



Scale: 5" / 100'
Measured Depth Log

Well Name Ruegge 3R-4H-N165

Location Sec. 4 T1N R65W

State Colorado

County Weld

Country USA

Rig Number Ensign 140

API Number 05123465680000

AFE # 16190994

Geographic Region Rockies

Field Wattenberg

Spud Date 7/27/2018

Drilling Completed 7/29/2018

Surface Coordinates Lat/Long: 40.075285/-104.670526

SHL: Sec: 4 Twp: 1N 65W
Footage: 717 FSL 2205 FWL

Bottom Hole Coordinates Proposed BHL: Sec: 4 Twp: 1N 65W
Footages: 460 FFNLL 225 FFELL

Ground Elevation 4,914'

K.B. Elevation 4,937'

Logged Interval 7,100' **To** 12,660'

Total Depth 12,660'

Formation Codell

Type of Drilling Fluid Synthetic Oil Based Mud

Operator

Company Crestone Peak Resources

Address 370 17th Street #2170
Denver, CO 80202



CRESTONE PEAK
RESOURCES

Geologist

Zone Color Coding

Geologist

Name John Ready

Company Crestone Peak Resources

Address 370 17th Street #2170
Denver, CO 80202



CRESTONE PEAK
RESOURCES

Zone Color Coding

Oil	Condensate	Gas
Note	Core	Pressure
Error	Water	Seal

Other

Loggers: Brian Ferwerda / Nick Watkins

Services Provided: 2-Man Mudlogging / Geosteering

Equipment: ML-533

Contractor: Empirica, Reservoir Group
6360 West Sam Houston Pkwy N
Houston, Texas, 77041

Service Start Date: 7/28/2018

Service End Date: 7/31/2018

Rock Types

UNKNOWN	
ANHYDRITE	
GYPSUM	
SALT	
SIDERITE or LIMONITE	
LIMESTONE	

DOLOMITE	
CHERT	
COAL	
MARLSTONE	
CHALK	
SHALE	

SHALE GRAY	
SHALE COLORED	
SILTSTONE	
SANDSTONE	
CONGLOMERATE	
BRECCIA	

TILL	
BENTONITE	
TUFF	
IGNEOUS	
METAMORPHIC	
CEMENT	

Accessories

Fossils

ALGAE
AMPHIPORA
BELEMNITE
BIOCLASTIC
BRACHIOPOD
BRYOZOA
CEPHALOPOD
CORAL
CRINOID
ECHINOID
FISH
FORAMINIFERA

Fossil

GASTROPOD
OOLITE
OSTRACOD
PELECYPOD
PELLET
PISOLITE
PLANT REMAINS
PLANT SPORES
SCAPHOPOD
STROMATOPOROIDEA

Minerals

ANHYDRITIC

Argillaceous

ARGILLITE GRAIN
BENTONITE
BITUMENOUS SUBSTANCE
BRECCIA FRAGMENTS
CALCAREOUS
CARBONACEOUS FLAKES
CHTDK
CHTLT
COAL - THIN BEDS
DOLOMITIC
FELDSPAR
FERRUGINOUS PELLET
FERRUGINOUS

Glaucconite

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

- E EARTHY
- F FENESTRAL
- F FRACTURE
- X INTERCRYSTALLINE
- Q INTEROOLITIC
- M MOLDIC

- ORGANIC
- PINPOINT
- VUGGY

Engineering

- BIT
- CASING
- CONNECTION (LEFT)
- CONNECTION (RIGHT)
- 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

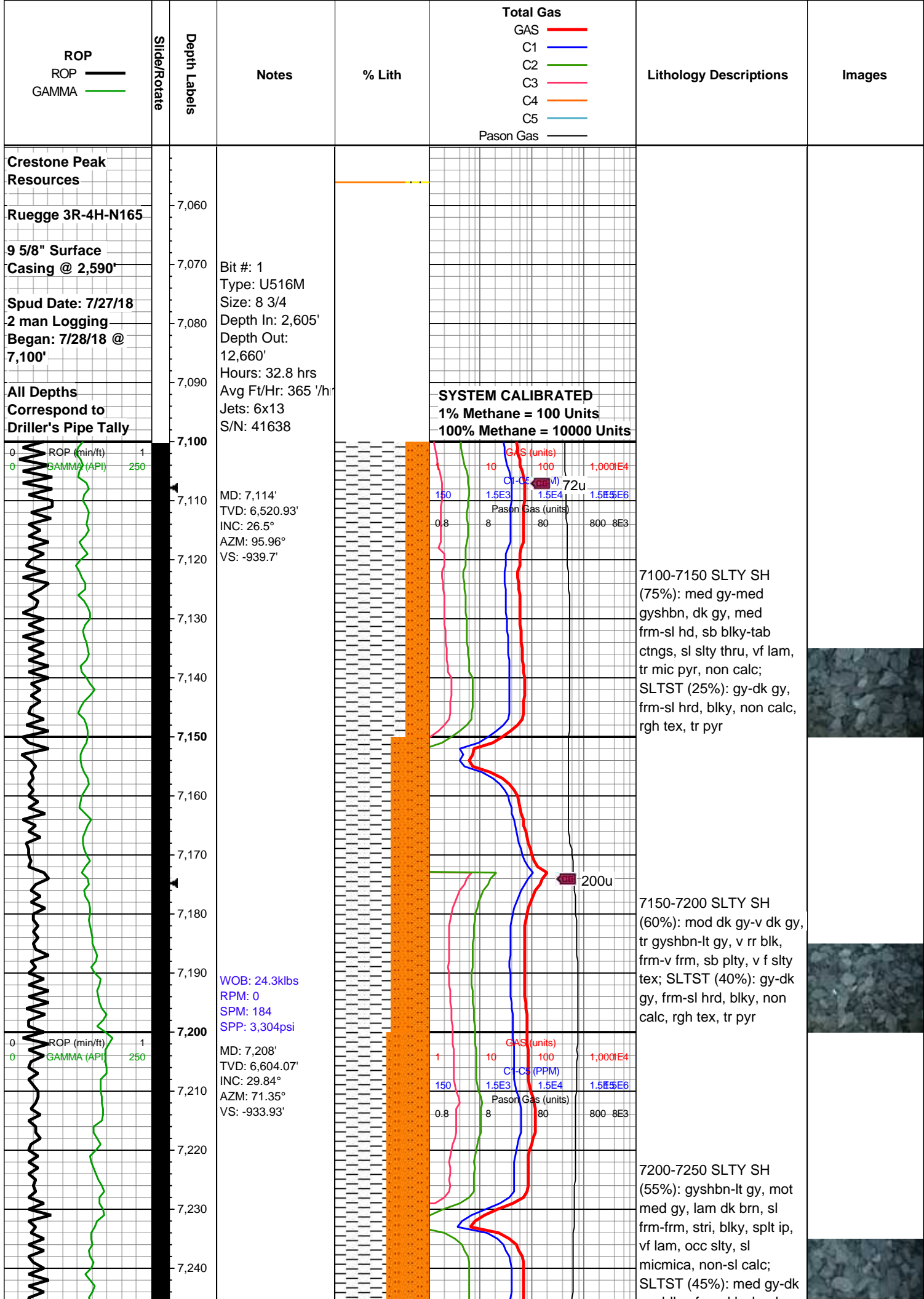
Textures

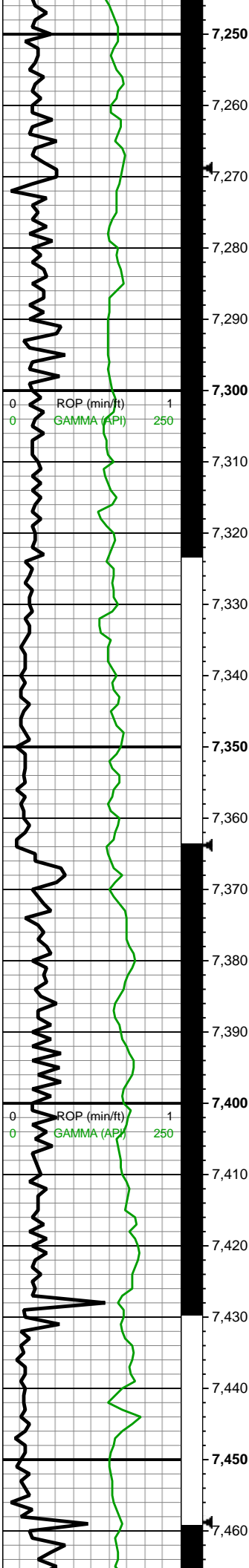
- BOUNDSTONE
- CHALKY
- CRYPTOXLN
- E EARTHY
- F FINELYXLN
- GRAINSTONE

- L LITHOGRAPHIC
- MX MICROXLN
- MS MUDSTONE
- PS PACKSTONE
- WS WACKESTONE

Sorting

- M MODERATE
- P POOR
- W WELL



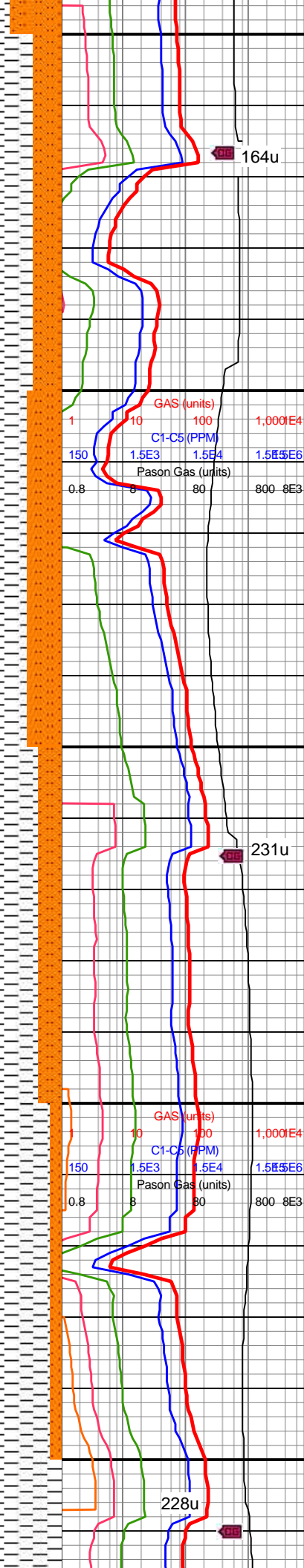


MW IN: 9.5
VIS IN: 45
MW OUT: 9.5+
VIS OUT: 44

MD: 7,303'
TVD: 6,684.75'
INC: 34.23°
AZM: 53.95°
VS: -910.14'

MD: 7,398'
TVD: 6,763.43'
INC: 34.01°
AZM: 47.8°
VS: -876.13'

WOB: 24.5klbs
RPM: 0
SPM: 186
SPP: 3,309psi



164u

231u

228u

gy, blk, frm-sl hrd, rgh
tex, non calc, micmica

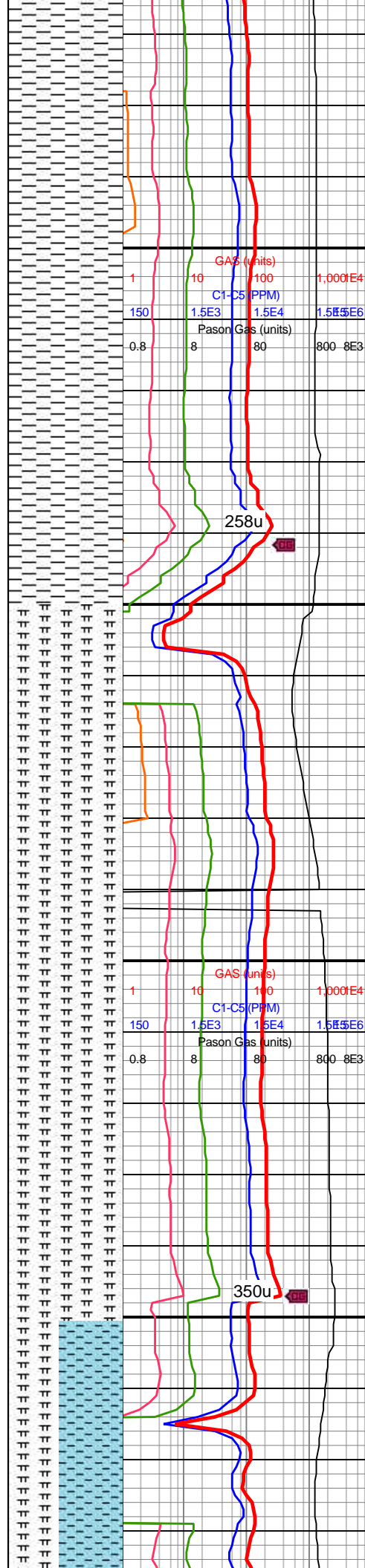
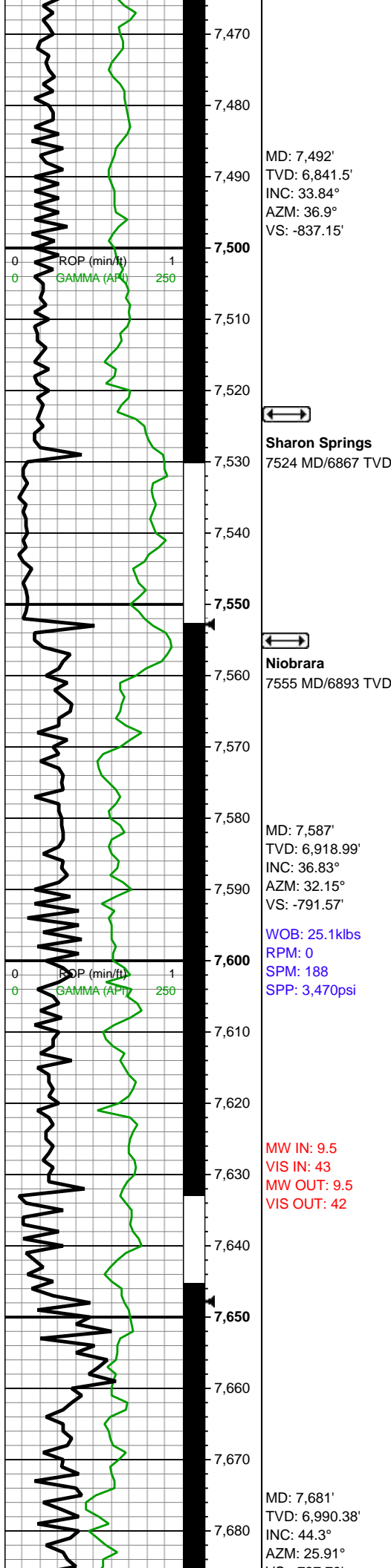
7250-7300 SLTY SH
(75%): med gy-med
gyshbn, dk gy, med
frm-sl hd, sb blk-tab
ctngs, sl slty thru, vf lam,
tr mic pyr, non calc;
SLTST (25%): gy-dk gy,
frm-sl hrd, blk, non calc,
rgh tex, tr pyr

7300-7350 SLTY SH
(70%): mod dk gy-v dk gy,
tr gyshbn-lt gy, v rr blk,
frm-v frm, sb plty, v f slty
tex; SLTST (30%): gy-dk
gy, frm-sl hrd, blk, non
calc, rgh tex, tr pyr

7350-7400 SLTY SH
(80%): med gy-med
gyshbn, dk gy, med
frm-sl hd, sb blk-tab
ctngs, sl slty thru, vf lam,
tr mic pyr, non calc;
SLTST (20%): gy-dk gy,
frm-sl hrd, blk, non calc,
rgh tex, tr pyr

7400-7450 SLTY SH
(90%): v lt gy-lt gy, predy v
sft w hydrated, sme sb
frm, mod fis sb blk ctngs
wi f lamn, sm arg-sl slty
tex, non calc; SLTST
(10%): gy-dk gy, occ v dk
gy-blk, frm, brit, non calc,
sl calc ip





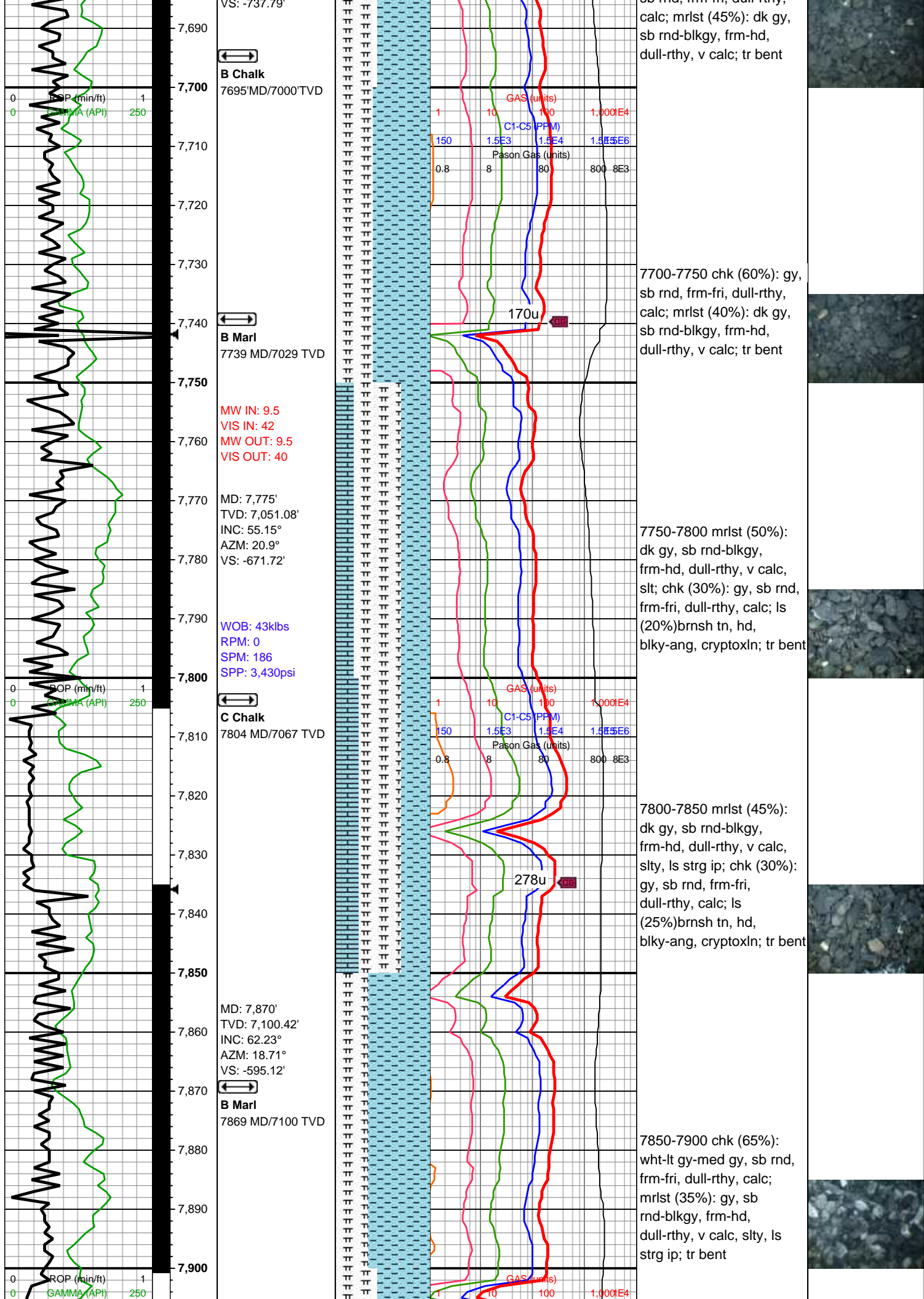
7450-7500 SLTY SH
(100%): gy-gyshbn wi sp
blk lith incl, frm, brit, sb
frm ip, med-hi fis blkly-tab
ctngs wi wxy lstr, slty arg
tex, tr tn bent, mod calc

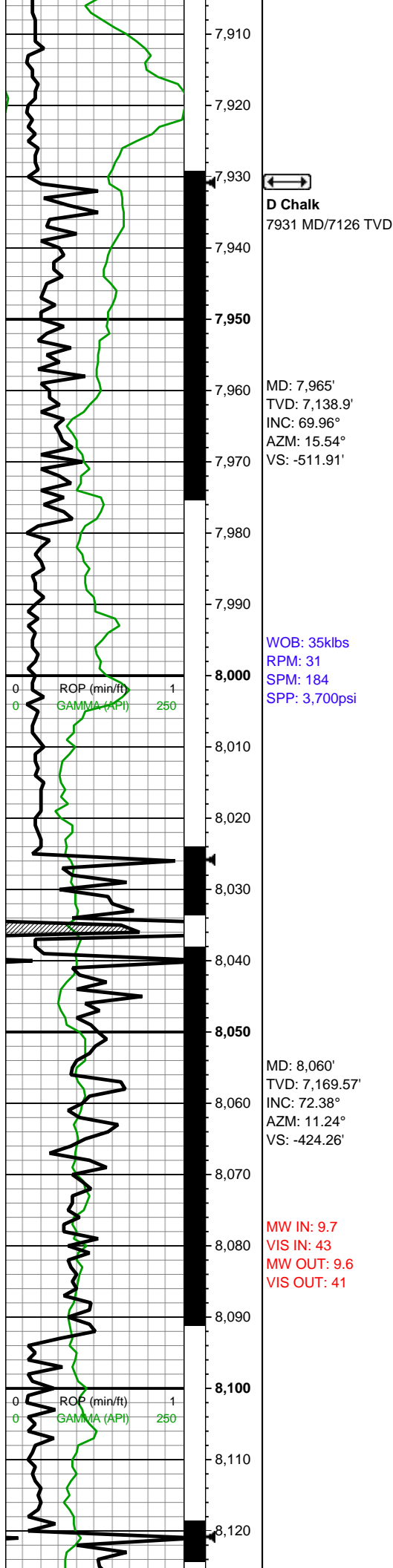
7500-7550 SH (100%):
lt-med gyshbn, scat
blkgy, frm, brit, sb plty-sb
blkly, dull, com v thnly
lam, mod calc, micmica,
rr dissd pyr, tr bent

7550-7600 mrlst (100%):
dk gy, sb rnd-blkgy,
frm-hd, dull-rthy, v calc, tr
pyr

7600-7650 mrlst (100%):
dk gy, sb rnd-blkgy,
frm-hd, dull-rthy, v calc, tr
pyr

7650-7700 chk (55%): gy,
sb rnd, frm-fri, dull-rthy





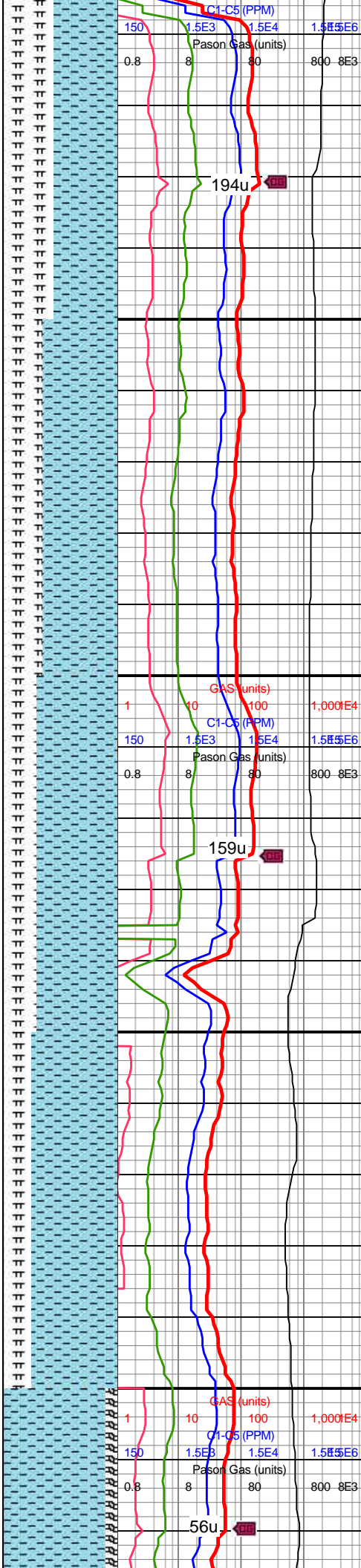
D Chalk
7931 MD/7126 TVD

MD: 7,965'
TVD: 7,138.9'
INC: 69.96°
AZM: 15.54°
VS: -511.91'

WOB: 35klbs
RPM: 31
SPM: 184
SPP: 3,700psi

MD: 8,060'
TVD: 7,169.57'
INC: 72.38°
AZM: 11.24°
VS: -424.26'

MW IN: 9.7
VIS IN: 43
MW OUT: 9.6
VIS OUT: 41



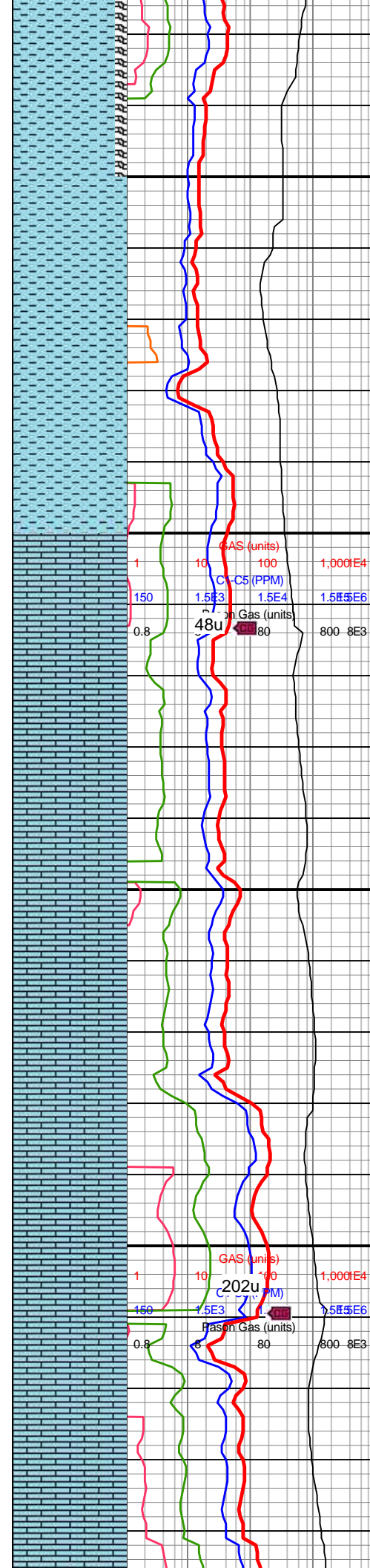
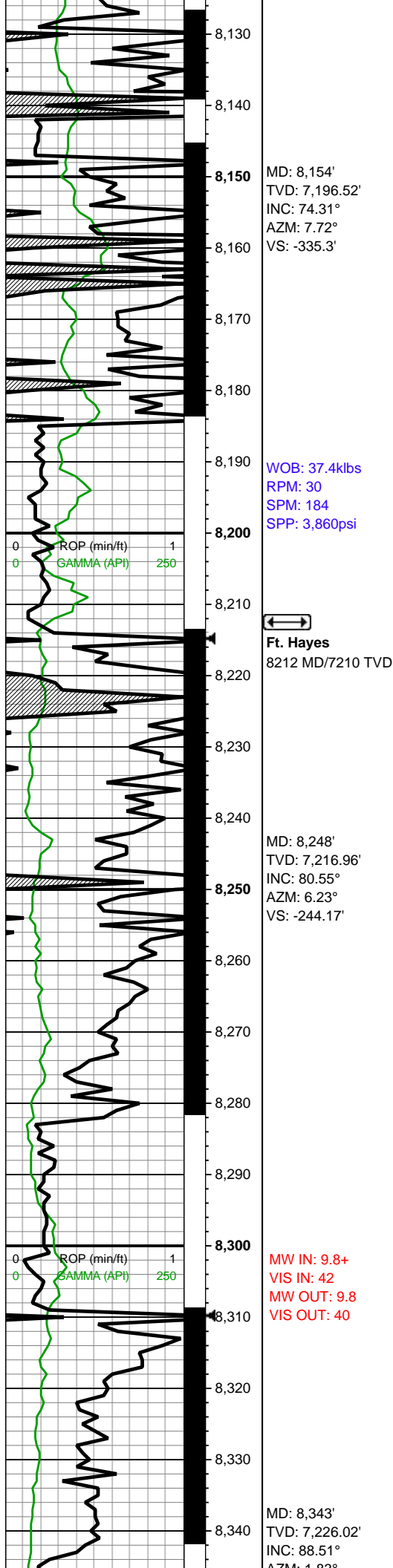
7900-7950 chk (55%):
wht-lt gy-med gy, sb rnd,
frm-fri, dull-rthy, calc;
mrlst (45%): gy, sb
rnd-blkgy, frm-hd,
dull-rthy, v calc, slty, ls
strg ip; tr bent

7950-8000 chk (65%):
wht ip- lt gy-gy, sb rnd,
frm-fri-sft, dull-rthy, calc;
mrlst (35%): med gy-dk
gy, sb rnd-blkgy, frm-hd,
dull-rthy, v calc, slty; tr
bent

8000-8050 chk (70%):
wht ip- lt gy-gy, sb rnd,
frm-fri-sft, dull-rthy, calc;
mrlst (30%): med gy-dk
gy, sb rnd-blkgy, frm-hd,
dull-rthy, v calc, slty; tr
bent

8050-8100 chk (75%):
wht ip- lt gy-gy, sb rnd,
frm-fri-sft, dull-rthy, calc;
mrlst (25%): med gy-dk
gy, sb rnd-blkgy, frm-hd,
dull-rthy, v calc, slty; tr
bent





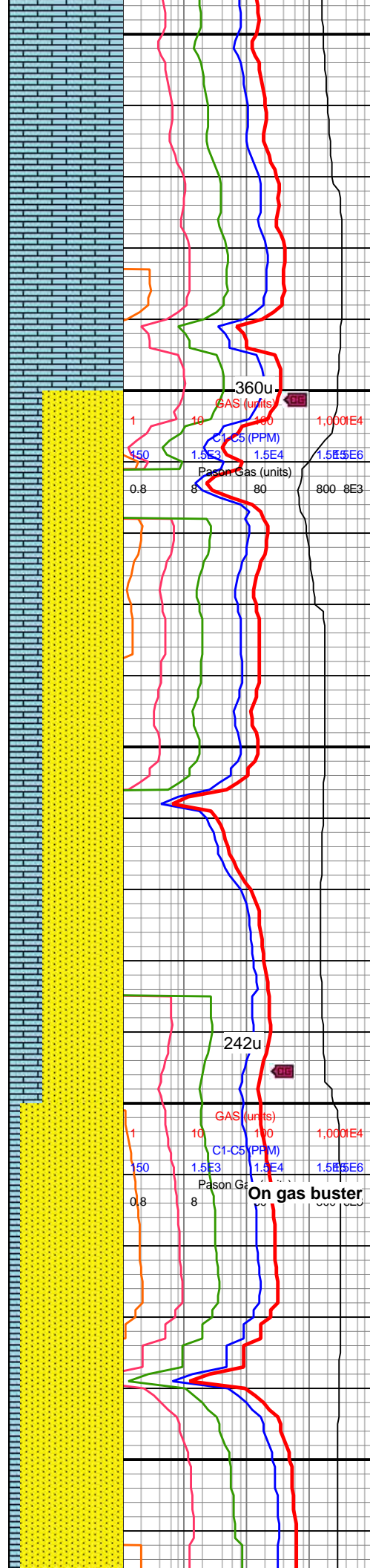
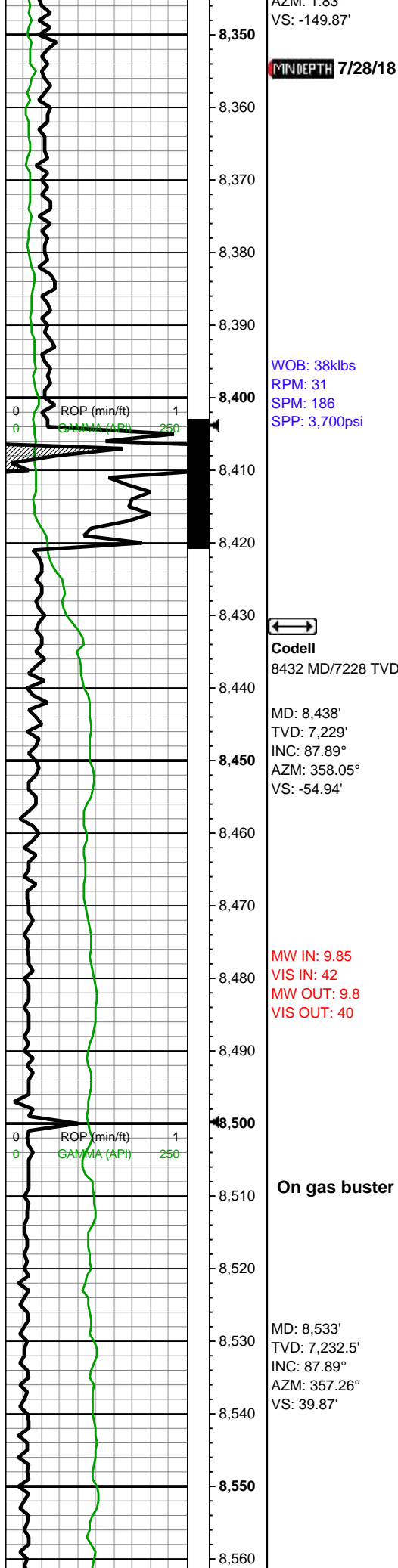
8100-8150 chk (90%):
wht ip- lt gy, sb rnd, fri-sft,
dull-rthy txt, calc; bent
(10%) wht, amor, sft, cly
txt

8150-8200 chk (100%):
wht ip- lt gy, sb rnd, fri-sft,
dull-rthy txt, calc

8200-8250 lmst (100%):
lt tn-brnsh tn, blk-ang,
hd-brit, crptxl txt, grnl pyr
ip.

8250-8300 LMST
(100%): lt gy-tn-lt gyshbn,
crpxln mudst, occ wkst, tr
vf pyr, hi calc

8300-8350 LMST
(100%): lt gy-tn-lt gyshbn,
rr dk gy lmst, crpxln
mudst. occ wkst. tr vf pyr.

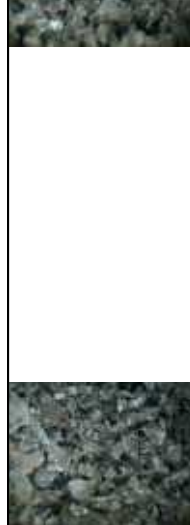


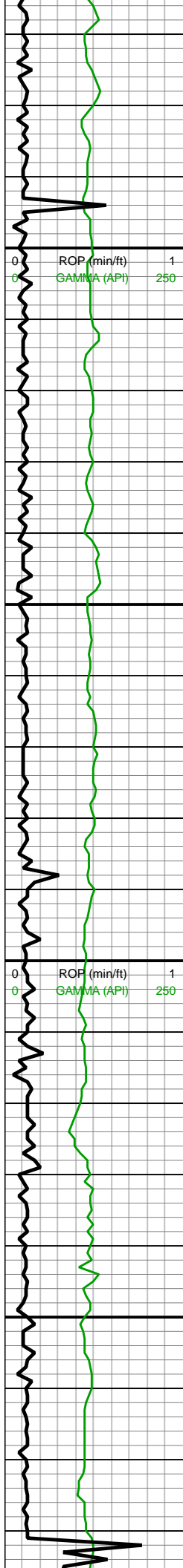
hi calc

8350-8400 LMST
(100%): lt gy-tn-lt gyshbn,
crpxln mudst, occ wkst, tr
vf pyr, hi calc

8400-8500 SST (70%):
predy gy-gyshbn, sme off
wh-lt gy, lt brn ip, frm-sli
fri p-mod srted gr sup sst
clus cons wi silc cmt, arg
cmt ip & slty thru, s&p ip
wi w sd grs occ calc,
predy mod calc, non calc
ip; LMST (30%): tn-lt brn,
frm-hd, sb blkly-blky
crpxln mudst-wkst, wxy
lstr, tr vf pyr, hi calc

8500-8600 SST (70%):
gy-gyshbn, sme off wh-lt
gy, s&p ip wi w sd grs. lt





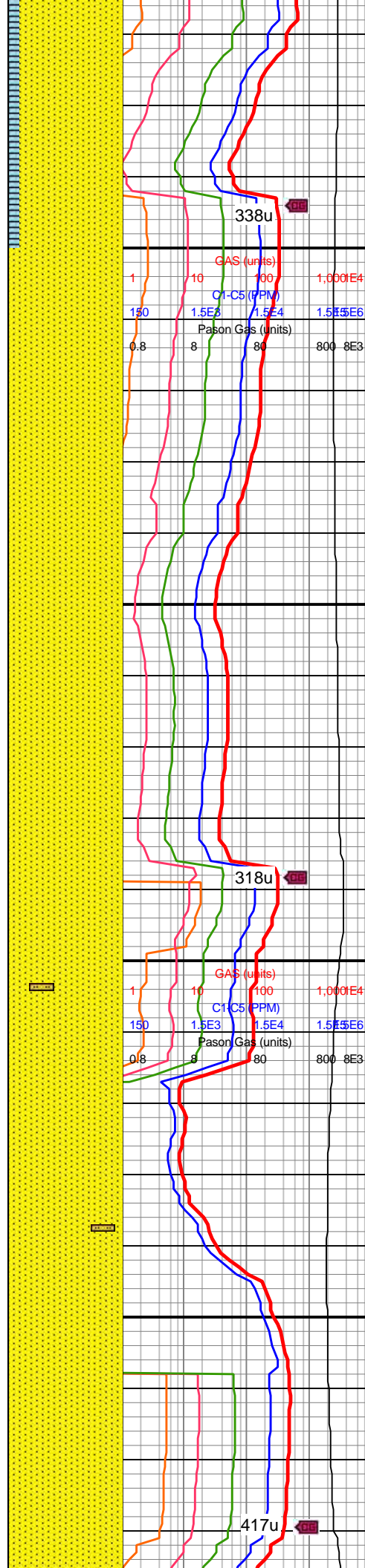
8,570
8,580
8,590
8,600
8,610
8,620
8,630
8,640
8,650
8,660
8,670
8,680
8,690
8,700
8,710
8,720
8,730
8,740
8,750
8,760
8,770
8,780

WOB: 36klbs
RPM: 61
SPM: 184
SPP: 3,780psi

MD: 8,627'
TVD: 7,235.42'
INC: 88.55°
AZM: 357°
VS: 133.65'

MD: 8,722'
TVD: 7,237.64'
INC: 88.77°
AZM: 356.12°
VS: 228.39'

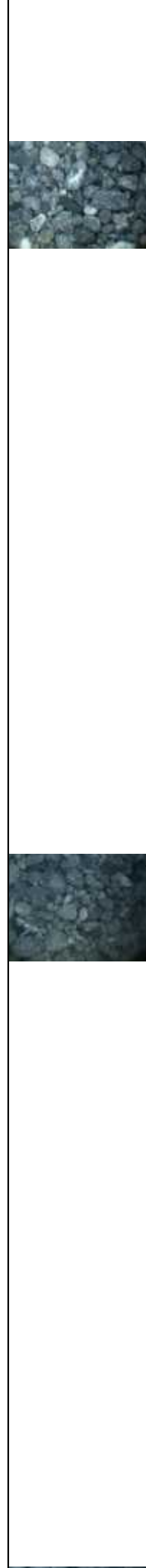
MW IN: 9.85
VIS IN: 43
MW OUT: 9.85
VIS OUT: 40

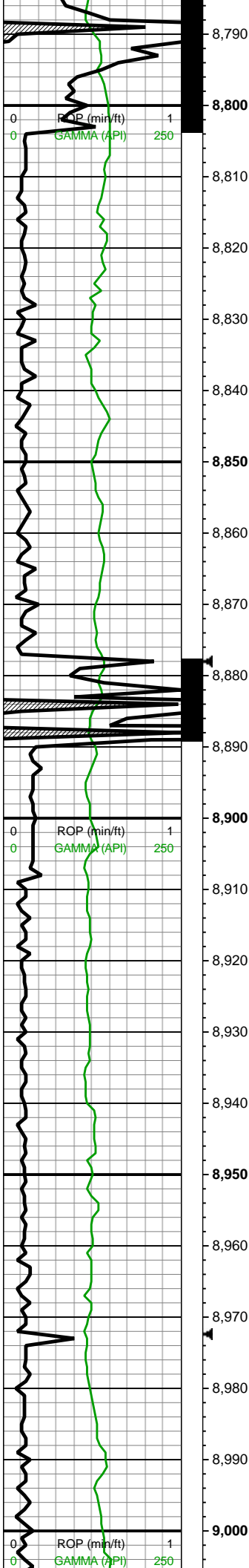


gy, sup ip w w sd grs, lt
brn ip, rr intbdd dk gy
sltst, frm-sli fri p-mod
srted gr sup sst clus cons
wi silc cmt, arg cmt ip &
silty thru, predy mod calc,
non calc ip; LMST (10%):
tn-lt brn, frm-hd, sb
blky-blky crpxln
mudst-wkst, wxy lstr, tr vf
pyr, hi calc

8600-8700 SST (100%):
predy med gy, lt gy ip,
s&p thru wi wh sd grs,
frm-hd sli fri gr sup ss
clus cons wi silc cmt,
mod srted vf-f sd grs, tr c
pyr strg, tr intbdd sltst
predy non calc, sl calc ip

8700-8800 SST (100%):
lt gy-med gy, s&p ip wi
wh sd grs, mod srted vf-f
sd grs, frm-hd sli fri ar





WOB: 47klbs
RPM: 0
SPM: 184
SPP: 3,370psi

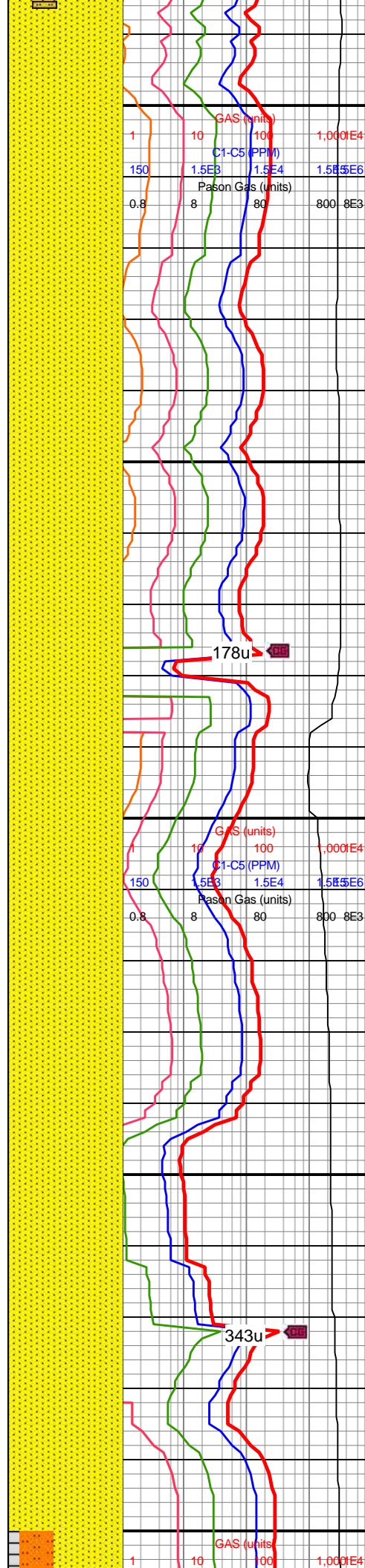
MD: 8,817'
TVD: 7,240.73'
INC: 87.5°
AZM: 358.93°
VS: 323.19'

MD: 8,911'
TVD: 7,243.83'
INC: 88.73°
AZM: 0.43°
VS: 417.12'

MW IN: 9.85
VIS IN: 42
MW OUT: 9.8
VIS OUT: 40

WOB: 34klbs
RPM: 60
SPM: 184
SPP: 3,920psi

MD: 9,006'

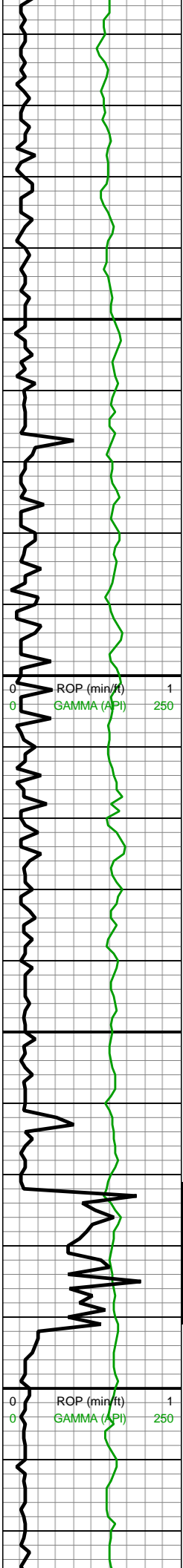


sup ss clus cons wi silc
cmt, rr intbdd dk gy sltst,
tr c pyr strg, predy non
calc, sl calc ip

8800-8850 SST (100%):
lt gy-med gy, s&p ip wi
wh sd grs, mod srtd vf-f
sd grs, frm-hd sli fri gr
sup ss clus cons wi silc
cmt, rr intbdd dk gy sltst,
tr c pyr strg, predy non
calc, sl calc ip

8850-8900 SST (100%):
lt gy-med gy, s&p ip wi
wh sd grs, mod srtd vf-f
sd grs, frm-hd sli fri gr
sup ss clus cons wi silc
cmt, rr intbdd dk gy sltst,
tr c pyr strg, predy non
calc, sl calc ip, tr o.

8900-9000 SST (100%):
predy med gy, lt gy ip,
s&p thru wi wh sd grs,
frm-hd sli fri gr sup ss
clus cons wi silc cmt,
mod srtd vf-f sd grs, tr c
pyr strg, tr intbdd sltst
predy non calc, sl calc ip



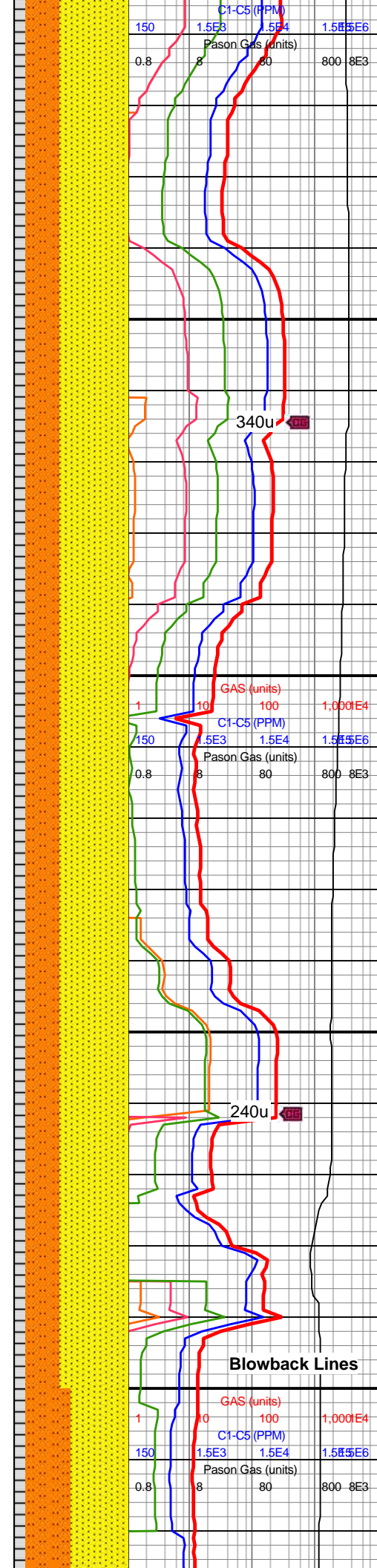
MD: 9,000'
TVD: 7,245.39'
INC: 89.39°
AZM: 359.9°
VS: 512.11'

MD: 9,100'
TVD: 7,246.07'
INC: 89.78°
AZM: 359.64°
VS: 606.1'

MW IN: 9.8
VIS IN: 43
MW OUT: 9.85
VIS OUT: 40

MD: 9,195'
TVD: 7,246.75'
INC: 89.39°
AZM: 2.54°
VS: 701.08'

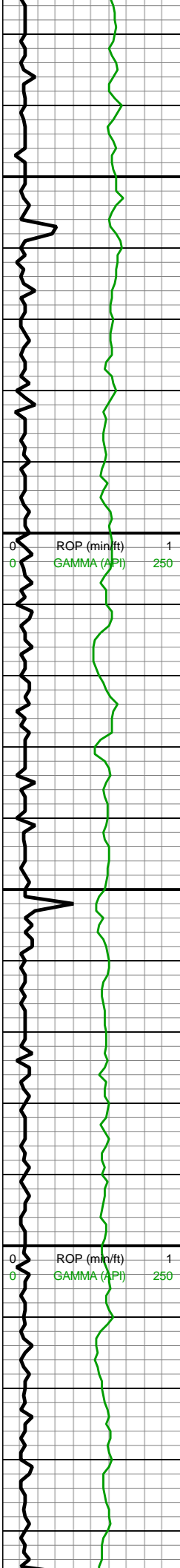
WOB: 34klbs
RPM: 60
SPM: 184
SPP: 3,810psi



9000-9100 SST (60%): lt gy-med gy, s&p ip wi wh sd grs, mod srted vf-f sd grs, frm-hd sli fri gr sup ss clus cons wi silc cmt, predy non calc, sl calc ip; SLTST (30%): dk gy, frm, plty, silc, non calc; SH (10%): lt gy-med gy, sb frm-frm, sft sl hydrated mod fis sb rd-sb blkly-blky ctngs, thn lamn, slty ip & thru, non calc

9100-9200 SST (60%): lt gy-med gy, s&p ip wi wh sd grs, mod srted vf-f sd grs, frm-hd sli fri gr sup ss clus cons wi silc cmt, predy non calc, sl calc ip; SLTST (30%): dk gy, frm, plty, silc, non calc; SH (10%): lt gy-med gy, sb frm-frm, sft sl hydrated mod fis sb rd-sb blkly-blky ctngs, thn lamn, slty ip & thru, non calc



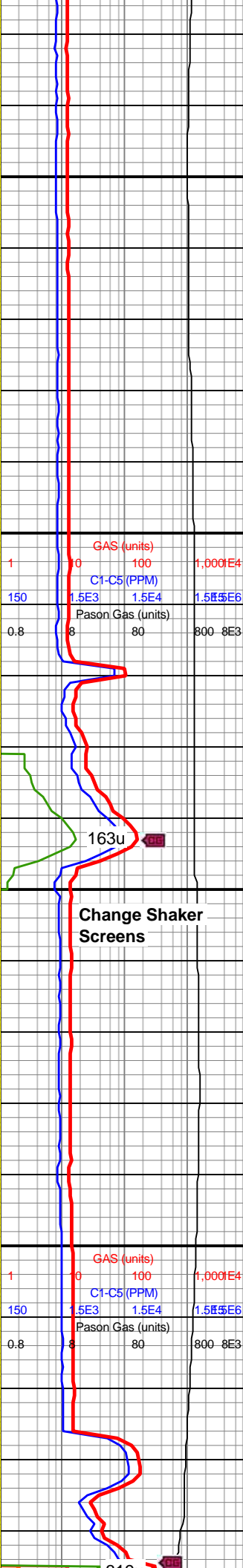
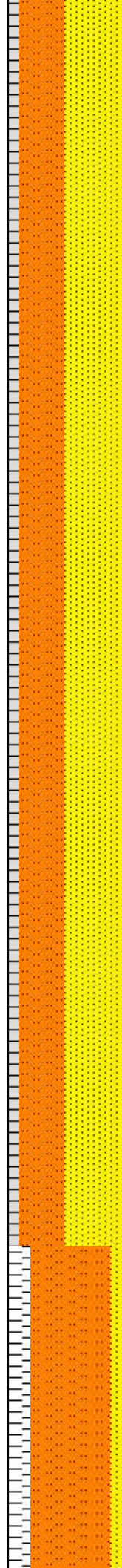


9,230
9,240
9,250
9,260
9,270
9,280
9,290
9,300
9,310
9,320
9,330
9,340
9,350
9,360
9,370
9,380
9,390
9,400
9,410
9,420
9,430
9,440

MD: 9,290'
TVD: 7,247.59'
INC: 89.6°
AZM: 2.27°
VS: 796.03'

MD: 9,384'
TVD: 7,248.25'
INC: 89.6°
AZM: 2.1°
VS: 889.99'

WOB: 35klbs
RPM: 61
SPM: 184
SPP: 4,030psi

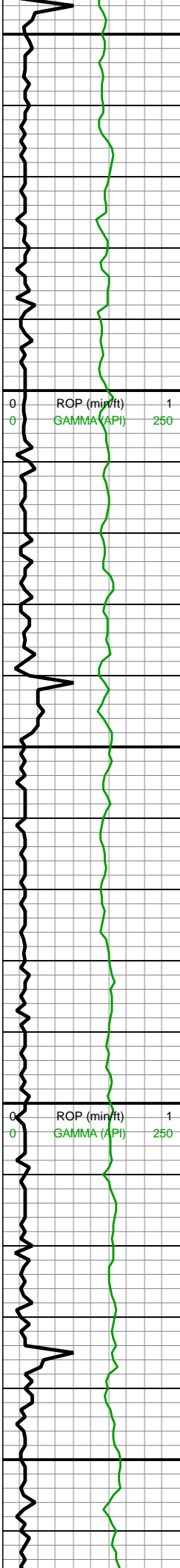


9200-9300 SST (50%):
predy lt-med gy v arg vf gr
mtx sup sst clus, occ
gy-dk gy mod srtd f gr
sup sst clus cons wi silc
cmt, non calc; SLTST
(40%): predy gy frm-plty
silc sltst, occ incr arg
sltst grdg to sl hydrated
slty sh, sdy ip, non calc;
SH (10%): lt gy-gy, sl
hydrated mod fis sb
rd-sb blkly-blky ctngs, thn
lamn, non calc

Change Shaker
Screens

9300-9400 SST (50%):
predy lt-med gy v arg vf gr
mtx sup sst clus, occ
gy-dk gy mod srtd f gr
sup sst clus cons wi silc
cmt, non calc; SLTST
(40%): predy gy frm-plty
silc sltst, occ incr arg
sltst grdg to sl hydrated
slty sh, sdy ip, non calc;
SH (10%): lt gy-gy, sl
hydrated mod fis sb
rd-sb blkly-blky ctngs, thn
lamn, non calc





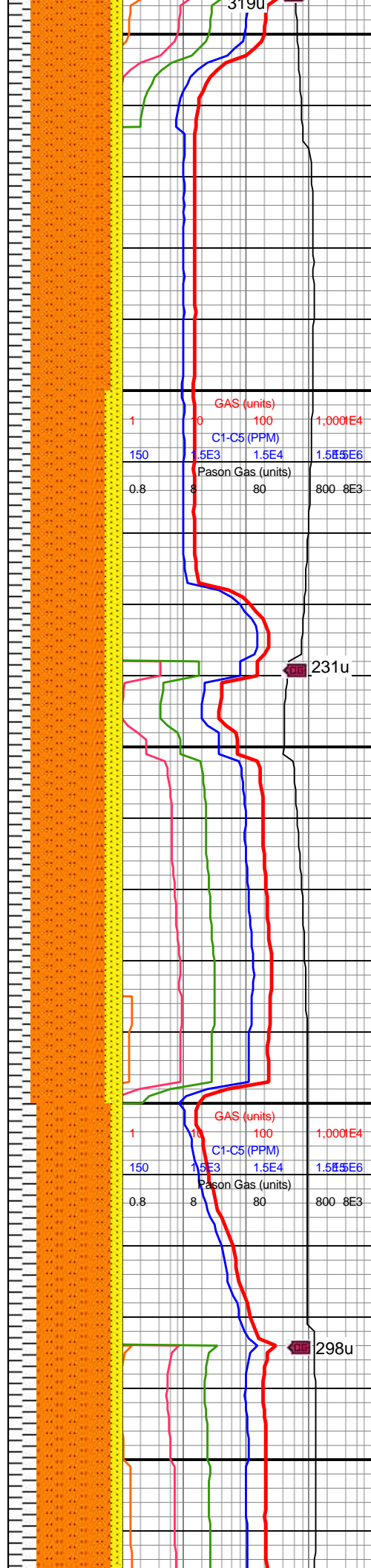
MD: 9,479'
TVD: 7,248.47'
INC: 90.13°
AZM: 2.45°
VS: 984.95'

MD: 9,574'
TVD: 7,247.63'
INC: 90.88°
AZM: 2.54°
VS: 1,079.89'

WOB: 36klbs
RPM: 60
SPM: 186
SPP: 4,170psi

MW IN: 9.8
VIS IN: 42
MW OUT: 9.8
VIS OUT: 40

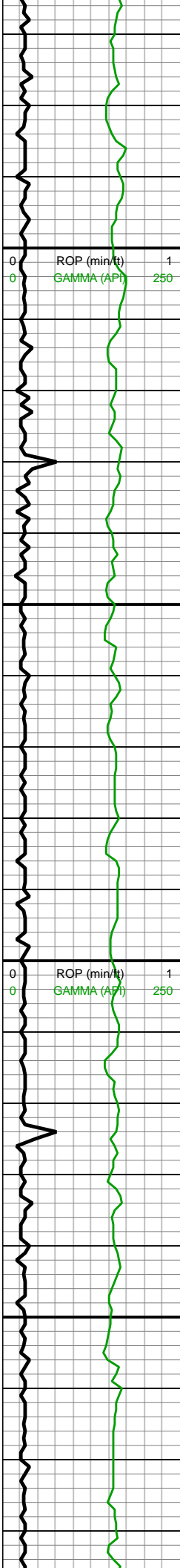
MD: 9,668'



9400-9500 SLTST (70%):
predy gy frm-plty silc sltst,
occ incr arg sltst grd to
sl hydrated slty sh, sdy ip,
non calc; SH (20%): lt
gy-gy, sl hydrated mod fis
sb rd-sb blkly-blky ctngs,
thn lamn, non calc; SST
(10%): predy lt-med gy v
arg vf gr mtx sup sst clus,
occ gy-dk gy mod srted f gr
sup sst clus cons wi silc
cmt, non calc.

9500-9600 SLTST (65%):
predy gy frm-plty silc sltst,
occ incr arg sltst grd to
sl hydrated slty sh, sdy ip,
non calc; SH (20%): lt
gy-gy, sl hydrated mod fis
sb rd-sb blkly-blky ctngs,
thn lamn, non calc; SST
(15%): predy lt-med gy v
arg vf gr mtx sup sst clus,
occ gy-dk gy mod srted f gr
sup sst clus cons wi silc
cmt, non calc.

9600-9700 SLTST (65%):
dk gy, frm, plty, silc, non



V.D: 7,246.3'
INC: 90.75°
AZM: 2.01°
VS: 1,173.84'

MW IN: 9.8+
VIS IN: 43
MW OUT: 9.8+
VIS OUT: 41

MD: 9,763'
TVD: 7,244.95'
INC: 90.88°
AZM: 1.83°
VS: 1,268.8'

WOB: 39.3klbs
RPM: 60
SPM: 186
SPP: 4,142psi

MD: 9,858'
TVD: 7,243.49'
INC: 90.88°
AZM: 1.92°
VS: 1,363.77'

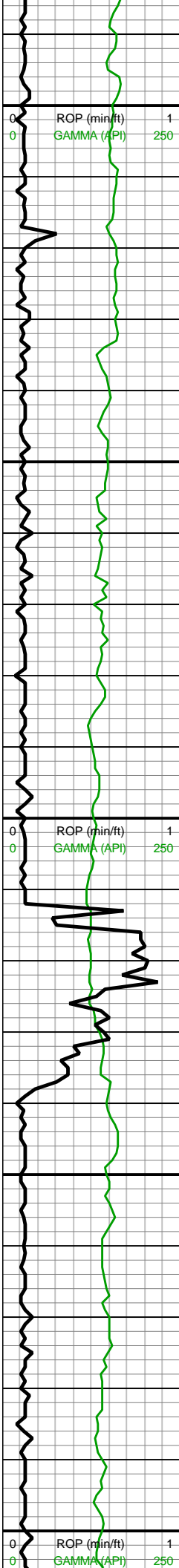


calc; SST (25%): lt
gy-med gy, s&p ip wi wh
sd grs, mod srtd vf-f sd
grs, frm-hd sli fri gr sup
ss clus cons wi silc cmt,
predy non calc, sl calc ip;
SH (10%): lt gy-med gy,
sb frm-frm, sft sl hydrated
mod fis sb rd-sb blkly-blky
ctngs, thn lamn, slty ip &
thru, non calc

9700-9800 SLTST (65%):
predy gy frm-plty silc sltst,
occ incr arg sltst grd to
sl hydrated slty sh, sdy ip,
non calc; SH (25%): lt
gy-gy, sl hydrated mod fis
sb rd-sb blkly-blky ctngs,
thn lamn, non calc; SST
(10%): predy lt-med gy v
arg vf gr mtx sup sst clus,
occ gy-dk gy mod srtd f gr
sup sst clus cons wi silc
cmt, non calc.

9800-9900 SLTST (60%):
lt gy-med gy sb frm-frm
silc-arg sltst, occ frm-brit
silc sltst, non calc-sl-l
calc; SH (30%): lt gy-gy,
sl hydrated mod fis sb
rd-sb blkly-blky ctngs, thn
lamn, non calc; SST
(10%): lt gy-med gy, occ
dk gy, p-mod srtd vf sd





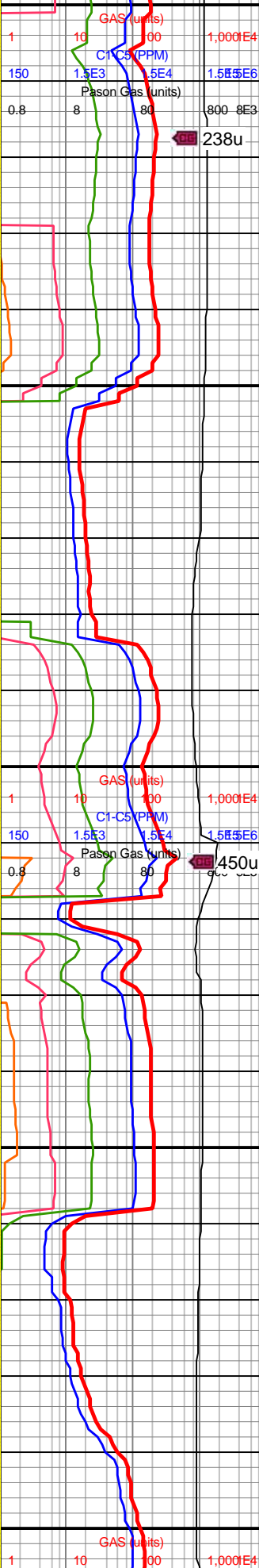
9,890
9,900
9,910
9,920
9,930
9,940
9,950
9,960
9,970
9,980
9,990
10,000
10,010
10,020
10,030
10,040
10,050
10,060
10,070
10,080
10,090
10,100

MD: 9,952'
TVD: 7,241.79'
INC: 91.19°
AZM: 1.83°
VS: 1,457.73'

WOB: 36.5klbs
RPM: 61
SPM: 184
SPP: 4,252psi

MW IN: 9.7+
VIS IN: 40
MW OUT: 9.9
VIS OUT: 42

MD: 10,047'
TVD: 7,242.66'
INC: 87.76°
AZM: 2.01°
VS: 1,552.69'

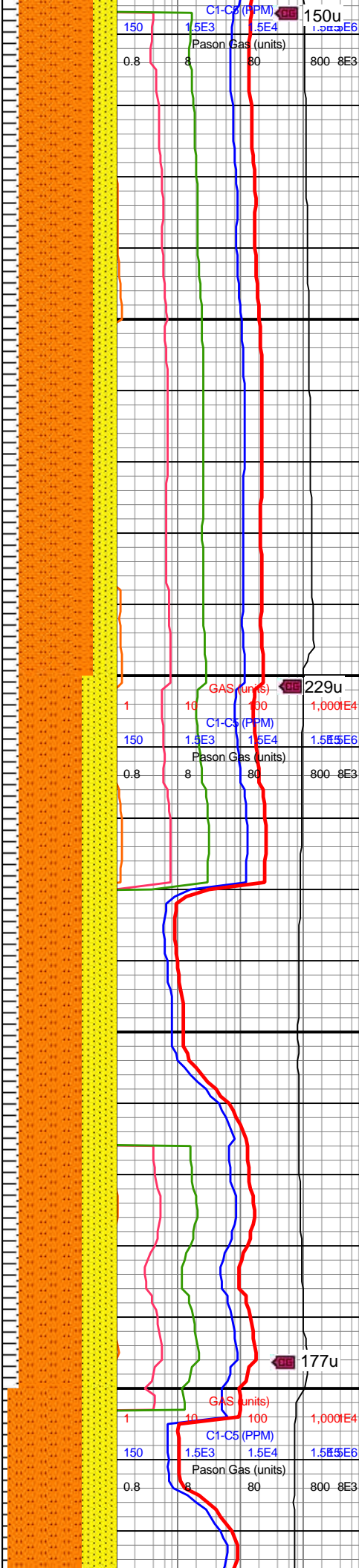
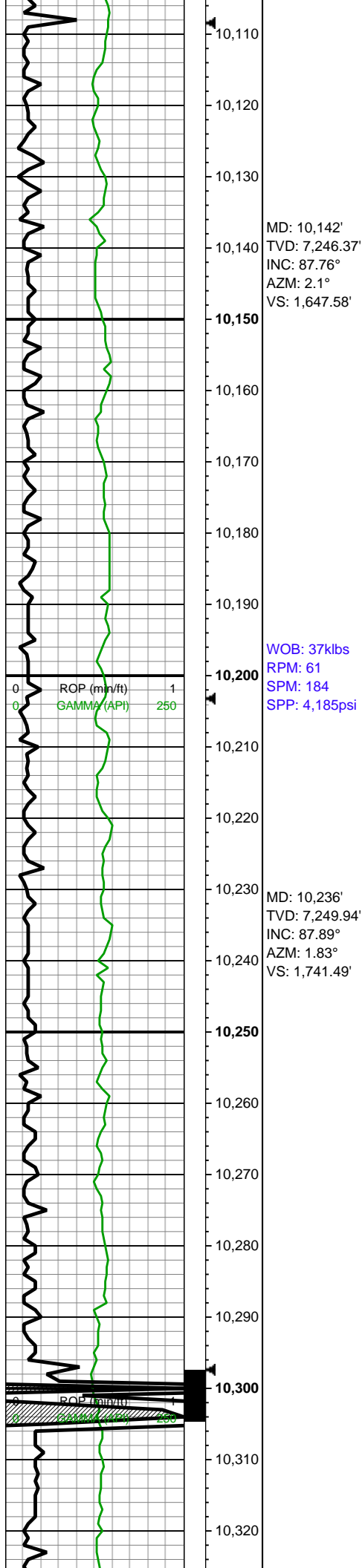


grdg to slt ip, sb frm-frm
predy mtx sup arg ss, occ
gr sup silc cmt wi predy f
sd grs, non-l calc;

9900-10000 SLTST
(70%): dk gy, frm, blk, slty
calc txt, v calc; SH (25%):
lt gy-gy, sl hydrated mod
fis sb rd-sb blk-blky
ctngs, thn lamn, non calc;
SST (5%): gy-lt gy,
frm-brit, rnd, mod srt, calc
cmt, sdy arg mtx sup tex,
lt calc

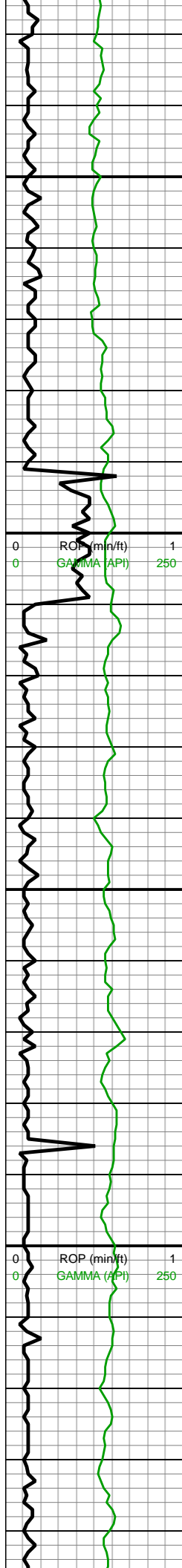
10000-10100 SLTST
(70%): dk gy, frm, blk,
slty calc txt, v calc; SST
(15%) gy-lt gy, frm-brit,
rnd, mod srt, calc cmt,
sdgy arg mtx sup tex, lt
calc; SH (15%): lt gy-med
gy, sb frm-frm, sft sl
hydrated mod fis sb
rd-sb blk-blky ctngs, thn
lamn, slty ip & thru, non
calc





10100-10200 SLTST
(65%): gy-dk gy, frm, brit,
plty, non calc; SST (25%):
gy-dk gy-gyshbn, occ
med-lt gy, frm, sli fri gr
sup ss clus cons wi silc
cmt, sme arg thru, mod
srted vf-f sd grs, s&p, non
calc, sl calc ip; SH (10%):
lt gy-gy, sl hydrated mod
fis sb rd-sb blkly-blky
ctngs, thn lamn, non calc

10200-10300 SLTST
(55%): predy gy frm-plty
silc sltst, occ incr arg
sltst grdg to slty sh, sdy
ip, non calc; SH (30%): lt
gy-gy, mod fis sb rd-sb
blkly-blky ctngs, thn lamn,
non calc; SST (15%):
predy lt-med gy v arg vf gr
mtx sup sst clus, occ
gy-dk gy mod srted f gr
sup sst clus cons wi silc
cmt, non calc.



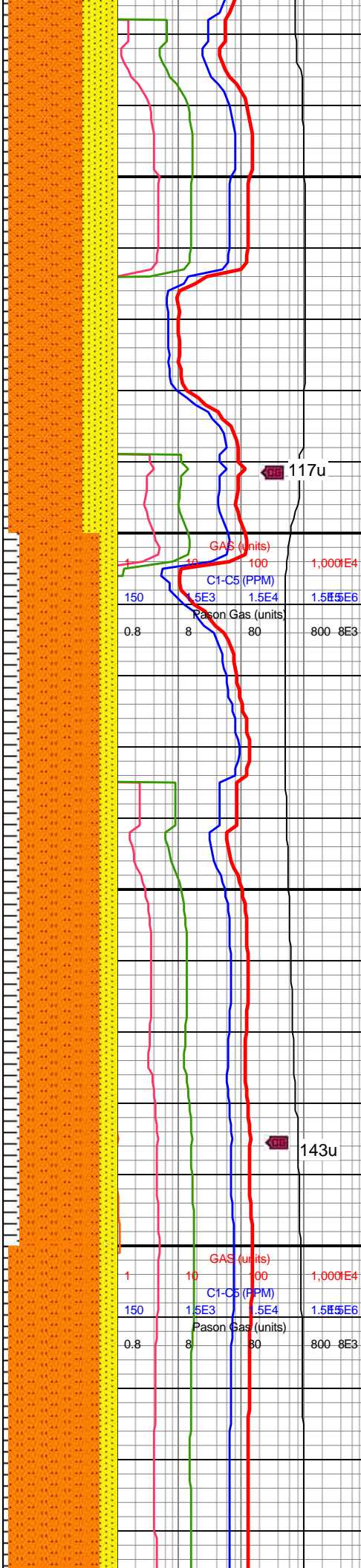
MD: 10,331'
TVD: 7,253.88'
INC: 87.36°
AZM: 1.48°
VS: 1,836.39'

MW IN: 9.8+
VIS IN: 43
MW OUT: 9.9
VIS OUT: 40

WOB: 42klbs
RPM: 0
SPM: 186
SPP: 3,725psi

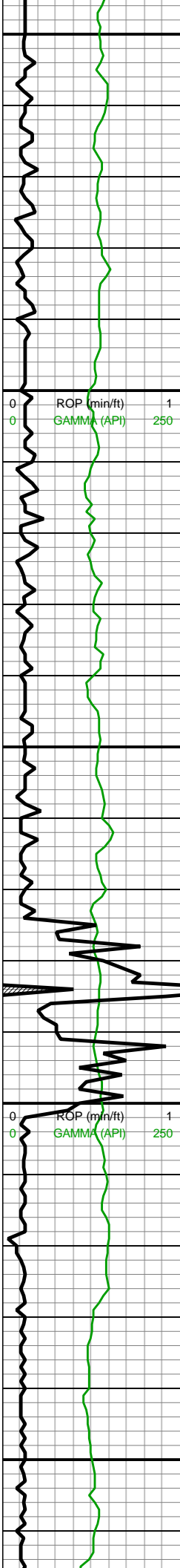
MD: 10,425'
TVD: 7,256.3'
INC: 89.69°
AZM: 0.07°
VS: 1,930.35'

MD: 10,520'
TVD: 7,256.66'
INC: 89.87°
AZM: 359.9°
VS: 2,025.34'



10300-10400 SLTST
(65%): predx gy frm-pty
silc sltst, occ incr arg
sltst grdg to slty sh, sdy
ip, non calc; SST (30%):
med-brn dk brn, com
rdshbr, hd, brit-smewh
fri, sb blk, ang-sb ang
grs, vf-f gr, mod-w srt, qtz
cls, silc cmt, cls sup-mtx
sup ip, non calc; SH
(5%): pred v dk gy-dk
gyshbn-blk, frm-hrd, blk,
sme pty, com micmica,
com f diss pyr, calc, rgh
tex, occ slty

10400-10500 SLTST
(70%): dk gy, frm, blk,
slty calc txt, v calc; SST
(15%) gy-lt gy, frm-brit,
rnd, mod srt, calc cmt,
sdy arg mtx sup tex, lt
calc; SH (15%): lt gy-med
gy, sb frm-frm, sft sl
hydrated mod fis sb
rd-sb blk-blk ctns, thn
lamn, slty ip & thru, non
calc



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

WOB: 38.6klbs
RPM: 61
SPM: 186
SPP: 4,333psi

MD: 10,614'
TVD: 7,257.02'
INC: 89.69°
AZM: 359.02°
VS: 2,119.32'

MD: 10,709'
TVD: 7,256.52'
INC: 90.92°
AZM: 358.49°
VS: 2,214.27'

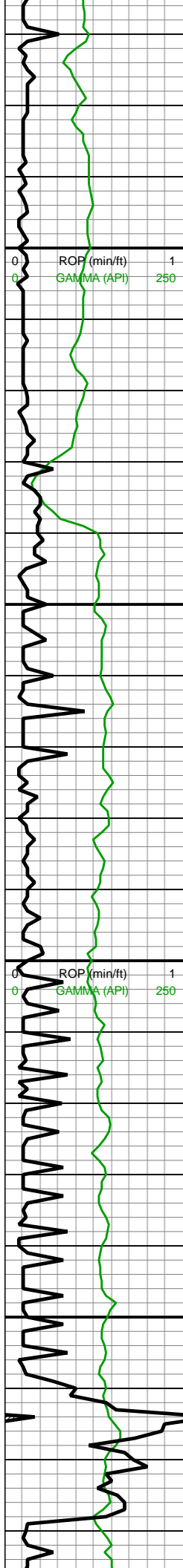
MW IN: 9.8
VIS IN: 42
MW OUT: 9.9
VIS OUT: 40



10500-10600 SLTST
(80%): predy gy frm-plty
silc sltst, occ incr arg
sltst grd to slty sh, sdy
ip, non calc; SST (15%):
predy lt-med gy v arg vf gr
mtx sup sst clus, occ
gy-dk gy mod srtd f gr
sup sst clus cons wi silc
cmt, non calc; SH (5%): lt
gy-gy, sl hydrated mod fis
sb rd-sb blkly-blky ctngs,
thn lamn, non calc

10600-10700 SLTST
(65%): predy gy frm-plty
silc sltst, occ incr arg
sltst grd to slty sh, sdy
ip, non calc; SH (25%):
pred v dk gy-dk
gyshbn-blk, frm-hrd, blkly,
sme plty, com micmica,
calc, rgh tex, occ slty; SST
(10%): gy-dk gy s&p sst
clus, sme tn sst clus,
mod srtd f sb rd-rd sd
grs, frm-hd sli fri predy gr
sup ss clus cons wi silc
cmt, occ mtx sup ss clus
cons wi arg & sl silc cmt,
predy non calc, v sl calc
ip

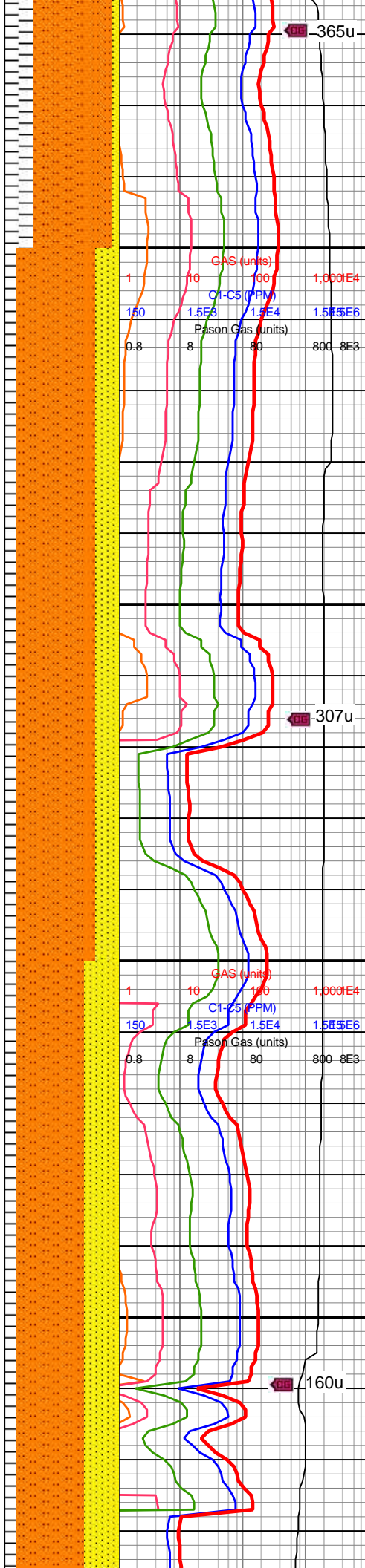
10700-10800 SLTST
(70%): predy gy frm-plty
silc sltst, occ incr arg
sltst grd to slty sh, sdy
ip, non calc; SST (15%):
predy lt-med gy v arg vf gr
mtx sup sst clus, occ
gy-dk gy mod srtd f gr
sup sst clus cons wi silc
cmt, non calc; SH (5%): lt
gy-gy, sl hydrated mod fis
sb rd-sb blkly-blky ctngs,
thn lamn, non calc



WOB: 37.4klbs
RPM: 61
SPM: 185
SPP: 4,339psi

MD: 10,804'
TVD: 7,254.4'
INC: 91.63°
AZM: 358.49°
VS: 2,309.18'

MD: 10,899'
TVD: 7,251.63'
INC: 91.71°
AZM: 357.88°
VS: 2,404.06'

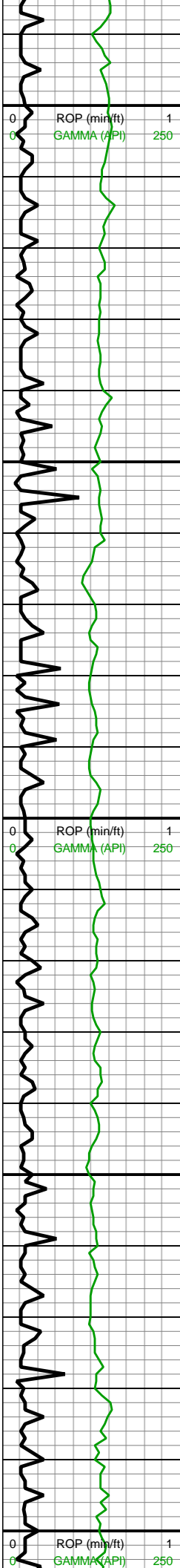


(70%): dk gy, frm, blk, slty calc txt, v calc; SST (25%): gy-lt gy, frm-brit, rnd, mod srt, calc cmt, sdy arg mtx sup tex, lt calc; SH (5%): lt gy-med gy, sb frm-frm, sft sl hydrated mod fis sb rd-sb blk-bly ctns, thn lamn, slty ip & thru, non calc

10800-10900 SLTST (70%) dk gy, frm, blk, slty calc txt, v calc; SST (20%): gy-lt gy, frm-brit, rnd, mod srt, calc cmt, sdy arg mtx sup tex, lt calc; SH (10%): lt gy-gy, sl hydrated mod fis sb rd-sb blk-bly ctns, thn lamn, non calc

10900-11000 SLTST (60%): predy gy frm-pty silc sltst, occ incr arg sltst grdg to slty sh, sdy ip, non calc; SST (30%): predy lt-med gy v arg vf gr mtx sup sst clus, occ gy-dk gy mod strd f gr sup sst clus cons w silc





MD: 10,993'
TVD: 7,248.57'
INC: 92.02°
AZM: 0.16°
VS: 2,497.97'

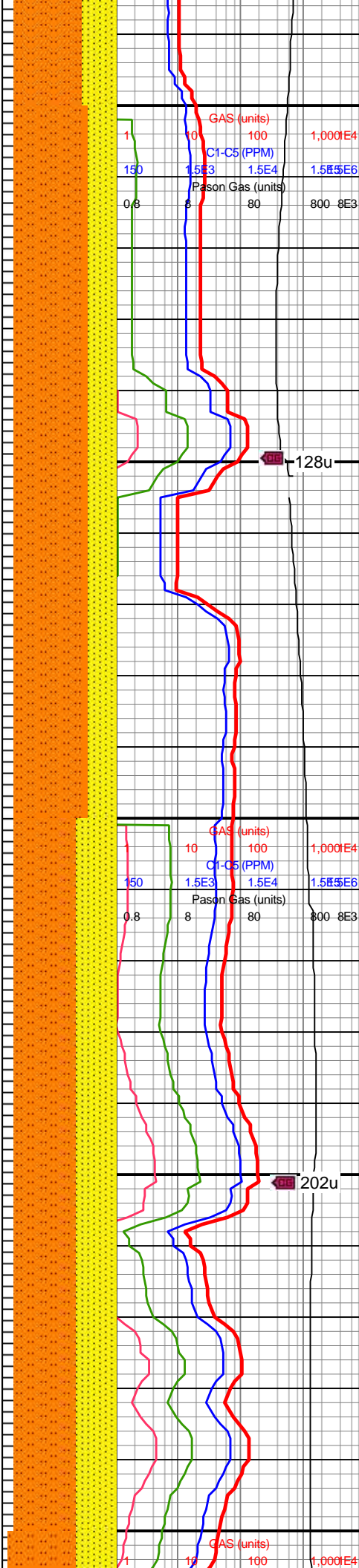
WOB: 41.6klbs
RPM: 61
SPM: 184
SPP: 4,310psi

MD: 11,088'
TVD: 7,245.18'
INC: 92.07°
AZM: 359.64°
VS: 2,592.9'

MW IN: 9.8+
VIS IN: 43
MW OUT: 9.9+
VIS OUT: 40

MD: 11,183'
TVD: 7,241.69'
INC: 92.15°
AZM: 358.93°
VS: 2,687.81'

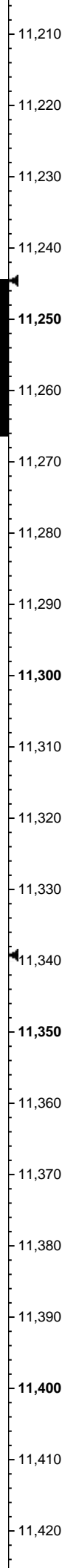
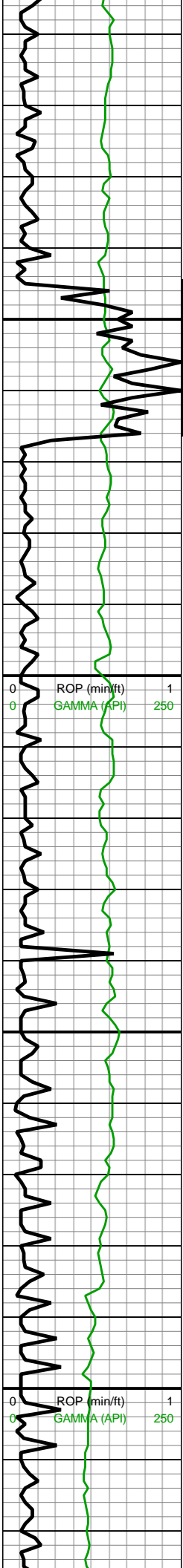
WOB: 34.5klbs
RPM: 61
SPM: 186
SPP: 4,278psi



lt gy-gy, mod fis sb rd-sb
blky-blky ctngs, thn lamn,
non calc;

11000-11100 SLTST
(65%): predy gy frm-plty
silc sltst, occ incr arg
sltst grdg to slty sh, sdy
ip, non calc; SST (25%):
predy lt-med gy v arg vf gr
mtx sup sst clus, occ
gy-dk gy mod srted f gr
sup sst clus cons wi silc
cmt, non calc; SH (10%):
lt gy-gy, sl hydrated mod
fis sb rd-sb blky-blky
ctngs, thn lamn, non calc;

11100-11200 SLTST
(55%): gy-dk gy, frm, brit,
plty, non calc; SST (35%):
predy brn, sme
bnshgy-mot med gy-lt gy,
pred shy ss cons wi p
srted sd grs, vf-f grs, frm-sl
fri, gr sup ss clus cons wi
pred arg cmt, silc ip, no
calc; SH (10%): lt gy-med
gy, sb frm-frm, sft sl
hydrated mod fis sb
rd-sb blky-blky ctngs, thn
lamn, slty ip & thru, non
calc

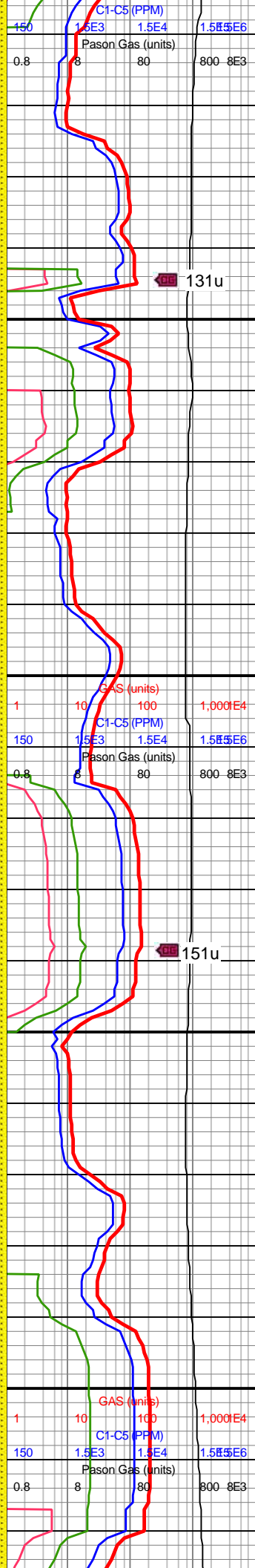
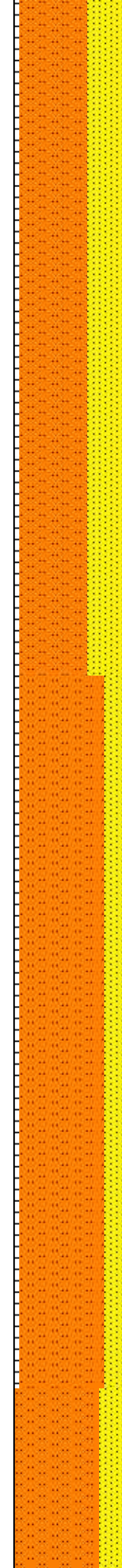


MD: 11,278'
TVD: 7,238.59'
INC: 91.58°
AZM: 2.01°
VS: 2,782.75'

MD: 11,372'
TVD: 7,235.9'
INC: 91.71°
AZM: 1.83°
VS: 2,876.68'

WOB: 37.1klbs
RPM: 61
SPM: 186
SPP: 4,224psi

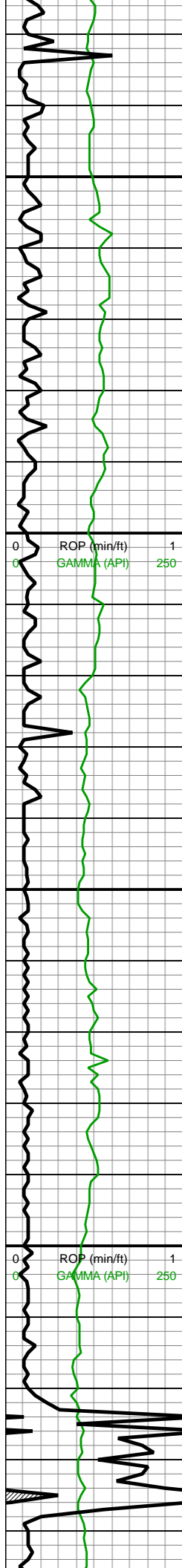
MW IN: 9.8+
VIS IN: 43
MW OUT: 9.9+
VIS OUT: 40



11200-11300 SLTST
(60%): predy gy frm-plty
silc sltst, occ incr arg
sltst grd to slty sh, sdy
ip, non calc; SST (35%):
predy lt-med gy v arg vf gr
mtx sup sst clus, occ
gy-dk gy mod srtd f gr
sup sst clus cons wi silc
cmt, non calc; SH (5%): lt
gy-gy, mod fis sb rd-sb
blky-blky ctngs, thn lamn,
non calc

11300-11400 SLTST
(75%): dk gy, frm, plty,
silc, non calc; SST (20%):
lt gy-med gy, s&p ip wi
wh sd grs, mod srtd vf-f
sd grs, frm-hd sli fri gr
sup ss clus cons wi silc
cmt, predy non calc, sl
calc ip; SH (5%): lt
gy-med gy, sb frm-frm, sft
mod fis sb rd-sb blky-blky
ctngs, thn lamn, slty ip &
thru, non calc



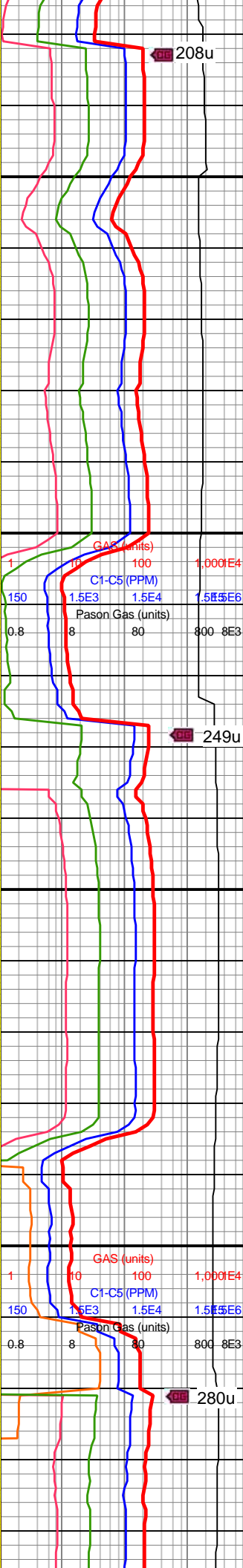
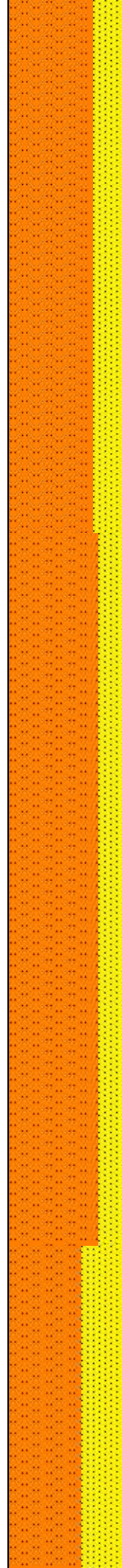


11,430
11,440
11,450
11,460
11,470
11,480
11,490
11,500
11,510
11,520
11,530
11,540
11,550
11,560
11,570
11,580
11,590
11,600
11,610
11,620
11,630
11,640

MD: 11,467'
TVD: 7,232.91'
INC: 91.89°
AZM: 1.31°
VS: 2,971.62'

MD: 11,562'
TVD: 7,229.38'
INC: 92.37°
AZM: 0.51°
VS: 3,066.55'

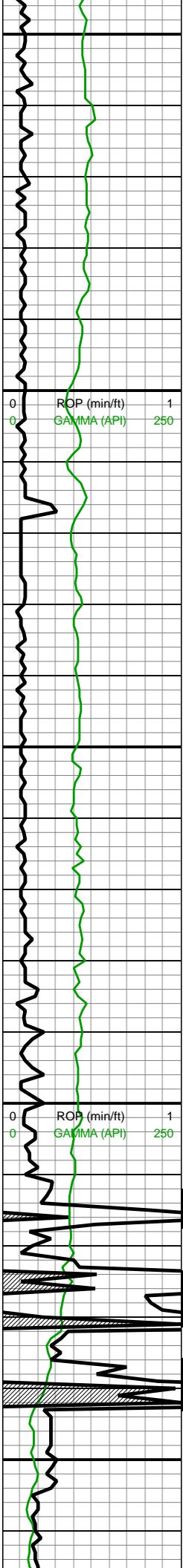
WOB: 34.8klbs
RPM: 61
SPM: 185
SPP: 4,411psi



11400-11500 SLTST
(75%): dk gy, frm, plty,
silc, non calc; SST (25%):
lt gy-med gy, s&p ip wi
wh sd grs, mod srtd vf-f
sd grs, frm-hd sli fri gr
sup ss clus cons wi silc
cmt, predy non calc, sl
calc ip

11500-11600 SLTST
(80%): predy gy frm-plty
silc sltst, occ incr arg
sltst grdg to slty sh, sdy
ip, non calc; SST (20%):
dk gy-dk gy brn gr-mtx
sup clus, occ lt gy-gy mtx
sup shy ss, pred dk gy wi
f sb rd qtz sd gr incl, p
srtd vf-f sd grs, pred sb
rd-rd sli fri gr sup ss clus
cons wi silc & arg cmt,
uncons ip, non calc





MD: 11,656'
TVD: 7,227.36'
INC: 90.09°
AZM: 0.51°
VS: 3,160.53'

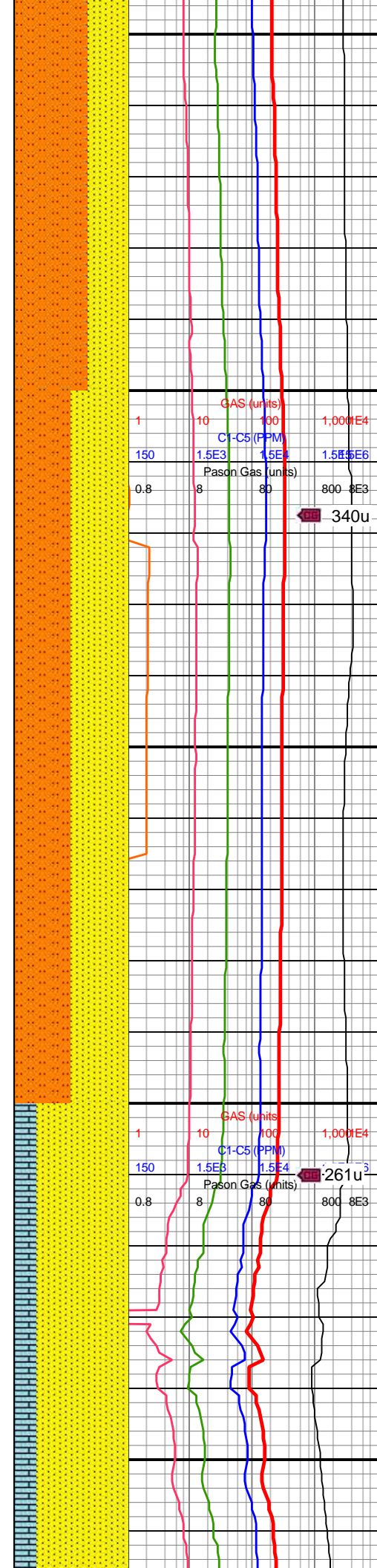
MW IN: 9.8+
VIS IN: 43
MW OUT: 10.0
VIS OUT: 40

MD: 11,751'
TVD: 7,226.63'
INC: 90.79°
AZM: 359.81°
VS: 3,255.52'

WOB: 36.2klbs
RPM: 61
SPM: 185
SPP: 4,512psi

MW IN: 9.8
VIS IN: 43
MW OUT: 10.0
VIS OUT: 40

MD: 11,845'
TVD: 7,225.91'
INC: 90.09°
AZM: 359.55°
VS: 3,349.5'

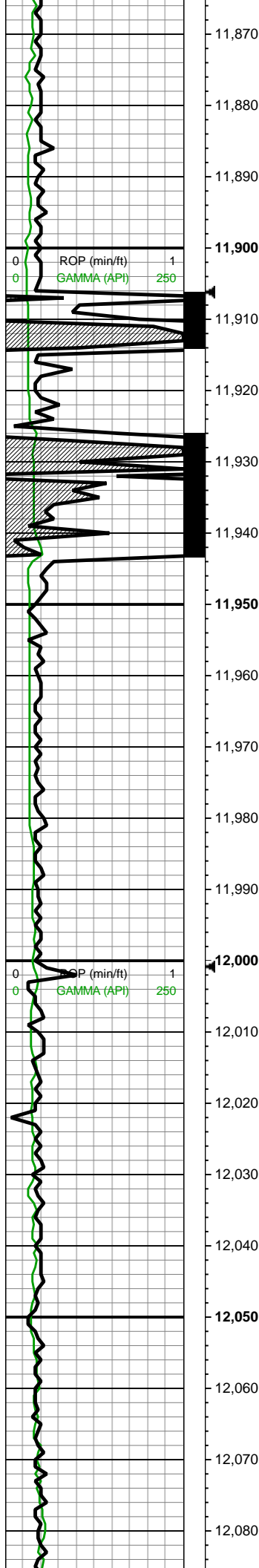


11600-11700 SLTST
(65%): med gy-dk gy, frm,
blky, slty calc txt, v calc;
SST (35%): lt
gy-gy-gy-gyshbn-dk gy,
p-mod srtd vf-f sd grs,
predy frm-hd sli fri gr sup
sst clus cons wi silc cmt
wi com wh sd grs, com
off wh-lt gy-gy sft-sb frm v
arg sst, predy non calc, sl
calc ip

11700-11800 SLTST
(50%): predy gy frm-plty
silc sltst, occ incr arg
sltst grdg to slty sh, sdy
ip, non calc; SST (50%):
pred dk gy wi f sb rd qtz
sd gr incl, sme lt gy-lt gy
brn, p srtd vf-f sd grs,
pred sb rd-rd sli fri gr sup
ss clus cons wi silc & arg
cmt, rr c pyr, non calc, sl
calc ip, tr-scat sh frags

11800-11900 SST (80%):



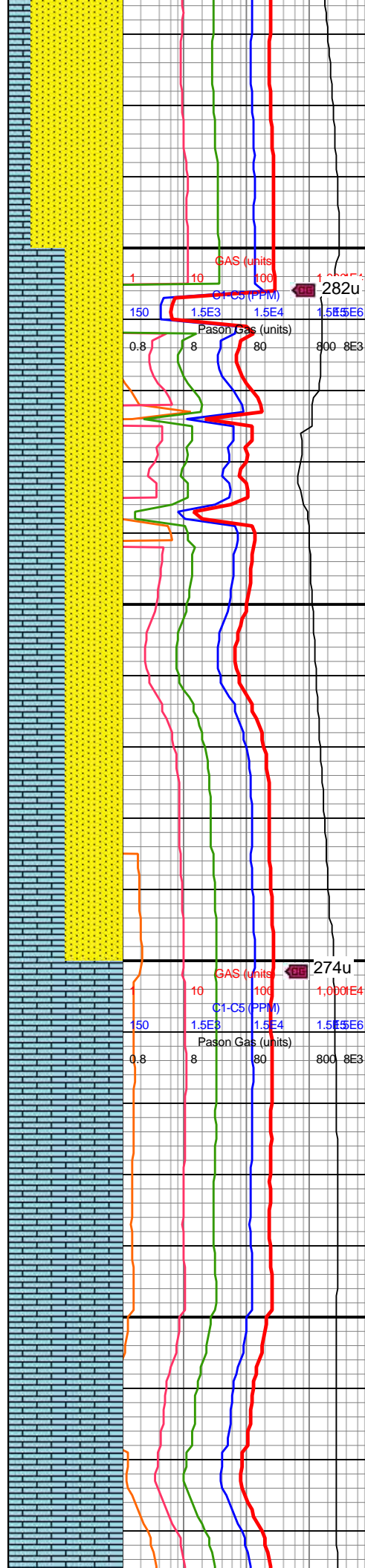


MW IN: 10
VIS IN: 42
MW OUT: 10.0
VIS OUT: 39

MD: 11,939'
TVD: 7,226.02'
INC: 89.78°
AZM: 0.07°
VS: 3,443.5'

WOB: 37.6klbs
RPM: 61
SPM: 184
SPP: 4,310psi

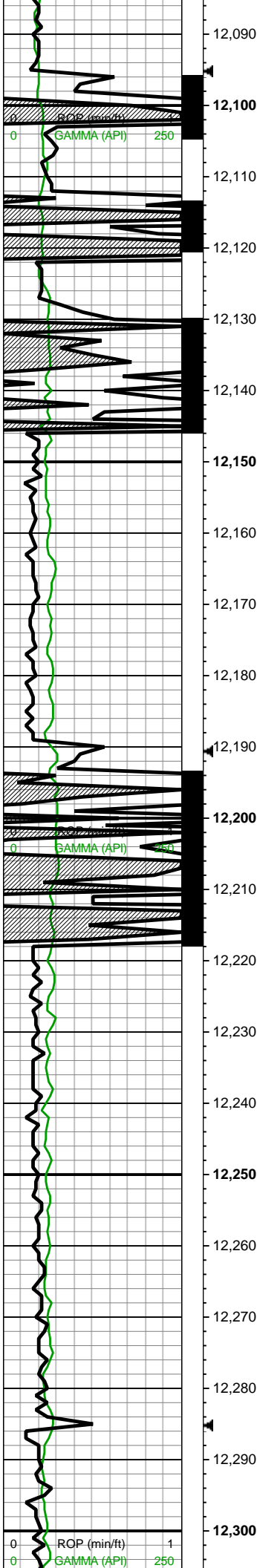
MD: 12,034'
TVD: 7,226.09'
INC: 90.13°
AZM: 359.81°
VS: 3,538.49'



pred brn-dk brn, com wht
specs, hrd, brit, occ fri, sb
blky, ang-sb ang mod-w
srted vf sd grs, occ qtz cls,
silc cmt, pred gr sup,
sme mtx sup, non calc,
occ sltst frags; LS (20%):
pred tn-med brn, occ gy, v
frm-hrd, blky, sme plty,
micxln- cryptoxln, wkst, tr
arg, sacc tex

11900-12000 SST (50%):
pred brn- dk brn
brnsh-red, occ gyshbn,
frm-sl hrd, pred w cons
cls, cons wi silc cmt, vf-f
sb ang-ang grns, p srt
grns, tr occ-pp pyr, pred
non calc; LS (50%):
offwht-lt gy-lt tn-tn, occ gy,
rr dk gy, frm-hd, crpxln
mudst, sm tex, wxy lstr, rr
f pyr, hi calc

12000-12100 LS (100%):



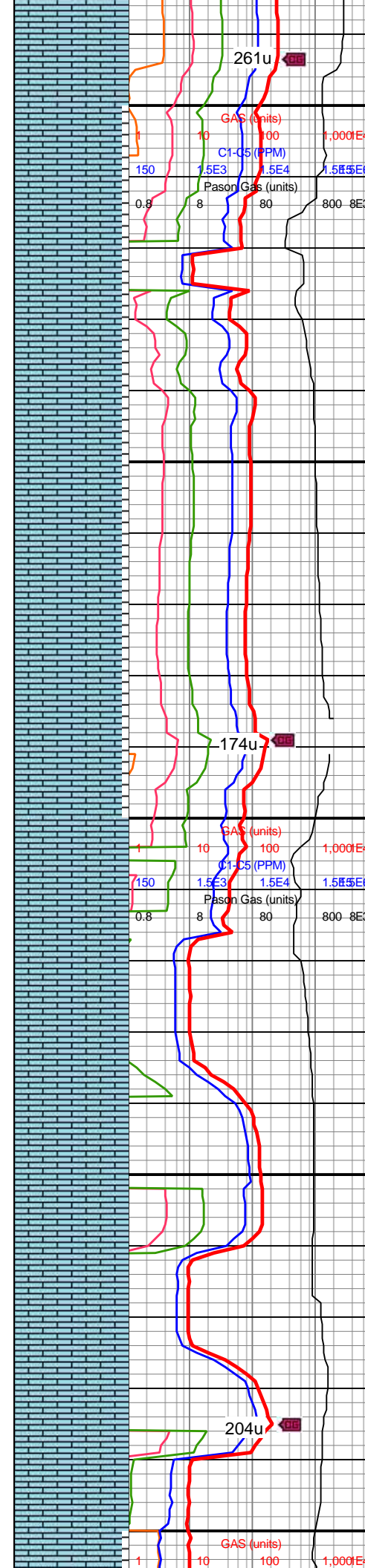
MW IN: 9.9
VIS IN: 41
MW OUT: 9.9
VIS OUT: 39

MD: 12,129'
TVD: 7,225.59'
INC: 90.48°
AZM: 358.84°
VS: 3,633.46'

WOB: 35klbs
RPM: 0
SPM: 188
SPP: 3,830psi

MW IN: 9.85
VIS IN: 40
MW OUT: 9.9
VIS OUT: 40

MD: 12,224'
TVD: 7,225.84'
INC: 89.21°
AZM: 2.27°
VS: 3,728.45'

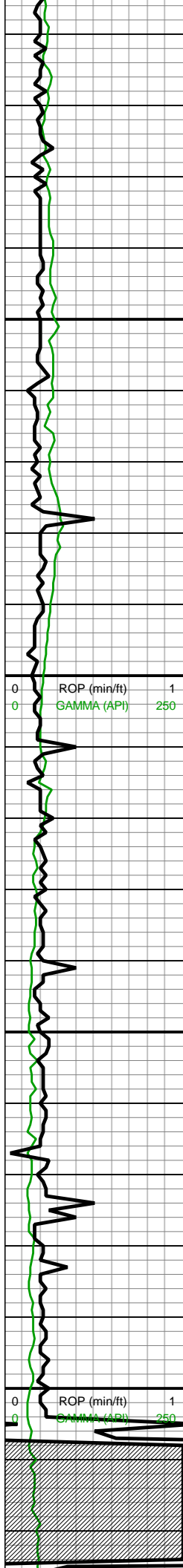


off wh-lt tn-crm-lt gy, occ
brn, crpxln-micxln
mudst-wkst ip, frm-hrd,
sb blkly-blky, plty ip, v calc,
rr vf pyr, hi calc

12100-12200 LS (95%):
off wh-lt tn-crm-lt gy, occ
brn, crpxln-micxln
mudst-wkst ip, frm-hrd,
sb blkly-blky, plty ip, v calc,
rr vf pyr, hi calc; sh (5%)
blk, plty-flky, hd, v calc

12200-12300 LMST
(100%): lt gy-tn-lt gyshbn,
rr dk gy calc shy intbds,
crpxln mudst, occ wkst, tr
vf pyr, hi calc





MD: 12,318'
TVD: 7,226.46'
INC: 90.04°
AZM: 2.18°
VS: 3,822.41'

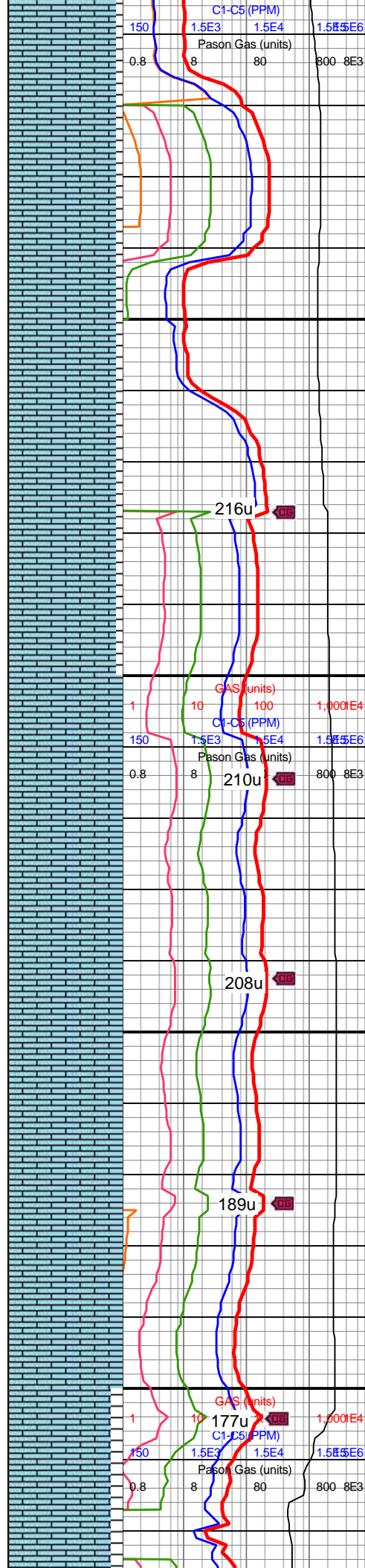
WOB: 40klbs
RPM: 61
SPM: 184
SPP: 4,340psi

MD: 12,413'
TVD: 7,225.51'
INC: 91.1°
AZM: 1.66°
VS: 3,917.37'

MW IN: 9.9
VIS IN: 41
MW OUT: 9.85
VIS OUT: 40

MD: 12,506'
TVD: 7,222.63'
INC: 92.46°
AZM: 1.04°
VS: 4,010.32'

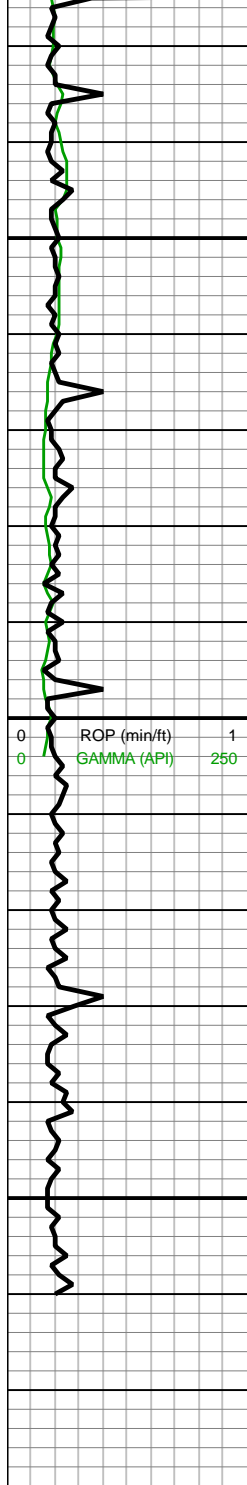
MW IN: 9.8
VIS IN: 41
MW OUT: 9.8
VIS OUT: 39



12300-12400 LMST
(90%): off wh-lt gy-tn-lt
brn, frm-hd-brit, crpxln
mudst, occ wkst,
chky-wxy lstr, hi calc, wi
calc shy intbds; SH
(10%): v dk gy-blk, frm,
brit, sb plty-plty, slty tex, hi
calc

12400-12500 LMST
(90%): off wh-lt gy-tn-lt
brn, frm-hd-brit, crpxln
mudst, occ wkst,
chky-wxy lstr, hi calc, wi
calc shy intbds; SH tr: v
dk gy-blk, frm, brit, sb
plty-plty, slty tex, hi calc





12,530
12,540
12,550
12,560
12,570
12,580
12,590
12,600
12,610
12,620
12,630
12,640
12,650
12,660
12,670
12,680

MD: 12,599'
TVD: 7,218.28'
INC: 92.9°
AZM: 0.95°
VS: 4,103.21'

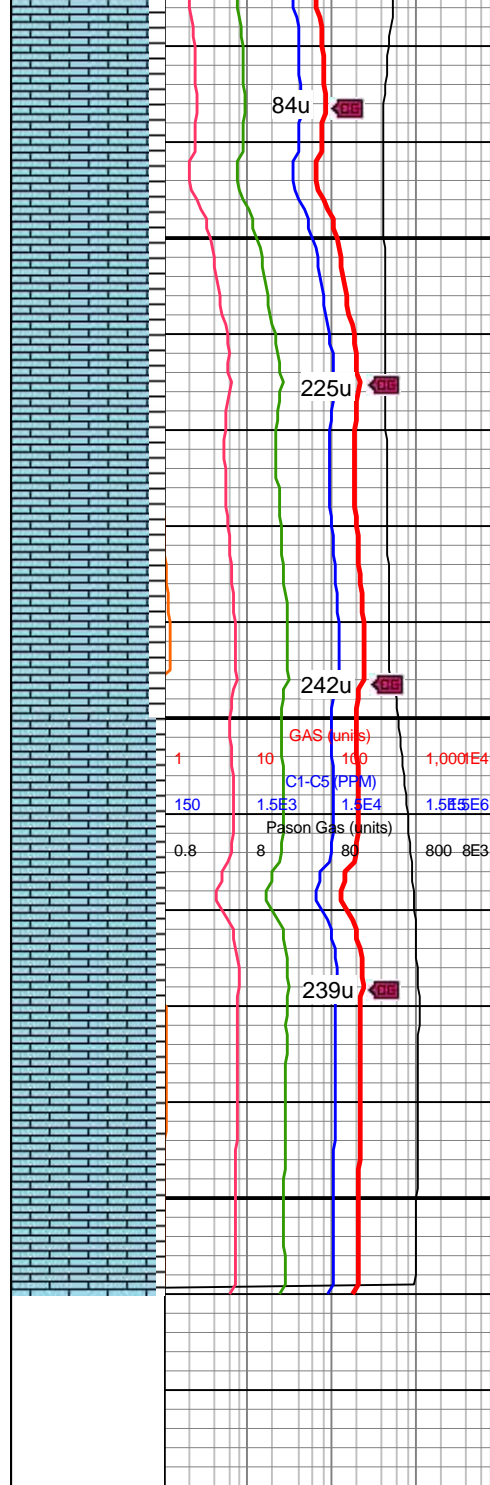
WOB: 29klbs
RPM: 60
SPM: 184
SPP: 3,740psi

MW IN: 9.8
VIS IN: 42
MW OUT: 9.8
VIS OUT: 40

Bit Projection

MD: 12,660'
TVD: 7,215.19'
INC: 92.9°
AZM: 0.95°
VS: 4,164.13'

Reach TD @
22:45hrs on
7/29/18



12500-12600 LMST
(90%): off wh-lt gy-tn-lt
brn, frm-hd-brit, crpxln
mudst, occ wkst,
chky-wxy lstr, hi calc, wi
calc shy intbds; SH
(10%): v dk gy-blk, frm,
brit, sb plty-plty, slty tex, hi
calc, imbd pyr.

12600-12660 LMST
(95%): off wh-lt gy-tn-lt
brn, frm-hd-brit, crpxln
mudst, occ wkst,
chky-wxy lstr, hi calc, wi
calc shy intbds; SH (5%):
v dk gy-blk, frm, brit, sb
plty-plty, slty tex, hi calc

