



Scale: 5" / 100'
Measured Depth Log

Well Name 70 Ranch State BB18-681

Location NENE 17 5N 63W

State COLORADO

County WELD

Country USA

Rig Number H&P #273

API Number 05-123-41529

Field WATTENBERG

Region DJ BASIN

Drilling Completed 8/1/2015

Spud Date 7/23/2015

Surface Coordinates

LAT: 40.40508
LONG: -104.48721
293' FNL
600' FEL

Bottom Hole Coordinates PROJECTED:

380' FNL
535' FWL

Ground Elevation 4699'

K.B. Elevation 4723'

Logged Interval 800' To 16023'

Total Depth 16023'

Formation CODELL SANDSTONE

Type of Drilling Fluid H2O, LSND

Operator

Company Noble Energy Inc.

Address 1625 BROADWAY
DENVER, CO 80202
(303) 228-4000

Geologists

Name MICHAEL ANDERSON, ADAM HARRIS, SH

Company COLUMBINE LOGGING, INC.

Address 602 S. LIPAN ST
DENVER, COLORADO 80223
(303) 289-7764

Zone Color Co

Oil
Note
Error




















































Condensate
Core
Water

Rock Type


UNKNOWN
ANHYDRITE
BENTONITE
BRECCIA
CHALK
CEMENT
CHERT
CLAY CHOKE SA...
CLAYSTONE
COAL
CONGLOMERATE
DOLomite
DOLOMITIC LIMESTO...
GRANITE
GYPSUM
IGNEOUS
SIDERITE or LIMONITE
LIMESTONE

Accessories

Fossils

- | Fossils | | Minerals | | Stringer | |
|---|--------------|---|---------------------------|---|--------------------------|
|  | GASTROPOD |  | ARGILLITE GRAN |  | HEAVY MINERAL |
|  | INOCERAMUS |  | B BENTONITE |  | KAOLIN |
|  | ALGAE |  | BITUMINOUS SUBSTANCE |  | MARCASITE |
|  | AMPHIPORA |  | BRECCIA FRAGMENTS |  | MARLSTONE |
|  | BELLEROPHON |  | CALCAREOUS |  | MICACEOUS |
|  | BIOCLASTIC |  | CARBONACEOUS FLAKES |  | MINERAL CRYSTALS |
|  | BRACHIOPOD |  | CHERT |  | NODULES |
|  | BRYOZOA |  | CHERT |  | PHOSPHATE PELLETS |
|  | CEPHALOPOD |  | COAL - THIN BEDS |  | PYRITE |
|  | CORAL |  | DOLOMITE |  | SALT CAST |
|  | CRINOID |  | FELDSPAR |  | SANDY |
|  | ECHINOID |  | FERRUGINOUS PELLETS |  | SIDERITE |
|  | FISH |  | FERRUGINOUS |  | SILICEOUS |
|  | FORAMINIFERA |  | GLAUCONITE |  | SILTY |
|  | F FOSSIL |  | GYPSEIFEROUS |  | TUFFACEOUS |
| | |  | SHALE STRINGER |  | LIMESTONE STRINGER |
| | |  | MARLSTONE (CALC) STRINGER |  | MARLSTONE (DOL) STRINGER |
| | |  | SANDSTONE STRINGER | | |
| | |  | SILTSTONE STRINGER | | |

Springer

-  ANHYDRITE STRINGER
-  PROCT BENTONITE STRINGER
-  COAL STRINGER
-  DOLomite STRINGER
-  GYPSUM STRINGER
-  LIMESTONE STRINGER
-  MARLSTONE (CALC.) STRG
-  MARLSTONE (DOL.) STRG
-  SANDSTONE STRINGER
-  SHALE STRINGER
-  SILTSTONE STRINGER

ANNA GILBERT

Other Symbols

Oil Show

- ✓ P PINPOINT
VUGGY

Engineering

- DEAD
 - EVEN
 - QUESTIONABLE
 - BIT
 - SPOTTED STAIN...
 - CONNECTION (UP)

Rounding

- | | | |
|---------------|-------------------------|----------------|
| DST INTERVAL | WIRELINE TESTED - LE... | E EARTHY |
| FAULT | WIRELINE TESTED - RT | FX FINELYXLN |
| FORMATION TOP | DRILL STEM TEST | GS GRAINSTONE |
| GAS SHOW | MNDEPTH MN DEPTH | L LITHOGRAPHIC |
| OIL SHOW | | MX MICROXLN |
| MN DEPTH UP | | MS MUDSTONE |

Porosity

- | Symbol | Feature | Symbol | Feature |
|--------|-------------------|--------|-----------|
| | CONNECTION (DOWN) | | ANGULAR |
| | MIN DEPTH (DOWN) | | ROUNDED |
| | CONNECTION GAS | | SUBANG |
| | NORMAL FAULT | | SUBUND |
| | OVERTURNED STRATA | | E EARTHY |
| | REVERSE FAULT | | FENESTRAL |
| | TRIP GAS | | |

Sorting

- M MODERATE**














































Textures

- X INTERCRYSTALL...
- D DOWN TIME GAS
- SIDEWALL CORE (LEFT)
- DOWN TIME GAS (LEFT)
- SIDEWALL CORE (RIGH..
- B BOUNDSTONE
- C CHALKY
- C CRYPTOXLN
- O ORGANIC
- M MOLDIC
- CORE - LOST
- CORE - RECOVERED
- S SURVEY
- SLIDE

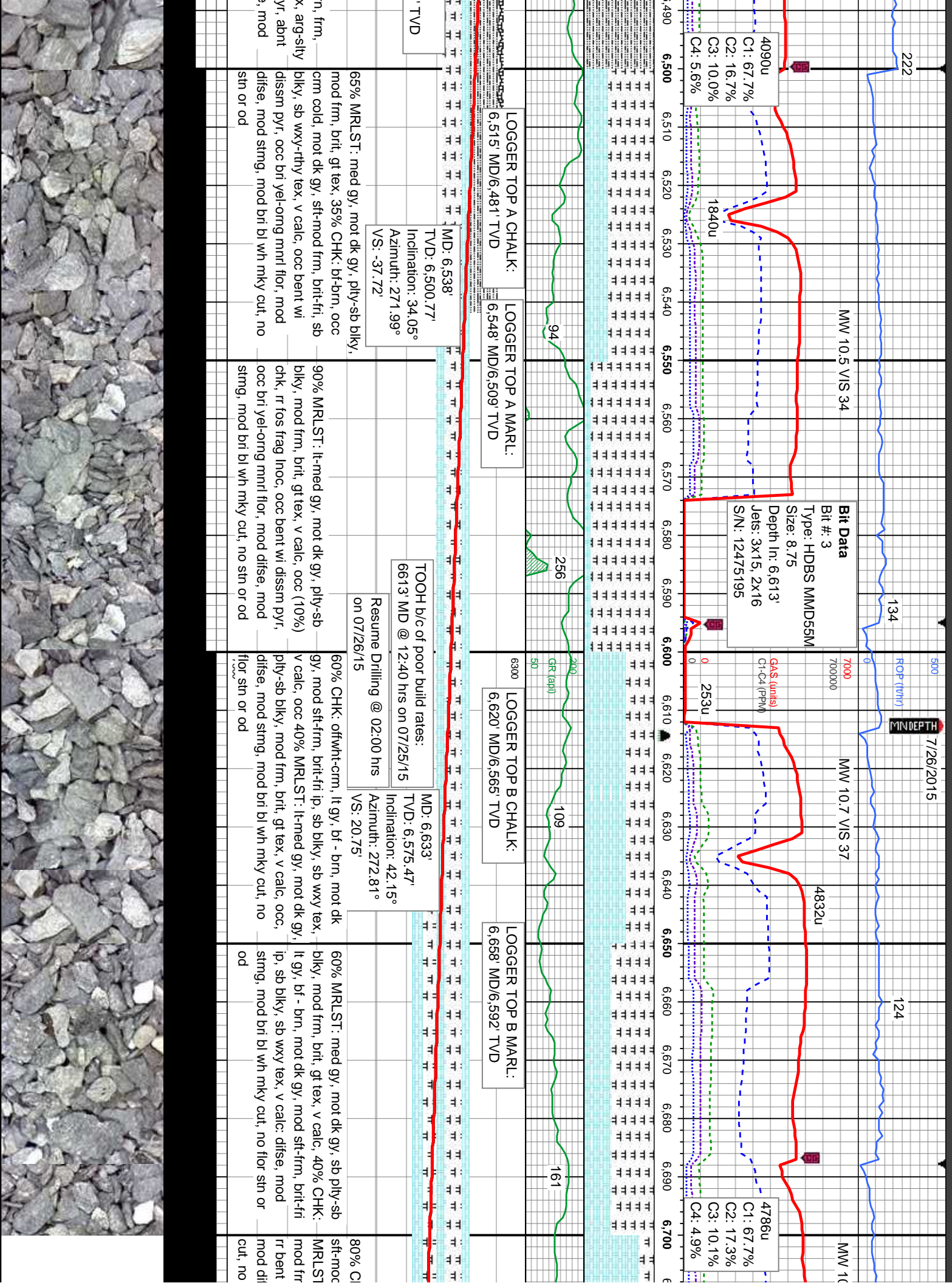
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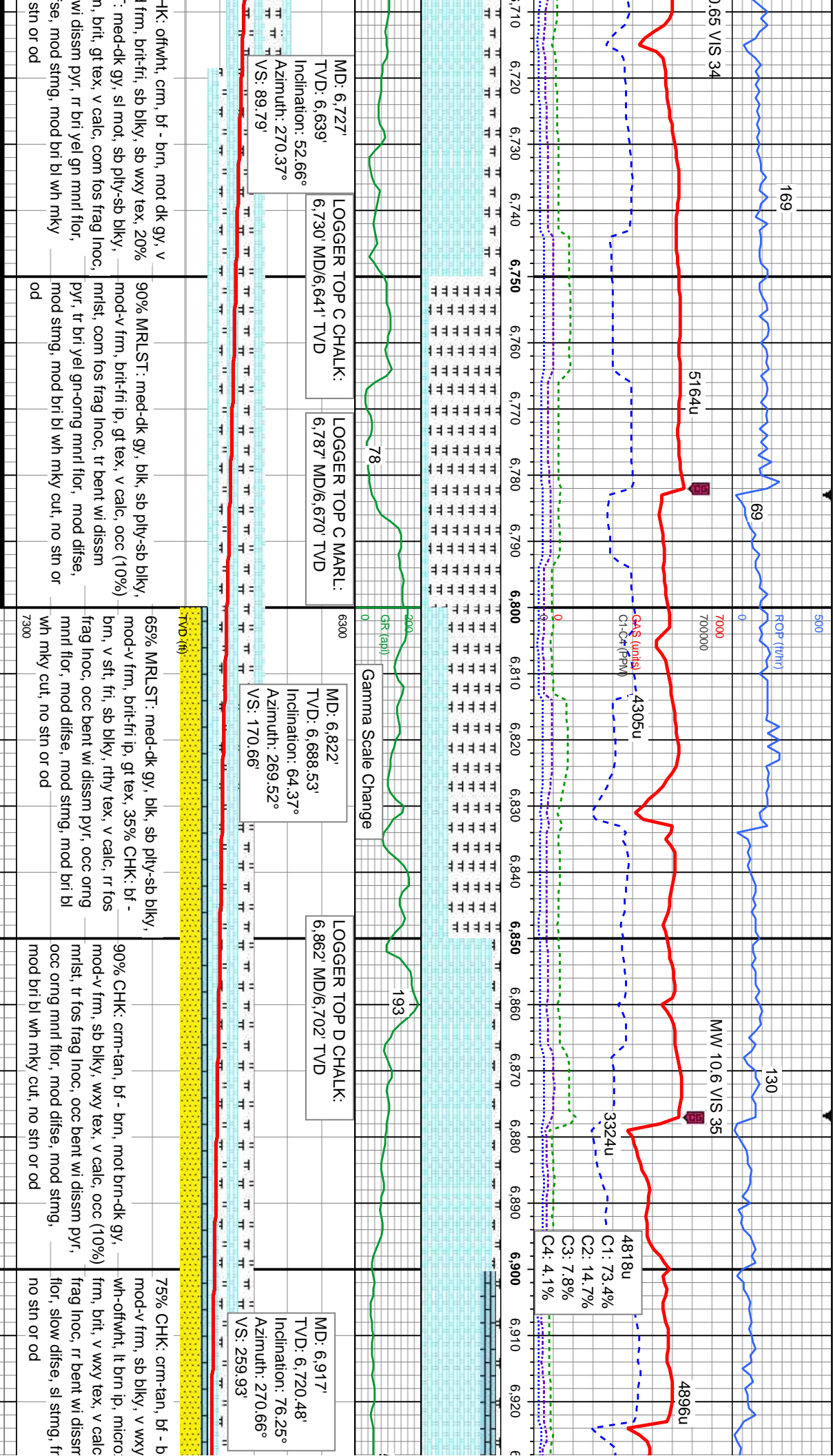
- | | | |
|-----|----------|------|
| Gas | Pressure | Seal |
|-----|----------|------|

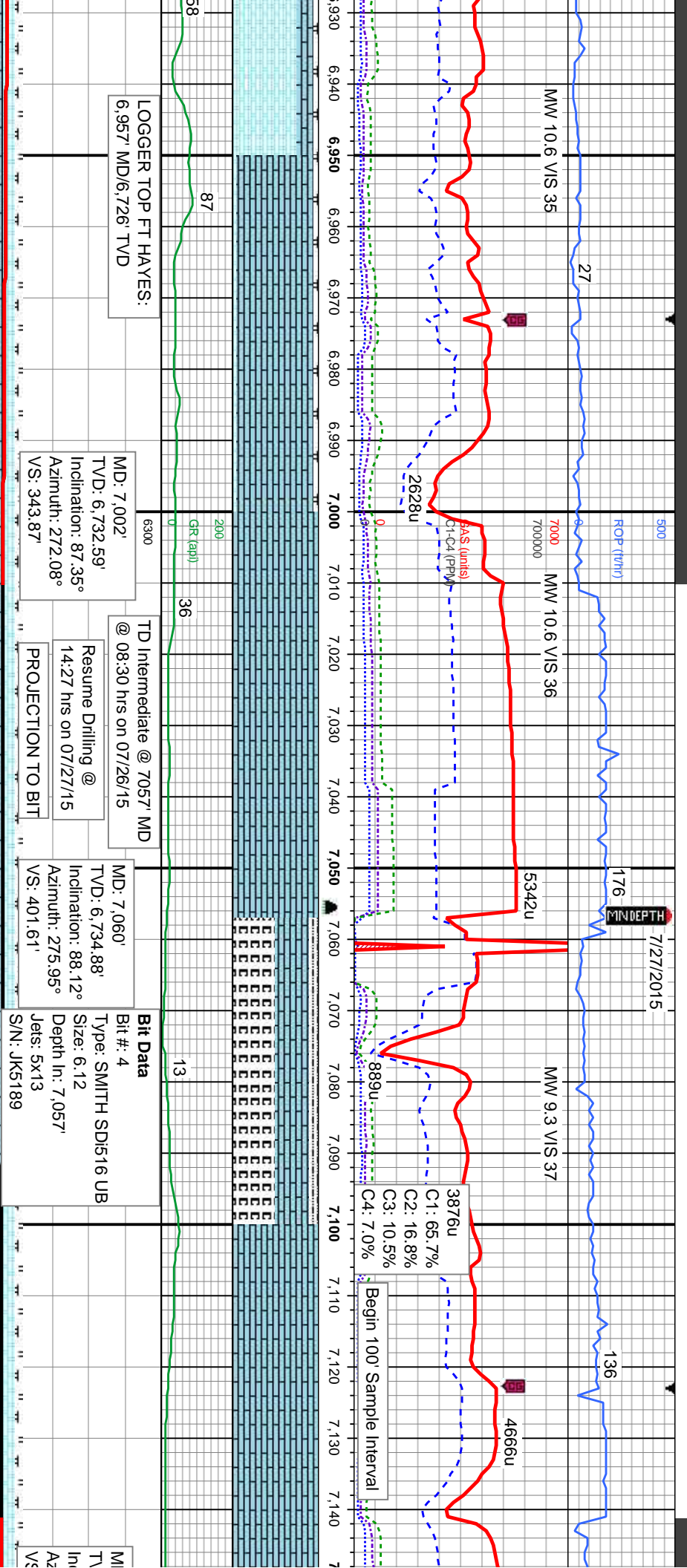
5

- | | |
|---|----------------------|
|  | SHALTY SANDSTONE ... |
|  | SHALTY SILTSTONE |
|  | SILT TY SHALE |
|  | SILTSTONE |
|  | TILL |
|  | TUFF |
|  | WELDED TUFF |
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Slide/Rotate						
ROP						
ROP From Pason						
Total Gas & Chromatograph GAS — C1 - - - C2 - - - C3 - - - C4						
Depth Labels						
% Lith						
GAMMA GR —						
Well Bore TVD	LOG CONTINUED FROM: 70 RANCH STATE BB18-681(VERT).mplot					
Oil Show	Logging of the Curve/Horizontal by Columbine Logging Inc.					
Images	95% SLTY SH: dk gy-blk, frm, brit, pily - sb ply, sm-sb wxy tex, arg-sily mtx, non calc, tr (5%) siltst, occ bent wi dissn pyr, occ bri yel-org mnrl flor, slow difse, sl sting, bl wh mky cut, no stn or od					
	MD: 6,349' TVD: 6,333.99' Inclination: 20.73° Azimuth: 272.83° VS: -125.66'					
	TVD (ft)					
	100% SLTY SH: dk gy-blk, frm, brit, pily, sb fis, rr sb ply, sb wxy tex, arg-sily mtx, non calc, rr siltst, tr bent wi dissn pyr, tr bri org mnrl flor, slow difse, sl sting, fnt bl wh mky cut, no stn or od					
	MD: 6,444' TVD: 6,420.37' Inclination: 28.29° Azimuth: 270° VS: -86.31'					
	LOGGER TOP SHARON SPRINGS: 6,472 MD/6,444'					
	100% SLTY SH: dk gy-blk, dk gy br brit, pily, sb fis, rr sb ply, sb wxy te mtx, non calc, abnt bent wi dissn p bri yel gn - ong mnrl flor, slow difse sting, bl wh mky cut, no stn or od					







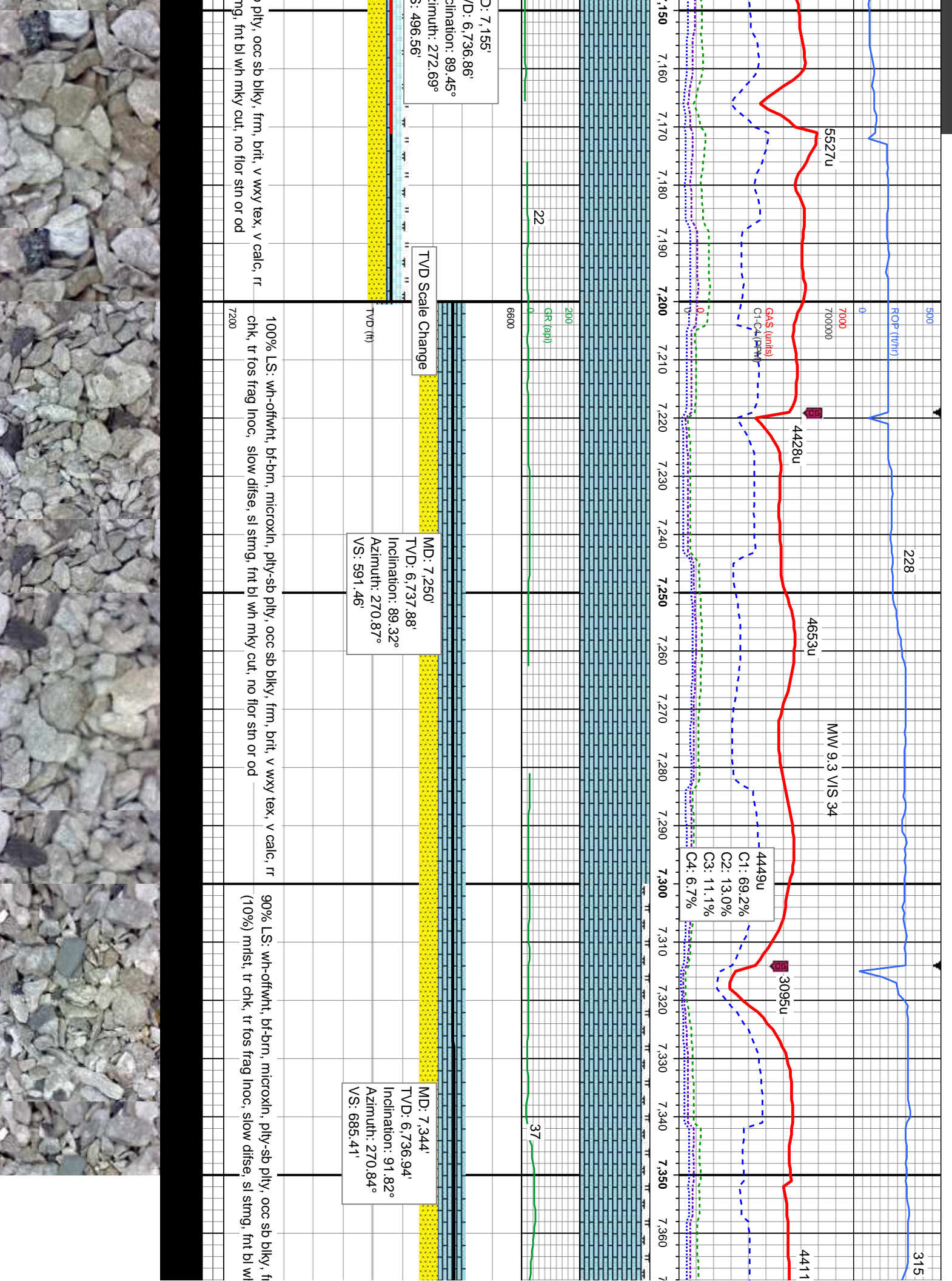
<p>—, mat brn-dk gy, — sl g/t tex, 20% LS: —, sb ply-sb blk, y, tr (5%) mlst, tr fos pyr, tr orng mml t bl wh mky cut,</p>	<p>90% LS. wh-offwht, b-f-brn, microxln, ply-sb ply, occ sb blk, frm, bit, v wxy tex, v calc, (5%) mlst, tr (5%) chk, tr fos frag inoc, tr bent wi dissn pyr, tr orng mml flor, slow dlise, sl stmg, fnt bl wh mky cut, no sin or od</p>
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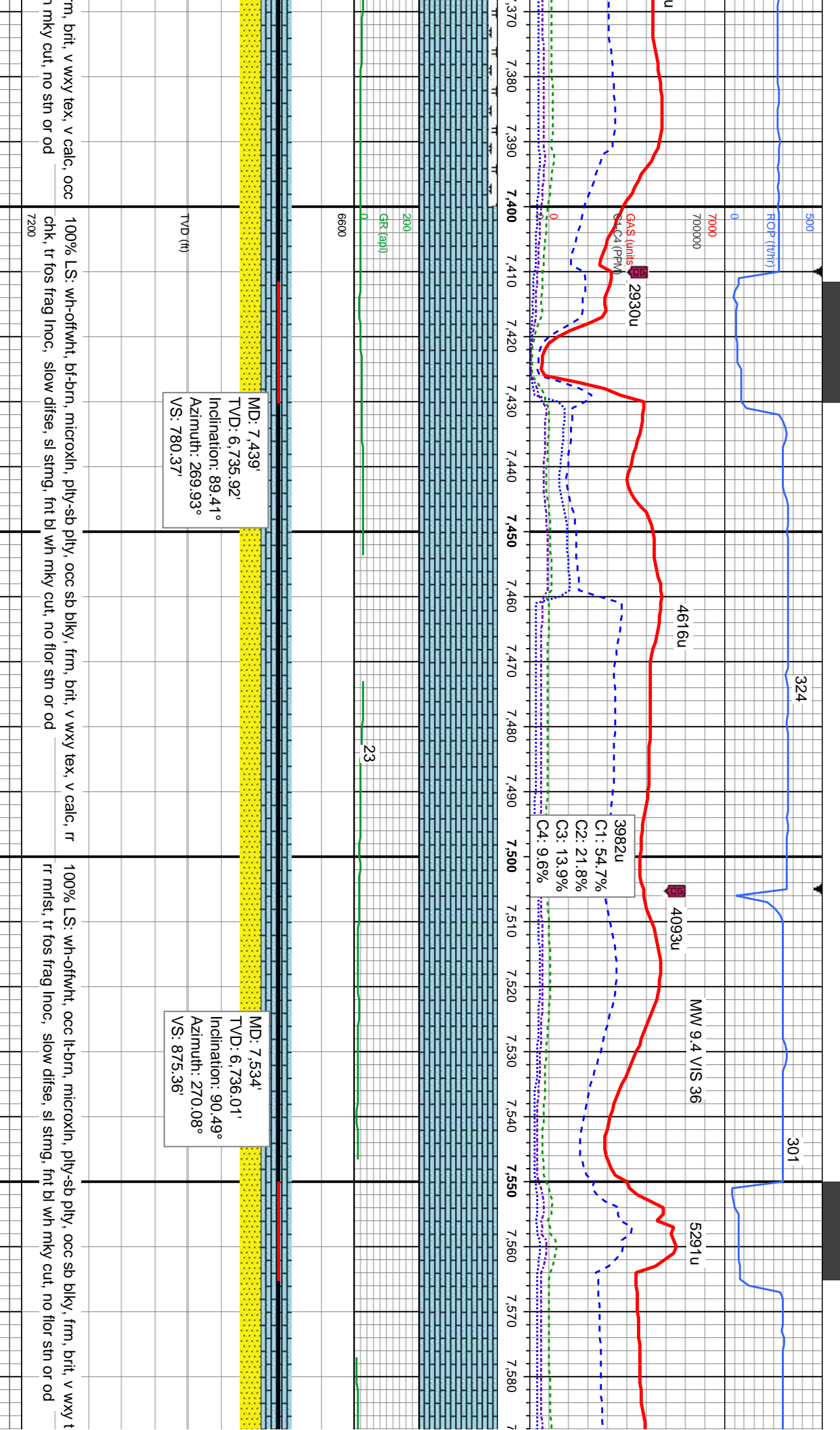
100% LS:	wh-offwht, bf-brn, microxln,
ply-sb ply,	occ sb blkly, frm, brit, v wxy tex, v
calc, r chk & mist,	r fos frag lnoc, slow
dise, sl strng,	fnt bl wh mky cut, no flor stn
or od	
7300	

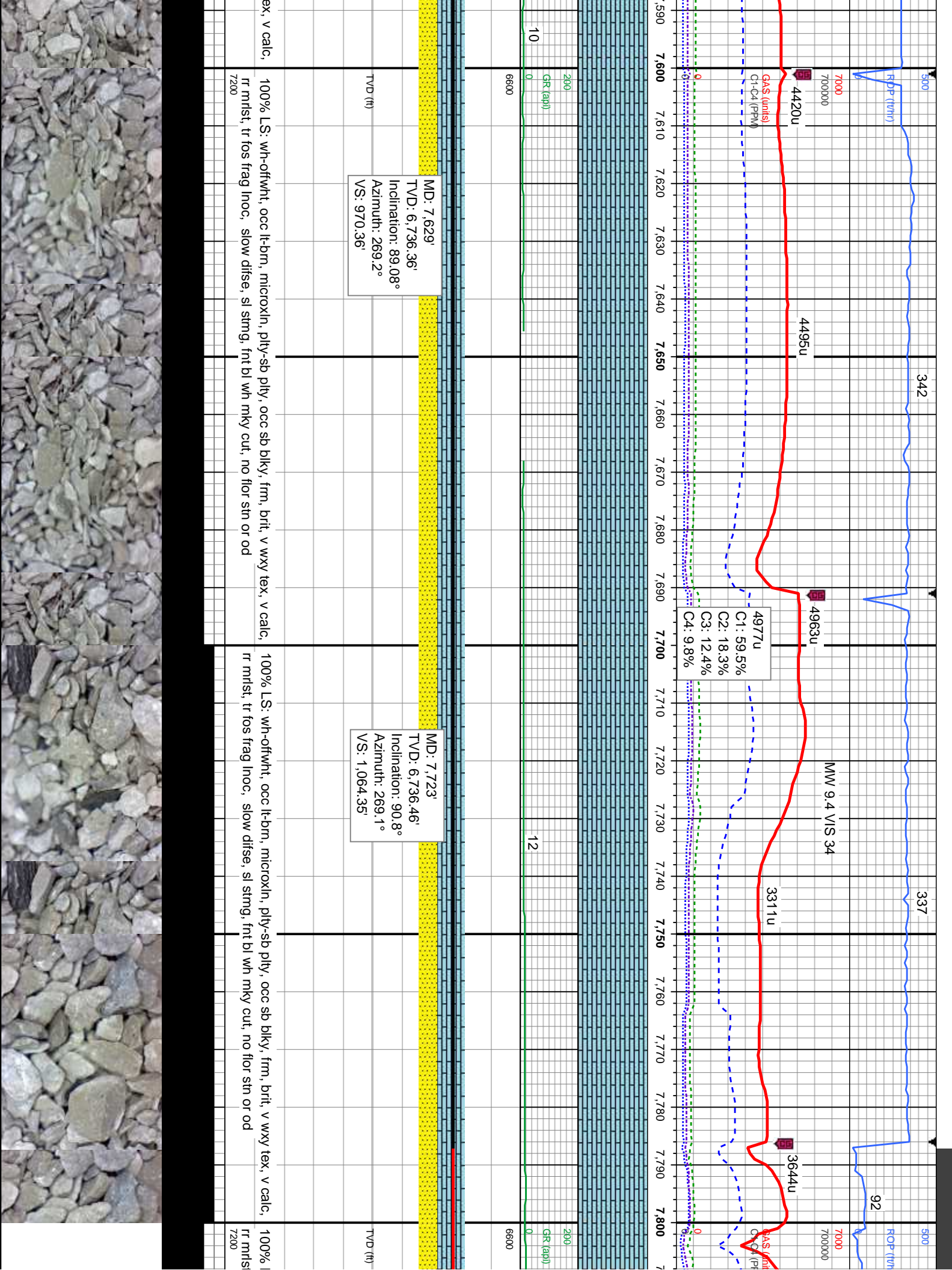
50% CMT, 40% L.S. wh-offwnt, bf-bm, microxln, ply-sb ply, occ sb blkly, frm, brit, v wxy tex, v calc, occ (10%) stly sh, tr fos frag lnoç, slow difse, sl strng, fnt bl wh mky cut, no flor stn or od

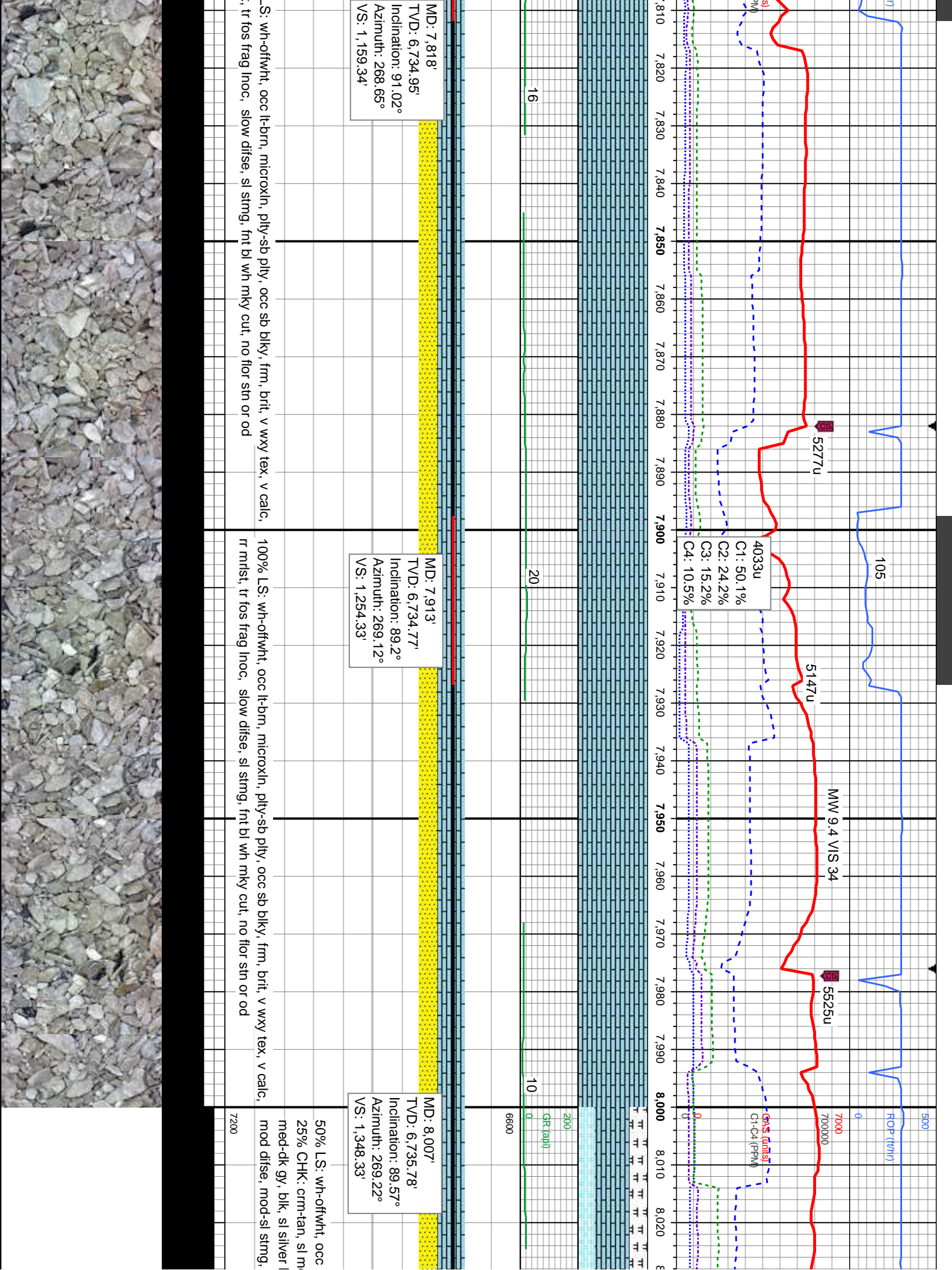
100% L.S.: wh-offwht, bf-brn, microxln, ply-st
chk & mrlst, tr fos frag lnc, slow difse, sl str

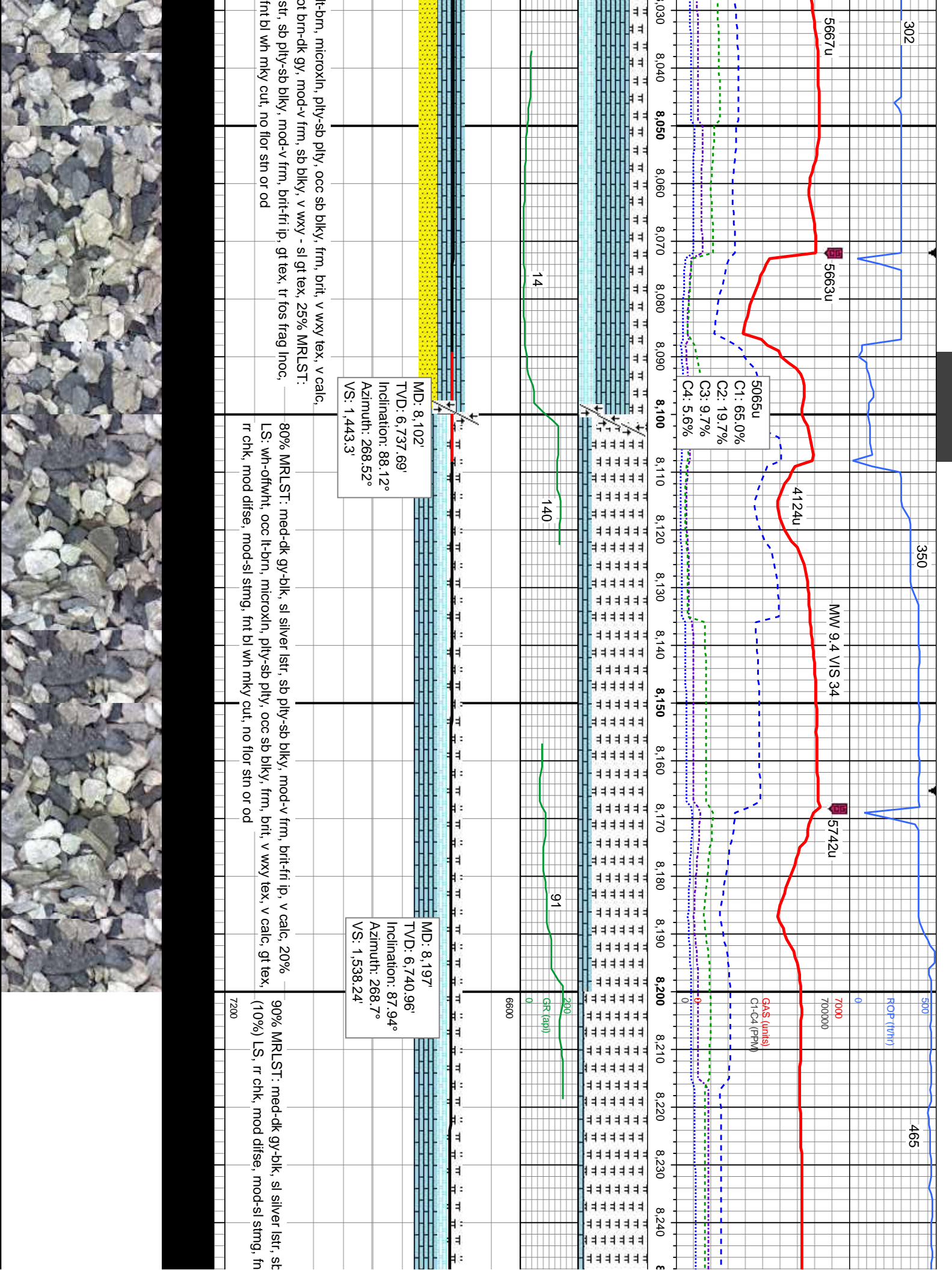


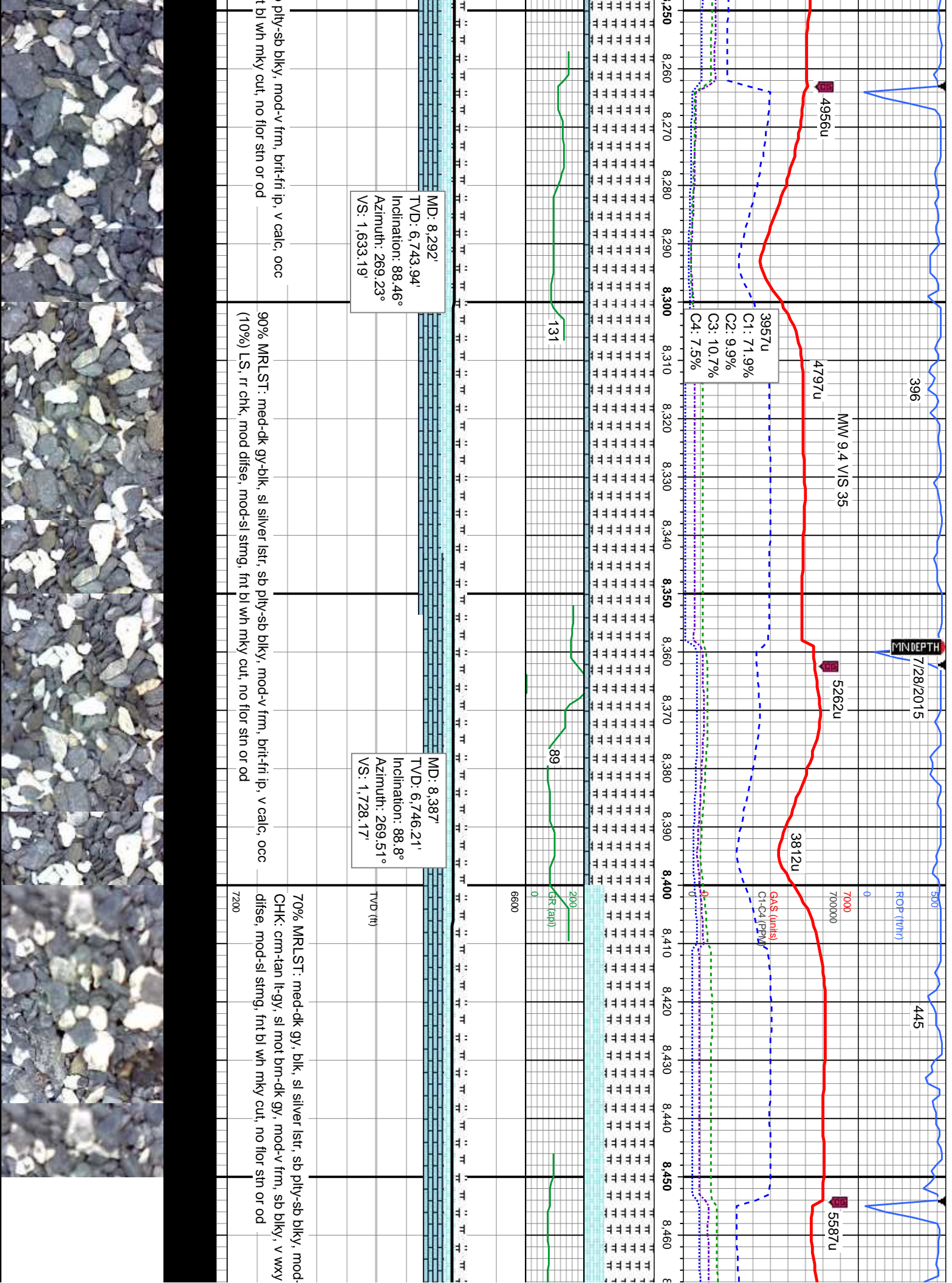


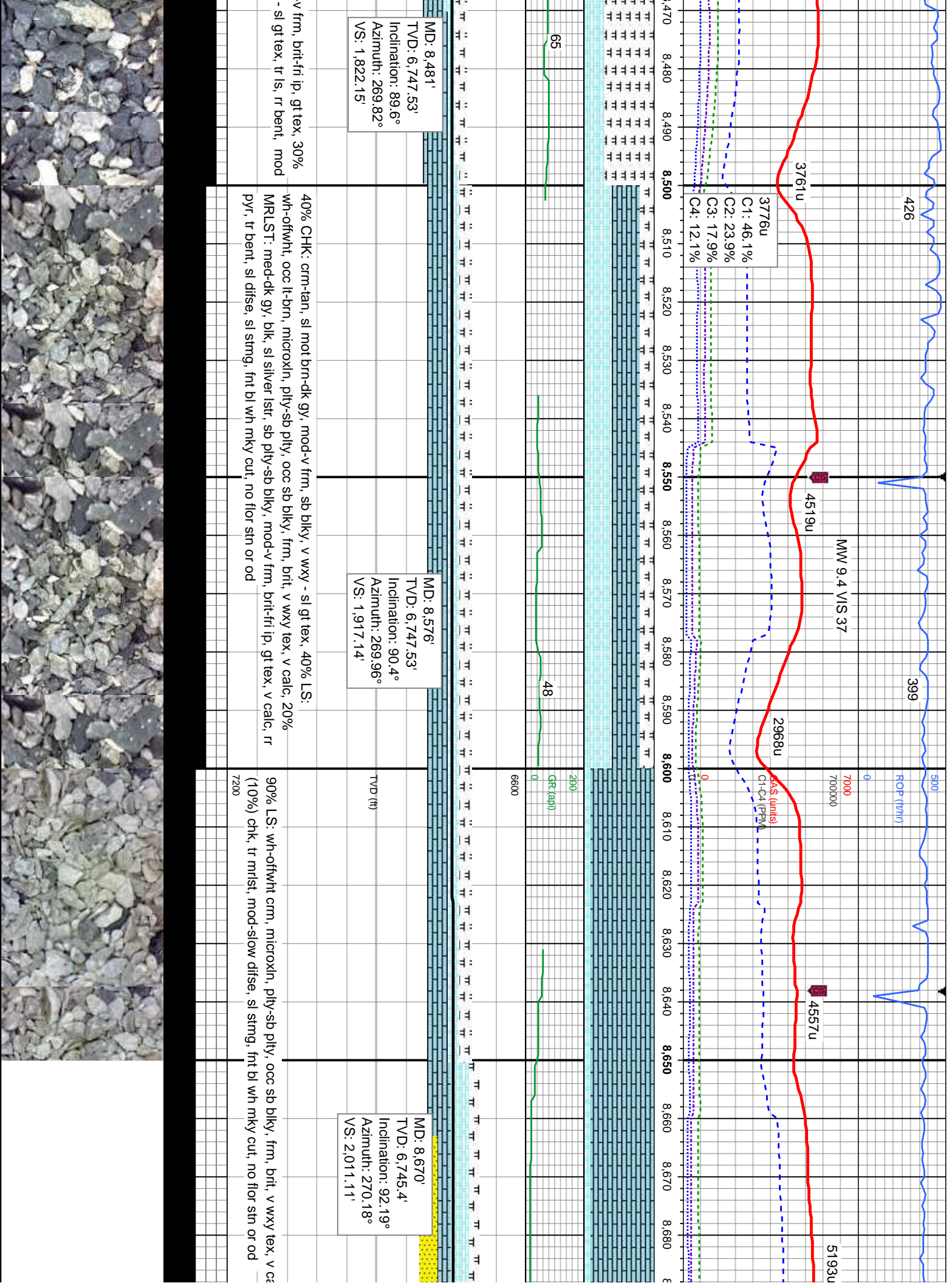


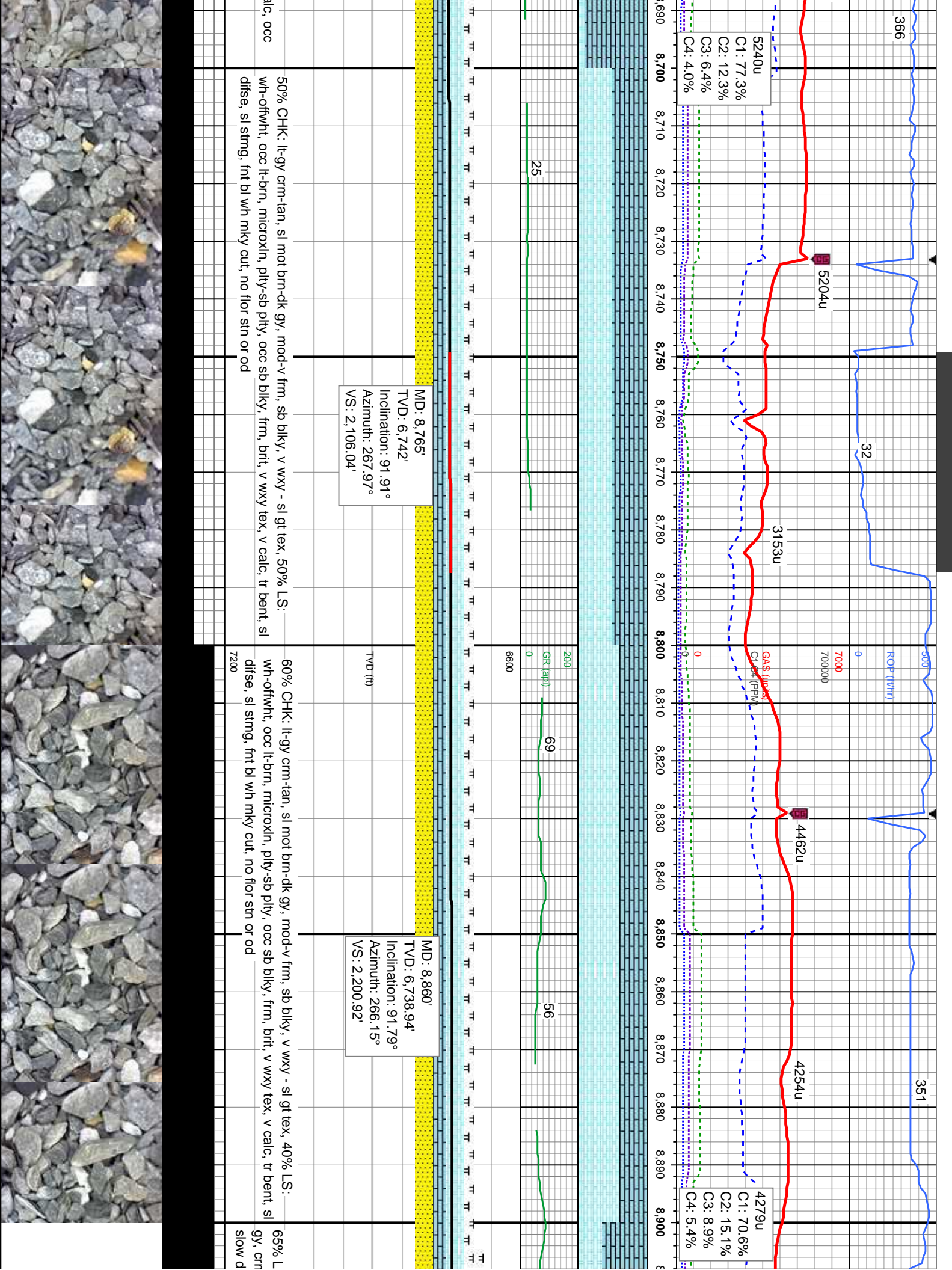


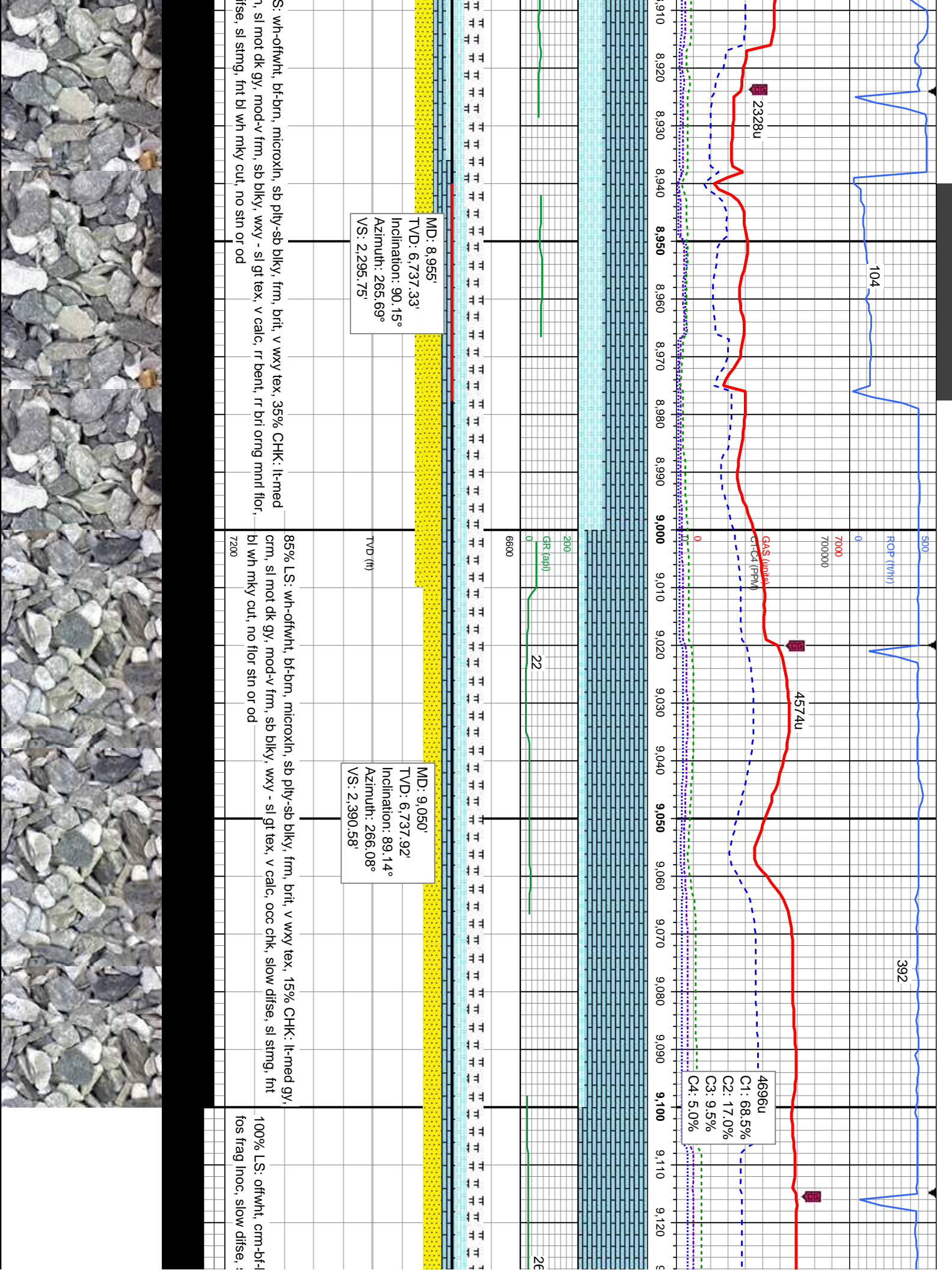


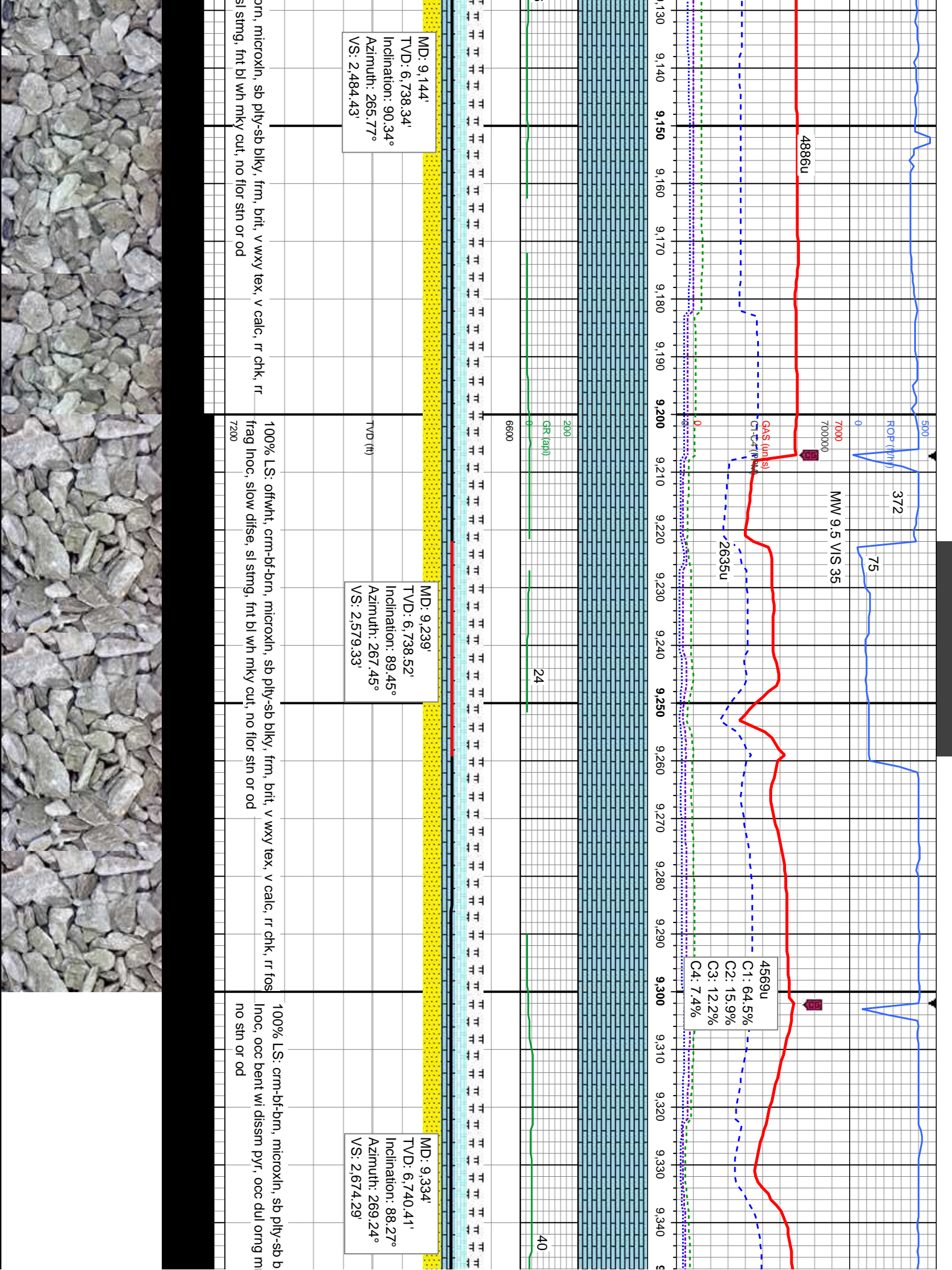


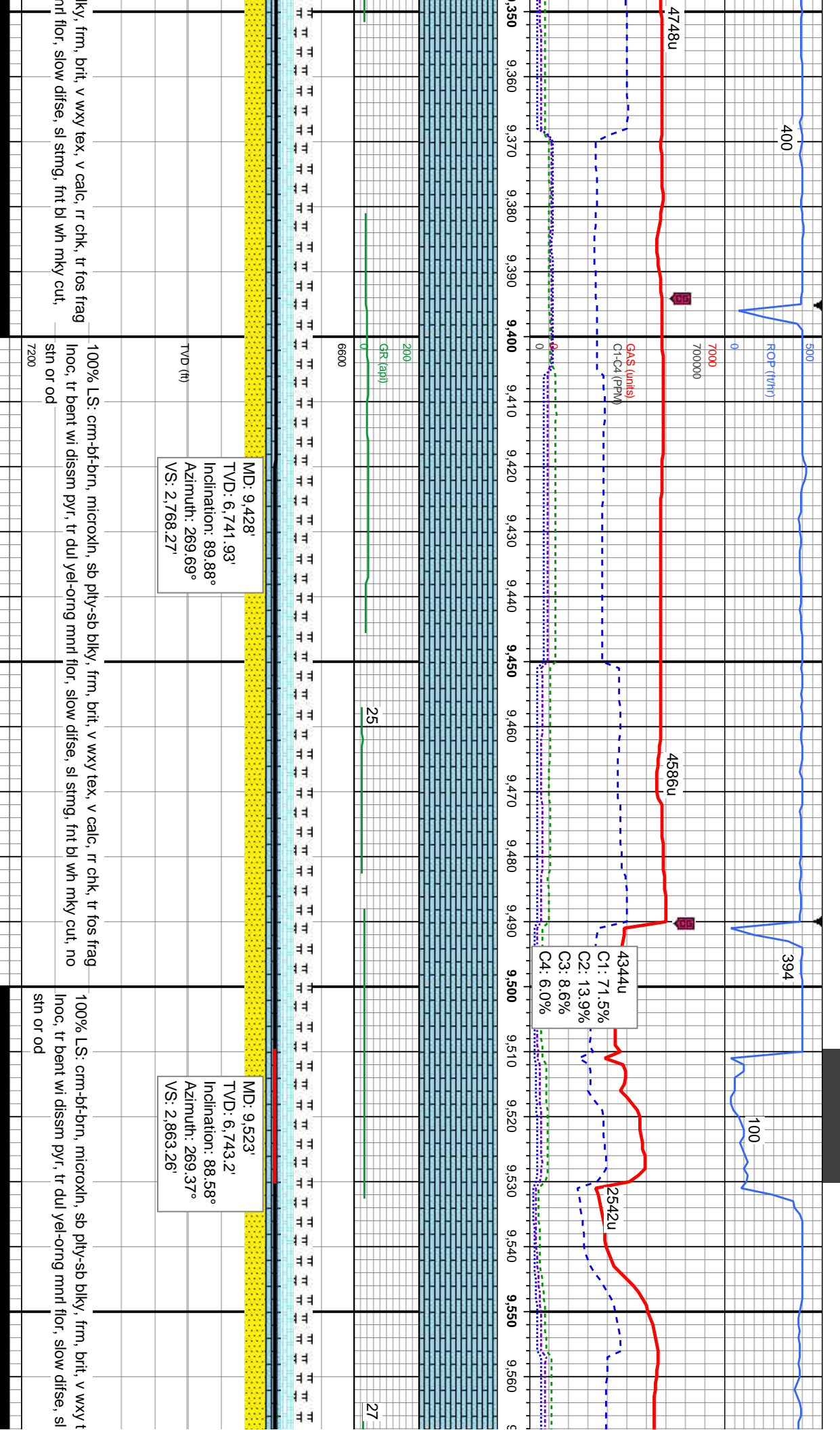


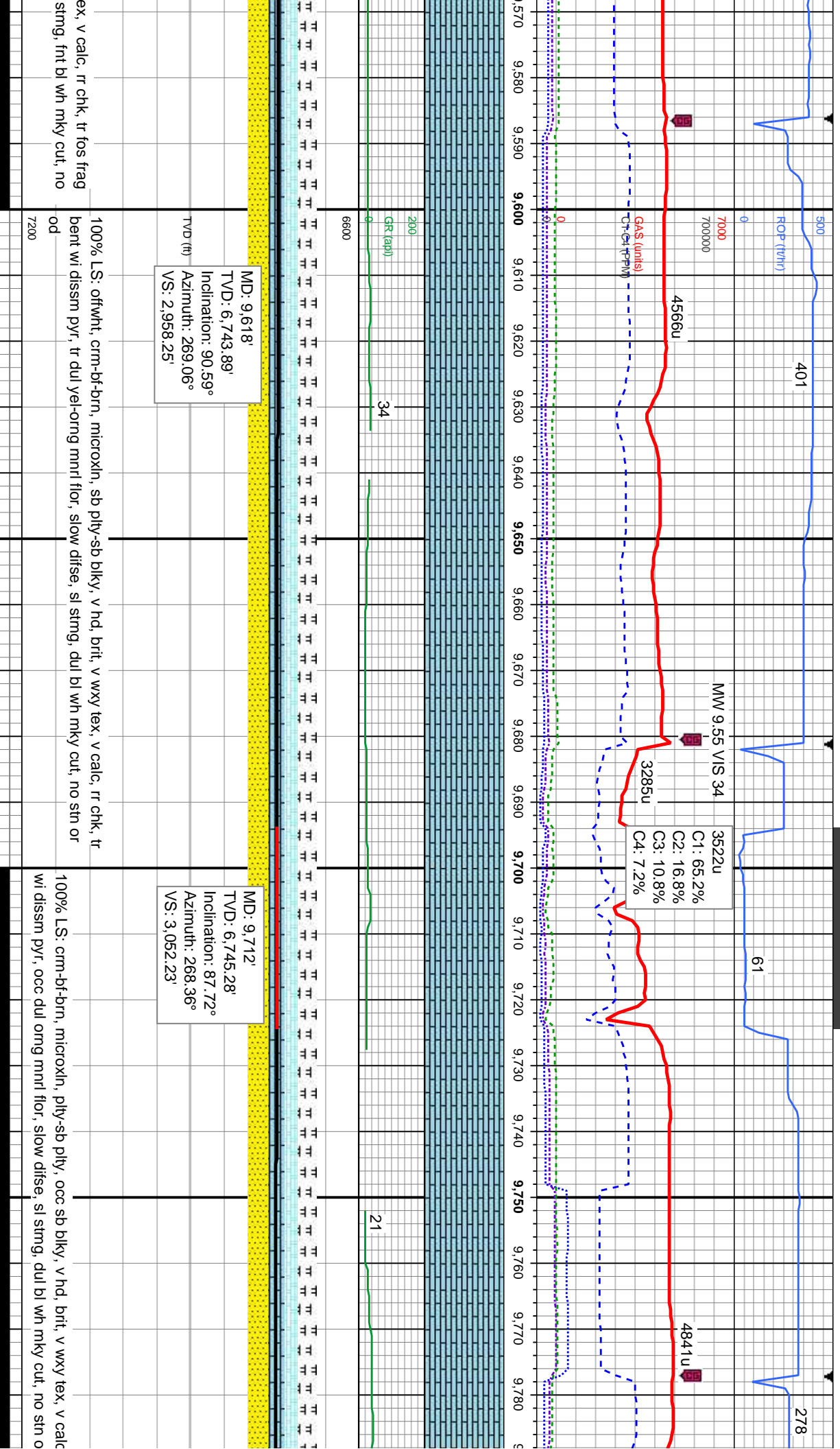


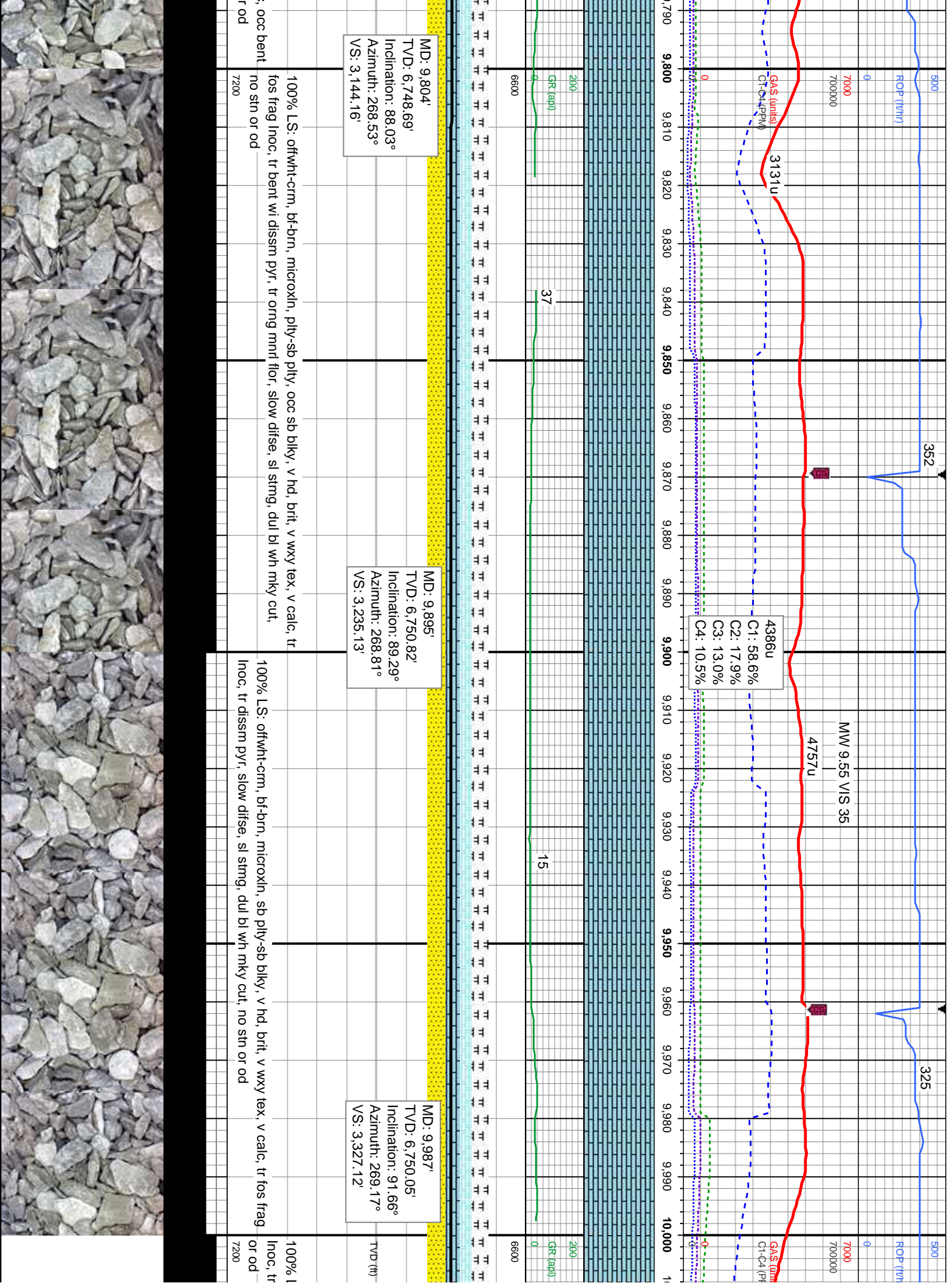


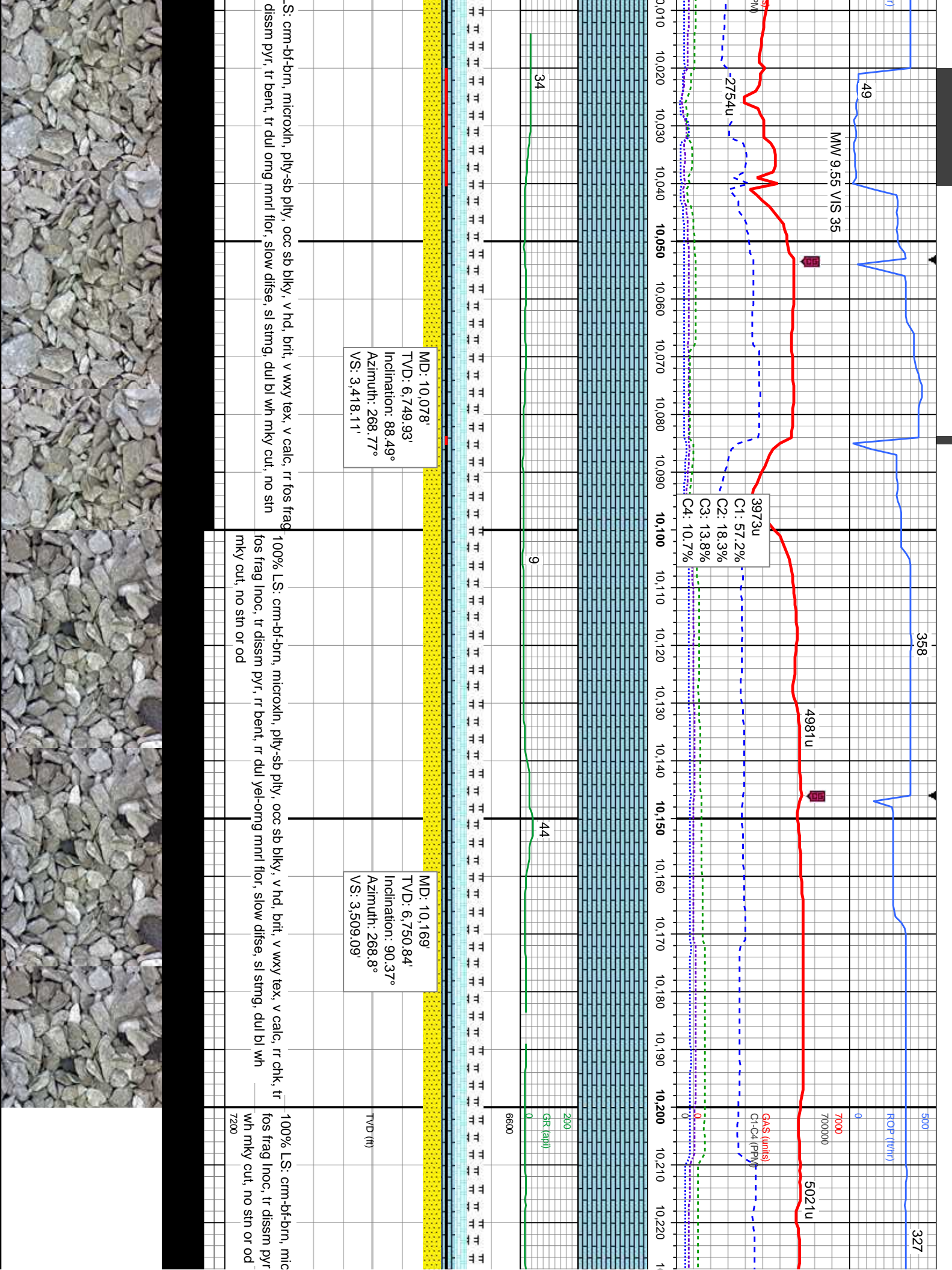


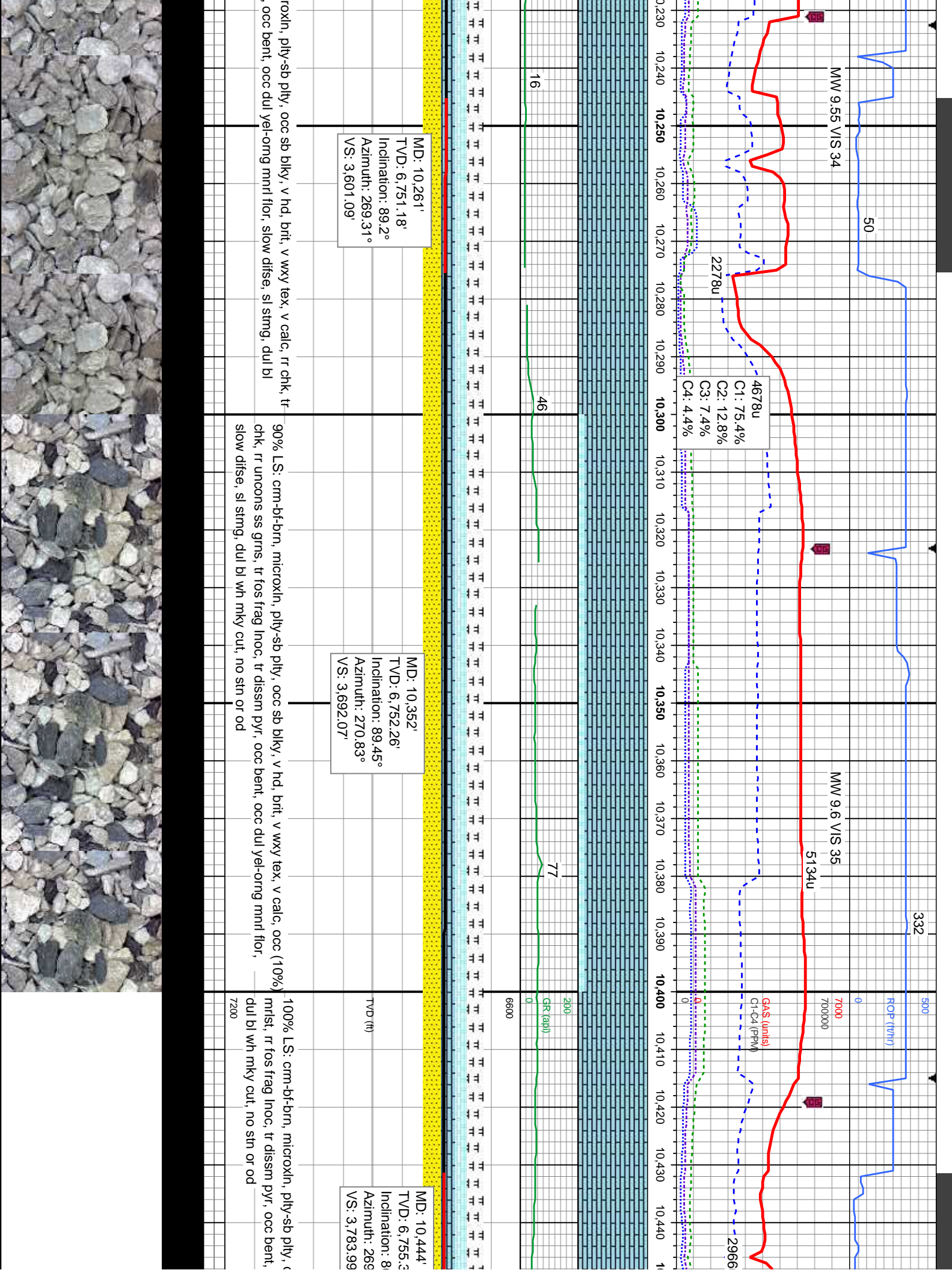


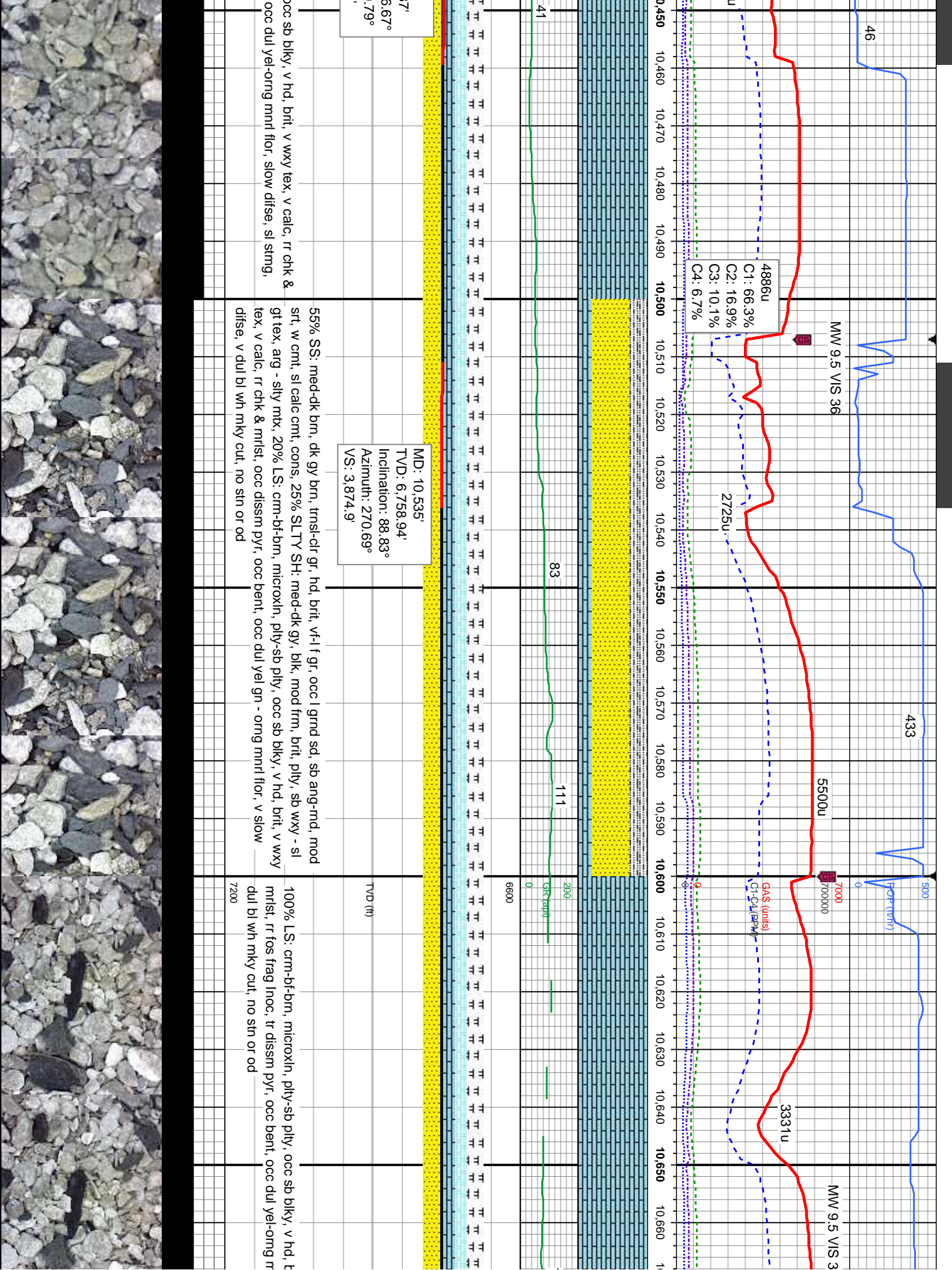


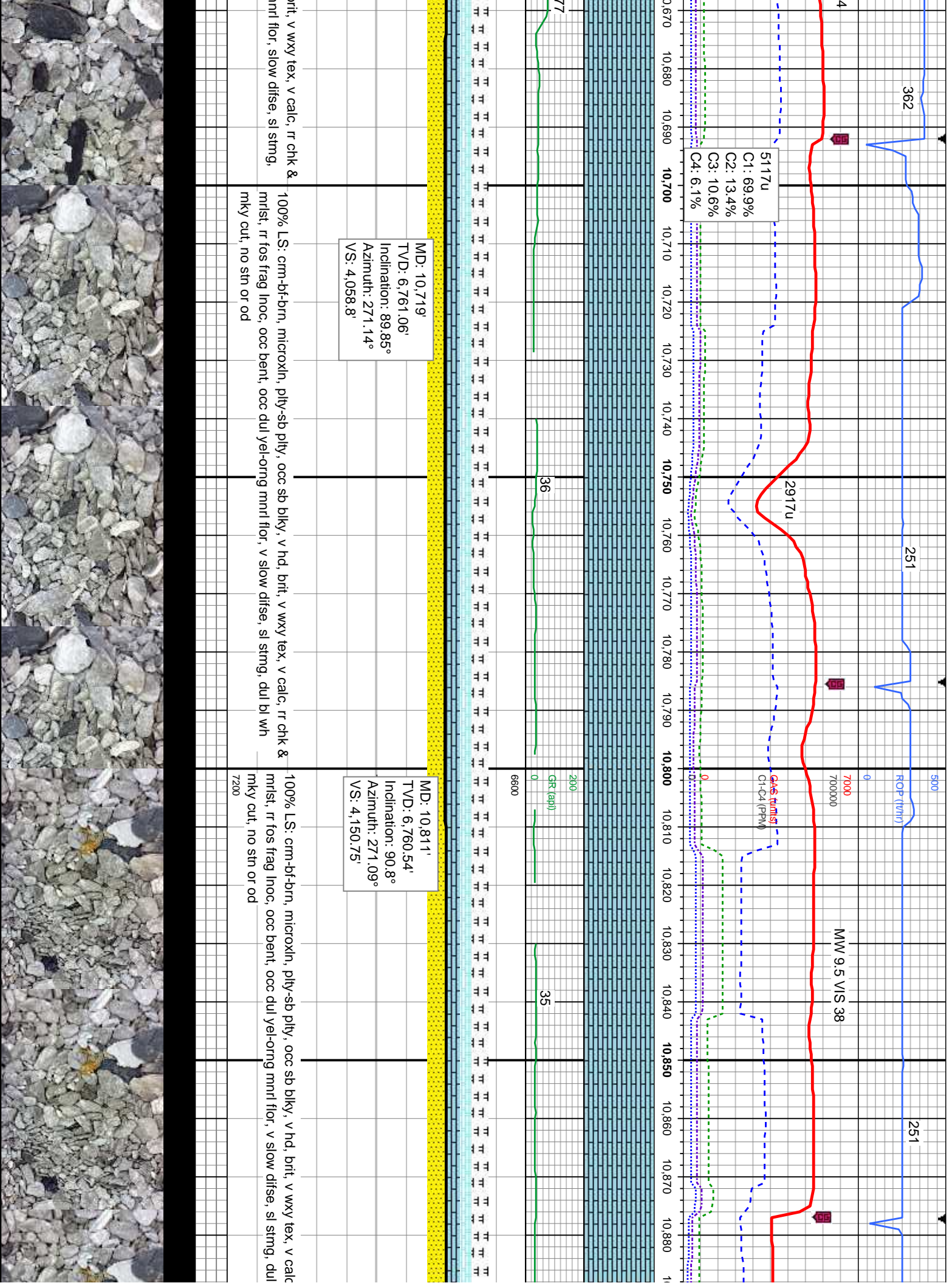


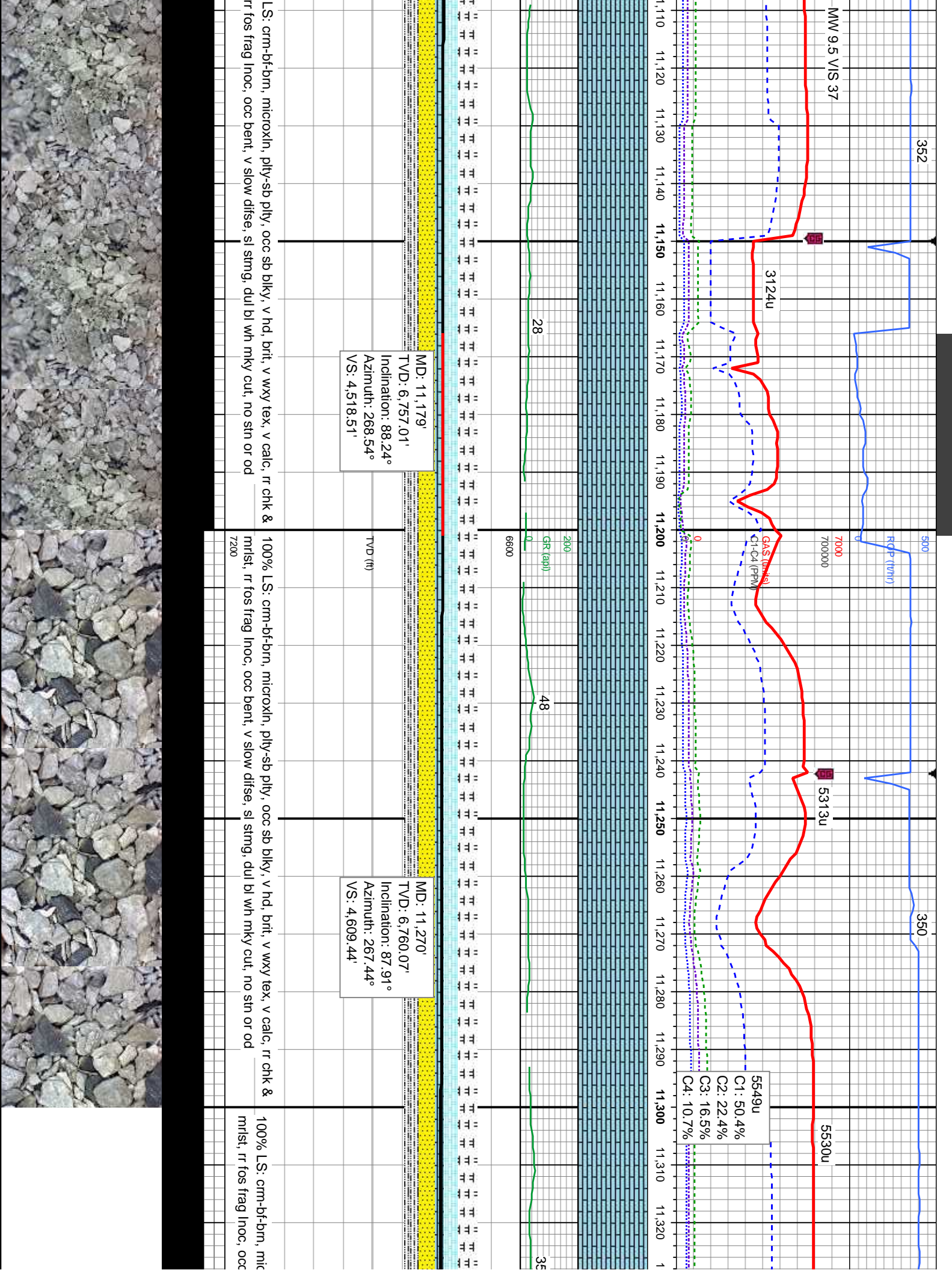


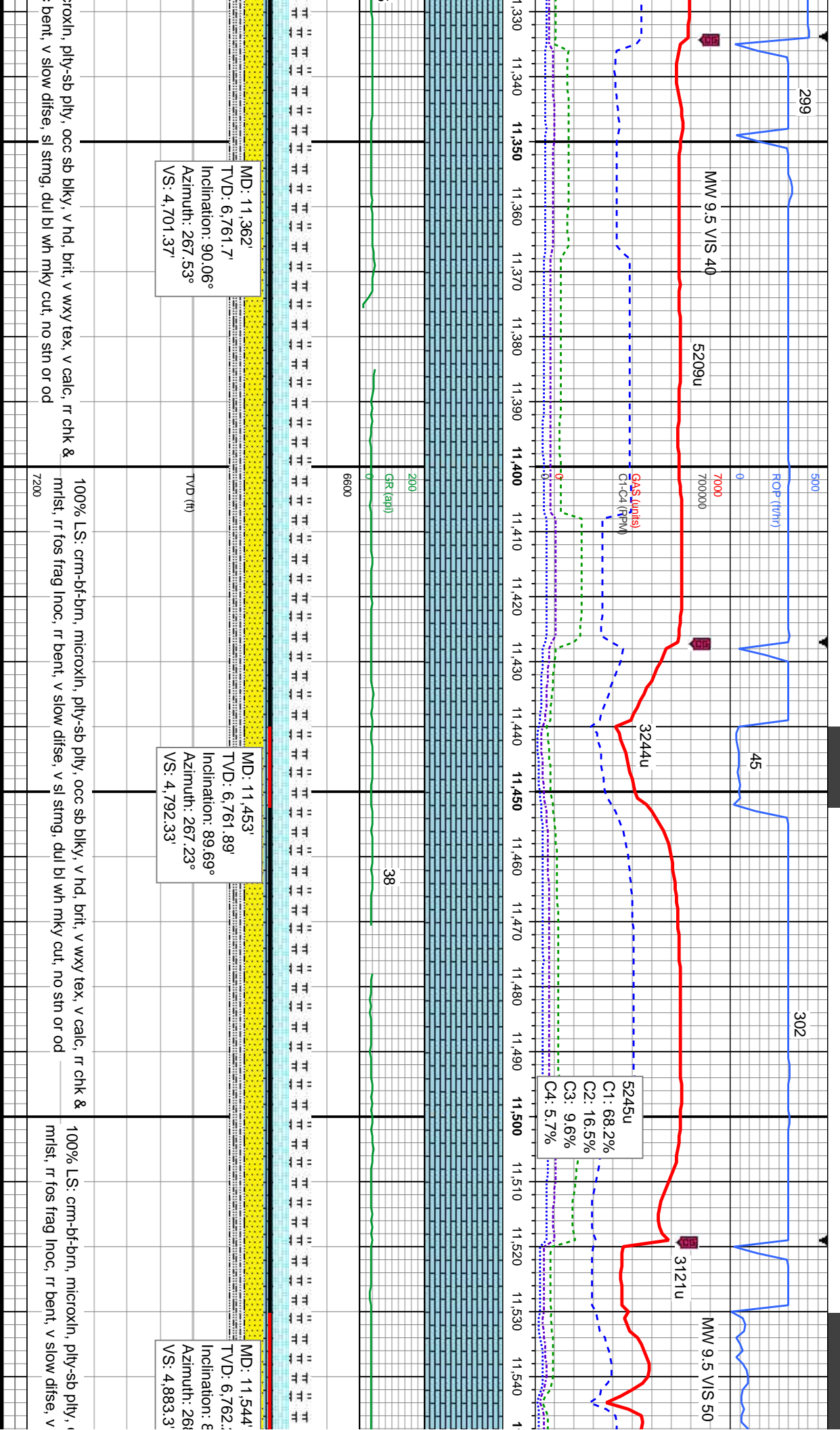


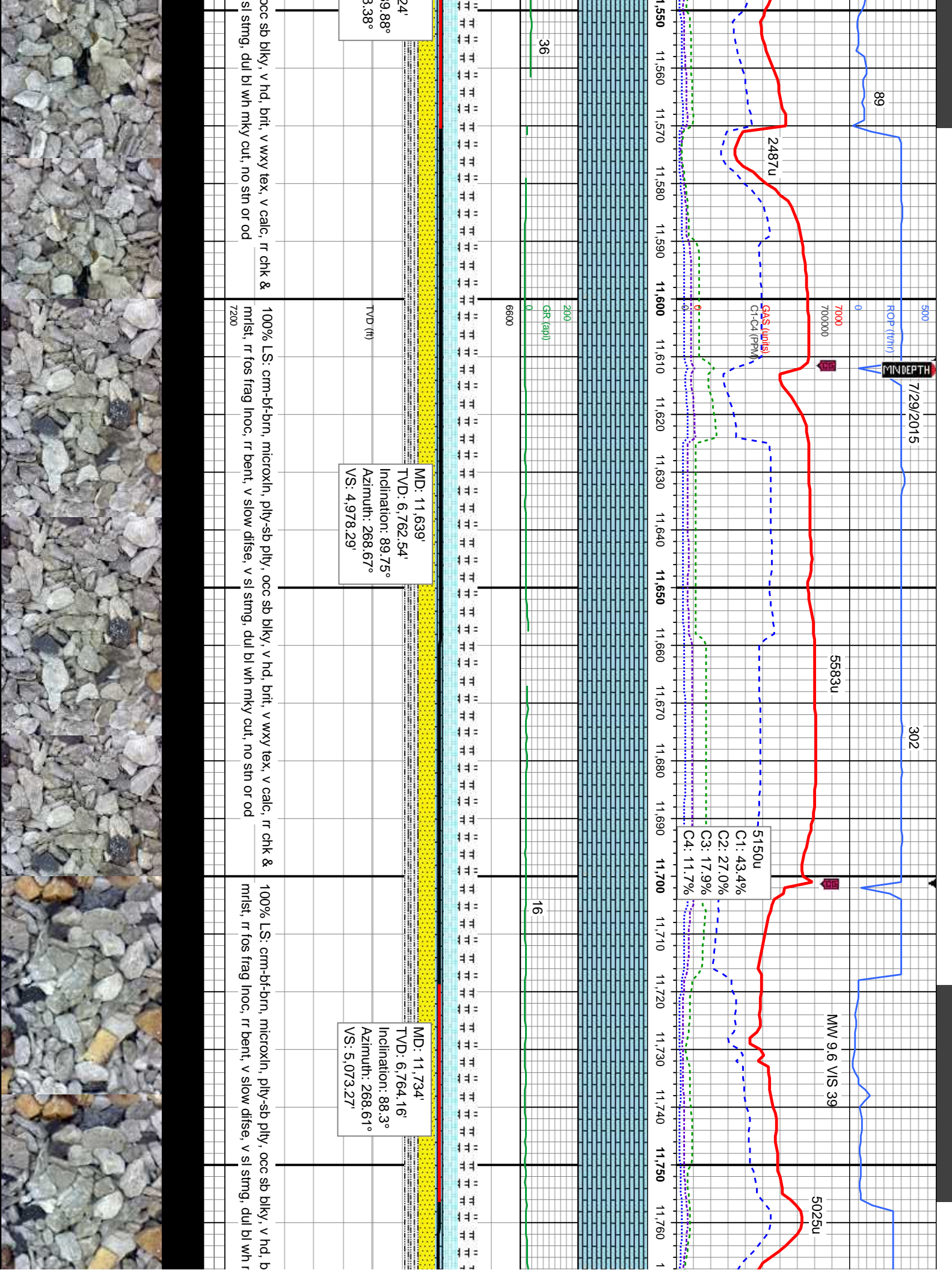


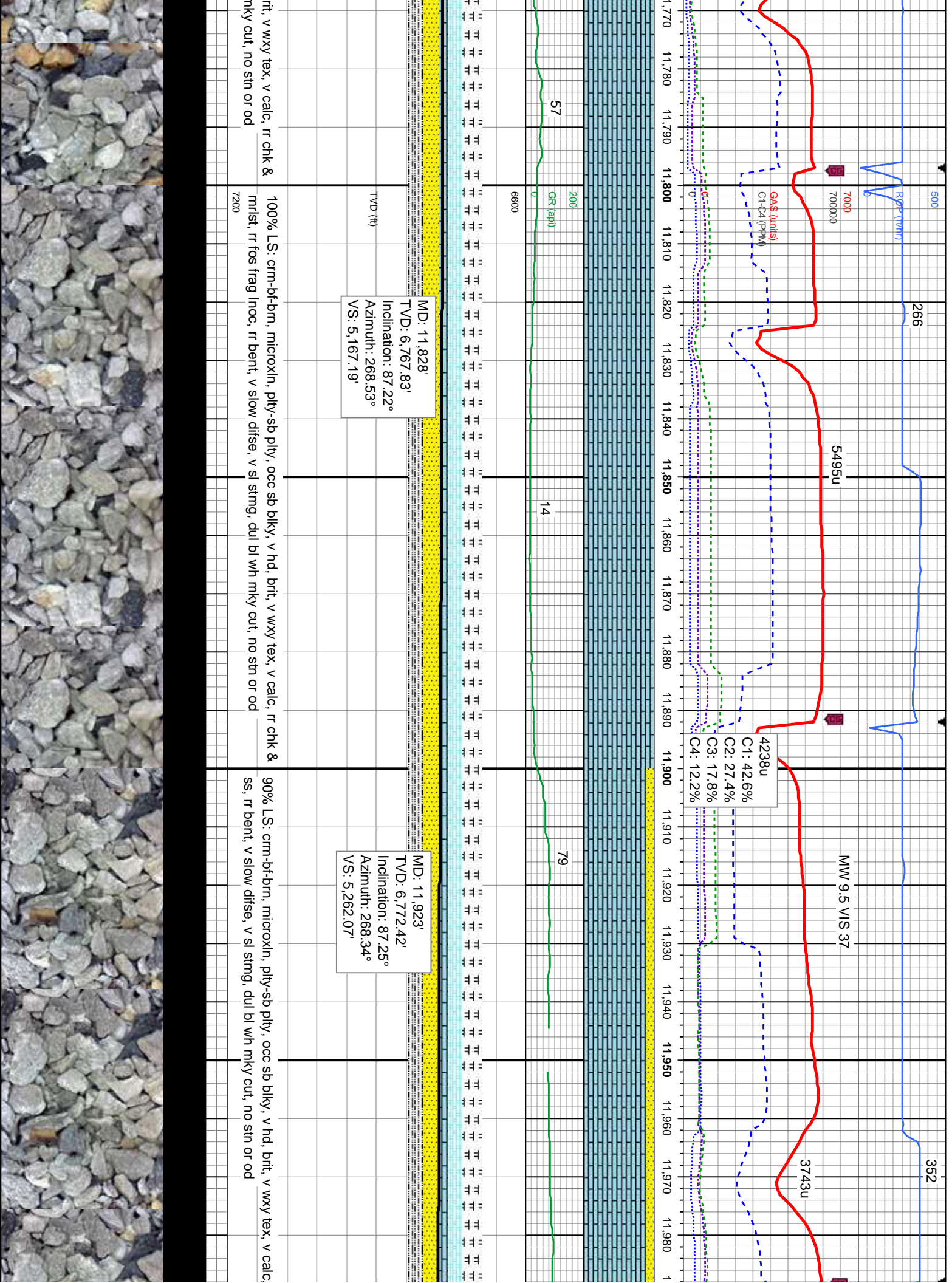


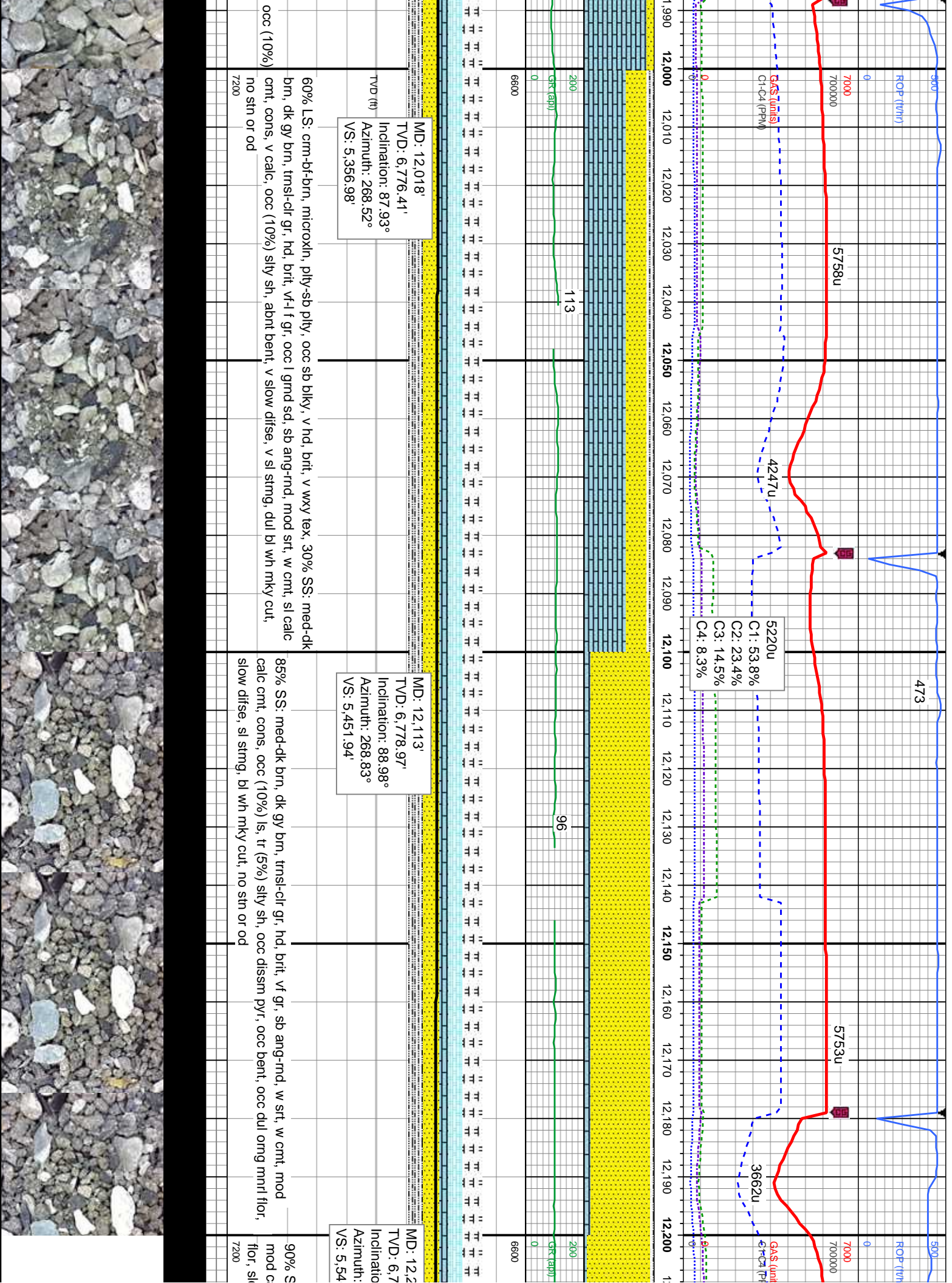


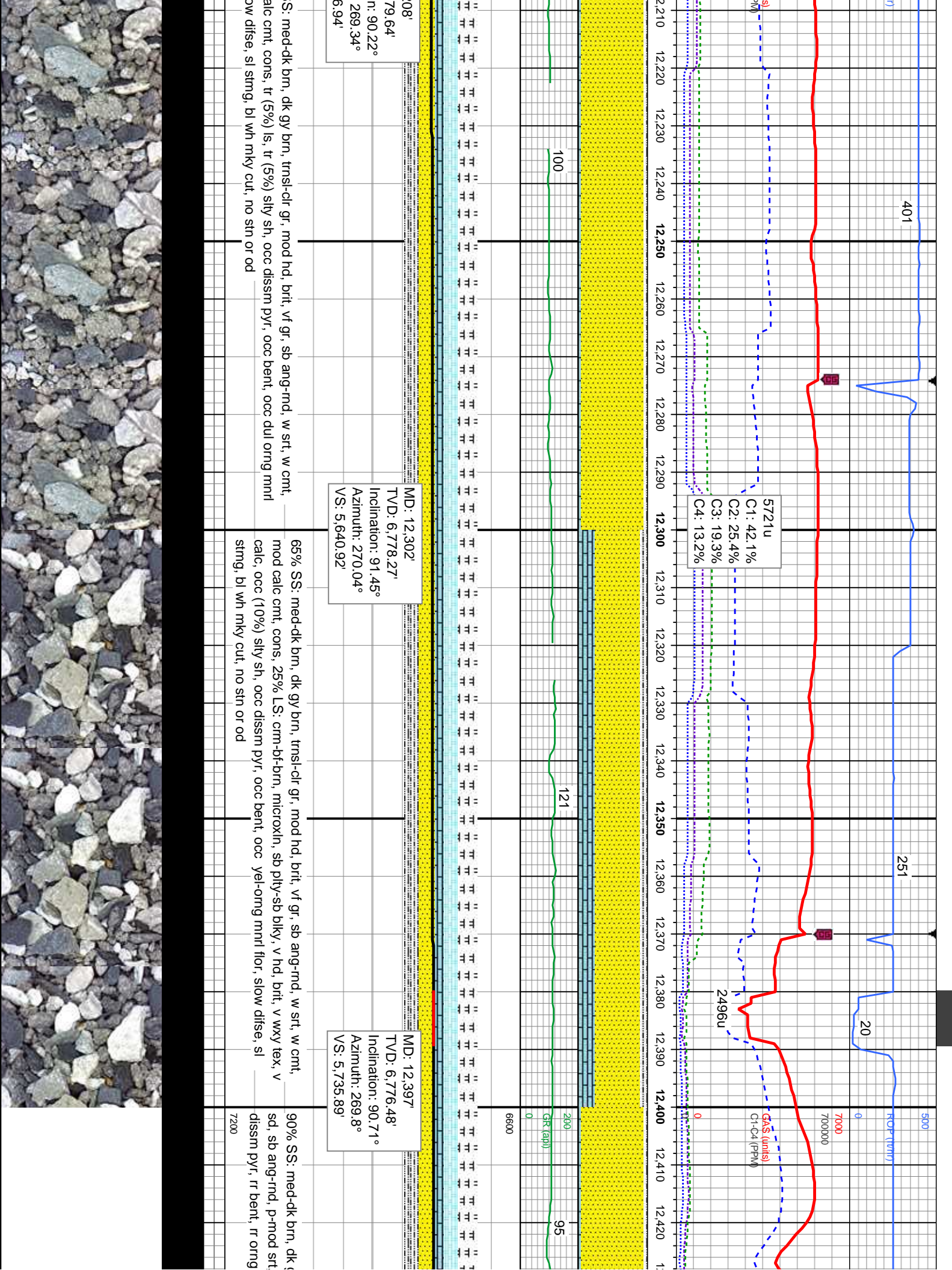


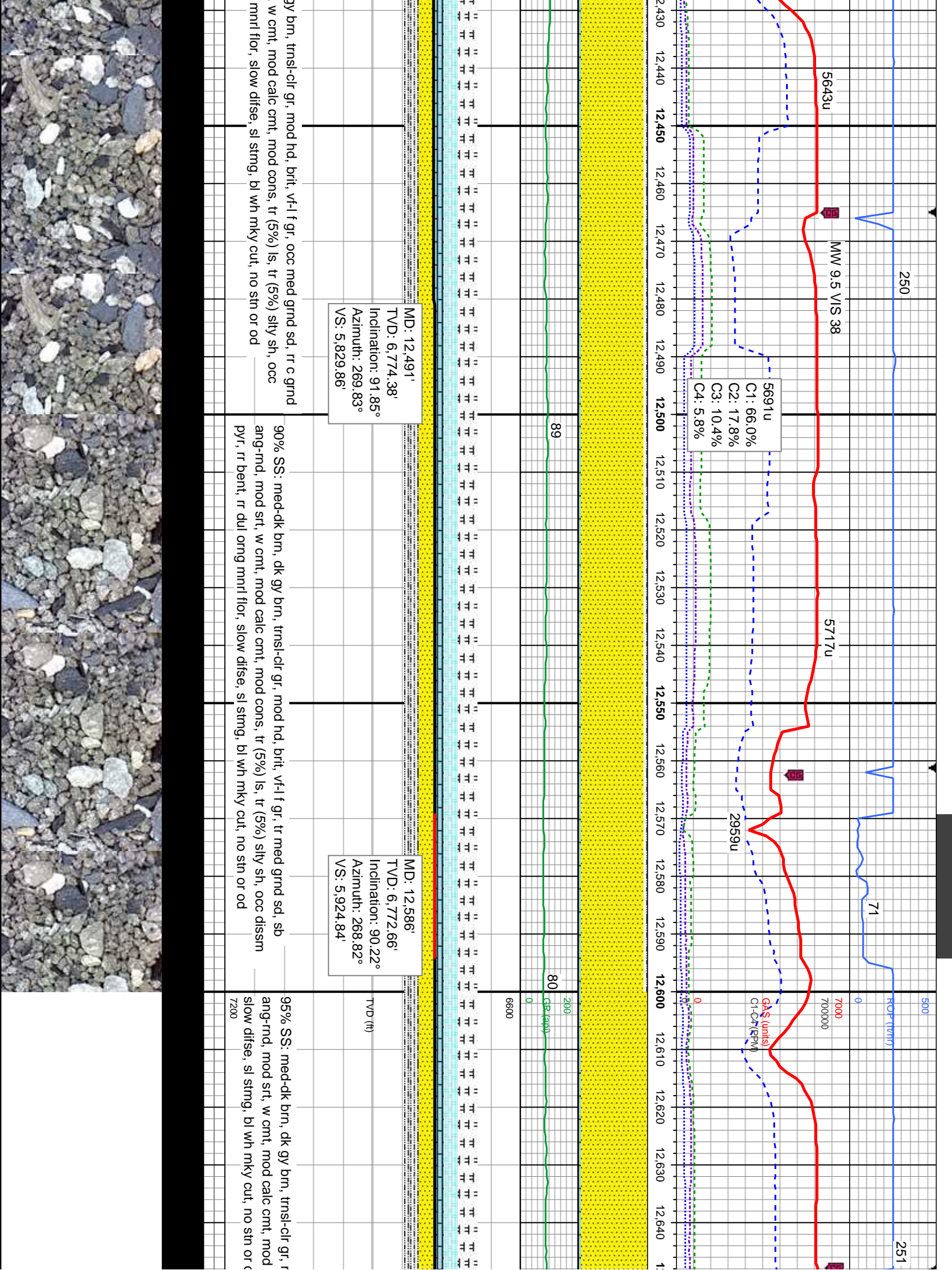


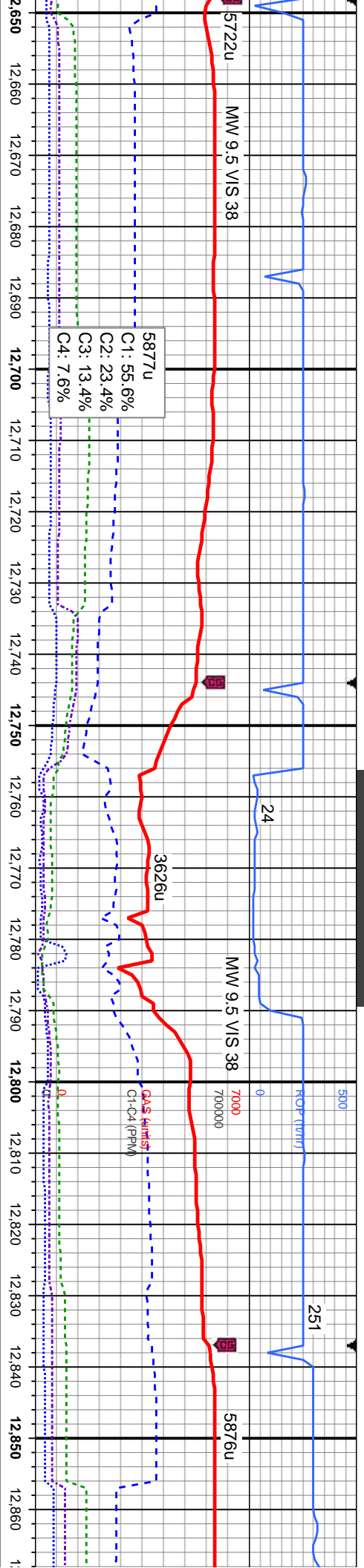












MD: 12,681'
TVD: 6,772.12'
Inclination: 90.43°
Azimuth: 267.97°
VS: 6,019.83'

65% LS: crm-bf-brn, microxln, sb pily-sb blkly, v hd, brit, v wxy tex, 30% SS: med-dk brn, dk gy brn, trns-l-clr gr, mod hd, brit, vf-l f gr, rr med grnd sd, sb ang-rnd, mod-w srt, w cnt, mod calc cnt, mod-w cons, tr (5%) silty sh, rr fos frag lnc, occ bent, occ dul orng mnrl flor, slow difse, sl string, bl wh mky cut, no stn or od

95% SS: med-dk brn, dk gy brn, trns-l-clr gr, mod hd, brit, vf-l f gr ang-rnd, mod-w srt, w cnt, mod calc cnt, mod-w cons, tr (5%) silty sh, v slow difse, v frnt bl wh mky cut, no flor stn or od

MD: 12,681'
TVD: 6,772.12'
Inclination: 90.43°
Azimuth: 267.97°
VS: 6,019.83'



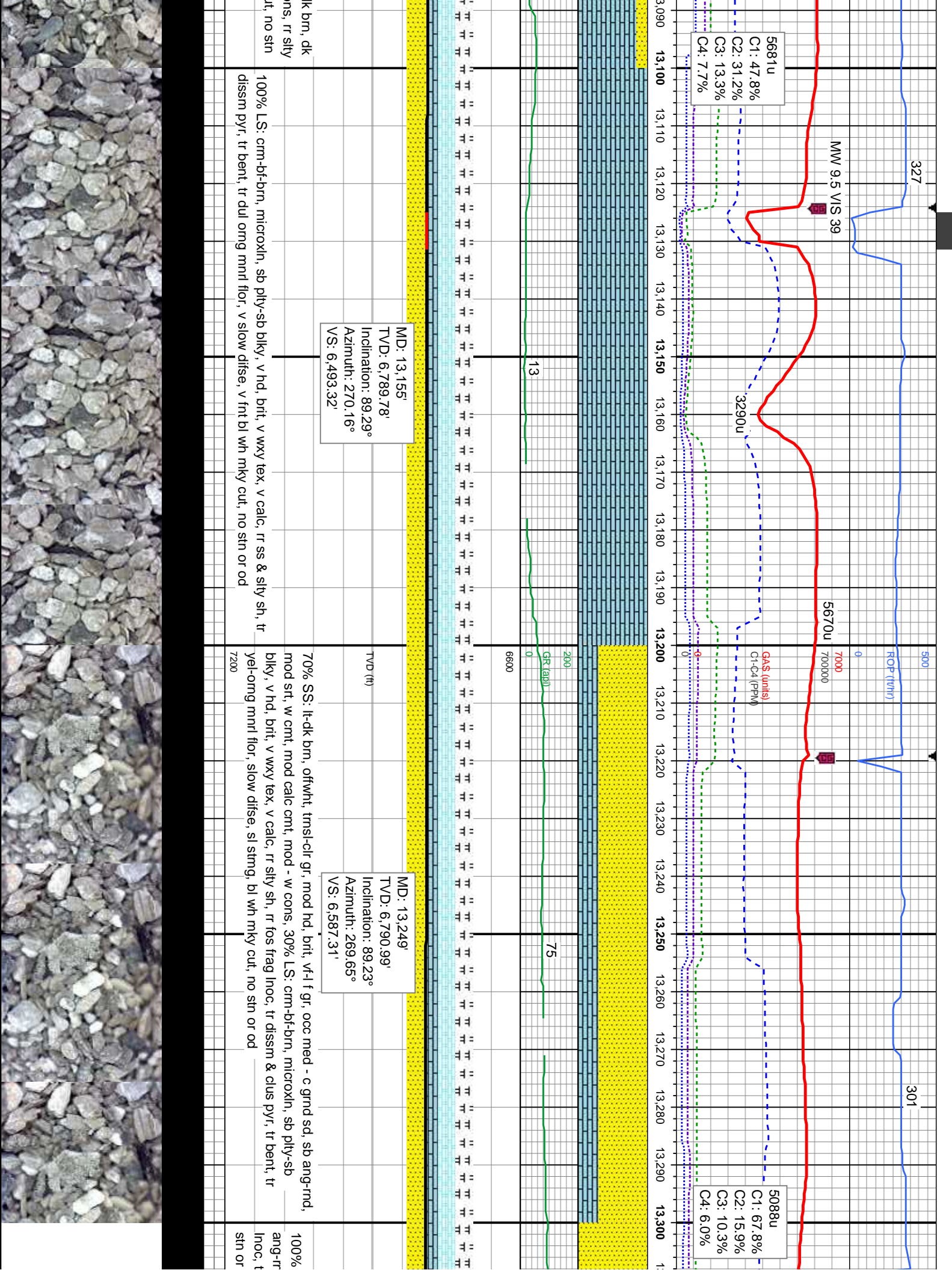


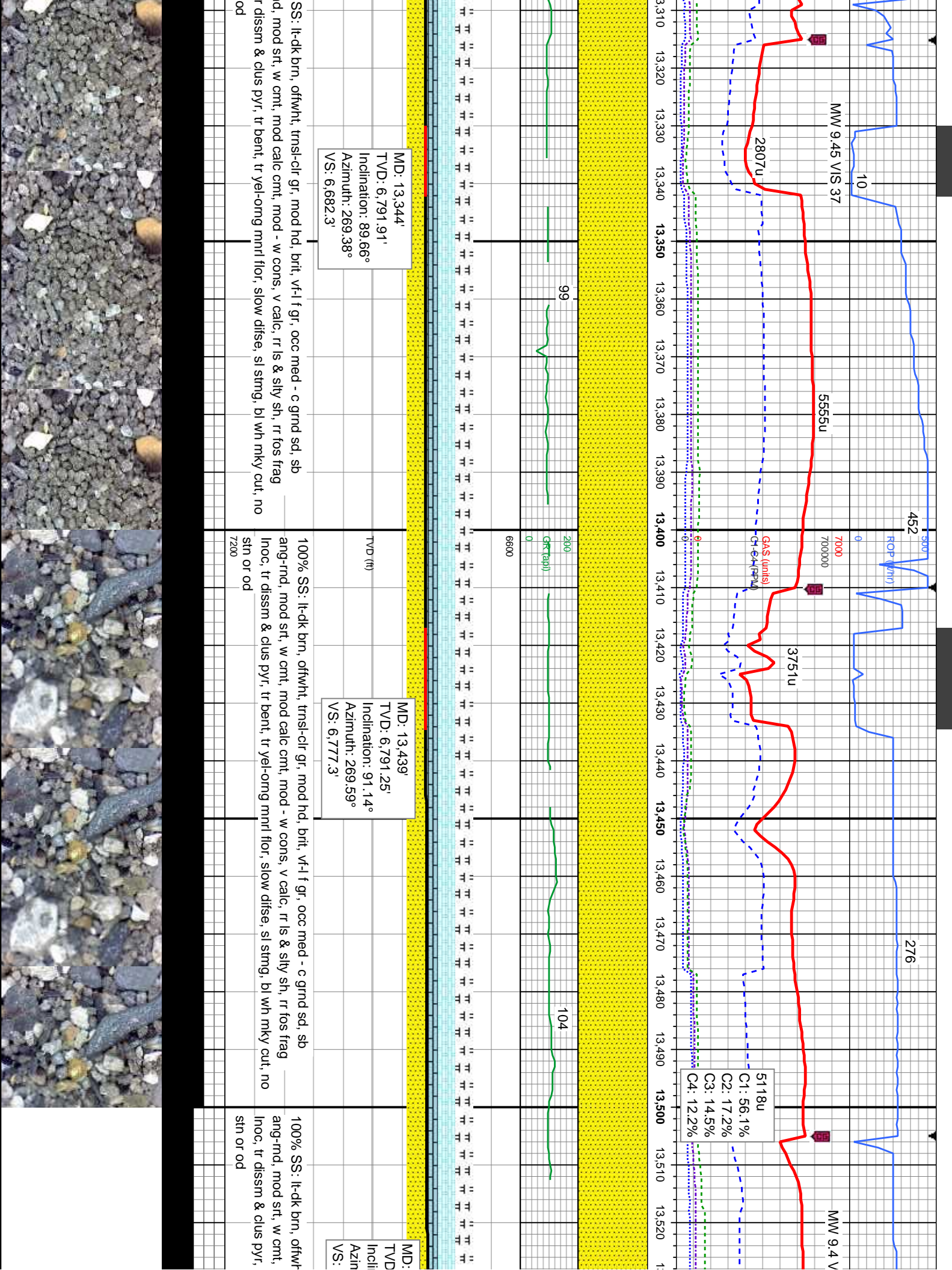
GAS (units)
C1-C4 (PPM)

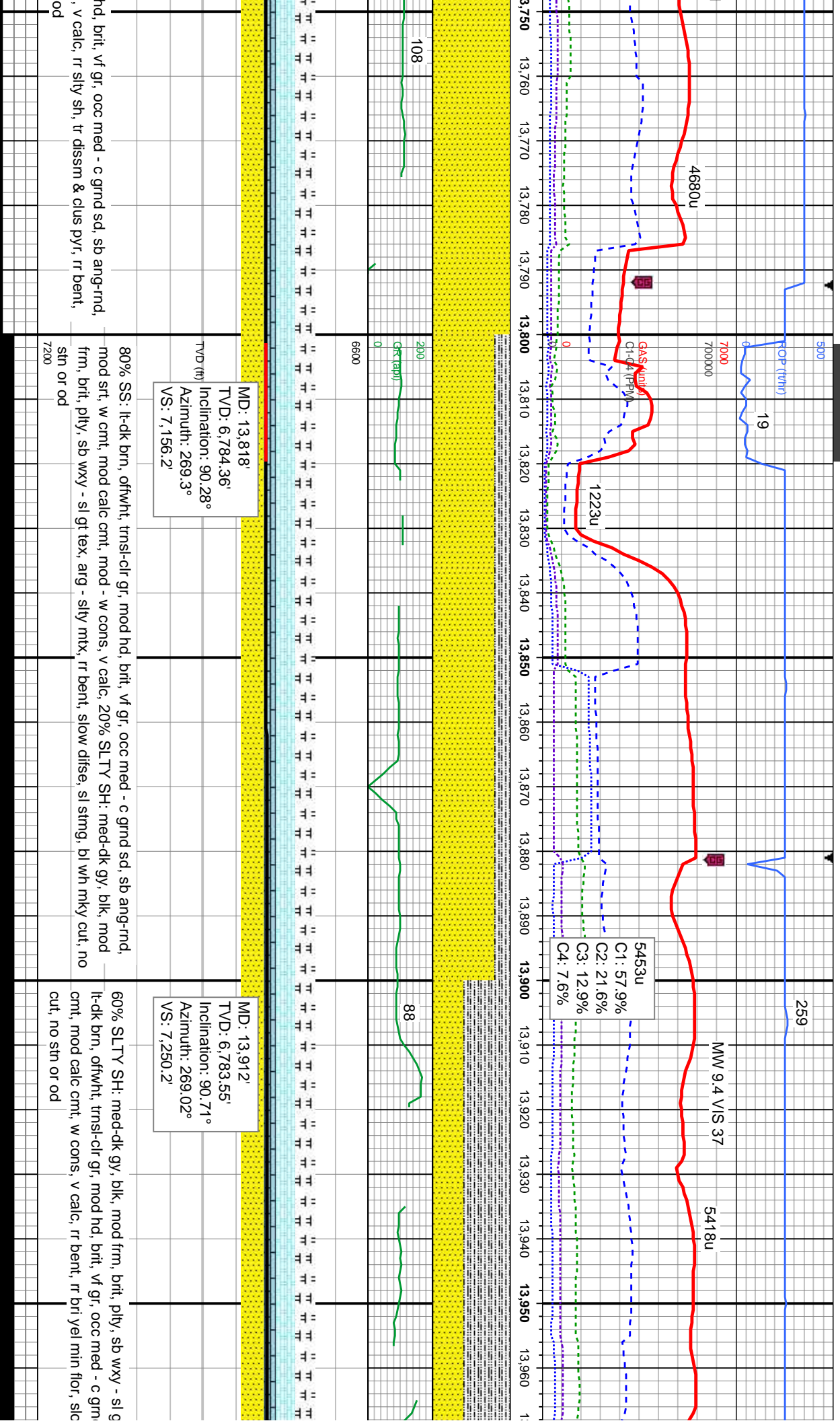
MD: 13,060'
TVD: 6,787.52'
Inclination: 87.99°
Azimuth: 269.11°
VS: 6,398.36'

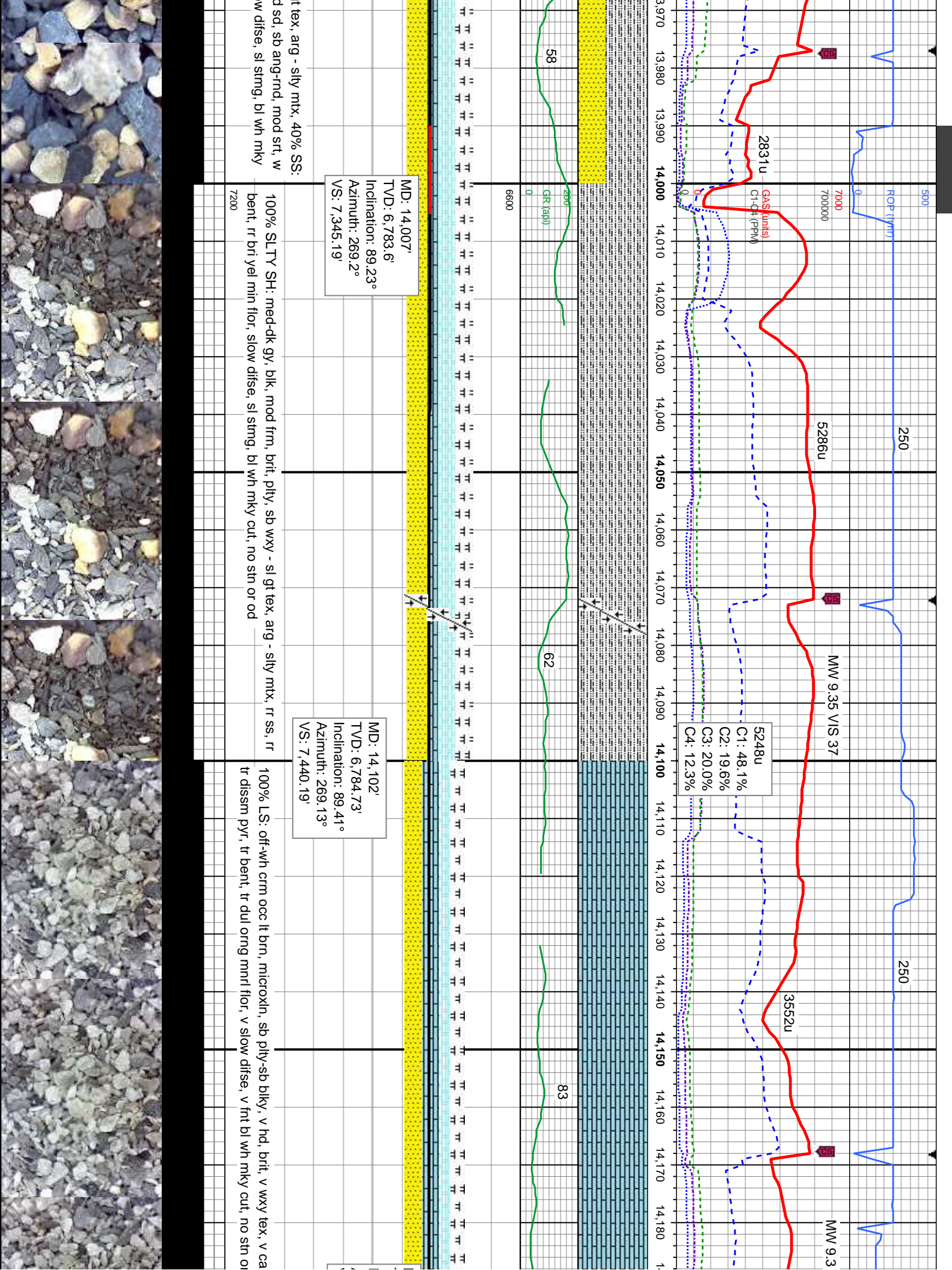
85% LS: crm-bi-brn, microxln, sb pily-sb blkly, v hd, brit, v wxy tex; 15% SS: med-c-
gy brn, tnsi-clr gr, mod hd, brit, v-f l gr, sb ang-rnd, w srt, w cmt, mod calc crt, cc
sh, r dissim pyr, occ bent, occ bri yel-orm mnl flr, v slow difse, v fnt bl wh mky c
or od

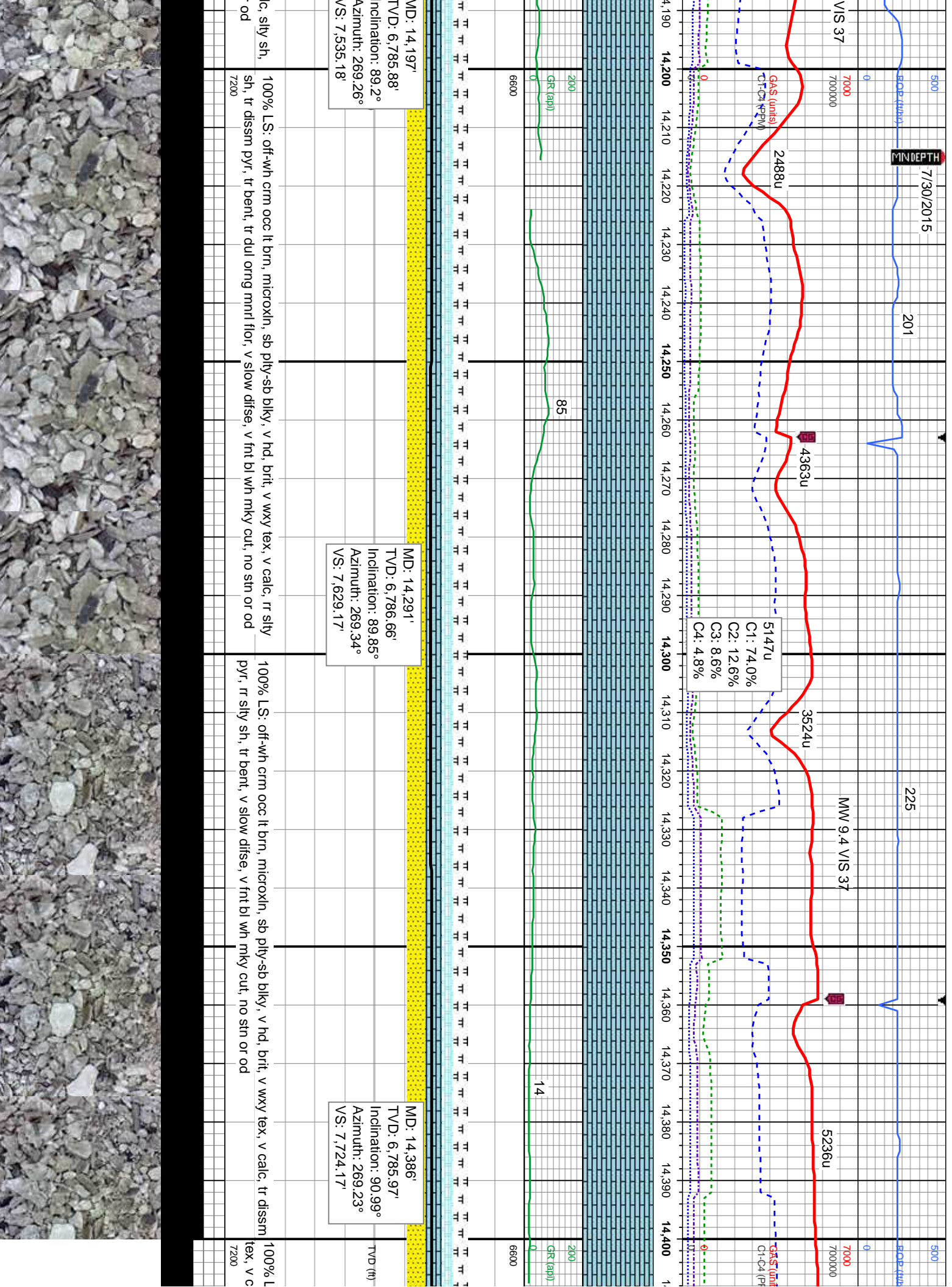


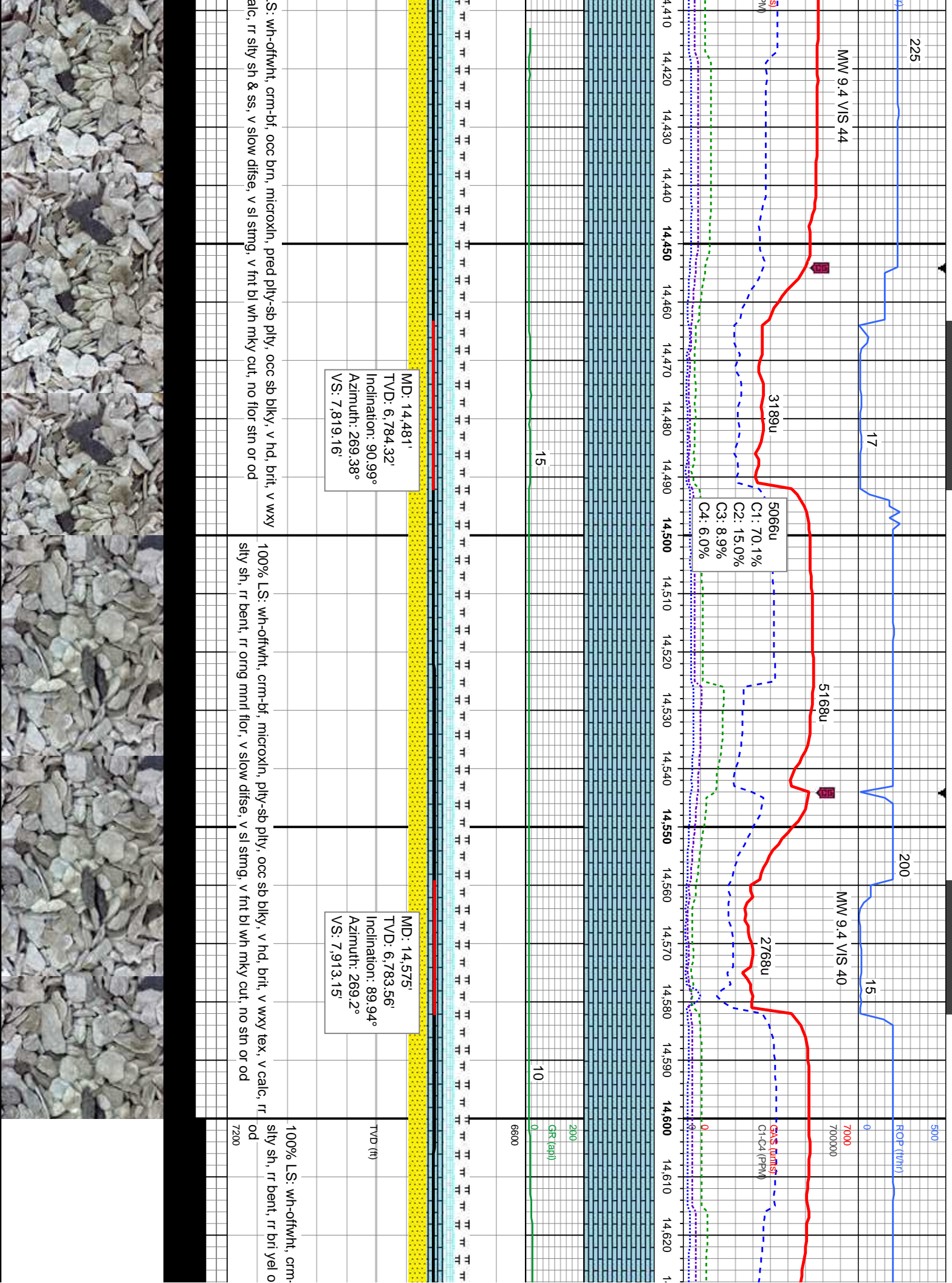


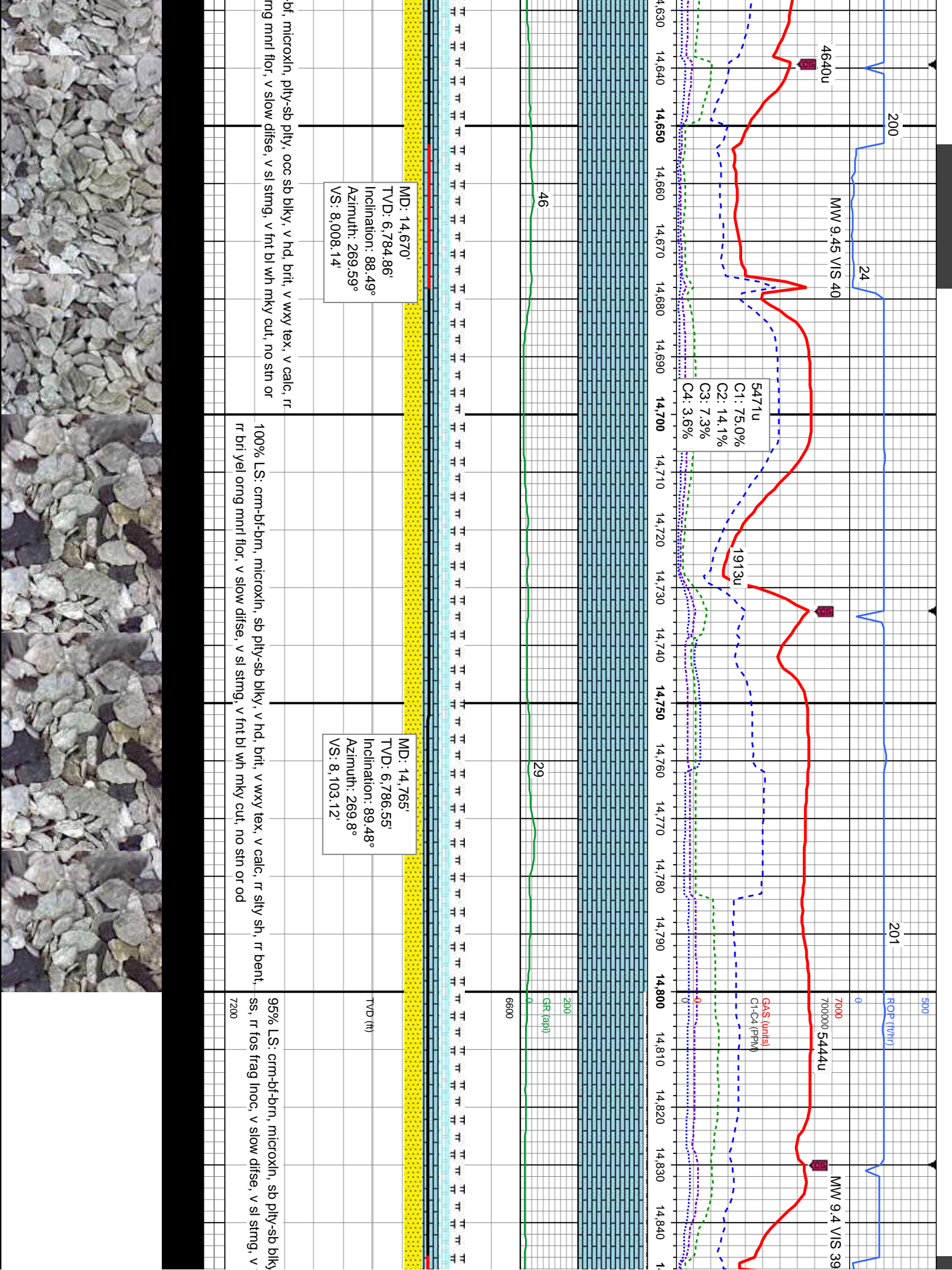






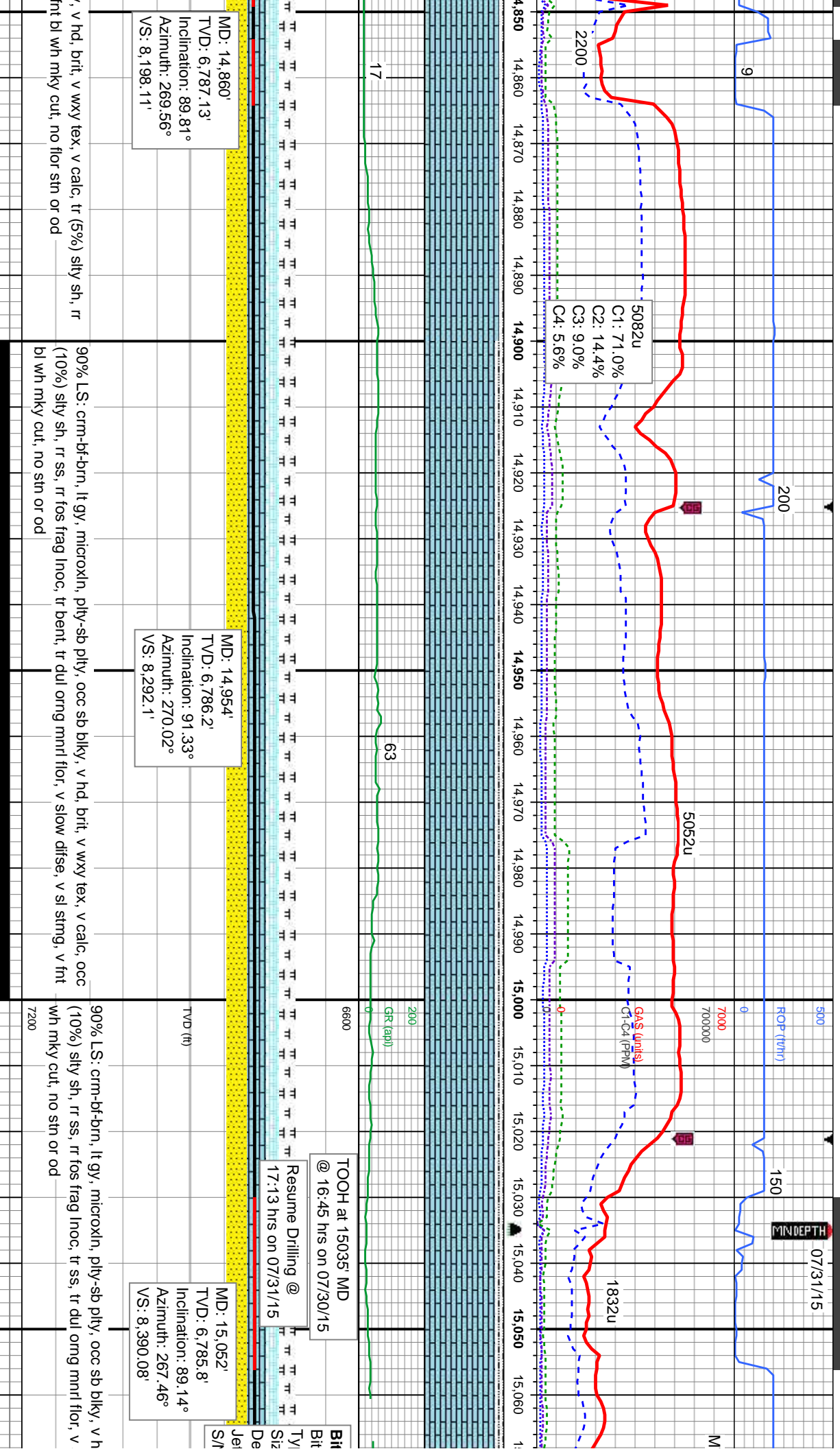






07/31/15

MINDEPTH



MD: 14,860'
TVD: 6,787.13'
Inclination: 89.81°
Azimuth: 269.56°
VS: 8,198.11'

MD: 14,954'
TVD: 6,786.2'
Inclination: 91.33°
Azimuth: 270.02°
VS: 8,292.1'

MD: 15,052'
TVD: 6,785.8'
Inclination: 89.14°
Azimuth: 267.46°
VS: 8,390.08'

, v hd, brit, v wxy tex, v calc, tr (5%) silty sh, r
fnt bl wh mky cut, no flor stn or od

90% LS: crm-bl-brn, lt gy, microxl, pty-sb pty, occ sb blk, v hd, brit, v wxy tex, v calc, occ
(10%) silty sh, rr ss, rr fos frag Inoc, tr bent, tr dul org mnr flr, v slow difse, v sl stmg, v fnt
bl wh mky cut, no stn or od

90% LS: crm-bl-brn, lt gy, microxl, pty-sb pty, occ sb blk, v h
(10%) silty sh, rr ss, rr fos frag Inoc, tr ss, tr dul org mnr flr, v
wh mky cut, no stn or od



225

226

W 9.5 VIS 42

MW 9.5 VIS 42

C1: 69.6%
C2: 15.3%
C3: 9.2%
C4: 5.9%

Gas (units)
C1-C4 (PPM)

4432u

4667u

3237u

Data

#: 5
oe: HDBS MM54
e: 6.12
pht ln: 15,035'
s: 5x13
N: 12560149

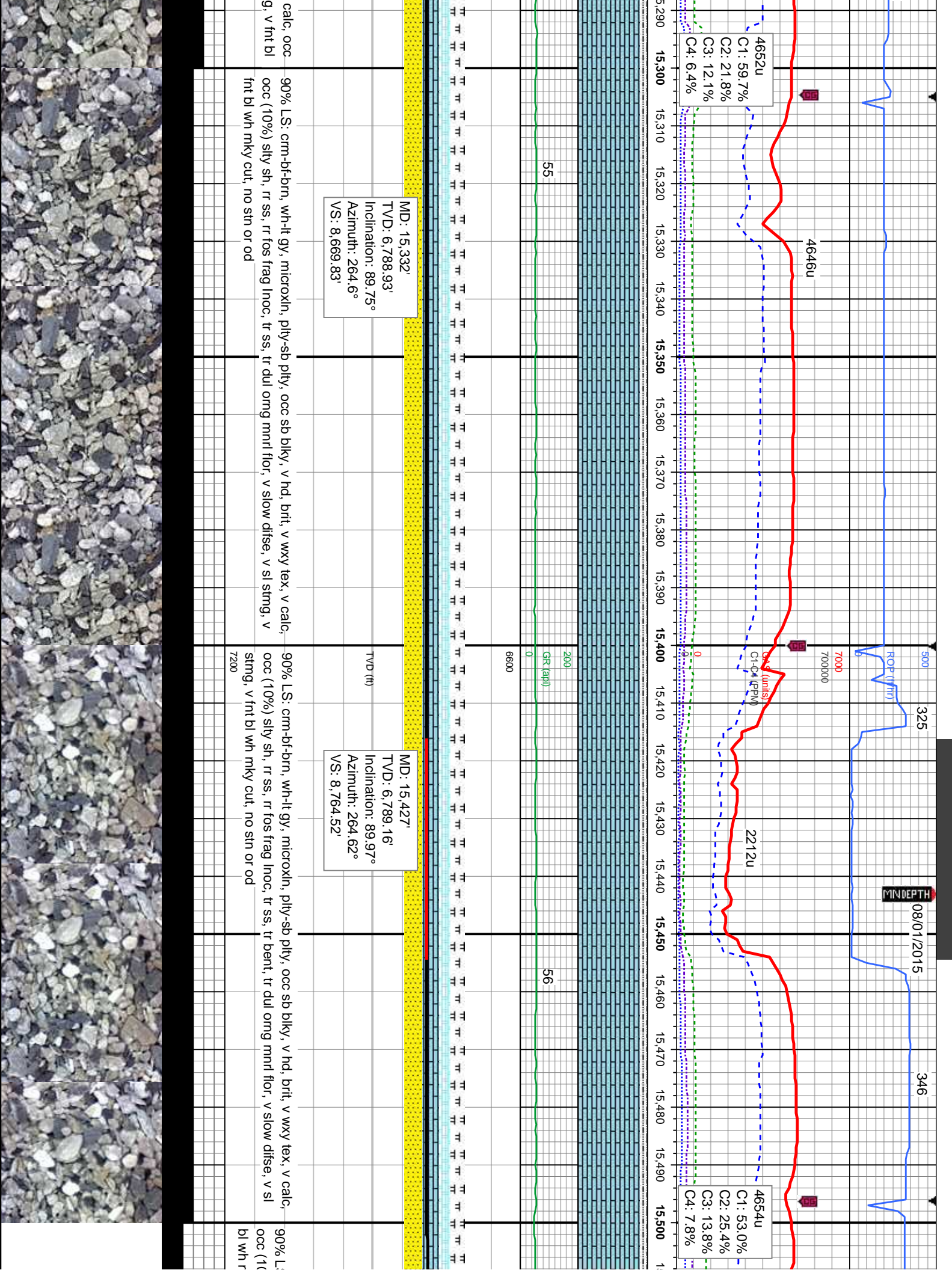
MD: 15,147'
TVD: 6,787.59'
Inclination: 88.7°
Azimuth: 267.25°
VS: 8,485.02'

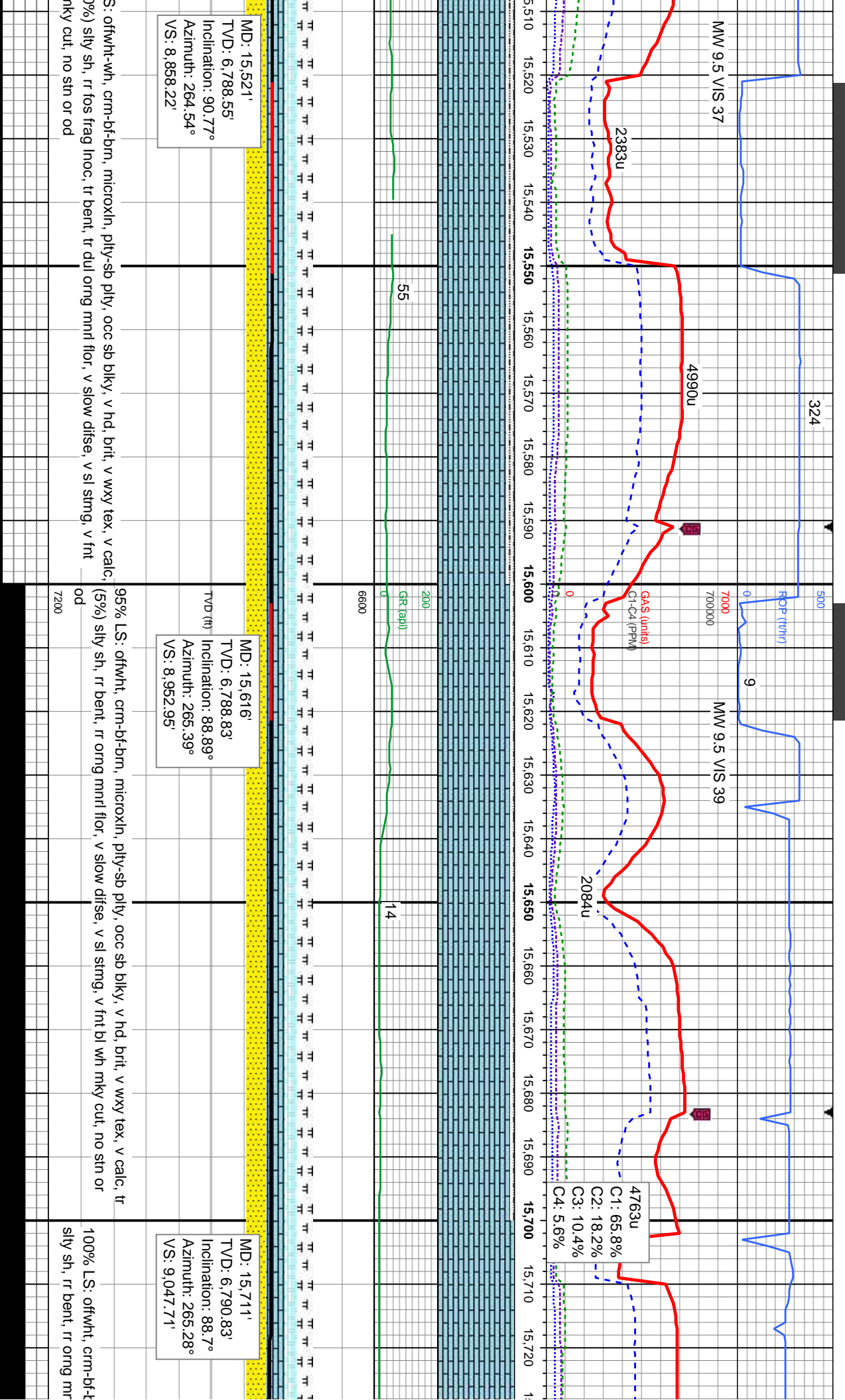
MD: 15,237'
TVD: 6,788.7'
Inclination: 89.97°
Azimuth: 267.84°
VS: 8,574.97'

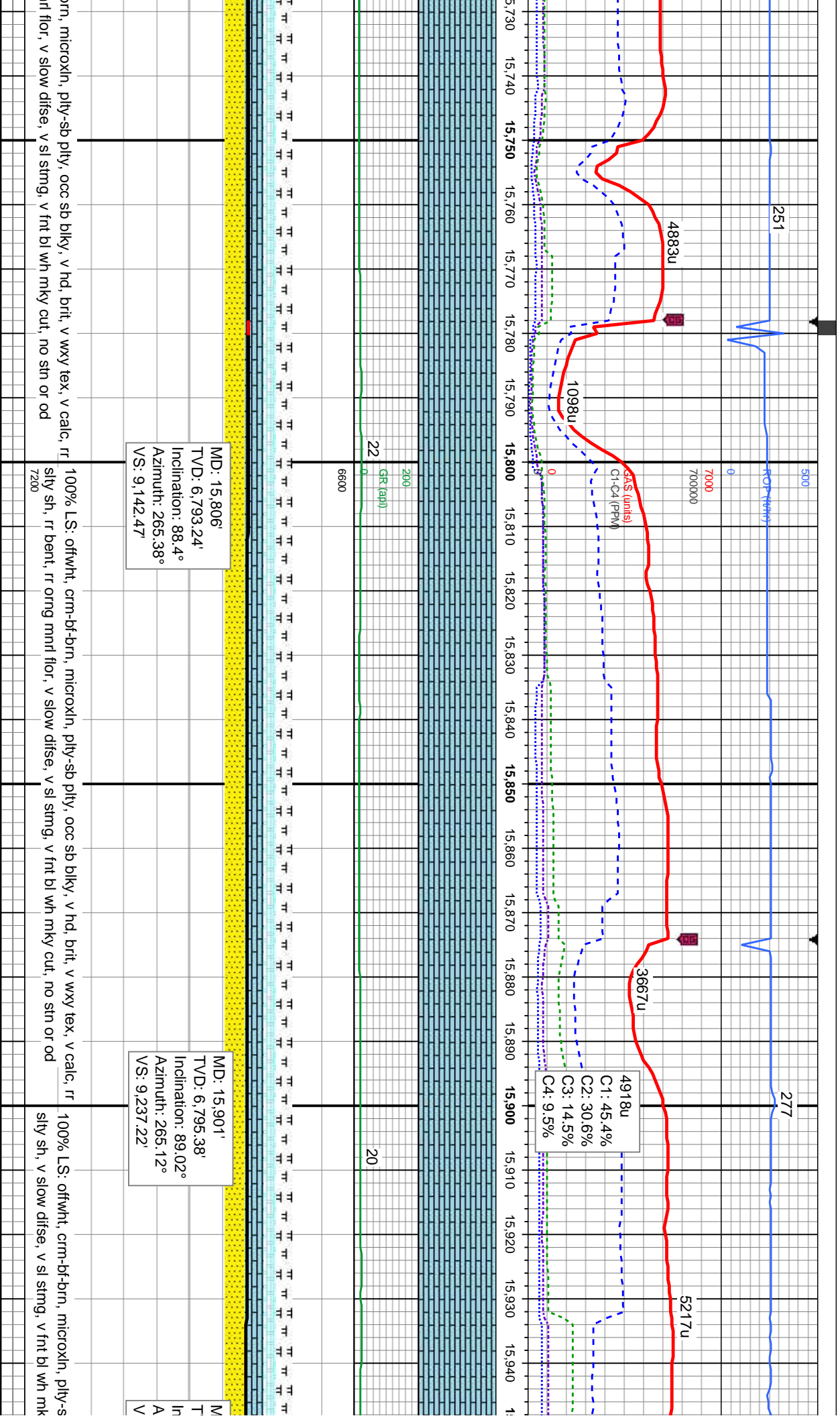
90% LS: crm-bf-brn, lt gy, microxln, pty-sb pty, occ sb blkly, v hd, brt, v wxy tex, v calc, occ (10%) silty sh, rr ss, rr fos frag inoc, tr ss, tr dul org mnrl flor, v slow dfse, v sl stmg, v fnt bl wh mky cut, no stn or od

90% LS: crm-bf-brn, lt gy, microxln, pty-sb pty, occ sb blkly, v hd, brt, v wxy tex, v calc, occ (10%) silty sh, rr ss, rr fos frag inoc, tr ss, tr dul org mnrl flor, v slow dfse, v sl stmg, v fnt bl wh mky cut, no stn or od







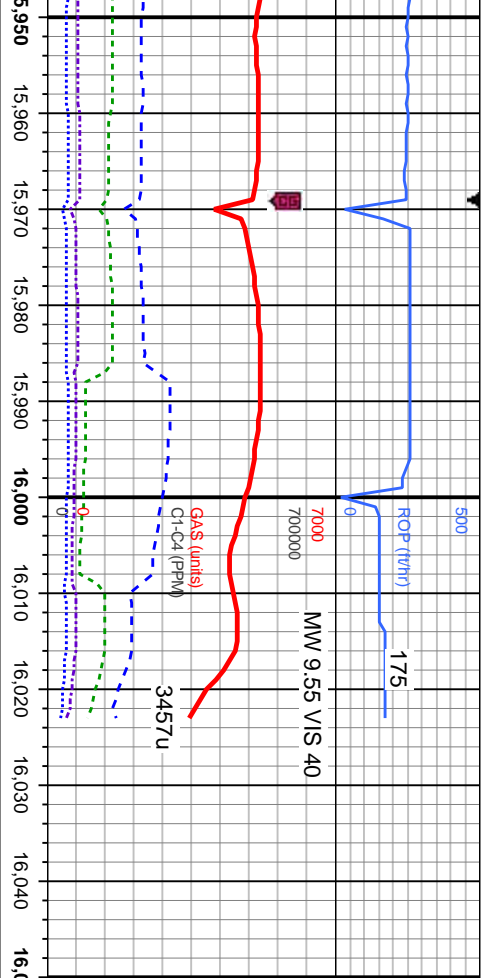


M	T	In	A	V
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born, microxin, pty-sb pty, occ sb blk, v hd, brit, v wxy tex, v calc, rtr flor, v slow disse, v sl stmg, v frt bl wh mky cut, no stn or od

100% LS: offwht, cm-bt-brn, microxin, ply-sb ply, ooc sb bkly, v hd, brit, v wxy tex, v ce
sly sh, rr bent, rr orng mnl flor, v sl strng, v fnt bl wh mky cut, no stn or od

100% LS: offwht, crm-bf-brn, microxln, pty-s
sily sh, v slow difse, v sl stmg, v fnt bl wh mk



70 Ranch State Wellbore TD @
GR 16023 MD @ 08:34 hrs on 08/01/15

Thank you for using
Columbine Logging Inc.

PROJECTION TO BIT

D: 15,956'
VD: 6,795.92'
Inclination: 89.85°
Azimuth: 264.88°
S: 9,292.07'

MD: 16,023'
TVD: 6,796.09'
Inclination: 89.85°
Azimuth: 264.88°
VS: 9,358.88'

TVD (ft)

b pty, occ sb blk, v hd, brt, v wxy tex, v calc, r
y cut, no flr stn or od

7200

