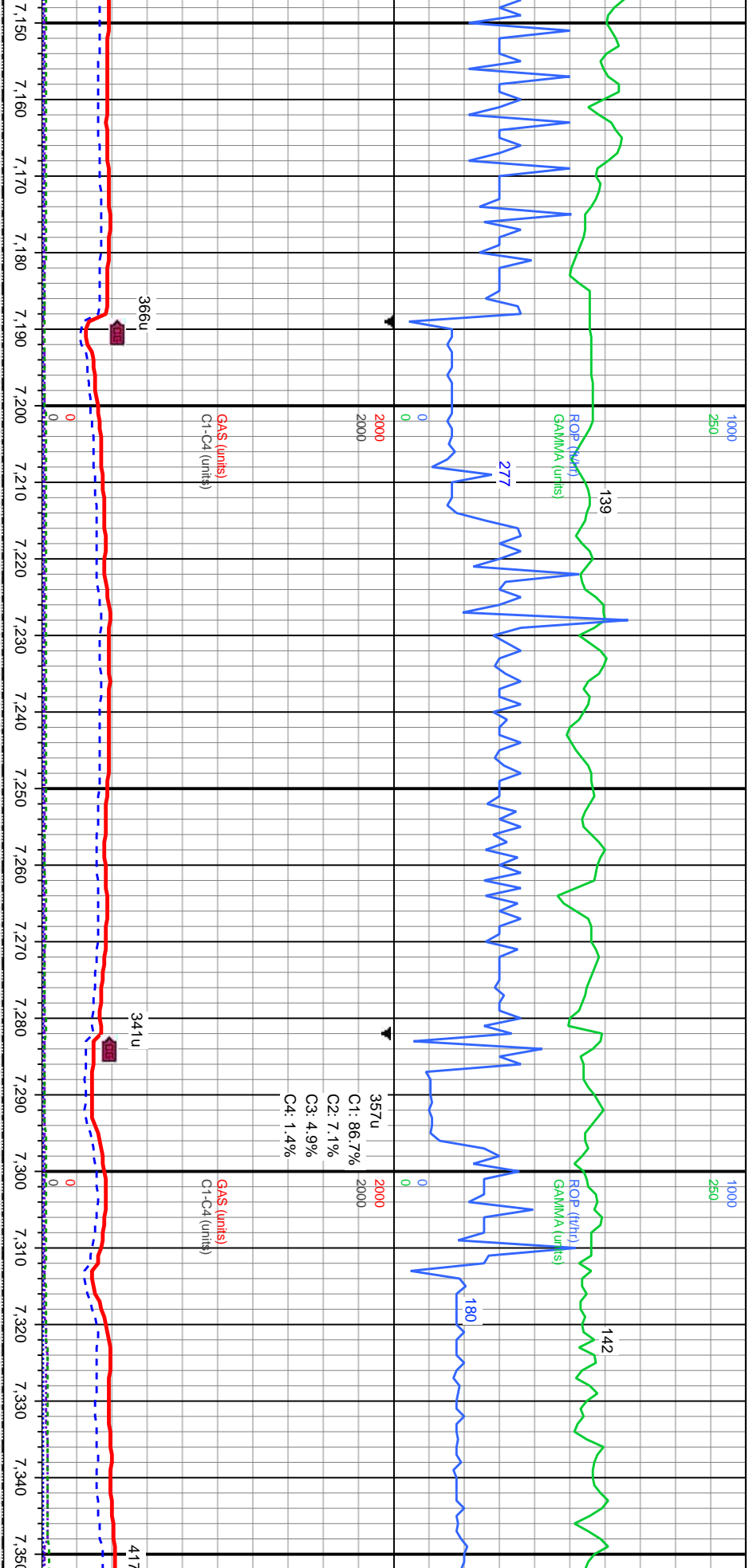
SLTY SH: lt-med gy, sb pily-sb blk, v sft-sft, silty in pt, rthy-sug tex, occ wxy lstr, sl-non calc, some bdd, tr bent

SLTY SH: lt-med gy, sb pily-sb blk, v sft-sft, silty in pt, rthy-sug tex, occ wxy lstr, sl-non calc, some bdd, tr bent

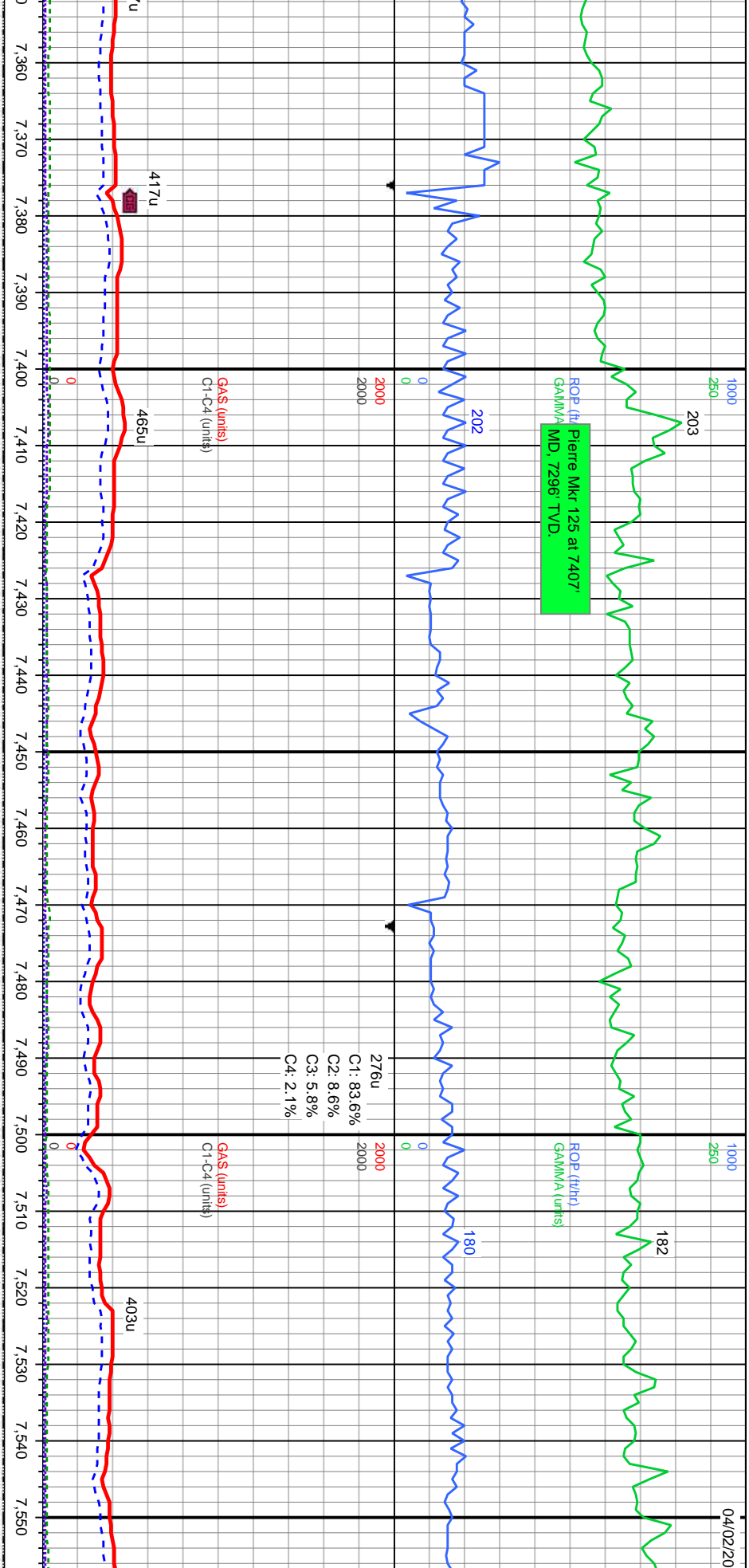
SLTY SH: lt-med gy, sb pily-sb blk, v sft-sft, silty in pt, rthy-sug tex, occ wxy lstr, sl-non calc, some bdd, tr bent

MD: 6,977'
Inclination: 20.5°
Azimuth: 26.86°
TVD: 6,895.56'
VS: 344.46'

MD: 7,071'
Inclination: 20.53°
Azimuth: 26.28°
TVD: 6,983.6'
VS: 361.2'



SLTY SH: lt-med gy, sb pily-sb blkly, v sft-sft, silty in pt, rthy-sug tex, occ wxy lstr, sl-non calc, some bdd, tr bent		5000	SLTY SH: lt-med gy, sb pily-pily, v sft-sft, silty in pt, rthy-sug tex, sl-non calc, fis,		5000	SLTY SH: lt-med gy, sb pily-pily, v sft-sft, silty in pt, rthy-sug tex, sl-non calc, fis,		5000	SLTY SH: lt-med gy, sb pily-pily, v sft-sft, silty in pt, rthy-sug tex, sl-non calc, fis,		5000
		TVD (ft)			TVD (ft)			TVD (ft)			TVD (ft)
		7900			7900			7900			7900



SLTY SH: lt-med gy, sb pily-pily, v sft-sft, stly
in pt, rthy-sug tex, sl-non calc, fis.

SLTY SH: lt-med gy, sb pily-pily, v sft-sft, stly
in pt, rthy-sug tex, non calc, fis,

SLTY SH: lt-med gy, sb pily-pily, v sft-sft, stly
in pt, rthy-sug tex, non calc, fis,

SLTY SH: lt-med gy, sb pily-pily, v sft-frm, stly
in pt, rthy-sug tex, sl-non calc, fis

SLTY SH: lt-med gy, sb pily-pily, v sft-frm, stly
in pt, rthy-sug tex, sl-non calc, fis

MD: 7,355'
Inclination: 21.68°
Azimuth: 30.46°
TVD: 7,249.52'
VS: 410.77'

MD: 7,450'
Inclination: 30.12°
Azimuth: 41.25°
TVD: 7,334.95'
VS: 437.67'

MD: 7,544'
Inclination: 38.03°
Azimuth: 56.97°
TVD: 7,412.9'
VS: 479.86'

MINDEPTH

Sharon Spgs. Mkr at
ROP th 7618' MD, 7467' TVD.
GAMMA (urits)

Niobrara at 7700' MD,
7521' TVD
ROP (ft/hr)
GAMMA (urits)

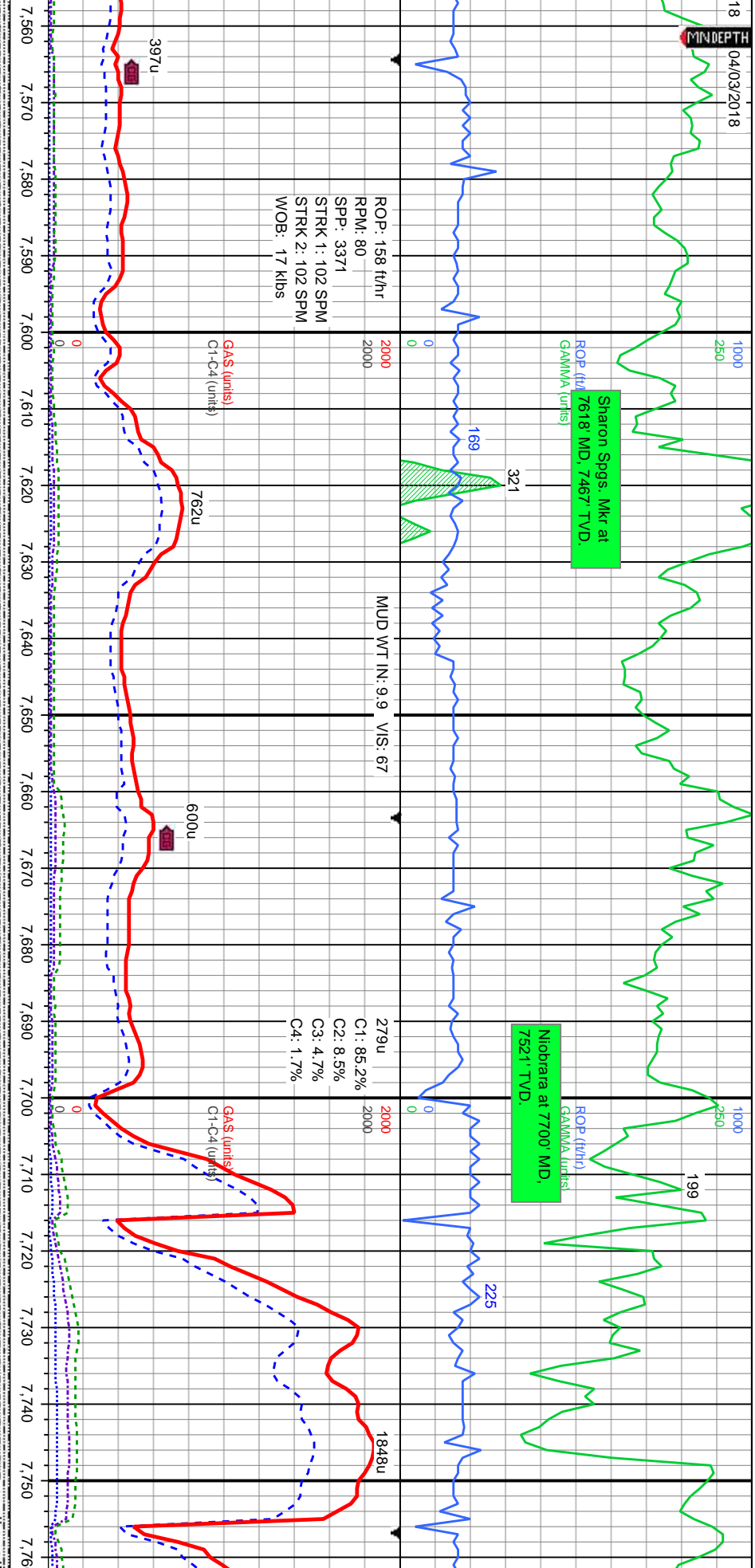
ROP: 158 ft/hr
RPM: 80
SPR: 3371
STRK 1: 102 SPM
STRK 2: 102 SPM
WOB: 17 klbs

MUD WT IN: 9.9 VIS: 67

279u
C1: 85.2%
C2: 8.5%
C3: 4.7%
C4: 1.7%

GAS (units)
C1-C4 (units)

GAS (units)
C1-C4 (units)



Y SH: lt-med gy, sb pily-sb blkly, v sft-sft,
in pt, rthy-sug tex, occ wxy lsir, si-non
; some bdd, Bent: lt gy-lt gn, silty, v sft.

SLTY SH: lt-med gy, sb pily-sb blkly, v
sft-sft, silty in pt, rthy-sug tex, occ wxy
lsir, si-non calc, some bdd, Bent: lt gy-lt
gn, silty, v sft.

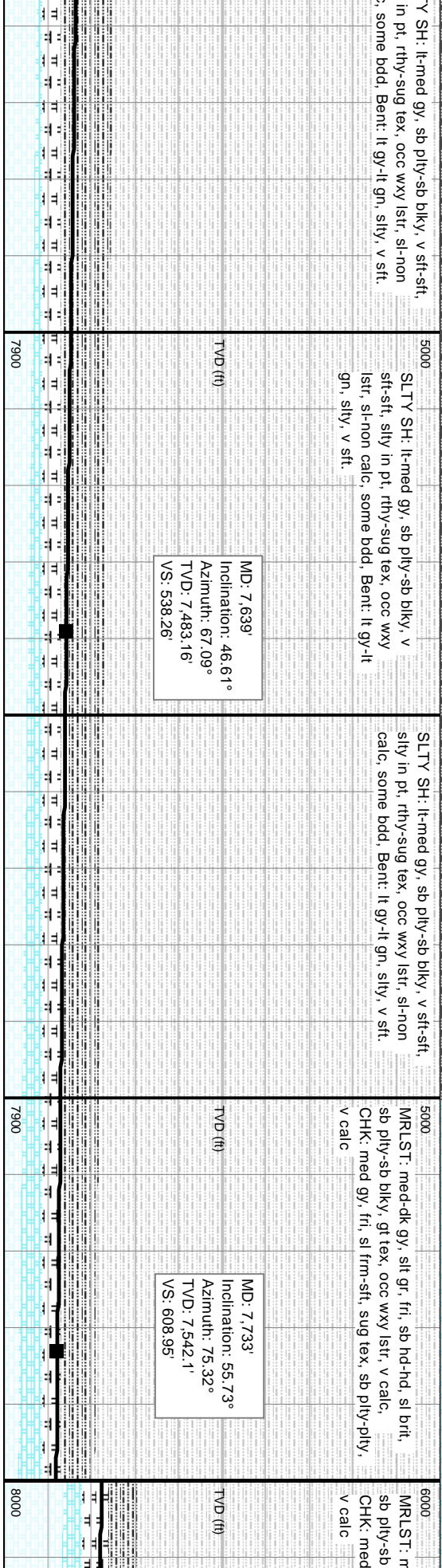
SLTY SH: lt-med gy, sb pily-sb blkly, v sft-sft,
silty in pt, rthy-sug tex, occ wxy lsir, si-non
calc, some bdd, Bent: lt gy-lt gn, silty, v sft.

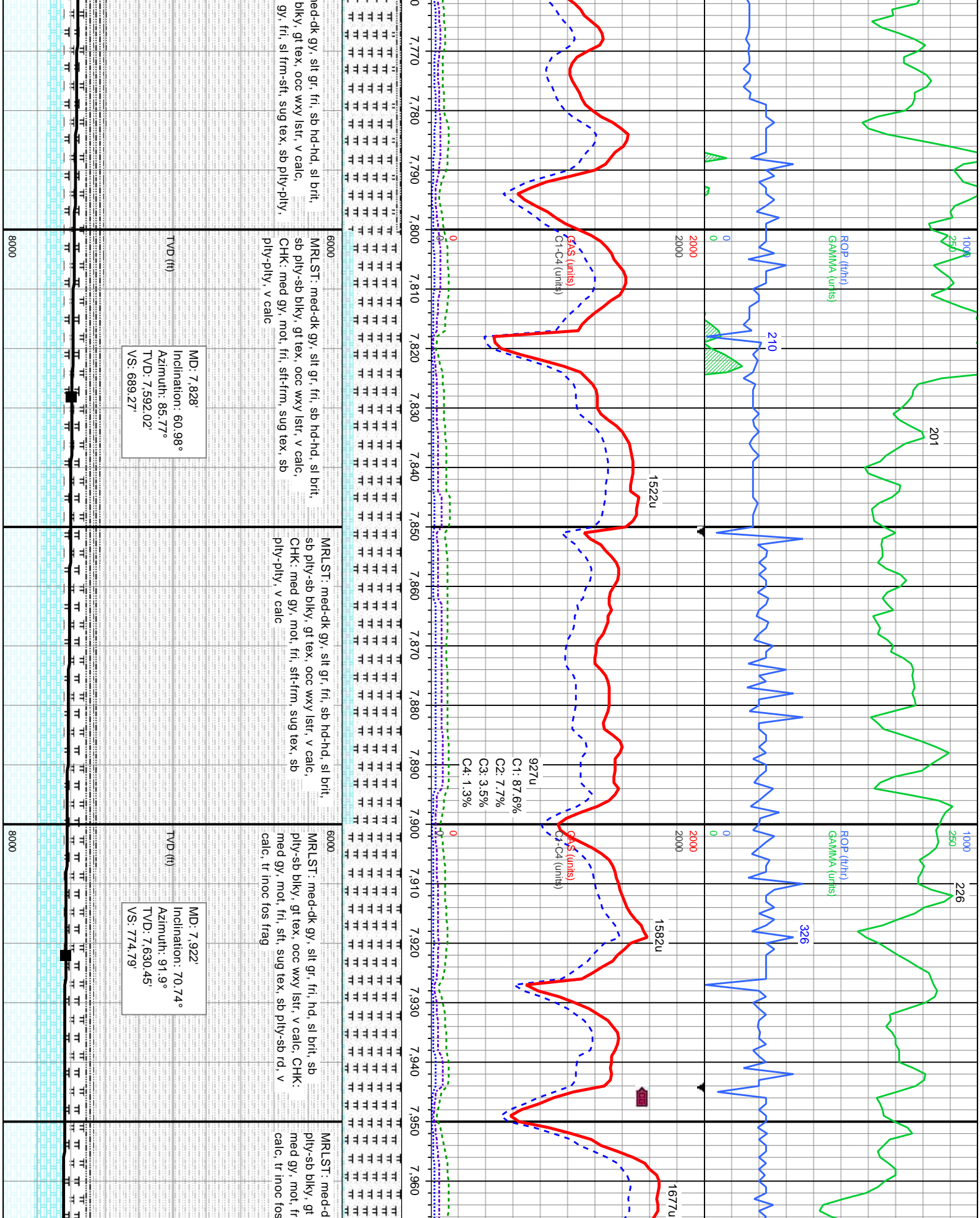
MRSLT: med-dk gy, slt gr, fri, sb nd-hd, sl brit,
sb pily-sb blkly, gt tex, occ wxy lsir, v calc,
CHK: med gy, fri, sl frm-sft, sug tex, sb pily-pily,
v calc

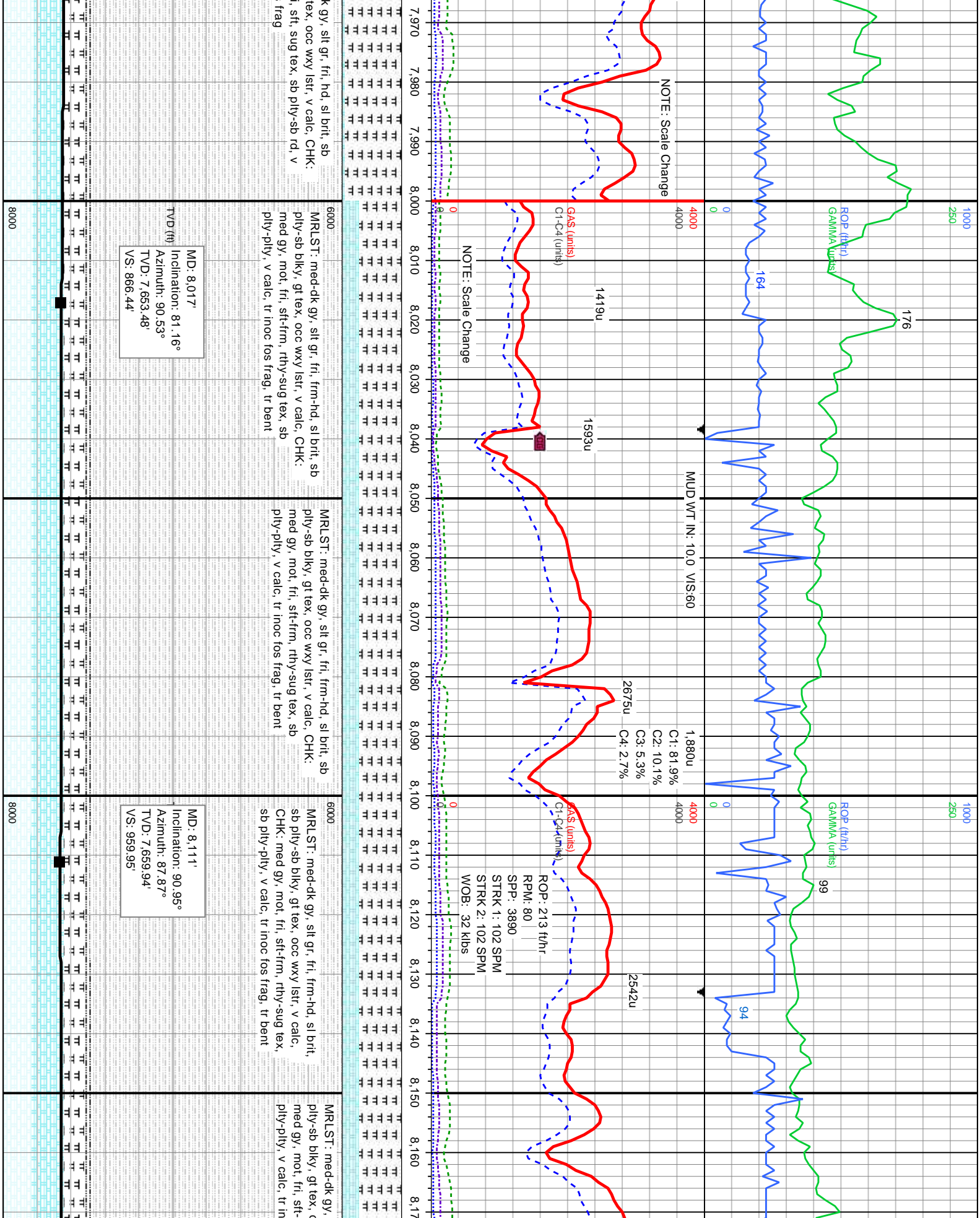
MRSLT: r
sb pily-sb
CHK: med
v calc

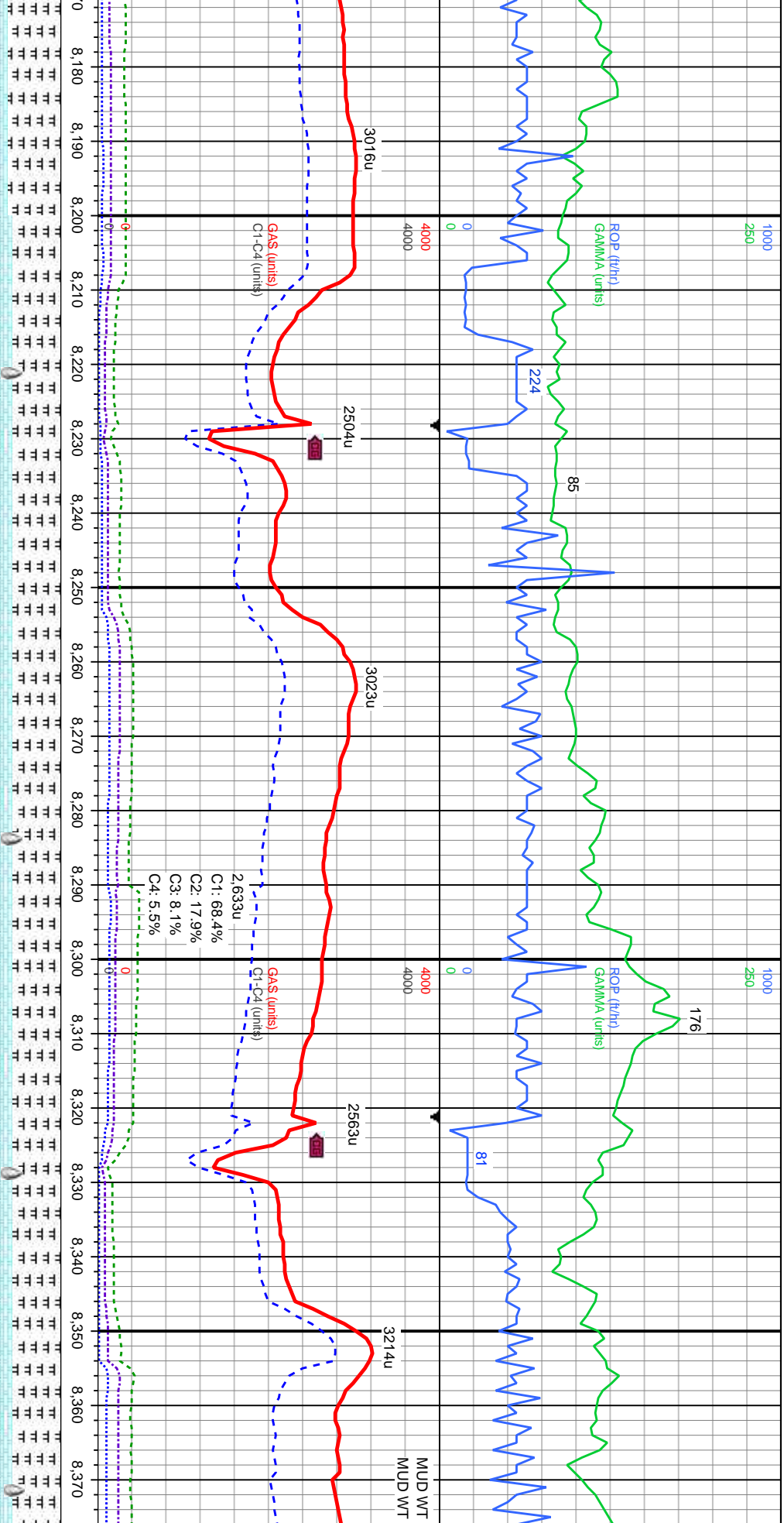
MD: 7,639'
Inclination: 46.61°
Azimuth: 67.09°
TVD: 7,483.16'
VS: 638.26'

MD: 7,733'
Inclination: 55.73°
Azimuth: 75.32°
TVD: 7,542.1'
VS: 608.95'









st gr, fri, frm-hd, sl brt, sb
occ wxy lstr, v calc, CHK:
frm, rthy-sug tex, sb
occ los frag, tr bent

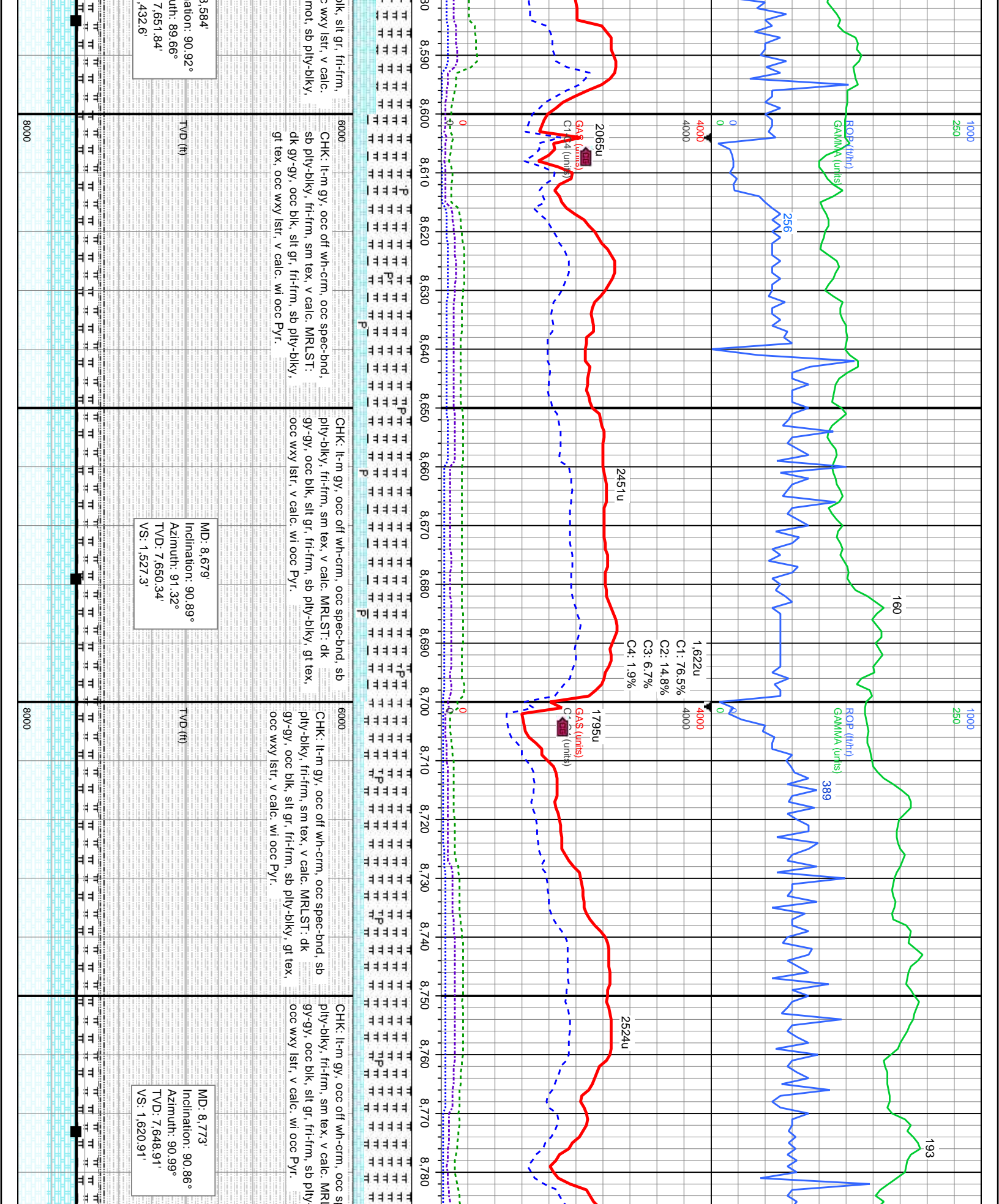
6000
MRLST: dk gy-gy, occ dk brn-blk, sit gr, fri-frm,
occ hd, sb pily-biky, gt tex, occ wxy lstr, v calc,
CHK: med-dk gy, occ crm-wh, mot, sb pily-biky,
fri-frm, sm tex, v calc. wi scat inoc foss.

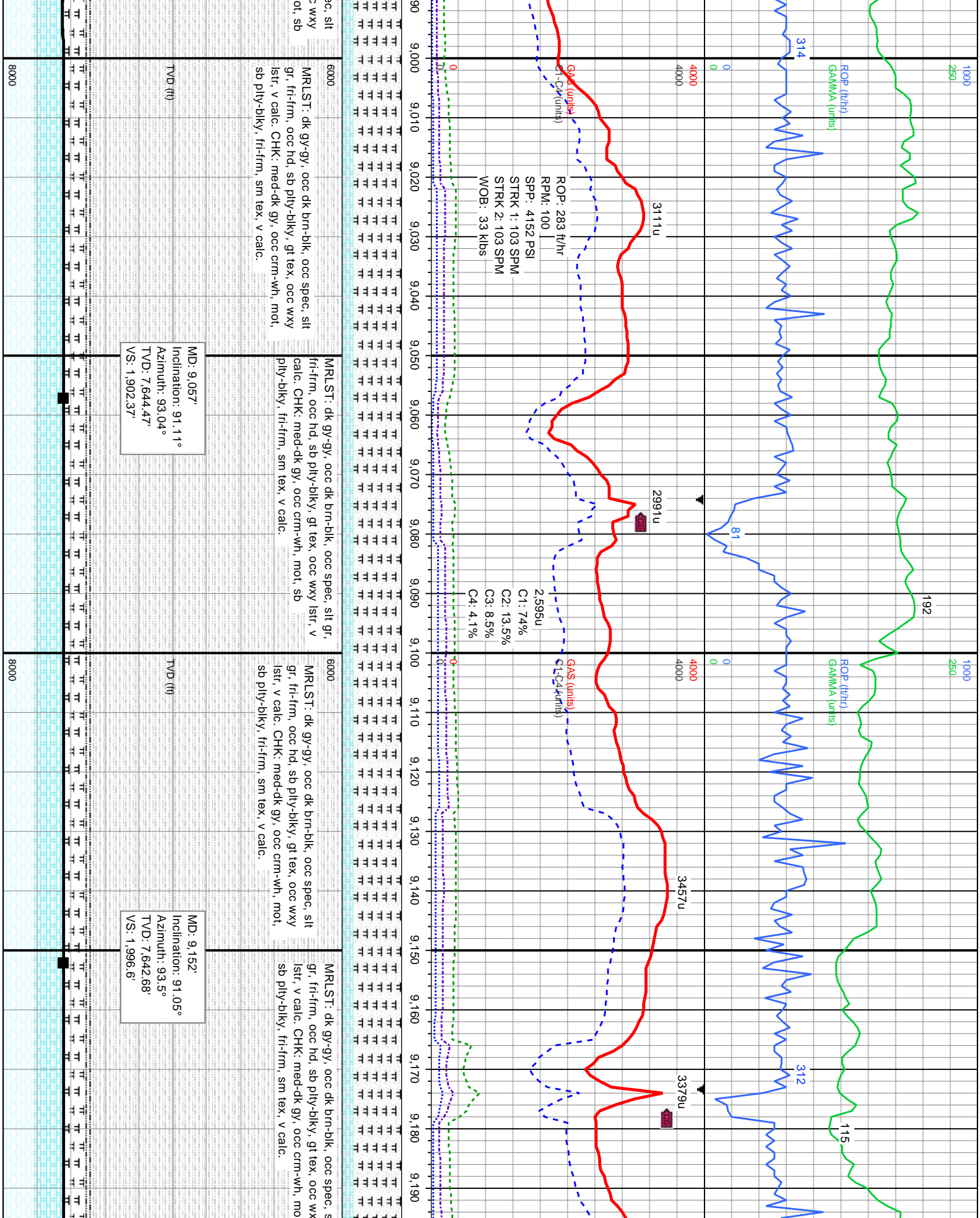
6000
MRLST: dk gy-gy, occ dk brn-blk, sit gr, fri-frm,
occ hd, sb pily-biky, gt tex, occ wxy lstr, v calc,
CHK: med-dk gy, occ crm-wh, mot, sb pily-biky,
fri-frm, sm tex, v calc. wi scat inoc foss.

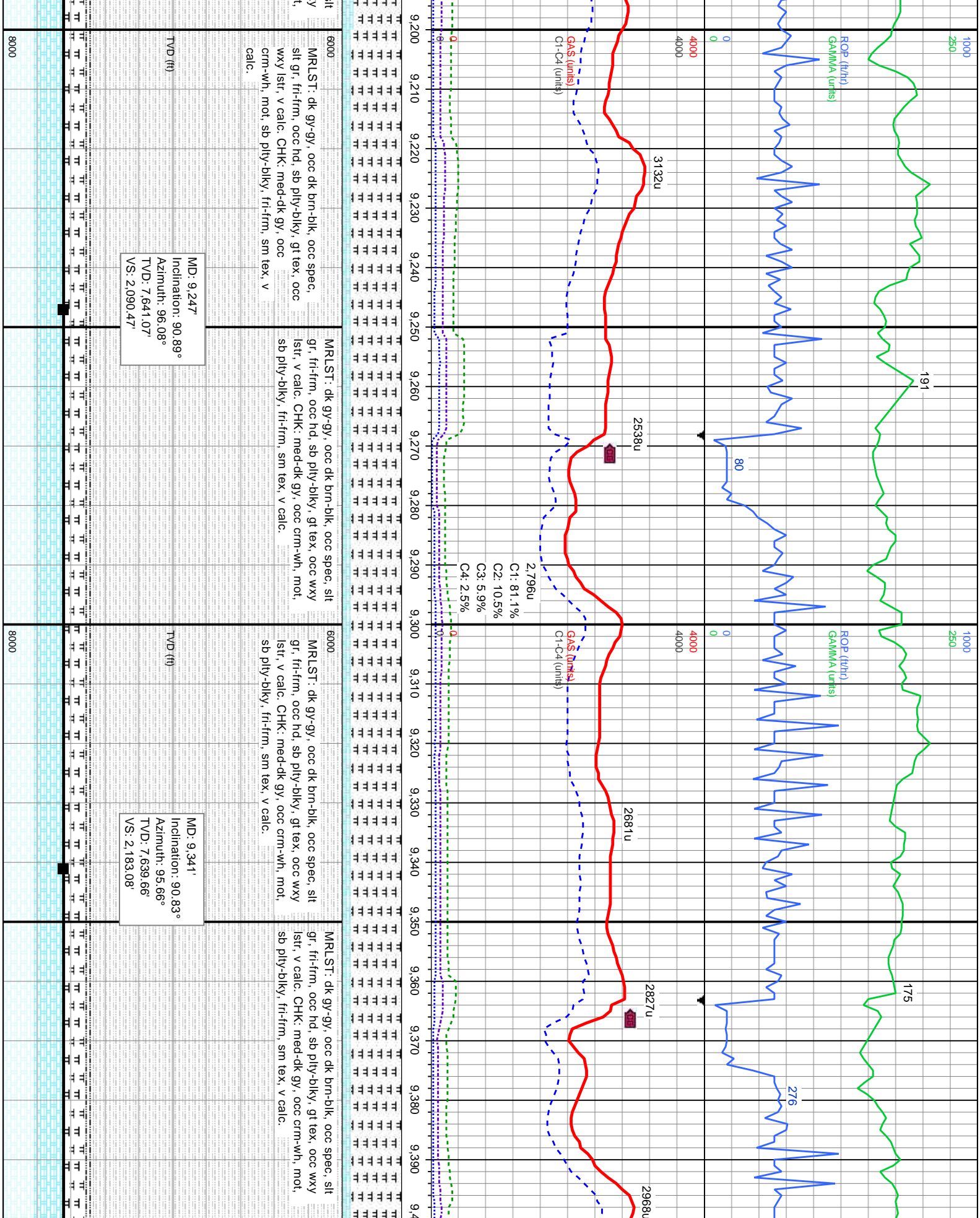
6000
MRLST: dk gy-gy, occ dk l
occ hd, sb pily-biky, gt tex
CHK: med-dk gy, occ crm-
fri-frm, sm tex, v calc. wi s

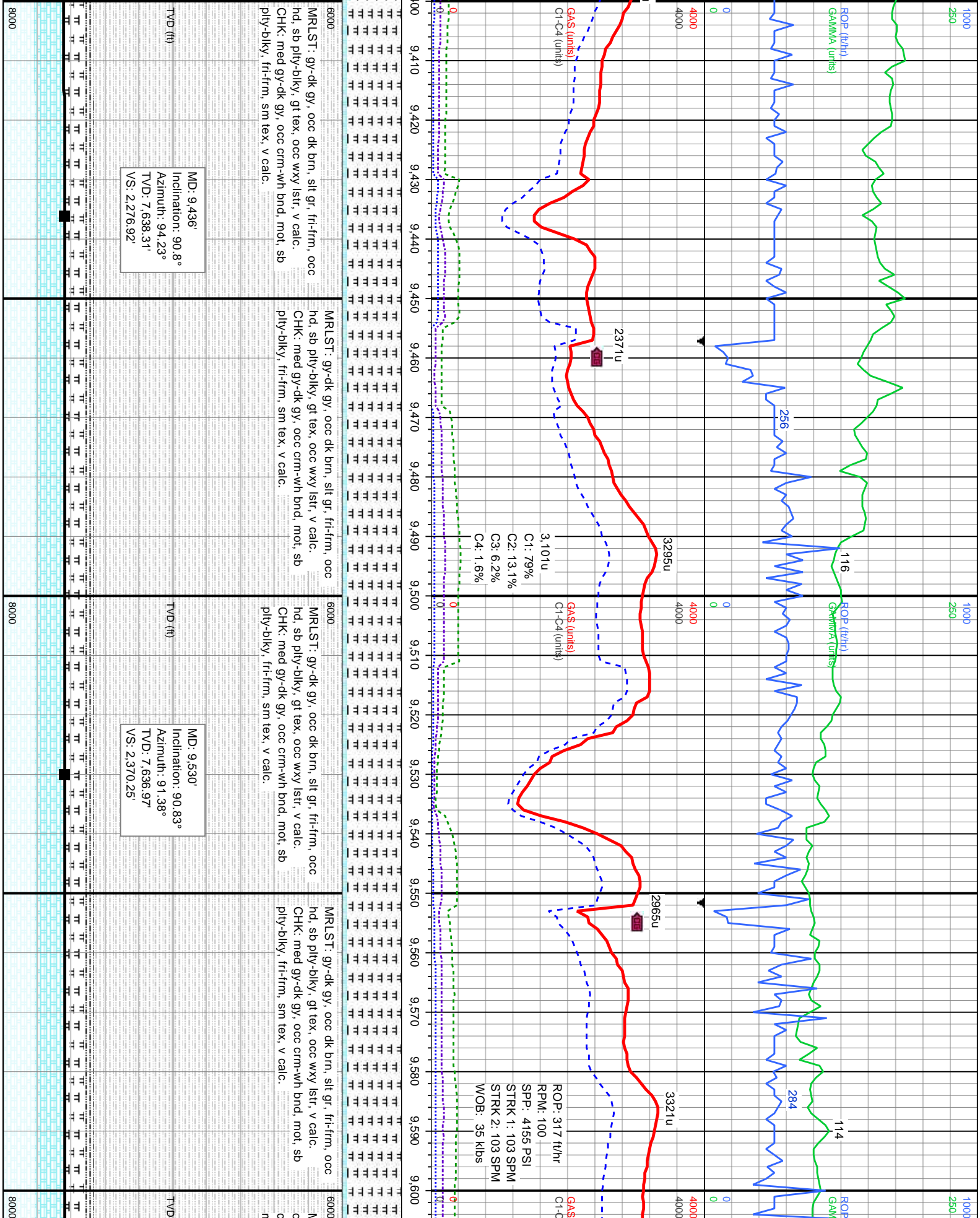
MD: 8,206'
Inclination: 91.02°
Azimuth: 87.27°
TVD: 7,658.31'
VS: 1,054.91'

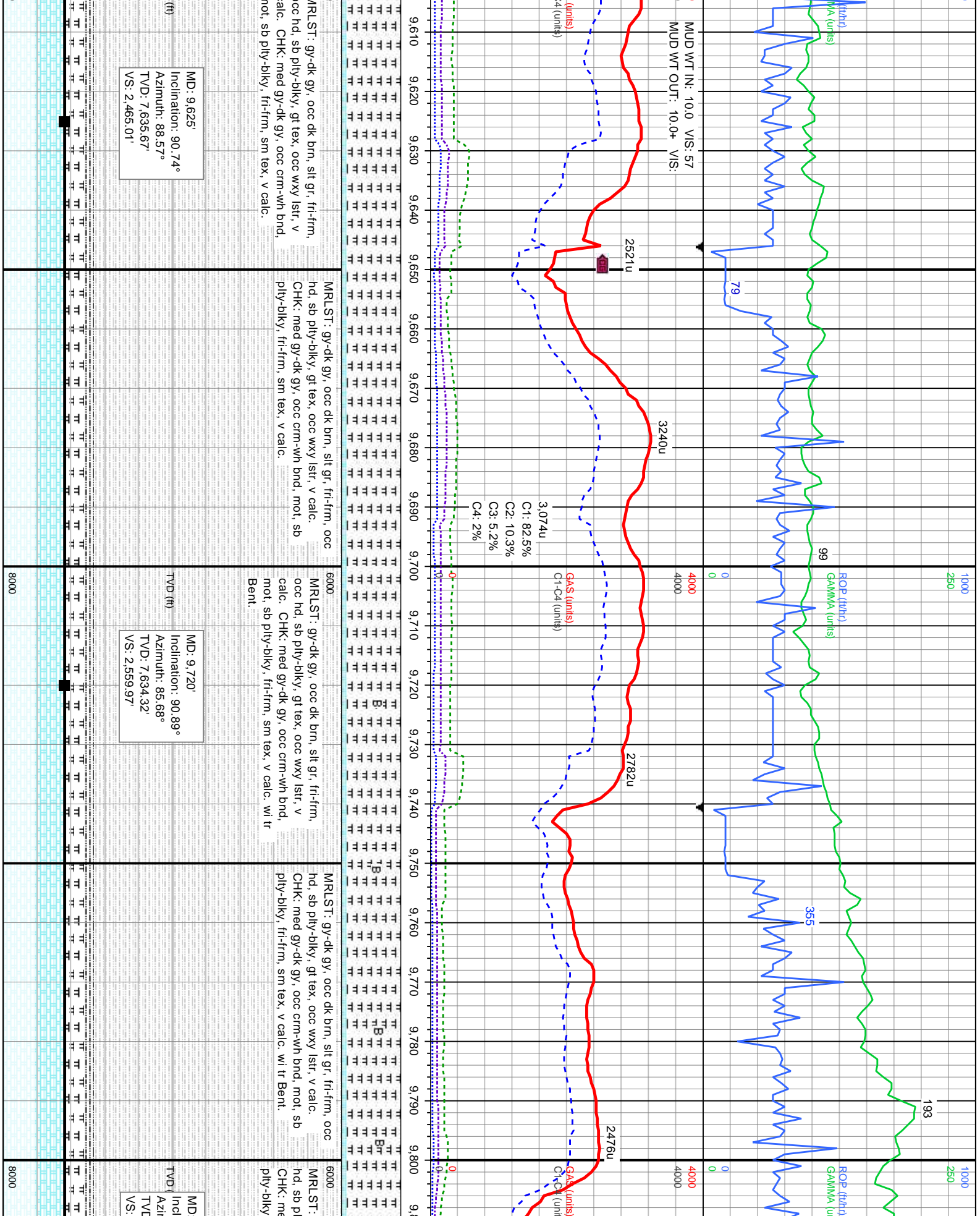
MD: 8,301'
Inclination: 91.08°
Azimuth: 87.14°
TVD: 7,656.57'
VS: 1,149.87'

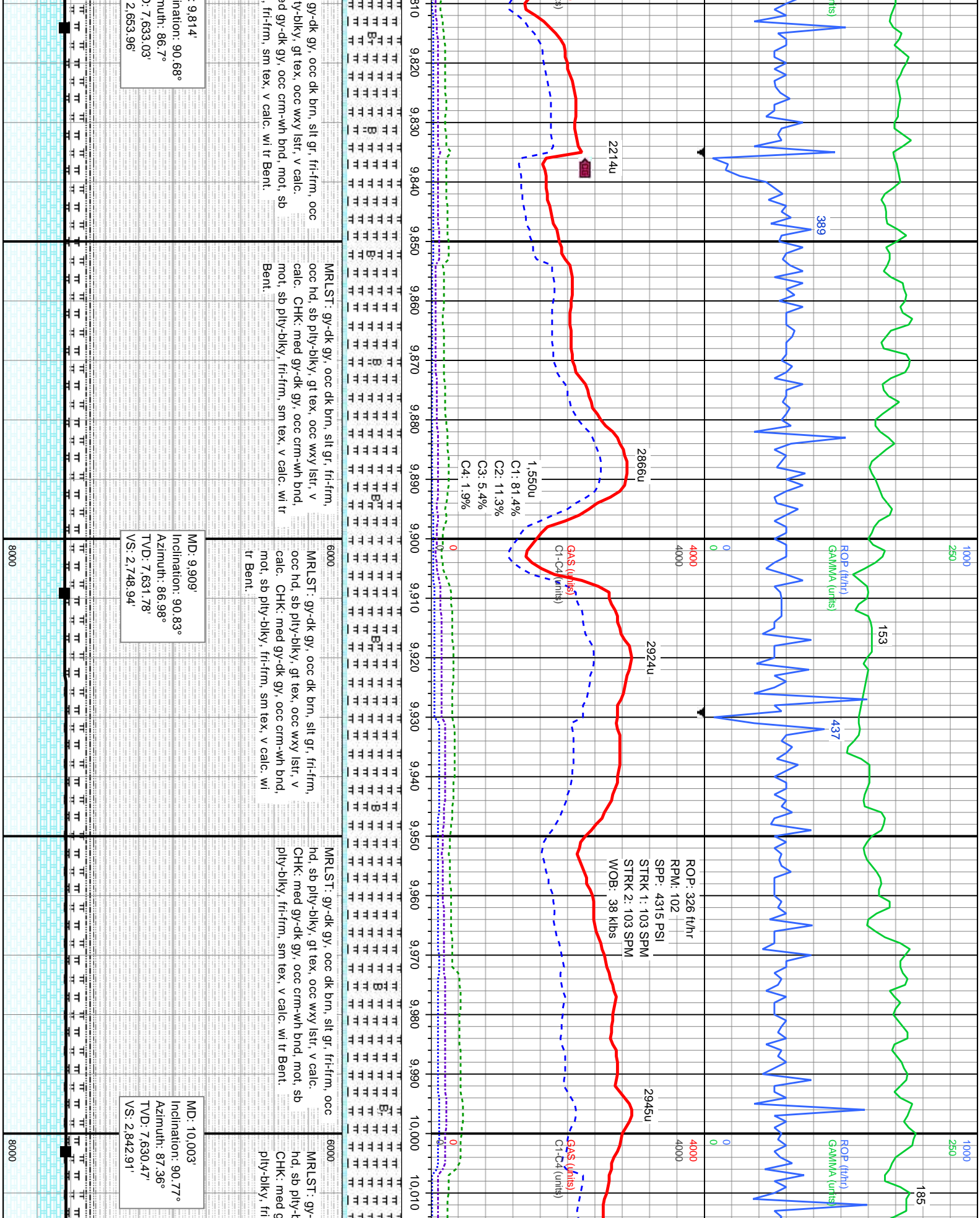


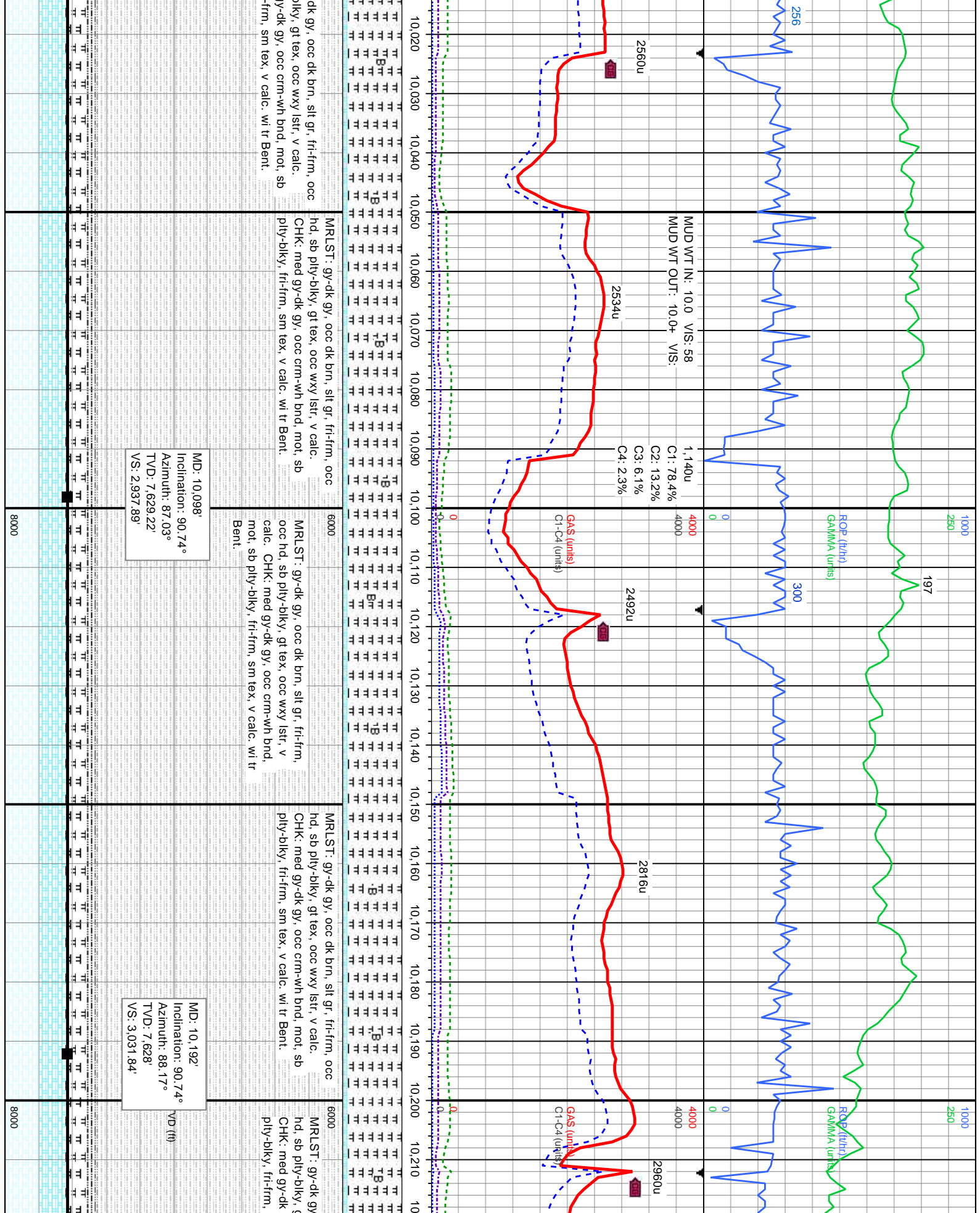


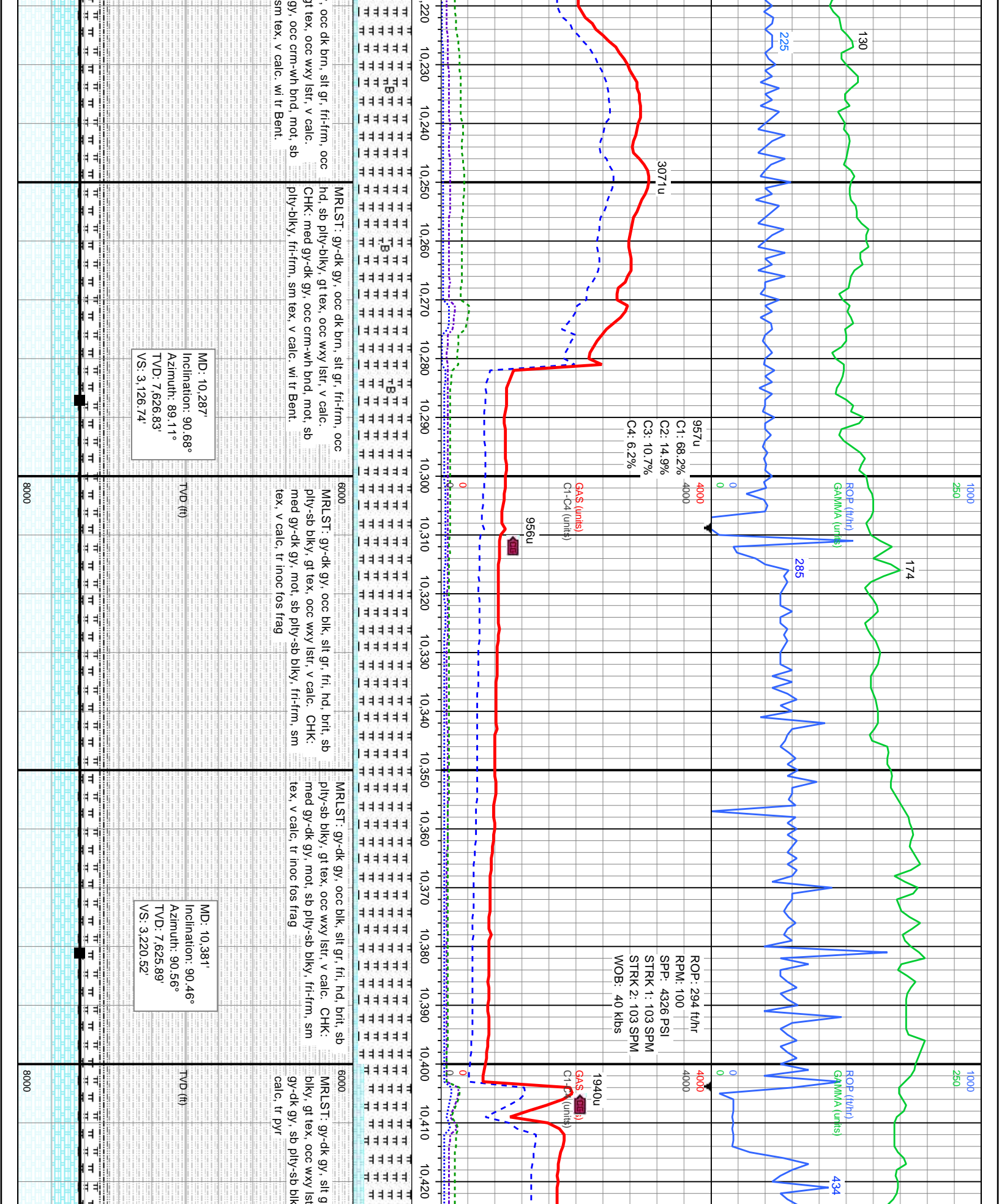


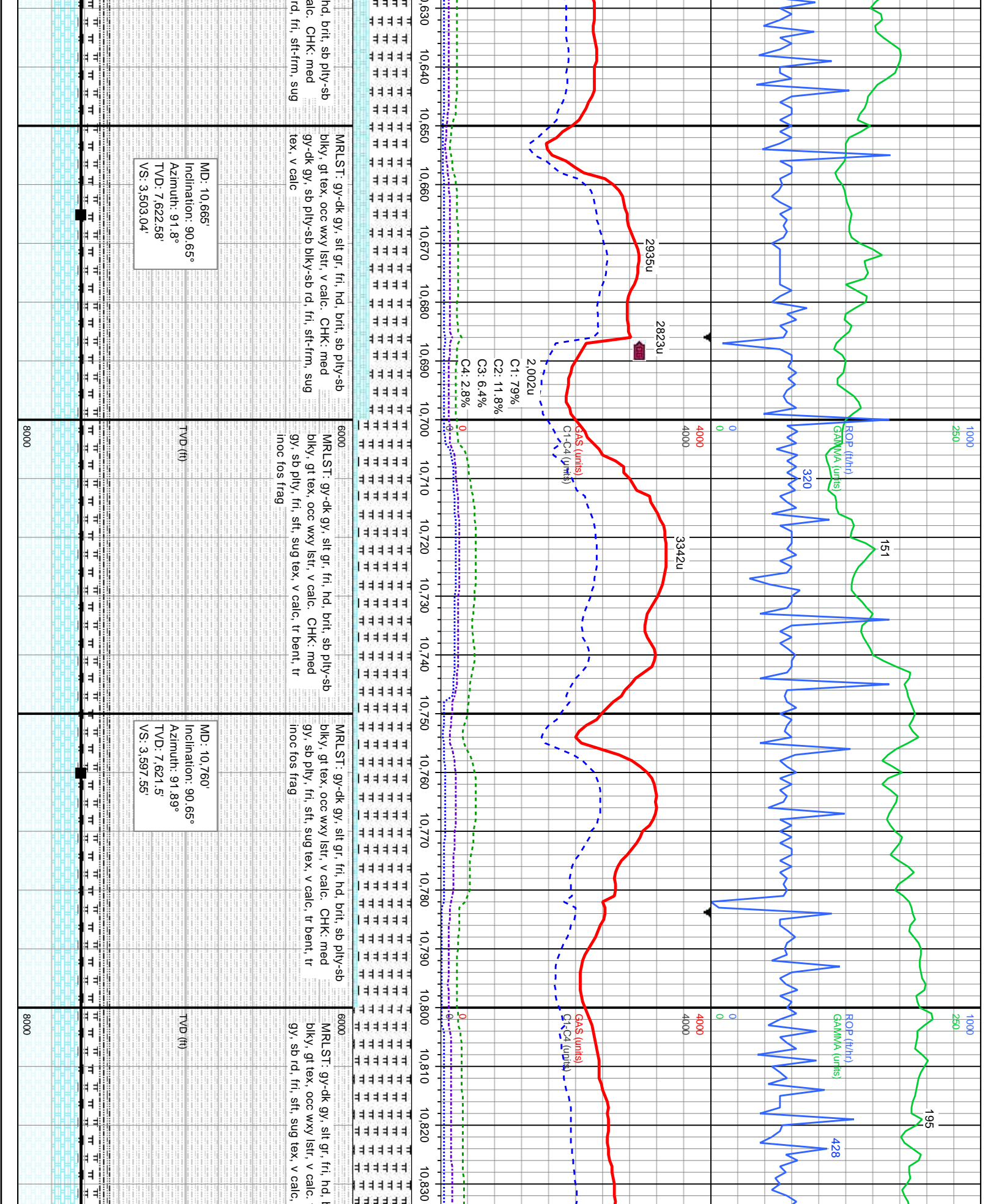


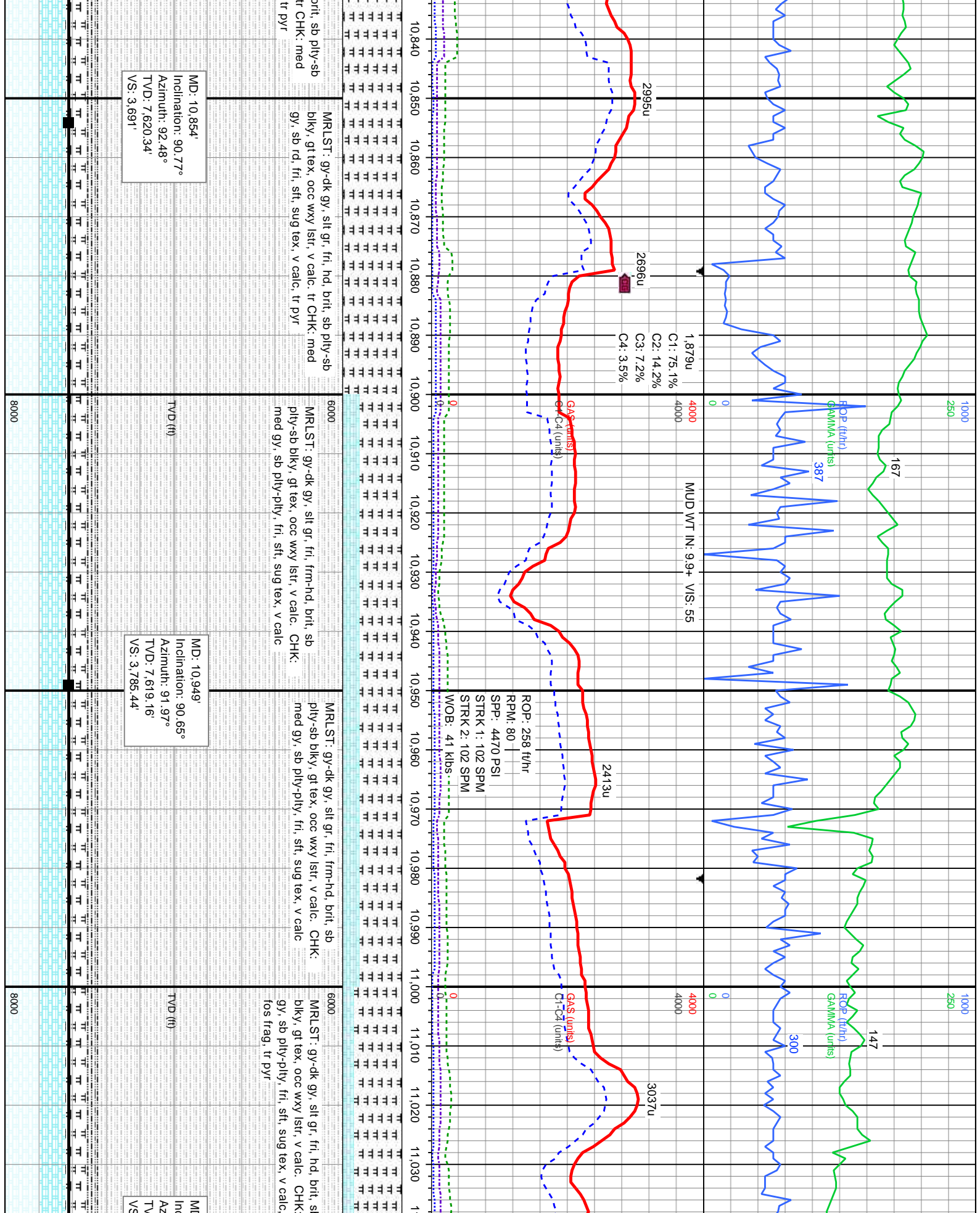


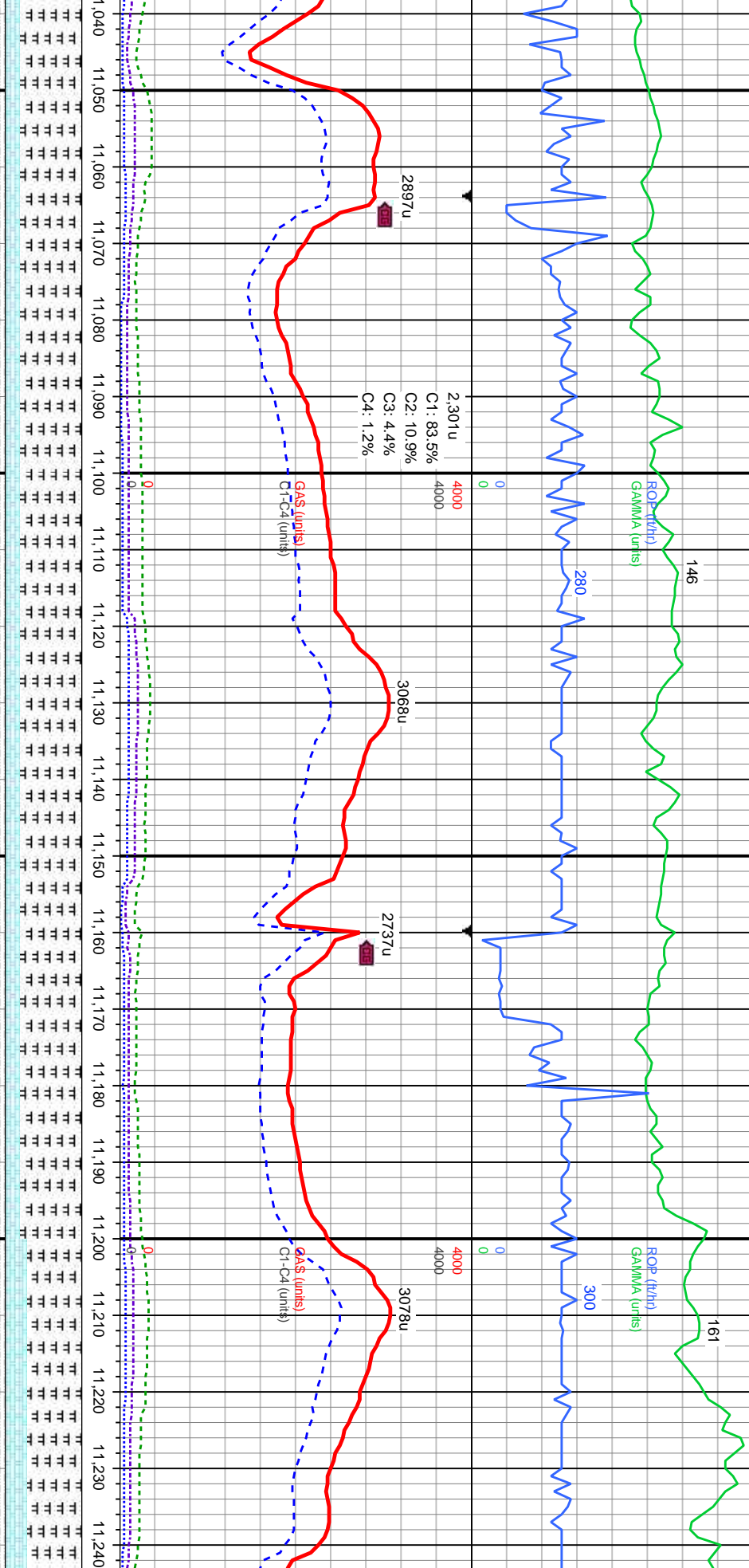












ply-sb med inoc	MRSLT: gy-dk gy, slt gr, fri, hd, brit, sb ply-sb blky, gt tex, occ wxy lstr, v calc. CHK: med gy, sb ply-ply, fri, sft, sug tex, v calc, tr inoc	6000	MRSLT: gy-dk gy, slt gr, fri, hd, brit, sb ply-sb blky, gt tex, occ wxy lstr, v calc. CHK: med gy, sb ply, fri, sft-frn, sug-rthy tex, v calc	6000	MRSLT: gy-dk gy, slt gr, fri, hd, brit, sb ply-sb blky, gt tex, occ wxy lstr, v calc. CHK: med gy, sb ply-ply, fri, sft-frn, rthy tex, v calc	6000
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MD: 11.043'
Inclination: 90.77°
Azimuth: 91.22°
TVD: 7.617.99'
VS: 3.878.99'

TVD (ft)

8000

MD: 11.138'
Inclination: 90.65°
Azimuth: 89.83°
TVD: 7.616.82'
VS: 3.973.69'

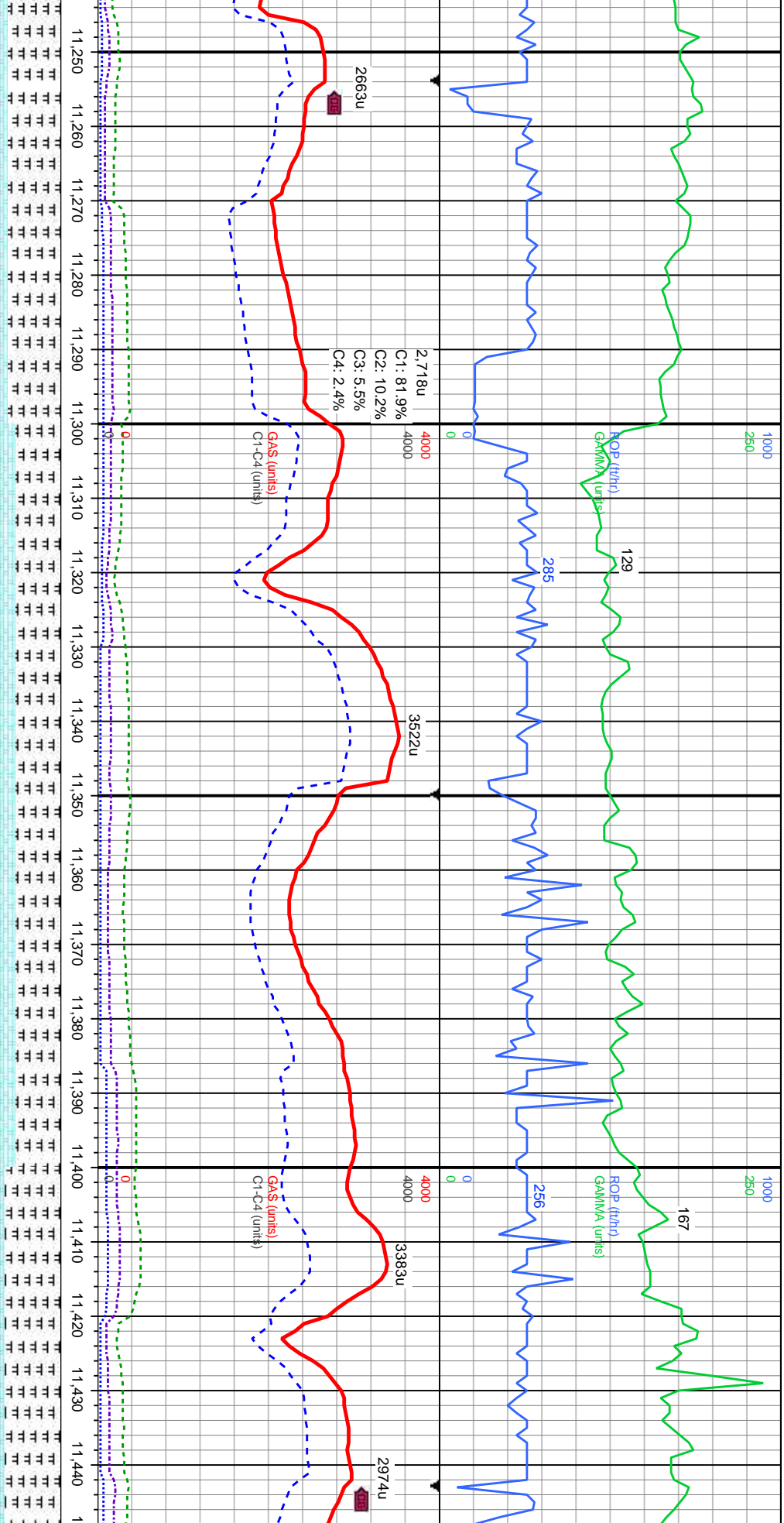
TVD (ft)

8000

MD: 11.232'
Inclination: 91.05°
Azimuth: 89.37°
TVD: 7.615.42'
VS: 4.067.5'

TVD (ft)

8000



MRSLT: gy-dk gy, silt gr, fri, hd, brit, sb pily-sb
biky, gt tex, occ wxy lstr, v calc. CHK: med
gy, sb pily-pily, fri, silt-frim, rthy tex, v calc

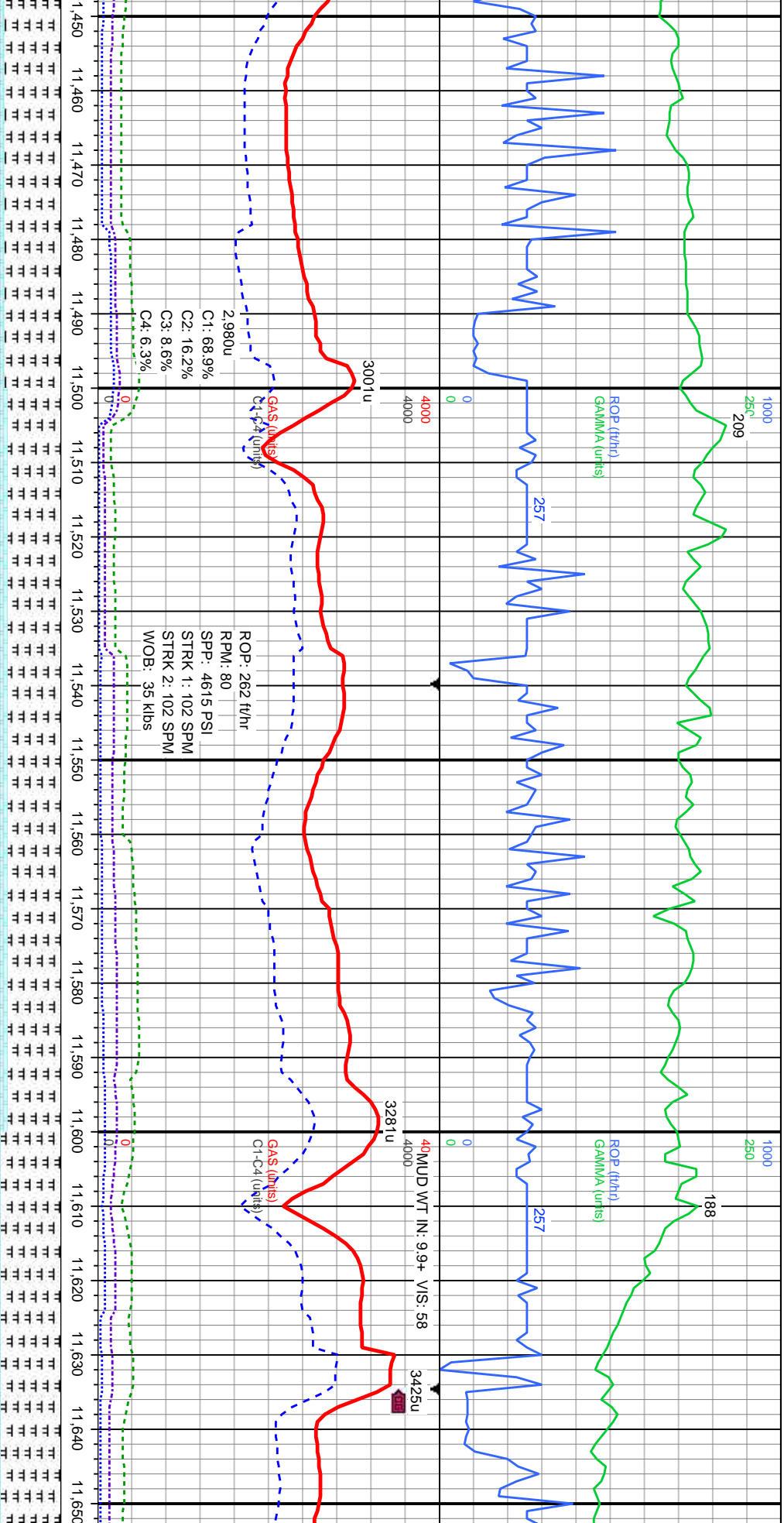
MRSLT: gy-dk gy, silt gr, fri, frm-hd, brit, sb
pily-sb biky, gt tex, occ wxy lstr, v calc. CHK:
med gy, sb pily-sb biky, fri, silt-frim, rthy tex, v
calc, tr bent

MRSLT: gy-dk gy, silt gr, fri, frm-hd, brit, sb
pily-sb biky, gt tex, occ wxy lstr, v calc. CHK:
med gy, sb pily-sb biky, fri, silt-frim, rthy tex, v
calc, tr bent

MRSLT: gy-dk gy, silt gr, fri, hd, brit, sb pily-sb
biky, gt tex, occ wxy lstr, v calc. CHK: med
gy, sb pily-sb biky, mot, fri, silt-frim, rthy-sug
tex, v calc, tr bent

MD: 11,327'
Inclination: 90.98°
Azimuth: 89.59°
TVD: 7,613.74'
VS: 4.162.31'

MD: 11,421'
Inclination: 90.62°
Azimuth: 89.81°
TVD: 7,612.43'
VS: 4.256.11'



MRLST: gy-dk gy, silt gr, fri, hd, brit, sb pily-sb
biky, gt tex, occ wxy istr, v calc. CHK: med
gy, sb pily-sb biky, mot, fri, sft-frm, rthy-sug
tex, v calc, tr bent

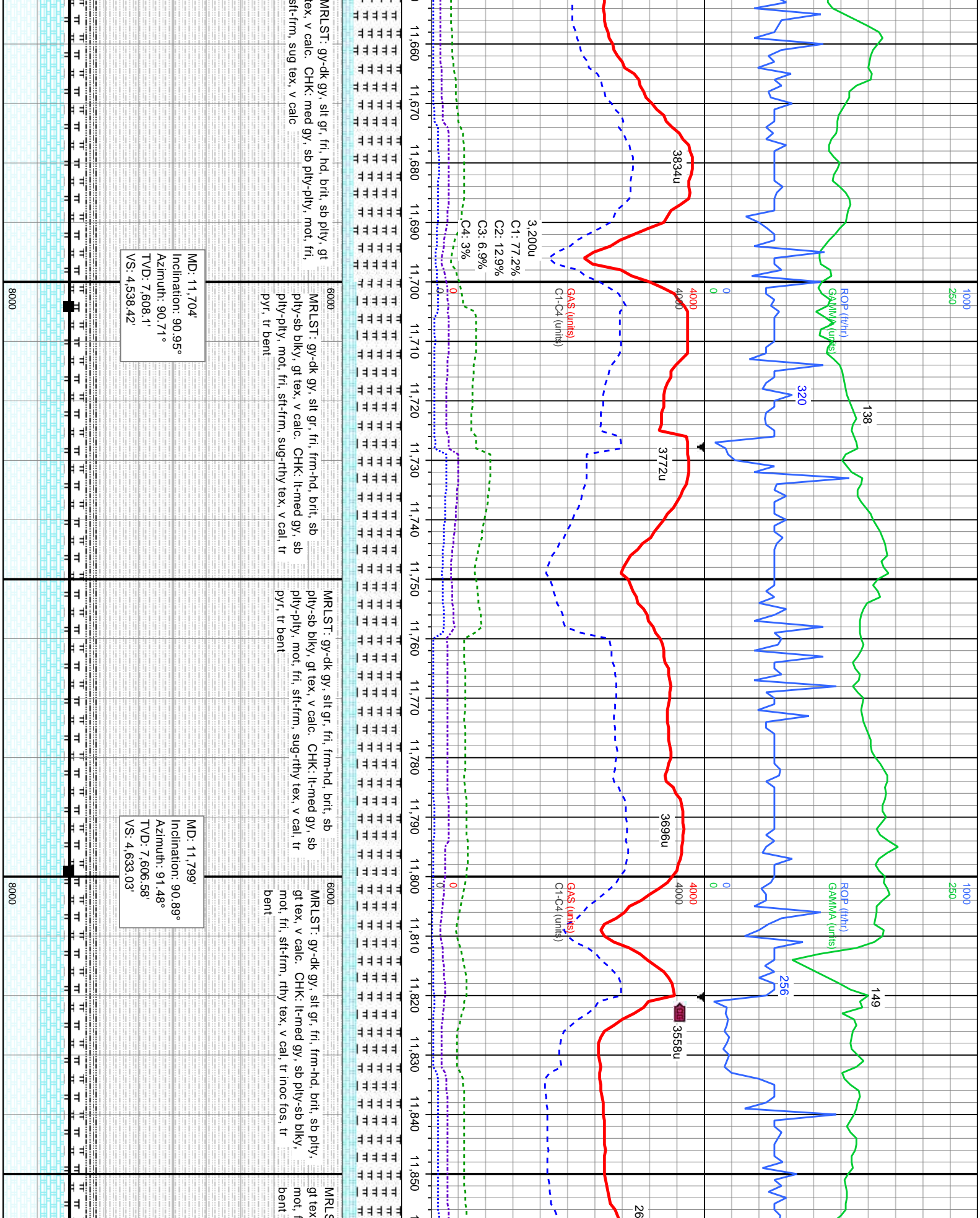
6000
MRLST: gy-dk gy, silt gr, fri, hd, brit, sb pily, gt
tex, v calc. CHK: med gy, sb pily-pily, mot, fri,
sft-frm, sug tex, v calc, tr bent

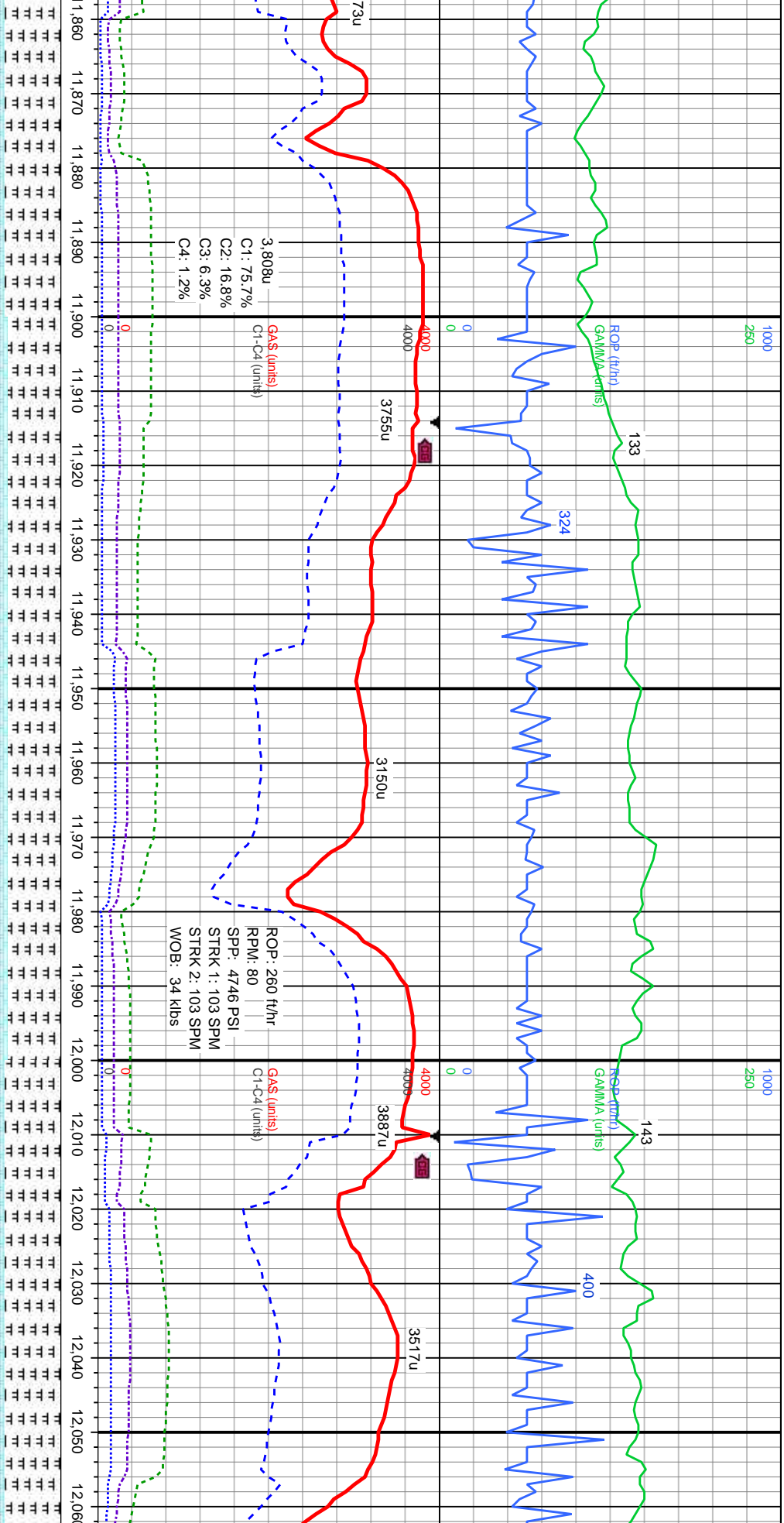
MRLST: gy-dk gy, silt gr, fri, hd, brit, sb pily, gt
tex, v calc. CHK: med gy, sb pily-pily, mot, fri,
sft-frm, sug tex, v calc, tr bent

6000
MRLST: gy-dk gy, silt gr, fri, hd, brit, sb pily, gt
tex, v calc. CHK: med gy, sb pily-pily, mot, fri,
sft-frm, sug tex, v calc

MD: 11,515'
Inclination: 90.95°
Azimuth: 90.47°
TVD: 7,611.14'
VS: 4,349.86'

MD: 11,610'
Inclination: 90.89°
Azimuth: 89.1°
TVD: 7,609.61'
VS: 4,444.65'





ST: gy-dk gy, silt gr, fri, frm-hd, brit, sb ply,
v calc. CHK: lt-med gy, sb ply-sb biky,
fri, sft-frm, rthy tex, v cal, tr inoc fos, tr

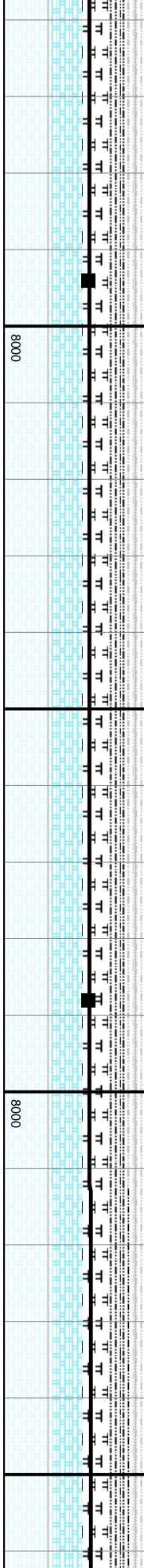
MRSLT: gy-dk gy, silt gr, fri, frm-hd, brit, sb
ply-sb biky, gt tex, v calc. CHK: lt-med gy, sb
ply-sb biky, mot, fri, sft-frm, rthy tex, v cal, tr
bent

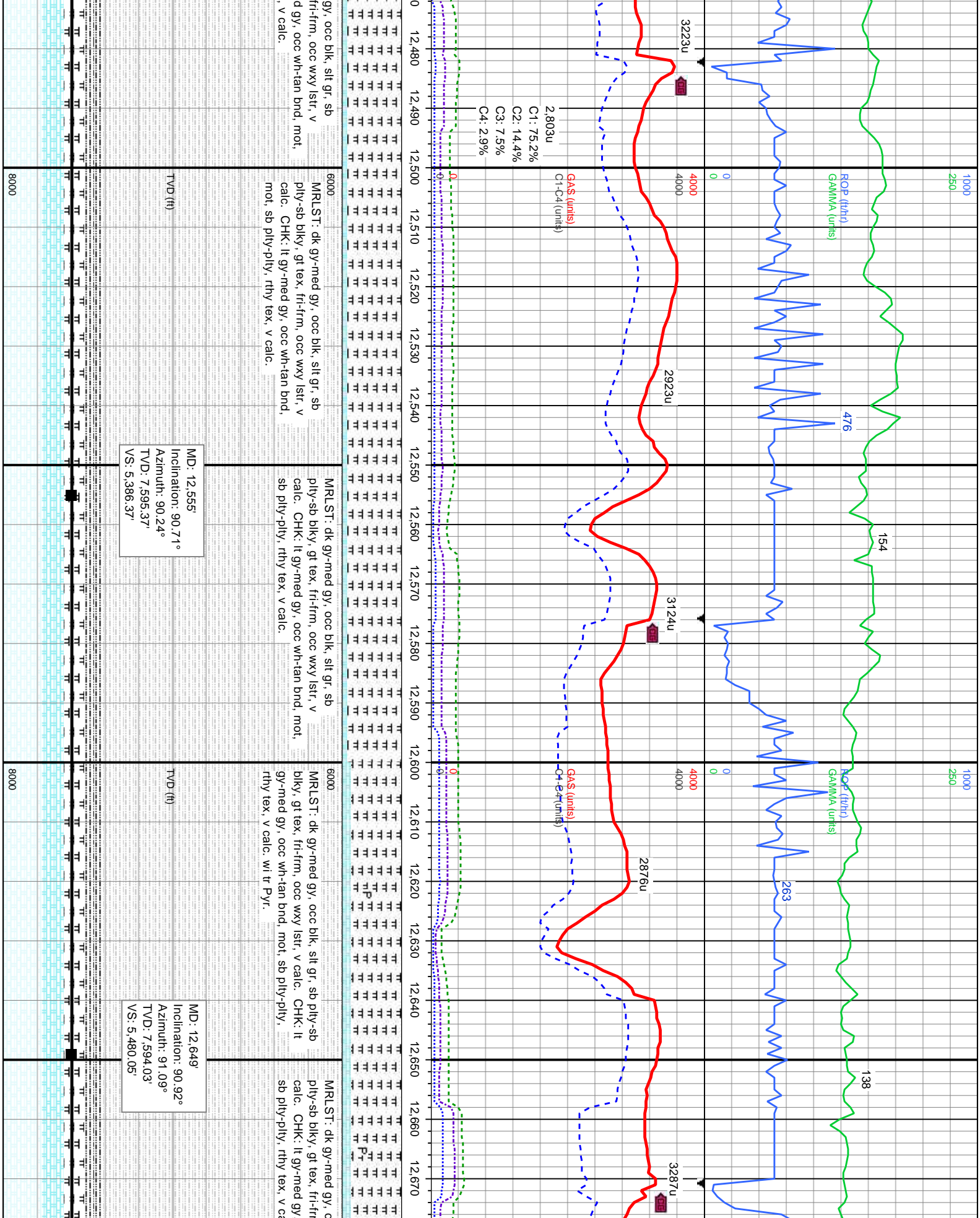
MRSLT: gy-dk gy, silt gr, fri, frm-hd, brit, sb
ply-sb biky, gt tex, v calc. CHK: lt-med gy, sb
ply-sb biky, mot, fri, sft-frm, rthy tex, v cal, tr
bent

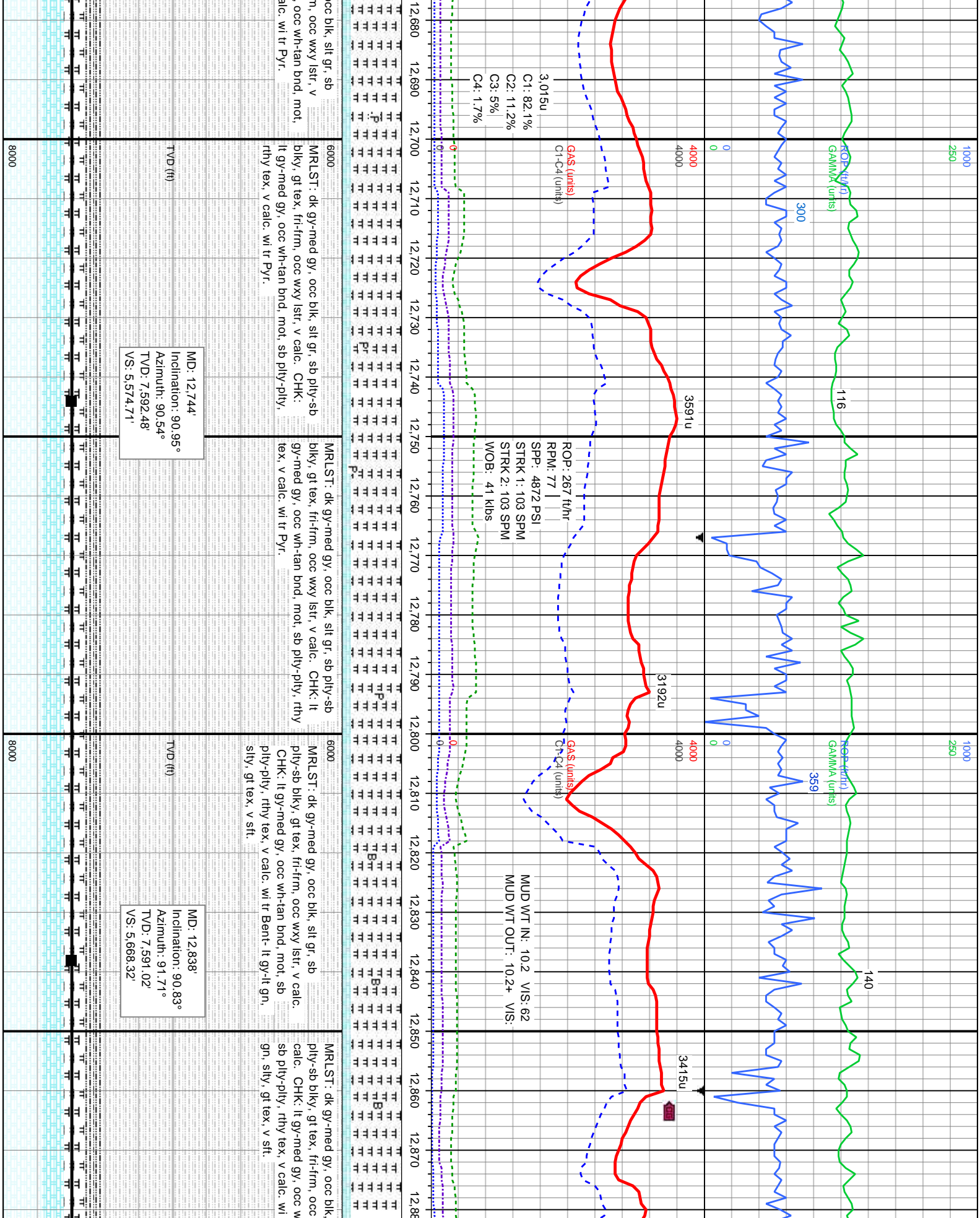
MRSLT: gy
ply-sb biky
ply-sb biky
bent

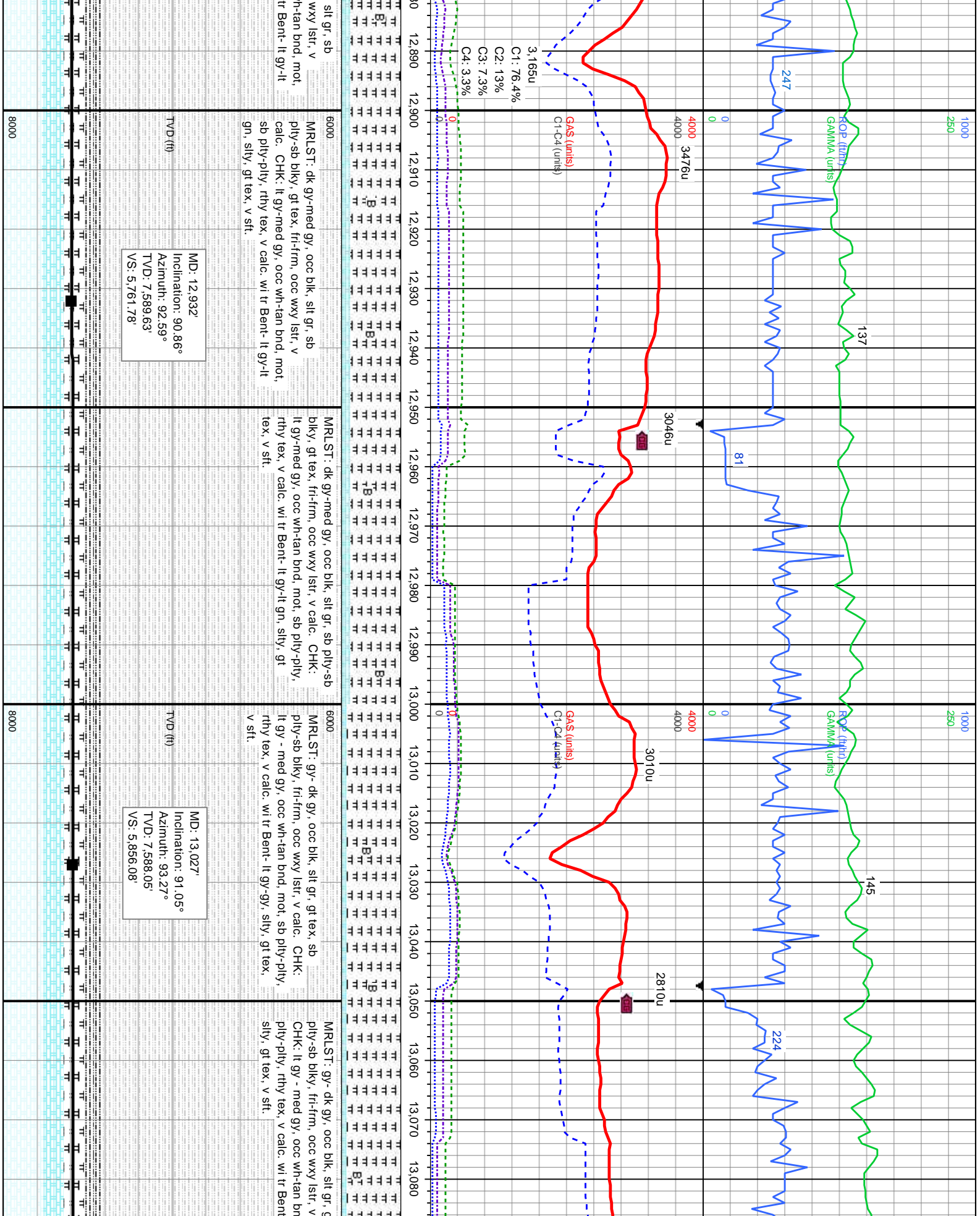
MD: 11,894'
Inclination: 90.77°
Azimuth: 91.77°
TVD: 7,605.2'
VS: 4,727.57'

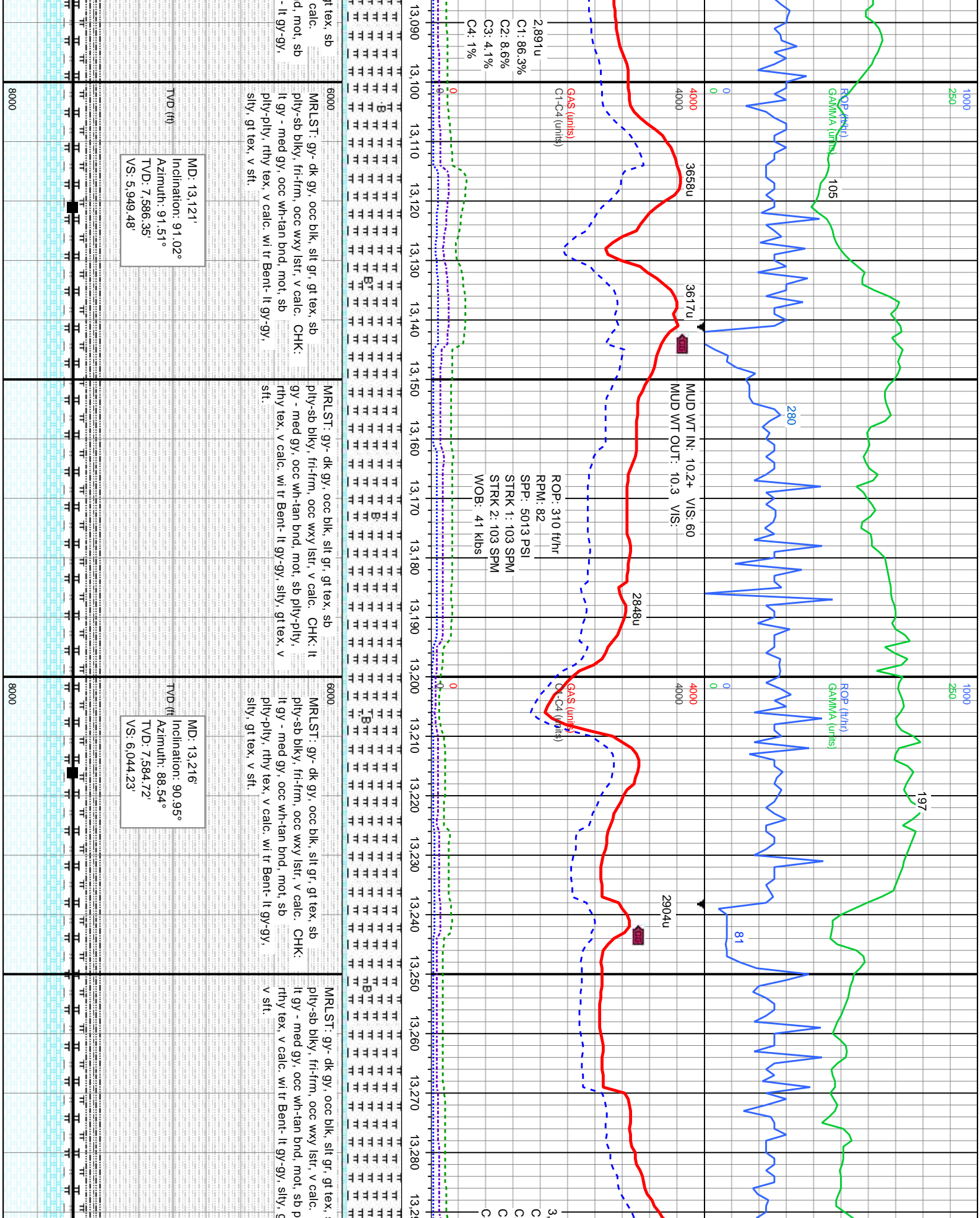
MD: 11,988'
Inclination: 90.83°
Azimuth: 91.39°
TVD: 7,603.89'
VS: 4,821.12'

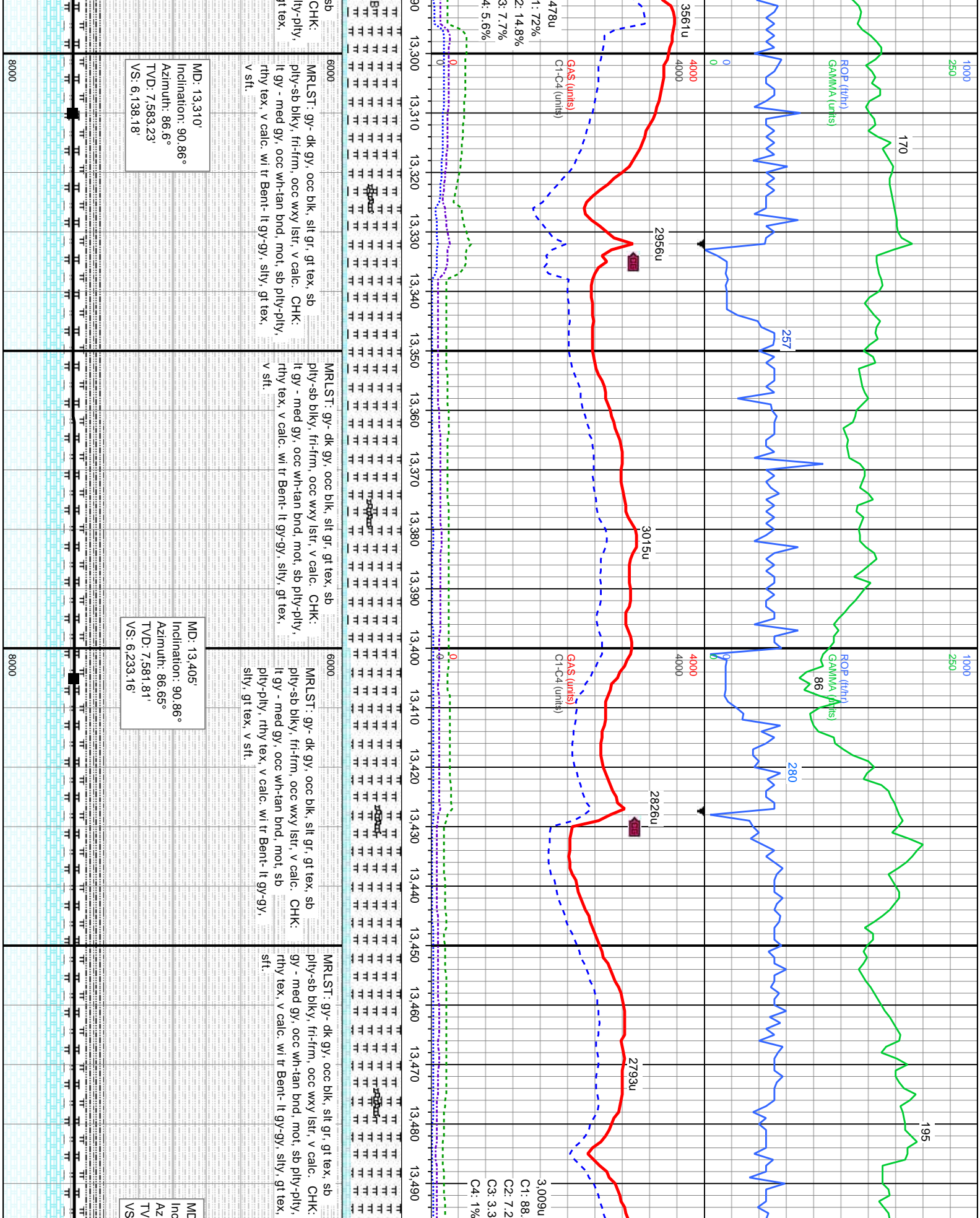


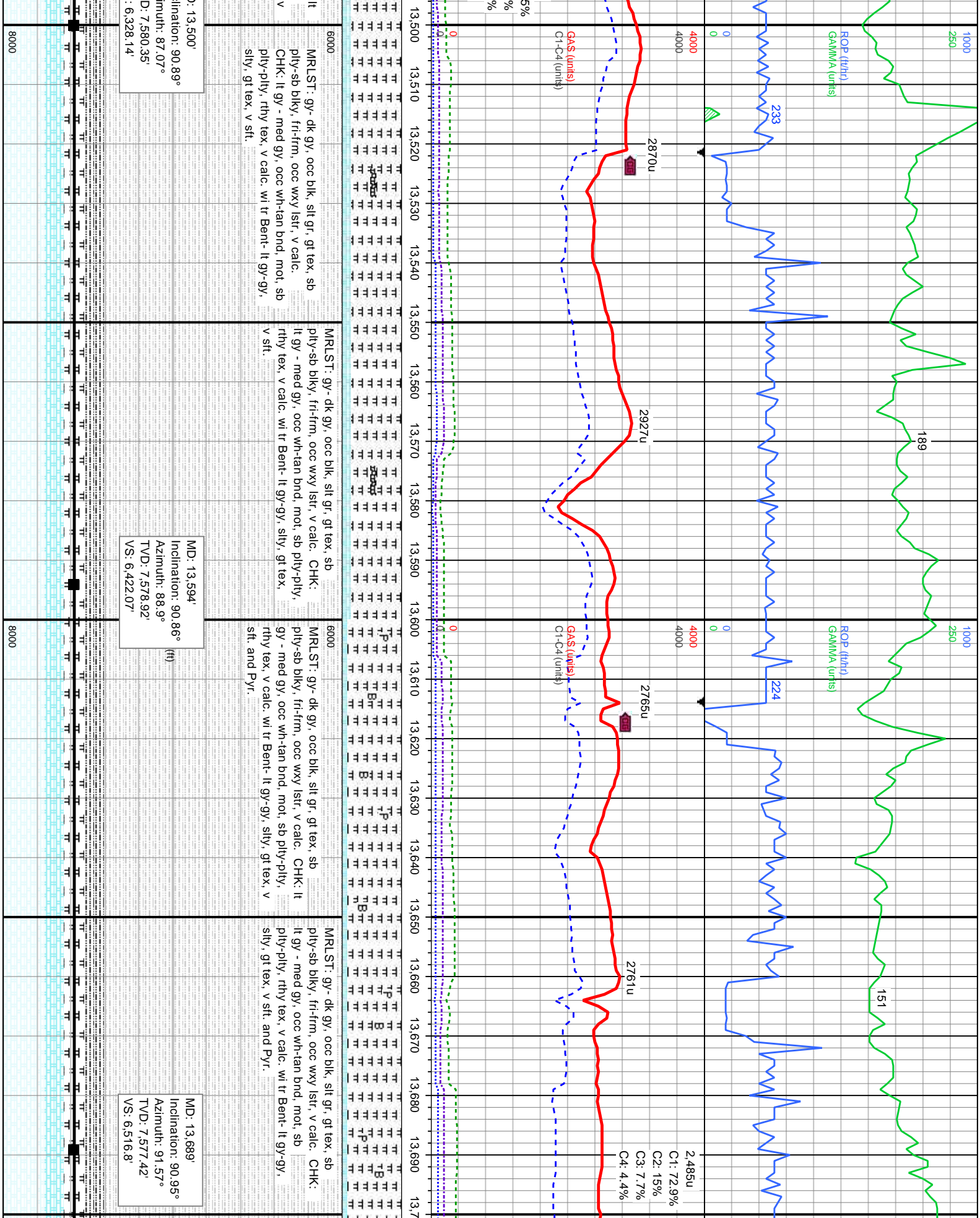


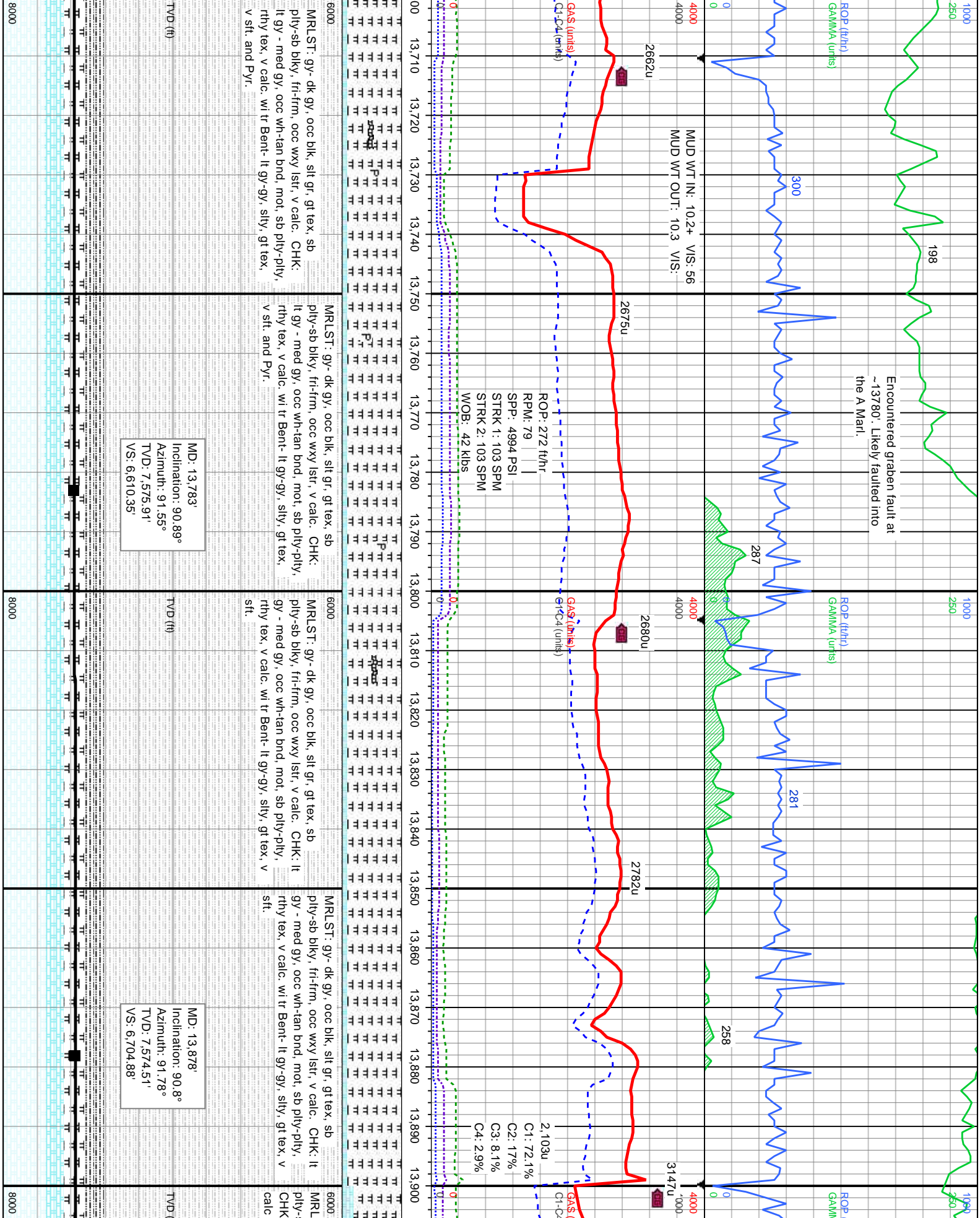


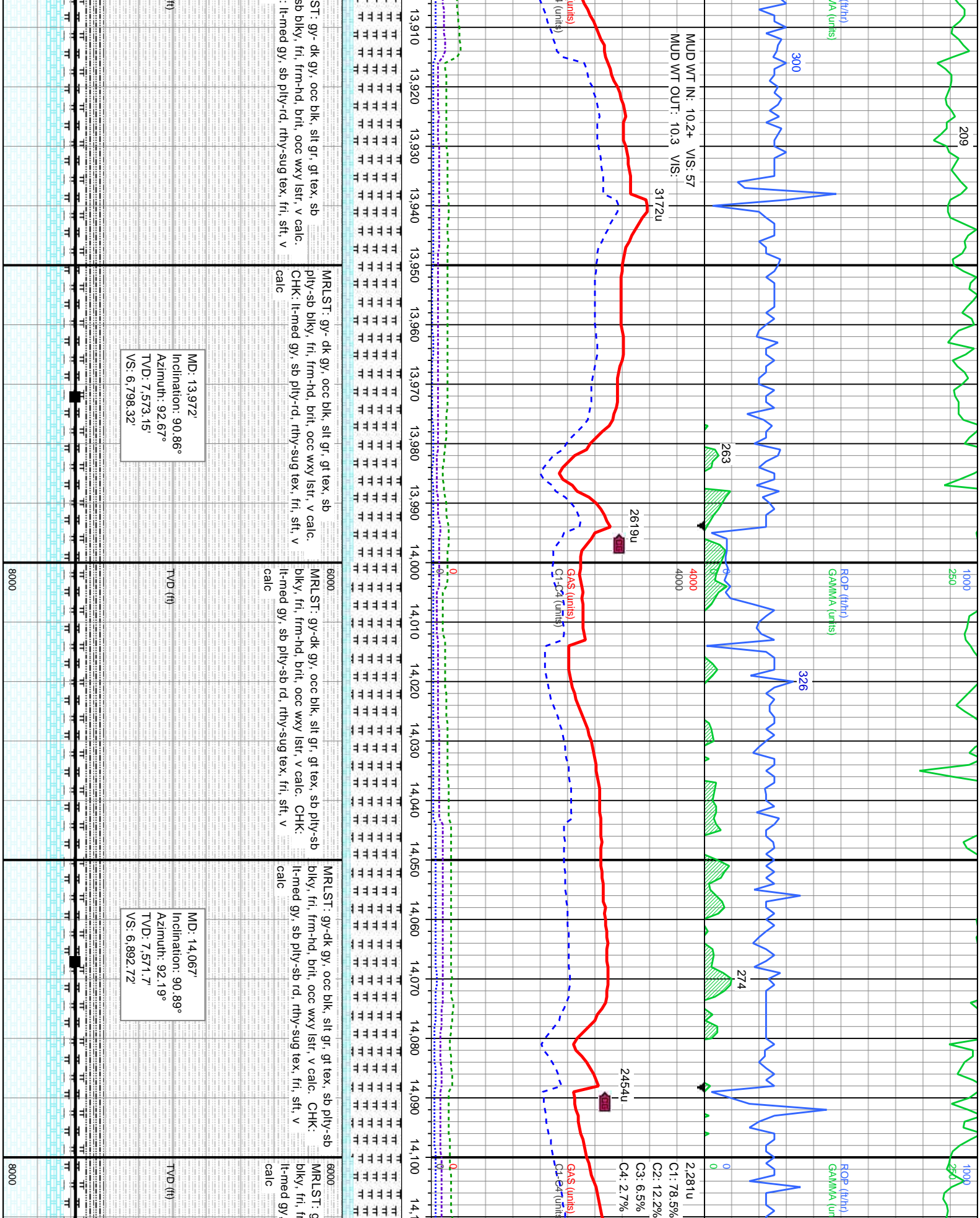


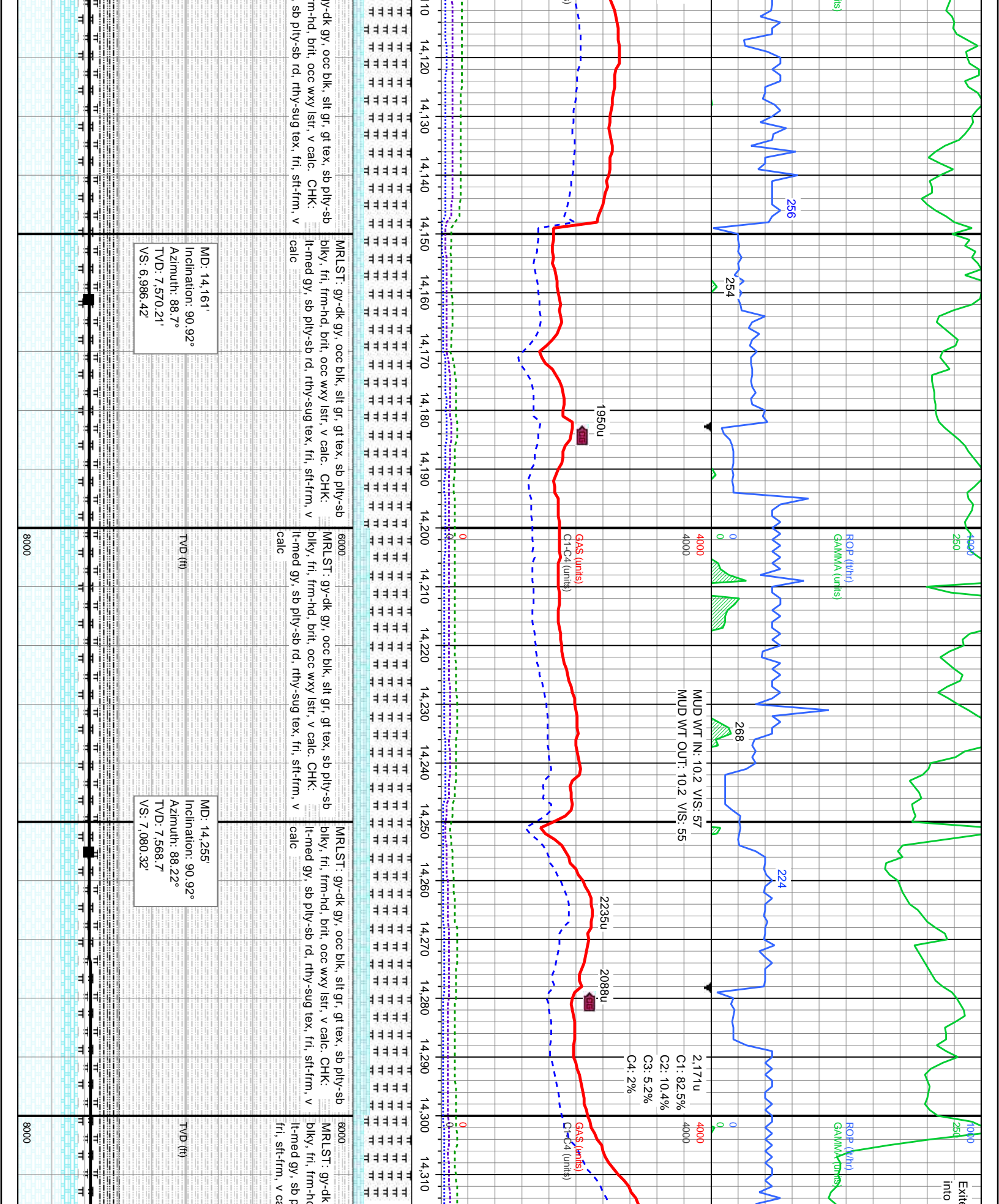




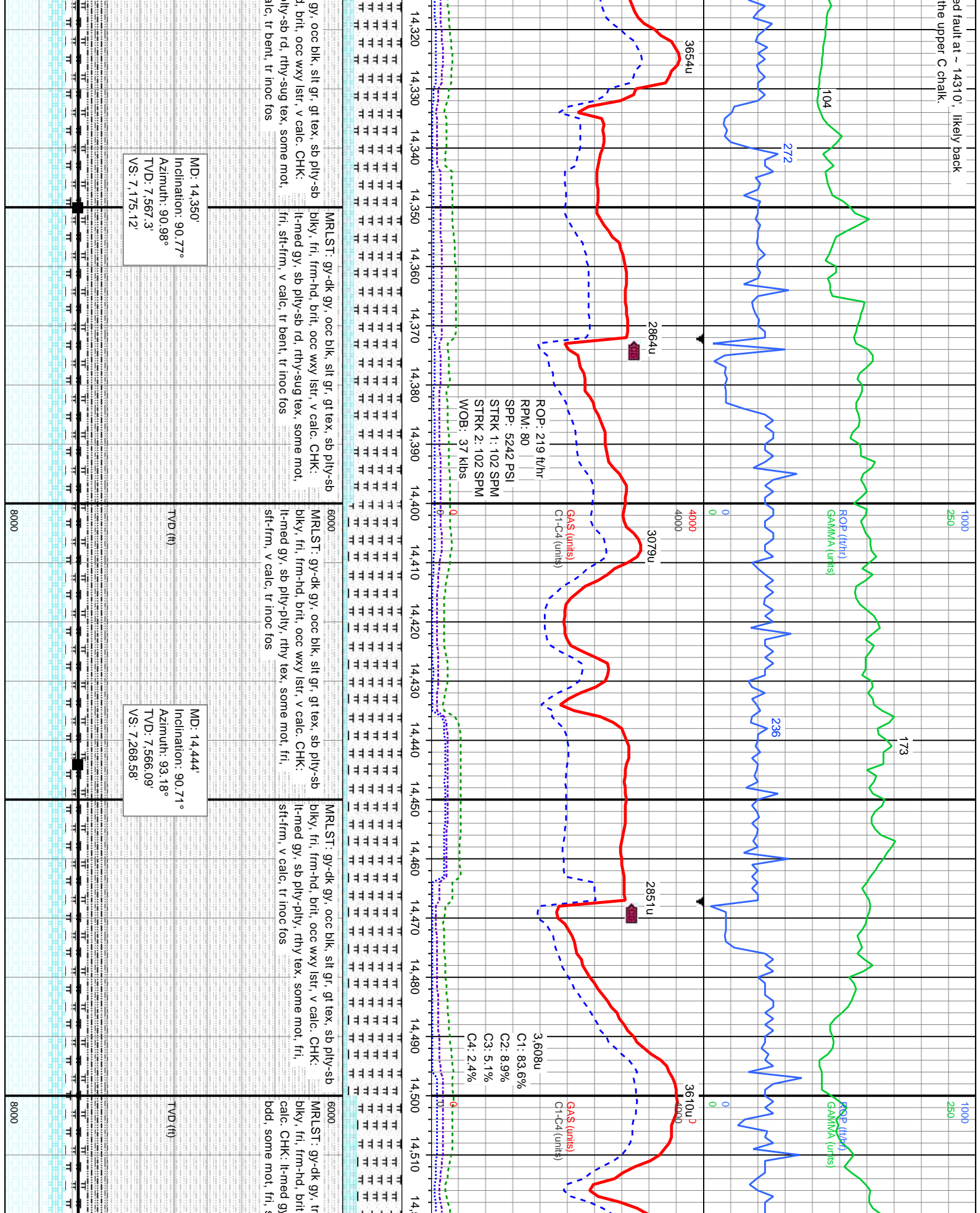


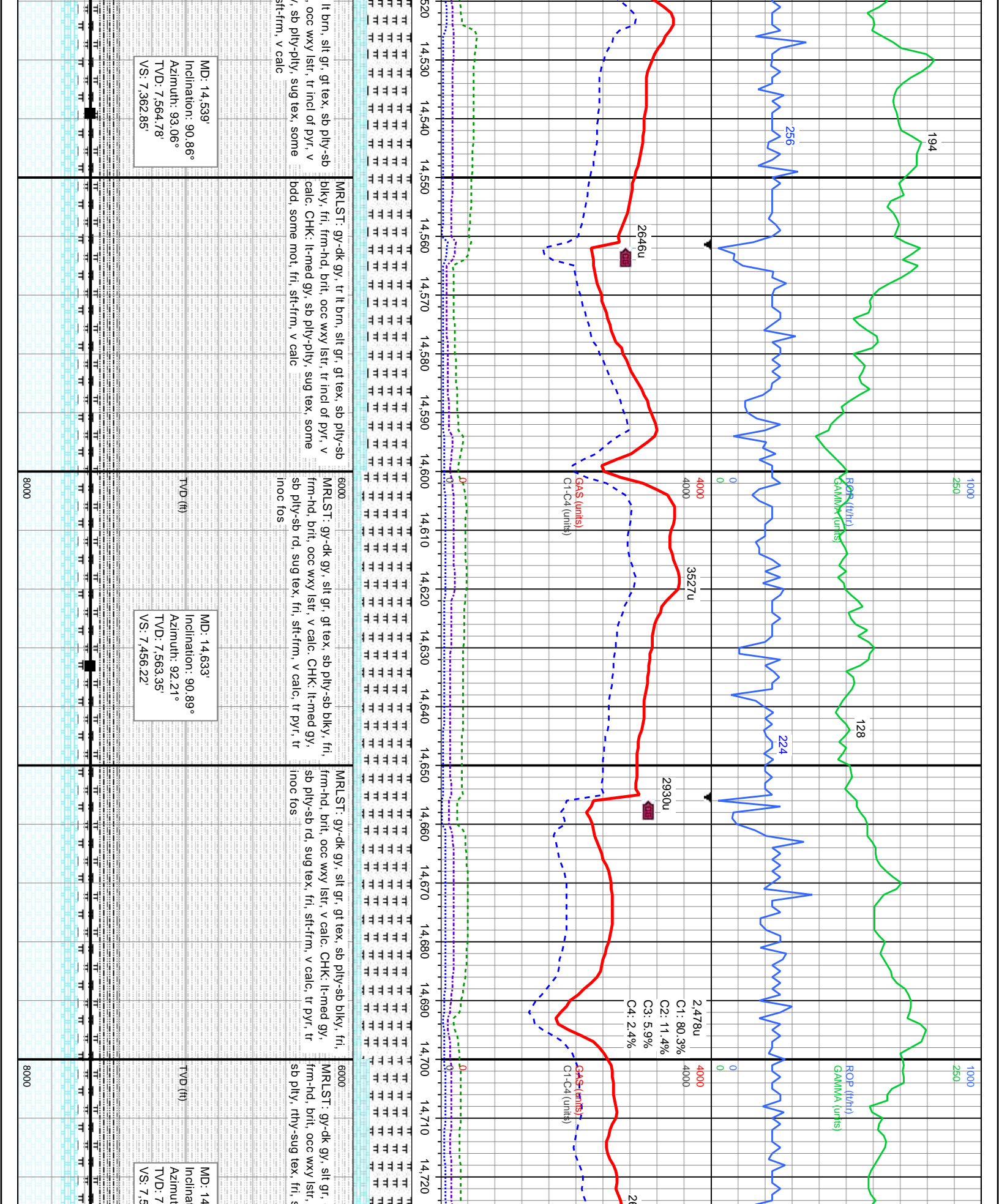




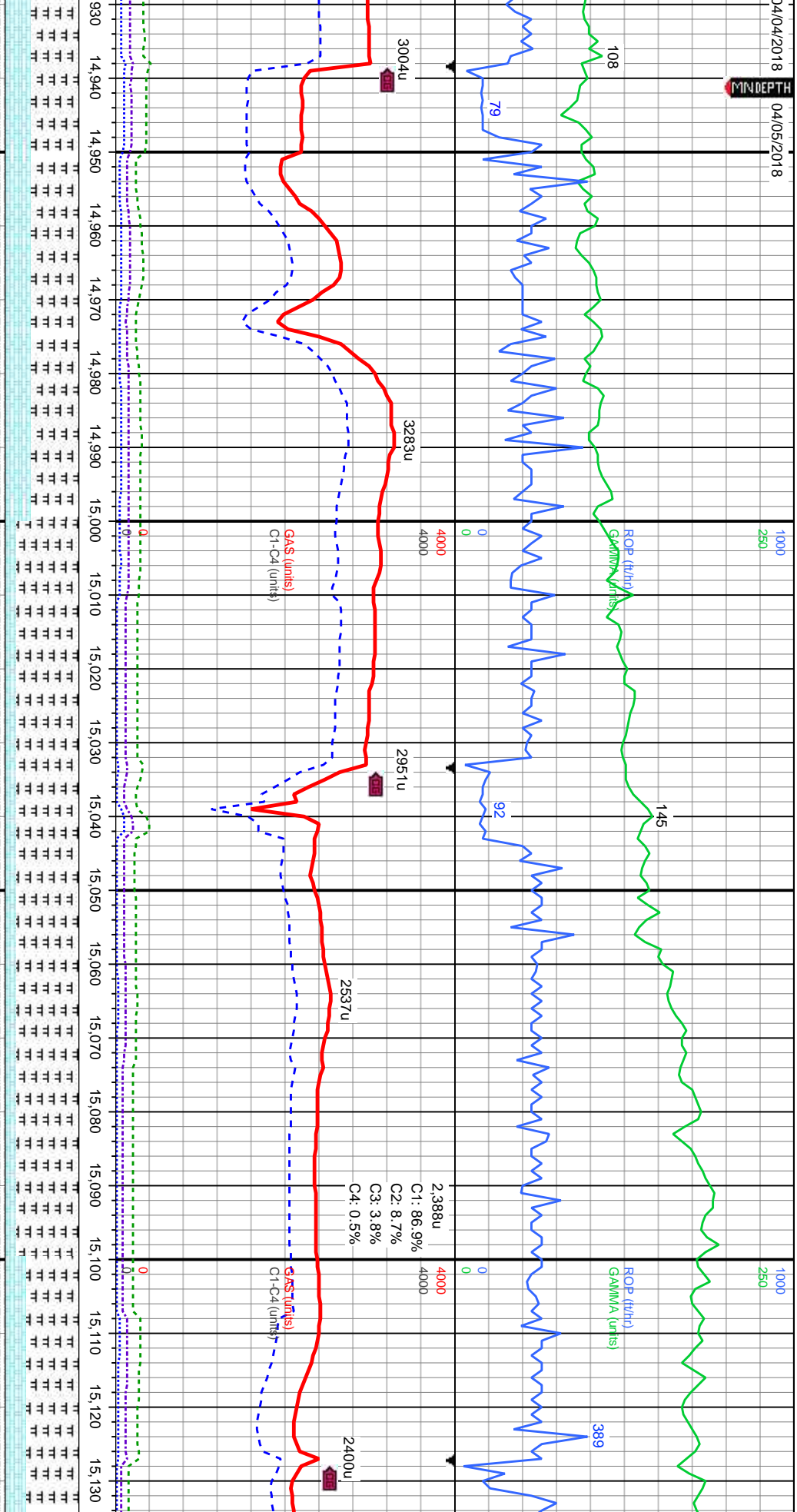


ed fault at ~ 14310', likely back
the upper C chalk.





MINDEPTH



sb pily-sb blkly, fri,
c. CHK: lt-med gy,
calc, some bdd, tr

MR LST: gy-dk gy, silt gr, gt tex, sb pily-sb blkly, fri,
frm-hd, brit, occ wxy lstr, v calc. CHK: lt-med gy,
sb pily-pily, sug tex, fri, sft, v calc, some bdd, tr
inoc fos

6000

MR LST: gy-dk gy, silt gr, gt tex, sb pily-sb blkly, fri,
frm-hd, brit, occ wxy lstr, v calc. CHK: lt-med gy,
sb pily, sug tex, fri, sft, v calc, some bdd, tr bent

6000

MR LST: gy-dk gy, silt gr, gt tex, sb pily-sb blkly, fri,
frm-hd, brit, occ wxy lstr, v calc. CHK: lt-med gy,
sb pily, sug tex, fri, sft, v calc, some bdd, tr bent

6000

MR LST: gy-dk gy, silt gr, gt tex, sb
frm-hd, brit, occ wxy lstr, v calc. Ch
sb pily-sb blkly, rthy-sug tex, fri, sft
some bdd, tr bent

MD: 15,010'
Inclination: 90.95°
Azimuth: 90.47°
TVD: 7,567.79'
VS: 7.832.03'

MD: 15,105'
Inclination: 90.86°
Azimuth: 91.49°
TVD: 7,566.29'
VS: 7.926.66'

