



# RESERVOIR GROUP

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Bighorn 4R-17H-P267

**Location** Sec. 17 T2N R67W

**State** Colorado

**County** Weld

**Country** USA

**Rig Number** Ensign 153

**API Number** 05123487590000

**AFE #** 16191917

**Geographic Region** Rockies

**Field** Wattenberg

**Spud Date** 3/11/2019

**Drilling Completed** 3/16/2019

**Surface Coordinates** Lat/Long (NAD27): 40.1336973/-104.907023  
Lat/Long (NAD83): 40.133681/-104.907554

SHL: Sec. 17 T2N R67W  
Footage: 923 FSL 660 FEL

**Bottom Hole Coordinates** Proposed BHL: Sec. 8 T2N R67W  
Footages: 2638 FSL 324 FEL

**Ground Elevation** 4,960'

**K.B. Elevation** 4,983'

**Logged Interval** 6,615' **To** 15,342'

**Total Depth** 15,342'

**Formation** B Chalk

**Type of Drilling Fluid** Synthetic Oil Based Mud

## Operator

**Company** Crestone Peak Resources

**Address** 1801 California Street, Suite 2500  
Denver, CO 80202



# CRESTONE PEAK RESOURCES

## Geologist

**Name** John Ready

**Company** Crestone Peak Resources

**Address** 1801 California Street, Suite 2500  
Denver, CO 80202



**CRESTONE PEAK**  
RESOURCES

## Zone Color Coding

Oil	Condensate	Gas
Note	Core	Pressure
Error	Water	Seal

## Other

**Loggers:** Nicholas Watkins / Shana Swirin

**Services Provided:** 2-Man Mudlogging / Geosteering

**Equipment:** ML-526

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

**Service Start Date:** 3/11/2019

**Release Date:** 3/17/2019

**Job Number:** 2036RK1903

## 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
- BRACHIOIPOD
- BRYOZOA
- CEPHALOPOD
- CORAL
- CRINOID
- ECHINOID
- FISH
- FORAMINIFERA

### F 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

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

### O ORGANIC

### P PINPOINT

### V 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

- A ANGULAR
- R ROUNDED
- S SUBANG
- F SUBRND

### Textures

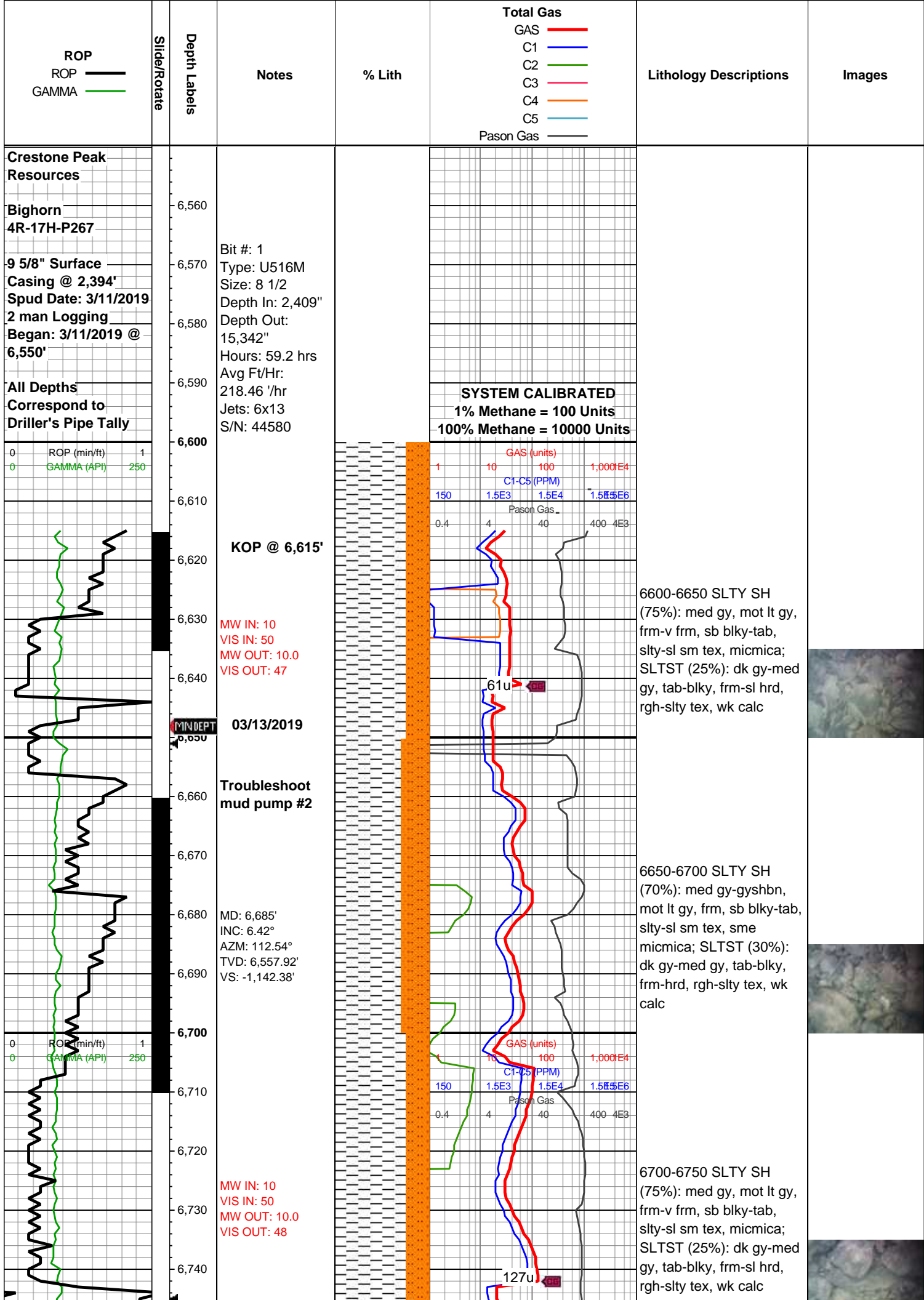
- B BOUNDSTONE
- C CHALKY
- C CRYPTOXLN
- E EARTHY
- F FINELYXLN
- G GRAINSTONE

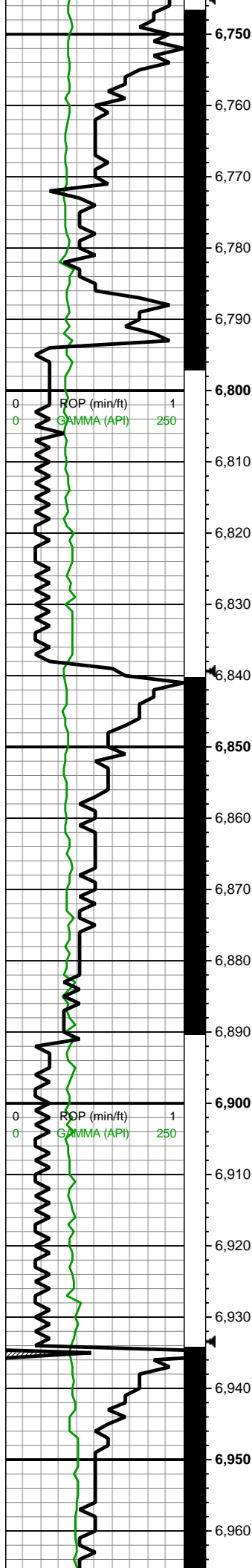
### L LITHOGRAPHIC

- M MICROXLN
- S MUDSTONE
- P PACKSTONE
- W WACKESTONE

### Sorting

- M MODERATE
- P POOR
- W WELL





MD: 6,779'  
INC: 8.35°  
AZM: 39.76°  
TVD: 6,651.32'  
VS: -1,138.48'

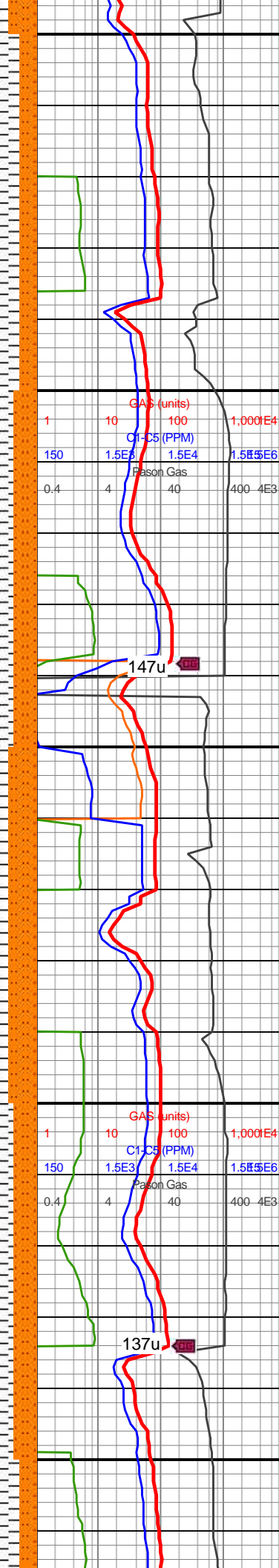
WOB: 10klbs  
RPM: 30  
SPM: 186  
SPP: 4,240psi

MW IN: 10  
VIS IN: 51  
MW OUT: 10.0  
VIS OUT: 48

MD: 6,873'  
INC: 14.51°  
AZM: 29.92°  
TVD: 6,743.42'  
VS: -1,122.3'

MW IN: 10  
VIS IN: 55  
MW OUT: 10.0  
VIS OUT: 49

MD: 6,967'  
INC: 19.52°



6750-6800 SLTY SH  
(85%): v lt gy-lt gy, predy v  
sft-sme sb frm w  
hydrated sltst wi v sol arg  
mtx washes out, mod fis  
sb blkly ctngs wi f lamn,  
sm arg-sl slty tex, non  
calc; SLTST (15%): gy-dk  
gy, occ v dk gy, frm, brit,  
non calc, sl calc ip

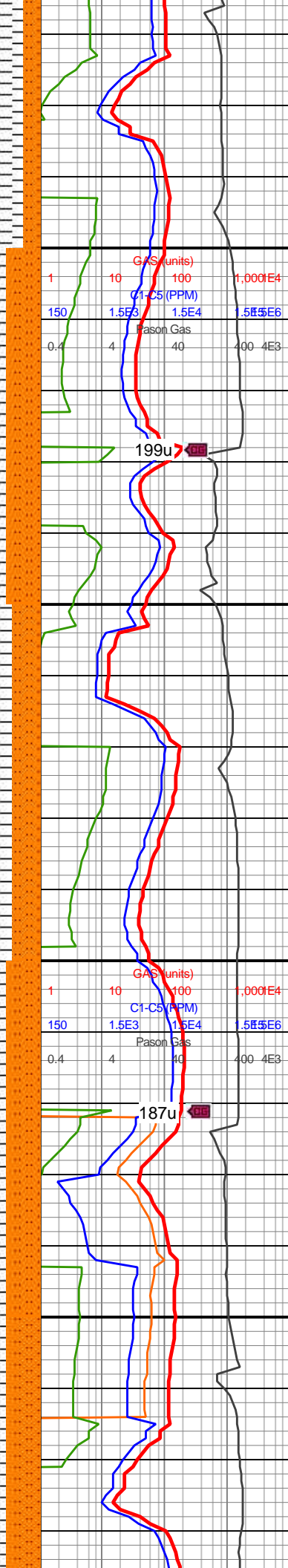
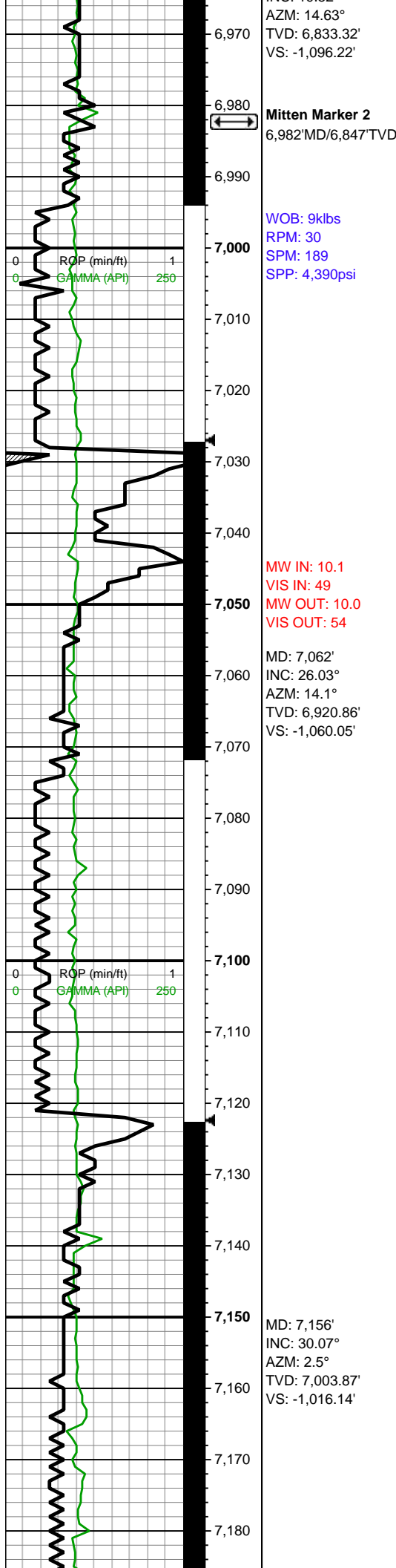
6800-6850 SLTY SH  
(80%): v lt gy-lt gy, predy v  
sft-sme sb frm w  
hydrated sltst wi v sol arg  
mtx, mod fis sb blkly  
ctngs wi f lamn, sm  
arg-sl slty tex, non calc;  
SLTST (20%): gy-dk gy,  
occ v dk gy-blk, frm, brit,  
non calc, sl calc ip

6850-6900 SLTY SH  
(75%): lt gy-gy, sft w  
hydrated water solu  
gumbo ctngs, slty arg tex  
thru, non calc; SLTST  
(25%): lt gy-gy, rr silc vugy  
vns & lamn ip, occ v dk  
gy-blk, frm, brit, rr vf pyr,  
non calc

6900-6950 SLTY SH  
(80%): v lt gy-lt gy, predy v  
sft-sme sb frm w  
hydrated sltst wi v sol arg  
mtx, mod fis sb blkly  
ctngs wi f lamn, sm  
arg-sl slty tex, non calc;  
SLTST (20%): gy-dk gy,  
occ v dk gy-blk, frm, brit,  
non calc, sl calc ip







6950-7000 SLTY SH  
(85%): off wh-v lt gy-lt gy,  
sft w hydrated water solu  
gumbo ctngs washes to  
sltst, slty arg tex thru, non  
calc; SLTST (15%): lt  
gy-gy, rr silc vugy vns &  
lamn ip, frm, brit, sdy  
intbd ip, non calc

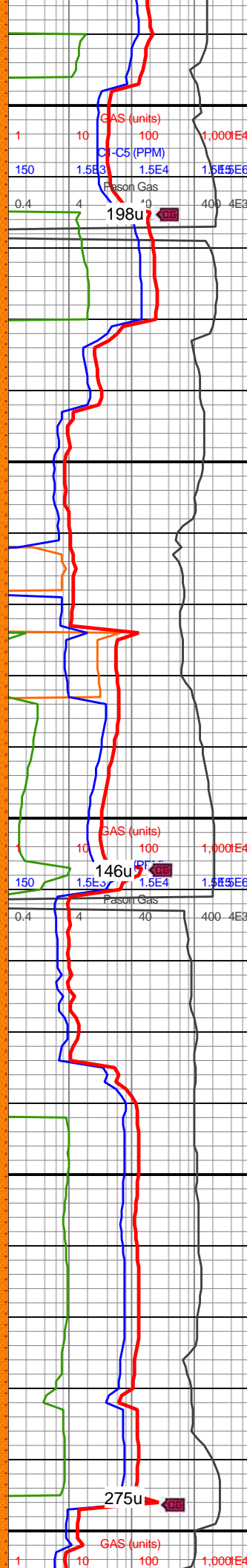
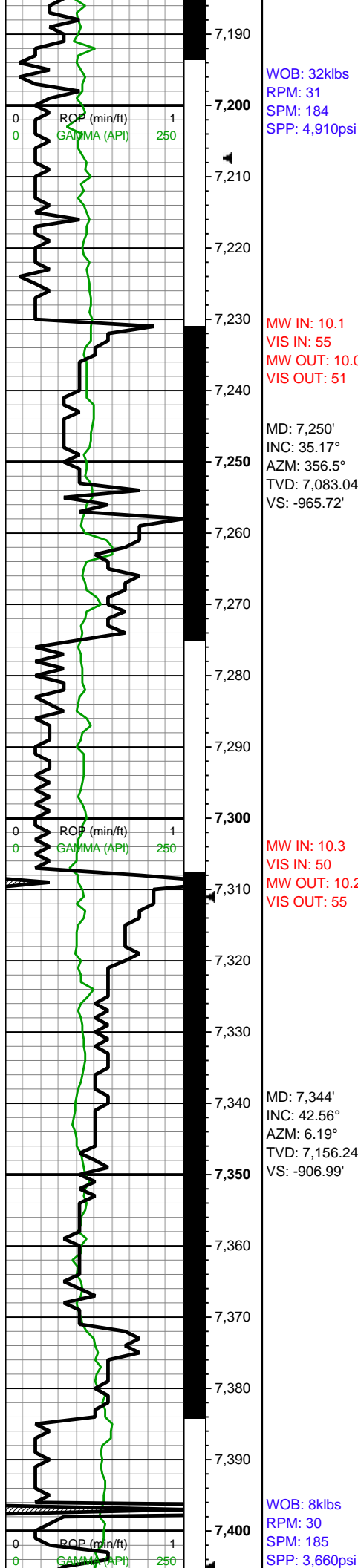
7000-7050 SLTY SH  
(70%): v lt gy-lt gy, lt  
gyshbn-tn ip, v sft w  
hydrated v arg sltsy, sme  
sb frm grd to sltst,  
slty-sdy ip, mod fis sb  
blky ctngs wi f lamn, sm  
arg-sl slty tex, non calc;  
SLTST (30%): gy-dk gy,  
occ v dk gy-blk, slty-sdy  
ip, frm, brit, non calc, sl  
calc ip

7050-7100 SLTY SH  
(75%): v lt gy-lt gy-lt  
gyshbn, predy v sft-sme  
sb frm w hydrated sltst wi  
v sol arg mtx, mod fis sb  
blky ctngs wi f lamn, sm  
arg-sl slty tex, non calc;  
SLTST (25%): gy-dk gy,  
occ v dk gy-blk, frm, brit,  
non calc, sl calc ip

7100-7150 SLTY SH  
(70%): v lt gy-lt gy, lt  
gyshbn-tn ip, v sft w  
hydrated v arg sltsy, sme  
sb frm grd to sltst,  
slty-sdy ip, mod fis sb  
blky ctngs wi f lamn, sm  
arg-sl slty tex, non calc;  
SLTST (30%): gy-dk gy,  
occ v dk gy-blk, slty-sdy  
ip, frm, brit, non calc, sl  
calc ip

7150-7200 SLTY SH  
(70%): lt gy-gy, predy v sft  
w hydrated v arg sltst,  
sme sb frm, mod fis sb  
blky ctngs wi f lamn, sm  
arg-sl slty tex, non calc;





arg-si slty tex, non calc,  
SLTST (30%): gy-dk gy,  
occ v dk gy-blk, frm, brit,  
non calc, rr calc ip

#### 7200-7250 SLTY SH

(60%): predy gy-gyshbn  
sft-sb frm-frm mod fis sb  
blky-sb plty ctngs, occ off  
wh-v lt gy sft w hydrated  
gumbo ctngs, water solu  
silty sh, thn lamn, slty arg  
tex, non calc; SLTST  
(40%): gy-dk gy, frm-brit,  
sb plty-plty, brit, tr vf pyr,  
non calc

#### 7250-7300 SLTY SH

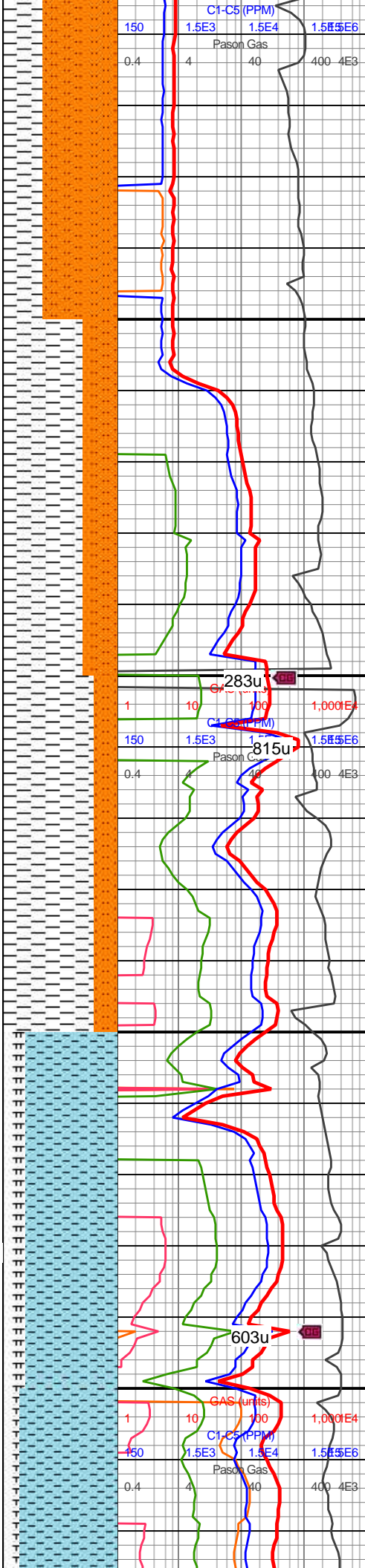
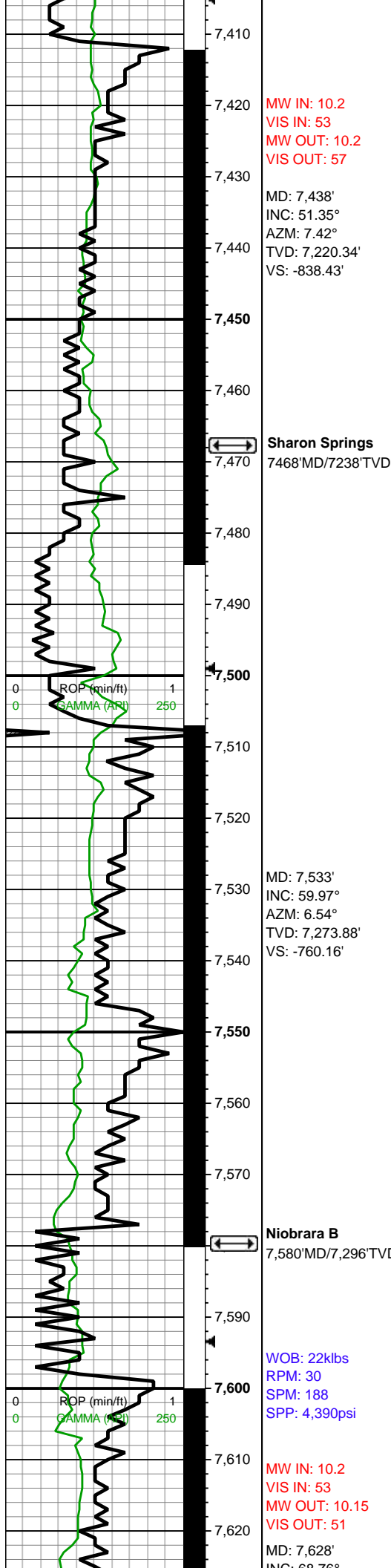
(55%): predy gy-gyshbn  
sft-sb frm-frm mod fis sb  
blky-sb plty ctngs, occ off  
wh-v lt gy sft w hydrated  
gumbo ctngs, water solu  
silty sh, thn lamn, slty arg  
tex, non calc; SLTST  
(45%): gy-dk gy, frm-brit,  
sb plty-plty, brit, tr vf pyr,  
non calc

#### 7300-7350 SLTY SH

(50%): lt gy-med gy, brn  
hue ip, predy sb plty-plty  
med-hi fis brit silc ctngs,  
occ sb frm sltst wi occ  
arg strg ip, tr vf-f micmica  
ip, non calc; SLTST  
(50%): gy-dk gy, frm-brit,  
sb plty-plty, brit, occ v dk  
gy wi vugy silc vn, tr vf pyr,  
non calc

#### 7350-7400 SLTST (60%):

predy gy-gyshbn, rr dk gy,  
frm-brit, sb frm arg sltst  
ip, sb plty-plty, brit, tr  
micmica, non calc; SLTY  
SH (40%): predy  
gy-gyshbn sb frm-frm  
mod fis sb blky-sb plty  
ctngs, occ off wh-v lt gy sft  
w hydrated gumbo slty  
sh, thn lamn, slty arg tex,  
non calc



7400-7450 SLTST (65%):  
predy gy-gyshbn, rr dk gy,  
frm-brit, sb frm arg sltst  
ip, sb plty-plty, tr micmica,  
non calc; SLTY SH  
(35%): predy gy-gyshbn  
sb frm-frm mod fis sb  
blky-sb plty ctngs, occ off  
wh-v lt gy sft w hydrated  
gumbo slty sh, thn lamn,  
slty arg tex, non calc

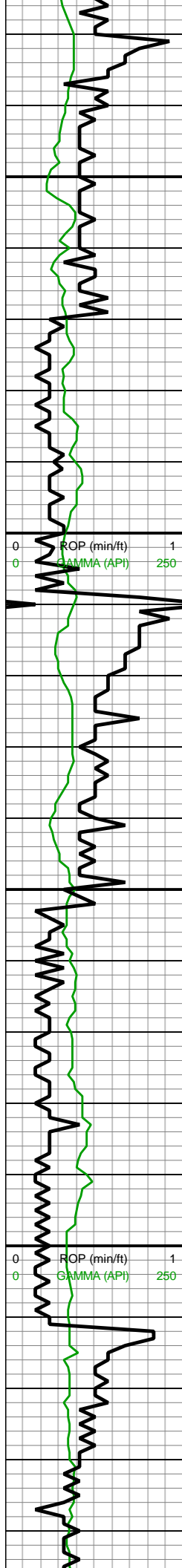
7450-7500 SH (70%):  
gy-dk gy, frm, brit, mod  
fis, sb blky-blky, wh silc  
vn ip, rr tn bent, mod calc;  
SLTST (30%): gy-dk gy,  
frm-brit, sb plty-plty, occ v  
dk gy wi vugy silc vn, tr vf  
pyr, non calc

7500-7550 SH (80%):  
gy-dk gy, frm, brit, mod  
fis, sb blky-blky, wh silc  
vn ip, rr tn bent, rr vf-f pyr,  
non-mod calc; SLTST  
(20%): gy-dk gy, frm-brit,  
sb plty-plty, occ v dk gy wi  
vugy silc vn, tr vf pyr, non  
calc

7550-7600 CHK (80%):  
med gy, gyshbn, sb  
tab-sb blky, frm-brit, tr  
MRLST intbds, hi calc;  
MRLST (20%): dk gy, sb  
tab-blky, sl hd-frm, tr CHK  
intbds, mod calc







INC: 68.76°  
AZM: 1.27°  
TVD: 7,314.97'  
VS: -674.64'

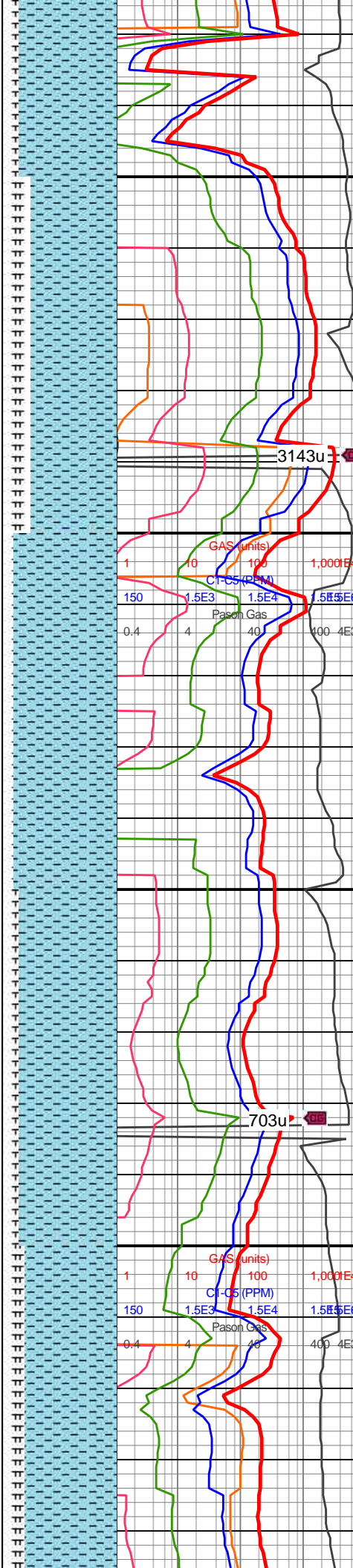
MD: 7,722'  
INC: 76.5°  
AZM: 359.69°  
TVD: 7,343.01'  
VS: -585.18'

MW IN: 10.2  
VIS IN: 53  
MW OUT: 10.2  
VIS OUT: 50

61' DTN

WOB: 33.9klbs  
RPM: 30  
SPM: 186  
SPP: 4,812psi

MD: 7,817'  
INC: 80.46°  
AZM: 0.57°  
TVD: 7,361.98'  
VS: -492.35'



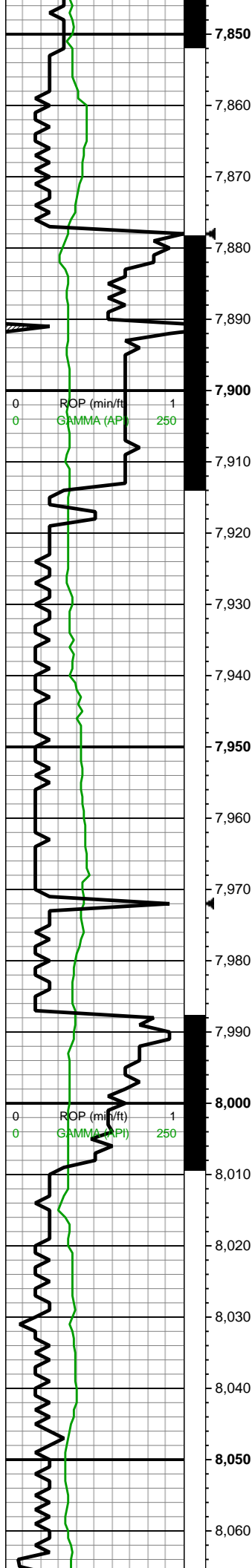
7600-7650 CHK (85%):  
predy lt gy-gyshbn, sb  
tab-sb blk, frm-brit, tr  
MRLST intbds, hi calc;  
MRLST (15%): dk gy-med  
gy, sb tab-blky, sl hd-frm,  
tr CHK intbds, mod calc

7650-7700 CHK (75%): lt  
gy, sme gyshbn, sb  
tab-sb blk, frm-brit, tr  
MRLST intbds, hi calc;  
MRLST (25%): med gy,  
sb tab-blky, sl hd-frm, tr  
CHK intbds, mod calc

7700-7750 CHK (90%):  
gyshbn, sb blk-sb plty,  
frm-brit, MRLST intbds, hi  
calc, occ pyr incl; MRLST  
(10%): med gy, sb tab-sb  
blk, sl hd-frm, tr CHK  
intbds, mod calc, sme  
free pyr

7750-7800 CHK (85%):  
gyshbn, sb blk-sb plty,  
frm-brit, MRLST intbds, hi  
calc, sme pyr incl;  
MRLST (15%): med gy,  
sb tab-sb blk, sl hd-frm,  
tr CHK intbds, mod calc,  
tr free pyr

7800-7850 CHK (80%):  
gyshbn-lt gy, sb blk-sb  
plty, frm-brit, MRLST  
intbds, hi calc, tr pyr incl;  
MRLST (20%): med gy,  
sb tab-sb blk, sl hd-frm,  
tr CHK intbds, mod calc



MW IN: 10.2  
VIS IN: 52  
MW OUT: 10.2  
VIS OUT: 49

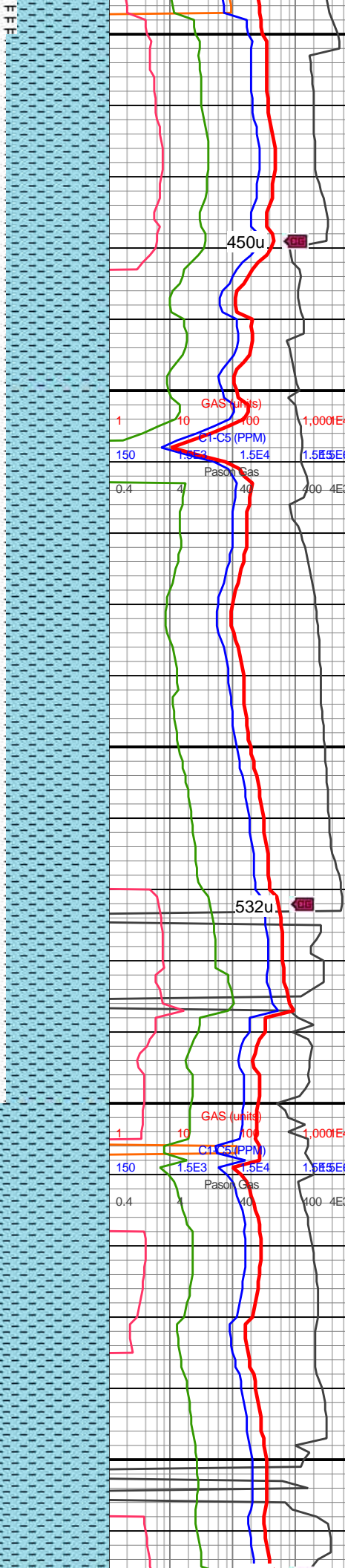
MD: 7,912'  
INC: 88.9°  
AZM: 4.43°  
TVD: 7,370.78'  
VS: -397.9'

**Curve Landed  
@ 7,915' MD**

WOB: 26.8klbs  
RPM: 37  
SPM: 184  
SPP: 4,030psi

MD: 8,006'  
INC: 90.22°  
AZM: 0.74°  
TVD: 7,371.51'  
VS: -303.96'

MW IN: 10.2  
VIS IN: 52  
MW OUT: 10.2  
VIS OUT: 49

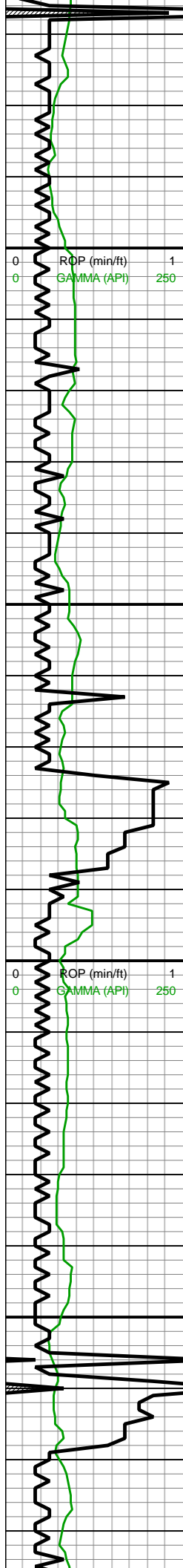


tr CHK intbds, med calc,  
rr free cal

7850-7900 CHK (90%):  
gyshbn, sb blkyl-sb plty,  
frm-brit, MRLST intbds, hi  
calc; MRLST (10%): dk  
gy, sb tab-sb blkyl, sl  
hd-frm, brit ip, CHK  
intbds, mod calc

7900-8000 CHK (90%):  
gyshbn, sb blkyl-sb plty, sl  
frm-brit, MRLST intbds,  
sme cal imbd, hi calc;  
MRLST (10%): dk gy-med  
gy, sb tab-sb blkyl, frm,  
brit ip, CHK intbds, mod  
calc

8000-8100 CHK (95%):  
med gyshbn-lt gy, sb  
blkyl-sb tab, sl frm-brit,  
MRLST intbds, v rr pyr  
specs, hi calc; MRLST  
(5%): dk gy-med gy, sb  
tab-sb blkyl, frm, brit ip,  
CHK intbds, mod calc, v  
rr fos



8,070  
8,080  
8,090  
8,100  
8,110  
8,120  
8,130  
8,140  
8,150  
8,160  
8,170  
8,180  
8,190  
8,200  
8,210  
8,220  
8,230  
8,240  
8,250  
8,260  
8,270  
8,280

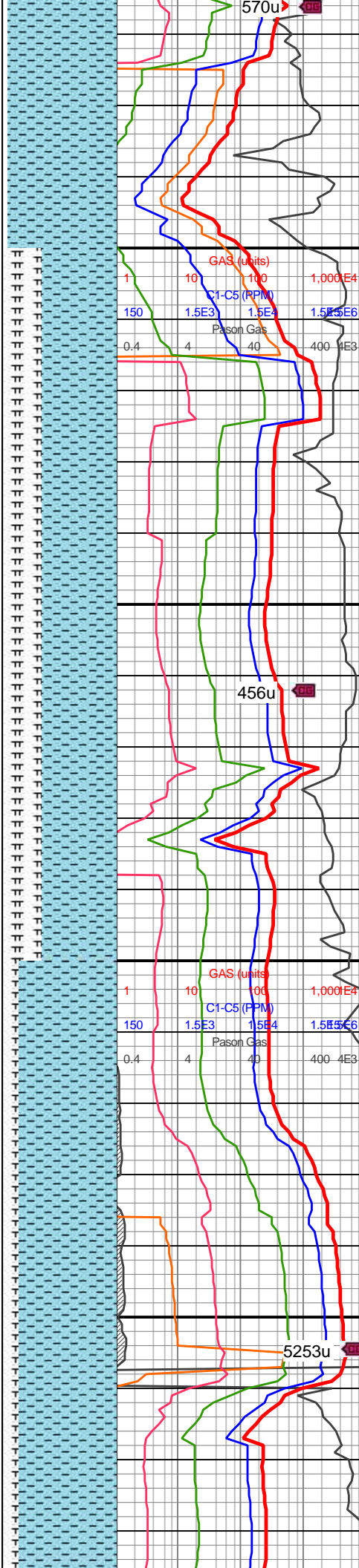
MD: 8,101'  
INC: 90.48°  
AZM: 1.09°  
TVD: 7,370.93'  
VS: -209.11'

MW IN: 10.2  
VIS IN: 52  
MW OUT: 10.2  
VIS OUT: 49

MD: 8,196'  
INC: 91.89°  
AZM: 358.98°  
TVD: 7,368.96'  
VS: -114.39'

WOB: 31.4klbs  
RPM: 50  
SPM: 186  
SPP: 4,900psi

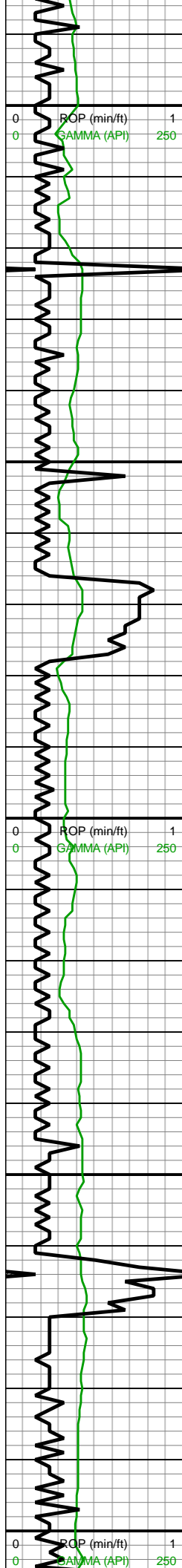
MD: 8,290'



8100-8200 CHK (65%):  
med gyshbn, sb blkly-sb  
tab, frm-brit, MRLST  
intbds, hi calc; MRLST  
(35%): dk gy-med gy, sb  
tab-sb blkly, frm, brit ip,  
CHK intbds, mod calc, v  
rr fos, v rr free cal

8200-8300 CHK (85%):  
med gyshbn-lt gy, sb  
blkly-sb tab, frm-brit,  
MRLST intbds, v rr imbd  
cal, hi calc; MRLST  
(15%): dk gy, sb tab-sb  
blkly, frm, brit ip, CHK  
intbds, mod calc





MD: 8,290'  
INC: 91.63°  
AZM: 357.58°  
TVD: 7,366.07'  
VS: -20.93'

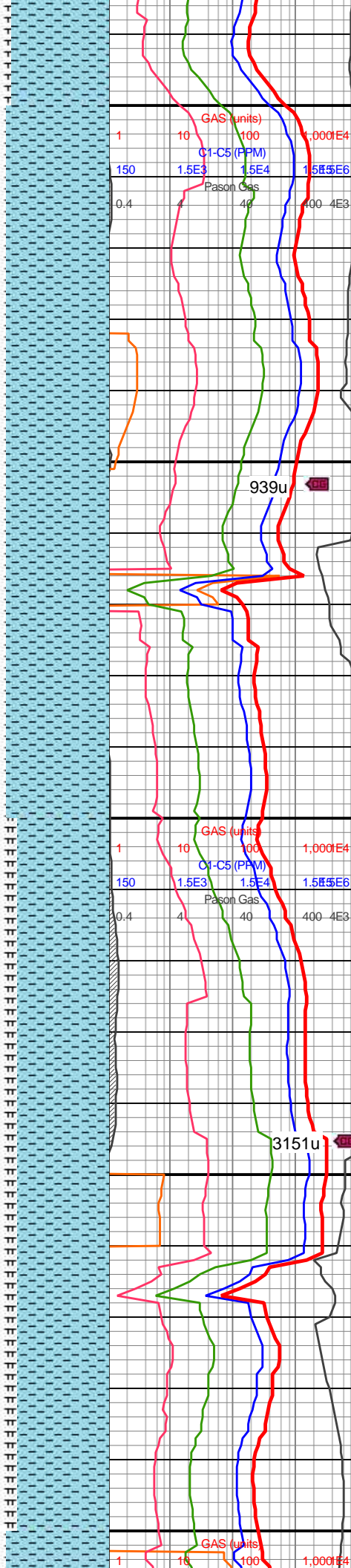
MD: 8,384'  
INC: 90.4°  
AZM: 355.64°  
TVD: 7,364.41'  
VS: 72.23'

WOB: 24.4klbs  
RPM: 50  
SPM: 184  
SPP: 4,768psi

MW IN: 10.3  
VIS IN: 53  
MW OUT: 10.2  
VIS OUT: 49

03/14/2019

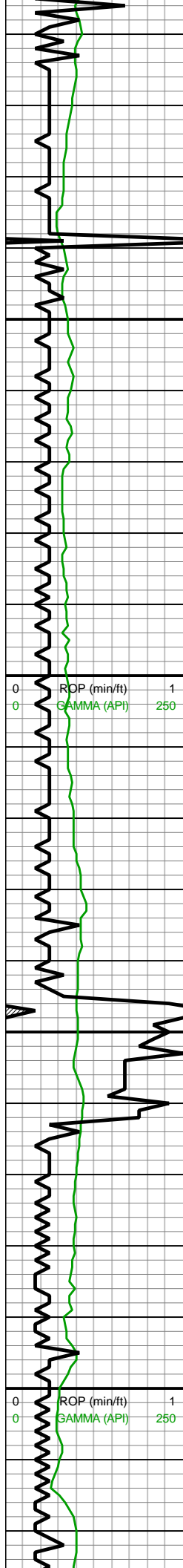
MD: 8,478'  
INC: 89.69°  
AZM: 357.4°  
TVD: 7,364.33'  
VS: 165.39'



8300-8400 CHK (90%):  
med gyshbn, sb blk-y-sb  
tab, frm-brit, MRLST  
intbds, hi calc; MRLST  
(10%): dk gy, sb tab-sb  
blk-y, frm, brit ip, CHK  
intbds, mod calc

8400-8500 CHK (80%):  
gyshbn, sb blk-y-sb tab-sl  
sb plty, frm-brit, MRLST  
intbds, rr imbd cal, hi  
calc; MRLST (20%): dk  
gy, sb tab-sb blk-y, frm,  
CHK intbds, mod calc





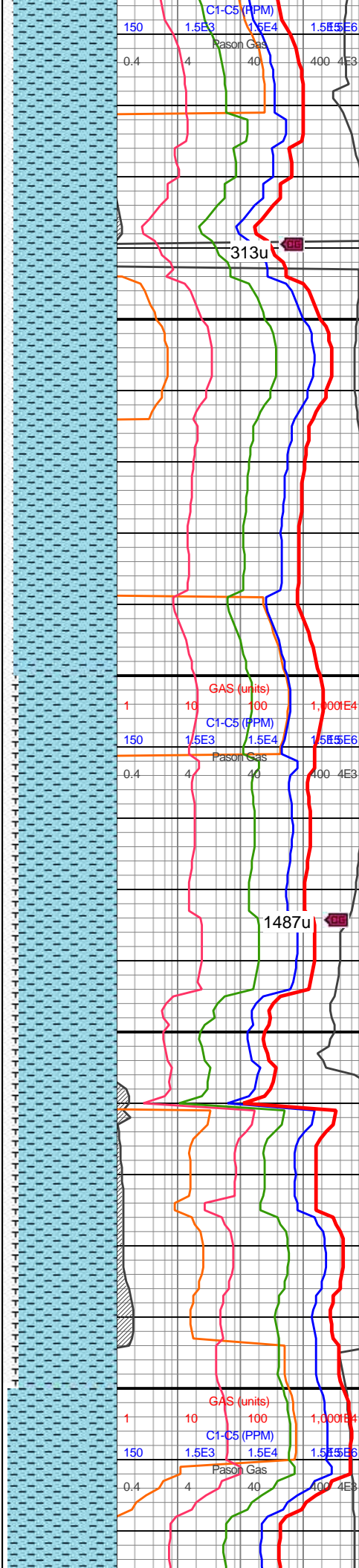
8,510  
8,520  
8,530  
8,540  
8,550  
8,560  
8,570  
8,580  
8,590  
8,600  
8,610  
8,620  
8,630  
8,640  
8,650  
8,660  
8,670  
8,680  
8,690  
8,700  
8,710  
8,720

MD: 8,573'  
INC: 89.69°  
AZM: 355.82°  
TVD: 7,364.85'  
VS: 259.56'

WOB: 29.6klbs  
RPM: 50  
SPM: 187  
SPP: 4,882psi

MD: 8,667'  
INC: 89.52°  
AZM: 358.63°  
TVD: 7,365.5'  
VS: 352.86'

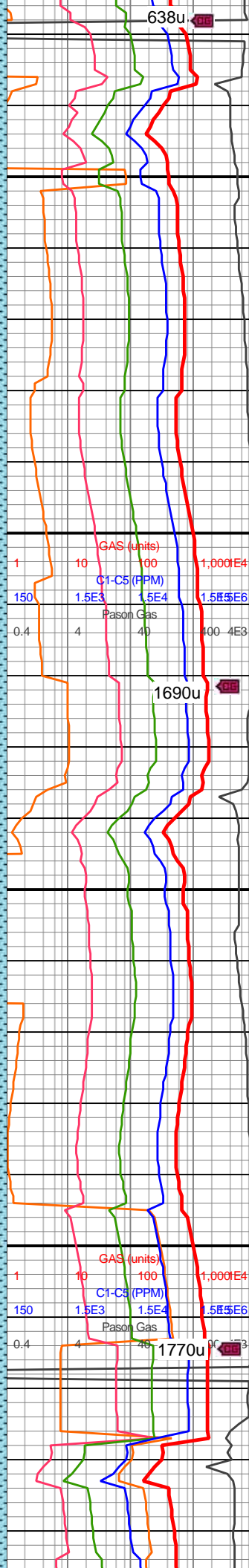
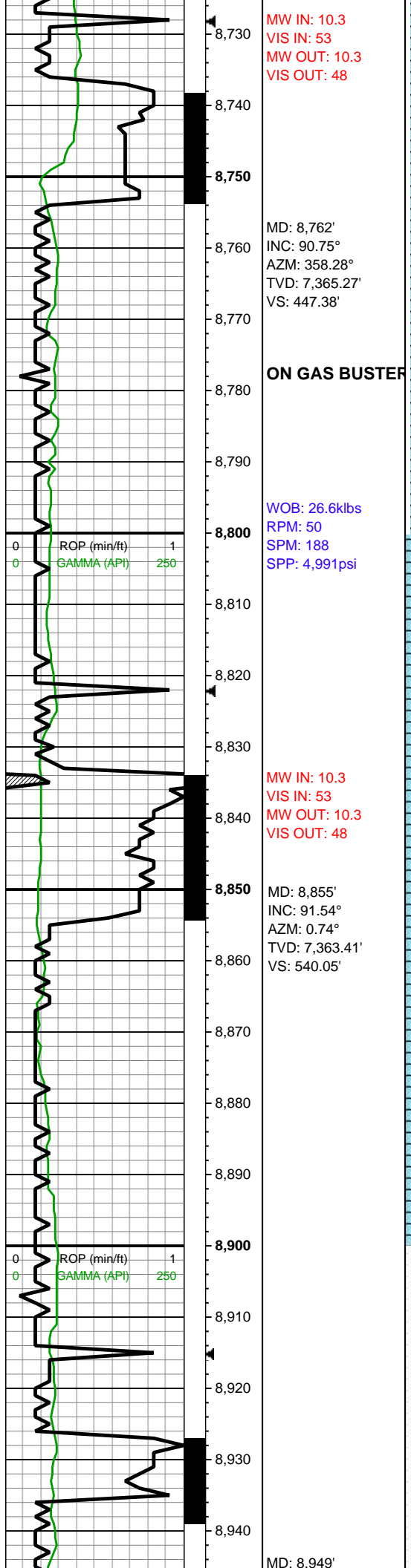
86' DTS



8500-8600 CHK (90%): lt  
gy-med gy, sb blkgy-sb  
tab, frm-brit, MRLST  
intbds, hi calc; MRLST  
(10%): dk gy, sb tab-sb  
blkgy, frm, CHK intbds,  
mod calc

8600-8700 CHK (85%):  
predy med gy-lt gy, sb  
blkgy-sb tab, frm-brit,  
MRLST intbds, hi calc;  
MRLST (15%): dk gy, sb  
tab-sb blkgy, frm, CHK  
intbds, mod calc



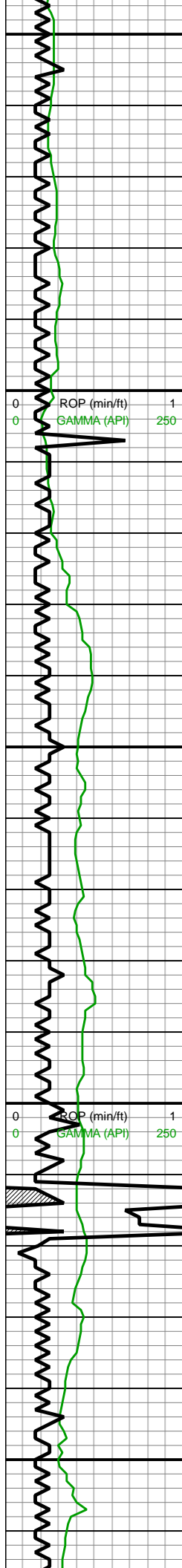


8700-8800 CHK (95%):  
predy gyshbn-lt gy, sb  
blky-sb tab, frm-brit,  
MRLST intbds, imbd cal,  
tr pyr specs, hi calc;  
MRLST (5%): dk gy, sb  
tab-sb blky, frm, CHK  
intbds, mod calc, tr free  
pyr

8800-8900 CHK (100%):  
predy lt gy-gyshbn, sb  
blky-sb tab, frm-brit, tr  
imbd cal, MRLST intbds,  
imbd cal, hi calc, sme  
free pyr, rr free cal, tr  
MRLST

8900-9000 CHK (85%):  
lt-med gy-gyshbn, sb frm,  
frm in, predy mod fis sb





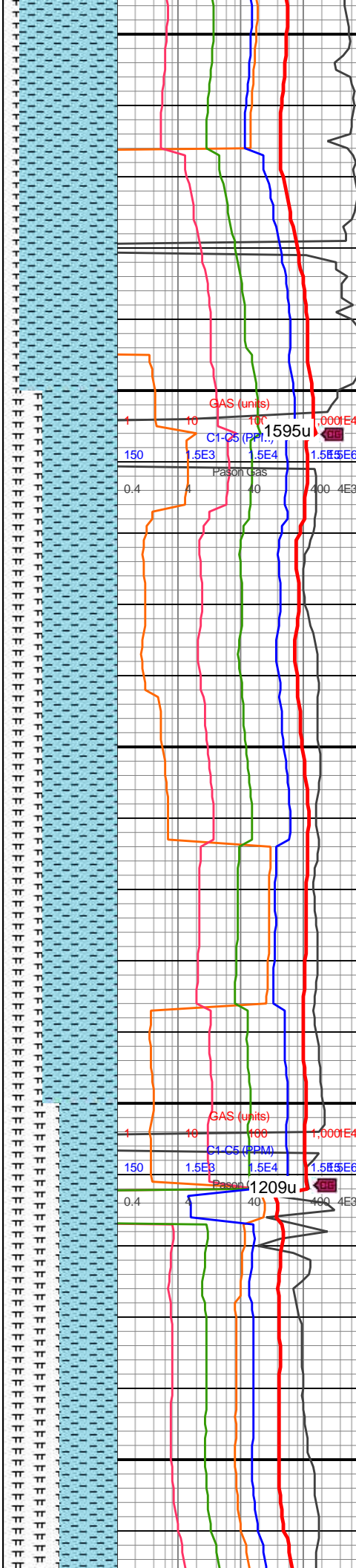
INC: 92.15°  
AZM: 2.85°  
TVD: 7,360.39'  
VS: 633.92'

WOB: 36.5klbs  
RPM: 50  
SPM: 186  
SPP: 4,967psi

MW IN: 10.3  
VIS IN: 53  
MW OUT: 10.3  
VIS OUT: 49

MD: 9,043'  
INC: 92.68°  
AZM: 2.15°  
TVD: 7,356.43'  
VS: 727.79'

MD: 9,138'  
INC: 92.15°  
AZM: 3.73°  
TVD: 7,352.42'  
VS: 822.68'

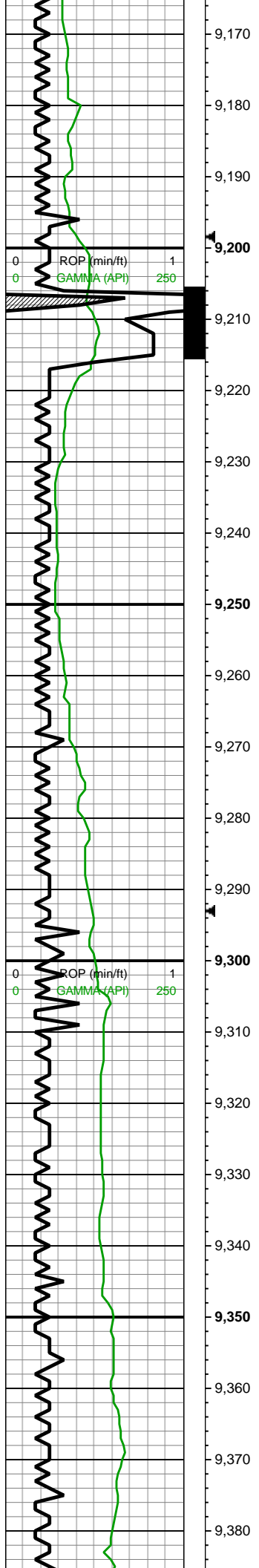


mm ip; predy med hi sb  
blky ctngs, sl slty tex, tr  
thn chky lamn, hi calc;  
MRLST (15%): dk gy,  
frm-brit sb plty ctngs, sl  
slty tex, rr vf pyr, mod calc

9000-9100 CHK (65%):  
med gy-gyshbn, lt gy ip wi  
com thn chky lamn, sb  
frm-occ frm, sb blky mod  
fis ctngs, sl slty tex, rr c  
forams, hi calc; MRLST  
(35%): dk gy, frm-brit sb  
plty ctngs, sl slty tex, rr vf  
pyr, mod calc

9100-9200 CHK (50%):  
predy med gy wi com f  
wh chky foram incl ip, lt  
gy ip, sb frm-frm, brit ip,  
predy mod fis sb blky  
ctngs, sm-sl slty tex, tr vf  
pyr ip, hi calc; MRLST  
(50%): dk gy, frm-brit, sb  
blky-sb plty mod-hi fis  
ctngs, sl slty tex, sp wi  
brn marl incl ip, tr vf pyr,





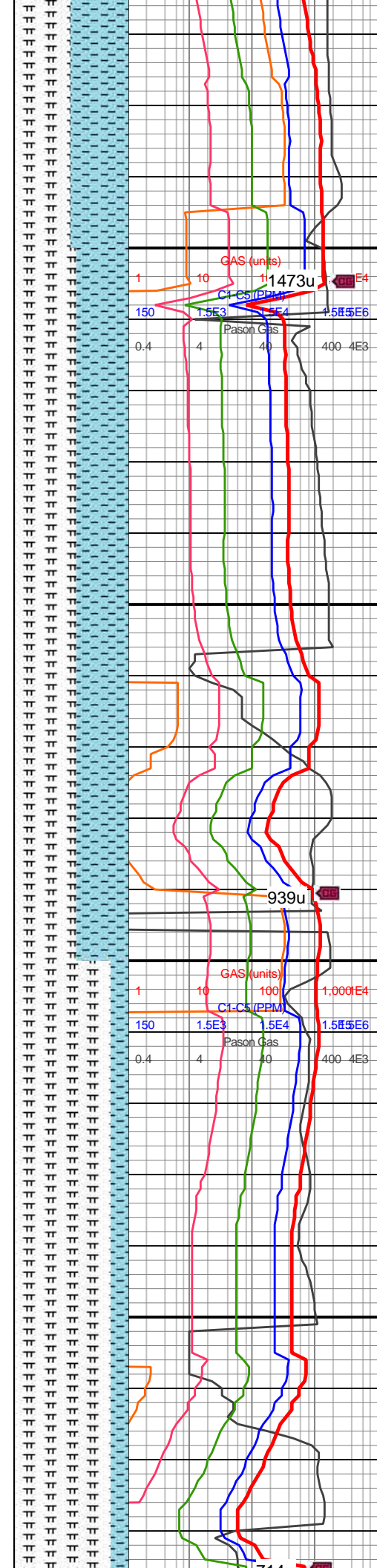
MW IN: 10.3  
VIS IN: 52  
MW OUT: 10.3  
VIS OUT: 49

WOB: 12klbs  
RPM: 50  
SPM: 187  
SPP: 4,020psi

MD: 9,232'  
INC: 90.84°  
AZM: 3.38°  
TVD: 7,349.97'  
VS: 916.64'

MD: 9,326'  
INC: 91.45°  
AZM: 2.32°  
TVD: 7,348.09'  
VS: 1,010.6'

MW IN: 10.35  
VIS IN: 53



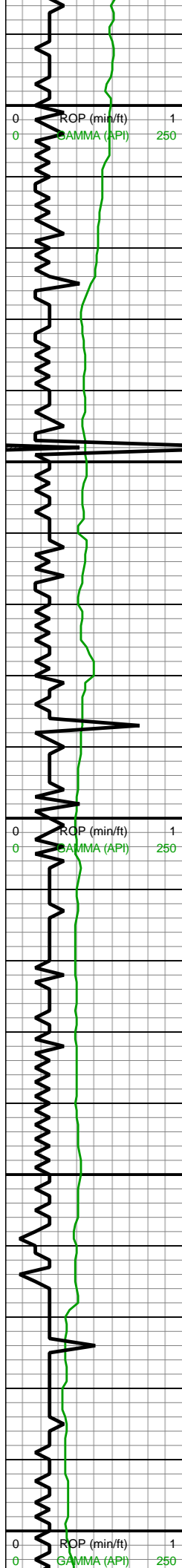
mod calc

9200-9300 MRLST  
(55%): dk gy, frm-brit, sb  
blky-sb plty mod-hi fis  
ctngs, sl slty tex, sp wi  
brn marl incl ip, tr vf pyr,  
mod calc; CHK (45%):  
predy med gy wi com f  
wh chky foram incl ip, lt  
gy ip, sb frm-frm, brit ip,  
predy mod fis sb blky  
ctngs, sm-sl slty tex, tr vf  
pyr ip, hi calc

9300-9400 MRLST  
(85%): dk gy,  
frm-crunchy-brit, sb  
blky-blky mod fis ctngs wi  
sl slty tex, sp wi brn marl  
incl ip & intbdd wi rr wh  
chky foram incl, tr vf pyr,  
mod calc; CHK (15%):  
med gy-dk gy wi com f wh  
chky foram incl ip, sb  
frm-frm-brit l-mod fis sb  
rd-sb blky ctngs, sm-sl  
slty tex, rr forams, tr vf pyr  
ip, hi calc





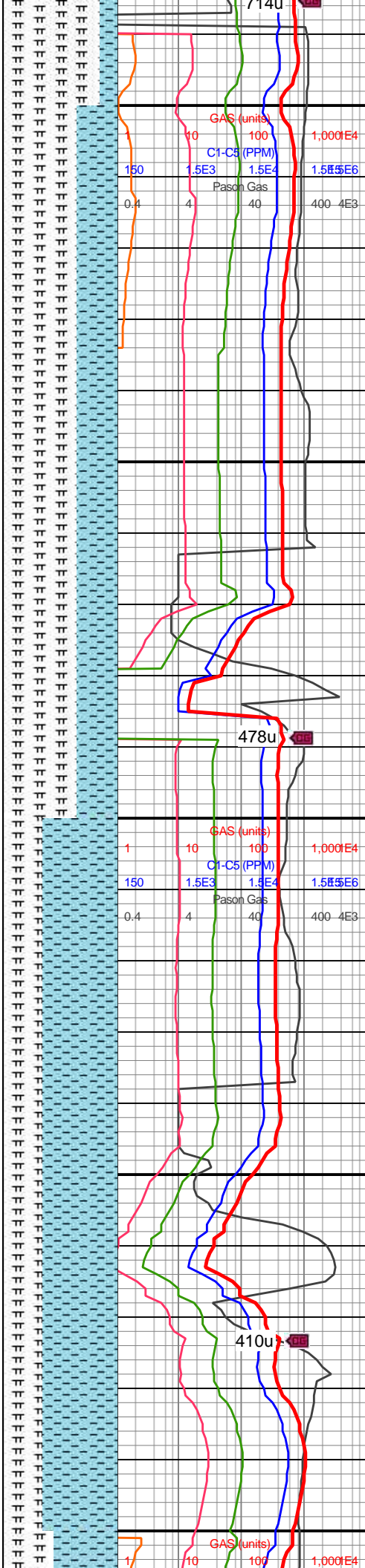


WOB: 33klbs  
RPM: 50  
SPM: 188  
SPP: 5,110psi

MD: 9,421'  
INC: 91.63°  
AZM: 2.15°  
TVD: 7,345.54'  
VS: 1,105.51'

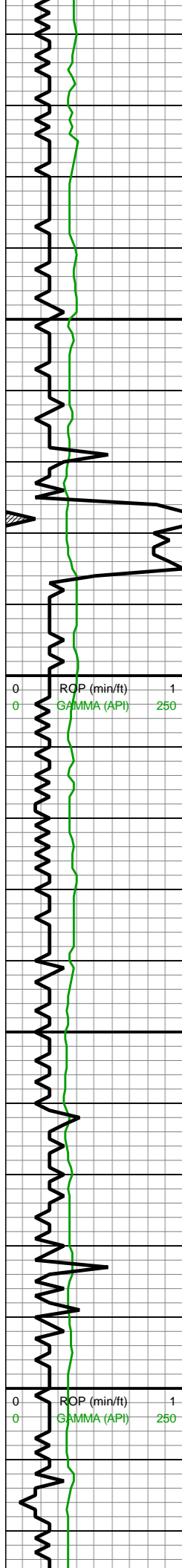
MD: 9,515'  
INC: 91.8°  
AZM: 0.92°  
TVD: 7,342.73'  
VS: 1,199.36'

WOB: 30klbs  
RPM: 50  
SPM: 181  
SPP: 4,790psi



9400-9500 MRLST (65%): dk gy, frm-crunchy-brit, sb blkly-blky mod fis ctngs wi sl slty tex, sp wi brn marl incl ip & intbdd wi rr wh chky foram incl, tr vf pyr, mod calc; CHK (35%): med gy-dk gy, sb frm-frm-brit l-mod fis sb rd-sb blkly ctngs, sm-sl slty tex, rr forams, tr vf pyr ip, hi calc

9500-9600 CHK (65%): med gy-occ dk gy, rr lt gy, sb frm-frm-brit, l-mod fis sb rd-sb blkly ctngs, sm-sl slty-occ bmpy mot tex wi thn chky lamn, rr-occ vf chky foram incl & c free foram intbds, hi calc; MRLST (35%): dk gy-dk gyshbn, frm, brit, sb blkly-sb plty mod fis ctngs, sl slty tex, wi rr tn bent wi occ pyr strg ip, mod calc wi brn mrly resdl



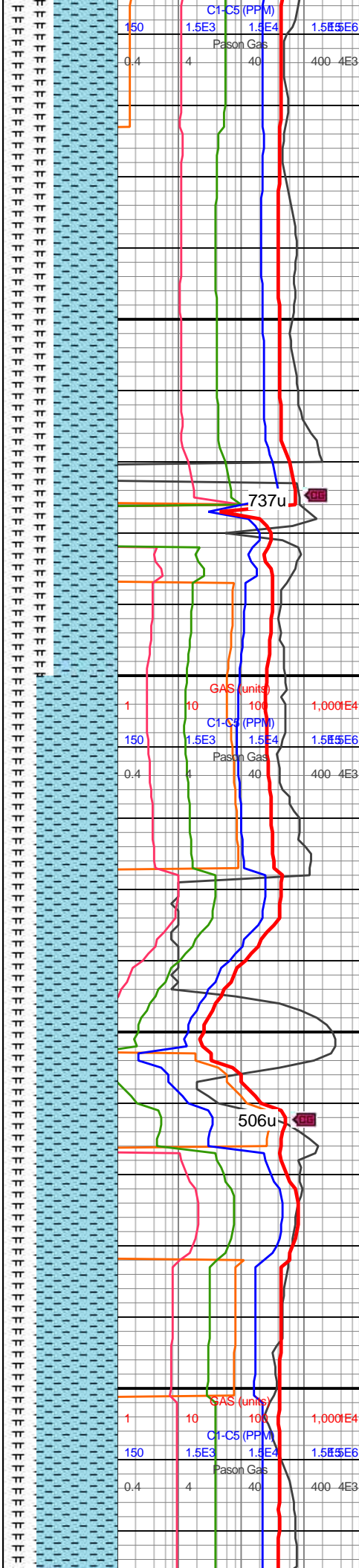
MD: 9,609'  
INC: 92.07°  
AZM: 1.27°  
TVD: 7,339.55'  
VS: 1,293.18'

MW IN: 10.3  
VIS IN: 53  
MW OUT: 10.35  
VIS OUT: 54

MD: 9,703'  
INC: 91.19°  
AZM: 358.81°  
TVD: 7,336.88'  
VS: 1,386.89'

MD: 9,798'  
INC: 91.36°  
AZM: 358.63°  
TVD: 7,334.76'  
VS: 1,481.43'

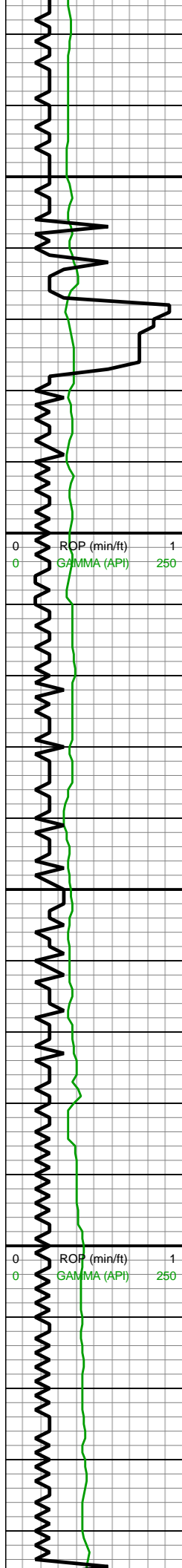
WOB: 30klbs  
RPM: 50  
SPM: 185  
SPP: 4,870psi



9600-9700 CHK (55%):  
med gy-occ dk gy mot wi  
com thn chky lamn, sb  
frm-frm-brit, l-mod fis sb  
rd-sb blkly ctngs, sm-sl  
silty-occ bmpy mot tex,  
rr-occ v chky foram incl, hi  
calc; MRLST (45%): dk  
gy-dk gyshbn, frm, brit, sb  
blkly-sb plty mod fis  
ctngs, sl slty tex, wi rr tn  
bent wi occ pyr strg ip,  
mod calc wi brn mrly  
resdl

9700-9800 CHK (70%):  
predy med gy wi thn chky  
lamn & occ f foram incl,  
occ lt gy, sb frm-frm,  
l-mod fis sb rd-sb blkly  
ctngs, sm-sl silty-occ  
bmpy mot tex, hi calc;  
MRLST (30%): dk gy-dk  
gyshbn, frm, brit, sb  
blkly-sb plty mod fis  
ctngs, sl slty tex, thn  
lamn, mod calc wi brn  
mrly resdl





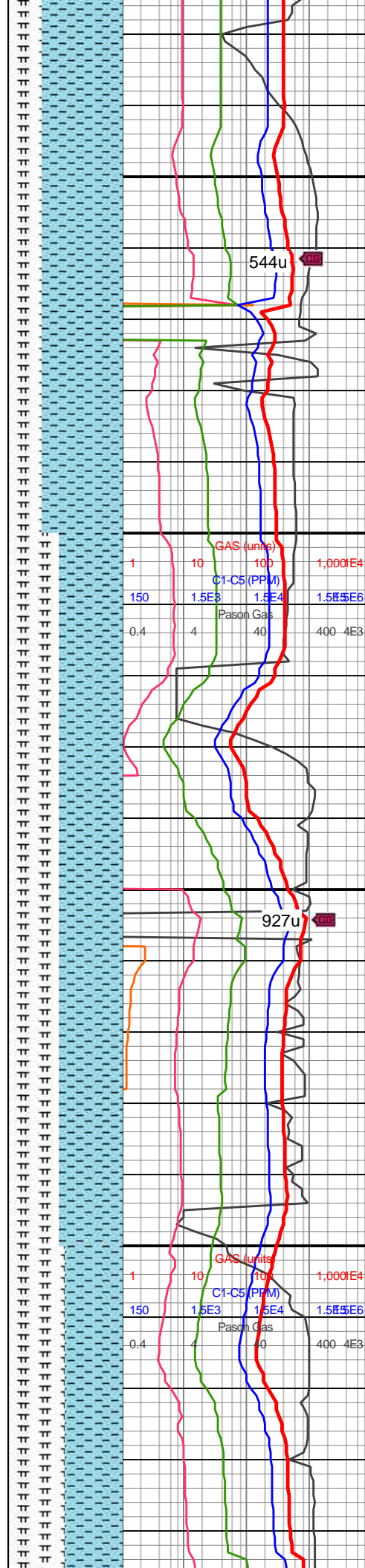
MW IN: 10.3  
VIS IN: 55  
MW OUT: 10.4  
VIS OUT: 51

MD: 9,892'  
INC: 90.48°  
AZM: 0.04°  
TVD: 7,333.25'  
VS: 1,575.08'

MD: 9,986'  
INC: 90.66°  
AZM: 359.51°  
TVD: 7,332.32'  
VS: 1,668.8'

WOB: 28klbs  
RPM: 50  
SPM: 183  
SPP: 4,810psi

MW IN: 10.3  
VIS IN: 53  
MW OUT: 10.3  
VIS OUT: 53

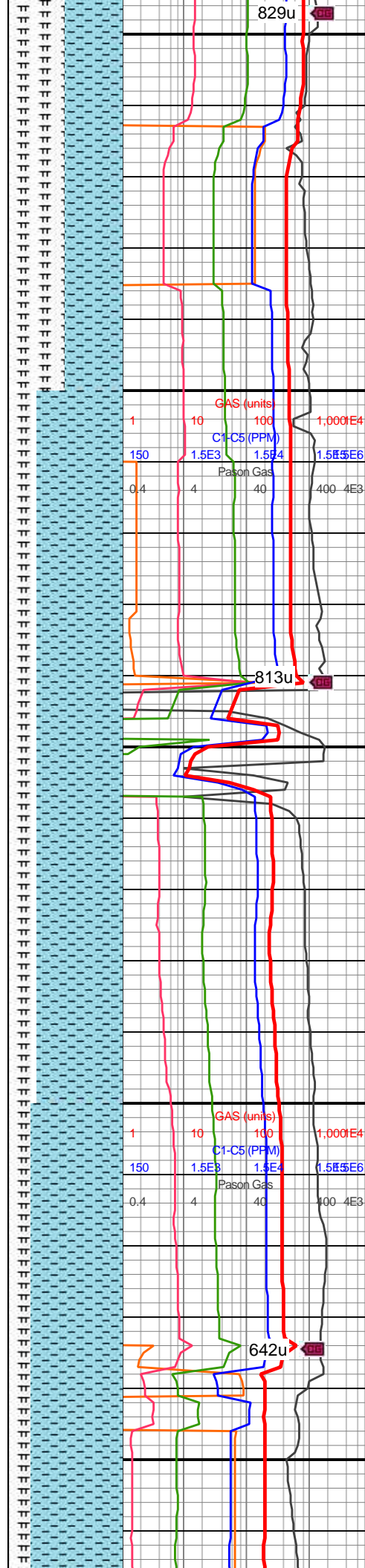
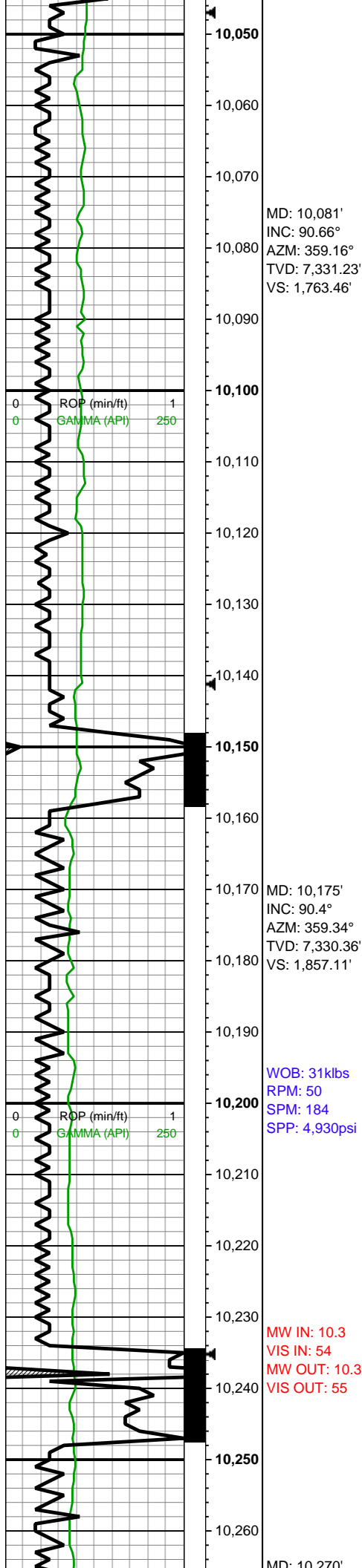


9800-9900 CHK (70%):  
predy med gy wi thn chky  
lamn & occ f foram incl,  
occ lt gy, sb frm-frm,  
l-mod fis sb rd-sb blk  
ctngs, sm-sl slty-occ  
bmpy mot tex, hi calc;  
MRLST (30%): dk gy-dk  
gyshbn, frm, brit, sb  
blk-sb plty mod fis  
ctngs, sl slty tex, thn  
lamn, mod calc wi brn  
mrly resdl

9900-10000 CHK (55%):  
med gy, rr lt gy, sb  
frm-crunchy-frm-brit,  
l-mod fis sb rd-sb blk  
ctngs, sm-sl slty-occ  
bmpy mot tex wi thn chky  
lamn, rr vf pyr, hi calc;  
MRLST (45%): dk gy sp  
wi brn marl incl-dk  
gyshbn, frm, brit, sb  
blk-sb plty mod fis  
ctngs, sl slty tex, thn  
lamn, mod calc

10000-10100 CHK  
(50%): med gy wi thn  
chky lamn, sb  
frm-crunchy-frm-brit,  
l-mod fis sb rd-sb blk  
ctngs, sm-sl slty-occ  
bmpy mot tex wi thn chky  
lamn, rr vf pyr, hi calc;





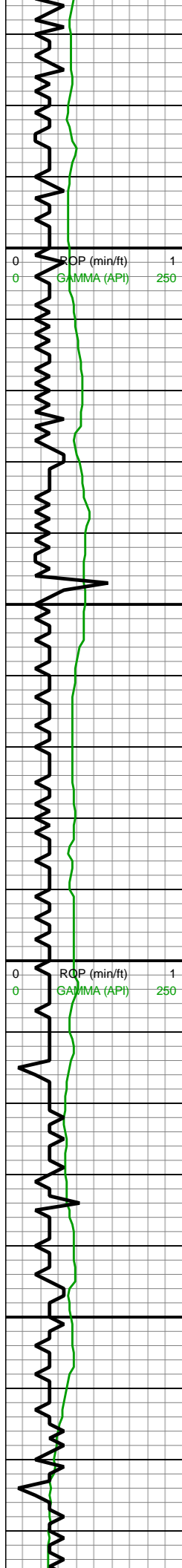
bmpy mot tex wi thn chky lamn, rr vf pyr, hi calc; MRLST (50%): dk gy sp wi brn marl incl-dk gyshbn, frm, brit, sb blk-y-sb plty mod fis ctngs, sl slty tex, thn lamn, mod calc wi brn mrly resdl

10100-10200 CHK (75%): lt gy-med gy, predy frm-brit, sb frm ip, l-mod fis sb rd-sb blk-y ctngs, sm-sl slty tex wi thn chky lamn, rr vf pyr-tr pyrc strg, rr-tr forams & fos frags, hi calc; MRLST (25%): dk gy-dk gyshbn, thn intbdd dk gy-brn lamn, sb frm-frm, brit, sb blk-y mod fis ctngs, sl slty tex, mod calc

10200-10300 CHK (80%): lt gy-med gy wi thn chky lamn, frm-brit, sb frm ip, sb rd-sb blk-y l-mod fis ctngs wi sm-sl slty tex, rr-tr forams & fos frags wi pyrc strg ip, hi calc; MRLST (20%): dk gy intbdd wi thn brn lamn, sb frm-frm, brit, sb blk-y mod fis ctngs, sl slty tex





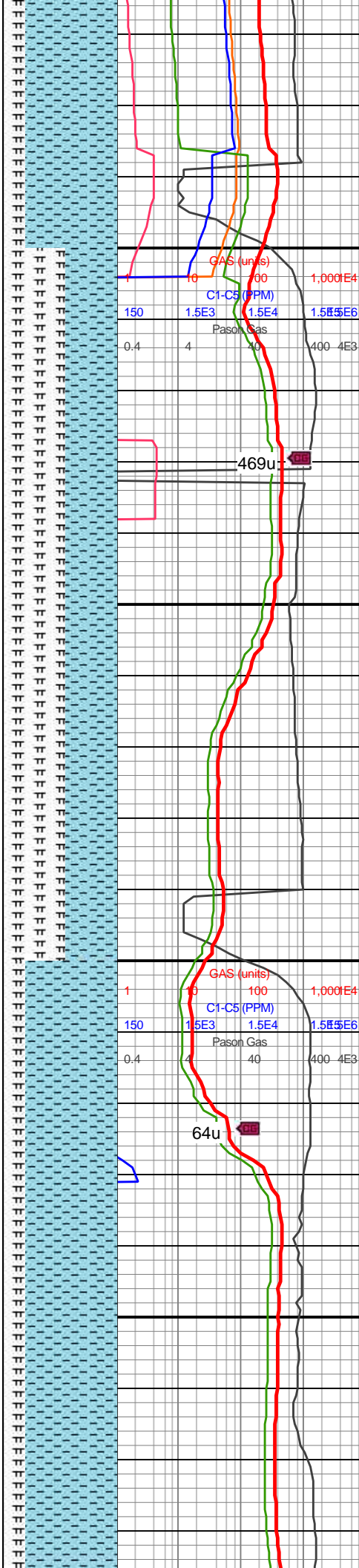


MD: 10,270'  
INC: 91.45°  
AZM: 0.57°  
TVD: 7,328.82'  
VS: 1,951.83'

MD: 10,364'  
INC: 91.45°  
AZM: 359.16°  
TVD: 7,326.44'  
VS: 2,045.54'

WOB: 33klbs  
RPM: 50  
SPM: 184  
SPP: 4,980psi

MD: 10,458'  
INC: 91.45°  
AZM: 359.16°  
TVD: 7,324.06'  
VS: 2,139.15'

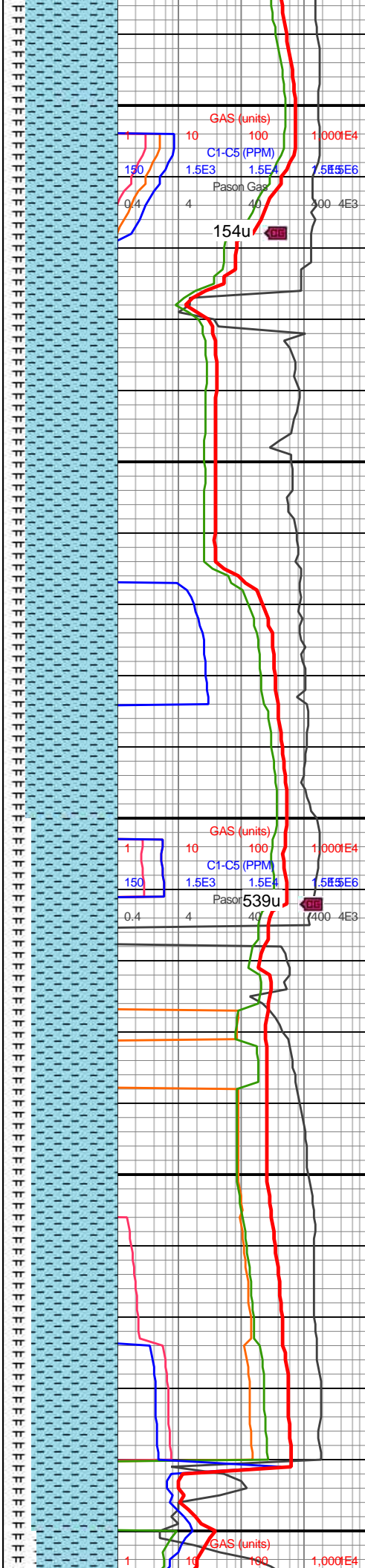
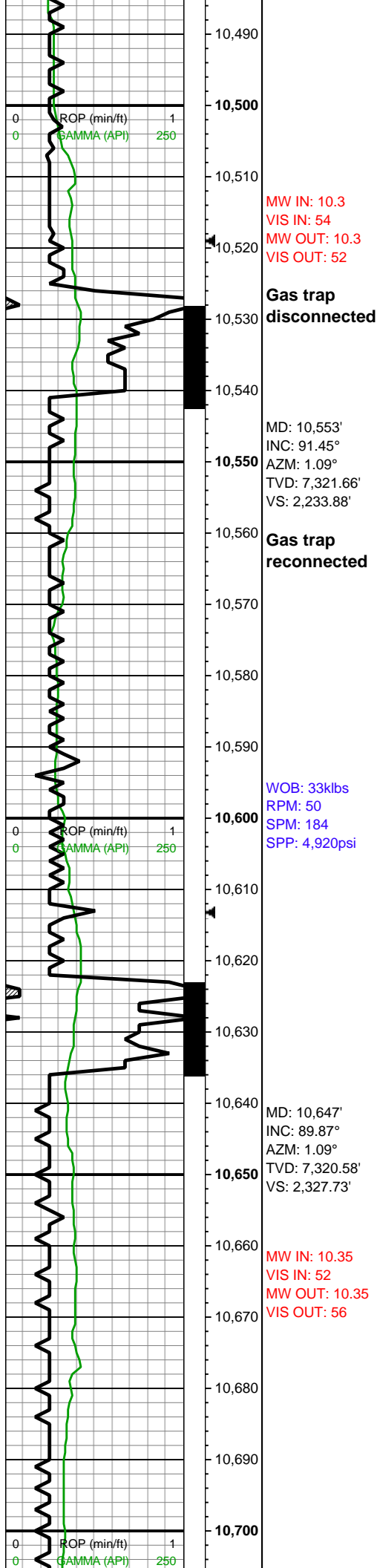


mod ls ctngs, sl slty tex,  
mod calc

10300-10400 MRLST  
(55%): dk gy sp wi brn  
marl incl & lamn, predy  
frm-brit, sb frm ip, sb  
blky-blky mod fis ctngs wi  
sl slty tex, tr vf pyr, tr tn  
bent, pyrc bent ip, mod  
calc; CHK (45%): med  
gy-dk gy, sb frm-frm-brit  
l-mod fis sb rd-sb blky  
ctngs, sm-sl slty tex, rr  
forams, tr vf pyr ip, hi calc

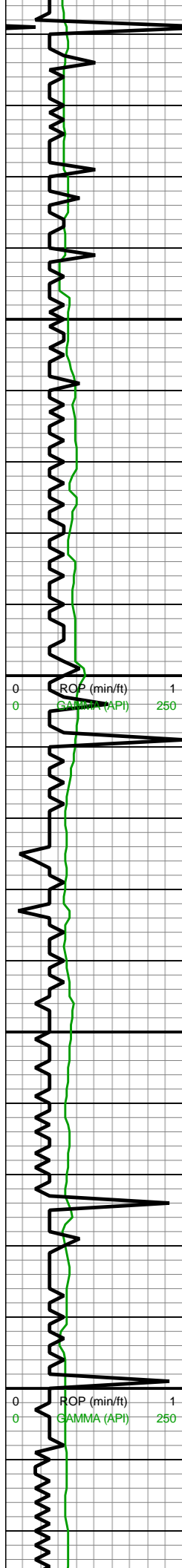
10400-10500 CHK  
(80%): lt gy-med gy wi thn  
chky lamn, frm-brit, sb  
frm ip, sb rd-sb blky  
l-mod fis ctngs wi sm-sl  
slty tex, rr-tr forams & fos  
frags, hi calc; MRLST  
(20%): dk gy intbdd wi thn  
brn lamn, sb frm-frm, brit,  
sb blky mod fis ctngs, sl  
slty tex, mod calc





10500-10600 CHK  
(80%): med gy-dk gy wi  
f-elong wh chky foram  
incl, frm-brit, mod fis sb  
blky-blky ctngs wi sm-sl  
silty tex, occ-com forams  
& acic fos frags, tr-rr vf  
pyr, hi calc; MRLST  
(20%): dk gy sp wi brn  
marl incl, frm-brit, sb blky  
mod fis ctngs, sl silty tex,  
rr tn bent, mod calc

10600-10700 CHK  
(75%): lt gy-med gy wi thn  
chky lamn, frm-brit, sb  
frm ip, sb rd-sb blky  
l-mod fis ctngs wi sm-sl  
silty tex, rr-tr forams & fos  
frags, hi calc; MRLST  
(25%): dk gy intbdd wi thn  
brn lamn, sb frm-frm, brit,  
sb blky mod fis ctngs, sl  
silty tex, mod calc



10,710  
10,720  
10,730  
10,740  
10,750  
10,760  
10,770  
10,780  
10,790  
10,800  
10,810  
10,820  
10,830  
10,840  
10,850  
10,860  
10,870  
10,880  
10,890  
10,900  
10,910  
10,920

MD: 10,742'  
INC: 90.31°  
AZM: 0.92°  
TVD: 7,320.43'  
VS: 2,422.59'

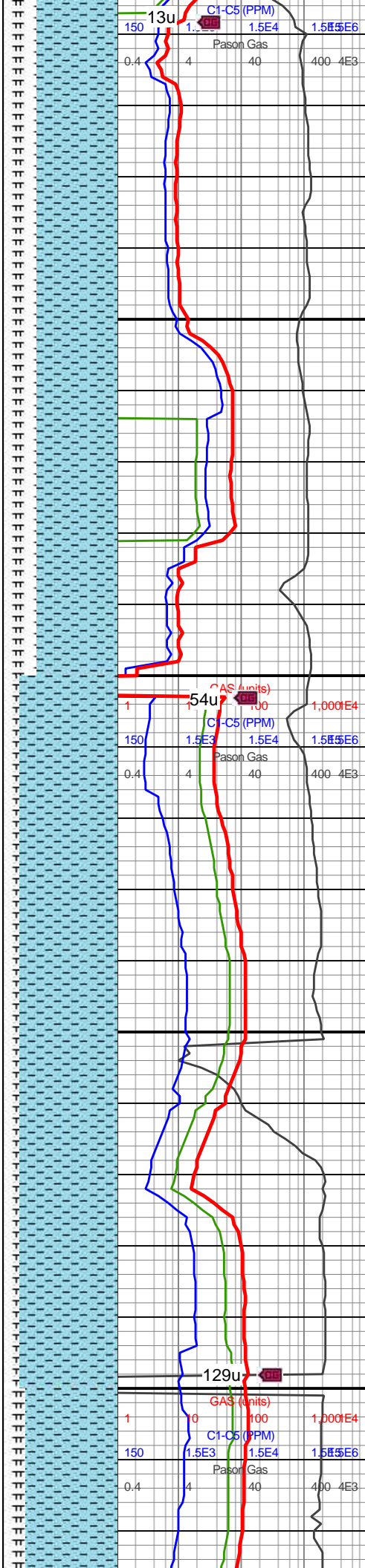
MW IN: 10.3  
VIS IN: 54  
MW OUT: 10.25  
VIS OUT: 56

WOB: 26klbs  
RPM: 50  
SPM: 157  
SPP: 4,000psi

C/O ROT Head  
Element

MD: 10,837'  
INC: 90.75°  
AZM: 359.34°  
TVD: 7,319.55'  
VS: 2,517.34'

MW IN: 10.3  
VIS IN: 55  
MW OUT: 10.3  
VIS OUT: 53

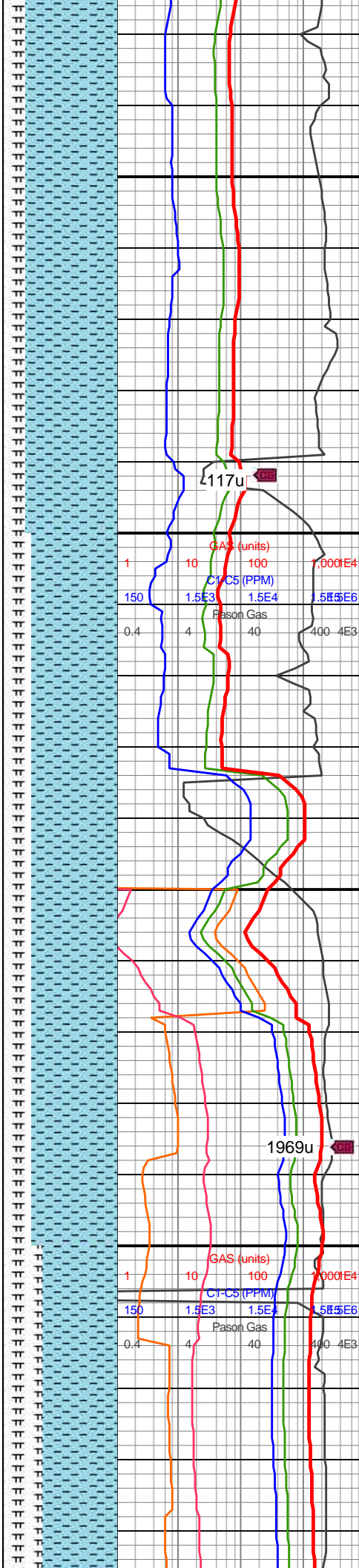
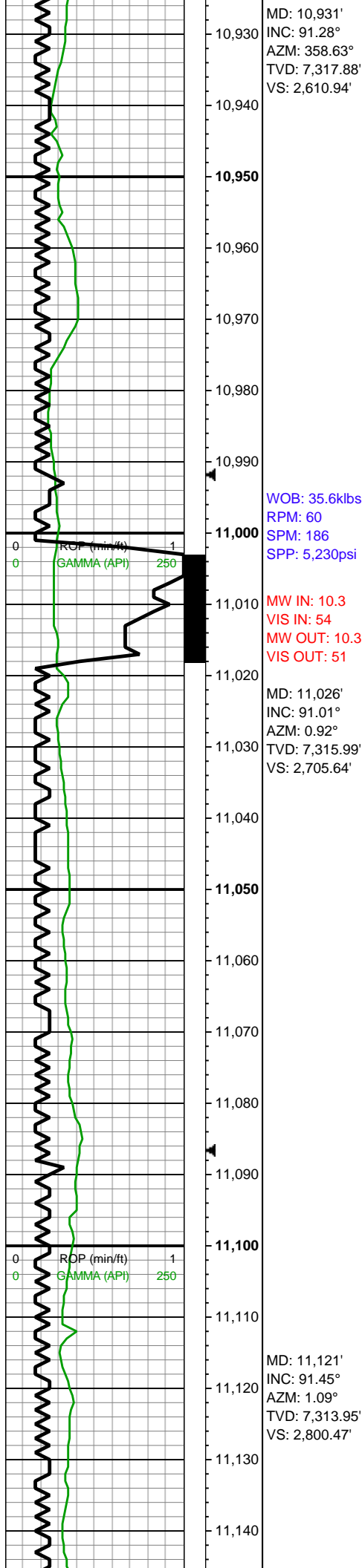


10700-10800 CHK  
(70%): med gy-dk gy wi  
f-elong wh chky foram  
incl, frm-brit, mod fis sb  
blky-blky ctngs wi sm-sl  
silty tex, occ-com forams  
& acic fos frags, tr-rr vf  
pyr, hi calc; MRLST  
(30%): dk gy sp wi brn  
marl incl, frm-brit, sb blky  
mod fis ctngs, sl silty tex,  
rr tn bent, mod calc

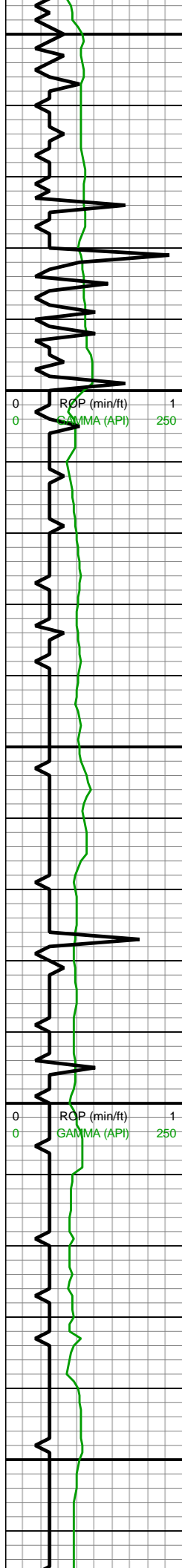
10800-10900 CHK  
(85%): gyshbn, sb  
blky-sb tab, frm-brit, tr  
imbd cal, MRLST intbds,  
hi calc; MRLST (15%): dk  
gy, sb tab-sb blky, frm,  
CHK intbds, mod calc, tr  
free pyr











32' DTS

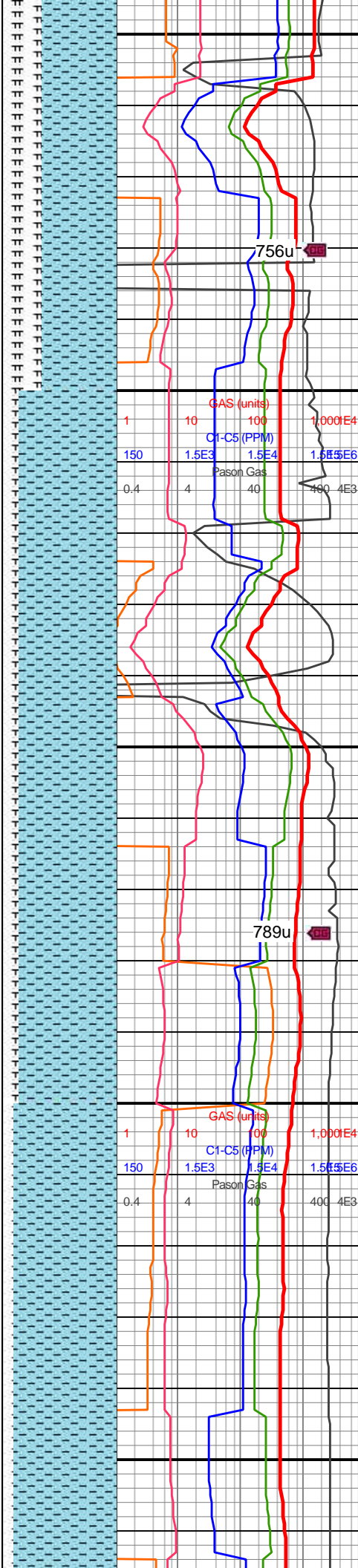
WOB: 20.7klbs  
RPM: 60  
SPM: 186  
SPP: 4,751psi

9' DTN

MD: 11,215'  
INC: 91.89°  
AZM: 0.21°  
TVD: 7,311.21'  
VS: 2,894.25'

MW IN: 10.3  
VIS IN: 54  
MW OUT: 10.3  
VIS OUT: 51

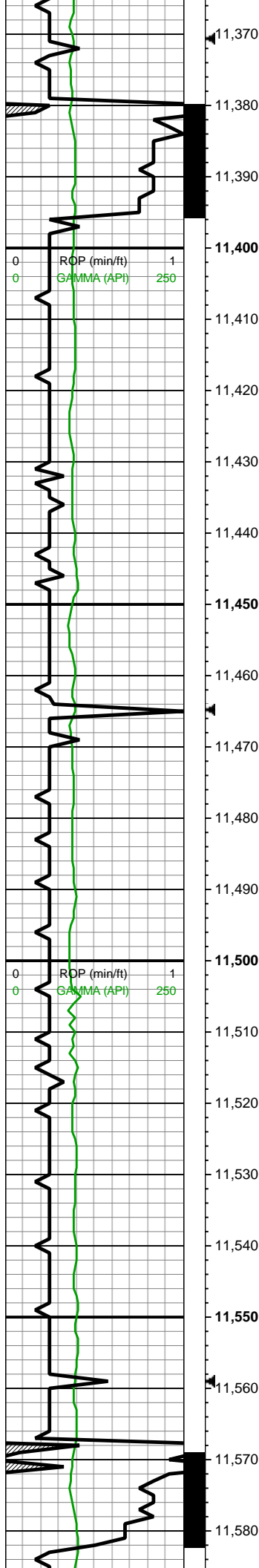
MD: 11,310'  
INC: 92.51°  
AZM: 358.98°  
TVD: 7,307.56'  
VS: 2,988.88'



SB blkly-sb tab, frm-brit, occ imbd cal, MRLST intbds, hi calc; MRLST (35%): dk gy, sb tab-sb blkly, frm-sl hrd, CHK intbds, mod calc

11200-11300 CHK (85%): gyshbn, sb blkly-sb tab, frm-brit, MRLST intbds, hi calc; MRLST (15%): med gy, sb tab-sb blkly, frm-sl hrd, CHK intbds, mod calc, occ free cal, rr free pyr

11300-11400 CHK (90%): gyshbn-lt gy, sb blkly-sb tab, frm-brit, sme imbd cal, MRLST intbds, hi calc; MRLST (10%): med gy, sb tab-sb blkly, frm-sl hrd, CHK intbds, mod calc



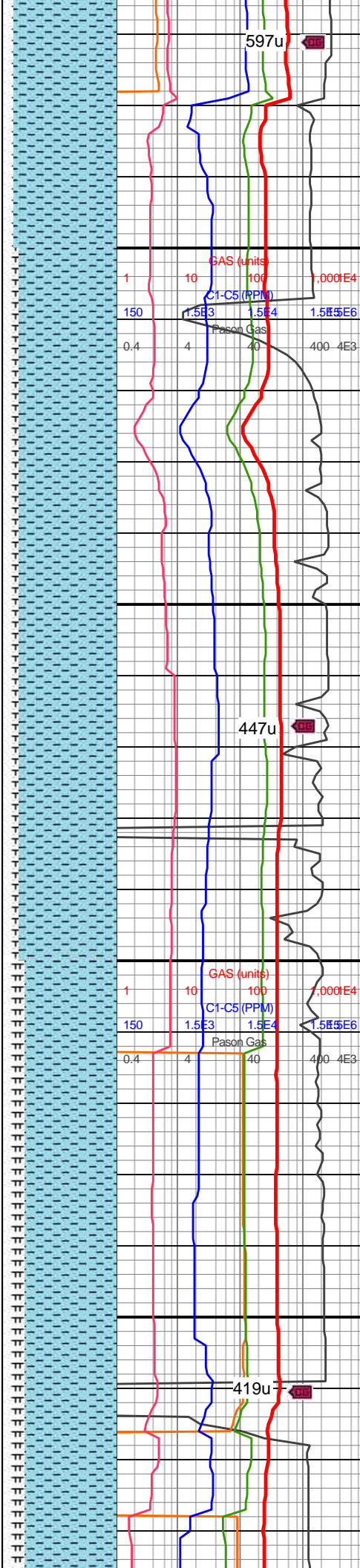
WOB: 23.9klbs  
RPM: 60  
SPM: 184  
SPP: 5,161psi

MD: 11,404'  
INC: 90.66°  
AZM: 0.57°  
TVD: 7,304.96'  
VS: 3,082.56'

MW IN: 10.3  
VIS IN: 53  
MW OUT: 10.3  
VIS OUT: 50

MD: 11,498'  
INC: 90.48°  
AZM: 358.81°  
TVD: 7,304.03'  
VS: 3,176.26'

MW IN: 10.3  
VIS IN: 52  
MW OUT: 10.3  
VIS OUT: 49



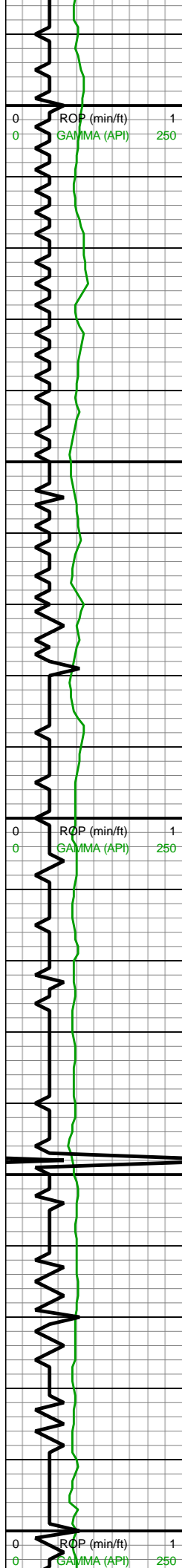
597u

447u

419u

11400-11500 CHK  
(85%): gyshbn, sb  
blky-sb tab, frm-brit, tr  
imbd cal, MRLST intbds,  
hi calc; MRLST (15%):  
med gy-dk gy, sb tab-sb  
blky, frm-sl hrd, CHK  
intbds, mod calc, tr fos

11500-11600 CHK  
(80%): predy gyshbn-lt  
gy, sb blky-sb tab,  
frm-brit, rr imbd cal,  
MRLST intbds, hi calc;  
MRLST (20%): med gy-dk  
gy, sb tab-sb blky, frm-sl  
hrd, CHK intbds, mod  
calc, occ free pyr



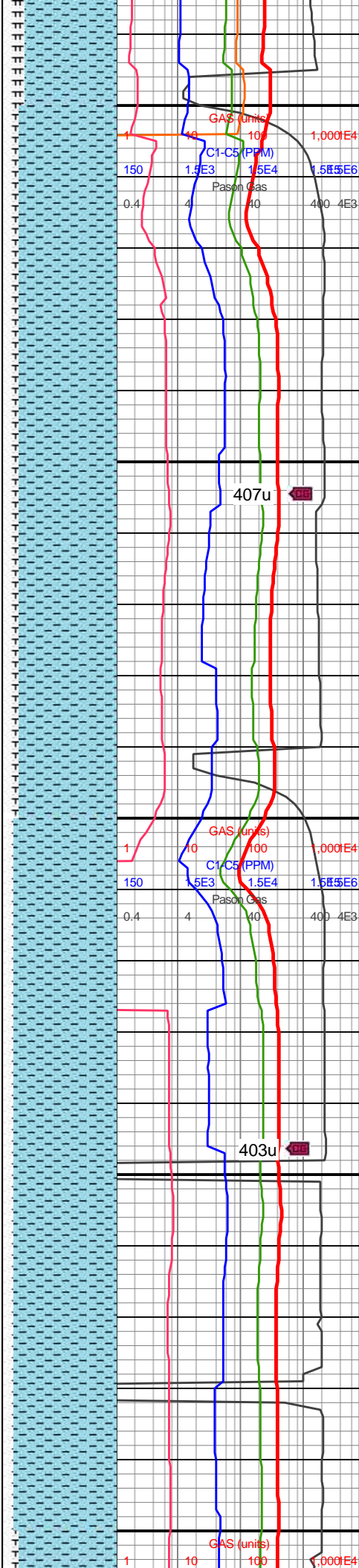
MD: 11,592'  
INC: 90.04°  
AZM: 1.8°  
TVD: 7,303.6'  
VS: 3,270.04'

WOB: 21.7klbs  
RPM: 60  
SPM: 186  
SPP: 5,167psi

MD: 11,687'  
INC: 90.04°  
AZM: 0.74°  
TVD: 7,303.53'  
VS: 3,364.91'

MD: 11,782'  
INC: 89.69°  
AZM: 359.69°  
TVD: 7,303.76'  
VS: 3,459.69'

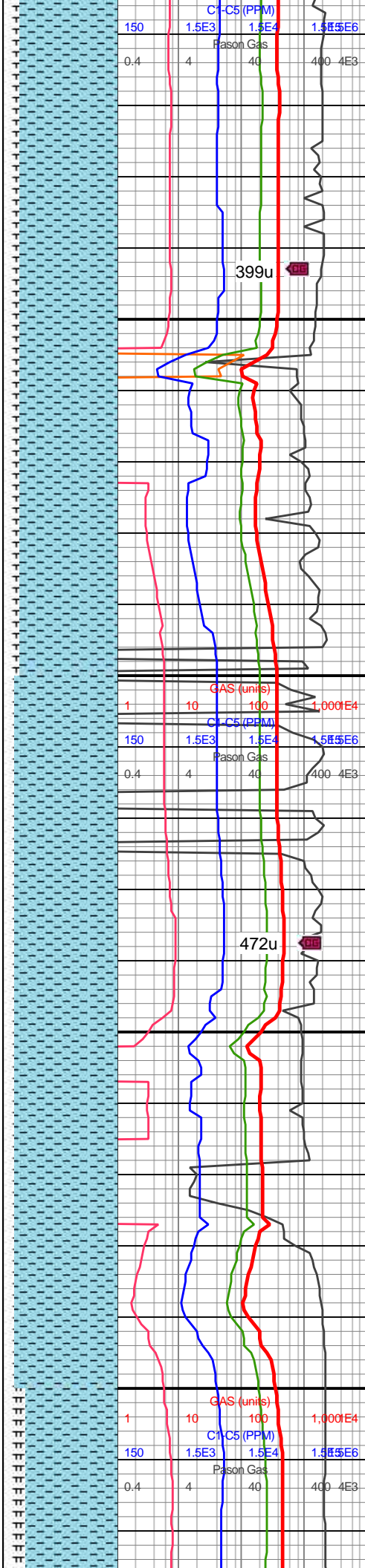
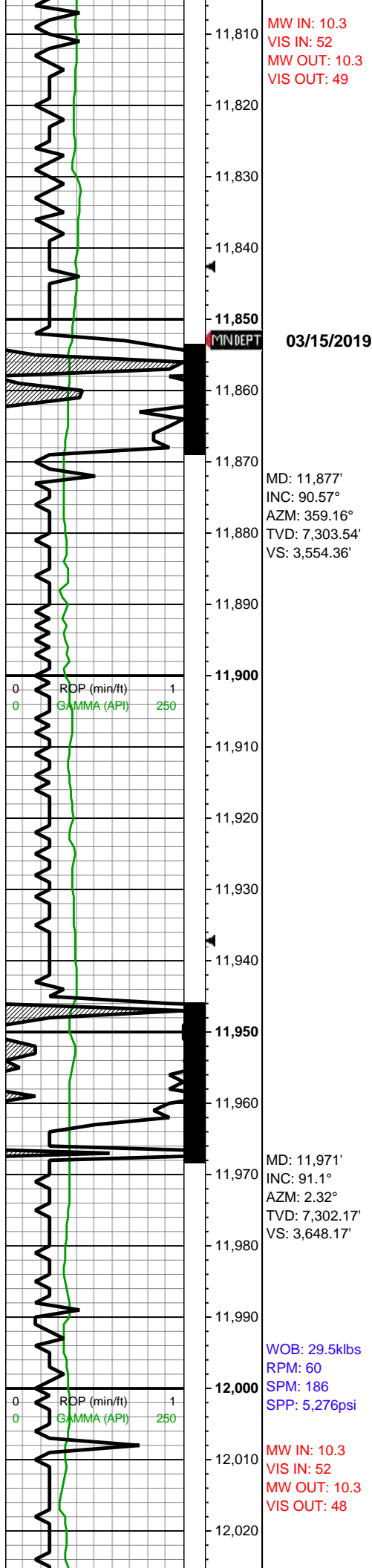
WOB: 27.1klbs  
RPM: 60  
SPM: 188  
SPP: 5,134psi



11600-11700 CHK  
(85%): lt gy, occ gyshbn,  
sb blkly-sb tab, frm-brit,  
MRLST intbds, sme imbd  
pyr specs, hi calc;  
MRLST (15%): dk gy, sb  
tab-sb blkly, frm-sl hrd,  
CHK intbds, mod calc, rr  
free pyr

11700-11800 CHK  
(90%): lt gy, sb blkly-sb  
tab, frm-brit, MRLST  
intbds, rr imbd pyr specs,  
hi calc; MRLST (10%): dk  
gy, sb tab-sb blkly, frm-sl  
hrd, CHK intbds, mod  
calc, rr fos

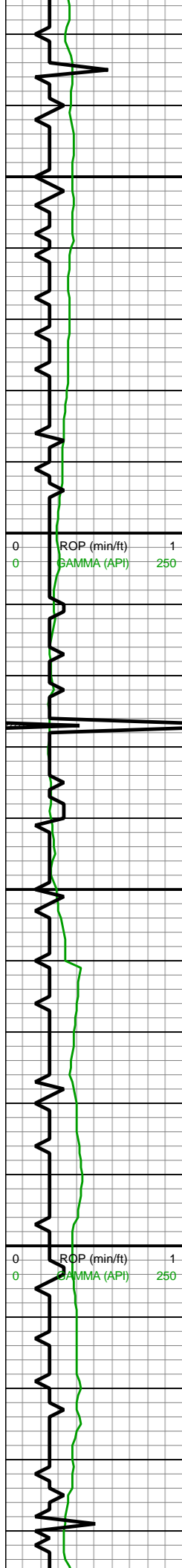




11800-11900 CHK  
(85%): lt gy-gyshbn, sb  
blky-sb tab, frm-brit,  
MRLST intbds, tr imbd  
pyr specs, tr imbd cal, hi  
calc; MRLST (15%): dk  
gy, sb tab-sb blky, frm-sl  
hrd, CHK intbds, mod  
calc, rr fos

11900-12000 CHK  
(90%): gyshbn, sb  
blky-sb tab, frm-brit,  
MRLST intbds, rr imbd  
pyr specs, rr imbd cal, hi  
calc; MRLST (10%): dk  
gy, sb tab-sb blky, frm-sl  
hrd, CHK intbds, mod  
calc, sme free pyr, sme  
free cal



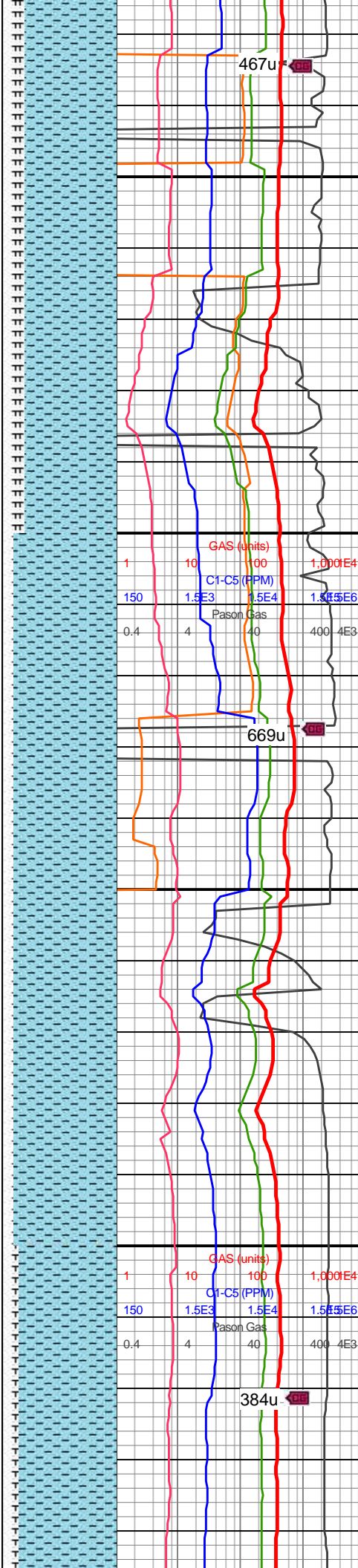


12,030  
12,040  
12,050  
12,060 MD: 12,066'  
INC: 91.36°  
AZM: 0.74°  
TVD: 7,300.13'  
VS: 3,743.04'  
12,070  
12,080  
12,090

6' DTS

12,100  
12,110  
12,120  
12,130  
12,140  
12,150 MD: 12,161'  
INC: 91.54°  
AZM: 0.92°  
TVD: 7,297.73'  
VS: 3,837.85'  
12,160  
12,170  
12,180  
12,190

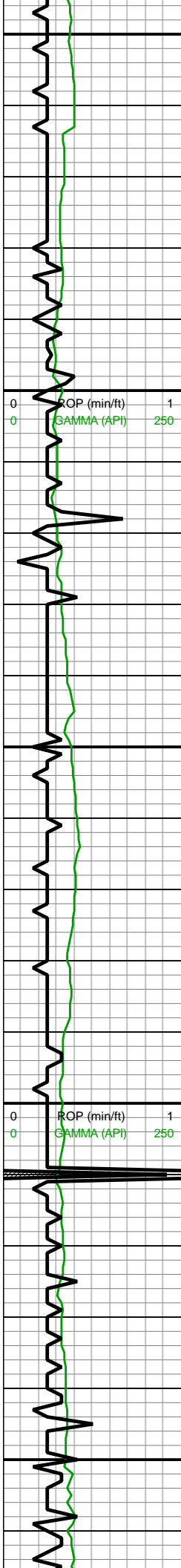
12,200 WOB: 34.6klbs  
RPM: 60  
SPM: 184  
SPP: 5,366psi  
12,210  
12,220  
12,230  
12,240



12000-12100 CHK  
(80%): gyshbn-med gy,  
sb blkyl-sb tab, frm-brit,  
MRLST intbds, tr imbd  
pyr specs, hi calc;  
MRLST (20%): dk gy, sb  
tab-sb blkyl, frm-sl hrd,  
CHK intbds, mod calc

12100-12200 CHK  
(90%): gyshbn-med gy,  
sb blkyl-sb tab, frm-brit,  
MRLST intbds, hi calc;  
MRLST (10%): dk gy, sb  
tab-sb blkyl, frm-sl hrd,  
CHK intbds, mod calc, tr  
free cal

12200-12300 CHK  
(85%): gyshbn-med gy,  
sb blkyl-sb tab, frm-brit



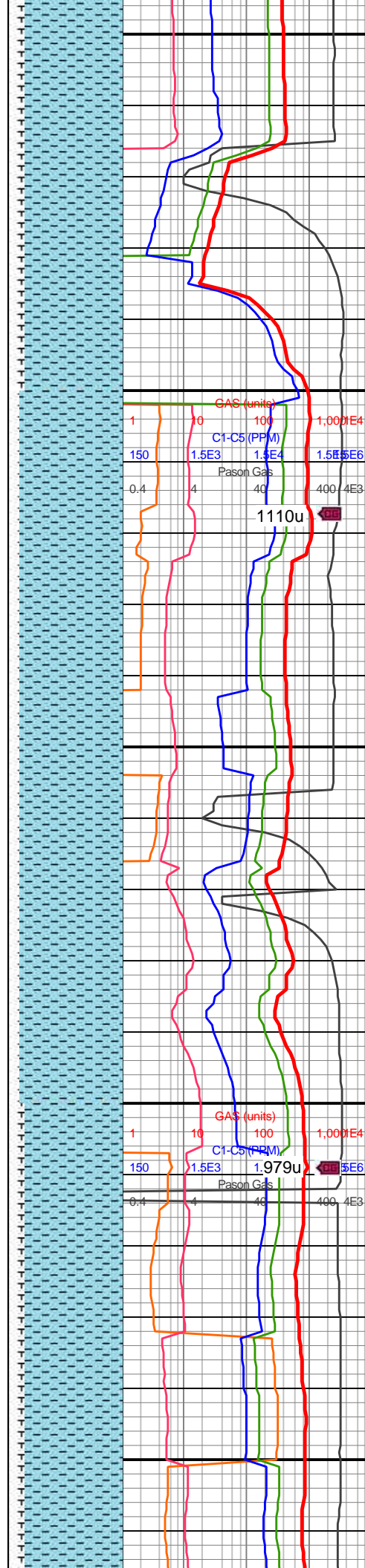
MD: 12,255'  
INC: 91.45°  
AZM: 0.21°  
TVD: 7,295.27'  
VS: 3,931.63'

MD: 12,350'  
INC: 91.8°  
AZM: 359.69°  
TVD: 7,292.58'  
VS: 4,026.34'

WOB: 34.1klbs  
RPM: 60  
SPM: 182  
SPP: 5,235psi

MW IN: 10.3  
VIS IN: 51  
MW OUT: 10.3  
VIS OUT: 47

MD: 12,444'  
INC: 92.07°  
AZM: 358.28°  
TVD: 7,289.41'  
VS: 4,119.89'

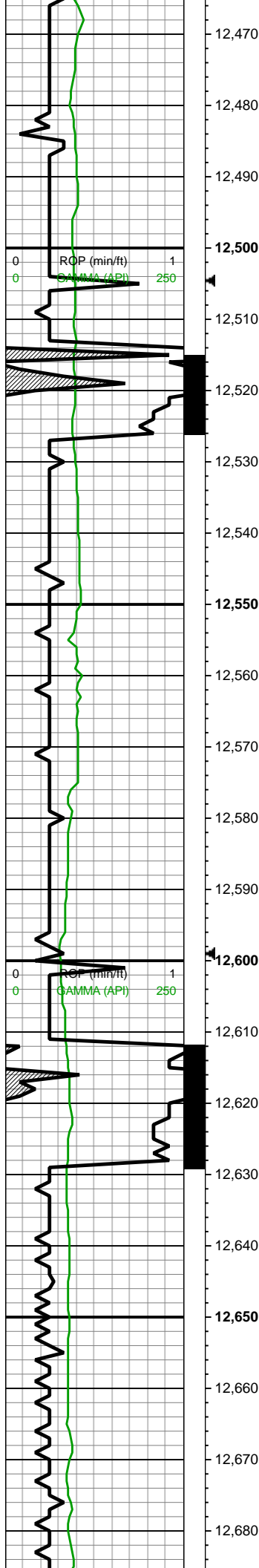


12250-12300 MRLST intbds, sme imbd cal, hi calc; MRLST (15%): dk gy, sb tab-sb blky, frm-sl hrd, CHK intbds, mod calc, tr fos

12300-12400 CHK (90%): gyshbn-med gy, sb blky-sb tab, frm-brit, MRLST intbds, tr imbd cal, hi calc; MRLST (10%): dk gy, sb tab-sb blky, frm-sl hrd, CHK intbds, mod calc, sme free cal, rr fos

12400-12500 CHK (85%): gyshbn-lt gy, sb blky-sb tab, frm-brit, MRLST intbds, sme imbd cal, hi calc; MRLST (15%): dk gy-med gy, sb tab-sb blky, frm-sl hrd, CHK intbds, mod calc



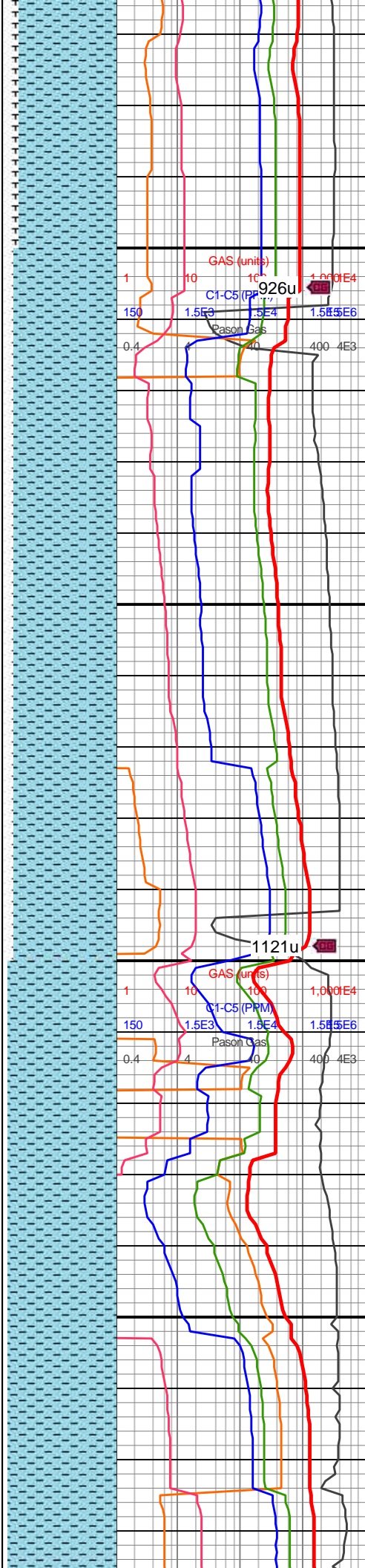


MD: 12,538'  
INC: 91.19°  
AZM: 359.51°  
TVD: 7,286.73'  
VS: 4,213.46'

MW IN: 10.3  
VIS IN: 50  
MW OUT: 10.3  
VIS OUT: 47

WOB: 34klbs  
RPM: 60  
SPM: 185  
SPP: 5,364psi

MD: 12,633'  
INC: 89.78°  
AZM: 1.27°  
TVD: 7,285.93'  
VS: 4,308.24'

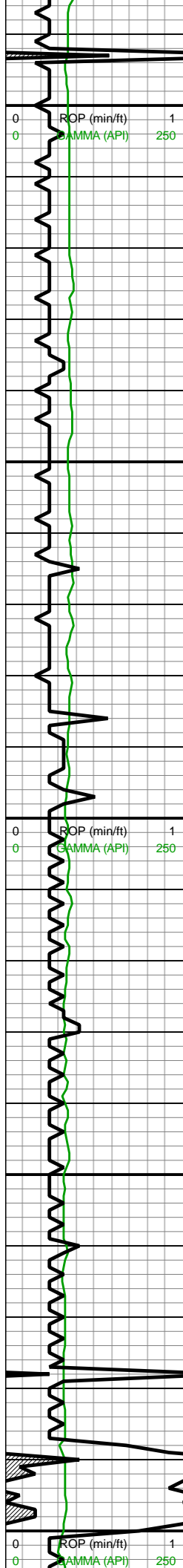


12500-12600 CHK  
(90%): predy med  
gy-gyshbn-lt gy, sb  
blky-sb tab, frm-brit,  
MRLST intbds, sme imbd  
cal, hi calc; MRLST  
(10%): dk gy, sb tab-sb  
blky, frm-sl hrd, CHK  
intbds, mod calc

12600-12700 CHK  
(95%): predy med gy-lt  
gy, sb blky-sb tab,  
frm-brit, MRLST intbds, hi  
calc; MRLST (5%): dk gy,  
sb tab-sb blky, frm-sl hrd,  
CHK intbds, mod calc,  
sme fos







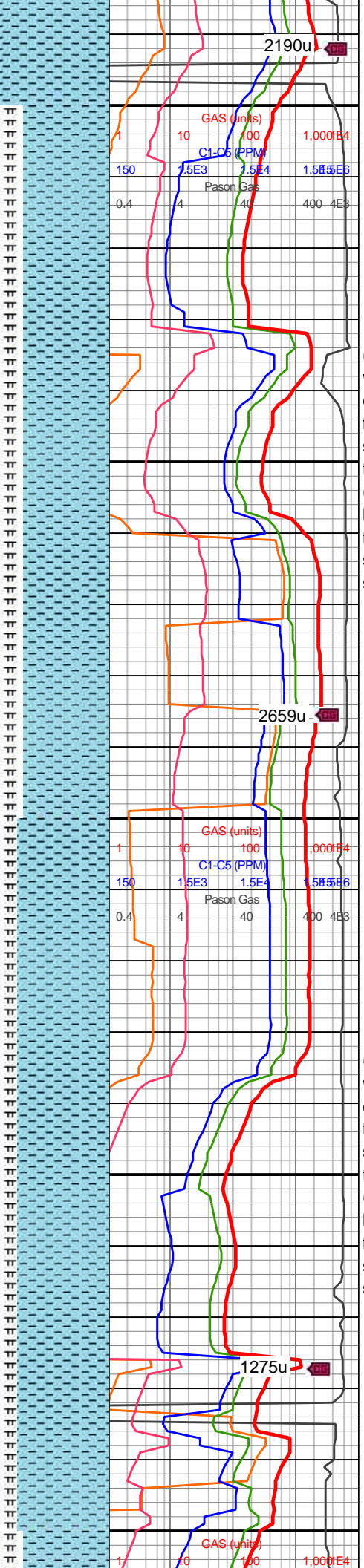
12,690  
12,700  
12,710  
12,720  
12,730  
12,740  
12,750  
12,760  
12,770  
12,780  
12,790  
12,800  
12,810  
12,820  
12,830  
12,840  
12,850  
12,860  
12,870  
12,880  
12,890  
12,900

MD: 12,727'  
INC: 89.34°  
AZM: 0.92°  
TVD: 7,286.65'  
VS: 4,402.1'

MW IN: 10.3+  
VIS IN: 49  
MW OUT: 10.3+  
VIS OUT: 51

WOB: 32.5klbs  
RPM: 60  
SPM: 186  
SPP: 5,263psi

MD: 12,821'  
INC: 89.16°  
AZM: 0.04°  
TVD: 7,287.88'  
VS: 4,495.9'

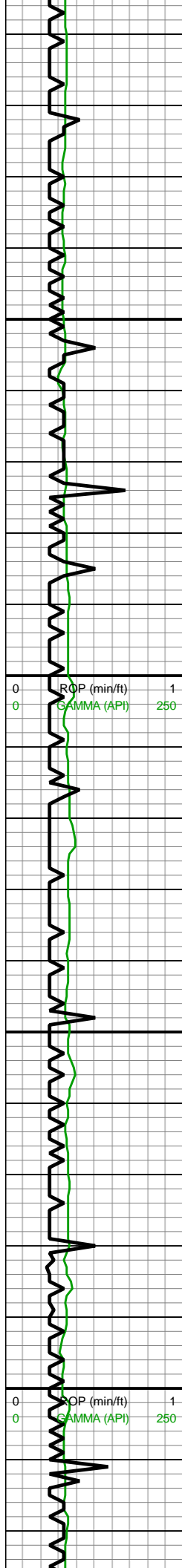


12700-12800 CHK  
(75%): gy-gyshbn ip wi f  
wh chky foram incl & thn  
chky lamn, frm, brit, mod  
fis sb blkly-sb plty ctngs,  
sm-sl slty tex, tr c forams,  
tr vf pyr, hi calc; MRLST  
(25%): dk gy-dk gyshbn,  
l-mod fis sb rd-sb blkly sb  
frm-frm ctngs wi sm-sl  
slty tex, tr tn bent wi pyrc  
strg ip, mod calc

12800-12900 CHK  
(80%): gy-gyshbn ip wi f  
wh chky foram incl & thn  
chky lamn, frm, brit, mod  
fis sb blkly-sb plty ctngs,  
sm-sl slty tex, tr c forams,  
tr vf pyr, hi calc; MRLST  
(20%): dk gy-dk gyshbn,  
l-mod fis sb rd-sb blkly sb  
frm-frm ctngs wi sm-sl  
slty tex, tr tn bent wi pyrc  
strg ip, mod calc







MD: 12,916'  
INC: 89.34°  
AZM: 2.15°  
TVD: 7,289.12'  
VS: 4,590.75'

MW IN: 10.3  
VIS IN: 50  
MW OUT: 10.3  
VIS OUT: 55

12,950

12,960

12,970

12,980

12,990

13,000

WOB: 34klbs  
RPM: 59  
SPM: 185  
SPP: 5,320psi

13,010

MD: 13,010'  
INC: 89.6°  
AZM: 1.27°  
TVD: 7,289.99'  
VS: 4,684.66'

13,030

13,040

13,050

13,060

13,070

13,080

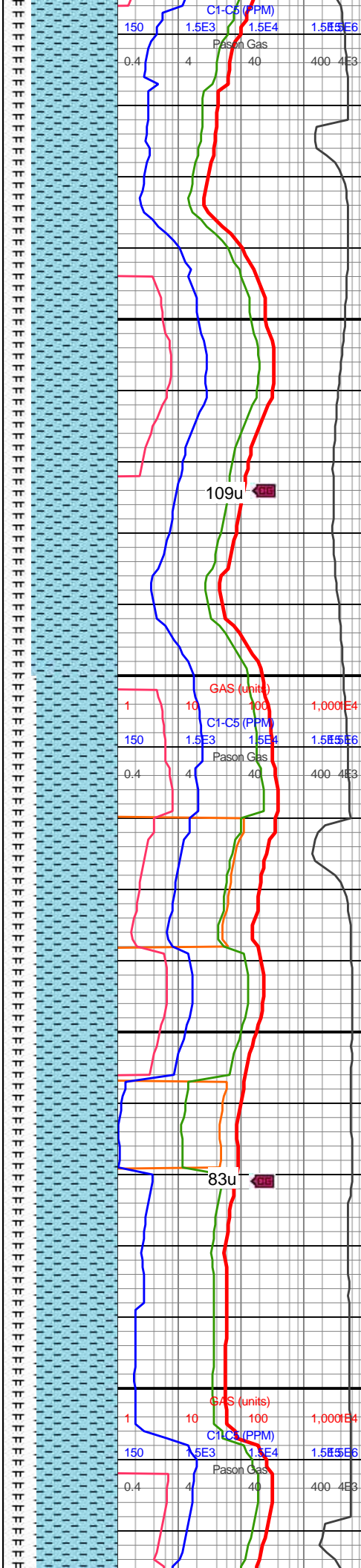
13,090

13,100

MD: 13,104'  
INC: 89.43°  
AZM: 0.74°  
TVD: 7,290.79'  
VS: 4,778.51'

13,110

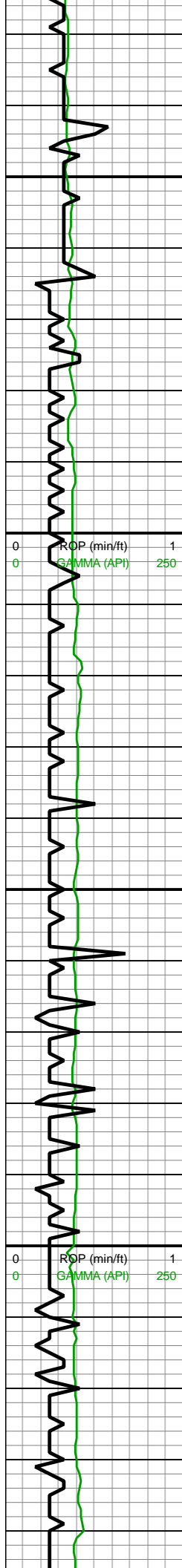
13,120



12900-13000 CHK  
(75%): lt gy-med gy,  
gyshbn ip, f-elong wh  
chky foram incl & thn chky  
lamn thru, frm-brit l-mod  
fis sb rd-sb blkly ctngs,  
sm-sl slty tex, tr vf pyr, hi  
calc; MRLST (25%): dk  
gy-dk gyshbn, l-mod fis  
sb rd-sb blkly sb frm-frm  
ctngs wi sm-sl slty tex,  
mod calc wi brn mrly  
resdl

13000-13100 CHK  
(70%): lt gy-med gy,  
gyshbn ip, frm-brit, sb  
rd-sb blkly l-mod fis ctngs  
wi sm-sl slty tex, f-elong  
wh chky foram incl & thn  
chky lamn ip, tr vf pyr, hi  
calc; MRLST (30%): dk  
gy-dk gyshbn, l-mod fis  
sb rd-sb blkly sb frm-frm  
ctngs wi sm-sl slty tex,  
mod calc





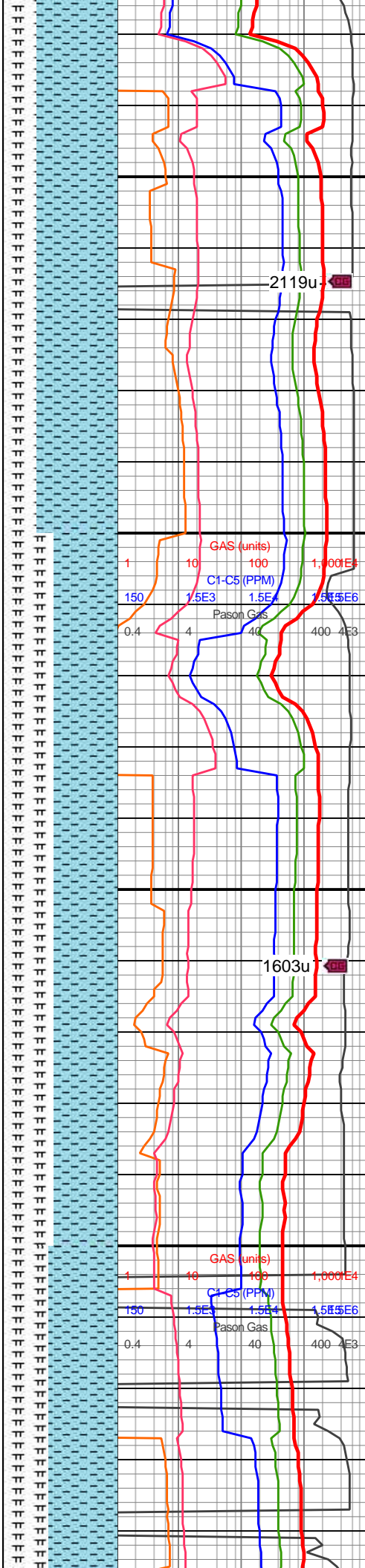
13,130  
13,140  
13,150  
13,160  
13,170  
13,180  
13,190  
13,200  
13,210  
13,220  
13,230  
13,240  
13,250  
13,260  
13,270  
13,280  
13,290  
13,300  
13,310  
13,320  
13,330  
13,340

MD: 13,198'  
INC: 89.96°  
AZM: 0.21°  
TVD: 7,291.29'  
VS: 4,872.31'

WOB: 33klbs  
RPM: 60  
SPM: 185  
SPP: 5,430psi

MW IN: 10.5  
VIS IN: 48  
MW OUT: 10.55  
VIS OUT: 50

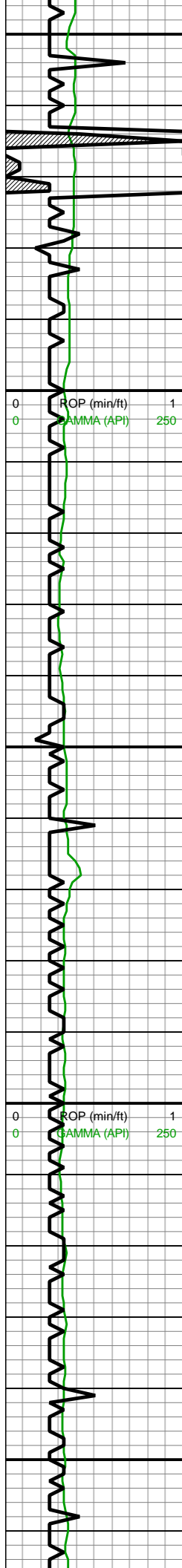
MD: 13,293'  
INC: 89.87°  
AZM: 358.81°  
TVD: 7,291.43'  
VS: 4,966.99'



13100-13200 CHK  
(70%): lt gy-med gy,  
gyshbn ip, f-elong wh  
chky foram incl & thn chky  
lamn thru, frm-brit l-mod  
fis sb rd-sb blkly ctngs,  
sm-sl slty tex, tr vf pyr, hi  
calc; MRLST (30%): dk  
gy-dk gyshbn, l-mod fis  
sb rd-sb blkly sb frm-frm  
ctngs wi sm-sl slty tex,  
mod calc wi brn mrly  
resdl

13200-13300 CHK  
(55%): predy med  
gy-gyshbn wi f wh chky  
incl & lamn, rr lt gy ip,  
frm-brit, sb rd-sb blkly  
l-mod fis ctngs wi sm-sl  
slty tex, f-c-elong wh chky  
foram incl, tr vf pyr, hi  
calc; MRLST (45%): dk  
gy-dk gyshbn, l-mod fis  
sb rd-sb blkly sb frm-frm  
ctngs wi sm-sl slty tex,  
mod calc wi brn mrly  
resdl

13300-13400 CHK  
(60%): predy med gy, lt  
gy-gyshbn ip, frm-brit  
l-mod fis sb rd-sb blkly  
ctngs wi f wh chky incl &  
thn chky lamn thru, frm-brit



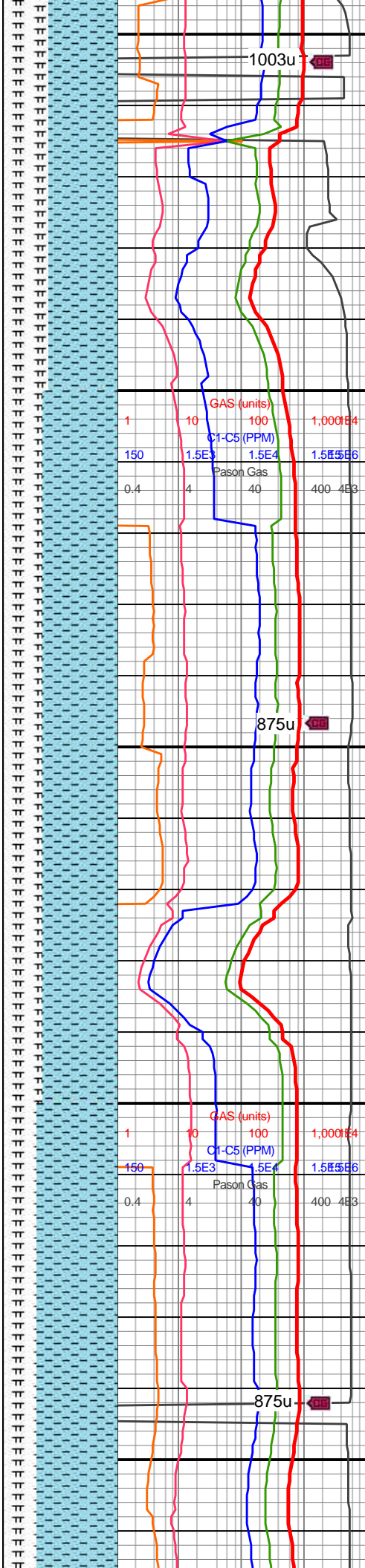
MW IN: 10.5  
VIS IN: 49  
MW OUT: 10.5  
VIS OUT: 48

MD: 13,387'  
INC: 89.96°  
AZM: 0.92°  
TVD: 7,291.57'  
VS: 5,060.72'

WOB: 30klbs  
RPM: 59  
SPM: 180  
SPP: 5,230psi

MD: 13,481'  
INC: 90.13°  
AZM: 359.69°  
TVD: 7,291.5'  
VS: 5,154.51'

MW IN: 10.5  
VIS IN: 46  
MW OUT: 10.5  
VIS OUT: 51

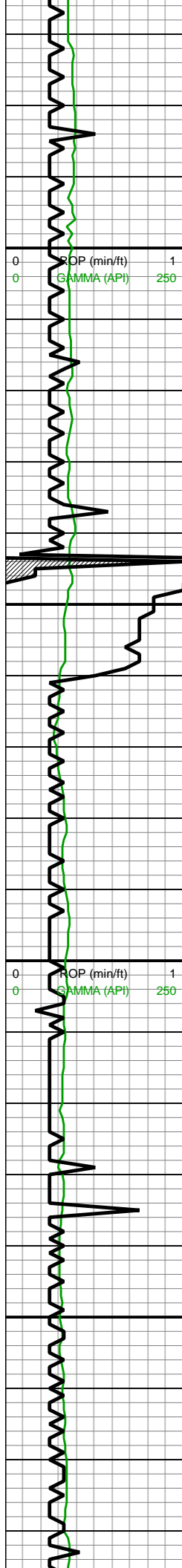


tnn chky lamn thru, sm-sl  
silty tex, rr-occ f-c-elong  
forams, tr cal, tr vf pyr, hi  
calc; MRLST (40%): dk  
gy-dk gyshbn, l-mod fis  
sb rd-sb blkly sb frm-frm  
ctngs wi sm-sl silty tex,  
mod calc wi brn mrly  
resdl

13400-13500 CHK  
(65%): lt gy-med gy,  
frm-brit, sb rd-sb blkly  
l-mod fis ctngs wi sm-sl  
silty tex, f-c-elong wh chky  
foram incl, tr vf pyr, hi  
calc; MRLST (35%): dk  
gy-dk gyshbn, l-mod fis  
sb rd-sb blkly sb frm-frm  
ctngs wi sm-sl silty tex, tr  
tn bent, mod calc wi brn  
mrly resdl

13500-13600 CHK  
(70%): lt gy-gy sp wi com  
f foram incl, frm-brit  
l-mod fis sb rd-sb blkly  
ctngs, thn chky lamn ip,  
sm-sl silty tex, rr-occ sp  
forams, tr vf pyr, hi calc;  
MRLST (30%): dk gy sp  
wi d brn marl incl, l-mod  
fis sb rd-sb blkly sb  
frm-frm ctngs wi sm-sl  
silty tex, mod calc wi brn  
mrly resdl





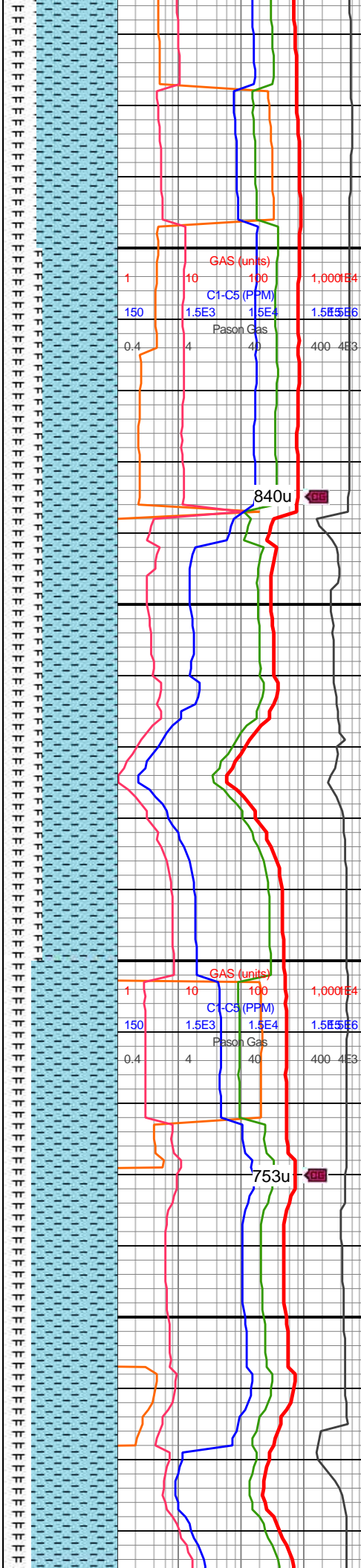
MD: 13,576'  
INC: 90.22°  
AZM: 358.98°  
TVD: 7,291.21'  
VS: 5,249.17'

WOB: 33klbs  
RPM: 60  
SPM: 178  
SPP: 5,230psi

MD: 13,671'  
INC: 90.22°  
AZM: 1.44°  
TVD: 7,290.84'  
VS: 5,343.93'

MW IN: 10.5  
VIS IN: 46  
MW OUT: 10.5  
VIS OUT: 50

MD: 13,765'  
INC: 90.22°  
AZM: 0.74°  
TVD: 7,290.48'  
VS: 5,437.8'

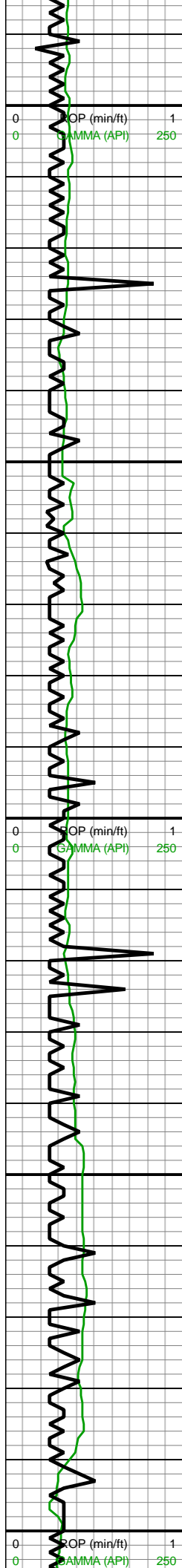


sity tex, mod calc wi brn  
mrly resdl

13600-13700 CHK  
(65%): lt gy-med gy,  
frm-brit, sb rd-sb blk  
l-mod fis ctngs wi sm-sl  
silty tex, f-c-elong wh chky  
foram incl, tr vf pyr, hi  
calc; MRLST (35%): dk  
gy-dk gyshbn sp wi brn  
marl, l-mod fis sb rd-sb  
blk sb frm-frn ctngs wi  
sm-sl silty tex, tr tn bent,  
mod calc wi brn mrly  
resdl

13700-13800 CHK  
(75%): lt gy-med gy,  
gyshbn ip, com thn chky  
lamn & foram incl,  
frm-brit l-mod fis sb rd-sb  
blk ctngs, sm-sl silty tex,  
rr-tr acic fos frags, tr vf  
pyr, hi calc; MRLST  
(25%): dk gy-dk gyshbn,  
l-mod fis sb rd-sb blk sb  
frm-frn ctngs wi sm-sl  
silty tex, tr tn bent, mod  
calc wi brn mrly resdl





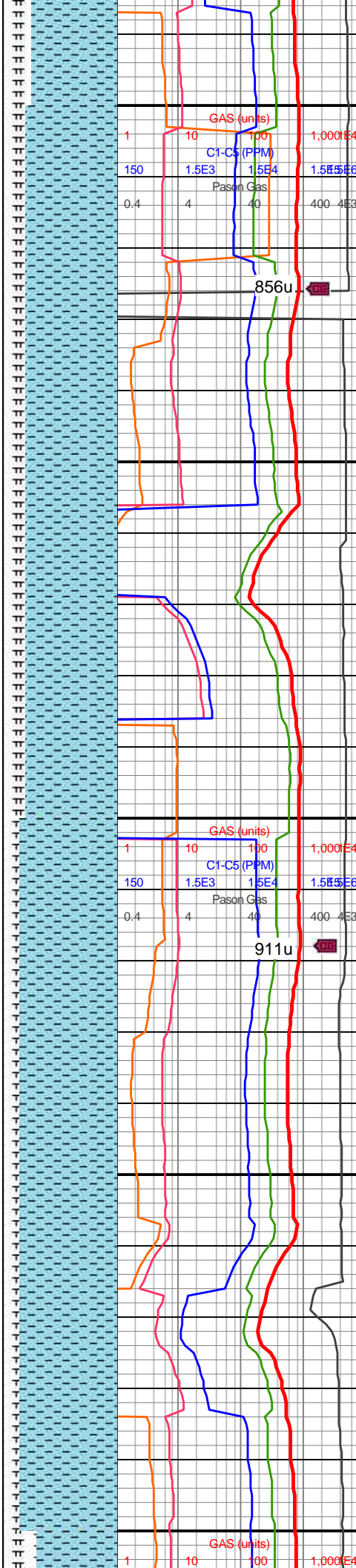
WOB: 32klbs  
RPM: 60  
SPM: 181  
SPP: 5,300psi

MW IN: 10.5  
VIS IN: 46  
MW OUT: 10.45  
VIS OUT: 46

MD: 13,860'  
INC: 90.66°  
AZM: 359.86°  
TVD: 7,289.75'  
VS: 5,532.58'

MD: 13,955'  
INC: 90.84°  
AZM: 359.86°  
TVD: 7,288.51'  
VS: 5,627.3'

WOB: 33klbs  
RPM: 60  
SPM: 181  
SPP: 5,090psi

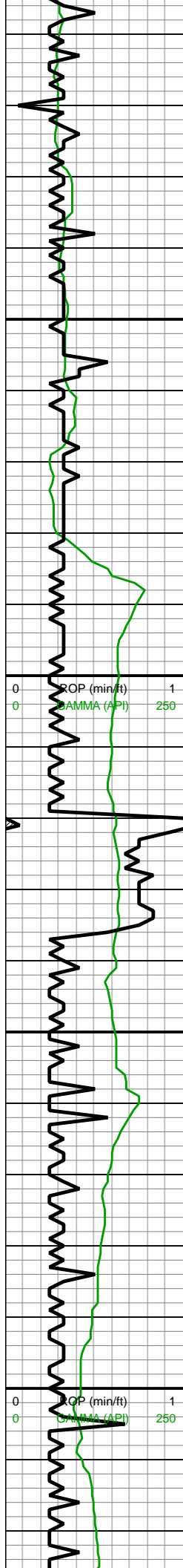


856u

911u

13800-13900 CHK  
(80%): predy med gy, lt gy  
ip wi f wh chky incl,  
frm-brit, mod fis sb  
blky-blky ctngs, sl slty tex,  
occ-com forams, rr acic  
cal/fos frags, tr vf pyr, hi  
calc; MRLST (20%): dk  
gy-dk gyshbn, l-mod fis  
sb rd-sb blky sb frm-frm  
ctngs wi sm-sl slty tex, rr  
tn bent, mod calc wi brn  
mrly resdl

13900-14000 CHK  
(85%): lt gy, sb blky-sb  
rnd, frm-brit, MRLST  
intbds, sme imbd cal, hi  
calc; MRLST (15%): med  
gy, sb tab-sb blky, frm-sl  
hrd, CHK intbds, mod  
calc, rr fos, rr free cal



14,010  
14,020  
14,030  
14,040  
14,050  
14,060  
14,070  
14,080  
14,090  
14,100  
14,110  
14,120  
14,130  
14,140  
14,150  
14,160  
14,170  
14,180  
14,190  
14,200  
14,210  
14,220

MW IN: 10.45  
VIS IN: 46  
MW OUT: 10.45  
VIS OUT: 46

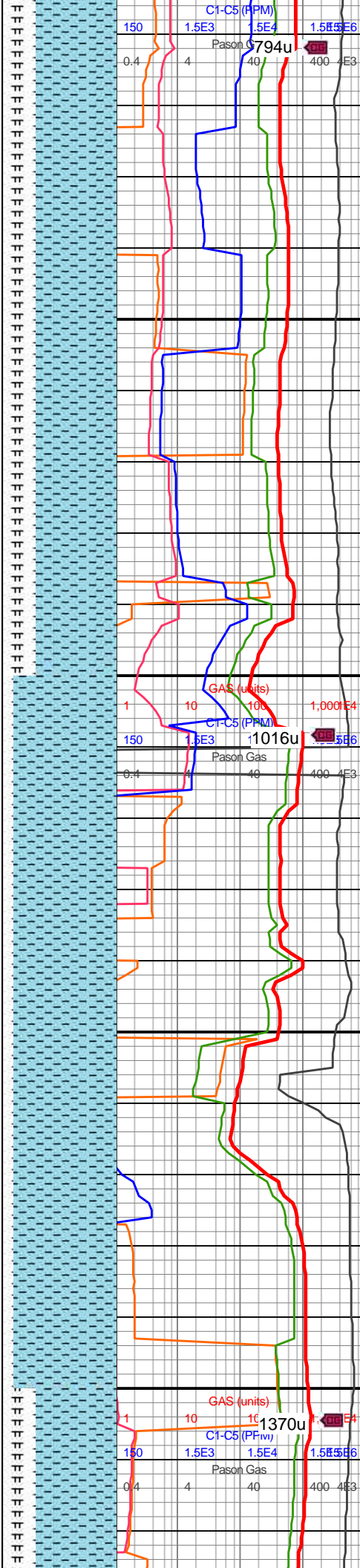
MD: 14,049'  
INC: 91.36°  
AZM: 359.34°  
TVD: 7,286.7'  
VS: 5,720.98'

38' DTN  
Fault to A Chalk

MD: 14,143'  
INC: 89.25°  
AZM: 359.86°  
TVD: 7,286.2'  
VS: 5,814.68'

MW IN: 10.5  
VIS IN: 48  
MW OUT: 10.45  
VIS OUT: 49

WOB: 33klbs  
RPM: 60  
SPM: 179  
SPP: 5,140psi

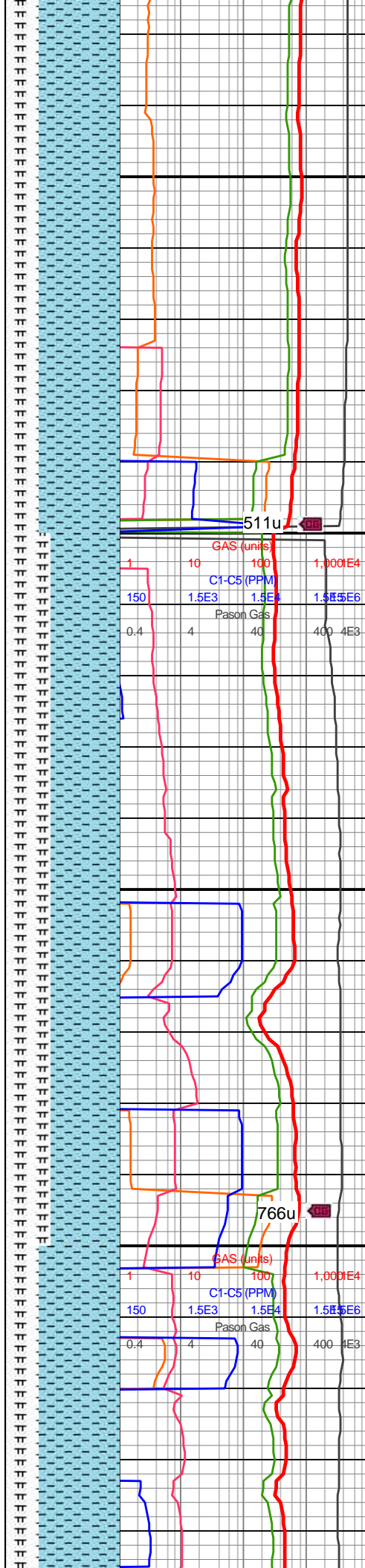
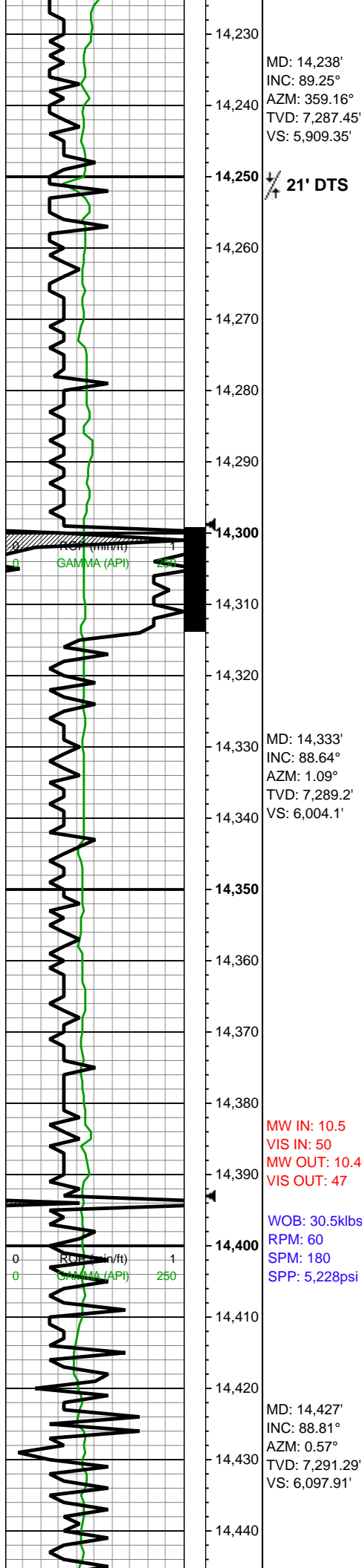


14000-14100 CHK  
(70%): lt gy-gyshbn, sb  
blky-sb rnd, frm-brit,  
MRLST intbds, sme imbd  
cal, hi calc; MRLST  
(30%): med gy-dk gy, sb  
tab-sb blky, frm-sl hrd,  
CHK intbds, mod calc, rr  
free cal

14100-14200 CHK  
(90%): lt gy, sb blky-sb  
rnd-sb tab, frm-brit,  
MRLST intbds, tr imbd  
cal, sme pyr specs, hi  
calc; MRLST (10%): med  
gy, sb tab-sb blky, frm-sl  
hrd, CHK intbds, mod  
calc, rr free cal



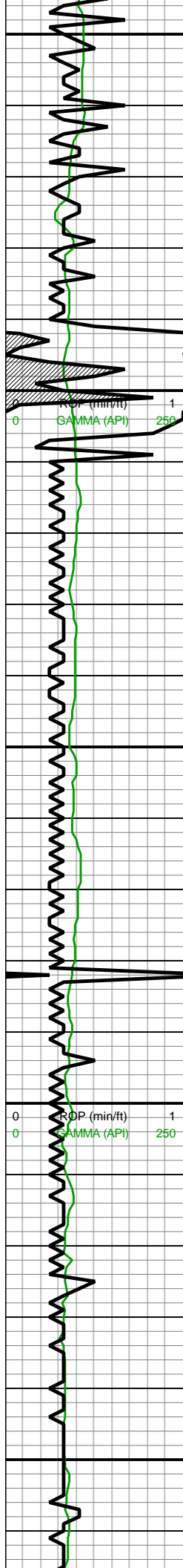




14200-14300 CHK  
(70%): med gy-lt gy, sb  
blky-sb tab, frm-brit,  
MRLST intbds, rr imbd  
cal, hi calc; MRLST  
(30%): dk gy, sb tab-sb  
blky, frm-sl hrd, CHK  
intbds, mod calc, rr free  
cal

14300-14400 CHK  
(60%): med gy, sb  
blky-sb tab, frm-brit,  
MRLST intbds, v rr imbd  
cal, hi calc; MRLST  
(40%): dk gy-med gy, sb  
tab-sb blky, frm-sl hrd,  
CHK intbds, mod calc

14400-14500 CHK  
(70%): lt gy-med gy, sb  
blky-sb tab, frm-brit,



14,450  
14,460  
14,470  
14,480  
14,490  
14,500  
14,510  
14,520  
14,530  
14,540  
14,550  
14,560  
14,570  
14,580  
14,590  
14,600  
14,610  
14,620  
14,630  
14,640  
14,650  
14,660

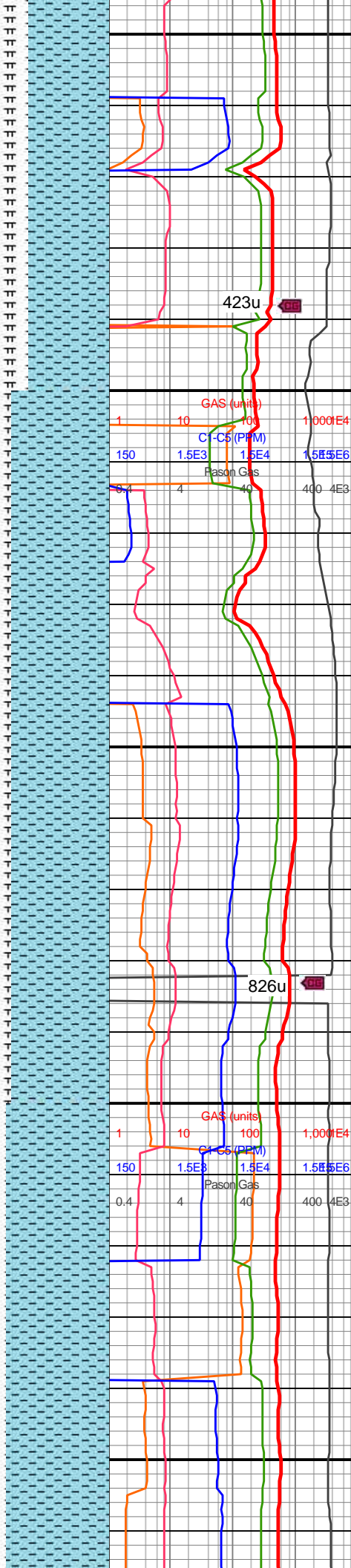
MW IN: 10.5  
VIS IN: 51  
MW OUT: 10.5  
VIS OUT: 48

MD: 14,521'  
INC: 89.34°  
AZM: 1.62°  
TVD: 7,292.8'  
VS: 6,191.76'

MW IN: 10.5  
VIS IN: 51  
MW OUT: 10.5  
VIS OUT: 48

WOB: 34.8klbs  
RPM: 60  
SPM: 182  
SPP: 5,539psi

MD: 14,615'  
INC: 89.6°  
AZM: 0.21°  
TVD: 7,293.67'  
VS: 6,285.61'



423u

GAS (units)  
CY-C5 (PPM)  
Pason Gas

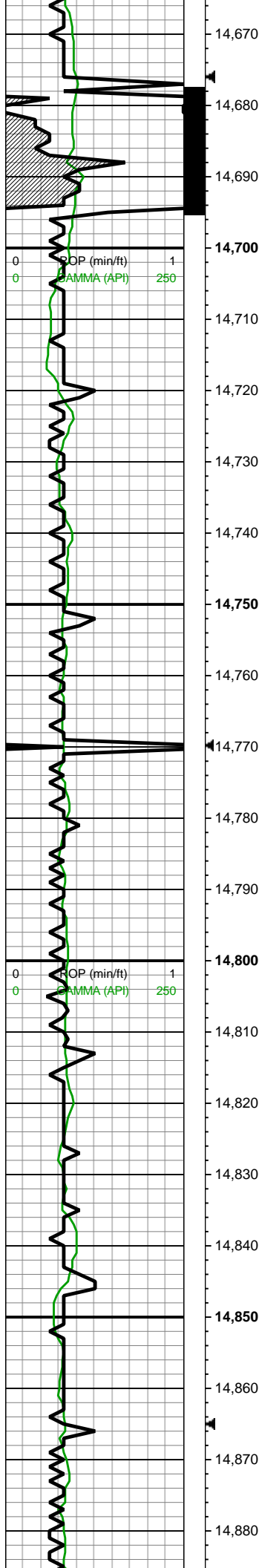
826u

GAS (units)  
CY-C5 (PPM)  
Pason Gas

MRLST intbds, rr pp pyr,  
hi calc; MRLST (30%): dk  
gy-med gy, sb tab-sb  
blky, frm-sl hrd, CHK  
intbds, mod calc

14500-14600 CHK  
(85%): lt gy-med gy, sb  
blky-sb tab, frm-brit,  
MRLST intbds, hi calc;  
MRLST (15%): dk gy-med  
gy, sb tab-sb blky, frm-sl  
hrd, CHK intbds, mod  
calc

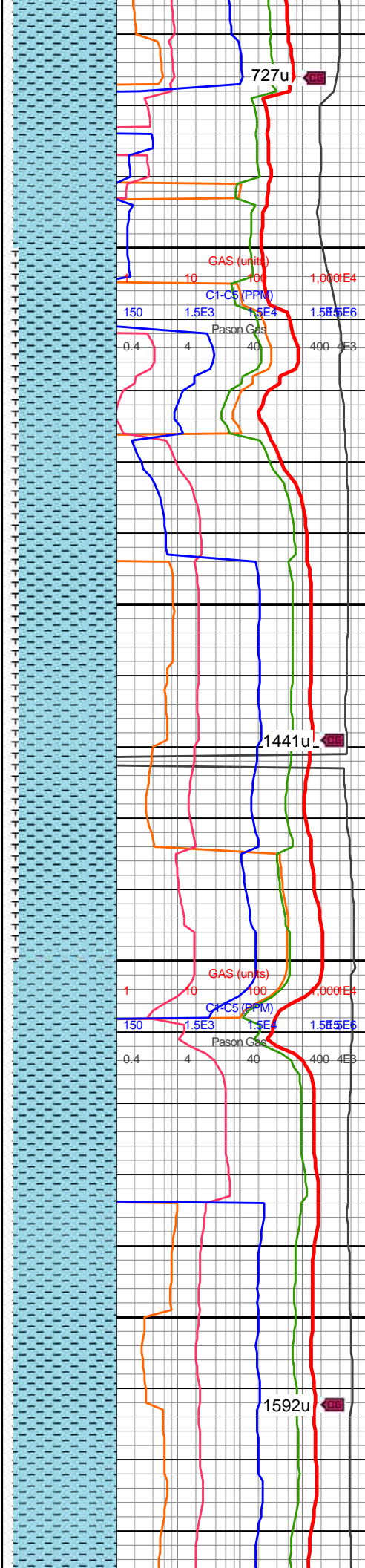
14600-14700 CHK  
(90%): med gy, sb  
blky-sb tab, frm-brit,  
MRLST intbds, hi calc;  
MRLST (10%): dk gy, sb  
tab-sb blky, frm-sl hrd,  
CHK intbds, mod calc,  
occ free cal, occ BENT



MD: 14,710'  
INC: 89.52°  
AZM: 3.2°  
TVD: 7,294.4'  
VS: 6,380.51'

WOB: 33.5klbs  
RPM: 60  
SPM: 180  
SPP: 5,428psi

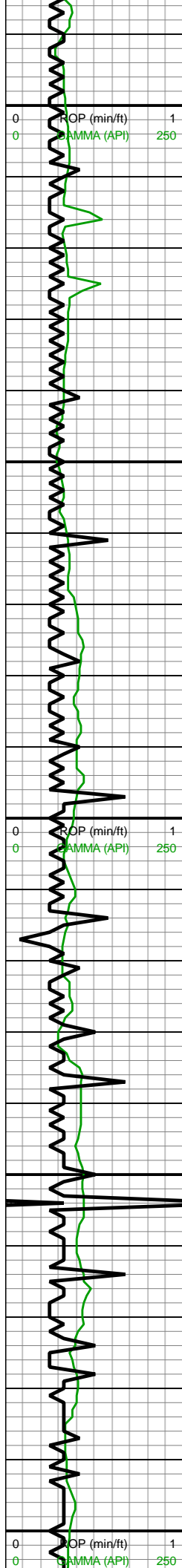
MD: 14,805'  
INC: 89.6°  
AZM: 2.15°  
TVD: 7,295.13'  
VS: 6,475.47'



14700-14800 CHK  
(85%): med gy-lt gy, sb  
blky-sb tab, frm-brit,  
MRLST intbds, hi calc;  
MRLST (15%): predy dk  
gy-med gy, sb tab-sb  
blky, frm-sl hrd, CHK  
intbds, mod calc, occ  
BENT

14800-14900 CHK  
(90%): dk gy-med gy-tr lt  
gy, sb blky-sb tab,  
frm-brit, MRLST intbds, hi  
calc; MRLST (10%):  
predy dk gy-med gy, sb  
tab-sb blky, frm-sl hrd,  
CHK intbds, mod calc,  
sme cal, tr fos, rr free pyr





MD: 14,898'  
INC: 90.4°  
AZM: 0.92°  
TVD: 7,295.13'  
VS: 6,568.37'

MW IN: 10.5  
VIS IN: 52  
MW OUT: 10.5  
VIS OUT: 48

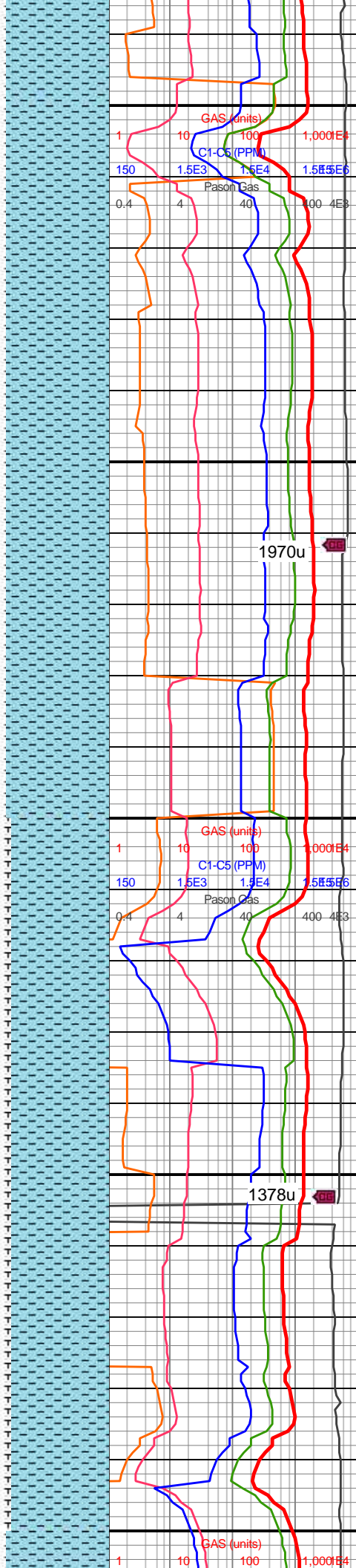
MD: 14,993'  
INC: 90.84°  
AZM: 1.44°  
TVD: 7,294.11'  
VS: 6,663.23'

WOB: 29klbs  
RPM: 60  
SPM: 178  
SPP: 5,294psi

26' DTS

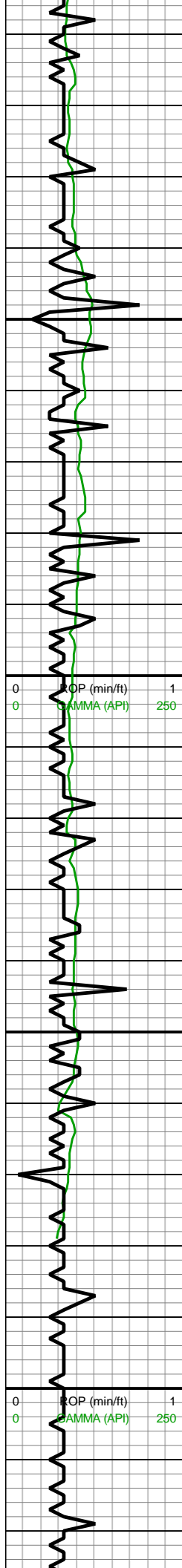
MIN DEPT 03/16/2019

MD: 15,087'  
INC: 91.54°  
AZM: 0.57°  
TVD: 7,292.15'  
VS: 6,757.07'



14900-15000 CHK  
(90%): lt gy-med gy, sb  
blky-sb tab, frm-brit,  
MRLST intbds, hi calc;  
MRLST (10%): predy dk  
gy-med gy, sb tab-sb  
blky, frm-sl hrd, CHK  
intbds, mod calc, tr cal, rr  
fos

15000-15100 CHK  
(85%): lt gy-med gy, sb  
blky-sb tab, frm-brit,  
MRLST intbds, hi calc;  
MRLST (15%): predy dk  
gy-med gy, sb tab-sb  
blky, frm-sl hrd, CHK  
intbds, mod calc



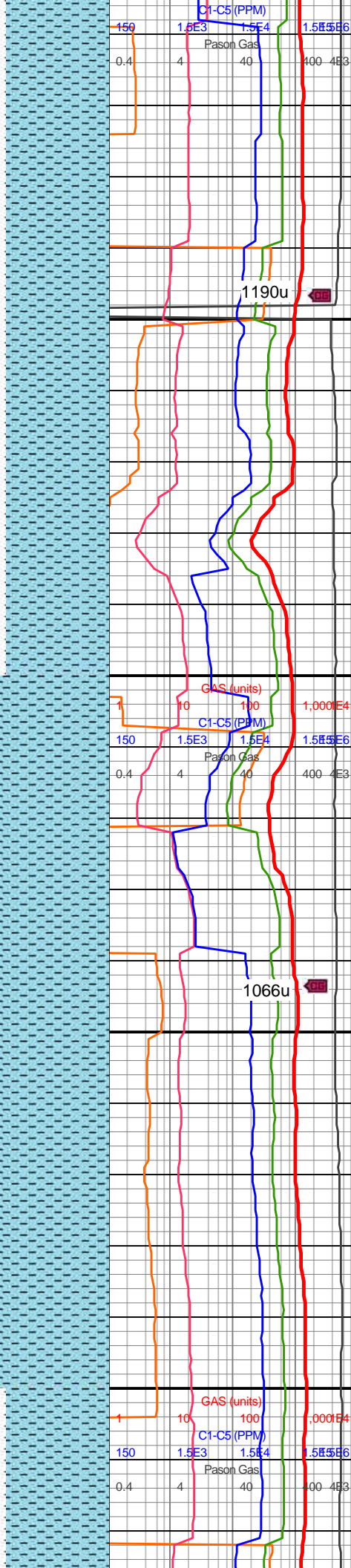
15,110  
15,120  
15,130  
15,140  
15,150  
15,160  
15,170  
15,180  
15,190  
15,200  
15,210  
15,220  
15,230  
15,240  
15,250  
15,260  
15,270  
15,280  
15,290  
15,300  
15,310  
15,320

MD: 15,182'  
INC: 91.89°  
AZM: 359.51°  
TVD: 7,289.31'  
VS: 6,851.78'

WOB: 34.7klbs  
RPM: 60  
SPM: 175  
SPP: 5,438psi

MD: 15,282'  
INC: 92.24°  
AZM: 359.86°  
TVD: 7,285.71'  
VS: 6,951.41'

MW IN: 10.5  
VIS IN: 52  
MW OUT: 10.5  
VIS OUT: 47

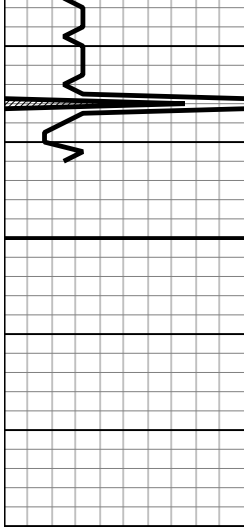


15100-15200 CHK  
(90%): med gy-lt gy, sb  
blky-sb tab, frm-brit,  
MRLST intbds, hi calc;  
MRLST (10%): dk gy, sb  
tab-sb blky, frm-sl hrd,  
CHK intbds, mod calc

15200-15300 CHK  
(95%): lt gy-gyshbn, sb  
blky-sb tab, frm-brit,  
MRLST intbds, tr pp pyr,  
hi calc; MRLST (5%): dk  
med gy-dk gy, sb tab-sb  
blky, frm-sl hrd, CHK  
intbds, mod calc

15300-15342 CHK  
(90%): lt gy, sb blky-sb  
tab, frm-brit, MRLST  
intbds, tr pp pyr, hi calc;  
MRLST (10%): dk med  
gy, sb tab-sb blky, frm-sl

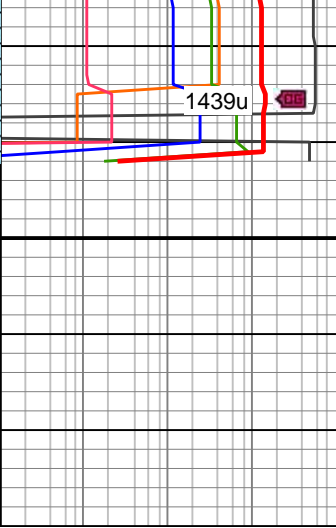
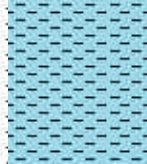




15,330  
15,340  
15,350  
15,360  
15,370  
15,380

**Projection to Bit**  
MD: 15,342'  
INC: 92.24°  
AZM: 359.86°  
TVD: 7,283.36'  
VS: 7,011.19'

**Total Depth of  
15,342' MD  
Reached on  
03/16/2019 @  
02:00 MST**



gy, SD tab-SD Biry, mm-S  
hrd, CHK intbds, mod  
calc

