COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name	Wells Ranch AE19-631 Horz		
Location	NWSW 20 6N 62W 6 PM		
State	COLORADO	**County**	WELD
Country	UNITED STATES	**Rig Number**	H&P 330
API Number	05-123-39636	**Field**	WATTENBERG
Region	DJ BASIN	**Drilling Completed**	12/26/2014
Spud Date	12/14/2014		
Surface Coordinates	1610 FSL 65 FWL Lat/Long: 40.46938/-104.35587		
Bottom Hole Coordinates	Proposed Sec: 24 Twp: 6N 63W		Footages: 1370 FFSLL 235 FFELL
Ground Elevation	4,786'	**K.B. Elevation**	4,816'
Logged Interval	2,000' **To** 12,066'	**Total Depth**	12,066'
Formation	Niobrara		
Type of Drilling Fluid	WATER BASED MUD		

Operato

Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202

Geologi

Name Teresa Malesardi

Company Noble Energy Inc

Address 1625 Broadway Suite 2200
Denver, CO 80202

tmalesardi@nobleenergyinc.com

Other

Well Site Logging Company Columbin

Well Site Geologist (Days) Brad Wils

Well Site Geologist (Nights) Brandan

Zone Color C

Oil
Note
Error
Condensate
Core
Water

or

st

ne Logging Inc.

son

Pfeiffer

Coding

Gas
Pressure
Seal

Rock Types

- UNKNOWN
- ANHYDRITE
- BENTONITE
- BRECCIA
- CHALK
- CEMENT
- CHERT
- CLAY CHOKE SAND
- CLAYSTONE
- COAL
- CONGLOMERATE
- DOLOMITE
- DOLOMITIC LIMESTONE
- GRANITE
- GYPSUM
- IGNEOUS
- SIDERITE or LIMONITE
- LIMESTONE
- MARLSTONE
- METAMORPHIC
- NO SAMPLE
- SALT
- SANDSTONE
- SALT-PEPPER SAND
- SHALE
- SHALE COLORED
- SHALE GRAY
- SHALY SANDSTONE
- SHALY SILTSTONE
- SILTY SHALE
- SILTSTONE
- TILL
- TUFF
- WELDED TUFF

Accessories

Fossils

- ALGAE
- AMPHIPORA
- BELEMNITE
- BIOCLASTIC
- BRACHOIPOD
- BRYOZOA
- CEPHALOPOD
- CORAL
- CRINOID
- ECHINOID
- FISH
- FORAMINIFERA
- FOSSIL
- GASTROPOD
- INOCERAMUS
- OOLITE
- OSTRACOD
- PELECYPOD
- PELLET
- PISOLITE
- PLANT REMAINS
- PLANT SPORES
- SCAPHOPOD
- STROMATOPOROID

Minerals

- ANHYDRITIC
- ARGILLACEOUS
- ARGILLITE GRAIN
- BENTONITE
- BITUMENOUS SUBSTANCE
- BRECCIA FRAGMENTS
- CALCAREOUS
- CARBONACEOUS FLAKES
- CHTDK
- CHTLT
- COAL - THIN BEDS
- DOLOMITIC
- FELDSPAR
- FERRUGINOUS PELLET
- FERRUGINOUS
- GLAUCONITE
- GYPSIFEROUS
- HEAVY MINERAL
- KAOLIN
- MARCASITE
- MARLSTONE
- MICACEOUS
- MINERAL CRYSTALS
- NODULES
- PHOSPHATE PELLETS
- PYRITE
- SALT CAST
- SANDY
- SIDERITE
- SILICEOUS
- SILTY
- TUFFACEOUS

Stringer

- ANHYDRITE STRINGER
- BENTONITE STRINGER
- COAL STRINGER
- DOLOMITE STRINGER
- GYPSUM STRINGER
- LIMESTONE STRINGER
- MARLSTONE (CALC) STRG
- MARLSTONE (DOL) STRG
- SANDSTONE STRINGER
- SHALE STRINGER
- SILTSTONE STRINGER

Oil Show

- D DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

Porosity

- E EARTHY
- FENESTRAL
- F FRACTURE
- INTERCRYSTALLINE
- INTEROOLITIC
- MOLDIC
- O ORGANIC

Other Symbols

PINPOINT

VUGGY

Engineering

BIT

CONNECTION (UP)

CONNECTION (DOWN)

CONNECTION GAS

CONNECTION GAS (LEFT)

TRIP GAS

TRIP GAS (LEFT)

DOWN TIME GAS

DOWN TIME GAS (LEFT)

CORE - LOST

CORE - RECOVERED

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

COLUMBINE LOGGING RIGGED UP ON 12/18/14 MANNED 2-PERSON

MUDLOG CONTUINED FROM "Wells Ranch AE19-631.mplot"

ROP Data Imported from Pason EDR

MUD WT 10.5 VIS 46

ROP

ROP

GAMMA

500
300
ROP (ft/hr)
GAMMA (api)
0
20
108api
142
102api
72

Total Gas & Chromatograph

GAS

C1

C2

C3

C4

GAS DATA FROM BLOODHOUND CHROMATOGRAPH UNIT #273 via IBALL GAS CHART

6000
600000
GAS (units)
C1-C4 (PPM)
0
2470u
2011u
1446u
1193.01u
C1: 73%
C2: 11.3%
C3: 10.3%
C4: 5.3%

Depth Labels

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 6,140

% Lith

Well Bore

TVD

Survey and Gamma Data Provided PathFinder Energy Services

5900
TVD (ft)

MD: 6,002'
TVD: 5,983.69'
Inclination: 3.52°
Azimuth: 258.22°
VS: 155.14'

MD: 6,097'
TVD: 6,078.44'
Inclination: 4.75°
Azimuth: 266.89°
VS: 161.96'

SLTY SH: med - dk gy occ gy brn, sb blky - plty, sl sft- frm, slt tex, rthy, aren, non calc, no bent

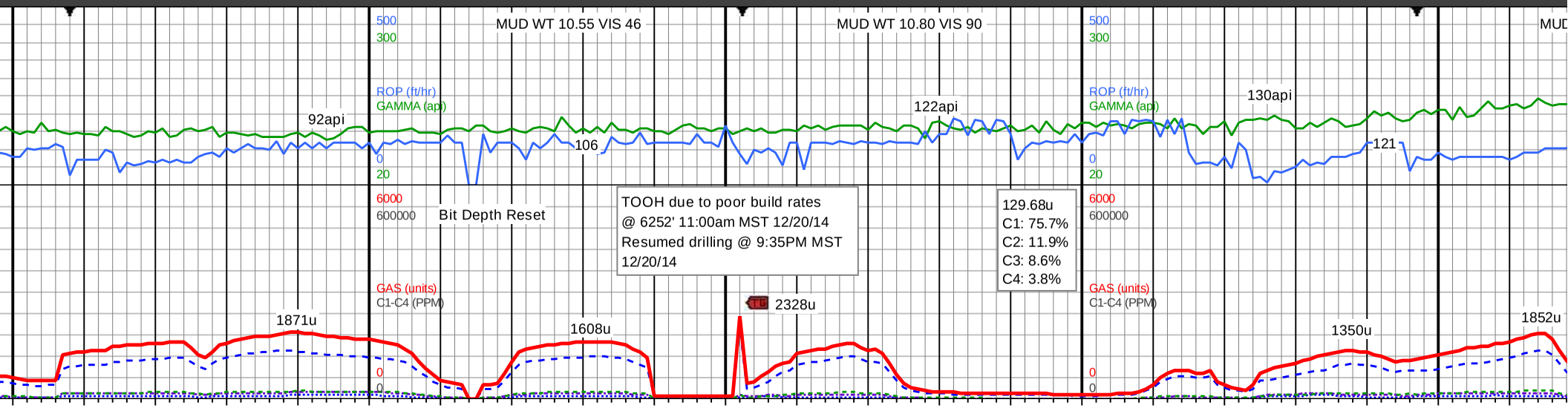
7000

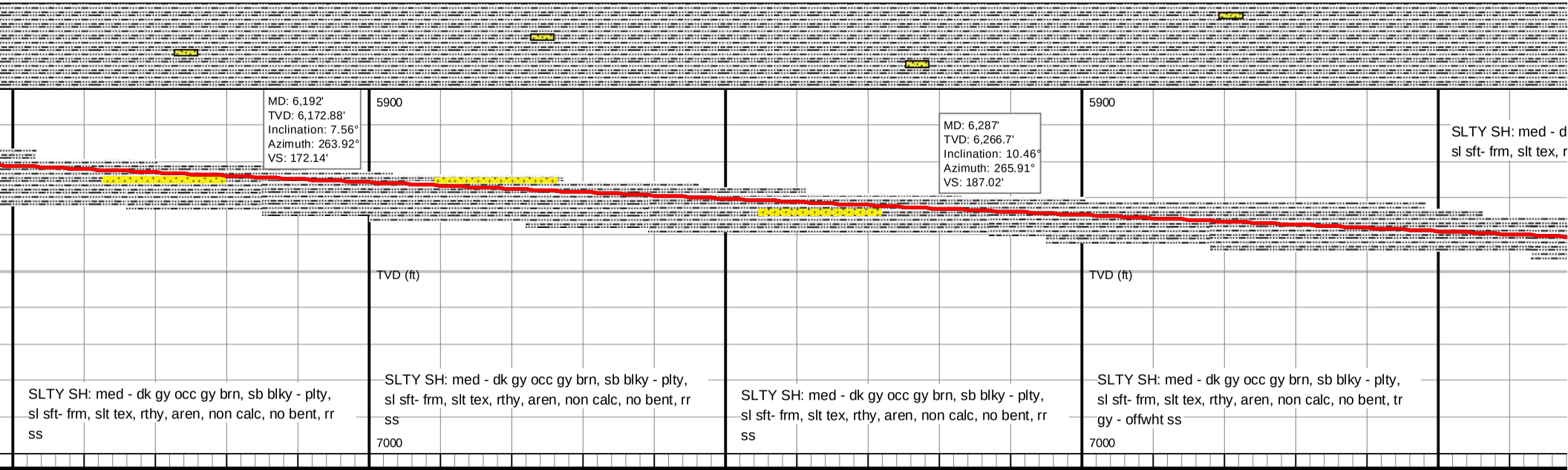
Oil Show

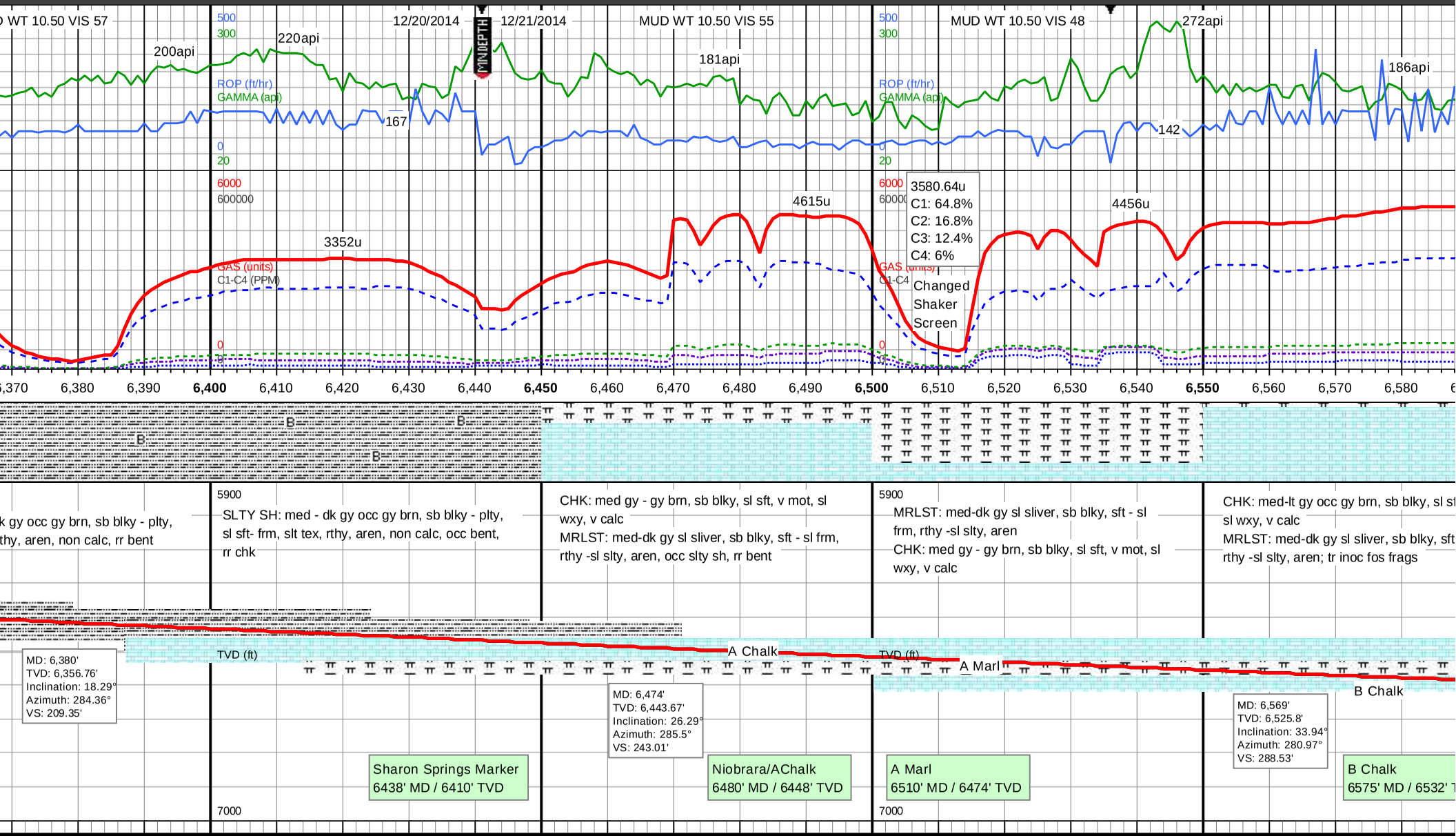
E
G
M
F
T
ST

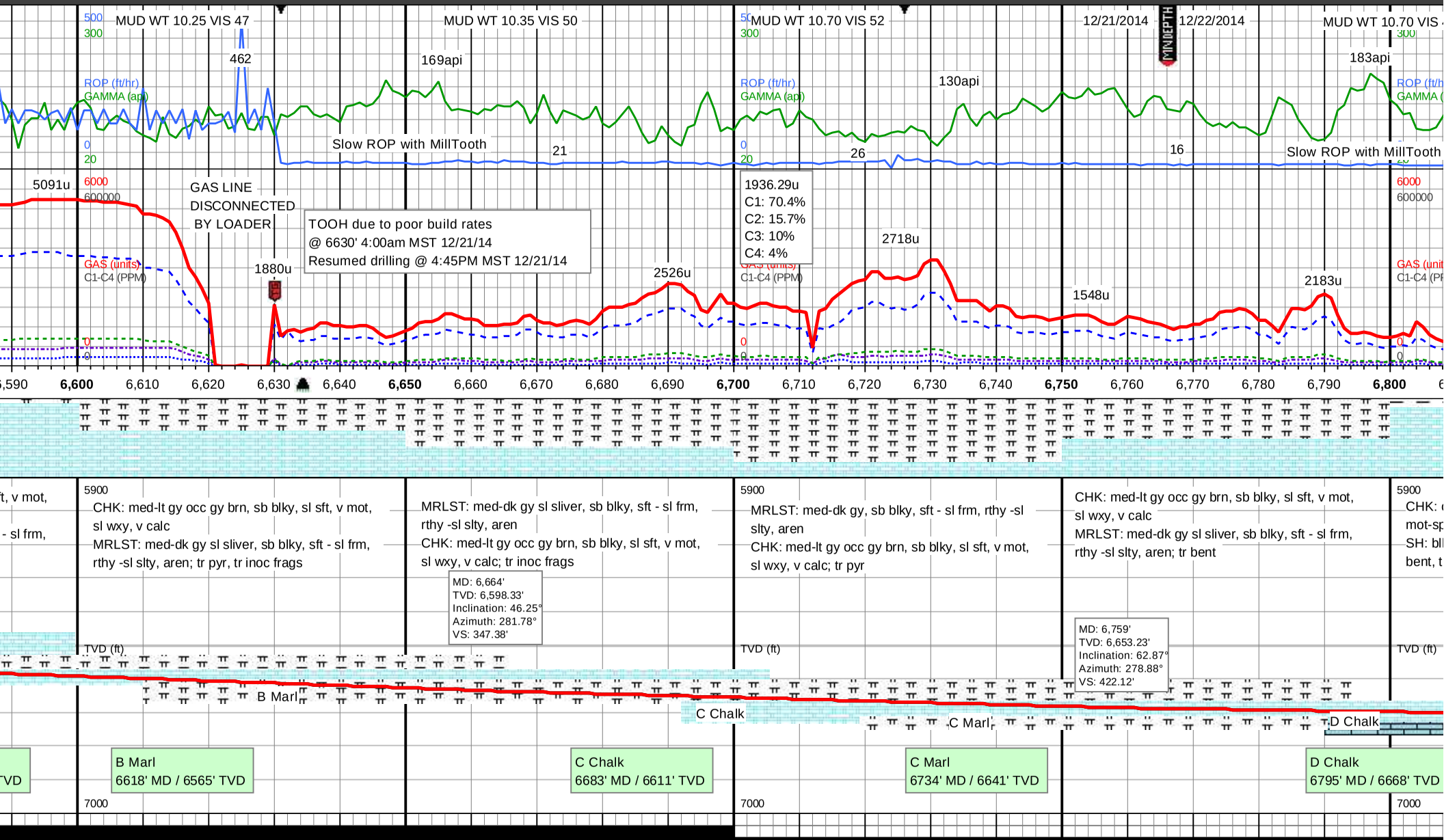
Images

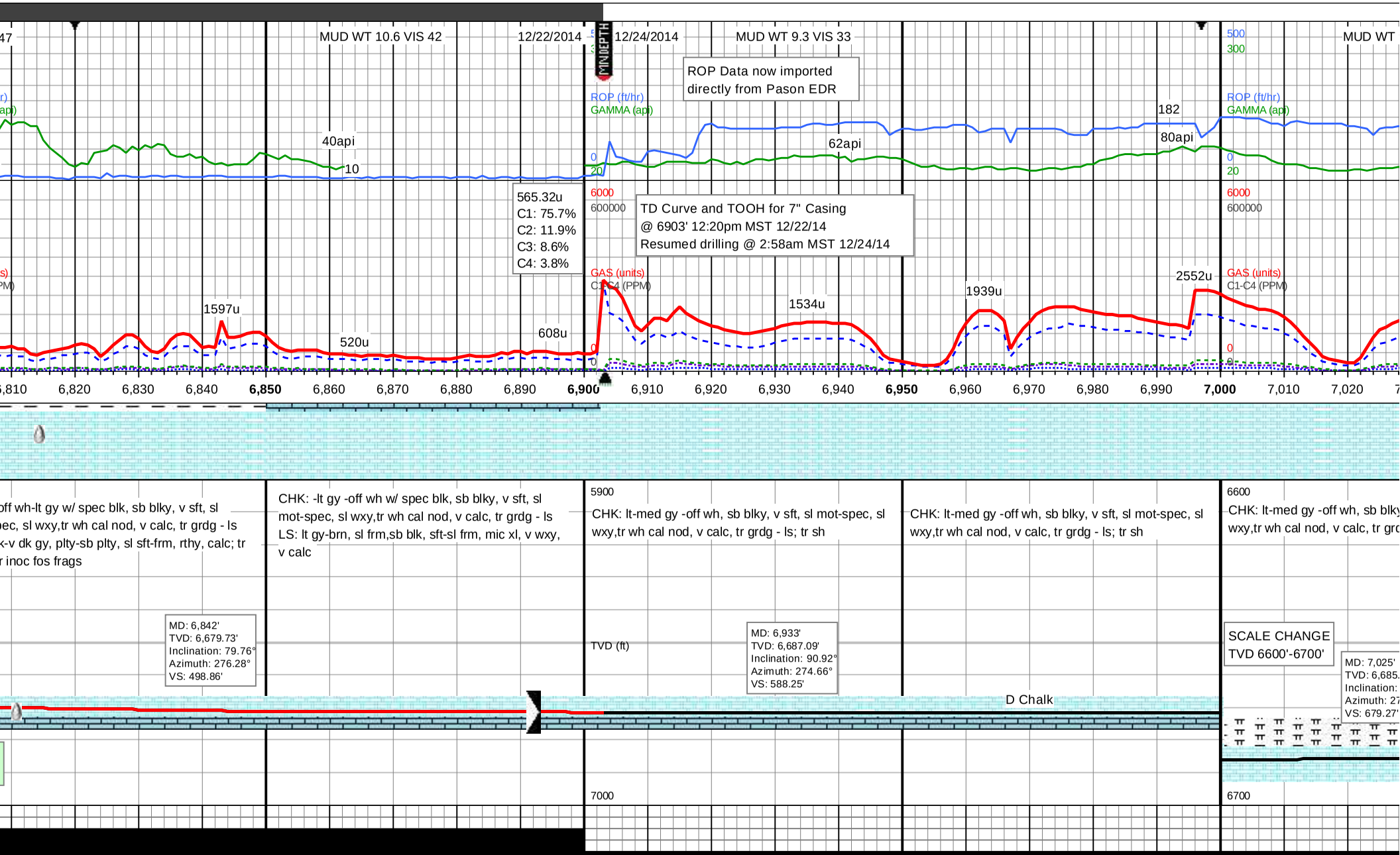



MUD WT 10.55 VIS 46
MUD WT 10.80 VIS 90
MUD
500
300
ROP (ft/hr)
GAMMA (api)
92api
106
122api
130api
121
0
20
6000
600000
Bit Depth Reset
TOOH due to poor build rates
@ 6252' 11:00am MST 12/20/14
Resumed drilling @ 9:35PM MST
12/20/14
129.68u
C1: 75.7%
C2: 11.9%
C3: 8.6%
C4: 3.8%
GAS (units)
C1-C4 (PPM)
1871u
1608u
2328u
1350u
1852u
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
6,360


MD: 6,192'
TVD: 6,172.88'
Inclination: 7.56°
Azimuth: 263.92°
VS: 172.14'
MD: 6,287'
TVD: 6,266.7'
Inclination: 10.46°
Azimuth: 265.91°
VS: 187.02'
5900
TVD (ft)
7000
SLTY SH: med - dk gy occ gy brn, sb blky - plty, sl sft- frm, slt tex, rthy, aren, non calc, no bent, rr ss
SLTY SH: med - dk gy occ gy brn, sb blky - plty, sl sft- frm, slt tex, rthy, aren, non calc, no bent, rr ss
SLTY SH: med - dk gy occ gy brn, sb blky - plty, sl sft- frm, slt tex, rthy, aren, non calc, no bent, tr gy - offwht ss
SLTY SH: med - d
sl sft- frm, slt tex, r


D WT 10.50 VIS 57
MUD WT 10.50 VIS 55
MUD WT 10.50 VIS 48
12/20/2014
12/21/2014
MIN DEPTH
200api
220api
181api
272api
186api
167
142
ROP (ft/hr)
GAMMA (api)
500
300
0
20
6000
600000
3352u
4615u
4456u
3580.64u
C1: 64.8%
C2: 16.8%
C3: 12.4%
C4: 6%
GAS (units)
C1-C4 (PPM)
Changed Shaker Screen
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
6,580
B
5900
SLTY SH: med - dk gy occ gy brn, sb blky - plty, sl sft- frm, slt tex, rthy, aren, non calc, occ bent, rr chk
CHK: med gy - gy brn, sb blky, sl sft, v mot, sl wxy, v calc
MRLST: med-dk gy sl sliver, sb blky, sft - sl frm, rthy -sl slty, aren, occ slty sh, rr bent
MRLST: med-dk gy sl sliver, sb blky, sft - sl frm, rthy -sl slty, aren
CHK: med gy - gy brn, sb blky, sl sft, v mot, sl wxy, v calc
CHK: med-lt gy occ gy brn, sb blky, sl sft, sl wxy, v calc
MRLST: med-dk gy sl sliver, sb blky, sft - sl rthy -sl slty, aren; tr inoc fos frags
k gy occ gy brn, sb blky - plty, thy, aren, non calc, rr bent
TVD (ft)
A Chalk
A Marl
B Chalk
MD: 6,380'
TVD: 6,356.76'
Inclination: 18.29°
Azimuth: 284.36°
VS: 209.35'
MD: 6,474'
TVD: 6,443.67'
Inclination: 26.29°
Azimuth: 285.5°
VS: 243.01'
MD: 6,569'
TVD: 6,525.8'
Inclination: 33.94°
Azimuth: 280.97°
VS: 288.53'
Sharon Springs Marker
6438' MD / 6410' TVD
Niobrara/AChalk
6480' MD / 6448' TVD
A Marl
6510' MD / 6474' TVD
B Chalk
6575' MD / 6532' T
7000


MUD WT 10.25 VIS 47
MUD WT 10.35 VIS 50
MUD WT 10.70 VIS 52
MUD WT 10.70 VIS
12/21/2014
12/22/2014
MIN DEPTH
462
169api
130api
183api
ROP (ft/hr)
GAMMA (api)
Slow ROP with MillTooth
21
26
16
Slow ROP with MillTooth
5091u
GAS LINE
DISCONNECTED
BY LOADER
TOOH due to poor build rates
@ 6630' 4:00am MST 12/21/14
Resumed drilling @ 4:45PM MST 12/21/14
1880u
2526u
1936.29u
C1: 70.4%
C2: 15.7%
C3: 10%
C4: 4%
2718u
1548u
2183u
GAS (units)
C1-C4 (PPM)
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
6,800
CHK: med-lt gy occ gy brn, sb blky, sl sft, v mot, sl wxy, v calc
MRLST: med-dk gy sl sliver, sb blky, sft - sl frm, rthy -sl slty, aren; tr pyr, tr inoc frags
MRLST: med-dk gy sl sliver, sb blky, sft - sl frm, rthy -sl slty, aren
CHK: med-lt gy occ gy brn, sb blky, sl sft, v mot, sl wxy, v calc; tr inoc frags
MD: 6,664'
TVD: 6,598.33'
Inclination: 46.25°
Azimuth: 281.78°
VS: 347.38'
MRLST: med-dk gy, sb blky, sft - sl frm, rthy -sl slty, aren
CHK: med-lt gy occ gy brn, sb blky, sl sft, v mot, sl wxy, v calc; tr pyr
CHK: med-lt gy occ gy brn, sb blky, sl sft, v mot, sl wxy, v calc
MRLST: med-dk gy sl sliver, sb blky, sft - sl frm, rthy -sl slty, aren; tr bent
MD: 6,759'
TVD: 6,653.23'
Inclination: 62.87°
Azimuth: 278.88°
VS: 422.12'
TVD (ft)
5900
7000
B Marl
C Chalk
C Marl
D Chalk
B Marl
6618' MD / 6565' TVD
C Chalk
6683' MD / 6611' TVD
C Marl
6734' MD / 6641' TVD
D Chalk
6795' MD / 6668' TVD



off wh-lt gy w/ spec blk, sb blky, v sft, sl
pec, sl wxy,tr wh cal nod, v calc, tr grdg - ls
k-v dk gy, plty-sb plty, sl sft-frm, rthy, calc; tr
r inoc fos frags

CHK: -lt gy -off wh w/ spec blk, sb blky, v sft, sl mot-spec, sl wxy,tr wh cal nod, v calc, tr grdg - ls
LS: lt gy-brn, sl frm,sb blk, sft-sl frm, mic xl, v wxy, v calc

CHK: lt-med gy -off wh, sb blky, v sft, sl mot-spec, sl wxy,tr wh cal nod, v calc, tr grdg - ls; tr sh

CHK: lt-med gy -off wh, sb blky, v sft, sl mot-spec, sl wxy,tr wh cal nod, v calc, tr grdg - ls; tr sh

CHK: lt-med gy -off wh, sb blky
wxy,tr wh cal nod, v calc, tr grd

MD: 6,842'
TVD: 6,679.73'
Inclination: 79.76°
Azimuth: 276.28°
VS: 498.86'

MD: 6,933'
TVD: 6,687.09'
Inclination: 90.92°
Azimuth: 274.66°
VS: 588.25'

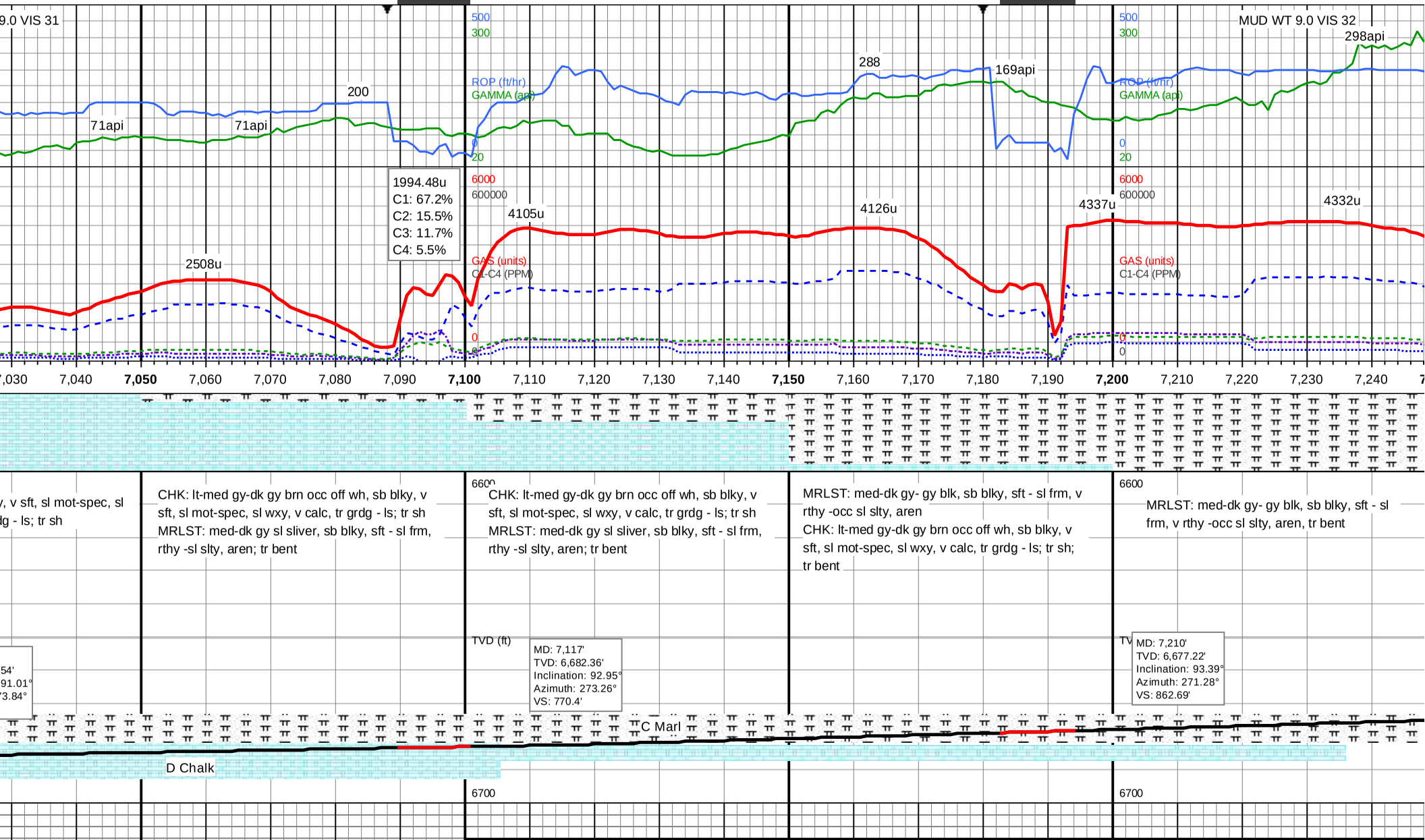
SCALE CHANGE
TVD 6600'-6700'

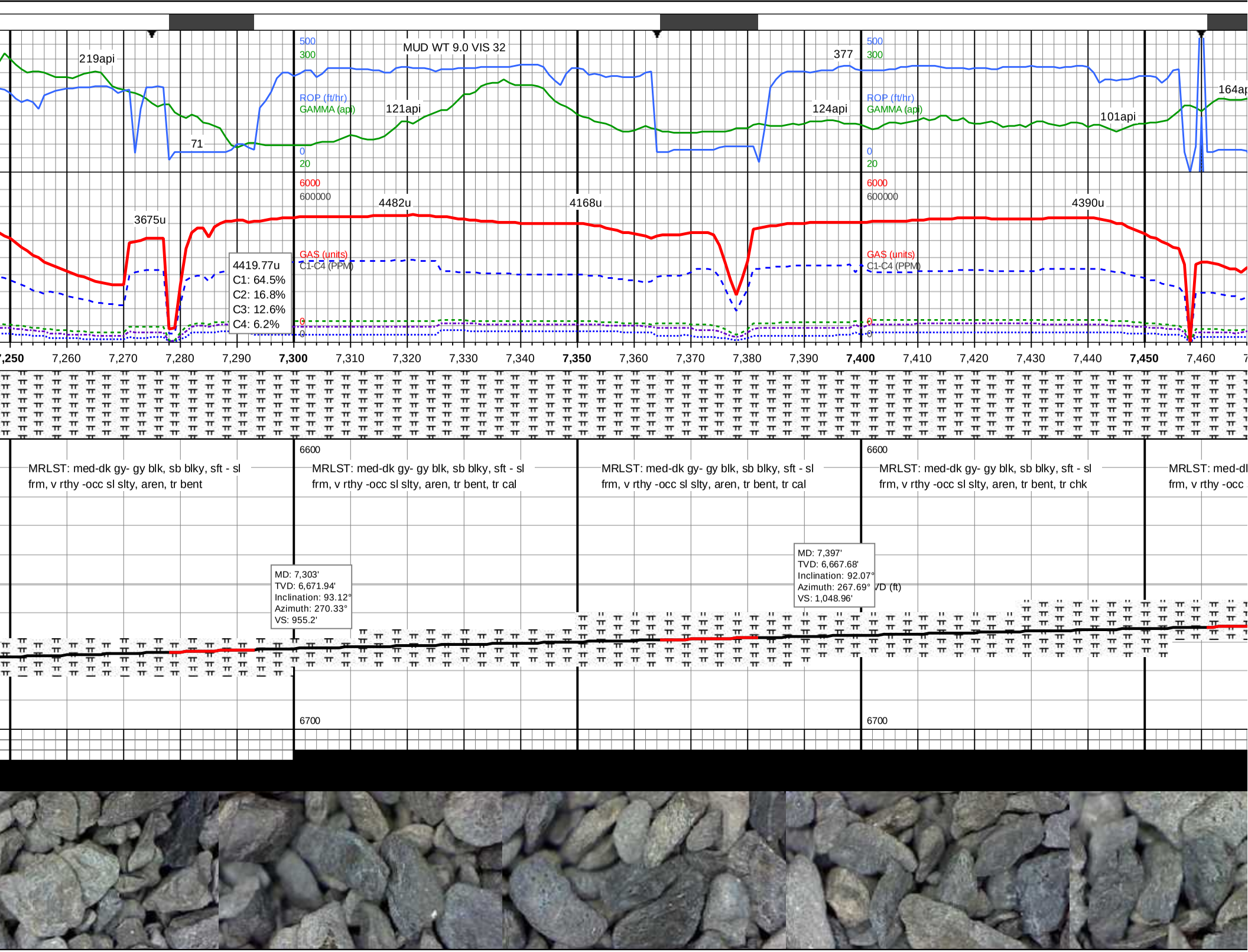
MD: 7,025'
TVD: 6,685.
Inclination:
Azimuth: 27
VS: 679.27'

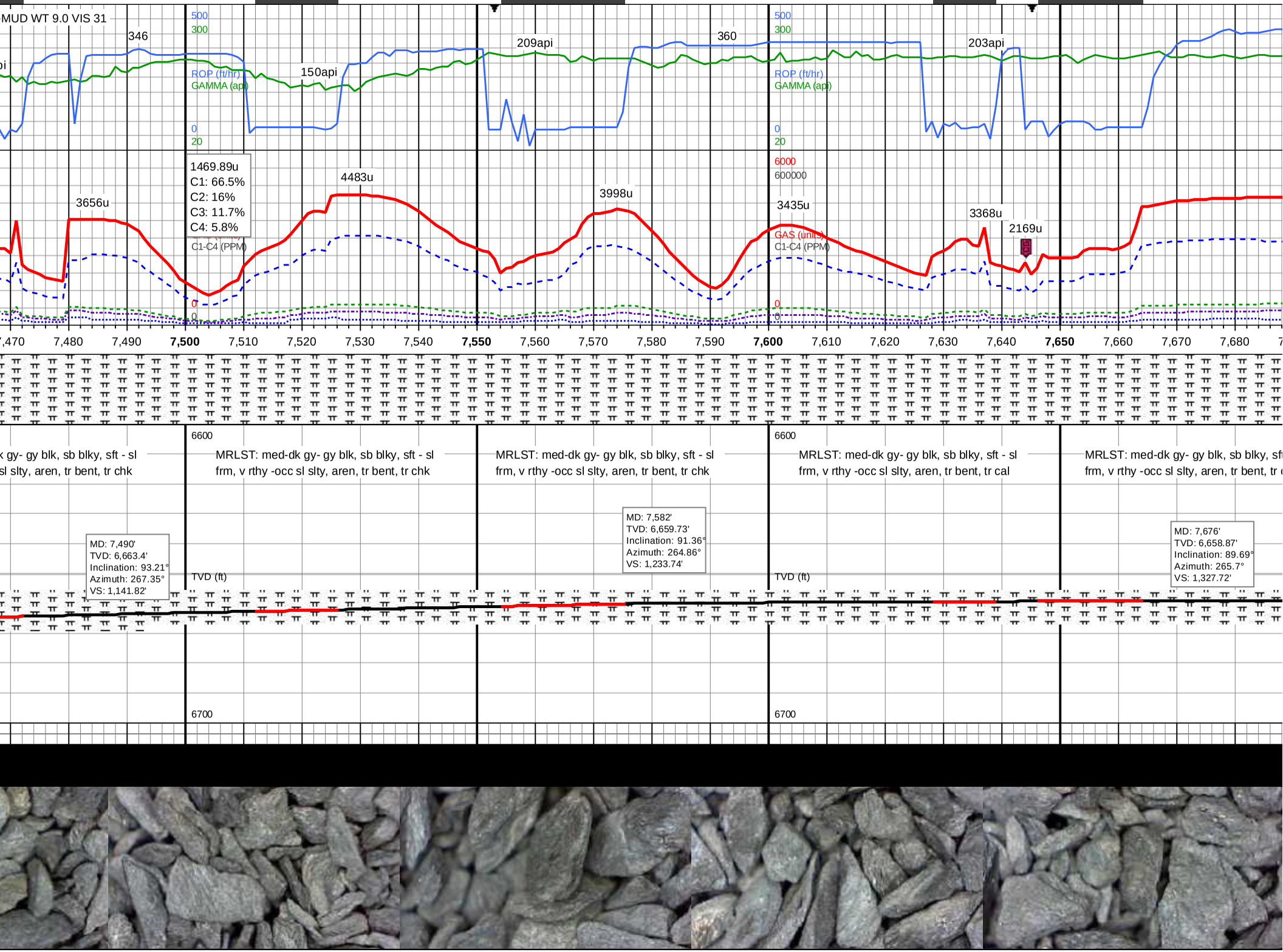
TVD (ft)

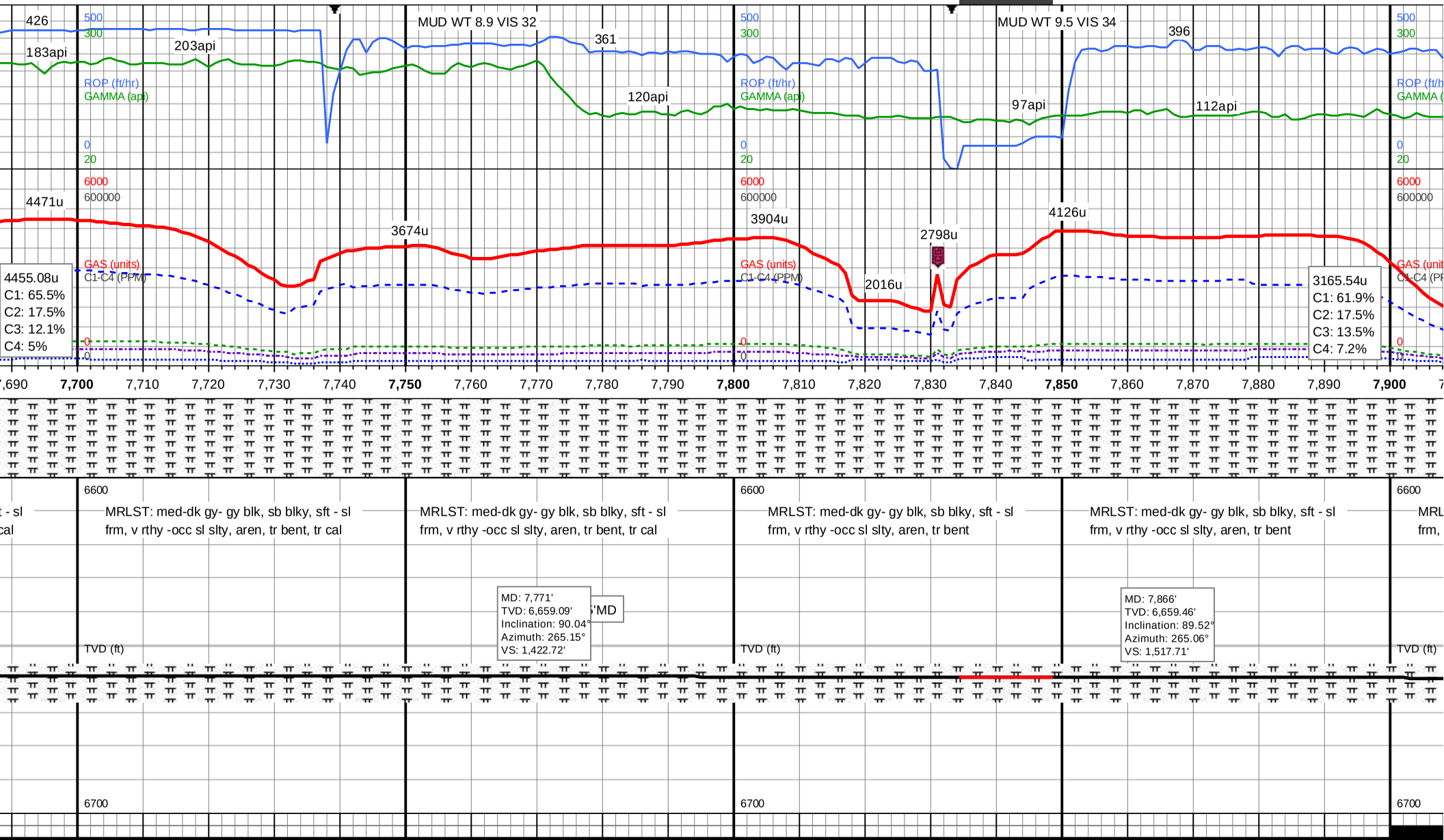
5900
7000
6600
6700

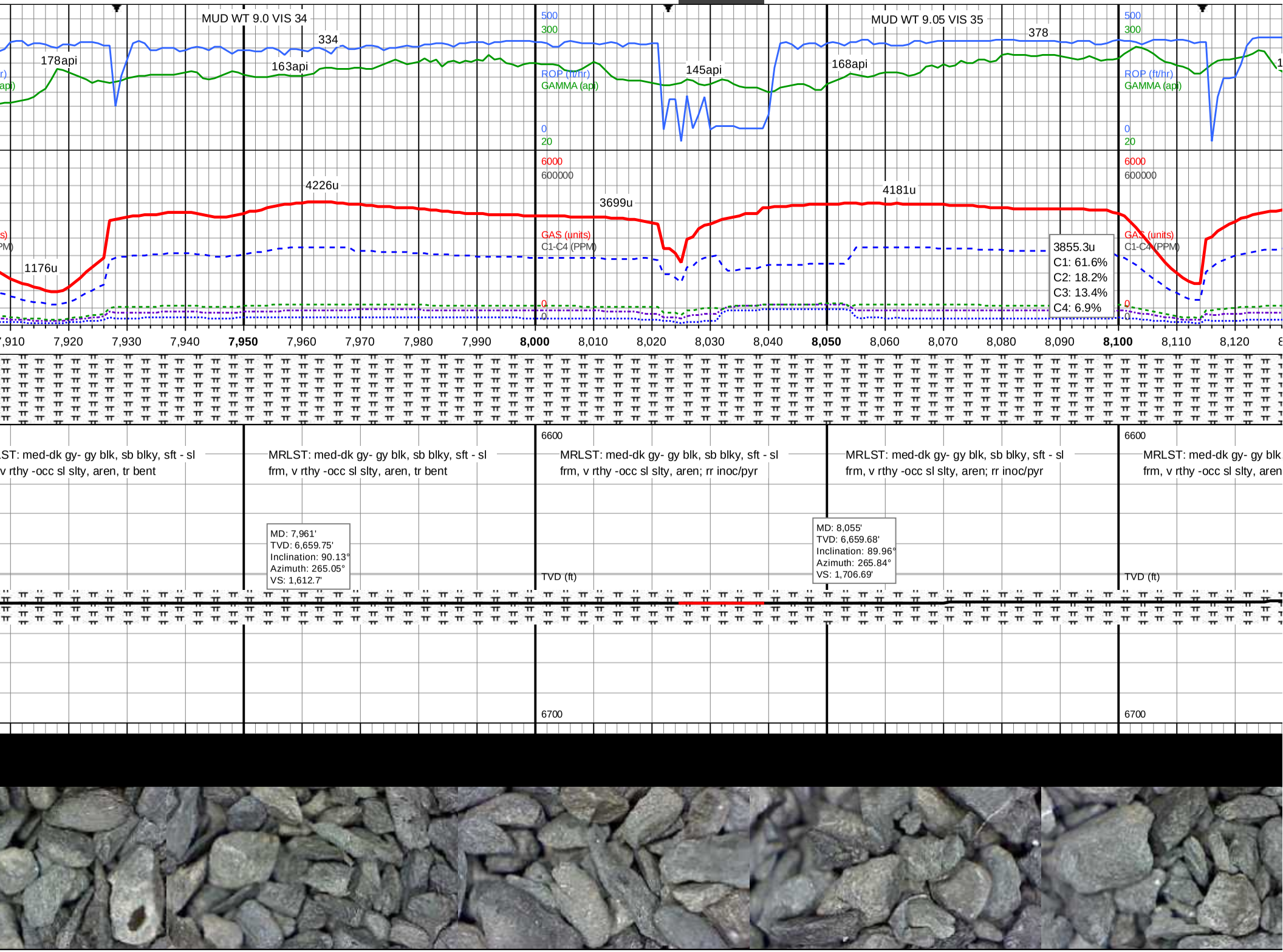
D Chalk

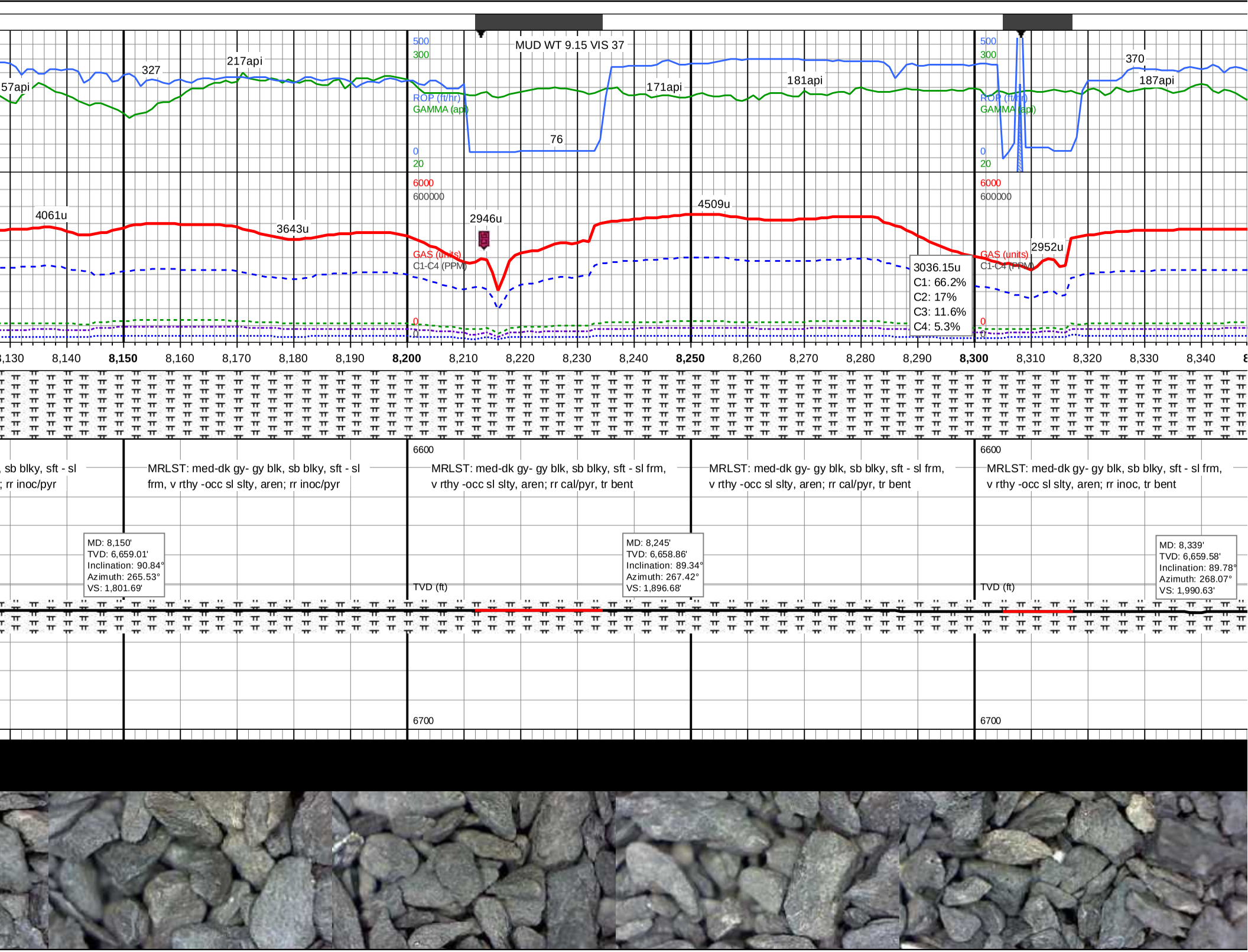

9.0 VIS 31
MUD WT 9.0 VIS 32
ROP (ft/hr)
GAMMA (api)
GAS (units)
C1-C4 (PPM)
71api
71api
200
288
169api
298api
1994.48u
C1: 67.2%
C2: 15.5%
C3: 11.7%
C4: 5.5%
2508u
4105u
4126u
4337u
4332u
7,030
7,040
7,050
7,060
7,070
7,080
7,090
7,100
7,110
7,120
7,130
7,140
7,150
7,160
7,170
7,180
7,190
7,200
7,210
7,220
7,230
7,240
CHK: lt-med gy-dk gy brn occ off wh, sb blky, v sft, sl mot-spec, sl wxy, v calc, tr grdg - ls; tr sh
MRLST: med-dk gy sl sliver, sb blky, sft - sl frm, rthy -sl slty, aren; tr bent
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren, tr bent
TVD (ft)
MD: 7,117'
TVD: 6,682.36'
Inclination: 92.95°
Azimuth: 273.26°
VS: 770.4'
MD: 7,210'
TVD: 6,677.22'
Inclination: 93.39°
Azimuth: 271.28°
VS: 862.69'
C Marl
D Chalk
6700
6700

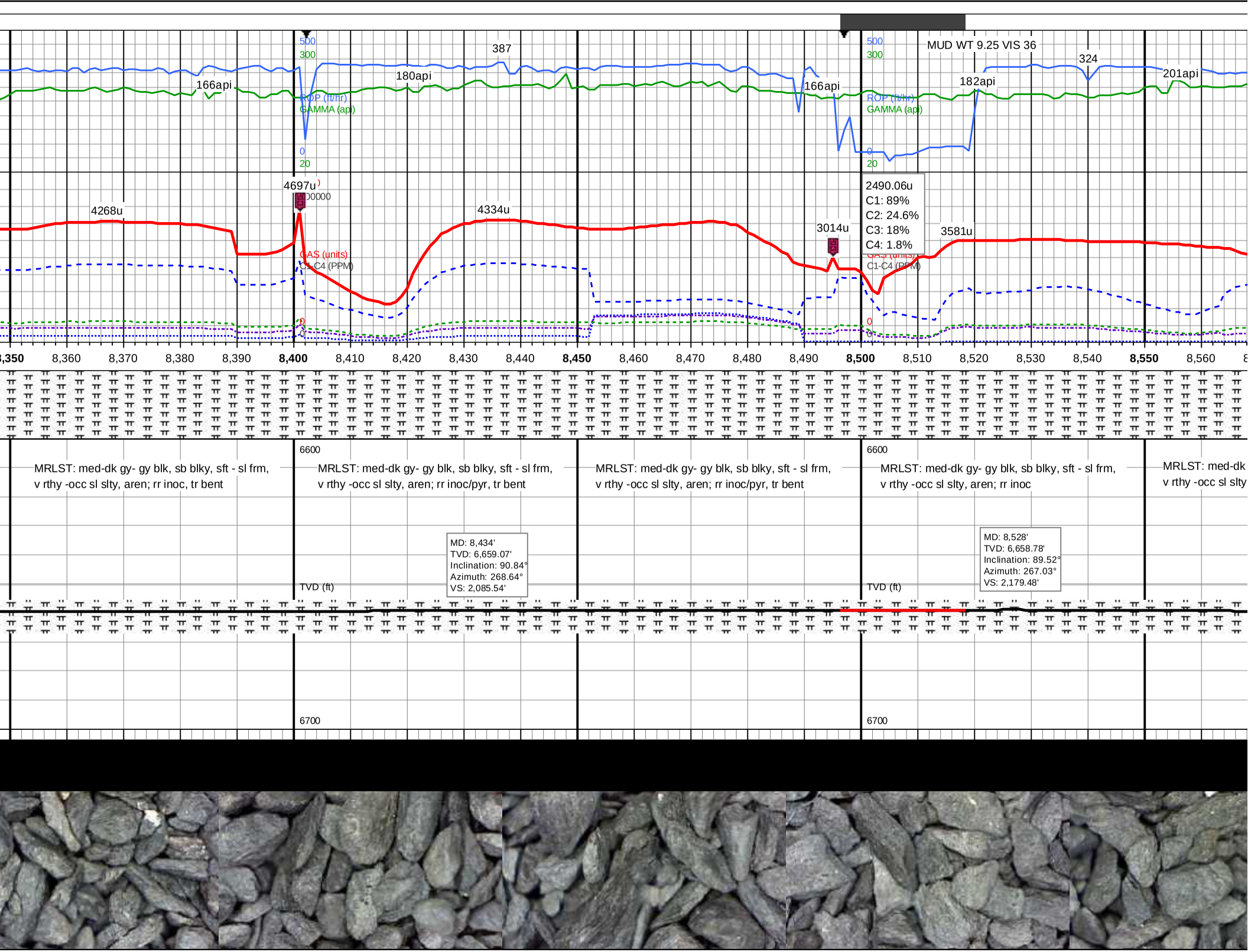

219api
71
MUD WT 9.0 VIS 32
500
300
ROP (ft/hr)
GAMMA (api)
121api
0
20
6000
600000
3675u
4482u
4168u
4419.77u
C1: 64.5%
C2: 16.8%
C3: 12.6%
C4: 6.2%
GAS (units)
C1-C4 (PPM)
377
124api
101api
164ap
4390u
7,250
7,260
7,270
7,280
7,290
7,300
7,310
7,320
7,330
7,340
7,350
7,360
7,370
7,380
7,390
7,400
7,410
7,420
7,430
7,440
7,450
7,460
6600
6700
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren, tr bent
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren, tr bent, tr cal
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren, tr bent, tr cal
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren, tr bent, tr chk
MRLST: med-dl frm, v rthy -occ
MD: 7,303'
TVD: 6,671.94'
Inclination: 93.12°
Azimuth: 270.33°
VS: 955.2'
MD: 7,397'
TVD: 6,667.68'
Inclination: 92.07°
Azimuth: 267.69°
VS: 1,048.96'
VD (ft)

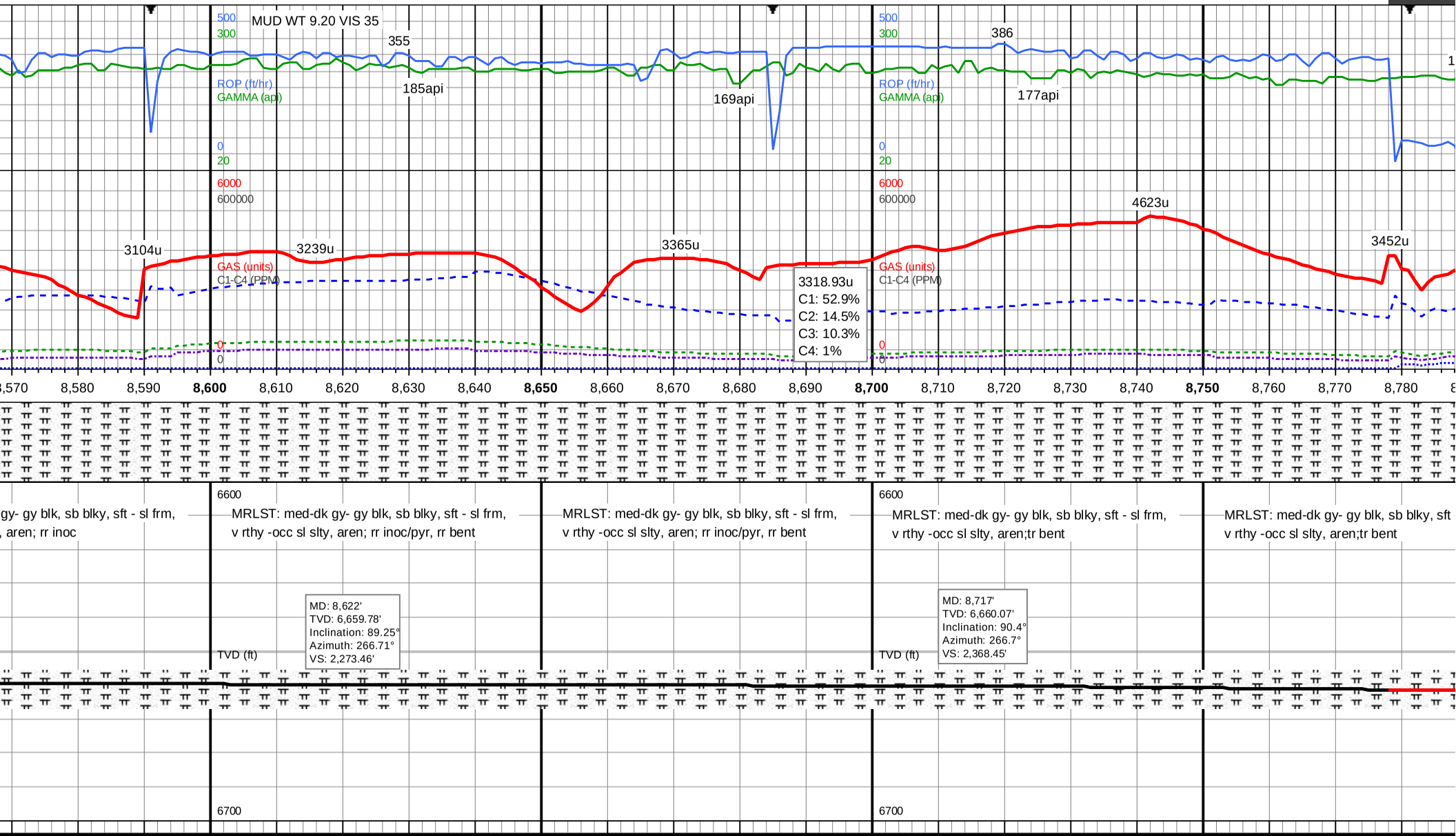

MUD WT 9.0 VIS 31
346
209api
150api
360
203api
500
300
ROP (ft/hr)
GAMMA (api)
0
20
6000
600000
1469.89u
C1: 66.5%
C2: 16%
C3: 11.7%
C4: 5.8%
C1-C4 (PPM)
3656u
4483u
3998u
3435u
3368u
2169u
GAS (units)
7,470
7,480
7,490
7,500
7,510
7,520
7,530
7,540
7,550
7,560
7,570
7,580
7,590
7,600
7,610
7,620
7,630
7,640
7,650
7,660
7,670
7,680
6600
6700
TVD (ft)
MRLST: med-dk gy- gy blk, sb blky, sft - sl
frm, v rthy -occ sl slty, aren, tr bent, tr chk
MRLST: med-dk gy- gy blk, sb blky, sft - sl
frm, v rthy -occ sl slty, aren, tr bent, tr cal
MD: 7,490'
TVD: 6,663.4'
Inclination: 93.21°
Azimuth: 267.35°
VS: 1,141.82'
MD: 7,582'
TVD: 6,659.73'
Inclination: 91.36°
Azimuth: 264.86°
VS: 1,233.74'
MD: 7,676'
TVD: 6,658.87'
Inclination: 89.69°
Azimuth: 265.7°
VS: 1,327.72'

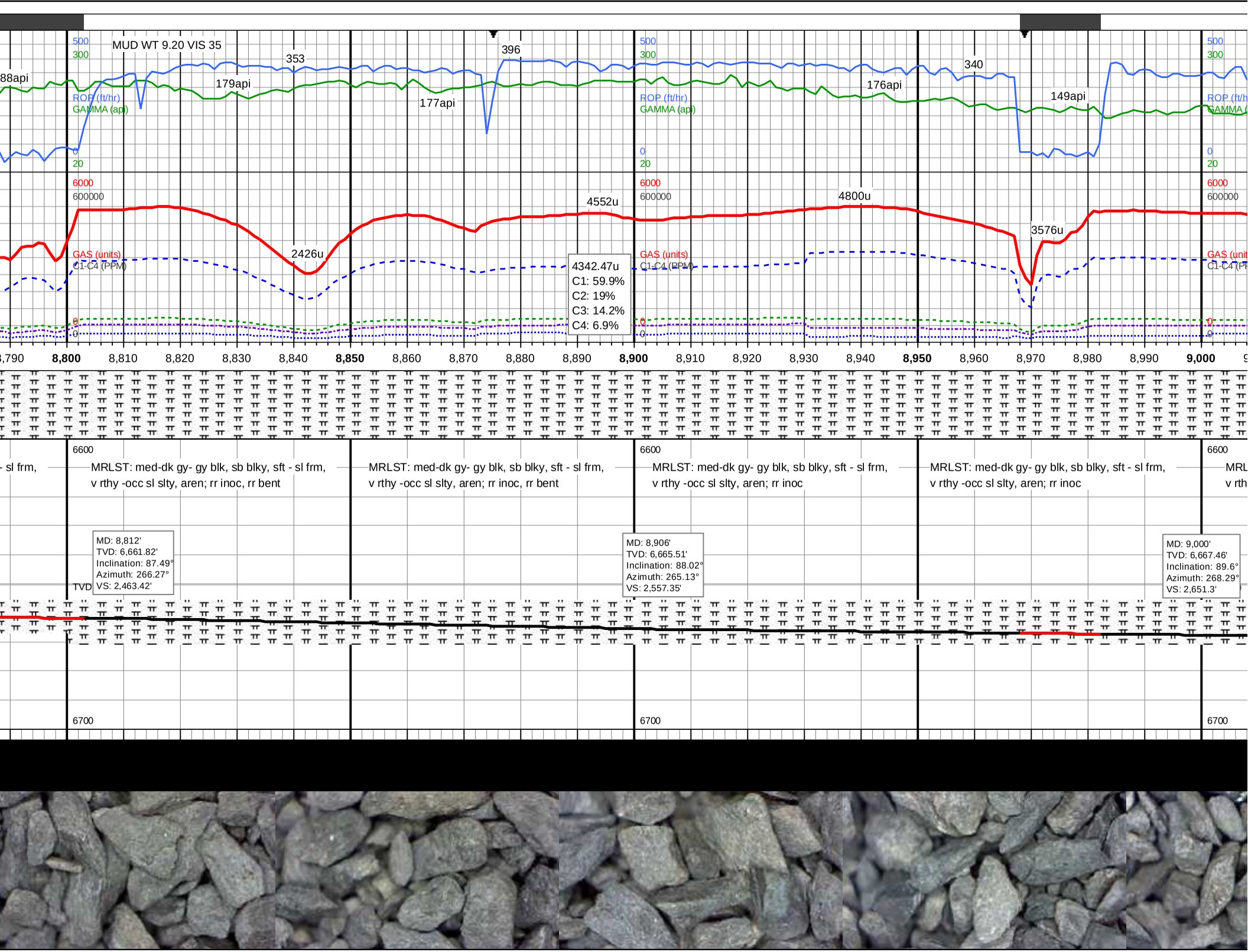

426
183api
203api
MUD WT 8.9 VIS 32
361
120api
MUD WT 9.5 VIS 34
396
97api
112api
ROP (ft/hr)
GAMMA (api)
500
300
0
20
6000
600000
4471u
3674u
3904u
2798u
4126u
2016u
GAS (units)
C1-C4 (PPM)
4455.08u
C1: 65.5%
C2: 17.5%
C3: 12.1%
C4: 5%
3165.54u
C1: 61.9%
C2: 17.5%
C3: 13.5%
C4: 7.2%
7,690
7,700
7,710
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
7,900
6600
MRLST: med-dk gy- gy blk, sb blky, sft - sl
frm, v rthy -occ sl slty, aren, tr bent, tr cal
MD: 7,771'
TVD: 6,659.09'
Inclination: 90.04°
Azimuth: 265.15°
VS: 1,422.72'
MD: 7,866'
TVD: 6,659.46'
Inclination: 89.52°
Azimuth: 265.06°
VS: 1,517.71'
TVD (ft)
6700

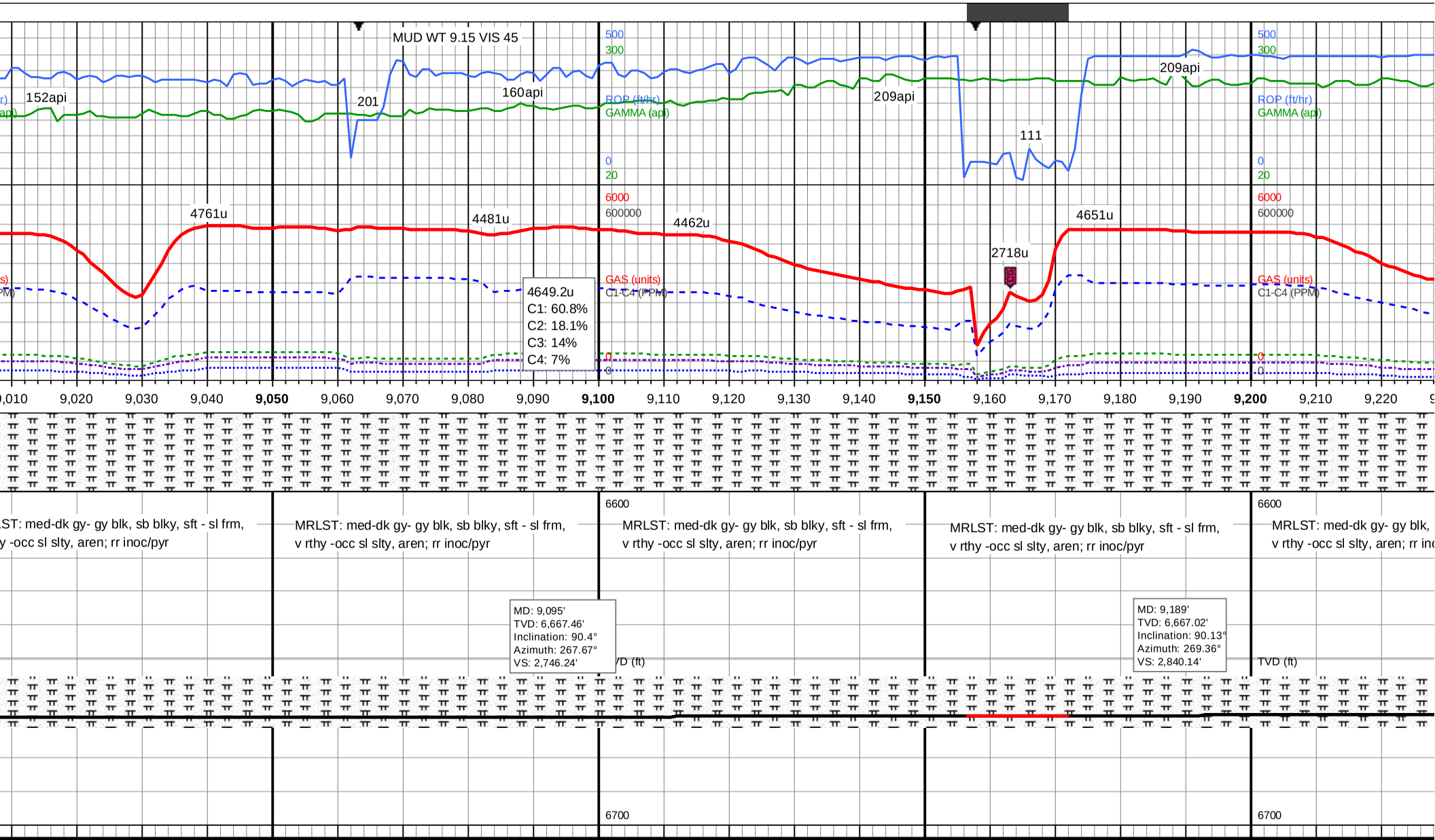

MUD WT 9.0 VIS 34
MUD WT 9.05 VIS 35
178api
334
163api
145api
168api
378
ROP (ft/hr)
GAMMA (api)
4226u
3699u
4181u
1176u
GAS (units)
C1-C4 (PPM)
3855.3u
C1: 61.6%
C2: 18.2%
C3: 13.4%
C4: 6.9%
7,910
7,920
7,930
7,940
7,950
7,960
7,970
7,980
7,990
8,000
8,010
8,020
8,030
8,040
8,050
8,060
8,070
8,080
8,090
8,100
8,110
8,120
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren, tr bent
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc/pyr
MD: 7,961'
TVD: 6,659.75'
Inclination: 90.13°
Azimuth: 265.05°
VS: 1,612.7'
MD: 8,055'
TVD: 6,659.68'
Inclination: 89.96°
Azimuth: 265.84°
VS: 1,706.69'
TVD (ft)
6600
6700

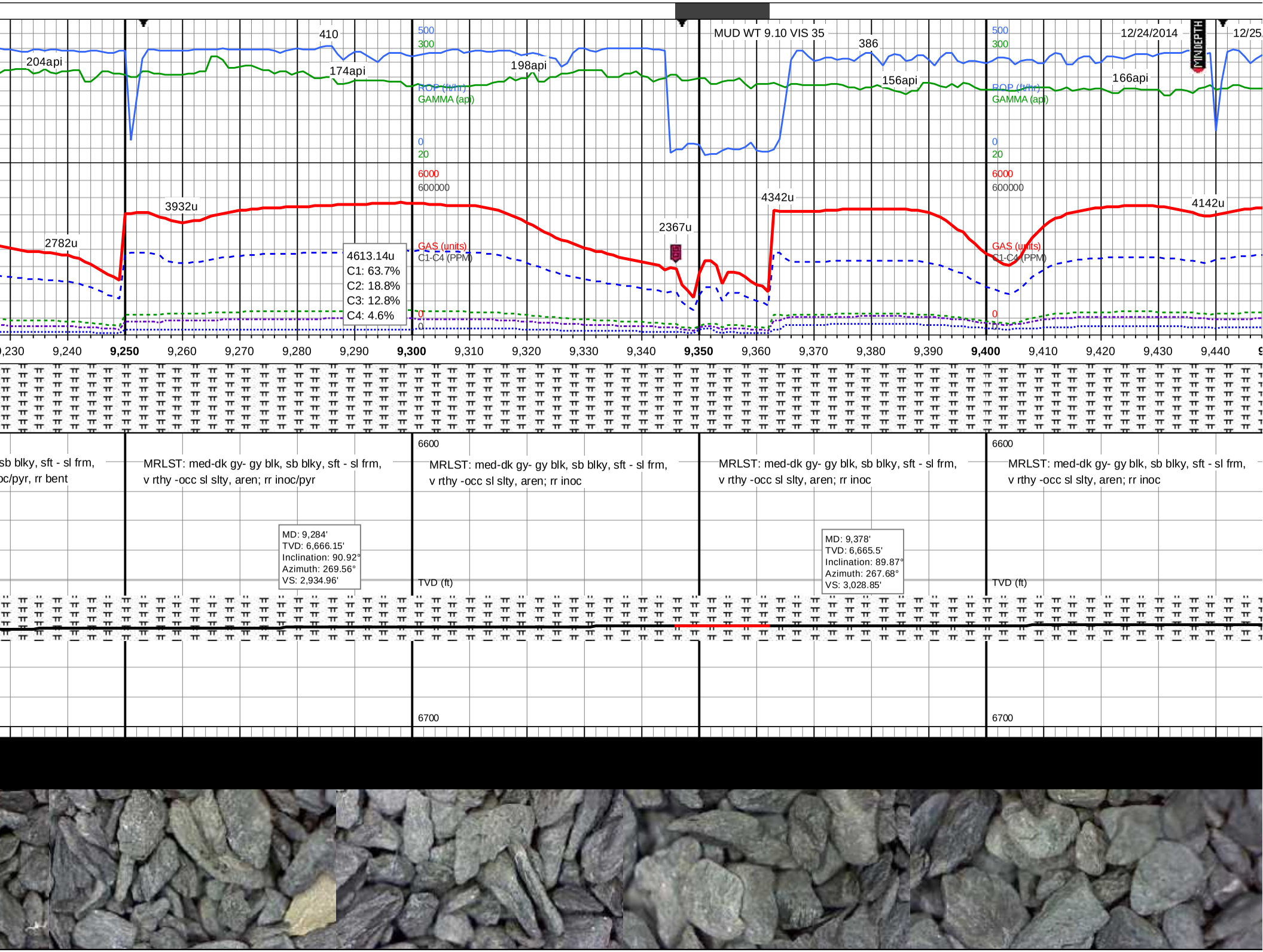

MUD WT 9.15 VIS 37
57api
327
217api
171api
181api
370
187api
ROP (ft/hr)
GAMMA (api)
500
300
0
20
6000
600000
76
4061u
3643u
2946u
4509u
2952u
GAS (units)
C1-C4 (PPM)
3036.15u
C1: 66.2%
C2: 17%
C3: 11.6%
C4: 5.3%
8,130
8,140
8,150
8,160
8,170
8,180
8,190
8,200
8,210
8,220
8,230
8,240
8,250
8,260
8,270
8,280
8,290
8,300
8,310
8,320
8,330
8,340
sb blky, sft - sl
rr inoc/pyr
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc/pyr
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr cal/pyr, tr bent
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr cal/pyr, tr bent
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc, tr bent
MD: 8,150'
TVD: 6,659.01'
Inclination: 90.84°
Azimuth: 265.53°
VS: 1,801.69'
MD: 8,245'
TVD: 6,658.86'
Inclination: 89.34°
Azimuth: 267.42°
VS: 1,896.68'
MD: 8,339'
TVD: 6,659.58'
Inclination: 89.78°
Azimuth: 268.07°
VS: 1,990.63'
TVD (ft)
6600
6700

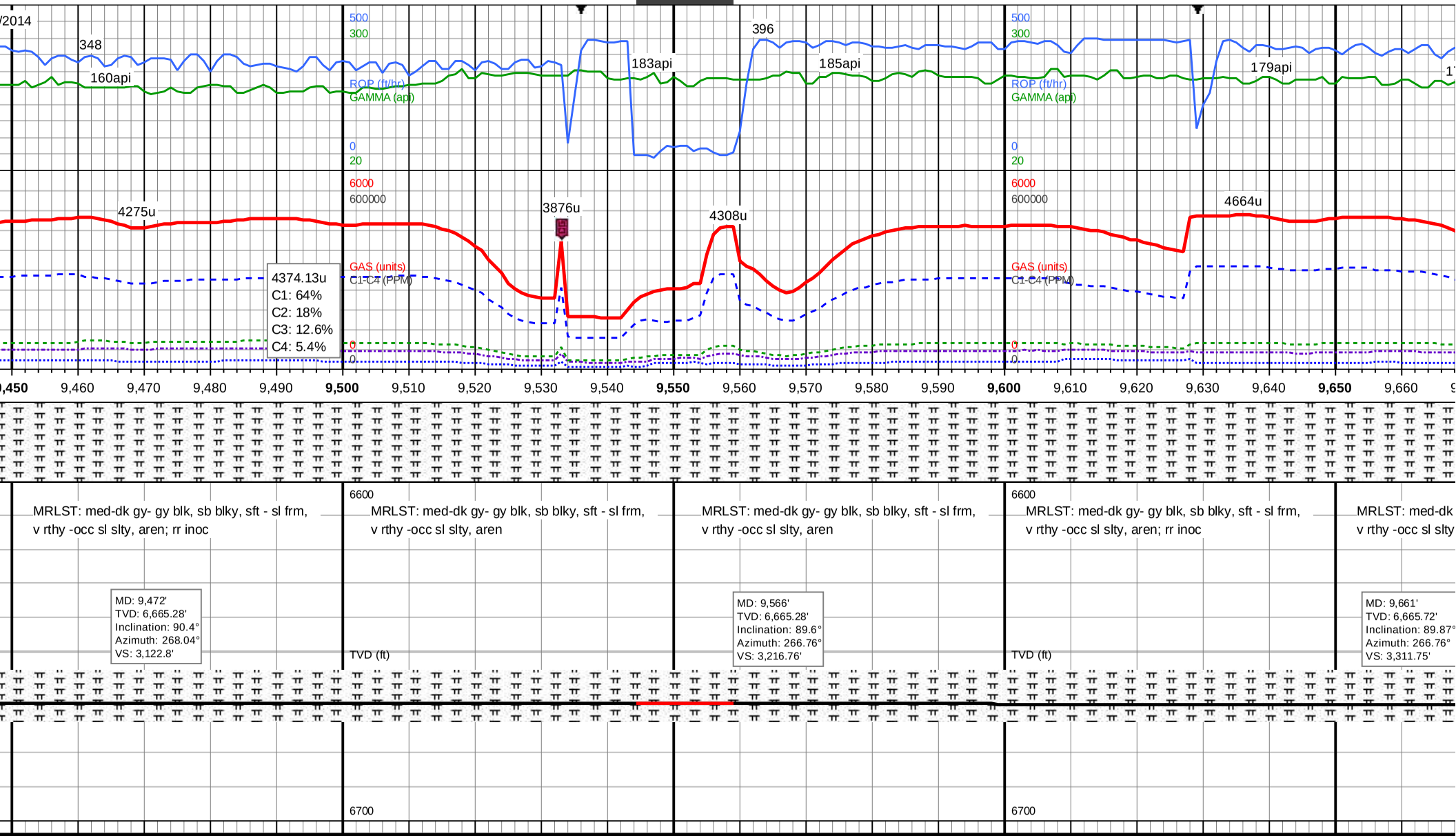

500
300
387
MUD WT 9.25 VIS 36
324
166api
180api
166api
182api
201api
ROP (ft/hr)
GAMMA (api)
0
20
4697u
4268u
4334u
3014u
3581u
2490.06u
C1: 89%
C2: 24.6%
C3: 18%
C4: 1.8%
GAS (units)
C1-C4 (PPM)
8,350
8,360
8,370
8,380
8,390
8,400
8,410
8,420
8,430
8,440
8,450
8,460
8,470
8,480
8,490
8,500
8,510
8,520
8,530
8,540
8,550
8,560
6600
6700
TVD (ft)
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc, tr bent
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc/pyr, tr bent
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc/pyr, tr bent
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc
MRLST: med-dk
v rthy -occ sl slty
MD: 8,434'
TVD: 6,659.07'
Inclination: 90.84°
Azimuth: 268.64°
VS: 2,085.54'
MD: 8,528'
TVD: 6,658.78'
Inclination: 89.52°
Azimuth: 267.03°
VS: 2,179.48'

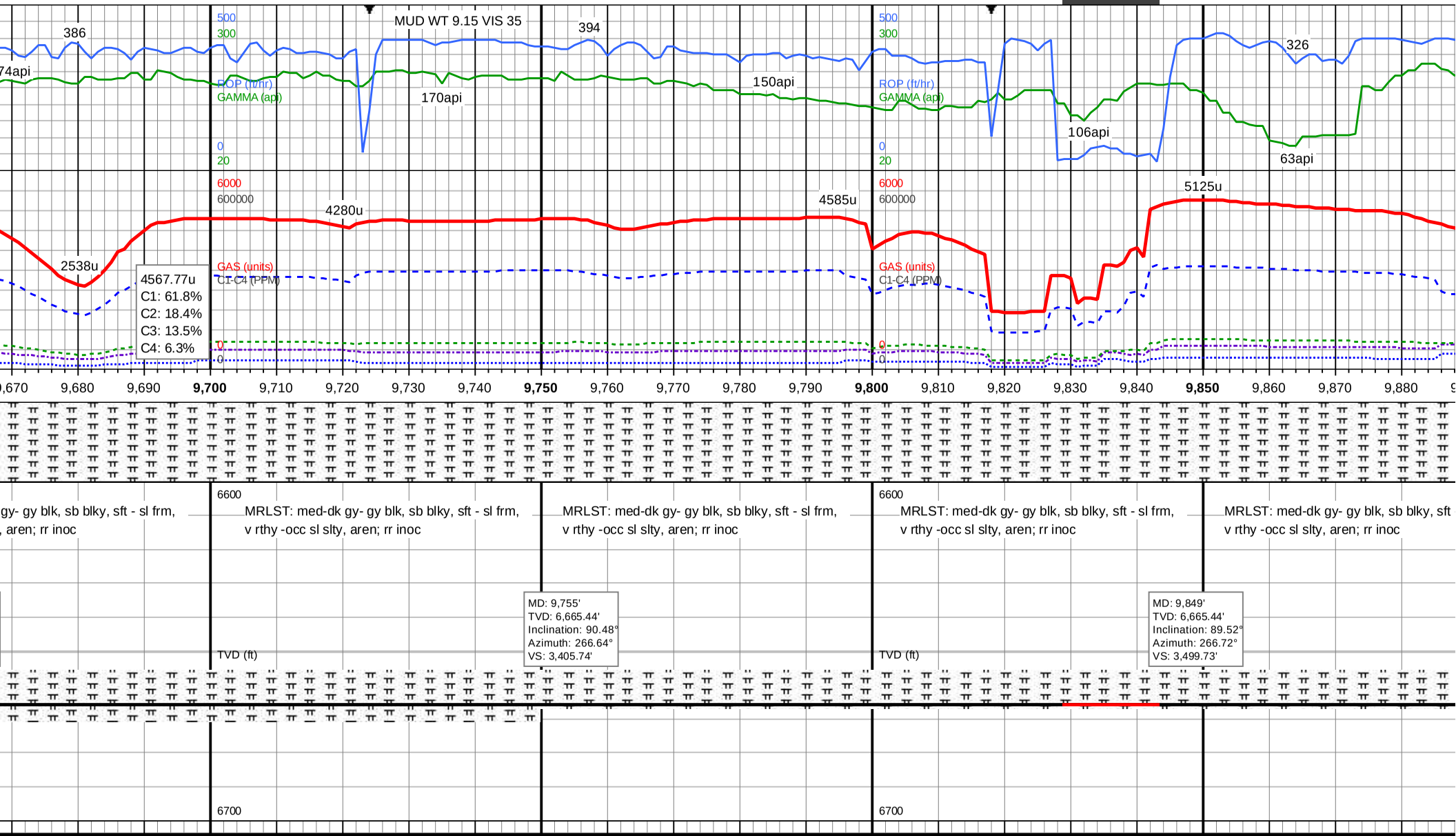

MUD WT 9.20 VIS 35
500
300
ROP (ft/hr)
GAMMA (api)
0
20
6000
600000
GAS (units)
C1-C4 (PPM)
355
185api
169api
386
177api
3104u
3239u
3365u
4623u
3452u
3318.93u
C1: 52.9%
C2: 14.5%
C3: 10.3%
C4: 1%
8,570
8,580
8,590
8,600
8,610
8,620
8,630
8,640
8,650
8,660
8,670
8,680
8,690
8,700
8,710
8,720
8,730
8,740
8,750
8,760
8,770
8,780
6600
6700
TVD (ft)
MD: 8,622'
TVD: 6,659.78'
Inclination: 89.25°
Azimuth: 266.71°
VS: 2,273.46'
MD: 8,717'
TVD: 6,660.07'
Inclination: 90.4°
Azimuth: 266.7°
VS: 2,368.45'
gy- gy blk, sb blky, sft - sl frm,
, aren; rr inoc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren; rr inoc/pyr, rr bent
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren; rr inoc/pyr, rr bent
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren;tr bent
MRLST: med-dk gy- gy blk, sb blky, sft
v rthy -occ sl slty, aren;tr bent

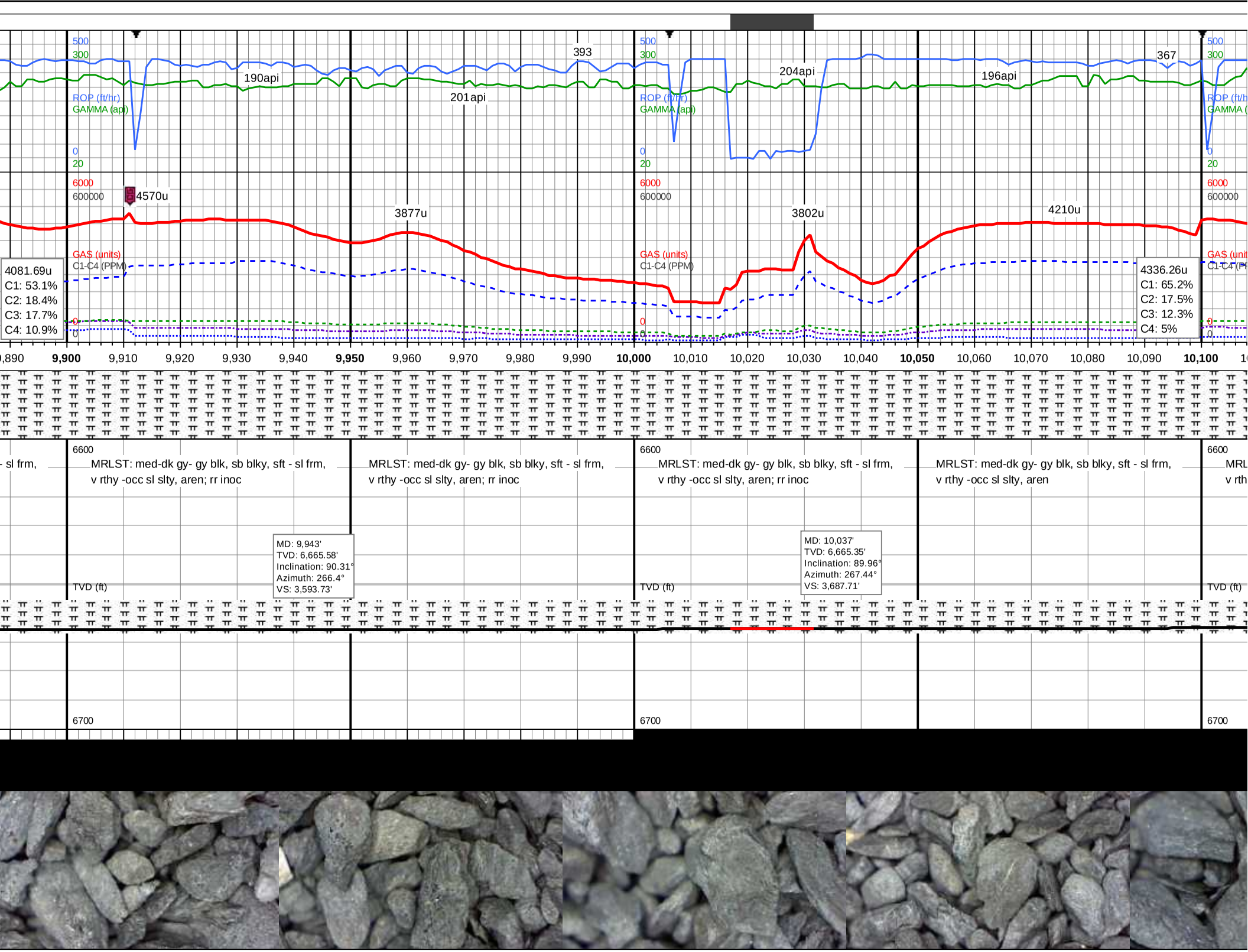

MUD WT 9.20 VIS 35
88api
353
179api
396
177api
340
176api
149api
ROP (ft/hr)
GAMMA (api)
GAS (units)
C1-C4 (PPM)
2426u
4552u
4800u
3576u
4342.47u
C1: 59.9%
C2: 19%
C3: 14.2%
C4: 6.9%
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren; rr inoc, rr bent
MD: 8,812'
TVD: 6,661.82'
Inclination: 87.49°
Azimuth: 266.27°
VS: 2,463.42'
MD: 8,906'
TVD: 6,665.51'
Inclination: 88.02°
Azimuth: 265.13°
VS: 2,557.35'
MD: 9,000'
TVD: 6,667.46'
Inclination: 89.6°
Azimuth: 268.29°
VS: 2,651.3'
TVD
6600
6700

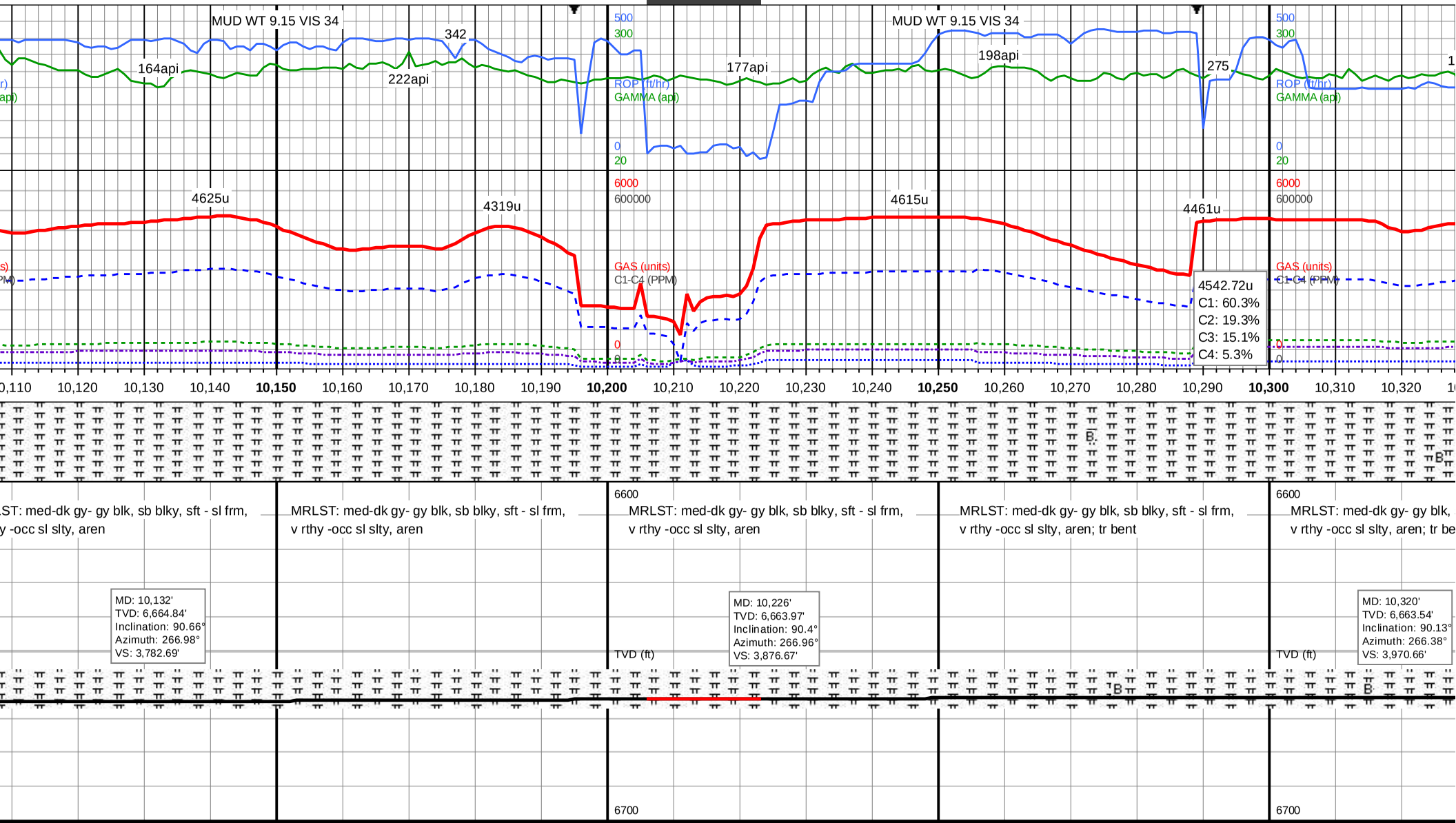

MUD WT 9.15 VIS 45
152api
201
160api
209api
111
209api
4761u
4481u
4462u
4651u
2718u
4649.2u
C1: 60.8%
C2: 18.1%
C3: 14%
C4: 7%
500
300
ROP (ft/hr)
GAMMA (api)
0
20
6000
600000
GAS (units)
C1-C4 (PPM)
9,010
9,020
9,030
9,040
9,050
9,060
9,070
9,080
9,090
9,100
9,110
9,120
9,130
9,140
9,150
9,160
9,170
9,180
9,190
9,200
9,210
9,220
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren; rr inoc/pyr
6600
6700
TVD (ft)
MD: 9,095'
TVD: 6,667.46'
Inclination: 90.4°
Azimuth: 267.67°
VS: 2,746.24'
MD: 9,189'
TVD: 6,667.02'
Inclination: 90.13°
Azimuth: 269.36°
VS: 2,840.14'

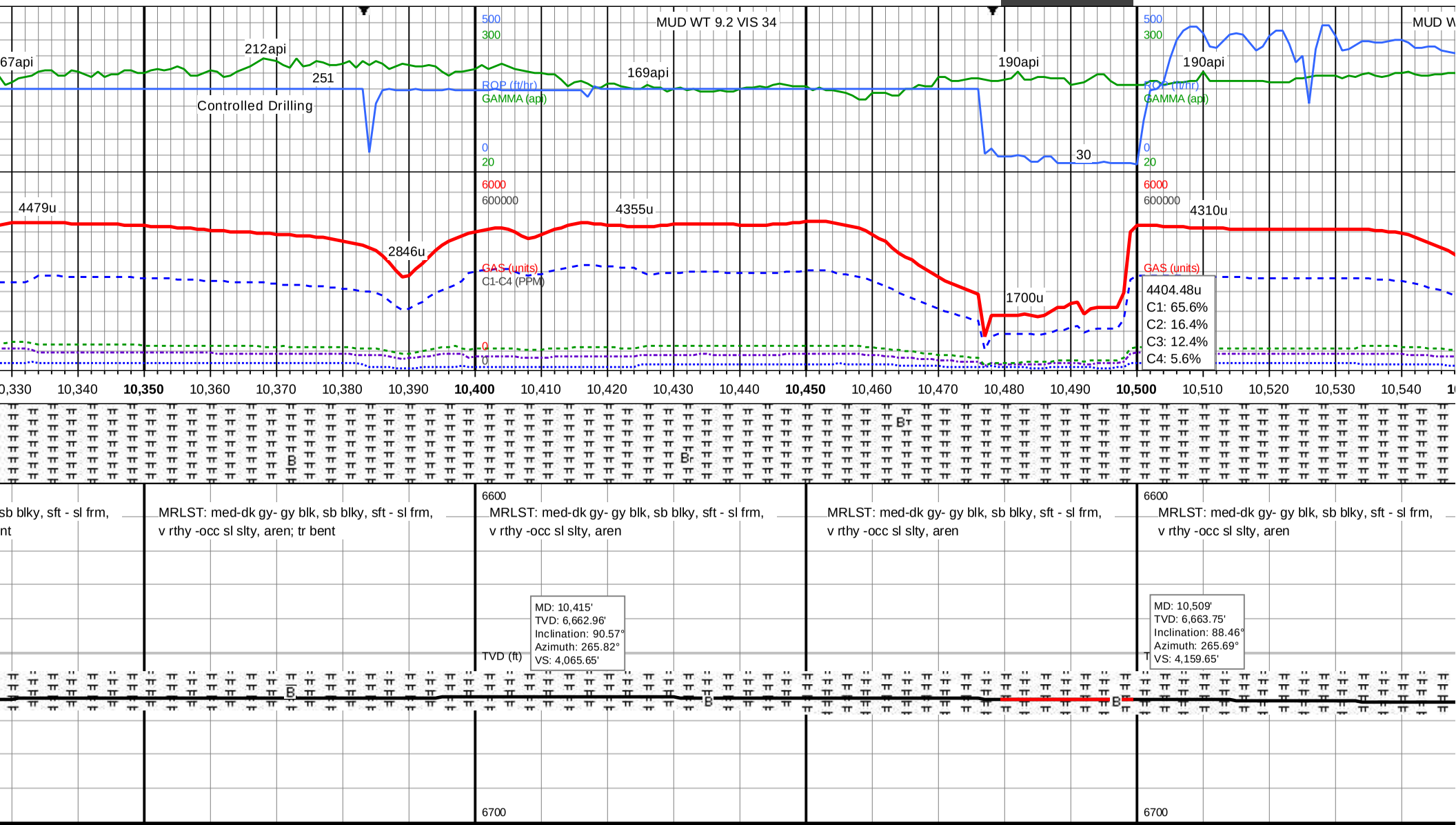

MUD WT 9.10 VIS 35
12/24/2014
MINDEPTH
410
204api
174api
198api
386
156api
166api
ROP (ft/hr)
GAMMA (api)
500
300
0
20
6000
600000
GAS (units)
C1-C4 (PPM)
2782u
3932u
2367u
4342u
4142u
4613.14u
C1: 63.7%
C2: 18.8%
C3: 12.8%
C4: 4.6%
9,230
9,240
9,250
9,260
9,270
9,280
9,290
9,300
9,310
9,320
9,330
9,340
9,350
9,360
9,370
9,380
9,390
9,400
9,410
9,420
9,430
9,440
sb blky, sft - sl frm,
oc/pyr, rr bent
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren; rr inoc/pyr
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren; rr inoc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren; rr inoc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren; rr inoc
MD: 9,284'
TVD: 6,666.15'
Inclination: 90.92°
Azimuth: 269.56°
VS: 2,934.96'
MD: 9,378'
TVD: 6,665.5'
Inclination: 89.87°
Azimuth: 267.68°
VS: 3,028.85'
6600
6700
TVD (ft)

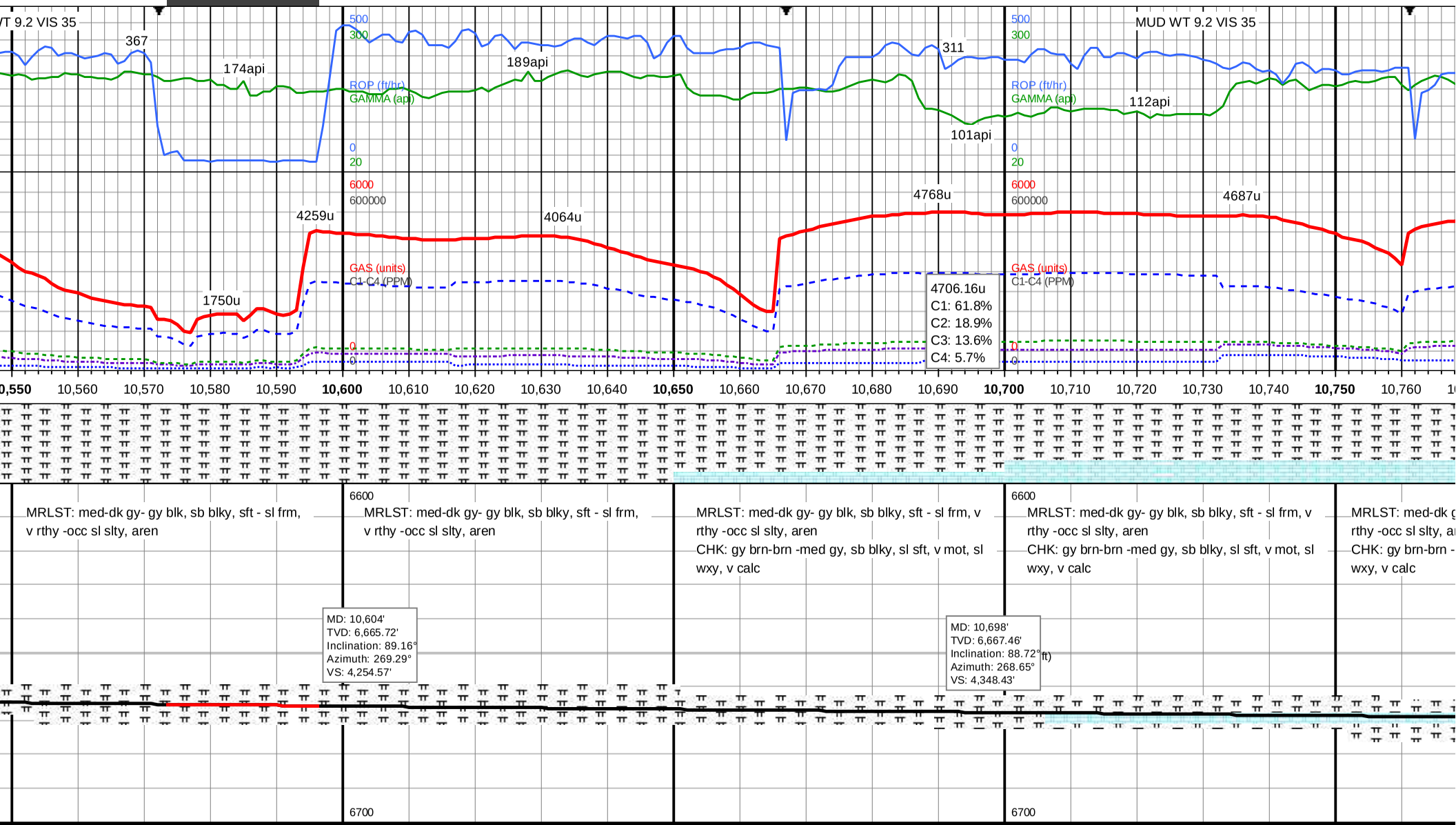

/2014
348
160api
500
300
ROP (ft/hr)
GAMMA (api)
0
20
6000
600000
396
183api
185api
179api
4275u
3876u
4308u
4664u
GAS (units)
C1-C4 (PPM)
4374.13u
C1: 64%
C2: 18%
C3: 12.6%
C4: 5.4%
9,450
9,460
9,470
9,480
9,490
9,500
9,510
9,520
9,530
9,540
9,550
9,560
9,570
9,580
9,590
9,600
9,610
9,620
9,630
9,640
9,650
9,660
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc
MRLST: med-dk
v rthy -occ sl slty
MD: 9,472'
TVD: 6,665.28'
Inclination: 90.4°
Azimuth: 268.04°
VS: 3,122.8'
MD: 9,566'
TVD: 6,665.28'
Inclination: 89.6°
Azimuth: 266.76°
VS: 3,216.76'
MD: 9,661'
TVD: 6,665.72'
Inclination: 89.87°
Azimuth: 266.76°
VS: 3,311.75'
6600
6700
TVD (ft)


MUD WT 9.15 VIS 35
386
74api
394
326
500
300
ROP (ft/hr)
GAMMA (api)
170api
150api
106api
63api
0
20
6000
600000
4280u
4585u
5125u
2538u
GAS (units)
C1-C4 (PPM)
4567.77u
C1: 61.8%
C2: 18.4%
C3: 13.5%
C4: 6.3%
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
9,880
6600
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren; rr inoc
MD: 9,755'
TVD: 6,665.44'
Inclination: 90.48°
Azimuth: 266.64°
VS: 3,405.74'
MD: 9,849'
TVD: 6,665.44'
Inclination: 89.52°
Azimuth: 266.72°
VS: 3,499.73'
TVD (ft)
6700

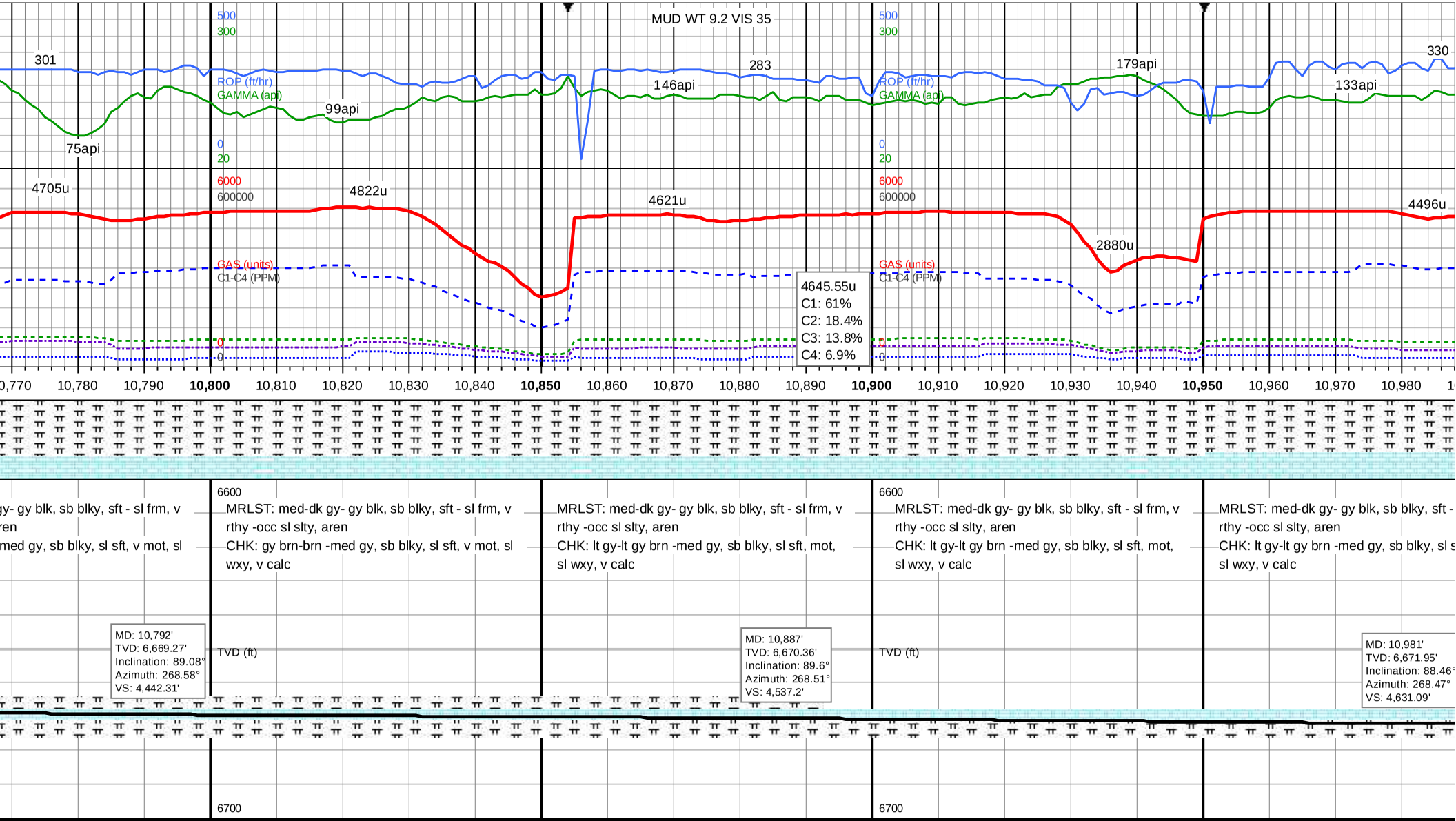

500
300
ROP (ft/hr)
GAMMA (api)
0
20
6000
600000
GAS (units)
C1-C4 (PPM)
190api
201api
393
204api
196api
367
4570u
3877u
3802u
4210u
4081.69u
C1: 53.1%
C2: 18.4%
C3: 17.7%
C4: 10.9%
4336.26u
C1: 65.2%
C2: 17.5%
C3: 12.3%
C4: 5%
9,890
9,900
9,910
9,920
9,930
9,940
9,950
9,960
9,970
9,980
9,990
10,000
10,010
10,020
10,030
10,040
10,050
10,060
10,070
10,080
10,090
10,100
6600
6700
TVD (ft)
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren; rr inoc
MD: 9,943'
TVD: 6,665.58'
Inclination: 90.31°
Azimuth: 266.4°
VS: 3,593.73'
MD: 10,037'
TVD: 6,665.35'
Inclination: 89.96°
Azimuth: 267.44°
VS: 3,687.71'

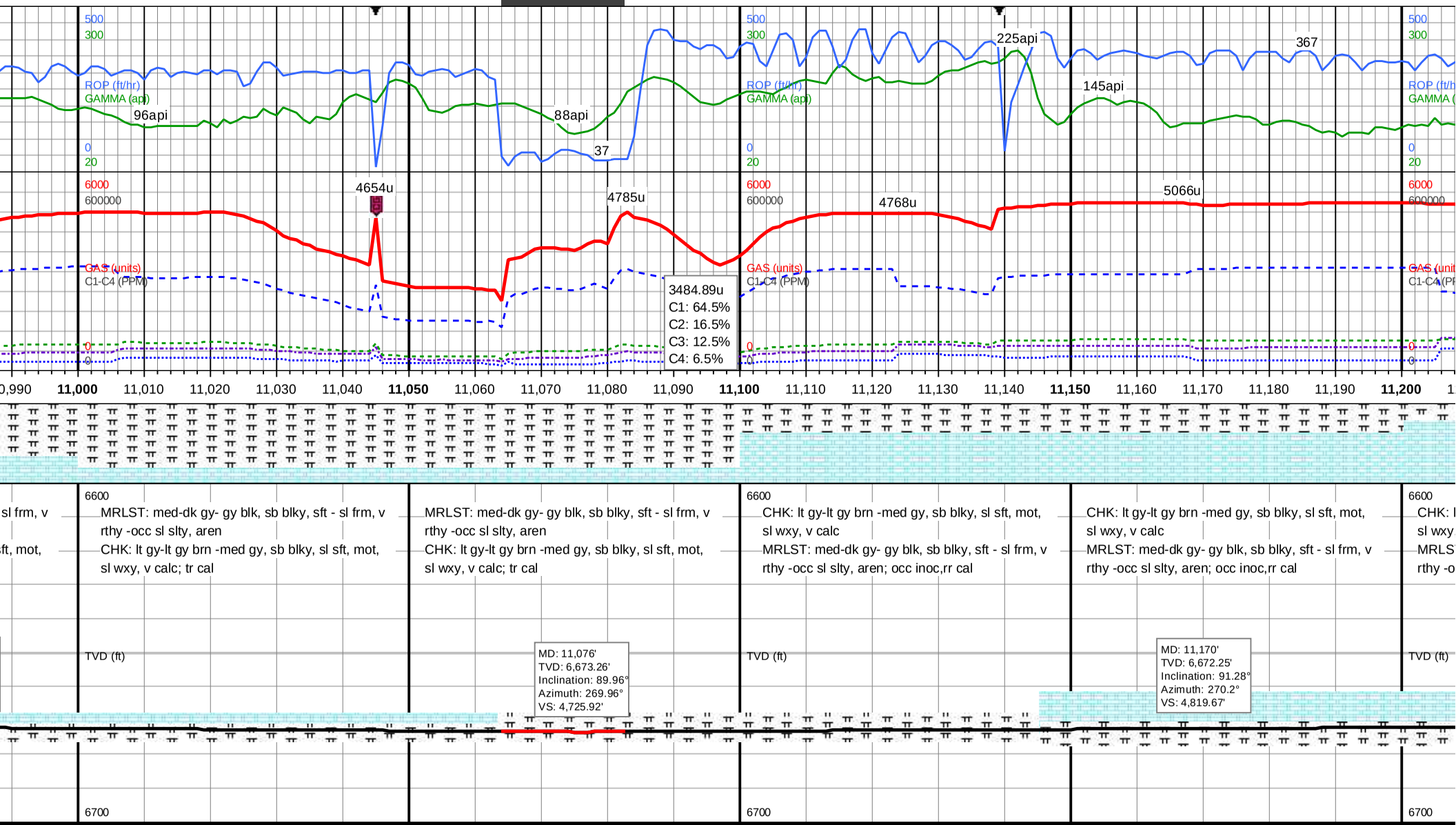

MUD WT 9.15 VIS 34
342
164api
222api
177api
MUD WT 9.15 VIS 34
198api
275
500
300
ROP (ft/hr)
GAMMA (api)
0
20
6000
600000
GAS (units)
C1-C4 (PPM)
4625u
4319u
4615u
4461u
4542.72u
C1: 60.3%
C2: 19.3%
C3: 15.1%
C4: 5.3%
10,110
10,120
10,130
10,140
10,150
10,160
10,170
10,180
10,190
10,200
10,210
10,220
10,230
10,240
10,250
10,260
10,270
10,280
10,290
10,300
10,310
10,320
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; tr bent
MRLST: med-dk gy- gy blk,
v rthy -occ sl slty, aren; tr be
MD: 10,132'
TVD: 6,664.84'
Inclination: 90.66°
Azimuth: 266.98°
VS: 3,782.69'
MD: 10,226'
TVD: 6,663.97'
Inclination: 90.4°
Azimuth: 266.96°
VS: 3,876.67'
MD: 10,320'
TVD: 6,663.54'
Inclination: 90.13°
Azimuth: 266.38°
VS: 3,970.66'
TVD (ft)
6600
6700
B
B
B
B

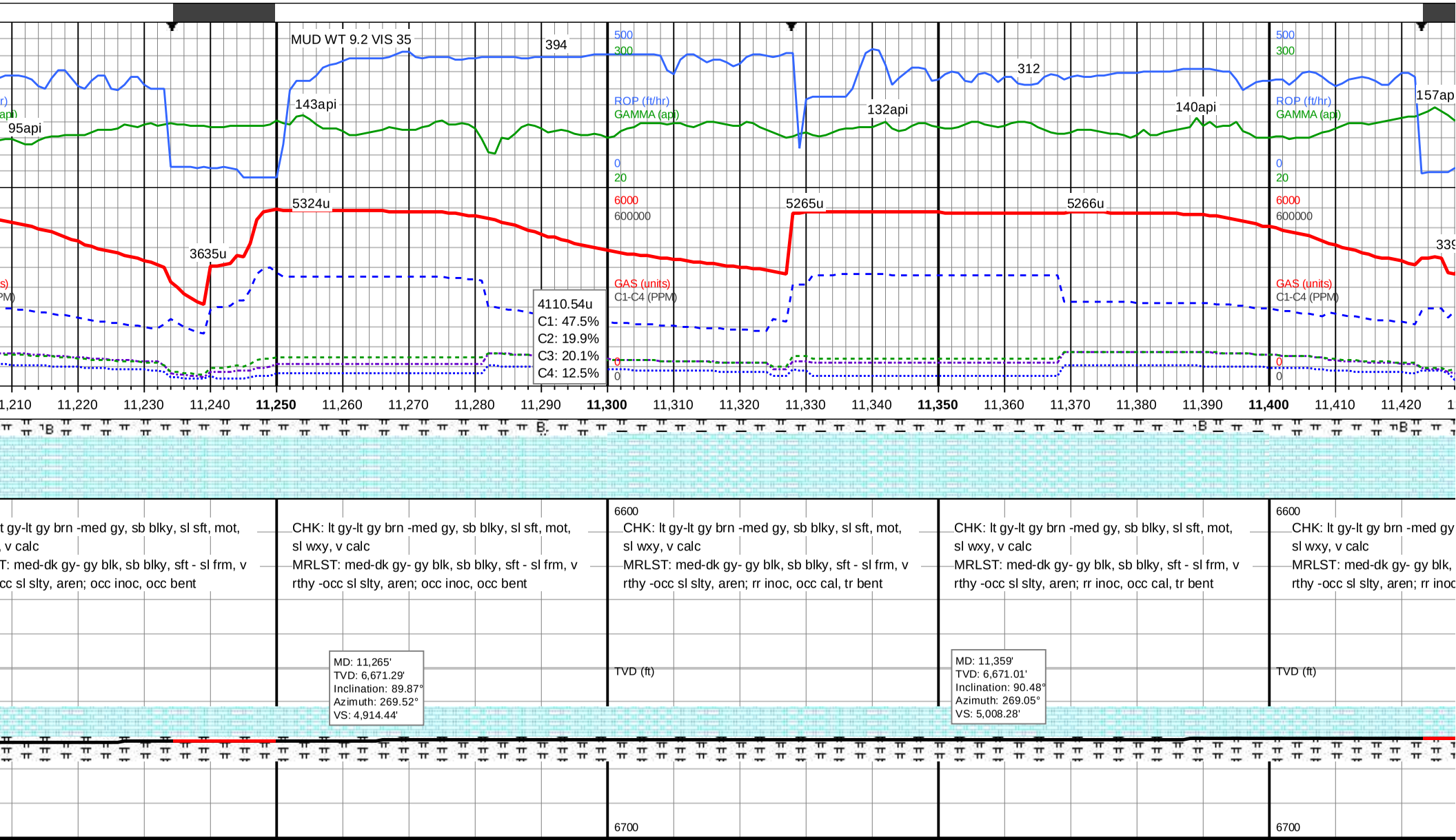

MUD WT 9.2 VIS 34
MUD W
67api
212api
251
Controlled Drilling
169api
190api
190api
30
ROP (ft/hr)
GAMMA (api)
500
300
0
20
6000
600000
4479u
4355u
4310u
2846u
1700u
GAS (units)
C1-C4 (PPM)
4404.48u
C1: 65.6%
C2: 16.4%
C3: 12.4%
C4: 5.6%
10,330
10,340
10,350
10,360
10,370
10,380
10,390
10,400
10,410
10,420
10,430
10,440
10,450
10,460
10,470
10,480
10,490
10,500
10,510
10,520
10,530
10,540
sb blky, sft - sl frm,
nt
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren; tr bent
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm,
v rthy -occ sl slty, aren
MD: 10,415'
TVD: 6,662.96'
Inclination: 90.57°
Azimuth: 265.82°
VS: 4,065.65'
MD: 10,509'
TVD: 6,663.75'
Inclination: 88.46°
Azimuth: 265.69°
VS: 4,159.65'
TVD (ft)
6600
6700


MUD WT 9.2 VIS 35
367
174api
189api
311
101api
112api
500
300
ROP (ft/hr)
GAMMA (api)
0
20
6000
600000
4259u
4064u
4768u
4687u
1750u
GAS (units)
C1-C4 (PPM)
4706.16u
C1: 61.8%
C2: 18.9%
C3: 13.6%
C4: 5.7%
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
10,760

6600
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren
CHK: gy brn-brn -med gy, sb blky, sl sft, v mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren
CHK: gy brn-brn -med gy, sb blky, sl sft, v mot, sl wxy, v calc
MD: 10,604'
TVD: 6,665.72'
Inclination: 89.16°
Azimuth: 269.29°
VS: 4,254.57'
MD: 10,698'
TVD: 6,667.46'
Inclination: 88.72°
Azimuth: 268.65°
VS: 4,348.43'
6700


MUD WT 9.2 VIS 35
500
300
ROP (ft/hr)
GAMMA (api)
0
20
6000
600000
GAS (units)
C1-C4 (PPM)
301
75api
99api
283
146api
179api
133api
330
4705u
4822u
4621u
2880u
4496u
4645.55u
C1: 61%
C2: 18.4%
C3: 13.8%
C4: 6.9%
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
10,900
10,910
10,920
10,930
10,940
10,950
10,960
10,970
10,980
6600
6700
TVD (ft)
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren
CHK: gy brn-brn -med gy, sb blky, sl sft, v mot, sl wxy, v calc
CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MD: 10,792'
TVD: 6,669.27'
Inclination: 89.08°
Azimuth: 268.58°
VS: 4,442.31'
MD: 10,887'
TVD: 6,670.36'
Inclination: 89.6°
Azimuth: 268.51°
VS: 4,537.2'
MD: 10,981'
TVD: 6,671.95'
Inclination: 88.46°
Azimuth: 268.47°
VS: 4,631.09'


500
300
ROP (ft/hr)
GAMMA (api)
96api
88api
37
225api
145api
367
0
20
6000
600000
4654u
4785u
4768u
5066u
GAS (units)
C1-C4 (PPM)
3484.89u
C1: 64.5%
C2: 16.5%
C3: 12.5%
C4: 6.5%
11,000
11,050
11,100
11,150
11,200
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren
CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc; tr cal
CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; occ inoc,rr cal
TVD (ft)
6600
6700
MD: 11,076'
TVD: 6,673.26'
Inclination: 89.96°
Azimuth: 269.96°
VS: 4,725.92'
MD: 11,170'
TVD: 6,672.25'
Inclination: 91.28°
Azimuth: 270.2°
VS: 4,819.67'



t gy-lt gy brn -med gy, sb blky, sl sft, mot, , v calc
T: med-dk gy- gy blk, sb blky, sft - sl frm, v cc sl slty, aren; occ inoc, occ bent

CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; occ inoc, occ bent

CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc, occ cal, tr bent

CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc, occ cal, tr bent

CHK: lt gy-lt gy brn -med gy
sl wxy, v calc
MRLST: med-dk gy- gy blk,
rthy -occ sl slty, aren; rr inoc

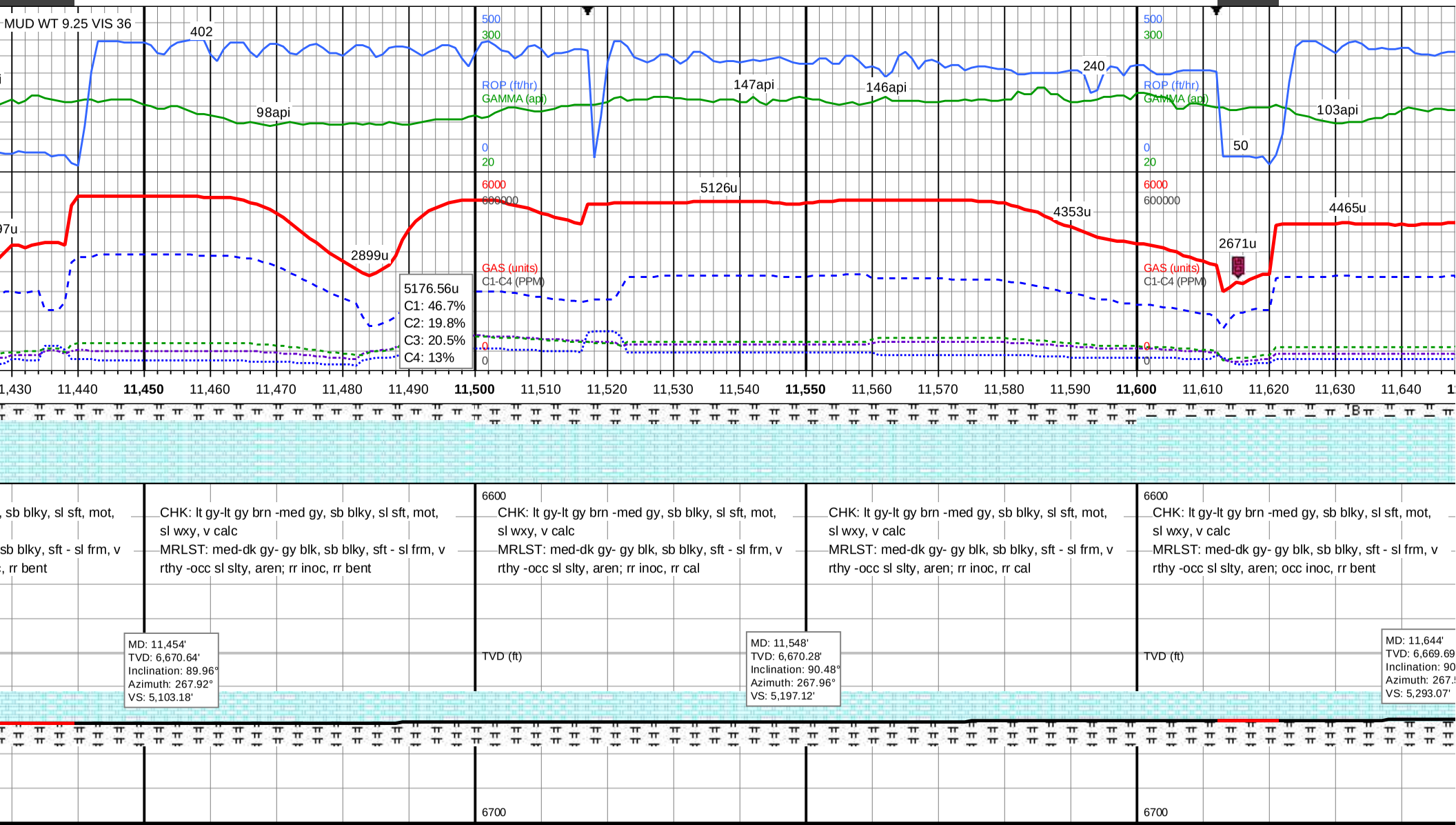
6600

MD: 11,265'
TVD: 6,671.29'
Inclination: 89.87°
Azimuth: 269.52°
VS: 4,914.44'

TVD (ft)

MD: 11,359'
TVD: 6,671.01'
Inclination: 90.48°
Azimuth: 269.05°
VS: 5,008.28'

6700



, sb blky, sl sft, mot,
sb blky, sft - sl frm, v
, rr bent

CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc, rr bent

MD: 11,454'
TVD: 6,670.64'
Inclination: 89.96°
Azimuth: 267.92°
VS: 5,103.18'

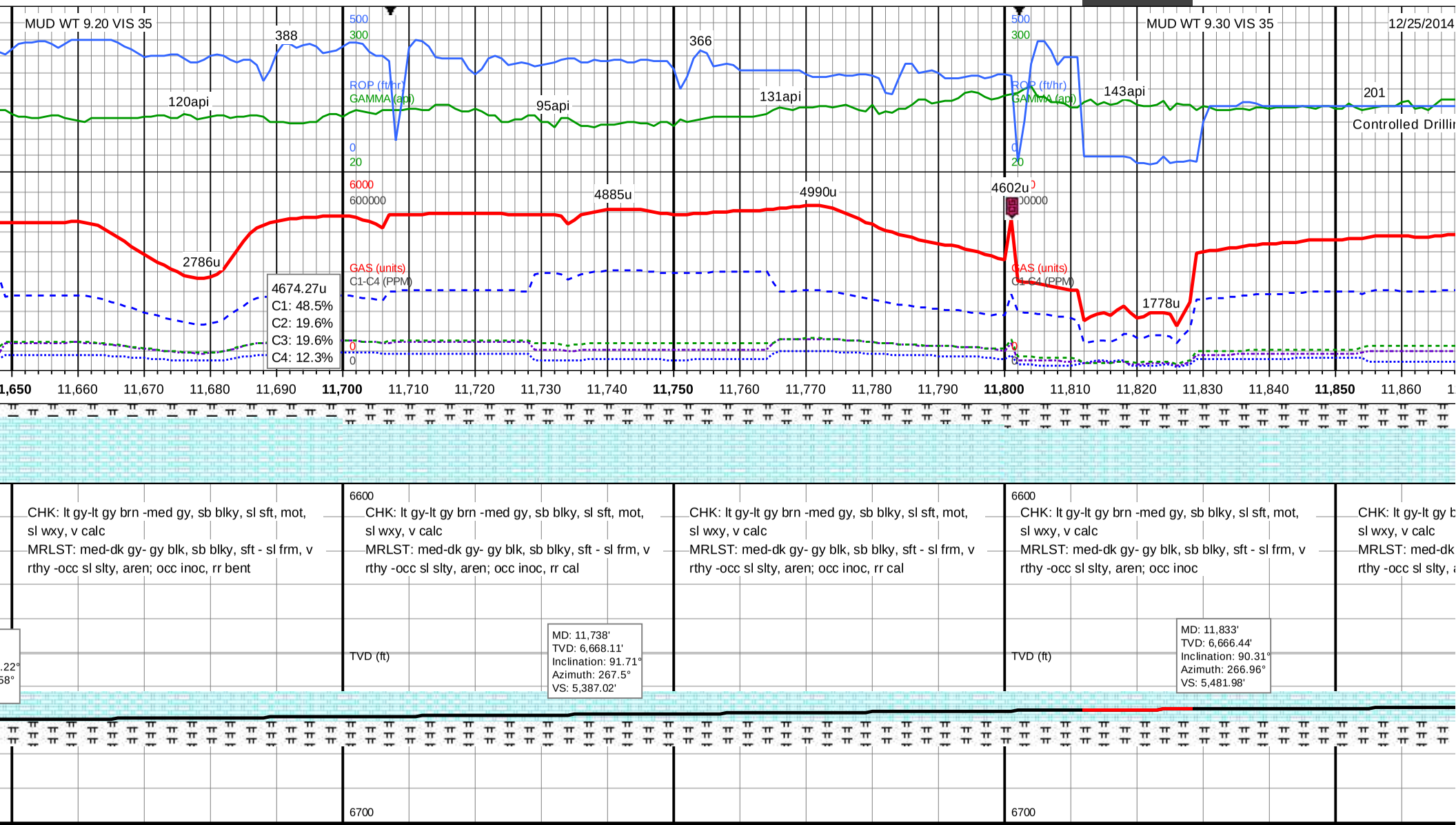
6600
CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc, rr cal
TVD (ft)
6700

MD: 11,548'
TVD: 6,670.28'
Inclination: 90.48°
Azimuth: 267.96°
VS: 5,197.12'

CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc, rr cal

6600
CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; occ inoc, rr bent
TVD (ft)
6700

MD: 11,644'
TVD: 6,669.69
Inclination: 90
Azimuth: 267.
VS: 5,293.07'



CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; occ inoc, rr bent

6600
CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; occ inoc, rr cal

CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; occ inoc, rr cal

6600
CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; occ inoc

CHK: lt gy-lt gy b
sl wxy, v calc
MRLST: med-dk
rthy -occ sl slty,

.22°
58°

TVD (ft)

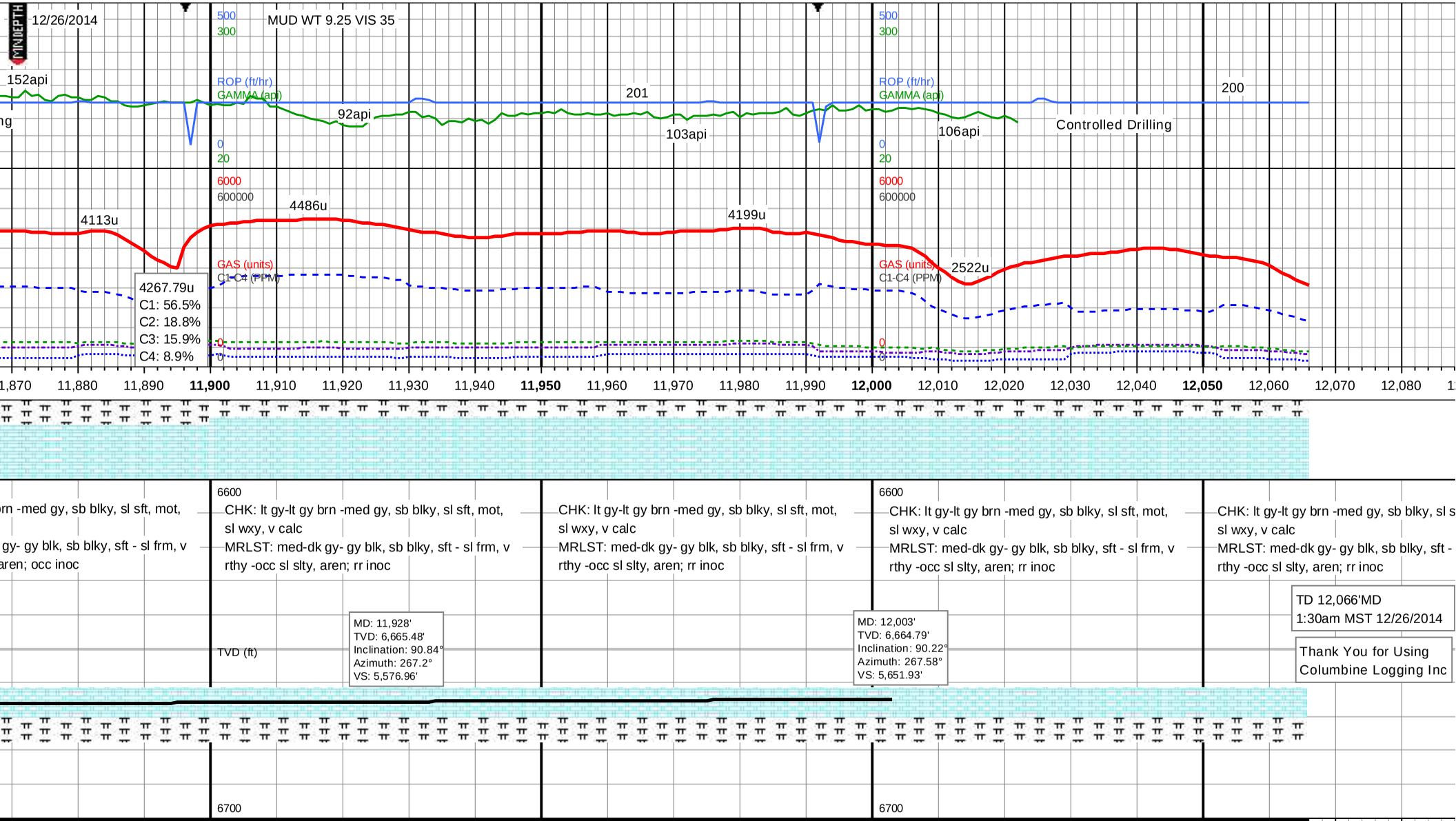
MD: 11,738'
TVD: 6,668.11'
Inclination: 91.71°
Azimuth: 267.5°
VS: 5,387.02'

TVD (ft)

MD: 11,833'
TVD: 6,666.44'
Inclination: 90.31°
Azimuth: 266.96°
VS: 5,481.98'

6700

6700



rn -med gy, sb blky, sl sft, mot,
gy- gy blk, sb blky, sft - sl frm, v
aren; occ inoc

6600

CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc

CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc

6600

CHK: lt gy-lt gy brn -med gy, sb blky, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft - sl frm, v rthy -occ sl slty, aren; rr inoc

CHK: lt gy-lt gy brn -med gy, sb blky, sl s
sl wxy, v calc
MRLST: med-dk gy- gy blk, sb blky, sft -
rthy -occ sl slty, aren; rr inoc

TD 12,066'MD
1:30am MST 12/26/2014

Thank You for Using
Columbine Logging Inc

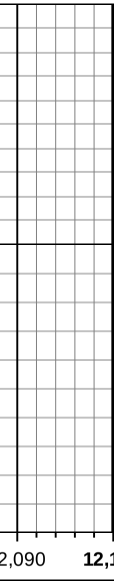
TVD (ft)

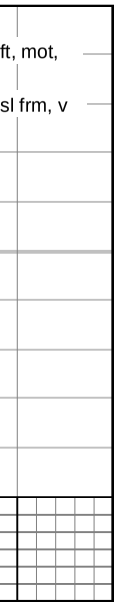
MD: 11,928'
TVD: 6,665.48'
Inclination: 90.84°
Azimuth: 267.2°
VS: 5,576.96'

MD: 12,003'
TVD: 6,664.79'
Inclination: 90.22°
Azimuth: 267.58°
VS: 5,651.93'

6700

6700


2,090
12,1


ft, mot,
sl frm, v