COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name	Gonsoulin State LD11-76HN		
Location	SESW SEC2, T9N, R58W, 6PM		
State	COLORADO	**County**	WELD
Country	USA	**Rig Number**	H&P 326
API Number	05-123-39836	**Field**	WILDCAT
Region	DJ BASIN	**Drilling Completed**	1/20/2015
Spud Date	1/14/2015		
Surface Coordinates	465' FSL, 1604' FWL 40.77456/-103.83521		
Bottom Hole Coordinates	(PROJ) 330' FFSLL, 1980' FFWLL		
Ground Elevation	4739'	**K.B. Elevation**	4769'
Logged Interval	4885' **To** 10,851'	**Total Depth**	10,851'
Formation	NIOBRARA A-CHALK		
Type of Drilling Fluid	LSND		

Operator

Company Noble Energy Inc

Address 1625 Broadway Suite 2200
Denver, CO 80202

Geologist

Name RENEE CLACKLER

Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202

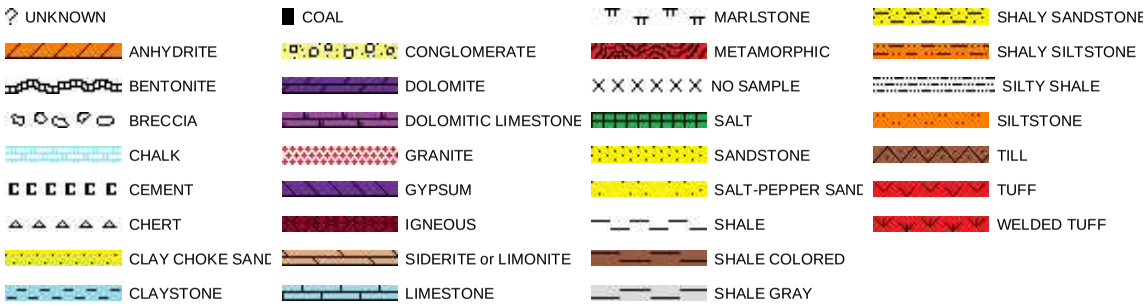
Other

COLUMBINE LOGGING MATT HOPKINS
IAN CONTRERAS

Zone Color Coding

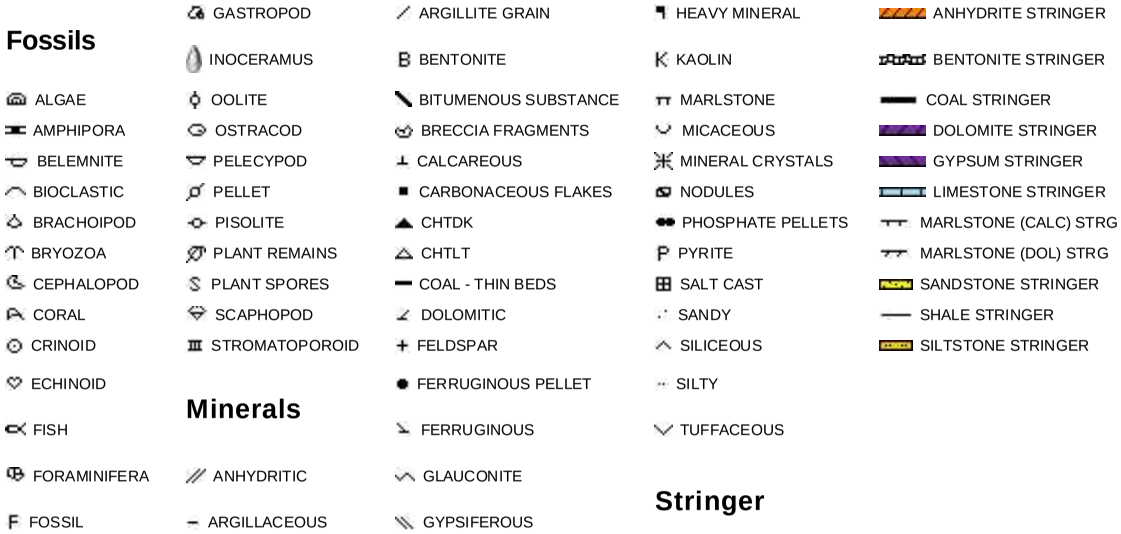
Oil
Note
Error
Condensate
Core
Water
Ga
Pre
Sea

Rock Types



Accessories

Fossils



Minerals

Stringer

Oil Show

Engineering

Porosity

Other Symbols

DST INTERVAL

FAULT

FORMATION TOP

GAS SHOW

OIL SHOW

MN DEPTH UP

MN DEPTH (DOWN)

NORMAL FAULT

OVERTURNED STRATA

REVERSE FAULT

CASING

SIDEWALL CORE (LEFT)

SIDEWALL CORE (RIGHT)

SLIDE

SURVEY

WIRELINE TESTED - LEFT

WIRELINE TESTED - RT

DRILL STEM TEST

MN DEPTH

Rounding

ANGULAR

ROUNDED

SUBANG

SUBRND

Textures

BOUNDSTONE

CHALKY

CRYPTOXLN

EARTHY

FINELYXLN

GRAINSTONE

LITHOGRAPHIC

MICROXLN

MUDSTONE

PACKSTONE

WACKESTONE

Sorting

MODERATE

POOR

WELL

Slide/Rotate

ROP

ROP

800

ROP (ft/hr)

0

496

800

ROP (ft/hr)

0

Total Gas & Chromatograph

GAS

C1

C2

C3

C4

COLUMBINE LOGGING INC.
RIGGED UP ON 1/15/2015
MANNED 2-PERSON LOGGING
WITH BLOODHOUND GAS
CHROMATOGRAPH UNIT #0568

3000

300000

GAS (units)

C1-C4 (PPM)

0

0

Mud Wt: 9.95 / 38 Vis

860u

Change Out Shaker Screens

3000

300000

GAS (units)

C1-C4 (PPM)

0

0

Mud Wt: 10.00 / 40 Vis

430u

Depth Labels

4,860 4,870 4,880 4,890 **4,900** 4,910 4,920 4,930 4,940 **4,950** 4,960 4,970 4,980 4,990 **5,000** 5,010 5,020 5,030

% Lith

GAMMA

GR

200

GR (units)

0

90

200

GR (units)

0

Well Bore

TVD

4800

4800

CONTINUED FROM GONSOULIN
STATE LD11-76HN(VERT)

50' Sample Intervals

Bit Data
Bit #: 1
Type: PDC
Size: 8.75
Depth In: 1,226'
Jets: 7x13
S/N: JJ1353

TVD (ft)

MD: 4,969'
Inclination: 7.03°
Azimuth: 166.25°
TVD: 4,938.96'
VS: 11.96'

TVD (ft)

SLTY SH: lt-dk gy, mod frm, sb blky-sb plty, gritty, rthy, slky, occ string of shy ss

5700

SLTY SH: lt-dk gy, mod frm, sb blky-sb plty, gritty, rthy, slky, occ string of shy ss

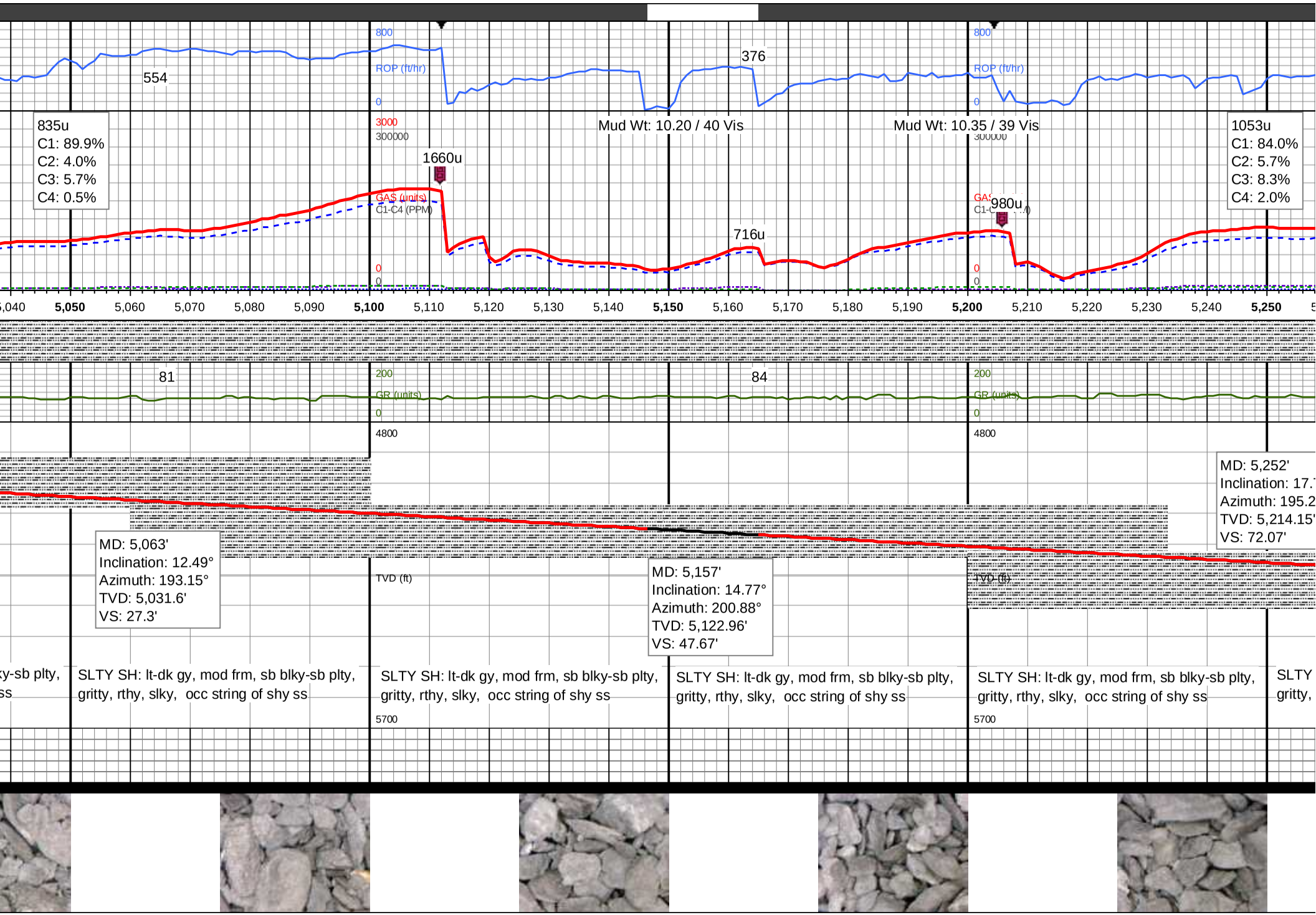
SLTY SH: lt-dk gy, mod frm, sb blk
gritty, rthy, slky, occ string of shy s

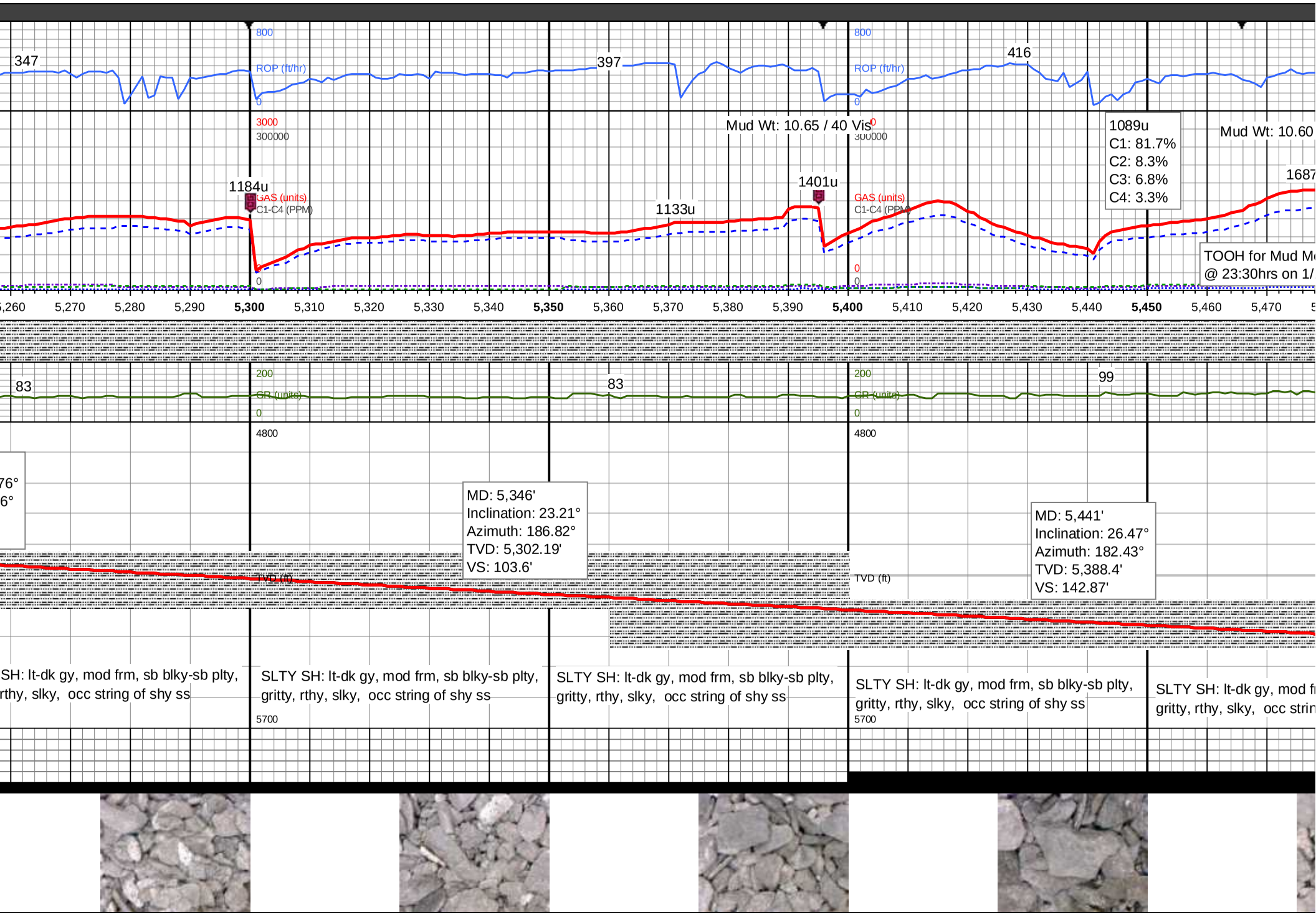
5700

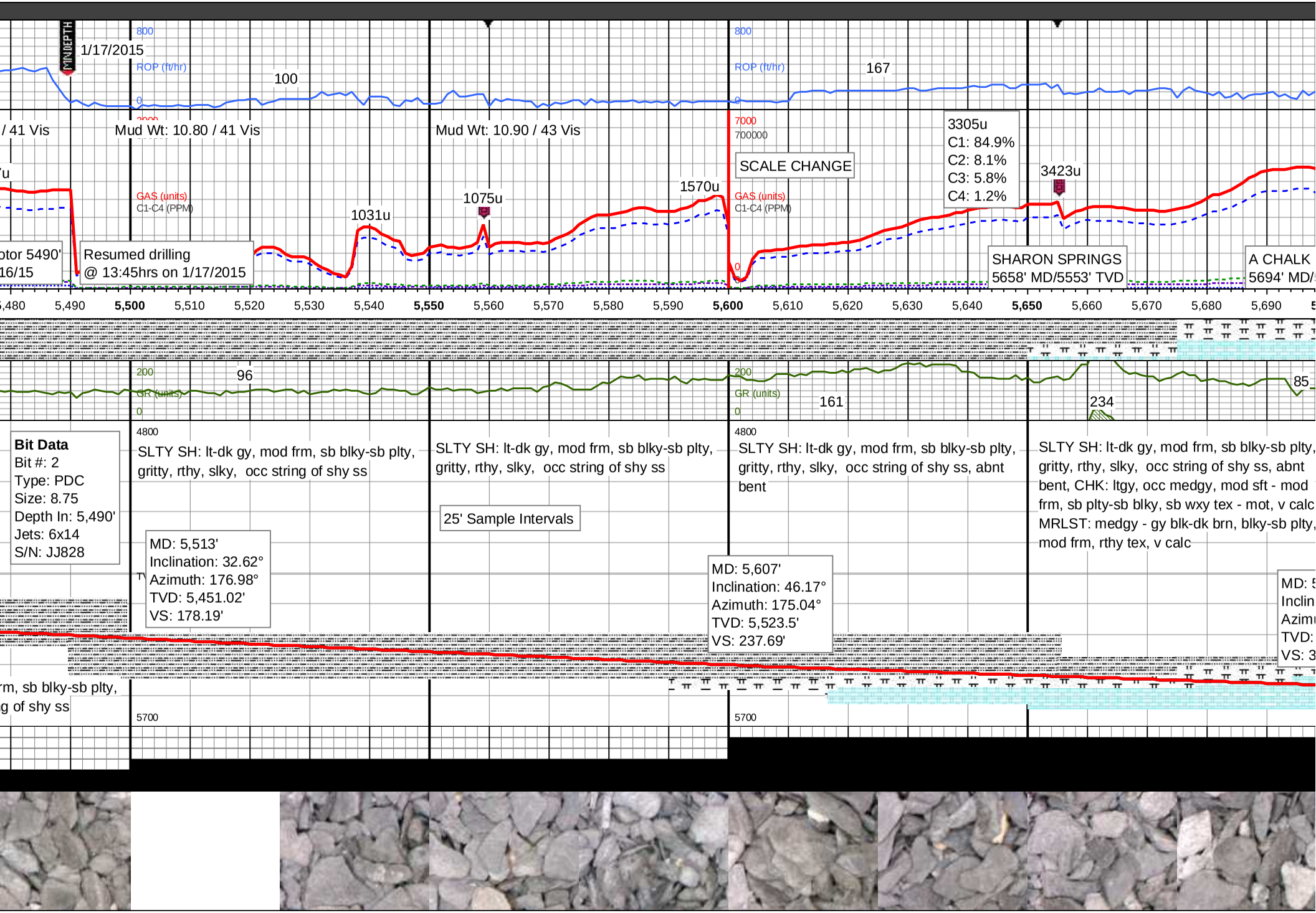
Oil Show

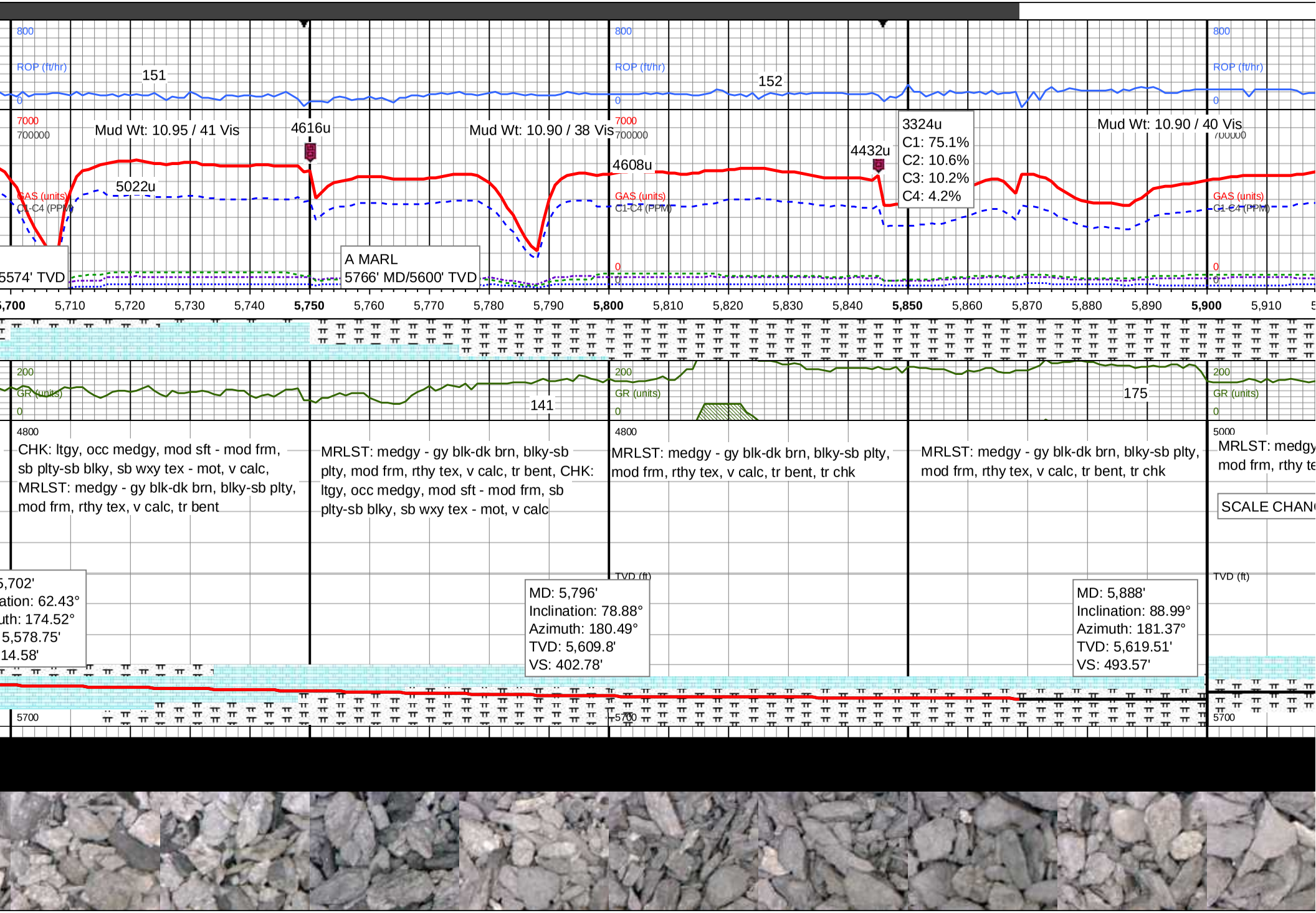
E
G
M
F
T
ST

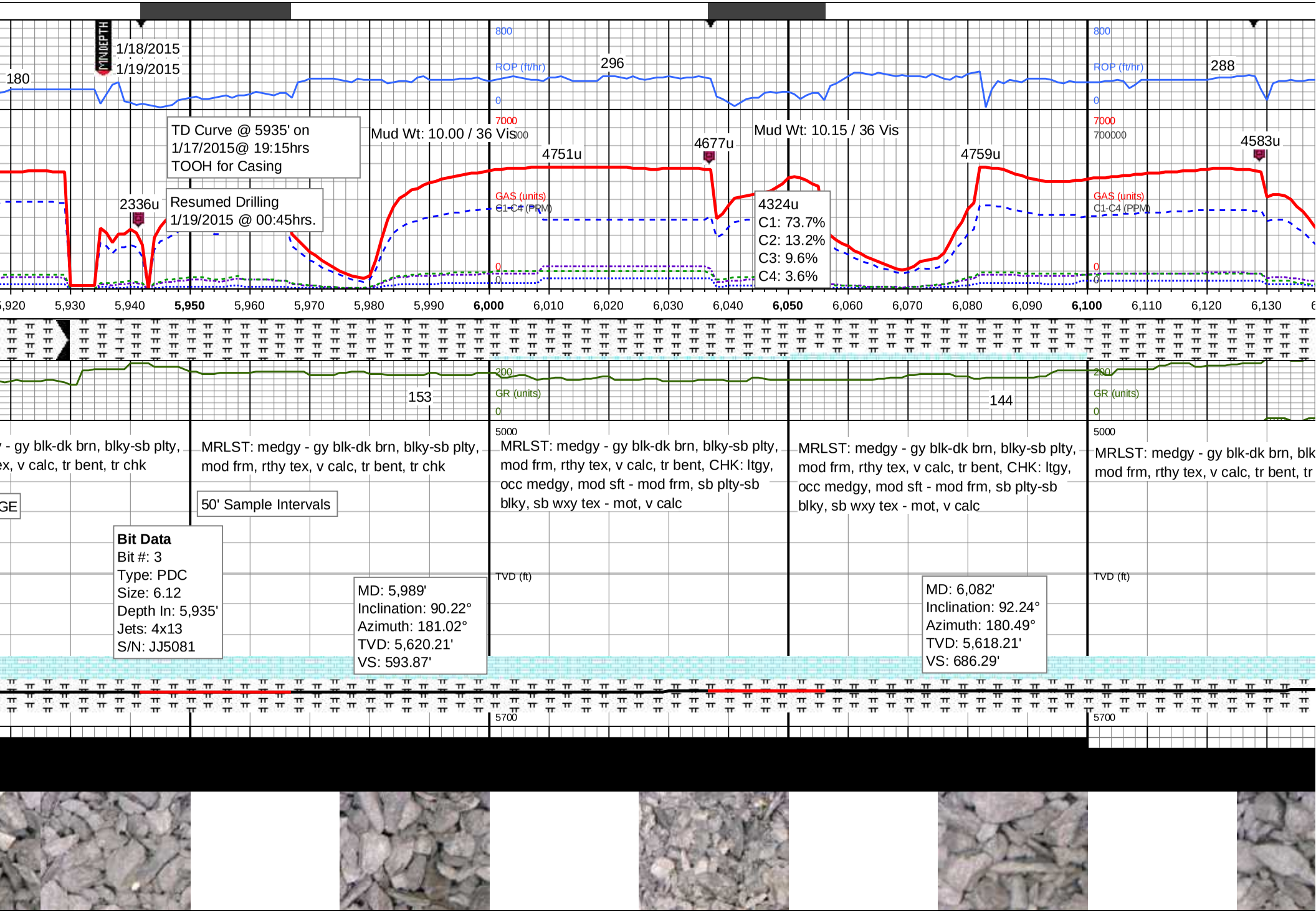
Images

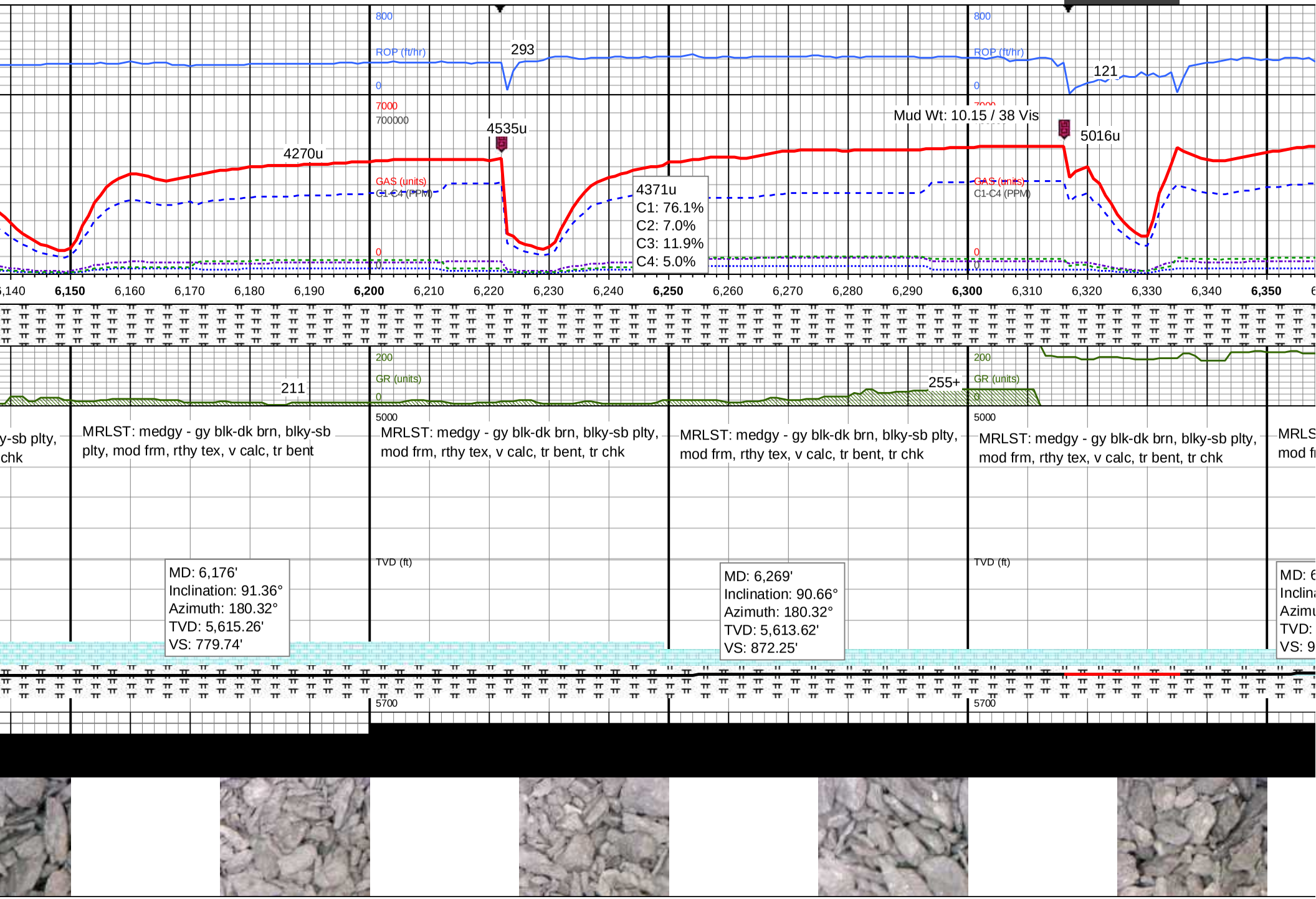

554
376
ROP (ft/hr)
800
0
3000
300000
835u
C1: 89.9%
C2: 4.0%
C3: 5.7%
C4: 0.5%
1660u
GAS (units)
C1-C4 (PPM)
Mud Wt: 10.20 / 40 Vis
716u
Mud Wt: 10.35 / 39 Vis
980u
1053u
C1: 84.0%
C2: 5.7%
C3: 8.3%
C4: 2.0%
5,040
5,050
5,060
5,070
5,080
5,090
5,100
5,110
5,120
5,130
5,140
5,150
5,160
5,170
5,180
5,190
5,200
5,210
5,220
5,230
5,240
5,250
81
84
200
GR (units)
4800
MD: 5,063'
Inclination: 12.49°
Azimuth: 193.15°
TVD: 5,031.6'
VS: 27.3'
MD: 5,157'
Inclination: 14.77°
Azimuth: 200.88°
TVD: 5,122.96'
VS: 47.67'
MD: 5,252'
Inclination: 17.
Azimuth: 195.2
TVD: 5,214.15'
VS: 72.07'
TVD (ft)
5700
SLTY SH: lt-dk gy, mod frm, sb blky-sb plty, gritty, rthy, slky, occ string of shy ss

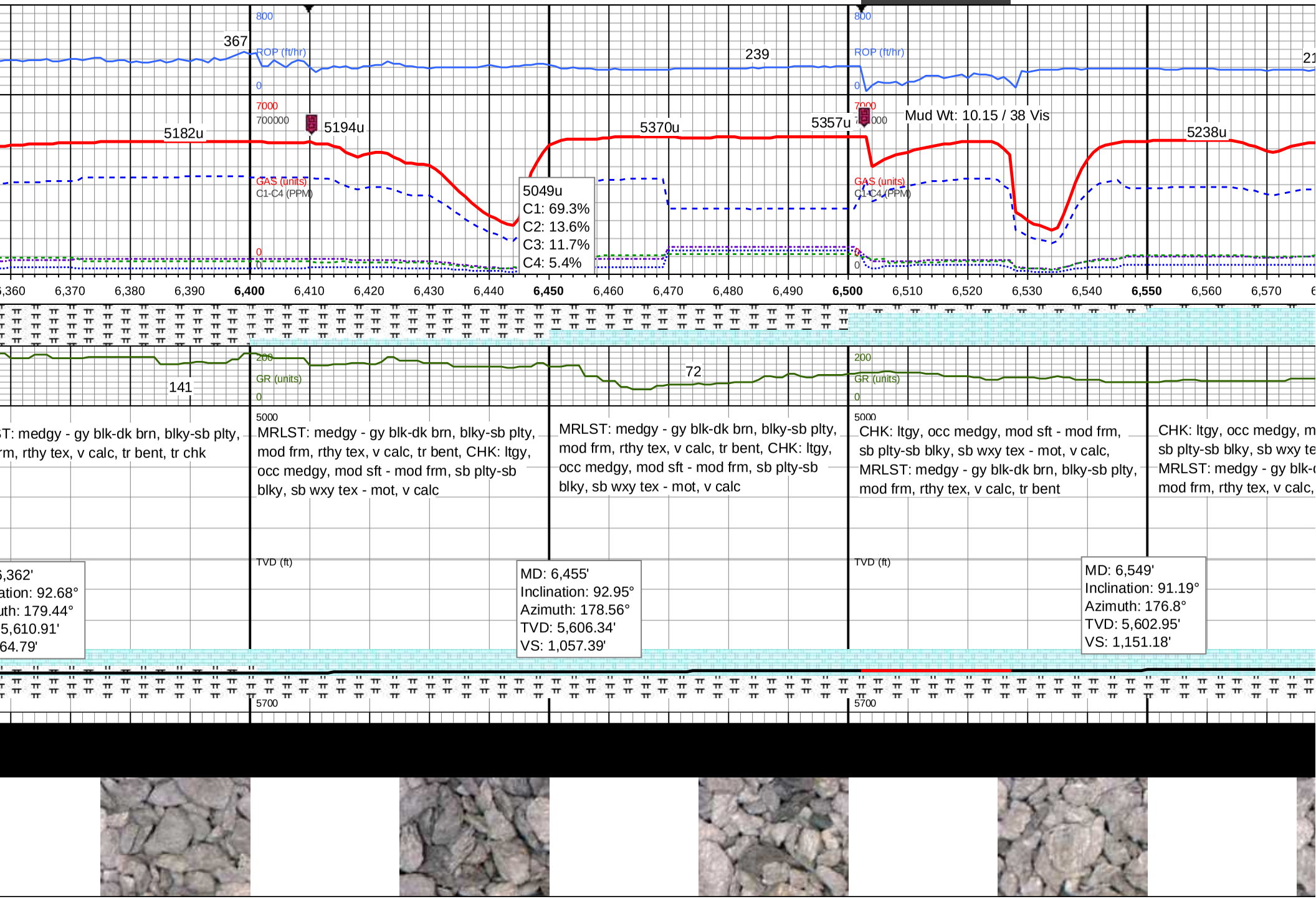

347
800
ROP (ft/hr)
0
3000
300000
397
800
ROP (ft/hr)
0
416
Mud Wt: 10.65 / 40 Vis
0
300000
1089u
C1: 81.7%
C2: 8.3%
C3: 6.8%
C4: 3.3%
Mud Wt: 10.60
1687
1184u
GAS (units)
C1-C4 (PPM)
0
1133u
1401u
GAS (units)
C1-C4 (PPM)
0
0
TOOH for Mud M
@ 23:30hrs on 1/
5,260
5,270
5,280
5,290
5,300
5,310
5,320
5,330
5,340
5,350
5,360
5,370
5,380
5,390
5,400
5,410
5,420
5,430
5,440
5,450
5,460
5,470
83
200
GR (units)
0
4800
83
200
GR (units)
0
4800
99
76°
6°
MD: 5,346'
Inclination: 23.21°
Azimuth: 186.82°
TVD: 5,302.19'
VS: 103.6'
TVD (ft)
MD: 5,441'
Inclination: 26.47°
Azimuth: 182.43°
TVD: 5,388.4'
VS: 142.87'
TVD (ft)
SH: lt-dk gy, mod frm, sb blky-sb plty,
rthy, slky, occ string of shy ss
SLTY SH: lt-dk gy, mod frm, sb blky-sb plty,
gritty, rthy, slky, occ string of shy ss
5700
SLTY SH: lt-dk gy, mod frm, sb blky-sb plty,
gritty, rthy, slky, occ string of shy ss
SLTY SH: lt-dk gy, mod frm, sb blky-sb plty,
gritty, rthy, slky, occ string of shy ss
5700
SLTY SH: lt-dk gy, mod f
gritty, rthy, slky, occ strin

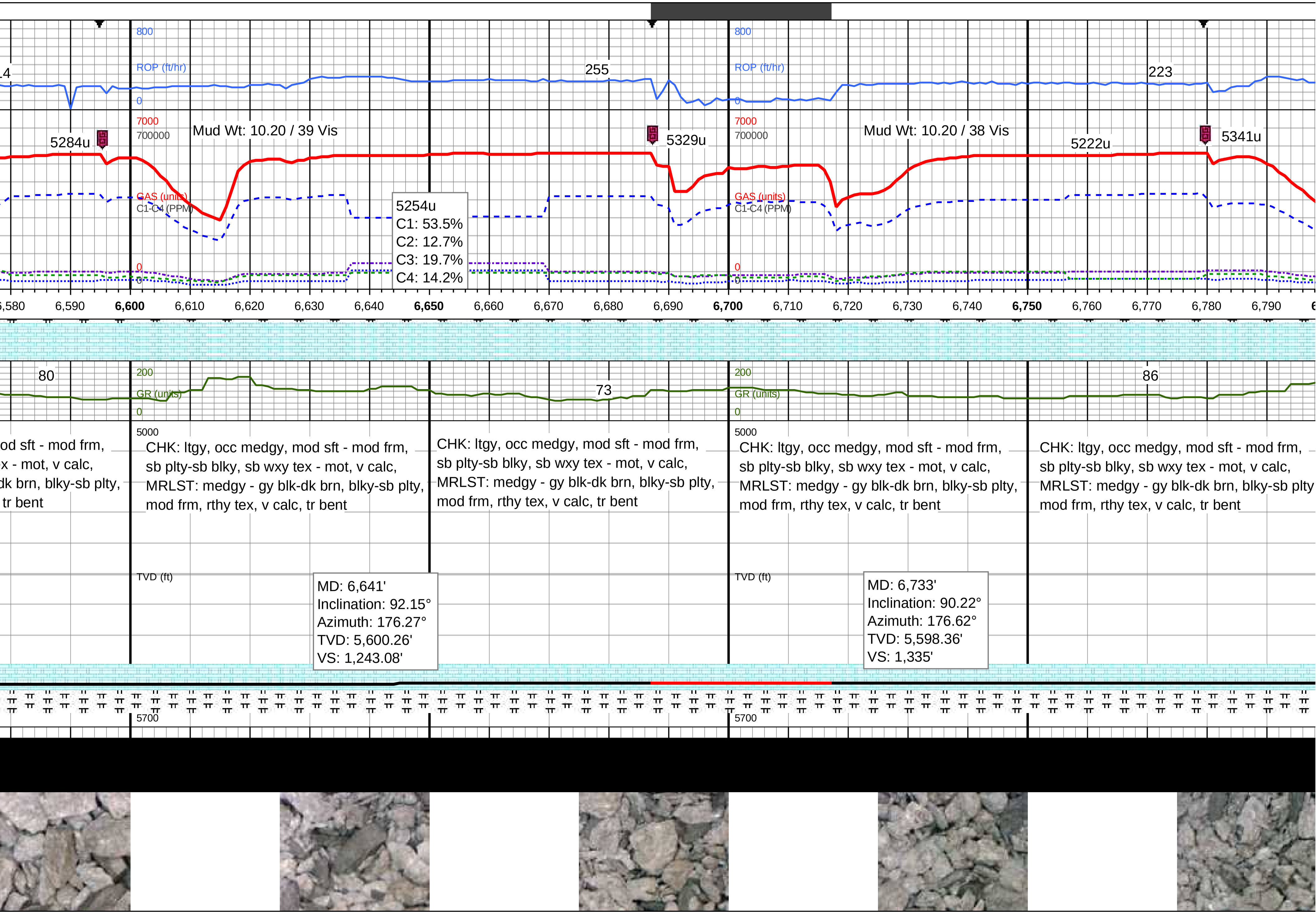

MINDEPTH
1/17/2015
800
ROP (ft/hr)
0
100
167
/ 41 Vis
Mud Wt: 10.80 / 41 Vis
Mud Wt: 10.90 / 43 Vis
7000
700000
SCALE CHANGE
3305u
C1: 84.9%
C2: 8.1%
C3: 5.8%
C4: 1.2%
3423u
1570u
1075u
1031u
GAS (units)
C1-C4 (PPM)
otor 5490'
16/15
Resumed drilling
@ 13:45hrs on 1/17/2015
SHARON SPRINGS
5658' MD/5553' TVD
A CHALK
5694' MD/
5,480
5,490
5,500
5,510
5,520
5,530
5,540
5,550
5,560
5,570
5,580
5,590
5,600
5,610
5,620
5,630
5,640
5,650
5,660
5,670
5,680
5,690
200
GR (units)
0
96
161
234
85
4800
Bit Data
Bit #: 2
Type: PDC
Size: 8.75
Depth In: 5,490'
Jets: 6x14
S/N: JJ828
SLTY SH: lt-dk gy, mod frm, sb blky-sb plty, gritty, rthy, slky, occ string of shy ss
SLTY SH: lt-dk gy, mod frm, sb blky-sb plty, gritty, rthy, slky, occ string of shy ss
SLTY SH: lt-dk gy, mod frm, sb blky-sb plty, gritty, rthy, slky, occ string of shy ss, abnt bent
SLTY SH: lt-dk gy, mod frm, sb blky-sb plty, gritty, rthy, slky, occ string of shy ss, abnt bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc
25' Sample Intervals
MD: 5,513'
Inclination: 32.62°
Azimuth: 176.98°
TVD: 5,451.02'
VS: 178.19'
MD: 5,607'
Inclination: 46.17°
Azimuth: 175.04°
TVD: 5,523.5'
VS: 237.69'
rm, sb blky-sb plty,
g of shy ss
5700


800
ROP (ft/hr)
0
151
152
7000
700000
Mud Wt: 10.95 / 41 Vis
4616u
5022u
Mud Wt: 10.90 / 38 Vis
4608u
4432u
3324u
C1: 75.1%
C2: 10.6%
C3: 10.2%
C4: 4.2%
Mud Wt: 10.90 / 40 Vis
GAS (units)
C1-C4 (PPM)
5574' TVD
A MARL
5766' MD/5600' TVD
5,700
5,710
5,720
5,730
5,740
5,750
5,760
5,770
5,780
5,790
5,800
5,810
5,820
5,830
5,840
5,850
5,860
5,870
5,880
5,890
5,900
5,910
200
GR (units)
141
175
4800
5000
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, tr chk
MRLST: medgy
mod frm, rthy te
SCALE CHAN
5,702'
ation: 62.43°
uth: 174.52°
5,578.75'
14.58'
TVD (ft)
MD: 5,796'
Inclination: 78.88°
Azimuth: 180.49°
TVD: 5,609.8'
VS: 402.78'
MD: 5,888'
Inclination: 88.99°
Azimuth: 181.37°
TVD: 5,619.51'
VS: 493.57'
5700

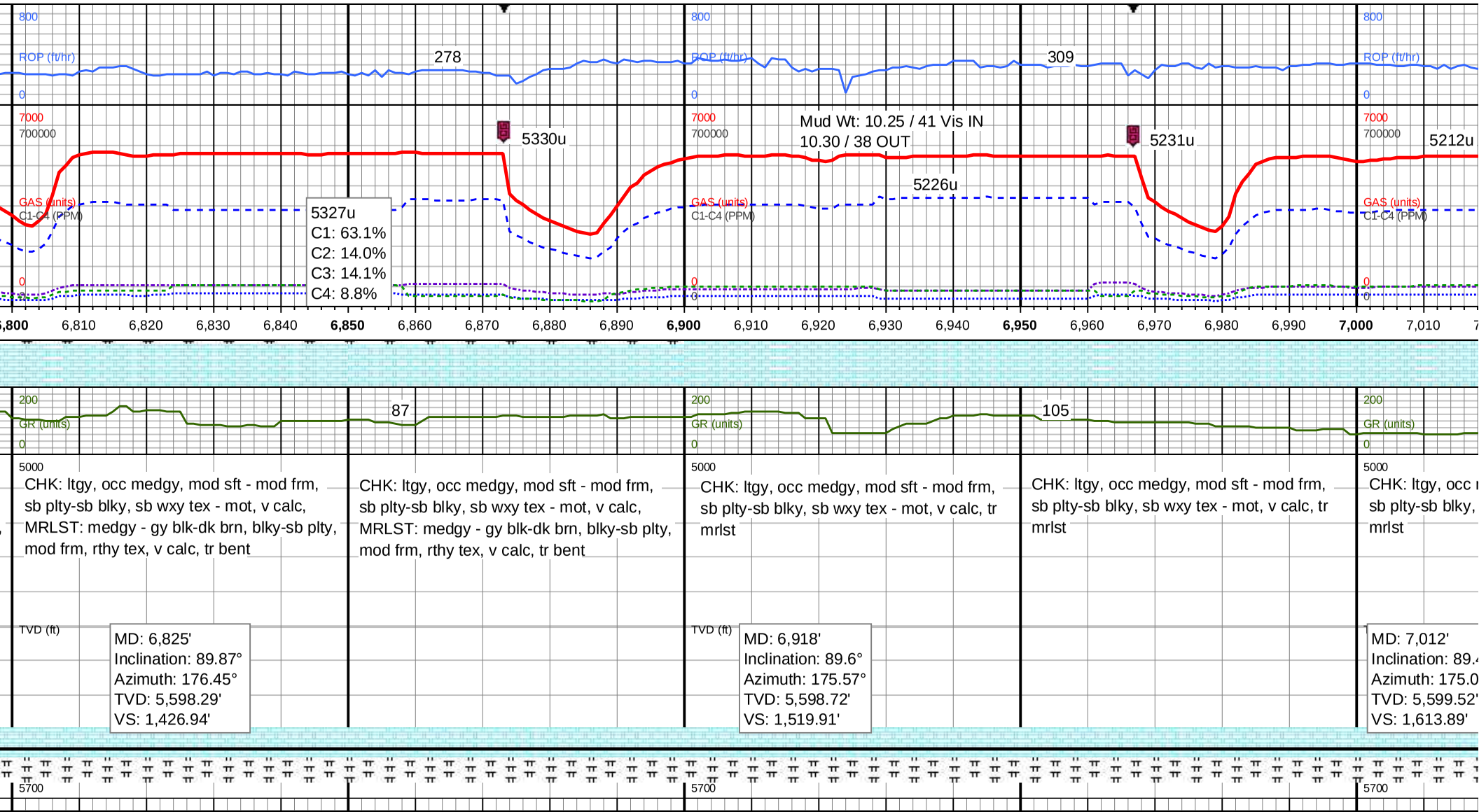

MINDEPTH
1/18/2015
1/19/2015
180
ROP (ft/hr)
800
0
296
288
TD Curve @ 5935' on
1/17/2015@ 19:15hrs
TOOH for Casing
Mud Wt: 10.00 / 36 Vis
Mud Wt: 10.15 / 36 Vis
2336u
Resumed Drilling
1/19/2015 @ 00:45hrs.
4751u
4677u
4759u
4583u
4324u
C1: 73.7%
C2: 13.2%
C3: 9.6%
C4: 3.6%
GAS (units)
C1-C4 (PPM)
7000
5,920
5,930
5,940
5,950
5,960
5,970
5,980
5,990
6,000
6,010
6,020
6,030
6,040
6,050
6,060
6,070
6,080
6,090
6,100
6,110
6,120
6,130
153
144
GR (units)
200
5000
5700
TVD (ft)
- gy blk-dk brn, blky-sb plty,
ex, v calc, tr bent, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty,
mod frm, rthy tex, v calc, tr bent, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty,
mod frm, rthy tex, v calc, tr bent, CHK: ltgy,
occ medgy, mod sft - mod frm, sb plty-sb
blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty,
mod frm, rthy tex, v calc, tr bent, CHK: ltgy,
occ medgy, mod sft - mod frm, sb plty-sb
blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blk
mod frm, rthy tex, v calc, tr bent, tr
GE
50' Sample Intervals
Bit Data
Bit #: 3
Type: PDC
Size: 6.12
Depth In: 5,935'
Jets: 4x13
S/N: JJ5081
MD: 5,989'
Inclination: 90.22°
Azimuth: 181.02°
TVD: 5,620.21'
VS: 593.87'
MD: 6,082'
Inclination: 92.24°
Azimuth: 180.49°
TVD: 5,618.21'
VS: 686.29'

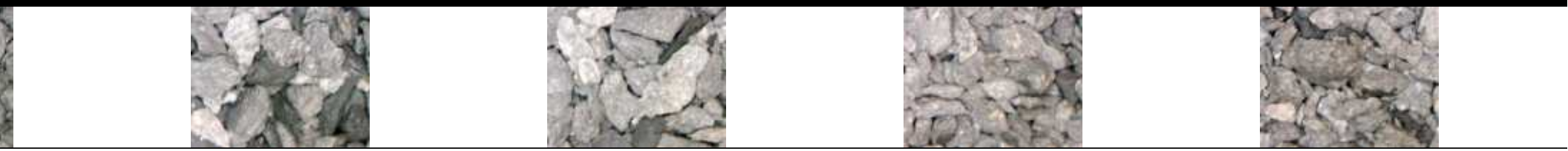

800
ROP (ft/hr)
0
293
121
7000
700000
4535u
4270u
Mud Wt: 10.15 / 38 Vis
5016u
GAS (units)
C1-C4 (PPM)
4371u
C1: 76.1%
C2: 7.0%
C3: 11.9%
C4: 5.0%
6,140
6,150
6,160
6,170
6,180
6,190
6,200
6,210
6,220
6,230
6,240
6,250
6,260
6,270
6,280
6,290
6,300
6,310
6,320
6,330
6,340
6,350
200
GR (units)
211
255+
5000
y-sb plty,
chk
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, tr chk
MRLS
mod f
TVD (ft)
MD: 6,176'
Inclination: 91.36°
Azimuth: 180.32°
TVD: 5,615.26'
VS: 779.74'
MD: 6,269'
Inclination: 90.66°
Azimuth: 180.32°
TVD: 5,613.62'
VS: 872.25'
MD: 6
Inclina
Azimu
TVD:
VS: 9
5700

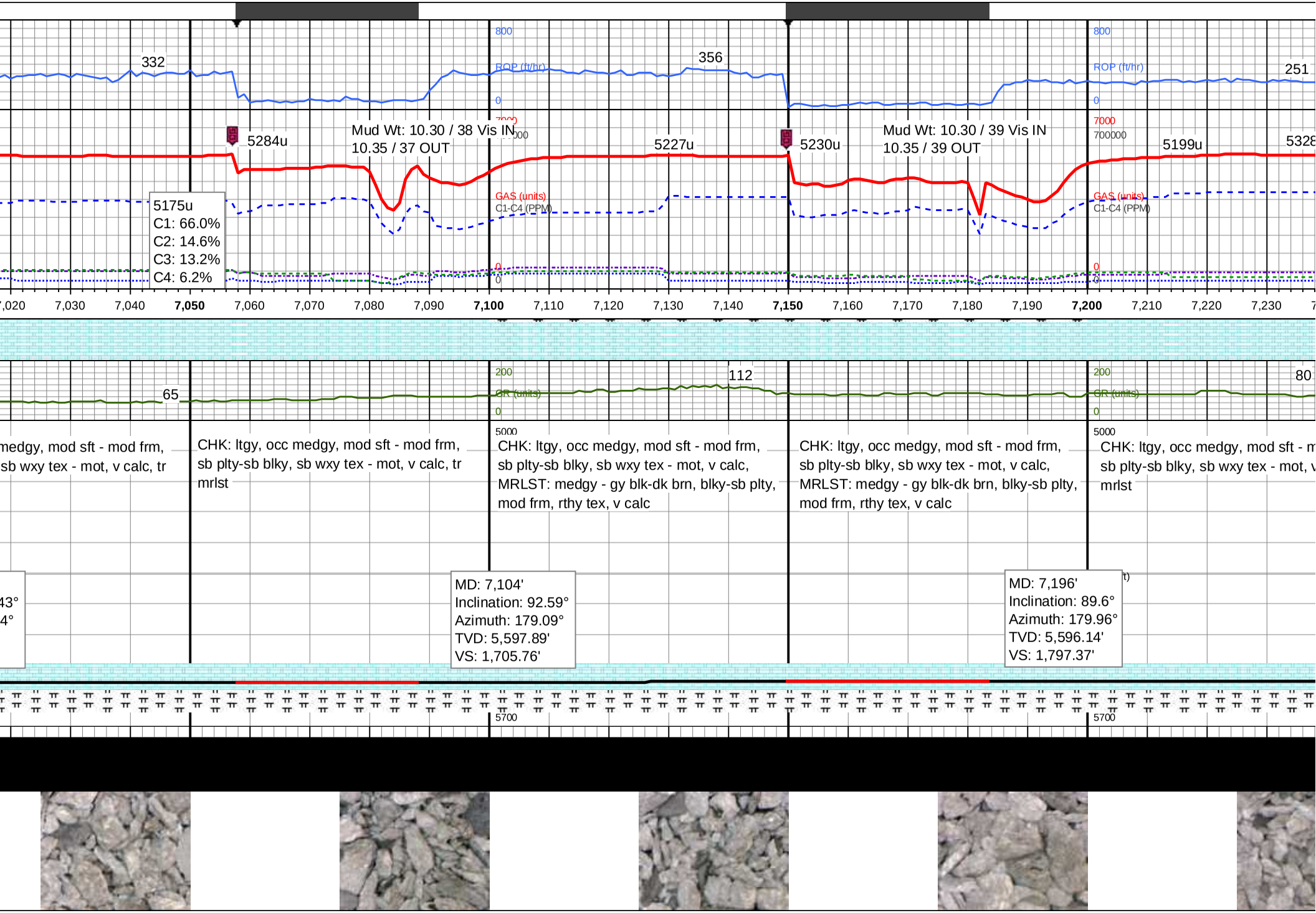

800
367
ROP (ft/hr)
0
7000
700000
5182u
5194u
GAS (units)
C1-C4 (PPM)
0
239
5370u
5049u
C1: 69.3%
C2: 13.6%
C3: 11.7%
C4: 5.4%
800
ROP (ft/hr)
0
7000
5357u
Mud Wt: 10.15 / 38 Vis
5238u
GAS (units)
C1-C4 (PPM)
6,360
6,370
6,380
6,390
6,400
6,410
6,420
6,430
6,440
6,450
6,460
6,470
6,480
6,490
6,500
6,510
6,520
6,530
6,540
6,550
6,560
6,570
141
200
GR (units)
0
5000
72
200
GR (units)
0
5000
ST: medgy - gy blk-dk brn, blky-sb plty, rm, rthy tex, v calc, tr bent, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
CHK: ltgy, occ medgy, m
sb plty-sb blky, sb wxy te
MRLST: medgy - gy blk-
mod frm, rthy tex, v calc,
TVD (ft)
TVD (ft)
6,362'
ation: 92.68°
uth: 179.44°
5,610.91'
64.79'
MD: 6,455'
Inclination: 92.95°
Azimuth: 178.56°
TVD: 5,606.34'
VS: 1,057.39'
MD: 6,549'
Inclination: 91.19°
Azimuth: 176.8°
TVD: 5,602.95'
VS: 1,151.18'
5700
5700

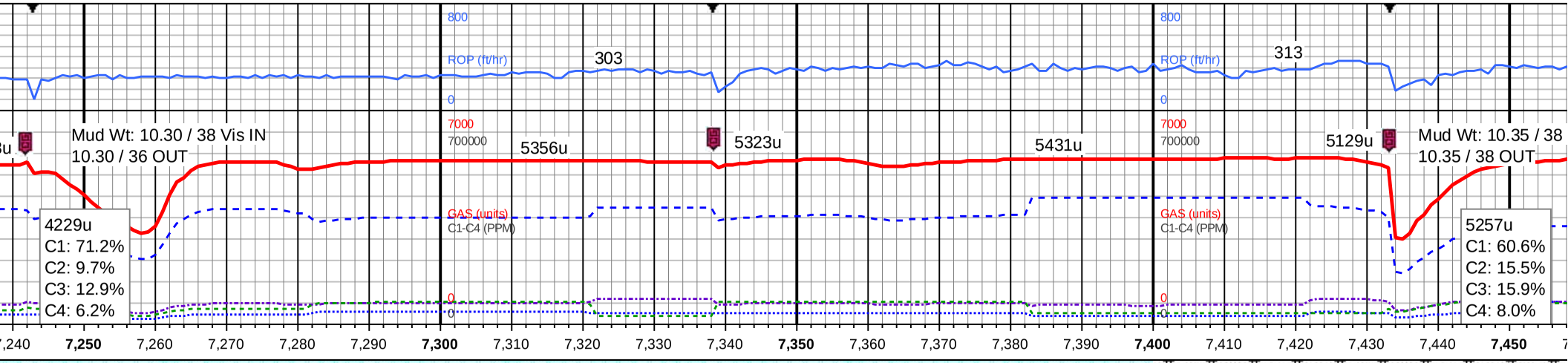


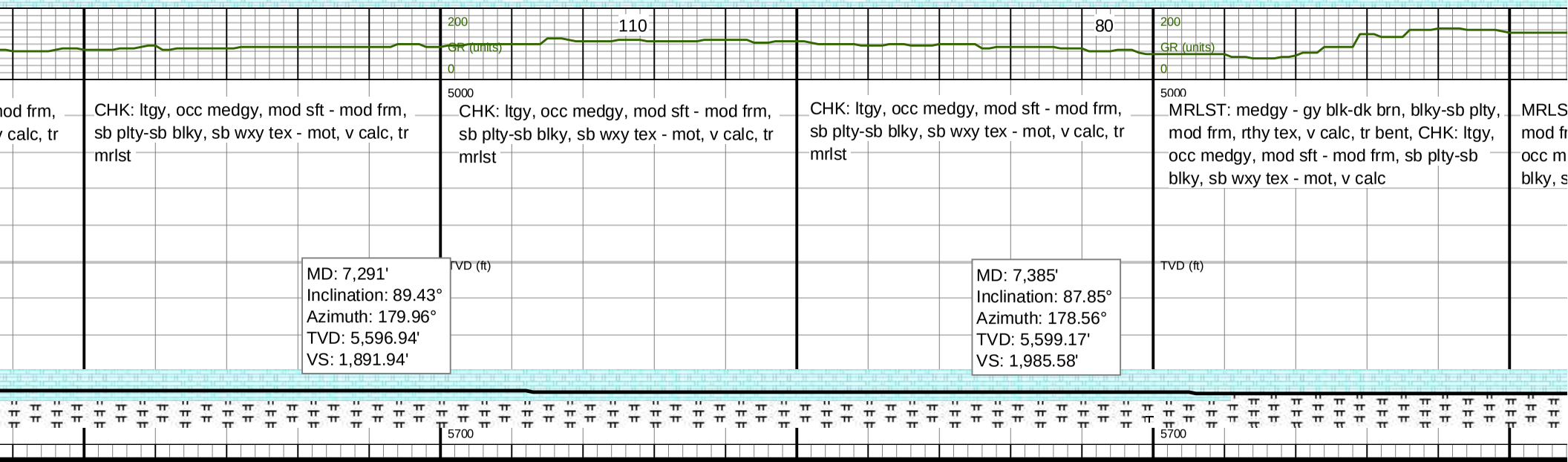
ROP (ft/hr)
800
0
14
255
223
7000
700000
Mud Wt: 10.20 / 39 Vis
Mud Wt: 10.20 / 38 Vis
5284u
5329u
5222u
5341u
GAS (units)
C1-C4 (PPM)
5254u
C1: 53.5%
C2: 12.7%
C3: 19.7%
C4: 14.2%
6,580
6,590
6,600
6,610
6,620
6,630
6,640
6,650
6,660
6,670
6,680
6,690
6,700
6,710
6,720
6,730
6,740
6,750
6,760
6,770
6,780
6,790
GR (units)
200
0
80
73
86
5000
od sft - mod frm,
x - mot, v calc,
dk brn, blky-sb plty,
tr bent
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
TVD (ft)
MD: 6,641'
Inclination: 92.15°
Azimuth: 176.27°
TVD: 5,600.26'
VS: 1,243.08'
MD: 6,733'
Inclination: 90.22°
Azimuth: 176.62°
TVD: 5,598.36'
VS: 1,335'
5700

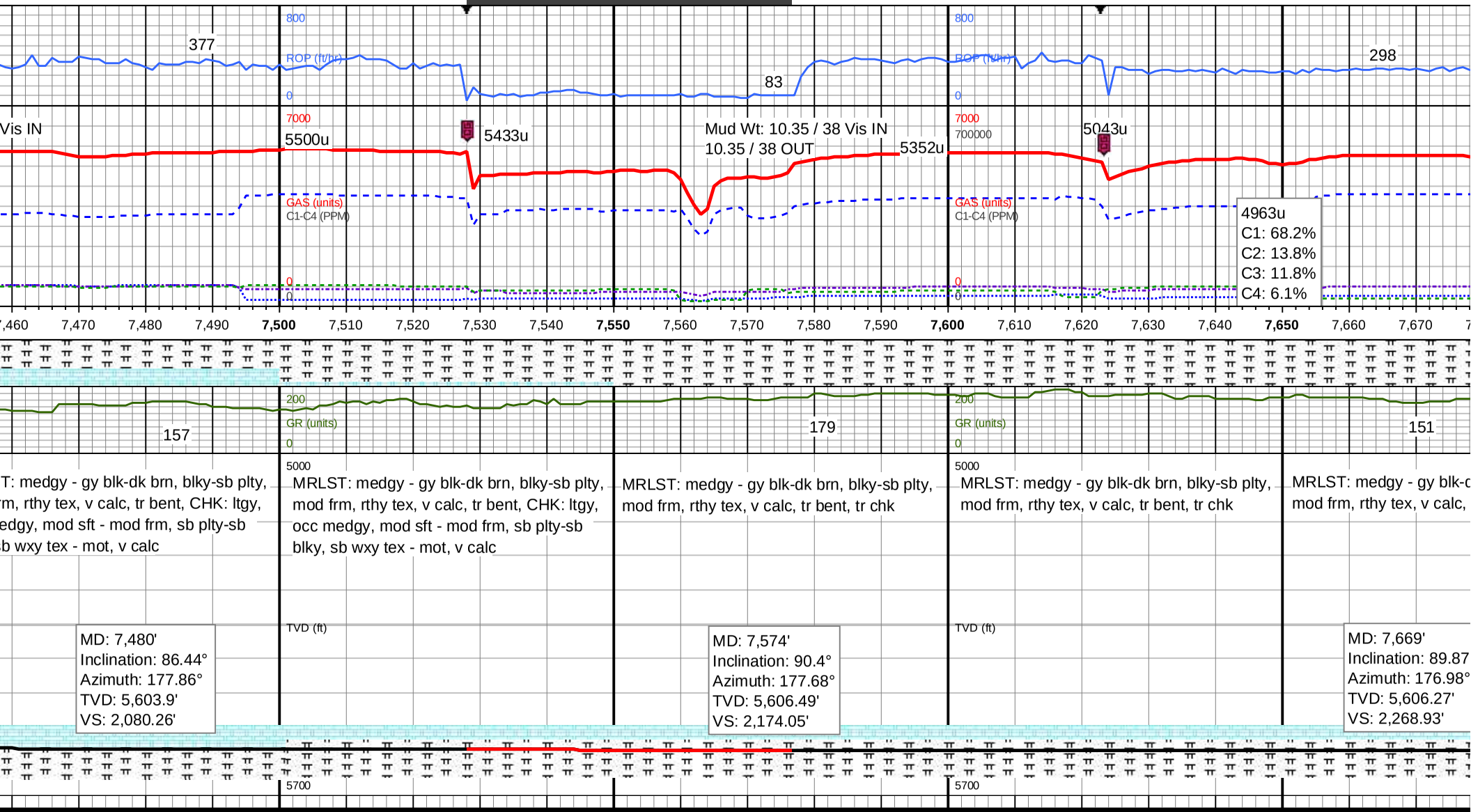

800
ROP (ft/hr)
0
7000
700000
GAS (units)
C1-C4 (PPM)
0
278
309
5330u
5231u
5212u
5226u
Mud Wt: 10.25 / 41 Vis IN
10.30 / 38 OUT
5327u
C1: 63.1%
C2: 14.0%
C3: 14.1%
C4: 8.8%
6,800
6,810
6,820
6,830
6,840
6,850
6,860
6,870
6,880
6,890
6,900
6,910
6,920
6,930
6,940
6,950
6,960
6,970
6,980
6,990
7,000
7,010
200
GR (units)
0
5000
87
105
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, tr mrlst
TVD (ft)
MD: 6,825'
Inclination: 89.87°
Azimuth: 176.45°
TVD: 5,598.29'
VS: 1,426.94'
MD: 6,918'
Inclination: 89.6°
Azimuth: 175.57°
TVD: 5,598.72'
VS: 1,519.91'
MD: 7,012'
TVD: 5,599.52'
VS: 1,613.89'
5700

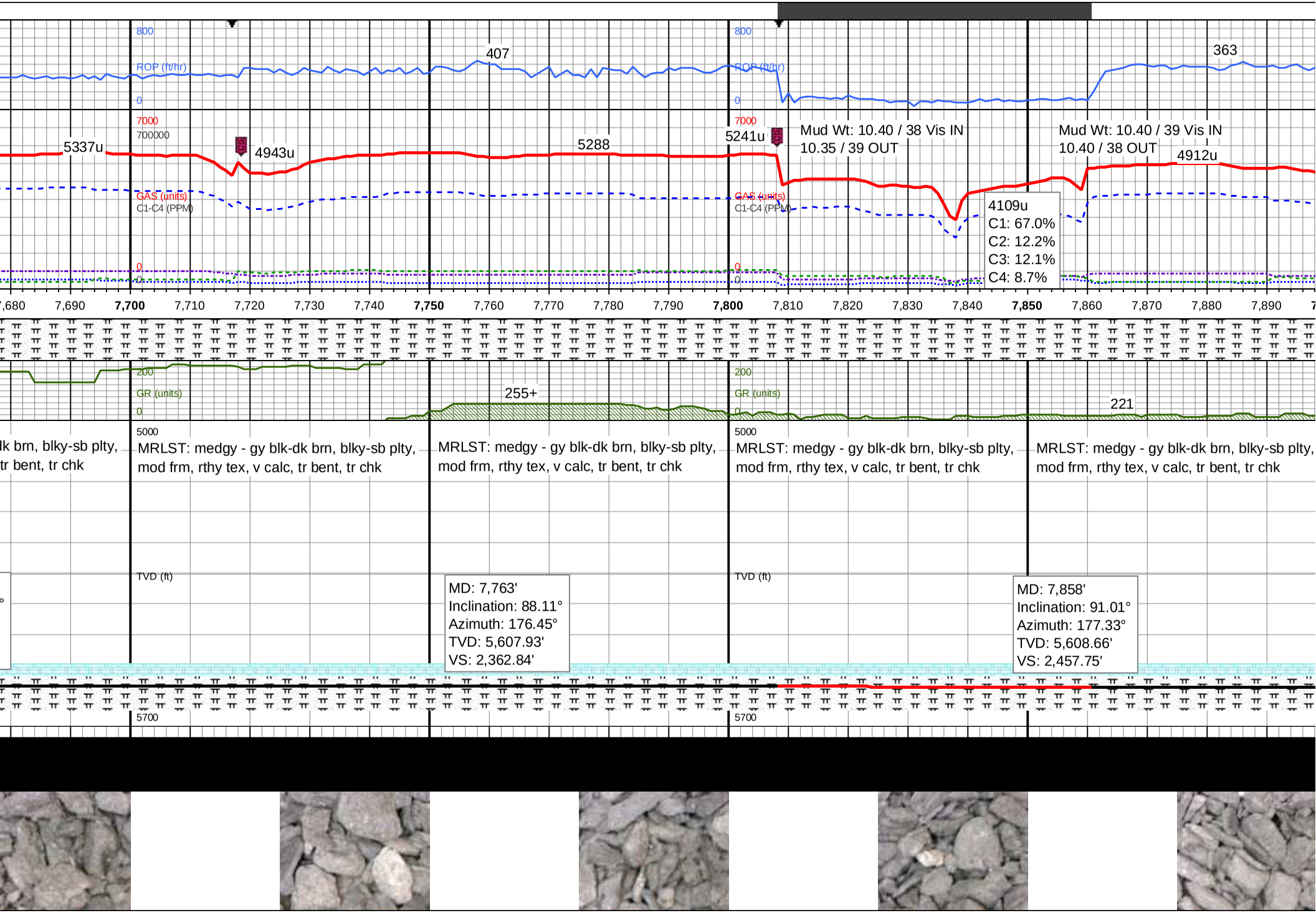


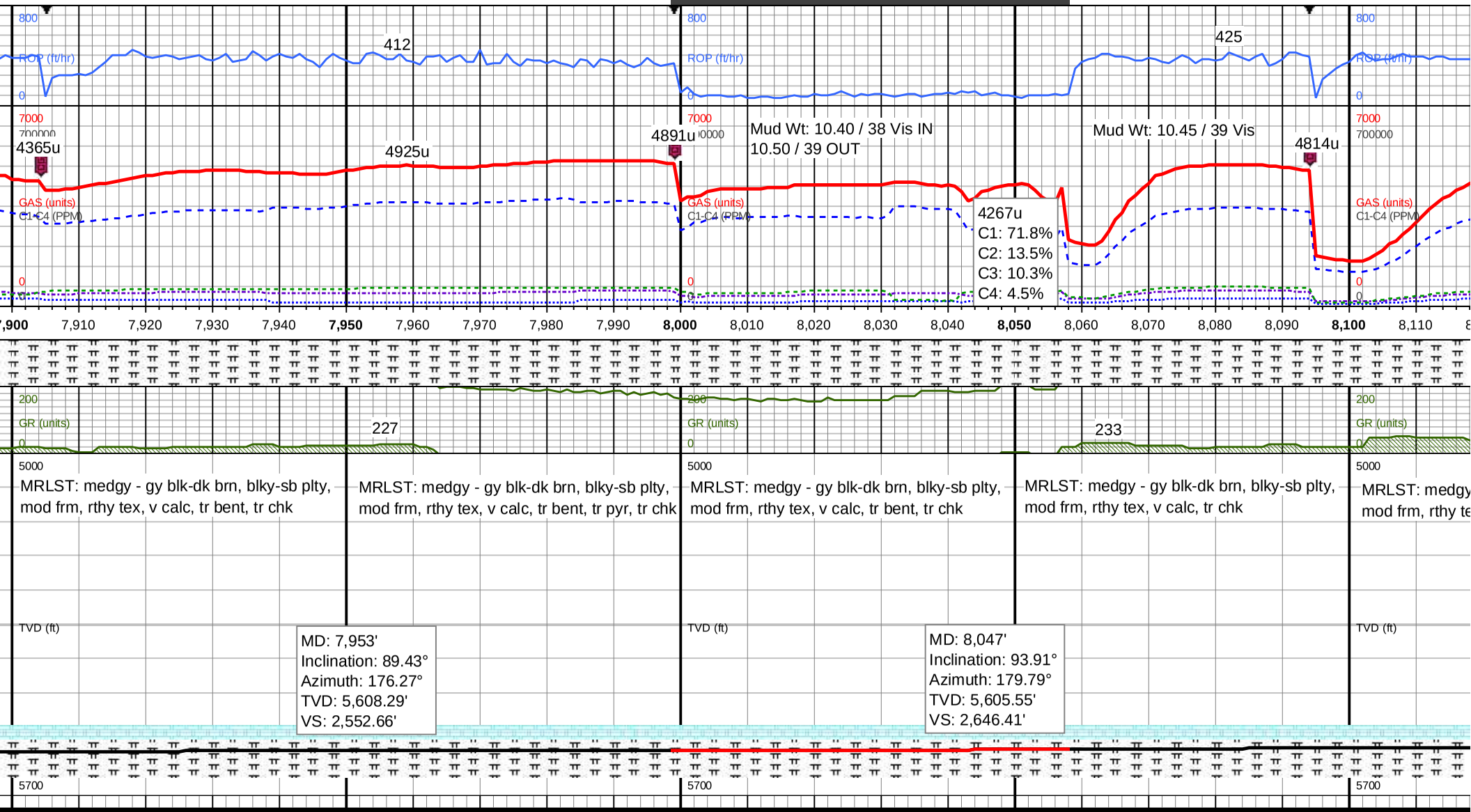

332
356
251
ROP (ft/hr)
800
0
5284u
Mud Wt: 10.30 / 38 Vis IN
10.35 / 37 OUT
5227u
5230u
Mud Wt: 10.30 / 39 Vis IN
10.35 / 39 OUT
5199u
5328
5175u
C1: 66.0%
C2: 14.6%
C3: 13.2%
C4: 6.2%
GAS (units)
C1-C4 (PPM)
7000
700000
7,020
7,030
7,040
7,050
7,060
7,070
7,080
7,090
7,100
7,110
7,120
7,130
7,140
7,150
7,160
7,170
7,180
7,190
7,200
7,210
7,220
7,230
65
112
80
GR (units)
200
5000
medgy, mod sft - mod frm,
sb wxy tex - mot, v calc, tr
CHK: ltgy, occ medgy, mod sft - mod frm,
sb plty-sb blky, sb wxy tex - mot, v calc, tr
mrlst
CHK: ltgy, occ medgy, mod sft - mod frm,
sb plty-sb blky, sb wxy tex - mot, v calc,
MRLST: medgy - gy blk-dk brn, blky-sb plty,
mod frm, rthy tex, v calc
CHK: ltgy, occ medgy, mod sft - mod frm,
sb plty-sb blky, sb wxy tex - mot, v calc,
MRLST: medgy - gy blk-dk brn, blky-sb plty,
mod frm, rthy tex, v calc
CHK: ltgy, occ medgy, mod sft - m
sb plty-sb blky, sb wxy tex - mot, v
mrlst
43°
4°
MD: 7,104'
Inclination: 92.59°
Azimuth: 179.09°
TVD: 5,597.89'
VS: 1,705.76'
MD: 7,196'
Inclination: 89.6°
Azimuth: 179.96°
TVD: 5,596.14'
VS: 1,797.37'
5700

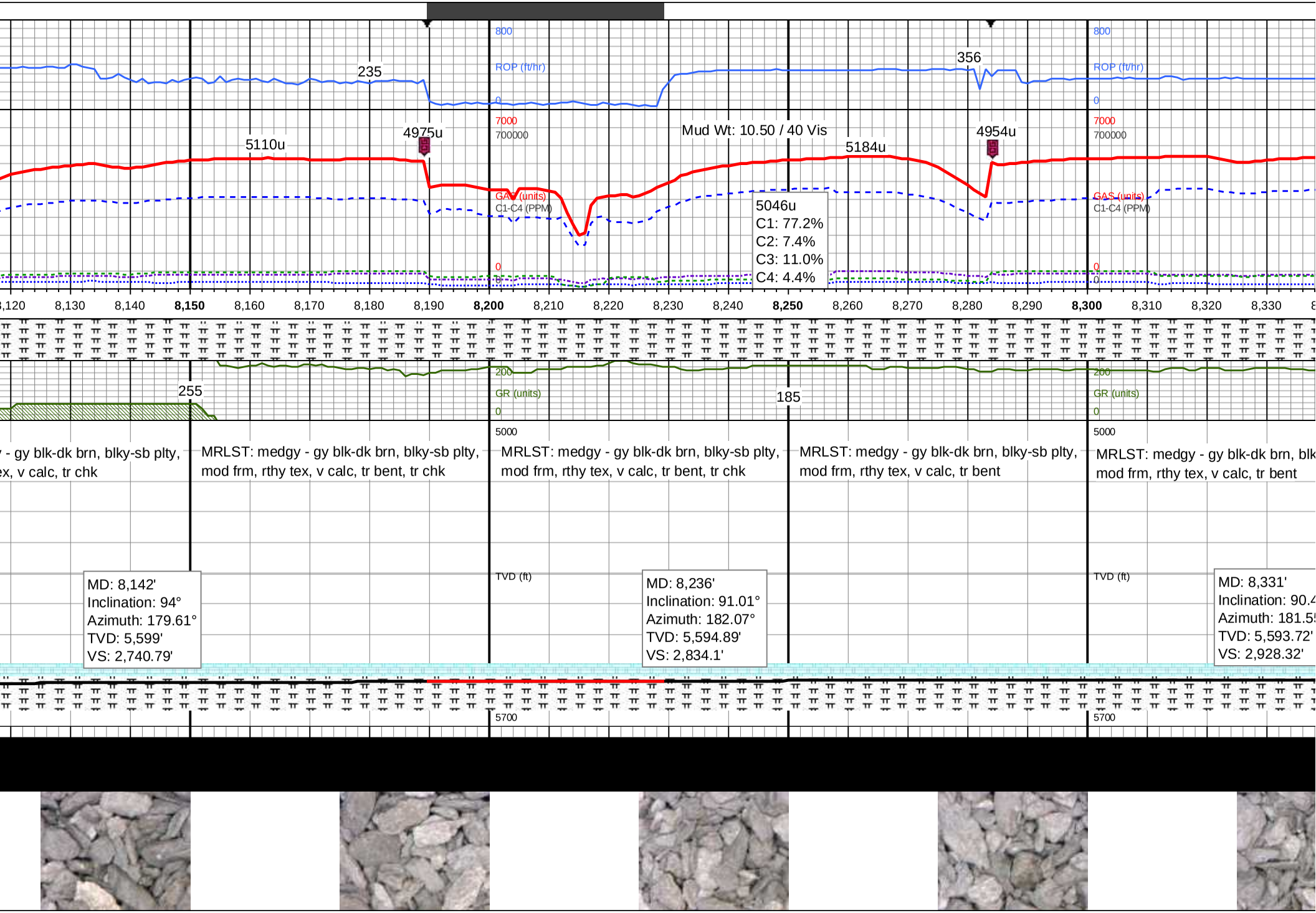

800
ROP (ft/hr)
0
303
313
7000
700000
GAS (units)
C1-C4 (PPM)
Mud Wt: 10.30 / 38 Vis IN
10.30 / 36 OUT
Mud Wt: 10.35 / 38
10.35 / 38 OUT
5356u
5323u
5431u
5129u
4229u
C1: 71.2%
C2: 9.7%
C3: 12.9%
C4: 6.2%
5257u
C1: 60.6%
C2: 15.5%
C3: 15.9%
C4: 8.0%
7,240
7,250
7,260
7,270
7,280
7,290
7,300
7,310
7,320
7,330
7,340
7,350
7,360
7,370
7,380
7,390
7,400
7,410
7,420
7,430
7,440
7,450

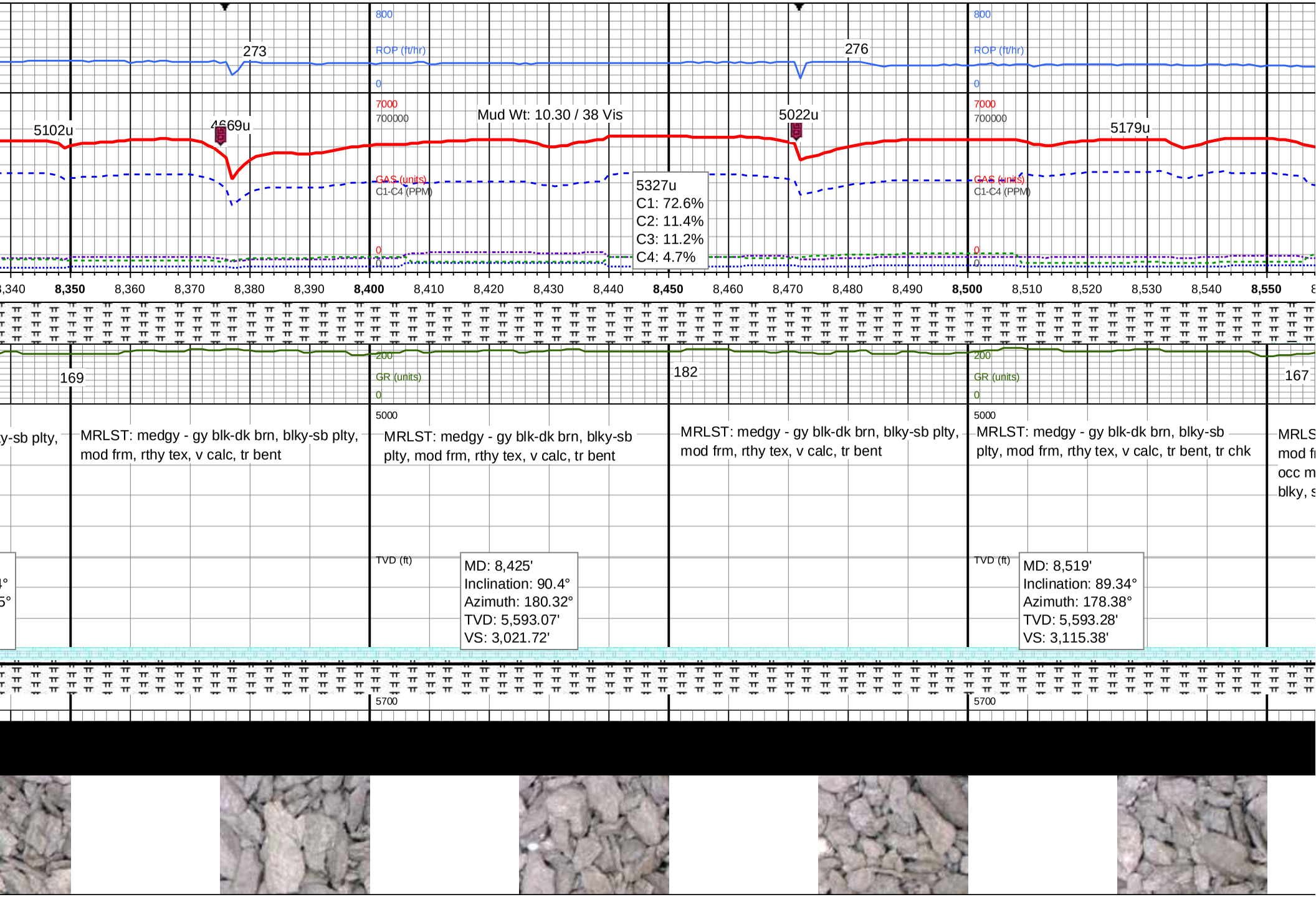

200
GR (units)
0
5000
110
80
od frm,
calc, tr
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, tr mrlst
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, tr mrlst
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, tr mrlst
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MRLS
mod fr
occ m
blky, s
MD: 7,291'
Inclination: 89.43°
Azimuth: 179.96°
TVD: 5,596.94'
VS: 1,891.94'
MD: 7,385'
Inclination: 87.85°
Azimuth: 178.56°
TVD: 5,599.17'
VS: 1,985.58'
TVD (ft)
5700

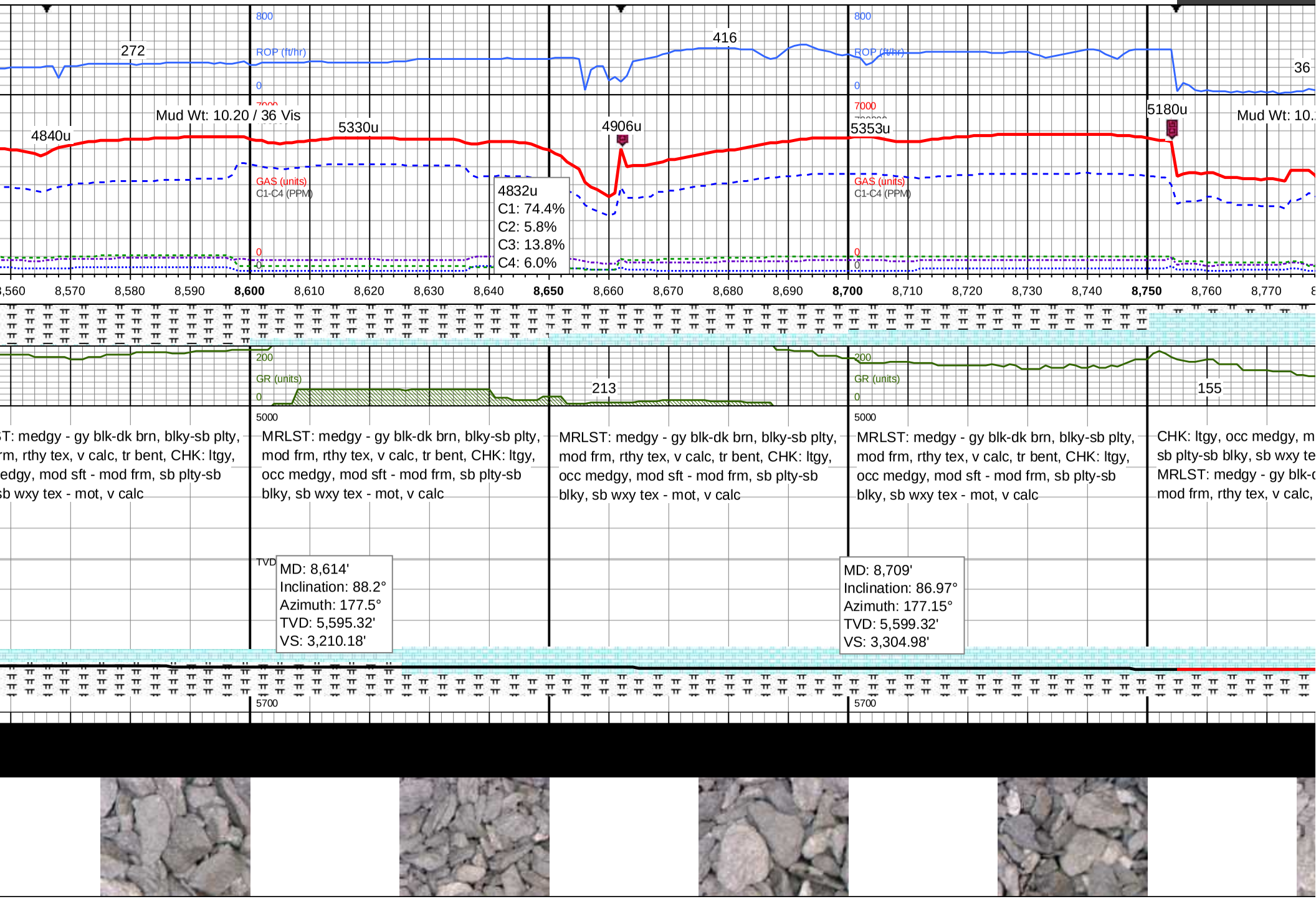

377
800
ROP (ft/hr)
0
83
298
Vis IN
7000
5500u
5433u
Mud Wt: 10.35 / 38 Vis IN
10.35 / 38 OUT
5352u
5043u
700000
GAS (units)
C1-C4 (PPM)
4963u
C1: 68.2%
C2: 13.8%
C3: 11.8%
C4: 6.1%
7,460
7,470
7,480
7,490
7,500
7,510
7,520
7,530
7,540
7,550
7,560
7,570
7,580
7,590
7,600
7,610
7,620
7,630
7,640
7,650
7,660
7,670
157
200
GR (units)
179
151
5000
T: medgy - gy blk-dk brn, blky-sb plty,
rm, rthy tex, v calc, tr bent, CHK: ltgy,
edgy, mod sft - mod frm, sb plty-sb
b wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty,
mod frm, rthy tex, v calc, tr bent, CHK: ltgy,
occ medgy, mod sft - mod frm, sb plty-sb
blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty,
mod frm, rthy tex, v calc, tr bent, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty,
mod frm, rthy tex, v calc, tr bent, tr chk
MRLST: medgy - gy blk-d
mod frm, rthy tex, v calc,
TVD (ft)
MD: 7,480'
Inclination: 86.44°
Azimuth: 177.86°
TVD: 5,603.9'
VS: 2,080.26'
MD: 7,574'
Inclination: 90.4°
Azimuth: 177.68°
TVD: 5,606.49'
VS: 2,174.05'
MD: 7,669'
Inclination: 89.87
Azimuth: 176.98°
TVD: 5,606.27'
VS: 2,268.93'
5700

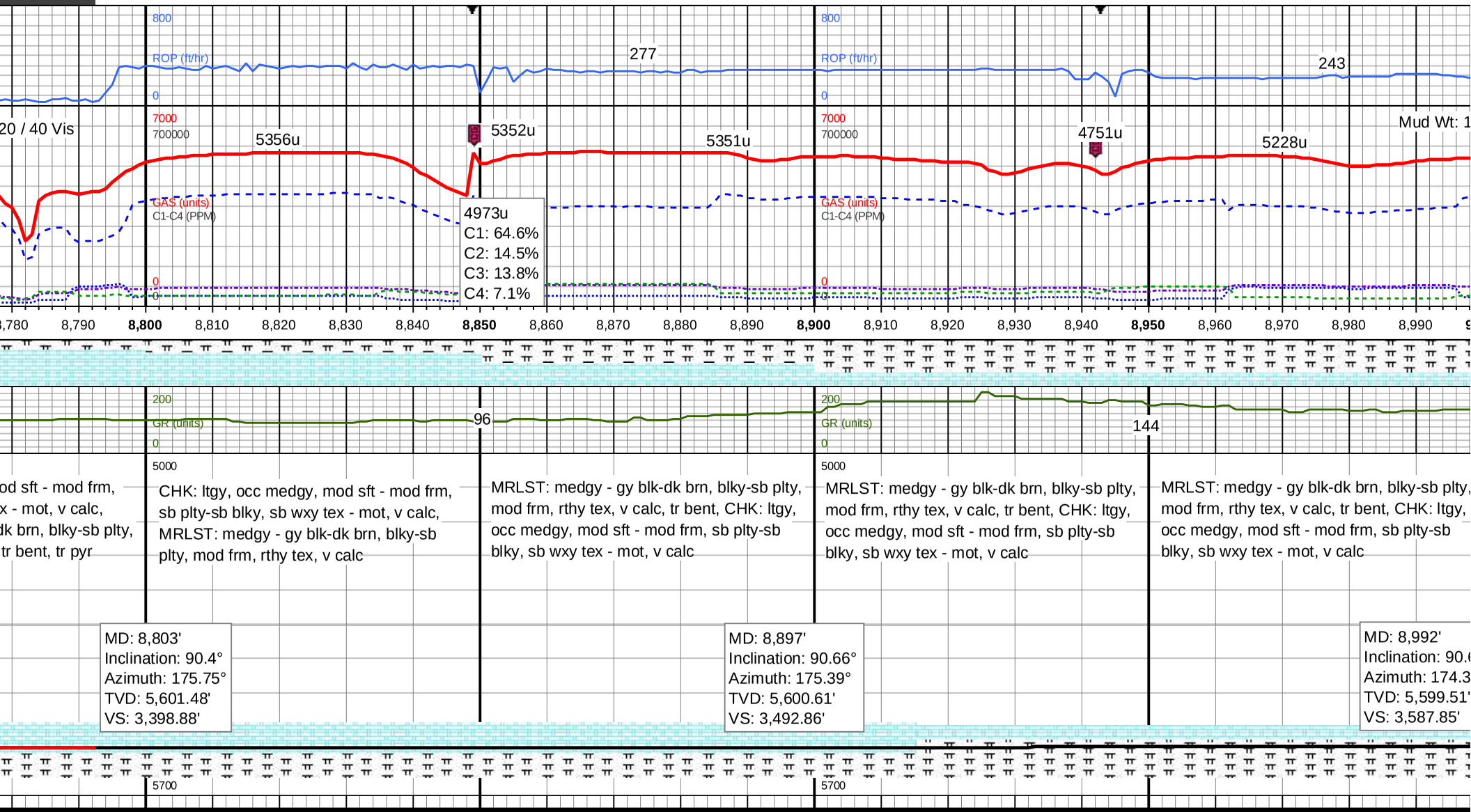

800
ROP (ft/hr)
0
407
363
7000
700000
5337u
4943u
5288
5241u
Mud Wt: 10.40 / 38 Vis IN
10.35 / 39 OUT
Mud Wt: 10.40 / 39 Vis IN
10.40 / 38 OUT
4912u
GAS (units)
C1-C4 (PPM)
4109u
C1: 67.0%
C2: 12.2%
C3: 12.1%
C4: 8.7%
7,680
7,690
7,700
7,710
7,720
7,730
7,740
7,750
7,760
7,770
7,780
7,790
7,800
7,810
7,820
7,830
7,840
7,850
7,860
7,870
7,880
7,890
200
GR (units)
0
255+
221
5000
lk brn, blky-sb plty,
tr bent, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty,
mod frm, rthy tex, v calc, tr bent, tr chk
TVD (ft)
MD: 7,763'
Inclination: 88.11°
Azimuth: 176.45°
TVD: 5,607.93'
VS: 2,362.84'
MD: 7,858'
Inclination: 91.01°
Azimuth: 177.33°
TVD: 5,608.66'
VS: 2,457.75'
5700

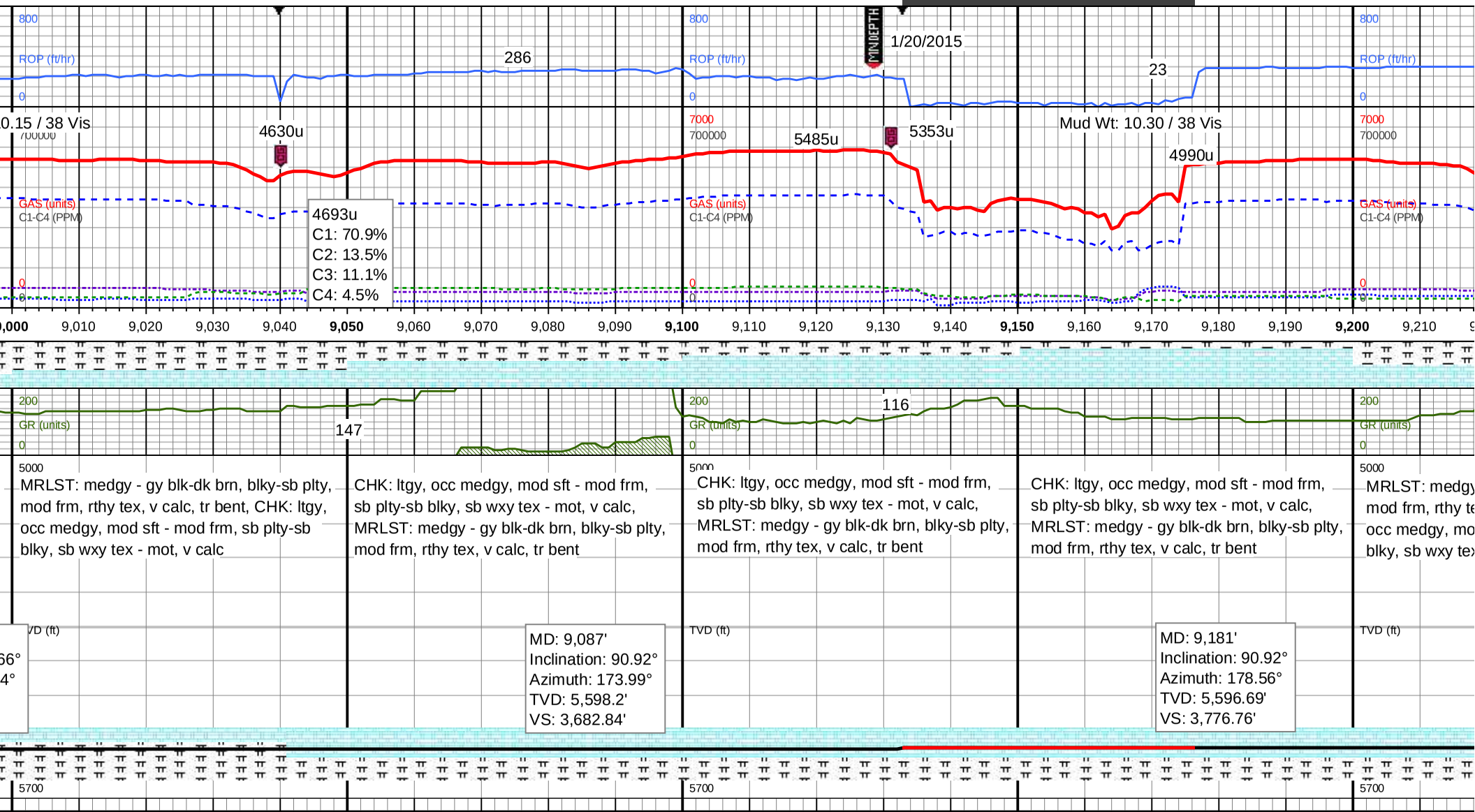

800
ROP (ft/hr)
0
412
425
7000
700000
4365u
4925u
4891u
Mud Wt: 10.40 / 38 Vis IN
10.50 / 39 OUT
Mud Wt: 10.45 / 39 Vis
4814u
GAS (units)
C1-C4 (PPM)
4267u
C1: 71.8%
C2: 13.5%
C3: 10.3%
C4: 4.5%
7,900
7,910
7,920
7,930
7,940
7,950
7,960
7,970
7,980
7,990
8,000
8,010
8,020
8,030
8,040
8,050
8,060
8,070
8,080
8,090
8,100
8,110
200
GR (units)
227
233
5000
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, tr pyr, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr chk
MRLST: medgy
mod frm, rthy te
TVD (ft)
MD: 7,953'
Inclination: 89.43°
Azimuth: 176.27°
TVD: 5,608.29'
VS: 2,552.66'
MD: 8,047'
Inclination: 93.91°
Azimuth: 179.79°
TVD: 5,605.55'
VS: 2,646.41'
5700

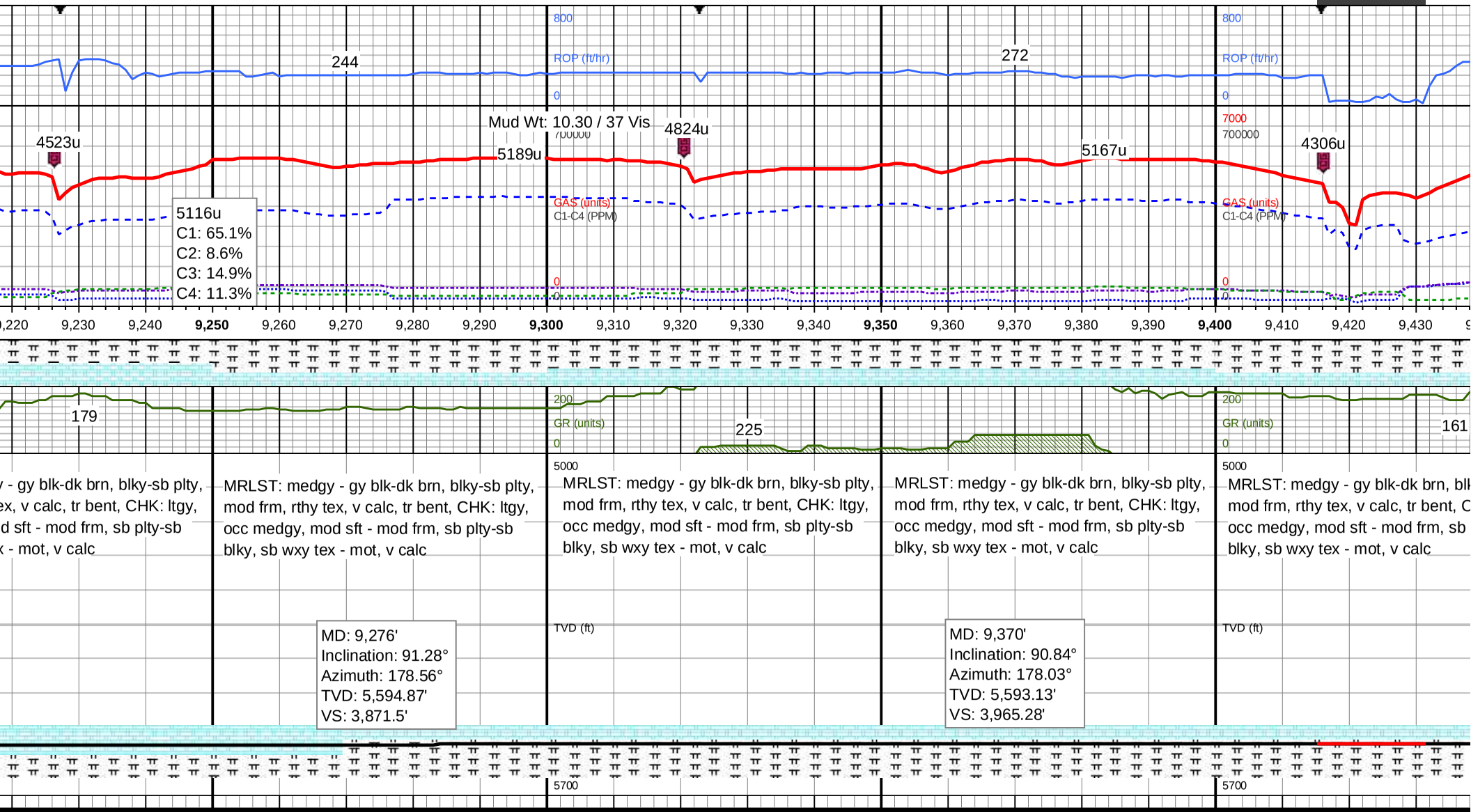

800
ROP (ft/hr)
0
7000
700000
GAS (units)
C1-C4 (PPM)
0
235
356
5110u
4975u
Mud Wt: 10.50 / 40 Vis
5184u
4954u
5046u
C1: 77.2%
C2: 7.4%
C3: 11.0%
C4: 4.4%
8,120
8,130
8,140
8,150
8,160
8,170
8,180
8,190
8,200
8,210
8,220
8,230
8,240
8,250
8,260
8,270
8,280
8,290
8,300
8,310
8,320
8,330
200
GR (units)
0
5000
255
185
- gy blk-dk brn, blky-sb plty, ex, v calc, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, tr chk
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
MRLST: medgy - gy blk-dk brn, blk mod frm, rthy tex, v calc, tr bent
TVD (ft)
MD: 8,142'
Inclination: 94°
Azimuth: 179.61°
TVD: 5,599'
VS: 2,740.79'
MD: 8,236'
Inclination: 91.01°
Azimuth: 182.07°
TVD: 5,594.89'
VS: 2,834.1'
MD: 8,331'
Inclination: 90.4
Azimuth: 181.5
TVD: 5,593.72'
VS: 2,928.32'
5700

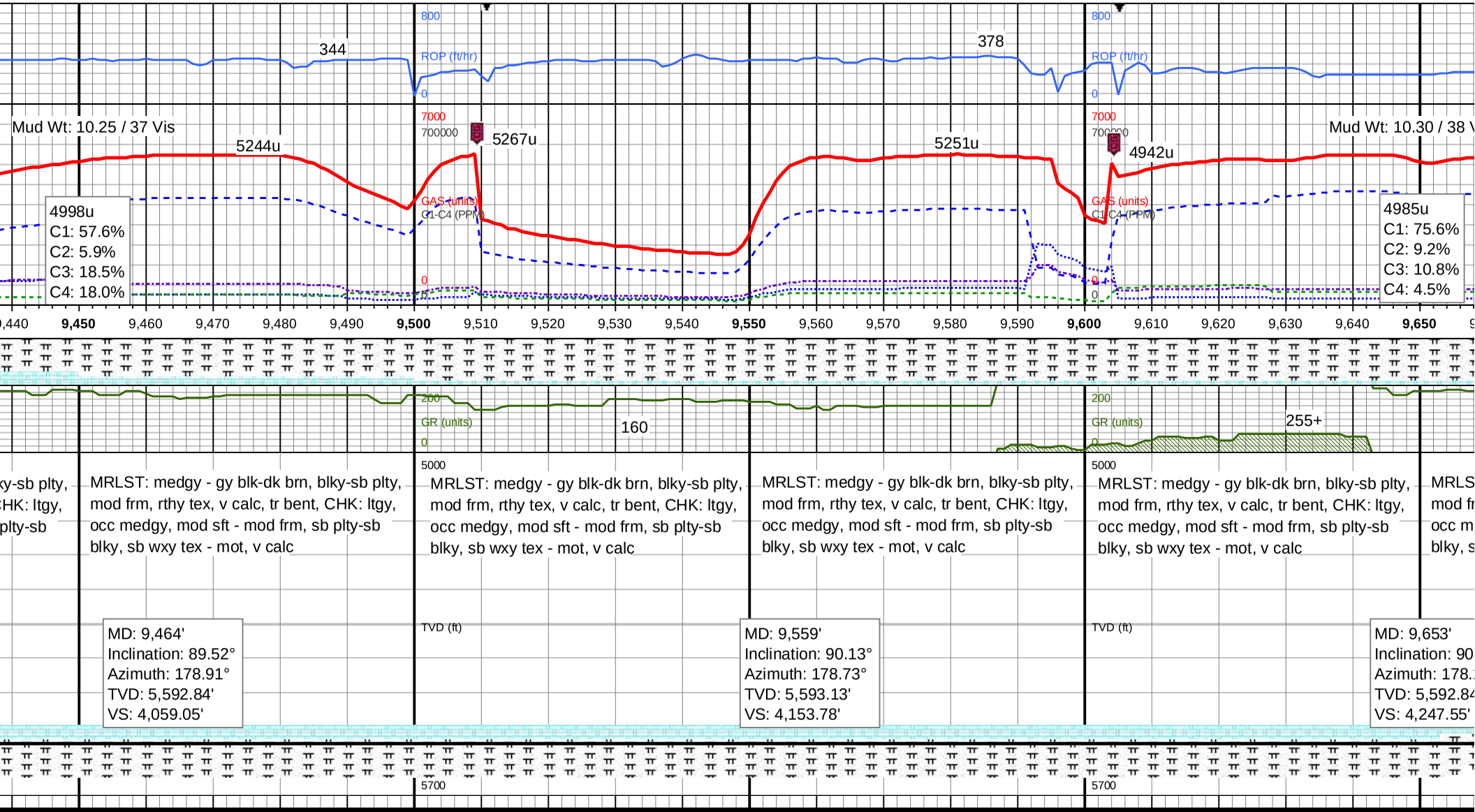

800
ROP (ft/hr)
0
7000
700000
GAS (units)
C1-C4 (PPM)
0
273
276
5102u
4669u
5022u
5179u
Mud Wt: 10.30 / 38 Vis
5327u
C1: 72.6%
C2: 11.4%
C3: 11.2%
C4: 4.7%
8,340
8,350
8,360
8,370
8,380
8,390
8,400
8,410
8,420
8,430
8,440
8,450
8,460
8,470
8,480
8,490
8,500
8,510
8,520
8,530
8,540
8,550
200
GR (units)
0
5000
169
182
167
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, tr chk
TVD (ft)
MD: 8,425'
Inclination: 90.4°
Azimuth: 180.32°
TVD: 5,593.07'
VS: 3,021.72'
MD: 8,519'
Inclination: 89.34°
Azimuth: 178.38°
TVD: 5,593.28'
VS: 3,115.38'
5700

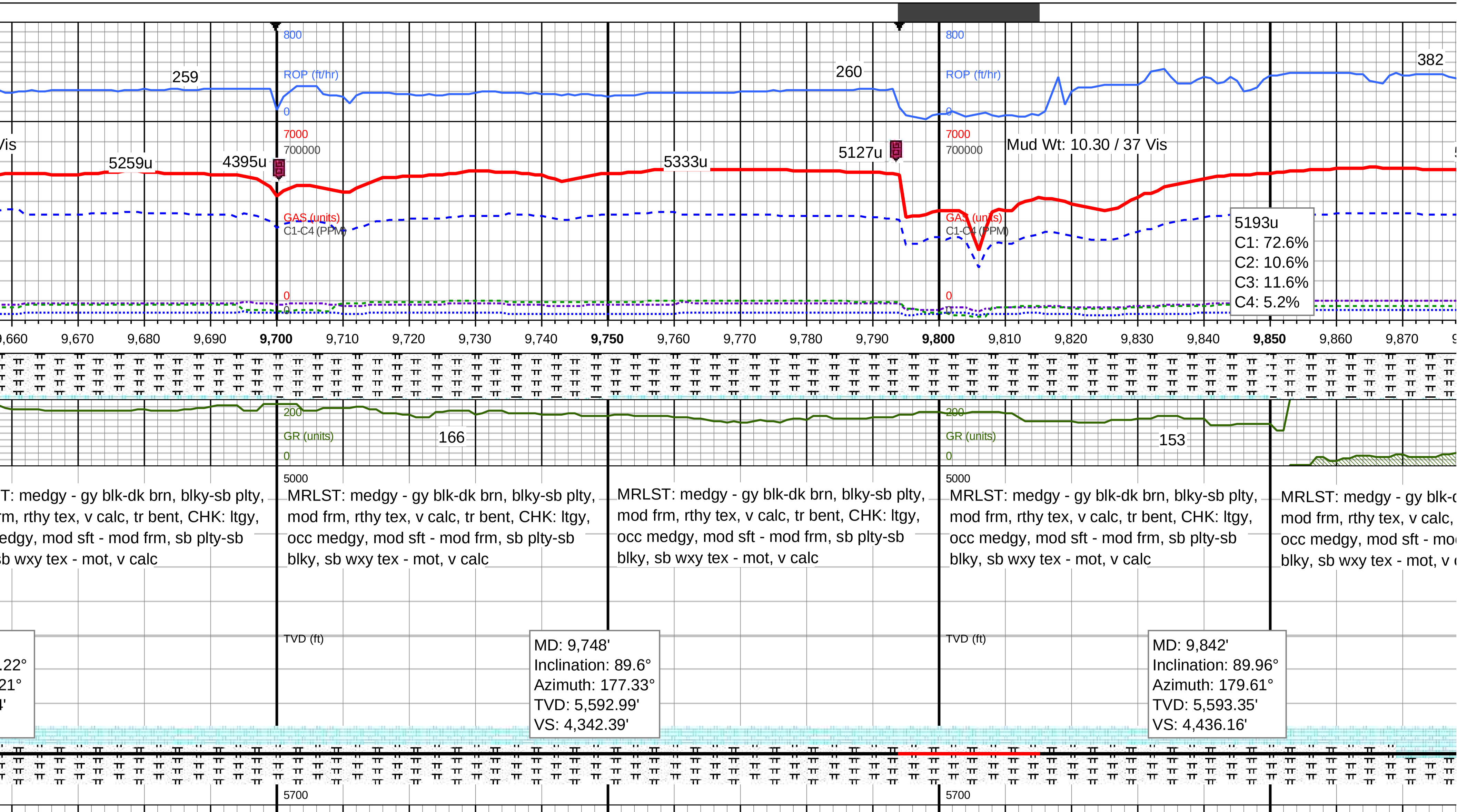

800
ROP (ft/hr)
0
272
416
36
7000
Mud Wt: 10.20 / 36 Vis
4840u
5330u
4906u
5353u
5180u
Mud Wt: 10.
GAS (units)
C1-C4 (PPM)
4832u
C1: 74.4%
C2: 5.8%
C3: 13.8%
C4: 6.0%
8,560
8,570
8,580
8,590
8,600
8,610
8,620
8,630
8,640
8,650
8,660
8,670
8,680
8,690
8,700
8,710
8,720
8,730
8,740
8,750
8,760
8,770
200
GR (units)
213
155
5000
5700
T: medgy - gy blk-dk brn, blky-sb plty, rm, rthy tex, v calc, tr bent, CHK: ltgy, edgy, mod sft - mod frm, sb plty-sb sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
CHK: ltgy, occ medgy, m sb plty-sb blky, sb wxy te MRLST: medgy - gy blk- mod frm, rthy tex, v calc,
TVD
MD: 8,614'
Inclination: 88.2°
Azimuth: 177.5°
TVD: 5,595.32'
VS: 3,210.18'
MD: 8,709'
Inclination: 86.97°
Azimuth: 177.15°
TVD: 5,599.32'
VS: 3,304.98'

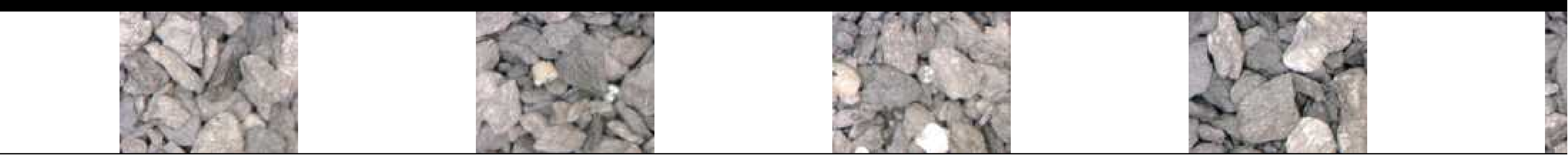

800
ROP (ft/hr)
0
277
243
20 / 40 Vis
7000
700000
5356u
5352u
5351u
4751u
5228u
Mud Wt: 1
GAS (units)
C1-C4 (PPM)
4973u
C1: 64.6%
C2: 14.5%
C3: 13.8%
C4: 7.1%
8,780
8,790
8,800
8,810
8,820
8,830
8,840
8,850
8,860
8,870
8,880
8,890
8,900
8,910
8,920
8,930
8,940
8,950
8,960
8,970
8,980
8,990
200
GR (units)
96
144
5000
od sft - mod frm,
x - mot, v calc,
dk brn, blky-sb plty,
tr bent, tr pyr
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MD: 8,803'
Inclination: 90.4°
Azimuth: 175.75°
TVD: 5,601.48'
VS: 3,398.88'
MD: 8,897'
Inclination: 90.66°
Azimuth: 175.39°
TVD: 5,600.61'
VS: 3,492.86'
MD: 8,992'
Inclination: 90.
Azimuth: 174.3
TVD: 5,599.51'
VS: 3,587.85'
5700

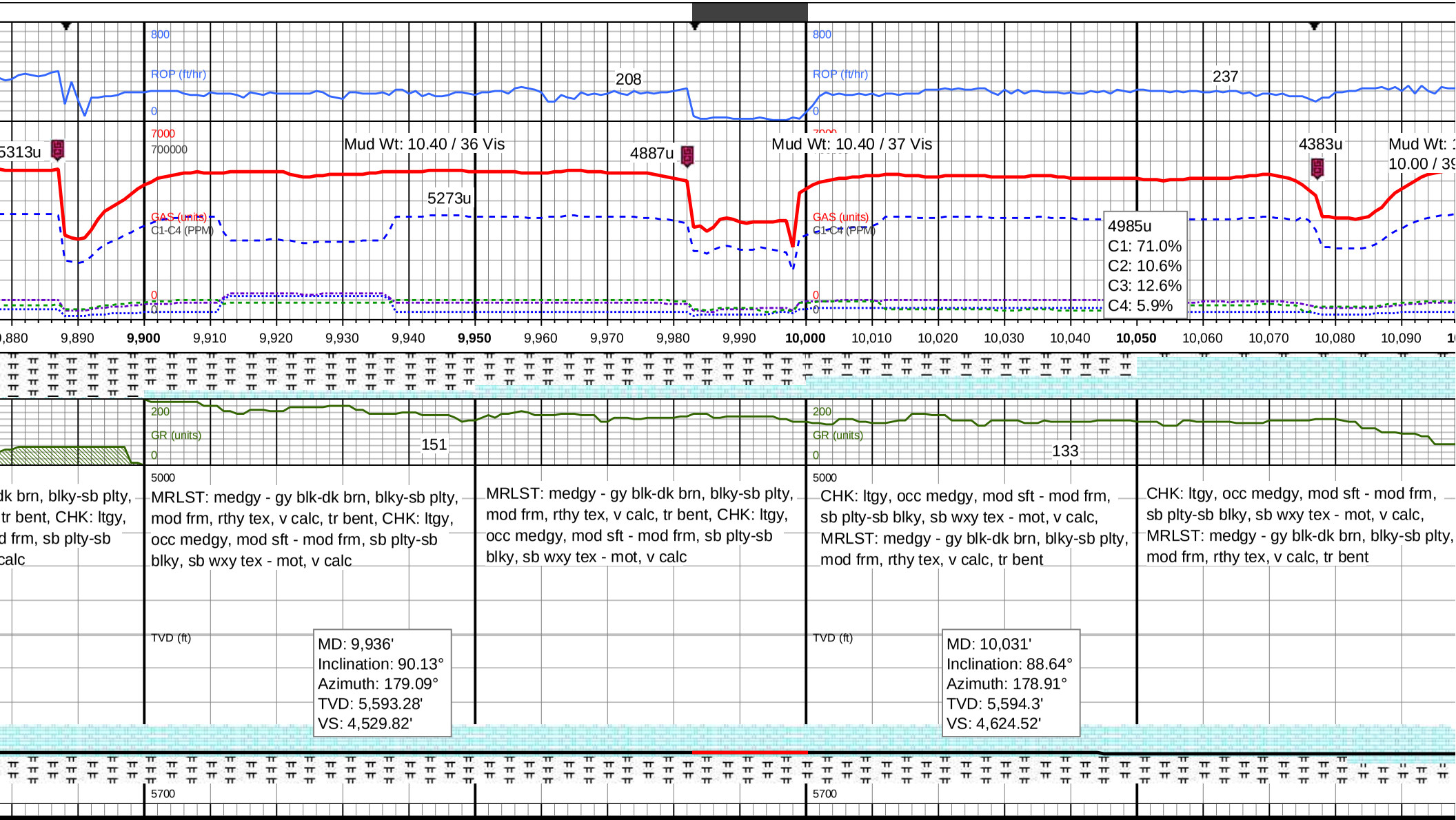

800
ROP (ft/hr)
0
286
1/20/2015
MINDEPTH
23
0.15 / 38 Vis
4630u
5485u
5353u
Mud Wt: 10.30 / 38 Vis
4990u
7000
700000
GAS (units)
C1-C4 (PPM)
4693u
C1: 70.9%
C2: 13.5%
C3: 11.1%
C4: 4.5%
9,000
9,010
9,020
9,030
9,040
9,050
9,060
9,070
9,080
9,090
9,100
9,110
9,120
9,130
9,140
9,150
9,160
9,170
9,180
9,190
9,200
9,210
200
GR (units)
147
116
5000
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
MRLST: medgy
mod frm, rthy te
occ medgy, mo
blky, sb wxy tex
TVD (ft)
MD: 9,087'
Inclination: 90.92°
Azimuth: 173.99°
TVD: 5,598.2'
VS: 3,682.84'
MD: 9,181'
Inclination: 90.92°
Azimuth: 178.56°
TVD: 5,596.69'
VS: 3,776.76'
5700

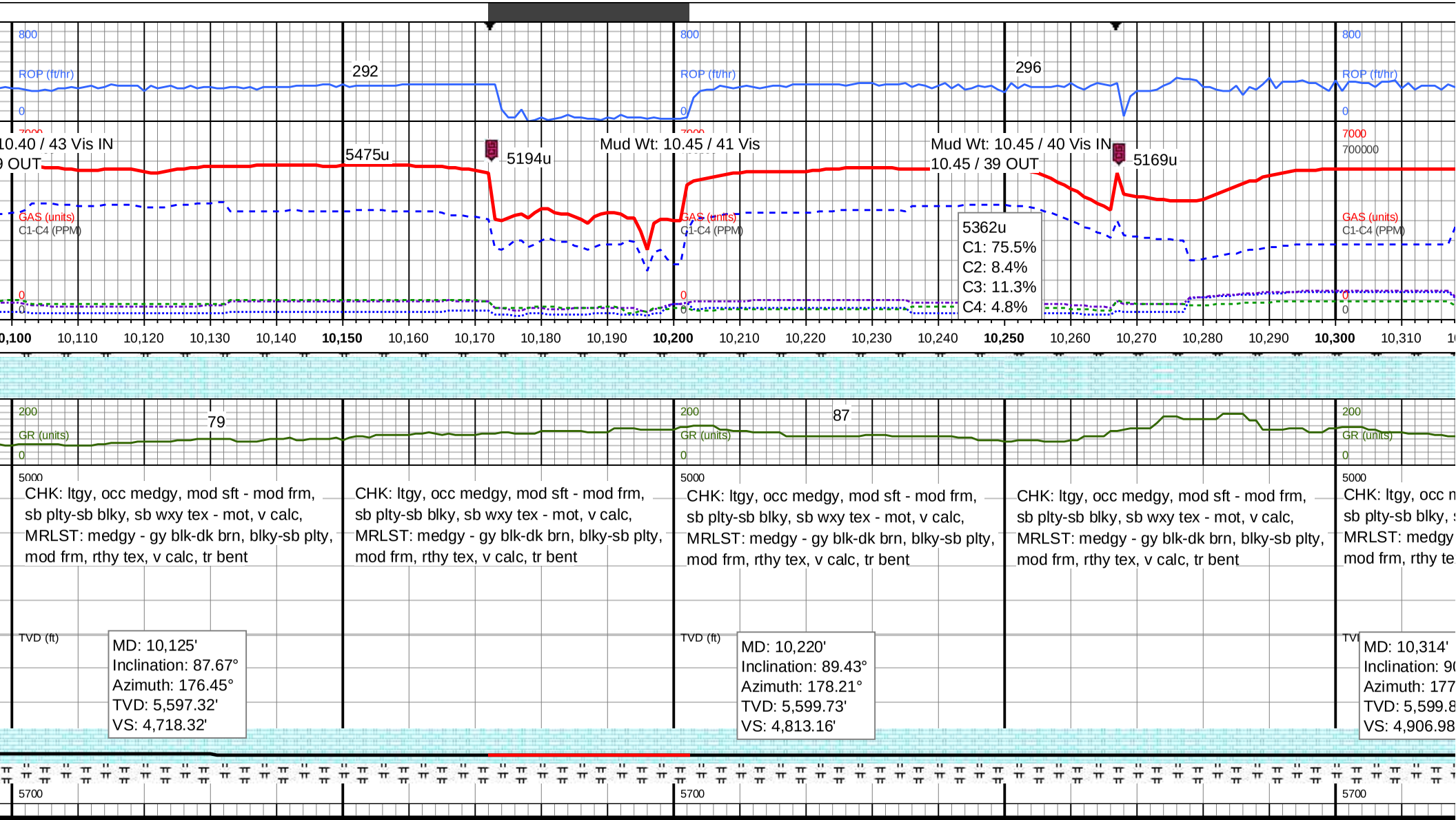

800
ROP (ft/hr)
0
244
272
Mud Wt: 10.30 / 37 Vis
4523u
5189u
4824u
5167u
4306u
7000
700000
GAS (units)
C1-C4 (PPM)
5116u
C1: 65.1%
C2: 8.6%
C3: 14.9%
C4: 11.3%
9,220
9,230
9,240
9,250
9,260
9,270
9,280
9,290
9,300
9,310
9,320
9,330
9,340
9,350
9,360
9,370
9,380
9,390
9,400
9,410
9,420
9,430
179
200
GR (units)
0
5000
225
161
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
TVD (ft)
MD: 9,276'
Inclination: 91.28°
Azimuth: 178.56°
TVD: 5,594.87'
VS: 3,871.5'
MD: 9,370'
Inclination: 90.84°
Azimuth: 178.03°
TVD: 5,593.13'
VS: 3,965.28'
5700

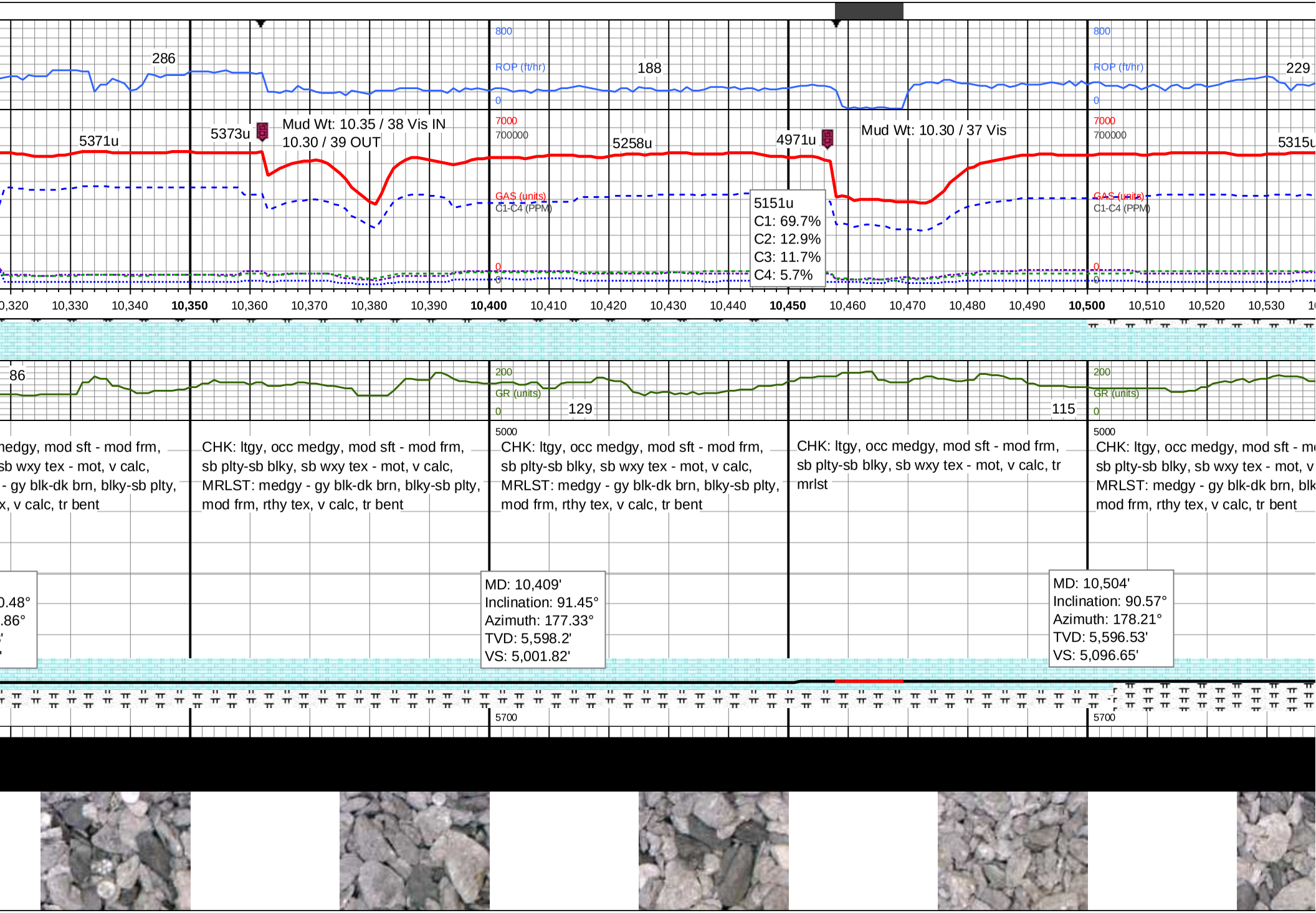

344
ROP (ft/hr)
800
0
Mud Wt: 10.25 / 37 Vis
5244u
7000
700000
5267u
GAS (units)
C1-C4 (PPM)
4998u
C1: 57.6%
C2: 5.9%
C3: 18.5%
C4: 18.0%
9,440
9,450
9,460
9,470
9,480
9,490
9,500
9,510
9,520
9,530
9,540
9,550
9,560
9,570
9,580
9,590
9,600
9,610
9,620
9,630
9,640
9,650
200
GR (units)
160
5000
TVD (ft)
5700
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MD: 9,464'
Inclination: 89.52°
Azimuth: 178.91°
TVD: 5,592.84'
VS: 4,059.05'
MD: 9,559'
Inclination: 90.13°
Azimuth: 178.73°
TVD: 5,593.13'
VS: 4,153.78'
378
5251u
4942u
255+
4985u
C1: 75.6%
C2: 9.2%
C3: 10.8%
C4: 4.5%
Mud Wt: 10.30 / 38
MD: 9,653'
Inclination: 90
Azimuth: 178.
TVD: 5,592.84
VS: 4,247.55'

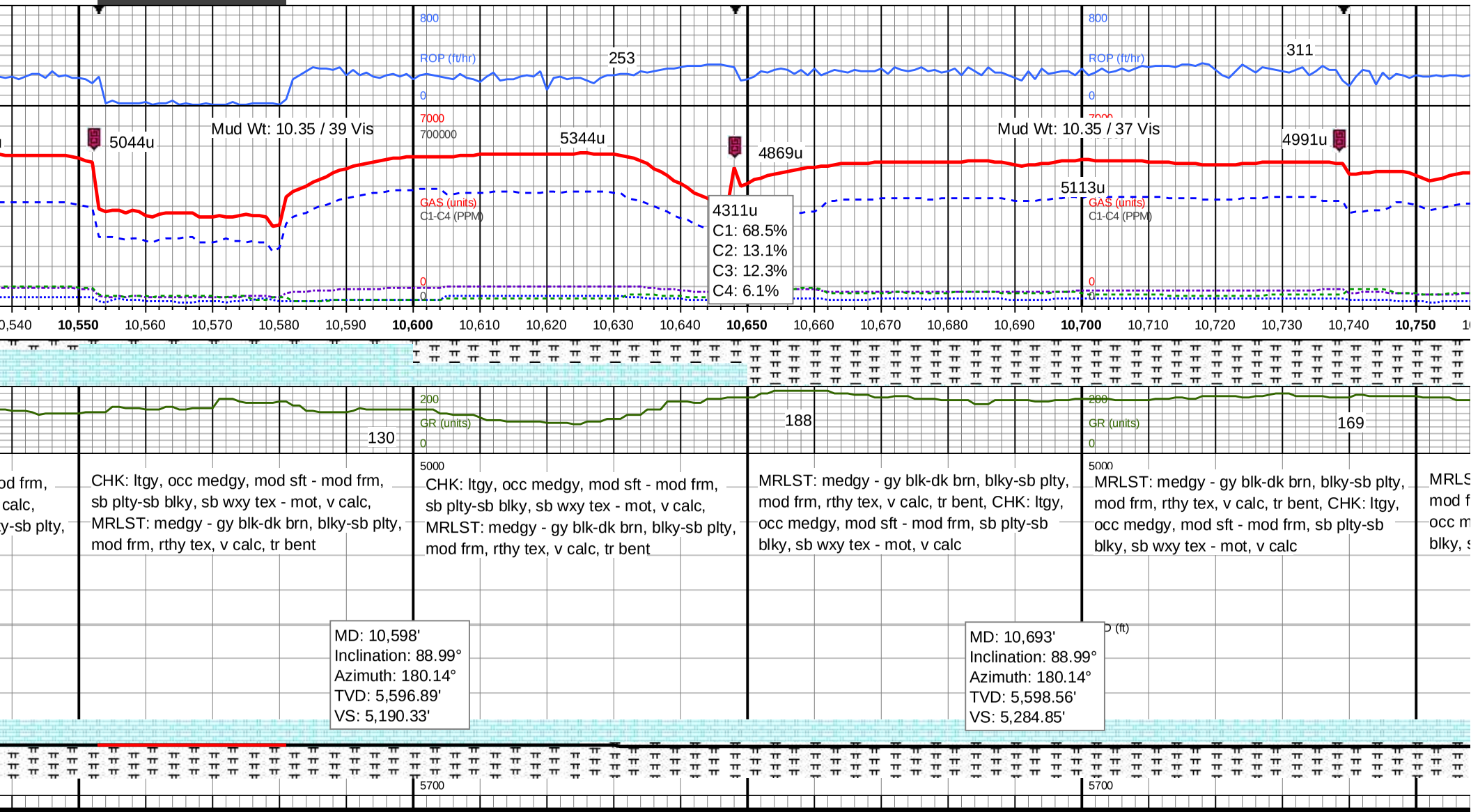

800
ROP (ft/hr)
0
259
260
382
7000
700000
GAS (units)
C1-C4 (PPM)
0
5259u
4395u
5333u
5127u
Mud Wt: 10.30 / 37 Vis
5193u
C1: 72.6%
C2: 10.6%
C3: 11.6%
C4: 5.2%
9,660
9,670
9,680
9,690
9,700
9,710
9,720
9,730
9,740
9,750
9,760
9,770
9,780
9,790
9,800
9,810
9,820
9,830
9,840
9,850
9,860
9,870
200
GR (units)
0
166
153
5000
T: medgy - gy blk-dk brn, blky-sb plty, rm, rthy tex, v calc, tr bent, CHK: ltgy, edgy, mod sft - mod frm, sb plty-sb b wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-d mod frm, rthy tex, v calc, occ medgy, mod sft - mo blky, sb wxy tex - mot, v
TVD (ft)
.22°
21°
4'
MD: 9,748'
Inclination: 89.6°
Azimuth: 177.33°
TVD: 5,592.99'
VS: 4,342.39'
MD: 9,842'
Inclination: 89.96°
Azimuth: 179.61°
TVD: 5,593.35'
VS: 4,436.16'
5700

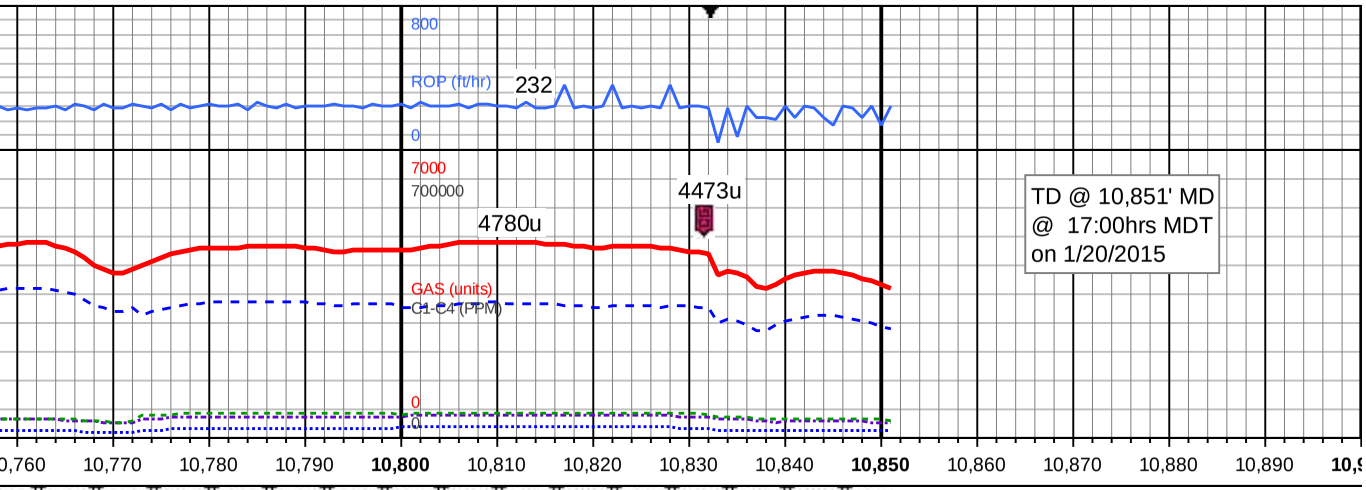


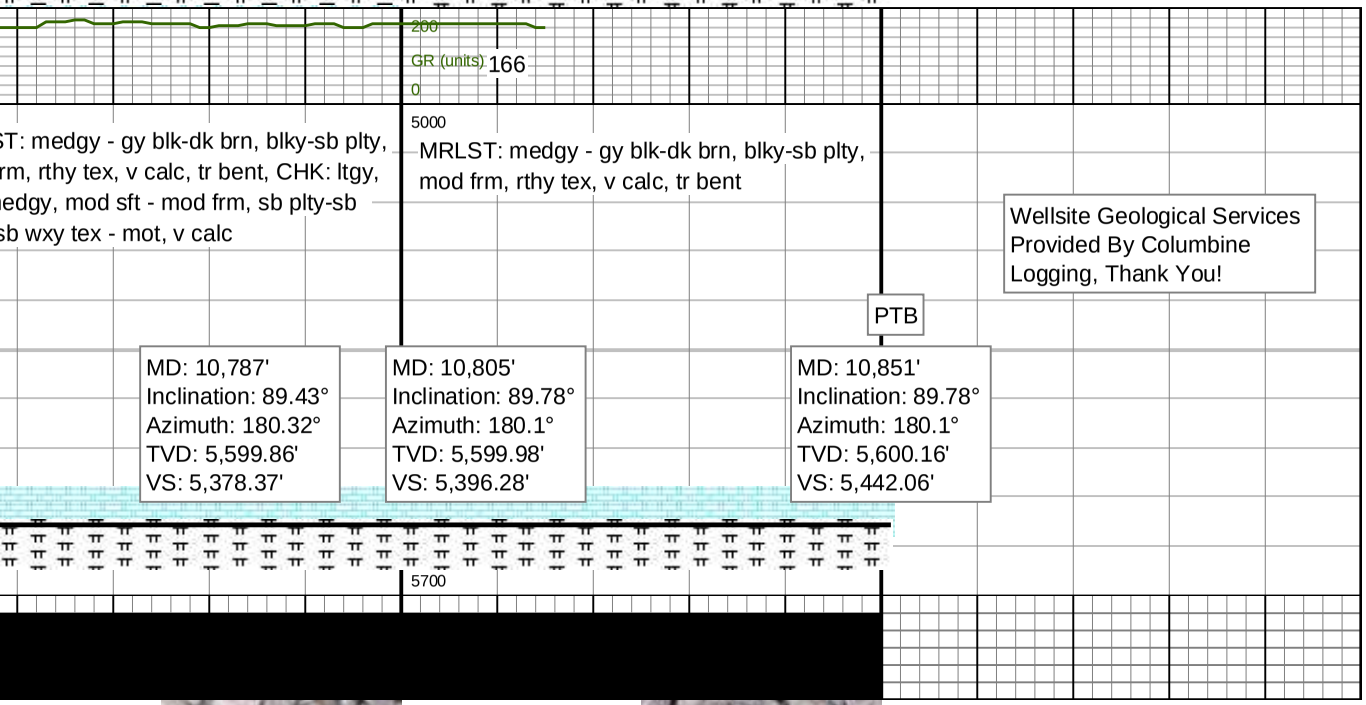

800
ROP (ft/hr)
0
208
237
7000
700000
5313u
Mud Wt: 10.40 / 36 Vis
4887u
Mud Wt: 10.40 / 37 Vis
4383u
Mud Wt:
10.00 / 39
5273u
GAS (units)
C1-C4 (PPM)
4985u
C1: 71.0%
C2: 10.6%
C3: 12.6%
C4: 5.9%
9,880
9,890
9,900
9,910
9,920
9,930
9,940
9,950
9,960
9,970
9,980
9,990
10,000
10,010
10,020
10,030
10,040
10,050
10,060
10,070
10,080
10,090
200
GR (units)
0
151
133
5000
dk brn, blky-sb plty,
tr bent, CHK: ltgy,
d frm, sb plty-sb
calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
TVD (ft)
MD: 9,936'
Inclination: 90.13°
Azimuth: 179.09°
TVD: 5,593.28'
VS: 4,529.82'
MD: 10,031'
Inclination: 88.64°
Azimuth: 178.91°
TVD: 5,594.3'
VS: 4,624.52'
5700


800
ROP (ft/hr)
0
292
296
10.40 / 43 Vis IN
9 OUT
5475u
5194u
Mud Wt: 10.45 / 41 Vis
Mud Wt: 10.45 / 40 Vis IN
10.45 / 39 OUT
5169u
7000
700000
GAS (units)
C1-C4 (PPM)
5362u
C1: 75.5%
C2: 8.4%
C3: 11.3%
C4: 4.8%
0,100 10,110 10,120 10,130 10,140 10,150 10,160 10,170 10,180 10,190 10,200 10,210 10,220 10,230 10,240 10,250 10,260 10,270 10,280 10,290 10,300 10,310
200
GR (units)
79
87
5000
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
TVD (ft)
MD: 10,125'
Inclination: 87.67°
Azimuth: 176.45°
TVD: 5,597.32'
VS: 4,718.32'
MD: 10,220'
Inclination: 89.43°
Azimuth: 178.21°
TVD: 5,599.73'
VS: 4,813.16'
5700


286
ROP (ft/hr)
800
0
188
229
5371u
5373u
Mud Wt: 10.35 / 38 Vis IN
10.30 / 39 OUT
5258u
4971u
Mud Wt: 10.30 / 37 Vis
5315u
7000
700000
GAS (units)
C1-C4 (PPM)
5151u
C1: 69.7%
C2: 12.9%
C3: 11.7%
C4: 5.7%
10,320
10,330
10,340
10,350
10,360
10,370
10,380
10,390
10,400
10,410
10,420
10,430
10,440
10,450
10,460
10,470
10,480
10,490
10,500
10,510
10,520
10,530
86
GR (units)
200
0
129
115
5000
5700
edgy, mod sft - mod frm,
sb wxy tex - mot, v calc,
- gy blk-dk brn, blky-sb plty,
x, v calc, tr bent
CHK: ltgy, occ medgy, mod sft - mod frm,
sb plty-sb blky, sb wxy tex - mot, v calc,
MRLST: medgy - gy blk-dk brn, blky-sb plty,
mod frm, rthy tex, v calc, tr bent
CHK: ltgy, occ medgy, mod sft - mod frm,
sb plty-sb blky, sb wxy tex - mot, v calc,
MRLST: medgy - gy blk-dk brn, blky-sb plty,
mod frm, rthy tex, v calc, tr bent
CHK: ltgy, occ medgy, mod sft - mod frm,
sb plty-sb blky, sb wxy tex - mot, v calc, tr
mrlst
CHK: ltgy, occ medgy, mod sft - mo
sb plty-sb blky, sb wxy tex - mot, v
MRLST: medgy - gy blk-dk brn, blk
mod frm, rthy tex, v calc, tr bent
0.48°
.86°
MD: 10,409'
Inclination: 91.45°
Azimuth: 177.33°
TVD: 5,598.2'
VS: 5,001.82'
MD: 10,504'
Inclination: 90.57°
Azimuth: 178.21°
TVD: 5,596.53'
VS: 5,096.65'


800
ROP (ft/hr)
0
253
311
7000
700000
GAS (units)
C1-C4 (PPM)
5044u
Mud Wt: 10.35 / 39 Vis
5344u
4869u
4311u
C1: 68.5%
C2: 13.1%
C3: 12.3%
C4: 6.1%
Mud Wt: 10.35 / 37 Vis
4991u
5113u
10,540
10,550
10,560
10,570
10,580
10,590
10,600
10,610
10,620
10,630
10,640
10,650
10,660
10,670
10,680
10,690
10,700
10,710
10,720
10,730
10,740
10,750
200
GR (units)
0
5000
130
188
169
od frm,
calc,
y-sb plty,
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty, mod frm, rthy tex, v calc, tr bent, CHK: ltgy, occ medgy, mod sft - mod frm, sb plty-sb blky, sb wxy tex - mot, v calc
MRLS
mod f
occ m
blky, s
MD: 10,598'
Inclination: 88.99°
Azimuth: 180.14°
TVD: 5,596.89'
VS: 5,190.33'
MD: 10,693'
Inclination: 88.99°
Azimuth: 180.14°
TVD: 5,598.56'
VS: 5,284.85'
5700


800
ROP (ft/hr)
232
0
7000
700000
4473u
4780u
GAS (units)
C1-C4 (PPM)
0
0
TD @ 10,851' MD
@ 17:00hrs MDT
on 1/20/2015
0,760
10,770
10,780
10,790
10,800
10,810
10,820
10,830
10,840
10,850
10,860
10,870
10,880
10,890


200
GR (units)
166
0
5000
ST: medgy - gy blk-dk brn, blky-sb plty,
rm, rthy tex, v calc, tr bent, CHK: ltgy,
edgy, mod sft - mod frm, sb plty-sb
sb wxy tex - mot, v calc
MRLST: medgy - gy blk-dk brn, blky-sb plty,
mod frm, rthy tex, v calc, tr bent
Wellsite Geological Services
Provided By Columbine
Logging, Thank You!
PTB
MD: 10,787'
Inclination: 89.43°
Azimuth: 180.32°
TVD: 5,599.86'
VS: 5,378.37'
MD: 10,805'
Inclination: 89.78°
Azimuth: 180.1°
TVD: 5,599.98'
VS: 5,396.28'
MD: 10,851'
Inclination: 89.78°
Azimuth: 180.1°
TVD: 5,600.16'
VS: 5,442.06'
5700