



Scale: 5' / 100'
Measured Depth Log

Well Name Hullahaloo State Y21-763

Location Sec. 16,21 T2N R64W

State Colorado

County Weld

Country USA

Rig Number H&P 517

API Number 05-123-45236

Field Weld

Geographic Region Weld County, Colorado - DJ Basin Drilling Completed 10/5/2017

Spud Date 9/25/2017

Surface Coordinates NENW 44S' FNL & 2580' FWL, SEC 16-2N-64W

Bottom Hole Coordinates SESW 100 FSL & 1810 FWL, SEC 16-2N-64W

Ground Elevation 4912'

K.B. Elevation 4942'

Logged Interval 6300 To 17477

Total Depth 17477

Formation Codell

Type of Drilling Fluid OBM

Operator

Company Noble Energy, Inc.

Address 1625 Broadway Suite 2200
Denver, CO 80202



Geologists

Name Renee Clackler

Company Noble Energy Inc

Address 1625 Broadway Suite 2200
Denver, CO 80202


Other


Well Site Logging Company Columbine


Wellsite Geologist (Days) Zak Lewis


Wellsite Geologist (Nights) James Av


Zone Color Coding


 Oil


 Note


 Error


 Condensate

 Core


 Water


 Gas


 Pressure


 Seal


Rock Types


 UNKNOWN


 ANHYDRITE


 BENTONITE


 BRECCIA


 CHALK


 CEMENT


 CHERT


 CLAY CHOKE SAND


 CLAYSTONE


 COAL


 CONGLOMERATE


 DOLOMITE


 DOLOMITIC LIMESTONE


 GRANITE


 GYPSUM


 IGNEOUS


 SIDERITE or LIMONITE


 LIMESTONE


 MARLSTONE


 METAMORPHIC


 NO SAMPLE


 SALT


 SANDSTONE


 SALT-PEPPER SAND


 SHALE


 SHALE COLORED


 SHALE GRAY


 SHALY SANDSTONE

 SHALY SILTSTONE


 SILTY SHALE


 SILTSTONE


 TUFF


 WELDED TUFF


Accessories


 GASTROPOD


 INOCERAMUS


 OOLITE


 OSTRACOD


 PELECYPOD


 PELLET


 PISOLITE


 PLANT REMAINS


 PLANT SPORES


 SCAPHOPOD


 STROMATOPOROÏD


 ARGILLITE GRAIN


 BENTONITE


 BITUMENOUS SUBSTANCE


 BRECCIA FRAGMENTS


 CALCAREOUS


 CARBONACEOUS FLAKES


 CHERT


 CHERT


 COAL - THIN BEDS


 DOLOMITIC


 FELDSPAR


 HEAVY MINERAL


 KAOLIN


 MARCASITE


 MARLSTONE


 MICACEOUS


 MINERAL CRYSTALS


 NODULES


 PHOSPHATE PELLETS


 PYRITE


 SALT CAST


 SANDY


 SIDERITE


 SILICEOUS


 SILTY


 TUFFACEOUS


 ANHYDRITE STRINGER


 BENTONITE STRINGER


 COAL STRINGER


 DOLOMITE STRINGER


 GYPSUM STRINGER


 LIMESTONE STRINGER

 MARLSTONE (CALC) STRG

 MARLSTONE (DOU) STRG


 SANDSTONE STRINGER


 SHALE STRINGER


 SILTSTONE STRINGER


Stringer

Oil Show


 DEAD


 EVEN


 QUESTIONABLE


 SPOTTED STAINING


Porosity


 E EARTHY


 F FENESTRAL

 F FRACTURE

 X INTERCRYSTALLINE

 Ø INTEROUTLITIC

 M MOLDIC

 O ORGANIC

Other Symbols

PINPOINT	DST INTERVAL	WIRELINE TESTED - LEFT	E EARTHY
VUGGY	FAULT	WIRELINE TESTED - RT	FX FINELYXLN

Engineering

FORMATION TOP	DRILL STEM TEST	GS GRAINSTONE
GAS SHOW	MN DEPTH	L LITHOGRAPHIC
OIL SHOW		MX MICROXLN

BIT

Rounding

CONNECTION (UP)	MN DEPTH UP	MS MUDSTONE
CONNECTION (DOWN)	MN DEPTH (DOWN)	PS PACKSTONE

CONNECTION GAS	NORMAL FAULT	R ROUNDED	WS WACKESTONE
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CONNECTION GAS (LEFT)	OVERTURNED STRATA	S SUBANG
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TRIP GAS	REVERSE FAULT	T SUBRND
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TRIP GAS (LEFT)	CASING	M MODERATE
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Textures

DOWN TIME GAS	SIDEWALL CORE (LEFT)	P POOR
DOWN TIME GAS (LEFT)	SIDEWALL CORE (RIGHT)	W WELL

CORE - LOST	SLIDE	C CHALKY
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CORE - RECOVERED	SURVEY	CX CRYPTOXLN
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ROP
ROP —
GAMMA —

Columbine Logging Inc. Rigged up 2 man logging 10/2/2017. Began Logging at 6300MD @ 00:18 MDT on 10/2/2017

ROP, WOB and RPM
Imported from Pason EDR

Total Gas & Chromatograph
GAS —
C1 —
C2 —
C3 —
C4 —

Gas Data From Pason EDR

Depth Labels

% Lith

Well Bore
TVD —

Gamma & Survey Data
Provided by Baker Hughes
Directional

Images

Kick off point @ 6385 MD

750
250

251

ROP (ft/hr)
GAMMA (api)

134

563

TG: 399u
C1: 78.6%
C2: 13%
C3: 5.6%
C4: 2.9%

GAS (units)
C1-C4 (PPM)

370u

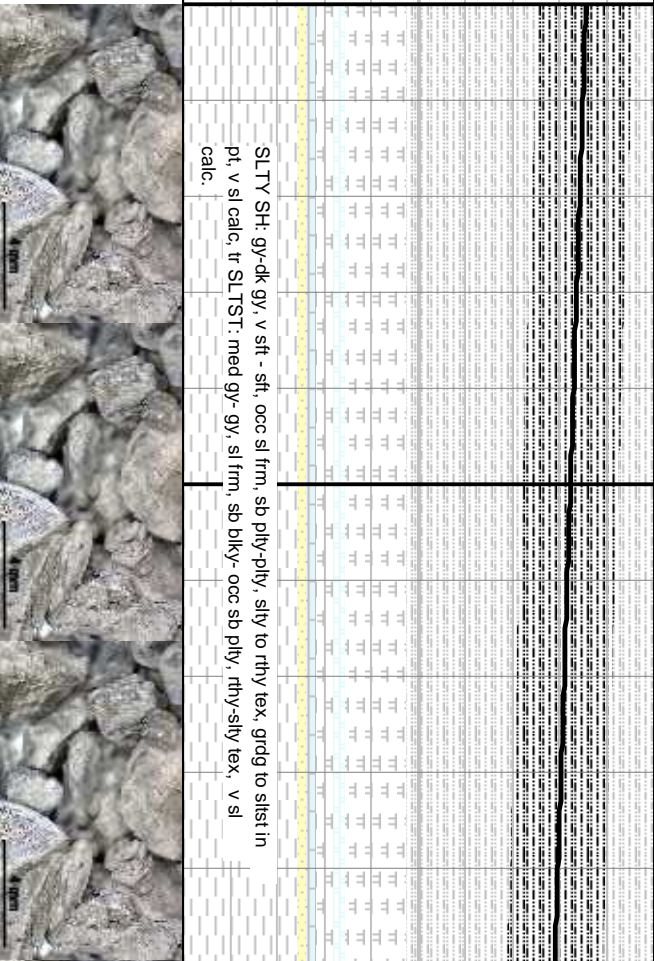
898u

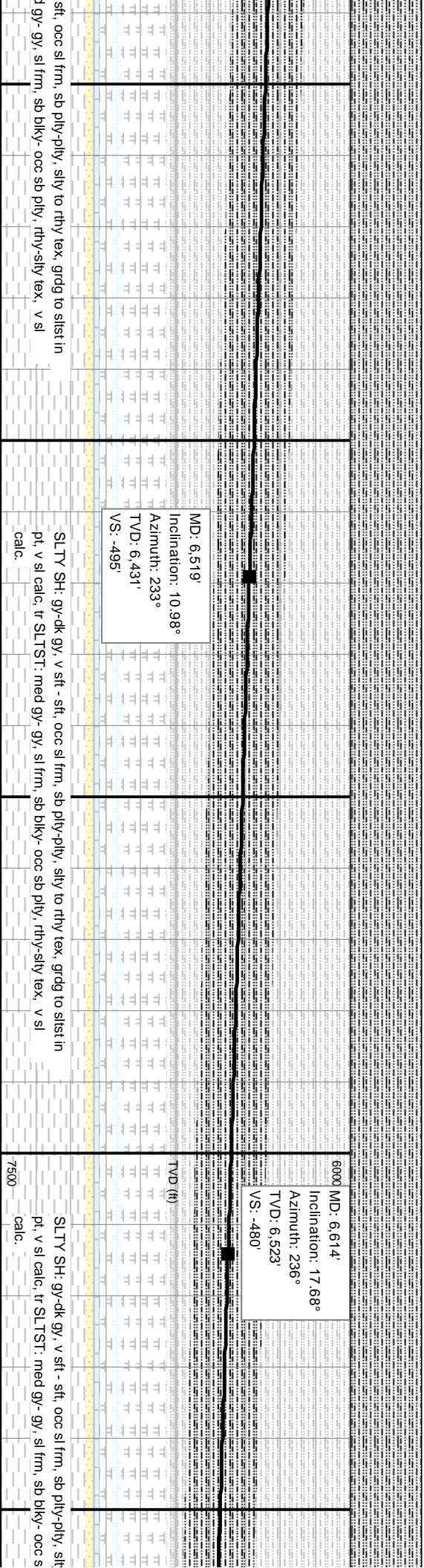
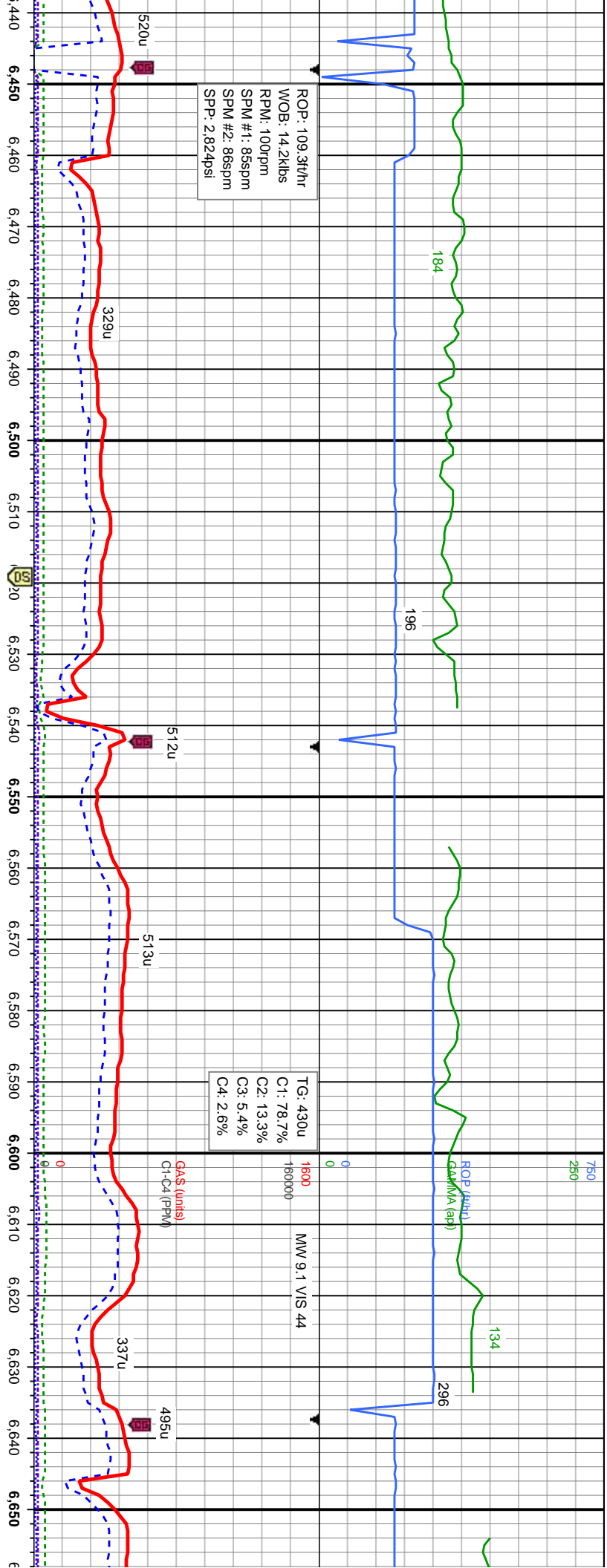
6000

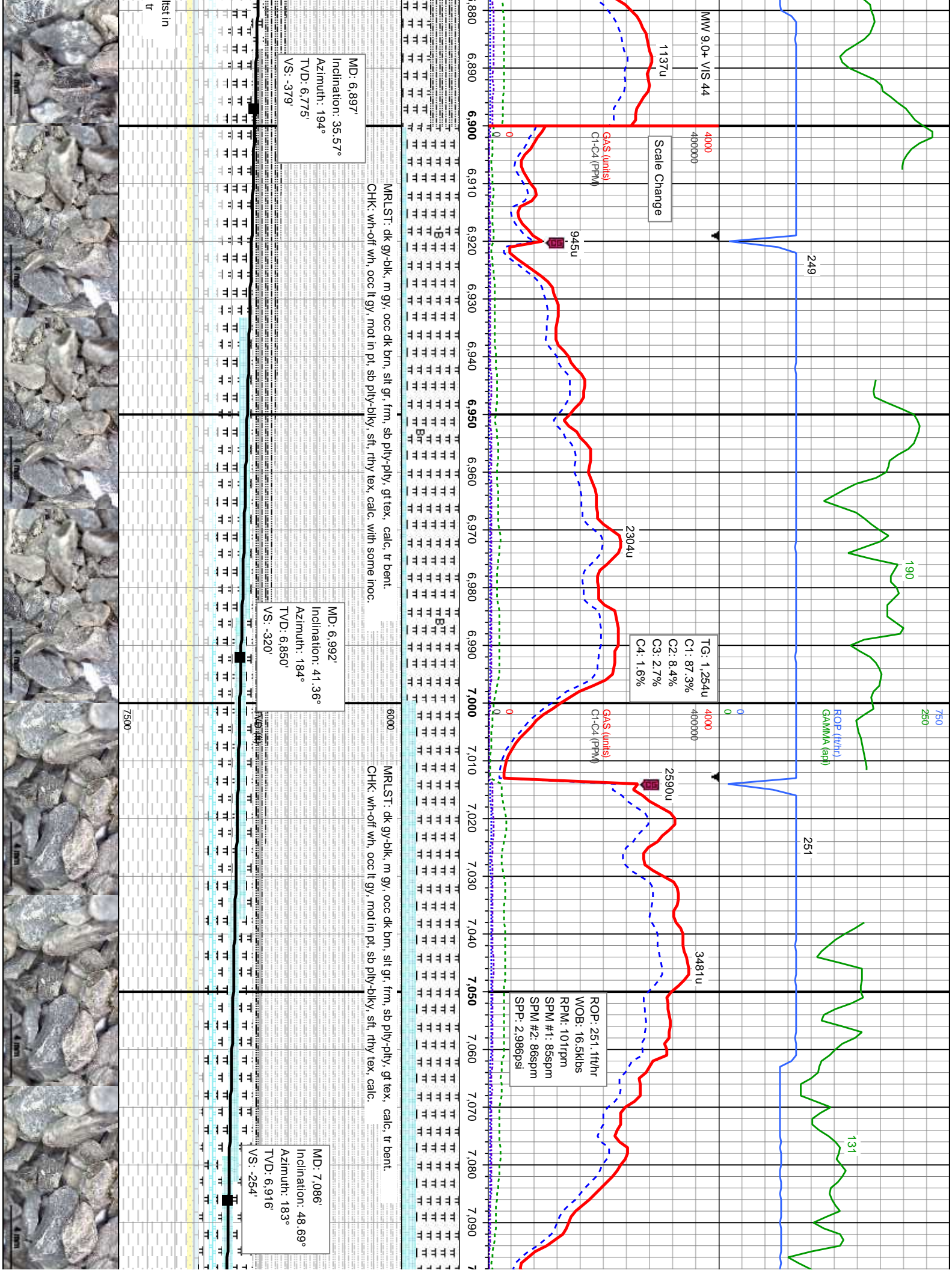
MD: 6.425'
Inclination: 7.7°
Azimuth: 278°
TVD: 6.338'
VS: -500'

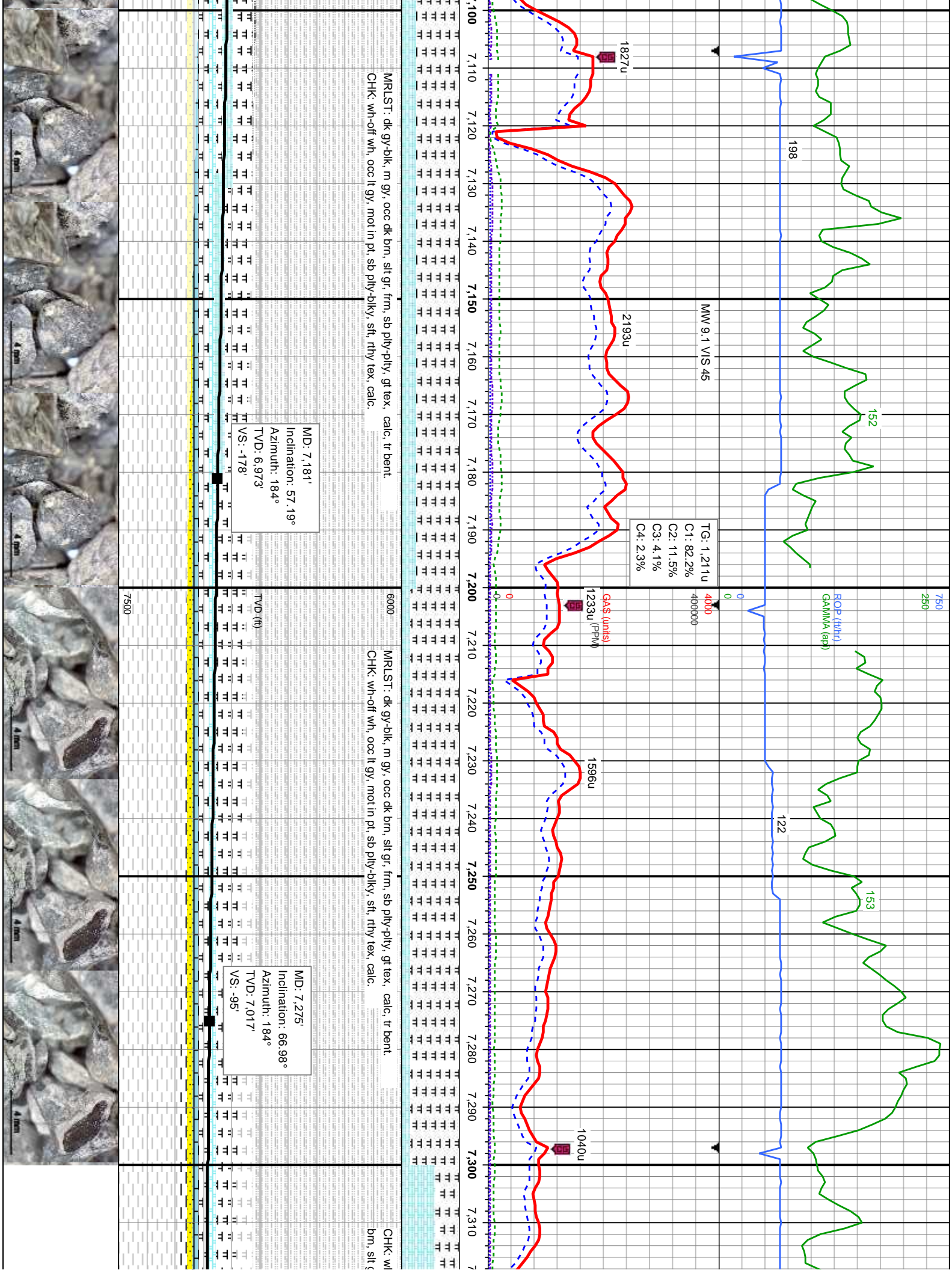
SLTY SH: gy-dk gy, v sft - sft, occ sl frm, sb ply-ply, slty to rthy tex, grdg to slst in pt, v sl calc, tr SLTST: med gy- gy, sl frm, sb blk- occ sb ply, rthy-sly tex, v sl calc.

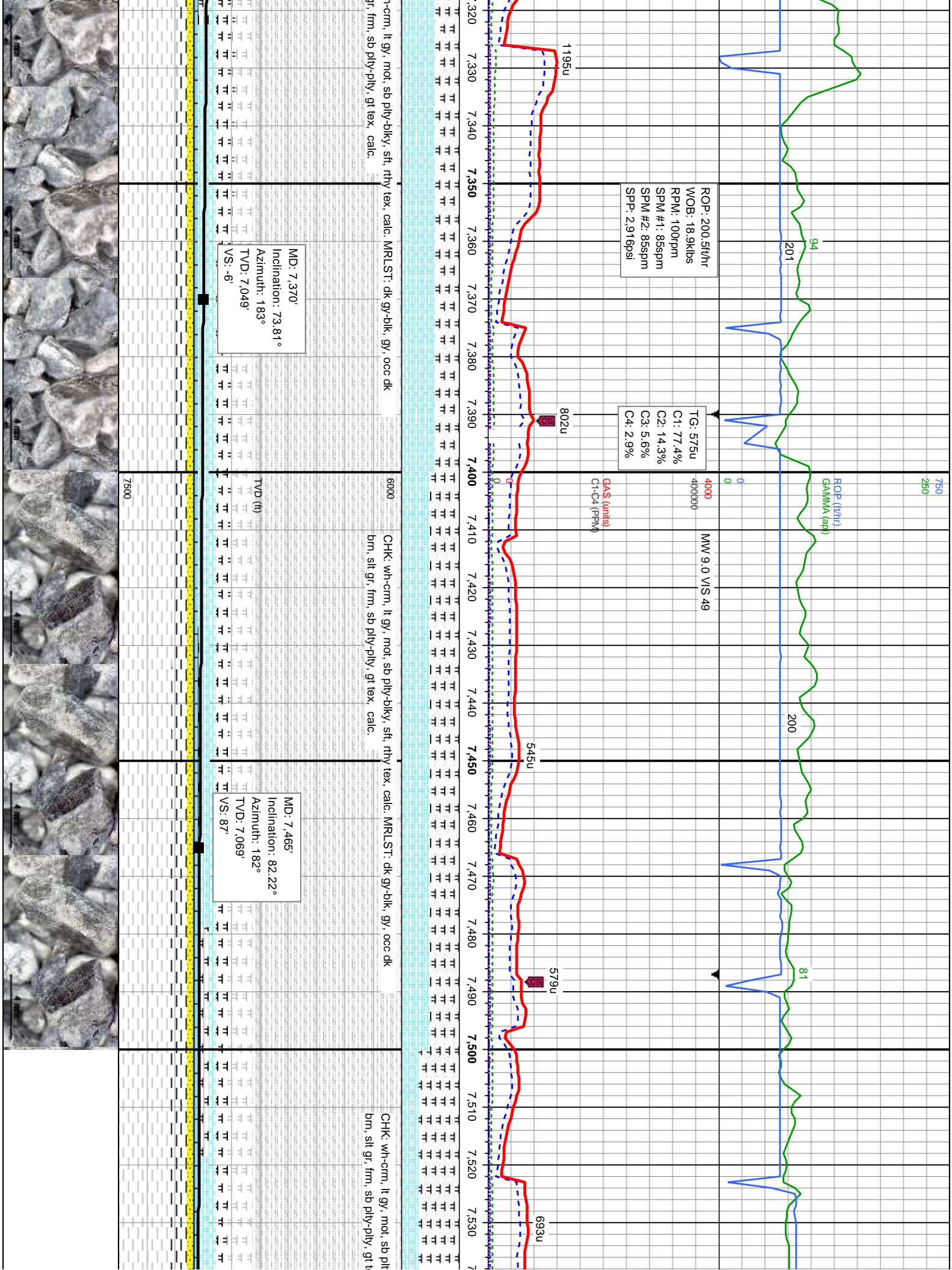
SLTY SH: gy-dk gy, v sft - pt, v sl calc, tr SLTST: med calc.

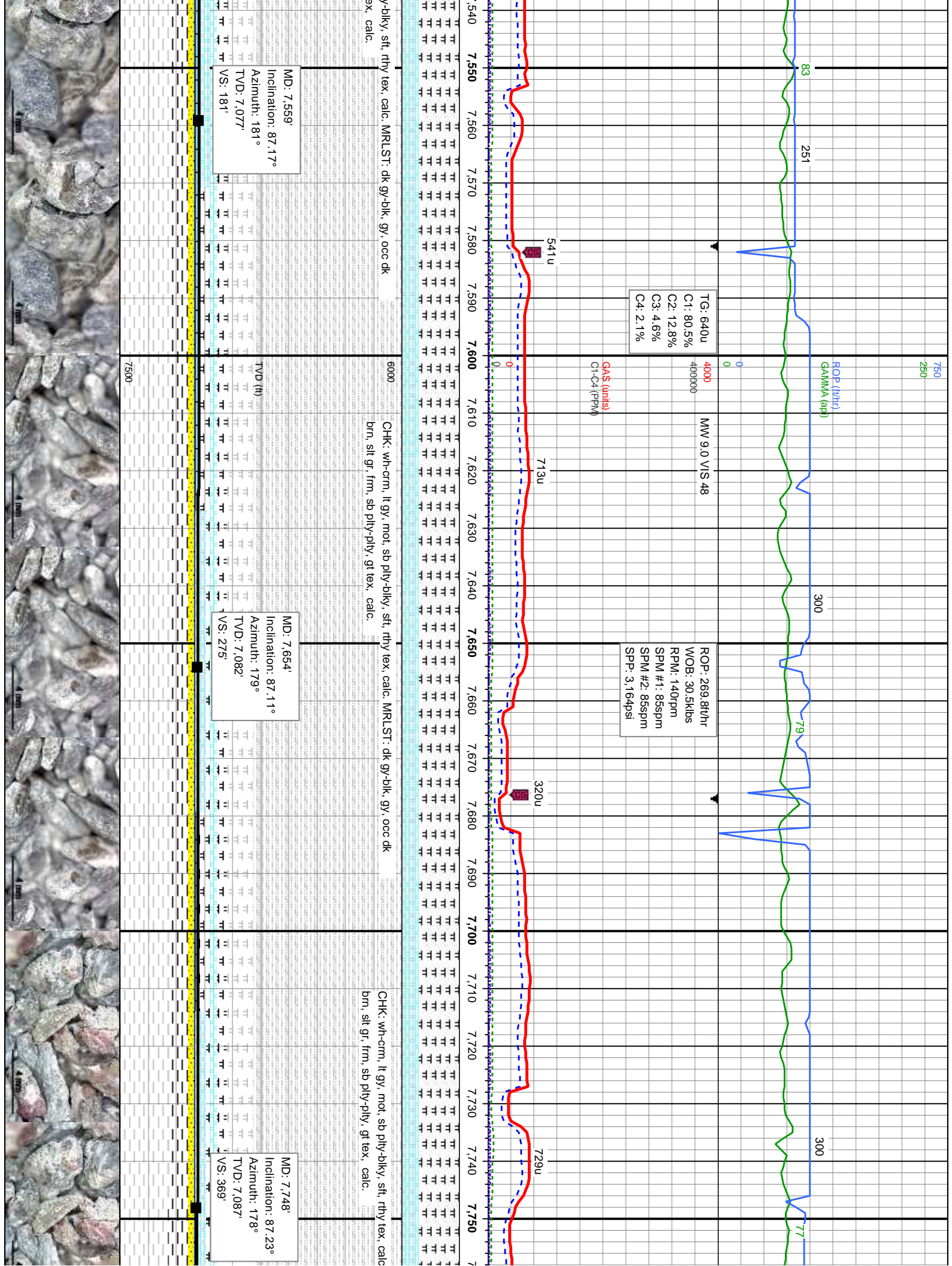


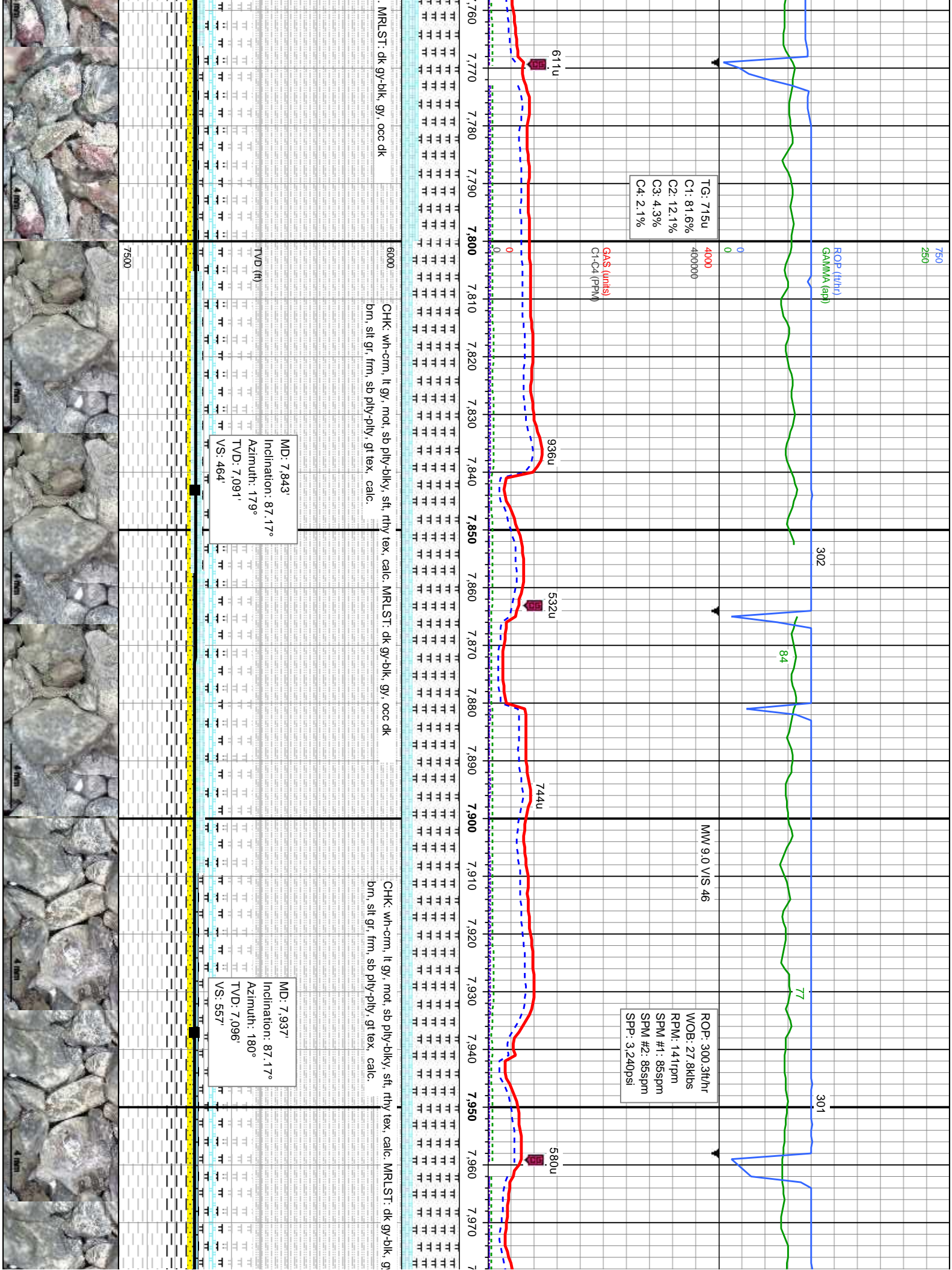


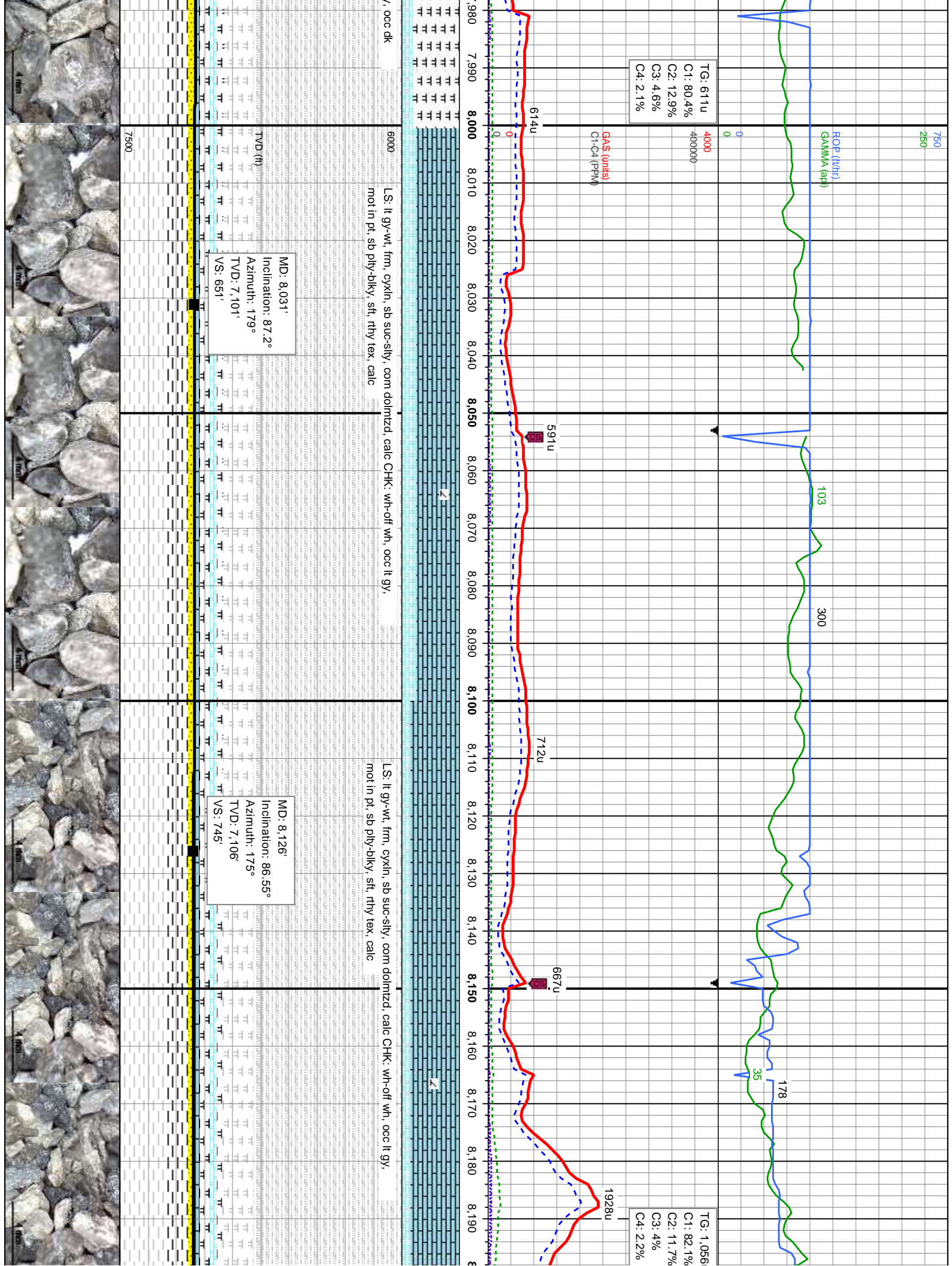


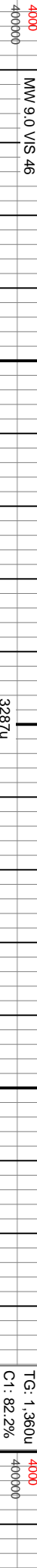
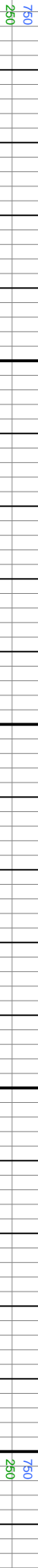






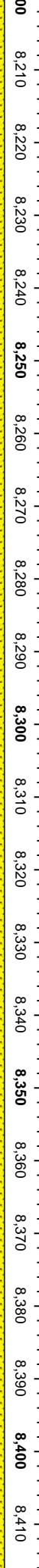






ROP: 300ft/hr
WOB: 13.9kbs
RPM: 110rpm
SPM #1: 73spm
SPM #2: 73spm
SPR: 2.47psi

TG: 1.360u
C1: 82.2%
C2: 11.6%
C3: 4.1%
C4: 2.1%



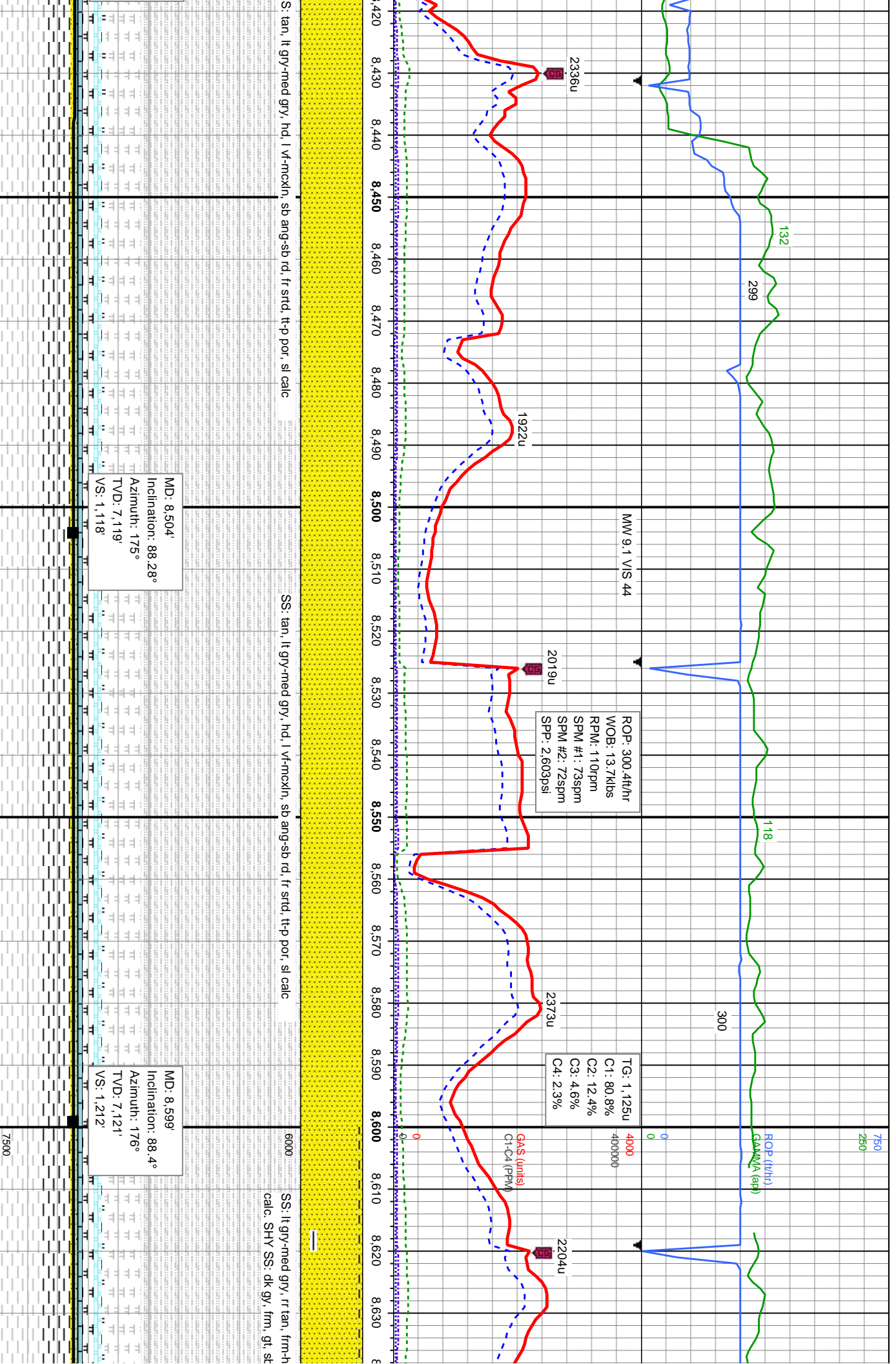
SS: tan, lt gry-med gry, hd, l vf-mcxln, sb ang-sb rd, fr srtld, tt-p por, sl calc LS: lt
gy-wt, frm, cyxln, sb suc-sltly, com dolmztd, calc.

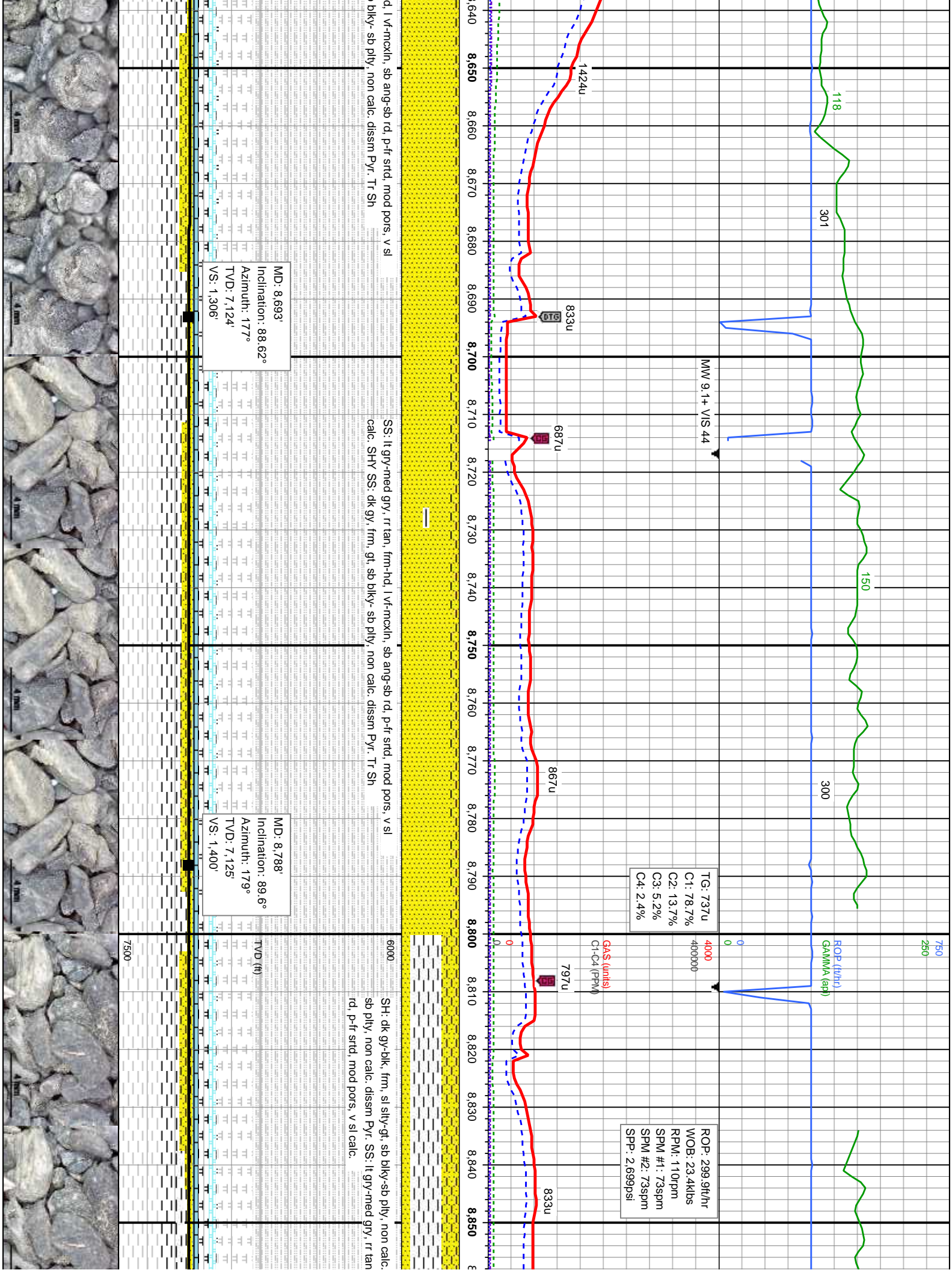
MD: 8,220'
Inclination: 87.23°
Azimuth: 172°
TVD: 7,111'
VS: 838'

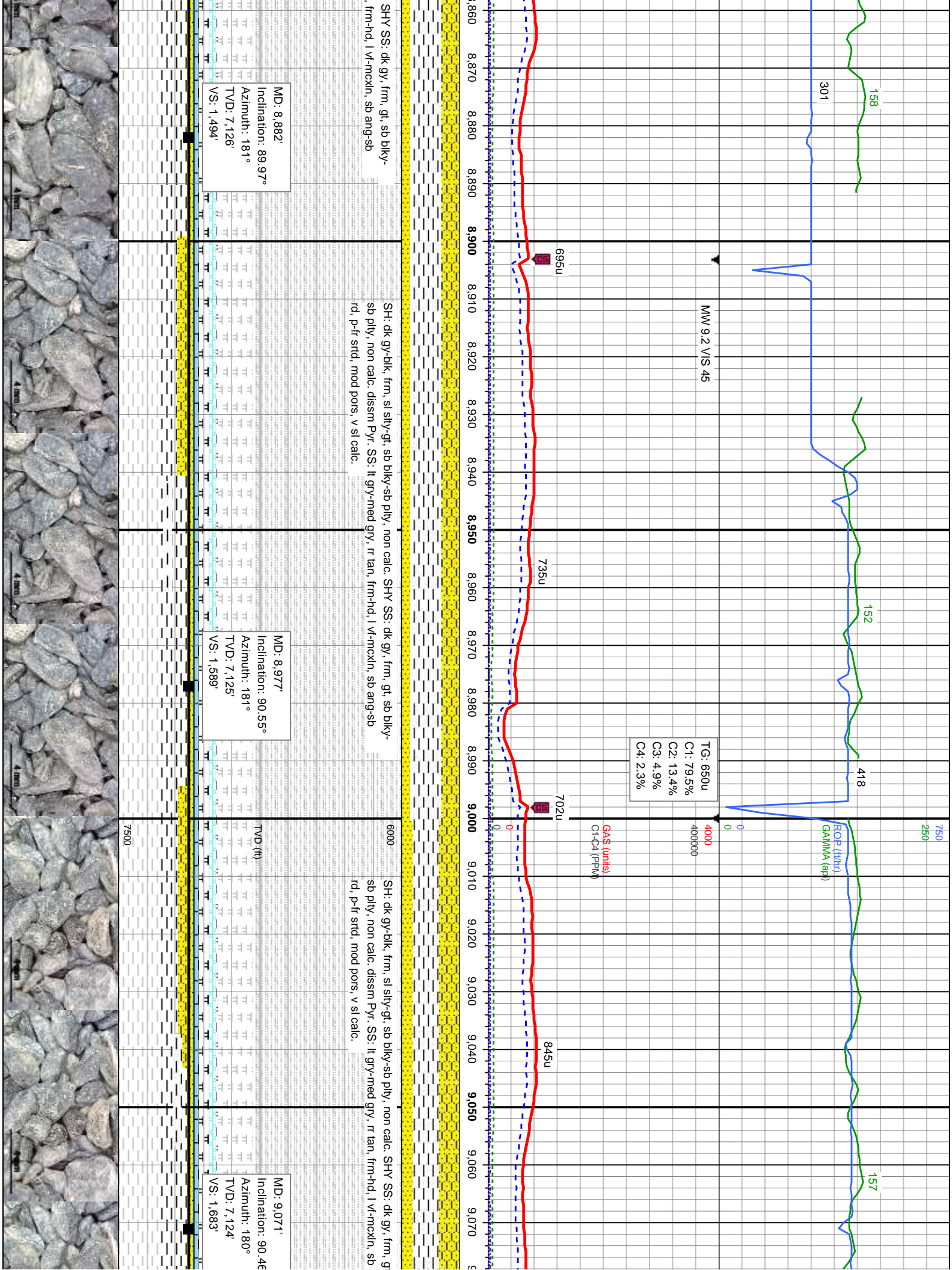
MD: 8,315'
Inclination: 88.15°
Azimuth: 173°
TVD: 7,115'
VS: 931'

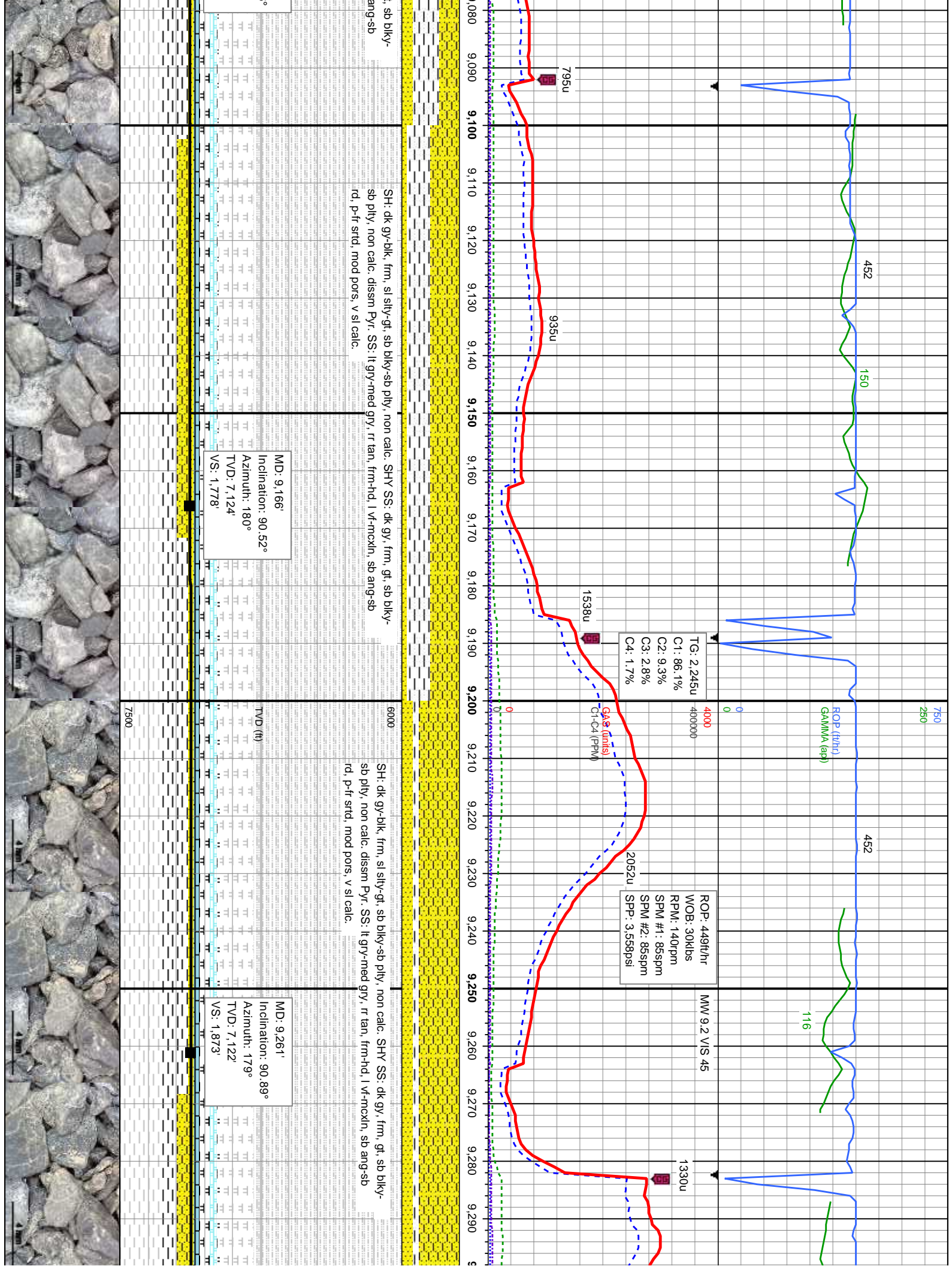
MD: 8,409'
Inclination: 89.42°
Azimuth: 174°
TVD: 7,117'
VS: 1,024'

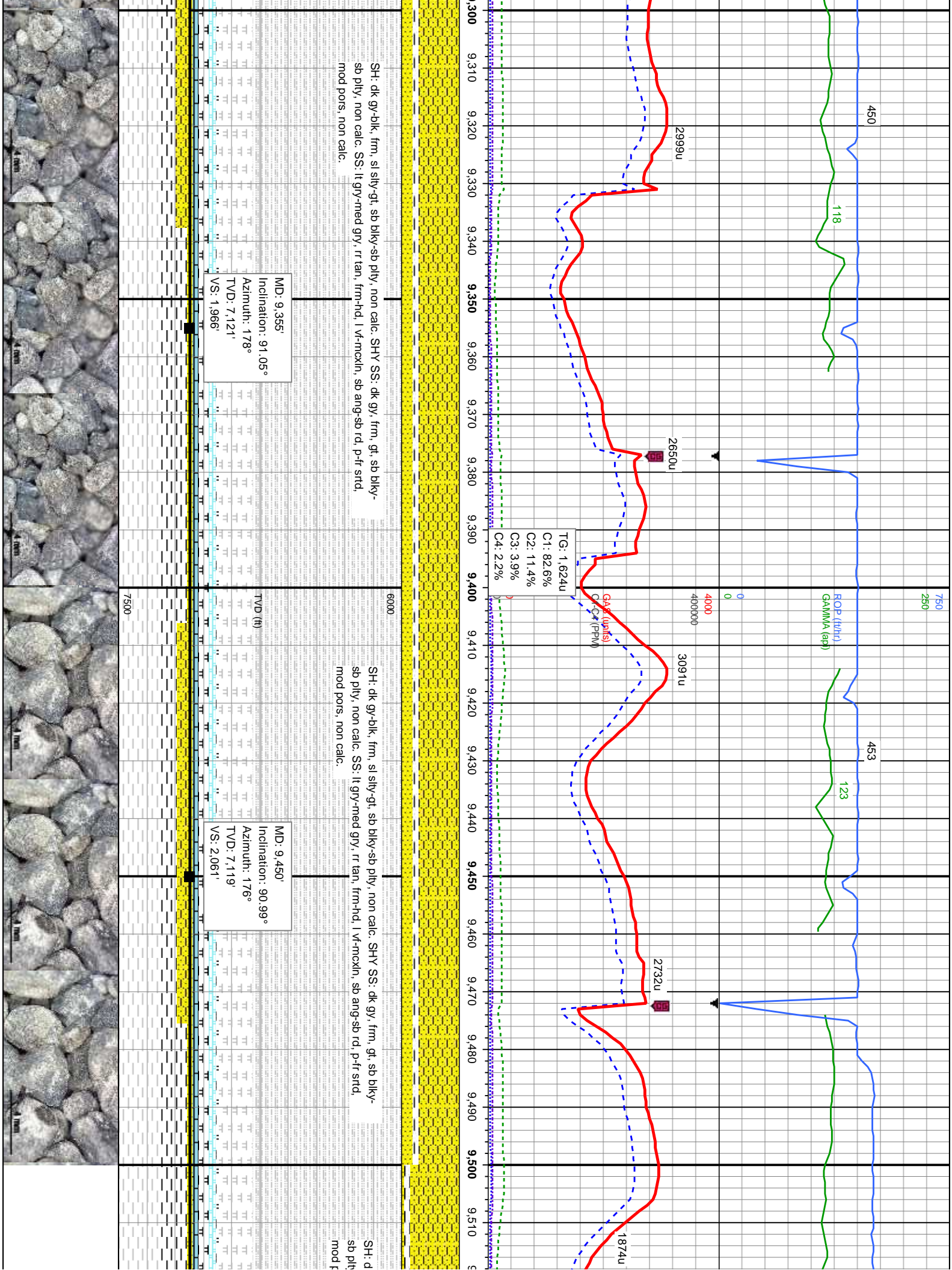


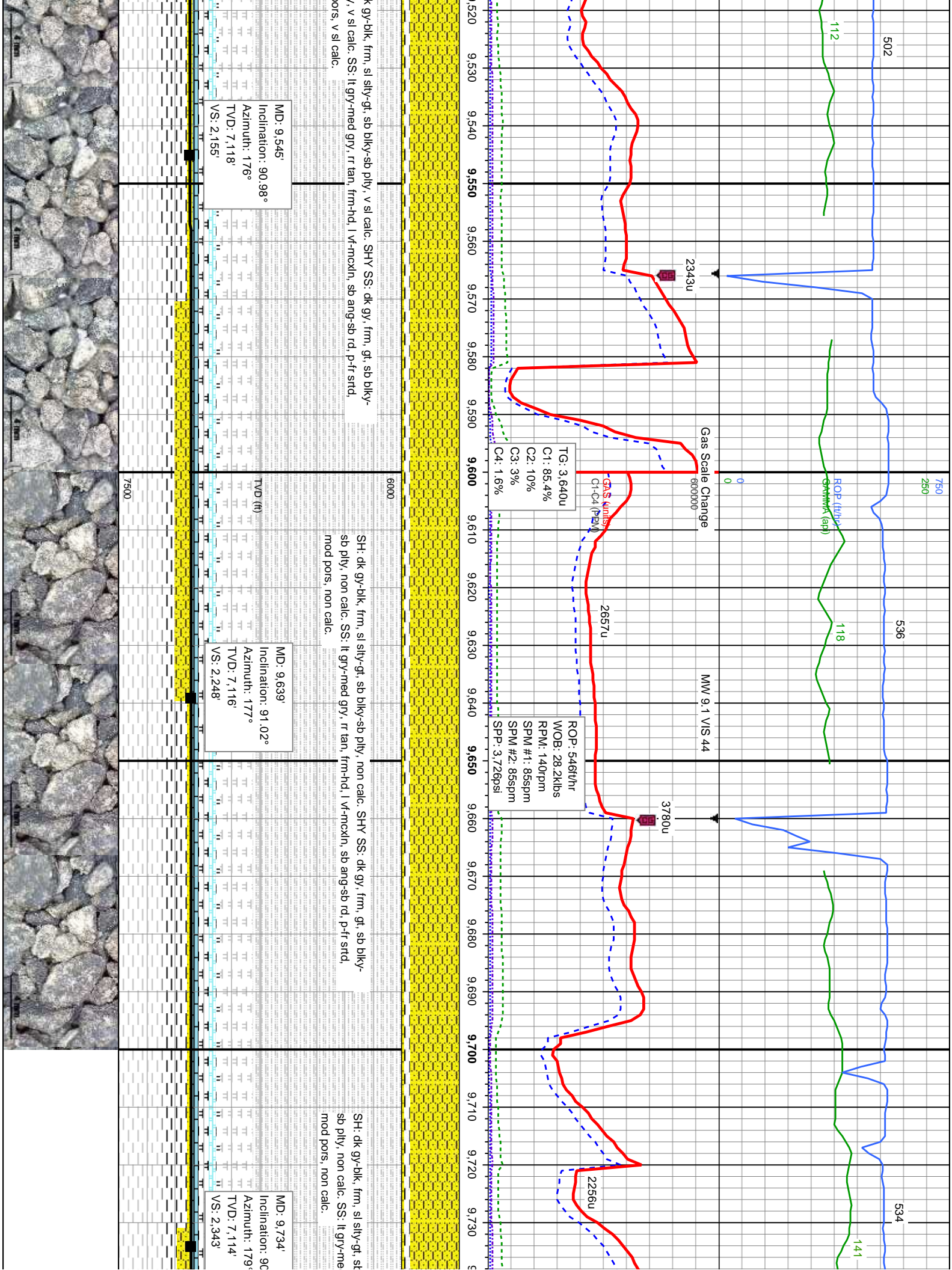


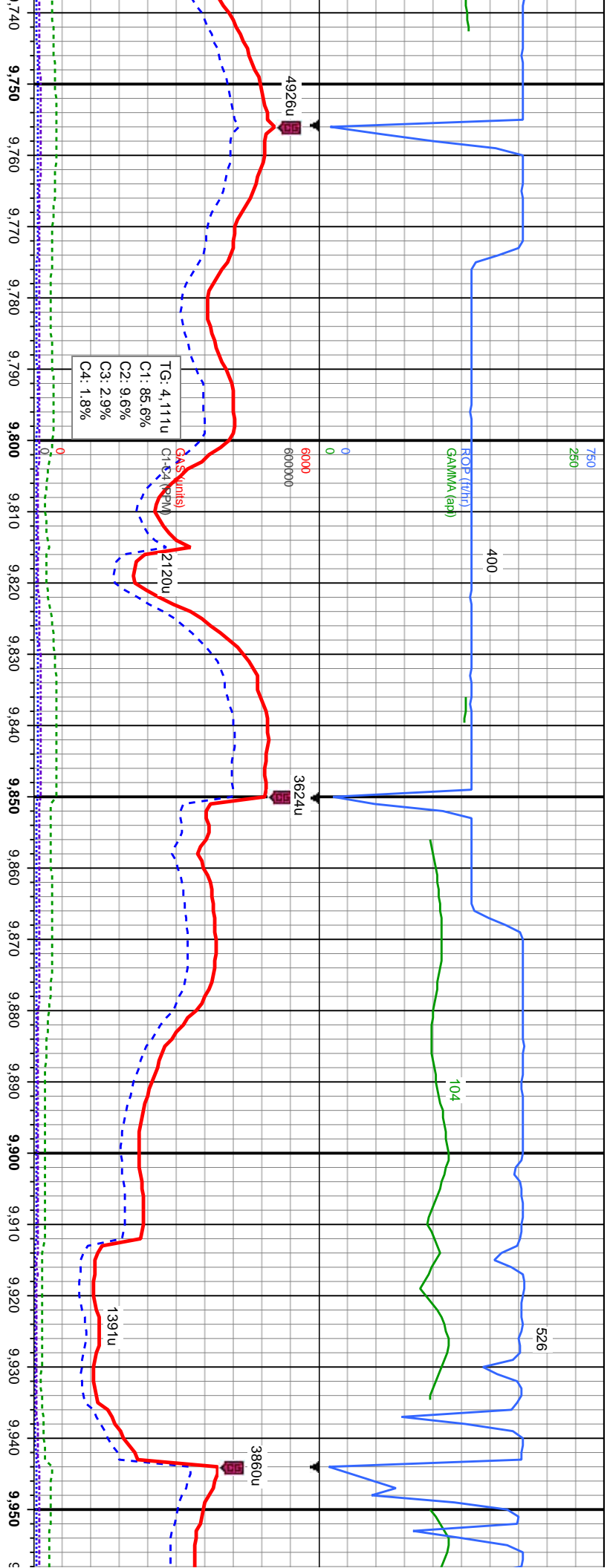












biky-sb pty, non calc. SHY SS: dk gy, frm, gt, sb biky-
gry, rr tan, frm-hd, lv-mckln, sb ang-sb rd, p-fr strd,

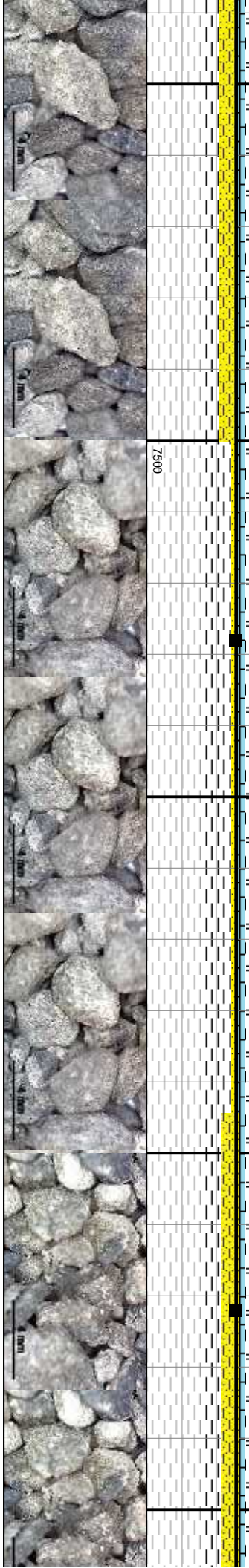
SH: dk gy-blk, frm, sl silty-gt, sb biky-sb pty, non calc. SHY SS: dk gy, frm, gt, sb biky-
sb pty, non calc. SS: lt gry-med gry, rr tan, frm-hd, lv-mckln, sb ang-sb rd, p-fr strd,
mod pors, non calc.

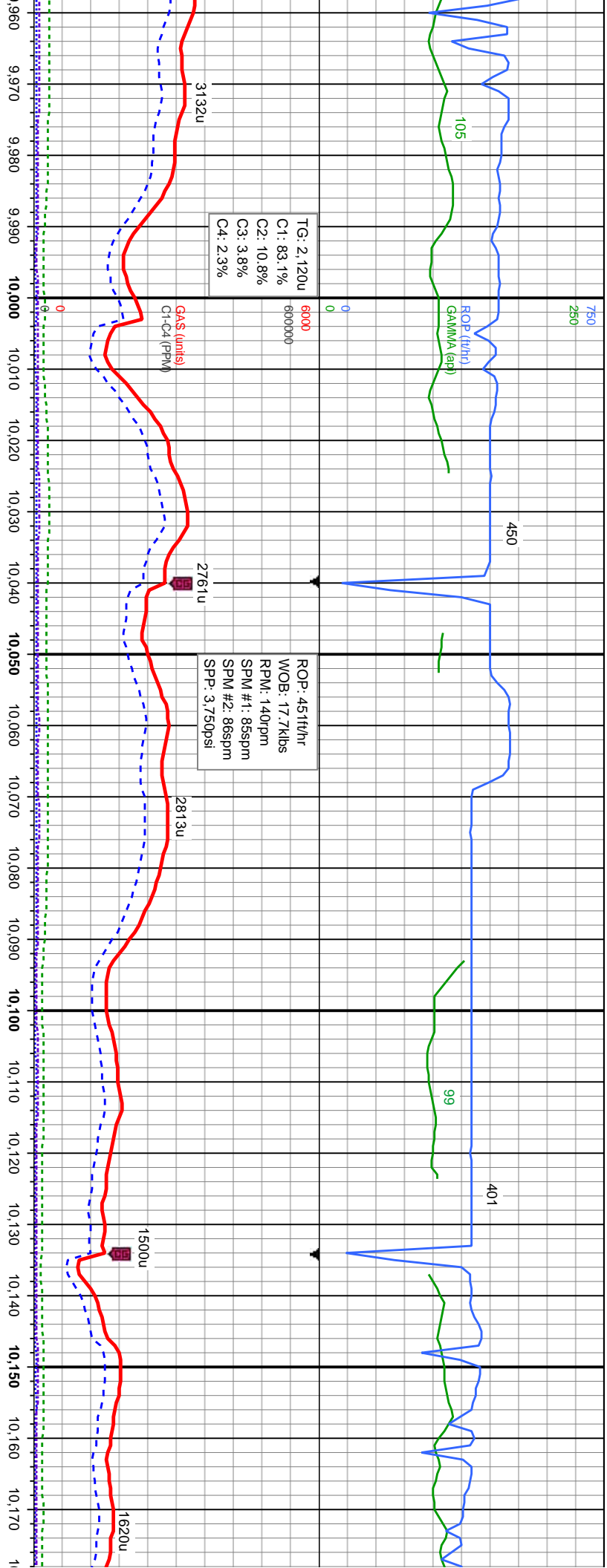
SH: dk gy-blk, frm, sl silty-gt, sb biky-sb pty, non calc.
sb pty, non calc. SS: lt gry-med gry, rr tan, frm-hd, lv
mod pors, non calc.

.89°

MD: 9.828'
Inclination: 90.92°
Azimuth: 179°
TVD: 7.113'
VS: 2.437'

MD: 9.922'
Inclination: 90.43°
Azimuth: 179°
TVD: 7.112'
VS: 2.531'





TG: 2.120u
C1: 83.1%
C2: 10.8%
C3: 3.8%
C4: 2.3%

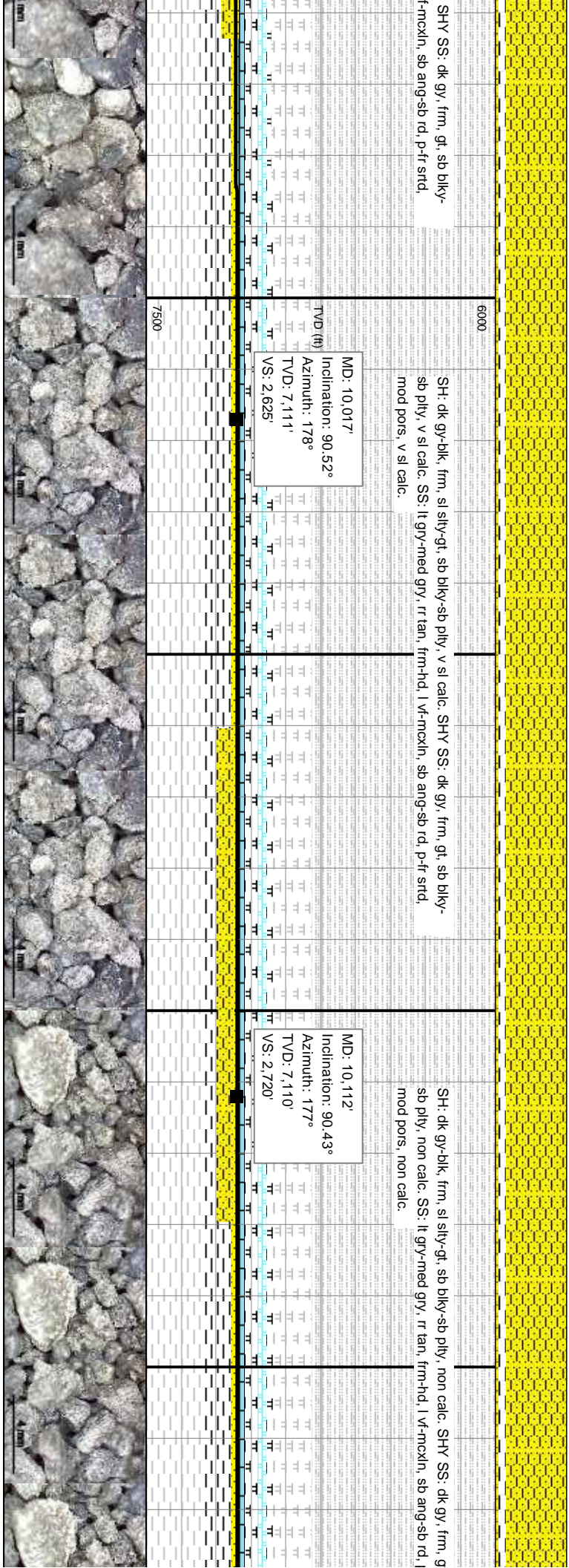
ROP: 451ft/hr
WOB: 17.7kbs
RPM: 140rpm
SPM #1: 85spm
SPM #2: 86spm
SP: 3.750psi

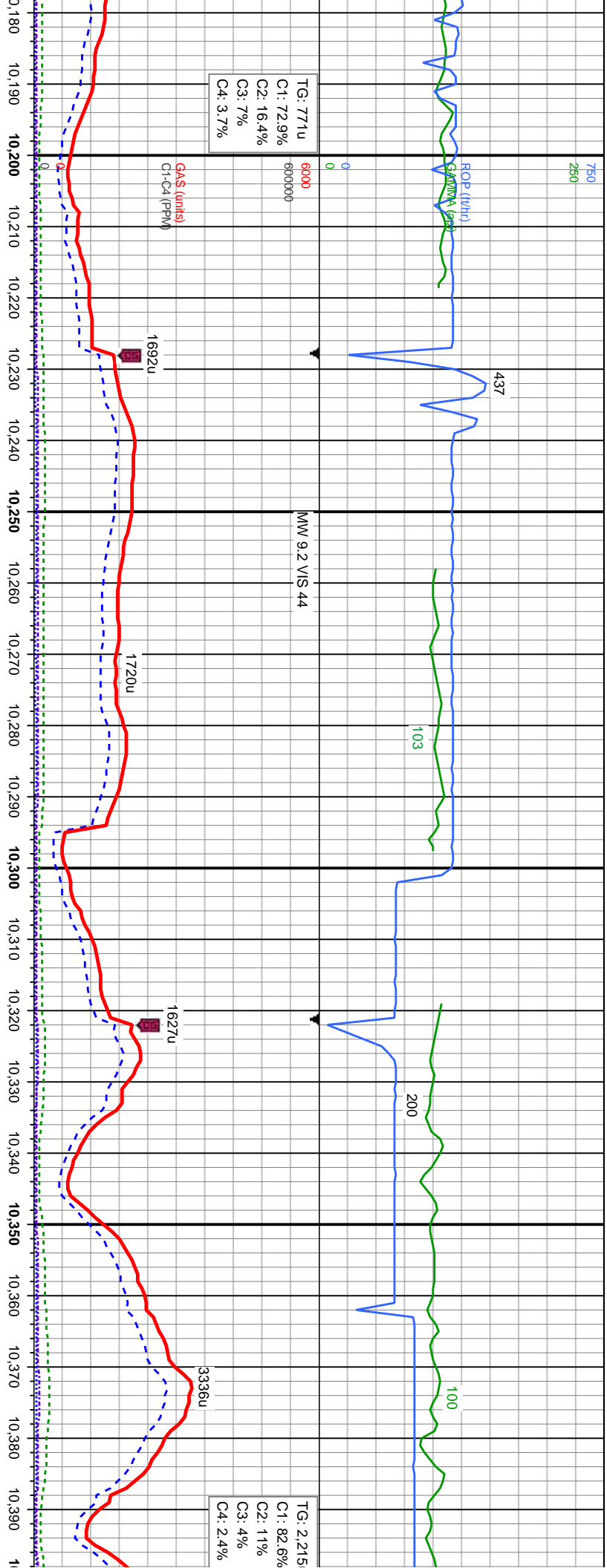
MD: 10.017'
Inclination: 90.52°
Azimuth: 178°
TVD: 7.111'
VS: 2.625'

MD: 10.112'
Inclination: 90.43°
Azimuth: 177°
TVD: 7.110'
VS: 2.720'

SHY SS: dk gy, frm, gt, sb blk-
f-mcn, sb ang-sb rd, p-fr srd,
SH: dk gy-blk, frm, sl silty-gt, sb blk-sb ply, v sl calc. SHY SS: dk gy, frm, gt, sb blk-
sb ply, v sl calc. SS: lt gry-med gry, rr tan, frm-hd, l v-mcn, sb ang-sb rd, p-fr srd,
mod por, v sl calc.

SH: dk gy-blk, frm, sl silty-gt, sb blk-sb ply, non calc. SHY SS: dk gy, frm, g
sb ply, non calc. SS: lt gry-med gry, rr tan, frm-hd, l v-mcn, sb ang-sb rd, l
mod por, non calc.





6000

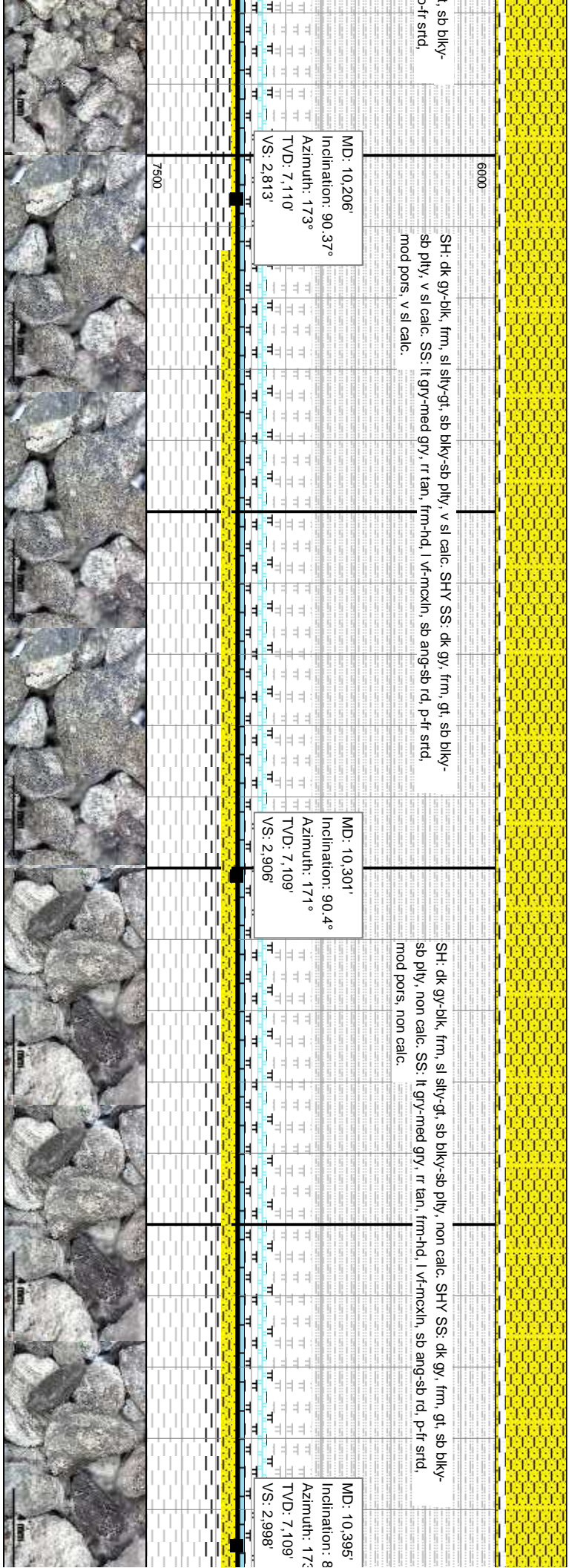
SH: dk gy-blk, frm, sl silty-gt, sb blk-y-sb pily, v sl calc. SHY SS: dk gy, frm, gt, sb blk-y-sb pily, v sl calc. SS: lt gry-med gry, rr tan, frm-hd, l vf-mcxln, sb ang-sb rd, p-fr strd, mod pors, v sl calc.

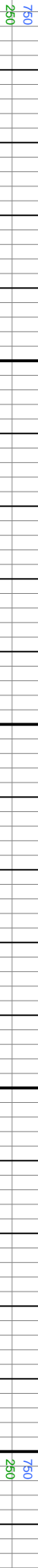
MD: 10,206'
Inclination: 90.37°
Azimuth: 173°
TVD: 7,110'
VS: 2.813'

MD: 10,301'
Inclination: 90.4°
Azimuth: 171°
TVD: 7,109'
VS: 2.906'

SH: dk gy-blk, frm, sl silty-gt, sb blk-y-sb pily, non calc. SHY SS: dk gy, frm, gt, sb blk-y-sb pily, non calc. SS: lt gry-med gry, rr tan, frm-hd, l vf-mcxln, sb ang-sb rd, p-fr strd, mod pors, non calc.

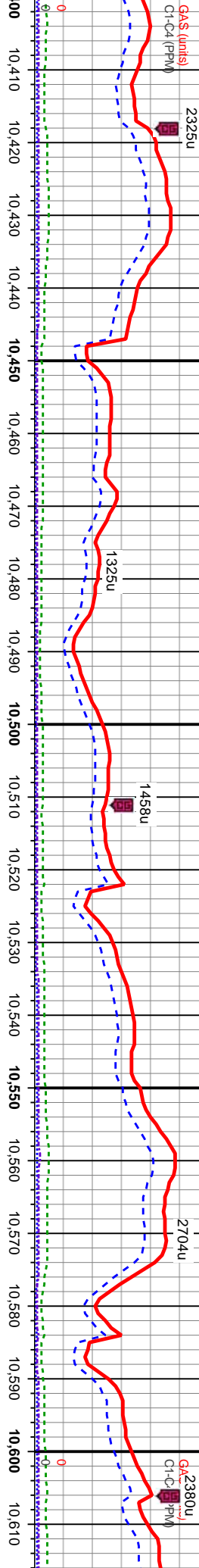
MD: 10,395'
Inclination: 8°
Azimuth: 173°
TVD: 7,109'
VS: 2.998'





ROP: 249ft/hr
WOB: 10.8klbs
RPM: 141rpm
SPM #1: 86spm
SPM #2: 86spm
SPP: 3.485psi

TG: 2.009u
C1: 82.1%
C2: 11.2%
C3: 4.1%
C4: 2.5%

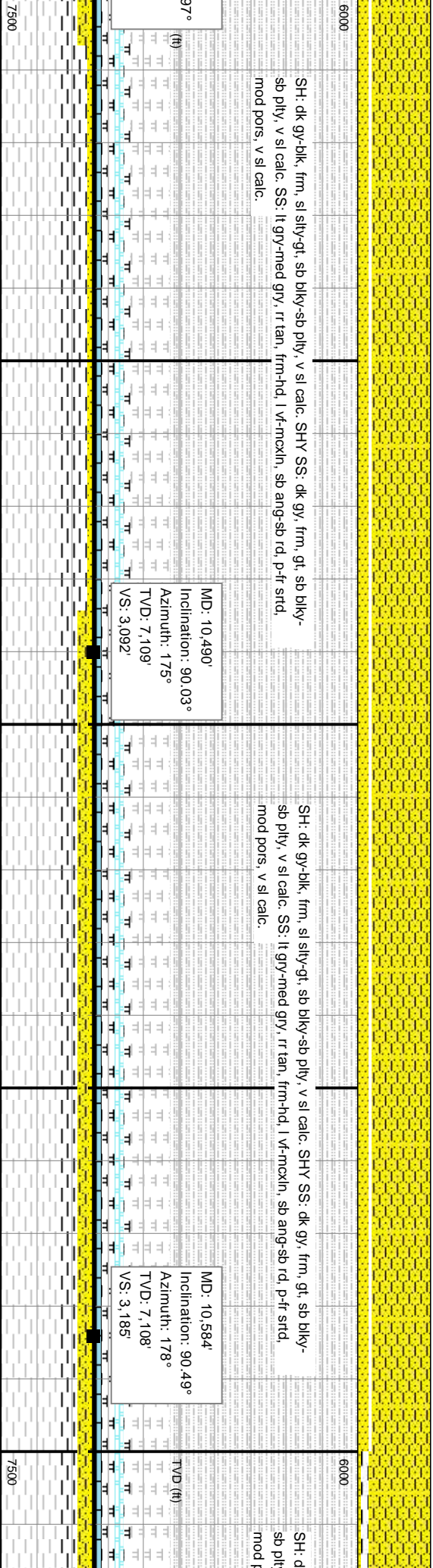


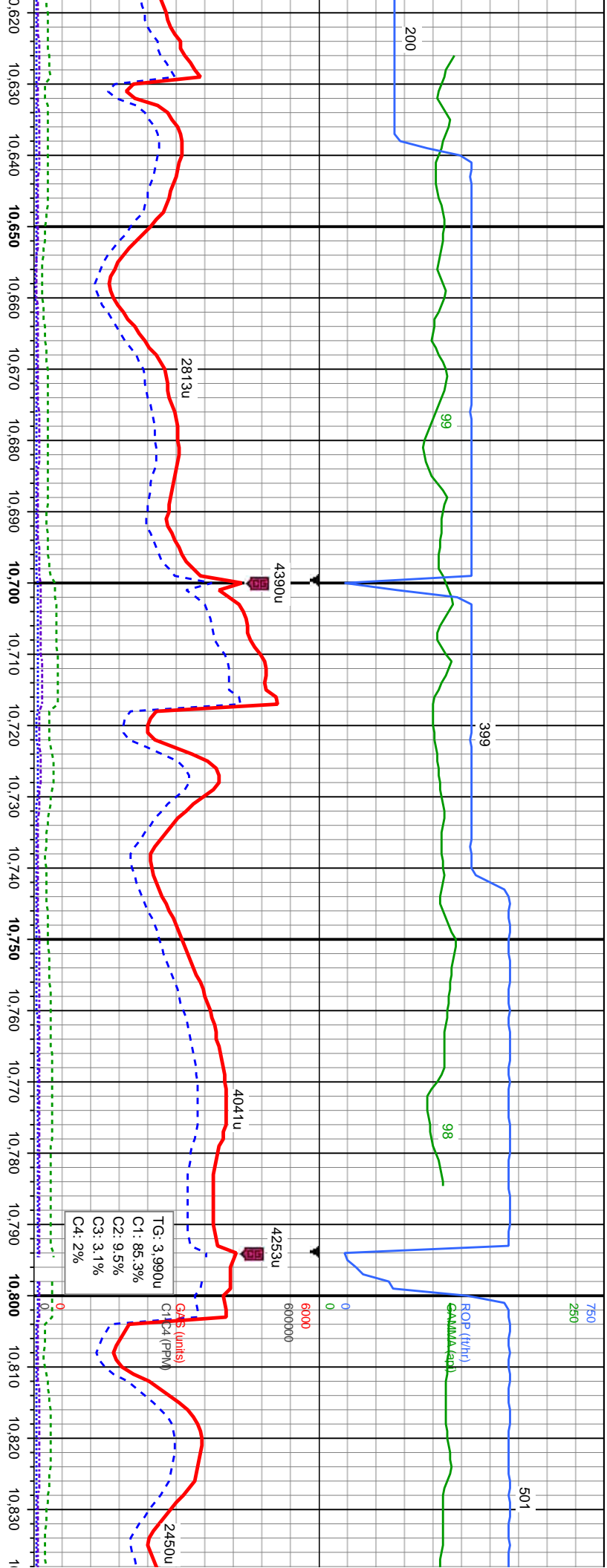
SH: dk. gy-blk, frm, sl silty-gt, sb blk-y-sb pily, v sl calc. SHY SS: dk gy, frm, gt, sb blk-y-sb pily, v sl calc. SS: lt gry-med gry, rrtan, frm-hd, l vf-mcxln, sb ang-sb rd, p-fr strd, mod pors, v sl calc.

SH: dk. gy-blk, frm, sl silty-gt, sb blk-y-sb pily, v sl calc. SHY SS: dk gy, frm, gt, sb blk-y-sb pily, v sl calc. SS: lt gry-med gry, rrtan, frm-hd, l vf-mcxln, sb ang-sb rd, p-fr strd, mod pors, v sl calc.

MD: 10.490'
Inclination: 90.03°
Azimuth: 175°
TVD: 7.109'
VS: 3.092'

MD: 10.584'
Inclination: 90.49°
Azimuth: 178°
TVD: 7.108'
VS: 3.185'





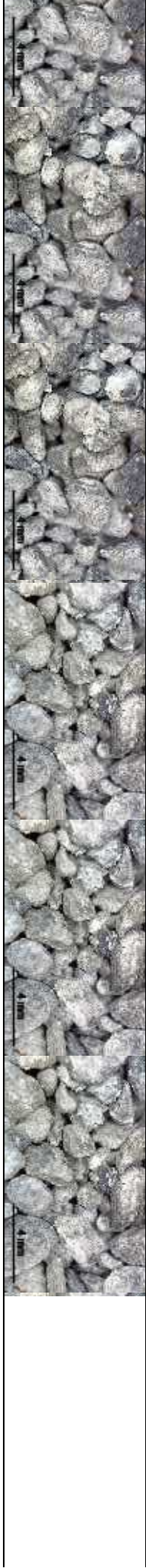
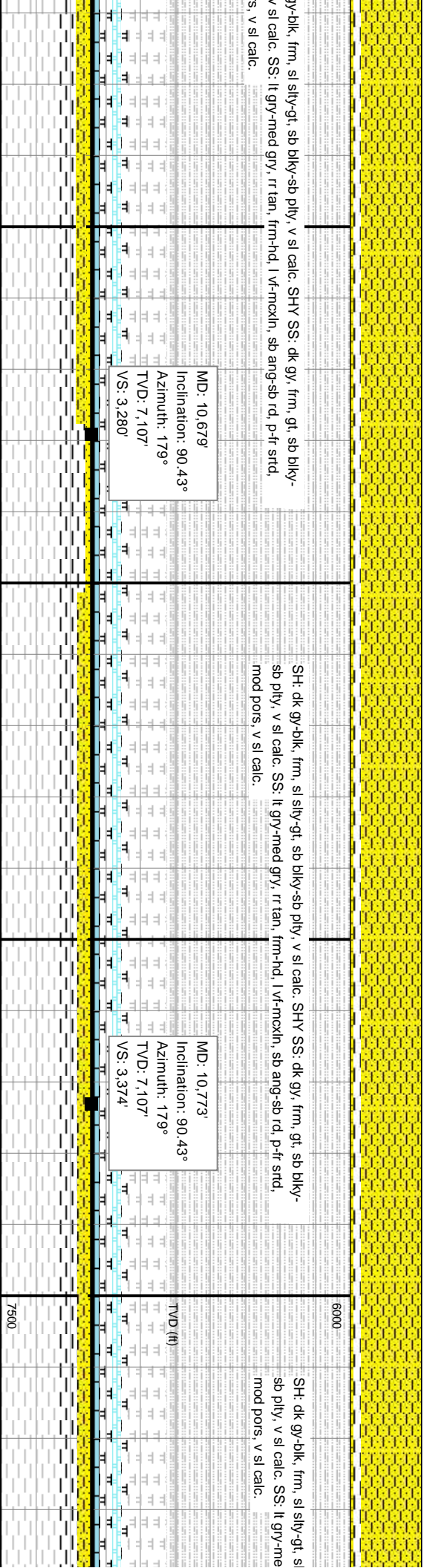
gy-blk, frm, sl silty-gt, sb blk-ly-sb pty, v sl calc. SHY SS: dk gy, frm, gt, sb blk-ly-sb pty, v sl calc. SS: lt gry-med gry, rr tan, frm-hd, l vf-mcxl, sb ang-sb rd, p-fr strd, s, v sl calc.

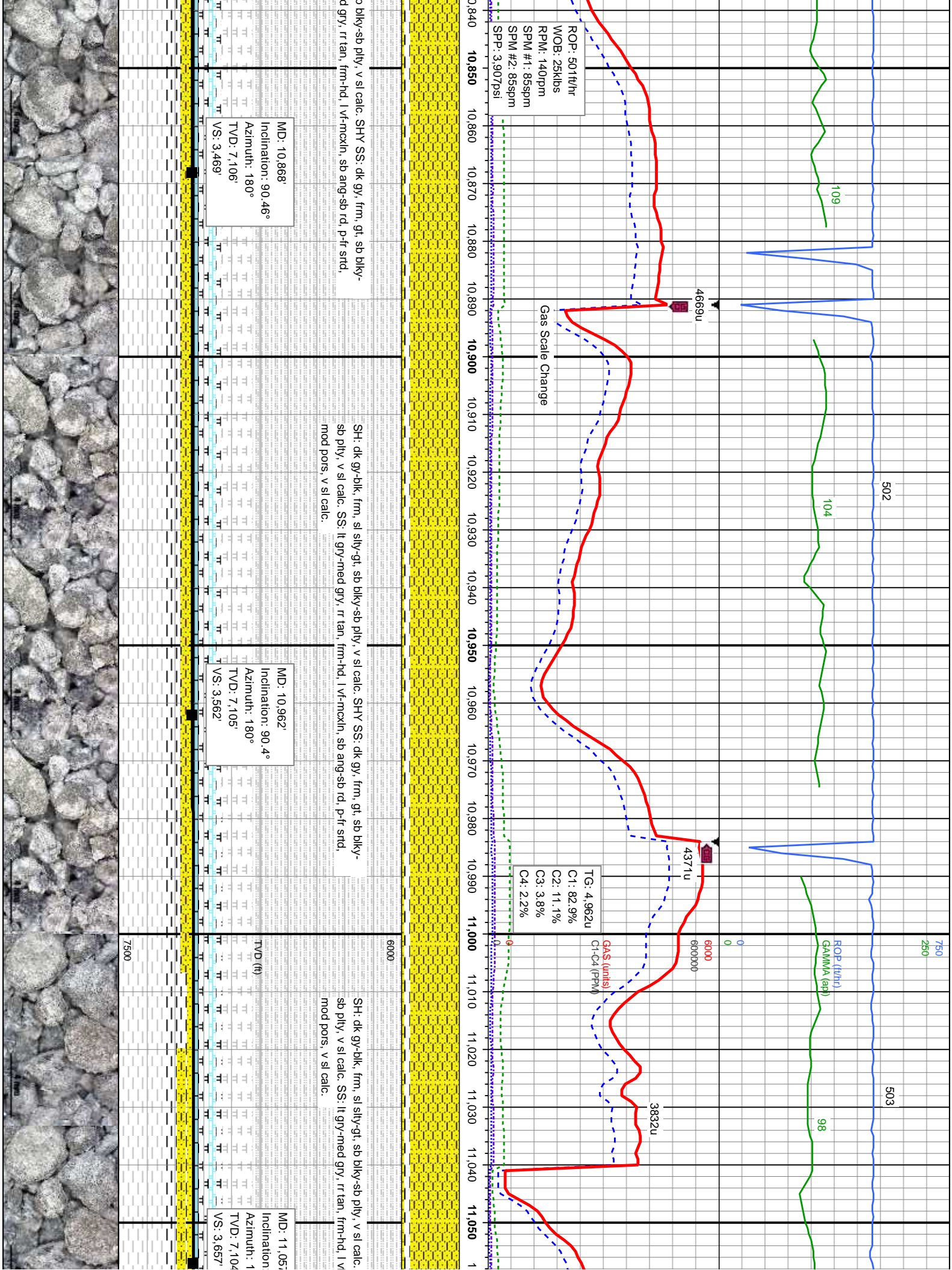
SH: dk gy-blk, frm, sl silty-gt, sb blk-ly-sb pty, v sl calc. SHY SS: dk gy, frm, gt, sb blk-ly-sb pty, v sl calc. SS: lt gry-med gry, rr tan, frm-hd, l vf-mcxl, sb ang-sb rd, p-fr strd, mod pors, v sl calc.

SH: dk gy-blk, frm, sl silty-gt, sb blk-ly-sb pty, v sl calc. SS: lt gry-me mod pors, v sl calc.

MD: 10,679'
Inclination: 90.43°
Azimuth: 179°
TVD: 7,107'
VS: 3,280'

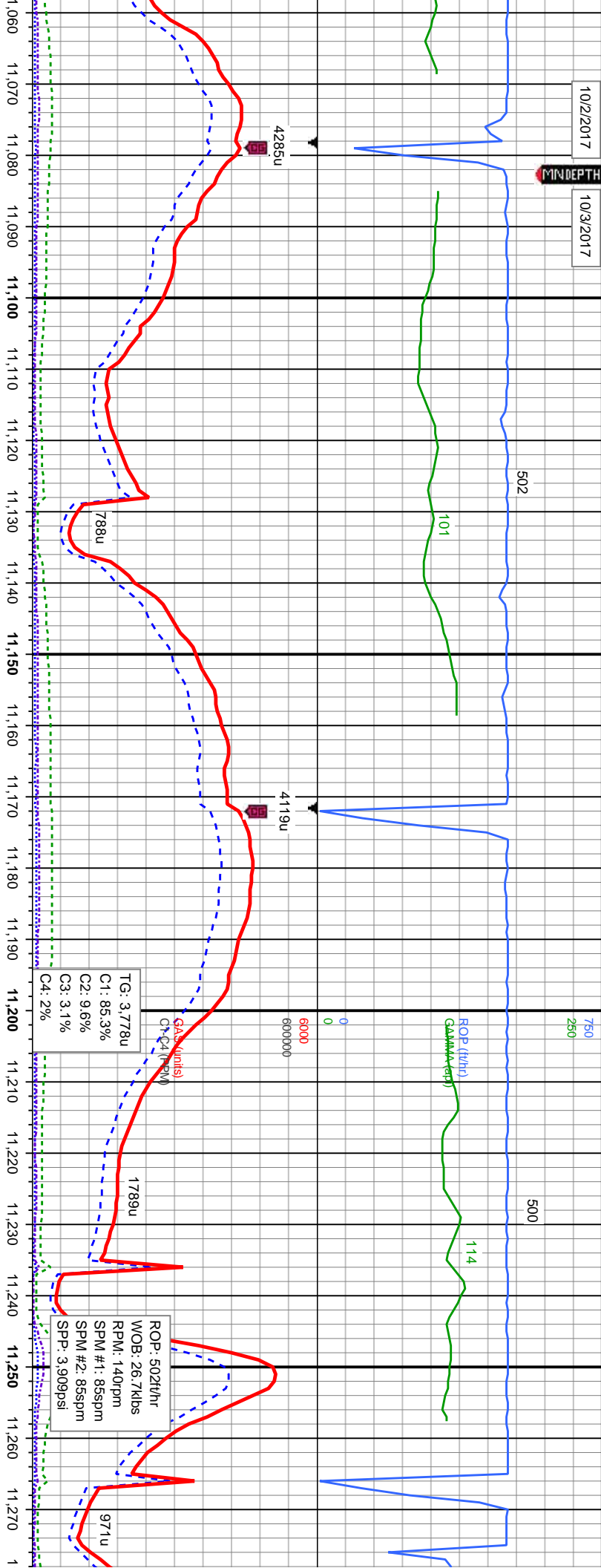
MD: 10,773'
Inclination: 90.43°
Azimuth: 179°
TVD: 7,107'
VS: 3,374'





10/3/2017

MNDEPTH



SHY SS: dk gy, frm, gt, sb blk-
-mcln, sb ang-sb rd, p-fr strd,

SH: dk, gy-blk, frm, sl slfy-gt, sb blk-y-sb ply, v sl calc. SHY SS: dk gy, frm, gt, sb blk-y-sb ply, v sl calc. SS: lt gry-med gy, r r tan, frm-hd, l v-f-mcxl, sb ang-sb rd, p-fr strd, mod pors, v sl calc.

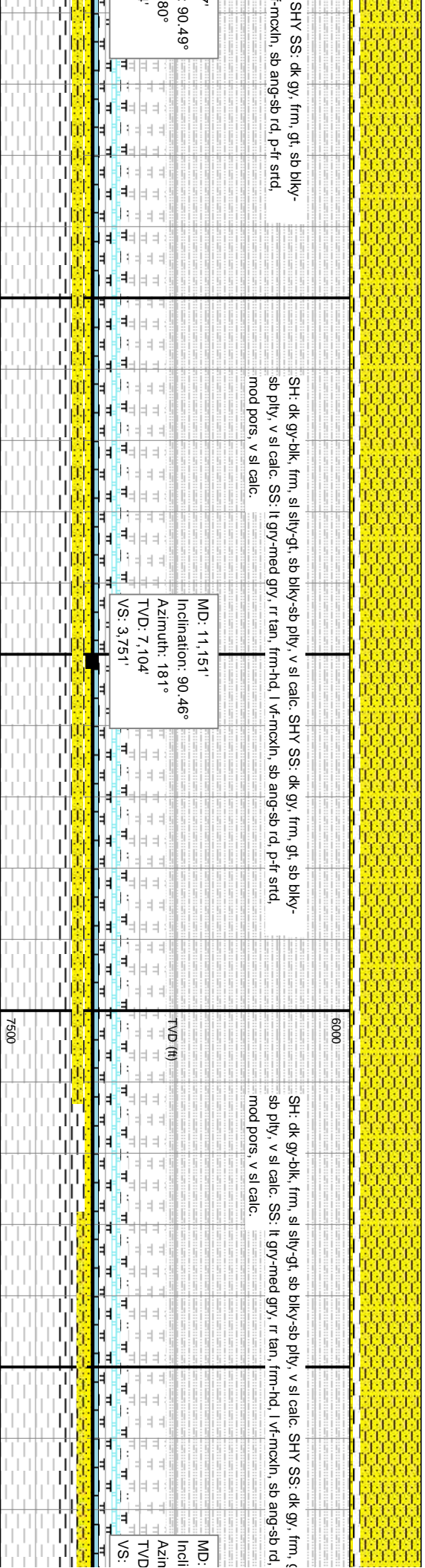
SH: dk gy-blik, frm, sl silty-gt, sb blyk-sb ply, v sl calc. SHY SS: dk gy, frm, s
sb ply, v sl calc. SS: lt gry-med gry, r tan, frm-hd, l vf-mcxlh, sb ang-sb rd,
mod pors, v sl calc.

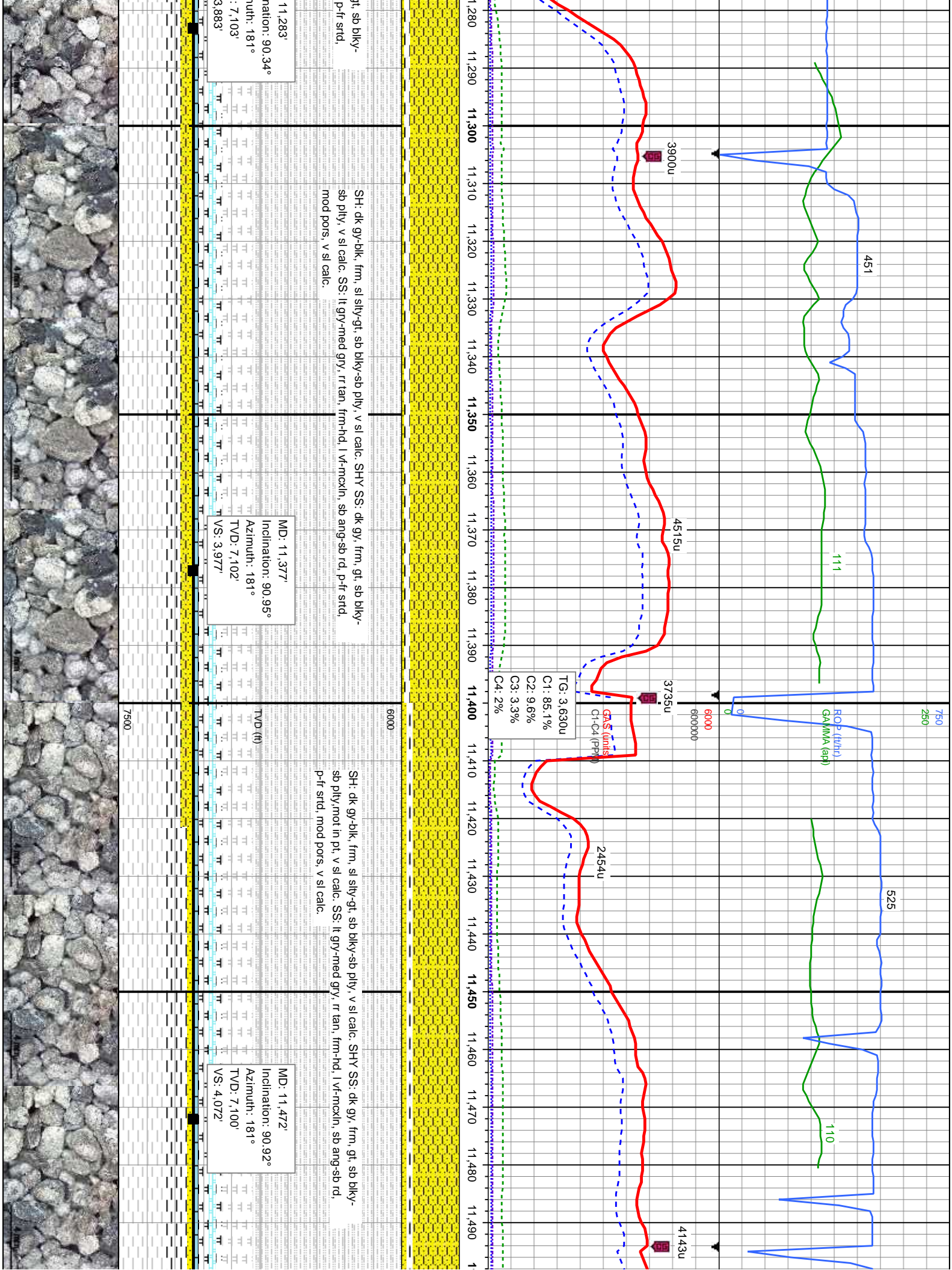
90.49°
80°

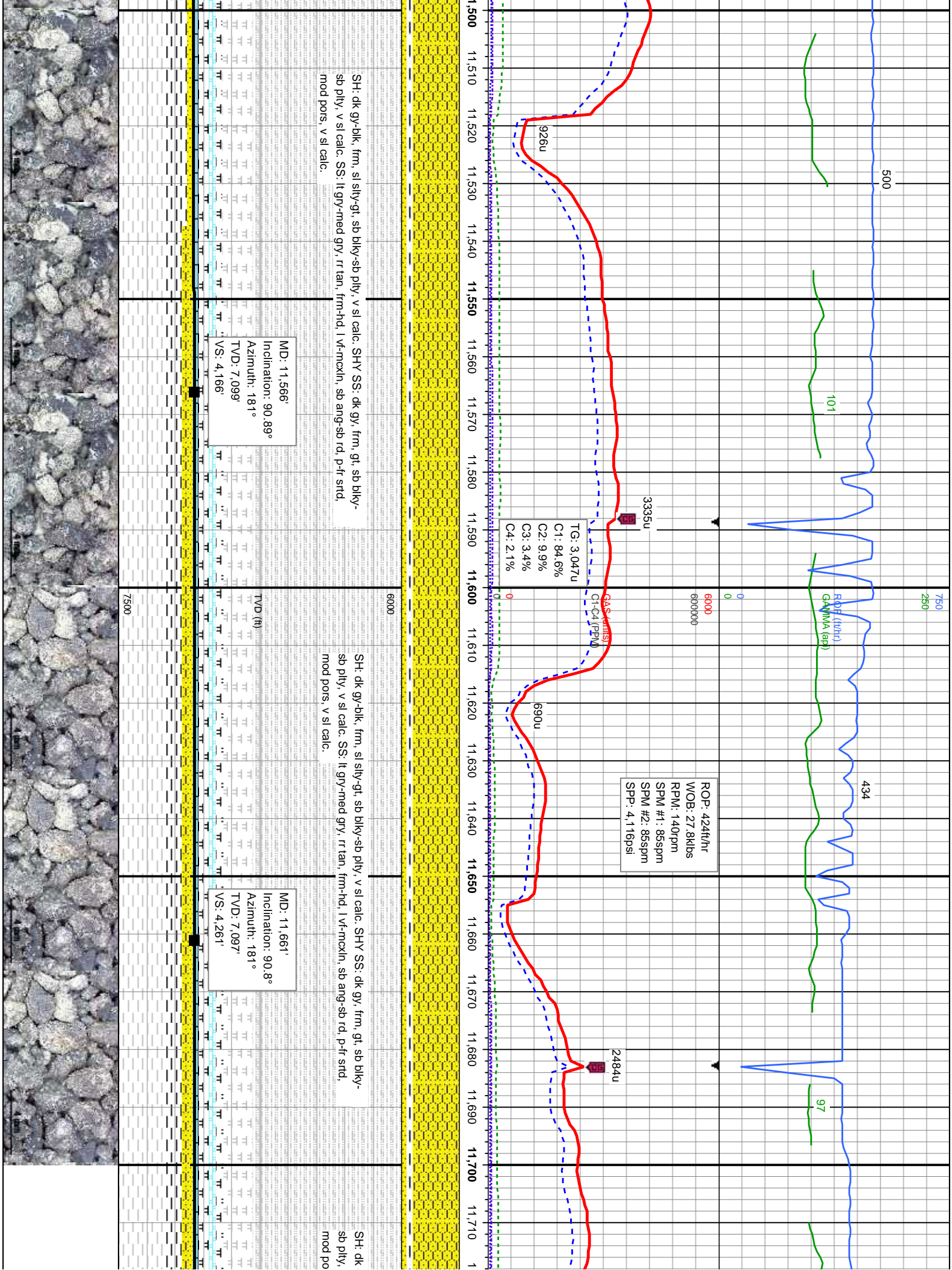
MD: 11,151'
Inclination: 90.46°
Azimuth: 181°
TVD: 7,104'
VS: 3,751'

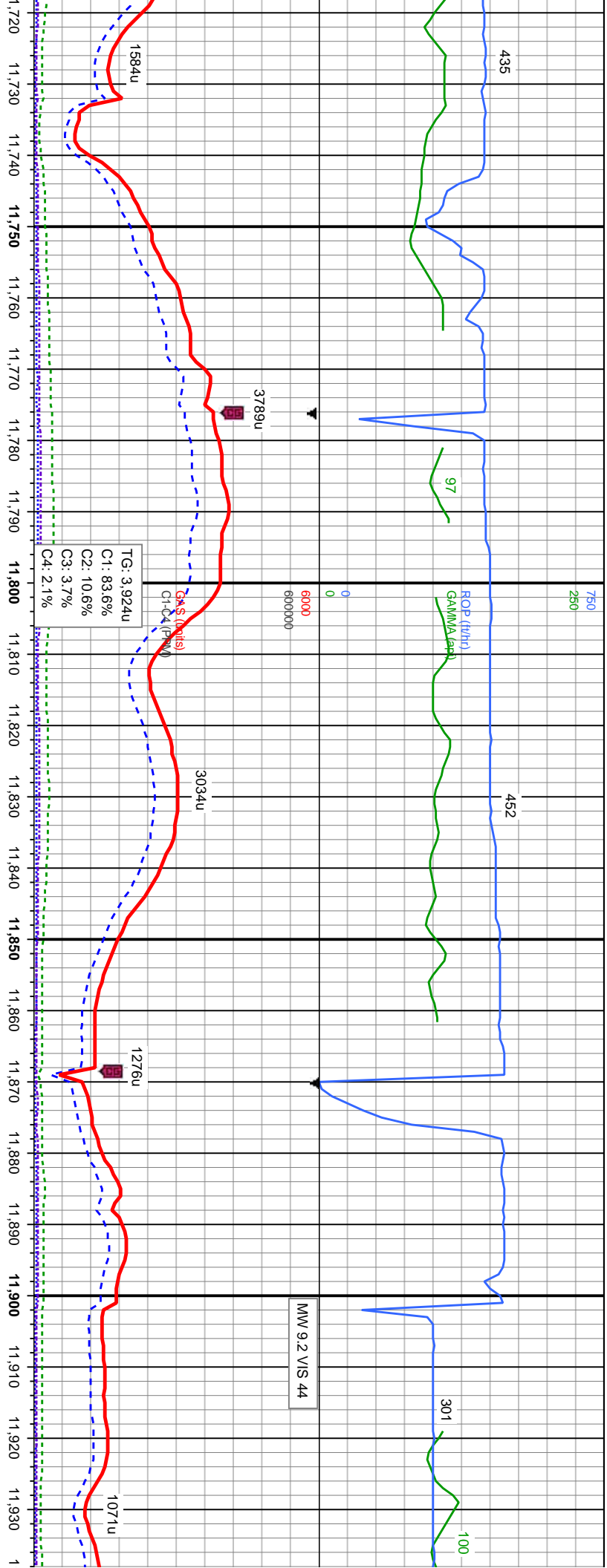
TVD (ft)

MD:
Incli
Azin
TVD
VS:







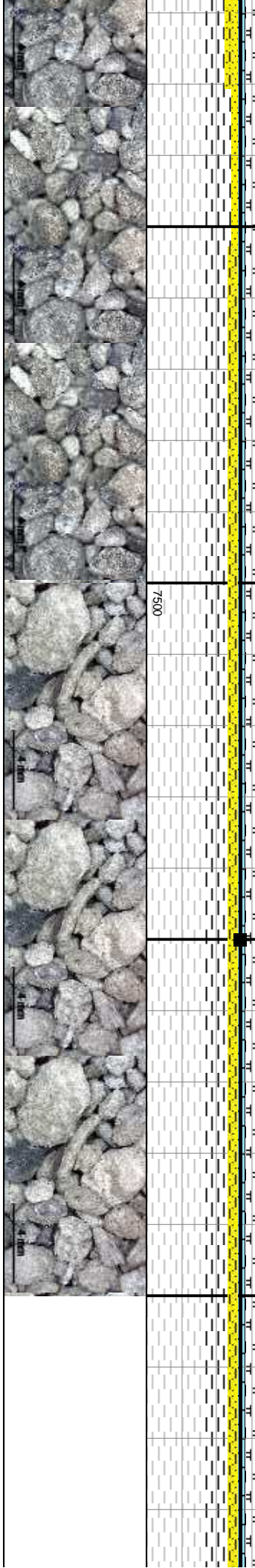


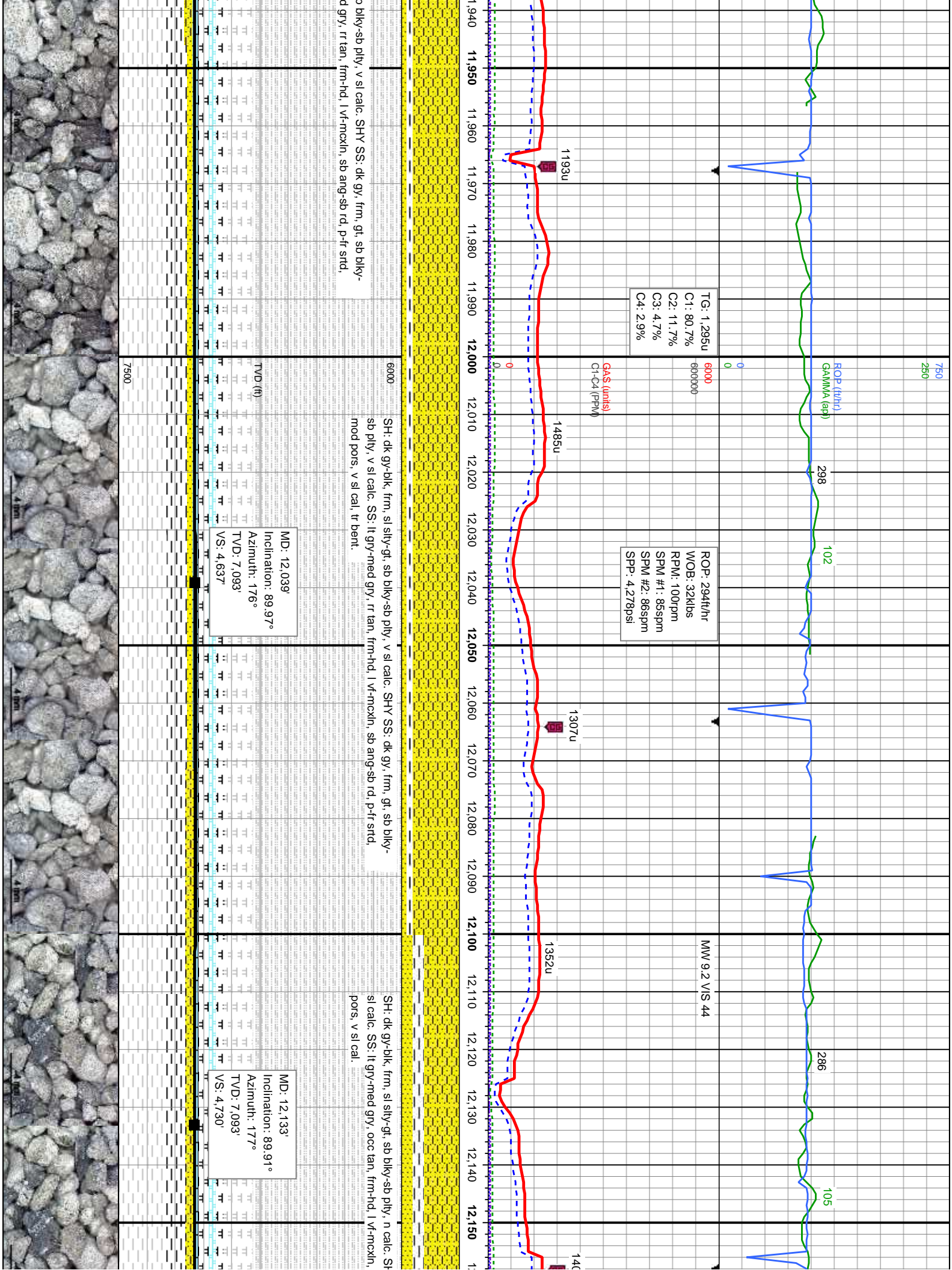
gy-blk, frm, sl silty-gt, sb blkly-sb ply, v sl calc. SHY SS: dk gy, frm, gt, sb blkly-sb ply, v sl calc. SS: lt gry-med gry, rr tan, frm-hd, l vf-mcxln, sb ang-sb rd, p-fr strd, mod pors, v sl calc, tr bent.

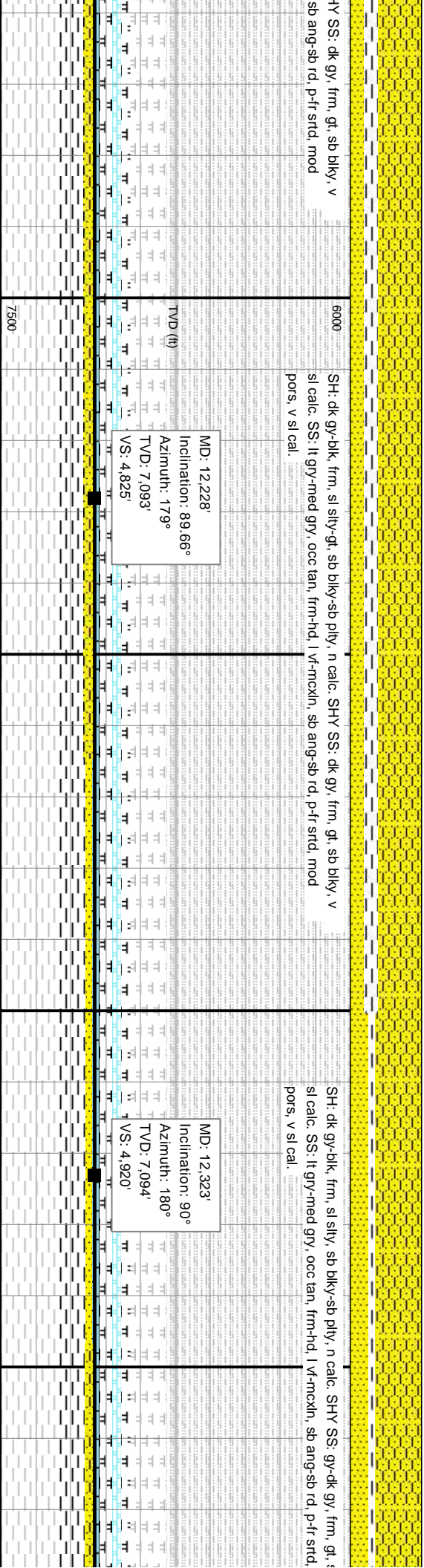
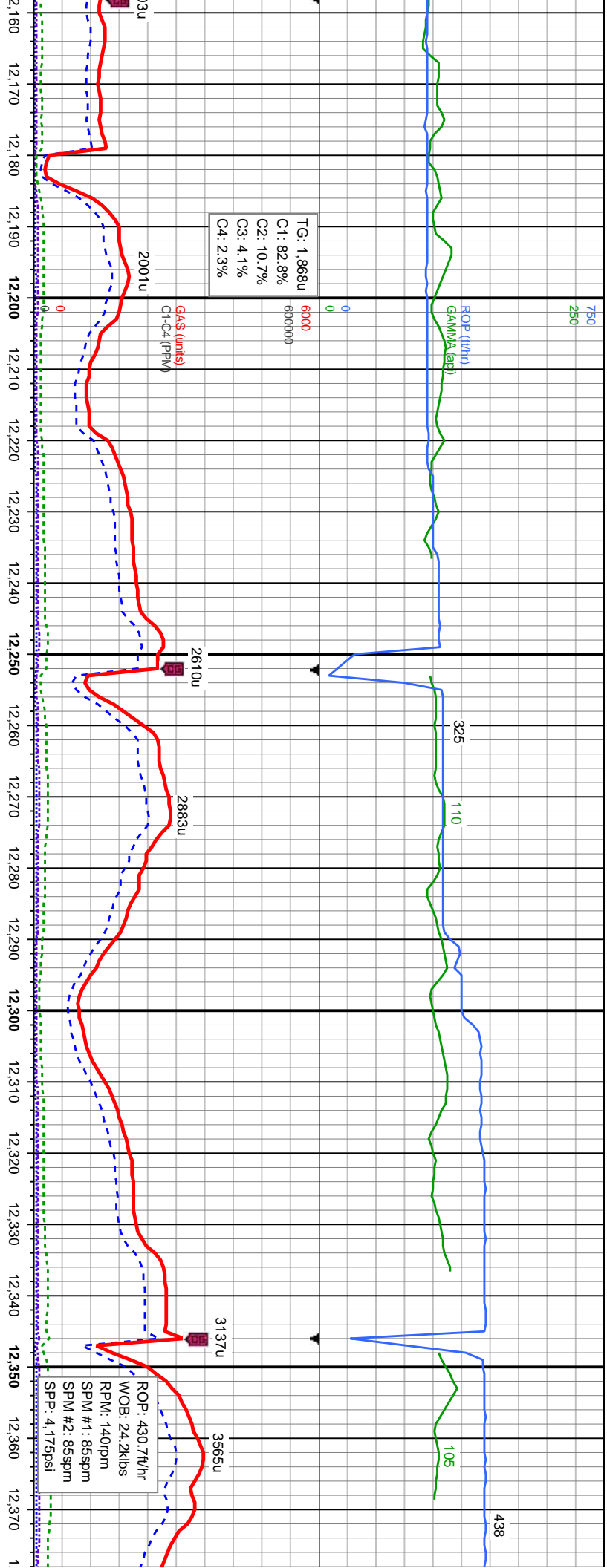
SH: dk gy-blk, frm, sl silty-gt, sb blkly-sb ply, v sl calc. SHY SS: dk gy, frm, gt, sb blkly-sb ply, v sl calc. SS: lt gry-med gry, rr tan, frm-hd, l vf-mcxln, sb ang-sb rd, p-fr strd, mod pors, v sl cal, tr bent.

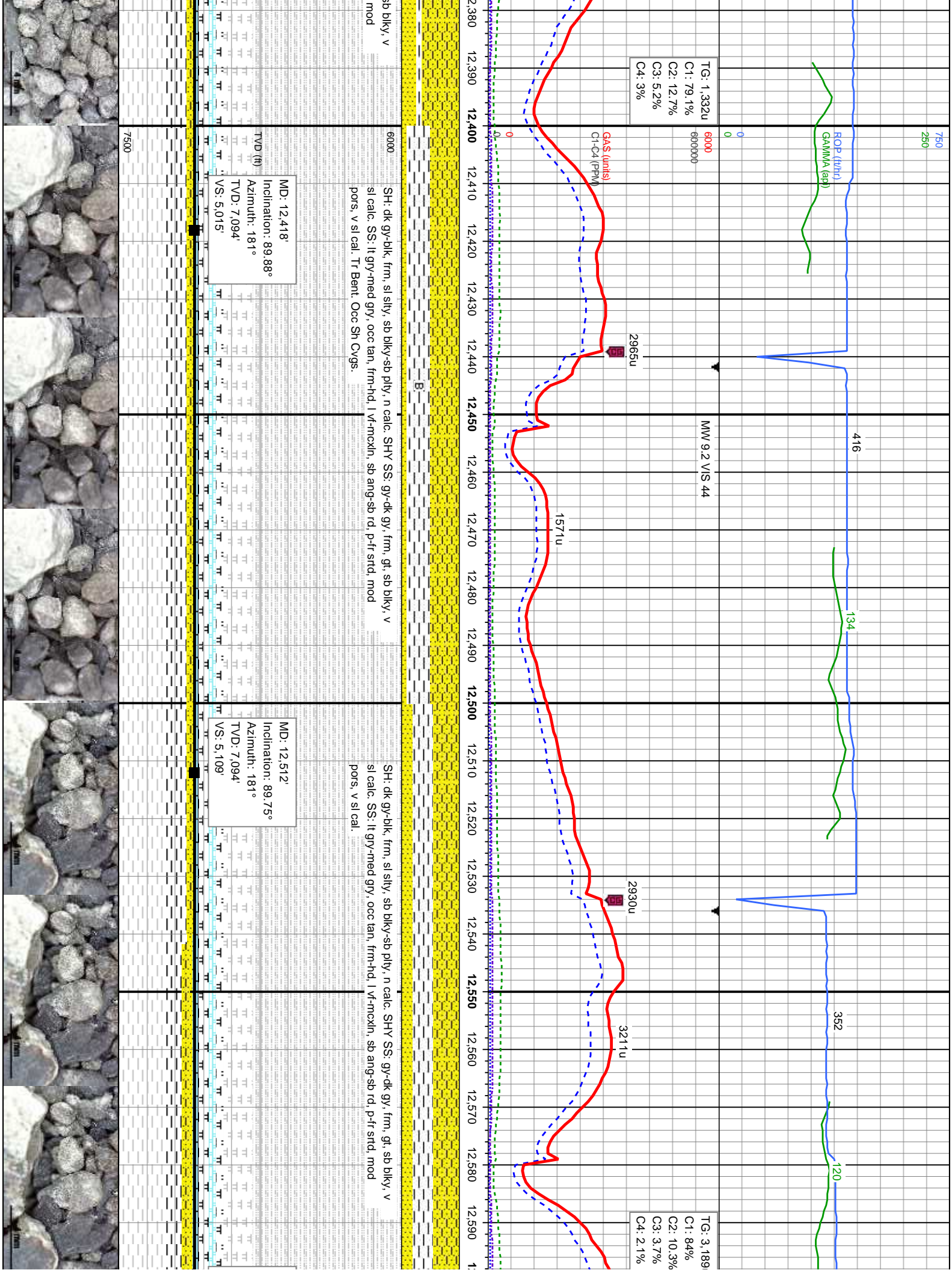
SH: dk gy-blk, frm, sl silty-gt, sb blkly-sb ply, v sl calc. SHY SS: dk gy, frm, gt, sb blkly-sb ply, v sl calc. SS: lt gry-med gry, rr tan, frm-hd, l vf-mcxln, sb ang-sb rd, p-fr strd, mod pors, v sl cal, tr bent.

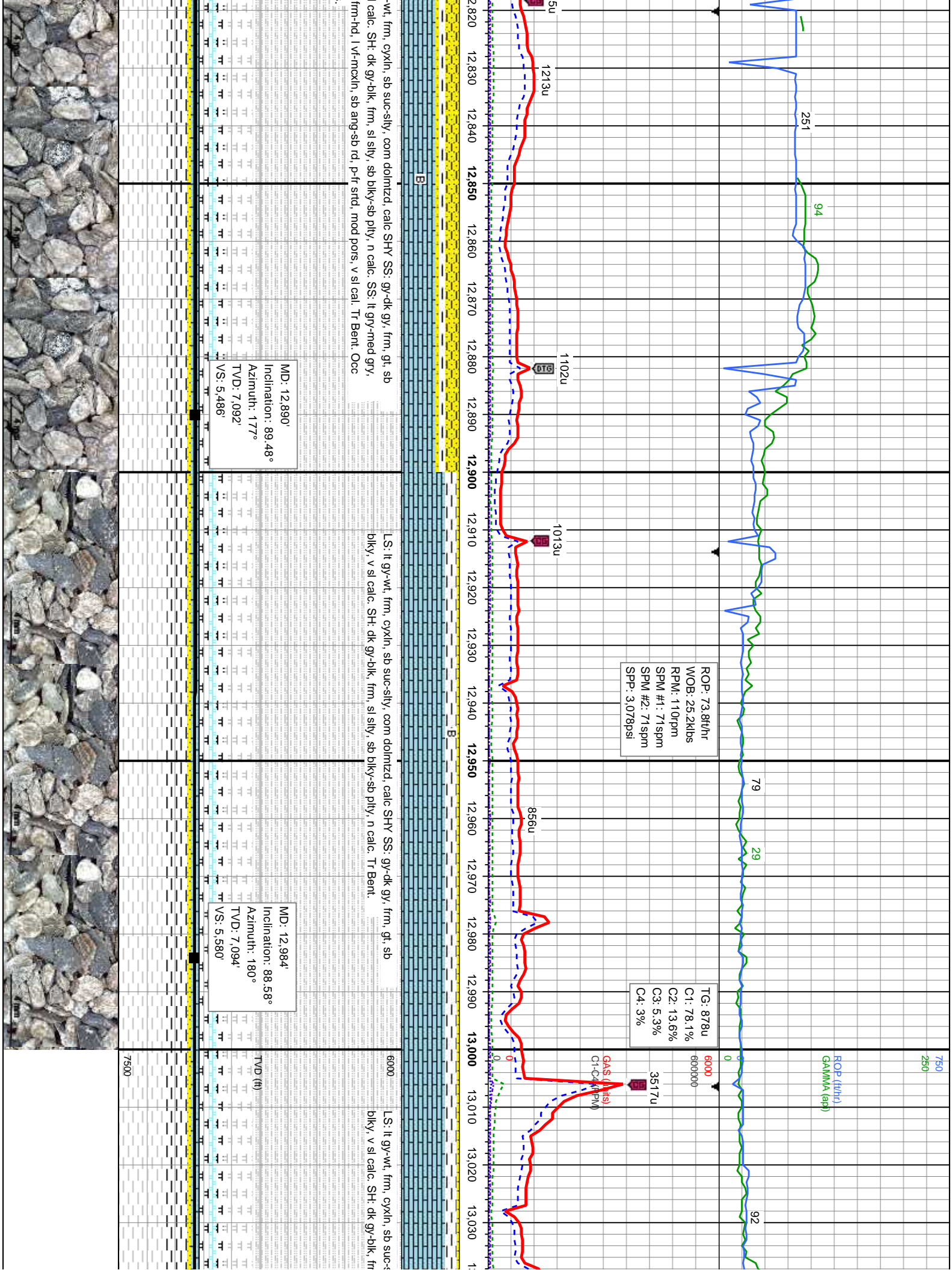
MD: 11,850'
Inclination: 90.98°
Azimuth: 177°
TVD: 7,094'
VS: 4,449'

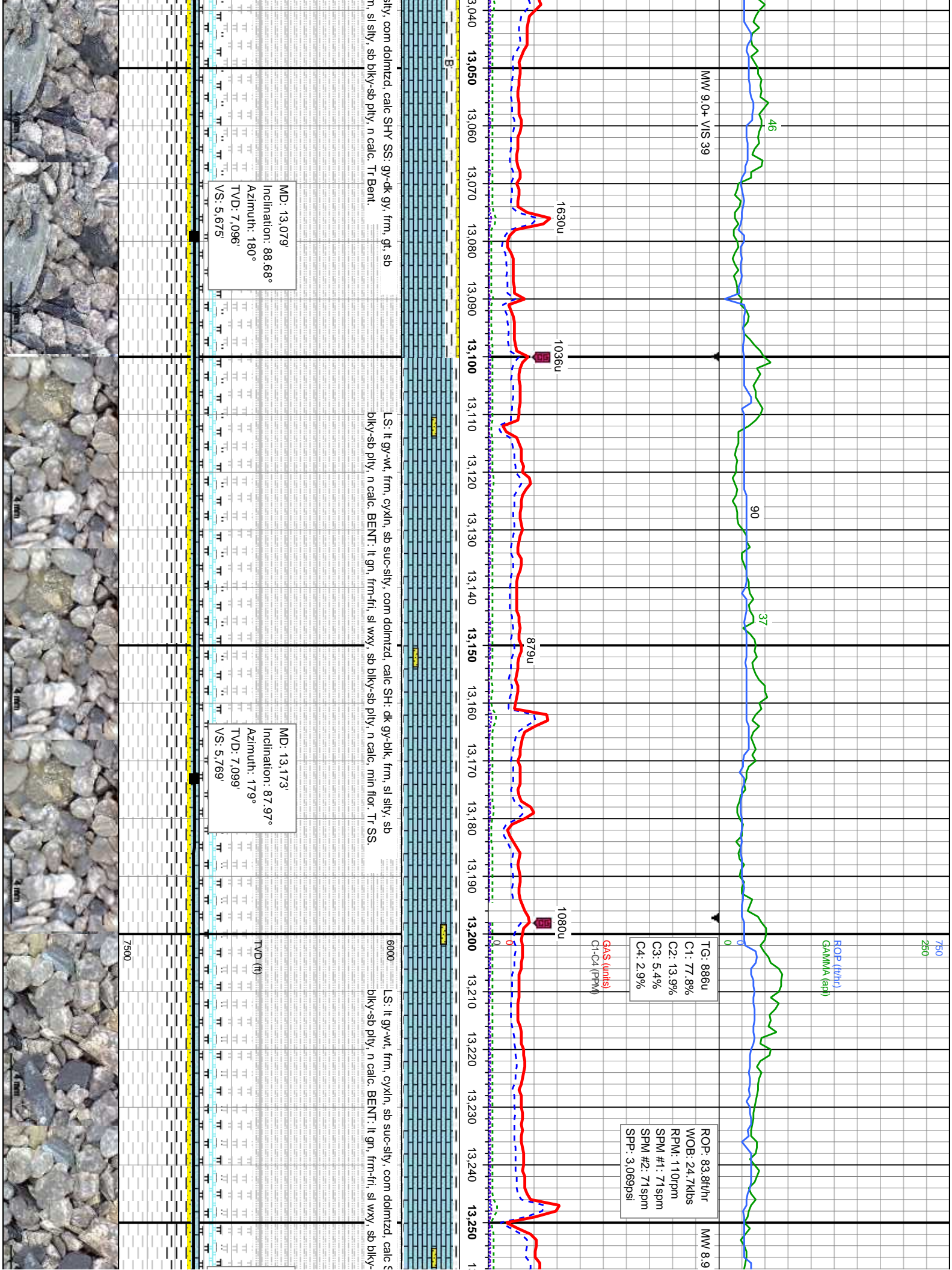








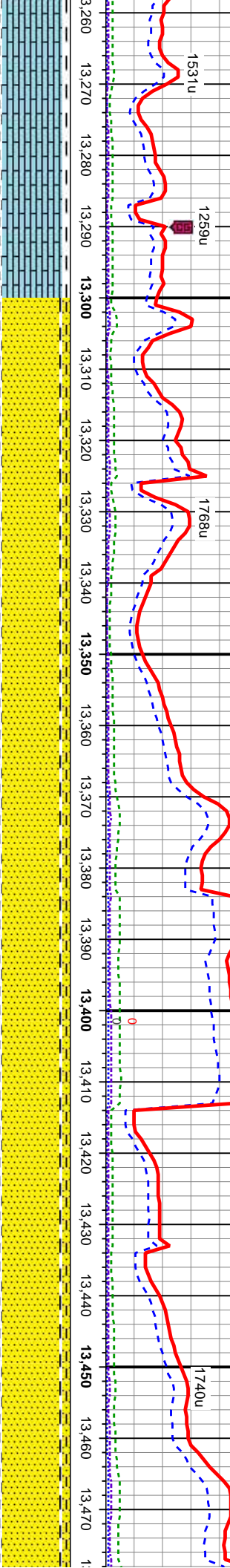






TG: 2.685u
C1: 83.2%
C2: 10.8%
C3: 3.9%
C4: 2.2%

GAS (units)
C1 C2 C3 C4



SS: lt gy-med gry, occ tan, frm-hd, l vf-mcxl, sb ang-sb rd, p-fr strd, mod por, v sl cal SHY SS: gy-dk gy, frm, gt, sb blk, v sl calc SH: dk gy-blk, frm, sl silty, sb blk-sb ply, n calc BENT: lt gn, frm-fri, sl wxy, sb blk-sb ply, n calc, min flor.

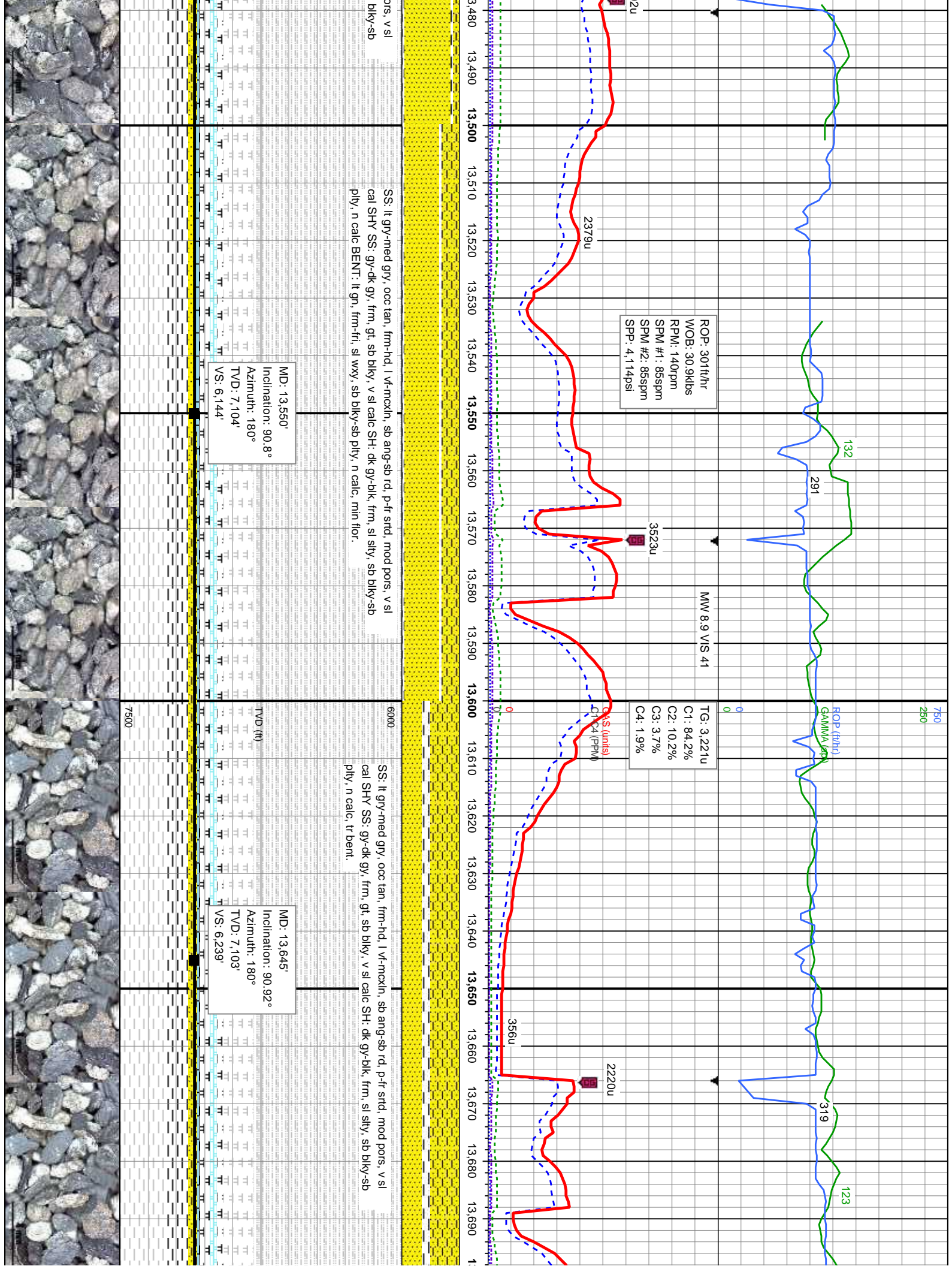
MD: 13.267
Inclination: 88.92°
Azimuth: 178°
TVD: 7.101'
VS: 5.862'

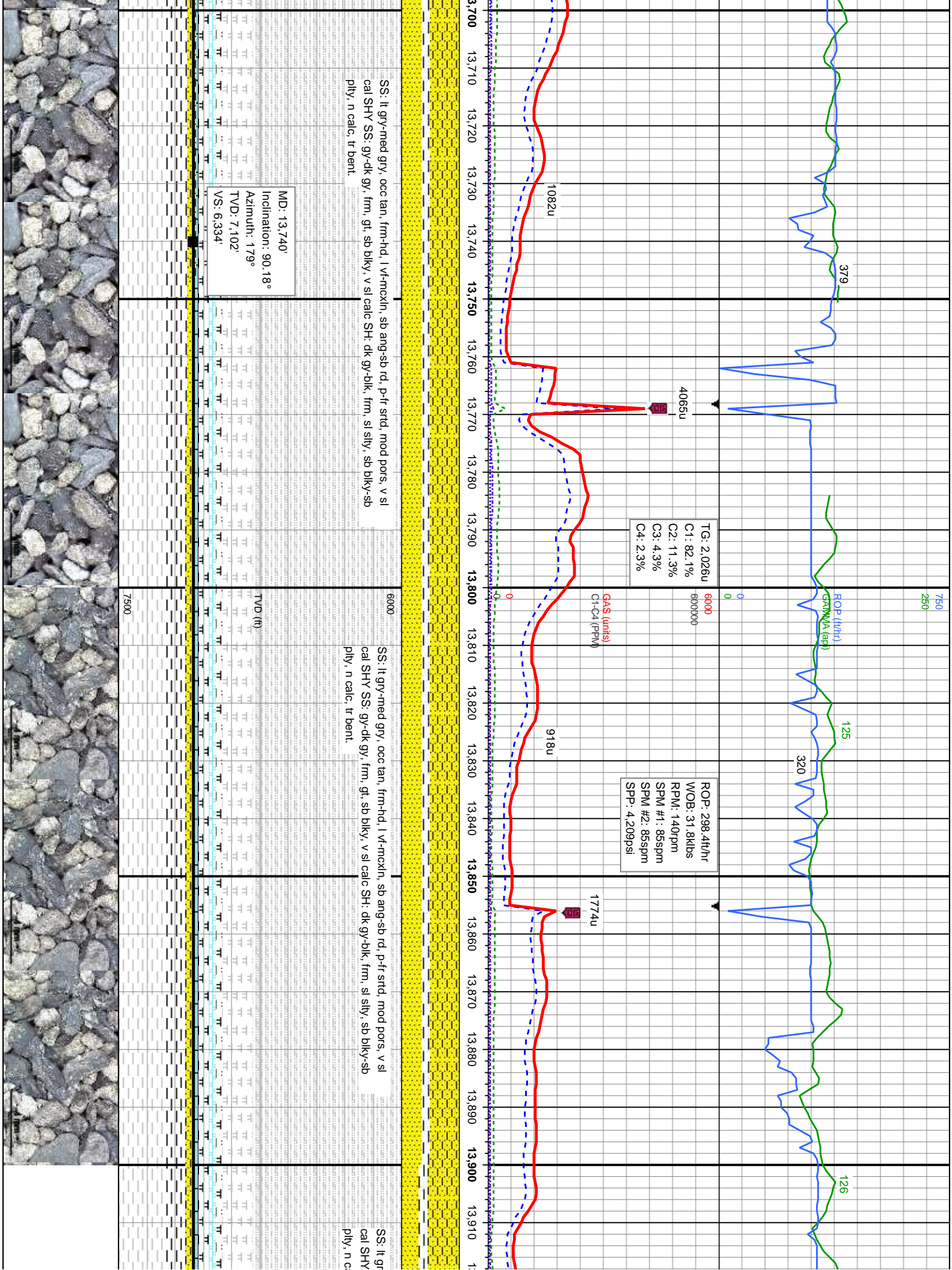
MD: 13.362
Inclination: 88.68°
Azimuth: 178°
TVD: 7.103'
VS: 5.957'

MD: 13.456
Inclination: 89.75°
Azimuth: 178°
TVD: 7.104'
VS: 6.051'

SS: lt gy-med gry, occ tan, frm-hd, l vf-mcxl, sb ang-sb rd, p-fr strd, mod por, v sl cal SHY SS: gy-dk gy, frm, gt, sb blk, v sl calc SH: dk gy-blk, frm, sl silty, sb ply, n calc BENT: lt gn, frm-fri, sl wxy, sb blk-sb ply, n calc, min flor.





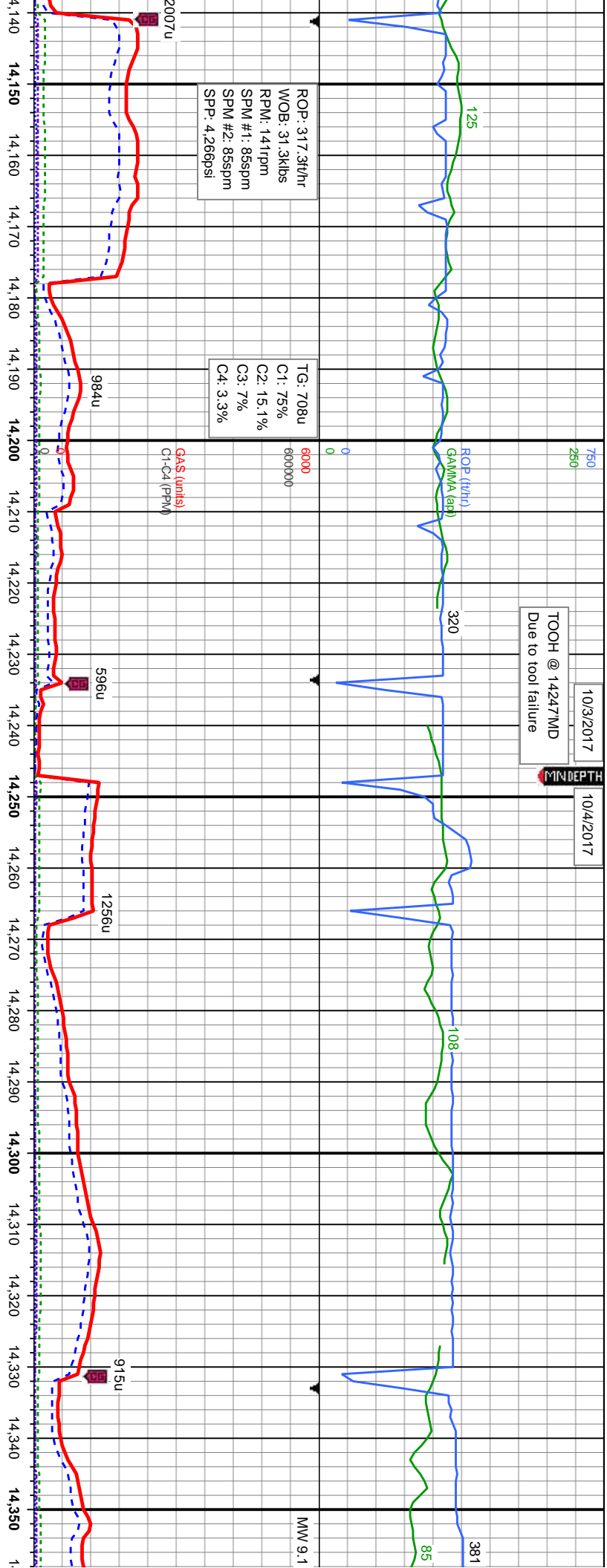


10/3/2017

10/4/2017

TOOH @ 14247MD
Due to tool failure

MINDEPTH



ROP: 317.3ft/hr
WOB: 31.3kbs
RPM: 141rpm
SPM #1: 85spm
SPM #2: 85spm
SPP: 4.26gpsi

TG: 708u
C1: 75%
C2: 15.1%
C3: 7%
C4: 3.3%

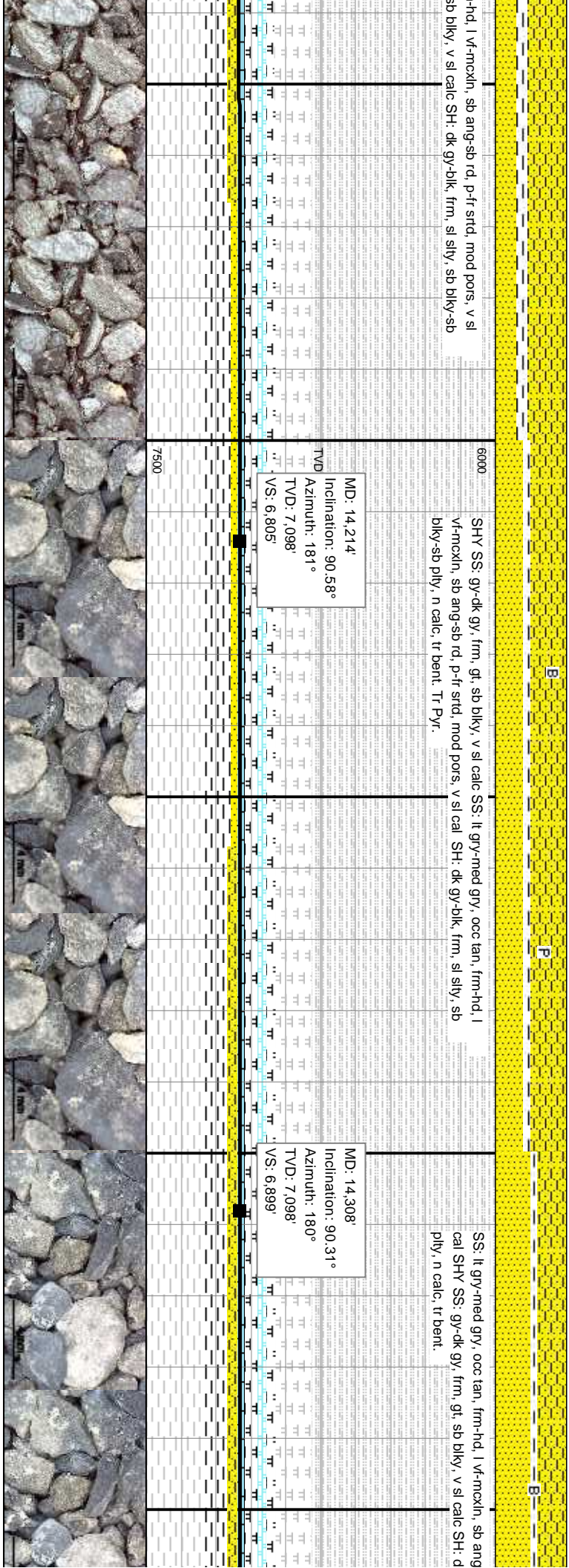
GALS (units)
C1-C4 (PPM)

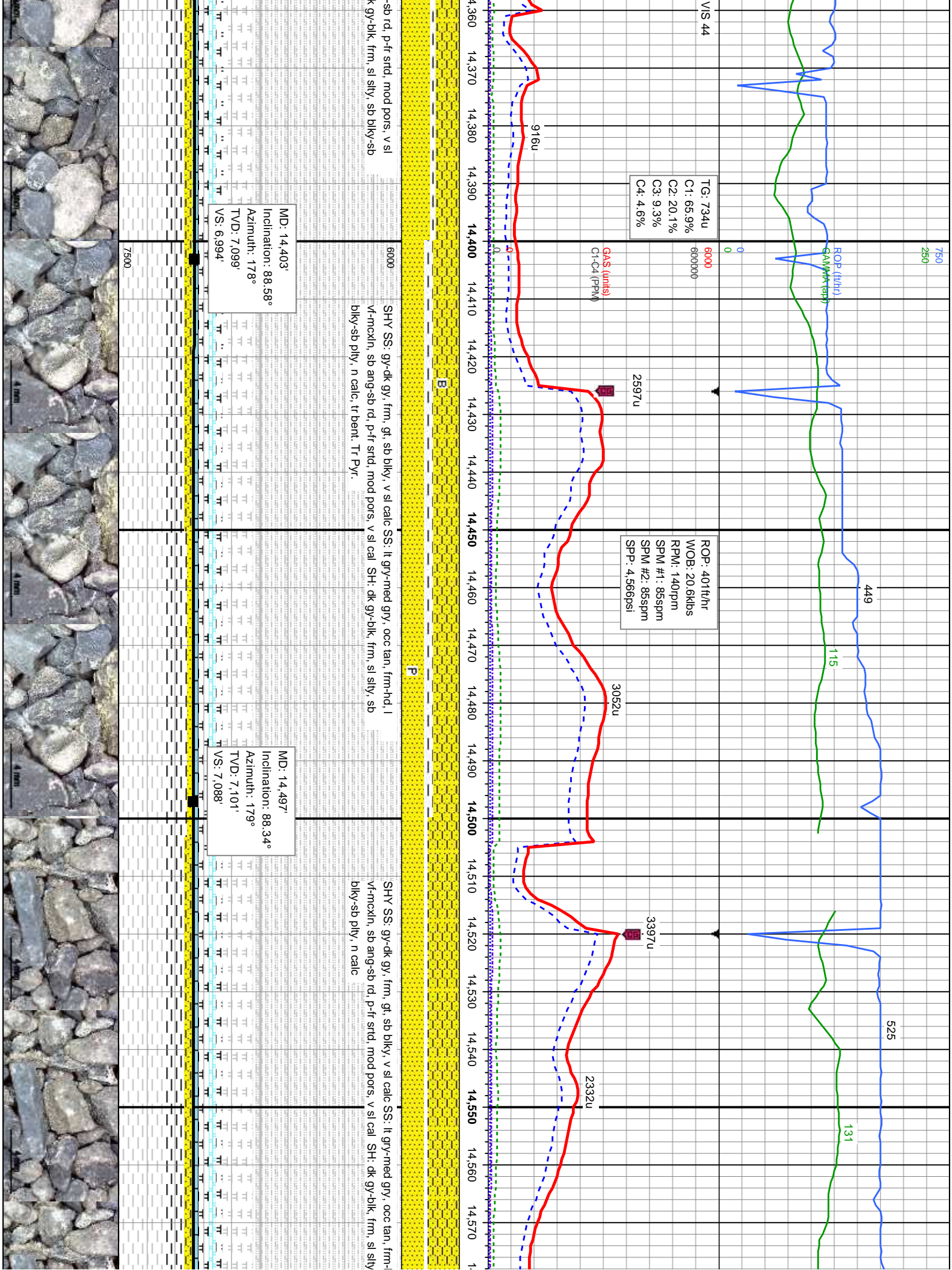
MD: 14,214'
Inclination: 90.58°
Azimuth: 181°
TVD: 7,098'
VS: 6,805'

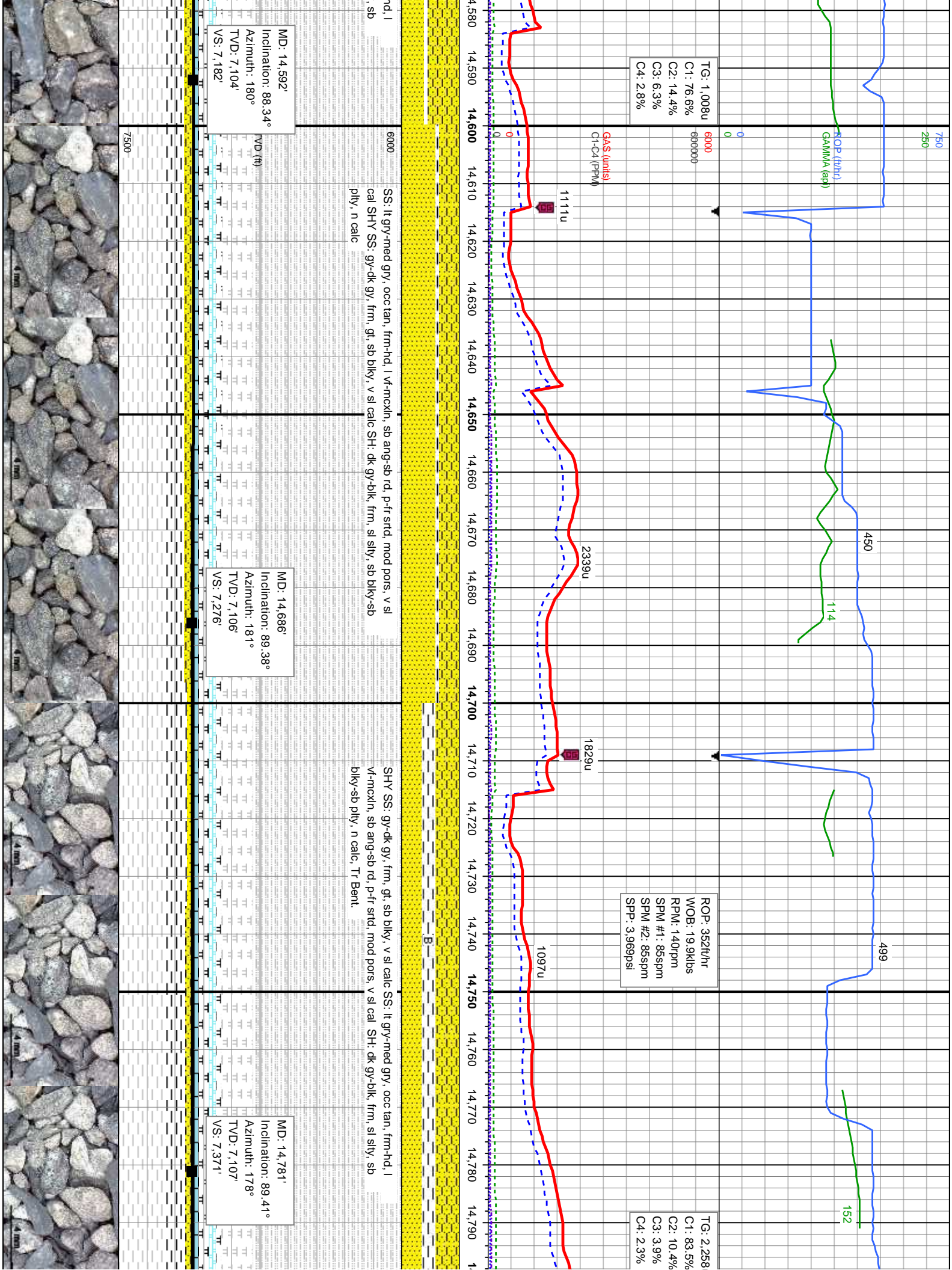
MD: 14,308'
Inclination: 90.31°
Azimuth: 180°
TVD: 7,098'
VS: 6,889'

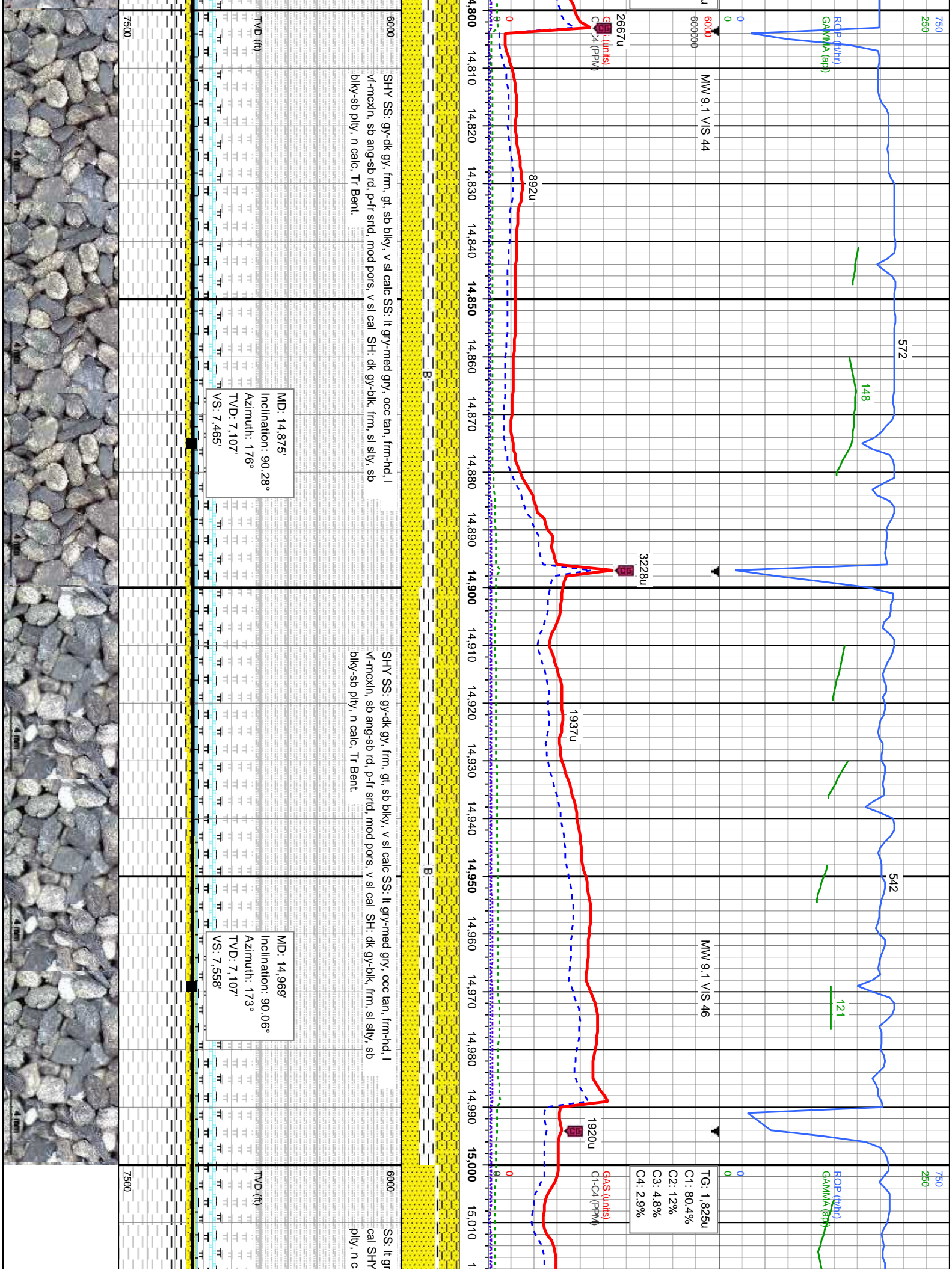
SHY SS, gy-dk gy, frm, gt, sb blk, v sl calc SS; lt gry-med gy, occ tan, frm-hd, l v-mcxln, sb ang-sb rd, p-fr strd, mod pors, v sl cal SH; dk gy-blk, frm, sl slty, sb blk-sb ply, n calc, tr bent. Tr Pyr.

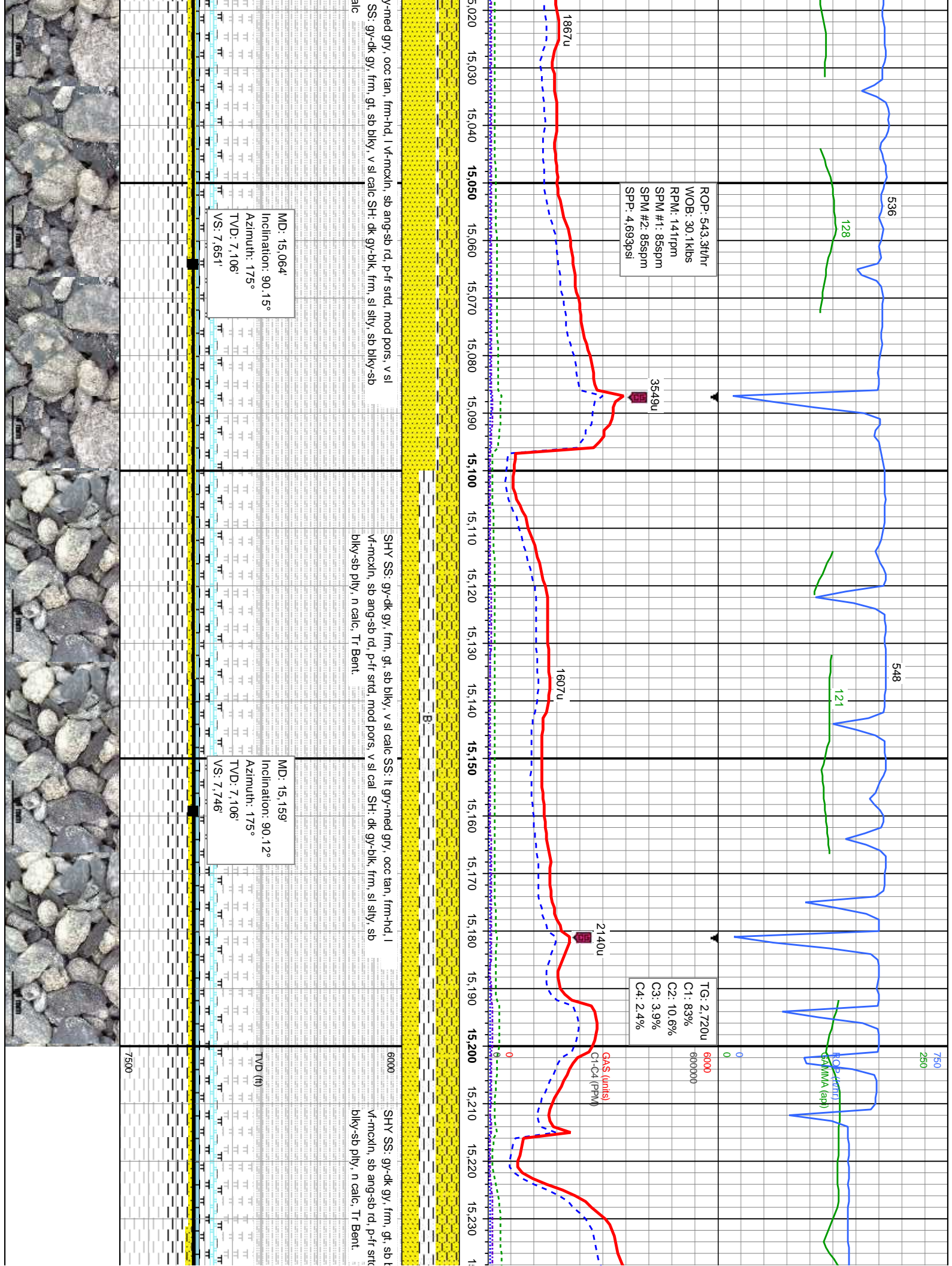
SS: lt gry-med gy, occ tan, frm-hd, l v-mcxln, sb ang cal SHY SS, gy-dk gy, frm, gt, sb blk, v sl calc SH; d ply, n calc, tr bent.

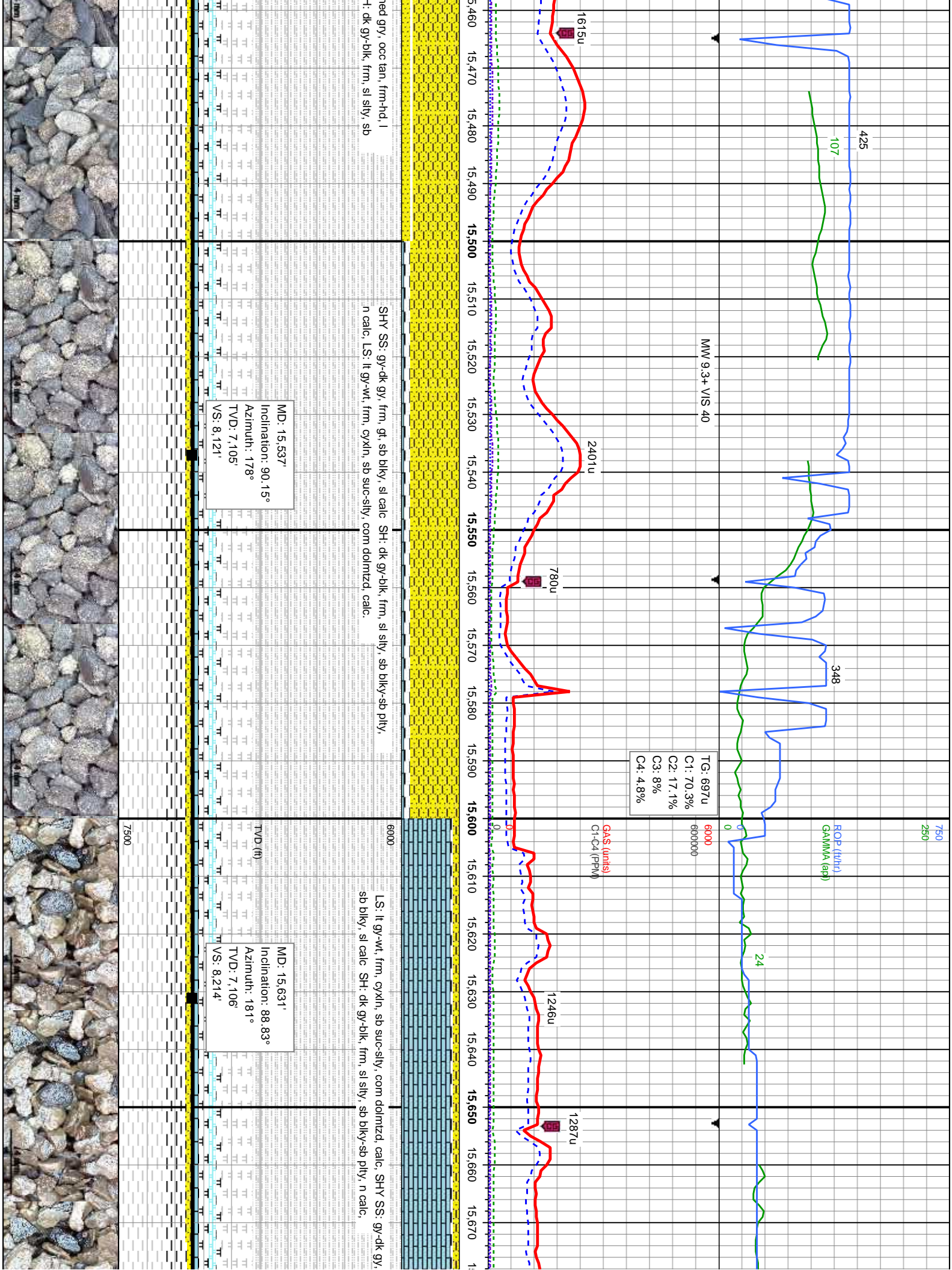


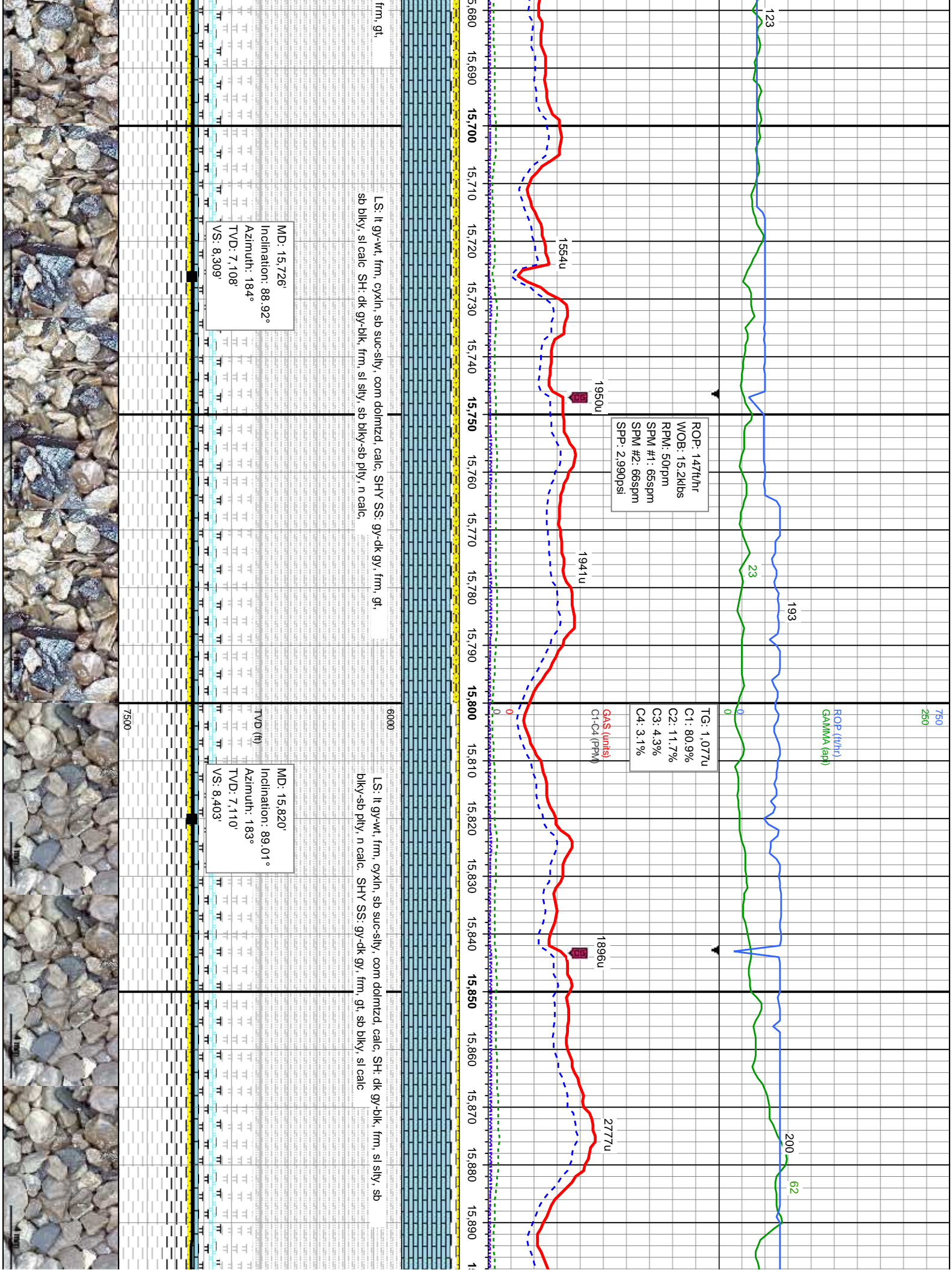










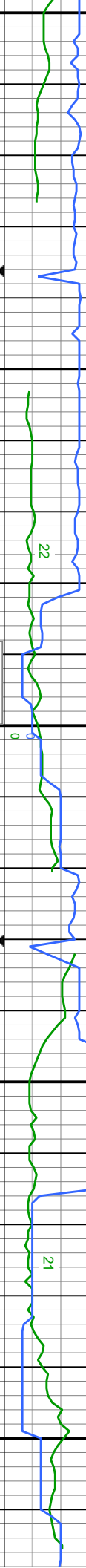


10/4/2017 10/5/2017

MINDEPTH

750
250

ROP (ft/h)
GAMMA (pp)



TG: 1.217u
C1: 78.5%
C2: 13.4%
C3: 5.1%
C4: 2.9%

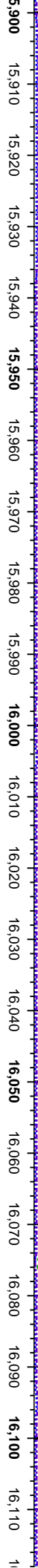
1742u

886u

1066u

1276u

GAS (units)
C1-C4 (PPM)



LS: lt gy-wt, frm, cyxln, sb suc-sily, com dolmitzd, calc, SH: dk gy-blk, frm, sl sily, sb
bkly-sb ply, n calc. SHY SS: gy-dk gy, frm, gt, sb bkly, sl calc

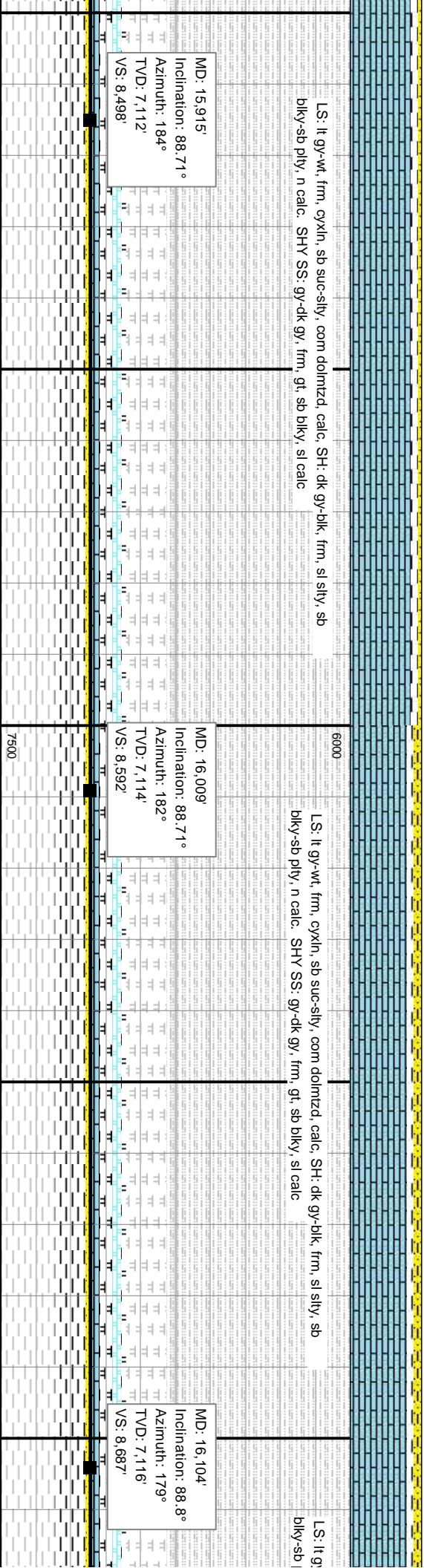
LS: lt gy-wt, frm, cyxln, sb suc-sily, com dolmitzd, calc, SH: dk gy-blk, frm, sl sily, sb
bkly-sb ply, n calc. SHY SS: gy-dk gy, frm, gt, sb bkly, sl calc

LS: lt gy-wt, frm, cyxln, sb suc-sily, com dolmitzd, calc, SH: dk gy-blk, frm, sl sily, sb
bkly-sb ply, n calc. SHY SS: gy-dk gy, frm, gt, sb bkly, sl calc

MD: 15,915'
Inclination: 88.71°
Azimuth: 184°
TVD: 7,112'
VS: 8,498'

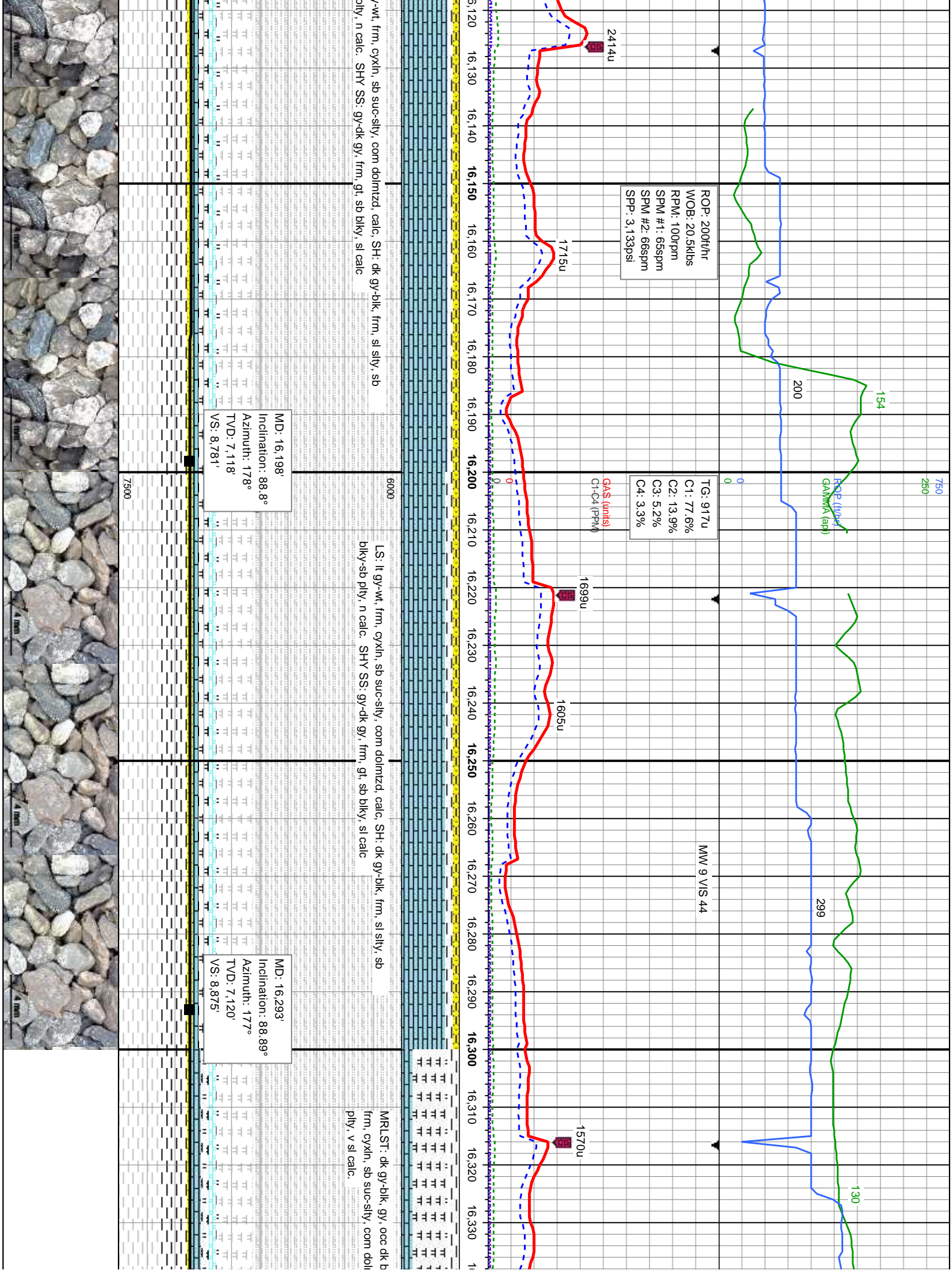
MD: 16,009'
Inclination: 88.71°
Azimuth: 182°
TVD: 7,114'
VS: 8,592'

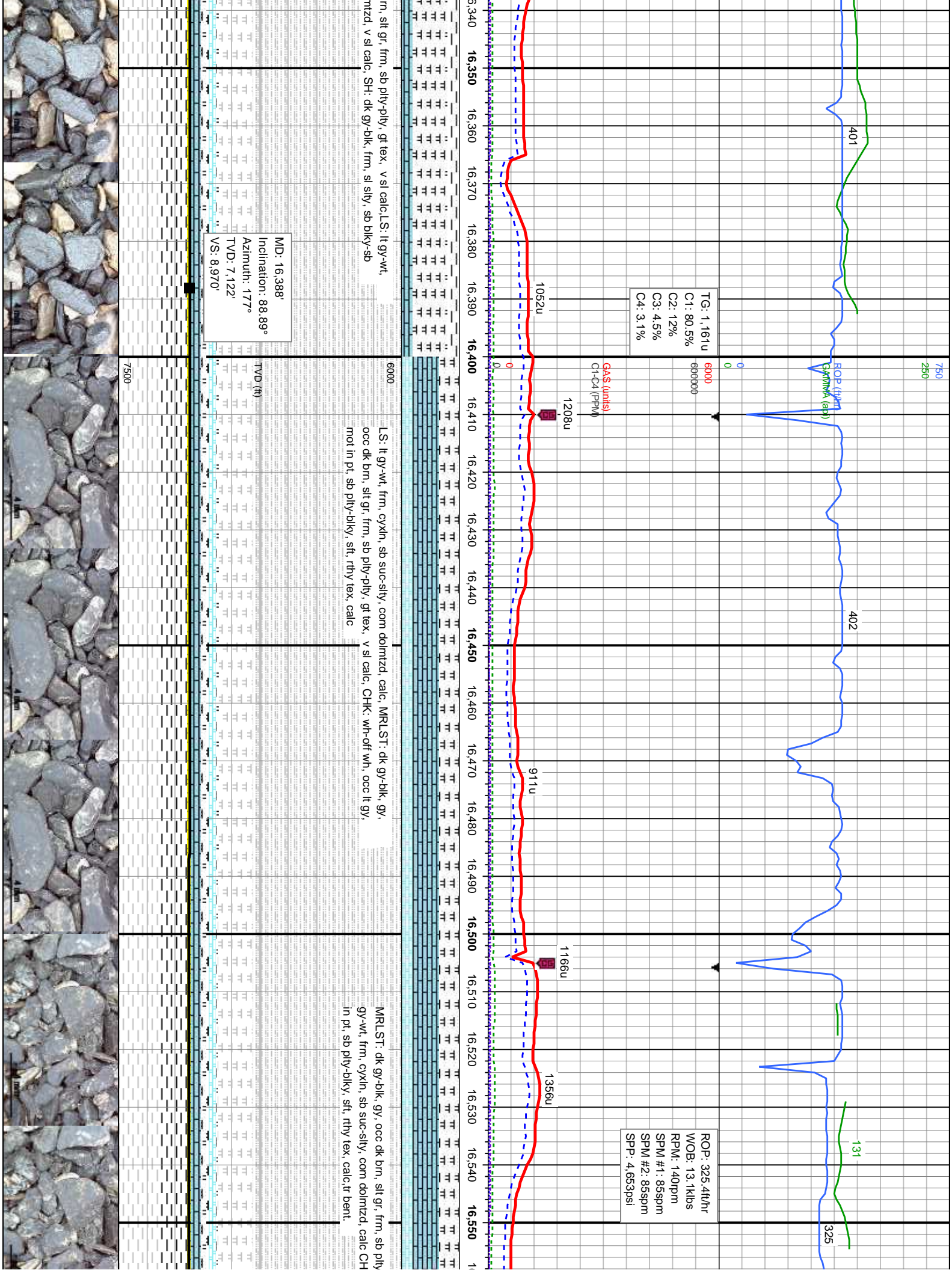
MD: 16,104'
Inclination: 88.8°
Azimuth: 179°
TVD: 7,116'
VS: 8,687'

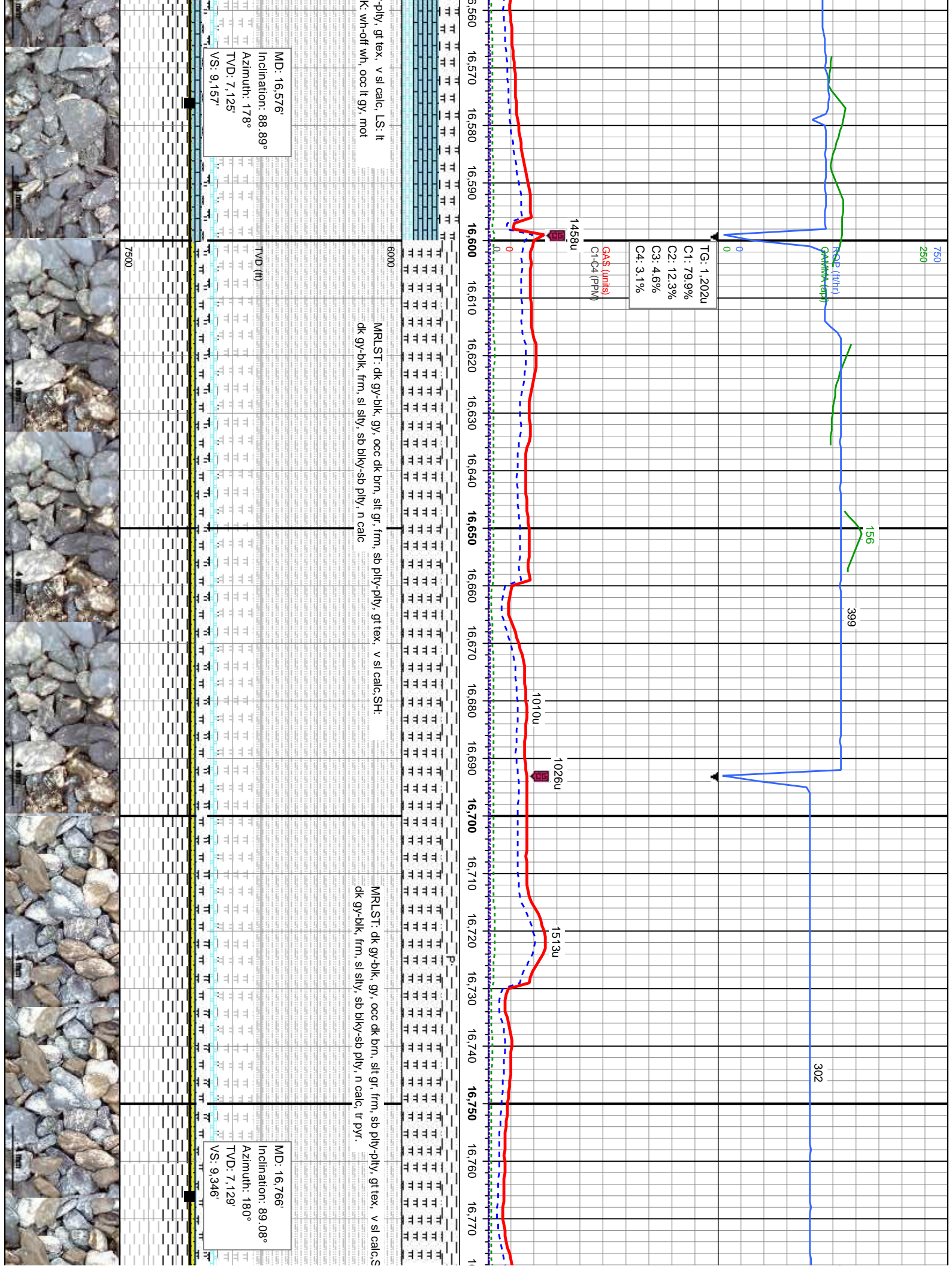


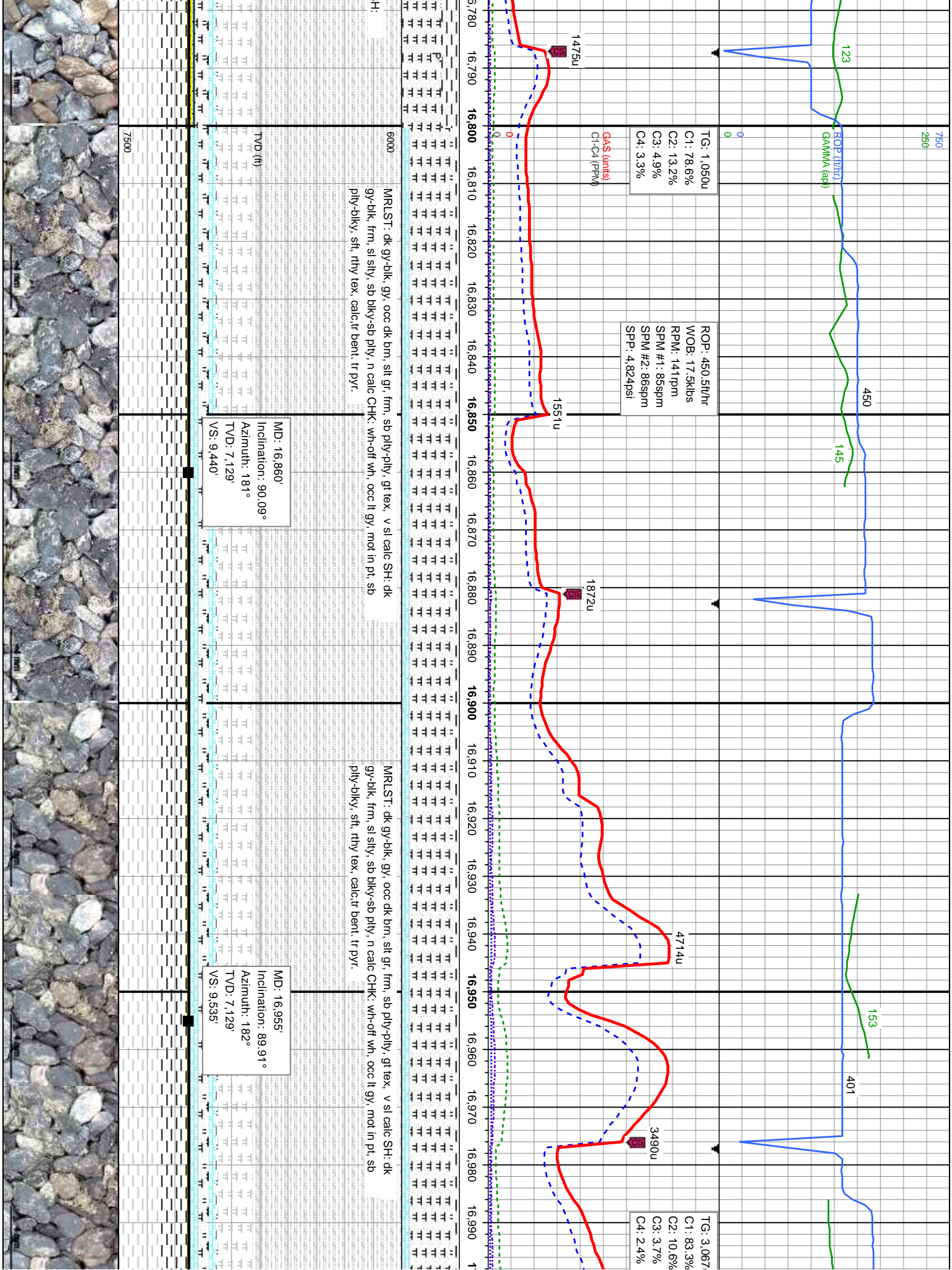
7500

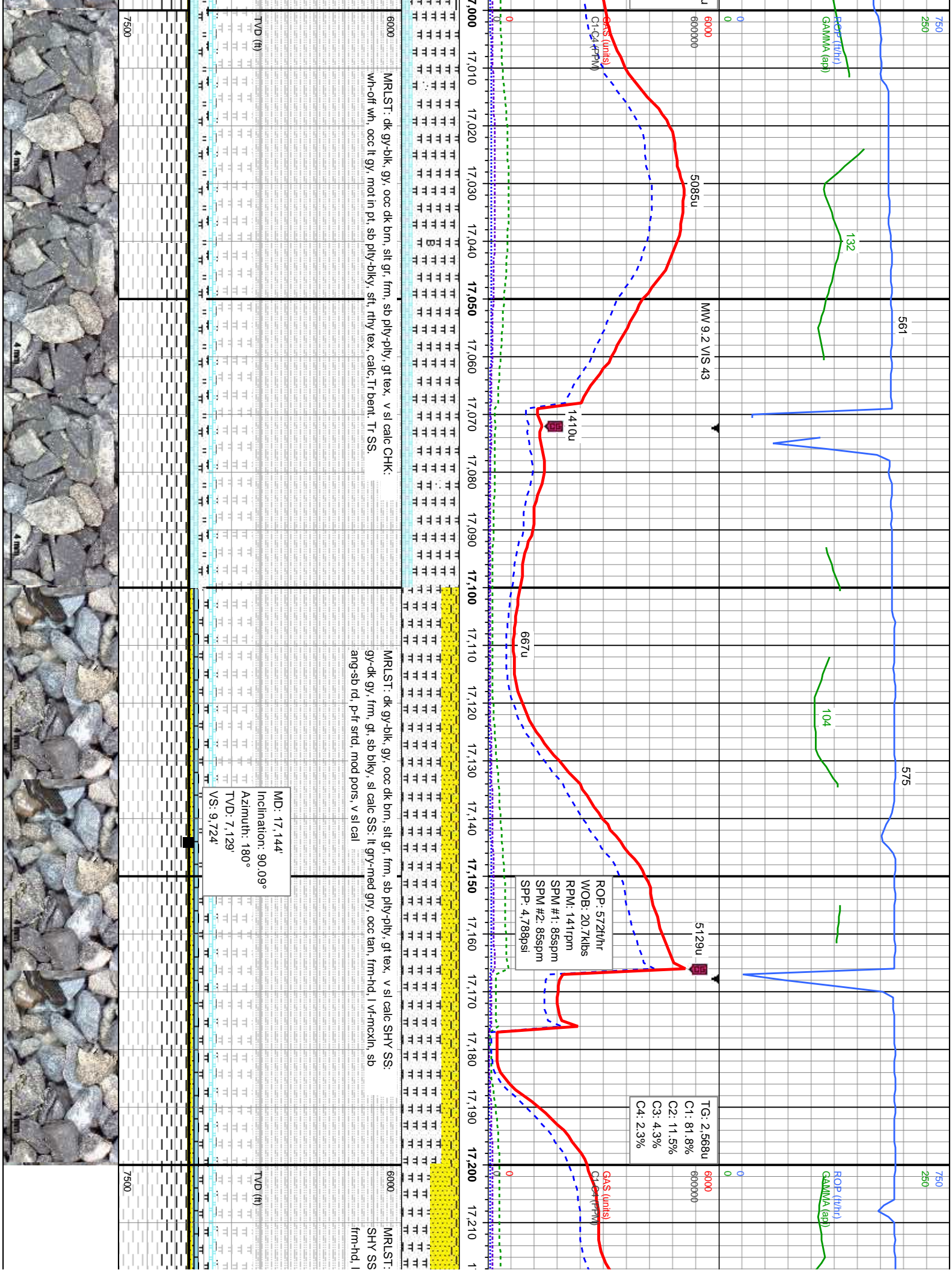


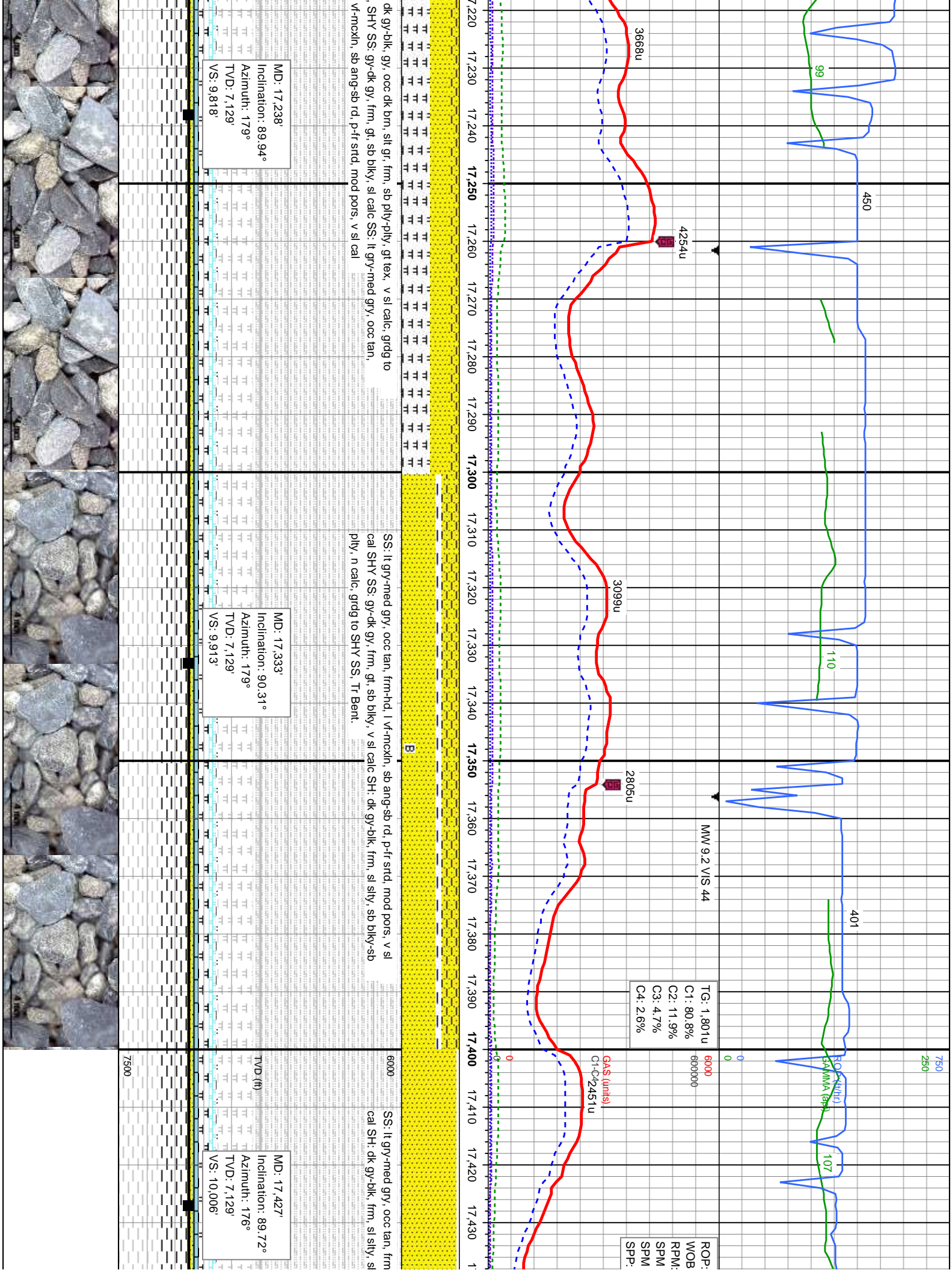












Thank you for choosing
Columbine Logging

TD LATERAL
@ 06:15 hrs MDT 10/5/2017
17,477' MD/7,129' TVD

TD: 17,477MD

85.1ft/hr
9.2klbs
140lpm
#1: 85spm
#2: 85spm
4.293psi

2075u

379

17,440 17,450 17,460 17,470 17,480 17,490 17,500 17,510 17,520 17,530 17,540 17,550

hd, l vf-mcxl, sb ang-sb rd, p-ft std, mod pois, v sl
b bkly-sb ply, n calc, gridg to SHY SS lp

MD: 17,477'
Inclination: 89.72°
Azimuth: 176°
TVD: 7,129'
VS: 10,056'

PTB

