



Scale: 5" / 100'  
Measured Depth Log

**Well Name** Kugel 1J-18H-H267

**Location** Sec. 18 T2N R67W

**State** Colorado

**County** Weld

**Country** USA

**Rig Number** Ensign 153

**API Number** 05-123-49483

**AFE #** 16192096

**Geographic Region** Rockies

**Field** Wattenberg

**Spud Date** 7/19/2019

**Drilling Completed** 7/22/2019

**Surface Coordinates** Lat/Long (NAD83): 40.139578/-104.926457

SHL: Sec 18 T2N R67W  
Footage: 2208 FNL 682 FEL

**Bottom Hole Coordinates** Proposed BHL: Sec 7 T2N R67W  
Footage: 10 FNL 610 FEL

**Ground Elevation** 4,953'

**K.B. Elevation** 4,976'

**Logged Interval** 6,550' **To** 15,252'

**Total Depth** 15,252'

**Formation** Niobrara C Chalk

**Type of Drilling Fluid** Synthetic Oil Based Mud (Neoflo Base Oil)

## Operator

**Company** Crestone Peak Resources

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



**CRESTONE PEAK**  
RESOURCES

Geologist

Color Coding

## Geologist

**Name** John Ready

**Company** Crestone Peak Resources

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



## Color Coding

Oil	Condensate	Gas
Note	Core	Pressure
Error	Water	Seal

## Other

**Loggers:** Nicholas Watkins, Thomas Yull

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

**Equipment:** ML-558

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

**Service Start Date:** 7/19/2019

**Service End Date:** 7/24/2019

**Job #** 2347RK1907

**Release Date:** 7/24/2019

## Rock Types

UNKNOWN	CHERT	SILTSTONE	IGNEOUS
ANHYDRITE	COAL	SANDSTONE	METAMORPHIC
GYPSUM	MARLSTONE	CONGLOMERATE	CEMENT
SALT	CHALK	BRECCIA	No Sample
SIDERITE or LIMONITE	SHALE	TILL	
LIMESTONE	SHALE GRAY	BENTONITE	
DOLOMITE	SHALE COLORED	TUFF	

## Accessories

### Fossils

ALGAE
AMPHIPORA
BELEMNITE
BIOCLASTIC
BRACHIOPOD
BRYOZOA
CEPHALOPOD
CORAL

### Fossil

GASTROPOD
OOLITE
OSTRACOD
PELECYPOD
PELLET
PISOLITE
PLANT REMAINS
PLANT SPORES
SCAPHOPOD

### ARGILLACEOUS

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

### GLAUCONITE

GYPSIFEROUS
HEAVY MINERAL
KAOLIN
MARLSTONE
MINERAL CRYSTALS
NODULES
PHOSPHATE PELLETS
PYRITE
SALT CAST

### Stringer

ANHYDRITE STRINGER
BENTONITE STRINGER
COAL STRINGER
DOLOMITE STRINGER
GYPSUM STRINGER
LIMESTONE STRINGER
MARLSTONE (CALC) STRG
MARLSTONE (DOL) STRG

⊗ CRINOID  
♥ ECHINOID  
🐟 FISH  
🔍 FORAMINIFERA

▮ STROMATOPOROID  
**Minerals**  
// ANHYDRITIC

⚡ DOLOMITIC  
+ FELDSPAR  
● FERRUGINOUS PELLET  
🔍 FERRUGINOUS

⋄ SANDY  
^ SILICEOUS  
- SILTY  
✓ TUFFACEOUS

▬ SANDSTONE STRINGER  
— SHALE STRINGER  
▬ SILTSTONE STRINGER

## Oil Show

▮ DEAD  
● EVEN  
○ QUESTIONABLE  
⦿ SPOTTED STAINING

## Porosity

Ⓔ EARTHY  
▮ FENESTRAL  
F FRACTURE  
× INTERCRYSTALLINE  
⦿ INTEROOLITIC  
✂ MOLDIC

□ ORGANIC  
P PINPOINT  
▽ VUGGY

## Engineering

▲ BIT  
▬ CASING  
◀ CONNECTION (LEFT)  
▶ CONNECTION (RIGHT)  
🔍 CONNECTION GAS  
↓ CORE - LOST  
■ CORE - RECOVERED  
⋮ DST INTERVAL  
⚡ FAULT

## Other Symbols

↔ FORMATION TOP  
✂ GAS SHOW  
MINDPTH MN DEPTH  
↗ NORMAL FAULT  
● OIL SHOW  
⚡ OVERTURNED STRATA  
↘ REVERSE FAULT  
◀ SIDEWALL CORE (LEFT)  
▶ SIDEWALL CORE (RIGHT)  
▬ SLIDE  
DS SURVEY  
TG TRIP GAS  
◀ WIRELINE TESTED - LEFT  
▶ WIRELINE TESTED - RT

## Rounding

△ ANGULAR  
R ROUNDED  
▮ SUBANG  
r SUBRND

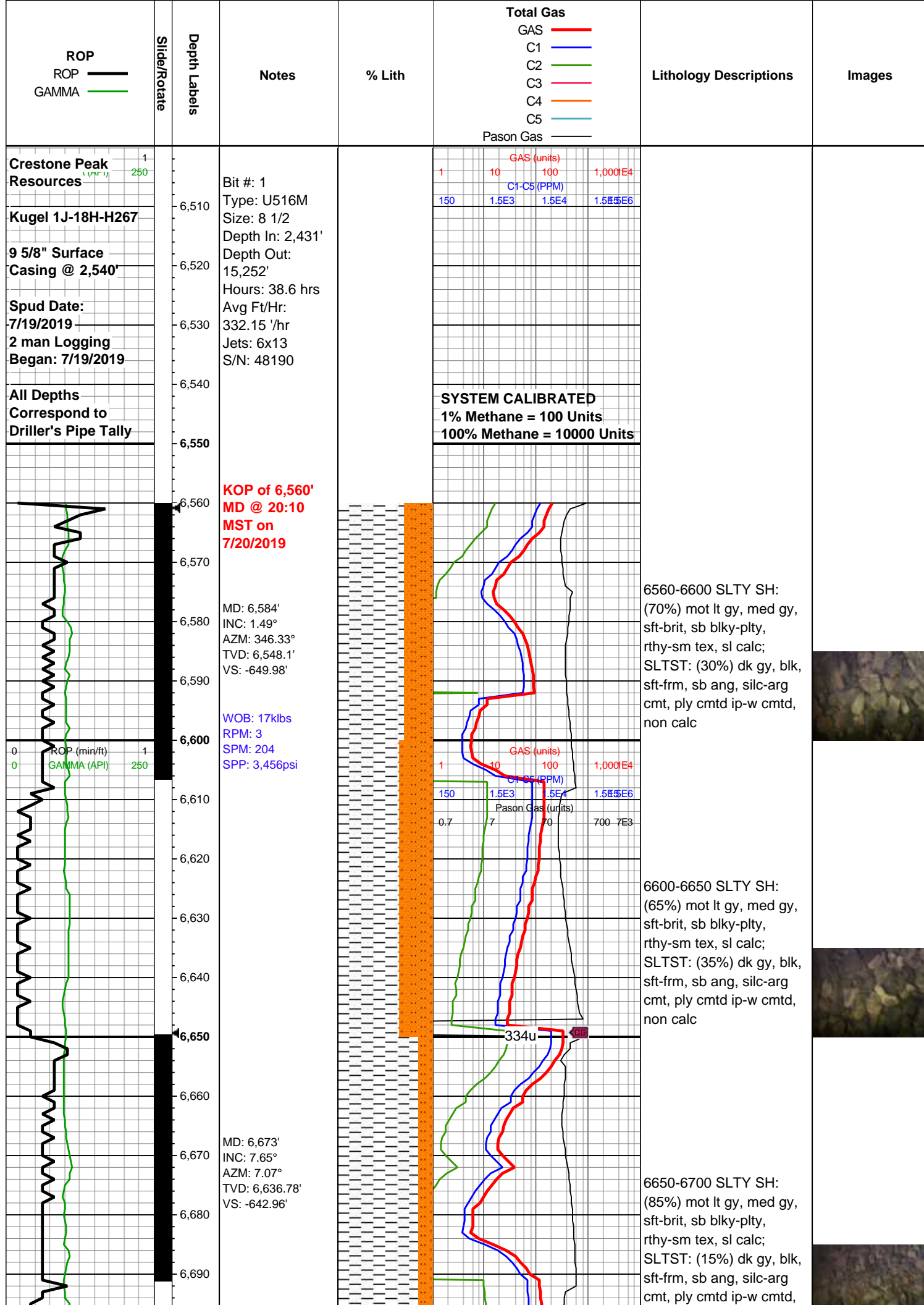
## Textures

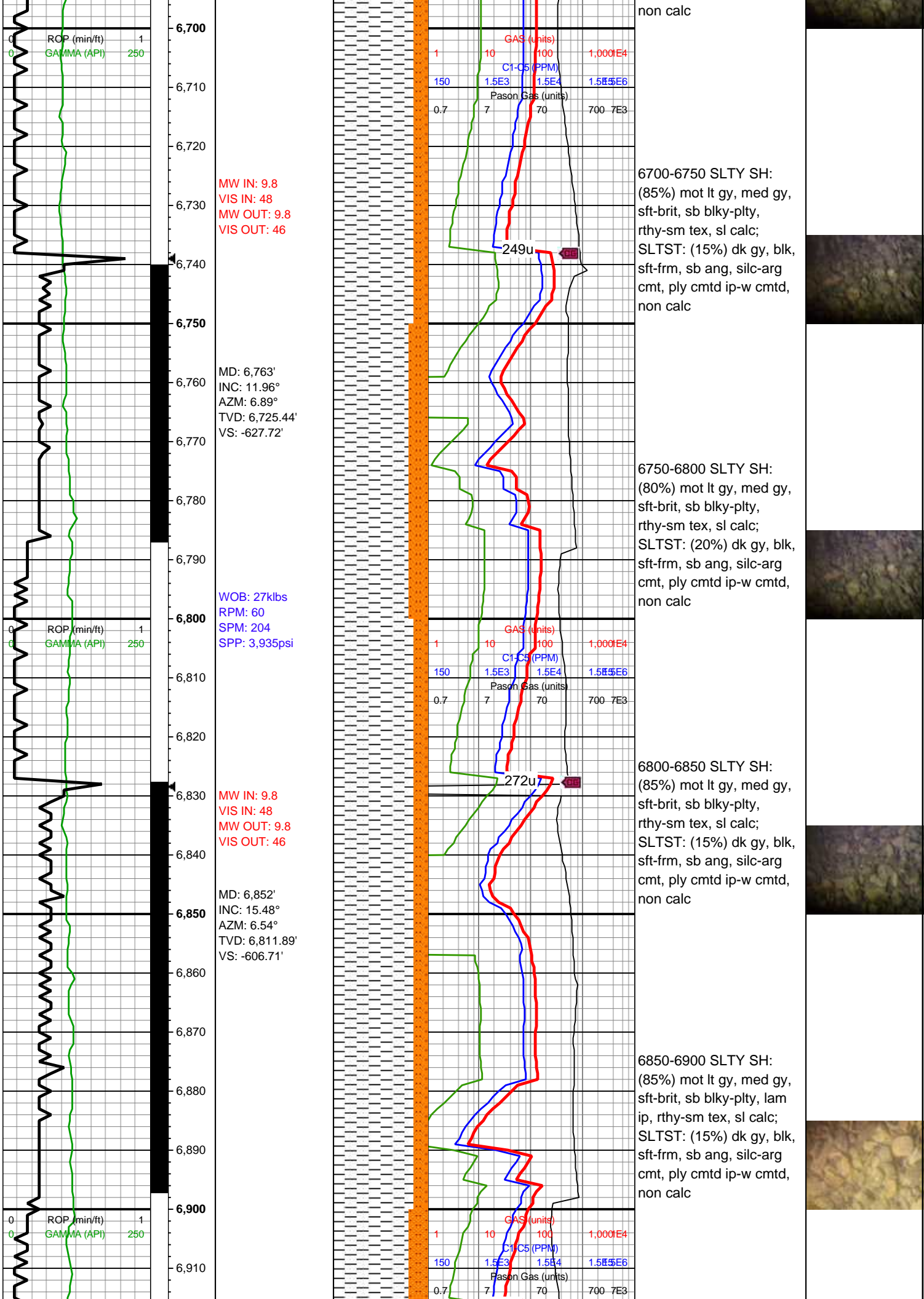
BS BOUNDSTONE  
C CHALKY  
CX CRYPTOXLN  
E EARTHY  
FX FINELYXLN  
GS GRAINSTONE

L LITHOGRAPHIC  
MX MICROXLN  
MS MUDSTONE  
PS PACKSTONE  
WS WACKESTONE

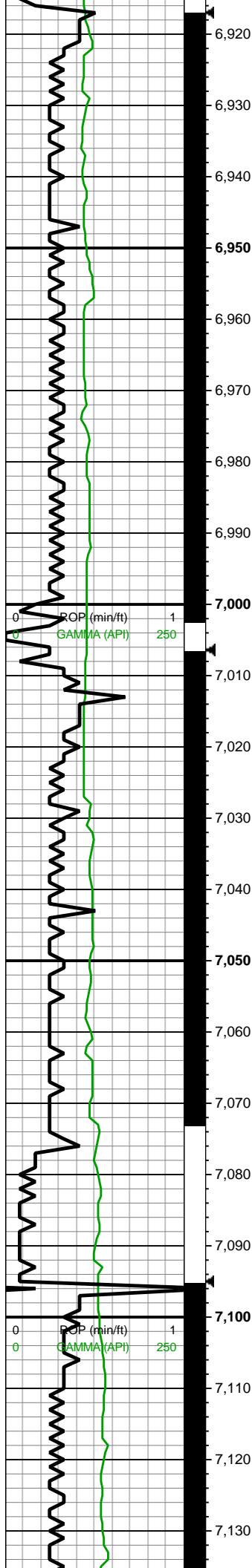
## Sorting

M MODERATE  
P POOR  
W WELL









MD: 6,941'  
INC: 22.51°  
AZM: 357.05°  
TVD: 6,896.01'  
VS: -577.85'

MW IN: 9.8  
VIS IN: 47  
MW OUT: 9.8  
VIS OUT: 46

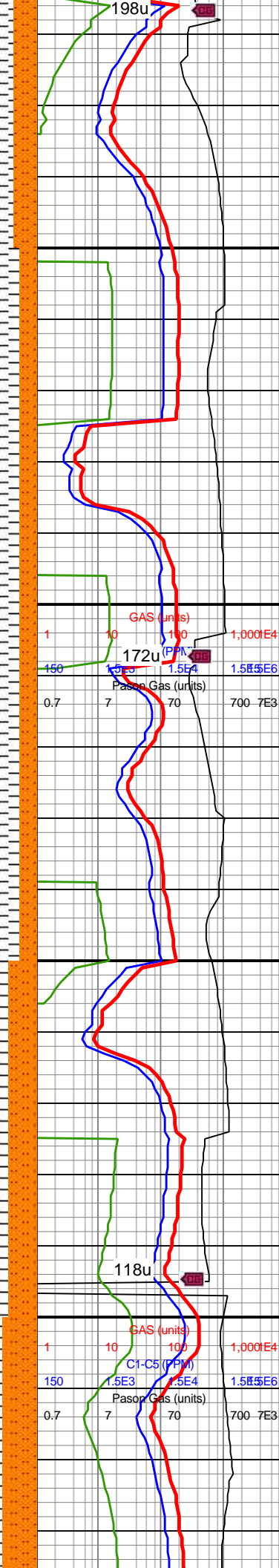
WOB: 15klbs  
RPM: 3  
SPM: 204  
SPP: 3,543psi

MD: 7,030'  
INC: 31.74°  
AZM: 355.64°  
TVD: 6,975.14'  
VS: -537.47'

**MINDEPTH**  
**07/21/2019**

MW IN: 9.9  
VIS IN: 49  
MW OUT: 9.8  
VIS OUT: 47

MD: 7,119'  
INC: 37.81°  
AZM: 358.46°  
TVD: 7,048.21'  
VS: -486.86'



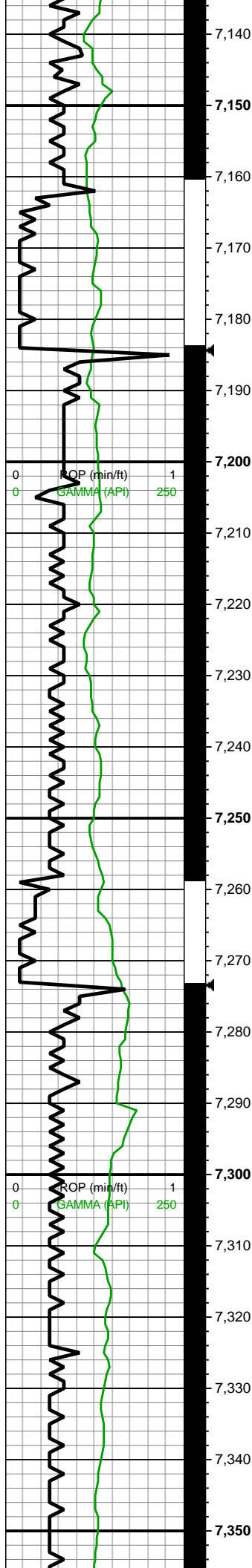
6900-6950 SLTY SH:  
(80%) mot lt gy, med gy,  
sft-brit, sb blkylt, lam  
ip, rthy-sm tex, sl calc;  
SLTST: (20%) dk gy, blk,  
sft-frm, sb ang, silc-arg  
cmt, ply cmt ip-w cmt,  
non calc

6950-7000 SLTY SH:  
(85%) mot lt gy, med gy,  
sft-brit, sb blkylt, lam  
ip, rthy-sm tex, sl calc;  
SLTST: (15%) dk gy, blk,  
sft-frm, sb ang, silc-arg  
cmt, ply cmt ip-w cmt,  
non calc

7000-7050 SLTY SH:  
(85%) mot lt gy, med gy,  
sft-brit, sb blkylt, lam  
ip, rthy-sm tex, sl calc;  
SLTST: (15%) dk gy, blk,  
sft-frm, sb ang, silc-arg  
cmt, ply cmt ip-w cmt,  
non calc

7050-7100 SLTY SH:  
(75%) mot lt gy, med gy,  
sft-brit, sb blkylt, lam  
ip, rthy-sm tex, sl calc;  
SLTST: (25%) dk gy, blk,  
sft-frm, sb ang, silc-arg  
cmt, ply cmt ip-w cmt,  
non calc

7100-7150 SLTY SH:  
(70%) mot lt gy, med gy,  
sft-brit, sb blkylt, lam  
ip, rthy-sm tex, sl calc;



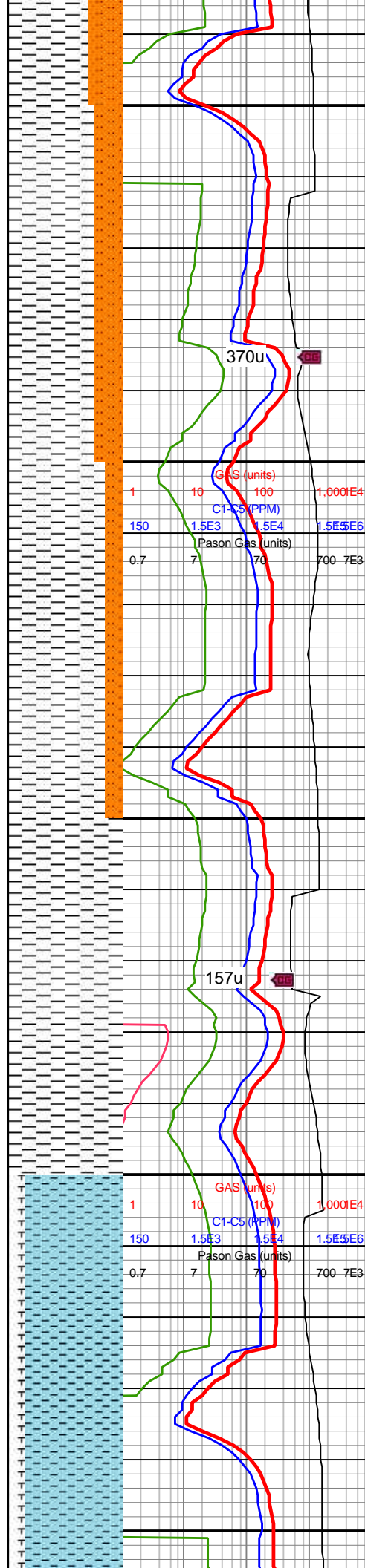
WOB: 10klbs  
RPM: 3  
SPM: 204  
SPP: 3,464psi

MD: 7,208'  
INC: 43.62°  
AZM: 358.28°  
TVD: 7,115.64'  
VS: -428.9'

MW IN: 9.8  
VIS IN: 48  
MW OUT: 9.9  
VIS OUT: 46

 Sharon Springs  
7269' MD/7157' TVD

MD: 7,297'  
INC: 52.32°  
AZM: 359.16°  
TVD: 7,175.17'  
VS: -362.92'



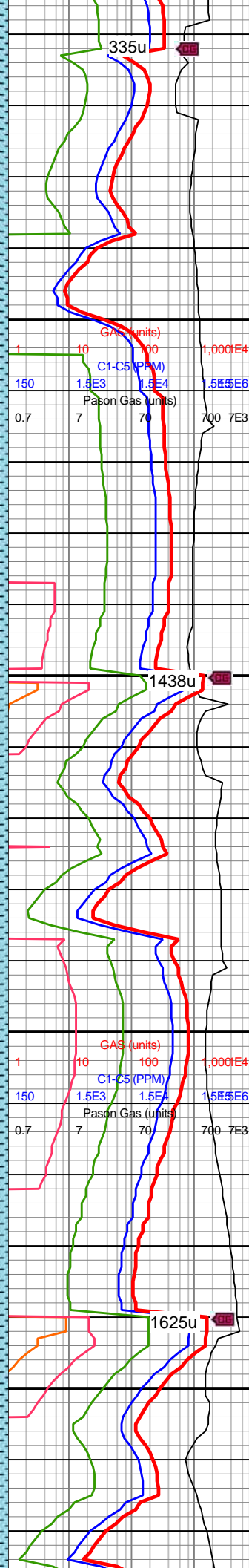
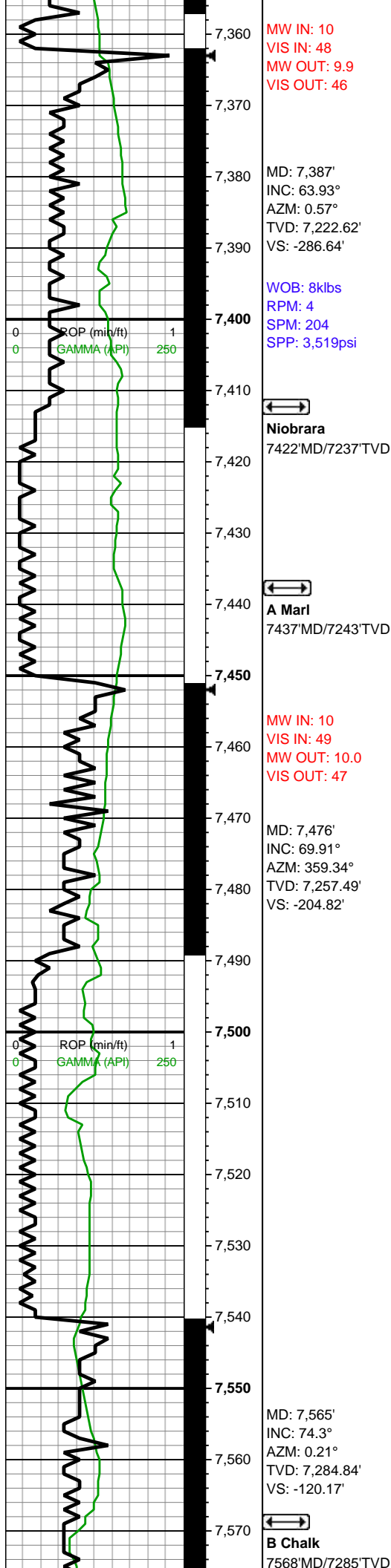
SLTST: (30%) dk gy, blk,  
sft-frm, sb ang, silc-arg  
cmt, ply cmtd ip-w cmtd,  
non calc

7150-7200 SLTY SH:  
(75%) mot lt gy, med gy,  
sft-brit, sb blk-y-plty, lam  
ip, rthy-sm tex, sl calc;  
SLTST: (25%) dk gy, blk,  
sft-frm, sb ang, silc-arg  
cmt, ply cmtd ip-w cmtd,  
non calc

7200-7250 SLTY SH:  
(85%) mot lt gy, med gy,  
sft-brit, sb blk-y-plty, lam  
ip, rthy-sm tex, sl calc;  
SLTST: (15%) dk gy, blk,  
sft-frm, sb ang, silc-arg  
cmt, ply cmtd ip-w cmtd,  
non calc

7250-7300 SH: (100%)  
dk gy, blk, mot lt gy,  
sft-frm, sb blk-y-plty, lam  
ip, rthy-sm tex

7300-7350 CHK: (85%)  
mot med gy, f-med xln,  
sft-frm, lam ip, rthy-chky  
tex, v tr pyr grns, MRLST:  
(15%) sft-frm, sb blk-y-sb  
plty, silc-arg cmt, w cmtd,  
non calc



7350-7400 CHK: (85%)  
mot med gy, f-med xln,  
sft-frm, lam ip, rthy-chky  
tex, v tr pyr grns, MRLST:  
(15%) sft-frm, sb blk-y-sb  
plty, silc-arg cmt, w cmted,  
non calc

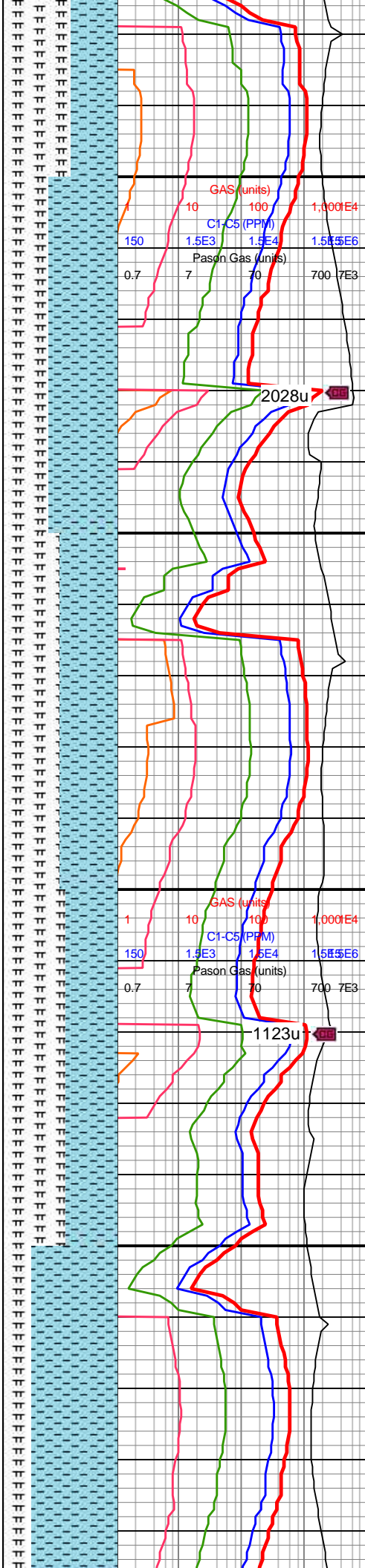
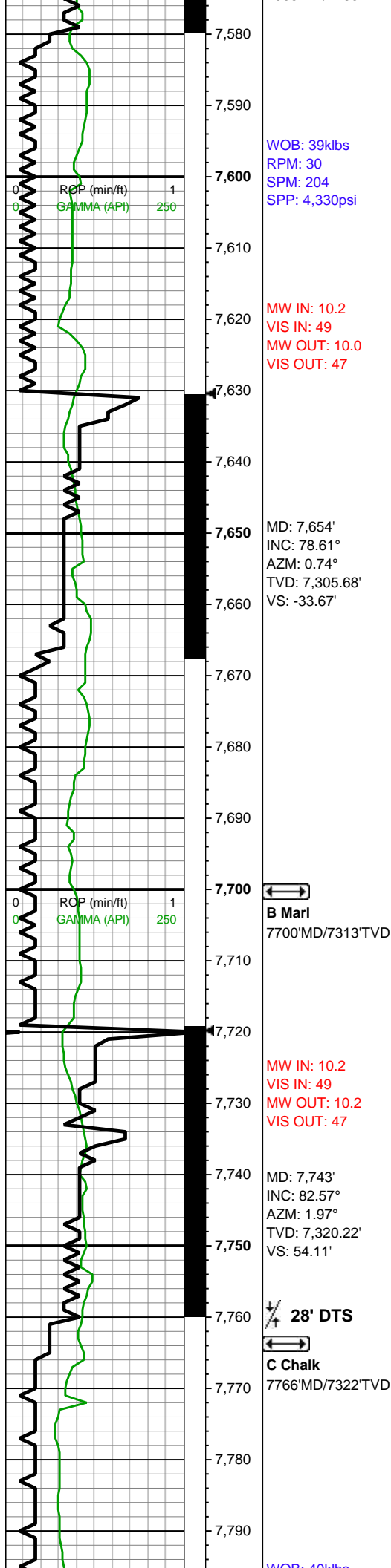
7400-7450 CHK: (70%)  
mot med gy, f-med xln,  
sft-frm, lam ip, rthy-chky  
tex, v tr pyr grns, MRLST:  
(30%) sft-frm, sb blk-y-sb  
plty, silc-arg cmt, w cmted,  
non calc

7450-7500 CHK: (65%)  
mot med gy, f-med xln,  
sft-frm, lam ip, rthy-chky  
tex, v tr pyr grns, MRLST:  
(35%) sft-frm, sb blk-y-sb  
plty, silc-arg cmt, w cmted,  
non calc

7500-7550 MRLST  
(55%): dk gy, predy mod  
fis sb frm-frm-brit sb  
blk-y-blk-y-sb plty ctngs,  
sm-sl slty tex, dk gy mod  
calc sh sp wi brn marl  
incl & mot wi occ thn brn  
marl lamn, rr-tr pyr strg, tr  
bent; CHK (45%): lt gy-lt  
gyshbn-gy sp wi occ  
foram incl, sb frm-frm,  
l-mod fis sb rd-sb blk-y  
ctngs wi sl slty tex, hi calc

7550-7600 MRLST  
(60%): dk gy sh sp wi brn  
marl incl, sb frm-frm-brit  
mod-hi fis sb blk-y-sb plty  
ctngs wi sm-sl slty tex,  
occ sl bmpy mot tex wi  
thn brn marl lamn, rr-tr  
pyr strg, tr bent, mod calc





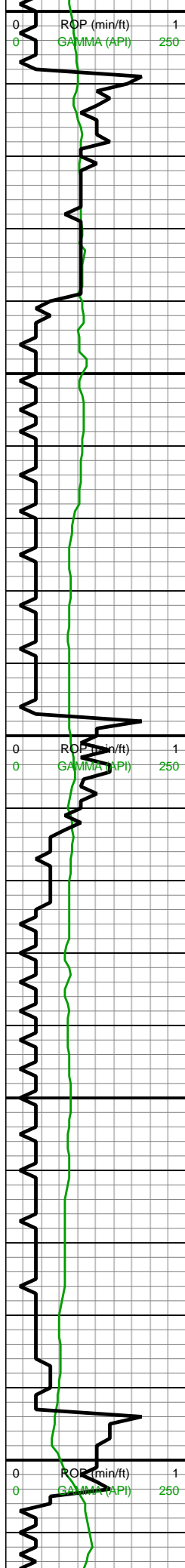
pyr frag, tr bent, mod calc  
wi brn marl resdl; CHK  
(40%): lt gy-lt gyshbn-gy  
sp wi occ foram incl, sb  
frm-frm, l-mod fis sb  
rd-sb blkly ctngs wi sl slty  
tex, hi calc

7600-7650 CHK (60%): lt  
gy-gy sb frm-frm-brit mod  
fis sb blkly v arg LS wi sl  
slty tex, sp wi occ f chky  
foram incl ip, tr vf pyr, hi  
calc; MRLST (40%): dk  
gy-dk gyshbn sh sp wi  
brn marl incl, sb blkly  
mod fis ctngs wi sl slty  
tex, sl bmpy mot tex wi  
brn marl lamn ip, tr bent,  
mod calc wi brn resdl

7650-7700 MRLST  
(60%): dk gy-dk gyshbn  
sb blkly mod fis sh sp wi  
brn marl incl, sl slty tex, sl  
bmpy mot tex wi brn marl  
lamn ip, tr bent, mod  
calc; CHK (40%): lt gy-gy  
sb frm-frm-brit mod fis sb  
blkly v arg LS wi sl slty tex,  
sp wi occ f chky foram  
incl ip, tr fos frags, tr vf  
pyr, hi calc

7700-7750 MRLST  
(55%): dk gy, frm-hd-brit  
mod-hi fis blkly ctngs, sl  
slty-slty tex, tr acic cal, tr  
bent, mod calc wi brn  
marl resdl, wi incr chky  
incl & decr marl incl grdg  
to chk; CHK (45%): lt  
gy-gy-dk gy ip wi f-u f wh  
chky foram incl, frm-brit,  
l-mod fis sb rd-sb blkly  
ctngs wi sl slty-slty tex, hi  
calc

7750-7800 CHK (75%): lt  
gy-gy-dk gy ip wi f-u f wh  
chky foram incl, frm-brit,  
l-mod fis sb rd-sb blkly  
ctngs wi sl slty-slty tex, hi  
calc; MRLST (25%): dk  
gy, frm-hd-brit mod-hi fis  
blkly ctngs, sl slty-slty tex,  
tr acic cal, tr bent, mod  
calc wi brn marl resdl



WOB: 40kbs  
RPM: 30  
SPM: 203  
SPP: 4,310psi

**Curve landing of  
7,828' MD @  
05:30 MST on  
7/21/2019**

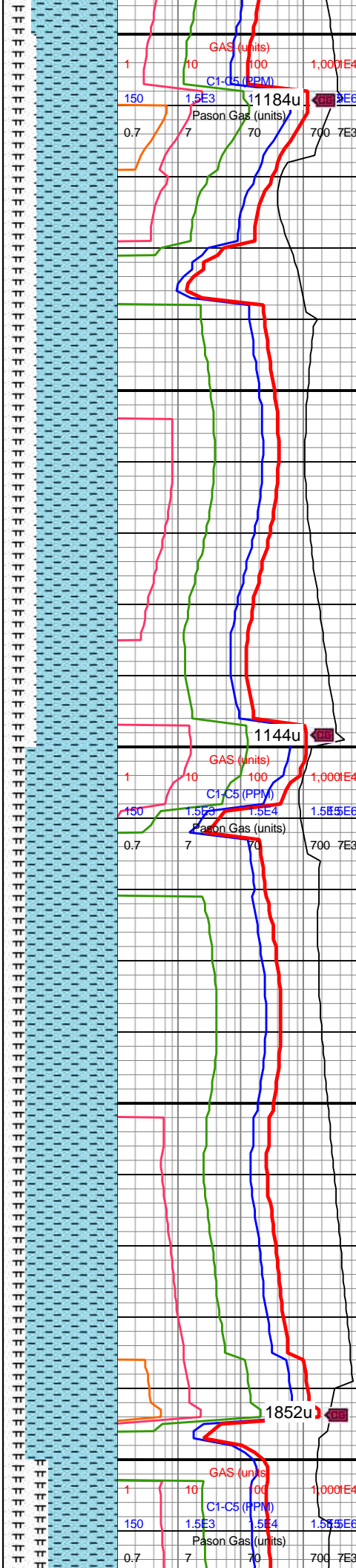
MD: 7,832'  
INC: 87.41°  
AZM: 0.92°  
TVD: 7,327.99'  
VS: 142.74'

MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 46

MD: 7,922'  
INC: 89.78°  
AZM: 358.63°  
TVD: 7,330.2'  
VS: 232.67'

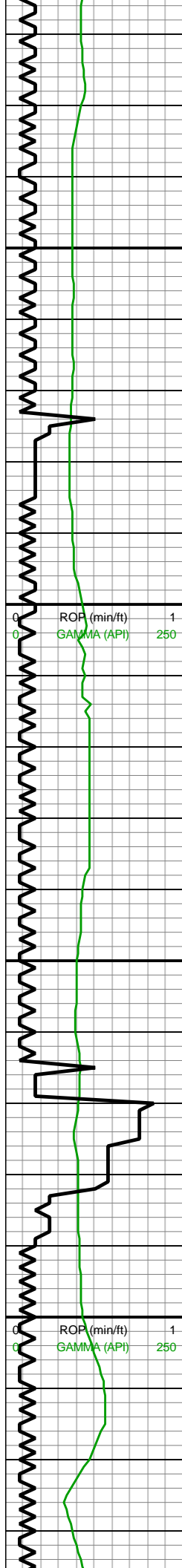
WOB: 27kbs  
RPM: 0  
SPM: 204  
SPP: 3,580psi

MD: 8,011'  
INC: 89.43°  
AZM: 0.04°



7800-7900 CHK (70%): lt  
gy-med gy, sl brn hue ip,  
sb frm-frm, brit ip, l-mod  
fis sb rd-sb blkly ctngs wi  
sl slty-slty tex ip, f wh chky  
incl, hi calc; MRLST  
(30%): dk gy sh sp wi brn  
marl incl, frm-brit mod fis  
sb blkly ctngs wi sl  
slty-slty tex, mod calc wi  
brn marl resdl

7900-8000 CHK (80%): lt  
gy-med gy, sl brn hue ip,  
sb frm-frm, brit ip, l-mod  
fis sb rd-sb blkly ctngs wi  
sl slty-slty tex ip, f wh chky  
incl, hi calc; MRLST  
(20%): dk gy sh sp wi brn  
marl incl, frm-brit mod fis  
sb blkly ctngs wi sl  
slty-slty tex, mod calc wi  
brn marl resdl



8,020  
8,030  
8,040  
8,050  
8,060  
8,070  
8,080  
8,090  
8,100  
8,110  
8,120  
8,130  
8,140  
8,150  
8,160  
8,170  
8,180  
8,190  
8,200  
8,210  
8,220  
8,230

TVD: 7,330.81'  
VS: 321.63'

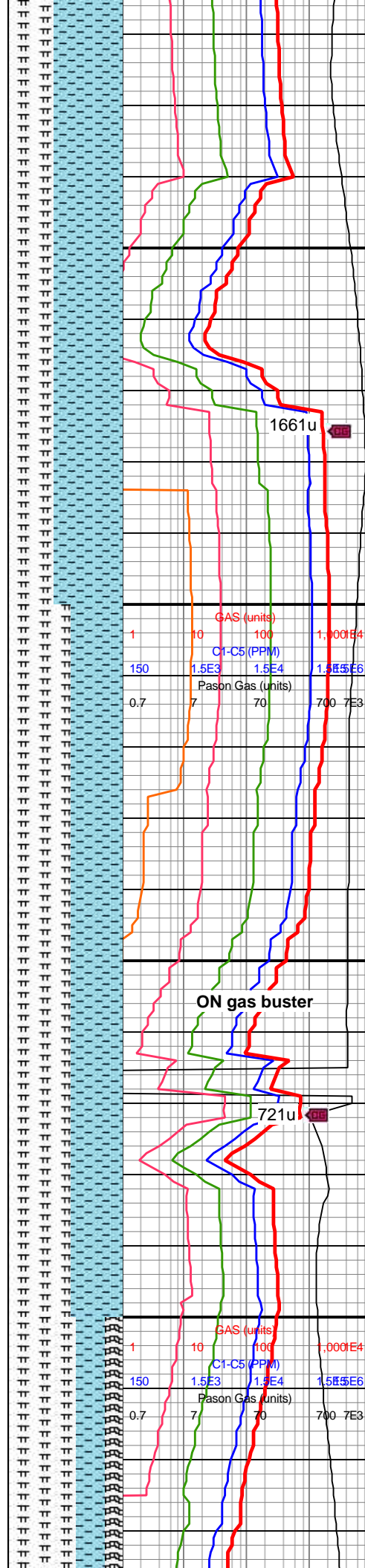
MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 47

MD: 8,100'  
INC: 89.96°  
AZM: 359.51°  
TVD: 7,331.29'  
VS: 410.6'

MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 46

MD: 8,189'  
INC: 90.13°  
AZM: 0.57°  
TVD: 7,331.22'  
VS: 499.58'

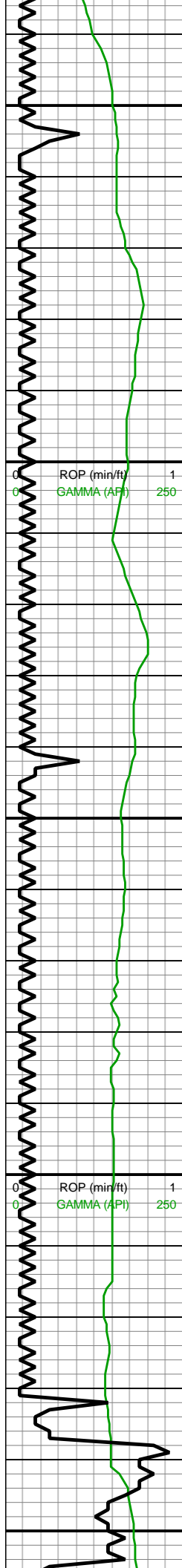
WOB: 38klbs  
RPM: 60  
SPM: 202  
SPP: 4,250psi



8000-8100 CHK (60%):  
gy-gyshbn ip wi f wh chky  
foram incl, frm, sb frm ip,  
l-mod fis sb rd-sb blk  
ctngs wi sl slty-slty tex ip,  
tr pyr nod strg, hi calc;  
MRLST (40%): dk gy-dk  
gyshbn ip, frm-brit mod  
fis sb blk ctngs wi sl  
slty-slty tex, tr bent, mod  
calc wi brn marl resdl

8100-8200 MRLST  
(55%): dk gy mod calc sh  
sp wi brn marl incl,  
frm-brit mod fis sb blk  
ctngs wi sl slty-slty tex, tr  
bent, wi incr chky foram  
incl grdg to chk; CHK  
(45%): gy-gyshbn ip wi f  
wh chky foram incl, frm,  
sb frm ip, l-mod fis sb  
rd-sb blk ctngs wi sl  
slty-slty tex ip, tr pyr nod  
strg, hi calc





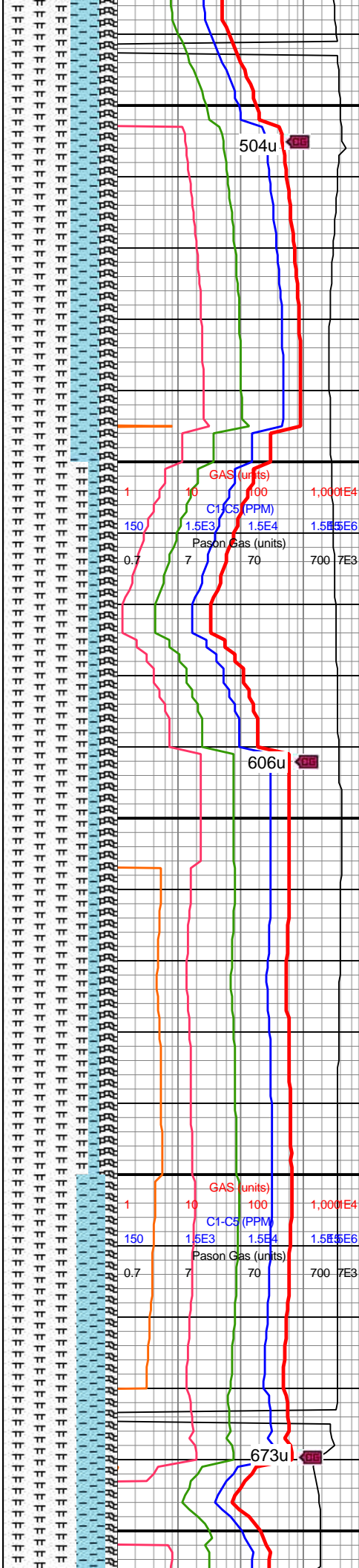
MD: 8,278'  
INC: 90.84°  
AZM: 0.39°  
TVD: 7,330.47'  
VS: 588.57'

MD: 8,367'  
INC: 90.57°  
AZM: 359.51°  
TVD: 7,329.37'  
VS: 677.54'

WOB: 61klbs  
RPM: 60  
SPM: 208  
SPP: 4,640psi

MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 47

MD: 8,456'

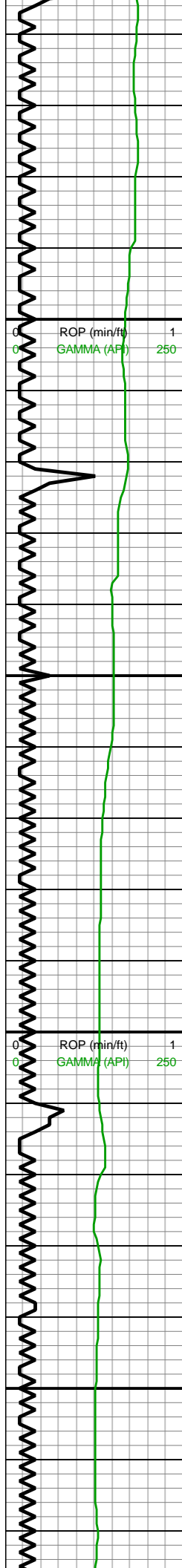


8200-8300 MRLST  
(60%): dk gy-v dk gy sh  
sp wi brn marl incl & abnt  
bent, frm, brit, sb frm ip,  
mod fis sb blkyl-bkly-tab  
ctngs wi sm-sl slty tex,  
mod calc wi brn mrly  
resdl, wi decr brn marl  
incl grdg to chk: CHK  
(25%): lt gy-gy-gyshbn-v  
dk gy sp wi chky incl, sb  
frm-frm, l-mod fis sb  
rd-sb blkyl v arg LS wi sl  
slty-slty tex, hi calc; BENT  
(15%): predy sft water  
solu off wh bent, tn sb  
frm-frm bent ip, non calc,  
hi flor

8300-8400 MRLST  
(75%): dk gy-v dk gy sp wi  
brn marl incl, frm, brit, sb  
frm ip, mod fis sb  
blkyl-bkly-tab mod calc sh  
wi sm-sl slty tex, sp &  
lamn wi brn marl thru,  
abnt bent; BENT (15%):  
predy sft water solu off  
wh bent, tn sb frm-frm  
bent ip, non calc, hi flor;  
CHK (10%): lt  
gy-gy-gyshbn-v dk gy sp  
wi chky incl, sb frm-frm,  
l-mod fis sb rd-sb blkyl v  
arg LS wi sl slty-slty tex,  
decr chk incl & incr brn  
marl incl grdg to mrlst ip,  
hi calc

8400-8500 MRLST  
(65%): dk gy-v dk gy sh  
sp wi brn marl incl & abnt  
bent, frm, brit, sb frm ip,



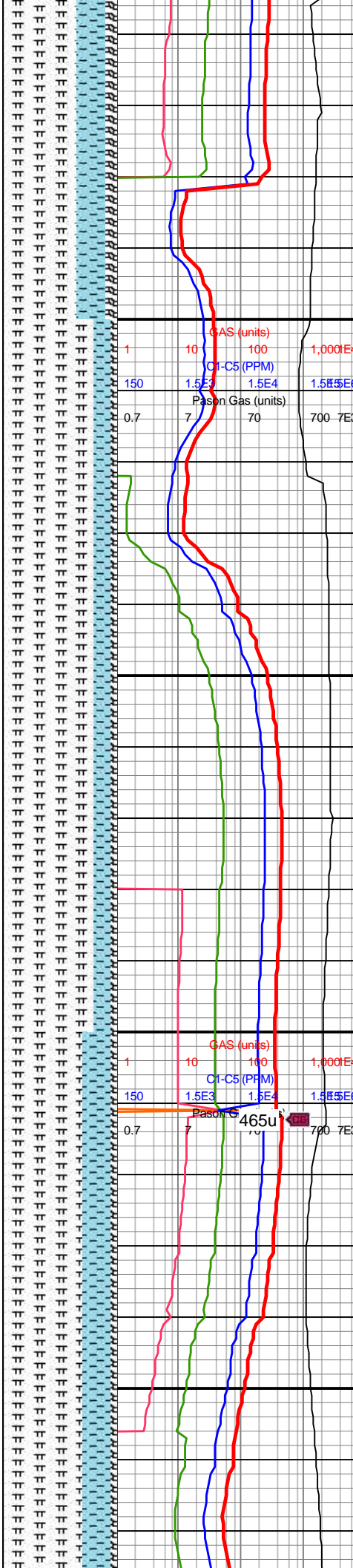


INC: 90.31°  
AZM: 1.09°  
TVD: 7,328.69'  
VS: 766.53'

WOB: 40klbs  
RPM: 60  
SPM: 208  
SPP: 4,590psi

MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 47

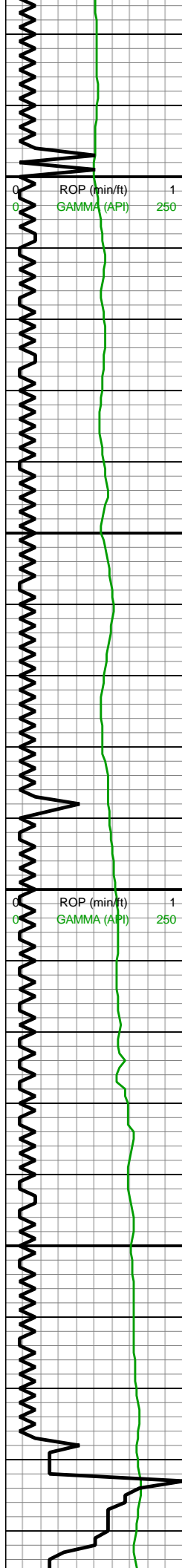
MD: 8,635'  
INC: 89.96°  
AZM: 0.92°  
TVD: 7,328.13'  
VS: 945.53'



mod fis sb blkyl-blky-tab  
ctngs wi sm-sl slty tex,  
mod calc wi brn mrly  
resdl, wi decr brn marl  
incl grdg to chk: CHK  
(25%): lt gy-gy-gyshbn-v  
dk gy sp wi chky incl, sb  
frm-frm, l-mod fis sb  
rd-sb blkyl v arg LS wi sl  
slty-slty tex, hi calc; BENT  
(10%): predy sft water  
solu off wh bent, tn sb  
frm-frm bent ip, non calc,  
hi flor

8500-8600 MRLST  
(80%): dk gy-v dk gy sh  
sp wi brn marl incl & abnt  
bent, frm, brit, sb frm ip,  
mod fis sb blkyl-blky-tab  
ctngs wi sm-sl slty tex,  
mod calc wi brn mrly  
resdl, wi decr brn marl  
incl grdg to chk; CHK  
(15%): lt gy-gy-gyshbn-v  
dk gy sp wi chky incl, sb  
frm-frm, l-mod fis sb  
rd-sb blkyl v arg LS wi sl  
slty-slty tex, decr chk incl  
& incr brn marl incl grdg  
to mrlst ip, hi calc; BENT  
(rr): predy off wh sft bent,  
occ tn frm & xln, non calc,  
hi flor

8600-8700 MRLST  
(70%): dk gy-v dk gy sh  
sp wi brn marl incl & abnt  
bent, frm, brit, sb frm ip,  
mod fis sb blkyl-blky-tab  
ctngs wi sm-sl slty tex,  
mod calc wi brn mrly  
resdl, wi decr brn marl  
incl grdg to chk: CHK  
(25%): lt gy-gy-gyshbn-v  
dk gy sp wi chky incl, sb



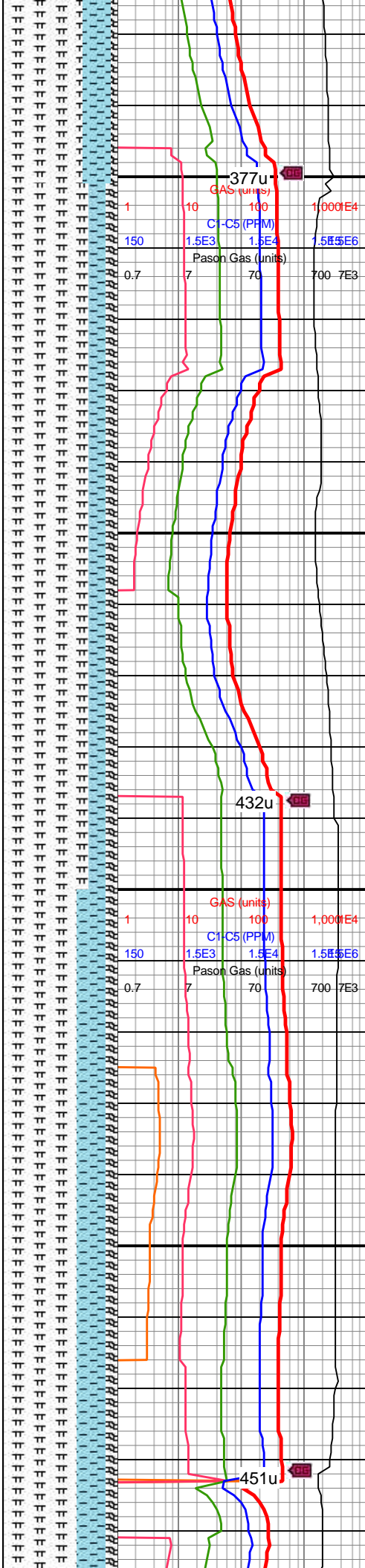
8,680  
8,690  
8,700  
8,710  
8,720  
8,730  
8,740  
8,750  
8,760  
8,770  
8,780  
8,790  
8,800  
8,810  
8,820  
8,830  
8,840  
8,850  
8,860  
8,870  
8,880  
8,890

MD: 8,724'  
INC: 89.69°  
AZM: 0.92°  
TVD: 7,328.4'  
VS: 1,034.52'

WOB: 41klbs  
RPM: 60  
SPM: 207  
SPP: 4,580psi

MD: 8,813'  
INC: 89.34°  
AZM: 0.39°  
TVD: 7,329.16'  
VS: 1,123.52'

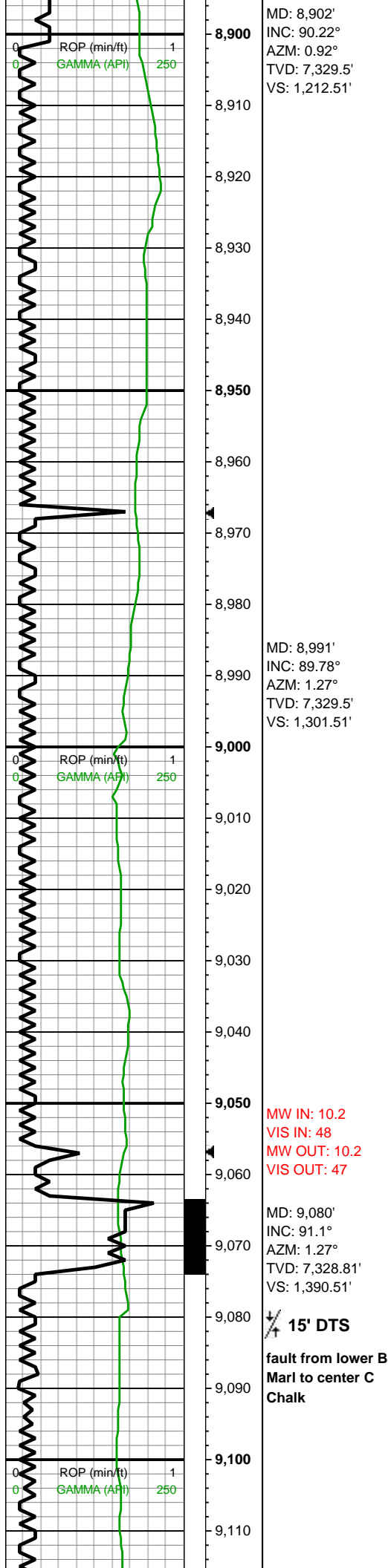
MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 47



frm-frm, l-mod fis sb  
rd-sb blkly v arg LS wi sl  
silty-silty tex, hi calc; BENT  
(15%): predy sft water  
solu off wh bent, tn sb  
frm-frm bent ip, non calc,  
hi flor

8700-8800 MRLST  
(75%): gy-dk gy,  
frm-crunchy-brit, l-mod fis  
sb rd-sb blkly-bkly ctngs  
wi slty-bmpy mot tex ip wi  
thn marl lamn thru, com  
bent, tr vf pyr, wi incr chky  
incl grdg to chk; CHK  
(15%): gy, lt gy-dk gy ip wi  
f wh chky foram incl, sb  
frm-frm sb rd-sb blkly  
predy l fis ctngs wi slty  
tex, tr c chky forams;  
BENT (10%): predy tn sb  
xln sb frm-frm bent, non  
calc, hi flor

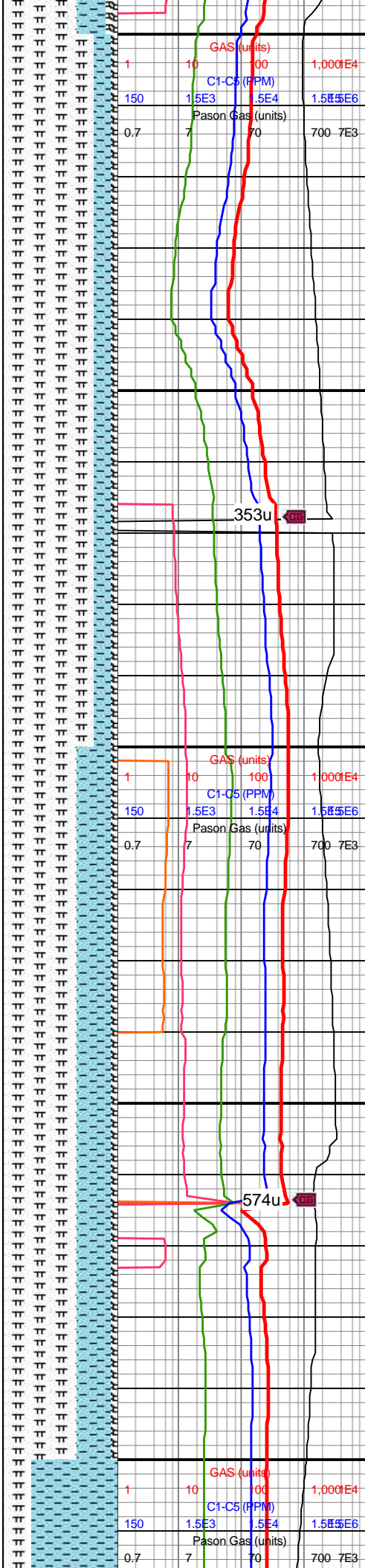
8800-8900 MRLST  
(65%): dk gy-v dk gy sh  
sp wi brn marl incl & abnt  
bent, frm, brit, sb frm ip,  
mod fis sb blkly-bkly-tab  
ctngs wi sm-sl slty tex,  
mod calc wi brn mrly  
resdl, wi decr brn marl  
incl grdg to chk; CHK  
(25%): lt gy-gy-gyshbn-v  
dk gy sp wi chky incl, sb  
frm-frm, l-mod fis sb  
rd-sb blkly v arg LS wi sl  
silty-silty tex, hi calc; BENT  
(10%): off wh sft water  
solu-sb frm tn & xln ip,  
non calc, hi flor



MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 47

MD: 9,080'  
INC: 91.1°  
AZM: 1.27°  
TVD: 7,328.81'  
VS: 1,390.51'

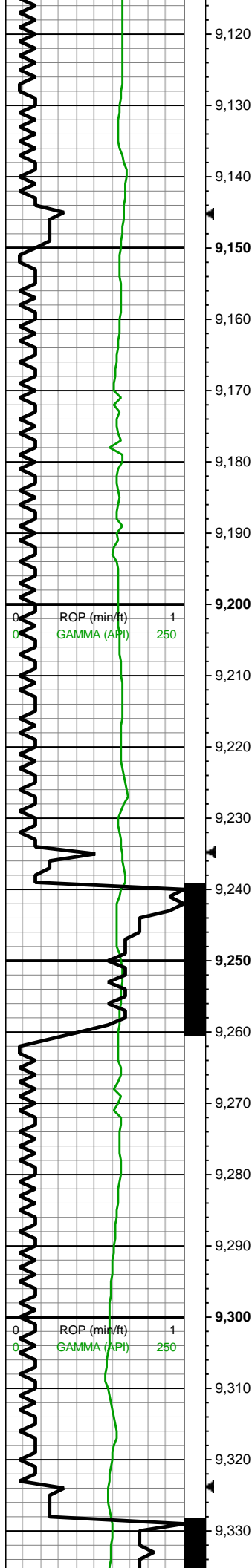
15' DTS  
fault from lower B  
Marl to center C  
Chalk



8900-9000 MRLST  
(80%): dk gy-v dk gy sh  
sp wi brn marl incl & abnt  
bent, frm, brit, sb frm ip,  
mod fis sb blkyl-blky-tab  
ctngs wi sm-sl slty tex,  
mod calc wi brn mrly  
resdl, wi decr brn marl  
incl grdg to chk; CHK  
(15%): lt gy-gy-gyshbn-v  
dk gy sp wi chky incl, sb  
frm-frm, l-mod fis sb  
rd-sb blkyl v arg LS wi sl  
slty-slty tex, decr chk incl  
& incr brn marl incl grdg  
to mrlst ip, hi calc; BENT  
(rr): predy off wh sft bent,  
occ tn frm & xln, non calc,  
hi flor

9000-9100 MRLST  
(65%): dk gy-v dk gy sh  
sp wi brn marl incl, frm,  
brit, sb frm ip, mod fis sb  
blkyl-blky-tab ctngs wi  
sm-sl slty-bmpy mot tex,  
mod calc wi brn mrly  
resdl; CHK (30%): dk gy  
sp wi chky incl, sb  
frm-frm, l-mod fis sb  
rd-sb blkyl v arg LS wi sl  
slty-slty tex, hi calc; BENT  
(rr%): off wh sft water  
solu-sb frm tn & xln ip,  
non calc, hi flor

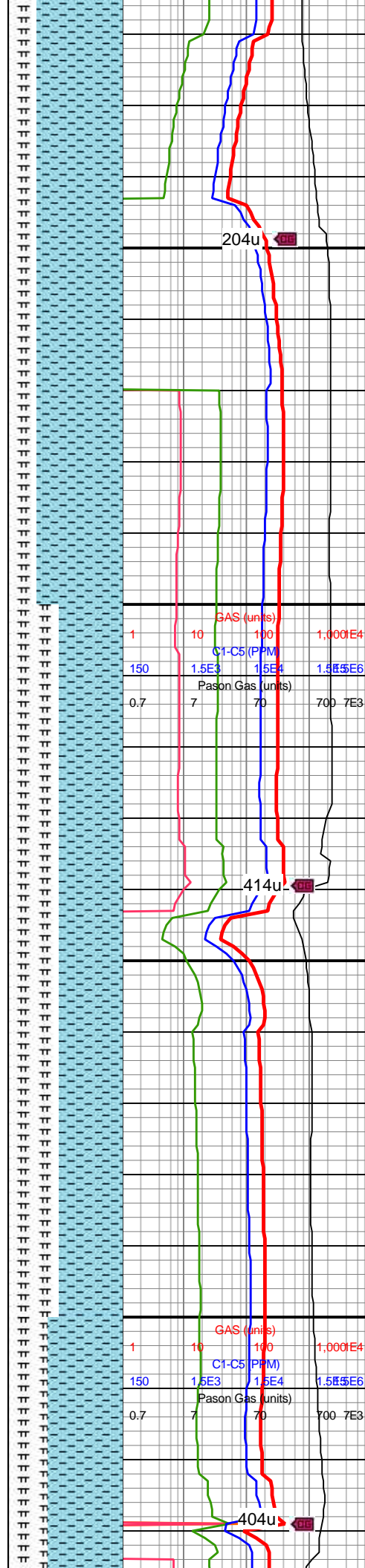




MD: 9,169'  
INC: 90.75°  
AZM: 2.68°  
TVD: 7,327.38'  
VS: 1,479.48'

MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 46

MD: 9,258'  
INC: 90.4°  
AZM: 0.92°  
TVD: 7,326.48'  
VS: 1,568.47'

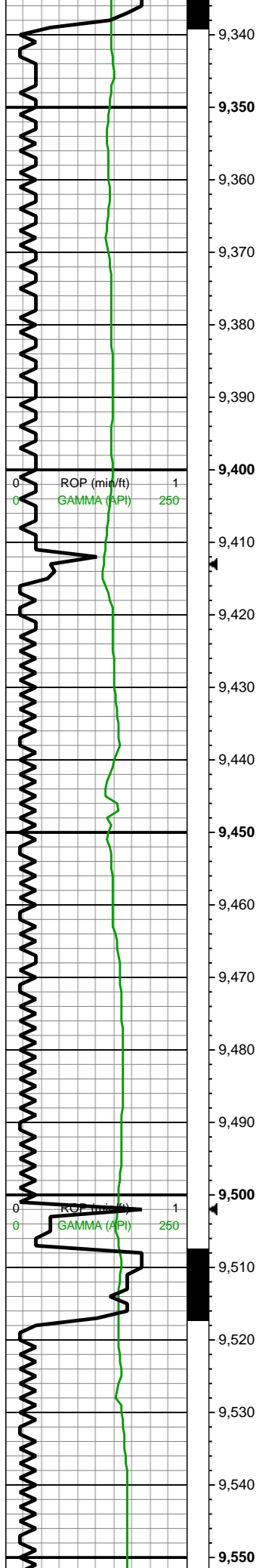


9100-9200 CHK (75%):  
predy dk gy sp wi abnt  
chky incl, lt gy ip, sb  
frm-frm, l-mod fis sb  
rd-sb blkly ctngs wi sl  
silty-silty tex, rr bent, hi  
calc; MRLST (25%): dk  
gy-v dk gy sh sp wi brn  
marl incl, frm, brit, sb frm  
ip, mod fis sb  
blkly-blkly-tab ctngs wi  
sm-sl silty-bmpy mot tex,  
mod calc wi brn mrly  
resdl

9200-9300 CHK (55%):  
predy med gy wi occ-com  
chky foram incl, lt gy-dk  
gy ip, frm-brit, sb frm ip,  
l-mod fis sb rd-sb blkly v  
arg LS wi silty tex, tr bent,  
hi calc; MRLST (45%): dk  
gy-v dk gy, frm-brit, mod  
fis sb blkly ctngs wi sm  
arg-sl silty-silty tex, sp wi  
occ brn marl inc, mod  
calc wi brn marl resdl







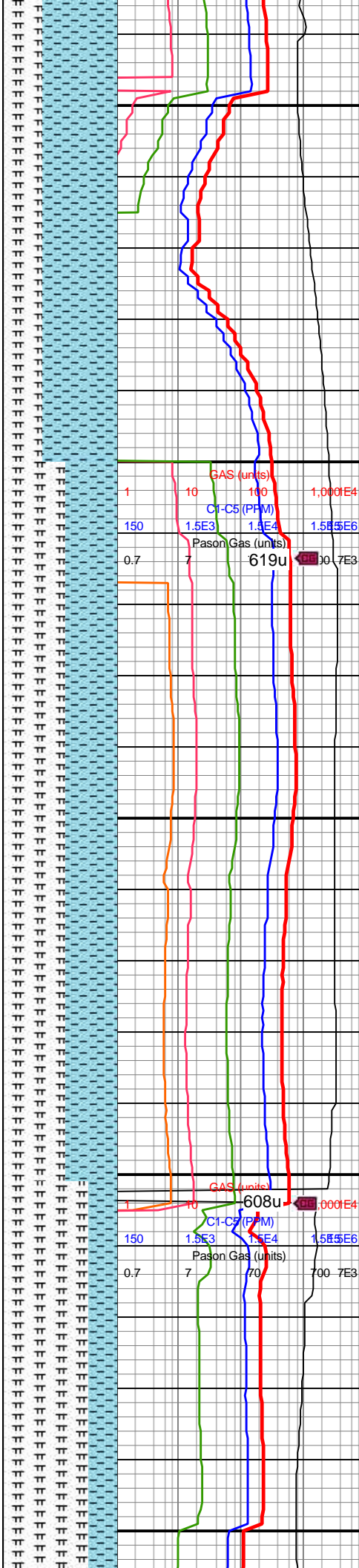
MD: 9,347'  
INC: 90.57°  
AZM: 358.81°  
TVD: 7,325.73'  
VS: 1,657.44'

MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 46

WOB: 39klbs  
RPM: 60  
SPM: 206  
SPP: 4,500psi

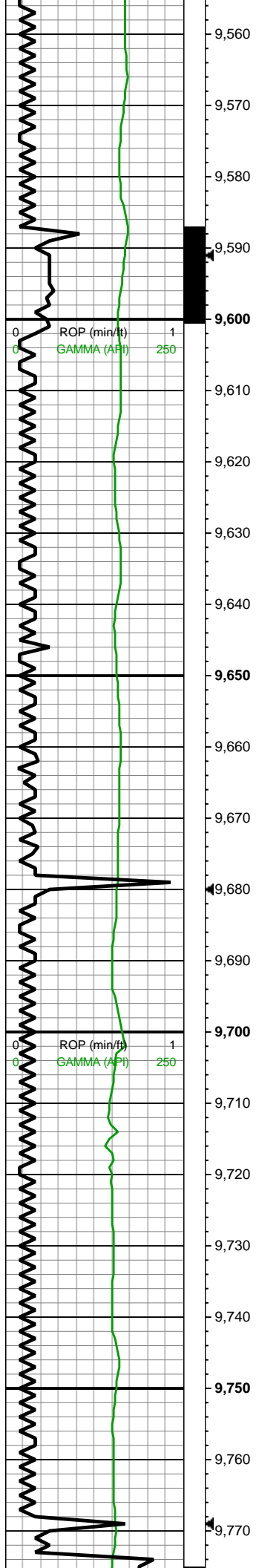
MD: 9,436'  
INC: 91.19°  
AZM: 358.46°  
TVD: 7,324.36'  
VS: 1,746.34'

MD: 9,525'  
INC: 90.75°  
AZM: 359.69°  
TVD: 7,322.86'  
VS: 1,835.27'



9300-9400 CHK (65%):  
predy med gy wi occ-com  
chky foram incl, lt gy-dk  
gy ip, frm-brit, sb frm ip,  
l-mod fis sb rd-sb blkly v  
arg LS wi slty tex, tr bent,  
hi calc; MRLST (35%): dk  
gy-v dk sh gy sp wi occ  
brn marl incl, frm-brit,  
mod fis sb blkly ctngs wi  
sm arg-sl slty-slty tex,  
mod calc wi brn marl  
resdl

9400-9500 MRLST  
(55%): dk gy-v dk gy,  
frm-brit, mod fis sb blkly  
ctngs wi sm arg-sl  
slty-slty tex, sp wi occ brn  
marl inc, mod calc wi brn  
marl resdl; CHK (45%): lt  
gy-med gy-dk gy wi  
occ-com chky foram incl,  
frm-brit, sb frm ip, l-mod  
fis sb rd-sb blkly v arg LS  
wi slty tex, hi calc

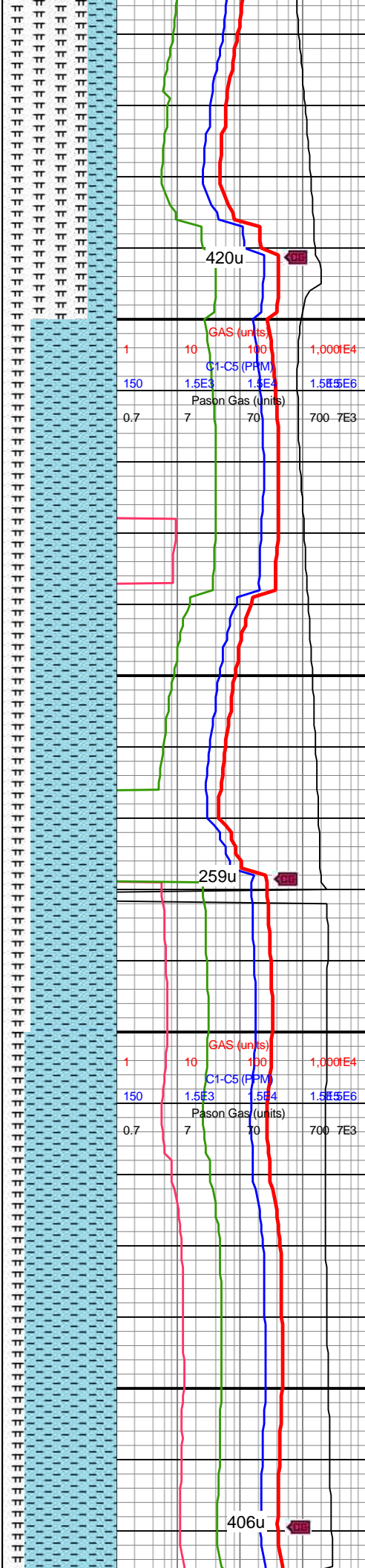


MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 47

WOB: 18klbs  
RPM: 60  
SPM: 207  
SPP: 4,090psi

MD: 9,614'  
INC: 90.31°  
AZM: 0.39°  
TVD: 7,322.03'  
VS: 1,924.25'

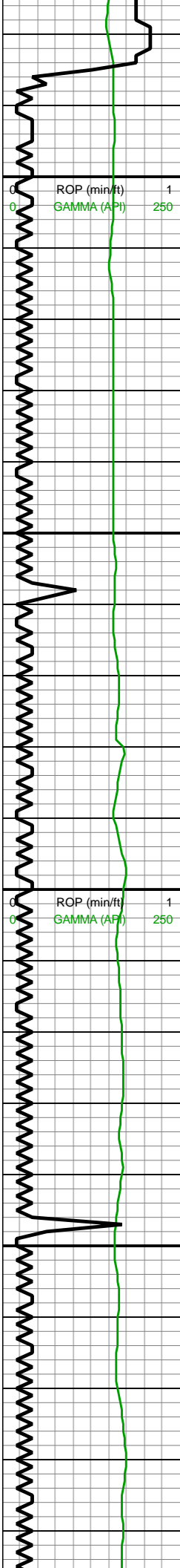
MD: 9,703'  
INC: 90.66°  
AZM: 0.21°  
TVD: 7,321.28'  
VS: 2,013.23'



9500-9600 MRLST (65%): dk gy-v dk gy sh  
sp wi occ brn marl incl,  
frm-brit, mod fis sb blk  
ctngs wi sm arg-sl  
slty-slty tex, mod calc wi  
brn resdl; CHK (35%):  
predy gy-dk gy wi occ f  
chky foram incl, frm-brit,  
sb frm ip, l-mod fis sb  
rd-sb blkly ctngs wi sl  
slty-slty tex, hi calc

9600-9700 CHK (75%):  
pred med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, v calc;  
MRLST (35%): med gy,  
dk gy-tr v dk gy, fri-brit,  
mod fis, sb blkly-sb ang,  
arg tex, mod calc

9700-9800 CHK (80%):  
pred med gy, lt gy, vf-f xln



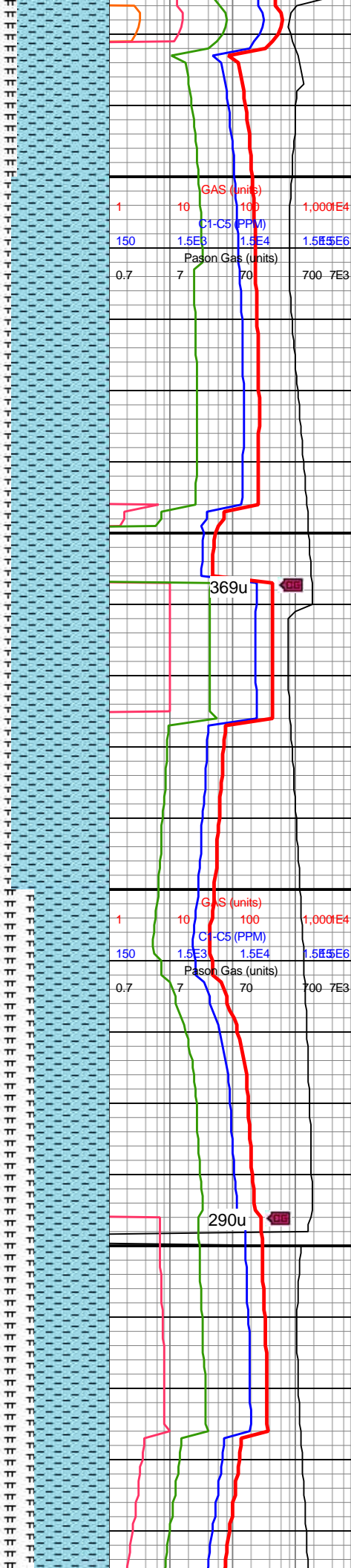
MD: 9,793'  
INC: 90.66°  
AZM: 0.92°  
TVD: 7,320.24'  
VS: 2,103.22'

WOB: 41klbs  
RPM: 52  
SPM: 207  
SPP: 4,715psi

MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 47

MD: 9,882'  
INC: 91.1°  
AZM: 1.44°  
TVD: 7,318.88'  
VS: 2,192.21'

MD: 9,971'  
INC: 90.92°  
AZM: 0.92°  
TVD: 7,317.31'  
VS: 2,281.2'



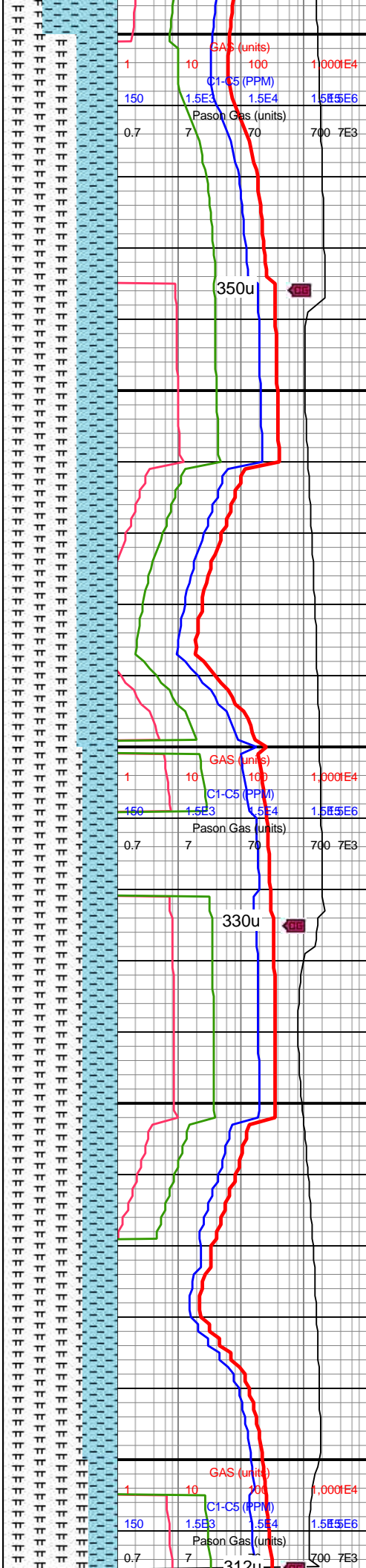
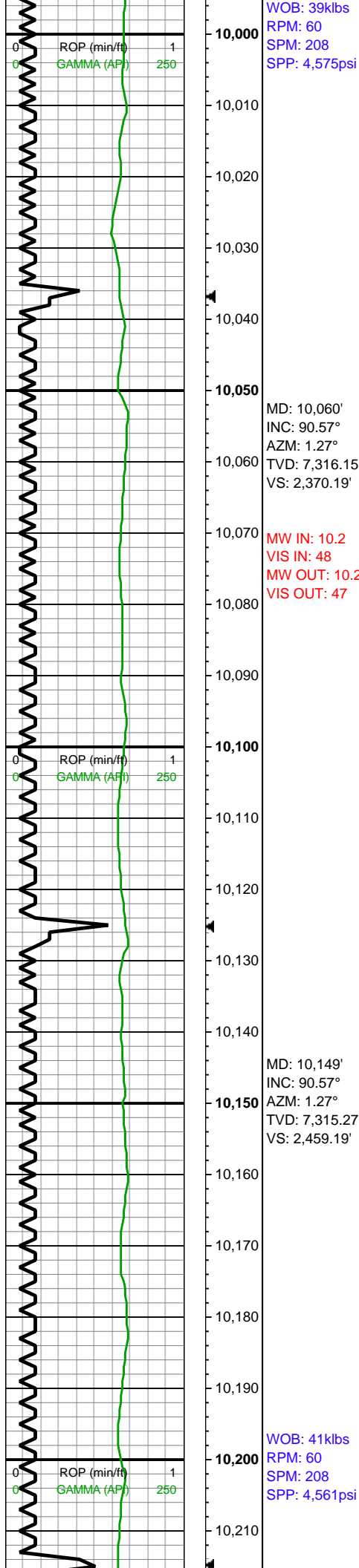
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, v calc;  
MRLST (20%): med gy,  
dk gy-tr v dk gy, fri-brit,  
mod fis, sb blk-y-sb ang,  
arg tex, mod calc

9800-9900 CHK (85%):  
pred med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, v calc;  
MRLST (15%): med gy,  
dk gy-tr v dk gy, fri-brit,  
mod fis, sb blk-y-sb ang,  
arg tex, mod calc

9900-10000 CHK (65%):  
pred med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, v calc;  
MRLST (35%): med gy,  
dk gy-tr v dk gy, fri-brit,  
mod fis, sb blk-y-sb ang,  
arg tex, tr pyr nod, mod



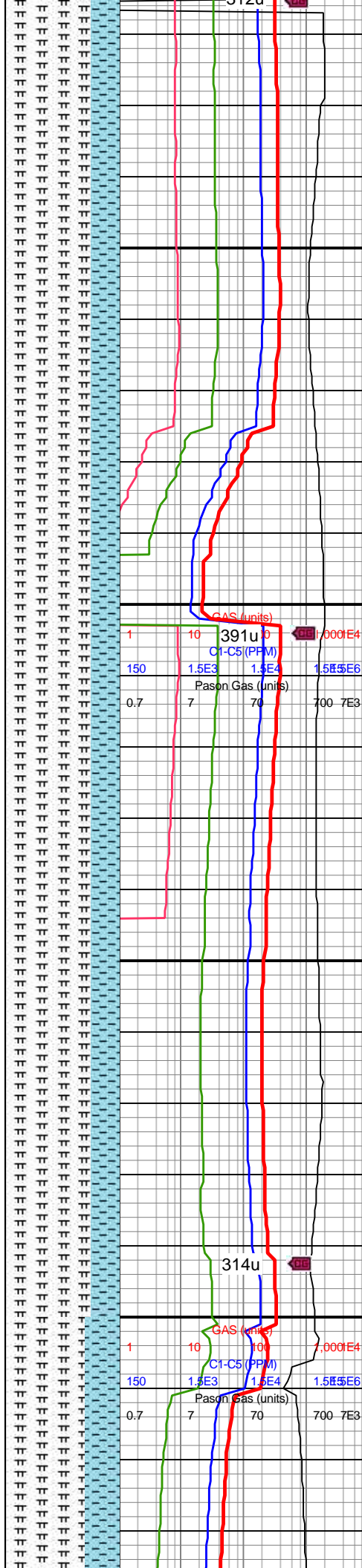
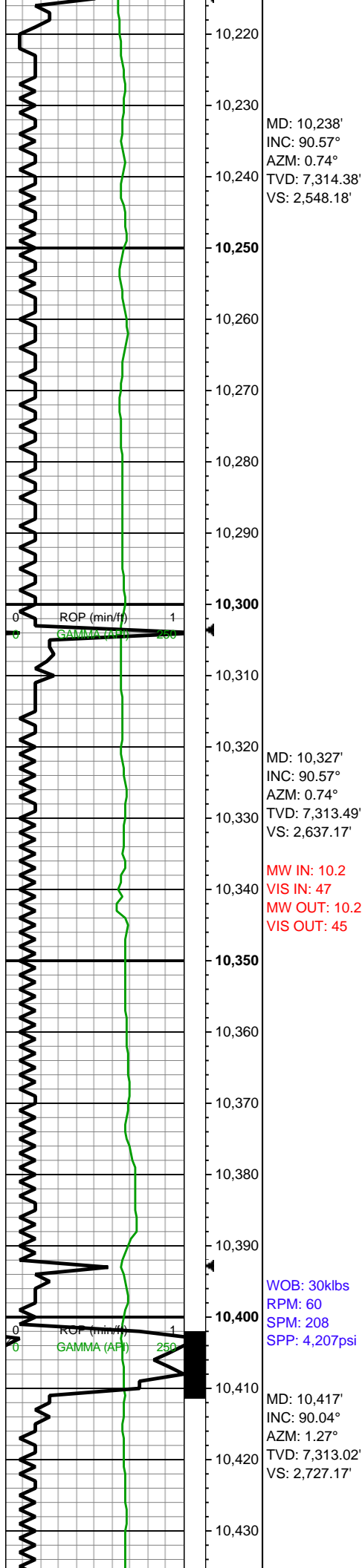




10000-10100 MRLST  
(65%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (65%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, v calc;  
MRLST (35%): med gy,  
dk gy-tr v dk gy, fri-brit,  
mod fis, abnt bent

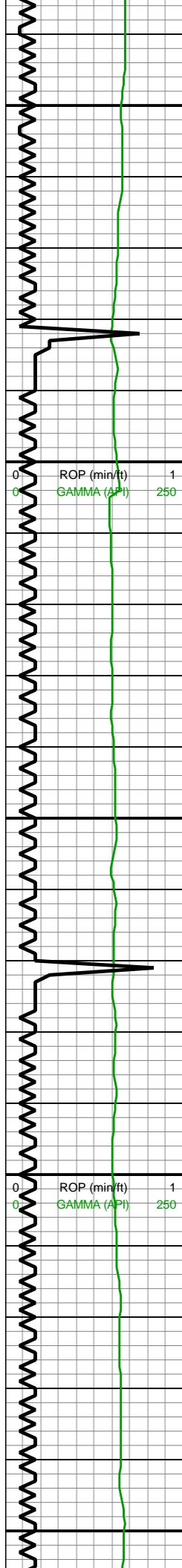
10100-10200 MRLST  
(70%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (65%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, abnt  
bent, v calc





10200-10300 MRLST  
(75%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (65%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, abnt  
bent, tr foram, v calc

10300-10400 MRLST  
(75%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (65%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, abnt  
bent, tr foram, v calc



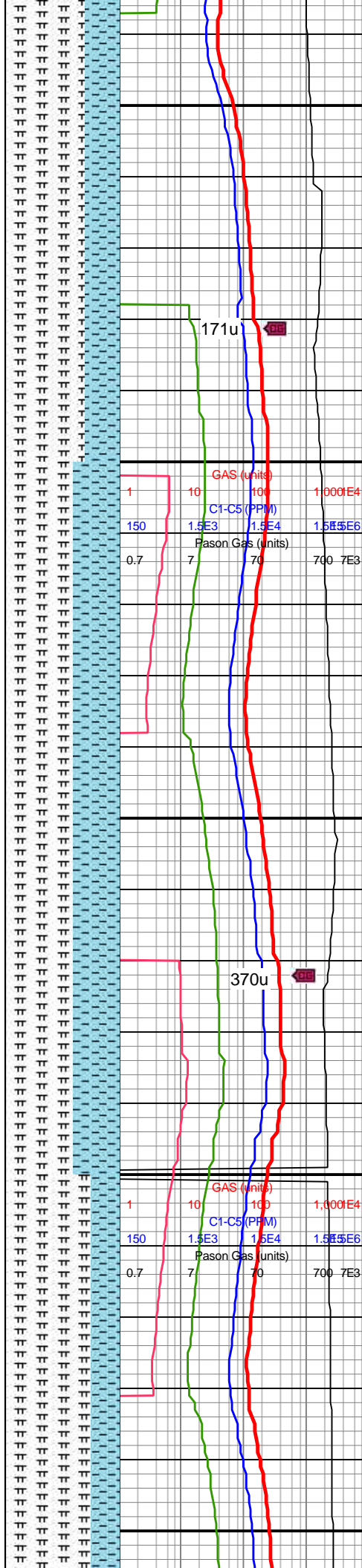
10,440  
10,450  
10,460  
10,470  
10,480  
10,490  
10,500  
10,510  
10,520  
10,530  
10,540  
10,550  
10,560  
10,570  
10,580  
10,590  
10,600  
10,610  
10,620  
10,630  
10,640  
10,650

MD: 10,506'  
INC: 90.22°  
AZM: 1.62°  
TVD: 7,312.81'  
VS: 2,816.17'

MW IN: 10.2  
VIS IN: 47  
MW OUT: 10.2  
VIS OUT: 45

MD: 10,595'  
INC: 90.75°  
AZM: 1.62°  
TVD: 7,312.06'  
VS: 2,905.16'

WOB: 38klbs  
RPM: 60  
SPM: 208  
SPP: 4,842psi

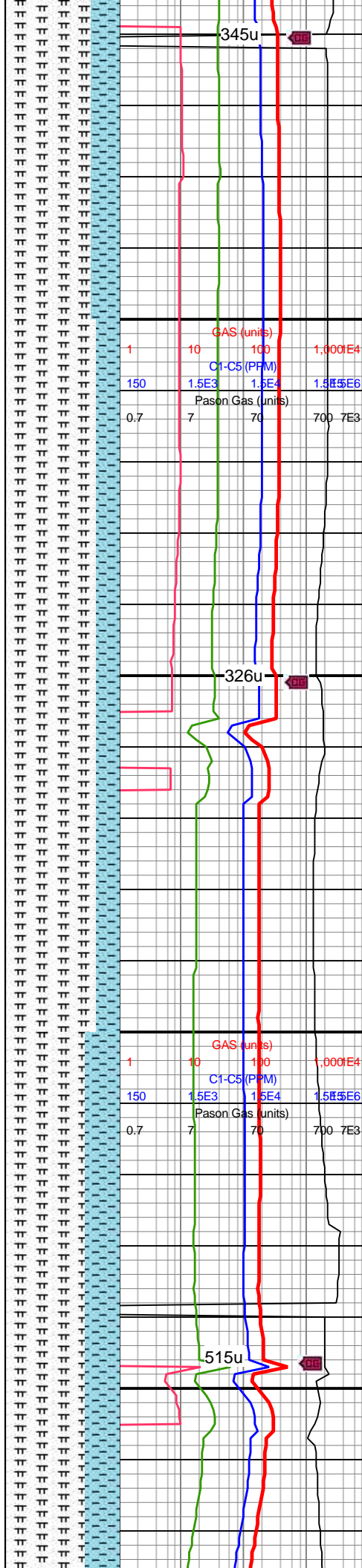
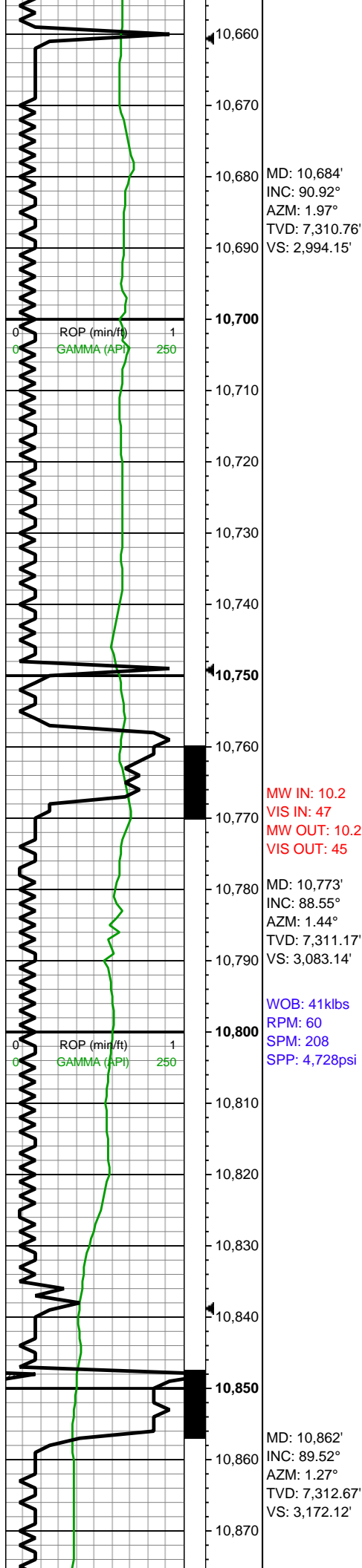


171u

370u

10400-10500 MRLST  
(70%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (30%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, tr bent,  
tr foram, v calc

10500-10600 MRLST  
(60%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (40%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, tr bent,  
tr foram, v calc



10600-10700 MRLST  
(75%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (30%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, occ  
bent, tr foram, v calc

10700-10800 MRLST  
(80%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (20%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, occ  
bent, tr foram, v calc

10800-10900 MRLST  
(70%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (30%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, occ  
bent, tr foram, v calc





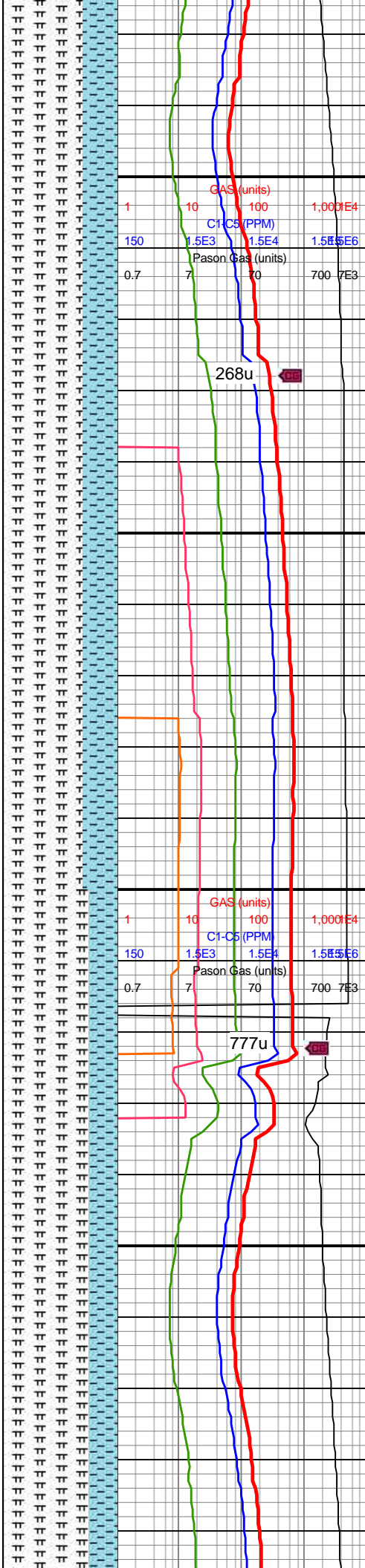
10,880  
10,890  
10,900  
10,910  
10,920  
10,930  
10,940  
10,950  
10,960  
10,970  
10,980  
10,990  
11,000  
11,010  
11,020  
11,030  
11,040  
11,050  
11,060  
11,070  
11,080  
11,090

MW IN: 10.2  
VIS IN: 46  
MW OUT: 10.2  
VIS OUT: 45

MD: 10,951'  
INC: 90.22°  
AZM: 0.74°  
TVD: 7,312.88'  
VS: 3,261.12'

WOB: 40klbs  
RPM: 60  
SPM: 208  
SPP: 4,732psi

MD: 11,040'  
INC: 89.87°  
AZM: 1.44°  
TVD: 7,312.81'  
VS: 3,350.12'



GAS (units)  
1 10 100 1,000 E4  
C1-C5 (PPM)  
150 1.5E3 1.5E4 1.5E6  
Pason Gas (units)  
0.7 7 70 700 7E3

268u

GAS (units)  
1 10 100 1,000 E4  
C1-C5 (PPM)  
150 1.5E3 1.5E4 1.5E6  
Pason Gas (units)  
0.7 7 70 700 7E3

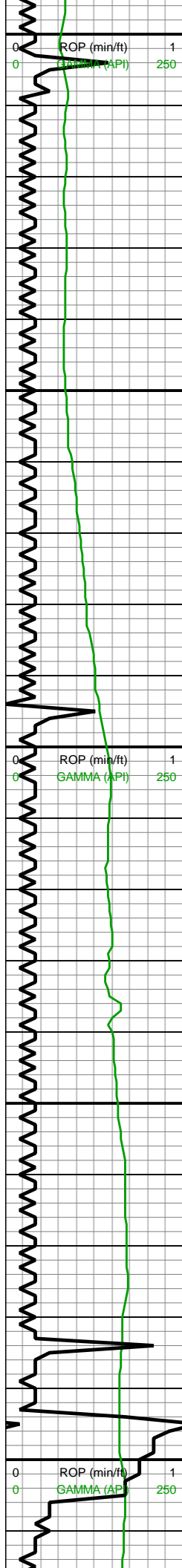
777u

dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (30%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, tr bent,  
tr foram, tr pyr nod, v calc

10900-11000 MRLST  
(70%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (30%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, tr bent,  
tr foram, tr pyr nod, v calc

11000-11100 MRLST  
(75%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (25%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, tr bent,  
tr foram, tr pyr nod, v calc





11,100  
11,110  
11,120  
11,130  
11,140  
11,150  
11,160  
11,170  
11,180  
11,190  
11,200  
11,210  
11,220  
11,230  
11,240  
11,250  
11,260  
11,270  
11,280  
11,290  
11,300  
11,310

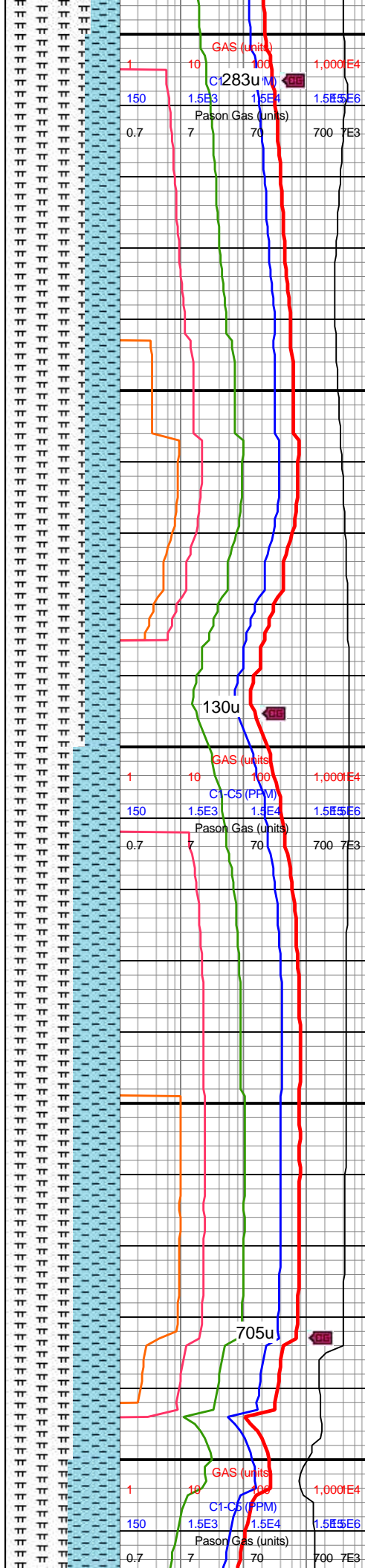
MD: 11,129'  
INC: 90.4°  
AZM: 1.97°  
TVD: 7,312.6'  
VS: 3,439.12'

MW IN: 10.2  
VIS IN: 46  
MW OUT: 10.22  
VIS OUT: 44

WOB: 26klbs  
RPM: 60  
SPM: 206  
SPP: 4,136psi

MD: 11,219'  
INC: 90.75°  
AZM: 1.27°  
TVD: 7,311.69'  
VS: 3,529.11'

MD: 11,308'  
INC: 89.34°  
AZM: 3.03°  
TVD: 7,311.62'  
VS: 3,618.09'



11100-11200 MRLST  
(70%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (30%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, tr bent,  
tr foram, tr pyr nod, v calc

11200-11300 MRLST  
(60%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (40%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, occ  
bent, tr foram, tr pyr nod, v  
calc

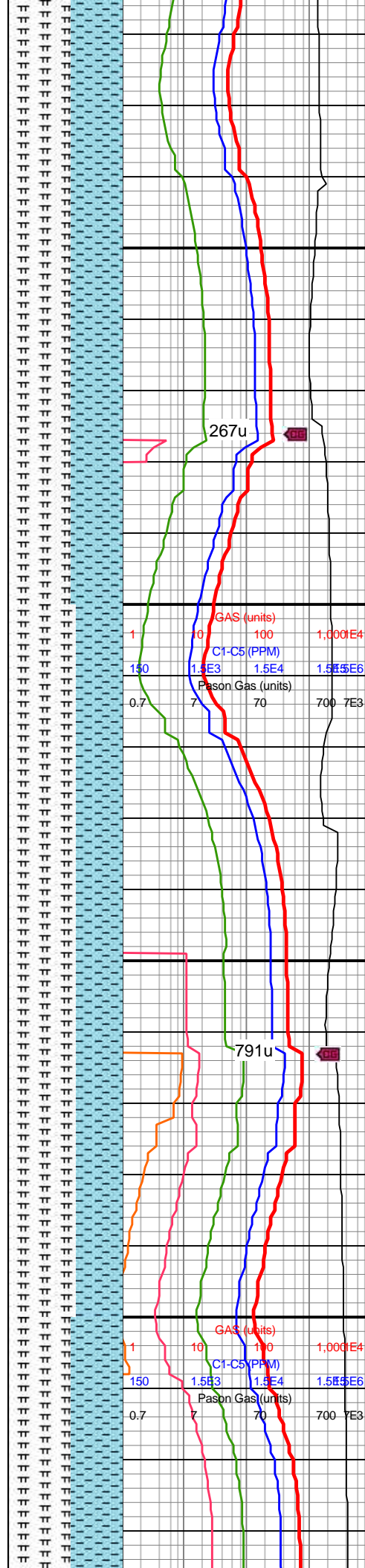


MW IN: 10.2  
VIS IN: 46  
MW OUT: 10.2  
VIS OUT: 44

MD: 11,397'  
INC: 89.87°  
AZM: 2.68°  
TVD: 7,312.24'  
VS: 3,707.05'

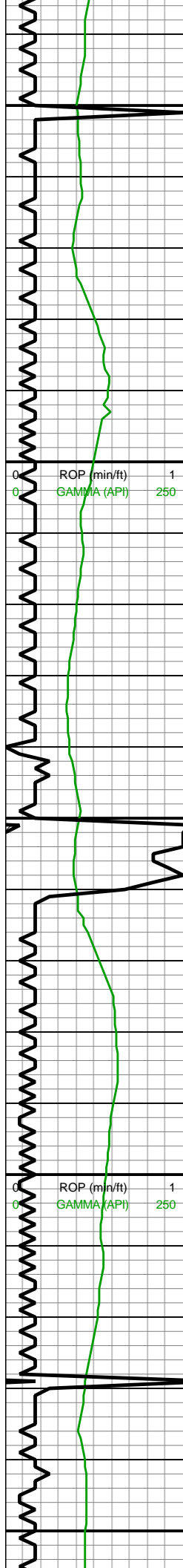
WOB: 42klbs  
RPM: 60  
SPM: 208  
SPP: 4,812psi

MD: 11,486'  
INC: 89.87°  
AZM: 2.32°  
TVD: 7,312.44'  
VS: 3,796.02'



11300-11400 MRLST  
(55%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, mod  
calc CHK (45%): pred  
med gy, lt gy, vf-f xln,  
fri-hrd, tr lam, rthy-chky  
tex, occ mrlst incl, occ  
bent, tr foram, tr pyr nod, v  
calc

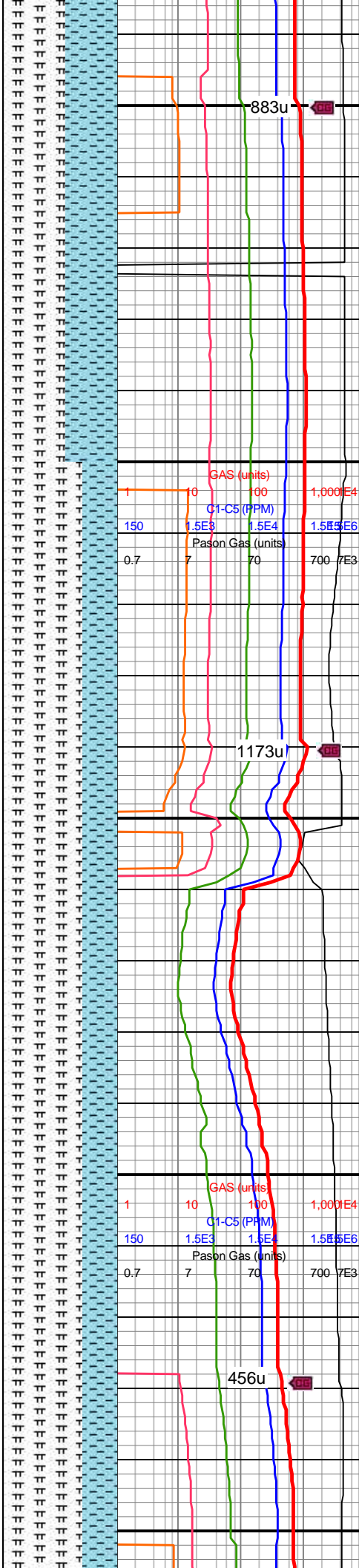
11400-11500 MRLST  
(60%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, intbd  
chk frags, mod calc CHK  
(40%): pred med gy, lt gy,  
vf-f xln, fri-hrd, tr lam,  
rthy-chky tex, occ mrlst  
incl, occ bent, tr foram, tr  
pyr nod, v calc



MINDEPTH  
07/22/2019  
MD: 11,575'  
INC: 89.6°  
AZM: 2.68°  
TVD: 7,312.85'  
VS: 3,884.99'  
MW IN: 10.2  
VIS IN: 47  
MW OUT: 10.2  
VIS OUT: 45  
WOB: 41klbs  
RPM: 60  
SPM: 209  
SPP: 4,815psi

MD: 11,664'  
INC: 89.96°  
AZM: 0.92°  
TVD: 7,313.19'  
VS: 3,973.98'

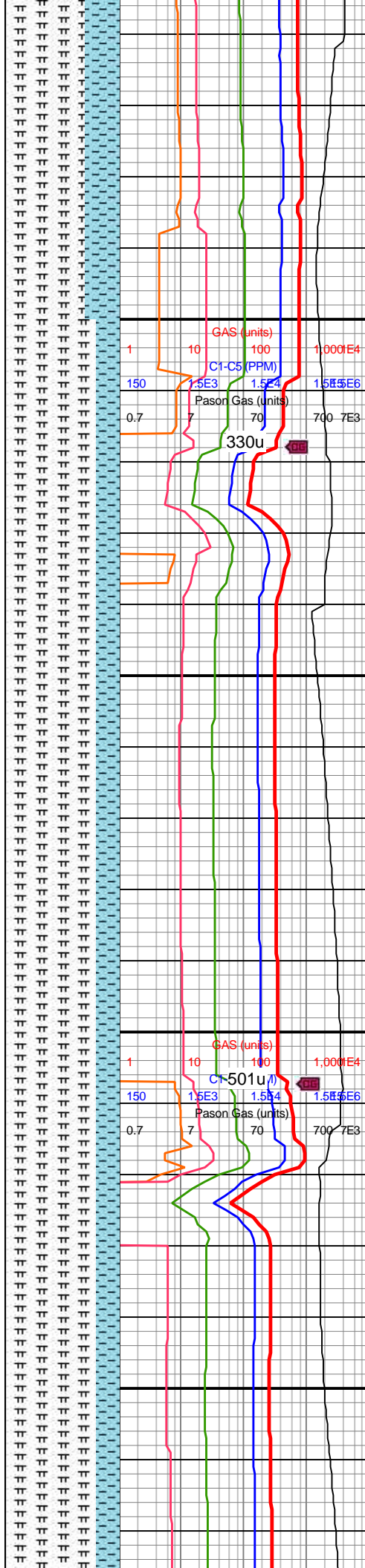
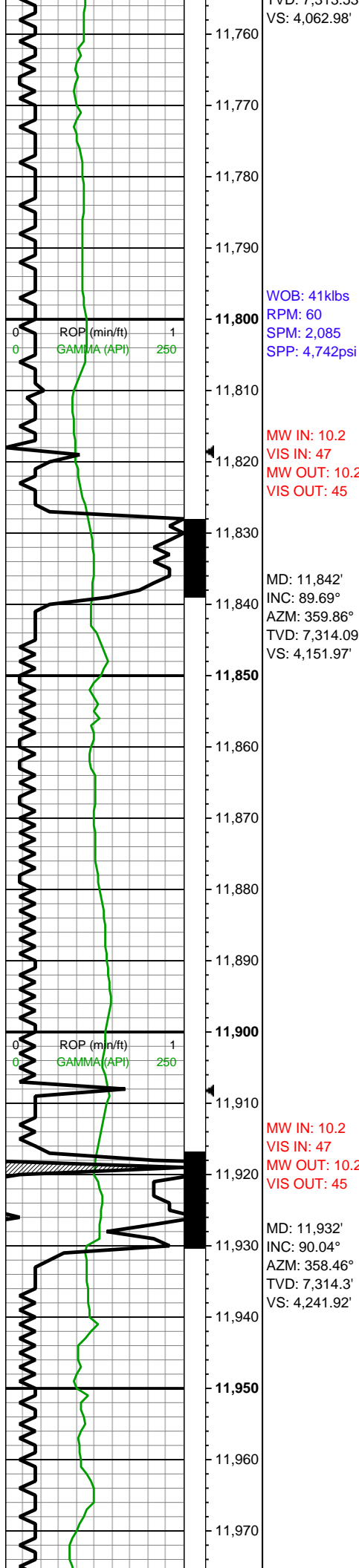
MD: 11,753'  
INC: 89.6°  
AZM: 0.92°  
TVD: 7,313.53'



11500-11600 MRLST  
(55%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, intbd  
chk frags, mod calc CHK  
(45%): pred med gy, lt gy,  
vf-f xln, fri-hrd, tr lam,  
rthy-chky tex, occ mrlst  
incl, occ bent, tr foram, tr  
pyr nod, v calc

11600-11700 MRLST  
(70%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, intbd  
chk frags, mod calc CHK  
(30%): pred med gy, lt gy,  
vf-f xln, fri-hrd, tr lam,  
rthy-chky tex, occ mrlst  
incl, rr bent, tr foram, v  
calc

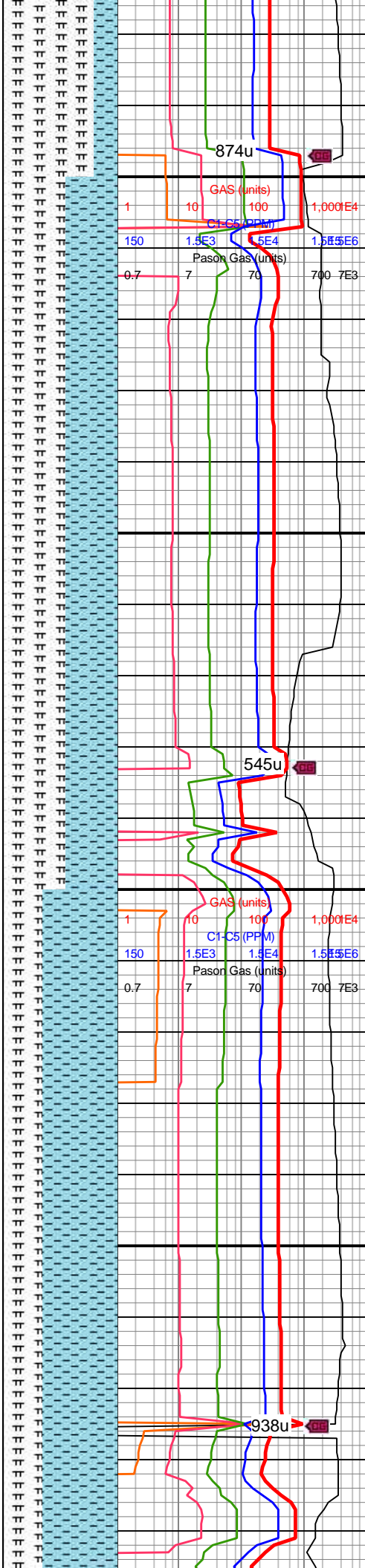
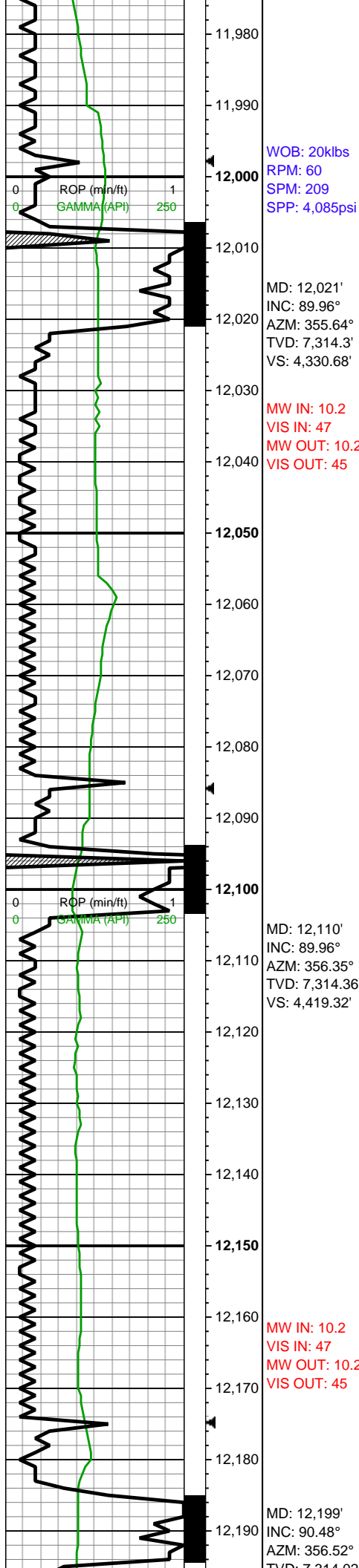




11700-11800 MRLST  
(70%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, intbd  
chk frags, mod calc CHK  
(25%): pred med gy, lt gy,  
vf-f xln, fri-hrd, tr lam,  
rthy-chky tex, occ mrlst  
incl, rr bent, tr foram, v  
calc

11800-11900 MRLST  
(80%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb  
blky-sb ang, arg tex, intbd  
chk frags, mod calc CHK  
(20%): pred med gy, lt gy,  
vf-f xln, fri-hrd, tr lam,  
rthy-chky tex, occ mrlst  
incl, rr bent, tr foram, v  
calc

11900-12000 MRLST  
(80%): med gy, dk gy-tr v  
dk gy, fri-brit, mod fis, sb



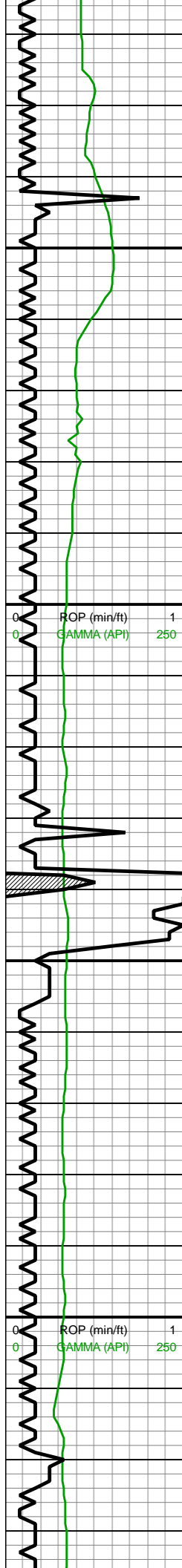
dk gy, m-bnt, mod ls, sb  
blky-sb ang, arg tex, intbd  
chk frags, mod calc CHK  
(20%): pred med gy, lt gy,  
vf-f xln, fri-hrd, tr lam,  
rthy-chky tex, occ mrlst  
incl, rr bent, tr foram, v  
calc

12000-12100 MRLST  
(55%): dk gy-v dk gy mod  
calc sh wi brn marl incl,  
frm-brit, sb blky-blky mod  
fis ctngs wi sm-sl slty tex,  
tr tn bent, wi incr wh chky  
foram incl grd to chk;  
CHK (45%): predy gy-dk  
gy wi f wh chky incl, occ lt  
gy ip, frm-brit mod fis sb  
blky-blky v arg LS wi  
sm-sl slty tex, tr fos frags  
& mict cal, hi calc

12100-12200 CHK  
(65%): predy gy-dk gy wi f  
wh chky incl, occ lt gy ip,  
frm-brit mod fis sb  
blky-blky v arg LS wi  
sm-sl slty tex, tr fos frags  
& mict cal, hi calc;  
MRLST (35%): dk gy-v dk  
gy, frm-brit, sb blky-blky  
mod fis ctngs wi sm-sl  
slty tex, tr tn bent, mod  
calc wi brn marl read







12,420  
12,430  
12,440  
12,450  
12,460  
12,470  
12,480  
12,490  
12,500  
12,510  
12,520  
12,530  
12,540  
12,550  
12,560  
12,570  
12,580  
12,590  
12,600  
12,610  
12,620  
12,630

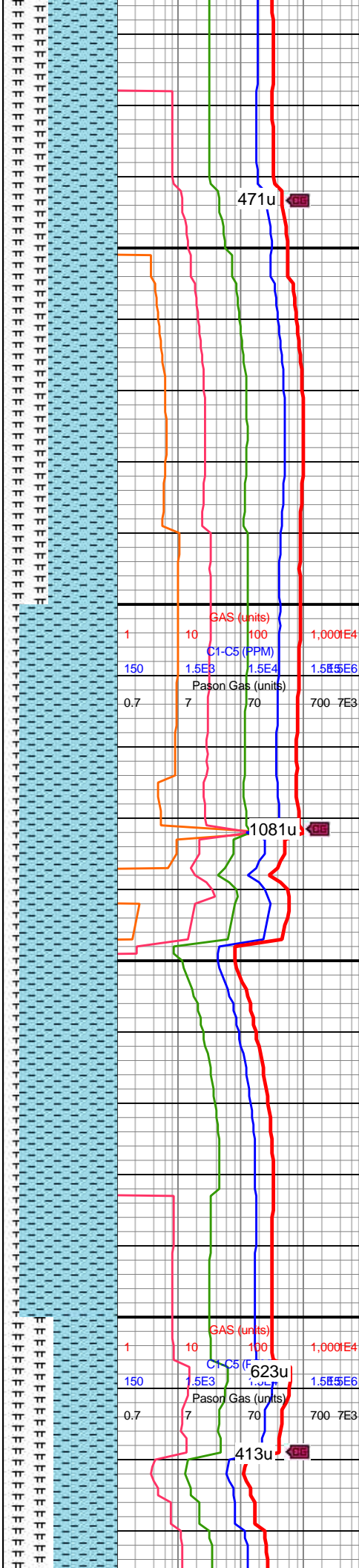
MD: 12,466'  
INC: 91.36°  
AZM: 357.4°  
TVD: 7,309.3'  
VS: 4,774.06'

MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 47

MD: 12,556'  
INC: 90.04°  
AZM: 358.28°  
TVD: 7,308.2'  
VS: 4,863.9'

WOB: 40klbs  
RPM: 60  
SPM: 207  
SPP: 4,700psi

MW IN: 10.1  
VIS IN: 48  
MW OUT: 10.0  
VIS OUT: 47



471u

GAS (units)  
C1-C5 (PPM)  
Pason Gas (units)

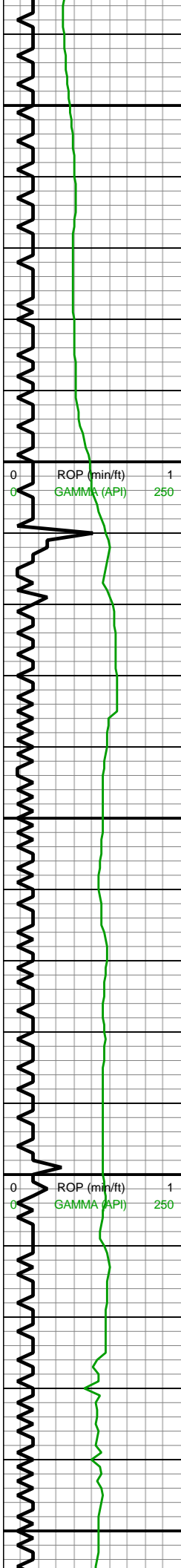
1081u

623u

413u

12400-12500 CHK  
(65%): lt gy-lt  
gyshbn-gy-occ dk gy,  
com f-u f wh chky incl  
thru, l-mod fis sb  
frm-crunchy-brit sb rd-sb  
blky-blky ctngs wi sl slty  
tex, slty-sm ip, tr mict cal,  
hi calc; MRLST (35%): dk  
gy-v dk gy, frm-brit sb  
blky-blky mod fis sh wi  
sm-sl slty tex, rr-tr vf-pp  
pyr, mod calc

12500-12600 CHK  
(85%): lt  
gy-gyshbn-gy-occ dk gy  
wi com f-u f wh chky incl,  
frm-brit, sb frm ip, l-mod  
fis sb rd-sb blky-blky  
ctngs wi sl slty tex,  
slty-sm ip, tr mict cal, hi  
calc; MRLST (15%): dk-v  
dk gy, frm-hd-brid, sb  
blky-blky mod fis ctngs wi  
sl slty-slt tex, mod calc  
wi brn marly resdl

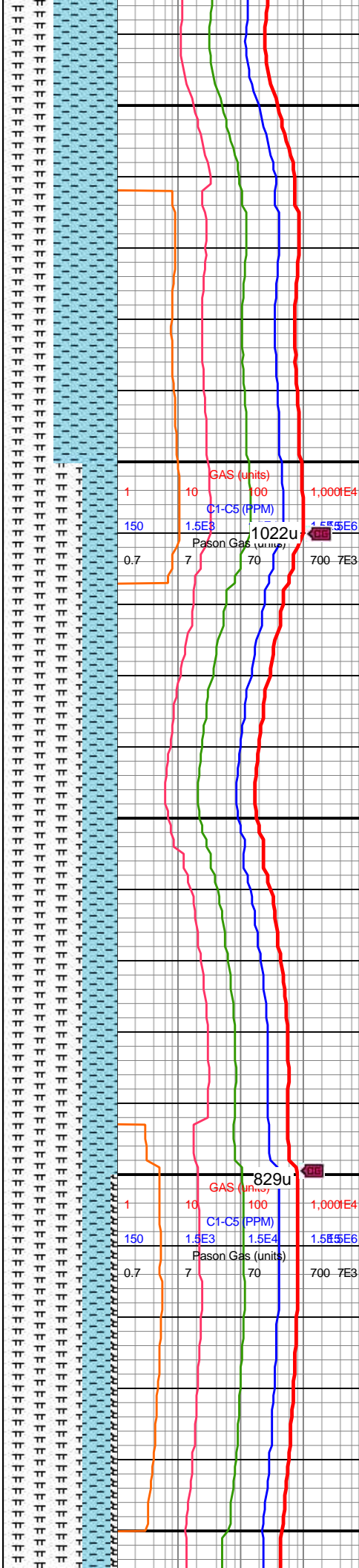


MD: 12,645'  
INC: 90.4°  
AZM: 358.81°  
TVD: 7,307.85'  
VS: 4,952.81'

MD: 12,734'  
INC: 89.78°  
AZM: 358.1°  
TVD: 7,307.71'  
VS: 5,041.71'

WOB: 41klbs  
RPM: 60  
SPM: 207  
SPP: 4,750psi

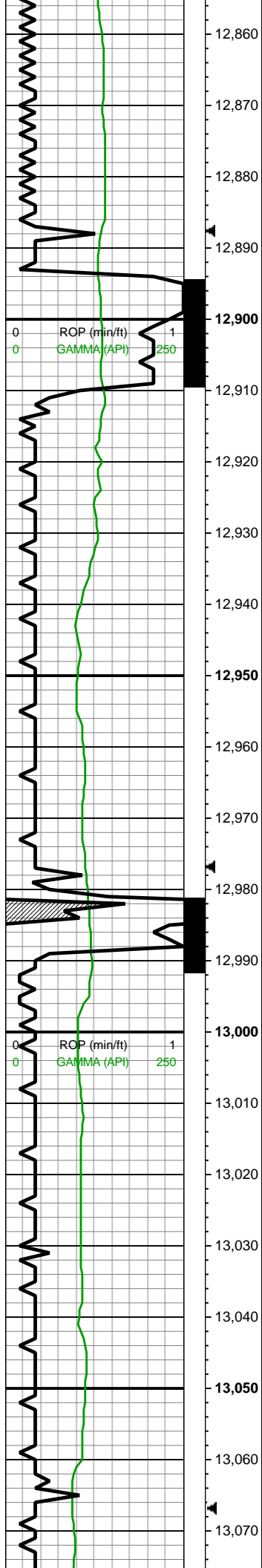
MD: 12,823'  
INC: 91.1°  
AZM: 0.39°  
TVD: 7,307.03'  
VS: 5,130.65'



12600-12700 CHK  
(55%): lt gy-med gy-occ  
dk gy v arg LS wi com f-u  
f wh chky incl, l-mod fis  
sb frm-crunchy-brit sb  
rd-sb blkyl-blky ctngs wi  
sm-sl sl slty tex, tr tn  
bent, hi calc; MRLST  
(45%): dk gy-v dk gy,  
frm-brit sb blkyl-blky mod  
fis sh wi sm-sl slty tex,  
rr-tr vf-pp pyr, mod calc wi  
brn marl resdl

12700-12800 MRLST  
(70%): dk-v dk gy,  
frm-hd-brid, sb blkyl-blky  
mod fis ctngs wi sl  
slty-slty tex, tr tn bent,  
mod calc wi brn marly  
resdl; CHK (30%): lt  
gy-med gy-occ dk gy v arg  
LS wi com f-u f wh chky  
incl, frm-brit l-mod fis sb  
rd-sb blkyl-blky ctngs wi  
sm-sl sl slty tex, hi calc

12800-12900 MRLST  
(70%): dk-v dk gy,  
frm-hd-brid, sb blkyl-blky  
mod fis ctngs wi sl  
slty-slty tex, tr tn bent,  
mod calc wi brn marly  
resdl; CHK (30%): lt  
gy-med gy-occ dk gy v arg  
LS wi com f-u f wh chky  
incl, frm-brit l-mod fis sb  
rd-sb blkyl-blky ctngs wi  
sm-sl sl slty tex, hi calc



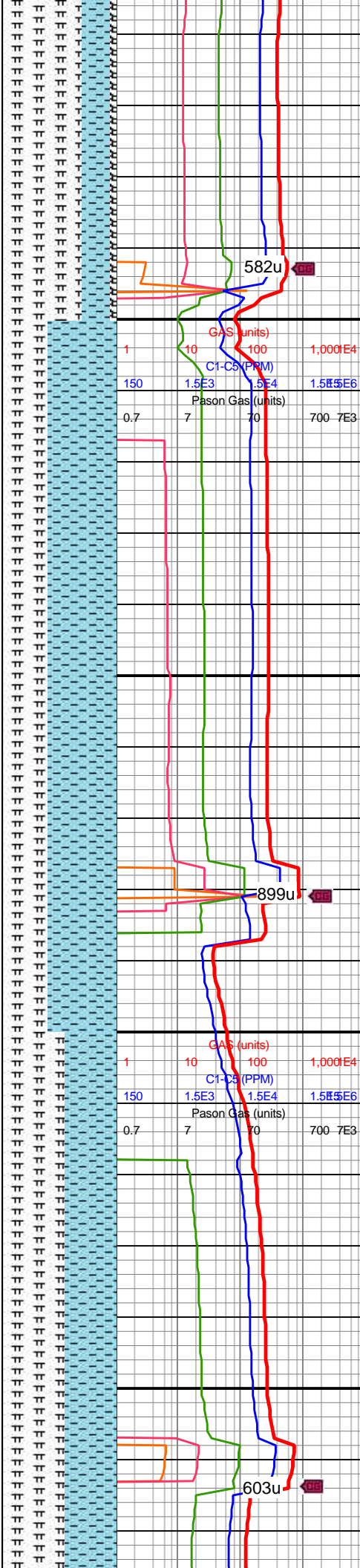
MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 46

MD: 12,912'  
INC: 89.6°  
AZM: 358.1°  
TVD: 7,306.49'  
VS: 5,219.59'

MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 46

WOB: 42klbs  
RPM: 60  
SPM: 207  
SPP: 4,690psi

MD: 13,001'  
INC: 89.25°  
AZM: 357.05°  
TVD: 7,307.38'  
VS: 5,308.41'



582u

899u

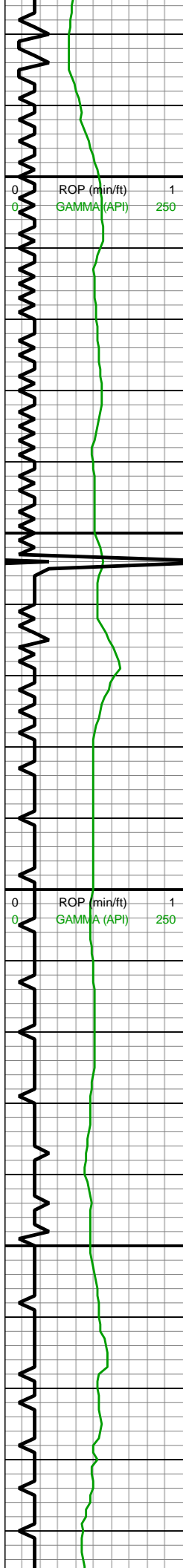
603u

(70%): dk-v dk gy,  
frm-hd-brit, sb blkly-blky  
mod fis ctngs wi sl  
silty-silty tex, rr tn bent,  
mod calc wi brn marly  
resdl; CHK (25%): lt  
gy-med gy-occ dk gy v arg  
LS wi com f-u f wh chky  
incl, frm-brit l-mod fis sb  
rd-sb blkly-blky ctngs wi  
sm-sl sl slty tex, hi calc;  
BENT (rr): tn, sb frm-frm,  
crunchy-brit, xln ip, hi flor,  
non calc

12900-13000 CHK  
(60%): lt gy-gy, l-mod fis  
frm-brit sb rd-sb blkly-sb  
pity ctngs, sm-sl sl slty  
tex, rr c chky forams, tr  
fos frags, tr tn bent, hi  
calc; MRLST (40%): dk  
gy-v dk gy, frm-brit sb  
blkly-blky mod fis sh wi  
sm-sl slty tex, rr-tr vf-pp  
pyr, mod calc wi brn marl  
resdl

13000-13100 MRLST  
(55%): dk-v dk gy,  
frm-hd-brit, sb blkly-blky  
mod fis ctngs wi sl  
silty-silty tex, rr tn bent,  
mod calc wi brn marly  
resdl





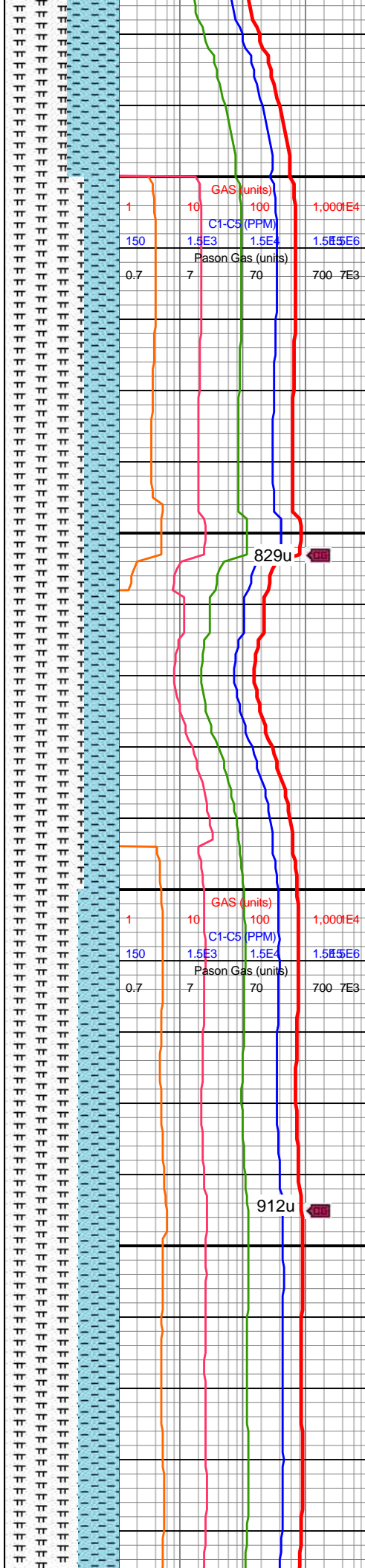
MD: 13,090'  
INC: 89.25°  
AZM: 356.87°  
TVD: 7,308.55'  
VS: 5,397.17'

MD: 13,179'  
INC: 88.99°  
AZM: 356.7°  
TVD: 7,309.91'  
VS: 5,485.9'

WOB: 41klbs  
RPM: 60  
SPM: 208  
SPP: 4,710psi

MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 46

MD: 13,268'  
INC: 88.64°  
AZM: 356.52°  
TVD: 7,311.75'  
VS: 5,574.6'

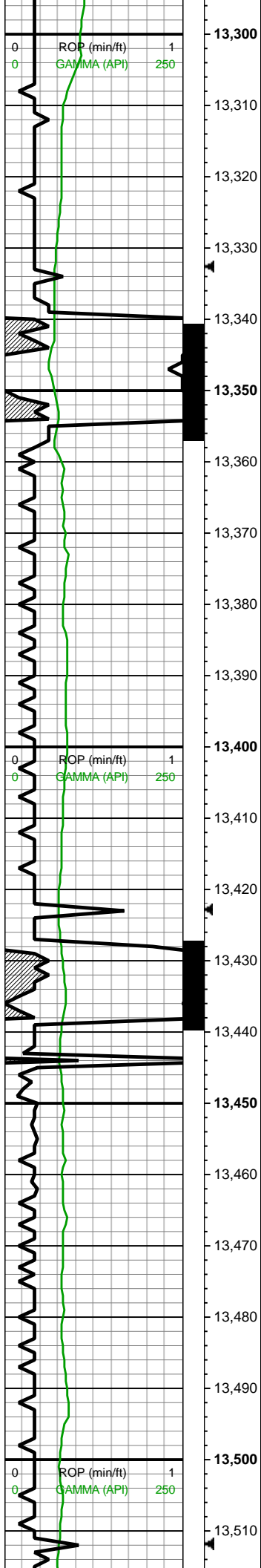


It gyshbn, med-dk gy ip  
wi chky foram incl grdg to  
mrlst wi decr chky incl ip,  
frm-brit l-mod fis sb rd-sb  
blky-blky ctngs wi sm-sl  
sl slty tex, hi calc

13100-13200 MRLST  
(70%): dk-v dk gy, dk  
gyshbn intbds ip,  
frm-hd-brit, sb blky-blky  
mod fis ctngs wi sl  
slty-slty tex, rr, mod calc;  
CHK (30%): lt gy-lt  
gyshbn, med-dk gy ip wi  
chky foram incl, frm-brit  
l-mod fis sb rd-sb  
blky-blky ctngs wi sm-sl  
sl slty tex, hi calc

13200-13300 MRLST  
(65%): dk-v dk gy, dk  
gyshbn intbds ip,  
frm-hd-brit, sb blky-blky  
mod fis ctngs wi sl  
slty-slty tex, rr, mod calc;  
CHK (35%): lt gy-lt  
gyshbn, med-dk gy ip wi  
chky foram incl, frm-brit  
l-mod fis sb rd-sb  
blky-blky ctngs wi sm-sl  
sl slty tex, hi calc



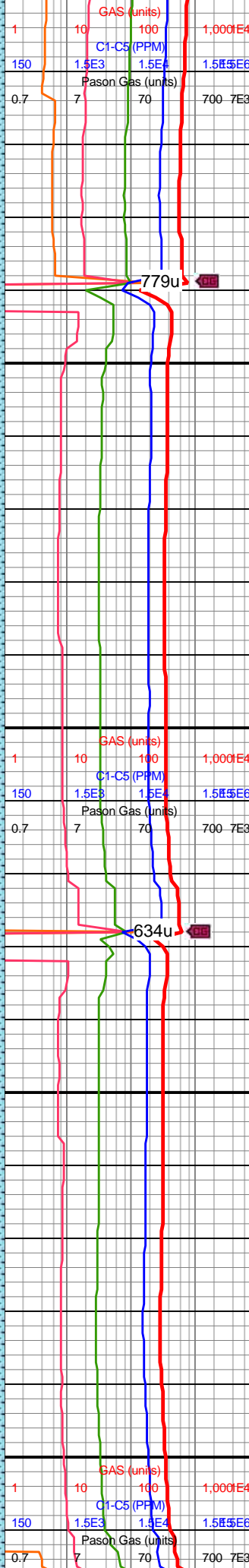


MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 47

MD: 13,357'  
INC: 89.25°  
AZM: 358.98°  
TVD: 7,313.39'  
VS: 5,663.42'

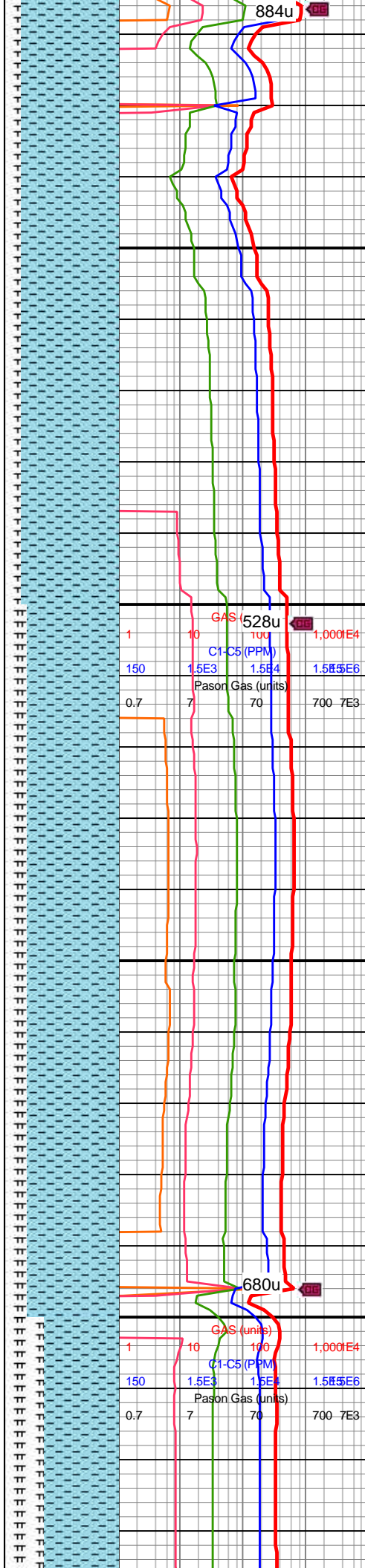
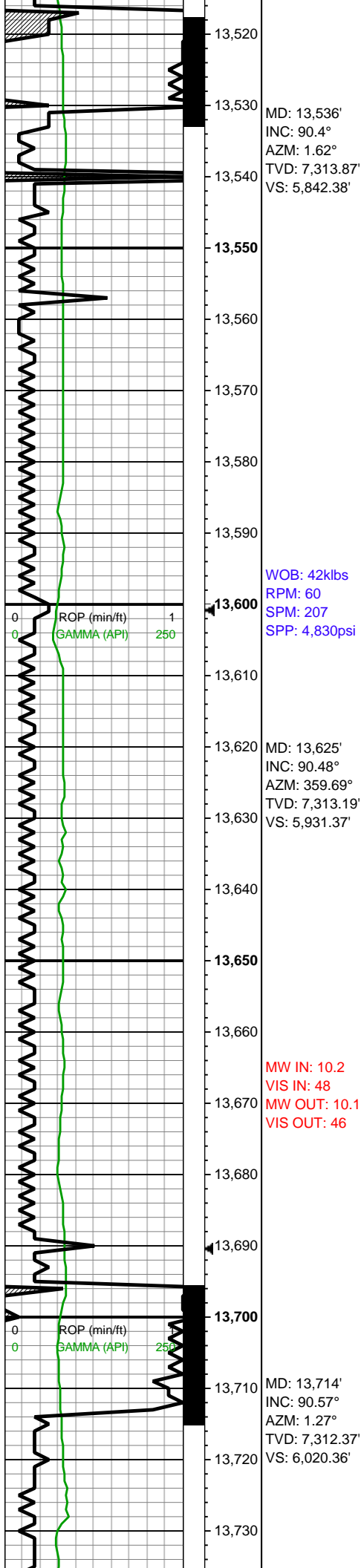
WOB: 41kbs  
RPM: 60  
SPM: 207  
SPP: 4,730psi

MD: 13,447'  
INC: 89.87°  
AZM: 0.39°  
TVD: 7,314.08'  
VS: 5,753.39'



13300-13400 CHK  
(75%): lt gy-gy-lt  
gyshbn-gyshbn, sb  
frm-frm, l-mod fis frm-brit  
sb rd-sb blk-sb plty  
ctngs, sm-sl sl slty tex, hi  
calc; MRLST (25%): dk  
gy-v dk gy, frm-brit sb  
blk-sb blk mod fis sh wi  
sm-sl slty tex, rr-tr vf-pp  
pyr, mod calc wi brn marl  
resdl

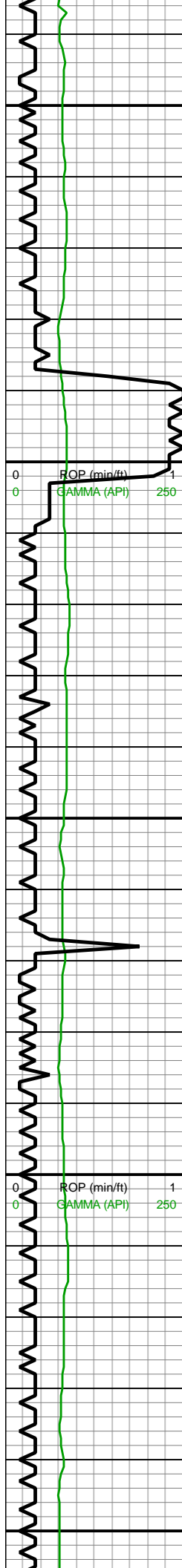
13400-13500 CHK  
(85%): lt gy-lt gyshbn, dk  
gy mot wi lt gyshbn lamn  
ip, sb frm-frm, l-mod fis  
frm-brit sb rd-sb blk-sb  
plty ctngs, sm-sl sl slty-sl  
bmpy mot tex, hi calc;  
MRLST (25%): dk gy-v dk  
gy, frm-brit, mod fis ctngs  
wi sm-sl slty tex, rr-tr  
vf-pp pyr, mod calc wi brn  
mrly resdl



13500-13600 CHK  
(85%): lt gy-gy-lt  
gyshbn-gyshbn, sb  
frm-frm, l-mod fis frm-brit  
sb rd-sb blk-y-sb plty  
ctngs, sm-sl sl slty tex, hi  
calc; MRLST (15%): dk  
gy-v dk gy, frm-brit sb  
blk-y-blky mod fis sh wi  
sm-sl slty tex, rr-tr vf-pp  
pyr, mod calc wi brn marl  
resdl

13600-13700 CHK  
(80%): lt gy-lt gyshbn,  
med-dk gy ip wi occ f  
chky incl, sb frm-frm-brit,  
l-mod fis sb rd-sb blk-y-sb  
plty ctngs, sm-sl sl slty  
tex, hi calc; MRLST  
(20%): dk gy-v dk gy sh  
sp wi occ brn marl incl,  
frm-brit, mod fis ctngs wi  
sm-sl slty tex, rr-tr vf-pp  
pyr, mod calc





13,740  
13,750  
13,760  
13,770  
13,780  
13,790  
13,800  
13,810  
13,820  
13,830  
13,840  
13,850  
13,860  
13,870  
13,880  
13,890  
13,900  
13,910  
13,920  
13,930  
13,940  
13,950

MW IN: 10.2  
VIS IN: 47  
MW OUT: 10.2  
VIS OUT: 46

WOB: 36klbs  
RPM: 29  
SPM: 206  
SPP: 4,050psi

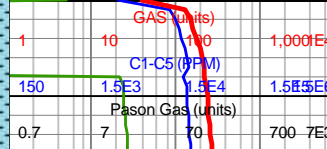
MD: 13,803'  
INC: 90.4°  
AZM: 3.38°  
TVD: 7,311.62'  
VS: 6,109.33'

MW IN: 10.2  
VIS IN: 48  
MW OUT: 10.2  
VIS OUT: 46

MD: 13,892'  
INC: 90.66°  
AZM: 2.85°  
TVD: 7,310.8'  
VS: 6,198.28'



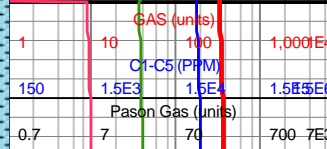
897u

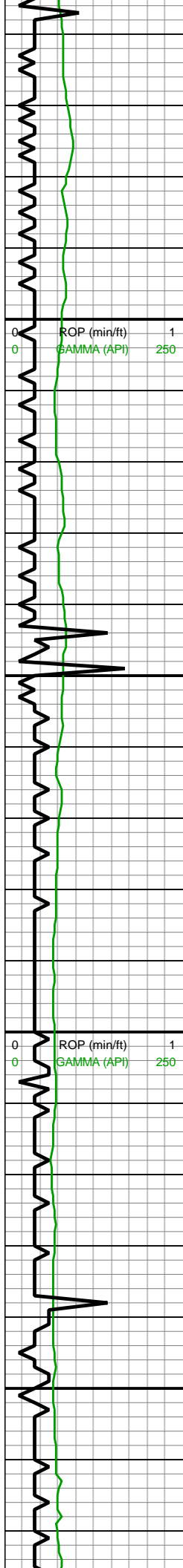


13700-13800 CHK  
(65%): lt gy-med gy, dk gy  
mot wi lt gyshbn lamn ip,  
predy frm-brit l-mod fis  
sb rd-sb blkyl-sb plty  
ctngs, sm-sl sl slty-sl  
bmpry mot tex, hi calc;  
MRLST (35%): dk gy-v dk  
gy, frm-brit, mod fis ctngs  
wi sm-sl slty tex, rr-tr  
vf-pp pyr, mod calc wi brn  
mrly resdl



13800-13900 CHK  
(80%): lt gy, med gy, rr dk  
gy, vf-f xln, fri-frm, lam ip,  
rthy-chky tex, v calc ;  
MRLST (20%): dk gy-v dk  
gy, fri-frm, mod fis ctngs,  
rr-tr vf-pyr grns, mod calc,  
brn arg resdl



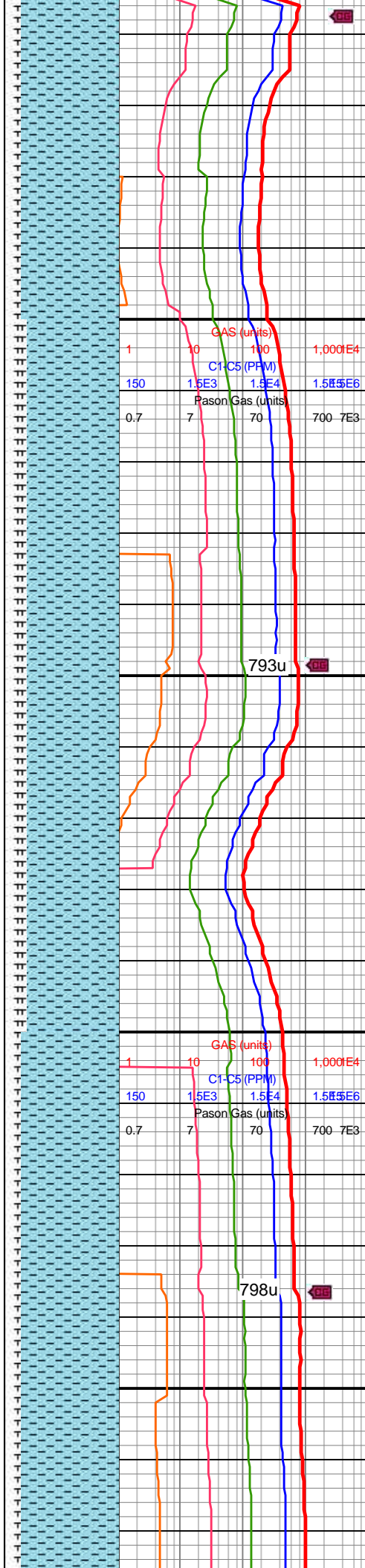


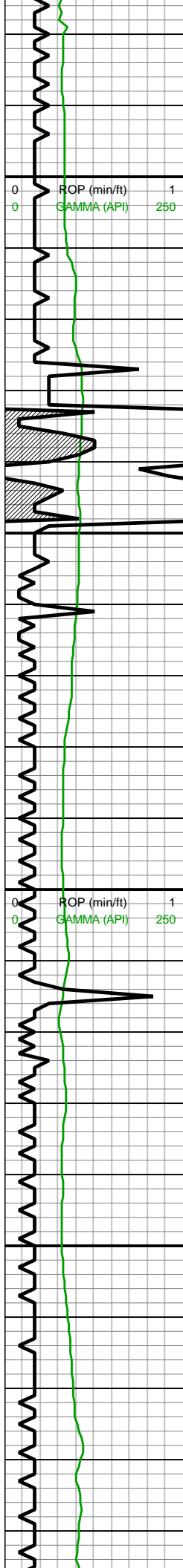
MD: 13,981'  
INC: 91.01°  
AZM: 3.03°  
TVD: 7,309.5'  
VS: 6,287.22'

WOB: 42klbs  
RPM: 60  
SPM: 208  
SPP: 4,842psi

MD: 14,070'  
INC: 91.1°  
AZM: 2.5°  
TVD: 7,307.86'  
VS: 6,376.17'

MD: 14,159'  
INC: 91.98°  
AZM: 2.5°  
TVD: 7,305.47'  
VS: 6,465.12'





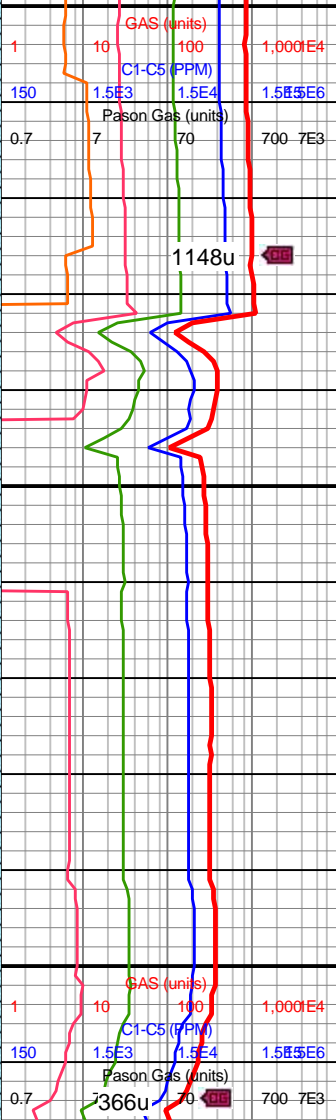
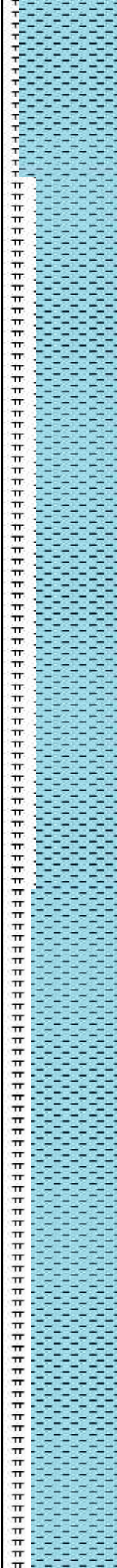
14,180  
14,190  
14,200  
14,210  
14,220  
14,230  
14,240  
14,250  
14,260  
14,270  
14,280  
14,290  
14,300  
14,310  
14,320  
14,330  
14,340  
14,350  
14,360  
14,370  
14,380  
14,390

WOB: 42klbs  
RPM: 60  
SPM: 207  
SPP: 4,652psi

MW IN: 10.2  
VIS IN: 47  
MW OUT: 10.2  
VIS OUT: 48

MD: 14,248'  
INC: 90.04°  
AZM: 2.32°  
TVD: 7,303.9'  
VS: 6,554.08'

MD: 14,338'  
INC: 91.01°  
AZM: 3.03°  
TVD: 7,303.08'  
VS: 6,644.04'



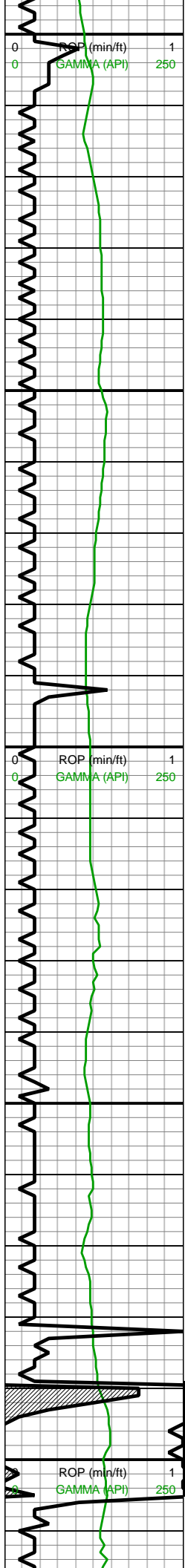
(65%): lt gy, med gy, rr dk  
gy, vf-f xln, fri-frm, lam ip,  
rthy-chky tex, v calc ;  
MRLST (15%): dk gy-v dk  
gy, fri-frm, occ wh chky  
incl, mod fis ctngs, rr-tr  
vf-pyr grns, brn arg resdl,  
mod calc,

14200-14300 CHK  
(70%): lt gy, med gy, rr dk  
gy, vf-f xln, fri-frm, lam ip,  
rthy-chky tex, v calc;  
MRLST (30%): dk gy-v dk  
gy, fri-frm, occ wh chky  
incl, mod fis ctngs, rr-tr  
vf-pyr grns, brn arg resdl,  
v tr foram, mod calc,

14300-14400 CHK  
(75%): lt gy, med gy, rr dk  
gy, vf-f xln, fri-frm, lam ip,  
rthy-chky tex, v calc;  
MRLST (25%): dk gy-v dk  
gy, fri-frm, occ wh chky  
incl, mod fis ctngs, rr-tr  
vf-pyr grns, brn arg resdl,







WOB: 41klbs  
RPM: 60  
SPM: 206  
SPP: 4,752psi

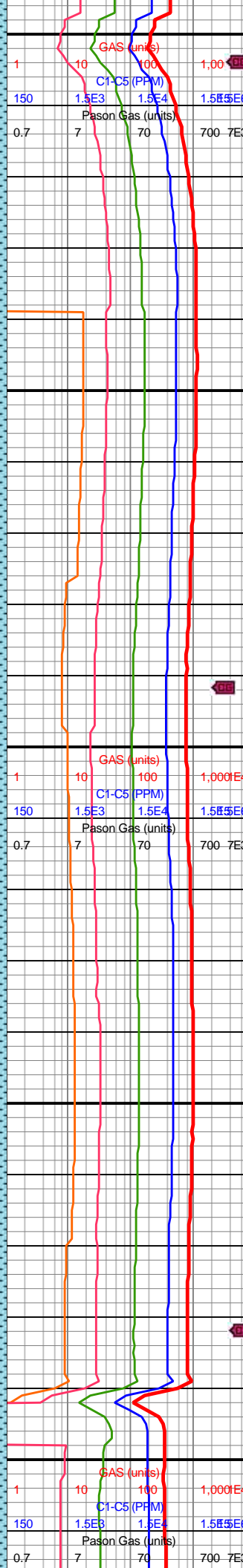
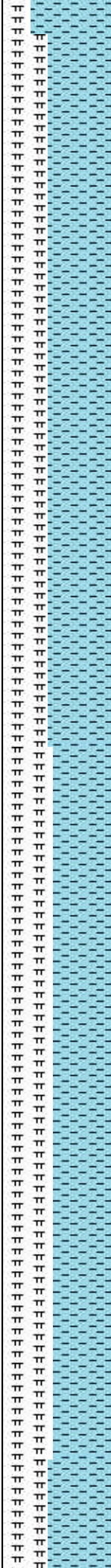
MD: 14,427'  
INC: 91.28°  
AZM: 2.85°  
TVD: 7,301.3'  
VS: 6,732.98'

MW IN: 10.2  
VIS IN: 47  
MW OUT: 10.2  
VIS OUT: 45

MD: 14,516'  
INC: 91.71°  
AZM: 2.32°  
TVD: 7,298.98'  
VS: 6,821.92'

WOB: 51klbs  
RPM: 39  
SPM: 208  
SPP: 4,160psi

MD: 14,605'  
INC: 90.4°  
AZM: 3.38°  
TVD: 7,297.34'  
VS: 6,910.86'

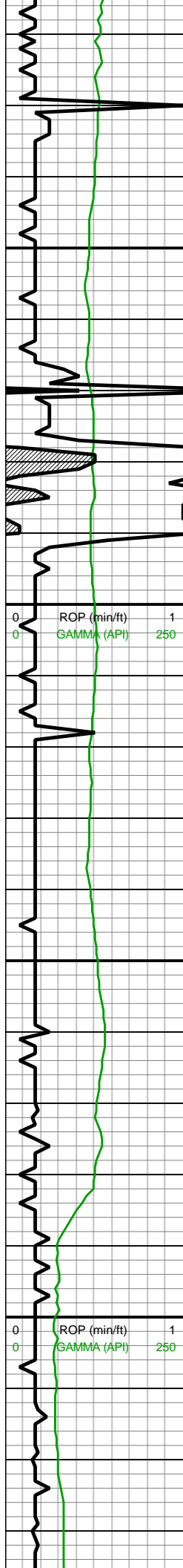


v tr foram, mod calc,

14400-14500 CHK  
(60%): lt gy, med gy, rr dk gy, vf-f xln, fri-frm, lam ip, rthy-chky tex, v calc;  
MRLST (40%): dk gy-v dk gy, fri-frm, occ wh chky incl, mod fis ctngs, brn arg resdl, v tr foram, mod calc,

14500-14600 CHK  
(55%): lt gy, med gy, rr dk gy, vf-f xln, fri-frm, lam ip, rthy-chky tex, v calc;  
MRLST (45%): dk gy-v dk gy, fri-frm, occ wh chky incl, mod fis ctngs, brn arg resdl, v tr foram, mod calc,





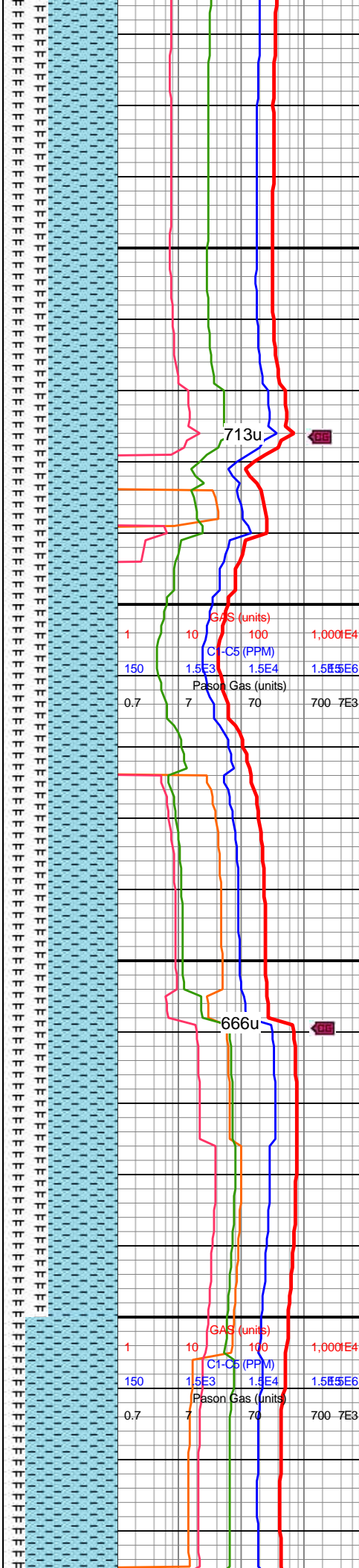
MW IN: 10.2  
VIS IN: 47  
MW OUT: 10.2  
VIS OUT: 45

MD: 14,694'  
INC: 88.29°  
AZM: 3.73°  
TVD: 7,298.35'  
VS: 6,999.77'

MW IN: 10.2  
VIS IN: 47  
MW OUT: 10.2  
VIS OUT: 45

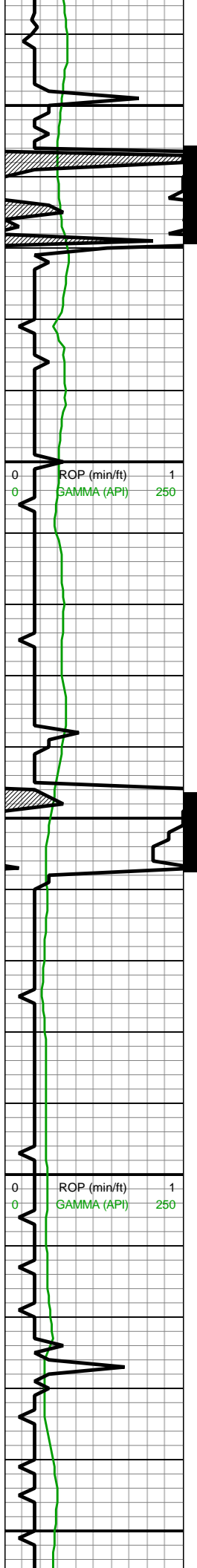
MD: 14,783'  
INC: 88.2°  
AZM: 2.85°  
TVD: 7,301.08'  
VS: 7,088.67'

WOB: 35klbs  
RPM: 60  
SPM: 207  
SPP: 4,750psi



14600-14700 CHK  
(60%): lt gy, med gy, rr dk  
gy, vf-f xln, fri-frm, lam ip,  
rthy-chky tex, v calc;  
MRLST (40%): dk gy-v dk  
gy, fri-frm, occ wh chky  
incl, mod fis ctngs, brn  
arg resdl, v tr foram, mod  
calc,

14700-14800 CHK  
(60%): lt gy, med gy, rr dk  
gy, vf-f xln, fri-frm, lam ip,  
rthy-chky tex, v calc;  
MRLST (40%): dk gy-v dk  
gy, fri-frm, occ wh chky  
incl, mod fis ctngs, brn  
arg resdl, v tr foram, mod  
calc,



14,840  
14,850  
14,860  
14,870  
14,880  
14,890  
14,900  
14,910  
14,920  
14,930  
14,940  
14,950  
14,960  
14,970  
14,980  
14,990  
15,000  
15,010  
15,020  
15,030  
15,040  
15,050

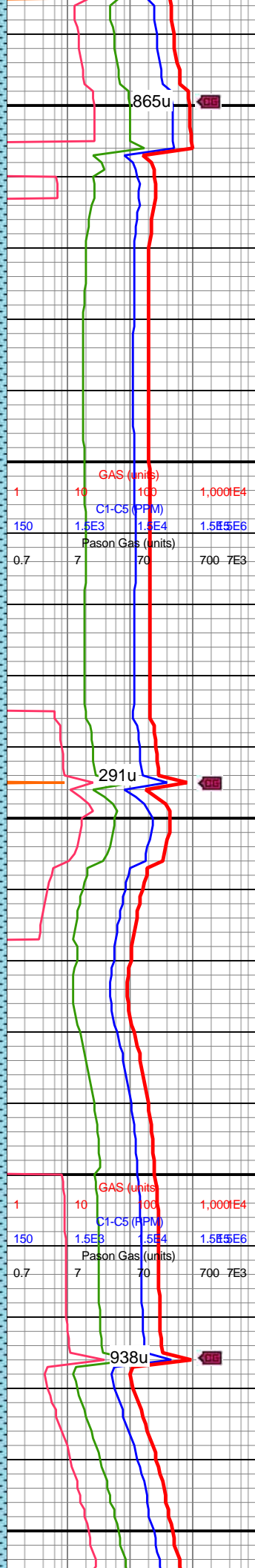
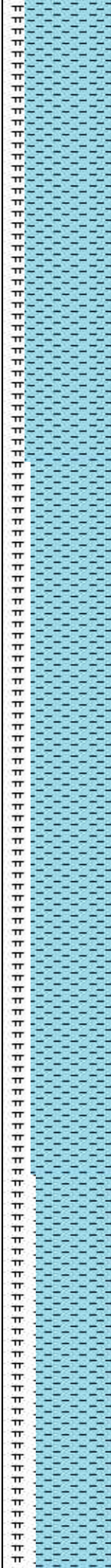
MW IN: 10.2  
VIS IN: 47  
MW OUT: 10.2  
VIS OUT: 45

MD: 14,873'  
INC: 88.29°  
AZM: 3.2°  
TVD: 7,303.84'  
VS: 7,178.58'

WOB: 37klbs  
RPM: 60  
SPM: 206  
SPP: 4,815psi

MW IN: 10.2  
VIS IN: 47  
MW OUT: 10.2  
VIS OUT: 45

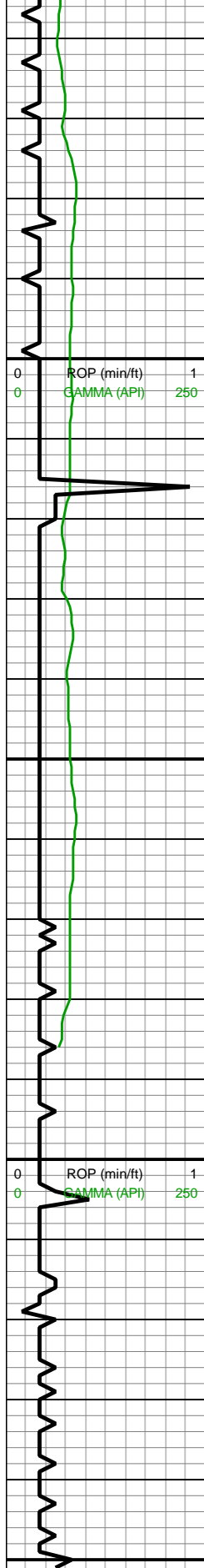
MD: 15,051'  
INC: 90.04°  
AZM: 5.14°  
TVD: 7,305.88'



14800-14900 CHK  
(80%): lt gy, med gy-gy  
brn, vf-f xln, fri-frm, lam ip,  
rthy-chky tex, v calc;  
MRLST (20%): dk gy-v dk  
gy, fri-frm, occ wh chky  
incl, mod fis ctngs, brn  
arg resdl, mod calc,

14900-15000 CHK  
(75%): lt gy, med gy-gy  
brn, vf-f xln, fri-frm, lam ip,  
rthy-chky tex, v calc;  
MRLST (25%): dk gy-v dk  
gy, fri-frm, occ wh chky  
incl, mod fis ctngs, brn  
arg resdl, mod calc,





VS: 7,356.31'

ROP (min/ft) 1  
GAMMA (API) 250

MD: 15,140'  
INC: 90.31°  
AZM: 4.43°  
TVD: 7,305.61'  
VS: 7,445.13'

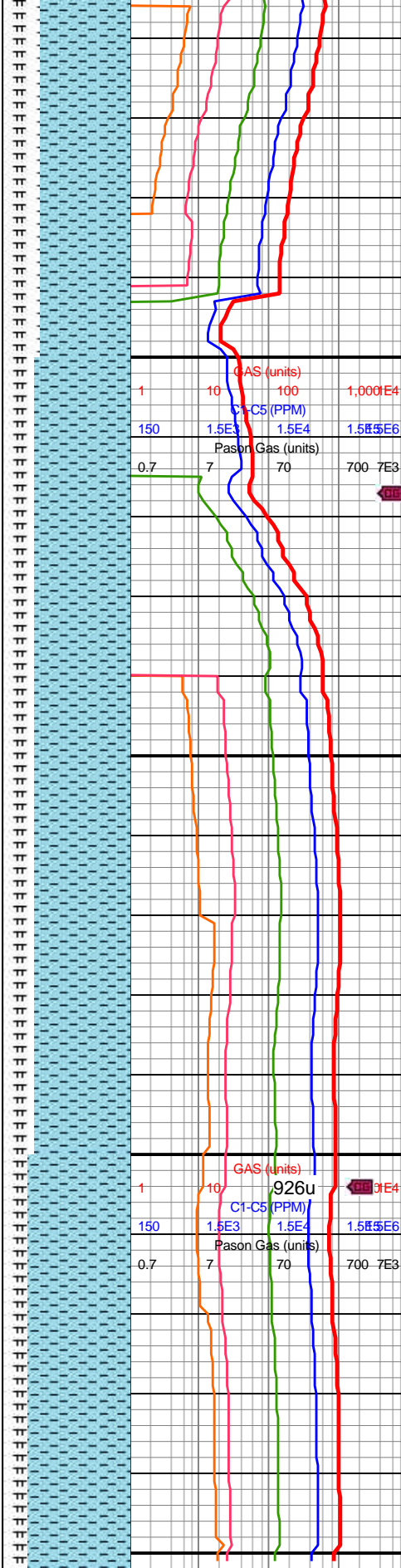
MD: 15,187'  
INC: 90.13°  
AZM: 4.78°  
TVD: 7,305.43'  
VS: 7,492.04'

ROP (min/ft) 1  
GAMMA (API) 250

Reach TD of  
15,252' @ 23:17  
hrs on 7/22/2019

\*Bit Projection\*

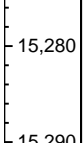
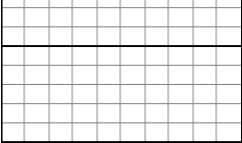
MD: 15,252'  
INC: 90.13°



15000-15100 CHK  
(70%): lt gy, mot med  
gy-gy brn, vf-f xln, fri-frn,  
lam ip, rthy-chky tex, v  
calc; MRLST (30%): dk  
gy-v dk gy, fri-frn, occ wh  
chky incl, mod fis ctngs,  
brn arg resdl, mod calc,

15100-15200 CHK  
(75%): lt gy, mot med  
gy-gy brn, vf-f xln, fri-frn,  
lam ip, rthy-chky tex, v  
calc; MRLST (25%): dk  
gy-v dk gy, fri-frn, occ wh  
chky incl, mod fis ctngs,  
brn arg resdl, mod calc,

15200-15252 CHK  
(80%): lt gy, mot med  
gy-gy brn, vf-f xln, fri-frn,  
lam ip, rthy-chky tex, v  
calc; MRLST (20%): dk  
gy-v dk gy, fri-frn, occ wh  
chky incl, mod fis ctngs,  
brn arg resdl, mod calc,



AZM: 4.78°  
TVD: 7,305.28'  
VS: 7,556.91'

