



Scale: 5" / 100'
Measured Depth Log

Well Name Raindance FC 23-232HN

Location Section 30, TWP 6N, 67W

State COLORADO

County WELD

Country UNITED STATES

Rig Number PD 462

API Number 05123515810000

AFE # 20DC0372

Geographic Region DJ BASIN

Field WATTENBERG

Ground Elevation 4788'

K.B. Elevation 4808'

Logged Interval 6000'MD To 21273'

Total Depth 21273'

Formation Niobrara C Chalk

Type of Drilling Fluid OIL BASED MUD

Operator

Company Great Western Petroleum, LLC

Address 1001 17th Street, Suite 2000
Denver, CO 80202



Geologist

Name THOMAS YULL, TODD NAKATA, GERARDO CARPIN

Company TERRA GUIDANCE, LLC

Address 67 W FLOYD AVE
STE 105
ENGLEWOOD, CO 80110

Other

MUDLOG START DATE 09/22/2021

MUDLOG END DATE 10/1/2021

Rock Types



LIMESTONE



Chalk



T T T T Marl



Shaly Siltstone

Accessories

- Minerals**
- B BENTONITE
- Stringer**
- ~~Stringer~~ BENTONITE STRINGER

Other Symbols

- Engineering**
- CONNECTION (RIGHT)
- CONNECTION GAS
- FAULT
- MN DEPTH

Onsite Geological Services provided by
Terra Guidance

Loggers on Location: 09/22/2021

Logging Depth Reached:

05:57 MT, 09/23/2021

Bloodhound Unit: #5933

Sample Collection/Description Interval:

Curve 50'

Tangent/Lateral 100'

ROP SCALE (FT/HR): 0-1000

GAMMA SCALE (API): 0-300

GAS SCALE: 0-2000cu

Total Gas & Chromatograph

GAS

C1

C2

C3

C4

CO2

Depth



Images



% Lithology

TVD SCALE: 5500' - 8500'

Well Bore
TVD

Bit #: 1

Size: 8.5"

Make: Ulterra

Model: SPL616

Jets: 8x11

S/N: 57493

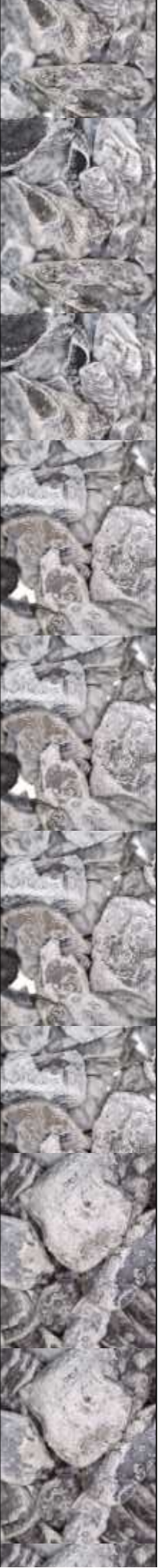
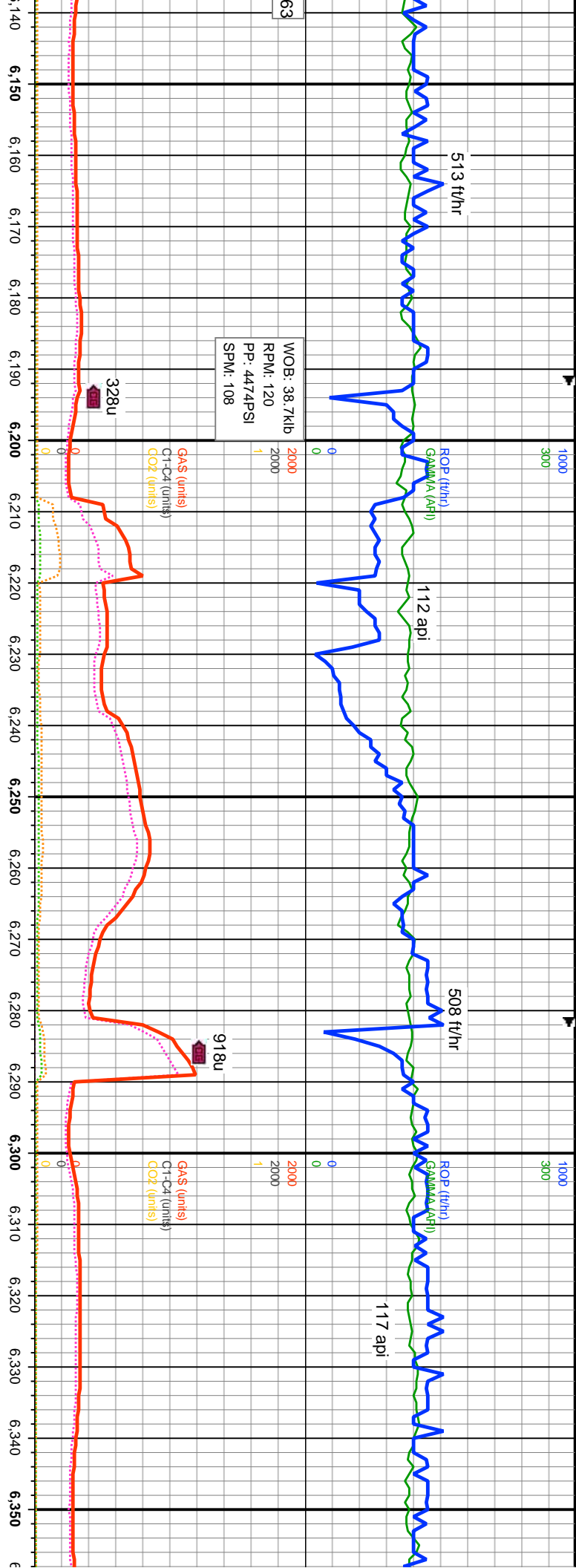
Depth In: 2,072'

MD: 6.074'
INC: 44.62°
AZM: 21.1°
TVD: 5.564.77'
VS: -230.06'

100% SHY SLTST: dk gy, lt-med gy, sb blk-y-sb pty, mod st-fr, arg cm, w cmd, stly, rthy, grdg to vf slst ip, sl calc

100% SHY SLTST: dk gy, lt-med gy, sb blk-y-sb pty, mod st-fr, arg cm, w cmd, stly, rthy, grdg to vf slst ip, sl calc

MW 11.5 / VIS



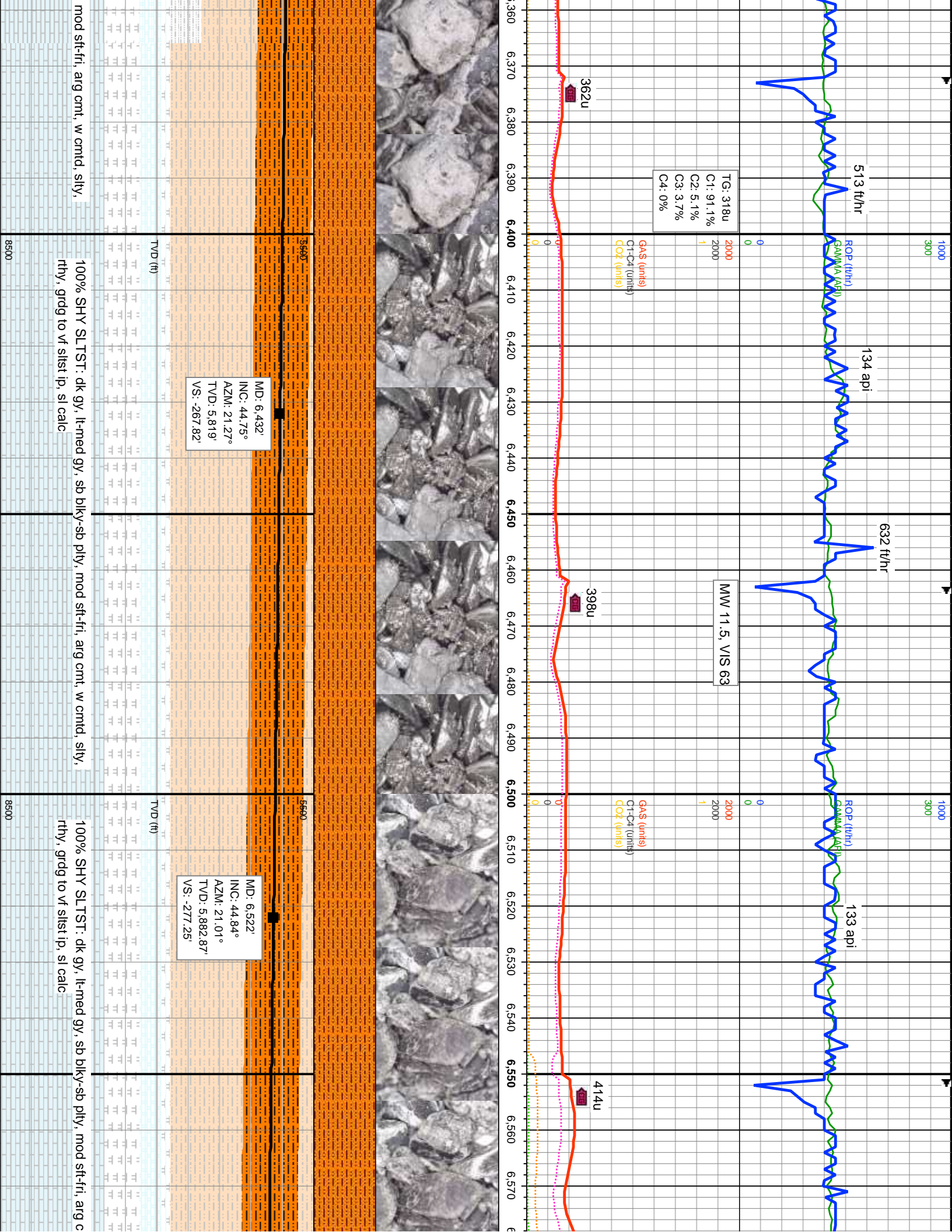
MD: 6,164'
INC: 44.62°
AZM: 21.36°
TVD: 5,628.83'
VS: -239.56'

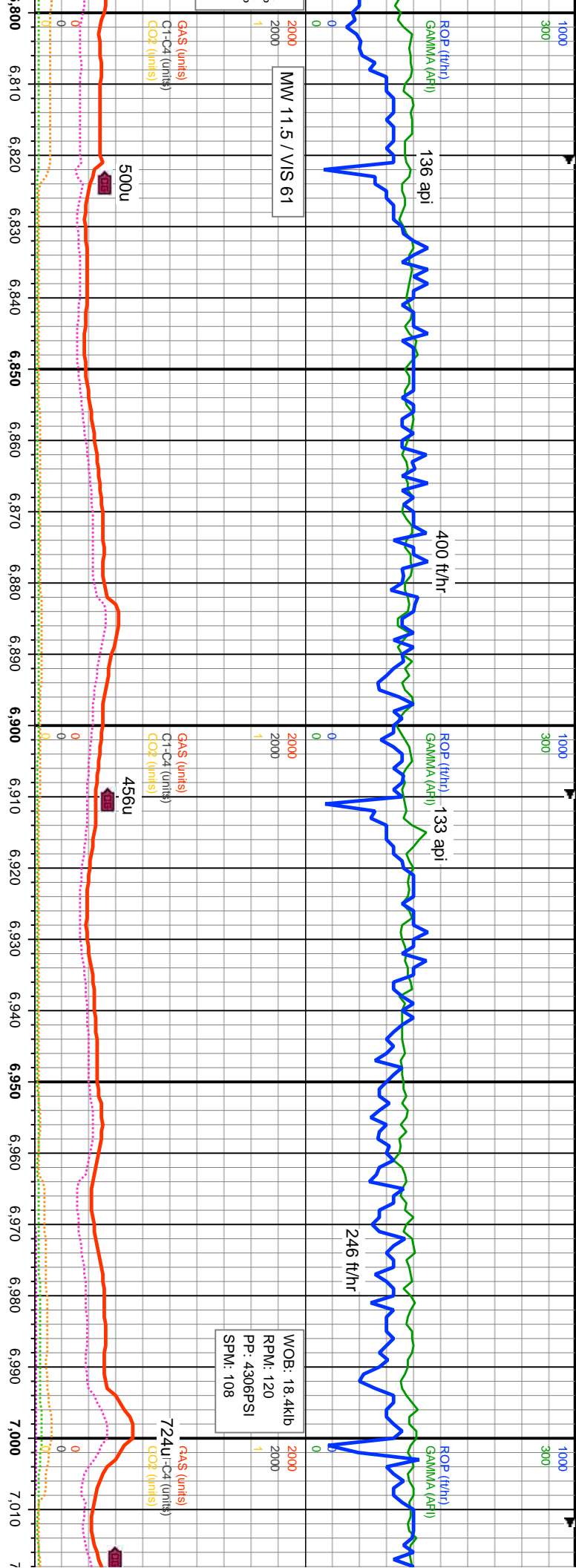
6225 MD: 32 D/T Fault

MD: 6,253'
INC: 44.79°
AZM: 21.27°
TVD: 5,692.09'
VS: -249.06'

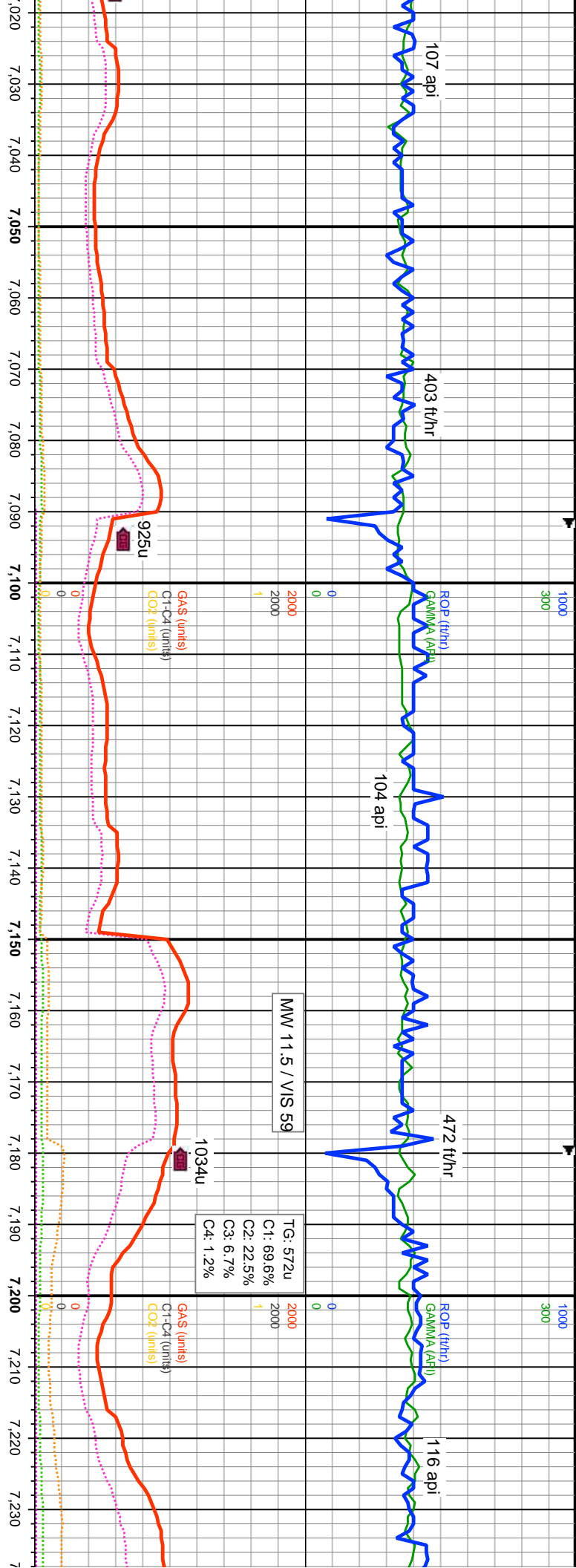
MD: 6,343'
INC: 44.92°
AZM: 21.01°
TVD: 5,755.89'
VS: -258.49'

100% SHY SLTST: dk gy, lt-med gy, sb blk-ly-sb pty, mod sft-fr, arg cnt, w cmt, silty, rthy, grdg to vf slst ip, sl calc

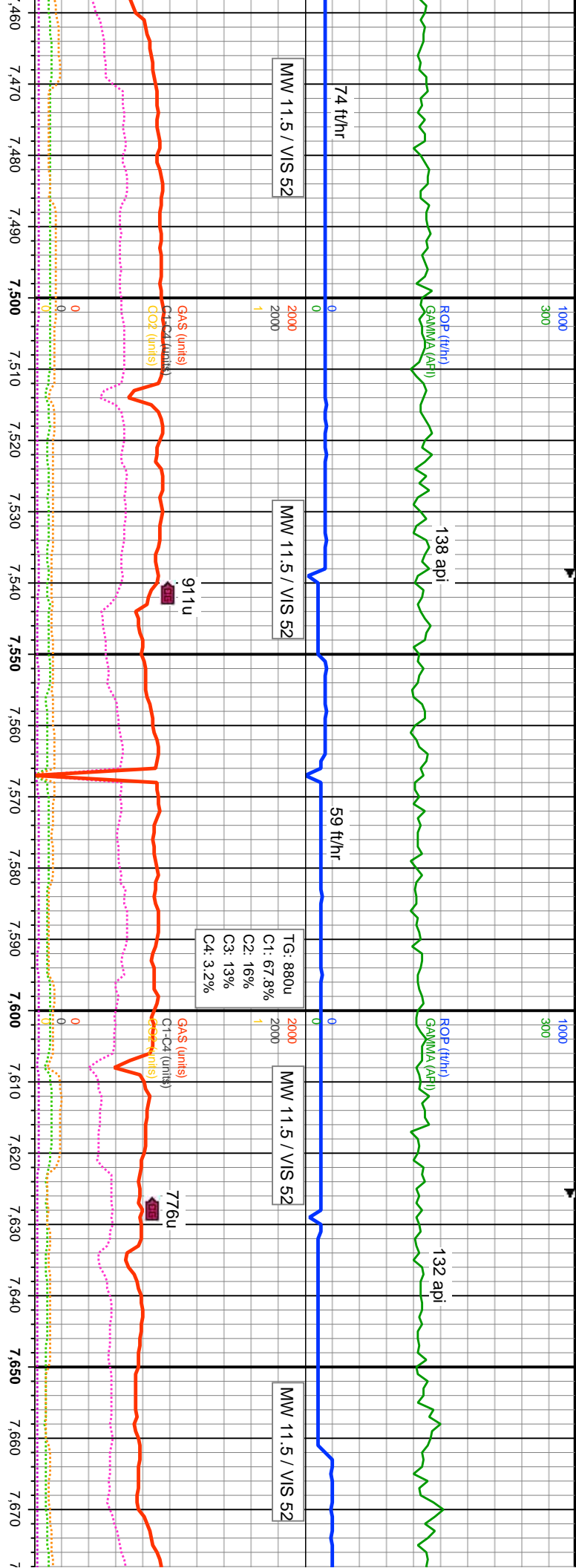




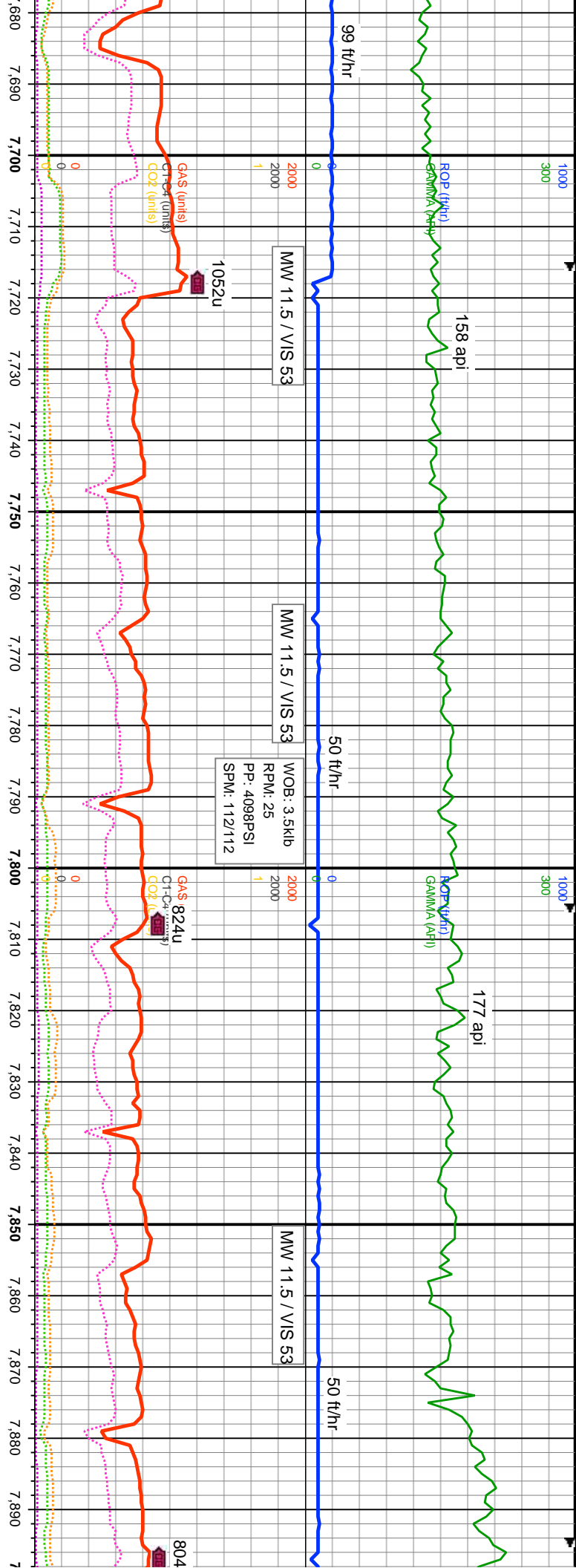
5500		5500		5500		5500		5500	
TVD (ft)		TVD (ft)		TVD (ft)		TVD (ft)		TVD (ft)	
100% SHY SLTST: dk gy, lt-med gy, sb blk-y-sb pty, mod sft-fri, arg cmt, w cmd, silty, rthy, grdg to v silt ip, sl calc		90% SHY SLTST: lt-med gy, lt brn, sb blk-y-sb pty, mod sft-fri, arg cmt, silty, rthy, grdg to v silt ip, sl calc: 10% SLTY SH: med-dkgy, dk gysbhn, mod sft-sl frm, ip brit, sb blk-y-ang, rr pty, com fis, silty, arg cmt, mod cmd, v sl calc		90% SHY SLTST: lt-med gy, lt brn, sb blk-y-sb pty, mod sft-fri, arg cmt, silty, rthy, grdg to v silt ip, sl calc: 10% SLTY SH: med-dkgy, dk gysbhn, mod sft-sl frm, ip brit, sb blk-y-ang, rr pty, com fis, silty, arg cmt, mod cmd, v sl calc		90% SHY SLTST: lt-med gy, lt brn, sb blk-y-sb pty, mod sft-fri, arg cmt, silty, rthy, grdg to v silt ip, sl calc: 10% SLTY SH: med-dkgy, dk gysbhn, mod sft-sl frm, ip brit, sb blk-y-ang, rr pty, com fis, silty, arg cmt, mod cmd, v sl calc		90% SHY SLTST: lt-med gy, lt brn, sb blk-y-sb pty, mod sft-fri, arg cmt, silty, rthy, grdg to v silt ip, sl calc: 10% SLTY SH: med-dkgy, dk gysbhn, mod sft-sl frm, ip brit, sb blk-y-ang, rr pty, com fis, silty, arg cmt, mod cmd, v sl calc	
MD: 6.881' INC: 44.75° AZM: 21.71° TVD: 6.137.73 VS: -316.18'		MD: 6.971' INC: 44.79° AZM: 21.45° TVD: 6.201.63 VS: -326.09'		MD: 6.971' INC: 44.79° AZM: 21.45° TVD: 6.201.63 VS: -326.09'		MD: 6.971' INC: 44.79° AZM: 21.45° TVD: 6.201.63 VS: -326.09'		MD: 6.971' INC: 44.79° AZM: 21.45° TVD: 6.201.63 VS: -326.09'	



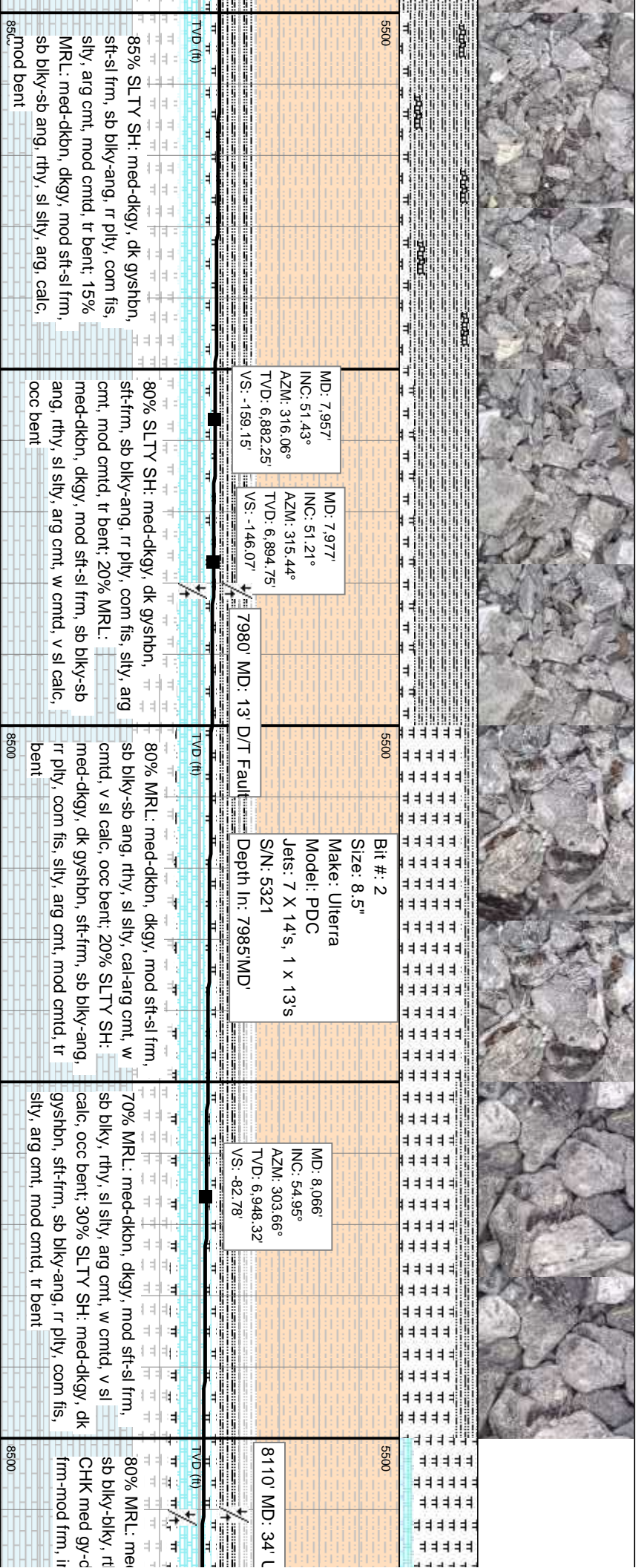
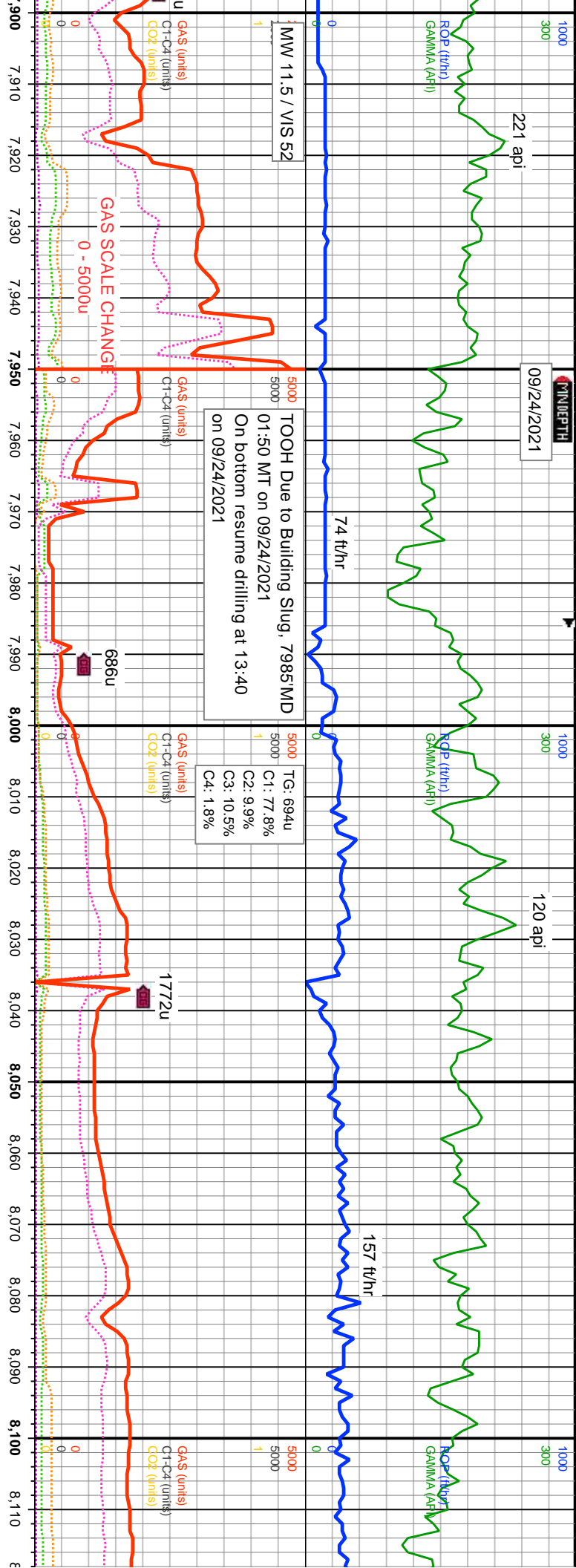
TST: lt-med gy, lt brn, sb blk-y-sb pty, mod sft-fr, arg cmt, silty, rthy, grdg sl calc: 10% SLTY SH: med-dgy, dk gysbn, mod sft-sl frm, ip brit, sb silty, com fis, silty, arg cmt, mod cmt'd, v sl calc		80% SHY SLTST: lt-med gy, lt brn, sb blk-y-sb pty, mod sft-fr, arg cmt, silty, rthy, grdg to v silst ip, sl calc: 20% SLTY SH: med-dgy, dk gysbn, mod sft-sl frm, ip brit, sb blk-y-ang, rr pty, com fis, silty, arg cmt, mod cmt'd, v sl calc		80% SHY SLTST: lt-med gy, lt brn, sb blk-y-sb pty, mod sft-fr, arg cmt, silty, rthy, grdg to v silst ip, sl calc: 20% SLTY SH: med-dgy, dk gysbn, mod sft-sl frm, ip brit, sb blk-y-ang, rr pty, com fis, silty, arg cmt, mod cmt'd, v sl calc	
MD: 7.060' INC: 44.7° AZM: 22.15° TVD: 6.264.84' VS: -336.11'		MD: 7.150' INC: 44.79° AZM: 21.62° TVD: 6.328.76' VS: -346.35'		MD: 7.150' INC: 44.79° AZM: 21.62° TVD: 6.328.76' VS: -346.35'	
TVD (ft)		TVD (ft)		TVD (ft)	
5500		5500		5500	
8500		8500		8500	

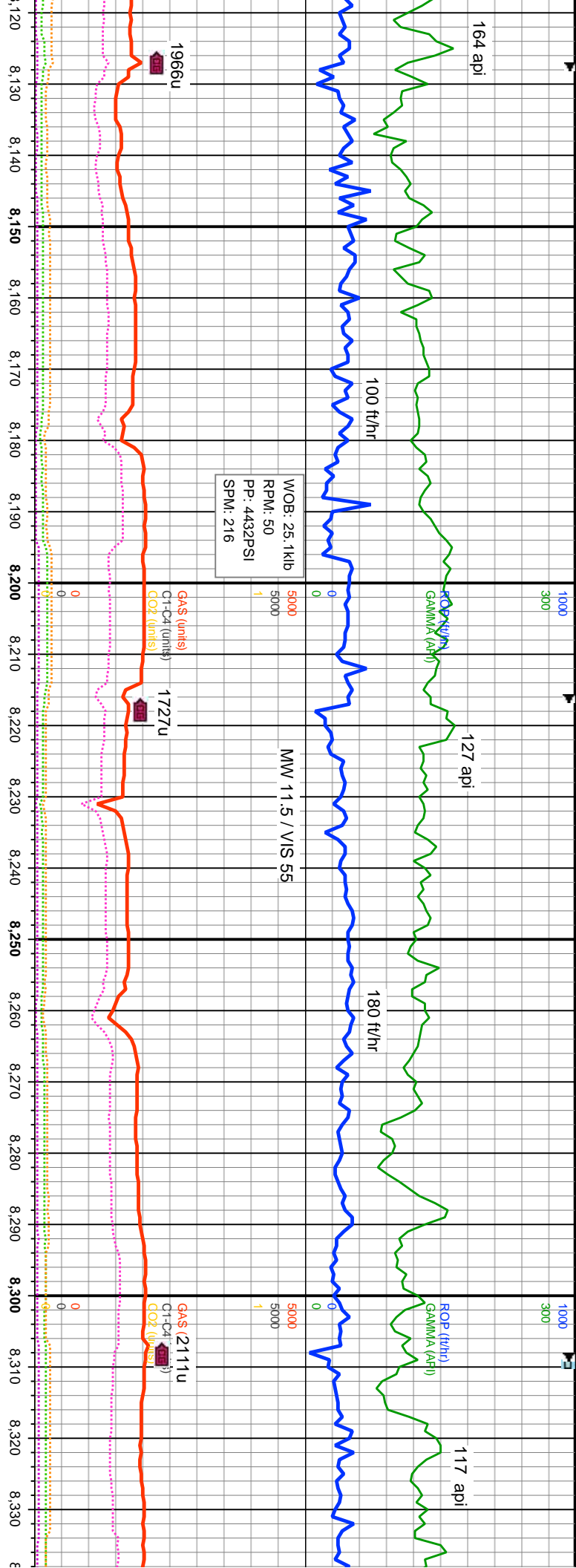


75% SLTY SH: med-dky, dk gysbhn, mod sft-sl frm, sb blk-ang, rr ply, com fis, sily, arg cnt, mod cntd, v sl calc, 25% SHY SLTST: lt-med gy, lt brn, sb blk-sb ply, mod sft-fr, arg cnt, sily, rthy, grdg to vf slst ip, sl calc		5500	5500	8500
90% SLTY SH: med-dky, dk gysbhn, mod sft-sl frm, sb blk-ang, rr f sily, arg cnt, mod cntd, v sl calc, 10% SHY SLTST: lt-med gy, lt brn, mod sft-fr, arg cnt, sily, rthy, grdg to vf slst ip, sl calc		5500	5500	8500

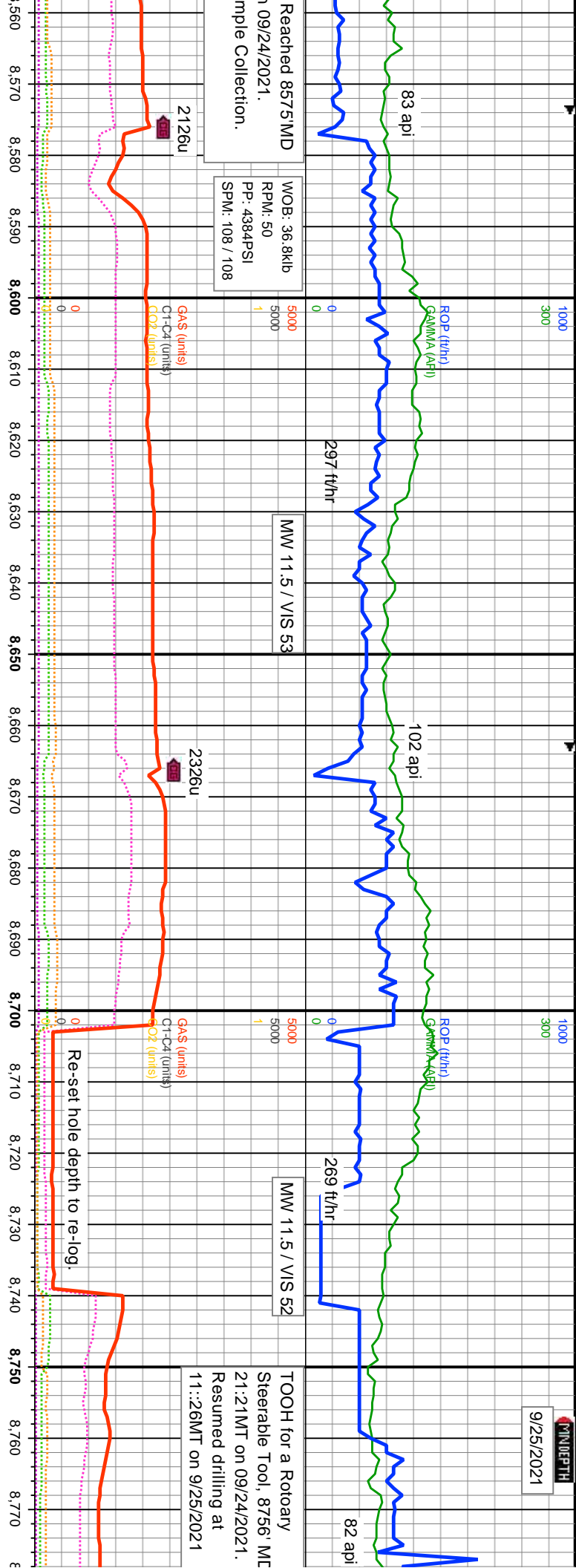


<p>MD: 7.688' INC: 48.7° AZM: 342.34° TVD: 6,708.82' VS: -299.93'</p> <p>100% SLTY SH: med-dkgy, dk gysbhn, sft-sl frm, sb blk-y-ang, rr pty, com fis, stly, arg cmt, mod cmtid</p>	<p>MD: 7.778' INC: 49.41° AZM: 333.46° TVD: 6,767.87' VS: -261.28'</p> <p>100% SLTY SH: med-dkgy, dk gysbhn, sft-sl frm, sb blk-y-ang, rr pty, com fis, stly, arg cmt, mod cmtid</p>	<p>MD: 7.867' INC: 50.24° AZM: 324.32° TVD: 6,825.35' VS: -214.37'</p> <p>100% SLTY SH: med-dkgy, dk gysbhn, sft-sl frm, sb blk-y-ang, rr pty, com fis, stly, arg cmt, mod cmtid</p>
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gy-dk gy, mod sft-sl frm, sb blk-arg, calc, 20% blk brn, blk-sb blk, intbd inoc, tr bent	MD: 8.156' INC: 59.52° AZM: 293.91° TVD: 6.987.1' VS: -10.21'	8500
80% MRL: med gy-dk gy, mod sft-sl frm, sb blk-arg, rthy, sl sily, arg, calc, 20% CHK med gy-dk brn, blk-sb blk, frm-mod frm, intbd inoc	MD: 8.246' INC: 65.32° AZM: 289.6° TVD: 7.038.77' VS: 68.5'	8500
85% MRL: med gy-dk gy, mod sft-sl frm, sb blk-arg, rthy, sl sily, arg, calc, 15% CHK med gy-dk brn, blk-sb blk, frm-mod frm, trc bent	MD: 8.335' INC: 74.46° AZM: 286.0° TVD: 7.066' VS: 151.62'	8500



Reached 8575 MD
09/24/2021.
Sample Collection.

WOB: 36.8klb
RPM: 50
PP: 4384PSI
SPM: 108 / 108

MW 11.5 / VIS 53

MW 11.5 / VIS 52

TOOH for a Rotary Steerable Tool, 8756' ME 21:21MT on 09/24/2021. Resumed drilling at 11:26MT on 9/25/2021



MD: 8.605'
INC: 90.37°
AZM: 269.83°
TVD: 7,101.41'
VS: 416.7'

MD: 8.694'
INC: 89.93°
AZM: 269.65°
TVD: 7,101.18'
VS: 503.48'

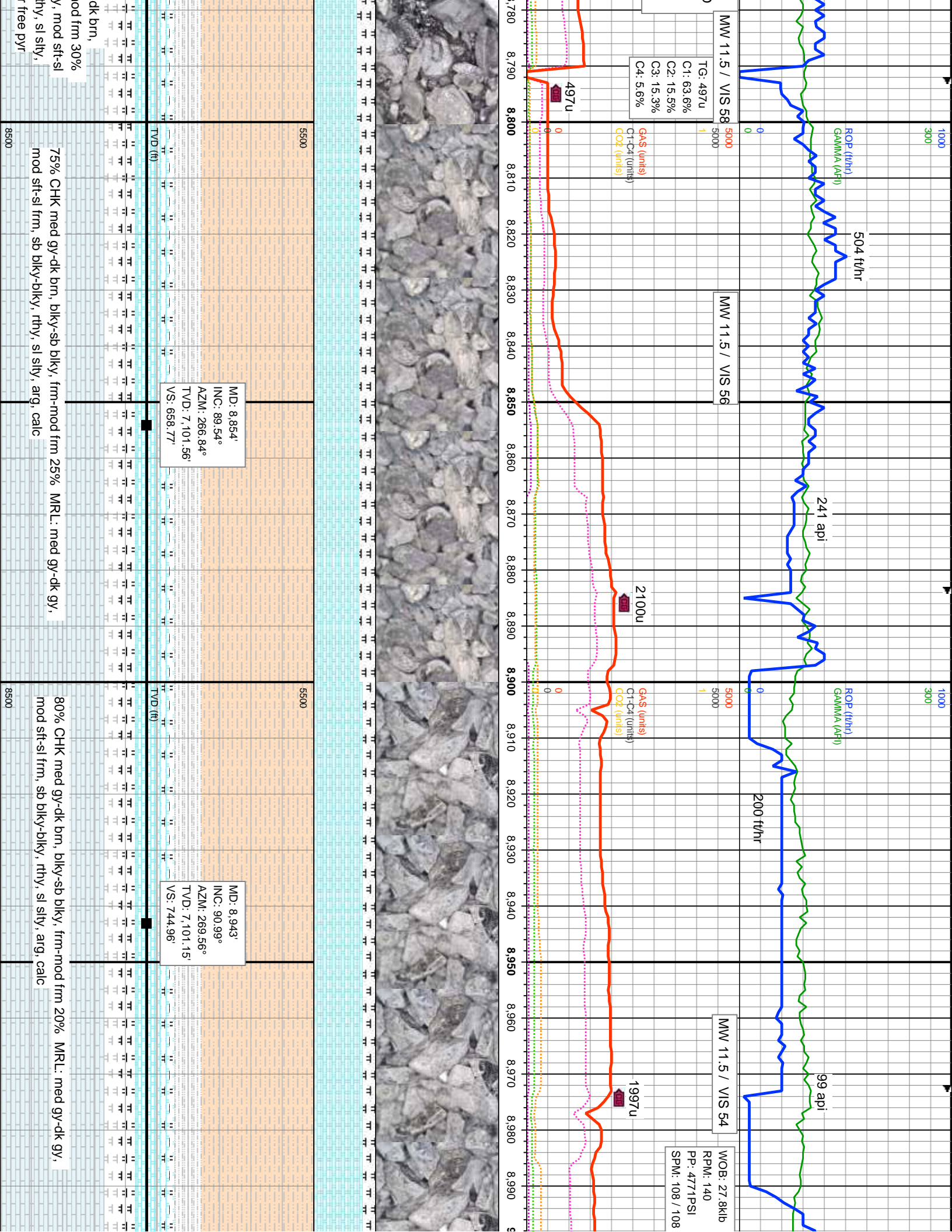
MD: 8.764'
INC: 90.02°
AZM: 269.3°
TVD: 7,101.21'
VS: 571.65'

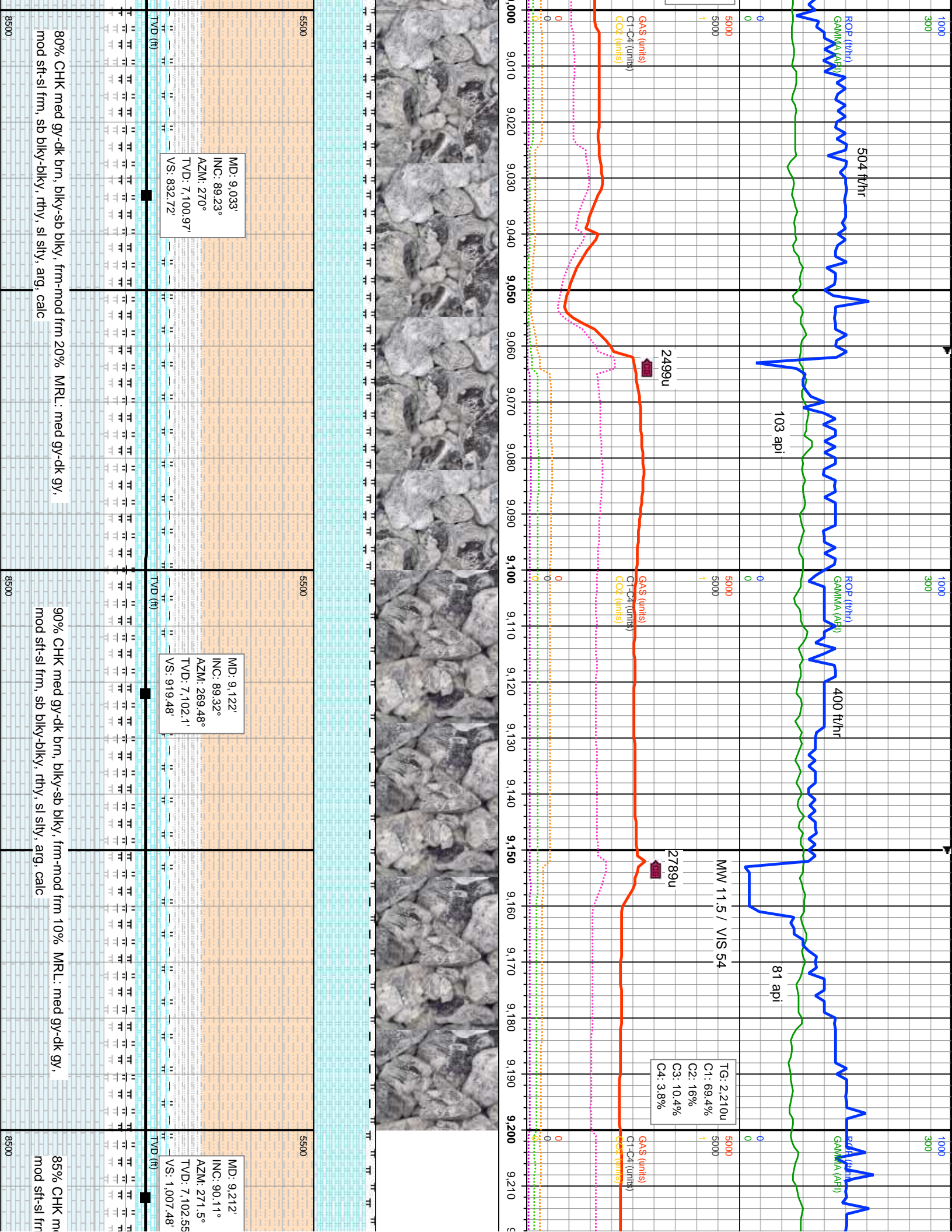
90% CHK med gy-dk brn, blk-y-sb blk-y, frm-mod frm 10% MRL: med gy-dk gy, mod sft-sl frm, sb blk-y-blky, rthy, sl sily, arg, calc, rr bent

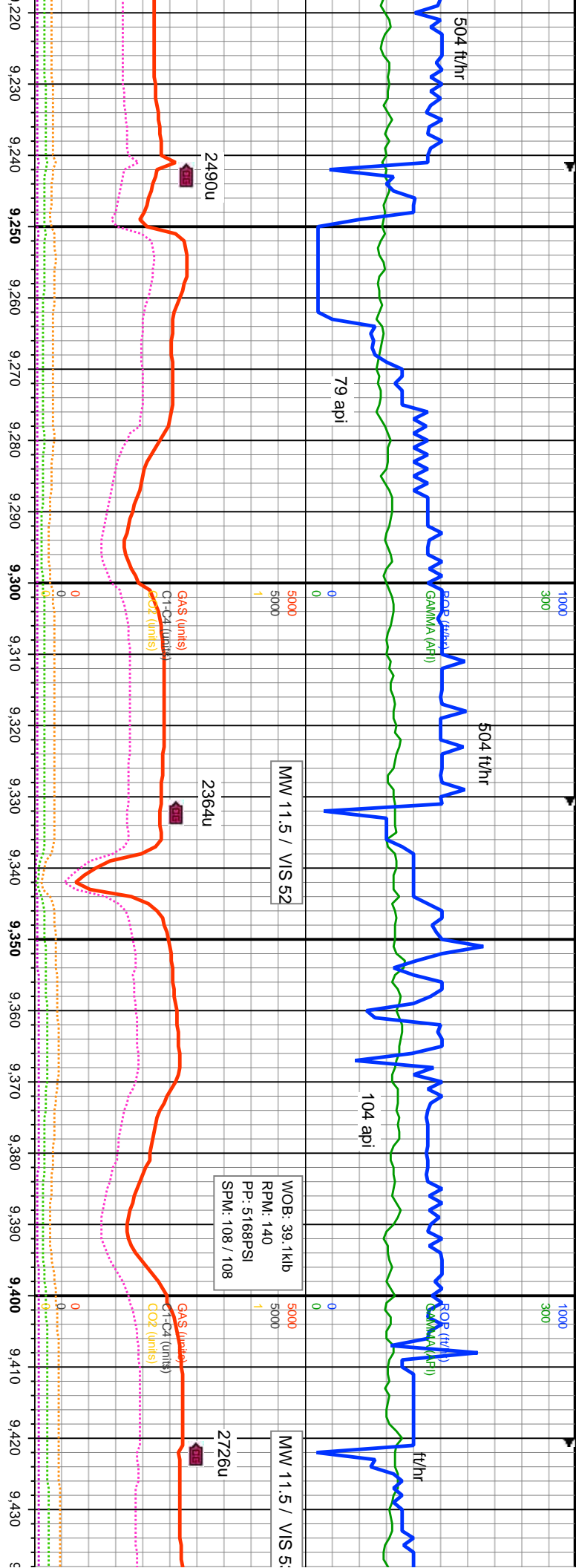
85% CHK med gy-dk brn, blk-y-sb blk-y, frm-mod frm 15% MRL: med gy-dk gy, mod sft-sl frm, sb blk-y-blky, rthy, sl sily, arg, calc, rr bent

70% CHK med gy-dk brn, blk-y-sb blk-y, frm-mod frm 30% MRL: med gy-dk gy, mod sft-sl frm, sb blk-y-blky, rthy, sl sily, arg, calc, rr bent, rr free pyr

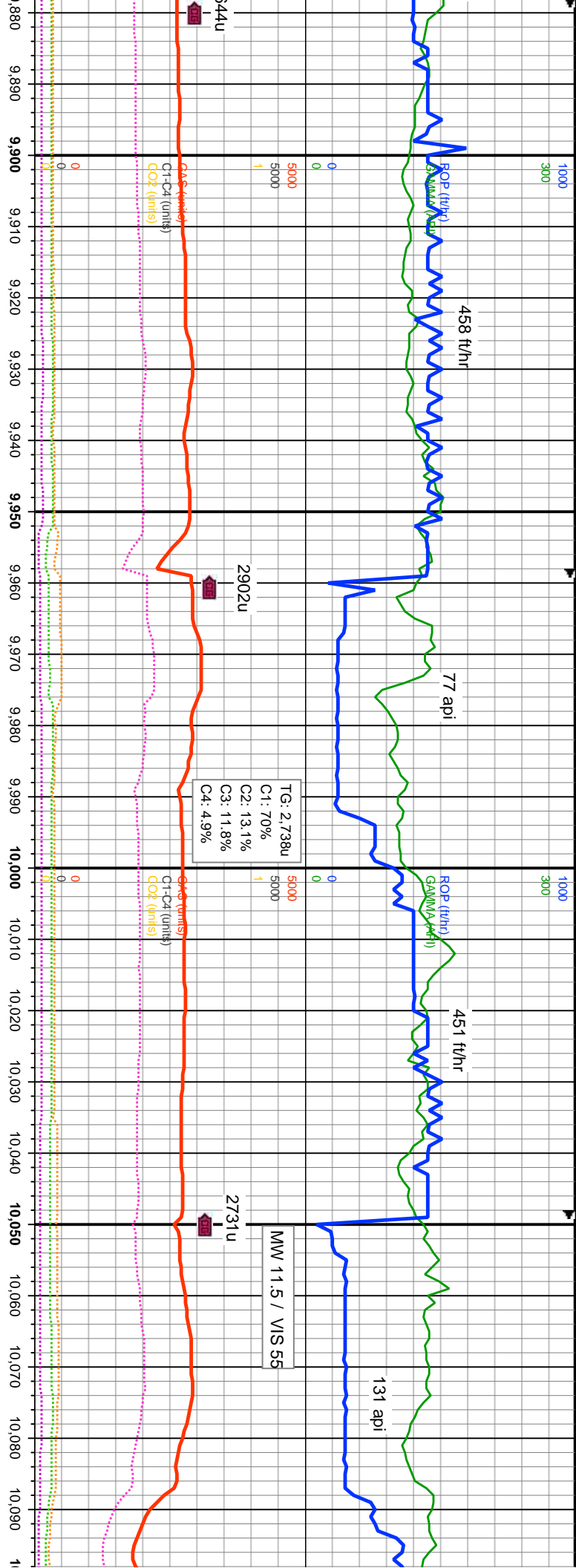
70% CHK med gy-dk brn, blk-y-sb blk-y, frm-mod frm 20% MRL: med gy-dk gy, mod sft-sl frm, sb blk-y-blky, rthy, sl sily, arg, calc, rr bent, rr free pyr





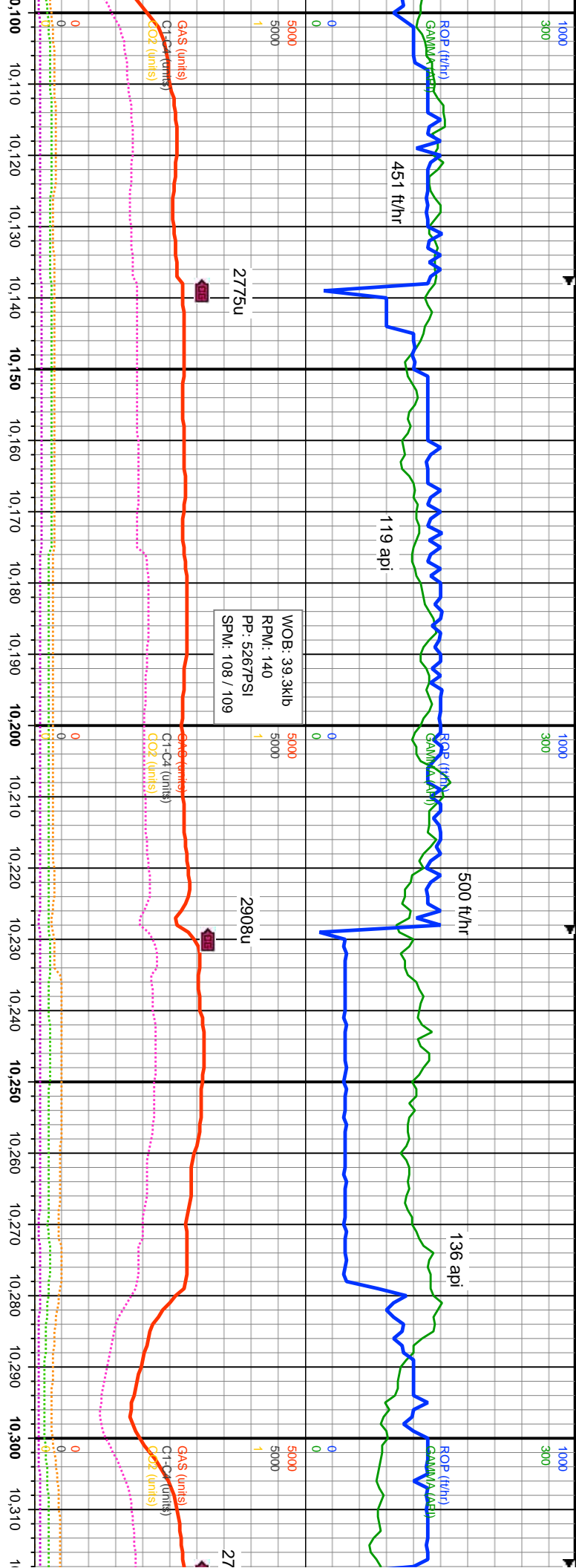


90% CHK med gy-dk brn, blk-ly-sb blk-ly, frm-mod frm 15% MRL: med gy-dk gy, mod sft-sl frm, sb blk-ly-blk-ly, rthy, slsly, arg, calc	5500	8500
70% CHK med-dk brn, gy lp, blk-ly-gy-dk gy, mod sft-sl frm, sb blk-ly-	5500	8500

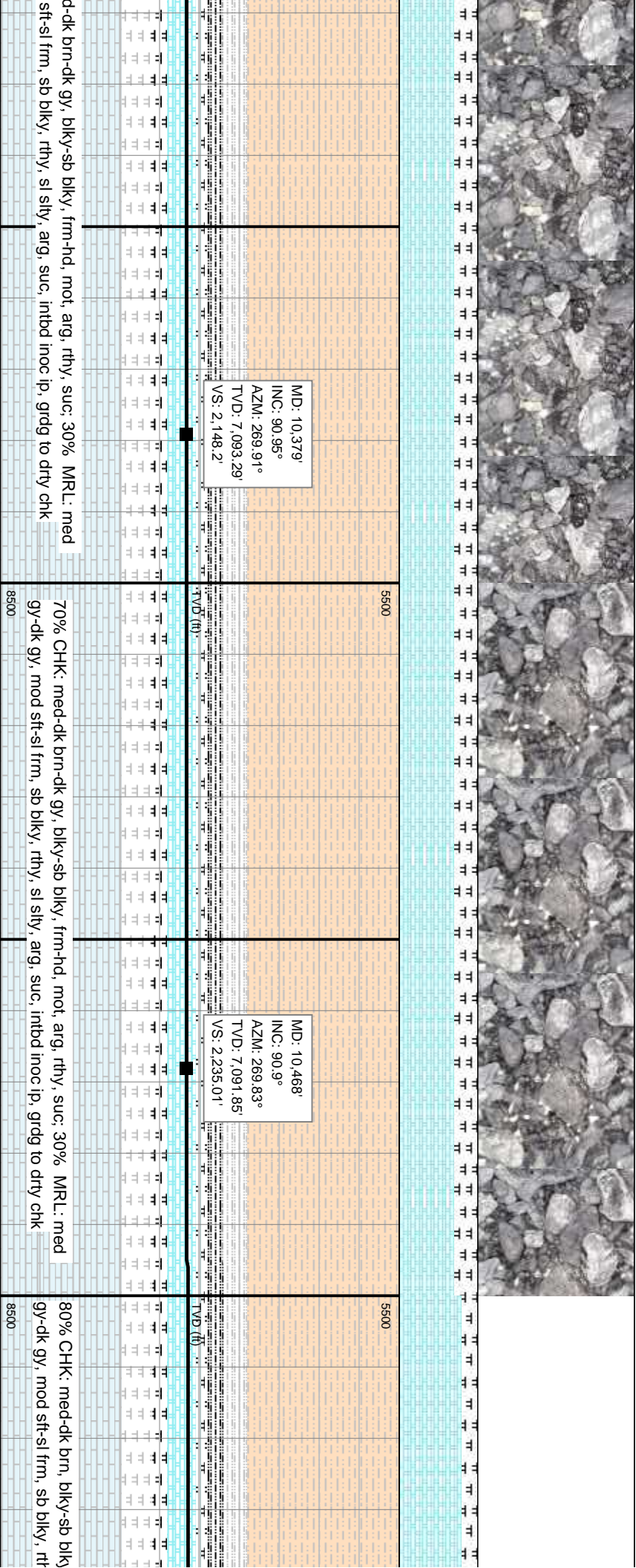
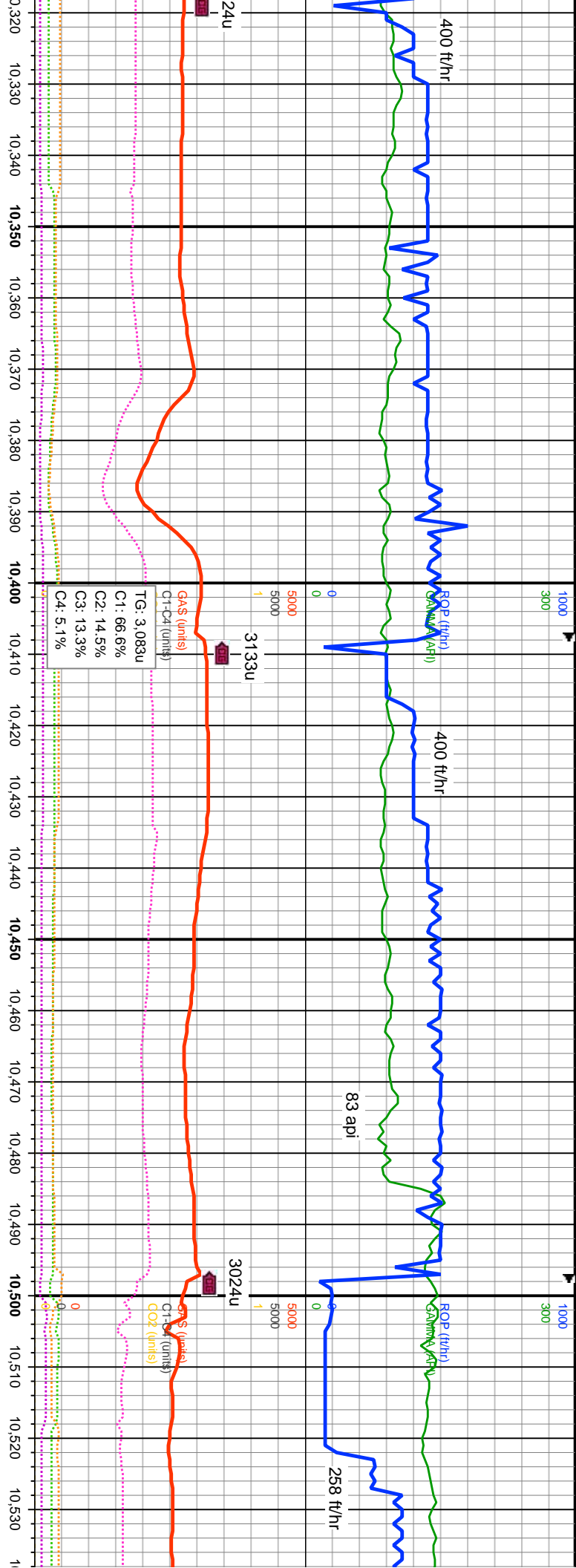


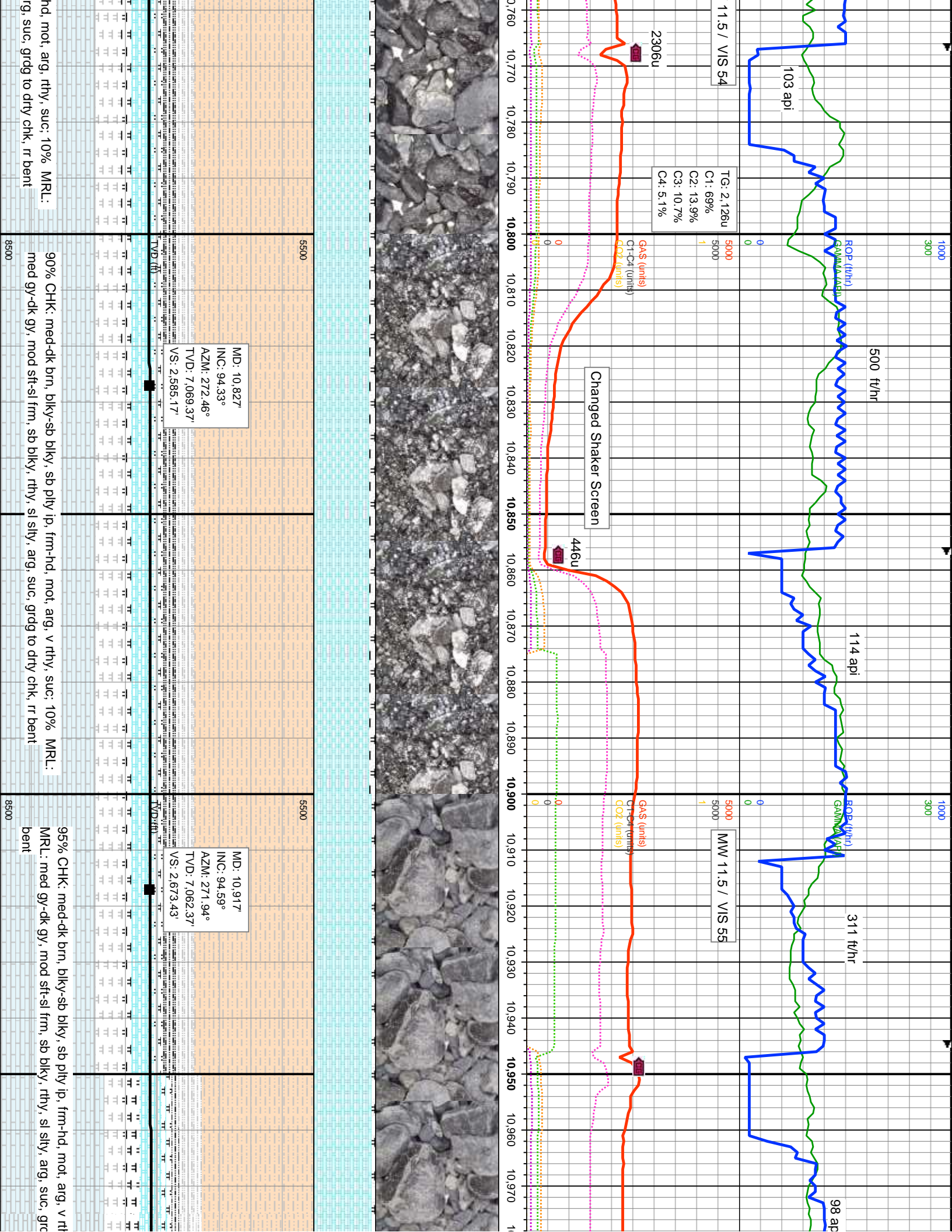
5500		5500		5500	
TVD (ft)		TVD (ft)		TVD (ft)	
MD: 9,930'		MD: 10,020'		MD: 10,020'	
INC: 90.95°		INC: 90.42°		INC: 90.42°	
AZM: 267.72°		AZM: 270.27°		AZM: 270.27°	
TVD: 7,096.44'		TVD: 7,095.36'		TVD: 7,095.36'	
VS: 1,709.14'		VS: 1,796.6'		VS: 1,796.6'	

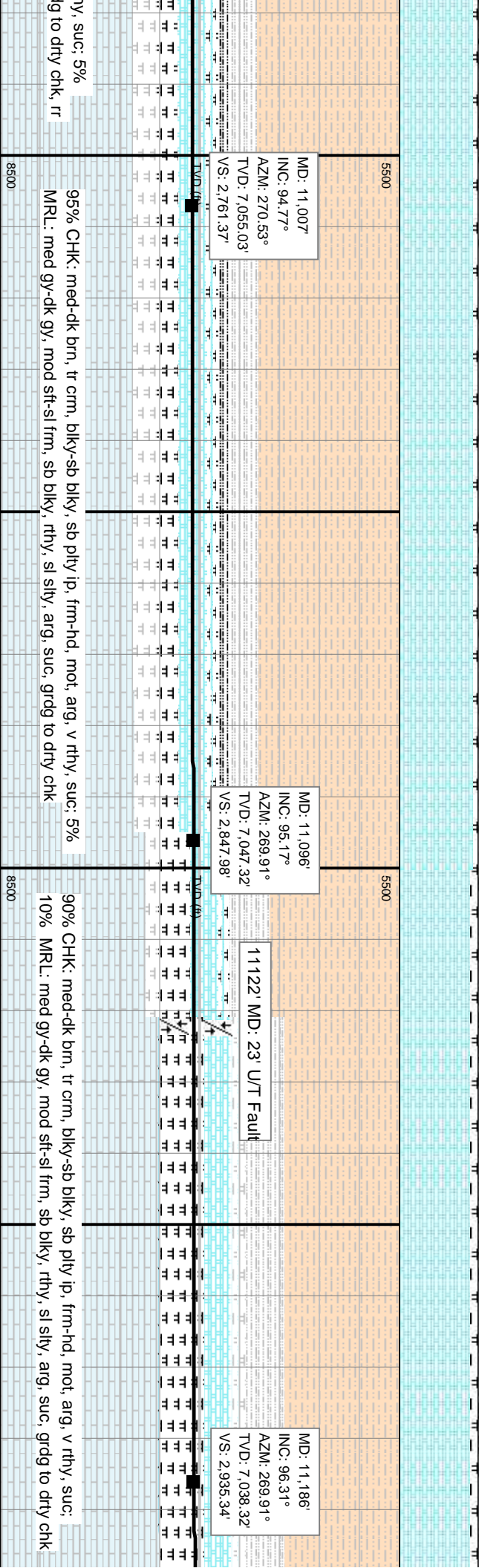
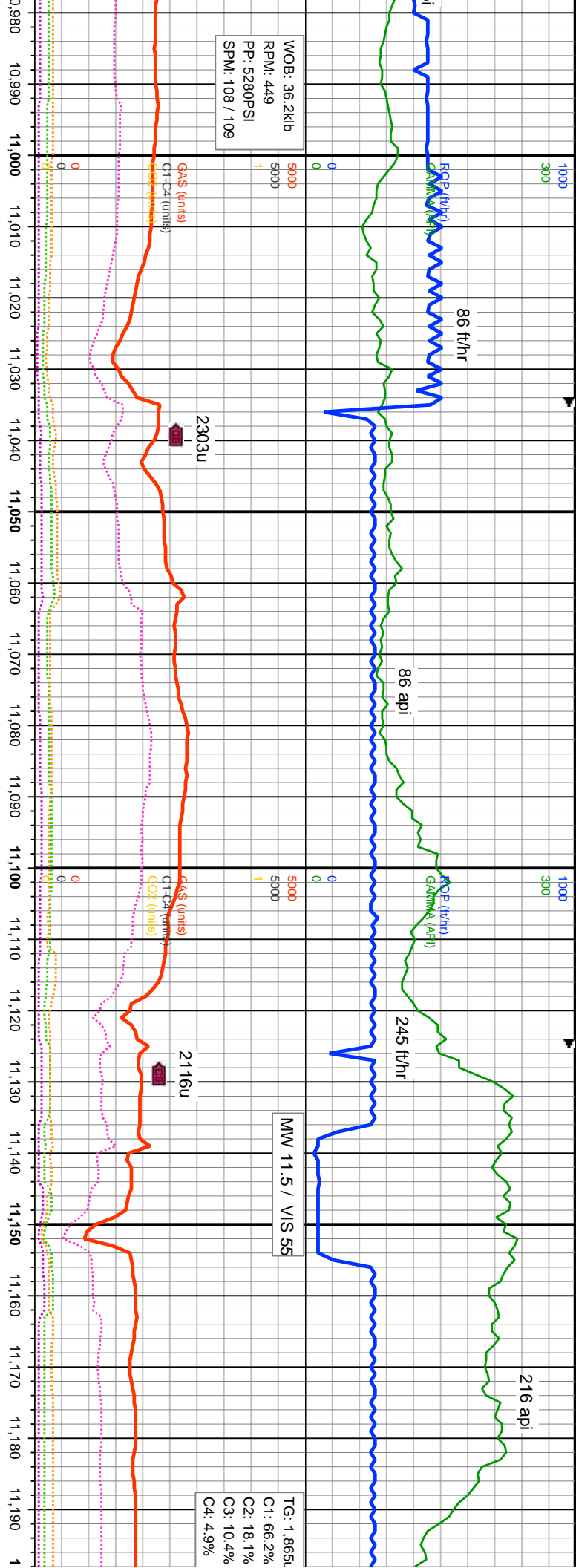
20% MRL: med dry chk ip, rr bent		90% CHK med-dk brn, dk gy ip, blk-sb blk, frm-mod frm, mot, arg, rthy, 10% MRL: med gy-dk gy, mod sft-sl frm, sb blk, rthy, sl sily, arg, suc, intbd inoc, grgd to dry chk		90% CHK med-dk brn, dk gy ip, blk-sb blk, frm-mod frm, mot, arg, rthy, 10% MRL: med med gy-dk gy, mod sft-sl frm, sb blk, rthy, sl sily, arg, suc, intbd inoc, grgd to dry chk	
8500		8500		8500	



5500	MD: 10.109' INC: 90.11° AZM: 271.41° TVD: 7.094.95' VS: 1.883.74'	90% CHK med-dk brn, blkly-sb blkly, frm-mod frm, mot, arg, rthy, grdg to mlst ip; 10% MRL: med gy-dk gy, mod sft-sl frm, sb blkly, rthy, sl sfty, arg, suc, intbd inoc, grdg to dry chk, rr inoc	5500	MD: 10.199' INC: 90.07° AZM: 271.15° TVD: 7.094.81' VS: 1.971.99'	70% CHK: med-dk brn-dk gy, blkly-sb blkly, frm-mod frm, mot, arg, rthy, rr dsm pyr; 30% MRL: med gy-dk gy, mod sft-sl frm, sb blkly, rthy, sl sfty, arg, suc, intbd inoc ip, grdg to dry chk	5500	MD: 10.289' INC: 90.46° AZM: 271.15° TVD: 7.094.39' VS: 2.060.2'	70% CHK: me gy-dk gy, mod
8500			8500			8500		



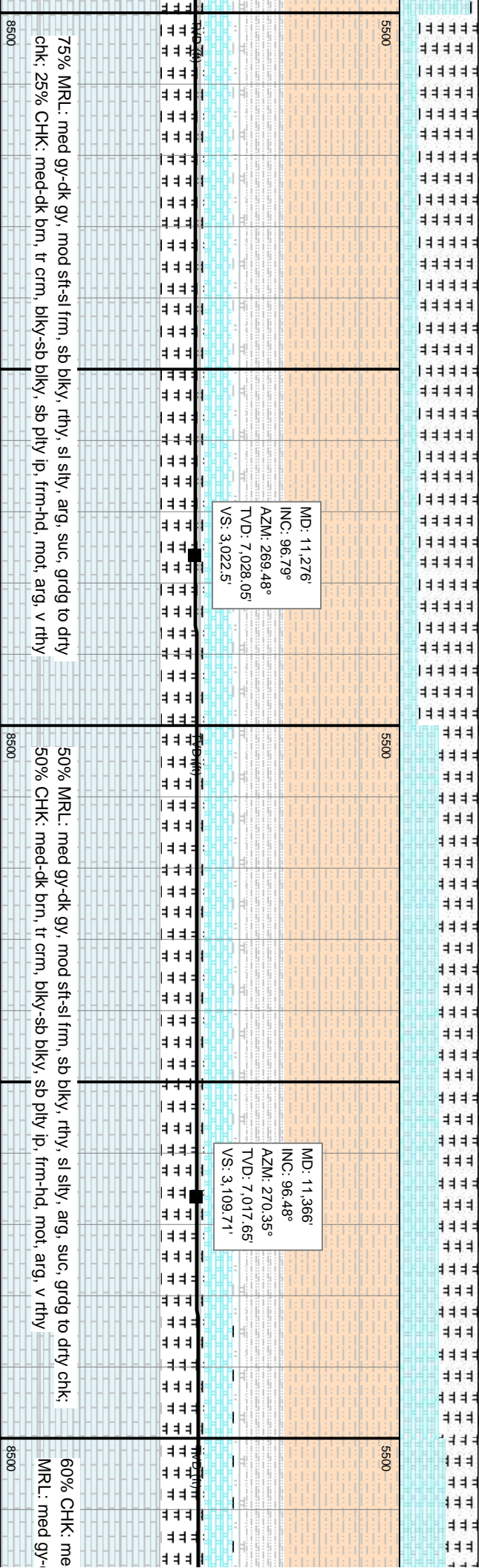
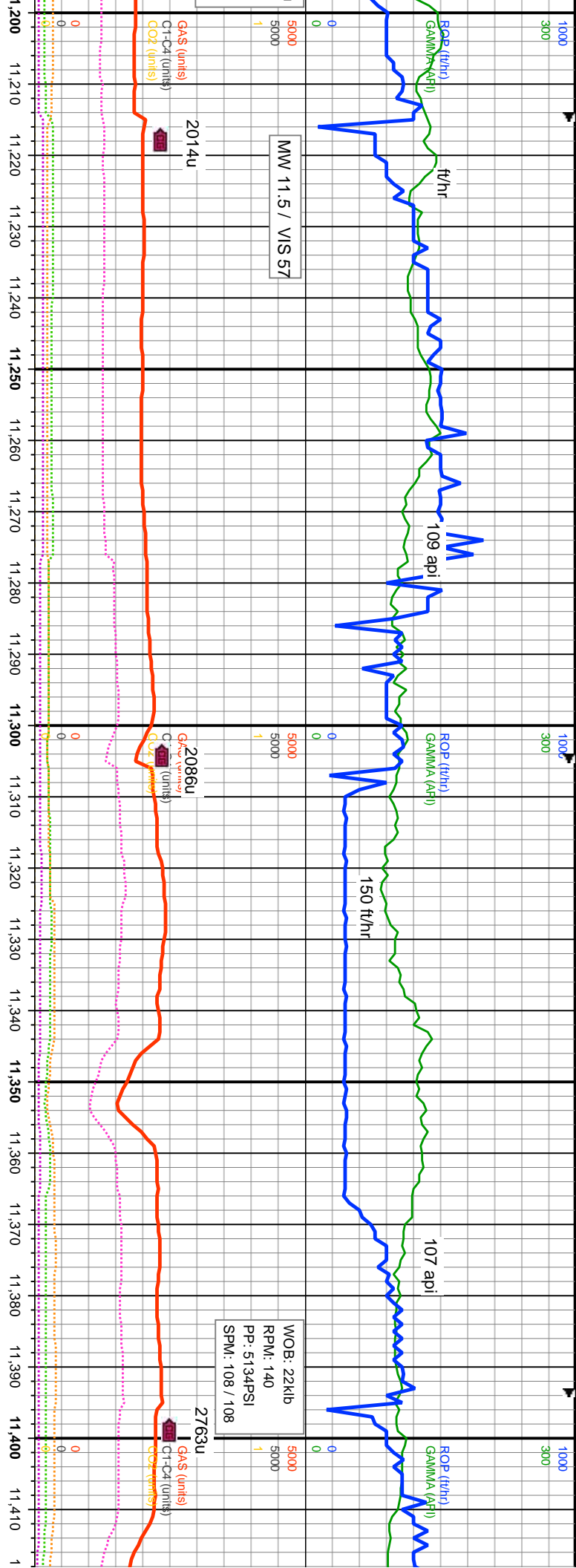


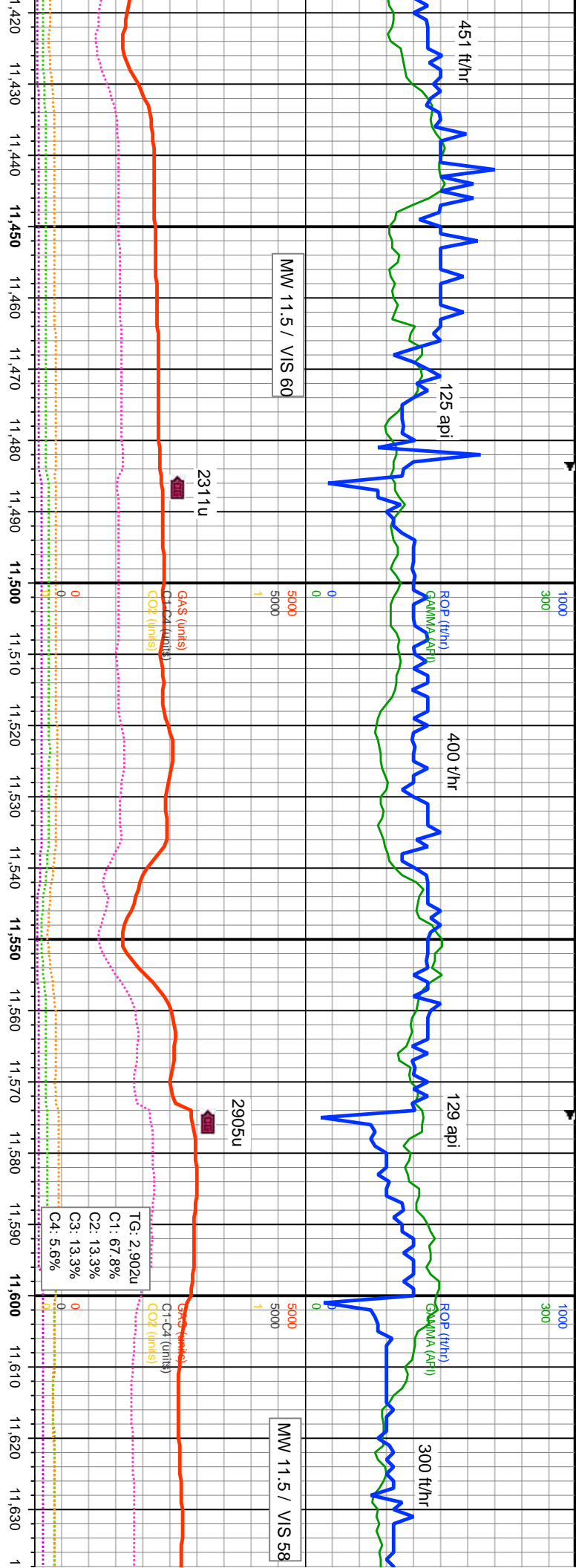


W, suc: 5%
9 to drty chk, r

95% CHK: med-dk brn, tr crm, blk-y-sb blk-y, sb ply ip, frm-hd, mot, arg, v rthy, suc: 5%
MRL: med gy-dk gy, mod sft-sl frm, sb blk-y, rthy, sl slty, arg, suc, grdg to drty chk

90% CHK: med-dk brn, tr crm, blk-y-sb blk-y, sb ply ip, frm-hd, mot, arg, v rthy, suc:
10% MRL: med gy-dk gy, mod sft-sl frm, sb blk-y, rthy, sl slty, arg, suc, grdg to drty chk





MW 11.5 / VIS 60

MW 11.5 / VIS 58

2311u

2905u

Gas (units)
C1-C4 (units)
CO2 (units)

Gas (units)
C1-C4 (units)
CO2 (units)

TG: 2.902u
C1: 67.8%
C2: 13.3%
C3: 13.3%
C4: 5.6%

MD: 11,455'
INC: 94.51°
AZM: 268.07°
TVD: 7,009.13'
VS: 3,195.89'

11463 MD: 31' D/T Fault

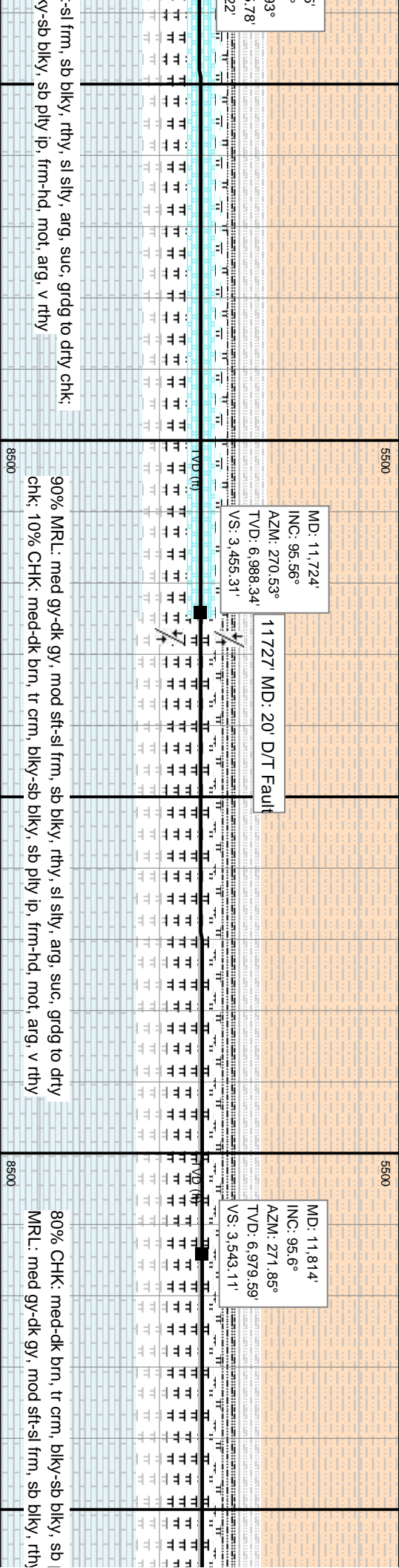
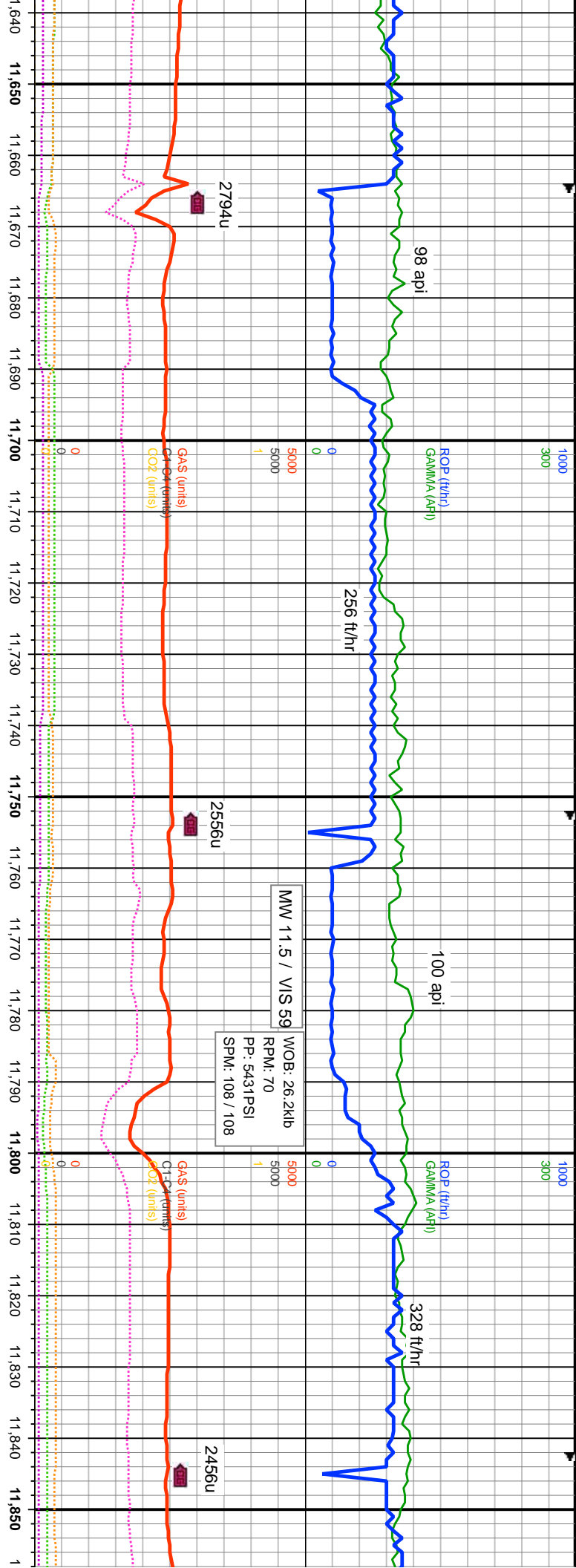
MD: 11,545'
INC: 94.24°
AZM: 267.54°
TVD: 7,002.26'
VS: 3,282.66'

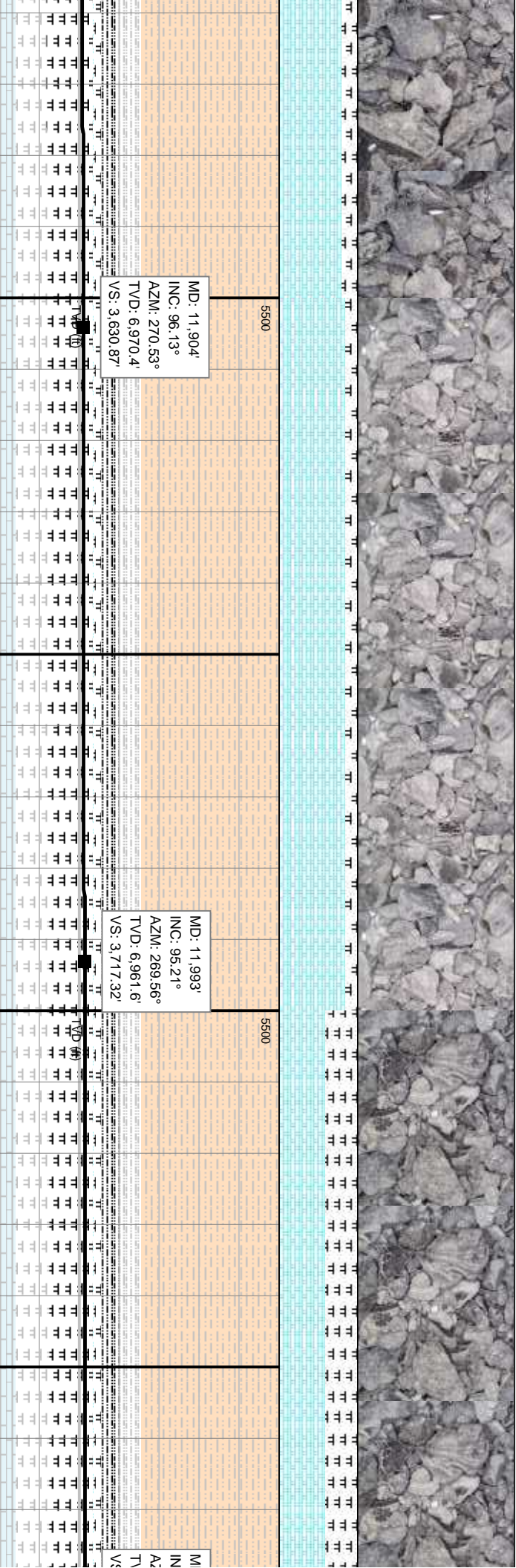
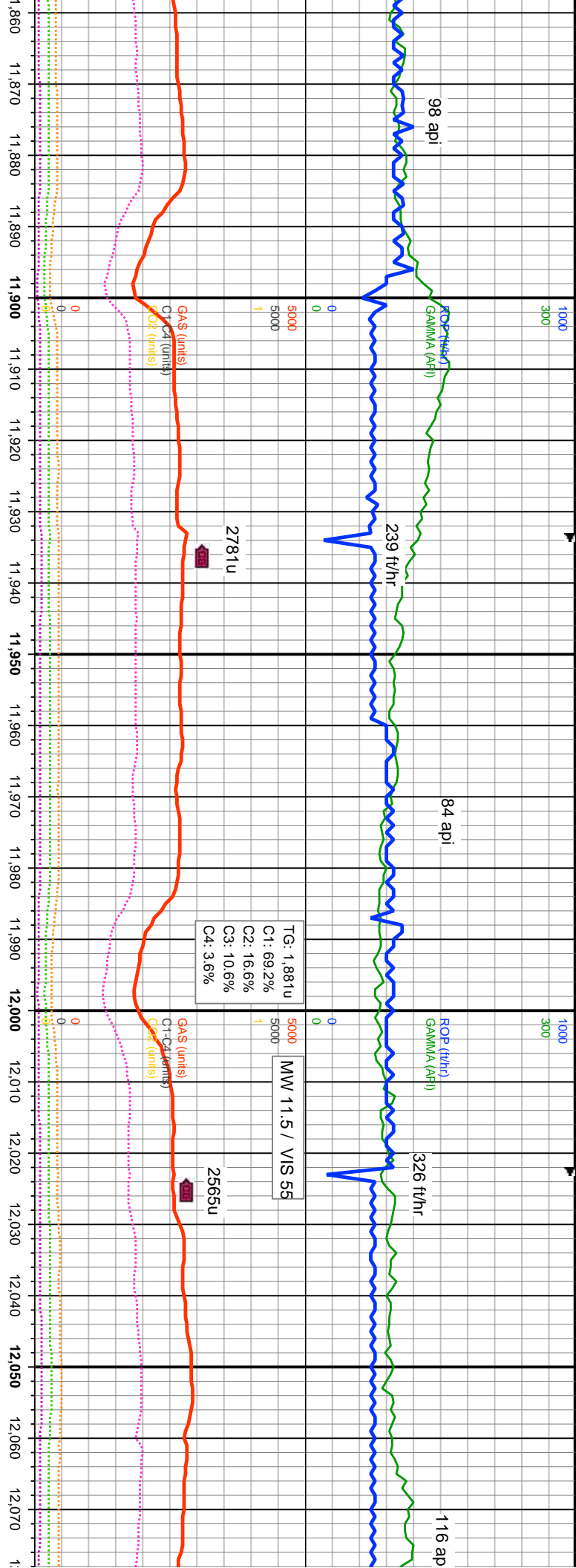
MD: 11,633'
INC: 94.02°
AZM: 266.5°
TVD: 6,996'
VS: 3,369.2'

-dk brn, tr crm, blk-y-sb blk-y, sb ply ip, frm-hd, mot, arg, v rthy, 40%
dk gy, mod sft-sl frm, sb blk-y, rthy, sl stly, arg, suc, grdg to drty chk

70% MRL: med gy-dk gy, mod sft-sl frm, sb blk-y, rthy, sl stly, arg, suc, grdg to drty
chk: 30% CHK: med-dk brn, tr crm, blk-y-sb blk-y, sb ply ip, frm-hd, mot, arg, v rthy

75% MRL: med gy-dk gy, mod sft
25% CHK: med-dk brn, tr crm, blk

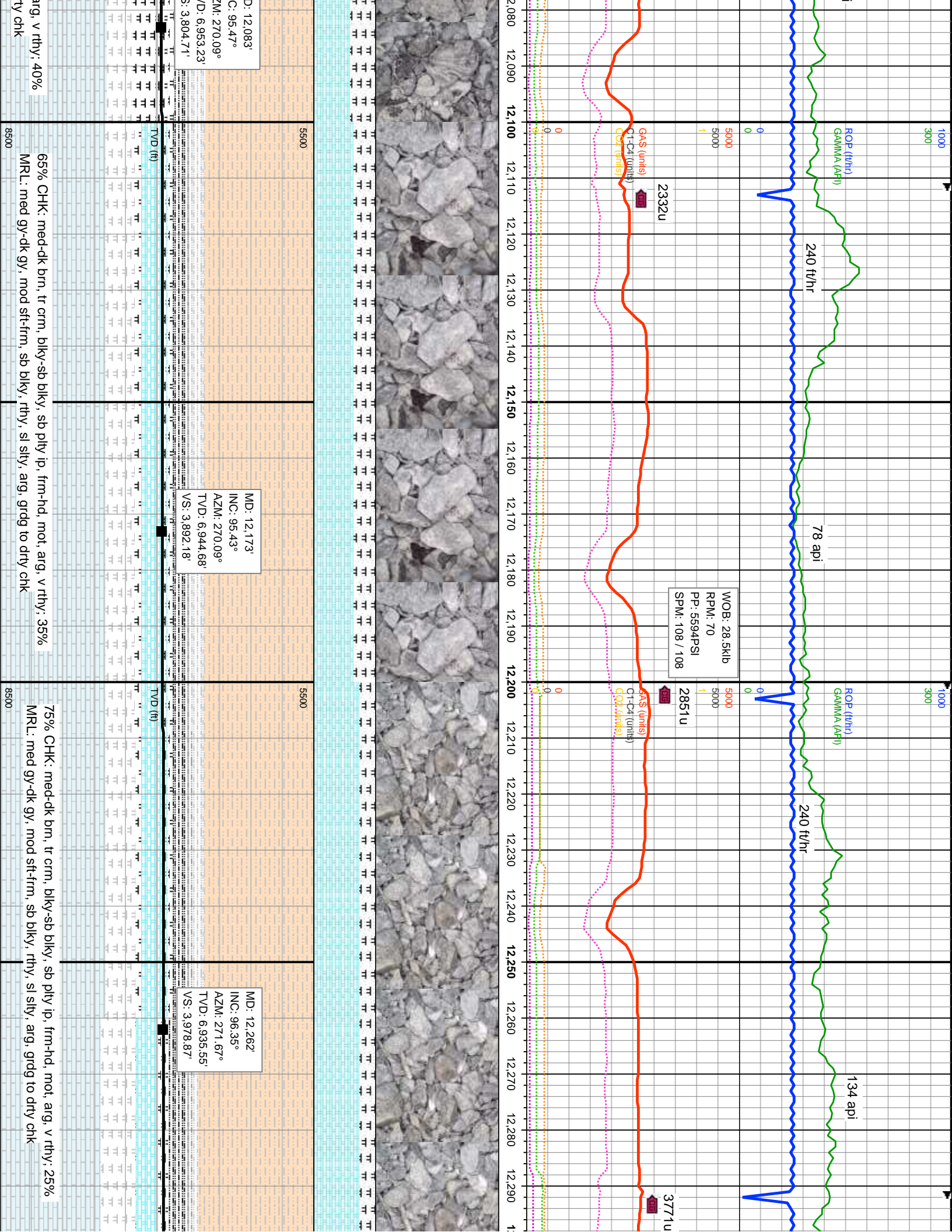


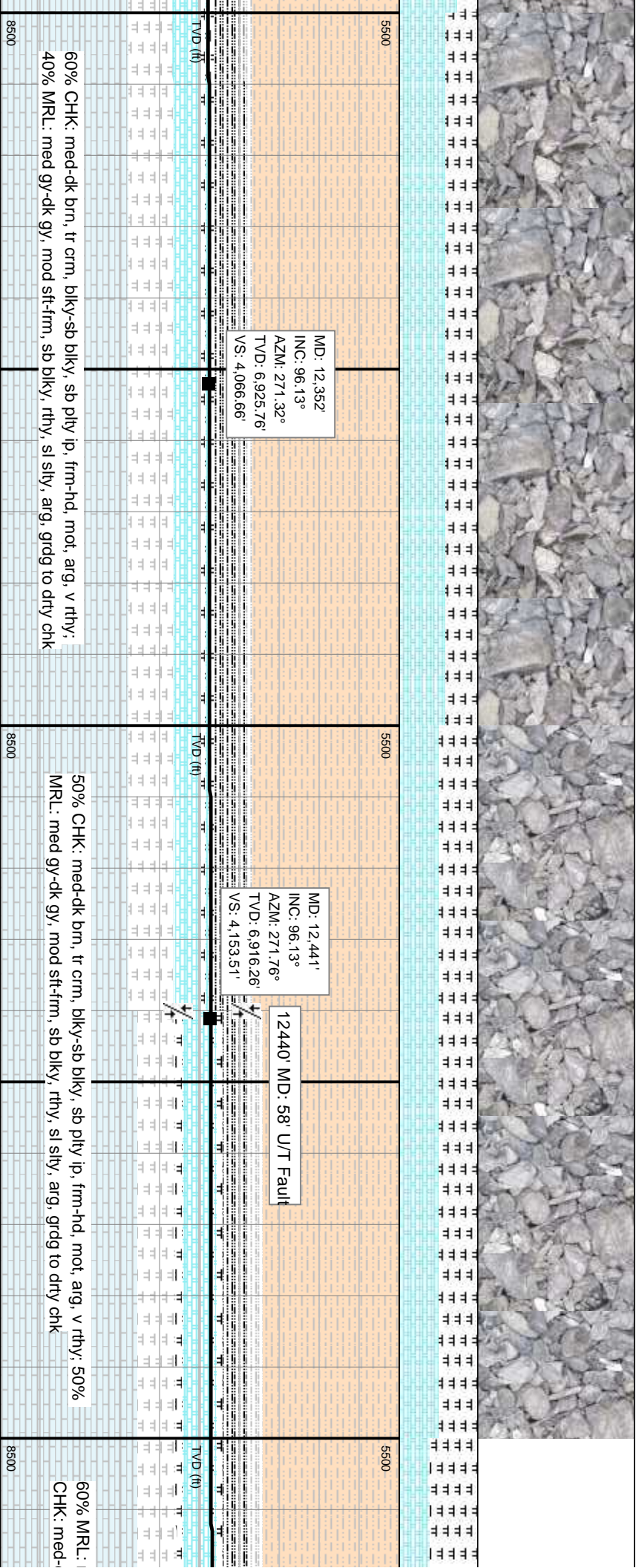
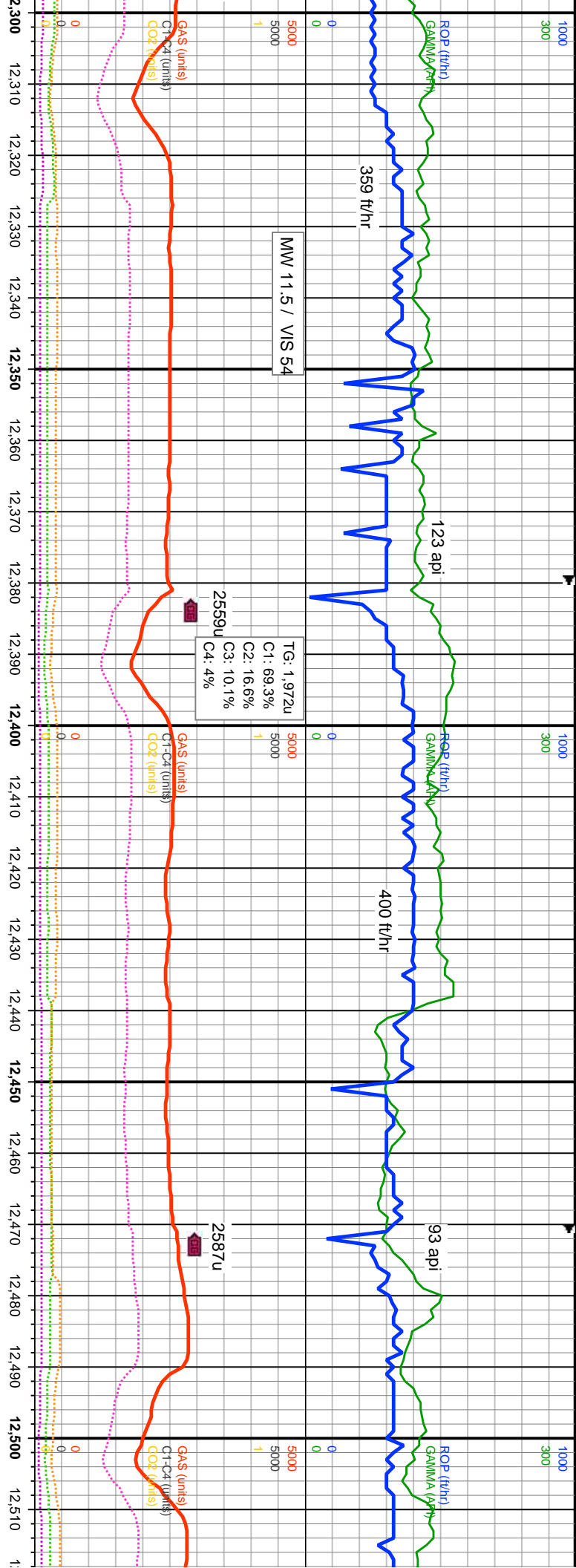


ply ip, frm-hd, mot, arg, v rthy, 20%
sl stly, arg, suc, grdg to drty chk

85% CHK: med-dk brn, tr crm, blkly-sb blkly, sb ply ip, frm-hd, mot, arg, v rthy, 15%
MRL: med gy-dk gy, mod sft-sl frm, sb blkly, rthy, sl stly, arg, suc, grdg to drty chk

60% CHK: med-dk brn, tr crm, blkly-sb blkly, sb ply ip, frm-hd, mot, arg, v rthy, 15%
MRL: med gy-dk gy, mod sft-frm, sb blkly, rthy, sl stly, arg, suc, grdg to drty chk

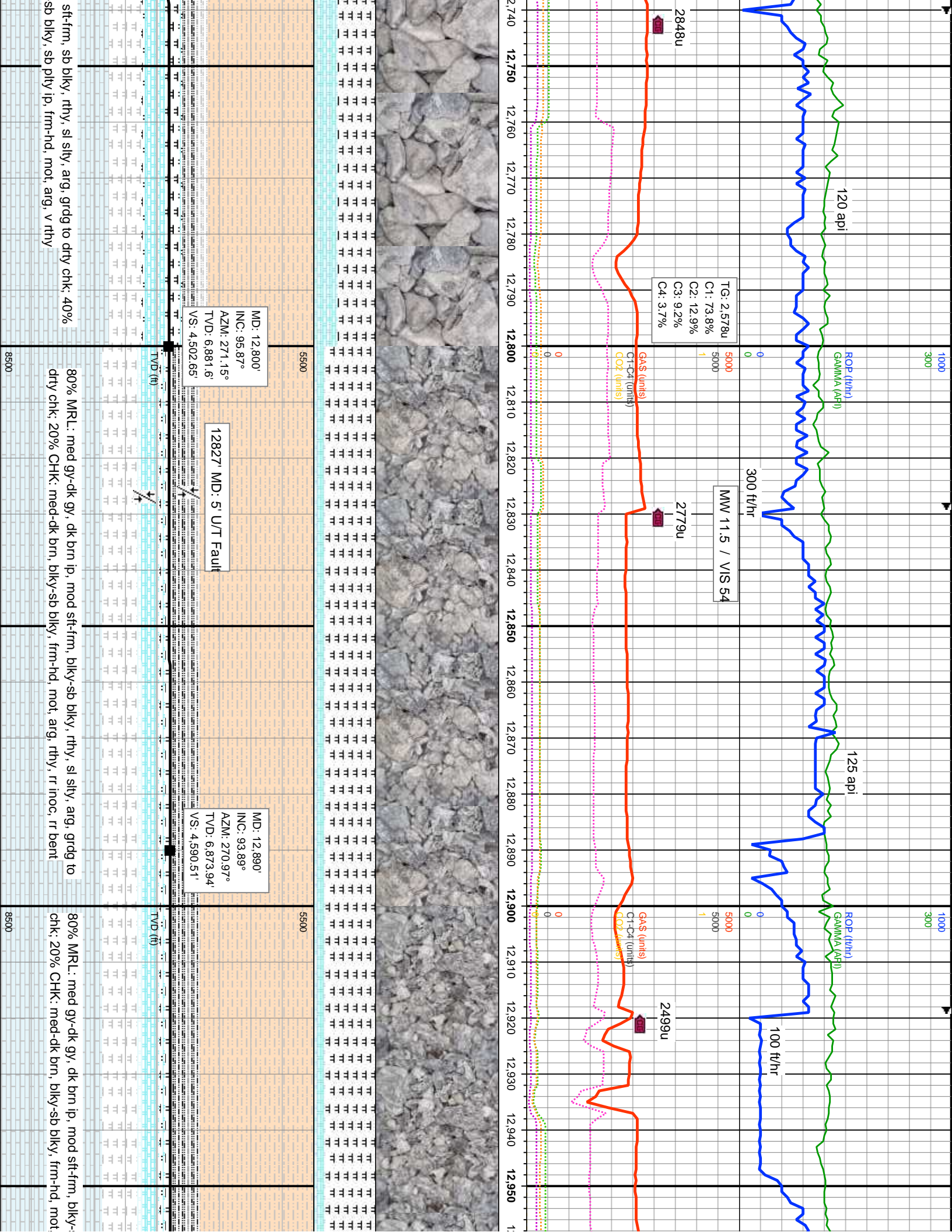


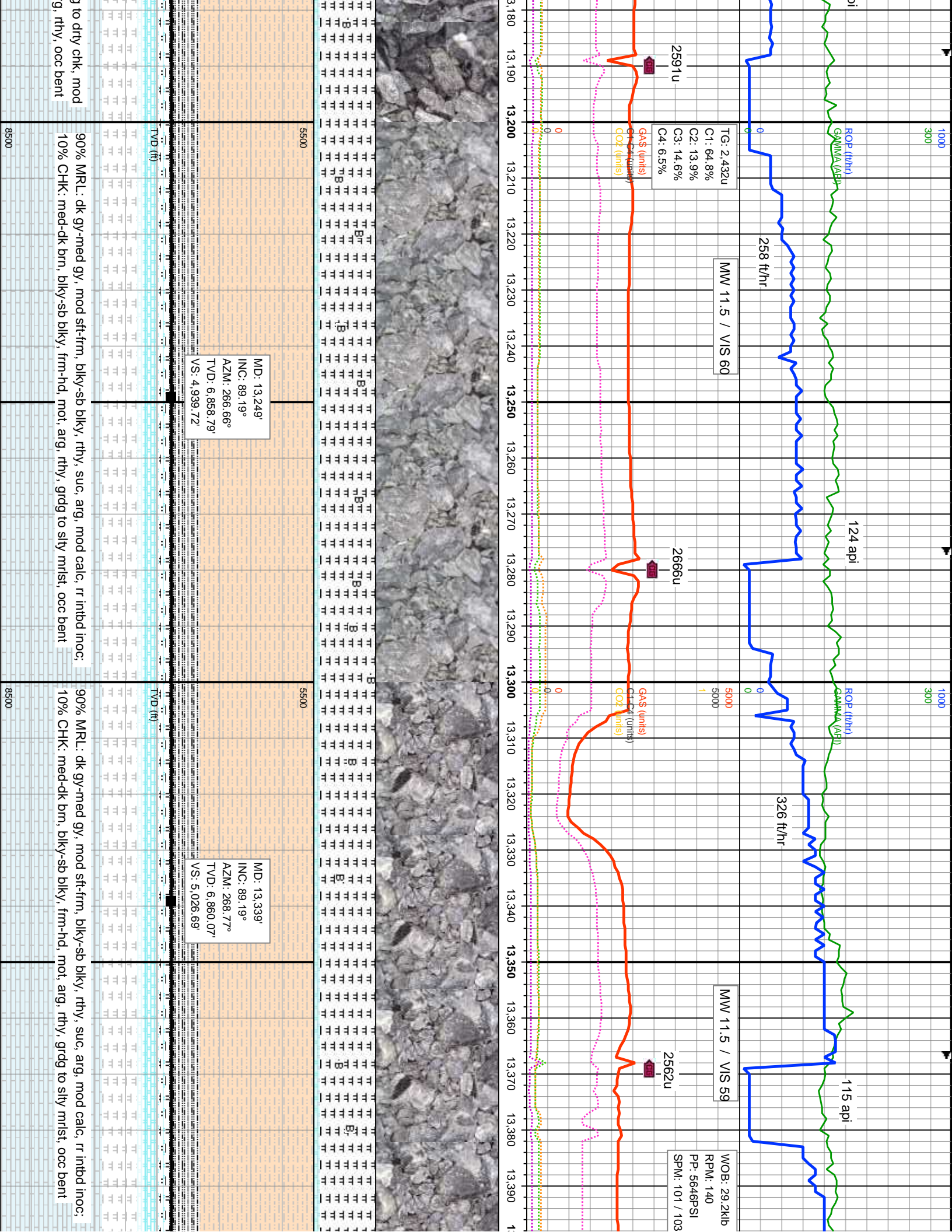


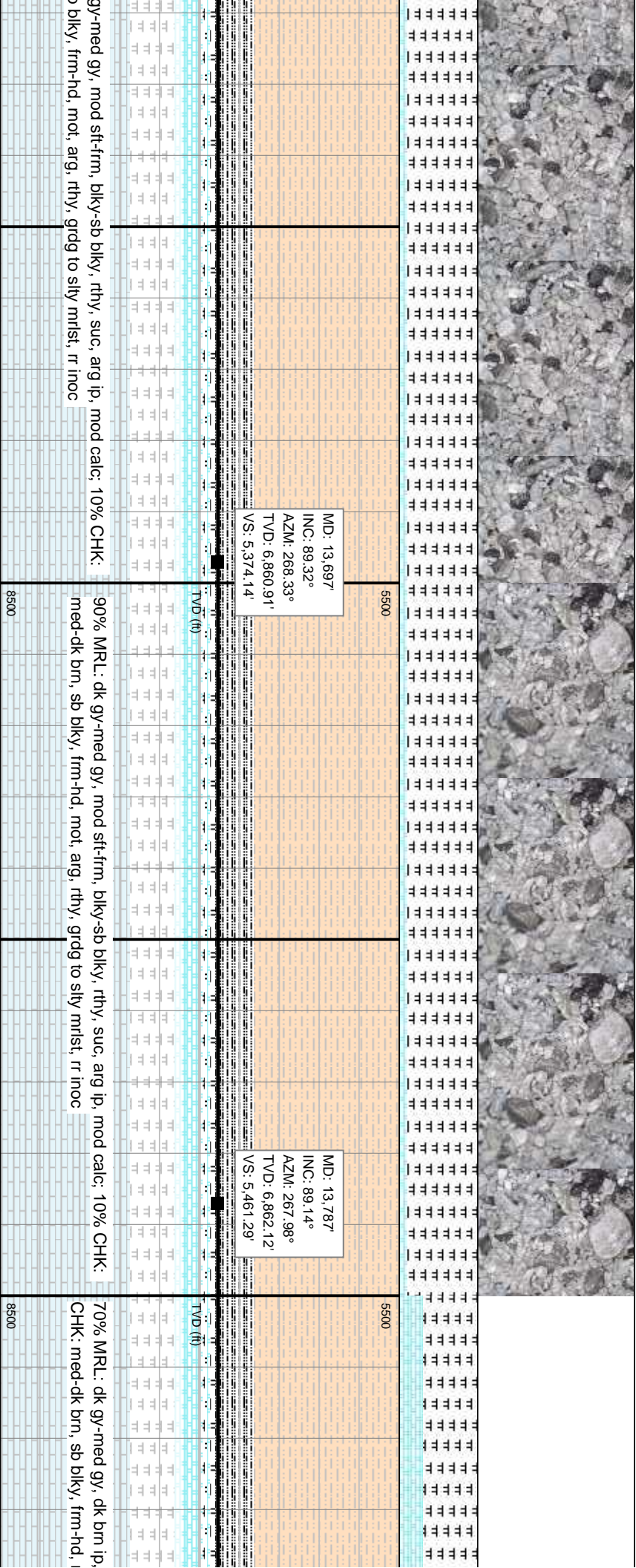
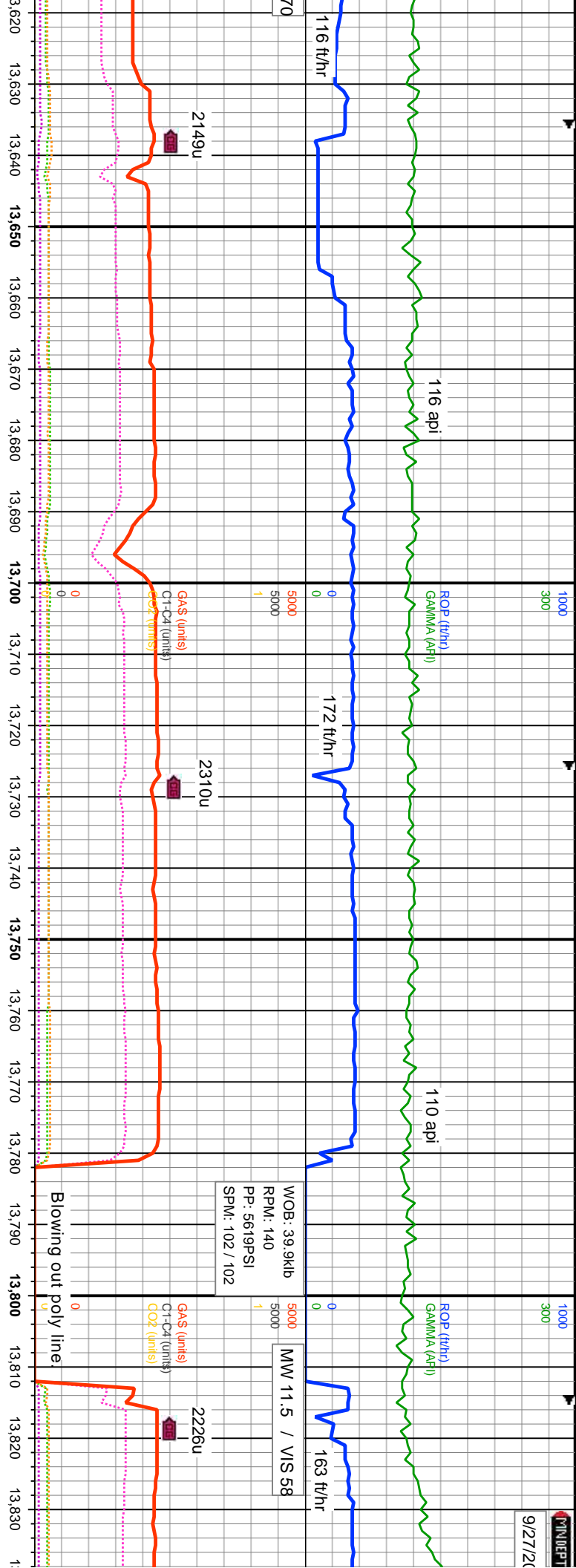
60% CHK: med-dk brn, tr crm, blk-y-sb blk-y, sb pily ip, frm-hd, mot, arg, v rthy;
40% MRL: med gy-dk gy, mod sft-frm, sb blk-y, rthy, sl sily, arg, grdg to dry chk

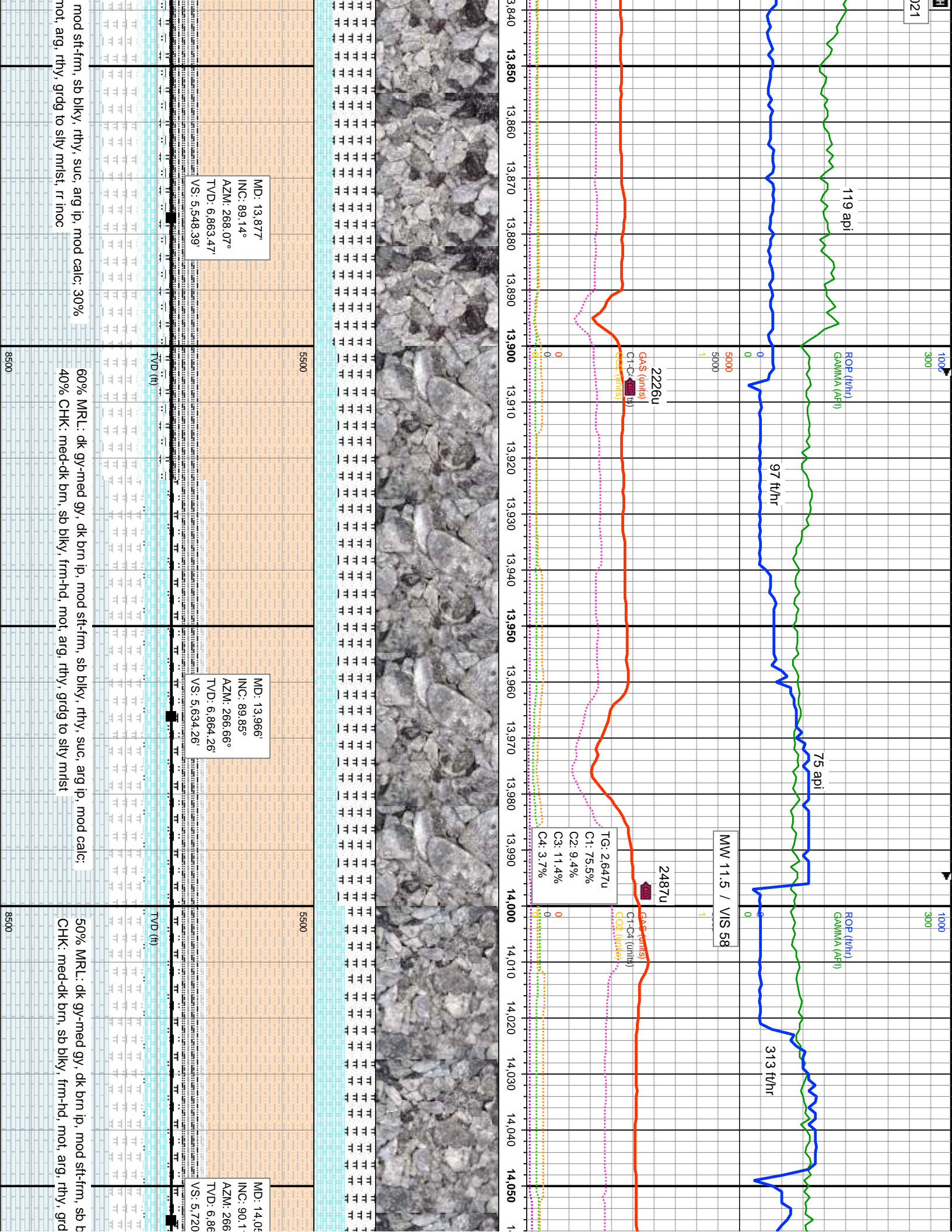
50% CHK: med-dk brn, tr crm, blk-y-sb blk-y, sb pily ip, frm-hd, mot, arg, v rthy; 50%
MRL: med gy-dk gy, mod sft-frm, sb blk-y, rthy, sl sily, arg, grdg to dry chk

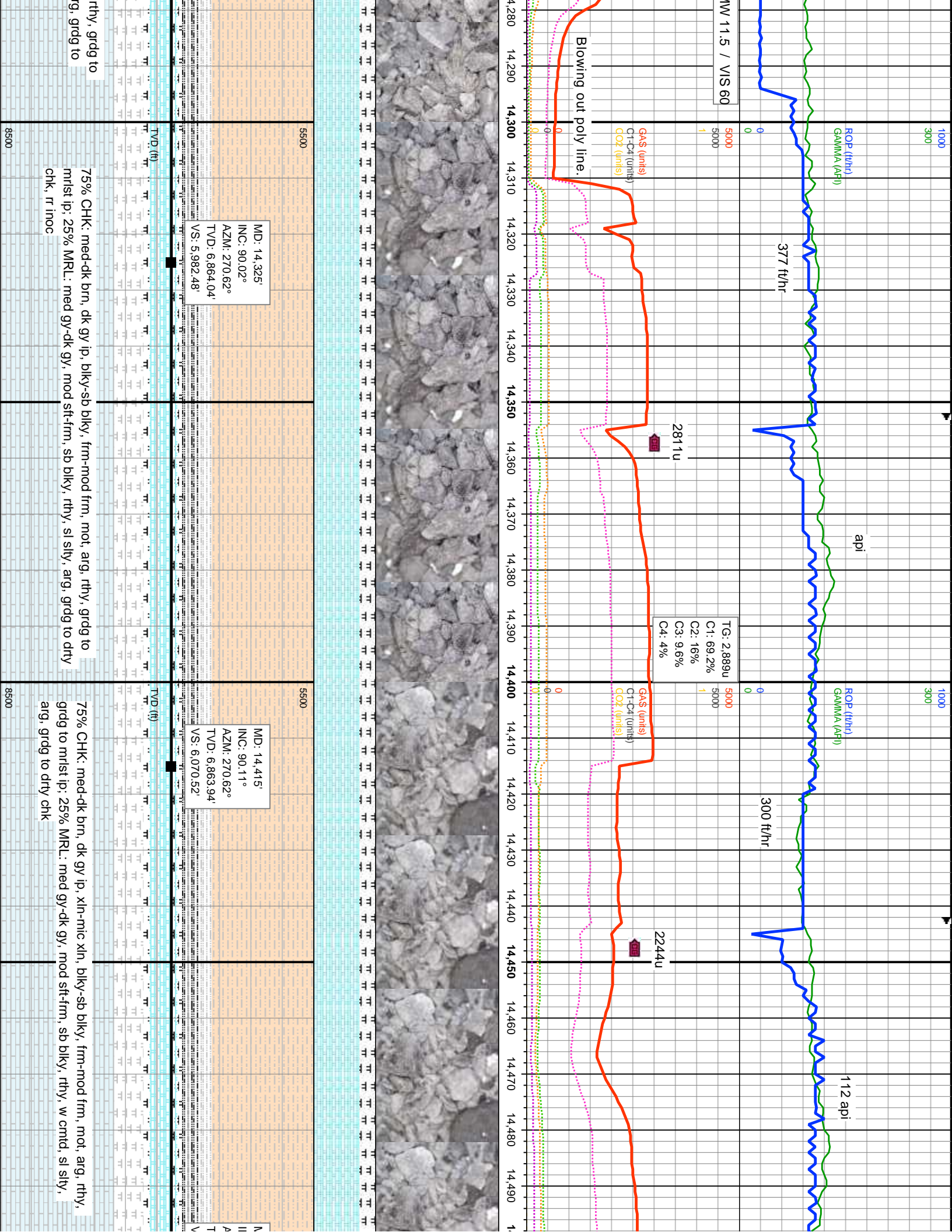
60% MRL:
CHK: med-

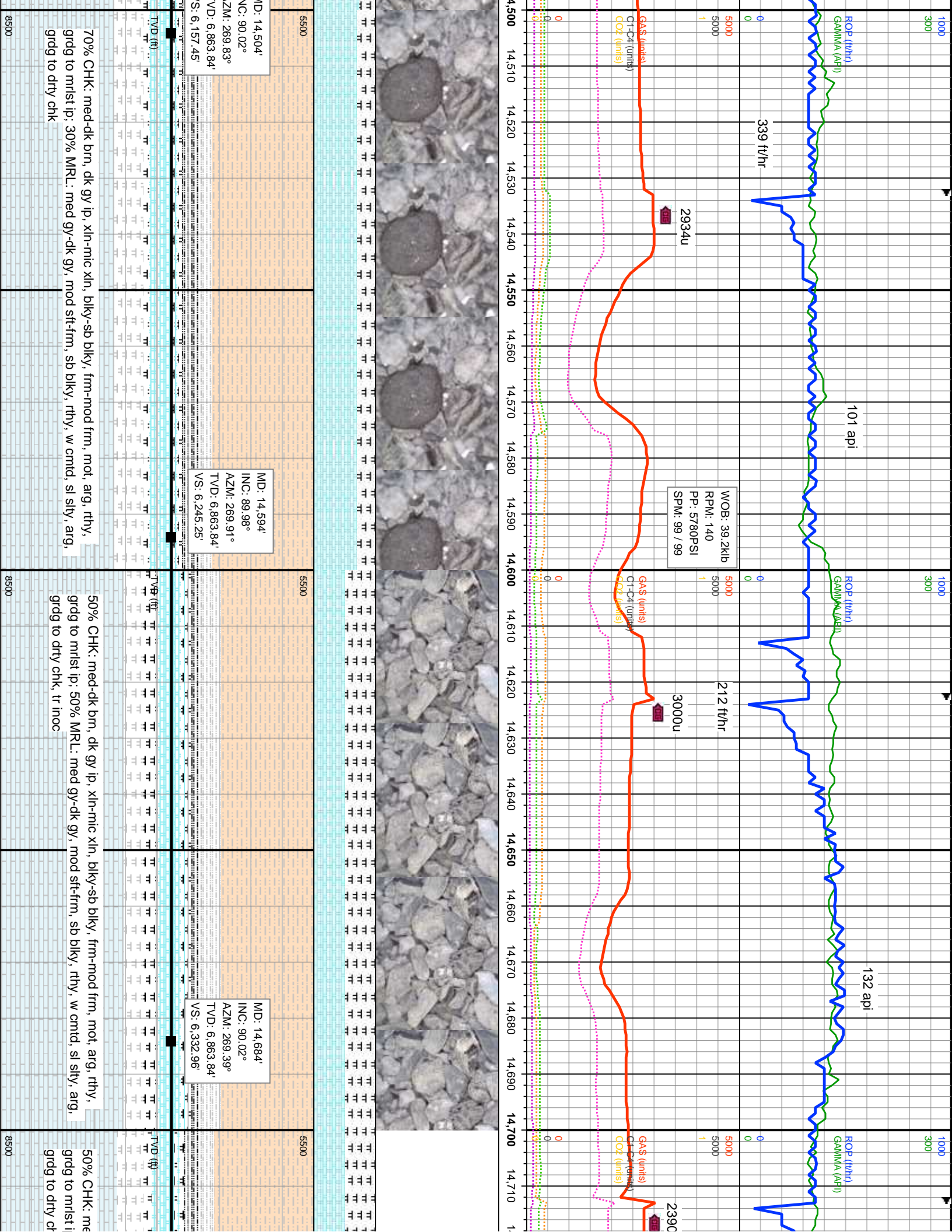


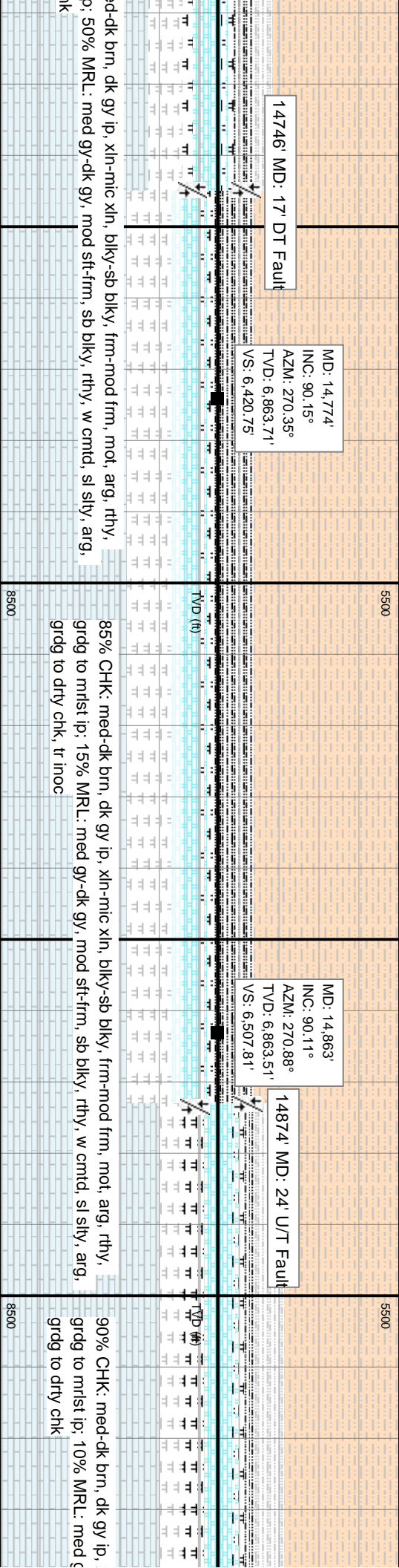
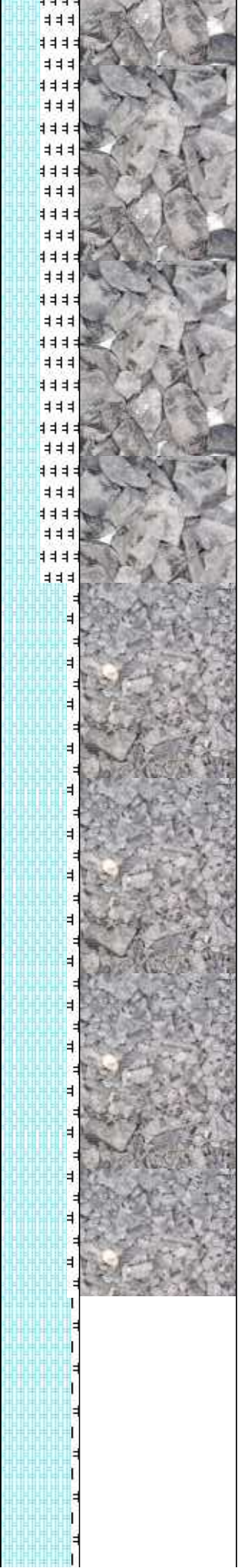
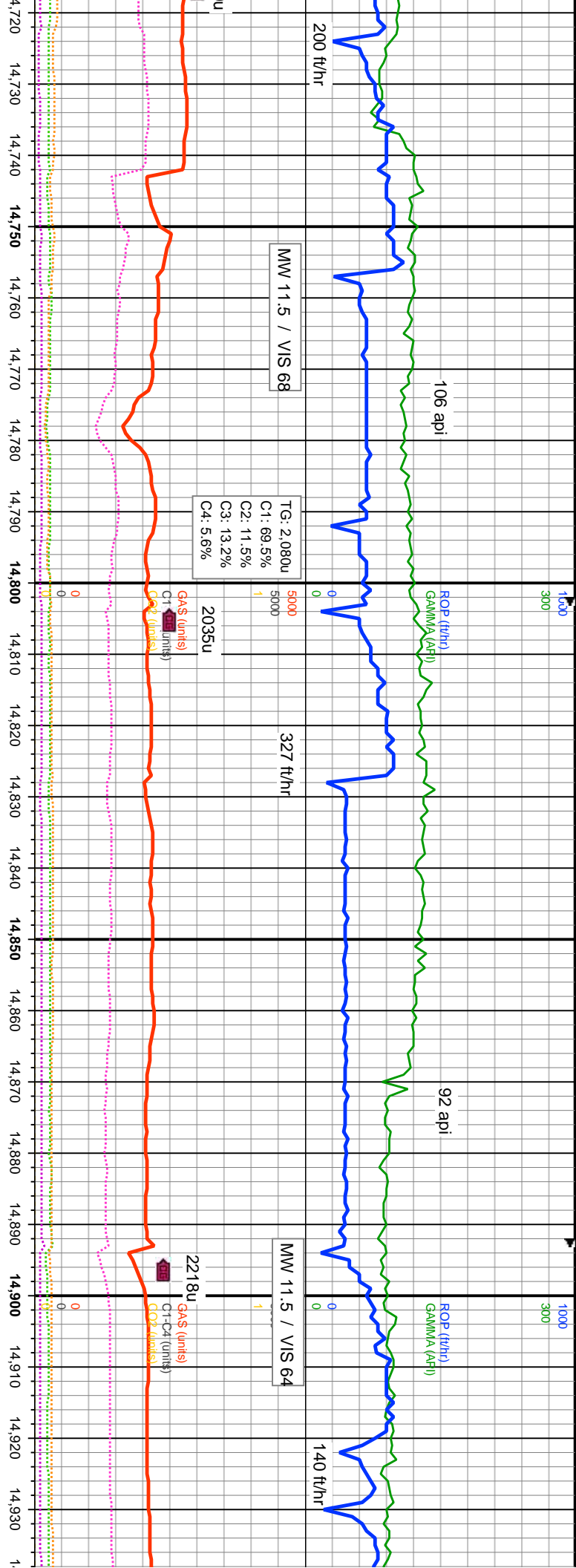


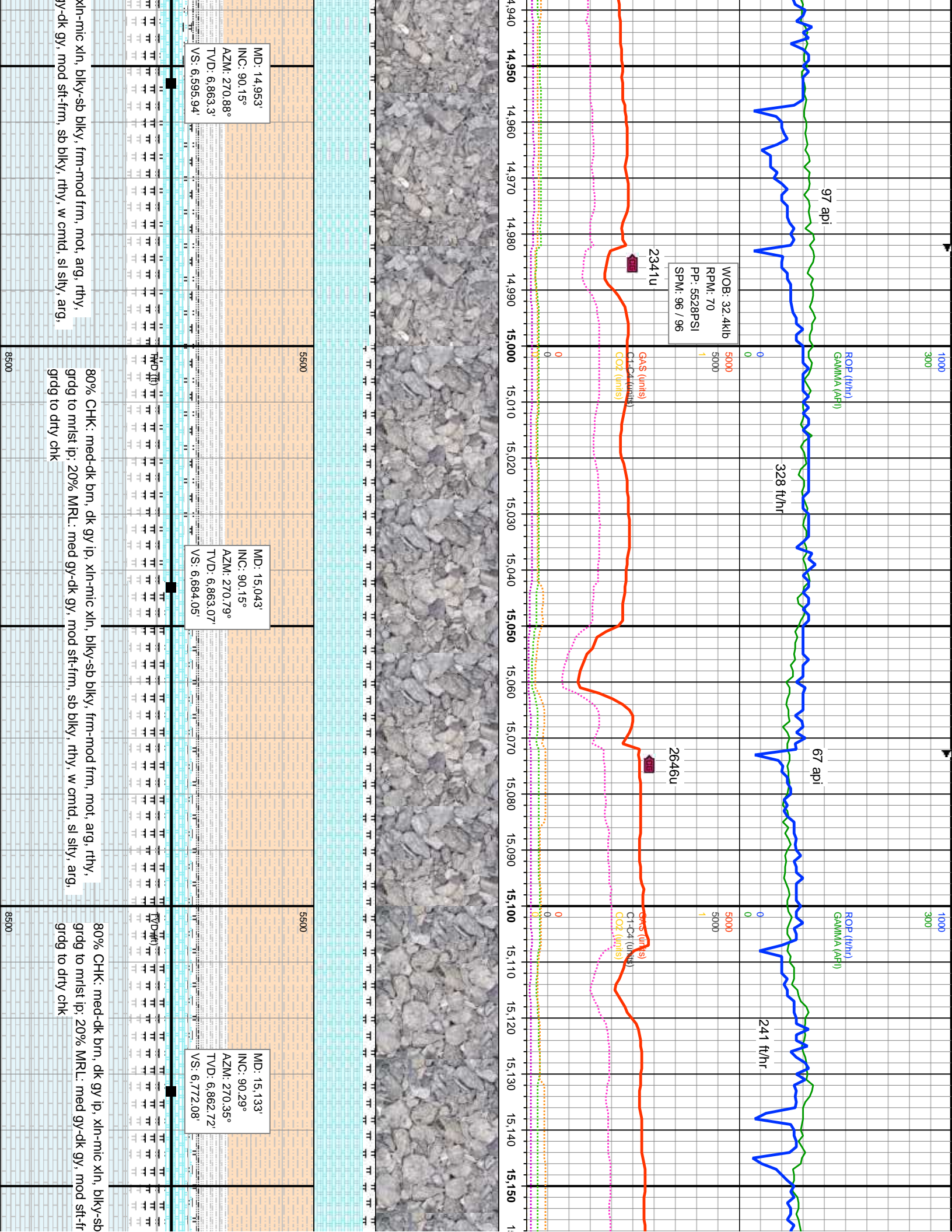


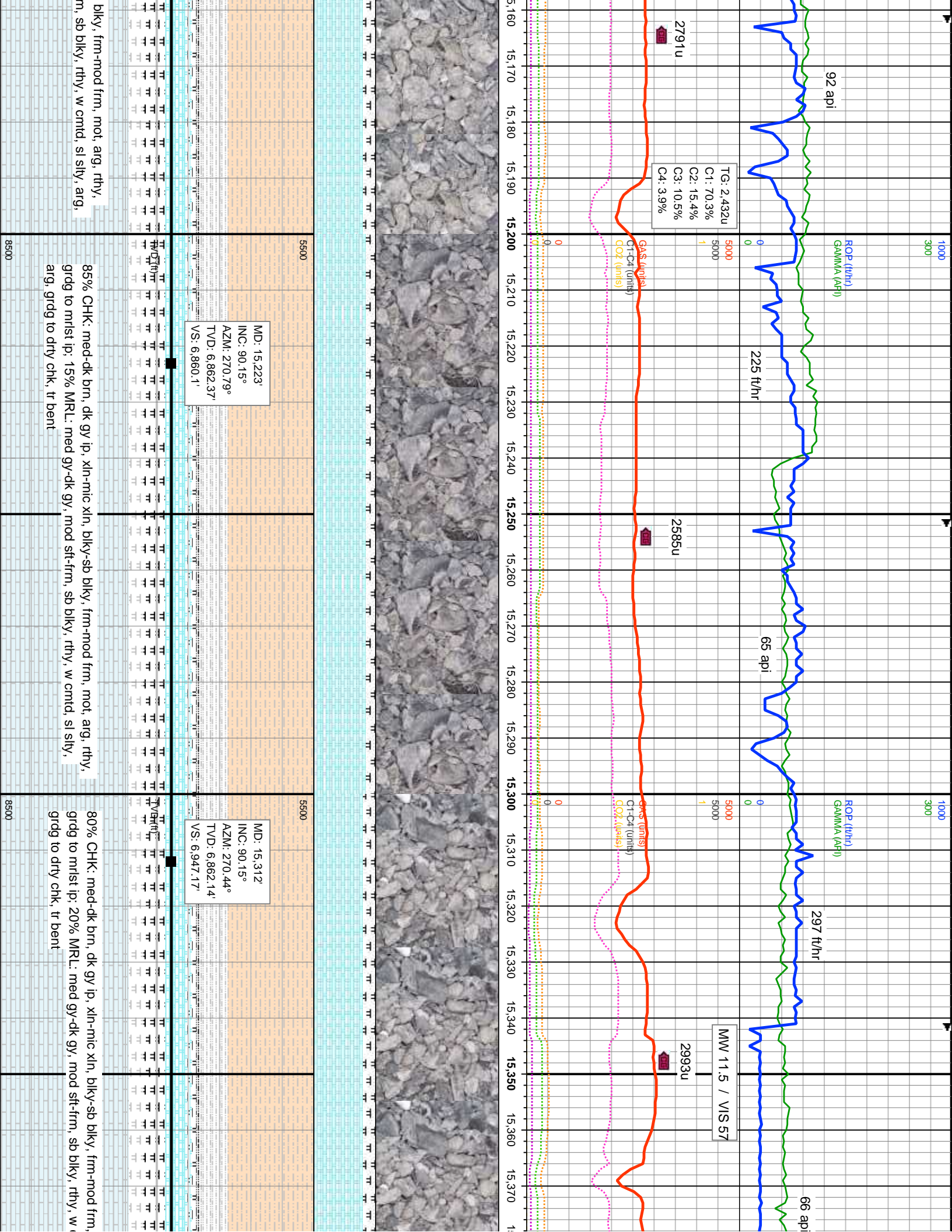


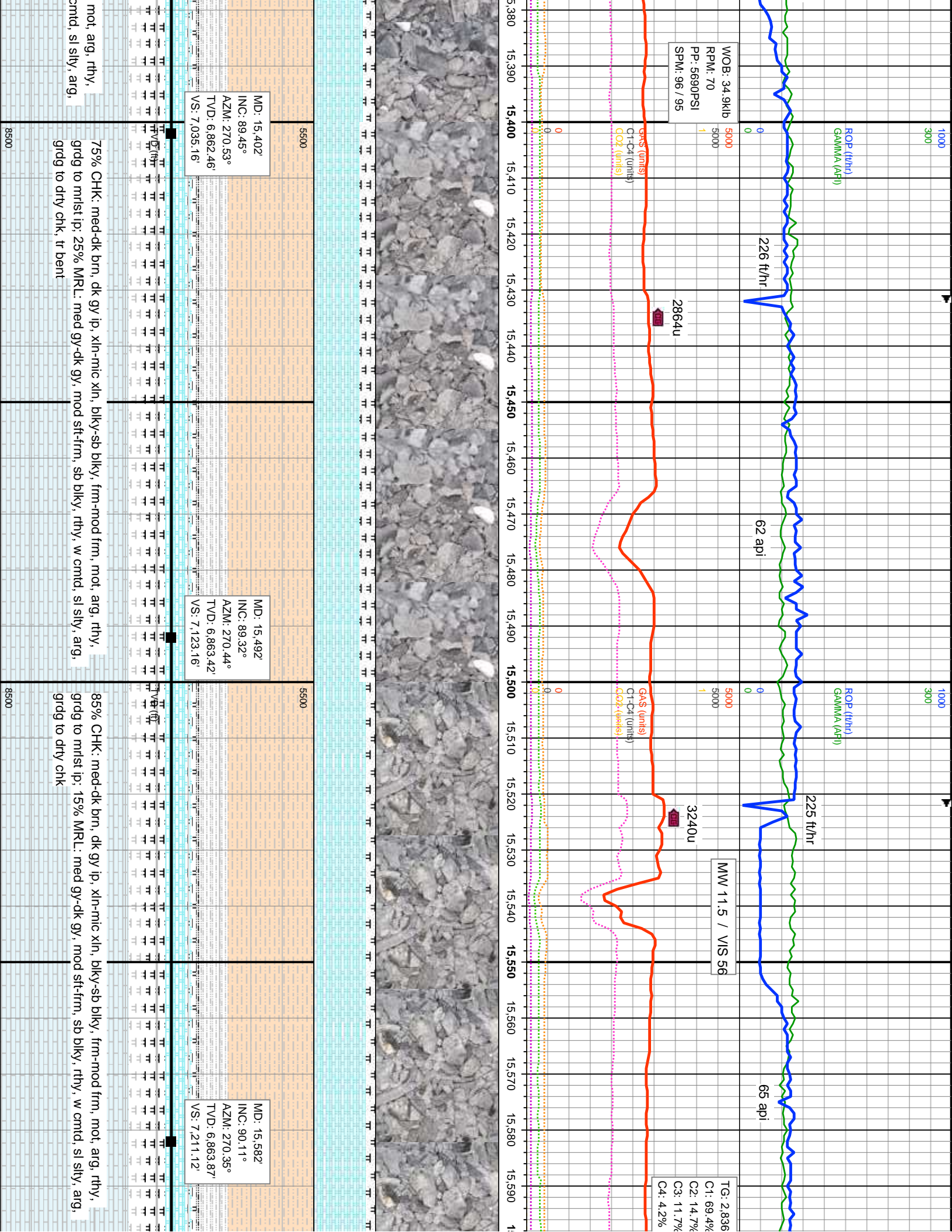


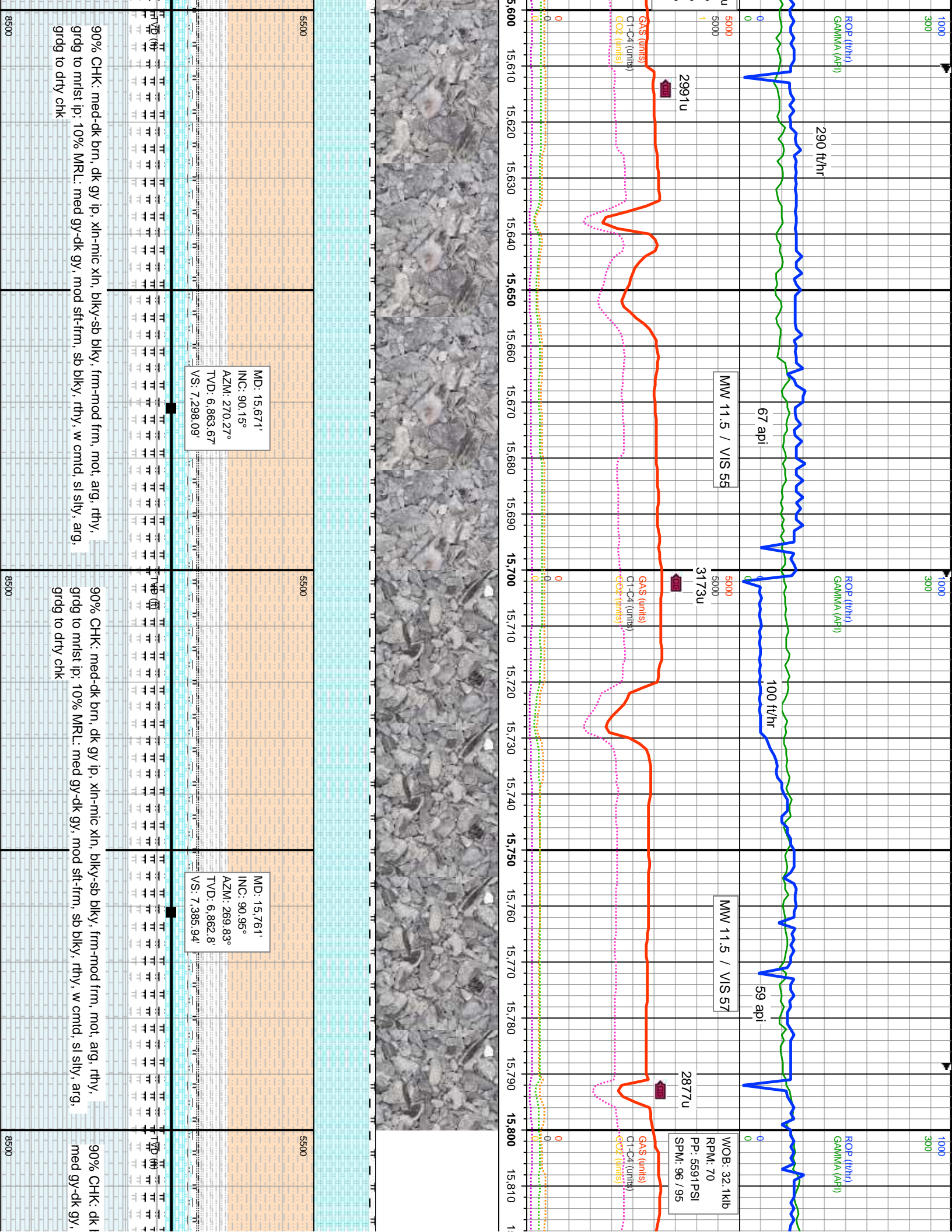


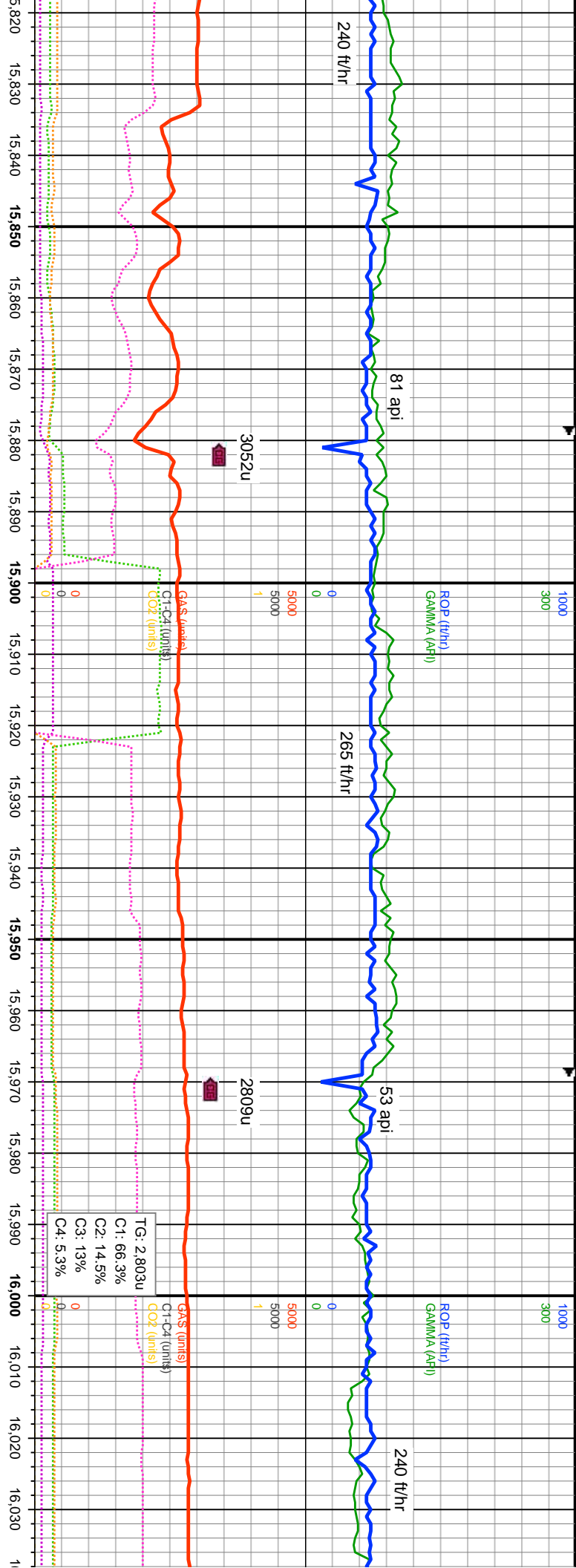












MD: 15,851'
INC: 90.99°
AZM: 268.68°
TVD: 6,861.28'
VS: 7,473.5'

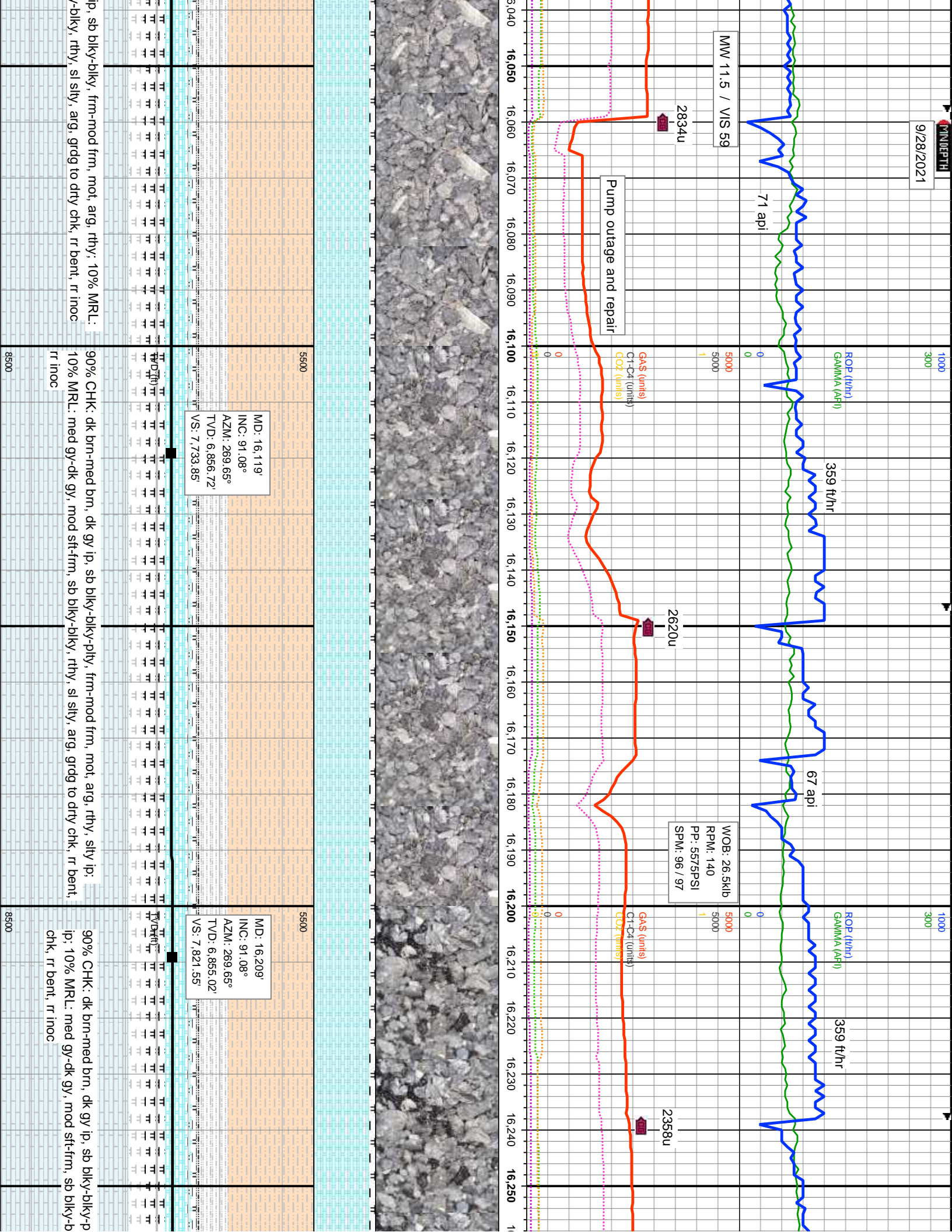
MD: 15,940'
INC: 91.03°
AZM: 268.95°
TVD: 6,859.71'
VS: 7,559.92'

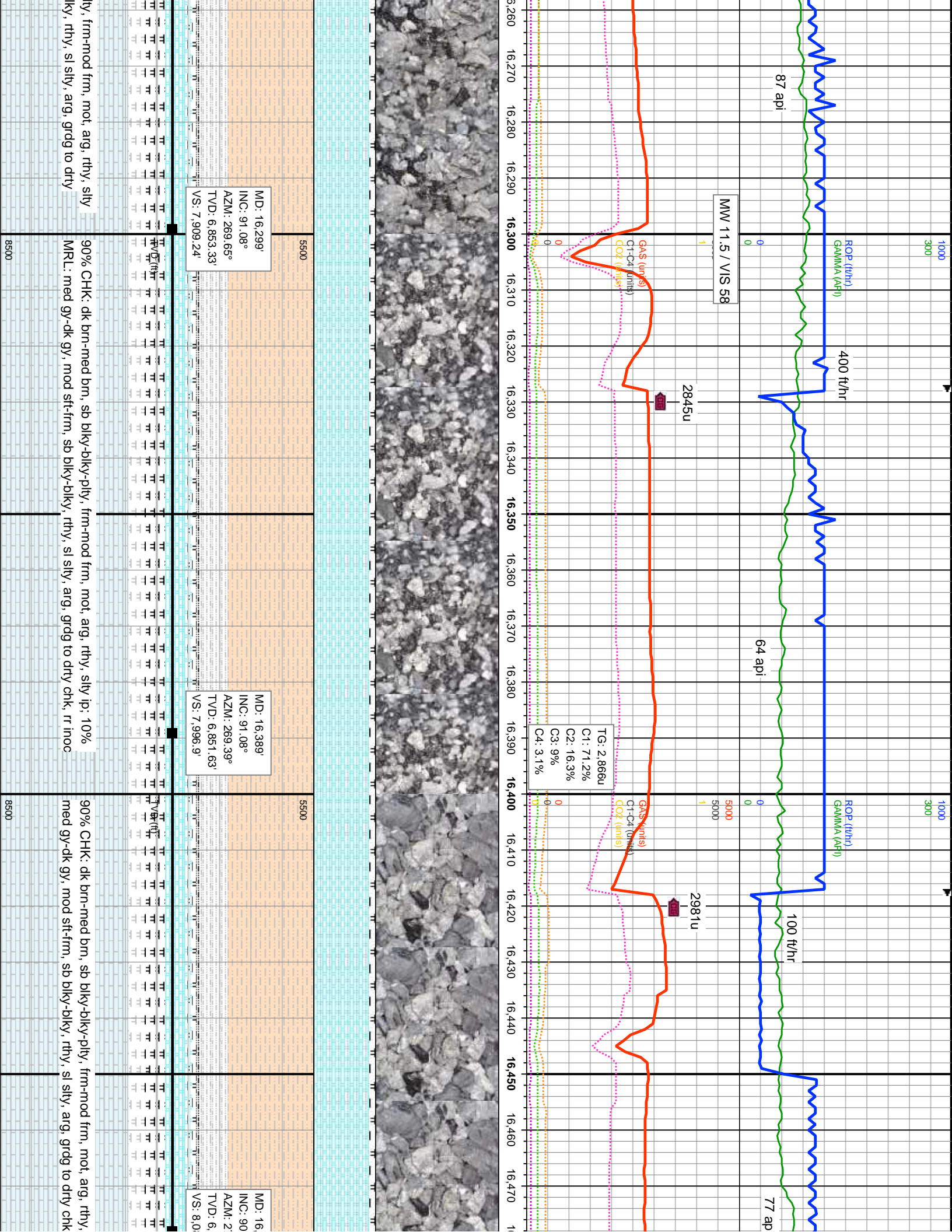
MD: 16,030'
INC: 90.86°
AZM: 268.6°
TVD: 6,856.23'
VS: 7,647.31'

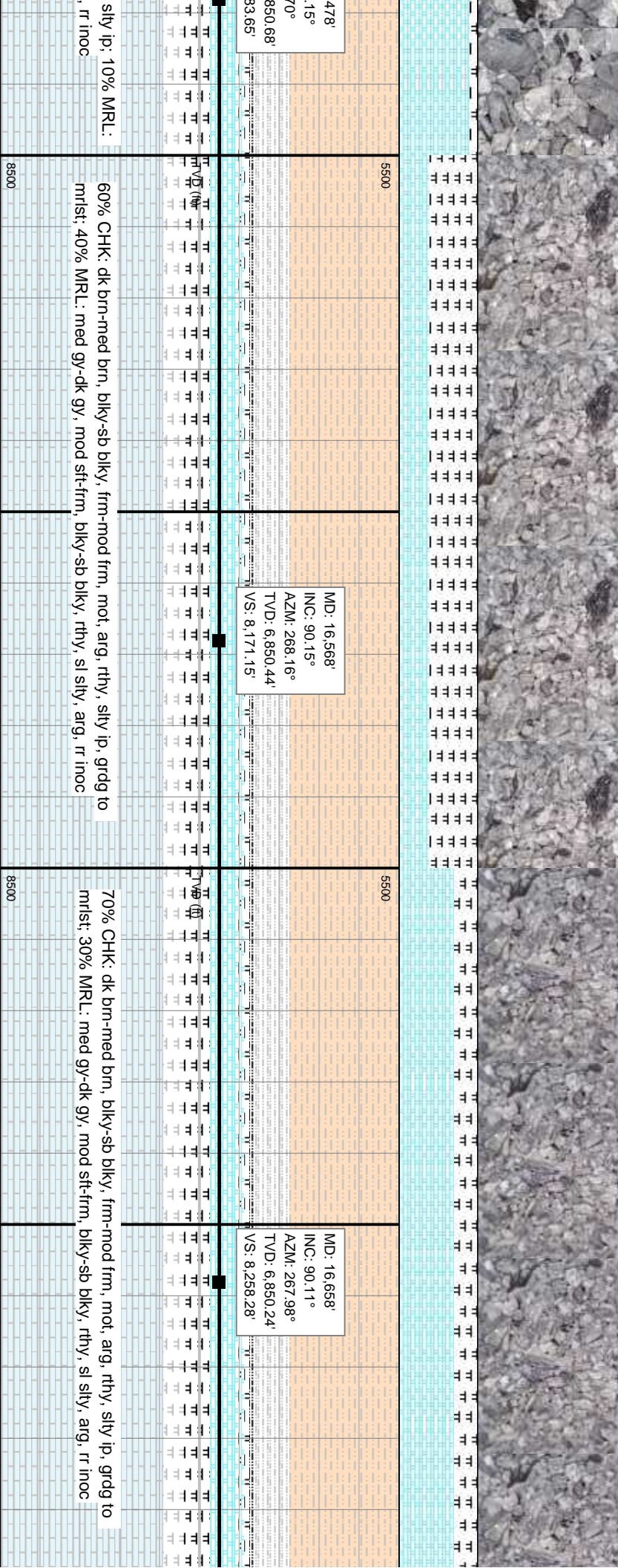
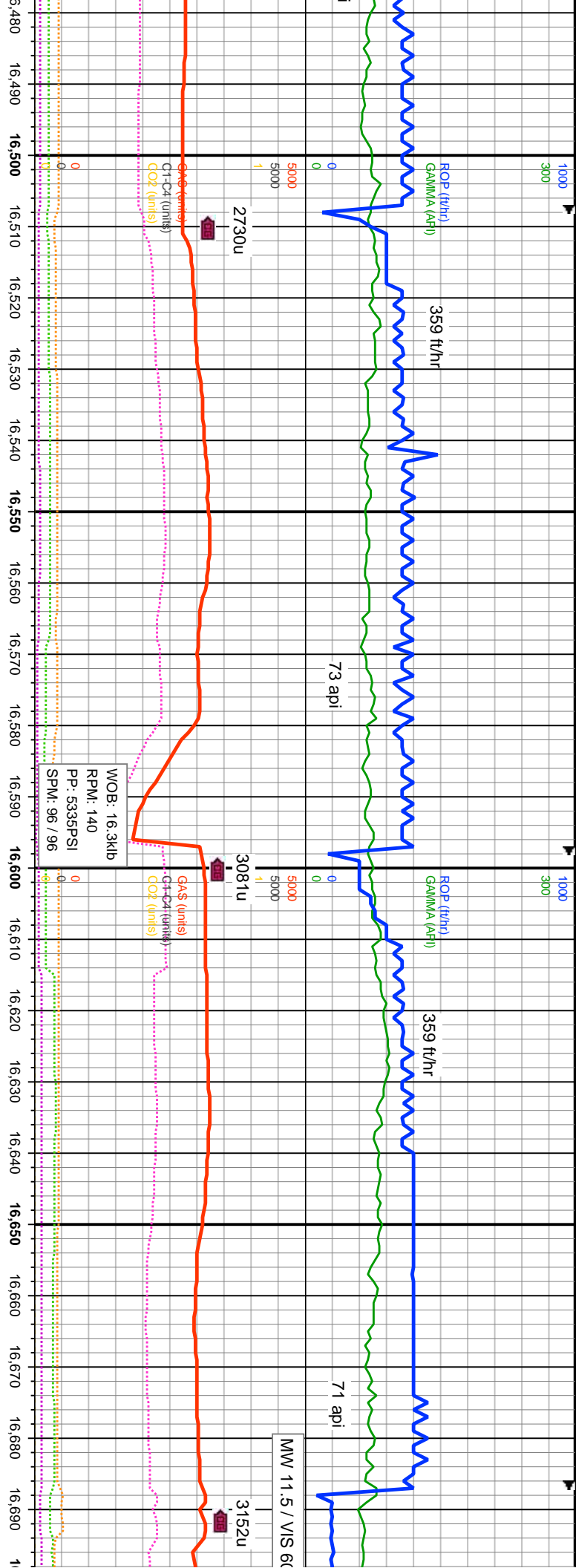
on-dk gy, sb blk, frm-mod frm, mot, arg, rthy, grdg to mlst ip: 10% MRL: mod sft-frm, sb blk-y-blk, rthy, sl stly, arg, grdg to dry chk

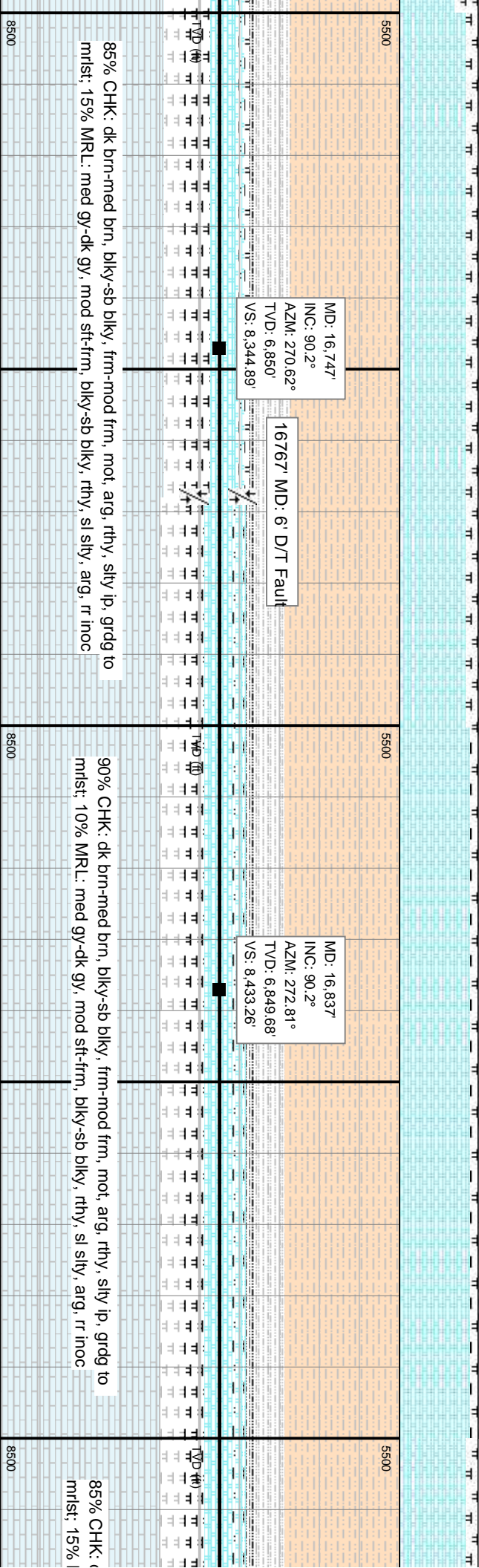
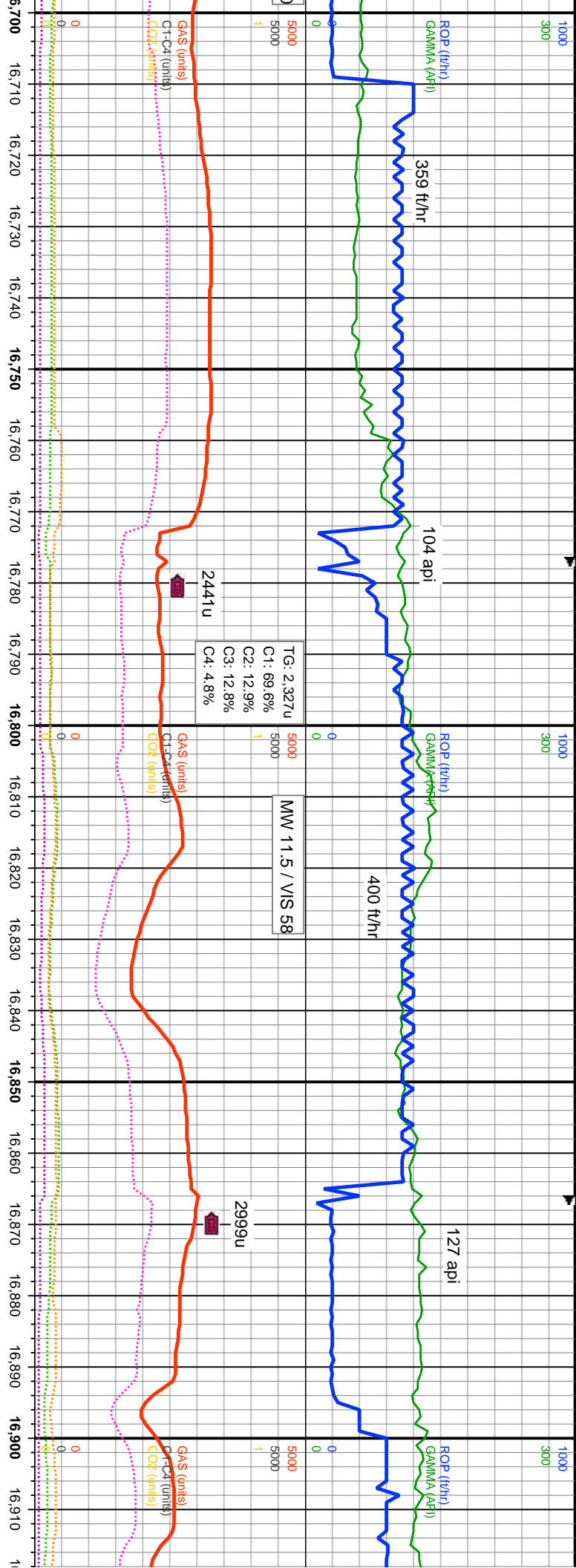
90% CHK: dk brn-dk gy, med brn ip, sb blk-y-blk, frm-mod frm, mot, arg, rthy, grdg to mlst ip: 10% MRL: med gy-dk gy, mod sft-frm, sb blk-y-blk, rthy, sl stly, arg, grdg to dry chk

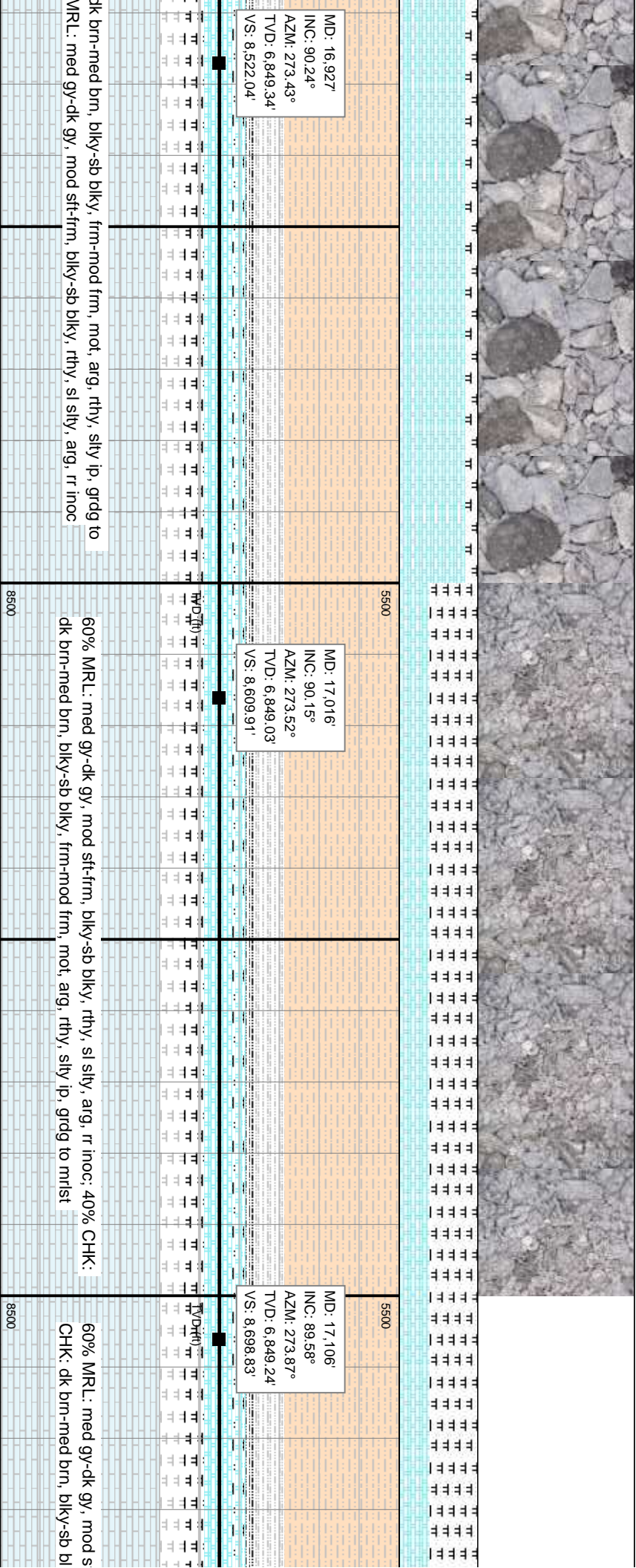
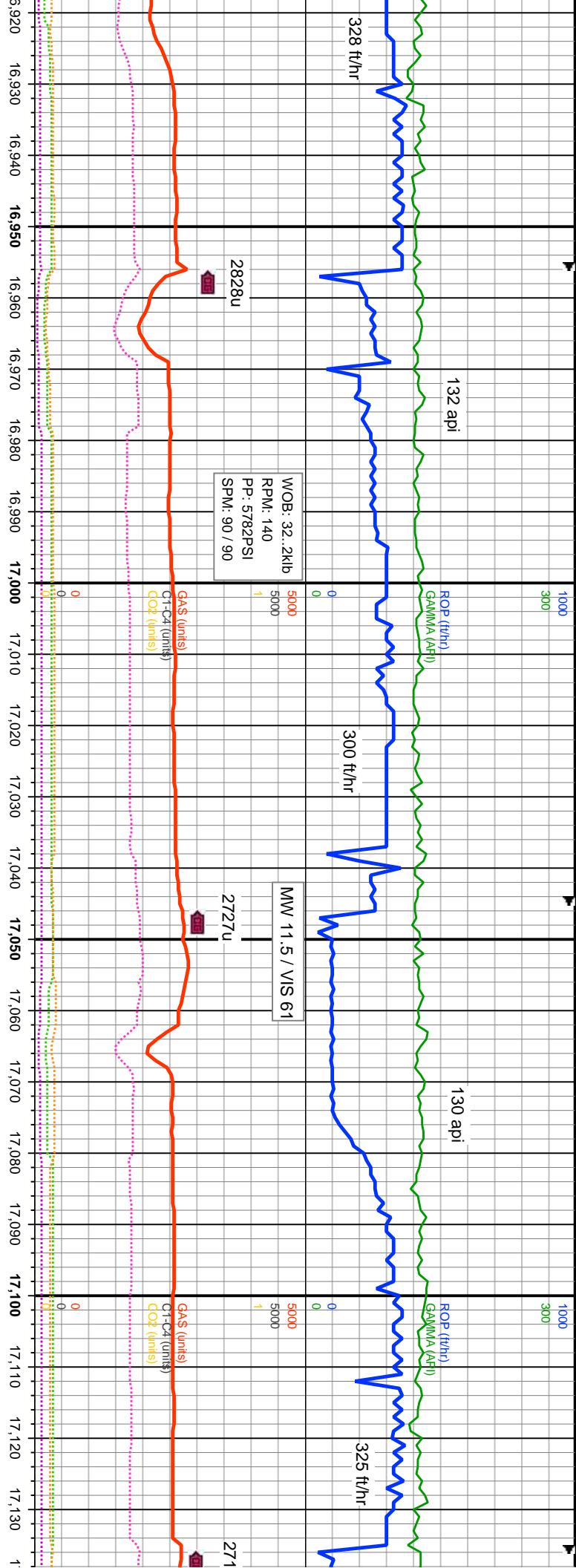
90% CHK: dk brn-med brn, dk gy med gy-dk gy, mod sft-frm, sb blk-y-blk, rthy, sl stly, arg, grdg to dry chk

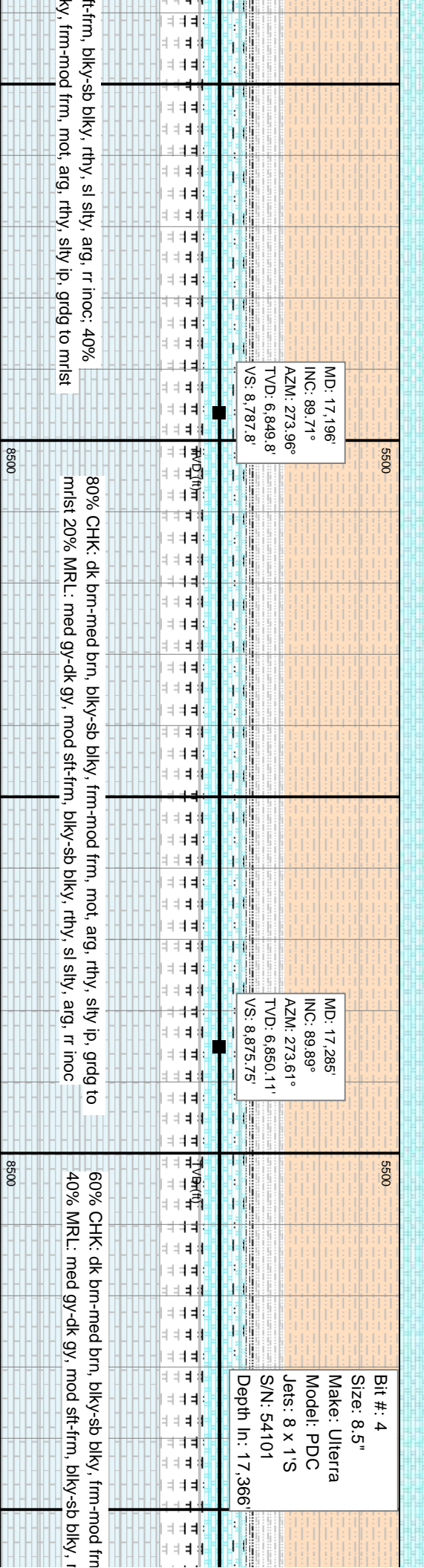
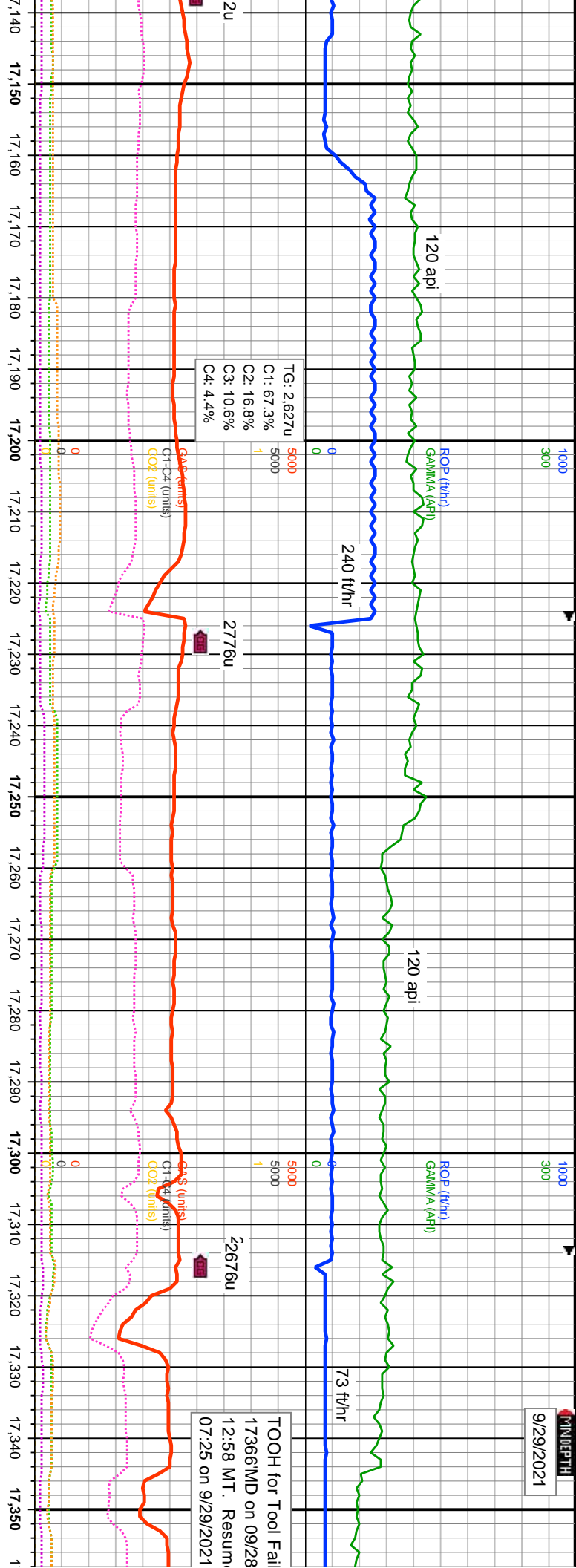


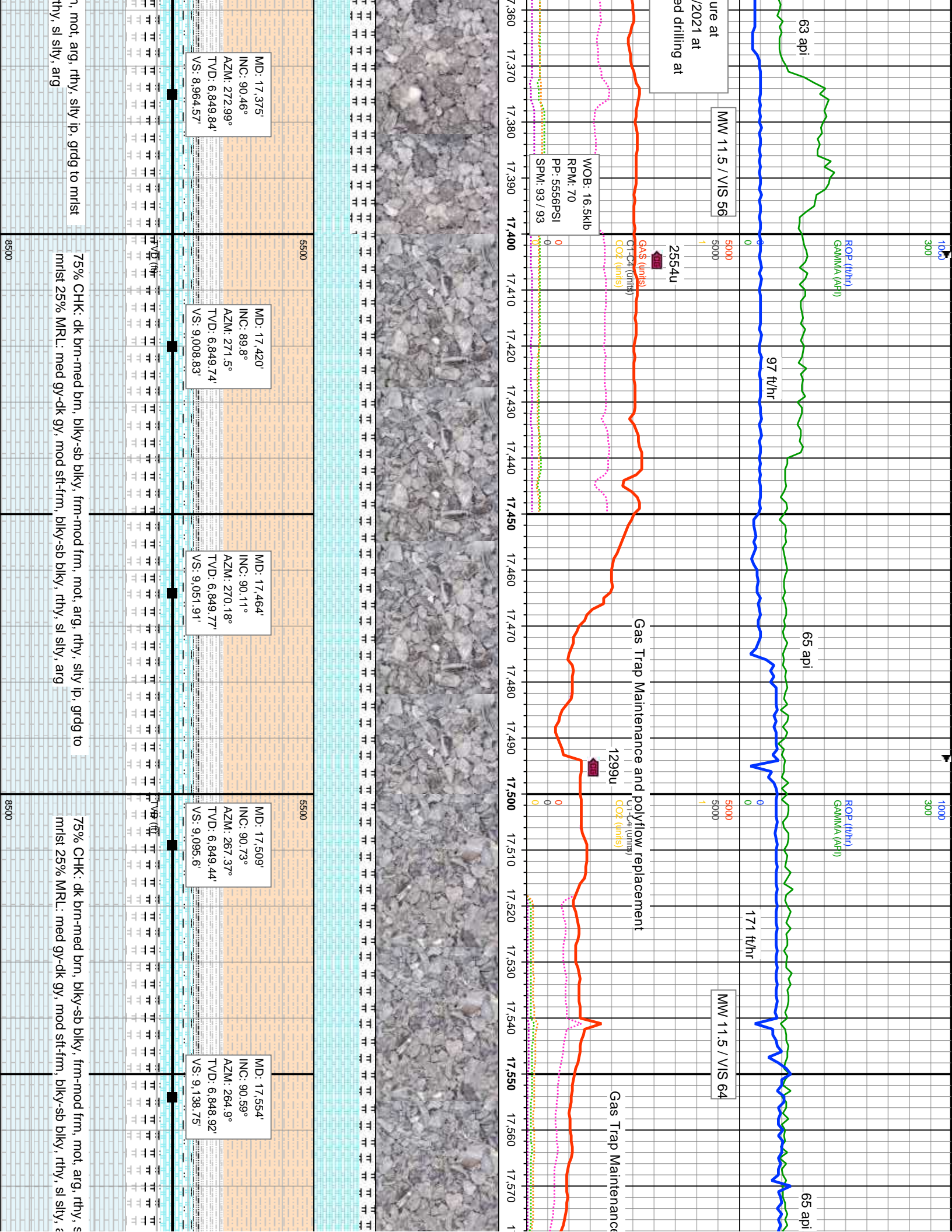


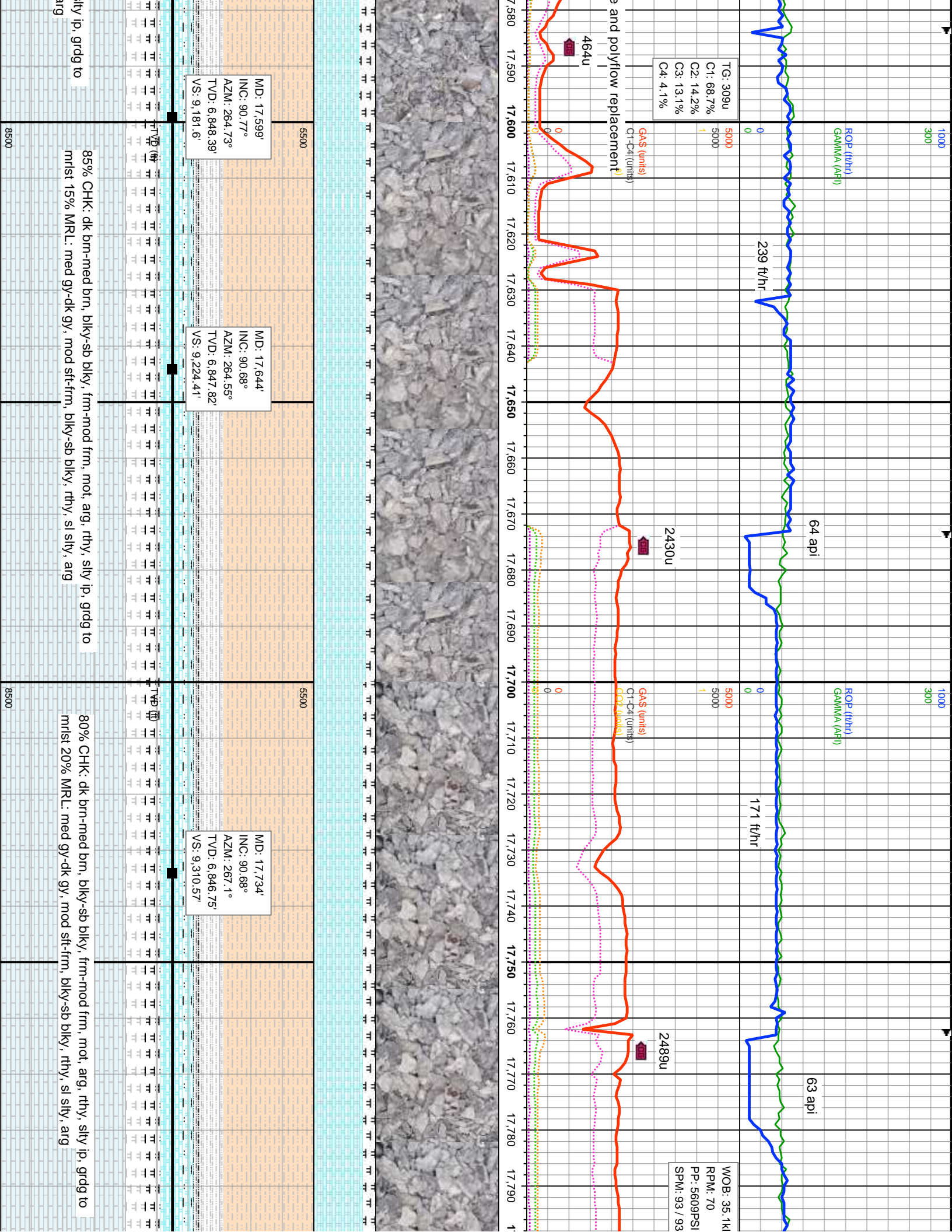


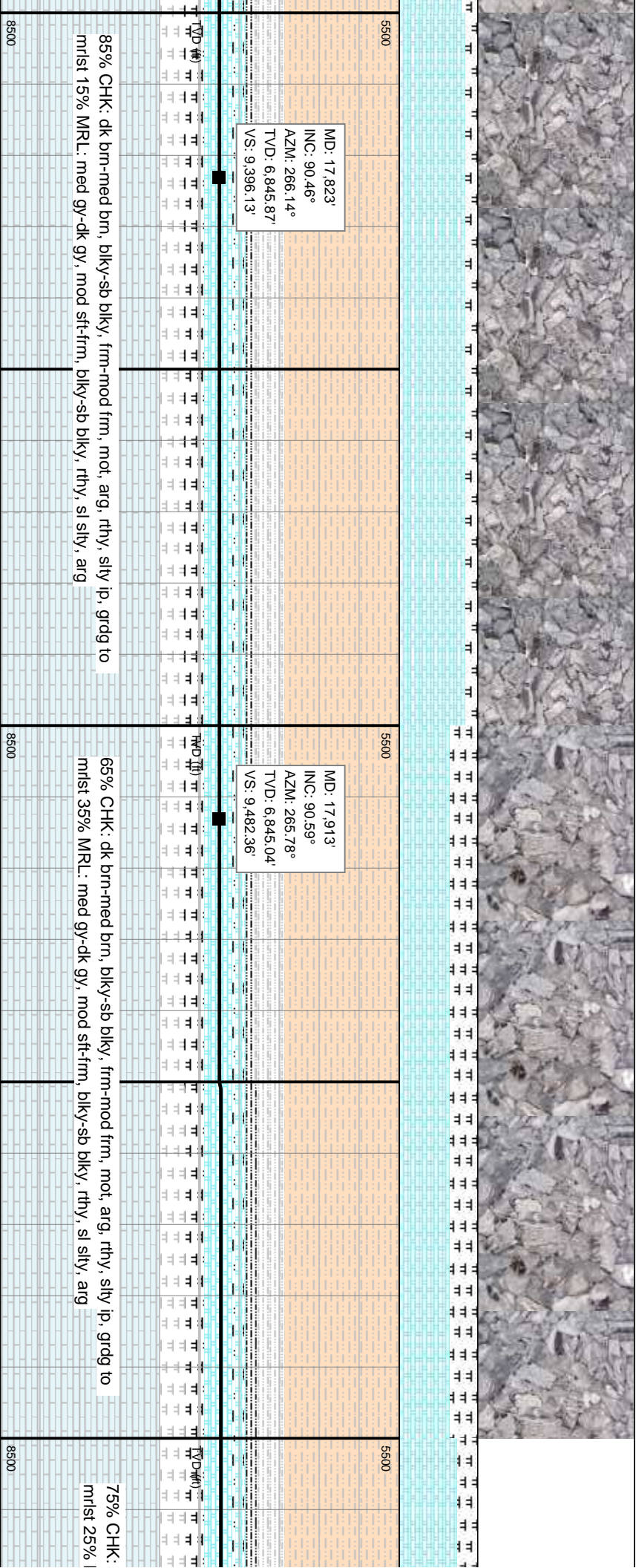
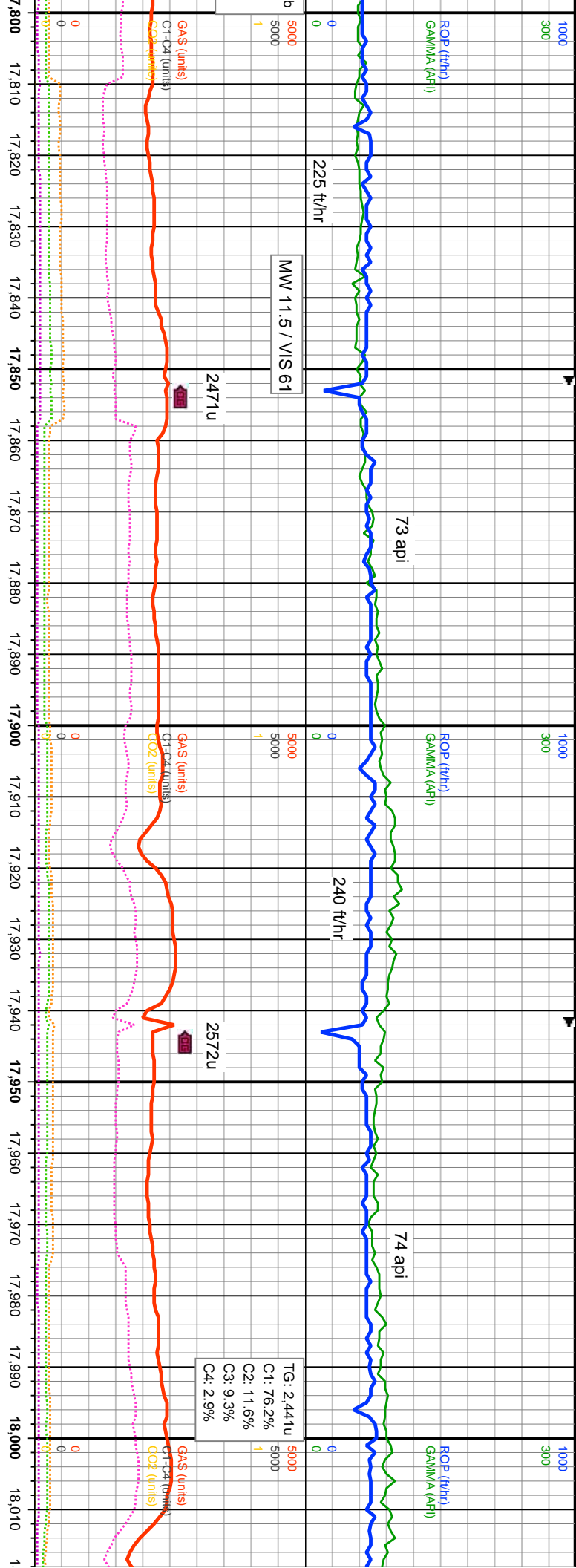








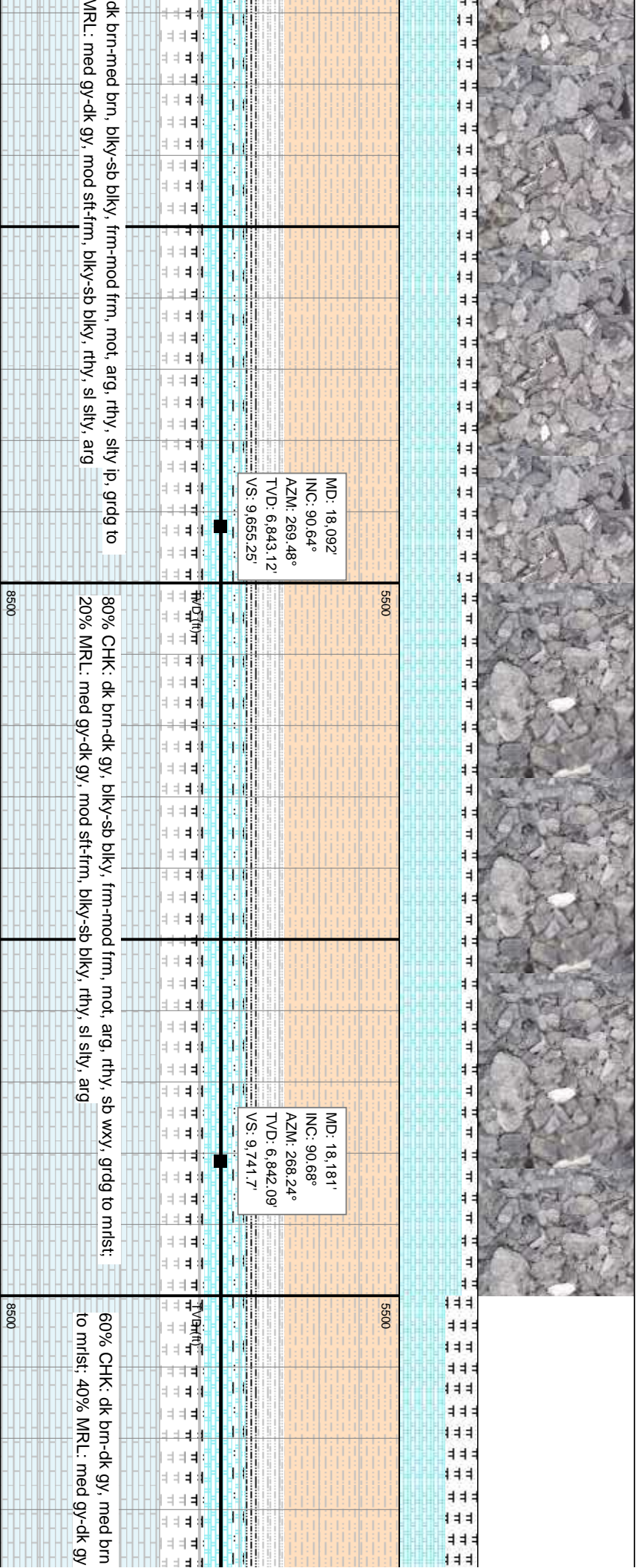
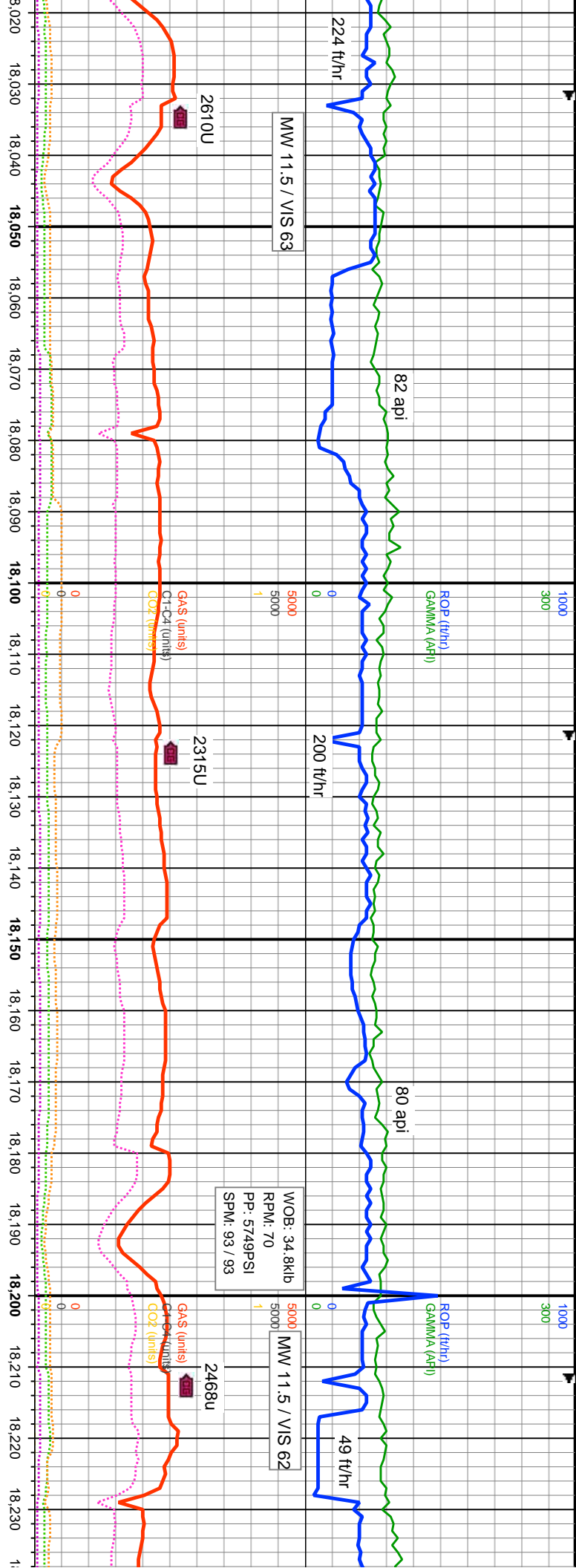


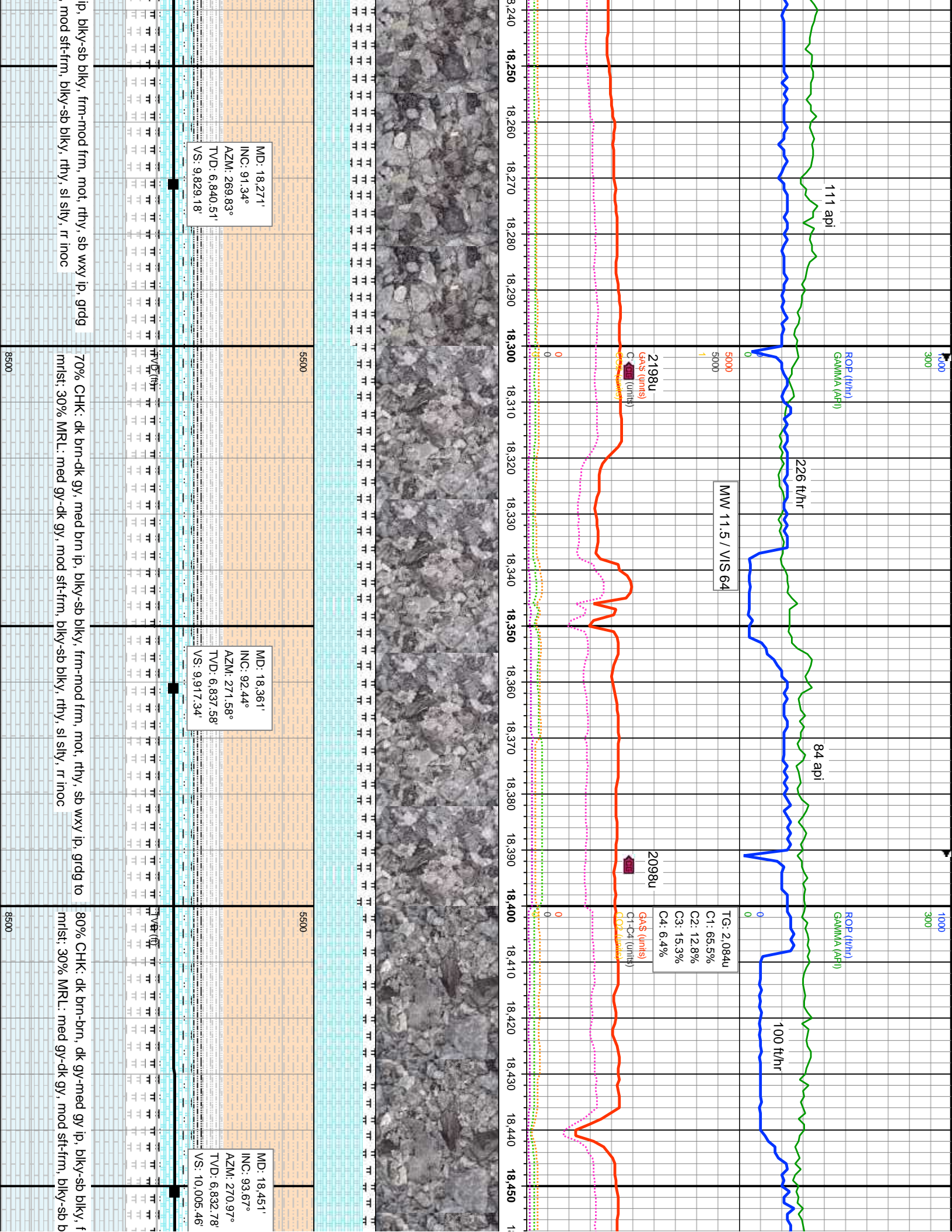


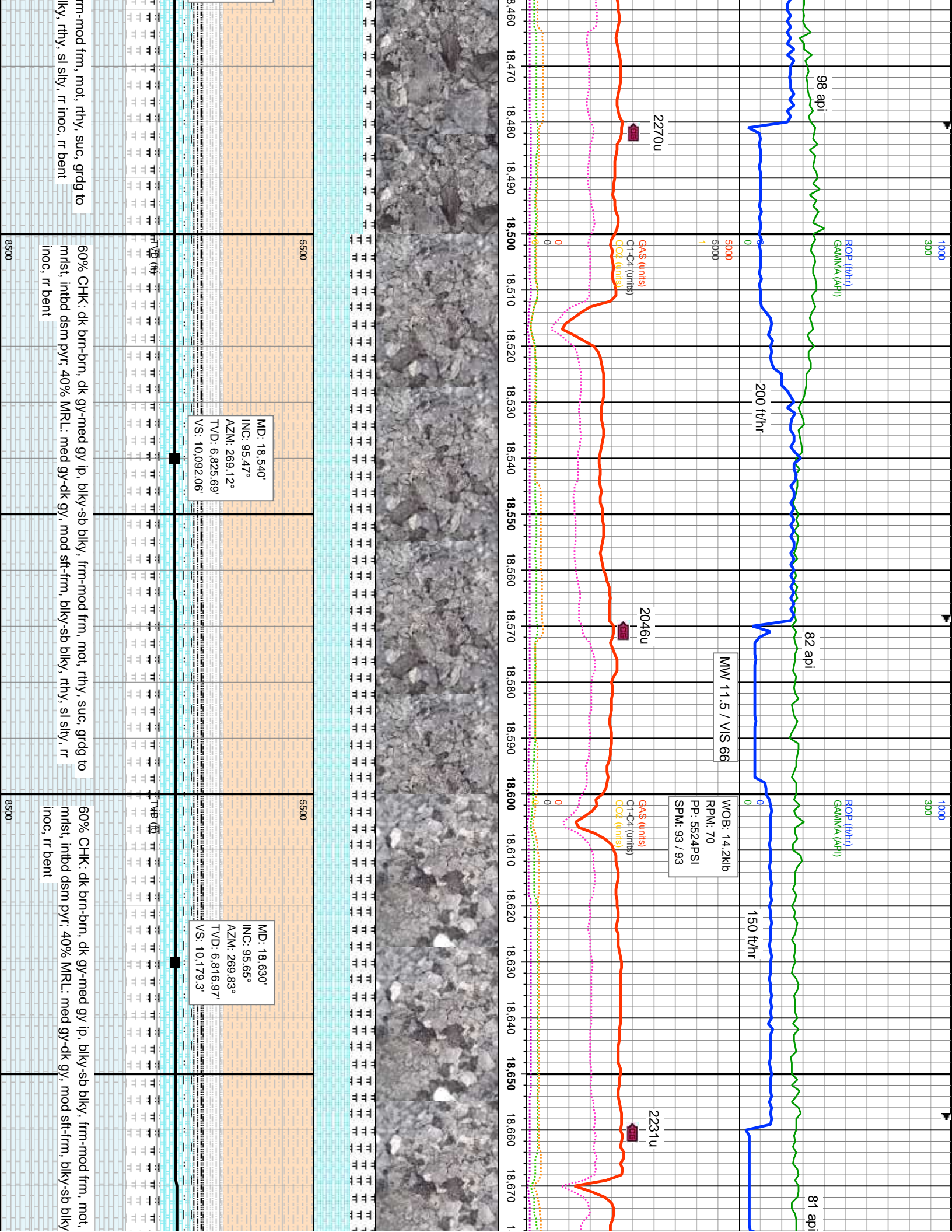
85% CHK: dk brn-med brn, blk-y-sb blk-y, frm-mod frm, mot, arg, rthy, silty ip, grdg to mlst 15% MRL: med gy-dk gy, mod sft-frm, blk-y-sb blk-y, rthy, sl silty, arg

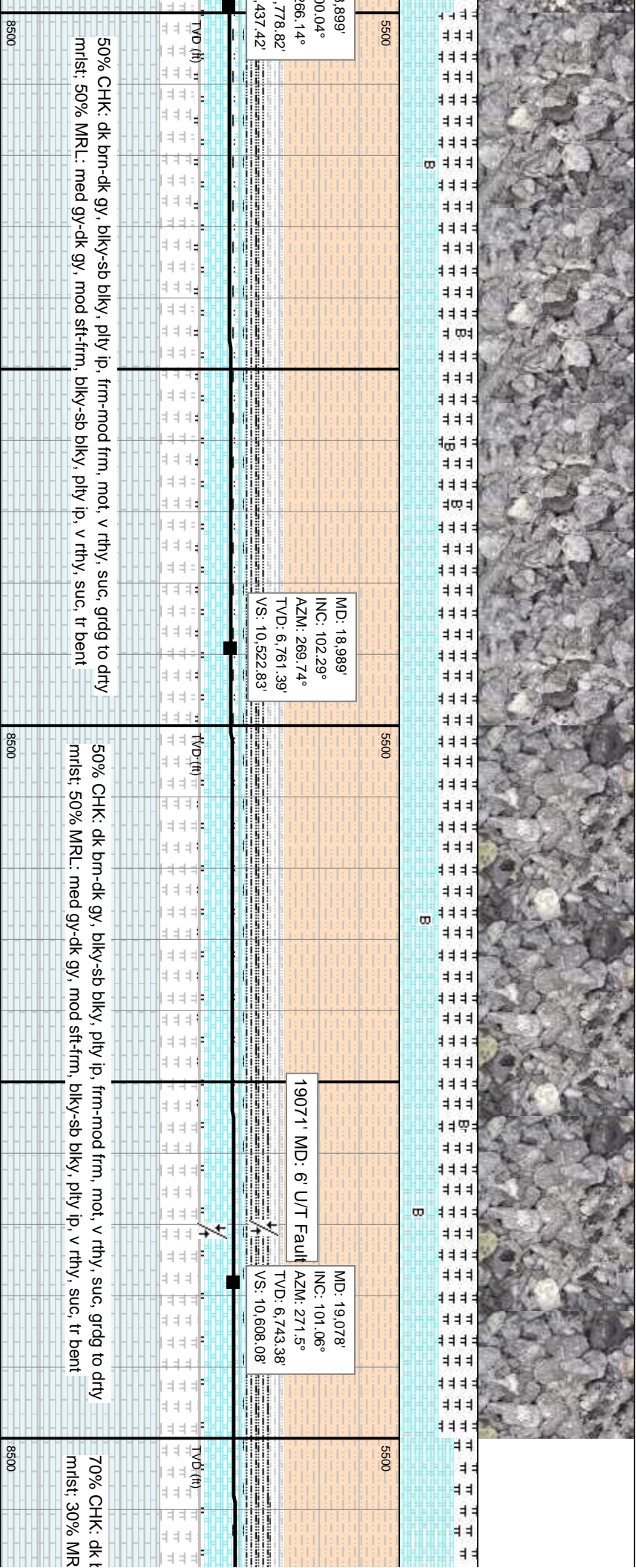
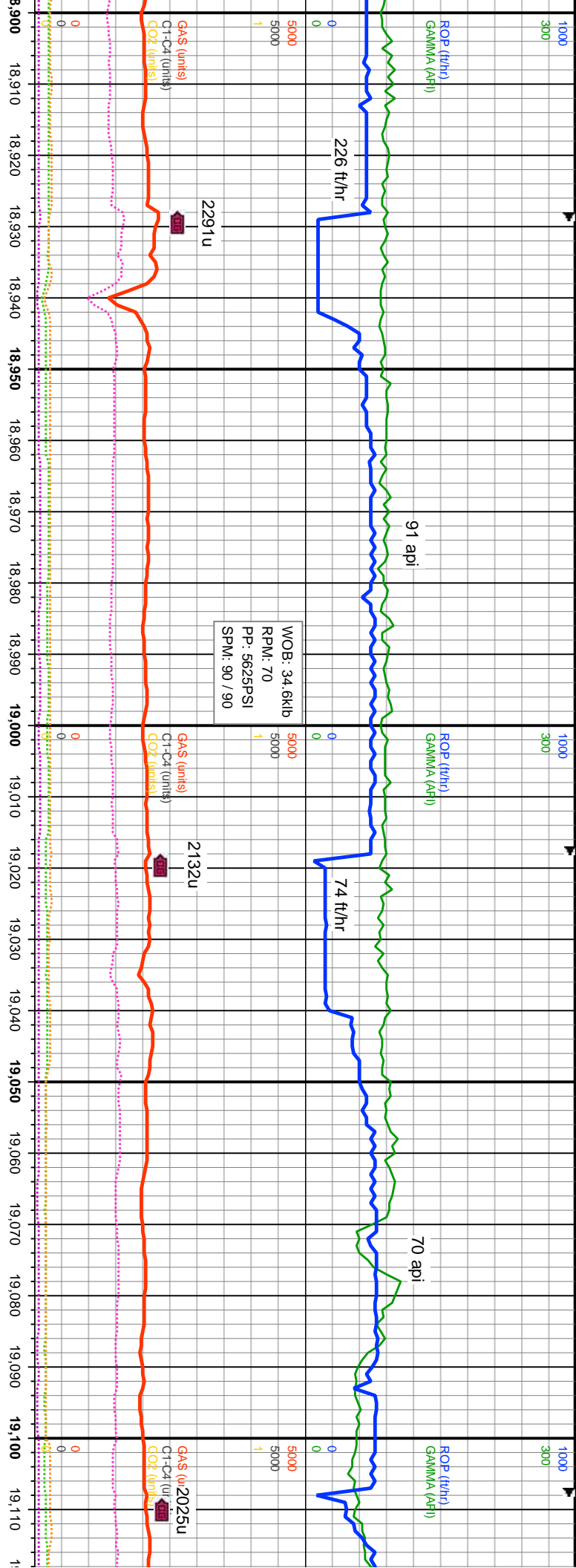
65% CHK: dk brn-med brn, blk-y-sb blk-y, frm-mod frm, mot, arg, rthy, silty ip, grdg to mlst 35% MRL: med gy-dk gy, mod sft-frm, blk-y-sb blk-y, rthy, sl silty, arg

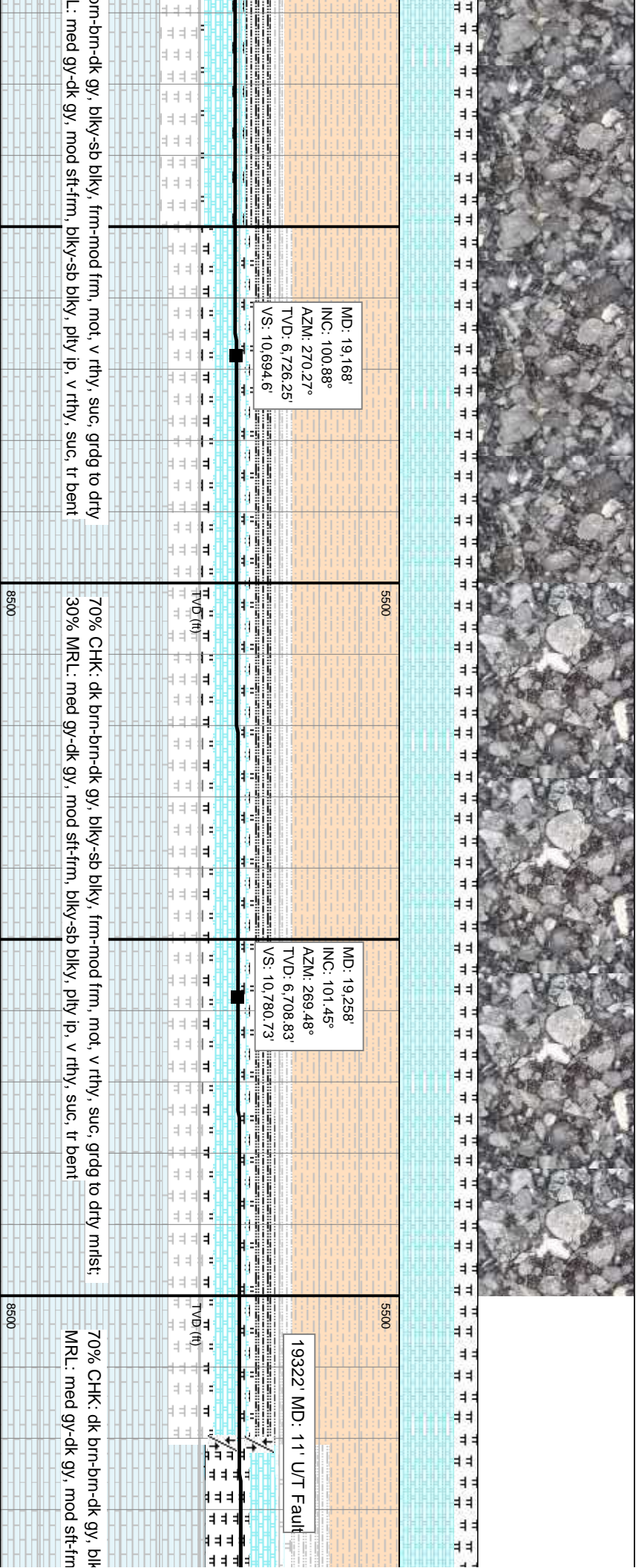
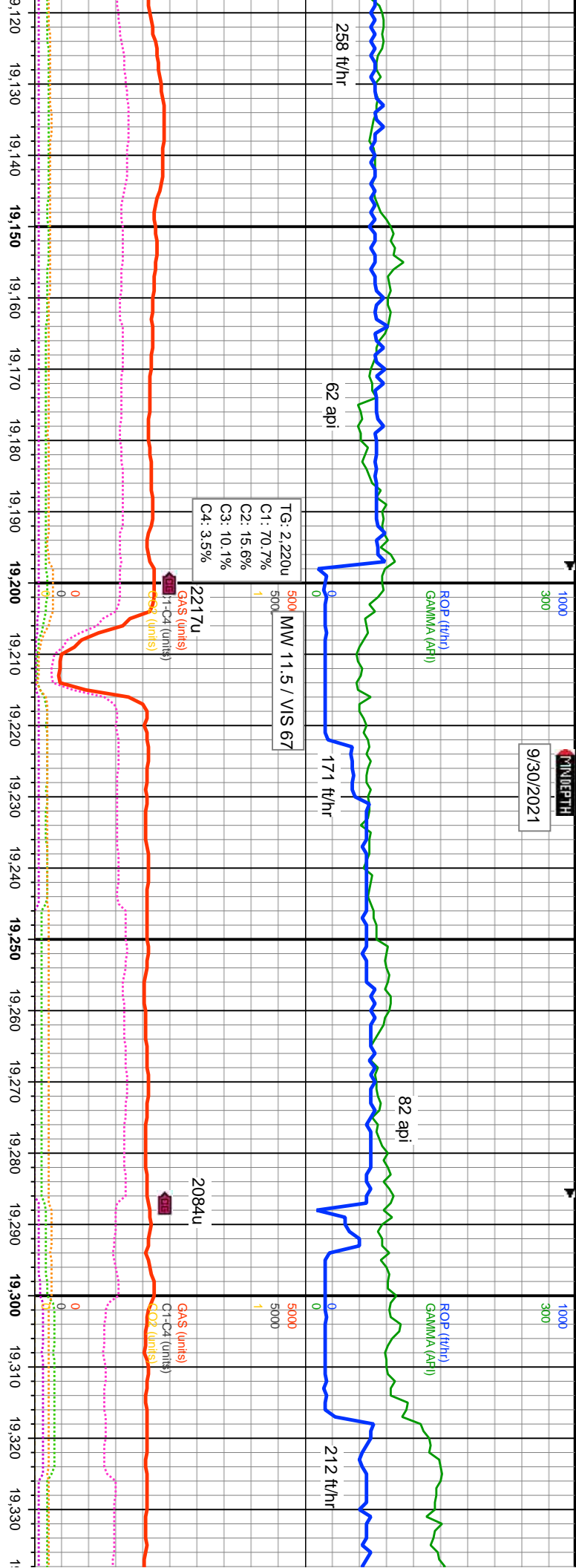
75% CHK: mlst 25%

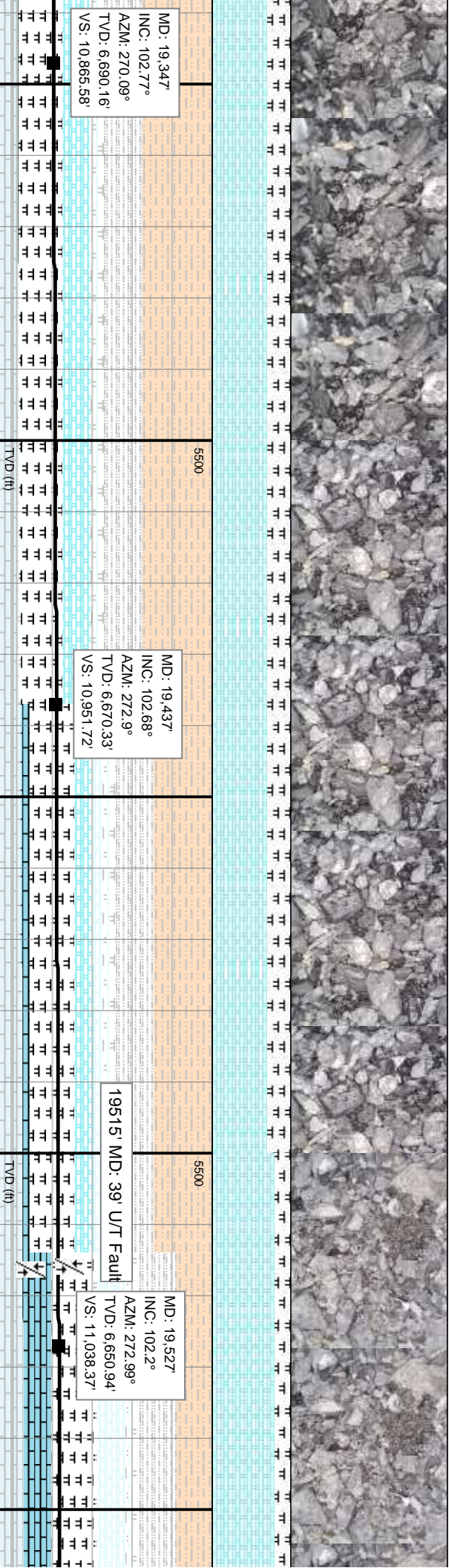
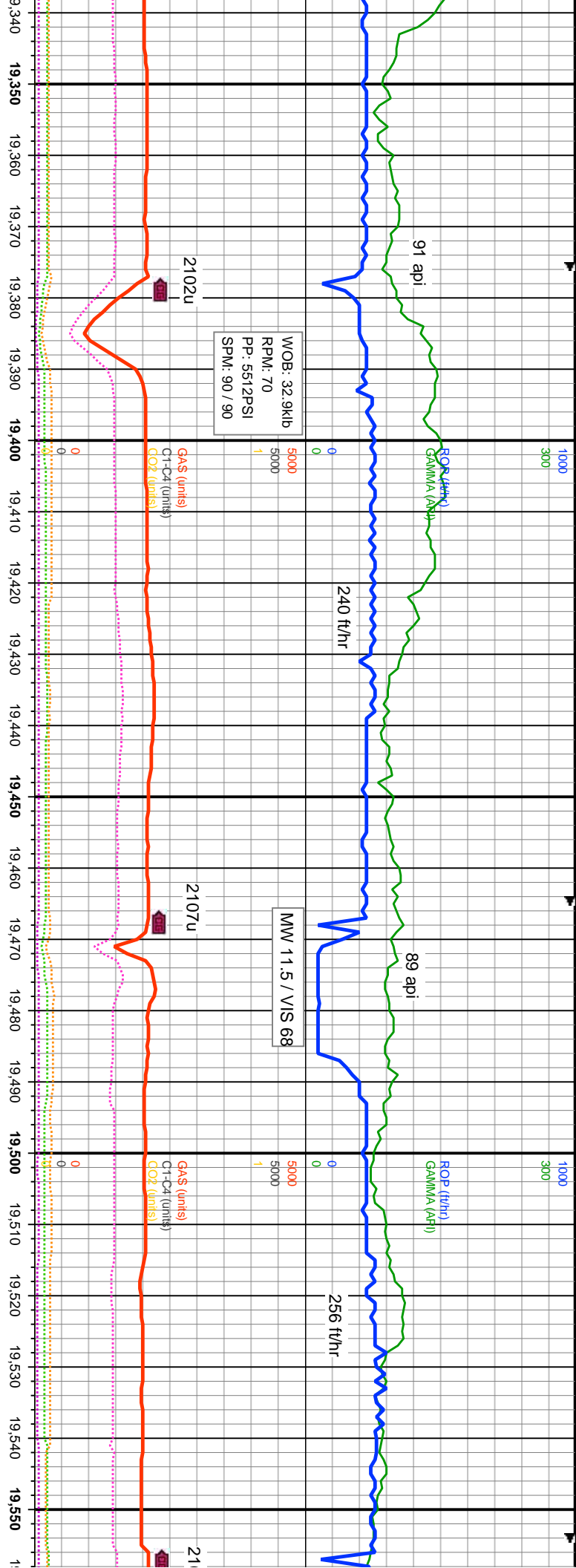












ly-sb blkly, frm-mod frm, mot, v rthy, suc, sb wxy: 30%
n, blkly-sb blkly, ply ip, v rthy, suc, rr bent, rr inoc

70% CHK: dk brn-brn-dk gy, blkly-sb blkly, frm-mod frm, mot, v rthy, suc, sb wxy: 30% MRL: med gy-dk gy, mod sft-frm, blkly-sb blkly, ply ip, v rthy, suc, grdg to drty chk: rr bent, rr inoc

80% CHK: dk brn-dk gy, blkly-sb blkly, ply ip, frm-mo
pyr lam: 20% MRL: med gy-dk gy, mod sft-frm, blkly-
drty chk: rr bent, rr inoc

8500
8500
8500

