



Scale: 5" / 100'  
Measured Depth Log

**Well Name** Ruegge 3H-4H-N165

**Location** Sec. 4 T1N R65W

**State** Colorado

**County** Weld

**Country** USA

**Rig Number** Ensign 140

**API Number** 05123465580000

**AFE #** 16190984

**Geographic Region** Rockies

**Field** Wattenberg

**Spud Date** 6/15/2018

**Drilling Completed** 6/18/2018

**Surface Coordinates** Lat/Long: 40.075245/-104.67088

SHL: Sec: 4 Twp: 1N 65W  
Footage: 702 FSL 2106 FWL

**Bottom Hole Coordinates** Proposed BHL: Sec: 4 Twp: 1N 65W  
Footages: 460 FNL 1540 FWL

**Ground Elevation** 4,916'

**K.B. Elevation** 4,939

**Logged Interval** 6,600' **To** 12,135'

**Total Depth** 12,135'

**Formation** Codell

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

## Operator

**Company** Crestone Peak Resources

**Address** 370 17th Street #2170  
Denver, CO 80202



**CRESTONE PEAK**  
RESOURCES

Geologist

Zone Color Coding

## Geologist

**Name** John Ready

**Company** Crestone Peak Resources

**Address** 370 17th Street #2170  
Denver, CO 80202



**CRESTONE PEAK**  
RESOURCES

## Zone Color Coding



Oil



Condensate



Gas



Note



Core



Pressure



Error



Water



Seal

## Other

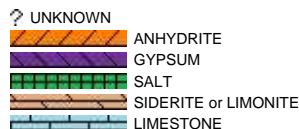
**Loggers:** Brian Ferwerda / Nick Watkins

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

**Equipment:** ML-533

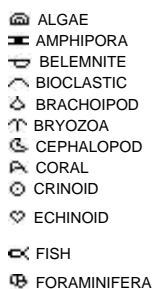
**Contractor:** Empirica, Reservoir Group  
6360 West Sam Houston Pkwy N  
Houston, Texas, 77041

## Rock Types



## Accessories

### Fossils



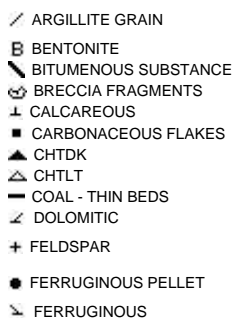
### Fossil



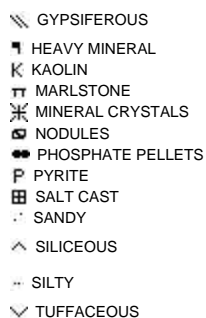
### Minerals



### ARGILLACEOUS



### GLAUCONITE



### Stringer



Other Symbols

Oil Show

- DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

Porosity

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

- ORGANIC
- PINPOINT
- VUGGY

Engineering

- BIT
- CASING
- CONNECTION (LEFT)
- CONNECTION (RIGHT)
- CONNECTION GAS
- CORE - LOST
- CORE - RECOVERED
- DST INTERVAL
- FAULT

- FORMATION TOP
- GAS SHOW
- MN DEPTH
- NORMAL FAULT
- OIL SHOW
- OVERTURNED STRATA
- REVERSE FAULT
- SIDEWALL CORE (LEFT)
- SIDEWALL CORE (RIGHT)
- SLIDE
- SURVEY
- TRIP GAS
- WIRELINE TESTED - LEFT
- WIRELINE TESTED - RT

Rounding

- ANGULAR
- ROUNDED
- SUBANG
- SUBRND

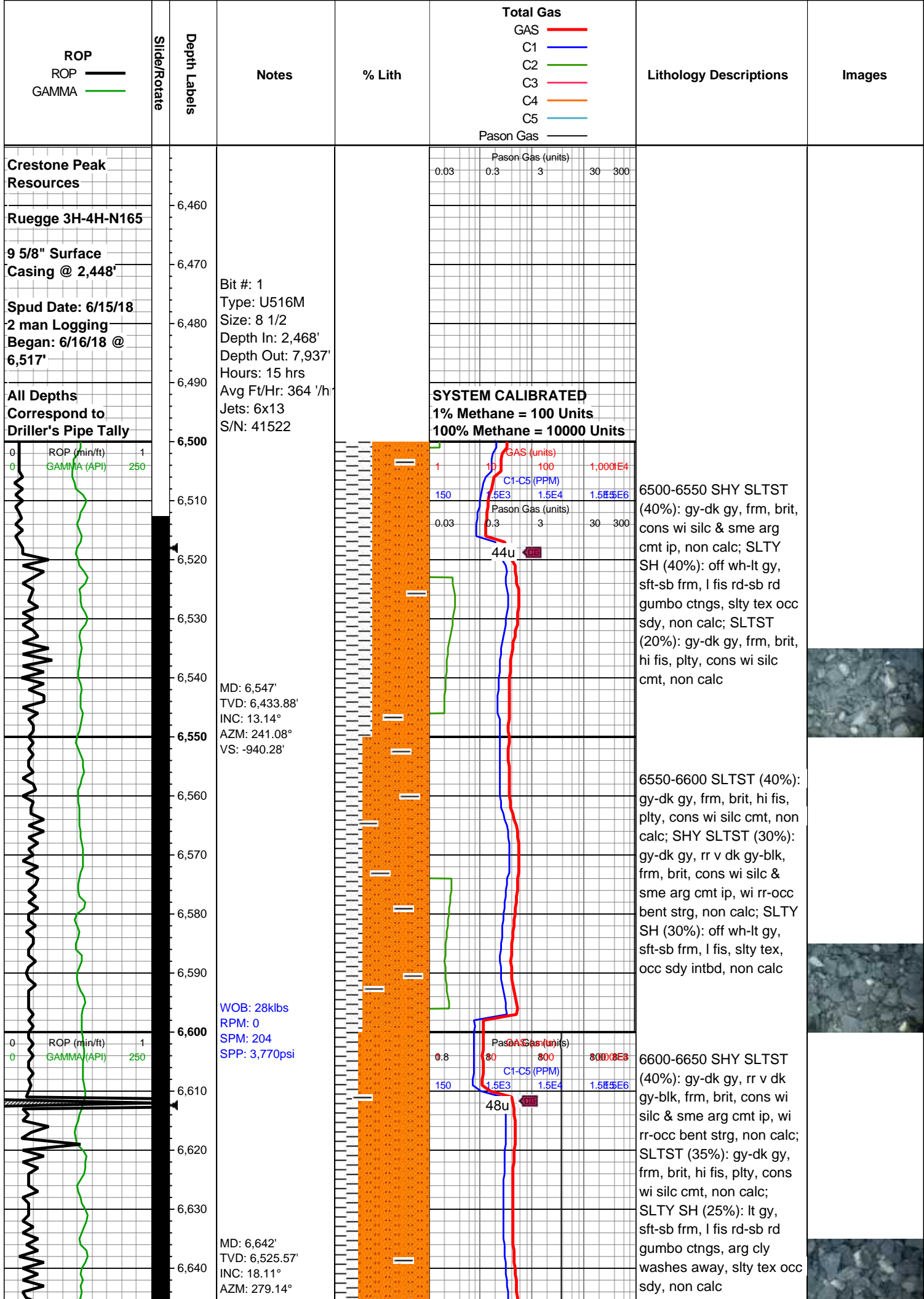
Textures

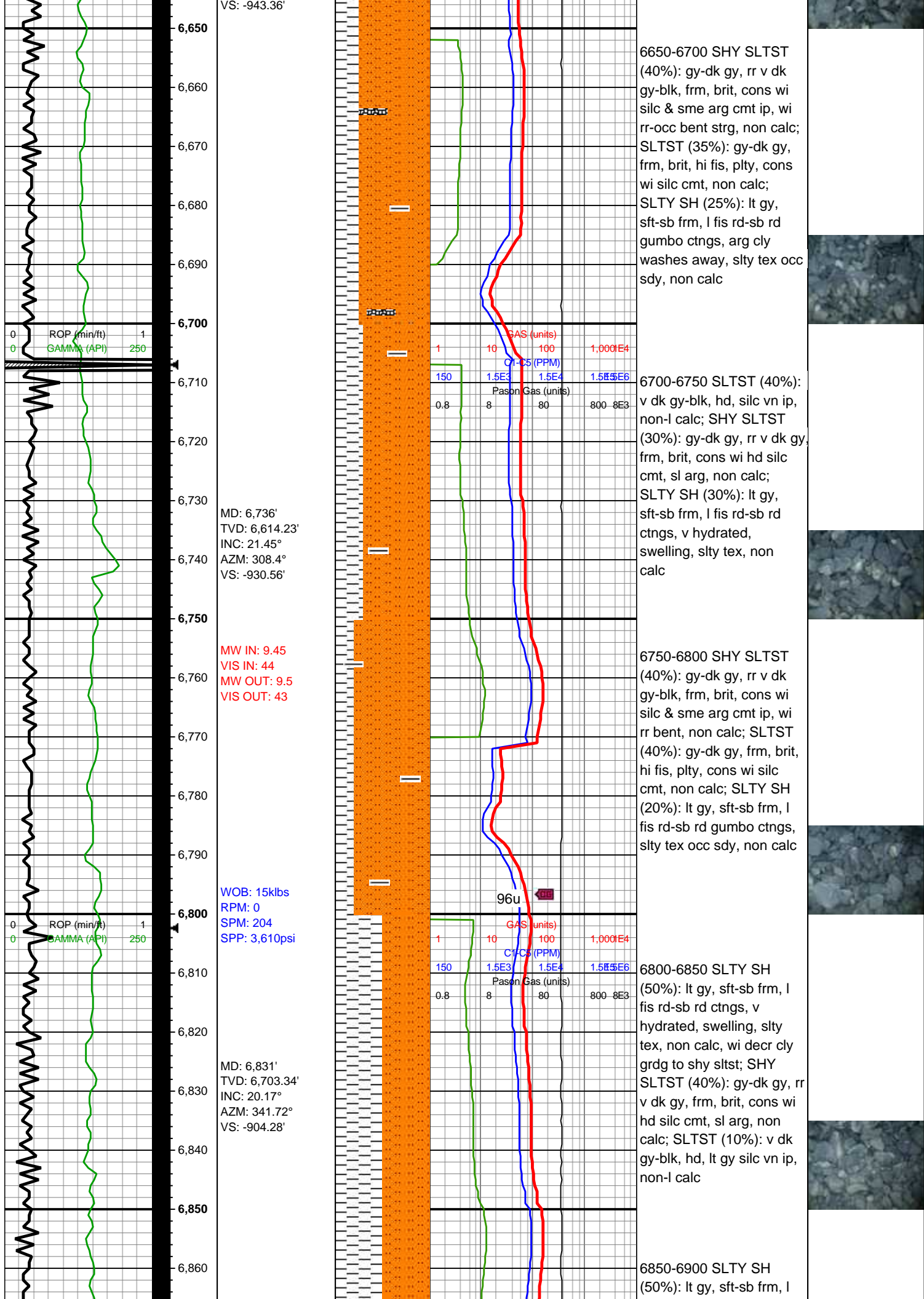
- BOUNDSTONE
- CHALKY
- CRYPTOXLN
- E EARTHY
- F FINELYXLN
- GRAINSTONE

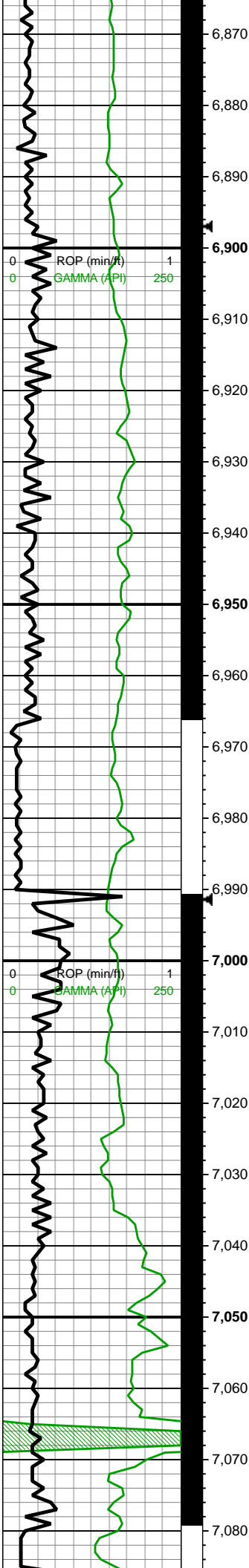
- L LITHOGRAPHIC
- MX MICROXLN
- MS MUDSTONE
- PS PACKSTONE
- WS WACKESTONE

Sorting

- M MODERATE
- P POOR
- W WELL







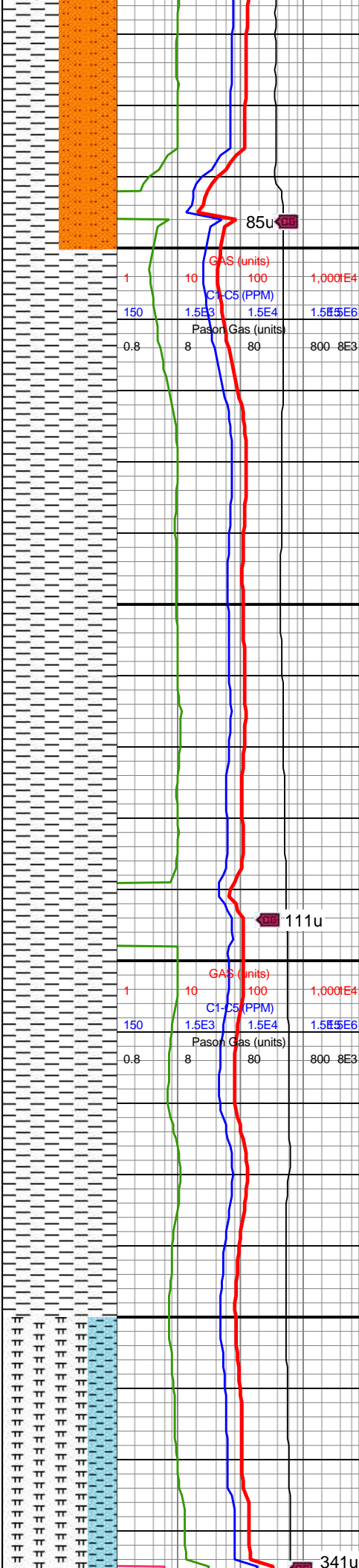
MD: 6,926'  
TVD: 6,791.61'  
INC: 23.6°  
AZM: 2.37°  
VS: -869.7'

WOB: 6klbs  
RPM: 0  
SPM: 206  
SPP: 3,590psi

MD: 7,021'  
TVD: 6,877.21'  
INC: 27.77°  
AZM: 358.94°  
VS: -828.55'

**Sharon Springs**  
7038 MD/6892 TVD

**Niobrara**  
7067 MD/6917 TVD



fis rd-sb rd ctngs, v  
hydrated, swelling, slty  
tex, non calc, wi decr cly  
grdg to shy sltst; SHY  
SLTST (40%): gy-dk gy, rr  
v dk gy, frm, brit, cons wi  
hd silc cmt, sl arg, non  
calc; SLTST (10%): v dk  
gy-blk, hd, lt gy silc vn ip,  
non-l calc

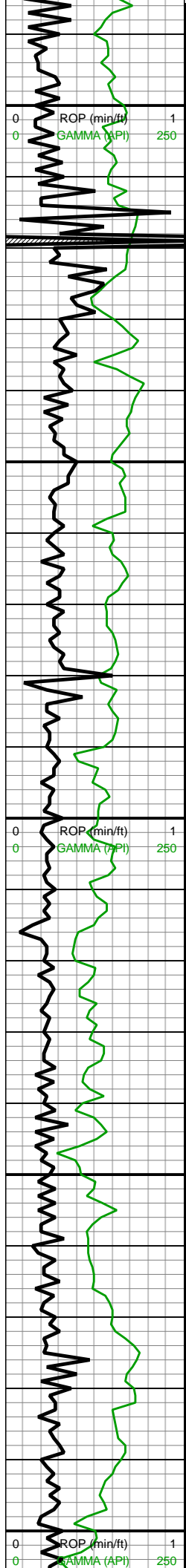
6900-6950 SLTY SH  
(100%): gyshbn-med gy,  
mot lt gy, lam dk brn,  
blk-y-sb tab ctngs, sl  
frm-frm, stri, vf lam, sl slty  
tex, sl micmica, non-sl  
calc, mnr imbd/dissm  
mic pyr

6950-7000 SLTY SH  
(100%) v gyshbn wi lt-sl  
med gy-occ scat dk gy, v  
frm-sl hrd wi sme fis, v  
pred plty-blky wi sl ang,  
sm tex wi scat-tr  
micmica, non-sl calc

7000-7050 SLTY SH  
(100%): pred dk gy, sme  
v dk gy-blk, frm, blk-y,  
sme plty, brit, sme v thnly lam,  
tr micmica, sm tex, non  
calc

7050-7100 MRLST  
(75%): v dk gy-dk gyshbn  
ip, frm-v frm, blk-y, v calc,  
rah tex, mot-stri, sme fv





MD: 7,115'  
TVD: 6,957.96'  
INC: 33.75°  
AZM: 353.84°  
VS: -780.67'

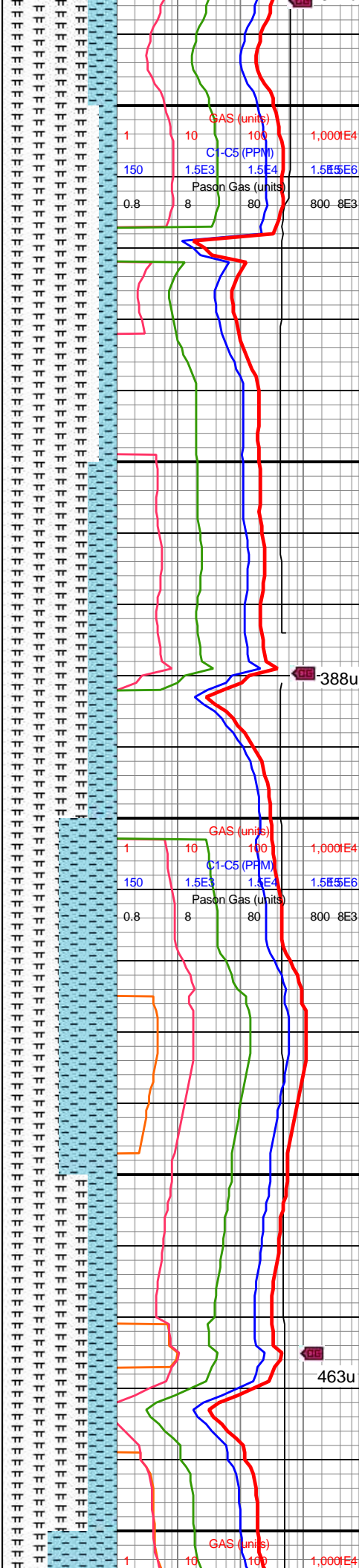
MW IN: 9.6  
VIS IN: 42  
MW OUT: 9.5  
VIS OUT: 41

WOB: 38.6klbs  
RPM: 0  
SPM: 206  
SPP: 3,861psi

**B Chalk**  
7209 MD/7035 TVD

MD: 7,209'  
TVD: 7,034.65'  
INC: 36.91°  
AZM: 358.06°  
VS: -726.51'

**C Chalk**  
7304 MD/7105 TVD



lam, tr pp pyr; CHK  
(25%): dk gy-brn, com lt  
gy-mot, blk, sft, fri, chky  
tex, occ stri, rr mic fos

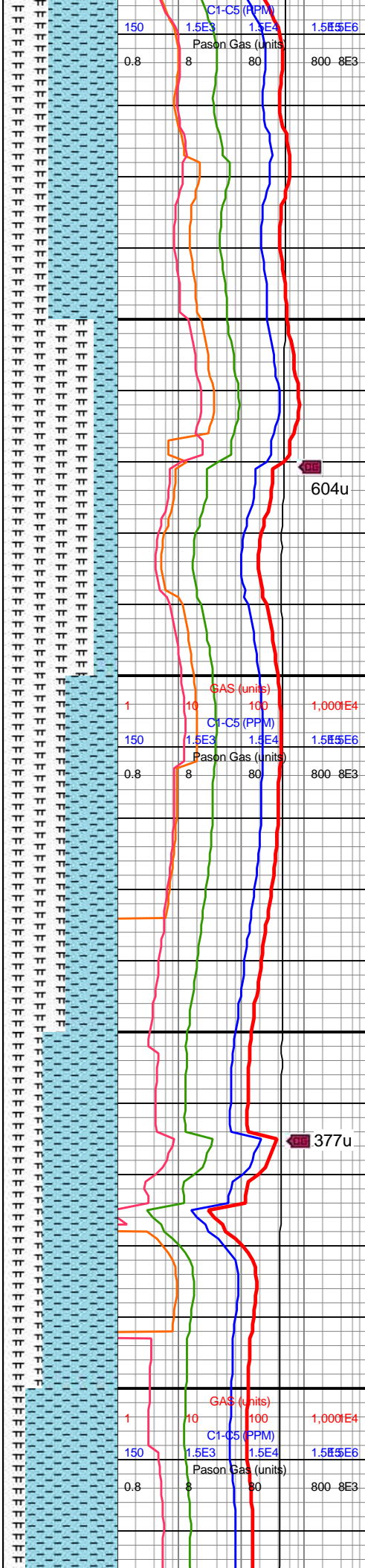
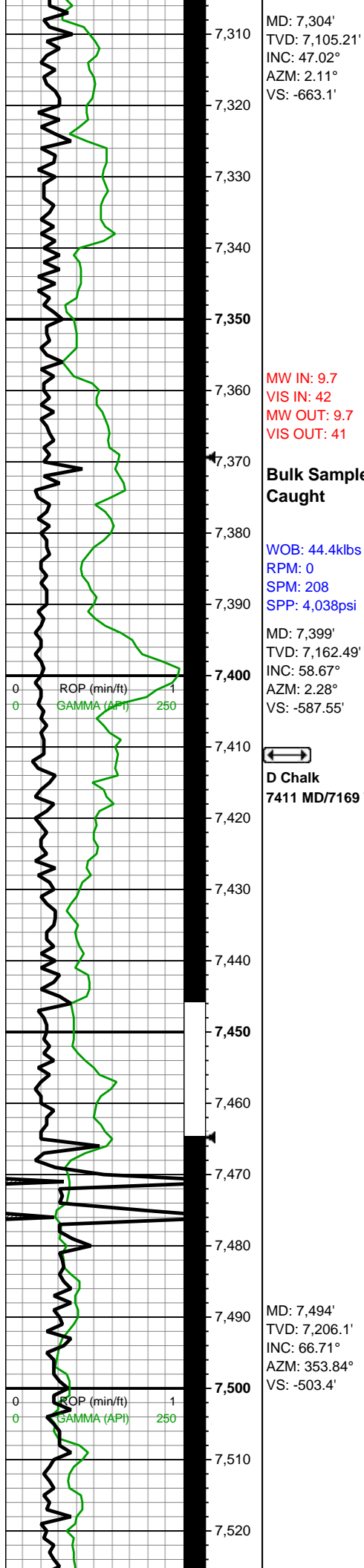
7100-7150 MRLST  
(85%): v dk gy-dk gyshbn  
ip, frm-v frm, blk, v calc,  
rgh tex, mot-stri, sme fy  
lam, tr pp pyr; CHK  
(15%): dk gy-brn, com lt  
gy-mot, blk, sft, fri, chky  
tex, occ stri, rr mic fos

7150-7200 MRLST  
(75%): dk gy-v dk gy,  
frm-brit, med-hi fis blk  
ctngs, rr vf pyr; CHK  
(25%): lt gy-gy, sb  
frm-frm, rd-sb rd-sb blk  
l-mod fis ctngs, f wh chky  
incl, rr vf pyr, hi calc

7200-7250 MRLST  
(50%): med-v dk gry,  
predy blk wi com lamn, v  
brit-hrd, micmica, hily  
calc; CHK (50%) pred  
ltgy-occ gyshbn wi sme  
com lt thn chky lamn, sb  
blk-bkly, v sft-sl frm, rgh  
tex wi rr-pp pyr, hily calc,  
scat cal

7250-7300 MRLST  
(75%): dk gy-dk gyshbn,  
frm, brit, blk, occ fy lam,  
rr vf pyr, v calc; CHK  
(25%): gy-dk gy, frm, brit,  
mod fis sb blk-bkly  
ctngs, f wh chky incl, rr vf  
pyr, hi calc





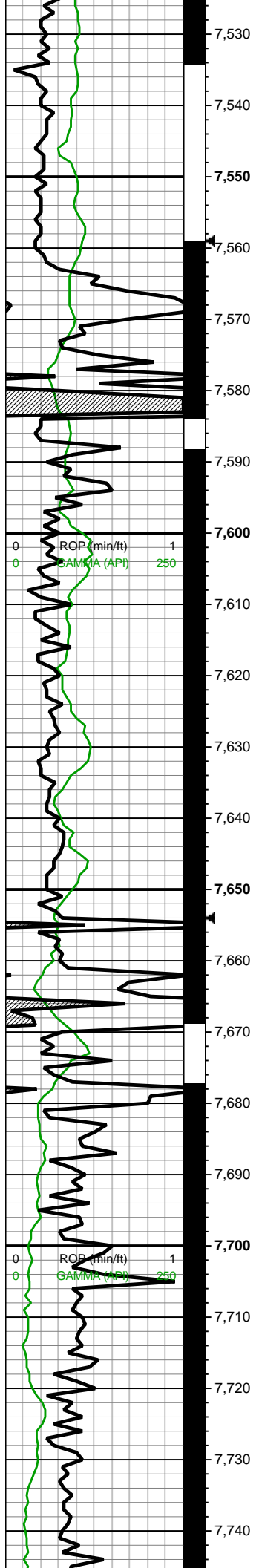
7300-7350 CHK (60%): lt gy-med gy, sb frm-frm, brit ip, l-mod fis sb blk-ly blk-ly ctngs, f wh chky incl, rr vf pyr, hi calc; MRLST (40%): dk gy-dk gyshbn, frm, brit, med-hi fis, blk-ly-tab, rr vf pyr, mod calc

7350-7400 MRLST (80%): dk gy-v dk gy, frm-brit, med-hi fis blk-ly ctngs, rr vf pyr, mod calc wi brn mrly resdl; CHK (20%): lt gy-gy, sb frm-frm, rd-sb rd-sb blk-ly l-mod fis ctngs, f wh chky incl, rr vf pyr, hi calc

7400-7450 MRLST (55%): dk gy-v dk gy, frm-brit, med-hi fis blk-ly ctngs, rr vf pyr, mod calc wi brn mrly resdl; CHK (45%): lt gy-gy, sb frm-frm, rd-sb rd-sb blk-ly l-mod fis ctngs, f wh chky incl, rr vf pyr, hi calc

7450-7500 CHK (65%): off wh-lt gy, predy sft-sb frm, occ frm, l-mod fis rd-sb rd-sb blk-ly ctngs, rr vf pyr, v hi calc; MRLST (35%): dk gy-v dk gy, frm-brit, med-hi fis blk-ly ctngs, rr vf pyr, mod calc





MW IN: 9.7  
VIS IN: 42  
MW OUT: 9.7  
VIS OUT: 41

MD: 7,589'  
TVD: 7,240.76'  
INC: 70.49°  
AZM: 352.53°  
VS: -415.68'

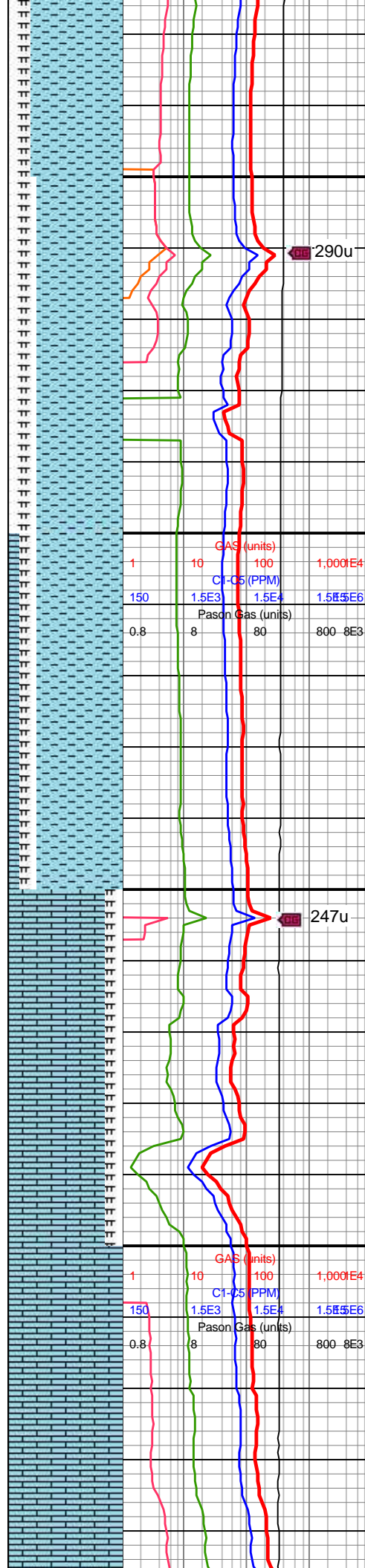
WOB: 49.6klbs  
RPM: 0  
SPM: 206  
SPP: 3,841psi

MW IN: 9.7  
VIS IN: 42  
MW OUT: 9.7  
VIS OUT: 41

**Fort Hayes**  
**7678 MD/7265 TVD**

MD: 7,683'  
TVD: 7,265.85'  
INC: 78.53°  
AZM: 348.48°  
VS: -326.57'

MW IN: 9.8  
VIS IN: 42  
MW OUT: 9.7  
VIS OUT: 41



7500-7550 CHK (80%):  
off wh-lt gy, sme tn, predy  
sft, rd-sb rd-sb blk  
ctngs, rr vf pyr, v hi calc;  
MRLST (20%): dk gy-v dk  
gy, frm-brit, blk-sb blk,  
rr vf pyr strg, mod calc

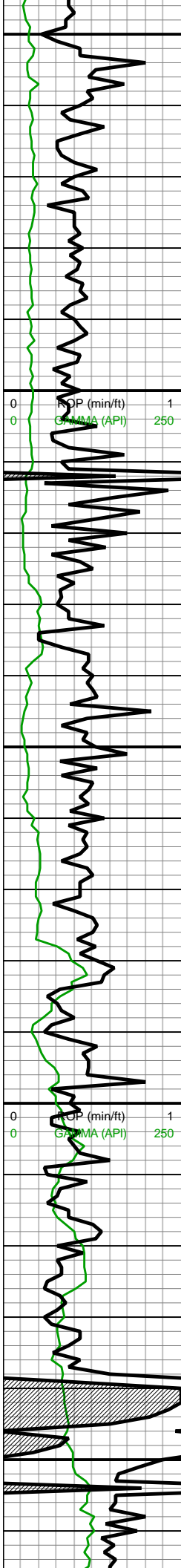
7550-7600 CHK (75%): lt  
gy, gyshbn, mot lt  
brn-wht, sme offwht,  
frm-sl sft, blk-tab, chky  
tex, tr imbd/pp mic pyr, v  
calc; MRLST (25%): dk  
gy, med gy, frm-sl hrd,  
blk-sb tab, tr imbd/pp  
pyr, vf lam, v calc

7600-7650 CHK (75%): lt  
gy, gyshbn, frm-sl sft,  
blk-tab, chky tex, v calc;  
MRLST (15%): dk gy-v dk  
gy, frm, brit, blk, occ fy  
lam, rr vf pyr, v calc; LS  
(10%): lt brn-tn, mot med  
brn, crpxln-micxln, mudst,  
tr pp mic pyr, hi calc

7650-7700 LS (85%):  
tn-crm, offwht-lt gy ip, occ  
brn, frm-hrd, blk, sme  
ply ctngs, v calc, mudst,  
cryptoxln, rr pyr, hi calc;  
MRLST (15%): dk gy-v dk  
gy, frm-brit, blk-sb blk,  
mod calc

7700-7750 LS (100%): lt  
tn-tn, sme offwht-crm-  
wht, frm-hd, crpxln  
mudst, wxy lstr wi rr dk gy  
ctngs wi rthv lstr. tr-rr vf





MD: 7,778'  
TVD: 7,275.23'  
INC: 90.13°  
AZM: 344.18°  
VS: -235.08'

WOB: 56klbs  
RPM: 0  
SPM: 206  
SPP: 3,994psi

MW IN: 9.8  
VIS IN: 42  
MW OUT: 9.8  
VIS OUT: 41

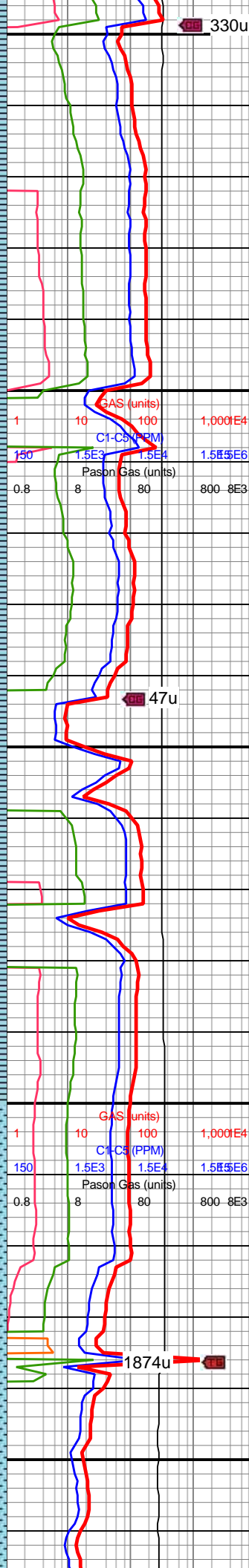
MD: 7,872'  
TVD: 7,265.31'  
INC: 102°  
AZM: 347.43°  
VS: -144.84'

MINDEPTH 6/17/18

TOOH for MWD  
Tool 01:30hrs  
6/17/18

Resume drilling  
@13:15hrs  
6/17/18

MD: 7,967'  
TVD: 7,248.27'  
INC: 98.61°  
AZM: 358.06°  
VS: -52.37'

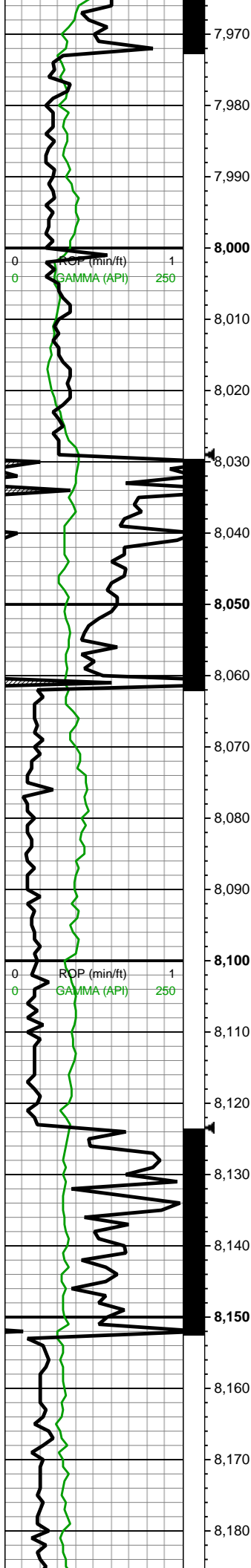


pyr, hi calc

7750-7800 LS (100%):  
off wh-lt gy-lt tn-tn, pred  
frm, hd ip, crpxln mudst  
wi sm tex & wxy lstr, tr vf  
pyr, hi calc

7800-7900 LS (100%):  
tn, lt brn, mot crm, mnr dk  
brn, plty-sb blkly ctngs,  
crpxln-sl micxln, frm-v  
frm, mudst, rthy-wxy lstr,  
mnr dk gy SH, hi calc, tr  
pp mic pyr

7900-8000 CHK (70%):



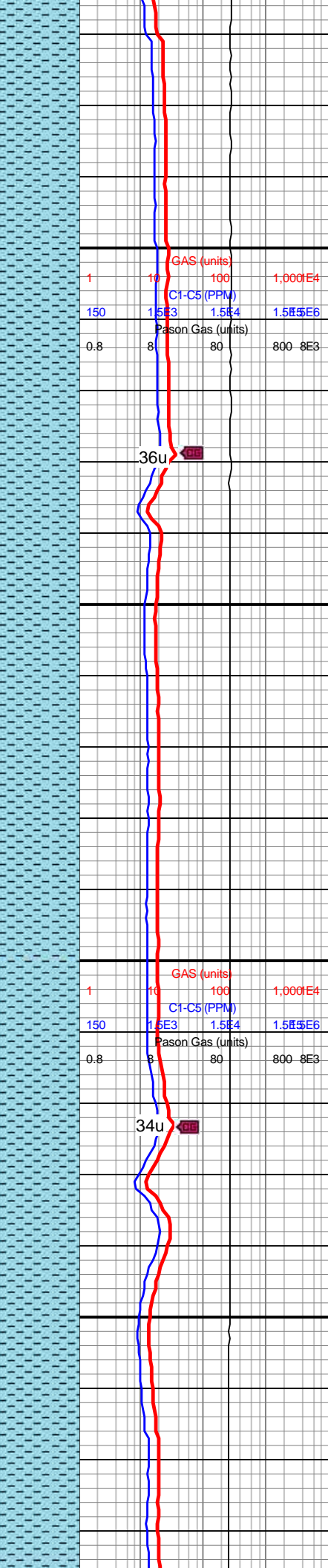
Bit #: 2  
Type: U516M  
Size: 8 1/2  
Depth In: 7,937'  
Depth Out: 12,135'  
Hours: 17.6 hrs  
Avg Ft/Hr: 238 '/hr  
Jets: 6x13  
S/N: 36904

WOB: 27klbs  
RPM: 33  
SPM: 184  
SPP: 3,690psi

MW IN: 9.9  
VIS IN: 48  
MW OUT: 9.9  
VIS OUT: 47

MD: 8,061'  
TVD: 7,237.88'  
INC: 94.09°  
AZM: 358.85°  
VS: 40.98'

MD: 8,156'  
TVD: 7,232.92'  
INC: 91.89°  
AZM: 0.96°  
VS: 135.83'

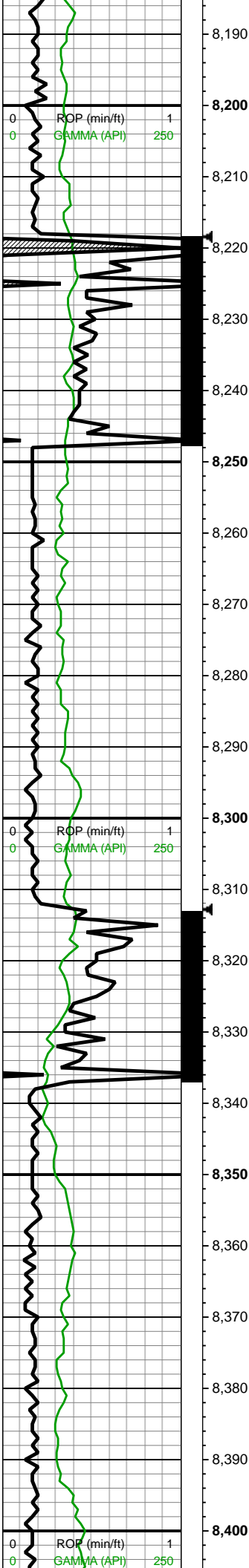


off wh-lt gy, occ gy, sft-sb frm, rr frm, l-mod fis rd-sb rd-sb blkly ctngs, chky tex, hi calc; MRLST (20%): gy-dk gy-dk gyshbn, frm, brit ip, mod fis sb blkly ctngs, sp wi brn mrly incl ip, tr vf pyr, mod calc wi brn mrly resdl; LS (10%): tn-brn, frm, crpxln mudst, hi calc

8000-8100 CHK (80%): predy off wh-lt gy, occ gy, sft-sb frm l fis rd-sb rd ctngs, occ frm sb blkly-blky mod fis ctngs, sm sft chky tex-frm sl slty tex, hi calc; MRLST (20%): gy-dk gy-dk gyshbn, frm, brit ip, mod fis sb blkly ctngs, sp wi brn mrly incl ip, tr vf pyr, mod calc wi brn mrly resdl

8100-8200 CHK (75%): off wh-lt gy, occ gy, sft-sb frm, rr frm, l-mod fis rd-sb rd-sb blkly ctngs, chky tex, hi calc; MRLST (25%): gy-dk gy-dk gyshbn-v dk





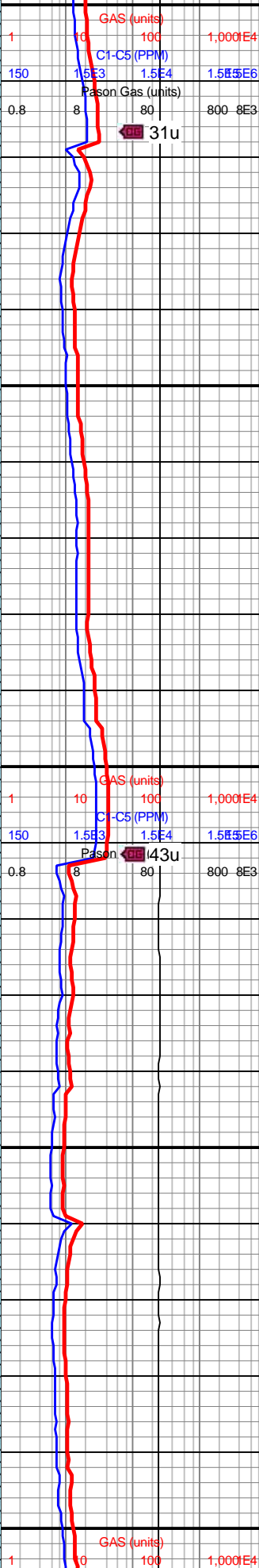
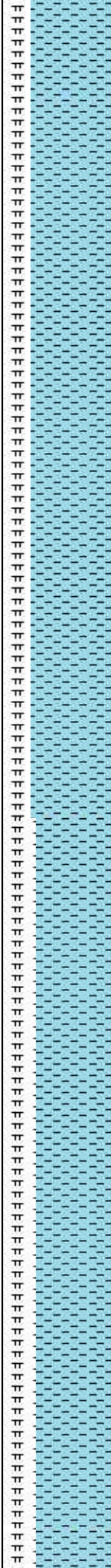
WOB: 35klbs  
RPM: 50  
SPM: 186  
SPP: 3,960psi

MW IN: 9.9  
VIS IN: 45  
MW OUT: 9.9  
VIS OUT: 43

MD: 8,250'  
TVD: 7,231.87'  
INC: 89.39°  
AZM: 3.16°  
VS: 229.77'

MD: 8,346'  
TVD: 7,237.02'  
INC: 84.46°  
AZM: 3.86°  
VS: 325.47'

WOB: 31.2klbs  
RPM: 70  
SPM: 186  
SPP: 4,010psi

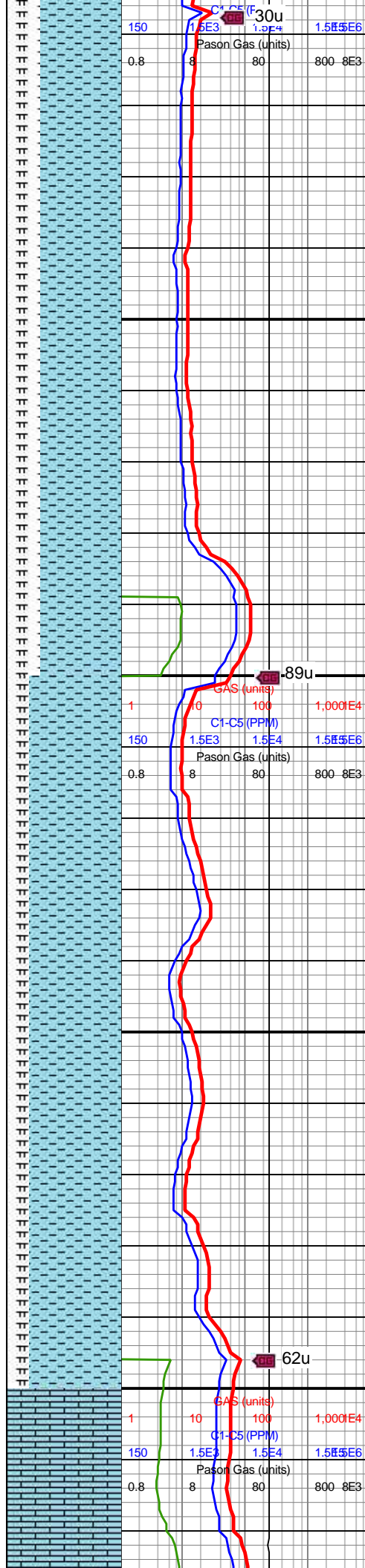
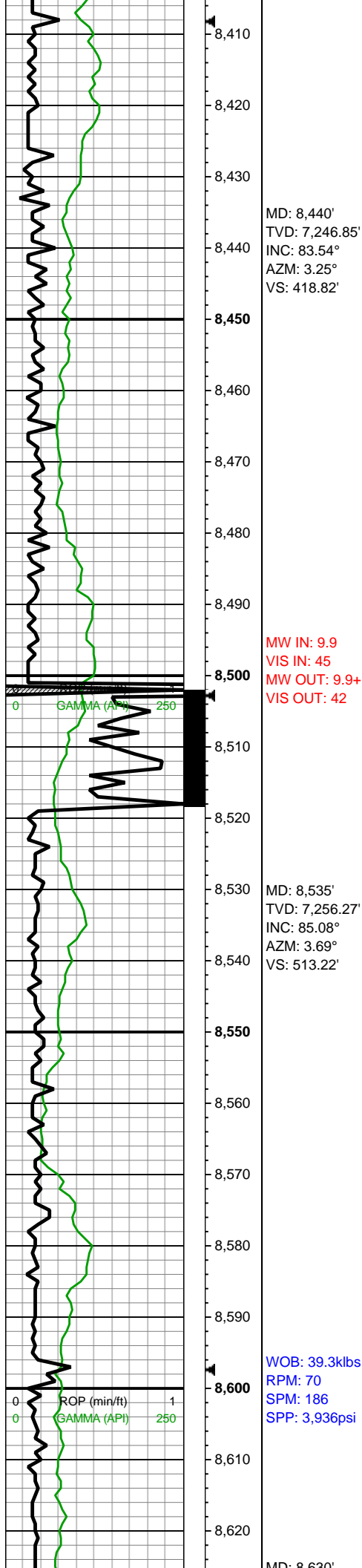


gy, frm-brit, mod fis sb  
blky ctngs, sp wi brn mrlly  
incl ip, tr vf pyr, mod calc  
wi brn mrlly resdl

8200-8300 CHK (75%): lt  
gy, gyshbn, mot lt  
brn-wht, sme offwht,  
frm-sl sft, blky-tab, chky  
tex, tr imbd/pp mic pyr, v  
calc; MRLST (25%): dk  
gy, med gy, frm-sl hrd,  
blky-sb tab, tr imbd/pp  
pyr, vf lam, v calc

8300-8400 CHK (70%):  
gyshbn-lt gy, mot lt brn,  
sb blky-plty, frm-sl sft,  
chky tex, v calc, tr imbd  
mic pyr; MRLST (30%):  
predy dk gy-med gy,  
blky-sb tab, frm-sl hrd, tr  
imbd/pp pyr, vf CHK  
lamn, v calc



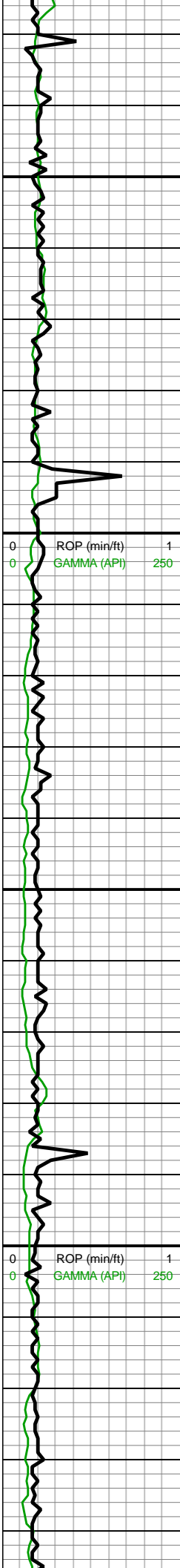


8400-8500 CHK (70%): lt  
gy, gyshbn, mot lt brn,  
frm-sl frm, l-mod fis, sb  
plty-sb blk, tr imbd mic  
pyr, hi calc; MRLST  
(30%): med gy, dk gy, sb  
blk-sb spl ctngs, frm-sl  
hd, mod fis, sm-sl slty  
tex, mod calc, sme CHK  
lamn



8500-8600 CHK (80%): lt  
gy, gyshbn, mot lt brn,  
frm-sl sft, blk-tab, chky  
tex, tr imbd/pp mic pyr, v  
calc; MRLST (20%): dk  
gy, med gy, frm-sl hrd,  
blk-sb tab, tr imbd/pp  
pyr, vf lam, v calc





MD: 8,030'  
TVD: 7,262.67'  
INC: 87.19°  
AZM: 5.89°  
VS: 607.72'

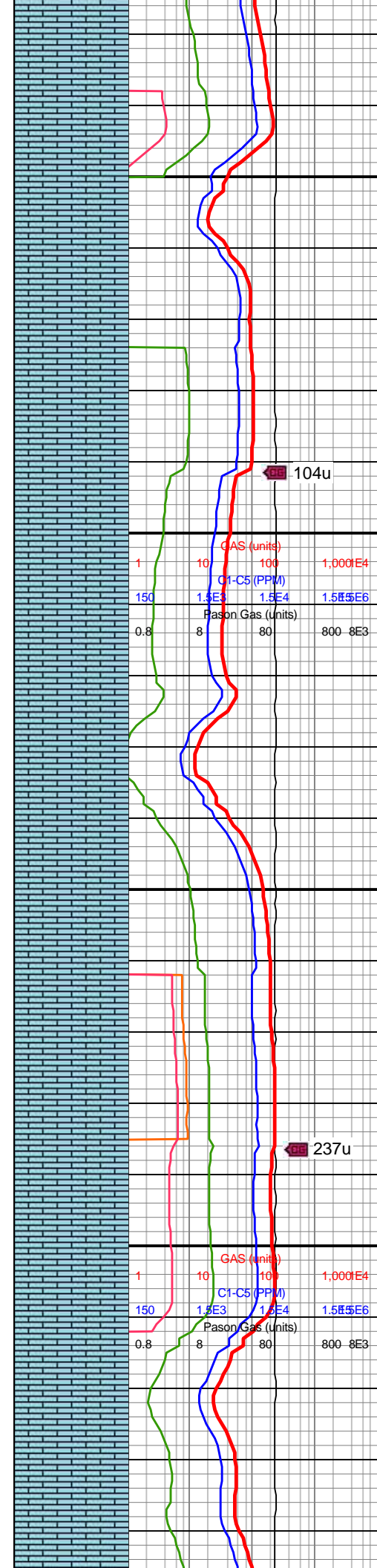
**On Buster**

MW IN: 9.9  
VIS IN: 45  
MW OUT: 9.9  
VIS OUT: 42

MD: 8,725'  
TVD: 7,267.07'  
INC: 87.5°  
AZM: 5.62°  
VS: 702.22'

WOB: 36.4klbs  
RPM: 70  
SPM: 184  
SPP: 3,999psi

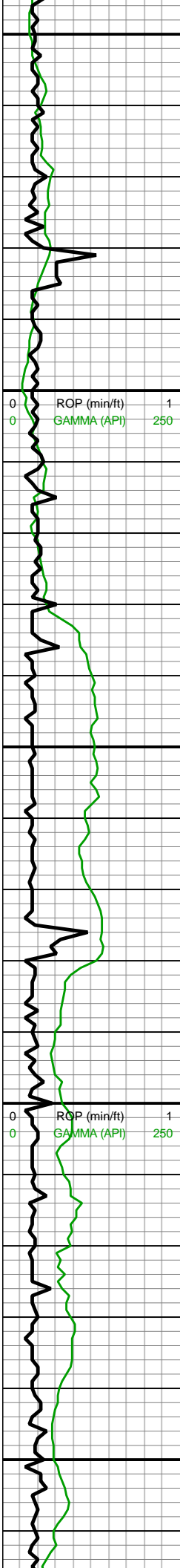
MD: 8,819'  
TVD: 7,271.06'  
INC: 87.63°  
AZM: 5.36°  
VS: 795.77'



8600-8700 LS (100%): lt  
brn-tn, mot gyshbn, sl  
stri, frm-v frm, crpxln-sl  
micxln, mudst, wxy lstr,  
tr-rr pp mic pyr, mnr dk gy  
SH, hi calc

8700-8800 LS (100%):  
off wh-crm-lt tn- lt  
gyshbn-gyshbn-brn, tr dk  
gy, frm-hd, crpxln mudst,  
wxy lstr wi rr dk gy ctngs  
wi rthy lstr, tr-rr vf pyr, hi  
calc





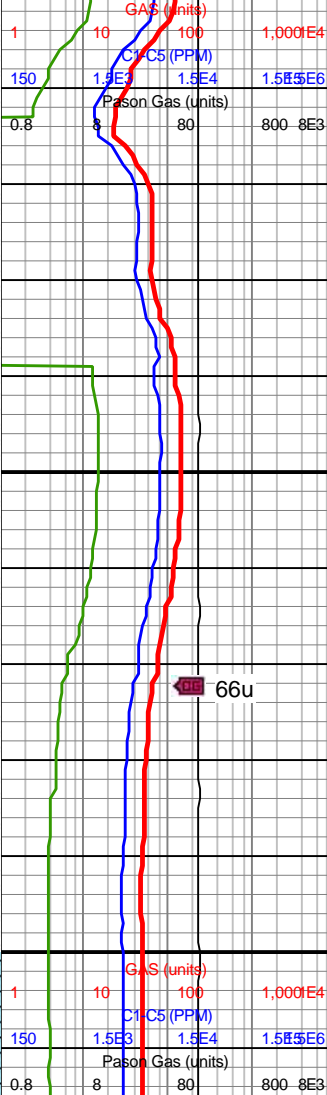
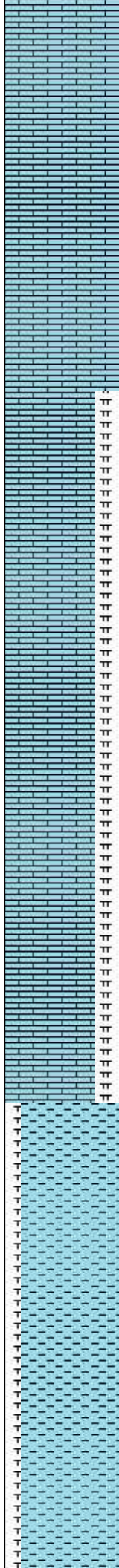
8,850  
8,860  
8,870  
8,880  
8,890  
8,900  
8,910  
8,920  
8,930  
8,940  
8,950  
8,960  
8,970  
8,980  
8,990  
9,000  
9,010  
9,020  
9,030  
9,040  
9,050  
9,060

MW IN: 9.9  
VIS IN: 44  
MW OUT: 9.9  
VIS OUT: 42

MD: 8,914'  
TVD: 7,275.22'  
INC: 87.36°  
AZM: 4.22°  
VS: 890.41'

WOB: 23.1klbs  
RPM: 70  
SPM: 184  
SPP: 3,943psi

MD: 9,008'  
TVD: 7,280.48'  
INC: 86.22°  
AZM: 3.69°  
VS: 984.09'



161u

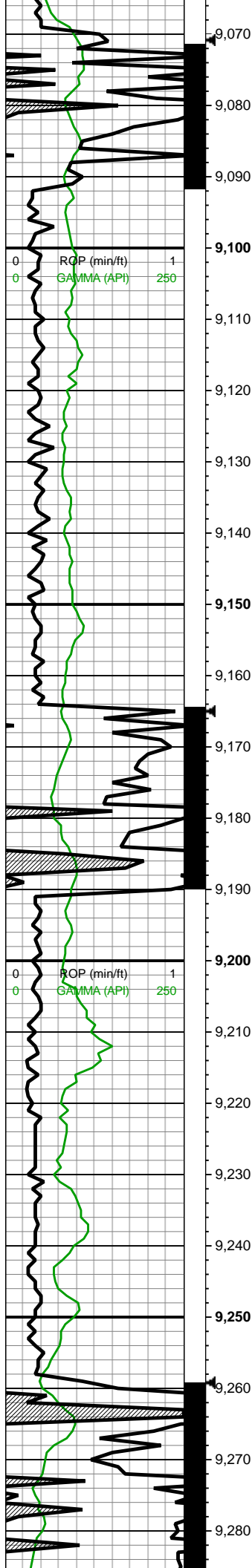
8800-8900 LS (100%):  
tn, lt brn, mot crm, mnr dk  
brn, plty-sb blkly ctngs,  
crpxln-sl micxln, frm-v  
frm, mudst, rthy-wxy lstr,  
rr dk gy SH, hi calc, tr pp  
mic pyr



66u

8900-9000 LS (80%): lt  
brn-tn, mot gyshbn, sl  
stri, frm-v frm, crpxln-sl  
micxln, mudst, wxy lstr,  
tr-rr pp mic pyr, hi calc;  
MRLST (20%): dk gy-v dk  
gy, frm-brit, med-hi fis  
blkly ctngs, rr vf pyr, mod  
calc





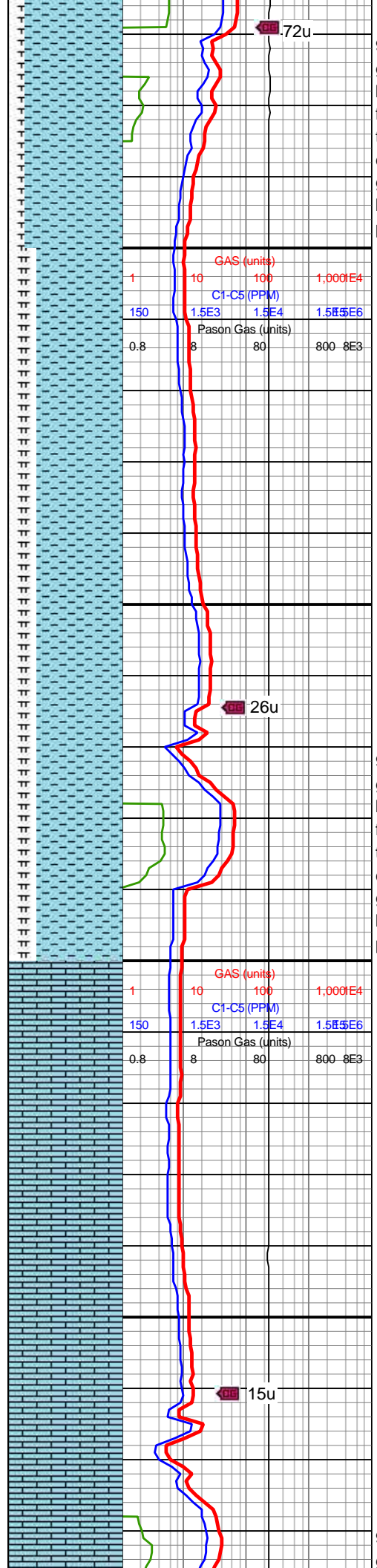
MD: 9,103'  
TVD: 7,287'  
INC: 85.91°  
AZM: 4.04°  
VS: 1,078.7'

MW IN: 9.8  
VIS IN: 43  
MW OUT: 9.8  
VIS OUT: 43

MD: 9,197'  
TVD: 7,292.62'  
INC: 87.23°  
AZM: 5.45°  
VS: 1,172.26'

WOB: 29.2klbs  
RPM: 70  
SPM: 184  
SPP: 3,958psi

MW IN: 9.8  
VIS IN: 43  
MW OUT: 9.8  
VIS OUT: 43



72u

26u

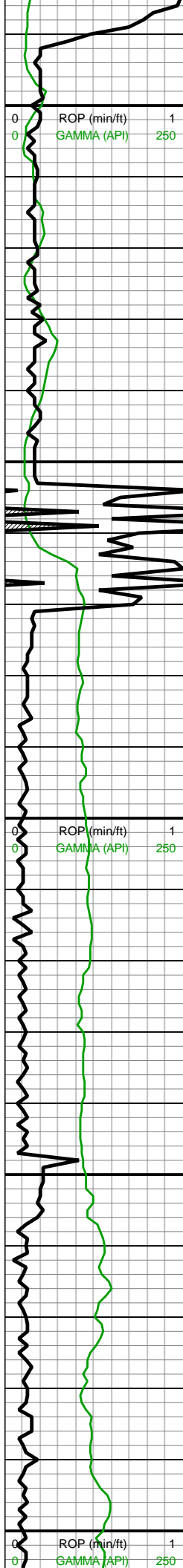
15u

9000-9100 CHK (85%): lt gy, gyshbn, mot lt brn-wht, sme offwht, frm-sl sft, blk-y-tab, chky tex, tr imbd/pp mic pyr, v calc; MRLST (15%): dk gy, med gy, frm-sl hrd, blk-y-sb tab, tr imbd/pp pyr, vf lam, v calc

9100-9200 CHK (75%): lt gy, gyshbn, mot lt brn-wht, sme offwht, frm-sl sft, blk-y-tab, chky tex, tr imbd/pp mic pyr, v calc; MRLST (25%): dk gy, med gy, frm-sl hrd, blk-y-sb tab, tr imbd/pp pyr, vf lam, v calc

9200-9300 LS (100%): lt gyshbn-med gy-gyshbn,



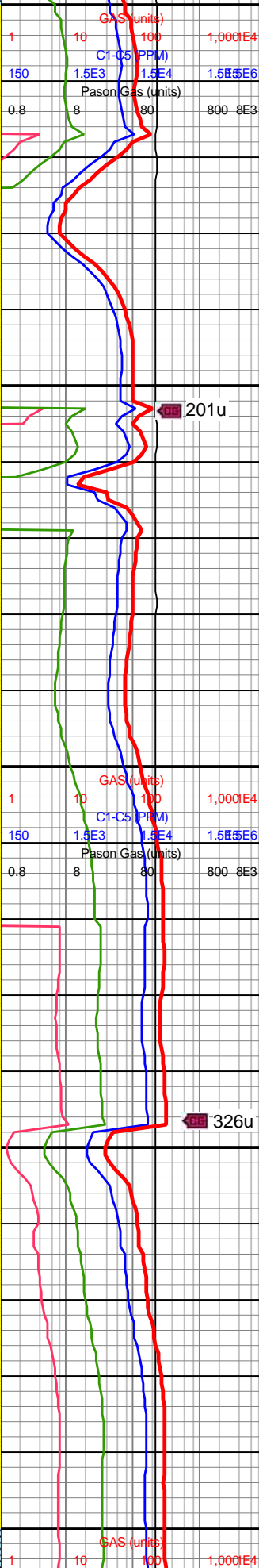


MD: 9,292'  
TVD: 7,295.79'  
INC: 88.95°  
AZM: 5.36°  
VS: 1,266.85'

MD: 9,386'  
TVD: 7,296.26'  
INC: 90.48°  
AZM: 3.86°  
VS: 1,360.6'

WOB: 25.3klbs  
RPM: 70  
SPM: 186  
SPP: 4,004psi

MD: 9,481'  
TVD: 7,295.71'  
INC: 90.18°  
AZM: 3.51°  
VS: 1,455.45'

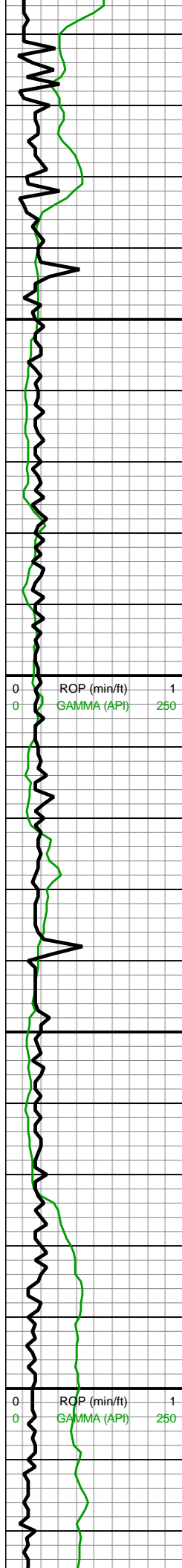


rr v dk gy, frm-hd, crpxln mudst, wxy lstr wi rr dk gy ctngs wi rthy lstr, tr-rr vf pyr, hi calc

9300-9400 LS (85%):  
tan-lt gy brn-gy brn, crpxln mudst, tr vf pyr, hi calc;  
SST (15%): pred dk gy wi f sb rd qtz sd gr incl, sme lt gy-lt gy brn, p srtd vf-f sd grs, pred sb rd-rd sli fri gr sup ss clus cons wi silc & arg cmt, rr c pyr, non calc, sl calc ip

9400-9500 LS (65%): lt brn-gyshbn, frm, wxy lstr, crpxln mudst, tr mic pyr, hi calc; SS (35%): predy med gy-gyshbn ss clus, occ lt gysbhn-lt brn clus, com vf-f gr, sb rd-sb ang clr qtz grs thru, mod srtd, gr sup clus, mtx sup ip, silc cmt, tr pp mic pyr, non calc





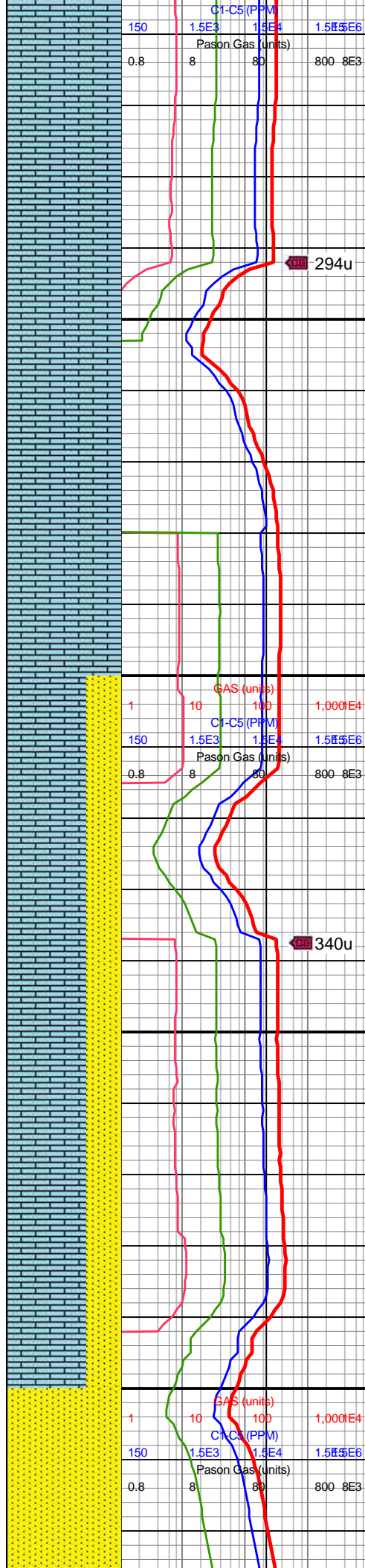
9,510  
9,520  
9,530  
9,540  
9,550  
9,560  
9,570  
9,580  
9,590  
9,600  
9,610  
9,620  
9,630  
9,640  
9,650  
9,660  
9,670  
9,680  
9,690  
9,700  
9,710  
9,720

MW IN: 9.8  
VIS IN: 43  
MW OUT: 9.8  
VIS OUT: 43

MD: 9,576'  
TVD: 7,295.78'  
INC: 89.74°  
AZM: 3.51°  
VS: 1,550.32'

WOB: 37.3klbs  
RPM: 70  
SPM: 185  
SPP: 4,044psi

MD: 9,671'  
TVD: 7,296.1'  
INC: 89.87°  
AZM: 2.28°  
VS: 1,645.23'



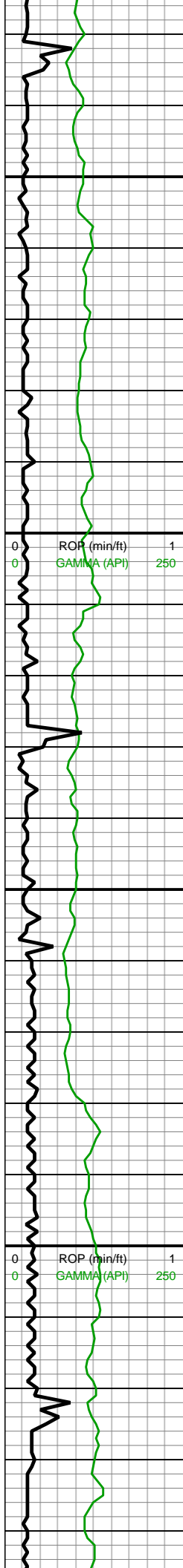
294u

340u

9500-9600 LS (100%):  
off wh-lt tn-crm-lt gy, occ  
brn, crpxln-micxln  
mudst-wkst ip, frm-hrd,  
sb blkyl-blky, plty ip, v calc,  
rr vf pyr, hi calc

9600-9700 LS (70%):  
pred tn-med brn, occ gy, v  
frm-hrd, blkyl, sme plty,  
micxln- cryptoxln, wkst, tr  
arg, sacc tex; SST (30%):  
pred brn-dk brn, com wht  
specs, hrd, brit, occ fri, sb  
blkyl, ang-sb ang mod-w  
srtd vf sd grs, occ qtz cls,  
silc cmt, pred gr sup,  
sme mtx sup, non calc,  
occ sltst frags





MINDEPTH 6/18/18

MD: 9,766'  
TVD: 7,296.36'  
INC: 89.82°  
AZM: 1.75°  
VS: 1,740.19'

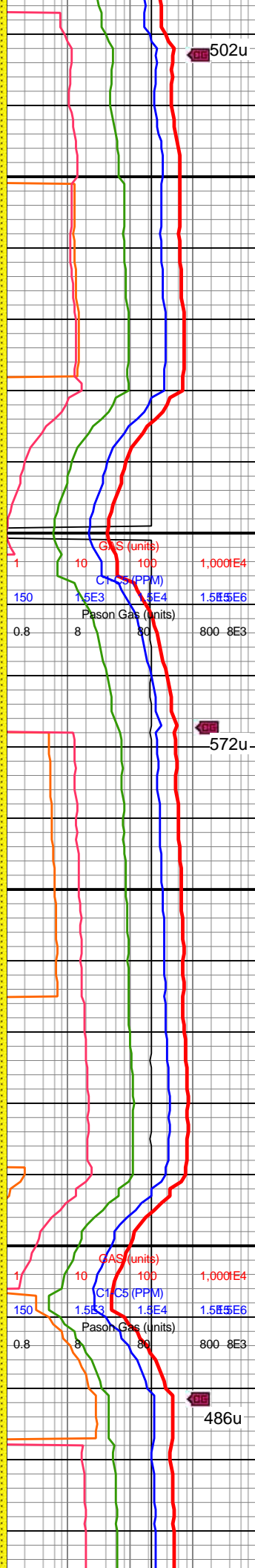
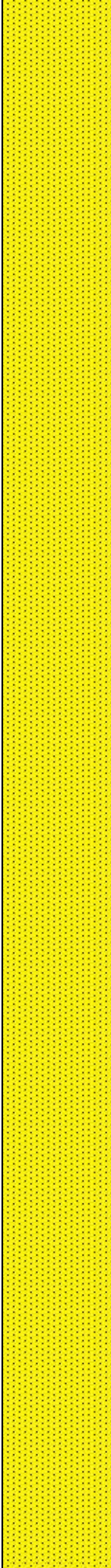
WOB: 36.1klbs  
RPM: 70  
SPM: 186  
SPP: 4,180psi

MW IN: 9.8  
VIS IN: 44  
MW OUT: 9.8  
VIS OUT: 43

MD: 9,860'  
TVD: 7,296.07'  
INC: 90.53°  
AZM: 1.49°  
VS: 1,834.17'

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

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

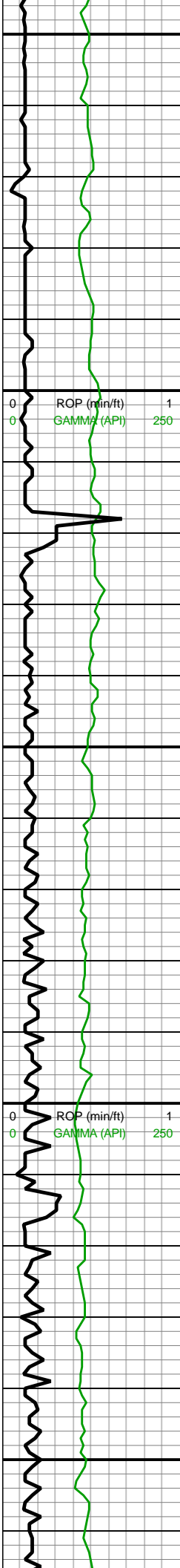


9700-9800 SST (100%):  
pred med gy-med gy brn,  
sme lt gy, tr dk gy grdg to  
sltst, p-mod srted vf-u f sd  
grs, uncons u f sb rd grs  
ip, frm, sli fri gr sup ss  
clus cons wi pred silc  
cmt, arg ip, non calc



9800-9900 SST (100%):  
pred dk gy-dk gy brn wi f  
sb rd qtz sd gr incl, fri-sli  
fri gr sup shy ss clus  
cons wi arg & silc cmt,  
occ lt gy-gy mtx sup shy  
ss cons wi arg cmt, p  
srted vf-f sd grs, com  
uncons sd, non calc





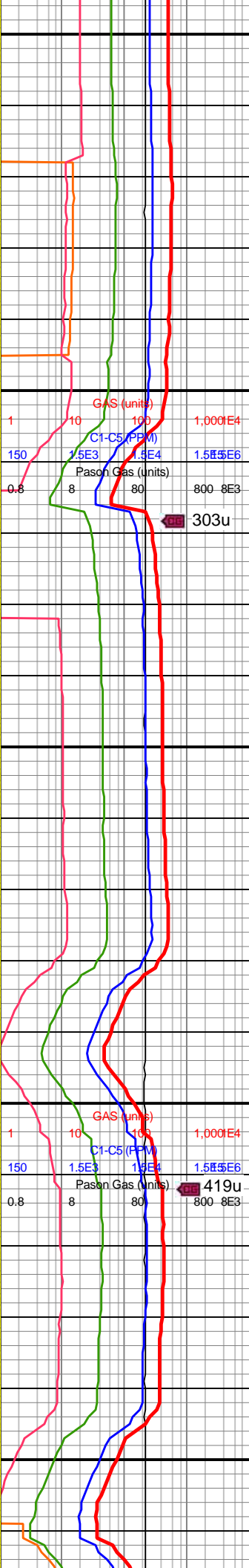
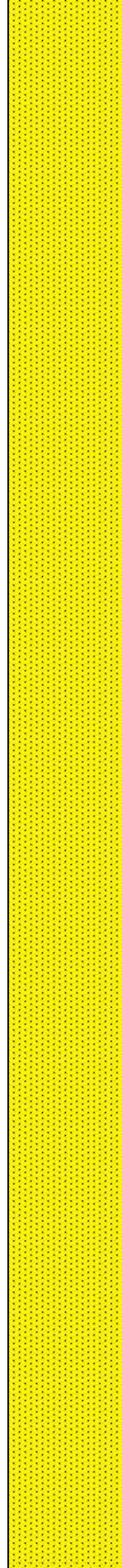
MD: 9,955'  
TVD: 7,295.3'  
INC: 90.4°  
AZM: 1.4°  
VS: 1,929.16'

WOB: 28.8klbs  
RPM: 70  
SPM: 184  
SPP: 4,185psi

MD: 10,049'  
TVD: 7,294.61'  
INC: 90.44°  
AZM: 0.7°  
VS: 2,023.15'

MD: 10,144'  
TVD: 7,293.7'  
INC: 90.66°  
AZM: 360°  
VS: 2,118.14'

MW IN: 9.9  
VIS IN: 44  
MW OUT: 9.9  
VIS OUT: 42

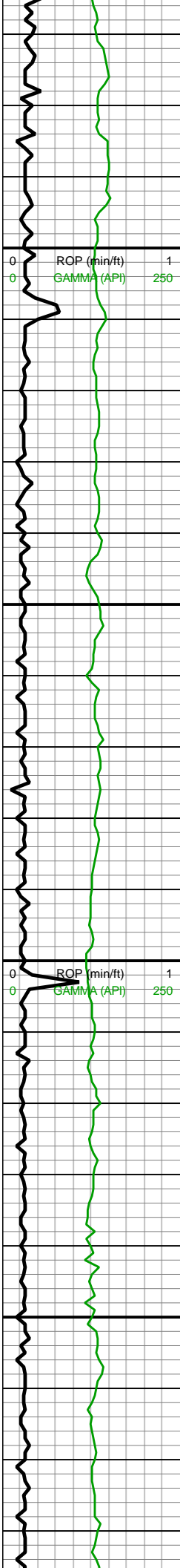


9900-10000 SST (100%):  
pred med gyshbn, occ lt  
gy-lt brn, sme red-brn,  
frm-v frm, blk, pred  
mod-w cons gr sup cls  
cons wi silc cmt, non  
calc, vf-f grnd, occ grdg to  
slt, com micmica, tr imbd  
pyr, scat sh frags



10000-10100 SST  
(100%): predy brn, sme  
bnshgy-mot med gy-lt gy,  
pred shy ss cons wi p  
srted sd grs, vf-f grs, frm-sl  
fri, gr sup ss clus cons wi  
pred arg cmt, silc ip, no  
calc, tr scat sh



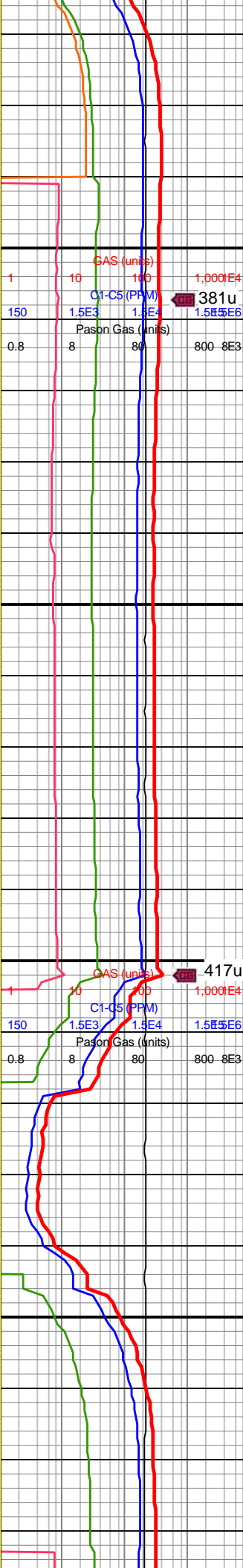
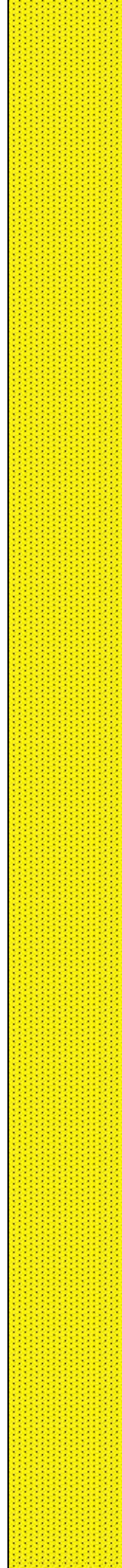


10,170  
10,180  
10,190  
10,200  
10,210  
10,220  
10,230  
10,240  
10,250  
10,260  
10,270  
10,280  
10,290  
10,300  
10,310  
10,320  
10,330  
10,340  
10,350  
10,360  
10,370  
10,380

WOB: 25.2klbs  
RPM: 70  
SPM: 186  
SPP: 4,149psi

MD: 10,239'  
TVD: 7,292.45'  
INC: 90.84°  
AZM: 359.29°  
VS: 2,213.12'

MD: 10,333'  
TVD: 7,291.12'  
INC: 90.79°  
AZM: 358.68°  
VS: 2,307.08'



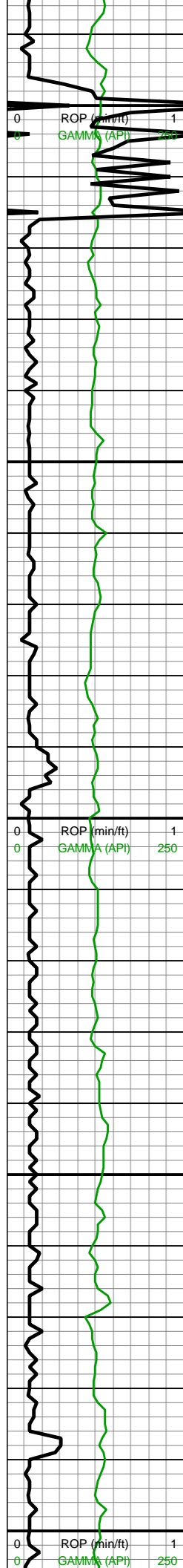
10100-10200 SST  
(100%): pred dk gy wi f  
sb rd qtz sd gr incl, sme lt  
gy-lt gy brn, p srted vf-f sd  
grs, pred sb rd-rd sli fri gr  
sup ss clus cons wi silc  
& arg cmt, rr c pyr, non  
calc, sl calc ip, tr-scat sh  
frags



10200-10300 SS (100%):  
dk gy-dk gyshbn, med gy,  
mot, sb rd-sb ang, vf-f gr,  
silty gr, mod srted SS clus,  
frm-v frm, gr sup clus,  
mtx sup ip, cons wi silc  
cmt, tr dissim mic-vf  
pyr/pyrc nod, non-sl calc,  
tr-scat SH frags



10300-10400 SST  
(100%): dk gy-dk gy brn  
gr-mtx sup clus, occ lt  
gy-gy mtx sup shy ss,  
pred dk gy wi f sb rd qtz  
sd gr incl, p srted vf-f sd



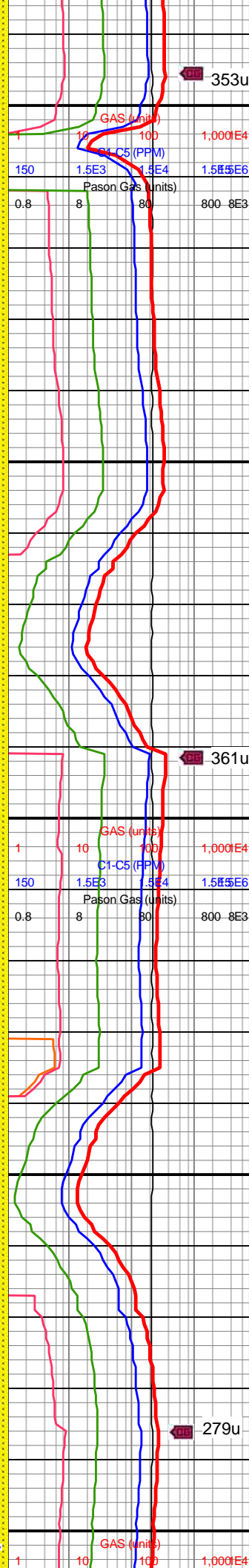
WOB: 39.5klbs  
RPM: 0  
SPM: 186  
SPP: 3,803psi

MW IN: 9.9  
VIS IN: 44  
MW OUT: 9.9  
VIS OUT: 42

MD: 10,428'  
TVD: 7,291.3'  
INC: 88.99°  
AZM: 1.32°  
VS: 2,402.07'

MD: 10,523'  
TVD: 7,292.87'  
INC: 89.12°  
AZM: 1.75°  
VS: 2,497.04'

WOB: 34.5klbs  
RPM: 70  
SPM: 185  
SPP: 4,336psi

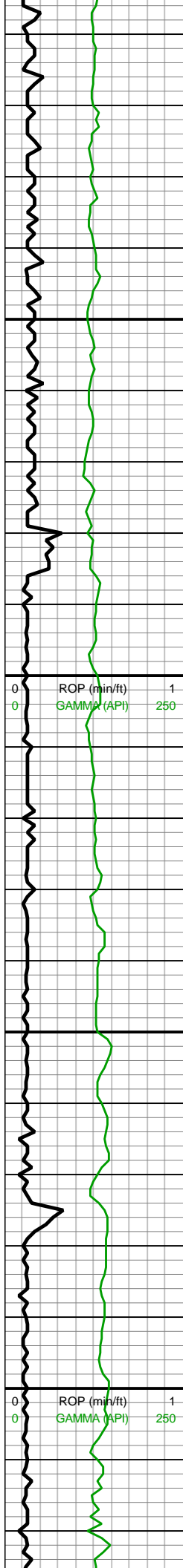


sd gr, incl, p silt v-f sd  
grs, pred sb rd-rd sli fri gr  
sup ss clus cons wi silc  
& arg cmt, unconsp ip, non  
calc, scat-com SH frags

10400-10500 SS (85%):  
dk gy-dk gyshbn, med gy,  
mot, sb rd-sb ang, vf-f gr,  
silty gr, mod srted SS clus,  
frm-v frm, gr sup clus,  
mtx sup ip, cons wi silc  
cmt, tr diss mic-vf  
pyr/pyrc nod, non-sl calc;  
SLTST (15%): pred v dk  
gy-blk, sme dk brn, blk, y,  
frm-hrd, slty tex, non calc,  
grdg to SH

10500-10600 SST (60%):  
pred med brn-dk brn,  
com speckl, pred w cons  
cls cons wi silc-arg cmt,  
f-vf grnd, mod-p srted, sb  
ang-ang grns, frm-v frm,  
occ fri, com micmica,  
scat imbd pyr, tr imbd  
mic pyr; SLTST (40%):  
pred v dk gy-blk, sme dk  
brn, blk, y, frm-hrd, slty tex,  
non calc, grdg to SH





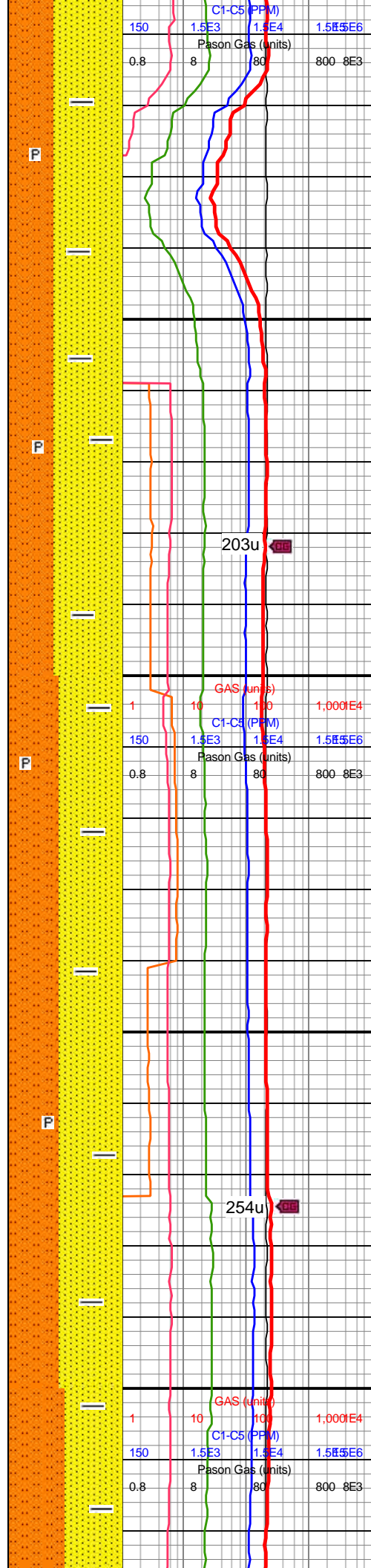
MD: 10,617'  
TVD: 7,294.56'  
INC: 88.81°  
AZM: 0.96°  
VS: 2,591.01'

MW IN: 9.9  
VIS IN: 44  
MW OUT: 9.9  
VIS OUT: 42

MD: 10,712'  
TVD: 7,296.64'  
INC: 88.68°  
AZM: 0.79°  
VS: 2,685.99'

WOB: 34.8klbs  
RPM: 70  
SPM: 184  
SPP: 4,422psi

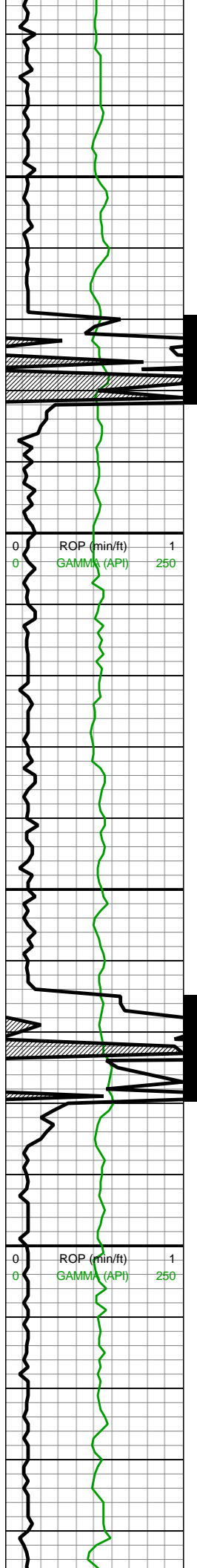
MD: 10,807'  
TVD: 7,299.05'  
INC: 88.42°  
AZM: 0.35°  
VS: 2,780.95'



10600-10700 SHY SST (60%): lt gy-med gy, sft-sb frm rd-sb rd ctngs, w hydrated, arg cly cmt wi occ dolc cmt ip, l-med calc; SLTST (40%): dk gy-v dk gy-blk ip, frm, brit, sb plty-plty, cons wi silc cmt-occ arg cmt, thn lamn, occ lam pyr strg, l calc

10700-10800 SHY SST (55%): lt gy-med gy p srtd v arg sst wi vf-f sd grs, sft-sb frm rd-sb rd ctngs, w hydrated, arg cly cmt wi occ dolc cmt ip, l-med calc; SLTST (45%): dk gy-v dk gy-blk ip, frm, brit, sb plty-plty, cons wi silc cmt-occ arg cmt, thn lamn, occ lam pyr strg, l calc





10,830  
10,840  
10,850  
10,860  
10,870  
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

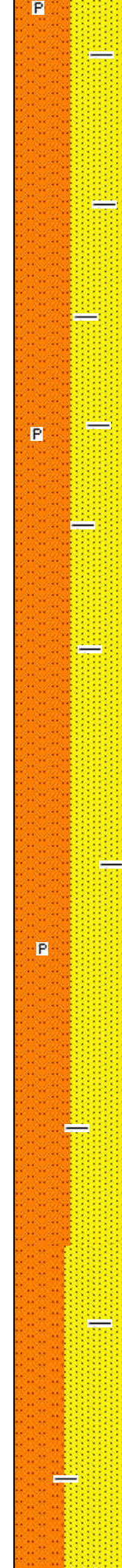
MW IN: 10  
VIS IN: 44  
MW OUT: 10.1  
VIS OUT: 44

MD: 10,902'  
TVD: 7,301.38'  
INC: 88.77°  
AZM: 359.47°  
VS: 2,875.89'

MW IN: 9.95  
VIS IN: 44  
MW OUT: 10  
VIS OUT: 43

MD: 10,996'  
TVD: 7,303.43'  
INC: 88.73°  
AZM: 358.33°  
VS: 2,969.83'

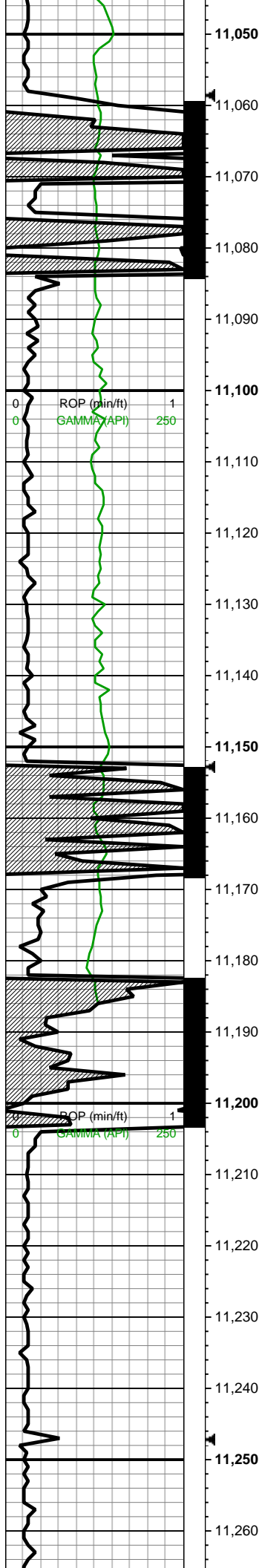
WOB: 27klbs  
RPM: 70  
SPM: 184  
SPP: 4,370psi



10800-10900 SHY SST  
(50%): off wh-lt gy, sft-sb  
frm p srted sst clus, predy  
vf sd grs-occ f sd grs,  
predy sft arg cly cmt, occ  
sb frm v fri sst clus cons  
wi silc cmt, calc thru wi  
l-mod calc; SLTST (50%):  
dk gy-blk, frm-brit, sb  
plty-plty hi fis ctngs, sm sl  
silty tex, thn vugy lamn,  
occ lam pyr strg, l calc

10900-11000 SHY SST  
(50%): lt gy-med gy, p  
srted sft-sb frm v arg sst  
wi vf-occ f sd grs, rd-sb rd  
ctngs, w hydrated, arg cly  
cmt, l-med calc; SLTST  
(50%): dk gy-v dk gy-blk  
ip, frm, brit, sb plty-plty,  
cons wi silc cmt-occ arg  
cmt, thn lamn, occ lam  
pyr strg, l calc





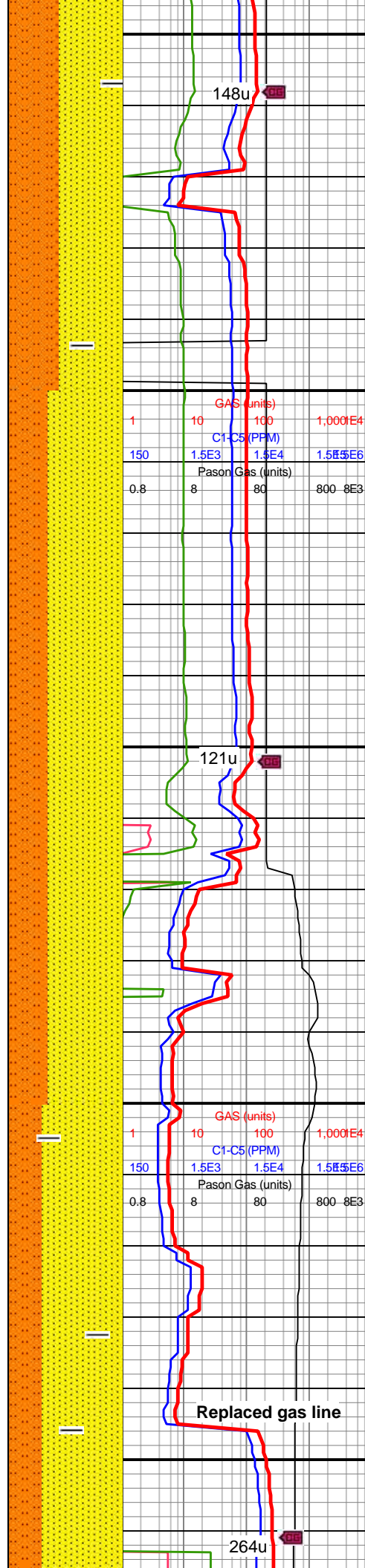
MW IN: 9.95  
VIS IN: 45  
MW OUT: 10  
VIS OUT: 43

MD: 11,090'  
TVD: 7,304.26'  
INC: 90.26°  
AZM: 358.24°  
VS: 3,063.75'

MW IN: 9.95  
VIS IN: 44  
MW OUT: 10  
VIS OUT: 43

MD: 11,185'  
TVD: 7,302.73'  
INC: 91.58°  
AZM: 359.56°  
VS: 3,158.7'

WOB: 12klbs  
RPM: 0  
SPM: 185  
SPP: 3,670psi



148u

121u

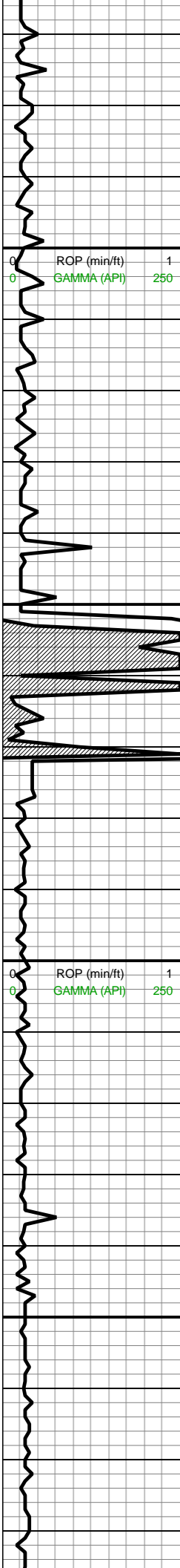
Replaced gas line

264u

11000-11100 SHY SST  
(45%): off wh-lt gy, sft-sb  
frm p srted sst clus, predy  
vf sd grs-occ f sd grs,  
predy sft arg cly cmt, occ  
sb frm v fri sst clus cons  
wi silc cmt, calc thru wi  
non-sl-l calc; SLTST  
(45%): dk gy-blk, frm-brit,  
sb plty-plty hi fis ctngs,  
sm sl slty tex, thn vugy  
lamn, occ lam pyr strg, l  
calc; SST (10%): lt gy,  
s&p ip, frm sli fri p-mod  
srted gr sup sst clus cons  
wi silc & arg cmt, predy  
non calc, sl calc ip

11100-11200 SHY SST  
(55%): off wh-lt gy, sft-sb  
frm sst clus, predy vf sd  
grs-occ f sd grs, p srted  
mtx sup sst clus cons wi  
sft arg cly cmt, occ sb frm  
v fri sst clus cons wi silc  
cmt, tr-rr vf pyr, non-sl  
calc; SLTST (35%): dk  
gy-blk, frm-brit, sb  
plty-plty hi fis ctngs, sm sl  
slty tex, vugy lamn ip, rr  
vf-f pyr, sl calc; SST  
(10%): lt gy, frm sli fri  
p-mod srted gr sup sst  
clus cons wi predy silc  
cmt, arg ip, predy non  
calc, sl calc ip

11200-11300 SHY SST  
(60%): off wh-lt gy, sft-sb  
frm sst clus, predy vf sd  
grs-occ f sd grs, p srted  
mtx sup sst clus cons wi  
sft arg cmt, occ sb frm



MD: 11,279'  
TVD: 7,300.35'  
INC: 91.32°  
AZM: 0.17°  
VS: 3,252.66'

11,300

11,310

11,320

11,330

11,340

11,350

11,360

11,370

11,380

11,390

11,400

11,410

11,420

11,430

11,440

11,450

11,460

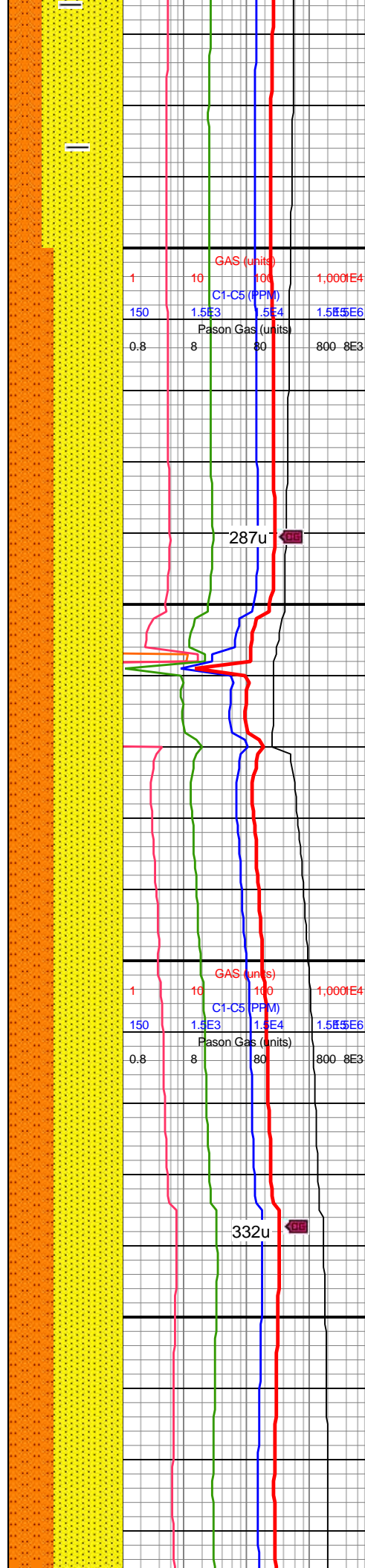
11,470

11,480

MD: 11,374'  
TVD: 7,298.02'  
INC: 91.49°  
AZM: 2.02°  
VS: 3,347.63'

WOB: 28klbs  
RPM: 70  
SPM: 188  
SPP: 4,520psi

MD: 11,468'  
TVD: 7,295.76'  
INC: 91.27°  
AZM: 1.05°  
VS: 3,441.58'

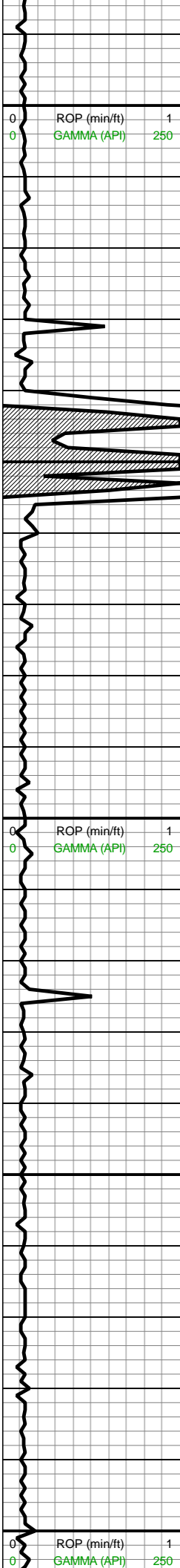


sft arg cly cmt, occ sb frm  
v fri sst clus cons wi silc  
cmt, non-sl calc; SLTST  
(30%): dk gy-blk, frm-brit,  
sb plty-plty hi fis ctngs,  
sm sl slty tex, sl calc;  
SST (10%): lt gy, frm sli fri  
p-mod srted gr sup sst  
clus cons wi predy silc  
cmt, arg ip, predy non  
calc, sl calc ip

11300-11400 SHY SST  
(60%): off wh-lt gy, sft-sb  
frm sst clus, predy vf sd  
grs-occ f sd grs, p srted  
mtx sup sst clus cons wi  
sft arg cly cmt, occ sb frm  
v fri sst clus cons wi silc  
cmt, tr-rr vf pyr, non-sl  
calc; SLTST (40%): dk  
gy-blk, frm-brit, sb  
plty-plty hi fis ctngs, sm sl  
slty tex, vugy lamn ip, rr  
vf-f pyr, sl calc, wi tr sst  
intbds

11400-11500 SHY SST  
(60%): off wh-lt gy, sft-sb  
frm sst clus, predy vf sd  
grs-occ f sd grs, p srted  
mtx sup sst clus cons wi  
sft arg cly cmt, occ sb frm  
v fri sst clus cons wi silc  
cmt, non-sl calc; SLTST  
(30%): dk gy-blk, frm-brit,  
sb plty-plty hi fis ctngs,  
sm sl slty tex, sl calc,  
intbdd wi sst lamn; SST  
(10%): lt gy-gy-dk gy, frm  
cli fri, p mod srted vf f sb





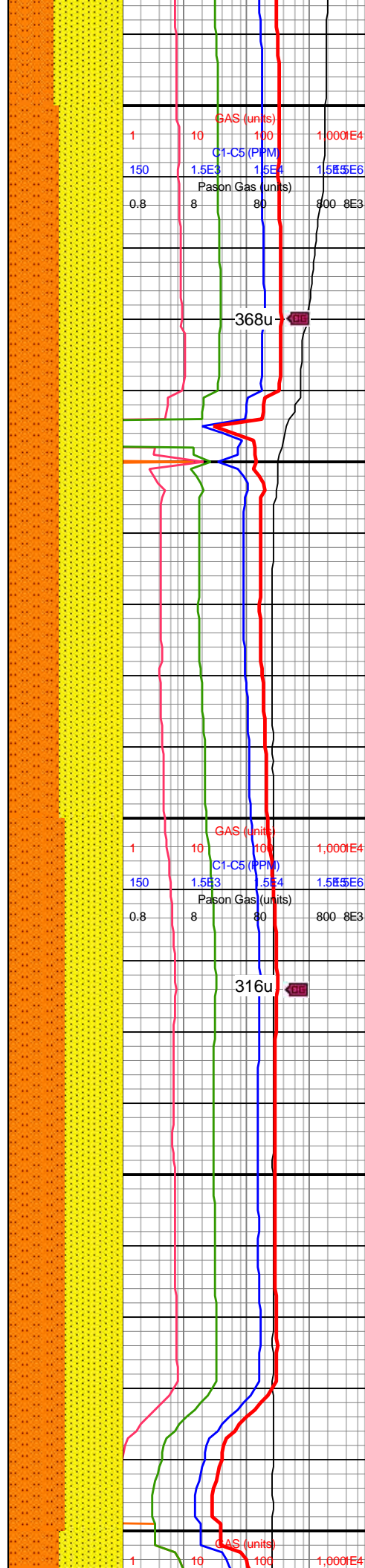
11,490  
11,500  
11,510  
11,520  
11,530  
11,540  
11,550  
11,560  
11,570  
11,580  
11,590  
11,600  
11,610  
11,620  
11,630  
11,640  
11,650  
11,660  
11,670  
11,680  
11,690  
11,700

MW IN: 9.95  
VIS IN: 43  
MW OUT: 10  
VIS OUT: 42

MD: 11,563'  
TVD: 7,293.32'  
INC: 91.67°  
AZM: 1.23°  
VS: 3,536.54'

WOB: 28klbs  
RPM: 70  
SPM: 186  
SPP: 4,480psi

MD: 11,657'  
TVD: 7,290.69'  
INC: 91.54°  
AZM: 0.88°  
VS: 3,630.5'



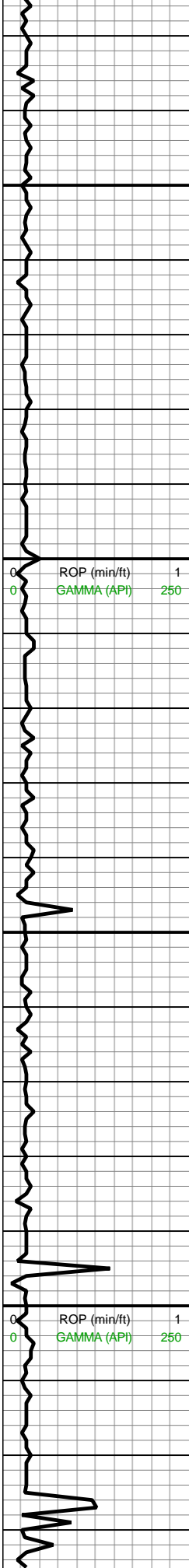
rd-rd sd grs, gr sup sst  
clus cons wi predy silc  
cmt, arg ip, predy non  
calc, sl calc ip

11500-11600 SHY SST  
(55%): lt gy-med gy p srt  
v arg sst wi vf-f sd grs,  
sft-sb frm rd-sb rd ctngs,  
w hydrated, arg cly cmt wi  
occ dolc cmt ip, l-med  
calc; SLTST (45%): dk  
gy-v dk gy-blk ip, frm, brit,  
sb plty-plty, cons wi silc  
cmt-occ arg cmt, thn  
lamn, rr vf pyr, l calc

11600-11700 SHY SST  
(50%): off wh-lt gy, sft-sb  
frm p srt sst clus, predy  
vf sd grs-occ f sd grs,  
predy sft arg cly cmt, occ  
sb frm v fri sst clus cons  
wi silc cmt, non-sl-l calc;  
SLTST (50%): dk gy-blk,  
frm-brit, sb plty-plty hi fis  
ctngs, sm sl slty tex, rr vf  
pyr, non calc-l calc







MW IN: 9.9  
VIS IN: 44  
MW OUT: 10  
VIS OUT: 42

MD: 11,942'  
TVD: 7,295.53'  
INC: 88.68°  
AZM: 0.7°  
VS: 3,915.42'

WOB: 32klbs  
RPM: 70  
SPM: 188  
SPP: 4,610psi

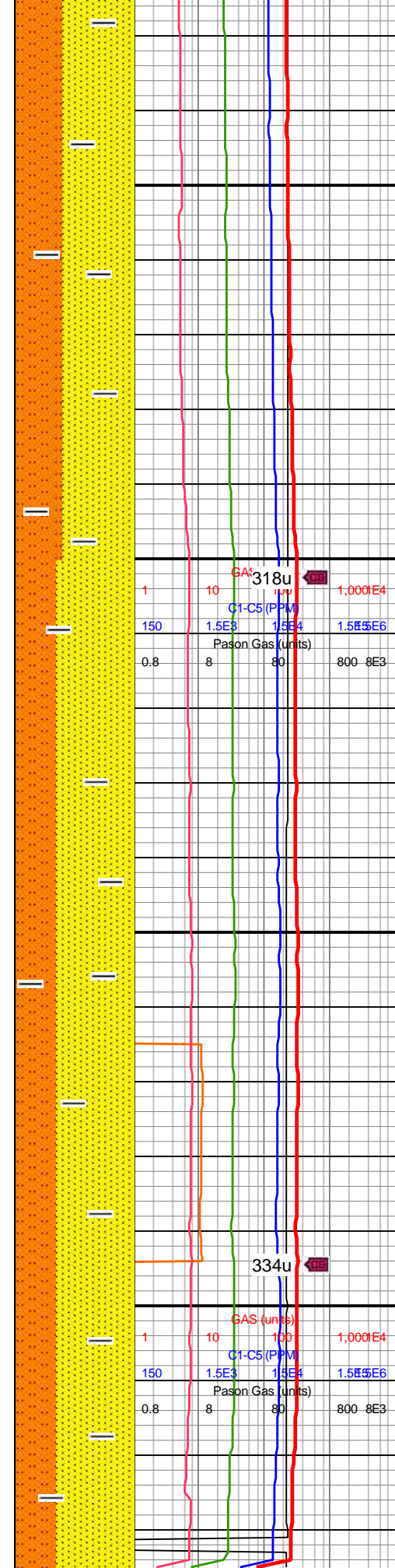
MD: 12,037'  
TVD: 7,297.98'  
INC: 88.37°  
AZM: 360°  
VS: 4,010.38'

MD: 12,073'  
TVD: 7,299'  
INC: 88.37°  
AZM: 359.03°  
VS: 4,046.36'

Reach TD @  
13:25hrs on  
6/18/18

\*Bit Projection\*

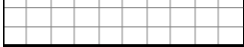
MD: 12,135'  
TVD: 7,300.76'  
INC: 88.37°  
AZM: 359.03°  
VS: 4,052.00'



11900-12000 SHY SST  
(50%): lt gy-lt  
gyshbn-med gy-med  
gyshbn, p srted vf-f sd grs,  
sft-sb frm mtz sup ss  
clus cons wi w hydrated  
sft arg cly cmt, slty grs ip,  
non-sl calc; SLTST  
(40%): dk gy-v dk gy, rr  
blk, frm-brit, occ sft arg  
sltst, blk-sb plty-plty, sm  
sl slty tex, occ gy vugy  
lamn, rr vf pyr, non calc-l  
calc grd to vf gr sst; SST  
(10%): gy-dk gy, frm-hd, vf  
sd grs grd to sltst, mod  
srted, occ vf pyr, non-sl  
calc

12000-12135 SHY SST  
(50%): lt gy-lt  
gyshbn-med gy-med  
gyshbn, p srted vf-f sd grs  
occ grd down to arg  
sltst, sft-sb frm mtz sup  
ss clus cons wi w  
hydrated sft arg cly cmt,  
non-sl calc; SLTST  
(35%): dk gy-v dk gy, rr  
blk & gy vugy lamn,  
frm-brit, occ sft arg sltst,  
blk-sb plty-plty, sm sl  
slty tex, rr vf pyr, non calc-l  
calc grd to vf gr sst; SST  
(15%): gy-dk gy, frm-hd, vf  
sd grs grd to sltst, mod  
srted, occ vf pyr, non-sl  
calc





12 150

AZM: 359.03°  
VS: 4,108.32'

