



# COLUMBINE CORPORATION

Scale: 5" / 100'  
Measured Depth Log

Location NENW, SEC 5, T4N, R68W

State COLORADO

Country USA

API Number 05-123-50139

Geographic Region DJ

Spud Date 7/29/2019

Surface Coordinates 386°FNL,1880°FWL

NENW, SEC 5, T4N, R68W  
40.348218, -105.030862

Bottom Hole Coordinates Sec 6, T4N, R68W

0°FNL, 1924°FWL

Ground Elevation 5068'

Logged Interval 3000' To 12052'

Formation Niobrara

County WELD

Rig Number Akita 524

A/E # Campion 5-6-1H

Field Loveland

Drilling Completed 8/15/2019

K.B. Elevation 5088'

Total Depth 12052'

## Operator

Company

Address 2707 S County Road 11  
Loveland, CO 80537

## Geologist

Company Magpie Operating

Address 2707 S County Road 11  
Loveland, CO 80537

## Other

Columbine Corp. Dennis C. Vert

Bloodhound unit # 263, Job# 210

Computer 29A

## Rock Types

CHALK

TT TT TT MARLSTONE

SANDSTONE

Other

Engineering

 BIT

 CONNECTION (DOWN)

 CONNECTION GAS

 FORMATION TOP

 MN DEPTH

rees, William Gieser

NDSTONE  
SILTY SHALE

Columbine Corp. Rigged Up 2 man logging  
8/22/2019 Bloodhound Unit #0263, began  
logging at 3000' MD at 2:36, MDST on  
8/11/2019.

ROP/Gamma  
ROP  
Gamma

ROP Imported Via lball

Survey and Gamma Data Provided  
by Ensign

Gas Data From Bloodhound unit #0263,  
data imported via lball

Gas Data  
TG  
C1  
C2  
C3  
C4

Depth Labels

% Lith

**Bit Data**  
Bit #: 2  
Type: SD515  
Size: 8.75  
Depth In.: 1,532'  
Depth Out: 5,875'  
Hours: 15.5 hrs  
Jets: 3X12,3X13  
S/N: Jn6164

MD: 2,985'  
Inc: 29.3°  
Azim: 74.0°  
TVD: 2,679.20'  
VS: 228.31'

Drilling with Oil Based Mud

TVD (ft)

MD: 3,074'  
Inc: 28.6°  
Azim: 74.9°  
TVD: 2,757.07'  
VS: 239.87'

40% SS: crm-lt gy, occ wh-s&p, vf-f, mod w cmtl, p-g por, frm-v frm, w srt, 60% SLTY SH. lt  
gy-dk gy, occ lt brn, v sft-mod frm, sb pily-sb blkly, silty-rthy tex, non-v sl calic, silty lp, rr fos frag.

40% SS: crm-lt gy, occ wh-s&p, vf-f, mod w cmtl, p-g  
gy-dk gy, occ lt brn, v sft-mod frm, sb pily-sb blkly, silty-

800

300

ROP (lbf/hr)

Gamma (api)

115api

114api

529lbf/hr

1000

1000

Mud Wt.: 8.7  
Vis.: 50

WOB: 31.5kts  
ROP: 538lbf/hr  
RPM: 62rpm  
SPP: 2.335psi  
Pump #: 1045pm  
Pump #: 2: 1035pm

TG: 315u  
C1: 100%  
C2: 0%  
C3: 0%  
C4: 0%

TG (units)

C1-C4 (units)

352u

312u

316u

366u

2,960

2,970

2,980

2,990

3,000

3,010

3,020

3,030

3,040

3,050

3,060

3,070

3,080

3,090

3,100

3,110

3,120

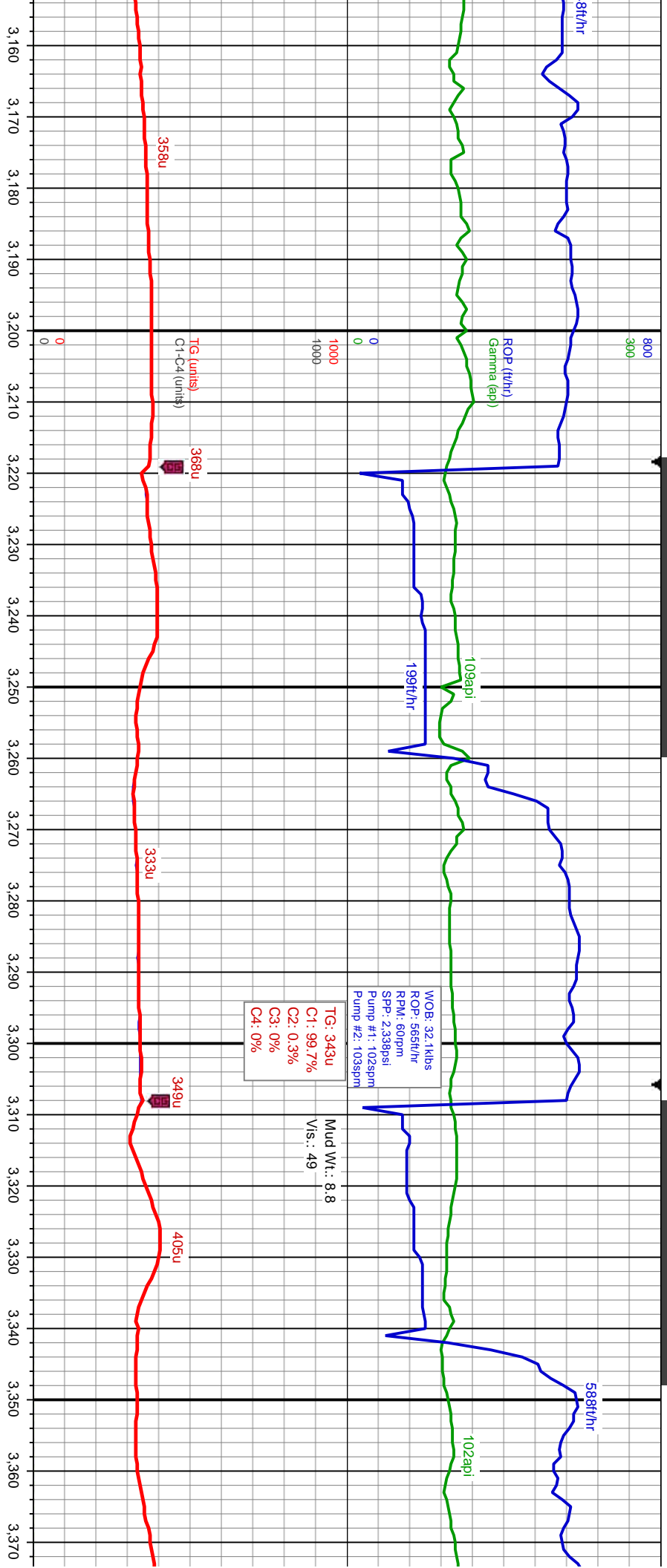
3,130

3,140

3,150

2000

5000



WOB: 32.1kbs  
ROP: 565ft/hr  
RPM: 60rpm  
SPP: 2.338psi  
Pump #1: 102spm  
Pump #2: 103spm

Mud Wt.: 8.8  
Vis.: 49

TG: 343u  
C1: 99.7%  
C2: 0.3%  
C3: 0%  
C4: 0%

MD: 3,251'  
Inc: 26.3°  
Azim: 77.4°  
TVD: 2,915.80'  
VS: 262.44'

MD: 3,340'  
Inc: 29.9°  
Azim: 81.2°  
TVD: 2,994.30'  
VS: 270.14'

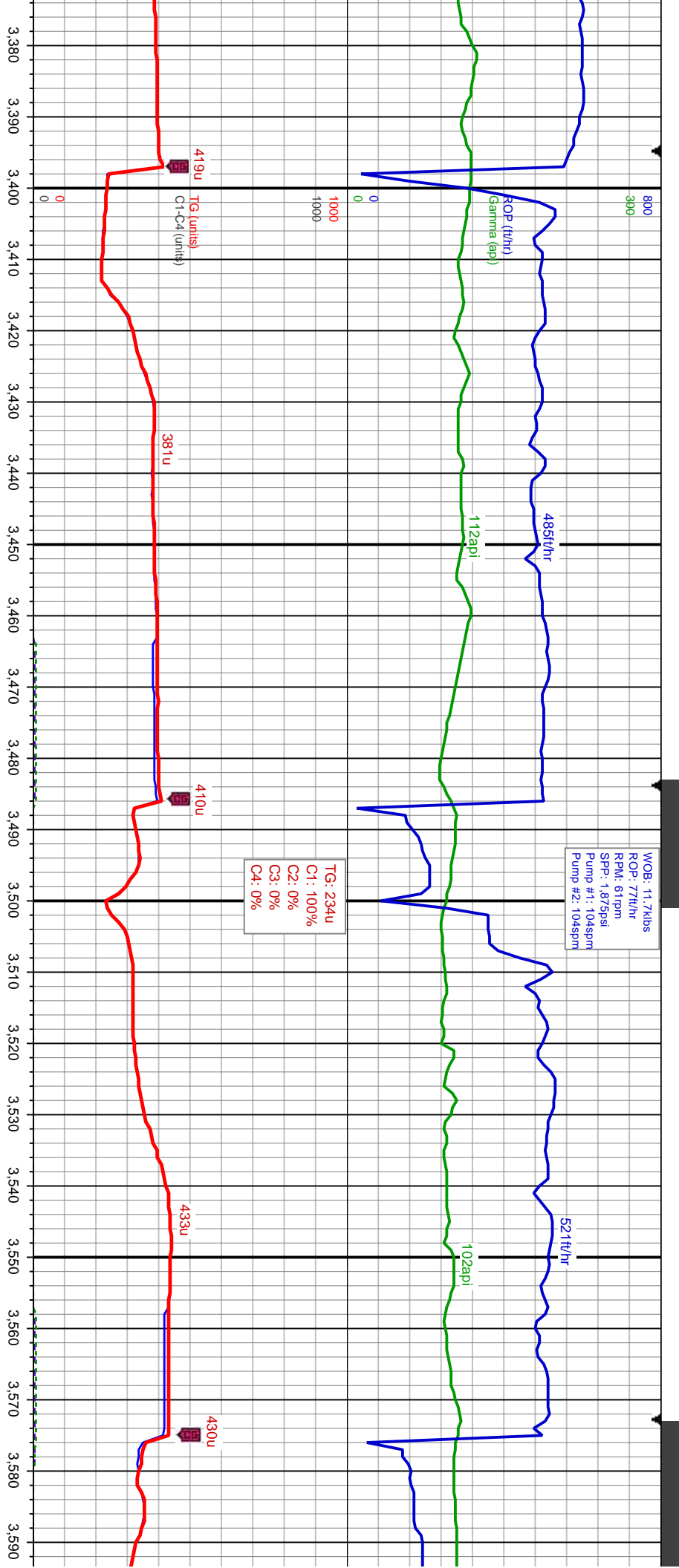
MD: 3,162'  
Inc: 25.1°  
Azim: 70.1°  
TVD: 2,835.58'  
VS: 251.71'

TVD (ft)

por, frm-v frm, w srt, 60% SLTY SH: lt  
rthy tex, non-v sl calc, silty ip, rr tos frag:

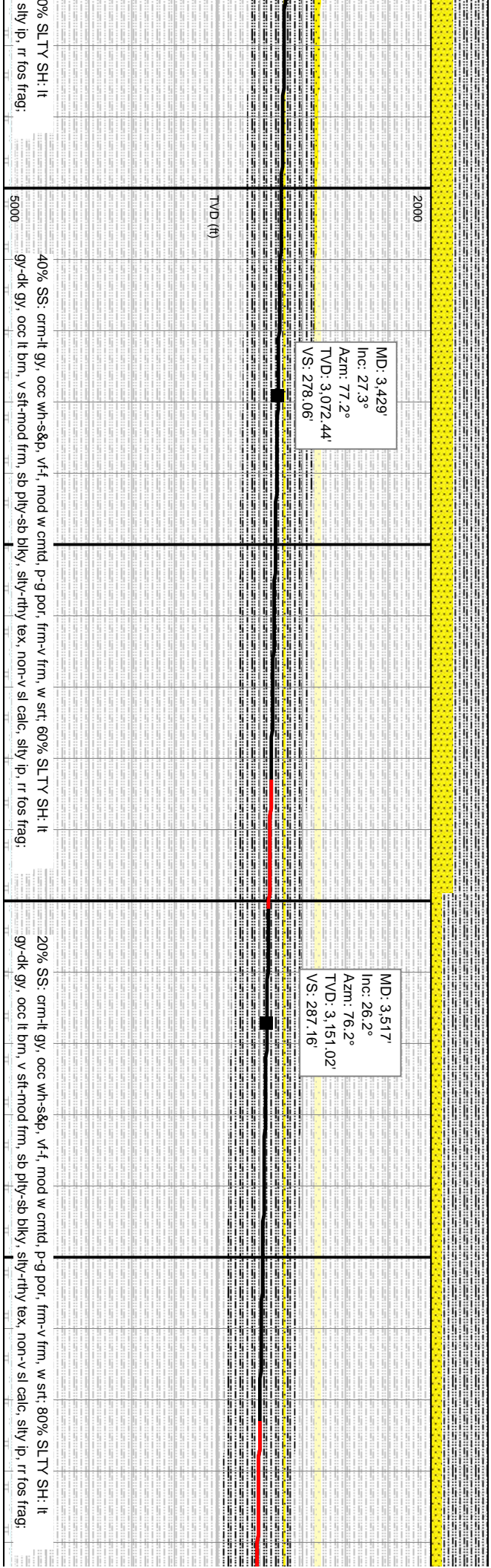
10% SS: crm-t gy, occ wh-s&g, v-f, mod w cntd, p-g por, frm-v frm, w srt, 90% SLTY SH: lt  
gy-dk gy, occ lt brn, v srt-mod frm, sb ply-sb blkly, silty-rthy tex, non-v sl calc, silty ip, rr tos frag:

40% SS: crm-t gy, occ wh-s&g, v-f, mod w cntd, p-g por, frm-v frm, w srt, 6  
gy-dk gy, occ lt brn, v srt-mod frm, sb ply-sb blkly, silty-rthy tex, non-v sl calc,

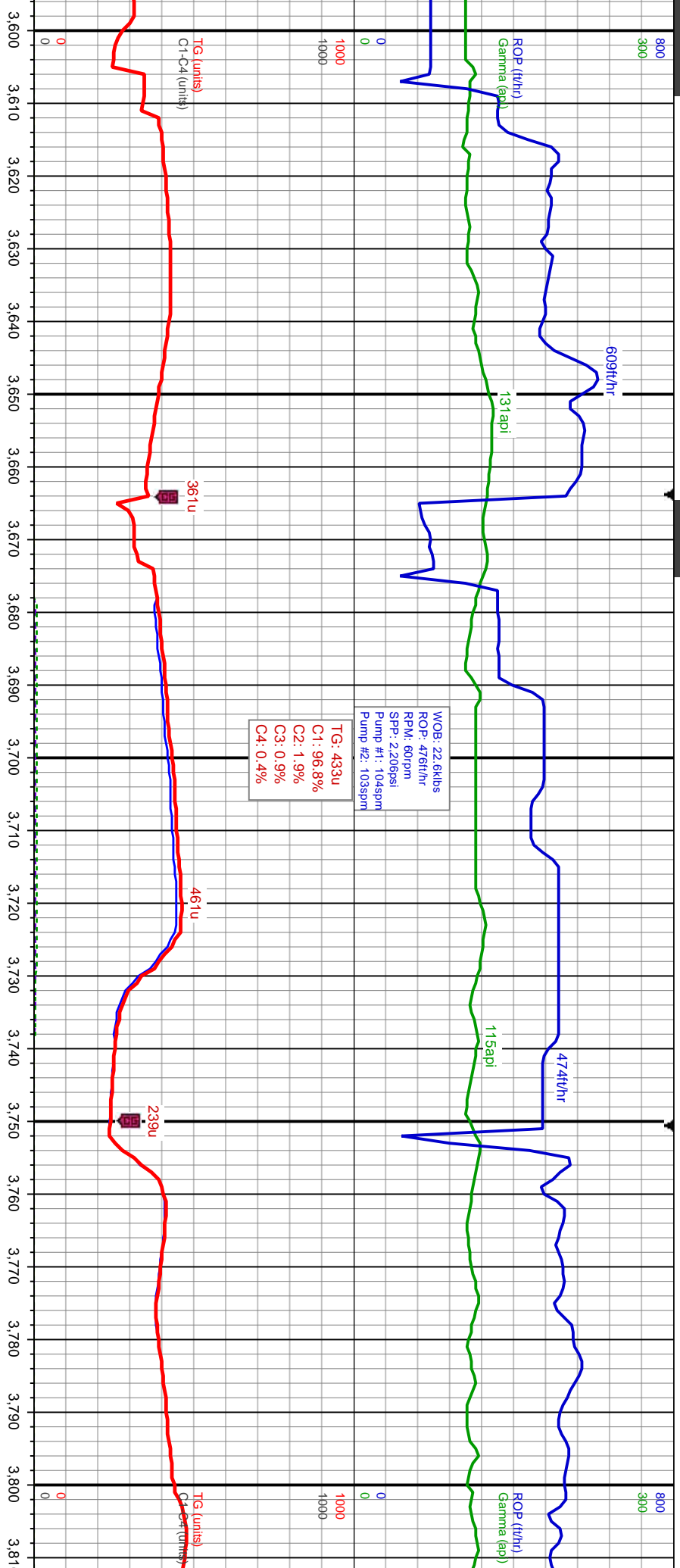


MD: 3,429'  
Inc: 27.3°  
Azim: 77.2°  
TVD: 3,072.44'  
VS: 278.06'

MD: 3,517'  
Inc: 26.2°  
Azim: 76.2°  
TVD: 3,151.02'  
VS: 287.16'







WOB: 22.6kbs  
ROP: 476t/hr  
RPM: 60rpm  
SPP: 2206psi  
Pump #: 104spt  
Pump #: 103spt

TG: 433u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

MD: 3.606'  
Inc: 28.6°  
Azmi: 77.0°  
TVD: 3.230.03'  
VS: 296.64'

MD: 3.695'  
Inc: 27.6°  
Azmi: 74.2°  
TVD: 3.308.55'  
VS: 307.05'

MD: 3.784'  
Inc: 24.9°  
Azmi: 69.4°  
TVD: 3.388.37'  
VS: 319.26'

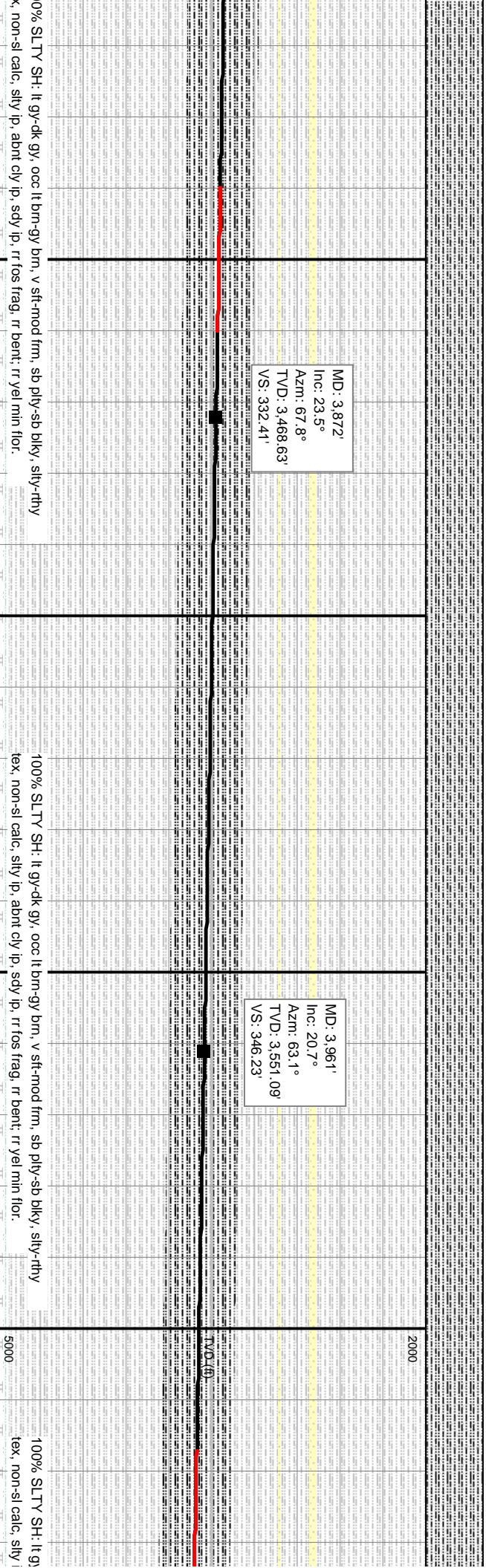
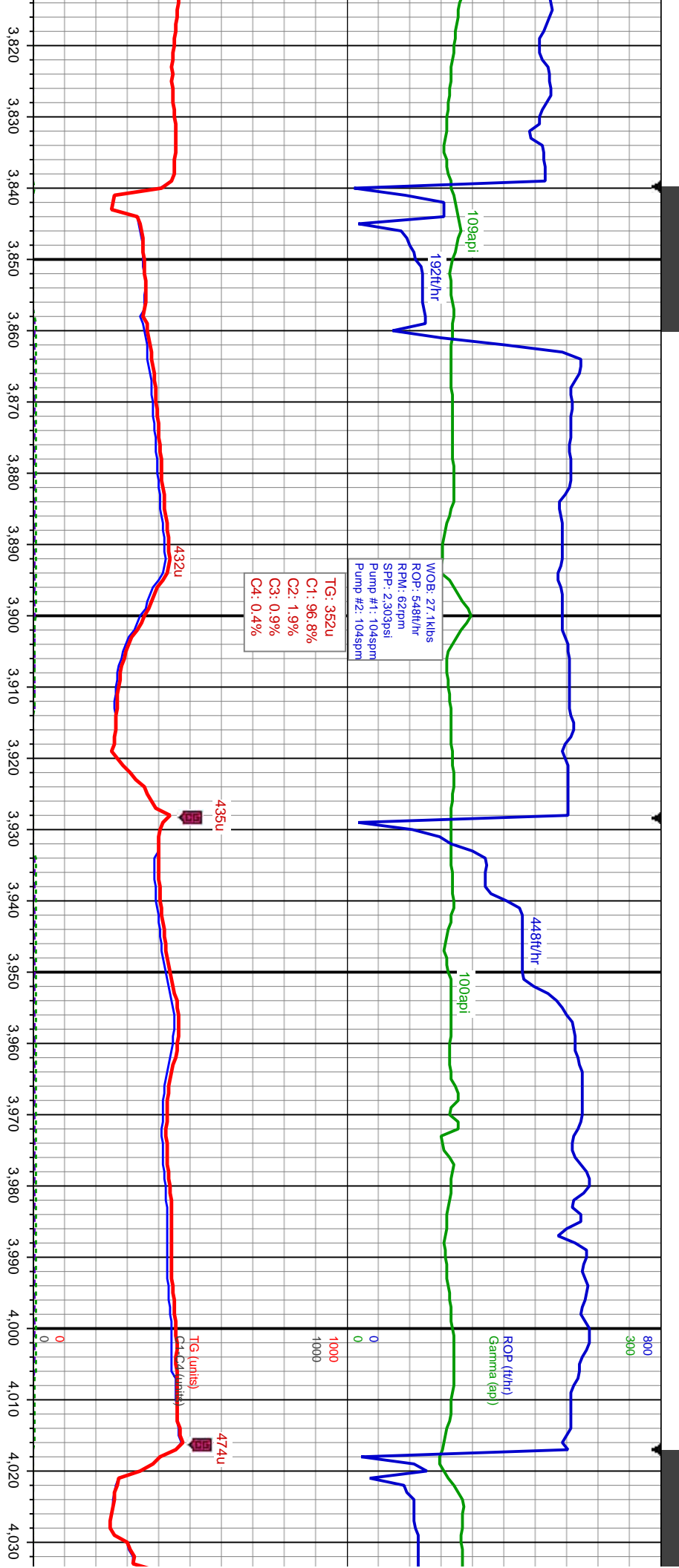
TVD (ft)

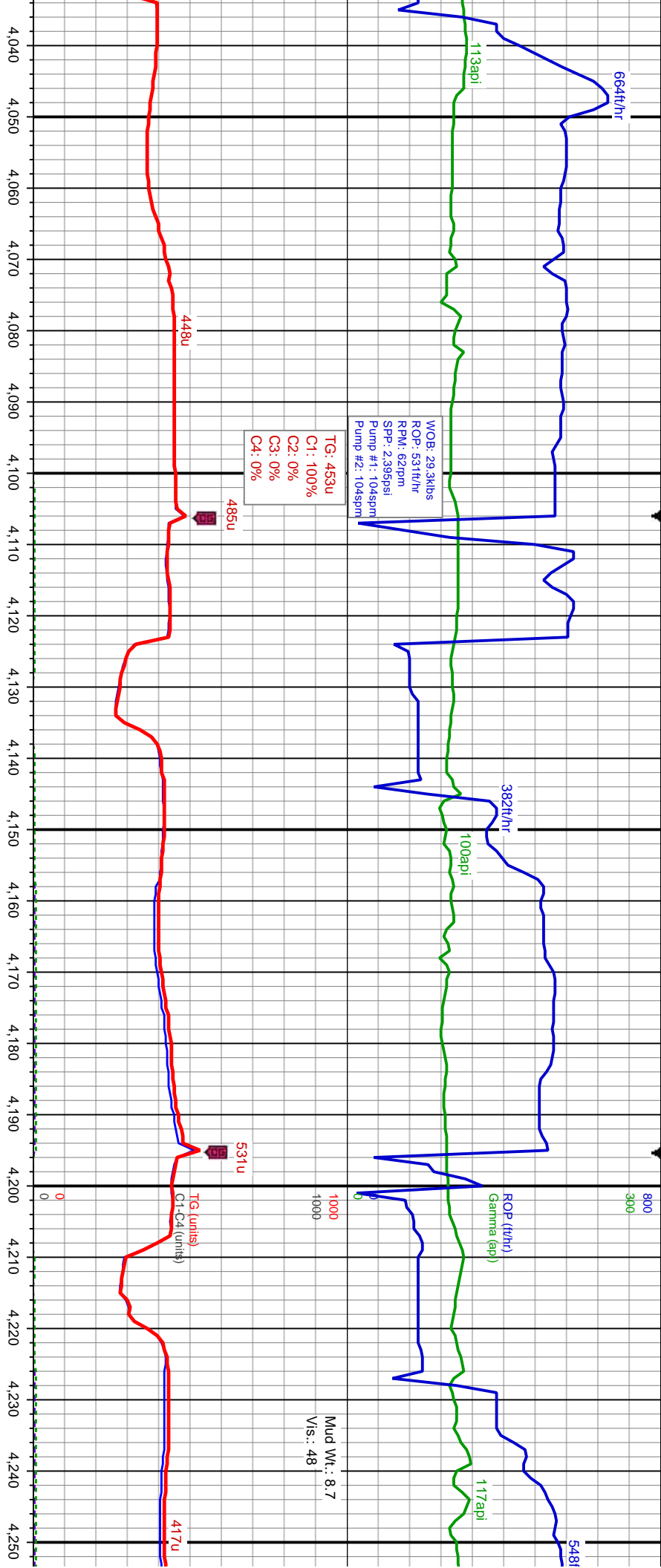
TVD (ft)

100% SLTY SH: lt gy-dk gy, occ lt brn-gy brn, v sft-mod frm, sb ply-sb blkky, silty-rthy tex, non-si calc, silty ip, abnt cly ip, sdy ip, rr fos frag, rr bent, rr yel min flor.

100% SLTY SH: lt gy-dk gy, occ lt brn-gy brn, v sft-mod frm, sb ply-sb blkky, silty-rthy tex, non-si calc, silty ip, abnt cly ip, sdy ip, rr fos frag, rr bent, rr yel min flor.

100% SLTY SH: lt gy-dk gy, occ lt brn-gy brn, v sft-mod frm, sb ply-sb blkky, silty-rthy tex, non-si calc, silty ip, abnt cly ip, sdy ip, rr fos frag, rr bent, rr yel min flor.





WOB: 29.3kbs  
ROP: 531 ft/hr  
RPM: 62 rpm  
SPP: 2.395 psi  
Pump #1: 104 spm  
Pump #2: 104 spm

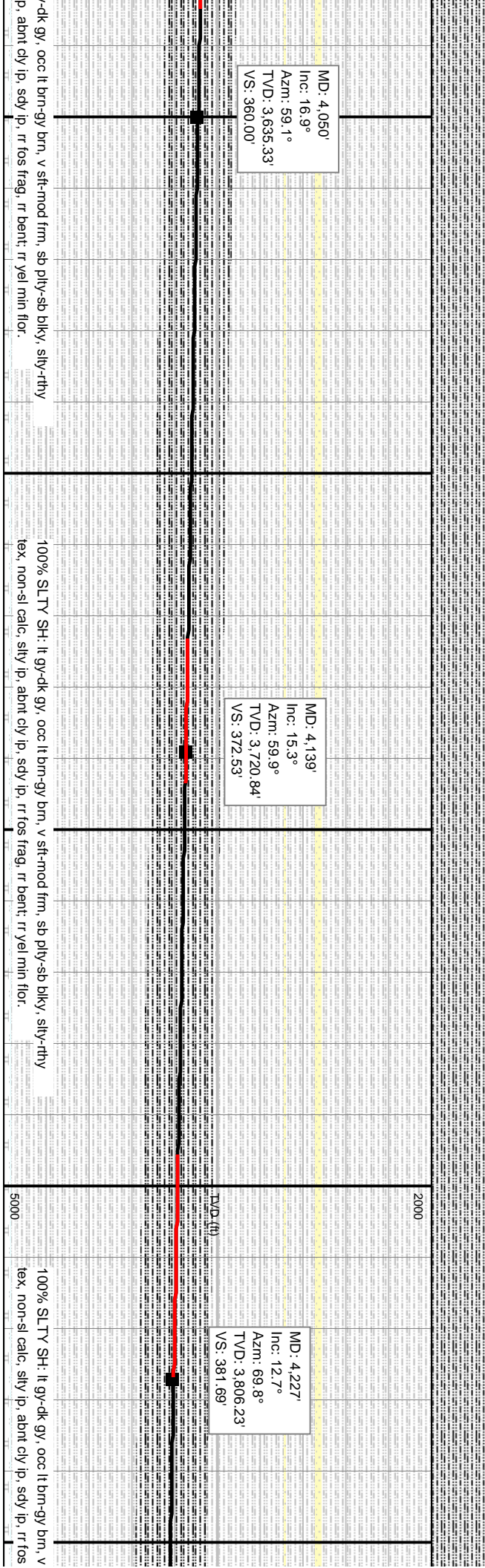
TG: 453u  
C1: 100%  
C2: 0%  
C3: 0%  
C4: 0%

Mud Wt.: 8.7  
Vis.: 48

MD: 4,050'  
Inc: 16.9°  
Azim: 59.1°  
TVD: 3,635.33'  
VS: 360.00'

MD: 4,139'  
Inc: 15.3°  
Azim: 59.9°  
TVD: 3,720.84'  
VS: 372.53'

MD: 4,227'  
Inc: 12.7°  
Azim: 69.8°  
TVD: 3,806.23'  
VS: 381.69'





WOB: 12.5klbs  
ROP: 171ft/hr  
RPM: 0rpm  
SPP: 1.328psi  
Pump #1: 104spm  
Pump #2: 104spm

558ft/hr

557ft/hr

ROP (ft/hr)  
Gamma (api)

TG: 431u  
C1: 99.1%  
C2: 0.9%  
C3: 0%  
C4: 0%

GAS SCALE CHANGE

TG (units)  
C1-C4 (units)

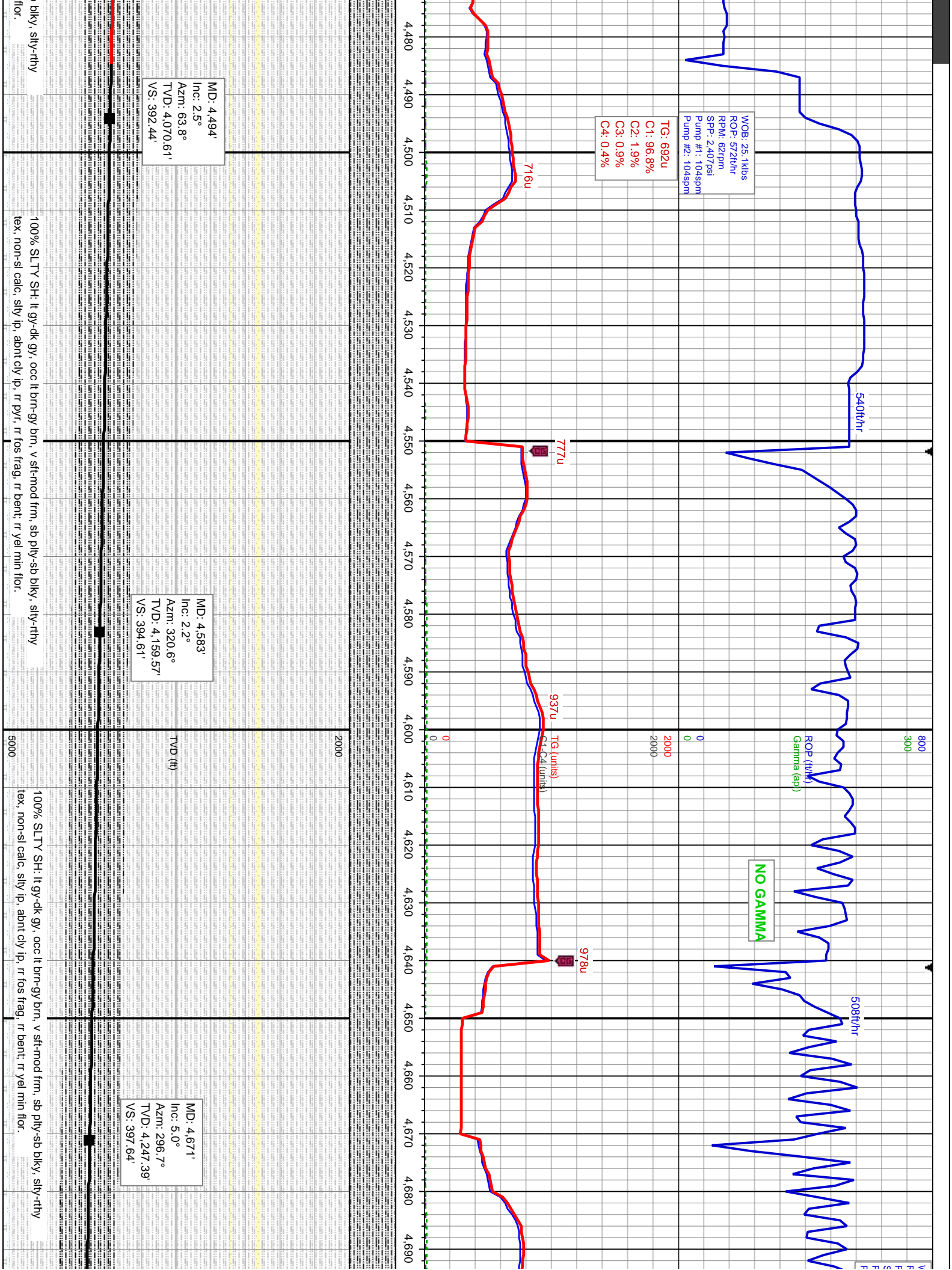
MD: 4,316'  
Inc: 9.3°  
Azim: 79.3°  
TVD: 3,893.59'  
VS: 386.41'

MD: 4,405'  
Inc: 5.5°  
Azim: 63.3°  
TVD: 3,981.84'  
VS: 389.66'

sft-mod frm, sb ply-sb blk, sily-rthy  
frag, rr bent, rr yel min flr.

100% SLTY SH: lt gy-dk gy, occ lt brn-gy brn, v sft-mod frm, sb ply-sb blk, sily-rthy  
tex, non-sl calc, sily ip, abnt cly ip, rr fos frag, rr bent, rr yel min flr.

100% SLTY SH: lt gy-dk gy, occ lt brn-gy brn, v sft-mod frm, sb ply-sb  
tex, non-sl calc, sily ip, abnt cly ip, rr pyr, rr fos frag, rr bent, rr yel min



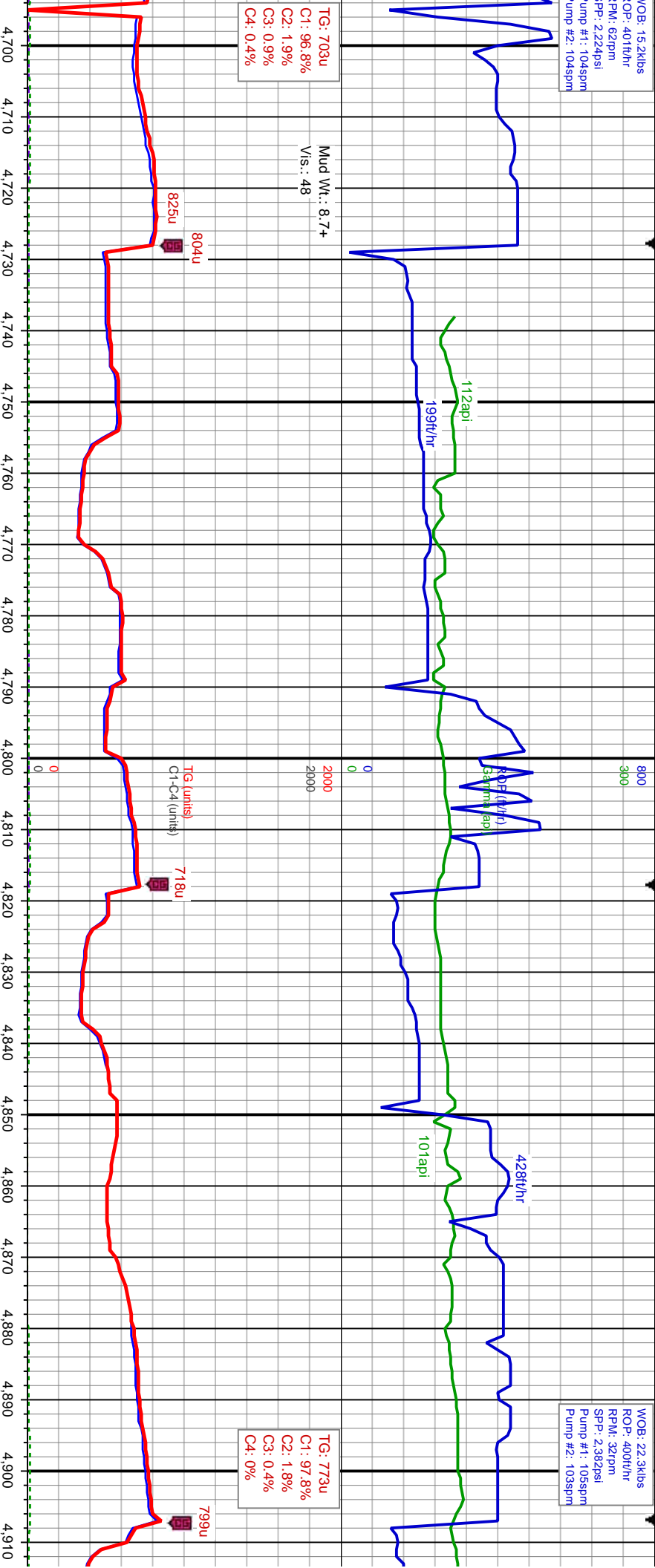
IOB: 15.2Kbs  
ROP: 401ft/hr  
RPM: 62rpm  
SP: 2.224psi  
Pump #1: 104spm  
Pump #2: 104spm

WOB: 22.3Klbs  
ROP: 400ft/hr  
RPM: 32rpm  
SP: 2.382psi  
Pump #1: 105spm  
Pump #2: 103spm

TG: 703u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

TG: 773u  
C1: 97.8%  
C2: 1.8%  
C3: 0.4%  
C4: 0%

Mud Wt.: 8.7+  
Vis.: 48



TVD SCALE CHANGE

MD: 4,760'  
Inc: 12.3°  
Az: 284.9°  
TVD: 4,335.33'  
VS: 401.83'

MD: 4,849'  
Inc: 20.3°  
Az: 280.6°  
TVD: 4,420.68'  
VS: 407.12'

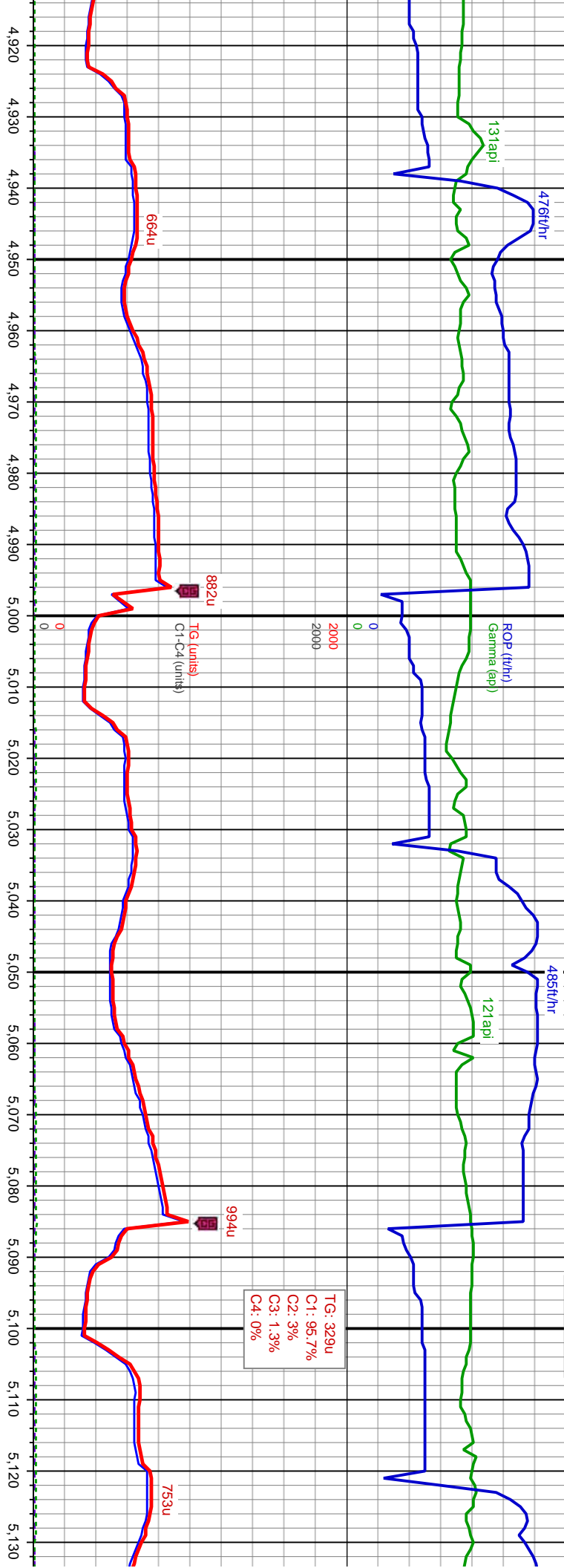
100% SLTY SH: It gy-dk gy, occ It brn-gy brn, v sft-mod frm, sb ply-sb blkly, silty-rthy  
tex, non-sl calc, silty ip, abnt cly ip, rr fos frag, tr bent, tr yel min flr.

100% SLTY SH: It gy-dk gy, occ It brn-gy brn, v sft-mod frm, sb ply-sb blkly, silty-rthy  
tex, non-sl calc, silty ip, abnt cly ip, rr fos frag, tr bent, tr yel min flr.

100% SLTY SH: It gy-dk gy, occ It brn-gy brn, v sft-mod frm, sb ply-sb blkly, silty-rthy  
tex, non-sl calc, silty ip, abnt cly ip, rr fos frag, tr bent, tr yel min flr.



WOB: 18.3kls  
ROP: 191ft/hr  
RPM: 0rpm  
SPP: 2.032psi  
Pump #1: 102spm  
Pump #2: 102spm

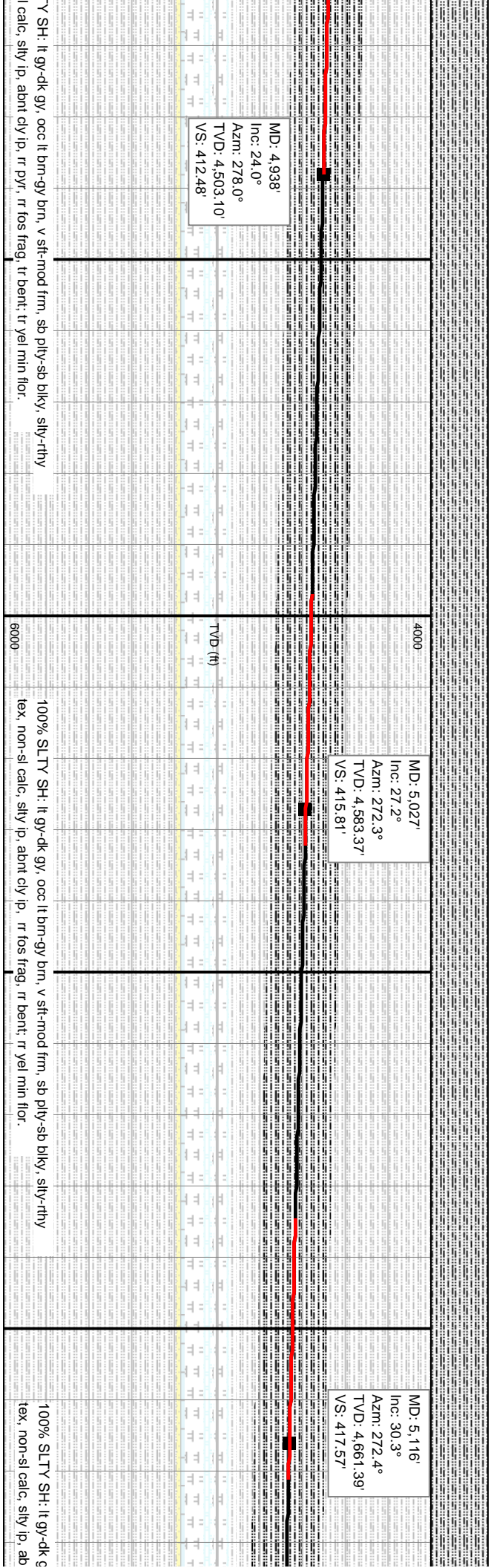


MD: 4,938'  
Inc: 24.0°  
Azim: 278.0°  
TVD: 4,503.10'  
VS: 412.48'

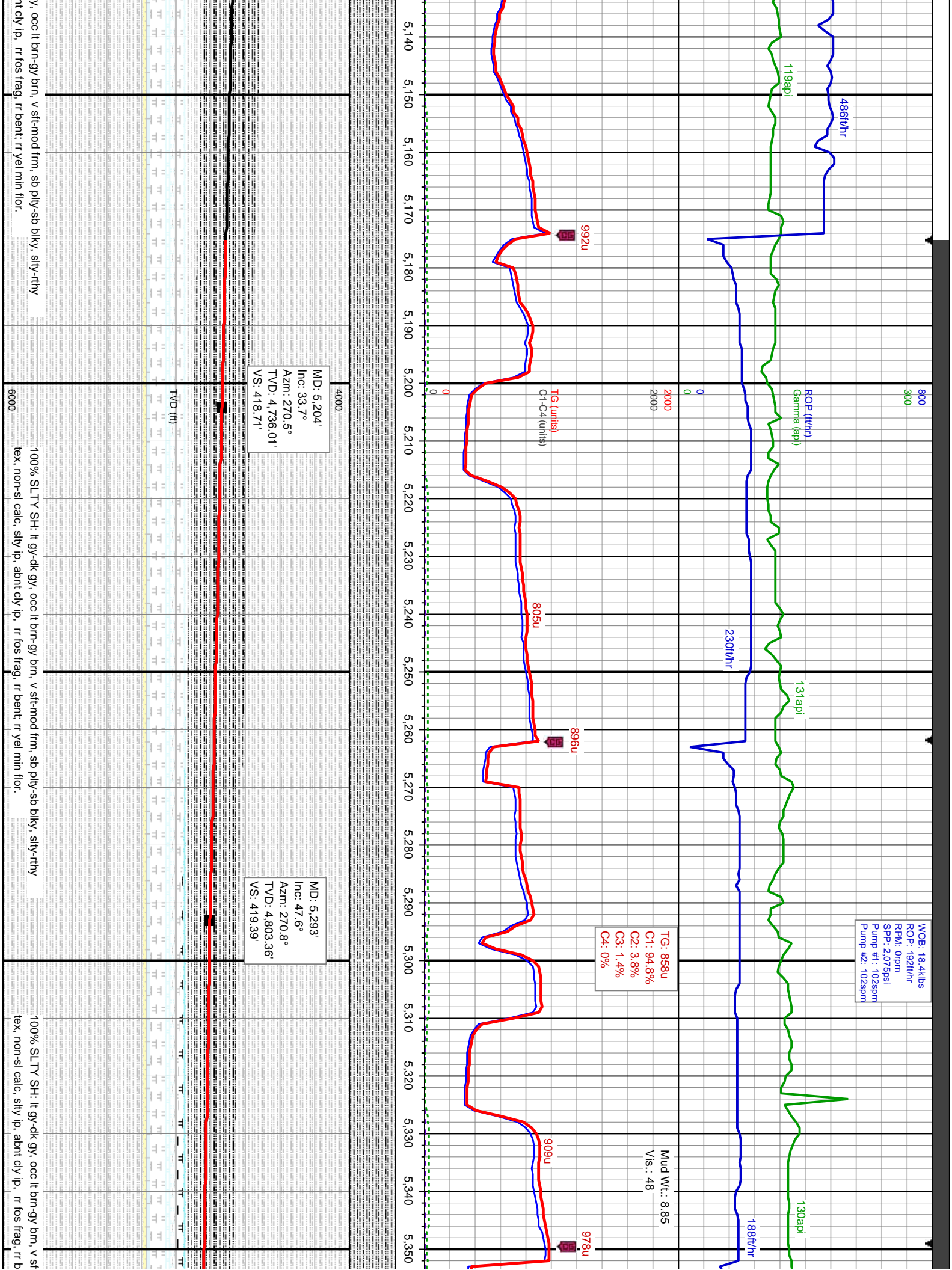
MD: 5,027'  
Inc: 27.2°  
Azim: 272.3°  
TVD: 4,583.37'  
VS: 415.81'

TG: 329u  
C1: 95.7%  
C2: 3%  
C3: 1.3%  
C4: 0%

MD: 5,116'  
Inc: 30.3°  
Azim: 272.4°  
TVD: 4,661.39'  
VS: 417.57'

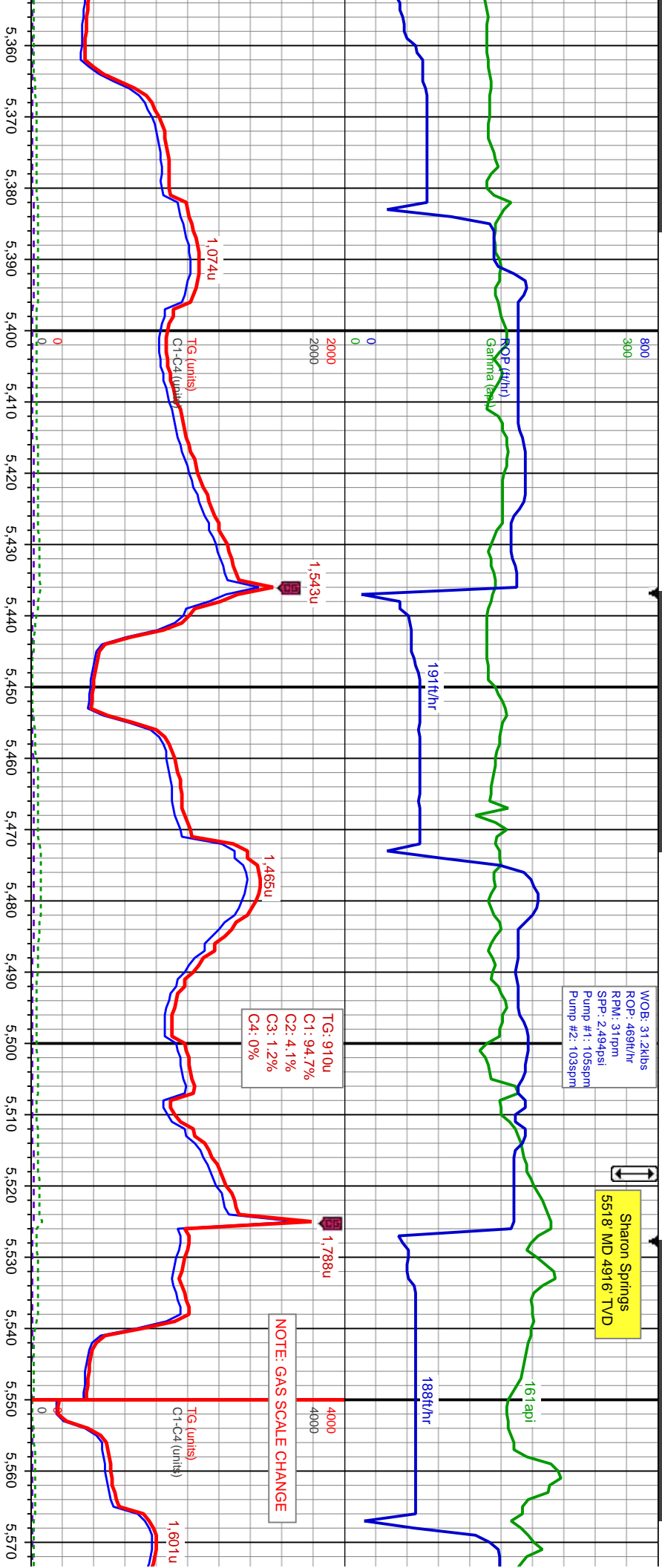






Sharon Springs  
5518' MD 4916' TVD

WOB: 31.2kibs  
ROP: 469ft/hr  
RPM: 31rpm  
SPP: 2.494psi  
Pump #1: 105spm  
Pump #2: 103spm



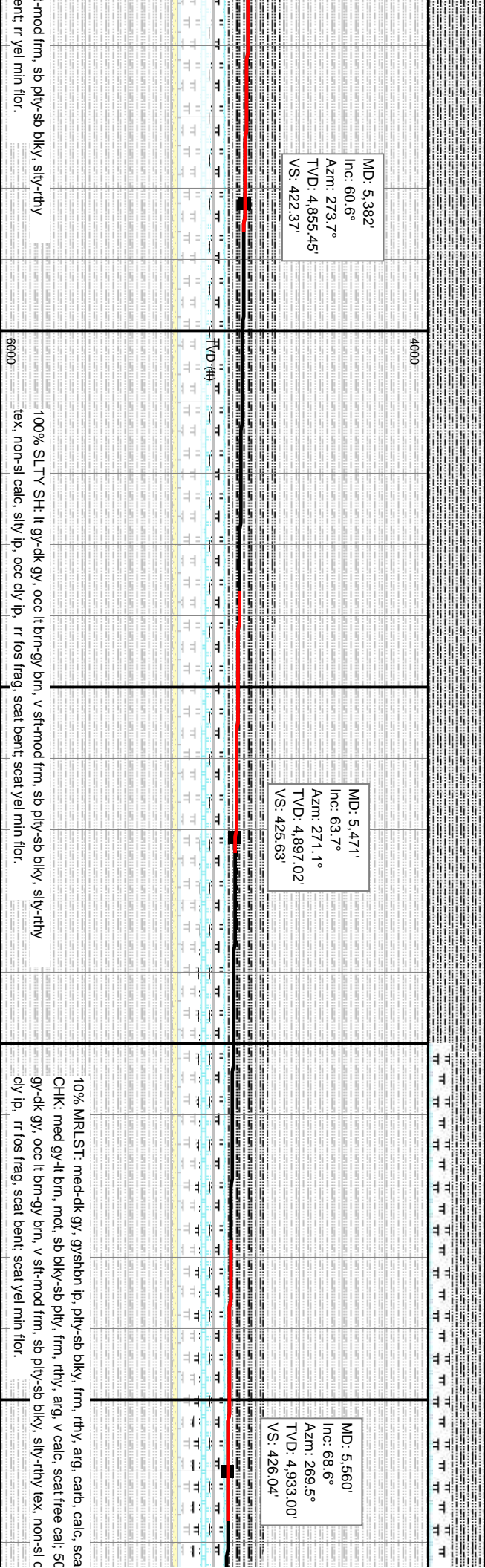
NOTE: GAS SCALE CHANGE

TG: 910u  
C1: 94.7%  
C2: 4.1%  
C3: 1.2%  
C4: 0%

MD: 5,382'  
Inc: 60.6°  
Azim: 273.7°  
TVD: 4,855.45'  
VS: 422.37'

MD: 5,471'  
Inc: 63.7°  
Azim: 271.1°  
TVD: 4,897.02'  
VS: 425.63'

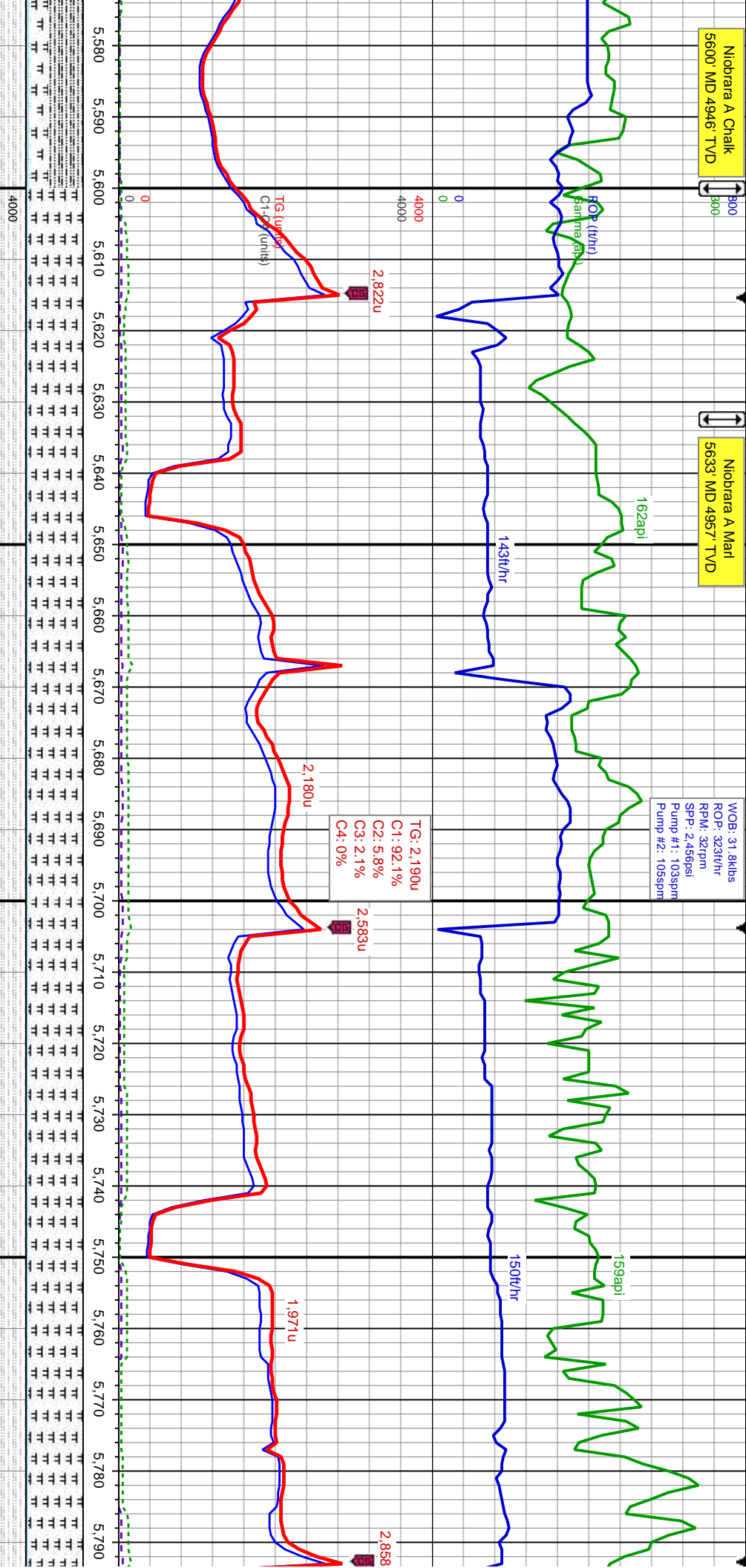
MD: 5,560'  
Inc: 68.6°  
Azim: 269.5°  
TVD: 4,933.00'  
VS: 426.04'



Niobrara A Chaik  
5600' MD 4946' TVD

Niobrara A Marl  
5633' MD 4957' TVD

WOB: 31.8kbs  
ROP: 323ft/hr  
RPM: 32rpm  
SPR: 2.456psi  
Pump #1: 103spm  
Pump #2: 105spm



MD: 5.649'  
Inc: 72.9°  
Azim: 268.8°  
TVD: 4.962.34'  
VS: 424.79'

MD: 5.737'  
Inc: 80.1°  
Azim: 268.3°  
TVD: 4.982.87'  
VS: 422.62'

SLTY SH: It  
bent: 30%  
95% MRLST: med-dk gy, gyshtn ip, ply-sb blk, frm, rthy, arg, carb, calc, scat bent: 5% CHK:  
med gy-lt brn, mot, sb blk-y-sb ply, frm, rthy, arg, v calc, scat free cal, scat brt yel mln flr



Reached LP of 5875' MD @ 19:20  
MDT on 8/1/19. TOOH for  
intermediate casing run, Ran &  
cemented 5863' of 7" Casing.  
Returned to drilling @ 00:27 MDT  
on 8/14/2019.

8/1/19 8/12-14/19  
MINDEPTH

WOB: 19.5kips  
ROP: 117ft/hr  
RPM: 0rpm  
SPR: 3.55dpsi  
Pump #1: 119spm  
Pump #2: 0spm

Niobrara B Chalk  
5960' MD 4972' TVD

800  
300  
600'

ROP (ft/hr)  
Gamma Ray (api)

476ft/hr  
110api

355ft/hr  
228api

ROP (ft/hr)  
Gamma Ray (api)

0  
4000  
4000

Mud Wt.: 9.1  
Vis.: 55

0  
4000  
4000

TG (units)  
C1-C4 (units)

2.257u

**Bit Data**  
Bit #: 3  
Type: SD1516  
Size: 6.12  
Depth In: 5.875'  
Depth Out: 12.052'  
Hours: 22.5 hrs  
Jets: 2X14, 3X12  
S/N: JK8295

TG: 227u  
C1: 97.3%  
C2: 2.6%  
C3: 0.1%  
C4: 0%

1.050u

887u

2.344u

TG (units)  
C1-C4 (units)

0

0

SCALE CHANGE

MD: 5.820'  
Inc: 96.6°  
Azim: 270.4°  
TVD: 4.985.25'  
VS: 421.68'

MD: 5.878'  
Inc: 97.6°  
Azim: 265.3°  
TVD: 4.978.08'  
VS: 419.53'

MD: 5.965'  
Inc: 90.9°  
Azim: 270.6°  
TVD: 4.971.63'  
VS: 416.45'

TVD (ft)

TVD (ft)

95% MRLST: med-dk gy. gysshn ip, ply-sb blkly, frm, rthy, arg, carb, calc, scat bent: 5% CHK:  
med gy-it brn, mot, sb blkly-sb ply, frm, rthy, arg, v calc, scat free cai, scat bri yel min flr

90% MRLST: med-dk gy. gysshn ip, ply-sb blkly, frm, rthy, arg, carb, calc, scat bent: 10% CHK:  
med gy-it brn, mot, sb blkly-sb ply, frm, rthy, arg, v calc, scat free cai, scat bri yel min flr

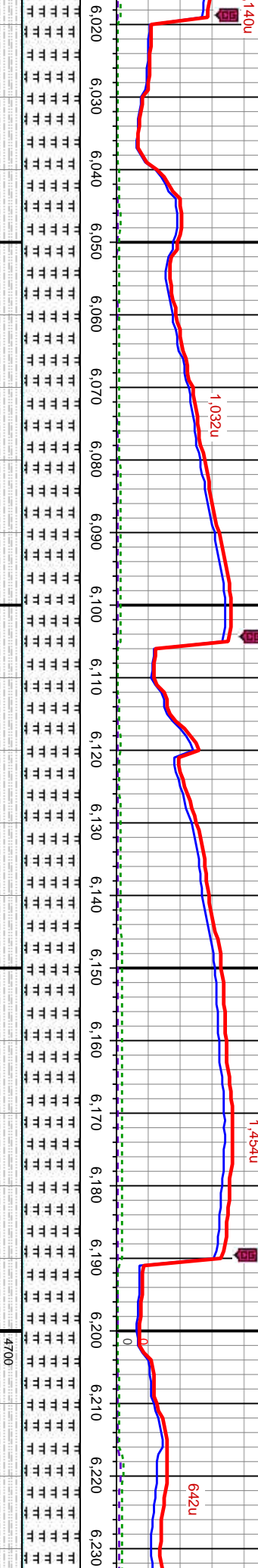
95% MR  
gy-it brn,



WOB: 16.2kips  
ROP: 425f/hr  
RPM: 617pm  
SPP: 4.019psi  
Pump #1: 119spm  
Pump #2: 0spm

Mud Wt.: 9.1  
Vis.: 55

TG (units)  
C1-C4 (units)



MD: 6,050'  
Inc: 89.8°  
Az: 269.8°  
TVD: 4,971.11'  
VS: 416.74'

MD: 6,135'  
Inc: 91.3°  
Az: 269.5°  
TVD: 4,970.29'  
VS: 416.22'

TVD SCALE CHANGE

MD: 6,220'  
Inc: 93.5°  
Az: 269.8°  
TVD: 4,966.73'  
VS: 415.70'

ST: med-dk gy, gysbhn ip, ply-sb blk, frm, rthy, arg, carb, calc, scat bent, 5% CHK, med  
mot, sb blk-sb ply, frm, rthy, arg, v calc, scat free cal, scat bri yel min flr, trace pyr.

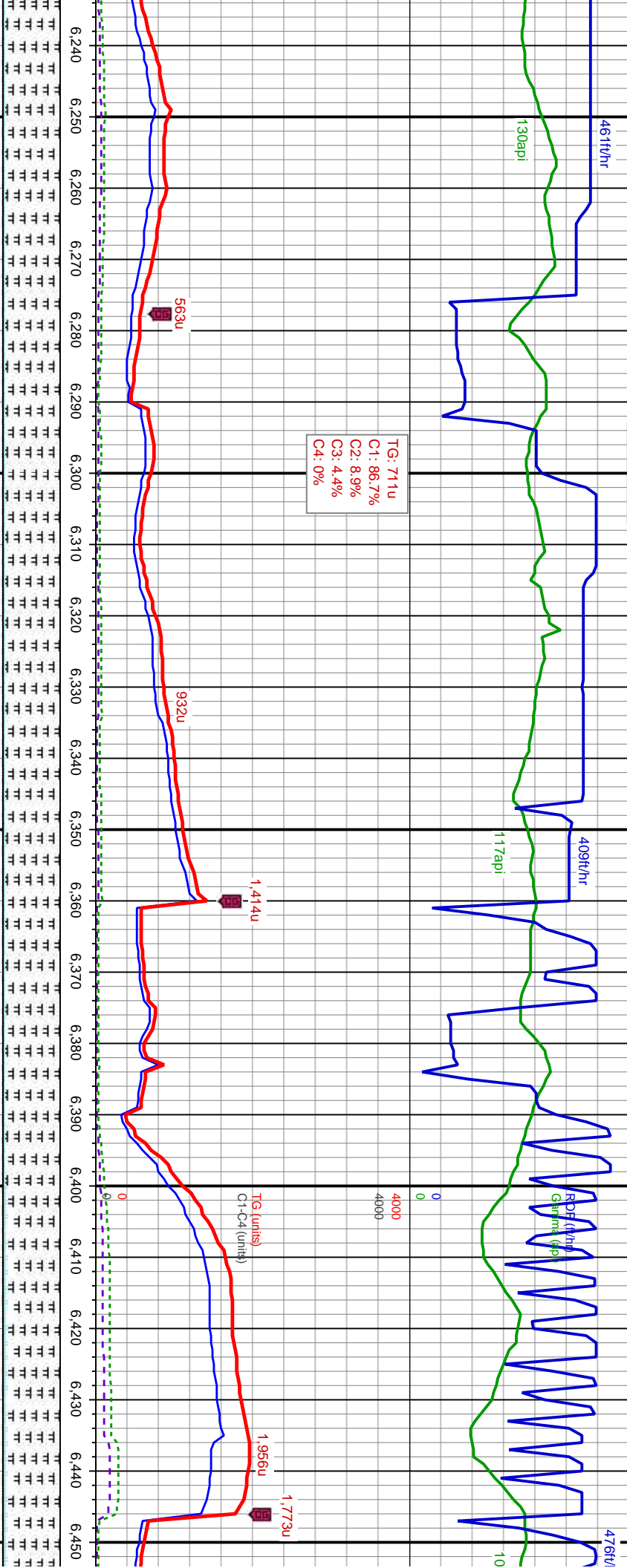
95% MRLST: med-dk gy, gysbhn ip, ply-sb blk, frm, rthy, arg, carb, calc,  
trace pyr, scat bent, 5% CHK: med gy-l brn, mot, sb blk-sb ply, frm, rthy,  
arg, v calc, scat free cal, scat bri yel min flr

95% MRLST: n  
calc, trace pyr,  
ply, frm, rthy, e

Niobrara C Chalk  
6399 MD 4952' TVD

800  
300

WOB: 14.7klbs  
ROP: 355ft/hr  
RPM: 60rpm  
SPP: 3.954psi  
Pump #1: 119spm  
Pump #2: 0spm



MD: 6,306'  
Inc: 95.3°  
Azim: 269.4°  
TVD: 4,960.14'  
VS: 415.11'

MD: 6,391'  
Inc: 95.1°  
Azim: 268.5°  
TVD: 4,952.43'  
VS: 413.55'

med-dk gy, gyshtn ip, pily-sb blkly, frm, rthy, arg, carb.  
scat bent, 5% CHK: med gy-it brn, mot, sb blkly-sb  
rg v calc, scat free cal, scat bri yel min flr

95% MRLST: med-dk gy, gyshtn ip, pily-sb blkly, frm, rthy, arg, carb.  
calc, scat bent, 5% CHK: med gy-it brn, mot, sb blkly-sb pily, frm,  
rthy, arg, v calc, scat free cal, scat bri yel min flr, trace pyr.

90% MRLST: med-dk gy, gyshtn ip, pily-st  
calc, abnt free cal, scat bent, t pyr, 10% Ch  
sb blkly-sb pily, frm, rthy, arg, v calc, scat br

4700  
5100

WOB: 21.4klbs  
ROP: 477ft/hr  
RPM: 61rpm  
SPP: 4.154psi  
Pump #1: 119spm  
Pump #2: 0spm

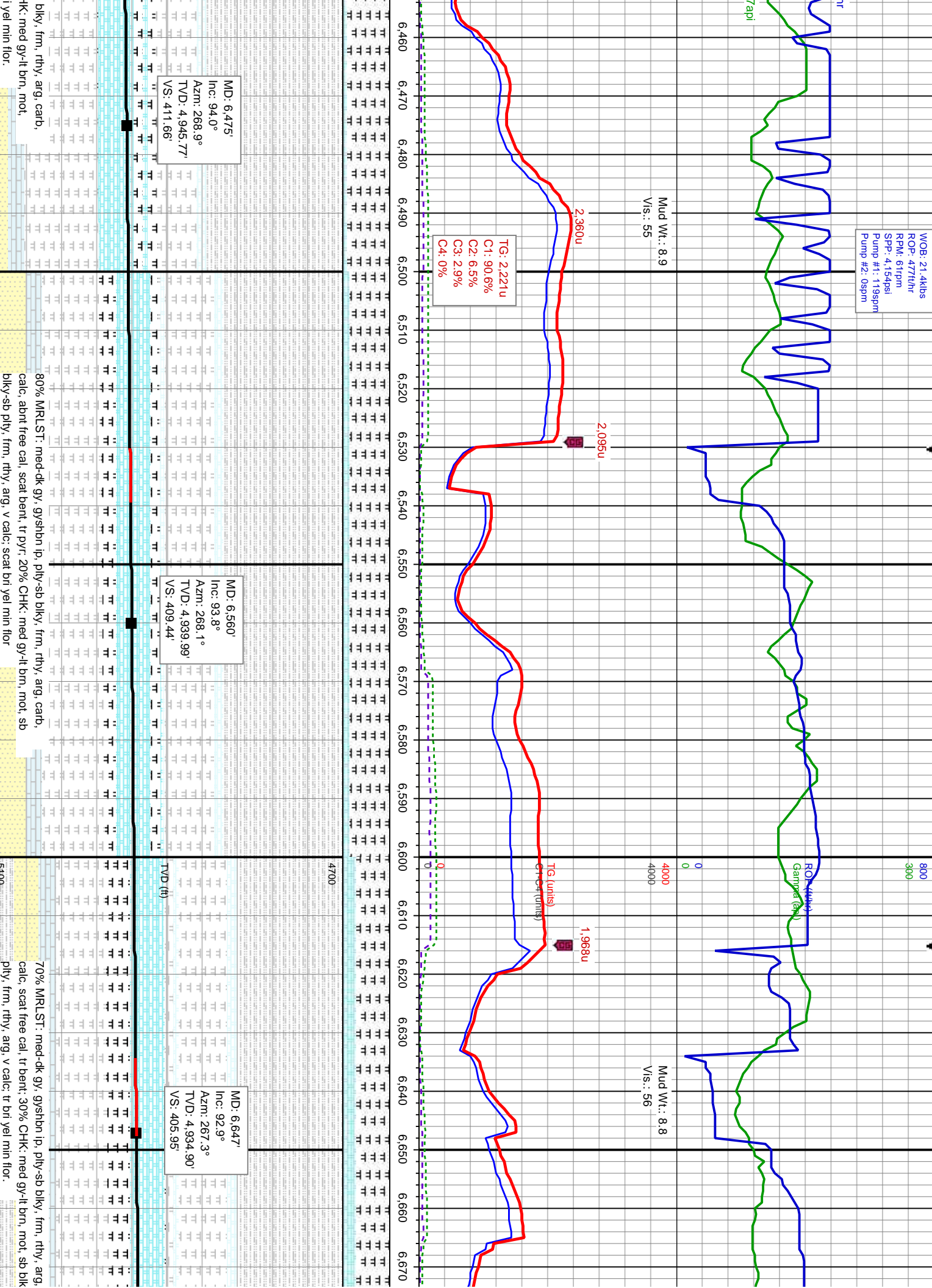
Mud Wt.: 8.9  
Vis.: 55

TG: 2.221u  
C1: 90.6%  
C2: 6.5%  
C3: 2.9%  
C4: 0%

MD: 6.475'  
Inc: 94.0°  
Azim: 268.9°  
TVD: 4.945.77'  
VS: 411.66'

MD: 6.560'  
Inc: 93.8°  
Azim: 268.1°  
TVD: 4.939.99'  
VS: 409.44'

MD: 6.647'  
Inc: 92.9°  
Azim: 267.3°  
TVD: 4.934.90'  
VS: 405.95'



WOB: 15.8kbs  
ROP: 393ft/hr  
RPM: 61rpm  
SP: 4.018psi  
Pump #1: 119spm  
Pump #2: 0spm

Niobrara C Marl  
6830' MD 4920' TVD

TG: 630u  
C1: 94.1%  
C2: 4.6%  
C3: 1.4%  
C4: 0%

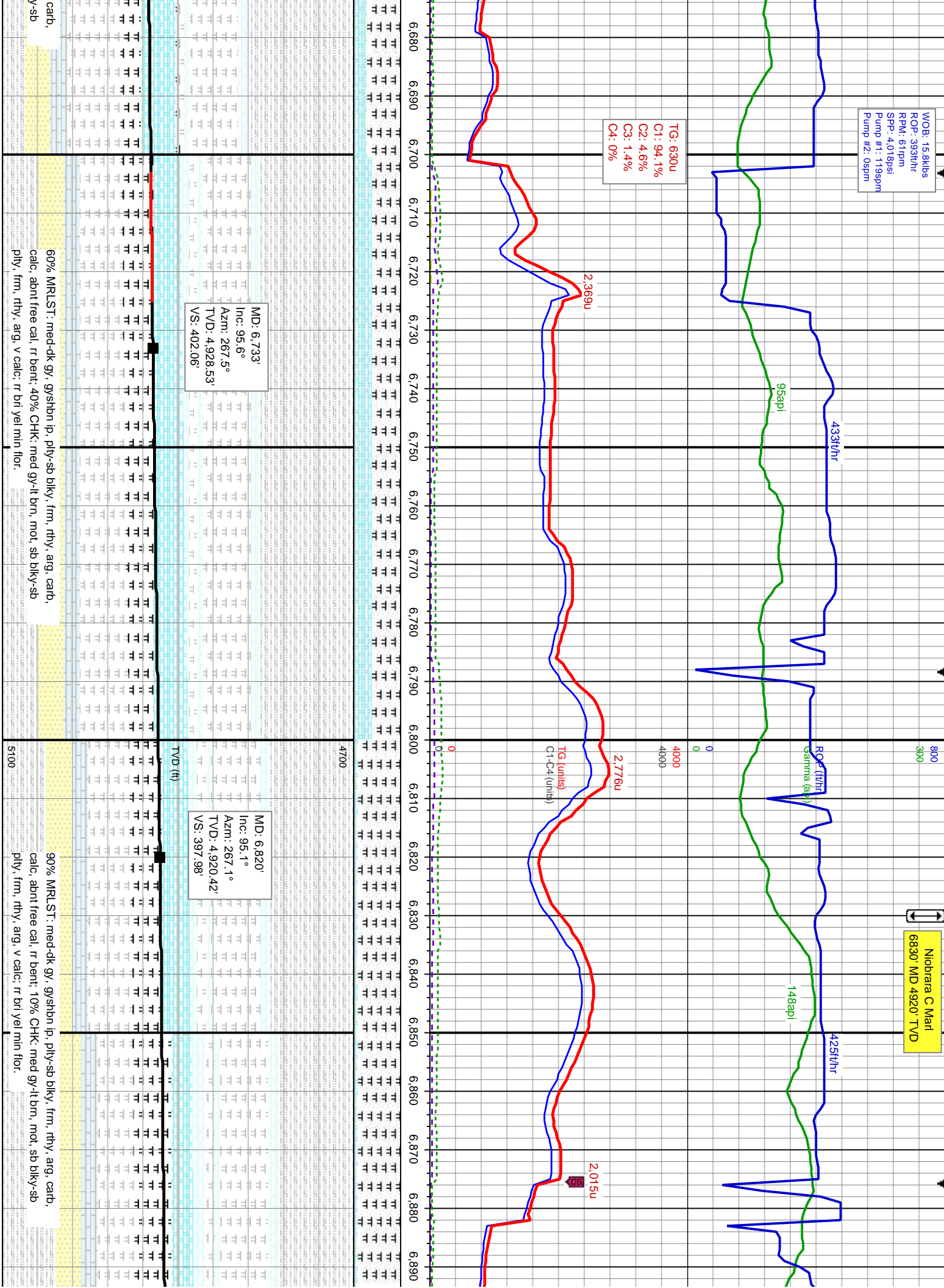
MD: 6.733'  
Inc: 95.6°  
Azim: 267.5°  
TVD: 4.928.53'  
VS: 402.06'

MD: 6.820'  
Inc: 95.1°  
Azim: 267.1°  
TVD: 4.920.42'  
VS: 397.98'

carb.  
v-sb

60% MRLST: med-dk gy. gysbhn ip, pty-sb blkly, frm, rthy, arg, carb.  
calc, abnt free cal, r bent, 40% CHK: med gy-it brn, mot, sb blkly-sb  
pty, frm, rthy, arg, v calc: r bri yel min flr.

90% MRLST: med-dk gy. gysbhn ip, pty-sb blkly, frm, rthy, arg, carb.  
calc, abnt free cal, r bent, 10% CHK: med gy-it brn, mot, sb blkly-sb  
pty, frm, rthy, arg, v calc: r bri yel min flr.





WOB: 16kbs  
ROP: 428ft/hr  
RPM: 62rpm  
SPP: 3.973psi  
Pump #1: 118spm  
Pump #2: 0spm

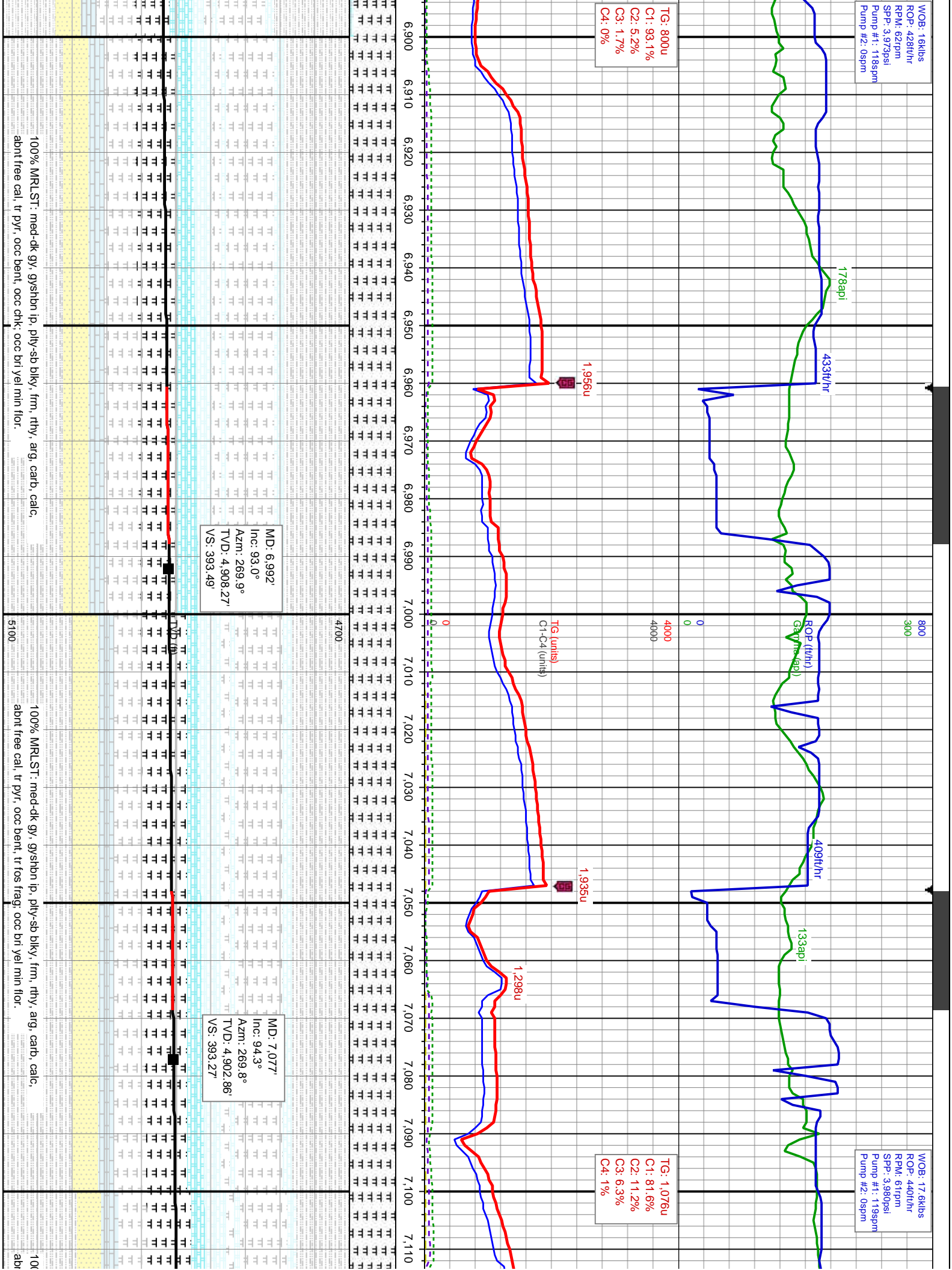
WOB: 17.6kbs  
ROP: 440ft/hr  
RPM: 61rpm  
SPP: 3.980psi  
Pump #1: 119spm  
Pump #2: 0spm

TG: 800u  
C1: 93.1%  
C2: 5.2%  
C3: 1.7%  
C4: 0%

TG: 1,076u  
C1: 81.6%  
C2: 11.2%  
C3: 6.3%  
C4: 1%

MD: 6,992'  
Inc: 93.0°  
Azm: 269.9°  
TVD: 4,908.27'  
VS: 393.49'

MD: 7,077'  
Inc: 94.3°  
Azm: 269.8°  
TVD: 4,902.86'  
VS: 393.27'



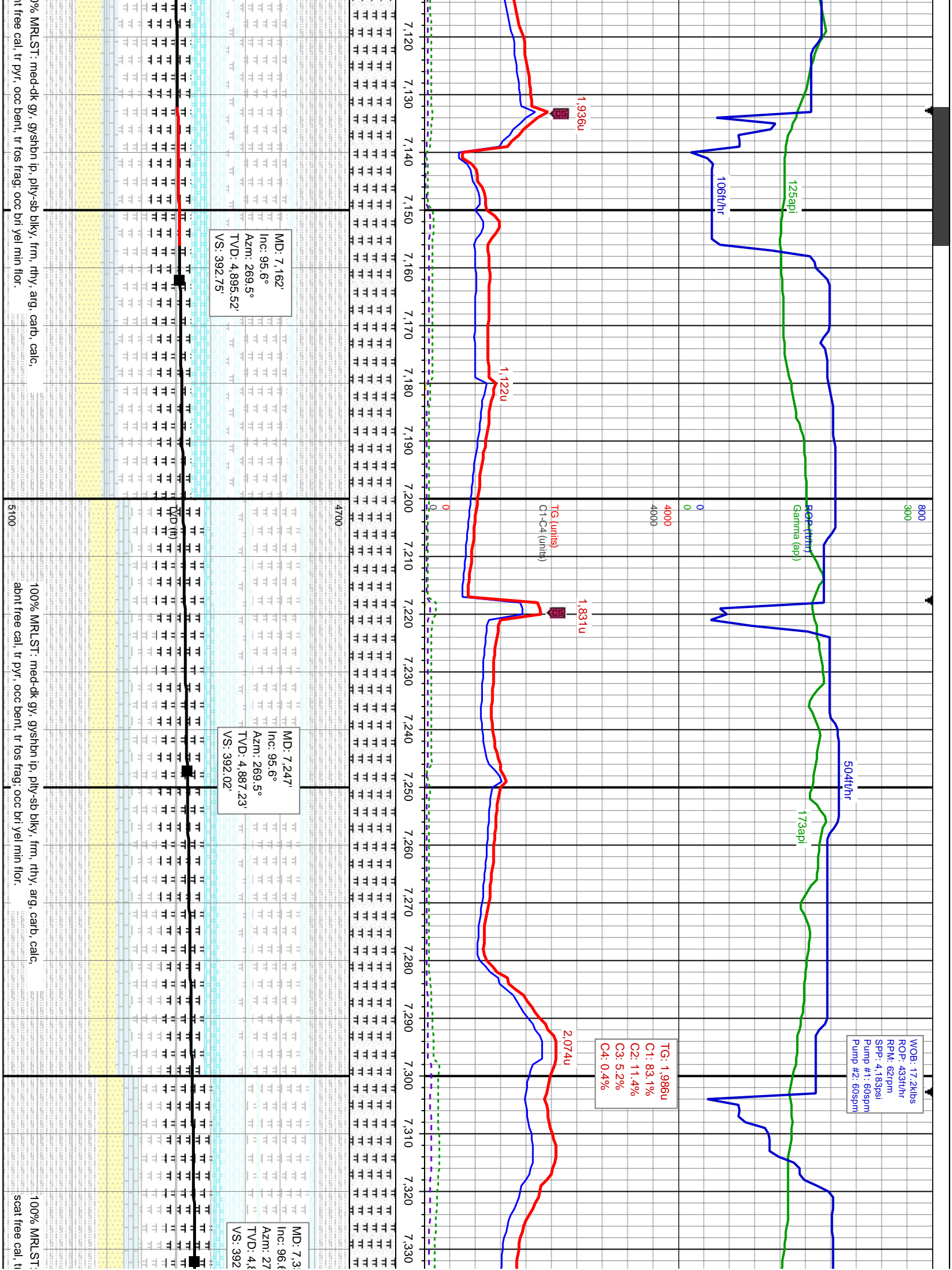
WOB: 17.2klbs  
ROP: 433ft/hr  
RPM: 62rpm  
SPP: 4.183psi  
Pump #1: 60spm  
Pump #2: 60spm

TG: 1.986u  
C1: 83.1%  
C2: 11.4%  
C3: 5.2%  
C4: 0.4%

MD: 7.3  
Inc: 96.6°  
Azim: 27°  
TVD: 4.8  
VS: 392

MD: 7.247'  
Inc: 95.6°  
Azim: 269.5°  
TVD: 4.887.23'  
VS: 392.02'

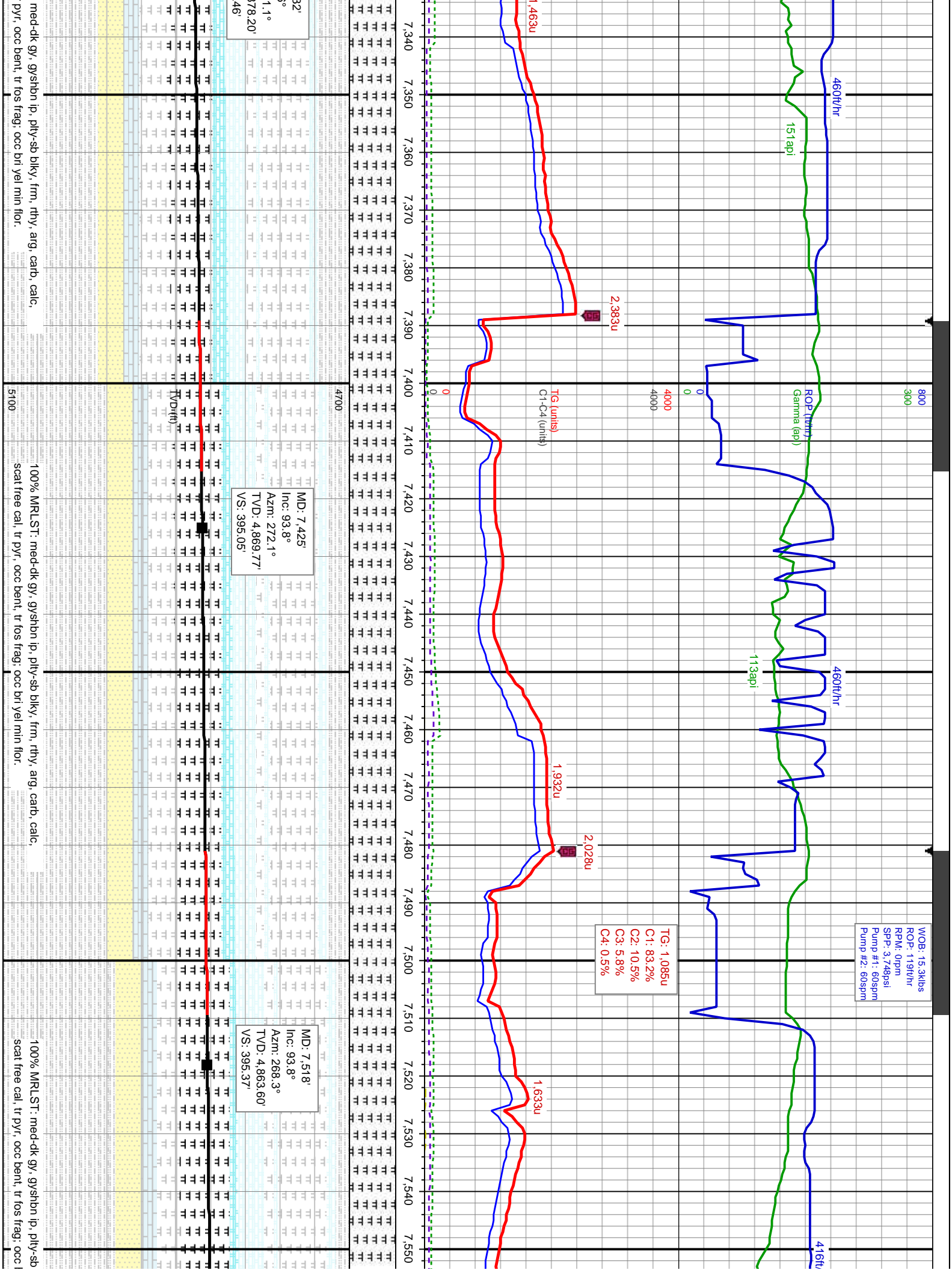
MD: 7.162'  
Inc: 95.6°  
Azim: 269.5°  
TVD: 4.895.52'  
VS: 392.75'

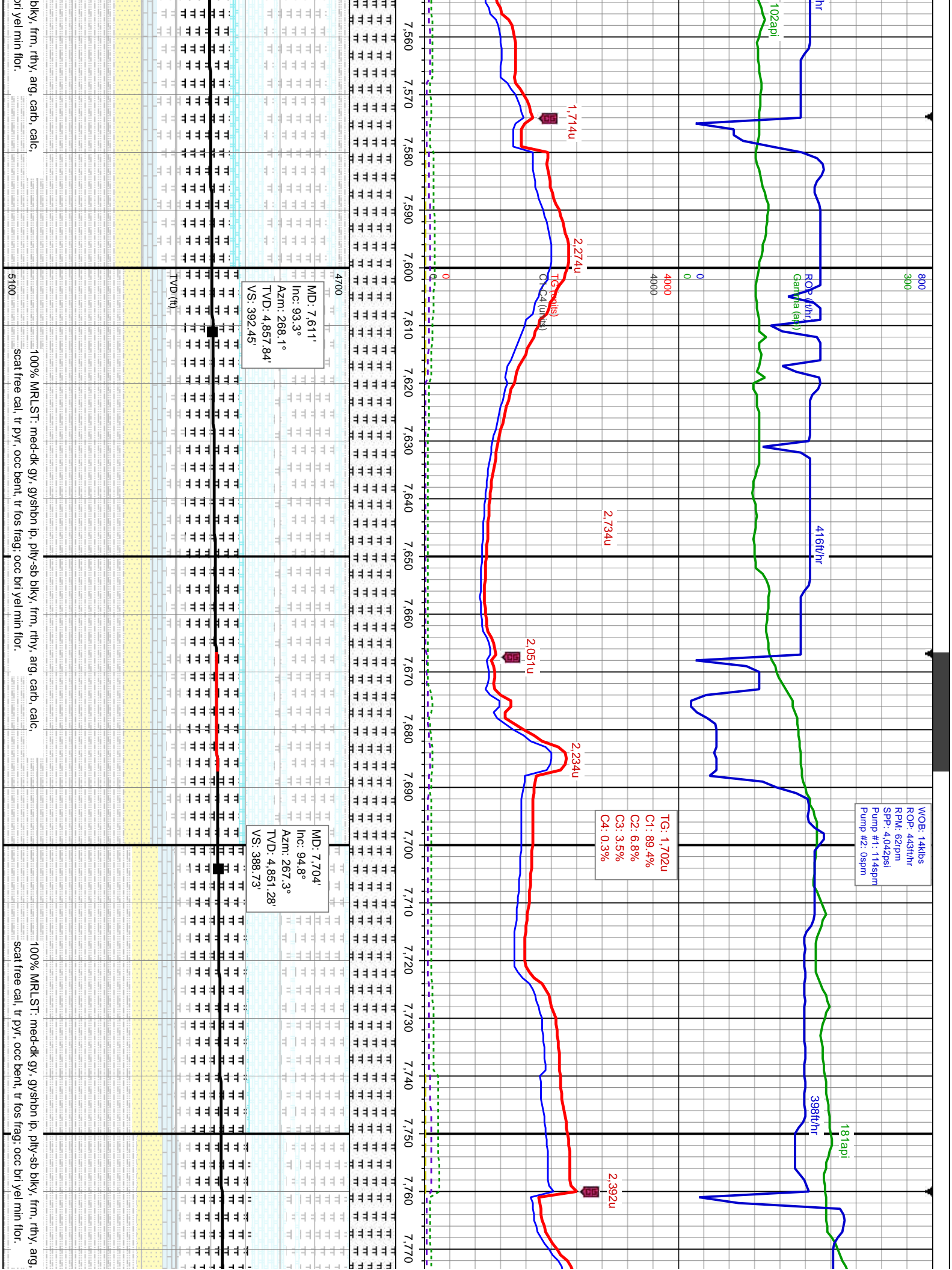


% MRLST: med-dk gy, gysbsh lp, pty-sb blk, frm, rthy, arg, carb, calc,  
t free cal, tr pyr, occ bent, tr fos frag, occ bri yel min flr.

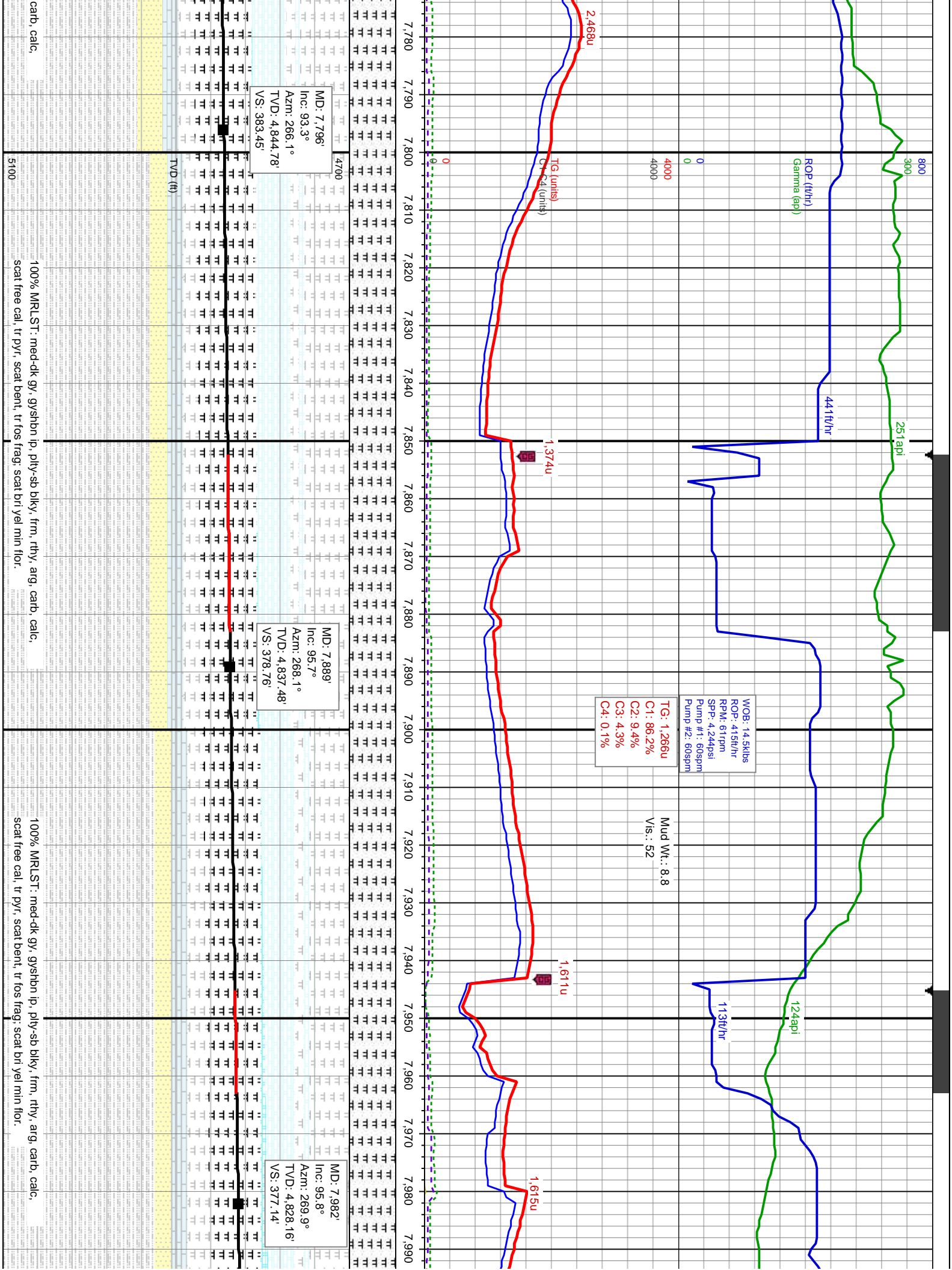
100% MRLST: med-dk gy, gysbsh lp, pty-sb blk, frm, rthy, arg, carb, calc,  
abt free cal, tr pyr, occ bent, tr fos frag, occ bri yel min flr.

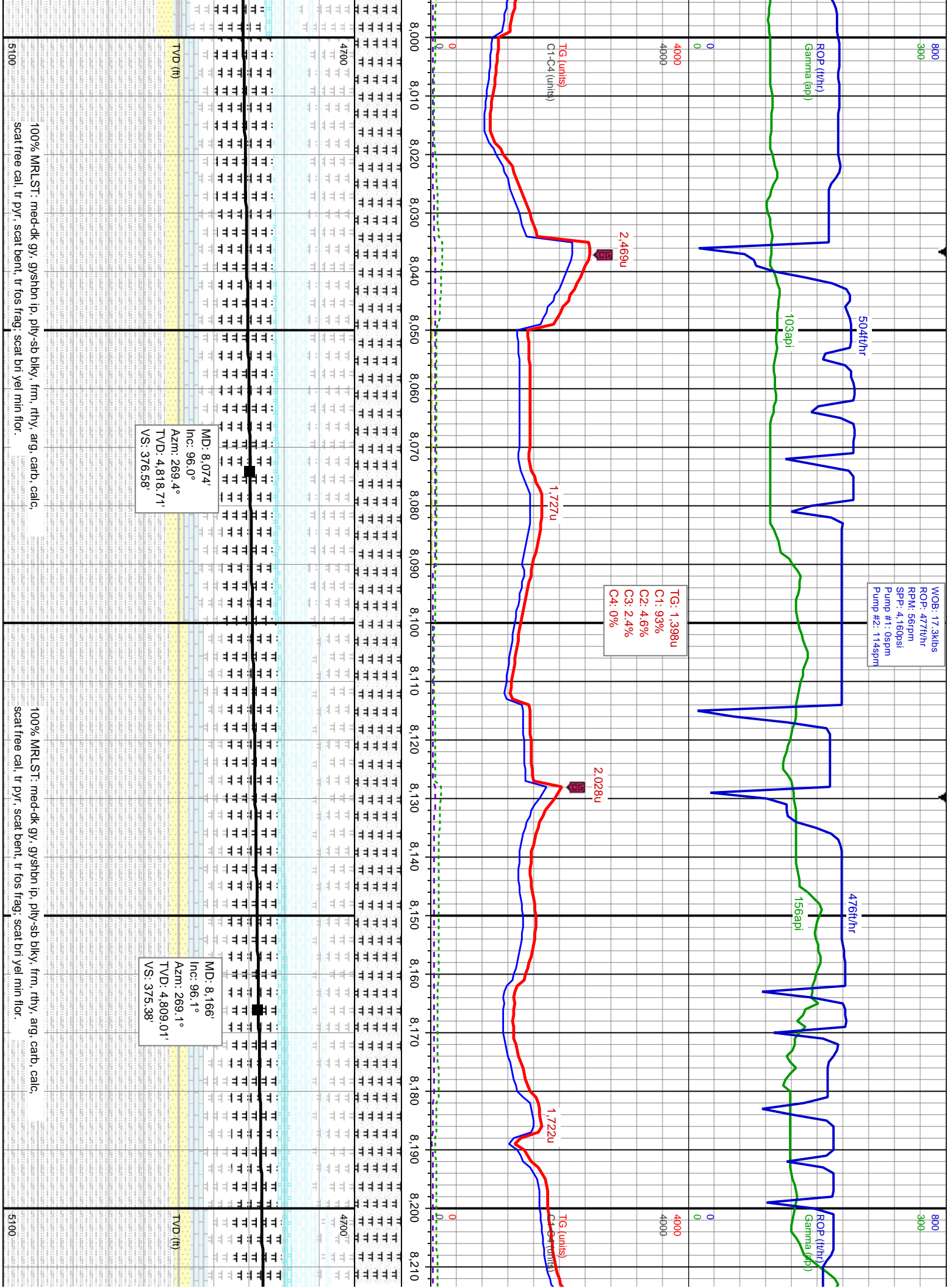
100% MRLST:  
scat free cal, tr

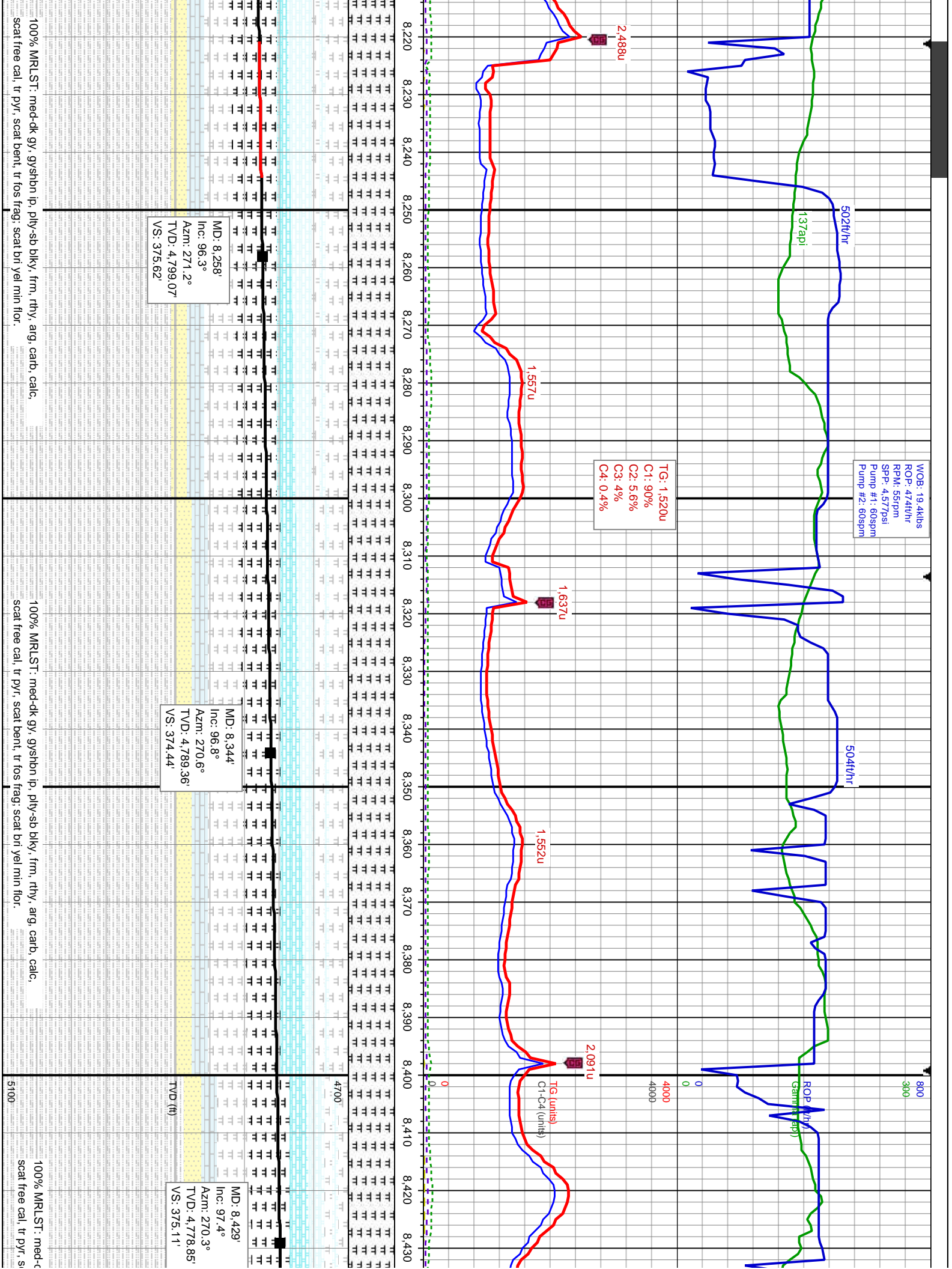


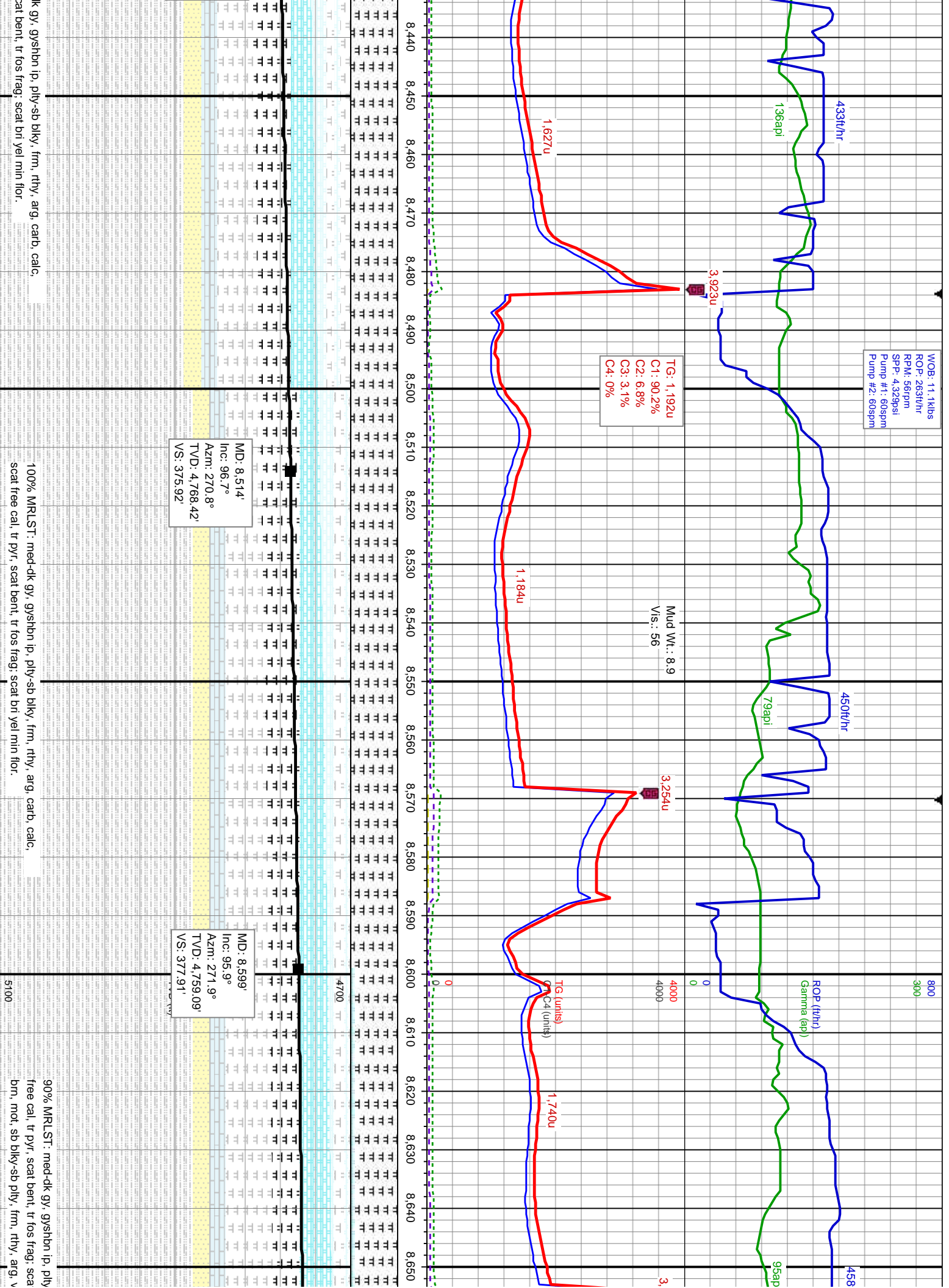














WOB: 19.6kibs  
ROP: 442ft/hr  
RPM: 59rpm  
SP: 4.534psi  
Pump #1: 60spm  
Pump #2: 60spm

TG: 1.447u  
C1: 90.5%  
C2: 6.2%  
C3: 3%  
C4: 0.2%

3.025u

2.836u

TG (units)  
C1-C4 (units)

Rig crew raised fluid level, by  
shutting gates out of possum belly,  
which caused fluid to inter into our  
drying system, which had to be  
completely dismantled and cleaned,  
thus the loss of gas data.

477ft/hr

144api

ROP (ft/hr)  
Gamma (api)

166api

428ft/hr

1.617u

295u

MD: 8.685'  
Inc: 92.9°  
Azim: 273.2°  
TVD: 4,752.49'  
VS: 381.72'

MD: 8.769'  
Inc: 90.0°  
Azim: 272.3°  
TVD: 4,750.37'  
VS: 385.75'

TVD SCALE CHANGE

MD: 8.854'  
Inc: 88.5°  
Azim: 271.8°  
TVD: 4,751.48'  
VS: 388.79'

-sb blkly, frm, rthy, arg, carb, calc, scat  
bri yel min flor, 10% CHK, med gy-it  
calc, scat bri yel min flor, trace pyr.

90% MRLST: med-dk gy, gysbhn ip, ply-sb blkly, frm, rthy, arg, carb, calc, scat  
free cal, tr pyr, scat bent, tr fos frag, scat bri yel min flor, 10% CHK, med gy-it brn,  
mot, sb blkly-sb ply, frm, rthy, arg, v calc, scat bri yel min flor, trace pyr.

90% MRLST: med-dk gy, gysbhn ip, ply-sb blkly, frm, rthy, arg, carb, ce  
cal, tr pyr, scat bent, tr fos frag, scat bri yel min flor, 10% CHK, med gy-  
sb blkly-sb ply, frm, rthy, arg, v calc, scat bri yel min flor, trace pyr.

WOB: 16.5Klbs  
ROP: 384ft/hr  
RPM: 56rpm  
SPP: 4.603psi  
Pump #1: 60spm  
Pump #2: 60spm

TG: 53u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

MD: 8.940'  
Inc: 88.4°  
Azmi: 270.3°  
TVD: 4.753.81'  
VS: 390.37'

MD: 9.025'  
Inc: 91.5°  
Azmi: 269.7°  
TVD: 4.753.88'  
VS: 390.37'

Mud Wt.: 8.9  
V/s.: 60

ic, scat free

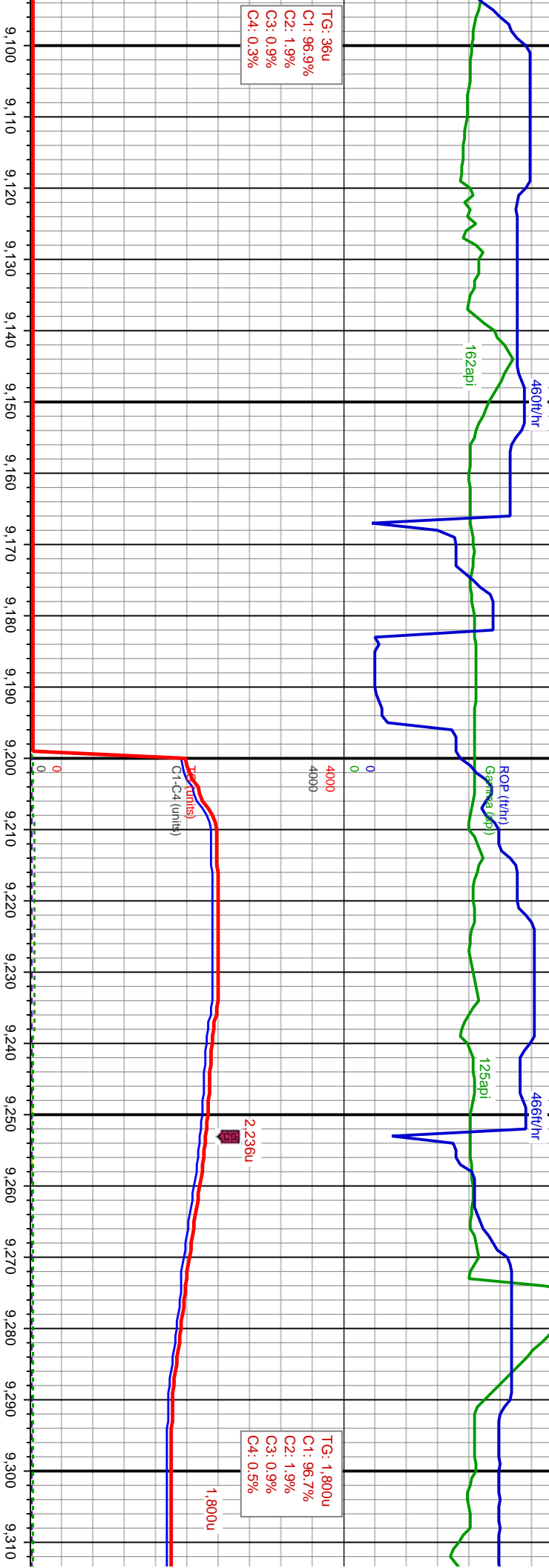
it brn, mot,

100% MRLST: med-dk gy, gys/shn ip, ply-sb blkly, frm, rthy, arg, carb, calc.  
scat free cal, tr pyr, scat bent, tr fos frag; scat bri yel min flor;

100% MRLST: med-dk gy, gys/shn ip, ply-sb blkly, frm, rthy, arg, carb, calc.  
scat free cal, tr pyr, scat bent, tr fos frag; scat bri yel min flor;

WOB: 14.6klbs  
ROP: 414ft/hr  
RPM: 56rpm  
SPP: 4,585psi  
Pump #1: 60spm  
Pump #2: 60spm

WOB: 14,7klbs  
ROP: 398ft/hr  
RPM: 55rpm  
SP: 4,630psi  
Pump #1: 60spm  
Pump #2: 60spm



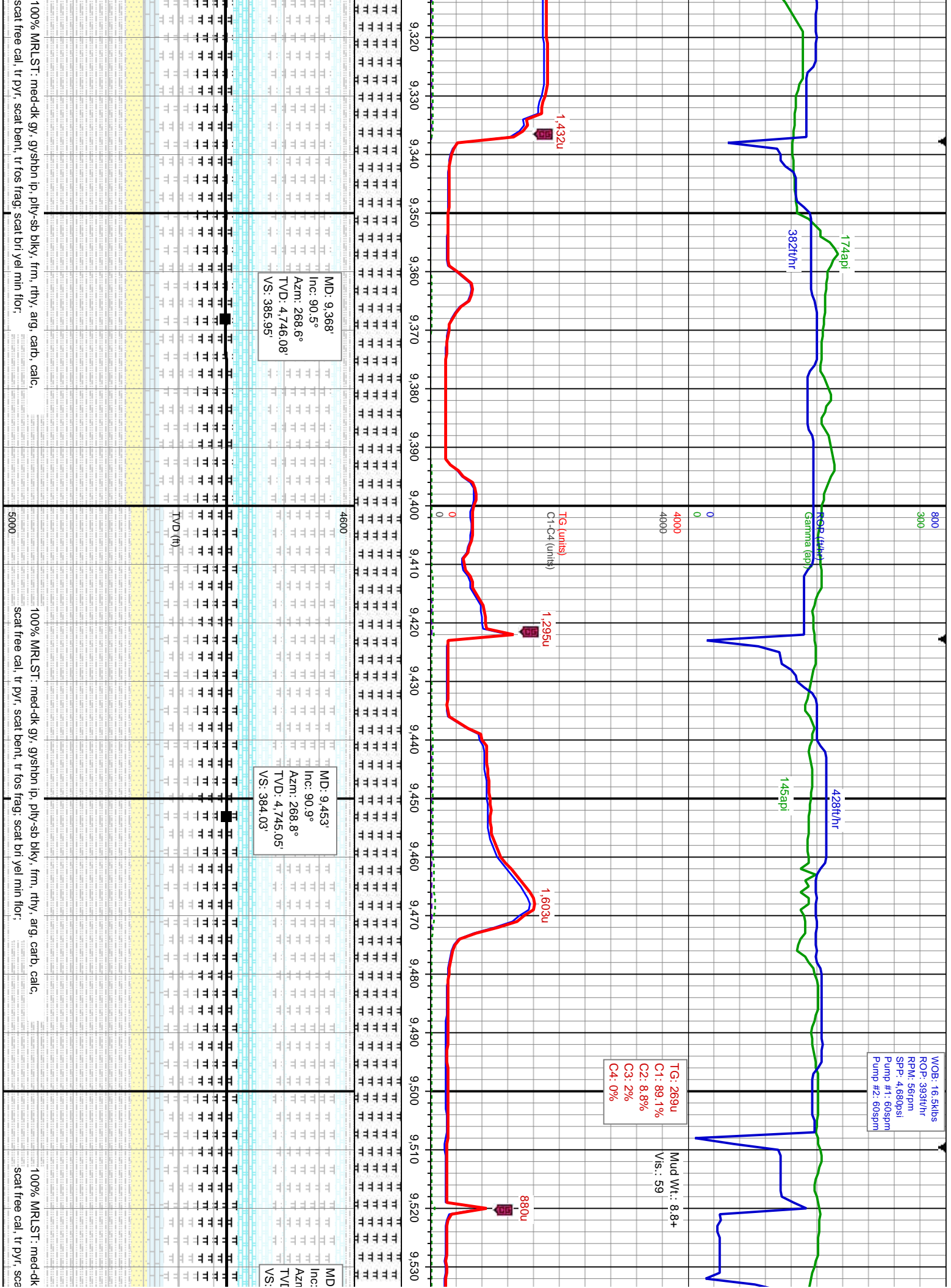
MD: 9,112'  
Inc: 92.7°  
Azim: 269.5°  
TVD: 4,750.69'  
VS: 389.76'

MD: 9,197'  
Inc: 90.9°  
Azim: 269.7°  
TVD: 4,748.02'  
VS: 389.17'

MD: 9,282'  
Inc: 90.6°  
Azim: 268.7°  
TVD: 4,746.91  
VS: 387.98'

100% MRLST: med-dk gy, gyshbn ip, plty-sb blk, frm, rthy, arg, carb, calc, scat free cal, tr pyr, scat bent, tr fos frag; scat bri yel min flor;

100% MRLST: med-dk gy, gysbhn ip, plty-sb blkly, frm, rthy, arg, carb, calc, scat free cal, tr pyr, scat bent, tr fos fragi, scat bri yel min flori;





WOB: 14.7kibs  
ROP: 398ft/hr  
RPM: 55rpm  
SPP: 4.630psi  
Pump #1: 60spm  
Pump #2: 60spm

8/14/2019 8/15/2019

MINDEPTH

Mud Wt.: 8.8  
Vis.: 61

TG: 141u  
C1: 50%  
C2: 48.6%  
C3: 1.4%  
C4: 0%

TG (units)  
C1-C4 (units)

9.540 9.550 9.560 9.570 9.580 9.590 9.600 9.610 9.620 9.630 9.640 9.650 9.660 9.670 9.680 9.690 9.700 9.710 9.720 9.730 9.740 9.750

451ft/hr

110api

ROF (ft/hr)  
Gamma (api)

126api

381ft/hr

1,26u

529u

425ft/hr

137api

9.538'  
Inc: 89.2°  
Azim: 269.5°  
TVD: 4,744.97'  
VS: 382.76'

MD: 9.623'  
Inc: 88.4°  
Azim: 269.4°  
TVD: 4,746.75'  
VS: 381.95'

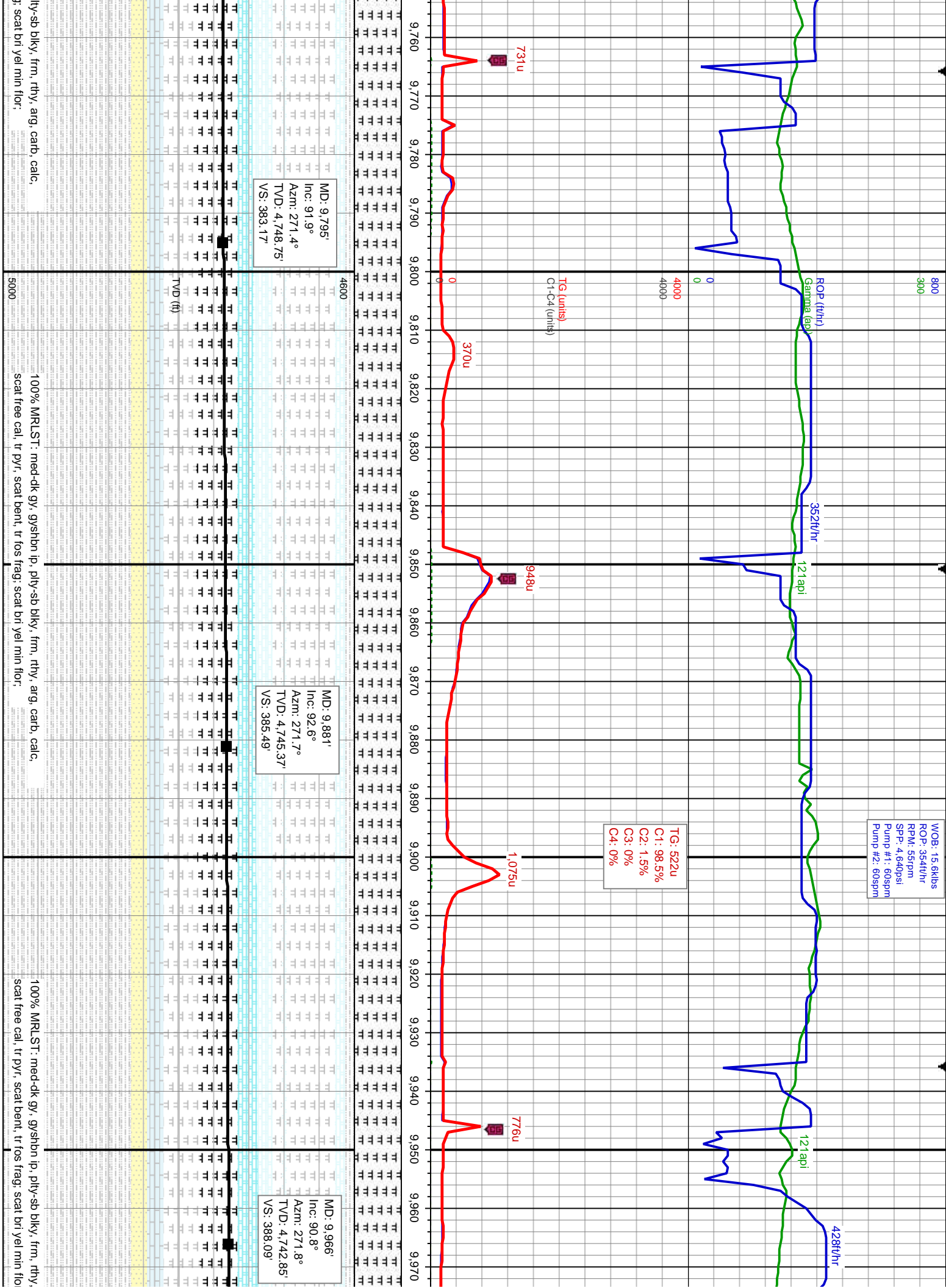
MD: 9.708'  
Inc: 88.5°  
Azim: 270.4°  
TVD: 4,749.05'  
VS: 381.80'

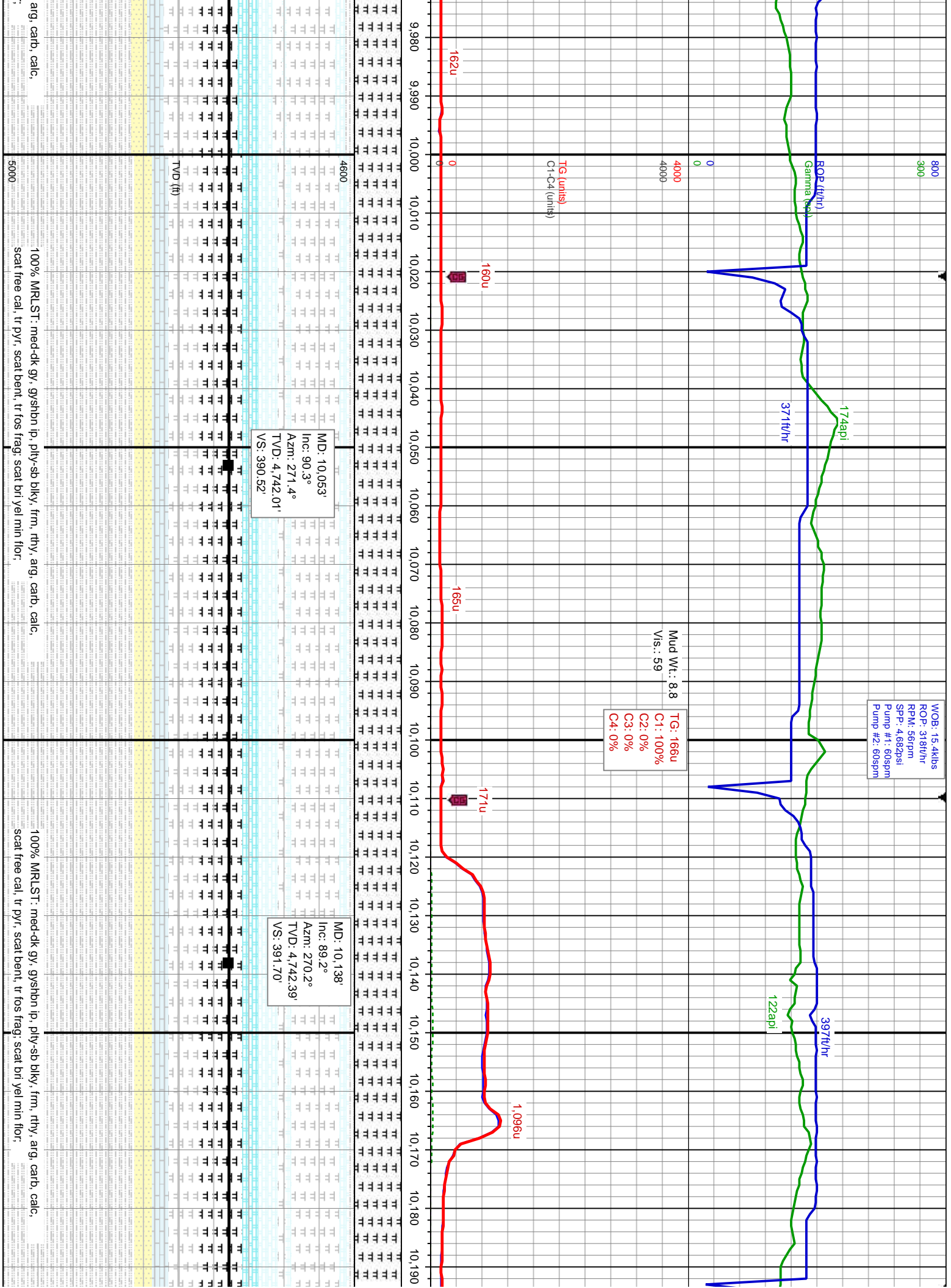
TVD (ft)

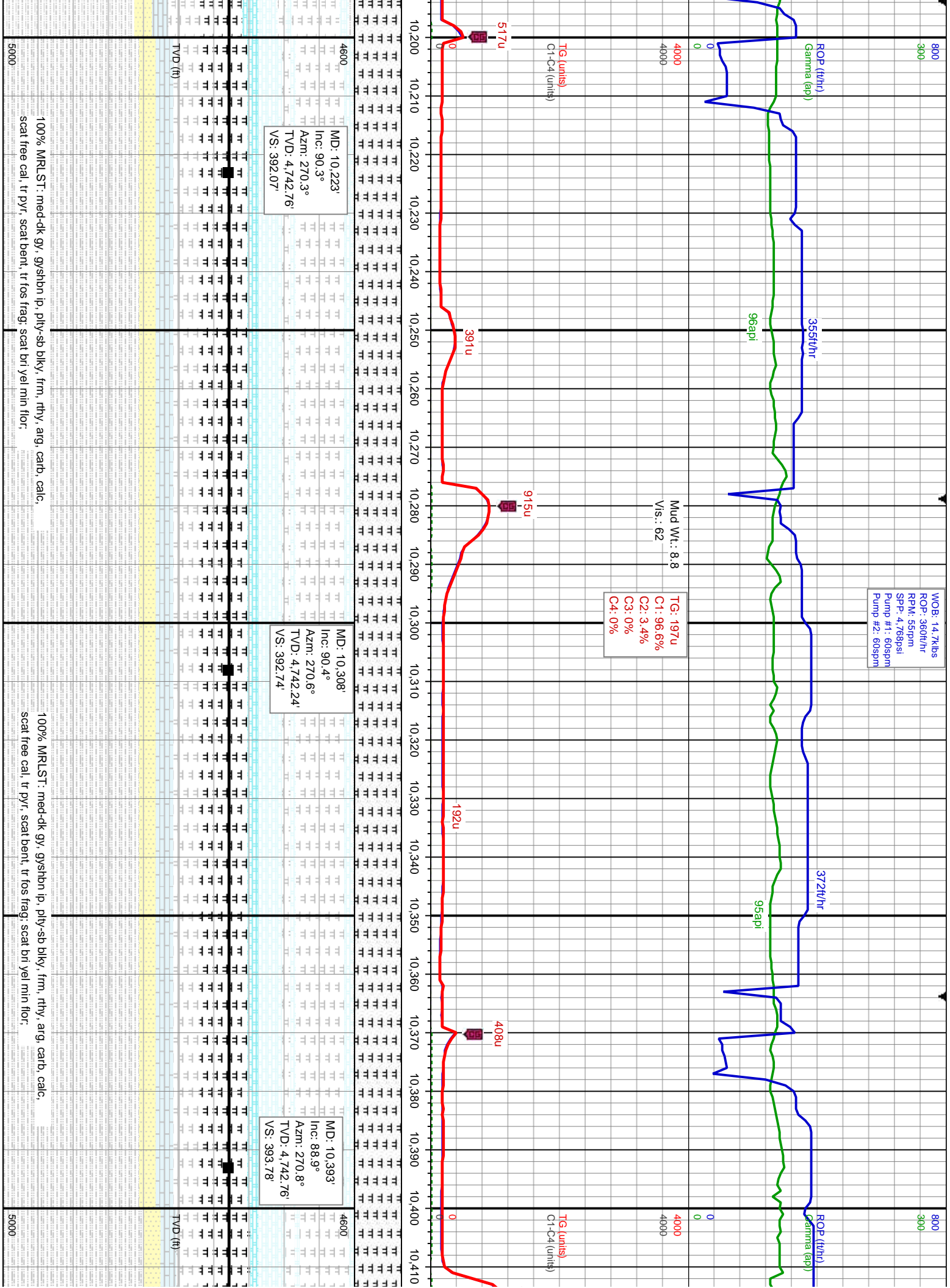
gy, gysbhn ip, ply-sb blkv, frm, rthy, arg, carb, calc,  
bent, tr fos frag: scat bri yel min floor;

100% MRLST: med-dk gy, gysbhn ip, ply-sb blkv, frm, rthy, arg, carb, calc,  
scat free cal, tr pyr, scat bent, tr fos frag: scat bri yel min floor;

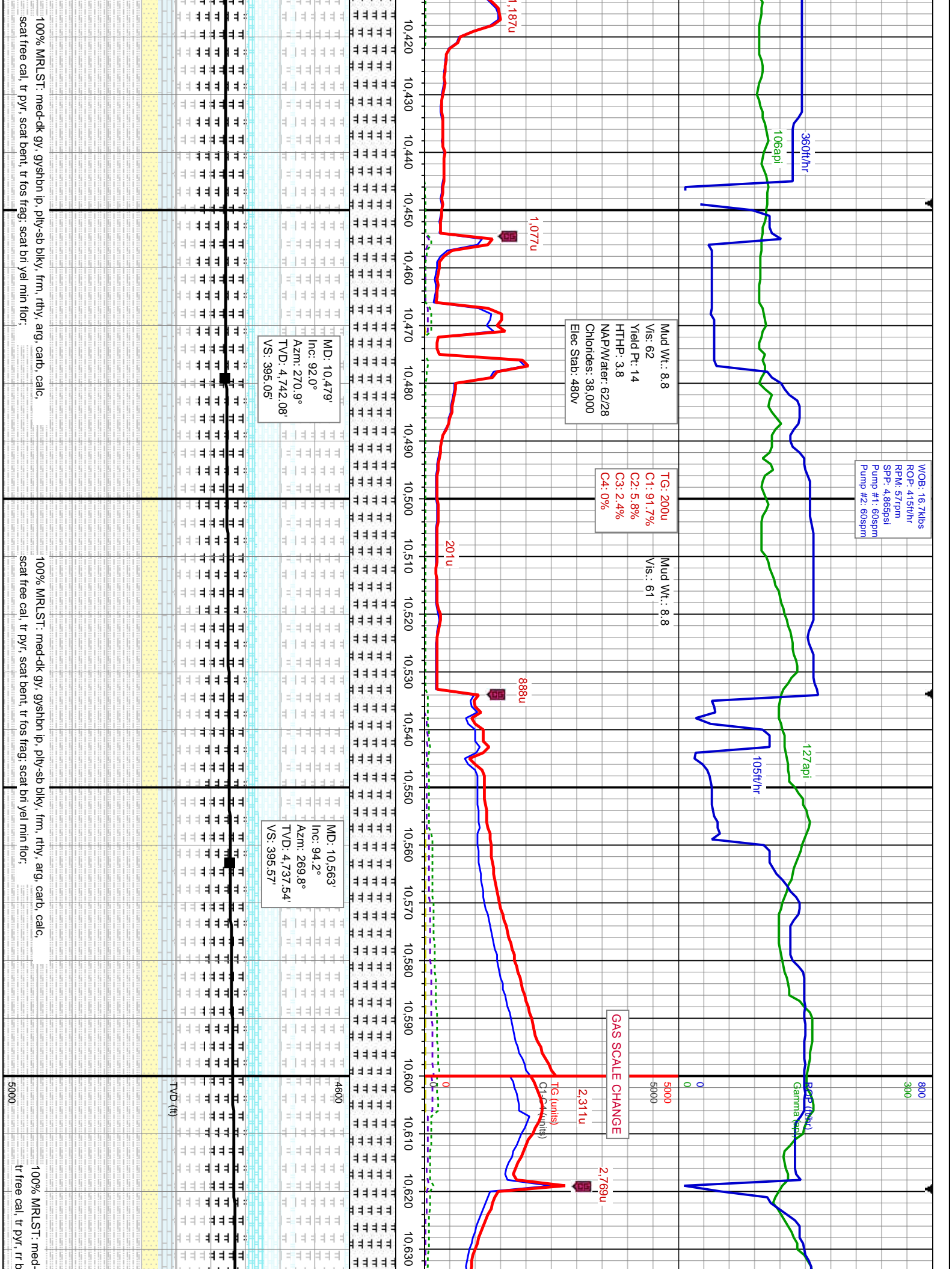
100% MRLST: med-dk gy, gysbhn ip, p  
scat free cal, tr pyr, scat bent, tr fos frag:











WOB: 17.8klbs  
ROP: 383ft/hr  
RPM: 55rpm  
SPP: 4.924psi  
Pump #1: 60spm  
Pump #2: 60spm

TG: 1.785u  
C1: 86.8%  
C2: 8.1%  
C3: 4.4%  
C4: 0.6%

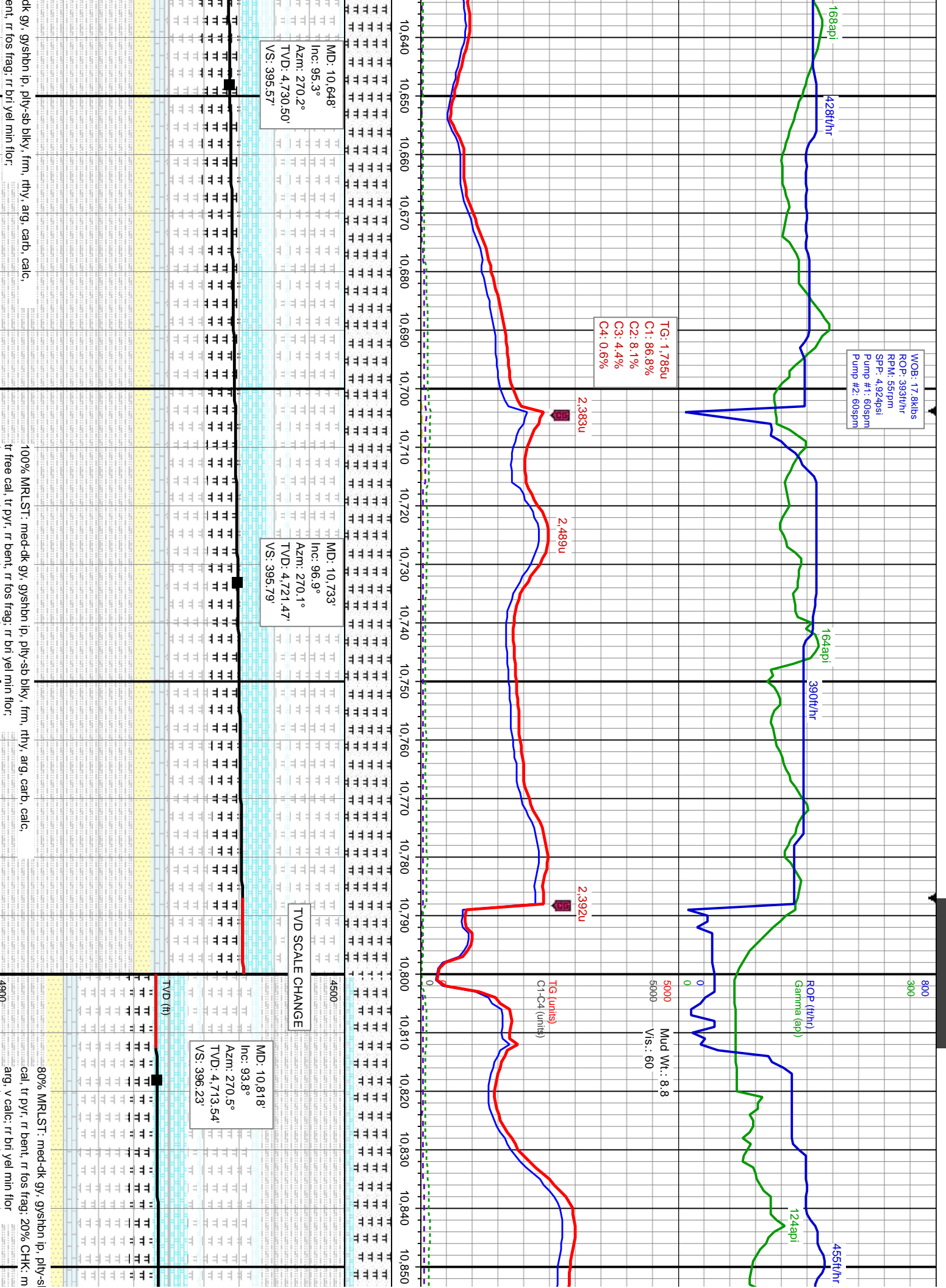
MD: 10.648'  
Inc: 95.3°  
Az: 270.2°  
TVD: 4,730.50'  
VS: 395.57'

MD: 10.733'  
Inc: 96.9°  
Az: 270.1°  
TVD: 4,721.47'  
VS: 395.79'

TVD SCALE CHANGE

MD: 10.818'  
Inc: 93.8°  
Az: 270.5°  
TVD: 4,713.54'  
VS: 396.23'

ROP (ft/hr)  
Gamma (api)  
Mud Wt.: 8.8  
Vis.: 60



dk gy, gysshn ip, pty-sb blk, frm, rthy, arg, carb, calc,  
ent, r tos frag, tr brl yel min flor.

100% MRLST, med-dk gy, gysshn ip, pty-sb blk, frm, rthy, arg, carb, calc,  
tr free cal, tr pyr, tr bent, r tos frag, tr brl yel min flor.

80% MRLST, med-dk gy, gysshn ip, pty-si  
cal, tr pyr, tr bent, r tos frag, 20% CHK, m  
arg, v calc, tr brl yel min flor

WOB: 31.8kips  
ROP: 99ft/hr  
RPM: 28rpm  
SPP: 4,390psi  
Pump #1: 605spm  
Pump #2: 605spm

Depth Correction

Top of C  
Marl/Bottom C  
Chalk @ 10885'  
MD, 4711' TVD

TG: 1.830u  
C1: 83.2%  
C2: 8.1%  
C3: 8.8%  
C4: 0%

MD: 10,903'  
Inc: 91.0°  
Azim: 271.2°  
TVD: 4,709.98'  
VS: 397.49'

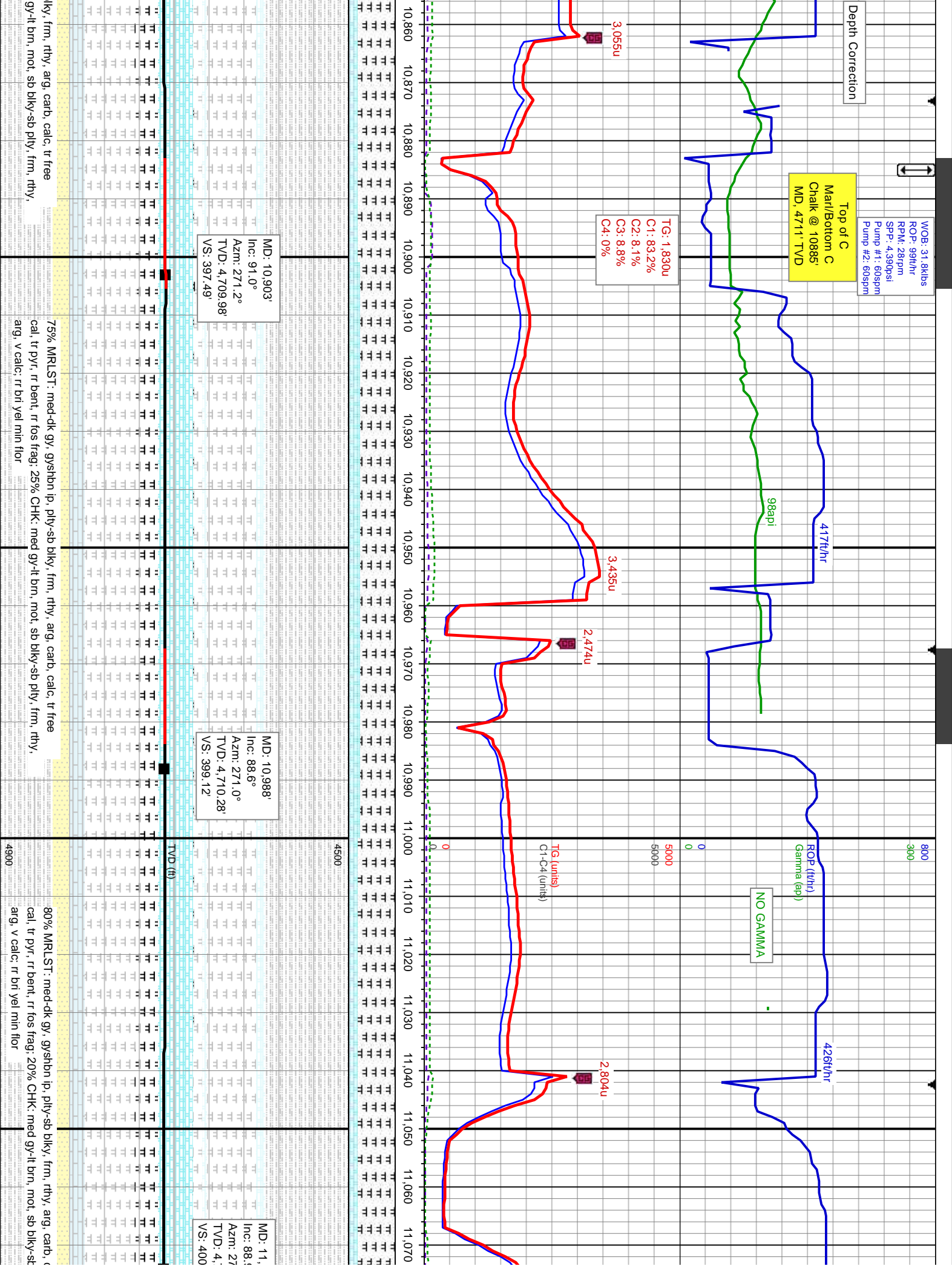
MD: 10,988'  
Inc: 88.6°  
Azim: 271.0°  
TVD: 4,710.28'  
VS: 399.12'

MD: 11,  
Inc: 88.6°  
Azim: 271.0°  
TVD: 4,710.28'  
VS: 399.12'

blky, frm, rthy, arg, carb, calc, tr free  
med gy-it brn, mot, sb blky-sb ply, frm, rthy,

75% MRLST: med-dk gy, gysbhn ip, ply-sb blky, frm, rthy, arg, carb, calc, tr free  
cal, tr pyr, rr bent, rr fos frag; 25% CHK: med gy-it brn, mot, sb blky-sb ply, frm, rthy,  
arg, v calc; rr bri yel min flr

80% MRLST: med-dk gy, gysbhn ip, ply-sb blky, frm, rthy, arg, carb, calc, tr pyr, rr bent, rr fos frag; 20% CHK: med gy-it brn, mot, sb blky-sb ply, frm, rthy, arg, v calc; rr bri yel min flr



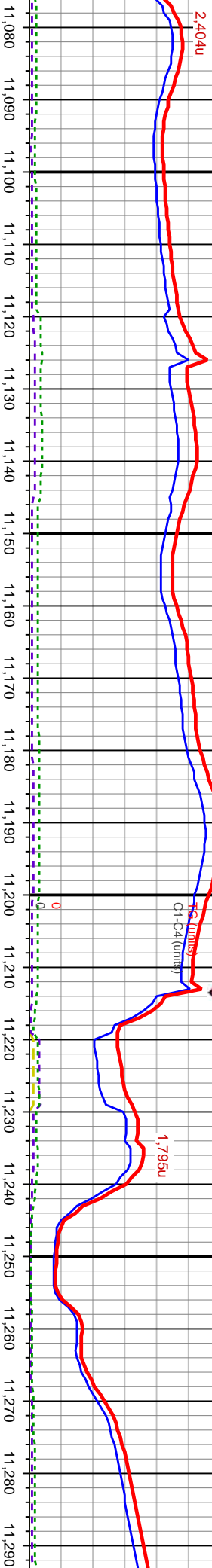
WOB: 18.2kibs  
ROP: 442ft/hr  
RPM: 56rpm  
SPR: 4.928psi  
Pump #1: 60spm  
Pump #2: 60spm

TG: 2.114u  
C1: 93.6%  
C2: 4.8%  
C3: 1.6%  
C4: 0%

074'  
0.5°  
112.16'

MD: 11,160'  
Inc: 89.1°  
Azim: 271.4°  
TVD: 4,713.66'  
VS: 401.68'

MD: 11,246'  
Inc: 88.7°  
Azim: 268.7°  
TVD: 4,715.31'  
VS: 401.75'



calc, tr free  
ply, frm, rthy,

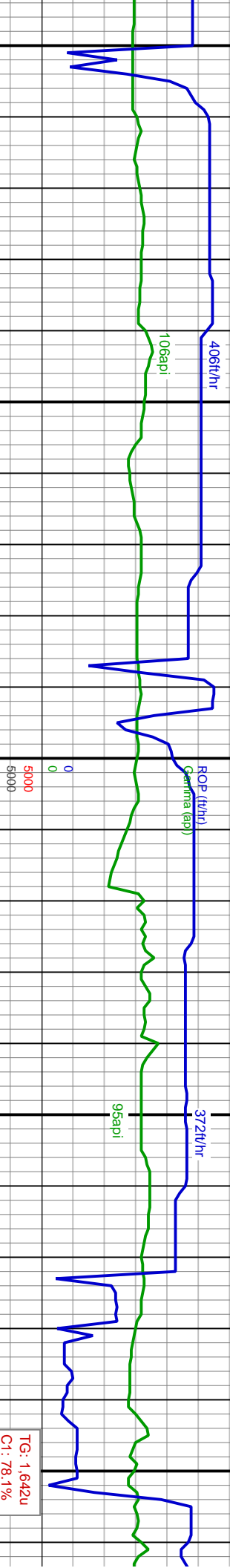
70% MRLST: med-dk gy, gysbhn ip, ply-sb blkly, frm, rthy, arg, carb, calc, tr free  
cal, tr pyr, rr bent, rr fos frag, 30% CHK: med gy-ilt brn, mot, sb blkly-sb ply, frm, rthy,  
arg, v calc, rr brl yel min flr

80% MRLST: med-dk gy, gysbhn ip, ply-sb blkly, frm, rthy, arg, carb, calc, tr free  
cal, tr pyr, rr bent, rr fos frag, 20% CHK: med gy-ilt brn, mot, sb blkly-sb ply, frm, rthy,  
arg, v calc, rr brl yel min flr



MOB: 19.7klbs  
ROP: 384ft/hr  
RPM: 55rpm  
SPP: 4.916psi  
Pump #1: 60spm  
Pump #2: 60spm

MOB: 34.4klbs  
ROP: 90ft/hr  
RPM: 28rpm  
SPP: 4.422psi  
Pump #1: 60spm  
Pump #2: 60spm



2,869u

3,228u

3,249u

2,674u

TG: 1.642u  
C1: 78.1%  
C2: 10.2%  
C3: 10.1%  
C4: 1.5%

TG: 2.869u  
C1: 98.2%  
C2: 1.8%  
C3: 0%  
C4: 0%

MD: 11,331'  
Inc: 89.9°  
Azim: 271.8°  
TVD: 4,716.35'  
VS: 402.12'

MD: 11,418'  
Inc: 90.5°  
Azim: 273.0°  
TVD: 4,716.04'  
VS: 405.76'

MD: 11,502'  
Inc: 89.4°  
Azim: 270.5°  
TVD: 4,716.12'  
VS: 408.33'

TVD (ft)

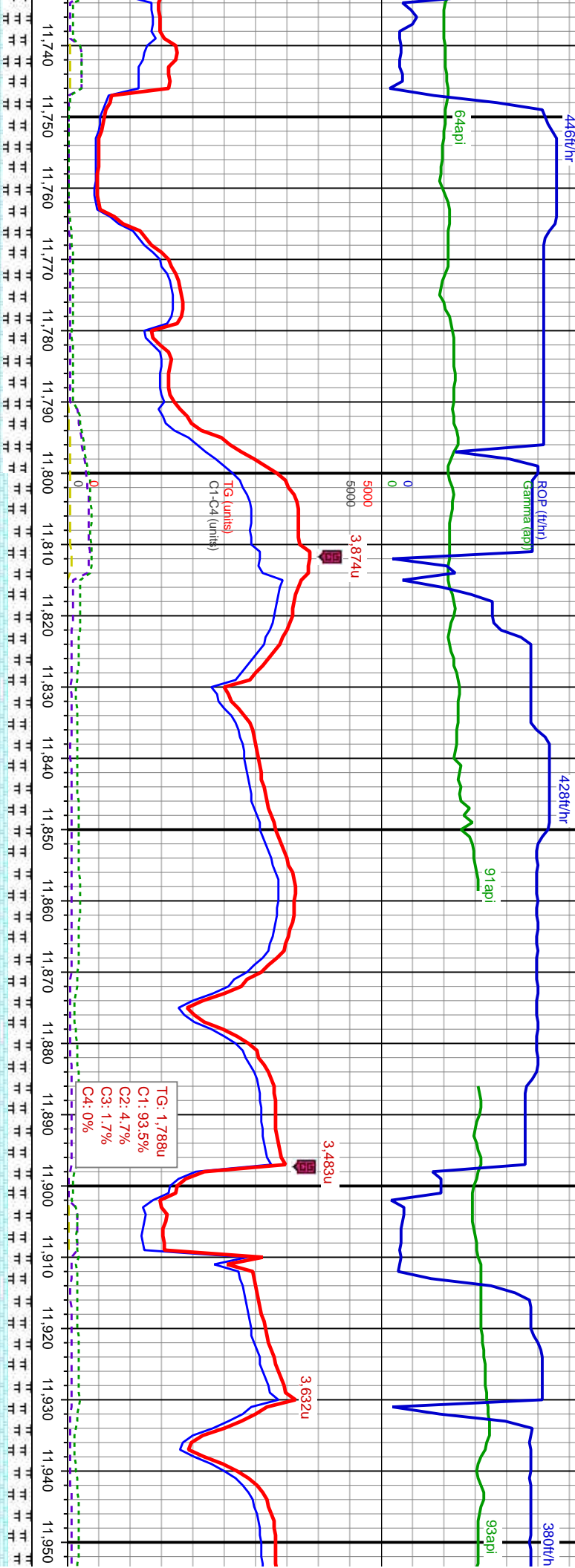
90% MRLST: med-dk gy, gysbhn ip, ply-sb blk, frm, rthy, arg, carb, calc, tr free  
cal, tr pyr, tr bent, tr fos frag, 10% CHK: med gy-it brn, mod, sb blk-sb ply, frm, rthy,  
arg, v calc; rr bri yel min flr

75% MRLST: med-dk gy, gysbhn ip, ply-sb blk, frm, rthy, arg, carb, calc, tr free  
cal, tr pyr, tr bent, tr fos frag, 25% CHK: med gy-it brn, mod, sb blk-sb ply, frm, rthy,  
arg, v calc; rr bri yel min flr

60% MRLST: med-dk gy, gysbhn ip, ply-sb blk, frm, rthy, arg, carb, calc, tr free  
cal, tr pyr, tr bent, tr fos frag, 50% CHK: med gy-it brn, mod, sb blk-sb ply, frm, rthy,  
arg, v calc; rr bri yel min flr



MOB: 8.6kbs  
ROP: 154ft/hr  
RPM: 55rpm  
SPP: 4.542psi  
Pump #1: 60spm  
Pump #2: 60spm



MD: 11,757'  
Inc: 91.8°  
Az: 267.1°  
TVD: 4,716.27'  
VS: 398.54'

MD: 11,842'  
Inc: 93.1°  
Az: 268.0°  
TVD: 4,712.63'  
VS: 394.91'

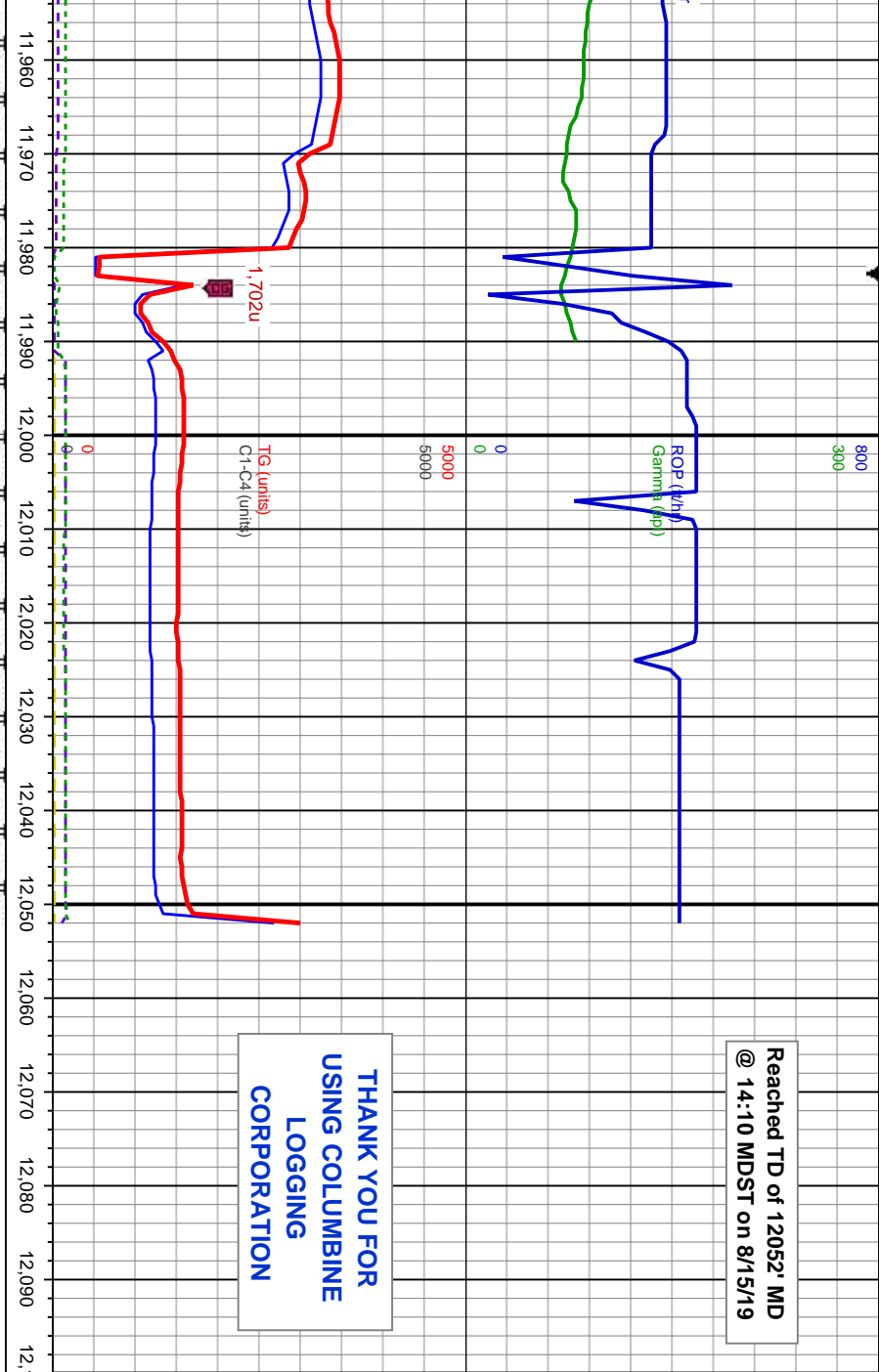
MD: 11,927'  
Inc: 91.5°  
Az: 268.7°  
TVD: 4,709.22'  
VS: 392.47'

gyshtn ip, pty-sb blk, frm, rthy, arg, carb, calc, tr free  
arg, 50% CHK: med gy-lt brn, mot, sb blk-sb pty, frm, rthy,  
lor

40% MRLST: med-dk gy, gyshtn ip, pty-sb blk, frm, rthy, arg, carb, calc, tr free  
cal, tr pyr, tr bent, tr fos frag, 60% CHK: med gy-lt brn, mot, sb blk-sb pty, frm, rthy,  
arg, v calc; tr bri yel min flr

40% MRLST: med-dk gy, gyshtn ip, pty-sb blk  
cal, tr pyr, tr bent, tr fos frag, 60% CHK: med  
arg, v calc; tr bri yel min flr

Reached TD of 12052' MD  
@ 14:10 MDST on 8/15/19



MD: 11,997'  
Inc: 92.0°  
Azim: 269.2°  
TVD: 4,707.08'  
VS: 391.19'

MD: 12,052'  
Inc: 92.0°  
Azim: 269.2°  
TVD: 4,705.16'  
VS: 5,304.73'

4500	4900
PTB	
MD: 11,997'	MD: 12,052'
Inc: 92.0°	Inc: 92.0°
Azm: 269.2°	Azm: 269.2°
TVD: 4,707.08'	TVD: 4,705.16'
VS: 391.19'	VS: 5,304.73'
xy, frm, rthy, arg, carb, calc, tr free	40% MRLST: med-dk gy, gysshn ip, ply-sb blk, y, frm, rthy, arg, carb, calc, tr free cal, tr pyr, r bent, r
gy-lt-bm, mot, sb blk, sb ply, frm, rthy,	fos frag: 60% CHK: med gy-lt-bm, mot, sb blk, sb ply, frm, rthy, arg, v calc: r bri yel min flor