Scale: 5" / 100'
Measured Depth Log

Well Name	Riley LD19-752		
Location	SWSE SEC19 T9N R58W		
State	Colorado	**County**	Weld
Country	USA	**Rig Number**	H&P 524
API Number	05-123-43480	**Field**	Wildcat
Geographic Region	Denver-Julesburg Basir		
Spud Date	10/26/2016		
Surface Coordinates	SWSE SEC19 T9N R58W 380' FSL 1607' FEL Lat/Long: 40.73025/-103.90341		
Bottom Hole Coordinates	Predicted: SEC19 T9N R58W		Footages: 140' FNL, 2520' FWL
Ground Elevation	4820'	**K.B. Elevation**	4850'
Logged Interval	5500'		
Formation	Codell, Ft. Hayes		
Type of Drilling Fluid	Oil Based Mud		

Operator

Company Noble Energy, Inc.

Address 1625 Broadway, Suite 2200
Denver, CO 80202

Geologist

Name Gary Myers, Gabriel Rubiio

Company Terra Guidance

Address 1298 O Road
Loma CO 81524
(970) 260-5408

Zone Color Coding

Oil
Note
Error
Condensate
Core
Water

Rock Types

LIMESTONE
Chalk
Marl
SHALE
Silty Shale
Shaly Siltstone
SILTSTONE
Shaly Sandston
SANDSTONE
BENTONITE
CEMENT
UNKNOWN
ANHYDRITE
GYPSUM
SALT
SIDERITE or LIMONITE
DOLOM
CHERT
COAL
MARLS
CLAYS
SHALE
SHALE
CONGL

Gas
Pressure
Seal

MITE
STONE
TONE
GRAY
COLORED
LOMERATE

BRECCIA
TILL
TUFF
IGNEOUS
METAMORPHIC

Accessories

Fossils

- ALGAE
- AMPHIPORA
- BELEMNITE
- BIOCLASTIC
- BRACHOIPOD
- BRYOZOA
- CEPHALOPOD
- CORAL
- CRINOID
- ECHINOID
- FISH
- FORAMINIFERA
- FOSSIL
- GASTROPOD
- 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
- MARLSTONE
- MINERAL CRYSTALS
- NODULES
- PHOSPHATE PELLETS
- 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

Other Symbols

Oil Show

- DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

Porosity

- EARTHY
- FENESTRAL
- FRACTURE
- INTERCRYSTALLINE
- INTEROOLITIC
- MOLDIC
- ORGANIC
- PINPOINT
- VUGGY

Engineering

- BIT
- CASING
- CONNECTION (LEFT)
- CONNECTION (DOWN)
- CONNECTION GAS
- CORE - LOST
- CORE - RECOVERED
- DST INTERVAL
- FAULT
- FORMATION TOP
- GAS SHOW
- MN DEPTH
- NORMAL FAULT
- OIL SHOW
- OVERTURNED STRATA
- REVERSE FAULT
- SIDEWALL CORE (LEFT)
- SIDEWALL CORE (RIGHT)
- SLIDE
- SURVEY
- TRIP GAS
- WIRELINE TESTED - LEFT
- WIRELINE TESTED - RT

Rounding

- ANGULAR
- ROUNDED
- SUBANG
- SUBRND

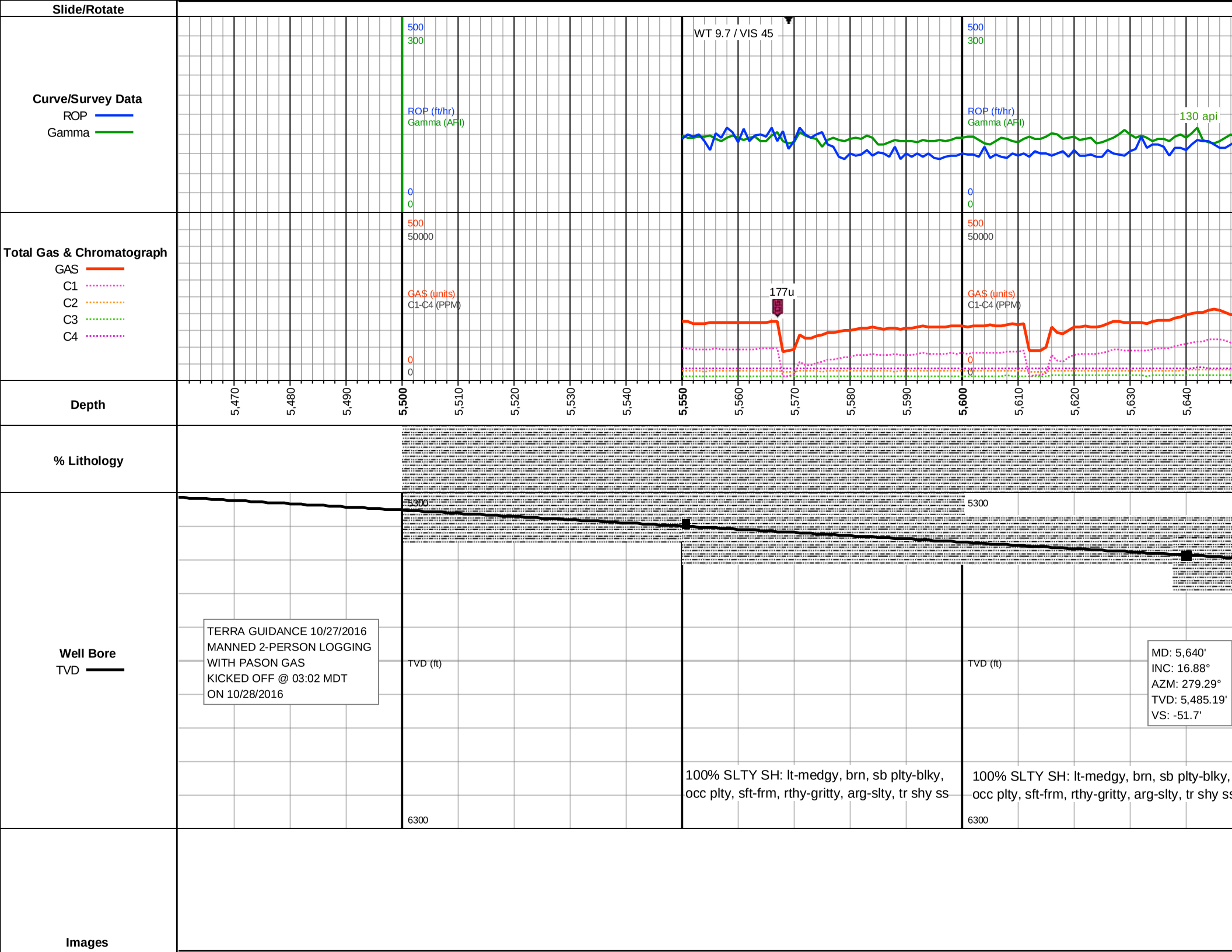
Textures

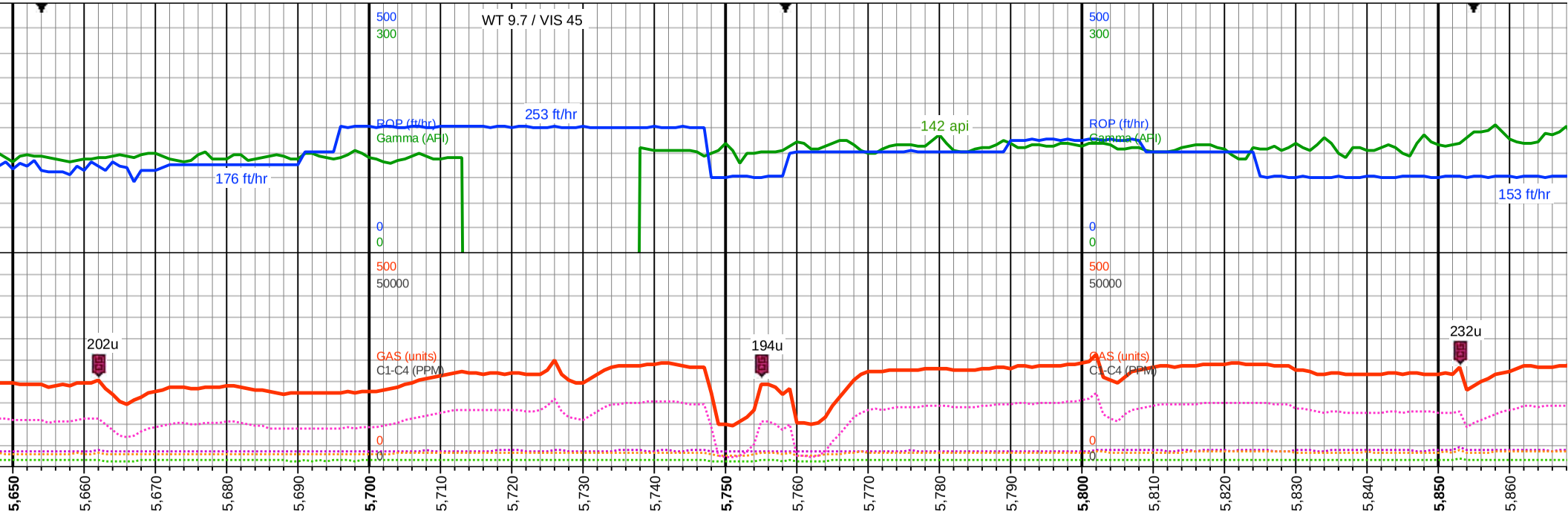
- BOUNDSTONE
- CHALKY
- CRYPTOXLN
- EARTHY
- FINELYXLN
- GRAINSTONE
- LITHOGRAPHIC
- MICROXLN
- MUDSTONE
- PACKSTONE
- WACKESTONE

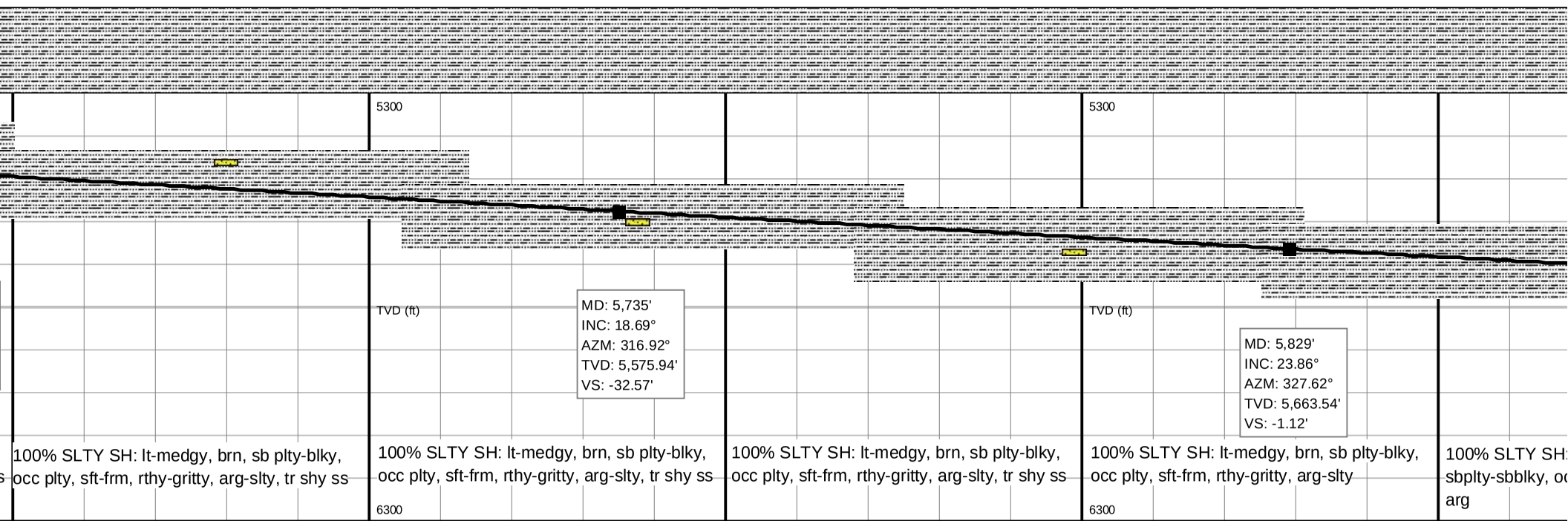
Sorting

- MODERATE
- POOR
- WELL

ConnectionGas(Vert)


Slide/Rotate
Curve/Survey Data
ROP
Gamma
500
300
ROP (ft/hr)
Gamma (API)
0
0
WT 9.7 / VIS 45
130 api
Total Gas & Chromatograph
GAS
C1
C2
C3
C4
500
50000
GAS (units)
C1-C4 (PPM)
177u
Depth
5,470
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
% Lithology
Well Bore
TVD
5300
TVD (ft)
6300
TERRA GUIDANCE 10/27/2016
MANNED 2-PERSON LOGGING
WITH PASON GAS
KICKED OFF @ 03:02 MDT
ON 10/28/2016
MD: 5,640'
INC: 16.88°
AZM: 279.29°
TVD: 5,485.19'
VS: -51.7'
100% SLTY SH: lt-medgy, brn, sb plty-blky,
occ plty, sft-frm, rthy-gritty, arg-slty, tr shy ss
Images





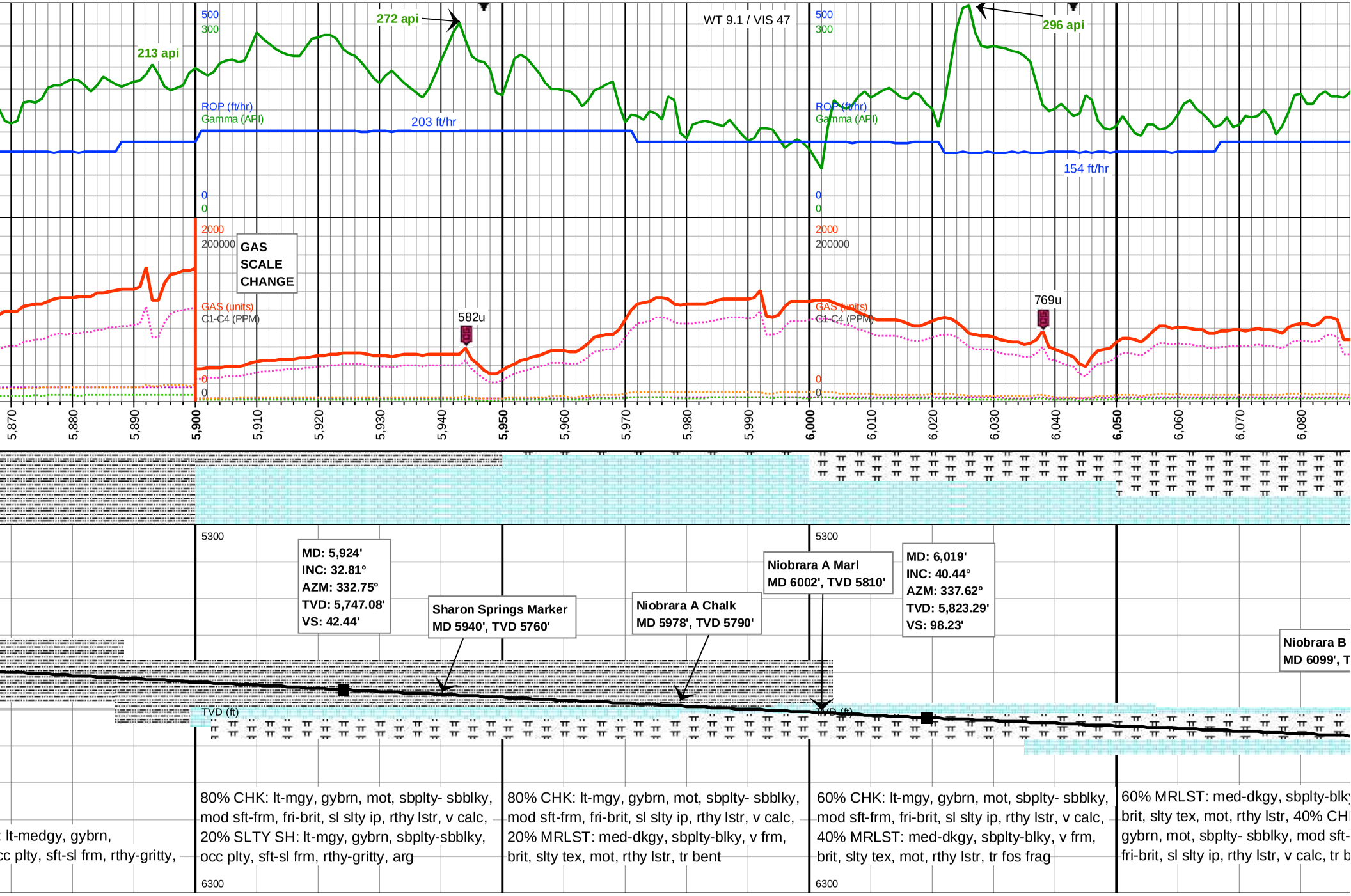
100% SLTY SH: lt-medgy, brn, sb plty-blky, occ plty, sft-frm, rthy-gritty, arg-slty, tr shy ss

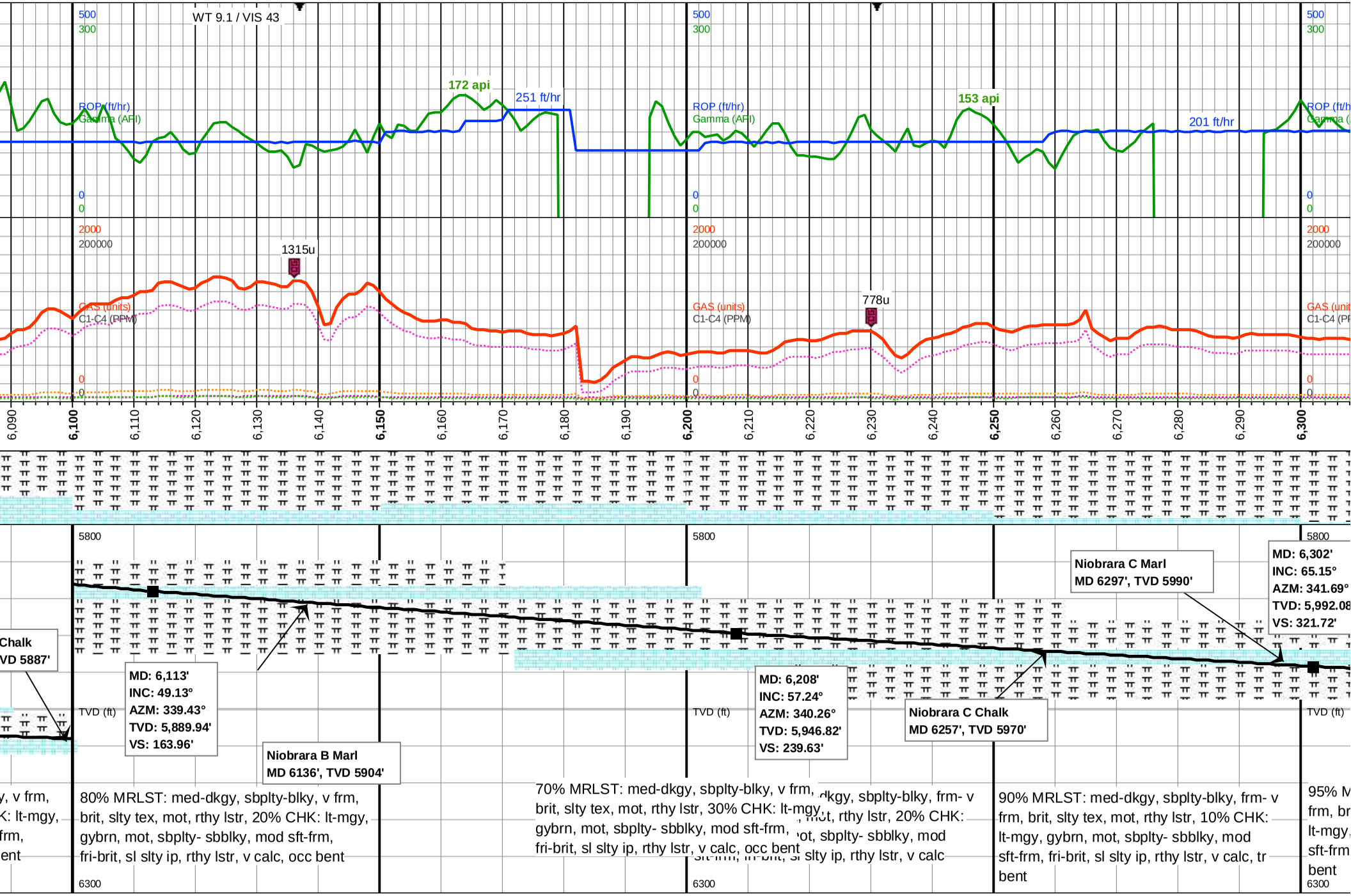
100% SLTY SH: lt-medgy, brn, sb plty-blky, occ plty, sft-frm, rthy-gritty, arg-slty, tr shy ss

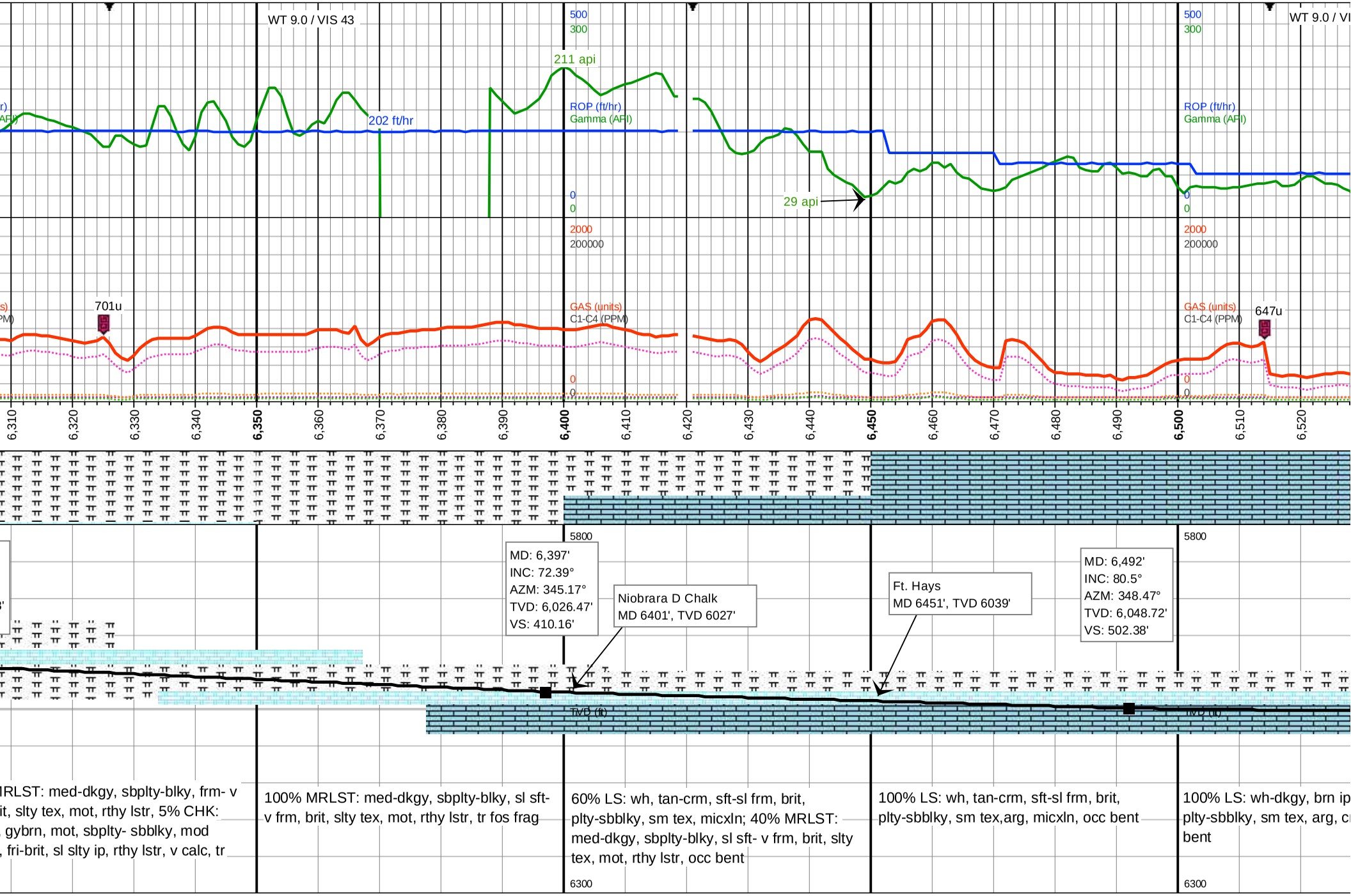
100% SLTY SH: lt-medgy, brn, sb plty-blky, occ plty, sft-frm, rthy-gritty, arg-slty, tr shy ss

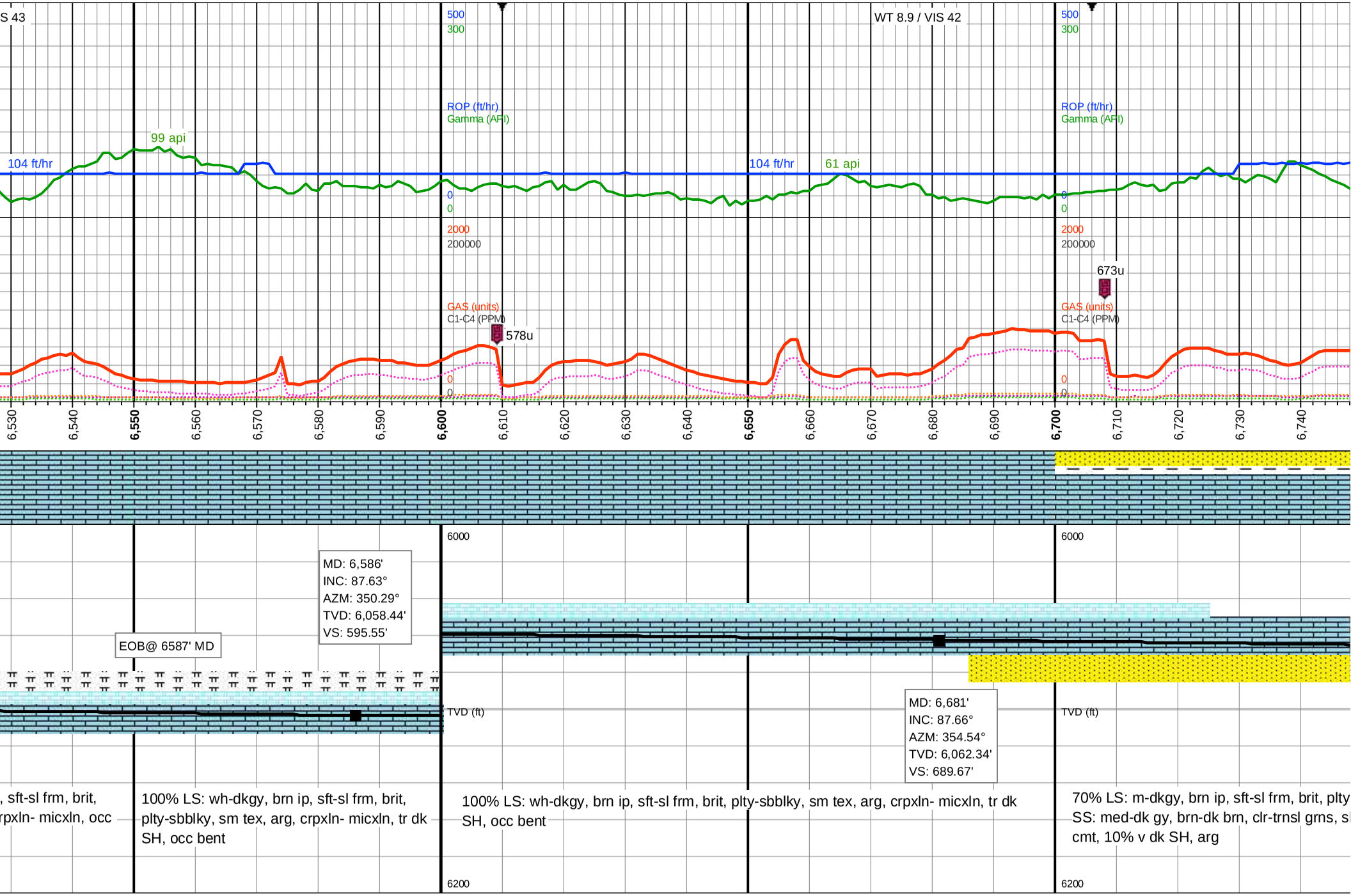
100% SLTY SH: lt-medgy, brn, sb plty-blky, occ plty, sft-frm, rthy-gritty, arg-slty

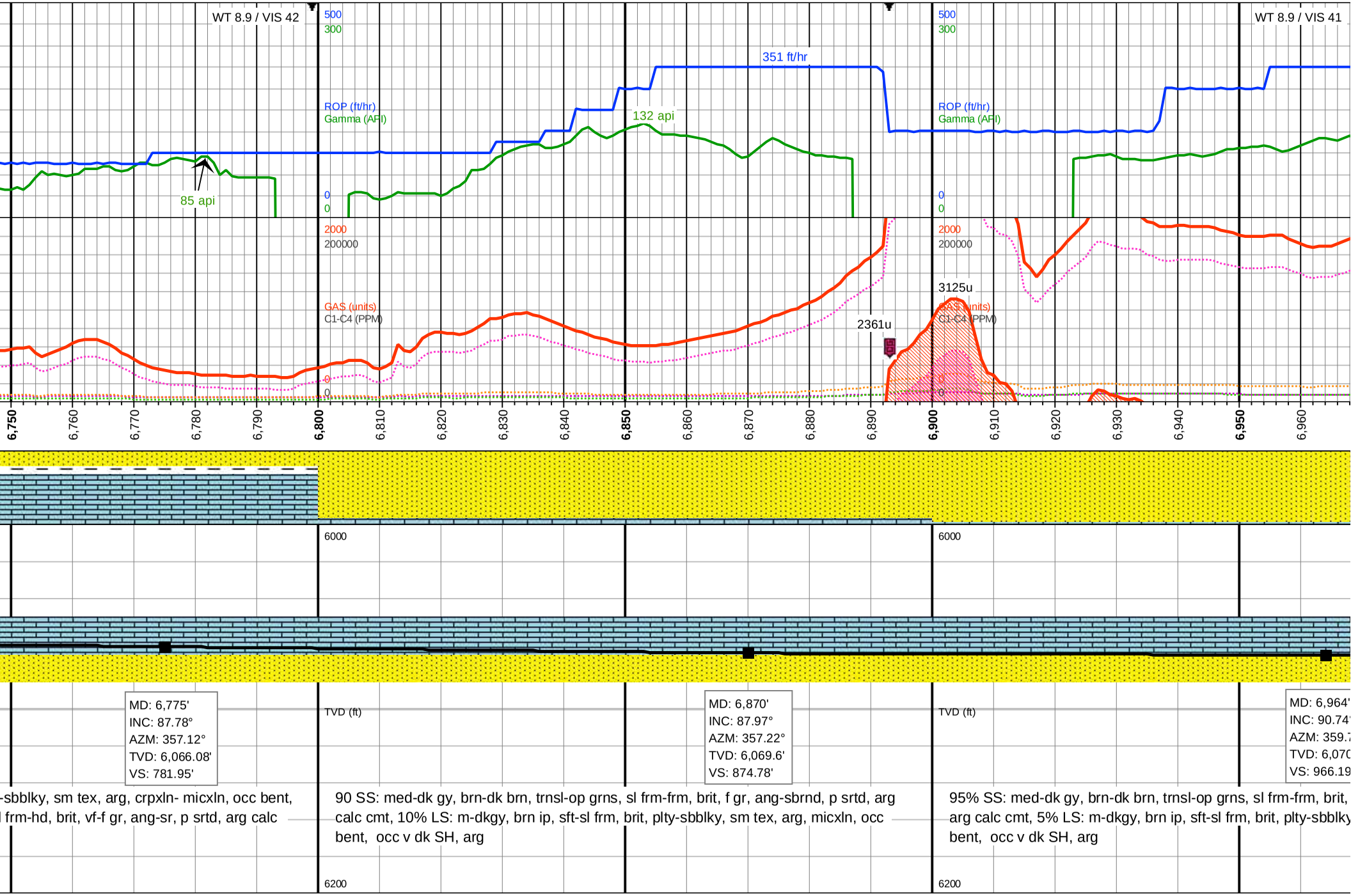
100% SLTY SH: sbplty-sbblky, oc arg

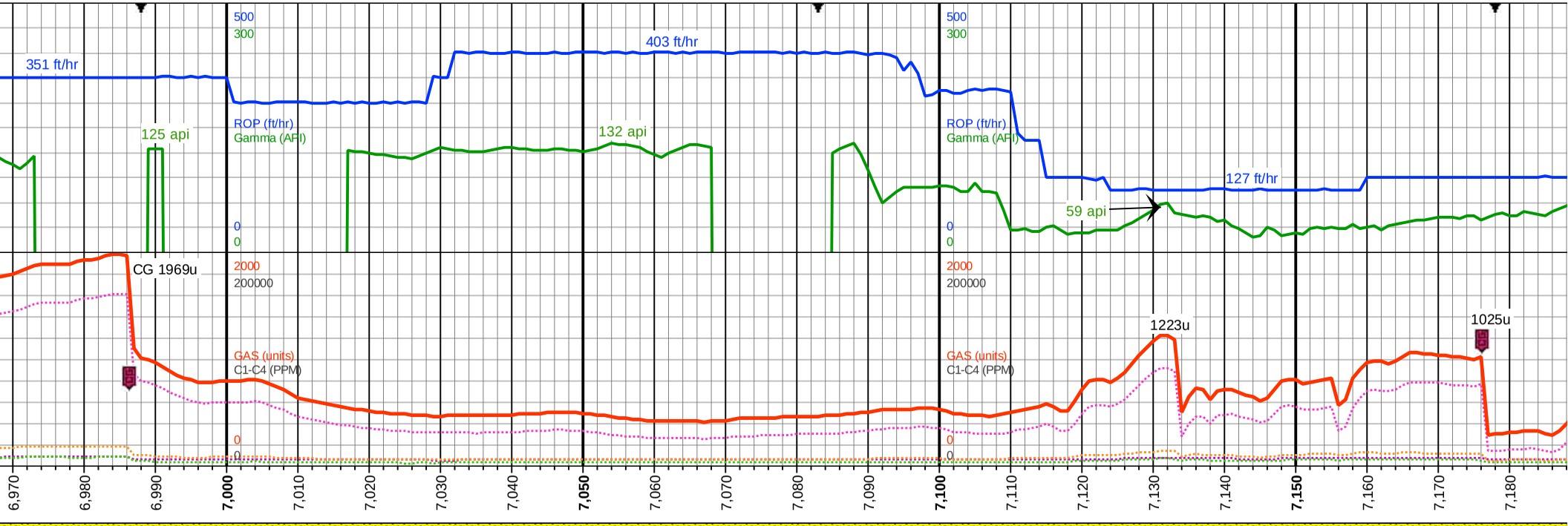

500
300
213 api
272 api
WT 9.1 / VIS 47
296 api
ROP (ft/hr)
Gamma (API)
203 ft/hr
154 ft/hr
0
0
2000
200000
GAS SCALE CHANGE
GAS (units)
C1-C4 (PPM)
582u
769u
5,870
5,880
5,890
5,900
5,910
5,920
5,930
5,940
5,950
5,960
5,970
5,980
5,990
6,000
6,010
6,020
6,030
6,040
6,050
6,060
6,070
6,080
5300
MD: 5,924'
INC: 32.81°
AZM: 332.75°
TVD: 5,747.08'
VS: 42.44'
Sharon Springs Marker
MD 5940', TVD 5760'
Niobrara A Chalk
MD 5978', TVD 5790'
Niobrara A Marl
MD 6002', TVD 5810'
MD: 6,019'
INC: 40.44°
AZM: 337.62°
TVD: 5,823.29'
VS: 98.23'
Niobrara B
MD 6099', T
TVD (ft)
lt-medgy, gybrn,
cc plty, sft-sl frm, rthy-gritty,
80% CHK: lt-mgy, gybrn, mot, sbplty- sbblky, mod sft-frm, fri-brit, sl slty ip, rthy lstr, v calc, 20% SLTY SH: lt-mgy, gybrn, sbplty-sbblky, occ plty, sft-sl frm, rthy-gritty, arg
80% CHK: lt-mgy, gybrn, mot, sbplty- sbblky, mod sft-frm, fri-brit, sl slty ip, rthy lstr, v calc, 20% MRLST: med-dkgy, sbplty-blky, v frm, brit, slty tex, mot, rthy lstr, tr bent
60% CHK: lt-mgy, gybrn, mot, sbplty- sbblky, mod sft-frm, fri-brit, sl slty ip, rthy lstr, v calc, 40% MRLST: med-dkgy, sbplty-blky, v frm, brit, slty tex, mot, rthy lstr, tr fos frag
60% MRLST: med-dkgy, sbplty-blk
brit, slty tex, mot, rthy lstr, 40% CH
gybrn, mot, sbplty- sbblky, mod sft-
fri-brit, sl slty ip, rthy lstr, v calc, tr b
6300

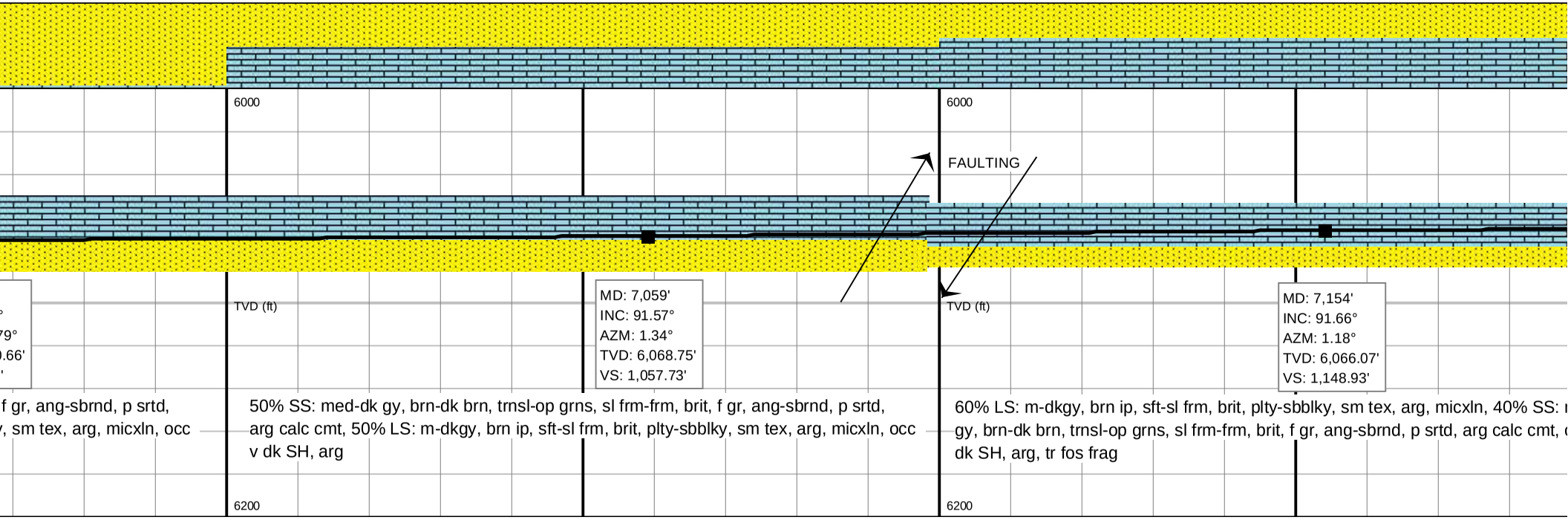

WT 9.1 / VIS 43
500
300
ROP (ft/hr)
Gamma (API)
0
0
172 api
251 ft/hr
153 api
201 ft/hr
2000
200000
GAS (units)
C1-C4 (PPM)
1315u
778u
6,090
6,100
6,110
6,120
6,130
6,140
6,150
6,160
6,170
6,180
6,190
6,200
6,210
6,220
6,230
6,240
6,250
6,260
6,270
6,280
6,290
6,300
5800
TVD (ft)
6300
Chalk
VD 5887'
MD: 6,113'
INC: 49.13°
AZM: 339.43°
TVD: 5,889.94'
VS: 163.96'
Niobrara B Marl
MD 6136', TVD 5904'
MD: 6,208'
INC: 57.24°
AZM: 340.26°
TVD: 5,946.82'
VS: 239.63'
Niobrara C Chalk
MD 6257', TVD 5970'
Niobrara C Marl
MD 6297', TVD 5990'
MD: 6,302'
INC: 65.15°
AZM: 341.69°
TVD: 5,992.08
VS: 321.72'
y, v frm,
K: lt-mgy,
frm,
ent
80% MRLST: med-dkgy, sbplty-blky, v frm,
brit, slty tex, mot, rthy lstr, 20% CHK: lt-mgy,
gybrn, mot, sbplty- sbblky, mod sft-frm,
fri-brit, sl slty ip, rthy lstr, v calc, occ bent
70% MRLST: med-dkgy, sbplty-blky, v frm,
brit, slty tex, mot, rthy lstr, 30% CHK: lt-mgy,
gybrn, mot, sbplty- sbblky, mod sft-frm,
fri-brit, sl slty ip, rthy lstr, v calc, occ bent
90% MRLST: med-dkgy, sbplty-blky, frm- v
frm, brit, slty tex, mot, rthy lstr, 10% CHK:
lt-mgy, gybrn, mot, sbplty- sbblky, mod
sft-frm, fri-brit, sl slty ip, rthy lstr, v calc, tr
bent
95% M
frm, br
lt-mgy,
sft-frm
bent


WT 9.0 / VIS 43
WT 9.0 / VI
500
300
211 api
ROP (ft/hr)
Gamma (API)
202 ft/hr
29 api
0
0
2000
200000
701u
647u
GAS (units)
C1-C4 (PPM)
6,310
6,320
6,330
6,340
6,350
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
5800
6300
TVD (ft)
MD (ft)
MD: 6,397'
INC: 72.39°
AZM: 345.17°
TVD: 6,026.47'
VS: 410.16'
Niobrara D Chalk
MD 6401', TVD 6027'
Ft. Hays
MD 6451', TVD 6039'
MD: 6,492'
INC: 80.5°
AZM: 348.47°
TVD: 6,048.72'
VS: 502.38'
MRLST: med-dkgy, sbplty-blky, frm- v
it, slty tex, mot, rthy lstr, 5% CHK:
gybrn, mot, sbplty- sbblky, mod
fri-brit, sl slty ip, rthy lstr, v calc, tr
100% MRLST: med-dkgy, sbplty-blky, sl sft-
v frm, brit, slty tex, mot, rthy lstr, tr fos frag
60% LS: wh, tan-crm, sft-sl frm, brit,
plty-sbblky, sm tex, micxln; 40% MRLST:
med-dkgy, sbplty-blky, sl sft- v frm, brit, slty
tex, mot, rthy lstr, occ bent
100% LS: wh, tan-crm, sft-sl frm, brit,
plty-sbblky, sm tex,arg, micxln, occ bent
100% LS: wh-dkgy, brn ip
plty-sbblky, sm tex, arg, c
bent


S 43
WT 8.9 / VIS 42
500
300
ROP (ft/hr)
Gamma (API)
99 api
104 ft/hr
61 api
0
0
2000
200000
GAS (units)
C1-C4 (PPM)
578u
673u
6,530
6,540
6,550
6,560
6,570
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
MD: 6,586'
INC: 87.63°
AZM: 350.29°
TVD: 6,058.44'
VS: 595.55'
EOB@ 6587' MD
6000
TVD (ft)
MD: 6,681'
INC: 87.66°
AZM: 354.54°
TVD: 6,062.34'
VS: 689.67'
6200
, sft-sl frm, brit,
rpxln- micxln, occ
100% LS: wh-dkgy, brn ip, sft-sl frm, brit,
plty-sbblky, sm tex, arg, crpxln- micxln, tr dk
SH, occ bent
100% LS: wh-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, crpxln- micxln, tr dk
SH, occ bent
70% LS: m-dkgy, brn ip, sft-sl frm, brit, plty
SS: med-dk gy, brn-dk brn, clr-trnsl grns, sl
cmt, 10% v dk SH, arg


WT 8.9 / VIS 42
500
300
ROP (ft/hr)
Gamma (API)
0
0
85 api
2000
200000
GAS (units)
C1-C4 (PPM)
0
0
6,750
6,760
6,770
6,780
6,790
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
6000
MD: 6,775'
INC: 87.78°
AZM: 357.12°
TVD: 6,066.08'
VS: 781.95'
TVD (ft)
-sbblky, sm tex, arg, crpxln- micxln, occ bent,
l frm-hd, brit, vf-f gr, ang-sr, p srtd, arg calc
6200
351 ft/hr
132 api
2361u
MD: 6,870'
INC: 87.97°
AZM: 357.22°
TVD: 6,069.6'
VS: 874.78'
90 SS: med-dk gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, 10% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ bent, occ v dk SH, arg
6200
WT 8.9 / VIS 41
500
300
ROP (ft/hr)
Gamma (API)
0
0
2000
200000
3125u
GAS (units)
C1-C4 (PPM)
0
0
6000
TVD (ft)
MD: 6,964'
INC: 90.74'
AZM: 359.7
TVD: 6,070
VS: 966.19
95% SS: med-dk gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, arg calc cmt, 5% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky bent, occ v dk SH, arg
6200

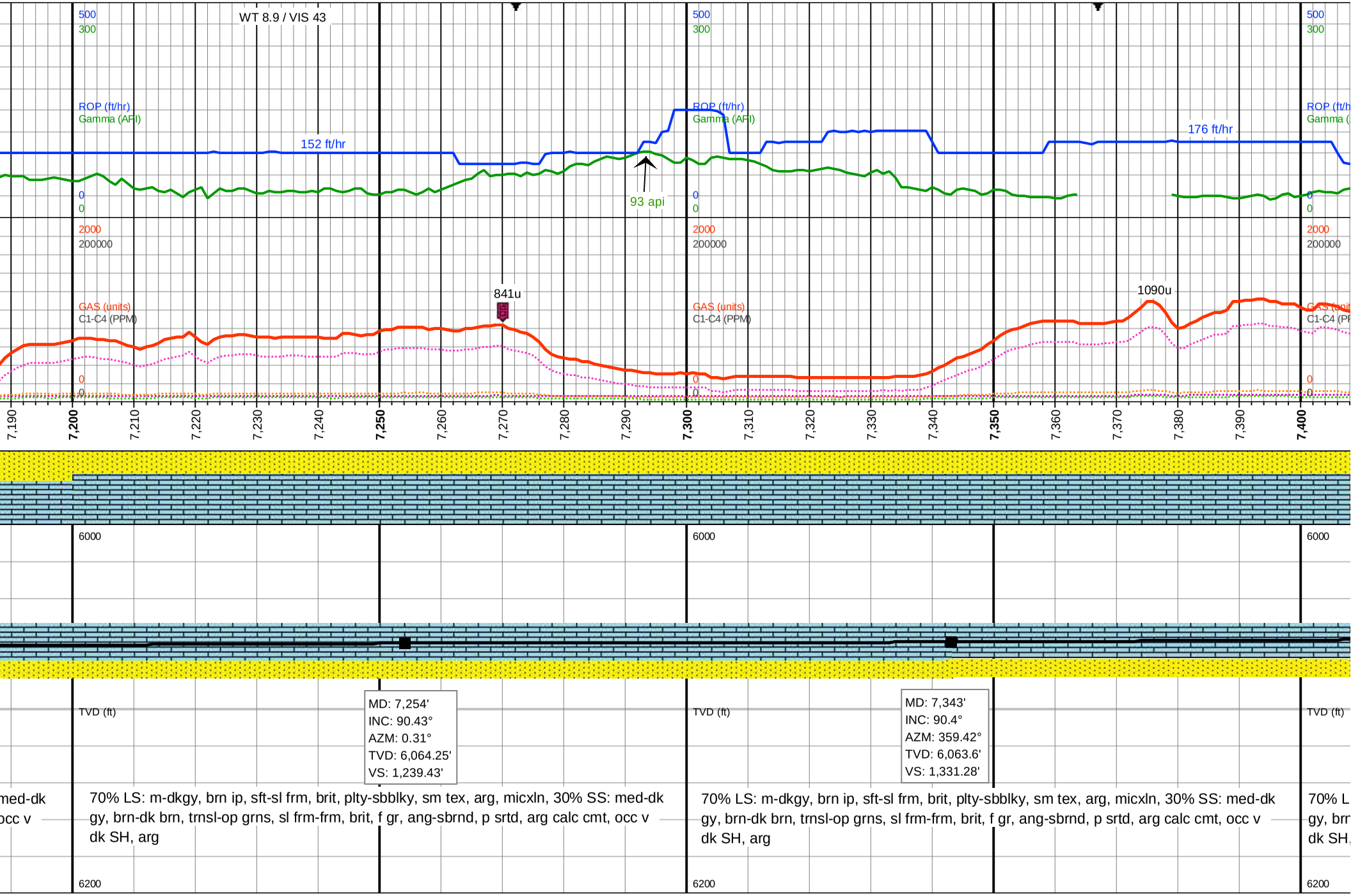


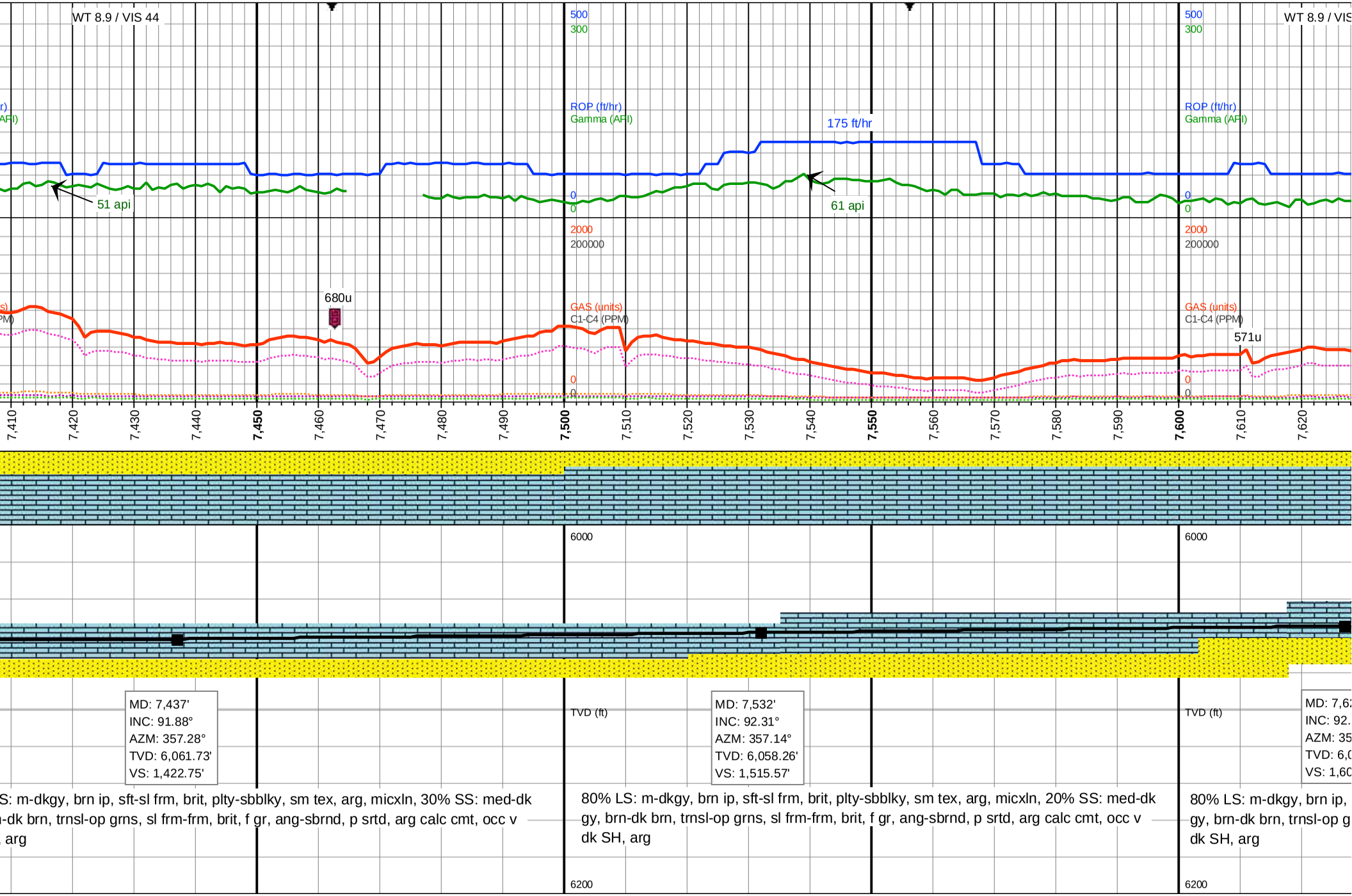


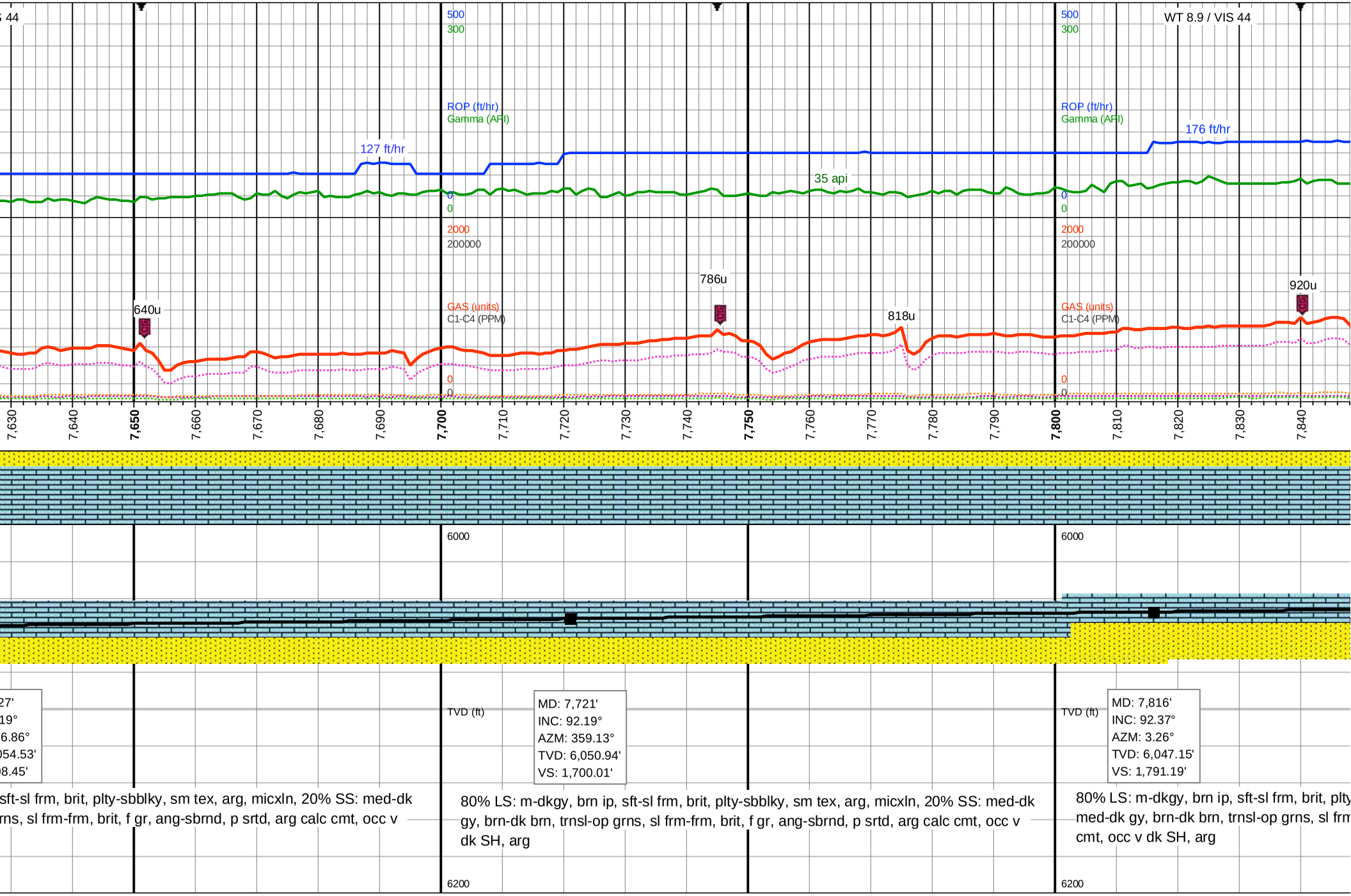
f gr, ang-sbrnd, p srtd,
, sm tex, arg, micxln, occ

50% SS: med-dk gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, 50% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ v dk SH, arg

60% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 40% SS: m gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, o dk SH, arg, tr fos frag


WT 8.9 / VIS 43
500
300
ROP (ft/hr)
Gamma (API)
152 ft/hr
93 api
176 ft/hr
0
0
2000
200000
GAS (units)
C1-C4 (PPM)
841u
1090u
7,190
7,200
7,210
7,220
7,230
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
6000
TVD (ft)
MD: 7,254'
INC: 90.43°
AZM: 0.31°
TVD: 6,064.25'
VS: 1,239.43'
MD: 7,343'
INC: 90.4°
AZM: 359.42°
TVD: 6,063.6'
VS: 1,331.28'
70% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 30% SS: med-dk gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v dk SH, arg
6200


WT 8.9 / VIS 44
WT 8.9 / VIS
500
300
ROP (ft/hr)
Gamma (AFI)
175 ft/hr
51 api
61 api
0
0
2000
200000
680u
571u
GAS (units)
C1-C4 (PPM)
7,410
7,420
7,430
7,440
7,450
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
6000
TVD (ft)
6200
MD: 7,437'
INC: 91.88°
AZM: 357.28°
TVD: 6,061.73'
VS: 1,422.75'
MD: 7,532'
INC: 92.31°
AZM: 357.14°
TVD: 6,058.26'
VS: 1,515.57'
S: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 30% SS: med-dk
-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v
arg
80% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 20% SS: med-dk
gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v
dk SH, arg
80% LS: m-dkgy, brn ip,
gy, brn-dk brn, trnsl-op g
dk SH, arg

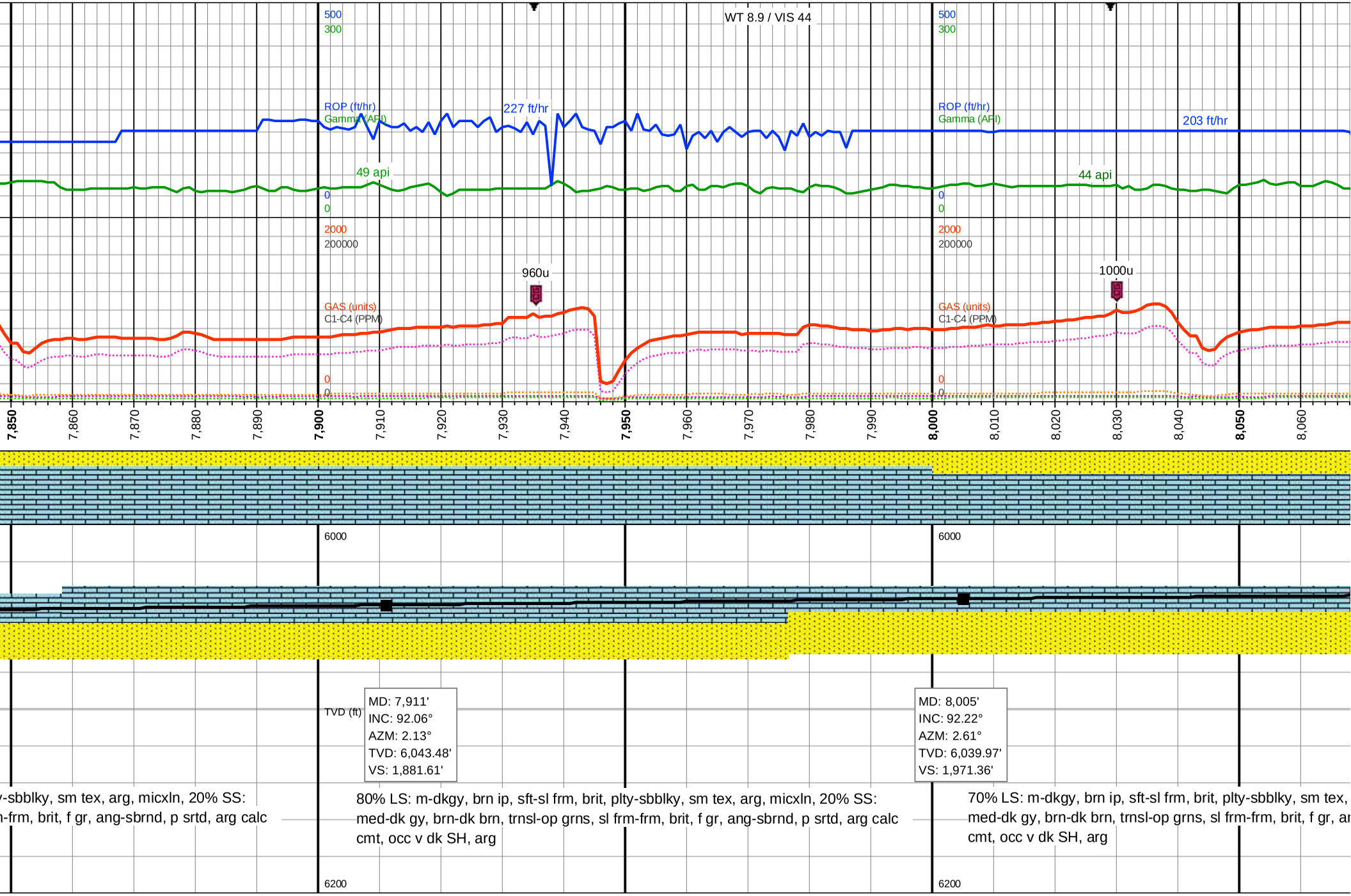


27'
19°
6.86°
054.53'
98.45'

sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 20% SS: med-dk
rns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v

80% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 20% SS: med-dk gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v dk SH, arg

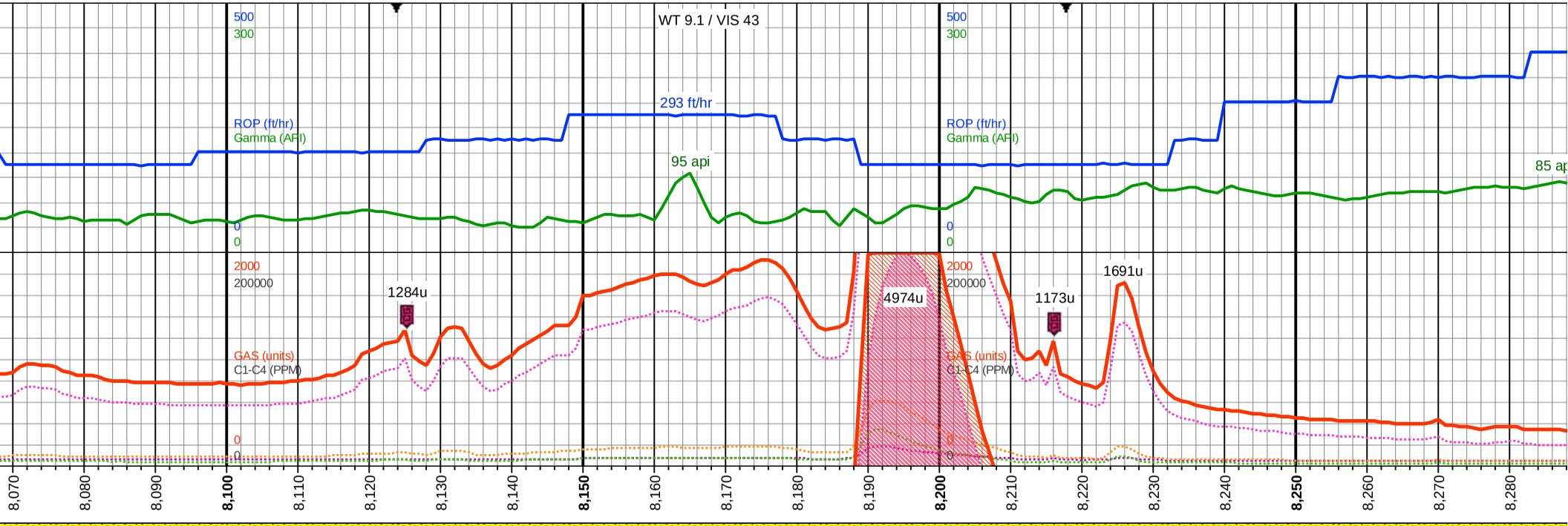
80% LS: m-dkgy, brn ip, sft-sl frm, brit, plty
med-dk gy, brn-dk brn, trnsl-op grns, sl frm
cmt, occ v dk SH, arg

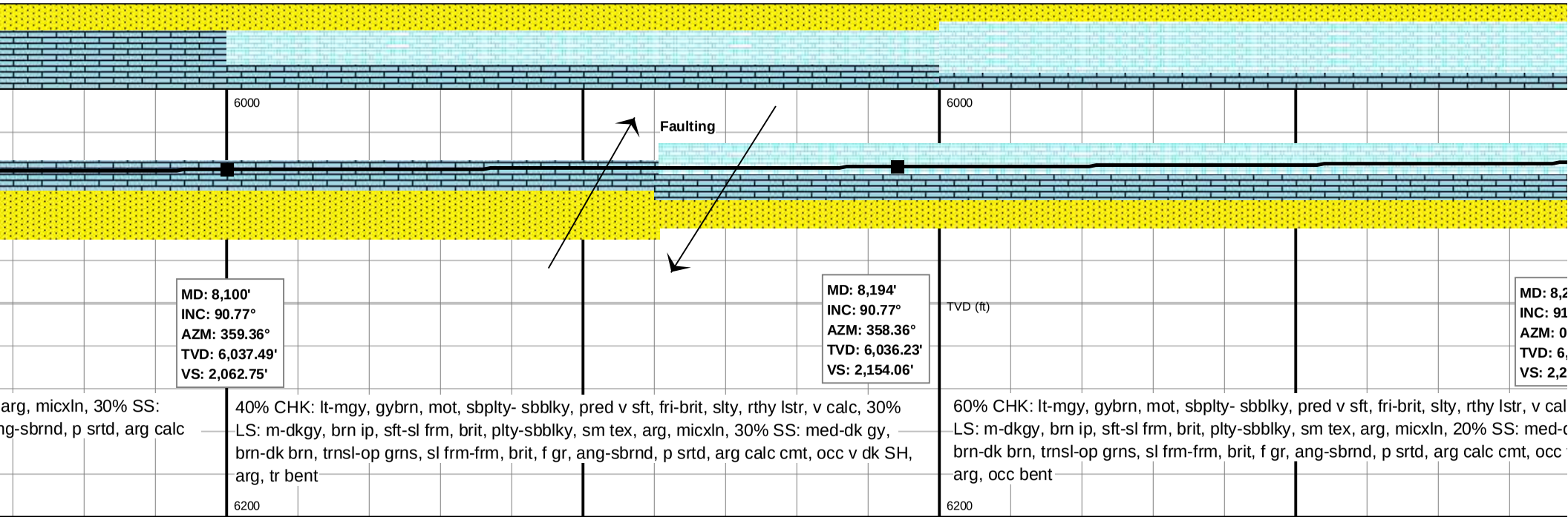


y-sbblky, sm tex, arg, micxln, 20% SS:
n-frm, brit, f gr, ang-sbrnd, p srtd, arg calc

80% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 20% SS:
med-dk gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc
cmt, occ v dk SH, arg

70% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex,
med-dk gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ar
cmt, occ v dk SH, arg





MD: 8,100'
INC: 90.77°
AZM: 359.36°
TVD: 6,037.49'
VS: 2,062.75'

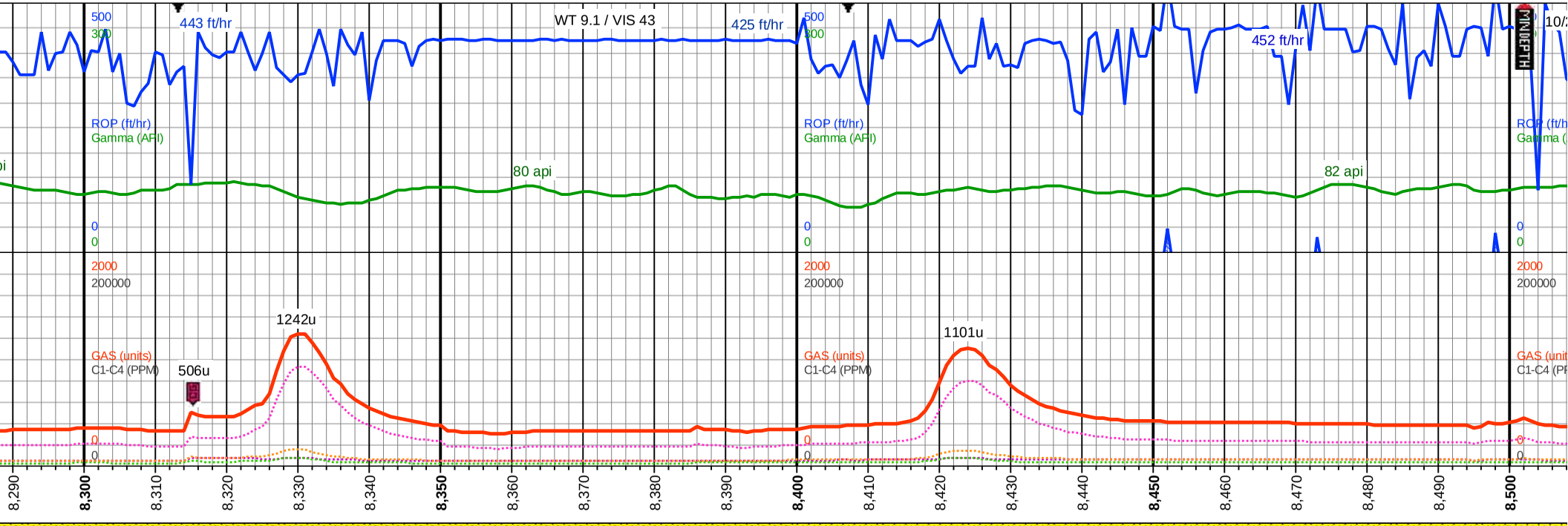
MD: 8,194'
INC: 90.77°
AZM: 358.36°
TVD: 6,036.23'
VS: 2,154.06'

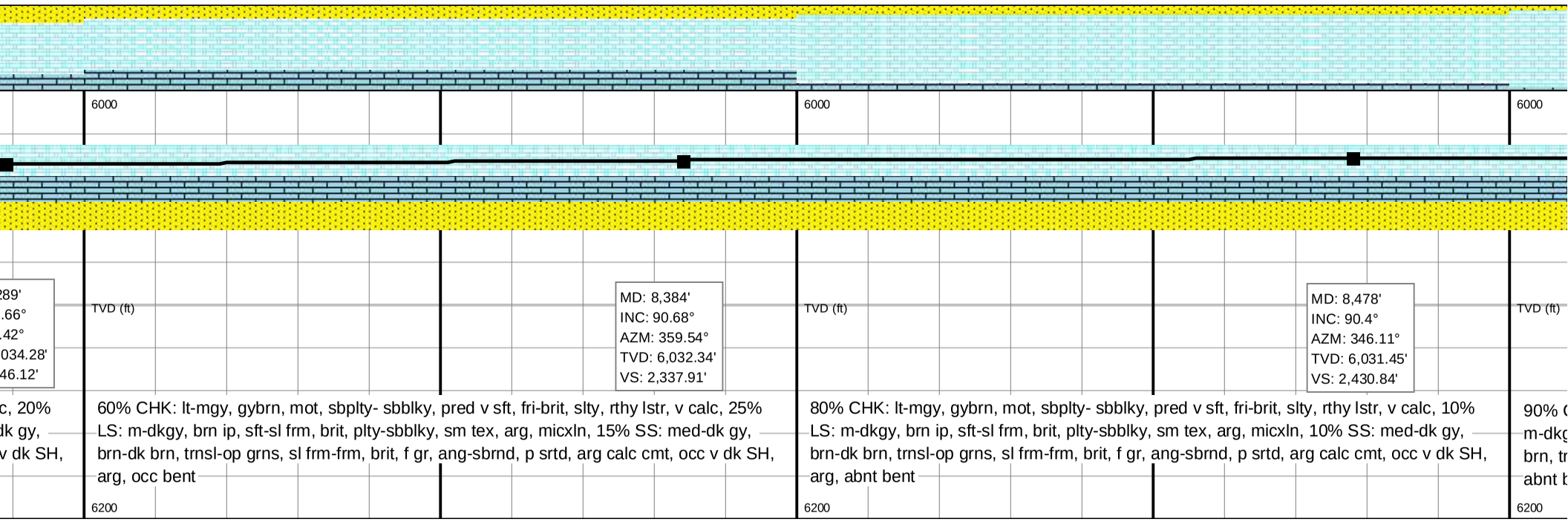
MD: 8,2
INC: 91
AZM: 0
TVD: 6,
VS: 2,2

arg, micxln, 30% SS:
ng-sbrnd, p srtd, arg calc

40% CHK: lt-mgy, gybrn, mot, sbplty- sbblky, pred v sft, fri-brit, slty, rthy lstr, v calc, 30% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 30% SS: med-dk gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v dk SH, arg, tr bent

60% CHK: lt-mgy, gybrn, mot, sbplty- sbblky, pred v sft, fri-brit, slty, rthy lstr, v cal
LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 20% SS: med-
brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ
arg, occ bent





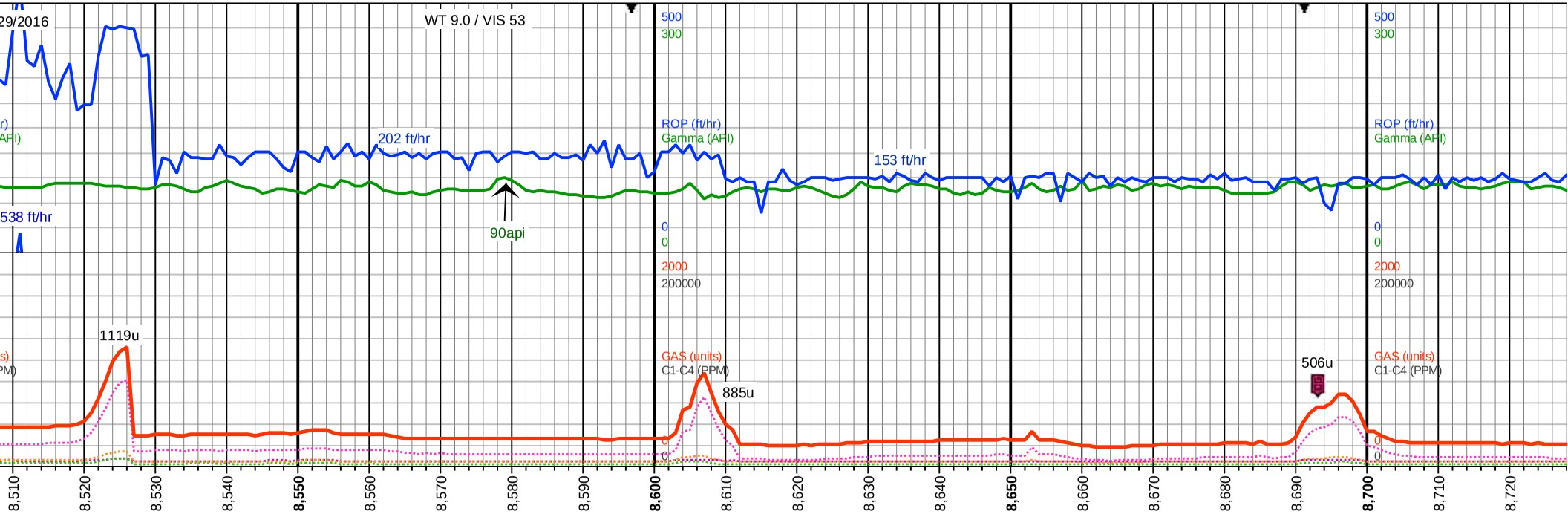
289'
.66°
.42°
034.28'
46.12'

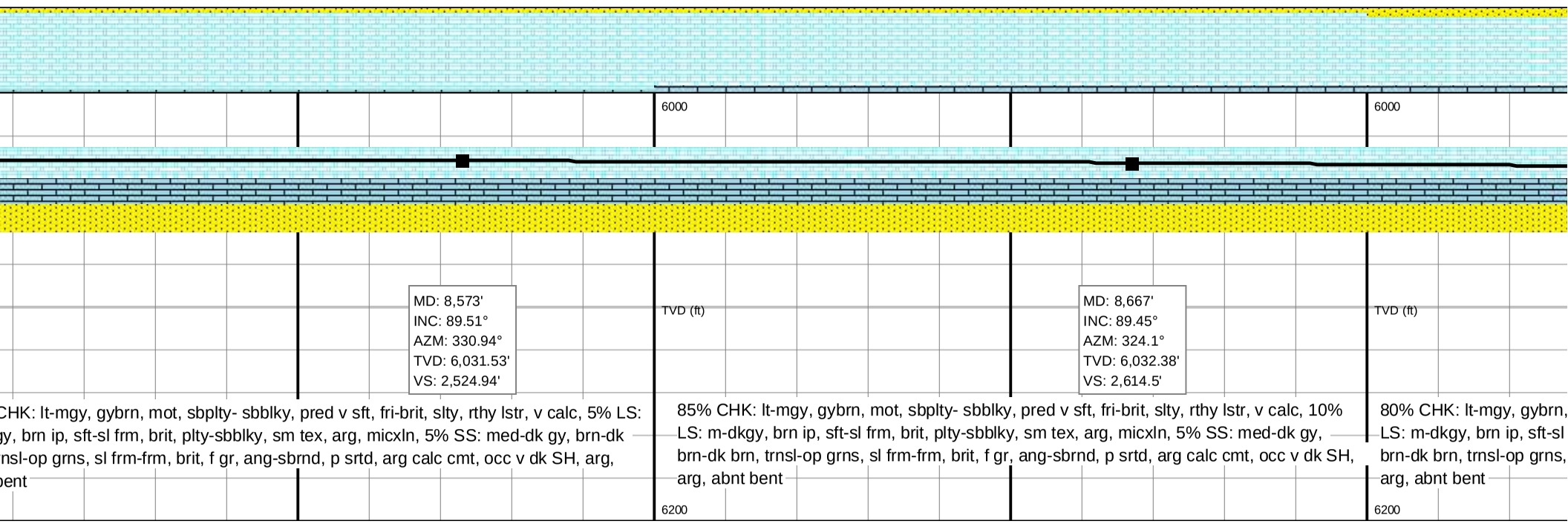
c, 20%
dk gy,
v dk SH,

60% CHK: lt-mgy, gybrn, mot, sbplty- sbblky, pred v sft, fri-brit, slty, rthy lstr, v calc, 25% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 15% SS: med-dk gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v dk SH, arg, occ bent

80% CHK: lt-mgy, gybrn, mot, sbplty- sbblky, pred v sft, fri-brit, slty, rthy lstr, v calc, 10% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 10% SS: med-dk gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v dk SH, arg, abnt bent

90% c
m-dkg
brn, tr
abnt b





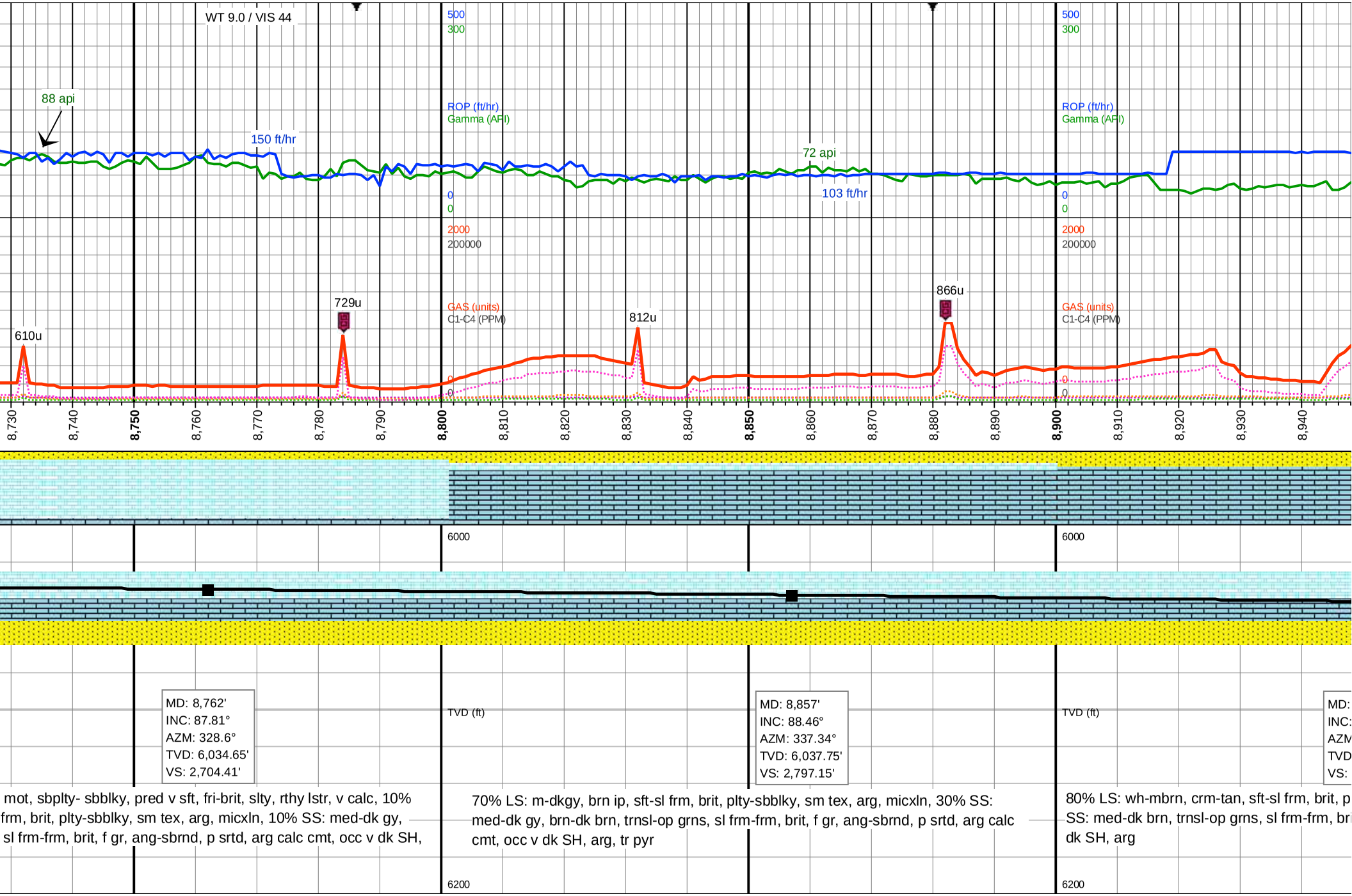
MD: 8,573'
INC: 89.51°
AZM: 330.94°
TVD: 6,031.53'
VS: 2,524.94'

MD: 8,667'
INC: 89.45°
AZM: 324.1°
TVD: 6,032.38'
VS: 2,614.5'

CHK: lt-mgy, gybrn, mot, sbplty- sbblky, pred v sft, fri-brit, slty, rthy lstr, v calc, 5% LS: gy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 5% SS: med-dk gy, brn-dk rnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v dk SH, arg, bent

85% CHK: lt-mgy, gybrn, mot, sbplty- sbblky, pred v sft, fri-brit, slty, rthy lstr, v calc, 10% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 5% SS: med-dk gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v dk SH, arg, abnt bent

80% CHK: lt-mgy, gybrn, LS: m-dkgy, brn ip, sft-sl brn-dk brn, trnsl-op grns, arg, abnt bent



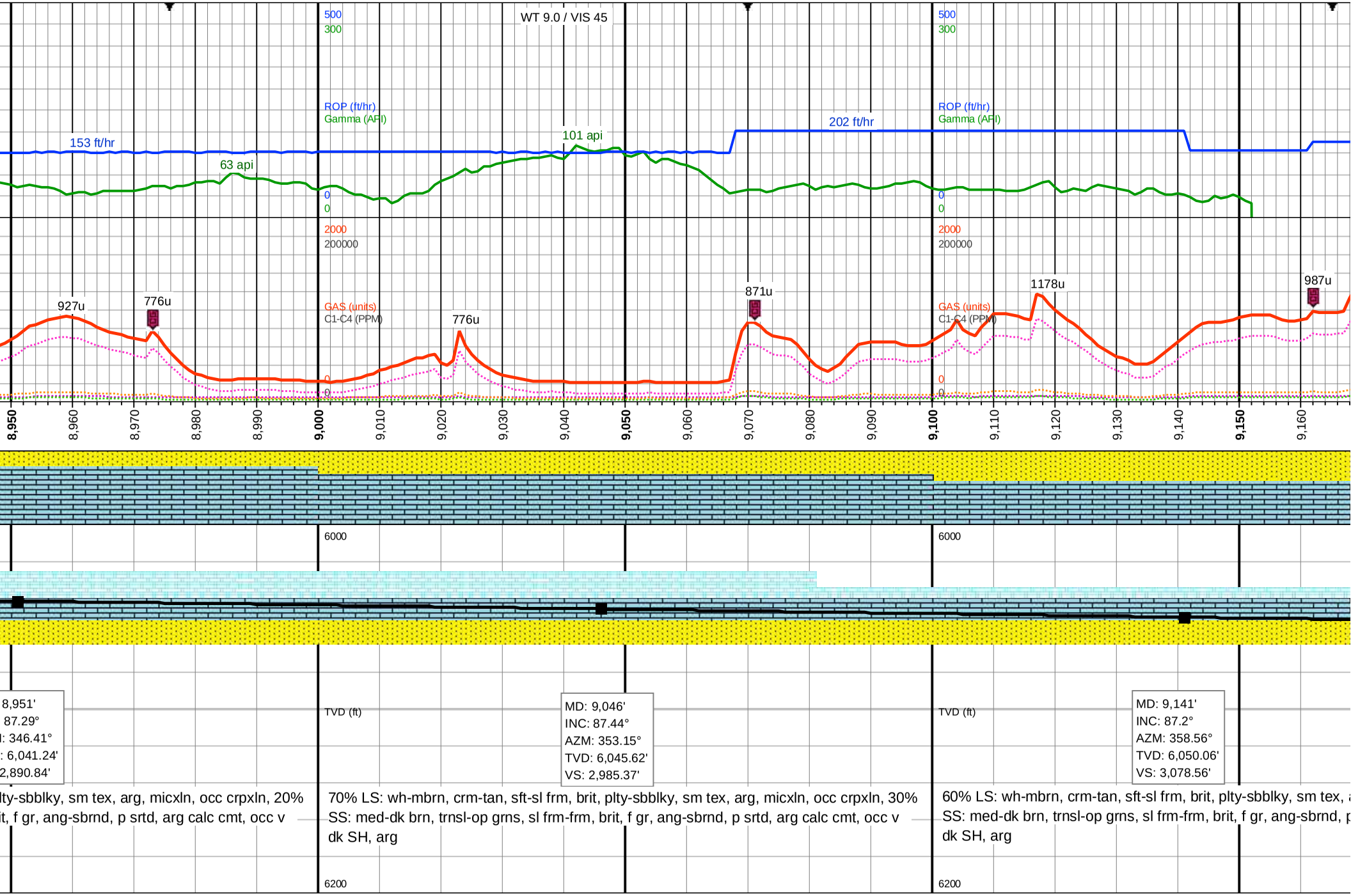
MD: 8,762'
INC: 87.81°
AZM: 328.6°
TVD: 6,034.65'
VS: 2,704.41'

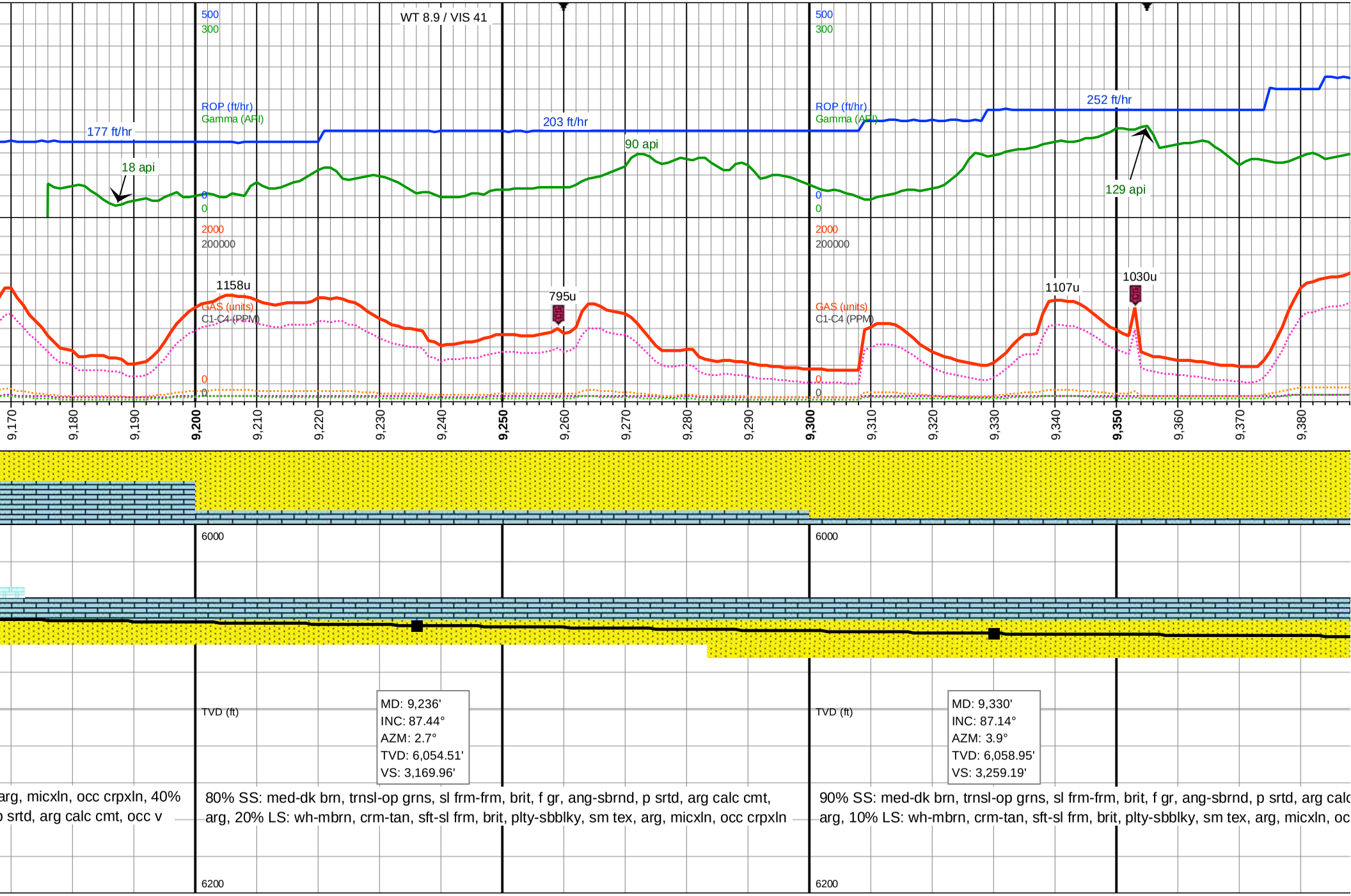
MD: 8,857'
INC: 88.46°
AZM: 337.34°
TVD: 6,037.75'
VS: 2,797.15'

mot, sbplty- sbblky, pred v sft, fri-brit, slty, rthy lstr, v calc, 10% frm, brit, plty-sbblky, sm tex, arg, micxln, 10% SS: med-dk gy, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v dk SH,

70% LS: m-dkgy, brn ip, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, 30% SS: med-dk gy, brn-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v dk SH, arg, tr pyr

80% LS: wh-mbrn, crm-tan, sft-sl frm, brit, p
SS: med-dk brn, trnsl-op grns, sl frm-frm, bri
dk SH, arg

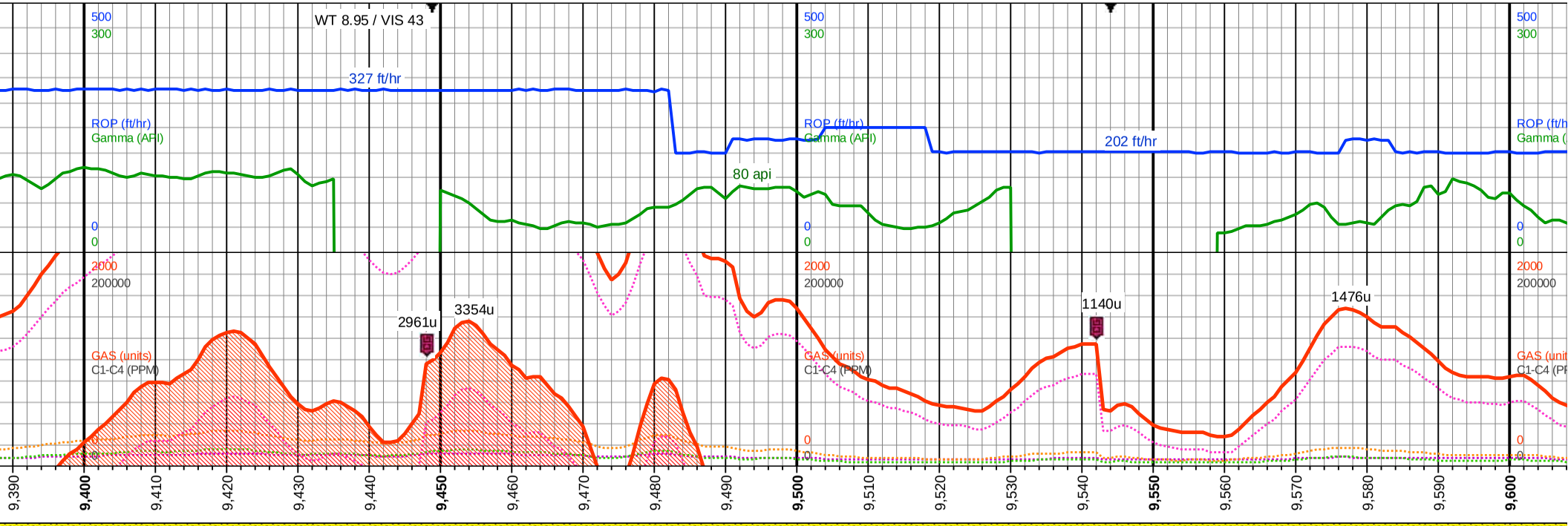

WT 9.0 / VIS 45
500
300
ROP (ft/hr)
Gamma (API)
153 ft/hr
63 api
101 api
202 ft/hr
0
0
2000
200000
GAS (units)
C1-C4 (PPM)
927u
776u
776u
871u
1178u
987u
8,950
8,960
8,970
8,980
8,990
9,000
9,010
9,020
9,030
9,040
9,050
9,060
9,070
9,080
9,090
9,100
9,110
9,120
9,130
9,140
9,150
9,160
6000
TVD (ft)
6200
8,951'
87.29°
: 346.41°
: 6,041.24'
2,890.84'
MD: 9,046'
INC: 87.44°
AZM: 353.15°
TVD: 6,045.62'
VS: 2,985.37'
MD: 9,141'
INC: 87.2°
AZM: 358.56°
TVD: 6,050.06'
VS: 3,078.56'
lty-sbblky, sm tex, arg, micxln, occ crpxln, 20%
it, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v
70% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln, 30%
SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, occ v
dk SH, arg
60% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex,
SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p
dk SH, arg

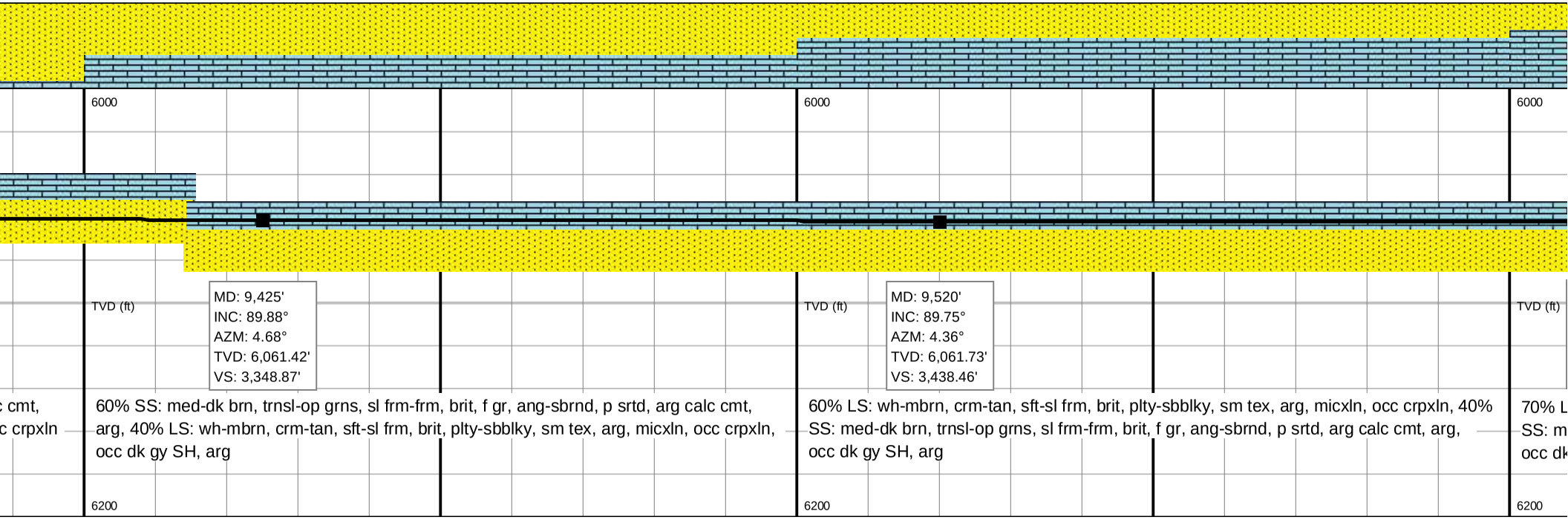


arg, micxln, occ crpxln, 40%
p srtd, arg calc cmt, occ v

80% SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, arg, 20% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln

90% SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc arg, 10% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, oc



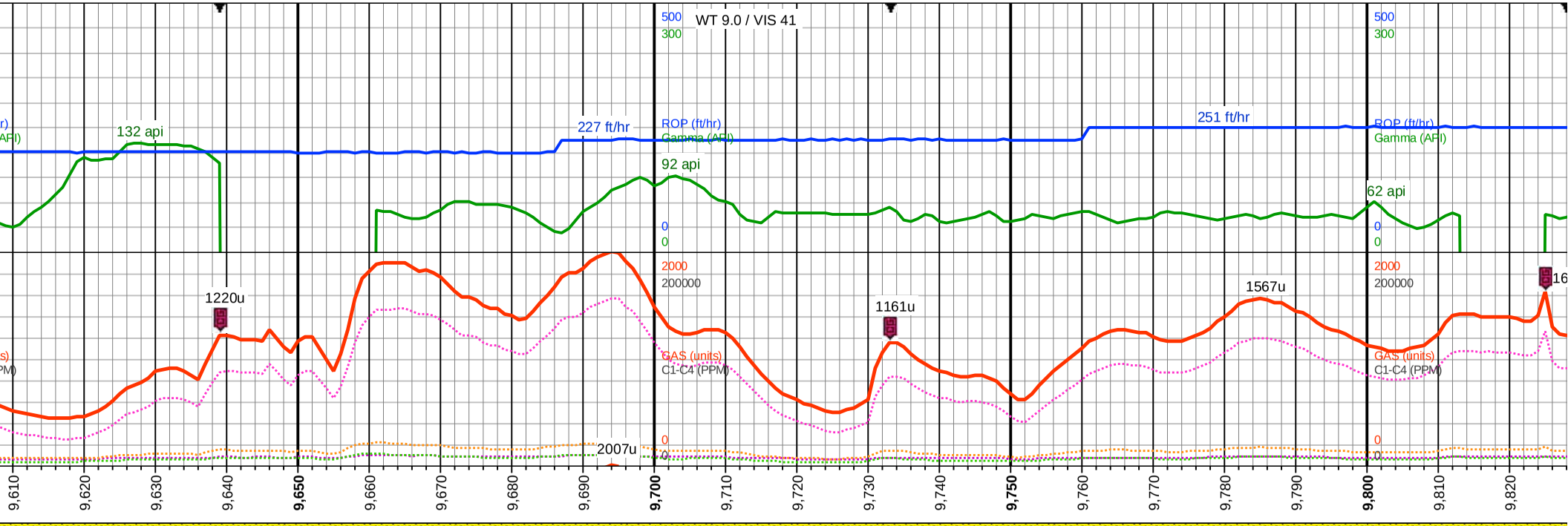


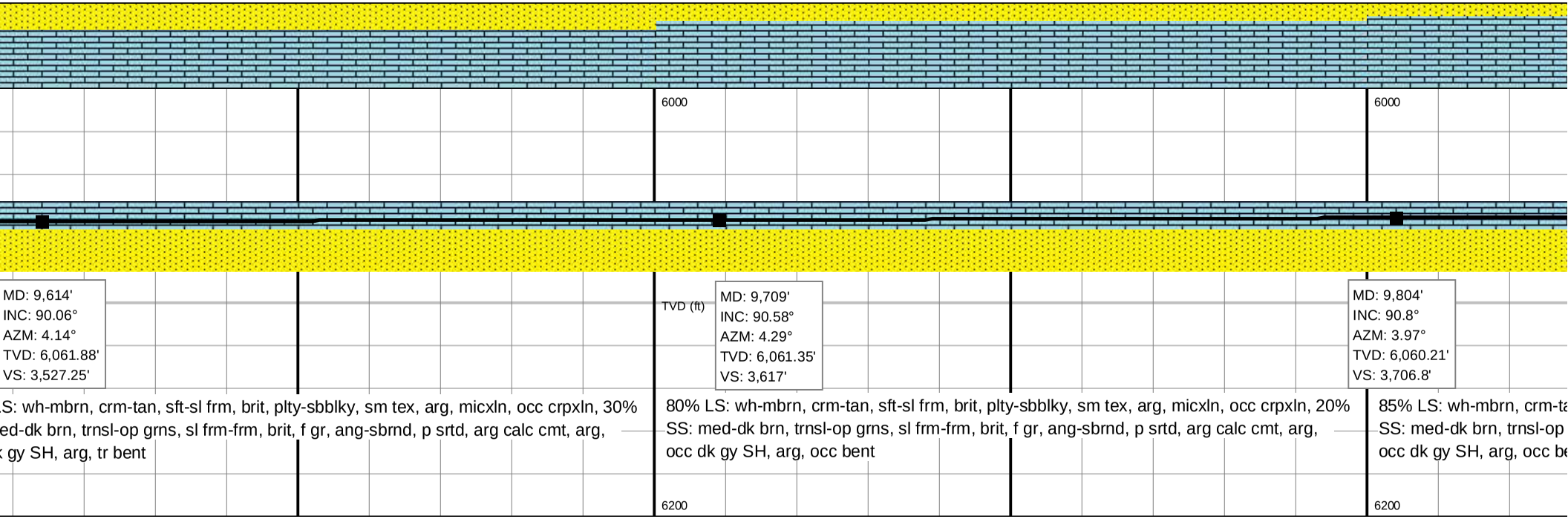
c cmt,
c crpxln

60% SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, arg, 40% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln, occ dk gy SH, arg

60% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln, 40% SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, arg, occ dk gy SH, arg

70% L
SS: m
occ dk





MD: 9,614'
INC: 90.06°
AZM: 4.14°
TVD: 6,061.88'
VS: 3,527.25'

LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln, 30%
ed-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, arg,
k gy SH, arg, tr bent

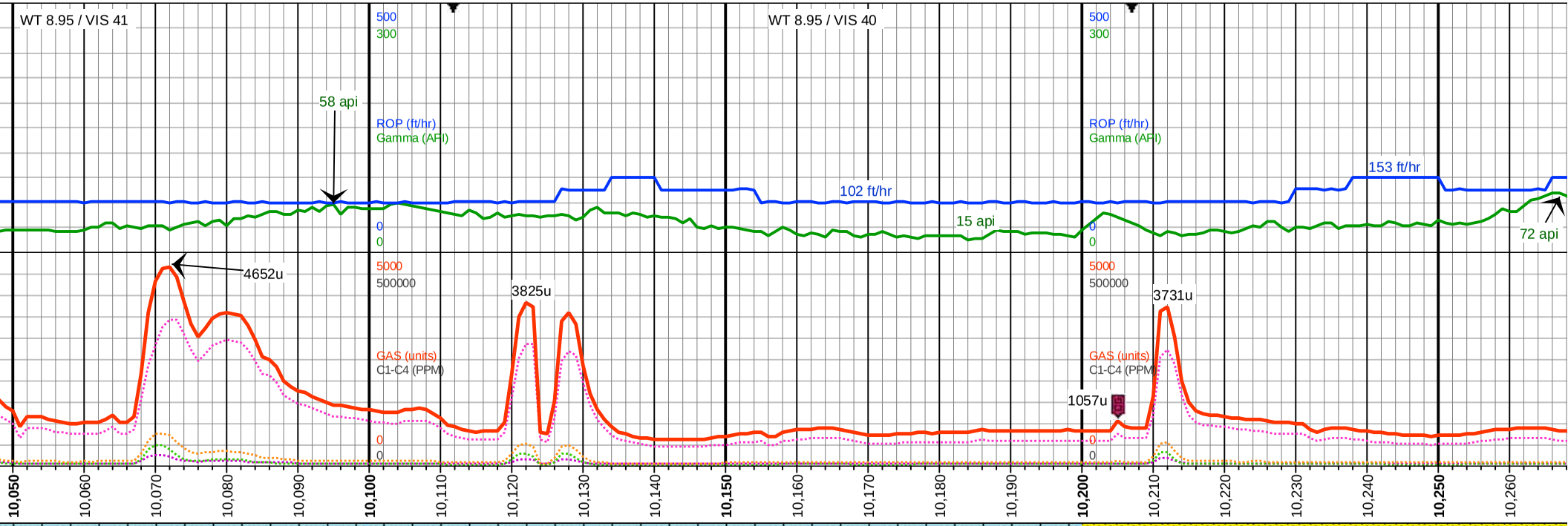
MD: 9,709'
INC: 90.58°
AZM: 4.29°
TVD: 6,061.35'
VS: 3,617'

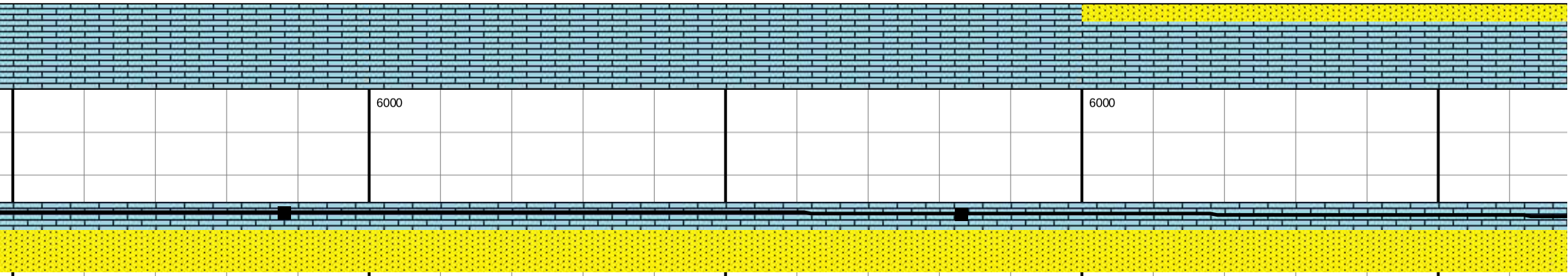
80% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln, 20%
SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, arg,
occ dk gy SH, arg, occ bent

MD: 9,804'
INC: 90.8°
AZM: 3.97°
TVD: 6,060.21'
VS: 3,706.8'

85% LS: wh-mbrn, crm-ta
SS: med-dk brn, trnsl-op
occ dk gy SH, arg, occ be


WT 9.0 / VIS 40
500
300
ROP (ft/hr)
Gamma (API)
254 ft/hr
202 ft/hr
152 ft/hr
43 api
0
0
2000
200000
5000
500000
GAS (units)
C1-C4 (PPM)
40u
1322u
1145u
1145u
9,830
9,840
9,850
9,860
9,870
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
6000
6200
TVD (ft)
MD: 9,899'
INC: 90.83°
AZM: 6.55°
TVD: 6,058.86'
VS: 3,795.96'
MD: 9,993'
INC: 90.8°
AZM: 6.28°
TVD: 6,057.52'
VS: 3,883.51'
an, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln, 15%
grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, arg,
ent
90% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln, 10%
SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, arg,
occ dk gy SH, arg, occ bent
100% LS: wh-mbrn, crm-tan, sft-sl frm, brit,
SS, tr dk gy arg SH, occ bent





6000

MD: 10,088'
INC: 89.57°
AZM: 3.97°
TVD: 6,057.21'
VS: 3,972.75'

TVD (ft)

MD: 10,183'
INC: 89.72°
AZM: 4.53°
TVD: 6,057.8'
VS: 4,062.49'

TVD (ft)

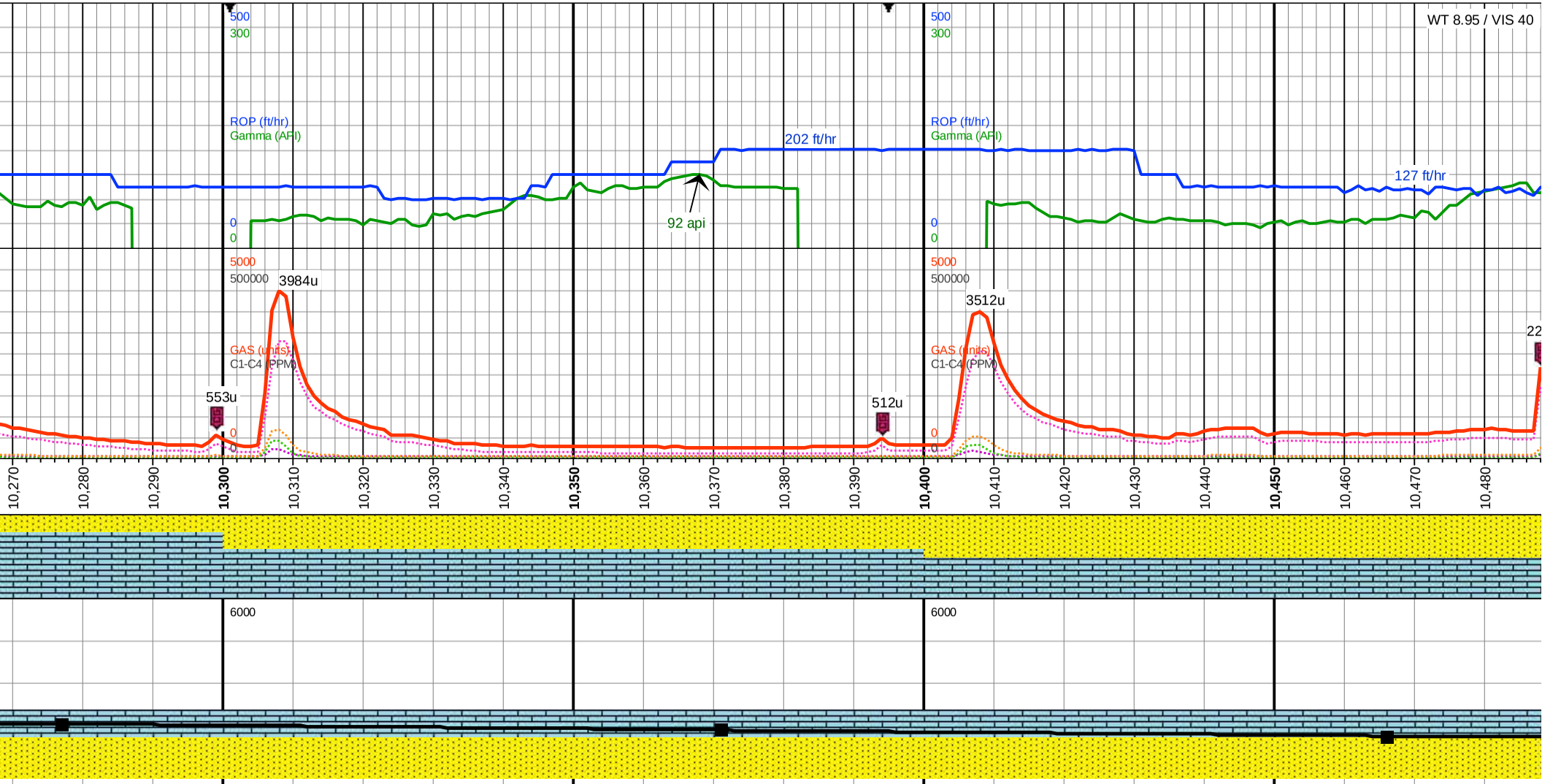
plty-sbblky, sm tex, arg, micxln, occ crpxln, tr

100% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln, tr SS, tr dk gy arg SH, tr bent

80% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, a
SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p
apr hydc stn, occ dk gy arg SH, tr bent

6200

6200



MD: 10,277'
INC: 88.55°
AZM: 4.38°
TVD: 6,059.22'
VS: 4,151.16'

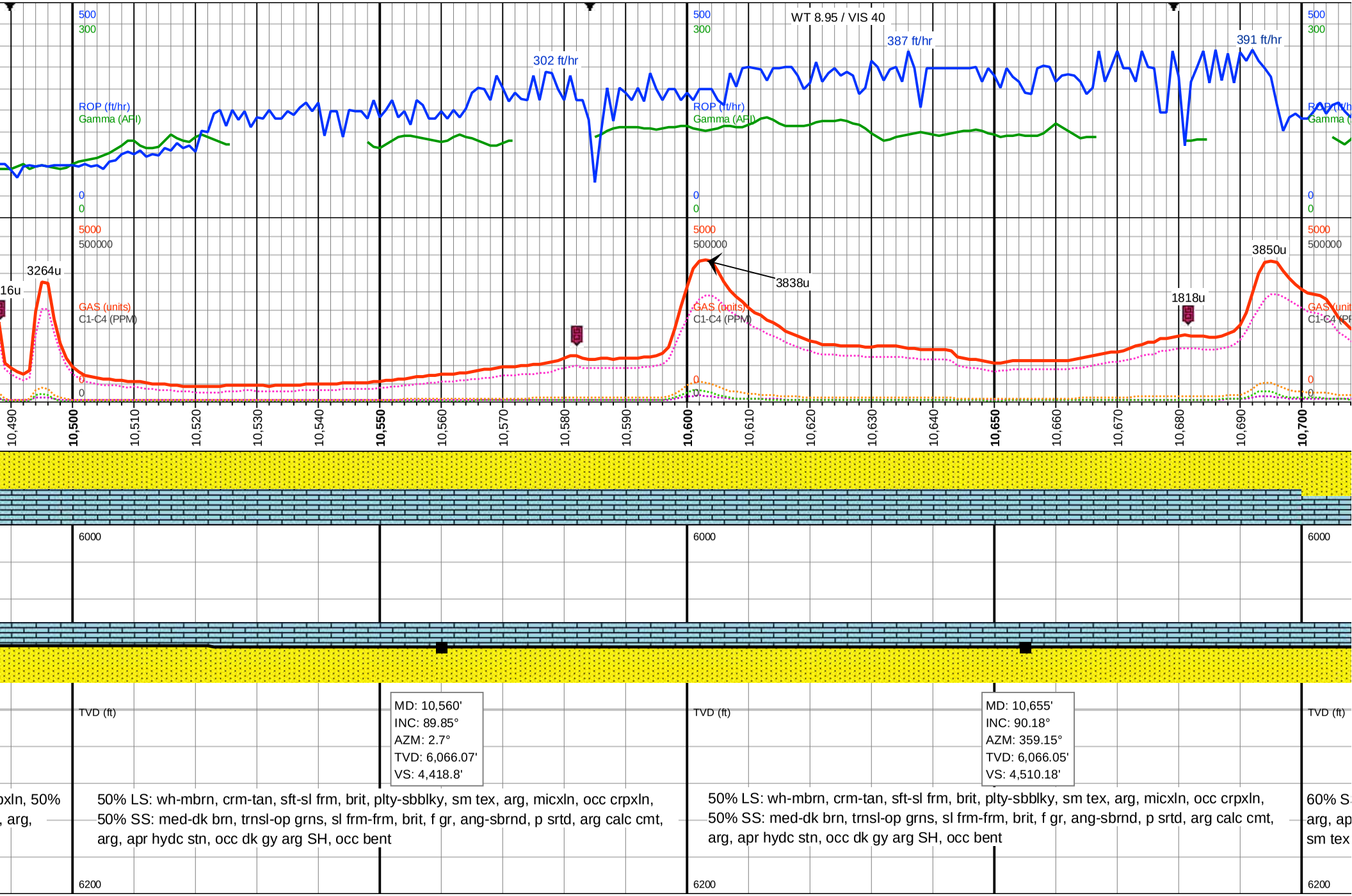
arg, micxln, occ crpxln, 20%
p srtd, arg calc cmt, arg,

MD: 10,371'
INC: 87.72°
AZM: 3.83°
TVD: 6,062.28'
VS: 4,239.98'

60% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln, 40%
SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt, arg,
apr hydc stn, occ dk gy arg SH, occ bent

MD: 10,466'
INC: 88.92°
AZM: 4.59°
TVD: 6,065.06'
VS: 4,329.7'

50% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crp
SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt
apr hydc stn, occ dk gy arg SH, occ bent

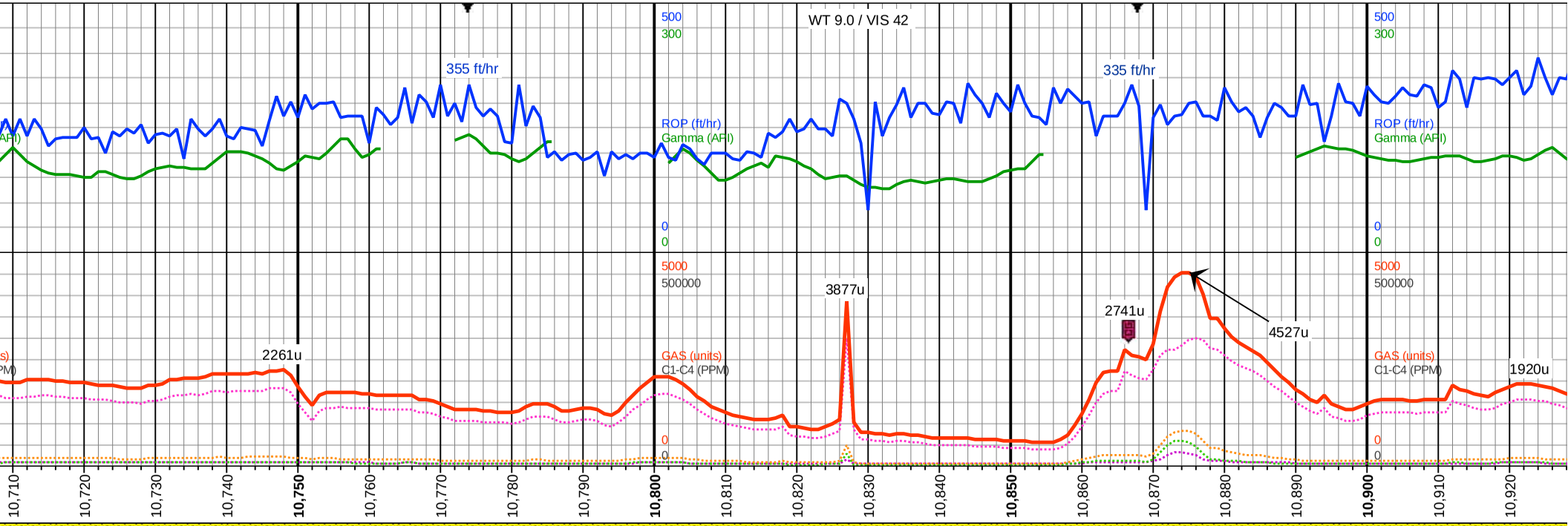


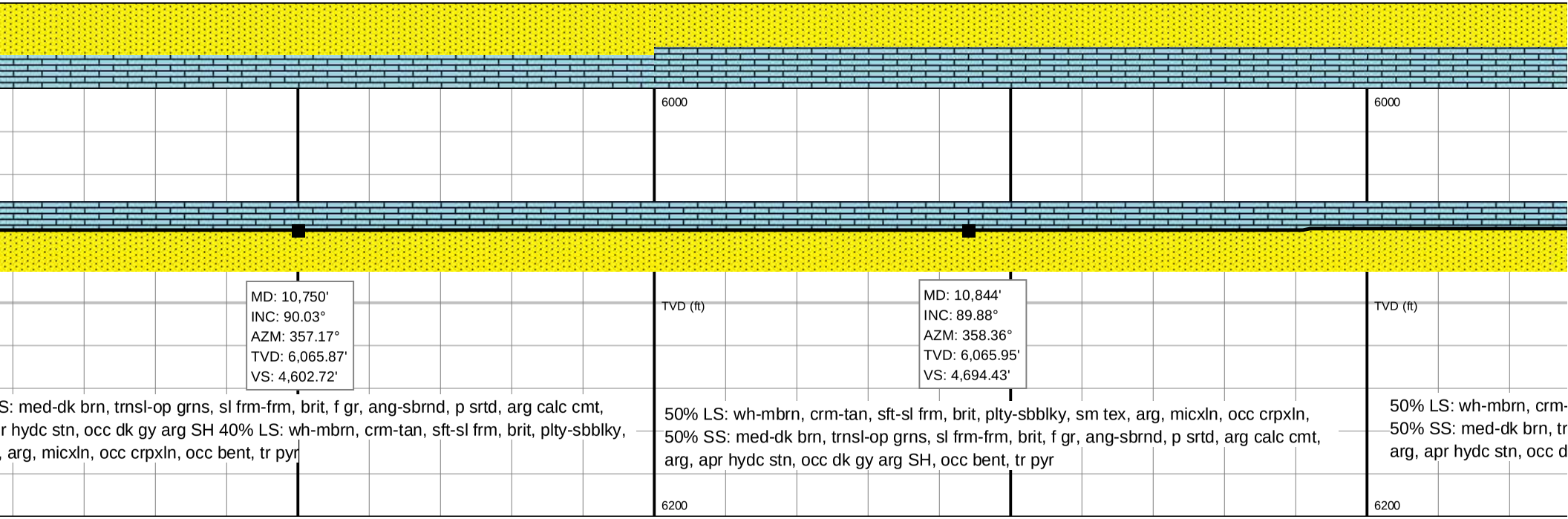
pxln, 50%
, arg,

50% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln,
50% SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt,
arg, apr hydc stn, occ dk gy arg SH, occ bent

50% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln,
50% SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt,
arg, apr hydc stn, occ dk gy arg SH, occ bent

60% S
arg, ap
sm tex





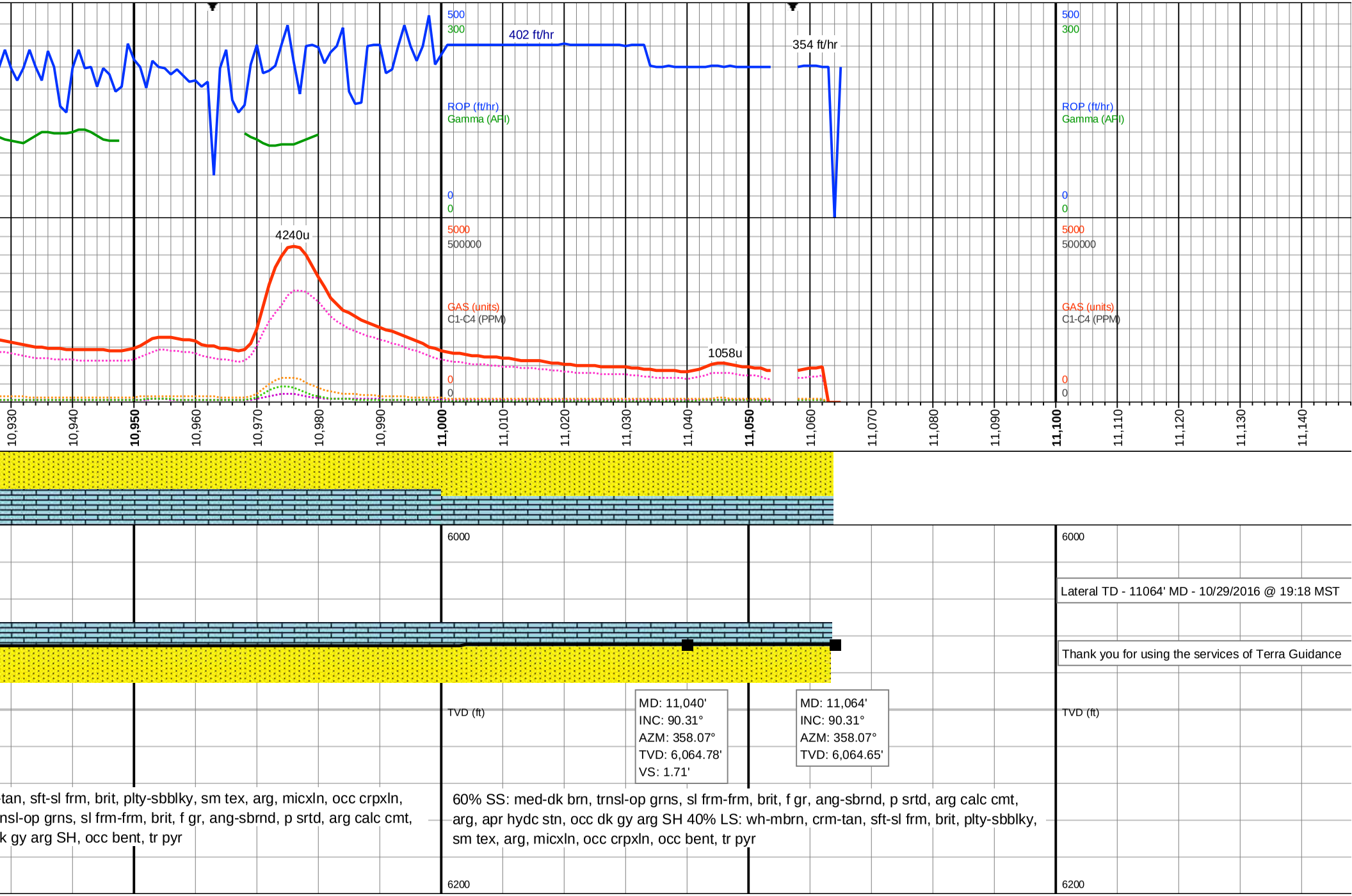
MD: 10,750'
INC: 90.03°
AZM: 357.17°
TVD: 6,065.87'
VS: 4,602.72'

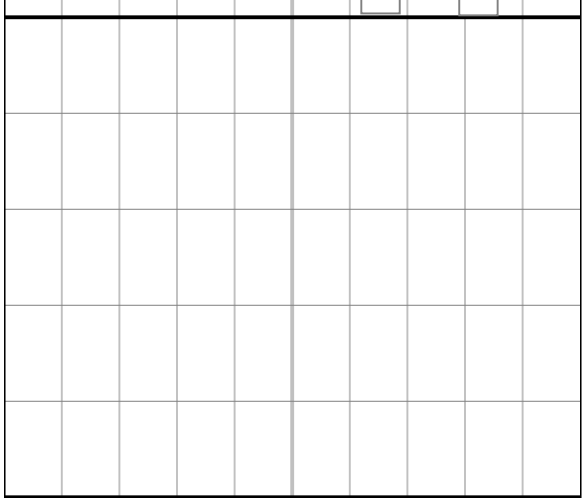
MD: 10,844'
INC: 89.88°
AZM: 358.36°
TVD: 6,065.95'
VS: 4,694.43'

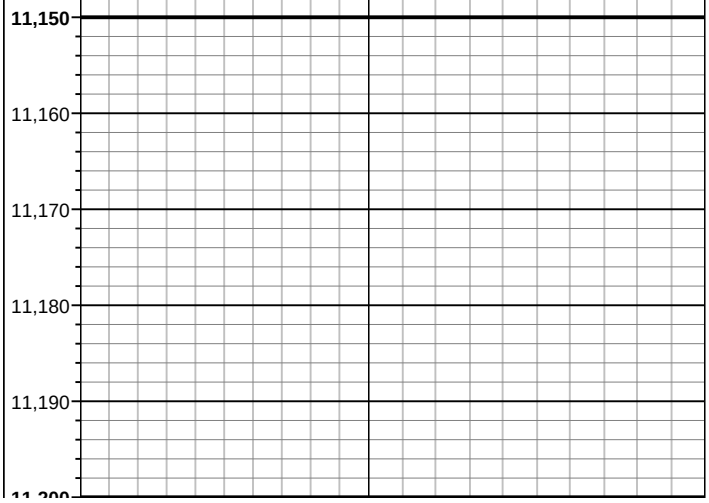
S: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt,
r hydc stn, occ dk gy arg SH 40% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky,
, arg, micxln, occ crpxln, occ bent, tr pyr

50% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln,
50% SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt,
arg, apr hydc stn, occ dk gy arg SH, occ bent, tr pyr

50% LS: wh-mbrn, crm-
50% SS: med-dk brn, tr
arg, apr hydc stn, occ d


500
300
402 ft/hr
354 ft/hr
ROP (ft/hr)
Gamma (API)
0
0
5000
500000
4240u
GAS (units)
C1-C4 (PPM)
1058u
10,930
10,940
10,950
10,960
10,970
10,980
10,990
11,000
11,010
11,020
11,030
11,040
11,050
11,060
11,070
11,080
11,090
11,100
11,110
11,120
11,130
11,140
6000
Lateral TD - 11064' MD - 10/29/2016 @ 19:18 MST
Thank you for using the services of Terra Guidance
TVD (ft)
MD: 11,040'
INC: 90.31°
AZM: 358.07°
TVD: 6,064.78'
VS: 1.71'
MD: 11,064'
INC: 90.31°
AZM: 358.07°
TVD: 6,064.65'
tan, sft-sl frm, brit, plty-sbblky, sm tex, arg, micxln, occ crpxln,
nsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt,
k gy arg SH, occ bent, tr pyr
60% SS: med-dk brn, trnsl-op grns, sl frm-frm, brit, f gr, ang-sbrnd, p srtd, arg calc cmt,
arg, apr hydc stn, occ dk gy arg SH 40% LS: wh-mbrn, crm-tan, sft-sl frm, brit, plty-sbblky,
sm tex, arg, micxln, occ crpxln, occ bent, tr pyr
6200




11,150
11,160
11,170
11,180
11,190