



Scale: 5" / 100'  
Measured Depth Log

Well Name Pronghorn K-O-22HNB

Location NWNW SECTION 22, T5N, R61W

State COLORADO

County WELD

Country USA

Rig Number CADE 25

API Number 05-123-39546

AFE # 14309

Region DJ BASIN

Field WATTENBERG

Spud Date 1/26/2015

Drilling Completed 2/2/2015

Surface Coordinates 392' FNL x 1278' FWL

Bottom Hole Coordinates 452' FSL x 2635' FWL

Ground Elevation 4661'

K.B. Elevation 4678'

Logged Interval 5650' To 10939

Total Depth 10939'

Formation NIOBRARA B CHALK

Type of Drilling Fluid FW LSND

## Operator

Company Bonanza Creek Energy Inc.

Address 410 17th STREET, SUITE 1500  
DENVER, CO 80202

## Geologist

Name BRANT LOGAN

Company BONANZA CREEK ENERGY INC.

Address 410 17th STREET, SUITE 1500  
DENVER, CO 80202

## Other

COLUMBINE LOGGING, INC. 602 S. LIPAN STREET

DENVER, COLORADO 80202

WELL SITE GEOLOGISTS JOEY LUCE

JEFF LACY

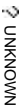

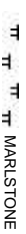
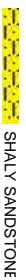

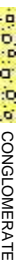

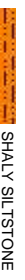



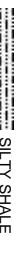

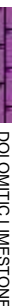








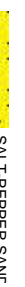





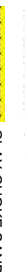





## Zone Color Coding

Oil  
Note  
Error

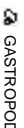

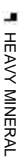
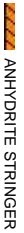
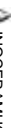
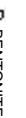

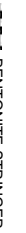
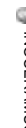


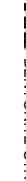
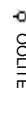
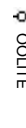
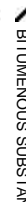
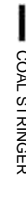
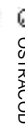
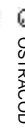

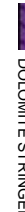


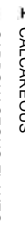
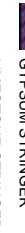
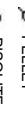
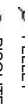

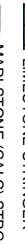
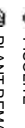
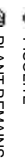

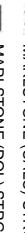
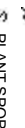
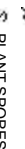




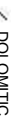
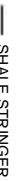
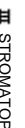
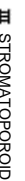







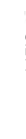

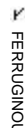




Condensate  
Core  
Water

Gas  
Pres  
Sea

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 SANC	 TUFF
 CHERT	 IGNEOUS	 SHALE	 WELDED TUFF
 CLAY CHOKE SANC	 SIDERITE or LIMONITE	 SHALE COLORED	
 CLAYSTONE	 LIMESTONE	 SHALE GRAY	

Accessories

 GASTROPOD	 ARGILLITE GRAIN	 HEAVY MINERAL	 ANHYDRITE STRINGER
 INOCERAMUS	 B BENTONITE	 K KAOLIN	 BENTONITE STRINGER
 ALGAE	 O OOLITE	 BITUMENOUS SUBSTANCE	 COAL STRINGER
 AMPHIPORA	 O OSTRACOD	 BRECCIA FRAGMENTS	 DOLOMITE STRINGER
 BELLENNITE	 P PELECYPOD	 CALCAREOUS	 GYPSUM STRINGER
 BIOCLASTIC	 P PELLET	 CARBONACEOUS FLAKES	 LIMESTONE STRINGER
 BRACHIOPOD	 P PISOLITE	 CHTDK	 MARLSTONE (CALC) STRG
 BRYOZOA	 P PLANT REMAINS	 CHTTL	 MARLSTONE (DOL) STRG
 CEPHALOPOD	 S PLANT SPORES	 COAL - THIN BEDS	 SANDSTONE STRINGER
 CORAL	 S SCAPHOPOD	 D DOLOMITIC	 SHALE STRINGER
 CRINOID	 S STROMATOPOROID	 F FELDSPAR	 SILTSTONE STRINGER
 ECHINOID	 F FERRUGINOUS PELLET	 S SILTY	
 FISH	 F FERRUGINOUS	 T TUFFACEOUS	
 FORAMINIFERA	 A ANHYDRITIC	 G GLAUCONITE	
 F FOSSIL	 A ARGILLACEOUS	 G GYPSIFEROUS	

Stringer

Oil Show

- P PINPOINT
- VUGGY






































Engineering

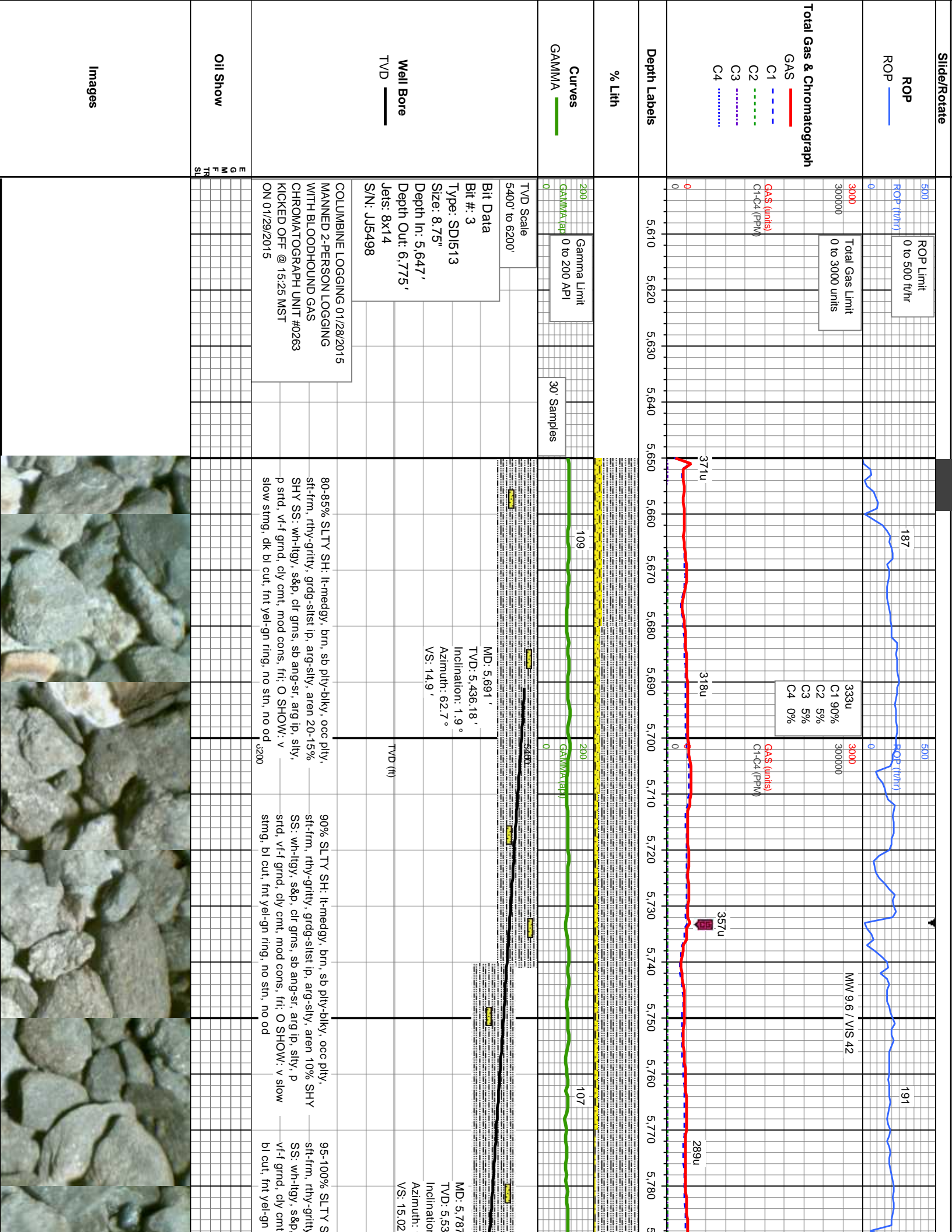
- D DEAD
- EVEN
- QUESTIONABLE
- BIT
- SPOTTED STAINING
- CONNECTION (UP)

Porosity

- CONNECTION GAS
- CONNECTION GAS
- TRIP GAS
- TRIP GAS (LEFT)
- FRACTURE
- INTERCRYSTALLINE
- DOWN TIME GAS
- INTEROOLITIC
- DOWN TIME GAS
- MOLDIC
- CORE - LOST
- CORE - RECOVERED

Other Symbols

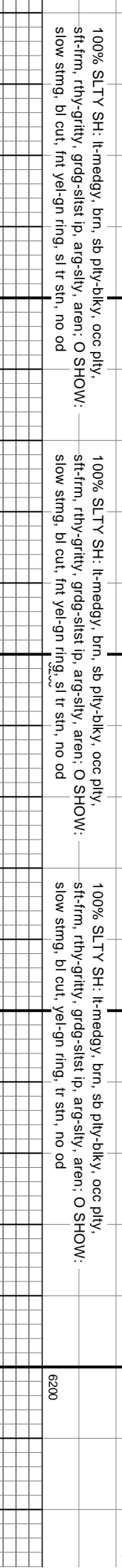
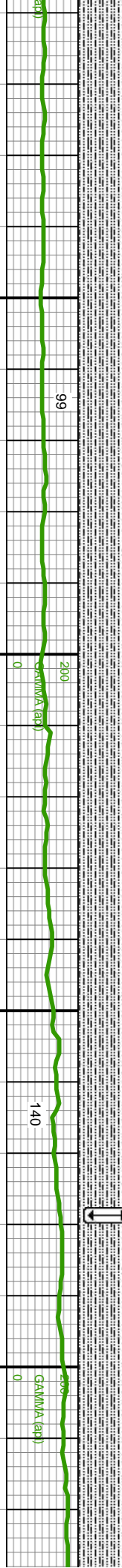
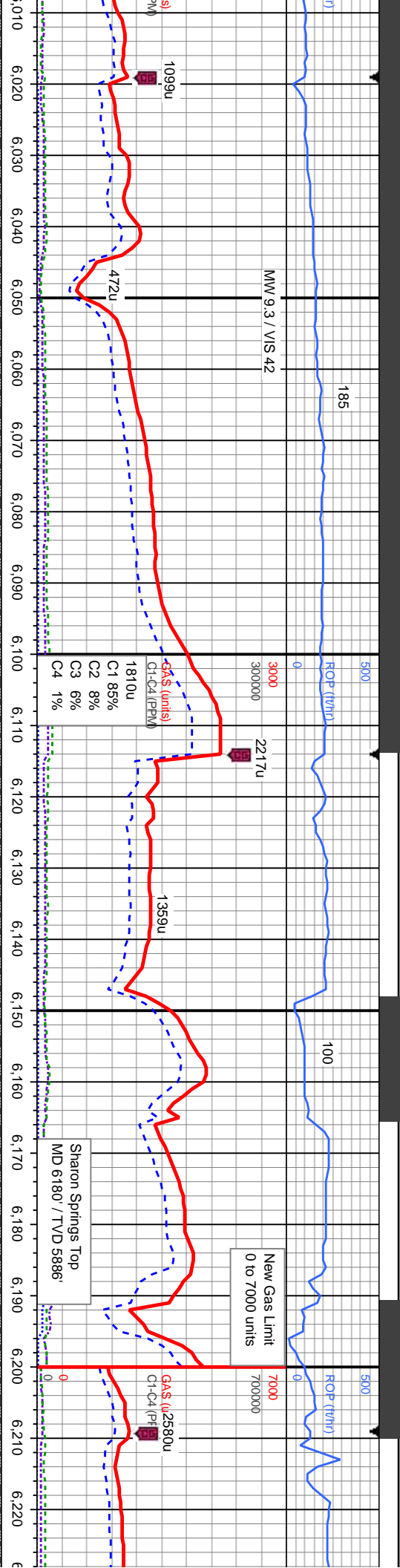
	DST INTERVAL		WIRELINE TESTED - LEFT		E EARTHY
	FAULT		WIRELINE TESTED - RT		FX FINELYXLN
	FORMATION TOP		DRILL STEM TEST		BS GRAINSTONE
	GAS SHOW		MIN DEPTH		L LITHOGRAPHIC
	OIL SHOW				MX MICROXLN
	MIN DEPTH UP	<b>Rounding</b>			
					MX MUDSTONE
	MIN DEPTH (DOWN)		ANGULAR		PS PACKSTONE
	NORMAL FAULT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

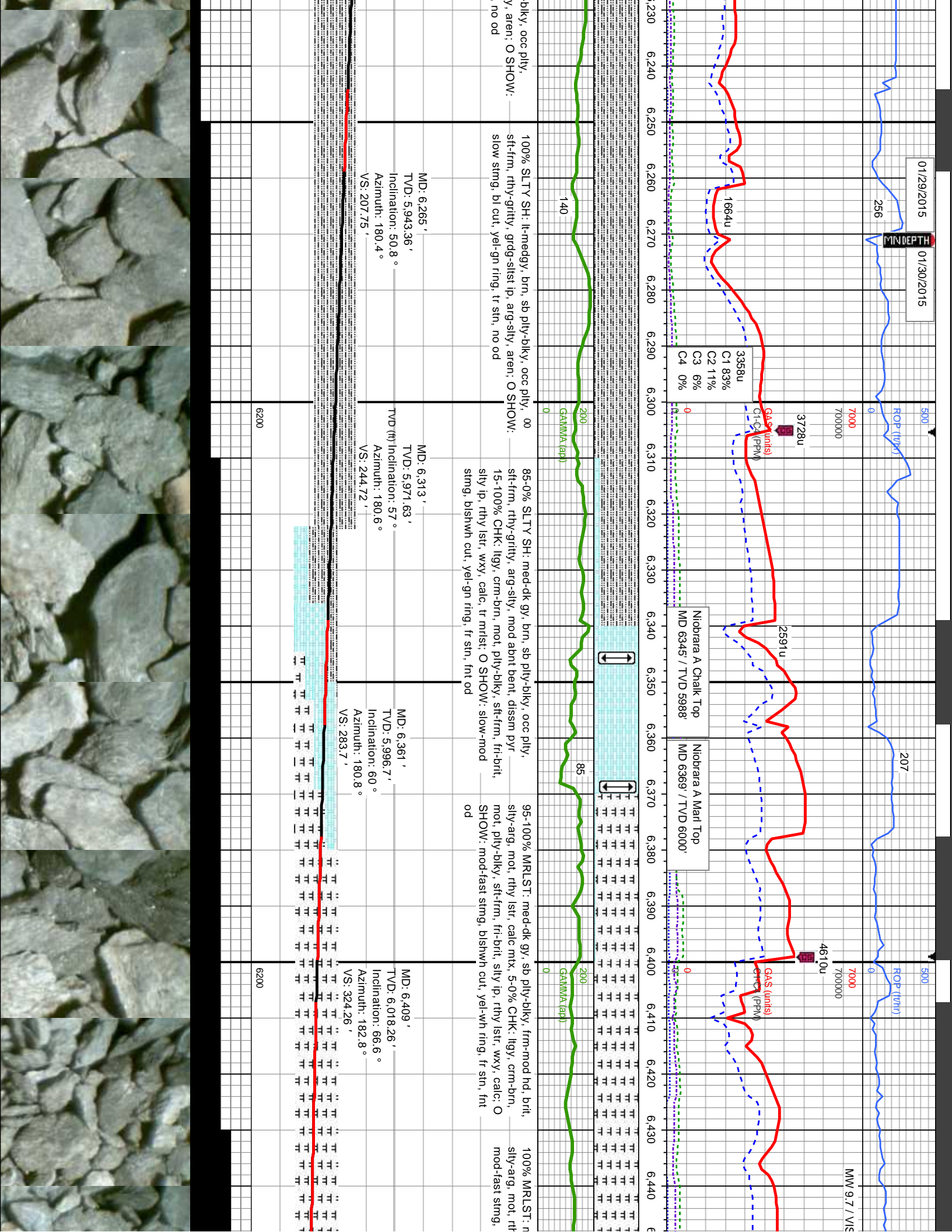














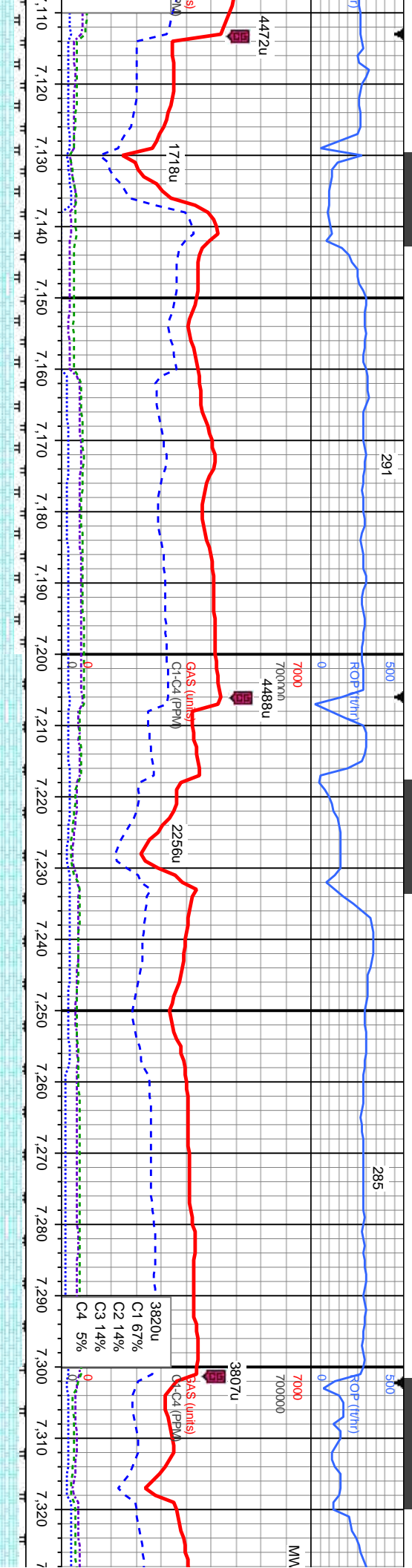




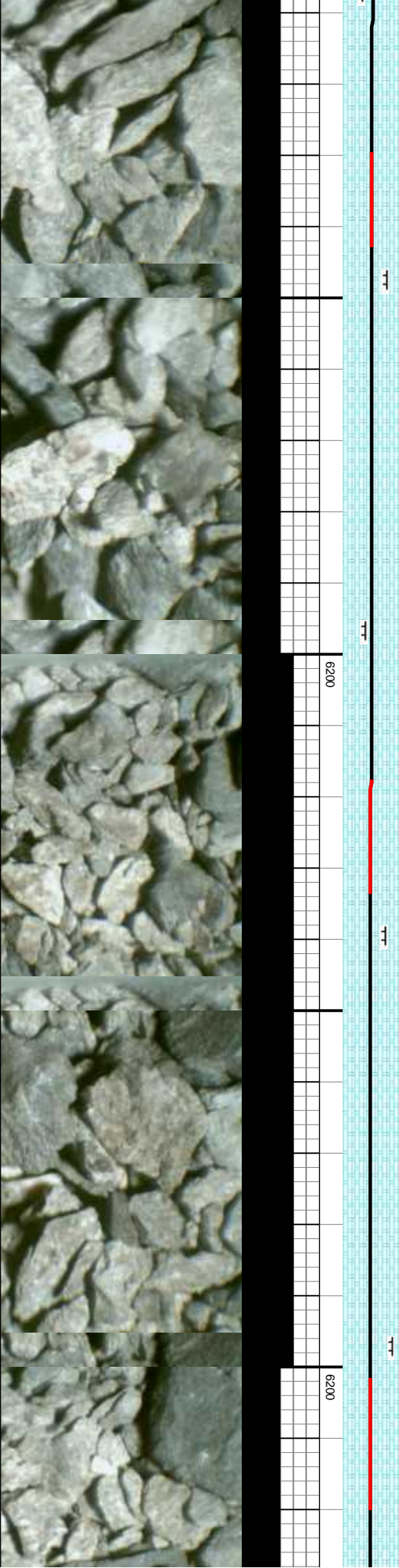




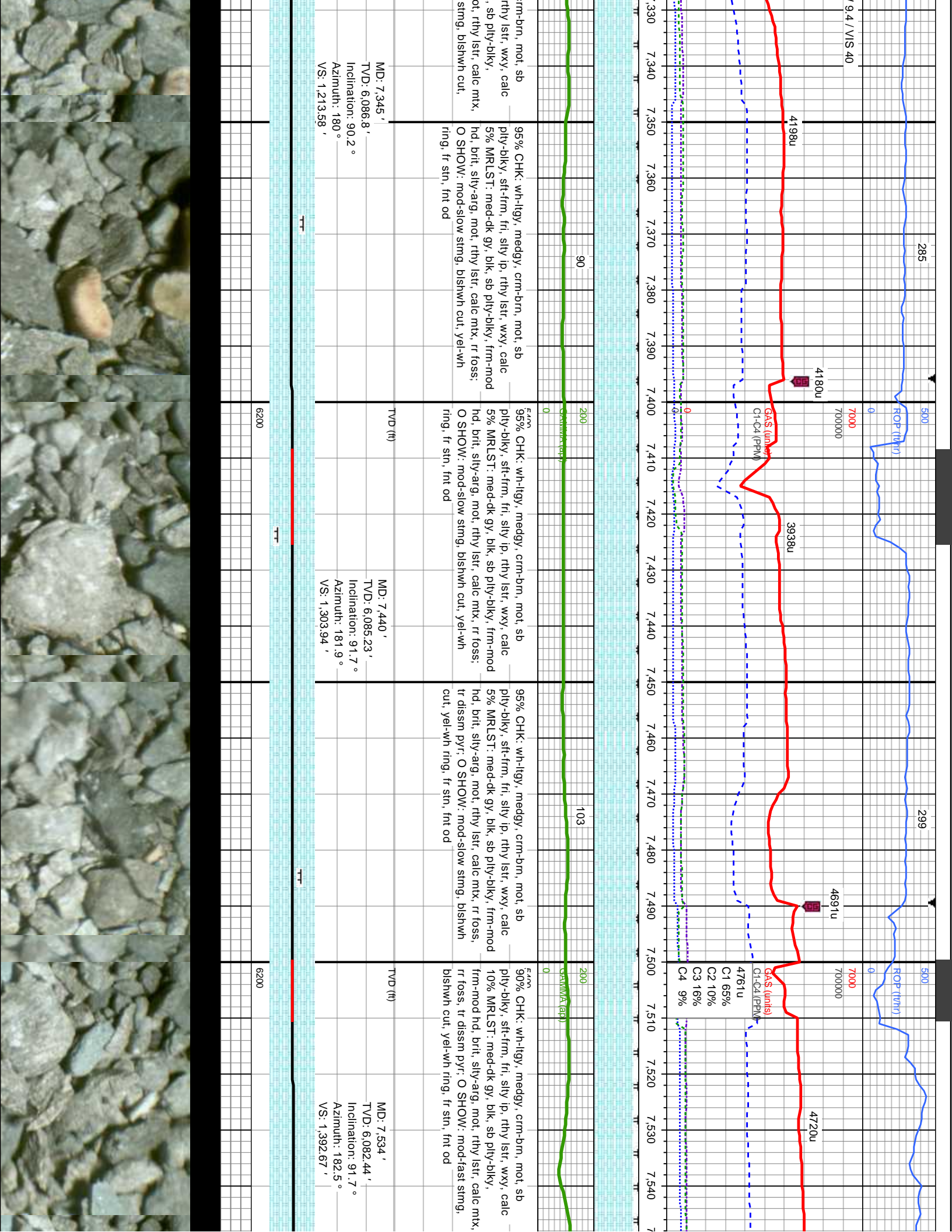


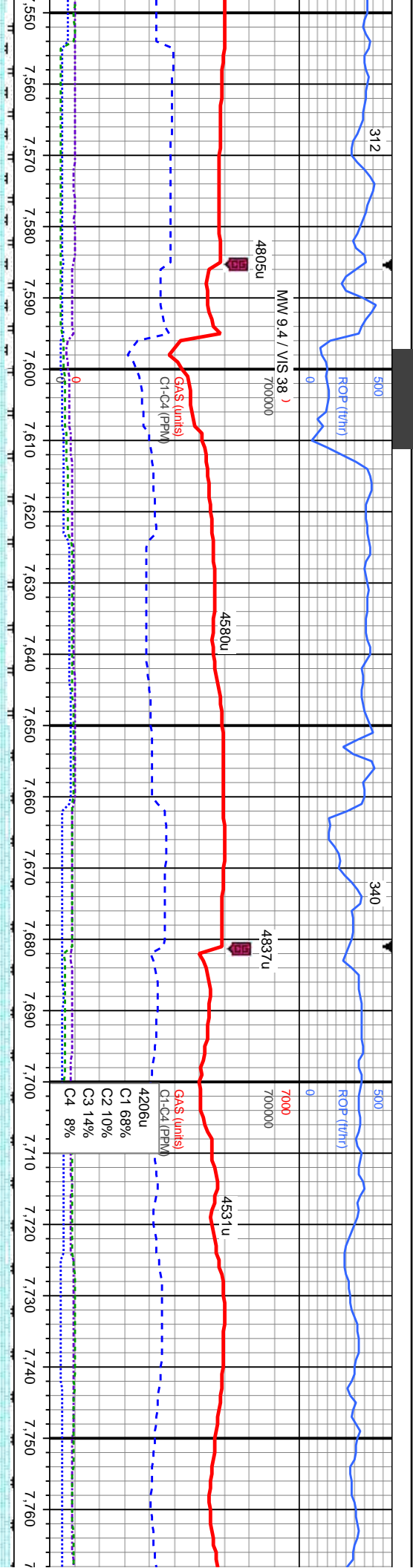


HK: wh-llgy, medgy, crm-brn, mot, sb y, sft-frm, fri, silty ip, rthy lst, wxy, calc RSLST: med-dk gy, sb pty-blky, frm-mod hd, -arg, mot, rthy lst, calc mtx, rr foss: O mod-slow stmg, blshwh cut, yel ring, fr d	80% CHK: wh-llgy, medgy, crm-brn, mot, sb pty-blky, sft-frm, fri, silty ip, rthy lst, wxy, calc 20% MRLST: med-dk gy, blk, sb pty-blky, frm-mod hd, brit, silty-arg, mot, rthy lst, calc mtx, rr foss: O SHOW: mod-slow stmg, blshwh cut, yel ring, fr stn, g od	95% CHK: wh-llgy, medgy, crm-brn, mot, sb pty-blky, sft-frm, fri, silty ip, rthy lst, wxy, calc 5% MRLST: med-dk gy, blk, sb pty-blky, frm-mod hd, brit, silty-arg, mot, rthy lst, calc mtx, rr foss: O SHOW: mod-fast stmg, blshwh cut, yel ring, mod stn, fnt od	95% CHK: wh-llgy, medgy, crm-brn, mot, sb pty-blky, sft-frm, fri, silty ip, rthy lst, wxy, calc 5% MRLST: med-dk gy, blk, sb pty-blky, frm-mod hd, brit, silty-arg, mot, rthy lst, calc mtx, rr foss: O SHOW: mod-fast stmg, blshwh cut, yel ring, mod stn, fnt od	90% CHK: wh-llgy, medgy, c pty-blky, sft-frm, fri, silty ip, 10% MRLST: med-dk gy, blk frm-mod hd, brit, silty-arg, m rr foss: O SHOW: mod-slow yel-wh ring, fr stn, fnt od
MD: 7,155 ' TVD: 6,084.56 ' Inclination: 87.9 ° Azimuth: 177.8 ° VS: 1,030.98 '	MD: 7,250 ' TVD: 6,086.63 ' Inclination: 89.6 ° Azimuth: 179.1 ° VS: 1,122.52 '	MD: 7,250 ' TVD: 6,086.63 ' Inclination: 89.6 ° Azimuth: 179.1 ° VS: 1,122.52 '	MD: 7,250 ' TVD: 6,086.63 ' Inclination: 89.6 ° Azimuth: 179.1 ° VS: 1,122.52 '	MD: 7,250 ' TVD: 6,086.63 ' Inclination: 89.6 ° Azimuth: 179.1 ° VS: 1,122.52 '

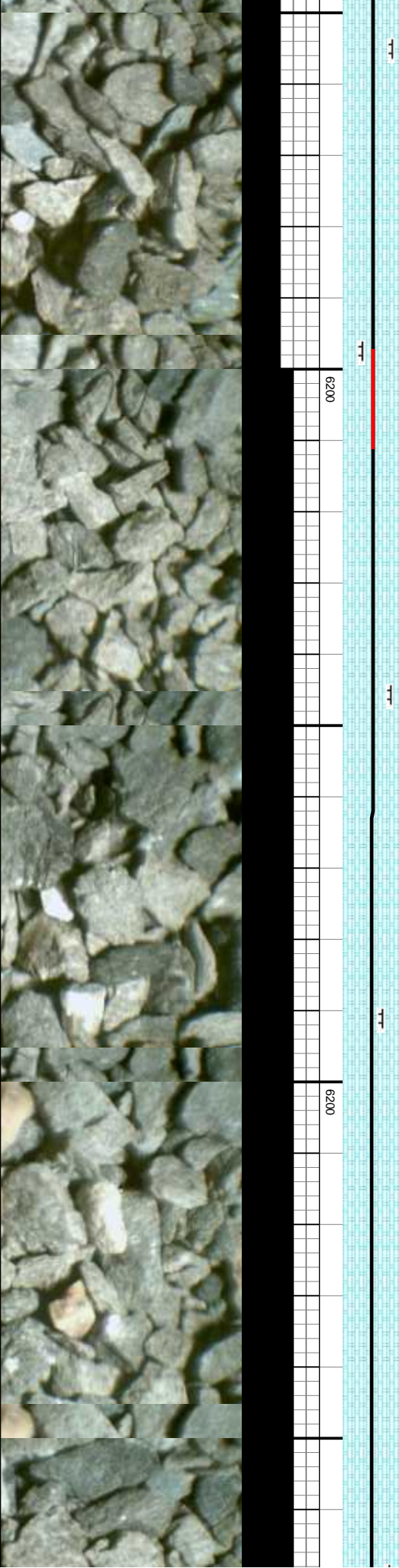








85% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-biky, sft-frm, fri, silty ip, rthy lstr, wxy, calc 15% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brti, silty-arg, mot, rthy lstr, calc mtx, rr foss, tr dissim pyr: O SHOW: mod-fast stimg, blshwh cut, yel-wh ring, fr sin, fnt od	200 GAMMA (api)	90% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-biky, sft-frm, fri, silty ip, rthy lstr, wxy, calc 10% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brti, silty-arg, mot, rthy lstr, calc mtx, rr foss, tr dissim pyr: O SHOW: mod-fast stimg, blshwh cut, yel ring, mod sin, fnt od	200 GAMMA (api)	95% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-biky, sft-frm, fri, silty ip, rthy lstr, wxy, calc 5% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brti, silty-arg, mot, rthy lstr, calc mtx, rr foss, tr dissim pyr: O SHOW: mod-fast stimg, blshwh cut, yel ring, mod sin, fnt od	200 GAMMA (api)	95% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-biky, sft-frm, fri, silty ip, rthy lstr, wxy, calc 5% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brti, silty-arg, mot, rthy lstr, calc mtx, rr foss, tr dissim pyr: O SHOW: mod-fast stimg, blshwh cut, yel-wh ring, mod sin, fnt od	200 GAMMA (api)
TVD (ft)							
MD: 7,630 ' TVD: 6,082.02 ' Inclination: 88.8 ° Azimuth: 180.1 ° VS: 1,483.8 '							
TVD (ft)							
MD: 7,725 ' TVD: 6,084.34 ' Inclination: 88.4 ° Azimuth: 178.5 ° VS: 1,574.95 '							

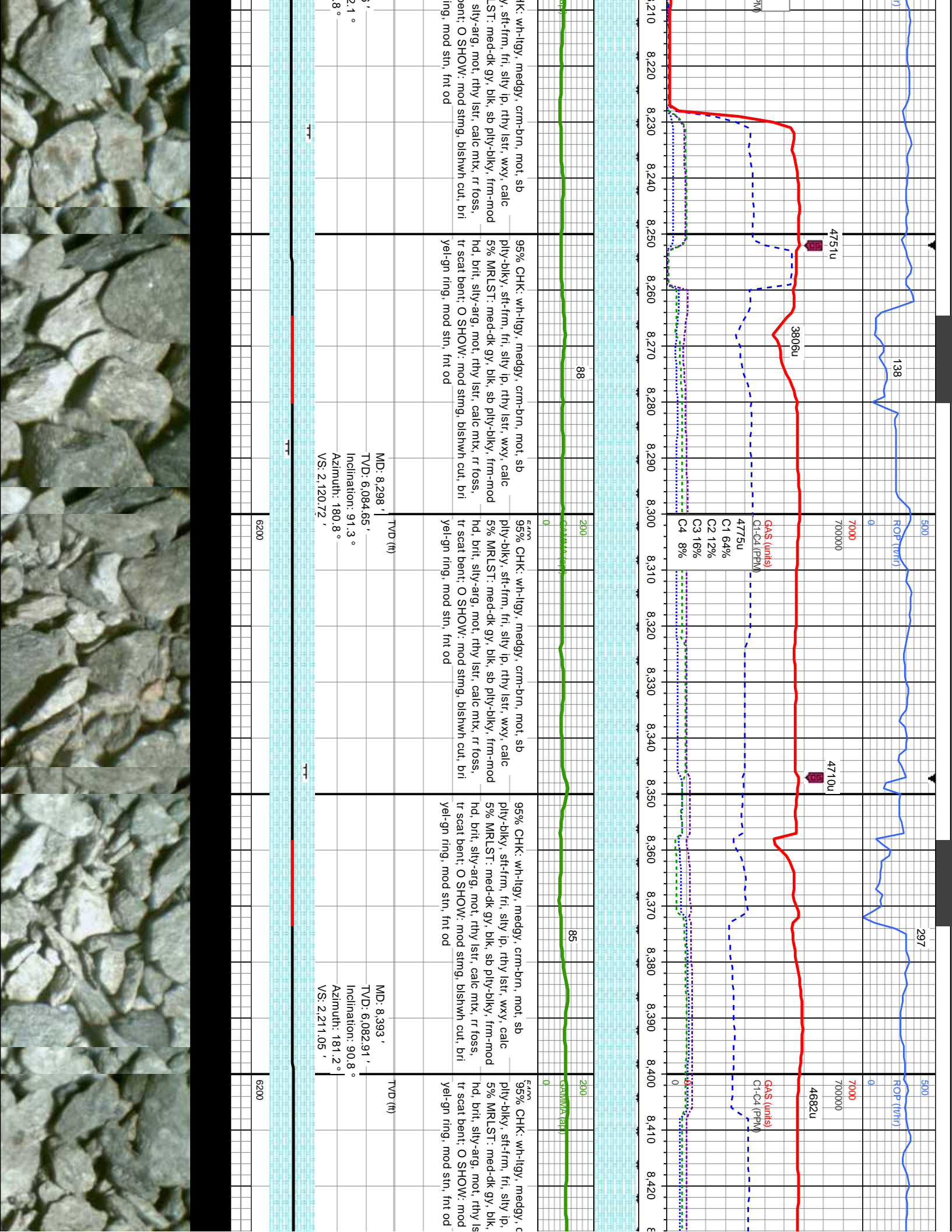




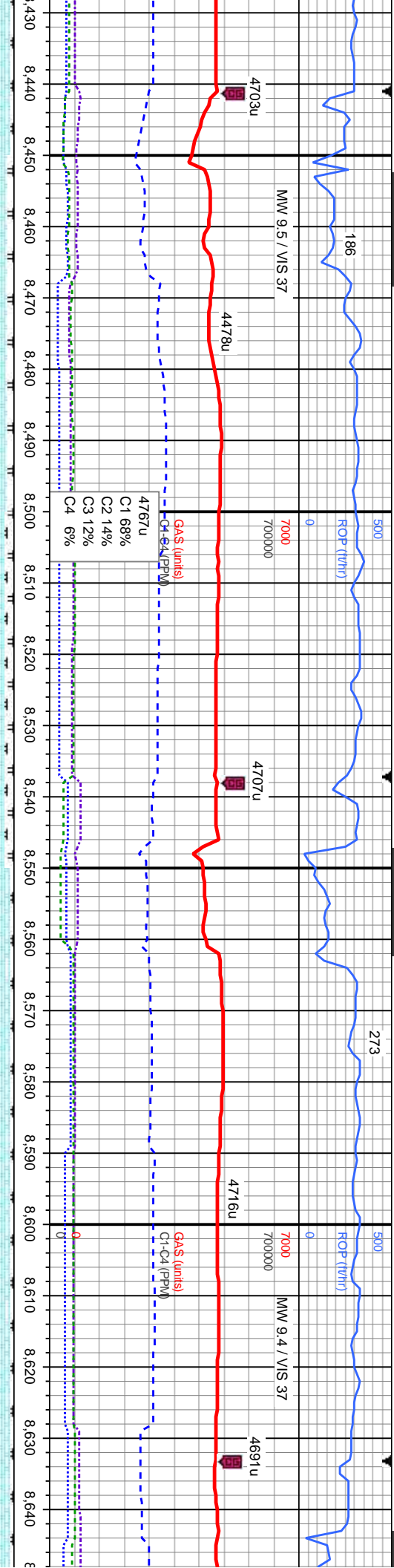




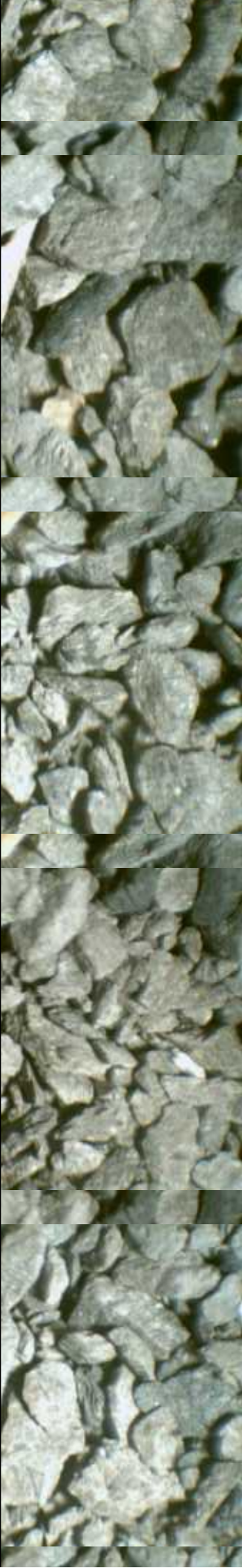




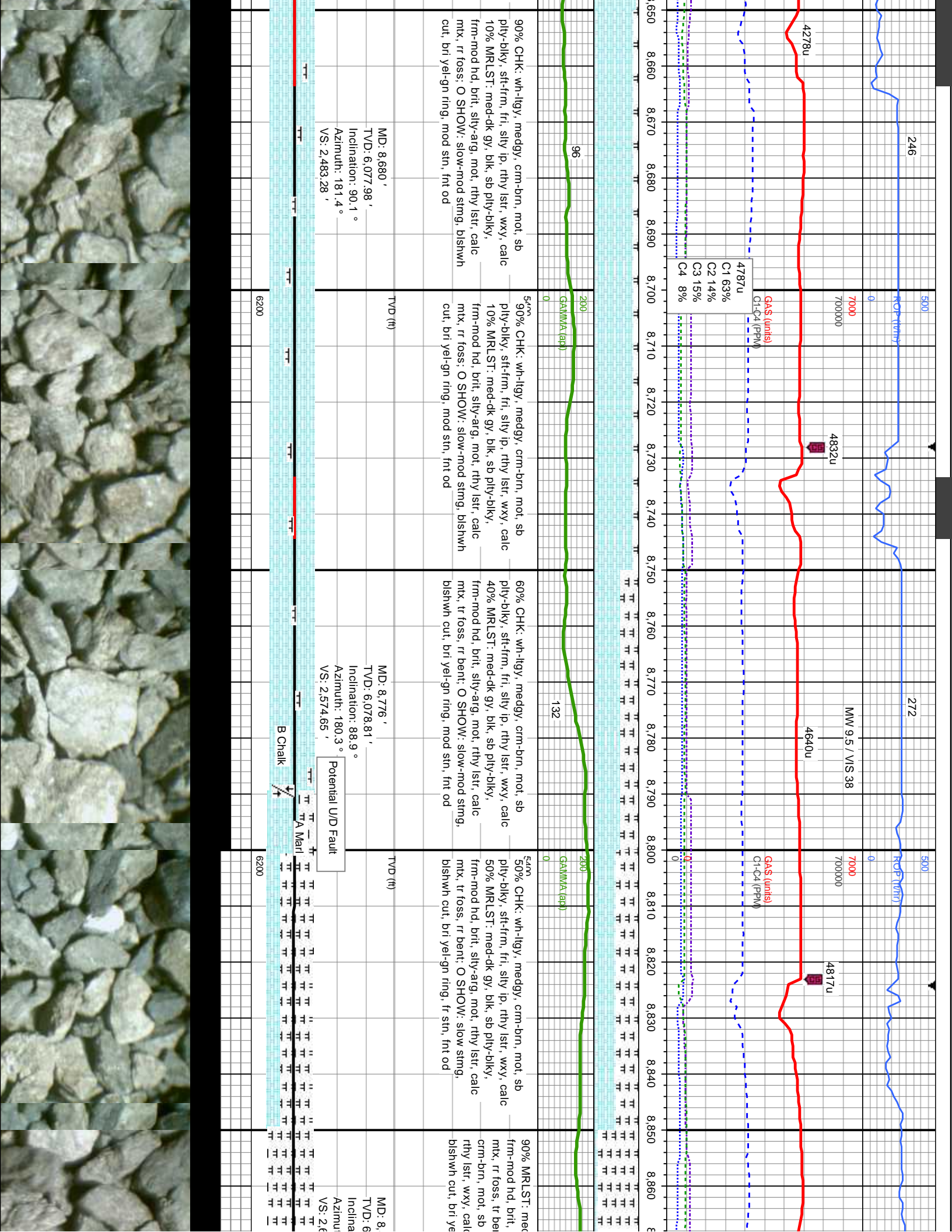


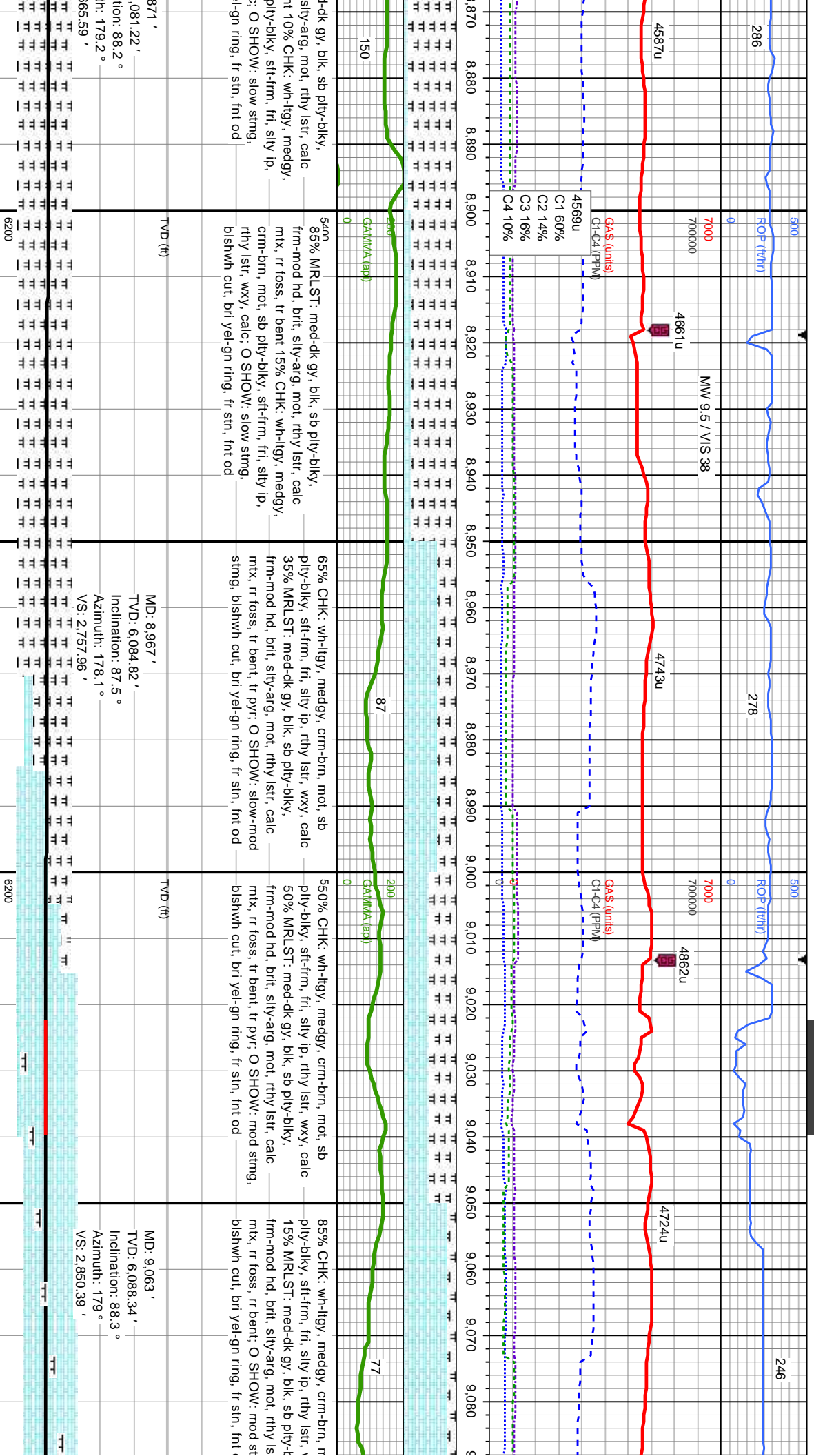


frm-brn, mot, sb ply-lstr, wxy, calc sb ply-blky, frm-mod tr, calc mtx, rr foss, stimg, blshwh cut, bri	90% CHK: wh-lgy, medgy, crm-brn, mot, sb ply-blky, sft-frm, fri, silty ip, rthy lstr, wxy, calc 10% MRLST: med-dk gy, blk, sb ply-blky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx, rr foss, tr scat bent; O SHOW: slow-mod stimg, blshwh cut, bri yel-gn ring, mod stn, fnt od	54% 85% CHK: wh-lgy, medgy, crm-brn, mot, sb ply-blky, sft-frm, fri, silty ip, rthy lstr, wxy, calc 15% MRLST: med-dk gy, blk, sb ply-blky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx, rr foss; O SHOW: slow-mod stimg, blshwh cut, bri yel-gn ring, mod stn, fnt od	95% CHK: wh-lgy, medgy, crm-brn, mot, sb ply-blky, sft-frm, fri, silty ip, rthy lstr, wxy, calc 5% MRLST: med-dk gy, blk, sb ply-blky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx, rr foss; O SHOW: slow-mod stimg, blshwh cut, bri yel-gn ring, mod stn, fnt od	54% 95% CHK: wh-lgy, medgy, crm-brn, mot, sb ply-blky, sft-frm, fri, silty ip, rthy lstr, wxy, calc 5% MRLST: med-dk gy, blk, sb ply-blky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx, rr foss; O SHOW: slow-mod stimg, blshwh cut, bri yel-gn ring, mod stn, fnt od
	99	106		
	MD: 8,489 ' TVD: 6,081.31 ' Inclination: 91.1 ° Azimuth: 181.2 ° VS: 2,302.24 '	MD: 8,585 ' TVD: 6,079.22 ' Inclination: 91.4 ° Azimuth: 181.8 ° VS: 2,393.25 '		
	TVD (ft)			TVD (ft)
	6200	6200		6200

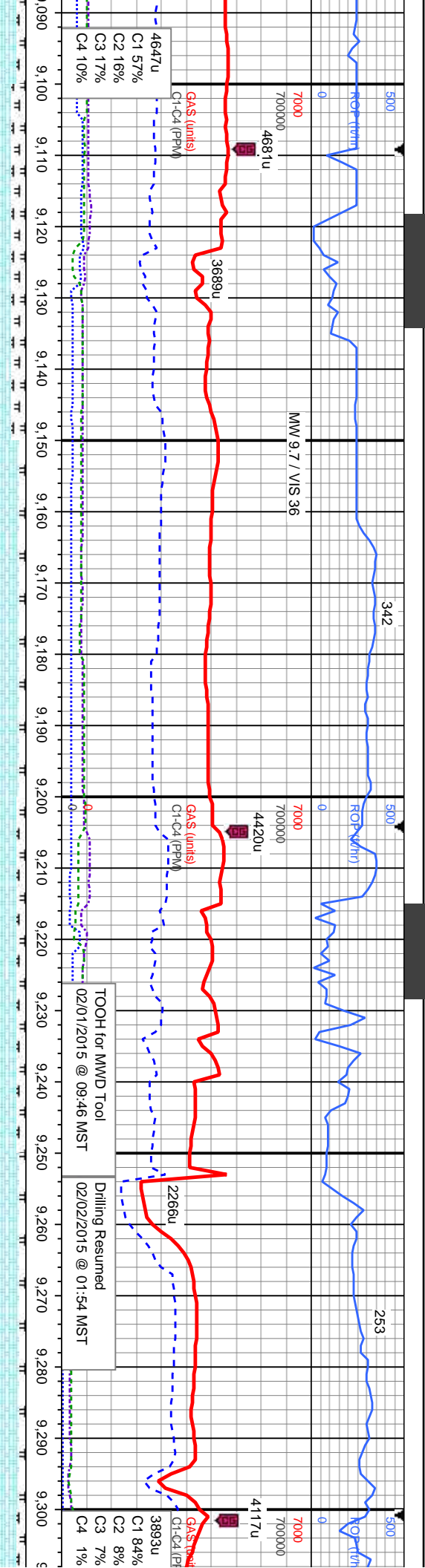




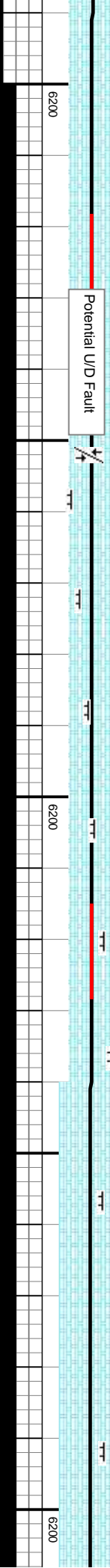






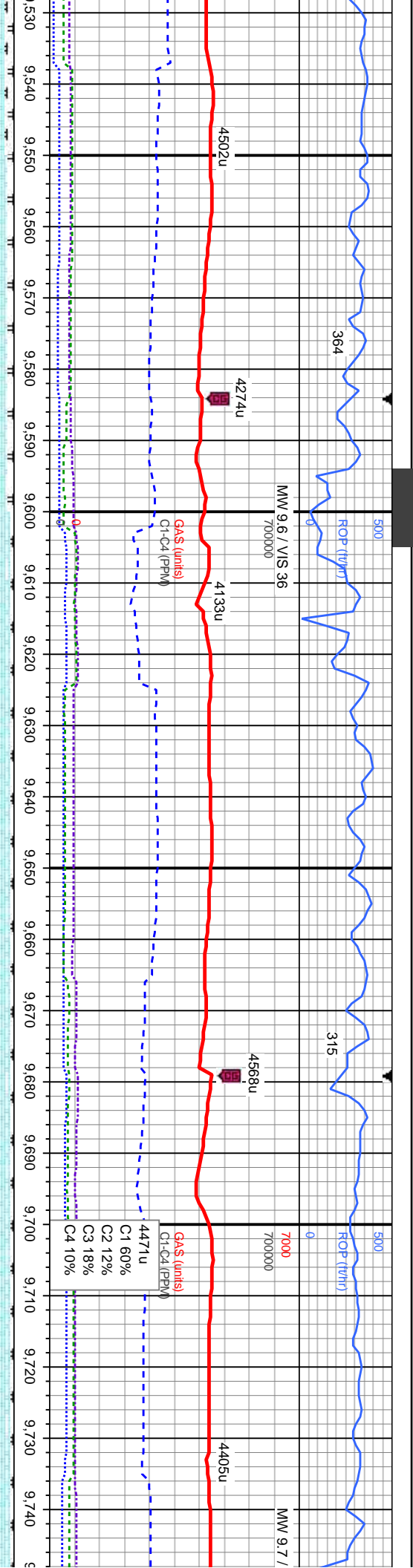


200 GAMMA (API)	157	200 GAMMA (API)	120	200 GAMMA (API)
54% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-biky, sft-frm, fri, sily ip, rthy lstr, wxy, calc 25% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brit, sily-arg, mot, rthy lstr, calc mtx, rr foss, rr bent: O SHOW: fast string, blshwh cut, bri yel-gn ring, mod str, frt od	90% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-biky, sft-frm, fri, sily ip, rthy lstr, wxy, calc 10% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brit, sily-arg, mot, rthy lstr, calc mtx, rr foss, rr bent: O SHOW: fast string, blshwh cut, bri yel-gn ring, mod str, frt od	585% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-biky, sft-frm, fri, sily ip, rthy lstr, wxy, calc 15% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brit, sily-arg, mot, rthy lstr, calc mtx, rr foss, rr bent: O SHOW: fast string, blshwh cut, bri yel-gn ring, mod str, fr od	90% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-biky, sft-frm, fri, sily ip, rthy lstr, wxy, calc 10% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brit, sily-arg, mot, rthy lstr, calc mtx, rr foss, rr bent: O SHOW: fast string, blshwh cut, bri yel-gn ring, mod str, fr od	585% C ply-bil 15% M frm-mc mtx, rr blshwh
TVD (ft)	MD: 9,158 ' TVD: 6,090.82 ' Inclination: 88.7 ° Azimuth: 179.2 ° VS: 2,941.63 '	TVD (ft)	MD: 9,253 ' TVD: 6,092.4 ' Inclination: 89.4 ° Azimuth: 178.9 ° VS: 3,032.91 '	TVD (ft)



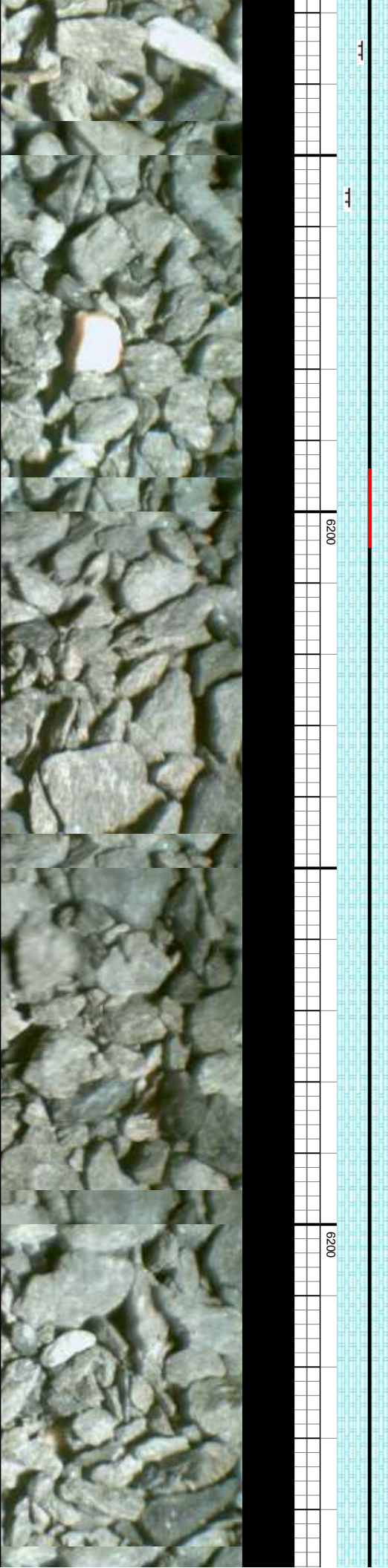




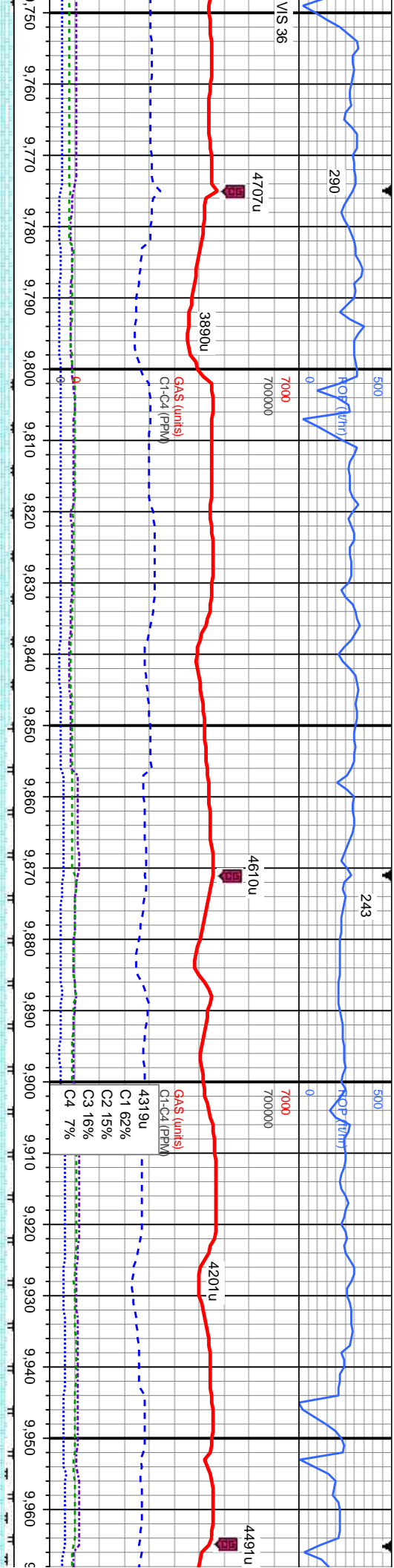


cm-brn, mot, sb	90% CHK: wh-llgy, medgy, cm-brn, mot, sb	5495% CHK: wh-llgy, medgy, cm-brn, mot, sb	95% CHK: wh-llgy, medgy, cm-brn, mot, sb	595% CHK: wh-llgy, medgy, cm-brn, mot, sb
rthy lstr, wxy, calc	ply-biky, sft-frm, fri, silty ip, rthy lstr, wxy, calc	ply-biky, sft-frm, fri, silty ip, rthy lstr, wxy, calc	ply-biky, sft-frm, fri, silty ip, rthy lstr, wxy, calc	ply-biky, sft-frm, fri, silty ip, rthy lstr, wxy, calc
k, sb ply-biky,	10% MRLST: med-dk gy, blk, sb ply-biky,	5% MRLST: med-dk gy, blk, sb ply-biky,	5% MRLST: med-dk gy, blk, sb ply-biky,	5% MRLST: med-dk gy, blk, sb ply-biky,
not, rthy lstr, calc	frm-mod hd, brit, silty-arg, mot, rthy lstr, calc	frm-mod hd, brit, silty-arg, mot, rthy lstr, calc	frm-mod hd, brit, silty-arg, mot, rthy lstr, calc	frm-mod hd, brit, silty-arg, mot, rthy lstr, calc
W: mod-fast string,	mtx, rr foss, rr bent: O SHOW: mod-fast string,	mtx, rr foss, rr bent: O SHOW: mod-fast string,	mtx, rr foss, rr bent: O SHOW: fast string,	mtx, rr foss, rr bent: O SHOW: fast string,
mod stn, fnt od	bishwh cut, bri yel-gn ring, mod stn, fnt od	bishwh cut, bri yel-gn ring, mod stn, fnt od	bishwh cut, bri yel-gn ring, mod stn, fnt od	bishwh cut, bri yel-gn ring, mod stn, fnt od

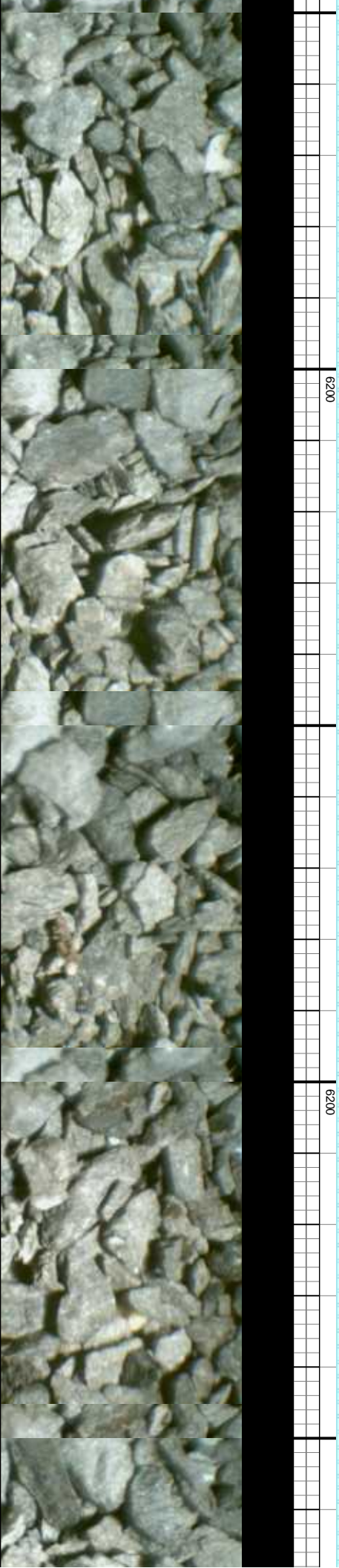
MD: 9.538 ' TVD: 6,091.75 ' Inclination: 91.2 ° Azimuth: 181.8 ° VS: 3.306.02 '	TVD (ft)	MD: 9.633 ' TVD: 6,090.42 ' Inclination: 90.4 ° Azimuth: 183.1 ° VS: 3.395.59 '	TVD (ft)	MD: 9.728 ' TVD: 6,090.59 ' Inclination: 89.4 ° Azimuth: 181.8 ° VS: 3.485.16 '
---	----------	---	----------	---





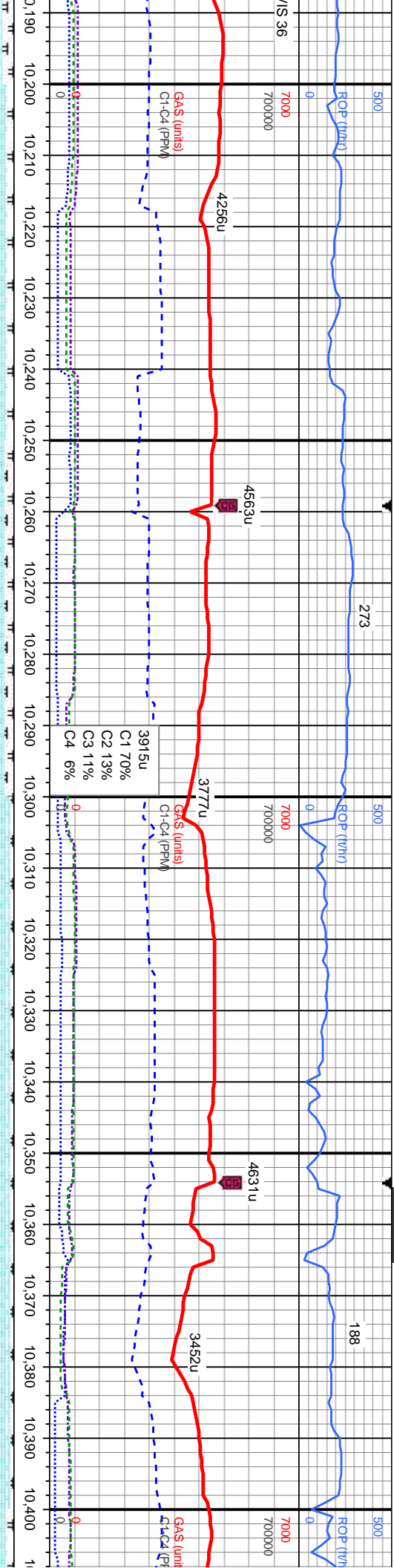


100% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-blky, sft-frn, fri, silty ip, rthy lstr, wxy, calc. rr bent, occ marl frag; O SHOW: fast stmg, blshwh cut, bri yel-gn ring, mod str, fnt od	77	200 GAS (units) C1-C4 (PPM) C4 7%	595% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-blky, sft-frn, fri, silty ip, rthy lstr, wxy, calc 5% MRLST: med-dk gy, blk, sb ply-blky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx, rr foss, rr bent; O SHOW: fast stmg, blshwh cut, bri yel-gn ring, mod str, fnt od	79	200 GAS (units) C1-C4 (PPM) C4 7%	590% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-blky, sft-frn, fri, silty ip, rthy lstr, wxy, calc 10% MRLST: med-dk gy, blk, sb ply-blky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx, rr foss, rr bent; O SHOW: mod-fast stmg, blshwh cut, bri yel-gn ring, mod str, fnt od	85% CHK: wh-llgy ply-blky, sft-frn, 15% MRLST: me frm-mod hd, brit, mtx, rr foss, rr be blshwh cut, bri y
TVD (ft)		MD: 9,825 ' TVD: 6,091.27 ' Inclination: 89.8 ° Azimuth: 182.1 ° VS: 3,576.9 '		TVD (ft)		MD: 9,921 ' TVD: 6,091.6 ' Inclination: 89.8 ° Azimuth: 181.1 ° VS: 3,667.89 '	

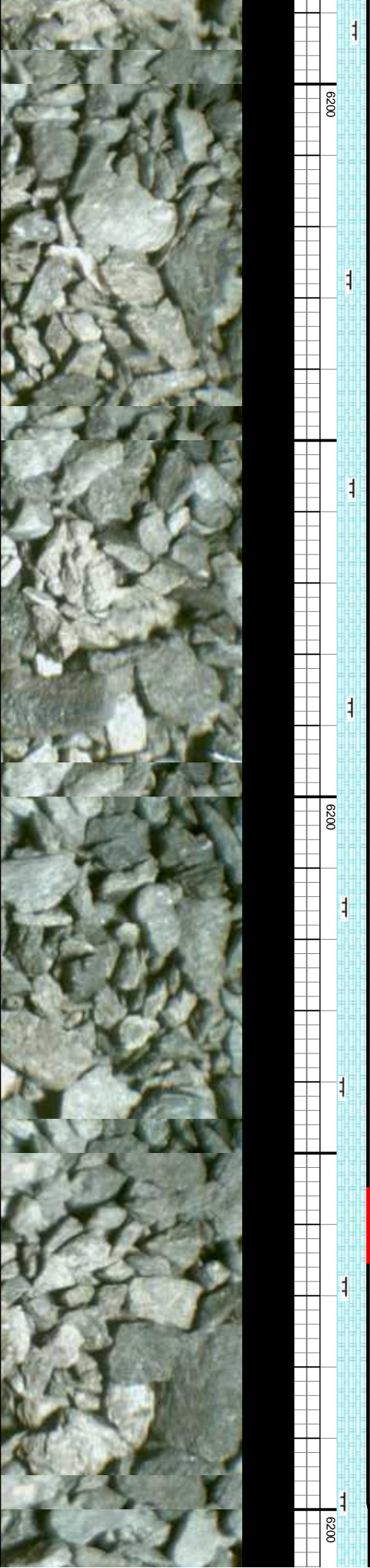


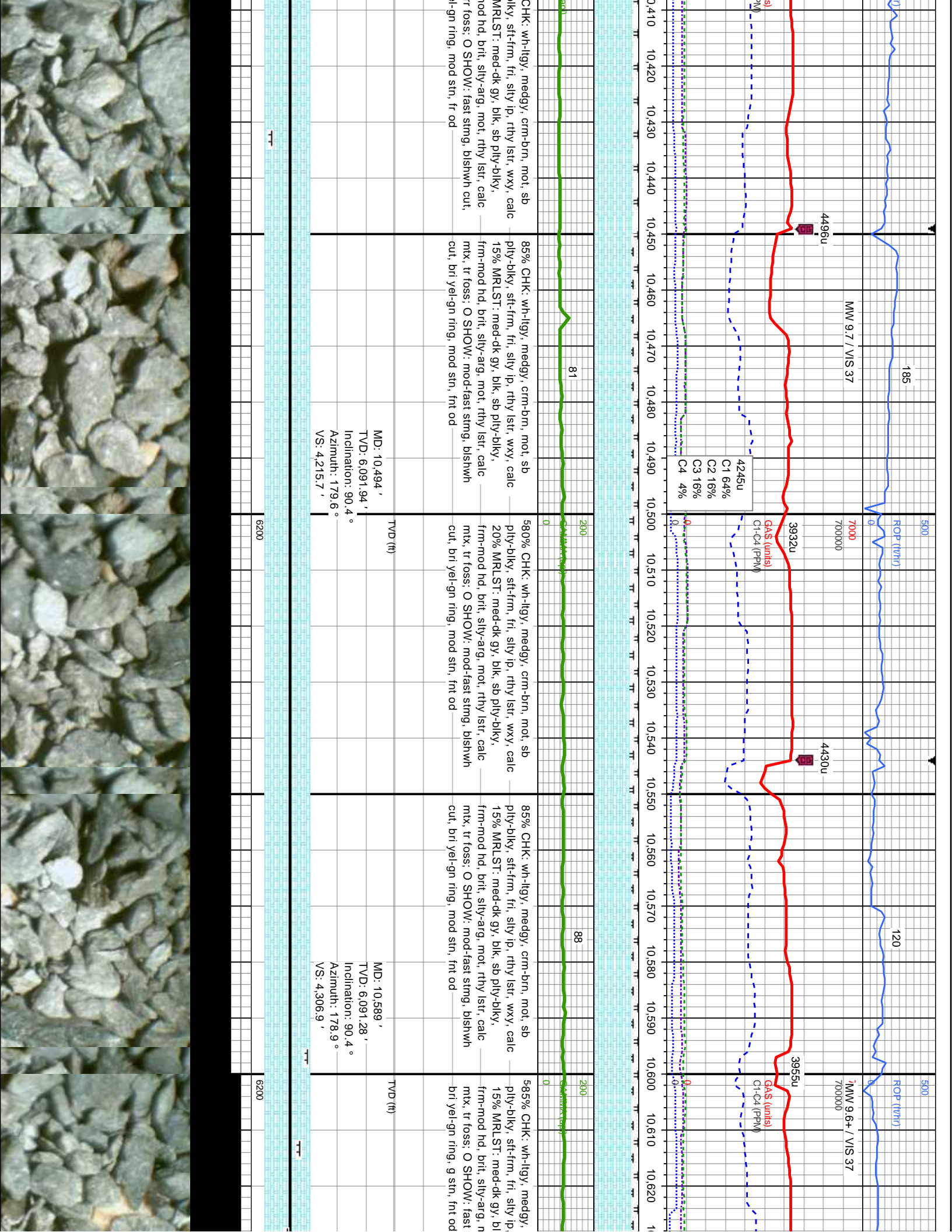




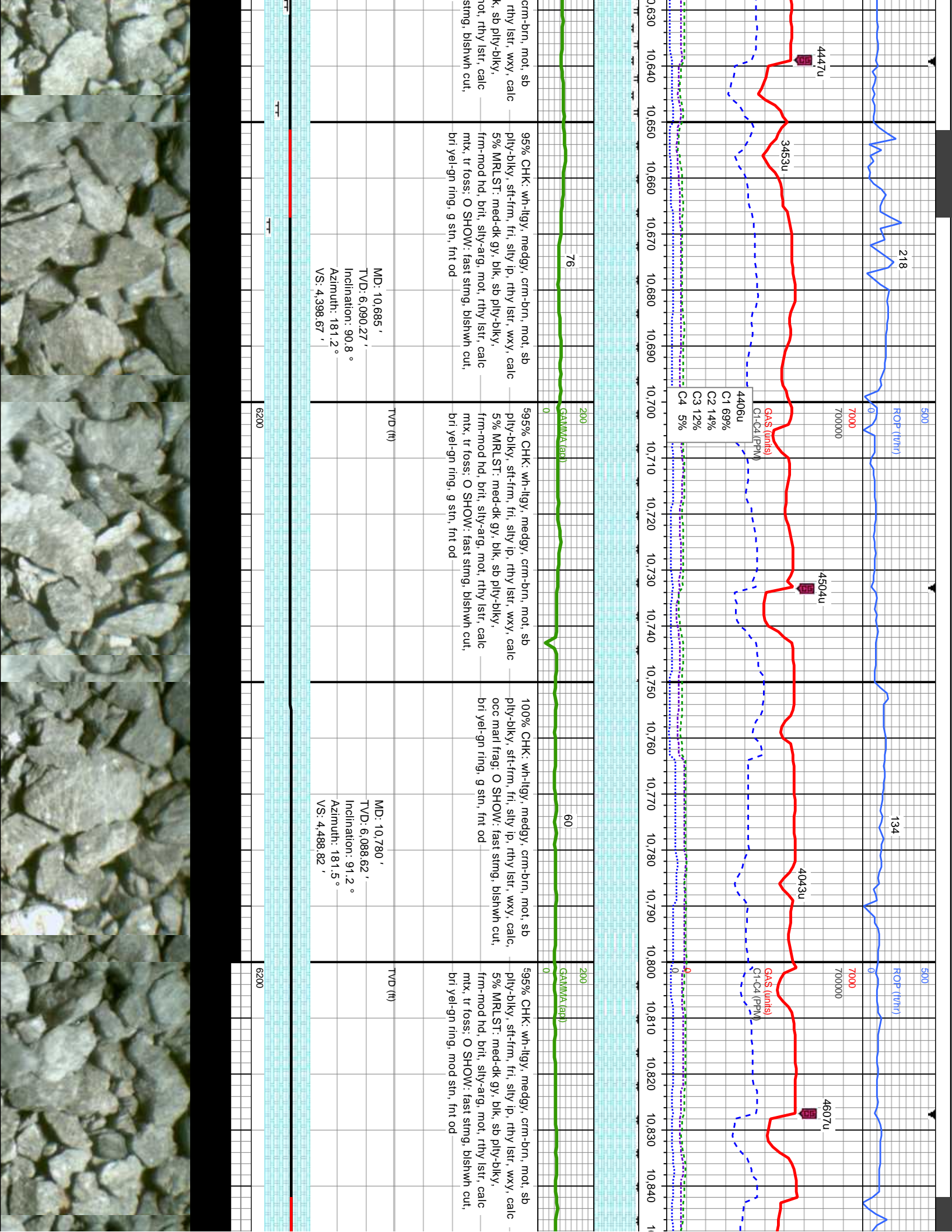


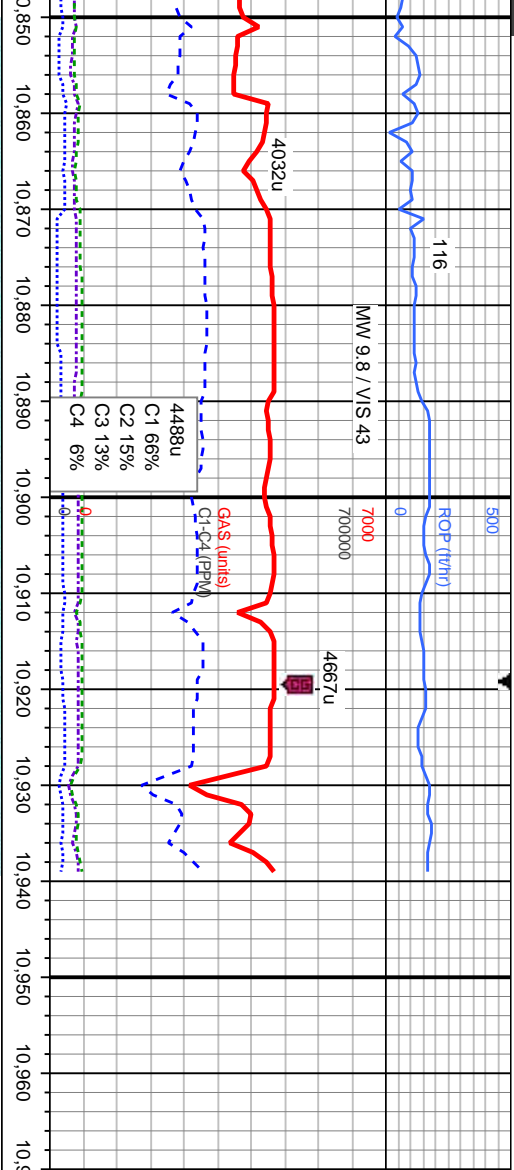
mot, sb wxy, calc biky, st, calc i, bishwh	5490% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-biky, sft-frn, fri, sily ip, rthy lstr, wxy, calc 10% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brit, sily-arg, mot, rthy lstr, calc mtx, rr foss: O SHOW: mod-fast stmg, bishwh cut, bri yel-gn ring, mod stn, fnt od	81	5495% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-biky, sft-frn, fri, sily ip, rthy lstr, wxy, calc 15% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brit, sily-arg, mot, rthy lstr, calc mtx, rr foss: O SHOW: mod-fast stmg, bishwh cut, bri yel-gn ring, mod stn, fnt od	79	95% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-biky, sft-frn, fri, sily ip, rthy lstr, wxy, calc 5% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brit, sily-arg, mot, rthy lstr, calc mtx, rr foss: O SHOW: fast stmg, bishwh cut, bri yel-gn ring, mod stn, fr od	5490% ply-b 10% frm-r mtx, bri ye
TVD (ft) MD: 10,208 ' TVD: 6,092.52 ' Inclination: 90.1 ° Azimuth: 180.2 ° VS: 3,941.52 '	TVD (ft) MD: 10,303 ' TVD: 6,092.28 ' Inclination: 90.2 ° Azimuth: 179.4 ° VS: 4,032.47 '	TVD (ft) MD: 10,399 ' TVD: 6,092.19 ' Inclination: 89.9 ° Azimuth: 179.3 ° VS: 4,124.59 '				











100% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-biky, sft-frm, ftn, silty ip, rthy lstr, wxy, calc, tr foss, occ marl frag; O SHOW: fast sting, blshwh cut, bri yel-gn ring, mod str, fnt od

54-100% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-biky, sft-frm, ftn, silty ip, rthy lstr, wxy, calc, tr foss, occ marl frag; O SHOW: fast sting, blshwh cut, bri yel-gn ring, mod str, fnt od

MD: 10,875 ' MD: 10,887 ' TVD: 6,087.46 ' TVD: 6,087.41 ' Inclination: 90.2 ° Inclination: 90.2 ° Azimuth: 182 ° Azimuth: 182 ° VS: 4,578.77 ' VS: 4,590.12 '

TD @ MD 10939' 02/02/2015 @ 16:57 MST

Thank you for using Columbine Logging, Inc.

