



Scale: 5" / 100'
Measured Depth Log

Well Name Rainbow LC28-78-1HNA(HORZ)

Location SESW SEC 28, T9N, R59W

State COLORADO **County** WELD

Country USA **Rig Number** H&P 326

API Number 05-123-38848 **Field** WILDCAT

Region DJ BASIN **Drilling Completed** 8/26/2014

Spud Date 8/21/2014

Surface Coordinates SESW SEC 28, T9N, R59W
340' FSL, 1430' FWL
40.71499 -103.98724

Ground Elevation 4853' **K.B. Elevation** 4883

Logged Interval 640' To 10339' **Total Depth** 10339'

Formation NIOBRARA-A MARL

Type of Drilling Fluid LSND

Operator

Company Noble Energy Inc

Address 1625 Broadway Suite 2200
Denver, CO 80202

Geologist

Name EVAN HOWELL

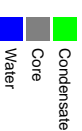
Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202



































Other

COLUMBINE LOGGING INC. MIKE KERSCHEN
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 SAND	 TUFF
 CHERT	 IGNEOUS	 SHALE	 WELDED TUFF
 CLAY CHOKE SAND	 SIDERITE or LIMONITE	 SHALE COLORED	
 CLAYSTONE	 LIMESTONE	 SHALE GRAY	







Accessories

 GASTROPOD	 ARGILLITE GRAIN	 HEAVY MINERAL	 ANHYDRITE STRINGER
 INOCERAMUS	 BENTONITE	 KAOLIN	 BENTONITE STRINGER
 ALGAE	 OOLITE	 BITUMINOUS SUBSTANCE	 COAL STRINGER
 AMPHIPORA	 OSTRACOD	 BRECCIA FRAGMENTS	 DOLOMITE STRINGER
 BELEMNITE	 PELECYPOD	 CALCAREOUS	 GYPSUM STRINGER
 BIOCLASTIC	 PELLET	 CARBONACEOUS FLAKES	 LIMESTONE STRINGER
 BRACHIOPOD	 PISOLITE	 CHTDK	 MARLSTONE (CALC) STRG
 BRYOZOA	 PLANT REMAINS	 CHTLT	 MARLSTONE (DOL) STRG
 CEPHALOPOD	 PLANT SPORES	 COAL - THIN BEDS	 SANDSTONE STRINGER
 CORAL	 SCAPHOPOD	 DOLOMITIC	 SHALE STRINGER
 CRINOID	 STROMATOPOROID	 FELDSPAR	 SILTSTONE STRINGER
 ECHINOID		 FERRUGINOUS PELLET	
 FISH	Minerals	 FERRUGINOUS	 TUFFACEOUS
 FORAMINIFERA	 ANHYDRITIC	 GLAUCONITE	
 F FOSSIL	 ARGILLACEOUS	 GYPSIFEROUS	Stringer

Oil Show

 PINPOINT
 VUGGY

Engineering

 DEAD	
 EVEN	
 QUESTIONABLE	 BIT
 SPOTTED STAINING	 CONNECTION (UP)

Porosity

 CONNECTION (DOWN)	 CONNECTION GAS
 E EARTHY	 CONNECTION GAS (LEFT)
 F FENESTRAL	 TRIP GAS
 F FRACTURE	 TRIP GAS (LEFT)
 X INTERCRYSTALLINE	 DOWN TIME GAS
 I INTEROOLITIC	 DOWN TIME GAS (LEFT)
 M 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  **MINDEPTH** MN DEPTH **L** LITHOGRAPHIC


 OIL SHOW  **MINDEPTH** MN DEPTH **MX** MICROXLN

 **MINDEPTH** MN DEPTH UP **MS** MUDSTONE

Rounding

 **MINDEPTH** MN DEPTH (DOWN) **A** ANGULAR **PS** PACKSTONE

 NORMAL FAULT **R** ROUNDED **WS** WACKESTONE

 OVERTURNED STRATA **B** SUBANG


 REVERSE FAULT **R** SUBRND

Sorting

 CASING **M** MODERATE

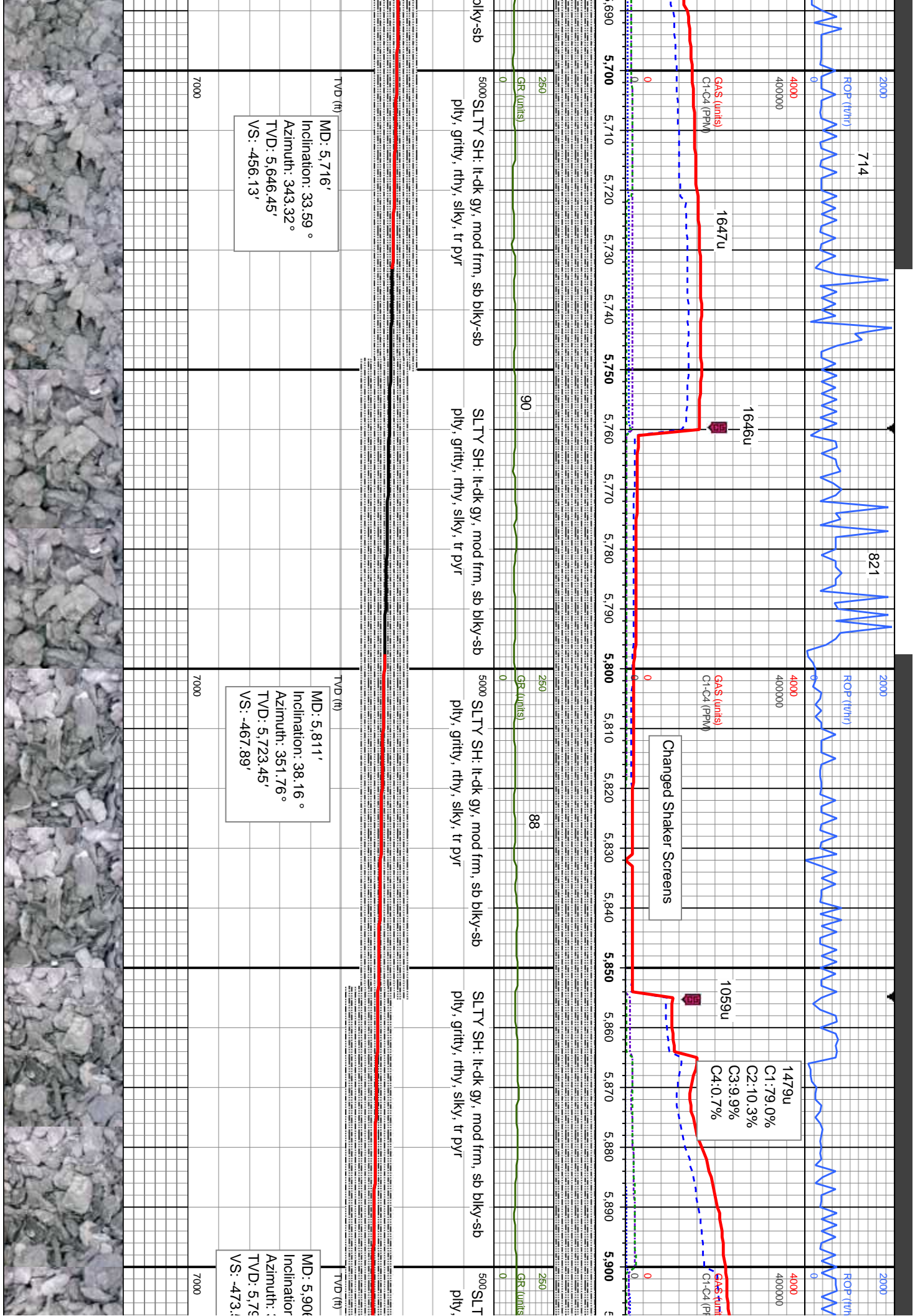
Textures

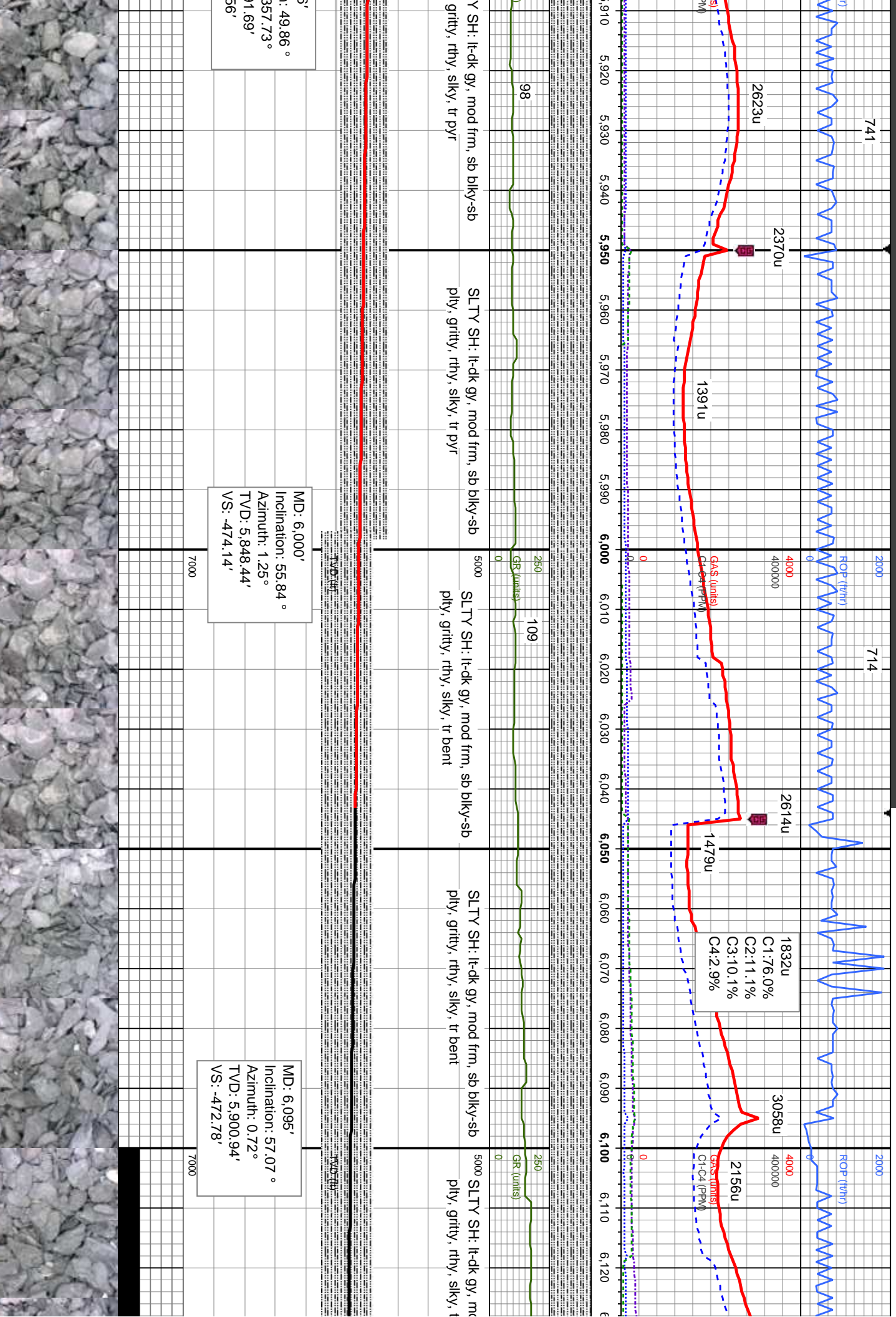
 SIDEWALL CORE (LEFT) **P** POOR

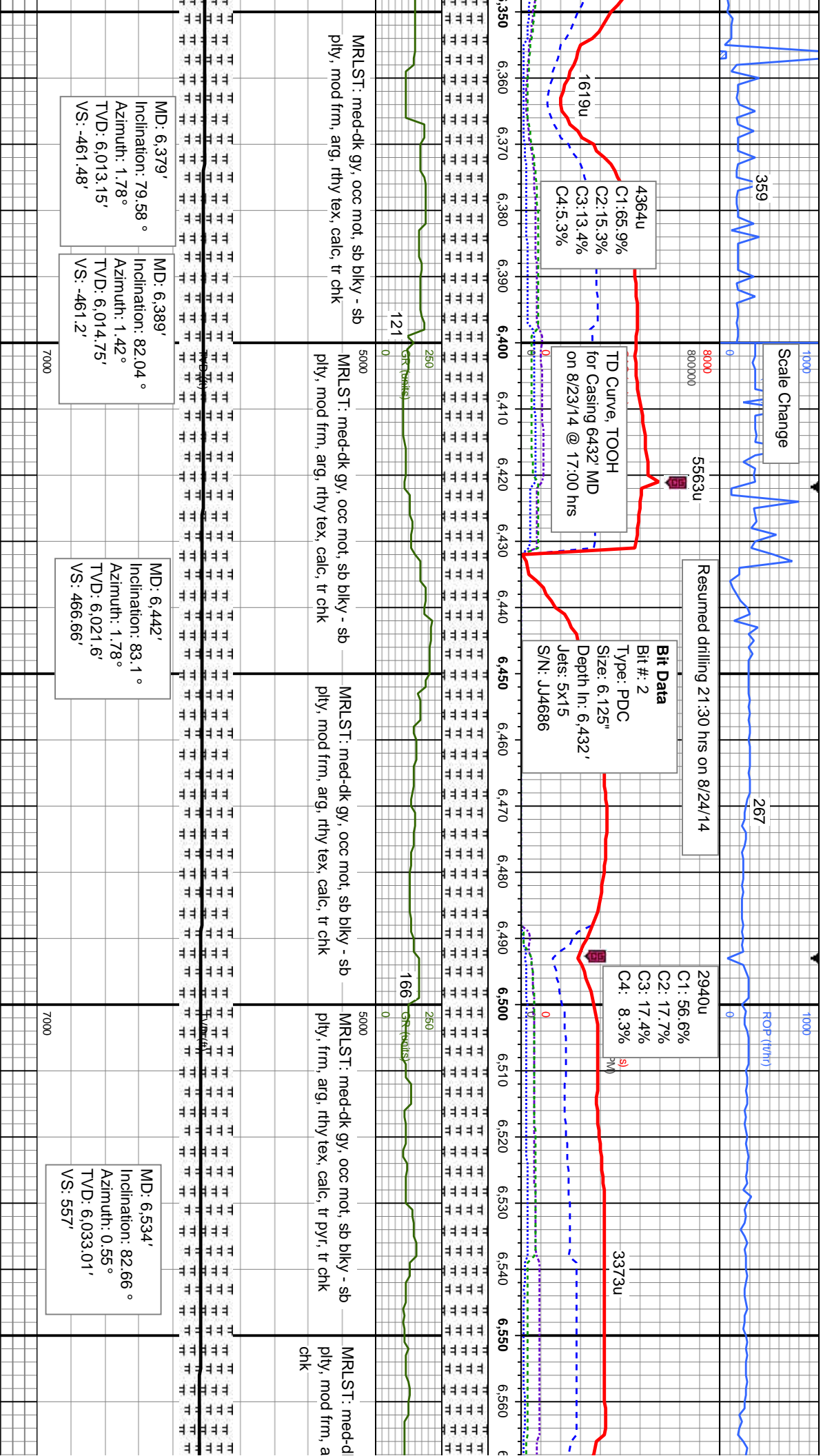
 SIDEWALL CORE (RIGHT) **BS** BOUNDSTONE **W** WELL

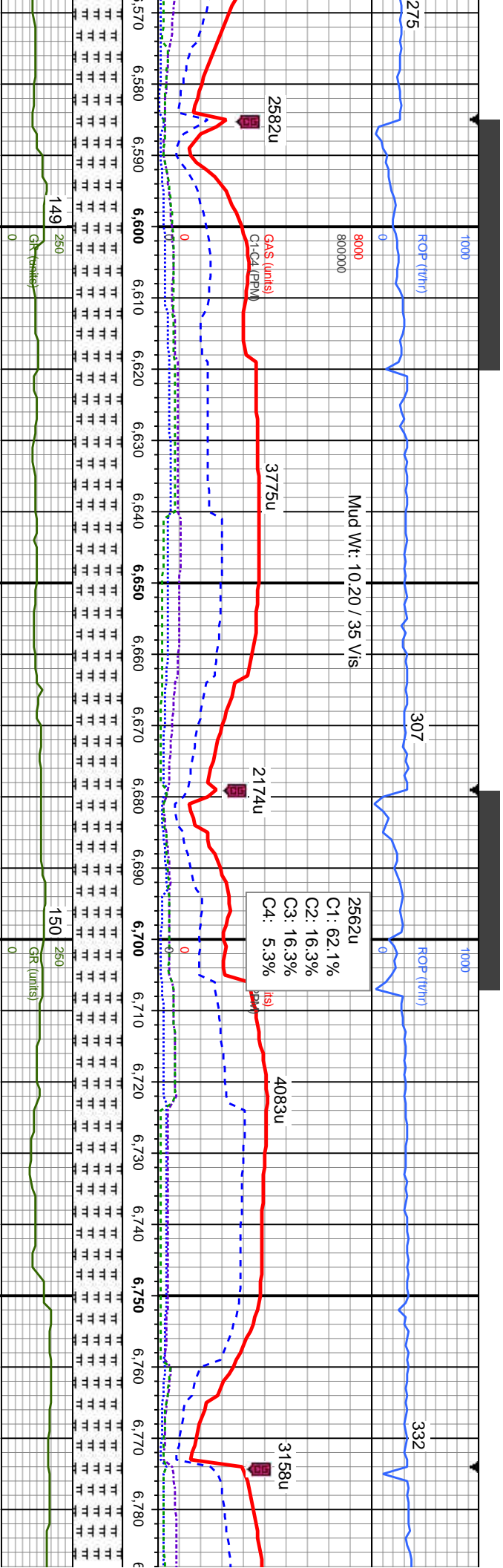
 SLIDE **C** CHALKY

 **SD** SURVEY **CX** CRYPTOXLN









k gy, occ mot, sb blkly - sb
g, rthy tex, calc, tr pyr, tr

MRLLST: med-dk gy, occ mot, sb blkly - sb
plty, frm, arg, rthy tex, calc, tr chk

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plty, frm, arg, rthy tex, calc, tr chk

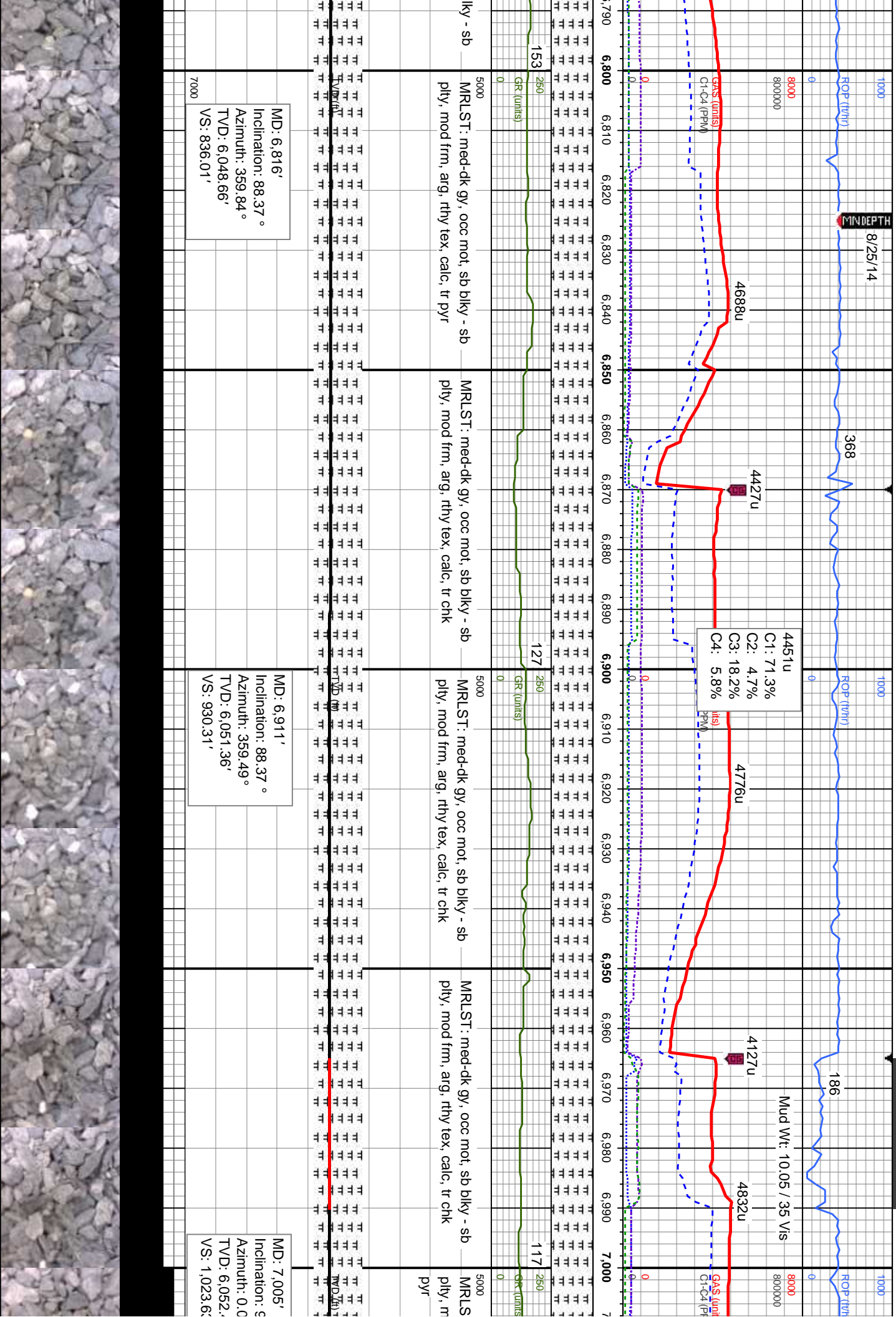
MRLLST: med-dk gy, occ mot, sb blkly - sb
plty, mod frm, arg, rthy tex, calc, tr chk

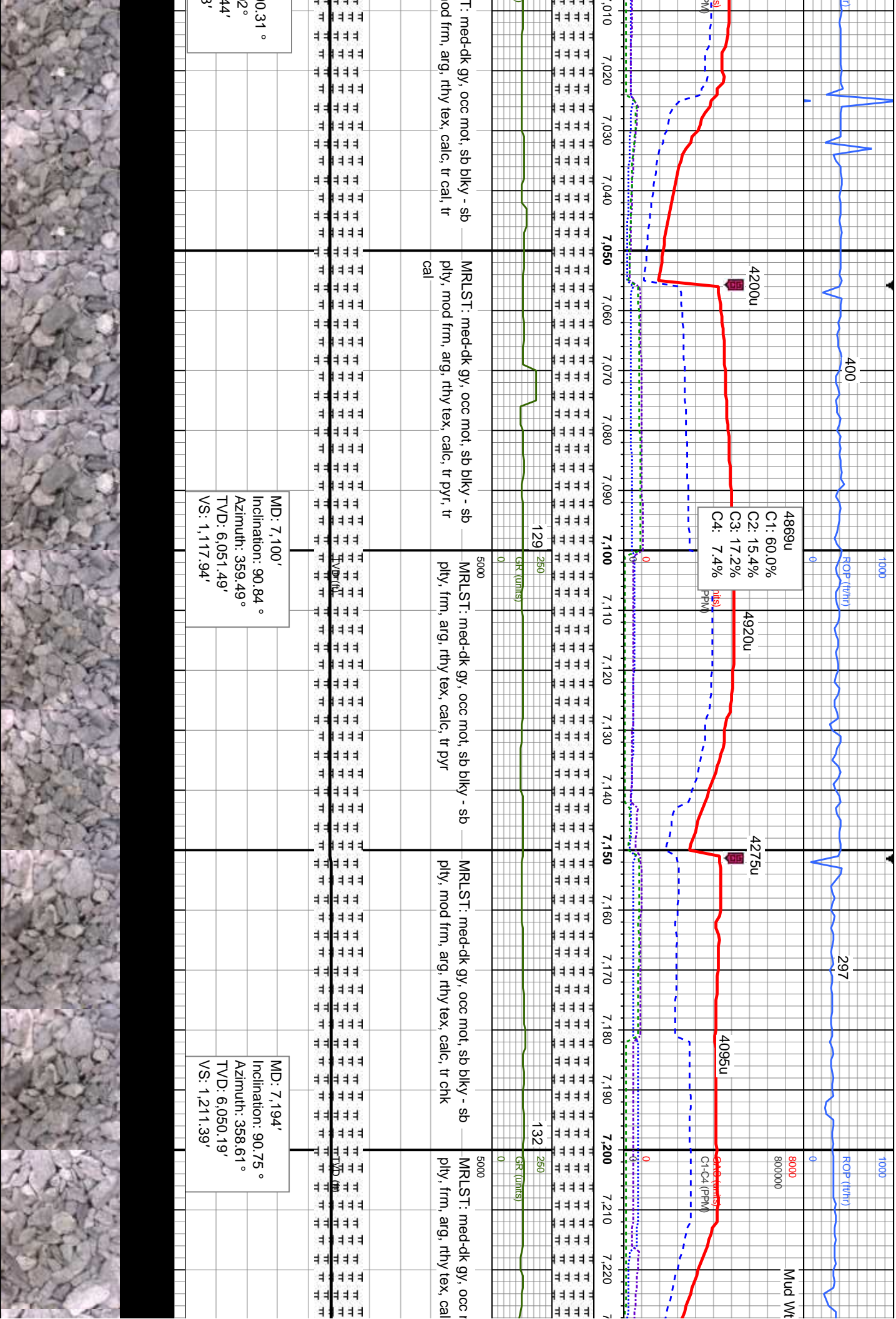
MRLLST: med-dk gy, occ mot, sb blkly - sb
plty, frm, arg, rthy tex, calc, tr pyr

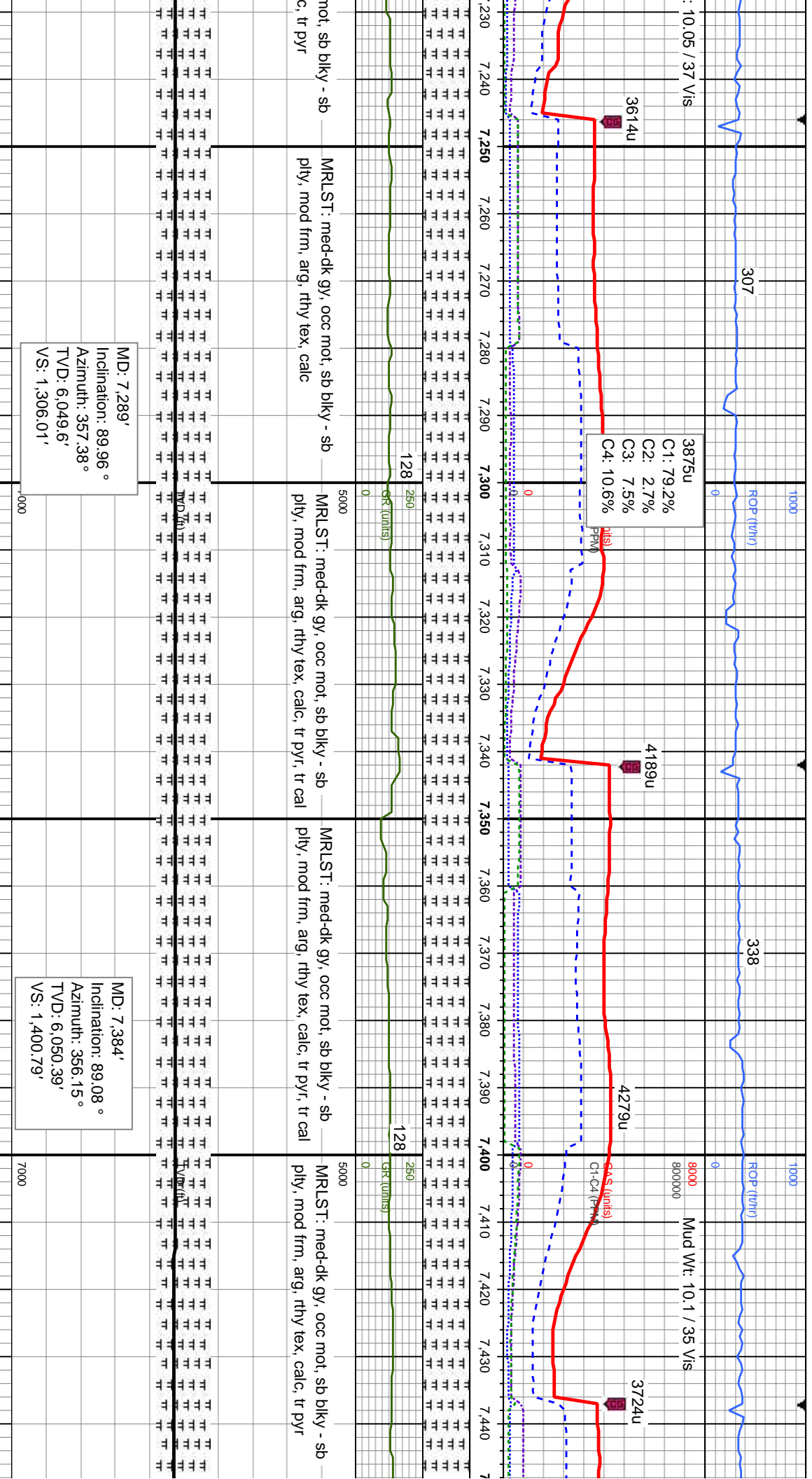
MD: 6.627'
Inclination: 86.09°
Azimuth: 0.37°
TVD: 6,042.12'
VS: 648.73'

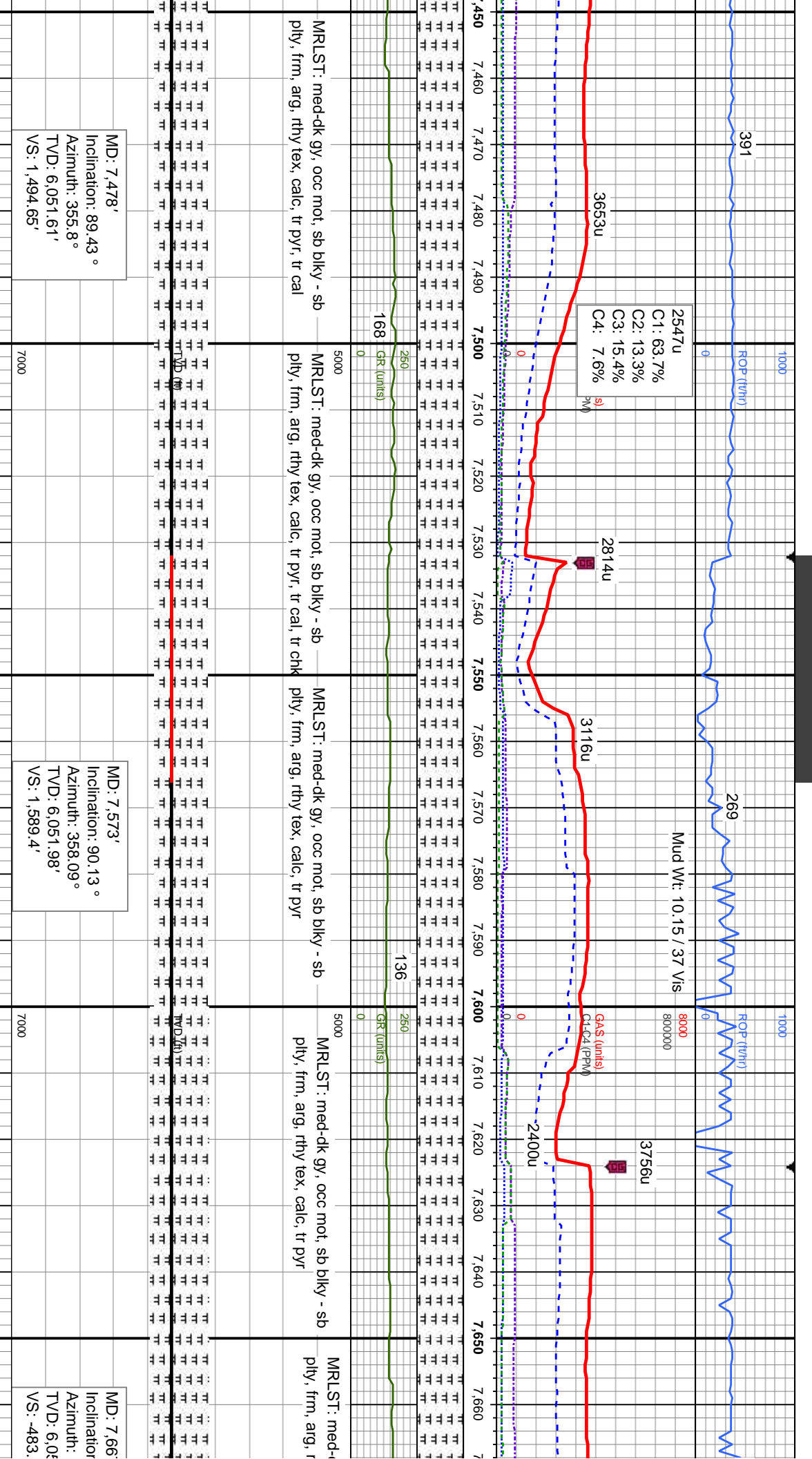
MD: 6.722'
Inclination: 88.81°
Azimuth: 0.55°
TVD: 6,046.35'
VS: 742.8'

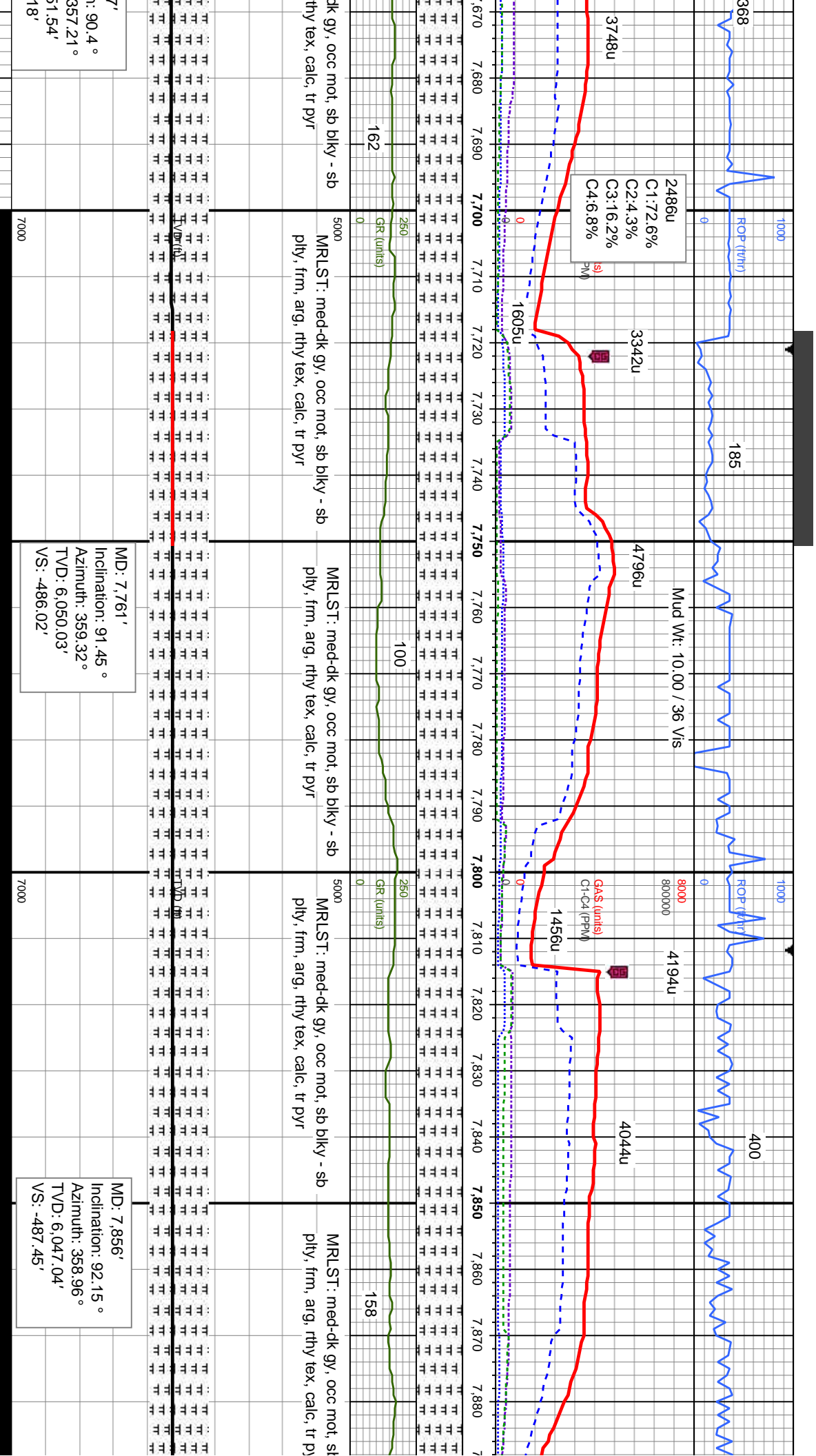


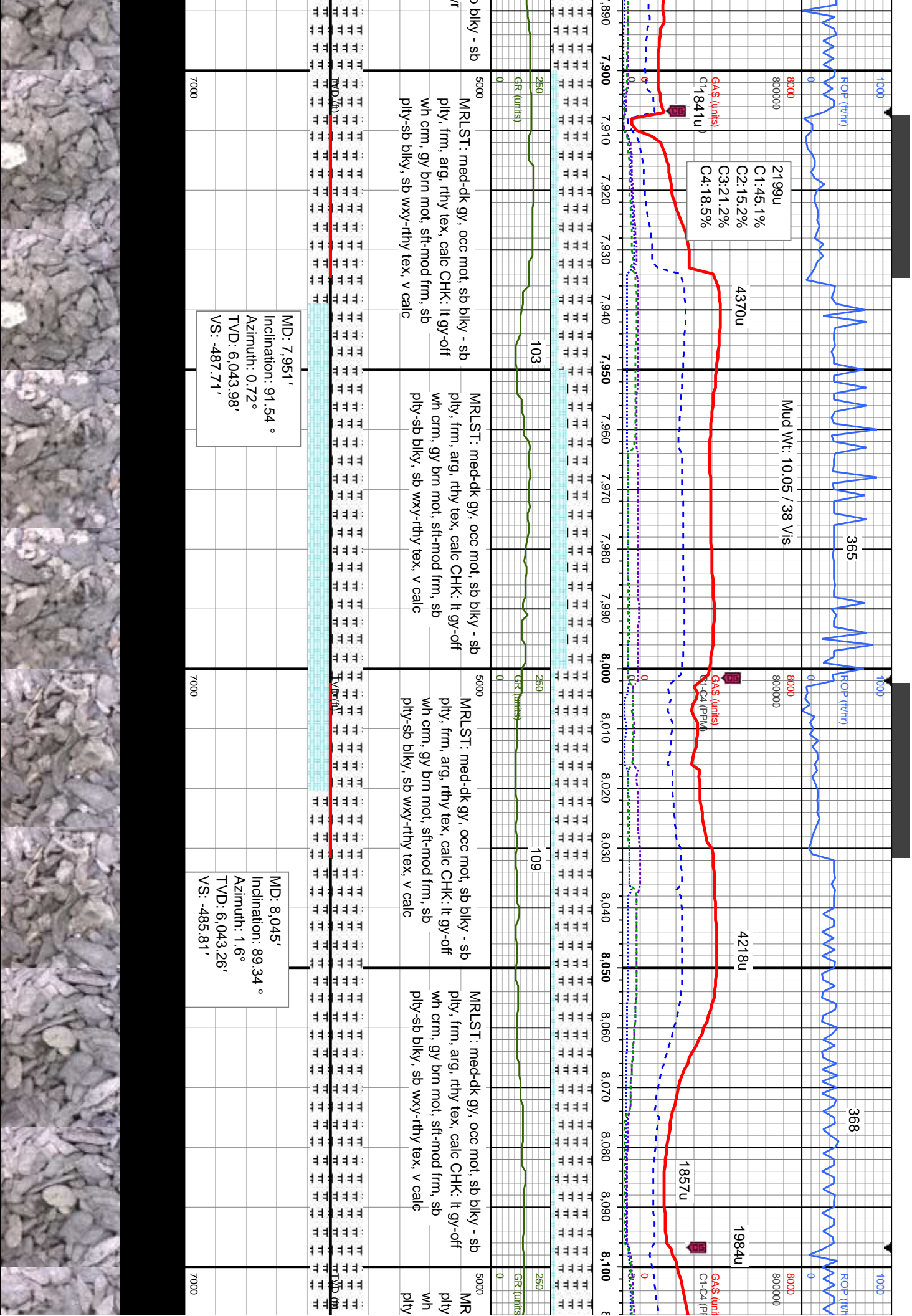


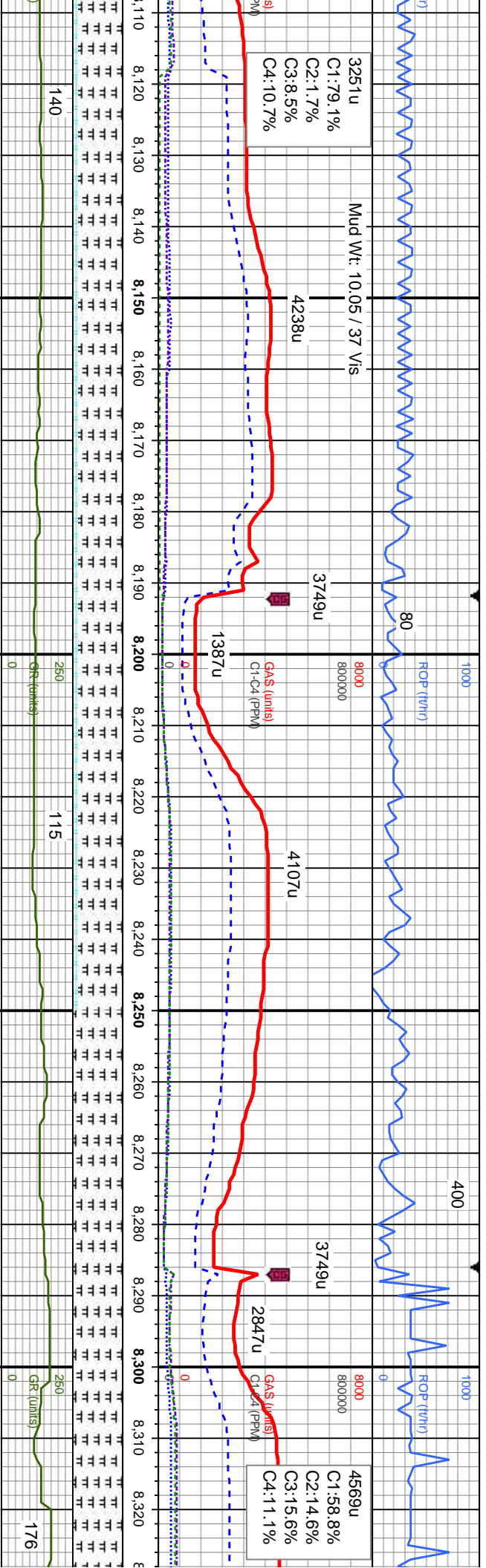












ST: med-dk gy, occ mot, sb biky - sb
frm, arg, rthy tex, calc CHK: lt gy-off
cm, gy brn mot, sft-mod frm, sb
-sb biky, sb wxy-rthy tex, v calc

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

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

MRLST: med-dk gy, occ mot, sb biky - sb
ply, frm, arg, rthy tex, calc, tr pyr

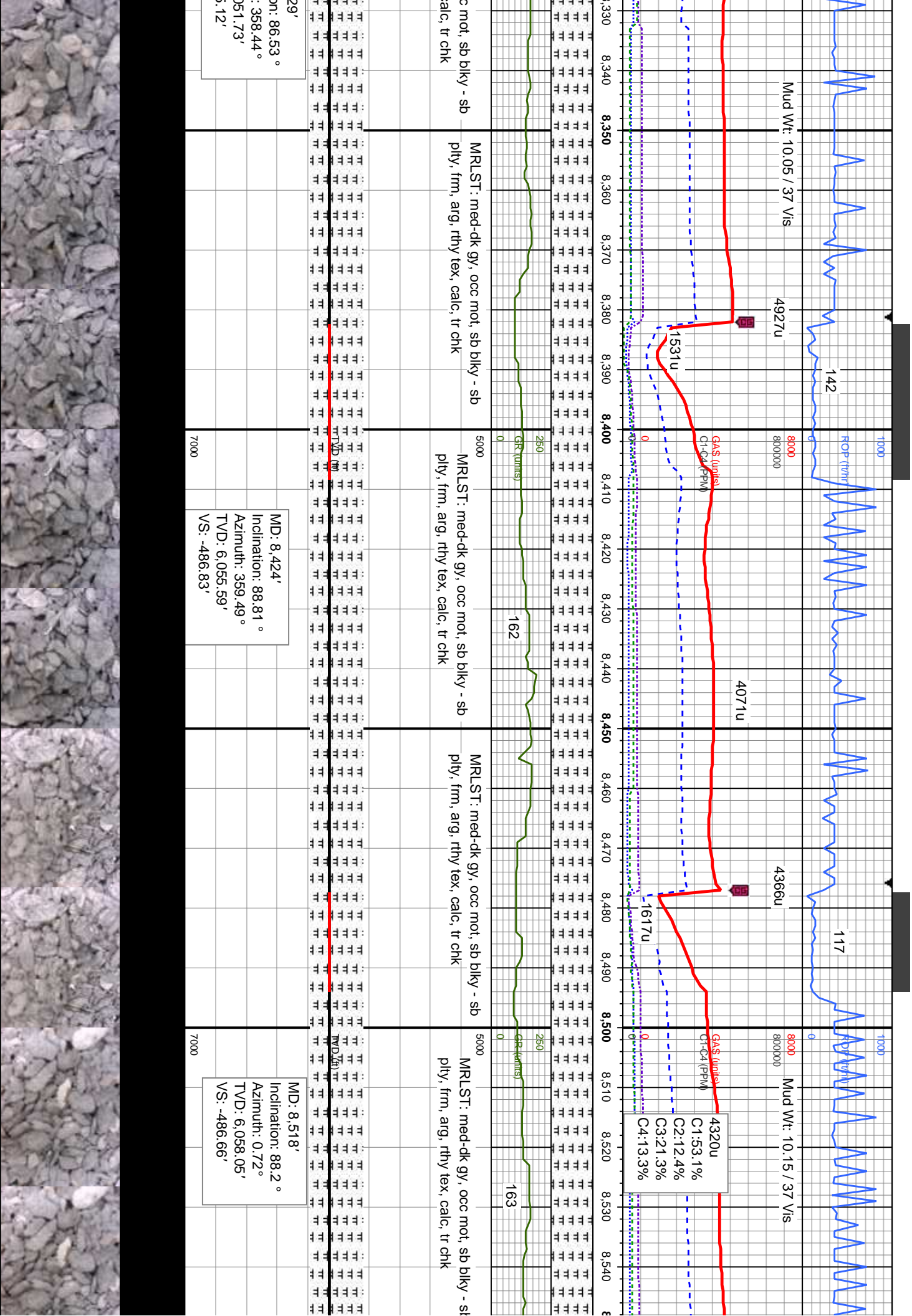
MRLST: med-dk gy, occ
ply, frm, arg, rthy tex, c

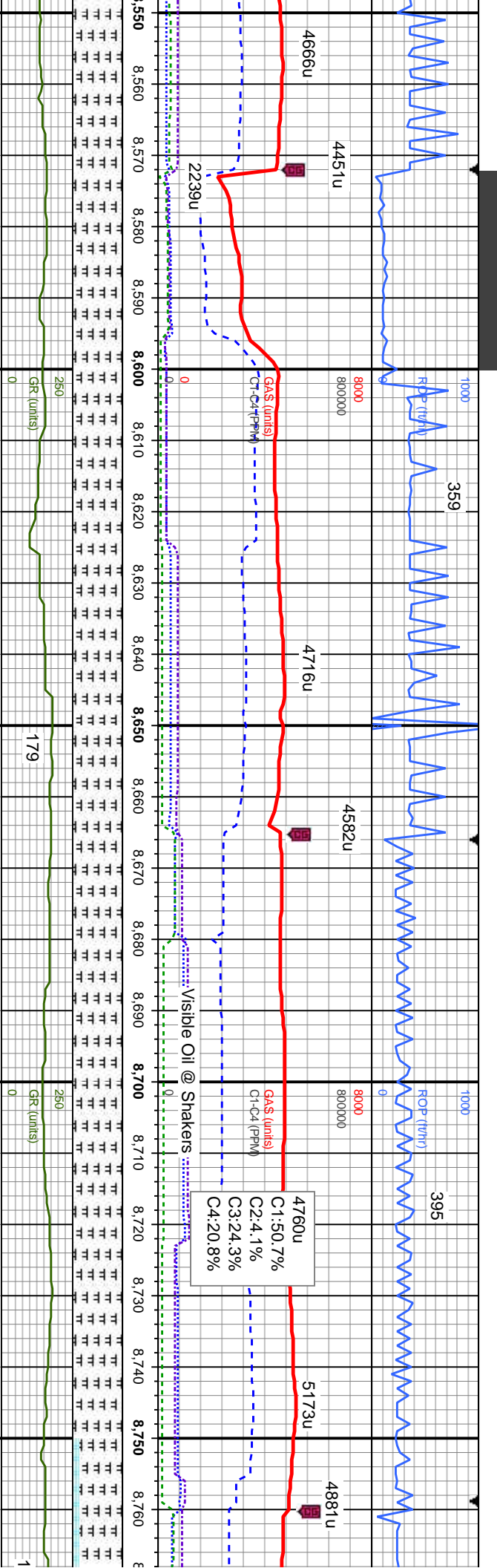
MD: 8,140'
Inclination: 90.04°
Azimuth: 1.42°
TVD: 6,043.78'
VS: -483.3'

MD: 8,235'
Inclination: 86.88°
Azimuth: 358.96°
TVD: 6,046.33'
VS: -482.99'

MD: 8,335'
Inclination: 86.88°
Azimuth: 358.96°
TVD: 6,046.33'
VS: -482.99'







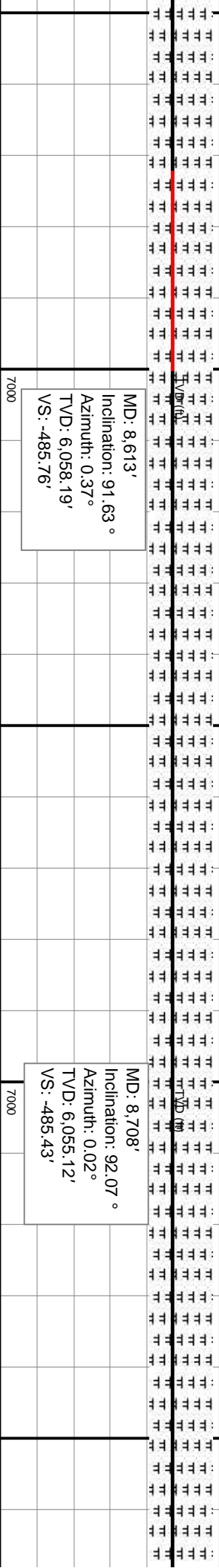
MRLST: med-dk gy, occ mot, sb blkly - sb
ply, frm, arg, rthy tex, calc, tr chk

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

MRLST: med-dk gy, occ mot, sb blkly - sb
ply, frm, arg, rthy tex, calc, o flor

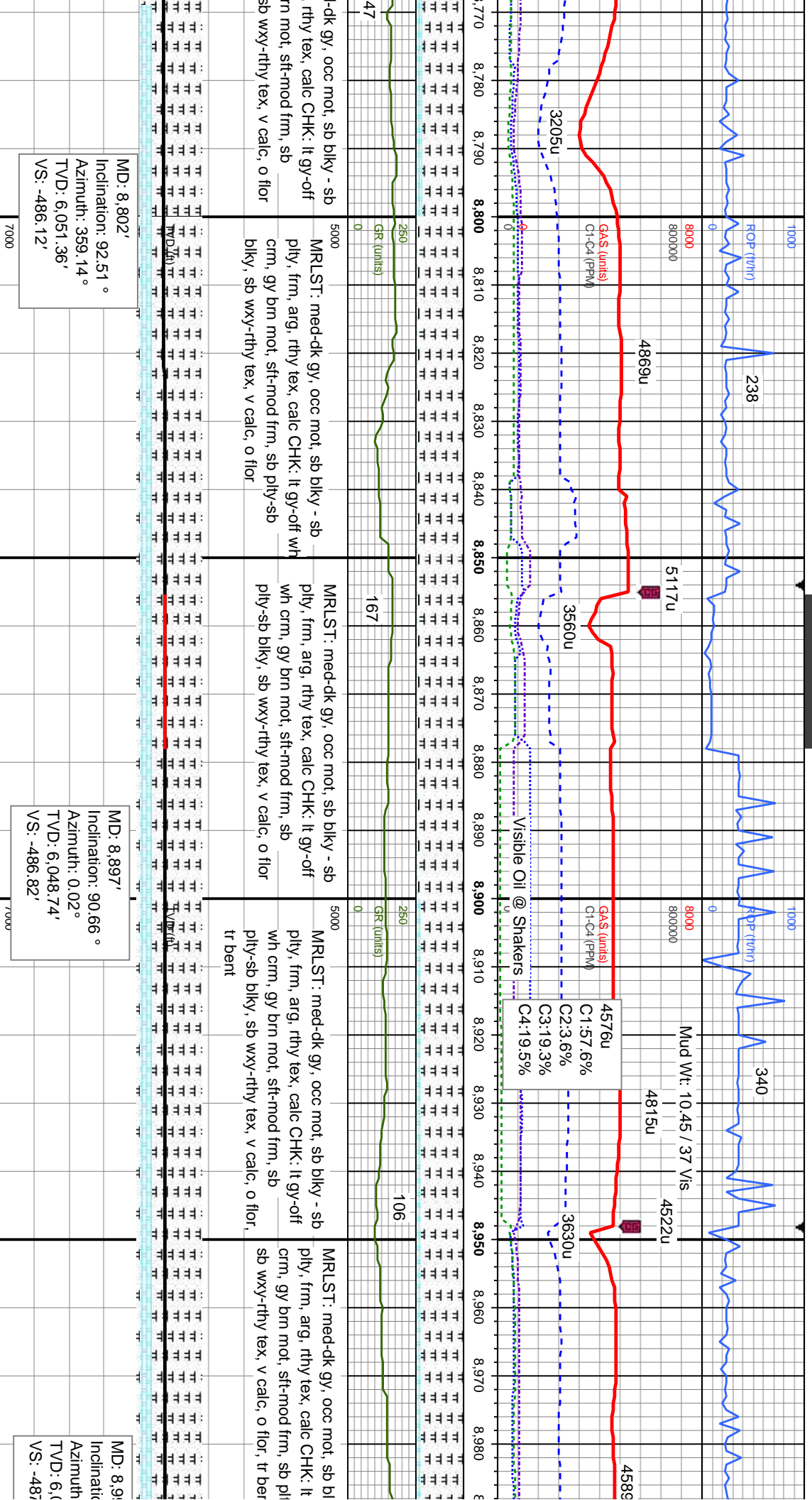
MRLST: med-dk gy, occ mot, sb blkly - sb
ply, frm, arg, rthy tex, calc, tr chk, o flor

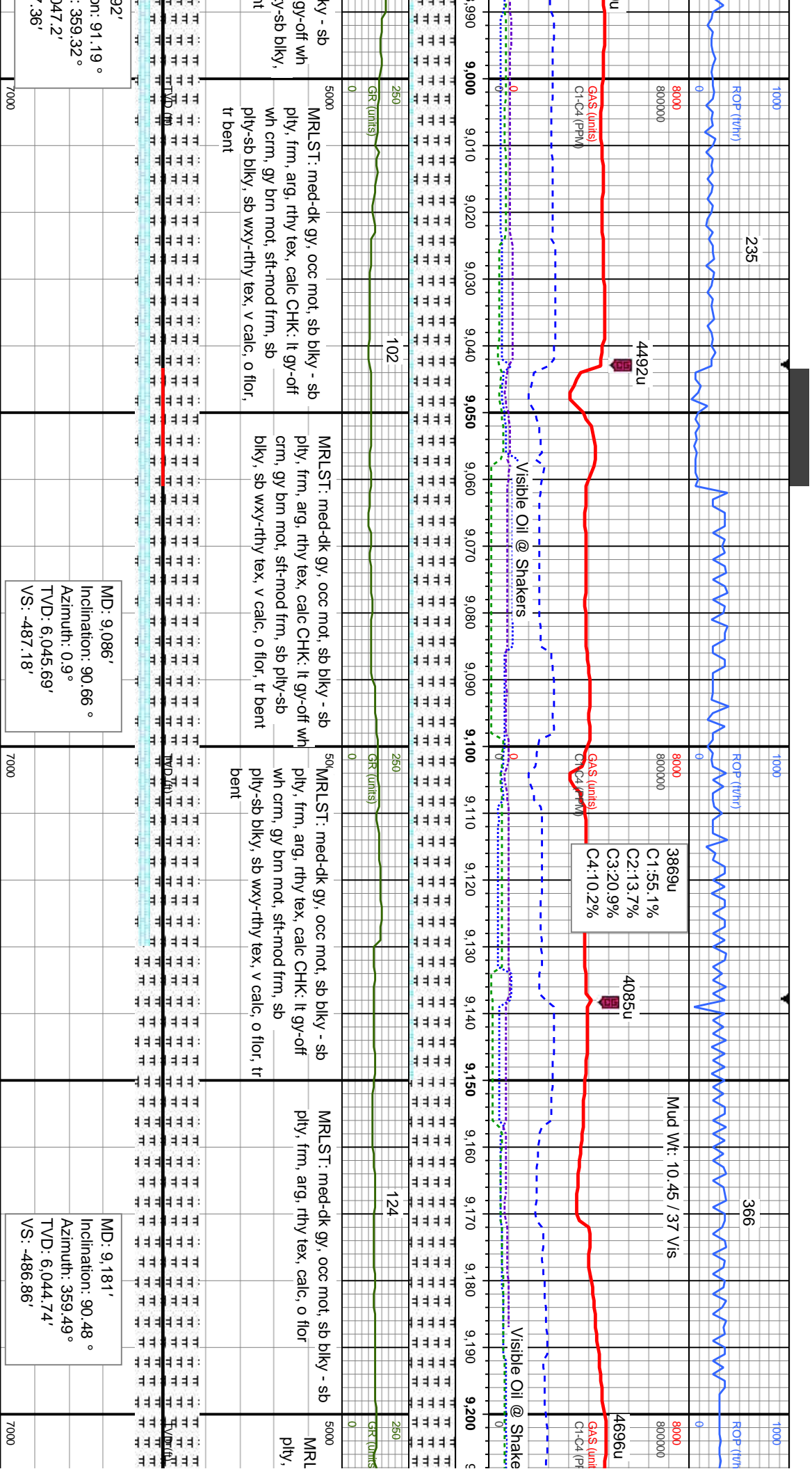
MRLST: med-dk gy, occ mot, sb blkly - sb
ply, frm, arg, rthy tex, calc, tr chk, o flor

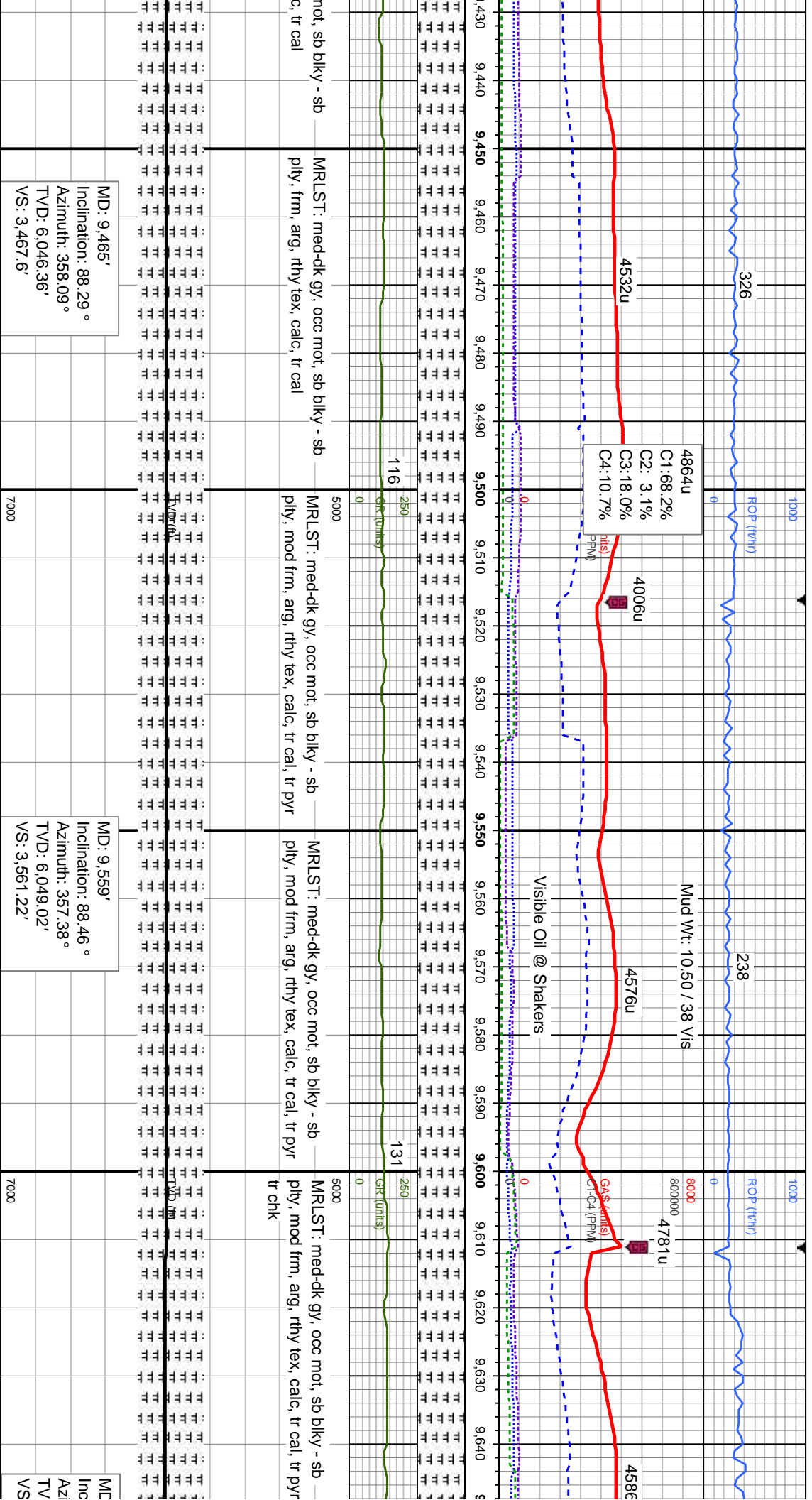


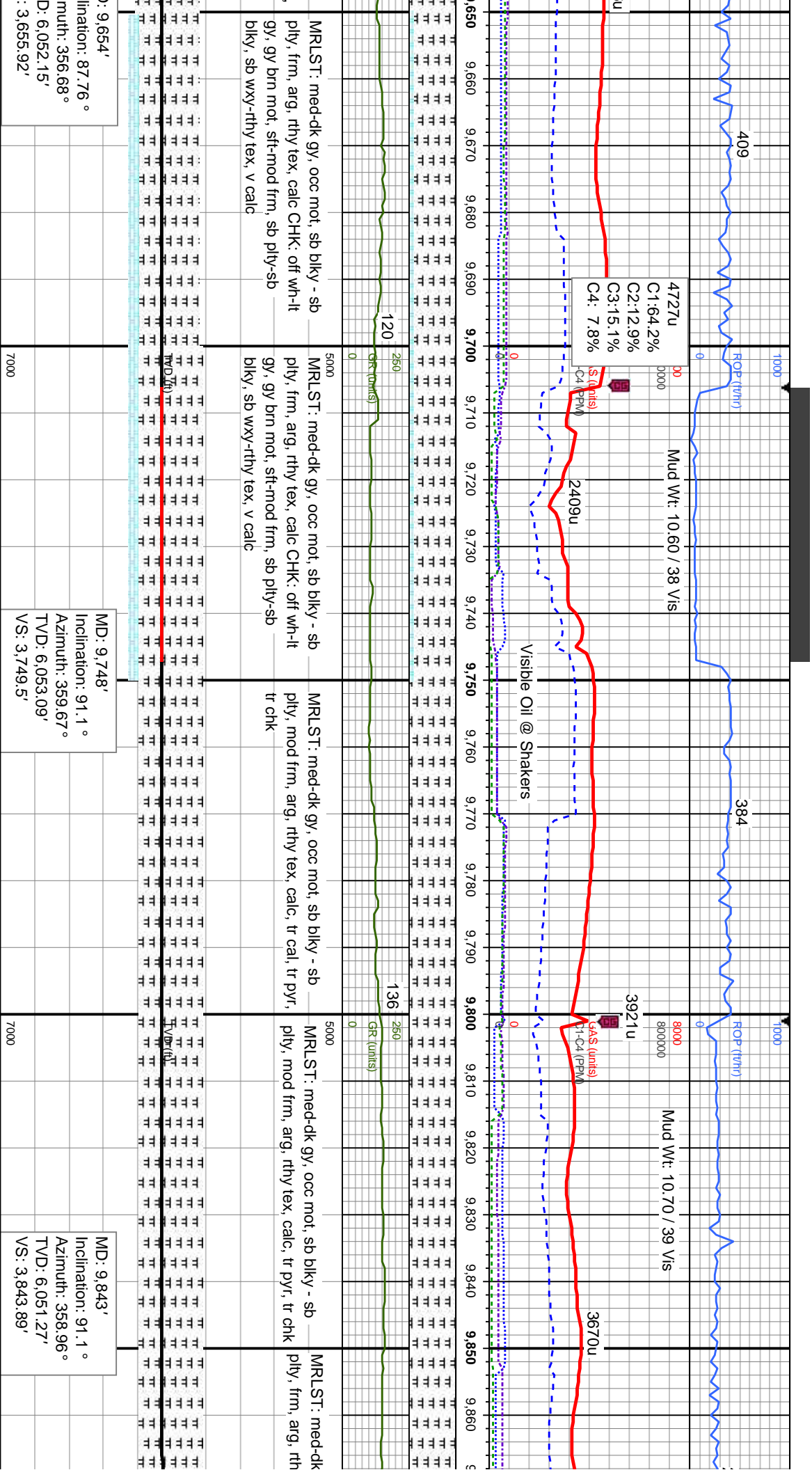
MD: 8,613'
Inclination: 91.63 °
Azimuth: 0.37°
TVD: 6,058.19'
VS: -485.76'

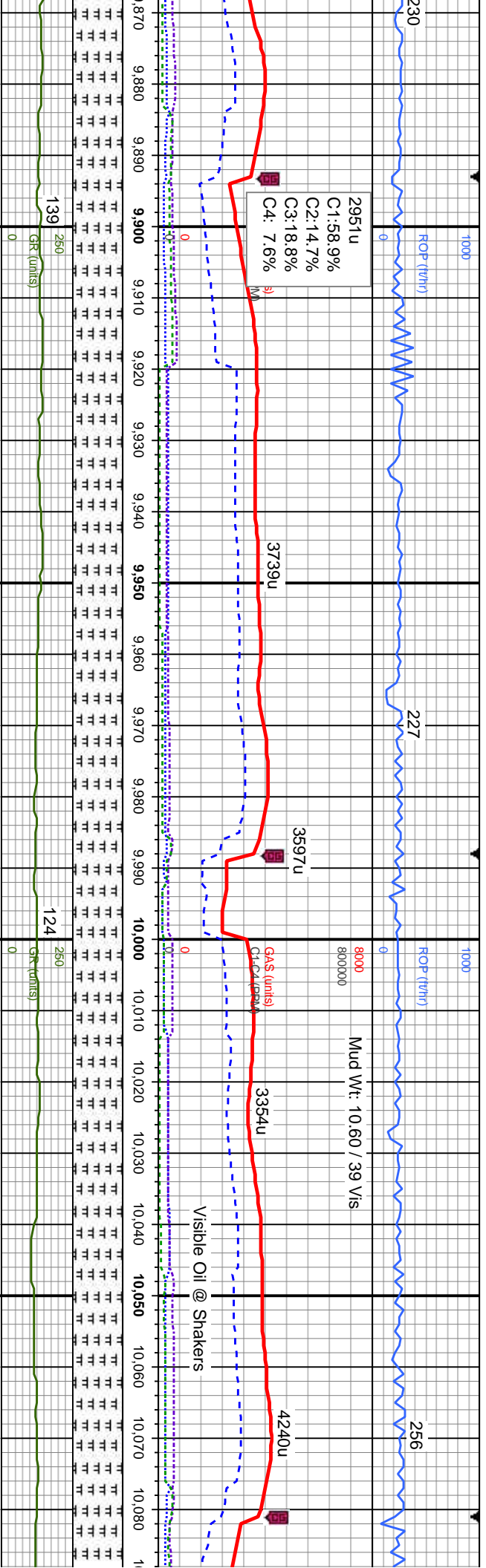
MD: 8,708'
Inclination: 92.07 °
Azimuth: 0.02°
TVD: 6,055.12'
VS: -485.43'











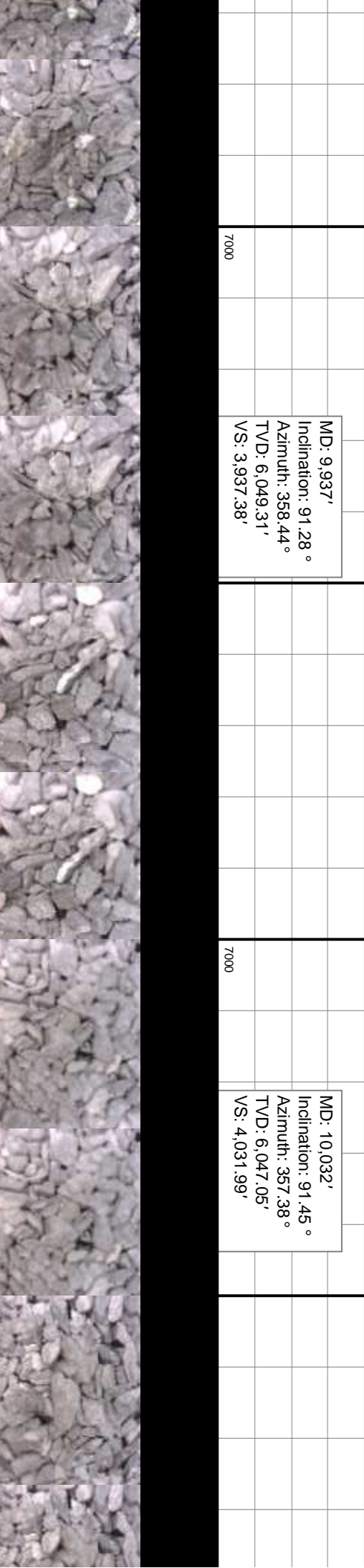
gy, occ mot, sb blkly - sb
y tex, calc, tr pyr, tr chk

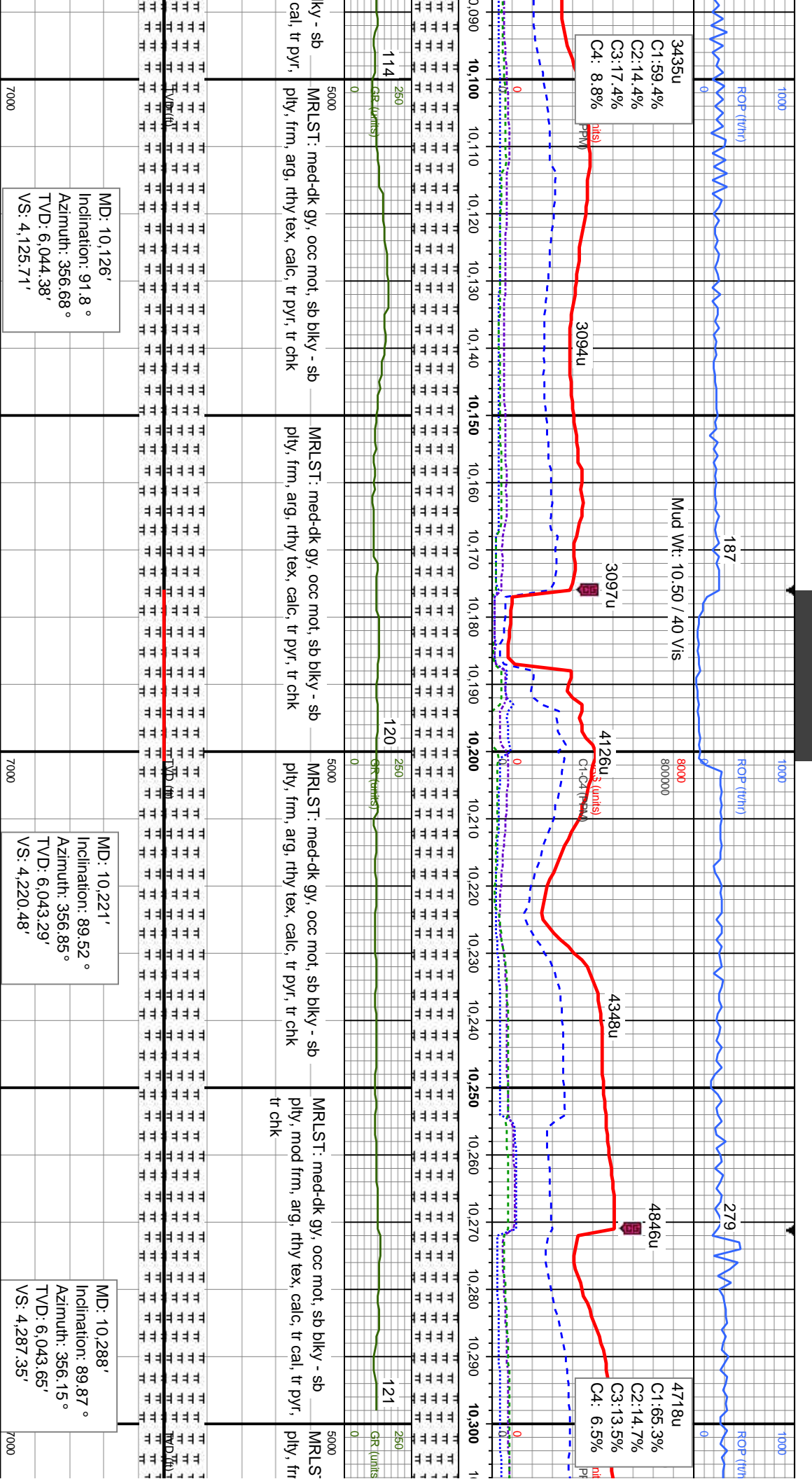
MD: 9.937'
Inclination: 91.28°
Azimuth: 358.44°
TVD: 6.049.31'
VS: 3.937.38'

MD: 10.032'
Inclination: 91.45°
Azimuth: 357.38°
TVD: 6.047.05'
VS: 4.031.99'

MD: 9.937'
Inclination: 91.28°
Azimuth: 358.44°
TVD: 6.049.31'
VS: 3.937.38'

MD: 10.032'
Inclination: 91.45°
Azimuth: 357.38°
TVD: 6.047.05'
VS: 4.031.99'



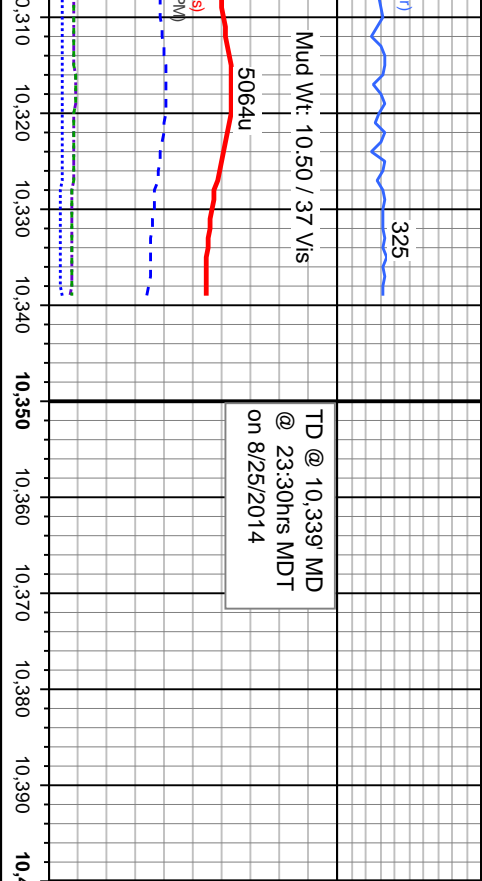


MD: 10,126'
Inclination: 91.8 °
Azimuth: 356.68 °
TVD: 6,044.38'
VS: 4,125.71'

MD: 10,221'
Inclination: 89.52 °
Azimuth: 356.85 °
TVD: 6,043.29'
VS: 4,220.48'

MD: 10,288'
Inclination: 89.87 °
Azimuth: 356.15 °
TVD: 6,043.65'
VS: 4,287.35'





10,310 10,320 10,330 10,340 10,350 10,360 10,370 10,380 10,390 10,400

med-dk gy, occ mot, sb blk - sb
n, arg, rthy tex, calc, tr pyr, tr chk

PROJ TO BIT

MD: 10,339'
Inclination: 89.87°
Azimuth: 356.15°
TVD: 6,043.76'
VS: 4,338.27'

Wellsite Geological Services
Provided By Columbine
Logging, Thank You!

