



Scale: 5" / 100'  
Measured Depth Log

**Well Name** Well Ranch AE19-644

**Location** NWSW 20 6N 62W 6 PM

**State** COLORADO

**County** WELD

**Country** UNITED STATES

**Rig Number** H&P 330

**API Number** 05-123-39639

**Field** WATTENBERG

**Region** DJ BASIN

**Drilling Completed** 1/15/2015

**Spud Date** 1/5/2015

**Surface Coordinates** NWSW 20 6N 62W 6 PM

1685 FSL 65 FWL

Lat/Long: 40.46958/-104.35586

**Bottom Hole Coordinates** Proposed

Sec: 24 Twp: 6N 63W

2240 FFSL 235 FFELL

**Ground Elevation** 4,786 ft

**K.B. Elevation** 4,816 ft

**Logged Interval** 2,000' To 11,985'

**Total Depth** 11,985'

**Formation** NIOBRARA

**Type of Drilling Fluid** WATER BASED MUD, LSND

## Operator

**Company** NOBLE ENERGY INC.

**Address** 1625 Broadway Suite 2200  
Denver, CO 80202

## Geologist

**Name** Teresa Malesardi

**Company** Noble Energy Inc.

**Address** 1625 Broadway Suite 2200  
Denver, CO 80202

tmalesardi@nobleenergyinc.com

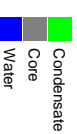
## Other

**Well Site Logging Company** Columbine Logging Inc.

**Well Site Geologist (Days)** Brad Wilson

**Well Site Geologist (Nights)** Jason Bell

## Zone 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 SANT	TUFF
CHERT	GNEOUS	SHALE	WELDED TUFF
CLAY CHOKE SANC	SIDERITE or LIMONITE	SHALE COLORED	
CLAYSTONE	LIMESTONE	SHALE GRAY	

Accessories

GASTROPOD	ARGILLITE GRAIN	HEAVY MINERAL	
INOCERAMUS	B BENTONITE	K KAOLIN	
ALGAE	BITUMENOUS SUBSTANCE	M MARCASTITE	ANHYDRITE STRINGER
AMPHIPORA	BRECCIA FRAGMENTS	M MARLSTONE	BENTONITE STRINGER
BELEMNITE	CALCAREOUS	M MICACEOUS	COAL STRINGER
BIOCLASTIC	PELLET	CARBONACEOUS FLAKES	DOLOMITE STRINGER
BRACHIOPOD	PISOLITE	CHITDK	GYPSUM STRINGER
BRYOZOA	PLANT REMAINS	CHITLT	LIMESTONE STRINGER
CEPHALOPOD	PLANT SPORES	COAL - THIN BEDS	MARLSTONE (CALC) STRG
CORAL	SCAPHOPOD	DOLOMITIC	MARLSTONE (DOL) STRG
CRINOID	STROMATOPOROID	F FELDSPAR	SANDSTONE STRINGER
ECHINOID	FERRUGINOUS PELLET	S SIDERITE	SHALE STRINGER
FISH		F FERRUGINOUS	SILTSTONE STRINGER
FORAMINIFERA	Minerals	GLAUCONITE	
F FOSSIL	ANHYDRITIC	SILTY	
	ARGILLACEOUS	TUFFACEOUS	

Oil Show

P PINPOINT
V VUG






































Engineering

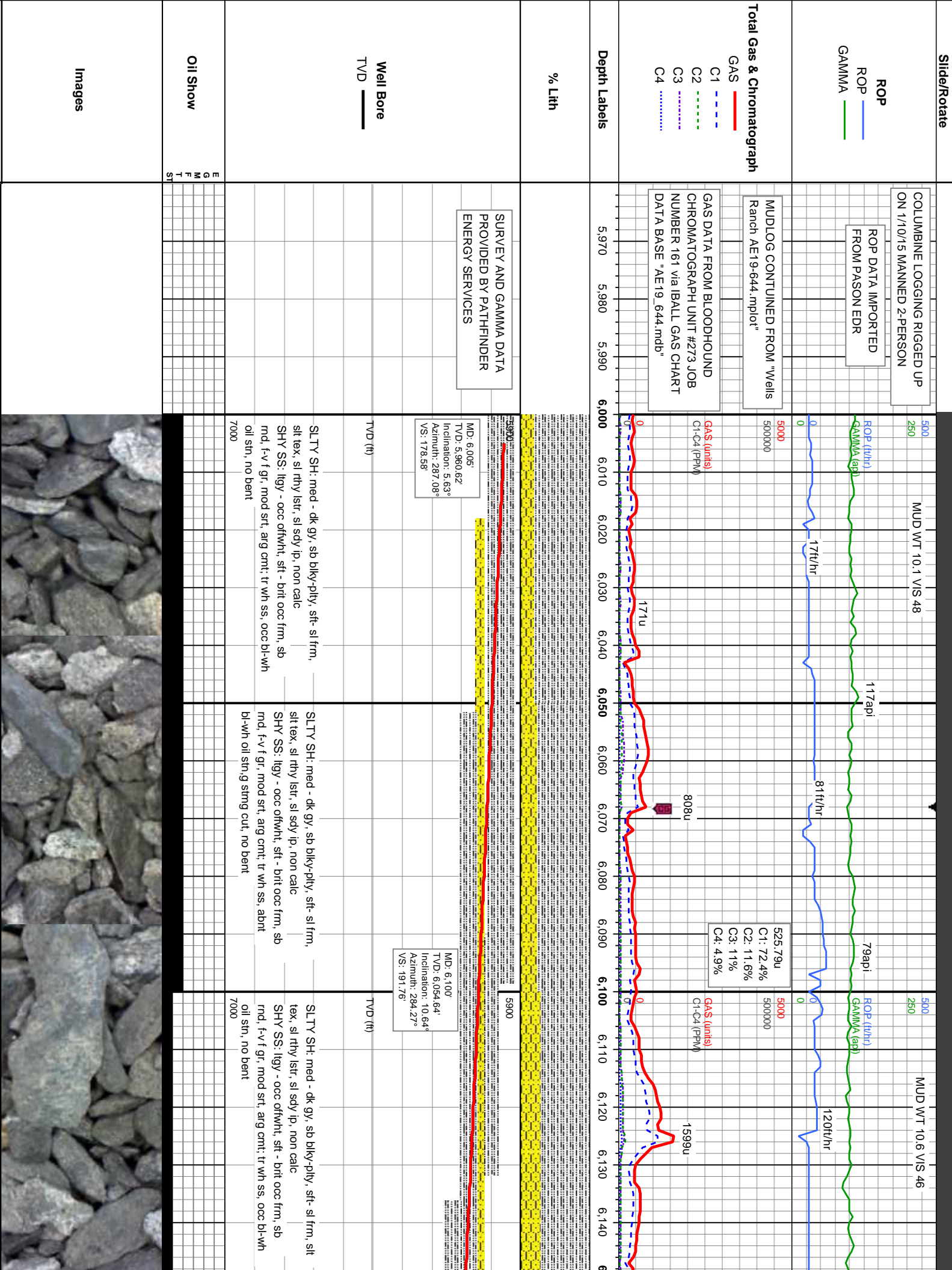
DEAD
EVEN
QUESTIONABLE
BIT
SPOTTED STAINING
CONNECTION (UP)

Porosity

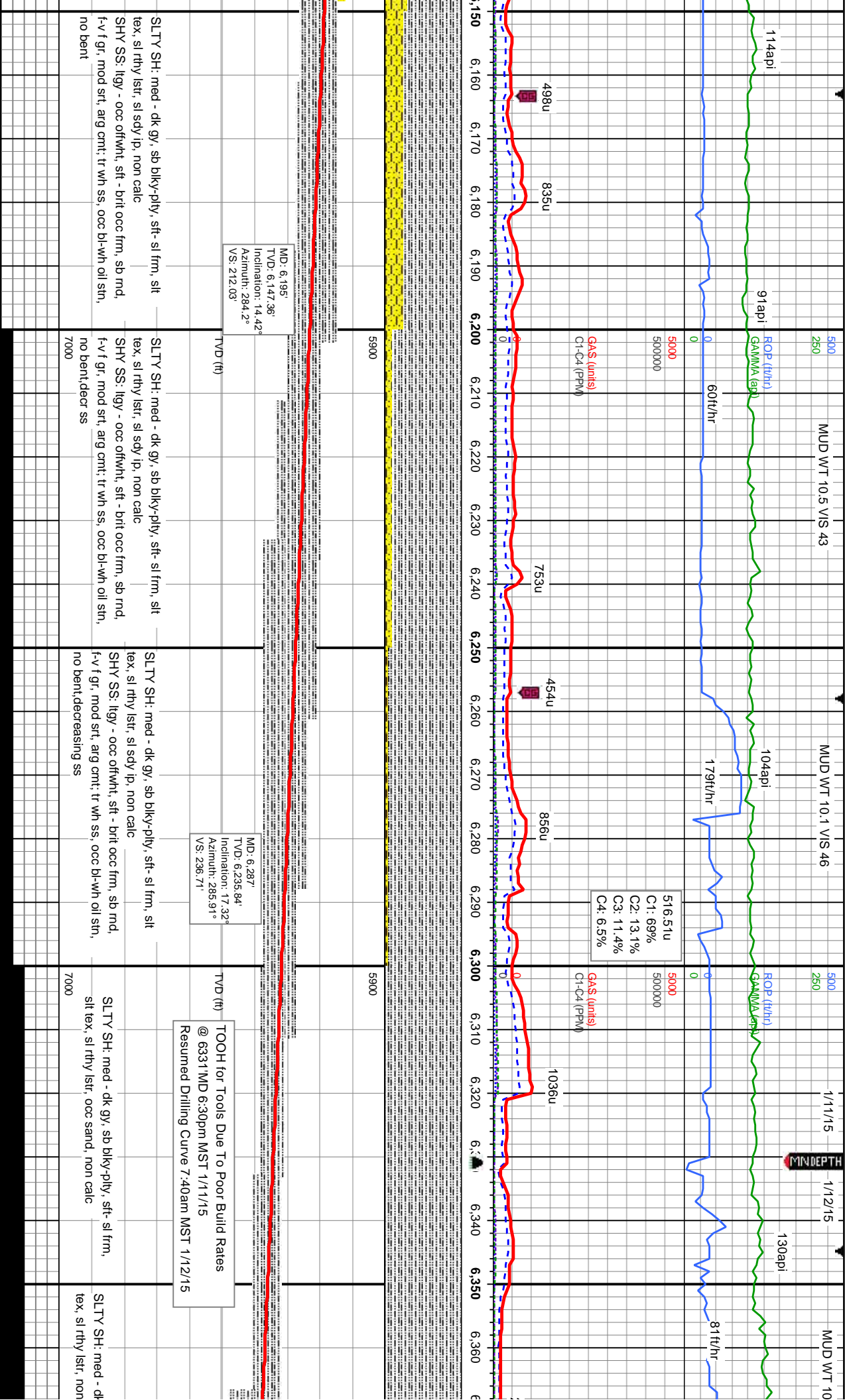
CONNECTION (DOWN)
CONNECTION GAS
E EARTHY
F FENESTRAL
TRIP GAS
F FRACTURE
TRIP GAS (LEFT)
INTERCRYSTALLINE
DOWN TIME GAS
INTEROOLITIC
DOWN TIME GAS
MOLDIC
CORE - LOST
O ORGANIC
CORE - RECOVERED

Other Symbols

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

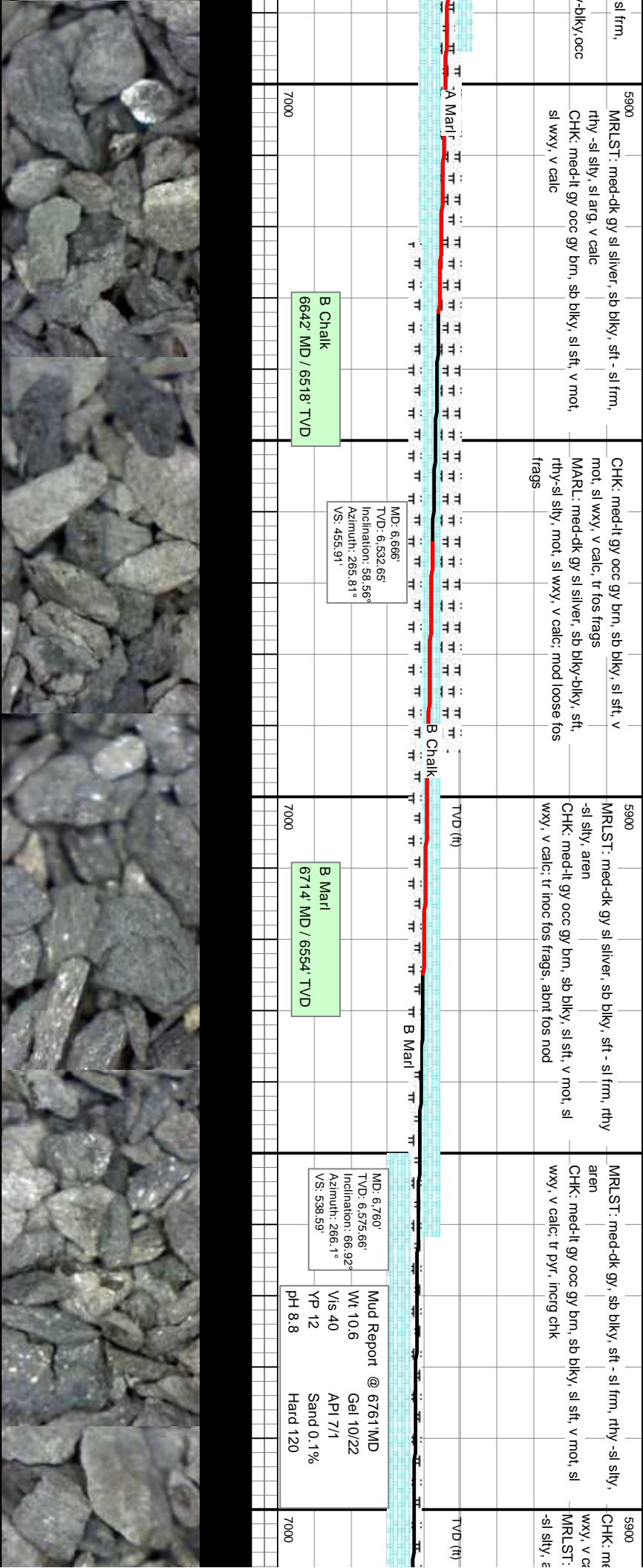








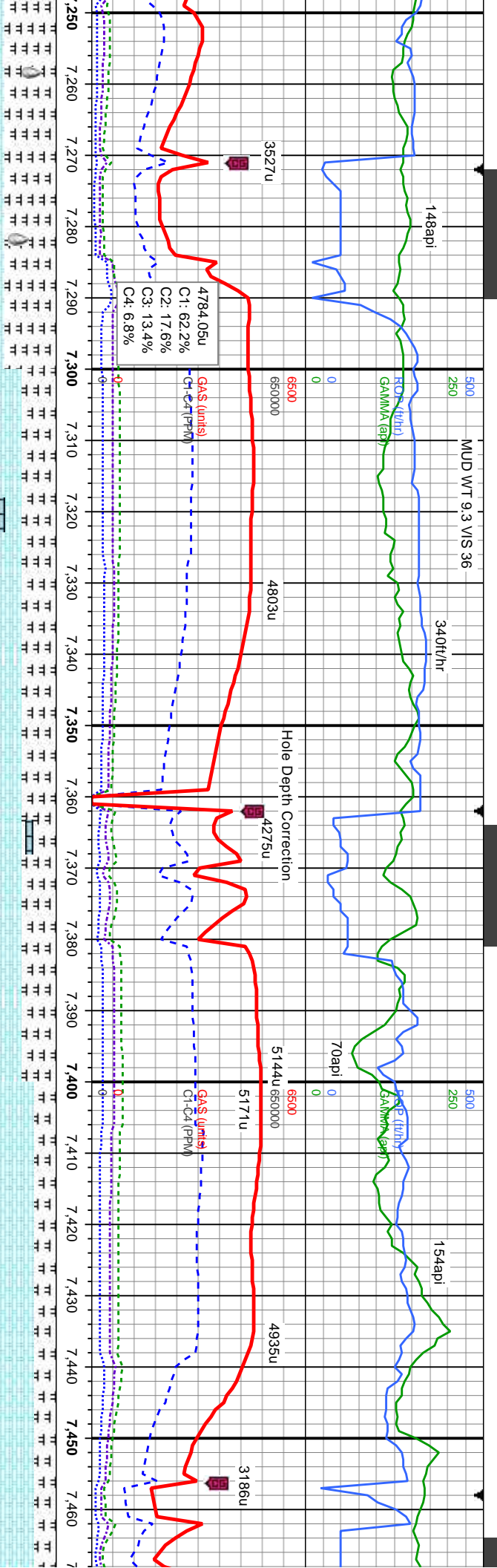












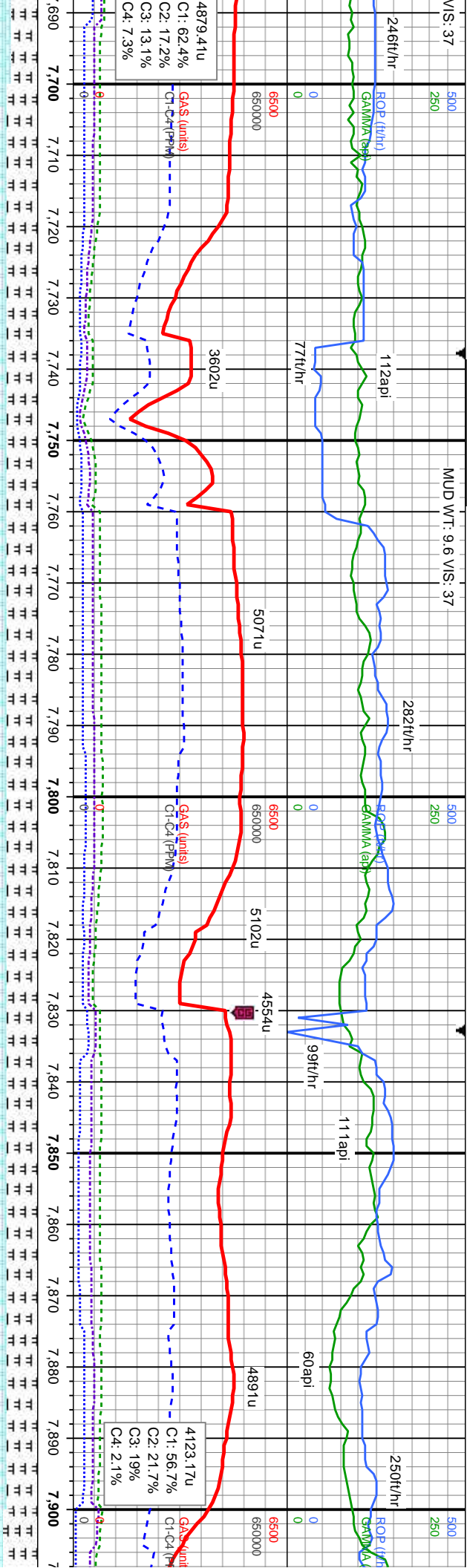
MD: 7.304' TVD: 6,620.46' Inclination: 89.52° Azimuth: 266.25° VS: 1,070.4'		MD: 7.397' TVD: 6,620.89' Inclination: 89.96° Azimuth: 267.41° VS: 1,162.68'	
MRLST: med-dk gy, sb blkly, sl sft - sl frm, rthy - sl silv, arg, occ imbd foss		MRLST: med-dk gy, sb blkly, sl sft - sl frm, rthy - sl silv, arg, occ imbd foss	
CHK: med gy -gy brn, sb blkly, sl sft, mot, sl wxy, v calc, tr dim dk yel mnrl flr as chk is grdg - dk gy		CHK: med gy -gy brn, sb blkly, sl sft, mot, sl wxy, v calc, tr-occ v dim dk yel mnrl flr as chk is grdg - dk gy/lan is, tr lse inoc fos frag, tr lse xl cal	
Is, occ lse inoc fos frag, tr lse xl cal; rr pyr		dk gy/lan is, tr lse inoc fos frag, tr lse xl cal	
6700		6700	











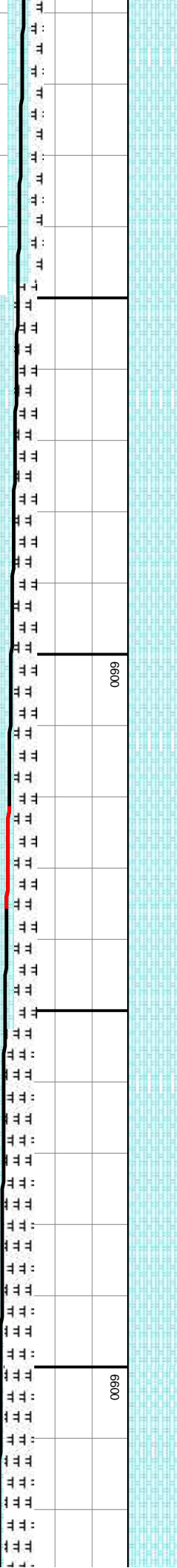
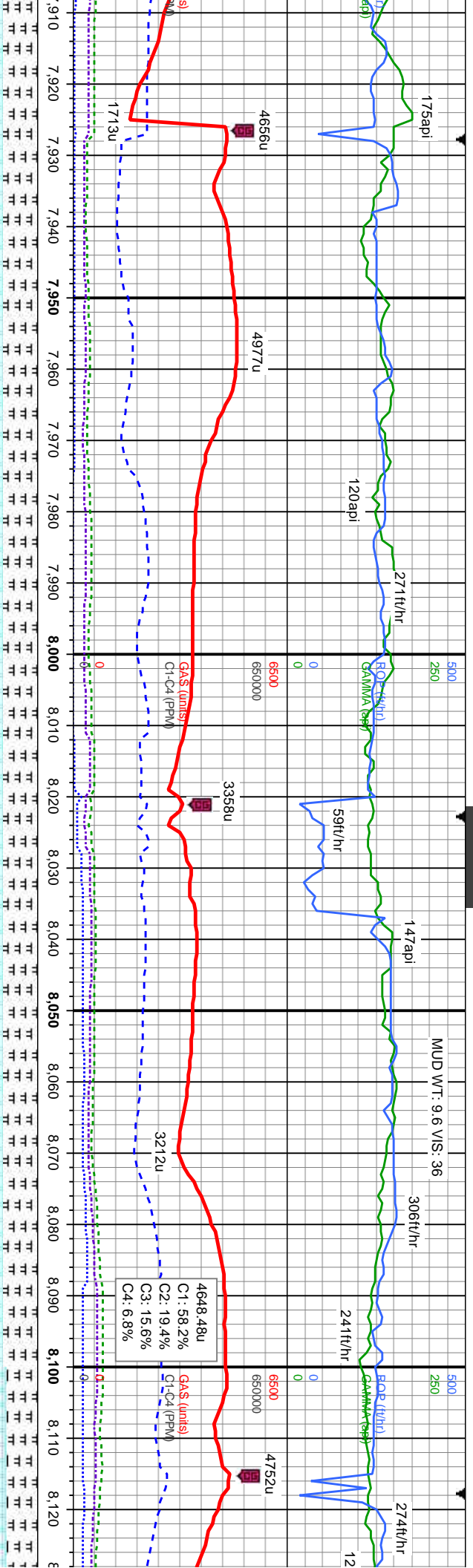
MUD WT: 9.6 VIS: 37

MD: 7.772  
TVD: 6,623.63'  
Inclination: 87.85°  
Azimuth: 269.44°  
VS: 1,536.36'

MD: 7.867  
TVD: 6,627.05'  
Inclination: 88.02°  
Azimuth: 268.97°  
VS: 1,630.97'

CHK: med gy -gy brn, sb blk, sl sft, mot, sl wxy, v	CHK: med gy -gy brn, sb blk, sl sft, mot, sl wxy, v	CHK: lgy-it brn gy, sb blk, sl sft-frm, mot, sl wxy, v	CHK: lgy-it brn gy, sb blk, sl sft-frm, mot, wxy-v
calc	calc	v calc, grdg -ls, v dim gn -yel mnrl flr	occ grdg
MRLST: med-dk gy, sb blk, sl sft - sl frm, rthy -sl	MRLST: med-dk gy, sb blk, sl sft - sl frm, rthy -sl	MRLST: dk gy -gy blk, sb blk-sb pily, sl sft - frm,	MRLST: dk gy -gy blk, sb blk-sb pily, sl sft - frm,
sily, arg, occ imbd foss, rr lse inoc fos frag, tr cal	sily, arg, occ imbd foss, rr lse inoc fos frag, tr cal	rthy -sl sily, arg, occ imbd fos, v calc	arg, occ
6700	6700	6700	6700

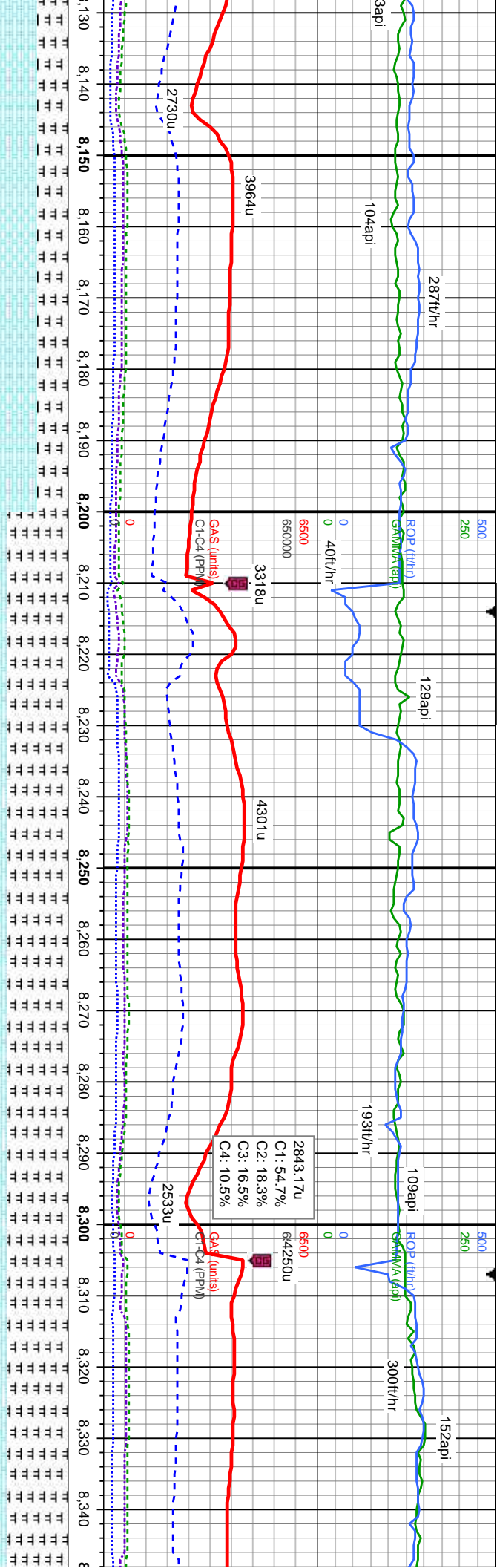




MD: 7.961' TVD: 6,630.51' Inclination: 87.76° Azimuth: 267.88° VS: 1.724.47'	CHK: lly-bm gy, sb blk/sl sft, mot, wxy, v calc, occ grdg-ls, occ yel-dul gn min flor, r frac fl pyr MRLST: dk gy-it blk, sb blk/sb ply, sl sft, silty tex, arg, occ imbd foss, v calc	MD: 8.056' TVD: 6,633.79' Inclination: 88.29° Azimuth: 267.73° VS: 1.818.87'	CHK: lly-bm gy, sb blk/sl sft, mot, wxy, v calc, occ grdg-ls, occ yel-dul gn min flor, r lse pyr MRLST: dk gy-it blk, sb blk/sb ply, sl sft, silty tex, arg, occ imbd foss, v calc	MD: 8.056' TVD: 6,633.79' Inclination: 88.29° Azimuth: 267.73° VS: 1.818.87'	CHK: lly-bm gy, sb blk/sl sft, mot, wxy, v calc, occ grdg-ls, occ yel-dul gn min flor, r lse pyr MRLST: dk gy-it blk, sb blk/sb ply, sl sft, silty tex, arg, occ imbd foss, v calc
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MD: 8.151'  
TVD: 6,636.75'  
Inclination: 89.34°  
Azimuth: 267.24°  
VS: 1.913.25'

MD: 8.245'  
TVD: 6,636.11'  
Inclination: 90.22°  
Azimuth: 269.79°  
VS: 2.006.82'

MD: 8.340'  
TVD: 6,634.87'  
Inclination: 91.28°  
Azimuth: 269.12°  
VS: 2.101.52'

mot, wxy, v calc,	CHK: ltgy-bm gy, sb blk/si sft, mot, wxy, v calc,	MRLST: dk gy-it blk, sb blk/sb pty, sl sft, silty tex,	arg, occ imbd foss, v calc, tr bent
flor, tr lse pyr	occ grdg-ls, occ yel-dul gn min flor, tr lse pyr	CHK: ltgy-bm gy, sb blk/si sft, mot, wxy, v calc,	arg, occ imbd foss, v calc, tr bent
pty, sl sft, silty tex,	MRLST: dk gy-it blk, sb blk/sb pty, sl sft, silty tex,	CHK: ltgy-bm gy, sb blk/si sft, mot, wxy, v calc,	arg, occ imbd foss, v calc, tr bent
bent	arg, occ imbd foss, v calc, occ bent	MRLST: dk gy-it blk, sb blk/sb pty, sl sft, silty tex,	arg, occ imbd foss, v calc, tr bent





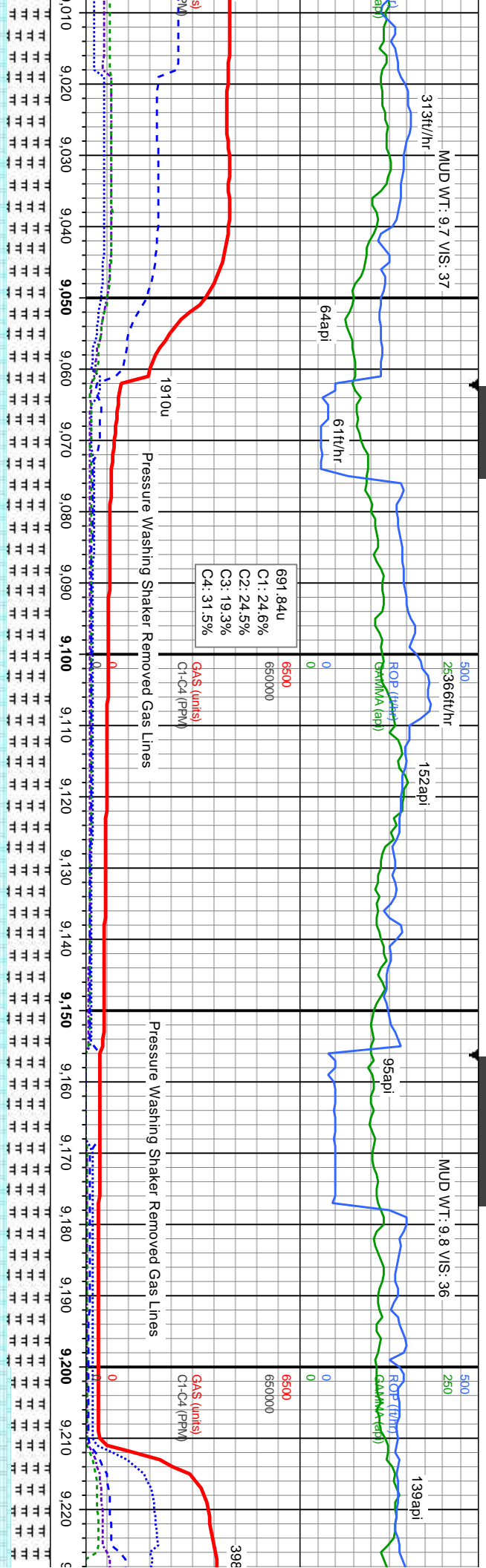












MD: 9.096'  
TVD: 6.632.54'  
Inclination: 90.75°D (ft)  
Azimuth: 269.71°  
VS: 2.853.24'

MD: 9.190'  
TVD: 6.633.34'  
Inclination: 88.29°  
Azimuth: 269.51°  
VS: 2.947.96'

y-bm gy, sb blk, sl sft, mot, wxy, calc, occ	CHK: lly-bm gy, sb blk, sl sft, mot, wxy, calc, occ
occ yel-dul gn min flor	grdg-ls, occ yel-dul gn min flor
dk gy-lt blk, sb blk-y-sb ply, sl sft, silty tex,	MRLST: dk gy-lt blk, sb blk-y-sb ply, sl sft, silty tex,
inbd foss, calc, occ bent	arg, occ inbd foss, calc, occ bent

CHK: lly-bm gy, sb blk, sl sft, mot, wxy, calc, occ
grdg-ls, occ yel-dul gn min flor
MRLST: dk gy-lt blk, sb blk-y-sb ply, sl sft, silty tex,
arg, occ inbd foss, calc, occ bent

CHK: lly-bm gy, sb blk, sl sft, mot, wxy, calc, occ
occ grdg-ls, occ yel-dul gn min
MRLST: dk gy-lt blk, sb blk-y-sb ply, sl sft, silty tex,
arg, occ inbd foss, calc, tr bent



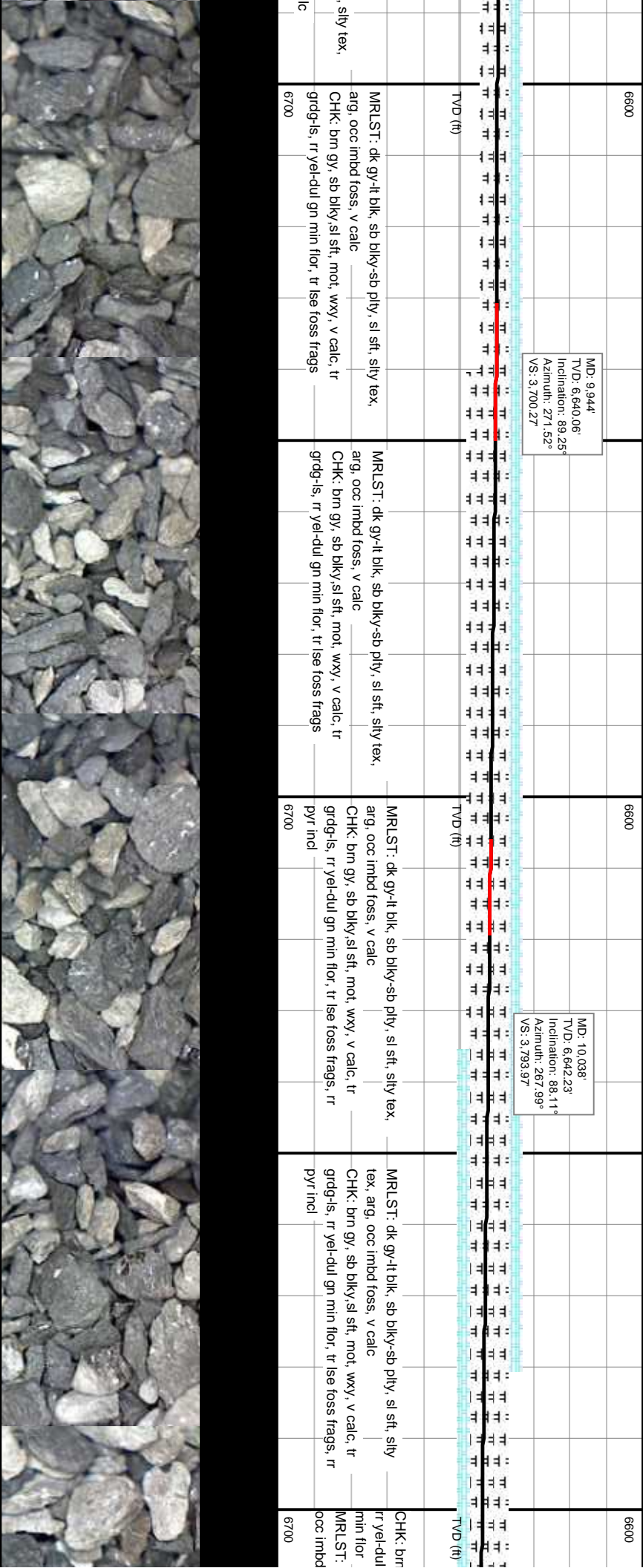




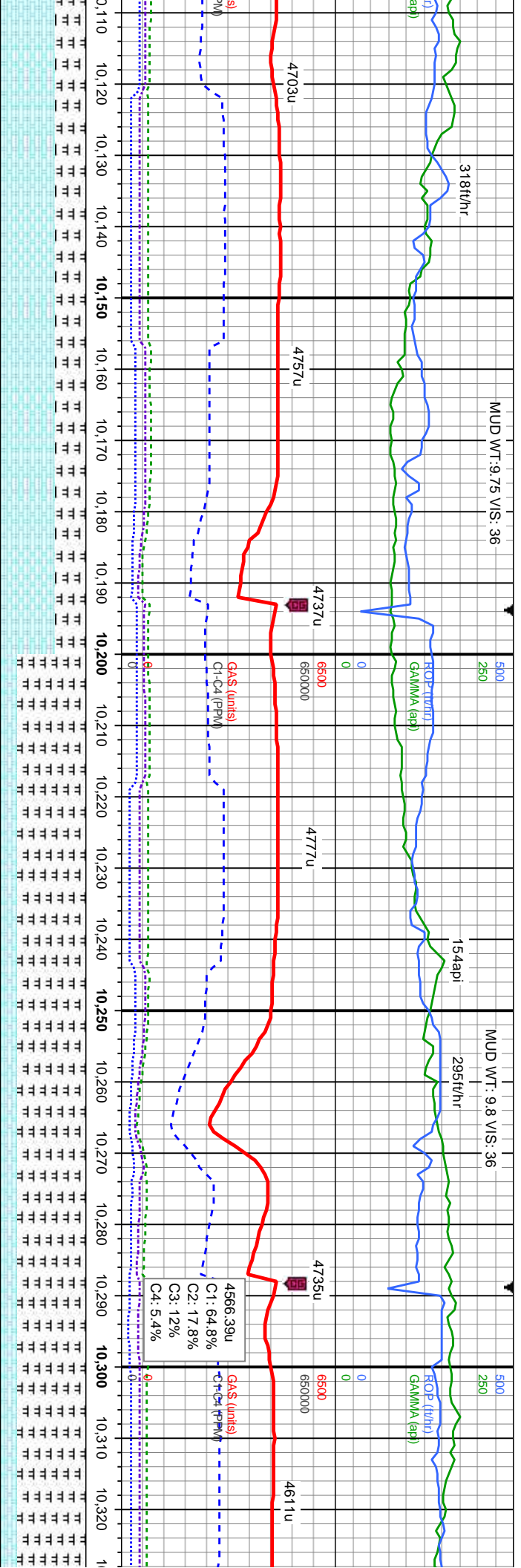












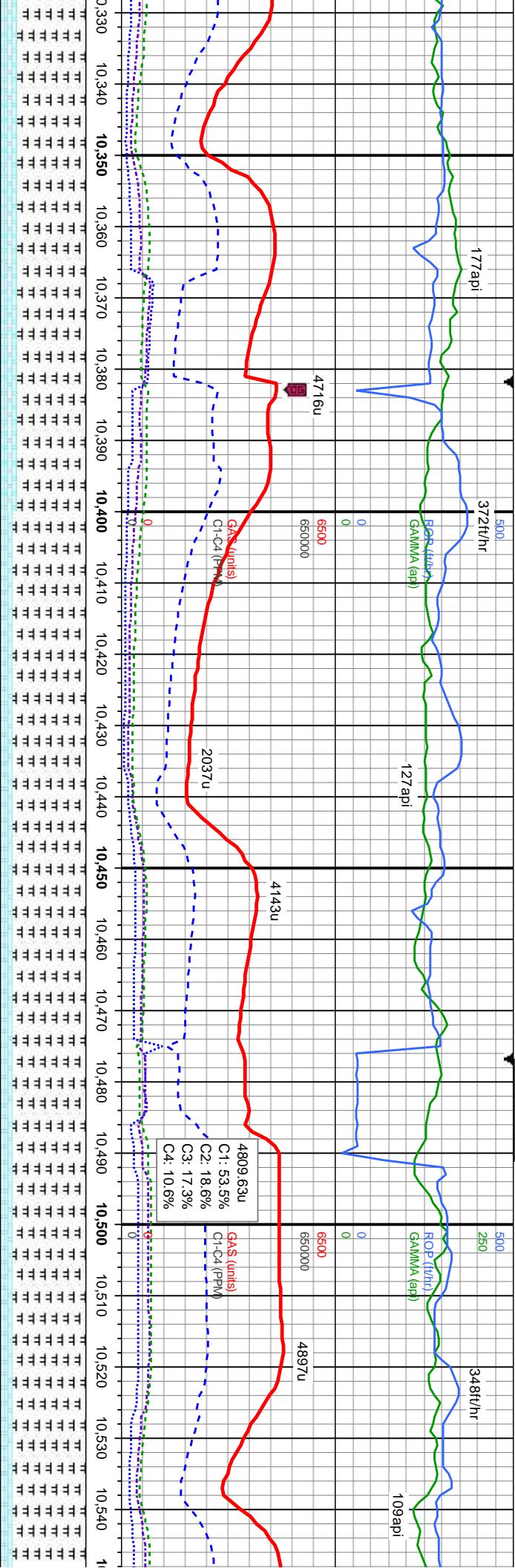
MD: 10.132'  
TVD: 6,644.61'  
Inclination: 88.99°  
Azimuth: 268.35°  
VS: 3.887.47'

MD: 10.227'  
TVD: 6,646.65'  
Inclination: 88.55°  
Azimuth: 266.85°  
VS: 3.981.86'

MD: 10.321'  
TVD: 6,648.89'  
Inclination: 88.72°  
Azimuth: 266.16°  
VS: 4.075.04'

gy, sb blk, sl sft, mot, wxy, v calc, tr grdg-ls, gn min flr, tr lse foss frags, occ dul gn-yel	CHK: brn gy, sb blk, sl sft, mot, wxy, v calc, tr grdg-ls, tr lse foss frags, occ dul gn-yel min flr	MRLST: dk gy-lt blk, sb blk, sl sft, silty tex, arg, occ imbd foss, v calc
dk gy-lt blk, sb blk, sb ply, sl sft, silty tex, arg, foss, v calc	MRLST: dk gy-lt blk, sb blk, sb ply, sl sft, silty tex, arg, mot, v calc, rr yel-dul gn min flr	MRLST: dk gy-lt blk, sb blk, sb ply, sl sft, silty tex, arg, occ imbd foss, v calc, tr lse foss frags
		CHK: gry- sl lt brn, sub blk, sub ply, sl sft, mot, v calc, rr yel-dul gn min flr
		MRLST: dk gy-lt blk, sb blk, sb ply, sl sft, silty tex, arg, occ imbd foss, v calc, tr lse foss frags
		CHK: gry- sl lt brn, sub blk, sub ply, sl sft, mot, v calc, rr yel-dul gn min flr
		MRLST: dk gy-lt blk, sb blk, sb ply, sl sft, silty tex, arg, occ imbd foss, v calc, tr lse foss frags
		CHK: gry- sl lt brn, sub blk, sub ply, sl sft, mot, v calc, rr yel-dul gn min flr



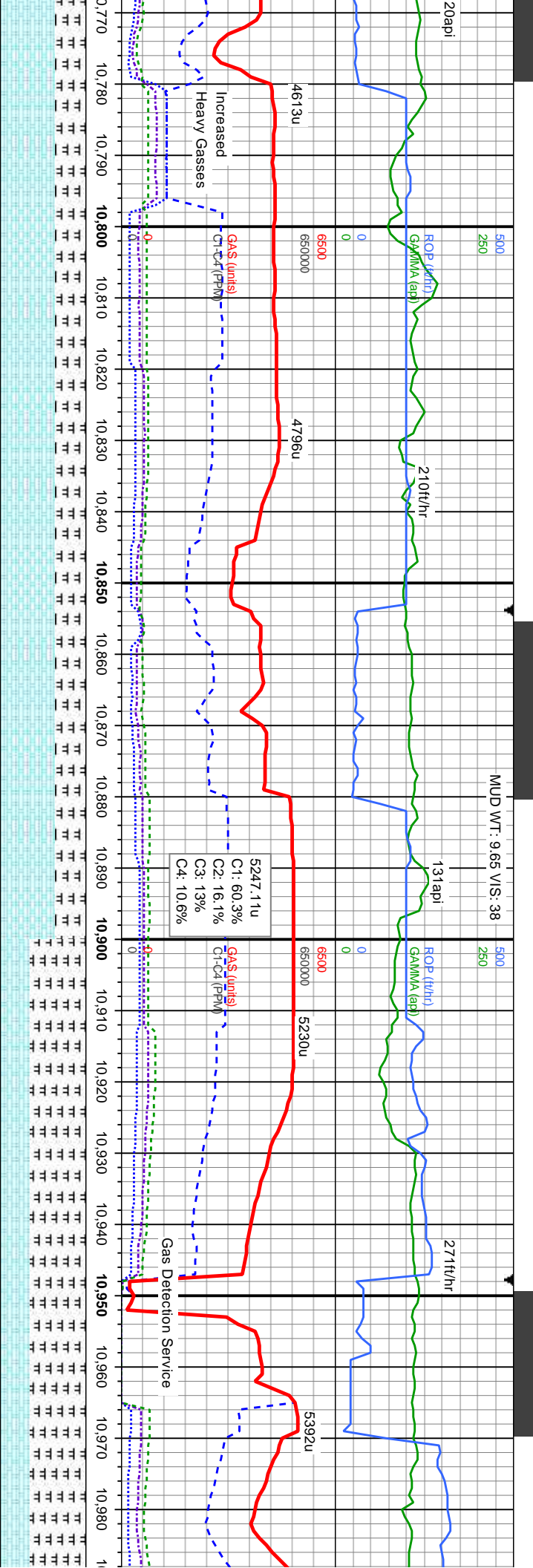


p pily, sl sft, silv tex, e foss frags w/ frac	MRLST: dk gy-lt blk, sb blk-y-sb pily, sl sft, silv tex, arg, occ imbd foss, v calc, tr lse foss frags w/ frac	MRLST: dk gy-lt blk, sb blk-y-sb pily, sl sft, silv tex, rr mot arg, occ imbd foss nod, v calc	MRLST: dk gy-lt blk, sb blk-y-sb pily, sl sft, silv tex, rr mot arg, occ imbd foss nod, v calc	MRLST: dk gy-lt blk, sb blk-y-sb pily, sl sft, silv tex, rr mot arg, occ imbd foss nod, v calc	MRLST: dk gy-lt blk, sb blk-y-sb pily, sl sft, silv tex, rr mot arg, occ imbd foss nod, v calc
p pily, sl sft-frn, mot,	CHK: gry- sl lt brn, sub blk-y-sub pily, sl sft-frn, mot, v calc	CHK: gry- sl brn, sb blk-y-sb pily, sl sft-frn, mot, sl wxy v calc	CHK: gry- sl brn, sb blk-y-sb pily, sl sft-frn, mot, sl wxy v calc	CHK: gry- sl brn, sb blk-y-sb pily, sl sft-frn, mot, sl wxy v calc	CHK: gry- sl brn gy, sb blk-y-sb pily, sl sft-frn, mot, sl wxy v calc, occ lse foss frags
6700	6700	6700	6700	6700	6700









MD: 10.793  
TVD: 6,644.79'  
Inclination: 91.19°  
Azimuth: 265.62°  
VS: 4,540.4'

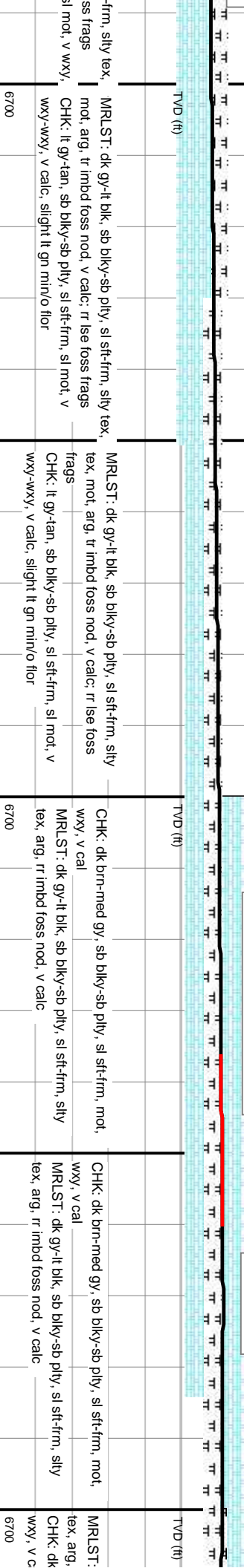
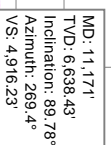
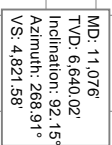
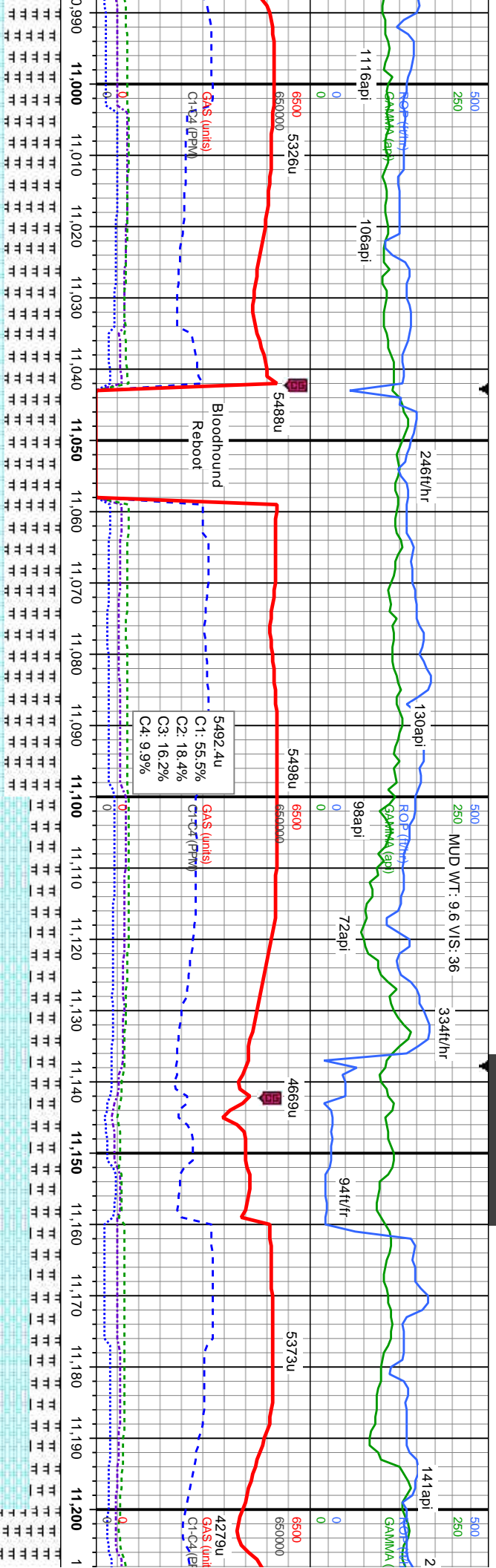
MD: 10.887  
TVD: 6,643.06'  
Inclination: 90.92°  
Azimuth: 267.75°  
VS: 4,633.63'

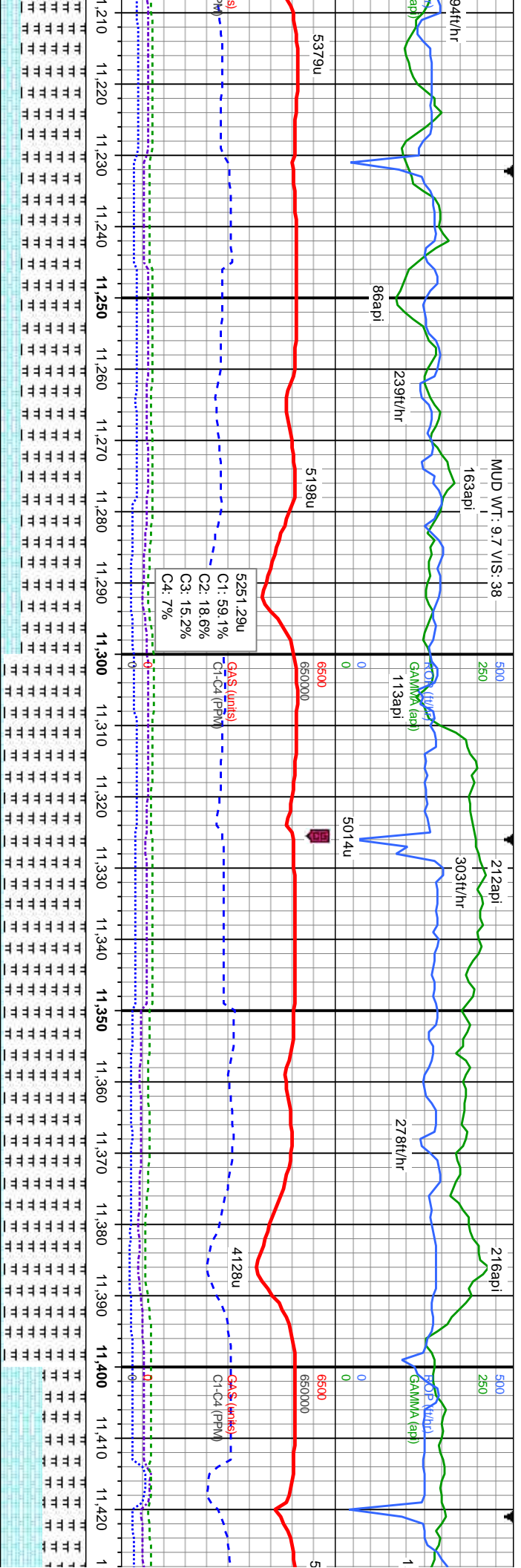
MD: 10.982  
TVD: 6,642.04'  
Inclination: 90.3°  
Azimuth: 267.69°  
VS: 4,728.06'

bkly-sb pty, sl sft-frm, mot, sl	CHK: It gy-tan, sb bkly-sb pty, sl sft-frm, sl mot, v wxy, v calc, rr lse foss frags, abnt lt gn min	MRSLST: dk gy-it blk, sb bkly-sb pty, sl sft, silty tex, mot, arg, occ imbd foss nod, v calc
bkly-sb pty, sl sft-frm, mot, sl	CHK: It gy-tan, sb bkly-sb pty, sl sft-frm, sl mot, v wxy, v calc, abnt lt gn min/o flor	MRSLST: dk gy-it blk, sb bkly-sb pty, sl sft-frm, silty tex, mot, arg, tr imbd foss nod, v calc; rr lse foss frags
bkly-sb pty, sl sft, silty tex, bod foss nod, v calc	CHK: It gy-tan, sb bkly-sb pty, sl sft-frm, silty tex, mot, arg, tr imbd foss nod, v calc, v wxy, v calc, occ lt gn min/o flor	MRSLST: dk gy-it blk, sb bkly-sb pty, sl sft-frm, silty tex, mot, arg, tr imbd foss nod, v calc; rr lse foss frags



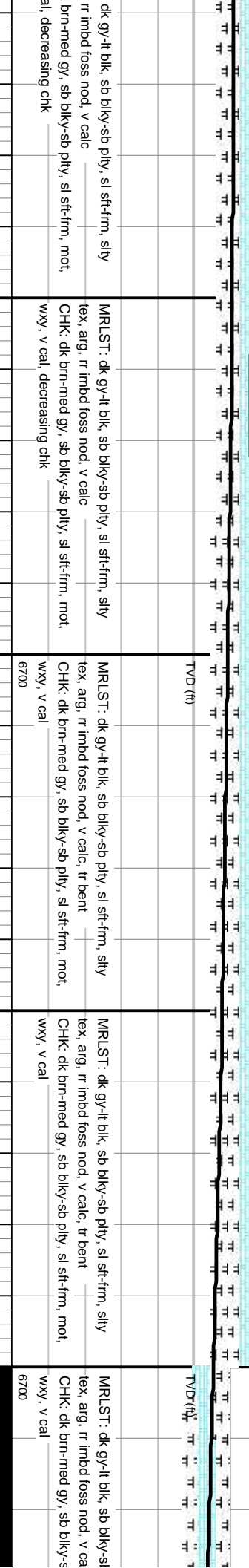




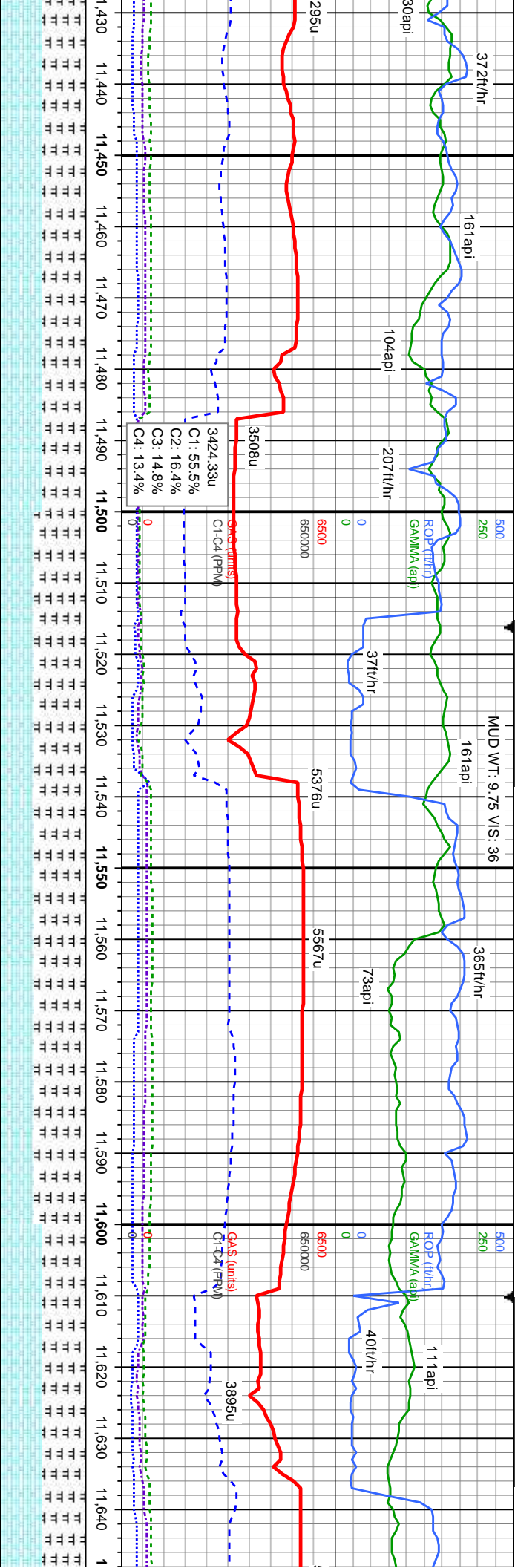


MD: 11,265'  
TVD: 6,639.58'  
Inclination: 88.81°  
Azimuth: 268.54°  
VS: 5,009.86

MD: 11,360'  
TVD: 6,642.43'  
Inclination: 87.76°  
Azimuth: 267.59°  
VS: 5,104.32'







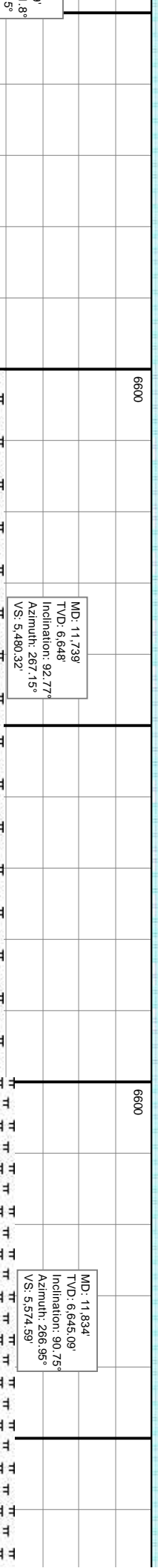
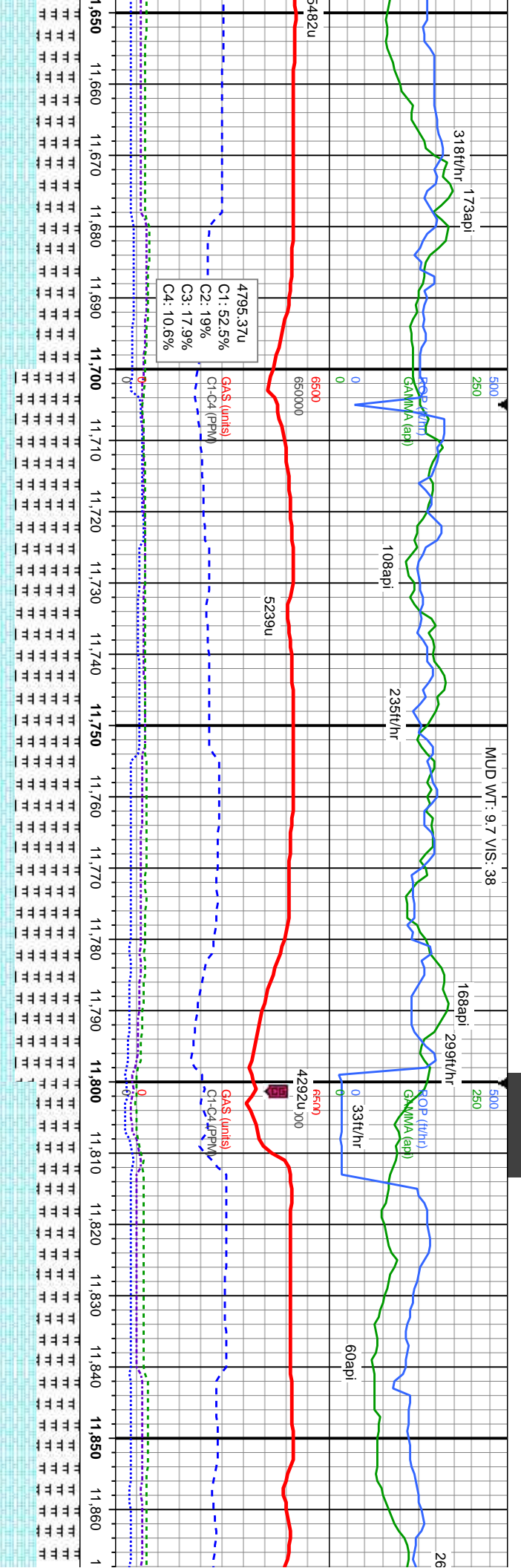
MD: 11.455°  
TVD: 6,647.45'  
Inclination: 86.17°  
Azimuth: 266.63°  
VS: 5,198.51'

MD: 11.549°  
TVD: 6,651.93'  
Inclination: 88.37°  
Azimuth: 267.14°  
VS: 5,291.69'

MD: 11.644°  
TVD: 6,651.76'  
Inclination: 9°  
Azimuth: 267°  
VS: 5,386.04'

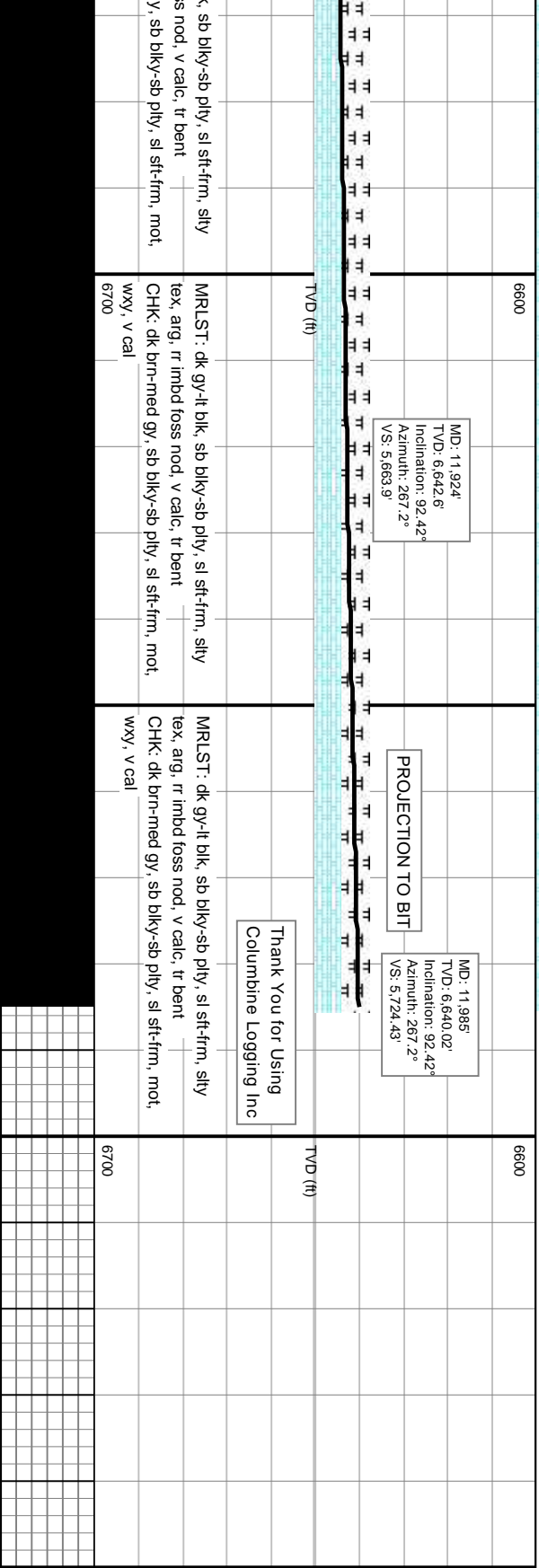
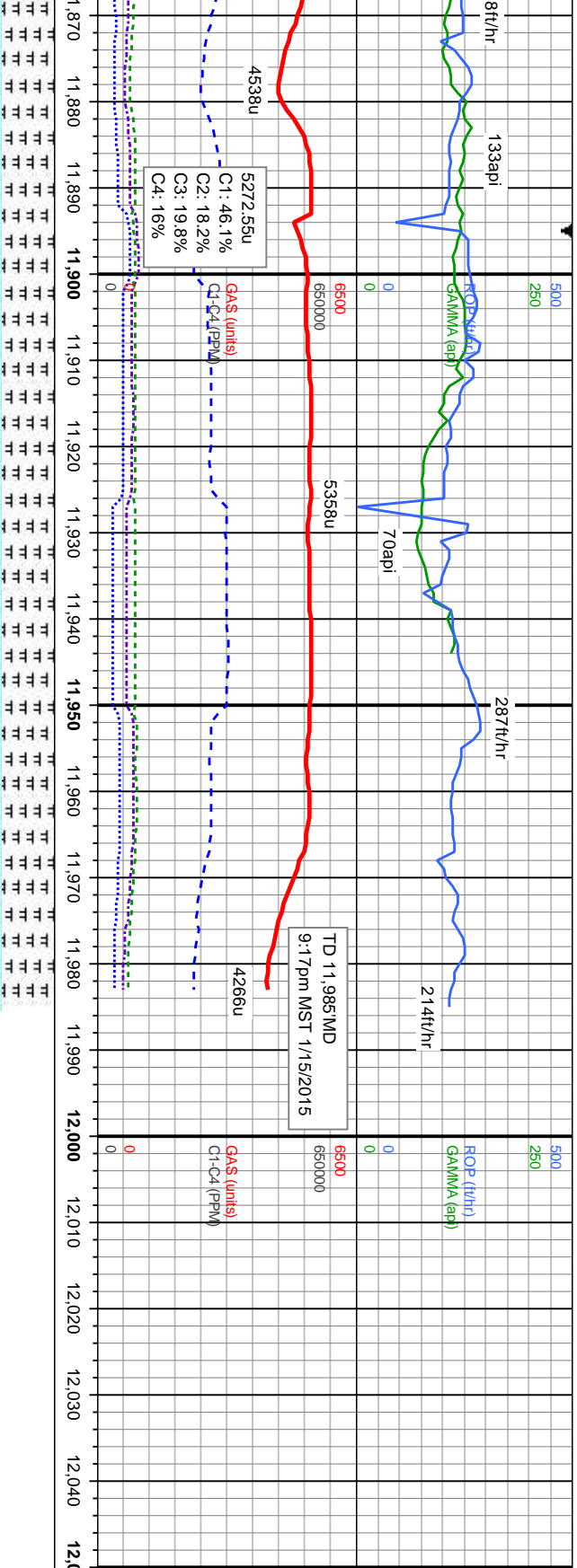
ply, sl sft-frm, silty	MRLST: dk gy-ft blk, sb blk-y-sb ply, sl sft-frm, silty	MRLST: dk gy-ft blk, sb blk-y-sb ply, sl sft-frm, silty	MRLST: dk gy-ft blk, sb blk-y-sb ply, sl sft-frm, silty
ic, tr bent	tex, arg, tr imbd foss nod, v calc, tr bent	tex, arg, tr imbd foss nod, v calc, occ bent, tr pyr	tex, arg, tr imbd foss nod, v calc, occ bent, tr pyr
b ply, sl sft-frm, mot,	CHK: dk brn-med gy, sb blk-y-sb ply, sl sft-frm, mot,	CHK: dk brn-med gy, sb blk-y-sb ply, sl sft-frm, mot,	CHK: dk brn-med gy, sb blk-y-sb ply, sl sft-frm, mot,
	wxy, v cal	wxy, v cal	wxy, v cal





										TVD (ft)																			
MRLST: dk gy-it blk, sb blk-y-sb ply, sl sft-frm, silty										MRLST: dk gy-it blk, sb blk-y-sb ply, sl sft-frm, silty										MRLST: dk gy-it blk, sb blk-y-sb ply, sl sft-frm, silty									
tex, arg, rr imbd foss nod, v calc, tr bent										tex, arg, rr imbd foss nod, v calc, tr bent										tex, arg, rr imbd foss nod, v calc, tr bent									
CHK: dk brn-med gy, sb blk-y-sb ply, sl sft-frm, mot,										CHK: dk brn-med gy, sb blk-y-sb ply, sl sft-frm, mot,										CHK: dk brn-med gy, sb blk-y-sb ply, sl sft-frm, mot,									
wxy, v cal										wxy, v cal										wxy, v cal									
6700										6700										6700									





Thank You for Using  
Columbine Logging Inc