



Scale: 5" / 100'
Measured Depth Log

Well Name Marcus LD 11-376HNX

Location SESE SEC. 34 T1N R67W

State COLORADO

Country USA

API Number 05-123-45385-0000

Geographic Region DJ BASIN

Spud Date 11/5/2017

Surface Coordinates SESE Sec 34-T1N-R67W
817' FSL x 410' FEL

Bottom Hole Coordinates SESW Sec 11-T1S-R67W
1429' FSL x 1880' FWL

County WELD

Rig Number PRECISION 460

AFE # 17DC0133

Field WATTENBERG

Drilling Completed 11/8/2017

Ground Elevation 5043'

K.B. Elevation 5062'

Logged Interval 6000' MD To 16107' MD

Formation NIOBRARA A BENCH

Type of Drilling Fluid OIL BASED MUD

Total Depth 16107' MD

Operator

Company Great Western Oil and Gas

Address 1801 Broadway, Ste 500
Denver, CO 80202



Geologist

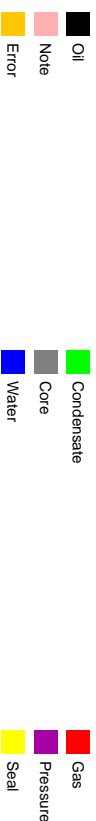
Name Joey Luce and Alec Walker

Company Terra Guidance

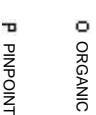
Address 1298 O Road
Loma CO 81524
(970) 260-5408



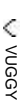
Color Coding



Oil Show



DEAD



EVEN

QUESTIONABLE

SPOTTED STAINING



Engineering



CASING



CONNECTION (LEFT)



CONNECTION (RIGHT)



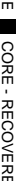
CONNECTION G

FRACTURE



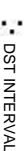
CORE - LOST

INTERCRYSTALLINE



CORE - RECOVERED

INTEROOLITIC



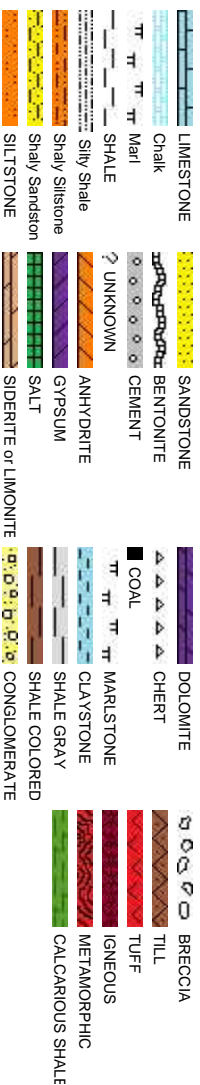
DST INTERVAL

MOLDIC



FAULT

Rock Types



Porosity

E EARTHY

FENESTRAL

FRACTURE

INTERCRYSTALLINE

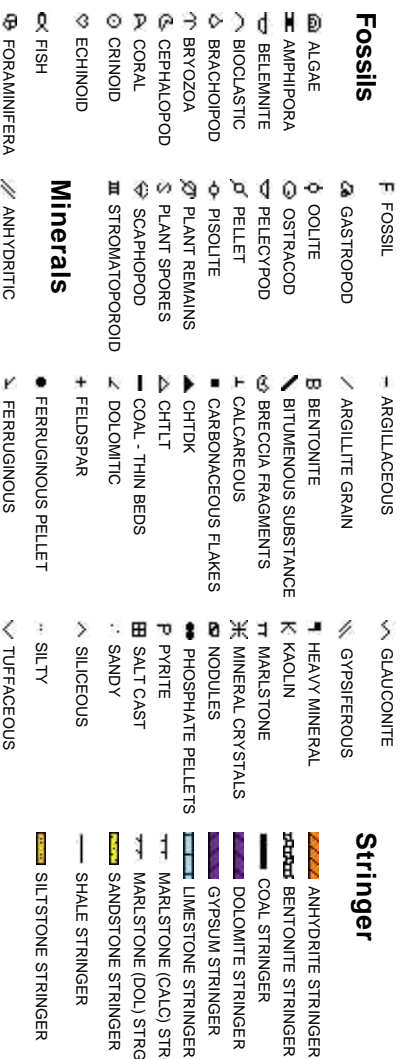
INTEROOLITIC

MOLDIC



FAULT

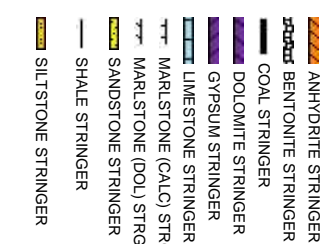
Accessories



Minerals



Stringer




Other Symbols

 FORMATION TOP

L LITHOGRAPHIC

Rounding

 GAS SHOW

MX MICROXLN

 MINDEPTH MN DEPTH


A ANGULAR

MS MUDSTONE

 NORMAL FAULT

R ROUNDED

PS PACKSTONE

 OIL SHOW

B SUBANG

WS WACKSTONE

 OVERTURNED STRATA

S SUBRND

Sorting

 REVERSE FAULT

Textures

 SIDEWALL CORE (LEFT)


M MODERATE

 SIDEWALL CORE (RIGHT) BS BOUNDSTONE P POOR

 SLIDE

C CHALKY

W WELL

 SURVEY

CX CRYPTOXLN


CALCARIUOS SHALE

 TRIP GAS

E EARTHY

 WIRELINE TESTED - LEFT FX FINELYXLN

CALCARIOUS SHALE

 WIRELINE TESTED - RT BS GRAINSTONE

TERRA GUIDANCE
BEGAN LOGGING @ 11:32 MST 11/06/2017
100' Sample Collection
BLOODHOUND GAS CHROMATOGRAPH #5053

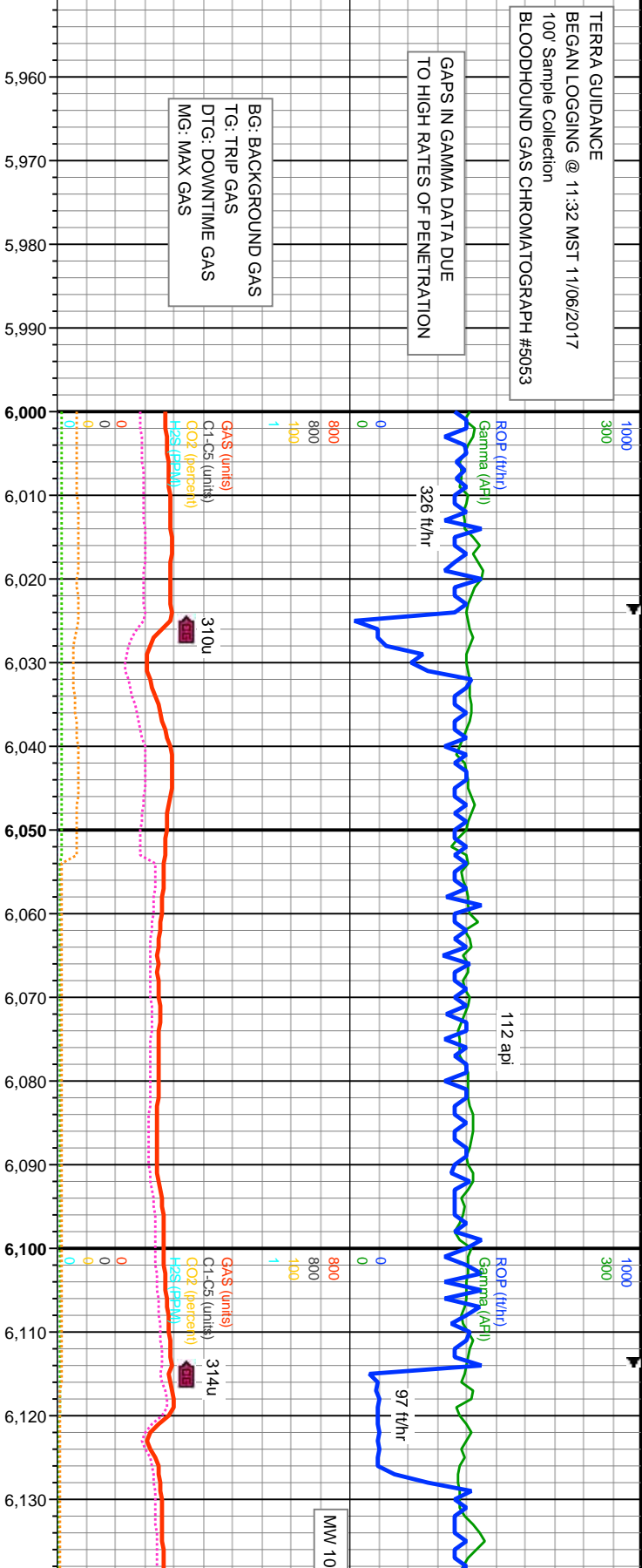
ROP —
Gamma —

GAPS IN GAMMA DATA DUE
TO HIGH RATES OF PENETRATION

BG: BACKGROUND GAS
TG: TRIP GAS
DTG: DOWNTIME GAS
MG: MAX GAS

Total Gas & Chromatograph
GAS —
C1 —
C2 —
C3 —
C4 —
C5 —
CO2 —
H2S —

Depth



Images



% Lithology



TVD Scale
5500' - 6500'

MD: 5,997'
INC: 30.01°
AZM: 129.4°
TVD: 5,523.63'
VS: 1,451.62'

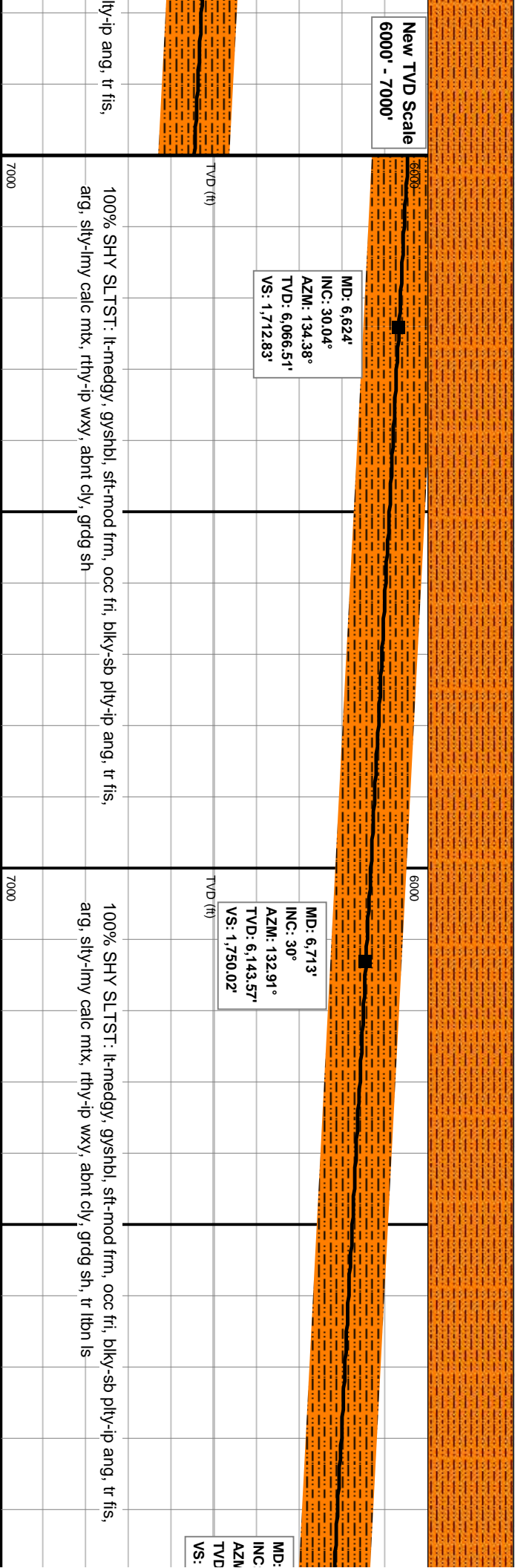
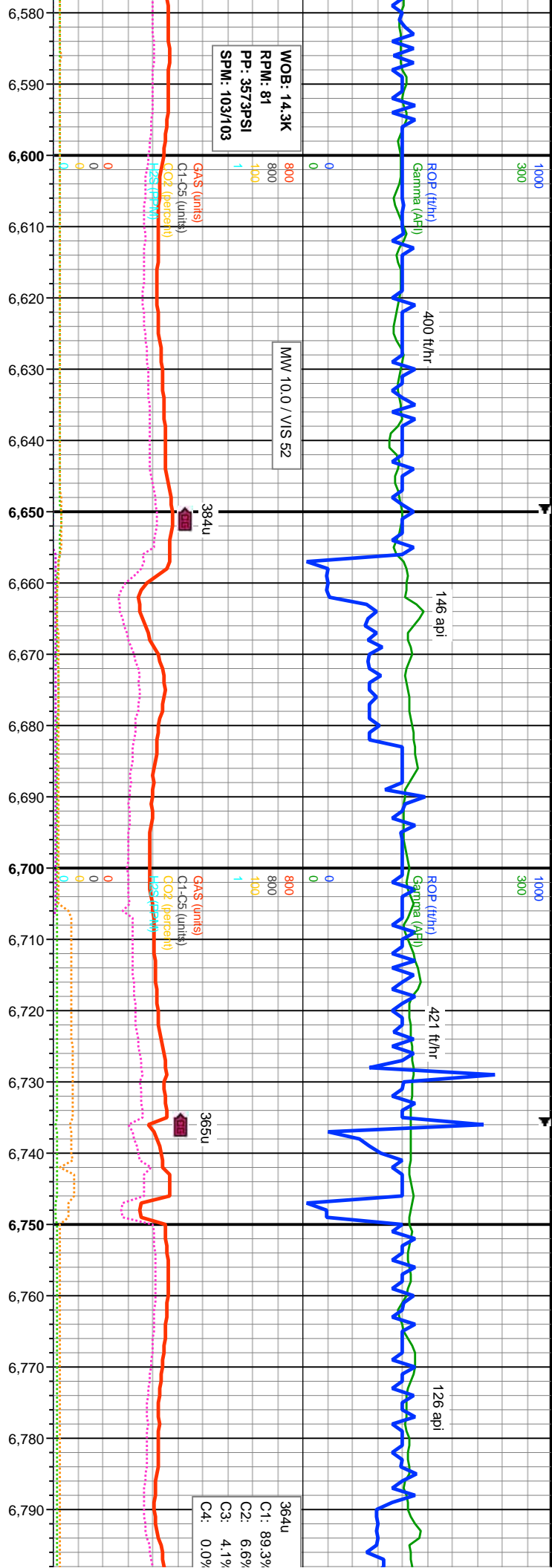
MD: 6,087'
INC: 30.11°
AZM: 131.95°
TVD: 5,601.52'
VS: 1,487.93'

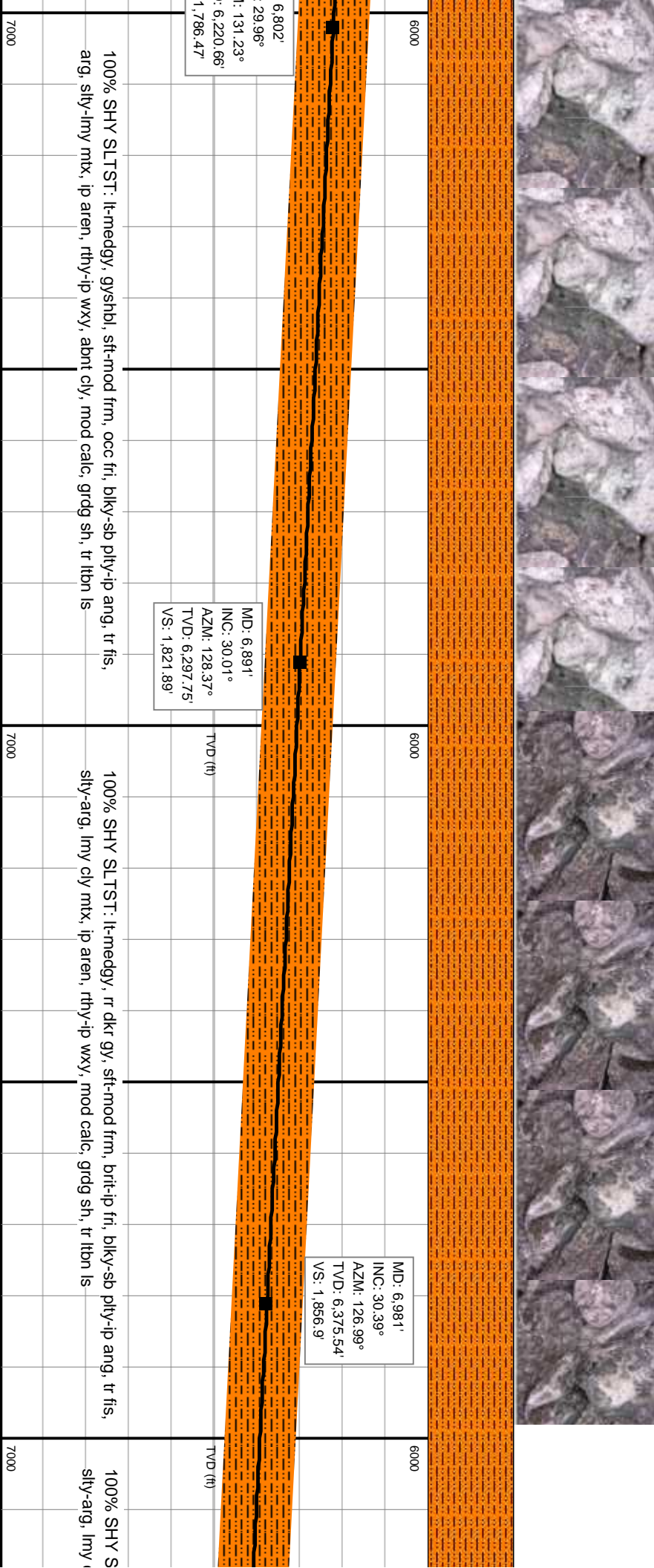
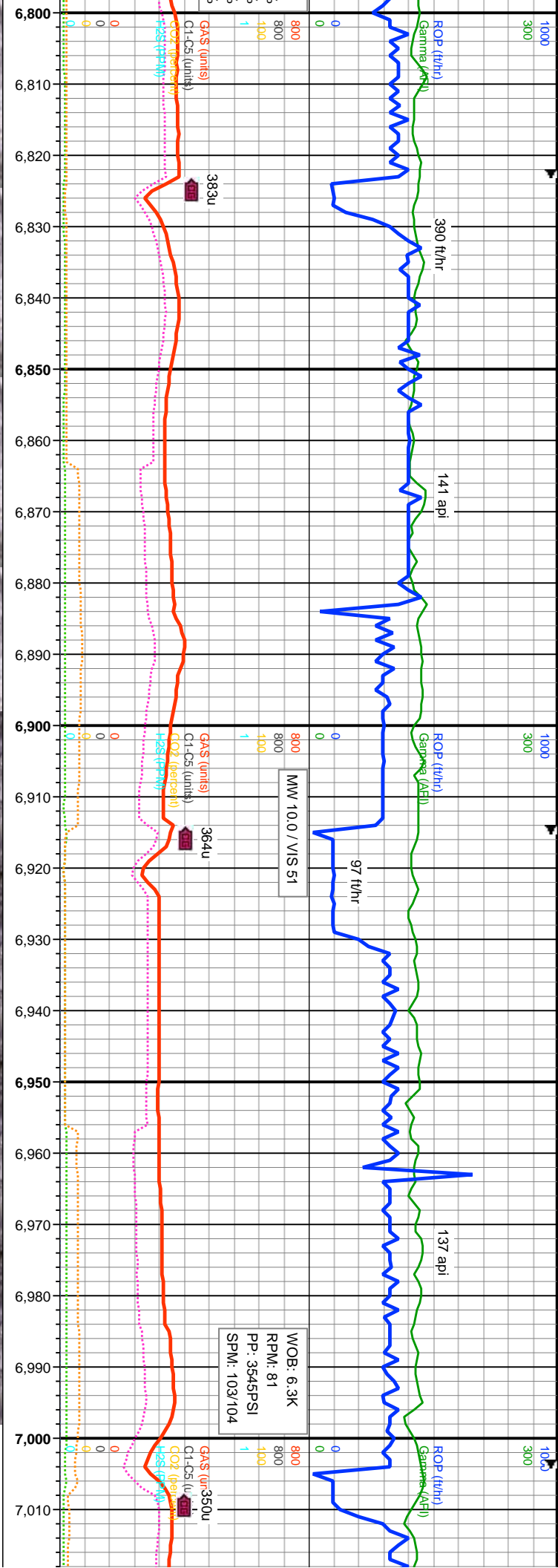
Bit #: 1
Type: AT505F
Size: 8.5"
Depth In: 1,738'
Jets: 5x15
S/N: 7162537

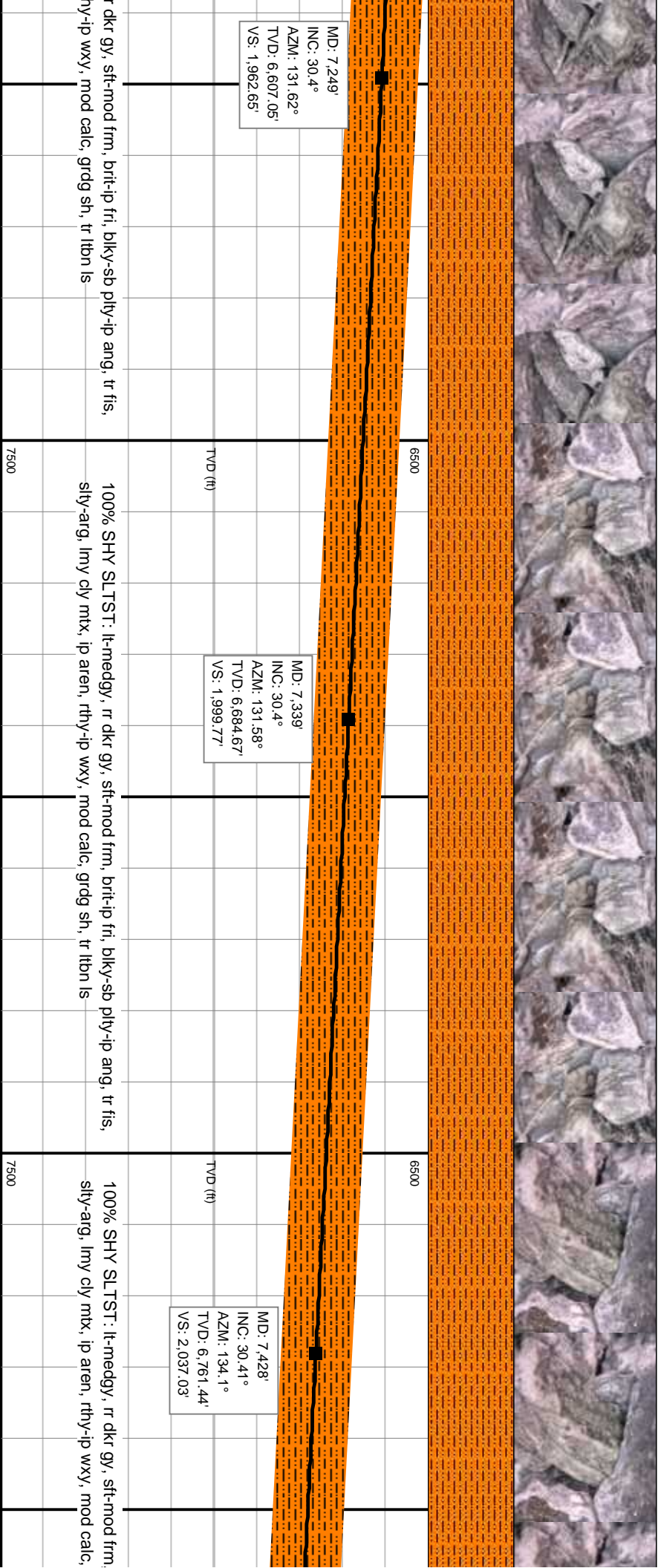
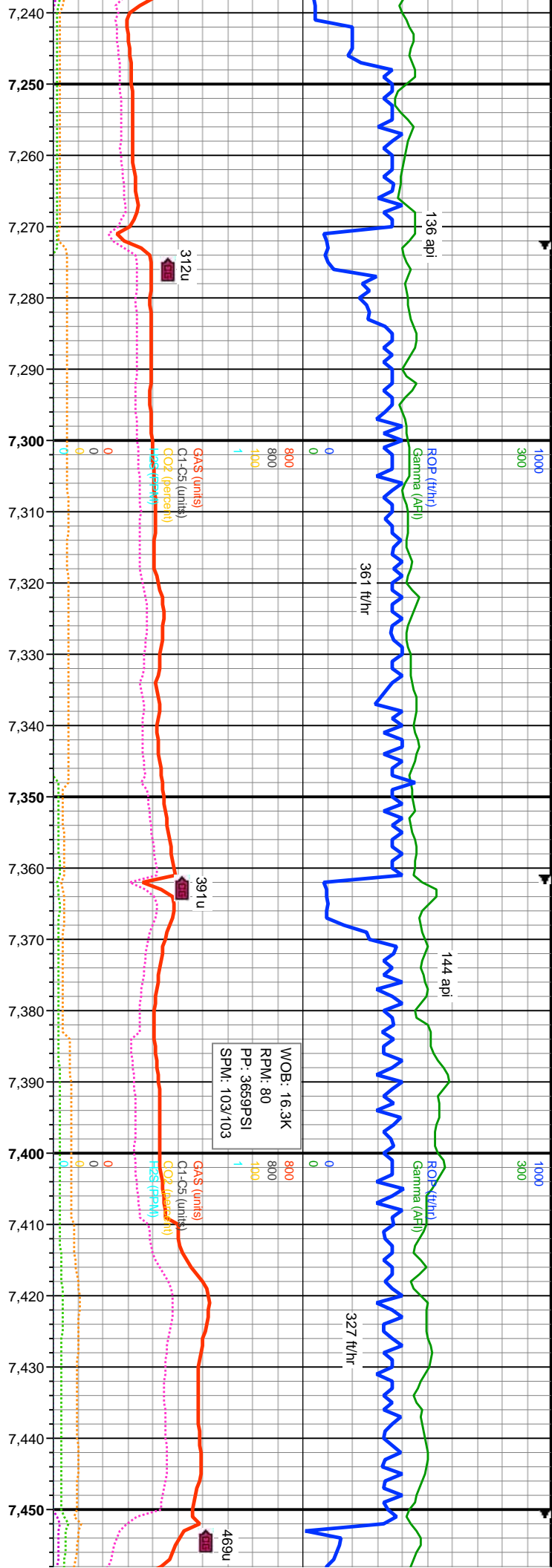
Well Bore
TVD —

100% SHY SLTST: lt-medgy, sft-nod frm, occ fri-brit, sb blkv-plty-ip ang, tr fis, arg,
sily-ip aren, rthy, abnt cly, grdg sh

100% SHY SLTST: lt-medgy, s
sily-ip aren, rthy, abnt cly, grdg





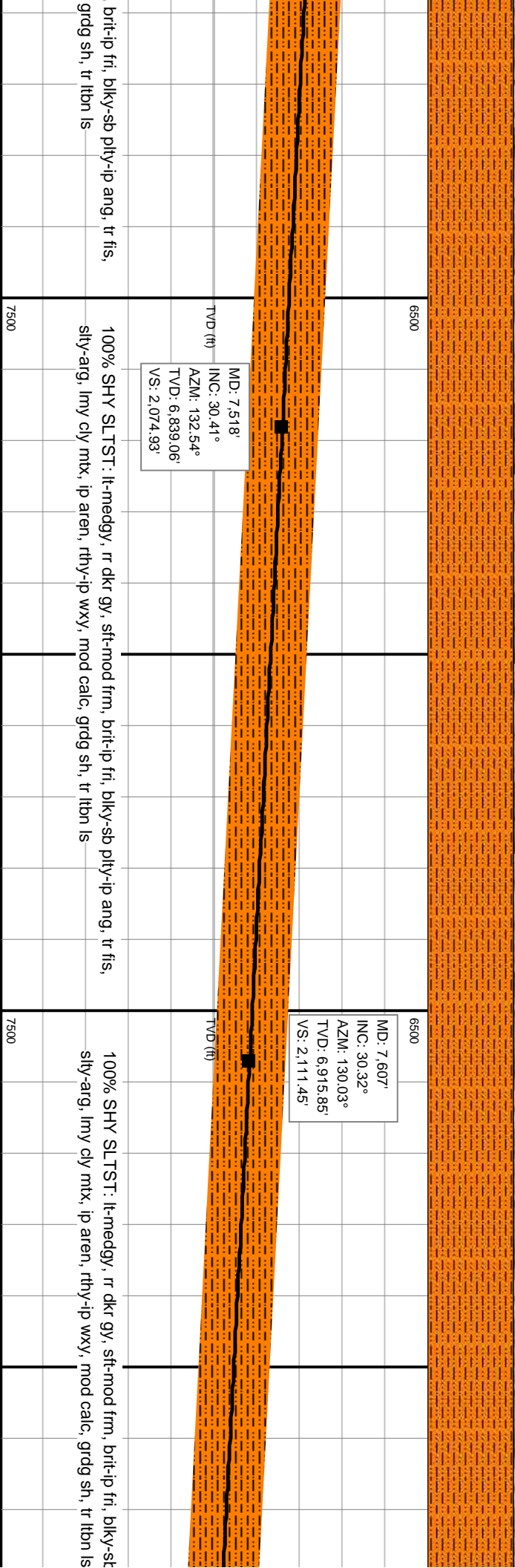
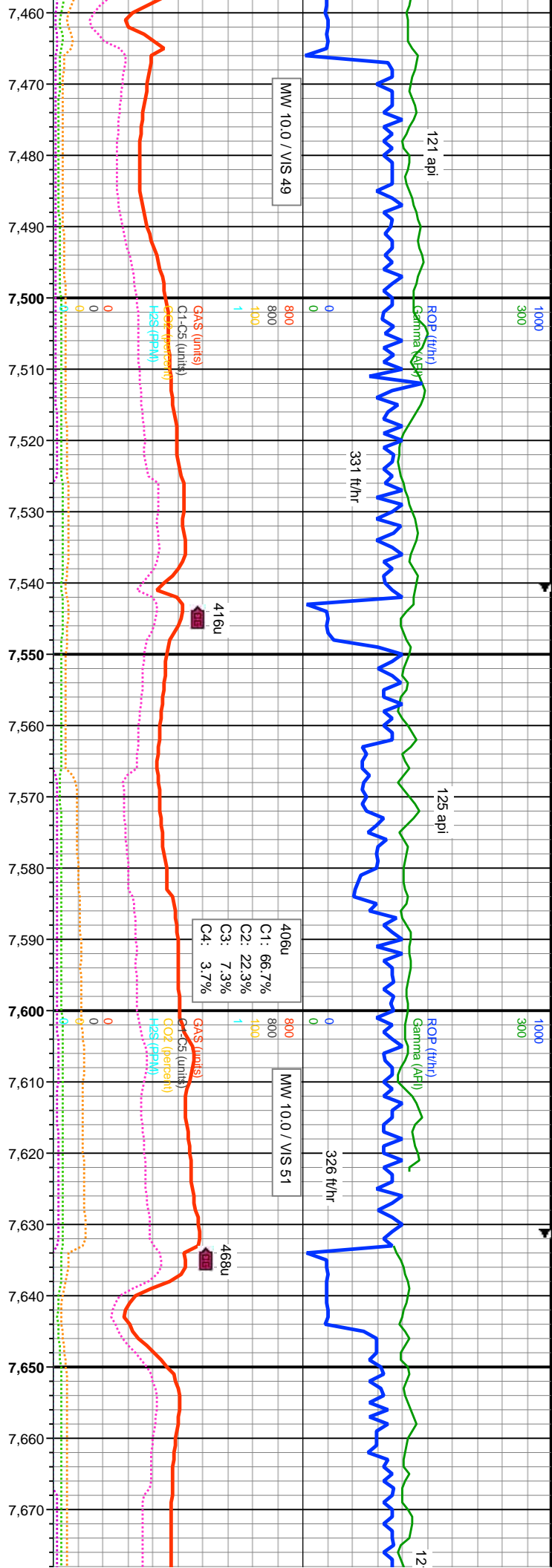


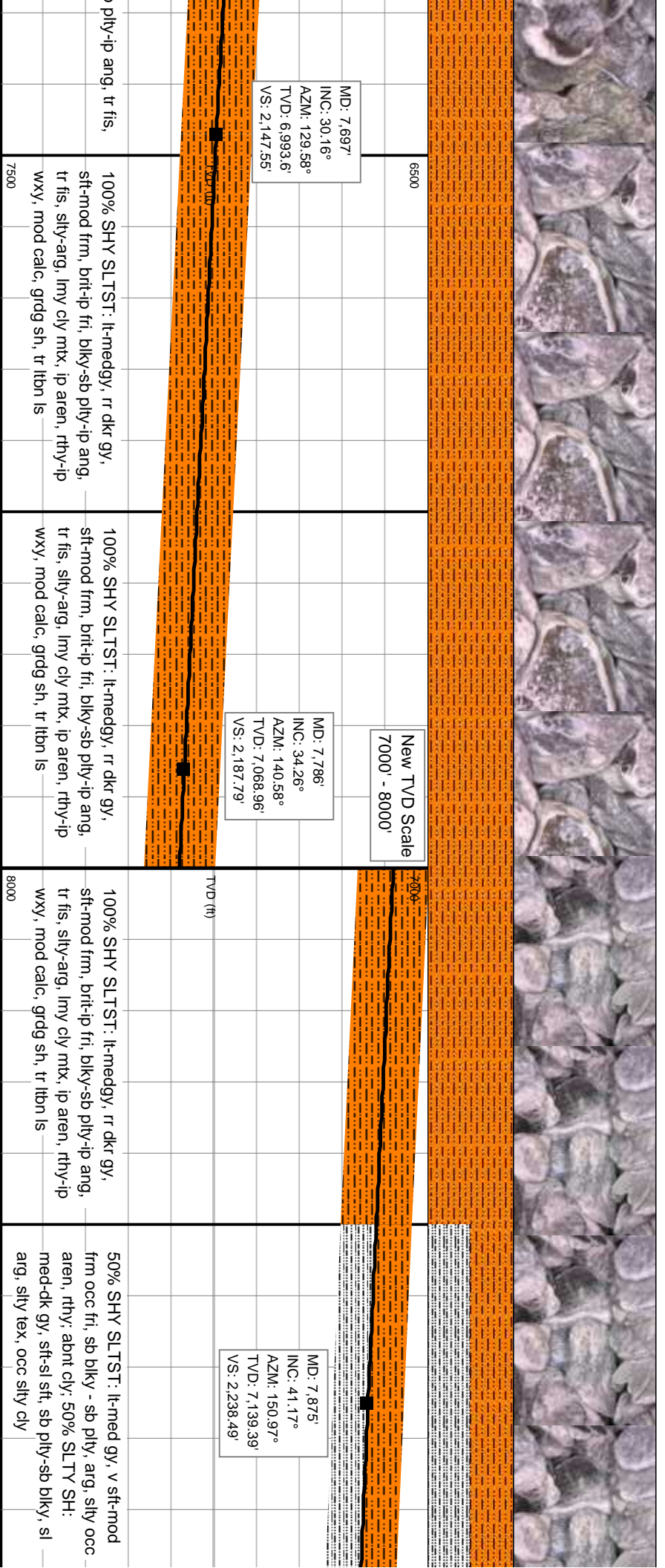
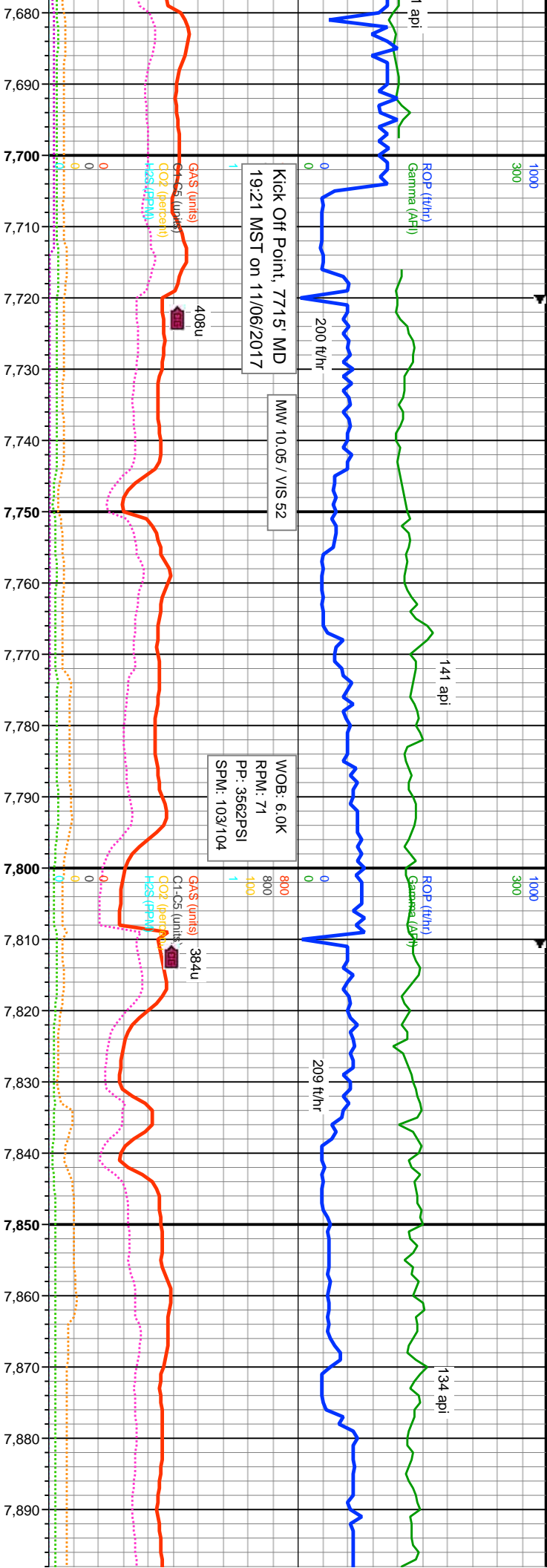
MD: 7,249'
INC: 30.4°
AZM: 131.62°
TVD: 6,607.05'
VS: 1,962.65'

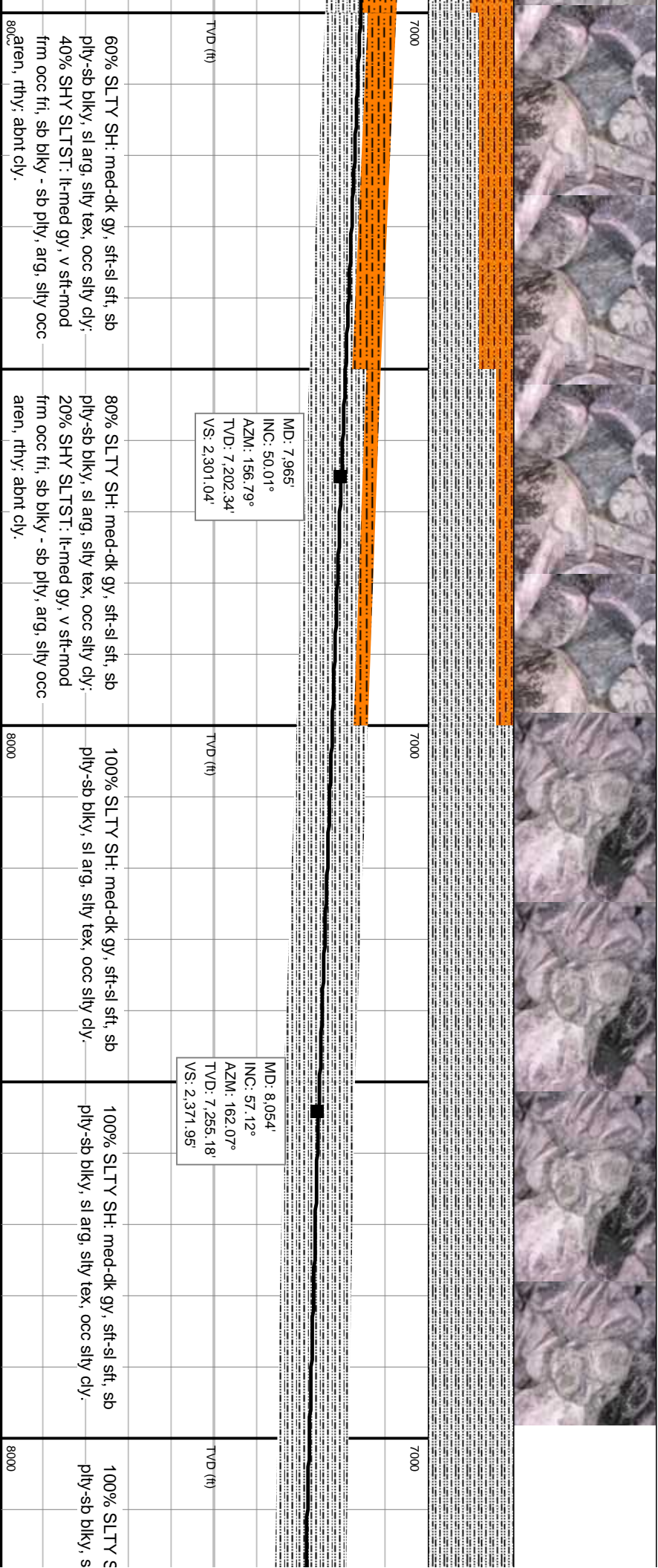
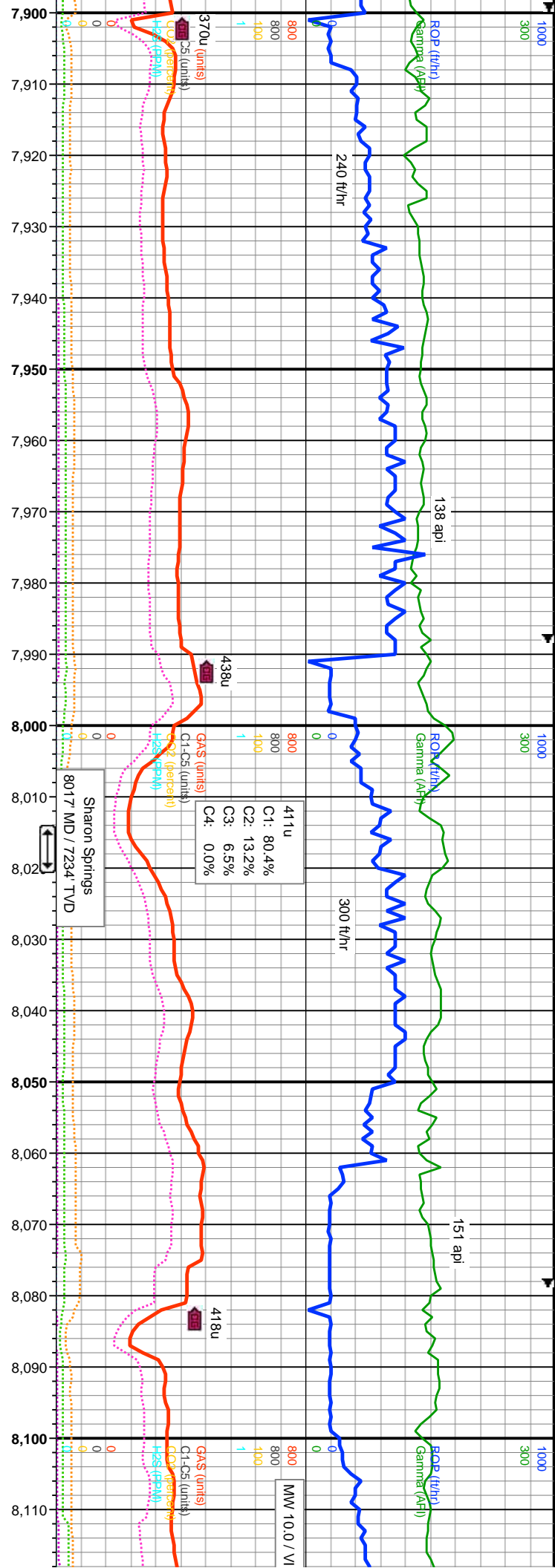
MD: 7,339'
INC: 30.4°
AZM: 131.58°
TVD: 6,684.67'
VS: 1,999.77'

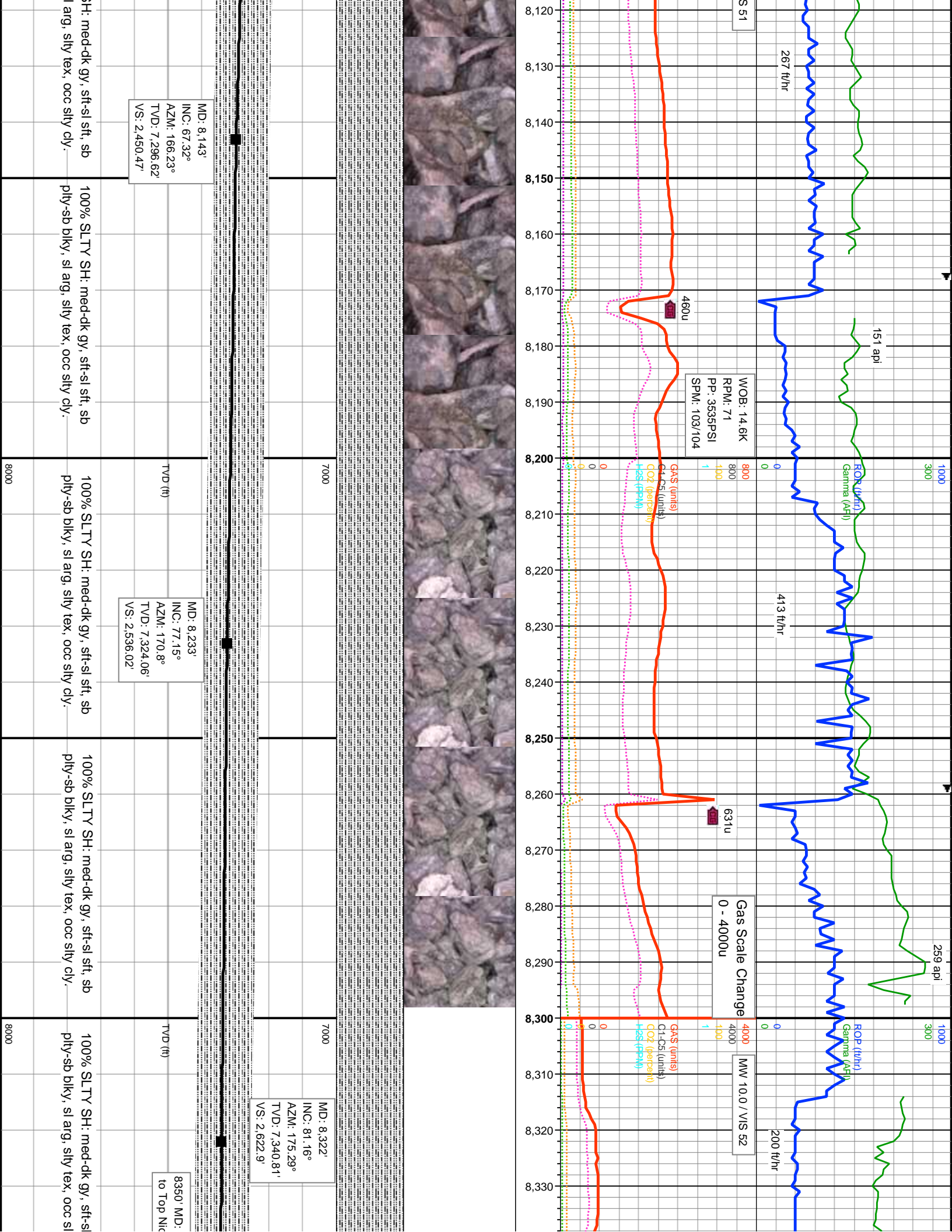
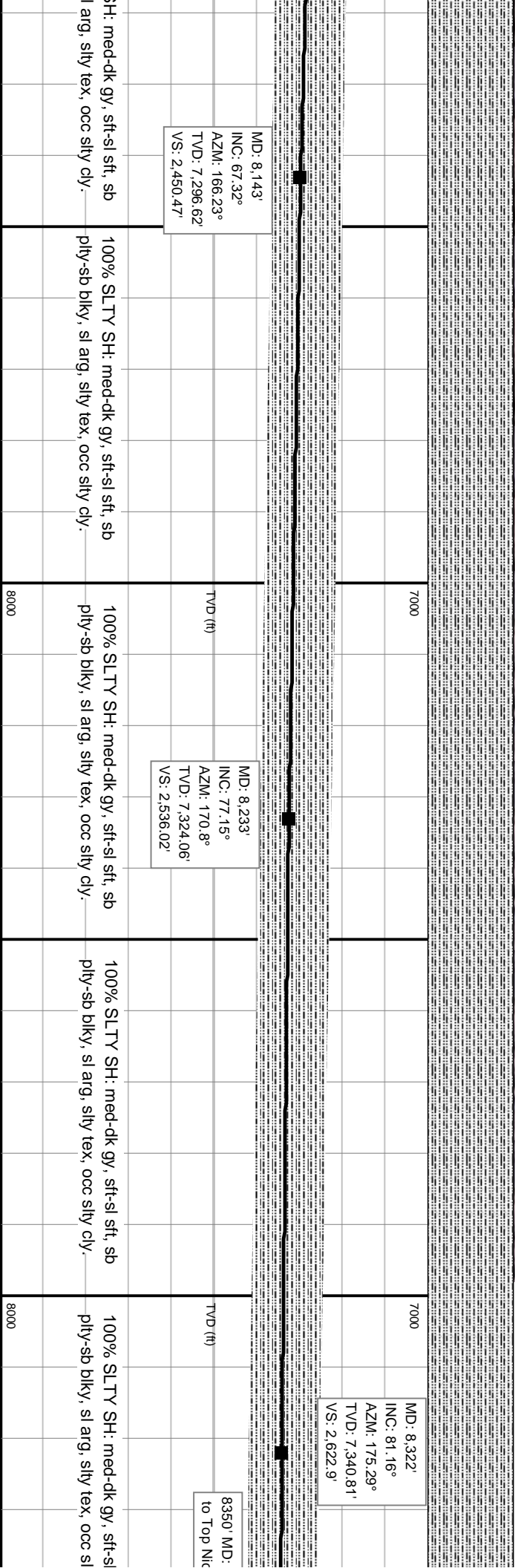
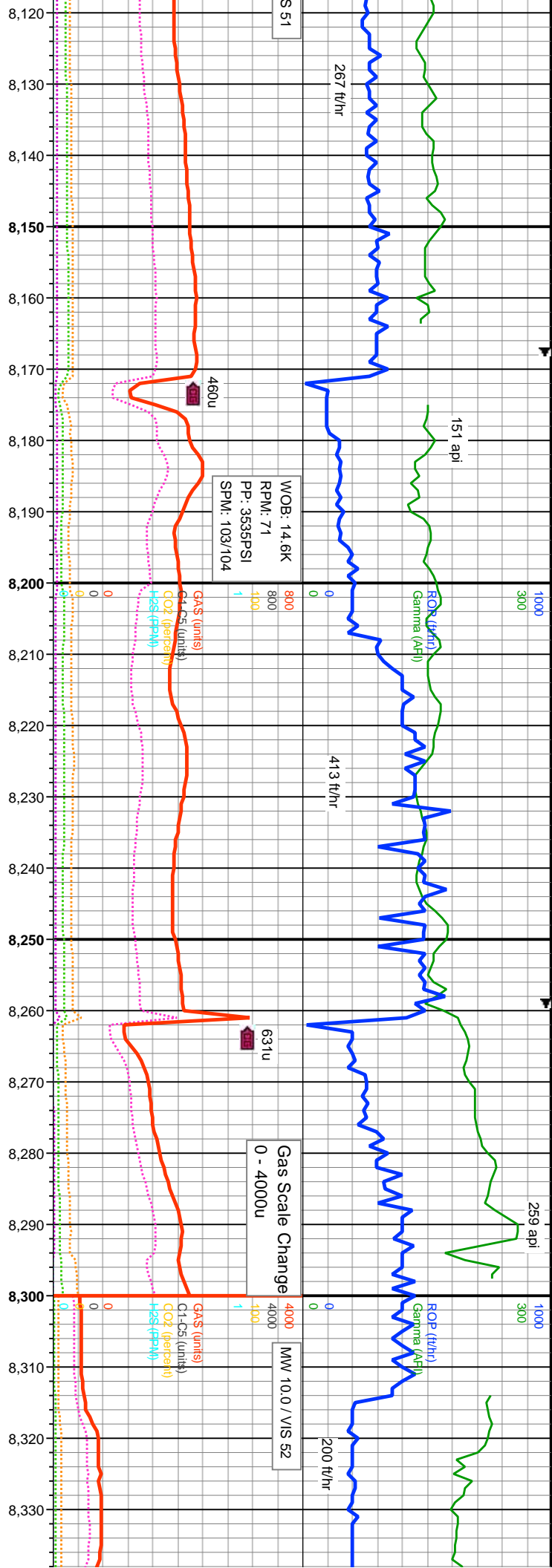
MD: 7,428'
INC: 30.41°
AZM: 134.1°
TVD: 6,761.44'
VS: 2,037.03'

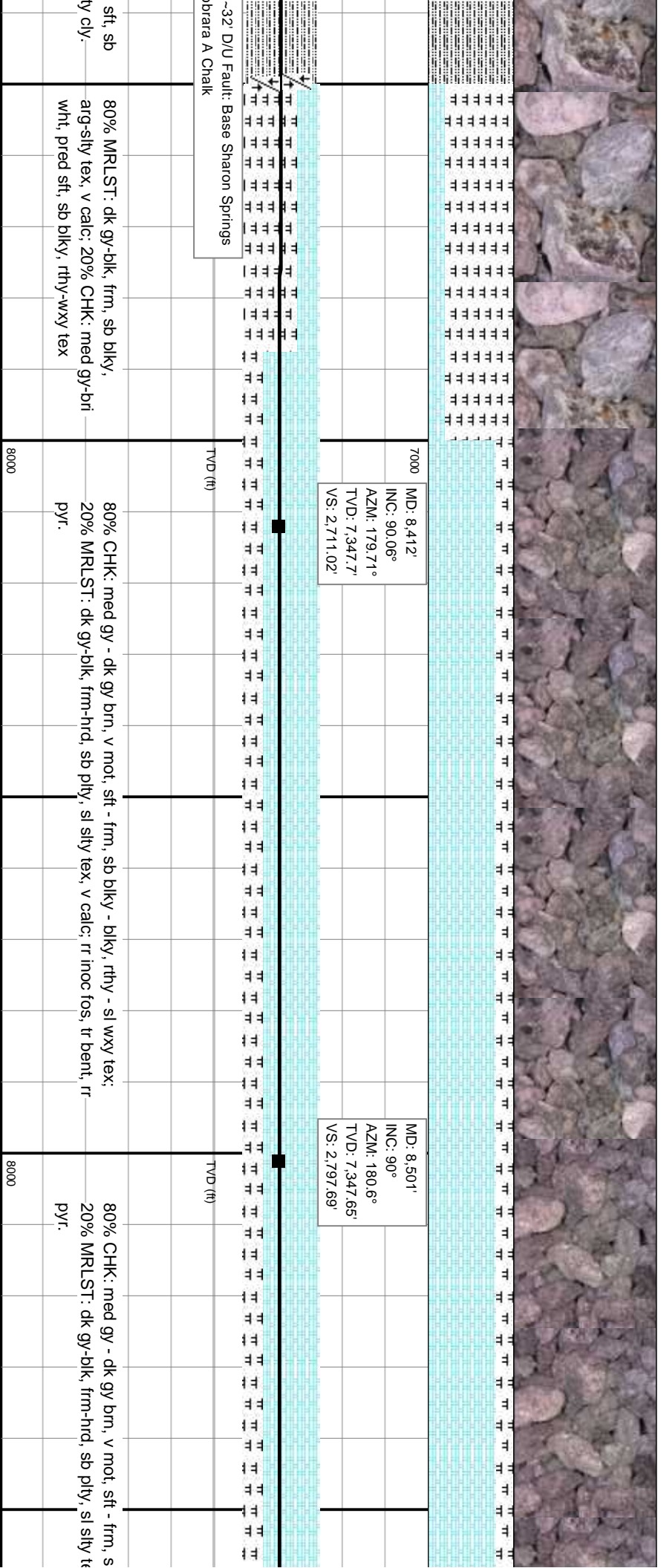
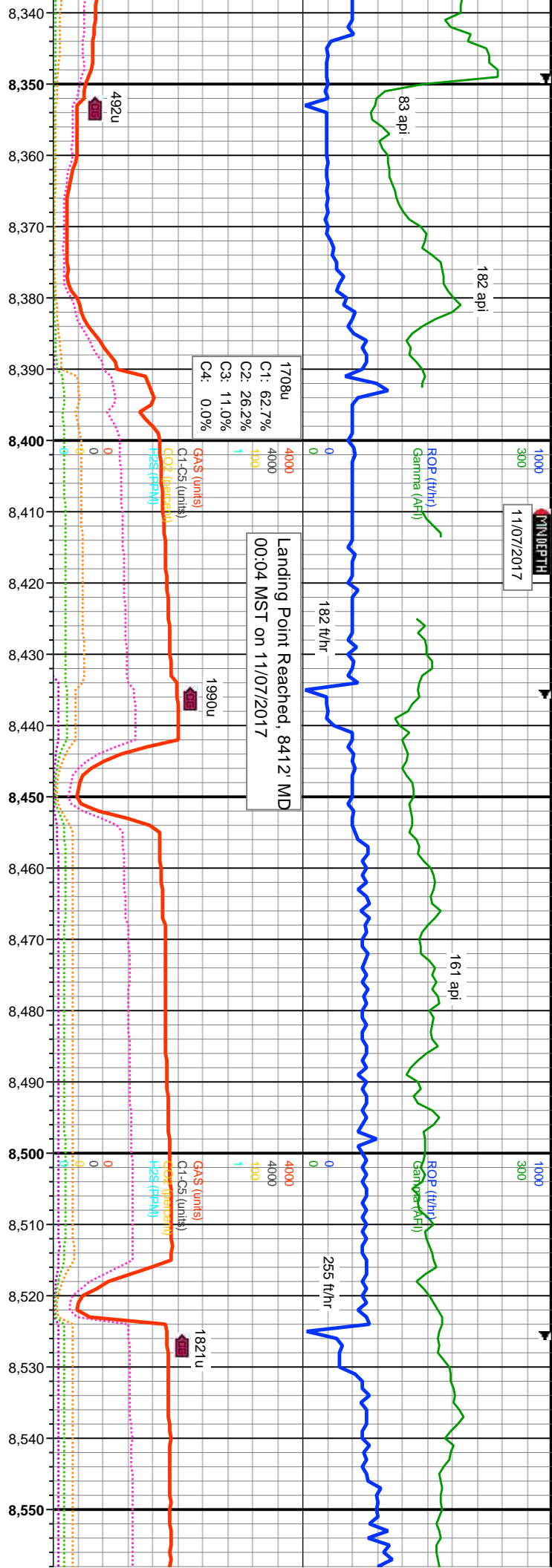
100% SHY SLTST: lt-medgy, r dr gy, sft-mod frm, brit-ip fri, blkys-sb ply-ip ang, tr fis, sily-aig, lmy cly mx, ip aren, rthy-ip wxy, mod calc, grdg sh, tr tbn ls

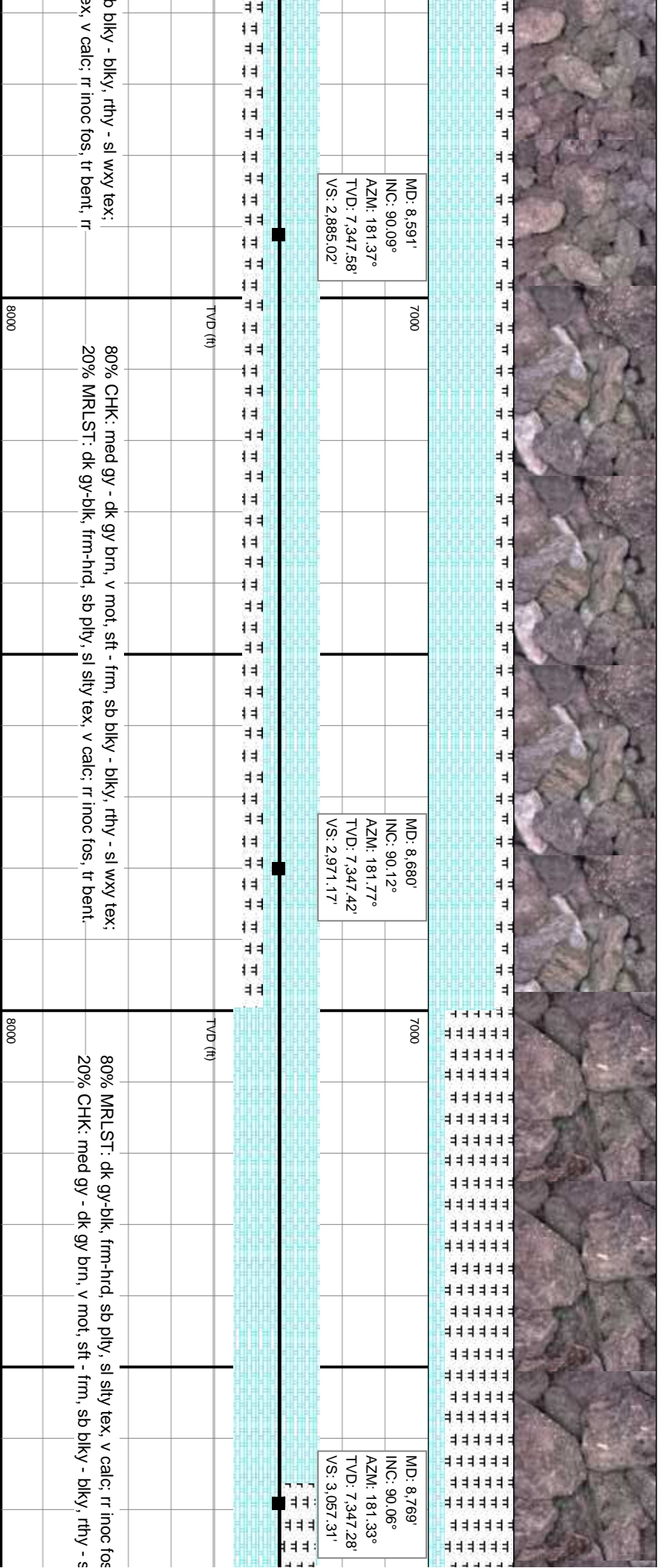
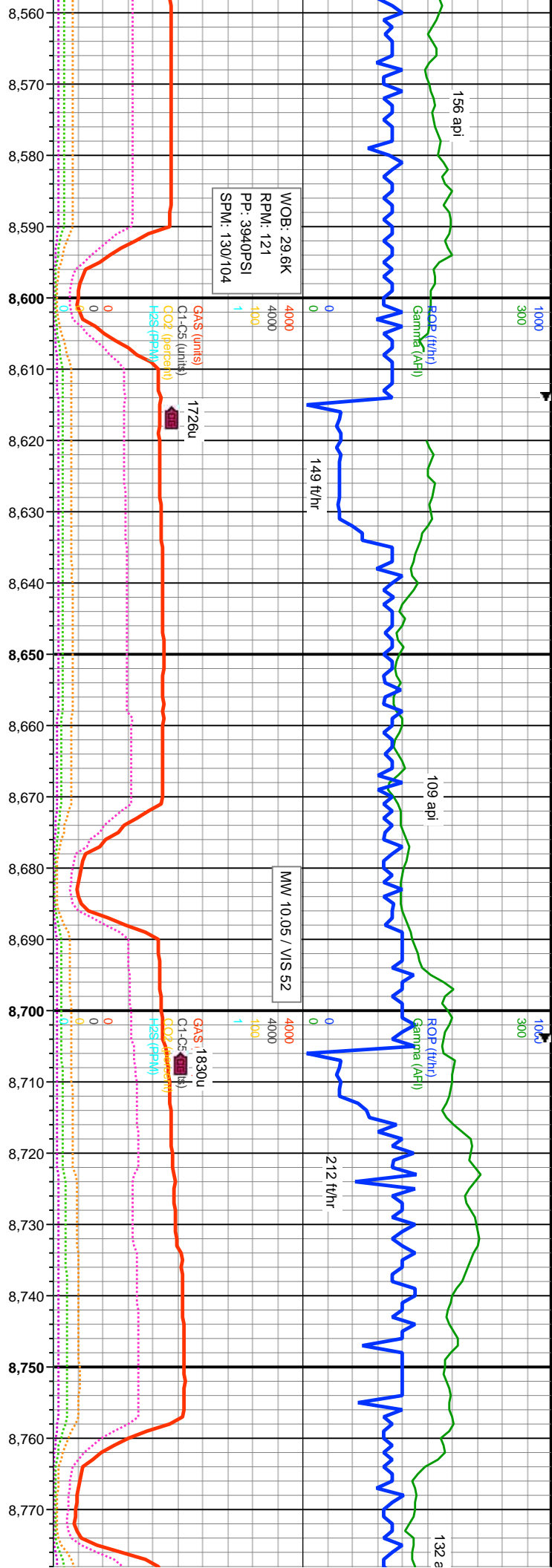


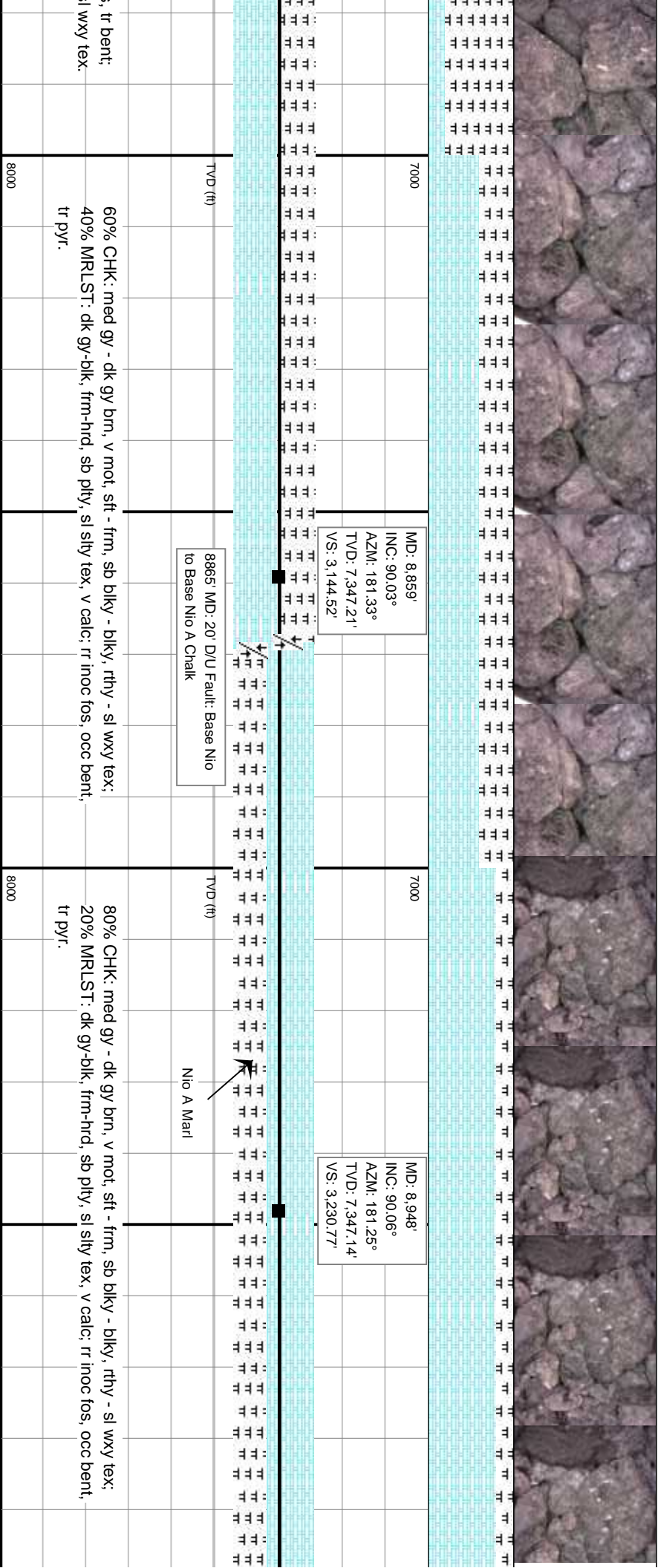
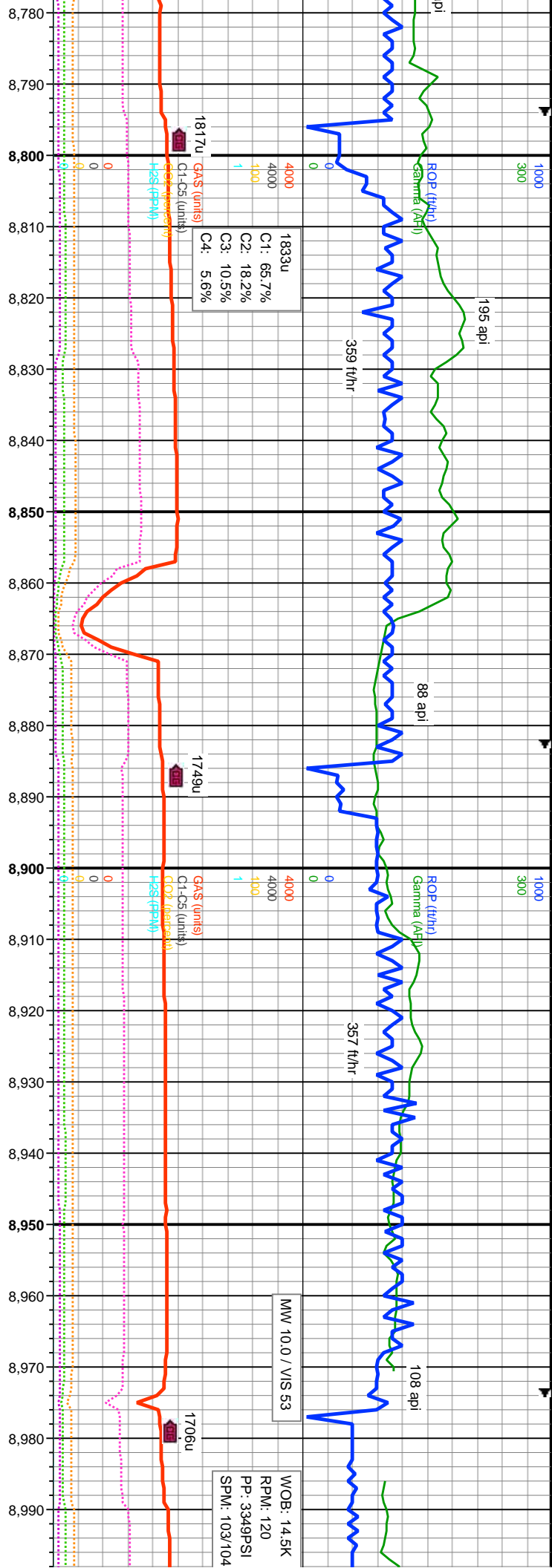


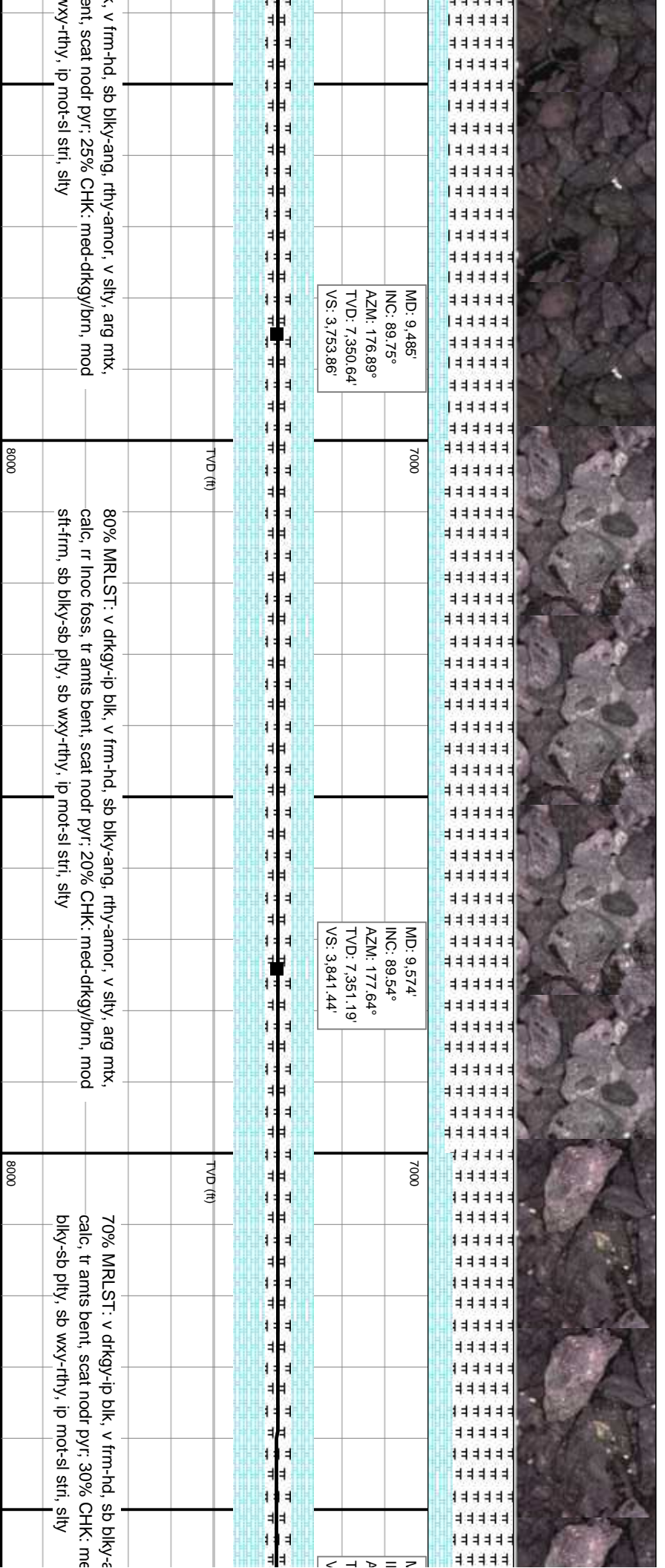
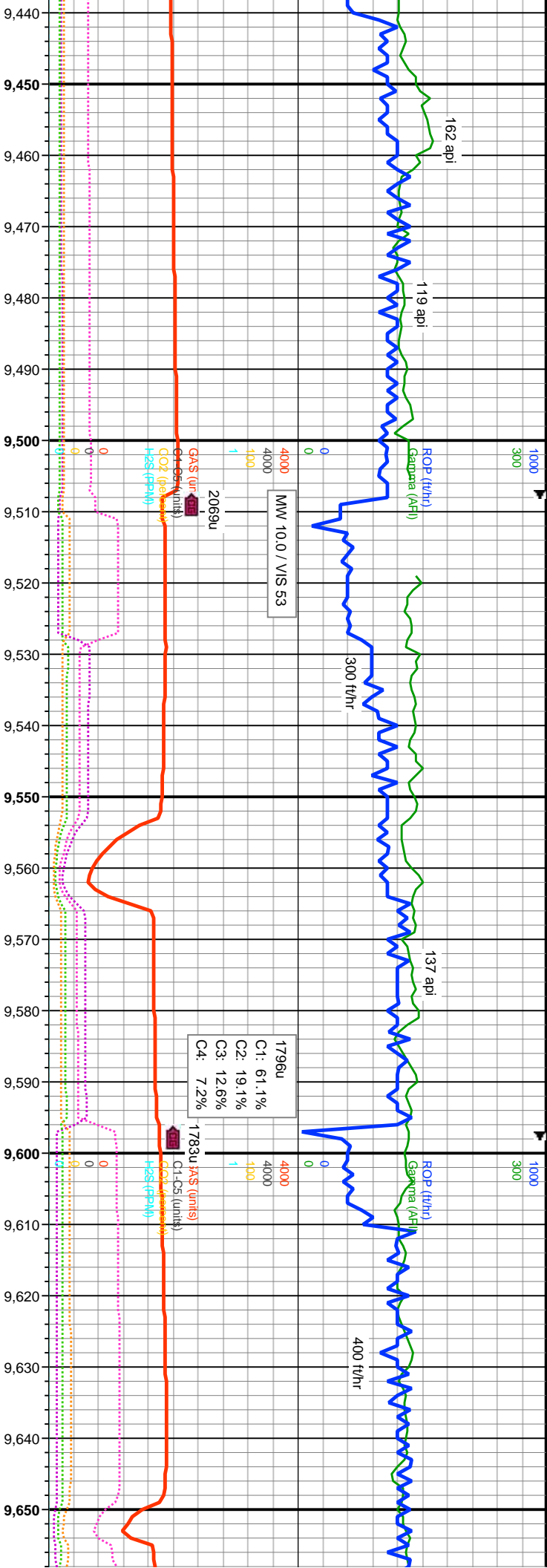


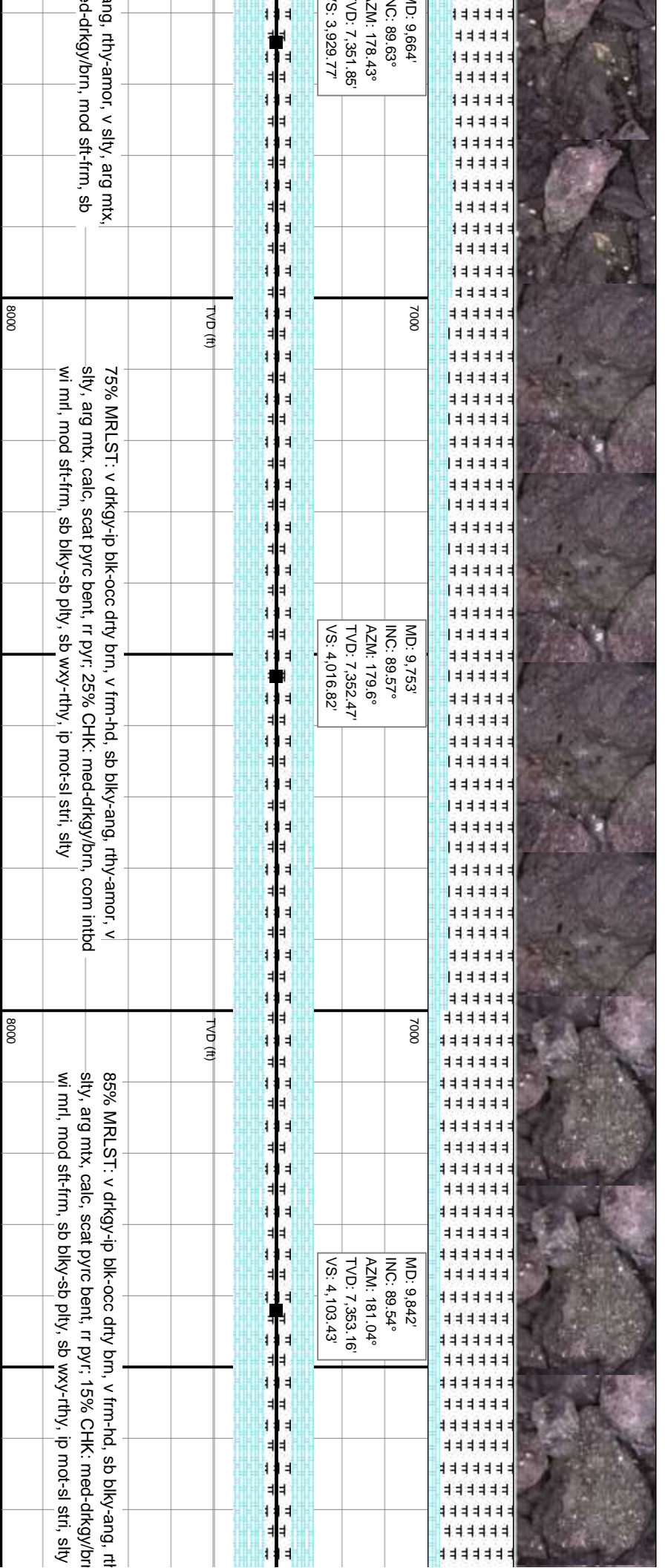
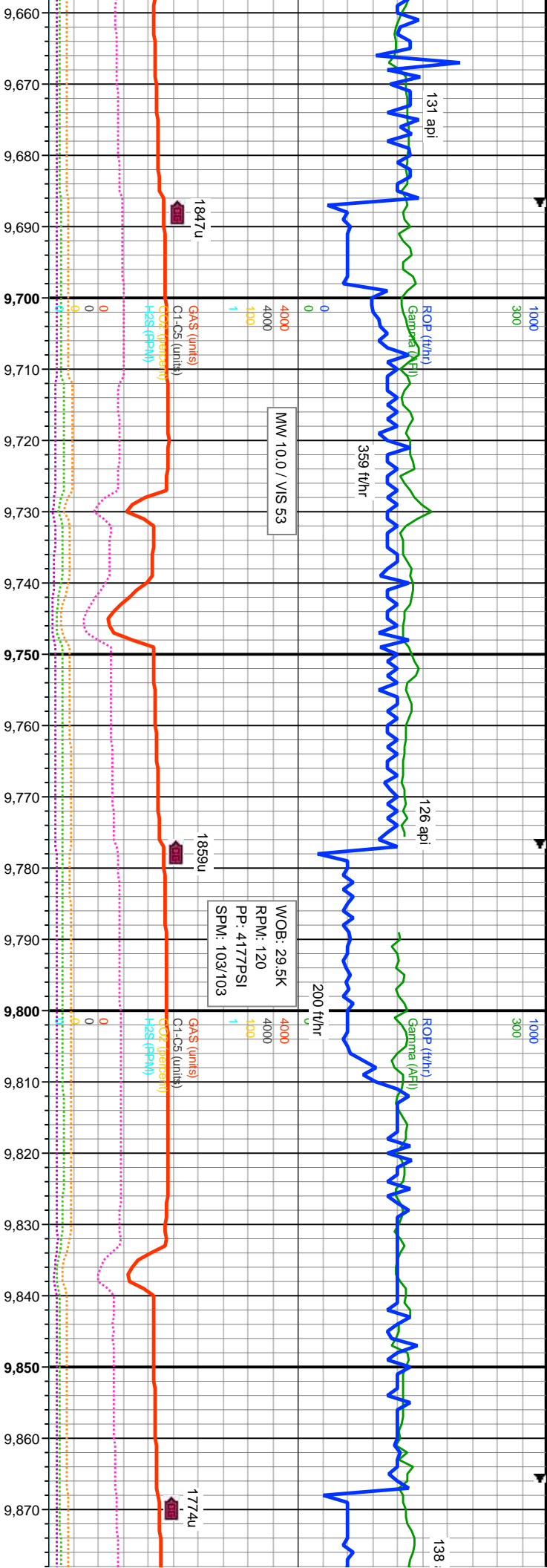


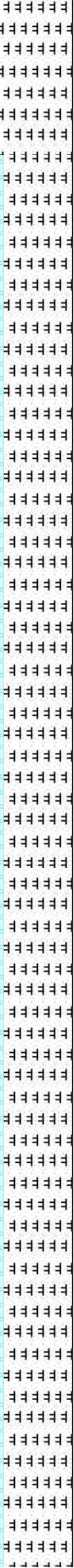
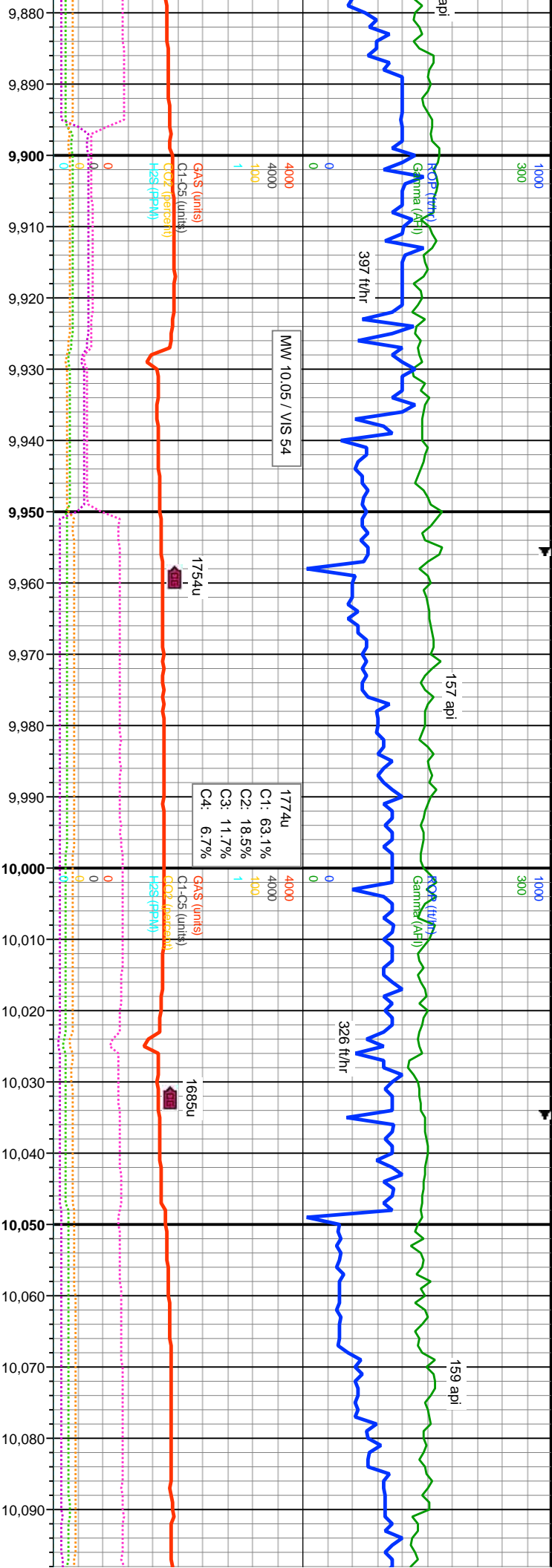




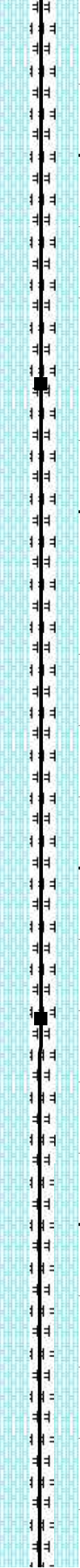








7000	MD: 9.932'	INC: 89.35°	AZM: 181.42°	TVD: 7.354.03'	VS: 4.190.67'
7000	MD: 10.021'	INC: 89.45°	AZM: 184.21°	TVD: 7.354.96'	VS: 4.276.29'

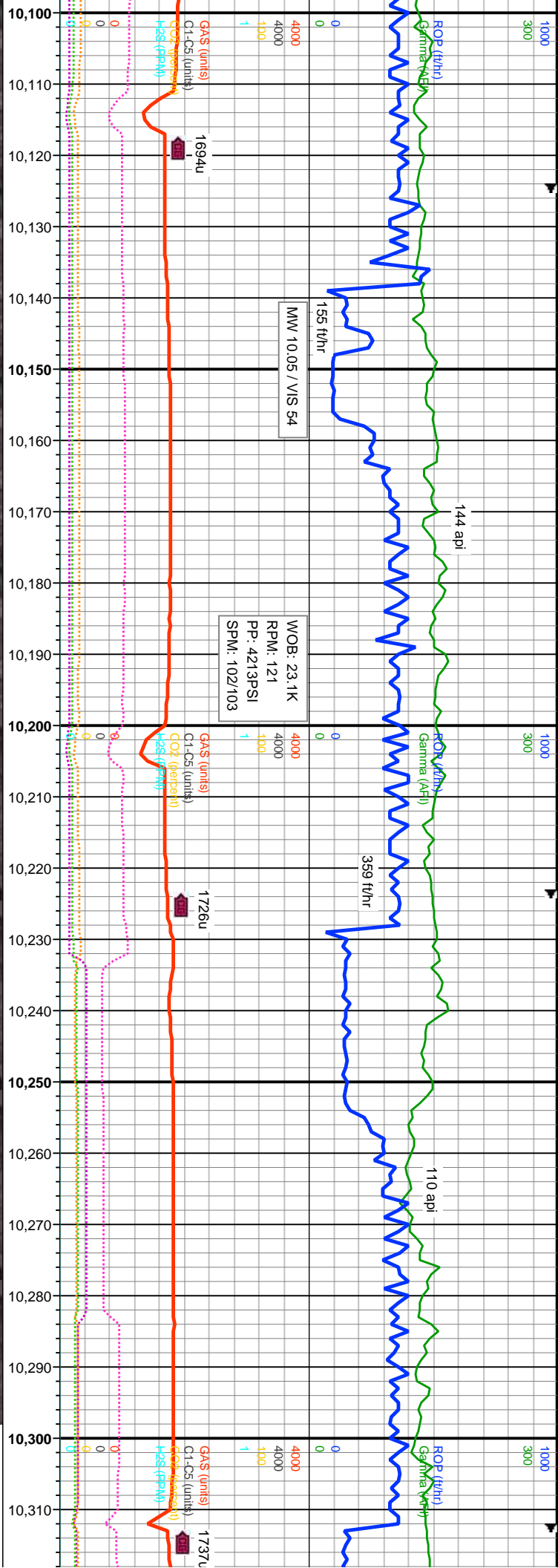


TVD (ft)	TVD (ft)
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80% MRLST: v drkgy-occ drty brn, v frm-hd, sb bkly-ang, rthy-amor, v silty, arg
mtx, calc, 20% CHK: med-drkgy/brn, com intbd wi mrl, mod sft-frm, sb
bkly-sb plty, sb wxy-rthy, ip mot-sl str, silty

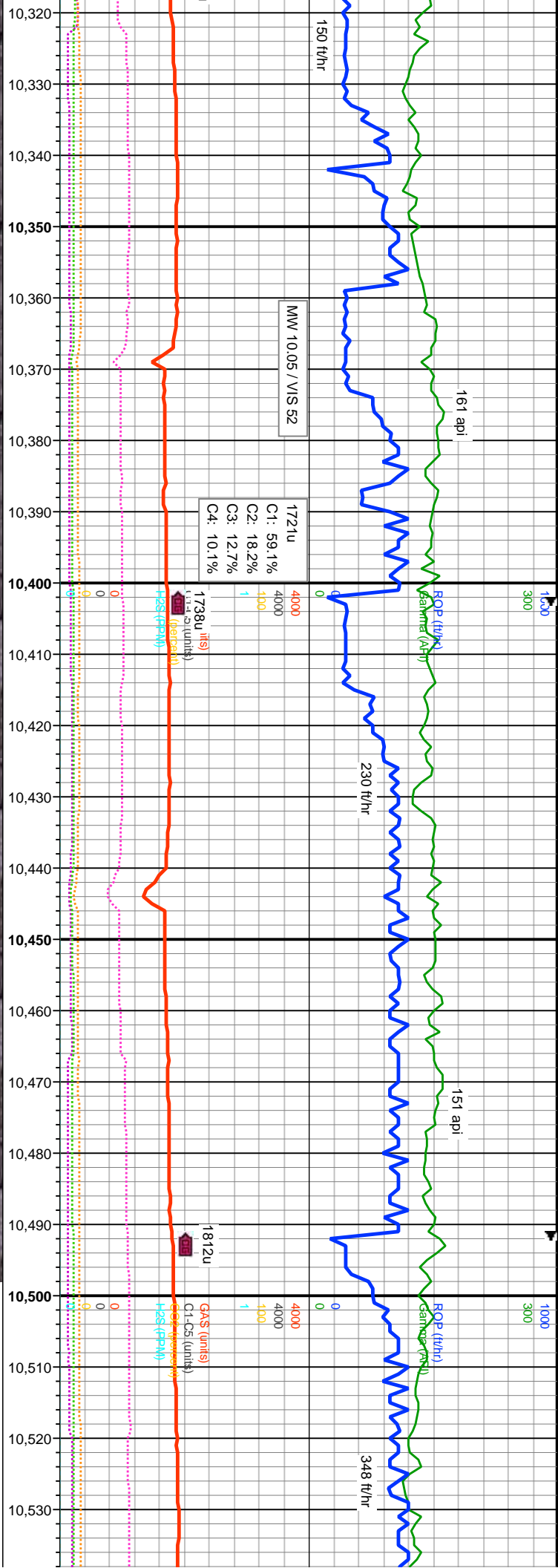
80% MRLST: v drkgy-occ drty brn, v frm-hd, sb bkly-ang, rthy-amor, v silty, arg
mtx, calc, 20% CHK: med-drkgy/brn, com intbd wi mrl, mod sft-frm, sb
bkly-sb plty, sb wxy-rthy, ip mot-sl str, silty

8000	8000
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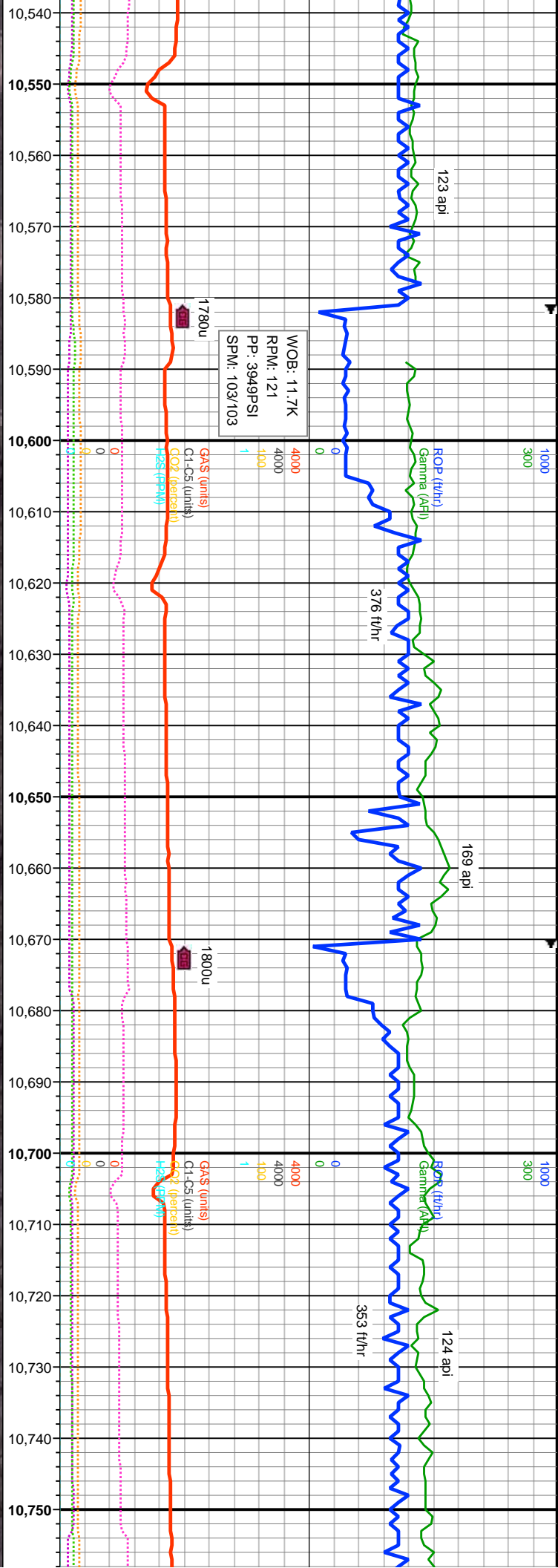


700	MD: 10.111'	INC: 89.54°	AZM: 184.34°	TVD: 7.355.76'	VS: 4.362.23'
700	MD: 10.200'	INC: 89.57°	AZM: 183.72°	TVD: 7.356.45'	VS: 4.447.33'
7000	MD: 10.290'	INC: 89.6°	AZM: 181.83°	TVD: 7.357.1'	VS: 4.533.94'

TVD (ft)	TVD (ft)	TVD (ft)
8000	8000	8000
80% MRLST: v dtkgy-occ dty brn, v frm-hd, sb bky-ang, rhy-amor, v slty, arg mtx, calc; 20% CHK: med-dtkgy/brn, com intbd wi mrl, mod sft-frm, sb bky-sb ply, sb wxy-rthy, ip mot-sl stri, slty	65% MRLST: dtkgy-occ dty brn, v frm-hd, sb bky-ang, rhy-amor, v slty, arg mtx, calc, scat nodl pyr-pyr inci; 35% CHK: med-dtkgy/brn, com intbd wi mrl, mod sft-frm, sb bky-sb ply, sb wxy-rthy, ip mot-sl stri, slty	70% MR calc, tr ls mod sft-f

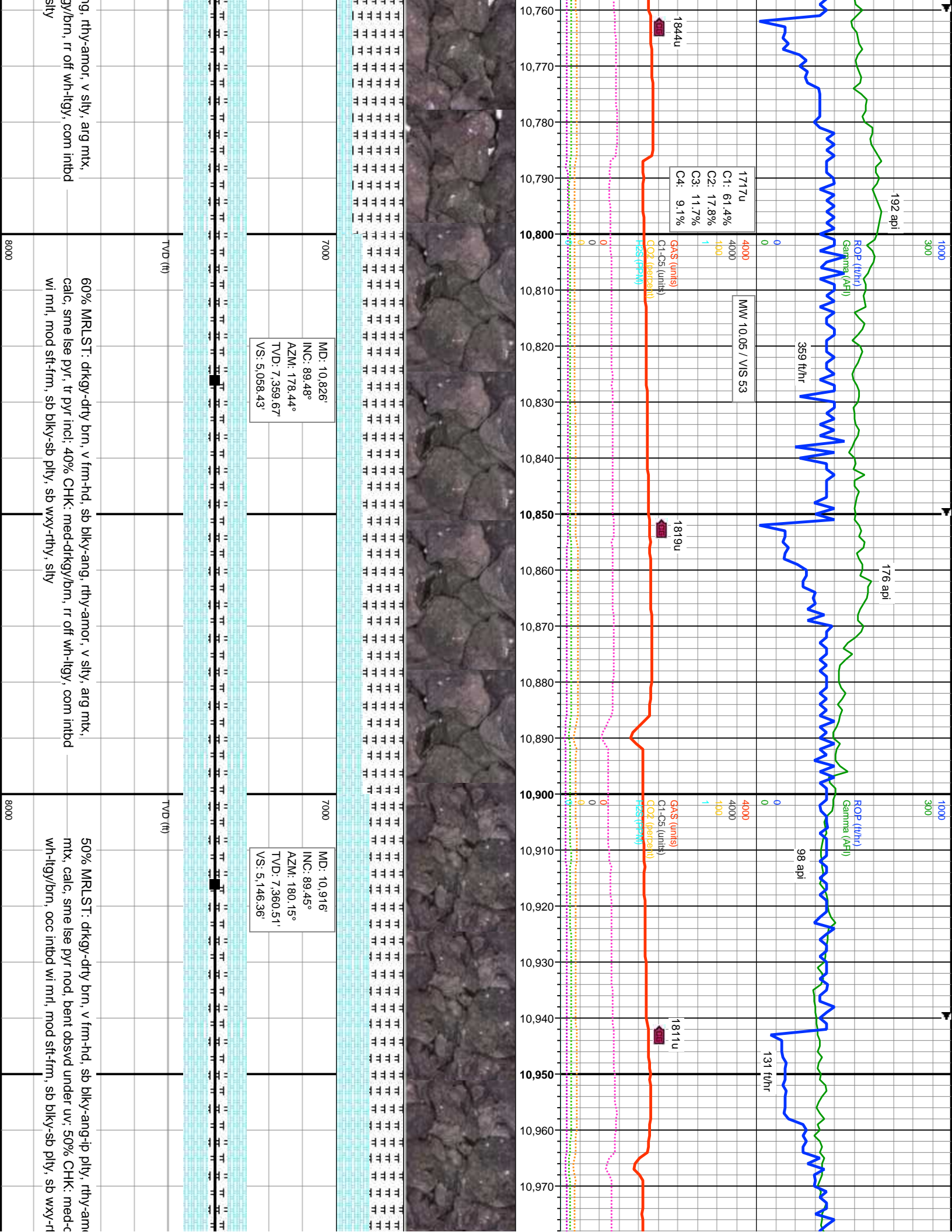


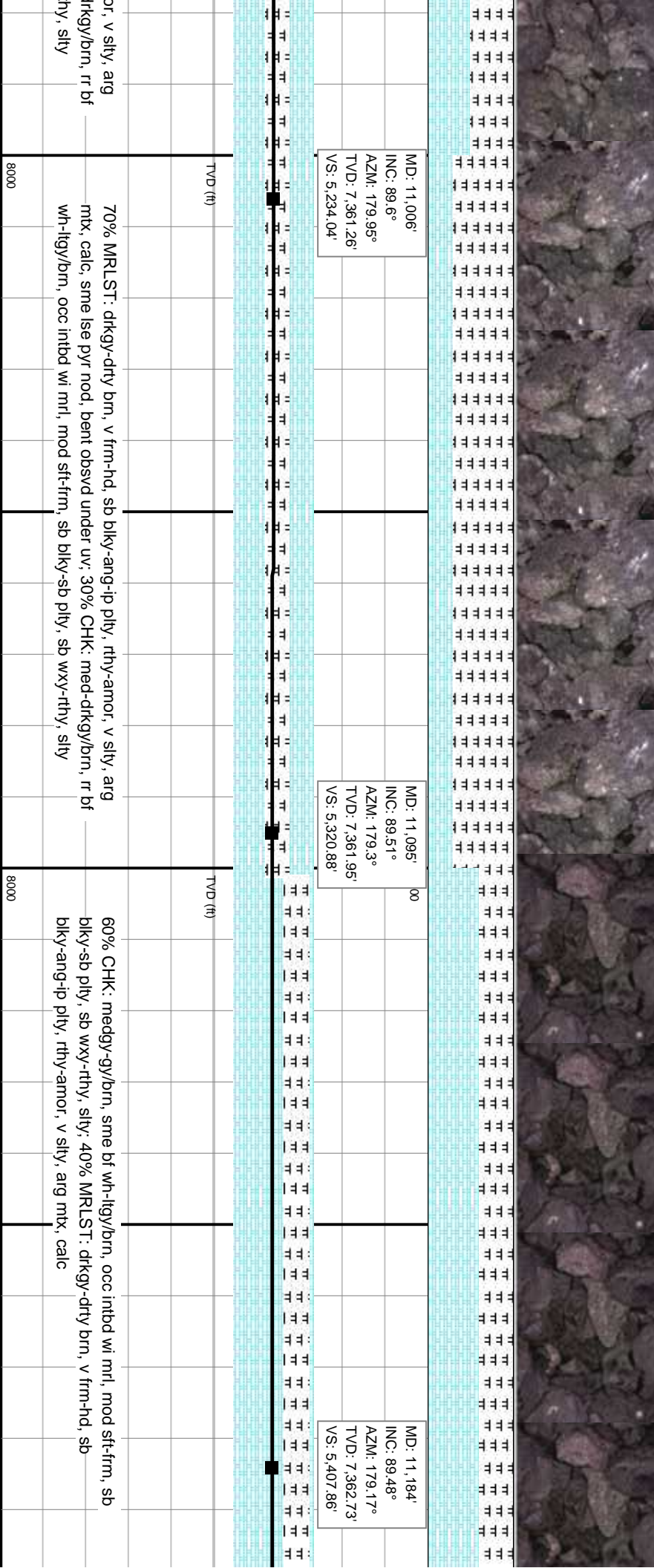
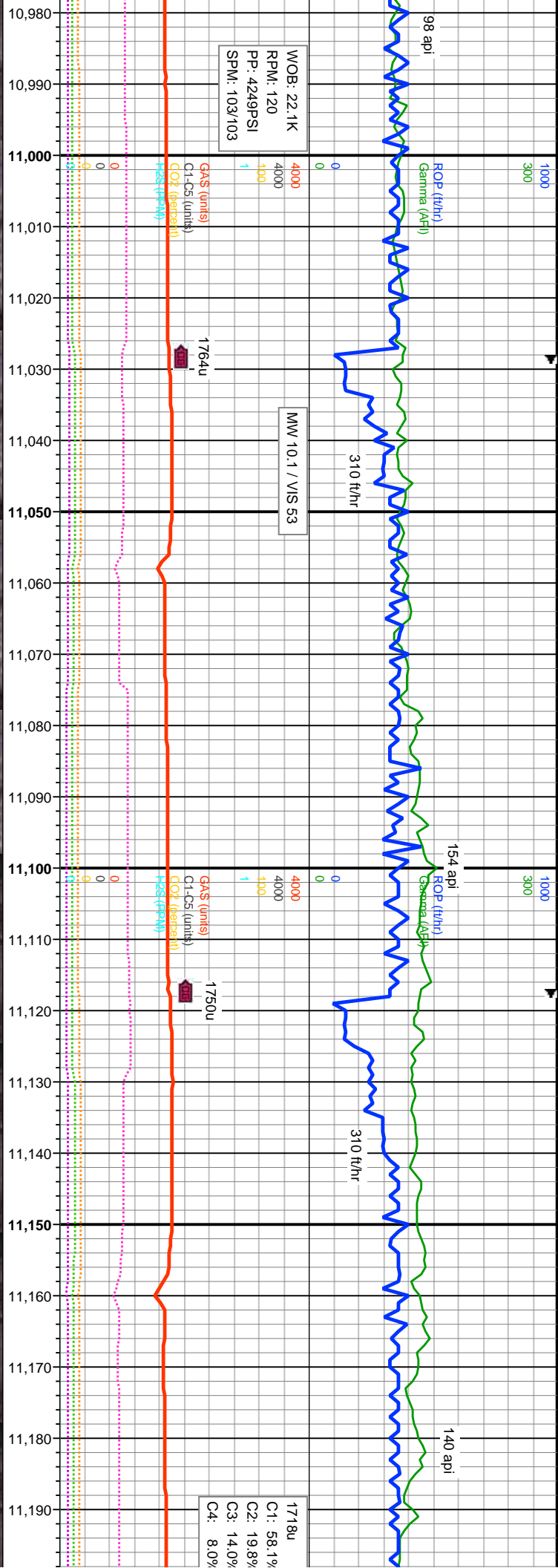
ST: drkgy-occ drty brn, v frm-hd, sb blk-ang, rthy-armor, v silty, arg mtx, e pyr & pyr incl, v r bent; 30% CHK; med-drkgy/brn, com intbd w mrl, —		70% MRLST: drkgy-occ drty brn, v frm-hd, sb blk-ang, rthy-armor, v silty, arg mtx, calc, tr ise pyr & pyr incl, v r bent; 30% CHK; med-drkgy/brn, com intbd w mrl, —		65% MRLST: drkgy-dty brn, calc, mod amt ise pyr, tr pyr com intbd w mrl, mod sft-frm	
rm, sb blk-ysb plty, sb wxy-rthy, ip mot-si stri, silty		mod sft-frm, sb blk-ysb plty, sb wxy-rthy, ip mot-si stri, silty		mod sft-frm, sb blk-ysb plty, sb wxy-rthy, ip mot-si stri, silty	
MD: 10.379' INC: 90.09° AZM: 179.35° TVD: 7.357.34' VS: 4.620.44'		MD: 10.469' INC: 89.85° AZM: 178.48° TVD: 7.357.39' VS: 4.708.5'		MD: 10.469' INC: 89.85° AZM: 178.48° TVD: 7.357.39' VS: 4.708.5'	
7000		7000		7000	
TVD (ft)		TVD (ft)		TVD (ft)	
8000		8000		8000	

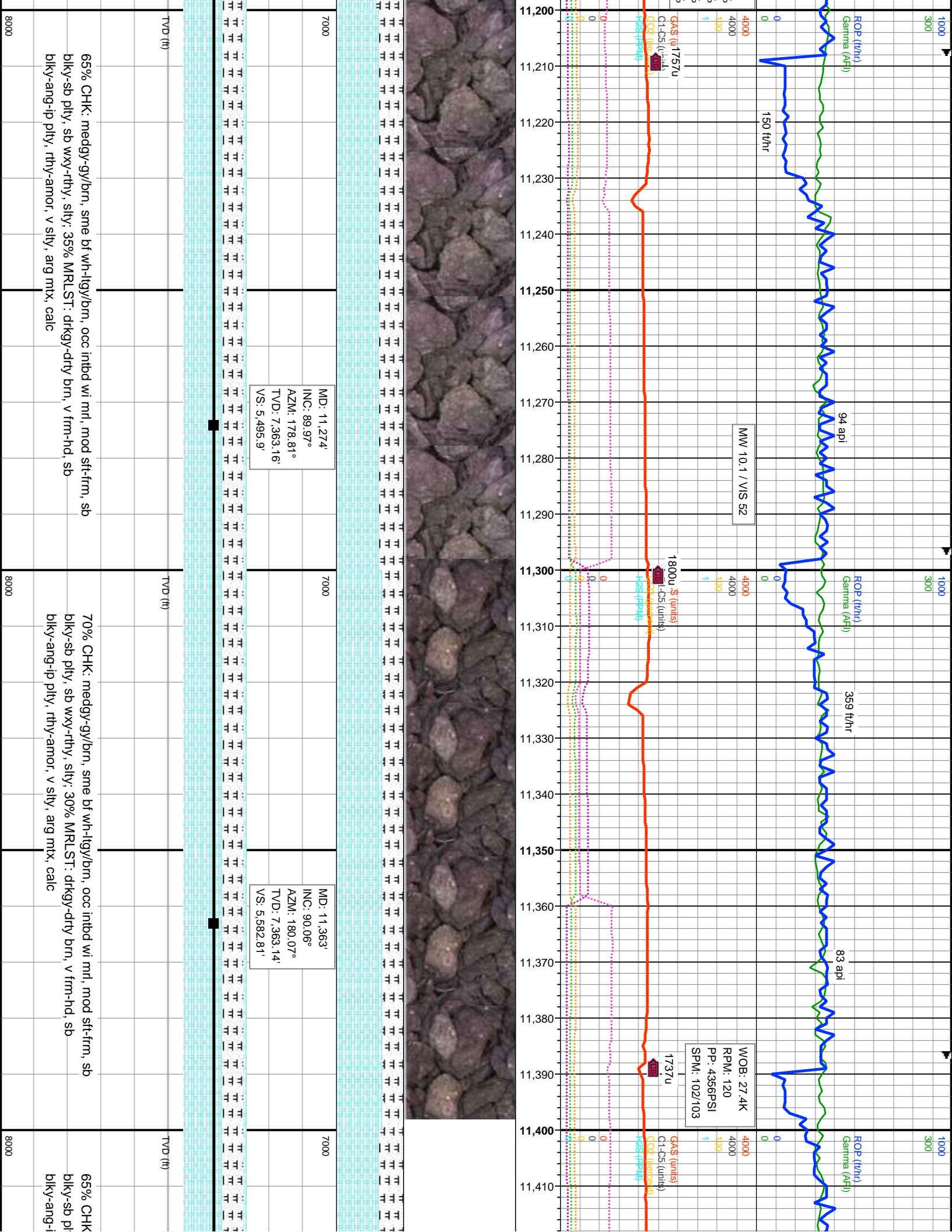


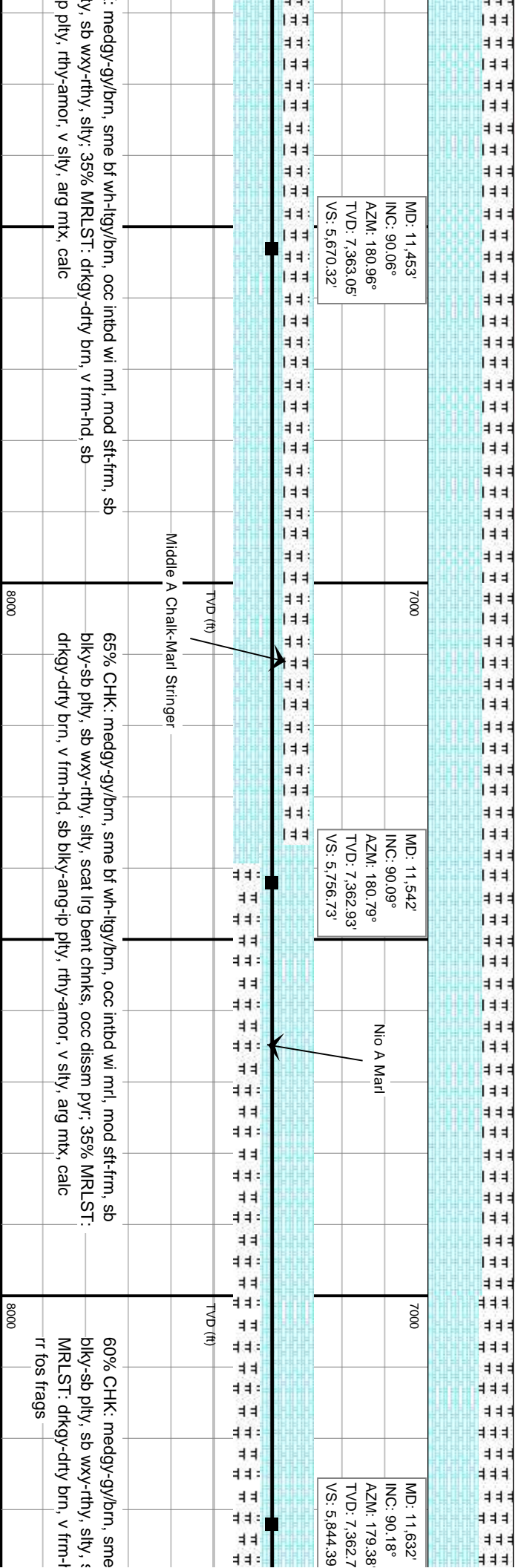
MD: 10.558' INC: 89.94° AZM: 178.35° TVD: 7.357.55' VS: 4.795.75'		MD: 10.648' INC: 89.42° AZM: 178.42° TVD: 7.358.05' VS: 4.883.98'		MD: 10.737' INC: 89.51° AZM: 178.49° TVD: 7.358.88' VS: 4.971.2'	
7000		7000		7000	

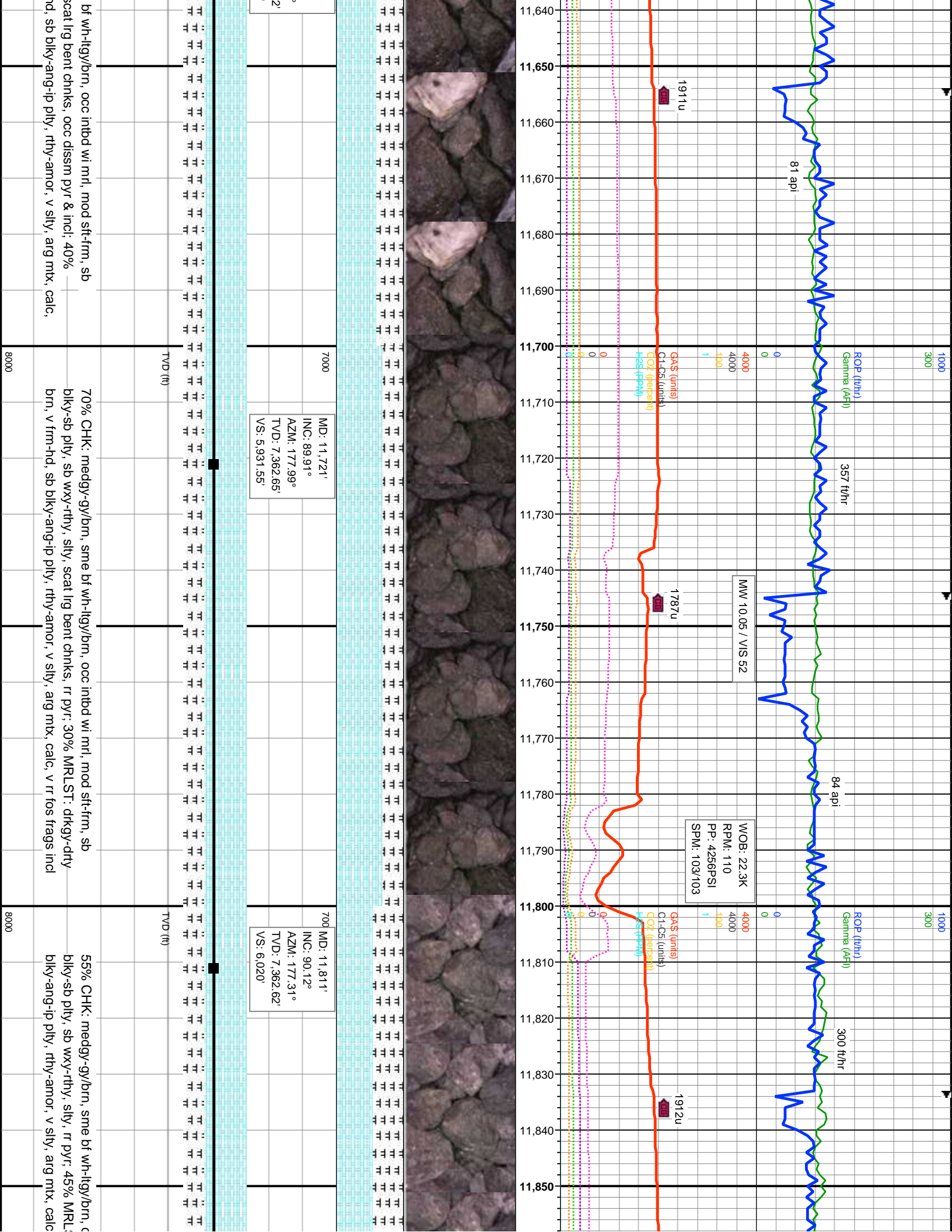
v frm-hd, sb blk-y-ang, rthy-amor, v silty, arg mtk, inci, rr bent, 35% CHK: med-dkgy/brn, rr off wh-ity, sb blk-y-sb pily, sb wxy-rthy, silty		70% MRLST: dkgy-dty brn, v frm-hd, sb blk-y-ang, rthy-amor, v silty, arg mtk, calc, mod amt lse pyr, tr pyr inci, rr bent, 30% CHK: med-dkgy/brn, rr off wh-ity, com inbd wi mri, mod sft-frm, sb blk-y-sb pily, sb wxy-rthy, silty		75% MRLST: dkgy-dty brn, v frm-hd, sb blk-y-ang, rthy-amor, v silty, arg mtk, calc, sme lse pyr, tr pyr inci, 25% CHK: med-dkgy/brn, rr off wh-ity, com inbd wi mri, mod sft-frm, sb blk-y-sb pily, sb wxy-rthy, silty	
TVD (ft)		TVD (ft)		TVD (ft)	
8000		8000		8000	

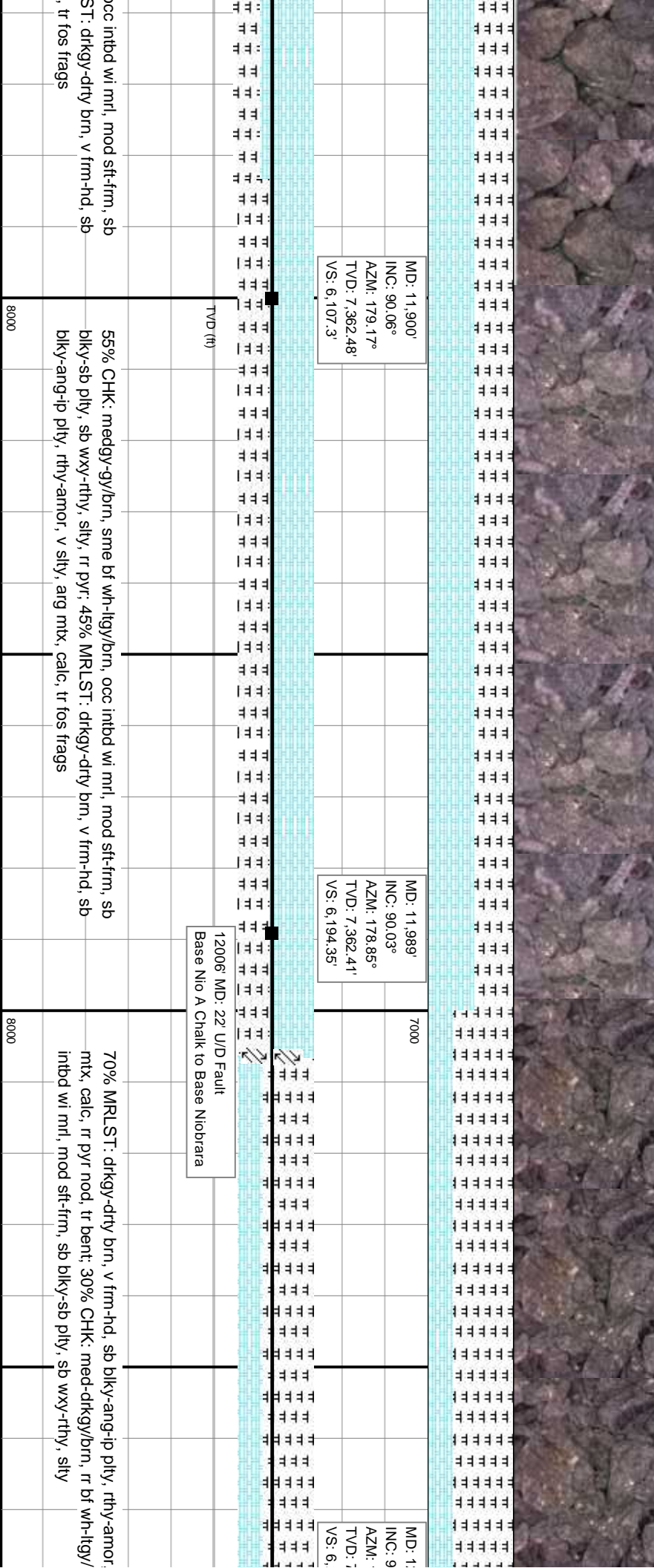
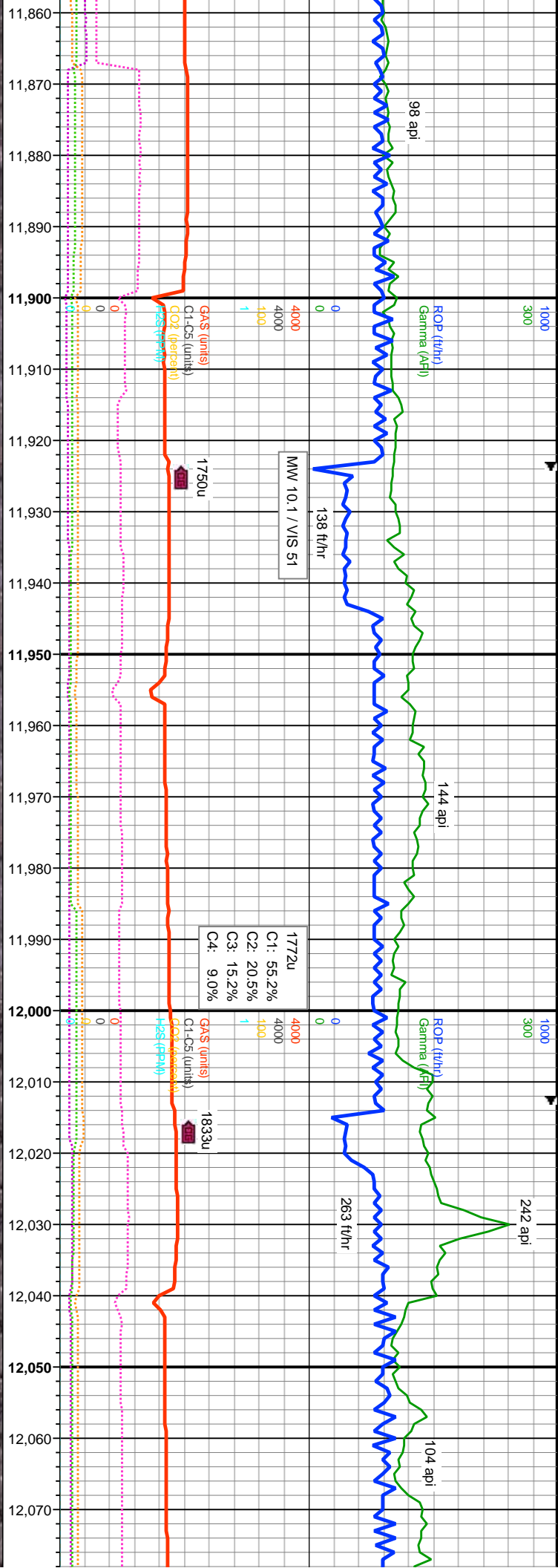


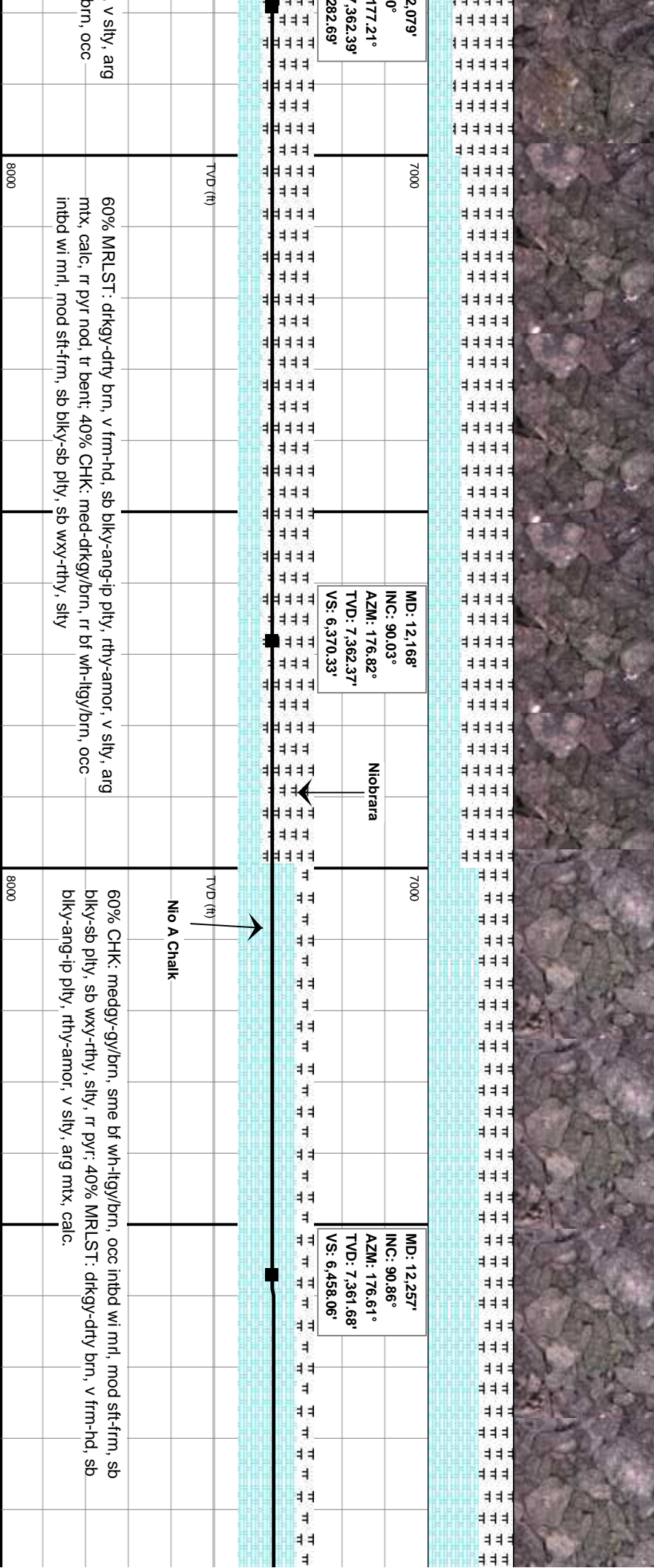
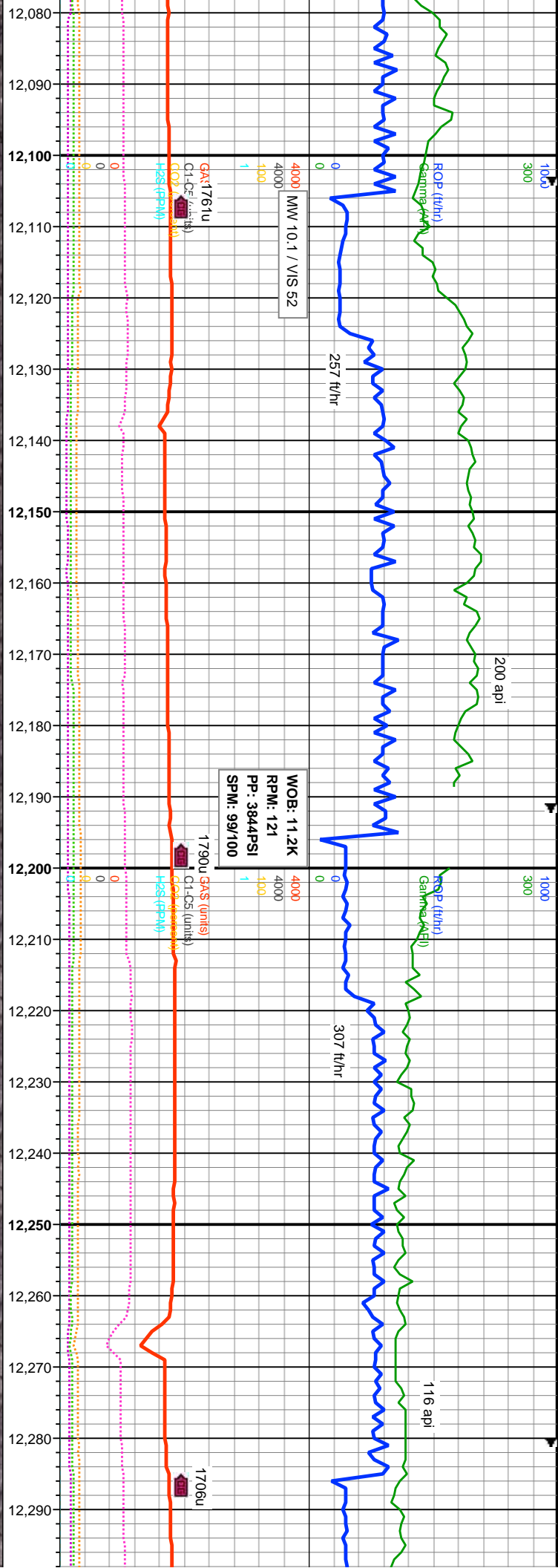


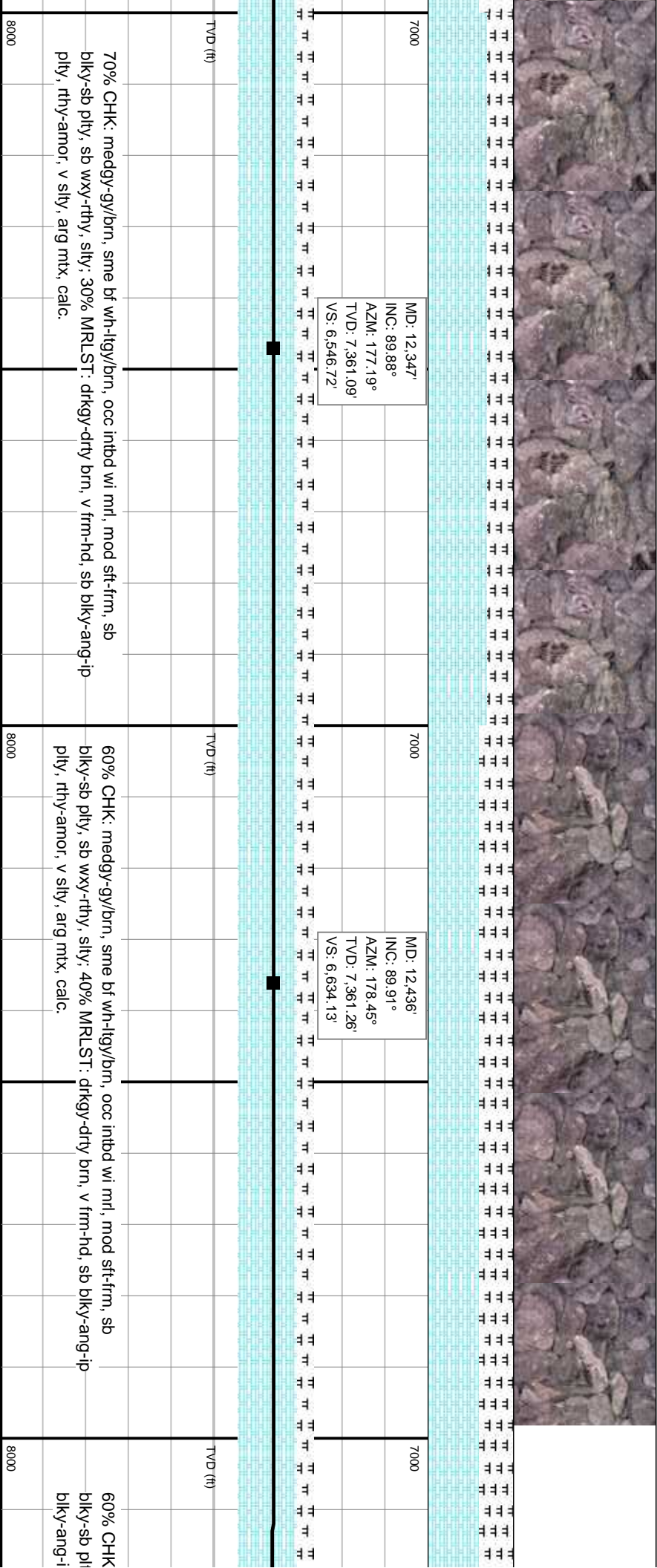
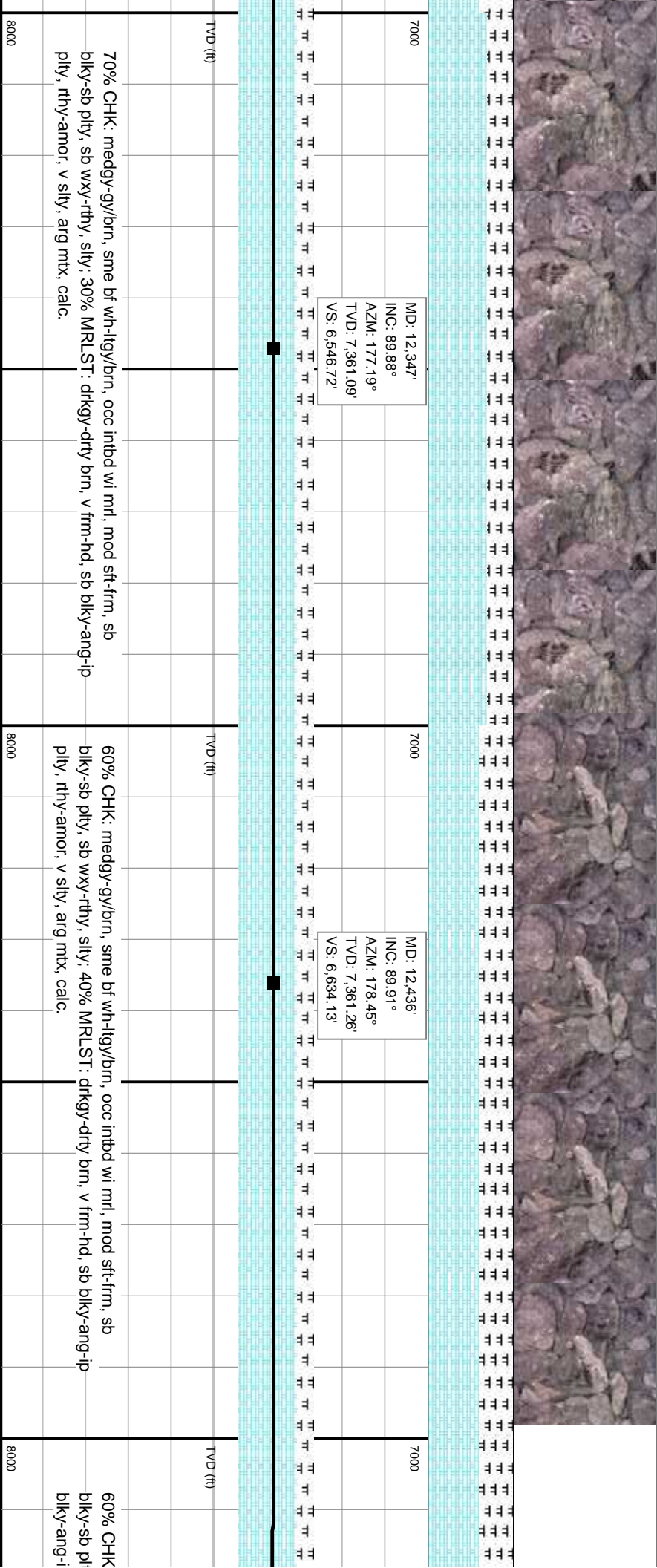
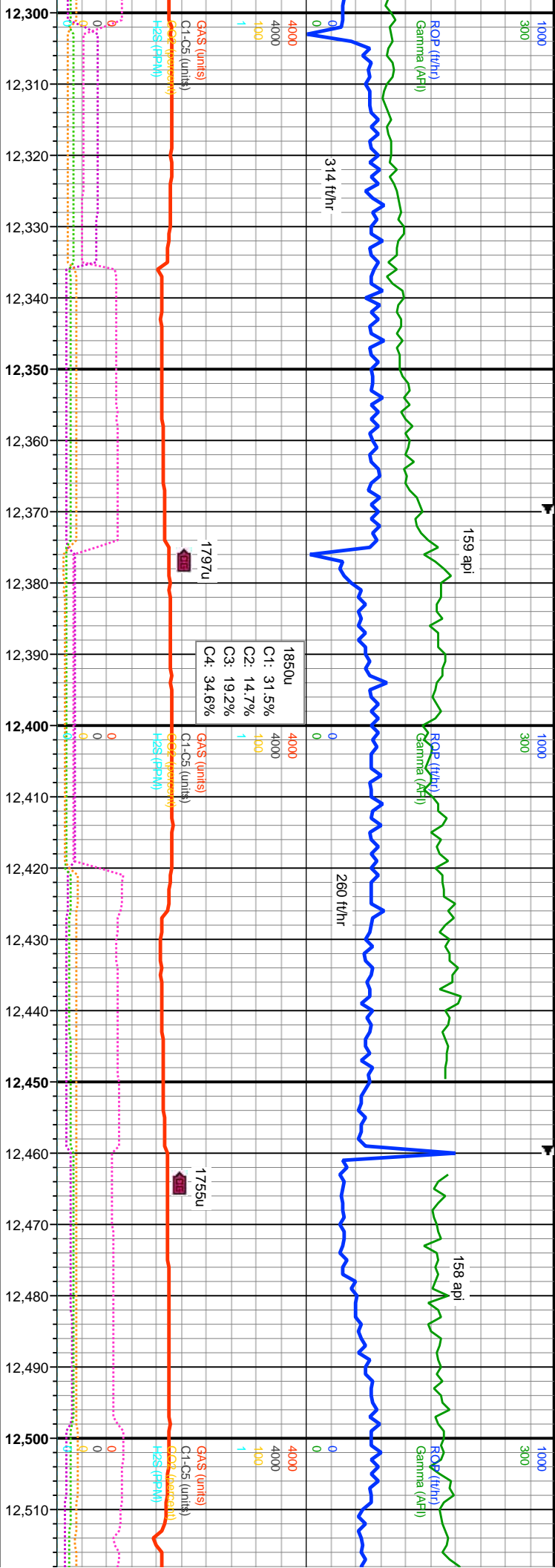


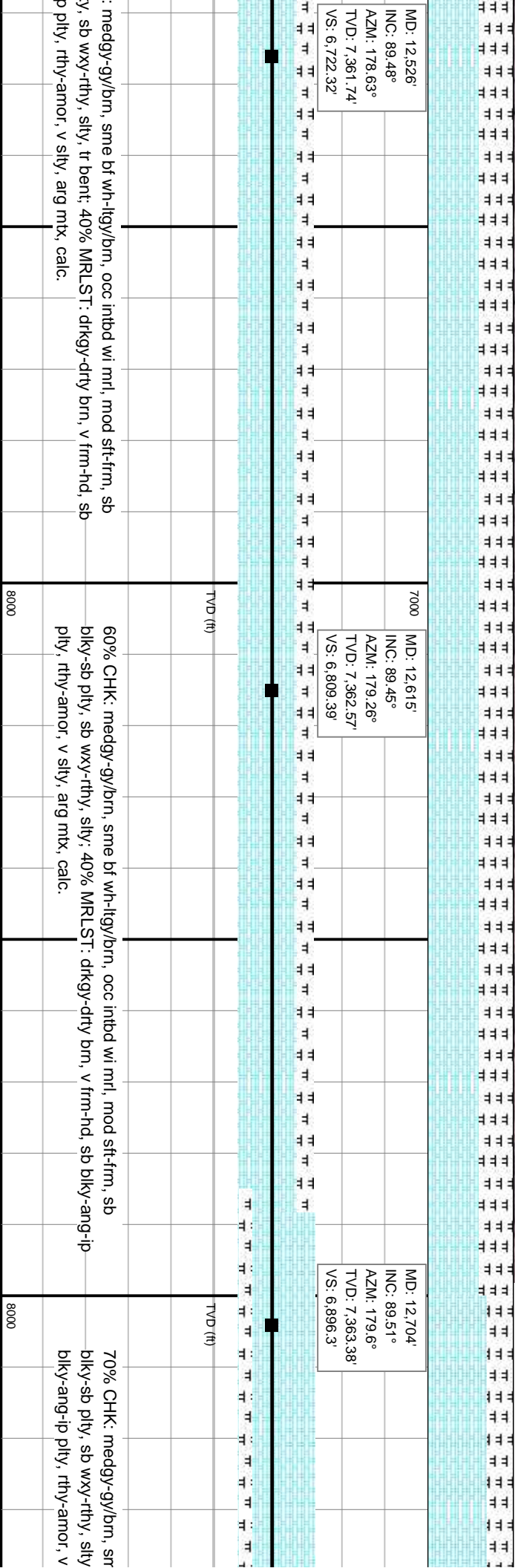
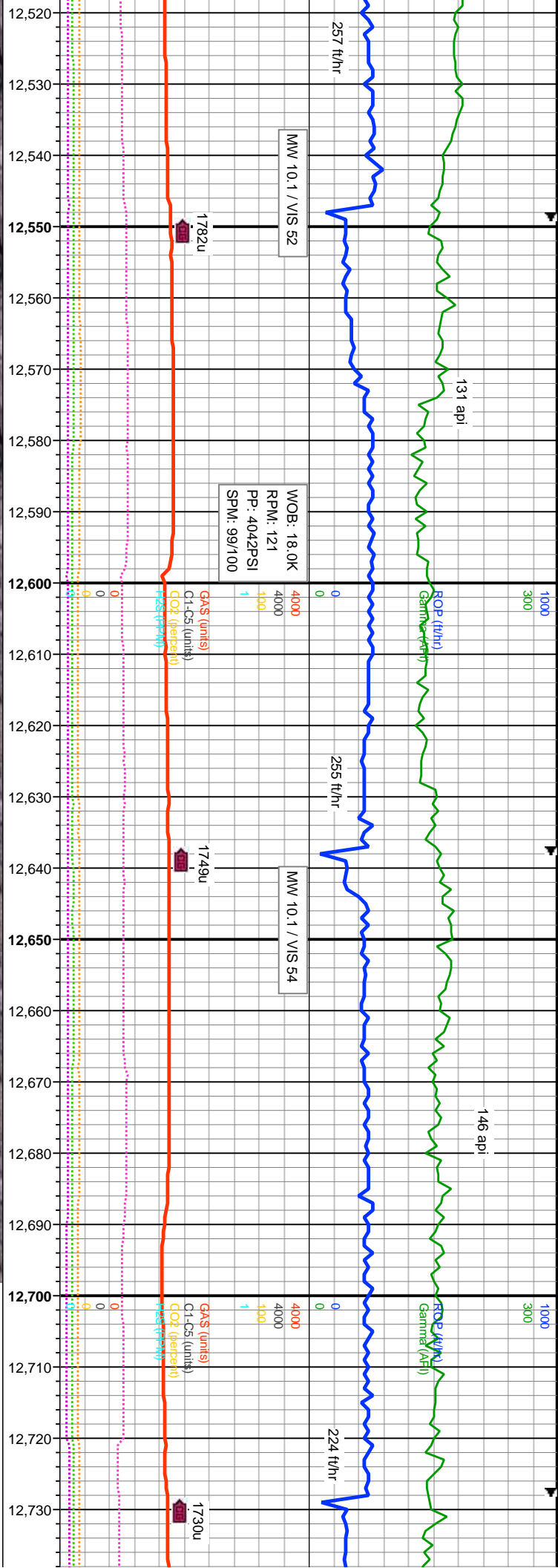


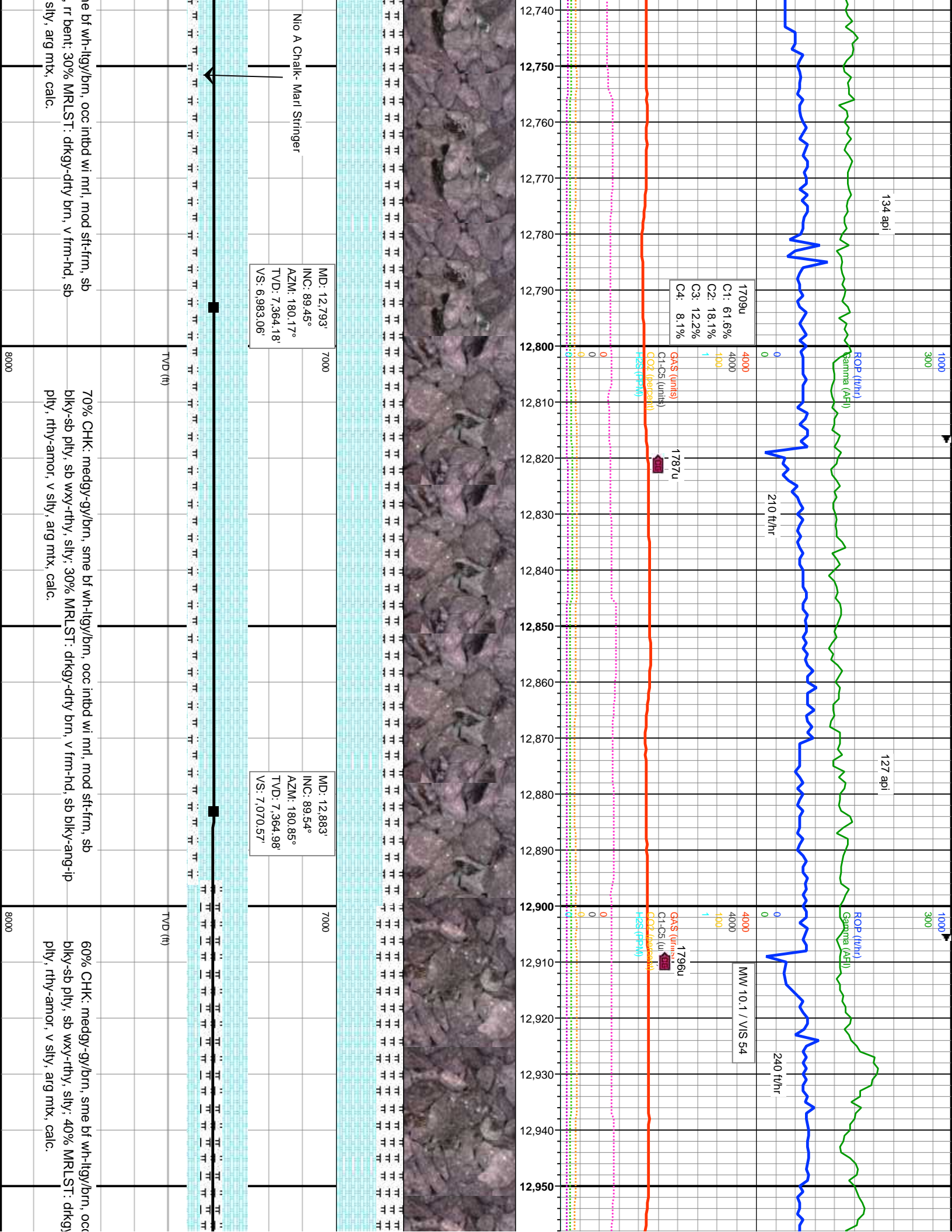


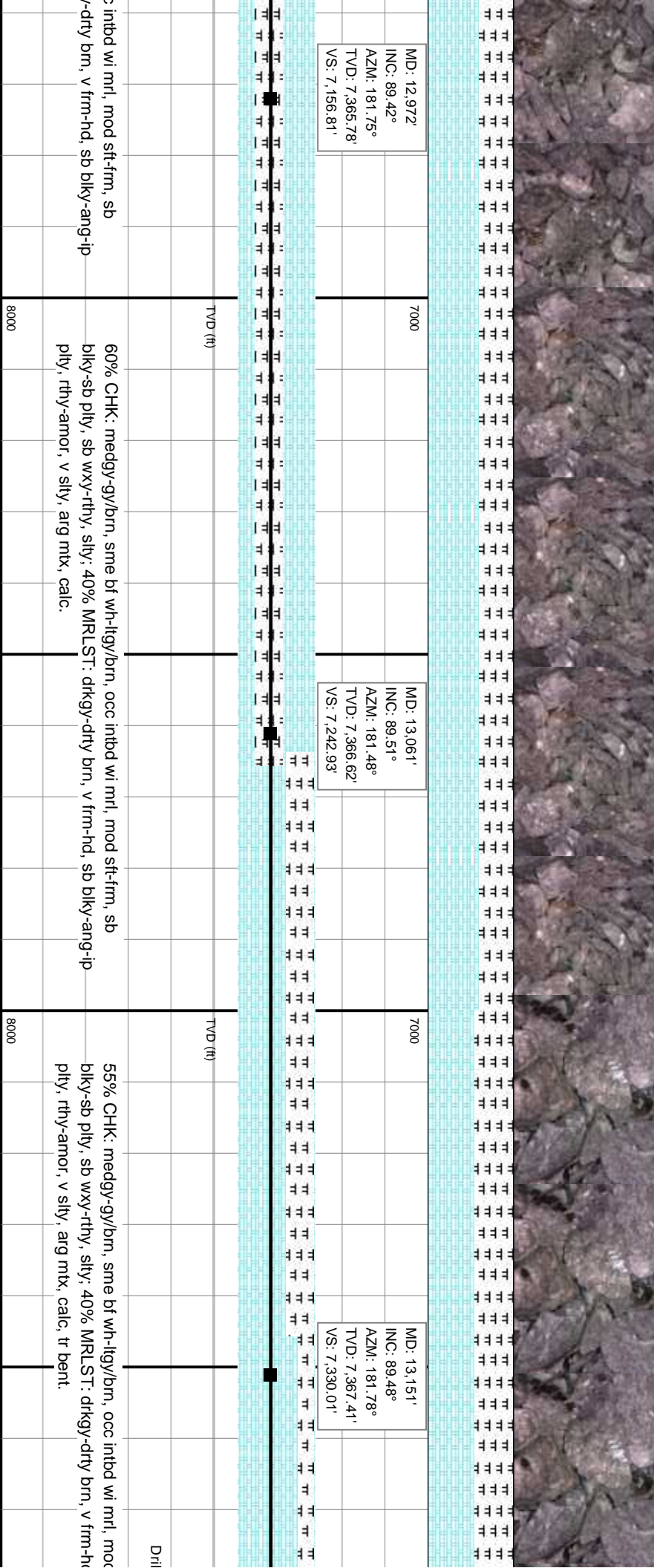
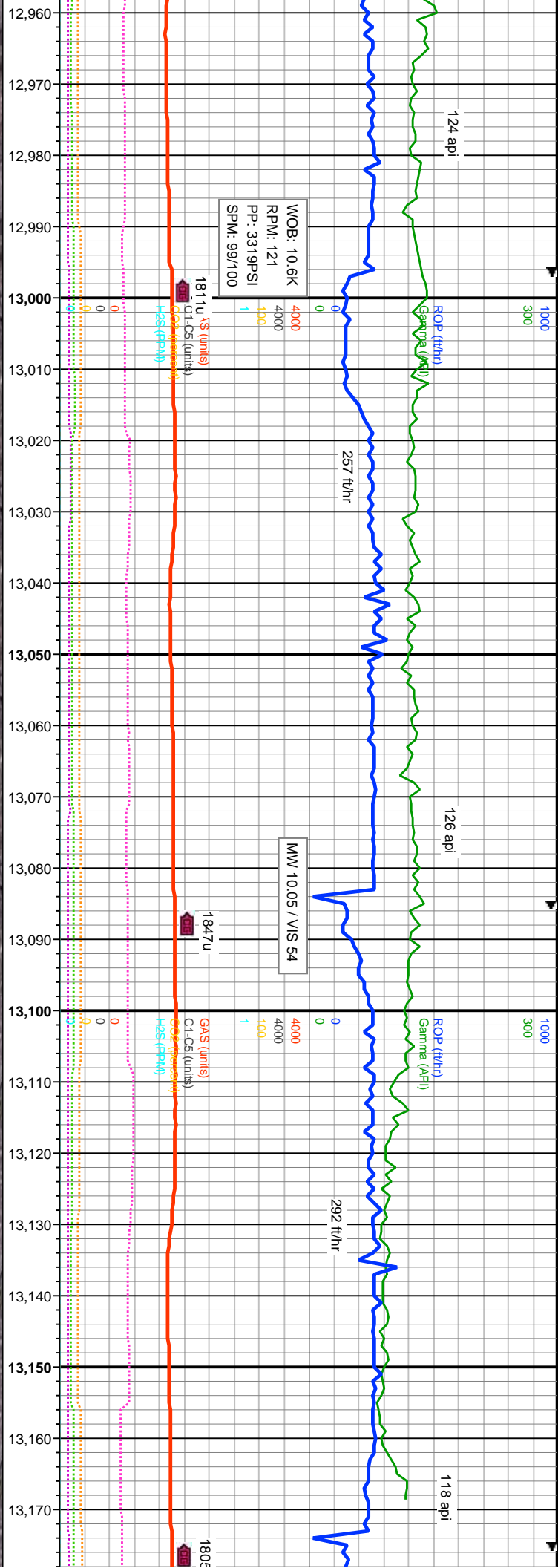


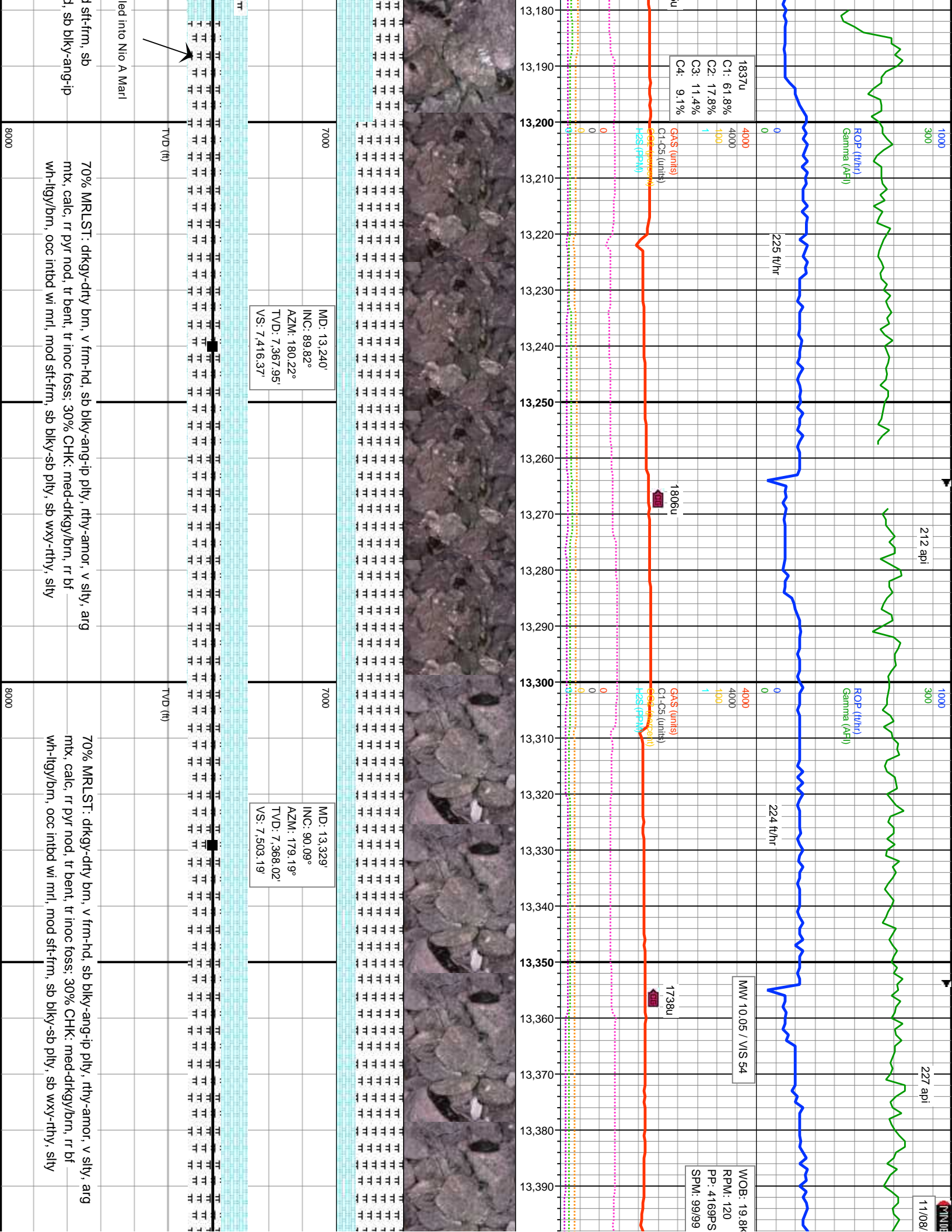


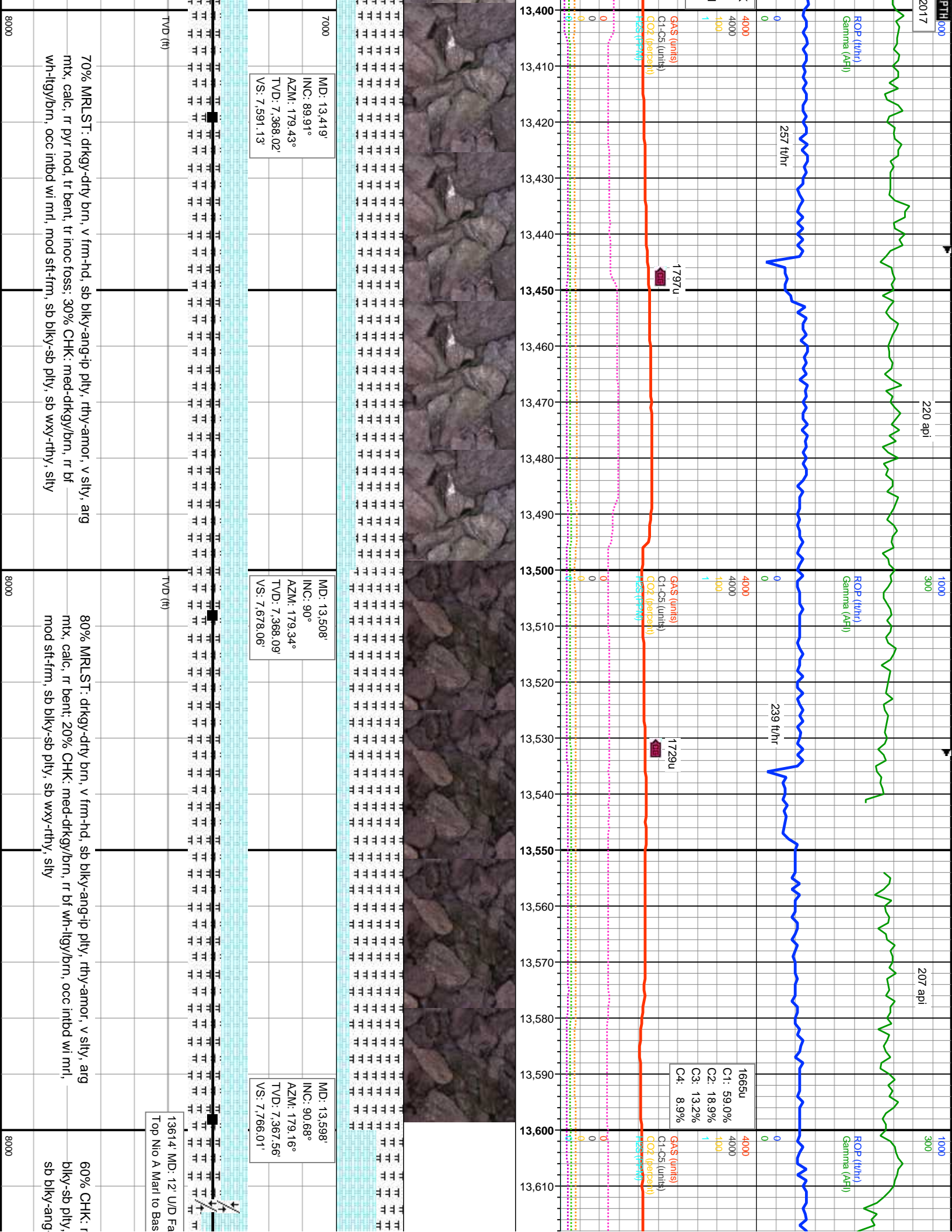


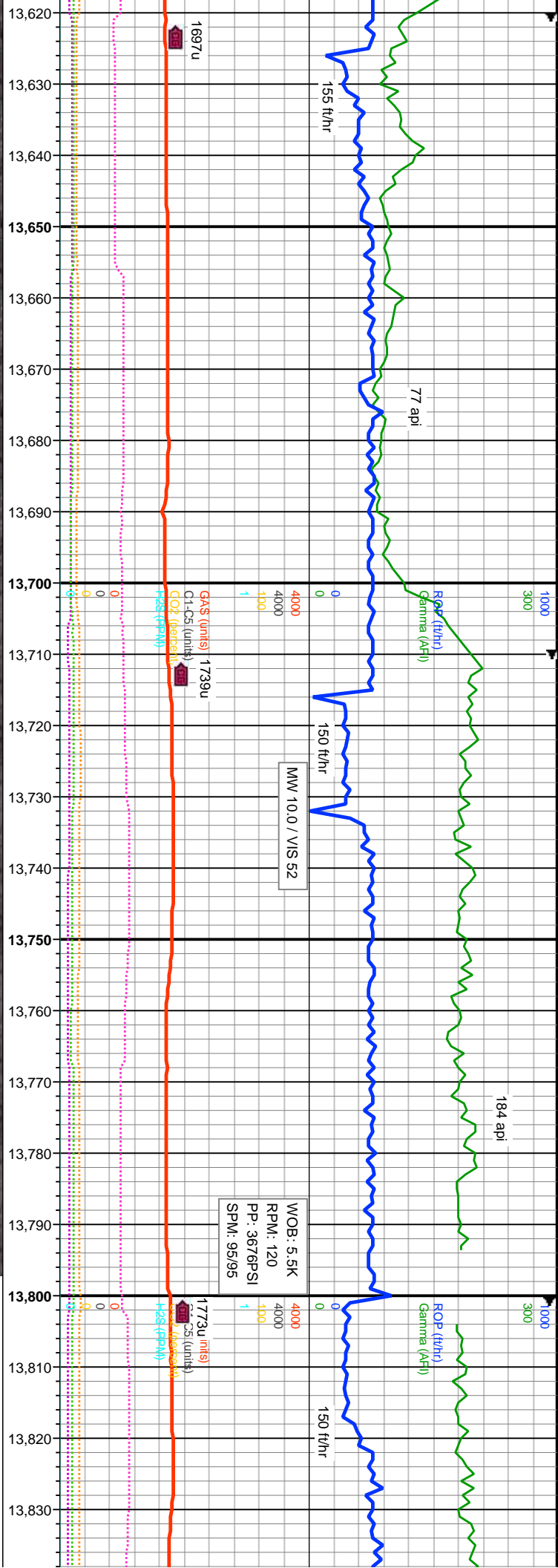












MD: 13,687'
INC: 90.77°
AZM: 179.59°
TVD: 7,366.43'
VS: 7,852.94'

MD: 13,776'
INC: 90.37°
AZM: 180.49°
TVD: 7,365.55'
VS: 7,939.64'

13701' MD: ~6' D/U Fault
Base Nio A Chalk to Top Nio A Marl

Nio A Marl

TVD (ft)

needy-gy/brn, sme bf wh-ity/brn, occ intbd wi mrl, mod sft-firm, sb
sb wxy-rthy, silty, rr bent, rr pyr: 40% MRLST: drkgy-dty brn, v firm-hd,
ip pily, rthy-amor, v silty, arg mtx, calc.

70% MRLST: drkgy-dty brn, v firm-hd, sb blk-y-ang-ip pily, rthy-amor, v silty, arg
mtx, calc, rr pyr nod, tr bent, tr inoc foss: 30% CHK: med-drkgy/brn, rr bf
wh-ity/brn, occ intbd wi mrl, mod sft-firm, sb blk-y-sb pily, sb wxy-rthy, silty

60% MRLST: drkgy-dty brn,
mtx, calc, rr bent, 40% CHK:
mod sft-firm, sb blk-y-sb pily, s

