



Scale: 5' / 100'  
Measured Depth Log

**Well Name** Raindance FC 23-312HN

**Location** SECTION 30, T6N, R67W

**State** COLORADO

**County** WELD

**Country** UNITED STATES

**Rig Number** PD 462

**API Number** 05123515860000

**AFE #** 20DC0371

**Geographic Region** DJ BASIN

**Field** WATTENBERG

**Ground Elevation** 4788'

**K.B. Elevation** 4808'

**Logged Interval** 6000' MD To 17425

**Total Depth** 17425' MD

**Formation** NIOBRARA B CHALK

**Type of Drilling Fluid** OIL BASED MUD

## Operator

**Company** Great Western Operating Company, LLC

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



Great Western  
PETROLEUM, LLC

## Geologist

**Name** TODD NAKATA, ZACH SOUVALL

**Company** TERRA GUIDANCE, LLC

**Address** 67 W FLOYD AVE  
STE 105  
ENGLEWOOD, CO 80110



Other

MUDLOG START DATE 08/08/2021  
MUDLOG END DATE 08/16/2021

Rock Types

 Chalk  TT  TT  TT  Marl  Silty Shale  Shaly Siltstone

Other Symbols

Engineering

 CONNECTION (RIGHT)  
 CONNECTION GAS  
 FAULT  
 MN DEPTH MN DEPTH

Loggers on Location: 08/09/2021

Logging Depth Reached:

13:53 MT, 08/09/2021

Bloodhound Unit: #5951

Sample Collection/Description Interval:

Curve 50'

Tangent/Lateral 100'

**Drilling Data**

ROP

GAMMA

**Total Gas & Chromatograph**

GAS

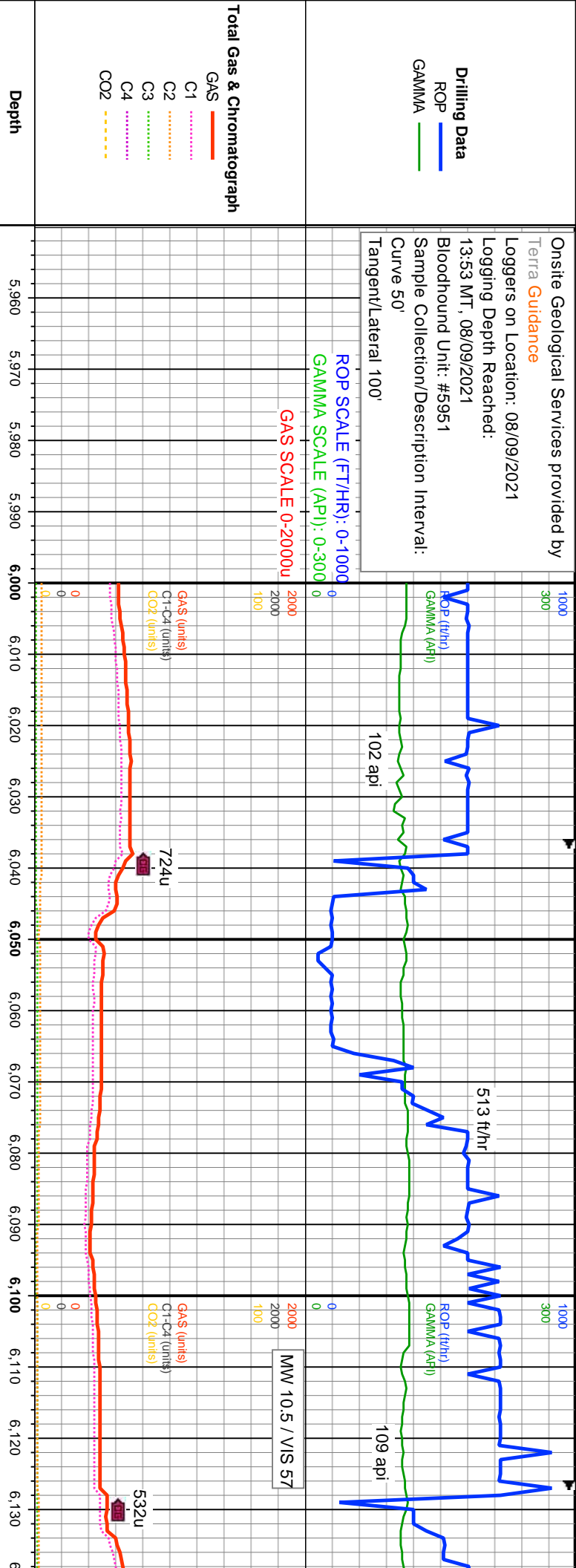
C1

C2

C3

C4

CO2



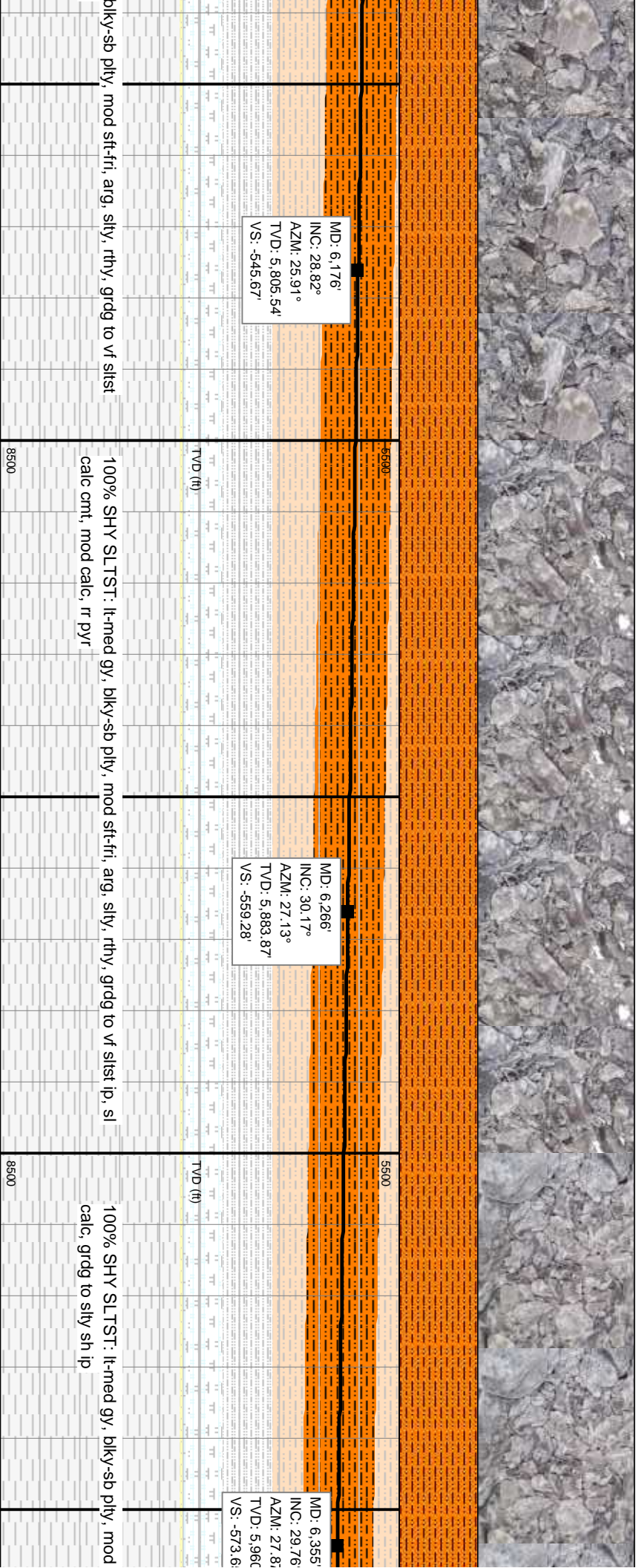
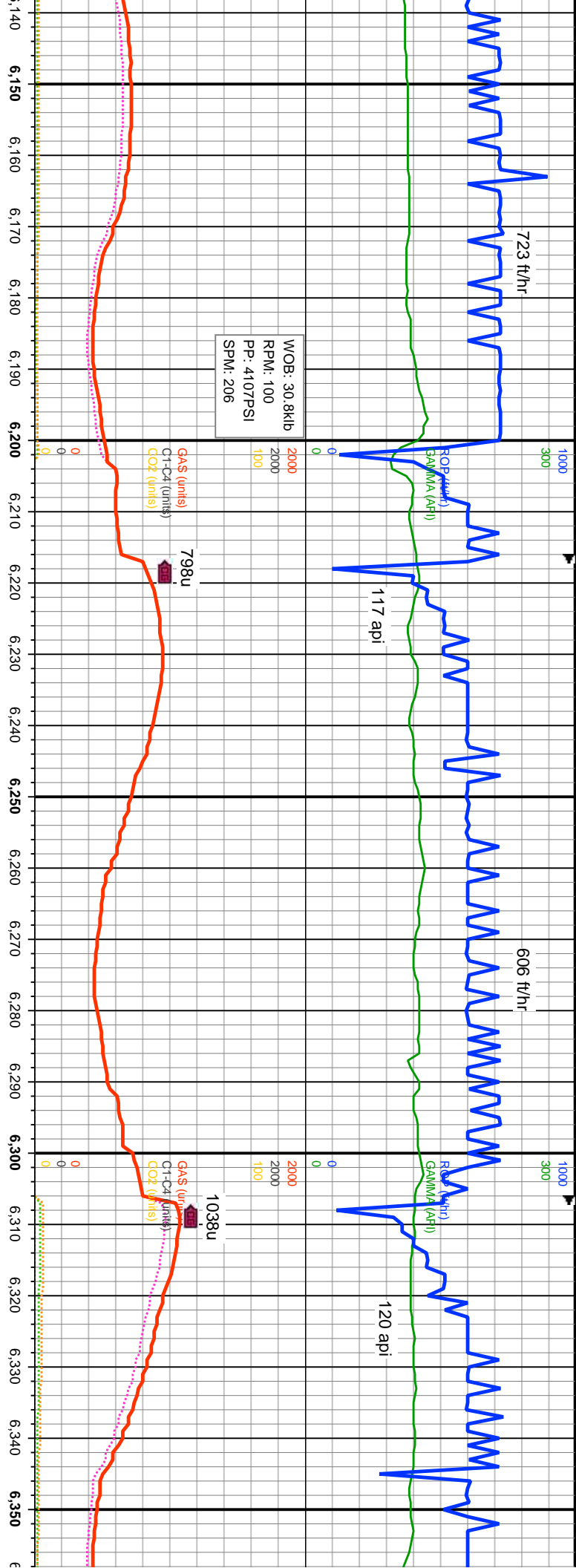
**% Lithology**

Bit #: 1  
Size: 8.5"  
Make: Smith  
Model: PDC Hybrid  
Jets: 2x9 5x10  
S/N: JV5774  
Depth In: 2,065'

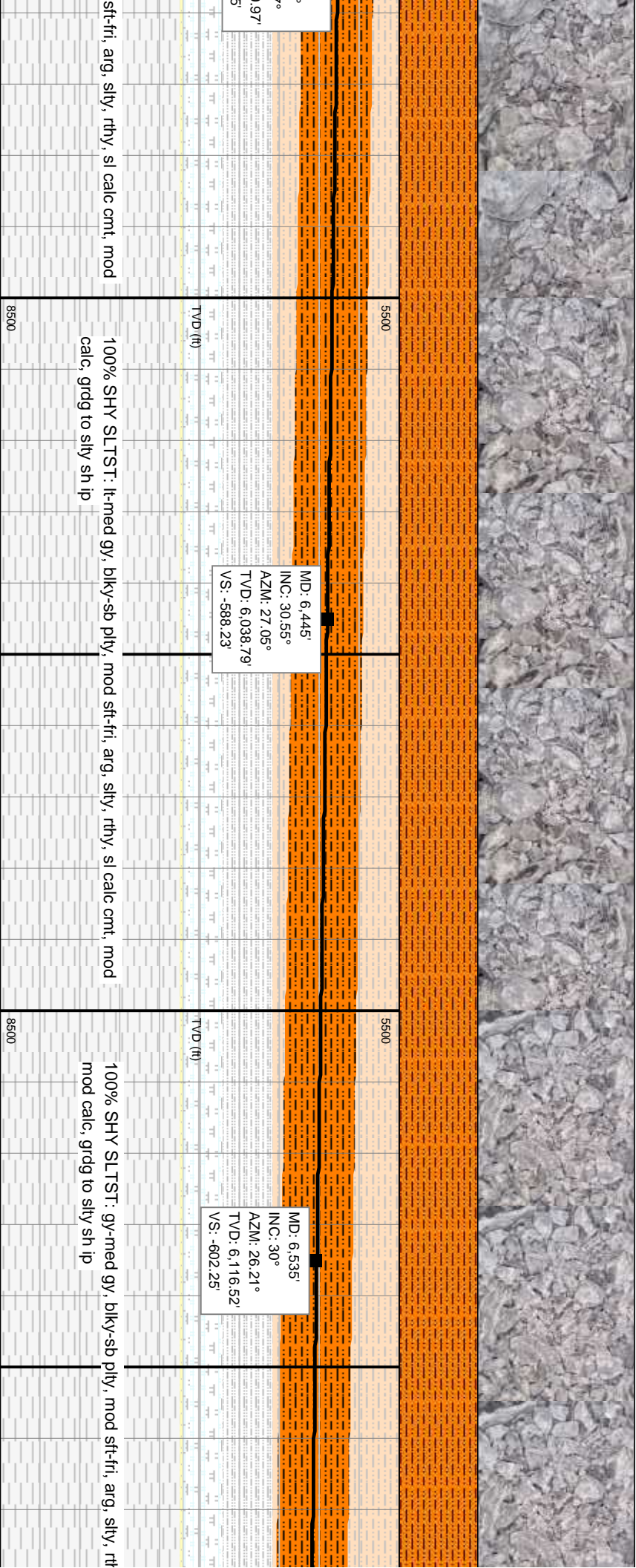
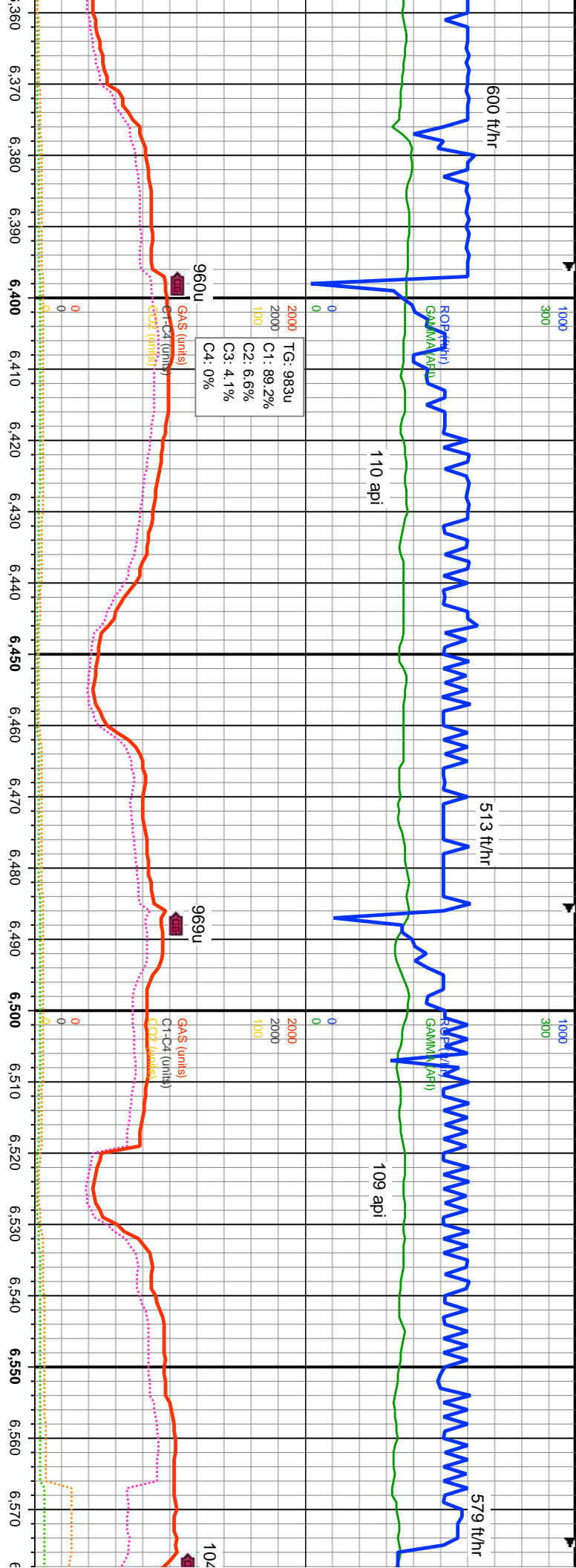
**Well Bore**

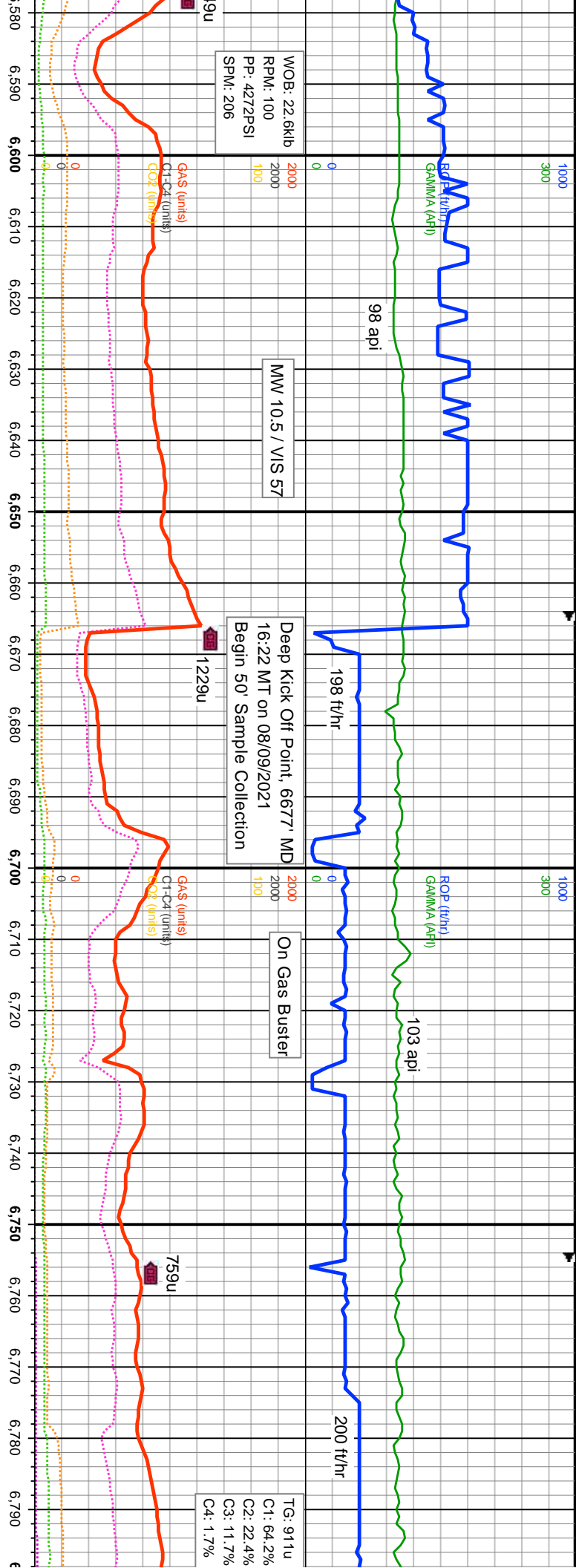
TVD

100% SHY SLTST: lt-med gy, blk-y-sb pty, mod stf-fri, arg, slty, rthy, grdg to vf slstst ip, sl calc cmt, mod calc		100% SHY SLTST: lt-med gy, ip, sl calc cmt, mod calc, rr pyr	
8500	8500	8500	8500



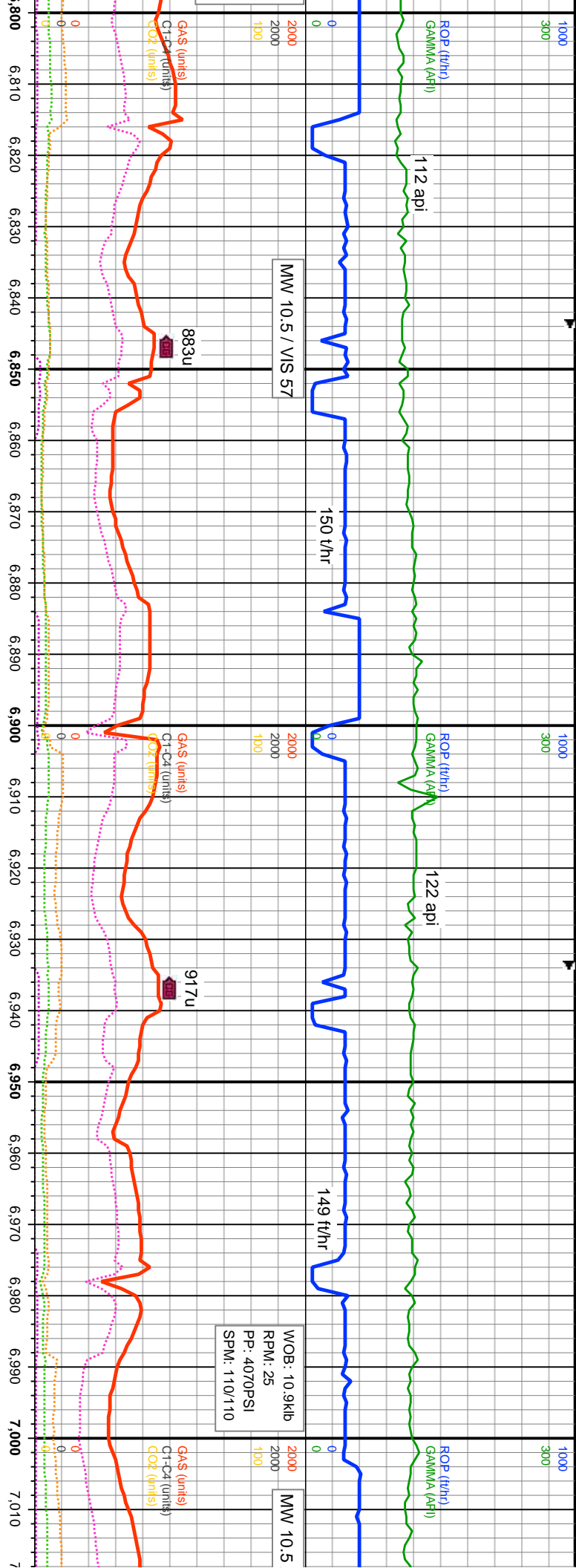




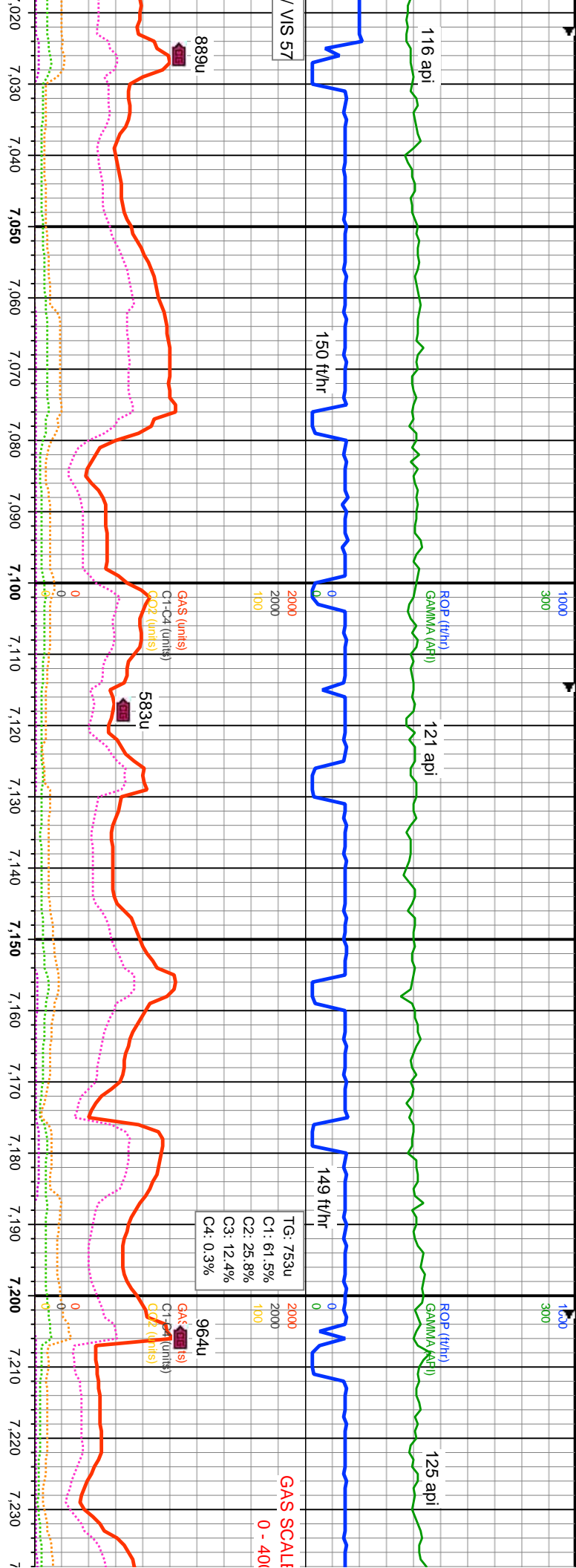


5500	MD: 6.625' INC: 30.23° AZM: 26.61° TVD: 6.194.37' VS: -616.03	90% SHY SLTST: gy-med gy, blkly-sb ppty, med gr ip, mod sft-fri, arg, slty, rthy, sl calc
5500	MD: 6.714' INC: 30.53° AZM: 21.37° TVD: 6.271.17' VS: -627.92	90% SHY SLTST: lt-med gy, lt brn ip, sb blkly-sb ppty, mod sft-fri, arg, slty, rthy, grdg to vf slst ip, sl calc cmt, sl calc; 10% SLTY SH: med-dkgy, dk gysbhn, mod sft-sl frm, ip brt, sb blkly-ang, rr ppty, com fis, slty, arg, v sl calc
6773	MD: 12' D/T Fault	80% SHY SLTST: lt-med gy, lt brn ip, sb blkly-sb ppty, mod sft-fri, arg, slty, rthy, grdg to vf slst ip, sl calc cmt, sl calc; 20% SLTY SH: med-dkgy, dk gysbhn, mod sft-sl frm, ip brt, sb blkly-ang, rr ppty, com fis, slty, arg, v sl calc



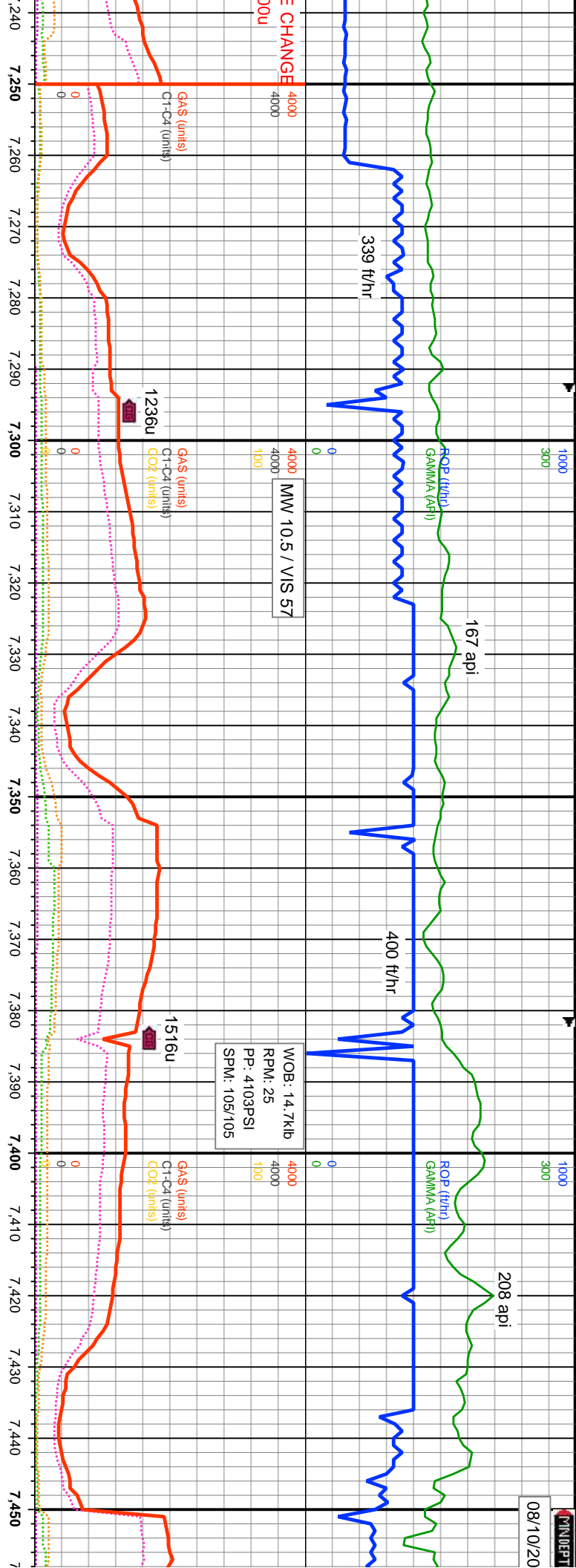


75% SHY SLTST: lt-med gy, lt brn ip, sb blkly-sb pily, mod sft-fri, arg, silty, rthy, grdg to vf slst ip, sl calc cnt, sl calc; 25% SLTY SH: med-dkgy, dk gyshbn, mod sft-sl frm, ip brt, sb blkly-ang, rr pily, com fis, silty, arg, v sl calc	60% SHY SLTST: lt-med gy, lt brn ip, sb blkly-sb pily, mod sft-fri, arg, silty, rthy, grdg to vf slst ip, sl calc cnt, sl calc; 40% SLTY SH: med-dkgy, dk gyshbn, mod sft-sl frm, ip brt, sb blkly-ang, rr pily, com fis, silty, arg, v sl calc	50% SHY SLTST: lt-med gy, lt brn ip, sb blkly-sb pily, mod sft-fri, arg, silty, rthy, grdg to vf slst ip, sl calc cnt, sl calc; 50% SLTY SH: med-dkgy, dk gyshbn, mod sft-sl frm, ip brt, sb blkly-ang, rr pily, com fis, silty, arg, v sl calc	60% SLTY SH: med-dkgy, dk gyshbn, mod sft-sl frm, ip brt, sb blkly-ang, rr pily, com fis, silty, arg, v sl calc	65% SLTY SH: sft-sl frm, ip brt, sb blkly-ang, rr pily, com fis, silty, arg, v s lt-med gy, lt brn sft-fri, arg, silty, calc cnt, sl calc
MD: 6,804' NC: 30.41° AZM: 10.41° TVD: 6,348.8' VS: -633.67'	MD: 6,894' INC: 30.47° AZM: 352.93° TVD: 6,426.55' VS: -628.18'	MD: 6,983' INC: 30.41° AZM: 336.27° TVD: 6,503.42' VS: -609.98'		

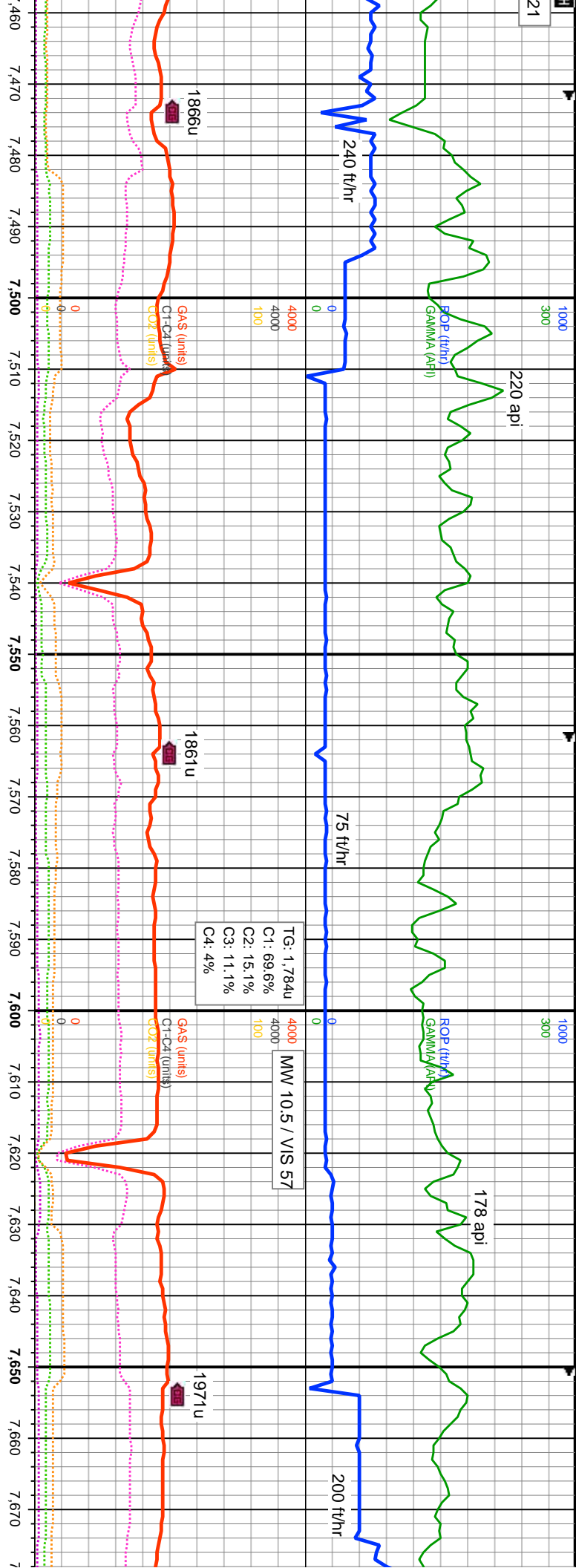
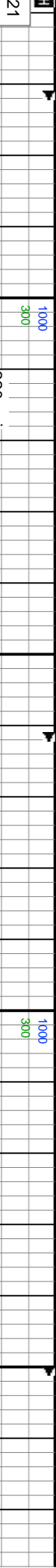


med-dkgy, dk gysbhn, mod sb blkgy-ang, rr pily, com l calc; 35% SHY SLTST: ip, sb blkgy-sb pily, mod rthy, grdg to vf slst ip, sl	75% SLTY SH: med-dkgy, dk gysbhn, mod sft-sl frm, ip brit, sb blkgy-ang, rr pily, com fis, silty, arg, v sl calc; 25% SHY SLTST: lt-med gy, lt brn ip, sb blkgy-sb pily, mod sft-frt, arg, silty, rthy, grdg to vf slst ip, sl calc cmt, sl calc	85% SLTY SH: med-dkgy, dk gysbhn, mod sft-sl frm, ip brit, sb blkgy-ang, rr pily, com fis, silty, arg, v sl calc; 15% SHY SLTST: lt-med gy, lt brn ip, sb blkgy-sb pily, mod sft-frt, arg, silty, rthy, grdg to vf slst ip, sl calc cmt, sl calc	90% SLTY SH: med-dkgy, dk gysbhn, mod sft-sl frm, ip brit, sb blkgy-ang, rr pily, com fis, silty, arg, v sl calc; 10% SHY SLTST: lt-med gy, lt brn ip, sb blkgy-sb pily, mod sft-frt, arg, silty, rthy, grdg to vf slst ip, sl calc cmt, sl calc	100% SLTY SH: med-dkgy, dk gysbhn, mod sft-sl frm, ip brit, sb blkgy-ang, rr pily, com fis, silty, arg, v sl calc; TR SHY SLTST: lt-med gy, lt brn ip, sb blkgy-sb pily, mod sft-frt, arg, silty, rthy, grdg to vf slst ip, sl calc cmt, sl calc
	MD: 7,073' INC: 31.06° AZM: 323.06° TVD: 6,580.87' VS: -581.17'		MD: 7,163' INC: 36.2° AZM: 311.71° TVD: 6,655.85' VS: -542.25'	
	5500	5500	5500	5500
	TVD (ft)	TVD (ft)	TVD (ft)	TVD (ft)
	7241' N			





MD: 7.253 INC: 42.65° AZM: 299.65° TVD: 6,725.44' VS: -491.39'		TVD SCALE CHANGE 6700' - 7100'		MD: 7.342 INC: 46.14° AZM: 289.04° TVD: 6,789.11' VS: -431.58'		MD: 7.432 INC: 49.15° AZM: 285.12° TVD: 6,849.74' VS: -365.81'	
100% SLTY SH: med-dkgy, dk gysbhn, r pty, mod sft-sl frm, ip brit, sb blk-ang, r pty, com fis, slty, arg, v sl calc: TR SHY SLTST		1100% SLTY SH: med-dkgy, dk gysbhn, r pty, mod sft-sl frm, ip brit, sb blk-ang, r pty, com fis, slty, arg, v sl calc		90% SLTY SH: med-dkgy, dk gysbhn, mod sft-sl frm, ip brit, sb blk-ang, r pty, com fis, slty, arg, v sl calc: 10% MRL: med-dkbn, dkgy, mod sft-sl frm, sb blk-ang, rthy, sl slty, arg, calc		75% MRL: med-dkbn, dkgy, mod sft-sl frm, sb blk-sb ang, rthy, sl slty, arg, calc, v r bent, 20% SLTY SH: med-dkgy, dk gysbhn, mod sft-sl frm, ip brit, sb blk-ang, r pty, com fis, slty, arg, v sl calc: 5% CHK: medgy-gysbhn, drty brn, tr intbd mrl, mod sft-frt, sb blkgy, rthy-sb wxy, v calc	
ID: 7' D/T Fault							



MRL: med-dkbn, dkgy, mod sft-sl frm, v-sb ang, rthy, sl silty, arg, calc, r	75% MRL: med-dkbn, dkgy, mod sft-sl frm, sb blk-y-sb ang, rthy, sl silty, arg, calc, r	65% MRL: med-dkbn, dkgy, mod sft-sl frm, sb blk-y-sb ang, rthy, sl silty, arg, calc, r	70% MRL: med-dkbn, dkgy, mod sft-sl frm, sb blk-y-sb ang, rthy, sl silty, arg, calc, r	55% MRL: med-dkbn, dkgy, mod sft-sl frm, sb blk-y-sb ang, rthy, sl silty, arg, calc, r
10% CHK: medgy-gyshbn, drty brn, tr	bent: 25% CHK: medgy-gyshbn, drty brn, tr	bent: 35% CHK: medgy-gyshbn, drty brn, tr	bent: 30% CHK: medgy-gyshbn, drty brn, tr	bent: 45% CHK: medgy-gyshbn, drty brn, tr
mod sft-fri, sb blk-y, rthy-sb wxy, v	intbd mrl, mod sft-fri, sb blk-y, rthy-sb wxy, v	intbd mrl, mod sft-fri, sb blk-y, rthy-sb wxy, v	intbd mrl, mod sft-fri, sb blk-y, rthy-sb wxy, v	intbd mrl, mod sft-fri, sb blk-y, rthy-sb wxy, v
calc: TR SLTY SH	calc	calc	calc	calc

MD: 7.522'  
INC: 54.33°  
AZM: 284.35°  
TVD: 6,905.45'  
VS: -295.56'

MD: 7.611'  
INC: 63.5°  
AZM: 283.84°  
TVD: 6,951.35'  
VS: -219.77'

TVD SCALE CHANGE  
6900' - 7300'

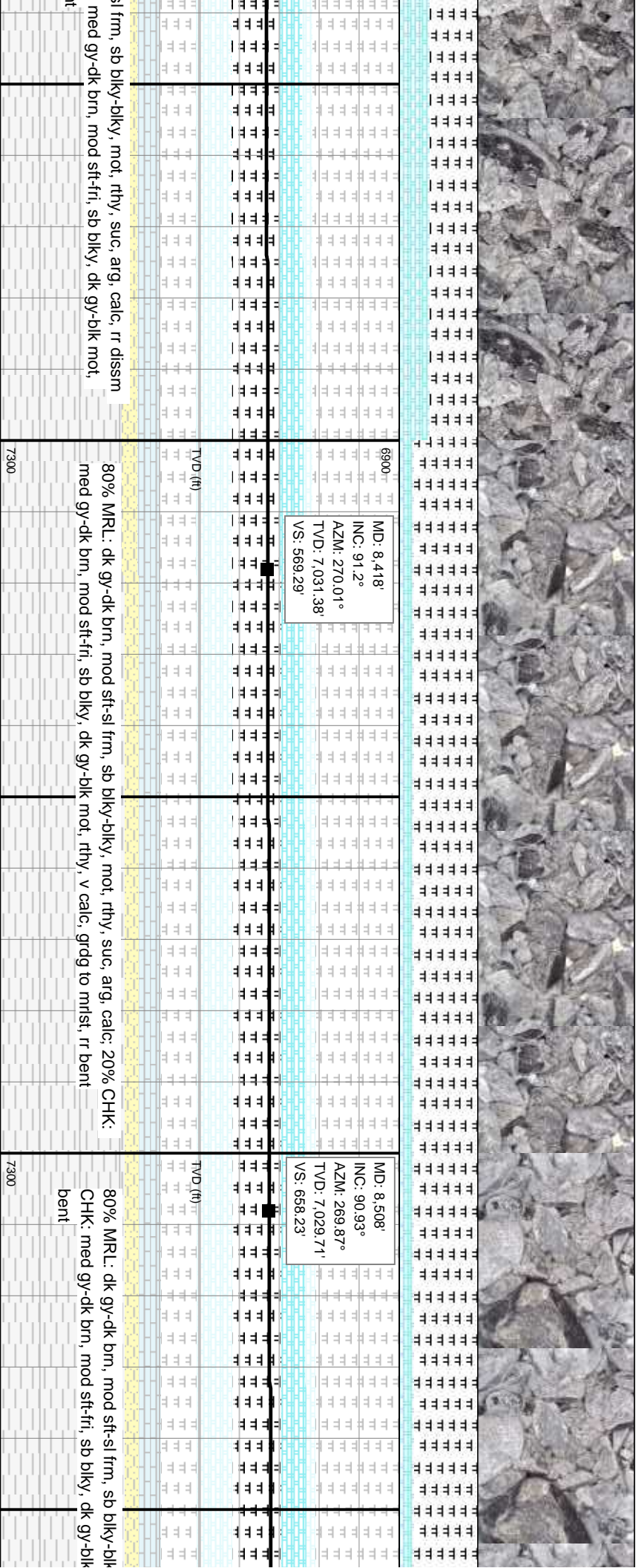
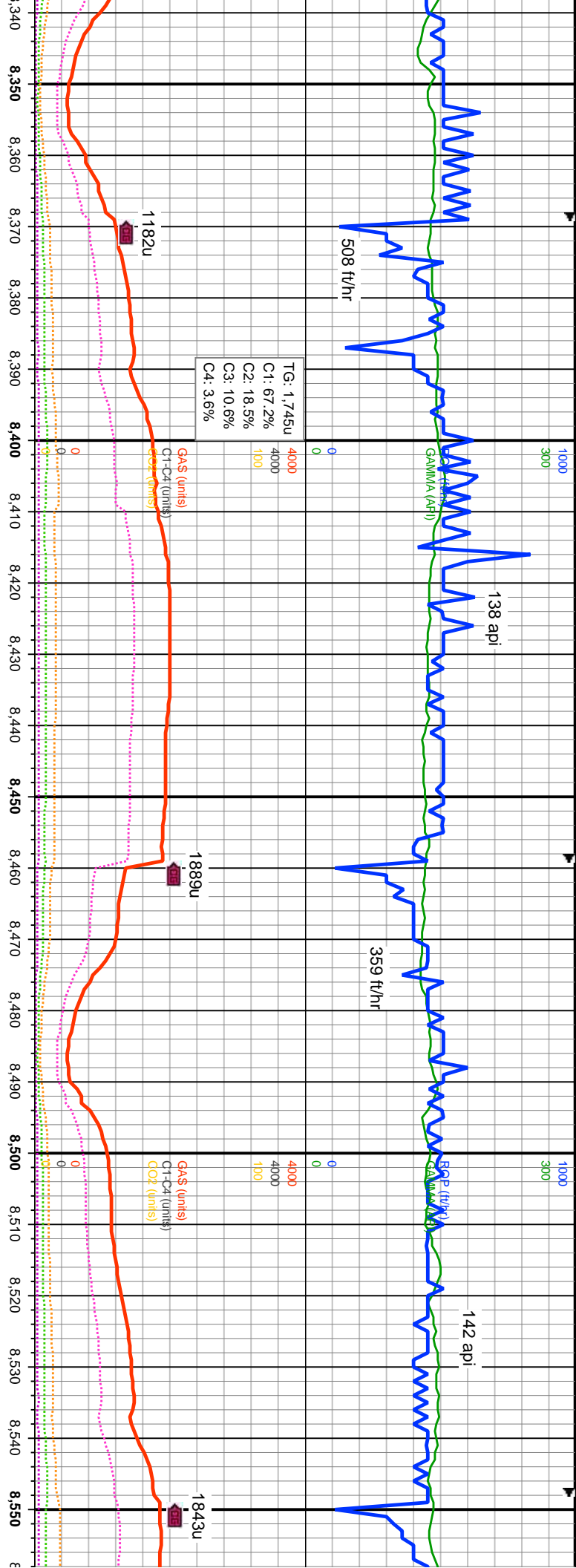




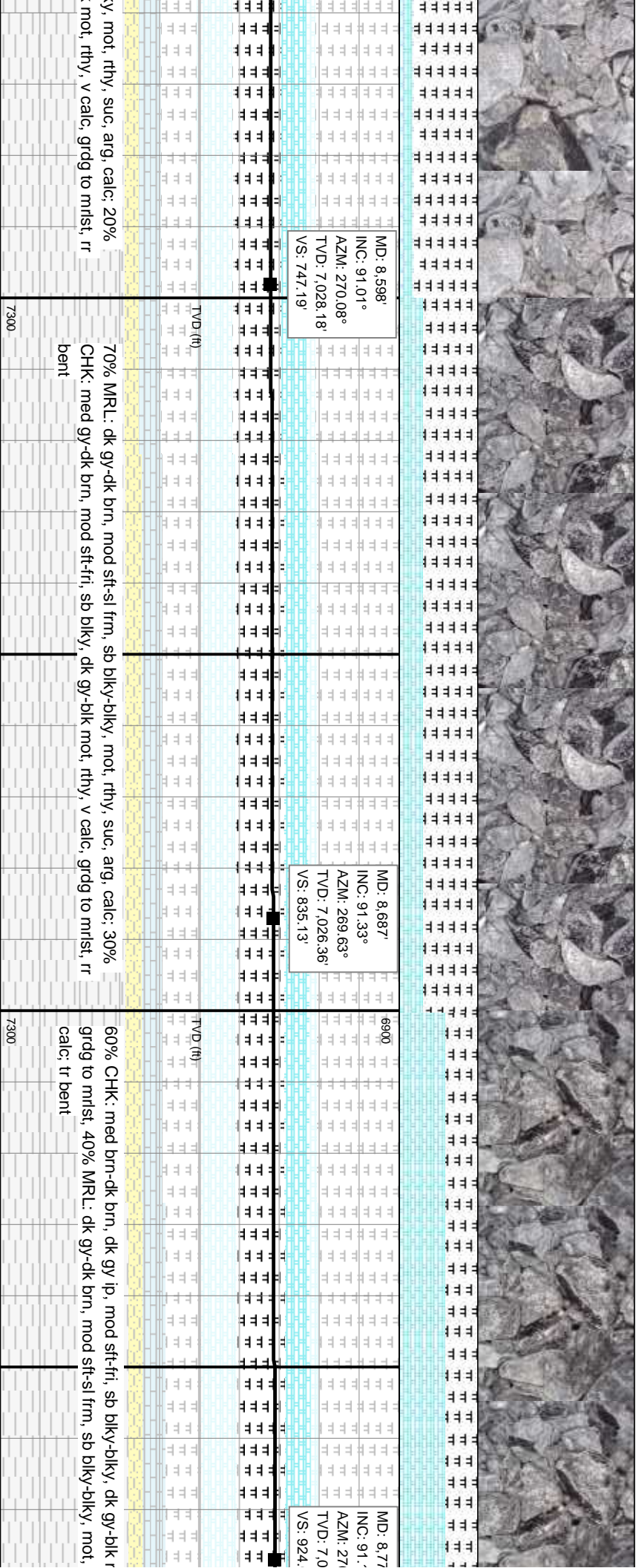
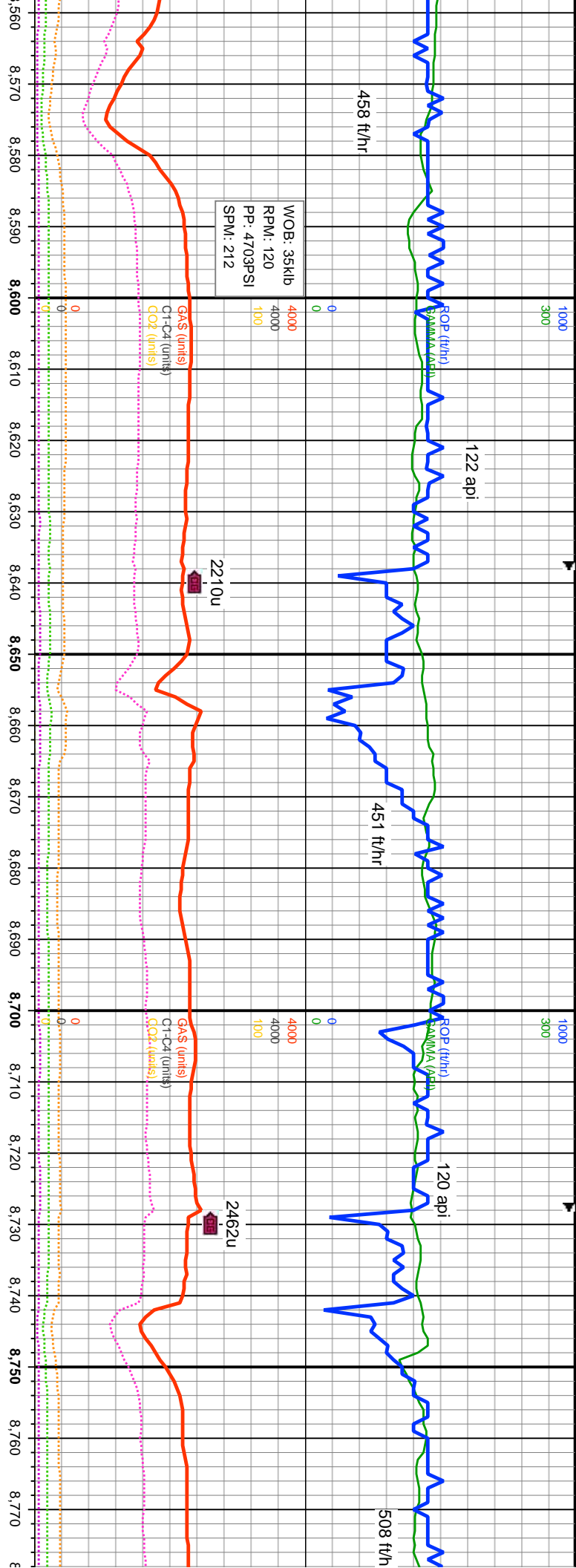


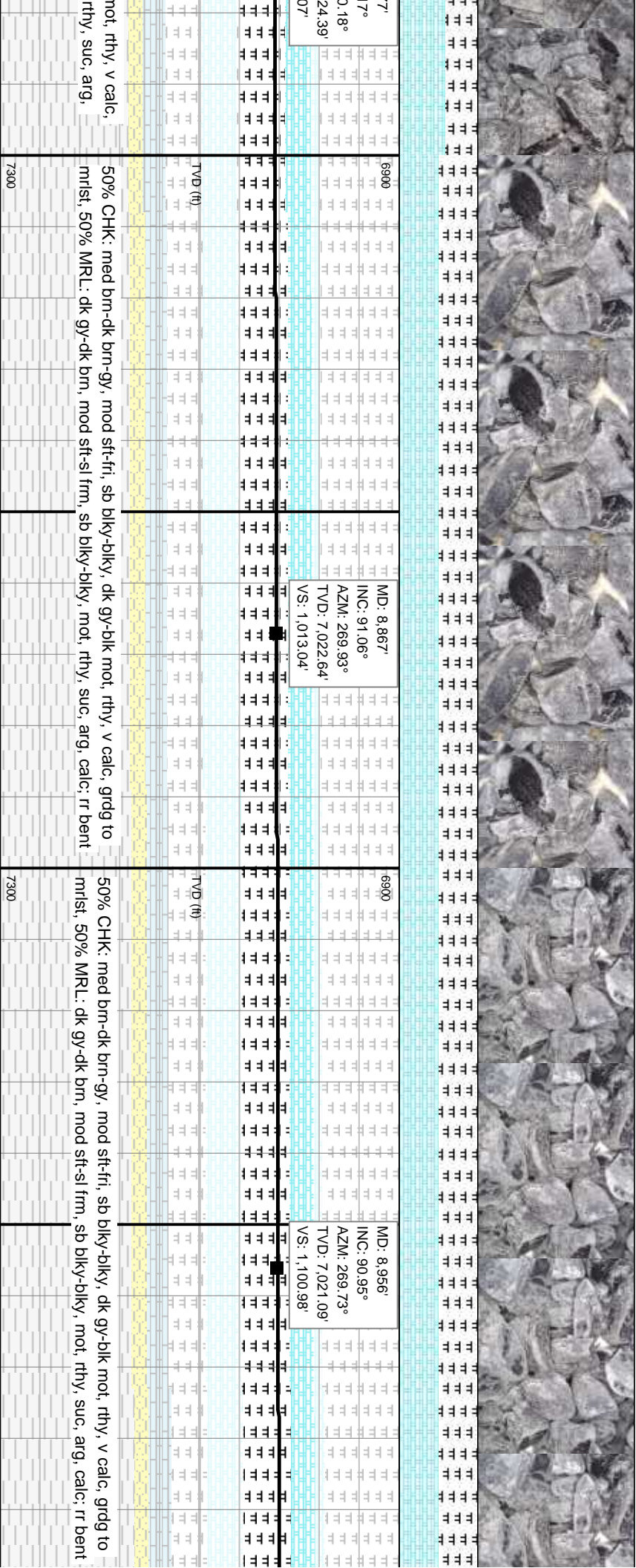
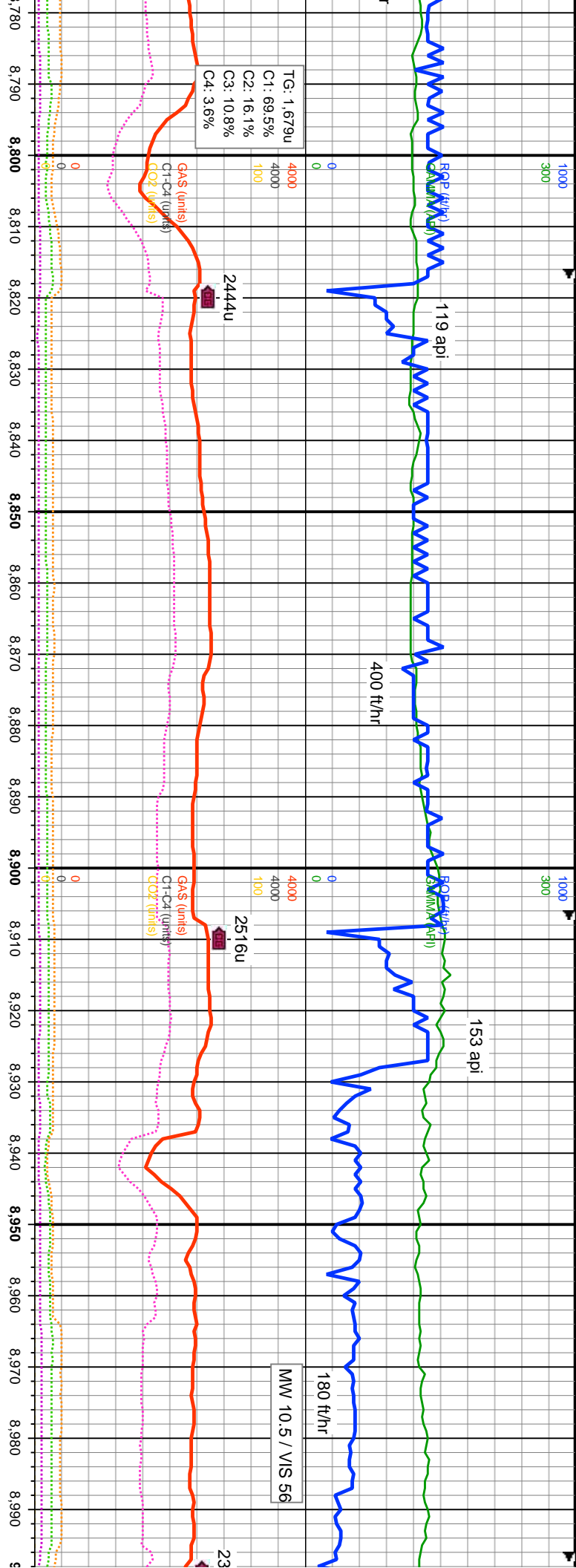




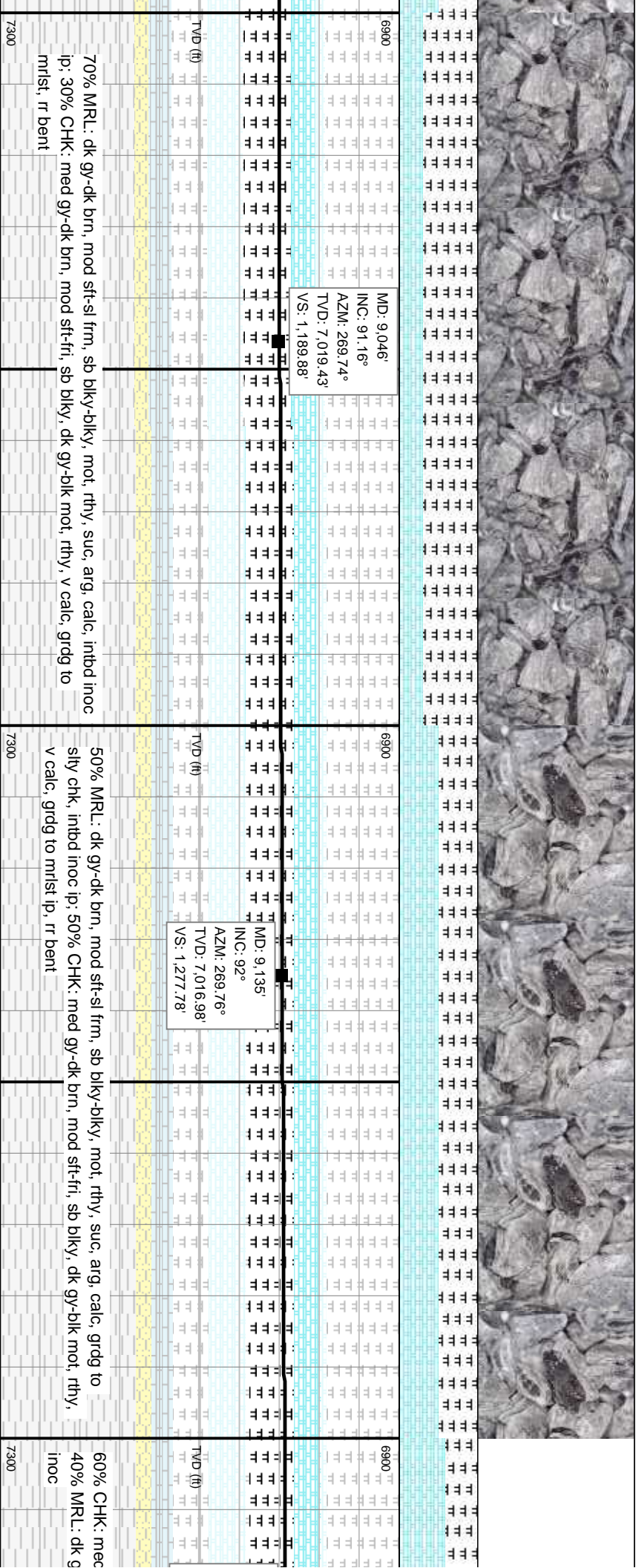
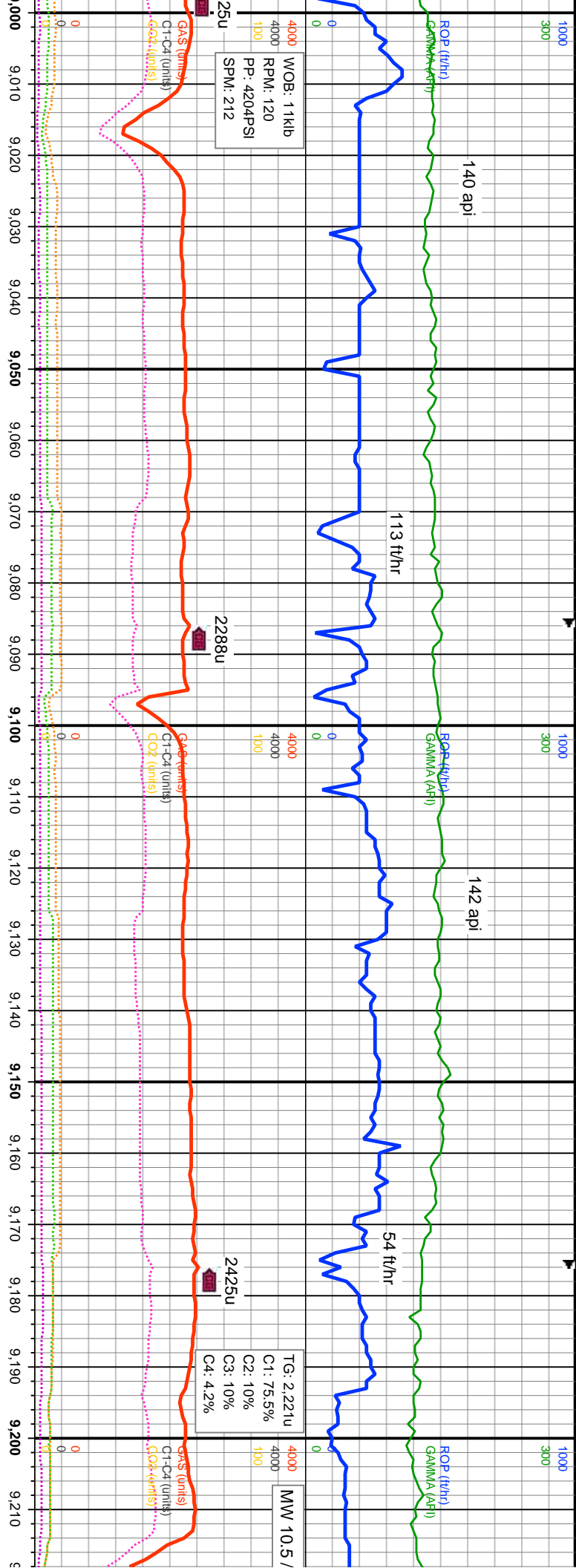


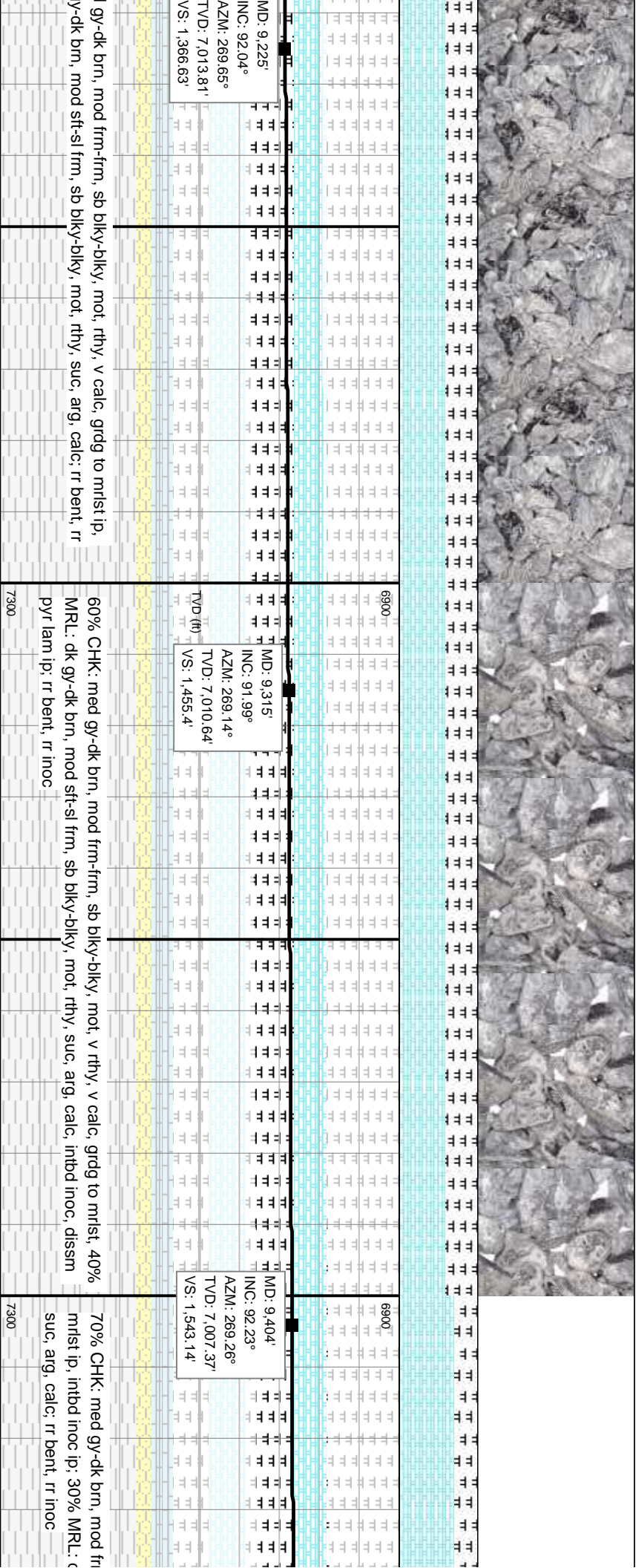
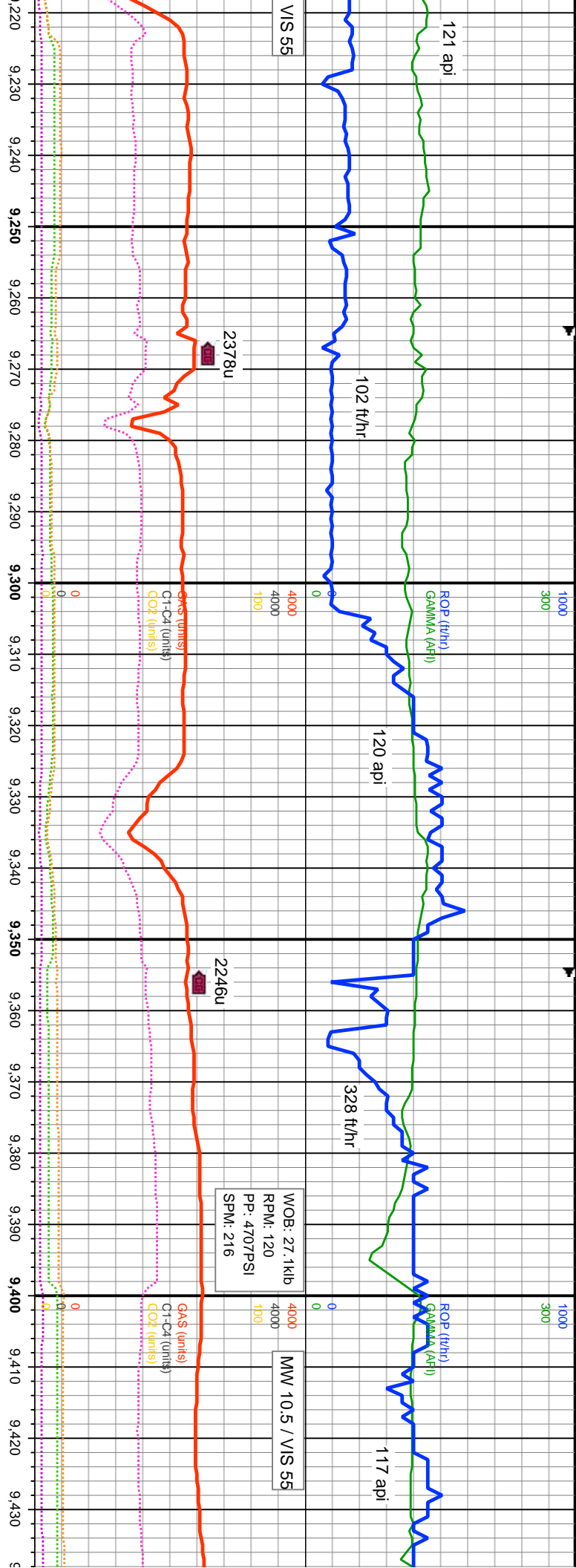




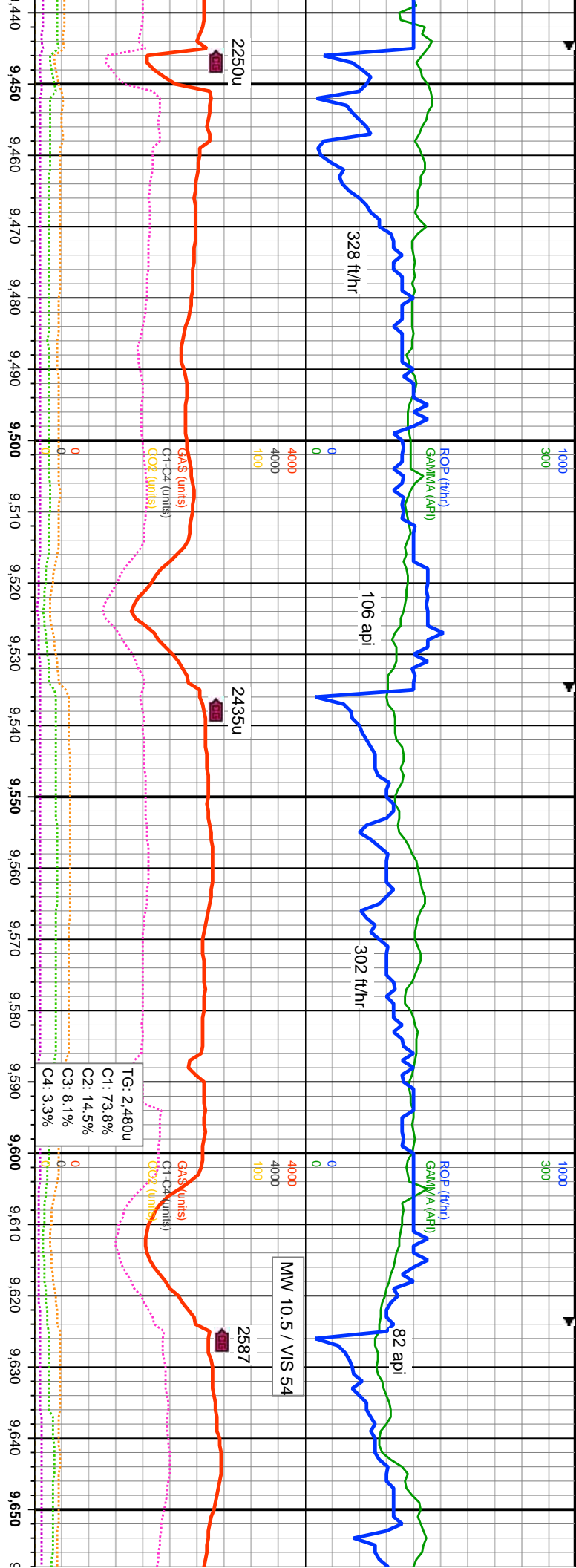












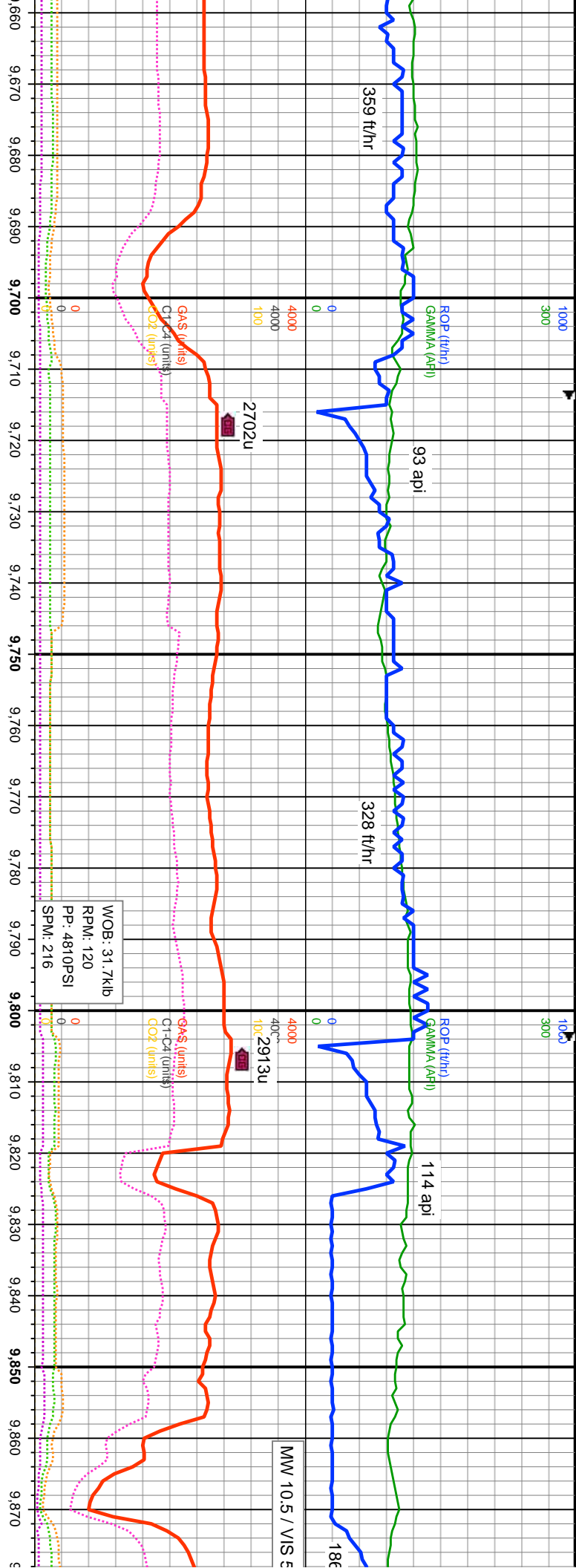
MD: 9.494'  
INC: 92.2°  
AZM: 269.09°  
TVD: 7,003.89'  
VS: 1,631.85'

MD: 9.584'  
INC: 92.13°  
AZM: 269.24°  
TVD: 7,000.49'  
VS: 1,720.56'

firm, sb blk-y-bkly, mot, v rthy, v calc, silty, grdg to  
dk gy-dk brn, mod sft-sl frm, sb blk-y-bkly, mot, rthy,

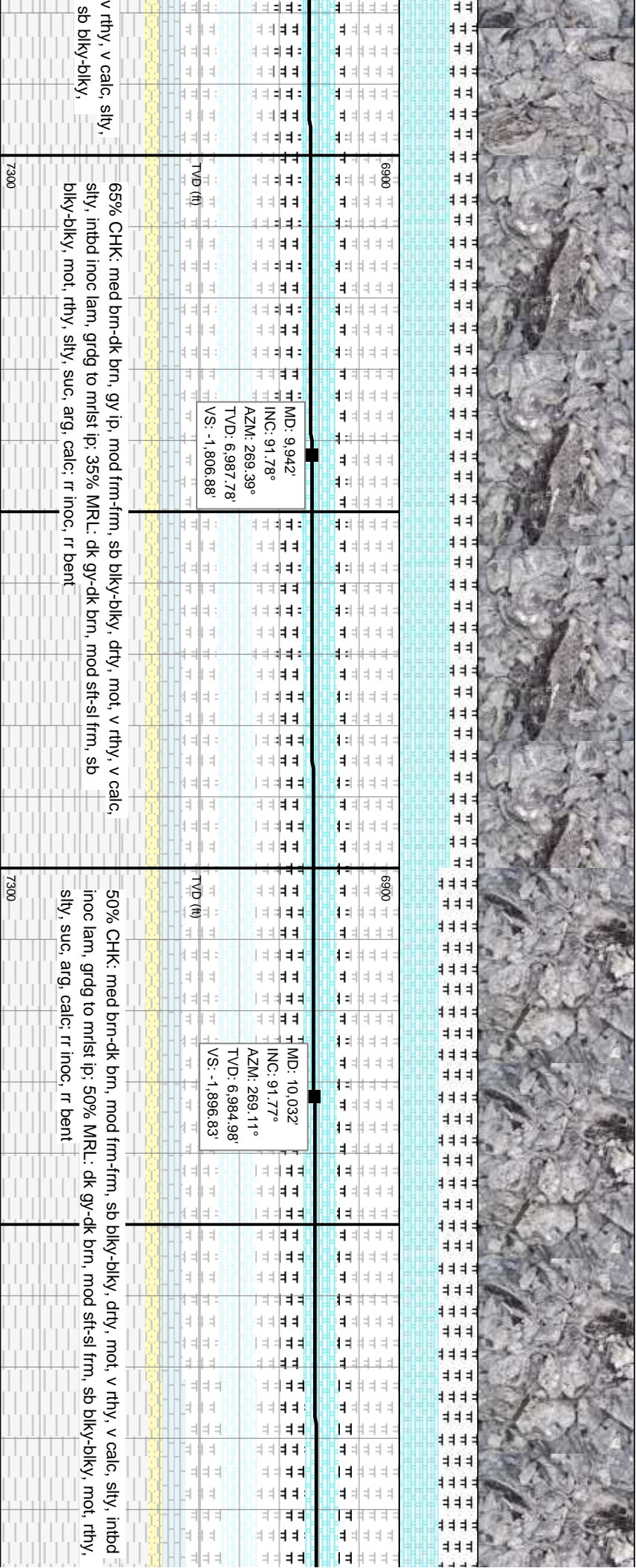
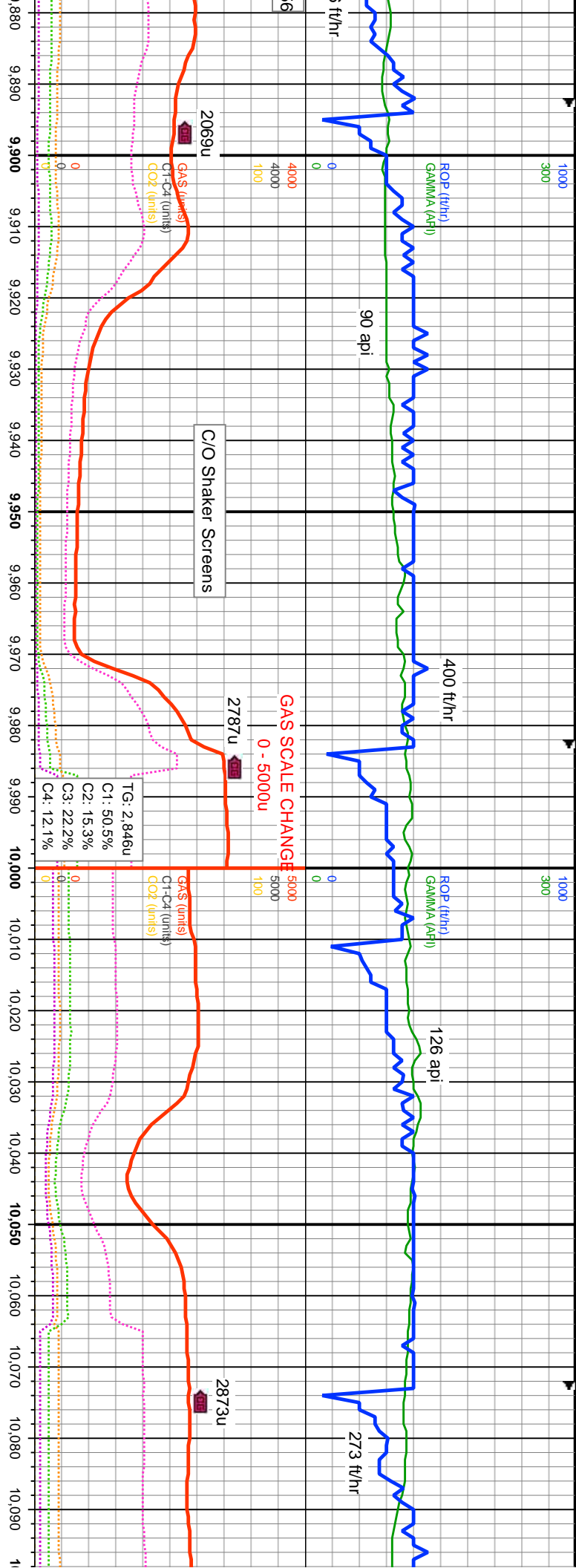
70% CHK: med gy-dk brn, mod frm-frim, sb blk-y-bkly, mot, v rthy, v calc, silty, grdg to  
mrst ip, intbd inoc ip, 30% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-bkly, mot, rthy,  
suc, arg, calc; rr bent, rr inoc

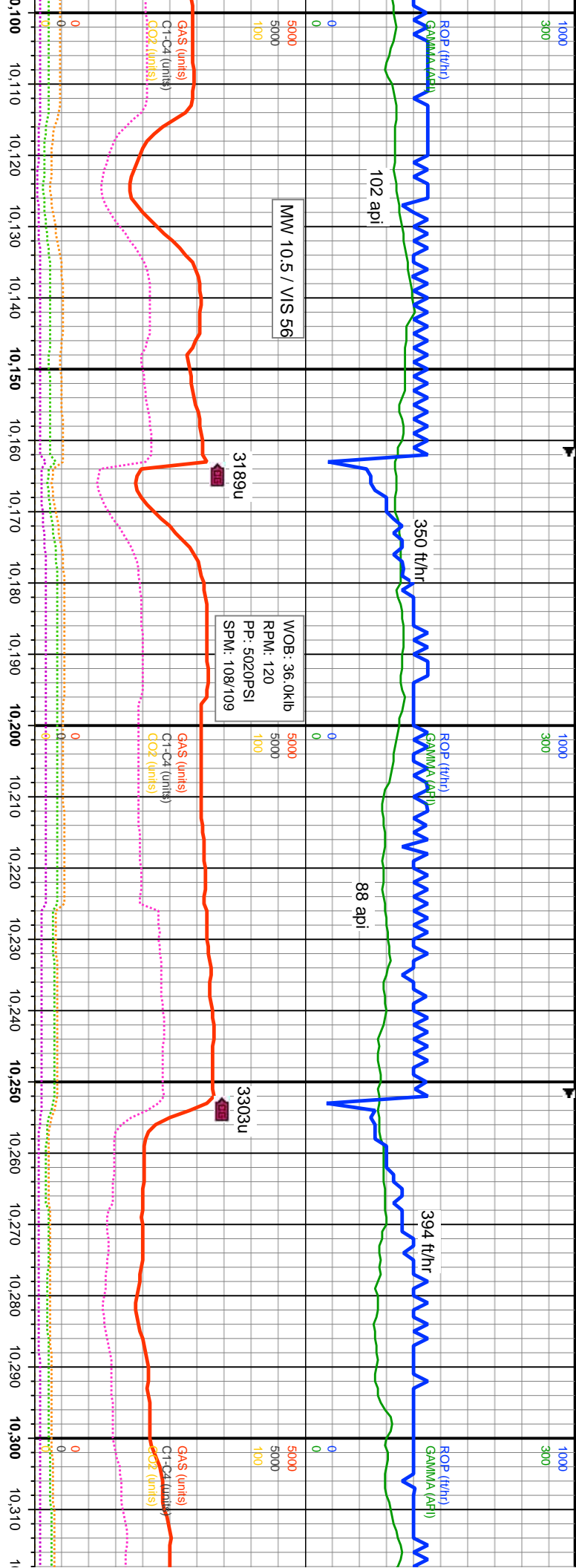
80% CHK: med brn-dk brn, gy ip, mod frm-frim, sb  
inoc lam, 20% MRL: dk gy-dk brn, mod sft-sl frm, silty



MD: 9.673 INC: 92.16° AZM: 269.47° TVD: 6.997.15' VS: -1.538.05'		MD: 9.763 INC: 92.08° AZM: 269.87° TVD: 6.993.83' VS: -1.627.99'		MD: 9.853 INC: 91.94° AZM: 269.46° TVD: 6.990.67' VS: -1.717.93'	
80% CHK: med brn-dk brn, gy ip, mod frm-frn, sb blk-y-bkly, mot, v rthy, v calc, slty, intbd inoc lam, 20% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-bkly, mot, rthy, suc, arg, calc, rr inoc		65% CHK: med brn-dk brn, gy ip, mod frm-frn, sb blk-y-bkly, dry, mot, intbd inoc lam, gydg to mlst ip, 35% MRL: dk gy-dk brn, mod sft-sl frm, mot, rthy, slty, suc, arg, calc, rr inoc			



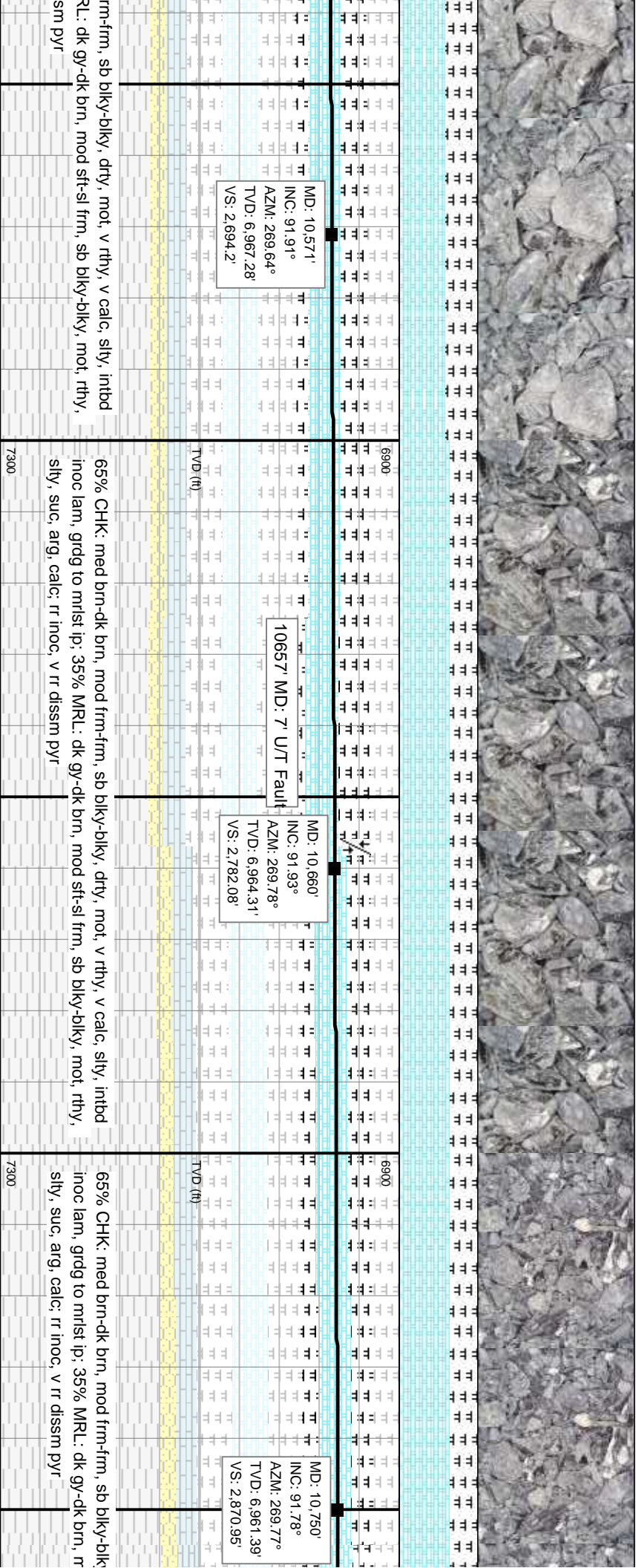
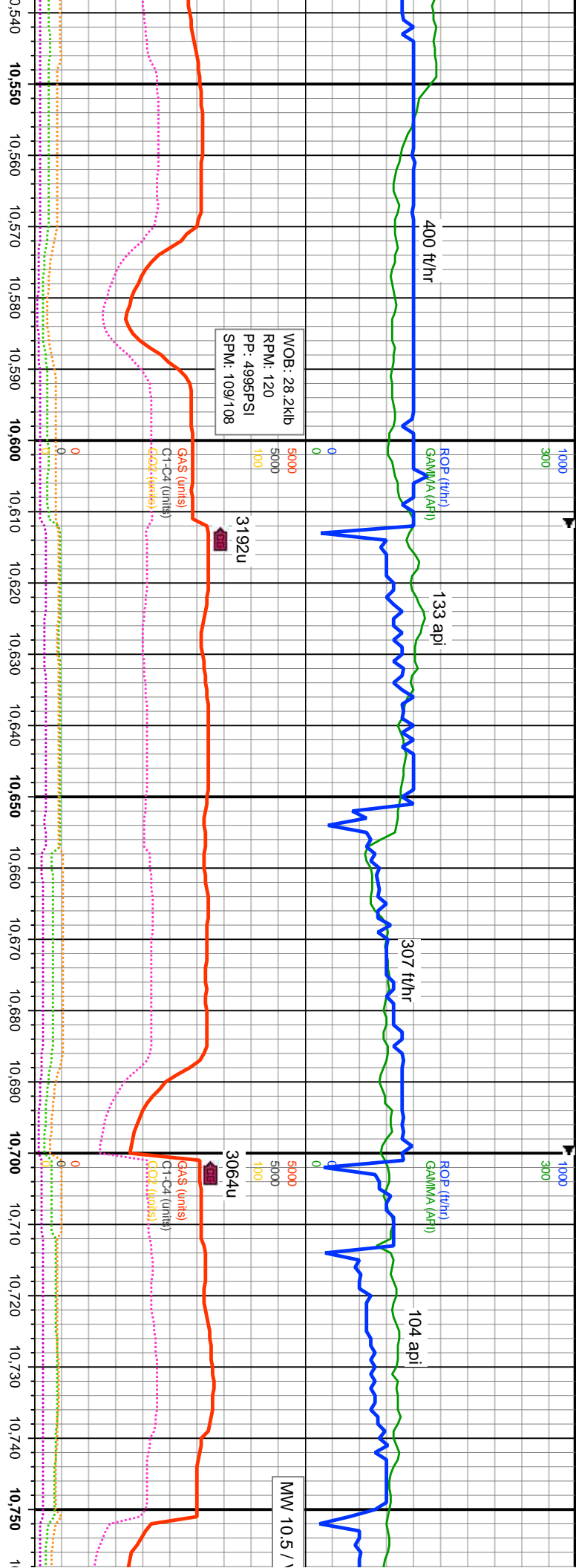




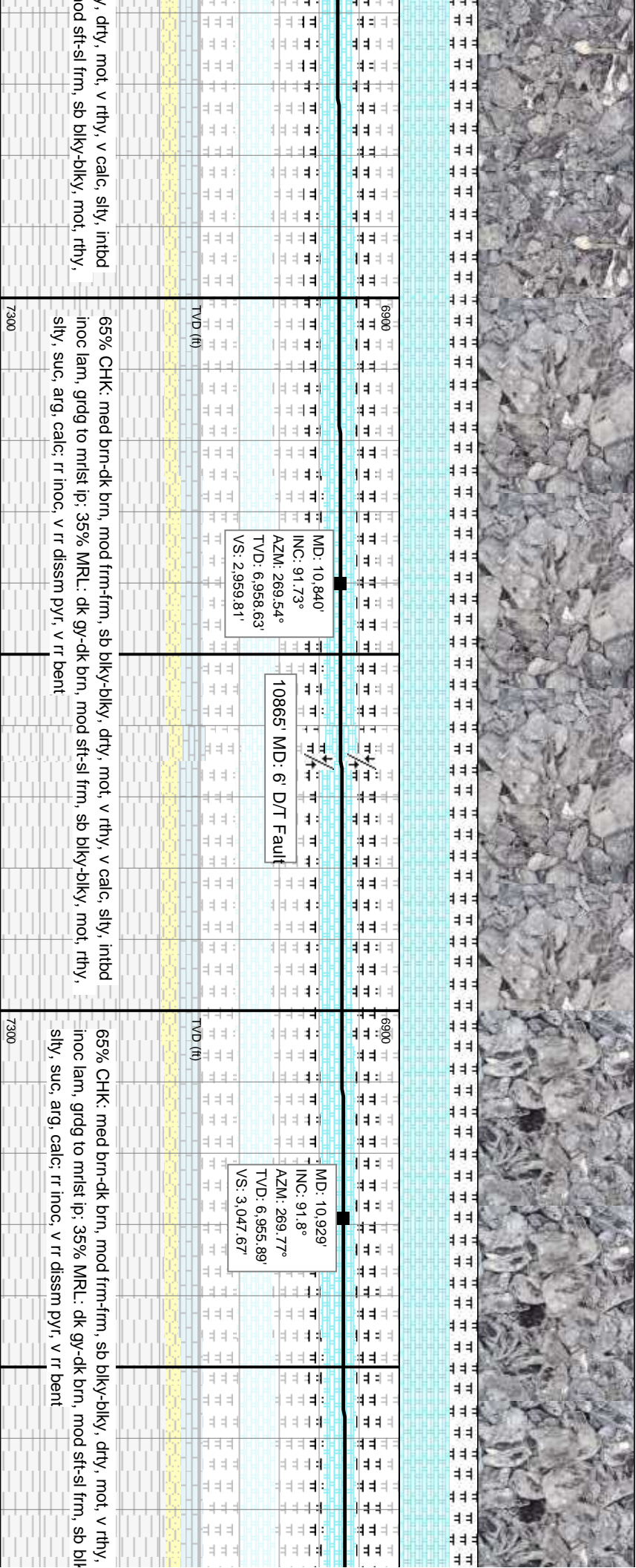
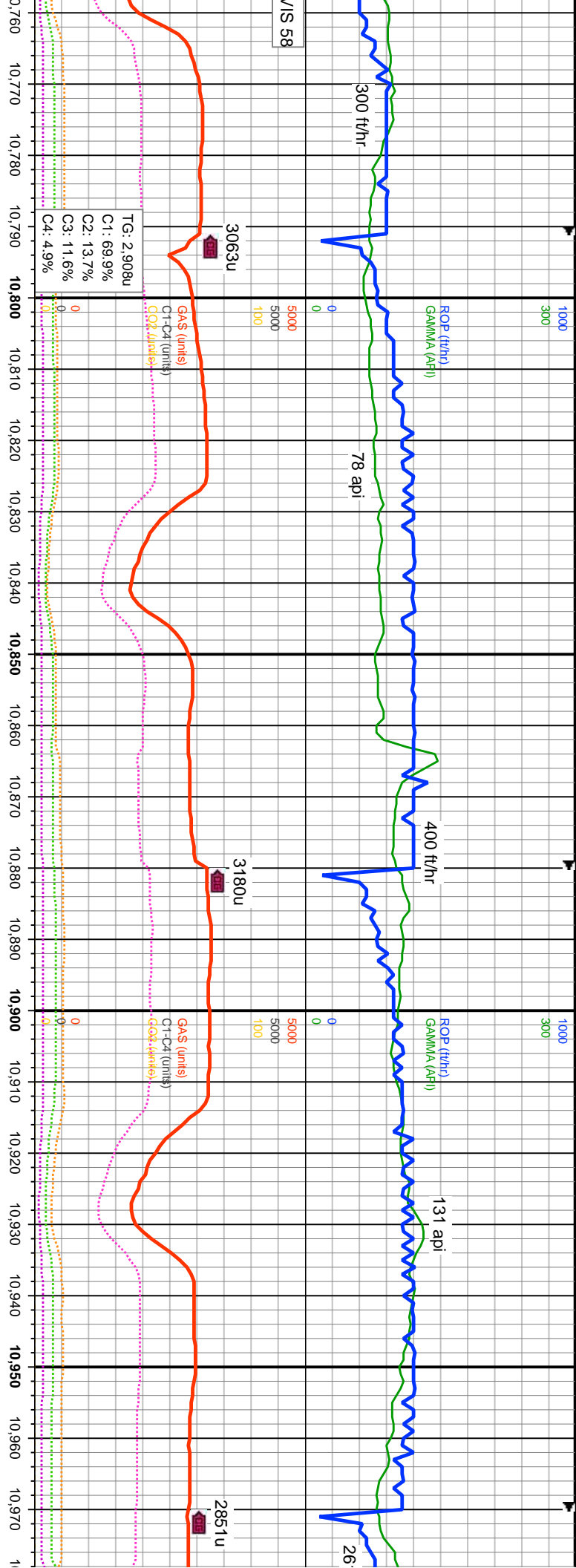
55% CHK: med brn-dk brn, mod frm-frm, sb blk-y-blk-y, drty, mot, v rthy, v calc, slty, intbd inoc lam, grdg to mlst ip; 45% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-blk-y, mot, rthy, slty, suc, arg, calc; rr inoc, rr bent		55% CHK: med brn-dk brn, mod frm-frm, sb blk-y-blk-y, drty, mot, v rthy, v calc, slty, intbd inoc lam, grdg to mlst ip; 45% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-blk-y, mot, rthy, slty, suc, arg, calc; rr inoc, rr bent		60% CHK: med brn-dk brn, mod frm-frm, sb blk-y-blk-y, drty, mot, v rthy, v calc, slty, intbd inoc lam, grdg to mlst ip; 45% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-blk-y, mot, rthy, slty, suc, arg, calc; rr inoc, rr bent	
MD: 10.122° INC: 91.79° AZM: 269.33° TVD: 6.982.18' VS: 2.251.31'		MD: 10.212° INC: 91.8° AZM: 269.36° TVD: 6.979.36' VS: 2.340.09'		MD: 10.301° INC: 91.91° AZM: 269.38° TVD: 6.976.48' VS: 2.427.88'	
TVD (ft)		TVD (ft)		TVD (ft)	
6900		6900		6900	
7300		7300		7300	







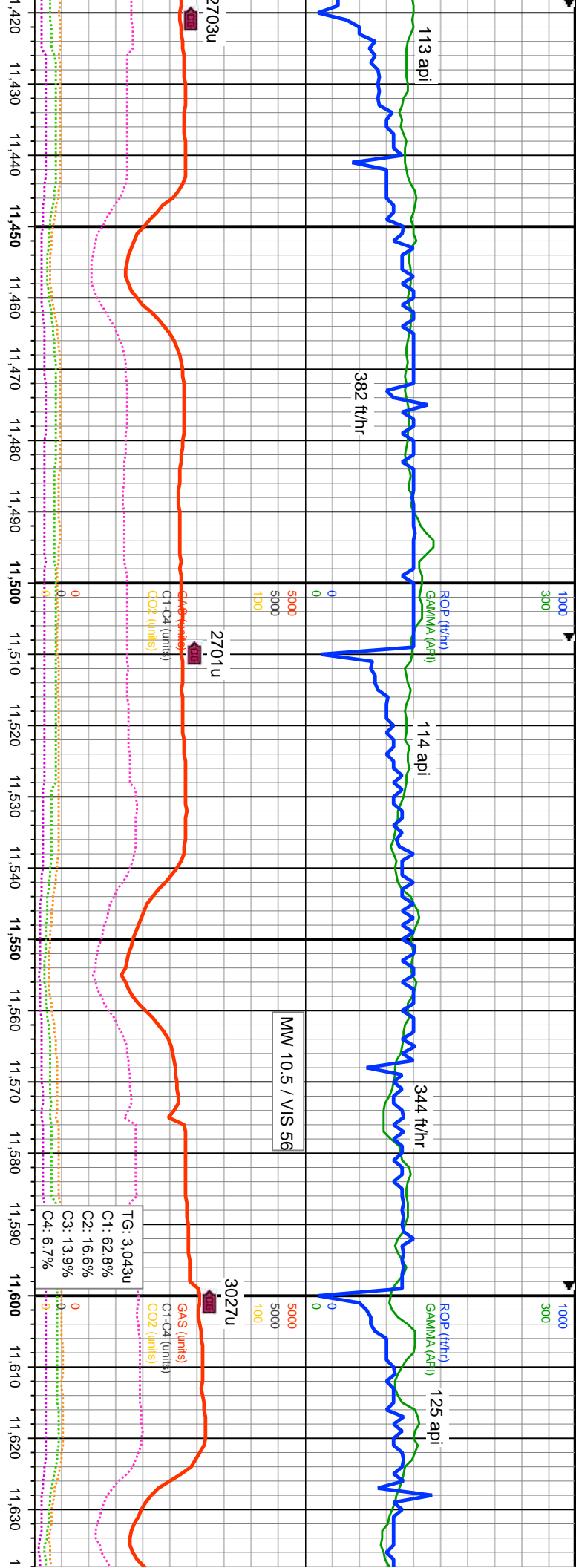






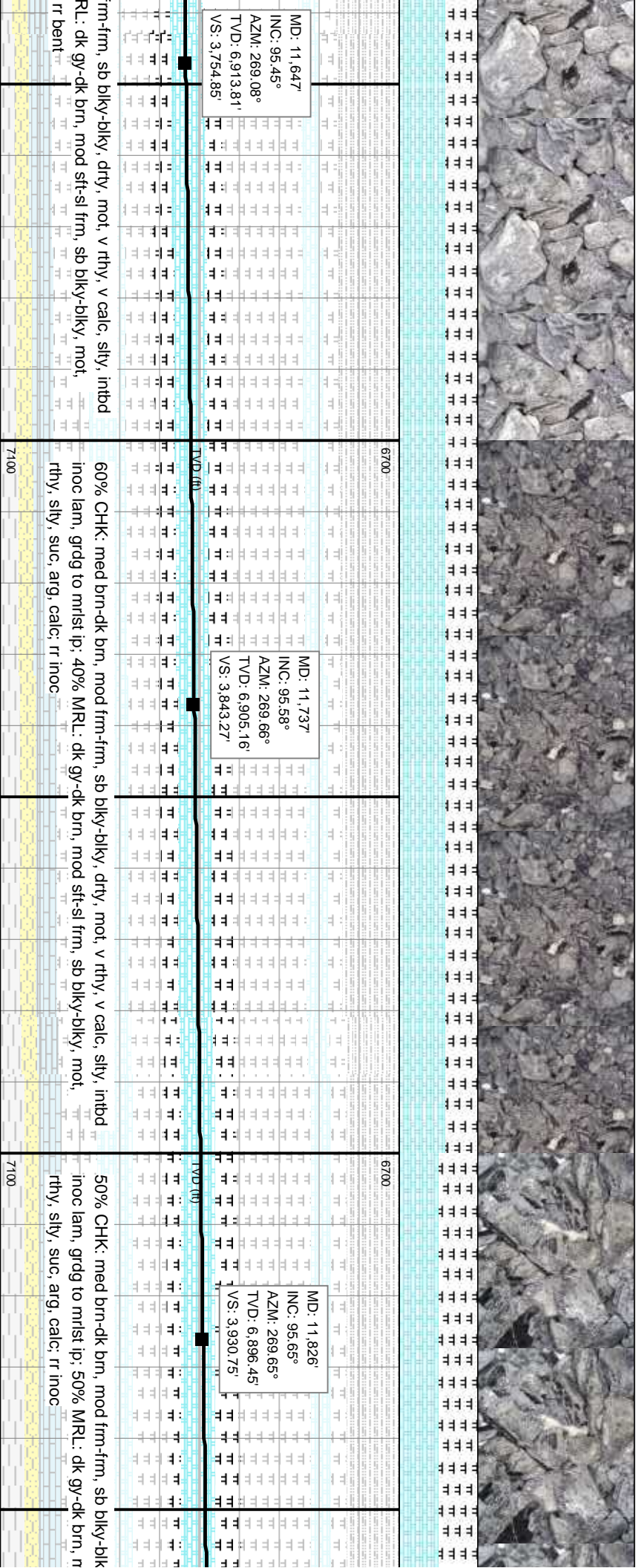
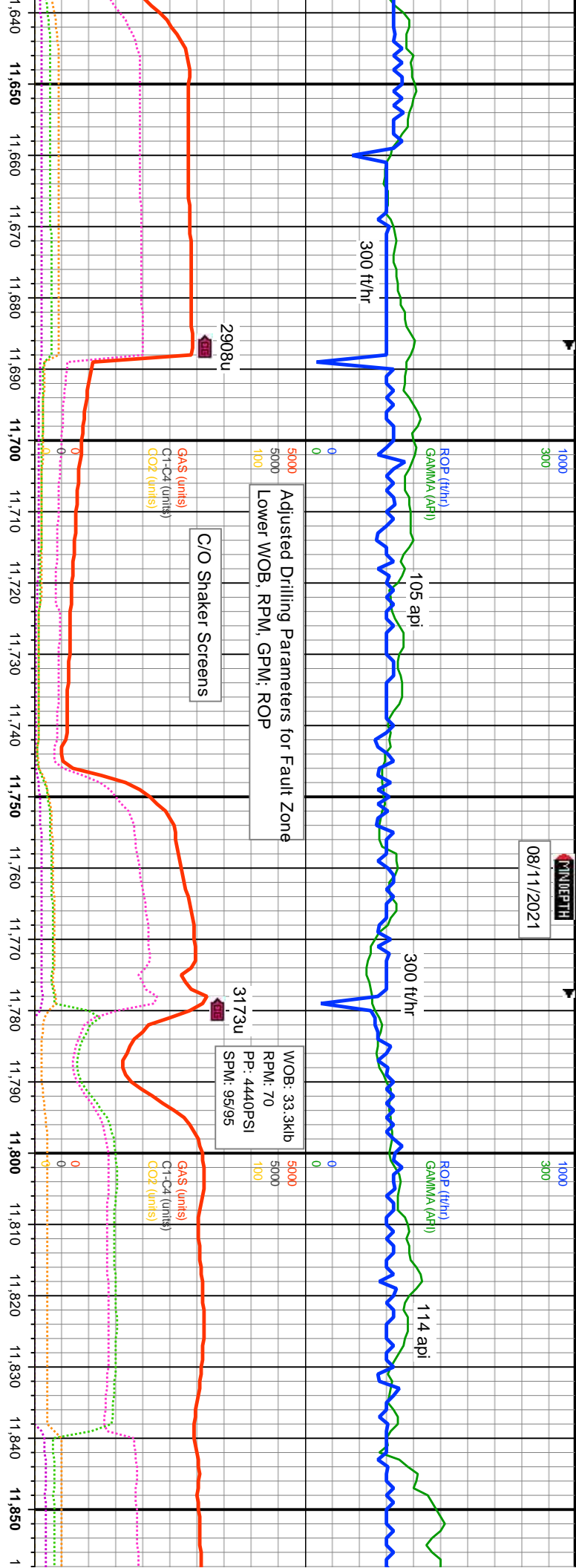






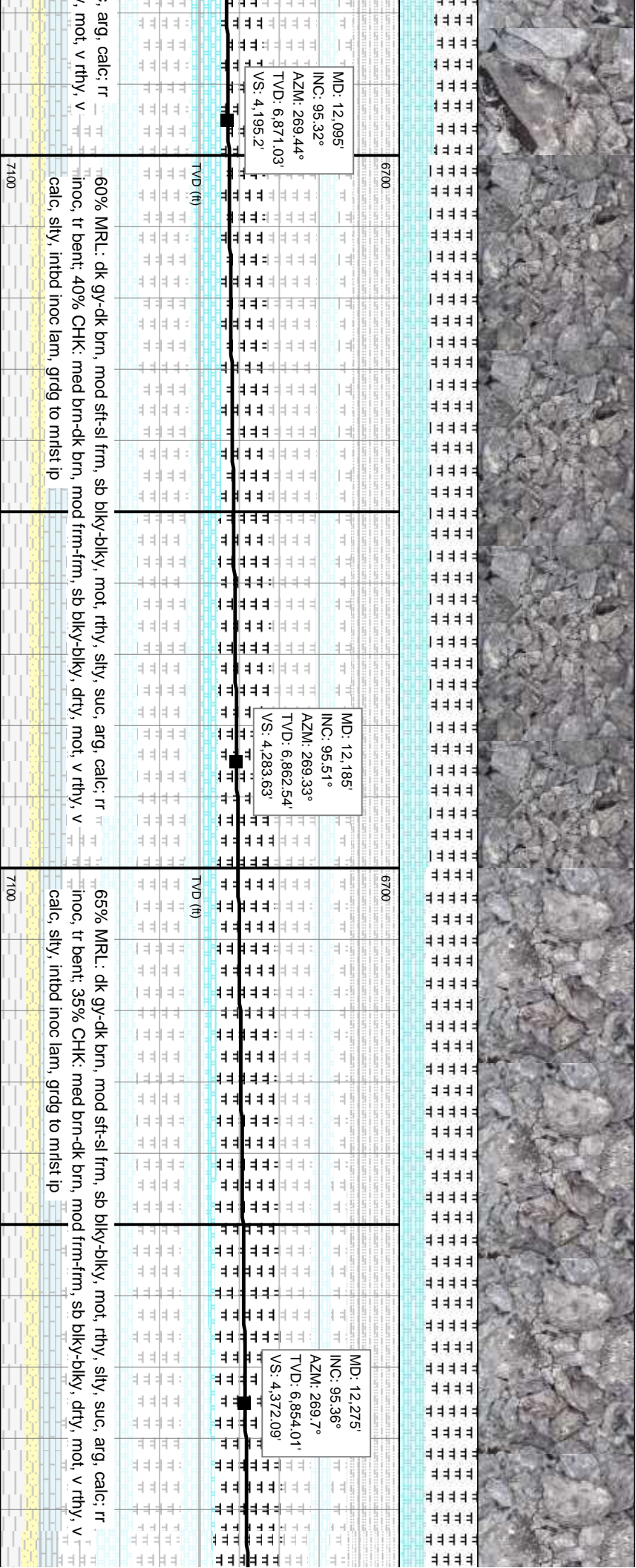
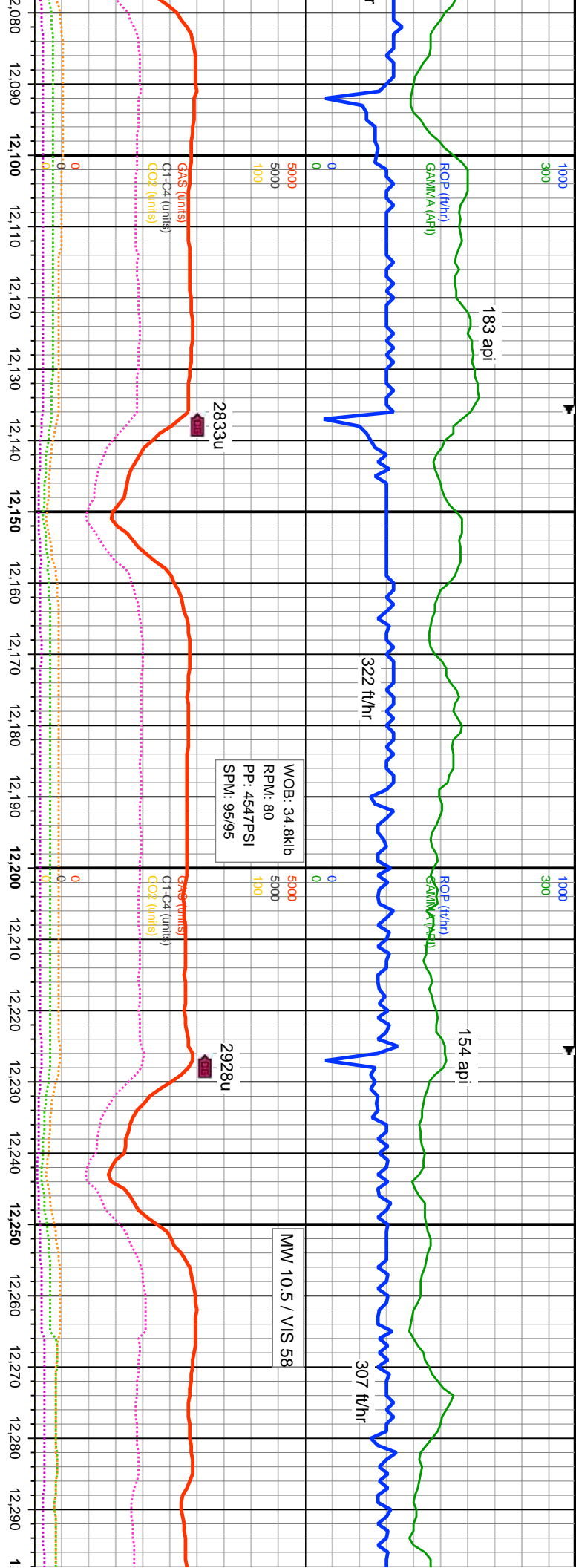
MD: 11.468'		MD: 11.558'		MD: 11.558'	
INC: 95.35°		INC: 95.37°		INC: 95.37°	
AZM: 269.22°		AZM: 269.39°		AZM: 269.39°	
TVD: 6.930.62'		TVD: 6.922.21'		TVD: 6.922.21'	
VS: 3.579.02'		VS: 3.667.44'		VS: 3.667.44'	
TVD SCALE CHANGE		TVD SCALE CHANGE		TVD SCALE CHANGE	
6700 - 7100		6700 - 7100		6700 - 7100	
55% CHK: med brn-dk brn, mod frm-frn, sb blk-y-bkly, drty, mot, v rthy, v calc, silty, intbd		55% CHK: med brn-dk brn, mod frm-frn, sb blk-y-bkly, drty, mot, v rthy, v calc, silty, intbd		60% CHK: med brn-dk brn, mod frm-frn, sb blk-y-bkly, drty, mot, v rthy, v calc, silty, intbd	
inoc lam, grdg to mlst ip: 45% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-bkly, mot, rthy,		inoc lam, grdg to mlst ip: 45% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-bkly, mot, rthy,		inoc lam, grdg to mlst ip: 40% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-bkly, mot, rthy,	
silty, suc, arg, calc, rr inoc, v rr bent		silty, suc, arg, calc, rr inoc, v rr bent		silty, suc, arg, calc, rr inoc, v rr bent	
7100		7100		7100	

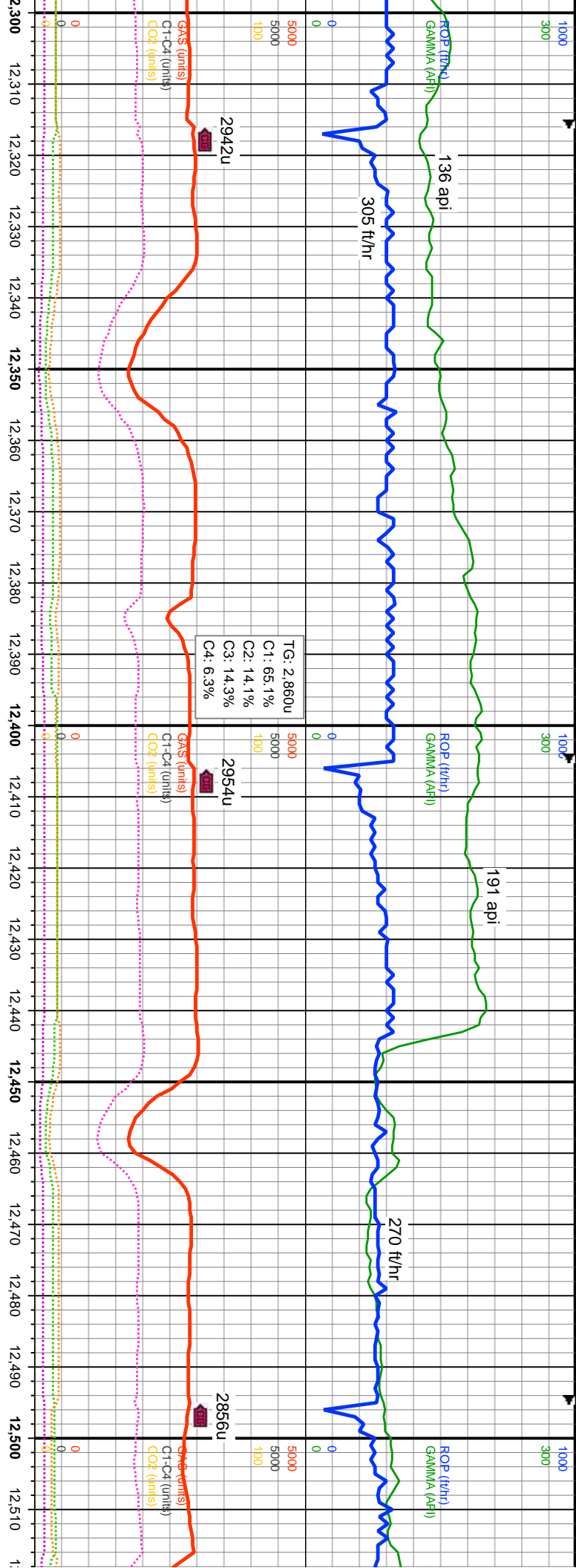








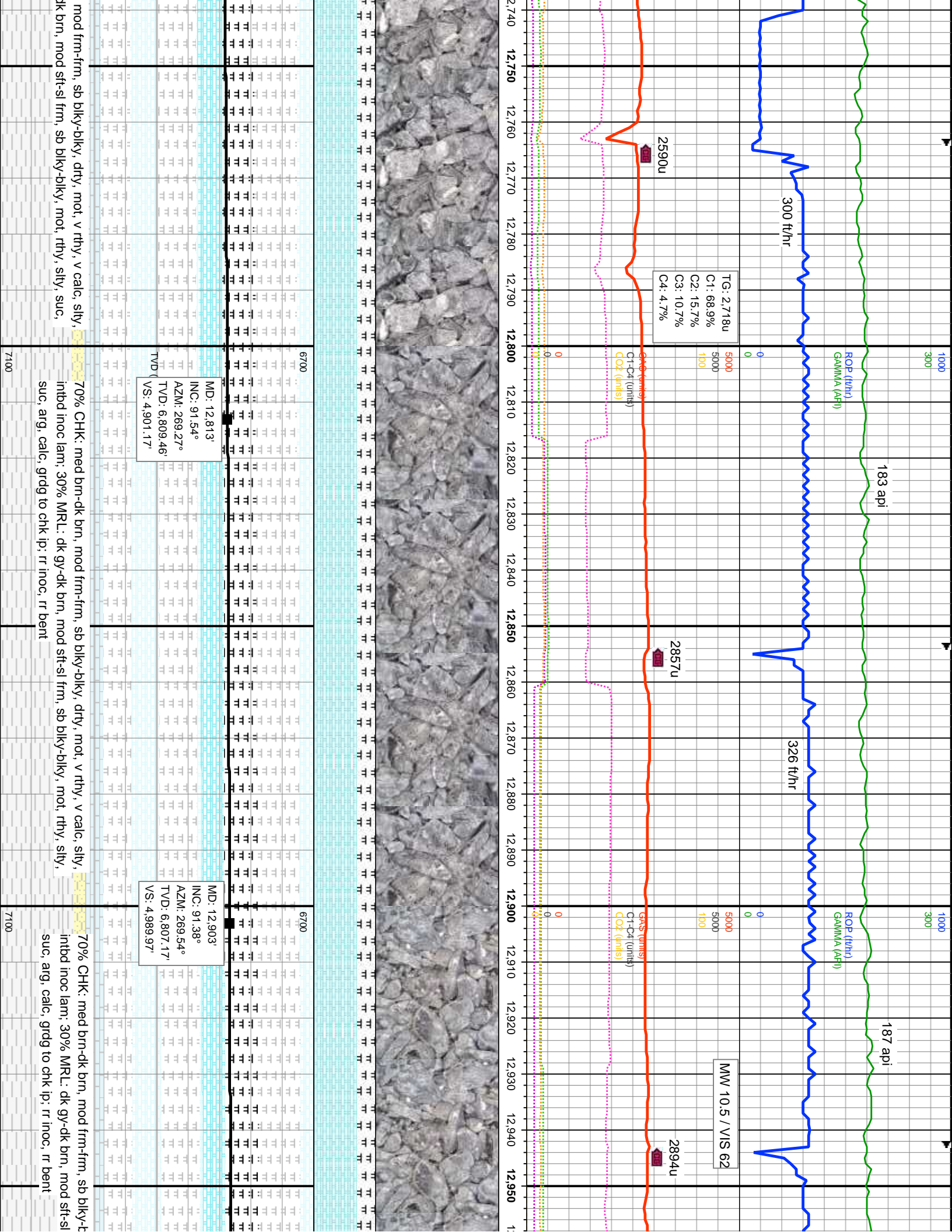




6700		6700		6700		6700	
MD: 12.364'		MD: 12.454'		MD: 12.454'		MD: 12.454'	
INC: 95.34°		INC: 95.38°		INC: 95.38°		INC: 95.38°	
AZM: 269.66°		AZM: 269.57°		AZM: 269.57°		AZM: 269.57°	
TVD: 6.845, 71'		TVD: 6.837, 3'		TVD: 6.837, 3'		TVD: 6.837, 3'	
VS: 4.459, 62'		VS: 4.548, 12'		VS: 4.548, 12'		VS: 4.548, 12'	
TVD (ft)		TVD (ft)		TVD (ft)		TVD (ft)	
60% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-bkly, mot, rthy, stly, suc, arg, calc; r		1245' MD: 66' U/T Fault		1245' MD: 66' U/T Fault		50% CHK: me	
inoc, tr bent; 40% CHK: med brn-dk brn, mod frm-frm, sb blk-y-bkly, drty, mot, v rthy, v						inoc lam, grdg	
calc, stly, intbd inoc lam, grdg to mrst ip						rthy, stly, suc,	
7100		7100		7100		7100	

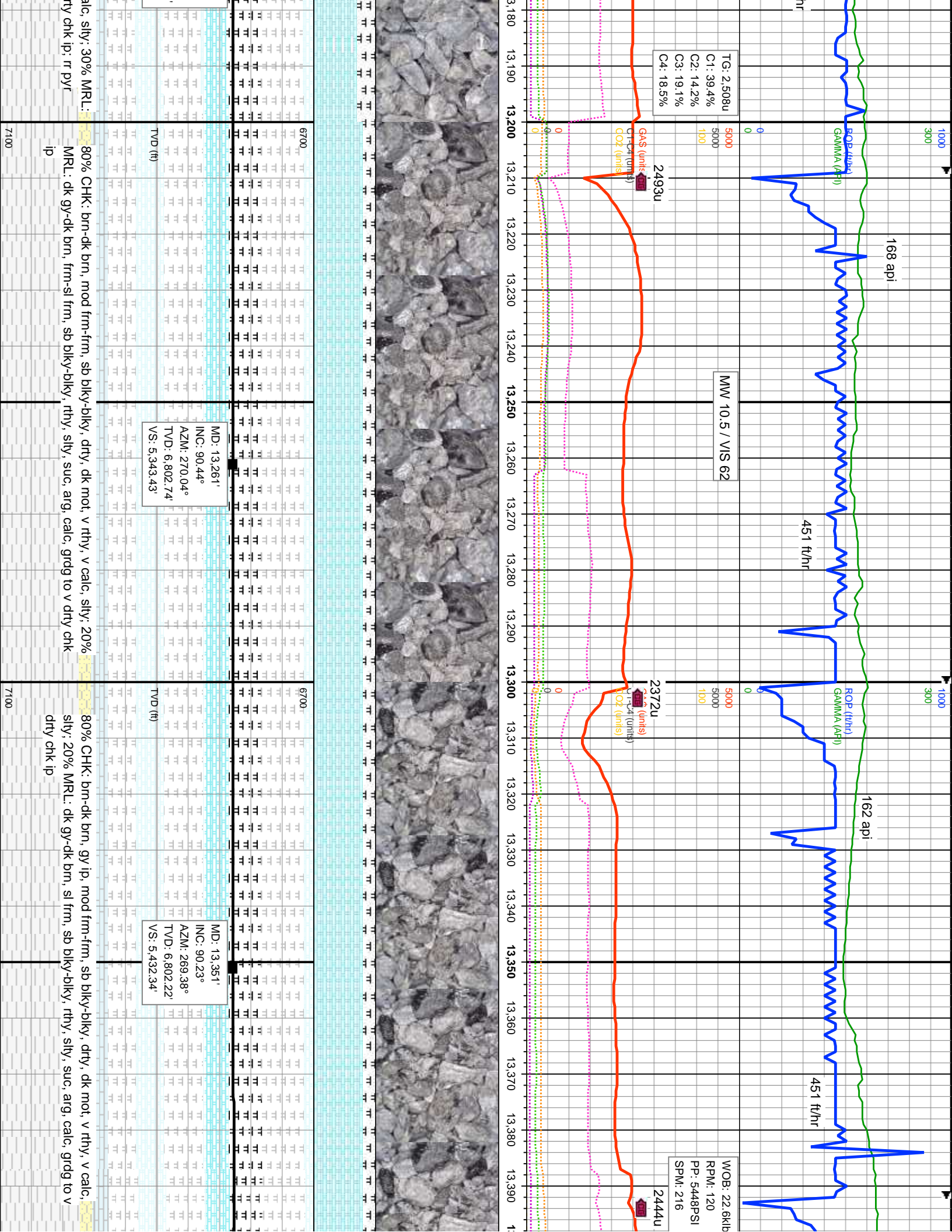




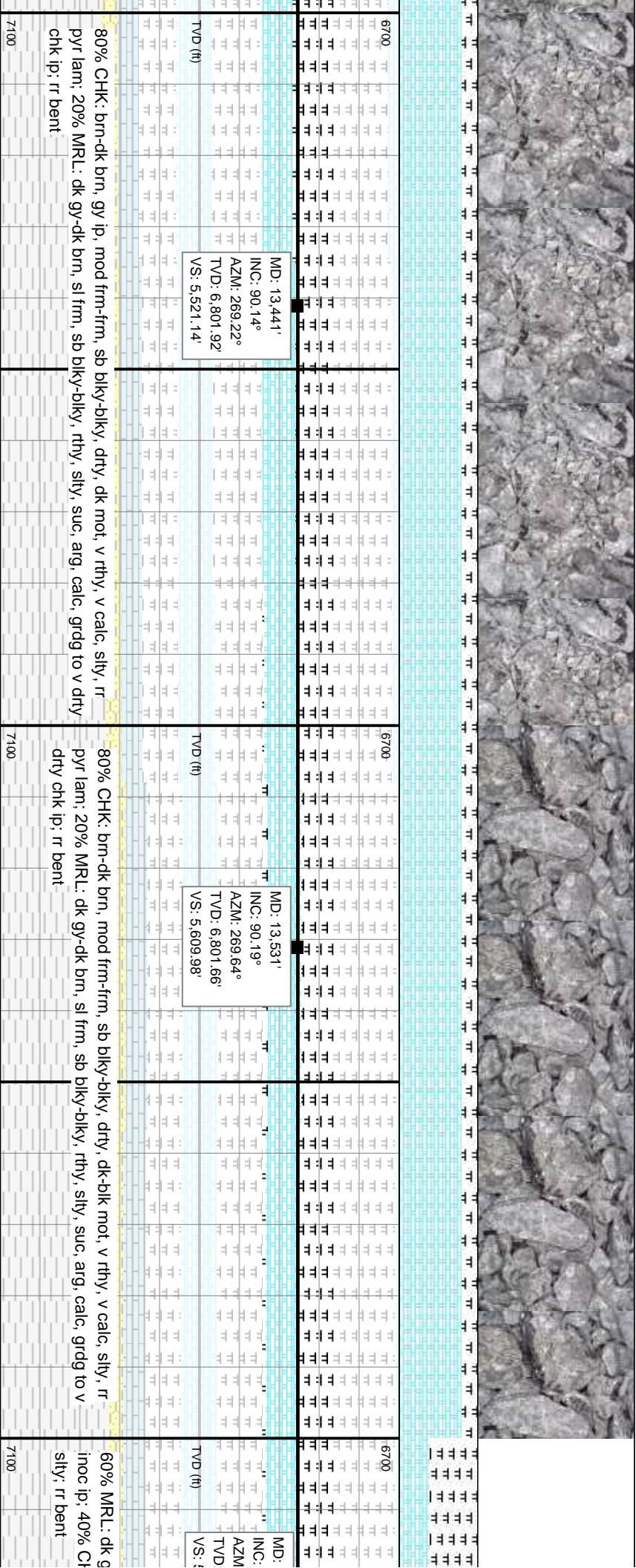
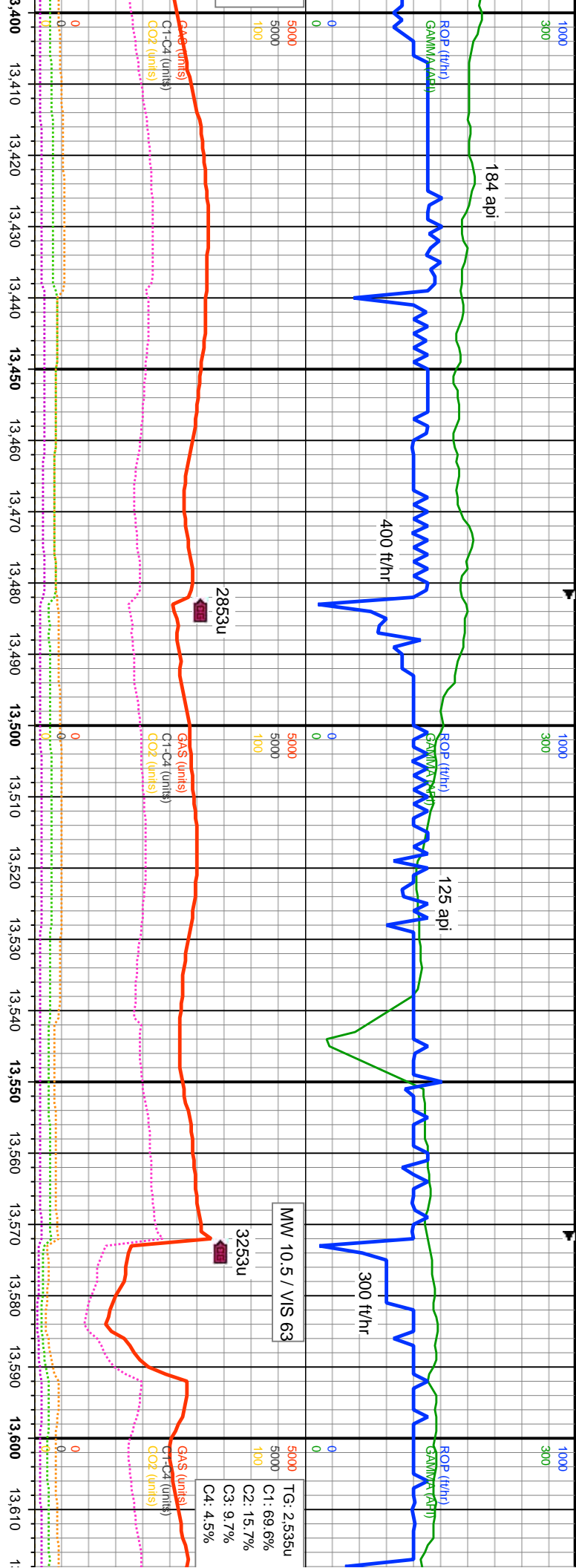






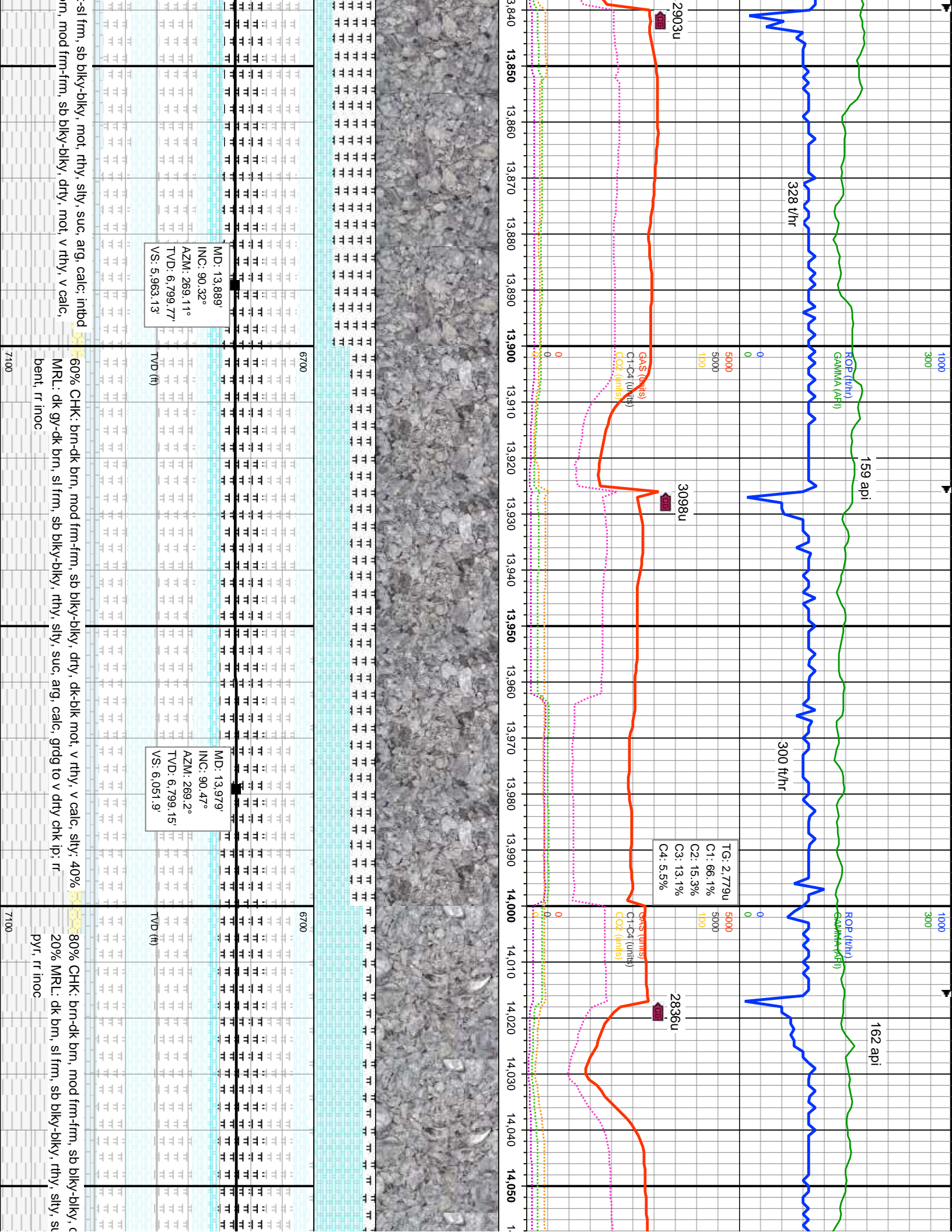


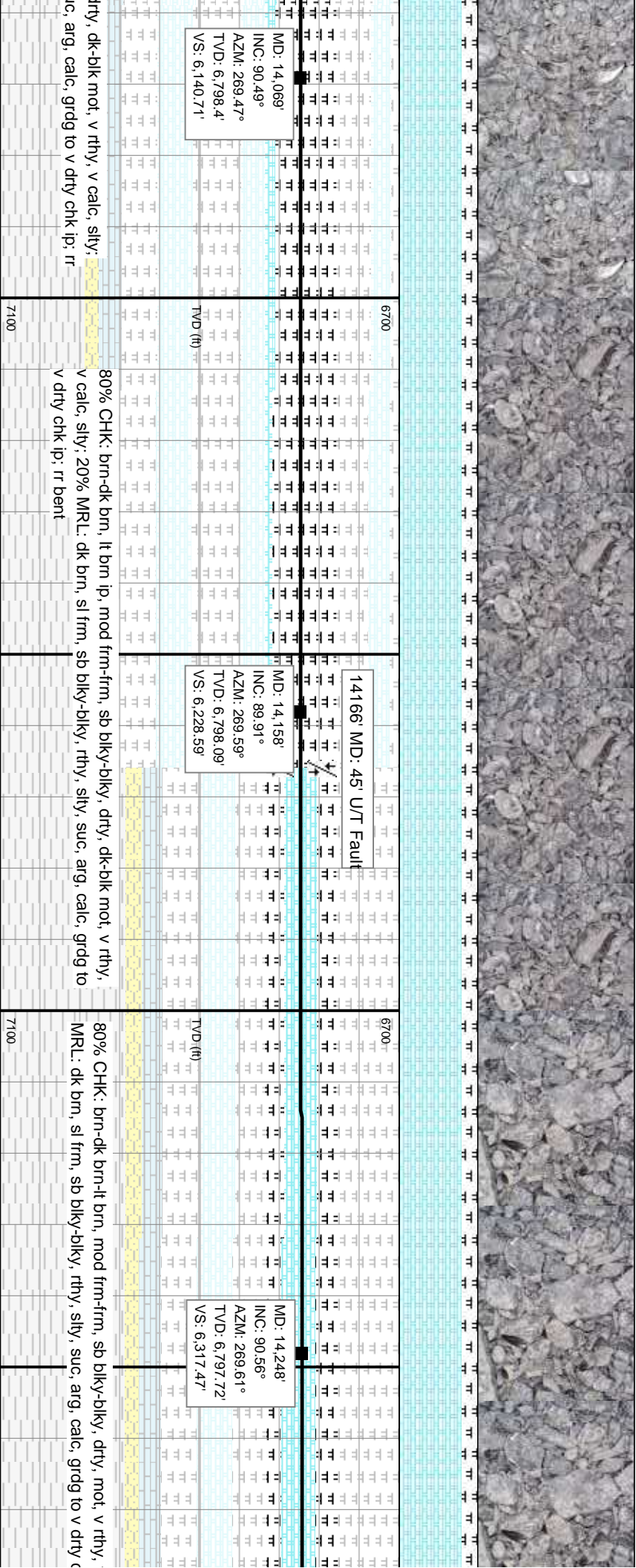
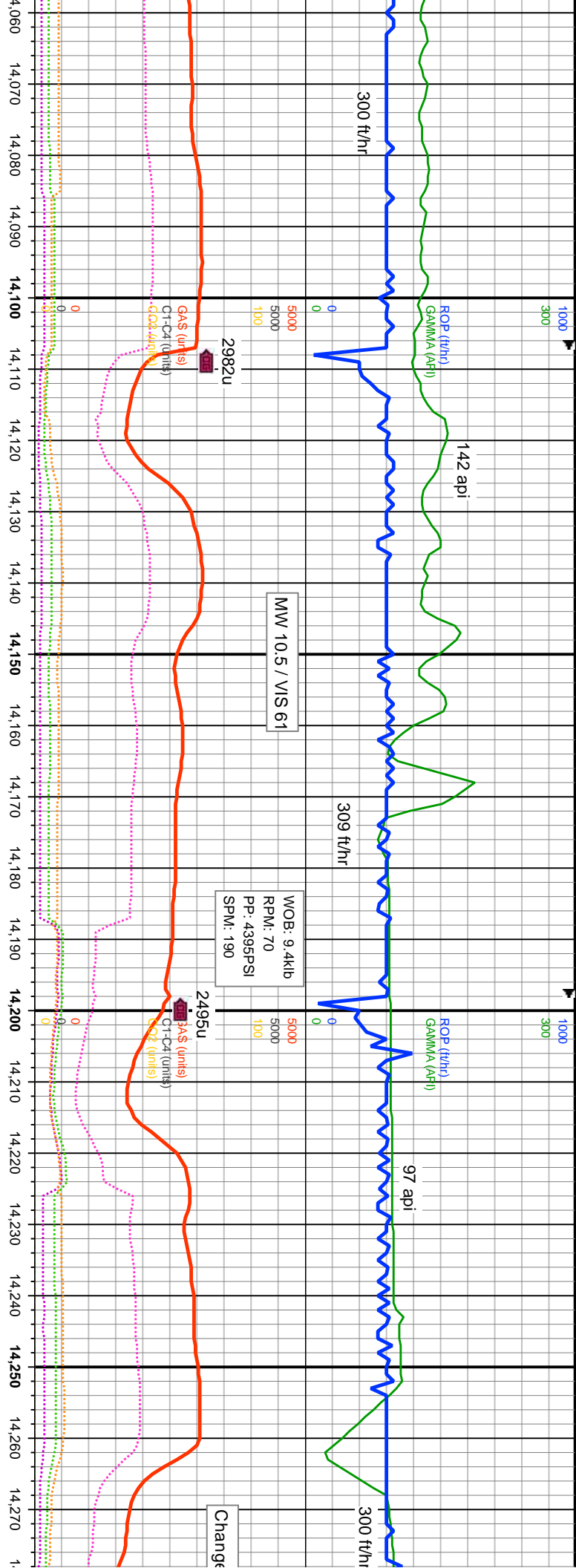




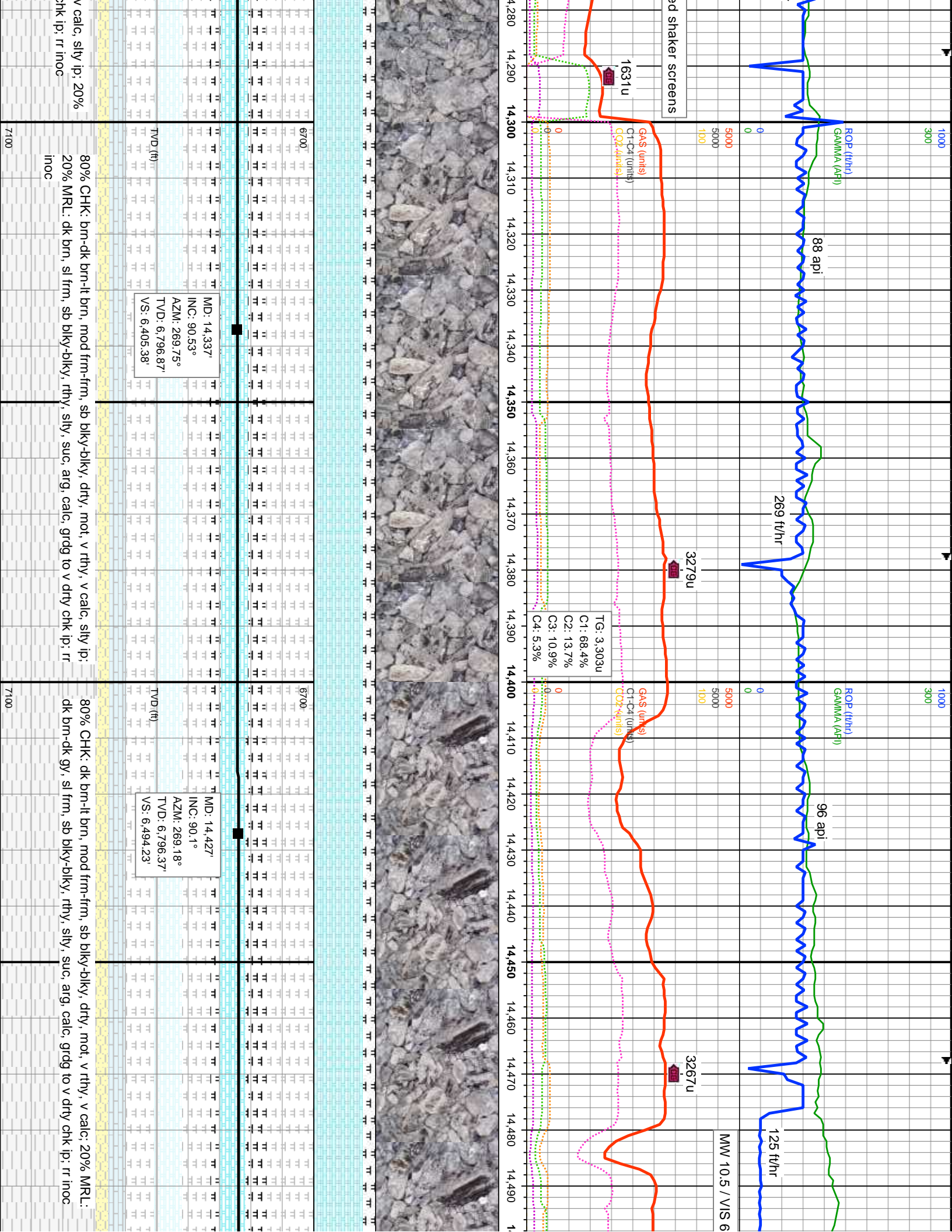


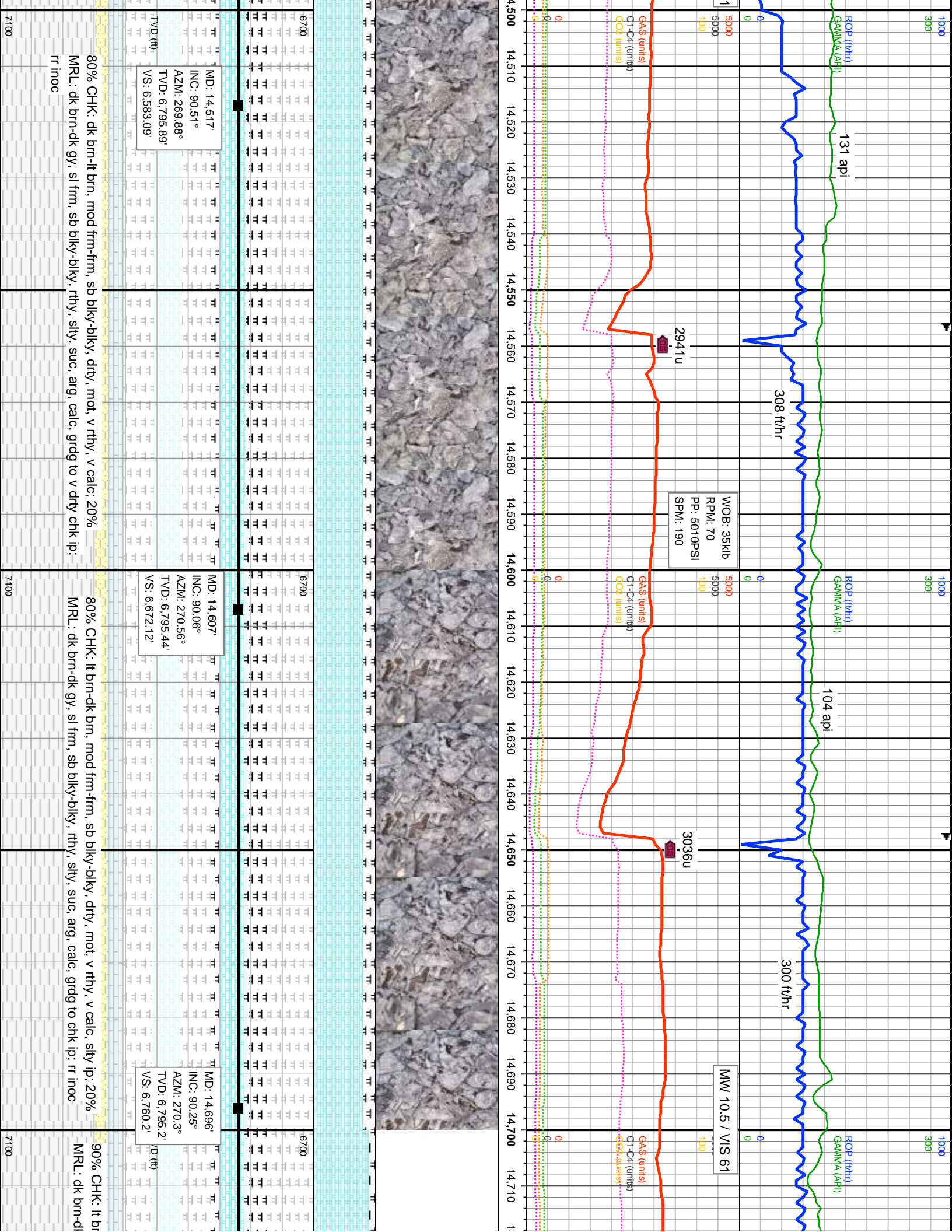




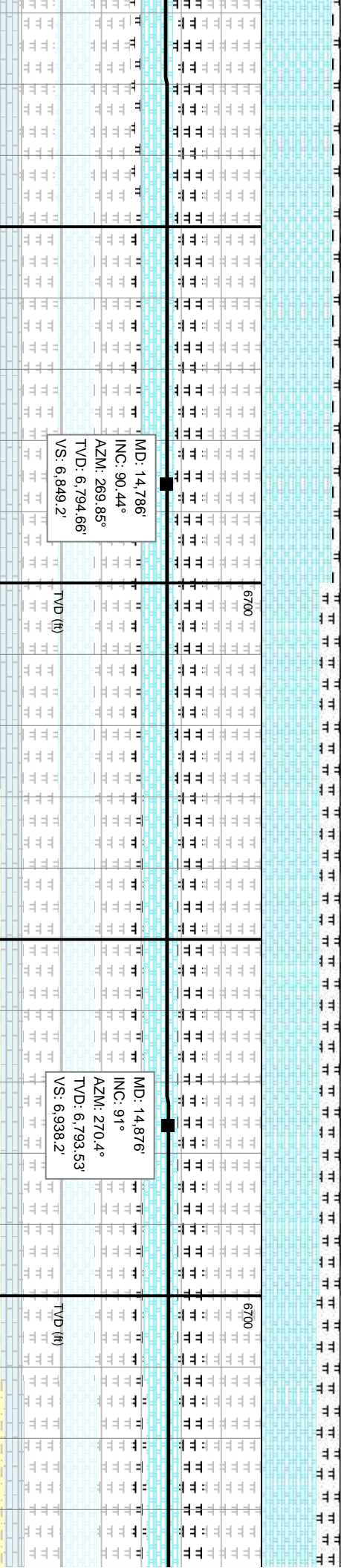
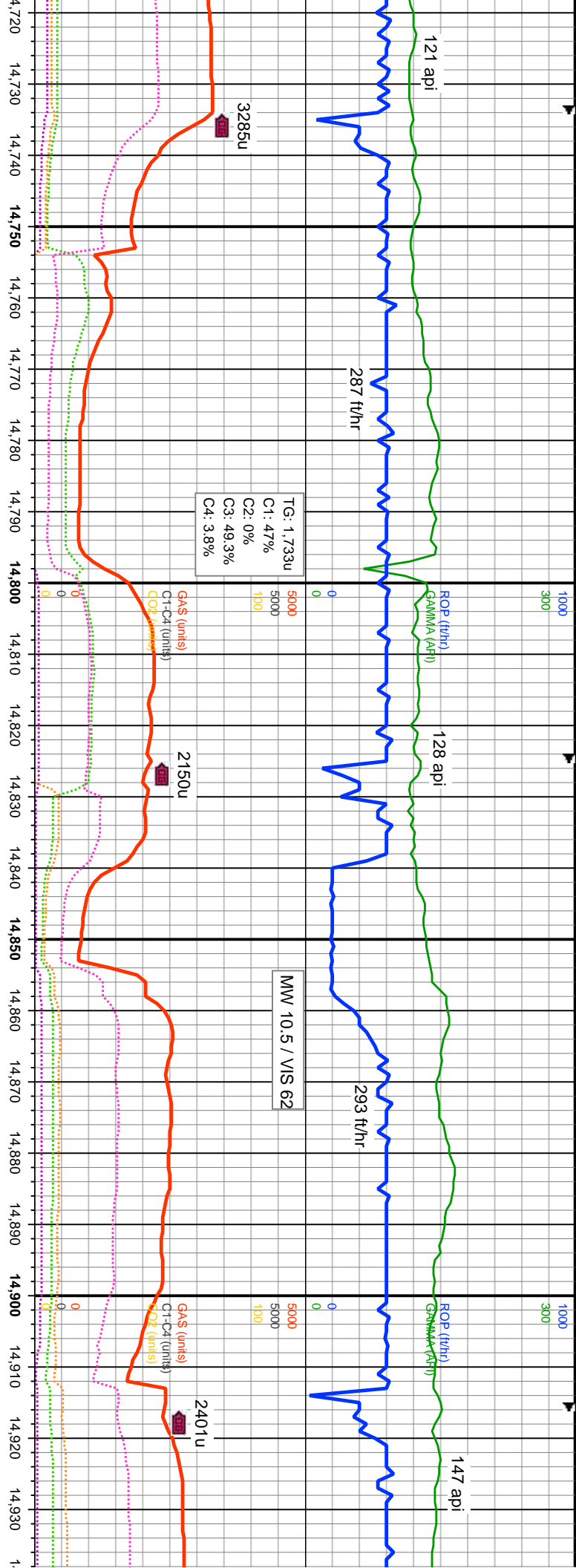












ndk brn, mod frm-frm, sb blkly-blky, drty, mot, v rthy, v calc, slty ip, 10%  
k gy, sl frm, sb blkly-blky, rthy, slty, suc, arg, calc, grdg to chk ip, rr inoc

75% CHK: lt brn-dk brn, mod frm-frm, sb blkly-blky, drty, mot, v rthy, v calc, slty ip, 25%  
MRL: dk brn-dk gy, sl frm, sb blkly-blky, rthy, slty, suc, arg, calc, grdg to chk ip, rr inoc

70% CHK: lt brn-dk brn, mod frm-frm, sb blkly-blky, drty, mot, v rthy, v calc, slty ip, 25%  
MRL: dk brn-dk gy, sl frm, sb blkly-blky, rthy, slty, suc, arg, calc, grdg to chk ip, rr inoc

7100

7100

