

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name State Seventy Holes F21-J24-4HNB

Location NENW SEC. 4 T4N R62W

State CO

County WELD

Country USA

Rig Number FRONTIER 4

API Number 05-123-39212-00

AFE # 14027

Region DJ BASIN

Field WATTENBERG

Spud Date 1/5/2015

Drilling Completed 1/13/2015

Surface Coordinates 330' FNL x 1384' FWL (LAT: 40.34803, -104.33591)

Bottom Hole Coordinates 470' FSL x 1656' FWL (LAT: 40.33528, -104.33409) PROJECTED

Ground Elevation 4551'

K.B. Elevation 4573'

Logged Interval 5900' To 10965'

Total Depth 10965'

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

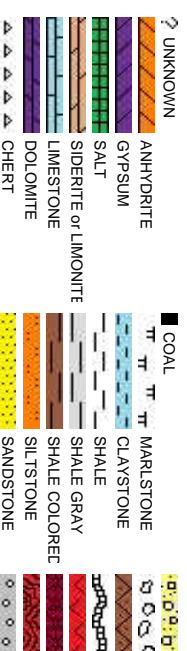
Company Bonanza Creek

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

Zone Color Code



Rock Types



Accessories

Fossils		Stringer	
F FOSSIL	ARGILLACEOUS	GLAUCONITE	
GASTROFOD	ARGILLITE GRAIN	GYPSIFEROUS	
OOLITE	B BENTONITE	HEAVY MINERAL	
AMPHIPORA	BITUMENOUS SUBSTANCE	KAOLIN	ANHYDRITE STRINGER
BELEMNITE	BRECCIA FRAGMENTS	MARLSTONE	BENTONITE STRINGER
BIOCLASTIC	CALCAREOUS	MINERAL CRYSTALS	COAL STRINGER
BRACHIOFOD	CARBONACEOUS FLAKES	NODULES	DOLOMITE STRINGER
PISOLUTE	CHTCK	PHOSPHATE PELLETS	GYPSUM STRINGER
PLANT REMAINS	CHTLT	PYRITE	LIMESTONE STRINGER
CEPHALOPOD	COAL - THIN BEDS	SALT CAST	MARLSTONE (CALC) STRG
CORAL	DOLOMITIC	SANDY	MARLSTONE (DOL) STRG
CRINOID	FELDSPAR	SILTY	SANDSTONE STRINGER
ECHINOID	FERRUGINOUS PELLETT	SILTY	SHALE STRINGER
FISH	FERRUGINOUS	TUFFACEOUS	SILTSTONE STRINGER
FORAMINIFERA	ANHYDRITIC		

Other Symbols

Oil Show		Engineering	
O ORGANIC	FORMATION TOP	NORMAL FAULT	CONNECTION GAS
P PINPOINT	GAS SHOW	OIL SHOW	CONNECTION DOWN
V VUGGY	MINDEPTH MN DEPTH	OVERTURNED STRATA	E EARTHY
EVEN		REVERSE FAULT	CASING
QUESTIONABLE		SIDEWALL CORE (LEFT)	FORMATION TOP
SPOTTED STAINING		SIDEWALL CORE (RIGHT)	CONNECTION GAS
		SLIDE	A ANGULAR
Porosity		Rounding	
E EARTHY	CONNECTION (LEFT)	R ROUNDED	MS MUDSTONE
F FENESTRAL	CONNECTION (RIGHT)	B SUBANG	PS PACKSTONE
F FRACTURE	CONNECTION GAS	P SUBRND	WS WACKESTONE
X INTERCRYSTALLINE	CORE - LOST		
O INTEROOLITIC	CORE - RECOVERED	Textures	
M MOLDIC	DST INTERVAL	SURVEY	M MODERATE
	FAULT	TRIP GAS	P POOR
		WIRELINE TESTED - LEFT	W WELL
		WIRELINE TESTED - RT	
		C CHALKY	

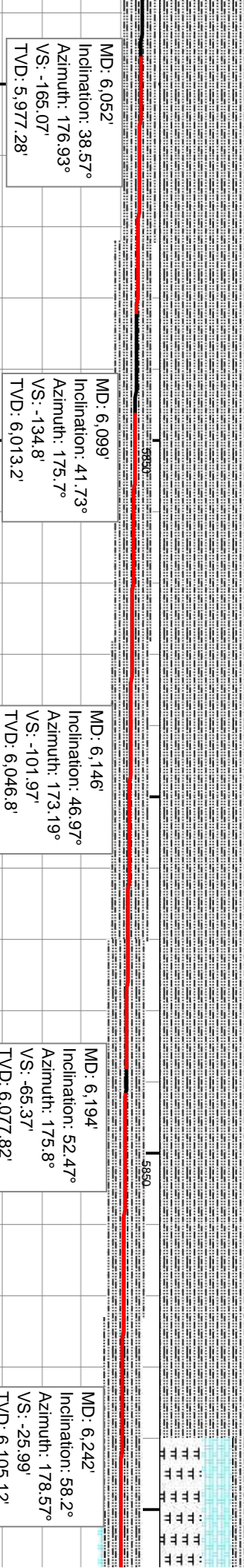
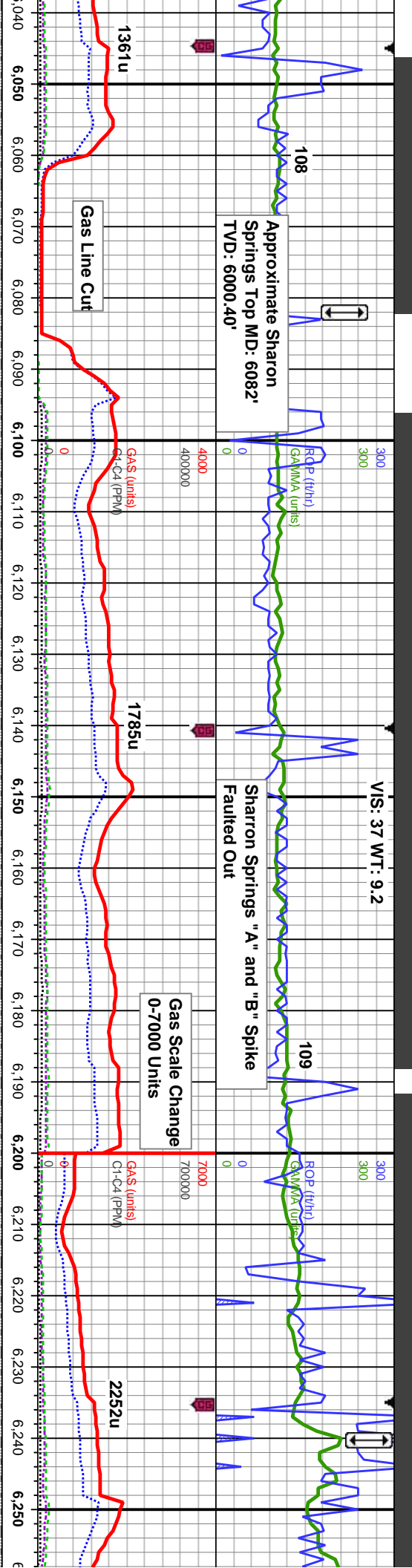
ding

Gas
Pressure
Seal

CONGLOMERATE
BRECCIA
TILL
BENTONITE
TUFF
IGNEOUS
METAMORPHIC
CEMENT

CHALK
SILTY SHALE
NO SAMPLE
SHALY SANDSTONE
SHALY SILTSTONE

CO 80202



MD: 6,052' Inclination: 38.57° Azimuth: 176.93° VS: -165.07' TVD: 5,977.28'	MD: 6,099' Inclination: 41.73° Azimuth: 175.7° VS: -134.8' TVD: 6,013.2'	MD: 6,146' Inclination: 46.97° Azimuth: 173.19° VS: -101.97' TVD: 6,046.8'	MD: 6,194' Inclination: 52.47° Azimuth: 175.8° VS: -65.37' TVD: 6,077.82'	MD: 6,242' Inclination: 58.2° Azimuth: 178.57° VS: -25.99' TVD: 6,105.12'
100% SLTY SH: lt-med gy, some dk gy, mod sft - sl	100% SLTY SH: lt-med gy, some dk gy, mod sft - sl	100% SLTY SH: lt-med gy, some dk gy, mod sft - sl	100% SLTY SH: lt-med gy, some dk gy, mod sft - sl	15-0% SLTY SH
firm, sb blkly-sb pty, occ pty, rthy, mtx; arg-sily, sl	firm, sb blkly-sb pty, occ pty, rthy, mtx; arg-sily, sl calc	firm, sb blkly-sb pty, occ pty, rthy, mtx; arg-sily, sl calc	firm, sb blkly-sb pty, occ pty, rthy, mtx; arg-sily, sl calc	mtx; arg-sily, sc
8500	8500	8500	8500	50-60%: MRLS
				frn-mod hd, arg
				occ wht-crm, mn
				50-60%: MRLS
				frn-mod hd, arg
				occ wht-crm, mn
				15-0% SLTY SH
				mtx; arg-sily, sc
				yel ring, fr stn



240 Niobrara A Chalk Top
6274' MD, 6120' TVD

300
300
ROF (ft/hr)
GAMMA (units)

74
Niobrara A Marl Top
6292' MD, 6128' TVD

278

Tangent Section
6330-6443'

300
300
ROF (ft/hr)
GAMMA (units)

96

Niobrara
6481' MD

6260 6270 6280 6290 6300 6310 6320 6330 6340 6350 6360 6370 6380 6390 6400 6410 6420 6430 6440 6450 6460 6470

7000
700000

7000
700000

GA&S (units)
Cl-Cr (ppm)

GA&S (units)
Cl-Cr (ppm)

4497u

3705u

5850

5850

MD: 6,288'
Inclination: 66°
Azimuth: 178.67°
VS: 14.49'
TVD: 6,126.62'

MD: 6,335'
Inclination: 69.87°
Azimuth: 177.46°
VS: 57.92'
TVD: 6,144.28'

MD: 6,383'
Inclination: 69.9°
Azimuth: 177.09°
VS: 102.91'
TVD: 6,160.78'

MD: 6,430'
Inclination: 69.99°
Azimuth: 177.05°
VS: 146.98'
TVD: 6,176.9'

MD: 6,470'
Inclination: 69.99°
Azimuth: 177.05°
VS: 192.19'
TVD: 6,193.17'

TVD (ft)

TVD (ft)

l: med-dk gy, blk, sb pty-biky, sl
-sly tex, 35-40% CHK: lt gy-med gy,
ot, sb pty-biky, sft-sl frm, rthy-sb wxy,
i: dk gy, mod sft-frm, sb blk-pty, rthy,
att bent, g od, mod string bl wh, mod

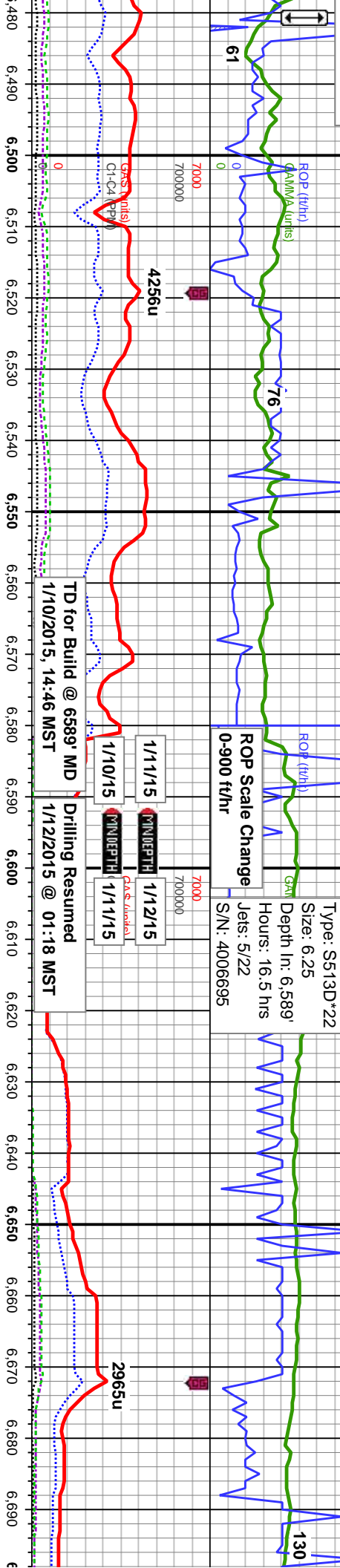
95-100%: MRLST: med-dk gy, blk, sb pty-biky, sl
frm-mod hd, arg-sly tex, 5-0% CHK: lt gy-med gy, occ
wht-crm, mot, sb pty-biky, sft-sl frm, rthy-sb wxy,
some pyr, mky-slow string bl wh, thin-mod yel ring, tr
stin

100-90%: MRLST: med-dk gy, blk, sb pty-biky, sl
frm-mod hd, arg-sly tex, 0-10% CHK: lt gy-med gy,
occ wht-crm, mot, sb pty-biky, sft-sl frm, rthy-sb wxy,
mky-slow string bl wh, thin-mod yel ring, tr stn

75-50%: MRLST: med-dk gy, blk, sb pty-biky, sl
frm-mod hd, arg-sly tex, 25-50% CHK: wht-crm,
lt-med gy, mot, sb pty-biky, sft-mod sft, rthy-sb wxy,
tr-no bent, some uphole con, mod od, mod string bl



ab B Chalk Top
D, 6192' TVD



MD: 6,524'
Inclination: 175.24°
Azimuth: 175.97°
VS: 72'
TVD: 91.24'

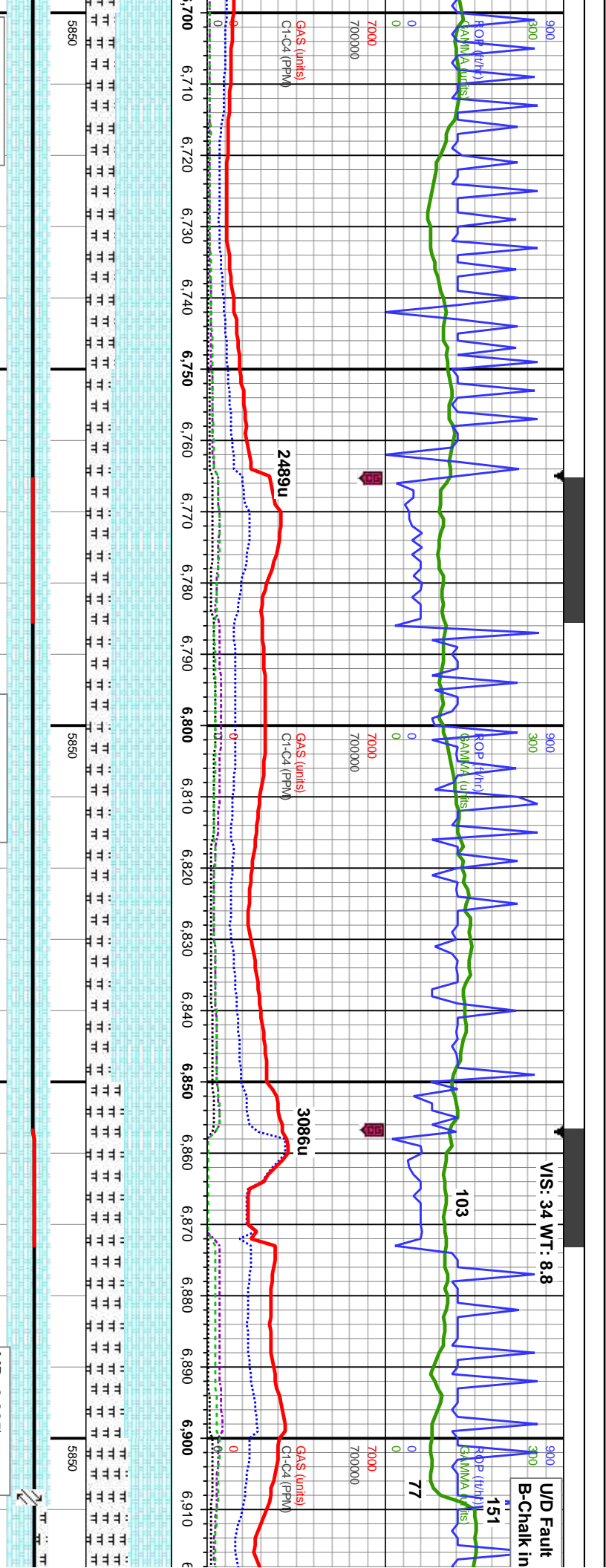
MD: 6,525'
Inclination: 81.28°
Azimuth: 175.52°
VS: 238.69'
TVD: 6,200.8'

MD: 6,547'
Inclination: 83.65°
Azimuth: 175.53°
VS: 260.49'
TVD: 6,203.68'

MD: 6,619'
Inclination: 91.02°
Azimuth: 174.61°
VS: 332.34'
TVD: 6,207.03'

65-70% CHK: lt-med gy, wht-crm, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, occ imbd cal, 35-30%: MRLST: med-dk gy, blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, g od, mod-fast stmg bl wh, mod-thick yel ring, mod stn	8500
80-70% CHK: lt-med gy, wht-crm, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, 20-30%: MRLST: med-dk gy, blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, mod od, mod-fast stmg bl wh, mod-thick yel ring, mod stn	
40-65% CHK: med-dk gy, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, occ imbd cal, 30-35%: MRLST: dk gy-blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, 30% Cement, mky frt wh bl, even v thn dull wh yel ring, sl tr yel brn stn	
60% CHK: med-dk gy, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, occ imbd cal, 40%: MRLST: dk gy-blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, mky frt wh bl, even v thn dull wh yel ring, sl tr yel brn stn	

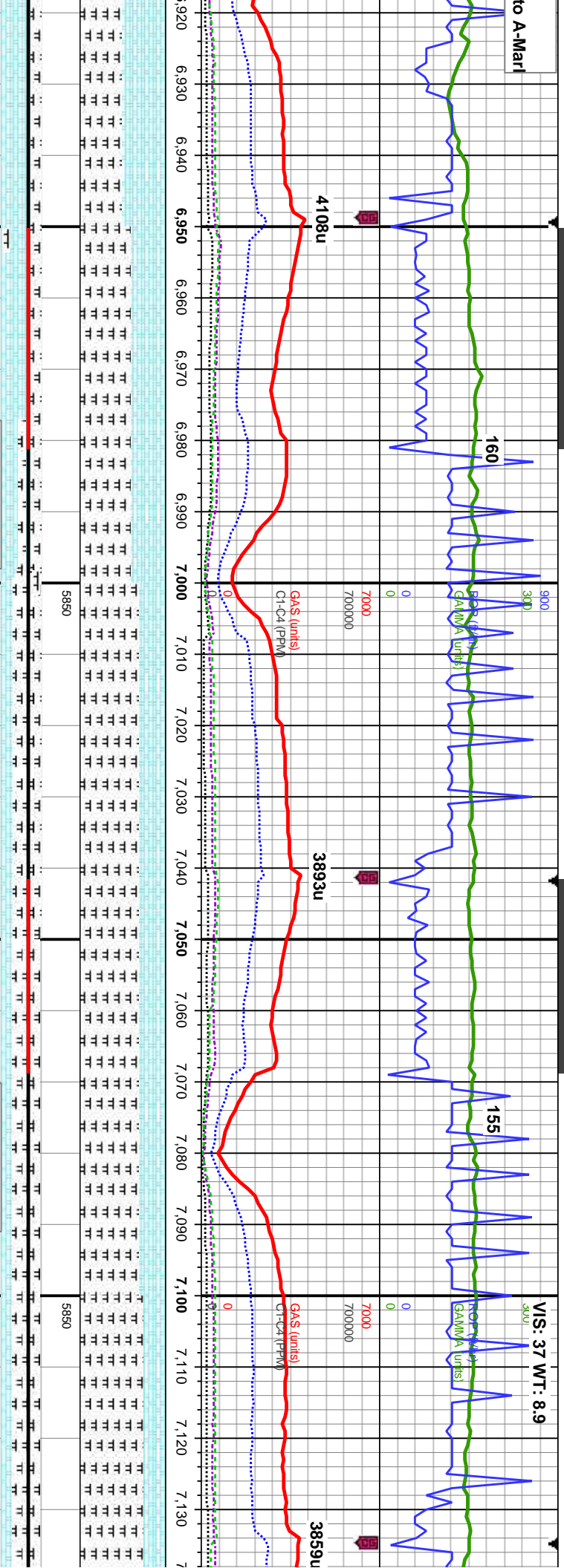




65% CHK: med-dk gy, mot, sb pty-biky, sft-si frm, rthy-sb wxy, occ imbd cal, 35%: MRLST: dk gy-blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, mod od: slow stmg bri wh bl, even v thn dull wh yel ring, sl tr yel brn stn	70% CHK: med-dk gy, mot, sb pty-biky, sft-si frm, rthy-sb wxy, 30%: MRLST: dk gy-blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, tr cal frags, mod od: slow stmg bri wh bl, even v thn dull wh yel ring, sl tr yel brn stn	70% CHK: med-dk gy, mot, sb pty-biky, sft-si frm, rthy-sb wxy, 30%: MRLST: dk gy-blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, tr cal frags, mod od: mod-fast stmg bri wh bl, even v thn dull wh yel ring, sl tr yel brn stn	55% CHK: med-dk gy, mot, sb pty-biky, sft-si frm, rthy-sb wxy, 45%: MRLST: dk gy-blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, tr cal frags, mod od: mod-fast stmg bri wh bl, even v thn dull wh yel ring, sl tr yel brn stn	50% CHK: med-dk gy, mot, sb pty-biky, sft-si frm, rthy-sb wxy, 45%: MRLST: dk gy-blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, tr cal frags, mod od: mod-fast stmg bri wh bl, even v thn dull wh yel ring, sl tr yel brn stn
--	--	--	--	--



to A-Marl



MD: 6,986'
Inclination: 91.17°
Azimuth: 177.26°
VS: 698.99'
TVD: 6,197.68'

TVD (ft)

dk gy, mot, sb pty-blky, wxy, 50%: MRLST: dk pty-blky, sl frm-mod hd, arg-sily tex, mtx, calc, 40% CHK: med-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, tr cal frags; fast stmg bri wh bl, even v thn dull wh yel ring, mod

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

70%: MRLST: dk gy-blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx, calc, 30% CHK: med-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, tr cal frags; fast stmg bri wh bl, even thn fnt wh yel ring, v thn yel brn

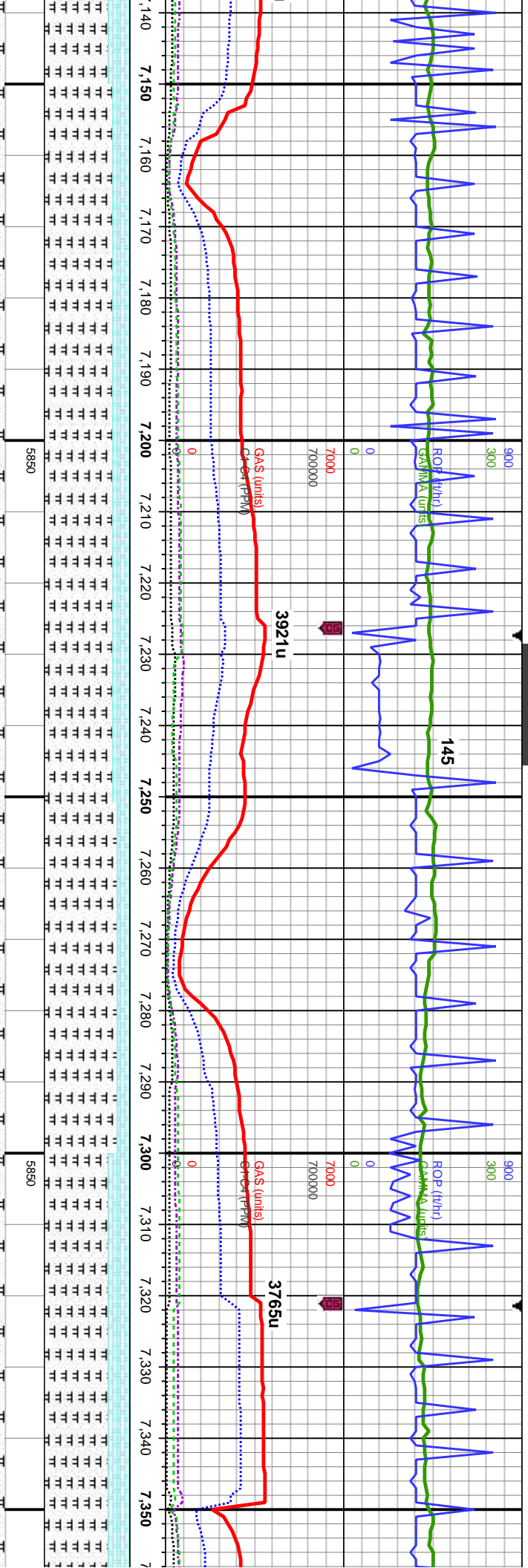
70%: MRLST: dk gy-blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx, calc, 30% CHK: med-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, tr cal frags; fast stmg bri wh bl, even thn fnt wh yel ring, v thn yel brn

75%: MRLST: dk gy-blk, sb pty-blky, sl frm-mod hd, arg-sily tex, mtx, calc, 30% CHK: med-dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, tr cal frags; fast stmg bri wh bl, even thn fnt wh yel ring, v thn

MD: 7,078'
Inclination: 89.42°
Azimuth: 177.11°
VS: 790.82'
TVD: 6,197.21'

TVD (ft)





5860

5860

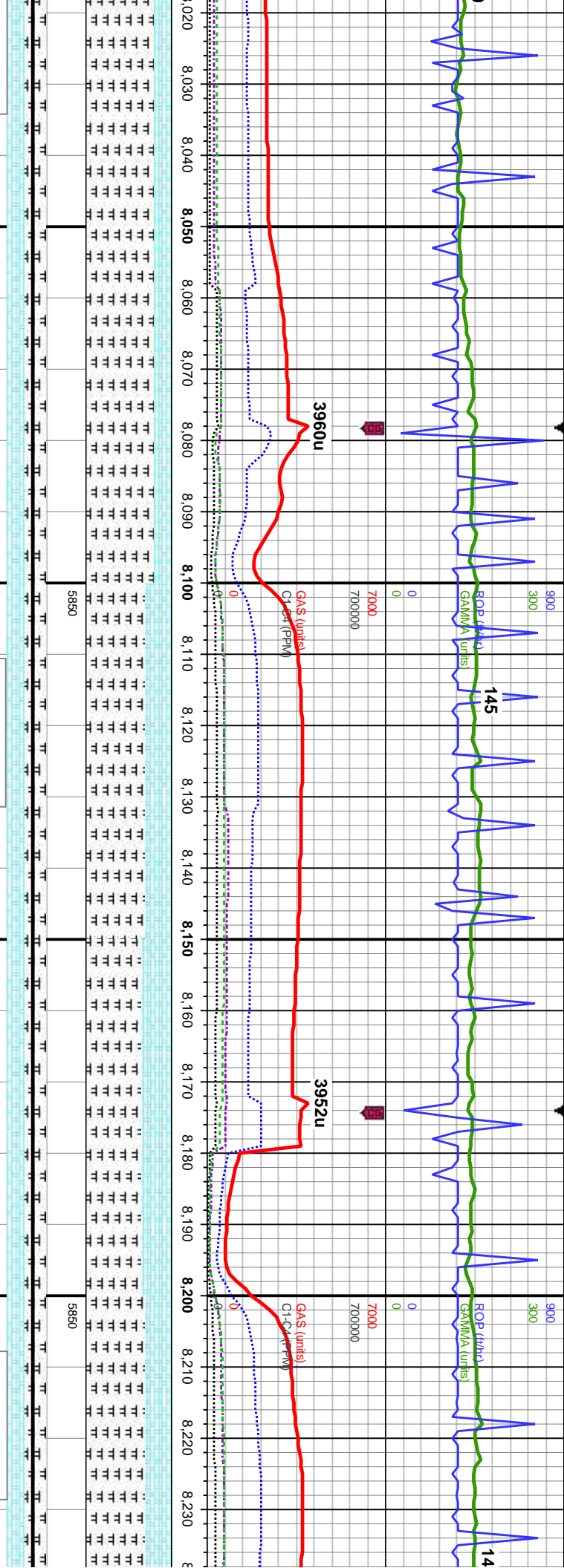
MD: 7,170'
Inclination: 90.25°
Azimuth: 176.75°
VS: 882.68'
TVD: 6,197.47'

MD: 7,266'
Inclination: 88.95°
Azimuth: 176.95°
VS: 978.53'
TVD: 6,198.14'

MD: 7,350'
Inclination: 88.95°
Azimuth: 176.95°
VS: 978.53'
TVD: 6,198.14'

80%: MRLST: dk gy-blk, sb pty-blky, sl	80%: MRLST: dk gy-blk, sb pty-blky, sl	85%: MRLST: dk gy-blk, sb pty-blky, sl	75%: MRLST: dk gy-blk, sb pty-blky, sl	75%: MRLST: dk gy-blk, sb pty-blky, sl
frm-mod hd, arg-sily tex, mtx; calc, 20%	frm-mod hd, arg-sily tex, mtx; calc, 20%	frm-mod hd, arg-sily tex, mtx; calc, 15%	frm-mod hd, arg-sily tex, mtx; calc, 25%	frm-mod hd, arg-sily tex, mtx; calc, 25%
CHK: med-dk gy, mot, sb pty-blky, sft-sl	CHK: med-dk gy, mot, sb pty-blky, sft-sl	CHK: med-dk gy, mot, sb pty-blky, sft-sl	CHK: med-dk gy, mot, sb pty-blky, sft-sl	CHK: med-dk gy, mot, sb pty-blky, sft-sl
frm, rthy-sb wxy, tr cal frags; fast stmg bri	frm, rthy-sb wxy, tr cal frags; fast stmg bri	frm, rthy-sb wxy, tr cal frags; fast stmg bri	frm, rthy-sb wxy, tr cal frags; fast stmg bri	frm, rthy-sb wxy, tr cal frags; fast stmg bri
wh bl, even thn fnt wh yel ring, v thn yel brn	wh bl, even thn fnt wh yel ring, thn yel brn stn	wh bl, even thn fnt wh yel ring, thn yel brn stn	wh bl, even thn fnt wh yel ring, thn yel brn stn	wh bl, even thn fnt wh yel ring, thn yel brn stn
stn	stn	stn	stn	stn





MD: 8,024'	
Inclination: 88.8°	
Azimuth: 177.97°	
VS: 1,735.21'	
TVD: 6,204.37'	

80%: MRLST: dk gy-blk, sb pty-blky, sl	
frm-mod hd, arg-sily tex, mtx: calc, 20%	
CHK: med-dk gy, occ lt gy, mot, sb pty-blky,	
sft-sl frm, rthy-sb wxy, mky bri wh bl, even thn	
mod yel ring, tr sin	

MD: 8,120'	
Inclination: 88.95°	
Azimuth: 177.52°	
VS: 1,830.96'	
TVD: 6,206.26'	

70%: MRLST: dk gy-blk, sb pty-blky, sl	
frm-mod hd, arg-sily tex, mtx: calc, 30%	
CHK: med-dk gy, occ lt gy, mot, sb pty-blky,	
sft-sl frm, rthy-sb wxy, tr fos frags, some pyr,	
mod stmg bri wh bl, even thn mod yel ring, tr	
stin	

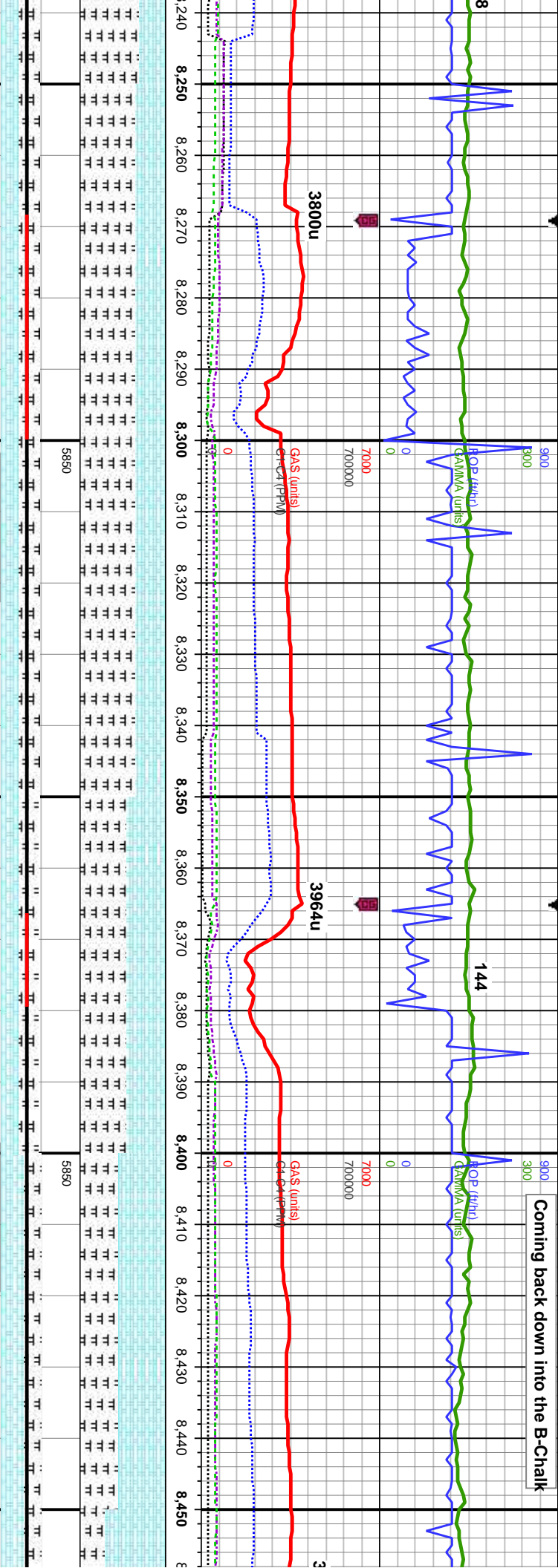
65%: MRLST: dk gy-blk, sb pty-blky, sl	
frm-mod hd, arg-sily tex, mtx: calc, 35%	
CHK: med-dk gy, occ lt gy, mot, sb pty-blky,	
sft-sl frm, rthy-sb wxy, tr fos frags, some pyr,	
mod stmg bri wh bl, even thn mod yel ring, tr	
stin	

MD: 8,216'	
Inclination: 91.02°	
Azimuth: 177.92°	
VS: 1,926.73'	
TVD: 6,206.28'	

70%: MRLST: dk gy-blk, sb pty-blky,	
frm-mod hd, arg-sily tex, mtx: calc,	
CHK: med-dk gy, occ lt gy, mot, sb	
sft-sl frm, rthy-sb wxy, tr fos frags, tr	
bri wh bl, even thn mod wh yel ring,	

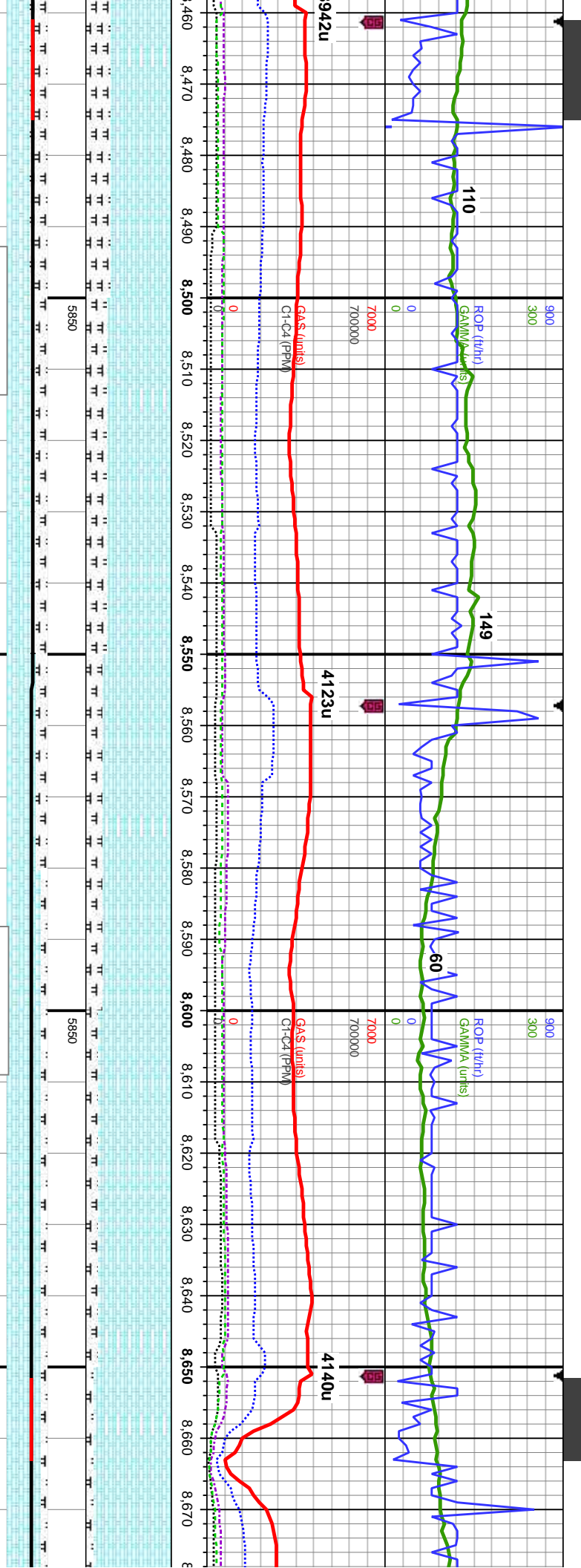


Coming back down into the B-Chalk



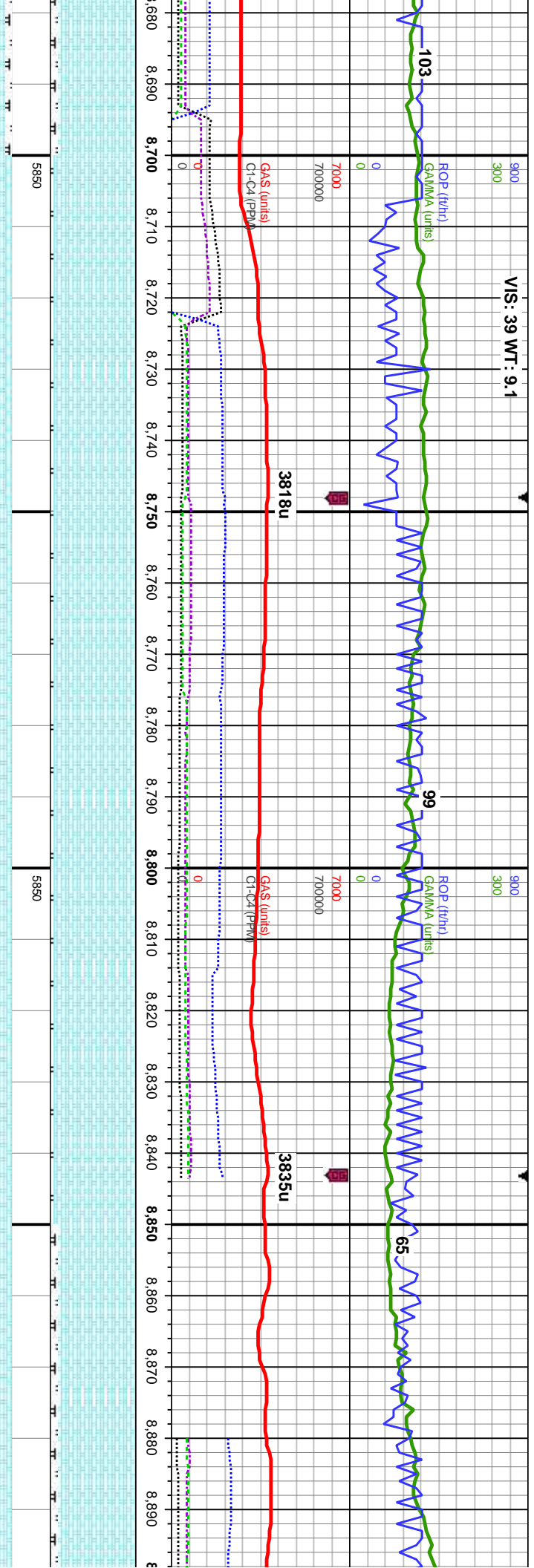
MD: 8,311' Inclination: 89.08° Azimuth: 176.68° VS: 2,021.54' TVD: 6,206.2'		65%: MRLST: dk gy-blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx, calc, 35% CHK: med-dk gy, occ lt gy, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, tr fos frags, some pyr; mky bri wh bl, even thn mod wh yel ring, tr stn	65%: MRLST: dk gy-blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx, calc, 35% CHK: med-dk gy, occ lt gy, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, tr fos frags, tr pyr; mod stmg bri wh bl, even mod thk bri wh yel ring, mod stn	55%: MRLST: dk gy-blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx, calc, 45% CHK: lt-med, occ dk gy, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, tr fos frags, mod od; mod stmg bri wh bl, even mod thk bri wh yel ring, mod stn	MD: 8,407' Inclination: 89.05° Azimuth: 176.1° VS: 2,117.43' TVD: 6,207.77'	55% CHK: lt-med gy, occ dk gy, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, occ imbd cal, 45%: MRLST: dk gy-blk, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx, calc; mod-fast stmg bri wh bl, even thin dull wh yel ring, mod stn	70% C pty-blk 30%: N frm-mc mod-fast yel ring
---	--	--	--	---	---	---	--

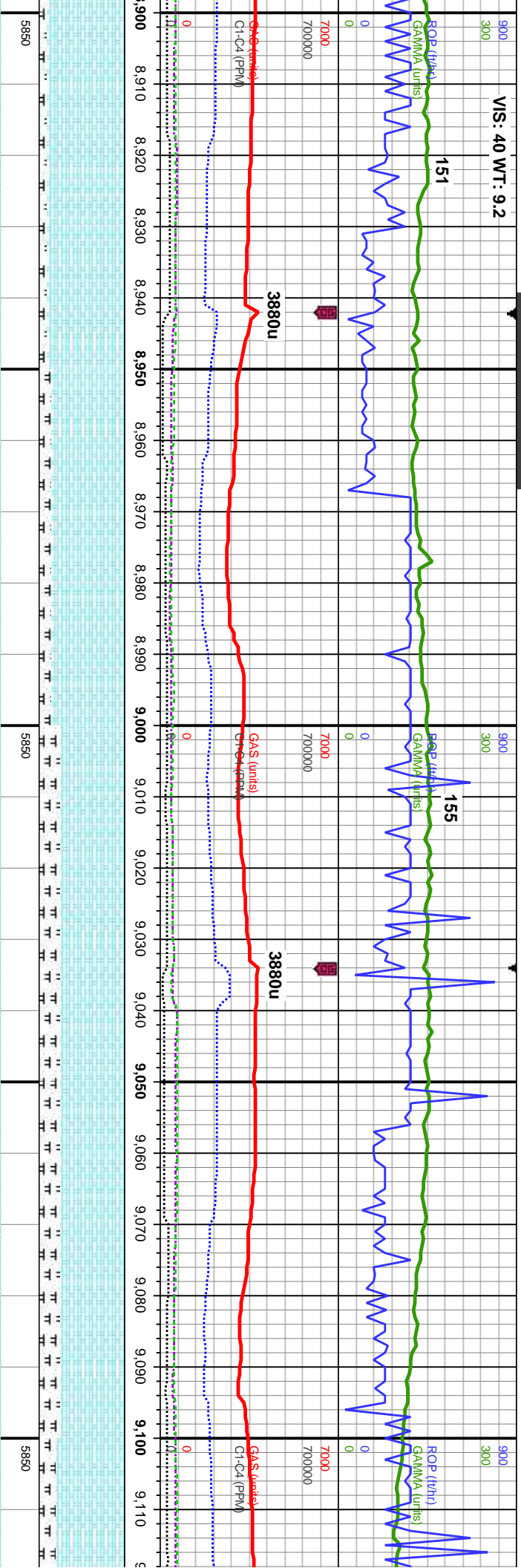




MD: 8,502' Inclination: 88.34° Azimuth: 176.42° VS: 2,212.32' TVD: 6,209.93'		MD: 8,597' Inclination: 88.52° Azimuth: 176.36° VS: 2,307.18' TVD: 6,212.53'	
HK: lt-med gy, occ dk gy, mot, sb y, sft-sl frm, rthy-sb wxy, occ imbd cal, MRLST: dk gy-blk, sb pty-blky, sl hd, arg-sly tex, mtx: calc, g od; stmg bri wh bl, even thin dull wh j, mod stn		75% CHK: lt-med gy, occ dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 25%: MRLST: dk gy-blk, sb pty-blky, sl frm-mod hd, arg-sly tex, mtx: calc, g od; fast stmg bri wh bl, even thin dull wh yel ring, mod stn	
80% CHK: lt-med gy, occ wht-crm, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 20%: MRLST: dk gy-blk, sb pty-blky, sl frm-mod hd, arg-sly tex, mtx: calc, g od; fast stmg bri wh bl, even thin dull wh yel ring, mod stn		85% CHK: wht-crm, lt-med gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 15%: MRLST: dk gy-blk, sb pty-blky, sl frm-mod hd, arg-sly tex, mtx: calc, g od; slow-mod stmg bri wh bl, even mod thk bri yel amb ring, thk stn	
90% CHK: wht-crm, lt-me pty-blky, sft-sl frm, rthy-sb MRLST: dk gy-blk, sb pty hd, arg-sly tex, mtx: calc; stmg bri wh bl, even mod ring, thk stn			

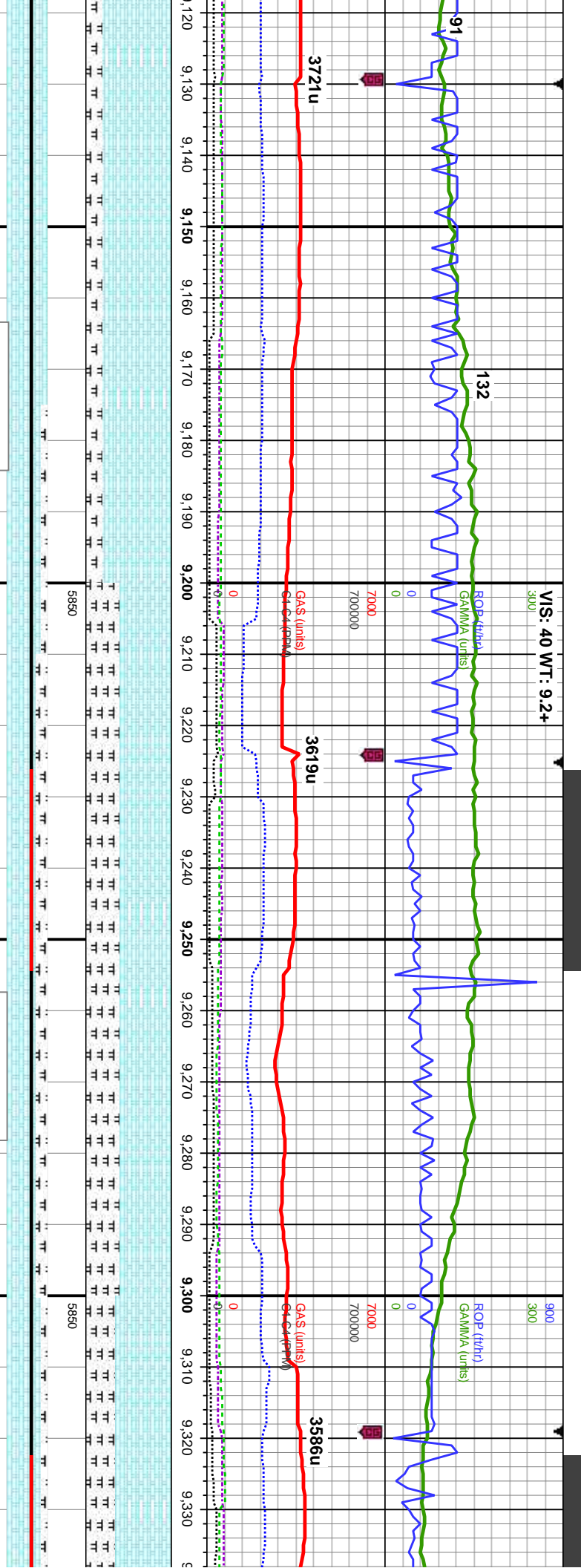


[illegible]



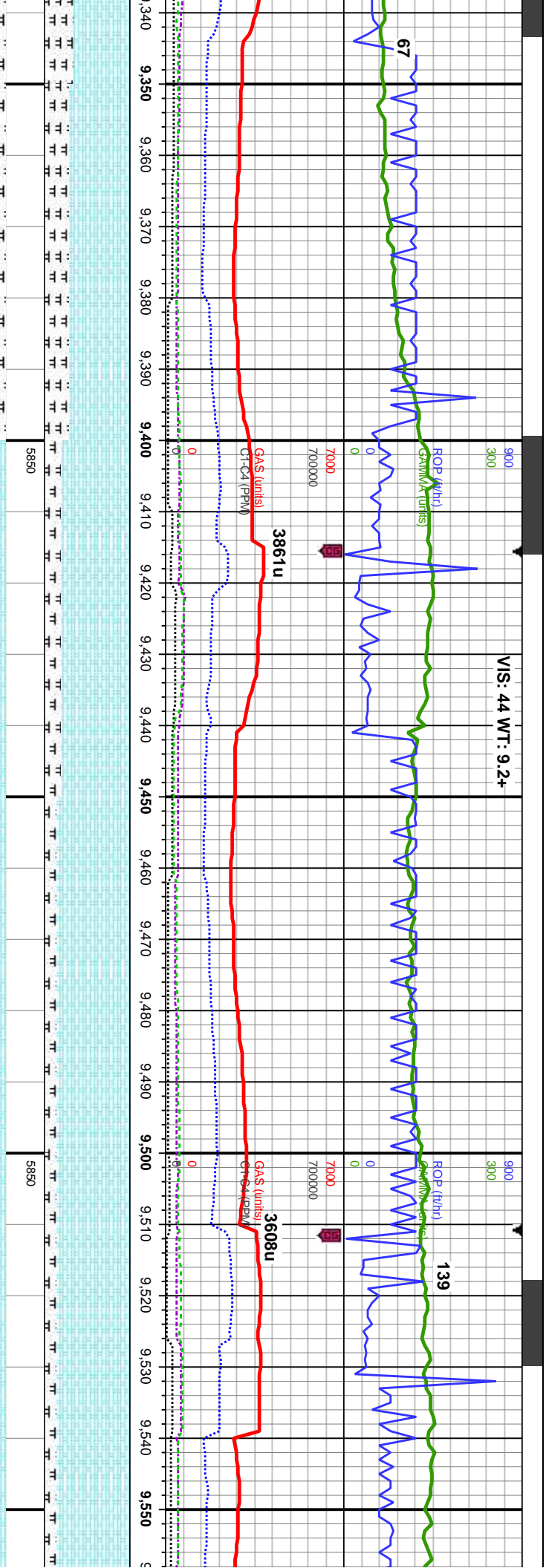
MD: 8,979' Inclination: 89.18° Azimuth: 177.37° VS: 2,688.76' TVD: 6,212.42'		MD: 9,075' Inclination: 89.08° Azimuth: 176.73° VS: 2,784.6' TVD: 6,213.87'	
90% CHK: lt-med gy, occ dk gy, mot, sb pily-biky, sft-sl frm, rthy-sb wxy, 10%: MRLST: dk gy-bik, sb pily-biky, sl frm-mod hd, arg-sily tex, mtx: calc, mod chk flor, g od; slow-mod string bri wh bl, even thk bri wh gn ring, thk stn	85% CHK: lt-med gy, occ dk gy, mot, sb pily-biky, sft-sl frm, rthy-sb wxy, 15%: MRLST: dk gy-bik, sb pily-biky, sl frm-mod hd, arg-sily tex, mtx: calc, mod chk flor, g od; slow-mod string bri wh bl, even thk bri wh gn ring, thk stn	75% CHK: lt-med gy, occ dk gy, mot, sb pily-biky, sft-sl frm, rthy-sb wxy, 25%: MRLST: dk gy-bik, sb pily-biky, sl frm-mod hd, arg-sily tex, mtx: calc, mod chk flor, g od; mky bri wh bl, even thk bri wh gn ring, thk stn	75% CHK: lt-med gy, occ dk gy, mot, sb pily-biky, sft-sl frm, rthy-sb wxy, 25%: MRLST: dk gy-bik, sb pily-biky, sl frm-mod hd, arg-sily tex, mtx: calc, scat bent, g od; mky bri wh bl, even thk bri wh gn ring, thk stn
TVD (ft)	TVD (ft)	TVD (ft)	TVD (ft)





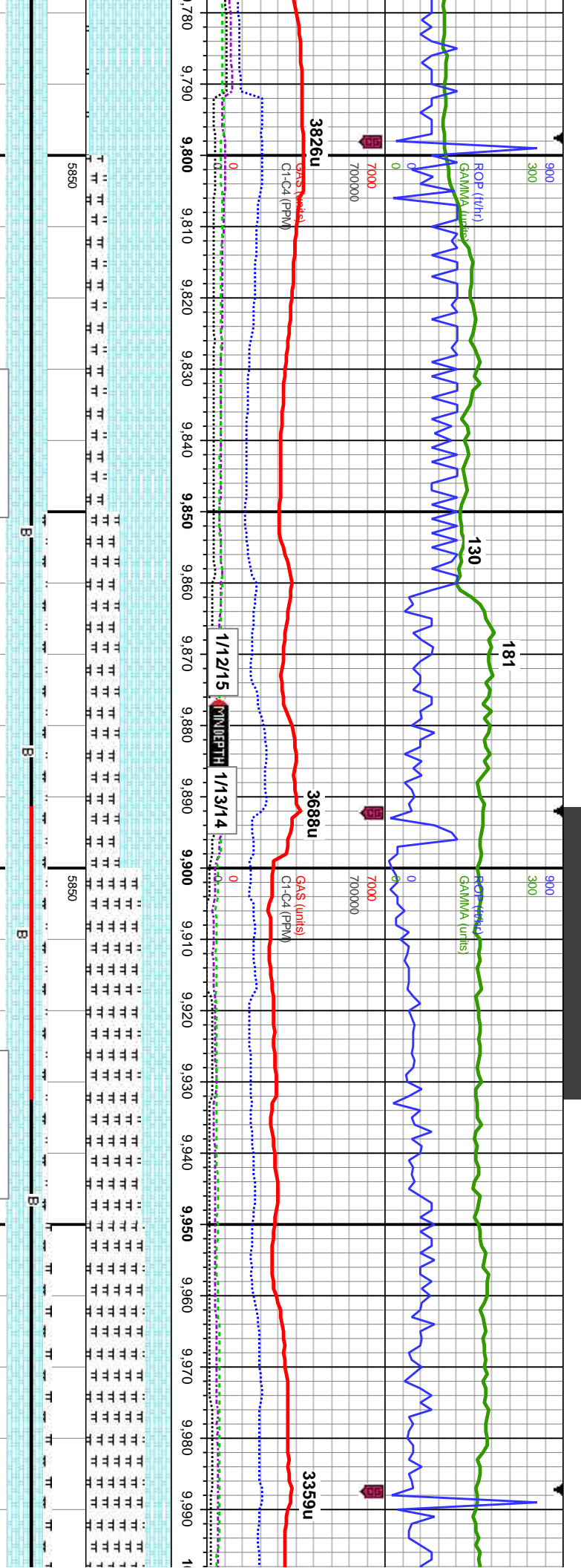
MD: 9,171' Inclination: 90.49° Azimuth: 176.88° VS: 2,880.46' TVD: 6,214.23'		MD: 9,266' Inclination: 88.43° Azimuth: 177.57° VS: 2,975.27' TVD: 6,215.13'	
80% CHK: lt-med gy, occ dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 20%: MRLST: dk gy-blk, sb pty-blky, sl frm-mod hd, arg-sly tex, mtx; calc, scatt bent, mod od; mod sting bri wh bl, even mod thk mod wh gn ring, thk str	60% CHK: med gy, occ dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 40%: MRLST: dk gy-blk, sb pty-blky, sl frm-mod hd, arg-sly tex, mtx; calc, scatt bent, cal frags, mod od; mod-fast sting bri wh bl, even thn fnt yel amb ring, mod str	60% CHK: med gy, occ dk gy, mot, sb pty-blky, sft-sl frm, rthy-sb wxy, 40%: MRLST: dk gy-blk, sb pty-blky, sl frm-mod hd, arg-sly tex, mtx; calc, scatt bent, cal frags, mod od; mod-fast sting bri wh bl, even thn fnt yel amb ring, mod str	65% CHK: med gy, occ dk gy, mot, pty-blky, sft-sl frm, rthy-sb wxy, 35%: MRLST: dk gy-blk, sb pty-blky, sl frm-mod hd, arg-sly tex, mtx; calc, scatt bent frags, mod od; mod-fast sting bri wh even mod thk mod grn wh ring, moc
TVD (ft)		TVD (ft)	





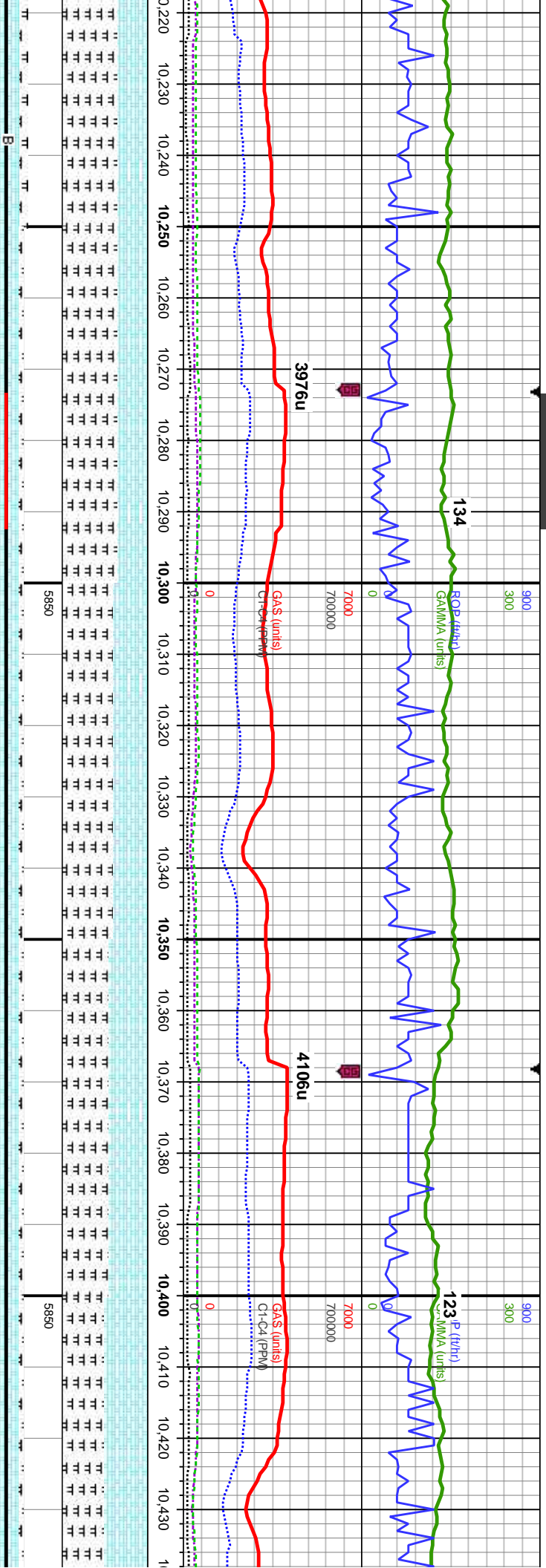
MD: 9,361' Inclination: 90.4° Azimuth: 177.11° VS: 3,070.08' TVD: 6,216.1'		MD: 9,457' Inclination: 90.22° Azimuth: 178.03° VS: 3,165.87' TVD: 6,215.58'		MD: 9,552' Inclination: 8 Azimuth: 17 VS: 3,260.7' TVD: 6,215:	
70% CHK: lt-med gy, occ dk gy, mot, sb	80% CHK: lt-med gy, occ dk gy, mot, sb	85% CHK: lt-med gy, occ dk gy, mot, sb	85% CHK: lt-med gy, occ dk gy, mot, sb	85% CHK: lt-med gy, occ dk gy, mot, sb	85% CHK: lt-med gy, occ dk gy, mot, sb
ply-blky, sft-sl frm, rthy-sb wxy, 30%:	ply-blky, sft-sl frm, rthy-sb wxy, 20%:	ply-blky, sft-sl frm, rthy-sb wxy, 15%:	ply-blky, sft-sl frm, rthy-sb wxy, 15%:	ply-blky, sft-sl frm, rthy-sb wxy, 15%:	ply-blky, sft-sl frm, rthy-sb wxy, 15%:
MRLST: dk gy-blk, sb ply-blky, sl frm-mod	MRLST: dk gy-blk, sb ply-blky, sl frm-mod	MRLST: dk gy-blk, sb ply-blky, sl frm-mod	MRLST: dk gy-blk, sb ply-blky, sl frm-mod	MRLST: dk gy-blk, sb ply-blky, sl frm-mod	MRLST: dk gy-blk, sb ply-blky, sl frm-mod
hd, arg-sily tex, mtx: calc, scatt bent, cal	hd, arg-sily tex, mtx: calc, mod chk flor, g od:	hd, arg-sily tex, mtx: calc, mod chk flor, g od:	hd, arg-sily tex, mtx: calc, mod chk flor, g od:	hd, arg-sily tex, mtx: calc, g od: fast stmg bri	hd, arg-sily tex, mtx: calc, g od: fast stmg bri
frags, mod od: mod-fast stmg bri wh bl,	fast stmg bri wh bl, even mod thk mod grn	fast stmg bri wh bl, even mod thk mod grn	fast stmg bri wh bl, even mod thk mod grn	fast stmg bri wh bl, even thk bri grn wh ring, thk stn	fast stmg bri wh bl, even thk bri grn wh ring, thk stn
even mod thk mod grn wh ring, mod stn	wh ring, mod stn	wh ring, mod stn	wh ring, mod stn	wh ring, mod stn	wh ring, mod stn





MD: 9,838' Inclination: 90.49° Azimuth: 177.28° VS: 3,546.32' TVD: 6,218.74'		MD: 9,933' Inclination: 89.35° Azimuth: 176.59° VS: 3,641.18' TVD: 6,218.87'	
75% CHK: lt-med gy, occ dk gy, mot, sb ply-blky, sft-sl frm, rthy-sb wxy, tr cal incl 25%: MRLST: dk gy-blk, sb ply-blky, sl frm-mod hd, arg-slty tex, mtx: calc, mod od, mod-fast stmg bri wh bl, even mod thk mod grn wh ring, mod stn	60% CHK: med gy, occ dk gy, mot, sb ply-blky, sft-sl frm, rthy-sb wxy, tr cal incl 40%: MRLST: dk gy-blk, sb ply-blky, sl frm-mod hd, arg-slty tex, mtx: calc, abnt bent, tr cal frags, mod od, mod-fast stmg bri wh bl, even mod thk mod grn wh ring, mod stn	65%: MRLST: dk gy-blk, sb ply-blky, sl frm-mod hd, arg-slty tex, mtx: calc 35% CHK: med gy, occ dk gy, mot, sb ply-blky, sft-sl frm, rthy-sb wxy, tr cal incl, scatt bent, tr cal frags, mod od, mod stmg bri wh bl, even mod yel-wht ring, fr sin	75%: MRLST: dk gy-blk, sb ply-blky, sl frm-mod hd, arg-slty tex, mtx: calc 25% CHK: med gy, occ dk gy, mot, sb ply-blky, sft-sl frm, rthy-sb wxy, tr cal incl, scatt bent, cal frags, mod od, mod stmg bri wh bl, even mod yel-wht ring, fr stn

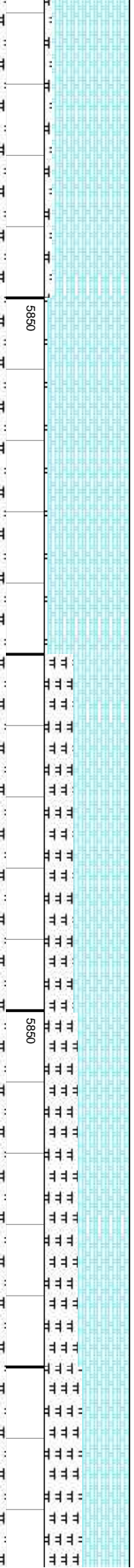
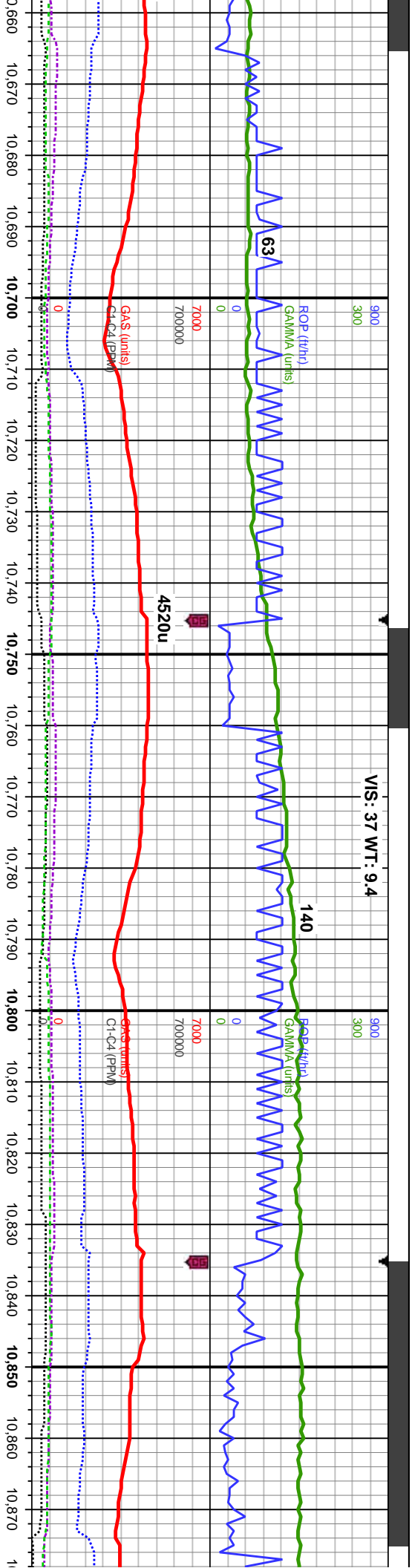




218'	MD: 10,314'	MD: 10,409'
Direction: 90.8°	Inclination: 89.78°	Inclination: 89.57°
True: 177.97°	Azimuth: 177.8°	Azimuth: 177.43°
25.82'	VS: 4,021.57'	VS: 4,116.36'
2221.83'	TVD: 6,221.34'	TVD: 6,221.88'

dk gy-blk, sb pty-blky, sl	65%: MRLST: dk gy-blk, sb pty-blky, sl	60%: MRLST: dk gy-blk, sb pty-blky, sl	55%: MRLST: dk gy-blk, sb pty-blky, sl	50%: MRLST: dk gy-blk, sb pty-blk
stly tex, mix; calc 35%	frm-mod hd, arg-sily tex, mix; calc 35%	frm-mod hd, arg-sily tex, mix; calc 40%	frm-mod hd, arg-sily tex, mix; calc 45%	frm-mod hd, arg-sily tex, mix; calc :
occ dk gy, mot, sb pty-blky,	CHK: med gy, occ dk gy, mot, sb pty-blky,	CHK: med gy, occ dk gy, mot, sb pty-blky,	CHK: med gy, occ dk gy, mot, sb pty-blky,	CHK: med gy, occ dk gy, mot, sb p
mod od, mod stmg bri wh bl, even mod	sft-sl frm, rthy-sb wxy, tr bent, tr cal frags,	sft-sl frm, rthy-sb wxy, tr cal frags, mod od,	sft-sl frm, rthy-sb wxy, tr cal frags, mod od,	sft-sl frm, rthy-sb wxy, tr cal frags, r
mod od, mod stmg bri wh bl, even mod	mod od, mod stmg bri wh bl, even mod	mod stmg bri wh bl, even mod yel-wht ring,	mod stmg bri wh bl, even mod yel-wht ring,	mod stmg bri wh bl, even mod yel-w
mod od, mod stmg bri wh bl, even mod	mod od, mod stmg bri wh bl, even mod	mod stn	mod stn	fr stn





MD: 10,695'
Inclination: 90.22°
Azimuth: 176.84°
VS: 4,401.79'
TVD: 6,222.41'

CHK: lt-med gy, wht-crm, mot, sb	95% CHK: wht-crm, lt gy, occ med gy, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, occ cal incl 5%: MRLST: dk gy-bik, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, g od, fast strng bri wh bl, even mod-thk yel-wht ring, mod str
95% CHK: wht-crm, lt gy, occ med gy, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, occ cal incl 5%: MRLST: dk gy-bik, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, g od, fast strng bri wh bl, even mod-thk yel-wht ring, mod str	65% CHK: med-dk gy, occ dk gy-brn, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, occ cal incl 35%: MRLST: dk gy-bik, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, tr foss frags, some bent, mod od, fast strng bri wh bl, even mod-thk yel-wht ring, mod str
60% CHK: med-dk gy, occ dk gy-brn, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, occ cal incl 40%: MRLST: dk gy-bik, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, tr foss frags, some bent, mod od, mod strng bri wh bl, even mod yel-wht ring, fr str	55% CHK: med-dk gy, occ dk gy-brn, mot, sb pty-biky, sft-sl frm, rthy-sb wxy, occ cal incl 45%: MRLST: dk gy-bik, sb pty-biky, sl frm-mod hd, arg-sily tex, mtx: calc, g od, bent, mod od, mod strng bri wh bl, even mod yel-wht ring, fr str

MD: 10,791'
Inclination: 90.49°
Azimuth: 178.33°
VS: 4,497.57'
TVD: 6,221.82'

