



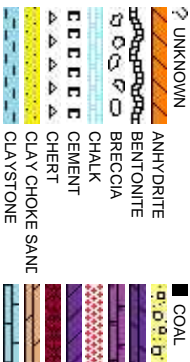
Scale: 5" / 100'  
Measured Depth Log

Well Name	Cutthroat LC28-78HNB(HORZ)		
Location	SESW, SEC 28, T9N, R59W		
State	COLORADO	County	WELD
Country	USA		
API Number	05-123-38846		
Region	DJ BASIN	Field	WILDCAT
Spud Date	8/14/2014	Drilling Completed	8/20/2014
Surface Coordinates	SESW, SEC 28, T9N, R59W 340' FSL, 1355' FWL 40.71499 -103.98751		
Ground Elevation	4862'	K.B. Elevation	4892'
Logged Interval	628'	To	10424'
Formation	NIOBRARA-B MARL		
Type of Drilling Fluid	LSND		
Total Depth	10424'		

Company Noble Energy Inc  
Address 1625 Broadway Suite  
Denver, CO 80202

Name EVAN HOWELL  
Company NOBLE ENERGY INC  
Address 1625 Broadway Suite  
Denver, CO 80202

COLUMBINE LOGGING INC.



Operator

2000

Geologist

2000

Other  
MIKE KERSCHEN  
COLLIN METZ

Rock Types

CONGLOMERATE

DOLomite

DOLomite Limestone

Granite

Gypsum

igneous

Siderite or Limonite

Limestone

Marlstone

Metamorphic

No Sample

SALT

SANDSTONE

SALT-PEPPER SANt

SHALE

SHALE COLORED

SHALE GRAY

SHALY SANDSTONE

SHALY SILTSTONE

SILTY SHALE

SILTSTONE

TILL

WELDED TUFF

Accessories

GASTROPOD

INOCERAMUS

OOLITE

OSTRACOD

PELECYPOD

BIOLASTIC

BRACHIOPOD

BRYOZOA

CEPHALOPOD

CORAL

CRINOID

ECHINOID

FISH

FORAMINIFERA

F FOSSIL

ARGILLITE GRAIN

B BENTONITE

BITUMENOUS SUBSTANCE

BRECCIA FRAGMENTS

CALCAREOUS

CARBONACEOUS FLAKES

CHITDK

CHTLT

COAL - THIN BEDS

DOLOMITIC

SCAPHOPOD

STROMATOPOROID

FERRUGINOUS PELLET

FERRUGINOUS

GLAUCONITE

GYPsIFEROUS

HEAVY MINERAL

K KAOLIN

MARLSTONE

MICACEOUS

MINERAL CRYSTALS

NDULES

PHOSPHATE PELLETS

P PYRITE

SALT CAST

SANDY

SILICEOUS

SILTY

TUFFACEOUS

ANHYDRITE STRINGER

BENTONITE STRINGER

COAL STRINGER

DOLomite STRINGER

GYPsUM STRINGER

LIMESTONE STRINGER

MARLSTONE (CALC) STRG

MARLSTONE (DOL) STRG

SANDSTONE STRINGER

SHALE STRINGER

SILTSTONE STRINGER

Other Symbols

OIL SHOW

DEAD

EVEN

QUESTIONABLE

SPOTTED STAINING

CONNECTION (UP)

CONNECTION (DOWN)

CONNECTION GAS (LEFT)

TRIP GAS

TRIP GAS (LEFT)

INTERCRYSTALLINE

INTEROOLITIC

MOLDIC

ORGANIC

ENGINEERING

BIT

GAS SHOW

OIL SHOW

FORMATION TOP

DRILL STEM TEST

MN DEPTH

WIRELINE TESTED - LEFT

WIRELINE TESTED - RT

FINELyXLN

L LITHOGRApHIC

MX MICROXLN

MUDSTONE

TEXTURES

P POOR

W WELL

M MODERATE

Sorting

Sorting

Textures

Rounding

Engineering

Oil Show

Slide/Rotate

ROP

ROF

Total Gas & Chromatograph

GAS

C1

C2

C3

C4

Depth Labels

% Lith

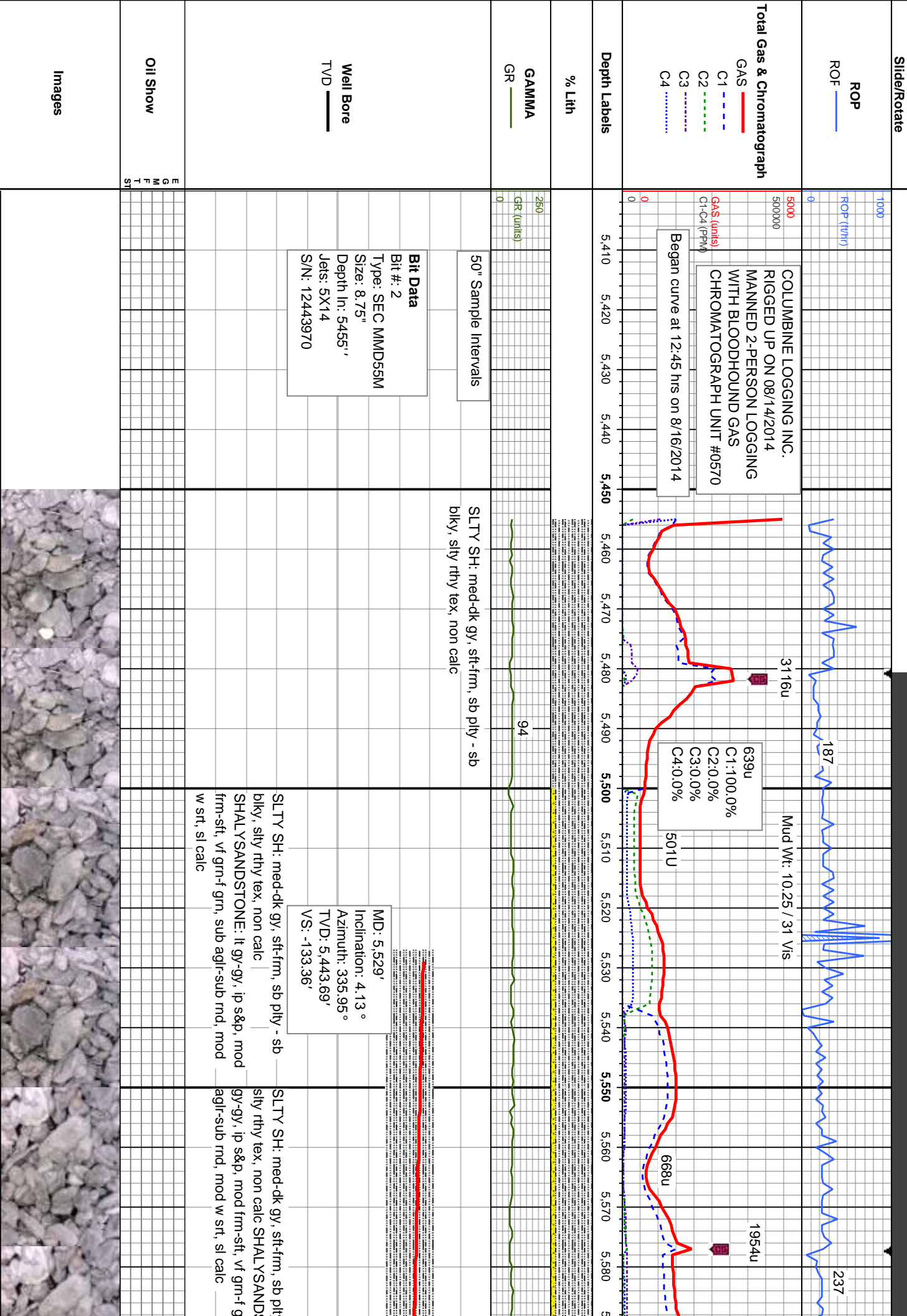
GAMMA

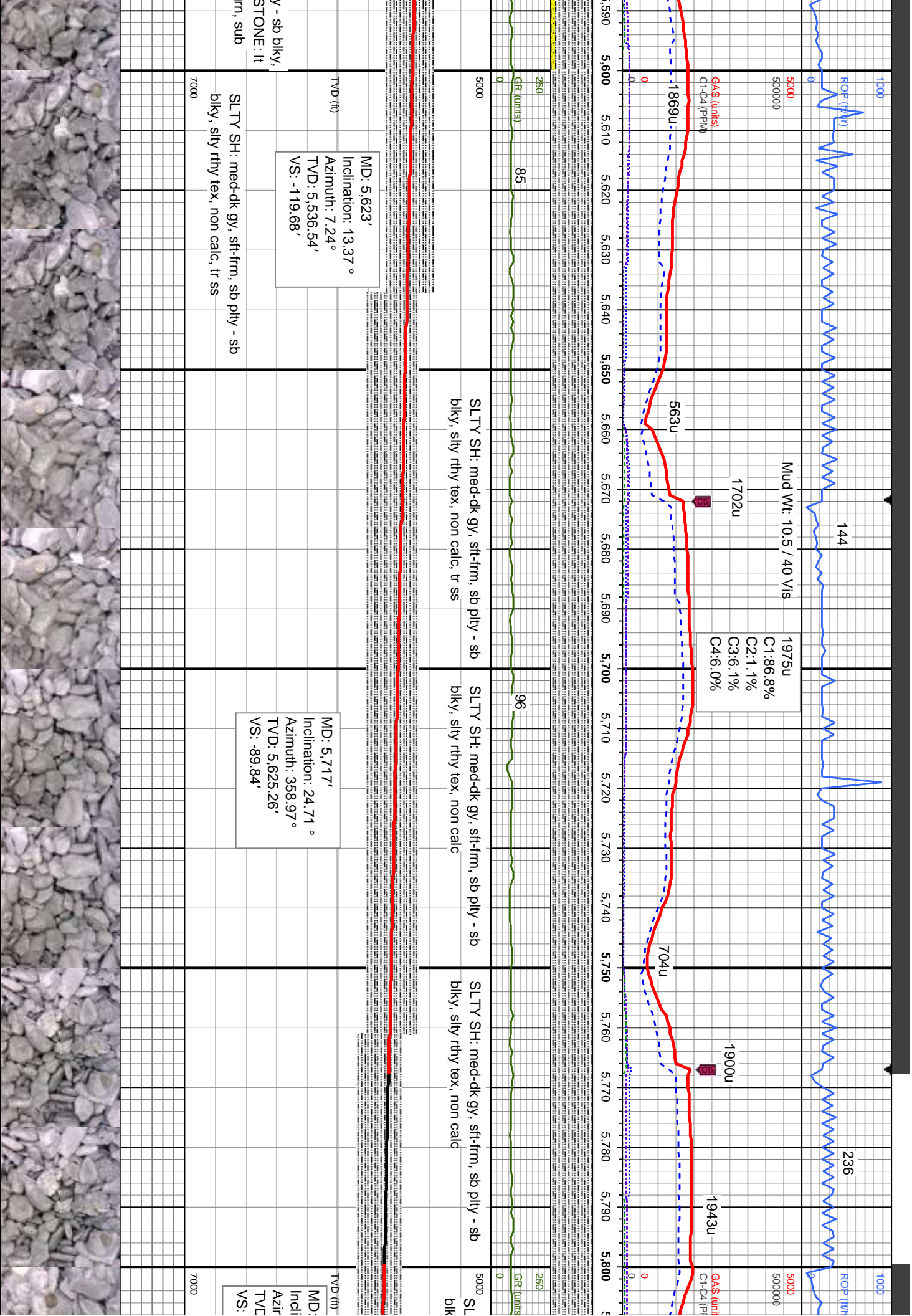
GR

Well Bore  
TVD

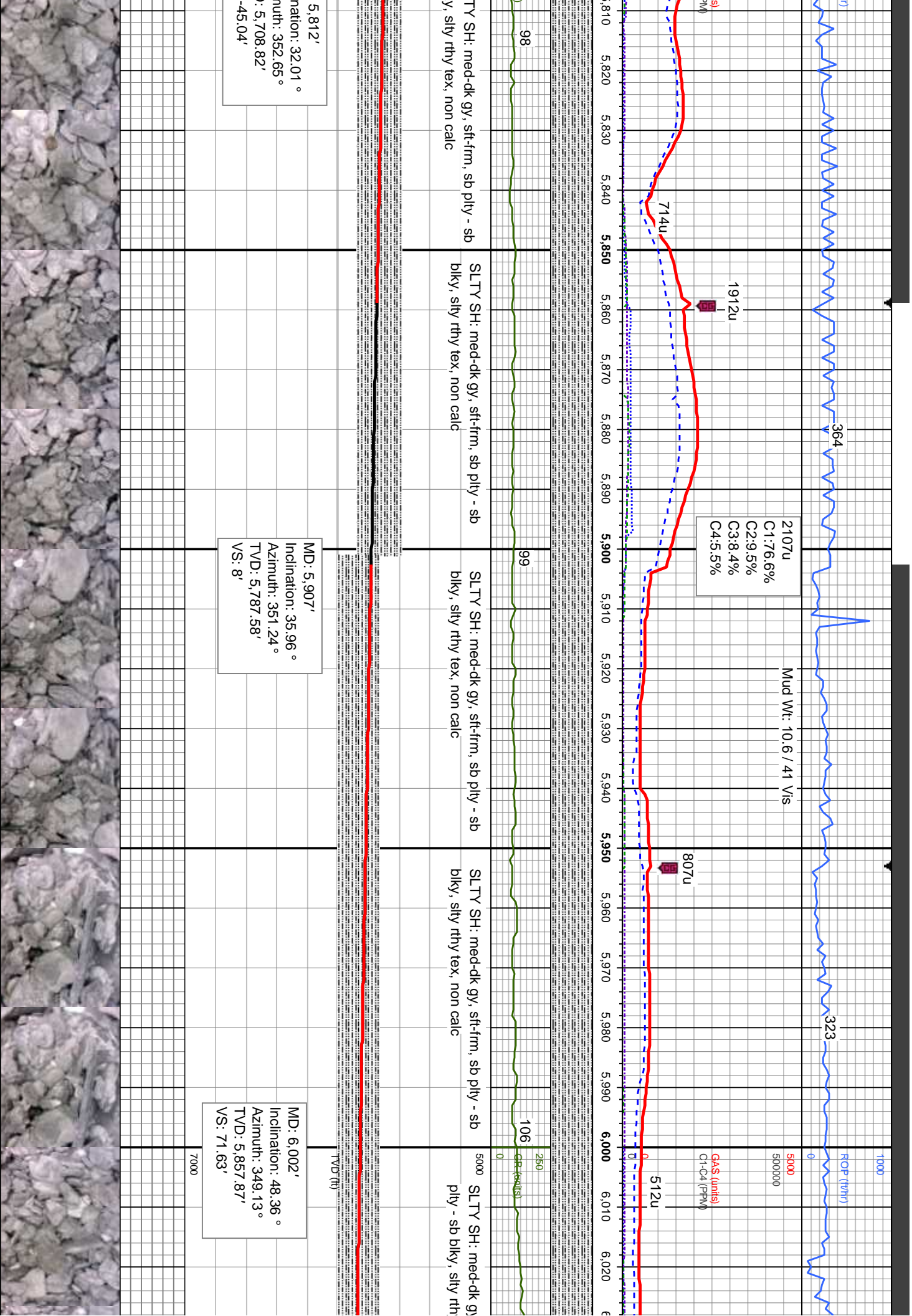
Oil Show

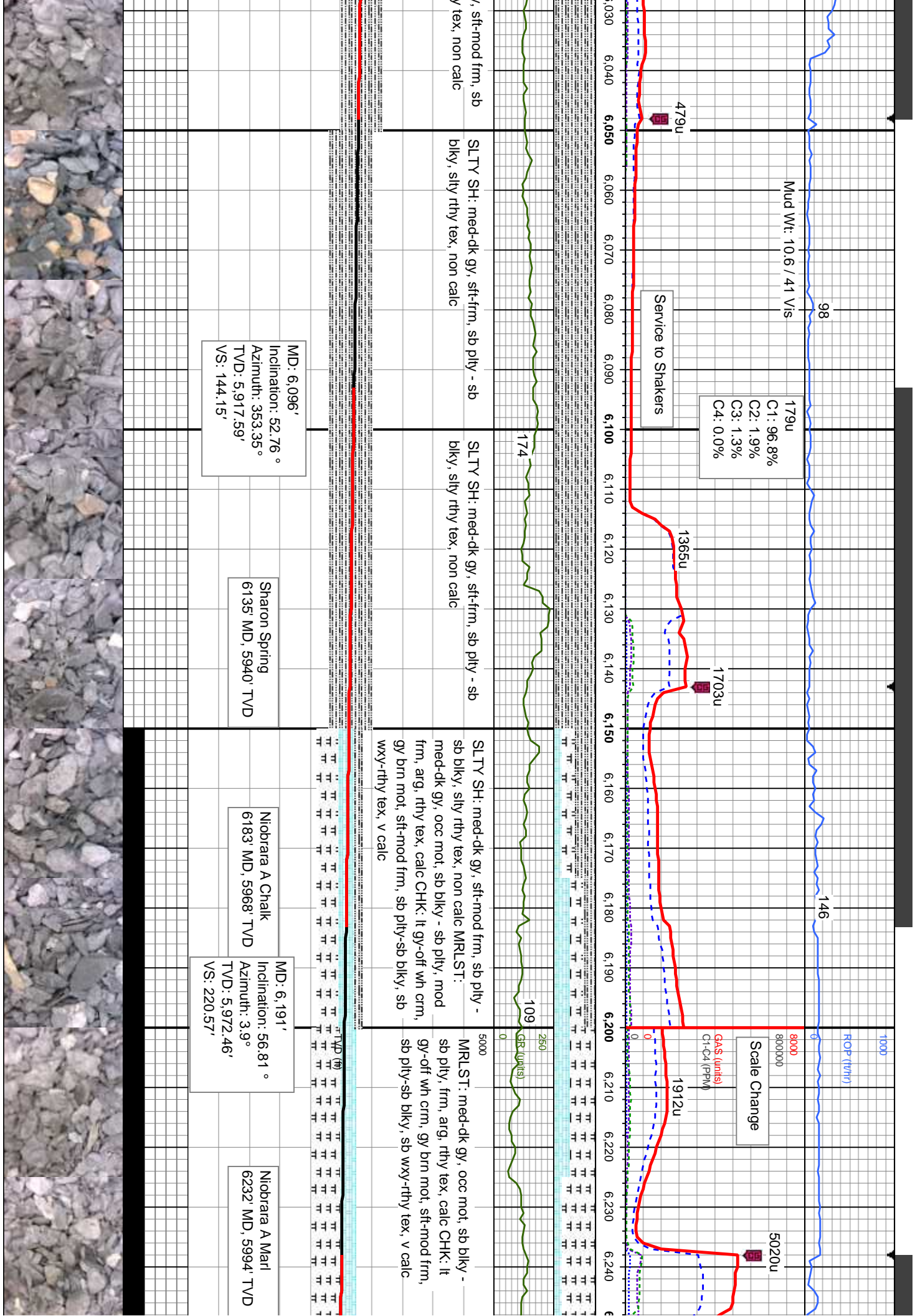
Images



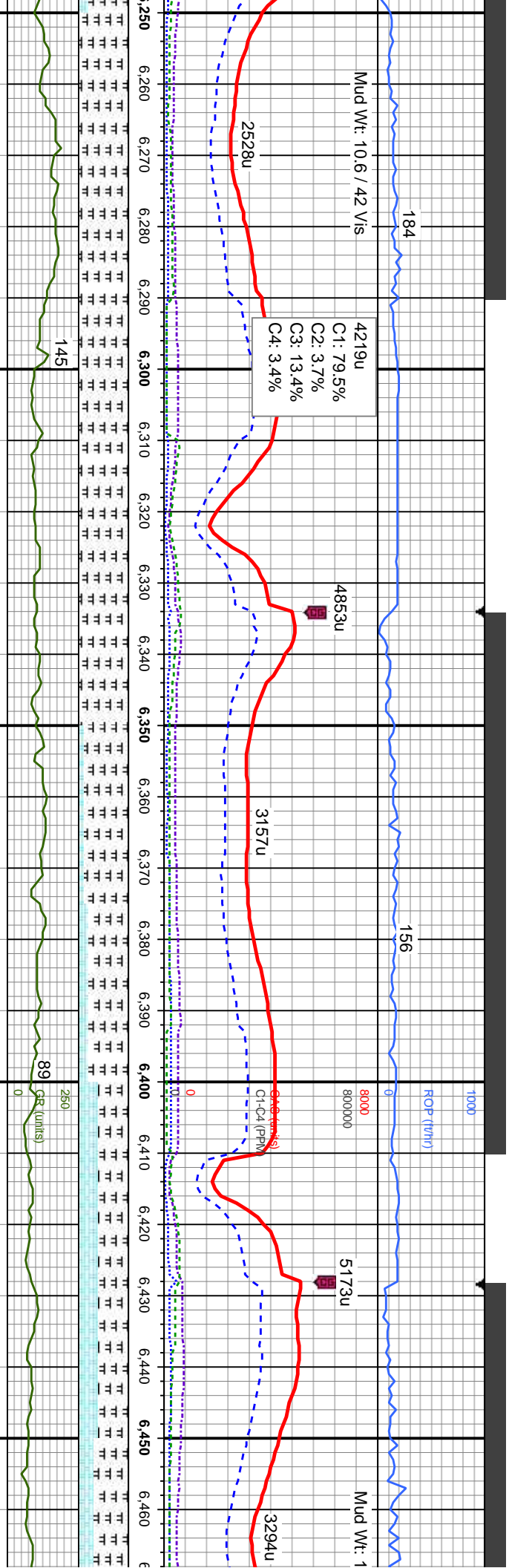












MRLST: med-dk gy, occ mot, sb blkly - sb  
ply, mod frm, arg, rthy tex, calc, tr chk

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

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

CHK: it gy-off wh crm, 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

MRLST: med-c  
sb ply, frm, arg  
gy-off wh crm,  
sb ply-sb blkly,

MD: 6,285'  
Inclination: 60.59 °  
Azimuth: 1.43 °  
TVD: 6,021.29'  
VS: 298.78'

MD: 6,380'  
Inclination: 67.45 °  
Azimuth: 359.68 °  
TVD: 6,062.89'  
VS: 382.57'

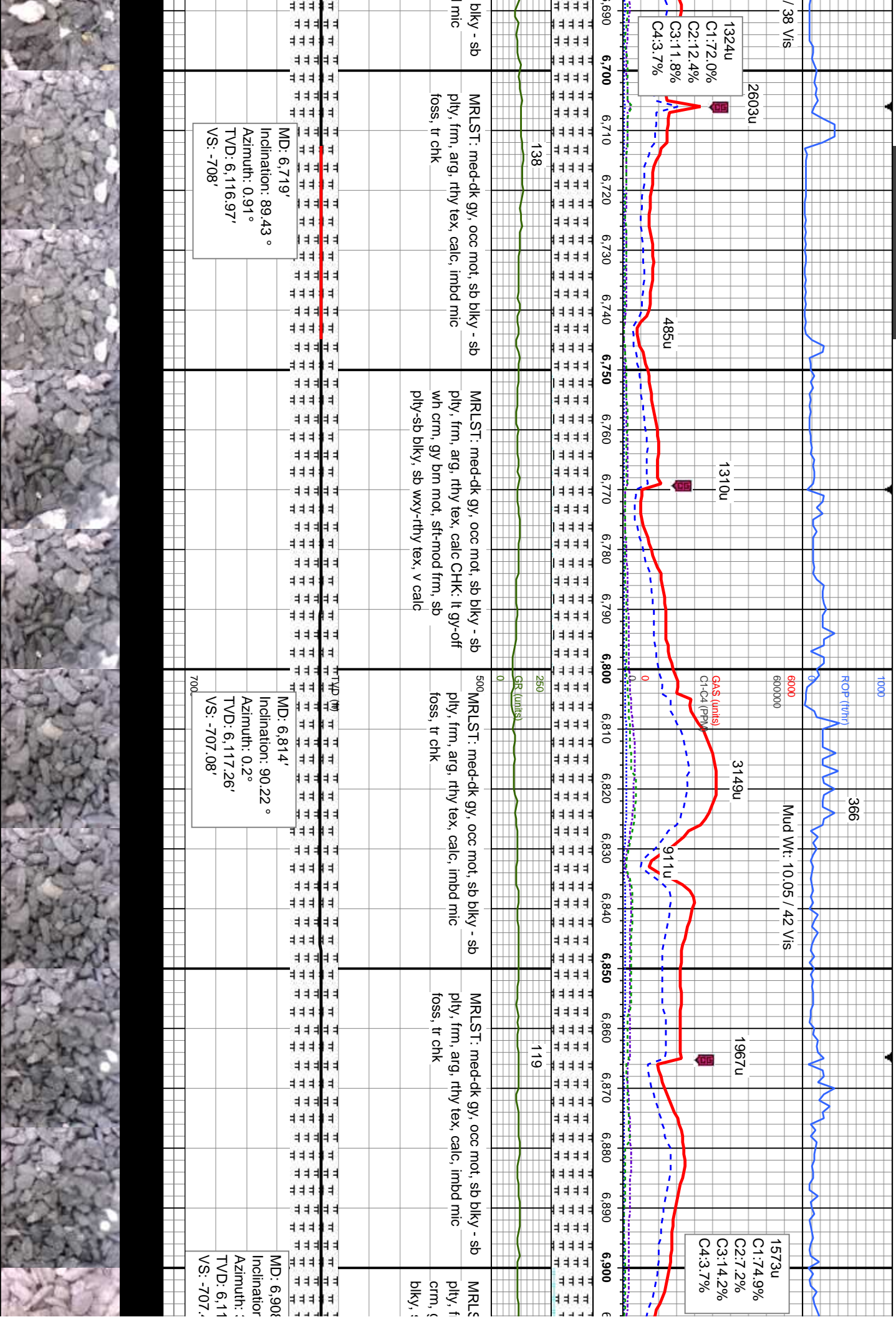
Niobrara B Chalk  
6404' MD, 6070' TVD

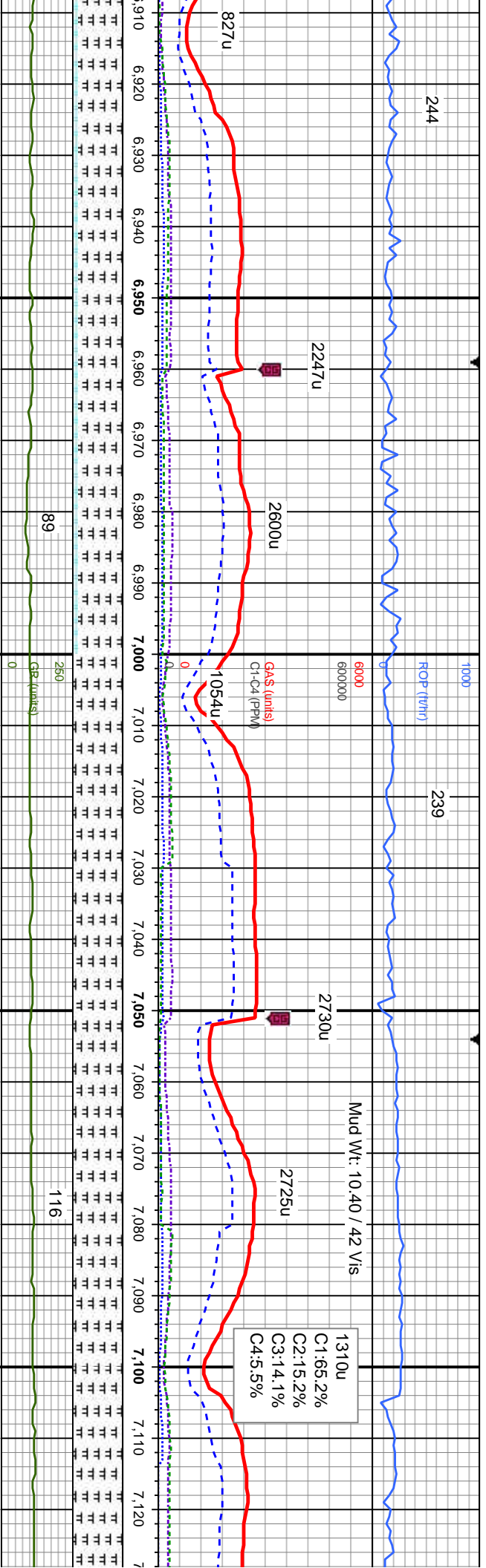
MD  
Incl  
Azi  
TVD  
VS











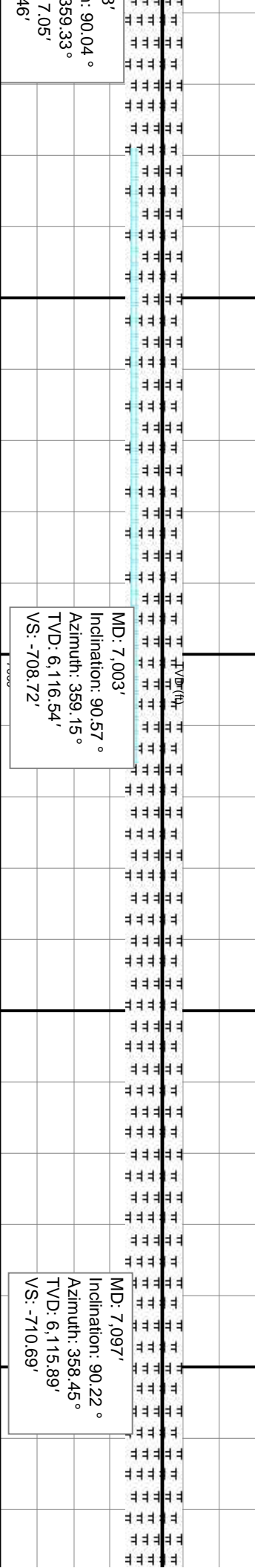
med-dk gy, occ mot, sb blkly - sb  
frm, arg, rthy tex, calc CHK: lt gy-off wh  
gy brn mot, sft-mod frm, sb pily-sb  
sb wxy-rthy tex, v calc

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

MRLST: med-dk gy, occ mot, sb blkly - sb  
pily, frm, arg, rthy tex, calc, occ imbd mic  
foss, tr chk

MRLST: med-dk gy, occ mot, sb blkly - sb  
pily, mod frm-frm, arg, rthy tex, calc, occ  
imbd mic foss, tr chk

MRLST: med-dk gy, occ  
pily, frm, arg, rthy tex, c  
foss, tr chk

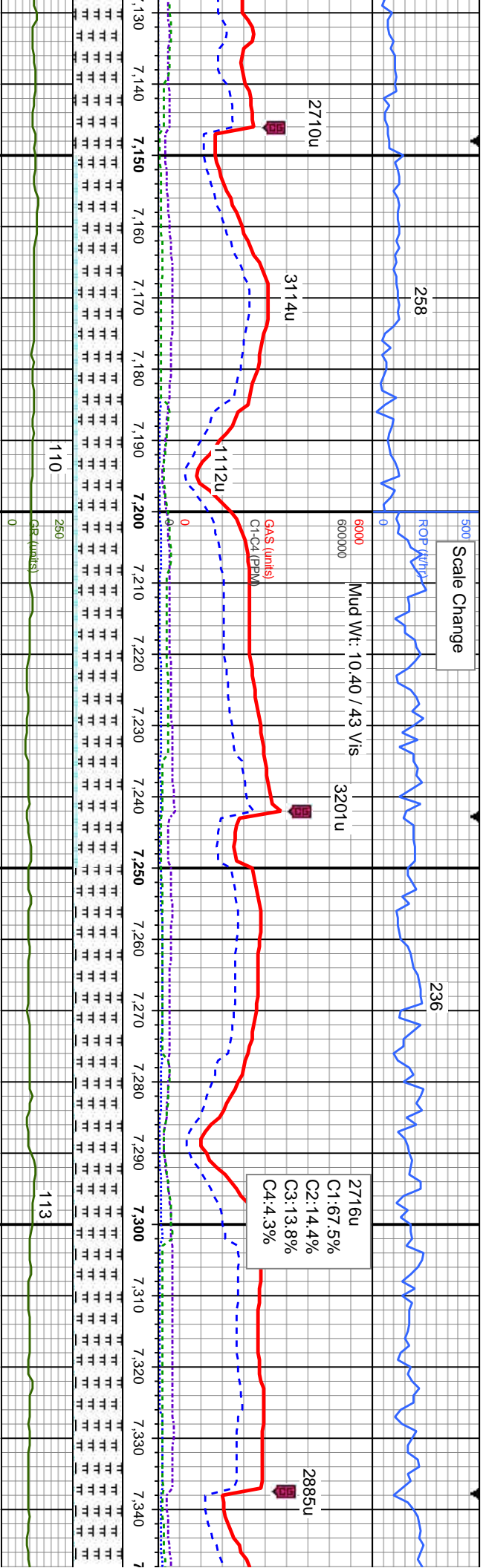


MD: 7.003'  
Inclination: 90.57°  
Azimuth: 359.15°  
TVD: 6,116.54'  
VS: -708.72'

MD: 7.097'  
Inclination: 90.22°  
Azimuth: 358.45°  
TVD: 6,115.89'  
VS: -710.69'







calc, occ imbd mic

MRSLT: med-dk gy, occ mot, sb blkly - sb  
ply, frm, arg, rthy tex, calc, occ imbd mic  
foss, CHK: lt gy-off wh crm, gy brn mot,  
sft-mot frm, sb ply-sb blkly, sb wxy-rthy  
tex, v calc

MD: 7,192'  
Inclination: 90.4°  
Azimuth: 358.62°  
TVD: 6,115.38'  
VS: -713.12'

MD: 7,297'  
Inclination: 90.13°  
Azimuth: 358.62°  
TVD: 6,114.89'  
VS: 1,279.27'

calc, occ imbd mic

MRSLT: med-dk gy, occ mot, sb blkly - sb  
ply, frm, arg, rthy tex, calc, occ imbd mic  
foss, CHK: lt gy-off wh crm, gy brn mot,  
sft-mot frm, sb ply-sb blkly, sb wxy-rthy  
tex, v calc

MD: 7,297'  
Inclination: 90.13°  
Azimuth: 358.62°  
TVD: 6,114.89'  
VS: 1,279.27'

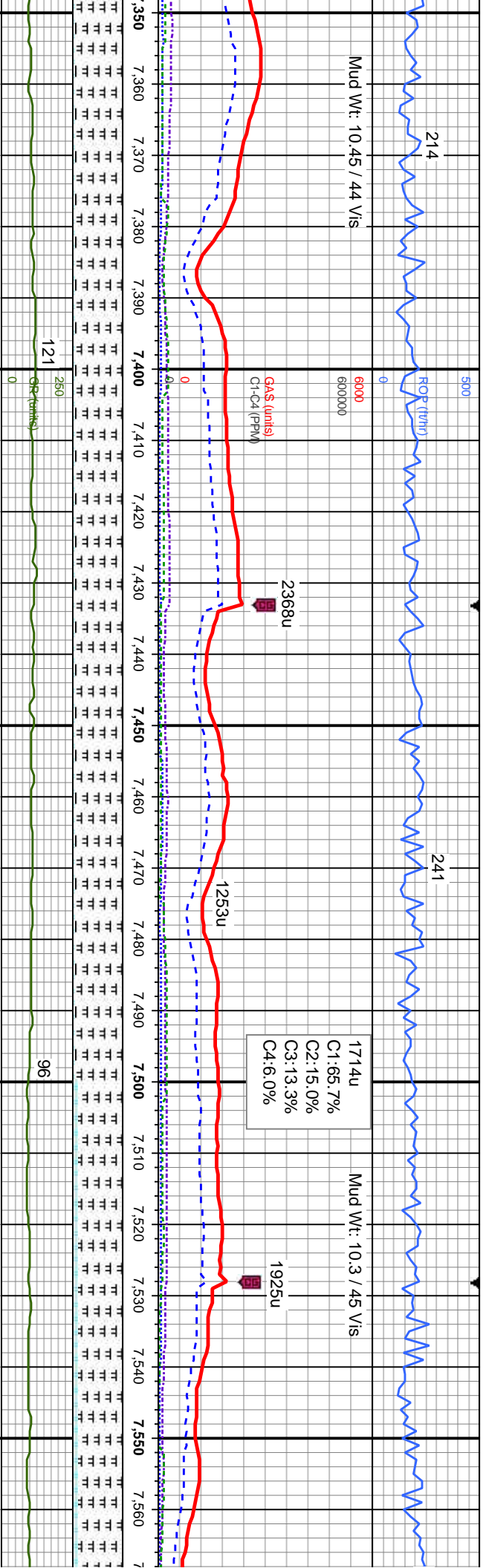
calc, occ imbd mic

MRSLT: med-dk gy, occ mot, sb blkly - sb  
ply, frm, arg, rthy tex, calc, occ imbd mic  
foss, CHK: lt gy-off wh crm, gy brn mot,  
sft-mot frm, sb ply-sb blkly, sb wxy-rthy  
tex, v calc

MD: 7,297'  
Inclination: 90.13°  
Azimuth: 358.62°  
TVD: 6,114.89'  
VS: 1,279.27'







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

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

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-mod frm, arg, rthy tex, calc, occ  
imbd mic foss, CHK: lt gy-off wh crm, gy  
brn mot, sft-frm, sb ply-sb blkly, sb  
wxy-rthy tex, v calc

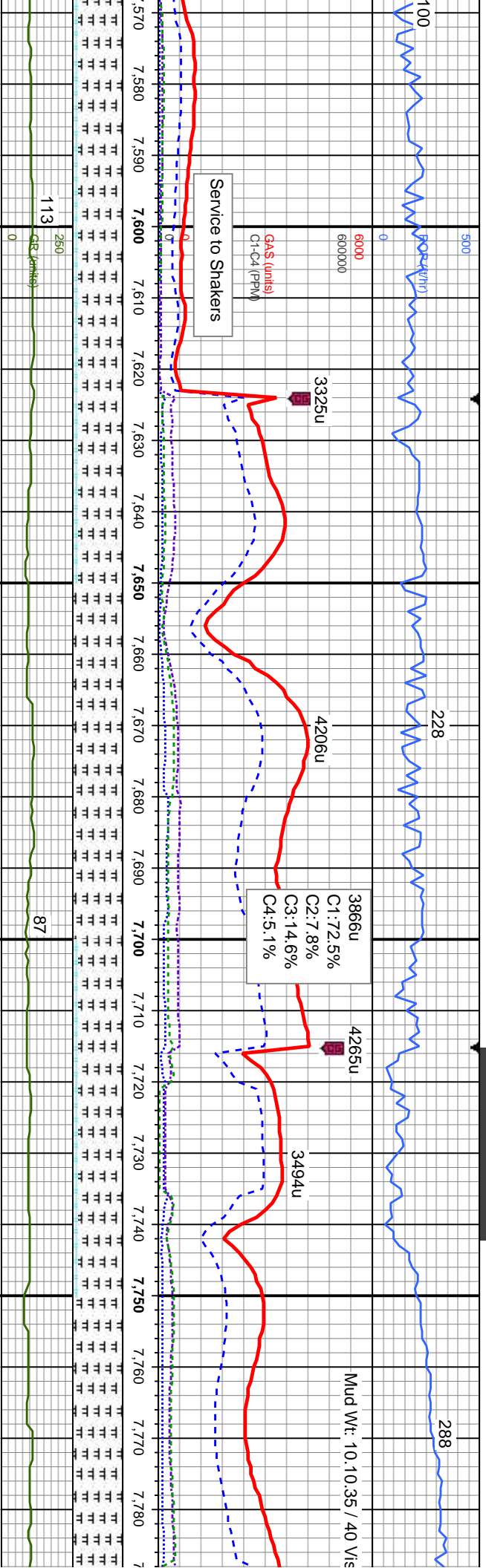
MRLST: med-dk gy, occ mot, sb blkly - sb  
ply, frm, arg, rthy tex, calc, occ  
gy-off wh crm, sb ply-sb blkly, sb

MD: 7,381'  
Inclination: 89.96°  
Azimuth: 359.15°  
TVD: 6,114.83'  
VS: 1,362.16'

MD: 7,476'  
Inclination: 89.43°  
Azimuth: 358.27°  
TVD: 6,115.33'  
VS: 1,455.94'

MD: 7,535'  
Inclination: 89.43°  
Azimuth: 358.27°  
TVD: 6,115.33'  
VS: 1,455.94'





dk gy, occ mot, sb blkly - sb  
ply, frm-hd, arg, rthy tex, calc, CHK: It  
gy brn mot, sift-frm, sb  
wxy-rthy tex, v calc

MRLST: med-dk gy, occ mot, sb blkly - sb  
ply, frm-hd, arg, rthy tex, calc, CHK: It  
gy-off wh crm, gy brn mot, sift-frm, sb  
ply-sb blkly, sb wxy-rthy tex, v calc

MRLST: med-dk gy, occ mot, sb blkly - sb  
ply, frm-hd, arg, rthy tex, calc CHK: It  
gy-off wh crm, gy brn mot, sift-frm, sb  
ply-sb blkly, sb wxy-rthy tex, v calc

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

MRLST: med-dk gy, occ mot, sb blkly - sb  
ply, frm-hd, arg, rthy tex, calc CHK: It  
gy-off wh crm, gy brn mot, sift-frm, sb  
ply-sb blkly, sb wxy-rthy tex, v calc

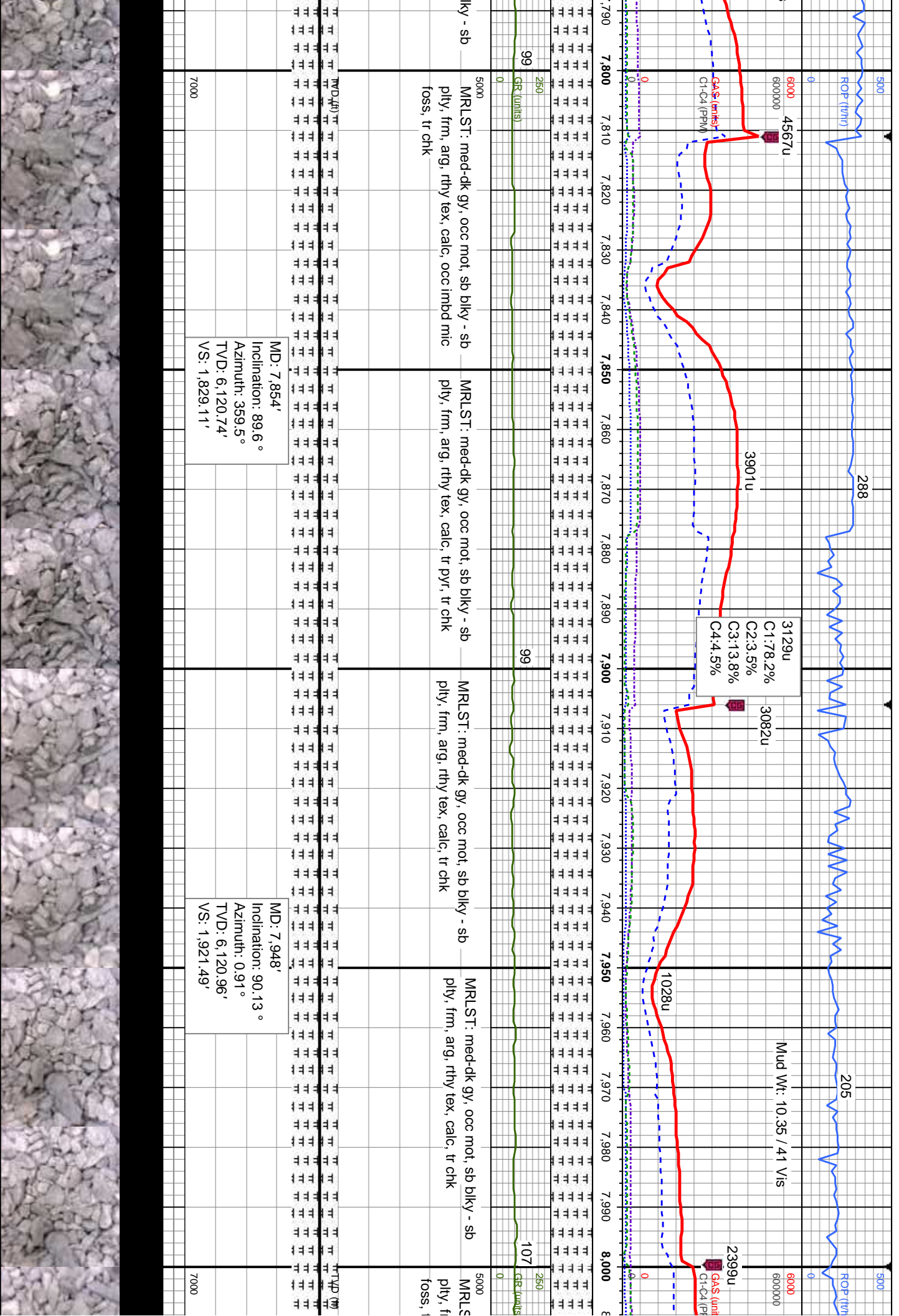
MRLST: med-dk gy, occ mot, sb blkly - sb  
ply, frm, arg, rthy tex, calc, tr chk

MD: 7,665'  
Inclination: 88.29°  
Azimuth: 357.74°  
TVD: 6,119.22'  
VS: 1,642.82'

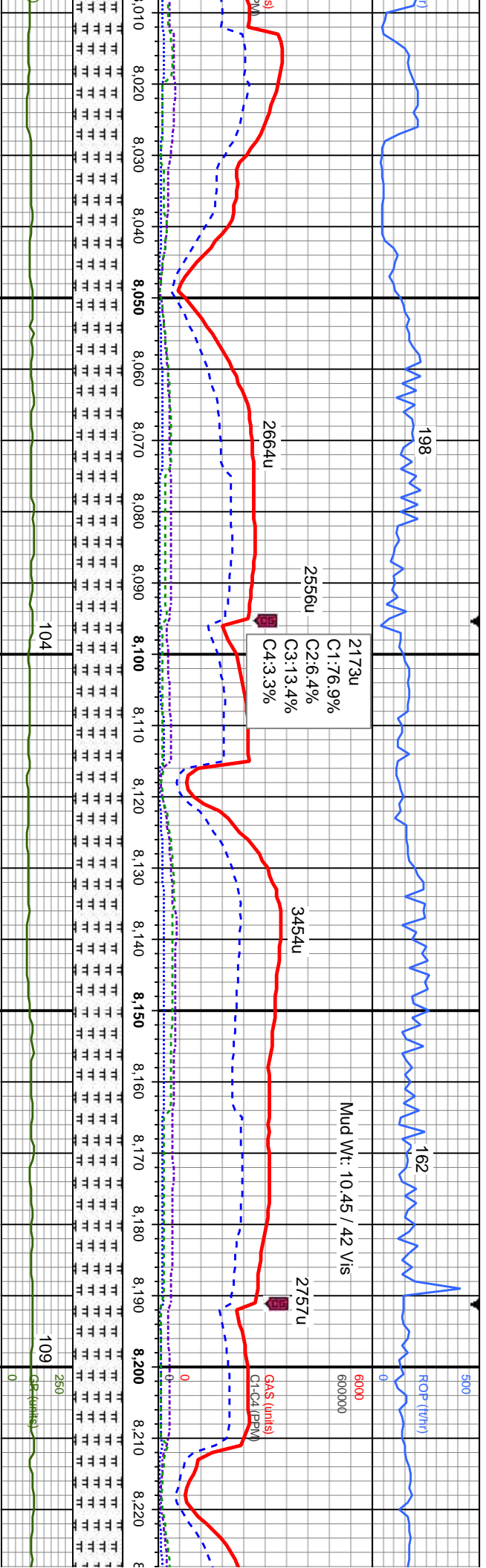
MD: 7,759'  
Inclination: 90.13°  
Azimuth: 359.85°  
TVD: 6,120.52'  
VS: 1,735.58'











8,010 8,020 8,030 8,040 8,050 8,060 8,070 8,080 8,090 8,100 8,110 8,120 8,130 8,140 8,150 8,160 8,170 8,180 8,190 8,200 8,210 8,220

med-dk gy, occ mot, sb blkly - sb  
m, arg, rthy tex, calc, occ imbd mic  
r chk

MRLST: med-dk gy, occ mot, sb blkly - sb  
pity, frm, arg, rthy tex, calc, occ imbd mic  
foss, tr pyr, tr chk

MRLST: med-dk gy, occ mot, sb blkly - sb  
pity, frm, arg, rthy tex, calc, tr imbd mic  
foss, tr pyr, tr chk

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

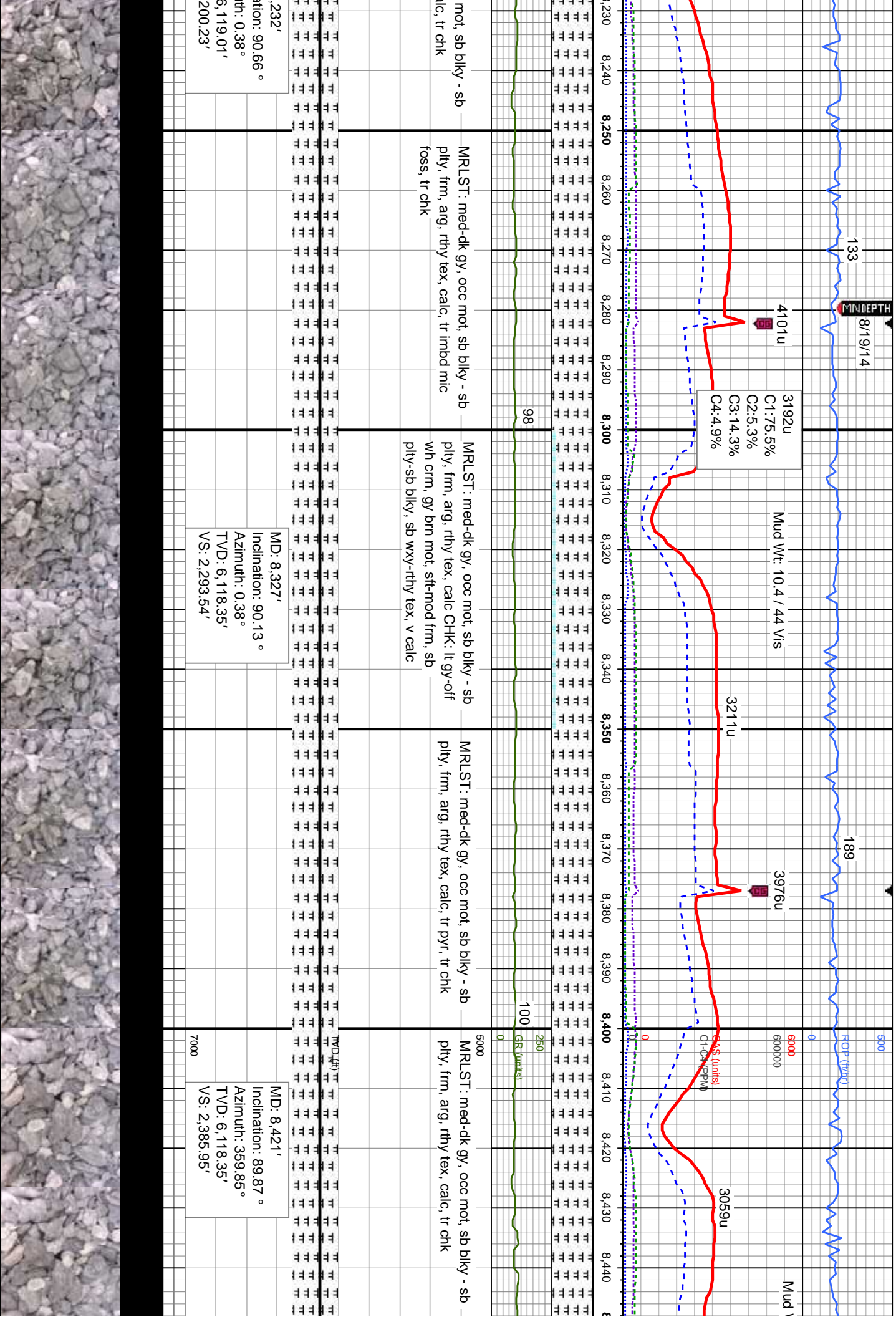
MRLST: med-dk gy, occ  
pity, frm, arg, rthy tex, ce

MD: 8,043'  
Inclination: 90.04 °  
Azimuth: 0.38°  
TVD: 6,120.82'  
VS: 2,014.71'

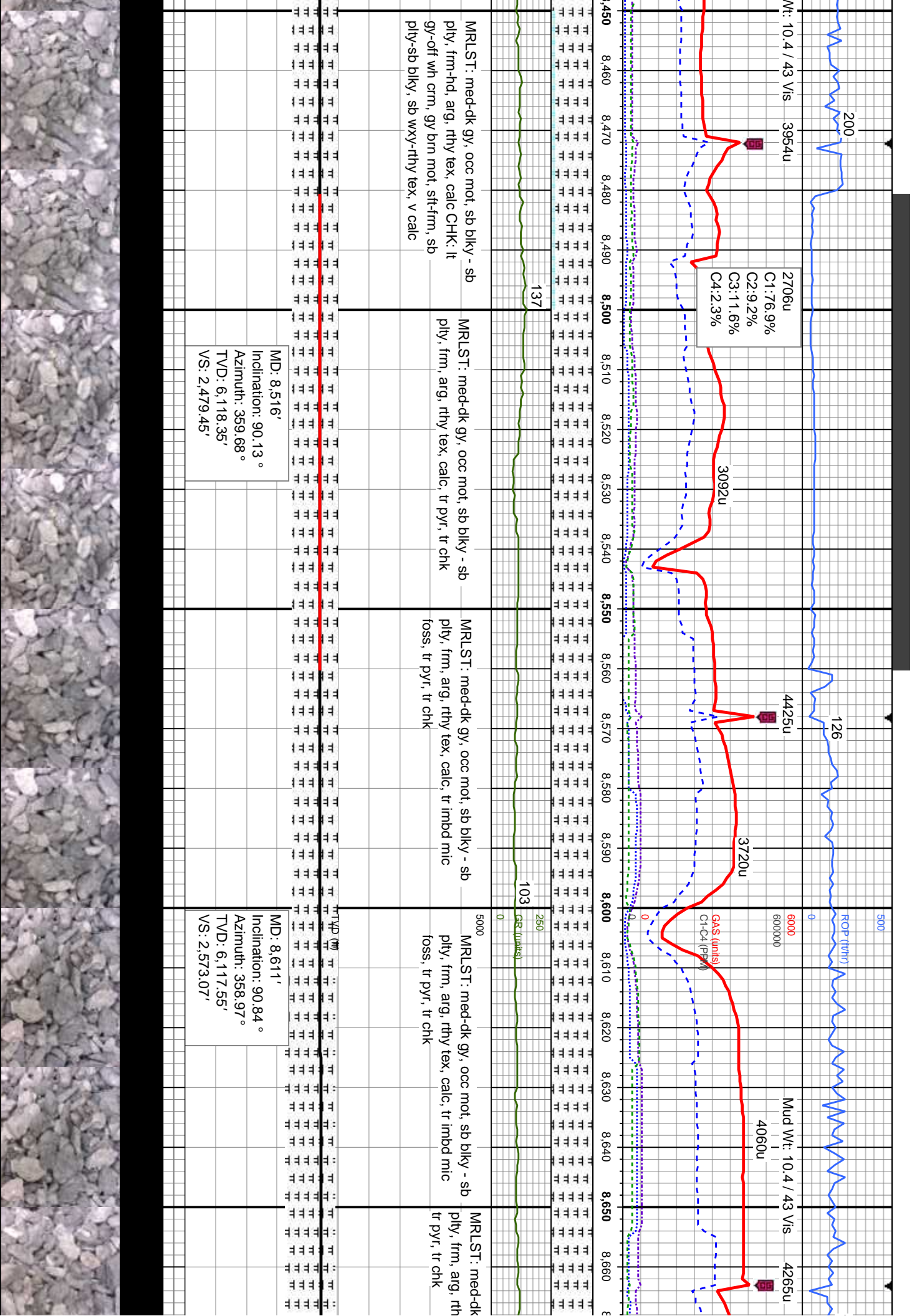
MD: 8,137'  
Inclination: 90.75 °  
Azimuth: 0.73°  
TVD: 6,120.17'  
VS: 2,106.99'

MD: 8  
Incline  
Azimu  
TVD:  
VS: 2,

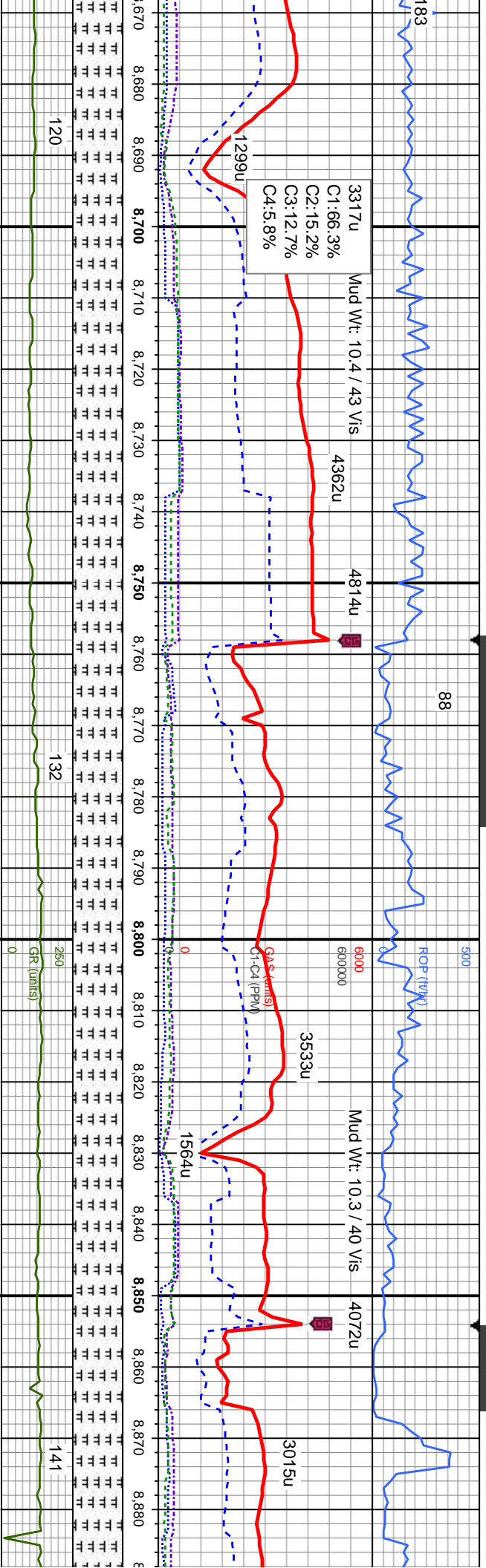












gy, occ mot, sb blkly - sb  
y tex, calc, tr imbd mic foss.

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

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

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

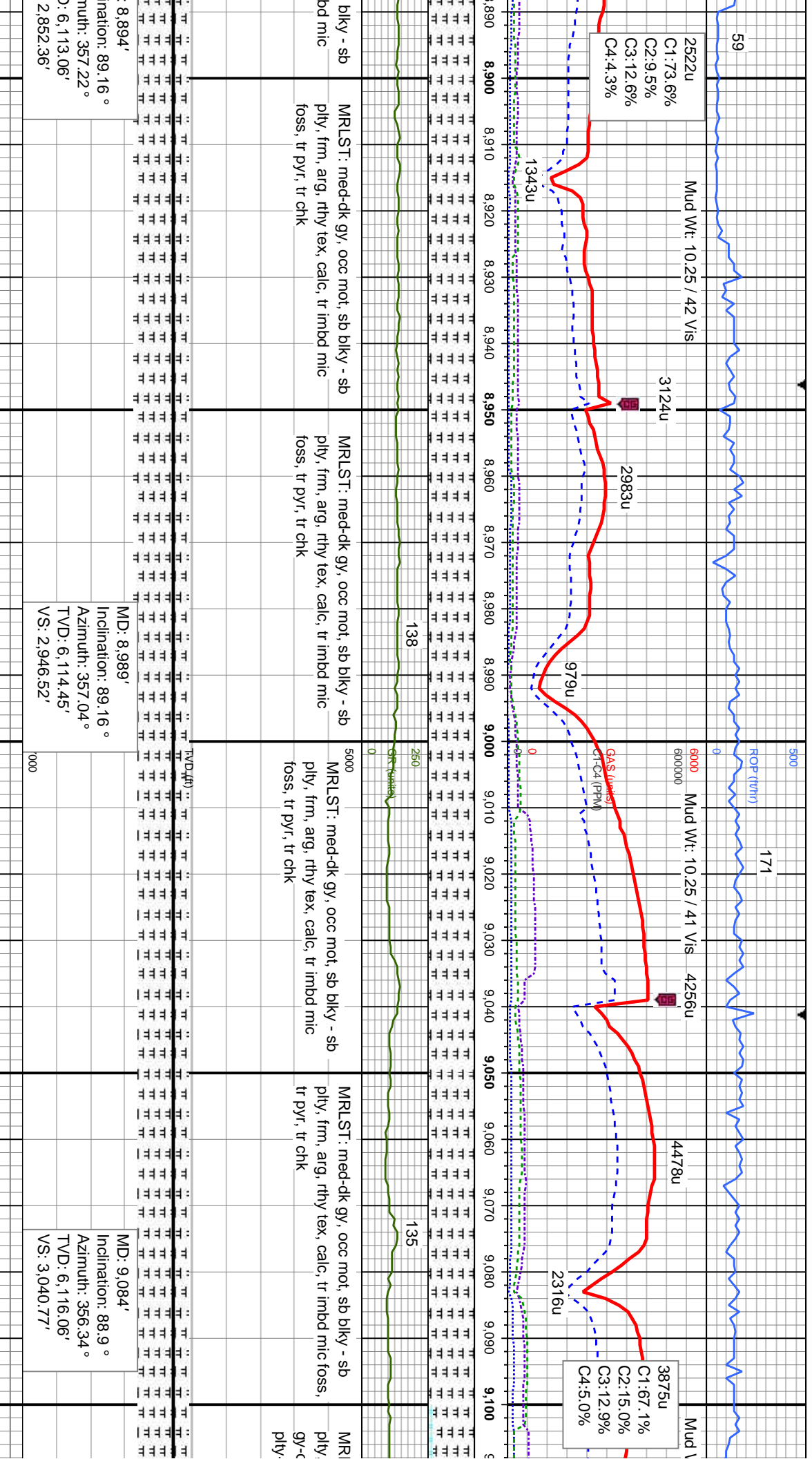
MRLST: med-dk gy, occ mot, sb blkly - sb  
ply, frm, arg, rthy tex, calc, tr imbd mic  
foss, tr pyr, tr chk

MD: 8,705'  
Inclination: 92.15 °  
Azimuth: 359.33 °  
TVD: 6,115.09'  
VS: 2,665.72'

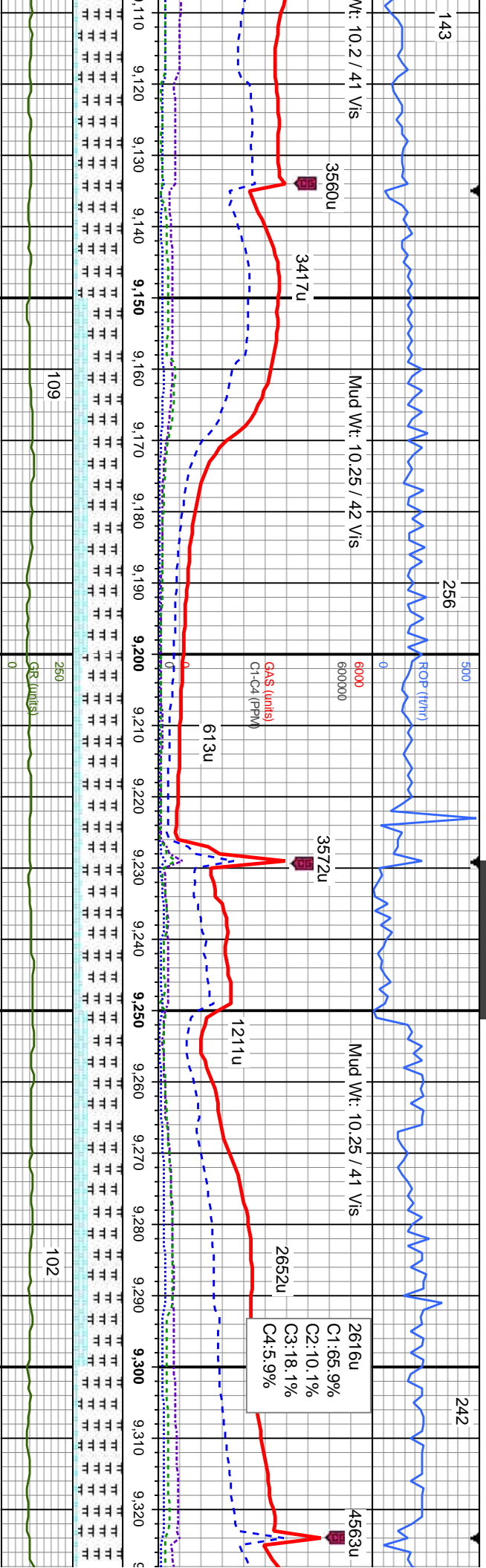
MD: 8,800'  
Inclination: 90.57 °  
Azimuth: 358.8 °  
TVD: 6,112.84'  
VS: 2,759.39'

MD  
Incl  
Azim  
TVD  
VS









ST: med-dk gy, occ mot, sb blk - sb  
frm-hd, arg, rthy tex, calc CHK: It  
gy-off wh crm, gy brn mot, sft-frm, sb  
sb blk, sb wxy-rthy tex, v calc

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

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

MRLST: med-dk gy, occ mot, sb blk - sb  
ply, frm-hd, arg, rthy tex, calc CHK: It  
wh crm, gy brn mot, sft-frm, sb ply-sb  
blk, sb wxy-rthy tex, v calc

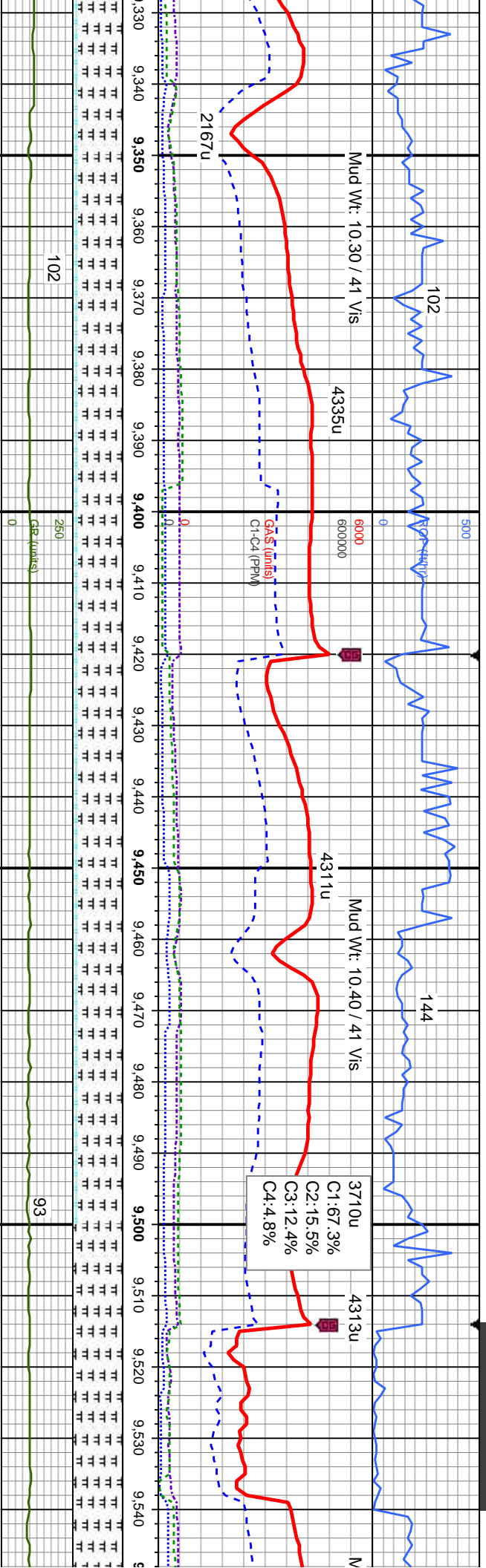
MRLST: med-dk gy, occ mot, sb blk - sb  
ply, frm-hd, arg, rthy tex, calc CHK: It  
gy-off wh crm, gy brn mot, sft-frm, sb  
ply-sb blk, sb wxy-rthy tex, v calc

MD: 9,178'  
Inclination: 88.64 °  
Azimuth: 355.81 °  
TVD: 6,118.08'  
VS: 3,134.15'

MD: 9,273'  
Inclination: 89.78 °  
Azimuth: 357.39 °  
TVD: 6,119.39'  
VS: 3,228.42'







2 mot, sb blkly - sb  
calic CHK: It  
mot, sft-frm, sb  
tex, v calic

MRLST: med-dk gy, occ mot, sb blkly - sb  
ply, frm-hd, arg, rthy tex, calic CHK: It  
gy-off wh crm, gy brn mot, sft-frm, sb  
ply-sb blkly, sb wxy-rthy tex, v calic

MRLST: med-dk gy, occ mot, sb blkly - sb  
ply, frm-hd, arg, rthy tex, calic CHK: It  
gy-off wh crm, gy brn mot, sft-frm, sb  
ply-sb blkly, sb wxy-rthy tex, v calic

MRLST: med-dk gy, occ mot, sb blkly - sb  
ply, frm, arg, rthy tex, calic, tr imbd mic  
foss, tr chk

MD: 9,368'  
Inclination: 89.34 °  
Azimuth: 357.22°  
TVD: 6,120.12'  
VS: 3,322.55'

MD: 9,462'  
Inclination: 89.16 °  
Azimuth: 356.69°  
TVD: 6,121.35'  
VS: 3,415.76'

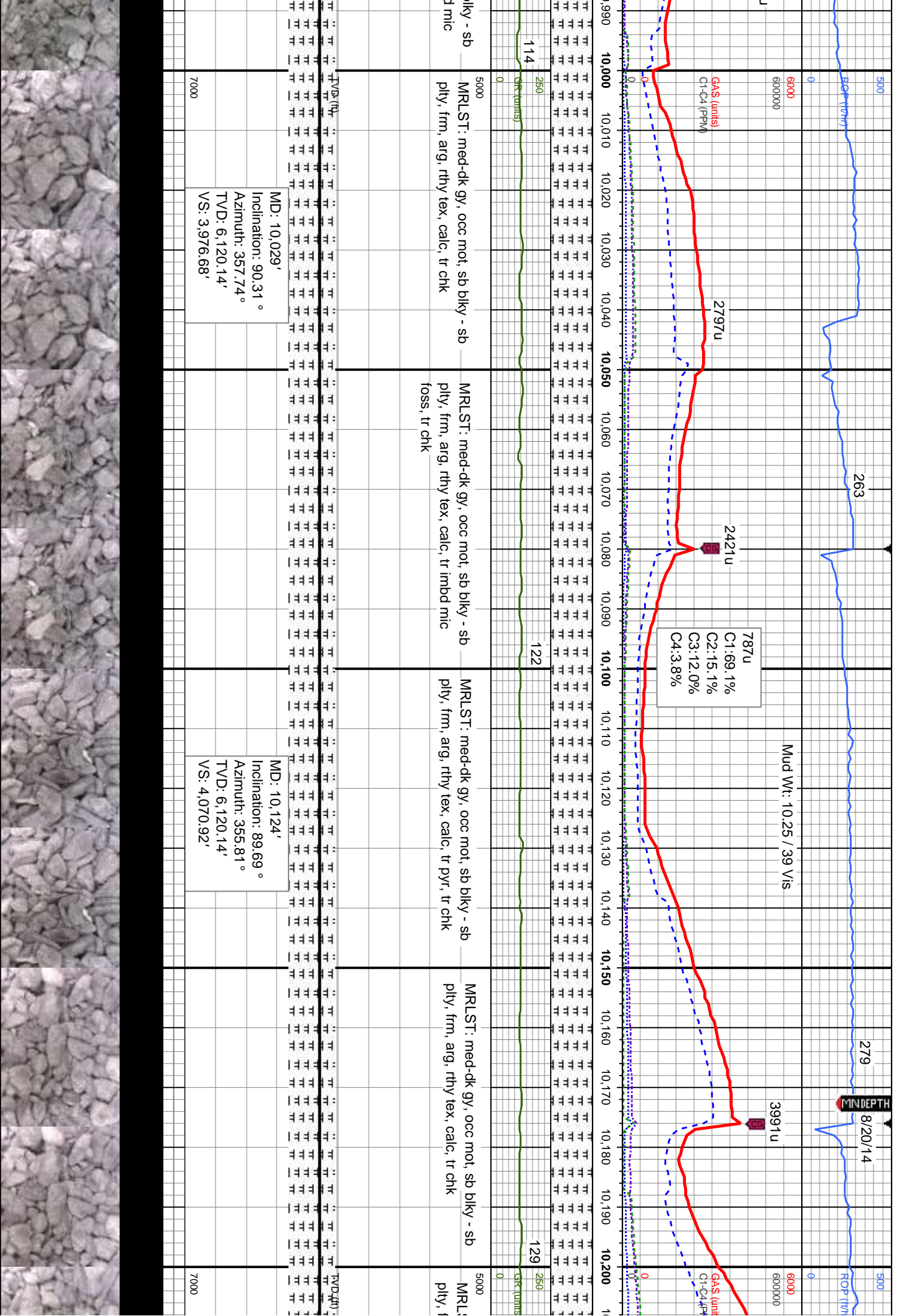


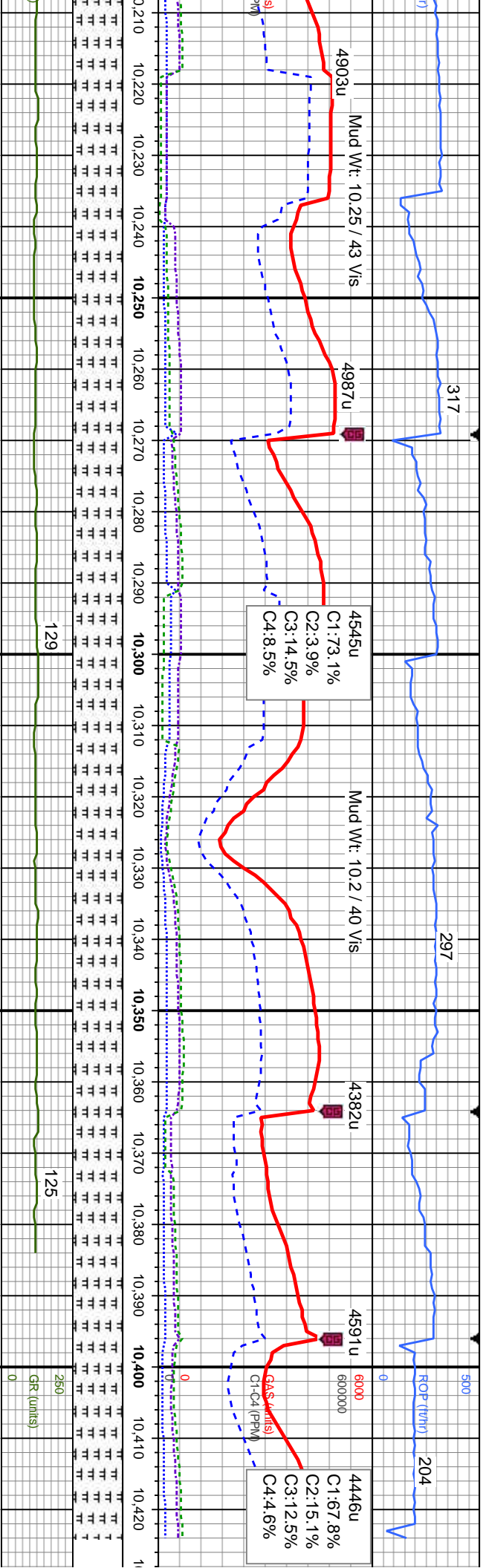












ST: med-dk gy, occ mot, sb blk - sb  
frm, arg, rhy tex, calc, tr pyr, tr chk

MRLST: med-dk gy, occ mot, sb blk - sb  
ply, frm, arg, rhy tex, calc, tr imbd mic  
foss, tr chk

MRLST: med-dk gy, occ mot, sb blk - sb  
ply, frm, arg, rhy tex, calc, tr cal, tr chk

MRLST: med-dk gy, occ mot, sb blk - sb  
ply, mod frm, arg, rhy tex, calc, tr cal, tr  
pyr, tr chk

MD: 10,219'  
Inclination: 90.22°  
Azimuth: 356.51°  
TVD: 6,120.22'  
VS: 4,165.29'

MD: 10,314'  
Inclination: 89.87°  
Azimuth: 355.99°  
TVD: 6,120.14'  
VS: 4,259.64'

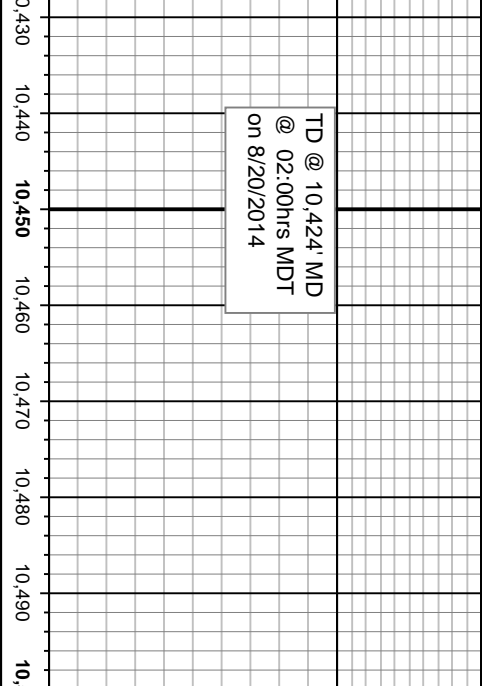
MD: 10,373'  
Inclination: 89.16°  
Azimuth: 355.28°  
TVD: 6,120.64'  
VS: 4,318.31'

MD: 10,424'  
Inclination: 88°  
Azimuth: 355°  
TVD: 6,121.3°  
VS: 4,369.05'



PROJ TO B

TD @ 10,424' MD  
@ 02:00hrs MDT  
on 8/20/2014



Wellsite Geological Services  
Provided By Columbine  
Logging, Thank You!

IT

3.16°  
28°  
9'

