



Scale: 5" / 100'
Measured Depth Log

Well Name Roberts 13N-22HZ

Location NWNW 22 3N 66W

State COLORADO

County WELD

Country UNITED STATES OF AMERICA

Rig Number ENSIGN 145

API Number 05123363130000

AFE # 2074512

Region DJ BASIN

Field WATTENBERG

Spud Date 6/10/2014

Drilling Completed 7/1/2014

Surface Coordinates Lat/Long: 40.216385/-104.771304
511 FNL 485 FWL

Bottom Hole Coordinates 22 Twp: 3N 66W

Ground Elevation 4,885'

K.B. Elevation 4,896'

Logged Interval 7000 To 12,125'

Total Depth 12,125'

Formation SUSSEX, SHARON SPRINGS, NIOBRARA A, NIOBRARA B, NIOBRARA C, FORT HAYS, CODELL

Type of Drilling Fluid FWLSND

Company Anadarko

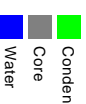
Address 1099 18TH ST.
DENVER, CO. 80202

Name RHEAD CANNON

Company ANADARKO PETROLEUM
Address 1099 18TH ST.
Denver, CO 80202

SENIOR WELLSITE GEOLOGIST

Zone



Operator

Geologist

JM CORPORATION

Other

ST MOHAMMED ALMUBARAK

e Color Coding



Rock Types

UNKNOWN	COAL	MARLSTONE	SHALY SANDSTONE
ANHYDRITE	CONGLOMERATE	METAMORPHIC	SHALY SILTSTONE
BENTONITE	DOLOMITE	NO SAMPLE	SILTY SHALE
BRECCIA	DOLOMITIC LIMESTONE	SALT	SILTSTONE
CHALK	GRANITE	SANDSTONE	TILL
CEMENT	GYPSUM	SALT-PEPPER SAND	TUFF
CHERT	IGNEOUS	SHALE	WELDED TUFF
CLAY CHOKE SAND	SIDERITE or LIMONITE	SHALE COLORED	
CLAYSTONE	LIMESTONE	SHALE GRAY	

Accessories

GASTROPOD	ARGILLITE GRAIN	HEAVY MINERAL	ANHYDRITE STRINGER
INOCERAMUS	B BENTONITE	KAOLIN	BENTONITE STRINGER
OOLITE	BITUMENOUS SUBSTANCE	MARLSTONE	COAL STRINGER
OSTRACOD	BRECCIA FRAGMENTS	MICACEOUS	DOLOMITE STRINGER
PELECYPOD	CALCAREOUS	MINERAL CRYSTALS	GYPSUM STRINGER
PELLET	CARBONACEOUS FLAKES	NODULES	LIMESTONE STRINGER
PISOLITE	CHTDK	PHOSPHATE PELLETS	MARLSTONE (CALC) STRG
PLANT REMAINS	CHTLT	PYRITE	MARLSTONE (DOL) STRG
PLANT SPORES	COAL - THIN BEDS	SALT CAST	SANDSTONE STRINGER
SCAPHOPOD	DOLOMITIC	SANDY	SHALE STRINGER
STROMATOPOROID	FELDSPAR	SILICEOUS	SILTSTONE STRINGER
ECHINOID	FERRUGINOUS PELLETT	SILTY	
FISH	FERRUGINOUS	TUFFACEOUS	
FORAMINIFERA	ANHYDRITIC	GLAUCONITE	
FOSSIL	ARGILLACEOUS	GYPSIFEROUS	

Minerals

Stringer

Other Symbols

Oil Show

P PINPOINT	⋮ DST INTERVAL	▽ WIRELINE TESTED - LEFT	E EARTHY
✓ VUGGY	⚡ FAULT	△ WIRELINE TESTED - RT	FX FINELYXLN

DEAD

Engineering

FORMATION TOP	DRILL STEM TEST	GS GRANSTONE
✖ GAS SHOW	MINDEPTH MIN DEPTH	L LITHOGRAPHIC
● OIL SHOW		MX MICROXLN

EVEN

QUESTIONABLE

BIT	MINDEPTH MIN DEPTH UP	
SPOTTED STAINING	▲ CONNECTION (UP)	MJS MUDSTONE

Rounding

Prosity

▼ CONNECTION (DOWN)	MINDEPTH MN DEPTH (DOWN)	▲ ANGULAR	PS PACKSTONE
CONNECTION GAS	↘ NORMAL FAULT	R ROUNDED	WJS WACKESTONE
CONNECTION GAS (LEFT)	↕ OVERTURNED STRATA	B SUBANG	
TRIP GAS	↗ REVERSE FAULT	P SUBRND	

Sorting

RACTURE	TRIP GAS (LEFT)	CASING	M MODERATE
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Textures

INTERCRYSTALLINE	DOWN TIME GAS	SIDEWALL CORE (LEFT)	P POOR
INTERCOLLITIC	DOWN TIME GAS (LEFT)	SIDEWALL CORE (RIGHT)	BS BOUNDSTONE
MOLDIC	↓ CORE - LOST	SLIDE	C CHALKY
ORGANIC	■ CORE - RECOVERED	SURVEY	CX CRYPTOXLN

Slide/Rotate

ROP

ROP

Total Gas & Chromatograph

- GAS
- C1
 - C2
 - C3
 - C4

Bit Data
Bit #: 1
Type: SDI611
Size: 8 3/4
Depth In: 1,244'
Jets: 6 X 18
S/N: JJ2944

Oil Shows Every 100'

Depth Labels

% Lith

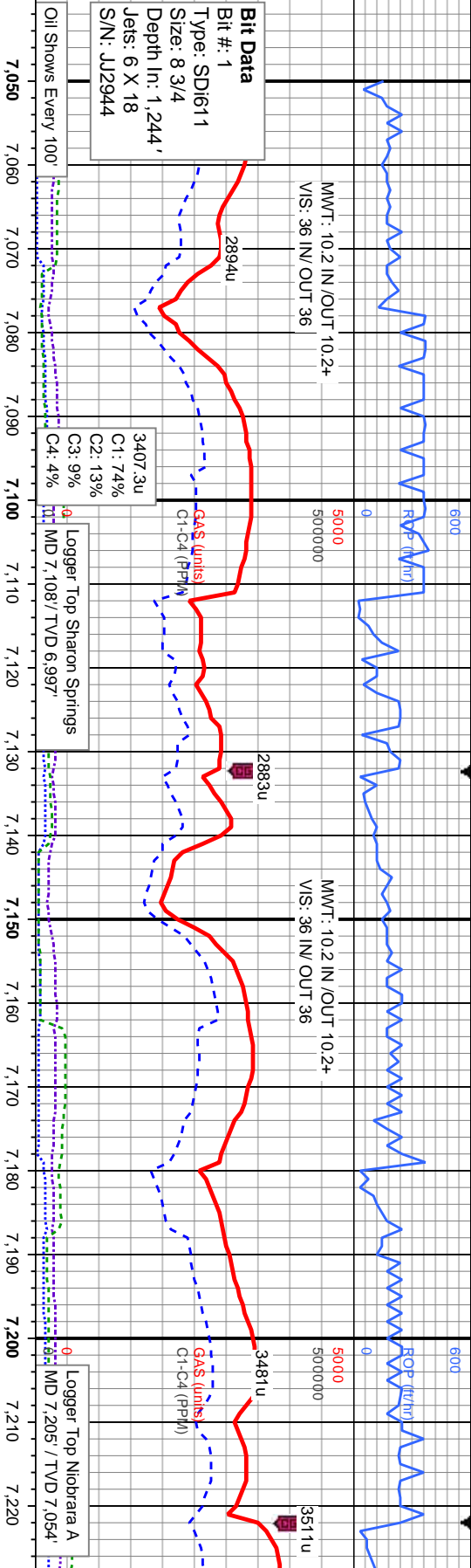
Curves

GAMMA

Well Bore
TVD

Oil Show

Images



Logger Top Sharon Springs
MD 7,108' / TVD 6,997'

Logger Top Niobrara A
MD 7,205' / TVD 7,054'

MD: 7,067
TVD: 6,968.74
Inclination: 44.99
Azimuth: 175.68

MD: 7,112
TVD: 6,999.14
Inclination: 49.98
Azimuth: 177.54

MD: 7,157
TVD: 7,026.7
Inclination: 54.47
Azimuth: 180.04

MD: 7,202
TVD: 7,052.14
Inclination: 56.68
Azimuth: 179.37

COLUMBINE LOGGING 06/1/14
1-MAN LOGGING - CURVE
2-MAN LOGGING - LATERAL
WITH BLOODHOUND GAS
CHROMATOGRAPH UNIT #314

100% SLTY SH: lt - dk gy/brn, sb ply - ply, sily
tex, v f grn, sft - mod frm, v sl calc, abnt bent;
O SHW: thk mod bl/wh cut, slow thk bl/wh
stmg, mod str, fr o

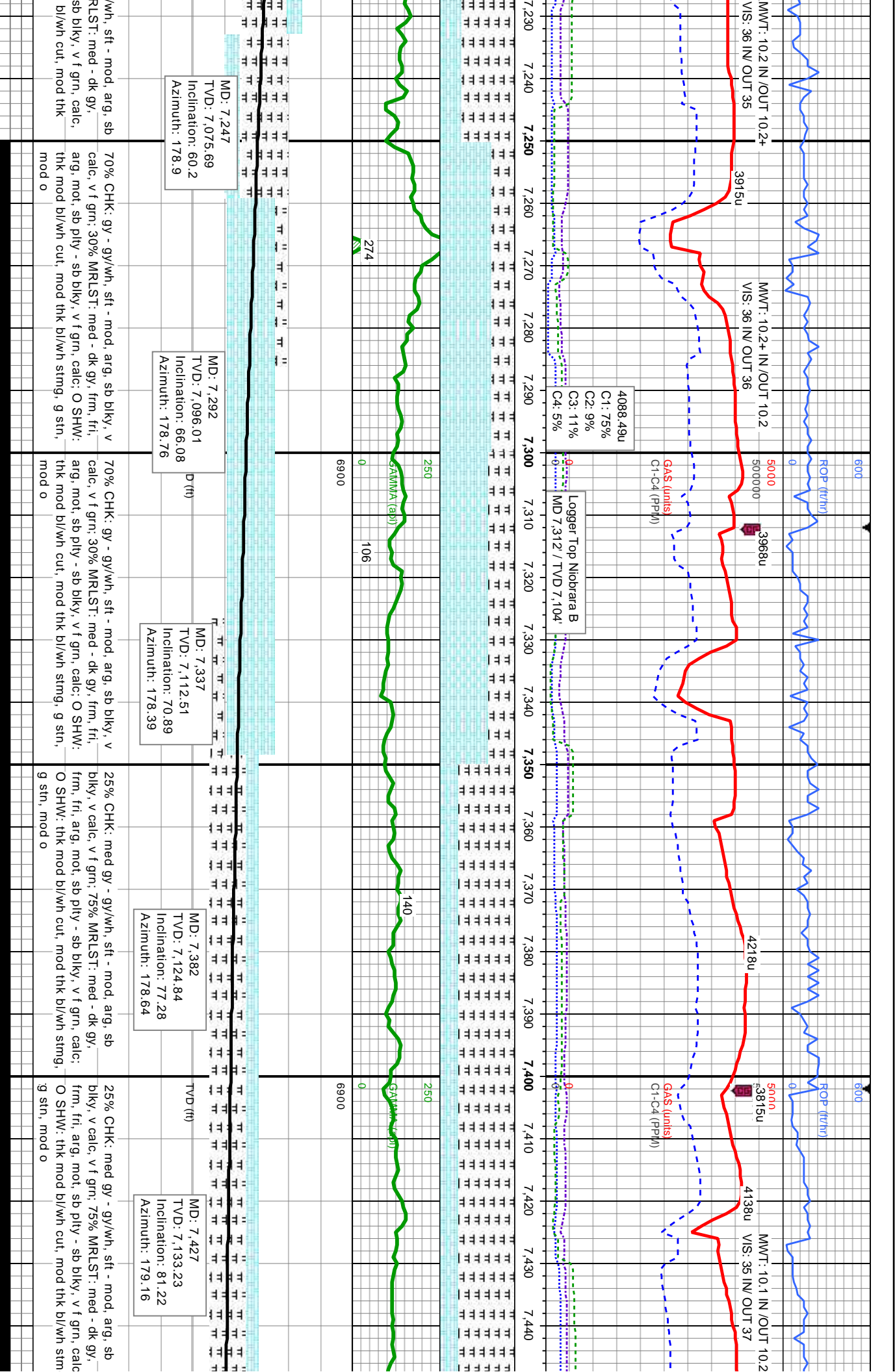
70% SLTY SH: dk gy/brn, sb ply - ply, sily tex, v
f grn, sft - mod frm, v sl calc; 30% MRLST: med -
dk gy/brn, sily tex, arg, fri, sl mot, sft - mod,
calc, sb ply - sb rmd, abnt bent; O SHW: thk mod
bl/wh cut, slow thk bl/wh stmg, mod str, fr o

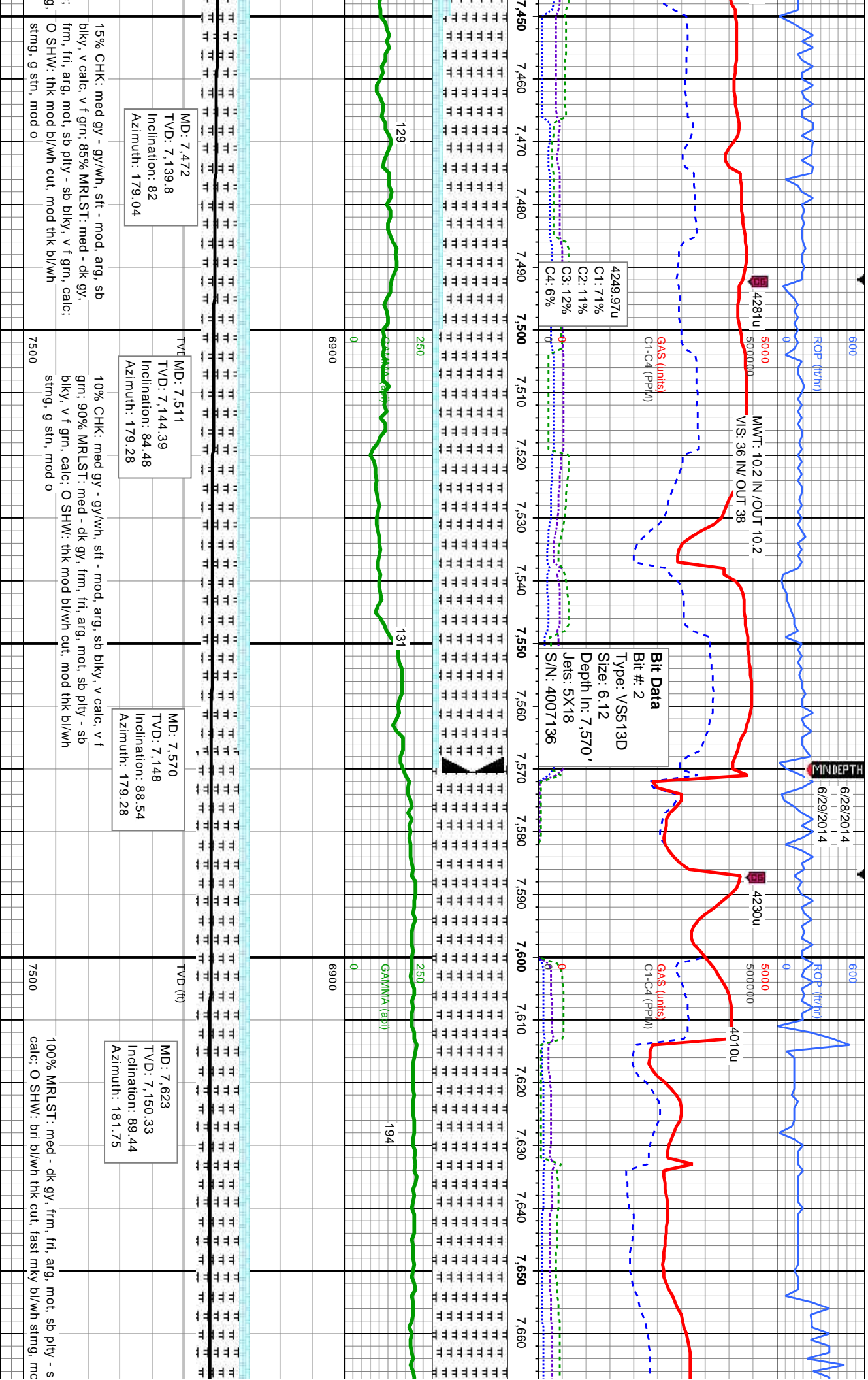
30% MRLST: dk gy, mod - frm, fri, arg, sm mot,
sb ply - sb blk, v f grn, calc; 70% CHK: lt - med
gy - gy/wh, sft - mod, arg, sb blk, v sl mod, v
calc, v f grn; O SHW: thk mod bl/wh cut, mod thk
bl/wh stmg, g str, mod o

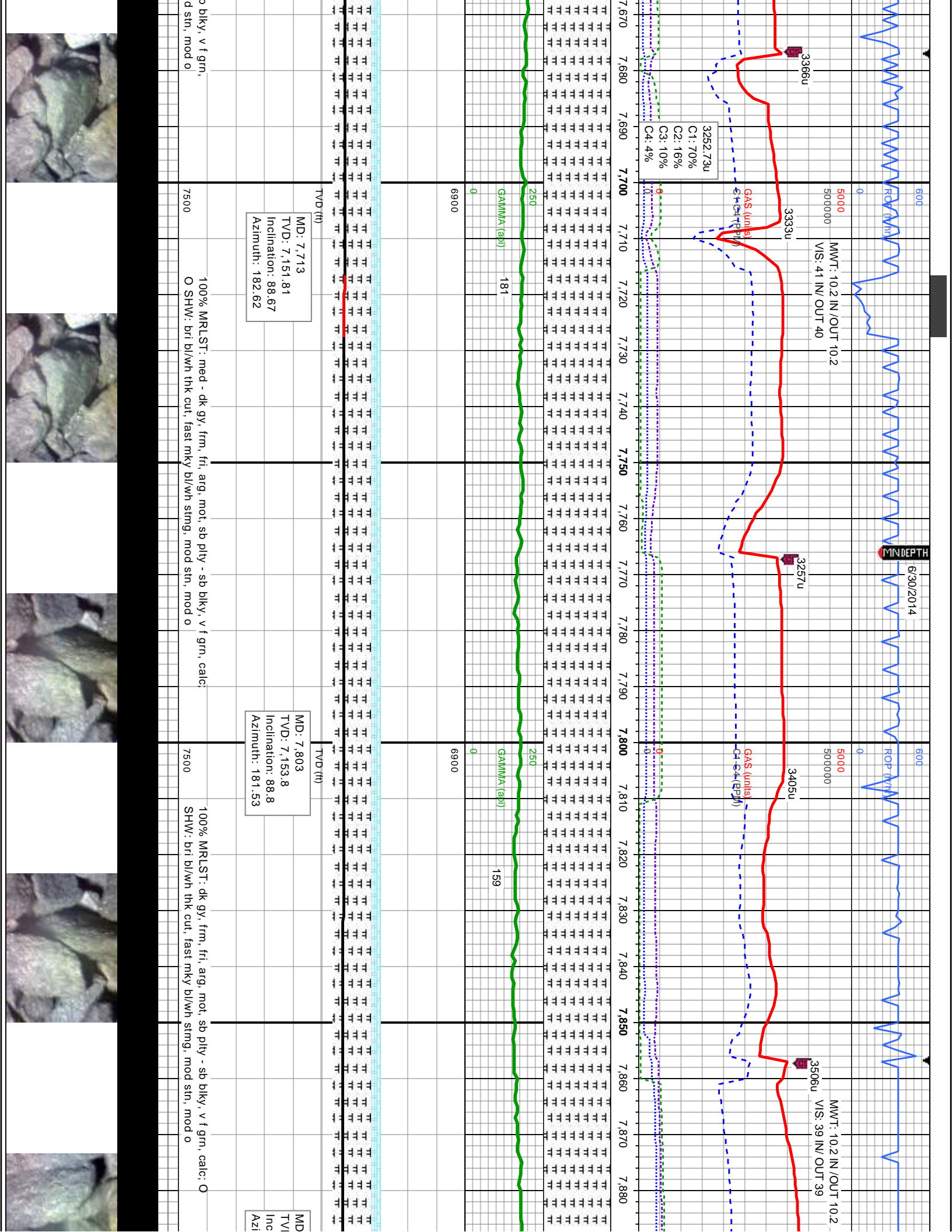
70% CHK: lt - med gy - gy/
blk, v calc, v f grn; 30% MRLST: med -
dk gy/brn, sily tex, arg, fri, sl mot, sft - mod,
calc, sb ply - sb rmd, abnt bent; O SHW: thk mod
bl/wh cut, slow thk bl/wh stmg, mod str, fr o

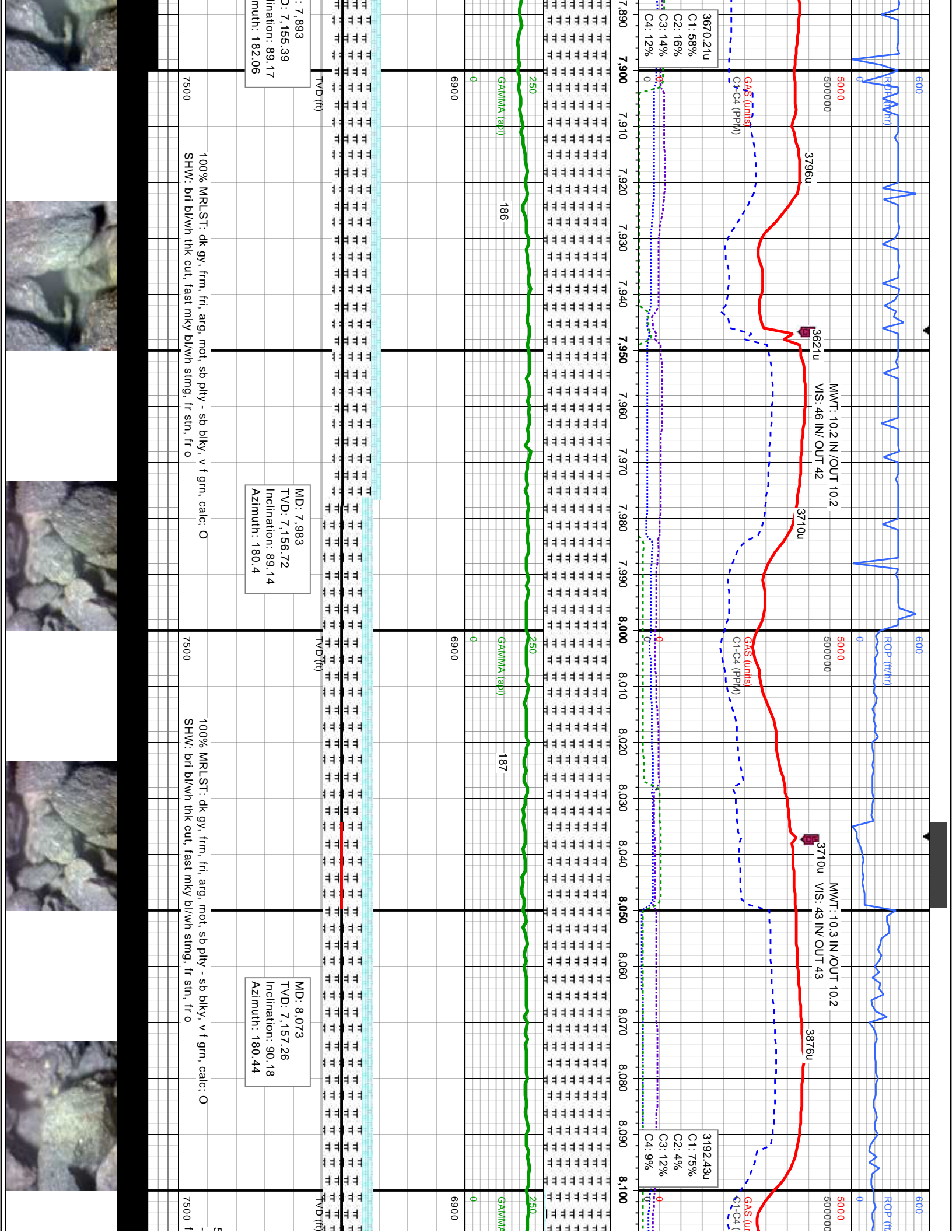
E
G
M
FR
TR
SL

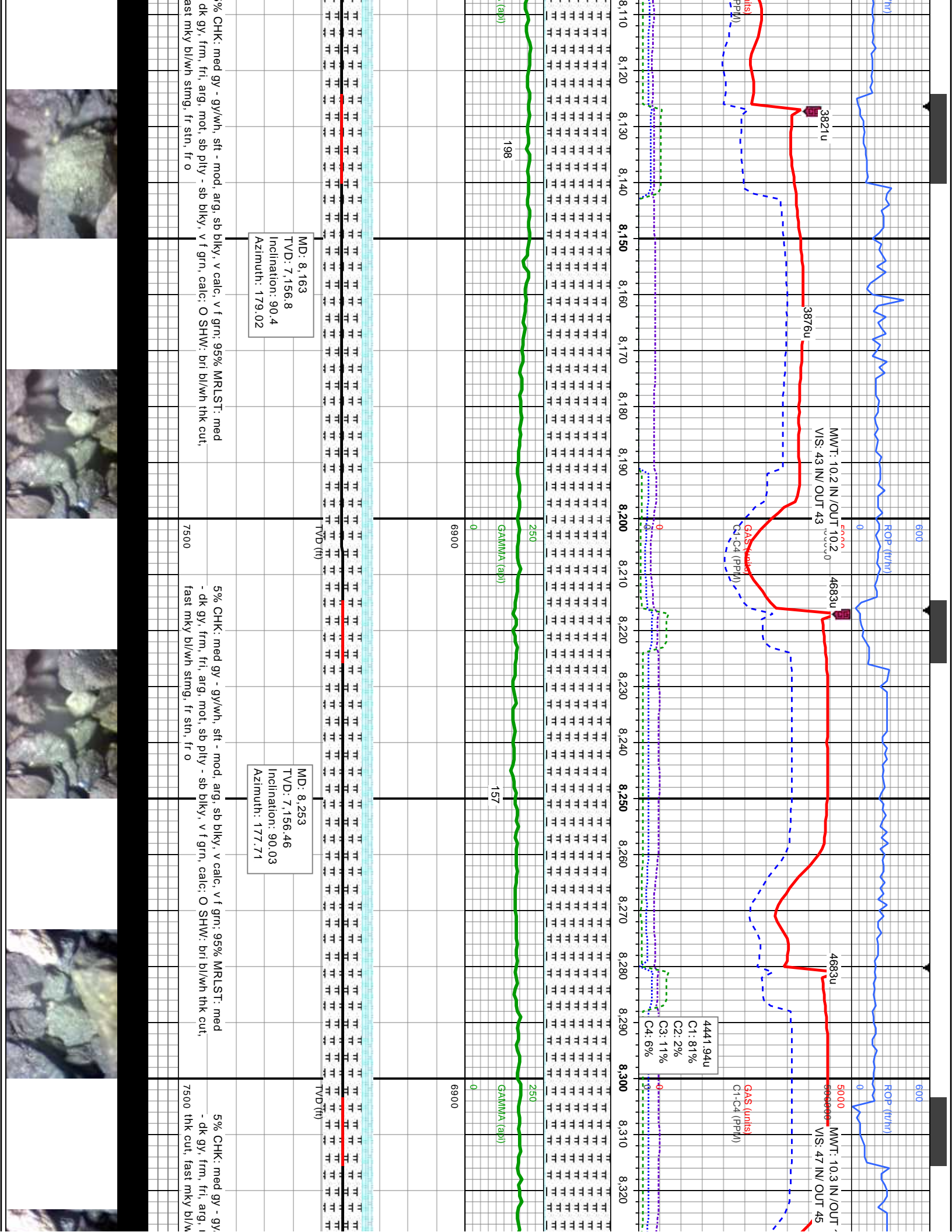


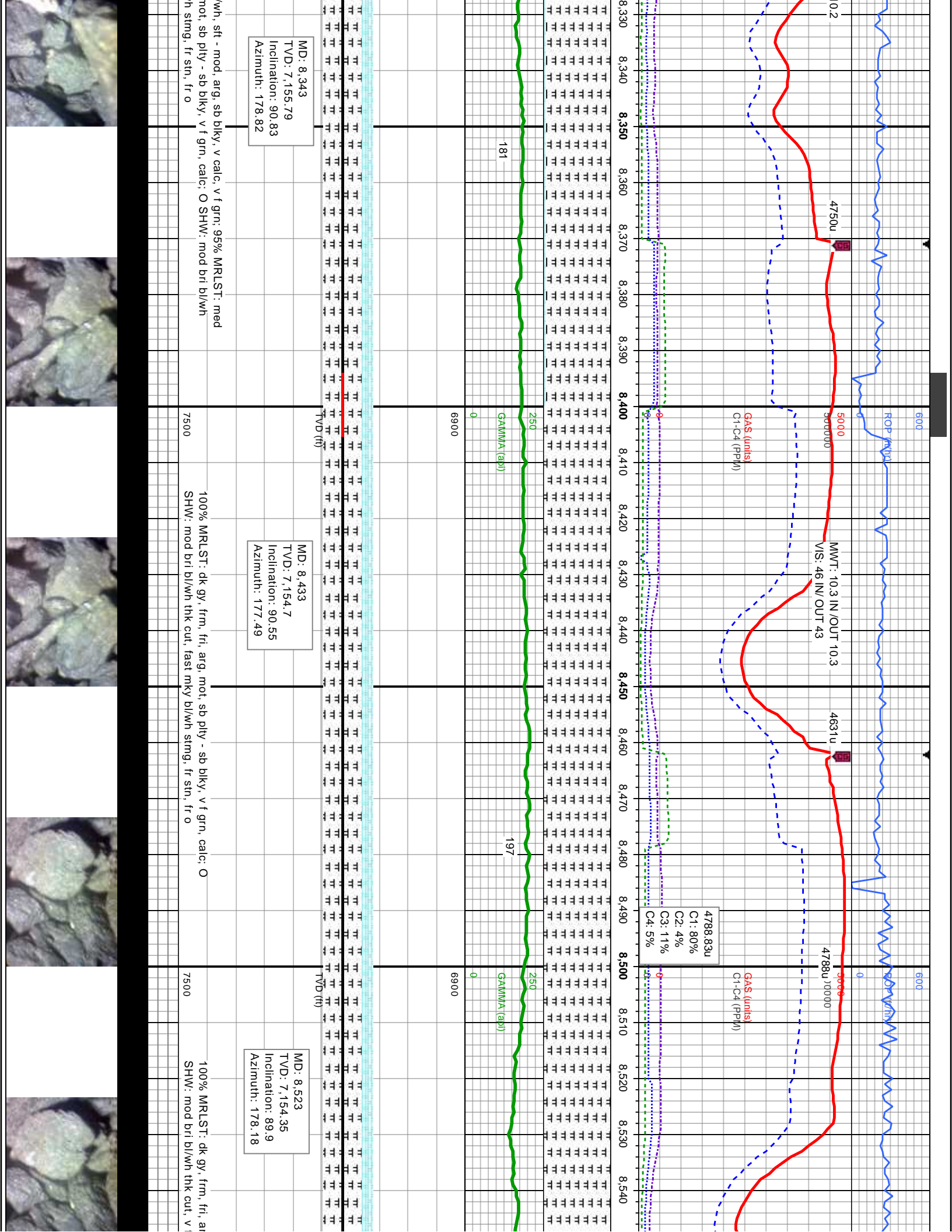


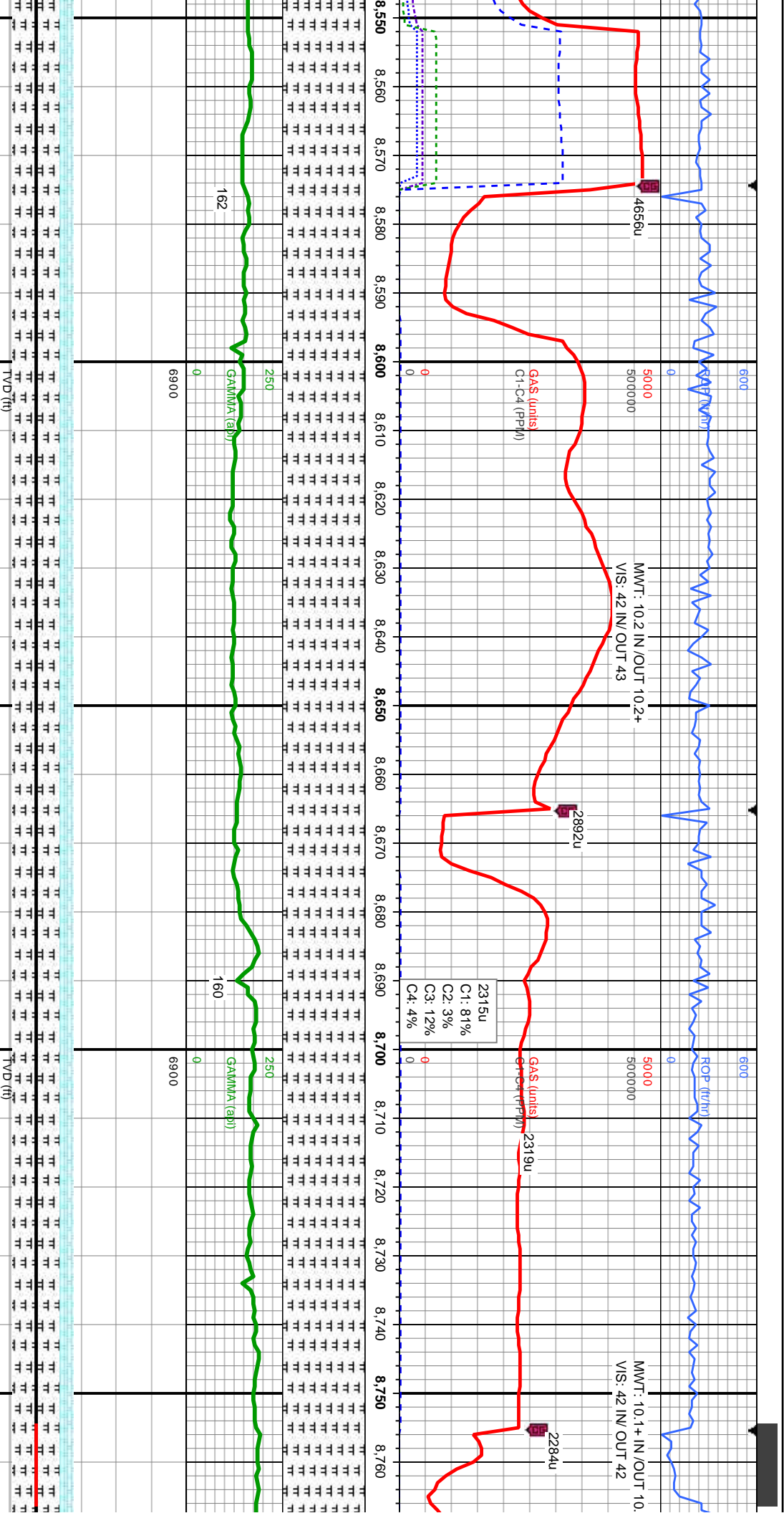










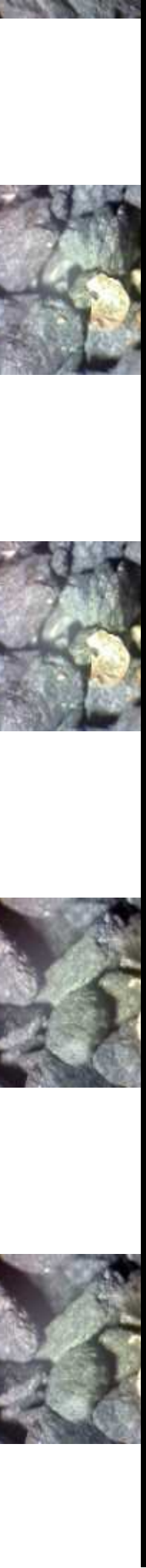


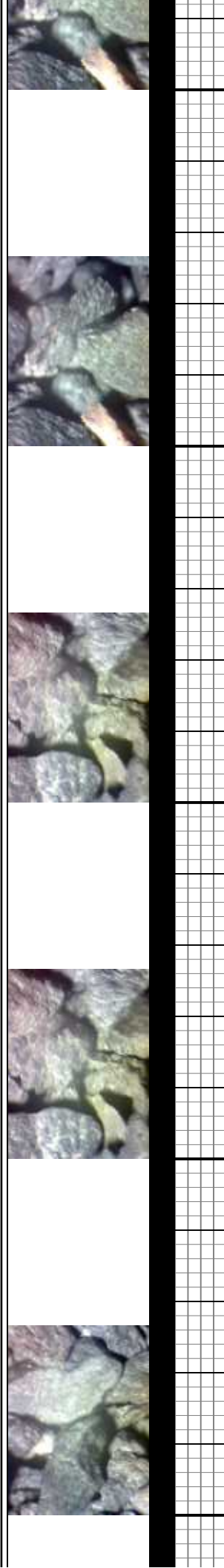
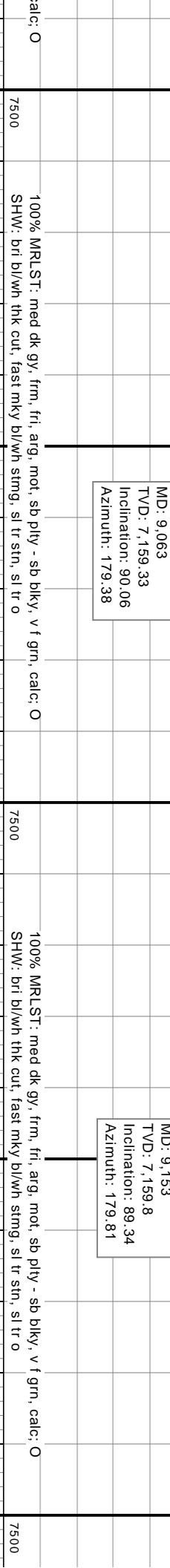
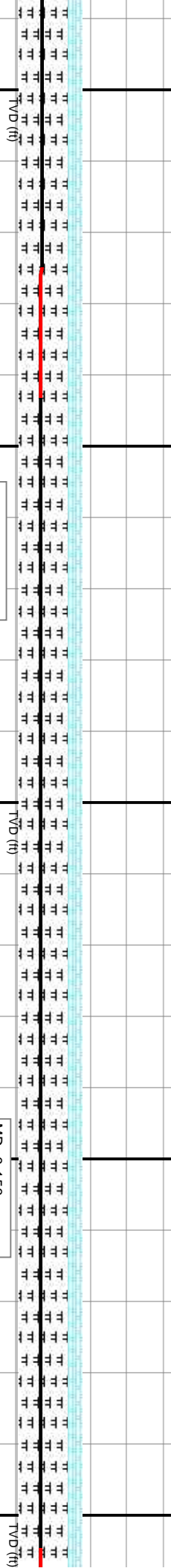
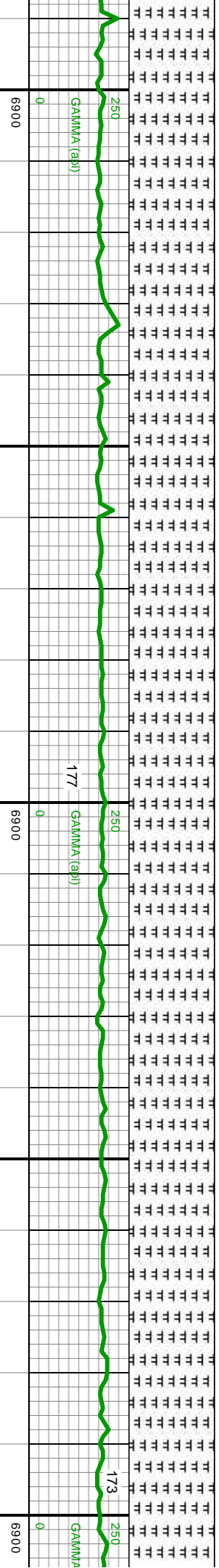
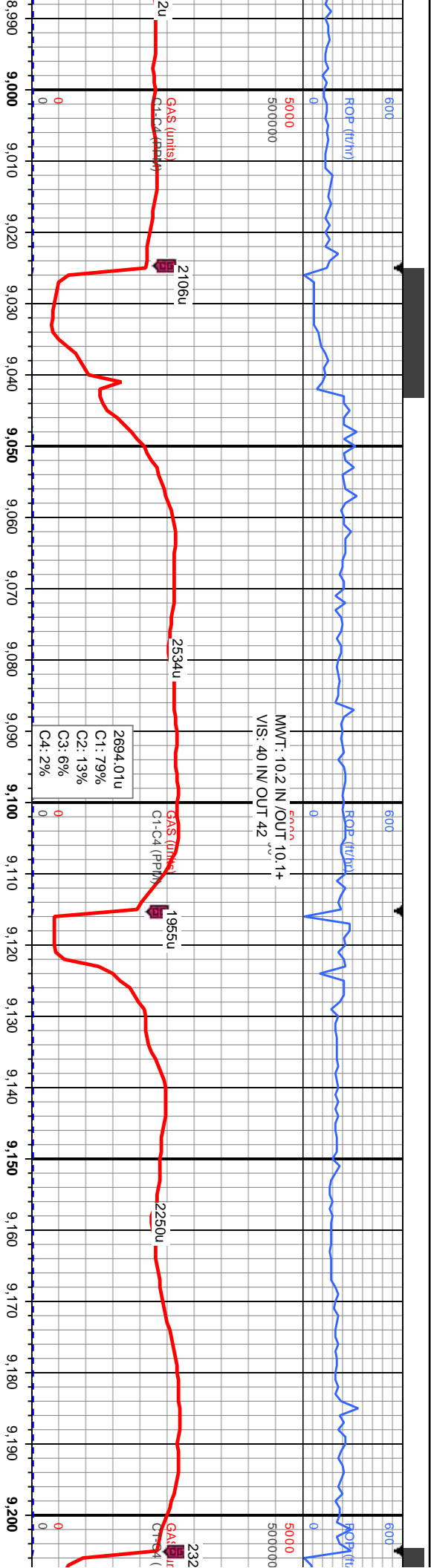
MD: 8.613
TVD: 7,154.53
Inclination: 89.87
Azimuth: 178.93

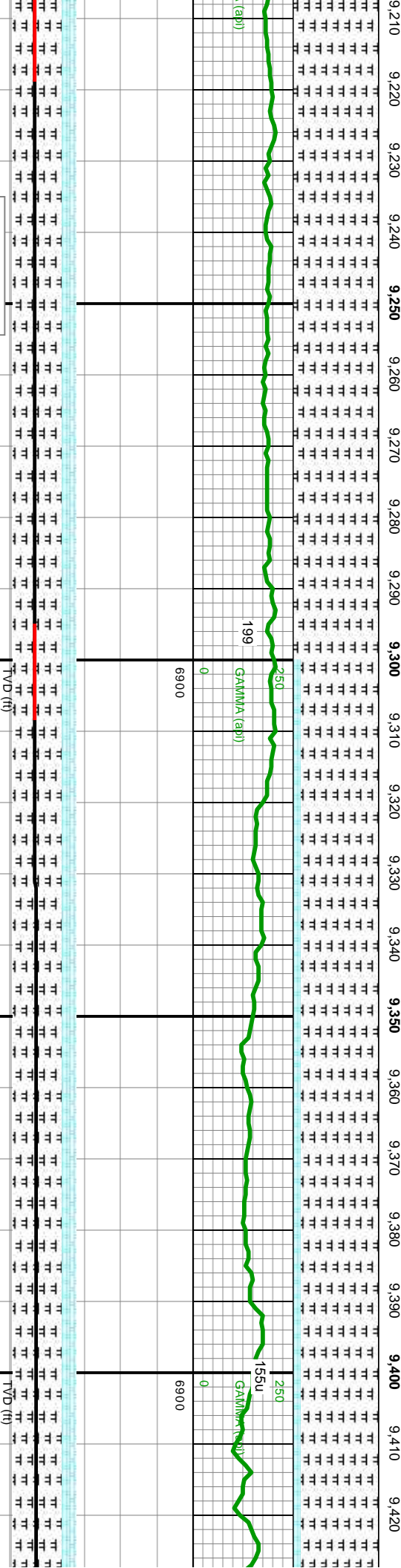
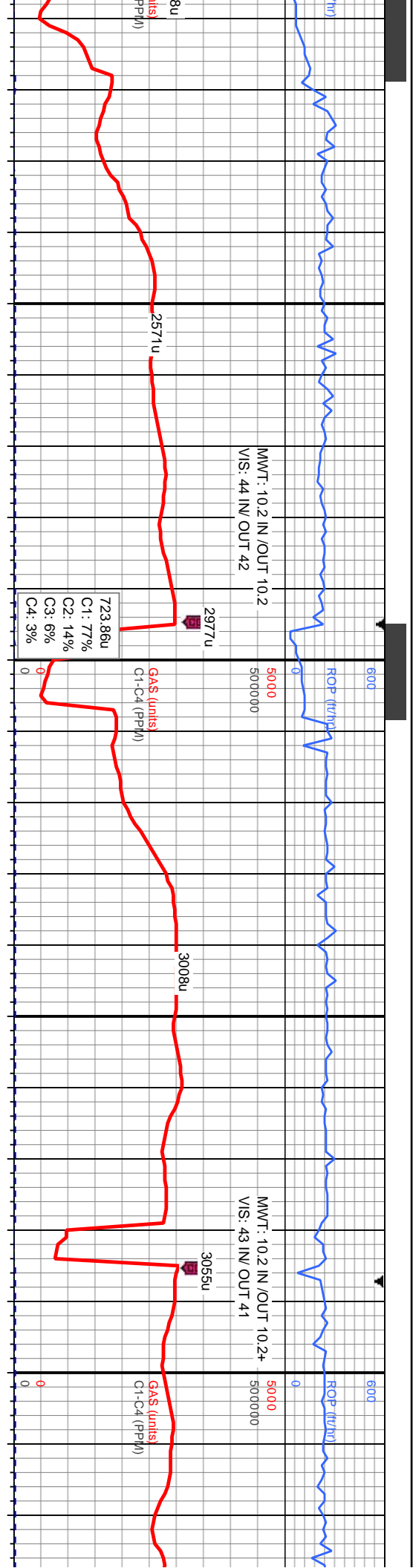
MD: 8.703
TVD: 7,154.98
Inclination: 89.56
Azimuth: 179.2

g, mot, sb pty - sb blk, v f grn, calc: O
fast mky bl/wh stmg, fr str, fr o
100% MRLST: dk gy, frm, fri, arg, mot, sb pty - sb blk, v f grn, calc: O
SHW: bri bl/wh thk cut, fast mky bl/wh stmg, fr str, fr o

100% MRLST: med dk gy, frm, fri, arg, mot, sb pty - sb blk, v f grn, calc: O
SHW: bri bl/wh thk cut, fast mky bl/wh stmg, fr str, fr c







MD: 9,243
TVD: 7,160.11
Inclination: 90.27
Azimuth: 179.82

MD: 9,333
TVD: 7,158.97
Inclination: 91.18
Azimuth: 180.07

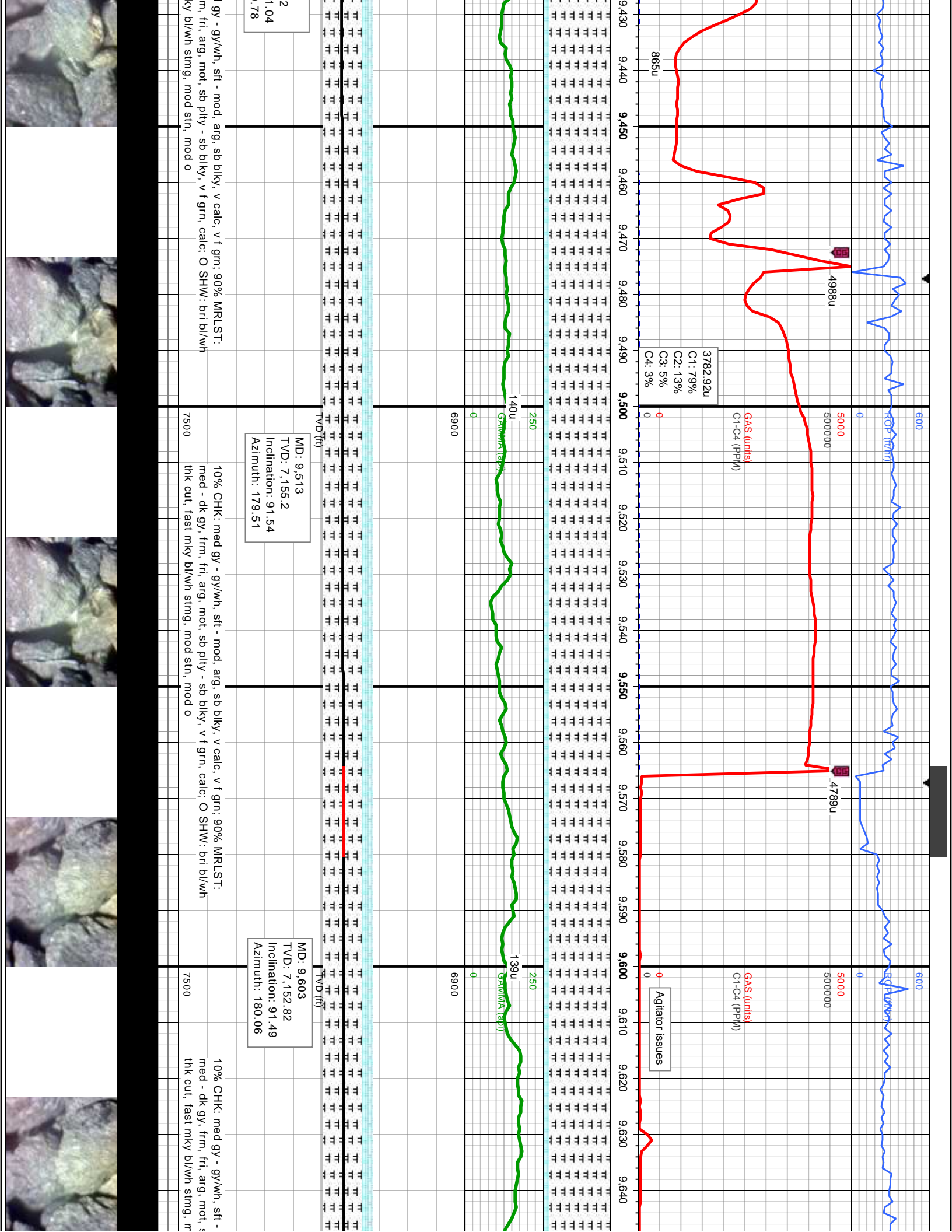
MD: 9,423
TVD: 7,157.2
Inclination: 9
Azimuth: 179

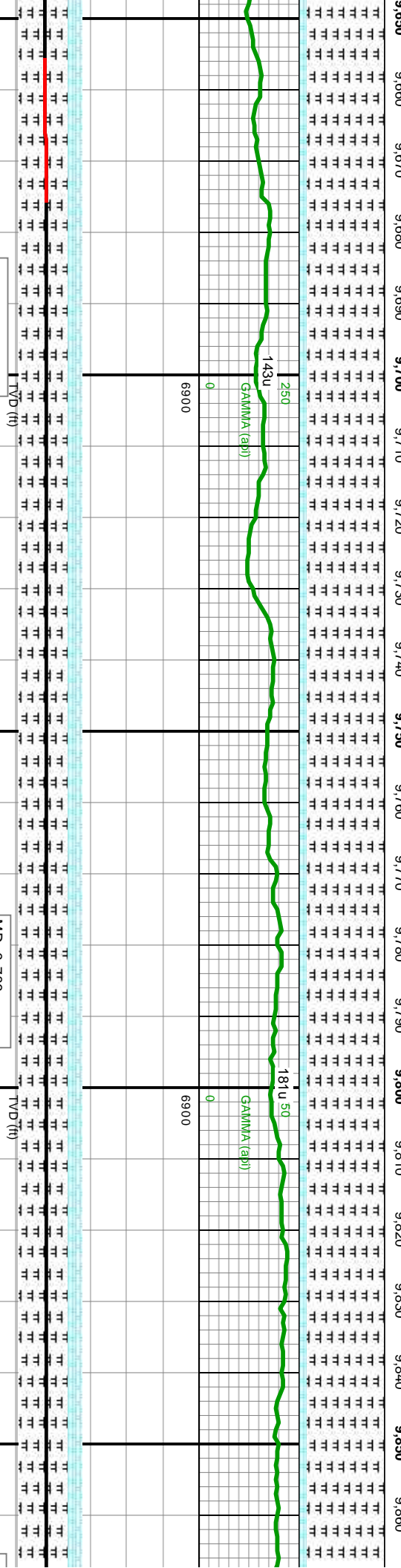
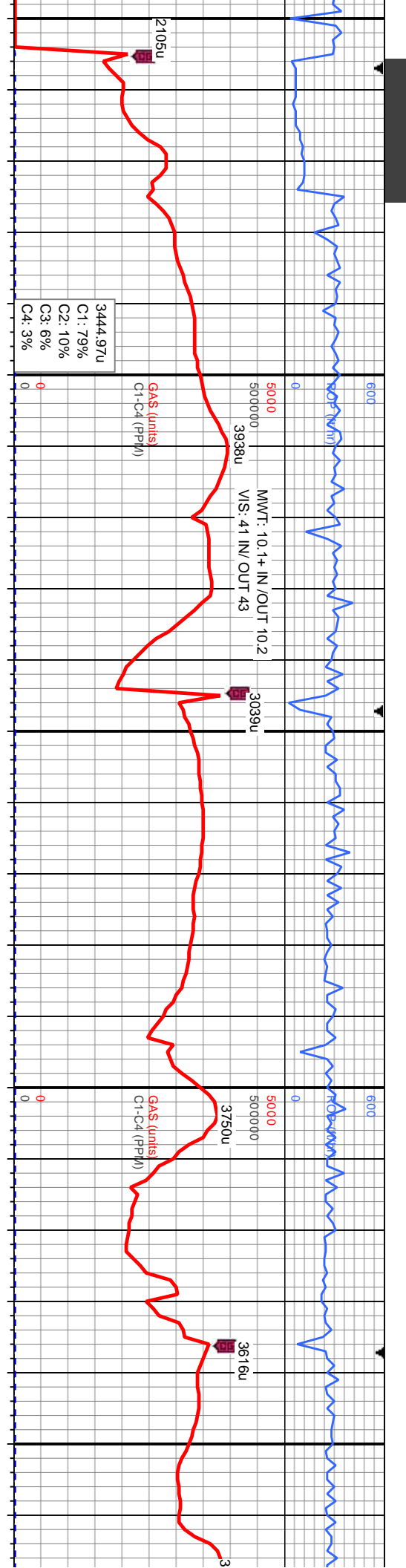
100% MRIST: med dk gy, frm, fri, arg, mot, sb ply - sb blk, v f grn, calc: O
SHW: mod bri bl/wh thk cut, fast mky bl/wh string, sl tr str, sl tr o

10% CHK: med gy - gy/wh, sft - mod, arg, sb blk, v calc, v f grn, 90% MRIST: med
- dk gy, frm, fri, arg, mot, sb ply - sb blk, v f grn, calc: O SHW: bri bl/wh thk cut,
fast mky bl/wh string, mod str, mod o

10% CHK: med
med - dk gy, fr
thk cut, fast m







MD: 9.693
TVD: 7,151.6
Inclination: 90.06
Azimuth: 181.41

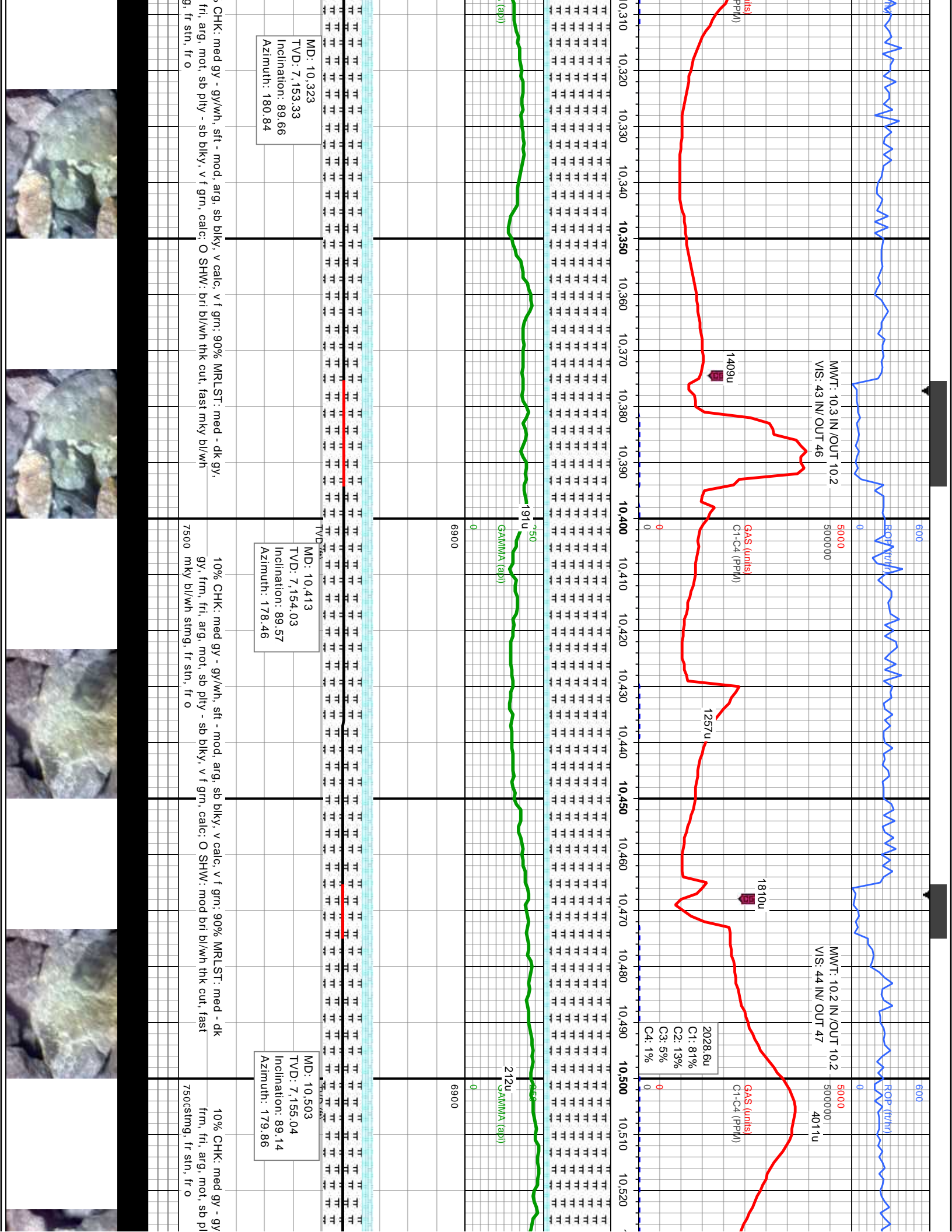
MD: 9.783
TVD: 7,151.55
Inclination: 90
Azimuth: 180.52

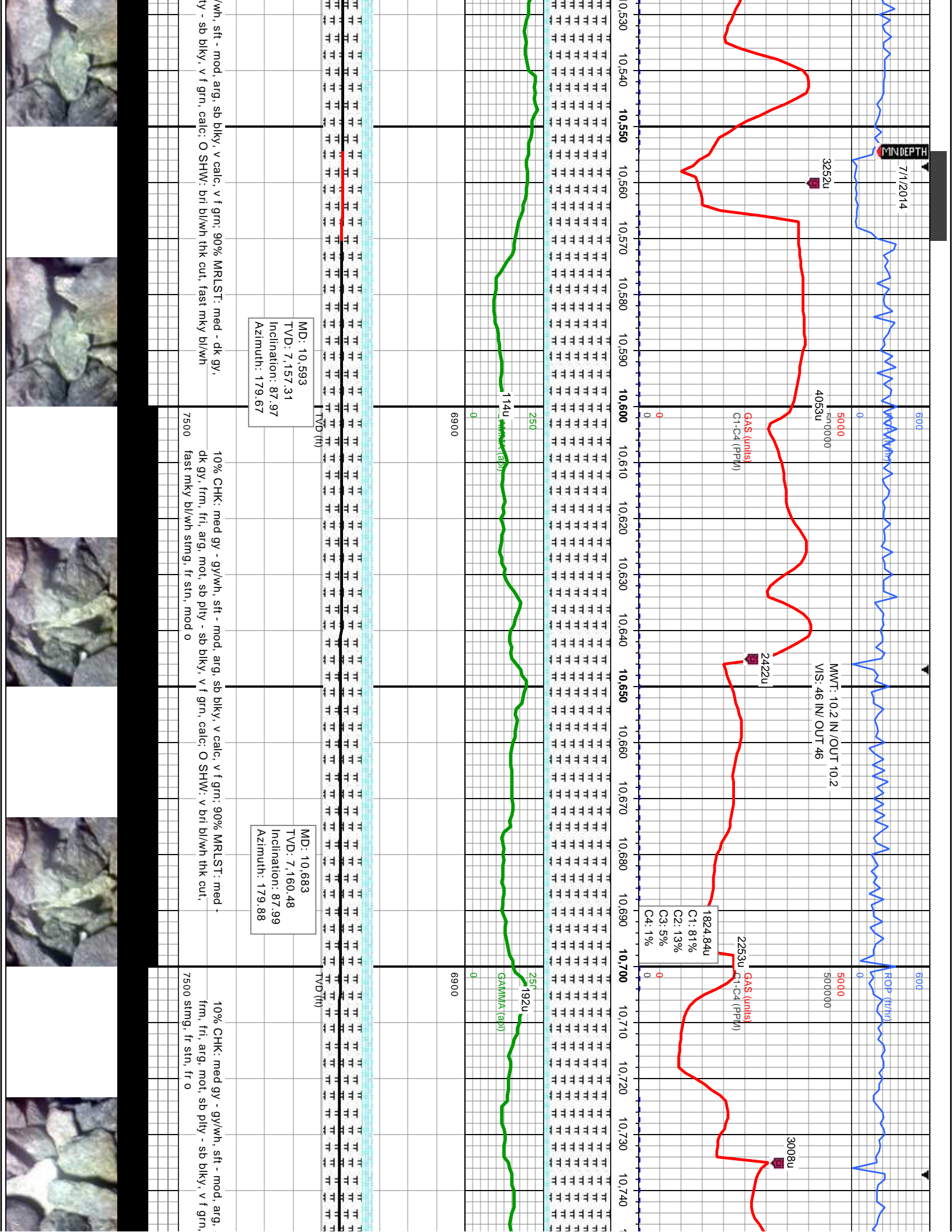
mod. arg, sb blk, v calc, v f grn; 90% MRLST:
sb ply - sb blk, v f grn, calc; O SHW: brl bl/wh
mod sin, mod o

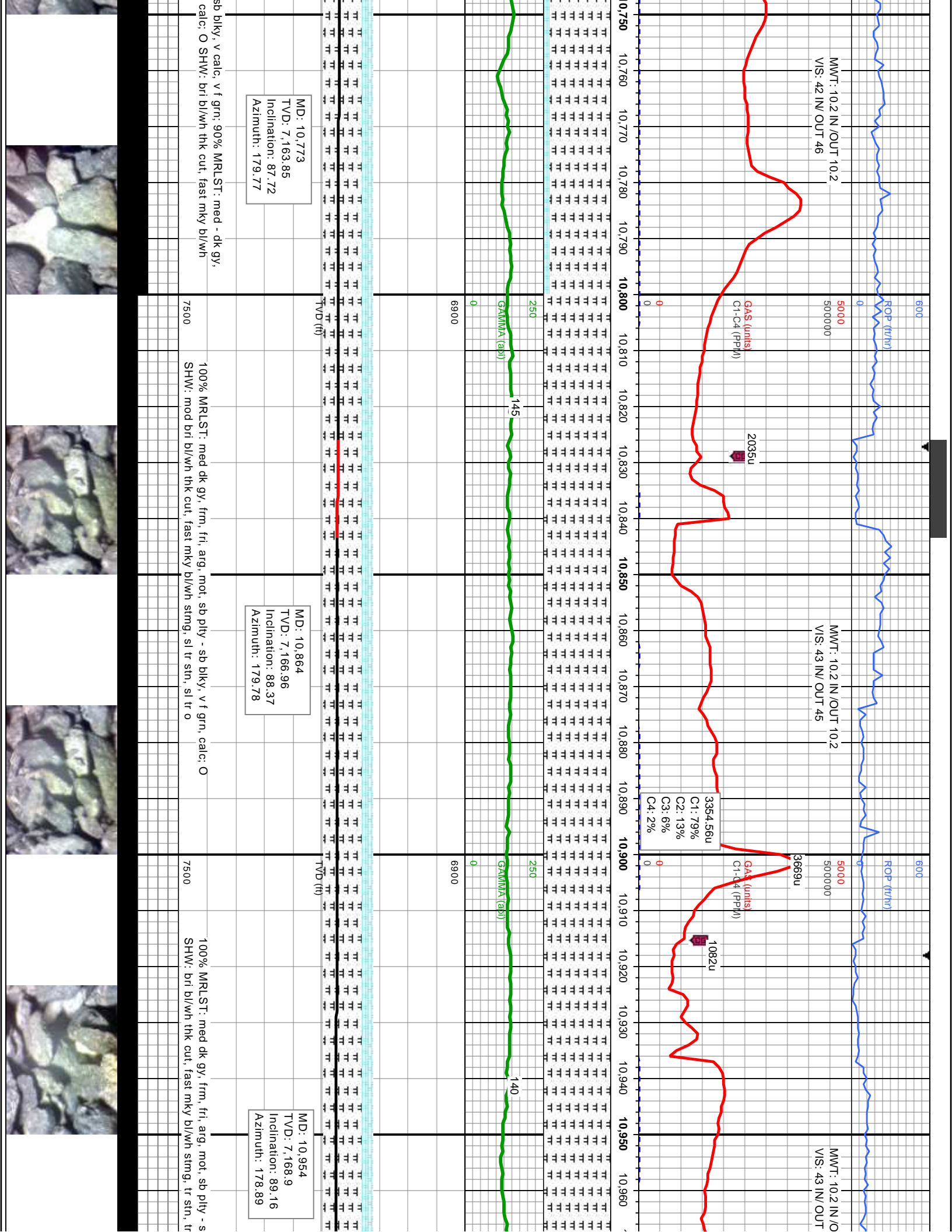
10% CHK: med gy - gy/wh, sft - mod. arg, sb blk, v calc, v f grn; 90% MRLST: med -
dk gy, frm, fri, arg, mot, sb ply - sb blk, v f grn, calc; O SHW: mod brl bl/wh thk cut,
fast mky bl/wh string, sl tr sin, sl tr o

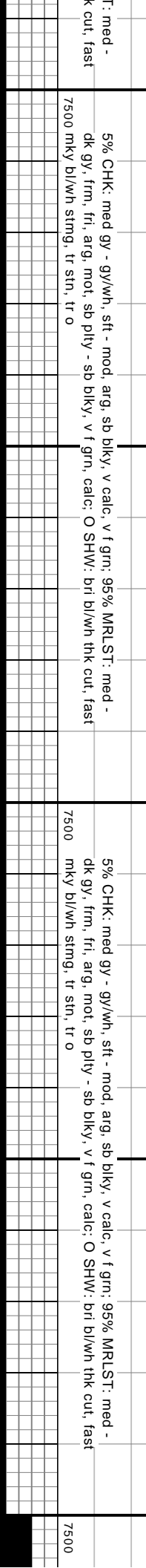
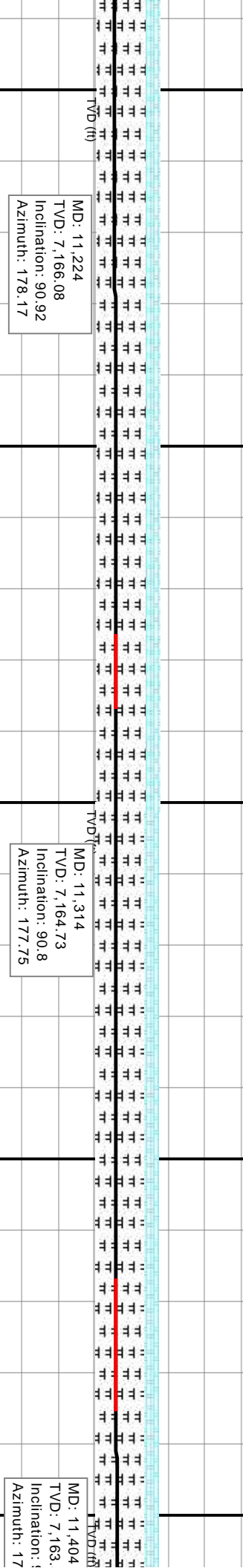
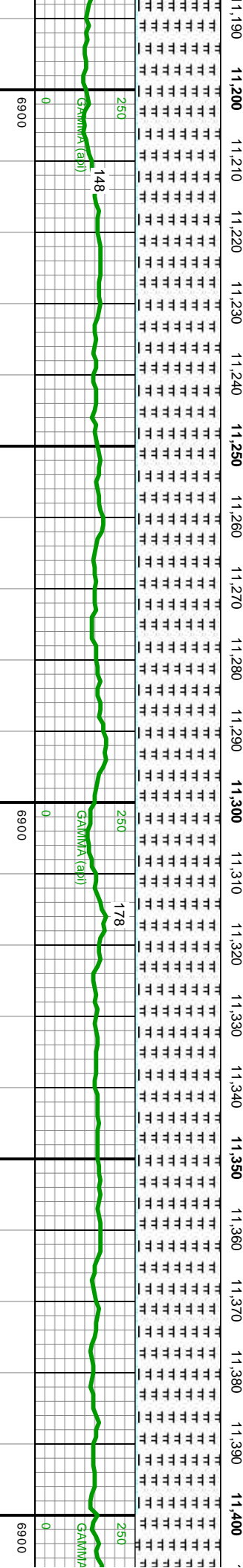
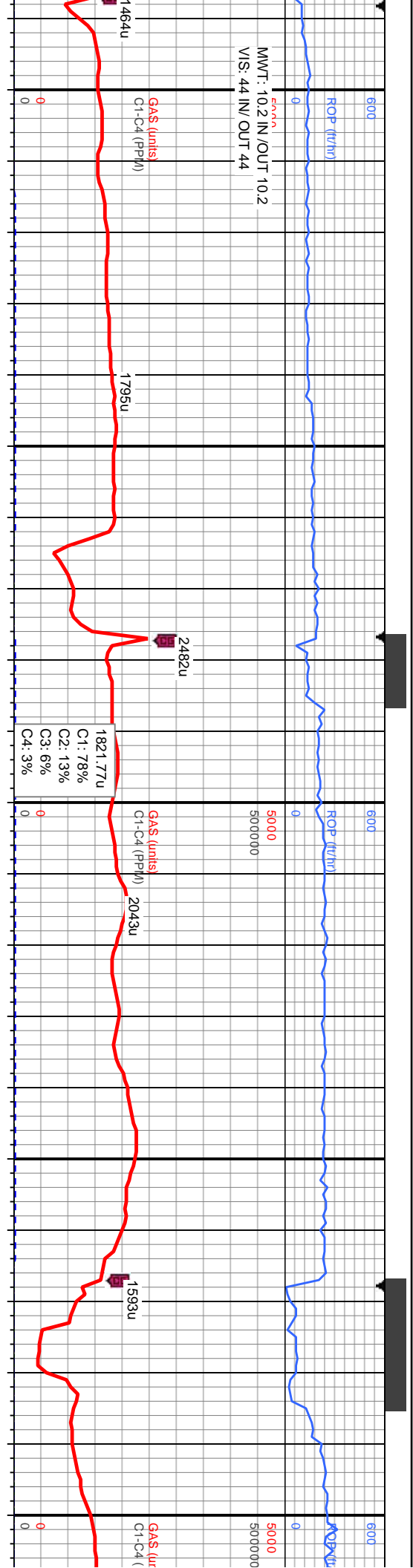
10% CHK: med gy - gy/wh, sft - mod. arg, sb blk, v calc,
- dk gy, frm, fri, arg, mot, sb ply - sb blk, v f grn, calc;
cut, fast mky bl/wh string, sl tr sin, sl tr o

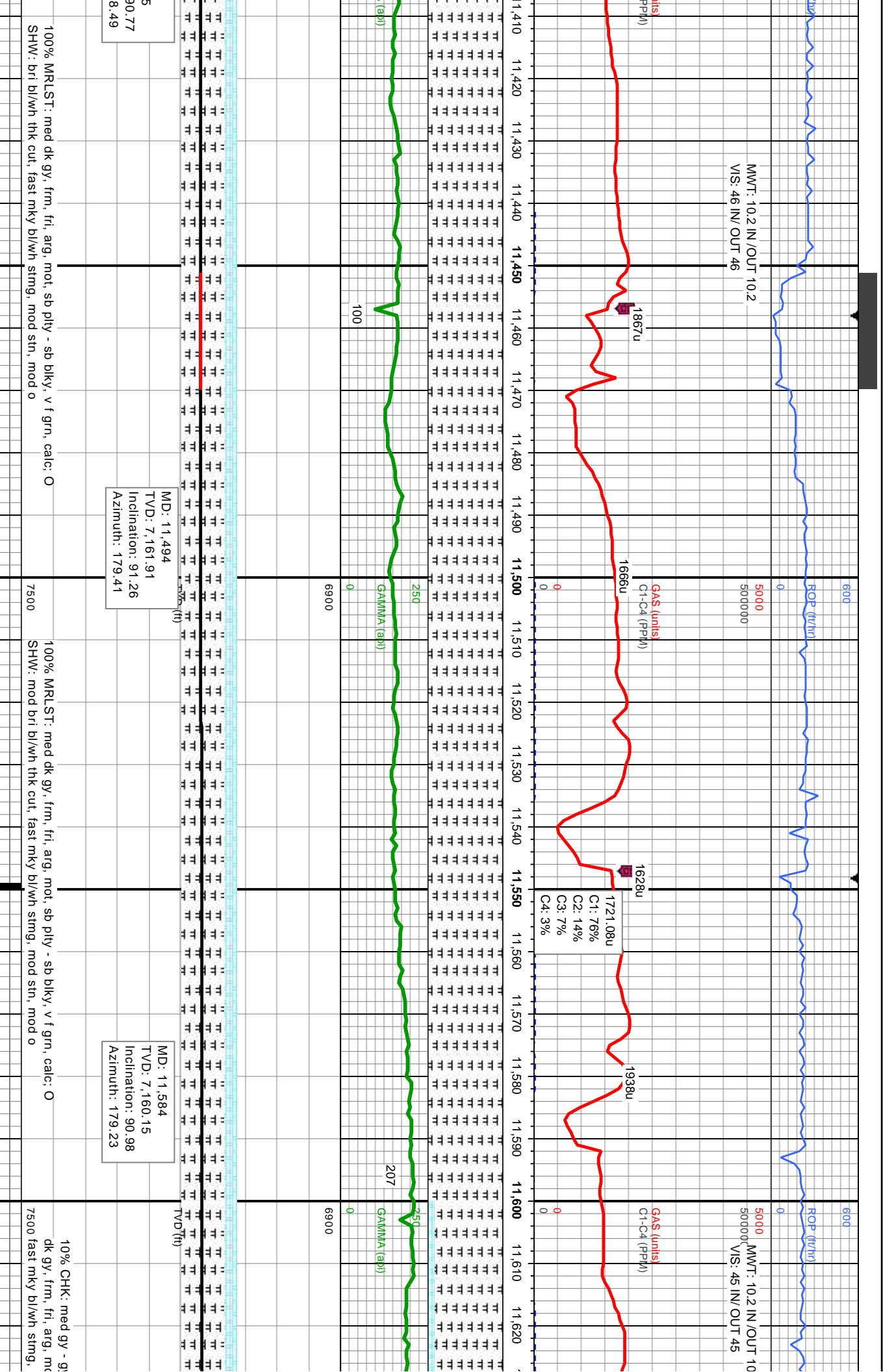
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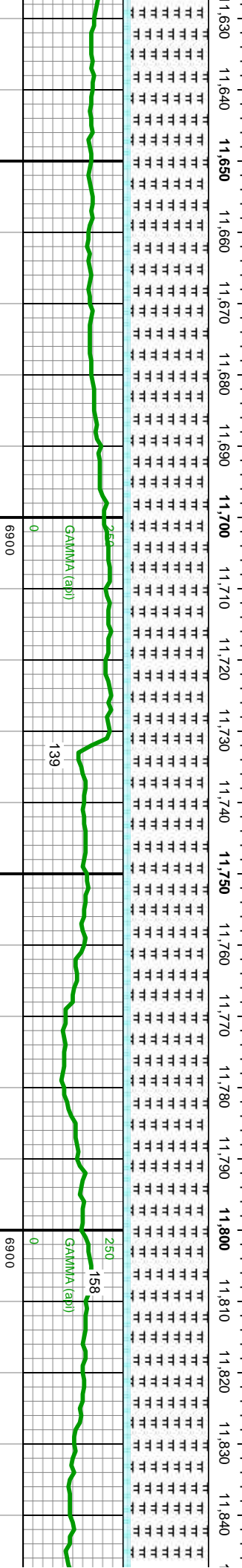
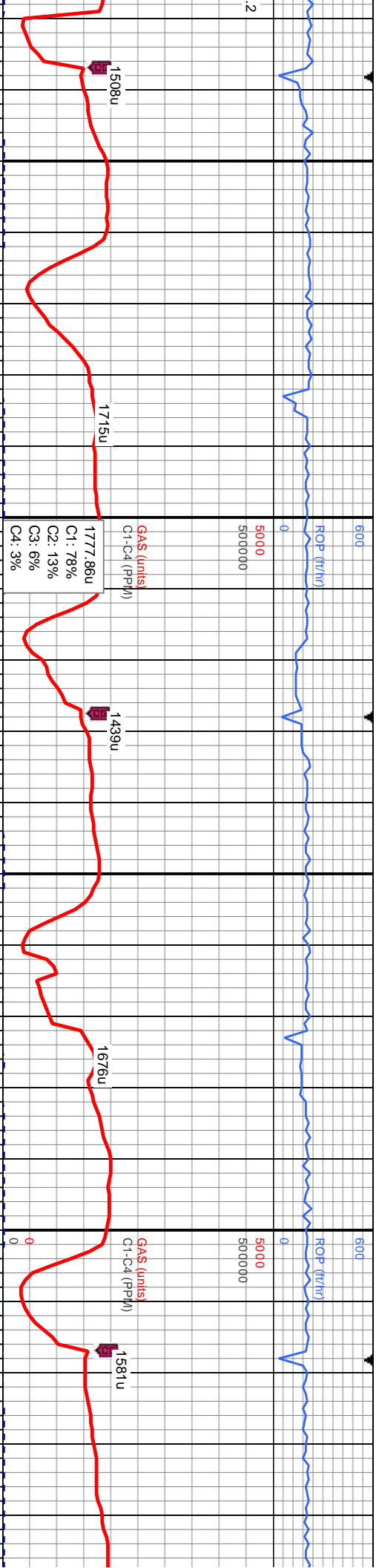












MD: 11,674
TVD: 7,158.9
Inclination: 90.61
Azimuth: 179.1

MD: 11,764
TVD: 7,158.23
Inclination: 90.24
Azimuth: 179.04

wh, sft - mod, arg, sb blkly, v calc, v f grn; 90% MRLST: med -
 t, sb ply - sb blkly, v f grn, calc; O SHW: v bri bl/wh thk cut,
 fr stn, mod o

10% CHK: med gy - gy/wh, sft - mod, arg - sb blk, v calc, v f grn; 90% MRST: med - dk gy, frm, fri, arg, mot, sb ply - sb blk, v f grn, calc; O SHW: bri bl/wh ttk cut, fast mky bl/wh stmg, fr stn, mod o

10% CHK: med gy - gy/wh, sft - mod, arg, sb t
fri, arg, mot, sb ply - sb blky, v f grn, calc; O
7&stn, mod o



