



Scale: 5" / 100'  
Measured Depth Log

**Well Name** Ward W-20-19HC

**Location** Sec 20 T6N R66W

**State** Colorado

**Country** USA

**API Number** 05-123-43654

**County** Weld

**Rig Number** True 38

**AFE #** 43654

**Geographic Region** Bracewell

**Field** Wattenberg

**Spud Date** 6/21/2017

**Drilling Completed** 11/19/2017

**Surface Coordinates** 274 FSL 213 FEL Sec 20 T6N R66W Weld Co, CO

**Bottom Hole Coordinates** 319 FSL 470 FWL Sec 19 T6N R66W Weld Co, CO

**Ground Elevation** 4727'

**K.B. Elevation** 4752'

**Logged Interval** 6000' To 17799'

**Total Depth** 17799'

**Formation** Codell

**Type of Drilling Fluid** OBM

## Operator

**Company** Bayswater Exploration & Production, LLC.

**Address** 730 17th St.  
Denver, CO 80202



## Geologist

**Name** Mark E. Brown

**Company** Bayswater Exploration & Production, LLC.

**Address** 730 17th St.  
Denver, CO 80202

## Other

**Columbine Logging Computer** 6A

**Bloodhound Unit** 273

**Mark Weiderspon** Lead Wellsite Geologist

**Jonathan Broussard** Wellsite Geologist

Zone Color Coding

Oil

Note

Error

Condensate

Core

Water

Gas

Pressure

Seal

Rock Types

UNKNOWN

ANHYDRITE

BENTONITE

BRECCIA

CHALK

CEMENT

CHERT

CLAY CHOKE SANC

CLAYSTONE

COAL

CONGLOMERATE

DOLOMITE

DOLOMITIC LIMESTONE

GRANITE

GYPSUM

IGNEOUS

SIDERITE or LIMONITE

LIMESTONE

MARLSTONE

METAMORPHIC

NO SAMPLE

SALT

SANDSTONE

SALT-PEPPER SANC

SHALE

SHALE COLORED

SHALE GRAY

SHALY SANDSTONE

SHALY SILSTONE

SILTY SHALE

SILTSTONE

TILL

TUFF

WELDED TUFF

Accessories

GASTROPOD

INOCERAMUS

OOLITE

OSTRACOD

PELECYOD

PELLET

PISULITE

PLANT REMAINS

PLANT SPORES

SCAPHOPOD

STROMATOPOROID

ARGILLITE GRAIN

B BENTONITE

BITUMENOUS SUBSTANCE

BRECCIA FRAGMENTS

CALCAREOUS

CARBONACEOUS FLAKES

CHTDK

CHTLT

COAL - THIN BEDS

DOLOMITIC

FELDSPAR

FERRUGINOUS PELLET

FERRUGINOUS

GLAUCONITE

GYPSIFEROUS

HEAVY MINERAL

K KAOLIN

MARCASITE

TT MARLSTONE

MICACEOUS

MINERAL CRYSTALS

NODULES

PHOSPHATE PELLETS

P PYRITE

SALT CAST

SANDY

SIDERITE

SILICEOUS

SILTY

TUFFACEOUS

ANHYDRITE STRINGER

BENTONITE STRINGER

COAL STRINGER

DOLOMITE STRINGER

GYPSUM STRINGER

LIMESTONE STRINGER

MARLSTONE (CALC) STRG

MARLSTONE (DOL) STRG

SANDSTONE STRINGER

SHALE STRINGER

SILTSTONE STRINGER

Oil Show

PINPOINT

VUGVY

Engineering

DEAD

EVEN

QUESTIONABLE

BIT

SPOTTED STAINING

CONNECTION (UP)

Porosity

CONNECTION (DOW)

CONNECTION GAS

TRIPP GAS

FRACTURE

TRIPP GAS (LEFT)

INTERCRYSTALLINE

DOWN TIME GAS

INTEROOLLTIC

DOWN TIME GAS






































MOLDIC

CORE - LOST

ORGANIC

CORE - RECOVERED

Other Symbols

	DST INTERVAL		WIRELINE TESTED - LEFT		E EARTHY
	FAULT		WIRELINE TESTED - RT		FX FINELYXLN
	FORMATION TOP		DRILL STEM TEST		BS GRAINSTONE
	GAS SHOW		MIN DEPTH		L LITHOGRAPHIC
	OIL SHOW				MX MICROXLN
	MIN DEPTH UP	<b>Rounding</b>			
					MX MUDSTONE
	MIN DEPTH (DOWN)		ANGULAR		PS PACKSTONE
	NORMAL FAULT		ROUNDED		WX WACKSTONE
	OVERTURNED STRATA		SUBANG		
	REVERSE FAULT		SUBRND		
<b>Sorting</b>					
	CASING				M MODERATE
<b>Textures</b>					
	SIDEWALL CORE (LEFT)				P POOR
	SIDEWALL CORE (RIGHT)		BOUNDSTONE		W WELL
	SLIDE		CHALKY		
	SURVEY		CRYPTOXLN		

ROP  
ROP

COLUMBINE LOGGING RIGGED UP 11/14/2017  
MANNED 2-PERSON LOGGING from 6000MD  
0050 hrs MDT 11/15/2017  
TD 17799' MD 1325 hrs 11/19/2017

Survey, Gamma, ROP Data provided by  
Baker Hughes  
Rotary Steerable BHA

Total Gas & Chromatograph

GAS  
C1  
C2  
C3  
C4

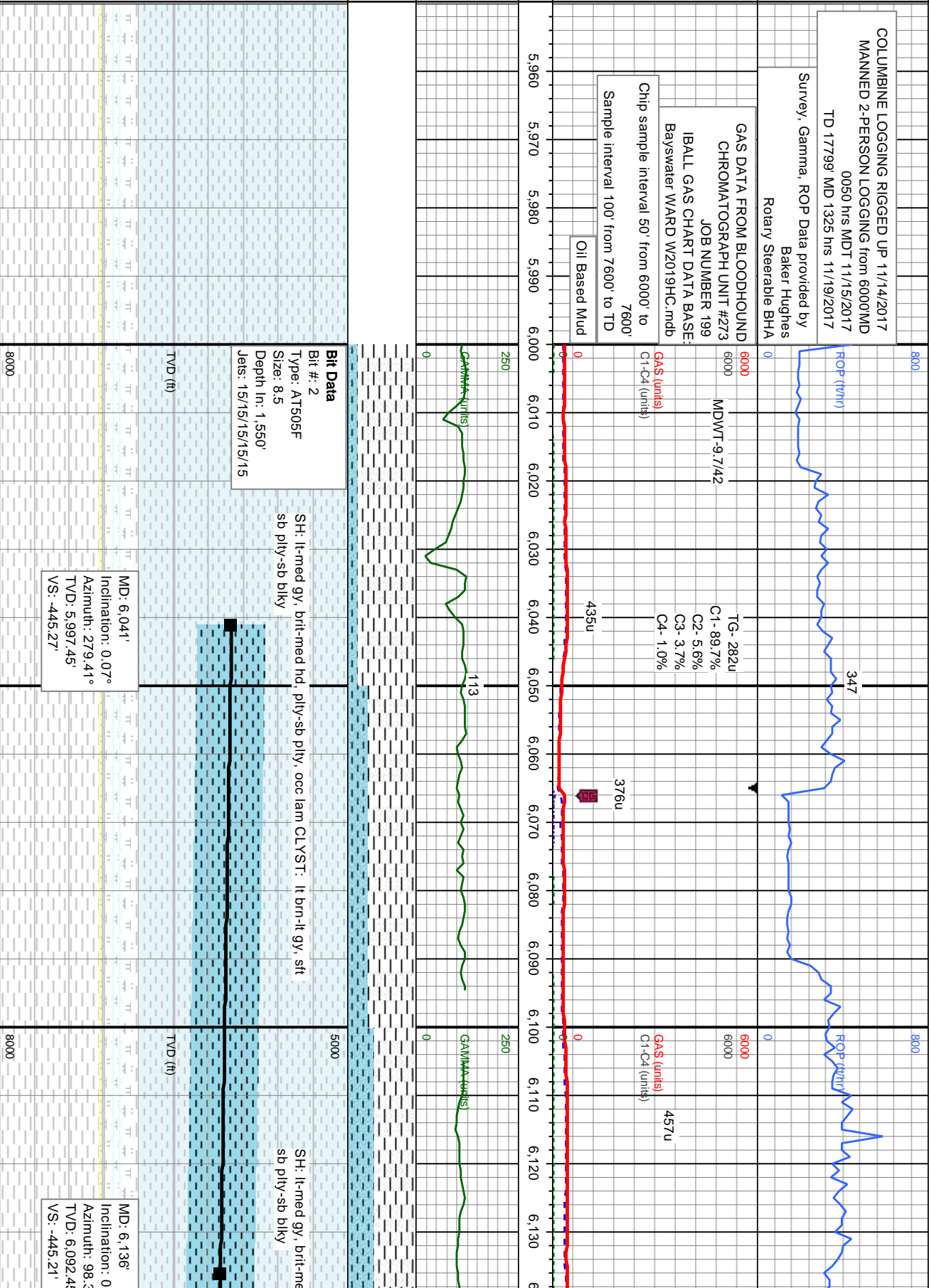
Depth Labels

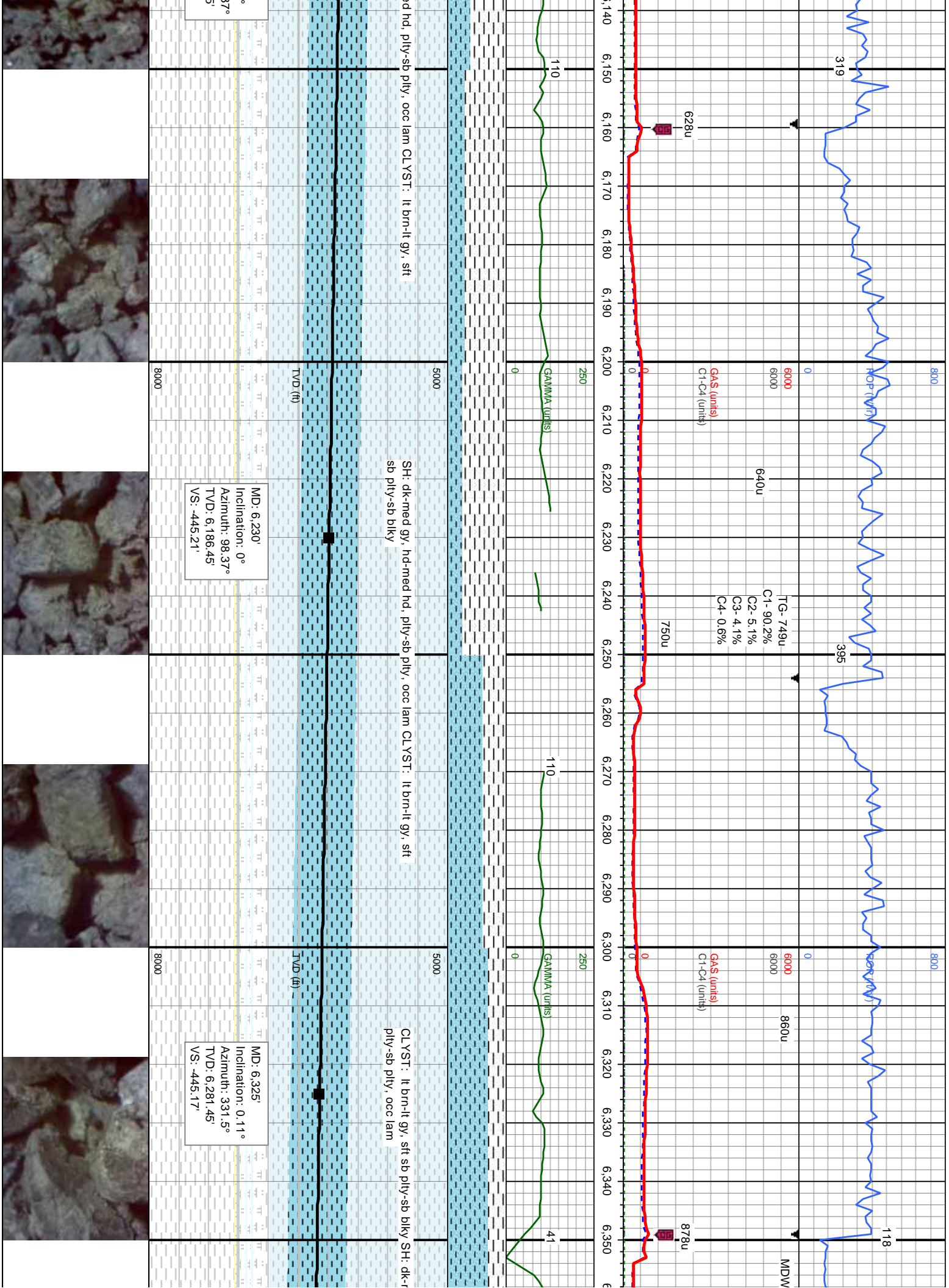
Gamma  
GAMMA

% Lith

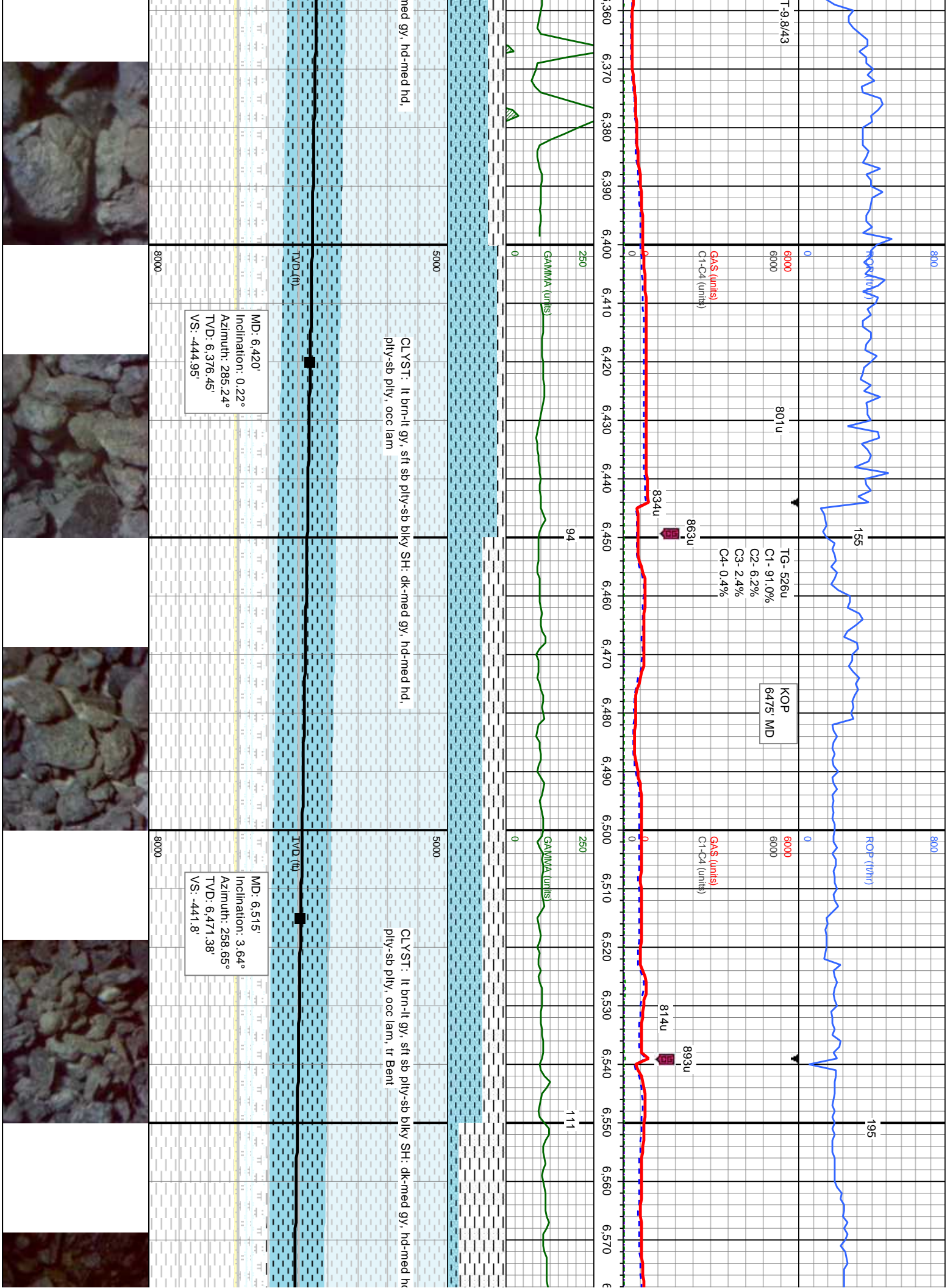
Well Bore  
TVD

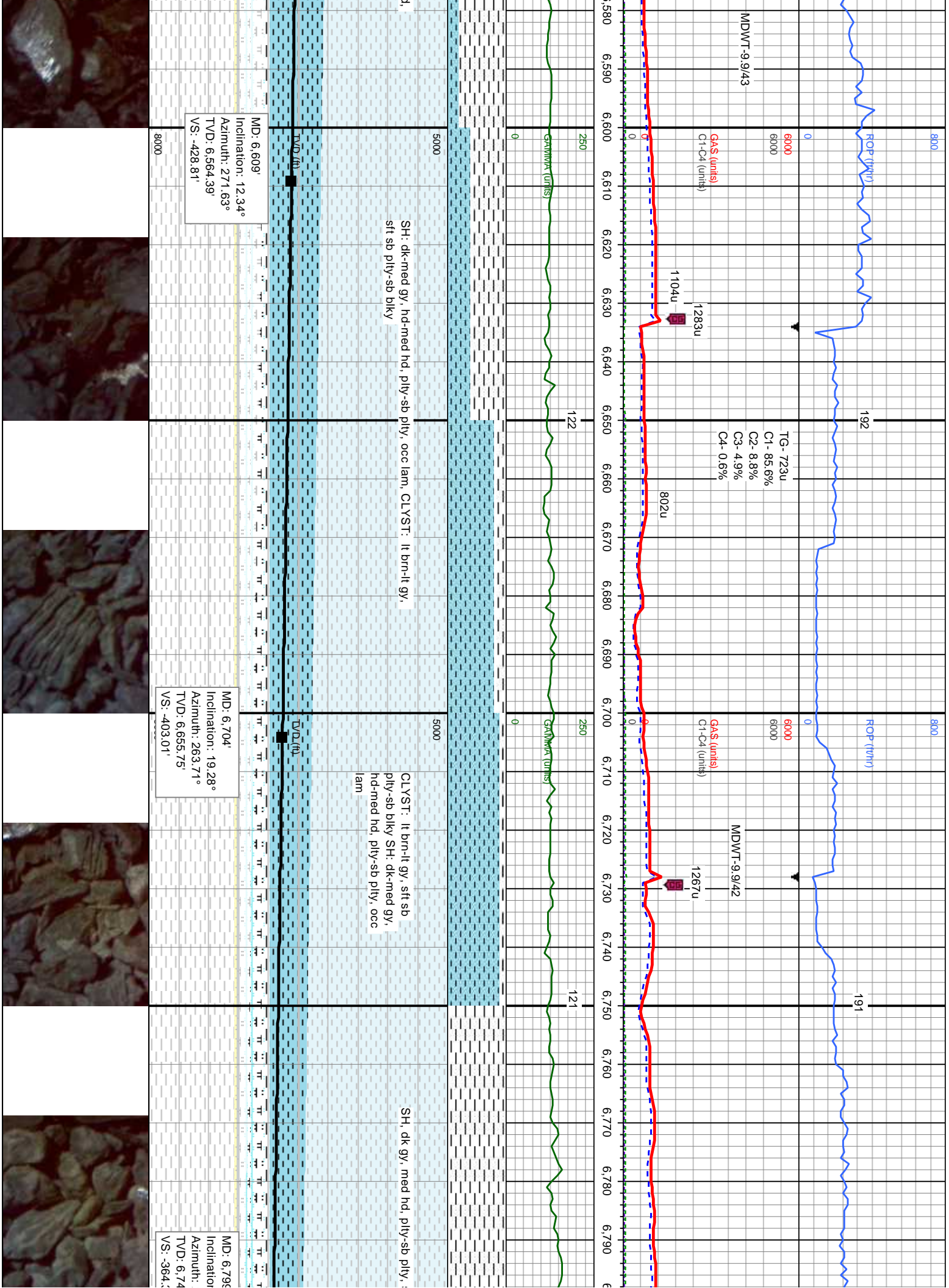
Images

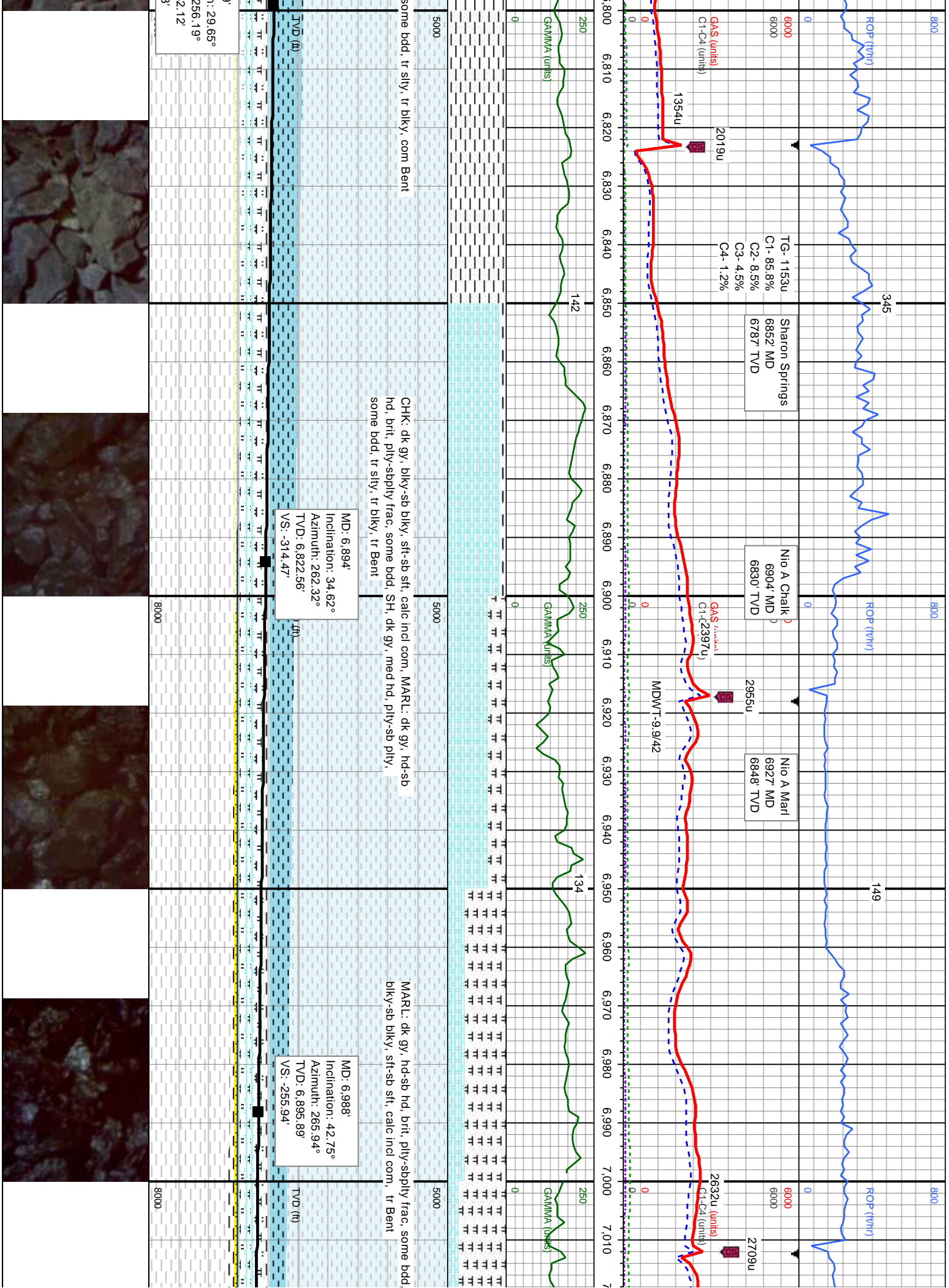






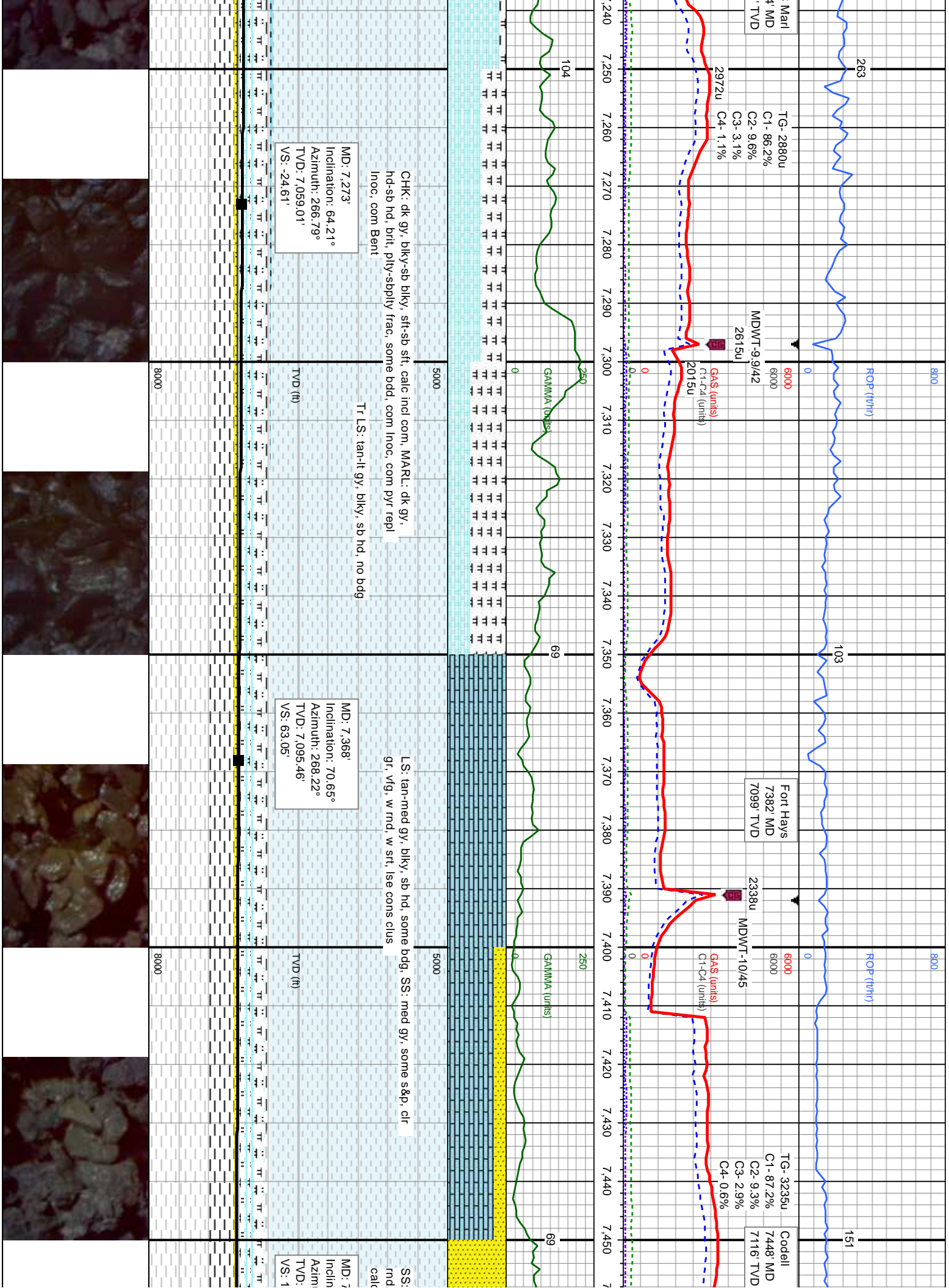


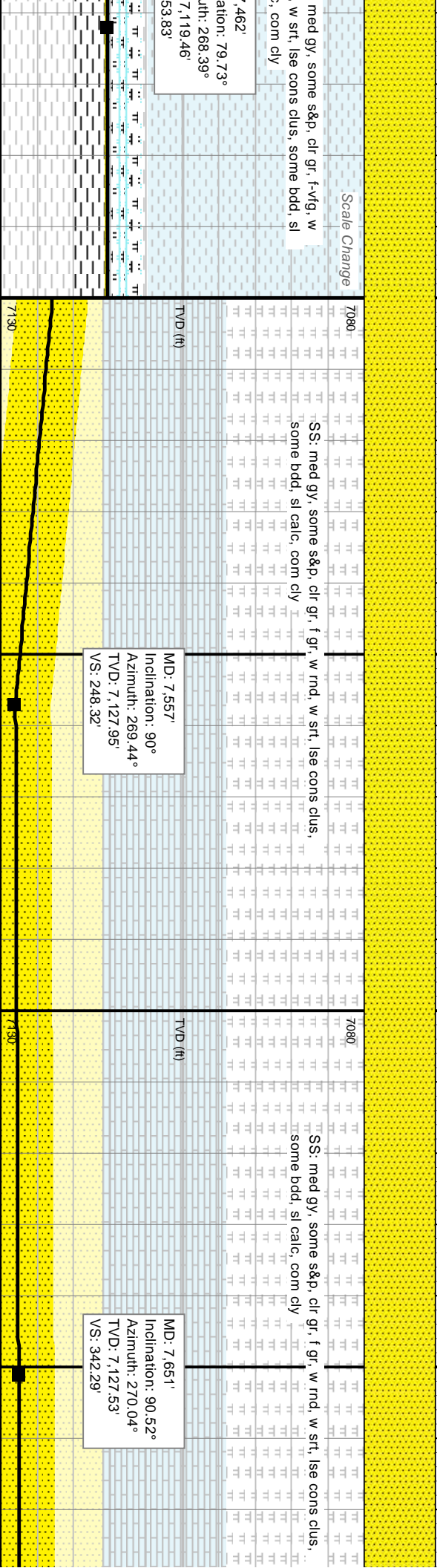
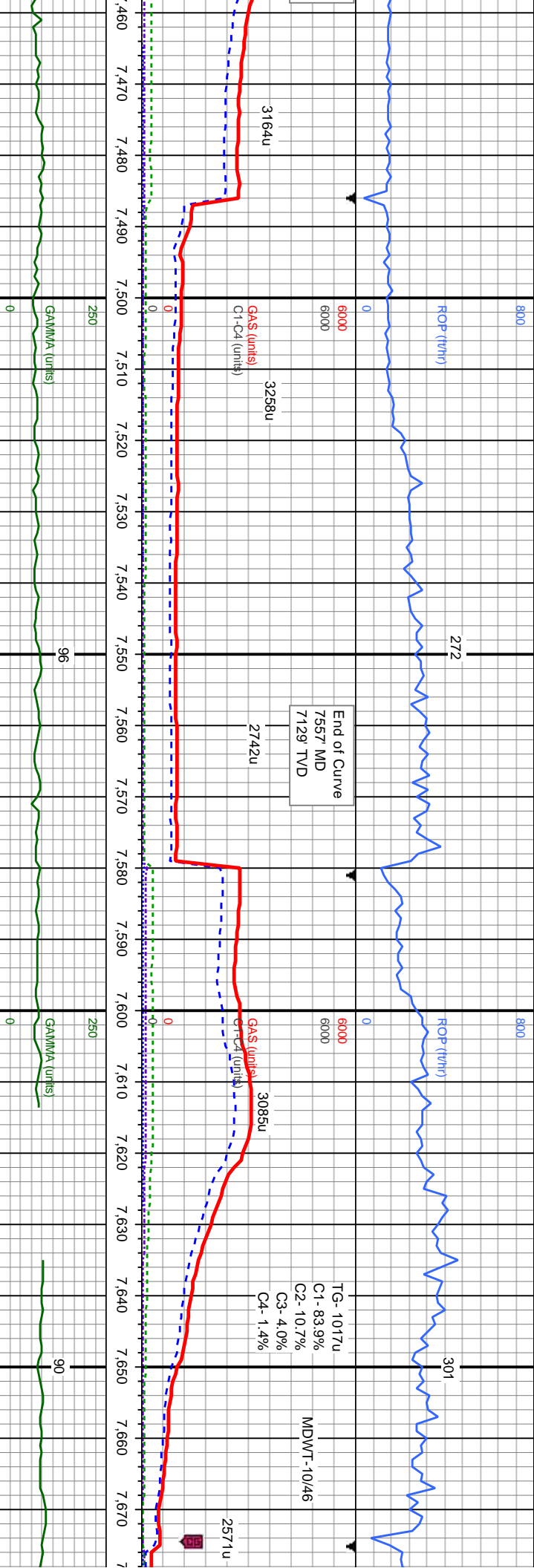




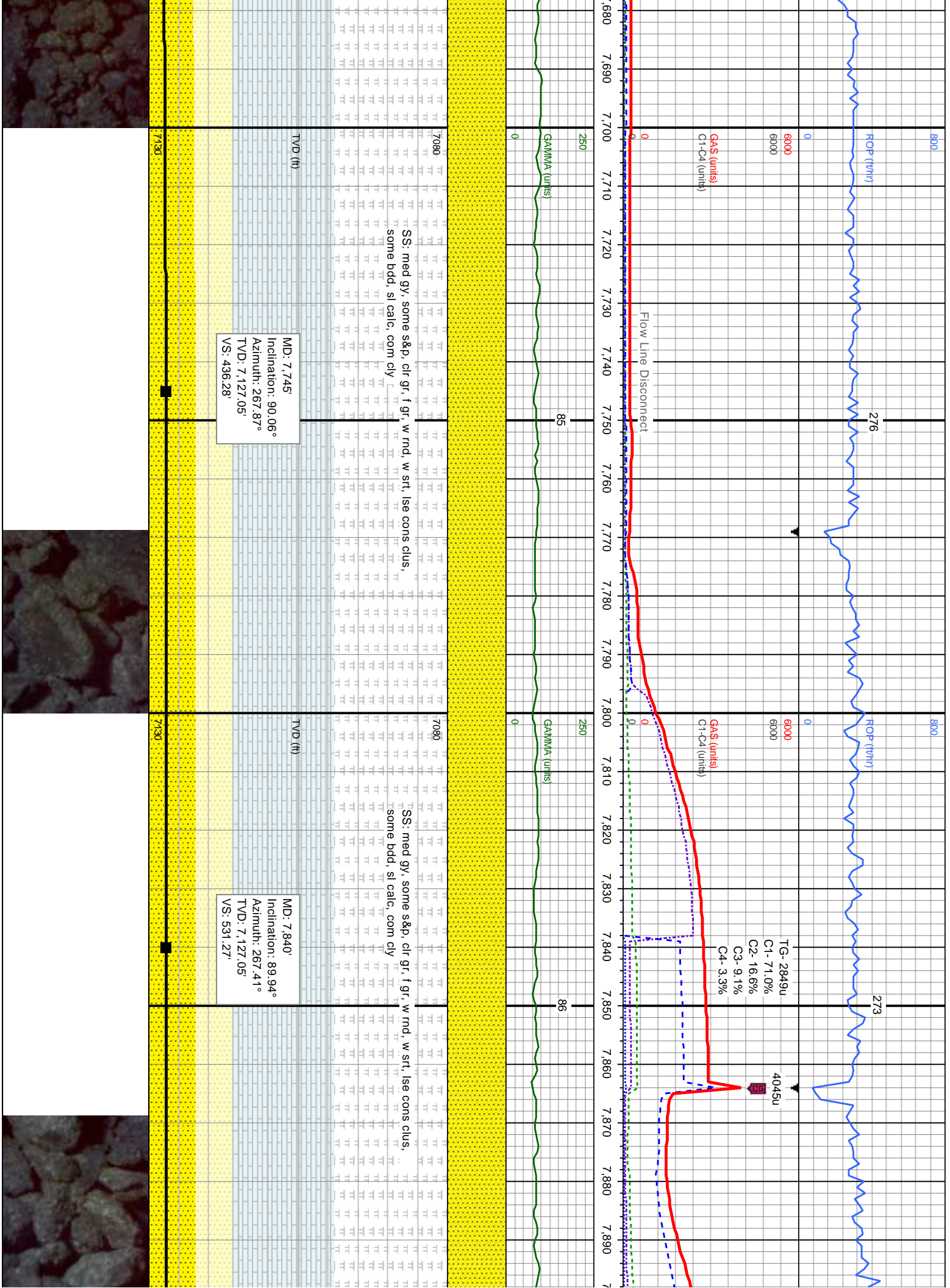




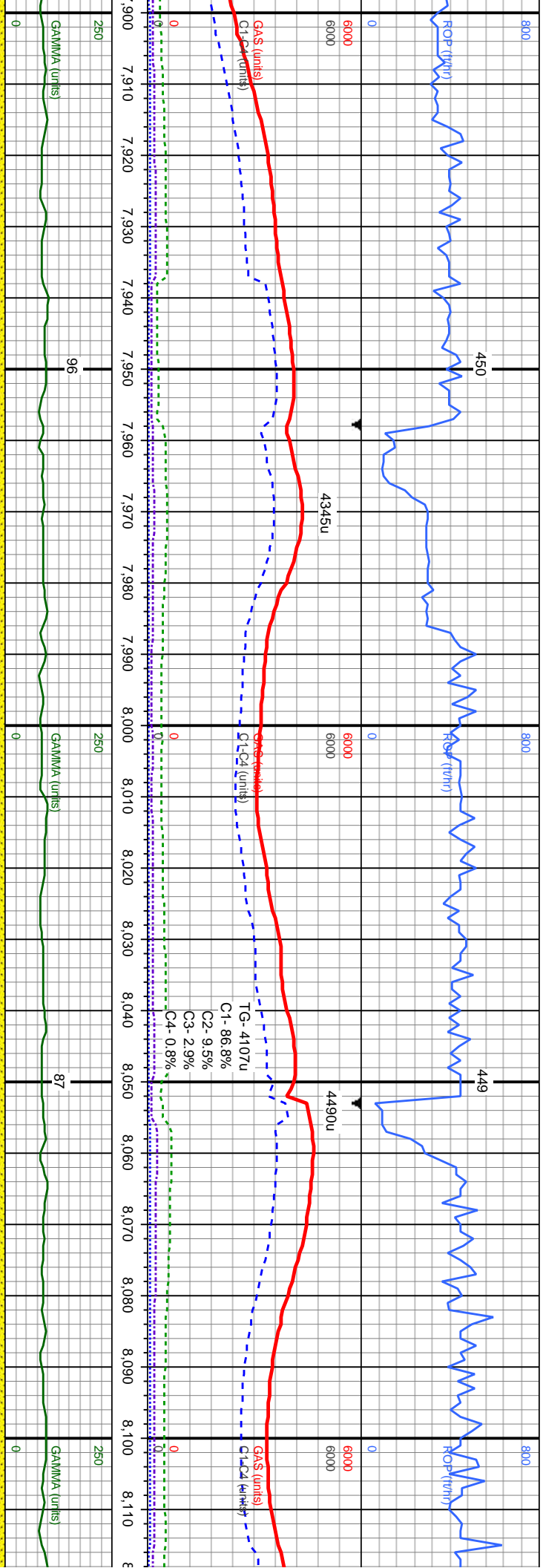






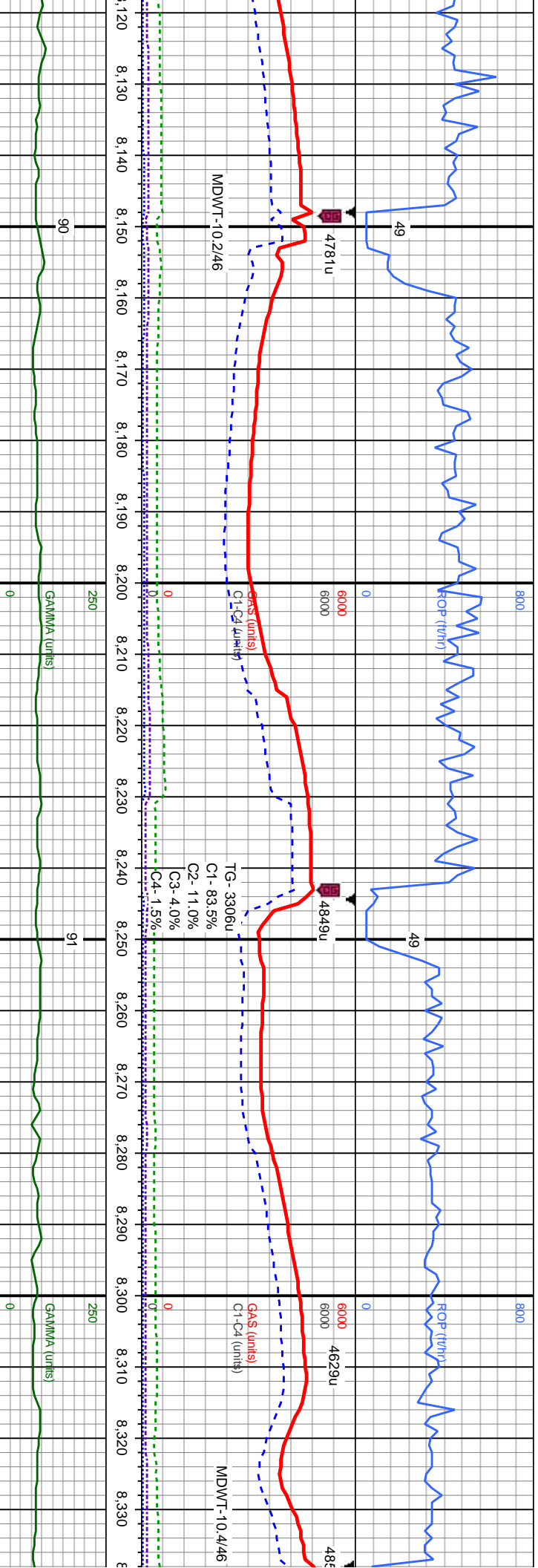






7080	7080	7080	7080
SS: dk gy, some s&p, clr gr, f gr, w md, w srt, lse cons clus, some bdd, sl calc, com cly	SS: dk gy, some s&p, clr gr, brt f gr, w md, w srt, large lse cons clus, some bdd, sl calc, com cly	SS: dk gy, some s&p, clr gr, brt f gr, w md, w srt, large lse cons clus, some bdd, sl calc, com cly	SS: dk gy, some s&p, clr gr, brt f gr, w md, w srt, large lse cons clus, some bdd, sl calc, com cly
TVD (ft)	TVD (ft)	TVD (ft)	TVD (ft)
MD: 7.934'	MD: 8.029'	MD: 8.029'	MD: 8.029'
Inclination: 90°	Inclination: 90.12°	Inclination: 90.12°	Inclination: 90.12°
Azimuth: 267.56°	Azimuth: 267.53°	Azimuth: 267.53°	Azimuth: 267.53°
TVD: 7.127, 1'	TVD: 7.127'	TVD: 7.127'	TVD: 7.127'
VS: 625.26'	VS: 720.25'	VS: 720.25'	VS: 720.25'





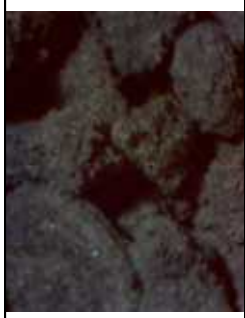
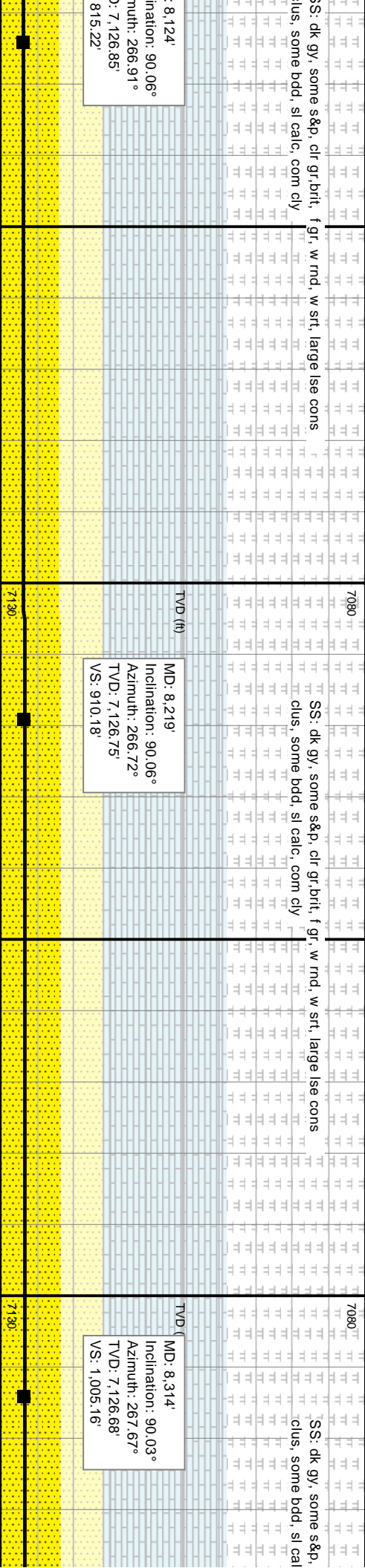
SS: dk gy, some s&p, clr gr, brit, f gr, w rnd, w srt, large lse cons  
cl, some bdd, sl calc, com cly

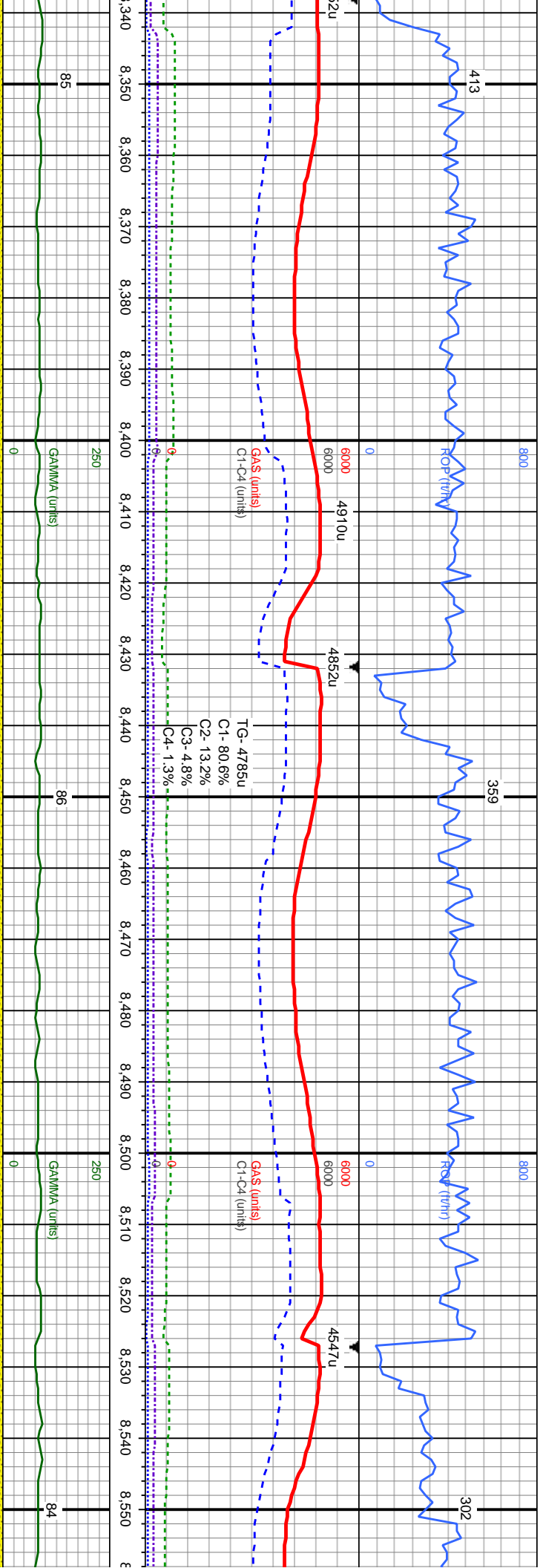
8,124'  
Inclination: 90.06°  
Azimuth: 266.91°  
TVD: 7,126.85'  
VS: 815.22'

MD: 8,219'  
Inclination: 90.06°  
Azimuth: 266.72°  
TVD: 7,126.75'  
VS: 910.18'

MD: 8,314'  
Inclination: 90.03°  
Azimuth: 267.67°  
TVD: 7,126.68'  
VS: 1,005.16'

SS: dk gy, some s&p,  
cl, some bdd, sl cal





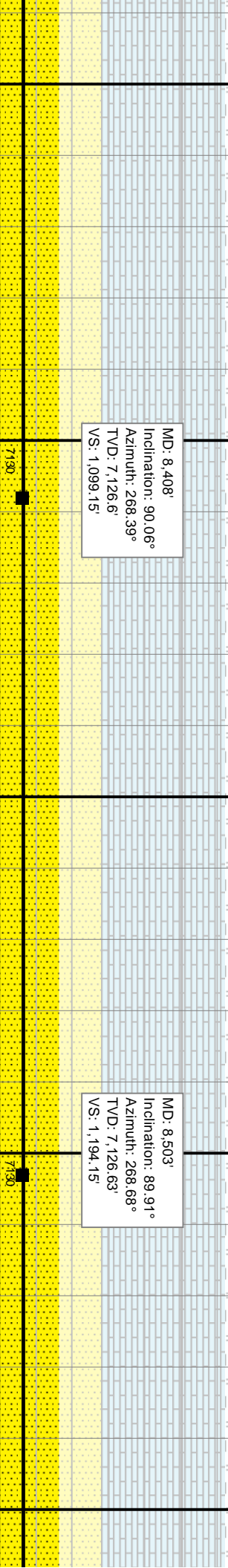
MD: 8,408'  
Inclination: 90.06°  
Azimuth: 268.39°  
TVD: 7,126.6'  
VS: 1,099.15'

MD: 8,503'  
Inclination: 89.91°  
Azimuth: 268.68°  
TVD: 7,126.63'  
VS: 1,194.15'

clr gr, brit, f gr, w rnd, w srt, large lse cons

SS: dk gy, some s&p, clr gr,brit, med-f gr, w rnd, w srt, large lse  
cons clus, some bdd, sl calc, com cly

SS: dk gy, some s&p, clr gr,brit, med-f g  
cons clus, some bdd, sl calc, com cly



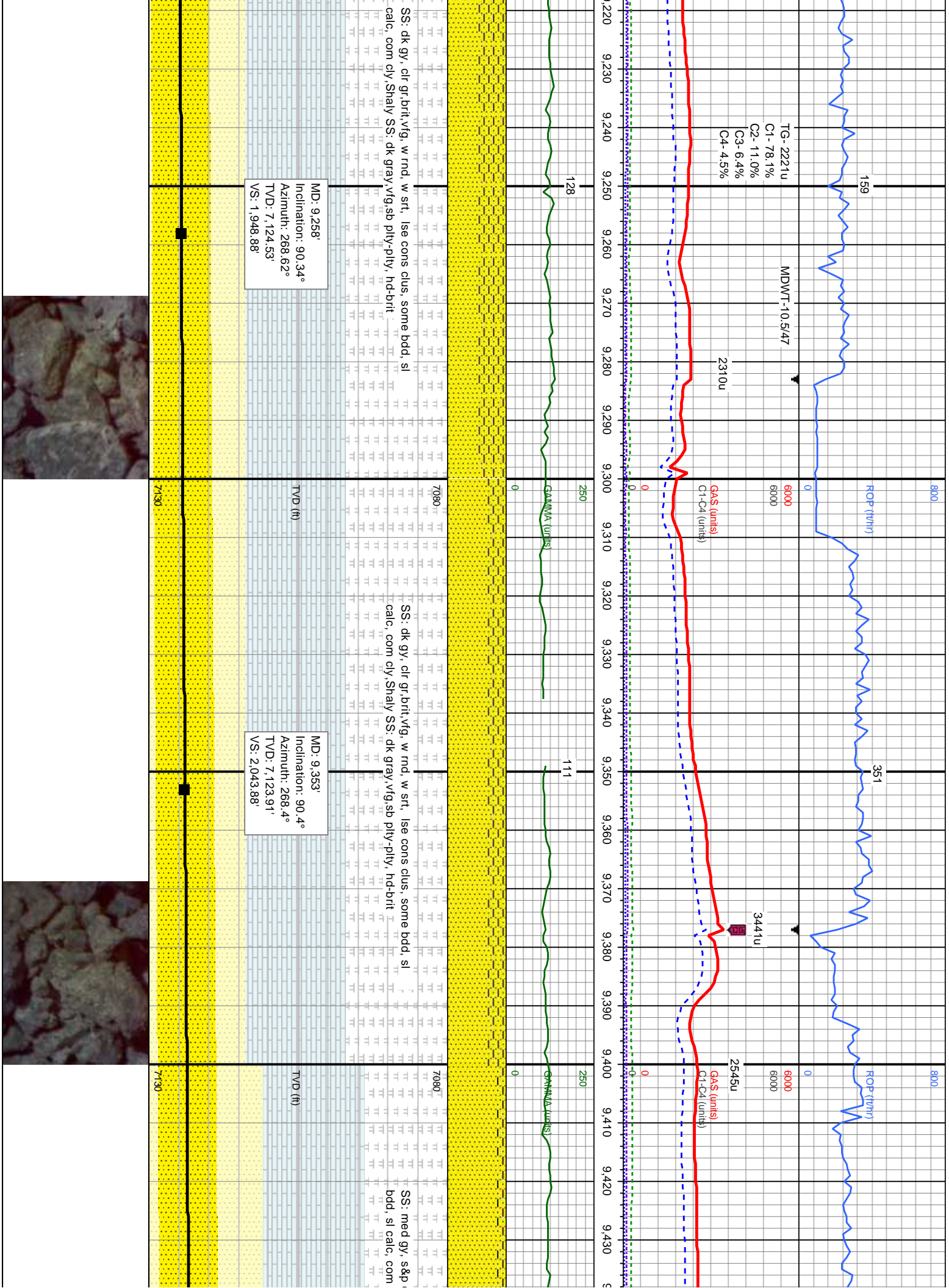




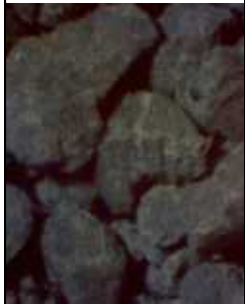
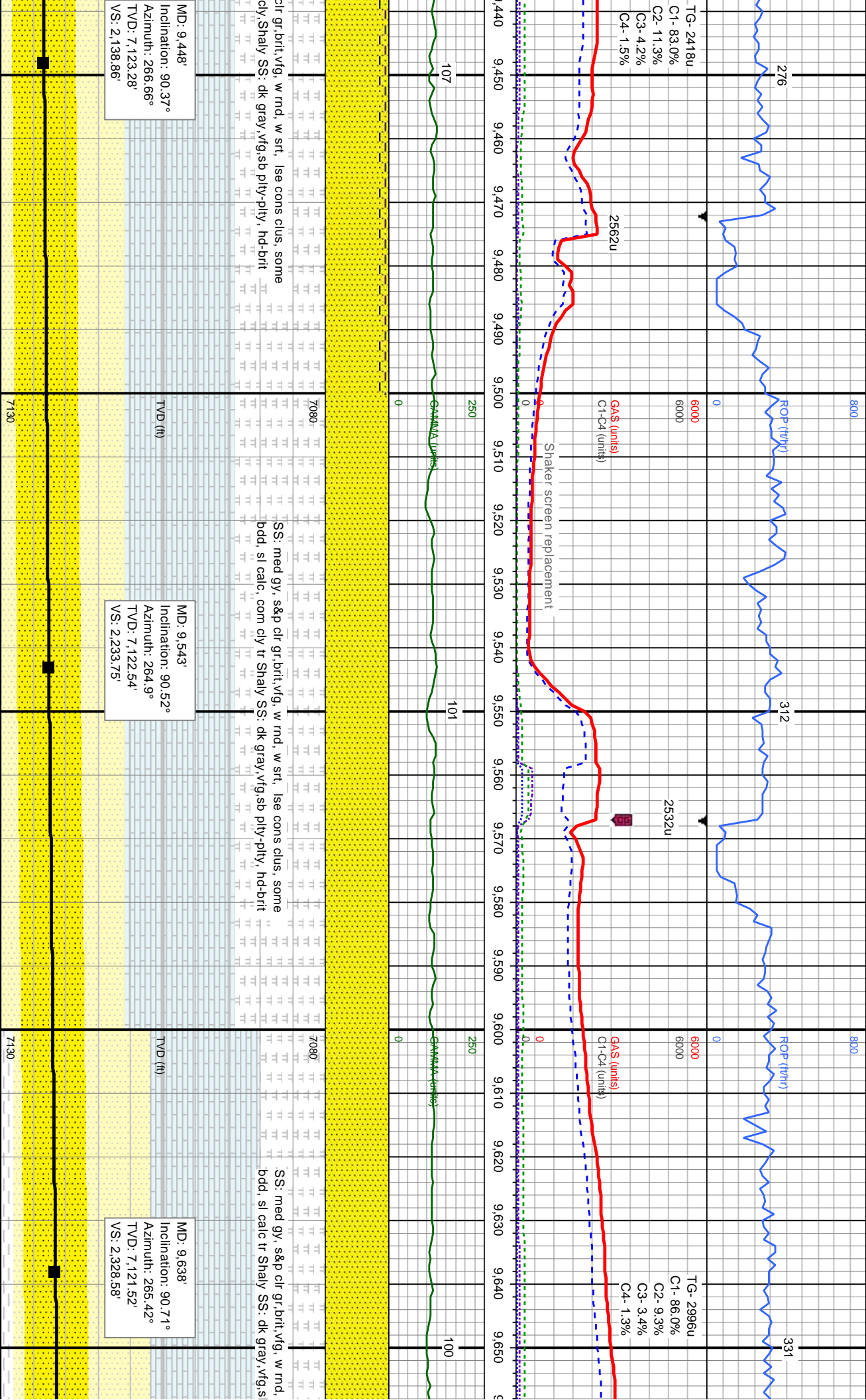




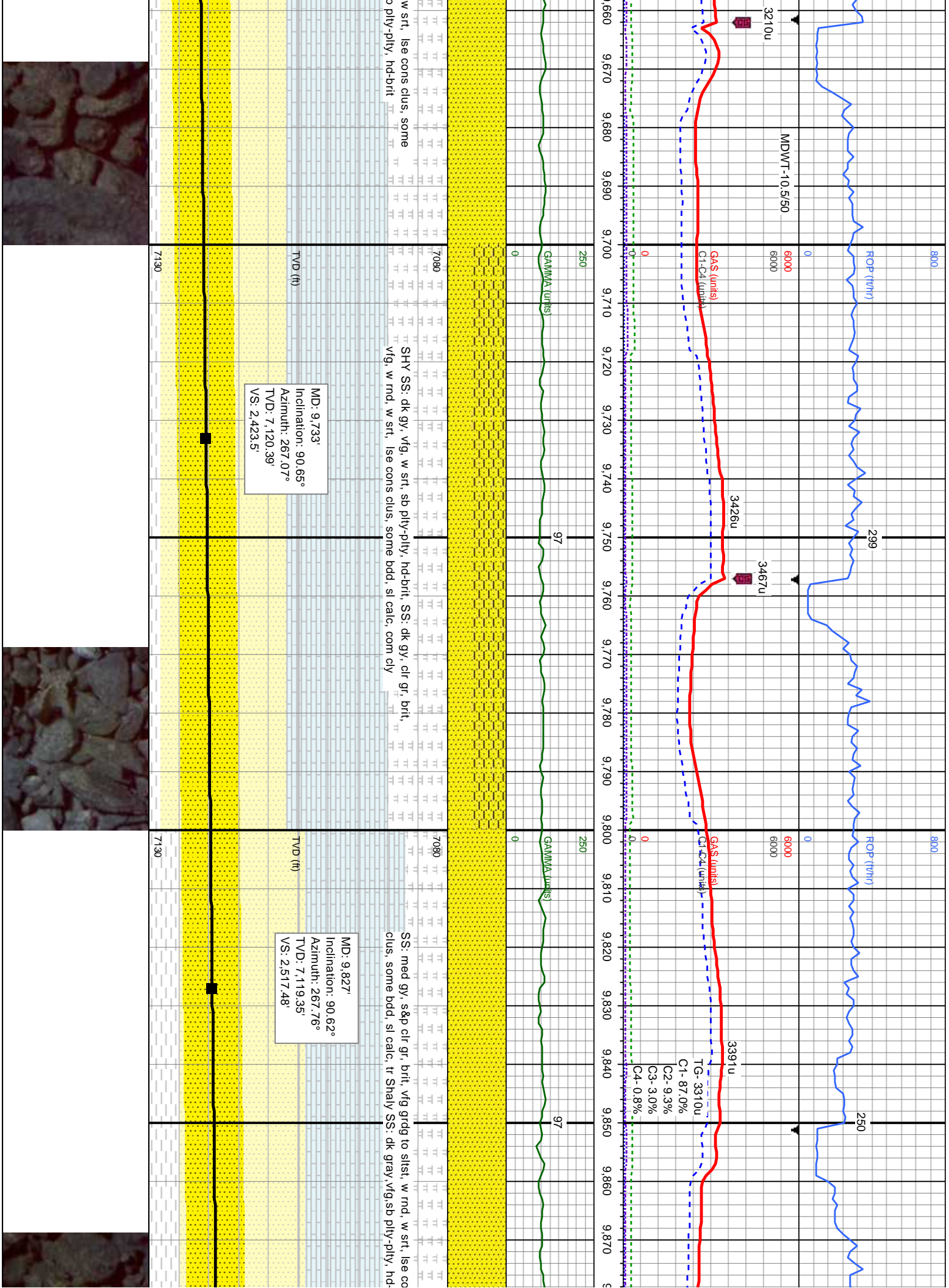


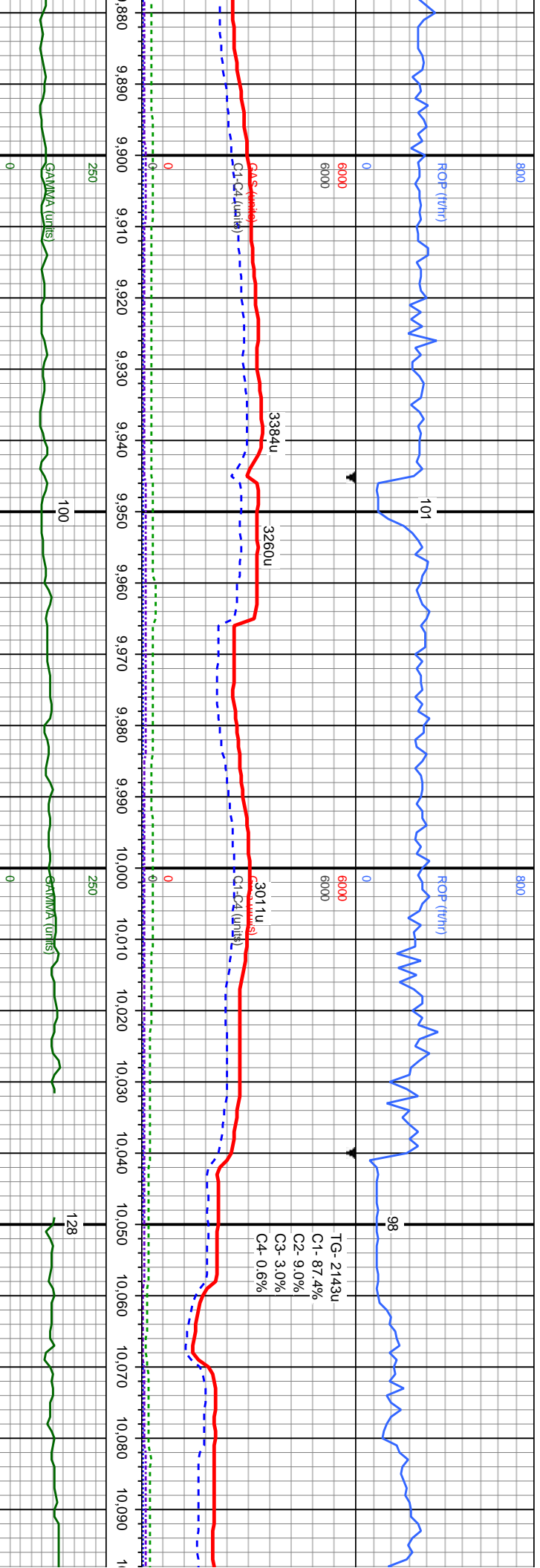






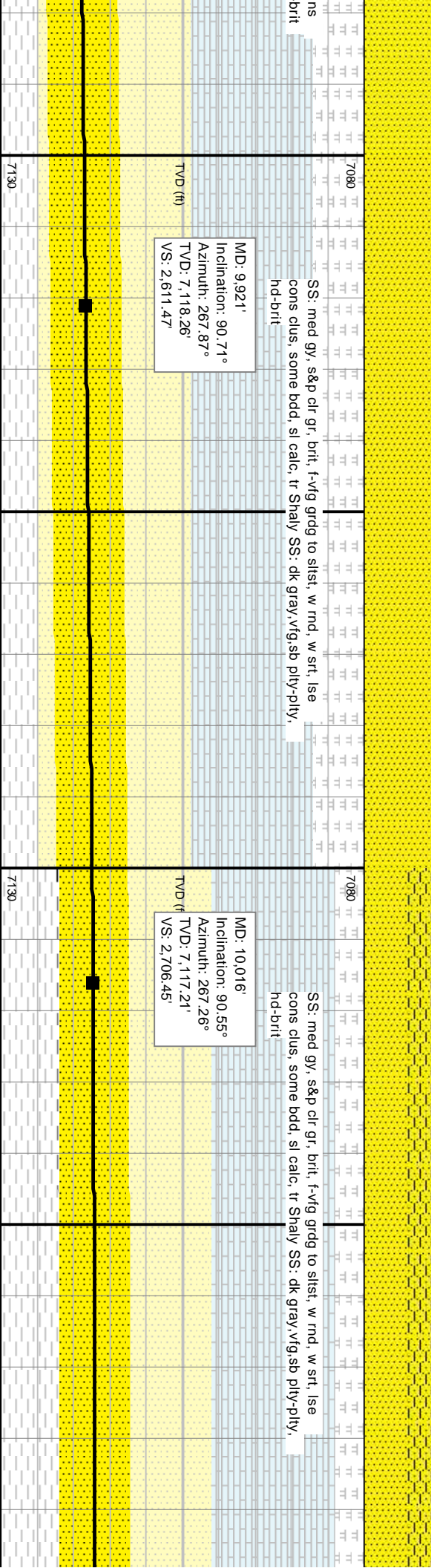






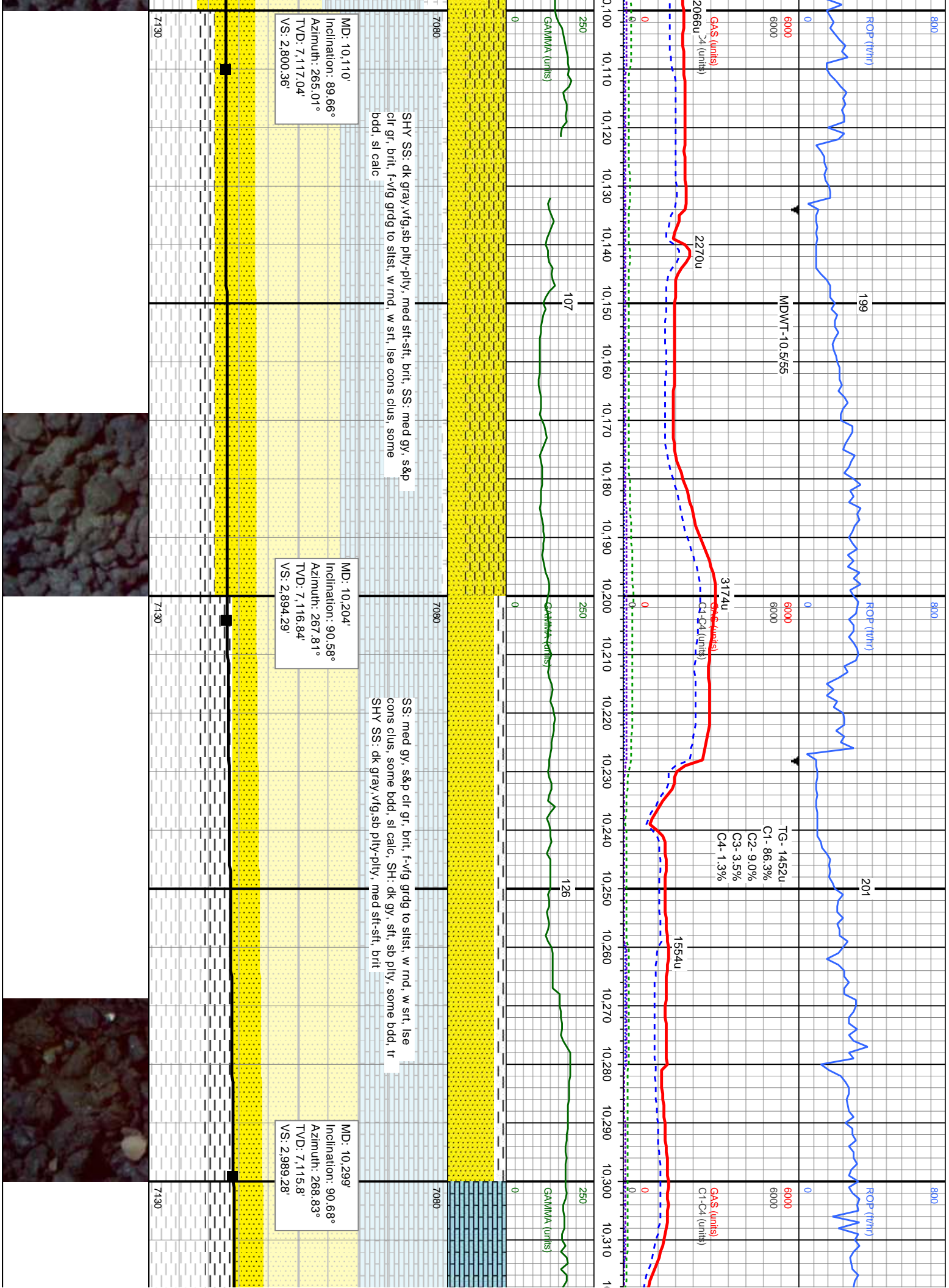
SS: med gy, s&p clr gr, brit, f-vfg grdg to slst, w md, w srt, lse  
cons clus, some bdd, sl calc, tr Shaly SS: dk gray, vfg, sb plty-plty,  
hd-brit

MD: 9,921'  
Inclination: 90.71°  
Azimuth: 267.87°  
TVD: 7,118.26'  
VS: 2,611.47'

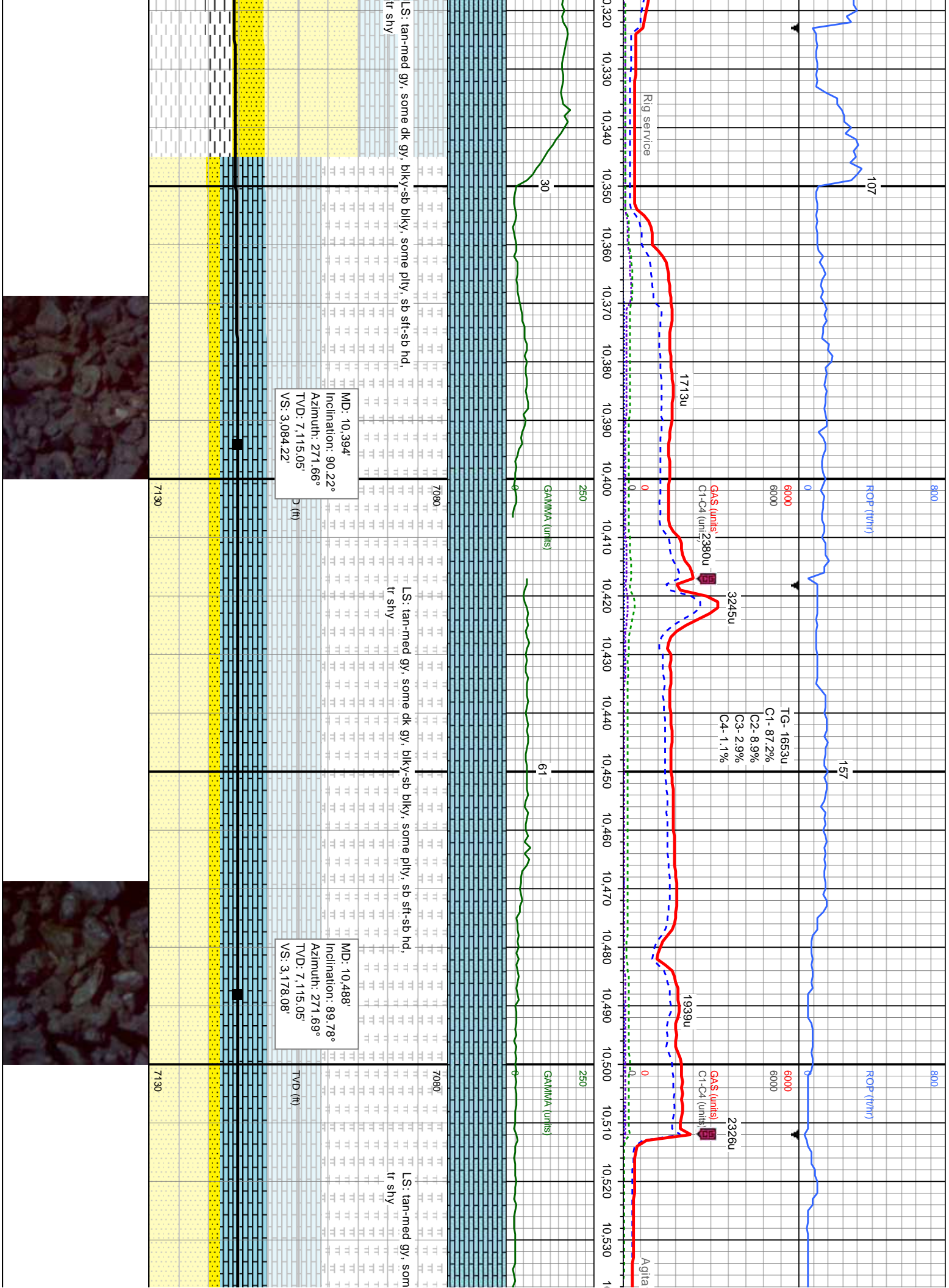


TG- 2143u  
C1- 87.4%  
C2- 9.0%  
C3- 3.0%  
C4- 0.6%

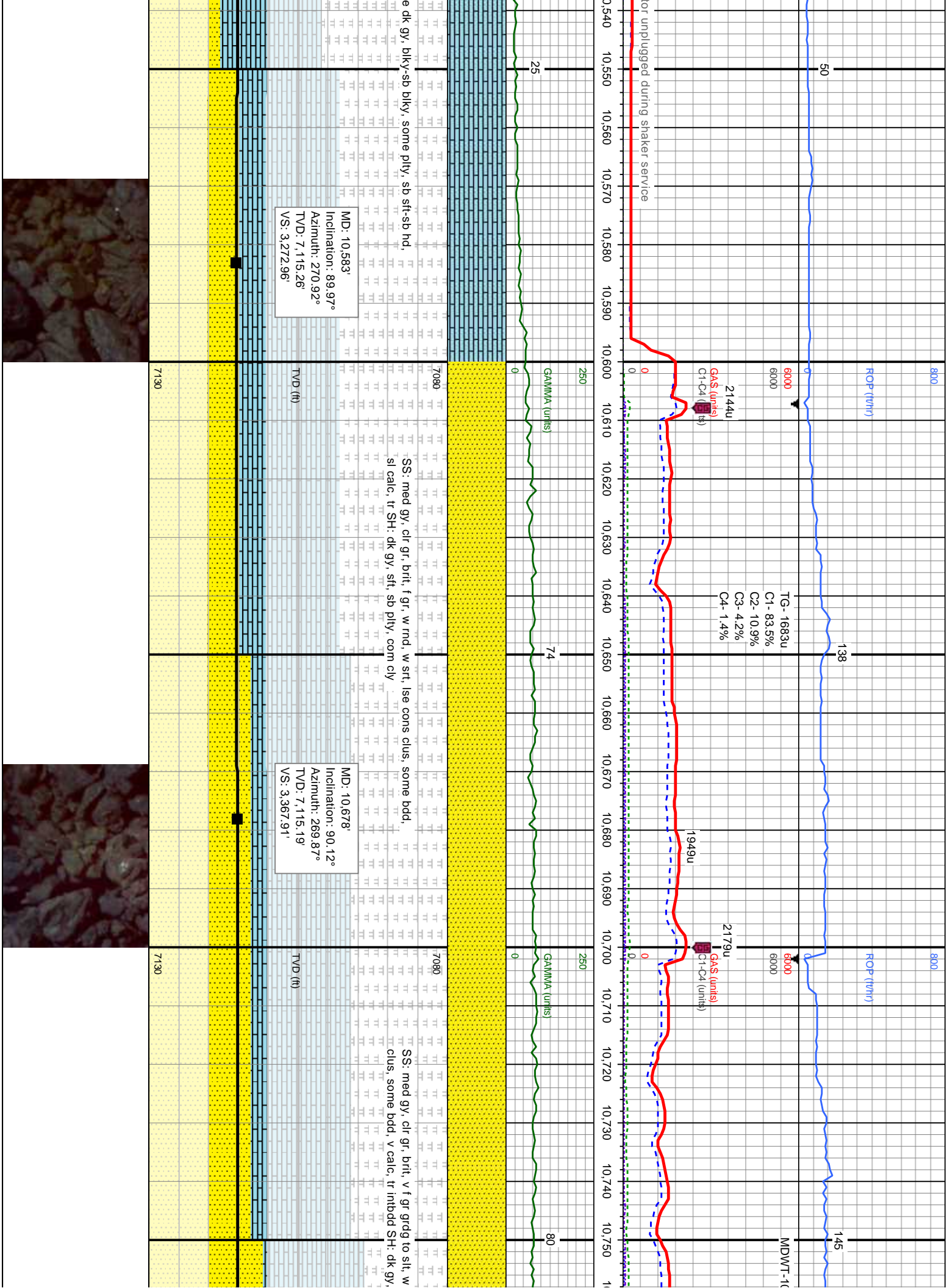
MD: 10,016'  
Inclination: 90.55°  
Azimuth: 267.26°  
TVD: 7,117.21'  
VS: 2,706.45'

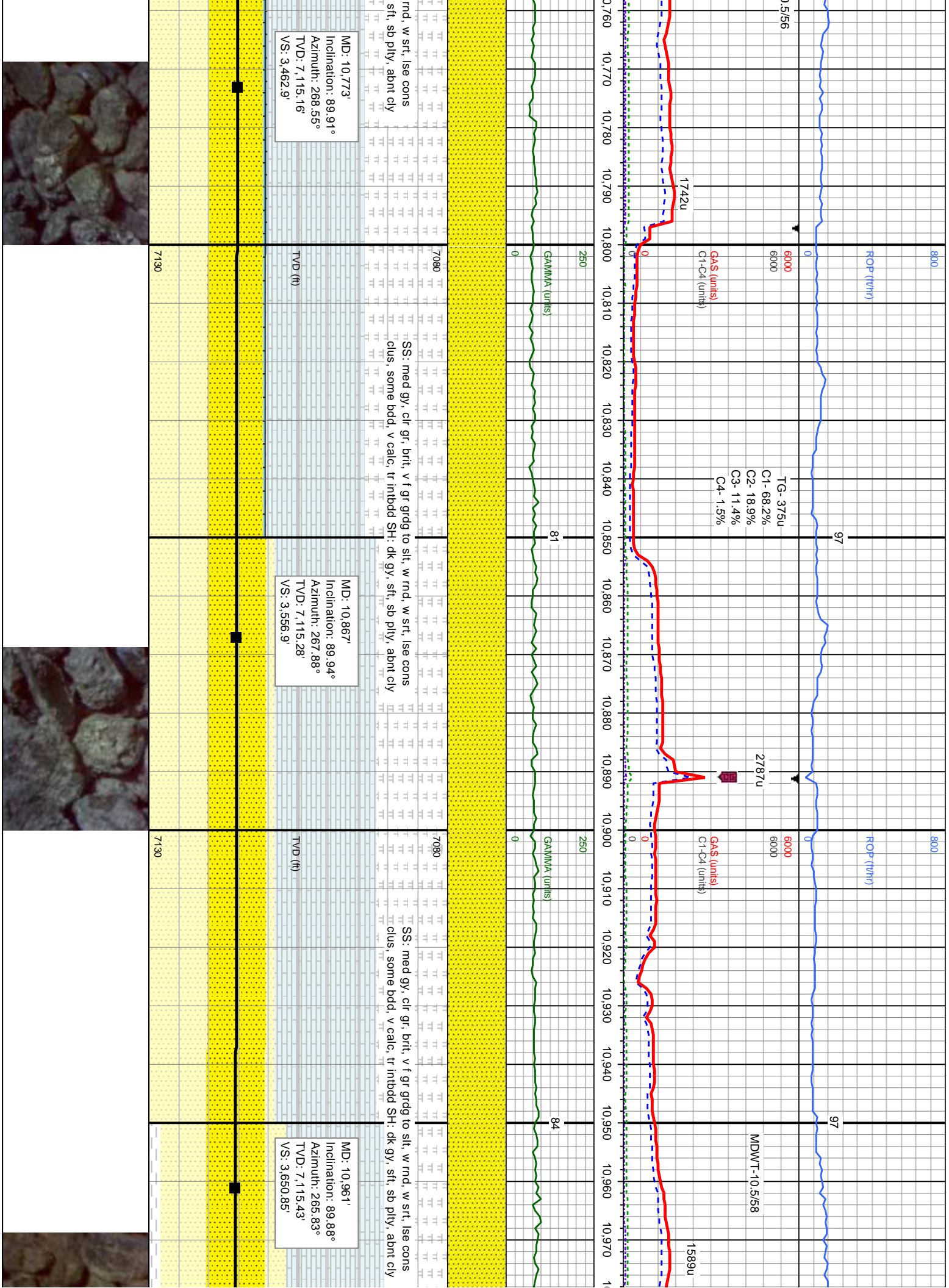


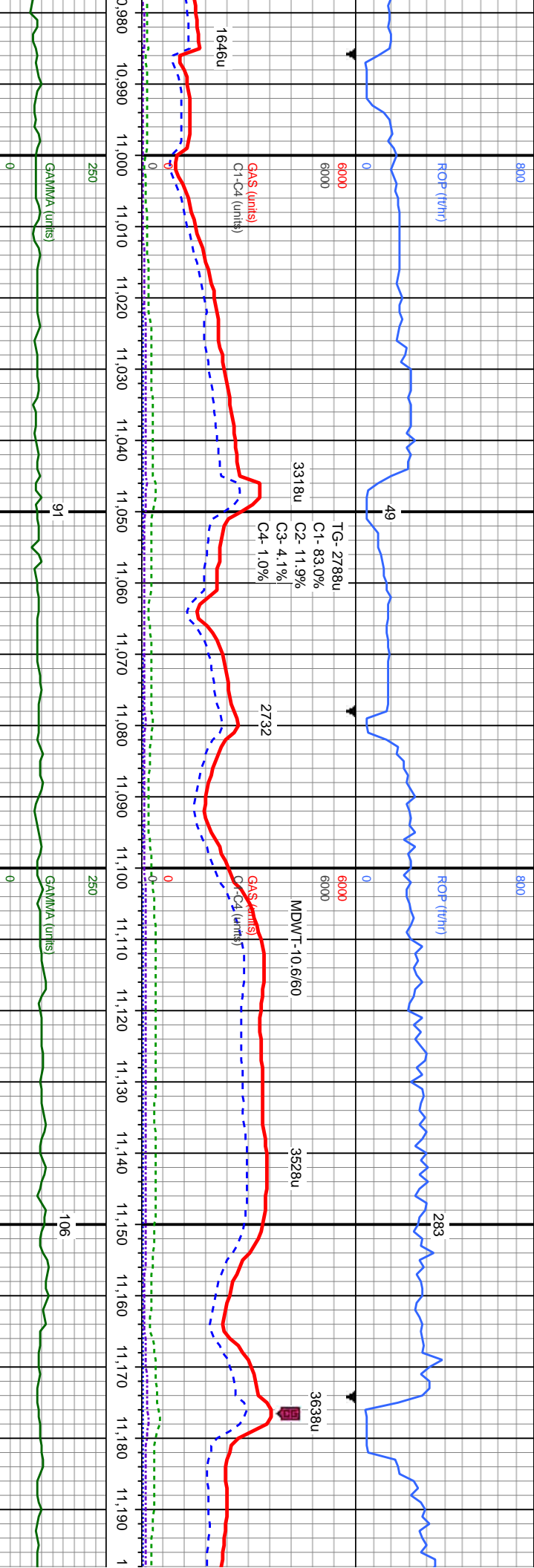










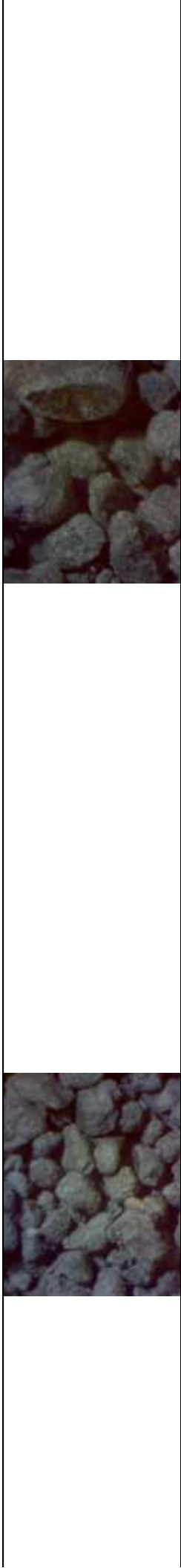
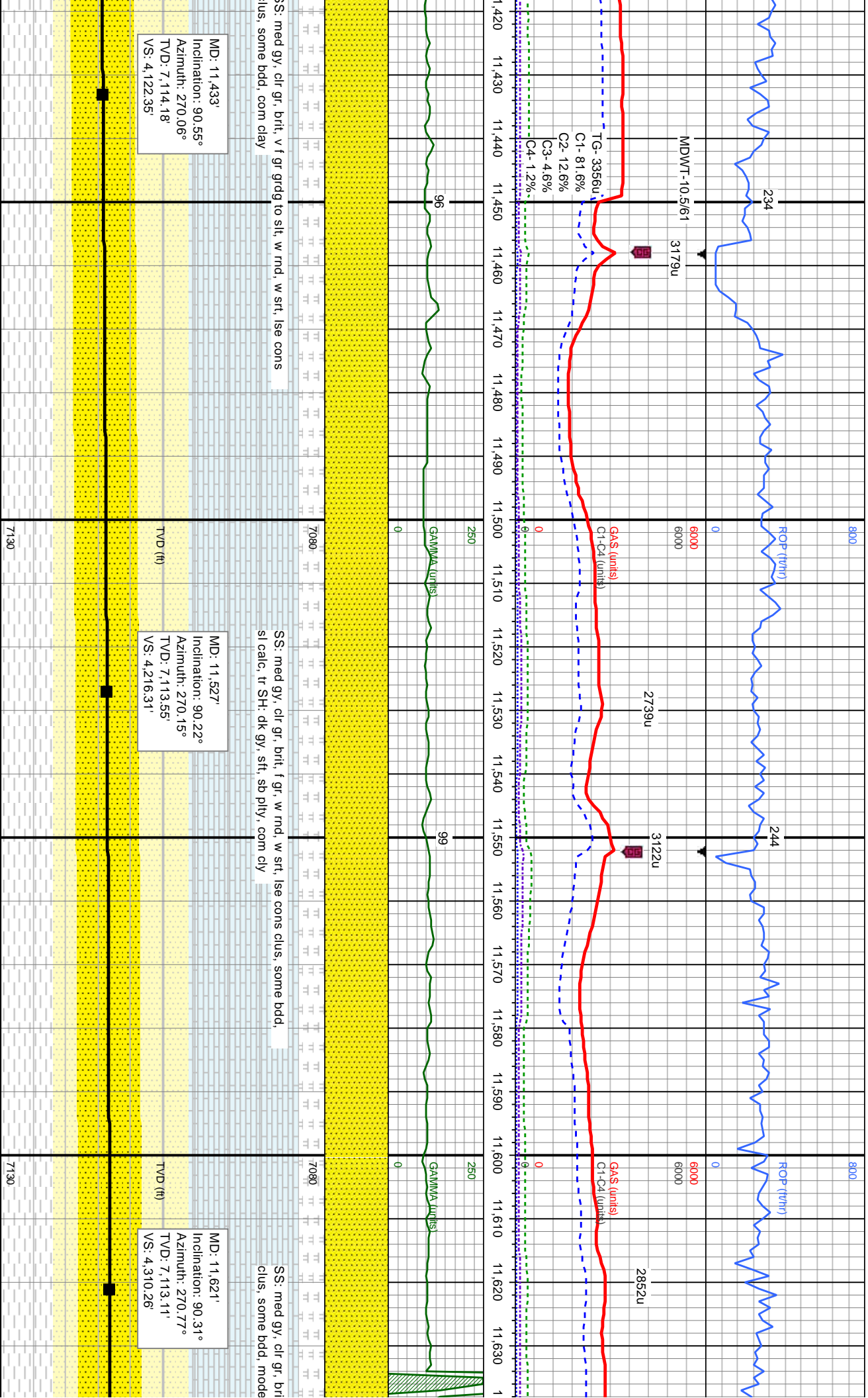


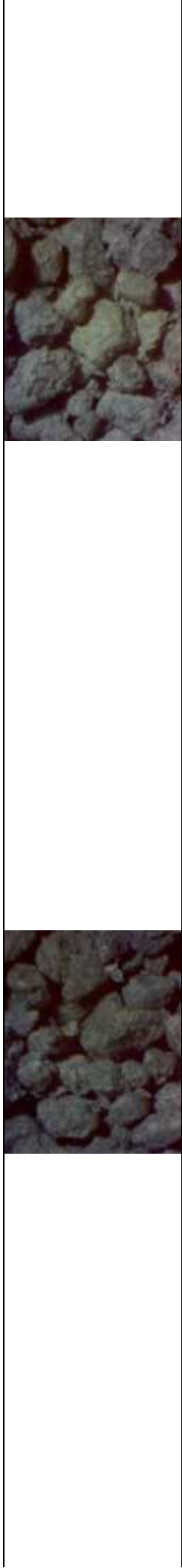
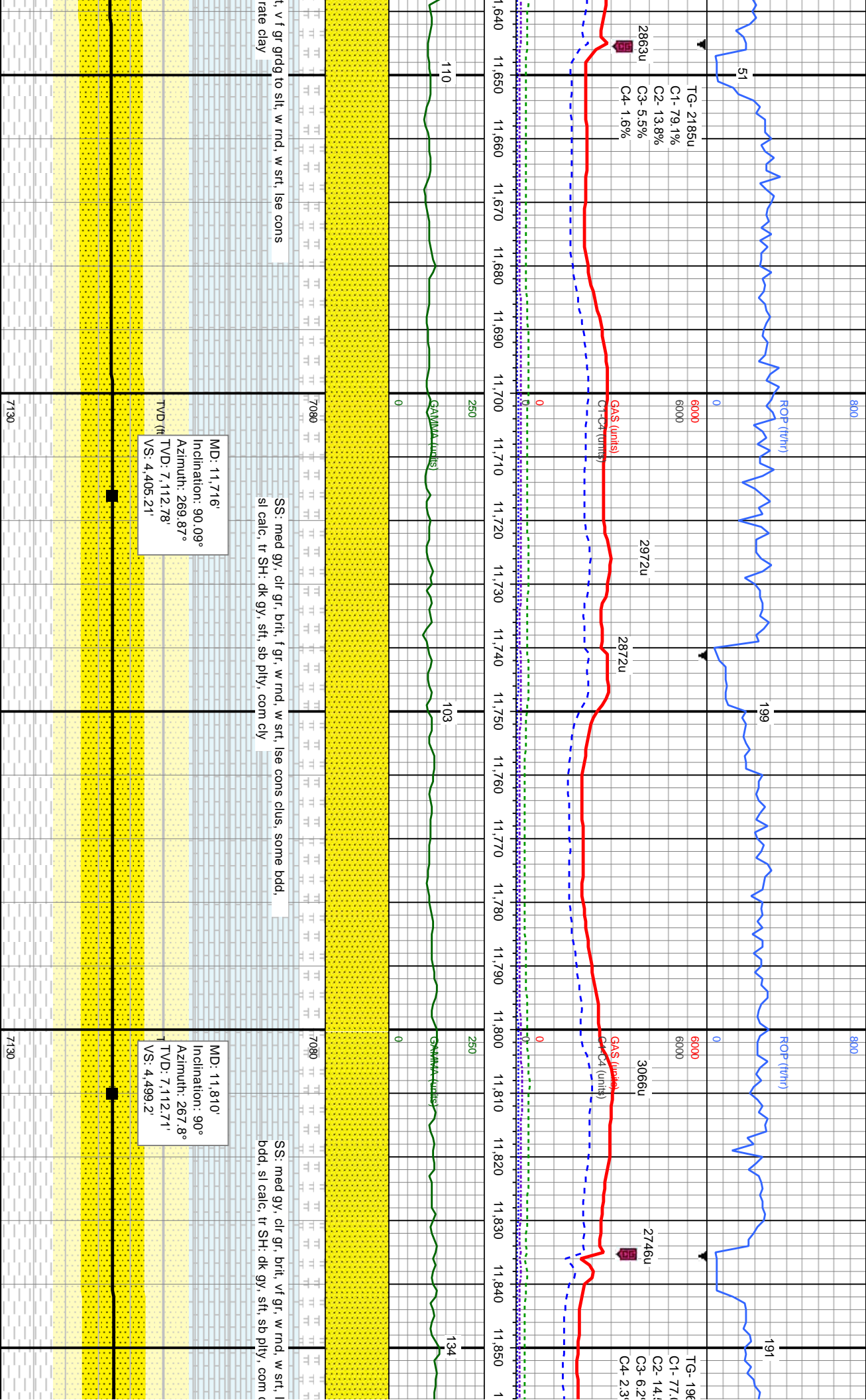
7080		SS: med gy, clr gr, brit, v f gr gridg to silt, w rnd, w srt, lse cons clus, some bdd, abnt cly
TVD (ft)		MD: 11,056' Inclination: 90° Azimuth: 263.91° TVD: 7,115.53' VS: 3,745.66'
7130		
7080		SS: med gy, clr gr, brit, v f gr gridg to silt, w rnd, w srt, lse cons clus, some bdd, abnt cly
TVD (ft)		MD: 11,150' Inclination: 89.82° Azimuth: 266.11° TVD: 7,115.68' VS: 3,839.48'
7130		



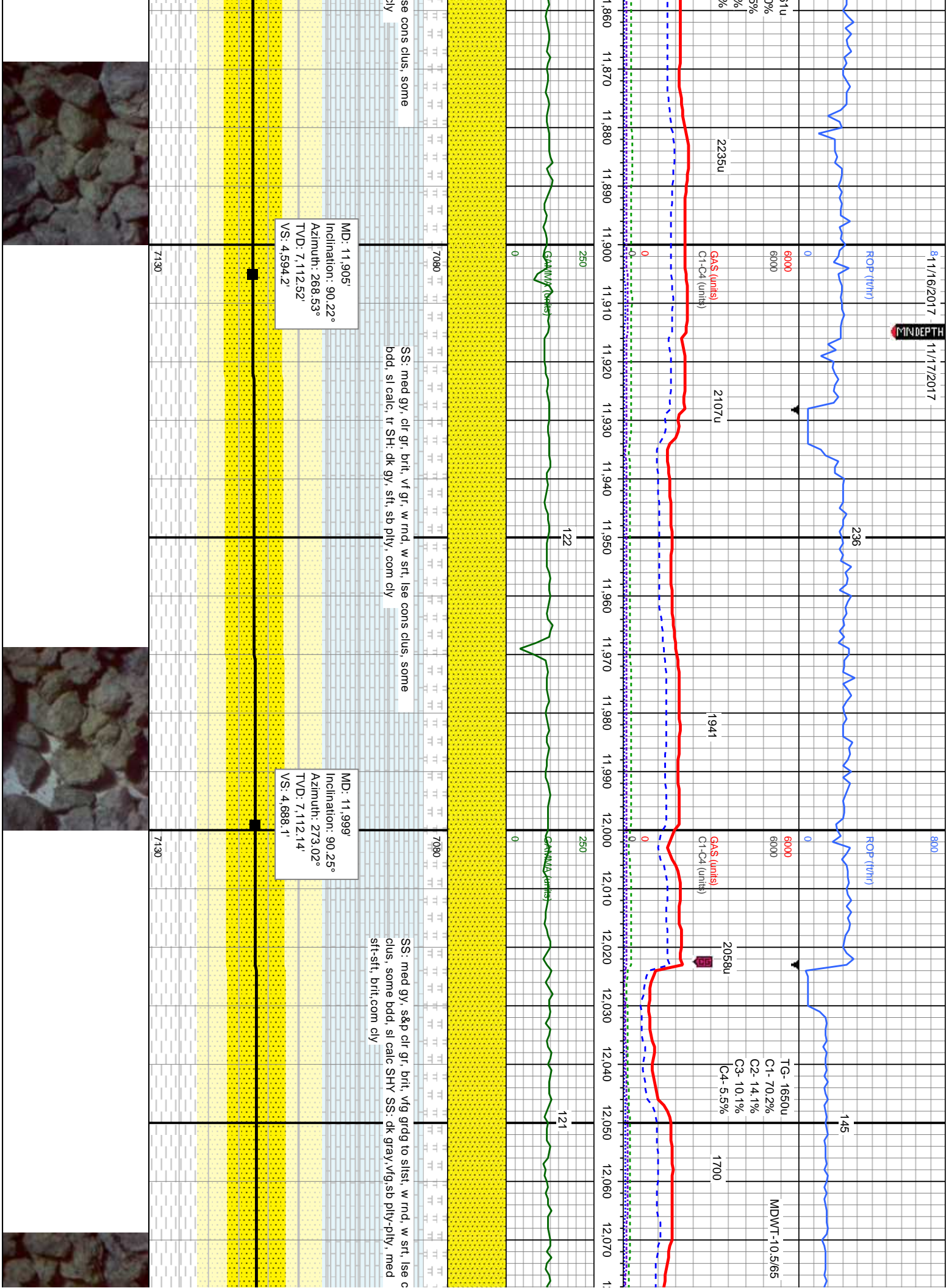


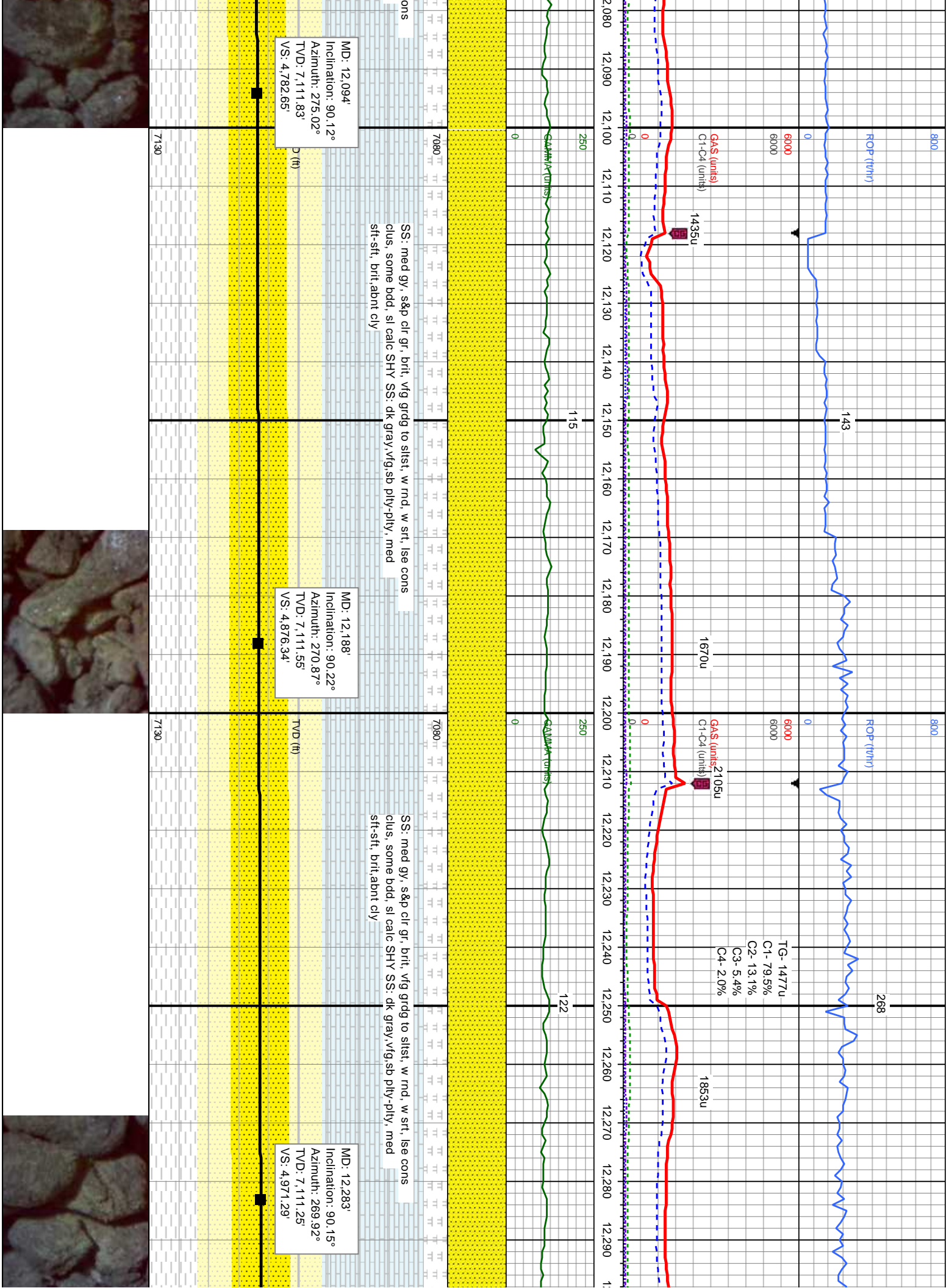


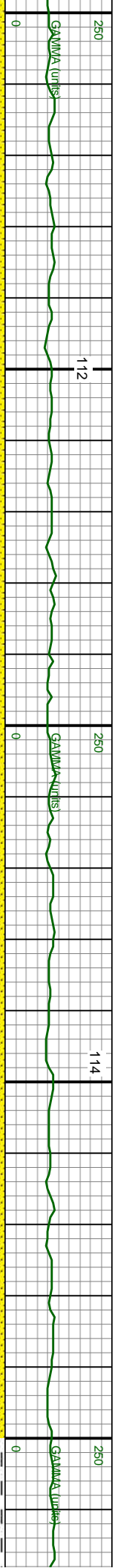
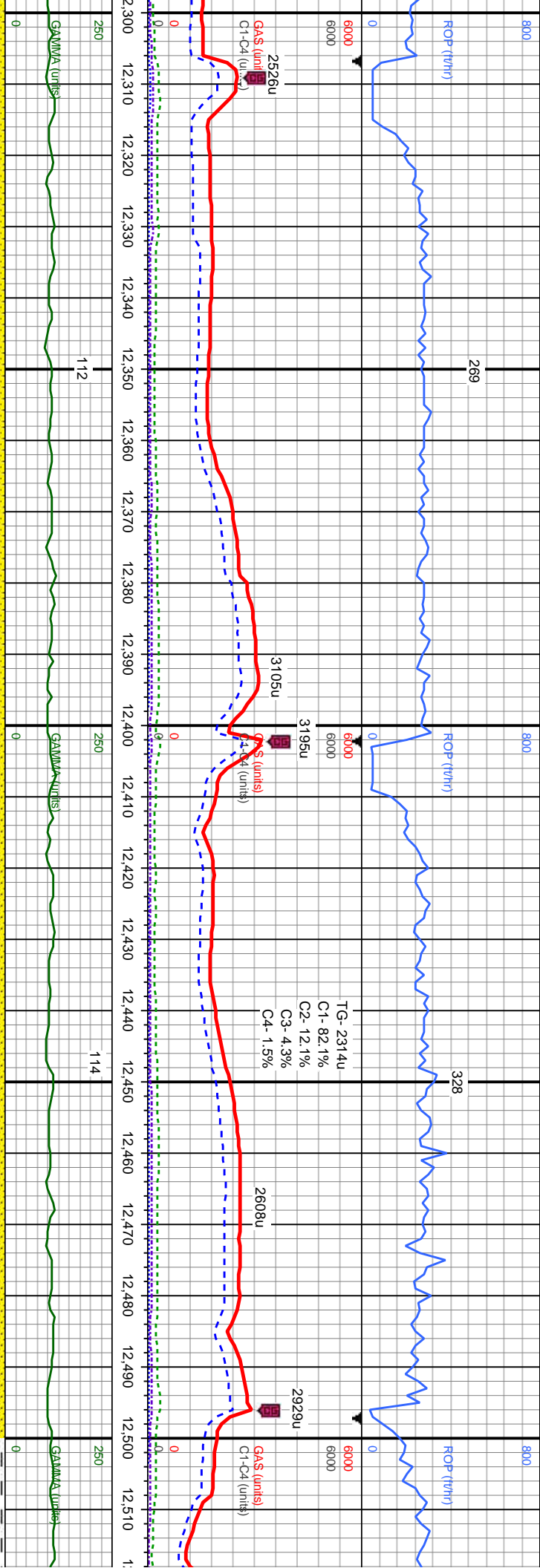










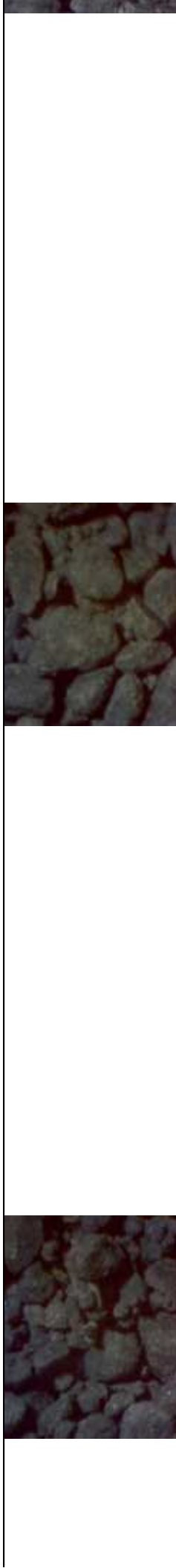
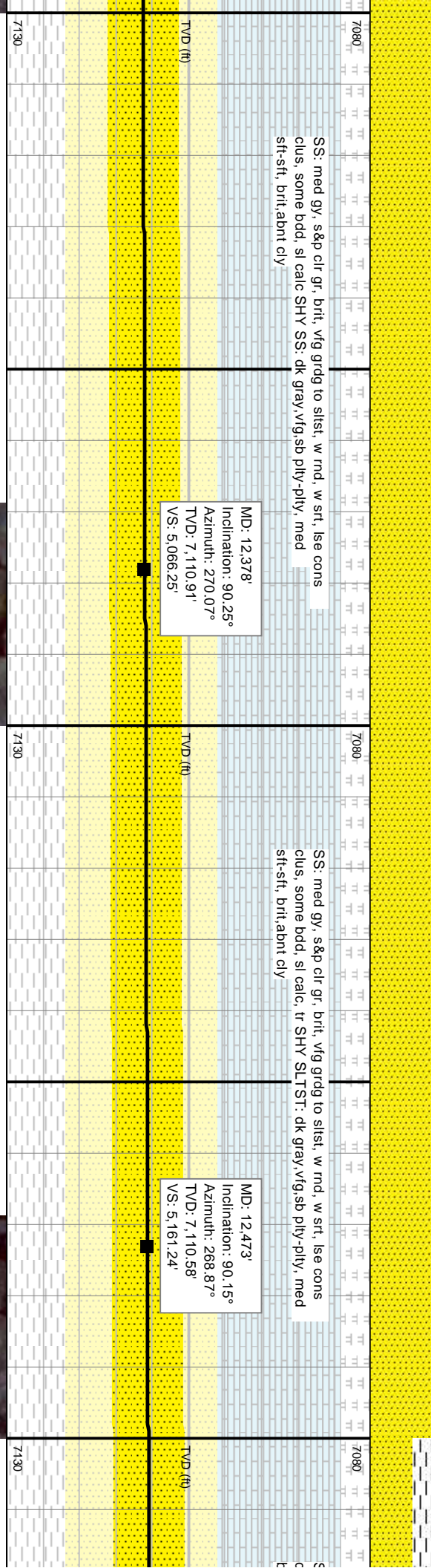


SS: med gy, s&p clr gr, brit, vfg grdy to slist, w nd, w str, lse cons  
clus, some bdd, sl calc SHY SS: dk gray, vfg sb pty-pty, med  
stf-stf, brit,abt cly

MD: 12,378'  
Inclination: 90.25°  
Azimuth: 270.07°  
TVD: 7,110.91'  
VS: 5,066.25'

SS: med gy, s&p clr gr, brit, vfg grdy to slist, w nd, w str, lse cons  
clus, some bdd, sl calc, tr SHY SLTST: dk gray, vfg sb pty-pty, med  
stf-stf, brit,abt cly

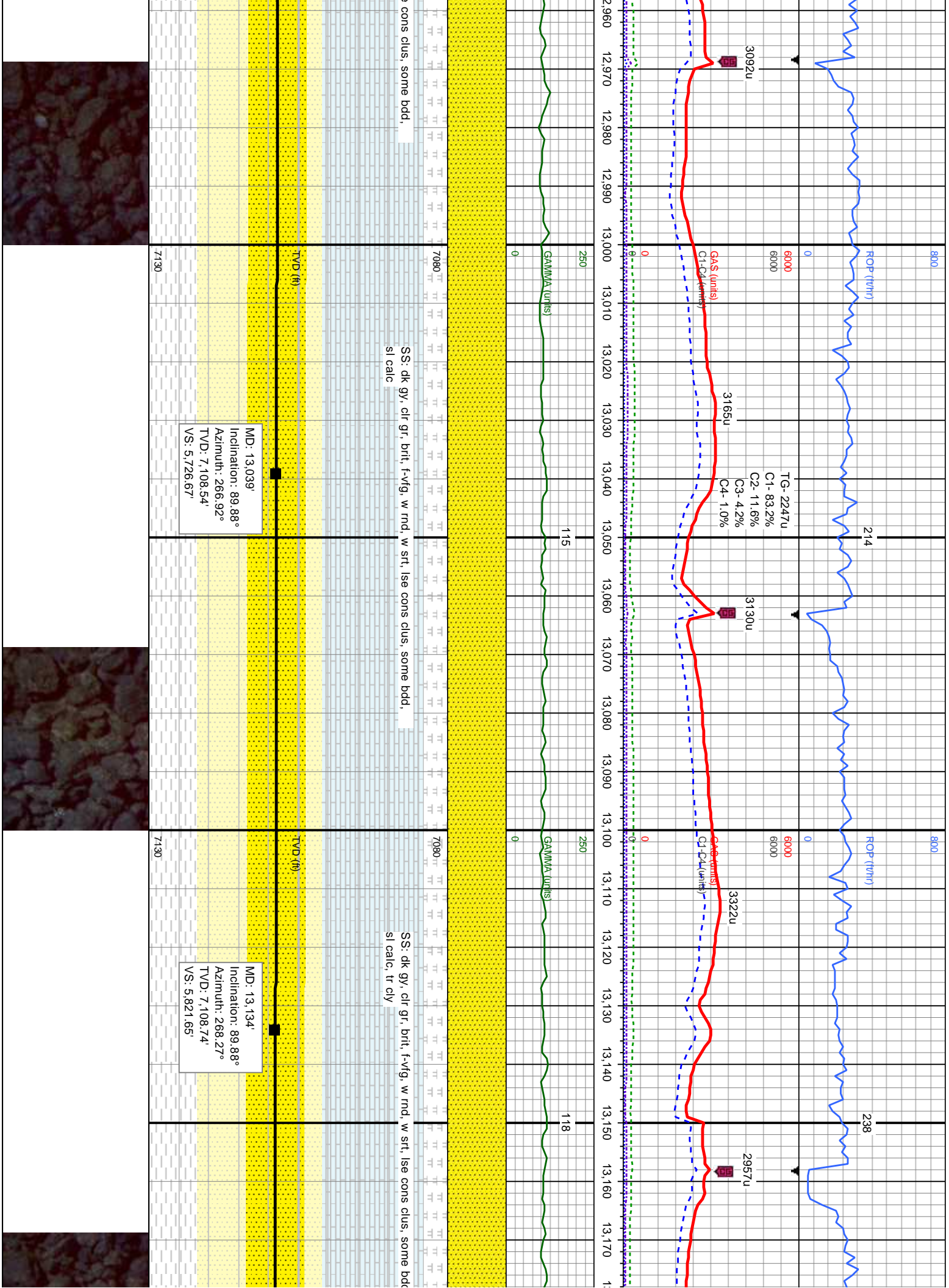
MD: 12,473'  
Inclination: 90.15°  
Azimuth: 268.87°  
TVD: 7,110.58'  
VS: 5,161.24'



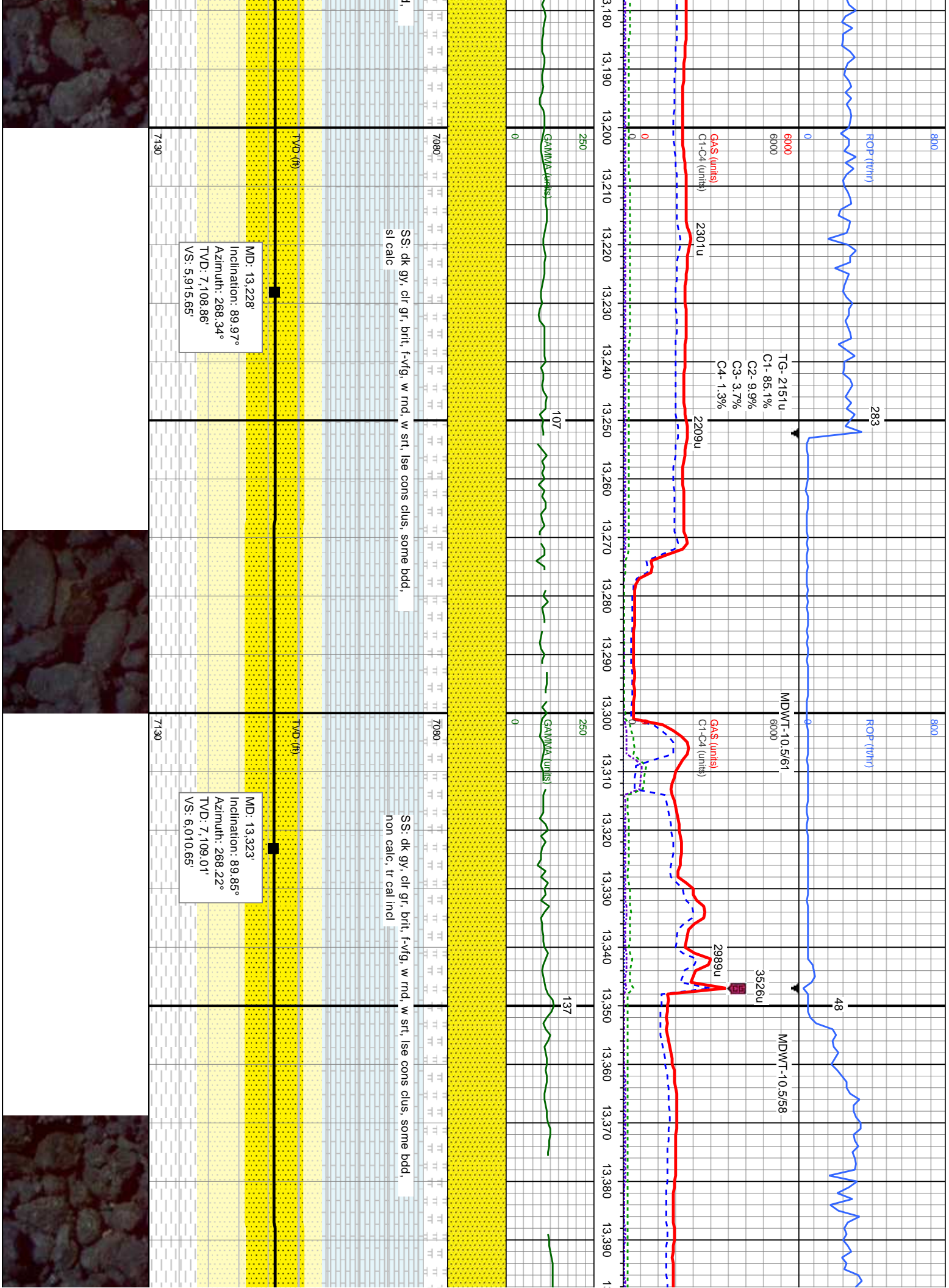




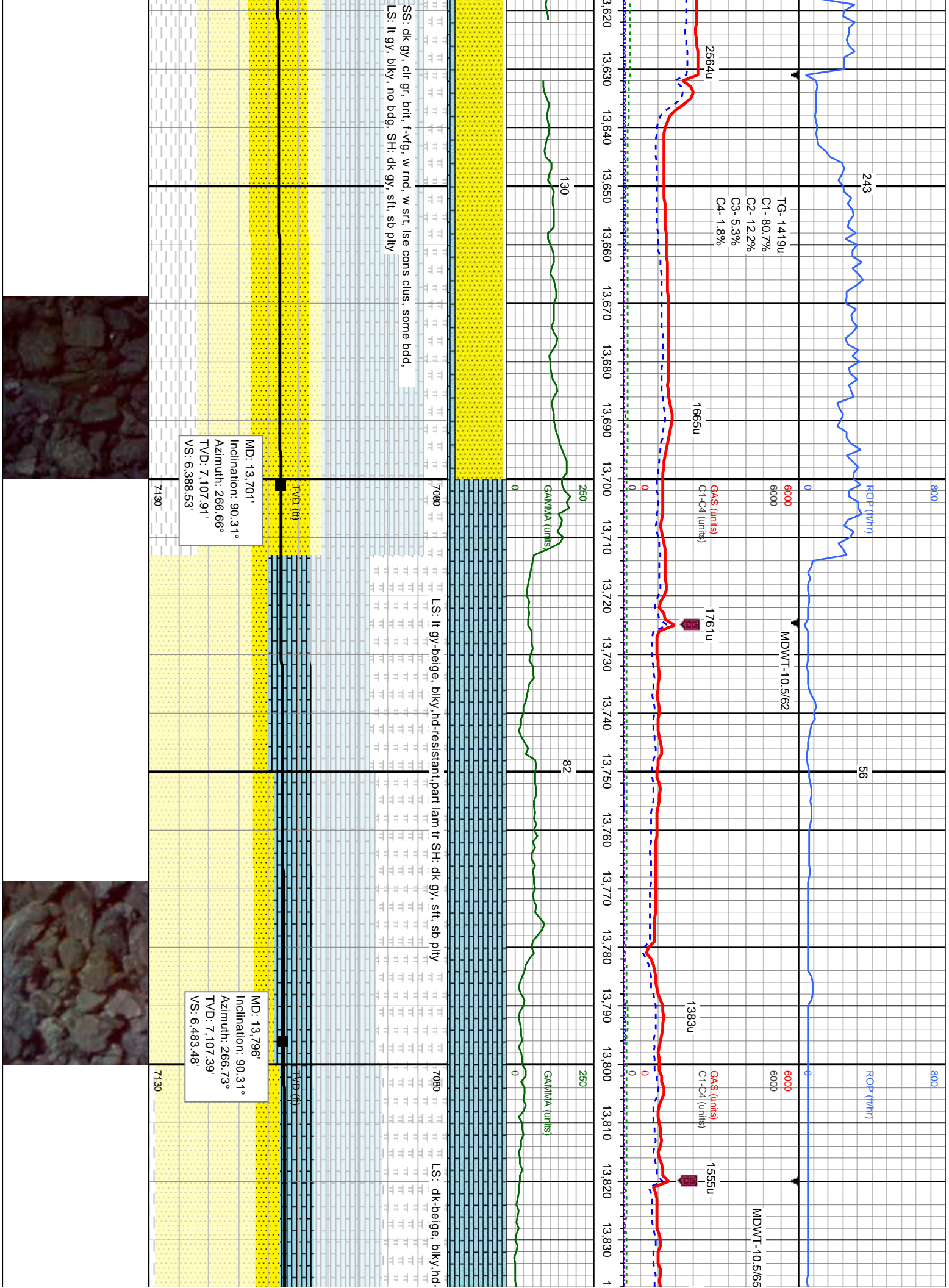




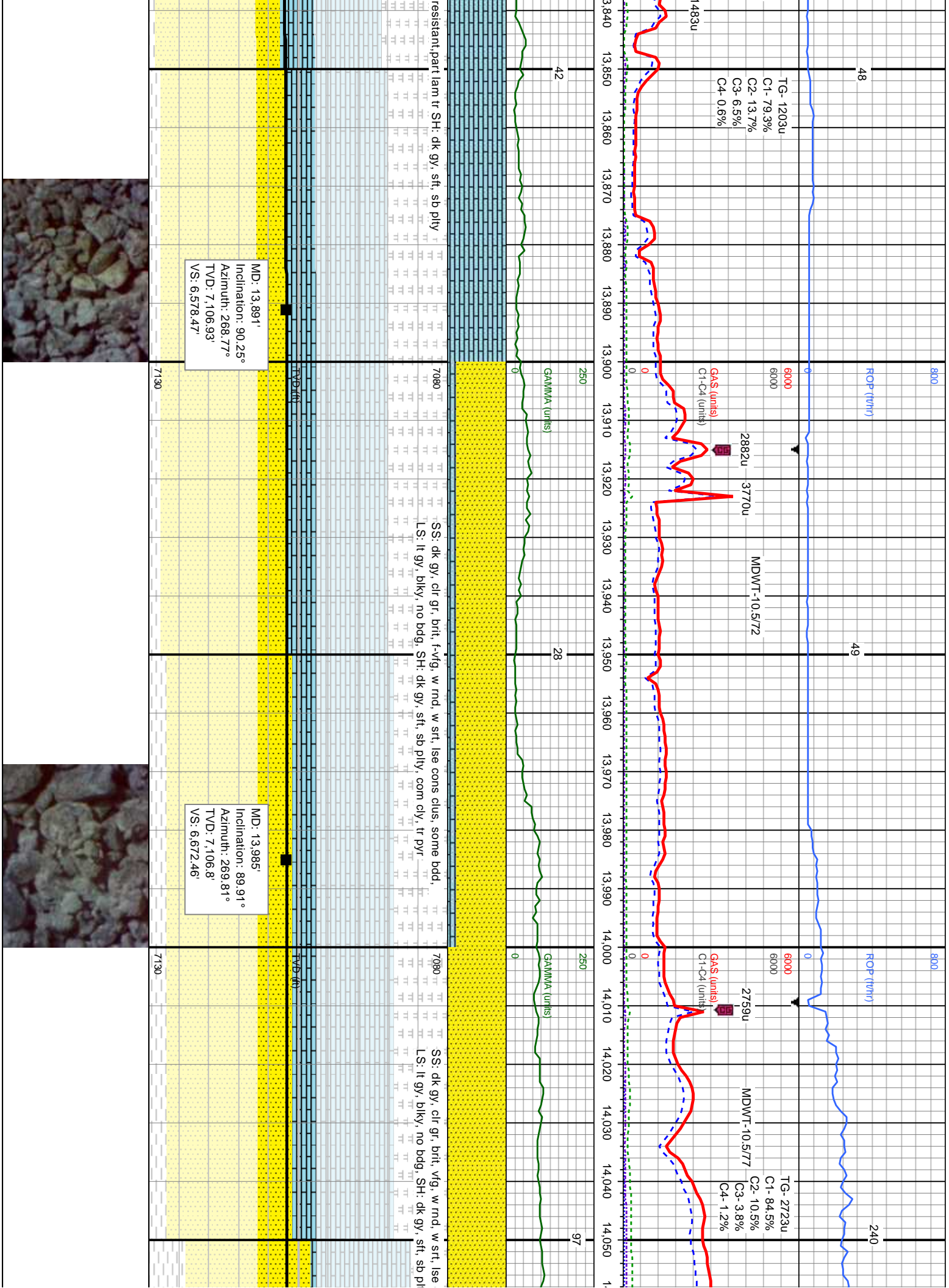


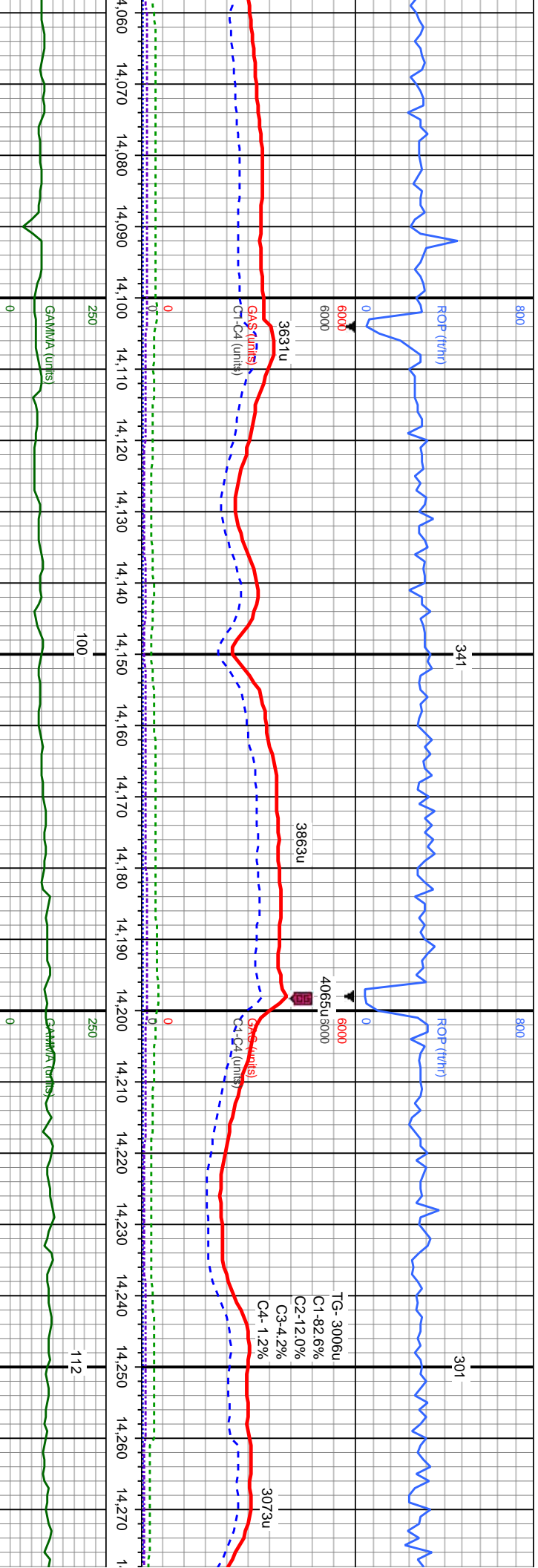












cons clus, some bdd, tr  
y, com cly,

7080 SS: dk gy, clr gr, brit, vfg, w rnd, w srt, lse cons clus, some bdd, tr  
LS: lt gy, blkly, no bdd, tr SH: dk gy, sft, sb ply, tr cly, com pyrite

7080 SS: dk gy, clr gr, brit, vfg grading to silt, w rnd, w srt, lse co  
clus, some bdd, tr LS: lt gy, blkly, no bdd, tr SH: dk gy, sft, s  
com cly

MD: 14,080'  
Inclination: 89.94°  
Azimuth: 269.63°  
TVD: 7,106.92'  
VS: 6,767.44'

MD: 14,174'  
Inclination: 89.97°  
Azimuth: 269.12°  
TVD: 7,106.99'  
VS: 6,861.42'

MD: 14,269'  
Inclination: 90.03°  
Azimuth: 269.32°  
TVD: 7,106.99'  
VS: 6,956.42'



11/17/2017  
11/18/2017

MINDEPTH

ROP (ft/hr)

MDWT -10.5+7/4

3227u

GA5 (units)  
C1-C4 (units)

3644u

GA5 (units)  
C1-C4 (units)

TG- 3298u

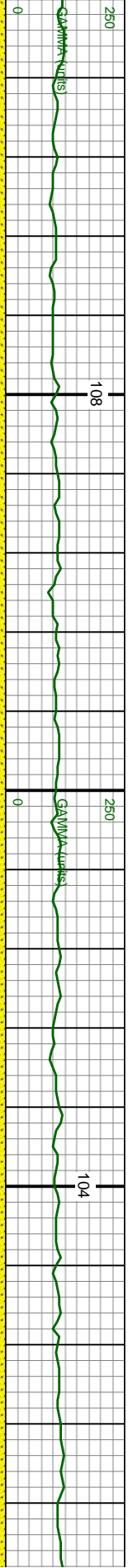
C1- 86.0%  
C2- 9.9%  
C3- 3.2%  
C4- 0.9%

3423u

3676u

270

288

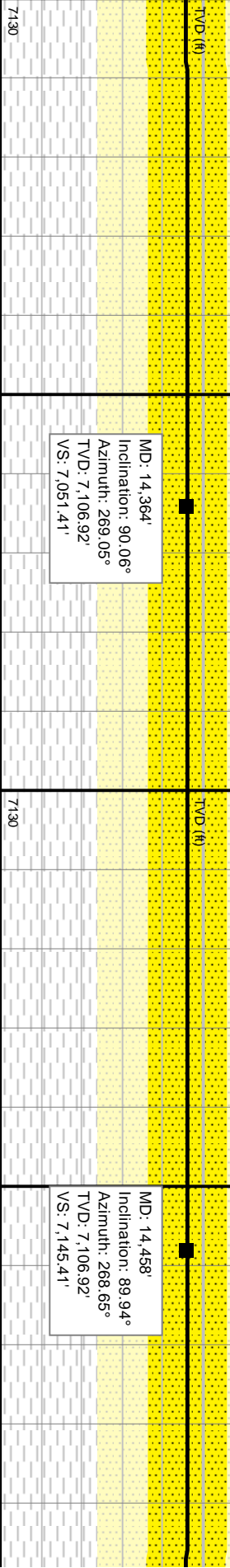


SS: dk gy, clr gr, brit, vfg grading to silt, w rnd, w srt, lse cons  
clus, some bdd, com cly

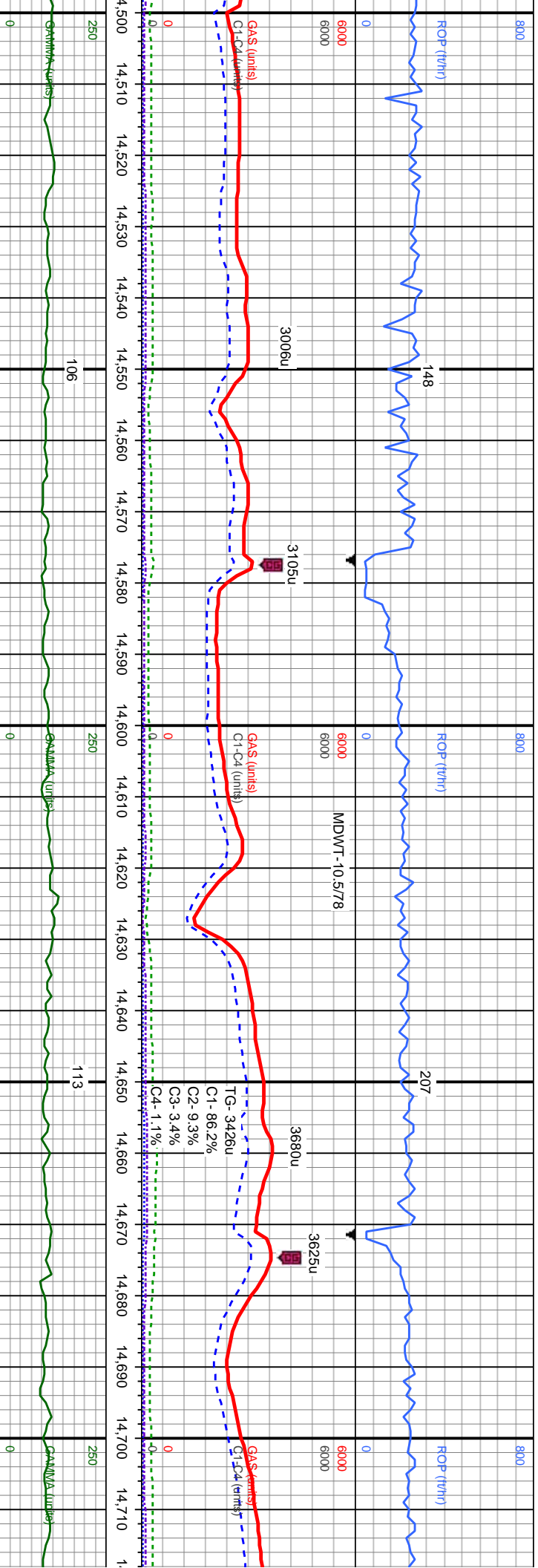
SS: dk gy, clr gr, brit, vfg grading to silt, w rnd, w srt, lse cons  
clus, some bdd, com cly, tr pyr

MD: 14,364'  
Inclination: 90.06°  
Azimuth: 269.05°  
TVD: 7,106.92'  
VS: 7,051.41'

MD: 14,458'  
Inclination: 89.94°  
Azimuth: 268.65°  
TVD: 7,106.92'  
VS: 7,145.41'



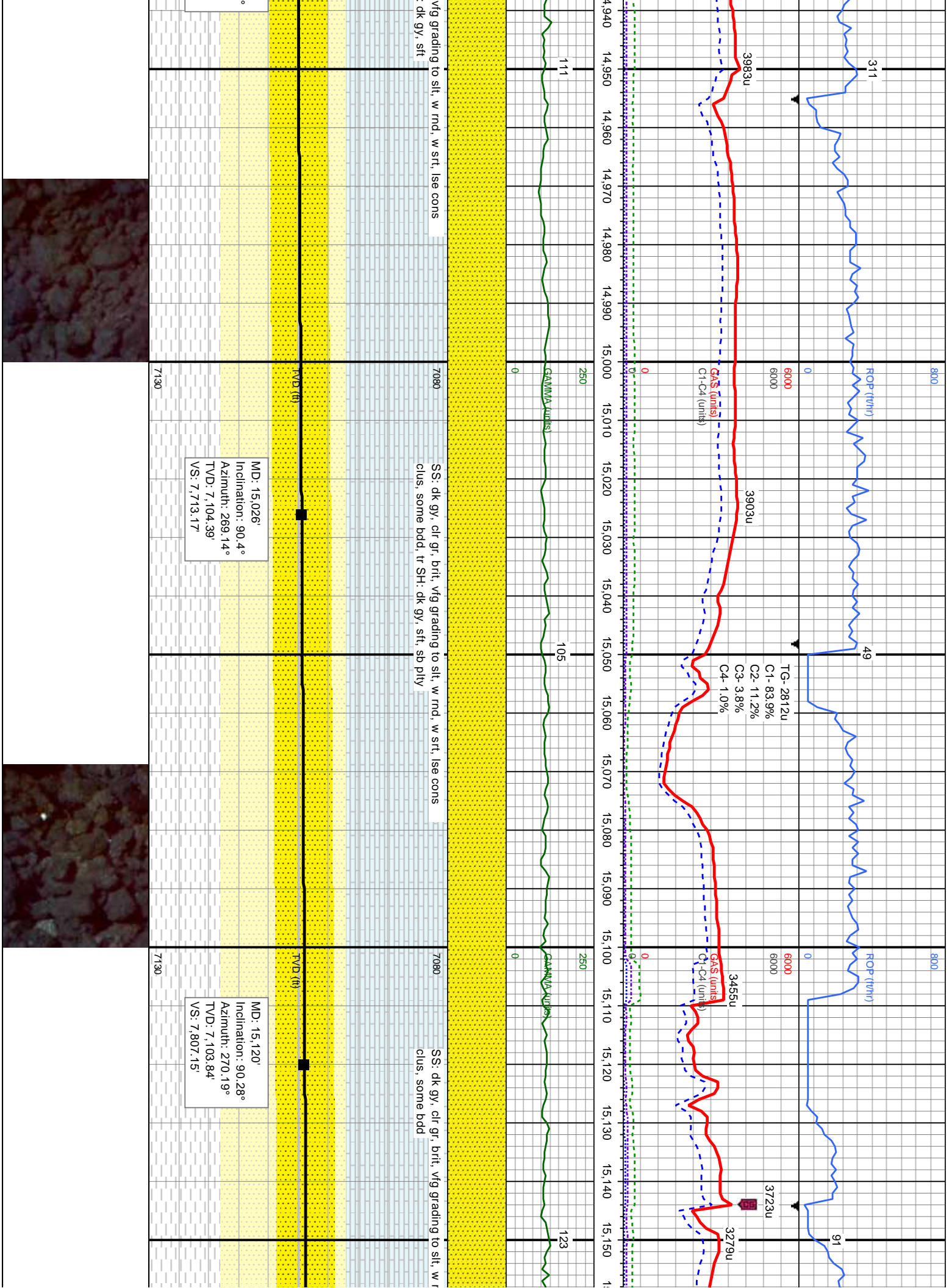




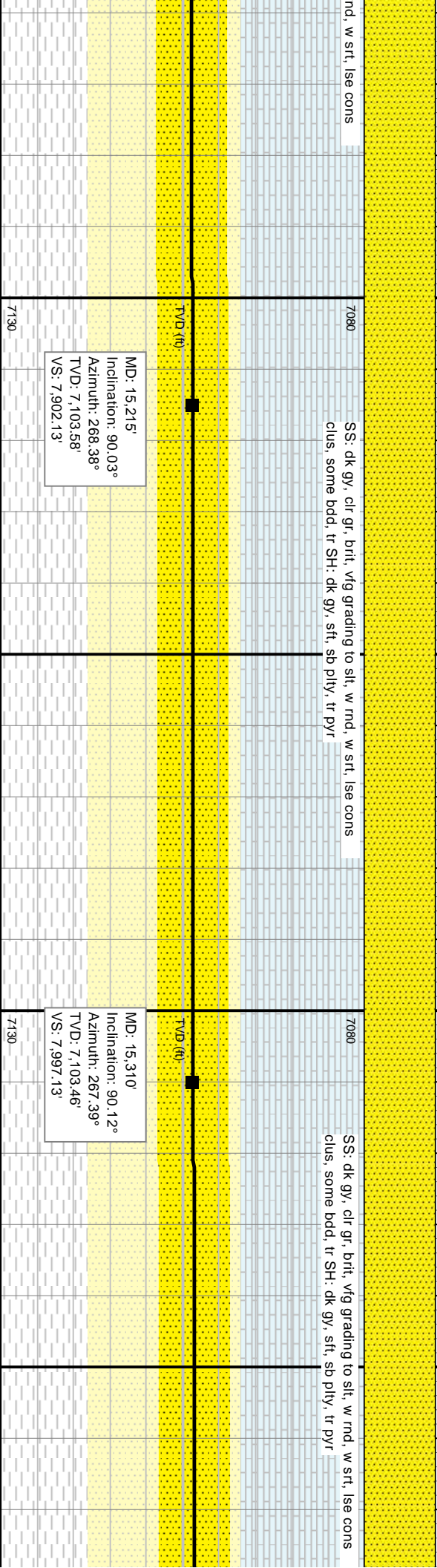
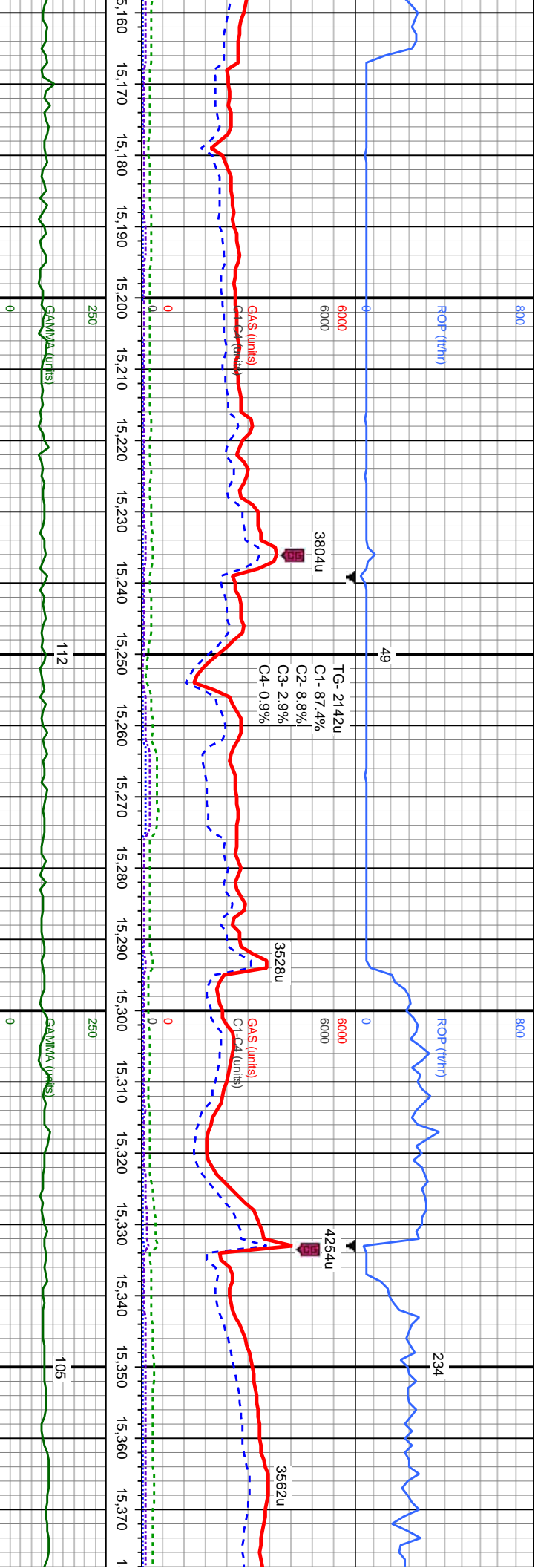
SS: dk gy, clr gr, brit, vfg grading to silt, w rnd, w srt, lse cons clus, some bdd, tr LS: dk-beige, blk,nd-resistant,part lam, tr pyr		7080	7130
MD: 14,553' Inclination: 89.94° Azimuth: 266.83° TVD: 7,107.02' VS: 7,240.39'		TVD (ft)	7130
SS: dk gy, clr gr, brit, vfg grading to silt, w rnd, w srt, lse cons clus, some bdd, tr SH: dk gy, sft, sb plty, tr pyr		7080	7130
MD: 14,648' Inclination: 90.34° Azimuth: 266.95° TVD: 7,106.79' VS: 7,335.36'		TVD (ft)	7130
		TVD (ft)	7130

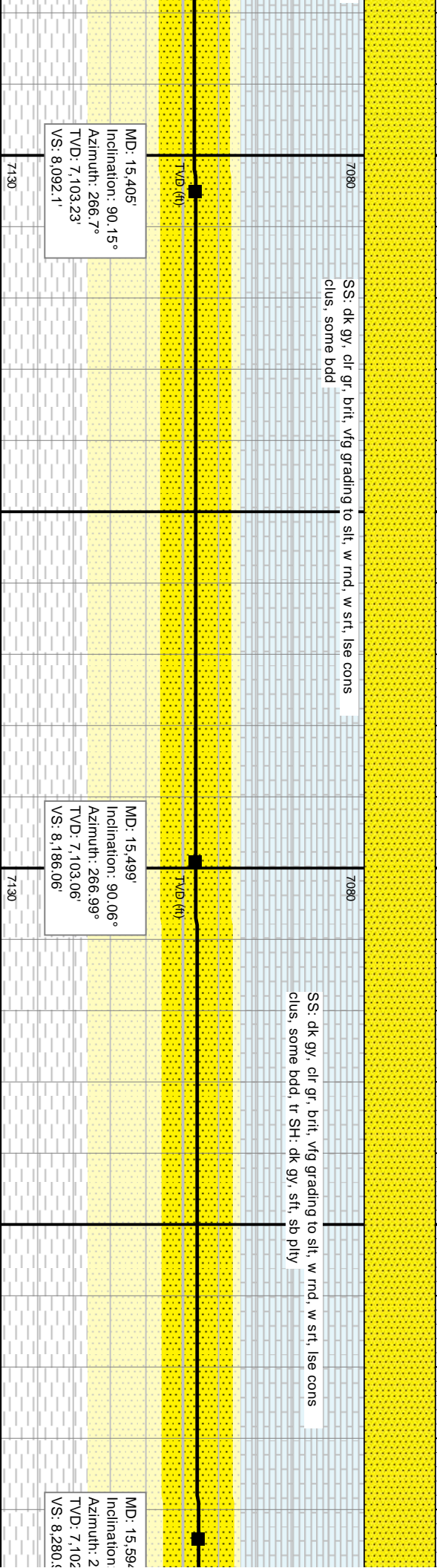
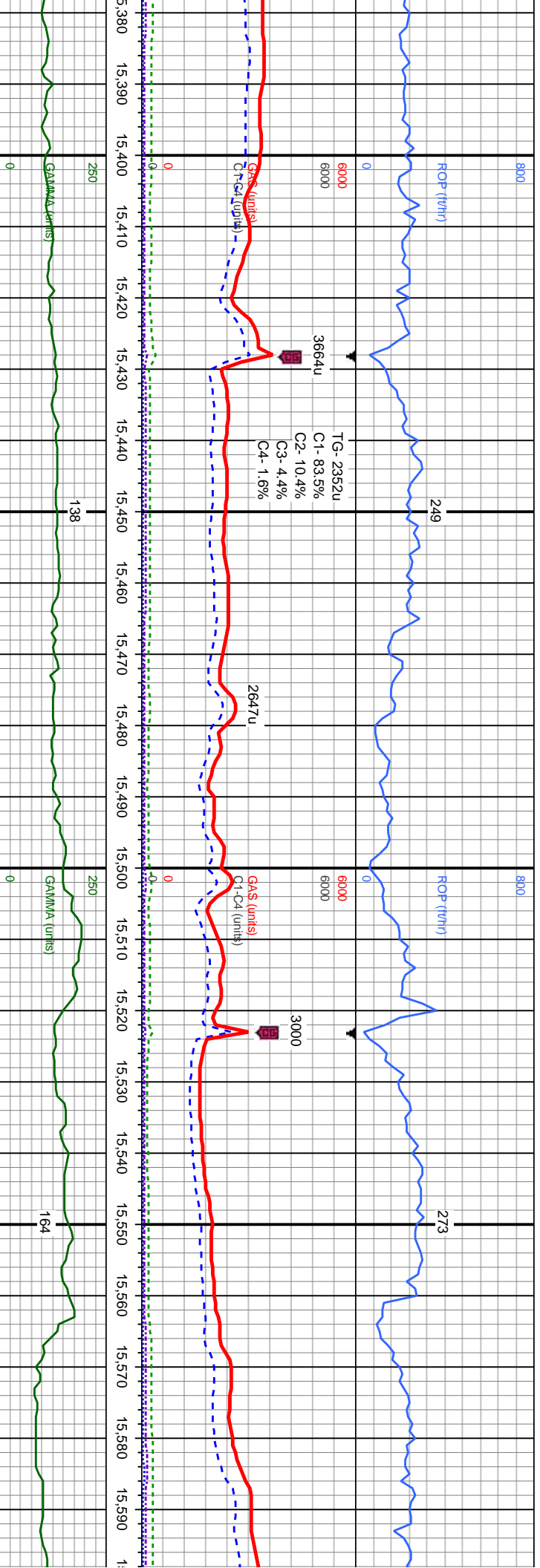








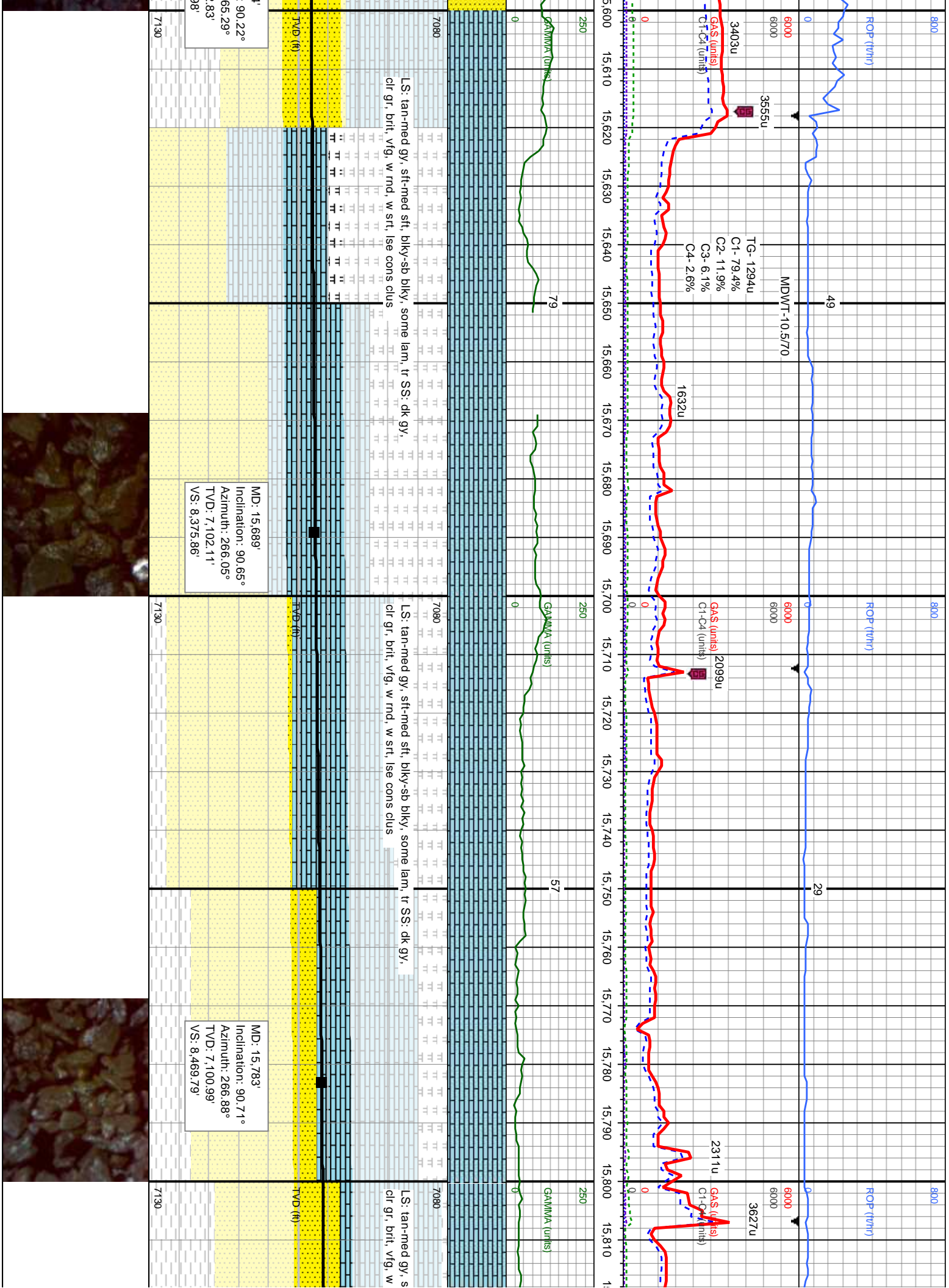




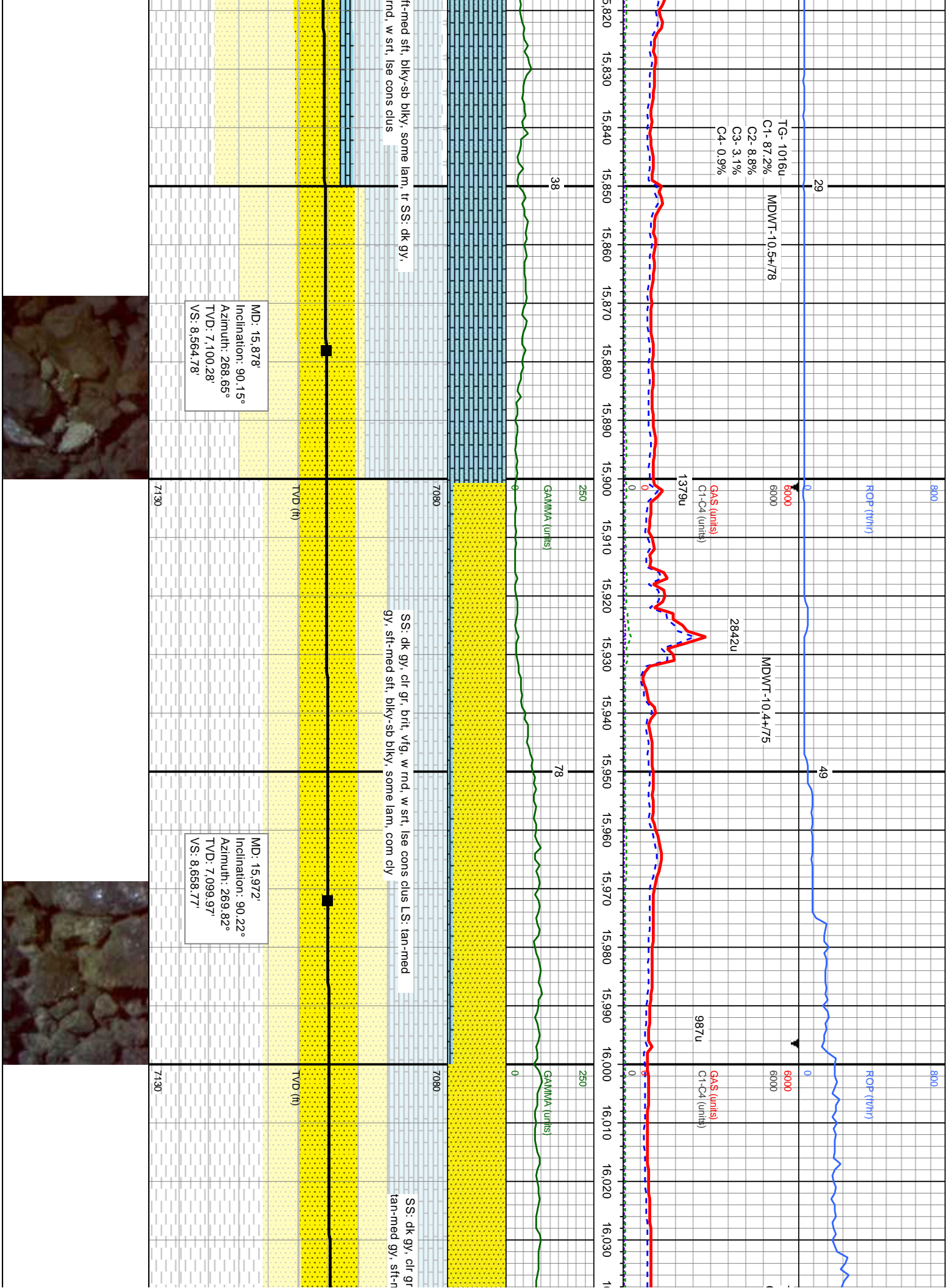
MD: 15,405'  
Inclination: 90.15°  
Azimuth: 266.7°  
TVD: 7,103.23'  
VS: 8,092.1'

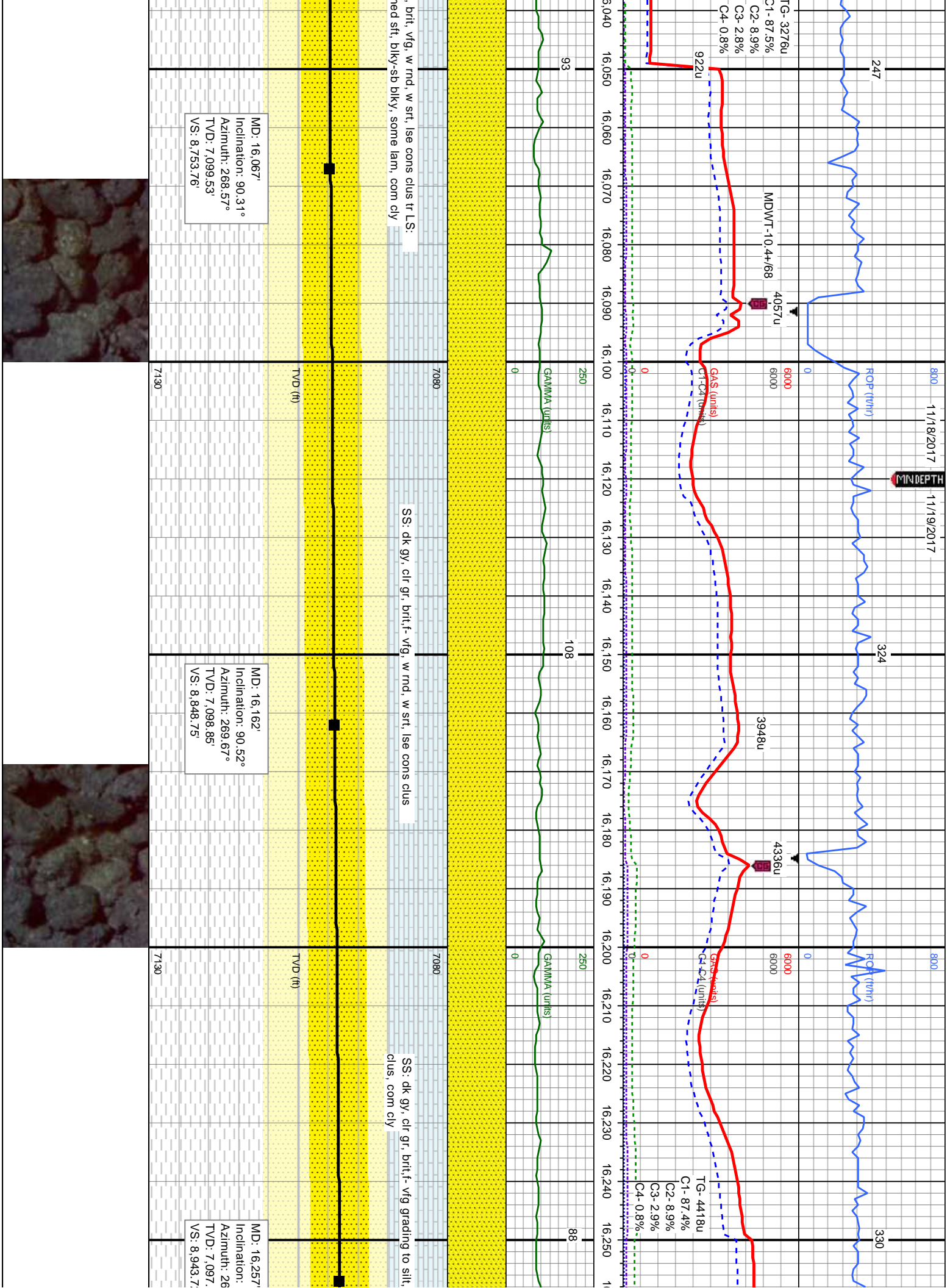
MD: 15,499'  
Inclination: 90.06°  
Azimuth: 266.99°  
TVD: 7,103.06'  
VS: 8,186.06'

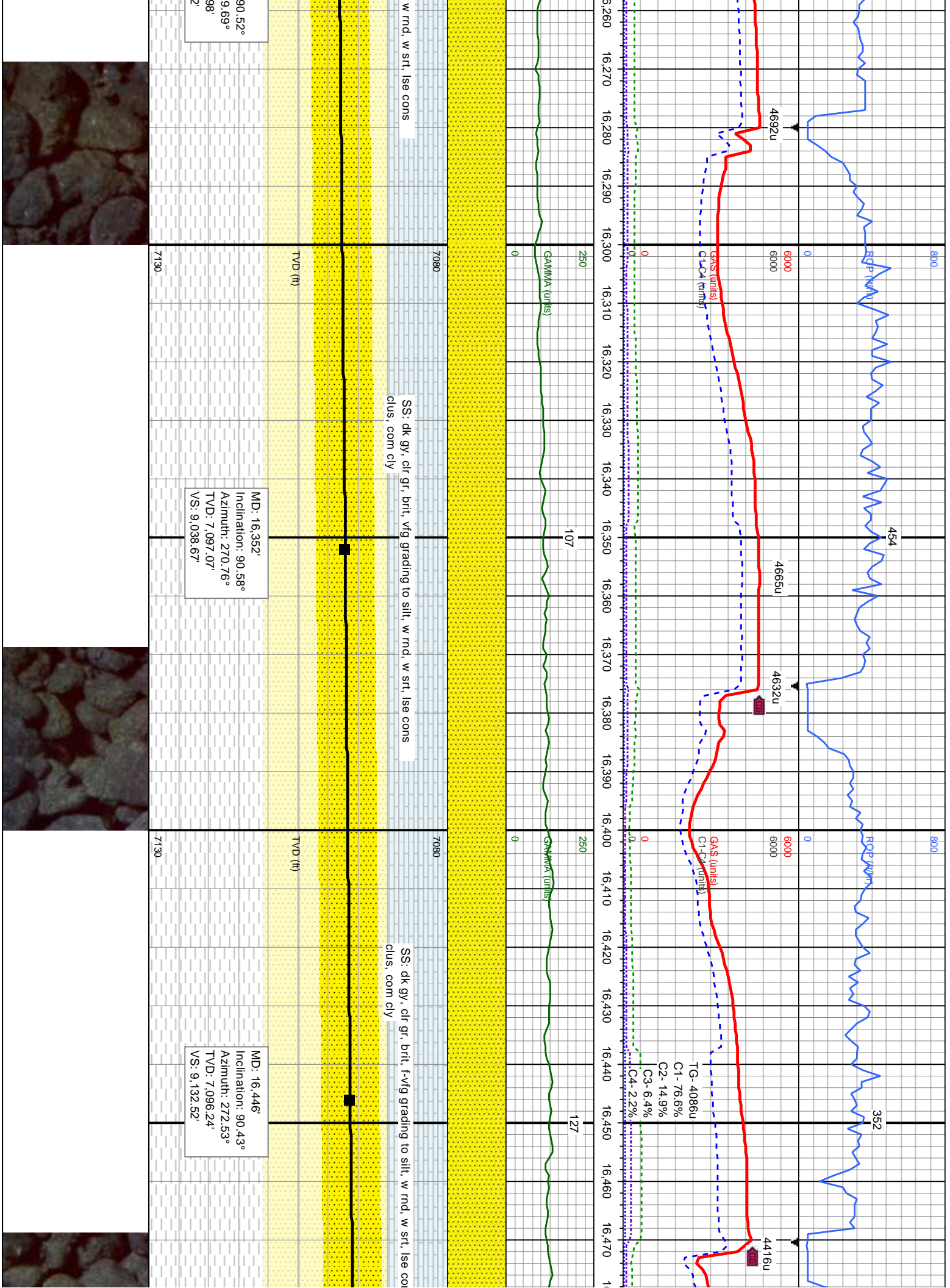
MD: 15,599'  
Inclination: 90.06°  
Azimuth: 266.99°  
TVD: 7,103.06'  
VS: 8,186.06'



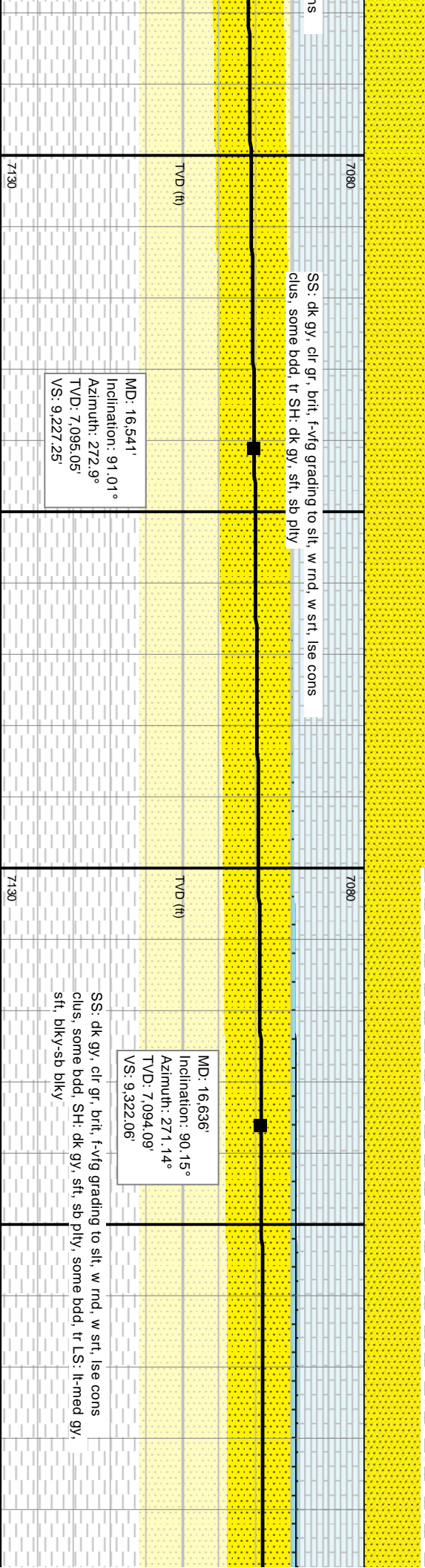
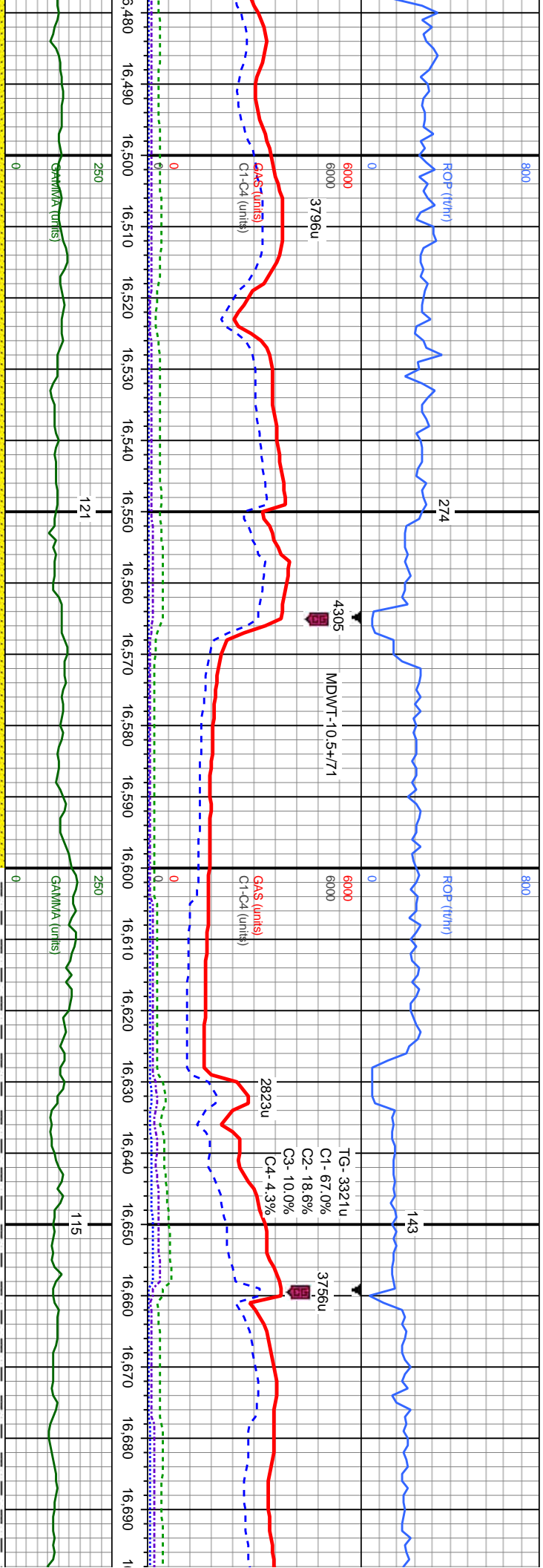




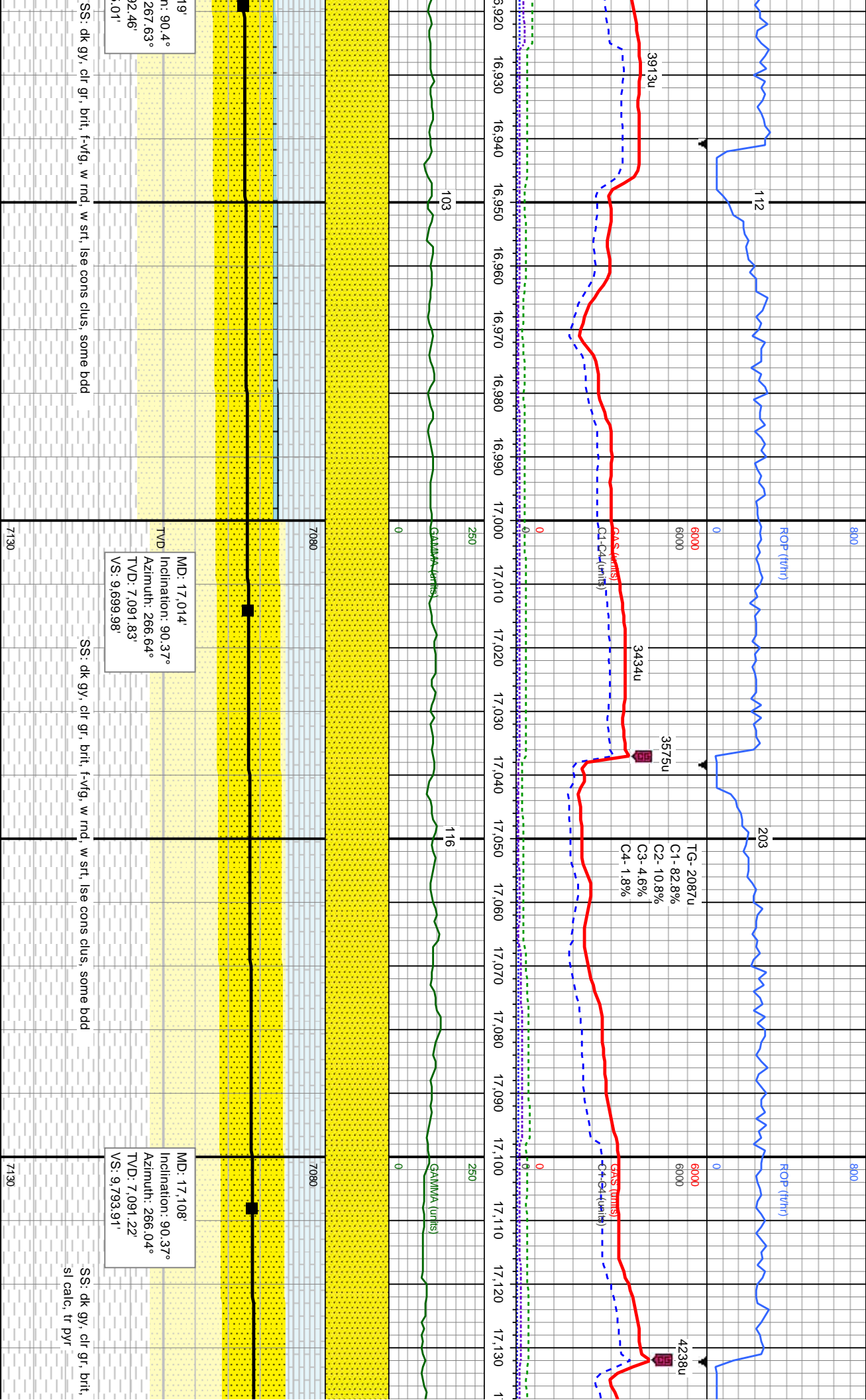












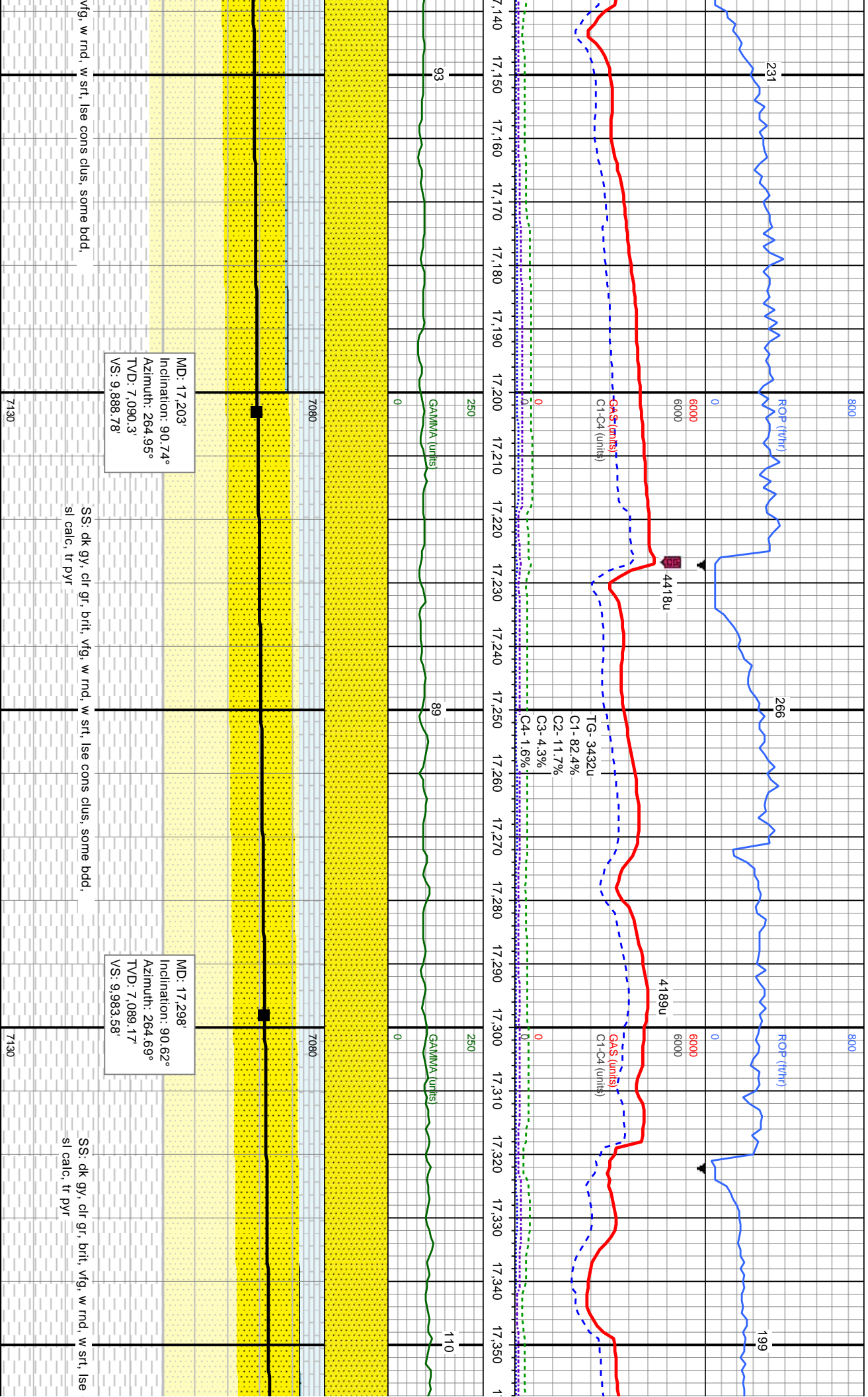
19'  
n: 90.4°  
267.63°  
22.46'  
.01'

MD: 17,014'  
Inclination: 90.37°  
Azimuth: 266.64°  
TVD: 7,091.83'  
VS: 9,699.98'

MD: 17,108'  
Inclination: 90.37°  
Azimuth: 266.04°  
TVD: 7,091.22'  
VS: 9,793.91'

SS: dk gy, clr gr, brlt, f-vfg, w rnd, w srt, lse cons clus, some bdd  
sl calc, tr pyr





vfg, w rnd, w srt, lse cons clus, some bdd.

SS: dk gy, clr gr, brlt, vfg, w rnd, w srt, lse cons clus, some bdd, sl calc, tr pyr

SS: dk gy, clr gr, brlt, vfg, w rnd, w srt, lse cons clus, some bdd, sl calc, tr pyr

