



Scale: 5" / 100'
Measured Depth Log

Well Name Raindance FC 23-249HN

Location SECTION 30, T6N, R67W

State COLORADO

County WELD

Country UNITED STATES

Rig Number PD 462

API Number 05123515820000

AFE # 20DC0370

Geographic Region DJ BASIN

Field WATTENBERG

Ground Elevation 4788'

K.B. Elevation 4808'

Logged Interval 6000' To 20928

Total Depth 20928'

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 09/03/2021





MUDLOG END DATE 09/08/2021

Rock Types

 Chalk
 Silty Shale
 Shaly Siltstone
 BENTONITE

Other Symbols

Engineering

 CONNECTION (RIGHT)
 CONNECTION GAS
 FAULT
 MN DEPTH

Onsite Geological Services provided by
Terra **Guidance**

Loggers on Location: 09/02/2021

Logging Depth Reached:

02:29 MT, 09/03/2021

Bloodhound Unit: #5951

Sample Collection/Description Interval:

Curve 50'

Tangent/Lateral 100'

Drilling Data

ROP

GAMMA

Total Gas & Chromatograph

GAS

C1

C2

C3

C4

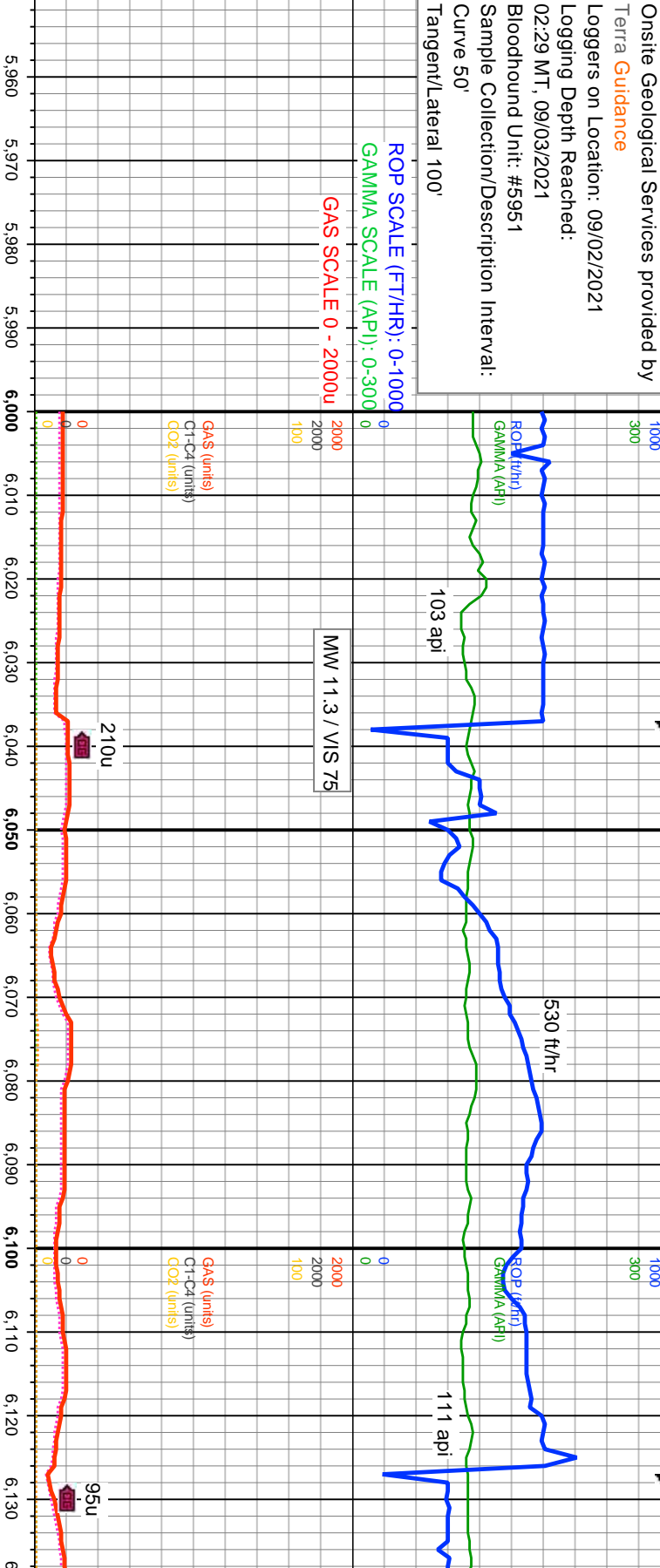
CO2

Depth

Images

% Lithology

Well Bore
TVD

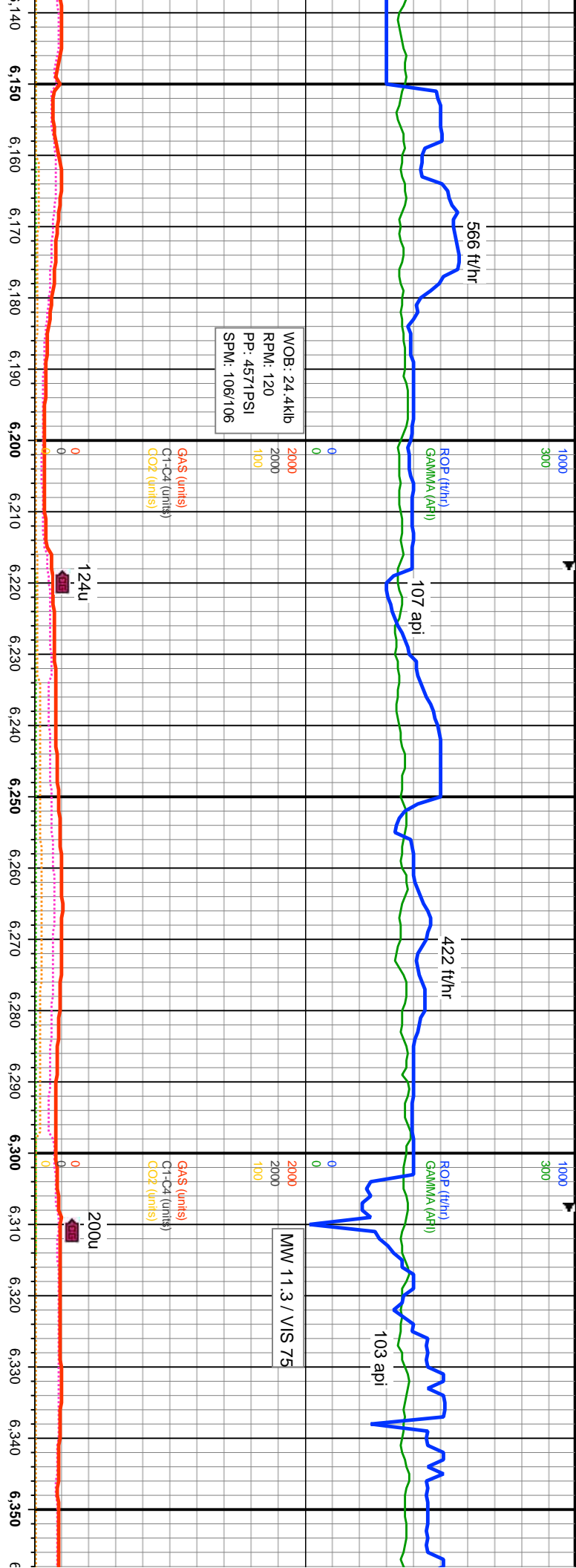


MD: 6.087°
INC: 37.64°
AZM: 21.66°
TVD: 5.556.35'
VS: -310.2'

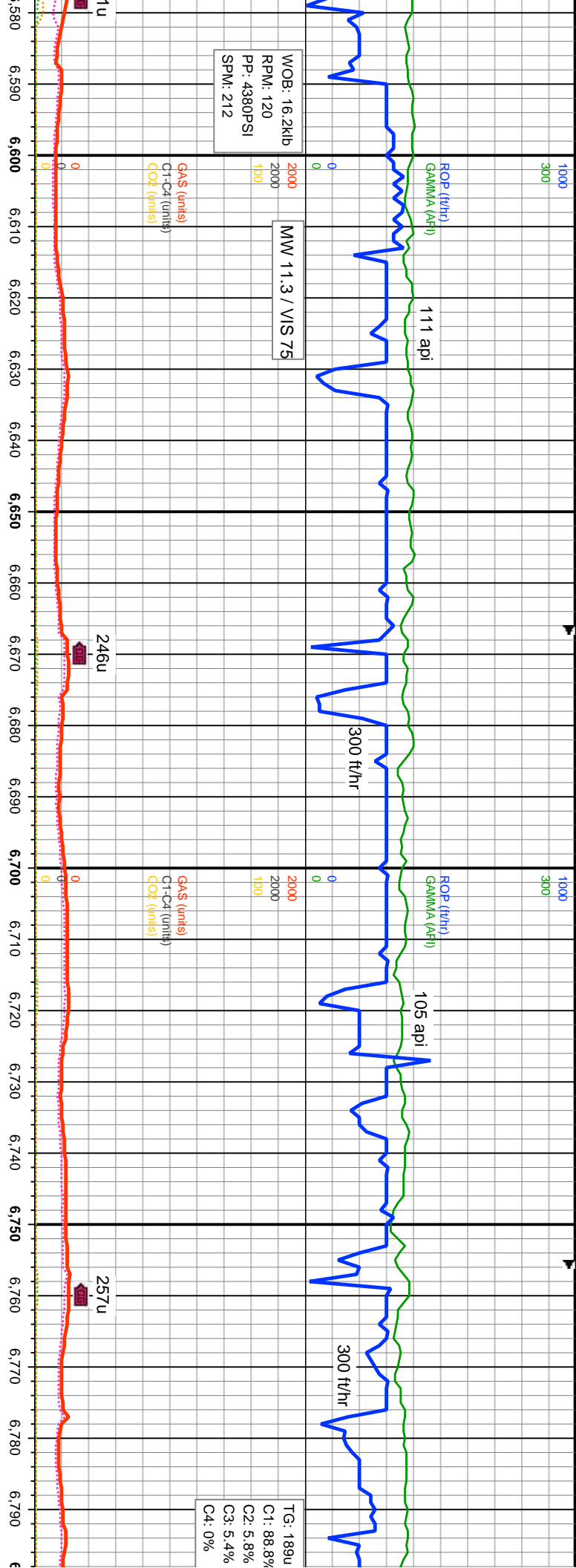
Bit #: 1
Size: 8.5"
Make: Smith
Model: PDC N516
Jets: 3x11, 4x10
S/N: JV4809
Depth In: 2,053'

100% SHY SLTST: lt-med gy, blk-y-sb pty, mod st-fri, arg, slty, rthy, grdy to v' silst
ip, sl calc cmt, mod calc

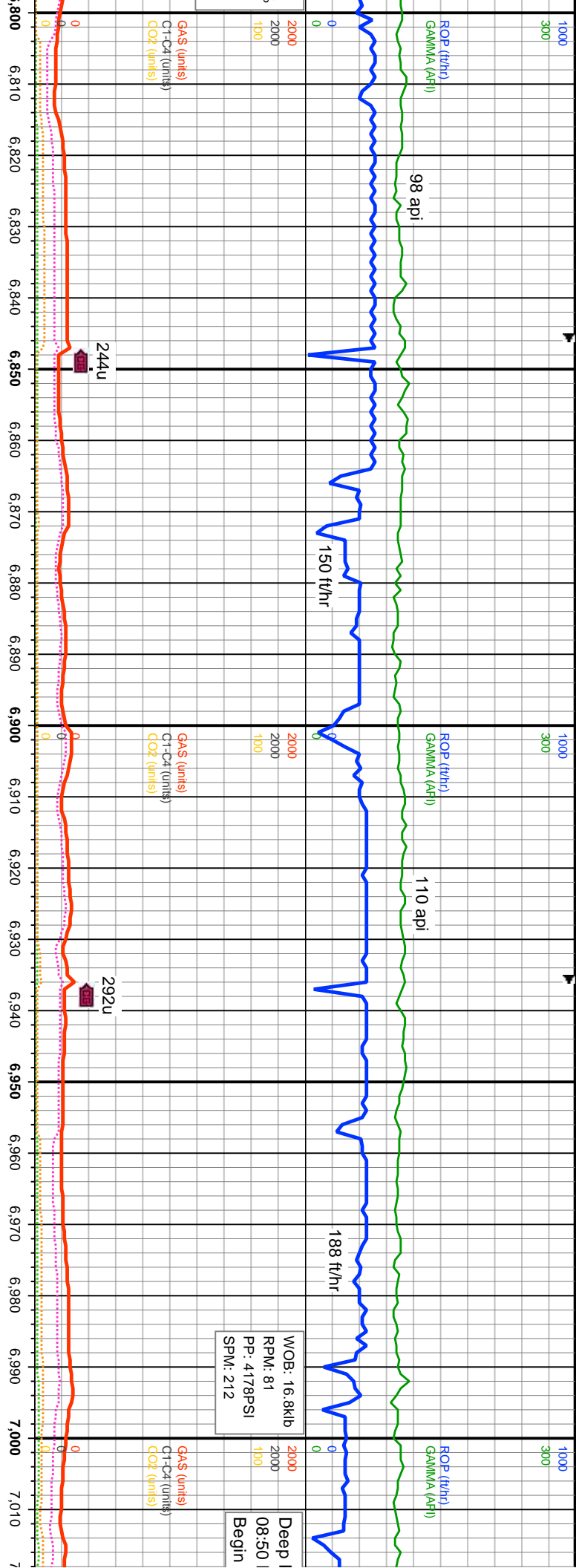
100% SHY SLTST: lt-med gy,
ip, sl calc cmt, mod calc



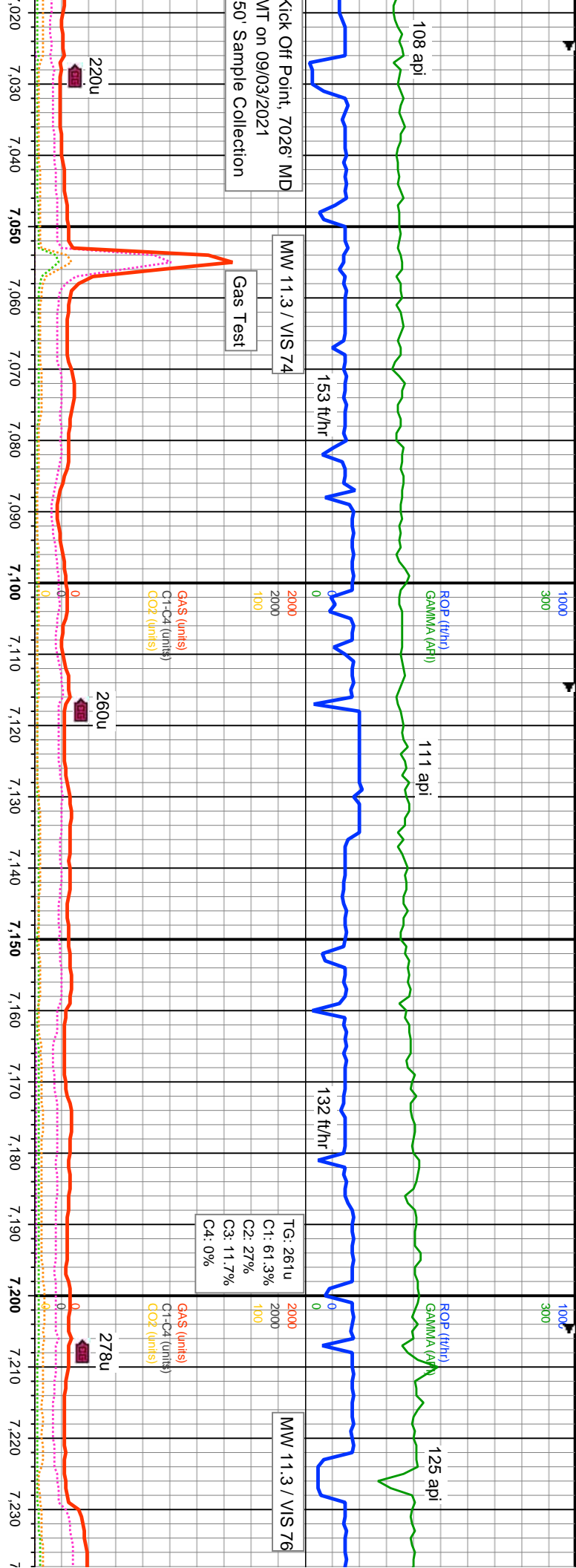
biky-sb plty, mod sft-fri, arg, silty, rthy, grdg to vf silst	<div>MD: 6.177' INC: 37.95° AZM: 21.55° TVD: 5.627.47' VS: -319.52'</div>		TVD (ft)		100% SHY SLTST: lt-med gy, biky-sb plty, mod sft-fri, arg, silty, rthy, grdg to vf silst ip, sl calc cmt, mod calc
biky-sb plty, mod sft-fri, arg, silty, rthy, grdg to vf silst	<div>MD: 6.267' INC: 38.09° AZM: 21.47° TVD: 5.698.37' VS: -328.8'</div>		TVD (ft)		100% SHY SLTST: lt-med gy, biky-sb plty, mod sft-fri, arg, silty, rthy, grdg to vf silst ip, sl calc cmt, mod calc
biky-sb plty, mod sft-fri, arg, silty, rthy, grdg to vf silst	<div>MD: 6.356' INC: 37.3° AZM: 20.9° TVD: 5.76° VS: -337.6'</div>		TVD (ft)		100% SHY SLTST: lt-med gy, biky-sb plty, mod sft-fri, arg, silty, rthy, grdg to vf silst ip, sl calc cmt, mod calc






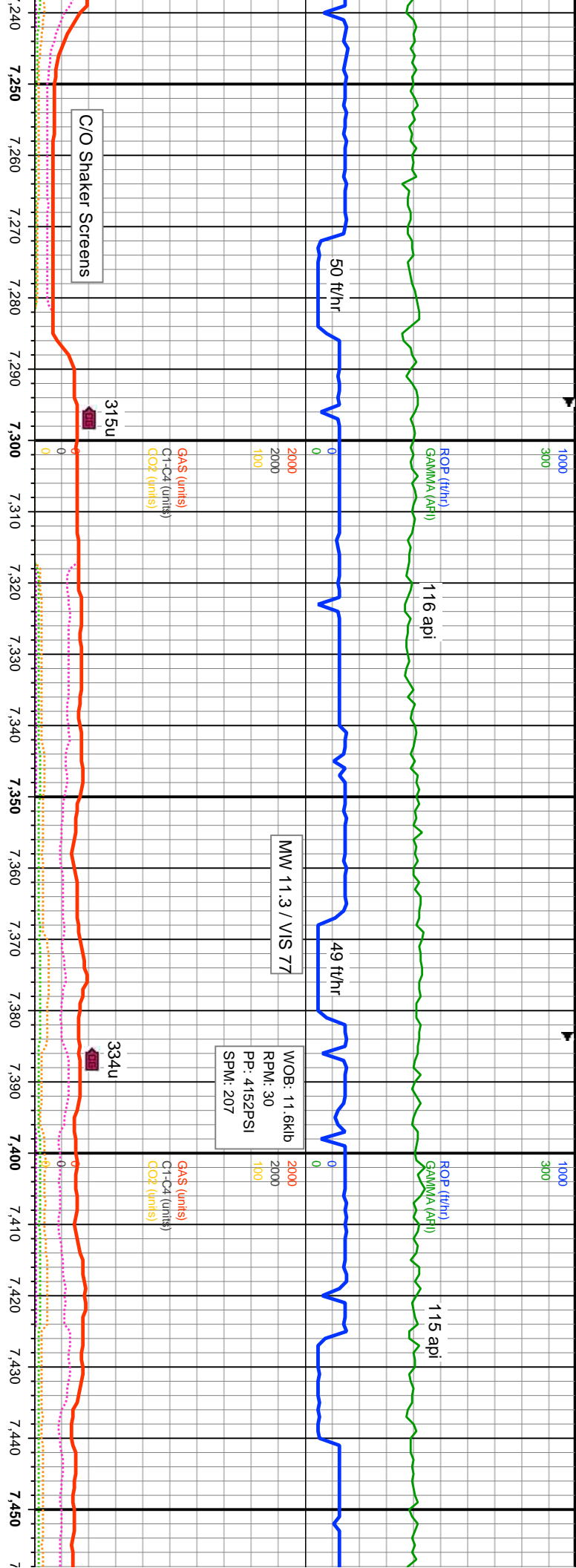
0 v/siltst ip, sl calc	5400	MD: 6.625' INC: 37.72° AZM: 21.36° TVD: 5.981.12' VS: -364.42'	5400	100% SHY SLTST: lt-med gy, blkly-sb blkly, frm-hd, arg, silty, rthy, grdgy to v/siltst ip, sl calc cnt, mod calc
0 v/siltst ip, sl calc	8500	MD: 6.715' INC: 37.99° AZM: 21.87° TVD: 6.052.18' VS: -373.77'	8500	100% SHY SLTST: gy-med gy, blkly-sb blkly, sb ply ip, frm-hd, arg, silty, rthy, grdgy to v/siltst ip, sl calc cnt, mod calc



MD: 6.805' INC: 37.82° AZM: 21.53° TVD: 6,123.19' VS: -383.2'		MD: 6.884' INC: 37.82° AZM: 21.79° TVD: 6,193.49' VS: -392.48'		MD: 6.984' INC: 38.06° AZM: 21.51° TVD: 6,264.46' VS: -401.87'	
100% SHY SLTST: gy-med gy, blk-y-sb blk-y, frm-hd, arg, silty, rthy, grdg to vf slst ip, non calc		100% SHY SLTST: gy-med gy, blk-y-sb blk-y, frm-hd, arg, silty, rthy, grdg to vf slst ip, calc		80% SHY SLT mod frm-frm, a ip, v sl calc: 20 stf-sl frm, blk-y-	
8500		8500		8500	



					
<p>ST: gy-med gy, sb blk-y-bkly, arg, silty, rthy, grdg to vf slst % SLTY SH: med gy, mod sb blk-y, silty, arg, v sl calc</p>		<p>80% SHY SLTST: lt gy-med gy, sb blk-y-bkly, mod frm-frm, arg, silty, rthy, grdg to c sh ip, non calc; 20% SLTY SH: med gy, mod sft-sl frm, blk-y-sb blk-y, silty, arg, v sl calc</p>		<p>60% SHY SLTST: lt gy-med gy, sb blk-y-bkly, mod frm-frm, arg, silty, rthy, grdg to c sh ip, non calc; 40% SLTY SH: med gy, mod sft-sl frm, blk-y-sb blk-y, silty, arg, v sl calc</p>	
<p>MD: 7.074' INC: 38.15° AZM: 12.72° TVD: 6.335.34' VS: 406.93'</p>		<p>5400</p>		<p>MD: 7.163' INC: 37.82° AZM: 355.92° TVD: 6.405.67' VS: 399.81'</p>	
<p>8500</p>		<p>5400</p>		<p>8500</p>	



MD: 7.253'
INC: 37.7°
AZM: 350.63°
TVD: 6.476.84'
VS: -382.24'

MD: 7.343'
INC: 38.01°
AZM: 336.16°
TVD: 6.548.04'
VS: -356.04'

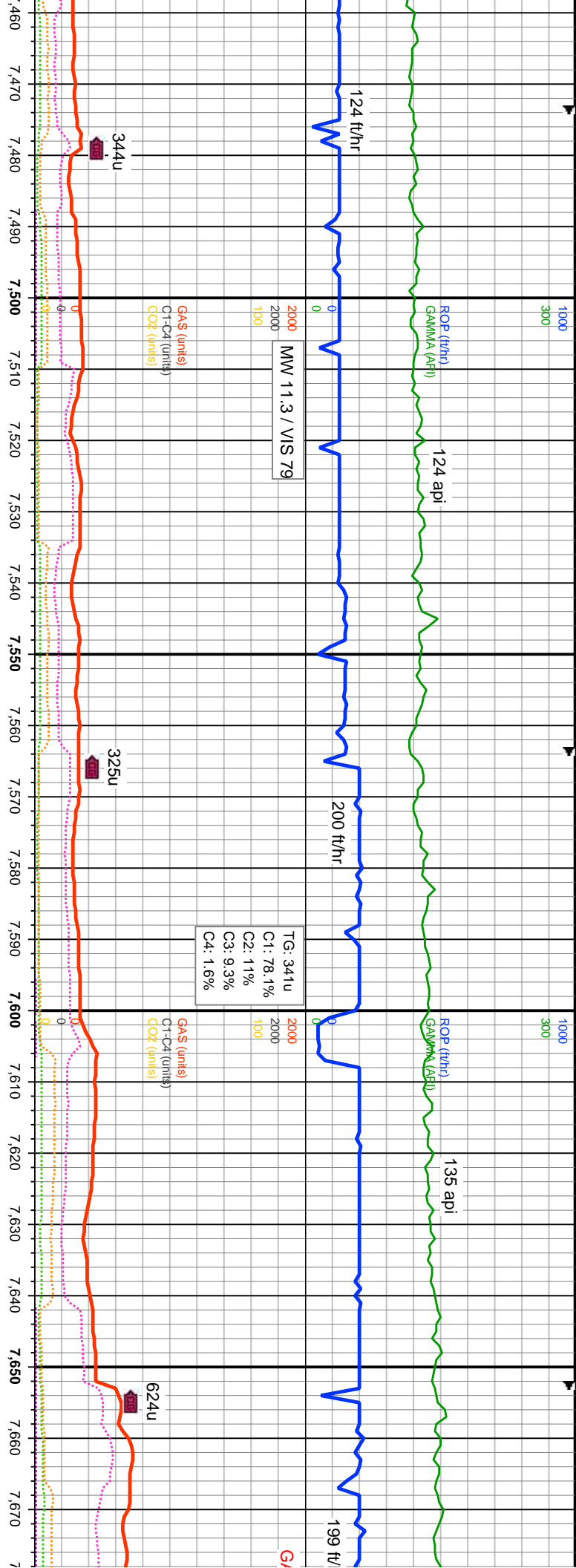
MD: 7.433'
INC: 39.48°
AZM: 329.4°
TVD: 6.618.26'
VS: -320.51'

80% SLTY SH: lt-dk gy, lt brn ip, mod sft-sl
frm, sb blkly-bkly, sb pily ip, slty, arg, v sl calc;
20% SHY SLTST: gy-med gy, sb blkly-bkly,
mod sft-frm, arg, slty, rthy, v sl calc

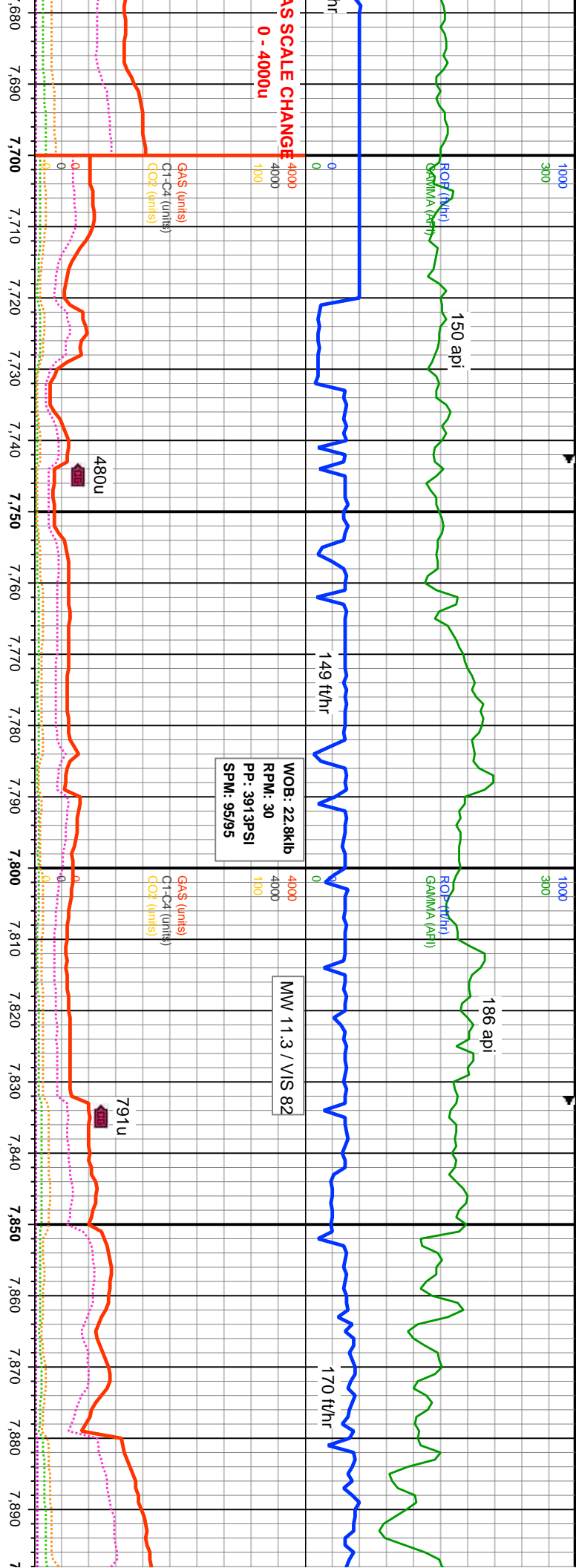
90% SLTY SH: gy-med brn, med gy ip,
blkly-sb pily, mod frm-fri, slty, arg, v sl calc;
10% SHY SLTST: gy-med gy, sb blkly-bkly,
mod sft-frm, arg, slty, rthy, v sl calc

90% SLTY SH: gy-med brn, med gy ip,
blkly-sb pily, mod frm-fri, slty, arg, v sl calc;
10% SHY SLTST: gy-med gy, sb blkly-bkly,
mod sft-frm, arg, slty, rthy, v sl calc

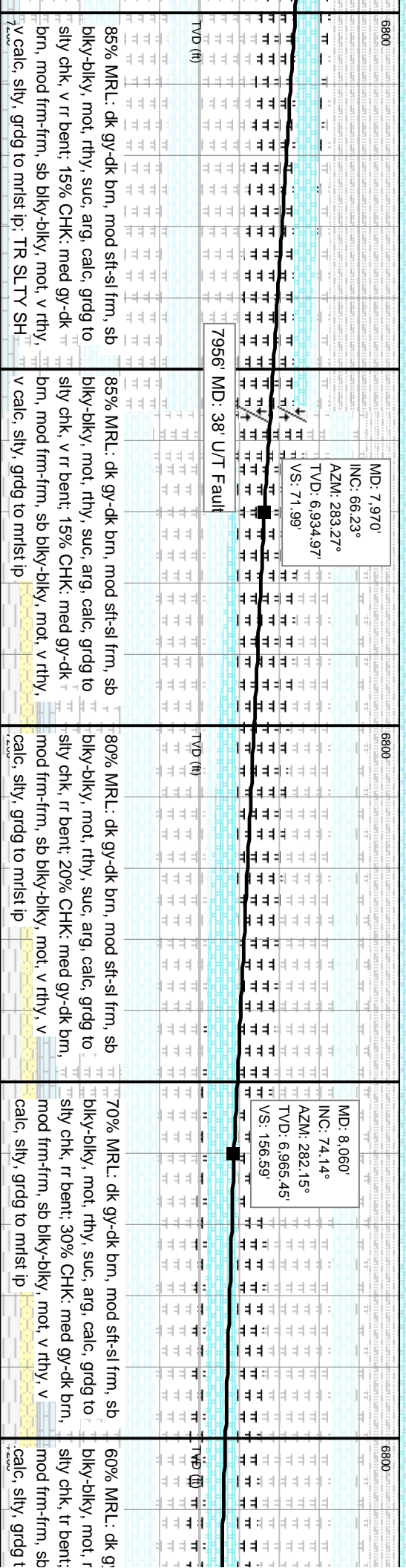
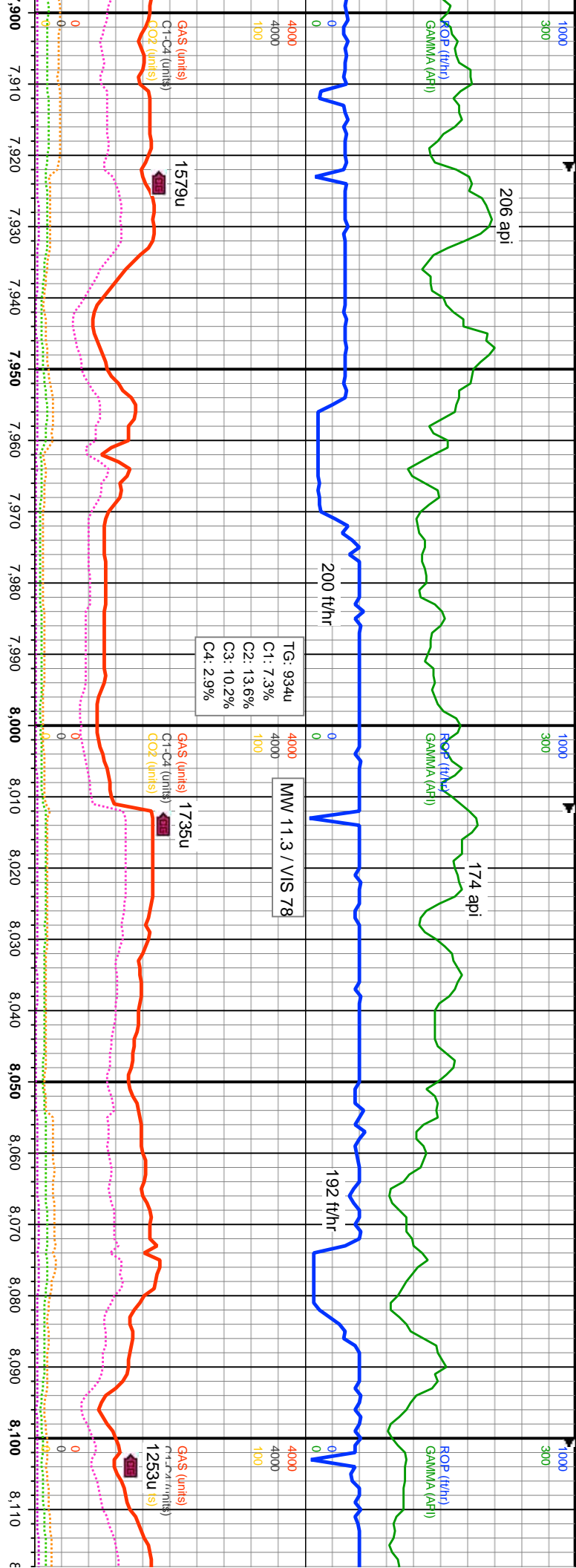
100% SLTY SH: med gy-med brn, blkly-sb
pily, mod frm-fri, slty, arg, v sl calc, grdg to
blkly grdg

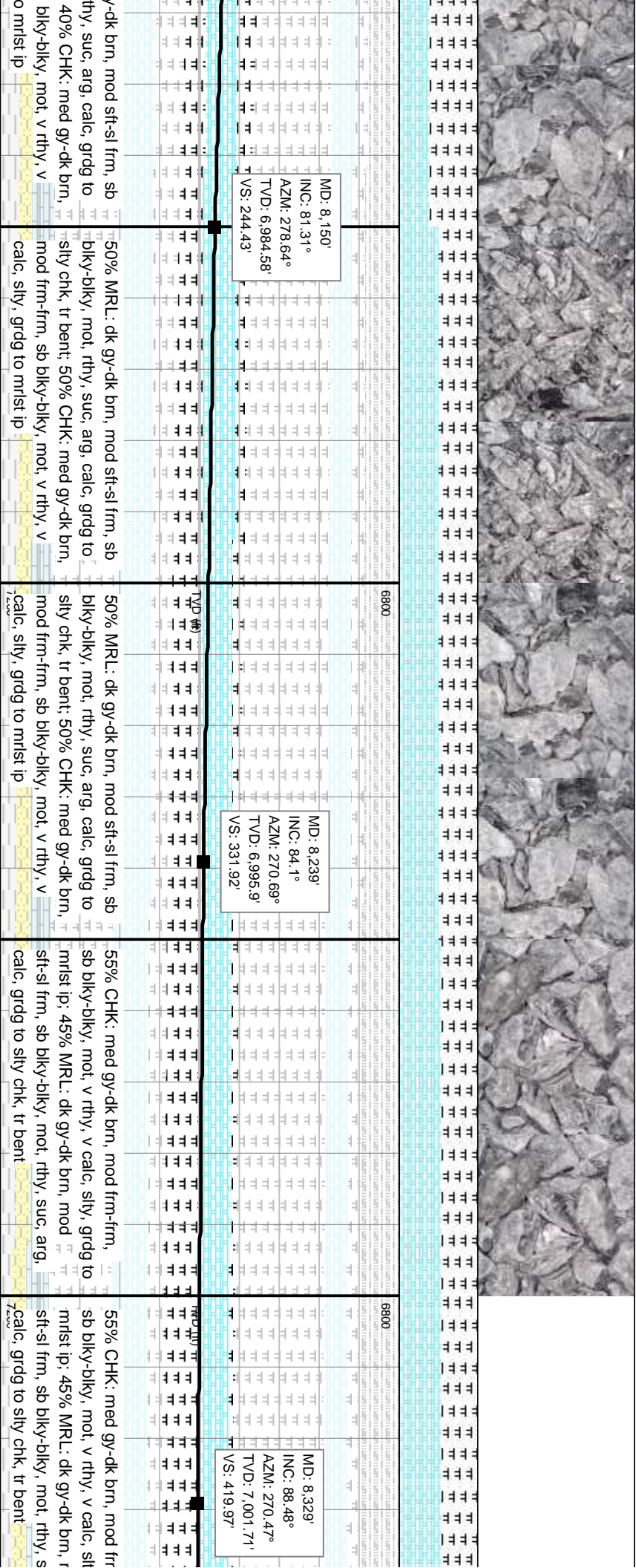
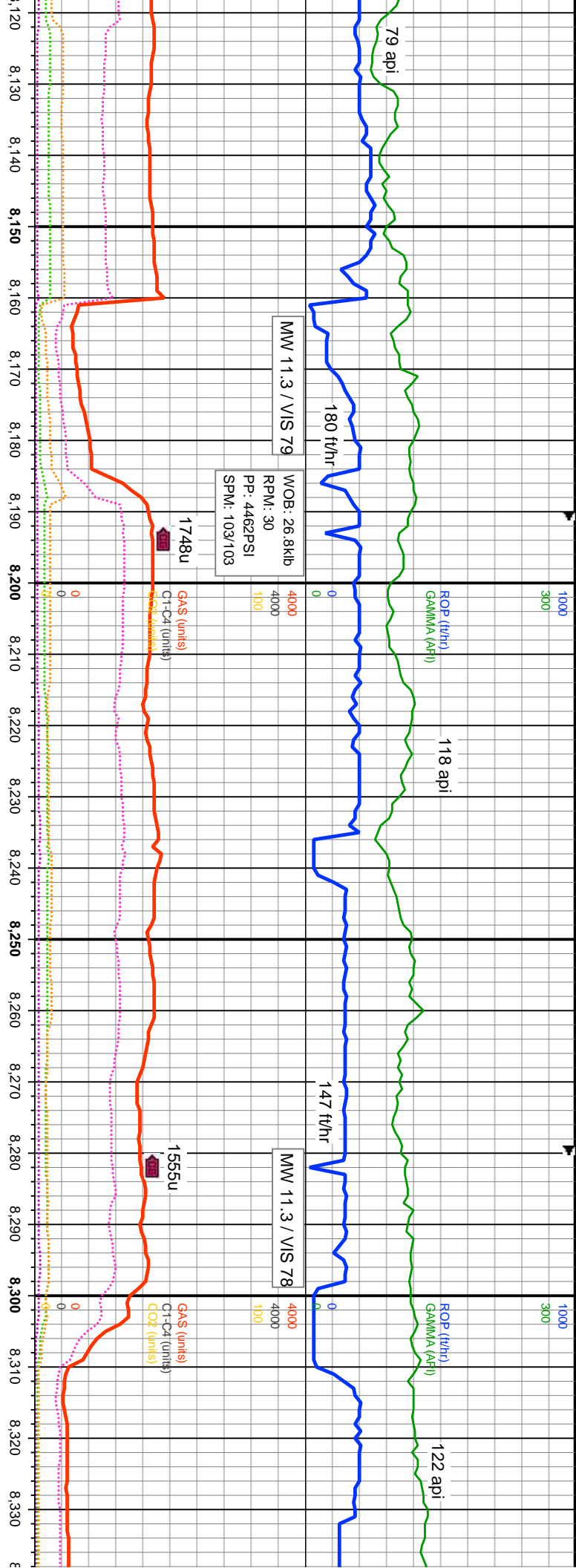


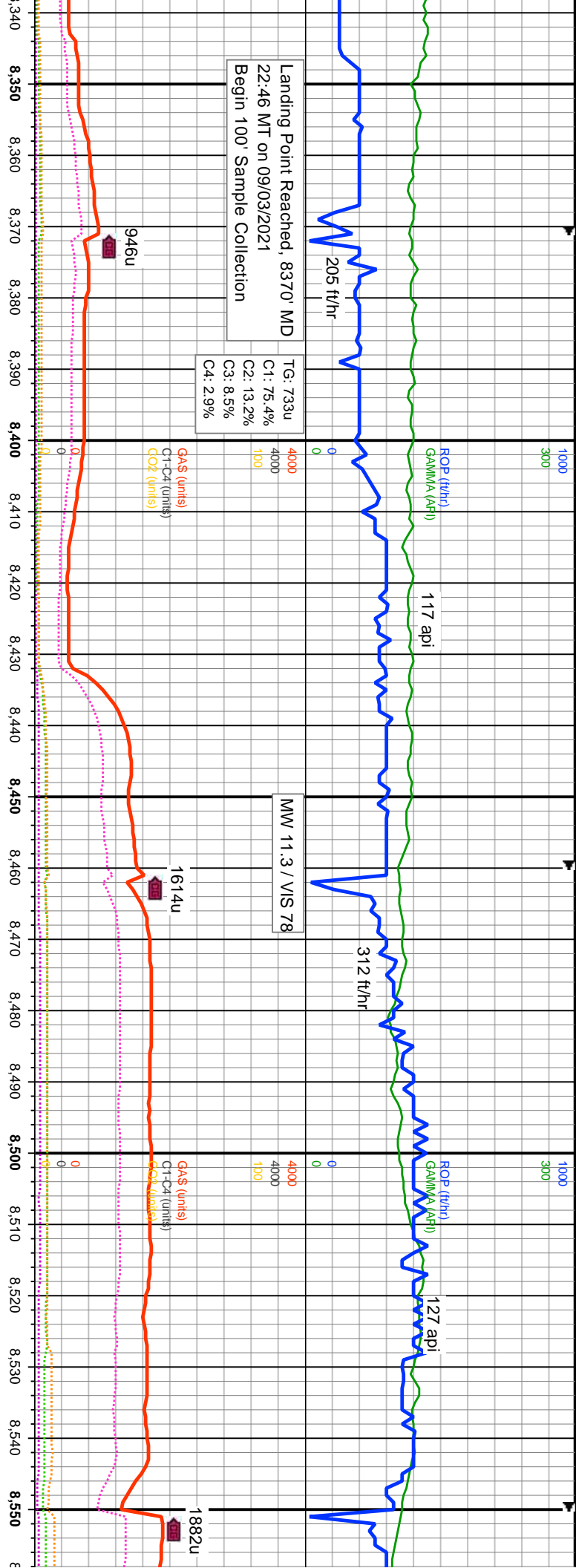
100% SLTY SH: med gy-med brn, blkly-sb blkly, mod frm-fri, silty, arg, sl calc, grdgd to vf silst ip	<div>MD: 7.522' INC: 46.32° AZM: 317.83° TVD: 6,683.52' VS: -275.23'</div>	100% SLTY SH: med brn-brn-med gy, blkly-sb blkly, mod frm-fri, silty, arg, sl calc, grdgd to vf silst ip, rr bent	<div>MD: 7.611' INC: 52.25° AZM: 307.24° TVD: 6,741.65' VS: -217.24'</div>	100% SLTY SH: med brn blkly-sb blkly-sb blkly, mod sl calc cmt, grdgd to vf silst
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100% SLTY SH: med brn-brn-med gy, blkly-sb blkly-sb pty, mod frm-fri, silty, arg, sl calc cmt, grdg to vf slst ip	90% SLTY SH: med brn-brn-med gy, blkly-sb blkly-sb pty, mod frm-fri, silty, arg, sl calc cmt, grdg to vf slst ip; 10% MRL: dk gy-dk brn, mod sft-sl frm, sb blkly-blky, v mot, rthy, suc, arg, calc, grdg to silty	60% MRL: dk gy-dk brn, mod sft-sl frm, sb blkly-blky, mot, rthy, suc, arg, calc, grdg to silty chk, v rr bent; 40% SLTY SH: med brn-brn-med gy, blkly-sb blkly-sb pty, mod frm-fri, silty, arg, sl calc cmt, grdg to vf slst ip; TR CHK	90% MRL: dk gy-dk brn, mod sft-sl frm, sb blkly-blky, mot, rthy, suc, arg, calc, grdg to silty chk, v rr bent; 10% CHK: med gy-dk brn, mod frm-fri, sb blkly-blky, mot, v rthy, v calc, silty, grdg to mlst ip; TR SLTY SH
MD: 7.701' INC: 51.65° AZM: 303.73° TVD: 6.797.13' VS: -152.32'	MD: 7.791' INC: 57.01° AZM: 297.48° TVD: 6.849.64' VS: -83.12'	MD: 7.880' INC: 61.41° AZM: 290.22° TVD: 6.895.23' VS: -8.4'	







Landing Point Reached, 8370' MD
22:46 MT on 09/03/2021
Begin 100' Sample Collection

TG: 733u
C1: 75.4%
C2: 13.2%
C3: 8.5%
C4: 2.9%

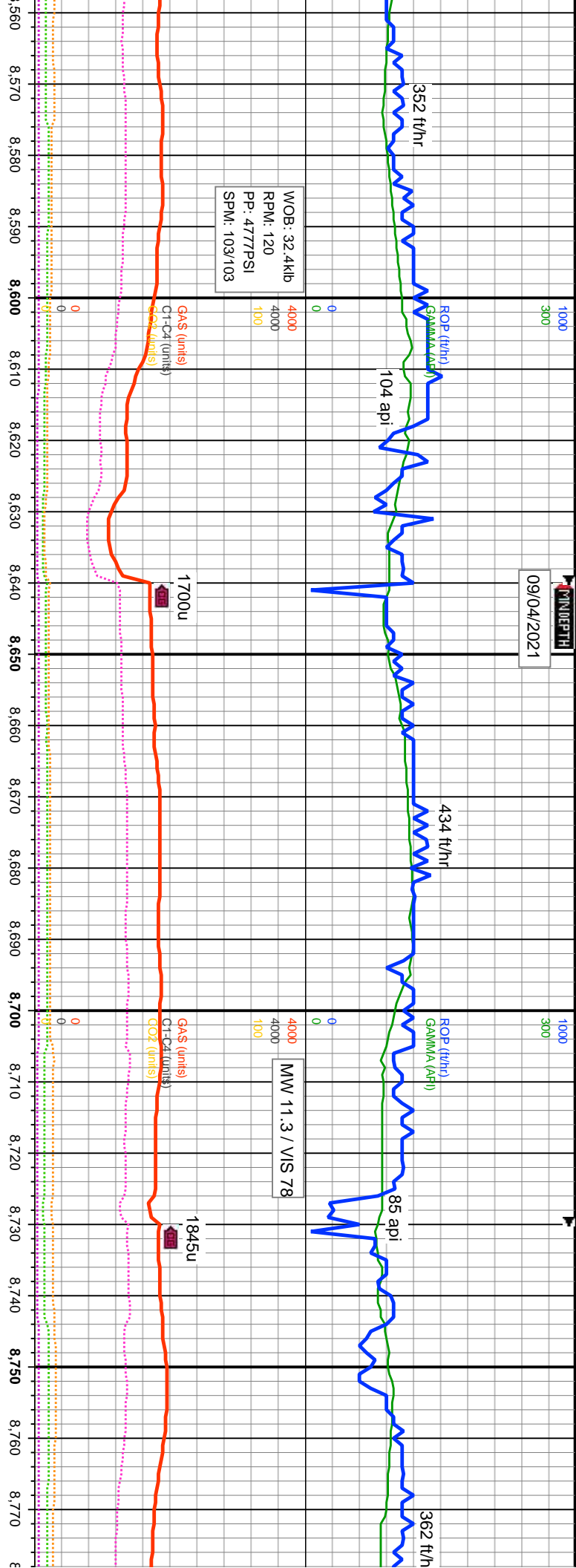
MW 11.3 / VIS 78

MD: 8.419'
INC: 90.22°
AZM: 269.62°
TVD: 7.002.73'
VS: 508.05'

MD: 8.508'
INC: 90.06°
AZM: 269.43°
TVD: 7.002.51'
VS: 594.99'

60% CHK: med gy-dk brn, mod frm-frm, sb blk-y-bkly, mot, v rthy, v calc, slty, grdg to mist ip, 40% MRL: dk gy-dk brn, mod stf-sl frm, sb blk-y-bkly, mot, rthy, suc, arg, calc, grdg to slty chk, rr bent	60% CHK: med gy-dk brn, mod frm-frm, sb blk-y-bkly, mot, v rthy, v calc, slty, grdg to mist ip, 40% MRL: dk gy-dk brn, mod stf-sl frm, sb blk-y-bkly, mot, rthy, suc, arg, calc, grdg to slty chk, rr bent	60% CHK: med gy-dk brn, mod frm-frm, sb blk-y-bkly, mot, v rthy, v calc, slty, grdg to mist ip, 40% MRL: dk gy-dk brn, mod stf-sl frm, sb blk-y-bkly, mot, rthy, suc, arg, calc, grdg to slty chk, rr bent	60% CHK: med gy-dk brn, mod frm-frm, sb blk-y-bkly, mot, v rthy, v calc, slty, grdg to mist ip, 40% MRL: dk gy-dk brn, mod stf-sl frm, sb blk-y-bkly, mot, rthy, suc, arg, calc, grdg to slty chk, rr bent
7200	7200	7200	7200

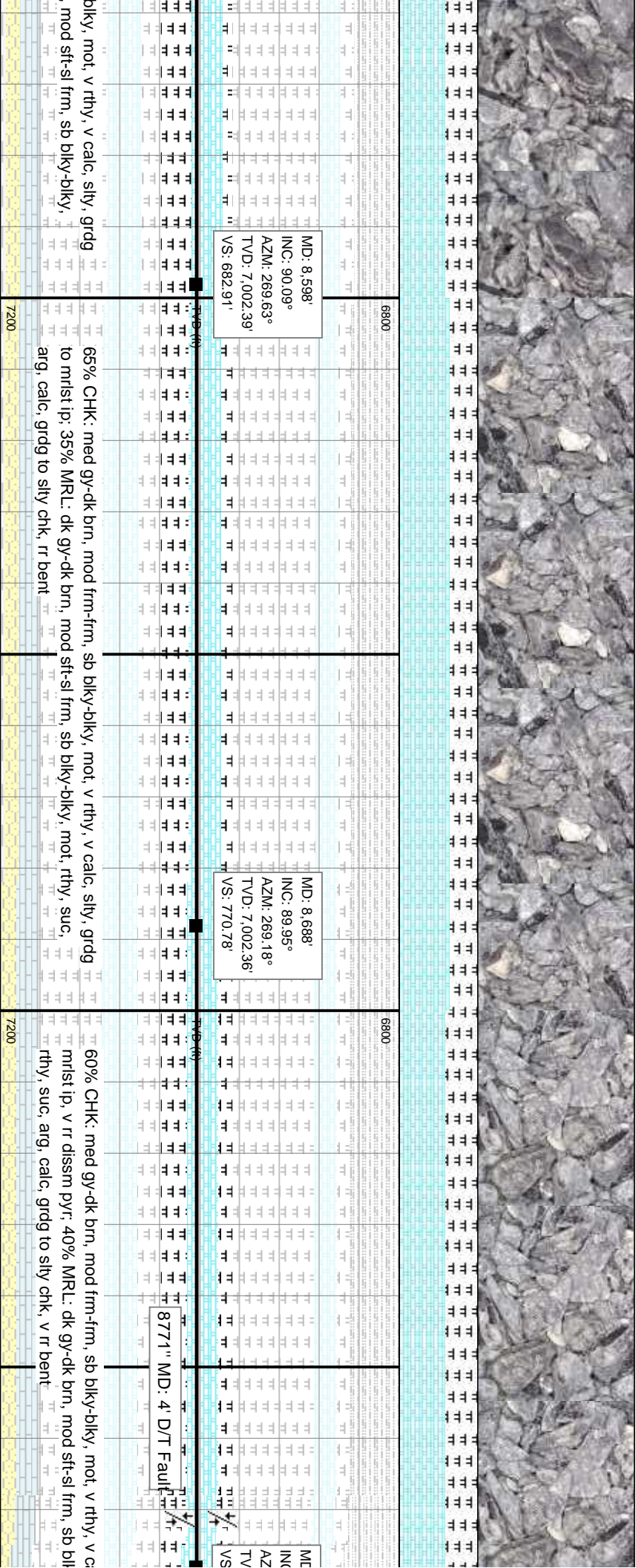
09/04/2021

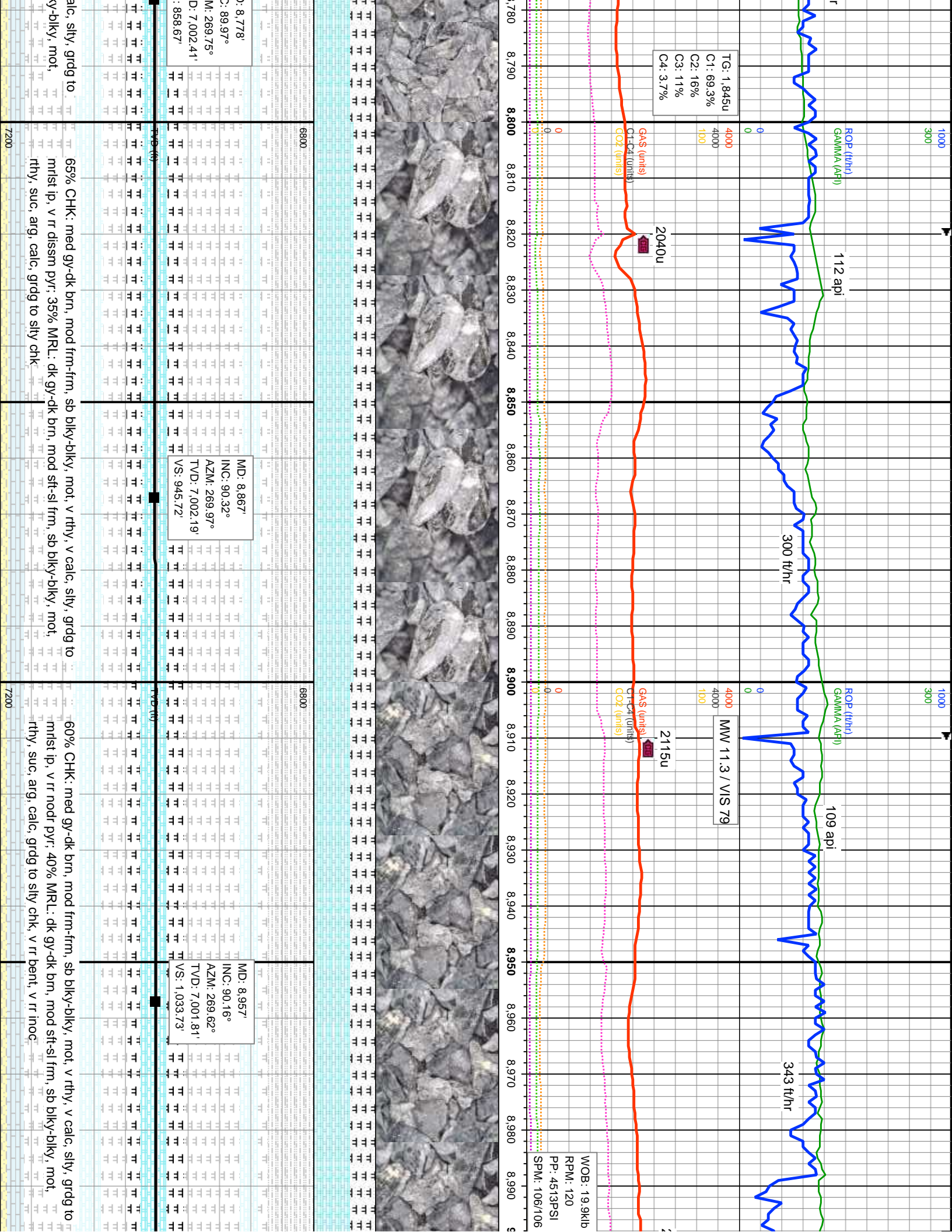


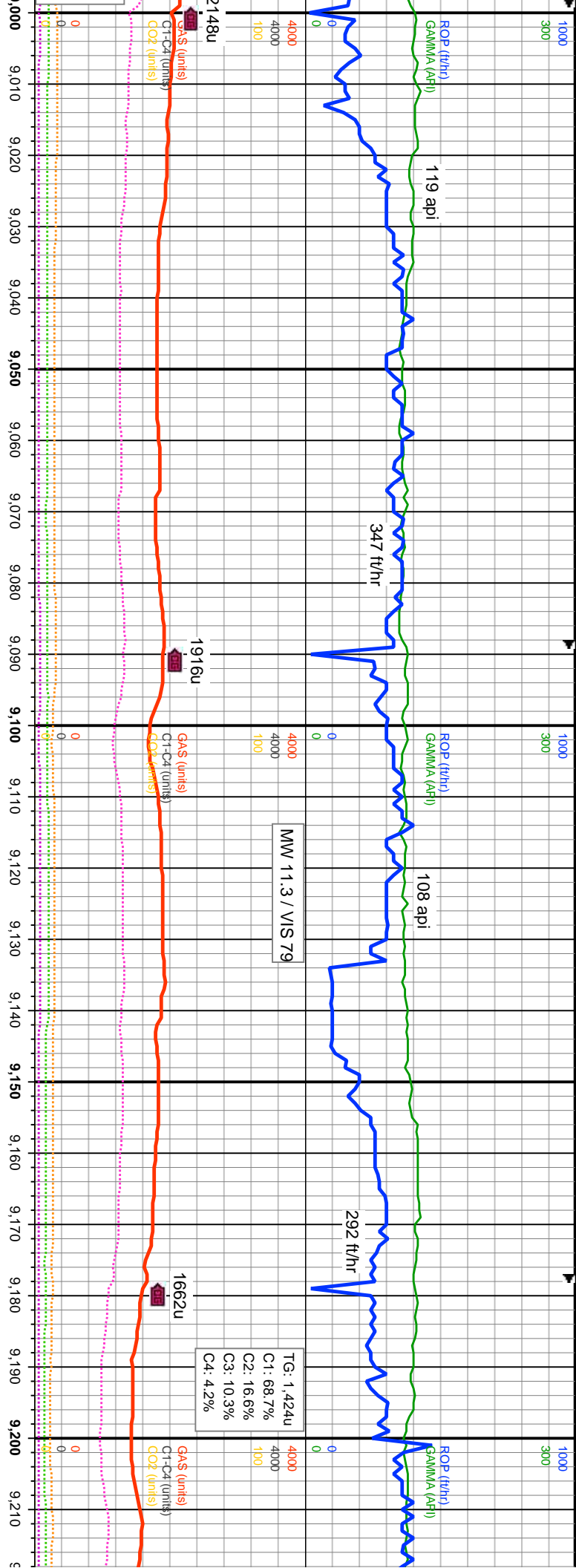
MD: 8.598'
INC: 90.09°
AZM: 269.63°
TVD: 7,002.39'
VS: 682.91'

MD: 8.688'
INC: 89.95°
AZM: 269.18°
TVD: 7,002.36'
VS: 770.78'

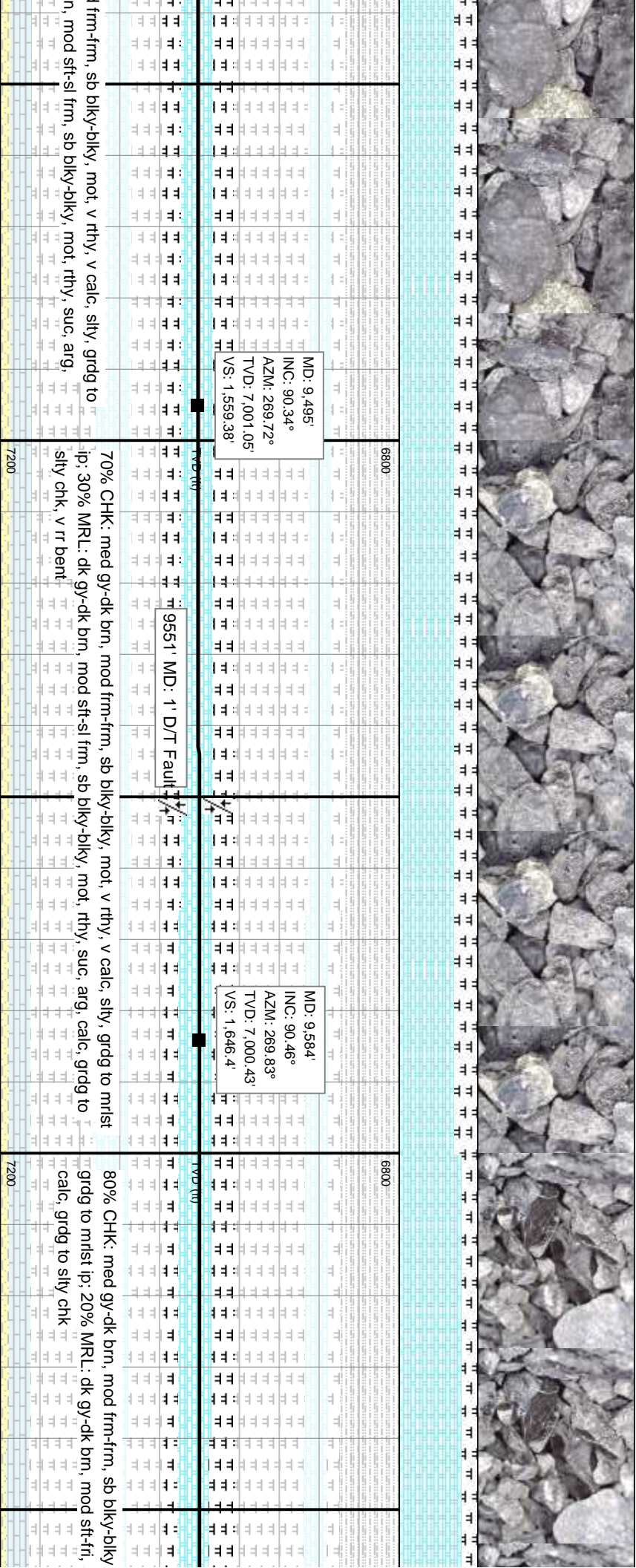
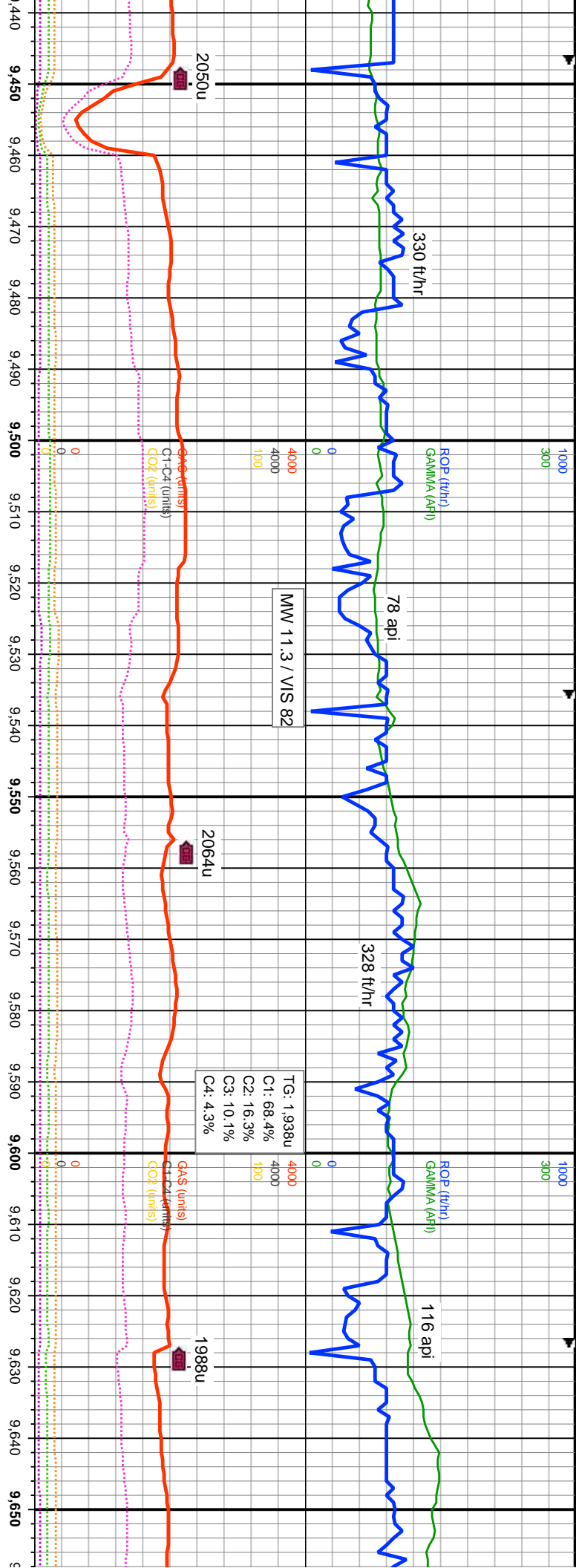
8771' MD: 4 D/T Fault

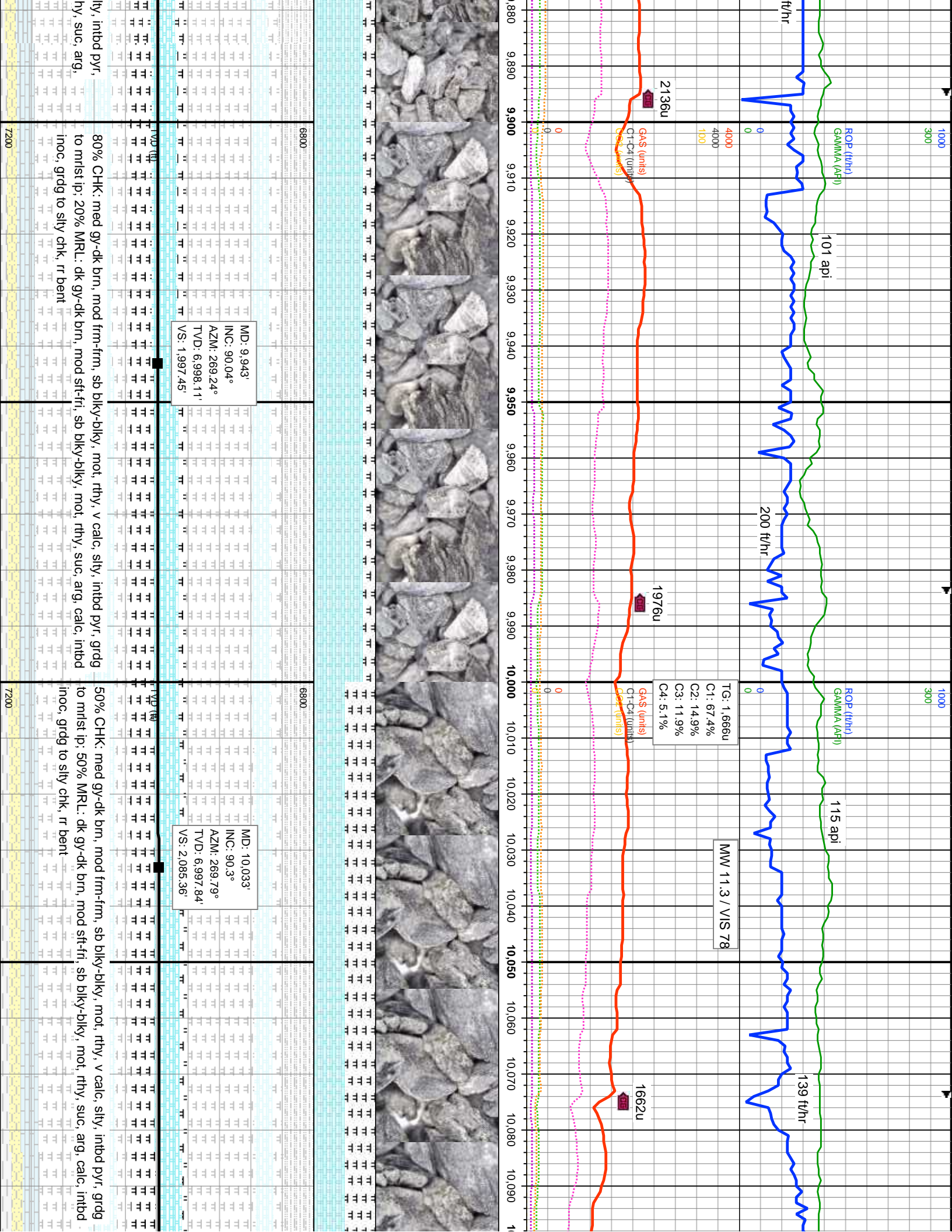


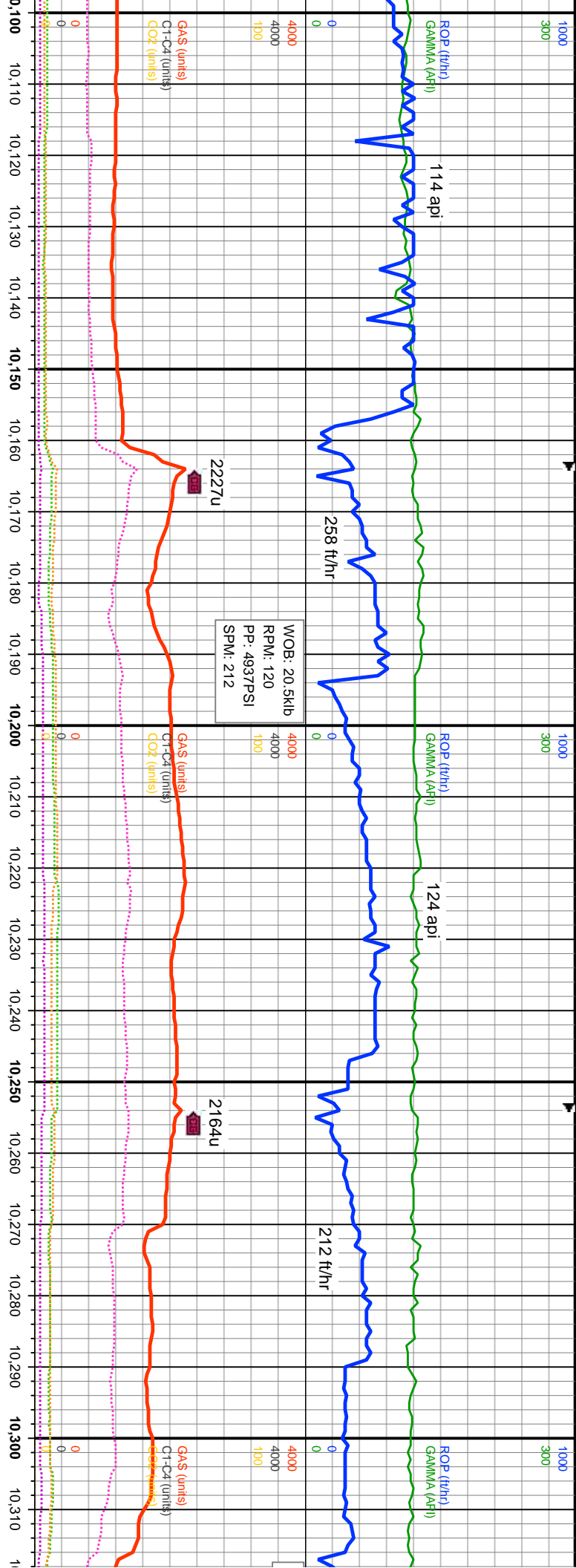




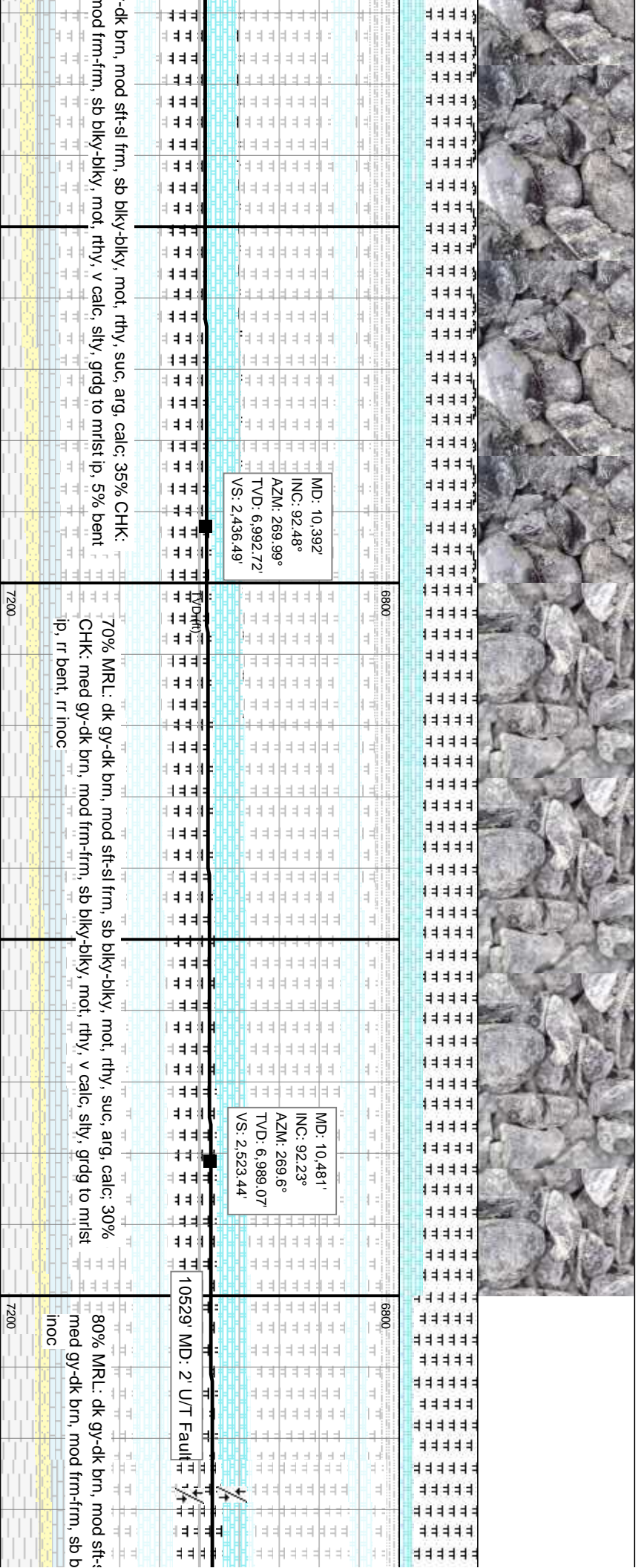
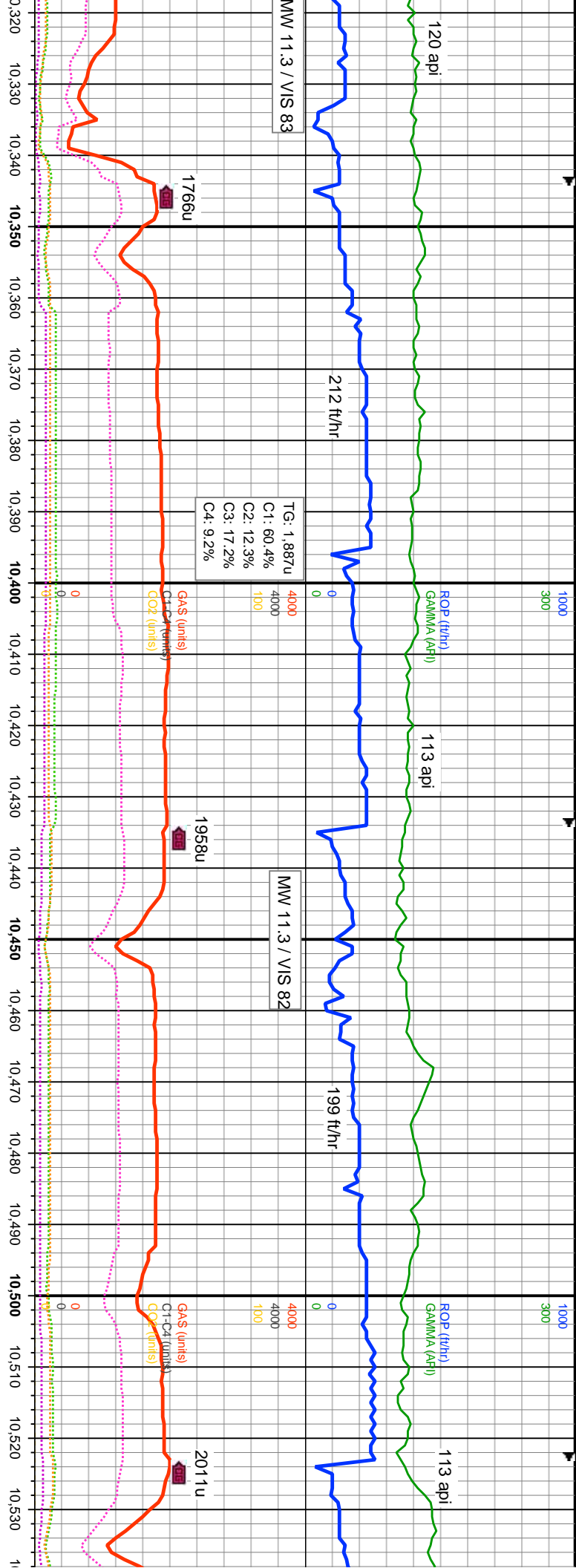
6800		6800		6800	
MD: 9.046'		MD: 9.136'		MD: 9.136'	
INC: 89.91°		INC: 89.97°		INC: 89.97°	
AZM: 269.54°		AZM: 269.64°		AZM: 269.64°	
TVD: 7,001.75'		TVD: 7,001.85'		TVD: 7,001.85'	
VS: 1,120.68'		VS: 1,208.62'		VS: 1,208.62'	
70% CHK: med gy-dk brn, mod frm-frm, sb blk-y-bkly, mot, v rthy, v calc, slty, grdg to mst ip, v rr nodt pyr, 30% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-bkly, mot, rthy, suc, arg, calc, grdg to slty chk, v rr bent		65% CHK: med gy-dk brn, mod frm-frm, sb blk-y-bkly, mot, v rthy, v calc, slty, grdg to mst ip, 35% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-bkly, mot, rthy, suc, arg, calc, grdg to slty chk, v rr bent		65% CHK: m mst ip: 35% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-bkly, mot, rthy, suc, arg, calc, grdg to	
7200		7200		7200	

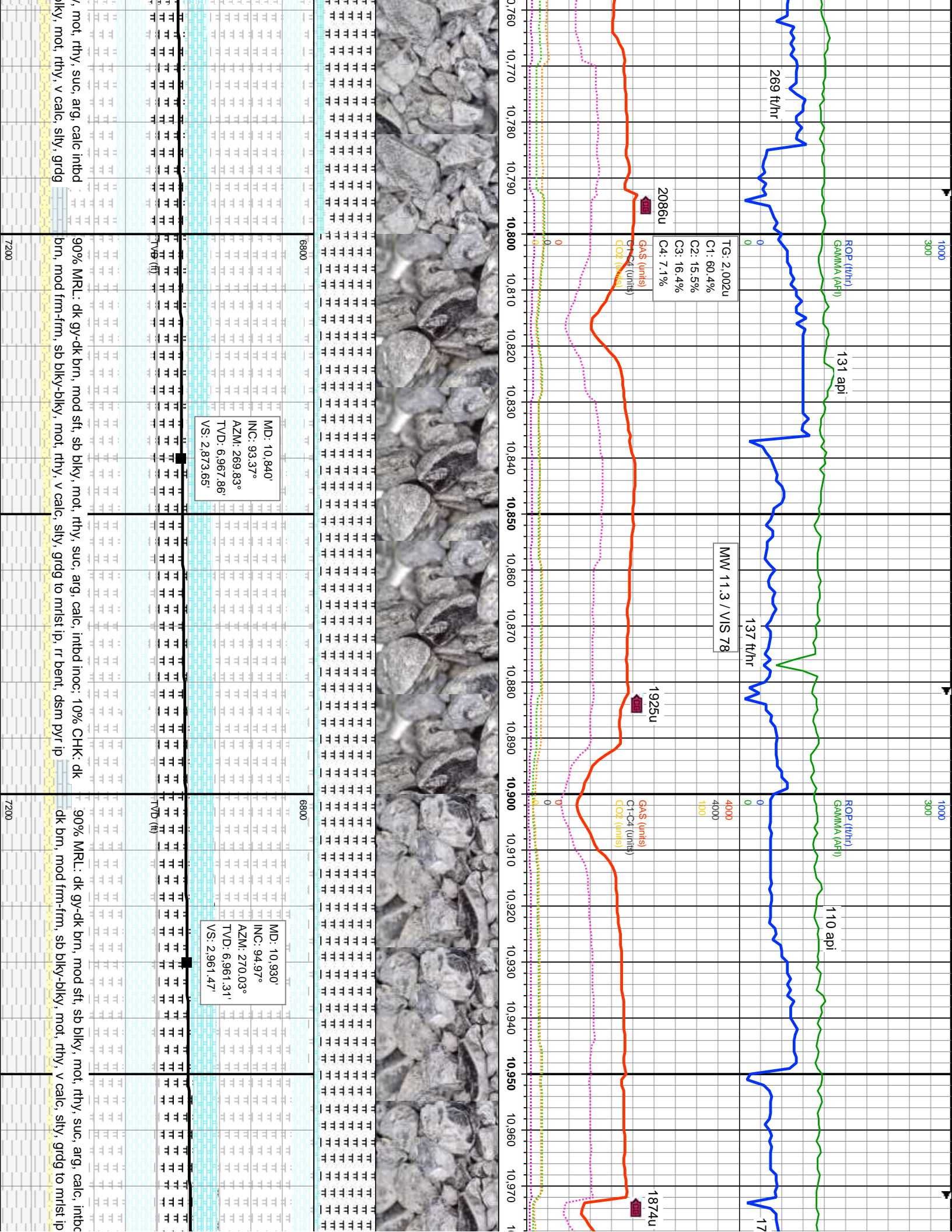


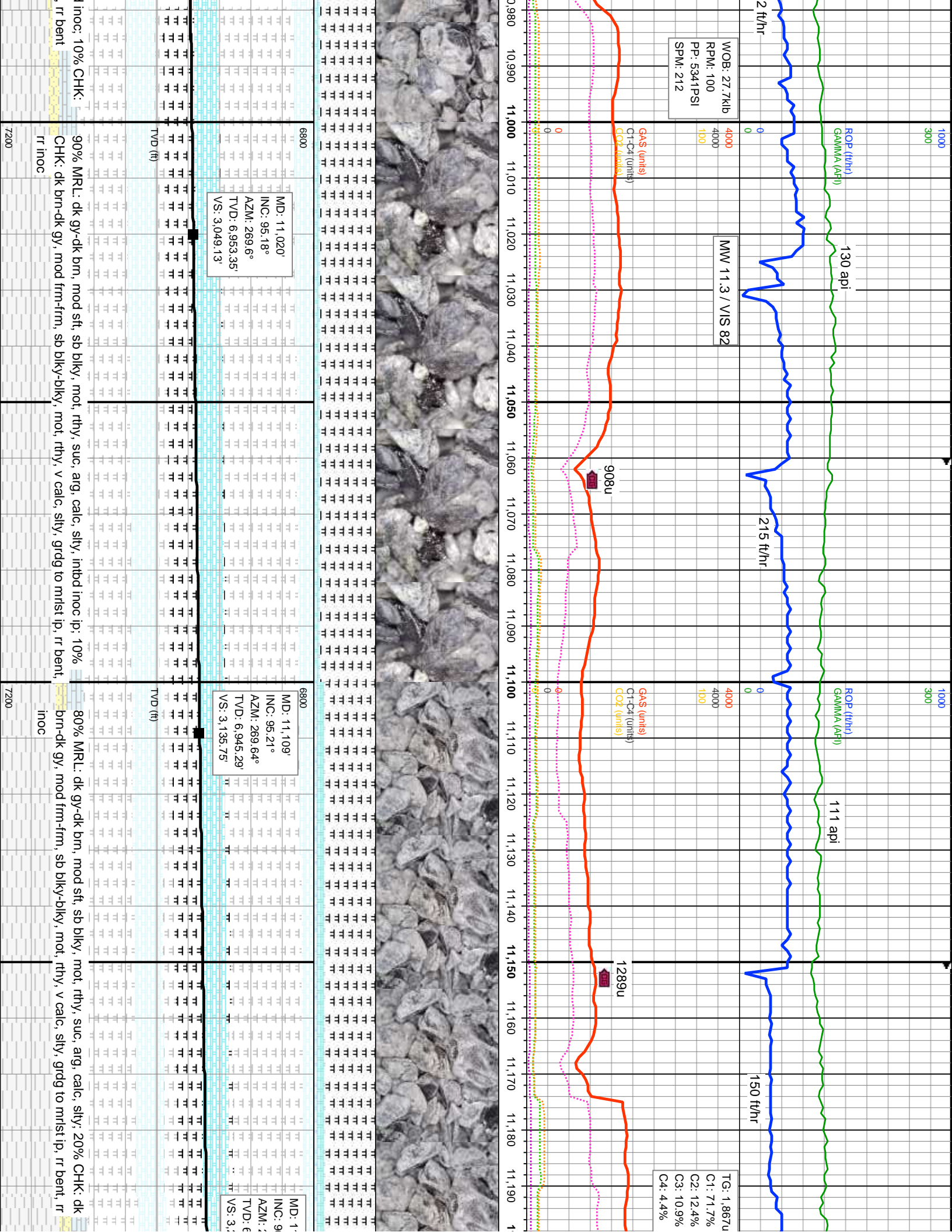


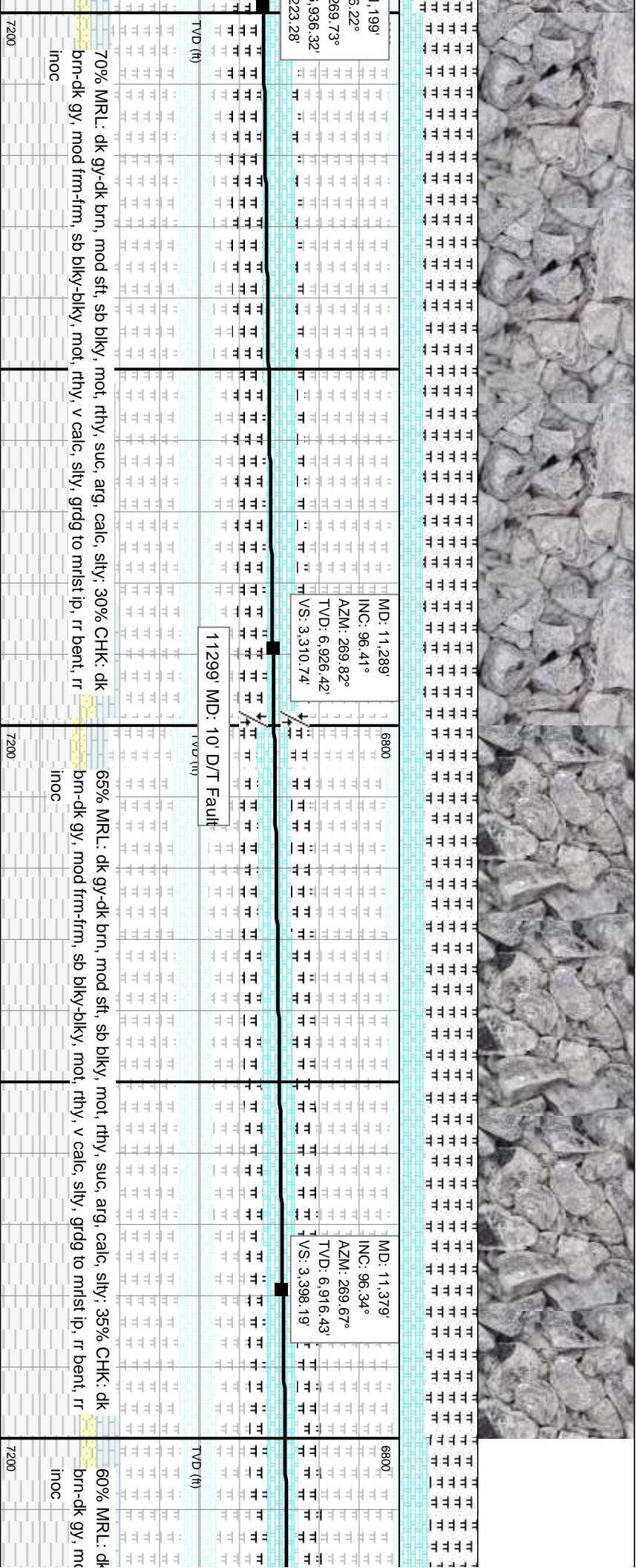
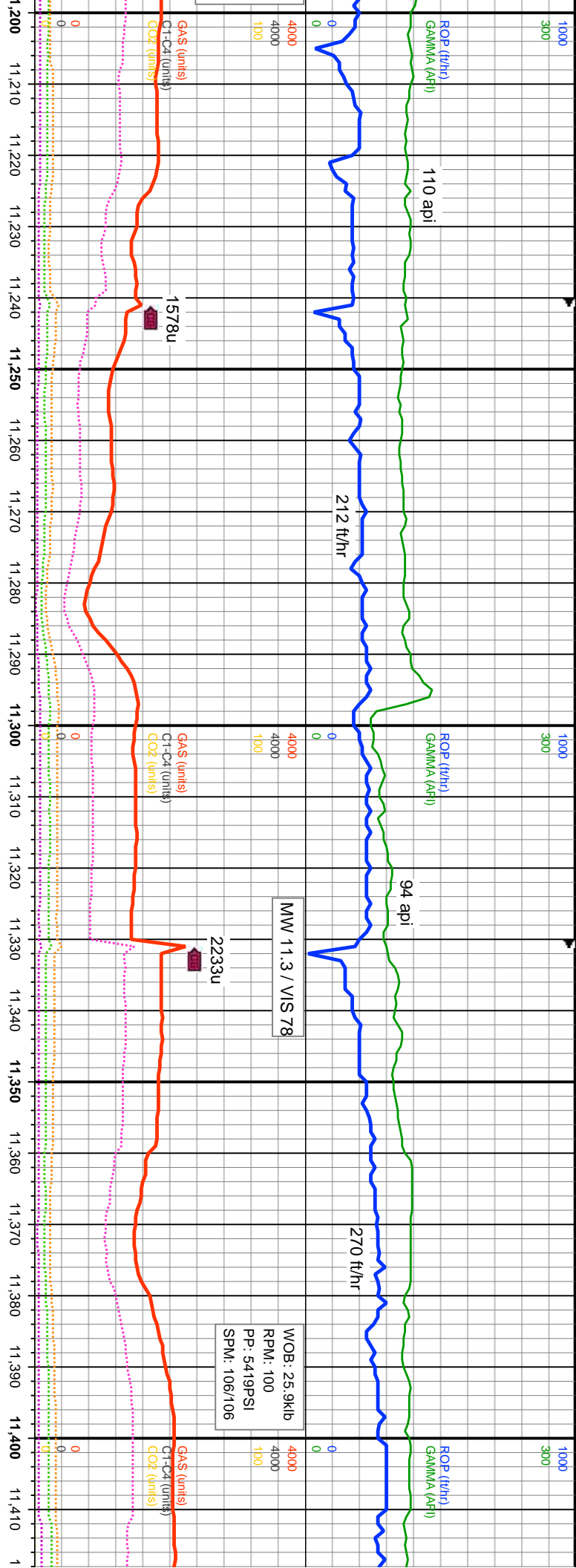


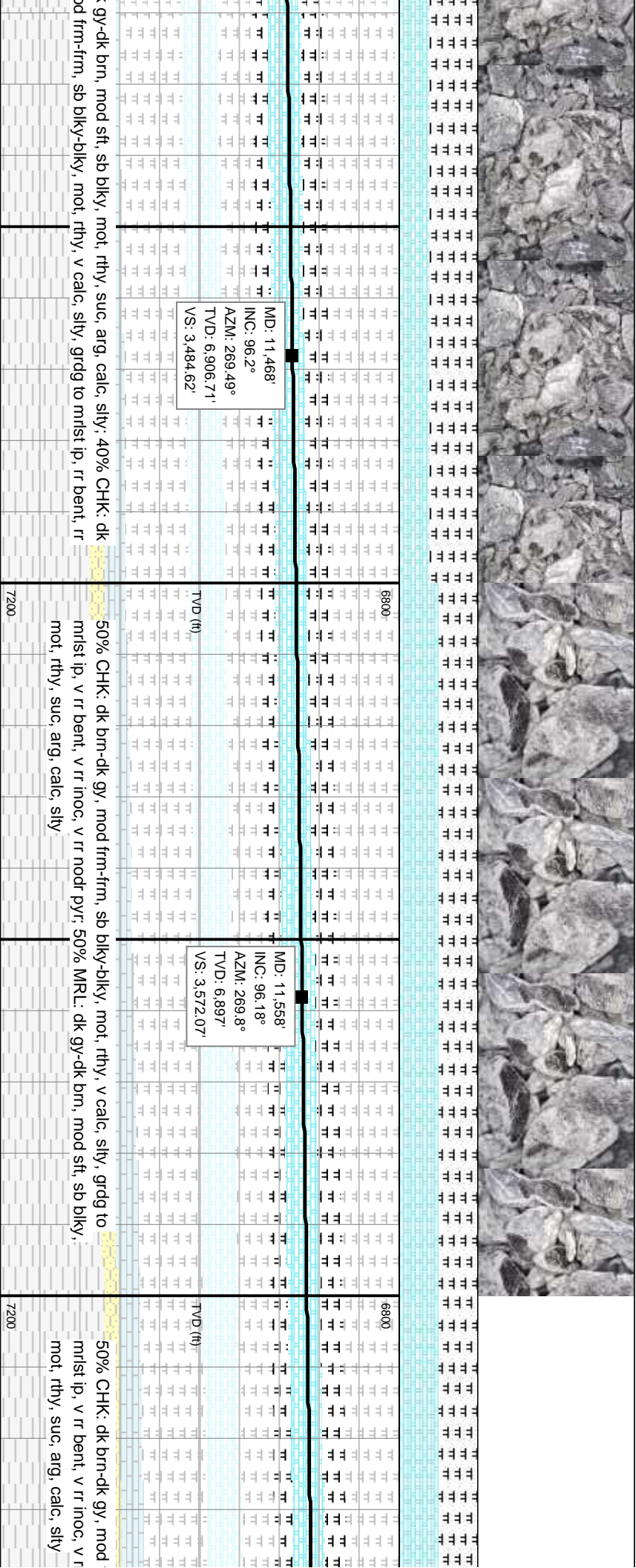
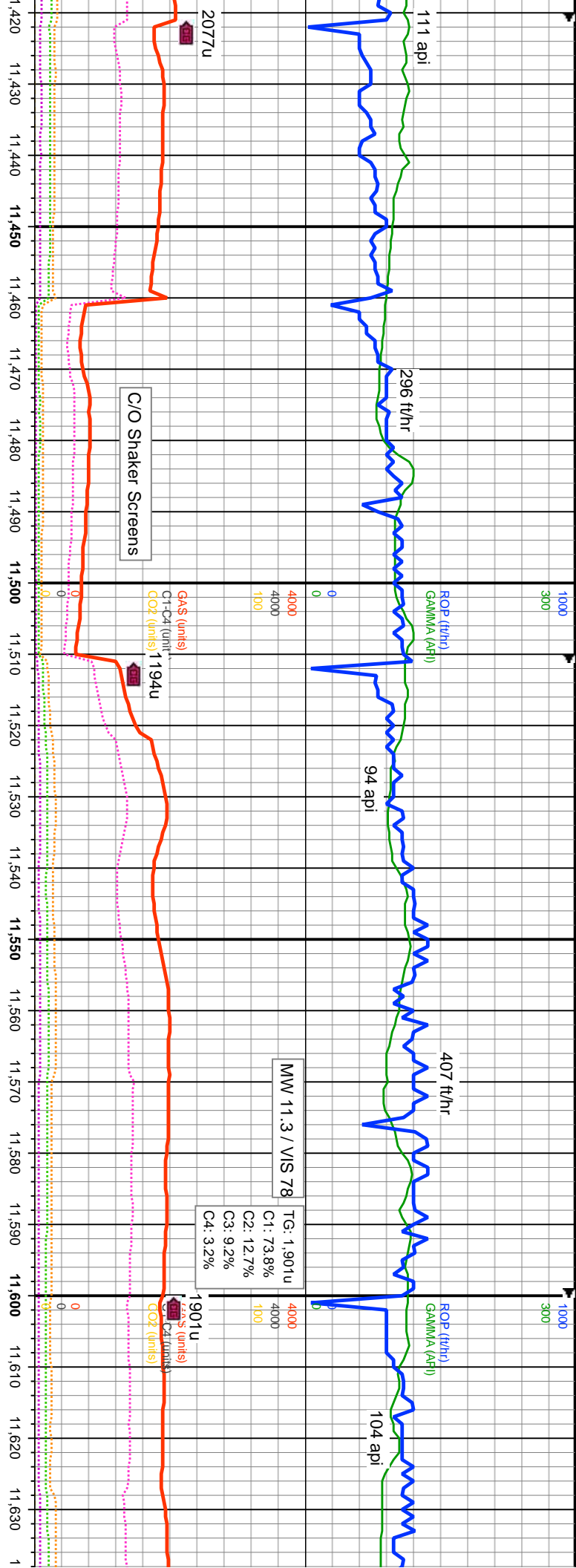
6800	MD: 10.122 INC: 90.51° AZM: 269.79° TVD: 6.997,21' VS: 2.172,38'	7200	MD: 10.212 INC: 90.44° AZM: 269.63° TVD: 6.996,46' VS: 2.260,36'	6800	MD: 10.302 INC: 90.92° AZM: 270.31° TVD: 6.996,39' VS: 2.348,41'
70% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-blk-y, mot, rthy, suc, arg, calc, grdg to silty chk, inbd inoc ip; 30% CHK: med gy-dk brn, mod frm-frm, sb blk-y-blk-y, mot, rthy, v calc, silty, grdg to mlst ip, rr bent	60% MRL: dk gy-dk brn, mod frm-frm, sb blk-y-blk-y, mot, rthy, v calc, silty, grdg to mlst ip, occ bent inbd dsm pyr	60% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-blk-y, mot, rthy, suc, arg, calc; 40% CHK: med gy-dk brn, mod frm-frm, sb blk-y-blk-y, mot, rthy, v calc, silty, grdg to mlst ip, occ bent inbd dsm pyr	60% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-blk-y, mot, rthy, suc, arg, calc; 40% CHK: med gy-dk brn, mod frm-frm, sb blk-y-blk-y, mot, rthy, v calc, silty, grdg to mlst ip, occ bent inbd dsm pyr	60% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-blk-y, mot, rthy, suc, arg, calc; 40% CHK: med gy-dk brn, mod frm-frm, sb blk-y-blk-y, mot, rthy, v calc, silty, grdg to mlst ip, occ bent inbd dsm pyr	60% MRL: dk gy-dk brn, mod sft-sl frm, sb blk-y-blk-y, mot, rthy, suc, arg, calc; 40% CHK: med gy-dk brn, mod frm-frm, sb blk-y-blk-y, mot, rthy, v calc, silty, grdg to mlst ip, occ bent inbd dsm pyr

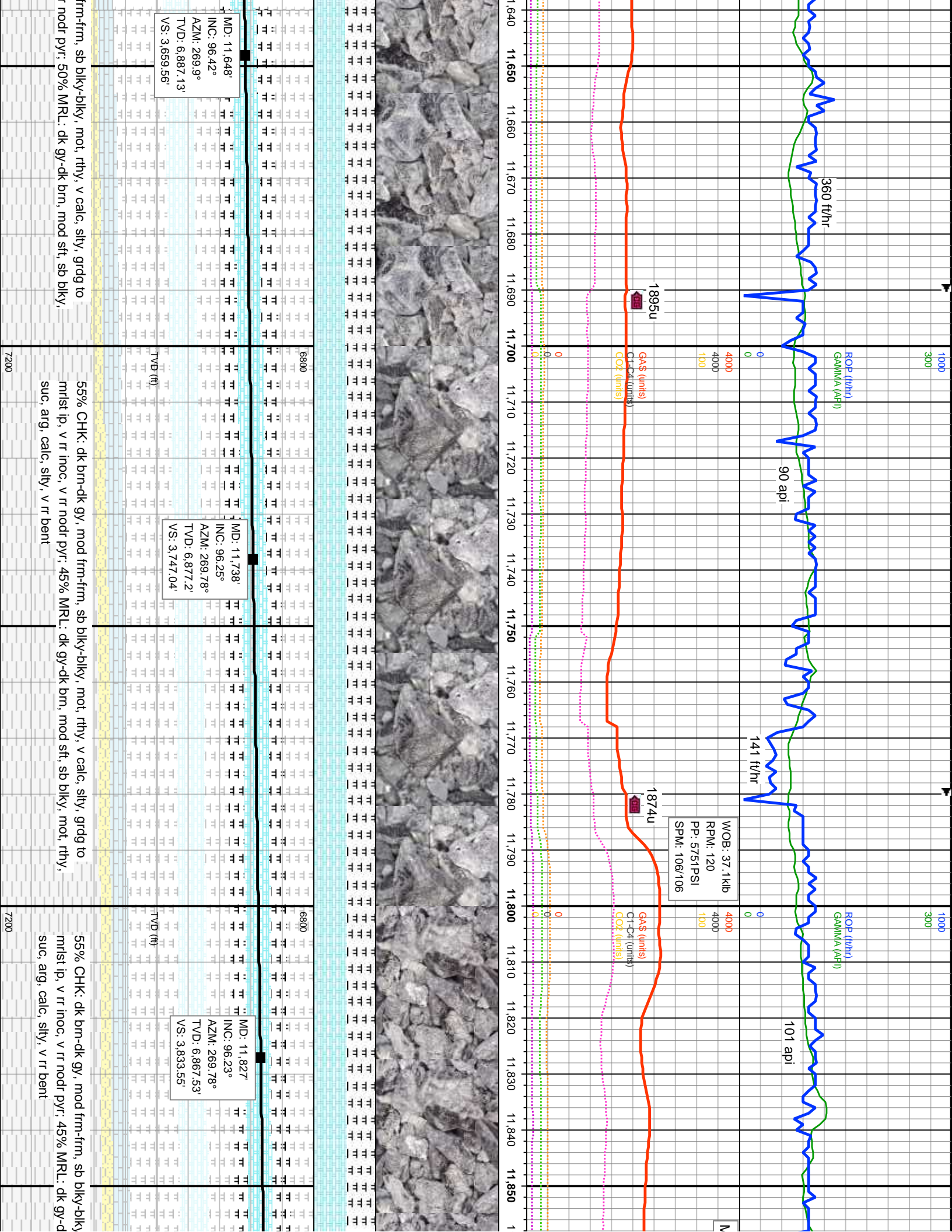


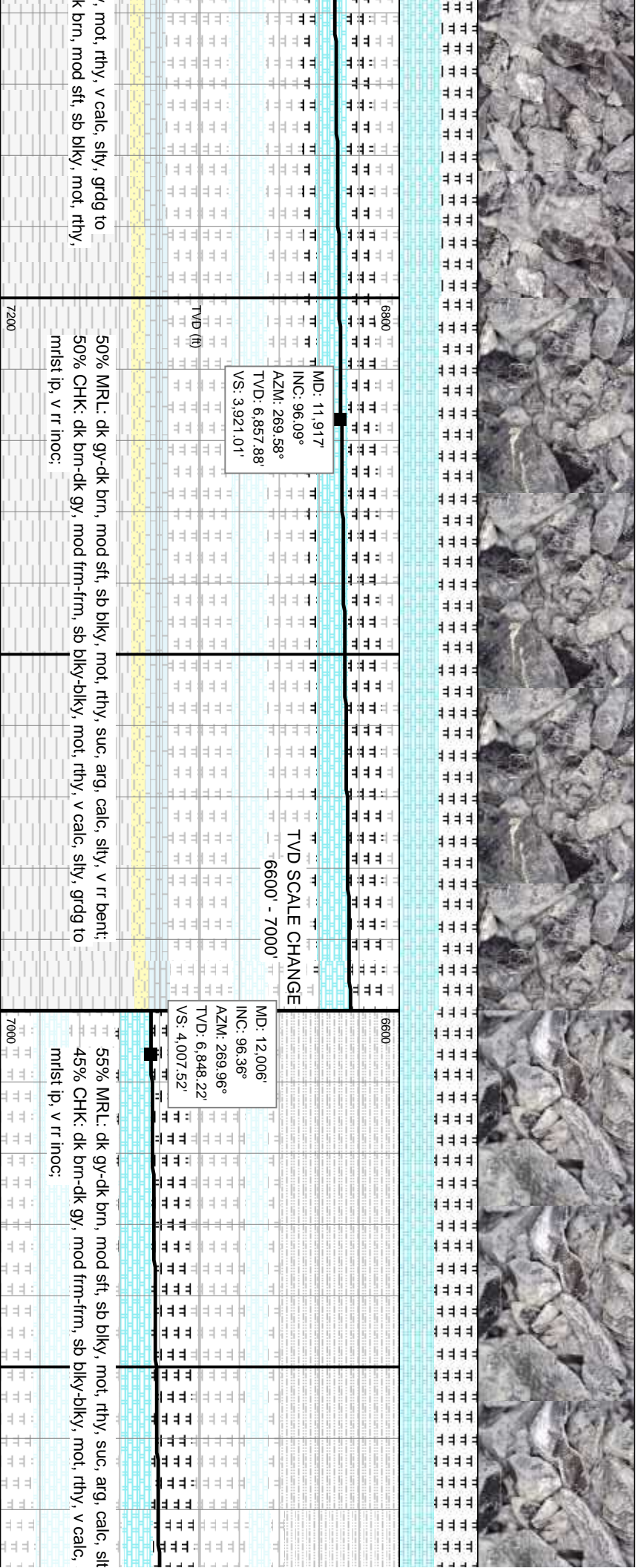
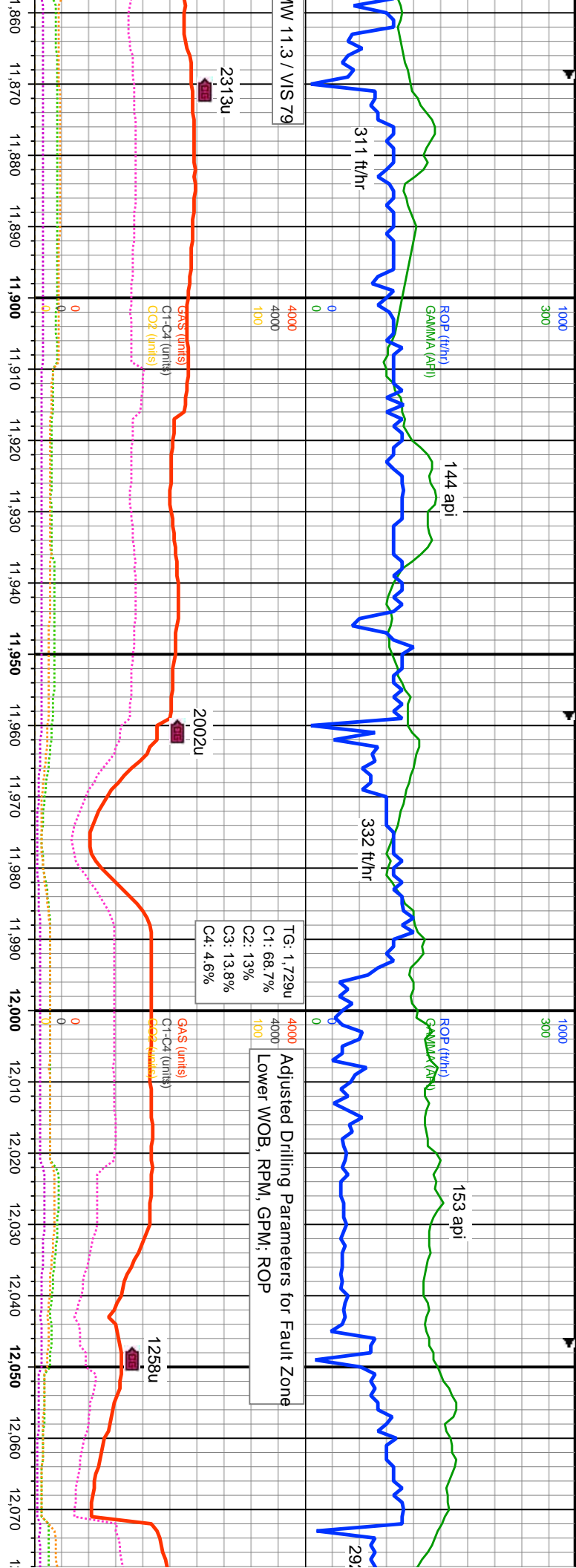


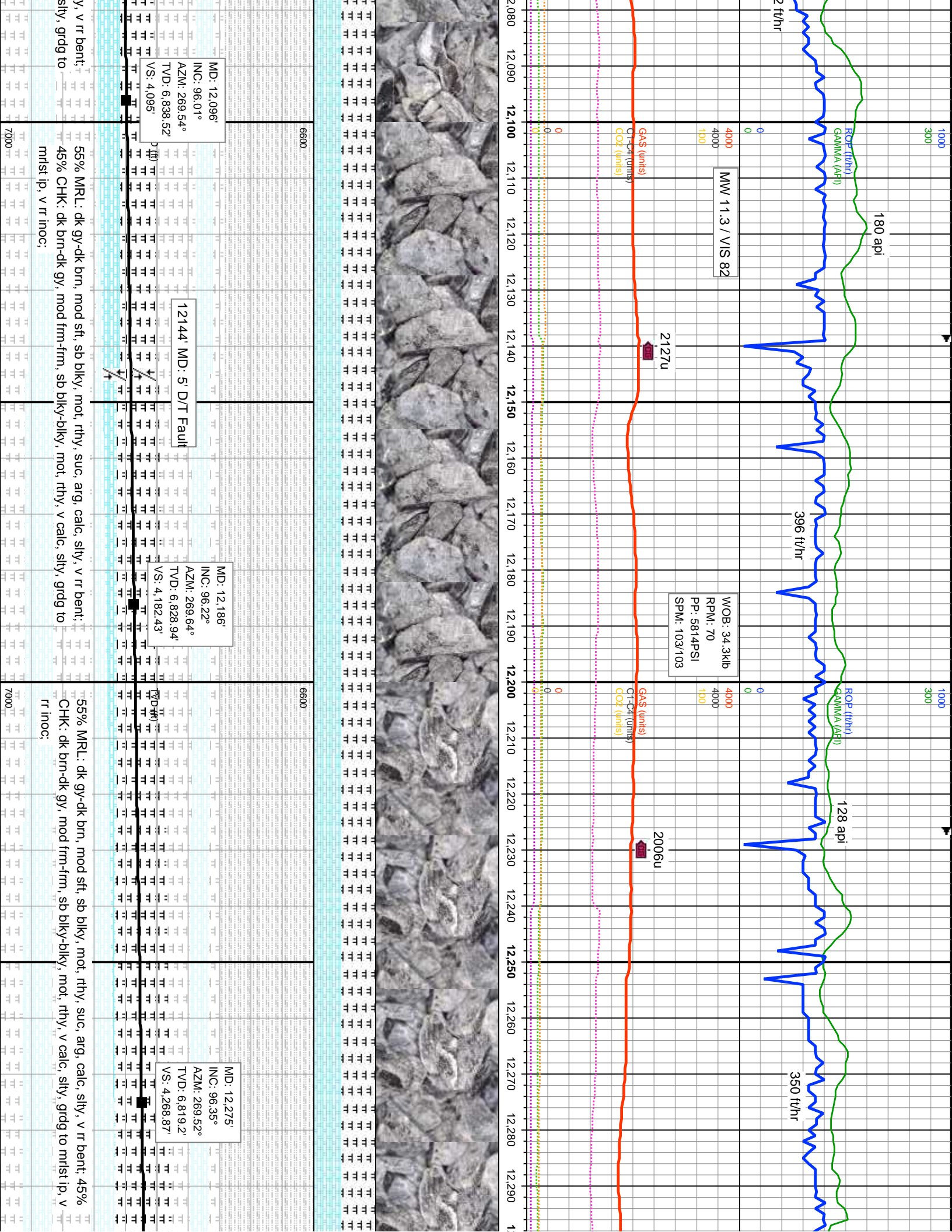


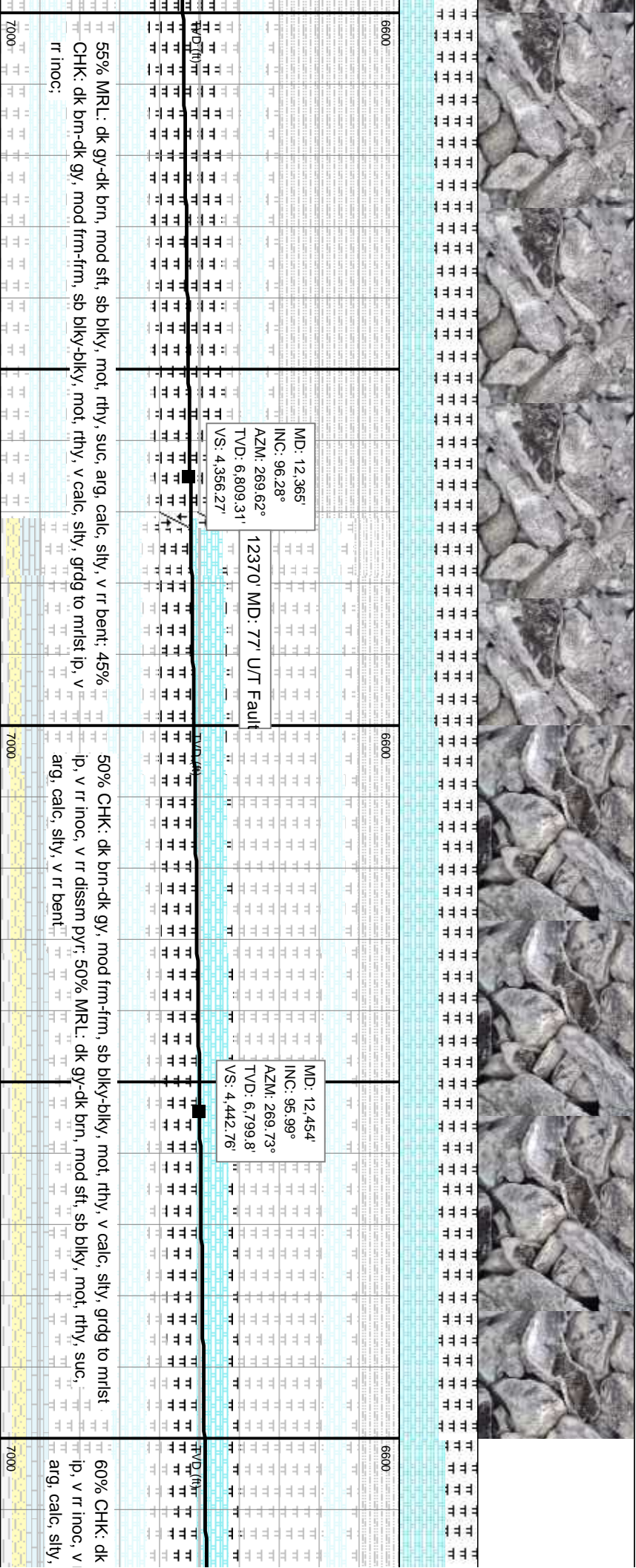
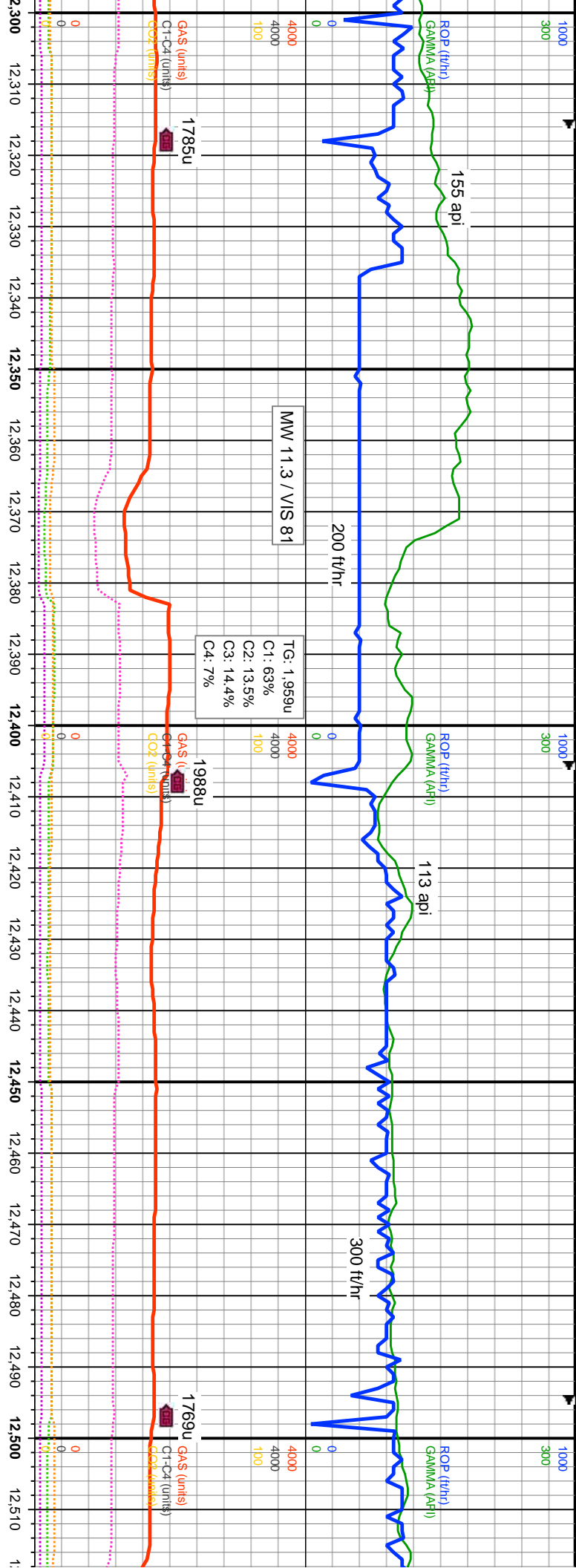


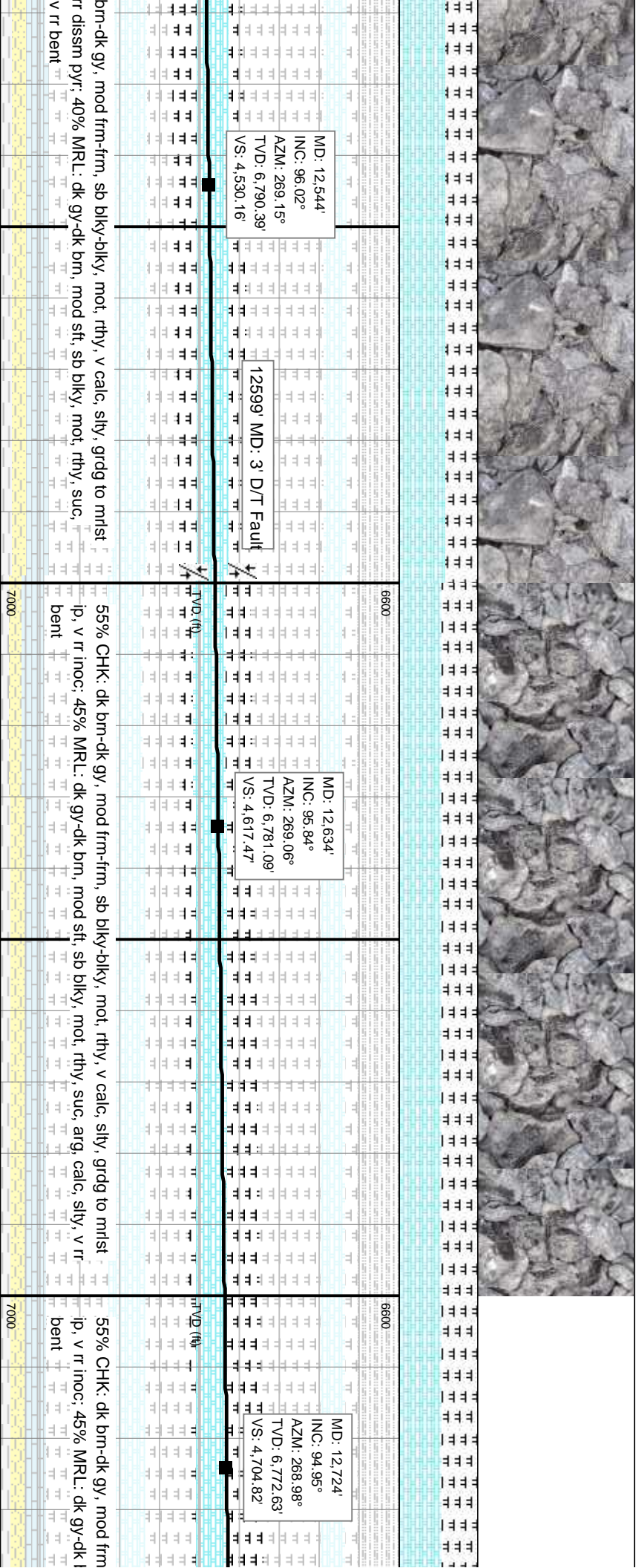
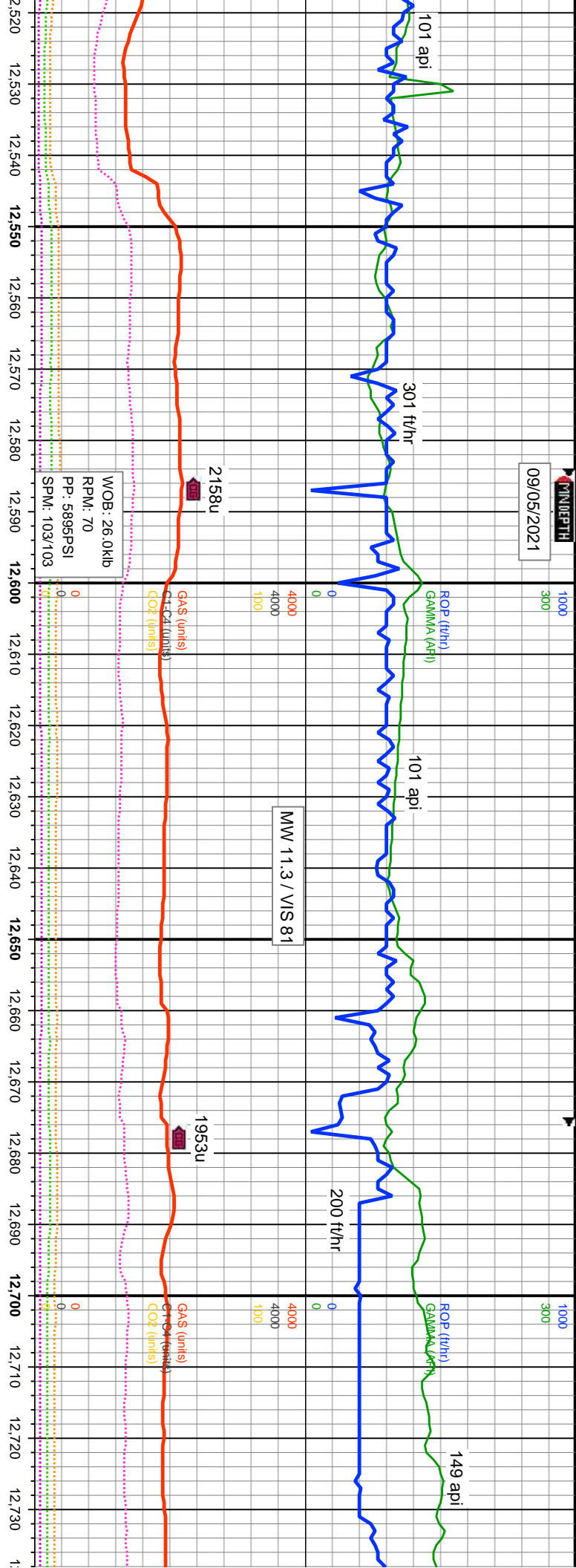


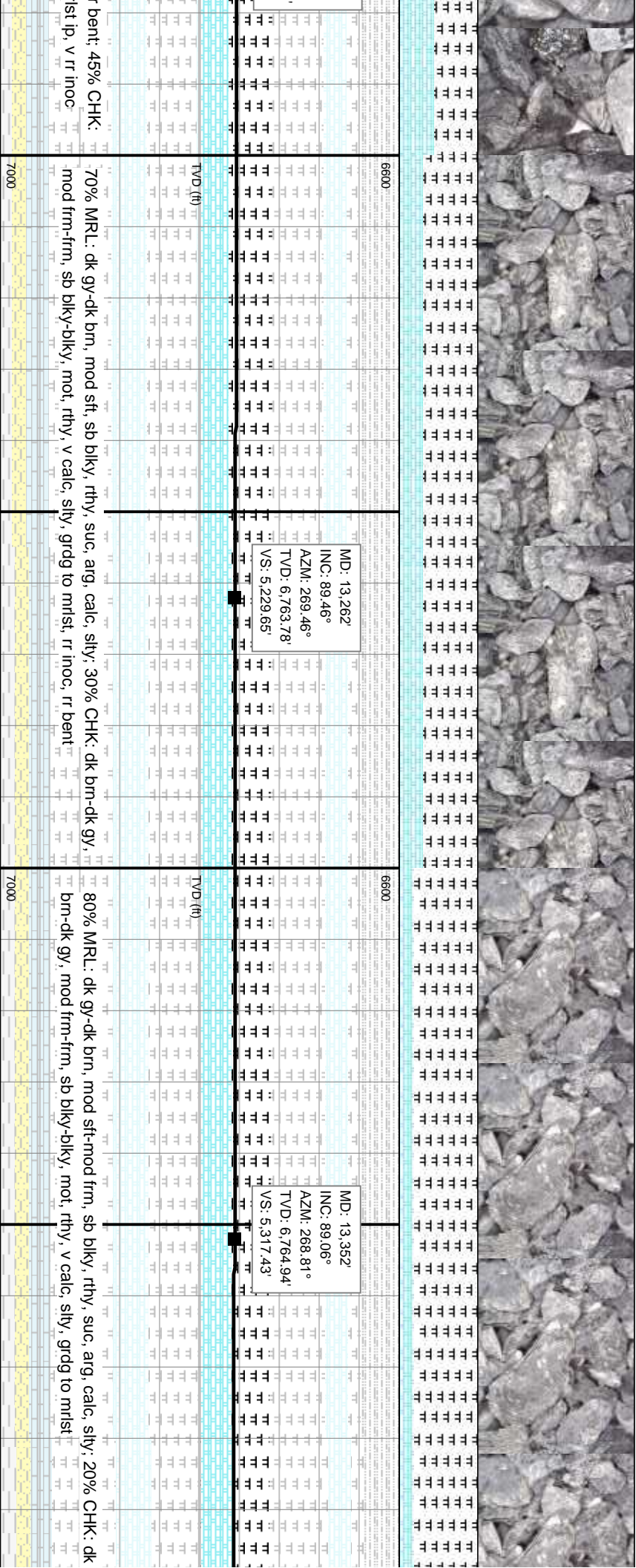
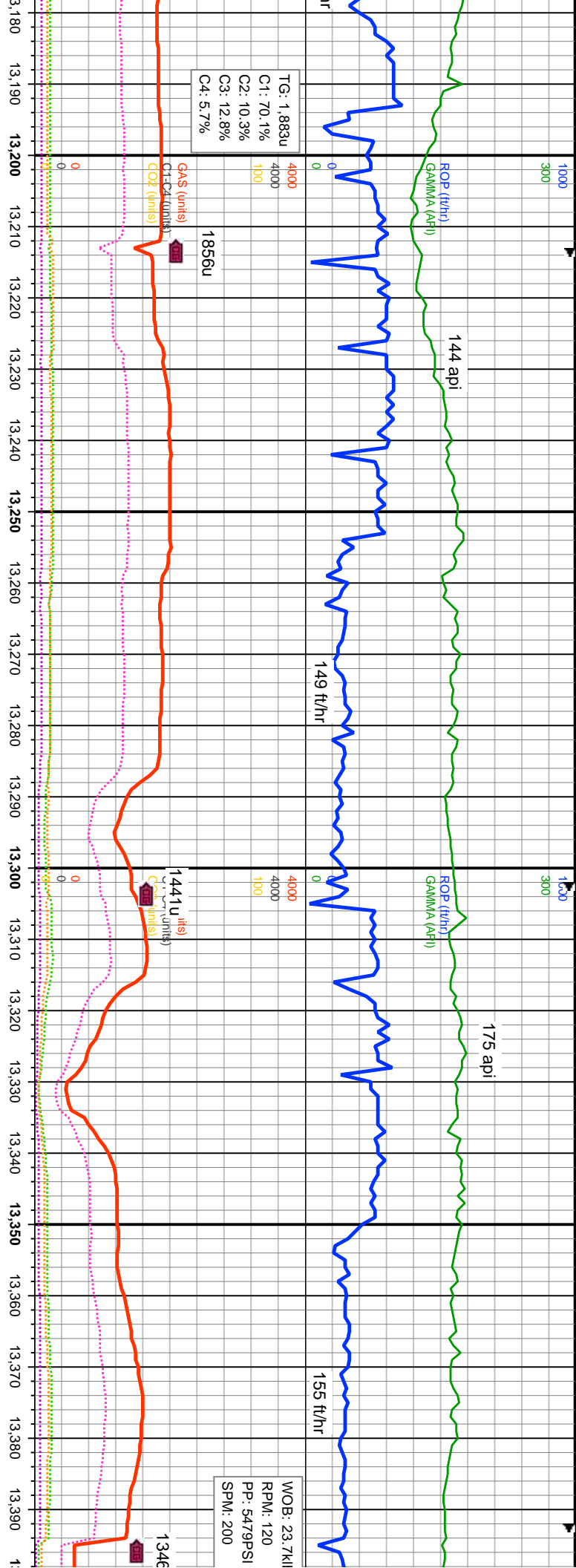


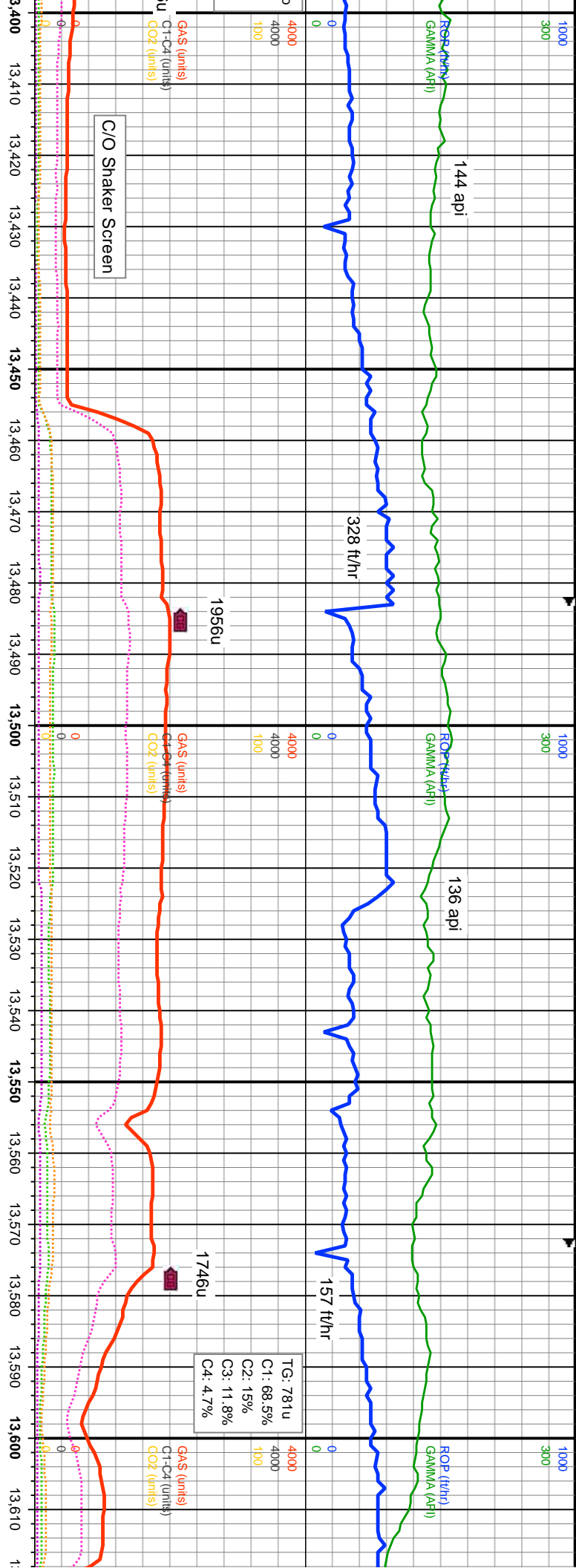




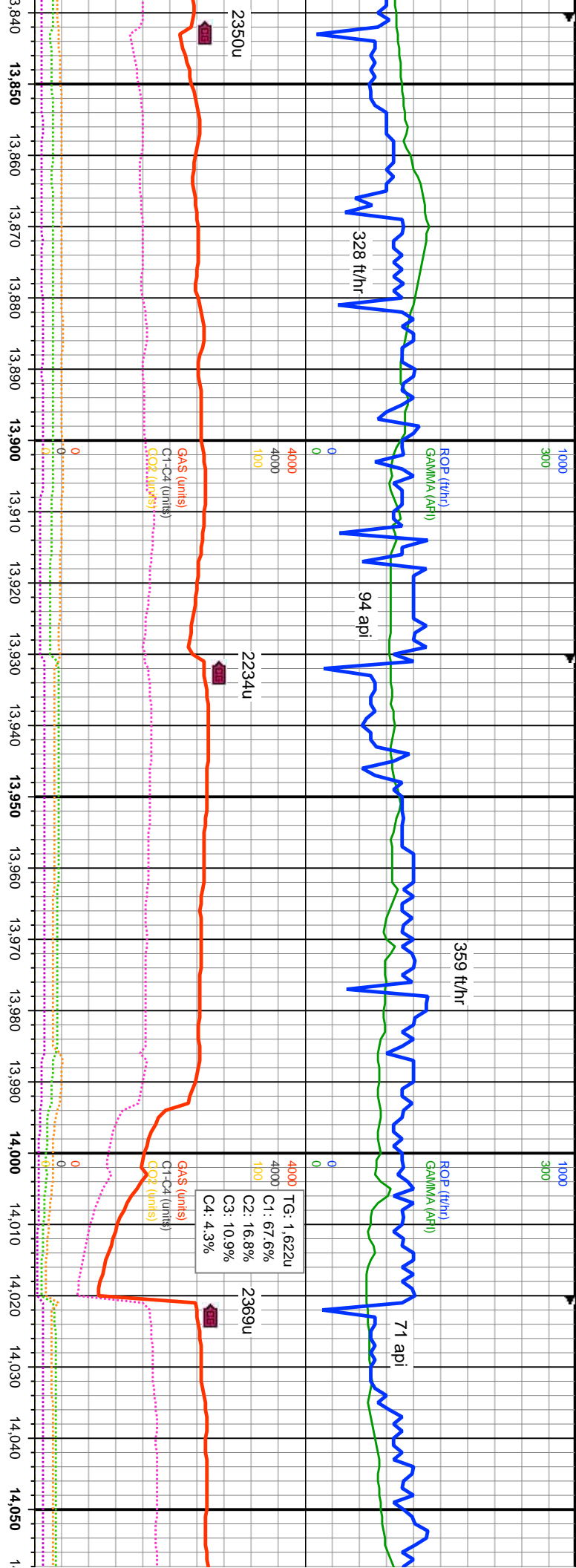




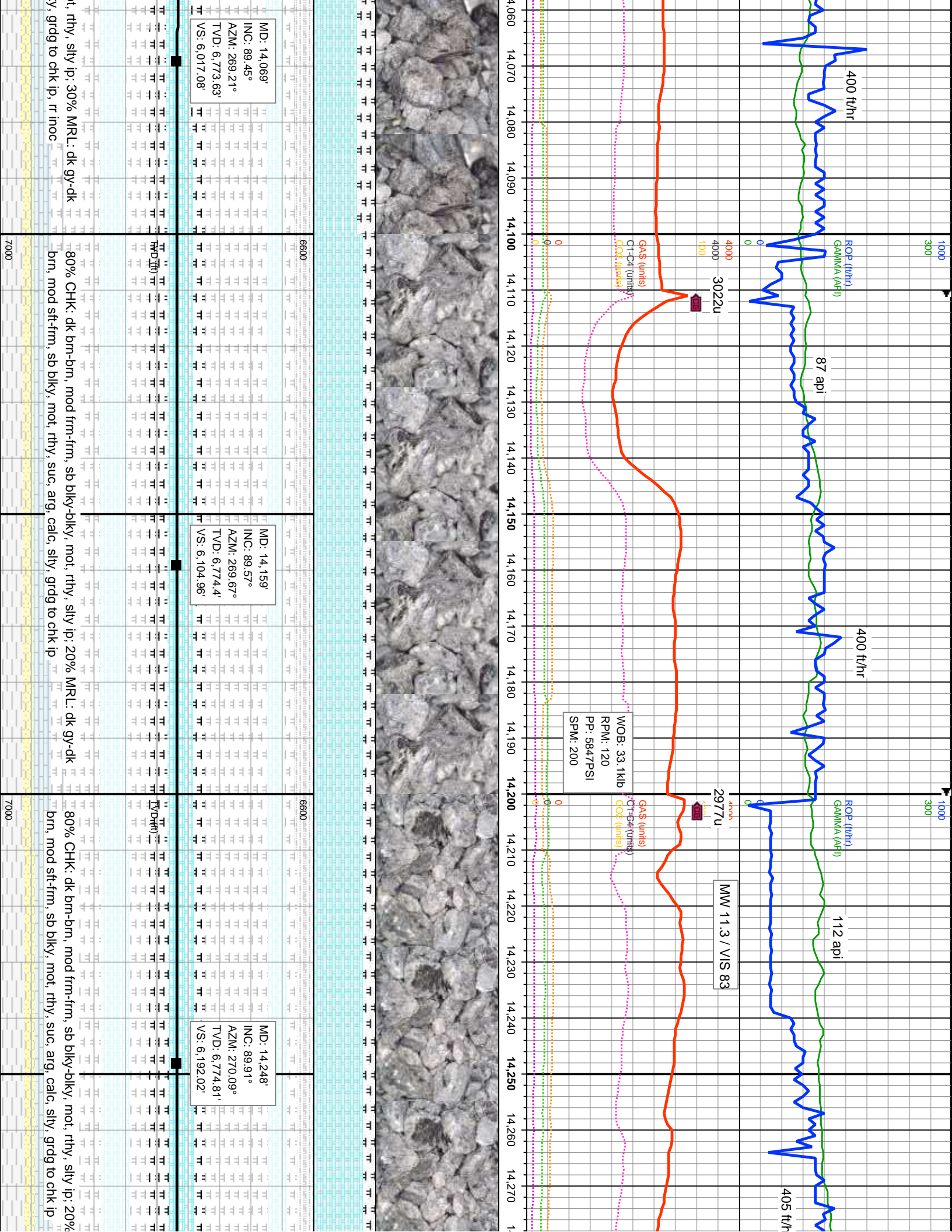


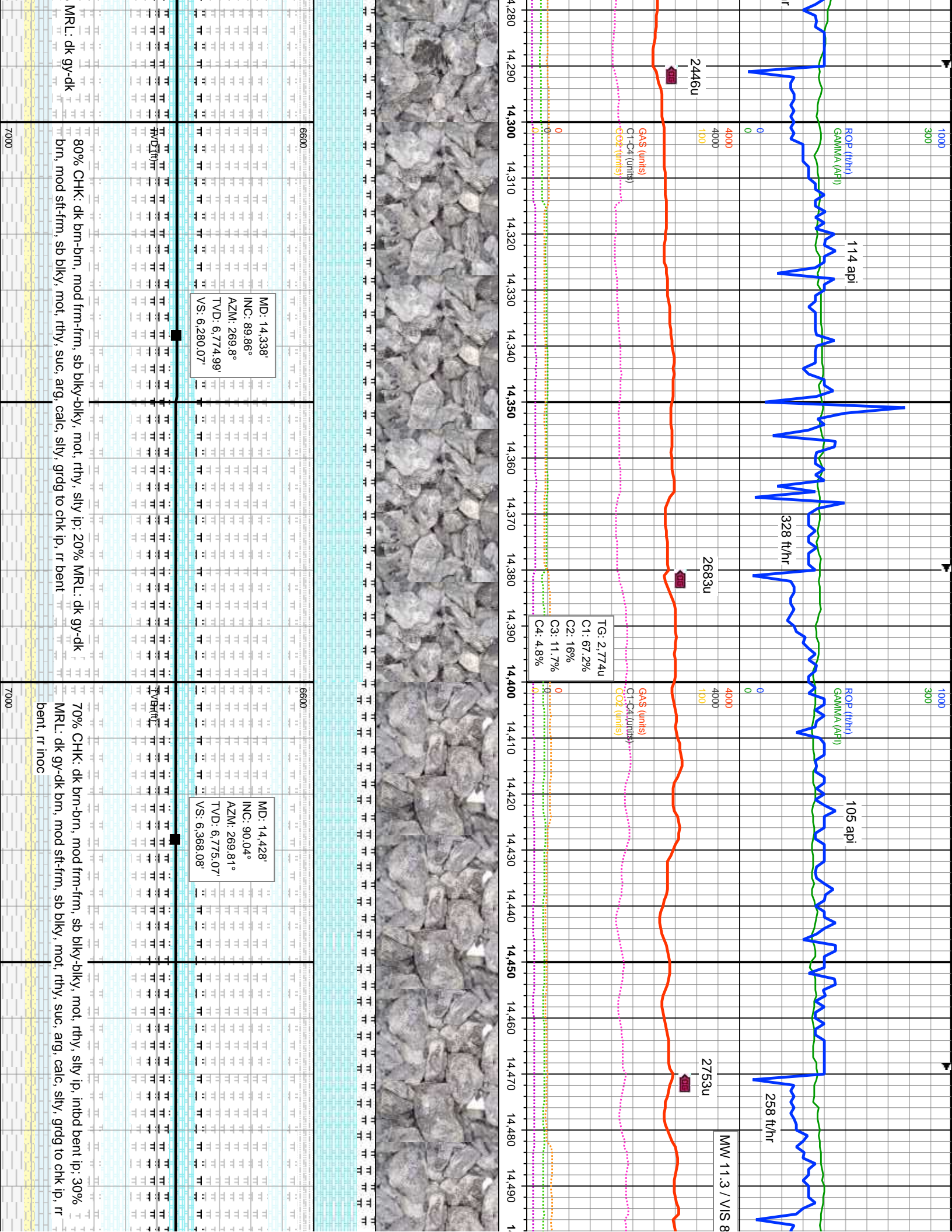


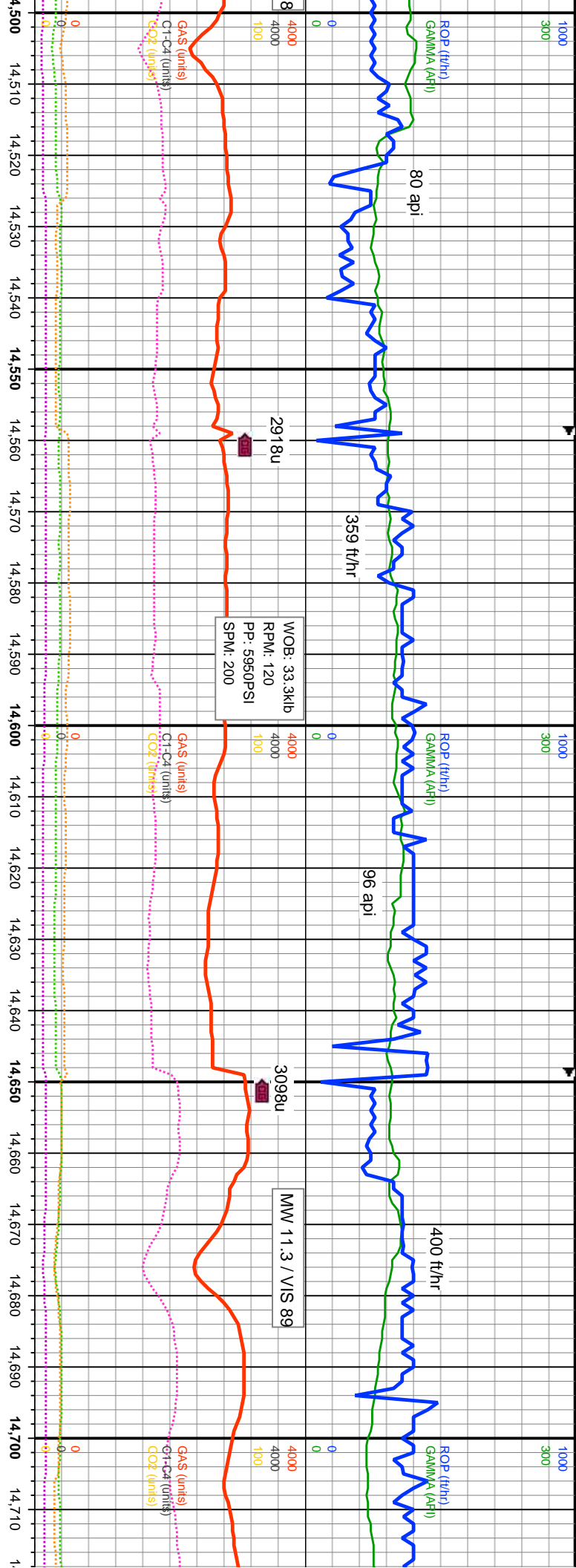
6600	MD: 13.441' INC: 89.35° AZM: 269.33° TVD: 6,766.17' VS: 5.4042'	80% MRL: dk gy-dk brn, mod sft-mod frm, sb blk, rthy, suc, arg, calc, silty, 20% CHK: dk brn-dk gy, mod frm-frm, sb blk, mot, rthy, v calc, silty, grdg to mlst
6600	MD: 13.531' INC: 89.37° AZM: 269.29° TVD: 6,767.18' VS: 5.492.04'	80% MRL: dk gy-dk brn, mod sft-mod frm, sb blk, mot, rthy, v calc, silty, grdg to mlst, rr bent, rr incc
6600	MD: 13.631' INC: 89.37° AZM: 269.29° TVD: 6,767.18' VS: 5.492.04'	70% MRL: dk gy-dk brn, mod sft-mod frm, sb blk, mot, rthy, v calc, silty, grdg to mlst, rr bent, rr incc



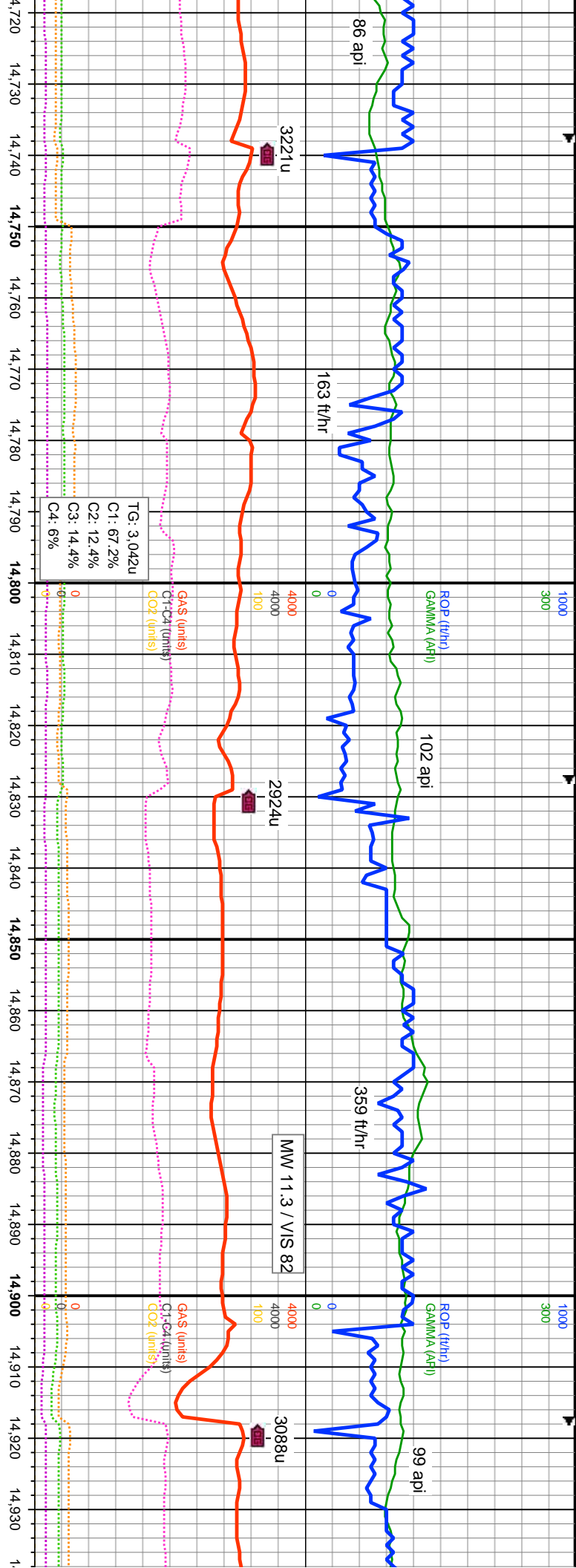
MD: 13.890'	6600	MD: 13.979'	6600
INC: 89.2°		INC: 89.36°	
AZM: 269°		AZM: 269.3°	
TVD: 6.771.57'		TVD: 6.772.69'	
VS: 5.842.45'		VS: 5.929.26'	
ROP (ft/hr)	328 ft/hr	ROP (ft/hr)	359 ft/hr
GAMMA (API)	94 api	GAMMA (API)	71 api
GAS (units)		GAS (units)	
C1-C4 (units)		C1-C4 (units)	
CO2 (units)		CO2 (units)	
70% CHK: dk brn-brn, mod frm-frm, sb blk-y-bkly, mot, rthy, stly ip; 30% MRL: dk gy-dk brn, mod sft-frm, sb blk-y, mot, rthy, suc, arg, calc, stly, grdg to chk ip, rr inoc		70% CHK: dk brn-brn, mod frm-frm, sb blk-y-bkly, mot, rthy, stly ip; 30% MRL: dk gy-dk brn, mod sft-frm, sb blk-y, mot, rthy, suc, arg, calc, stly, grdg to chk ip, rr inoc	



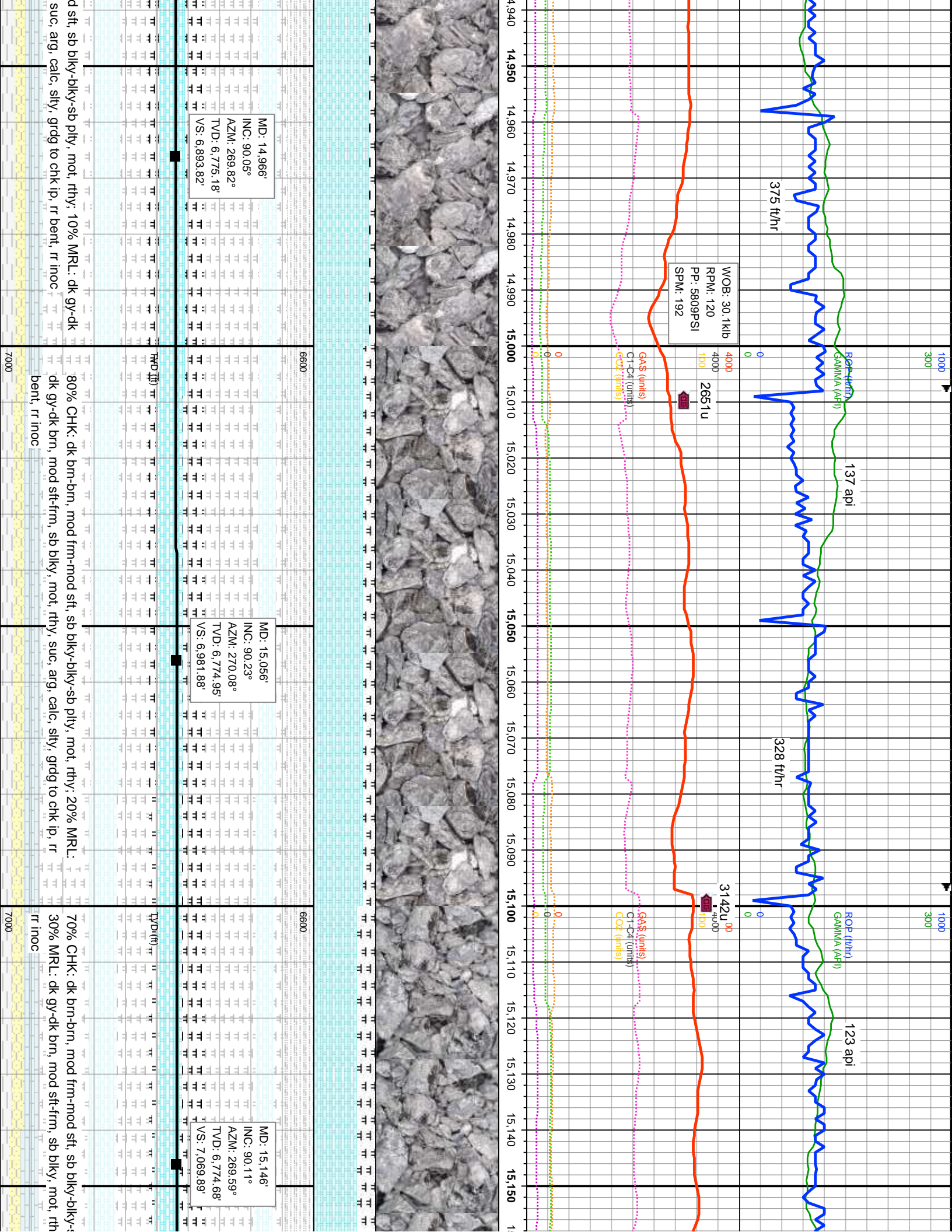


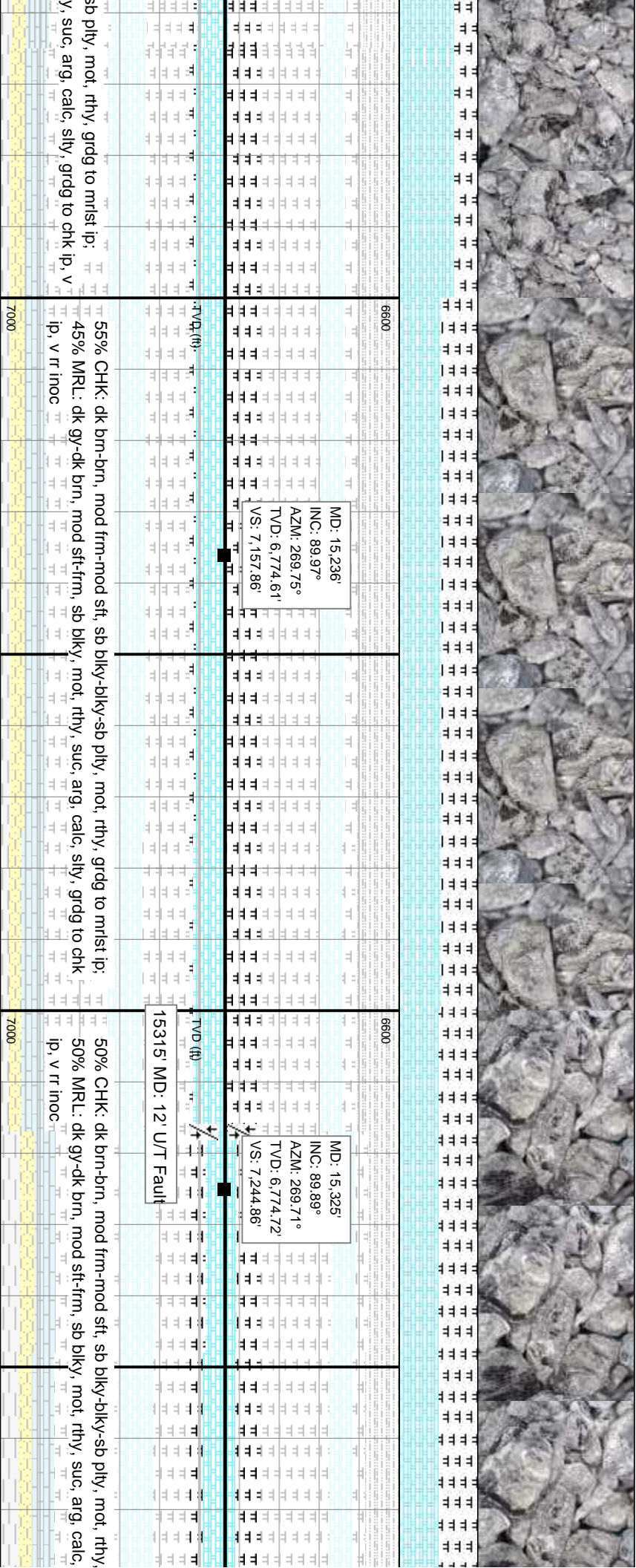
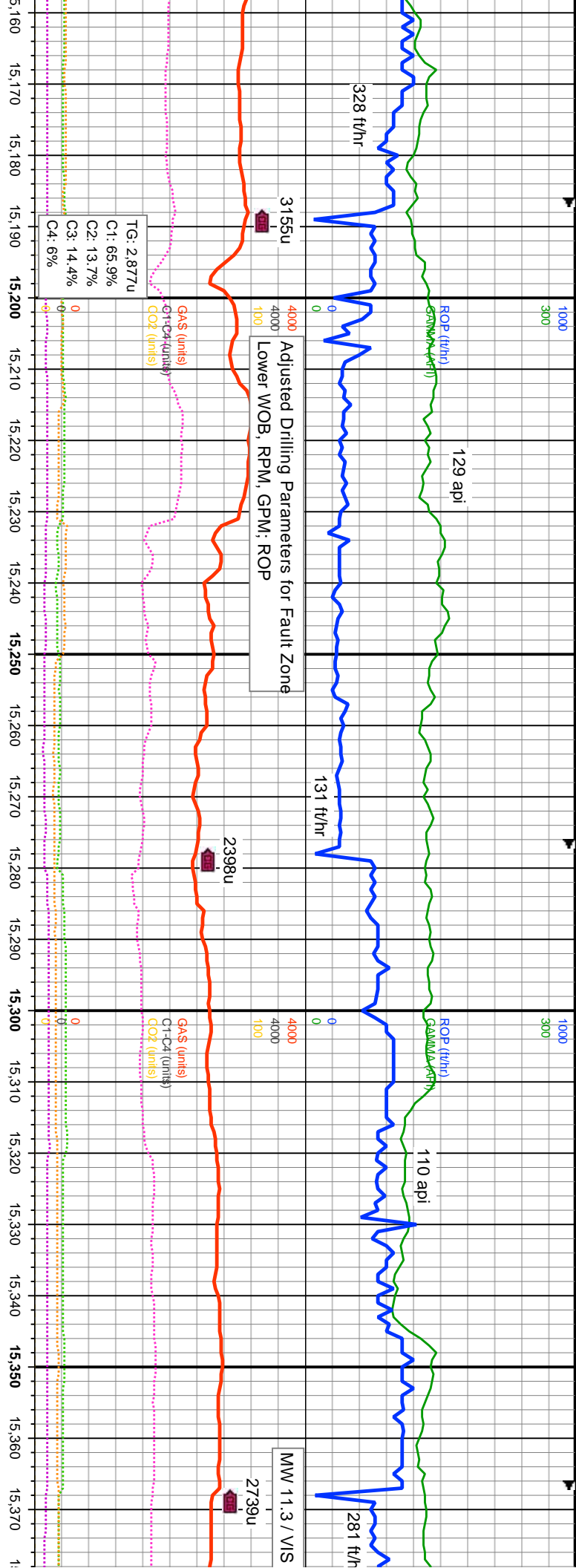


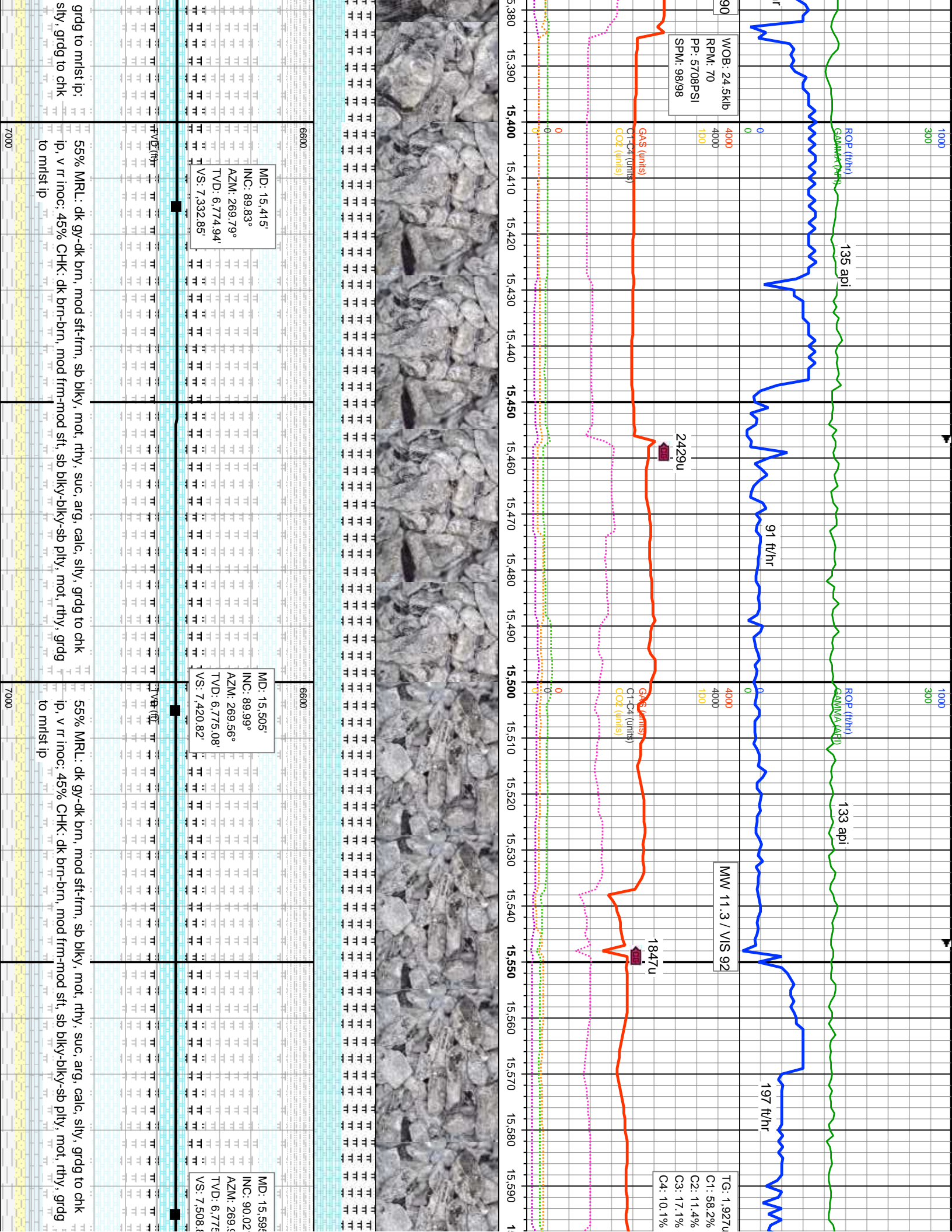
6600	MD: 14.517° INC: 89.98° AZM: 269.69° TVD: 6,775.05' VS: 6,455.09'	14526' MD: 3' D/T Fault	6600	MD: 14.607° INC: 90.35° AZM: 270.39° TVD: 6,774.79' VS: 6,543.18'	6600	MD: 14.697° INC: 90.01° AZM: 269.6° TVD: 6,774.5' VS: 6,631.25'
7000	70% CHK: dk brn-brn, dk gy ip, mod frm-frm, sb blk-y-bkly, sb pily, mot, rthy, intbd bent ip; 30% MRL: dk gy-dk brn, mod sft-frm, sb blkly, mot, rthy, suc, arg, calc, silty, intbd inoc, grdg to chk ip, rr bent		7000	70% CHK: dk brn-brn, dk gy ip, mod frm-frm, sb blk-y-bkly, sb pily, mot, rthy, intbd bent ip; 30% MRL: dk gy-dk brn, mod sft-frm, sb blkly, mot, rthy, suc, arg, calc, silty, intbd inoc, grdg to chk ip, rr bent	7000	80% CHK: dk b MRL: dk gy-dk l bent, rr inoc

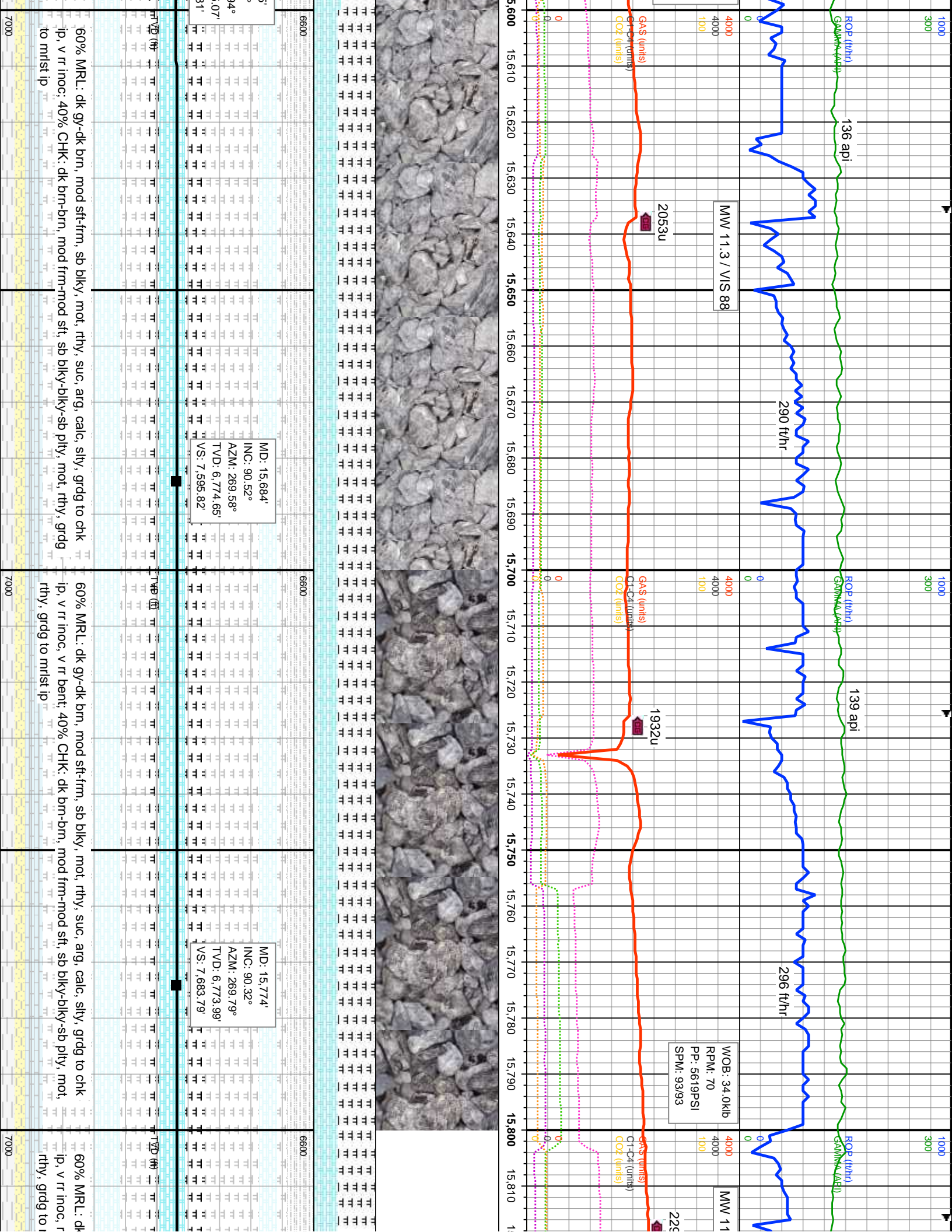


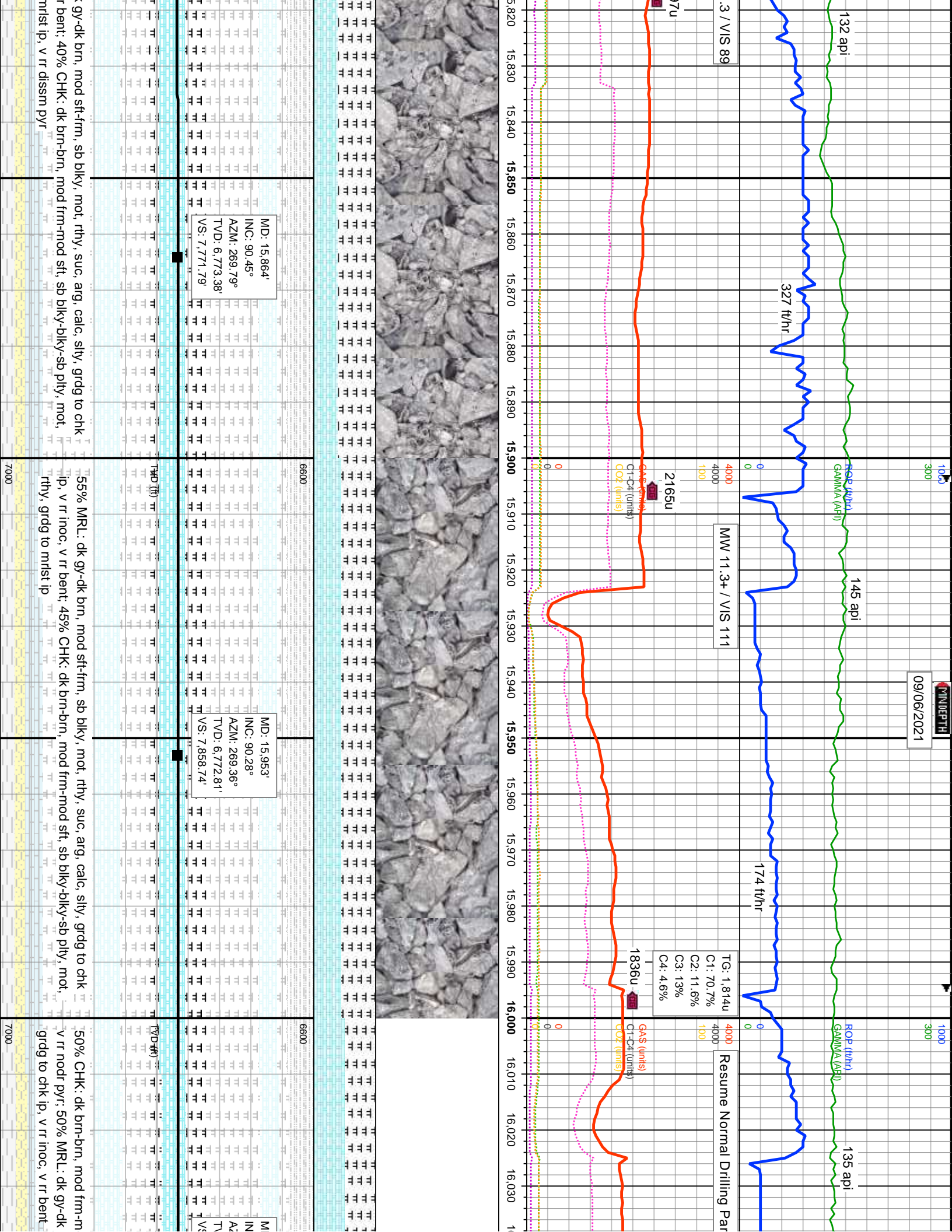
MD: 14.787 INC: 89.57° AZM: 268.42° TVD: 6,774.82' VS: 6,718.98'		MD: 14.876 INC: 89.96° AZM: 269.89° TVD: 6,775.18' VS: 6,805.79'	
86 api	163 ft/hr	102 api	359 ft/hr
3221u	2924u	3088u	
TG: 3.042u C1: 67.2% C2: 12.4% C3: 14.4% C4: 6%		MW 11.3 / VIS 82	
GAS (units) C1-C4 (units) CO2 (units)		GAS (units) C1-C4 (units) CO2 (units)	
80% CHK: dk brn-brn, mod frm-frn, sb blk-ly-sb ply, tan-dk mot, rthy, intbd bent ip; 20% MR: dk gy-dk brn, mod sft-frn, sb blk-ly, mot, rthy, suc, arg, calc, silty, grdg to chk ip, rr bent, rr inc		90% CHK: dk brn-brn, mod frm-frn, mod sft-frn, sb blk-ly, mot, rthy, suc, arg, calc, silty, grdg to chk ip, rr bent, rr inc	

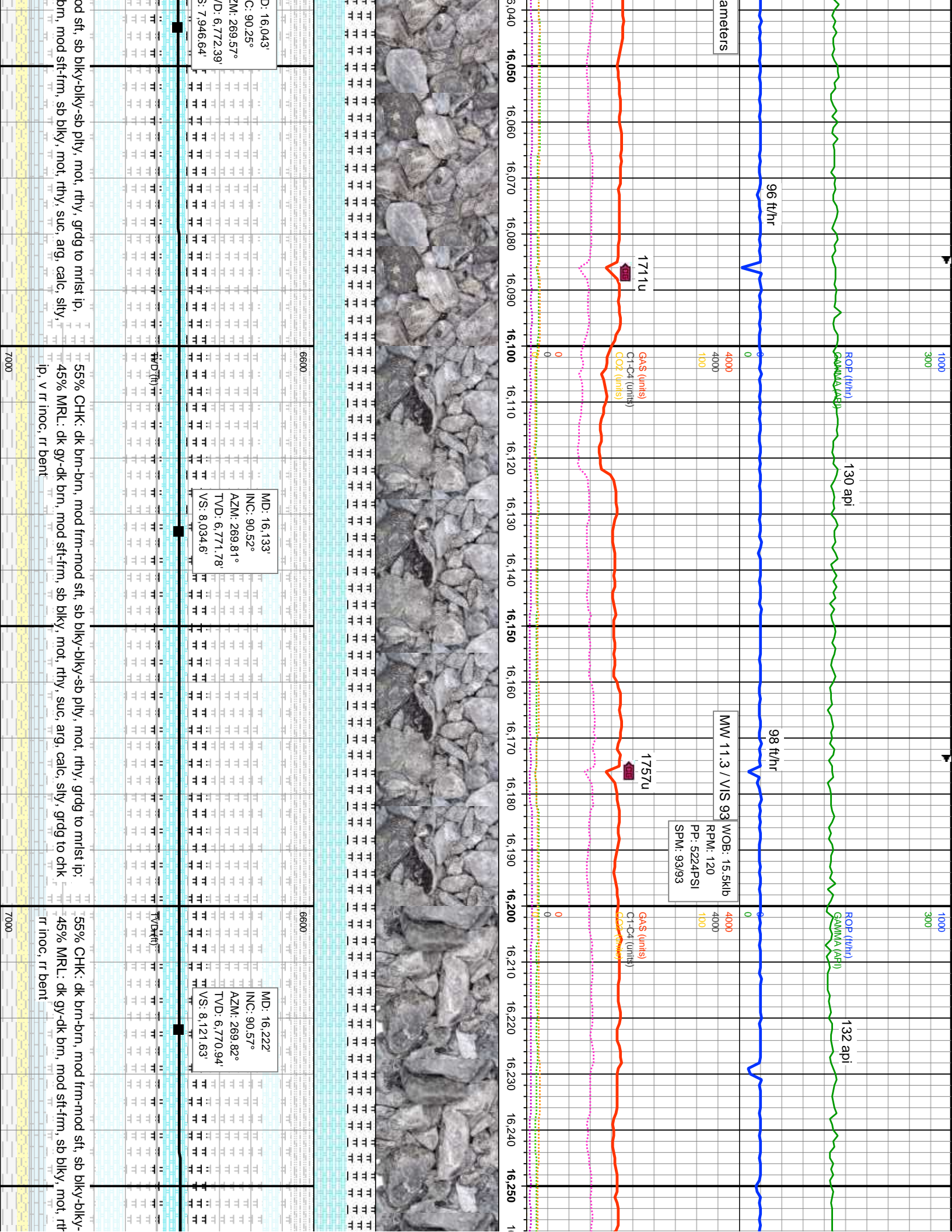


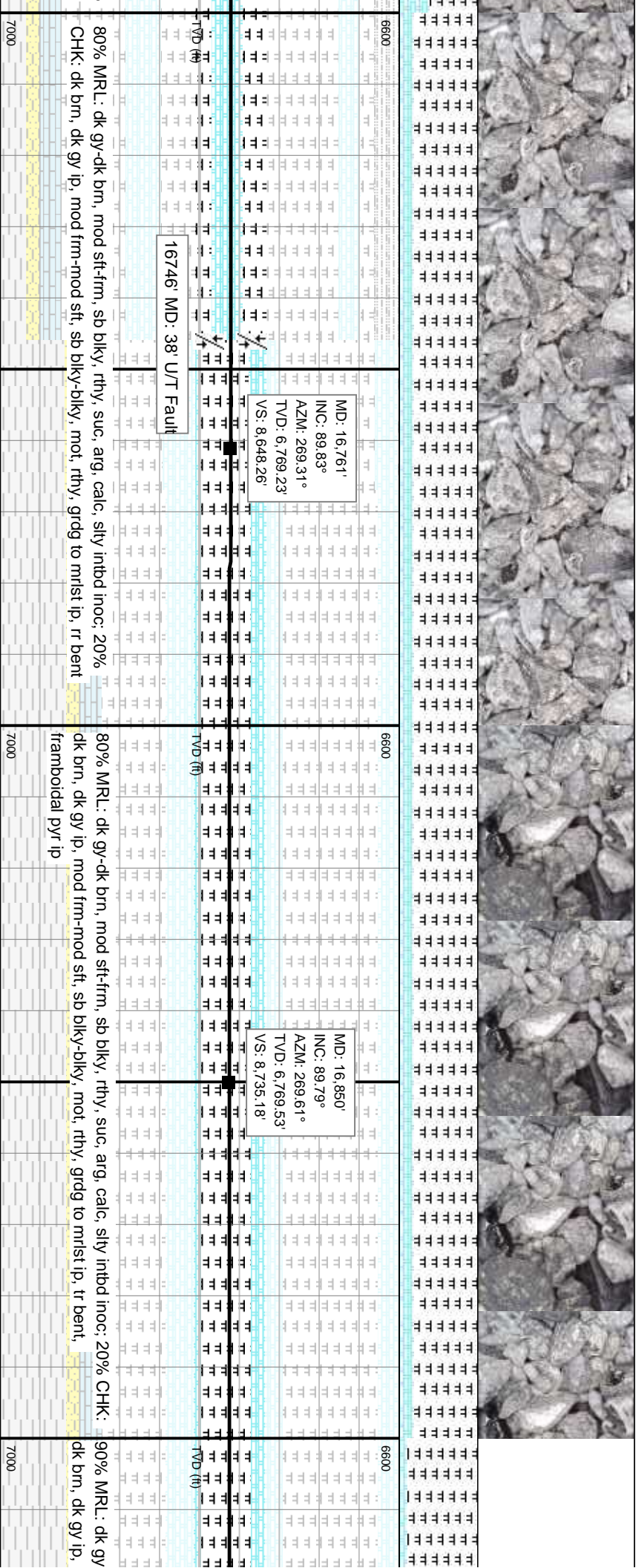
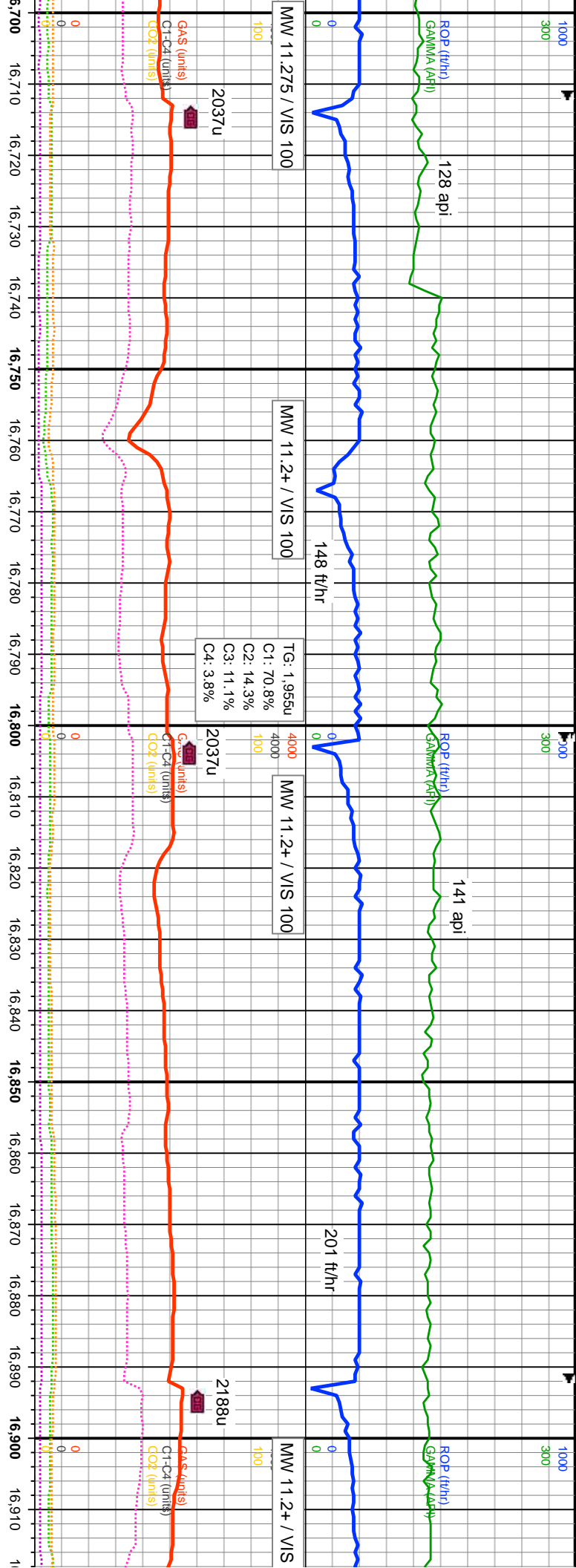


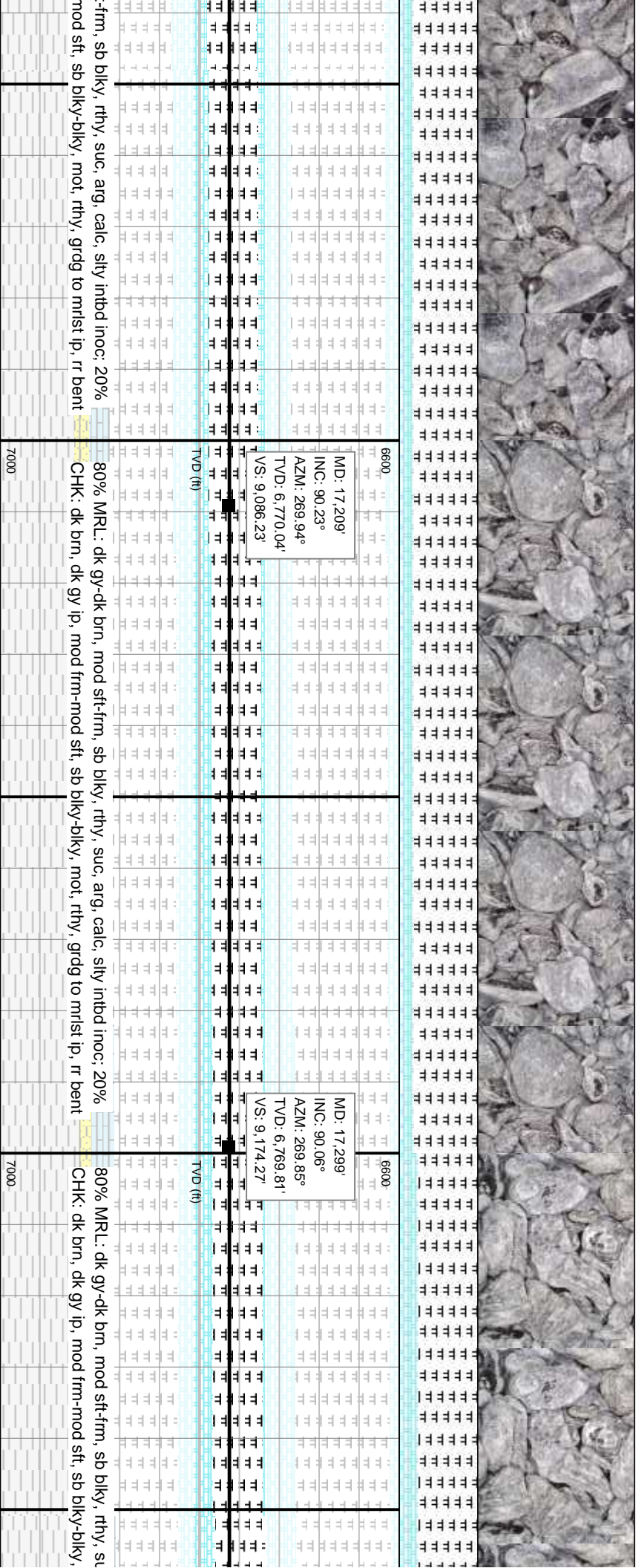
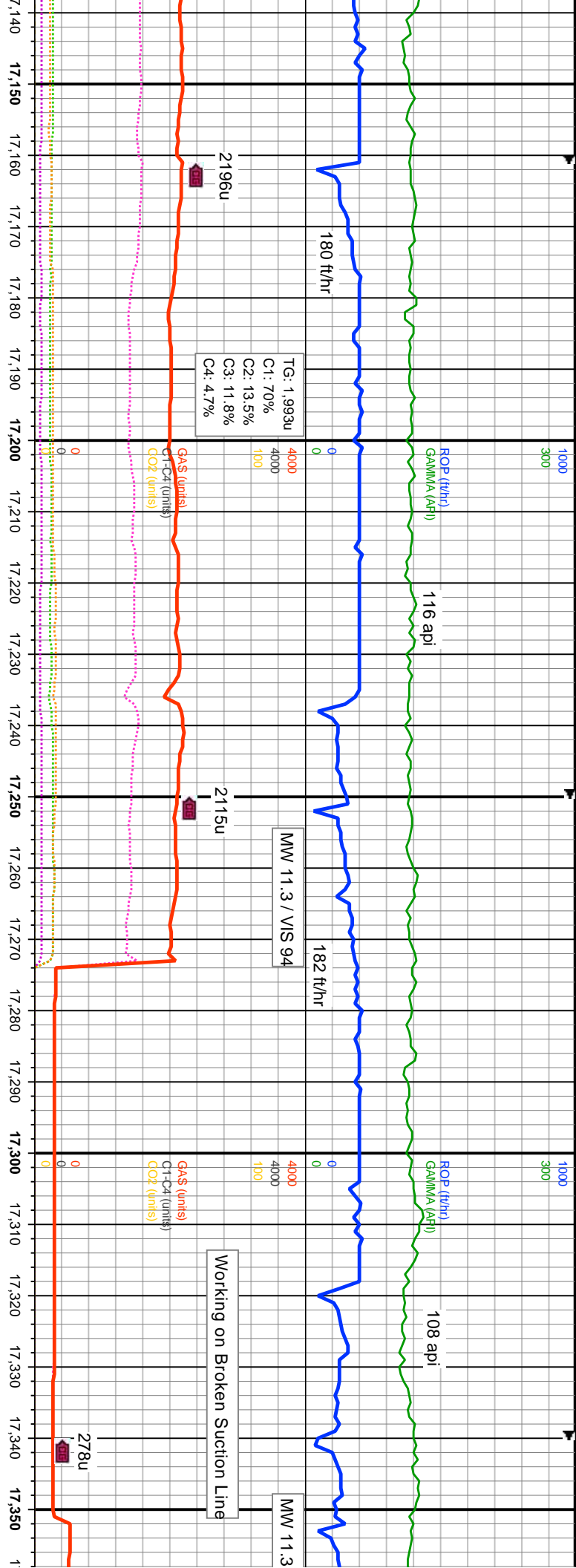


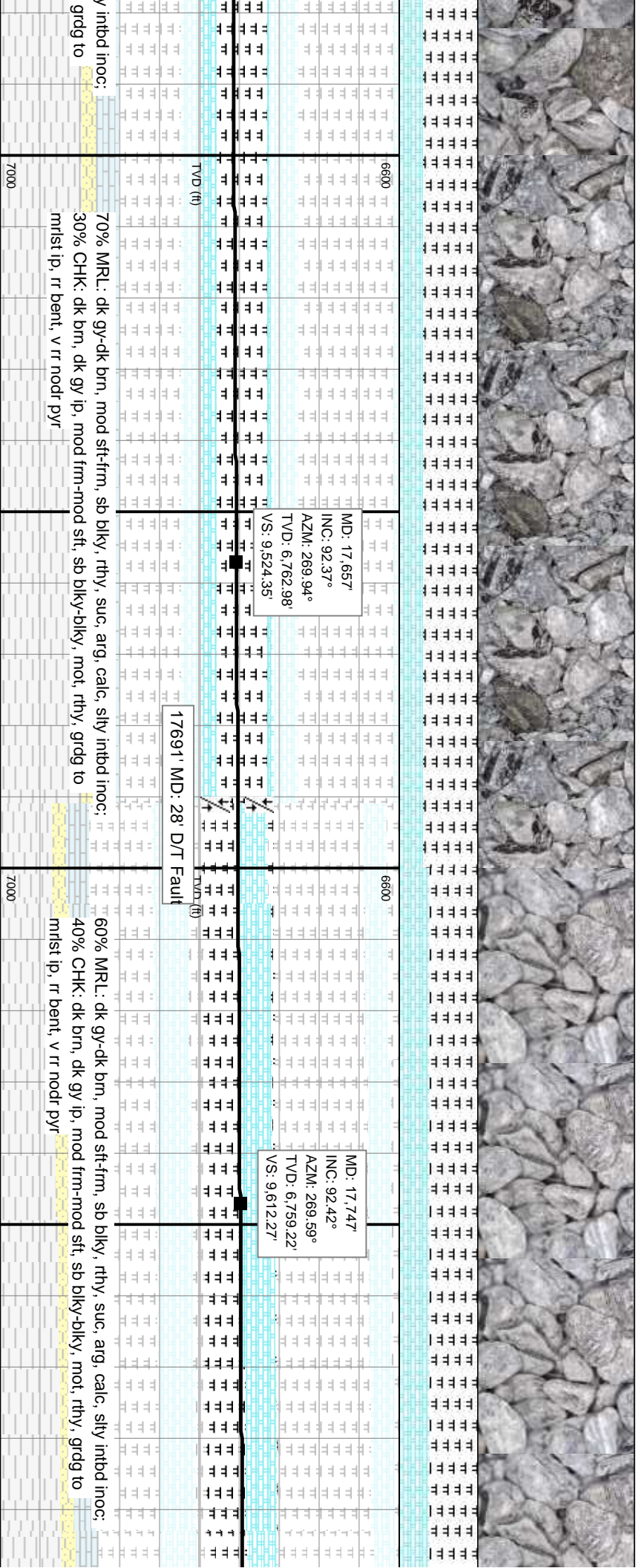
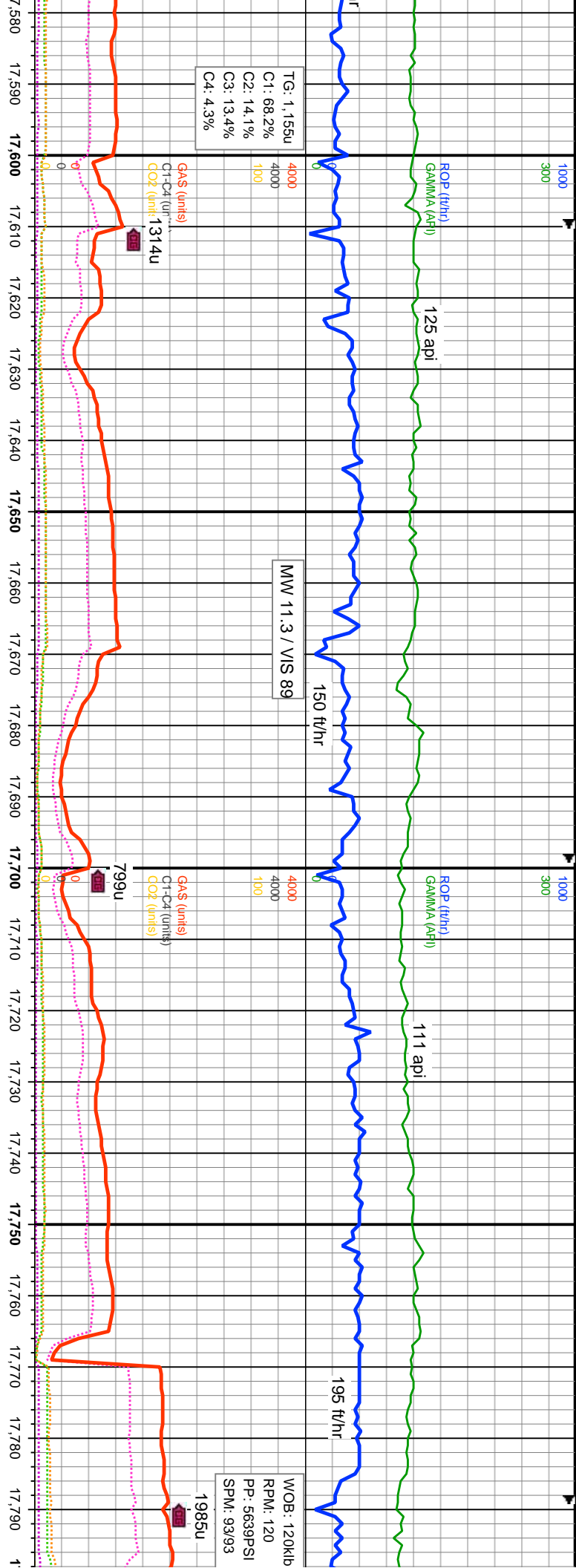


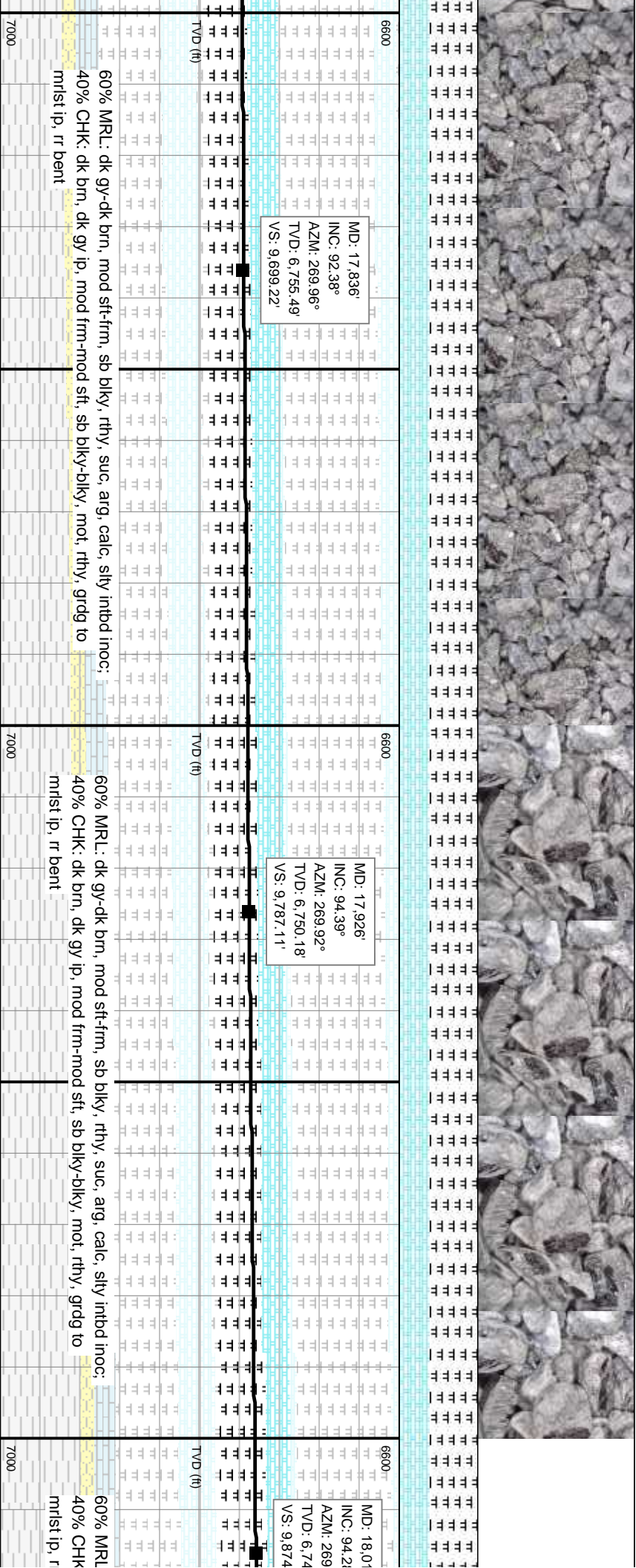
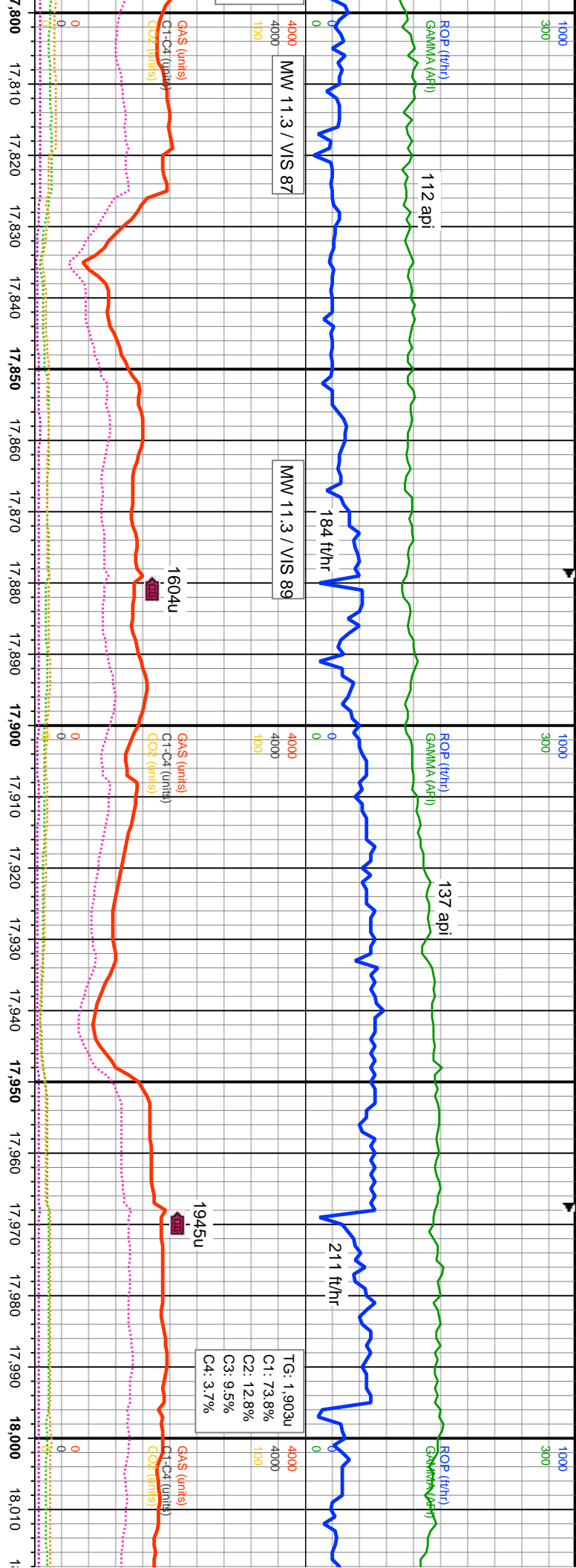


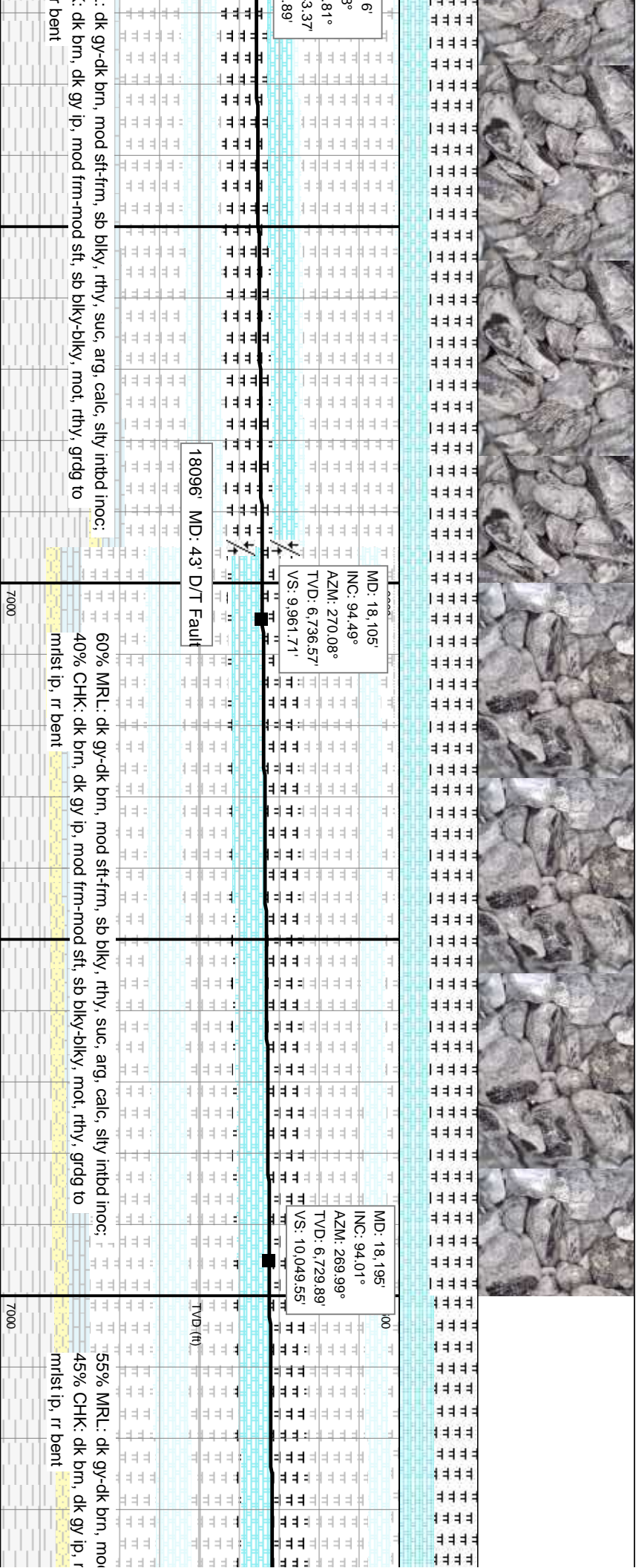
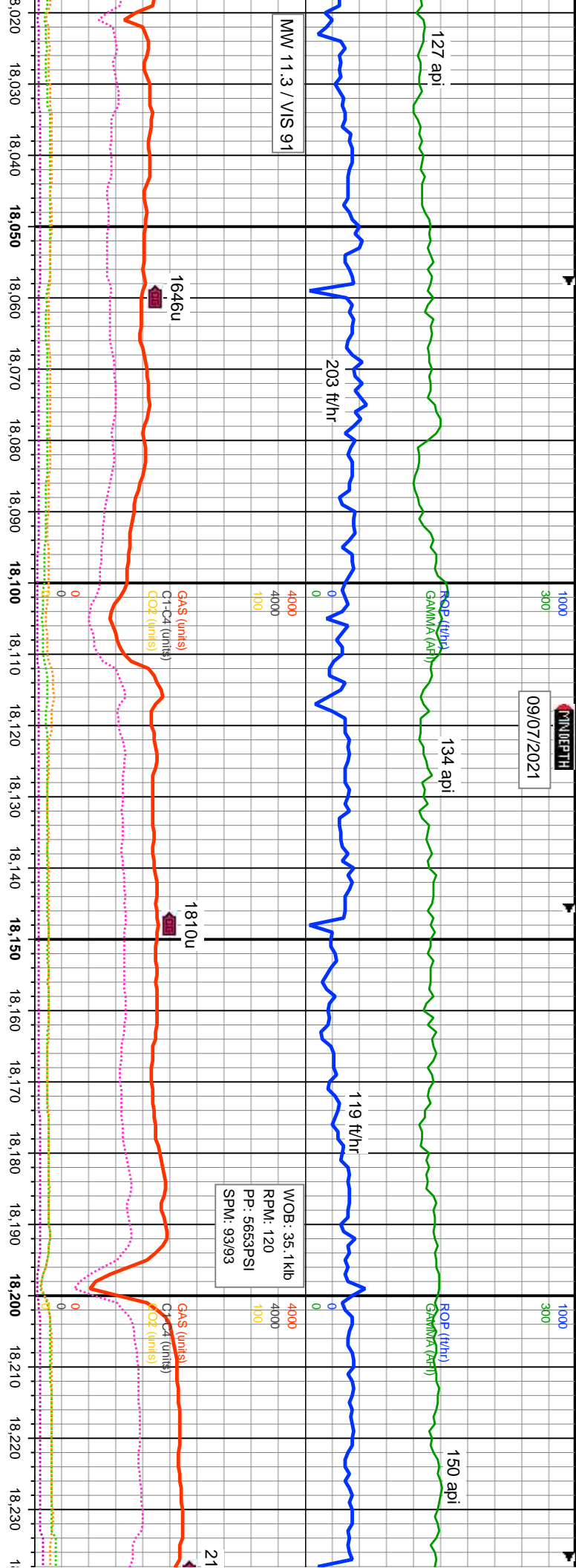


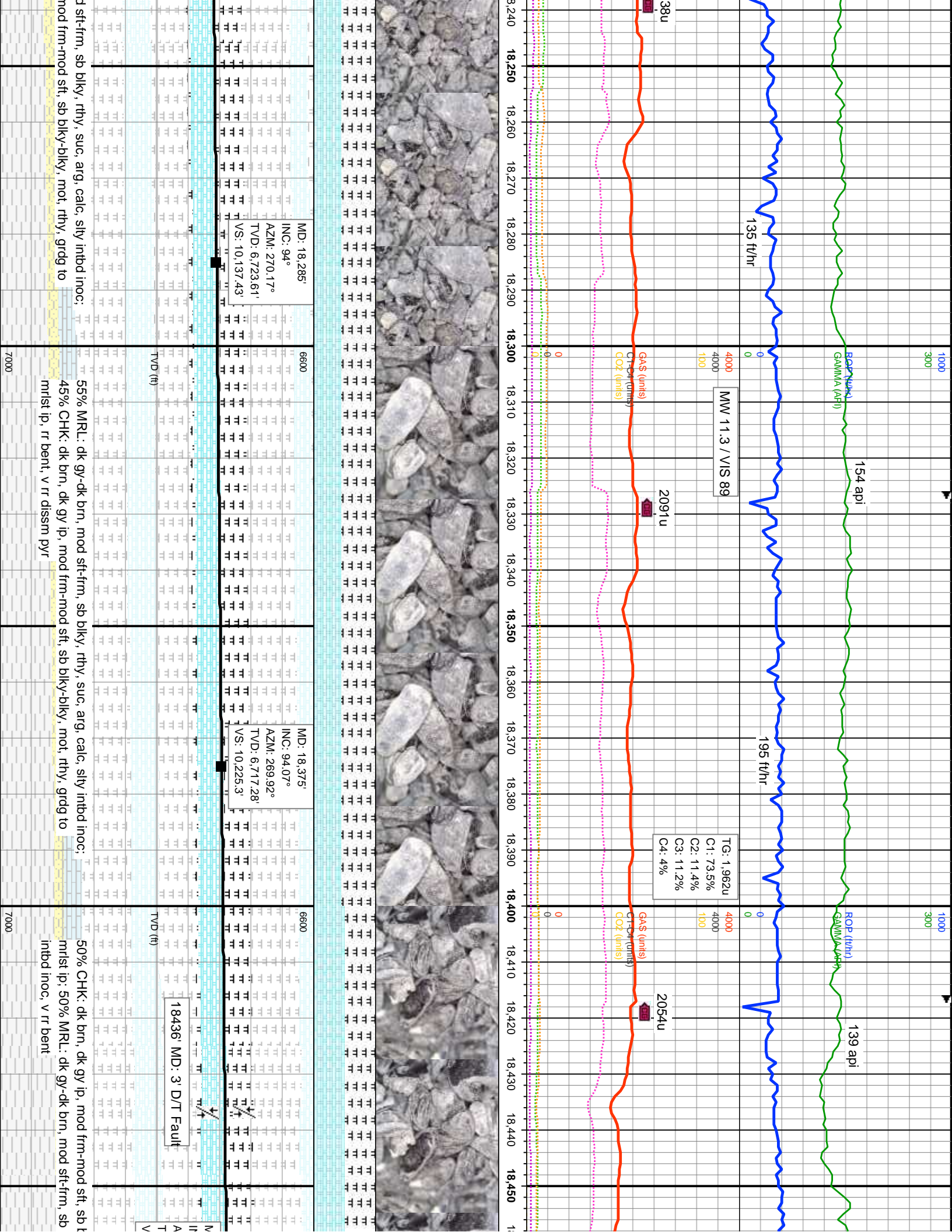


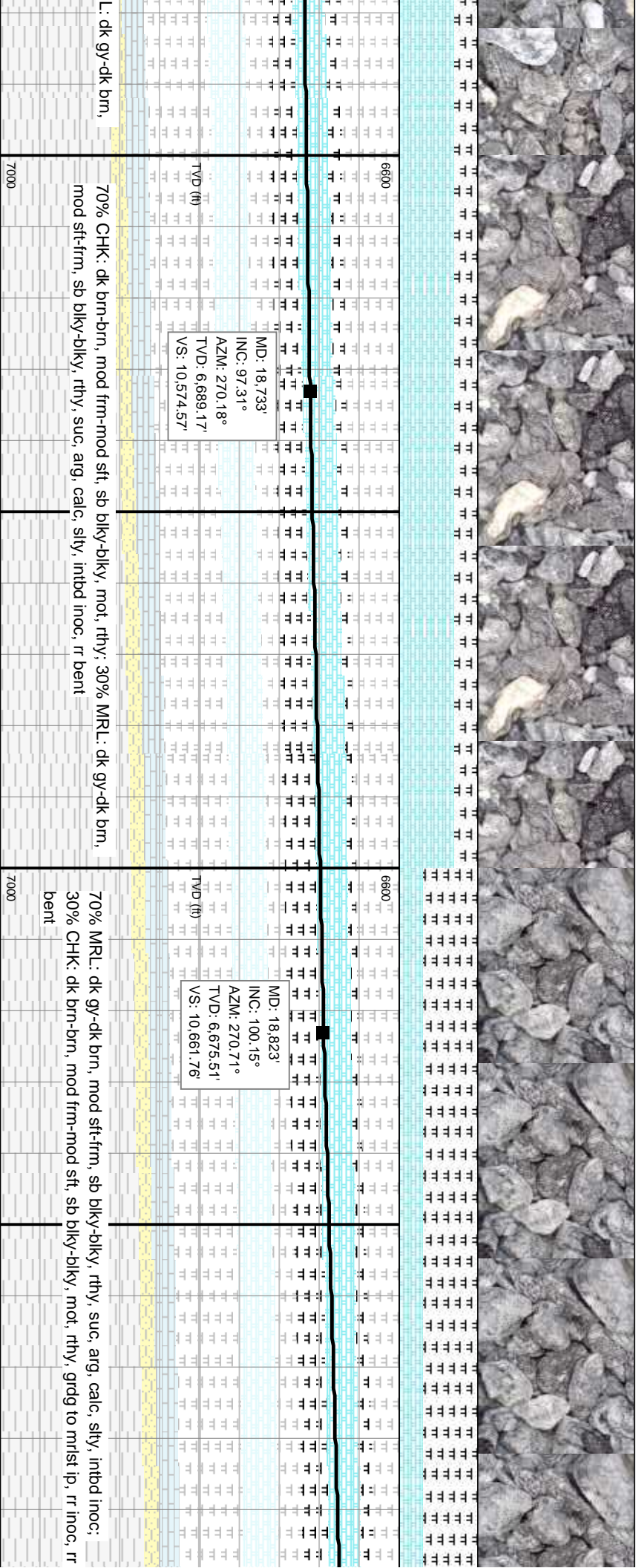
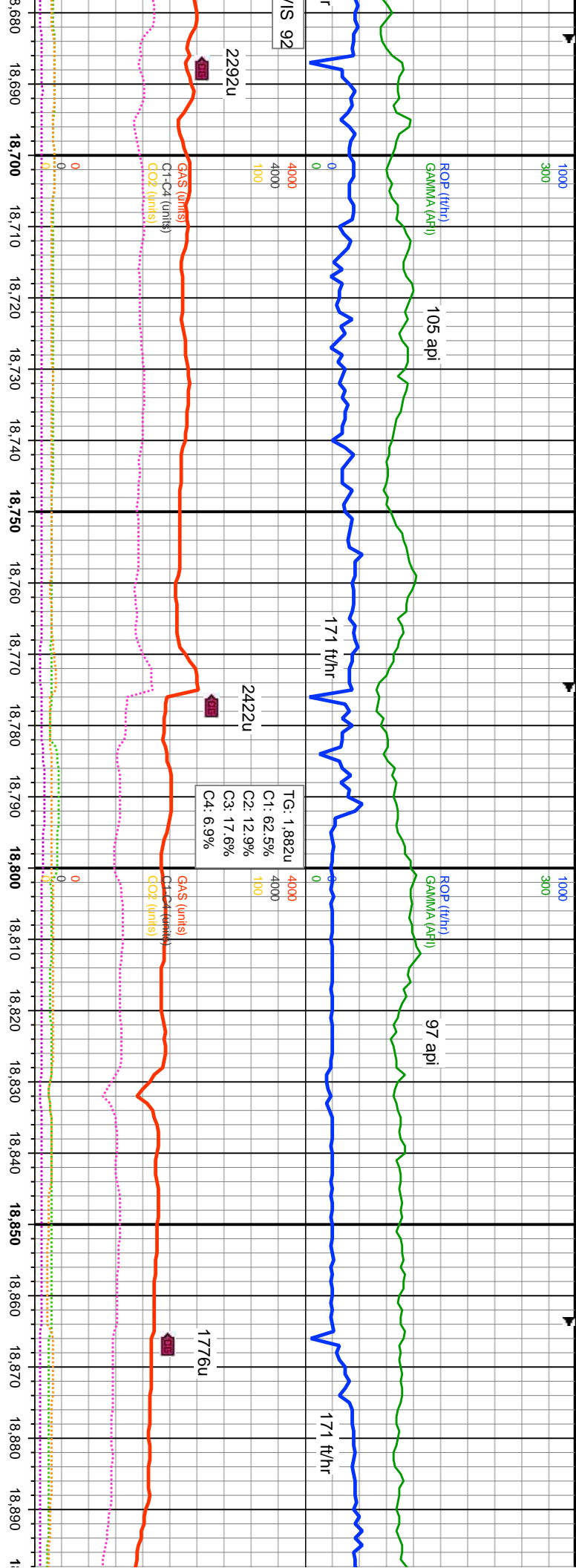


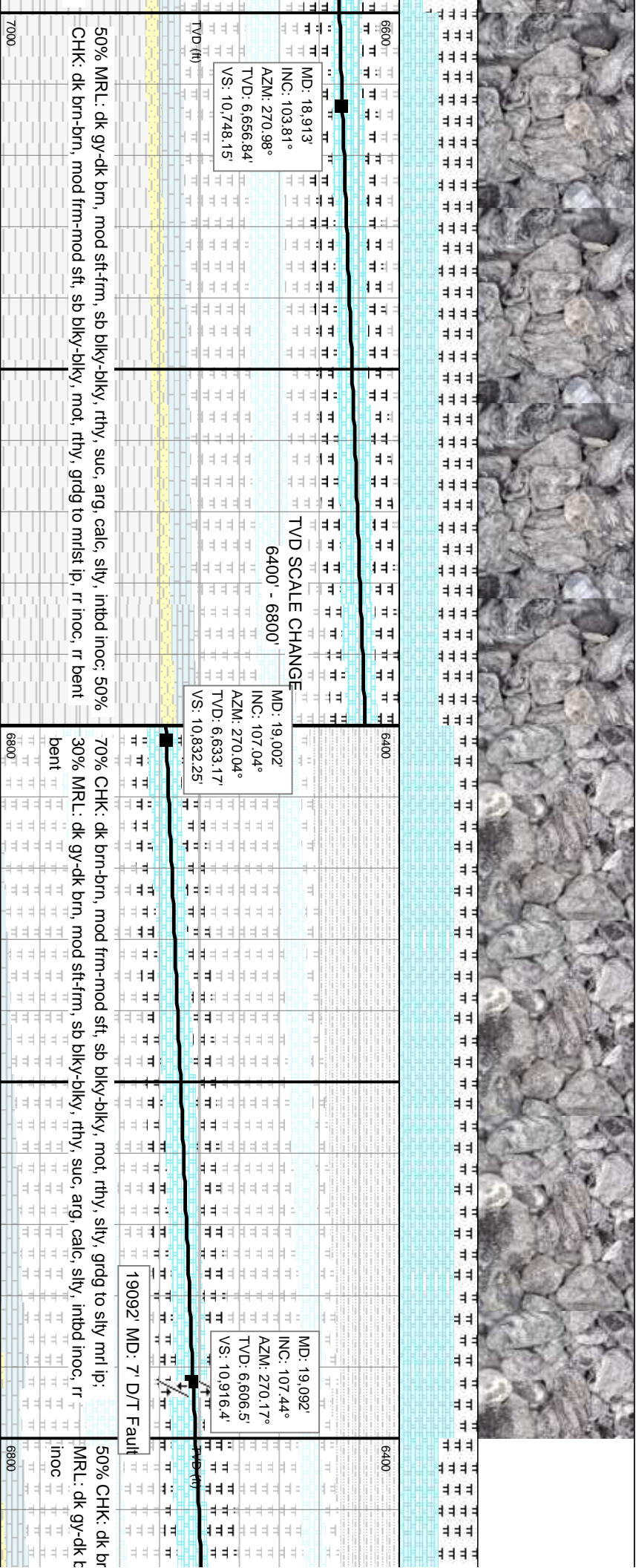
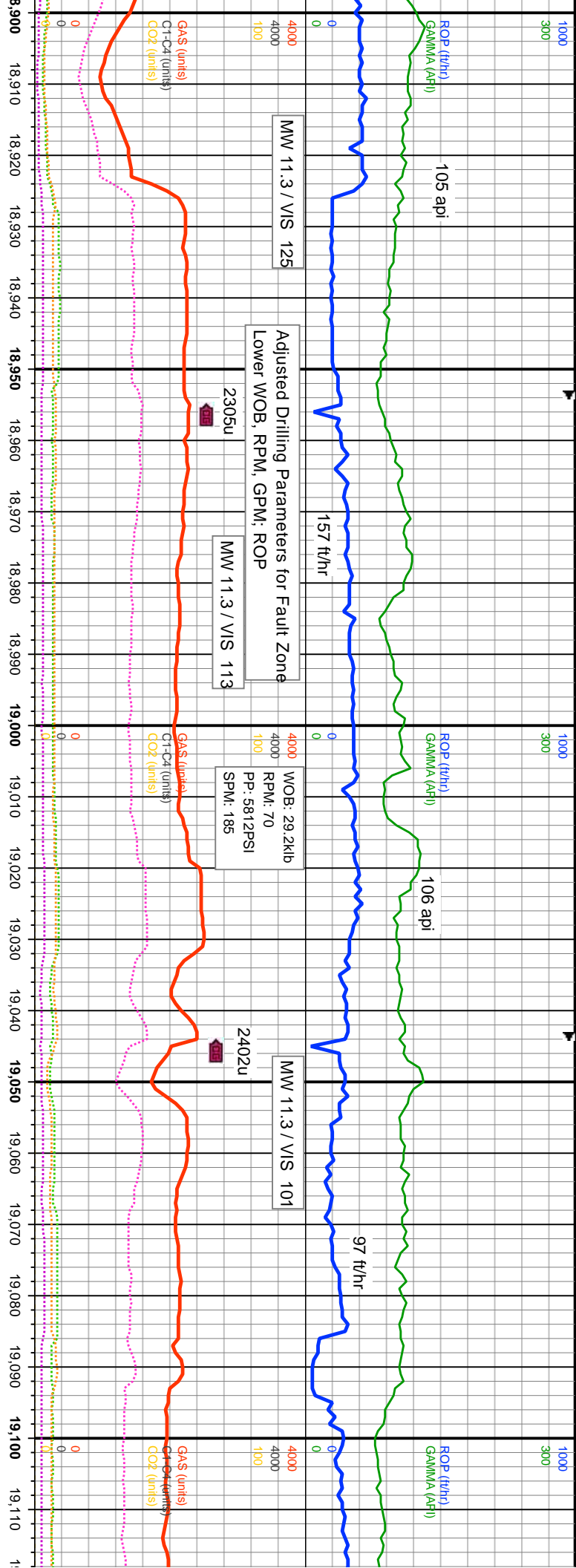


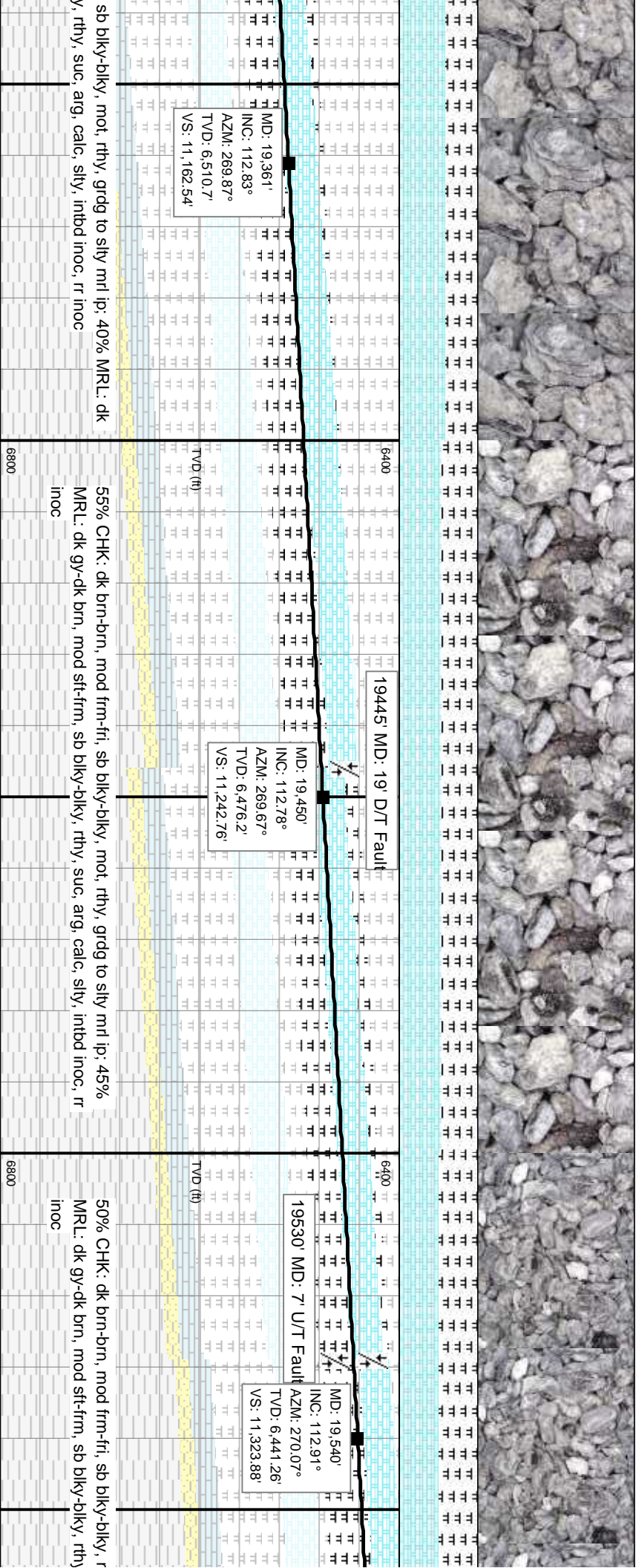
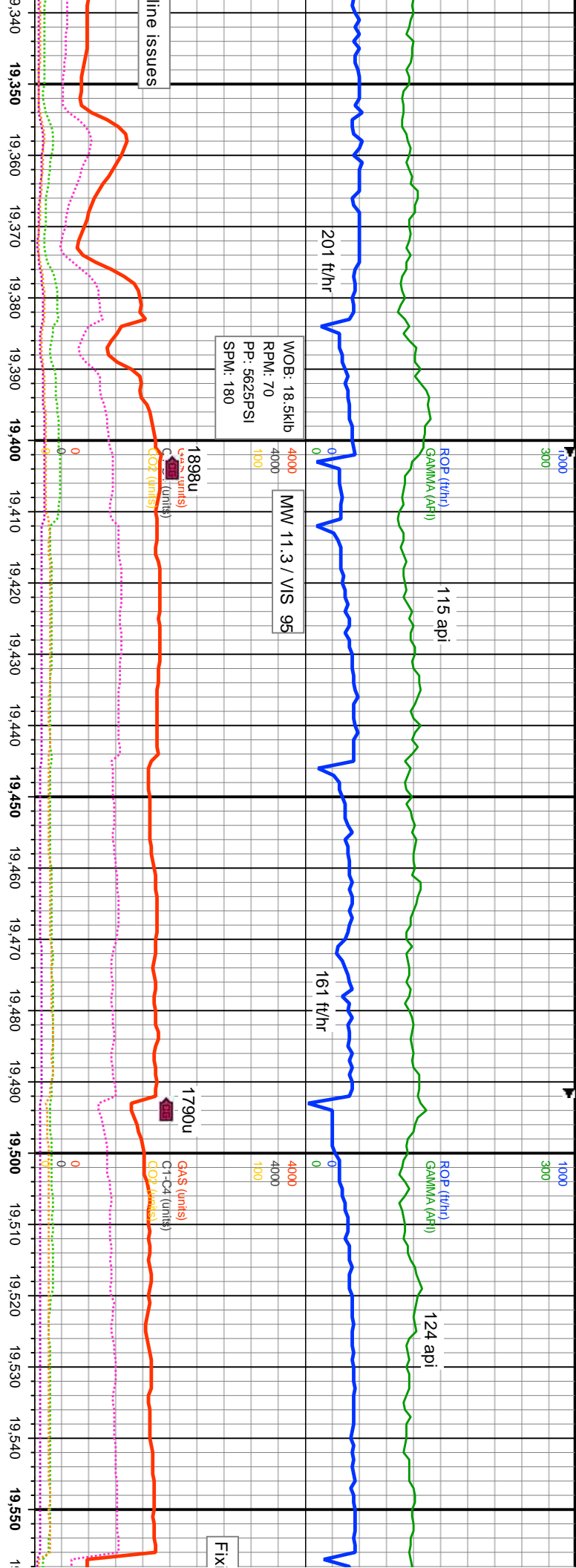


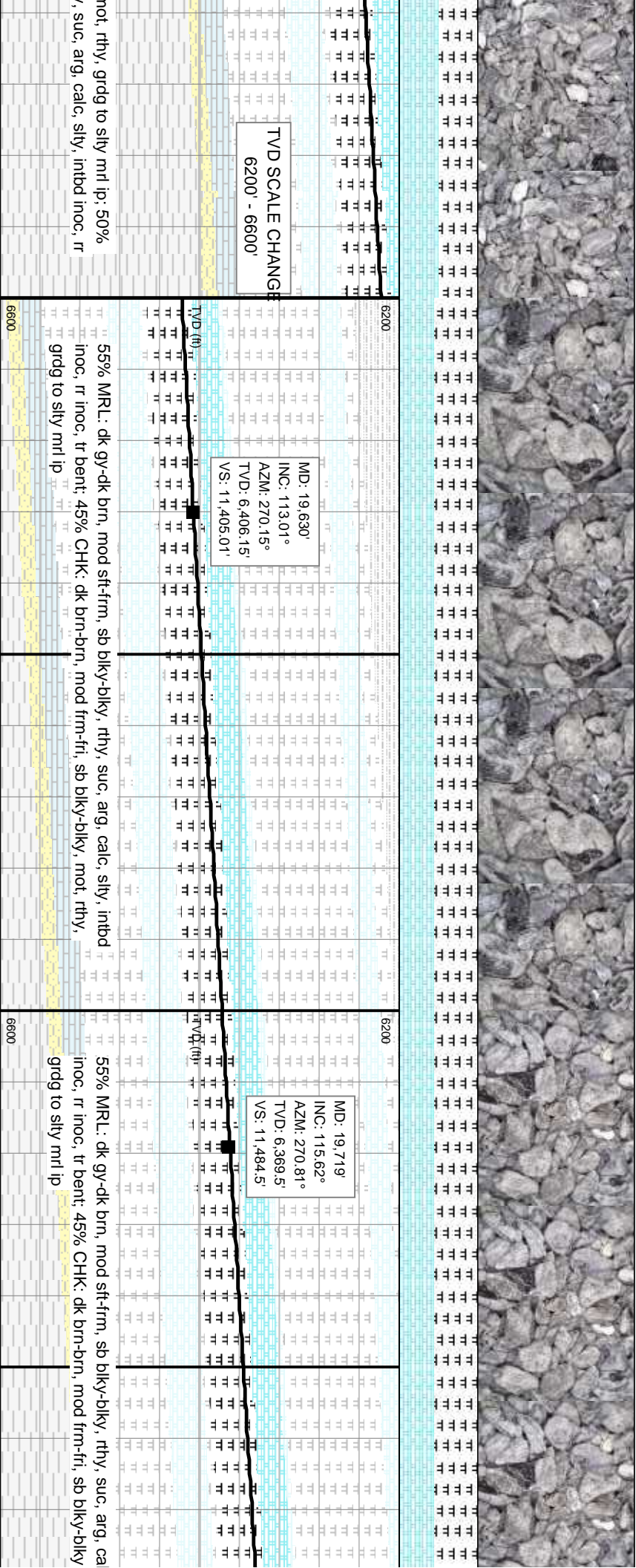
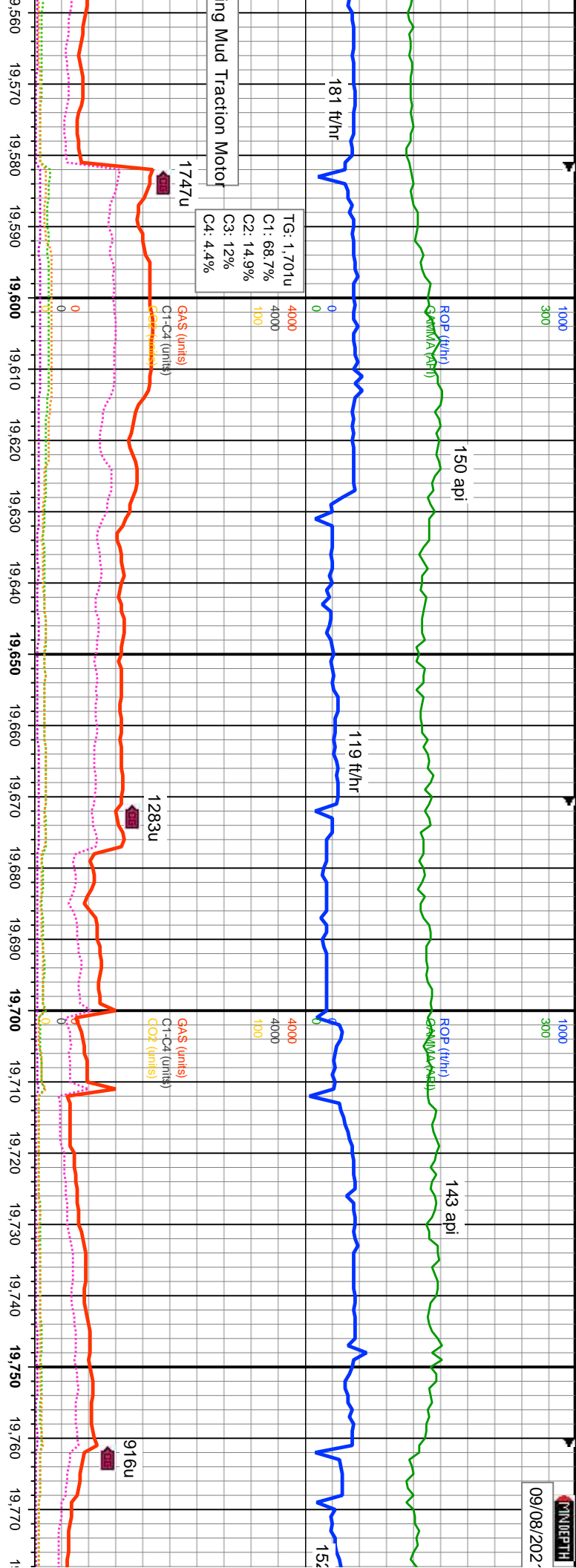


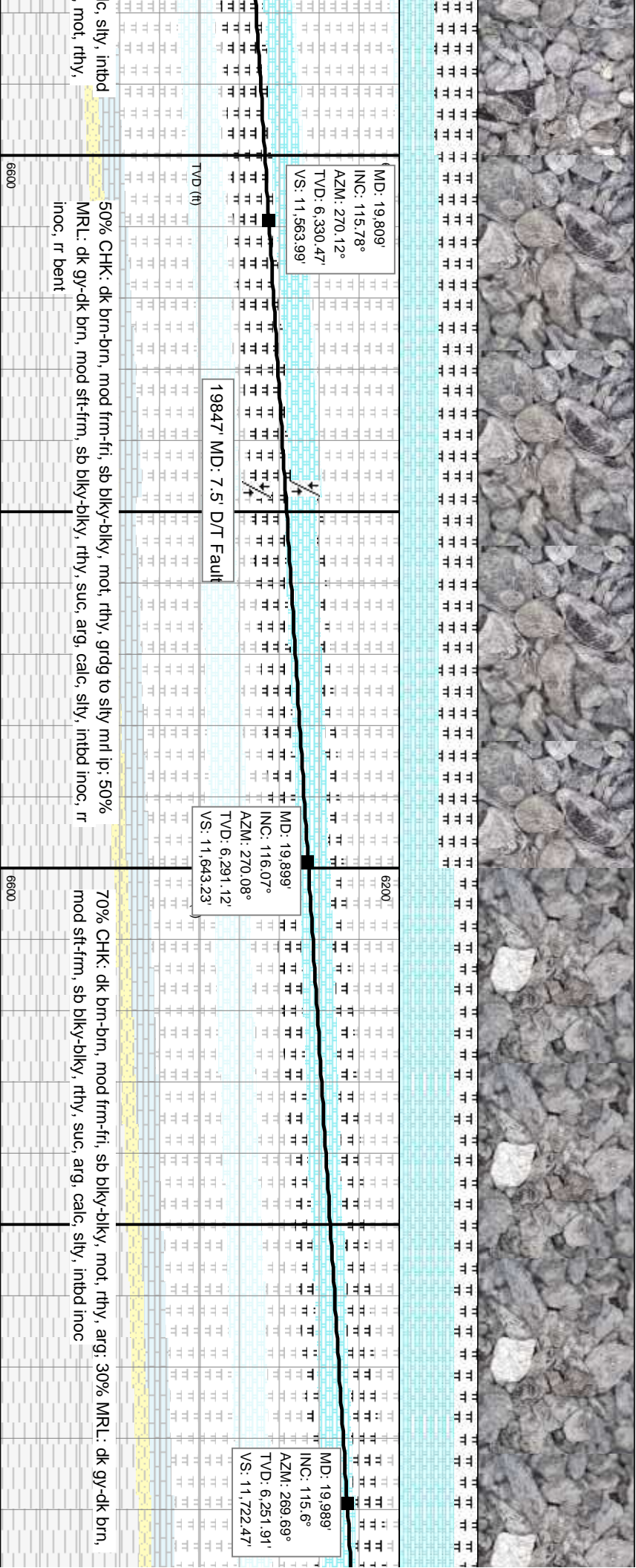
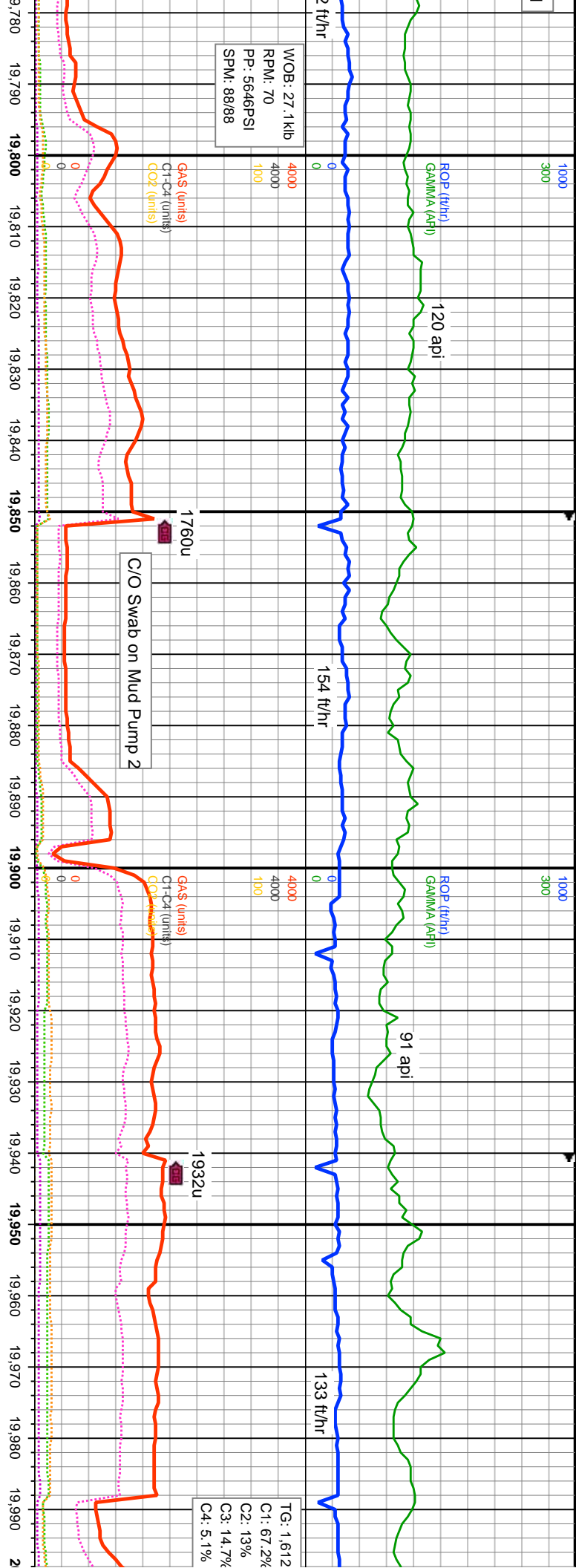


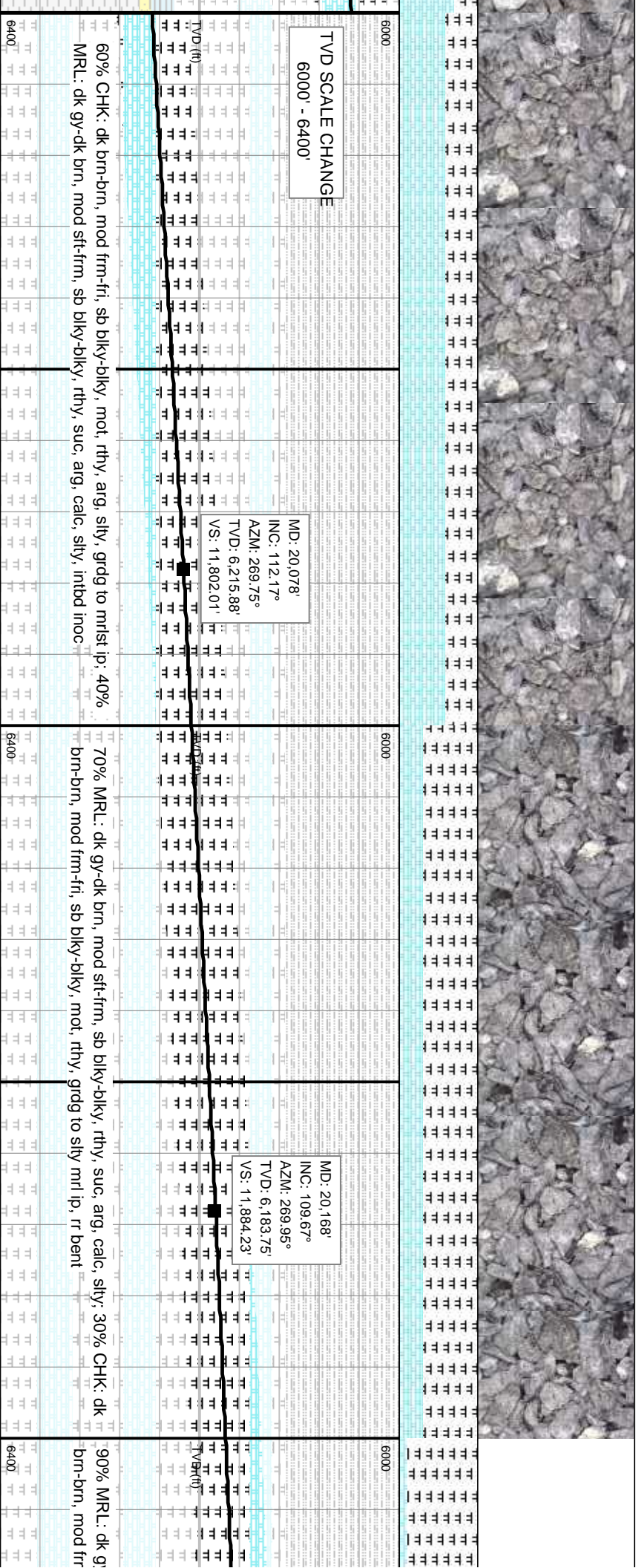
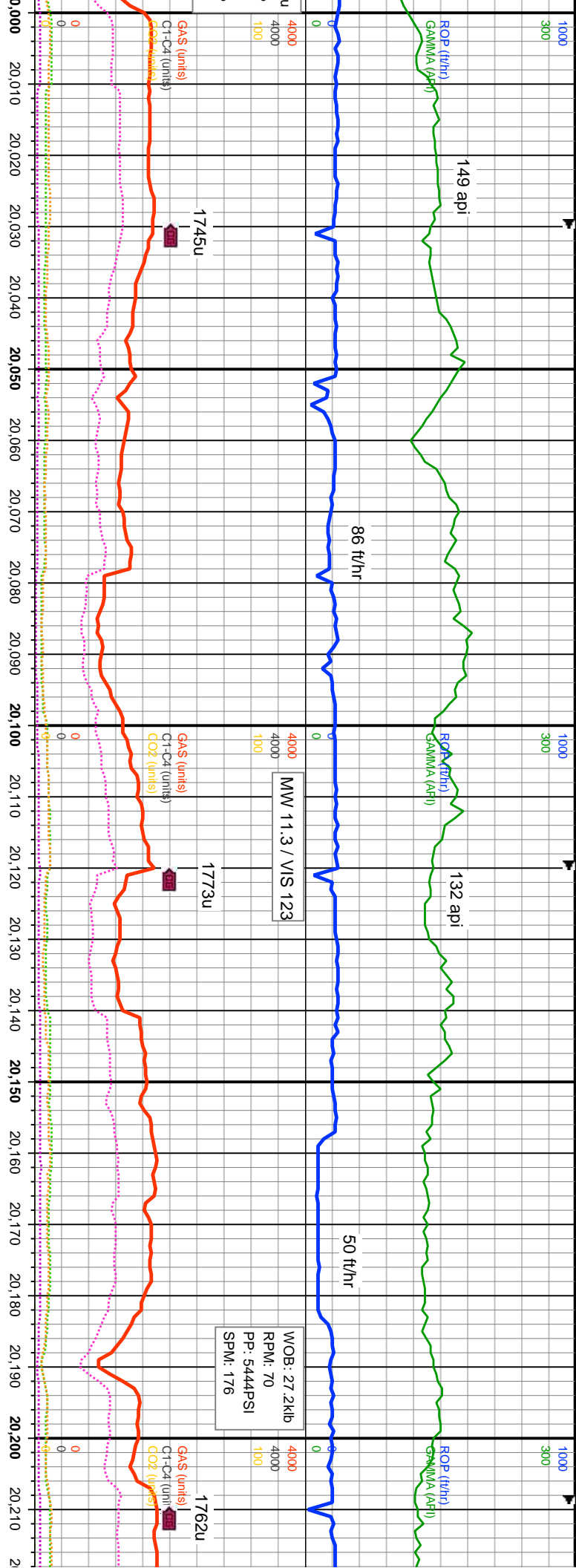


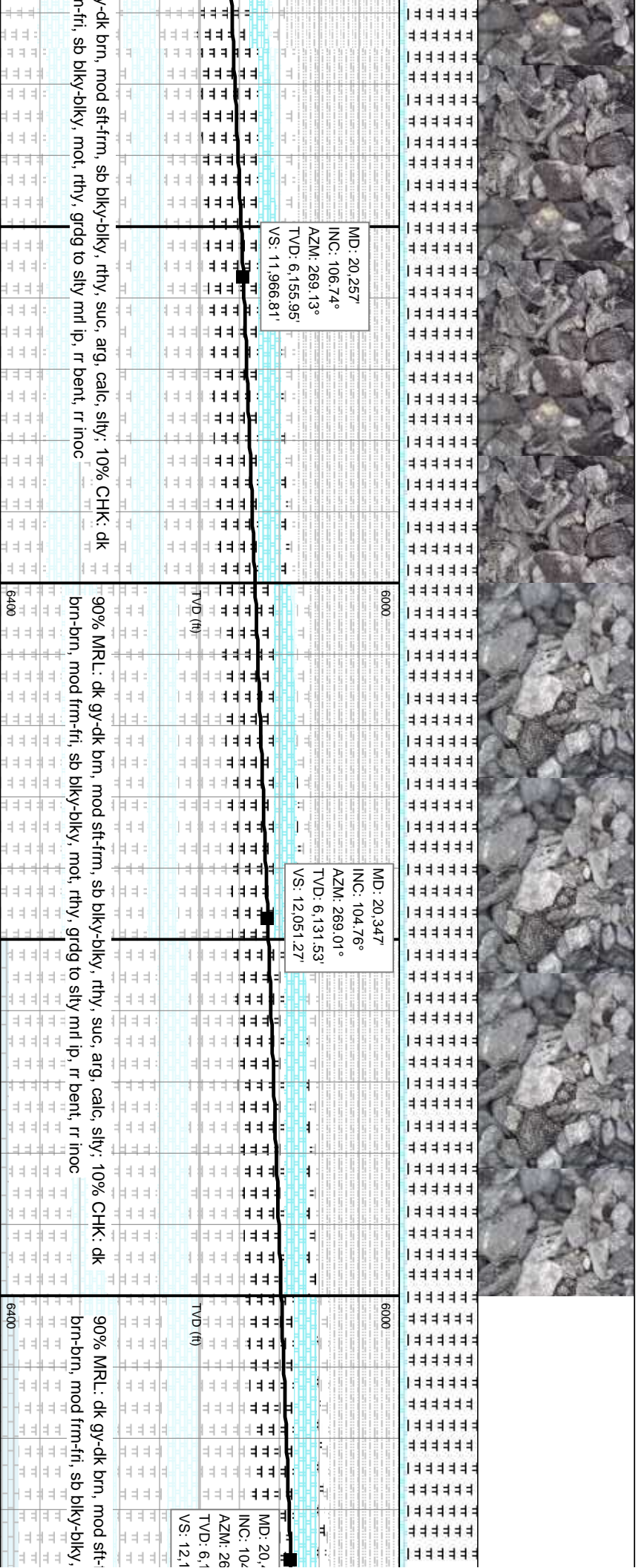
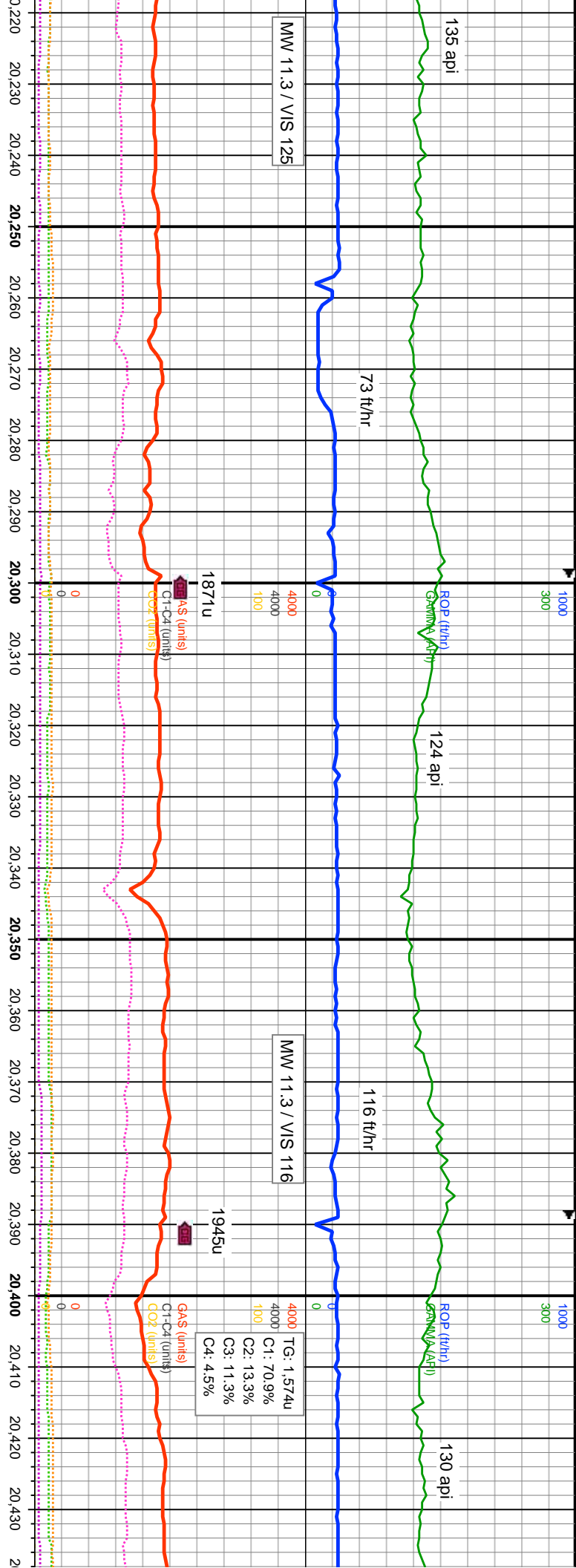


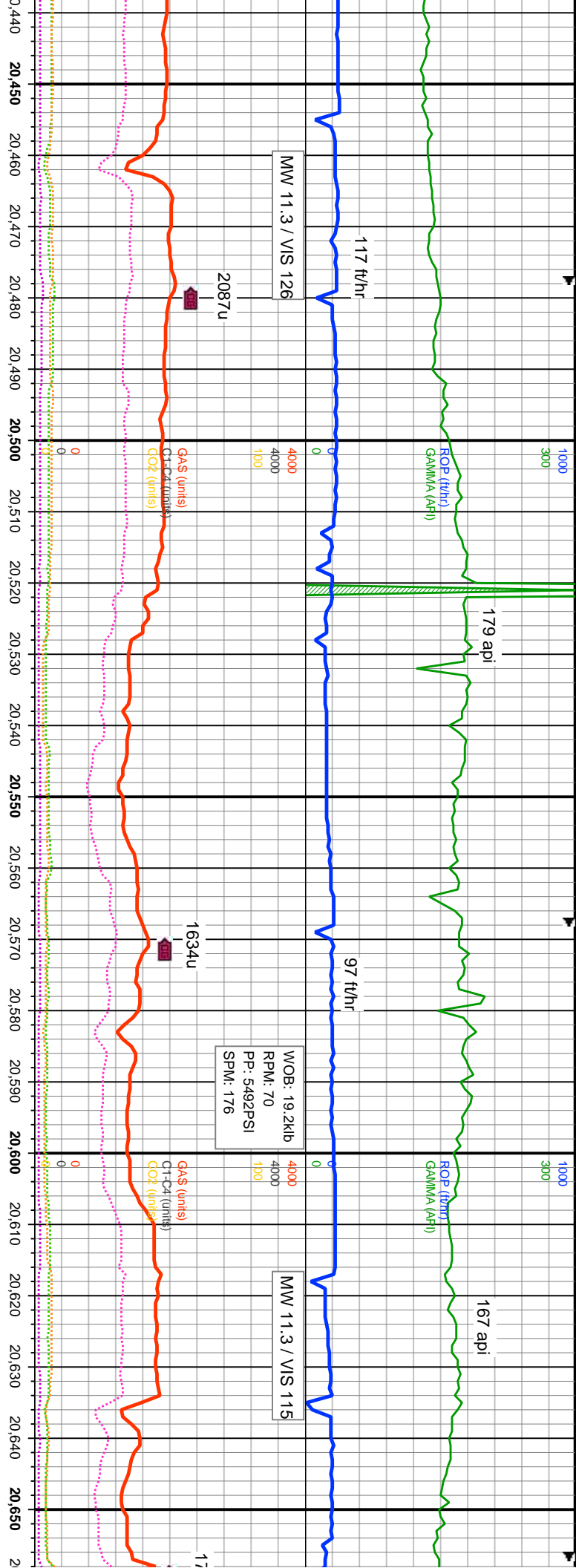












firm, sb blkly-blky, rthy, suc, arg, calc, silty, 10% CHK: dk	90% MRL: dk brn-brn, dk gy ip, mod sft-frm, sb blkly-blky, rthy, suc, arg, calc, silty, intbd
mot, rthy, grdg to silty mrl ip, rr bent, rr inoc	bent rr dsb pyr: 10% CHK: dk brn-brn, mod frm-fr, sb blkly-blky, mot, rthy, grdg to silty mrl
ip	mrl, rr inoc
6400	6400

37°	MD: 20.526°
88°	INC: 105.1°
8.86°	AZM: 269.32°
08.51°	TVD: 6.085.49'
36.07°	VS: 12.219.91'

TVD (ft)	6000
TVD (ft)	6000

37°	MD: 20.616°
88°	INC: 104.73°
8.86°	AZM: 268.97°
08.51°	TVD: 6.062.33'
36.07°	VS: 12.304.74'

TVD (ft)	6000
TVD (ft)	6000

