



Scale: 5" / 100'
Measured Depth Log

Well Name Cutthroat LC28-77HNB(HORZ)

Location SESW SEC 28, T9N, R59W

State COLORADO County WELD

Country USA Rig Number H&P 326

API Number 05-123-38851 Field WILDCAT

Region DJ BASIN Drilling Completed 9/1/2014

Spud Date 8/28/2014

Surface Coordinates 340 FSL, 1468 FWL
40.71499/-103.9871

Bottom Hole Coordinates 675 FFNLL, 1320FFWLL

Ground Elevation 4853' K.B. Elevation 4883'

Logged Interval 5550' To 10368' Total Depth 10368'

Formation NIOBRARA B MARL

Type of Drilling Fluid LSND

Operator

Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202

Geologist

Name EVAN HOWELL

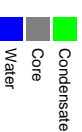
Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202




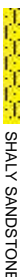

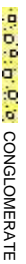

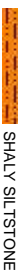



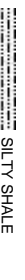










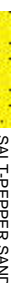





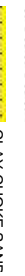
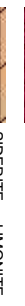




Other

COLUMBINE LOGGING INC. MATT HOPKINS
COLLIN METZ



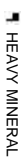


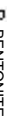






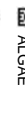
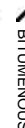
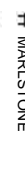
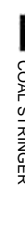

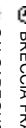

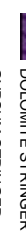
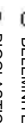

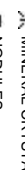
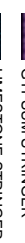
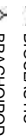
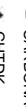

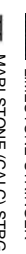
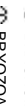
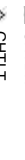


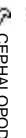

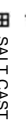



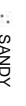
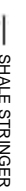
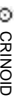
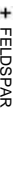


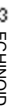





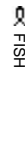
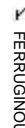




Zone Color Coding



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 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
 BELEMNITE	 P PELECYPOD	 C 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
 V VUGGY

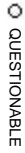
Engineering




D DEAD




EVEN




QUESTIONABLE



BIT



SPOTTED STAINING








































CONNECTION (UP)

Engineering

Porosity

 C CONNECTION (DOW)	 CG CONNECTION GAS	 E EARTHY	 CG CONNECTION GAS
 F FENESTRAL	 TG TRIP GAS	 F FRACTURE	 TLG TRIP GAS (LEFT)
 IC INTERCRYSTALLINE	 DTG DOWN TIME GAS	 IO INTEROOLITIC	 DTG DOWN TIME GAS
 M MOLDIC	 CL CORE - LOST	 O ORGANIC	 CR 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		MN DEPTH		L LITHOGRAPHIC
	OIL SHOW				MX MICROXLN
	MN DEPTH UP	Rounding			
					MS MUDSTONE
	MN DEPTH (DOWN)		ANGULAR		PS PACKSTONE
	NORMAL FAULT		ROUNDED		WS WACKESTONE
	OVERTURNED STRATA		SUBANG		
	REVERSE FAULT		SUBRND	Sorting	
	CASING				M MODERATE
Textures					
	SIDEWALL CORE (LEFT)				P POOR
	SIDEWALL CORE (RIGHT)		BS BOUNDSTONE		W WELL
	SLIDE		CHALKY		
	SURVEY		CX CRYPTOXLN		

Slide/Rotate

ROP

ROP

Total Gas & Chromatograph

GAS

C1

C2

C3

C4

Depth Labels

% Lith

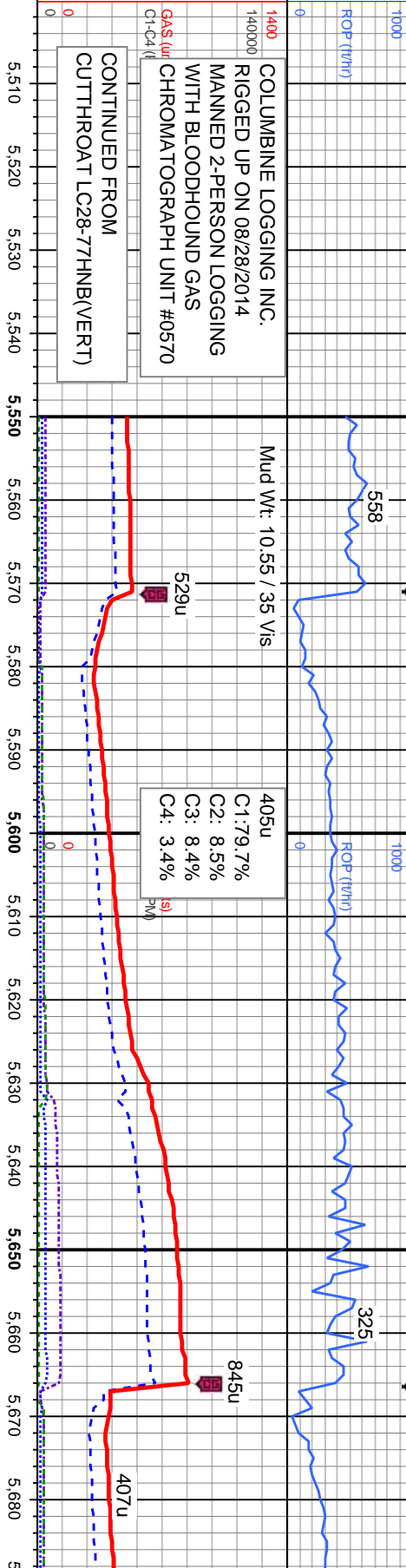
GAMMA

GR

Well Bore
TVD

Oil Show

Images



50' Sample Intervals

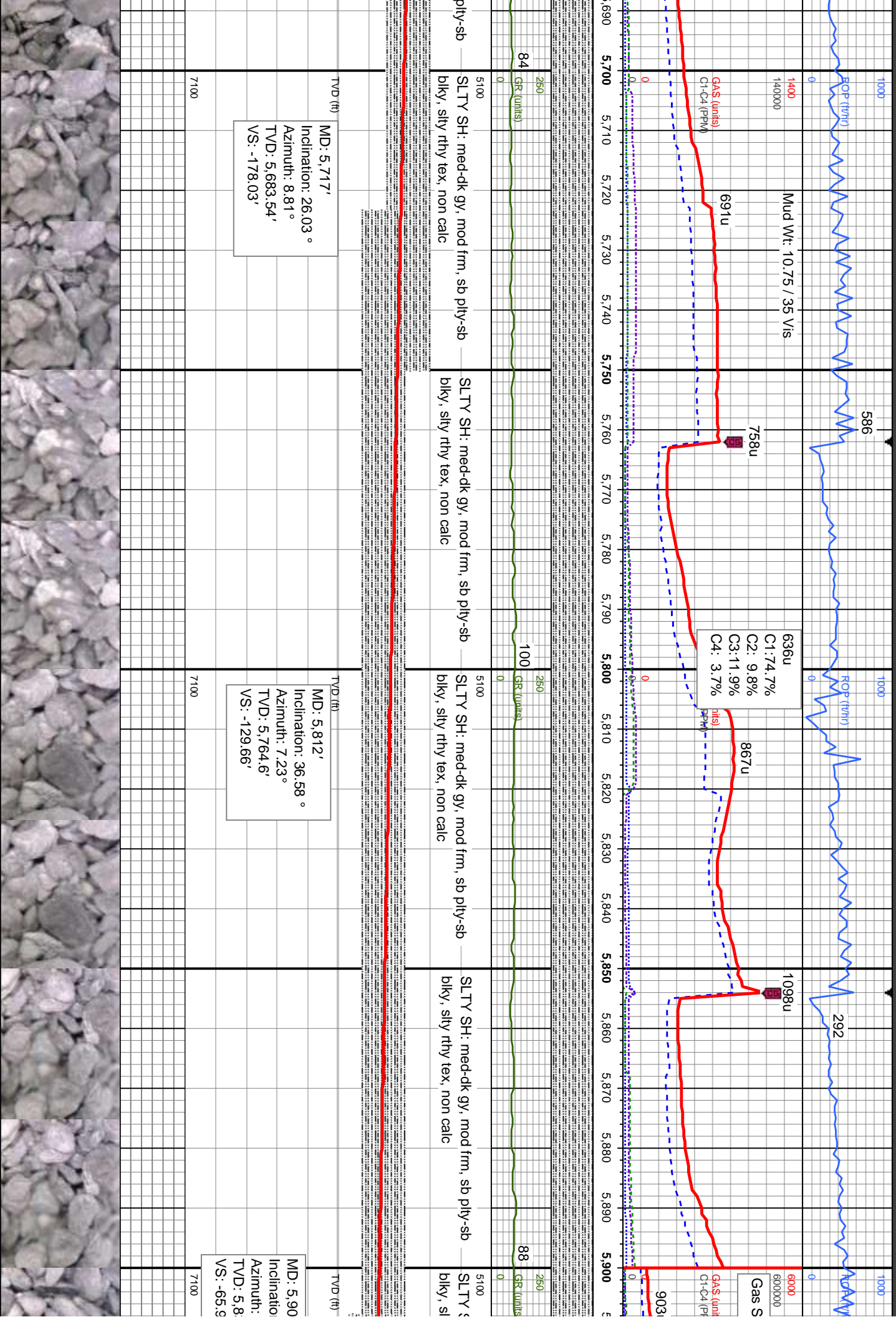
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biky, silty rthy tex, non calc

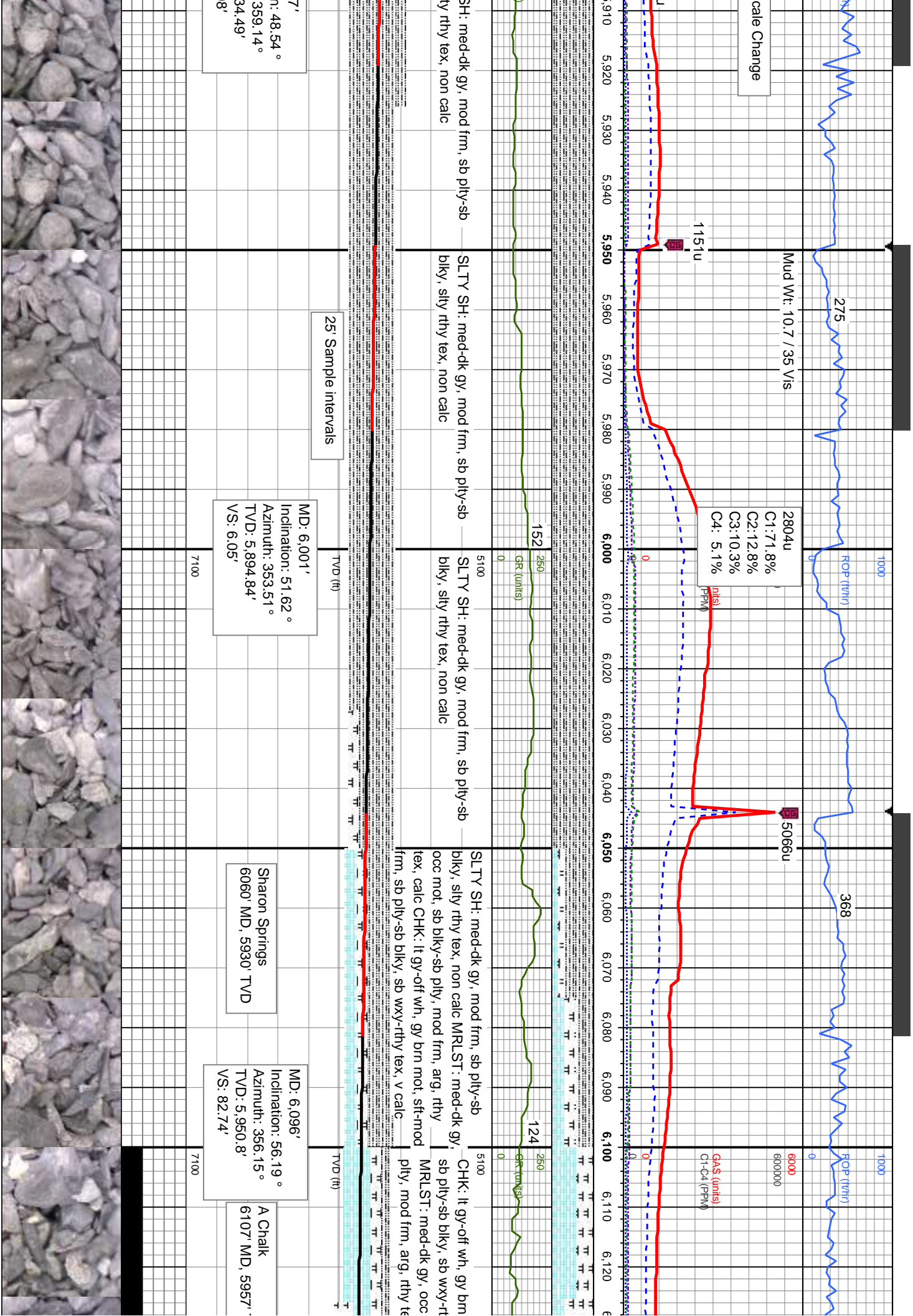
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biky, silty rthy tex, non calc

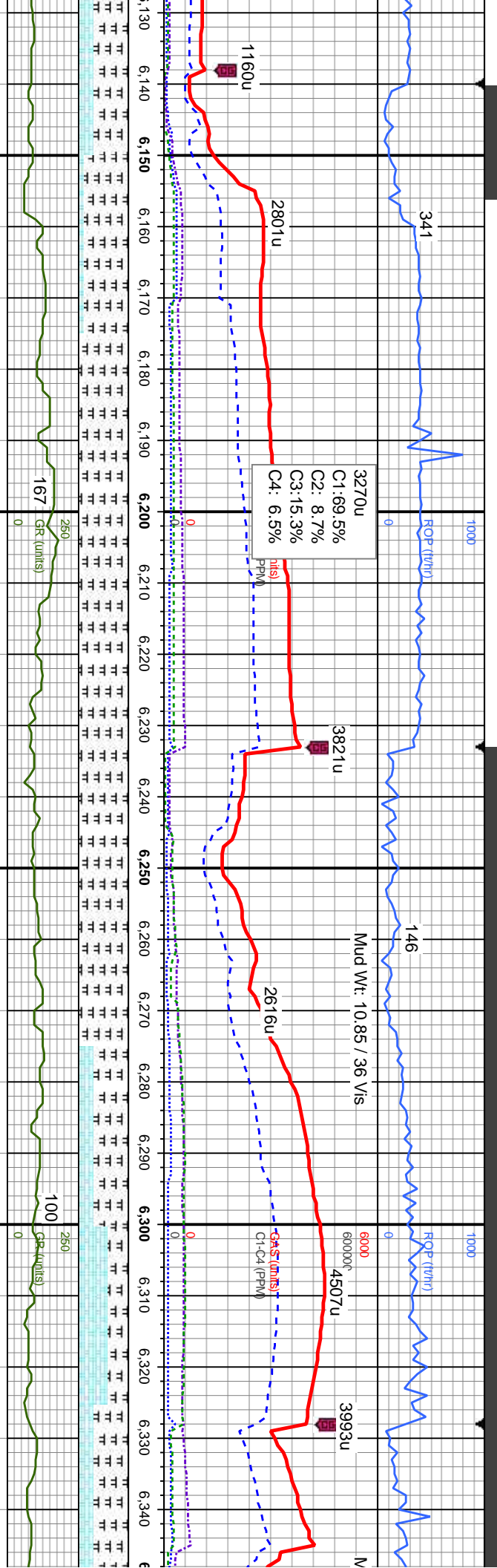
SLTY SH: med-dk gy, mod frm, sb
biky, silty rthy tex, non calc

MD: 5,622'
Inclination: 17.5 °
Azimuth: 4.94°
TVD: 5,595.39'
VS: -212.62'









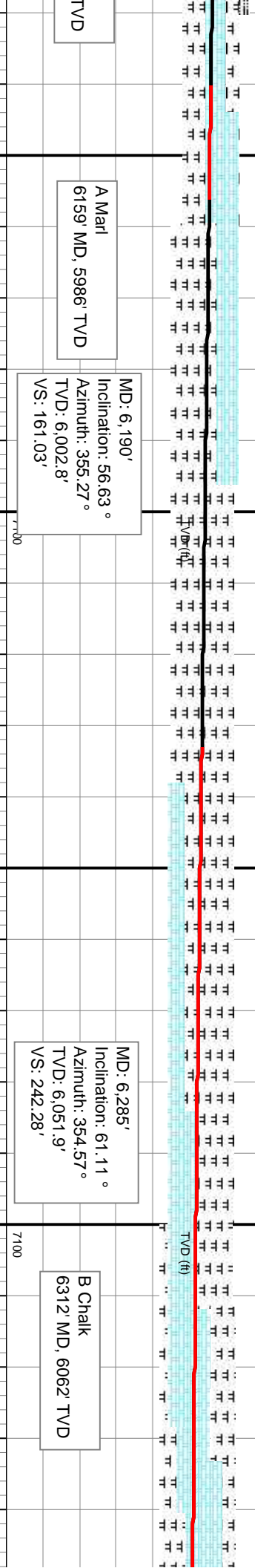
mot, sft-mod frm, hy tex, v calc
mot, sb blkly-sb x, calc

MRLST: med-dk gy, occ mot, sb blkly-sb ply, mod frm, arg, rthy tex, calc CHK: lt gy-off wh, gy brn mot, sft-mod frm, sb ply-sb blkly, sb wxy-rthy tex, v calc

MRLST: med-dk gy, occ mot, sb blkly-sb ply, mod frm, arg, rthy tex, calc, tr chk

MRLST: med-dk gy, occ mot, sb blkly-sb ply, mod frm, arg, rthy tex, calc CHK: lt gy-off wh, gy brn mot, sft-mod frm, sb ply-sb blkly, sb wxy-rthy tex, v calc

CHK: lt gy-off wh, gy brn mot, sft-mod frm, sb ply-sb blkly, sb wxy-rthy tex, v calc MRLST: med-dk gy, occ mot, sb blkly-sb ply, mod frm, arg, rthy tex, calc, tr pyr



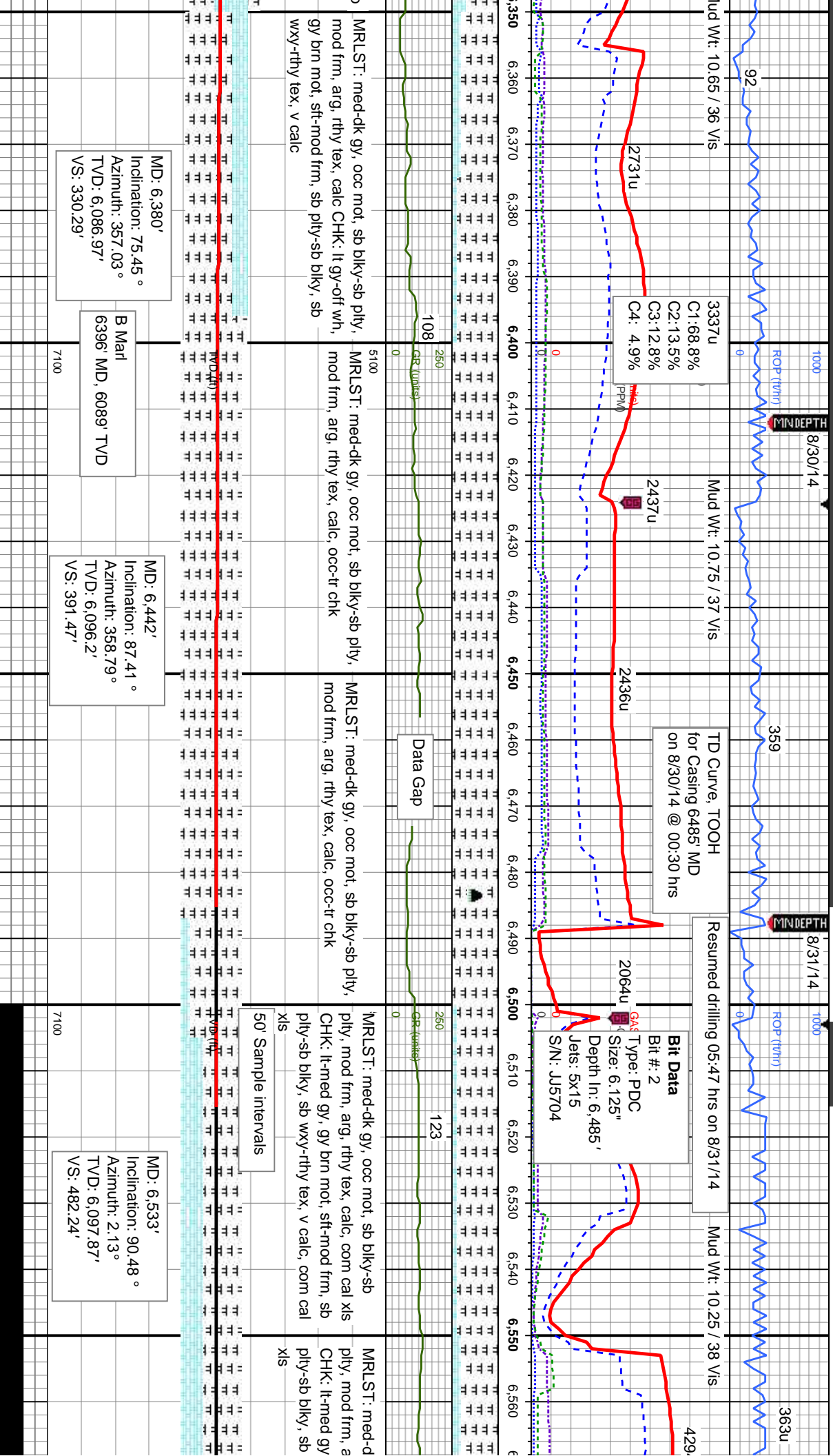
A Marl
6159' MD, 5986' TVD

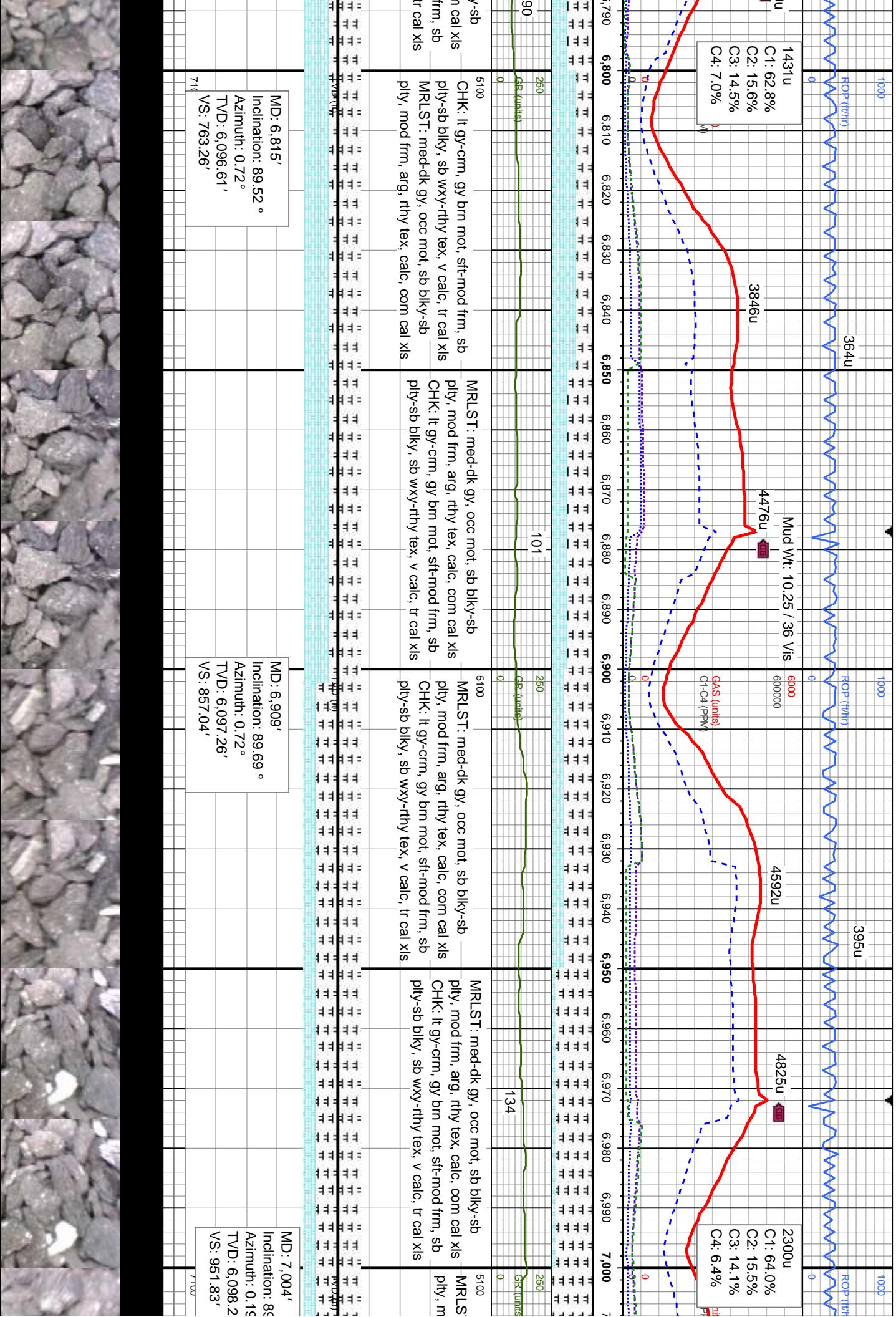
MD: 6,190'
Inclination: 56.63°
Azimuth: 355.27°
TVD: 6,002.8'
VS: 161.03'

MD: 6,285'
Inclination: 61.11°
Azimuth: 354.57°
TVD: 6,051.9'
VS: 242.28'

B Chalk
6312' MD, 6062' TVD







1431u
C1: 62.8%
C2: 15.6%
C3: 14.5%
C4: 7.0%

Mud Wt: 10.25 / 36 Vis

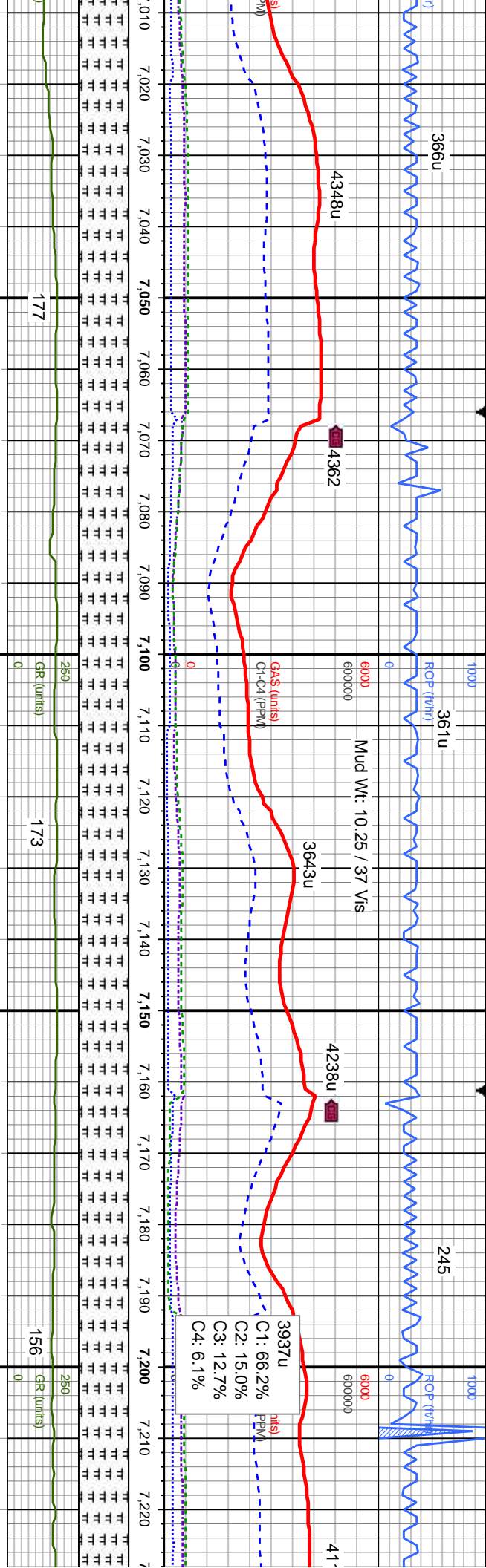
600000
GAS (units)
Cl-C4 (PPM)

2300u
C1: 64.0%
C2: 15.5%
C3: 14.1%
C4: 6.4%

MD: 6.815'
Inclination: 89.52°
Azimuth: 0.72°
TVD: 6.096.61'
VS: 763.26'

MD: 6.909'
Inclination: 89.69°
Azimuth: 0.72°
TVD: 6.097.26'
VS: 857.04'

MD: 7.004'
Inclination: 89.52°
Azimuth: 0.13°
TVD: 6.098.2
VS: 951.83'



med-dk gy, occ mot, sb blk-y-sb
od frm, arg, rthy tex, calc, com cal xls

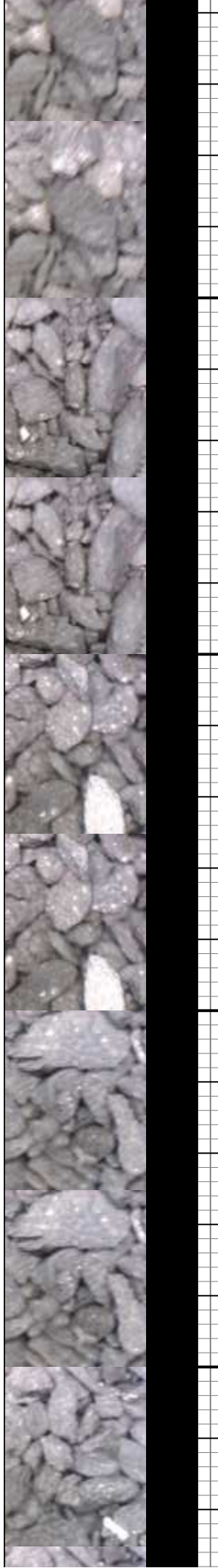
MRSLT: med-dk gy, occ mot, sb blk-y-sb
ply, mod frm, arg, rthy tex, calc, com cal xls

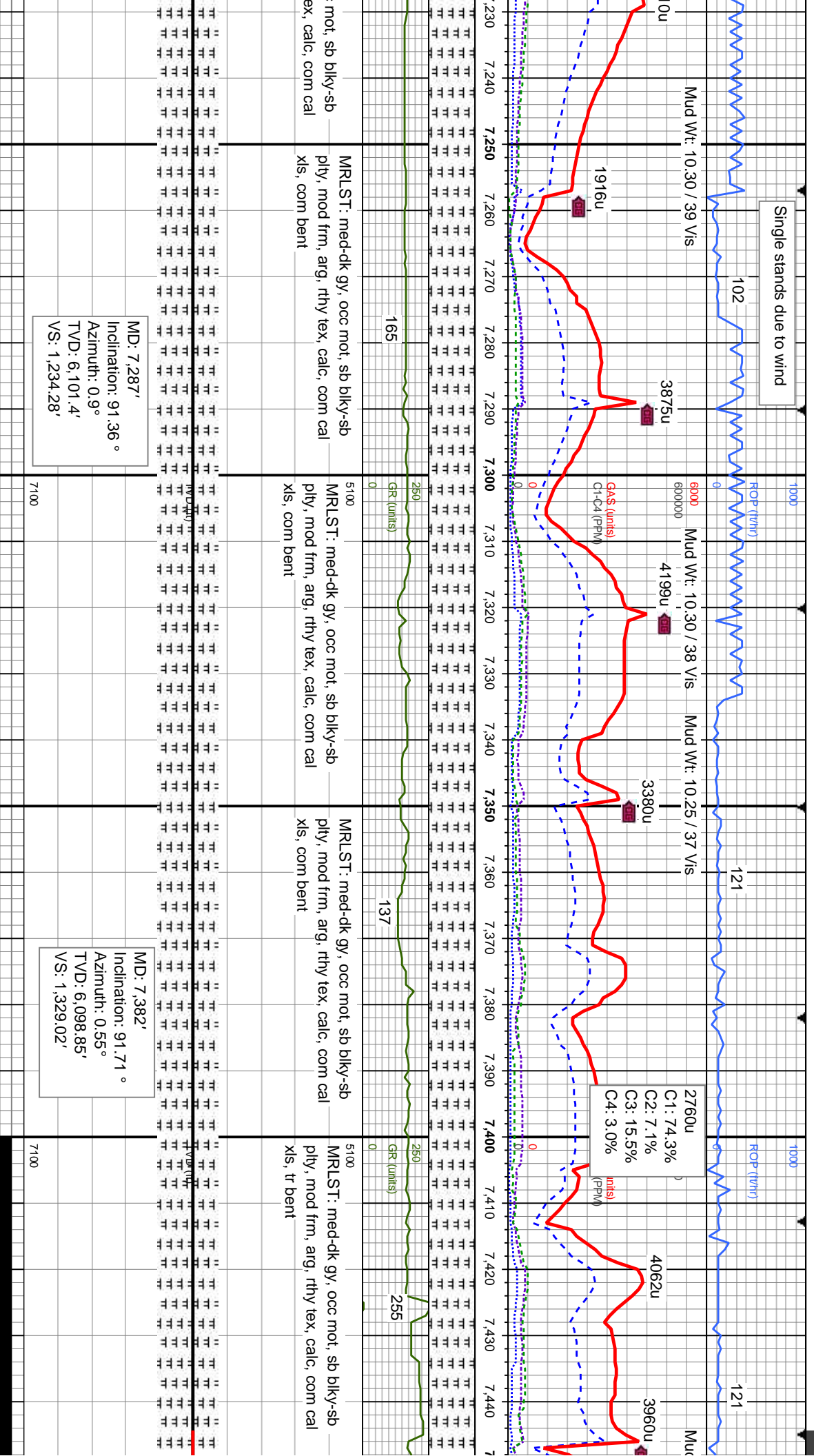
MRSLT: med-dk gy, occ mot, sb blk-y-sb
ply, mod frm, arg, rthy tex, calc, com cal
xls, com bent

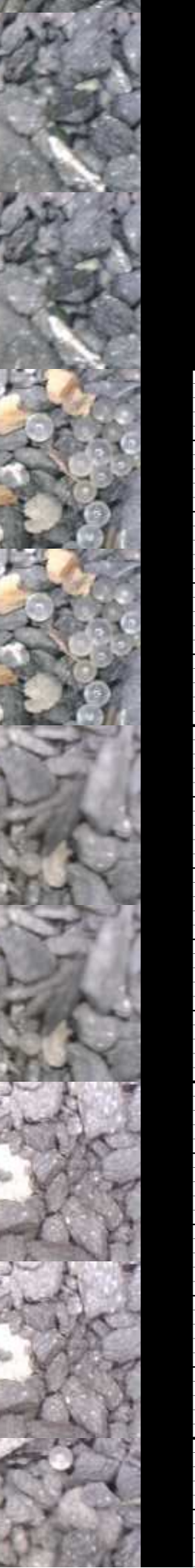
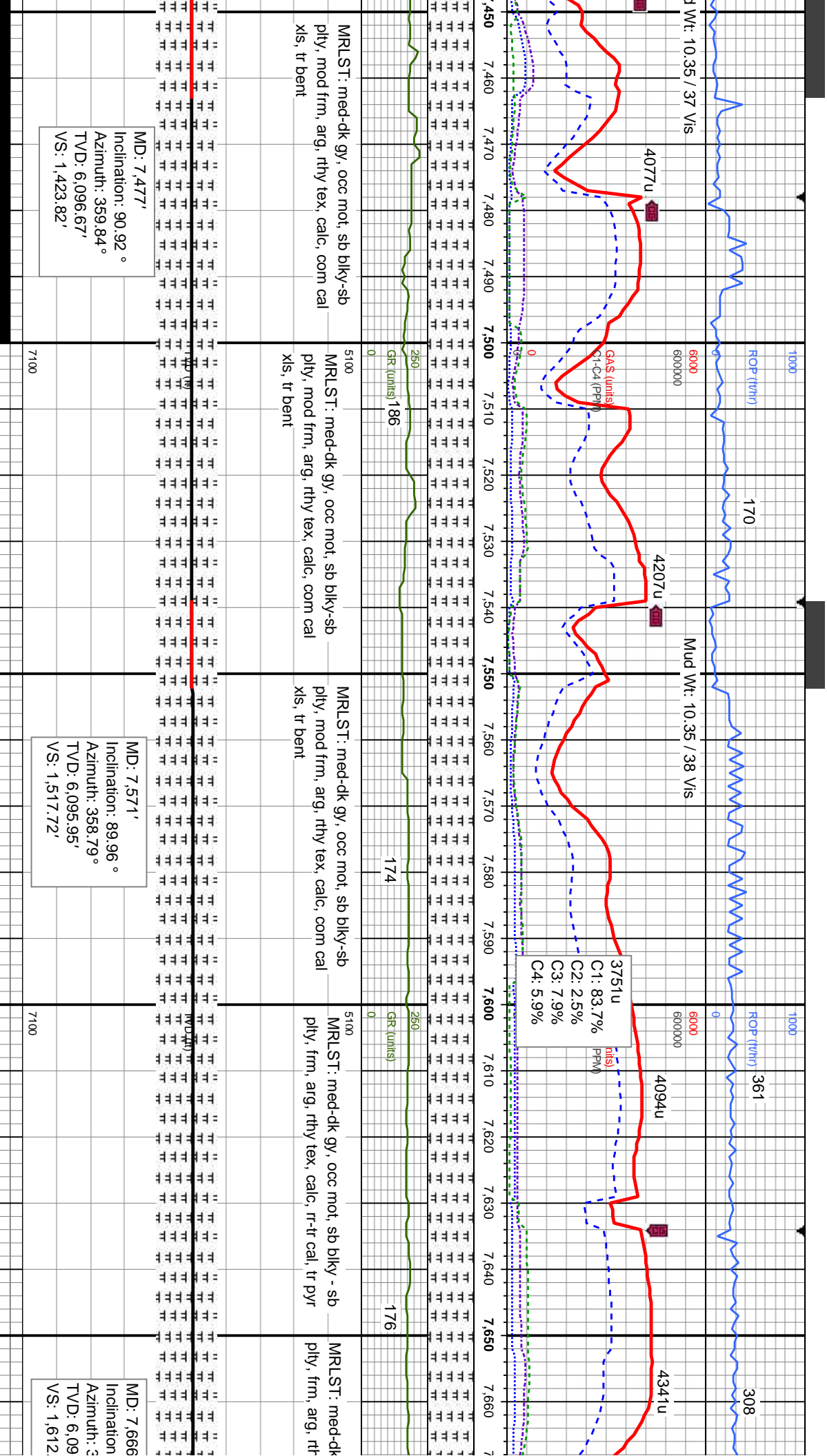
MRSLT: med-dk gy, occ mot, sb blk-y-sb
ply, mod frm, arg, rthy tex, calc, com cal
xls, com bent

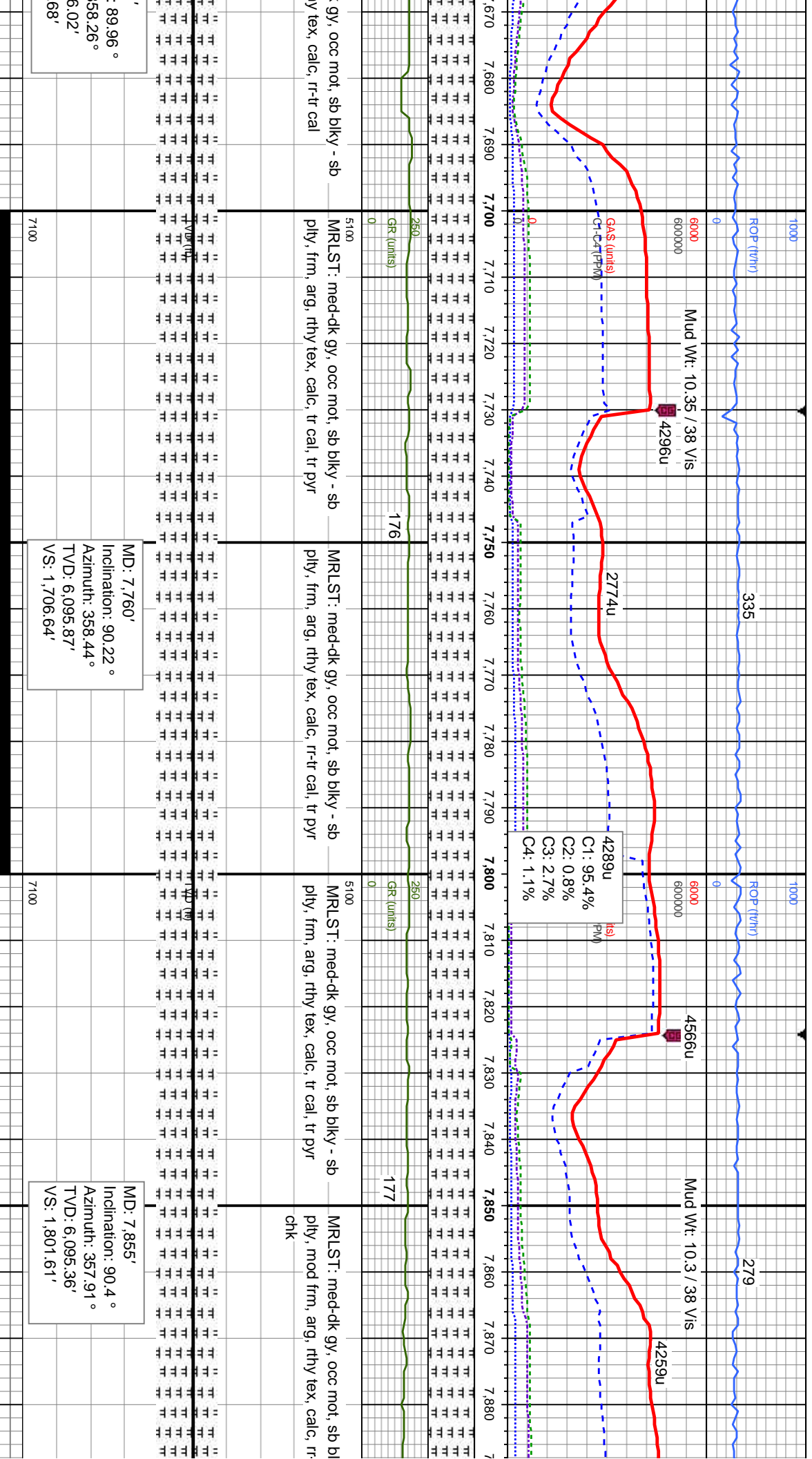
MD: 7,098'
Inclination: 88.99 °
Azimuth: 0.19 °
TVD: 6,099.86'
VS: 1,045.65'

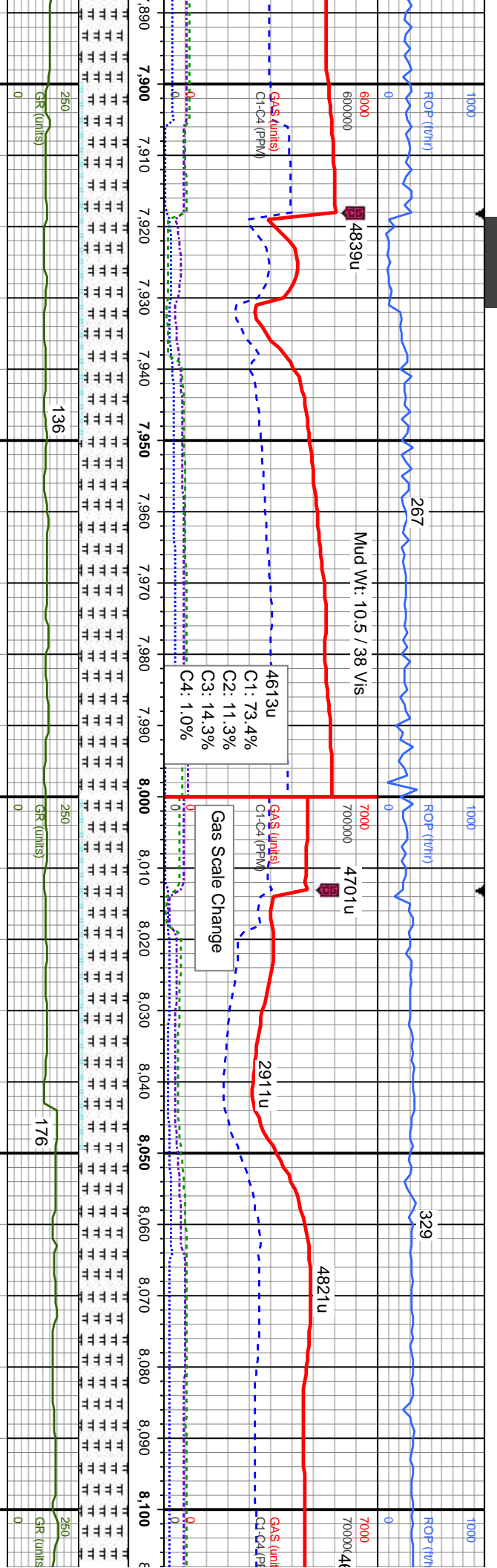
MD: 7,193'
Inclination: 88.9 °
Azimuth: 0.02 °
TVD: 6,101.61'
VS: 1,140.48'











ky - sb
cal, tr

MRSLT: med-dk gy, occ mot, sb blkly - sb
ply, mod frm, arg, rthy tex, calc CHK: off
wh-lt gy, gy brn mot, stf-mod frm, sb ply-sb
blkly, sb wxy-rthy tex, v calc

MRSLT: med-dk gy, occ mot, sb blkly - sb
ply, mod frm, arg, rthy tex, calc, rr-tr cal, tr
chk

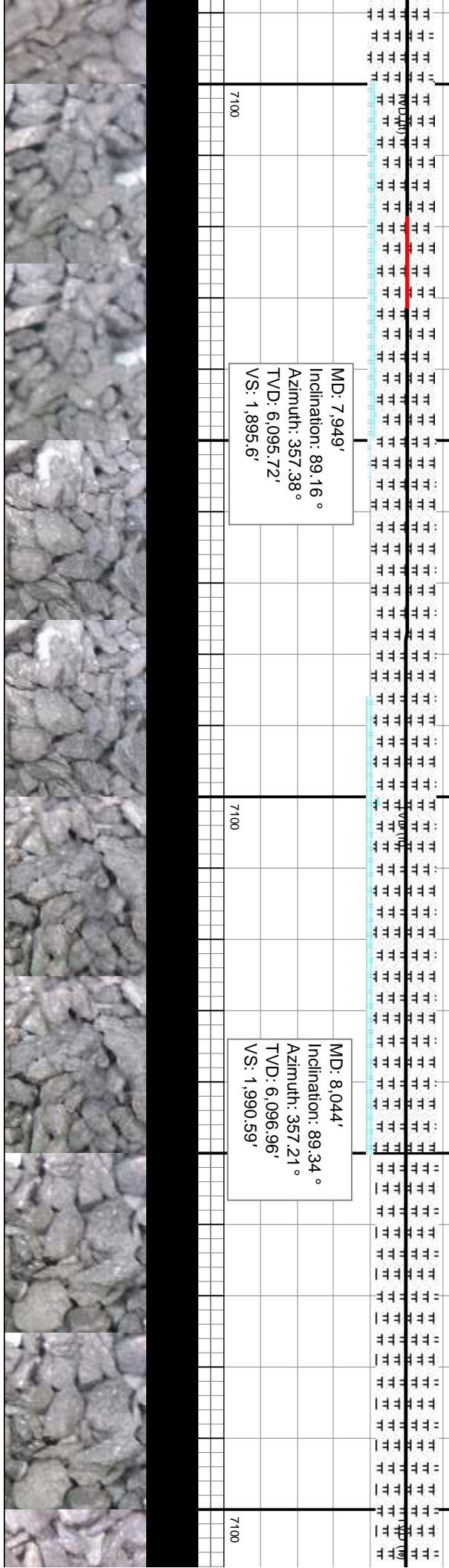
MRSLT: med-dk gy, occ mot, sb blkly - sb
ply, frm, arg, rthy tex, calc CHK: off wh-lt gy,
gy brn mot, stf-mod frm, sb ply-sb blkly, sb
wxy-rthy tex, v calc

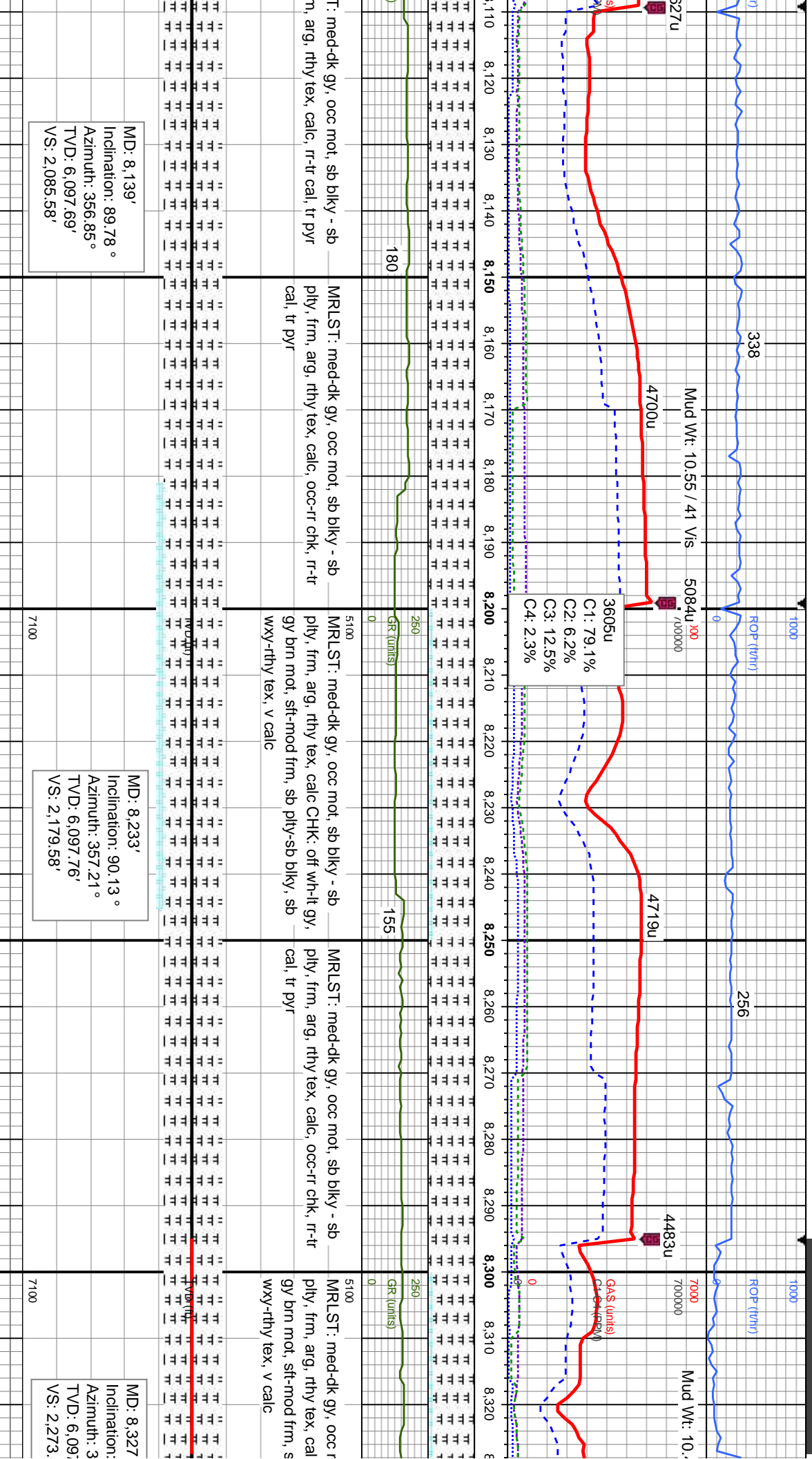
MRSLT: med-dk gy, occ mot, sb blkly - sb
ply, frm, arg, rthy tex, calc, rr-tr cal, tr chk

MRSLT: med-dk gy, occ mot, sb blkly - sb
ply, frm, arg, rthy tex, calc, rr-tr cal, tr chk

MD: 7,949'
Inclination: 89.16°
Azimuth: 357.38°
TVD: 6,095.72'
VS: 1,895.6'

MD: 8,044'
Inclination: 89.34°
Azimuth: 357.21°
TVD: 6,096.96'
VS: 1,990.59'



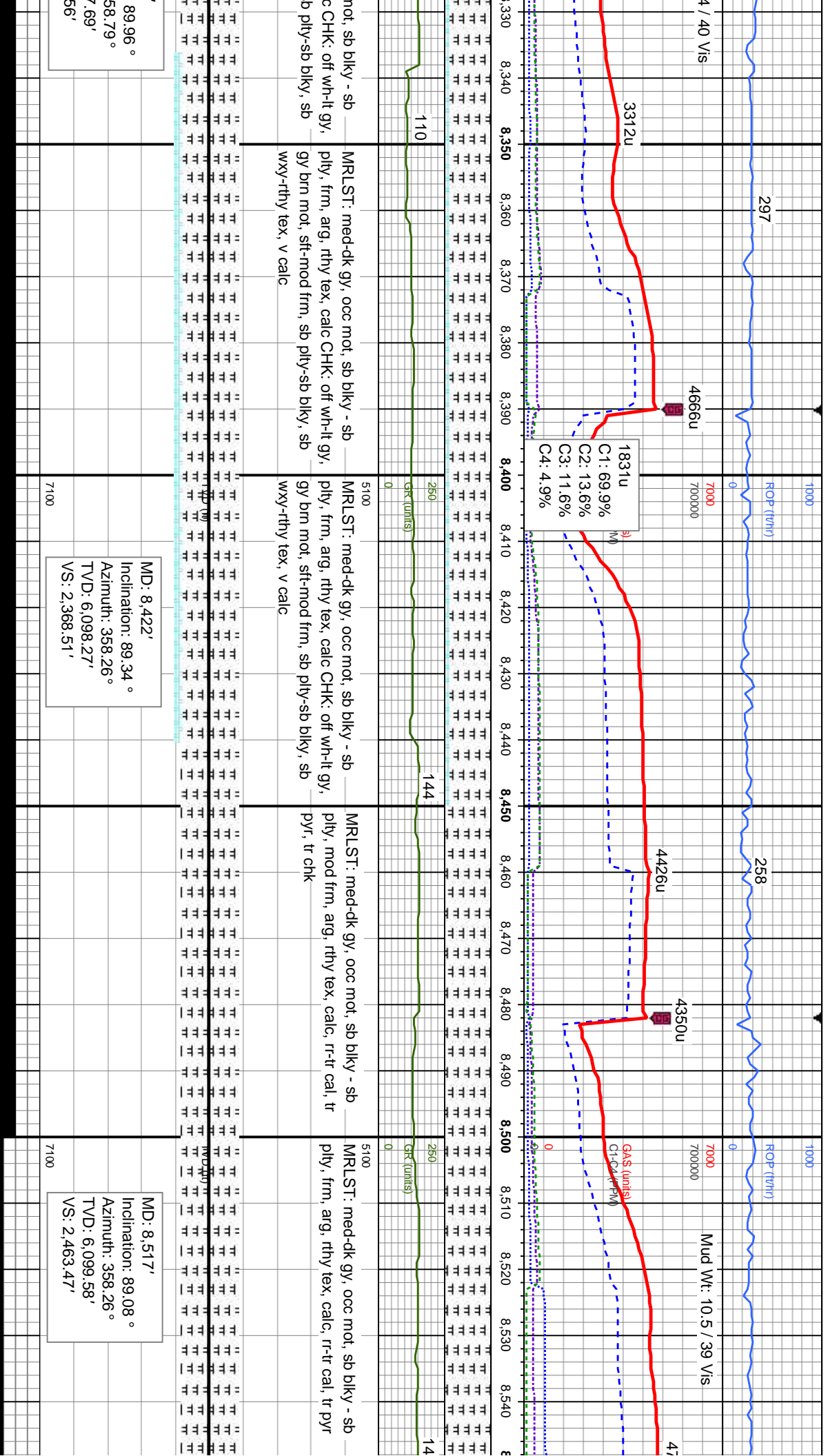


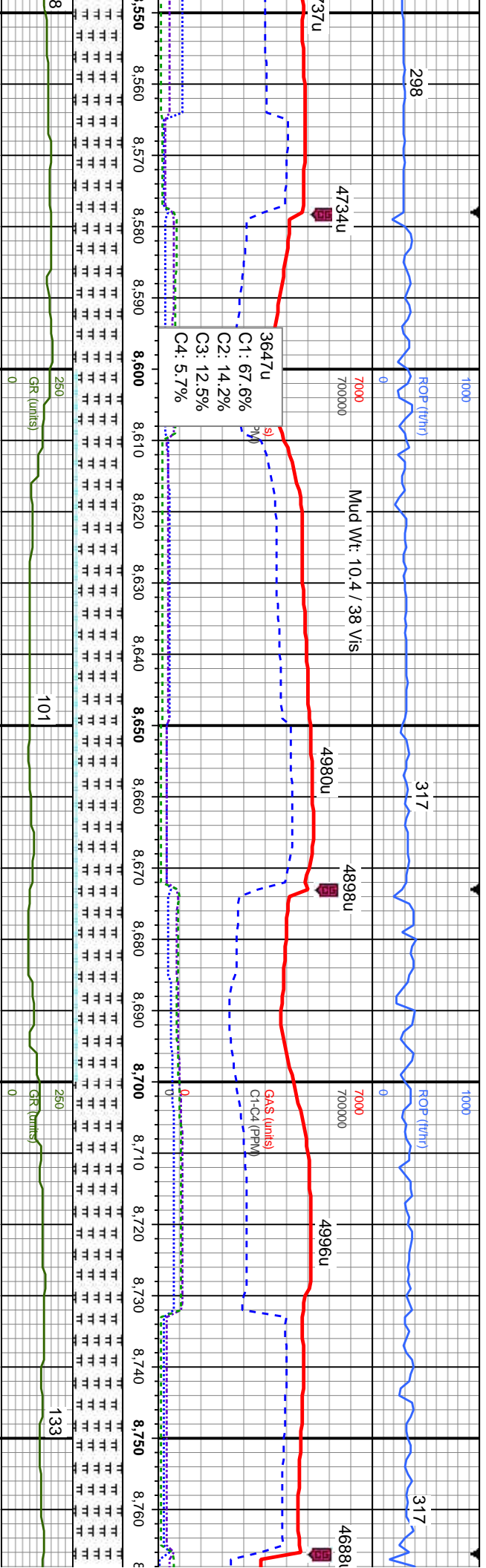
MD: 8,139'
Inclination: 89.78 °
Azimuth: 356.85 °
TVD: 6,097.69'
VS: 2,085.58'

MD: 8,233'
Inclination: 90.13 °
Azimuth: 357.21 °
TVD: 6,097.76'
VS: 2,179.58'

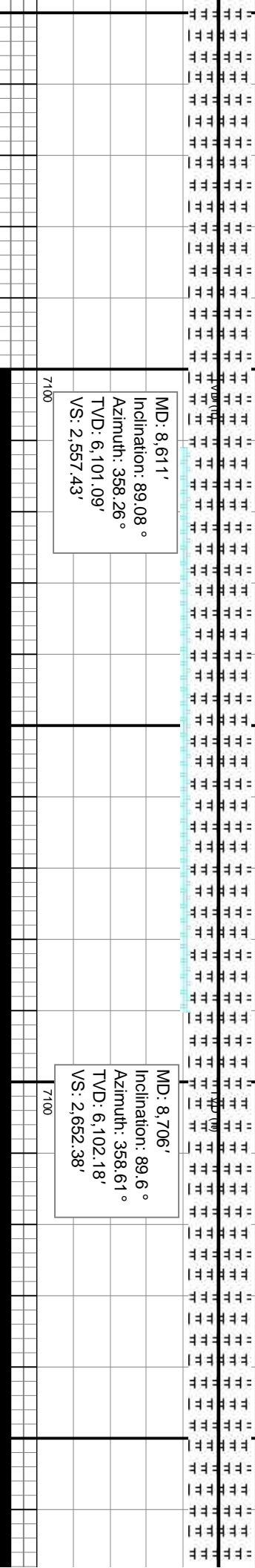
MD: 8,327'
Inclination: 3
Azimuth: 3
TVD: 6,097
VS: 2,273

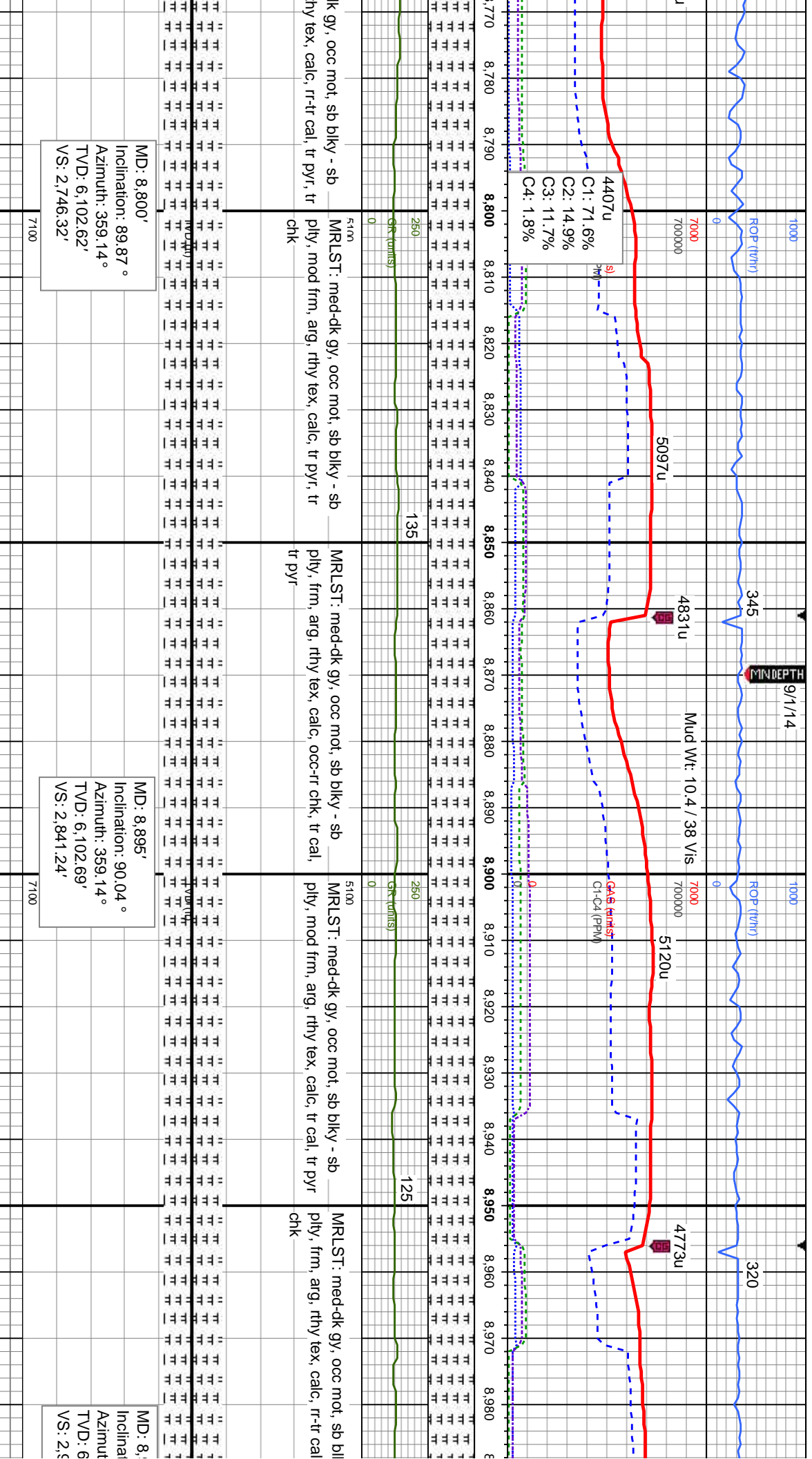


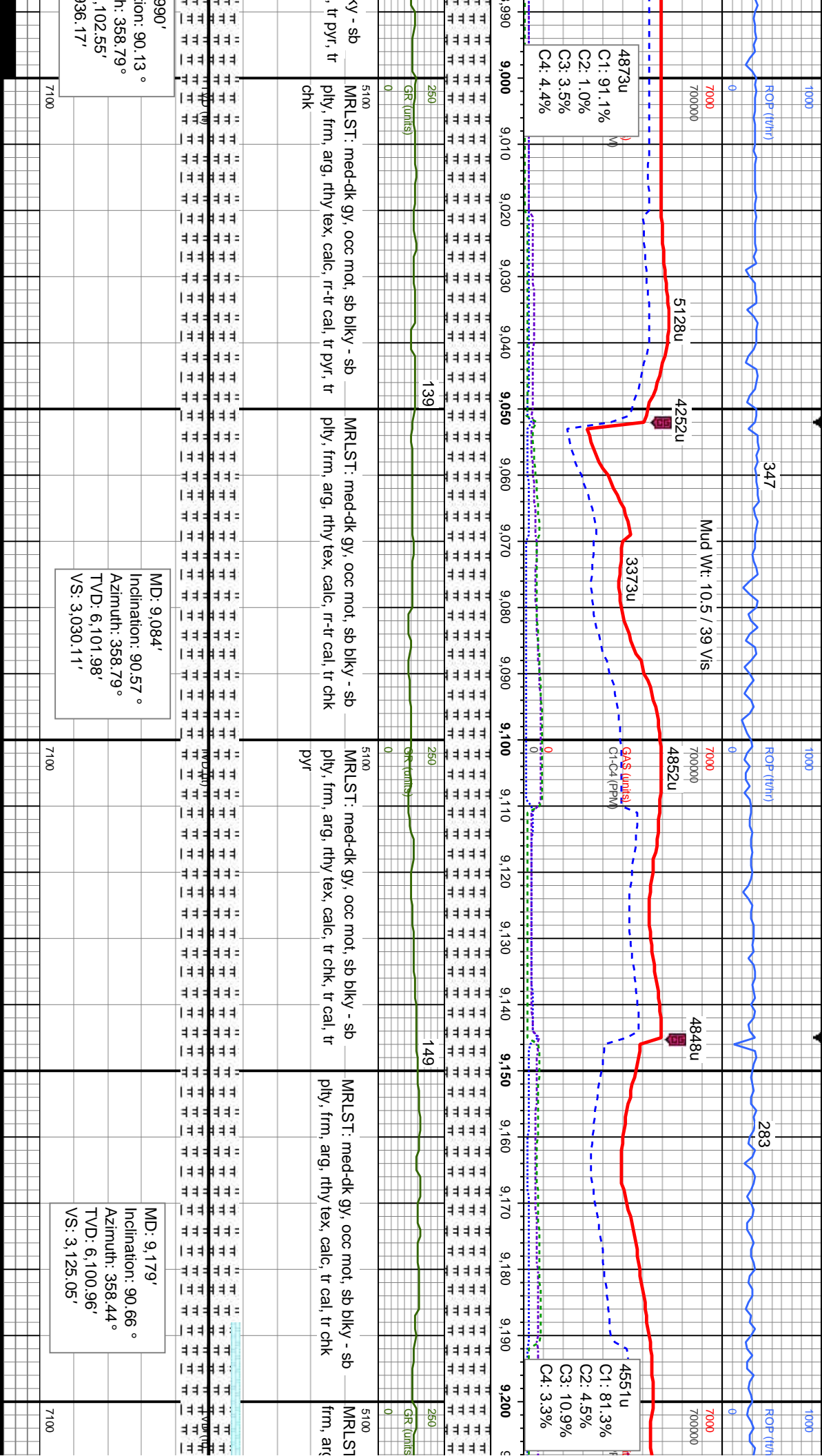


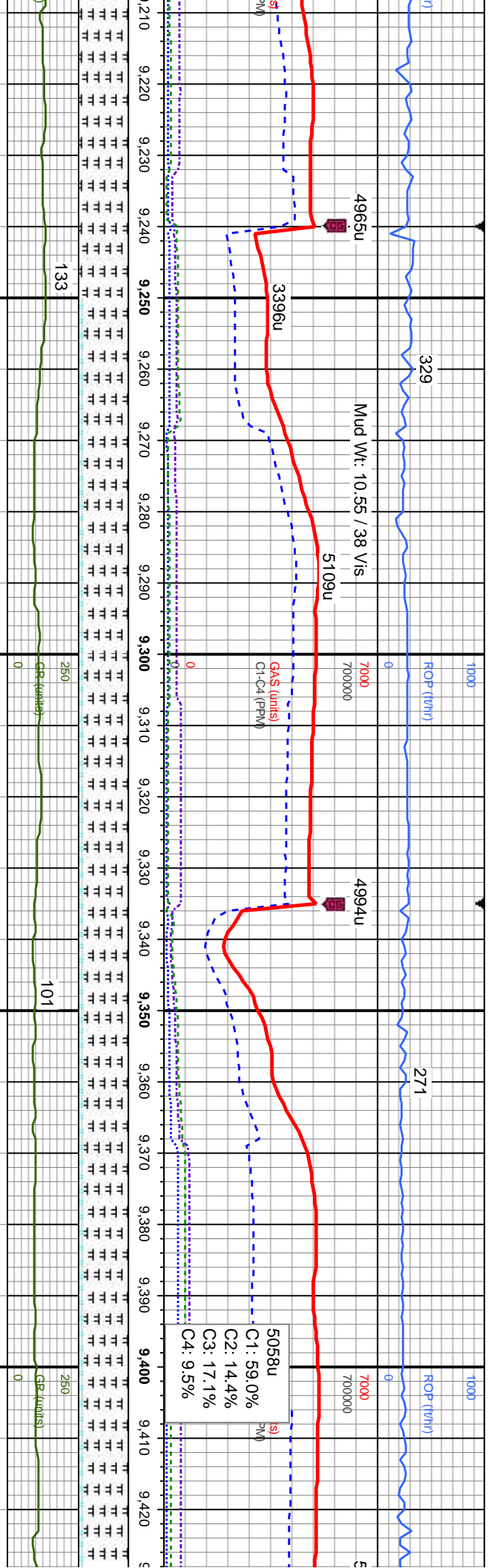


MRLST: med-dk gy, occ mot, sb blk - sb pty, frm, arg, rthy tex, calc, r-tr cal, tr chk	MRLST: med-dk gy, occ mot, sb blk - sb pty, frm, arg, rthy tex, calc CHK: off wh-lt gy, gy brn mot, sft-mod frm, sb pty-sb blk, sb wxy-rthy tex, v calc	MRLST: med-dk gy, occ mot, sb blk - sb pty, frm, arg, rthy tex, calc CHK: off wh-lt gy, gy brn mot, sft-mod frm, sb pty-sb blk, sb wxy-rthy tex, v calc	MRLST: med-dk gy, occ mot, sb blk - sb pty, frm, arg, rthy tex, calc, r-tr cal, tr chk	MRLST: med-c pty, frm, arg, r
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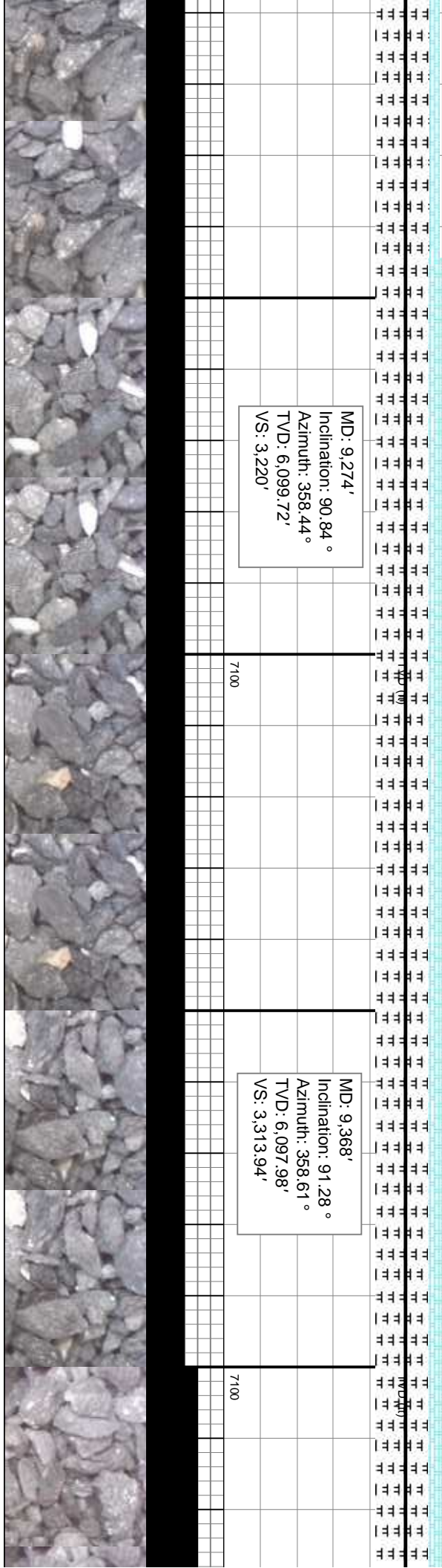
med-dk gy, occ mot, sb blkly - sb pily, MRLST: med-dk gy, occ mot, sb blkly - sb pily, frm, arg, rthy tex, calc, tr pyr CHK: off wh-it gy, gy brn mot, sft-mod frm, sb blkly, sb wxy-rthy tex, v calc

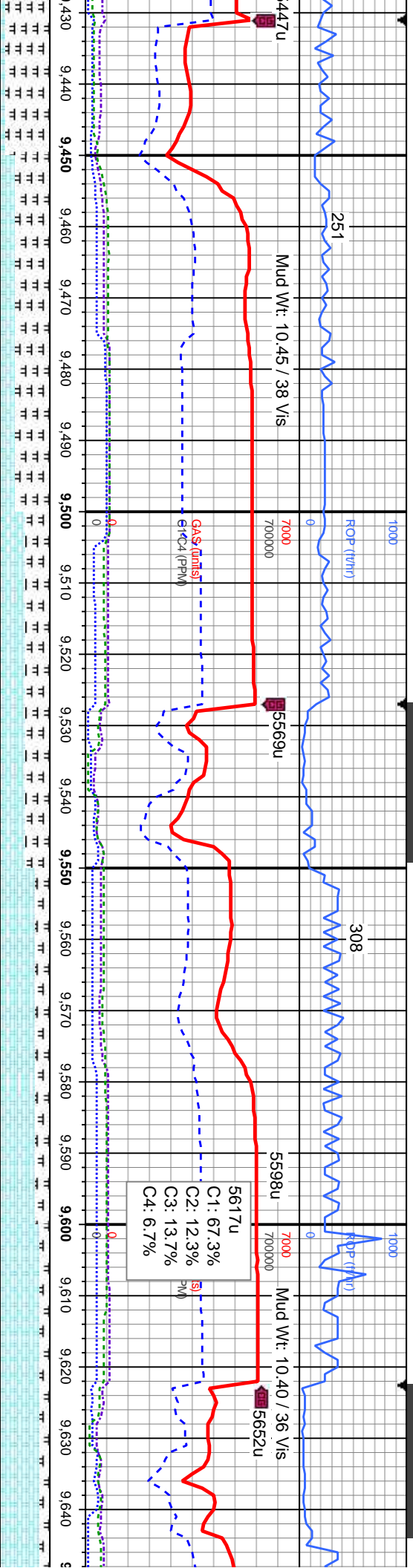
med-dk gy, occ mot, sb blkly - sb pily, MRLST: med-dk gy, occ mot, sb blkly - sb pily, frm, arg, rthy tex, calc, tr pyr CHK: off wh-it gy, gy brn mot, sft-mod frm, sb blkly, sb wxy-rthy tex, v calc

med-dk gy, occ mot, sb blkly - sb pily, MRLST: med-dk gy, occ mot, sb blkly - sb pily, frm, arg, rthy tex, calc, tr pyr CHK: off wh-it gy, gy brn mot, sft-mod frm, sb blkly, sb wxy-rthy tex, v calc

MD: 9,274'
Inclination: 90.84°
Azimuth: 358.44°
TVD: 6,099.72'
VS: 3,220'

MD: 9,368'
Inclination: 91.28°
Azimuth: 358.61°
TVD: 6,097.98'
VS: 3,313.94'



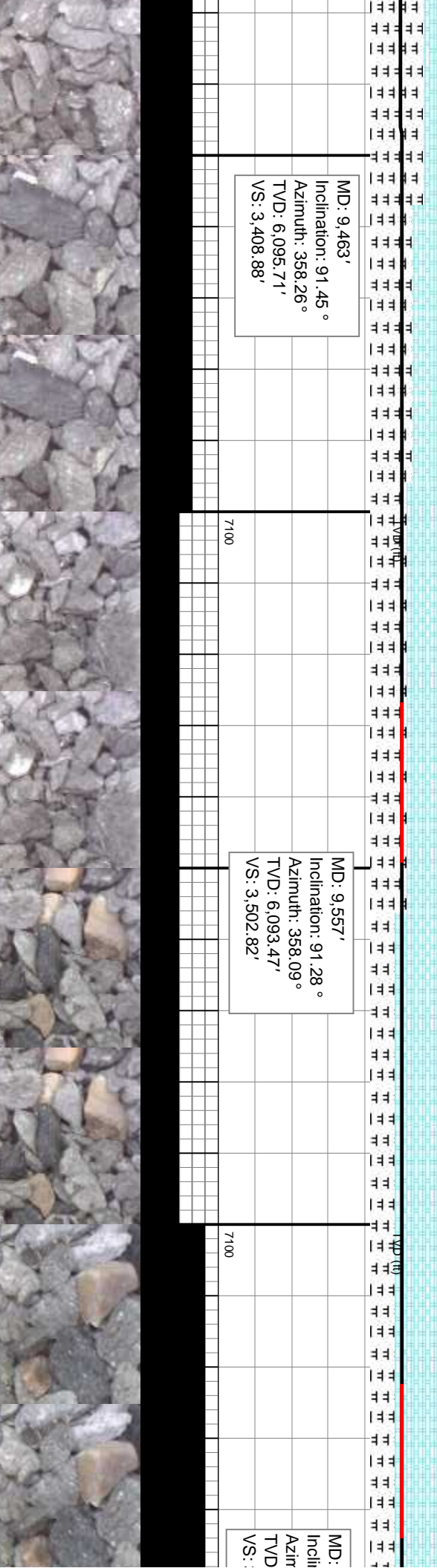


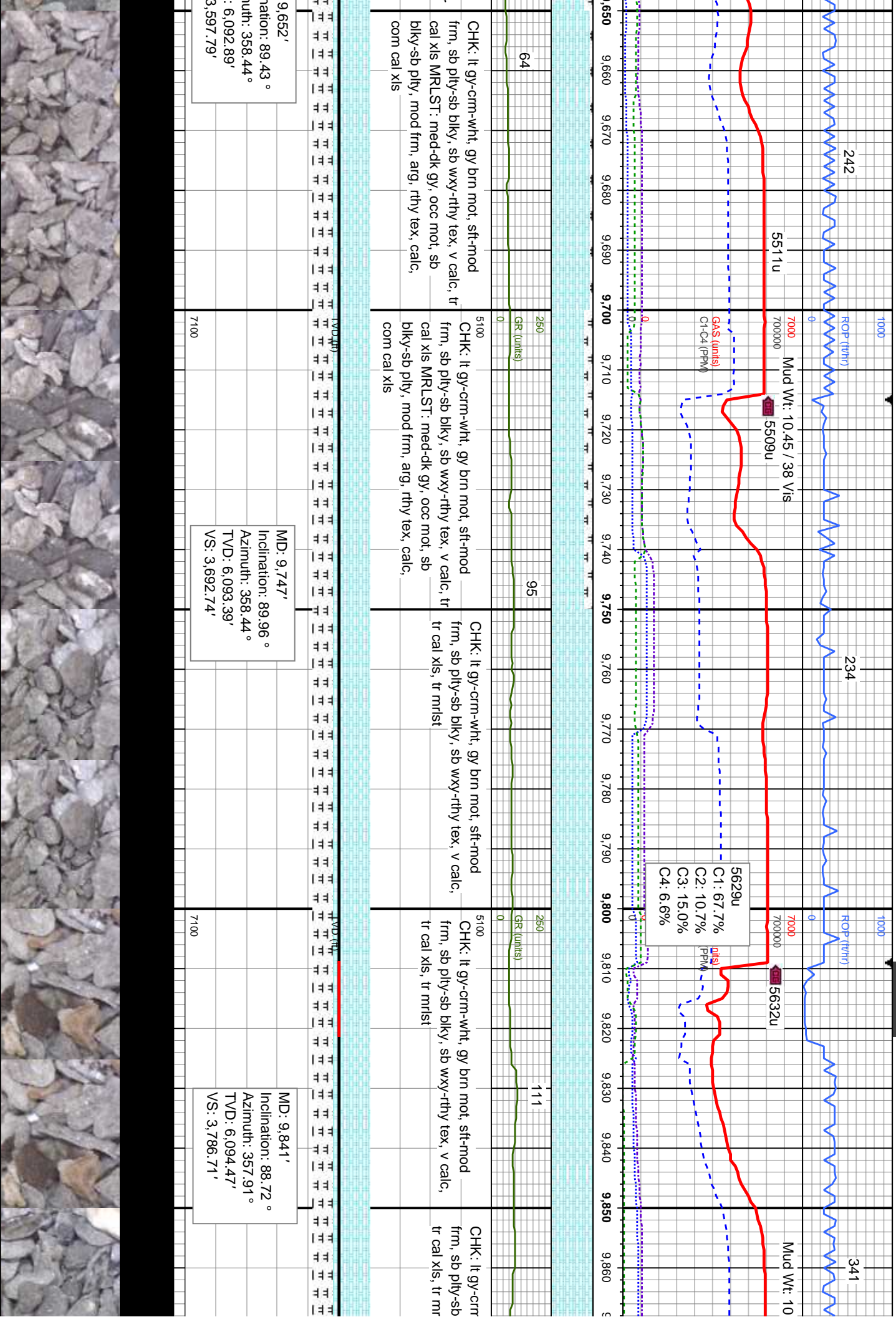
100	250	5100	GR (units)	100	250	5100	GR (units)
rot, sb blkly - sb	rot, sb blkly - sb	rot, sb blkly - sb	rot, sb blkly - sb	rot, sb blkly - sb	rot, sb blkly - sb	rot, sb blkly - sb	rot, sb blkly - sb
ply, mod frm, arg, rthy tex, calc	ply, mod frm, arg, rthy tex, calc	ply, mod frm, arg, rthy tex, calc	ply, mod frm, arg, rthy tex, calc	ply, mod frm, arg, rthy tex, calc	ply, mod frm, arg, rthy tex, calc	ply, mod frm, arg, rthy tex, calc	ply, mod frm, arg, rthy tex, calc
wh-it gy, gy brn mot, sft-mod frm, sb ply-sb	wh-it gy, gy brn mot, sft-mod frm, sb ply-sb	wh-it gy, gy brn mot, sft-mod frm, sb ply-sb	wh-it gy, gy brn mot, sft-mod frm, sb ply-sb	wh-it gy, gy brn mot, sft-mod frm, sb ply-sb	wh-it gy, gy brn mot, sft-mod frm, sb ply-sb	wh-it gy, gy brn mot, sft-mod frm, sb ply-sb	wh-it gy, gy brn mot, sft-mod frm, sb ply-sb
blkly, sb wxy-rthy tex, v calc	blkly, sb wxy-rthy tex, v calc	blkly, sb wxy-rthy tex, v calc	blkly, sb wxy-rthy tex, v calc	blkly, sb wxy-rthy tex, v calc	blkly, sb wxy-rthy tex, v calc	blkly, sb wxy-rthy tex, v calc	blkly, sb wxy-rthy tex, v calc

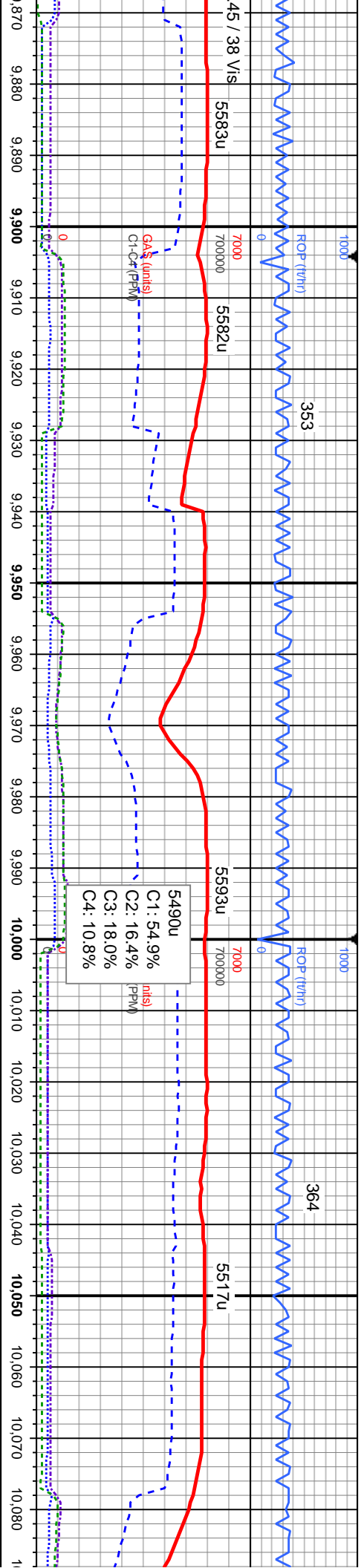
MD: 9,463'
Inclination: 91.45°
Azimuth: 358.26°
TVD: 6,095.71'
VS: 3,408.88'

MD: 9,557'
Inclination: 91.28°
Azimuth: 358.09°
TVD: 6,093.47'
VS: 3,502.82'

MD:
Incli
Azim
TVD
VS:







81	250	5100	81	250	5100	116	250	5100	116	250	5100	137	250	5100
blky, sb wxy-rthy tex, v calc,	GR (units)	CHK: It gy-crm-wht, gy brn mot, sft-mod frm, sb pily-sb blky, sb wxy-rthy tex, v calc, tr cal xis MRLST: med-dk gy, occ mot, sb blky-sb pily, mod frm, arg, rthy tex, calc, com cal xis	GR (units)	GR (units)	CHK: It gy-crm-wht, gy brn mot, sft-mod frm, sb pily-sb blky, sb wxy-rthy tex, v calc, tr cal xis MRLST: med-dk gy, occ mot, sb blky-sb pily, mod frm, arg, rthy tex, calc, com cal xis	GR (units)	GR (units)	CHK: It gy-crm-wht, gy brn mot, sft-mod frm, sb pily-sb blky, sb wxy-rthy tex, v calc, tr cal xis MRLST: med-dk gy, occ mot, sb blky-sb pily, mod frm, arg, rthy tex, calc, com cal xis	GR (units)	GR (units)	CHK: It gy-crm-wht, gy brn mot, sft-mod frm, sb pily-sb blky, sb wxy-rthy tex, v calc, tr cal xis MRLST: med-dk gy, occ mot, sb blky-sb pily, mod frm, arg, rthy tex, calc, com cal xis	GR (units)	GR (units)	CHK: It gy-crm-wht, gy brn mot, sft-mod frm, sb pily-sb blky, sb wxy-rthy tex, v calc, tr cal xis MRLST: med-dk gy, occ mot, sb blky-sb pily, mod frm, arg, rthy tex, calc, com cal xis

MD: 9,936'	MD: 10,030'
Inclination: 89.08 °	Inclination: 89.08 °
Azimuth: 357.91 °	Azimuth: 357.21 °
TVD: 6,096.3'	TVD: 6,097.81'
VS: 3,881.67'	VS: 3,975.65'



