COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name	State Pronghorn 43-13-29HNB		
Location	SESE SECTION 29, T5N, R61W		
State	COLORADO	**County**	WELD
Country	USA	**Rig Number**	CADE 25
API Number	05-123-40060	**AFE #**	14421
Region	DJ BASIN	**Field**	WATTENBERG
Spud Date	2/18/2015	**Drilling Completed**	2/23/2015
Surface Coordinates	1240' FSL x 230' FEL		
Bottom Hole Coordinates	1809' FSL x 483' FWL		
Ground Elevation	4602'	**K.B. Elevation**	4619'
Logged Interval	5600' **To** 10629'	**Total Depth**	10629'
Formation	NIOBRARA B CHALK		
Type of Drilling Fluid	FW LSND		

Operator

Company Bonanza Creek Energy Inc.

Address 410 17th STREET, SUITE 1500
DENVER, CO 80202

Geologist

Name BRANT LOGAN

Company BONANZA CREEK ENERGY INC.

Address 410 17th STREET, SUITE 1500
DENVER, CO 80202

Other

COLUMBINE LOGGING, INC. 602 S. LIPAN STREET
DENVER, COLORADO 8

WELL SITE GEOLOGISTS JOEY LUCE
JEFF LACY

Zone Color Coding

Oil
Note
Error
Condensate
Core
Water
Gas
Pres
Sea

30223

ssure

Rock Types

- UNKNOWN
- ANHYDRITE
- BENTONITE
- BRECCIA
- CHALK
- CEMENT
- CHERT
- CLAY CHOKE SANC
- CLAYSTONE
- COAL
- CONGLOMERATE
- DOLOMITE
- DOLOMITIC LIMESTONE
- GRANITE
- GYPSUM
- IGNEOUS
- SIDERITE or LIMONITE
- LIMESTONE
- MARLSTONE
- METAMORPHIC
- NO SAMPLE
- SALT
- SANDSTONE
- SALT-PEPPER SANC
- 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
- F FOSSIL
- GASTROPOD
- INOCERAMUS
- OOLITE
- OSTRACOD
- PELECYPOD
- PELLET
- PISOLITE
- PLANT REMAINS
- PLANT SPORES
- SCAPHOPOD
- STROMATOPOROID

Minerals

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

- P PINPOINT
- VUGGY
- D DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

Engineering

- BIT
- CONNECTION (UP)
- CONNECTION (DOW

Porosity

- CONNECTION GAS
- E EARTHY
- CONNECTION GA
- FENESTRAL
- TRIP GAS
- F FRACTURE
- TRIP GAS (LEFT)
- INTERCRYSTALLINE
- DOWN TIME GAS
- INTEROOLITIC
- DOWN TIME GAS
- MOLDIC
- CORE - LOST
- O ORGANIC
- CORE - RECOVERED

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

ROP Limit
0 to 500 ft/hr

500
ROP (ft/hr)
0
191
174

Total Gas & Chromatograph

GAS
C1
C2
C3
C4

Total Gas Limit
0 to 7000 units

7000
700000
GAS (units)
C1-C4 (PPM)
0
0

1184u
C1 100%
C2 0%
C3 0%
C4 0%

1856u
1144u

Depth Labels

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 5,700 5,710 5,720 5,730

% Lith

Curves

GAMMA

Gamma Limit
0 to 200 API

30' Samples

200
GAMMA (api)
0
87
89

Well Bore

TVD

TVD Scale
5525' to 6150'

5525

Bit Data
Bit #: 2
Type: SDi513
Size: 8.75"
Depth In: 791'
Depth Out: 6,503'
Jets: 8x14
S/N: JJ5495

MD: 5,615'
TVD: 5,542.62'
Inclination: 2.7°
Azimuth: 290.1°
VS: -74.21'

MD: 5,663'
TVD: 5,590.24'
Inclination: 11°
Azimuth: 286°
VS: -68.55'

MD: 5,711'
TVD: 5,636.68'
Inclination: 18°
Azimuth: 293.5°
VS: -56.83'

TVD (ft)

COLUMBINE LOGGING 02/20/2015
MANNED 2-PERSON LOGGING
WITH BLOODHOUND GAS
CHROMATOGRAPH UNIT #0263
KICKED OFF @ 07:10 MST
ON 02/20/2015

95% SLTY SH: lt-medgy, brn, sb plty-blky, occ plty, sft-frm, rthy-gritty, grdg-sltst ip, arg-slty, aren 5% SHY SS: wh-ltgy, s&p, clr-trnsl grns, sb ang-sr, arg ip, slty, p srtd, vf-f grnd, cly cmt, mod cons, fri; O SHOW: v slow stmg, dk bl cut, fnt yel-gn ring, no stn, no od

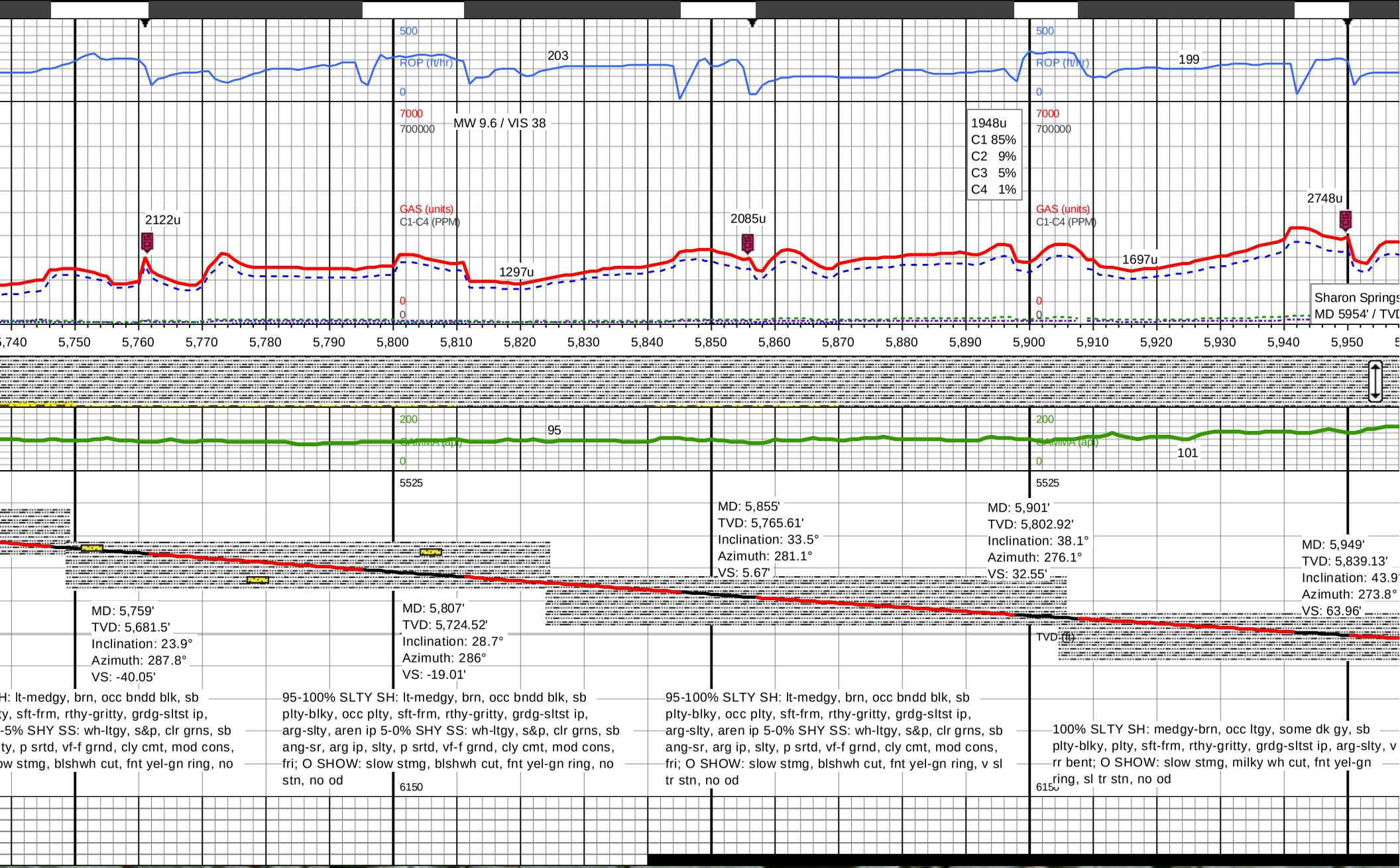
85-90% SLTY SH: lt-medgy, brn, sb plty-blky, occ plty, sft-frm, rthy-gritty, grdg-sltst ip, arg-slty, aren 15-10% SHY SS: wh-ltgy, s&p, clr-trnsl grns, sb ang-sr, arg ip, slty, p srtd, vf-f grnd, cly cmt, mod cons, fri; O SHOW: v slow stmg, dk bl cut, fnt yel-gn ring, no stn, no od

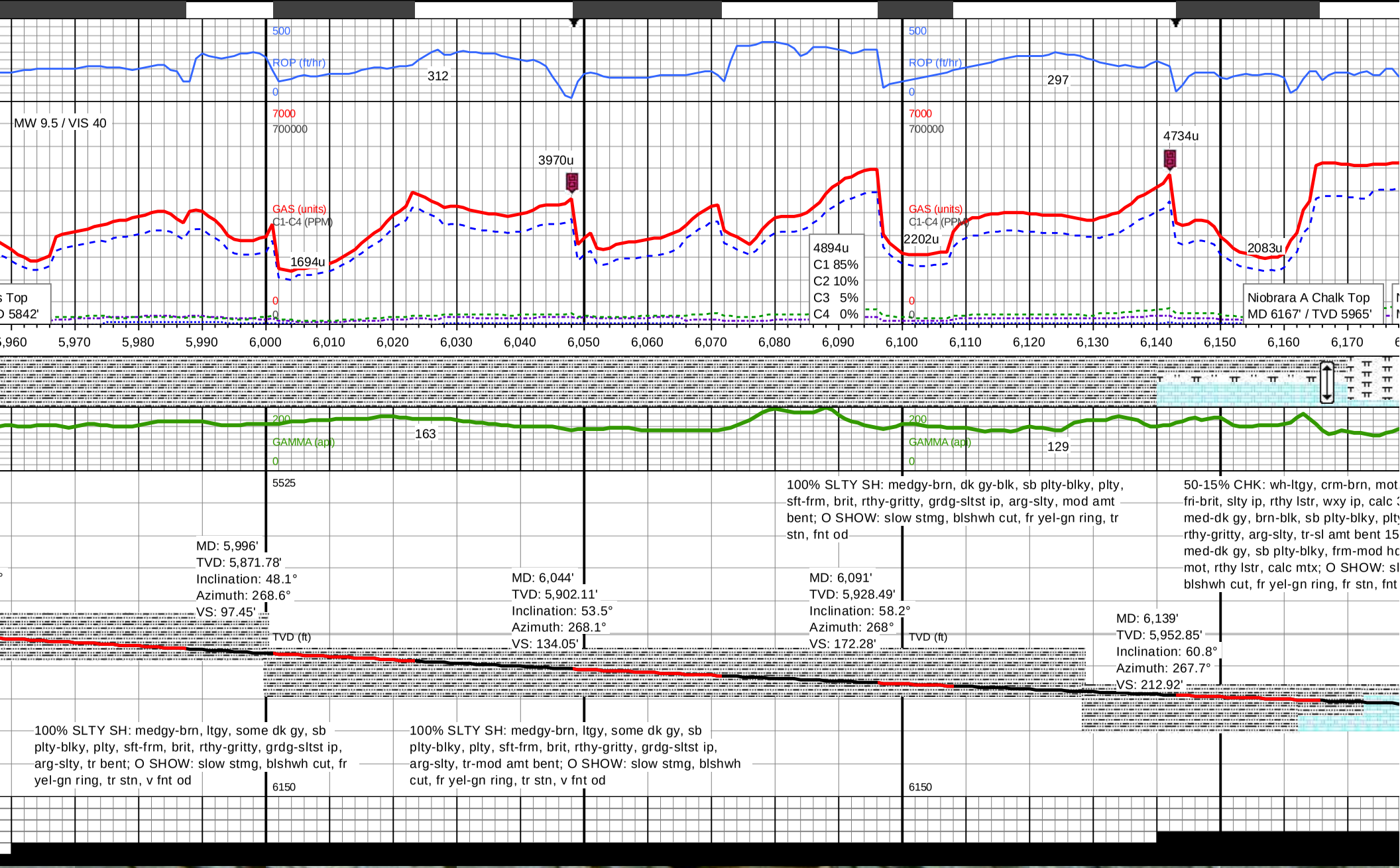
90-95% SLTY SH
plty-blky, occ plt
arg-slty, aren 10
ang-sr, arg ip, sl
fri; O SHOW: slo
stn, no od

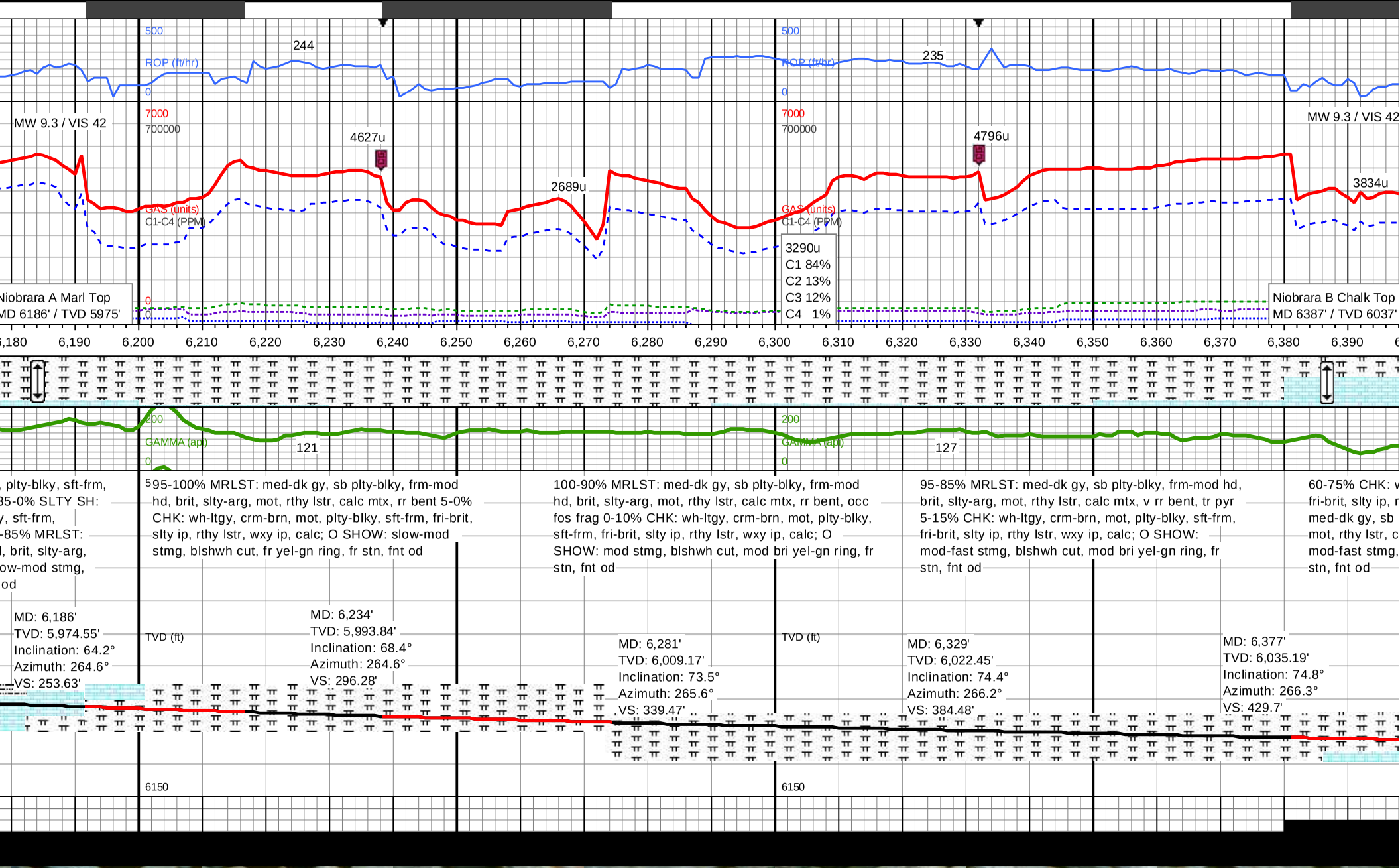
Oil Show

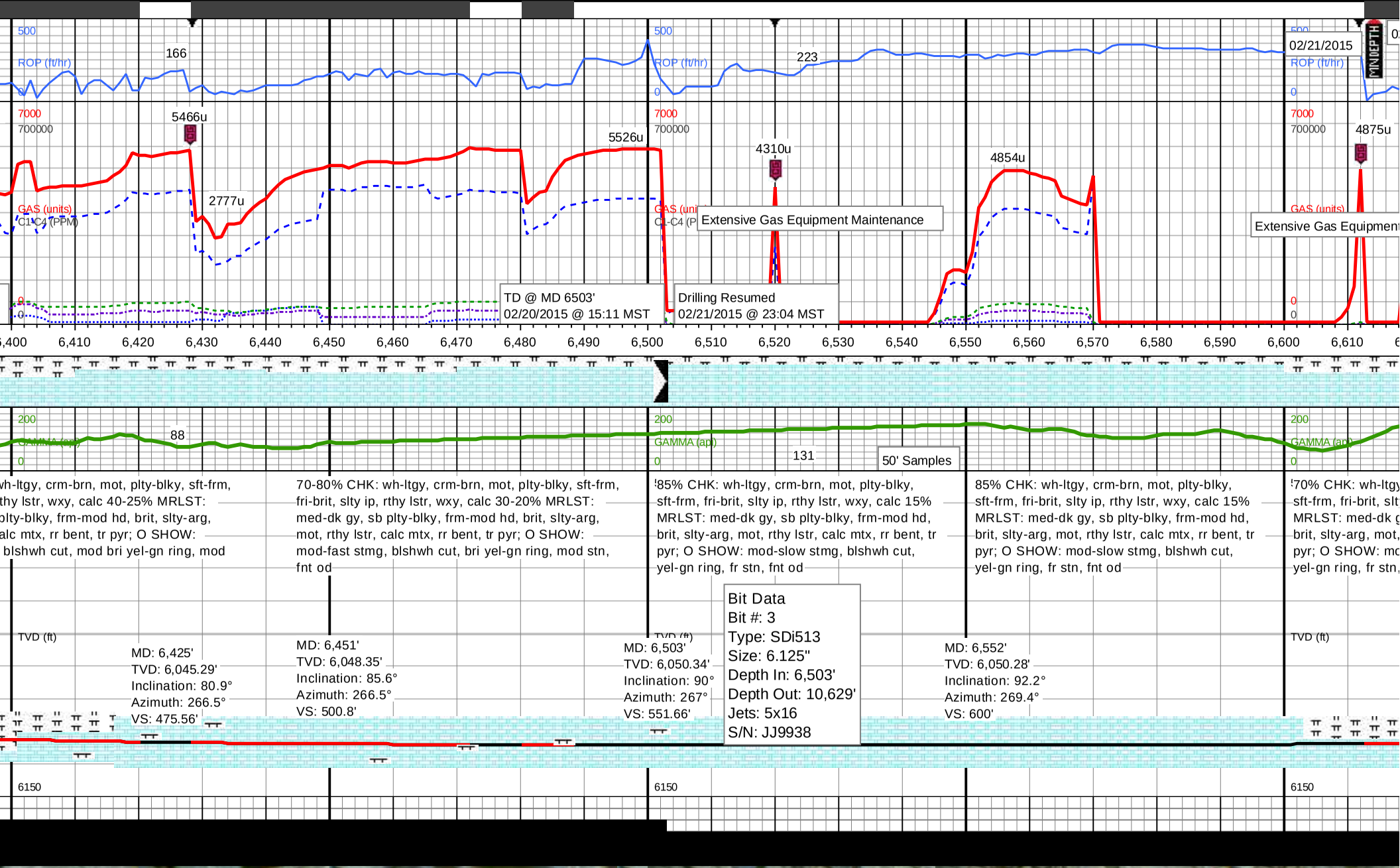
E
G
M
F
TR
SL

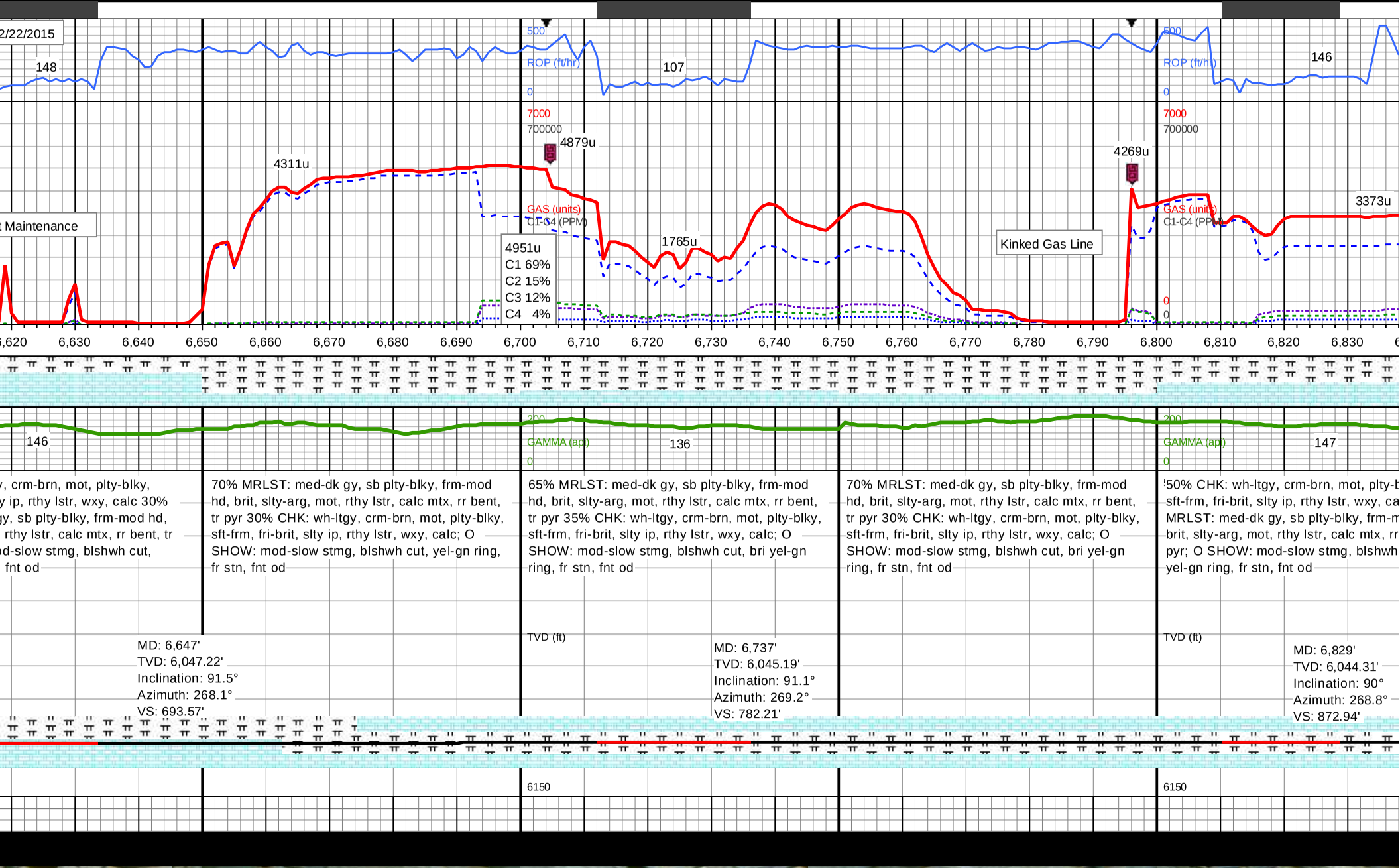
Images

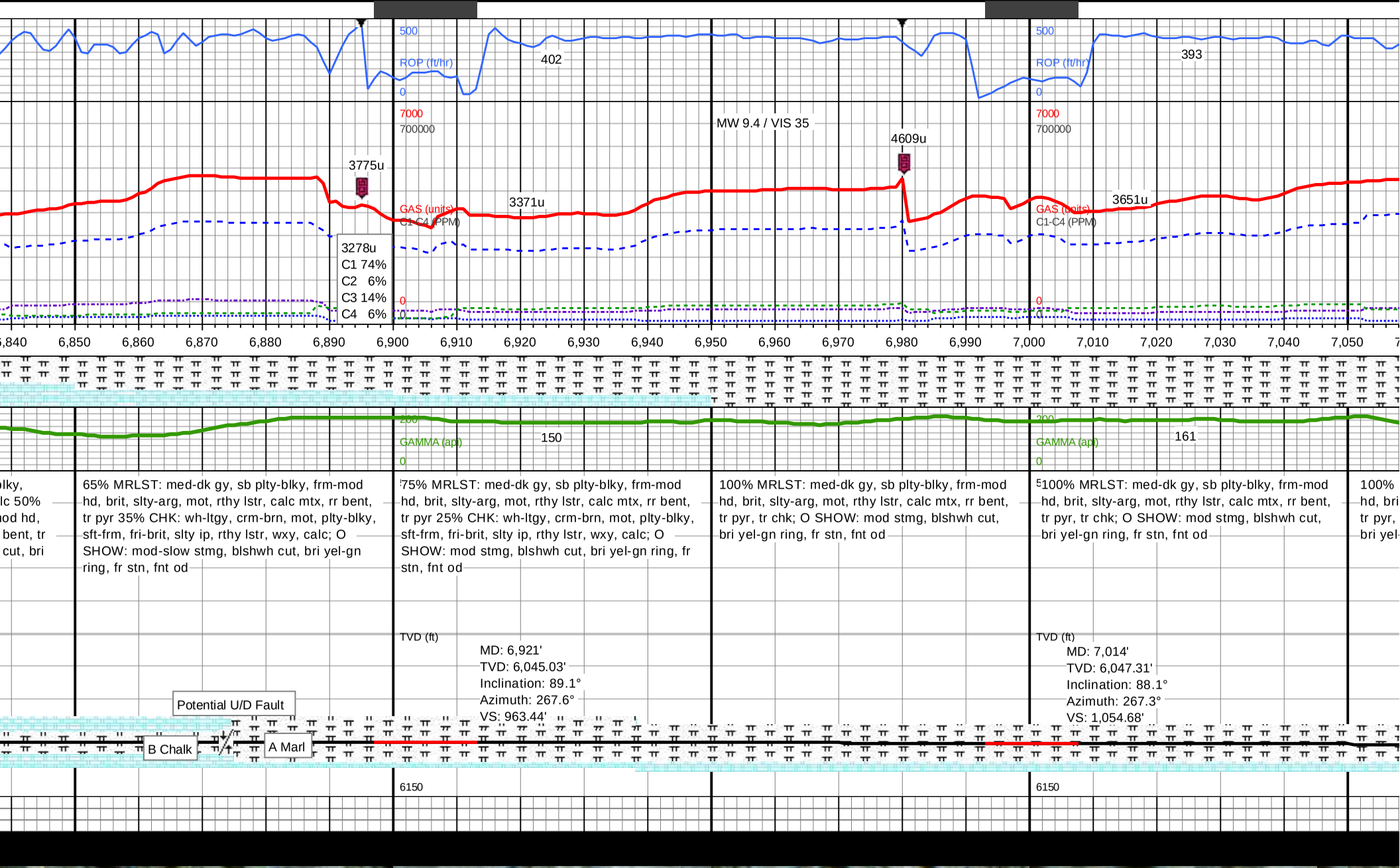

500
ROP (ft/hr)
0
203
199
7000
700000
MW 9.6 / VIS 38
1948u
C1 85%
C2 9%
C3 5%
C4 1%
GAS (units)
C1-C4 (PPM)
2122u
1297u
2085u
1697u
2748u
Sharon Springs
MD 5954' / TVD
5,740
5,750
5,760
5,770
5,780
5,790
5,800
5,810
5,820
5,830
5,840
5,850
5,860
5,870
5,880
5,890
5,900
5,910
5,920
5,930
5,940
5,950
200
GAMMA (api)
95
101
5525
MD: 5,759'
TVD: 5,681.5'
Inclination: 23.9°
Azimuth: 287.8°
VS: -40.05'
MD: 5,807'
TVD: 5,724.52'
Inclination: 28.7°
Azimuth: 286°
VS: -19.01'
MD: 5,855'
TVD: 5,765.61'
Inclination: 33.5°
Azimuth: 281.1°
VS: 5.67'
MD: 5,901'
TVD: 5,802.92'
Inclination: 38.1°
Azimuth: 276.1°
VS: 32.55'
MD: 5,949'
TVD: 5,839.13'
Inclination: 43.9
Azimuth: 273.8°
VS: 63.96'
TVD (ft)
6150
6150
H: lt-medgy, brn, occ bndd blk, sb
y, sft-frm, rthy-gritty, grdg-sltst ip,
-5% SHY SS: wh-ltgy, s&p, clr grns, sb
ty, p srtd, vf-f grnd, cly cmt, mod cons,
w stmg, blshwh cut, fnt yel-gn ring, no
95-100% SLTY SH: lt-medgy, brn, occ bndd blk, sb
plty-blky, occ plty, sft-frm, rthy-gritty, grdg-sltst ip,
arg-slty, aren ip 5-0% SHY SS: wh-ltgy, s&p, clr grns, sb
ang-sr, arg ip, slty, p srtd, vf-f grnd, cly cmt, mod cons,
fri; O SHOW: slow stmg, blshwh cut, fnt yel-gn ring, no
stn, no od
95-100% SLTY SH: lt-medgy, brn, occ bndd blk, sb
plty-blky, occ plty, sft-frm, rthy-gritty, grdg-sltst ip,
arg-slty, aren ip 5-0% SHY SS: wh-ltgy, s&p, clr grns, sb
ang-sr, arg ip, slty, p srtd, vf-f grnd, cly cmt, mod cons,
fri; O SHOW: slow stmg, blshwh cut, fnt yel-gn ring, v sl
tr stn, no od
100% SLTY SH: medgy-brn, occ ltgy, some dk gy, sb
plty-blky, plty, sft-frm, rthy-gritty, grdg-sltst ip, arg-slty, v
rr bent; O SHOW: slow stmg, milky wh cut, fnt yel-gn
ring, sl tr stn, no od

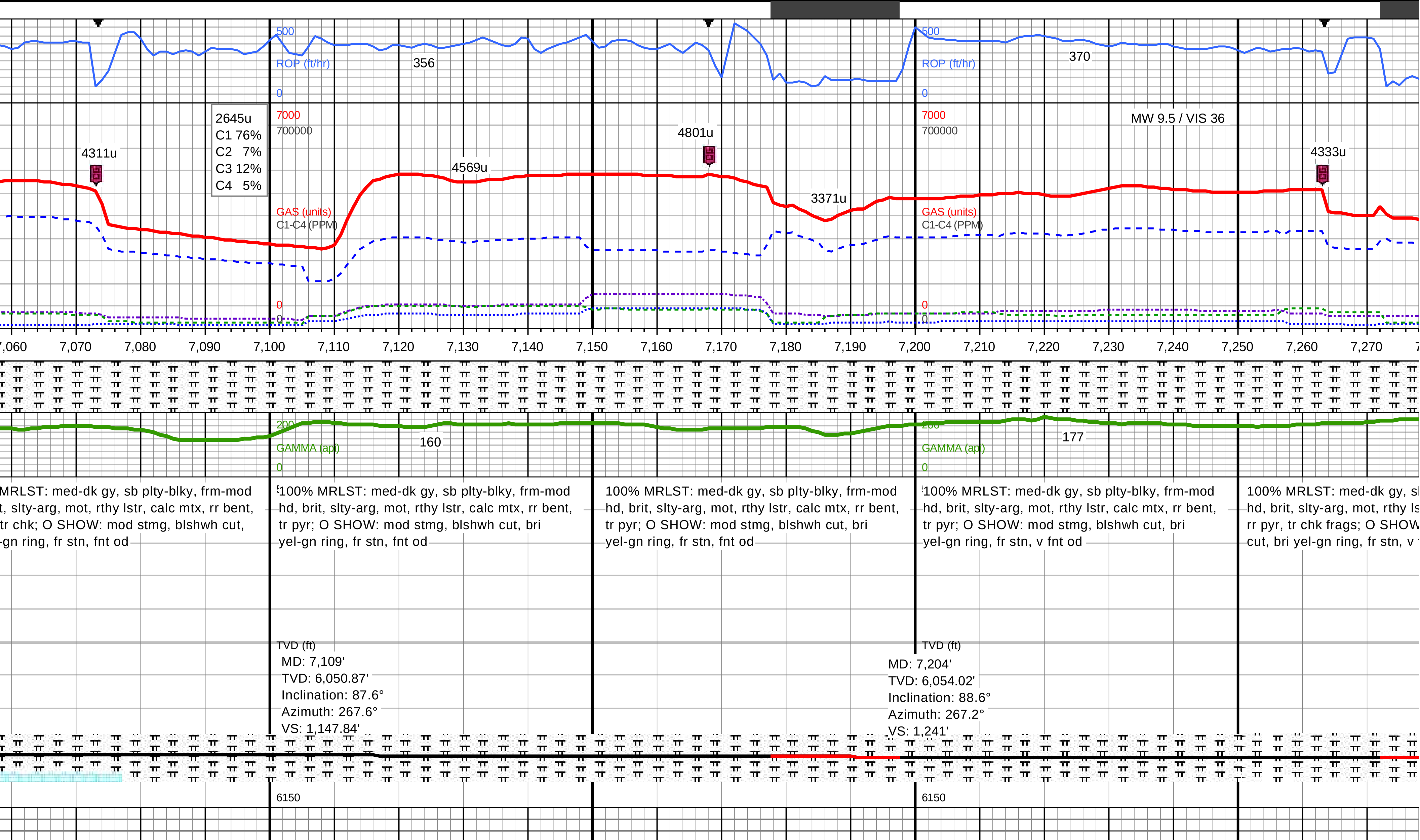

500
ROP (ft/hr)
0
312
297
MW 9.5 / VIS 40
7000
700000
3970u
4734u
GAS (units)
C1-C4 (PPM)
1694u
4894u
C1 85%
C2 10%
C3 5%
C4 0%
2202u
2083u
Niobrara A Chalk Top
MD 6167' / TVD 5965'
5,960
5,970
5,980
5,990
6,000
6,010
6,020
6,030
6,040
6,050
6,060
6,070
6,080
6,090
6,100
6,110
6,120
6,130
6,140
6,150
6,160
6,170
200
GAMMA (api)
163
129
5525
100% SLTY SH: medgy-brn, dk gy-blk, sb plty-blky, plty, sft-frm, brit, rthy-gritty, grdg-sltst ip, arg-slty, mod amt bent; O SHOW: slow stmg, blshwh cut, fr yel-gn ring, tr stn, fnt od
50-15% CHK: wh-ltgy, crm-brn, mot
fri-brit, slty ip, rthy lstr, wxy ip, calc
med-dk gy, brn-blk, sb plty-blky, plty
rthy-gritty, arg-slty, tr-sl amt bent 15
med-dk gy, sb plty-blky, frm-mod hd
mot, rthy lstr, calc mtx; O SHOW: sl
blshwh cut, fr yel-gn ring, fr stn, fnt
MD: 5,996'
TVD: 5,871.78'
Inclination: 48.1°
Azimuth: 268.6°
VS: 97.45'
MD: 6,044'
TVD: 5,902.11'
Inclination: 53.5°
Azimuth: 268.1°
VS: 134.05'
MD: 6,091'
TVD: 5,928.49'
Inclination: 58.2°
Azimuth: 268°
VS: 172.28'
MD: 6,139'
TVD: 5,952.85'
Inclination: 60.8°
Azimuth: 267.7°
VS: 212.92'
TVD (ft)
TVD (ft)
100% SLTY SH: medgy-brn, ltgy, some dk gy, sb plty-blky, plty, sft-frm, brit, rthy-gritty, grdg-sltst ip, arg-slty, tr bent; O SHOW: slow stmg, blshwh cut, fr yel-gn ring, tr stn, v fnt od
100% SLTY SH: medgy-brn, ltgy, some dk gy, sb plty-blky, plty, sft-frm, brit, rthy-gritty, grdg-sltst ip, arg-slty, tr-mod amt bent; O SHOW: slow stmg, blshwh cut, fr yel-gn ring, tr stn, v fnt od
6150
6150


500
ROP (ft/hr)
0
244
235
7000
700000
MW 9.3 / VIS 42
4627u
4796u
2689u
3834u
GAS (units)
C1-C4 (PPM)
3290u
C1 84%
C2 13%
C3 12%
C4 1%
Niobrara A Marl Top
MD 6186' / TVD 5975'
Niobrara B Chalk Top
MD 6387' / TVD 6037'
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
6,370
6,380
6,390
200
GAMMA (api)
121
127
95-100% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent 5-0% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc; O SHOW: slow-mod stmg, blshwh cut, fr yel-gn ring, fr stn, fnt od
100-90% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, occ fos frag 0-10% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc; O SHOW: mod stmg, blshwh cut, mod bri yel-gn ring, fr stn, fnt od
95-85% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, v rr bent, tr pyr 5-15% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc; O SHOW: mod-fast stmg, blshwh cut, mod bri yel-gn ring, fr stn, fnt od
60-75% CHK:
fri-brit, slty ip,
med-dk gy, sb
mot, rthy lstr,
mod-fast stmg,
stn, fnt od
MD: 6,186'
TVD: 5,974.55'
Inclination: 64.2°
Azimuth: 264.6°
VS: 253.63'
MD: 6,234'
TVD: 5,993.84'
Inclination: 68.4°
Azimuth: 264.6°
VS: 296.28'
MD: 6,281'
TVD: 6,009.17'
Inclination: 73.5°
Azimuth: 265.6°
VS: 339.47'
MD: 6,329'
TVD: 6,022.45'
Inclination: 74.4°
Azimuth: 266.2°
VS: 384.48'
MD: 6,377'
TVD: 6,035.19'
Inclination: 74.8°
Azimuth: 266.3°
VS: 429.7'
TVD (ft)
6150

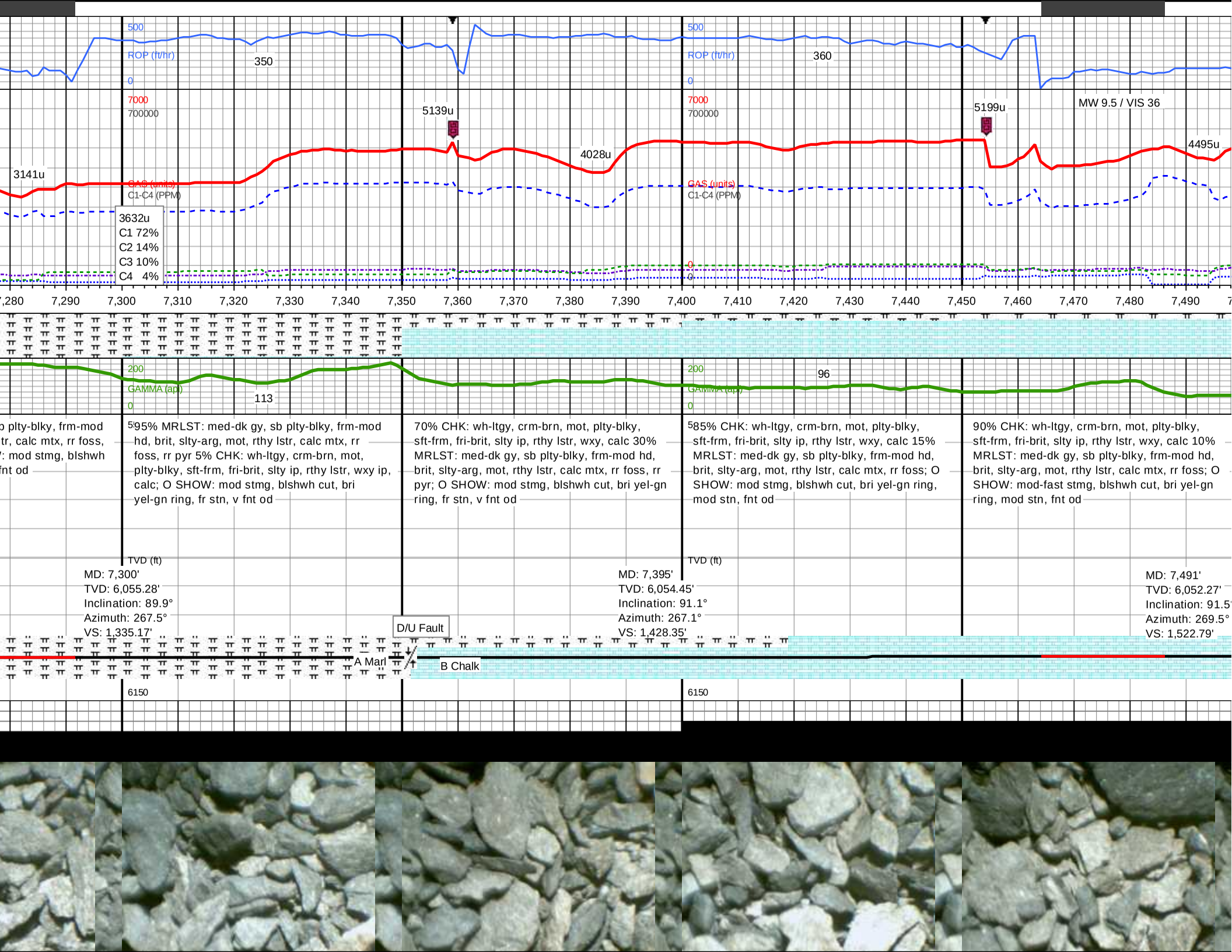

500
ROP (ft/hr)
0
166
7000
700000
5466u
GAS (units)
C1-C4 (PPM)
2777u
0
0
TD @ MD 6503'
02/20/2015 @ 15:11 MST
5526u
223
4310u
Extensive Gas Equipment Maintenance
Drilling Resumed
02/21/2015 @ 23:04 MST
4854u
02/21/2015
MINDEPTH
4875u
Extensive Gas Equipment
6,400
6,410
6,420
6,430
6,440
6,450
6,460
6,470
6,480
6,490
6,500
6,510
6,520
6,530
6,540
6,550
6,560
6,570
6,580
6,590
6,600
6,610
200
GAMMA (api)
0
88
131
50' Samples
wh-ltgy, crm-brn, mot, plty-blky, sft-frm, thy lstr, wxy, calc 40-25% MRLST: plty-blky, frm-mod hd, brit, slty-arg, alc mtx, rr bent, tr pyr; O SHOW: blshwh cut, mod bri yel-gn ring, mod
70-80% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 30-20% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, tr pyr; O SHOW: mod-fast stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
85% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 15% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, tr pyr; O SHOW: mod-slow stmg, blshwh cut, yel-gn ring, fr stn, fnt od
85% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 15% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, tr pyr; O SHOW: mod-slow stmg, blshwh cut, yel-gn ring, fr stn, fnt od
70% CHK: wh-ltgy, sft-frm, fri-brit, slt MRLST: med-dk g brit, slty-arg, mot, pyr; O SHOW: mo yel-gn ring, fr stn,
Bit Data
Bit #: 3
Type: SDi513
Size: 6.125"
Depth In: 6,503'
Depth Out: 10,629'
Jets: 5x16
S/N: JJ9938
TVD (ft)
MD: 6,425'
TVD: 6,045.29'
Inclination: 80.9°
Azimuth: 266.5°
VS: 475.56'
MD: 6,451'
TVD: 6,048.35'
Inclination: 85.6°
Azimuth: 266.5°
VS: 500.8'
MD: 6,503'
TVD: 6,050.34'
Inclination: 90°
Azimuth: 267°
VS: 551.66'
MD: 6,552'
TVD: 6,050.28'
Inclination: 92.2°
Azimuth: 269.4°
VS: 600'
6150

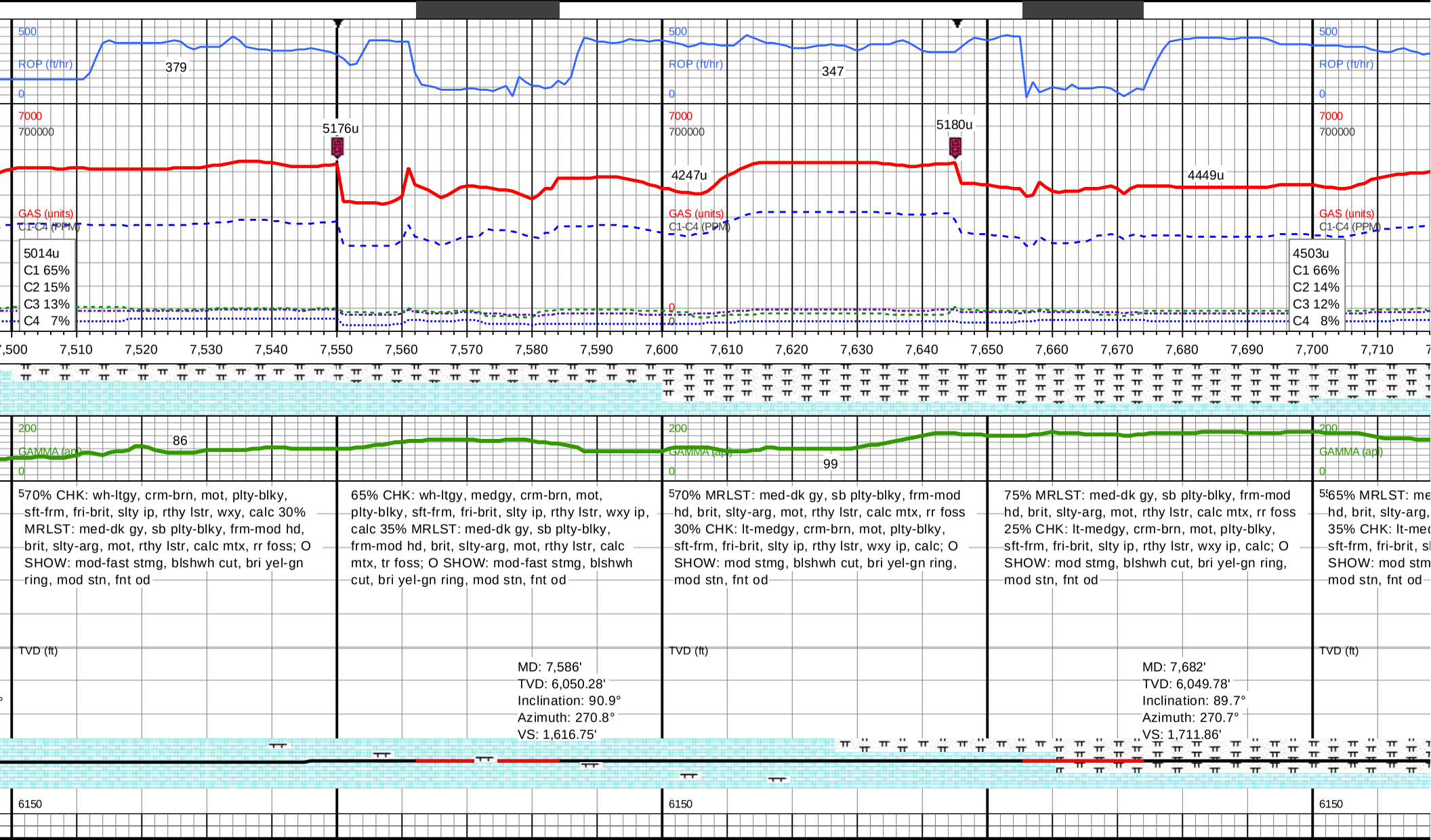

2/22/2015
148
ROP (ft/hr)
500
0
7000
700000
107
146
4879u
4311u
4269u
3373u
GAS (units)
C1-C4 (PPM)
4951u
C1 69%
C2 15%
C3 12%
C4 4%
1765u
Kinked Gas Line
Maintenance
6,620
6,630
6,640
6,650
6,660
6,670
6,680
6,690
6,700
6,710
6,720
6,730
6,740
6,750
6,760
6,770
6,780
6,790
6,800
6,810
6,820
6,830
146
GAMMA (api)
200
0
136
147
, crm-brn, mot, plty-blky,
y ip, rthy lstr, wxy, calc 30%
gy, sb plty-blky, frm-mod hd,
rthy lstr, calc mtx, rr bent, tr
od-slow stmg, blshwh cut,
fnt od
70% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, tr pyr 30% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-slow stmg, blshwh cut, yel-gn ring, fr stn, fnt od
65% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, tr pyr 35% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-slow stmg, blshwh cut, bri yel-gn ring, fr stn, fnt od
70% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, tr pyr 30% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-slow stmg, blshwh cut, bri yel-gn ring, fr stn, fnt od
50% CHK: wh-ltgy, crm-brn, mot, plty-b
sft-frm, fri-brit, slty ip, rthy lstr, wxy, ca
MRLST: med-dk gy, sb plty-blky, frm-m
brit, slty-arg, mot, rthy lstr, calc mtx, rr
pyr; O SHOW: mod-slow stmg, blshwh
yel-gn ring, fr stn, fnt od
TVD (ft)
MD: 6,647'
TVD: 6,047.22'
Inclination: 91.5°
Azimuth: 268.1°
VS: 693.57'
MD: 6,737'
TVD: 6,045.19'
Inclination: 91.1°
Azimuth: 269.2°
VS: 782.21'
MD: 6,829'
TVD: 6,044.31'
Inclination: 90°
Azimuth: 268.8°
VS: 872.94'
6150

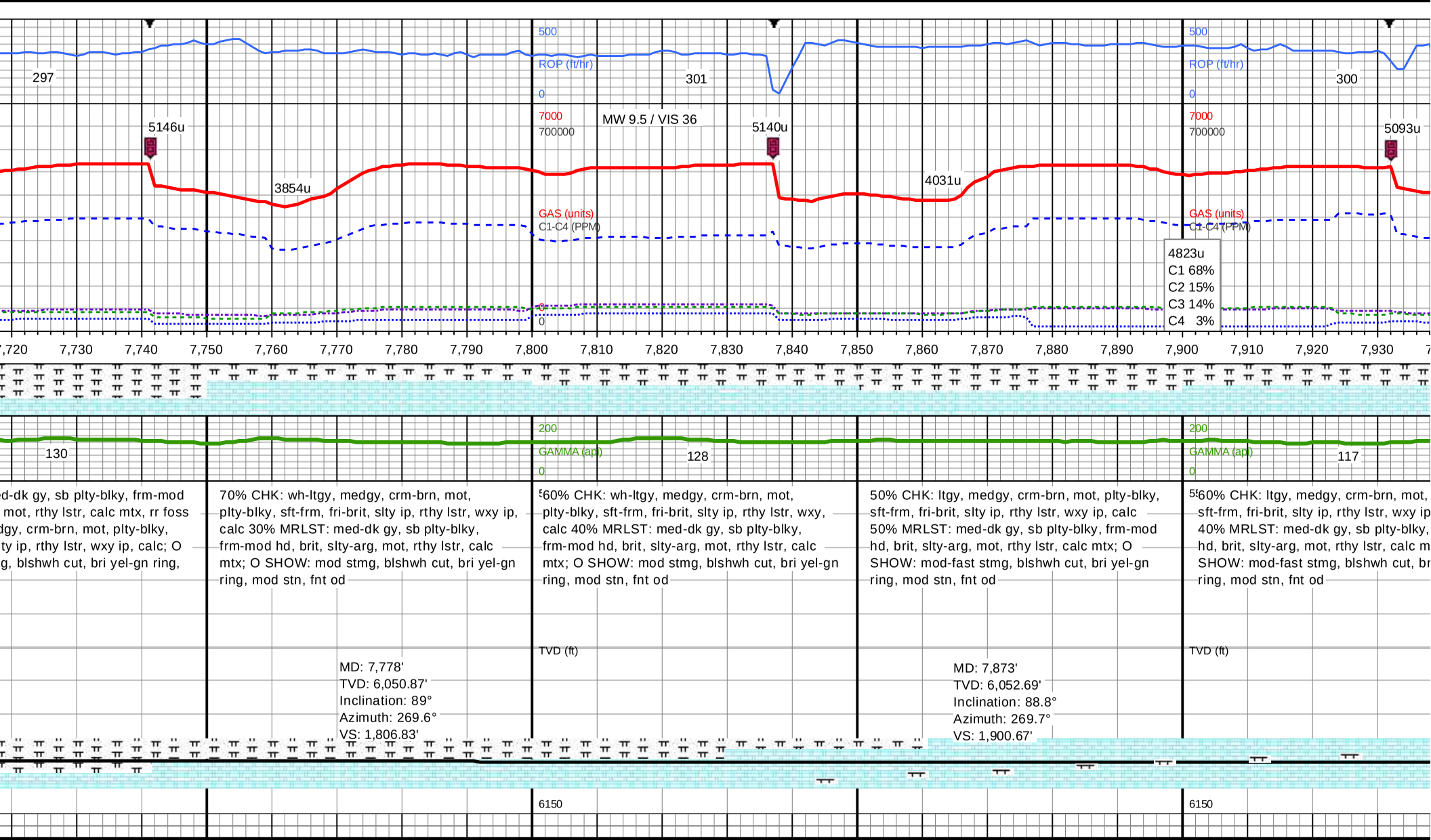

500
ROP (ft/hr)
0
402
7000
700000
MW 9.4 / VIS 35
3775u
4609u
3371u
3651u
GAS (units)
C1-C4 (PPM)
3278u
C1 74%
C2 6%
C3 14%
C4 6%
0
6,840
6,850
6,860
6,870
6,880
6,890
6,900
6,910
6,920
6,930
6,940
6,950
6,960
6,970
6,980
6,990
7,000
7,010
7,020
7,030
7,040
7,050
200
GAMMA (api)
150
161
65% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, tr pyr 35% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-slow stmg, blshwh cut, bri yel-gn ring, fr stn, fnt od
75% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, tr pyr 25% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, fr stn, fnt od
100% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, tr pyr, tr chk; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, fr stn, fnt od
100% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, tr pyr, tr chk; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, fr stn, fnt od
TVD (ft)
MD: 6,921'
TVD: 6,045.03'
Inclination: 89.1°
Azimuth: 267.6°
VS: 963.44'
MD: 7,014'
TVD: 6,047.31'
Inclination: 88.1°
Azimuth: 267.3°
VS: 1,054.68'
Potential U/D Fault
B Chalk
A Marl
6150

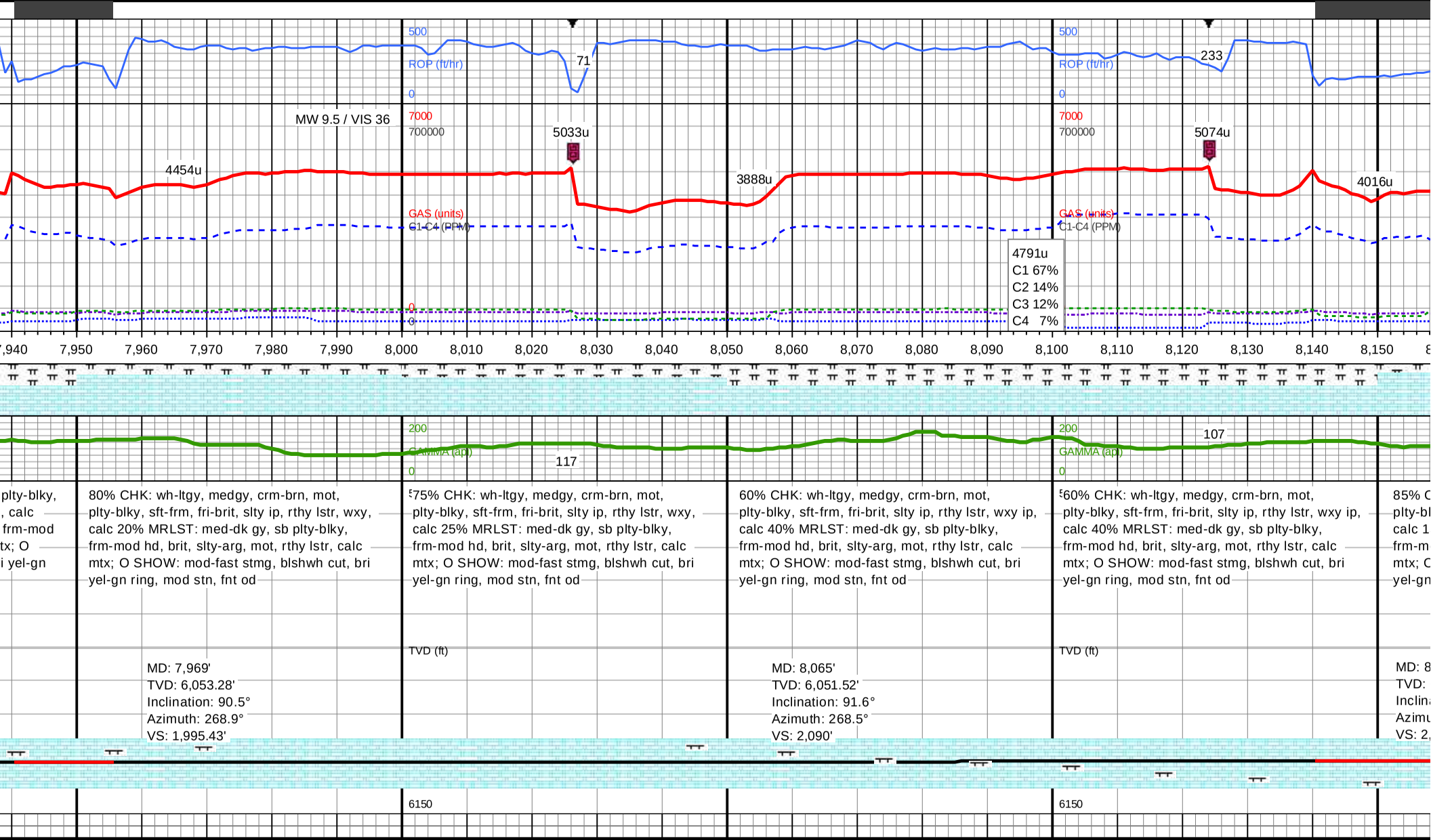


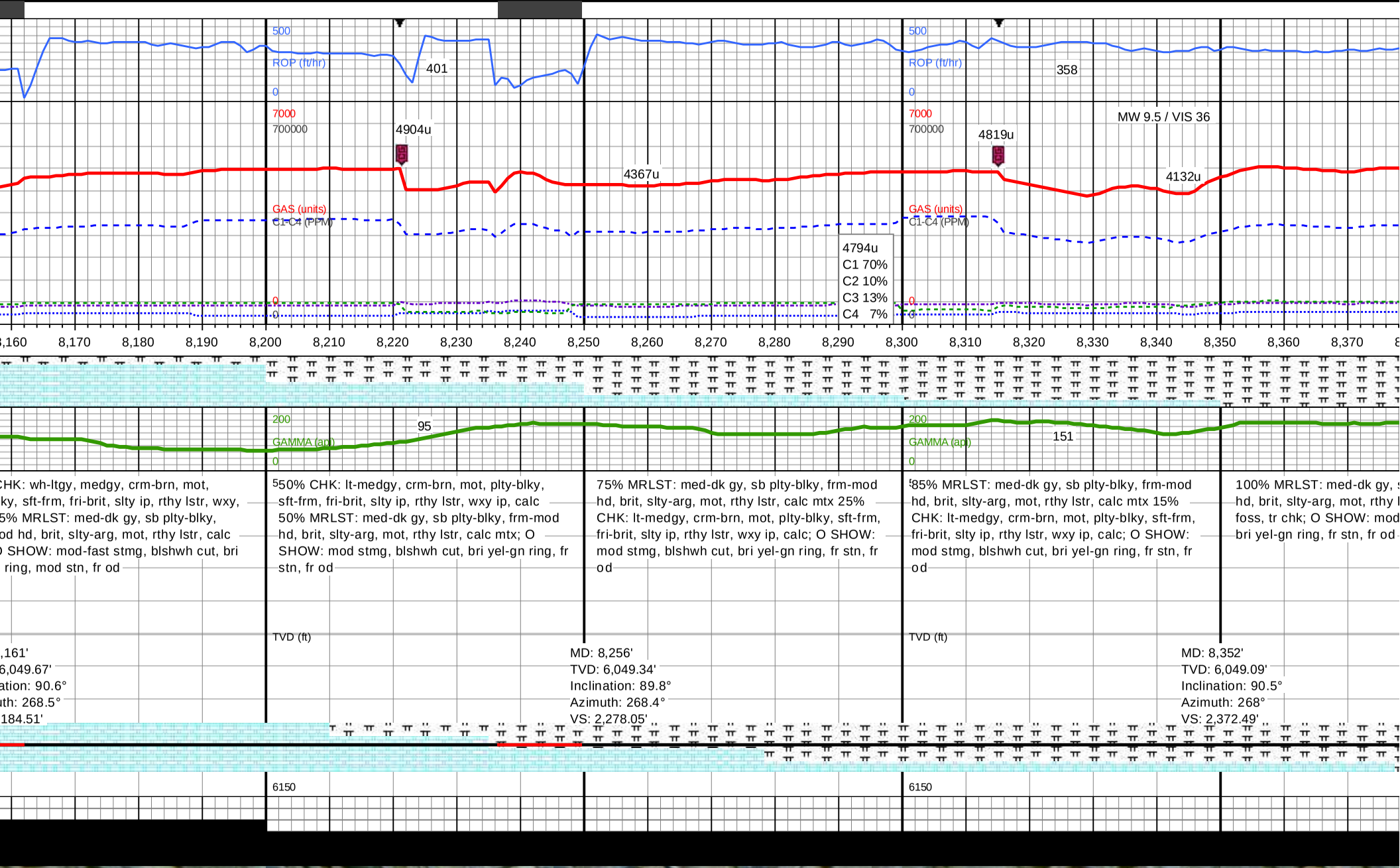
ROP (ft/hr)
500
0
356
370
7000
700000
GAS (units)
C1-C4 (PPM)
0
4311u
2645u
C1 76%
C2 7%
C3 12%
C4 5%
4569u
4801u
3371u
4333u
MW 9.5 / VIS 36
7,060
7,070
7,080
7,090
7,100
7,110
7,120
7,130
7,140
7,150
7,160
7,170
7,180
7,190
7,200
7,210
7,220
7,230
7,240
7,250
7,260
7,270
200
GAMMA (api)
0
160
177
MRLST: med-dk gy, sb plty-blky, frm-mod
t, slty-arg, mot, rthy lstr, calc mtx, rr bent,
tr chk; O SHOW: mod stmg, blshwh cut,
-gn ring, fr stn, fnt od
100% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, tr pyr; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, fr stn, fnt od
100% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, tr pyr; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, fr stn, fnt od
100% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, tr pyr; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, fr stn, v fnt od
100% MRLST: med-dk gy, sl
hd, brit, slty-arg, mot, rthy ls
rr pyr, tr chk frags; O SHOW
cut, bri yel-gn ring, fr stn, v
TVD (ft)
MD: 7,109'
TVD: 6,050.87'
Inclination: 87.6°
Azimuth: 267.6°
VS: 1,147.84'
TVD (ft)
MD: 7,204'
TVD: 6,054.02'
Inclination: 88.6°
Azimuth: 267.2°
VS: 1,241'
6150
6150

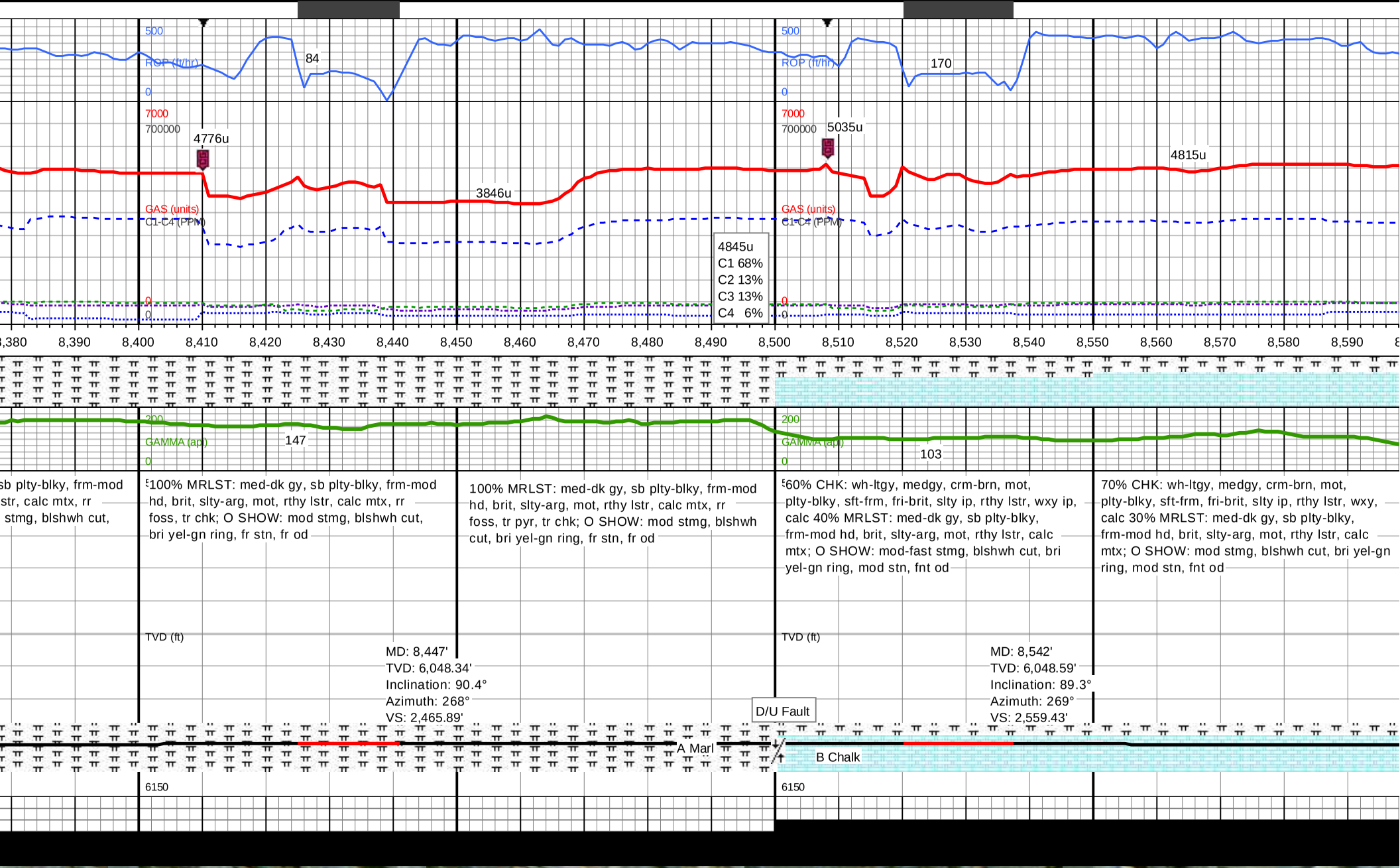

500
ROP (ft/hr)
0
350
360
7000
700000
5139u
5199u
MW 9.5 / VIS 36
4028u
4495u
3141u
GAS (units)
C1-C4 (PPM)
3632u
C1 72%
C2 14%
C3 10%
C4 4%
7,280
7,290
7,300
7,310
7,320
7,330
7,340
7,350
7,360
7,370
7,380
7,390
7,400
7,410
7,420
7,430
7,440
7,450
7,460
7,470
7,480
7,490
200
GAMMA (api)
0
113
96
plty-blky, frm-mod
tr, calc mtx, rr foss,
: mod stmg, blshwh
fnt od
95% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr foss, rr pyr 5% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, fr stn, v fnt od
70% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 30% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr foss, rr pyr; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, fr stn, v fnt od
85% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 15% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr foss; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
90% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 10% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr foss; O SHOW: mod-fast stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
TVD (ft)
MD: 7,300'
TVD: 6,055.28'
Inclination: 89.9°
Azimuth: 267.5°
VS: 1,335.17'
MD: 7,395'
TVD: 6,054.45'
Inclination: 91.1°
Azimuth: 267.1°
VS: 1,428.35'
MD: 7,491'
TVD: 6,052.27'
Inclination: 91.5
Azimuth: 269.5°
VS: 1,522.79'
D/U Fault
A Marl
B Chalk
6150

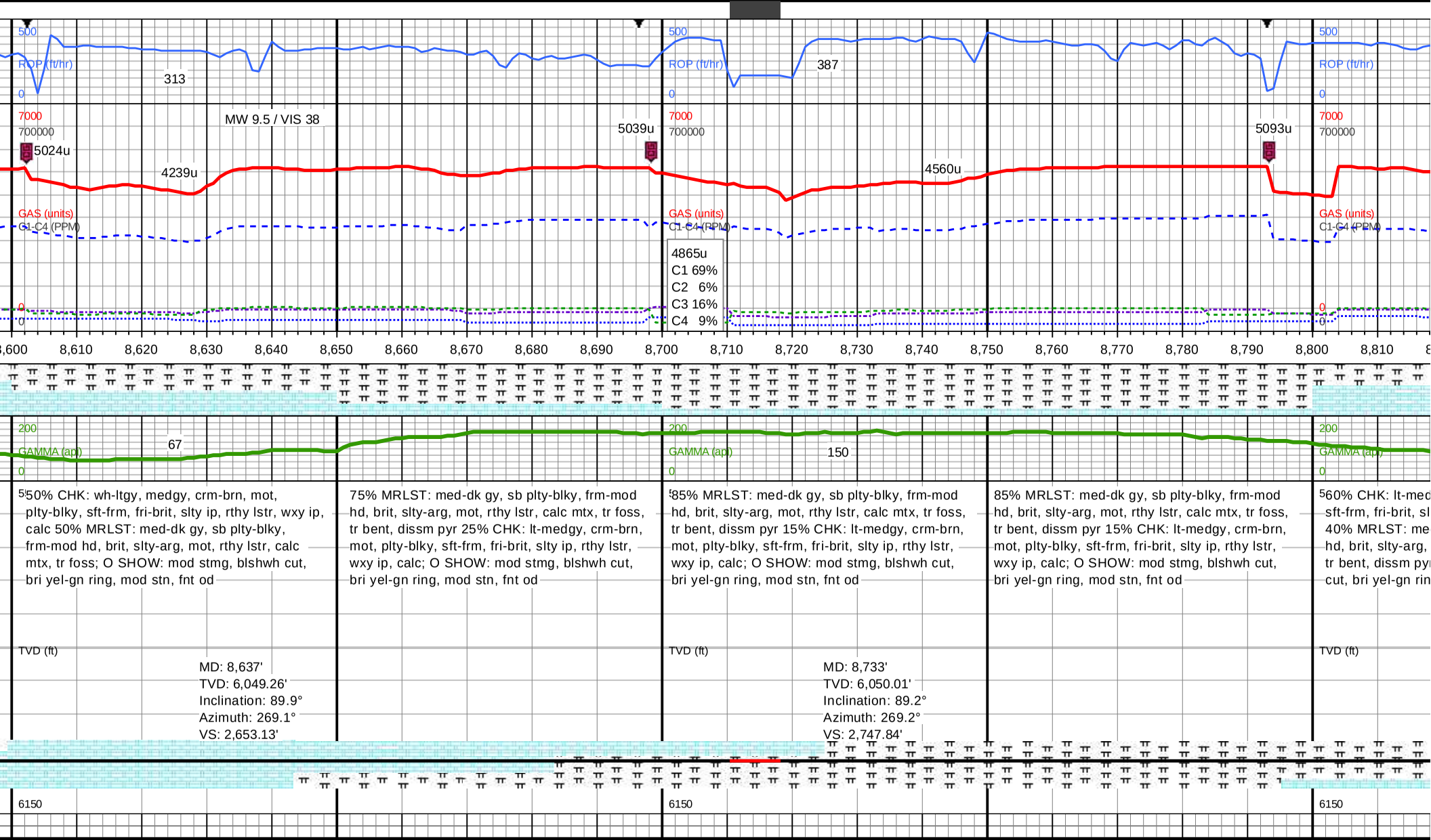

500
ROP (ft/hr)
0
379
347
7000
700000
5176u
5180u
4247u
4449u
GAS (units)
C1-C4 (PPM)
5014u
C1 65%
C2 15%
C3 13%
C4 7%
4503u
C1 66%
C2 14%
C3 12%
C4 8%
7,500
7,510
7,520
7,530
7,540
7,550
7,560
7,570
7,580
7,590
7,600
7,610
7,620
7,630
7,640
7,650
7,660
7,670
7,680
7,690
7,700
7,710
200
GAMMA (api)
86
99
570% CHK: wh-ltgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 30% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr foss; O SHOW: mod-fast stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
65% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc 35% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, tr foss; O SHOW: mod-fast stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
570% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr foss 30% CHK: lt-medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
75% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr foss 25% CHK: lt-medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
TVD (ft)
MD: 7,586'
TVD: 6,050.28'
Inclination: 90.9°
Azimuth: 270.8°
VS: 1,616.75'
MD: 7,682'
TVD: 6,049.78'
Inclination: 89.7°
Azimuth: 270.7°
VS: 1,711.86'
6150

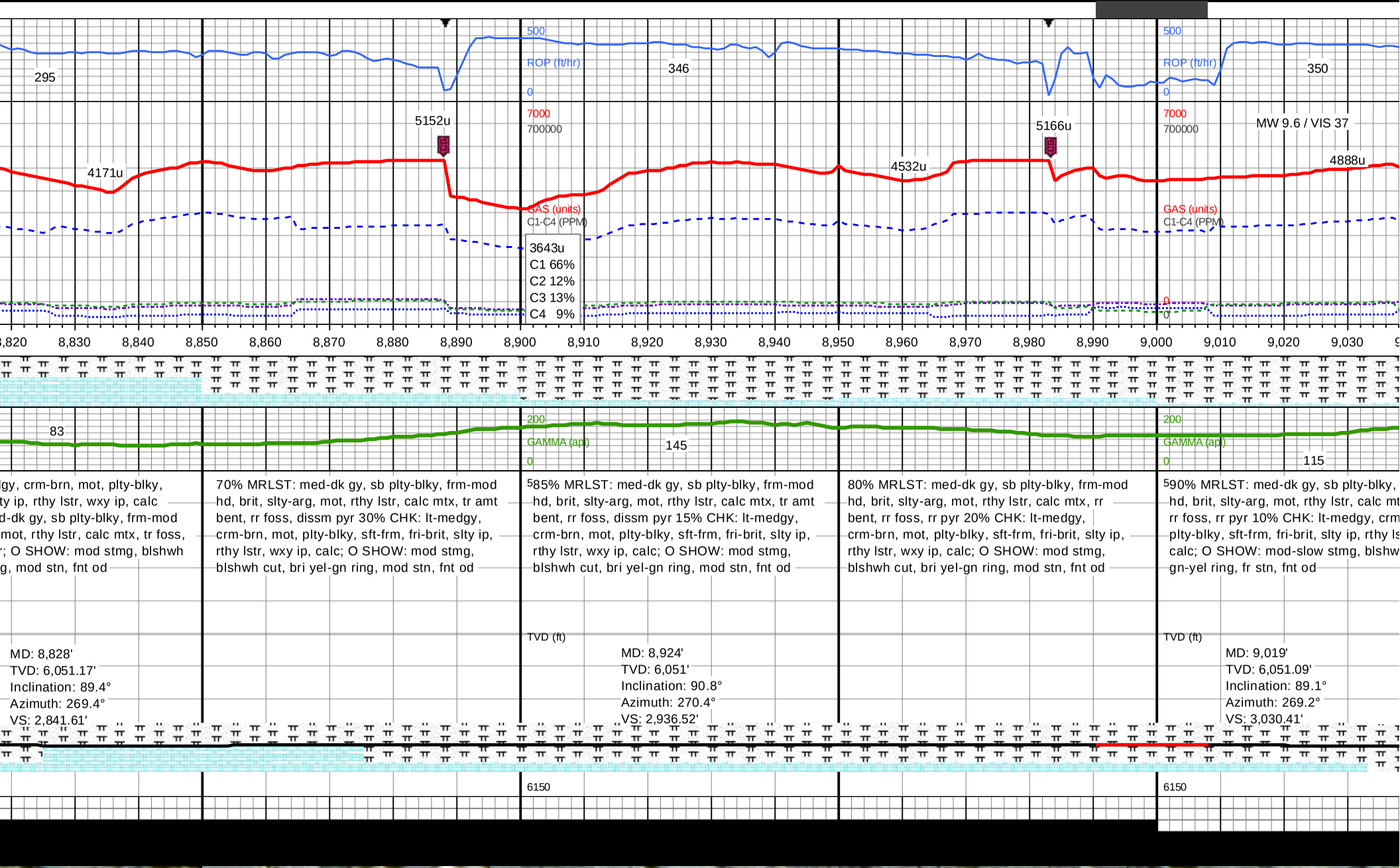

297
301
300
500
ROP (ft/hr)
0
7000
700000
MW 9.5 / VIS 36
5146u
5140u
5093u
3854u
4031u
GAS (units)
C1-C4 (PPM)
4823u
C1 68%
C2 15%
C3 14%
C4 3%
7,720
7,730
7,740
7,750
7,760
7,770
7,780
7,790
7,800
7,810
7,820
7,830
7,840
7,850
7,860
7,870
7,880
7,890
7,900
7,910
7,920
7,930
130
128
117
200
GAMMA (api)
d-dk gy, sb plty-blky, frm-mod
mot, rthy lstr, calc mtx, rr foss
dgy, crm-brn, mot, plty-blky,
ty ip, rthy lstr, wxy ip, calc; O
g, blshwh cut, bri yel-gn ring,
70% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc 30% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
60% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 40% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
50% CHK: ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc 50% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-fast stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
60% CHK: ltgy, medgy, crm-brn, mot, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip 40% MRLST: med-dk gy, sb plty-blky, hd, brit, slty-arg, mot, rthy lstr, calc m SHOW: mod-fast stmg, blshwh cut, br ring, mod stn, fnt od
TVD (ft)
MD: 7,778'
TVD: 6,050.87'
Inclination: 89°
Azimuth: 269.6°
VS: 1,806.83'
MD: 7,873'
TVD: 6,052.69'
Inclination: 88.8°
Azimuth: 269.7°
VS: 1,900.67'
6150

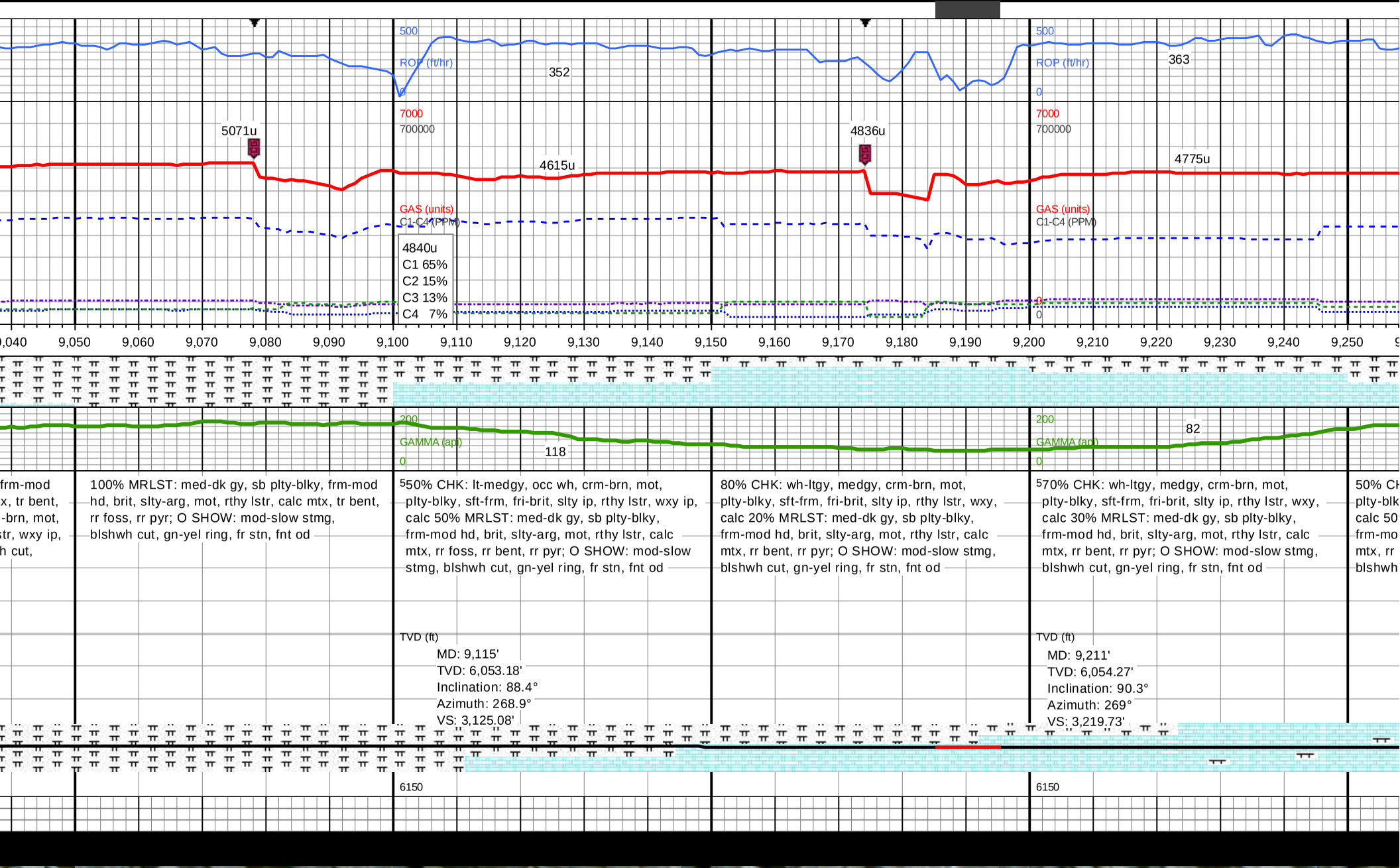

500
ROP (ft/hr)
0
71
233
MW 9.5 / VIS 36
7000
700000
5033u
5074u
4454u
3888u
4016u
GAS (units)
C1-C4 (PPM)
4791u
C1 67%
C2 14%
C3 12%
C4 7%
7,940
7,950
7,960
7,970
7,980
7,990
8,000
8,010
8,020
8,030
8,040
8,050
8,060
8,070
8,080
8,090
8,100
8,110
8,120
8,130
8,140
8,150
200
GAMMA (api)
117
107
80% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 20% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-fast stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
75% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 25% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-fast stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
60% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc 40% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-fast stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
60% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc 40% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-fast stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
TVD (ft)
MD: 7,969'
TVD: 6,053.28'
Inclination: 90.5°
Azimuth: 268.9°
VS: 1,995.43'
MD: 8,065'
TVD: 6,051.52'
Inclination: 91.6°
Azimuth: 268.5°
VS: 2,090'
6150

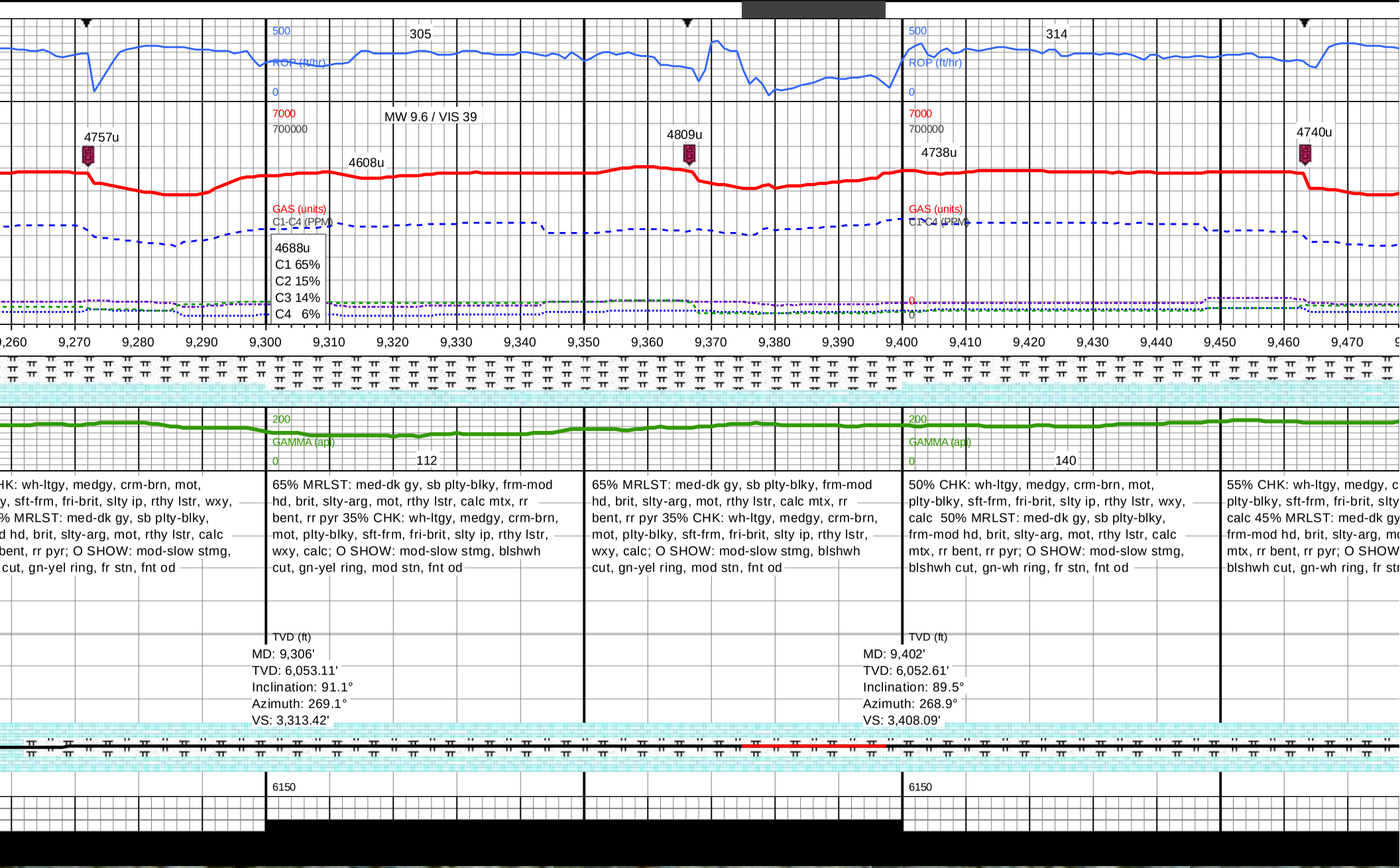

500
ROP (ft/hr)
0
401
358
7000
700000
4904u
4819u
MW 9.5 / VIS 36
4367u
4132u
GAS (units)
C1-C4 (PPM)
4794u
C1 70%
C2 10%
C3 13%
C4 7%
8,160
8,170
8,180
8,190
8,200
8,210
8,220
8,230
8,240
8,250
8,260
8,270
8,280
8,290
8,300
8,310
8,320
8,330
8,340
8,350
8,360
8,370
200
GAMMA (api)
95
151
CHK: wh-ltgy, medgy, crm-brn, mot,
ky, sft-frm, fri-brit, slty ip, rthy lstr, wxy,
5% MRLST: med-dk gy, sb plty-blky,
od hd, brit, slty-arg, mot, rthy lstr, calc
SHOW: mod-fast stmg, blshwh cut, bri
ring, mod stn, fr od
50% CHK: lt-medgy, crm-brn, mot, plty-blky,
sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc
50% MRLST: med-dk gy, sb plty-blky, frm-mod
hd, brit, slty-arg, mot, rthy lstr, calc mtx; O
SHOW: mod stmg, blshwh cut, bri yel-gn ring, fr
stn, fr od
75% MRLST: med-dk gy, sb plty-blky, frm-mod
hd, brit, slty-arg, mot, rthy lstr, calc mtx 25%
CHK: lt-medgy, crm-brn, mot, plty-blky, sft-frm,
fri-brit, slty ip, rthy lstr, wxy ip, calc; O SHOW:
mod stmg, blshwh cut, bri yel-gn ring, fr stn, fr
od
85% MRLST: med-dk gy, sb plty-blky, frm-mod
hd, brit, slty-arg, mot, rthy lstr, calc mtx 15%
CHK: lt-medgy, crm-brn, mot, plty-blky, sft-frm,
fri-brit, slty ip, rthy lstr, wxy ip, calc; O SHOW:
mod stmg, blshwh cut, bri yel-gn ring, fr stn, fr
od
100% MRLST: med-dk gy,
hd, brit, slty-arg, mot, rthy
foss, tr chk; O SHOW: mod
bri yel-gn ring, fr stn, fr od
TVD (ft)
,161'
6,049.67'
ation: 90.6°
uth: 268.5°
184.51'
MD: 8,256'
TVD: 6,049.34'
Inclination: 89.8°
Azimuth: 268.4°
VS: 2,278.05'
TVD (ft)
MD: 8,352'
TVD: 6,049.09'
Inclination: 90.5°
Azimuth: 268°
VS: 2,372.49'
6150
6150

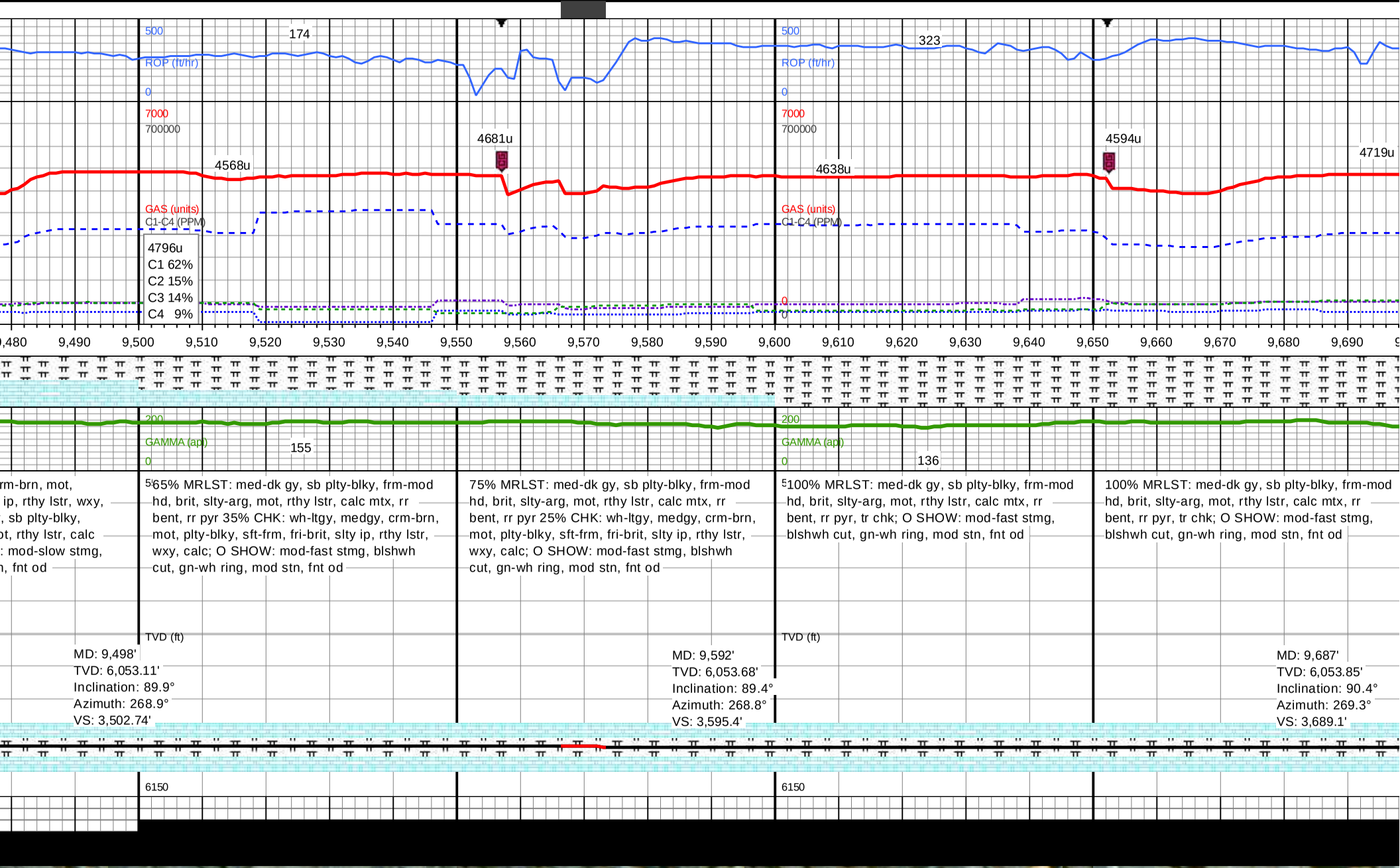

500
ROP (ft/hr)
0
84
170
7000
700000
4776u
5035u
3846u
4815u
GAS (units)
C1-C4 (PPM)
4845u
C1 68%
C2 13%
C3 13%
C4 6%
8,380
8,390
8,400
8,410
8,420
8,430
8,440
8,450
8,460
8,470
8,480
8,490
8,500
8,510
8,520
8,530
8,540
8,550
8,560
8,570
8,580
8,590
200
GAMMA (api)
147
103
sb plty-blky, frm-mod
str, calc mtx, rr
stmg, blshwh cut,
100% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr foss, tr chk; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, fr stn, fr od
100% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr foss, tr pyr, tr chk; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, fr stn, fr od
60% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc 40% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-fast stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
70% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 30% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
TVD (ft)
MD: 8,447'
TVD: 6,048.34'
Inclination: 90.4°
Azimuth: 268°
VS: 2,465.89'
D/U Fault
MD: 8,542'
TVD: 6,048.59'
Inclination: 89.3°
Azimuth: 269°
VS: 2,559.43'
A Marl
B Chalk
6150

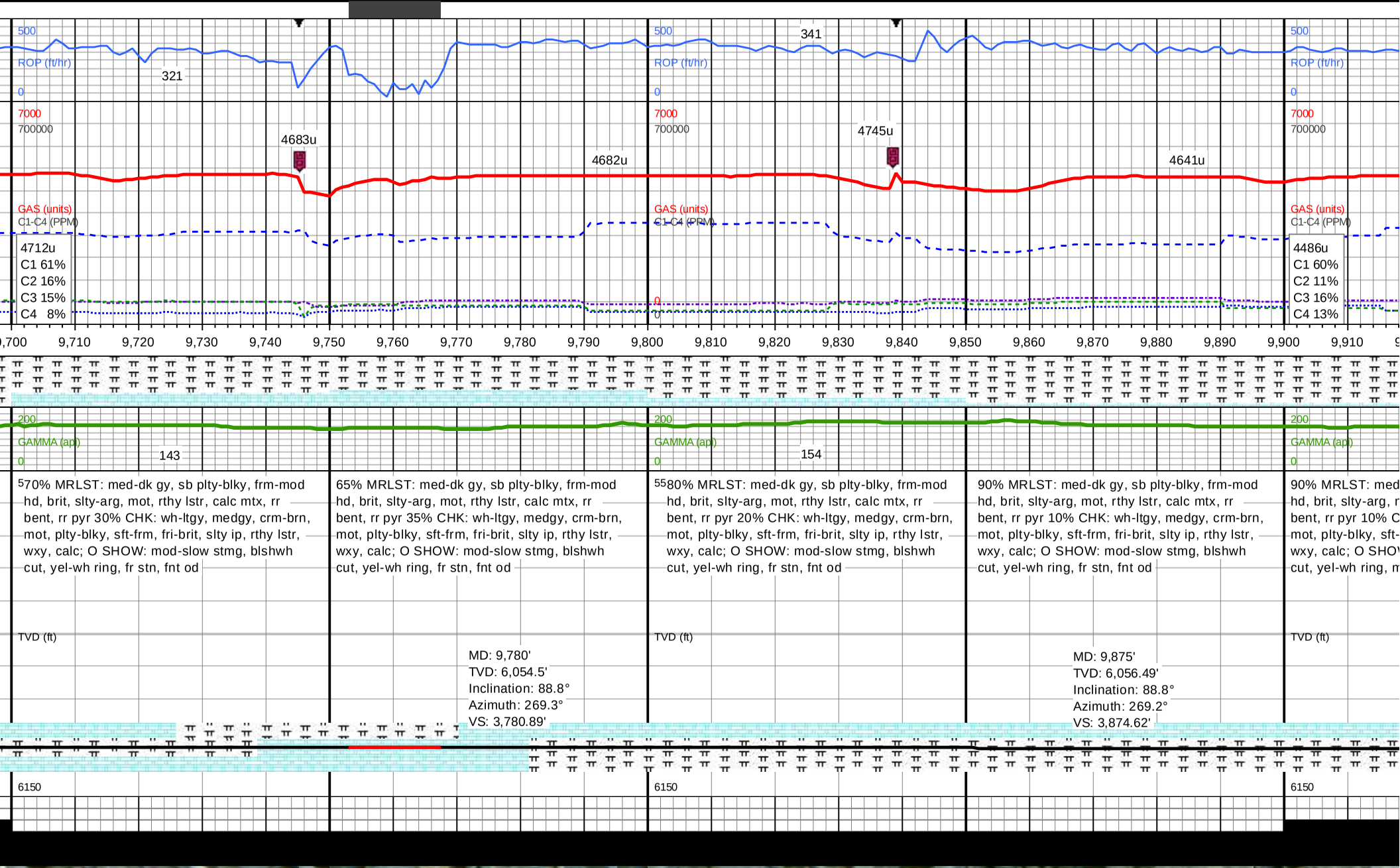

500
ROP (ft/hr)
0
313
387
7000
700000
MW 9.5 / VIS 38
5024u
4239u
5039u
4560u
5093u
GAS (units)
C1-C4 (PPM)
4865u
C1 69%
C2 6%
C3 16%
C4 9%
8,600
8,610
8,620
8,630
8,640
8,650
8,660
8,670
8,680
8,690
8,700
8,710
8,720
8,730
8,740
8,750
8,760
8,770
8,780
8,790
8,800
8,810
200
GAMMA (api)
67
150
50% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc 50% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, tr foss; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
75% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, tr foss, tr bent, dissm pyr 25% CHK: lt-medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
85% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, tr foss, tr bent, dissm pyr 15% CHK: lt-medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
85% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, tr foss, tr bent, dissm pyr 15% CHK: lt-medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc; O SHOW: mod stmg, blshwh cut, bri yel-gn ring, mod stn, fnt od
60% CHK: lt-med sft-frm, fri-brit, sl 40% MRLST: me hd, brit, slty-arg, tr bent, dissm py cut, bri yel-gn rin
TVD (ft)
MD: 8,637'
TVD: 6,049.26'
Inclination: 89.9°
Azimuth: 269.1°
VS: 2,653.13'
MD: 8,733'
TVD: 6,050.01'
Inclination: 89.2°
Azimuth: 269.2°
VS: 2,747.84'
6150

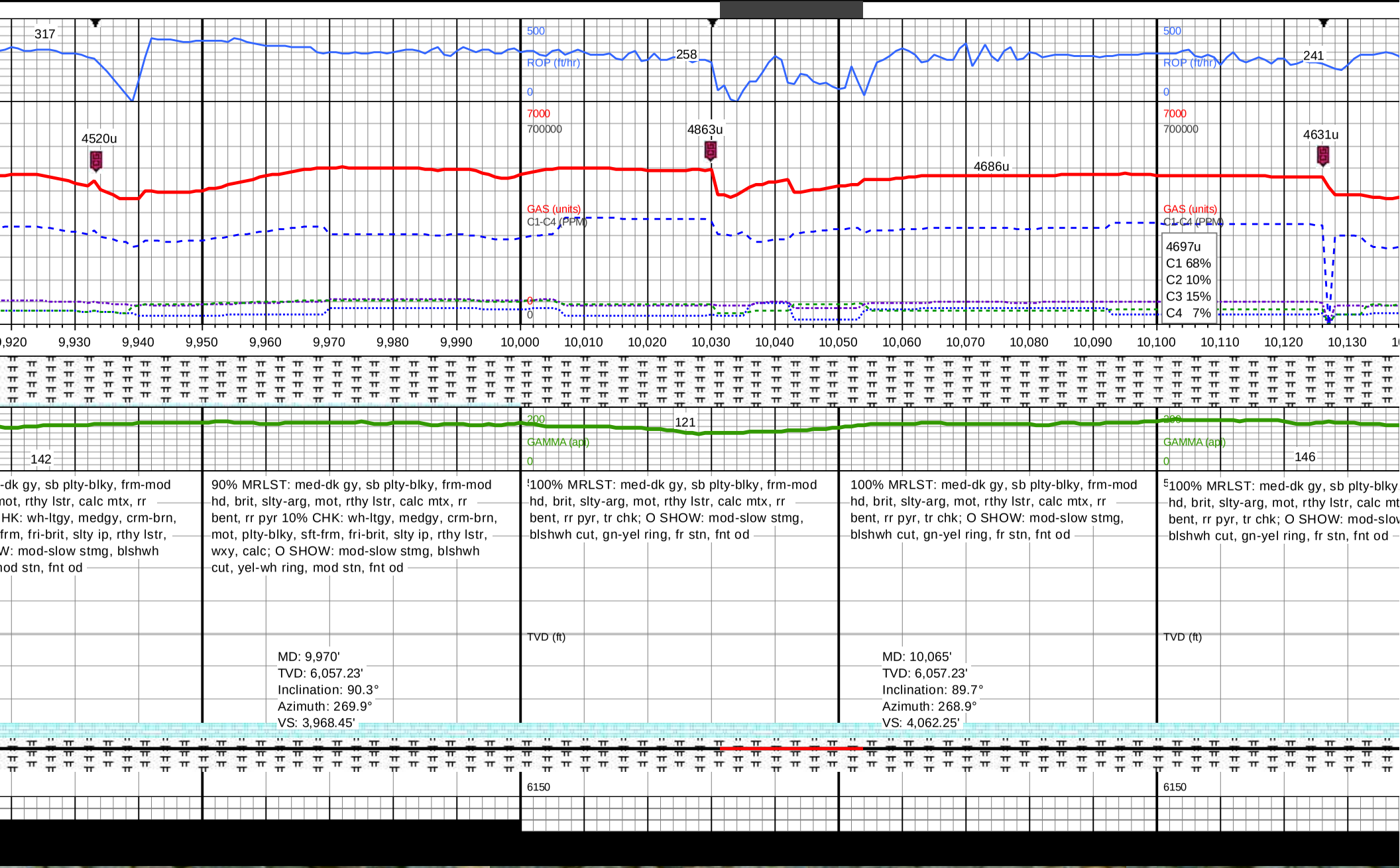

295
500
ROP (ft/hr)
0
346
7000
700000
5152u
4171u
GAS (units)
C1-C4 (PPM)
3643u
C1 66%
C2 12%
C3 13%
C4 9%
500
ROP (ft/hr)
0
350
7000
700000
MW 9.6 / VIS 37
5166u
4532u
4888u
GAS (units)
C1-C4 (PPM)
0
8,820
8,830
8,840
8,850
8,860
8,870
8,880
8,890
8,900
8,910
8,920
8,930
8,940
8,950
8,960
8,970
8,980
8,990
9,000
9,010
9,020
9,030
83
200
GAMMA (api)
0
145
200
GAMMA (api)
0
115
gy, crm-brn, mot, plty-blky,
ty ip, rthy lstr, wxy ip, calc
d-dk gy, sb plty-blky, frm-mod
mot, rthy lstr, calc mtx, tr foss,
r; O SHOW: mod stmg, blshwh
g, mod stn, fnt od
70% MRLST: med-dk gy, sb plty-blky, frm-mod
hd, brit, slty-arg, mot, rthy lstr, calc mtx, tr amt
bent, rr foss, dissm pyr 30% CHK: lt-medgy,
crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip,
rthy lstr, wxy ip, calc; O SHOW: mod stmg,
blshwh cut, bri yel-gn ring, mod stn, fnt od
85% MRLST: med-dk gy, sb plty-blky, frm-mod
hd, brit, slty-arg, mot, rthy lstr, calc mtx, tr amt
bent, rr foss, dissm pyr 15% CHK: lt-medgy,
crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip,
rthy lstr, wxy ip, calc; O SHOW: mod stmg,
blshwh cut, bri yel-gn ring, mod stn, fnt od
80% MRLST: med-dk gy, sb plty-blky, frm-mod
hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr
bent, rr foss, rr pyr 20% CHK: lt-medgy,
crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip,
rthy lstr, wxy ip, calc; O SHOW: mod stmg,
blshwh cut, bri yel-gn ring, mod stn, fnt od
90% MRLST: med-dk gy, sb plty-blky,
hd, brit, slty-arg, mot, rthy lstr, calc mt
rr foss, rr pyr 10% CHK: lt-medgy, crm
plty-blky, sft-frm, fri-brit, slty ip, rthy ls
calc; O SHOW: mod-slow stmg, blshw
gn-yel ring, fr stn, fnt od
TVD (ft)
TVD (ft)
MD: 8,828'
TVD: 6,051.17'
Inclination: 89.4°
Azimuth: 269.4°
VS: 2,841.61'
MD: 8,924'
TVD: 6,051'
Inclination: 90.8°
Azimuth: 270.4°
VS: 2,936.52'
MD: 9,019'
TVD: 6,051.09'
Inclination: 89.1°
Azimuth: 269.2°
VS: 3,030.41'
6150
6150

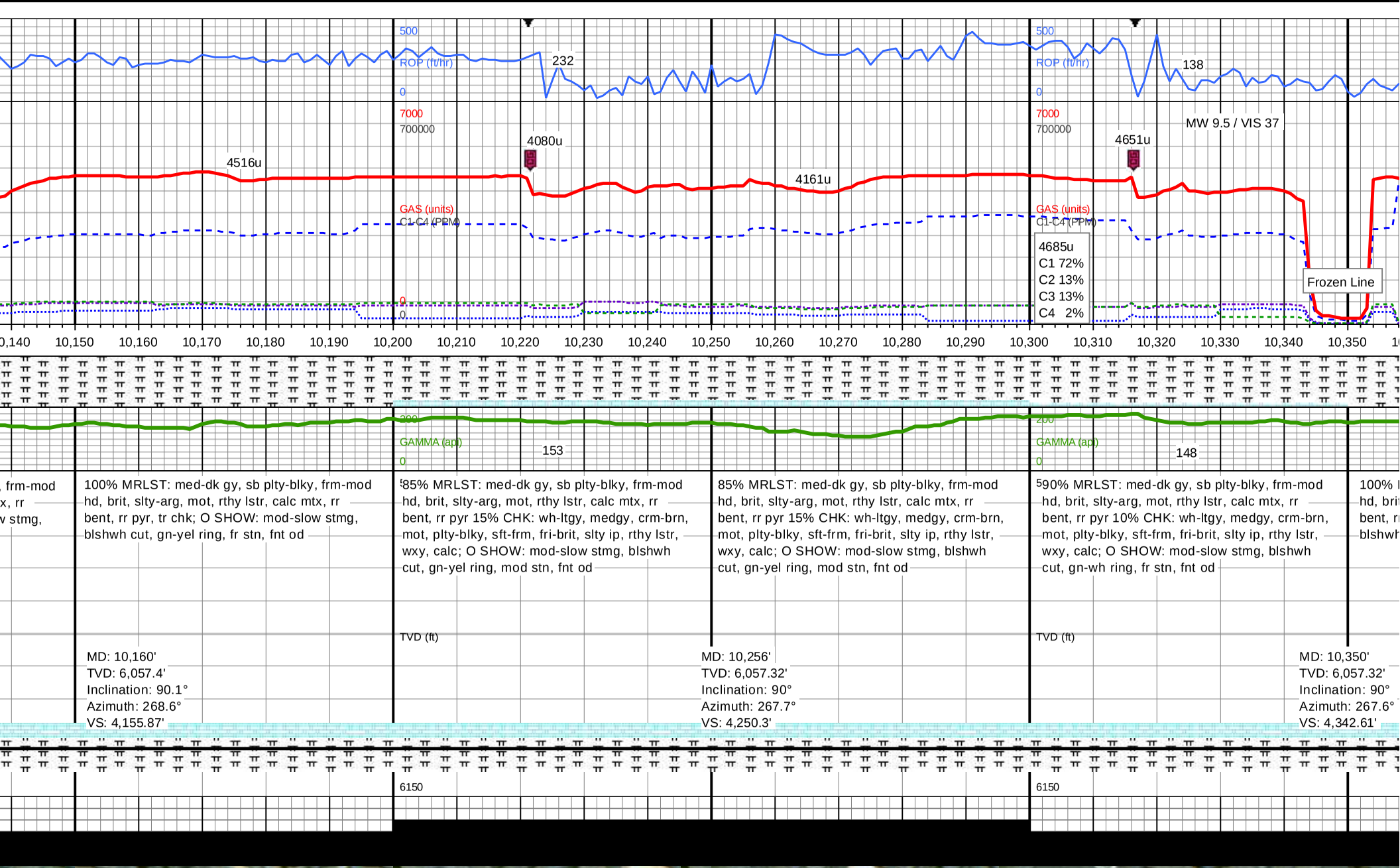

500
ROP (ft/hr)
0
352
7000
700000
5071u
4615u
GAS (units)
C1-C4 (PPM)
4840u
C1 65%
C2 15%
C3 13%
C4 7%
500
ROP (ft/hr)
0
363
7000
700000
4836u
4775u
GAS (units)
C1-C4 (PPM)
0
0
9,040
9,050
9,060
9,070
9,080
9,090
9,100
9,110
9,120
9,130
9,140
9,150
9,160
9,170
9,180
9,190
9,200
9,210
9,220
9,230
9,240
9,250
200
GAMMA (api)
0
118
200
GAMMA (api)
0
82
frm-mod
x, tr bent,
-brn, mot,
tr, wxy ip,
h cut,
100% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, tr bent, rr foss, rr pyr; O SHOW: mod-slow stmg, blshwh cut, gn-yel ring, fr stn, fnt od
50% CHK: lt-medgy, occ wh, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy ip, calc 50% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr foss, rr bent, rr pyr; O SHOW: mod-slow stmg, blshwh cut, gn-yel ring, fr stn, fnt od
80% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 20% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr; O SHOW: mod-slow stmg, blshwh cut, gn-yel ring, fr stn, fnt od
70% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 30% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr; O SHOW: mod-slow stmg, blshwh cut, gn-yel ring, fr stn, fnt od
50% CH
plty-blk
calc 50
frm-mo
mtx, rr
blshwh
TVD (ft)
MD: 9,115'
TVD: 6,053.18'
Inclination: 88.4°
Azimuth: 268.9°
VS: 3,125.08'
TVD (ft)
MD: 9,211'
TVD: 6,054.27'
Inclination: 90.3°
Azimuth: 269°
VS: 3,219.73'
6150
6150

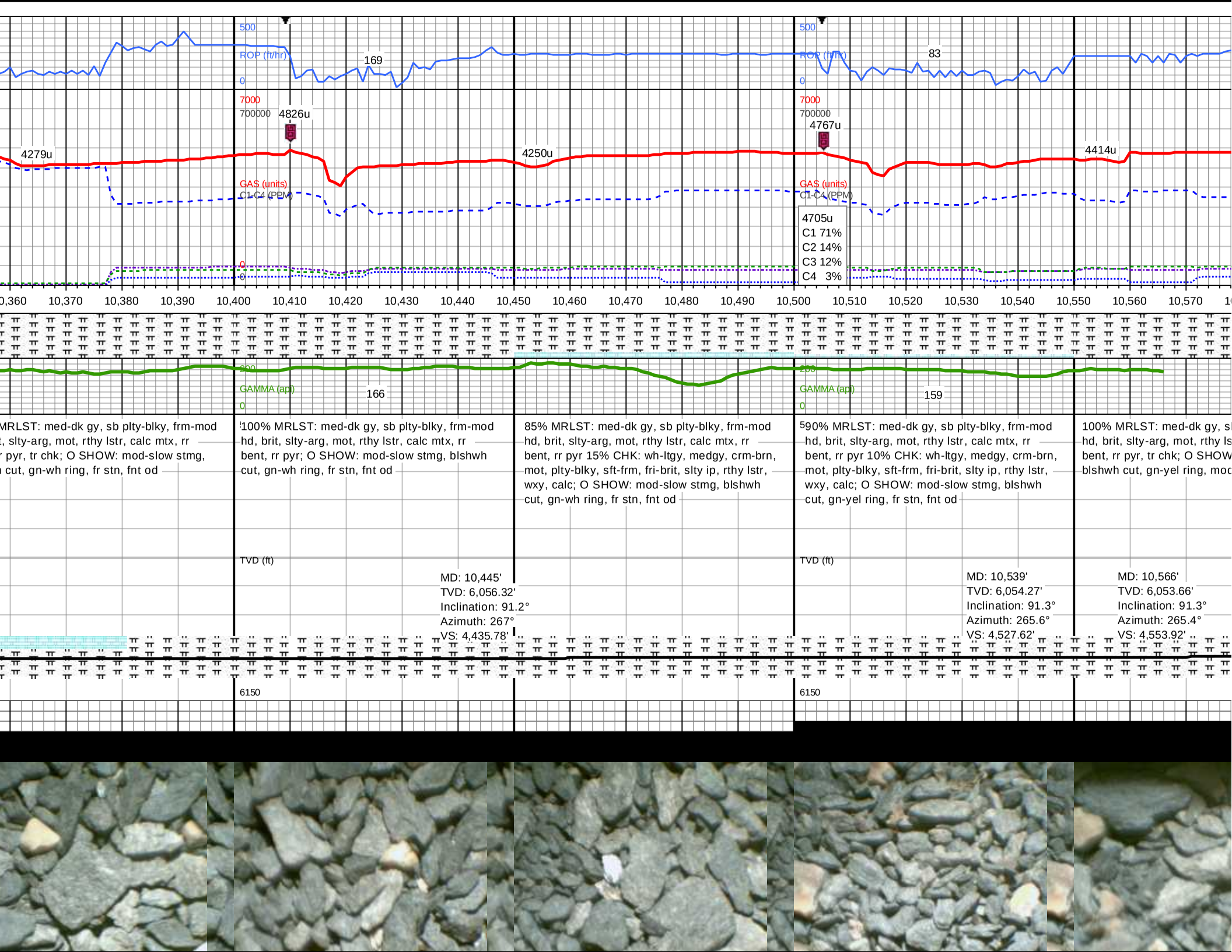

500
ROP (ft/hr)
0
305
314
7000
700000
MW 9.6 / VIS 39
4757u
4608u
4809u
4738u
4740u
GAS (units)
C1-C4 (PPM)
4688u
C1 65%
C2 15%
C3 14%
C4 6%
9,260
9,270
9,280
9,290
9,300
9,310
9,320
9,330
9,340
9,350
9,360
9,370
9,380
9,390
9,400
9,410
9,420
9,430
9,440
9,450
9,460
9,470
200
GAMMA (api)
112
140
HK: wh-ltgy, medgy, crm-brn, mot,
y, sft-frm, fri-brit, slty ip, rthy lstr, wxy,
% MRLST: med-dk gy, sb plty-blky,
d hd, brit, slty-arg, mot, rthy lstr, calc
bent, rr pyr; O SHOW: mod-slow stmg,
cut, gn-yel ring, fr stn, fnt od
65% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr 35% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-slow stmg, blshwh cut, gn-yel ring, mod stn, fnt od
65% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr 35% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-slow stmg, blshwh cut, gn-yel ring, mod stn, fnt od
50% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc 50% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr; O SHOW: mod-slow stmg, blshwh cut, gn-wh ring, fr stn, fnt od
55% CHK: wh-ltgy, medgy, c
plty-blky, sft-frm, fri-brit, slty
calc 45% MRLST: med-dk gy
frm-mod hd, brit, slty-arg, mo
mtx, rr bent, rr pyr; O SHOW
blshwh cut, gn-wh ring, fr str
TVD (ft)
MD: 9,306'
TVD: 6,053.11'
Inclination: 91.1°
Azimuth: 269.1°
VS: 3,313.42'
TVD (ft)
MD: 9,402'
TVD: 6,052.61'
Inclination: 89.5°
Azimuth: 268.9°
VS: 3,408.09'
6150
6150

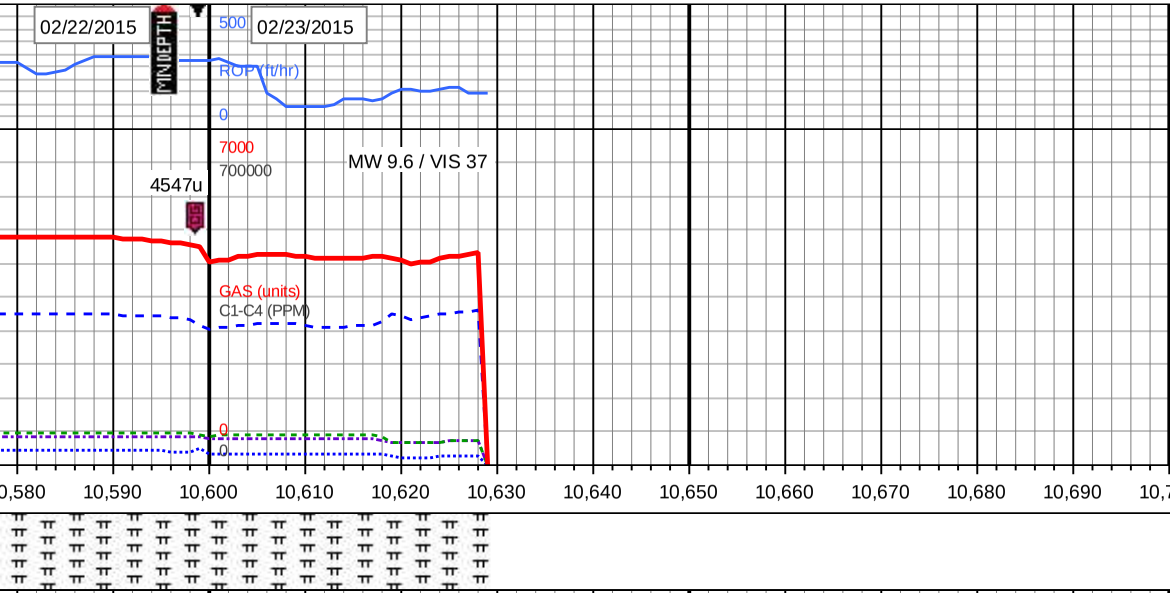

500
ROP (ft/hr)
0
174
323
7000
700000
4681u
4594u
4719u
4568u
4638u
GAS (units)
C1-C4 (PPM)
4796u
C1 62%
C2 15%
C3 14%
C4 9%
9,480
9,490
9,500
9,510
9,520
9,530
9,540
9,550
9,560
9,570
9,580
9,590
9,600
9,610
9,620
9,630
9,640
9,650
9,660
9,670
9,680
9,690
200
GAMMA (api)
0
155
136
rm-brn, mot,
ip, rthy lstr, wxy,
, sb plty-blky,
ot, rthy lstr, calc
: mod-slow stmg,
n, fnt od
65% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr 35% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-fast stmg, blshwh cut, gn-wh ring, mod stn, fnt od
75% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr 25% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-fast stmg, blshwh cut, gn-wh ring, mod stn, fnt od
100% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr, tr chk; O SHOW: mod-fast stmg, blshwh cut, gn-wh ring, mod stn, fnt od
100% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr, tr chk; O SHOW: mod-fast stmg, blshwh cut, gn-wh ring, mod stn, fnt od
TVD (ft)
MD: 9,498'
TVD: 6,053.11'
Inclination: 89.9°
Azimuth: 268.9°
VS: 3,502.74'
MD: 9,592'
TVD: 6,053.68'
Inclination: 89.4°
Azimuth: 268.8°
VS: 3,595.4'
MD: 9,687'
TVD: 6,053.85'
Inclination: 90.4°
Azimuth: 269.3°
VS: 3,689.1'
6150

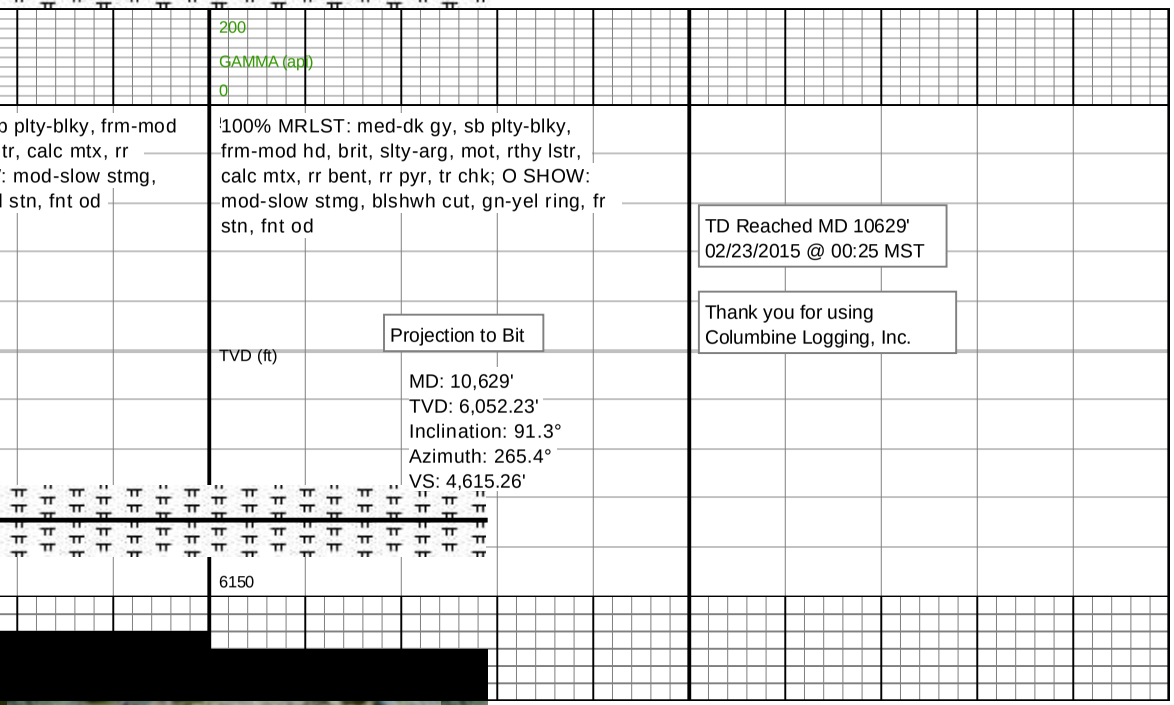

500
ROP (ft/hr)
0
321
341
7000
700000
4683u
4682u
4745u
4641u
GAS (units)
C1-C4 (PPM)
4712u
C1 61%
C2 16%
C3 15%
C4 8%
4486u
C1 60%
C2 11%
C3 16%
C4 13%
9,700
9,710
9,720
9,730
9,740
9,750
9,760
9,770
9,780
9,790
9,800
9,810
9,820
9,830
9,840
9,850
9,860
9,870
9,880
9,890
9,900
9,910
200
GAMMA (api)
143
154
70% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr 30% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-slow stmg, blshwh cut, yel-wh ring, fr stn, fnt od
65% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr 35% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-slow stmg, blshwh cut, yel-wh ring, fr stn, fnt od
80% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr 20% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-slow stmg, blshwh cut, yel-wh ring, fr stn, fnt od
90% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr 10% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-slow stmg, blshwh cut, yel-wh ring, fr stn, fnt od
90% MRLST: med
hd, brit, slty-arg,
bent, rr pyr 10% C
mot, plty-blky, sft-
wxy, calc; O SHO
cut, yel-wh ring,
TVD (ft)
MD: 9,780'
TVD: 6,054.5'
Inclination: 88.8°
Azimuth: 269.3°
VS: 3,780.89'
MD: 9,875'
TVD: 6,056.49'
Inclination: 88.8°
Azimuth: 269.2°
VS: 3,874.62'
6150


317
ROP (ft/hr)
500
0
7000
700000
4520u
258
4863u
4686u
241
4631u
GAS (units)
C1-C4 (PPM)
4697u
C1 68%
C2 10%
C3 15%
C4 7%
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
10,110
10,120
10,130
GAMMA (api)
200
142
121
146
-dk gy, sb plty-blky, frm-mod
mot, rthy lstr, calc mtx, rr
HK: wh-ltgy, medgy, crm-brn,
frm, fri-brit, slty ip, rthy lstr,
W: mod-slow stmg, blshwh
od stn, fnt od
90% MRLST: med-dk gy, sb plty-blky, frm-mod
hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr
bent, rr pyr 10% CHK: wh-ltgy, medgy, crm-brn,
mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr,
wxy, calc; O SHOW: mod-slow stmg, blshwh
cut, yel-wh ring, mod stn, fnt od
100% MRLST: med-dk gy, sb plty-blky, frm-mod
hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr
bent, rr pyr, tr chk; O SHOW: mod-slow stmg,
blshwh cut, gn-yel ring, fr stn, fnt od
100% MRLST: med-dk gy, sb plty-blky, frm-mod
hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr
bent, rr pyr, tr chk; O SHOW: mod-slow stmg,
blshwh cut, gn-yel ring, fr stn, fnt od
100% MRLST: med-dk gy, sb plty-blky
hd, brit, slty-arg, mot, rthy lstr, calc mt
bent, rr pyr, tr chk; O SHOW: mod-slow
blshwh cut, gn-yel ring, fr stn, fnt od
TVD (ft)
MD: 9,970'
TVD: 6,057.23'
Inclination: 90.3°
Azimuth: 269.9°
VS: 3,968.45'
MD: 10,065'
TVD: 6,057.23'
Inclination: 89.7°
Azimuth: 268.9°
VS: 4,062.25'
6150


500
ROP (ft/hr)
0
232
138
7000
700000
MW 9.5 / VIS 37
4516u
4080u
4161u
4651u
GAS (units)
C1-C4 (PPM)
4685u
C1 72%
C2 13%
C3 13%
C4 2%
Frozen Line
0
0
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
10,330
10,340
10,350
200
GAMMA (api)
0
153
148
frm-mod
x, rr
v stmg,
100% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr, tr chk; O SHOW: mod-slow stmg, blshwh cut, gn-yel ring, fr stn, fnt od
85% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr 15% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-slow stmg, blshwh cut, gn-yel ring, mod stn, fnt od
85% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr 15% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-slow stmg, blshwh cut, gn-yel ring, mod stn, fnt od
90% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr 10% CHK: wh-ltgy, medgy, crm-brn, mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr, wxy, calc; O SHOW: mod-slow stmg, blshwh cut, gn-wh ring, fr stn, fnt od
100% M
hd, brit
bent, r
blshwh
TVD (ft)
TVD (ft)
MD: 10,160'
TVD: 6,057.4'
Inclination: 90.1°
Azimuth: 268.6°
VS: 4,155.87'
MD: 10,256'
TVD: 6,057.32'
Inclination: 90°
Azimuth: 267.7°
VS: 4,250.3'
MD: 10,350'
TVD: 6,057.32'
Inclination: 90°
Azimuth: 267.6°
VS: 4,342.61'
6150
6150


500
ROP (ft/hr)
0
169
83
7000
700000
4826u
4767u
4279u
4250u
4414u
GAS (units)
C1-C4 (PPM)
4705u
C1 71%
C2 14%
C3 12%
C4 3%
0
0
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
10,550
10,560
200
GAMMA (api)
0
166
159
MRLST: med-dk gy, sb plty-blky, frm-mod
, slty-arg, mot, rthy lstr, calc mtx, rr
pyr, tr chk; O SHOW: mod-slow stmg,
cut, gn-wh ring, fr stn, fnt od
100% MRLST: med-dk gy, sb plty-blky, frm-mod
hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr
bent, rr pyr; O SHOW: mod-slow stmg, blshwh
cut, gn-wh ring, fr stn, fnt od
85% MRLST: med-dk gy, sb plty-blky, frm-mod
hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr
bent, rr pyr 15% CHK: wh-ltgy, medgy, crm-brn,
mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr,
wxy, calc; O SHOW: mod-slow stmg, blshwh
cut, gn-wh ring, fr stn, fnt od
90% MRLST: med-dk gy, sb plty-blky, frm-mod
hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr
bent, rr pyr 10% CHK: wh-ltgy, medgy, crm-brn,
mot, plty-blky, sft-frm, fri-brit, slty ip, rthy lstr,
wxy, calc; O SHOW: mod-slow stmg, blshwh
cut, gn-yel ring, fr stn, fnt od
100% MRLST: med-dk gy, sl
hd, brit, slty-arg, mot, rthy ls
bent, rr pyr, tr chk; O SHOW
blshwh cut, gn-yel ring, mod
TVD (ft)
MD: 10,445'
TVD: 6,056.32'
Inclination: 91.2°
Azimuth: 267°
VS: 4,435.78'
MD: 10,539'
TVD: 6,054.27'
Inclination: 91.3°
Azimuth: 265.6°
VS: 4,527.62'
MD: 10,566'
TVD: 6,053.66'
Inclination: 91.3°
Azimuth: 265.4°
VS: 4,553.92'
6150


02/22/2015
500
02/23/2015
MINDEPTH
ROP (ft/hr)
0
7000
700000
MW 9.6 / VIS 37
4547u
GAS (units)
C1-C4 (PPM)
0
0
0,580
10,590
10,600
10,610
10,620
10,630
10,640
10,650
10,660
10,670
10,680
10,690
10,7


200
GAMMA (api)
0
o plty-blky, frm-mod
tr, calc mtx, rr
: mod-slow stmg,
l stn, fnt od
100% MRLST: med-dk gy, sb plty-blky, frm-mod hd, brit, slty-arg, mot, rthy lstr, calc mtx, rr bent, rr pyr, tr chk; O SHOW: mod-slow stmg, blshwh cut, gn-yel ring, fr stn, fnt od
TD Reached MD 10629'
02/23/2015 @ 00:25 MST
Thank you for using
Columbine Logging, Inc.
Projection to Bit
TVD (ft)
MD: 10,629'
TVD: 6,052.23'
Inclination: 91.3°
Azimuth: 265.4°
VS: 4,615.26'
6150