

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** State Pronghorn 44-32-31MRLNB

**Location** SESE SEC. 32 T5N R61W

**State** COLORADO

**County** WELD

**Country** USA

**Rig Number** XTREME 20

**API Number** 05-123-41262

**AFE #** 15205

**Region** DJ BASIN

**Field** WATTENBERG

**Spud Date** 5/15/2015

**Drilling Completed** 5/29/2015

**Surface Coordinates** 392' FSL x 1123' FEL (LAT: 40.35104, -104.22736)

**Bottom Hole Coordinates** 660' FSL x 860' FEL (LAT: 40.35169, -104.24517)PROJECTED

**Ground Elevation** 4530'

**K.B. Elevation** 4547'

**Logged Interval** 5800' To 11913'

**Total Depth** 11913'

**Formation** NIOBRARA B-CHALK

**Type of Drilling Fluid** LSND, H2O

## Operator

**Company** Bonanza Creek Energy Inc.

**Address** 410 17th Street, Suite 1500 Denver, CO 80202

## Geologist

**Name** Paul McKay

**Company** Bonanza Creek

**Address** 410 17TH STREET, SUITE 1500 DENVER, CO

## Zone Color Coding

Oil  
Note  
Error

Condensate  
Core  
Water

## Rock Types

UNKNOWN  
ANHYDRITE  
GYPSUM  
SALT  
SIDERITE or LIMONITE  
LIMESTONE  
DOLOMITE  
CHERT

COAL  
MARLSTONE  
CLAYSTONE  
SHALE  
SHALE GRAY  
SHALE COLORET  
SILTSTONE  
SANDSTONE

CHALK  
SANDSTONE

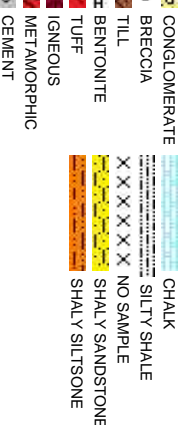


## Accessories

Fossils			Stringer
F FOSSIL	— ARGILLACEOUS	↘ GLAUCONITE	
GASTROPOD	/ ARGILLITE GRAIN	≡ GYPSIFEROUS	
ALGAE	⊖ B BENTONITE	⌒ HEAVY MINERAL	— ANHYDRITE STRINGER
AMPHIPORA	⌒ BITUMENOUS SUBSTANCE	⌒ KAOLIN	— BENTONITE STRINGER
BELEMNITE	⌒ BRECCIA FRAGMENTS	⌒ MARLSTONE	— COAL STRINGER
BIOLCLASTIC	⌒ CALCAREOUS	⌒ MINERAL CRYSTALS	— DOLOMITE STRINGER
BRACHIOPOD	⌒ CARBONACEOUS FLAKES	⌒ NODULES	— GYPSUM STRINGER
BRACHIOPOD	⌒ CHITDK	⌒ PHOSPHATE PELLET:	— LIMESTONE STRINGER
BRYOZOA	⌒ PLANT REMAINS	⌒ PYRITE	— MARLSTONE (CALC) STRG
CERPHALOPOD	⌒ PLANT SPORES	⌒ SALT CAST	— MARLSTONE (DOL) STRG
CORAL	⌒ SCAPHOPOD	⌒ COAL - THIN BEDS	— SANDSTONE STRINGER
CRINOID	⌒ STROMATOPOROID	⌒ DOLOMITIC	— SANDSTONE STRINGER
ECHINOID	⌒ FELDSPAR	⌒ SILICEOUS	— SHALE STRINGER
FISH	⌒ FERRUGINOUS PELLET	⌒ SILTY	
FORAMINIFERA	⌒ ANHYDRITIC	⌒ TUFFACEOUS	— SILTSTONE STRINGER

## Other Symbols

Oil Show			
⊖ ORGANIC	↔ FORMATION TOP	⌒ CONNECTION GAS	⌒ CRYPTOXLN
P PINPOINT	⌒ GAS SHOW	⌒ CONNECTION DOWN	E EARTHY
D DEAD	⌒ MINDEPTH MN DEPTH	⌒ CASING	FX FINELYXLN
● EVEN	⌒ NORMAL FAULT	⌒ FORMATION TOP	ES GRAINSTONE
○ QUESTIONABLE	⌒ OIL SHOW	⌒ LITHOGRAPHIC	L LITHOGRAPHIC
⌒ SPOTTED STAINING	⌒ BIT	⌒ OVERTURNED STRATA	MX MICROXLN
Porosity	Engineering	Rounding	Sorting
⌒ E EARTHY	⌒ CONNECTION (LEFT)	⌒ ANGULAR	MS MUDSTONE
⌒ FENESTRAL	⌒ CONNECTION (RIGHT)	⌒ SIDEWALL CORE (LEFT)	PS PACKSTONE
F FRACTURE	⌒ CONNECTION GAS	⌒ SLIDE	WS WACKSTONE
⌒ INTERCRYSTALLINE	⌒ CORE - LOST	⌒ SURVEY	
⌒ INTEROOLITIC	⌒ CORE - RECOVERED	⌒ TRIP GAS	
⌒ MOLDIC	⌒ DST INTERVAL	⌒ WIRELINE TESTED - LEFT	
	⌒ FAULT	⌒ WIRELINE TESTED - RT	
		⌒ CHALKY	
			W WELL

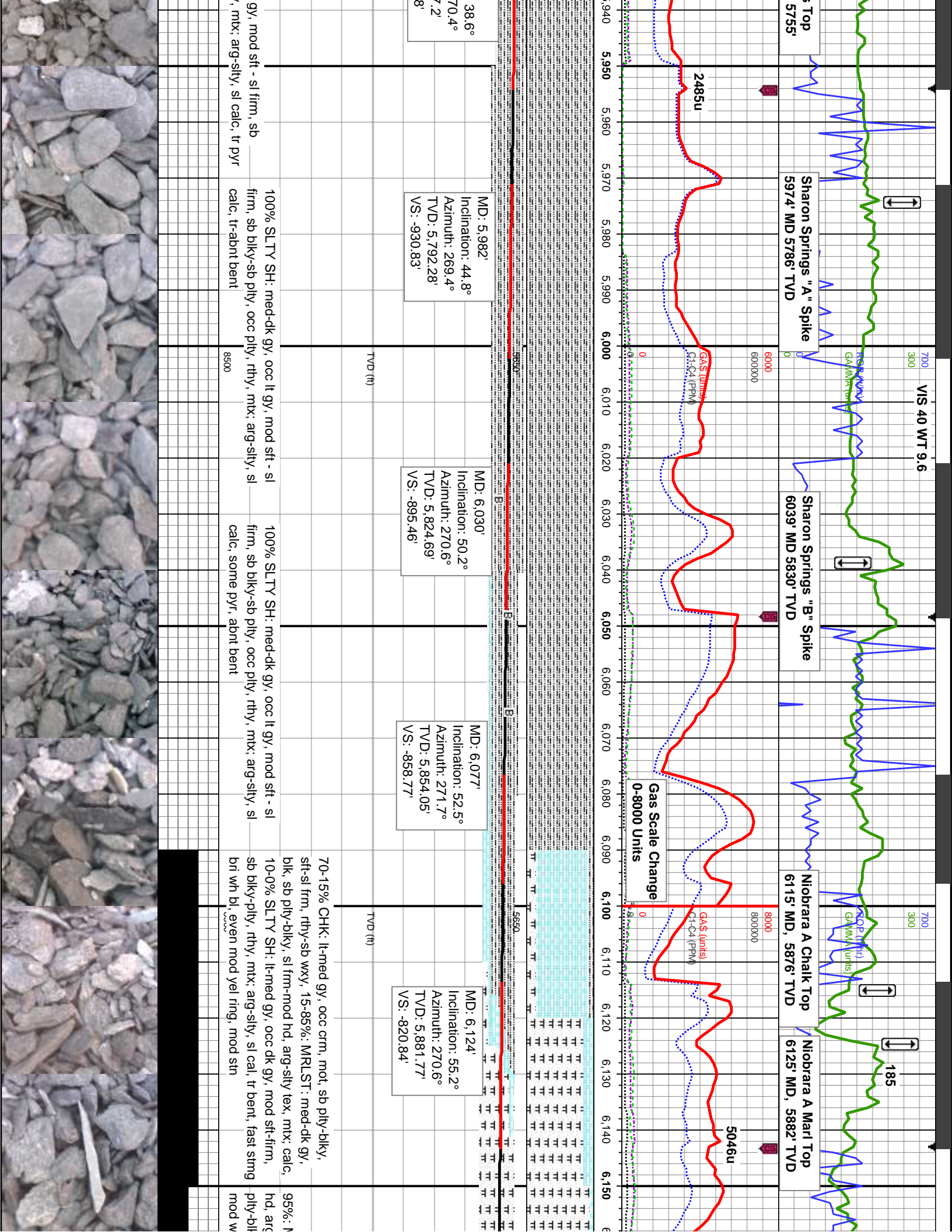


80202



Slide/Rotate		V/S 37 WT 9.6	
<p>Bit Data</p> <p>Bit #: 1</p> <p>Type: PDC</p> <p>Size: 8.75</p> <p>Depth In: 457'</p> <p>Hours: 10 hrs</p> <p>Jets: 7x18</p> <p>S/N: VS513HG</p>		<p>ROP (ft/hr)</p> <p>GAMMA (units)</p> <p>94</p>	
<p>ROP</p> <p>GAMMA</p>		<p>ROP (ft/hr)</p> <p>GAMMA (units)</p> <p>94</p>	
<p>Total Gas &amp; Chromatograph</p> <p>GAS</p> <p>C1</p> <p>C2</p> <p>C3</p> <p>C4</p>		<p>GAS (units)</p> <p>C1-C4 (PPM)</p> <p>2314u</p> <p>GAS (units)</p> <p>C1-C4 (PPM)</p>	
<p>Depth Labels</p>		<p>5,760 5,770 5,780 5,790 5,800 5,810 5,820 5,830 5,840 5,850 5,860 5,870 5,880 5,890 5,900 5,910 5,920 5,930</p>	
<p>% Lith</p>		<p>5,760 5,770 5,780 5,790 5,800 5,810 5,820 5,830 5,840 5,850 5,860 5,870 5,880 5,890 5,900 5,910 5,920 5,930</p>	
<p>Well Bore</p> <p>TVD</p>		<p>MD: 5,841'</p> <p>Inclination: 24°</p> <p>Azimuth: 267.9°</p> <p>TVD: 5,676.88'</p> <p>VS: -1,010.42'</p>	
<p>COLUMBINE LOGGING INC. RIGGED UP ON 4/17/2015 MANNED 2-PERSON LOGGING WITH BLOODHOUND GAS CHROMATOGRAPH UNIT #316 BEGAN LOGGING ON 5/18/2015 @ 04:26 MST</p>		<p>MD: 5,888'</p> <p>Inclination: 30.8°</p> <p>Azimuth: 271.4°</p> <p>TVD: 5,718.59'</p> <p>VS: -988.81'</p>	
<p>Oil Show</p>		<p>MD: 5,935'</p> <p>Inclination: 2°</p> <p>Azimuth: 2°</p> <p>TVD: 5,755.0'</p> <p>VS: -962.0'</p>	
<p>Images</p>		<p>100% SLTY SH: lt-med gy, occ dk gy, mod sft - sl firm, sb blk-y-sb pfty, occ pfty, rthy, mtk; arg-sily, sl calc, occ shy ss</p> <p>100% SLTY SH: med-dk gy, occ lt gy, mod sft - sl firm, sb blk-y-sb pfty, occ pfty, rthy, mtk; arg-sily, sl calc, tr shy ss</p> <p>100% SLTY SH: med-dk blk-y-sb pfty, occ pfty, rthy</p>	



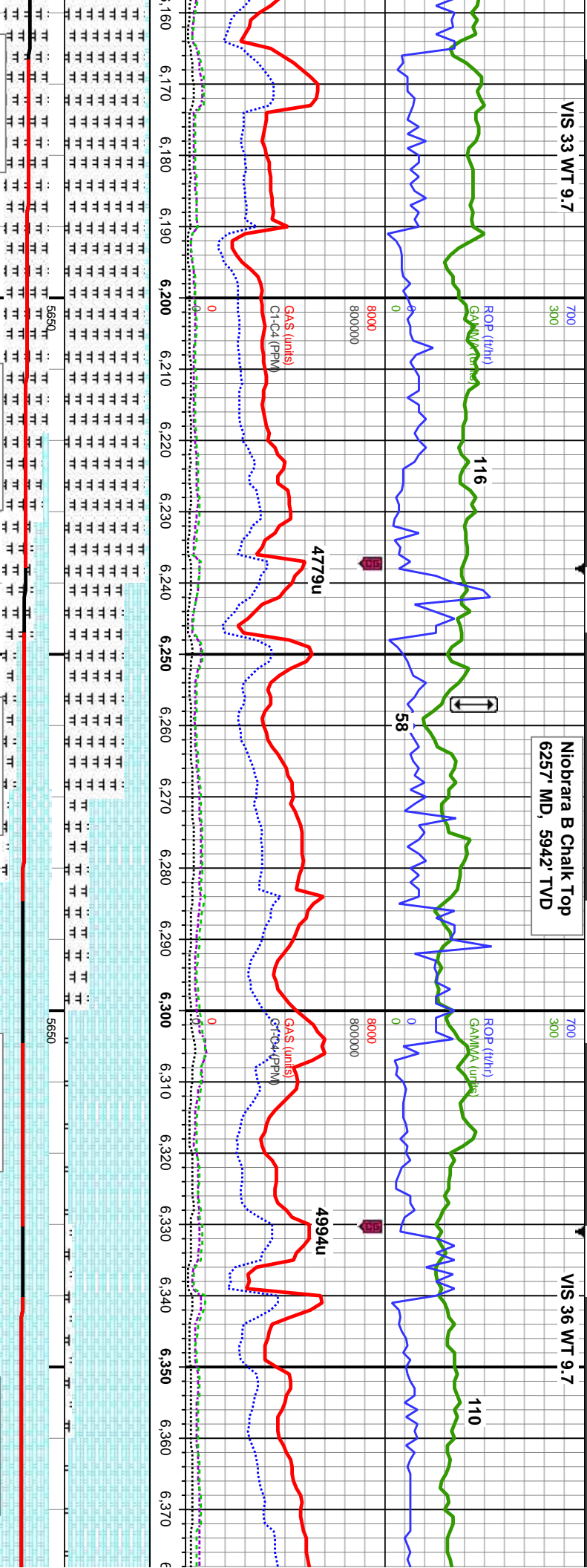




VIS 33 WT 9.7

Niobrara B Chalk Top  
6257' MD, 5942' TVD

VIS 36 WT 9.7



MD: 6,171'  
Inclination: 59.6°  
Azimuth: 269.9°  
TVD: 5,907.08'  
VS: -781.25'

MD: 6,218'  
Inclination: 68.5°  
Azimuth: 269.3°  
TVD: 5,927.63'  
VS: -739.04'

MD: 6,264'  
Inclination: 74.9°  
Azimuth: 266.9°  
TVD: 5,942.07'  
VS: -695.4'

MD: 6,312'  
Inclination: 80.4°  
Azimuth: 266.8°  
TVD: 5,952.33'  
VS: -648.59'

MD: 6,359'  
Inclination: 86.7°  
Azimuth: 269°  
TVD: 5,957.61'  
VS: -601.93'

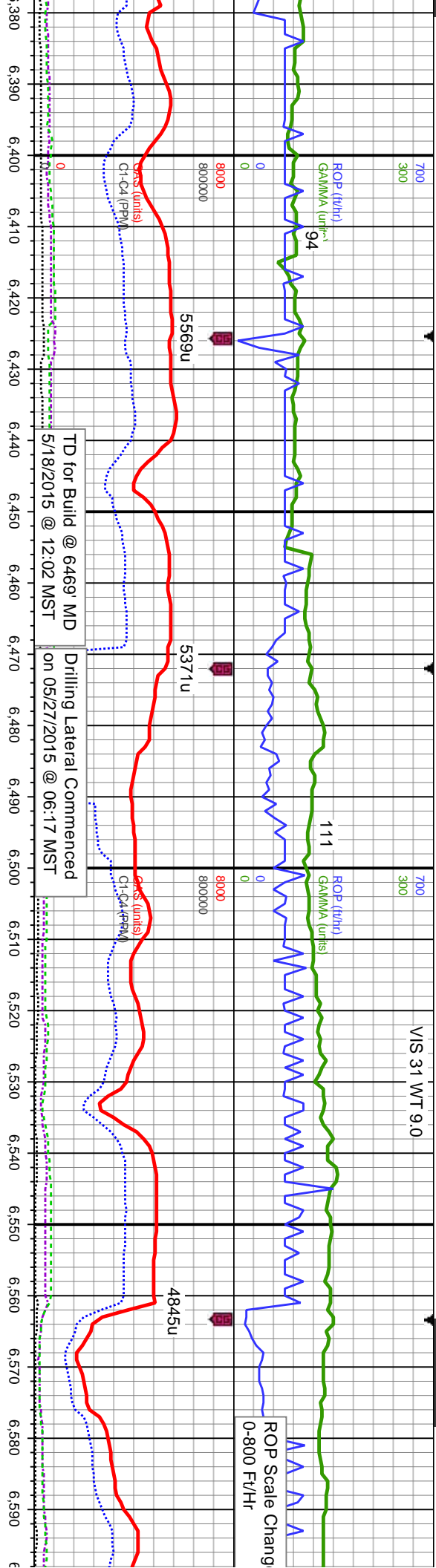
95-70%: MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod  
frm-mod hd, arg-sily tex, mtx: calc, 5-30% CHK:  
lt-med gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, tr  
bent, tr bent, mod stmg mod wh bl, even fr dull amb  
ring, tr stn

70-95% CHK: lt-med gy, occ wht-crm, mot, sb  
pty-blky, sft-sl frm, rthy-sb wxy, 30-5%: MRLST:  
med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily  
tex, mtx: calc, tr bent, tr cal frags, mod chk flor, fast  
stmg bri wh bl, even mod yel ring, mod stn

90-95% CHK: lt-med gy, occ wht-crm, mot, s  
pty-blky, sft-sl frm, rthy-sb wxy, 10-5%: MRL  
med-dk gy, blk, sb pty-blky, sl frm-mod hd, a  
tex, mtx: calc, tr cal frags, mod chk flor, some  
contaminants, fast stmg bri wh bl, even thk y  
ring, thk stn



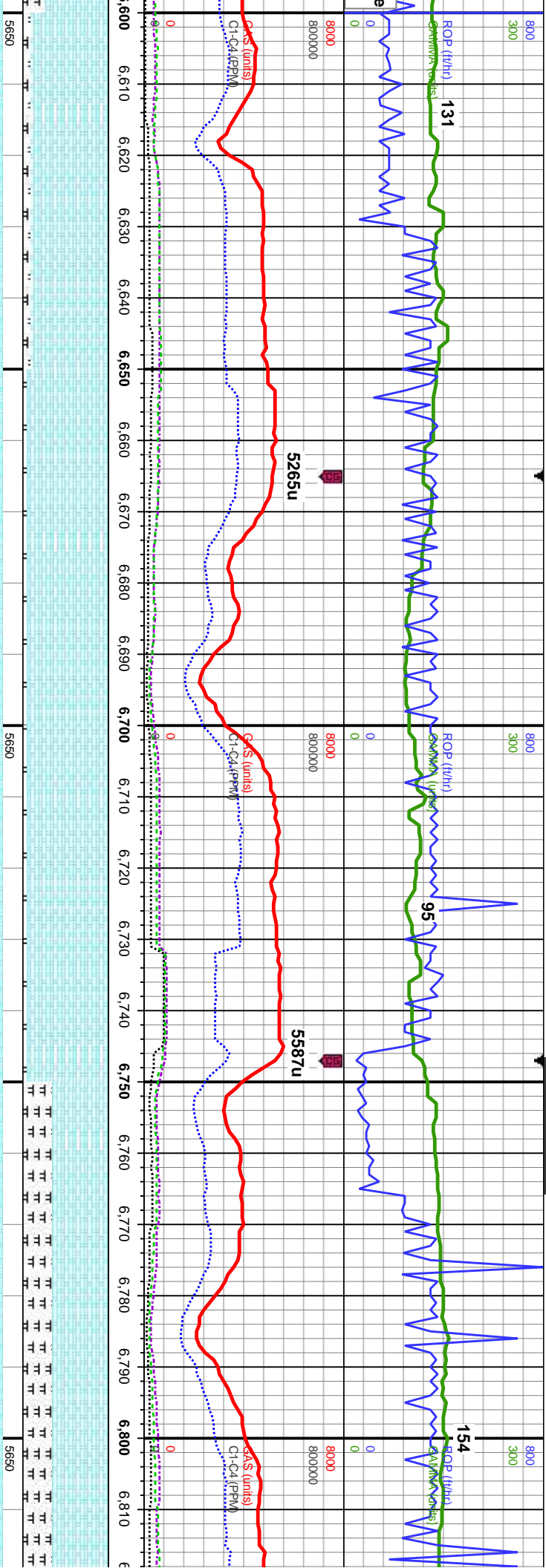




MD: 6.403' Inclination: 90.9° Azimuth: 270.7° TVD: 5,958.53' VS: -557.96'		Projection to Bit MD: 6.469' Inclination: 90.9° Azimuth: 270° TVD: 5,957.49' VS: -491.97'		MD: 6.498' Inclination: 89.8° Azimuth: 272° TVD: 5,957.95' VS: -463'		MD: 6.589' Inclination: 89.9° Azimuth: 269.9° TVD: 5,958.19' VS: -372.03'	
ST:		b		b		b	
arg-sily		95-90% CHK: lt-med gy, occ wht-crm, mot, sb pily-blky, sft-sl frm,		75% CHK: lt-med gy, mot, sb pily-blky, sft-sl frm, rthy-sb wxy, some		75% CHK: lt-med gy, occ wht-crm, mot, sb	
e up hole		rthy-sb wxy, 5-10%: MRLST: med-dk gy, blk, sb pily-blky, sl frm-mod		cal incl, 15-20%: MRLST: med-dk gy, blk, sb pily-blky, sl frm-mod		pily-blky, sft-sl frm, rthy-sb wxy, 25% MRLST	
el grn		hd, arg-sily tex, mtz: calc, tr cal frags, mod chk flor, some up hole		hd, arg-sily tex, mtz: calc, 10%-5 Cement, scat cal and fos frags,		med-dk gy, blk, sb pily-blky, sl frm-mod hd,	
		contaminants, fast stmg bri wh bl, even thk yel grn ring, thk str		fast stmg bri wh bl, even mod thn mod yel grn ring, thn sin		arg-sily tex, mtz: calc, scat cal and fos frags,	
						fast stmg bri wh bl, even mod thn mod yel	
						grn ring, thn str	



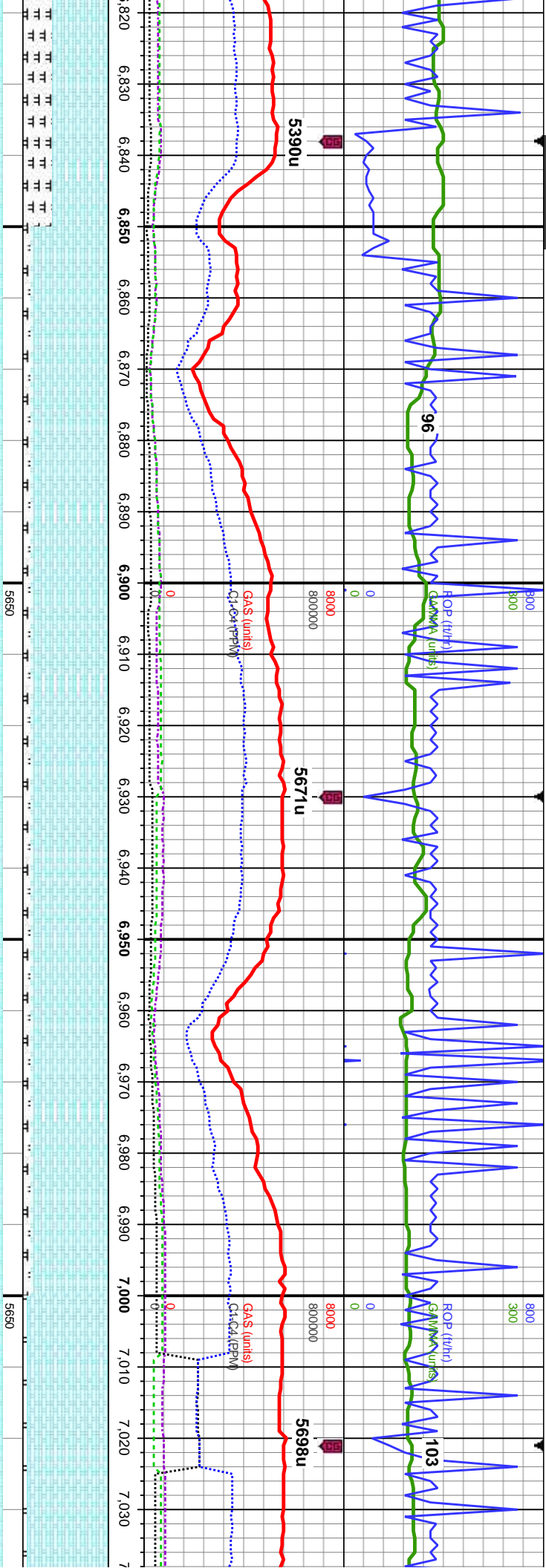




MD: 6,682' Inclination: 90.9° Azimuth: 269.9° TVD: 5,957.54' VS: -279.04'		MD: 6,773' Inclination: 90.3° Azimuth: 270.1° TVD: 5,956.59' VS: -188.04'	
90% CHK: lt gy, wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 10% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx, calc, tr cal frags, mod chk flor, fast stmg bri wh bl, even thk bri yel grn ring, thk stn	95% CHK: lt gy, wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 5% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx, calc, tr cal frags, mod chk flor, fast stmg bri wh bl, even thk bri yel grn ring, thk stn	95% CHK: lt gy, wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 5% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx, calc, tr cal frags, mod chk flor, fast stmg bri wh bl, even thk bri yel grn ring, mod stn	65% CHK: lt-med gy, occ wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 35% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx, calc, tr cal frags, fast stmg bri wh bl, even thk bri yel grn ring, mod stn
TVD (ft)	TVD (ft)	TVD (ft)	TVD (ft)



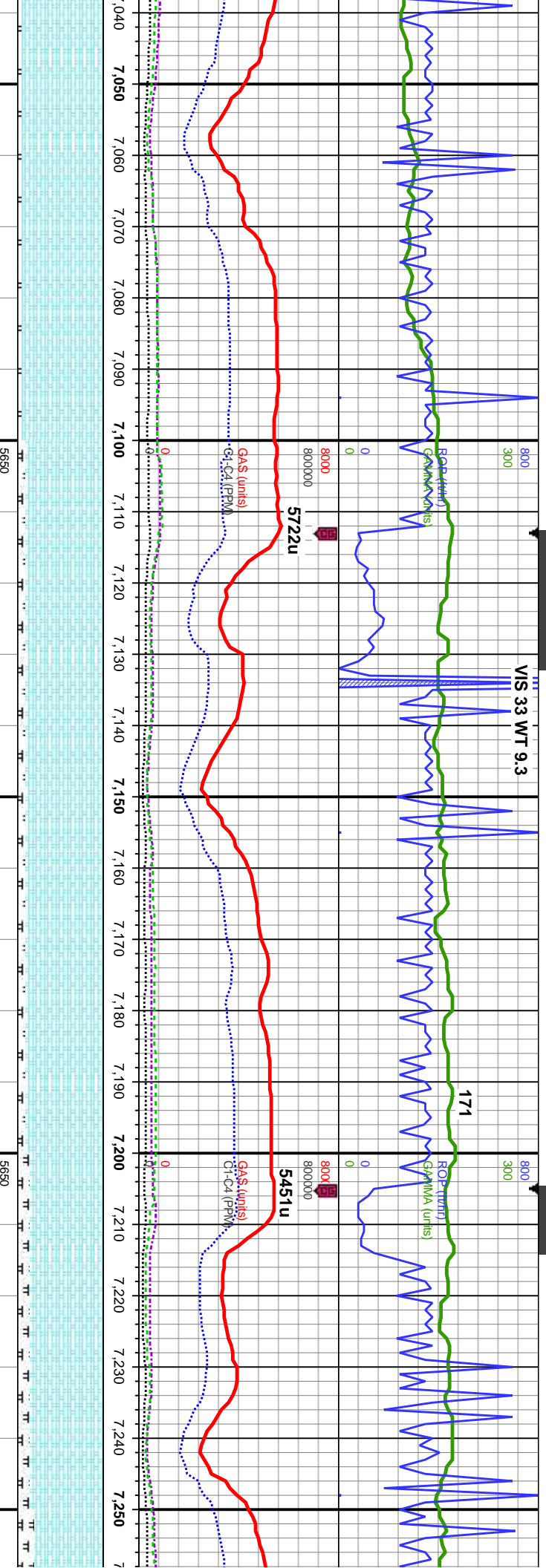




MD: 6,865' Inclination: 88.8° Azimuth: 268.2° TVD: 5,957.31' VS: -96.06'		90% CHK: lt gy, wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 10% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx: calc, tr cal frags, mod chk flr, fast stmg bri wh bl, even mod thn ring, thk stn	90% CHK: lt gy, wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 10% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx: calc, tr cal frags, mod chk flr, fast stmg bri wh bl, even thk bri yel grn ring, thk stn	90% CHK: lt gy, wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 10% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx: calc, tr cal frags, mod chk flr, fast stmg bri wh bl, even thk bri yel grn ring, thk stn	95% CHK: lt gy, occ wht-crm, mot, s pty-blky, sft-sl frm, rthy-sb wxy, 5% med-dk gy, blk, sb pty-blky, sl frm-r arg-sily tex, mtx: calc, mod chk flr, stmg bri wh bl, even thk bri yel grn r stn
TVD (ft)		TVD (ft)	TVD (ft)	TVD (ft)	TVD (ft)





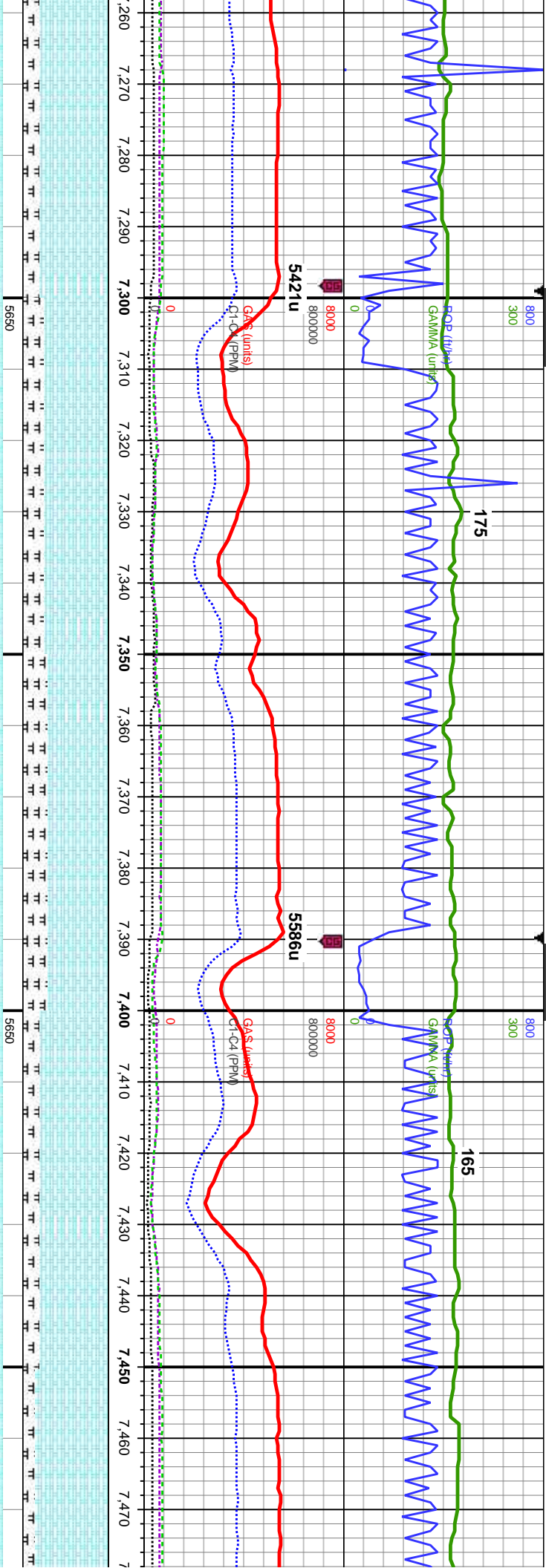


MD: 7,047' Inclination: 90.7° Azimuth: 268.8° TVD: 5,959.28' VS: 85.87'	MD: 7,139' Inclination: 90.1° Azimuth: 269° TVD: 5,958.64' VS: 177.86'	MD: 7,232' Inclination: 89.1° Azimuth: 268.8° TVD: 5,959.28' VS: 270.85'
-------------------------------------------------------------------------------------	------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------

95% CHK: lt gy, occ wht-crm, mot, sb ply-blky, sft-sl frm, rthy-sb wxy, 5% MRLST: med-dk gy, blk, sb ply-blky, sl frm-mod hd, arg-slty tex, mtz, calc, mod chk flor, fast stmg bri wh bl, even thk bri yel grn ring, thk stin	90% CHK: lt-med gy, occ med gy brn, mot, sb ply-blky, sft-sl frm, rthy-sb wxy, 10% MRLST: med-dk gy, blk, sb ply-blky, sl frm-mod hd, arg-slty tex, mtz, calc, fast stmg bri wh bl, even thk bri yel grn ring, thk stin	90% CHK: lt-med gy, occ med gy brn, mot, sb ply-blky, sft-sl frm, rthy-sb wxy, 10% MRLST: med-dk gy, blk, sb ply-blky, sl frm-mod hd, arg-slty tex, mtz, calc, fast stmg bri wh bl, even thk bri yel grn ring, thk stin	85% CHK: med gy, occ lt gy, mot, sb ply-blky, sft-sl frm, rthy-sb wxy, 15% MRLST: med-dk gy, blk, sb ply-blky, sl frm-mod hd, arg-slty tex, mtz, calc, mod stmg mod wh bl, even thn dull amb ring, fr stin	80% C ply-blk med-dk arg-slty even th
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------



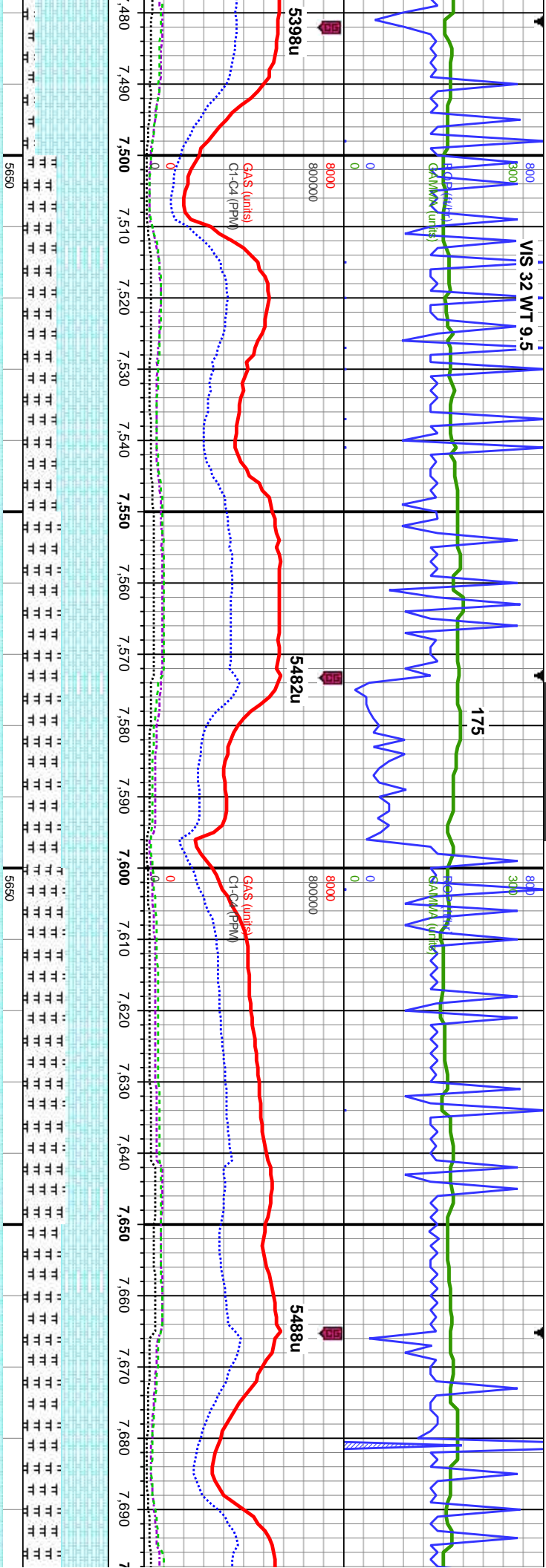




MD: 7.324' Inclination: 90.3° Azimuth: 269.4° TVD: 5.959.77' VS: 362.84'		MD: 7.415' Inclination: 89.8° Azimuth: 269.9° TVD: 5.959.69' VS: 453.84'	
CHK: med gy, occ lt gy, mot, sb sft-sl frm, rthy-sb wxy, 20% MRLST: gy, blk, sb pty-blky, sl frm-mod hd, arg-slty tex, mtx: calc, mod stmg mod wh bl, n dull amb ring, fr sin	75% CHK: med gy, occ lt gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 25% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-slty tex, mtx: calc, mod stmg mod wh bl, even thn dull amb ring, fr sin	70% CHK: med gy, occ lt gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 30% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-slty tex, mtx: calc, mod stmg mod wh bl, even thn dull amb ring, fr sin	80% CHK: med gy, occ lt gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 20% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-slty tex, mtx: calc, fast stmg bri wh bl, even thk bri yel grn ring, mod sin
TVD (ft)		TVD (ft)	







MD: 7,509'  
Inclination: 90.1°  
Azimuth: 268.9°  
TVD: 5,959.77'  
VS: 547.84'

TVD (ft)

gy, mot, sb  
wxy, 15% MRLST:  
y, sl frm-mod hd,  
stmg bri wh bl,  
mod stn

60% CHK: med-dk gy, mot, sb pty-blky,  
st-sl frm, rthy-sb wxy, 40% MRLST: med-dk  
gy, blk, sb pty-blky, sl frm-mod hd, arg-sily  
tex, mtb; calc, tr cal frags, mod stmg mod wh  
bl, even thn yel-gn ring, fr stn

TVD (ft)

MD: 7,600'  
Inclination: 89.7°  
Azimuth: 270.1°  
TVD: 5,959.93'  
VS: 638.84'

50% CHK: med-dk gy, mot, sb pty-blky,  
st-sl frm, rthy-sb wxy, 50% MRLST: med-dk  
gy, blk, sb pty-blky, sl frm-mod hd, arg-sily  
tex, mtb; calc, tr cal frags, mod stmg mod wh  
bl, even thn yel-gn ring, fr stn

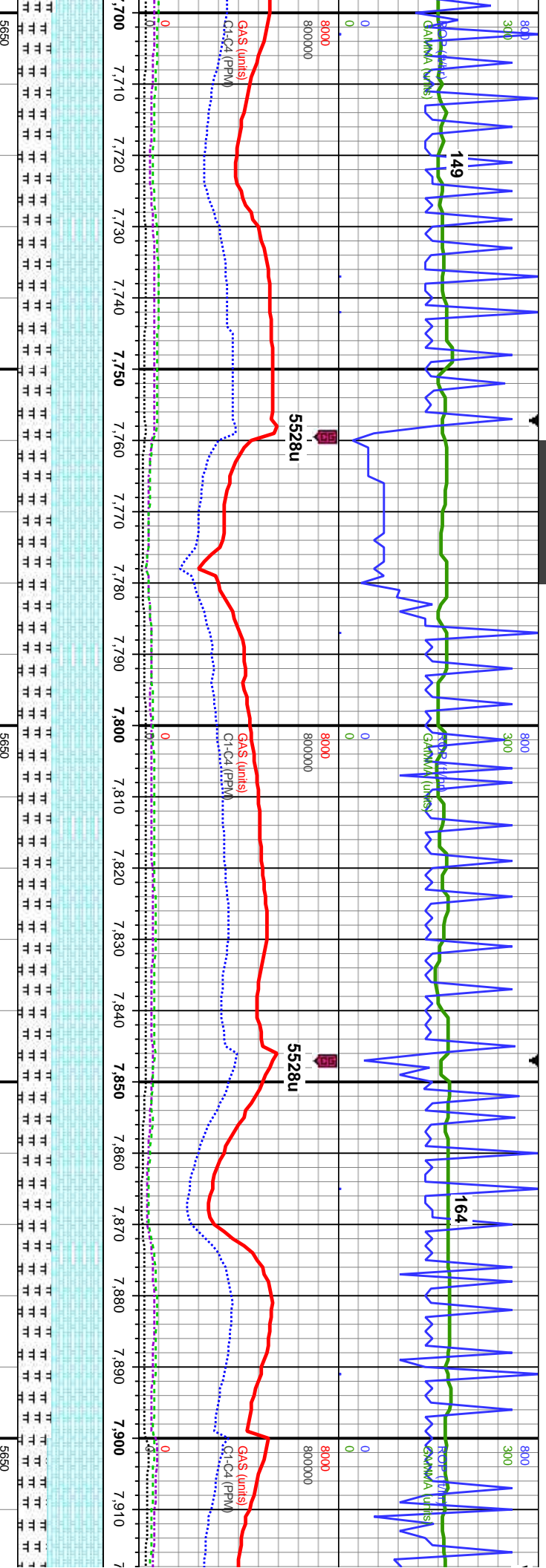
TVD (ft)

55% CHK: med-dk gy, mot, sb pty-blky,  
st-sl frm, rthy-sb wxy, 45% MRLST: med-dk  
gy, blk, sb pty-blky, sl frm-mod hd, arg-sily  
tex, mtb; calc, mod stmg mod wh bl, even thr

MD: 7,691'  
Inclination: 90.  
Azimuth: 269.1  
TVD: 5,960.09  
VS: 729.84'







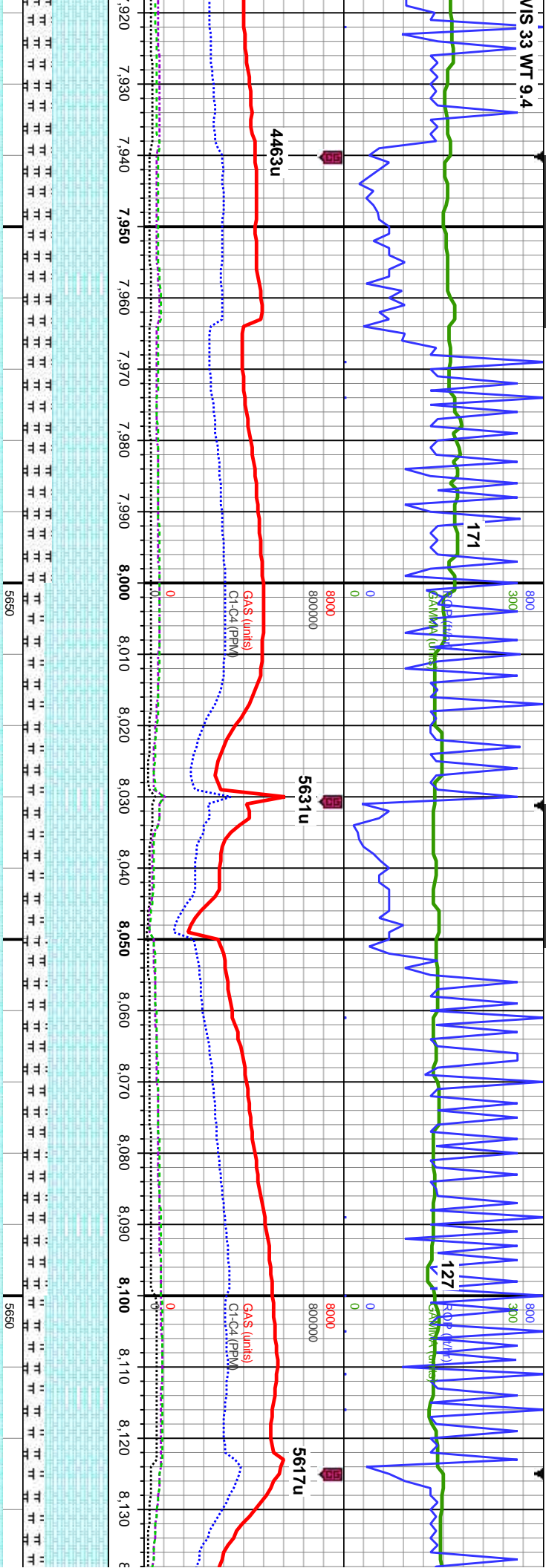
MD: 7,783'  
Inclination: 90.4°  
Azimuth: 270.1°  
TVD: 5,959.69'  
VS: 821.83'

MD: 7,875'  
Inclination: 90.7°  
Azimuth: 269.5°  
TVD: 5,958.8'  
VS: 913.83'

60% CHK, med-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 40% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtk; calc, mod stmg mod wh bl, even thn yel-gn ring, tr stn	60% CHK, med-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 40% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtk; calc, mod stmg mod wh bl, even thn yel-gn ring, tr stn	60% CHK, med-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 40% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtk; calc, mod stmg mod wh bl, even thn yel-gn ring, tr stn	60% CHK, med-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 40% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtk; calc, tr cal frags, mod stmg mod wh bl, even thn yel-gn ring, tr stn	65% CHK, med-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 40% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtk; calc, tr cal frags, mod stmg mod wh bl, even thn yel-gn ring, tr stn
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------







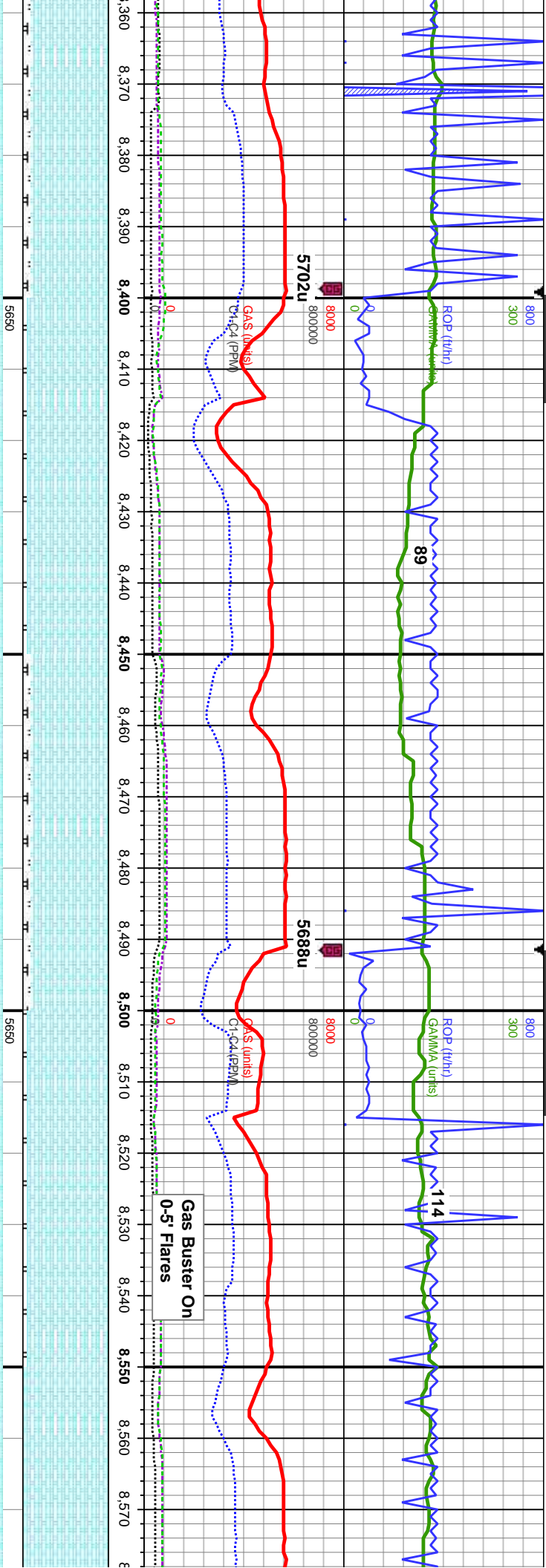
MD: 7.967' Inclination: 91.3° Azimuth: 272.1° TVD: 5.957.2' VS: 1,005.79'		65% CHK: med-dk gy, mot, sb pily-biky, sft-sl frm, rthy-sb wxy, 35% MRLST: med-dk gy, blk, sb pily-biky, sl frm-mod hd, arg-sily tex, mtx: calc, tr cal frags, mod stmg mod wh bl, even thn yel-gn ring, fr stn	75% CHK: lt-med gy, mot, sb pily-biky, sft-sl frm, rthy-sb wxy, 25% MRLST: med-dk gy, blk, sb pily-biky, sl frm-mod hd, arg-sily tex, mtx: calc, mod stmg mod wh bl, even thn yel-gn ring, fr stn	70% CHK: lt-med gy, occ dk gy, mot, sb pily-biky, sft-sl frm, rthy-sb wxy, 30% MRLST: med-dk gy, blk, sb pily-biky, sl frm-mod hd, arg-sily tex, mtx: calc, mod stmg mod wh bl, even thn yel-gn ring, fr stn	75% CHK: lt-med gy, mot, sb pily-t-frm, rthy-sb wxy, 25% MRLST: med-dk gy, blk, sb pily-biky, sl frm-mod hd, arg-sily tex, mtx: calc, mod stmg mod wh bl, even thn yel-gn ring, mod stn
TVD (ft)		TVD (ft)	TVD (ft)	TVD (ft)	TVD (ft)











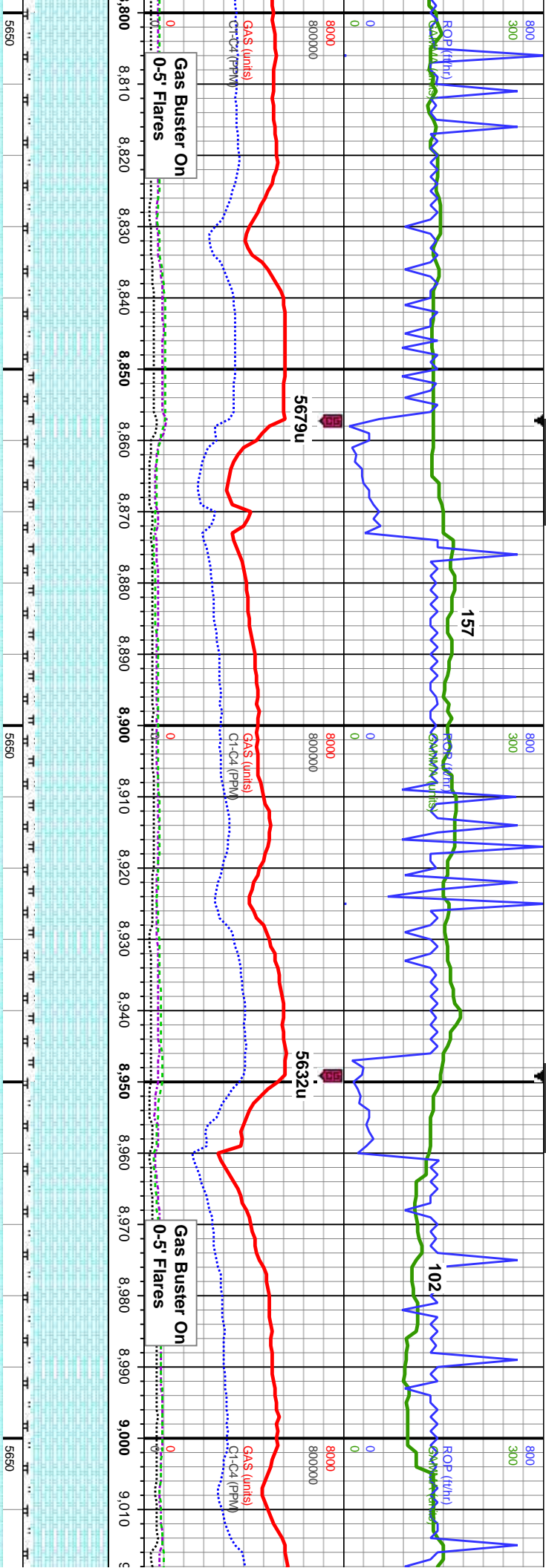
HK: lt-med gy brn, wht-crm, mot, sb gy, sft-sl frm, rthy-sb wxy, 10% T: med-dk gy, blk, sb pty-blky, sl hd, arg-slty tex, mtx; calc, g chk mod, fast stmg bri wh bl, even thk bri ring, mod sin		95% CHK: lt-med gy brn, wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 5% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-slty tex, mtx; calc, g chk flor, g od, mod stmg mod wh bl, even thn yel-gn ring, fr stn		90% CHK: lt-med gy brn, wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 10% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-slty tex, mtx; calc, g chk flor, g od, mod stmg mod wh bl, even thn yel-gn ring, fr stn		95% CHK: lt gy, wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 5% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-slty tex, mtx; calc, g chk flor, g od, fast stmg bri wh bl, even thk bri yel gm ring, thk sin		100% CHK: lt-med gy brn, wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 10% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-slty tex, mtx; calc, g chk flor, g od, fast stmg bri wh bl, even thk bri ring, thk sin	
MD: 8,426' Inclination: 91.1° Azimuth: 269.4° TVD: 5,957.19' VS: 1,464.63'		MD: 8,517' Inclination: 90.3° Azimuth: 269.1° TVD: 5,956.08' VS: 1,555.62'		MD: 8,517' Inclination: 90.3° Azimuth: 269.1° TVD: 5,956.08' VS: 1,555.62'		MD: 8,517' Inclination: 90.3° Azimuth: 269.1° TVD: 5,956.08' VS: 1,555.62'		MD: 8,517' Inclination: 90.3° Azimuth: 269.1° TVD: 5,956.08' VS: 1,555.62'	
TVD (ft)		TVD (ft)		TVD (ft)		TVD (ft)		TVD (ft)	







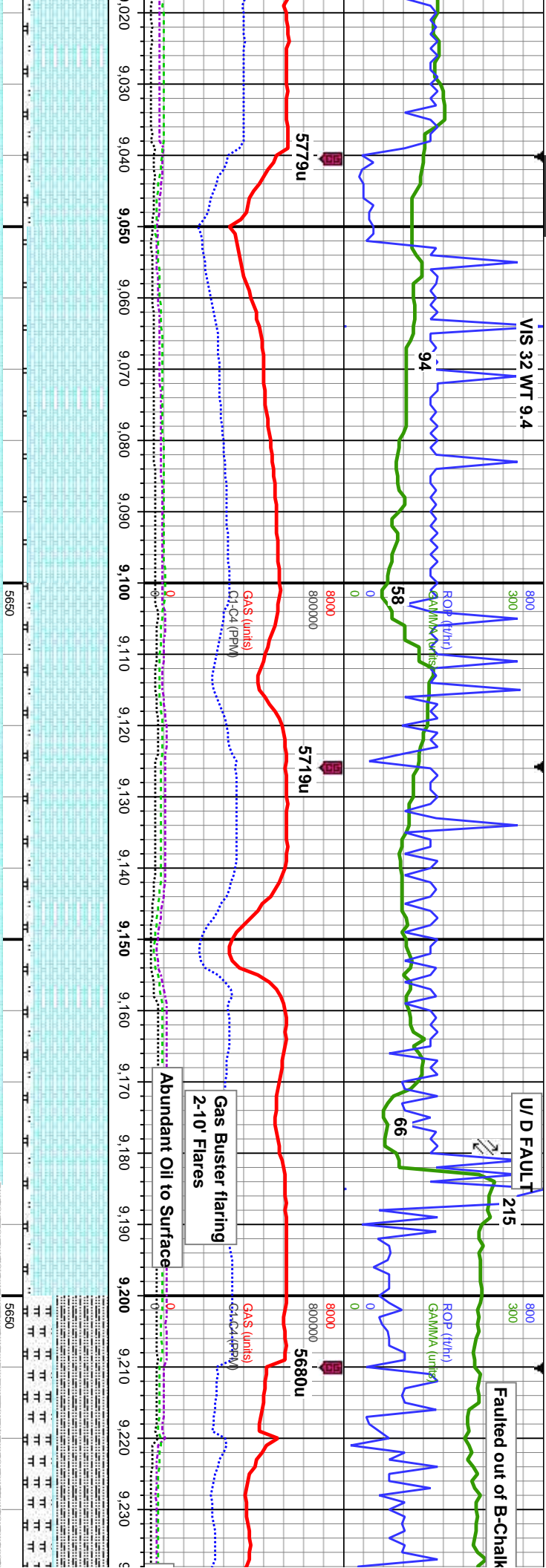




MD: 8.883' Inclination: 89.1° Azimuth: 269.8° TVD: 5,957.68' VS: 1,921.6'		MD: 8.975' Inclination: 89° Azimuth: 269.1° TVD: 5,959.21' VS: 2,013.58'	
90% CHK: lt-med gy brn, wht-crm, mot, sb ply-blky, sft-sl frm, rthy-sb wxy, 10% MRLST: med-dk gy, blk, sb ply-blky, sl frm-mod hd, arg-sily tex, mtx; calc, g chk flor, g od, mod stmg bri wh bl, even v thk bri yel ring, thk stn		90% CHK: lt-med gy brn, occ wht-crm, mot, sb ply-blky, sft-sl frm, rthy-sb wxy, occ cal incl, 15% MRLST: med-dk gy, blk, sb ply-blky, sl frm-mod hd, arg-sily tex, mtx; calc, mod chk flor, g od, mod stmg bri wh bl, even v thk bri yel ring, thk stn	
TVD (ft)		TVD (ft)	





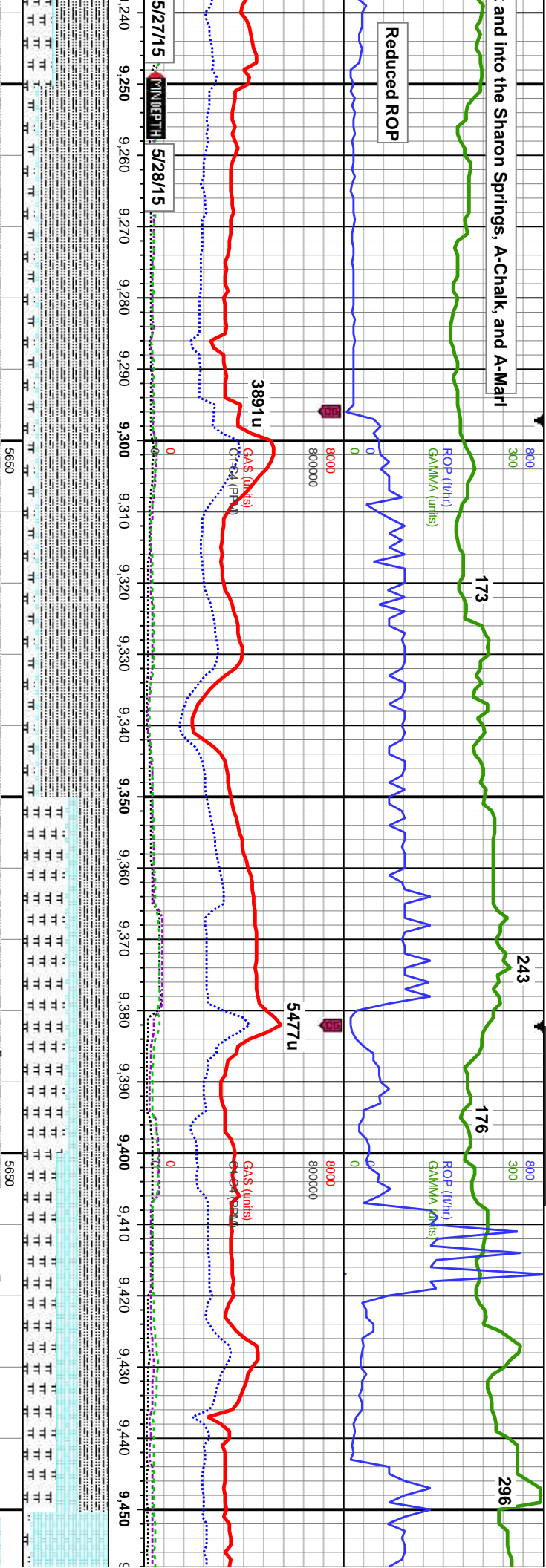


95% CHK: lt-med gy brn, occ wht-crm, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, occ cal incl, 5% MRLST: med-dk gy, blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx; calc, occ cal and fos frags, g chk flor, g od, fast stmg bri wh bl, even mod thk mod yel amb ring, thk str	MD: 9,060' Inclination: 89° Azimuth: 270.5° TVD: 5,960.69' VS: 2,098.57'	TVD (ft)	90% CHK: lt-med gy brn, occ wht-crm, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, occ cal incl, 10% MRLST: med-dk gy, blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx; calc, occ cal and fos frags, g chk flor, g od, fast stmg bri wh bl, even thn mod yel grn ring, thk str	90% CHK: lt gy brn, wht-crm, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, occ cal incl, 10% MRLST: med-dk gy, blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx; calc, occ cal and fos frags, v high chk flor, v g od, abnt o to surf, fast stmg bri wh bl, even thn mod yel grm ring, thk str	60% SLTY SH: med-dk gy, mod sft-biky-pty, rthy, mtx; arg-sily, sl cal, 3 MRLST: med, dk gy-blk, sb pty-biky-frm-mod hd, arg-sily tex, mtx; calc, lt-med gy, occ wht-crm, mot, sb pty-sft-sl frm, rthy-sb wxy, tr bent, mky bl, even thn dull amb ring, mod str





and into the Sharon Springs, A-Chalk, and A-Mari



5/27/15  
5/28/15

Reduced ROP

ROP (ft/hr)

ROP (ft/hr)

GAMMA (units)

GAMMA (units)

3891u

5477u

GAS (units)

CH-CA (PPM)

MD: 9,316'	MD: 9,401'
Inclination: 91.1°	Inclination: 89.6°
Azimuth: 270.7°	Azimuth: 270.5°
TVD: 5,961.23'	TVD: 5,960.71'
VS: 2,354.51'	VS: 2,439.5'

80% SLTY SH: med-dk gy, mod sft-firm, sb biky-pty, rthy, mtx: arg-sily, sl cal, 15%: MRLST: med, dk gy-blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx: calc, 5% CHK: lt-med gy, occ wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, abnt bent, mky mod wh bl, even thn dull amb ring, mod sin	80% SLTY SH: med-dk gy, mod sft-firm, sb biky-pty, rthy, mtx: arg-sily, sl cal, 15%: MRLST: med, dk gy-blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx: calc, 35% SLTY SH: med-dk gy, mod sft-firm, sb biky-pty, rthy, mtx: arg-sily, sl cal 15% CHK: lt-med gy, occ wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, abnt bent, mky mod wh bl, even thn dull amb ring, mod sin	40%: MRLST: med, dk gy-blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx: calc, 35% SLTY SH: med-dk gy, mod sft-firm, sb biky-pty, rthy, mtx: arg-sily, sl cal 25% CHK: lt-med gy, occ wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, abnt bent, fast strng bri wh bl, even mod thn mod yel gm ring, mod sin
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------







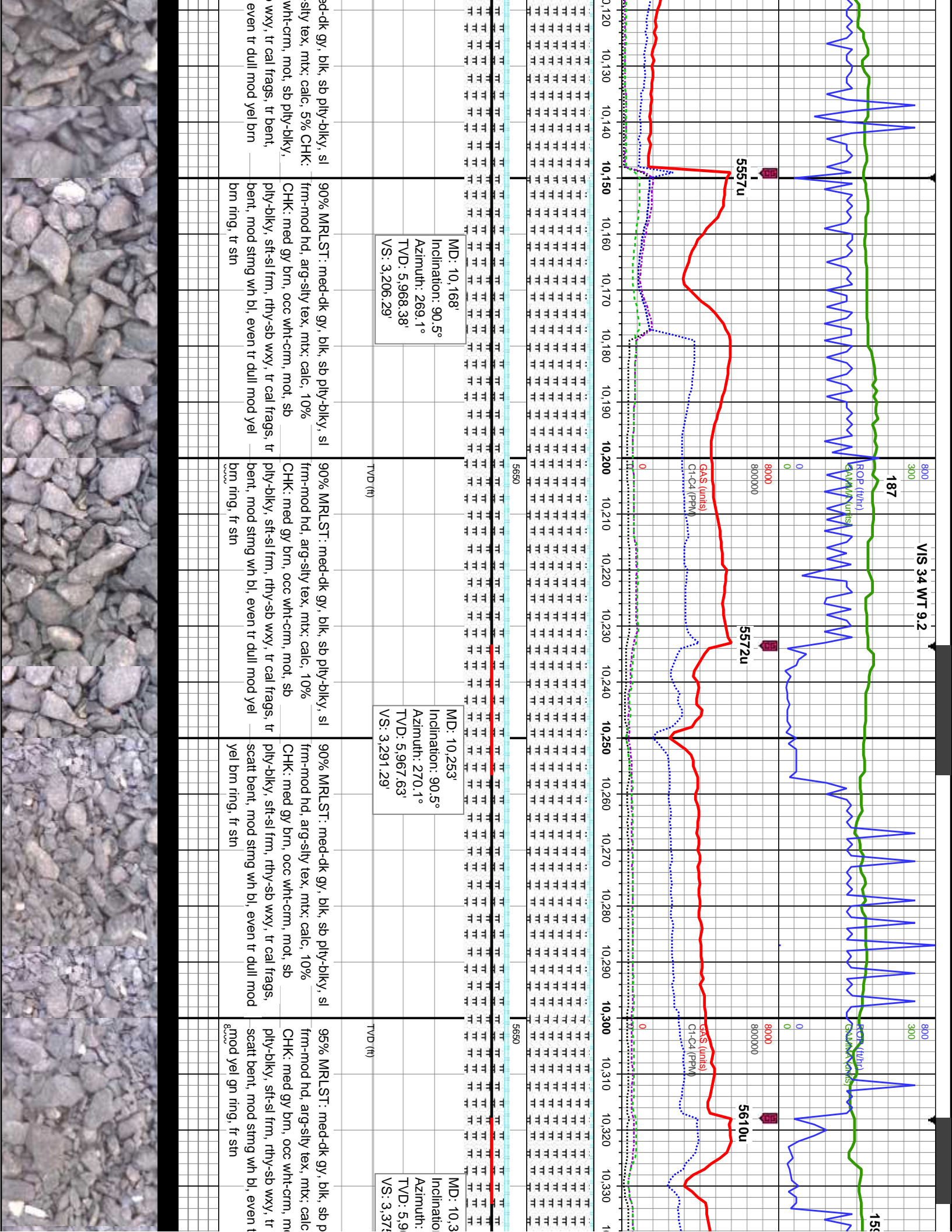




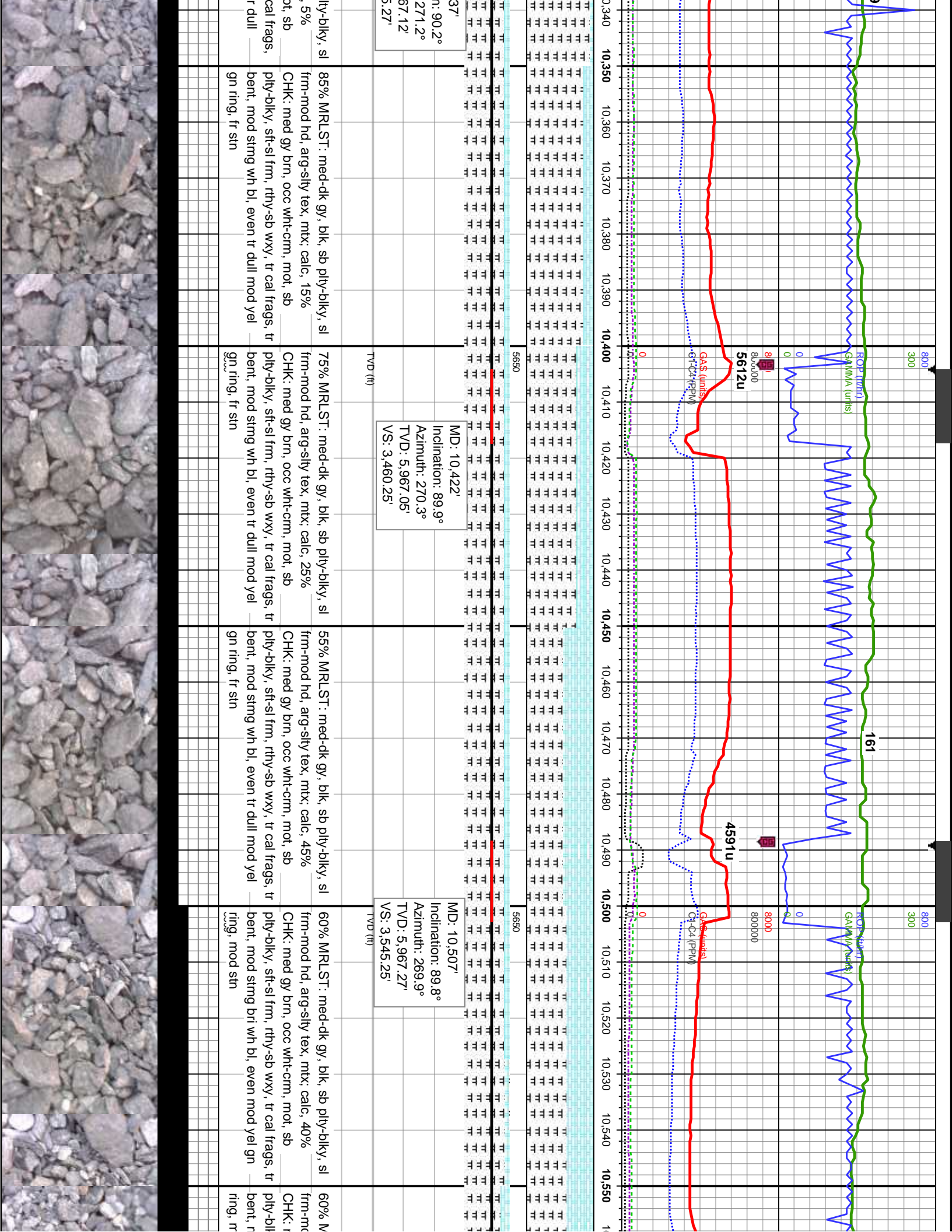






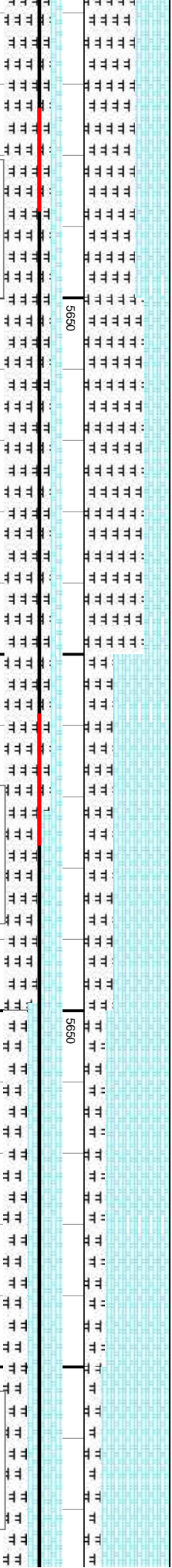
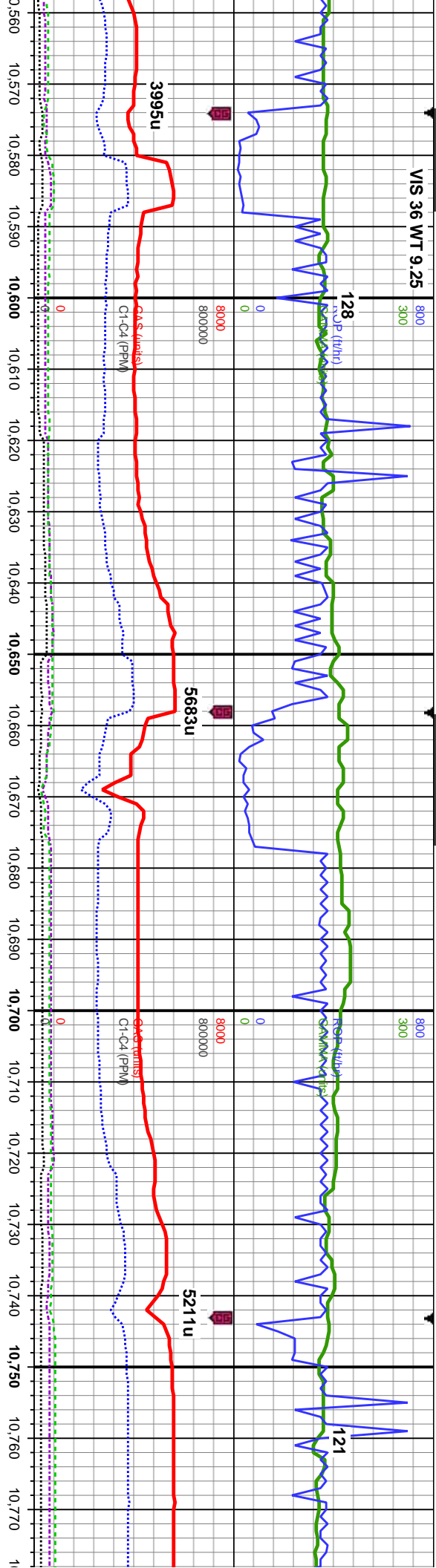








VIS 36 WT 9.25



MD: 10,592'  
Inclination: 89.7°  
Azimuth: 270.5°  
TVD: 5,967.64'  
VS: 3,630.25'

70% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sly tex, mtx; calc, 40%  
CHK: med gy brn, occ wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, tr cal frags, tr bent, fast stmg bri wh bl, even mod yel gn ring, mod stn

MD: 10,677'  
Inclination: 88.2°  
Azimuth: 270.2°  
TVD: 5,969.2'  
VS: 3,715.22'

65% CHK: med gy brn, occ lt gry, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 35% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sly tex, mtx; calc, tr cal frags, tr bent, fast stmg bri wh bl, even mod yel gn ring, mod stn

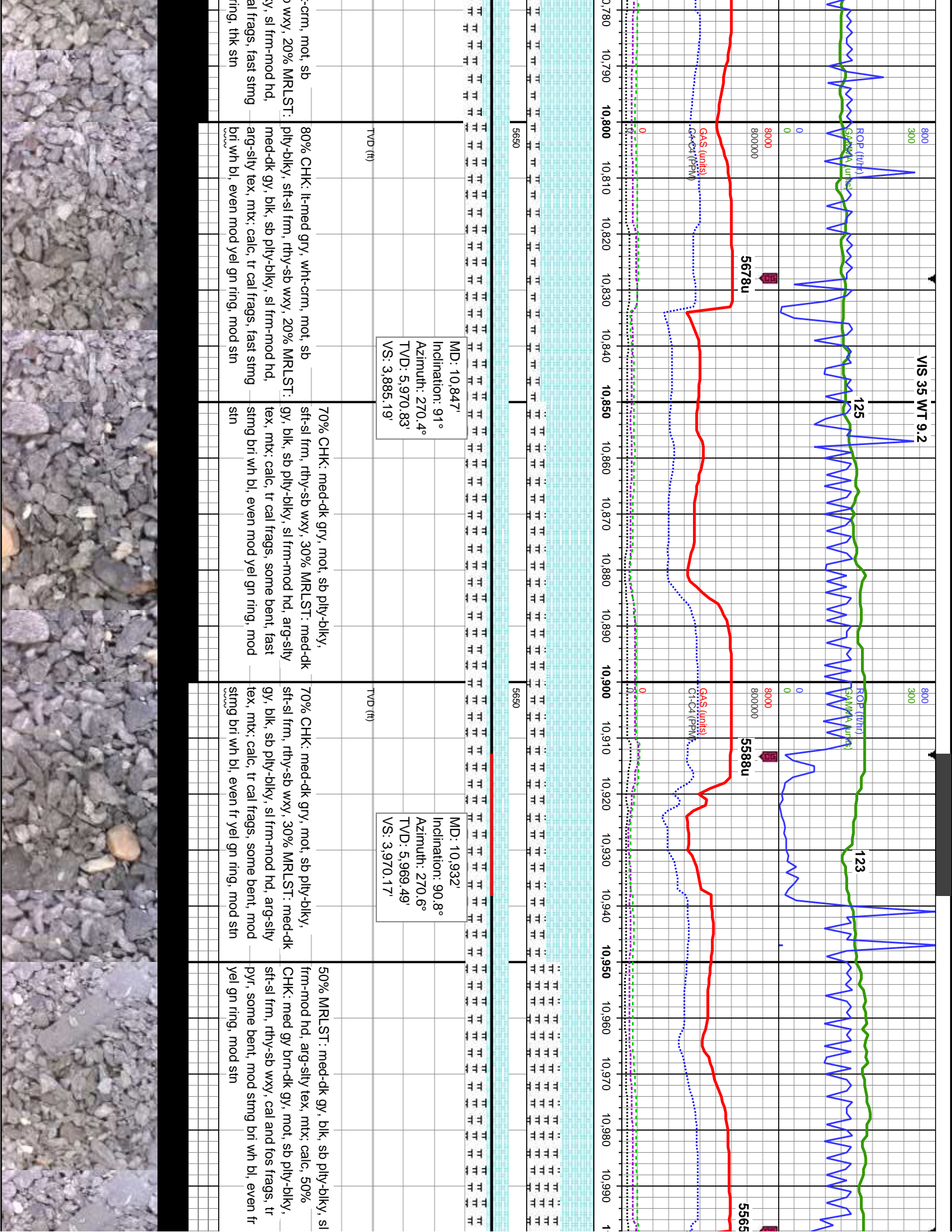
MD: 10,762'  
Inclination: 89.3°  
Azimuth: 270°  
TVD: 5,971.05'  
VS: 3,800.2'

80% CHK: lt-med gry, wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 25% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sly tex, mtx; calc, tr cal frags, fast stmg bri wh bl, even thk yel gn ring, thk stn

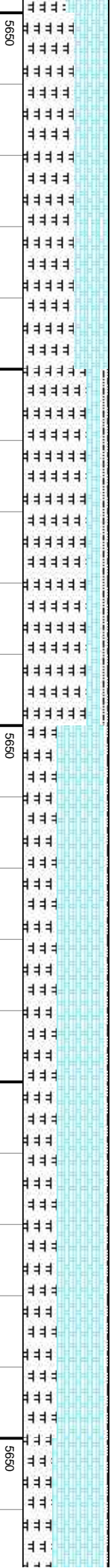
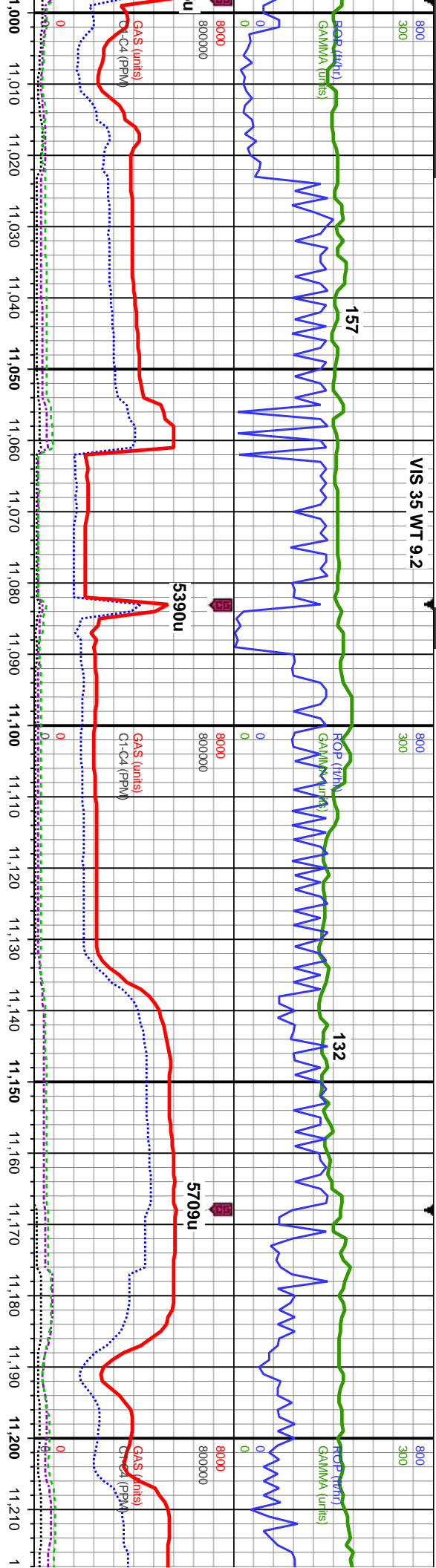
MD: 10,592' Inclination: 89.7° Azimuth: 270.5° TVD: 5,967.64' VS: 3,630.25'	70% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sly tex, mtx; calc, 40% CHK: med gy brn, occ wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, tr cal frags, tr bent, fast stmg bri wh bl, even mod yel gn ring, mod stn	65% CHK: med gy brn, occ lt gry, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 35% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sly tex, mtx; calc, tr cal frags, tr bent, fast stmg bri wh bl, even mod yel gn ring, mod stn	80% CHK: lt-med gry, wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 25% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sly tex, mtx; calc, tr cal frags, fast stmg bri wh bl, even thk yel gn ring, thk stn
-----------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------









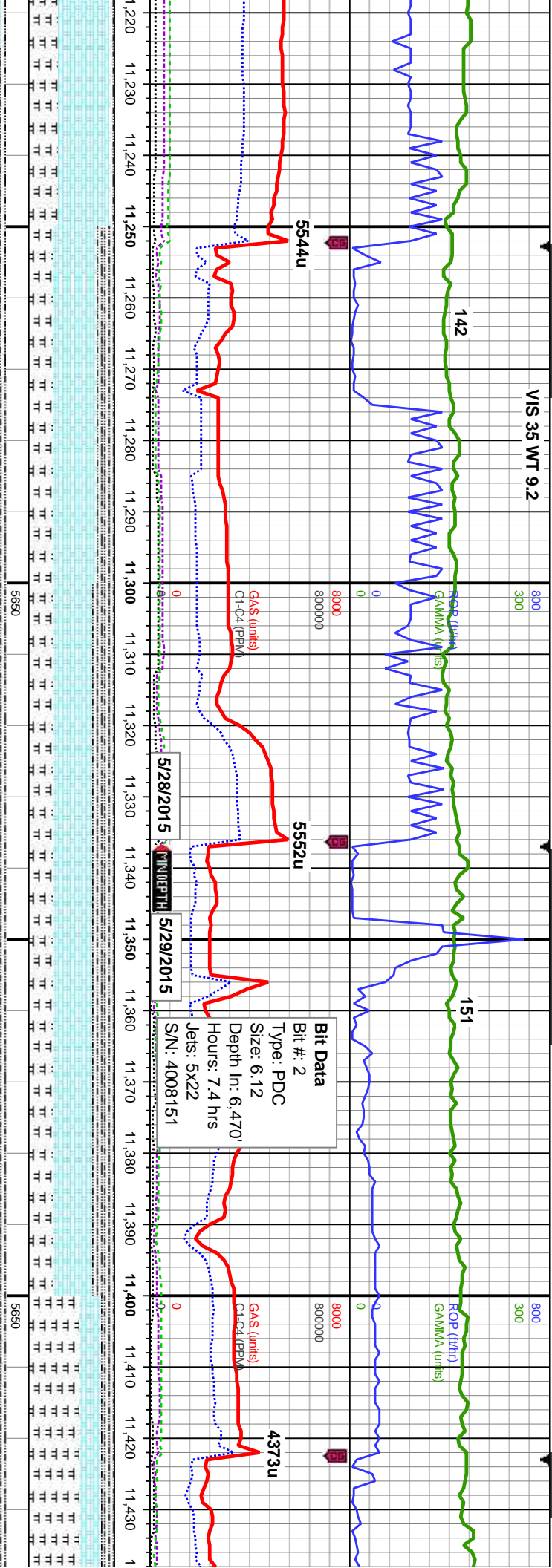


MD: 11,017' Inclination: 89.5° Azimuth: 269.9° TVD: 5,969.27' VS: 4,055.16'	MD: 11,102' Inclination: 89.7° Azimuth: 268.9° TVD: 5,969.87' VS: 4,140.16'	MD: 11,187' Inclination: 91.7° Azimuth: 269.1° TVD: 5,968.83' VS: 4,225.14'
-----------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------

60% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx: calc, 40% CHK: med gy brn-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, scat cal and fos frags, tr pyr, scat bent, mod stmg bri wh bl, even fr yel gn ring, mod sin	75% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx: calc, 15% CHK: med gy brn-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 10% Sily SH: gy-dk gy, blk, pty-sub pty, scat cal and fos frags, tr pyr, scat bent, mod stmg bri wh bl, even fr yel gn ring, mod sin	55% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx: calc, 40% CHK: med gy brn-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 5% Sily SH: gy-dk gy, blk, pty-sub pty, tr cal and fos frags, some bent, fast stmg bri wh bl, even mod yel gn ring, mod sin	55% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx: calc, 40% CHK: med gy brn-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 5% Sily SH: gy-dk gy, blk, pty-sub pty, tr cal and fos frags, tr bent, fast stmg bri wh bl, even mod yel gn ring, mod sin	60% MRLST: med-dk gy, blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx: calc, 40% CHK: med gy brn-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, scat cal and fos frags, tr pyr, scat bent, mod stmg bri wh bl, even fr yel gn ring, mod sin
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------







MD: 11,272'  
Inclination: 91.4°  
Azimuth: 268.9°  
TVD: 5,966.53'  
VS: 4,310.11'

MD: 11,357'  
Inclination: 91°  
Azimuth: 268.7°  
TVD: 5,964.75'  
VS: 4,395.08'

MD:  
Incl:  
Azir:  
TVC:  
VS:

bed-dk gy, blk, sb pty-blky, sl  
stly tex, mtx; calc, 35%  
n-dk gy, mot, sb pty-blky,  
wxy, 5% Sly SH: gy-dk gy,  
tr cal and fos frags, tr bent,  
bl, even fr yel gn ring, mod  
stn

50% CHK: med gy, occ lt gy, mot, sb  
pty-blky, sft-sl frm, rthy-sb wxy, 30%:  
MRLST: med, dk gy-blk, sb pty-blky, sl  
frm-mod hd, arg-sly tex, mtx; calc, 20%  
SLTY SH: med-dk gy, mod sft-frm, sb  
blky-pty, rthy, mtx; arg-sly, sl cal, tr bent,  
mod stmg bri wh bl, even fr yel gn ring, mod  
stn

45% CHK: med gy, occ lt gy, mot, sb  
pty-blky, sft-sl frm, rthy-sb wxy, 30%:  
MRLST: med, dk gy-blk, sb pty-blky, sl  
frm-mod hd, arg-sly tex, mtx; calc, 25%  
SLTY SH: med-dk gy, mod sft-frm, sb  
blky-pty, rthy, mtx; arg-sly, sl cal, tr bent,  
mod stmg bri wh bl, even fr yel gn ring, mod  
stn

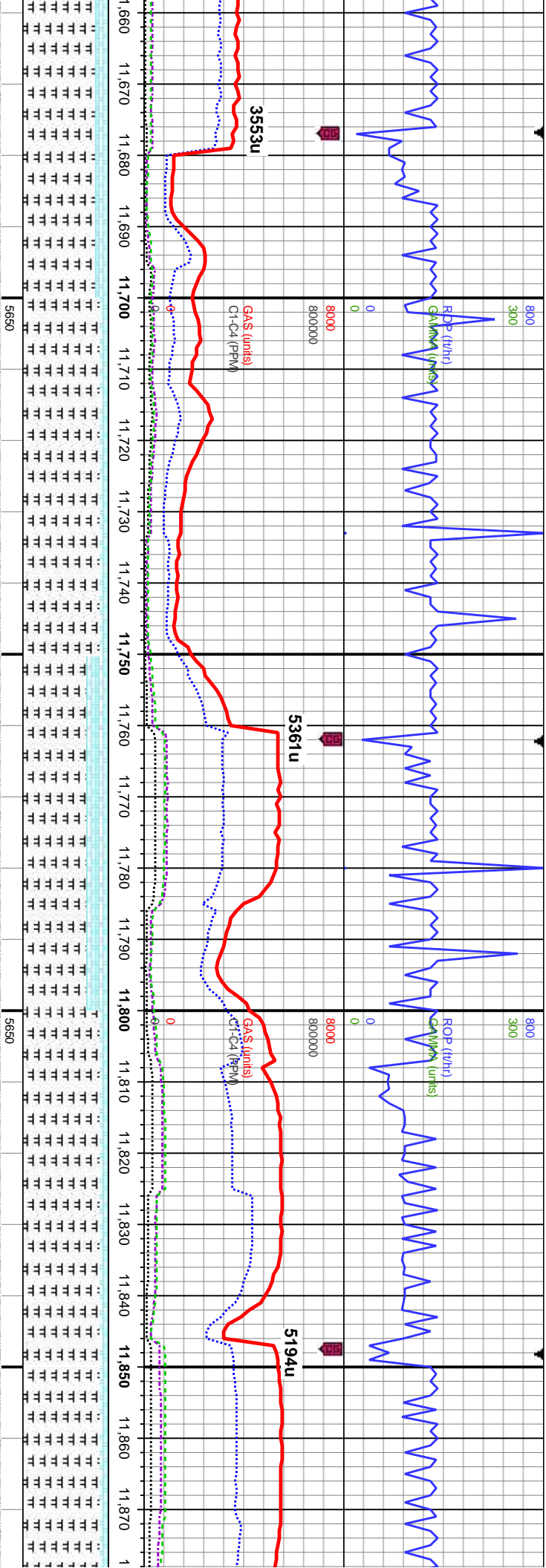
45% CHK: med gy, occ lt gy, mot, sb  
pty-blky, sft-sl frm, rthy-sb wxy, 30%:  
MRLST: med, dk gy-blk, sb pty-blky, sl  
frm-mod hd, arg-sly tex, mtx; calc, 25%  
SLTY SH: med-dk gy, mod sft-frm, sb  
blky-pty, rthy, mtx; arg-sly, sl cal, tr bent,  
mod stmg bri wh bl, even fr yel gn ring, mod  
stn

60%: MRLST: med, dk gy-blk, sb p  
frm-mod hd, arg-sly tex, mtx; calc,  
CHK: med gy, occ lt gy, mot, sb pty  
sft-sl frm, rthy-sb wxy, 15% SLTY S  
med-dk gy, mod sft-frm, sb blky-pty  
mtx; arg-sly, sl cal, scatt bent, moc  
bl, even tr dull mod yel gn ring, fr st









MD: 11,696'  
Inclination: 89.6°  
Azimuth: 268.7°  
TVD: 5,964.02'  
VS: 4,734.04'

TVD (ft)

MRSLT: med, dk gy-blk, sb pily-blky, sl  
hd hd, arg-sily tex, mtx; calc, 15%  
med gy, occ lt gy, mot, sb pily-blky,  
m, rthy-sb wxy, tr bent, mod sting wh  
n fr yel gn ring, tr stn

90%: MRSLT: med, dk gy-blk, sb pily-blky, sl  
frm-mod hd, arg-sily tex, mtx; calc, 10%  
CHK: med gy, occ lt gy, mot, sb pily-blky,  
sft-sl frm, rthy-sb wxy, mod sting wh bl, even  
fr yel gn ring, tr stn

MD: 11,781'  
Inclination: 90.6°  
Azimuth: 268.9°  
TVD: 5,963.87'  
VS: 4,819.03'

TVD (ft)

75%: MRSLT: med, dk gy-blk, sb pily-blky, sl  
frm-mod hd, arg-sily tex, mtx; calc, 25%  
CHK: med gy, occ lt gy, mot, sb pily-blky,  
sft-sl frm, rthy-sb wxy, mod sting wh bl, even  
fr yel gn ring, tr stn

90%: MRSLT: med, dk gy-blk, sb pily-blky, sl  
frm-mod hd, arg-sily tex, mtx; calc, 10%  
CHK: med gy, occ lt gy, mot, sb pily-blky,  
sft-sl frm, rthy-sb wxy, mod sting wh bl, even  
fr yel gn ring, tr stn

90%: MRSLT: med, dk gy-blk, sb pily-blky, sl  
frm-mod hd, arg-sily tex, mtx; calc, 10%  
CHK: med gy, occ lt gy, mot, sb pily-blky,  
sft-sl frm, rthy-sb wxy, mod sting wh bl, even fr yel gn ring, tr stn



