



Scale: 5" / 100'
Measured Depth Log

Well Name Ottesen LE 06-311HN

Location SEC.33, T1N, R66W

State COLORADO

Country USA

API Number 051234434500

Geographic Region DJ BASIN

County WELD

Rig Number PRECISION 466

AFE # 18DC0190

Field WATTENBERG

Ground Elevation 5076.5'

K.B. Elevation 5096.5'

Logged Interval 6000' MD To 18034' MD

Total Depth 18034' MD

Formation NIOBRARA B CHALK

Type of Drilling Fluid OIL BASED MUD

Operator

Company Great Western Oil and Gas

Address 1801 Broadway, Ste 500
Denver, CO 80202



Geologist

Name Zach Souvall, Wyatt Wicks

Company Terra Guidance

Address 67 W. Floyd Ave. Ste 105
Englewood, CO 80110
(970) 260-5408

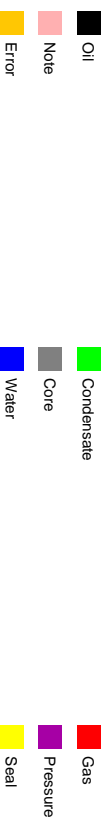


Other

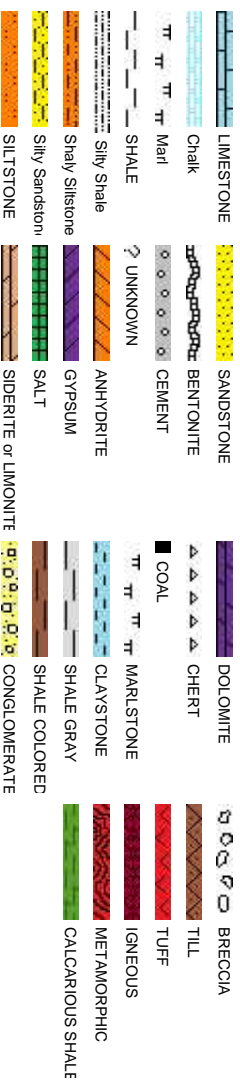
Mudlog Start Date 01/05/2019

Mudlog End Date 01/07/2019

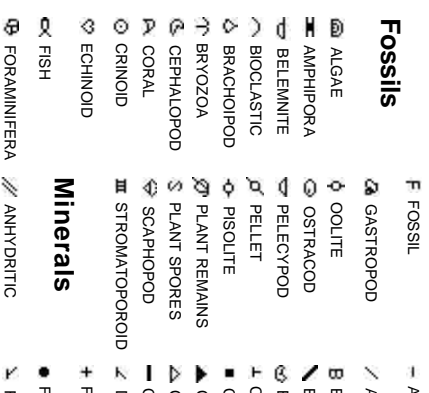
Color Coding



Rock Types



Fossils



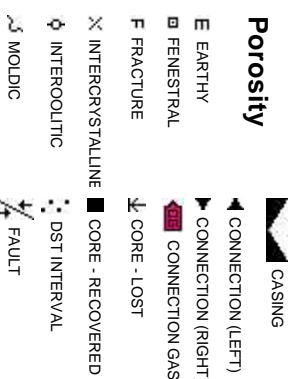
Minerals



Oil Show


















Porosity














Accessories






ERRUGINOUS PELLET	GLAUCONITE	Stringer
ERRUGINOUS	GYPSIFEROUS	
	HEAVY MINERAL	ANHYDRITE STRINGER
	KAOLIN	BENTONITE STRINGER
	MARLSTONE	COAL STRINGER
	MINERAL CRYSTALS	DOLomite STRINGER
	NOODULES	GYPSUM STRINGER
	PHOSPHATE PELLETS	LIMESTONE STRINGER
	PYRITE	MARLSTONE (CALC.) STRG
	SALT CAST	MARLSTONE (DOL.) STRG
	SANDY	SANDSTONE STRINGER
	SILICEOUS	SHALE STRINGER
	SILTY	SILTSTONE STRINGER
	TUFFACEOUS	






Other Symbols

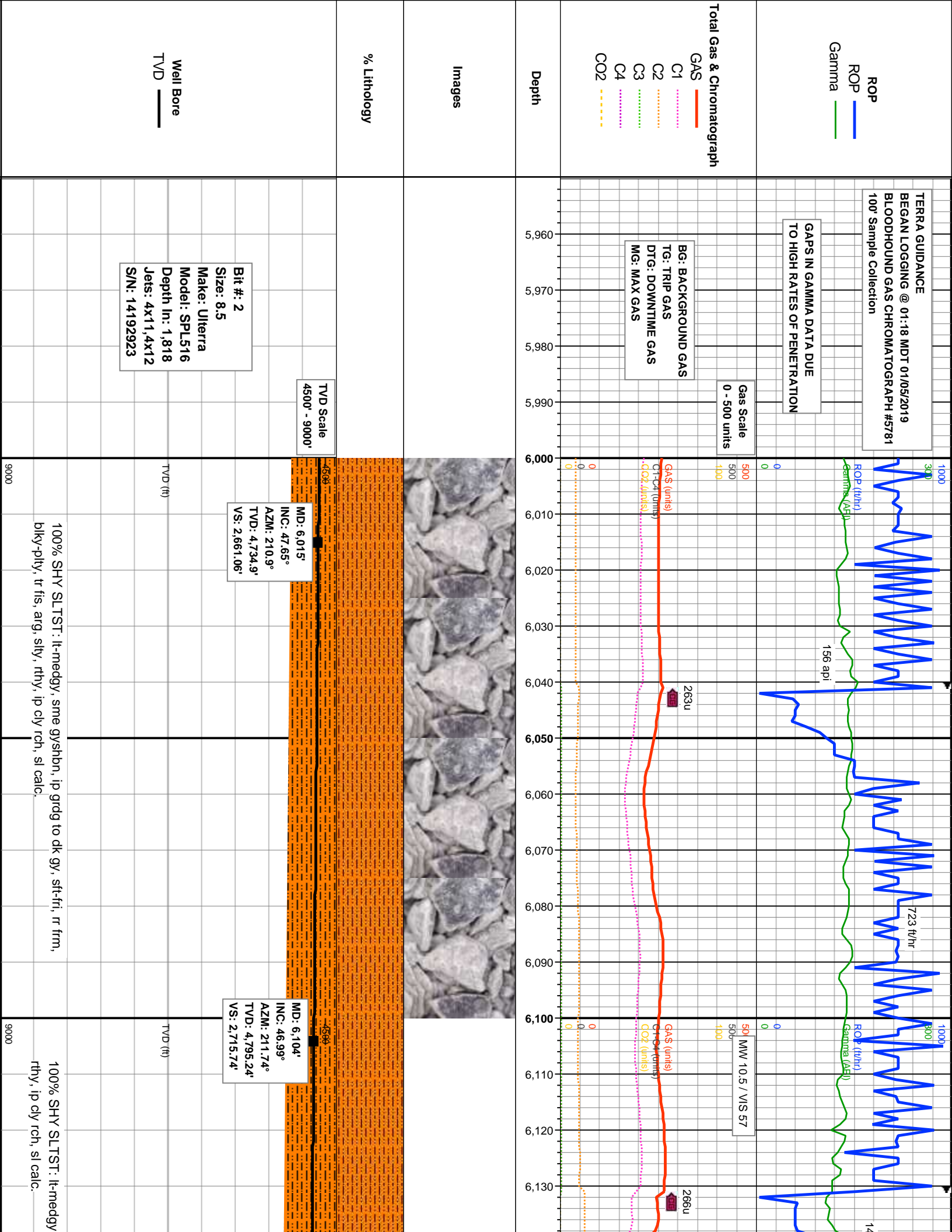
	FORMATION TOP
	GAS SHOW
	MINDEPTH MN DEPTH
	NORMAL FAULT
	OIL SHOW
	OVERTURNED STRATA
	REVERSE FAULT
	SIDEWALL CORE (LEFT)
	SIDEWALL CORE (RIGHT)
	SLIDE
	SURVEY
	TRIP GAS
	WIRELINE TESTED - LEFT
	WIRELINE TESTED - RT
	GRAINSTONE

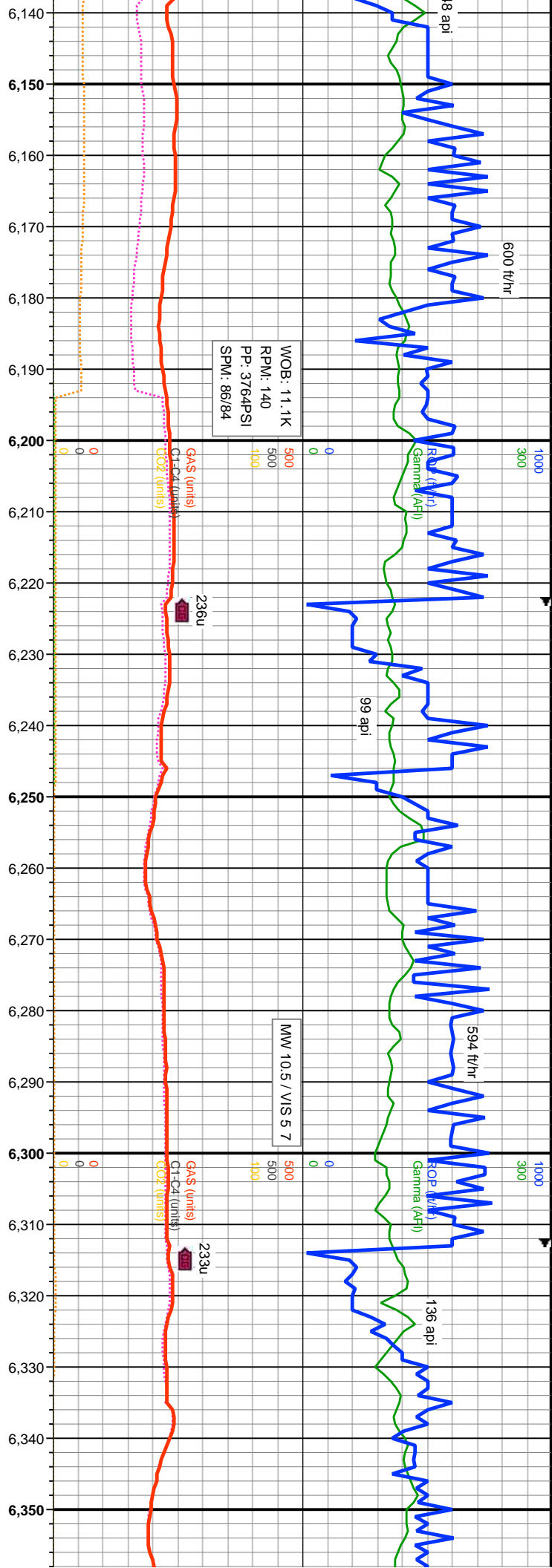
Rounding	
	ANGULAR
	ROUNDED
	SUBANG
	SUBRND

Textures	
	BOUNDSTONE
	CHALKY
	CRYPTOXLN
	EARTHY
	MODERATE
	POOR
	WELL

Sorting	
	LITHOGRAPHIC
	MICROXLN
	MUDSTONE
	PACKSTONE
	WACKSTONE

Calcarious Shale	
	LITHOGRAPHIC
	MICROXLN
	MUDSTONE
	PACKSTONE
	WACKSTONE

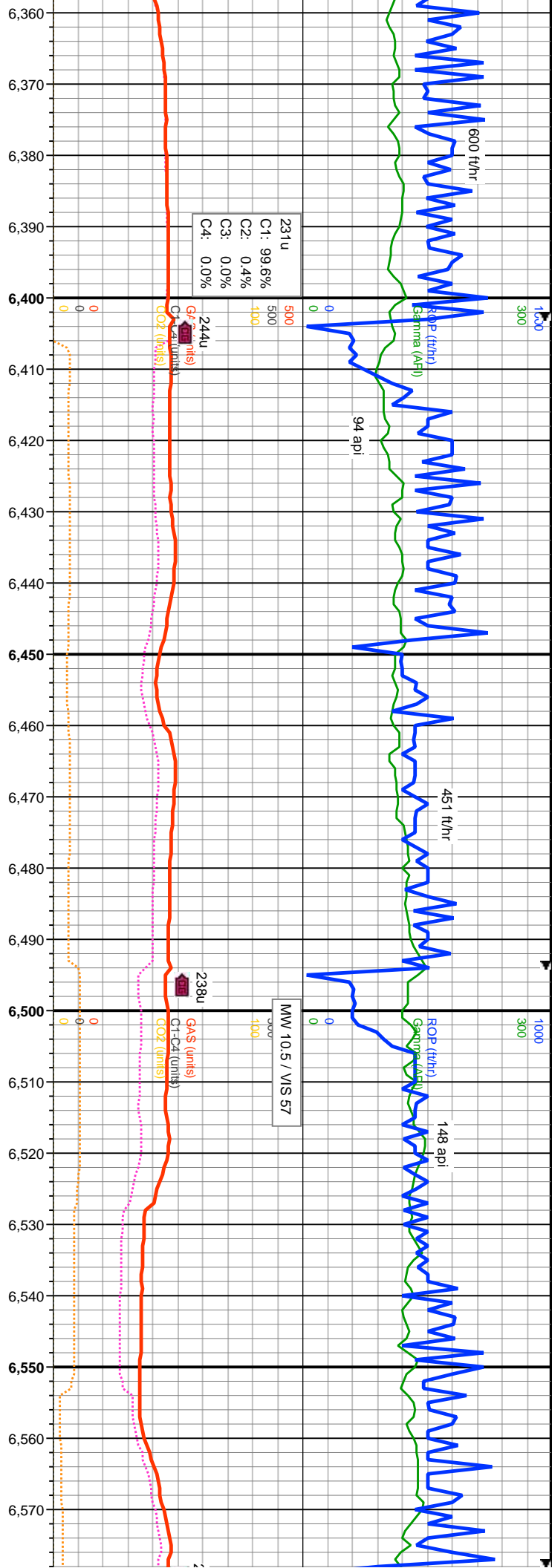




MD: 6,194'
INC: 47.68°
AZM: 211.65°
TVD: 4,856.23'
VS: 2,771.28'

MD: 6,284'
INC: 47.54°
AZM: 211.5°
TVD: 4,916.91'
VS: 2,826.99'

sme gysbhn, sft-fri, rr frm, blk-y-pity, tr fis, arg, slty,	100% SHY SLTST: lt-medgy, sme gysbhn, ip gridg to dk gy, sft-fri, rr frm, blk-y-pity, tr fis, arg, slty, rthy, ip cly rch, sl calc.	TVD (ft)	9000
sme gysbhn, sft-fri, rr frm, blk-y-pity, tr fis, arg, slty,	100% SHY SLTST: lt-medgy, sme gysbhn, ip gridg to dk gy, sft-fri, rr frm, blk-y-pity, tr fis, arg, slty, rthy, ip cly rch, sl calc.	TVD (ft)	9000



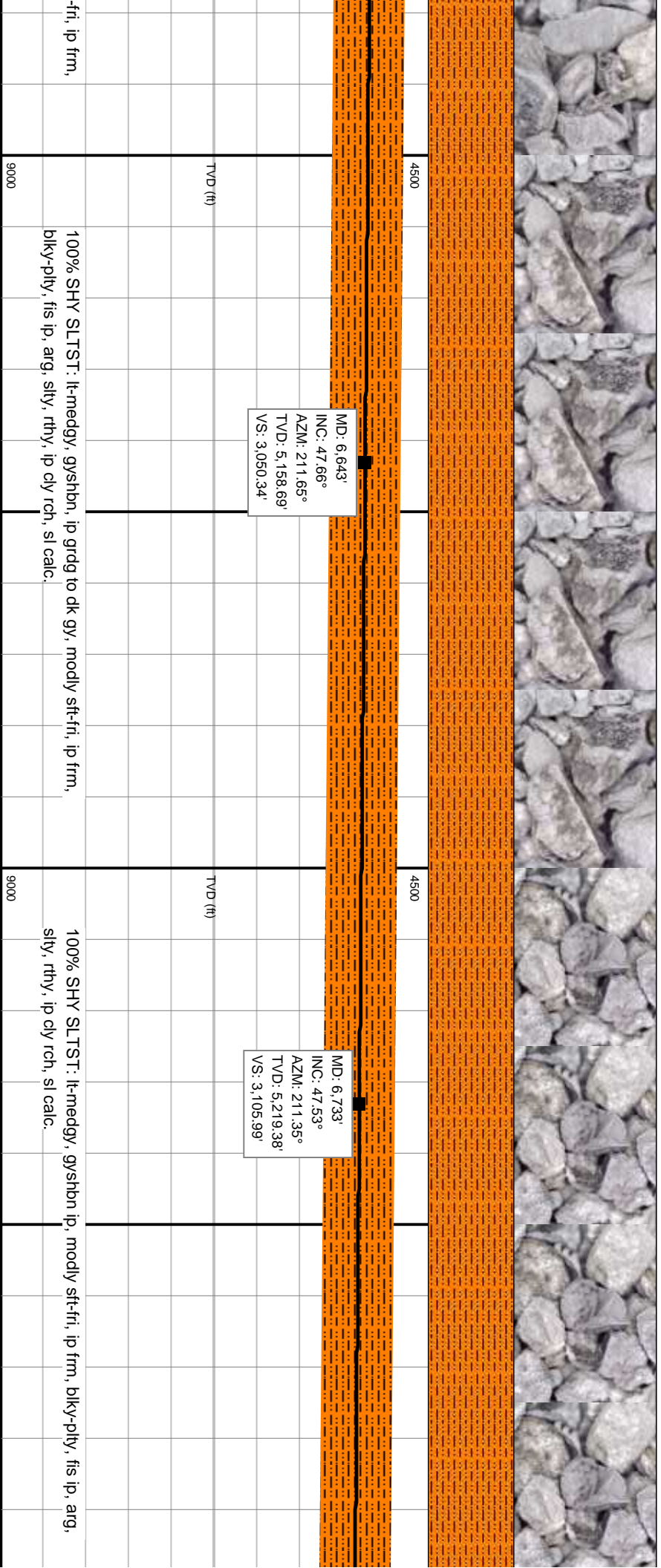
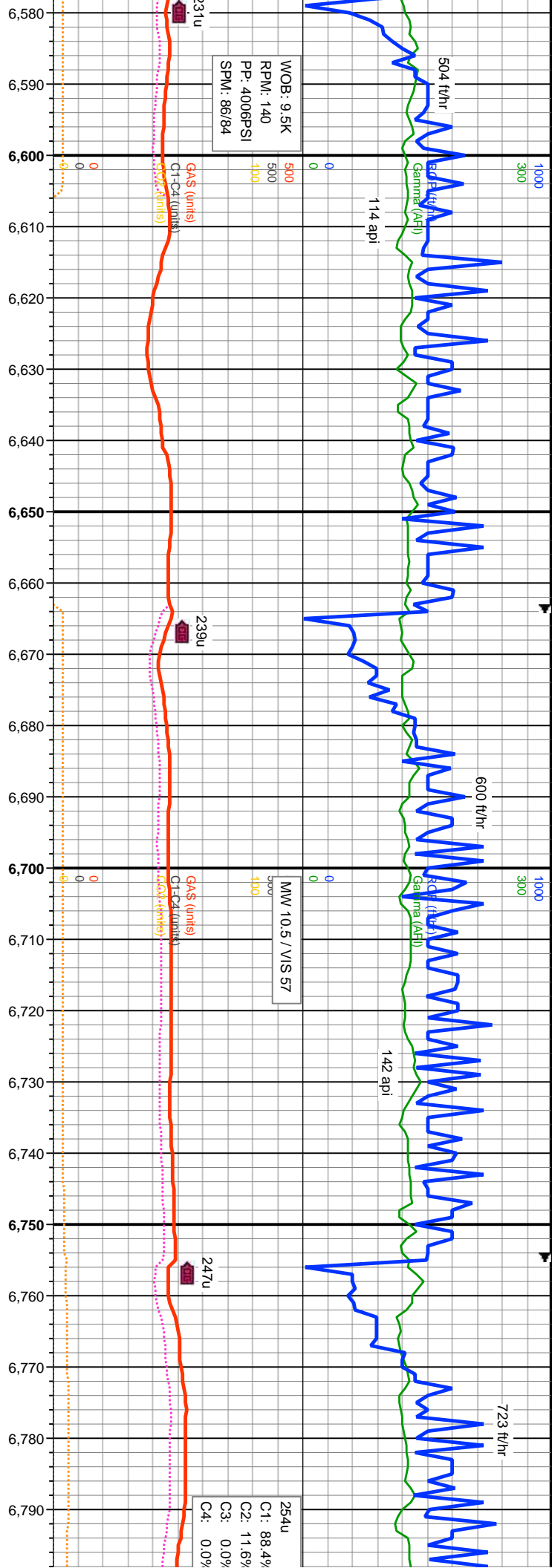
MD: 6,374'
INC: 47.62°
AZM: 212°
TVD: 4,977.62'
VS: 2,882.79'

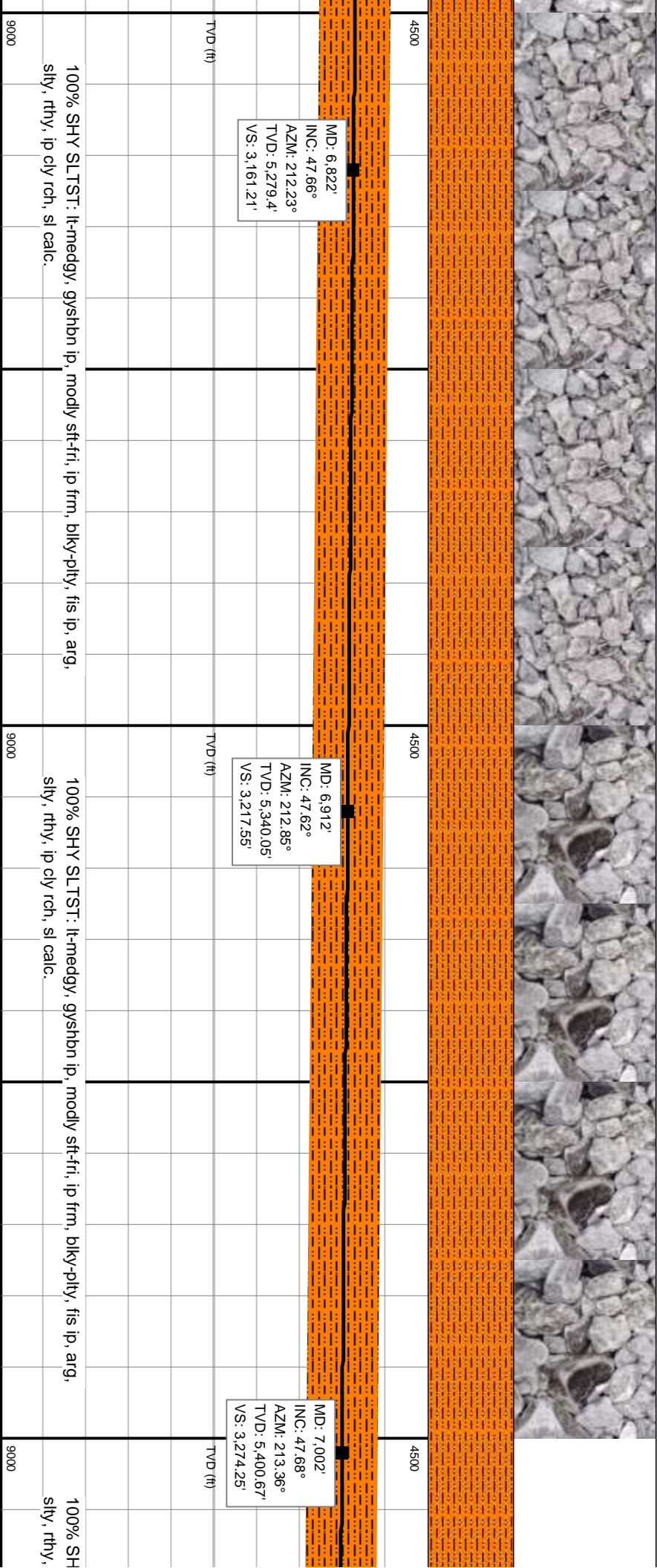
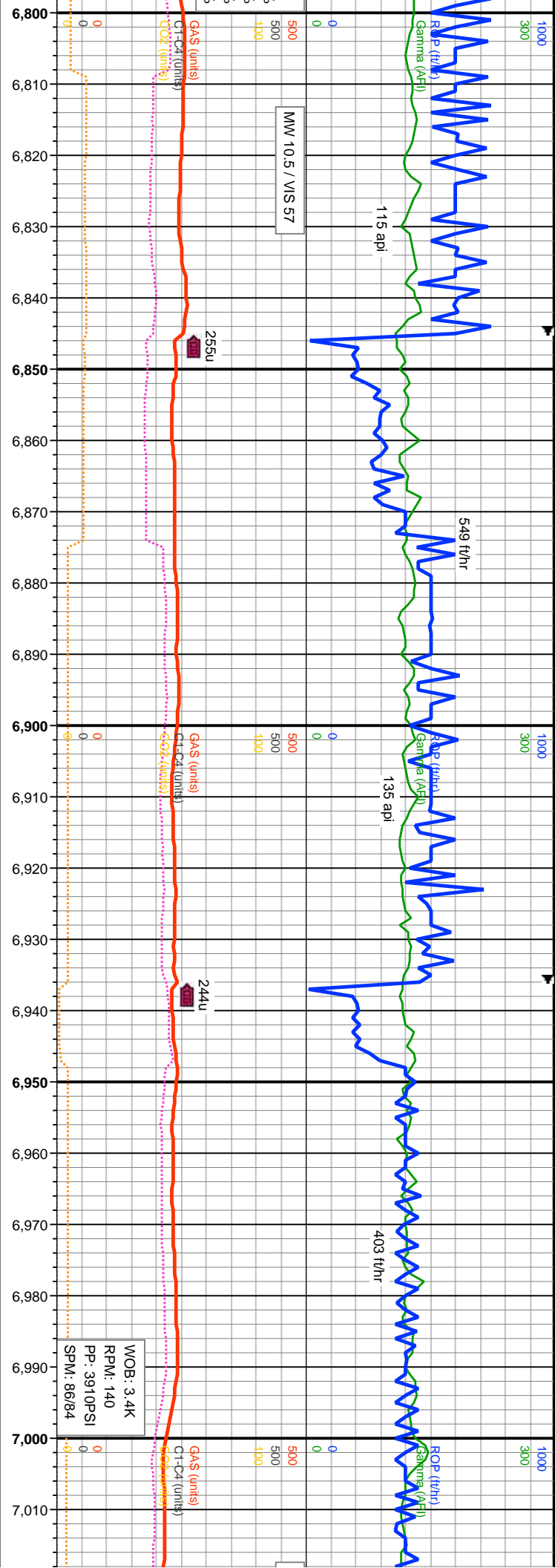
MD: 6,464'
INC: 47.74°
AZM: 212.3°
TVD: 5,038.21'
VS: 2,938.93'

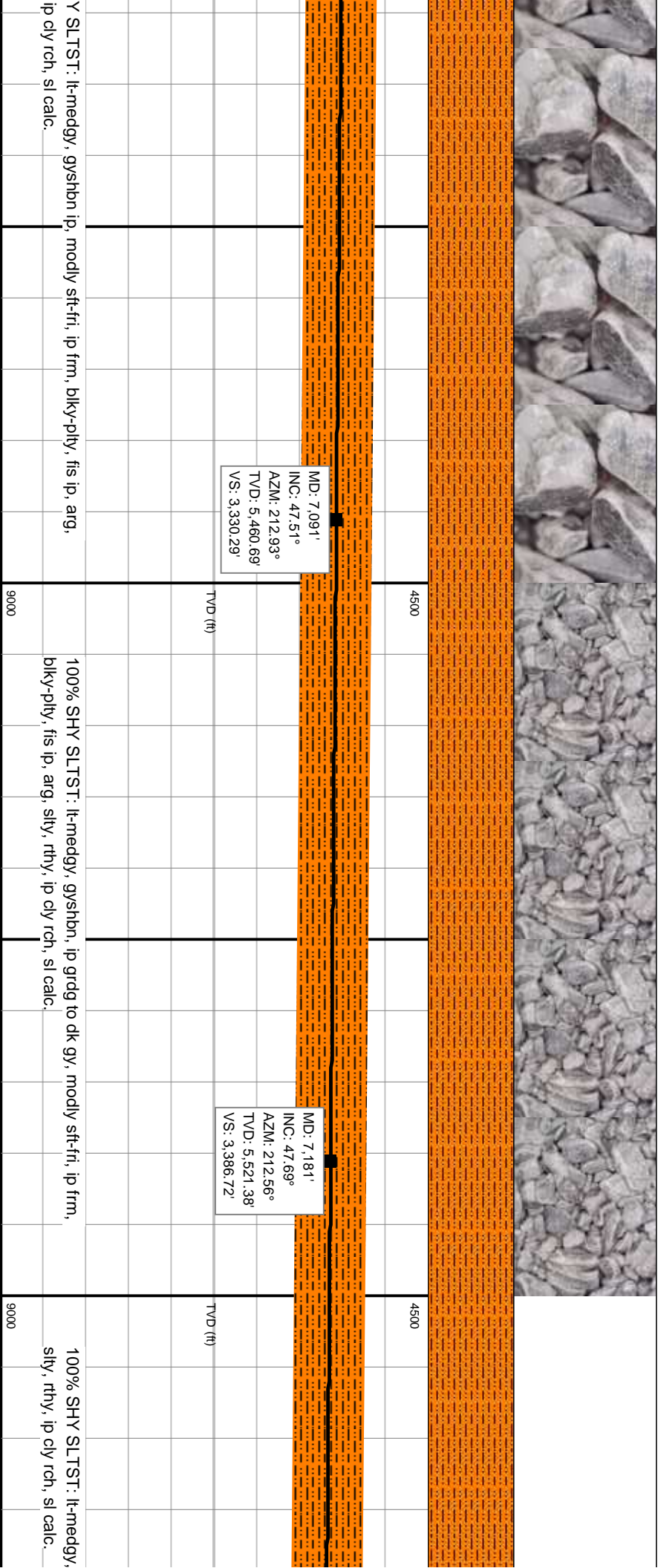
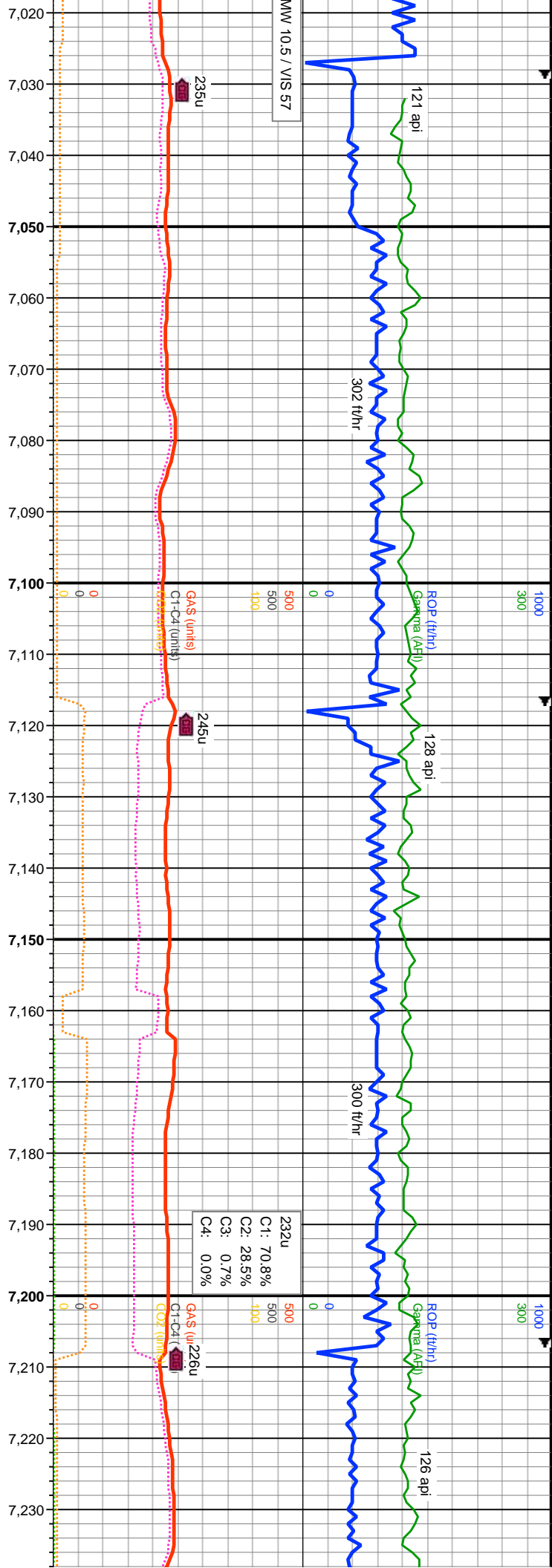
MD: 6,553'
INC: 47.69°
AZM: 211.91°
TVD: 5,098.09'
VS: 2,994.44'

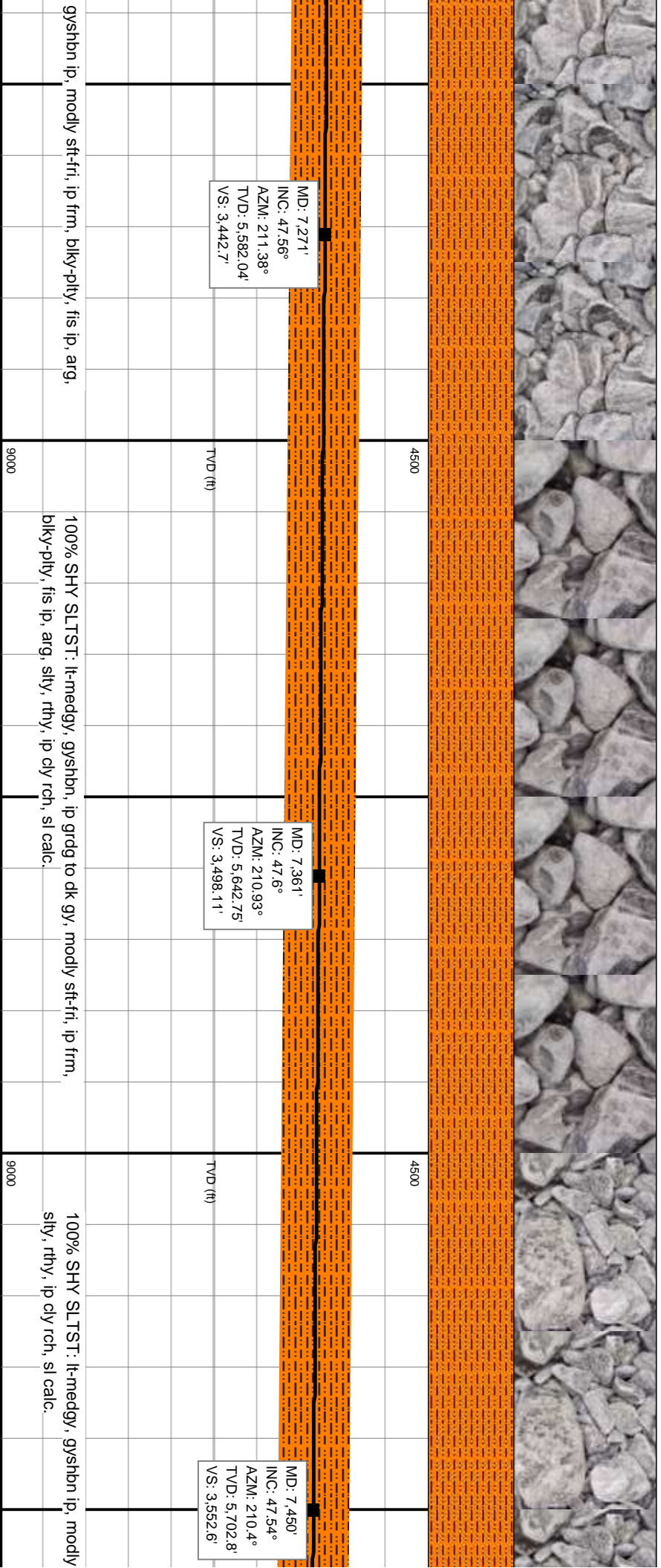
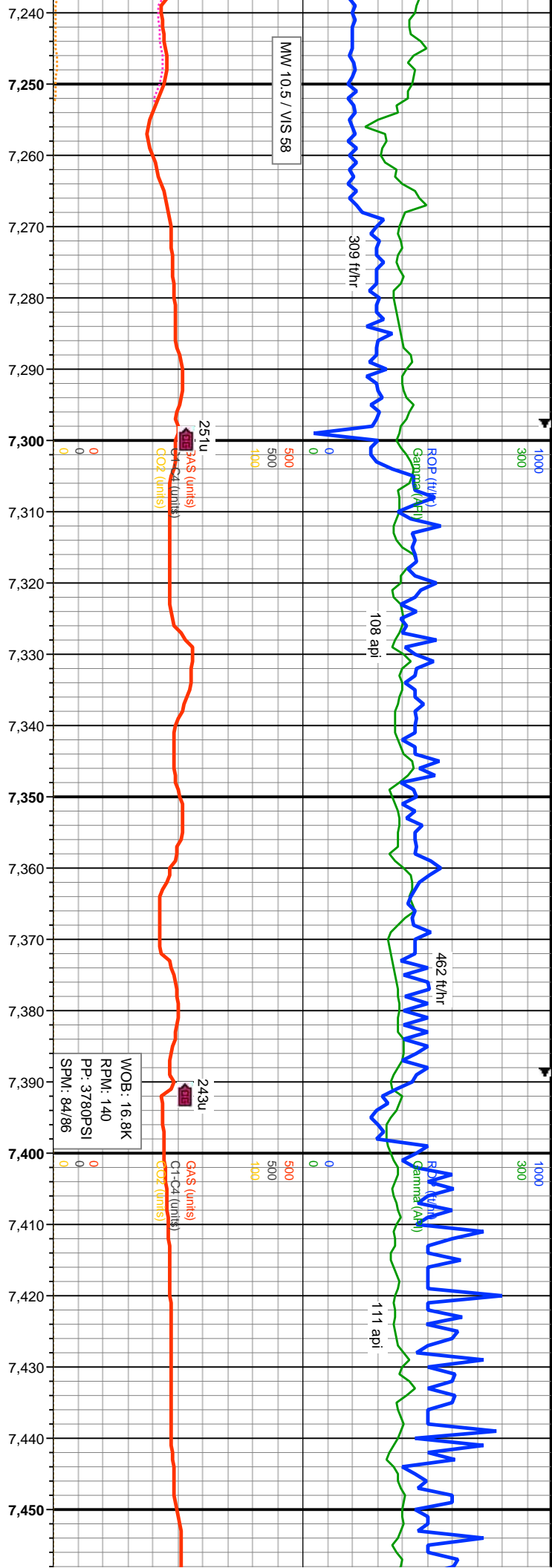
100% SHY SLTST: lt-medgy, sme gysbhn, ip grdg to dk gy, modly sft-fri, ip frm, blkly-pltly, arg, silty, rthy, ip cly rch, sl calc.

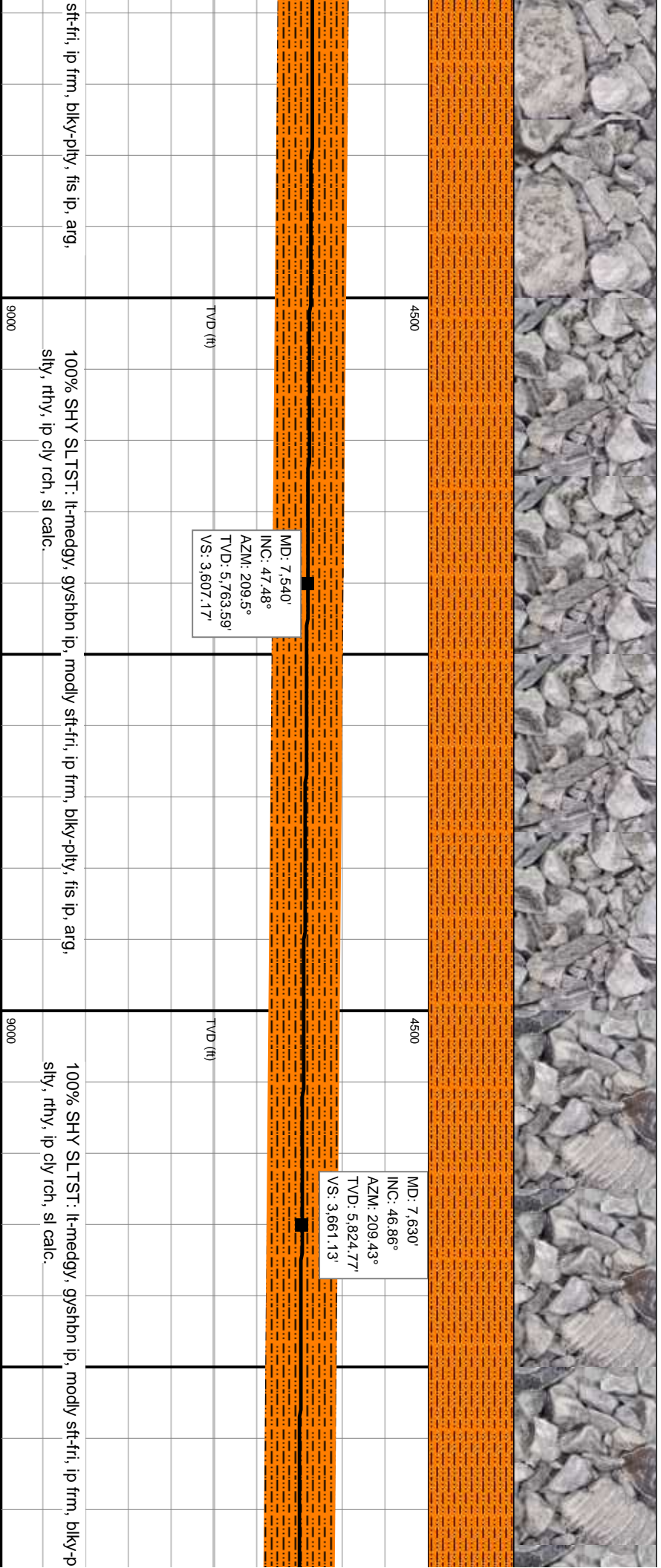
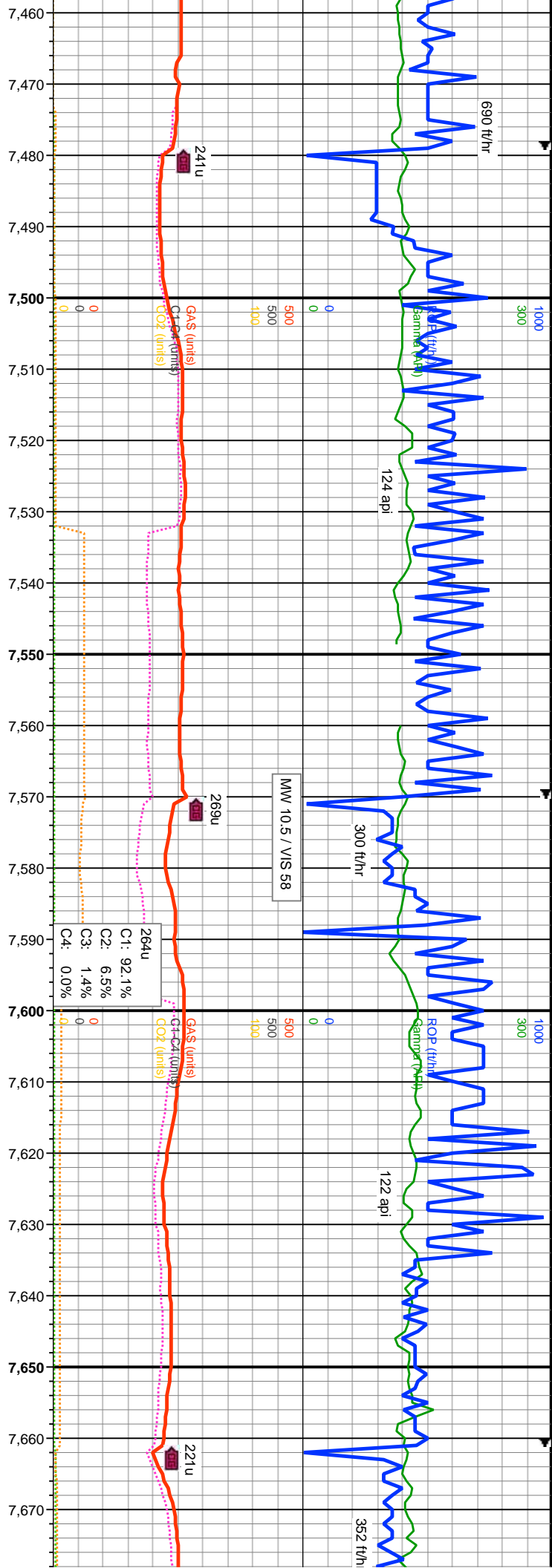
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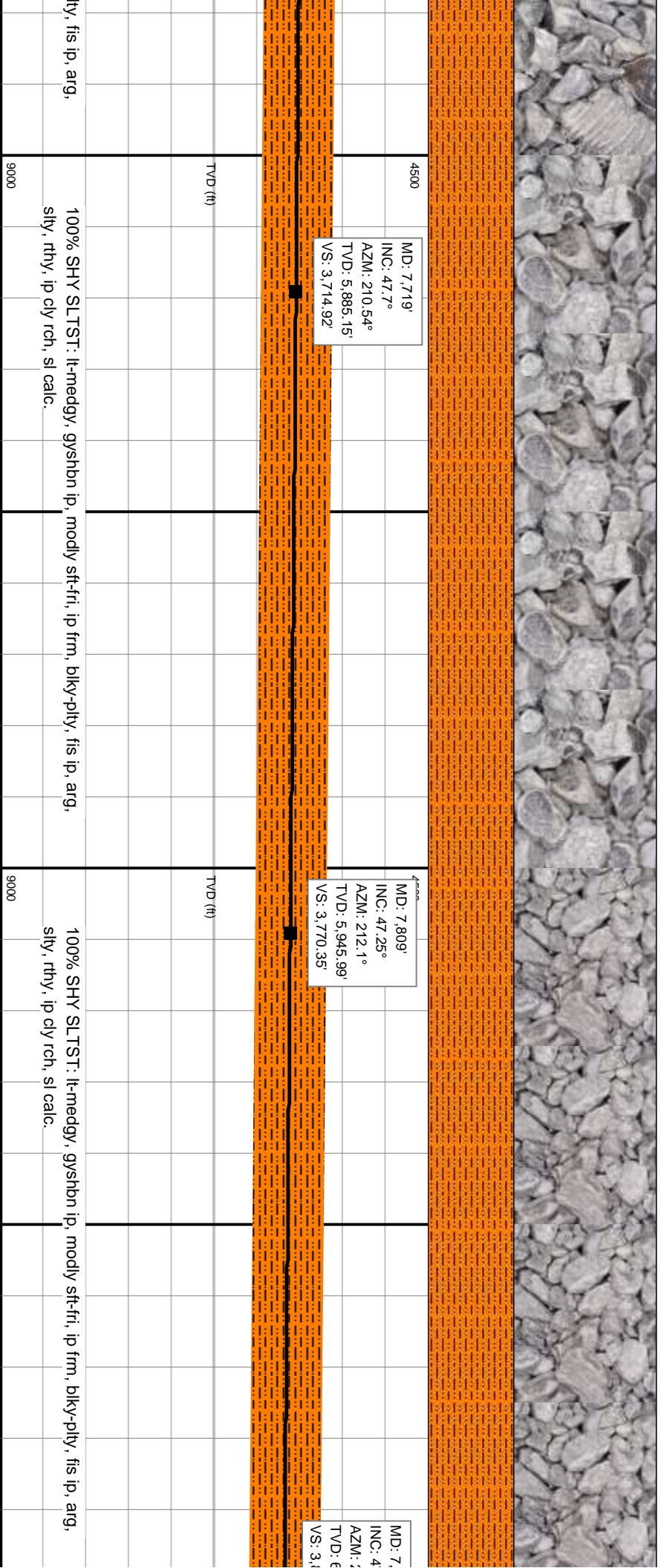
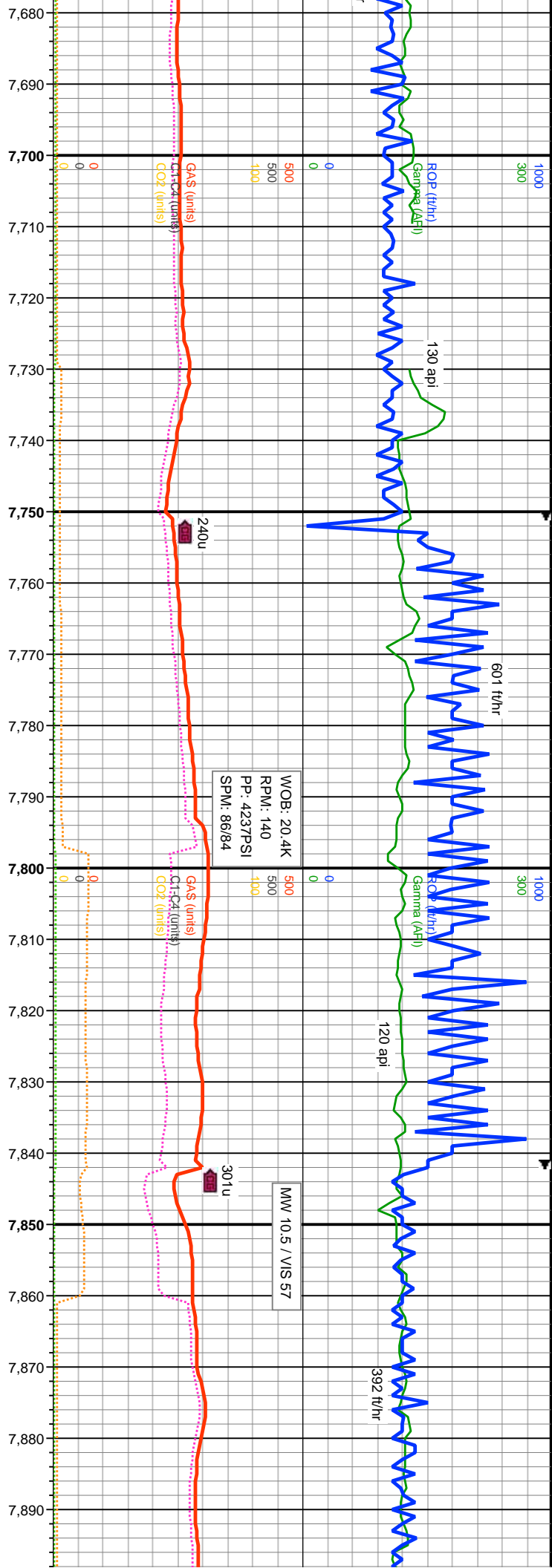


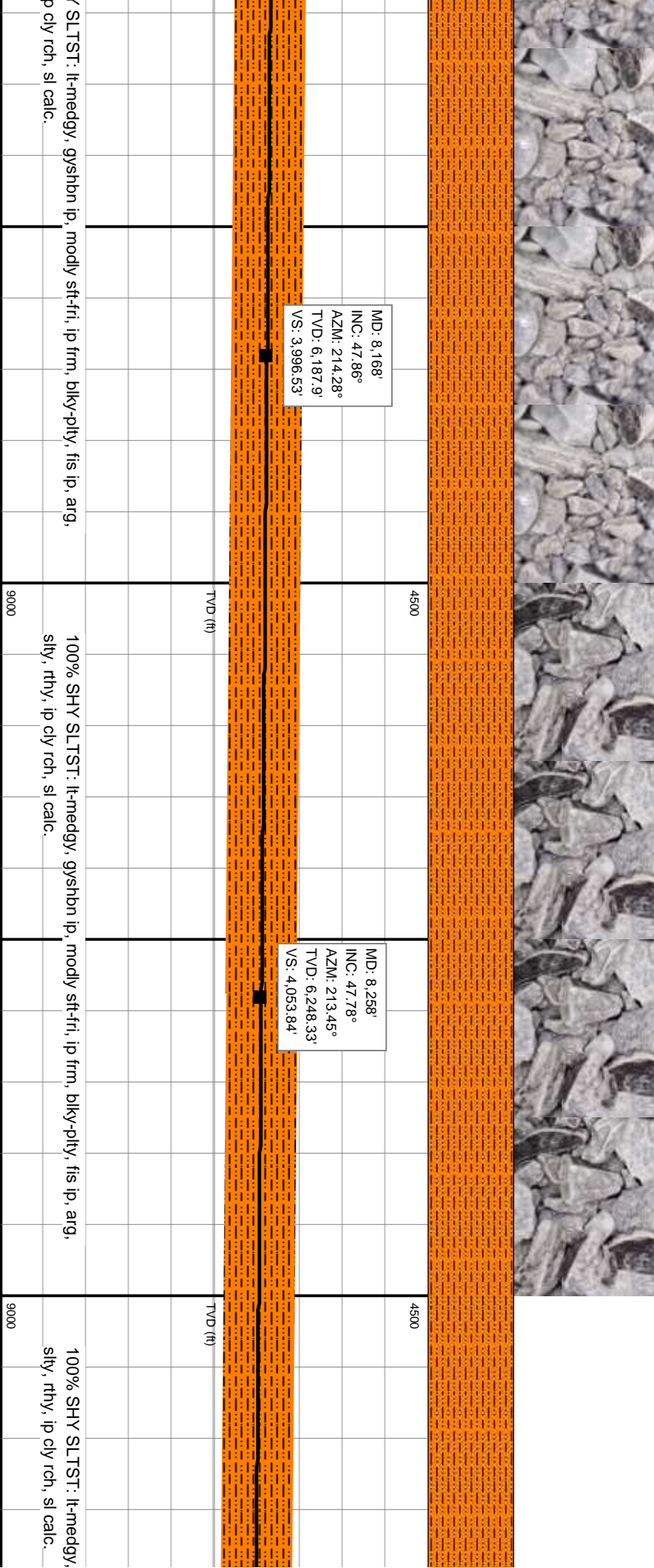
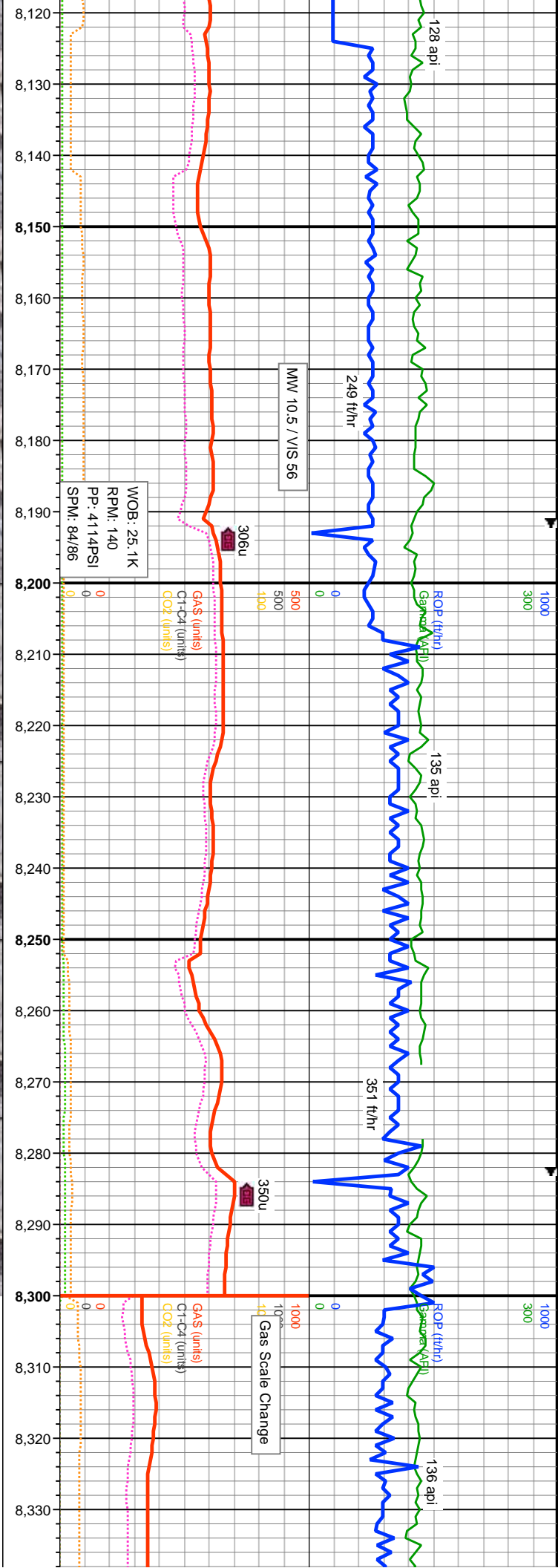


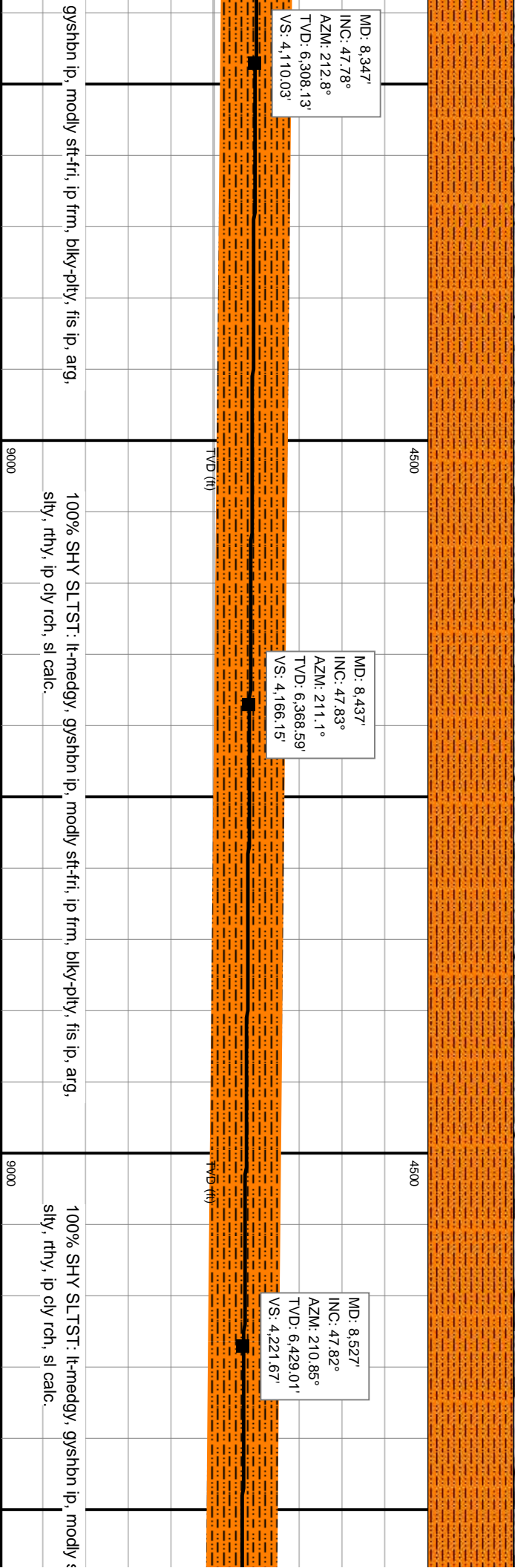
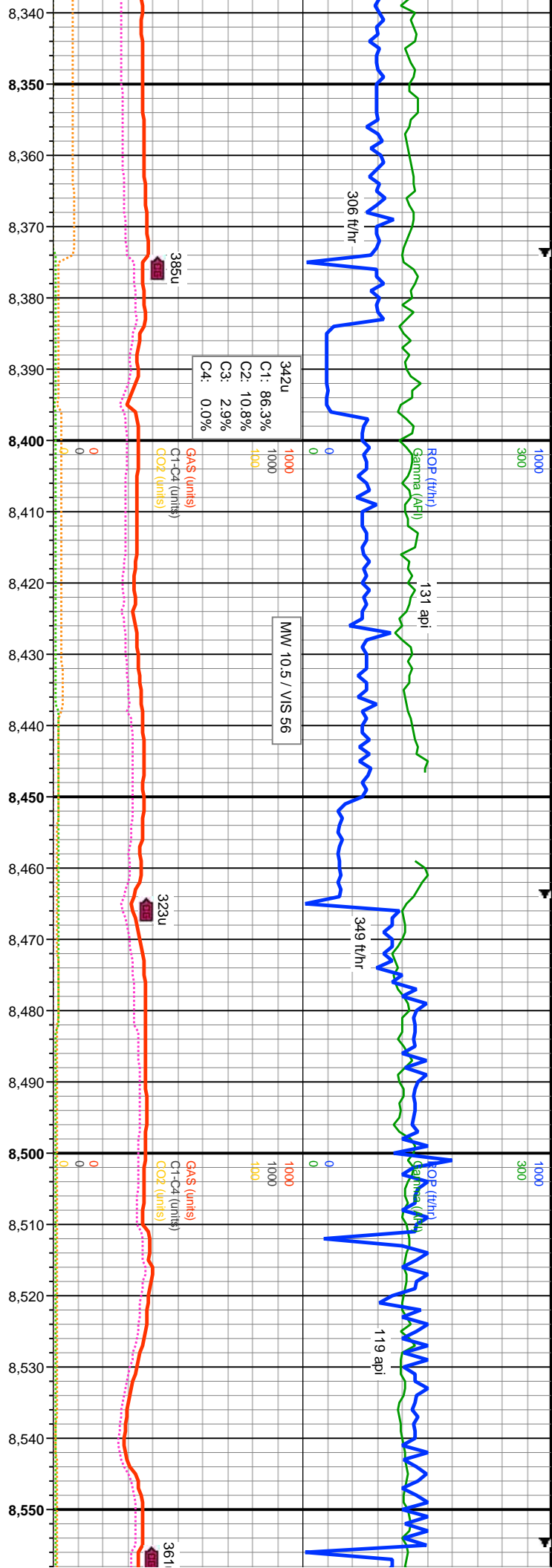


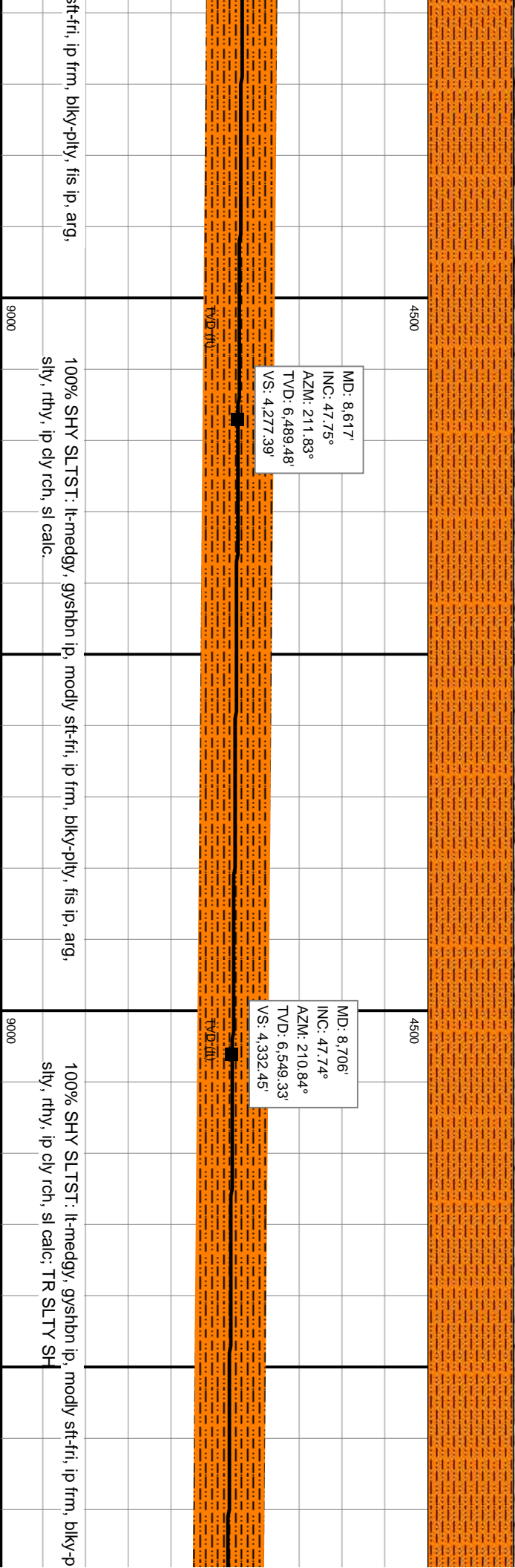
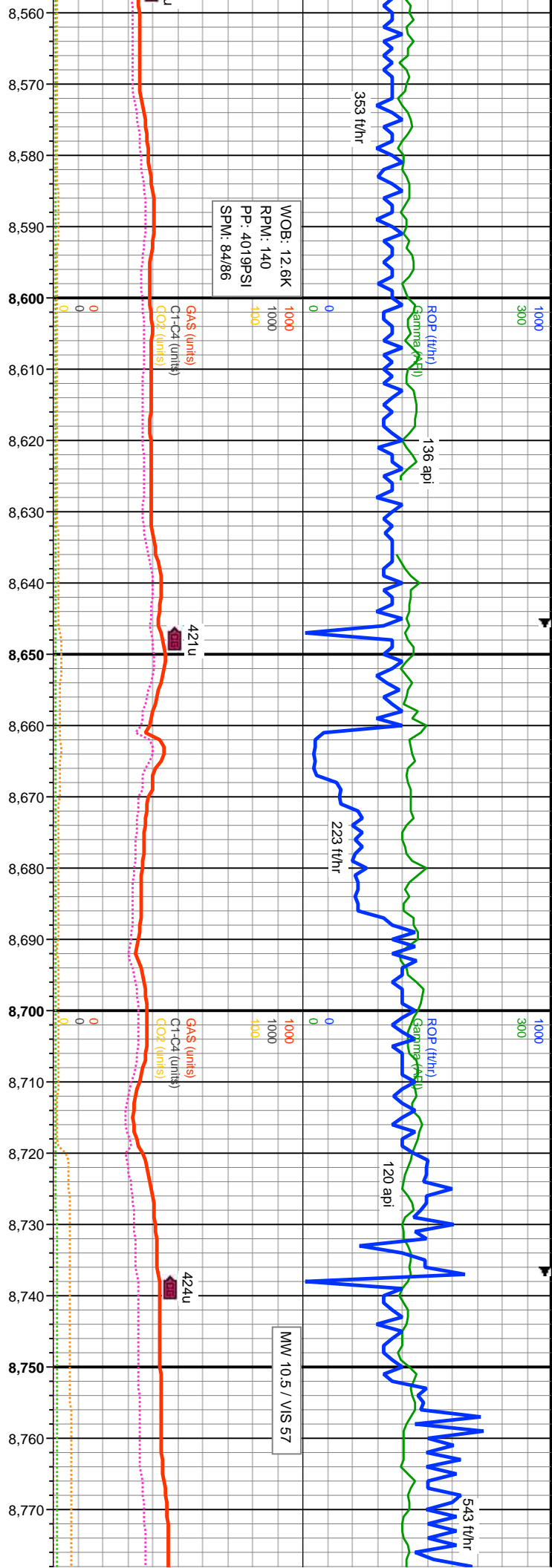


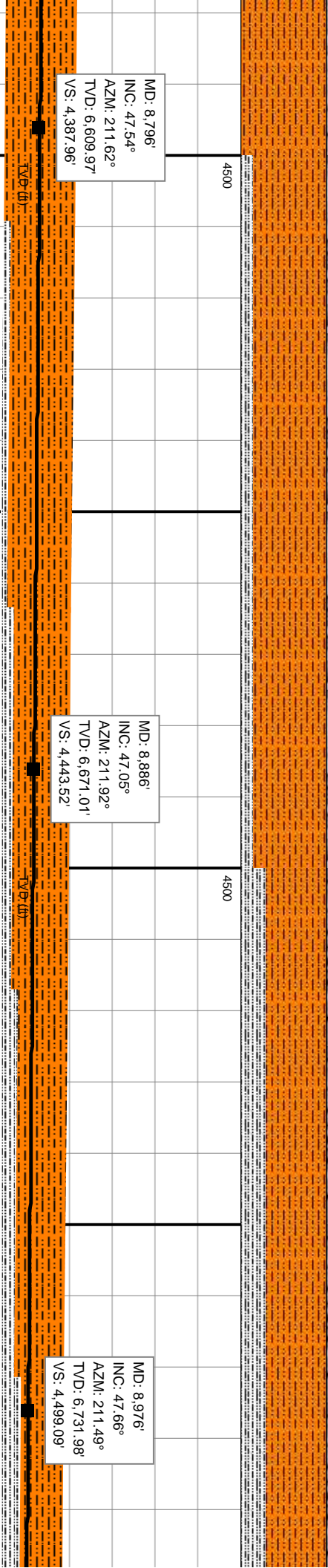
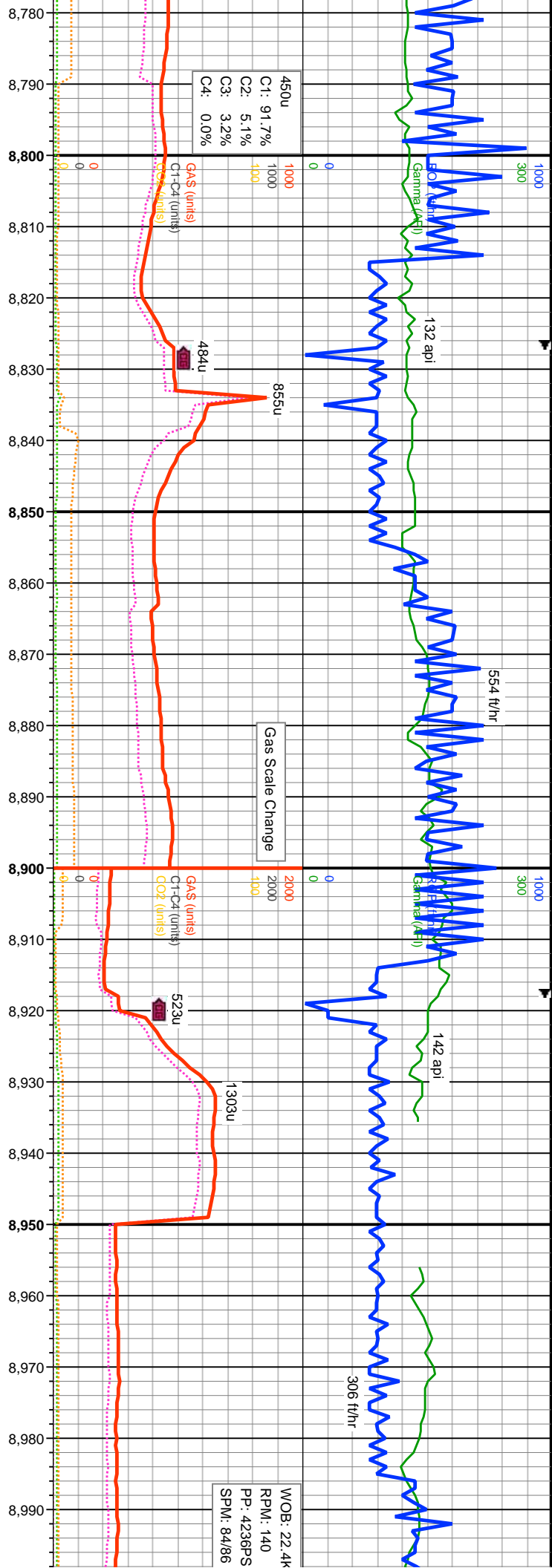






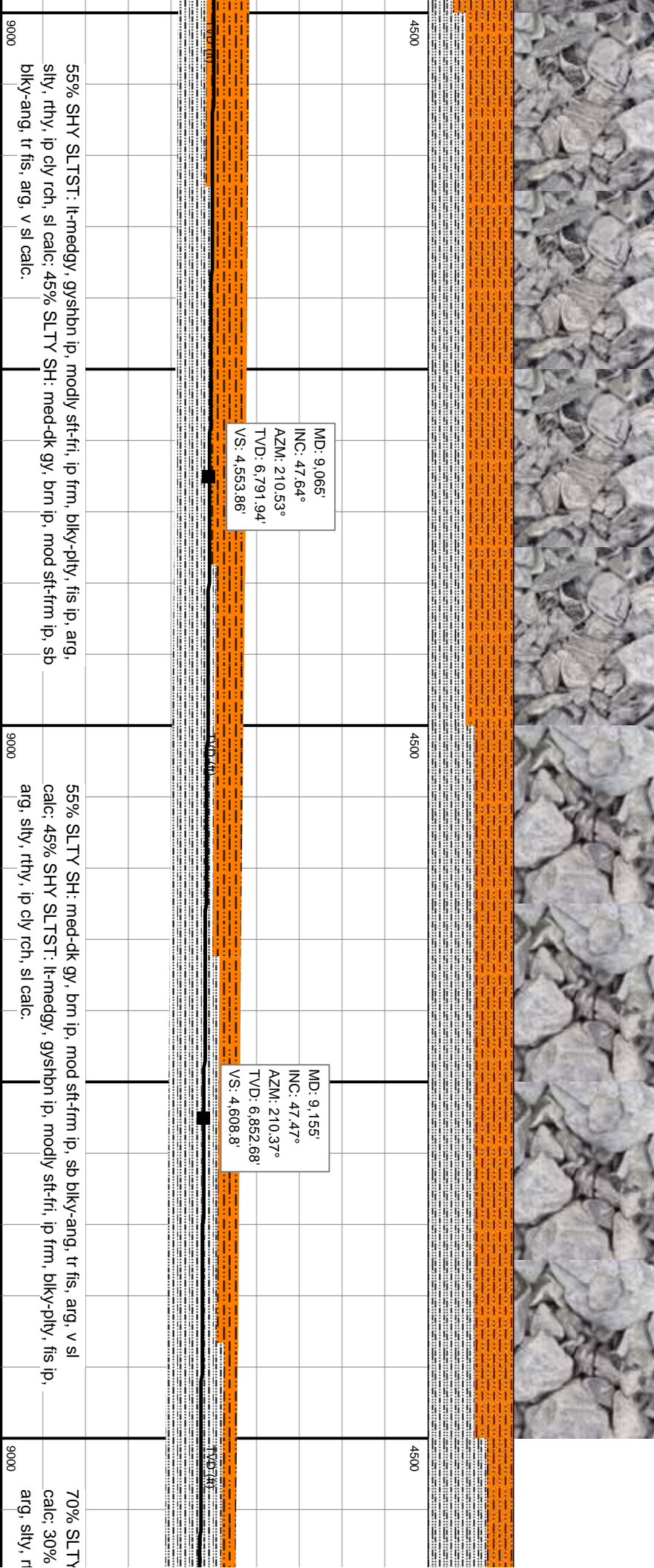
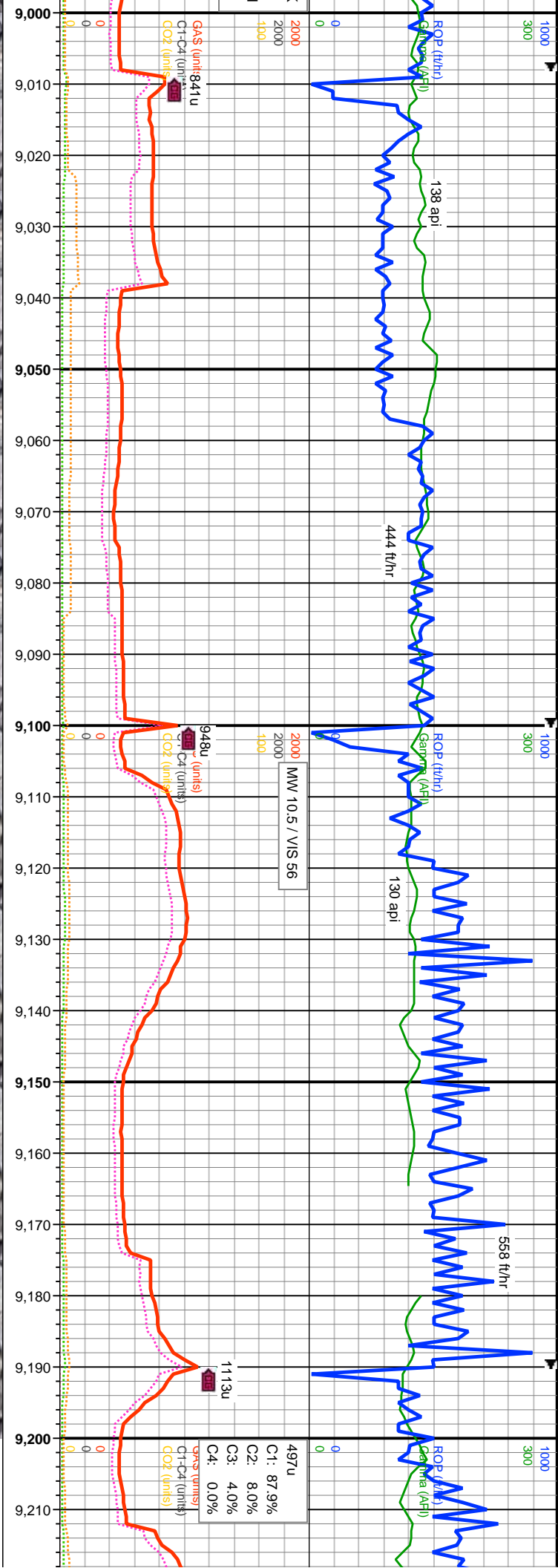


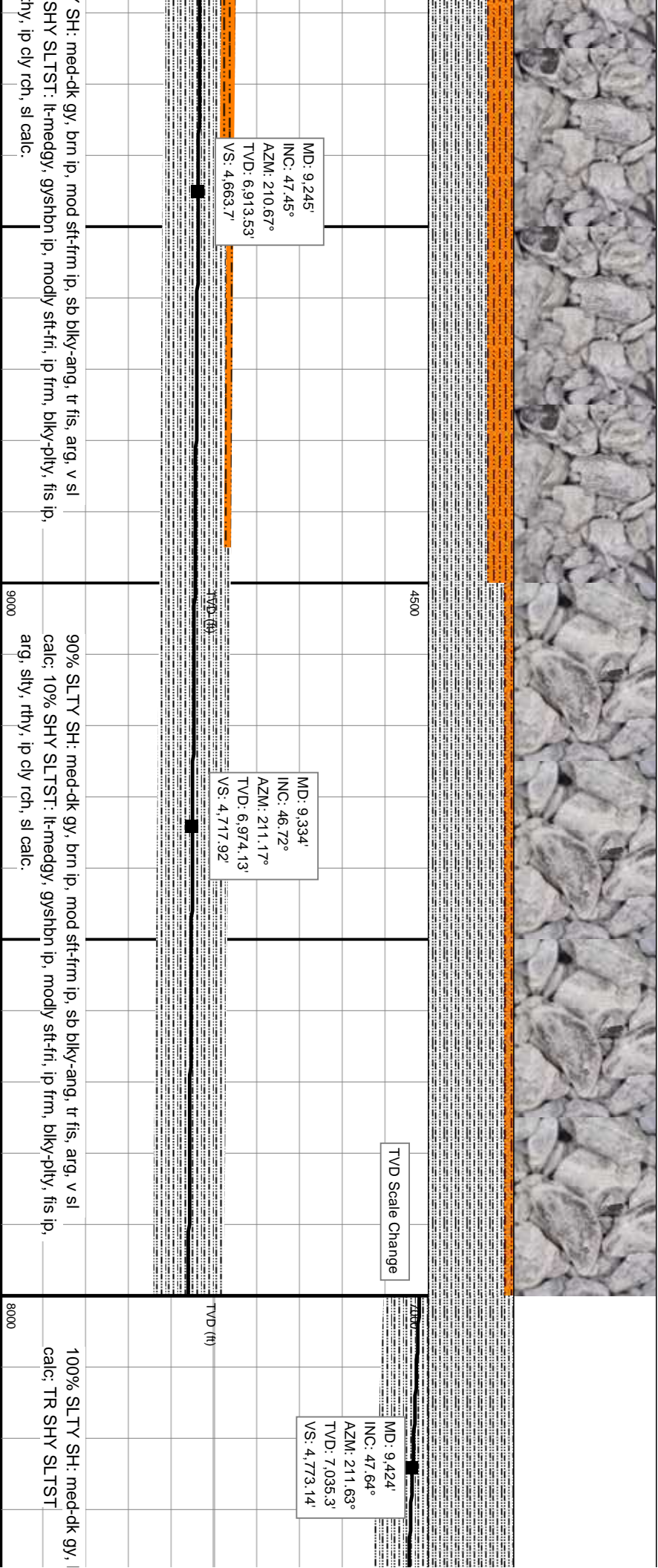
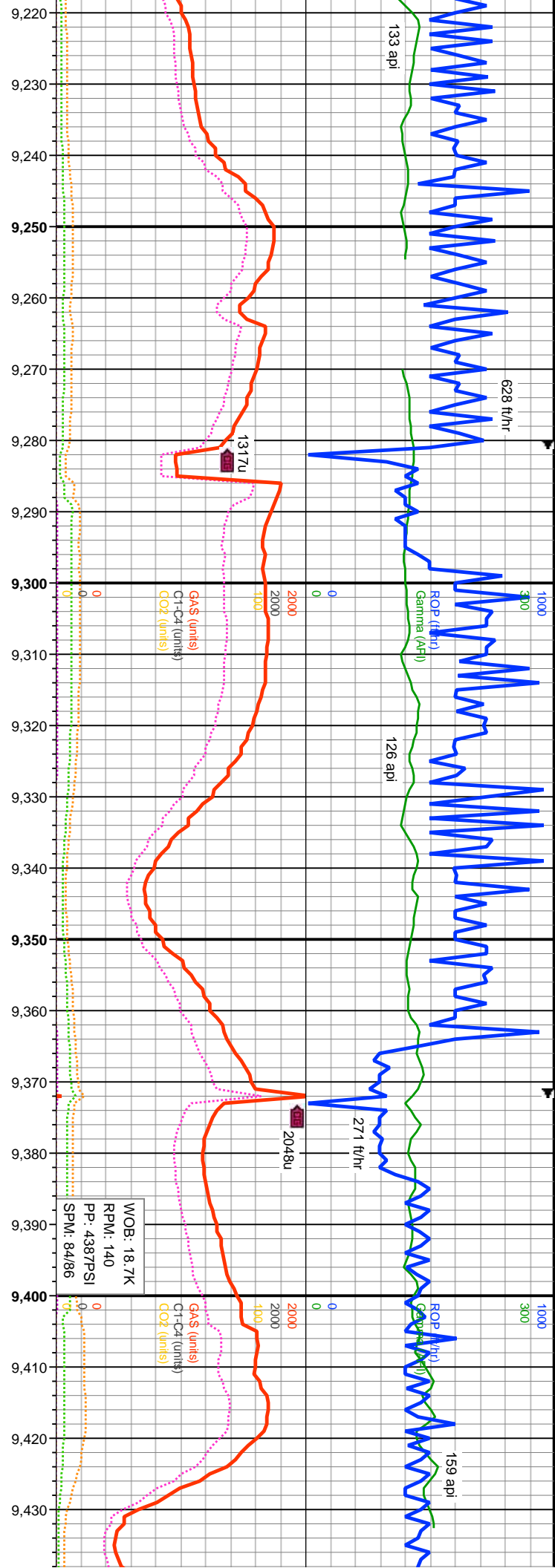


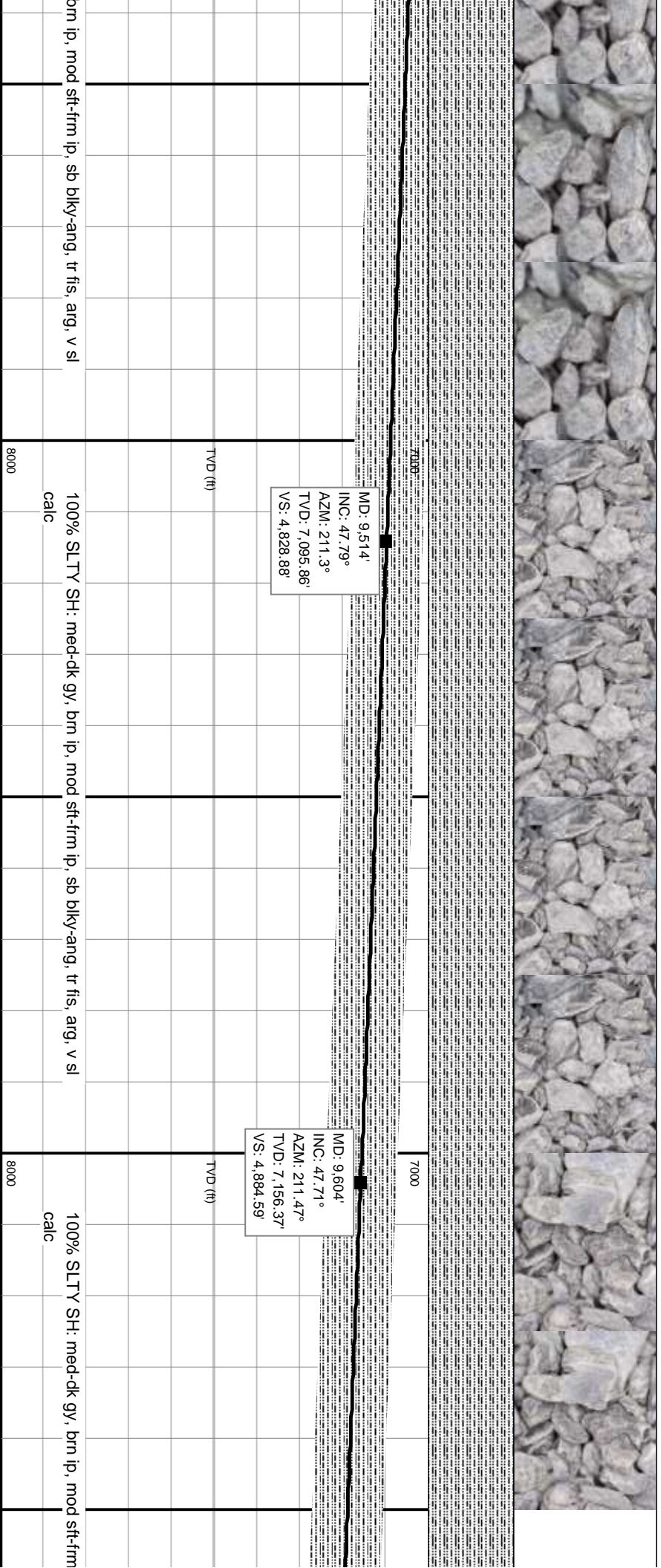
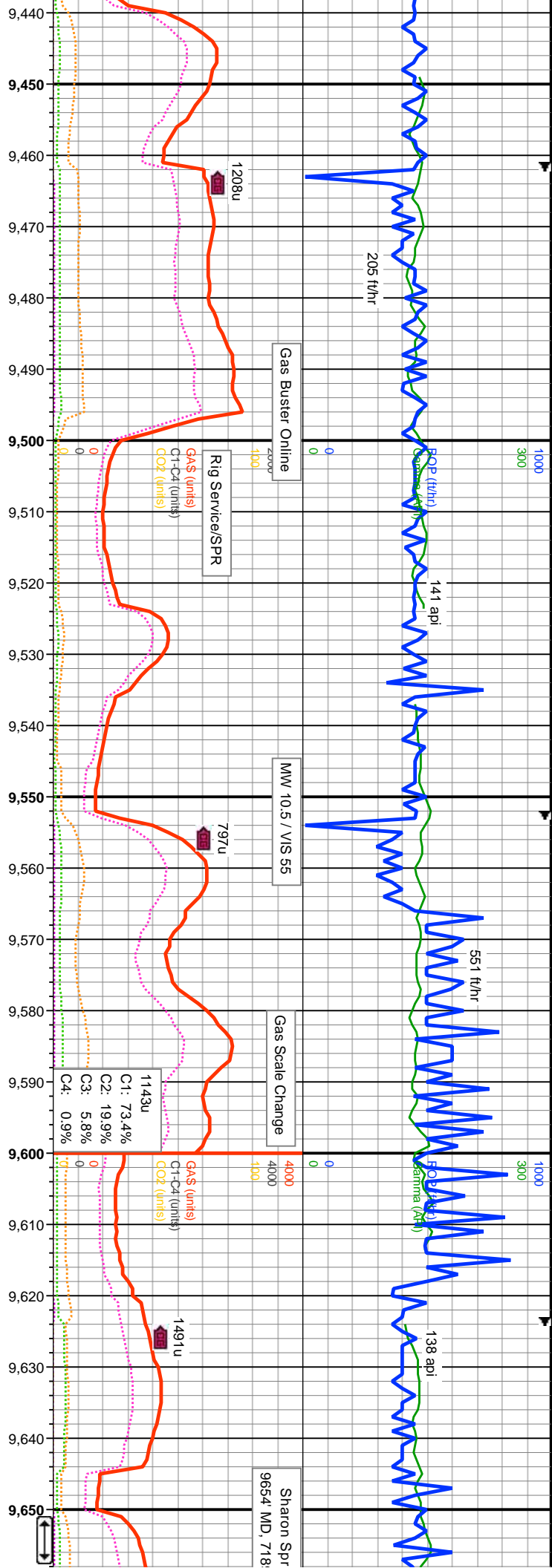


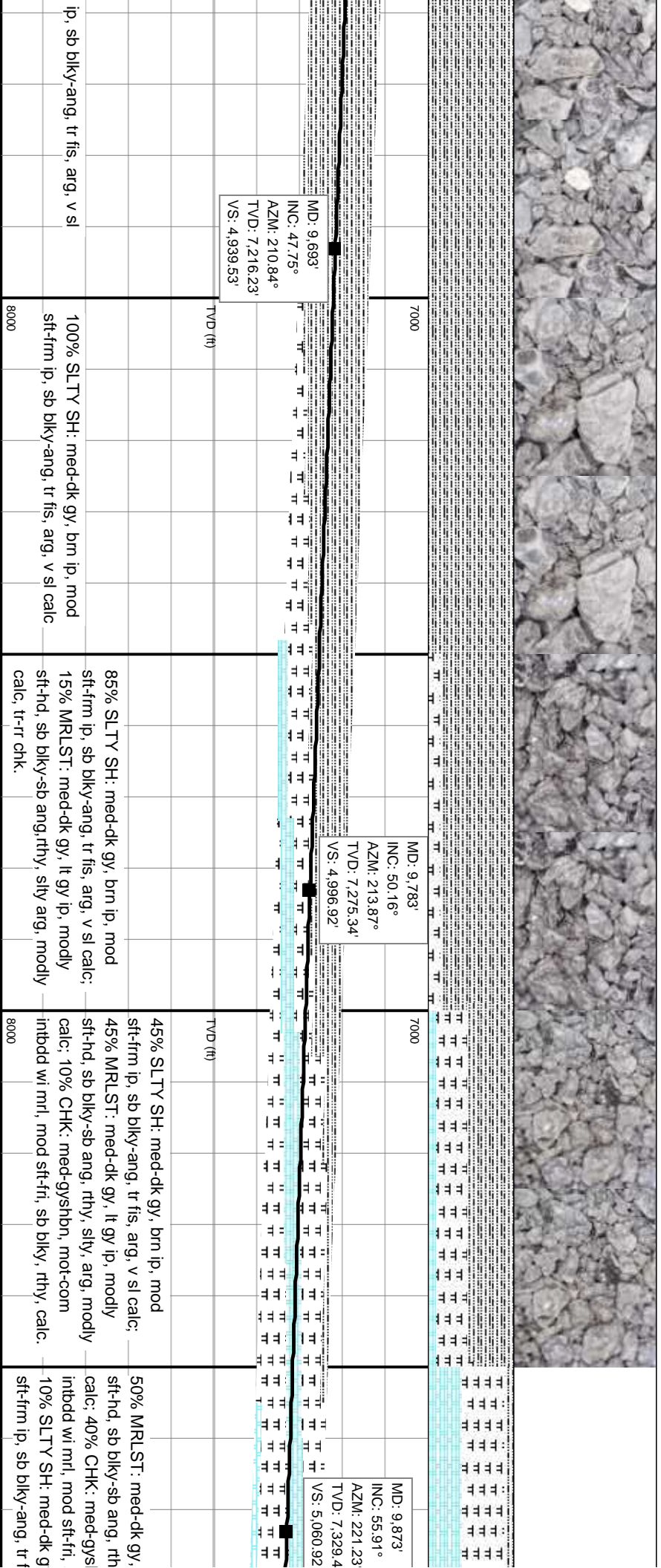
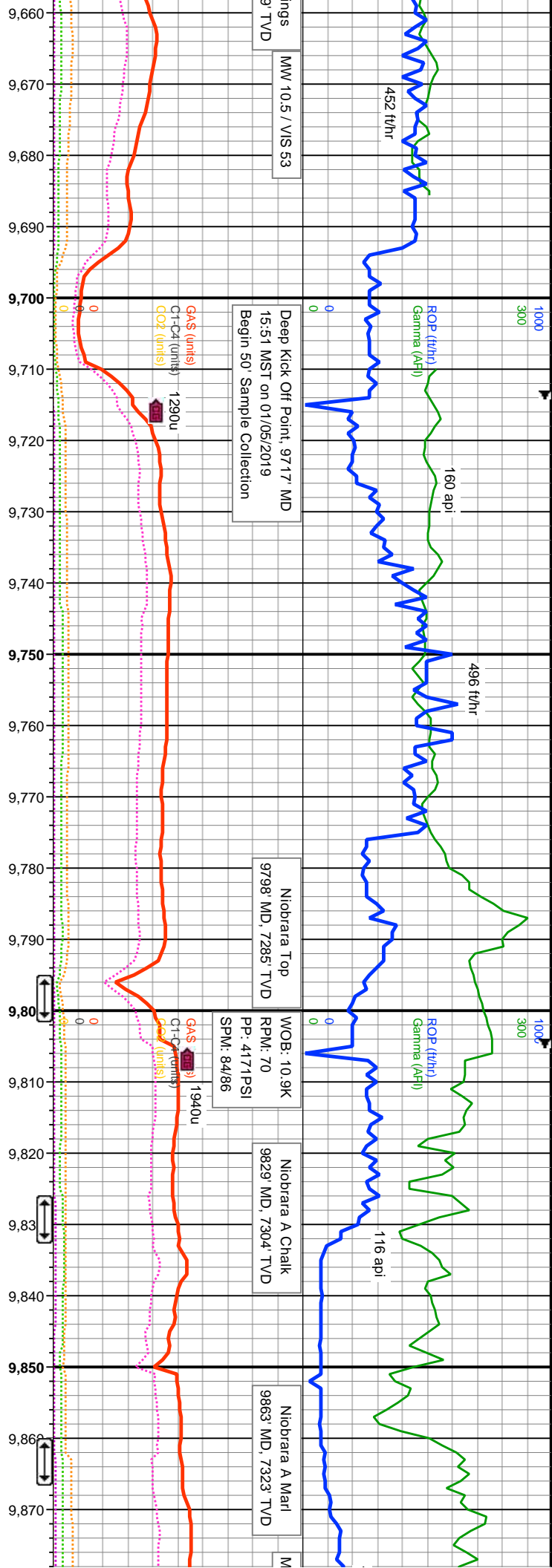
85% SHY SLTST: lt-medgy, gysbhn ip, modly sft-frt, ip frm, blk-y-plty, fis ip, arg, slty, rthy, ip cly rch, sl calc, 15% SLTY SH: med-dk gy, brn ip, mod sft-frm ip, sb blk-y-ang, tr fis, arg, v sl calc.

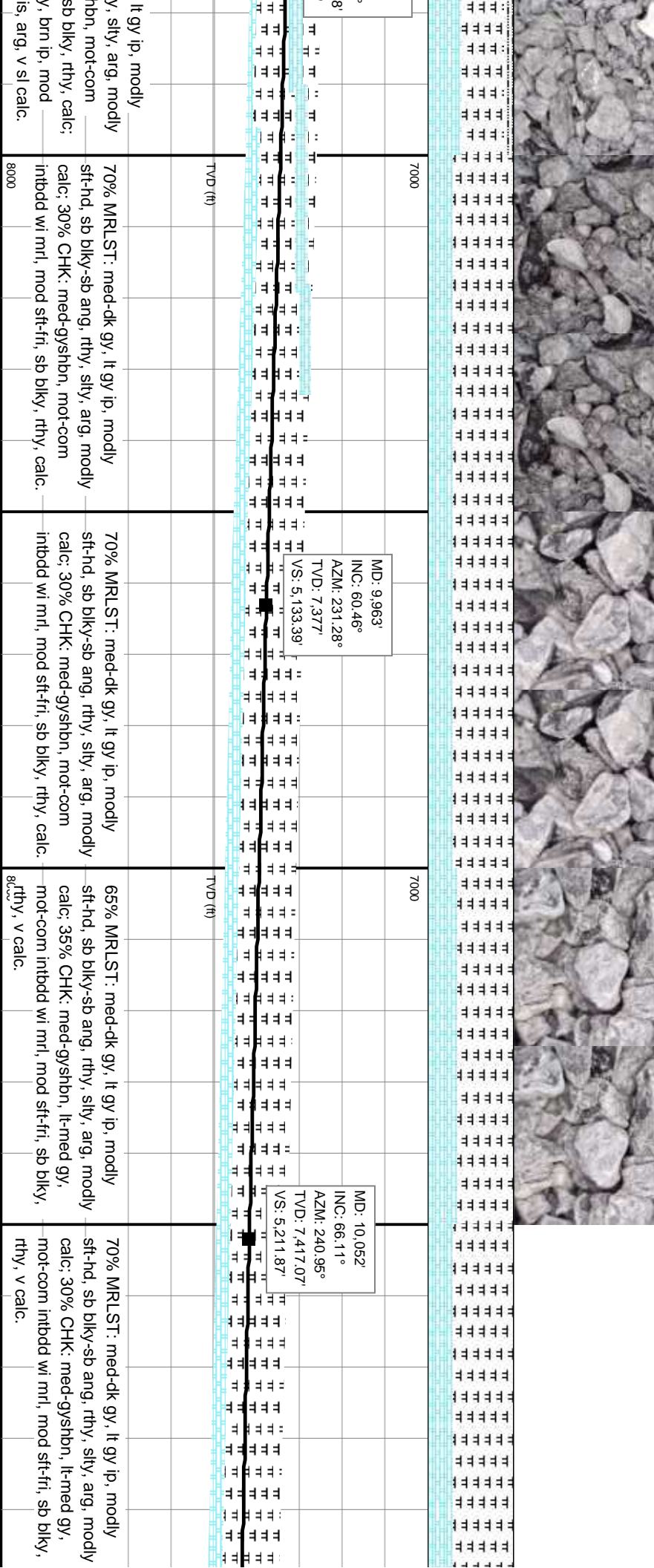
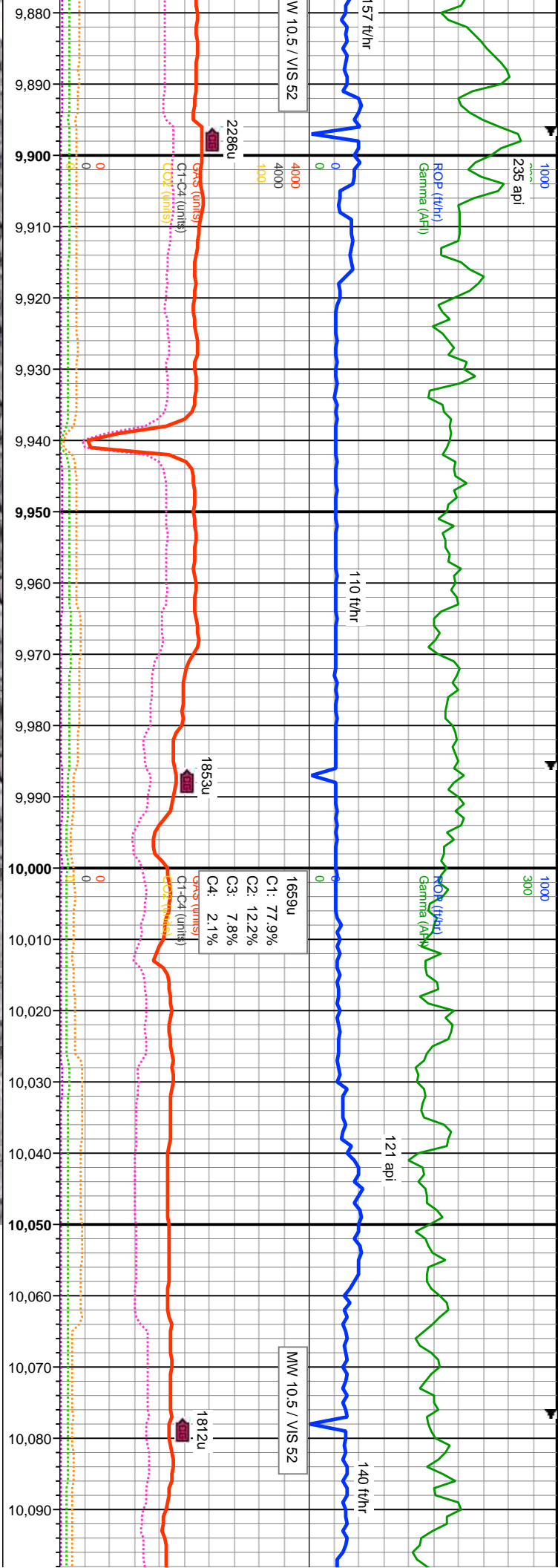
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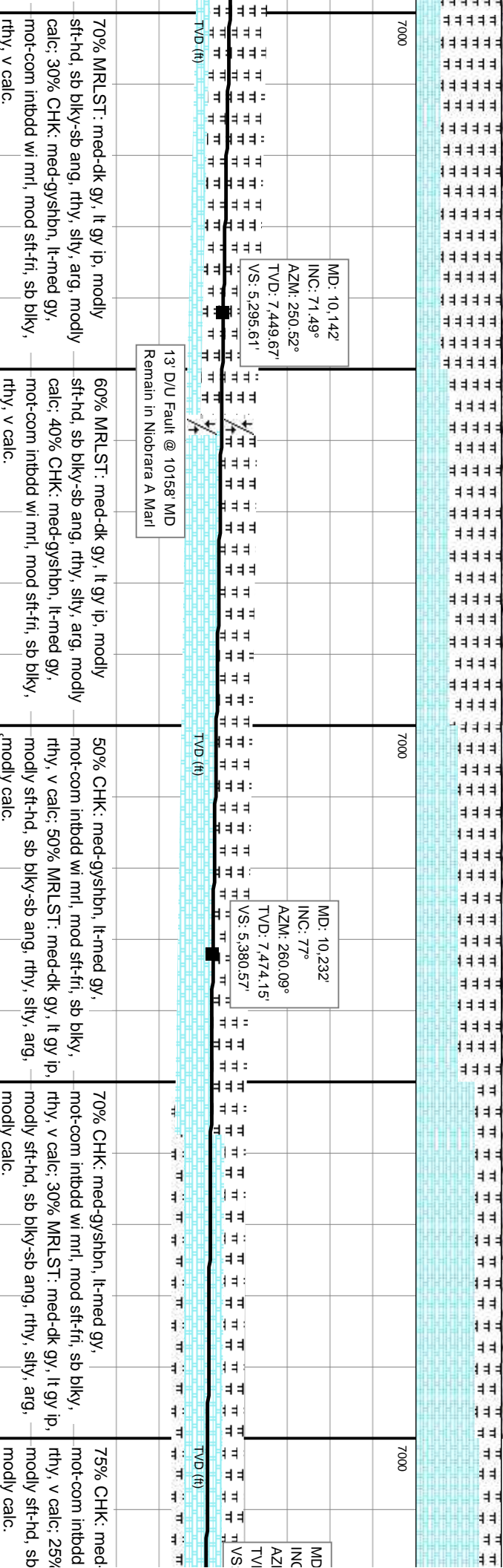
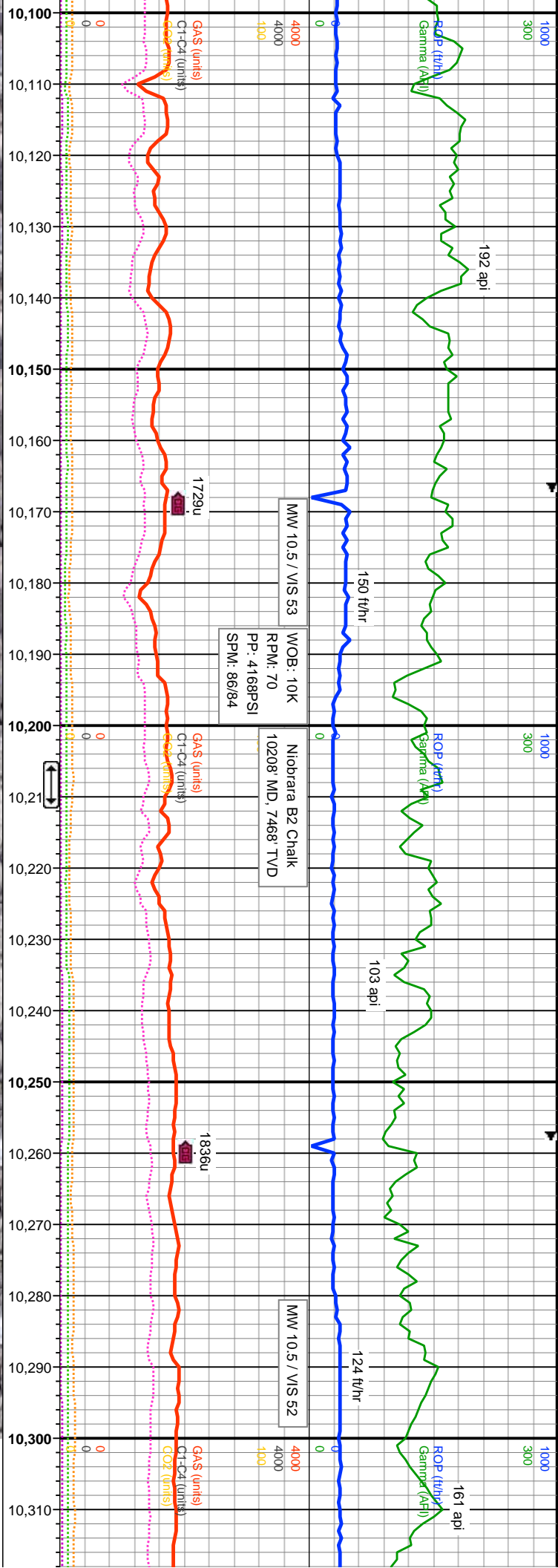


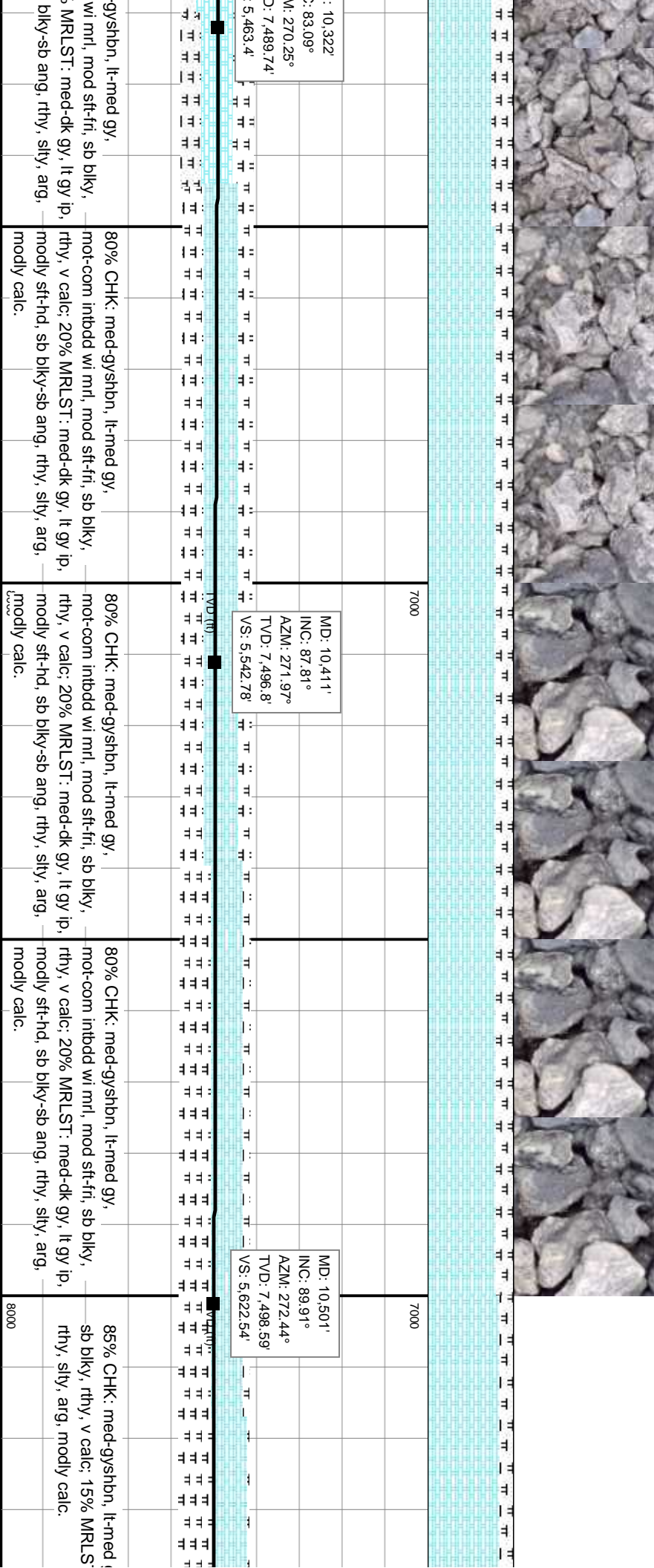
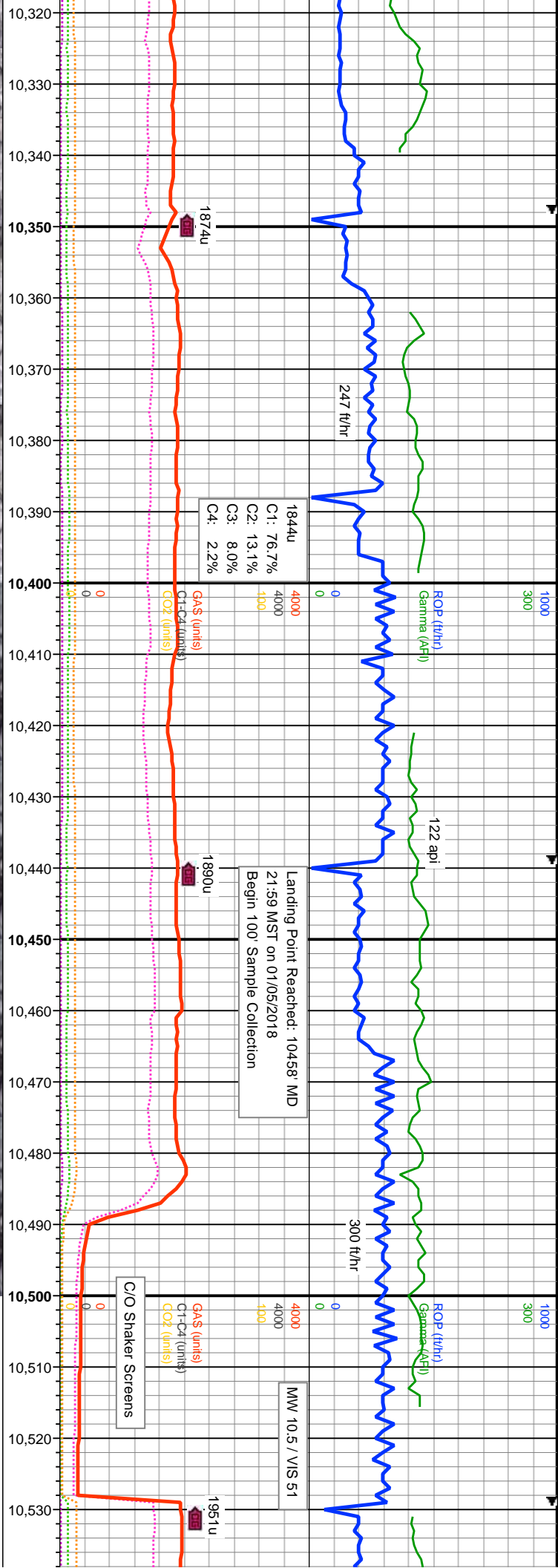


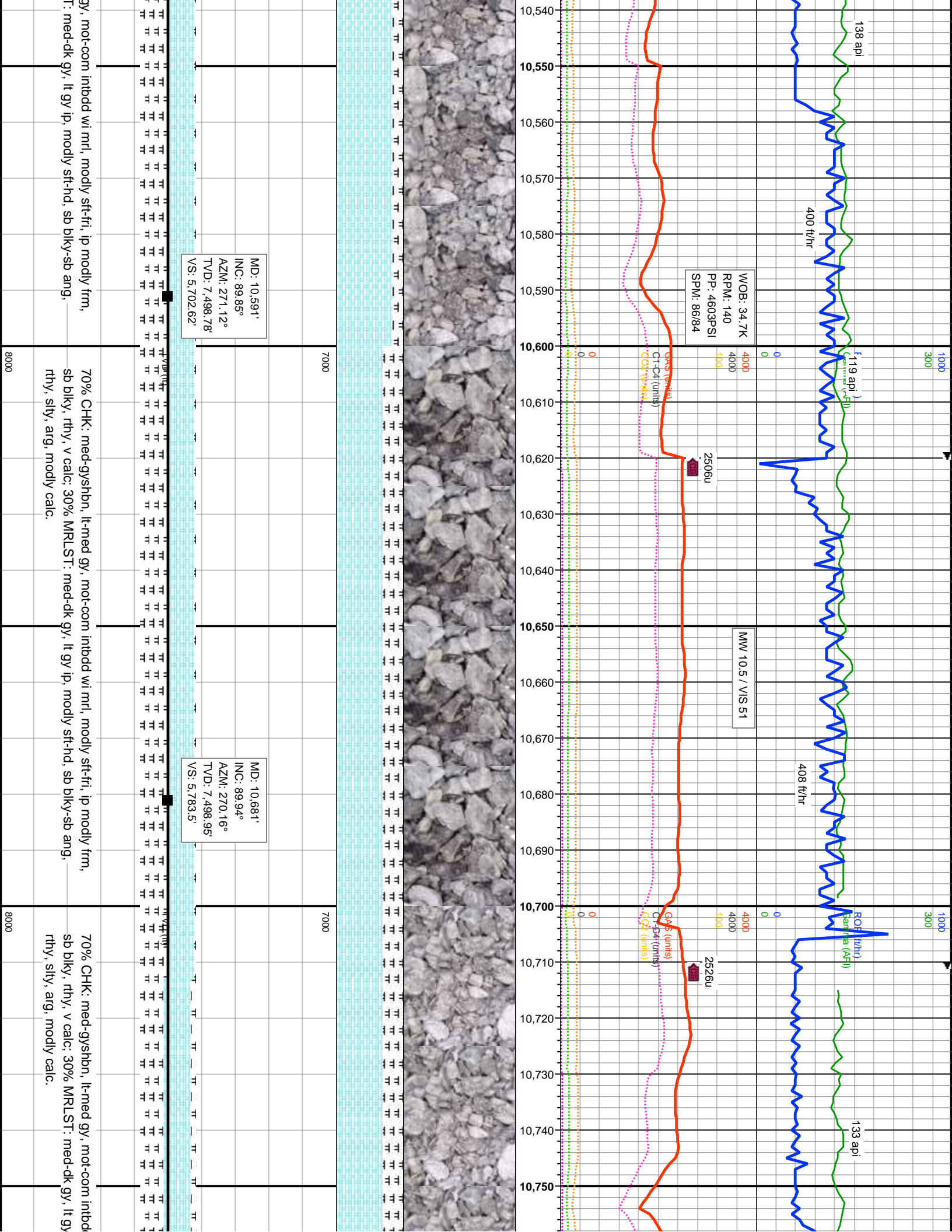


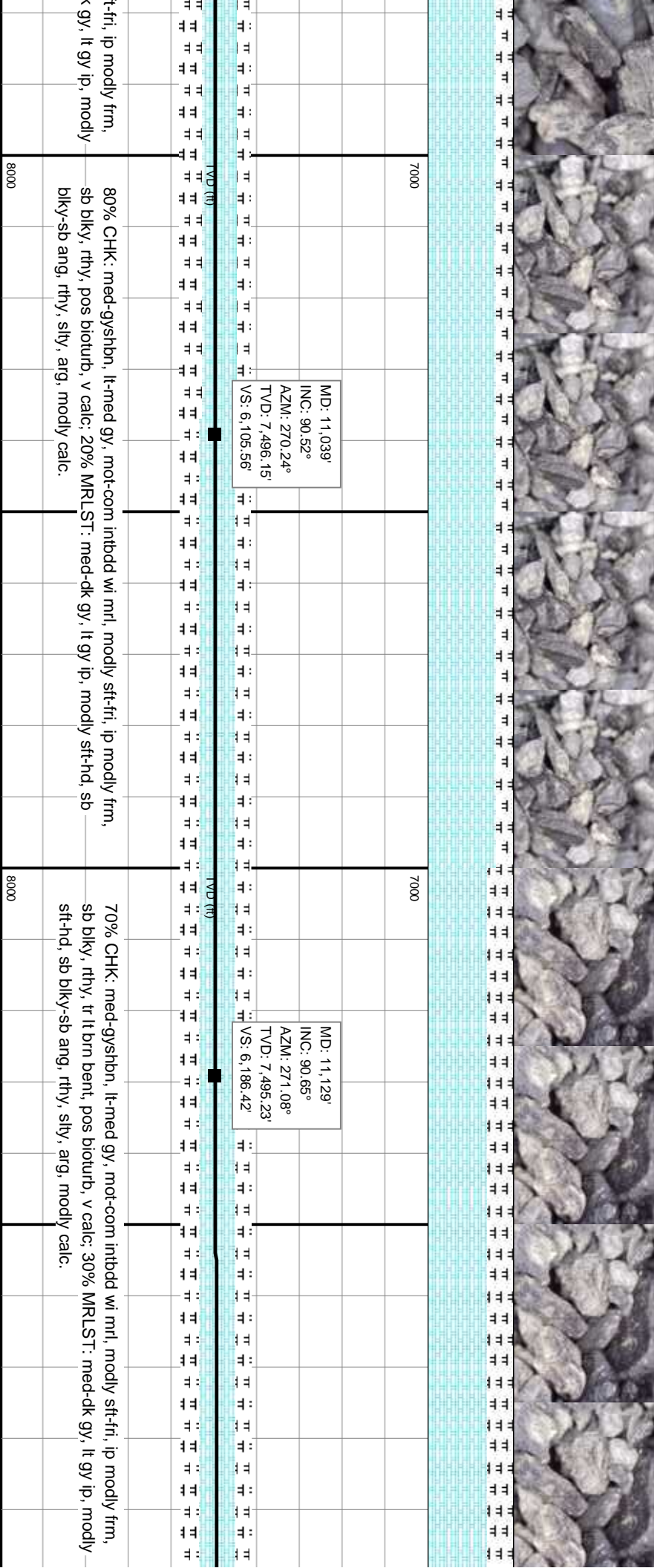
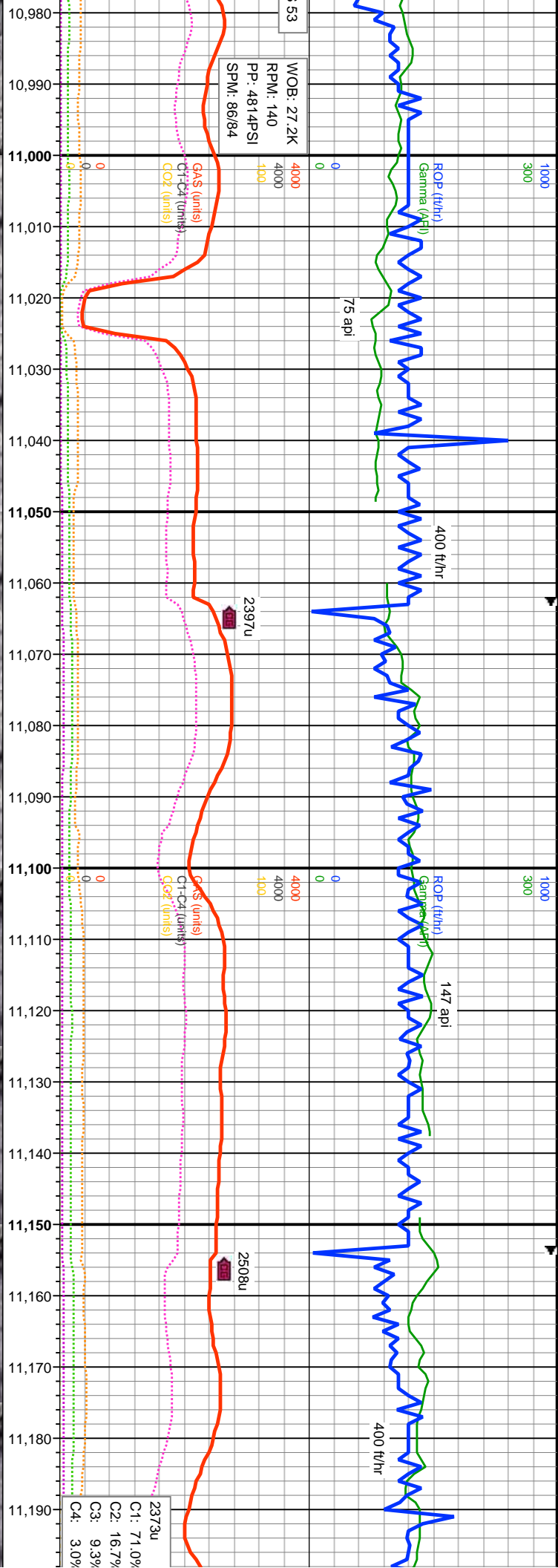


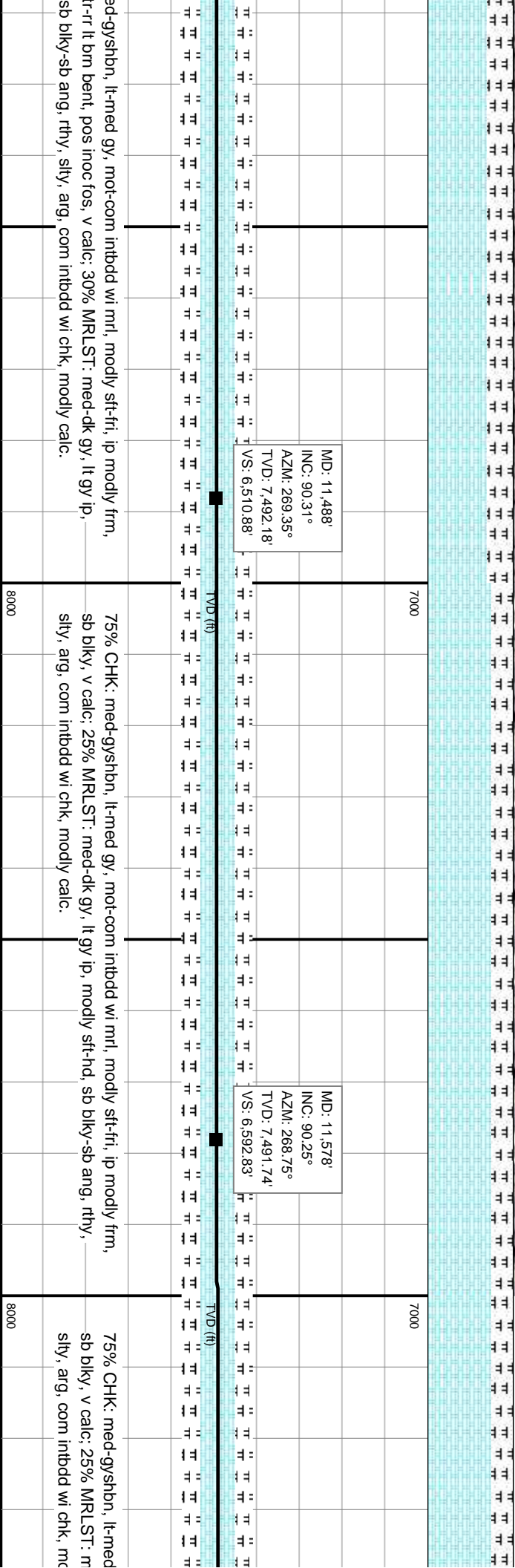
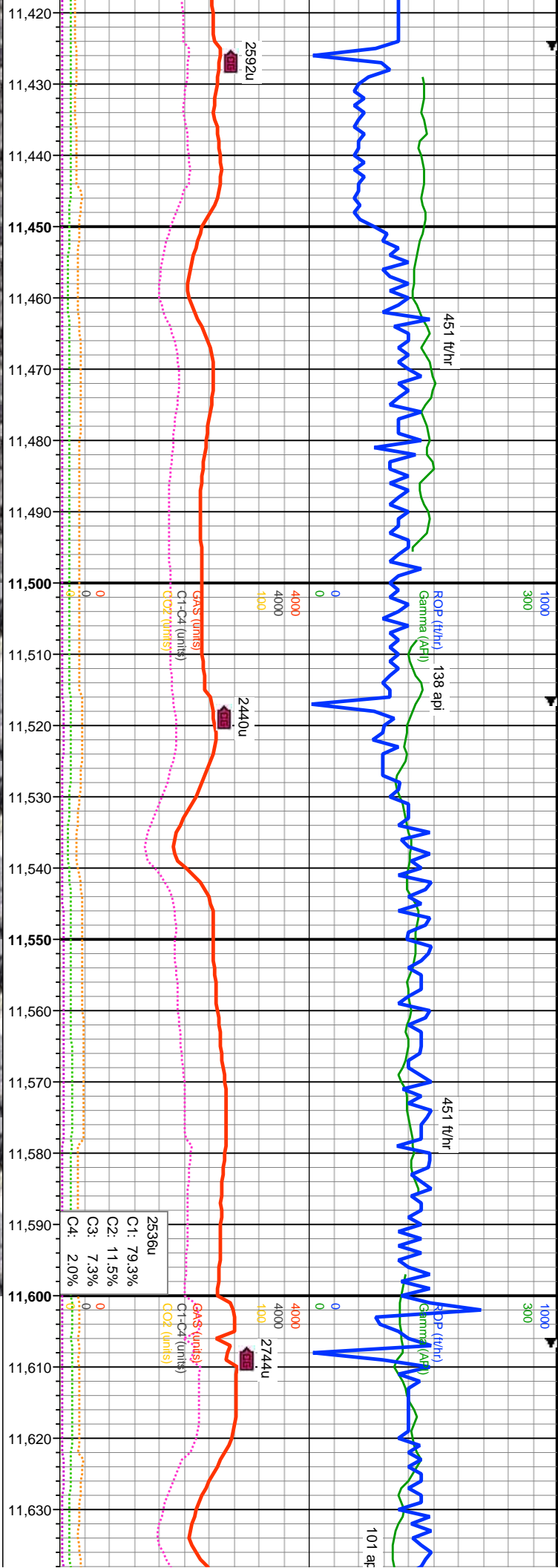


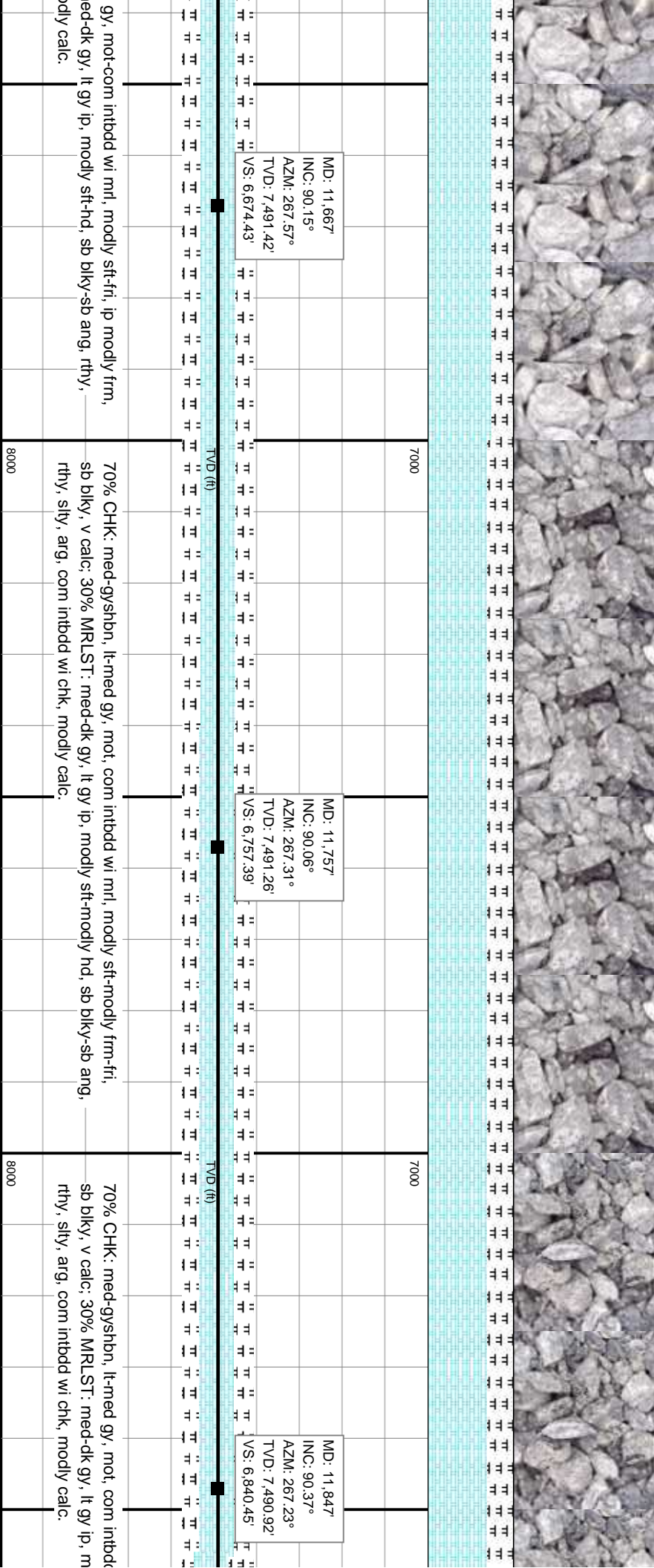
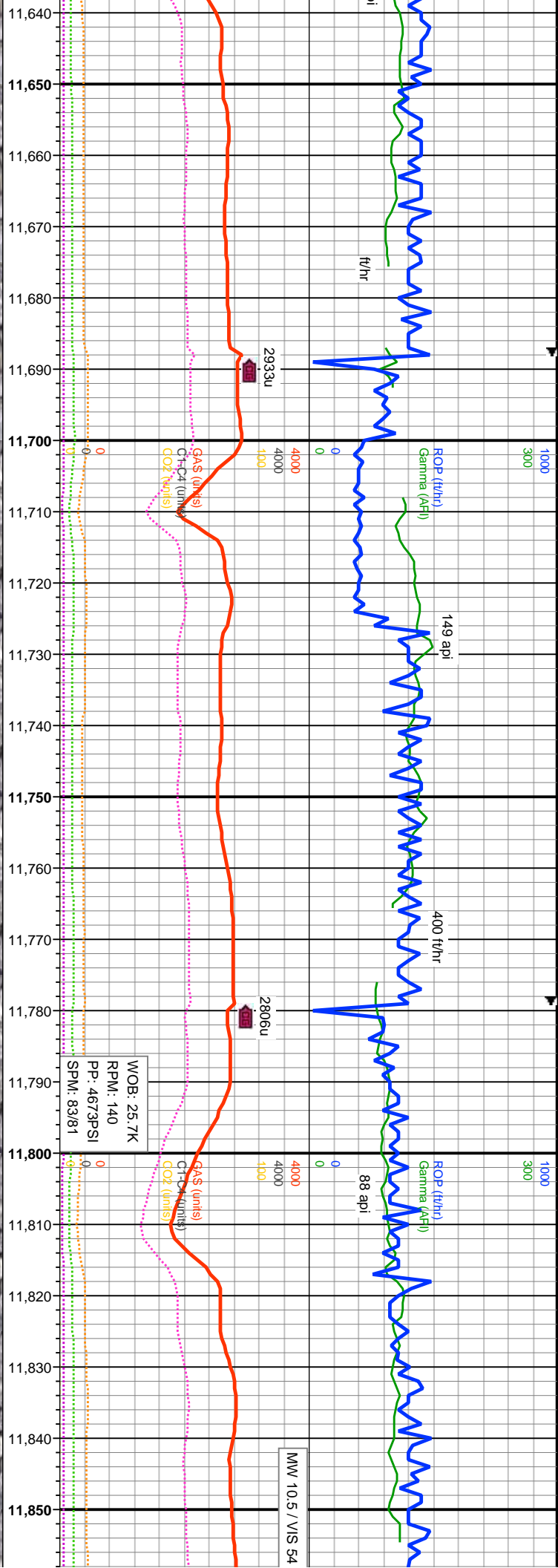


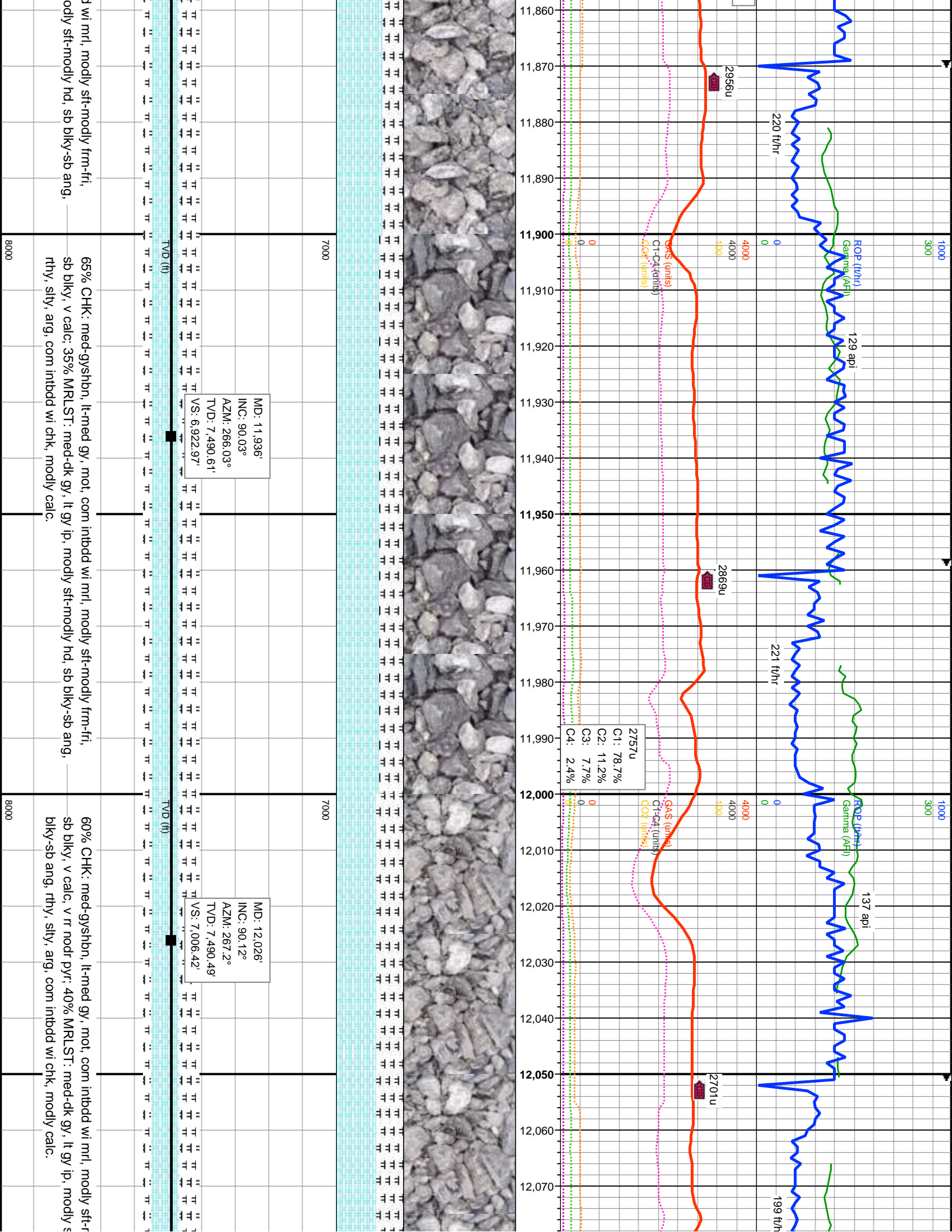


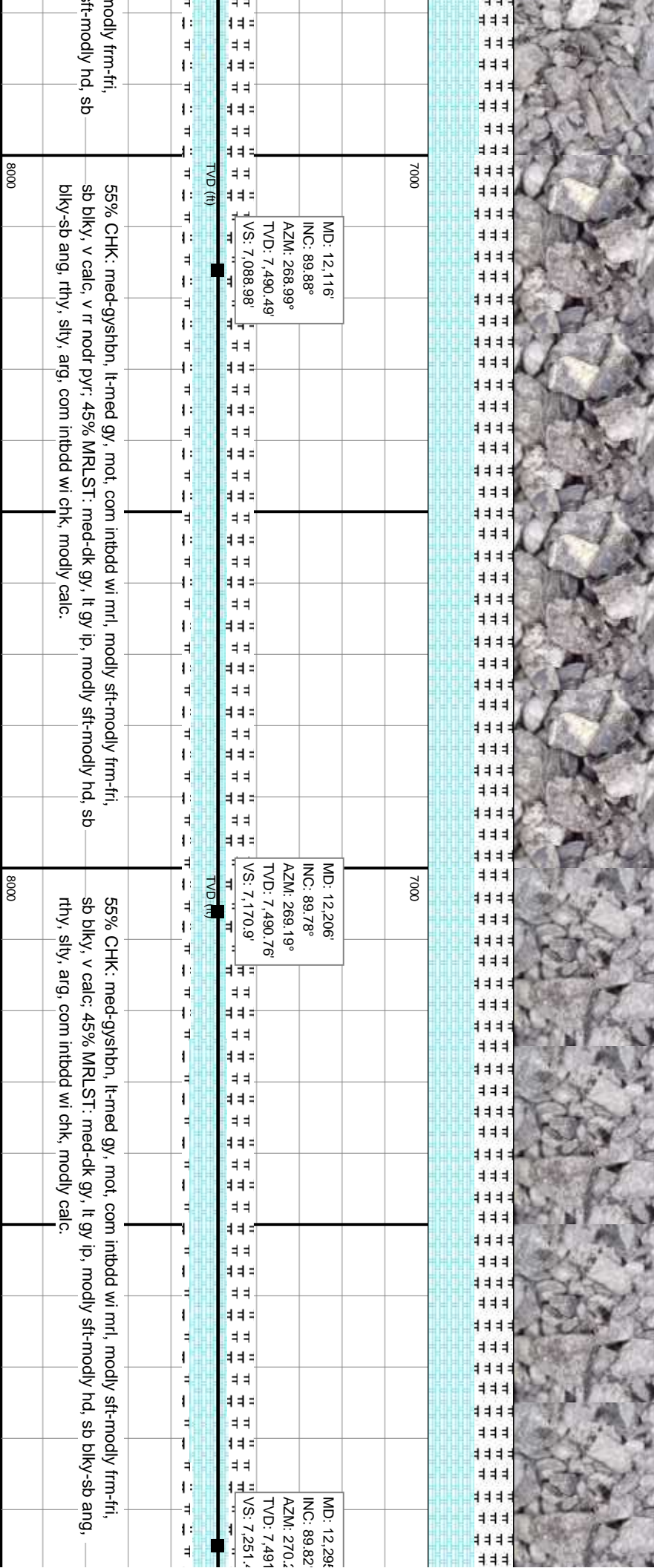
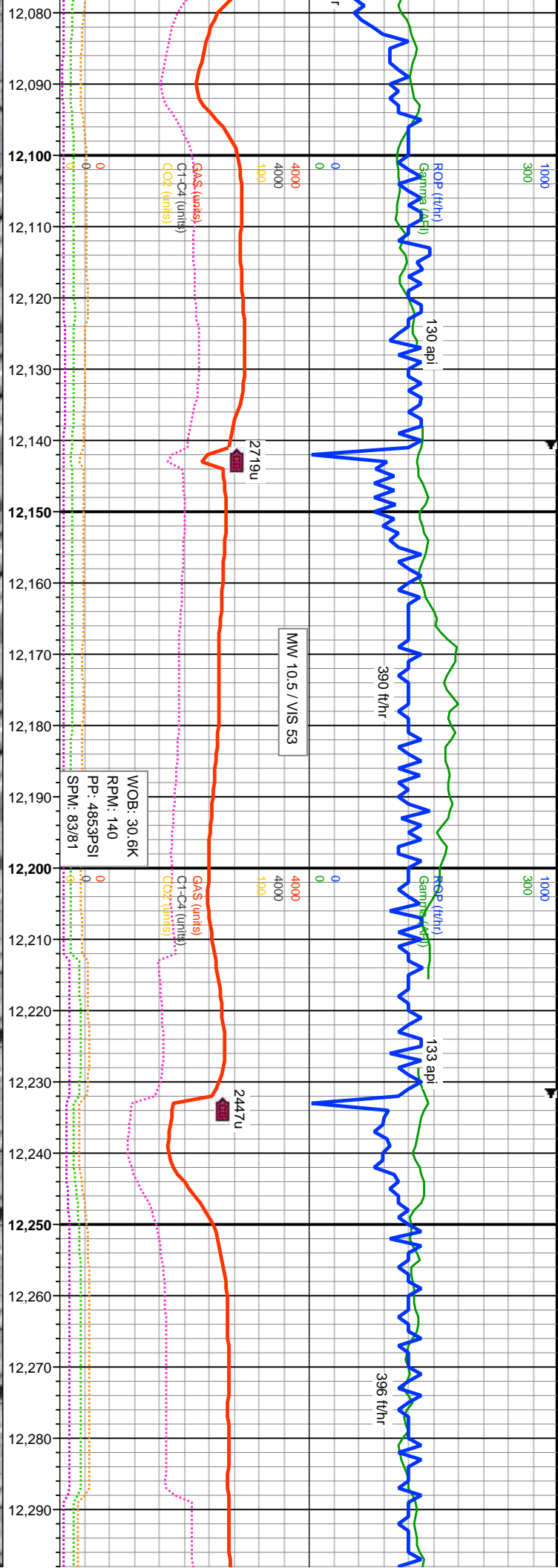


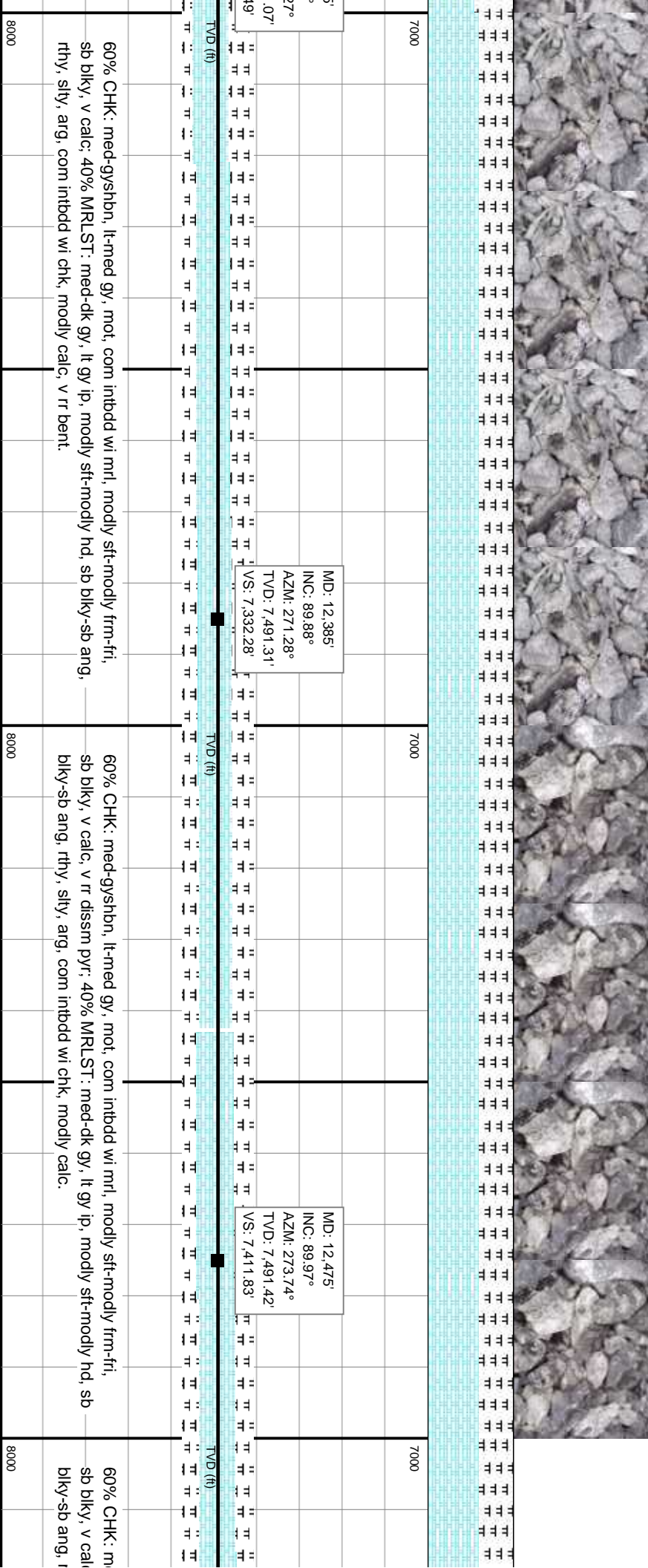
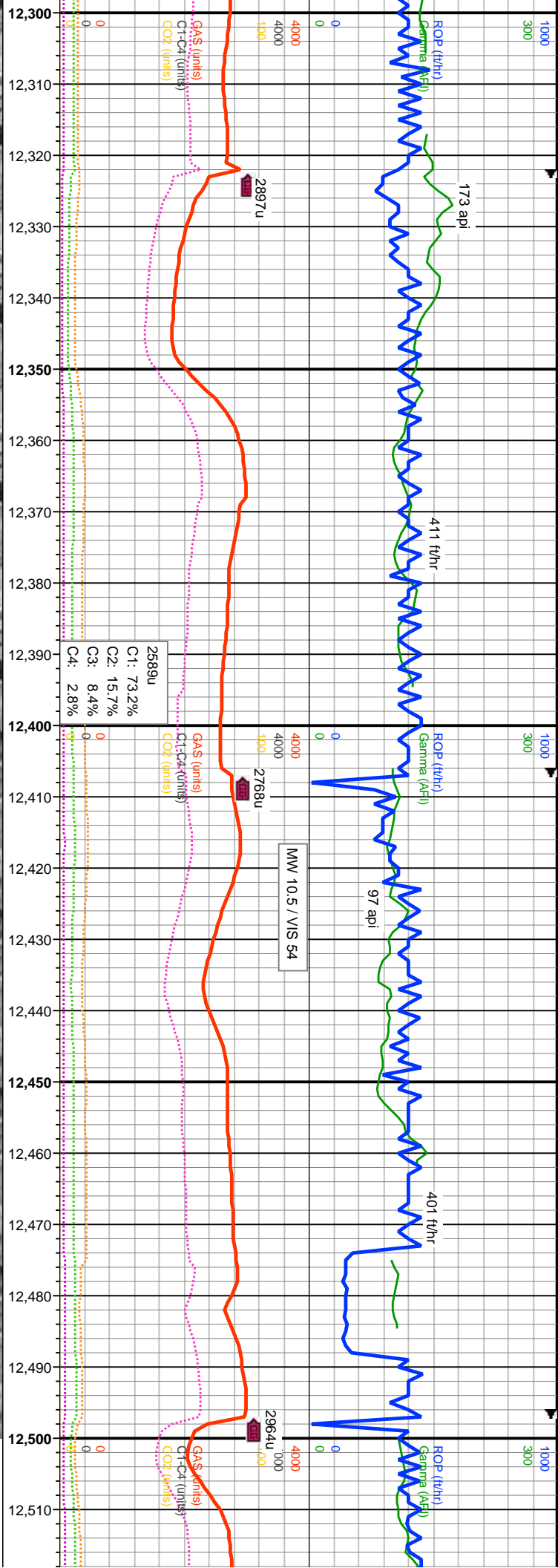


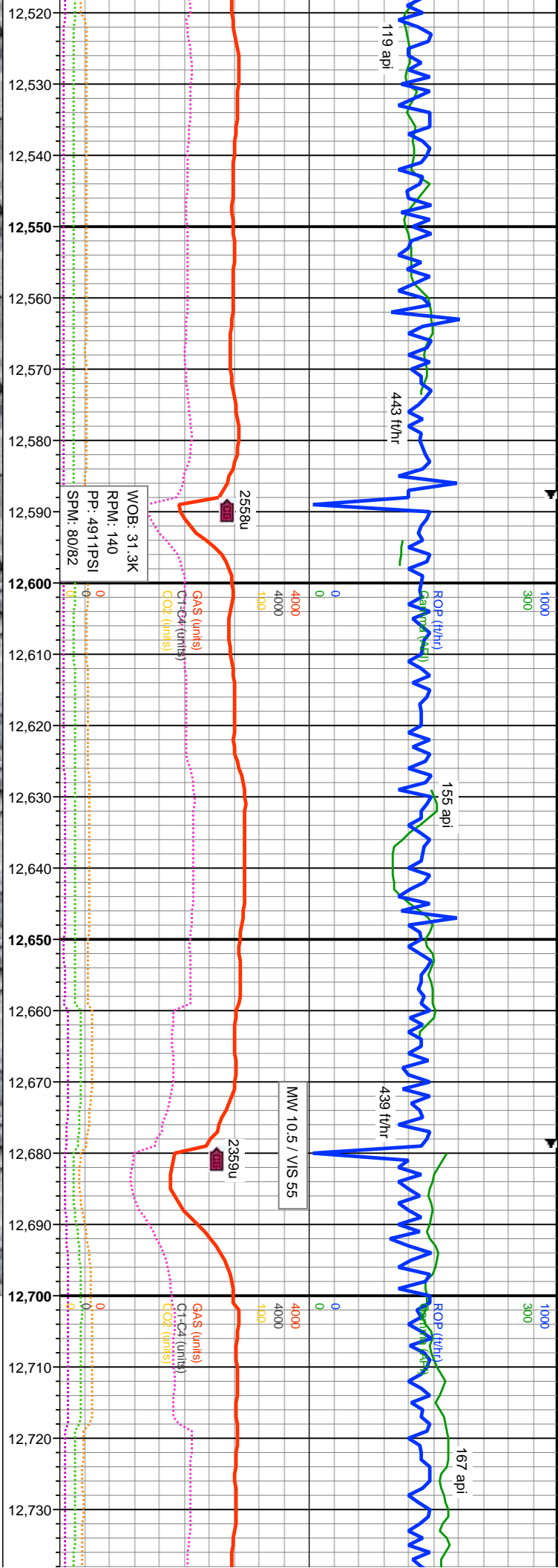




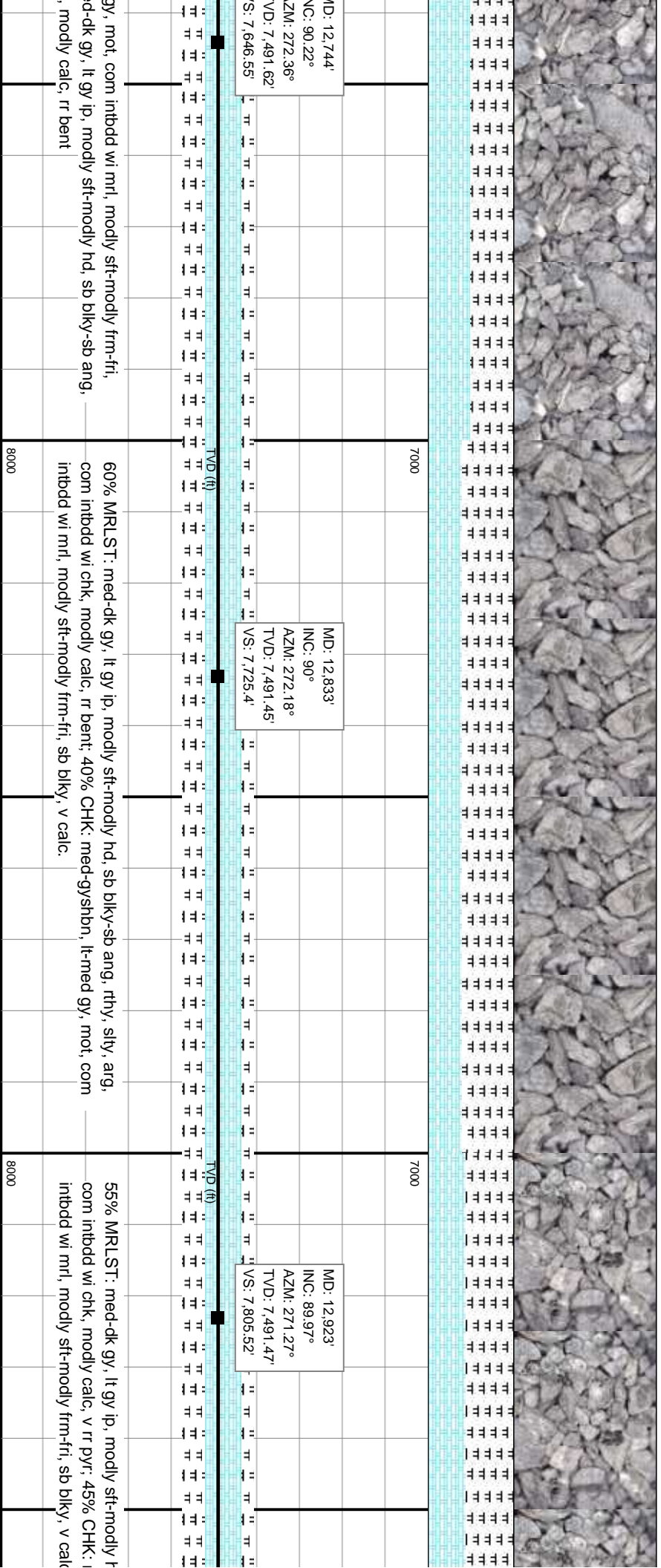
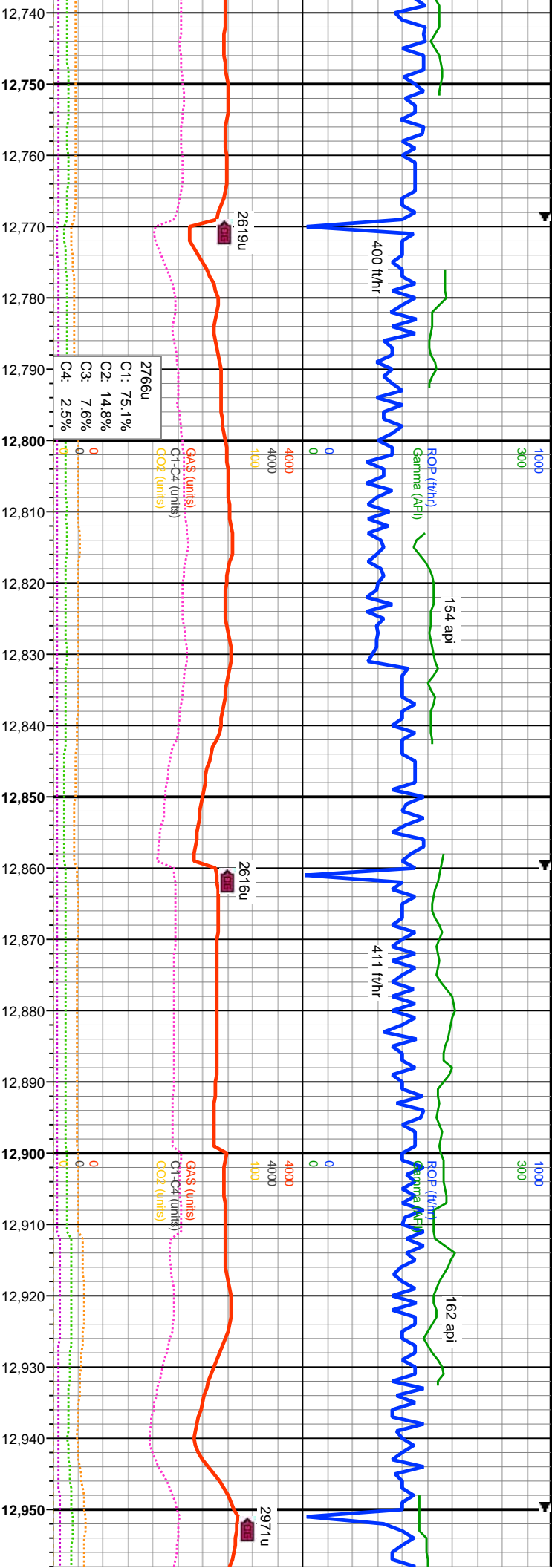


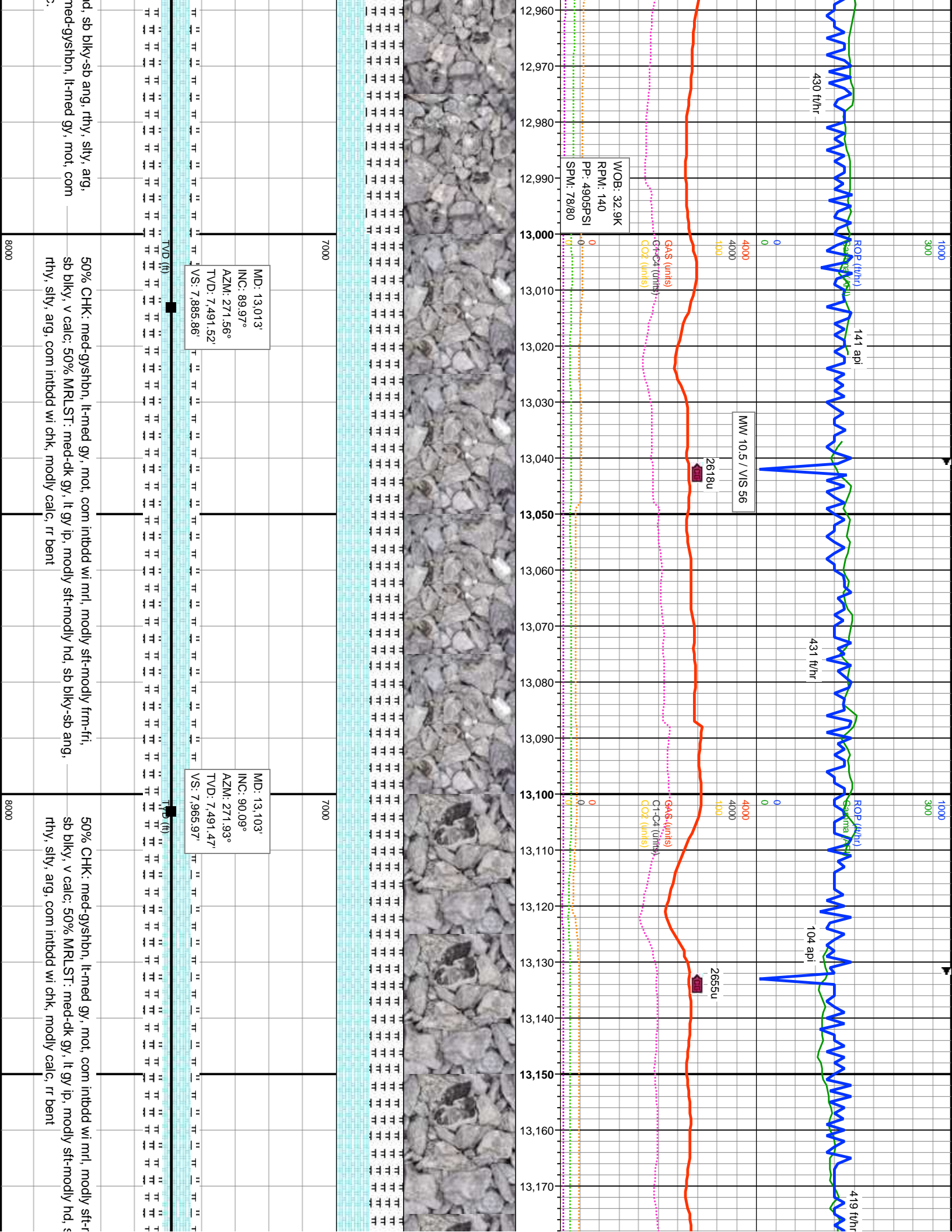


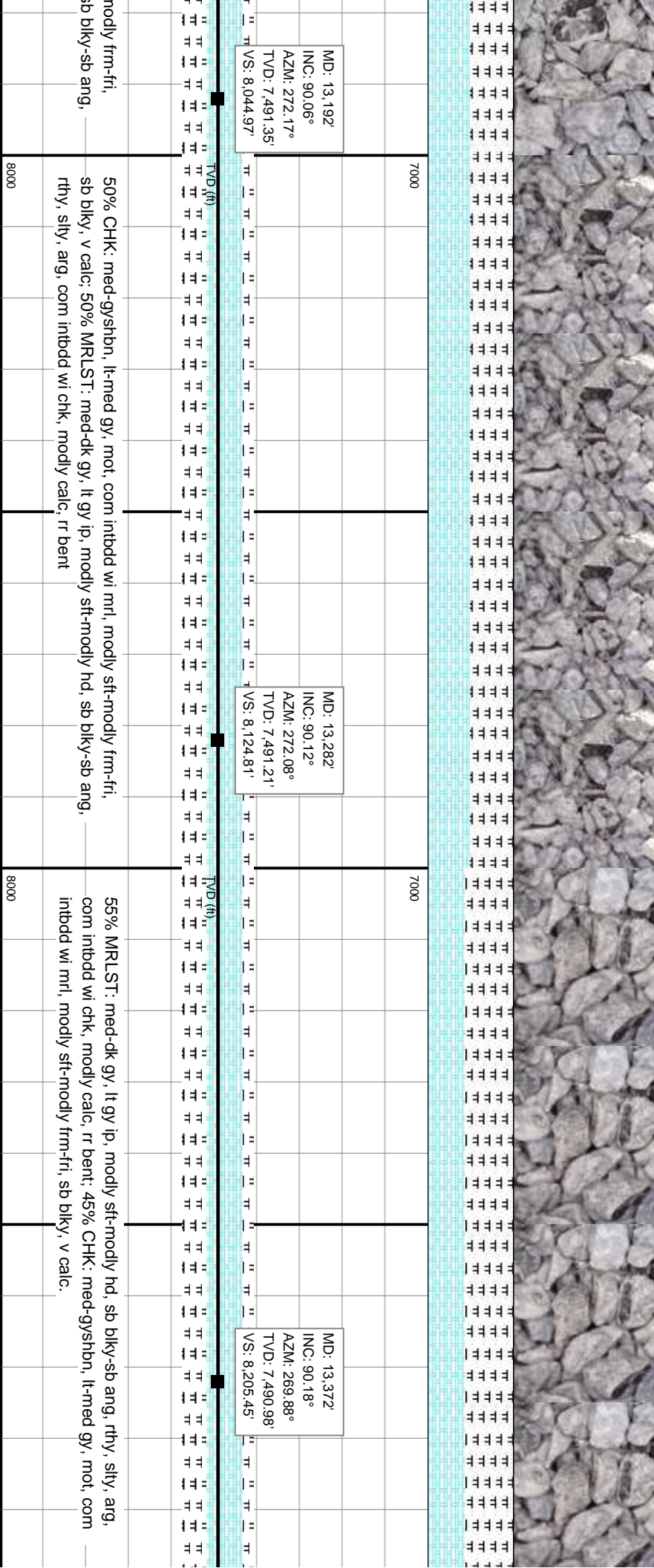
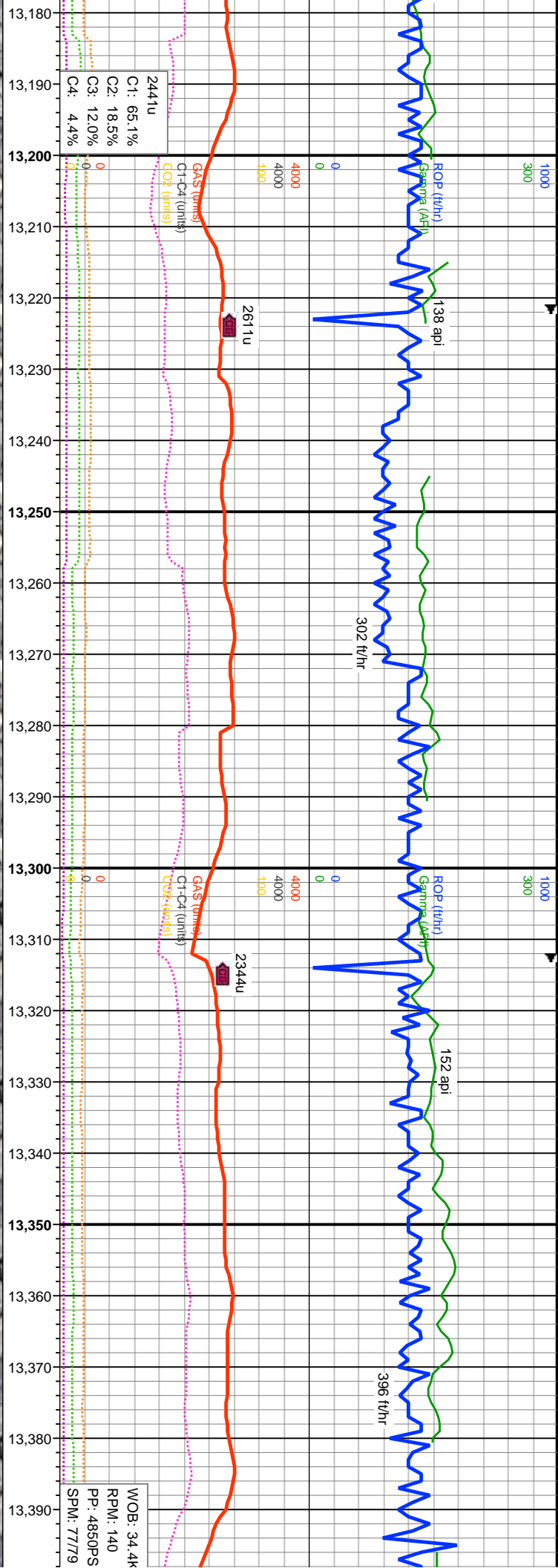


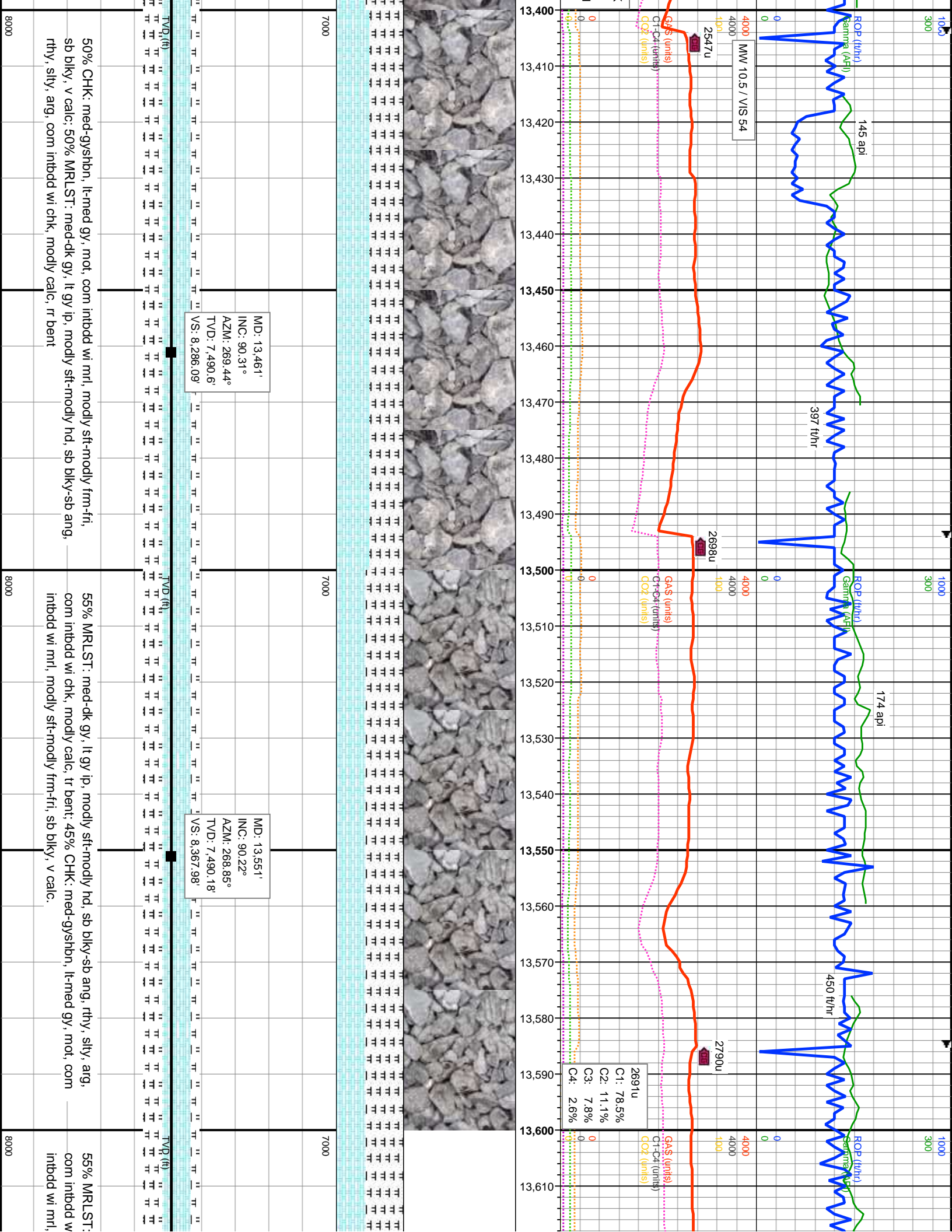


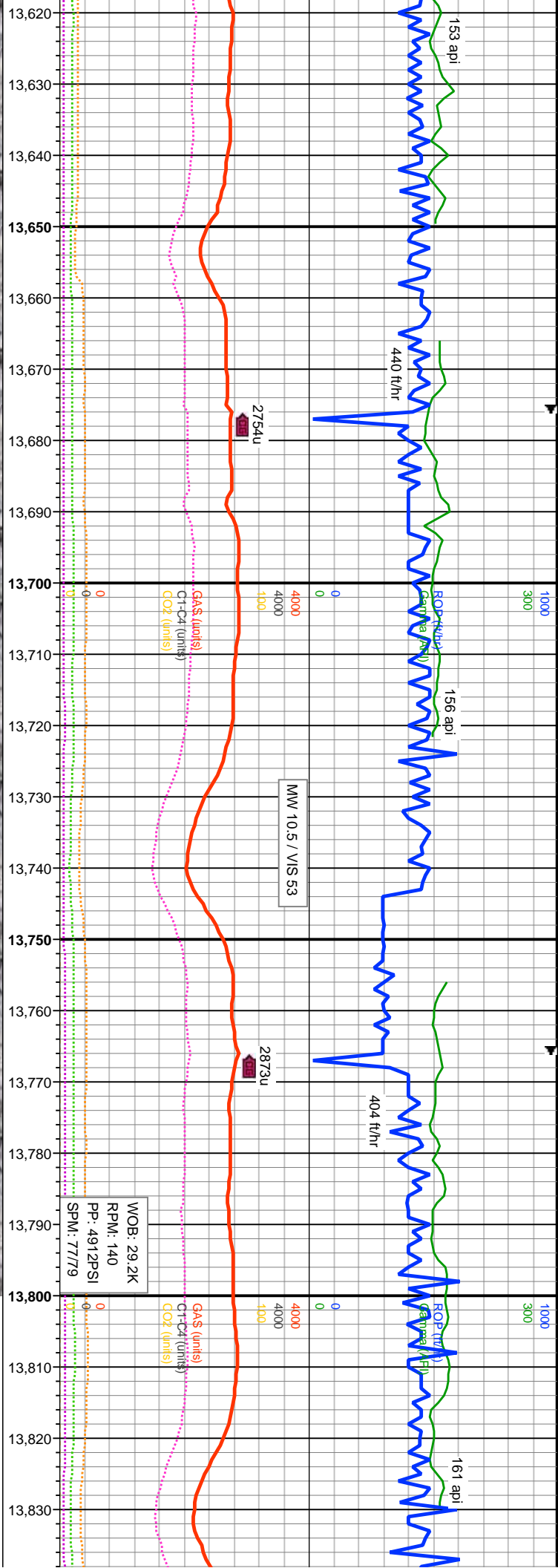
med-gyshbn, lt-med gy, mot, com intbdd wi mrl, modly sft-modly frm-fri, sb blkly, v r r dissm pyr, 40% MRLST: med-dk gy, lt gy ip, modly sft-modly hd, sb blkly-sb ang, rthy, slty, arg, com intbdd wi chk, modly calc.		MD: 12,564' INC: 89.78° AZM: 274.19° TVD: 7,491.62' VS: 7,489.42'		7000		8000	
55% CHK: med-gyshbn, lt-med gy, mot, com intbdd wi mrl, modly sft-modly frm-fri, sb blkly, v r r dissm pyr, 45% MRLST: med-dk gy, lt gy ip, modly sft-modly hd, sb blkly-sb ang, rthy, slty, arg, com intbdd wi chk, modly calc, r r bent		MD: 12,654' INC: 90° AZM: 274.36° TVD: 7,491.79' VS: 7,567.64'		7000		8000	
50% CHK: med-gyshbn, lt-med gy, mot, com intbdd wi mrl, modly sft-modly frm-fri, sb blkly, v r r dissm pyr, 50% MRLST: med-dk gy, lt gy ip, modly sft-modly hd, sb blkly-sb ang, rthy, slty, arg, com intbdd wi chk, modly calc		MD: 12,654' INC: 90° AZM: 274.36° TVD: 7,491.79' VS: 7,567.64'		7000		8000	









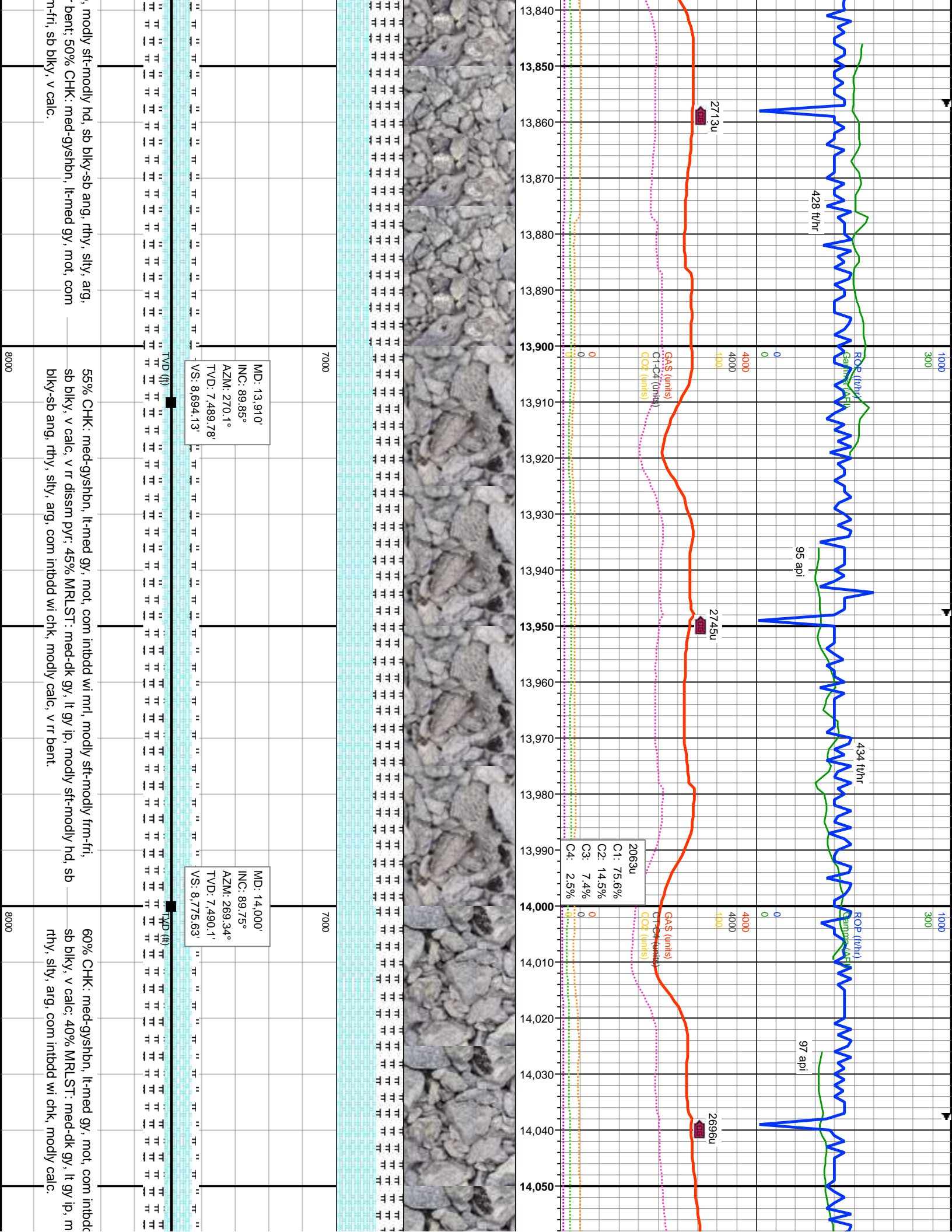


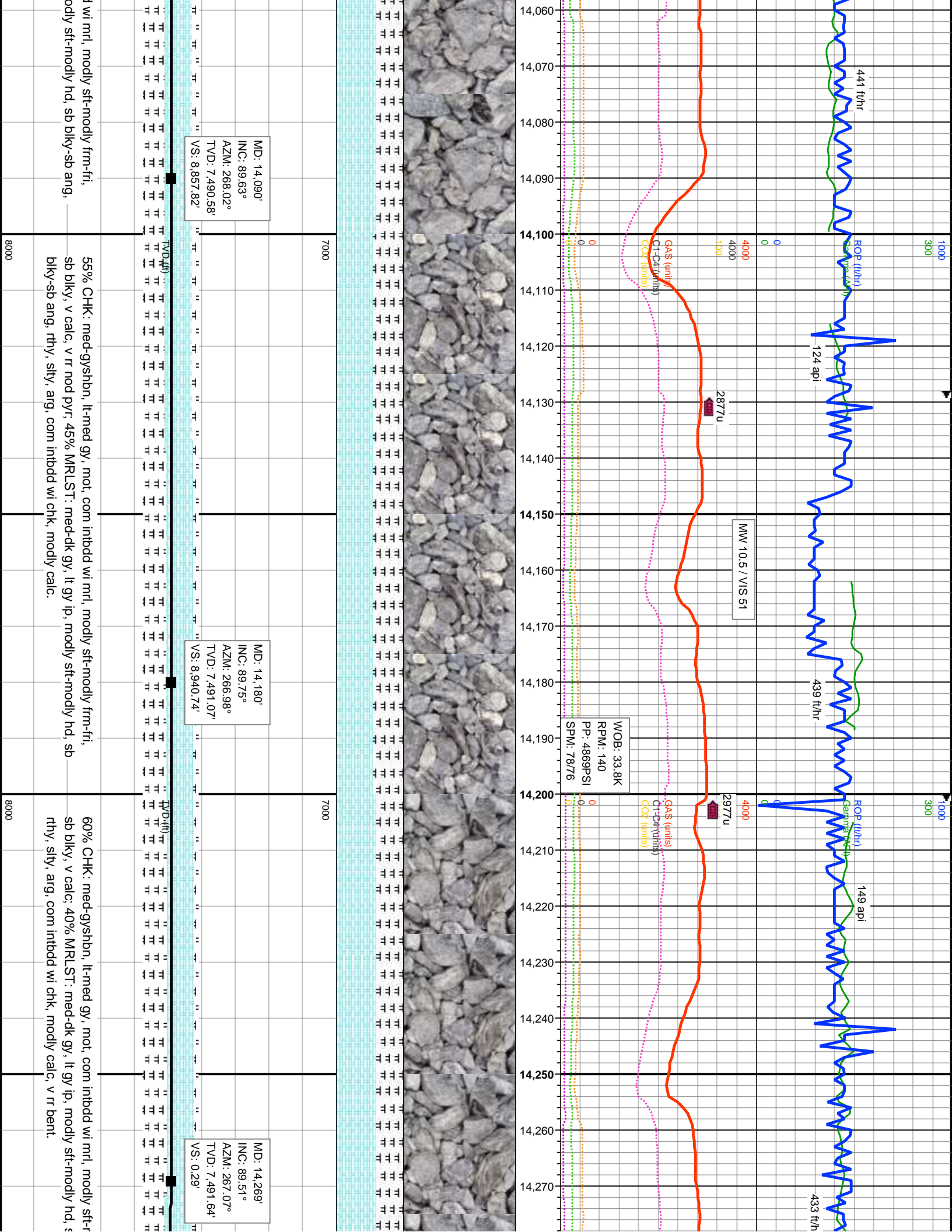
MD: 13,641'
INC: 90.18°
AZM: 268.93°
TVD: 7,489.87'
VS: 8,450.03'

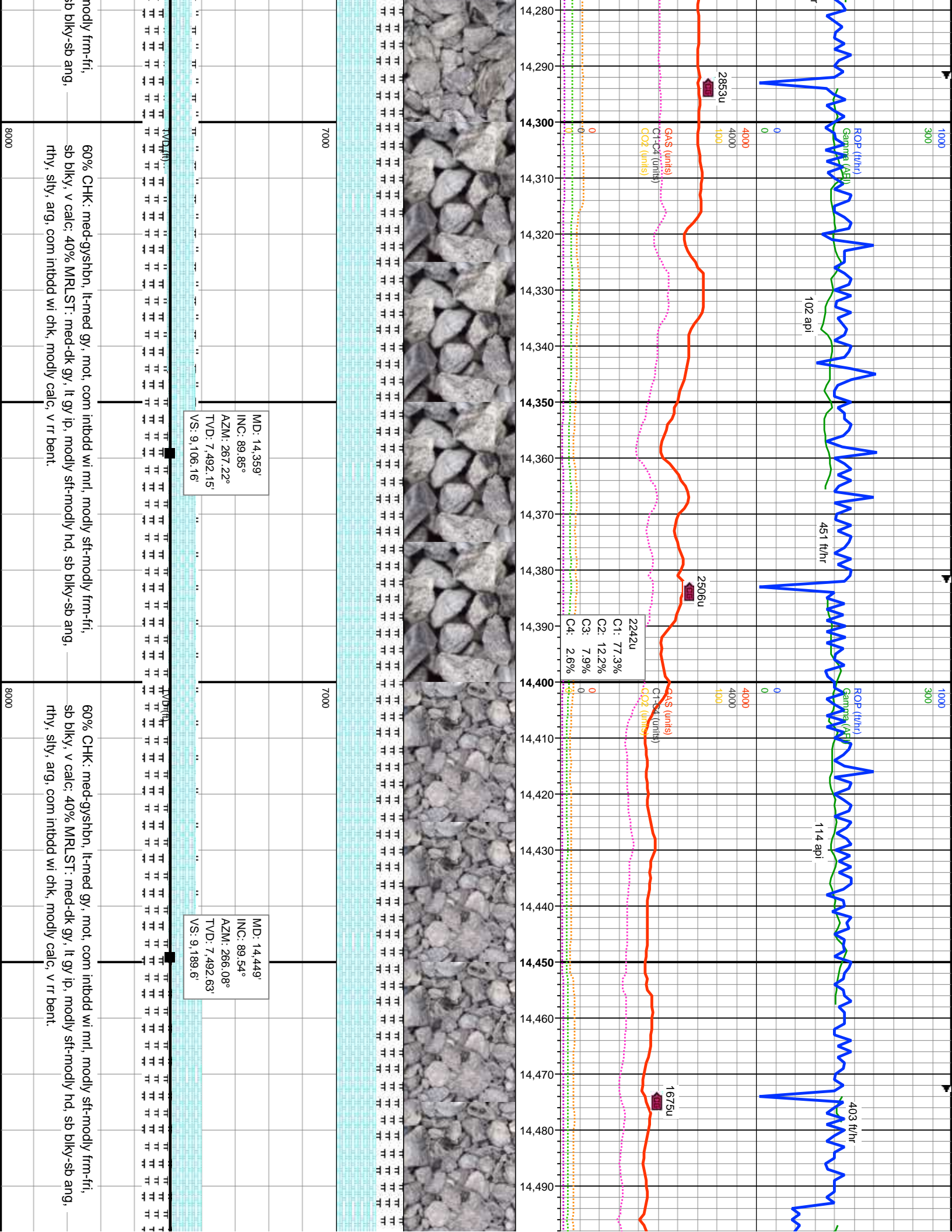
MD: 13,731'
INC: 90.22°
AZM: 269.37°
TVD: 7,489.55'
VS: 8,531.91'

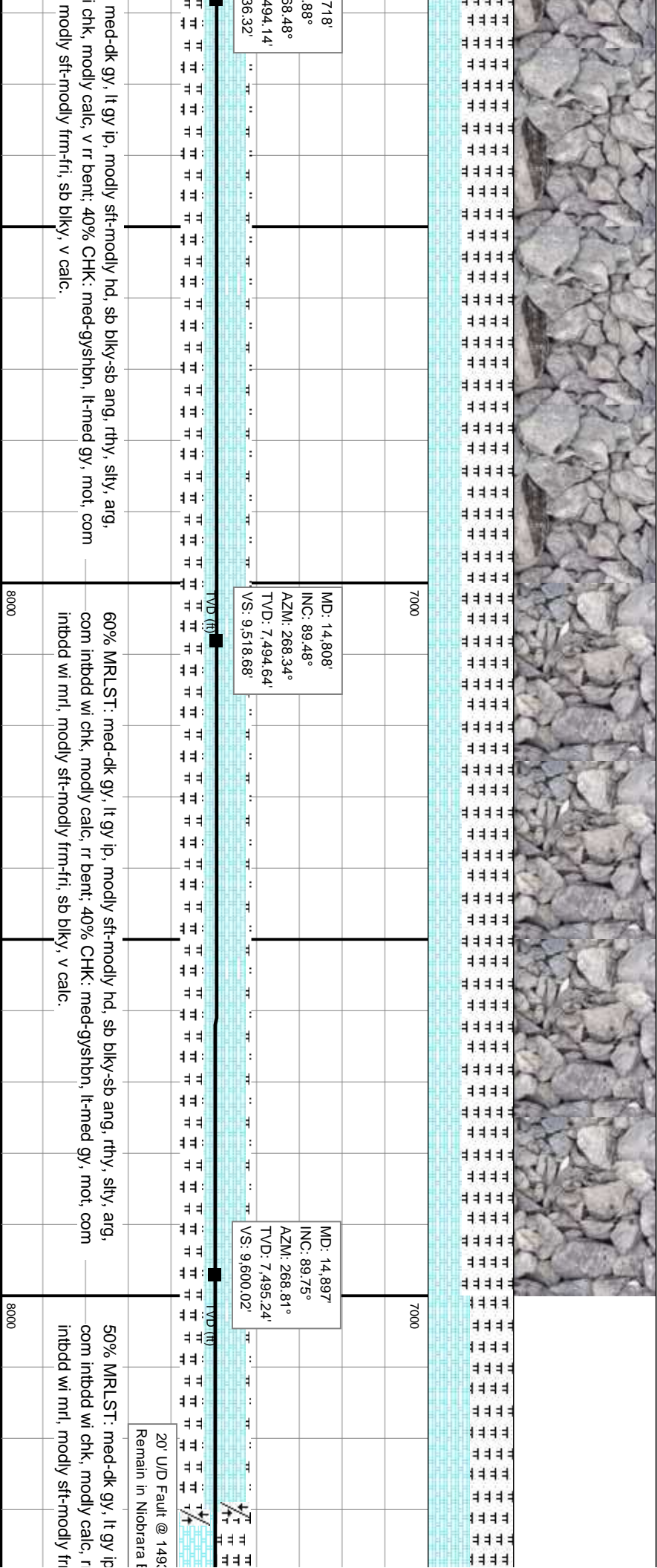
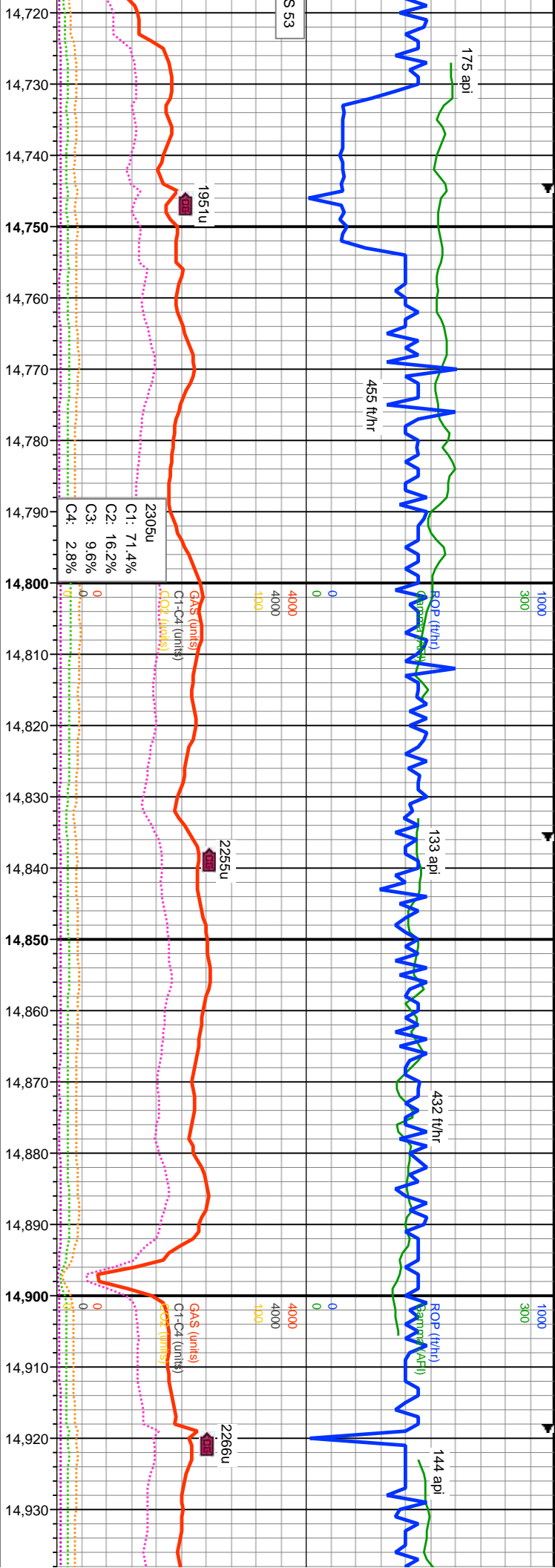
MD: 13,820'
INC: 89.82°
AZM: 269.54°
TVD: 7,489.52'
VS: 8,612.69'

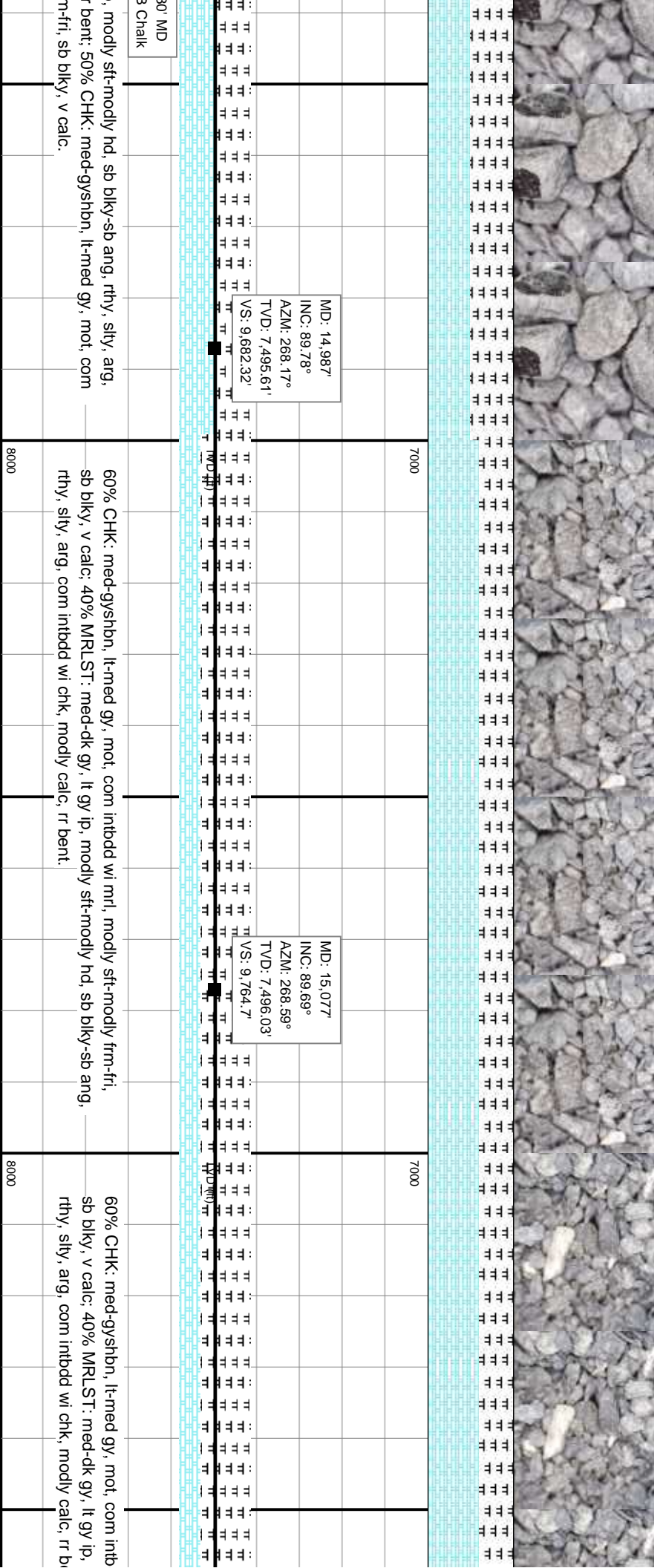
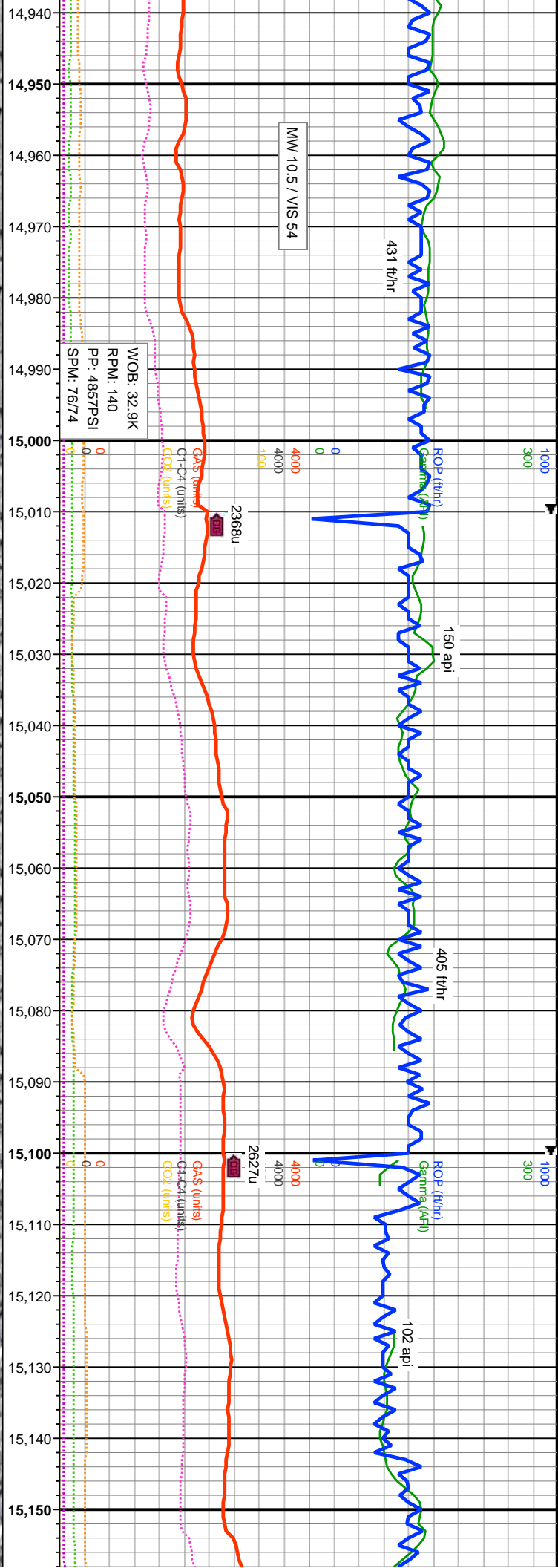
med-dk gy, lt gy ip, modly sft-modly hd, sb blkly-sb ang, rthy, silty, arg, chk, modly calc, tr bent; 45% CHK: med-gyshn, lt-med gy, mot, com modly sft-modly frm-frt, sb blkly, v calc, v tr nodr pyr.	7000	8000
55% MRLST: med-dk gy, lt gy ip, modly sft-modly hd, sb blkly-sb ang, rthy, silty, arg, com inbddd wi chk, modly calc, tr bent; 45% CHK: med-gyshn, lt-med gy, mot, com inbddd wi mri, modly sft-modly frm-frt, sb blkly, v calc, v tr nodr pyr.	7000	8000
50% MRLST: med-dk gy, lt gy ip, com inbddd wi chk, modly calc, tr inbddd wi mri, modly sft-modly frm-frt, sb blkly, v calc, v tr nodr pyr.	7000	8000

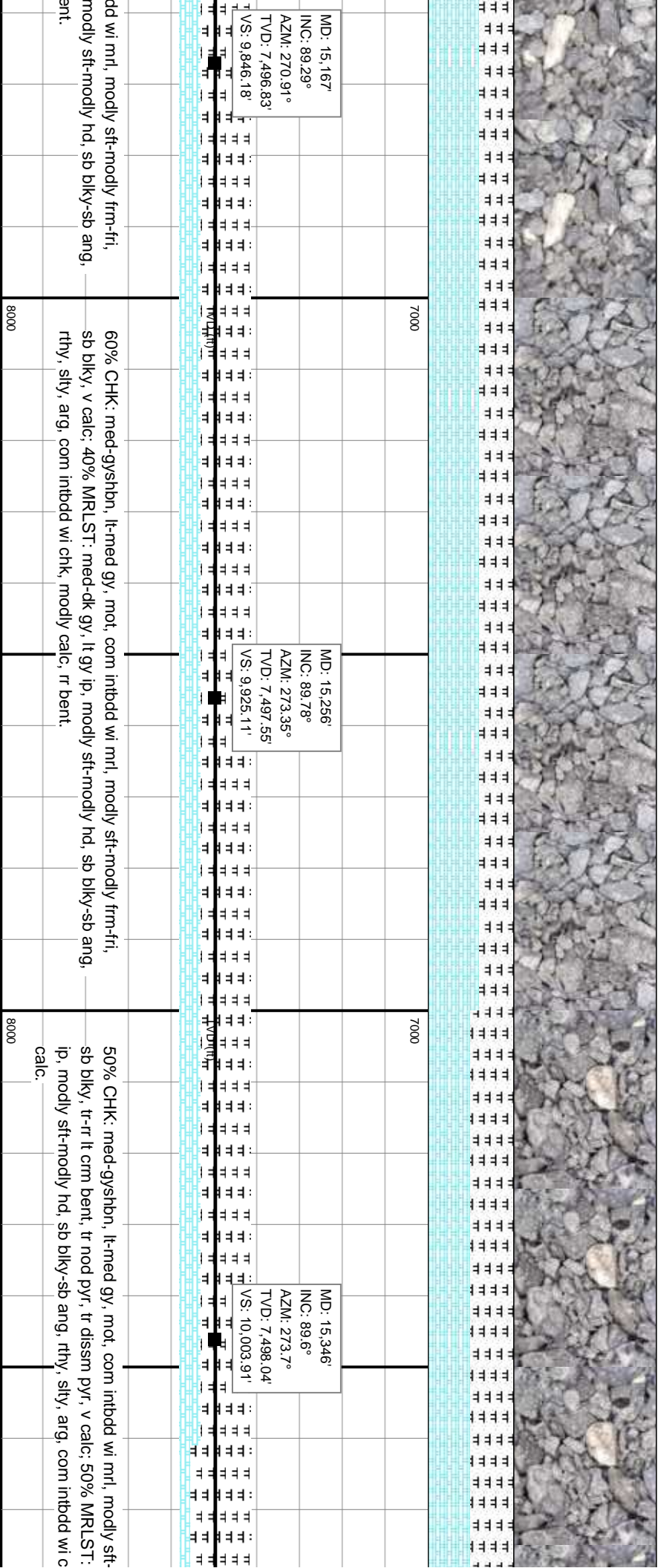
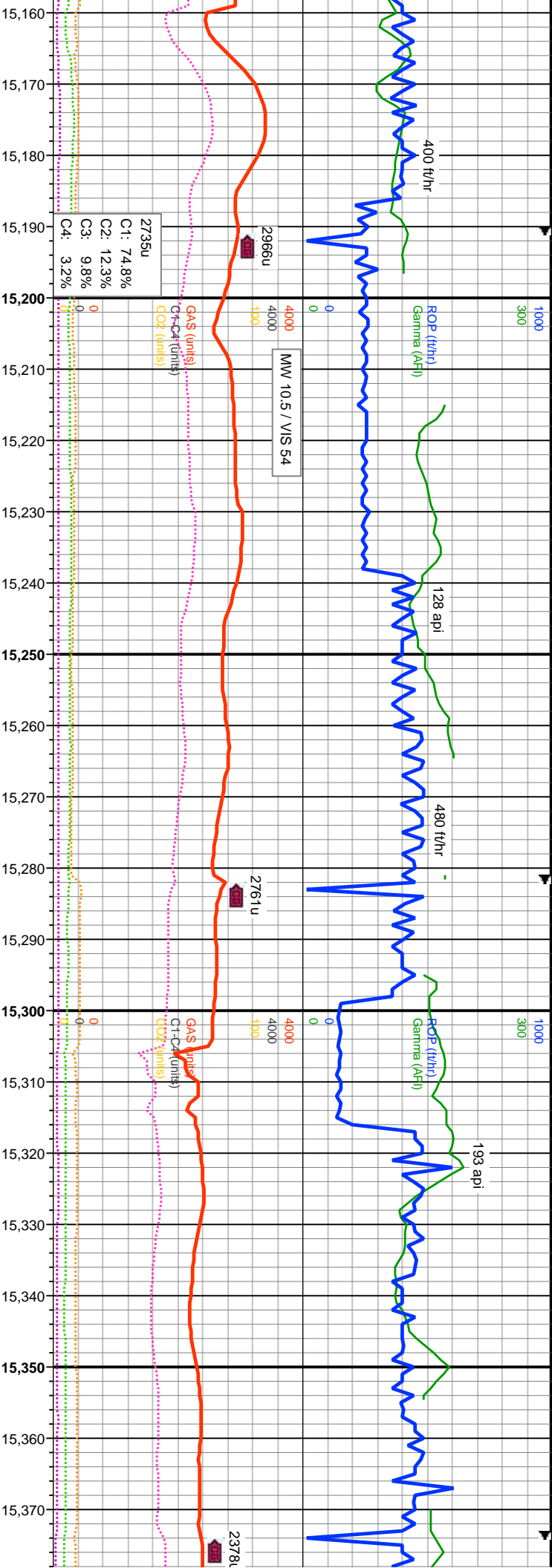


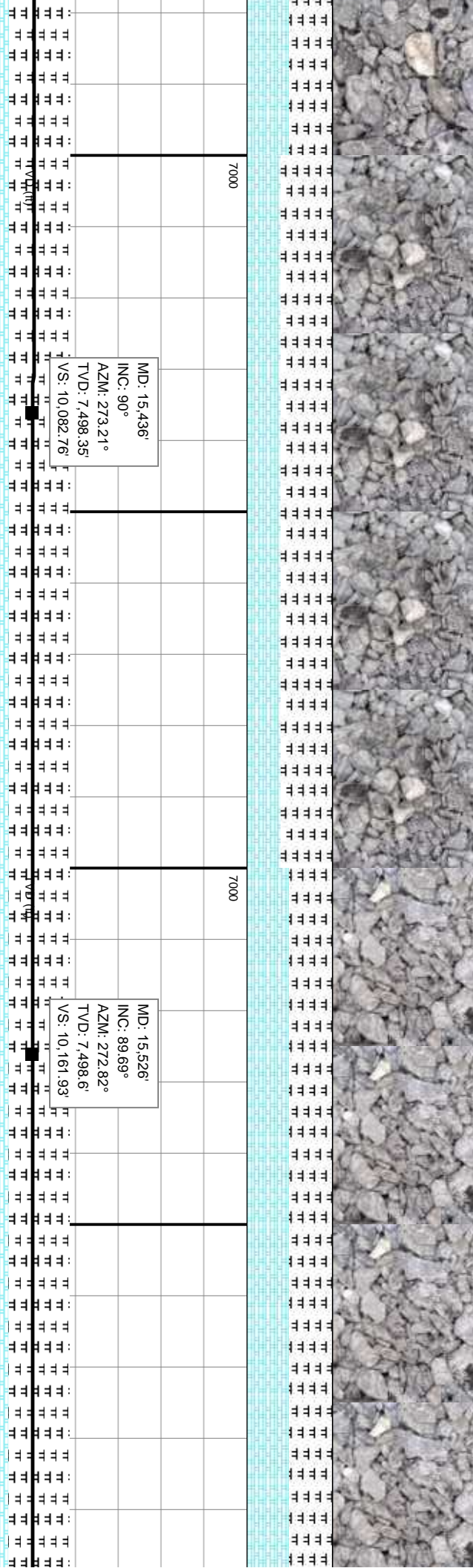
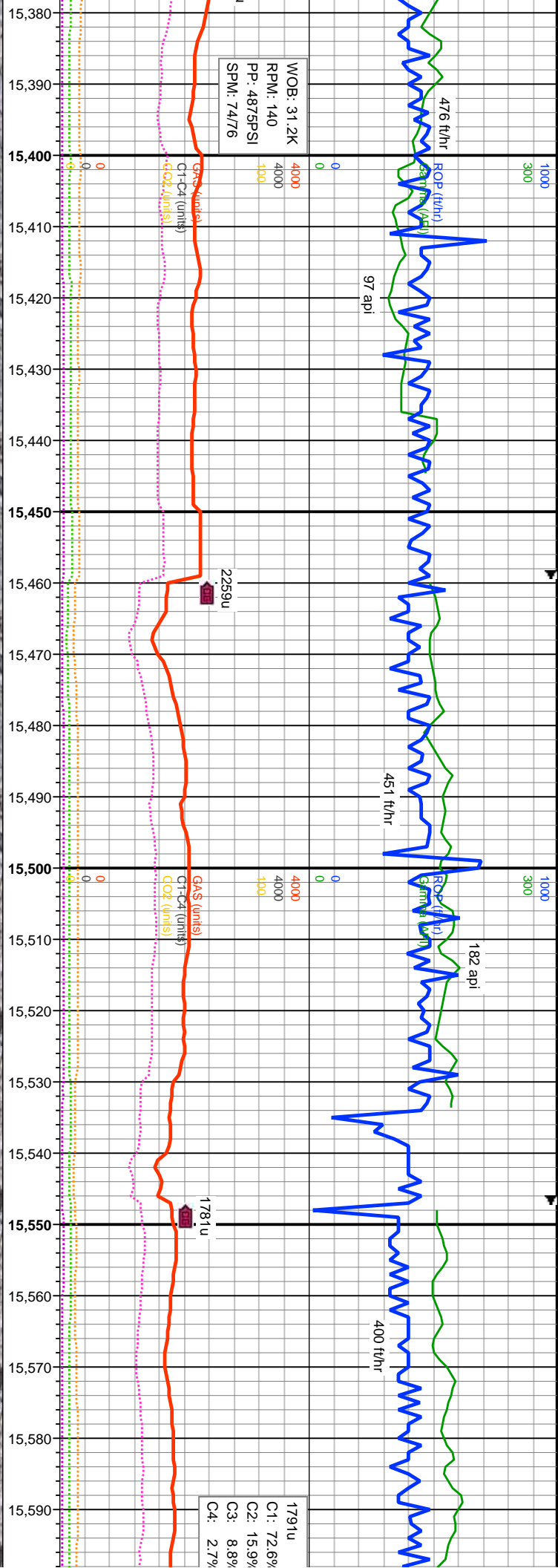




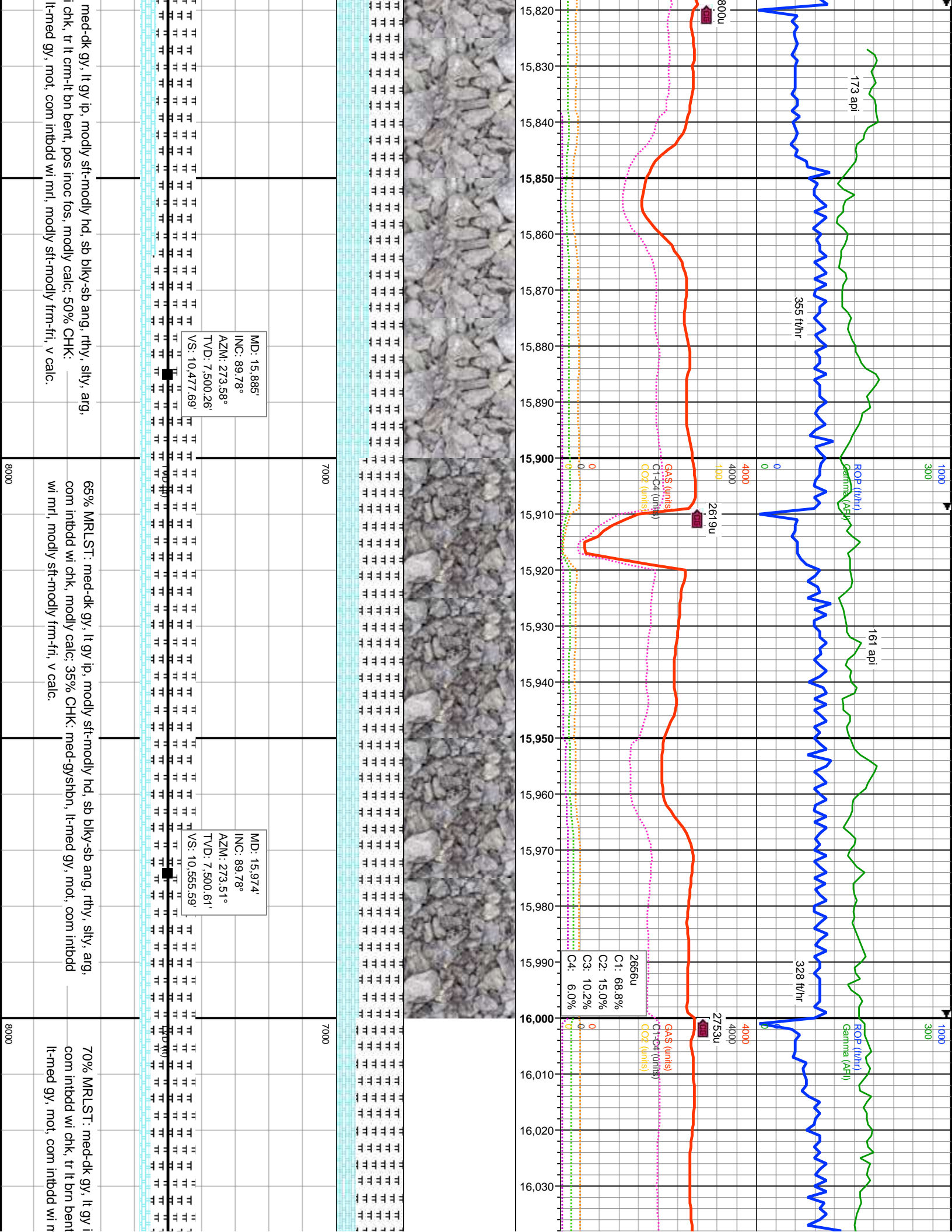


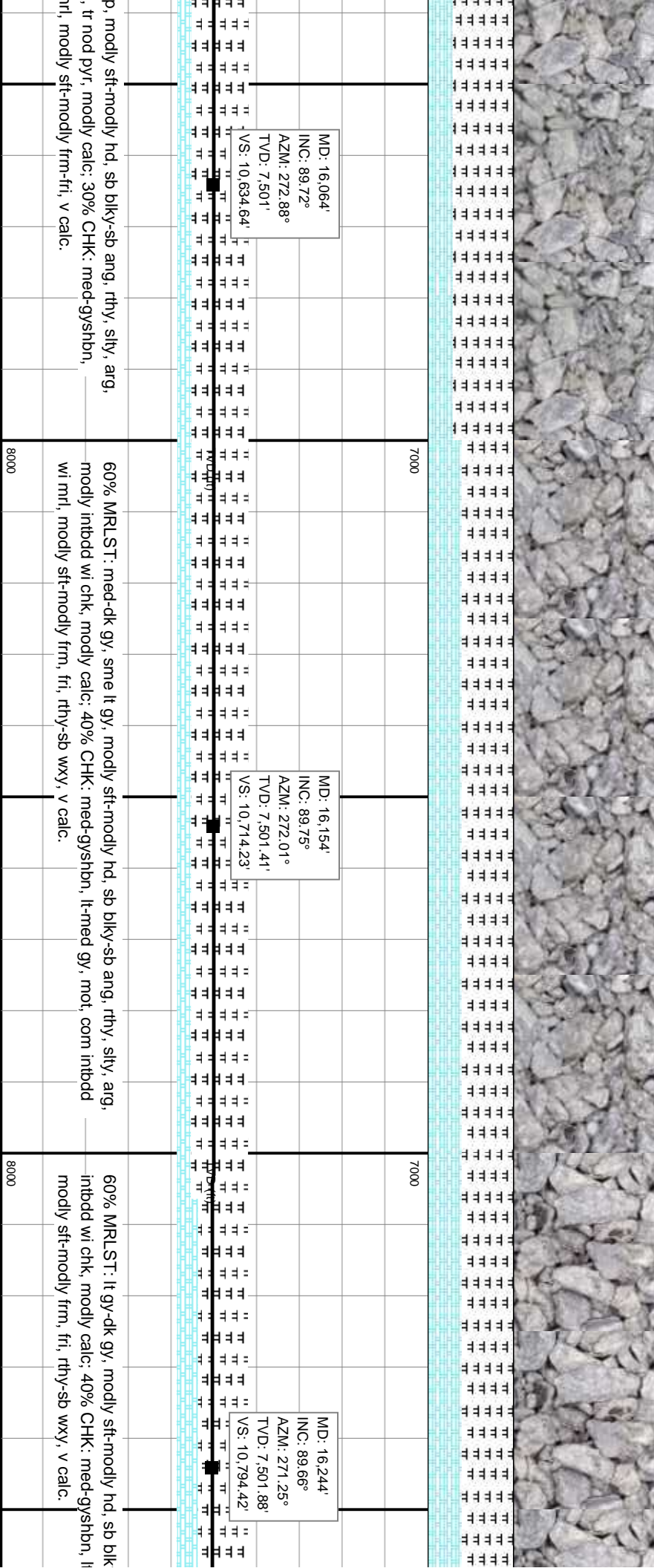
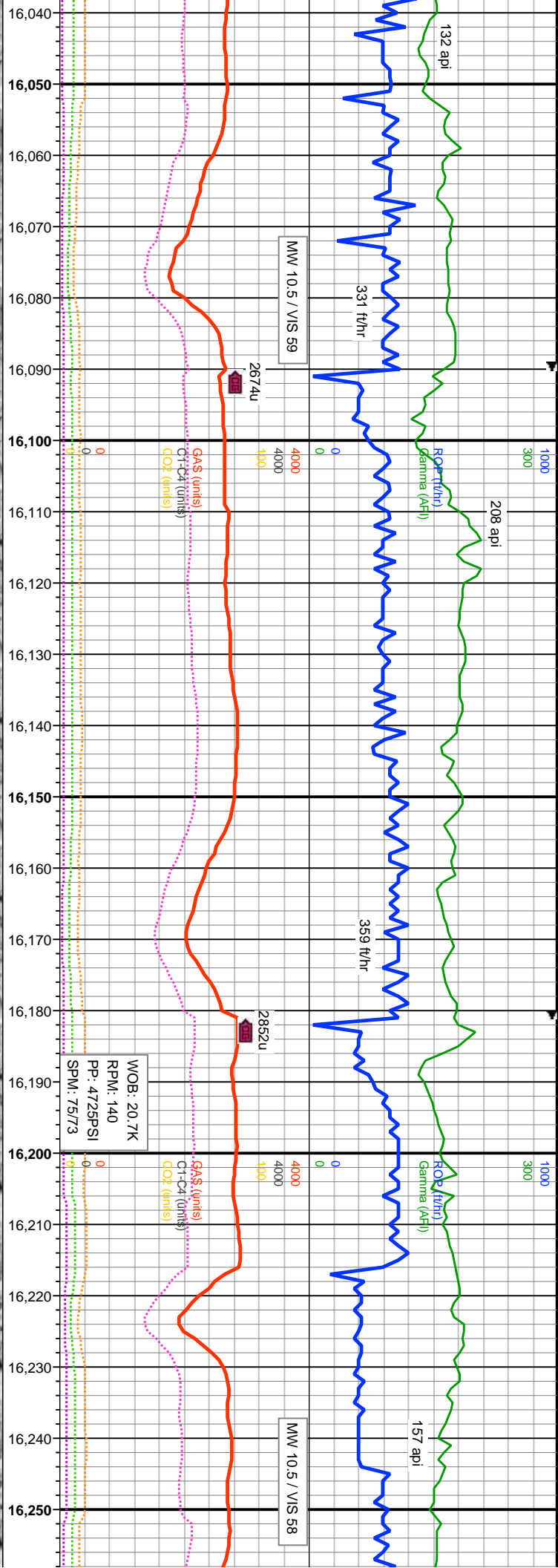


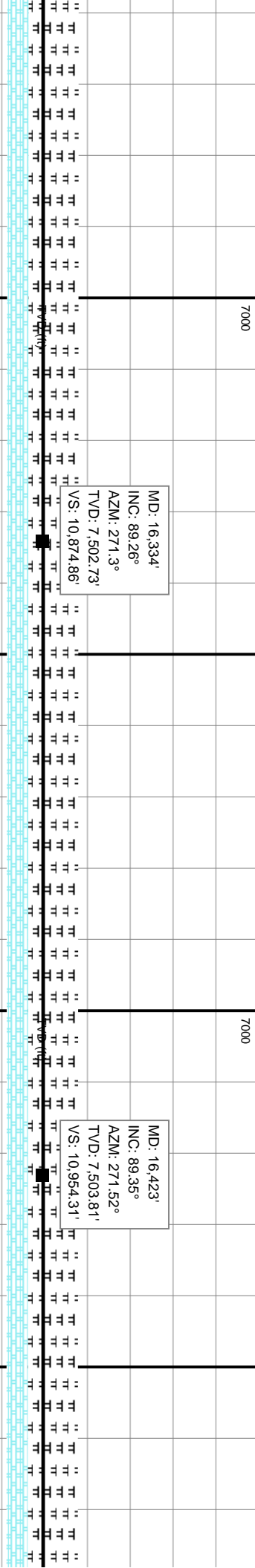
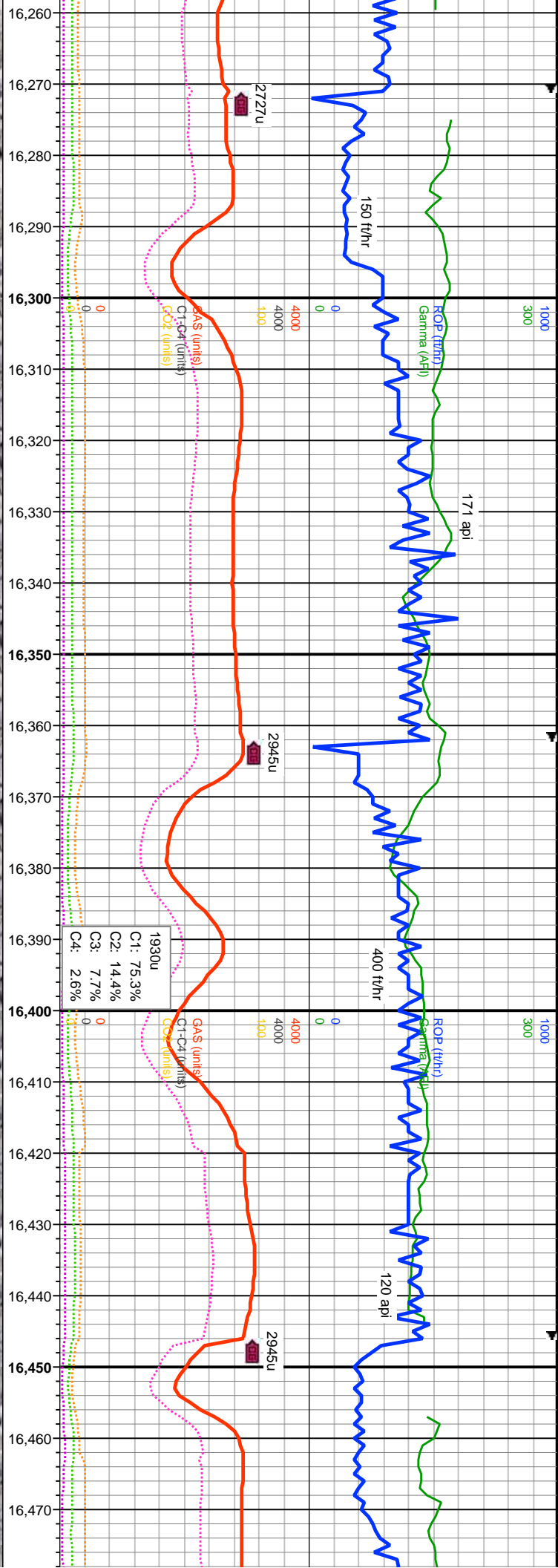




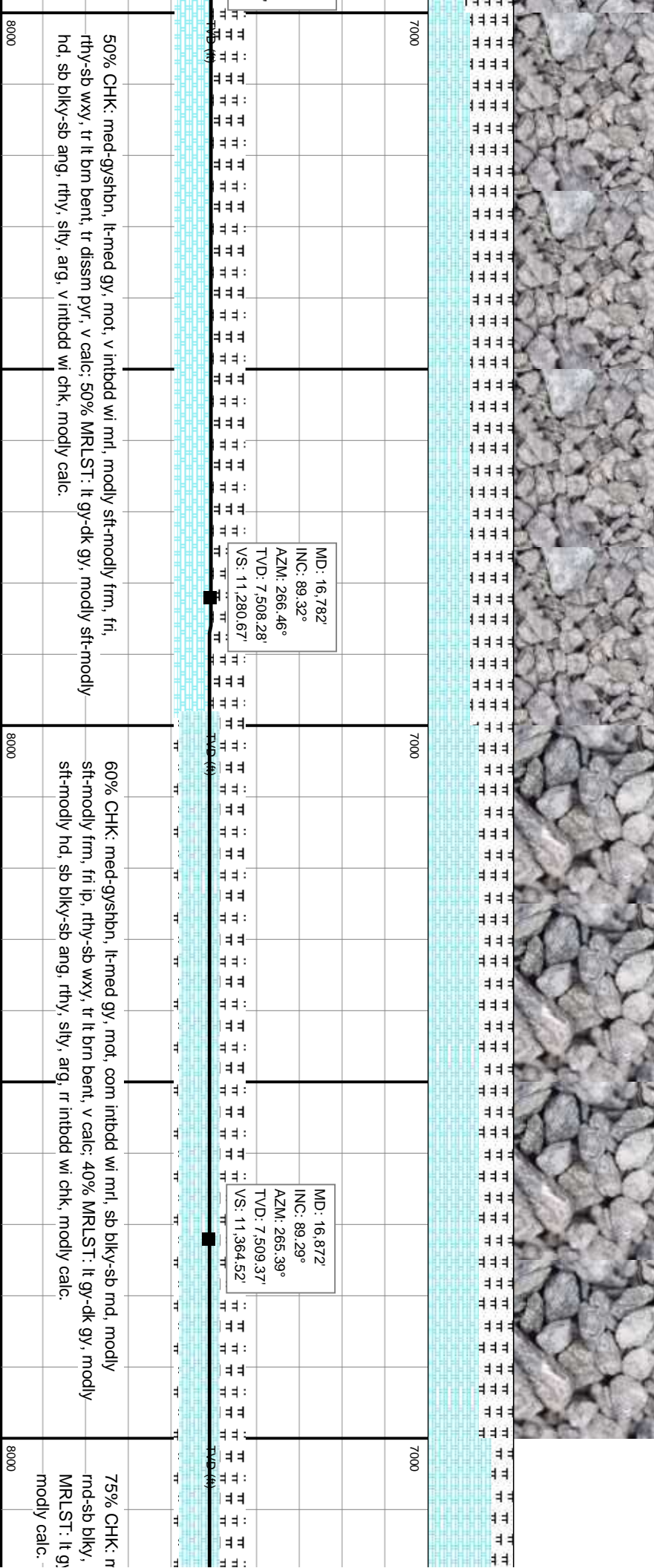
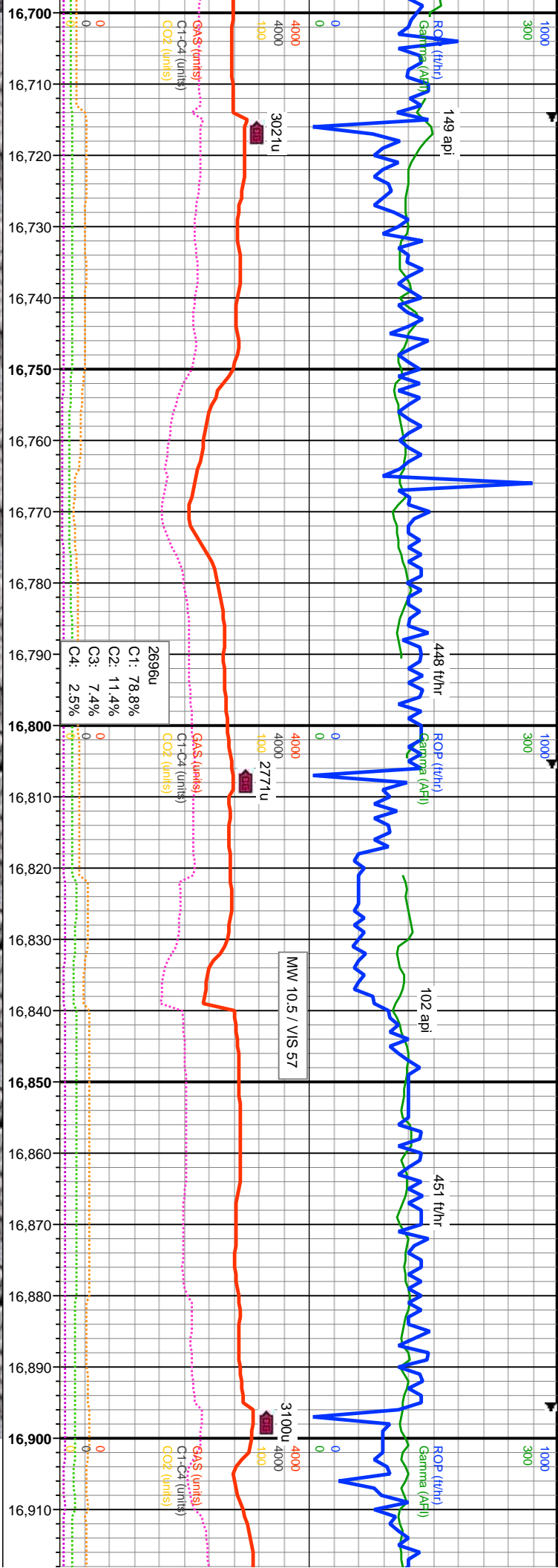
modly frm-fri, med-dk gy, lt gy chk, modly incrg	60% MRLST: med-dk gy, lt gy ip, modly sft-modly hd, sb blkv-sb ang, rthy, silty, arg, com intbdd wi chk, tr-rr lt crm-lt bn bent, tr nod pyr, pos inoc fos, modly incrg calc; 40% CHK: med-gyshbn, lt-med gy, mot, com intbdd wi mrl, modly sft-modly frm-fri, v calc.	7000	7000	8000
modly frm-fri, med-dk gy, lt gy chk, modly incrg	50% MRLST: med-dk gy, lt gy ip, modly sft-modly hd, sb blkv-sb ang, rthy, silty, arg, com intbdd wi chk, tr lt crm-lt bn bent, pos inoc fos, modly calc; 50% CHK: med-gyshbn, lt-med gy, mot, com intbdd wi mrl, modly sft-modly frm-fri, v calc.	7000	7000	8000

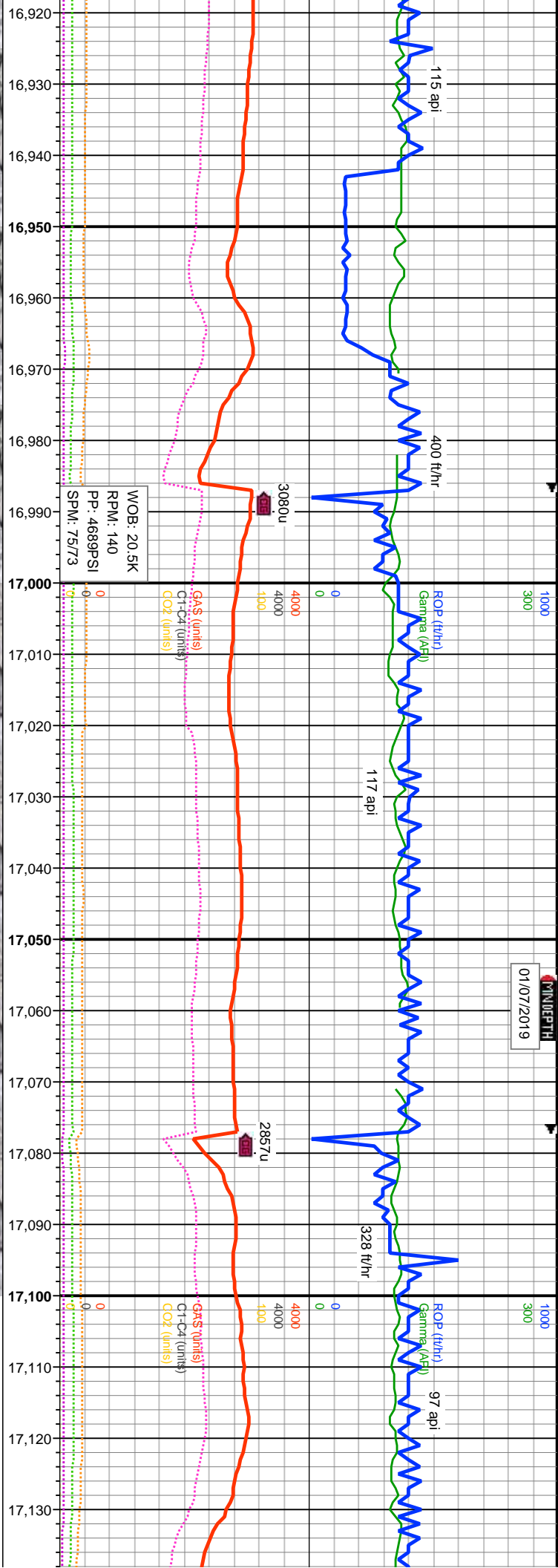






50% MRLST: It gy-dk gy, modly sft-modly hd, sb blkly-sb ang, rthy, silty, arg, v inbddd wi	50% MRLST: It gy-dk gy, modly sft-modly hd, sb blkly-sb ang, rthy, silty, arg, v inbddd wi
chk, modly calc, 50% CHK: med-gyshbn, lt-med gy, mot, v inbddd wi mrl, modly	chk, modly calc, 50% CHK: med-gyshbn, lt-med gy, mot, v inbddd wi mrl, modly
sft-modly frm, fri, rthy-sb wxy, v calc.	sft-modly frm, fri, rthy-sb wxy, v calc.





MD: 16,962'
INC: 89.42°
AZM: 265.56°
TVD: 7,510.38'
VS: 11,448.62'

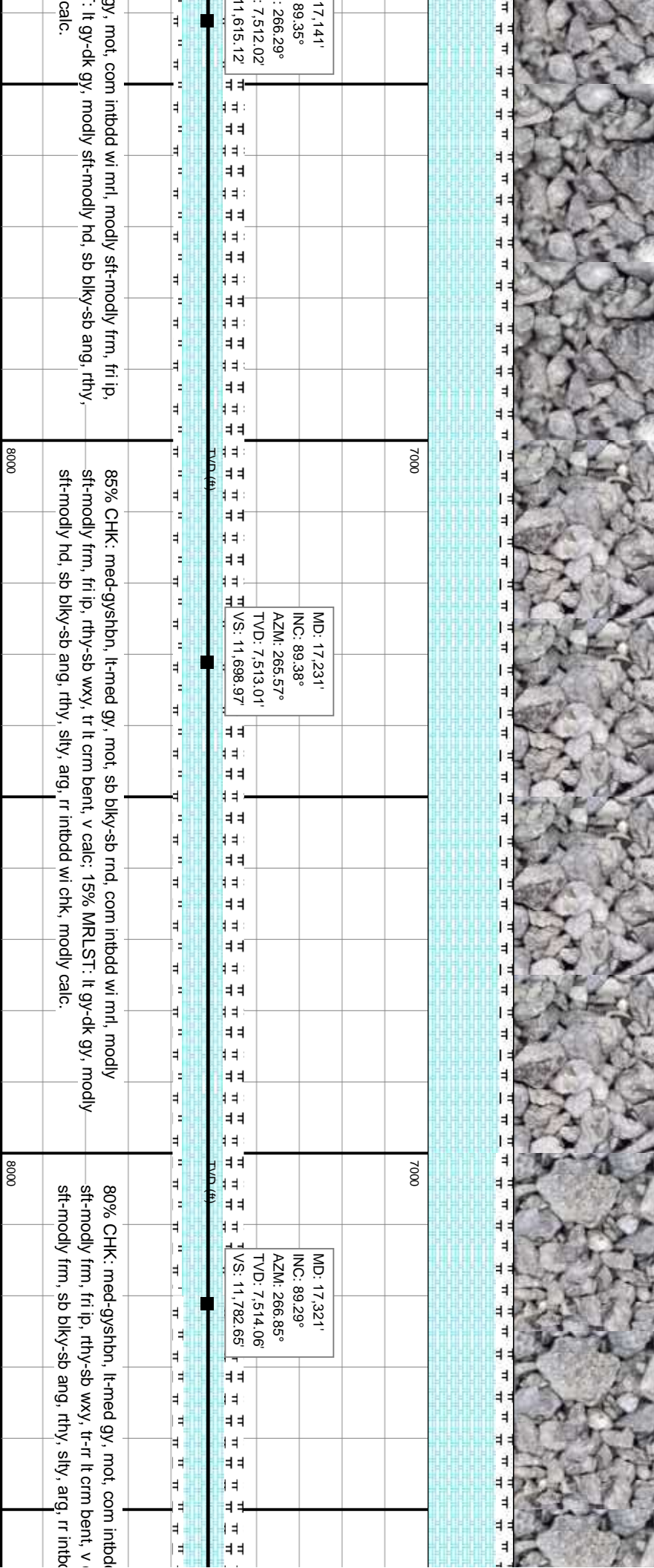
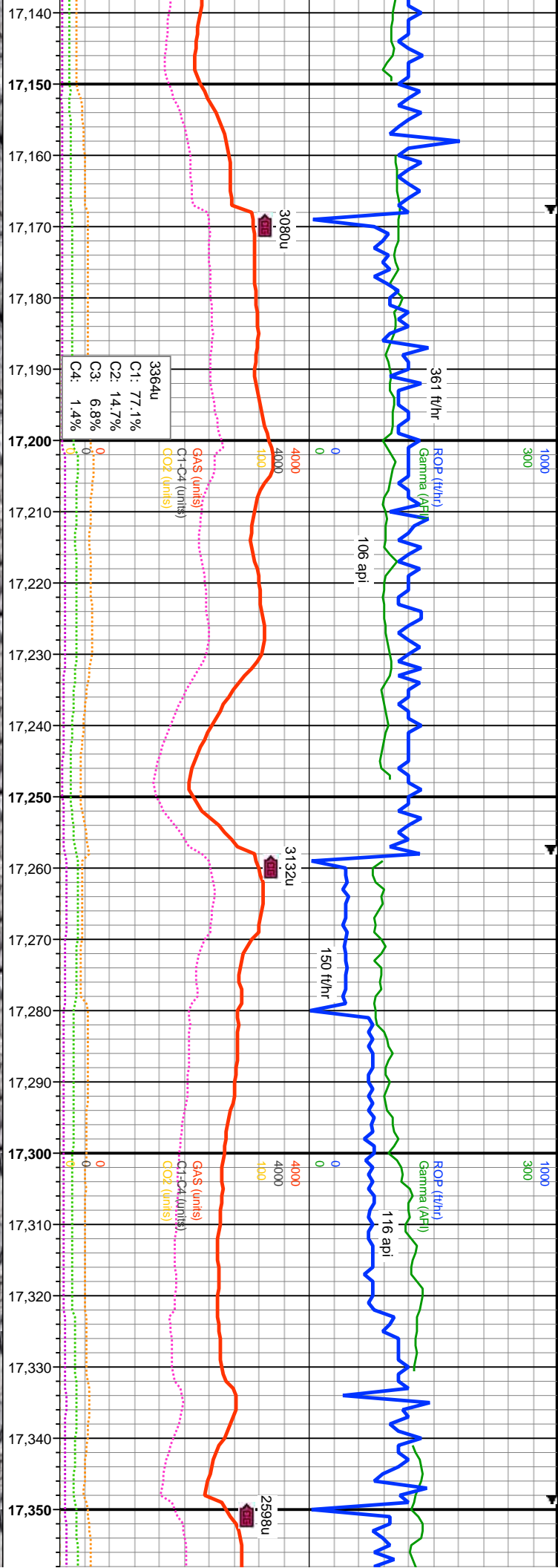
MD: 17,051'
INC: 89.57°
AZM: 266.4°
TVD: 7,511.17'
VS: 11,531.51'

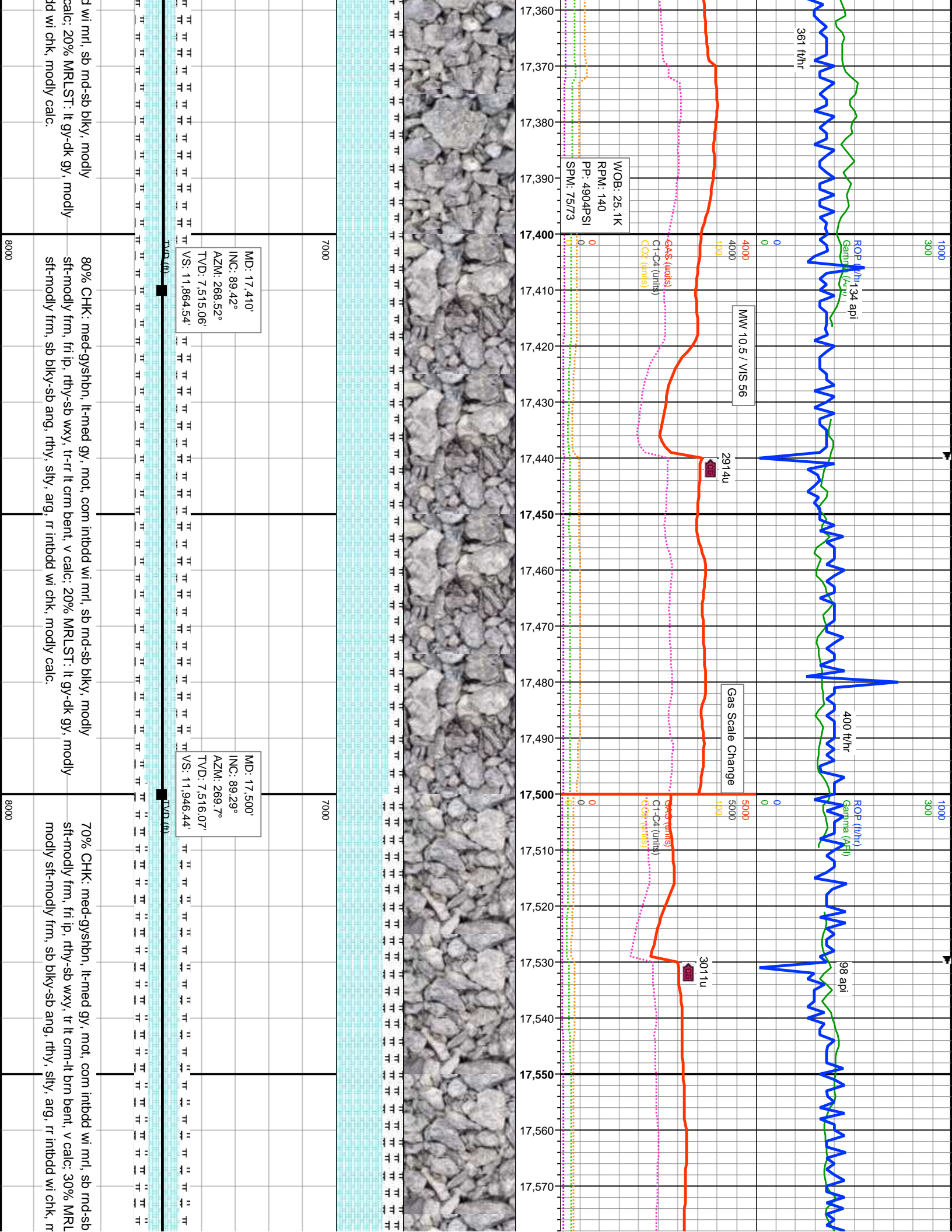
MD:
INC:
AZM
TVD
VS:

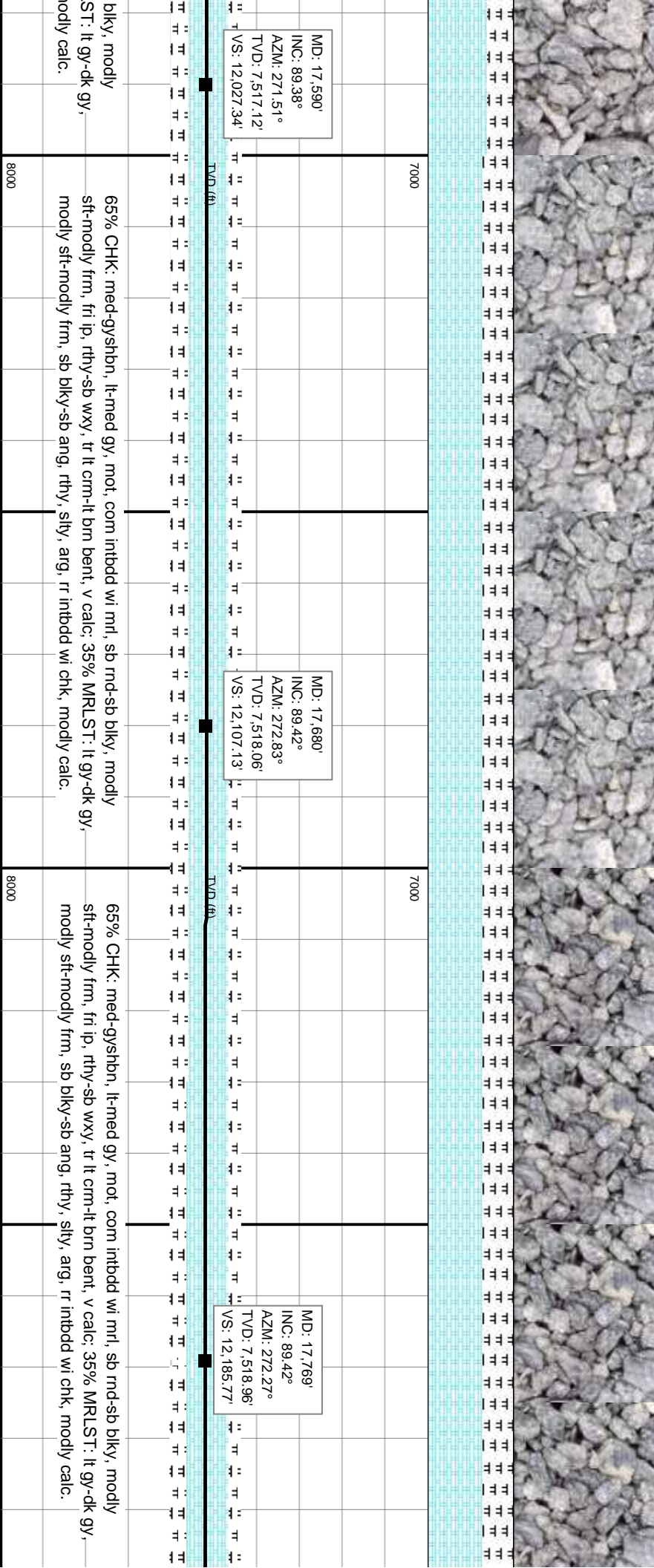
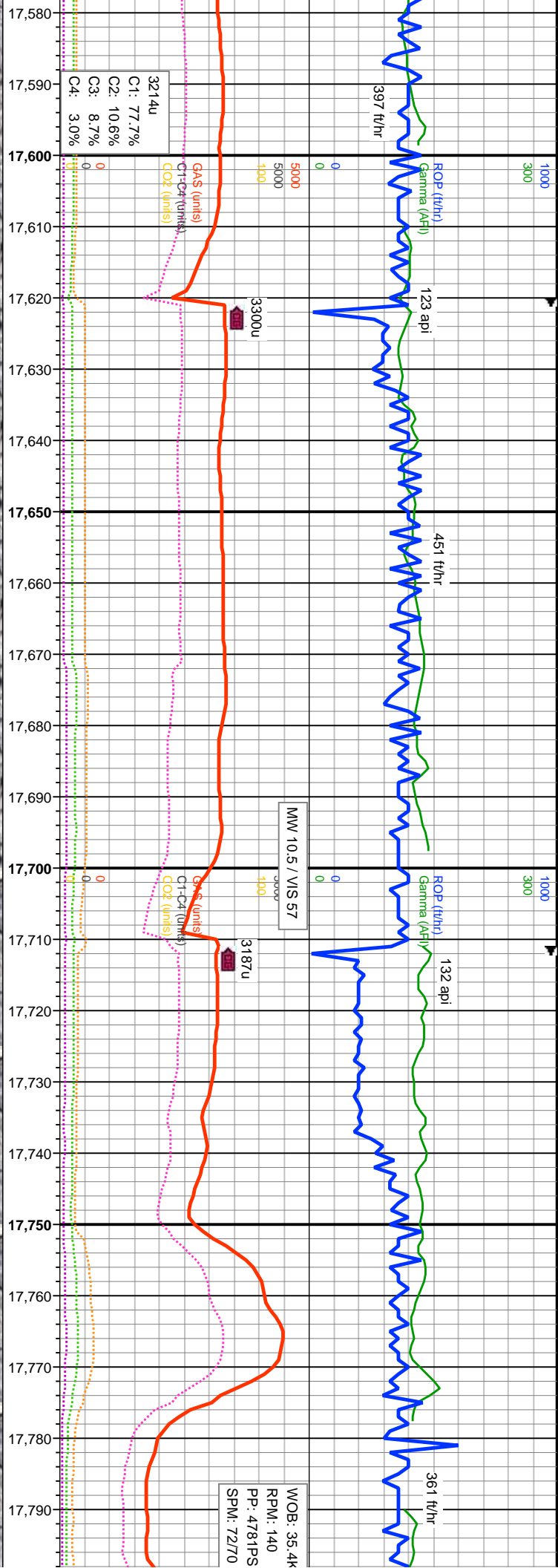
med-gyshbn, lt-med gy, mot, com intbdd wi mrl, modly sft-modly frm, sb
fri ip, rthy-sb wxy, tr lt bn bent, tr nod pyr, tr dissn pyr, v calc: 25%
-dk gy, modly sft-modly hd, sb blkly-sb ang, rthy, stly, arg, rr intbdd wi chk,

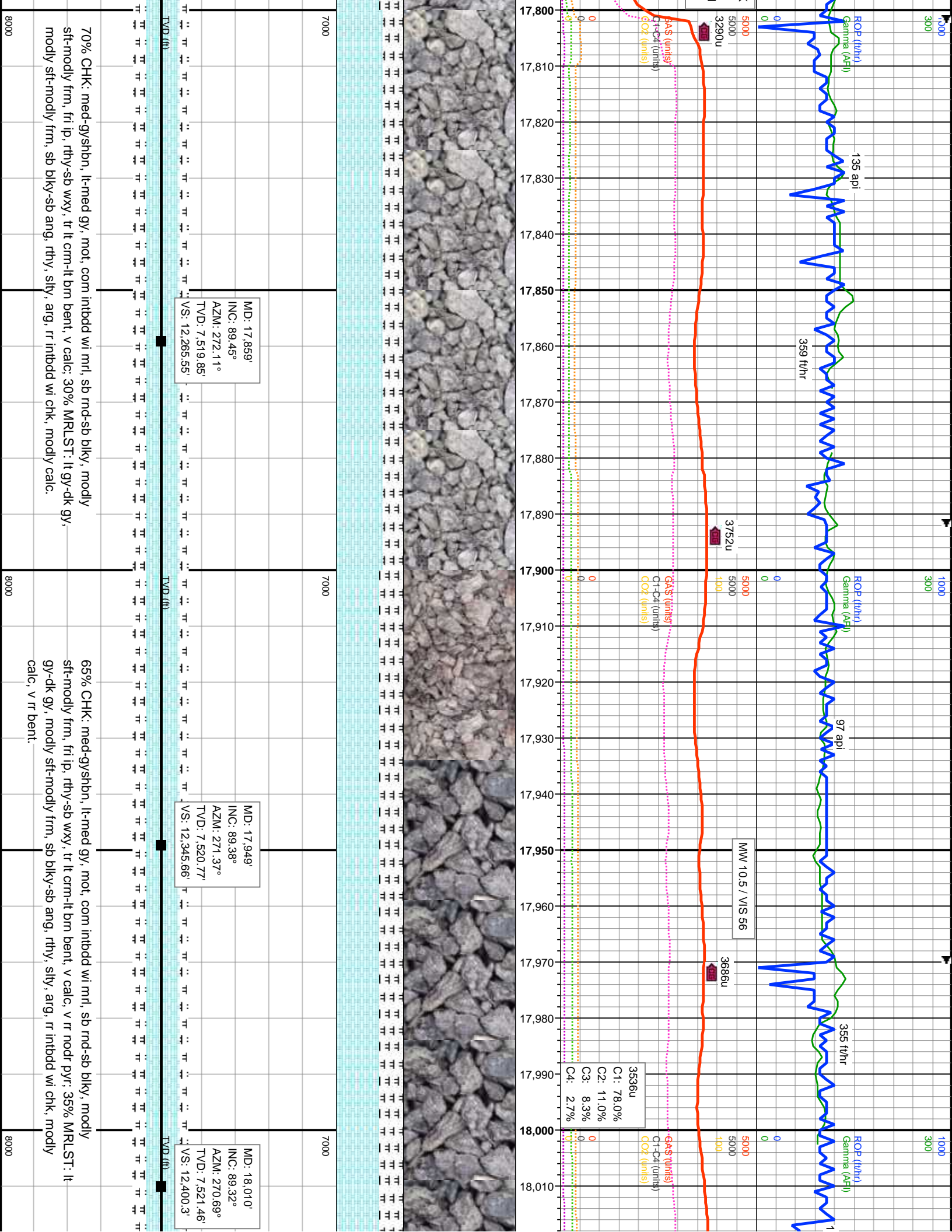
80% CHK: med-gyshbn, lt-med gy, mot, com intbdd wi mrl, sb blkly-sb md, modly
sft-modly frm, fri ip, rthy-sb wxy, v calc: 20% MRLST: lt gy-dk gy, modly sft-modly hd,
sb blkly-sb ang, rthy, stly, arg, rr intbdd wi chk, modly calc.

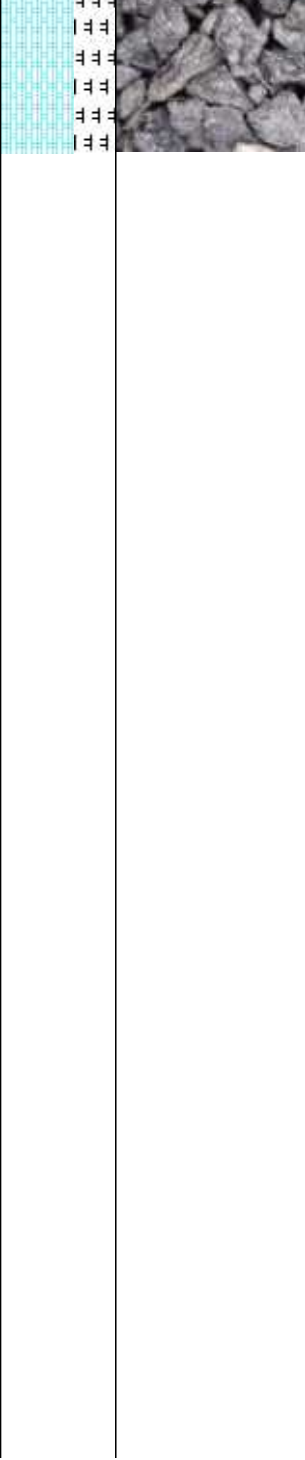
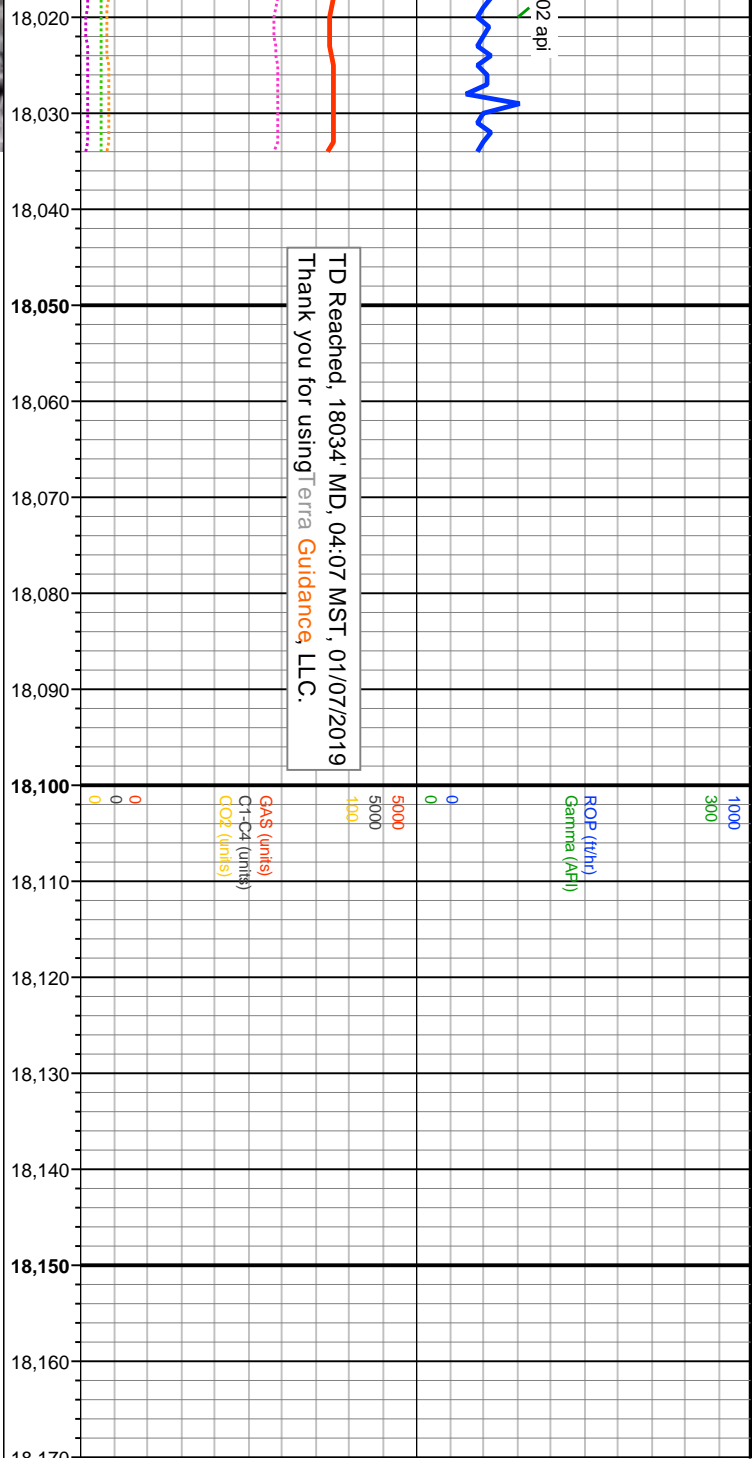
80% CHK: med-gyshbn, lt-med i
rthy-sb wxy, v calc: 20% MRLST
stly, arg, rr intbdd wi chk, modly











Projection to Bit
MD: 18,034'
INC: 89.32°
AZM: 270.69°
TVD: 7,521.74'
VS: 12,421.85'

Excursion Depths					
FM Name	9798				
Niobrara					
Ft Hays					
Codell					
Carlile					
Greenhorn					

8000