



RESERVOIR GROUP

Scale: 5" / 100'
Measured Depth Log

Well Name Cosslett 1F-22H-B168

Location Sec. 22 T1N R68W

State Colorado

County Weld

Country USA

Rig Number Ensign 140

API Number 05123476750000

AFE # 16191461

Geographic Region Rockies

Field Wattenberg

Spud Date 10/14/2018

Drilling Completed 1/13/2019

Surface Coordinates Lat/Long: 40.04139/-104.987904
SHL: Sec. 22 T1N R68W
Footage: 925 FNL 2200 FEL

Bottom Hole Coordinates Proposed BHL: Sec. 27 T1N R68W
Footages: 460 FFSLL 1530 FFELL

Ground Elevation 5,174'

K.B. Elevation 5,197'

Logged Interval 141' To 17,796'

Total Depth 17,796'

Formation Codell

Type of Drilling Fluid Synthetic Oil Based Mud

Operator

Company Crestone Peak Resources

Address 1801 California Street, Suite 2500
Denver, CO 80202



CRESTONE PEAK

CRESTONE PEAK RESOURCES

Geologist

Name John Ready

Company Crestone Peak Resources

Address 1801 California Street, Suite 2500
Denver, CO 80202



CRESTONE PEAK
RESOURCES

Zone Color Coding

Oil	Condensate	Gas
Note	Core	Pressure
Error	Water	Seal

Other

Loggers: Nicholas Watkins (Conductor/Surface/Horizontal), Thomas Yull (Horizontal)

Services Provided: 2-Man Mudlogging / Geosteering

Equipment: ML-522

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

Service Start Date: 10/14/18 (Conductor), 11/3/18 (Surface), 1/5/19 (Horizontal)

Service End Date: 10/15/18 (Conductor), 11/3/18 (Surface), 1/16/19 (Horizontal)

Rock Types

UNKNOWN	DOLOMITE	SHALE GRAY	TILL
ANHYDRITE	CHERT	SHALE COLORED	BENTONITE
GYPSUM	COAL	SILTSTONE	TUFF
SALT	MARLSTONE	SANDSTONE	IGNEOUS
SIDERITE or LIMONITE	CHALK	CONGLOMERATE	METAMORPHIC
LIMESTONE	SHALE	BRECCIA	CEMENT

Accessories

Fossils

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

F FOSSIL

- GASTROPOD
- OOLITE
- OSTRACOD
- PELECYPOD
- PELLET
- PISOLITE
- PLANT REMAINS
- PLANT SPORES
- SCAPHOPOD
- STROMATOPOROID

Minerals

- ANHYDRITIC

ARGILLACEOUS

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

GLAUCONITE

- GYPSIFEROUS
- HEAVY MINERAL
- KAOLIN
- MARLSTONE
- MINERAL CRYSTALS
- NODULES
- PHOSPHATE PELLETS
- PYRITE
- SALT CAST
- SANDY
- SILICEOUS
- SILTY
- TUFFACEOUS

Stringer

- ANHYDRITE STRINGER
- BENTONITE STRINGER
- COAL STRINGER
- DOLOMITE STRINGER
- GYPSUM STRINGER
- LIMESTONE STRINGER
- MARLSTONE (CALC) STRG
- MARLSTONE (DOL) STRG
- SANDSTONE STRINGER
- SHALE STRINGER
- SILTSTONE STRINGER

Oil Show

- DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

Porosity

- EARTHY
- FENESTRAL
- FRACTURE
- INTERCRYSTALLINE
- INTEROOLITIC
- MOLDIC

- ORGANIC
- PINPOINT
- VUGGY

Engineering

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

Other Symbols

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

Rounding

- ANGULAR
- ROUNDED
- SUBANG
- SUBRND

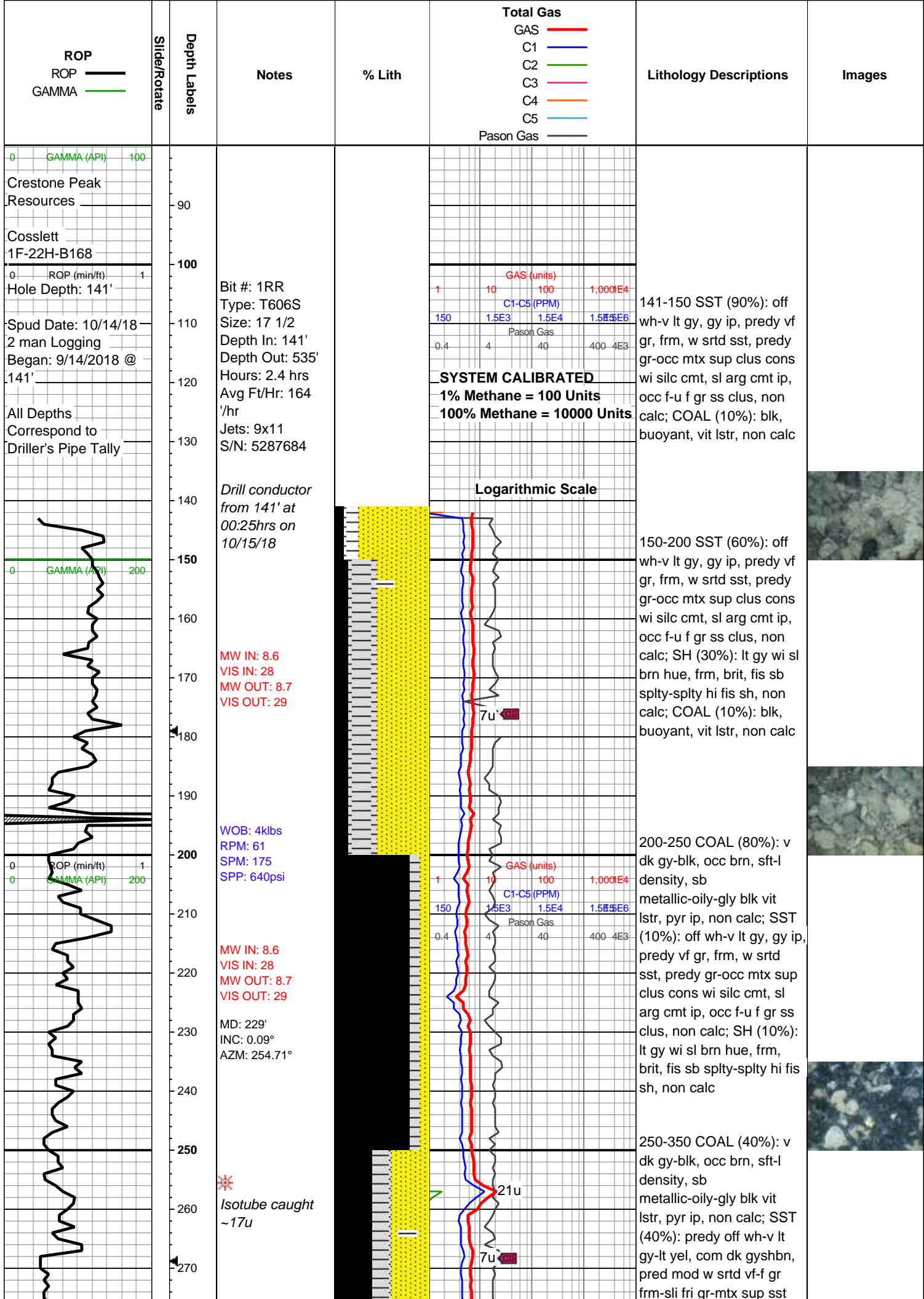
Textures

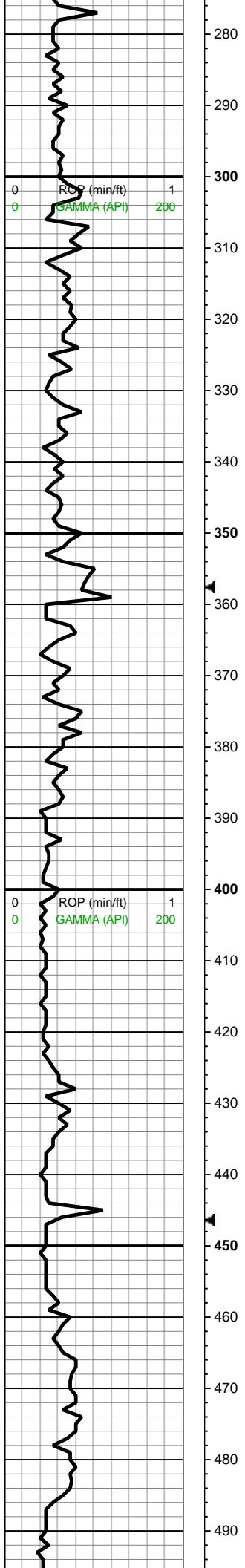
- BOUNDSTONE
- CHALKY
- CRYPTOXLN
- EARTHY
- FINELYXLN
- GRAINSTONE

- LITHOGRAPHIC
- MICROXLN
- MUDSTONE
- PACKSTONE
- WACKESTONE

Sorting

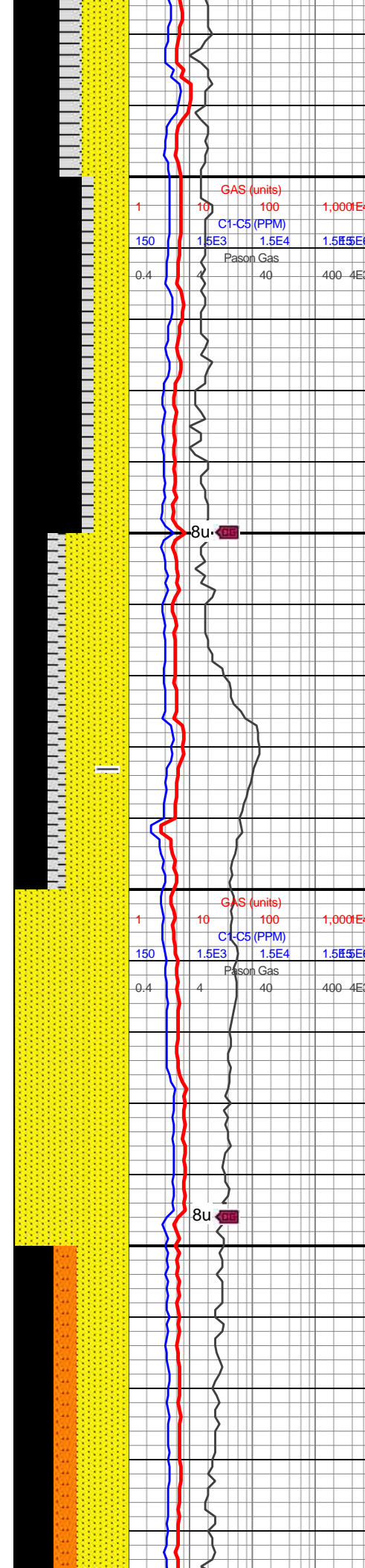
- MODERATE
- POOR
- WELL





Mud loss:
289-350 barrels
from 259' MD to
~400' MD
through coal
shafts

WOB: 3klbs
RPM: 70
SPM: 204
SPP: 810psi



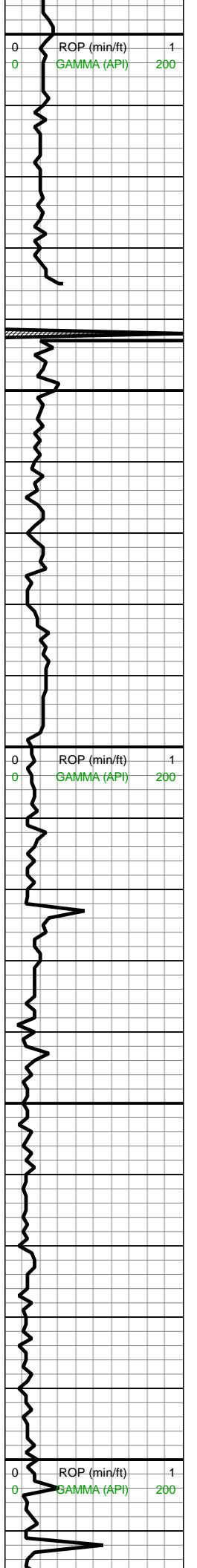
clus cons wi predy silc
cmt & sme arg cmt ip,
occ f-u f gr sup sst clus
cons wi silc & dolc cmt wi
mod calc rxn, occ dk coal
lithic grs ip, predy non
calc; SH (20%): lt gy-lt
gyshbn, frm, brit, mod fis
sb blk-ly-sb splty
ctngs, sl slty tex, non calc

350-400 SST (55%): off
wh-v lt gy-lt yel, occ dk
gyshbn, mod w srted vf-f gr
frm-sli fri gr-mtx sup sst
clus cons wi silc cmt &
sme arg strg ip, non calc,
occ f-u f gr sup sst clus
cons wi silc & dolc cmt wi
mod calc; COAL (30%): v
dk gy-blk, sb
metallic-oily-gly blk vit
lstr, vf pyr ip, non calc; SH
(15%): lt gy-lt gyshbn,
frm, brit, mod fis sb
blk-ly-sb splty ctngs,
sl slty tex, non calc

400-450 SST (100%):
clr-trnsl wh-op wh, v
srted sb rd-rd f uncons
predy qtz sd, non calc

450-500 SST (45%): off
wh-v lt gy-med gy, predy
mod w srted vf-f grs frm-sli
fri gr-mtx sup sst clus
cons wi silc cmt & arg
strg ip, non calc, occ f-u f
gr sup sst clus cons wi
silc & dolc cmt wi mod
calc; COAL (35%): v dk
gy-blk, sb metallic-oily-gly
blk vit lstr, vf pyr ip, non
calc; 25% SLTST: lt
gy-med gy-gyshbn, frm,
brit, sl arg ip, non calc





500
510
520
530
540
550
560
570
580
590
600
610
620
630
640
650
660
670
680
690
700
710

Reach
conductor TD @
03:35hrs on
10/15/18

Bit #: 2
Type: U519S
Size: 12 1/4
Depth In: 530'
Depth Out: 2,540'
Hours: 9.5 hrs
Avg Ft/Hr: 212 '/hr
Jets: 5x16
S/N: 44304

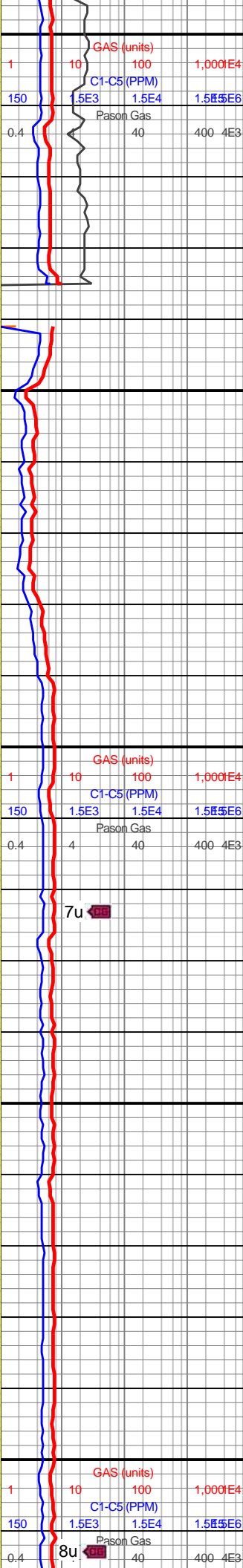
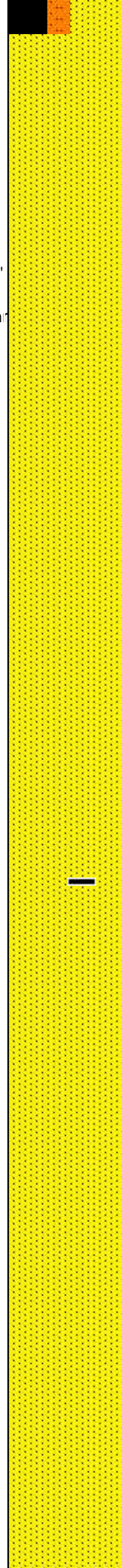
Resume drilling
surface @
05:17hrs on
11/3/18

MW IN: 8.55
VIS IN: 28
MW OUT: 8.55
VIS OUT: 28

MD: 586'
INC: 0.97°
AZM: 322.82°

WOB: 9klbs
RPM: 52
SPM: 164
SPP: 680psi

MD: 655'
INC: 0.84°
AZM: 315.65°



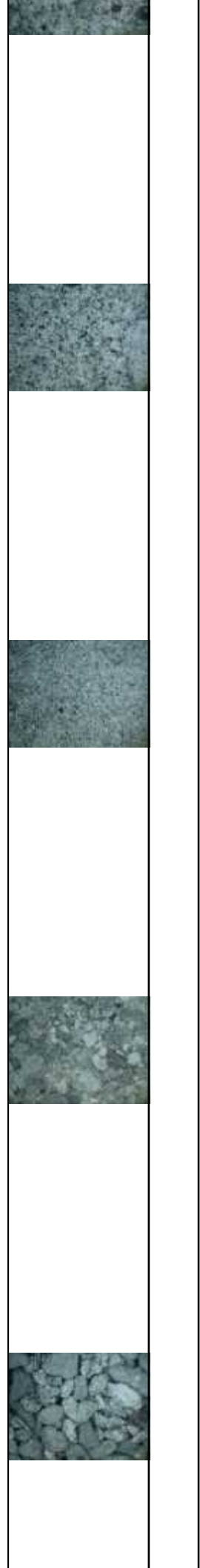
500-535 SST (100%):
clr-trnsl wh-op wh, v w
srtd sb rd-rd f uncons
predy qtz sd, non calc

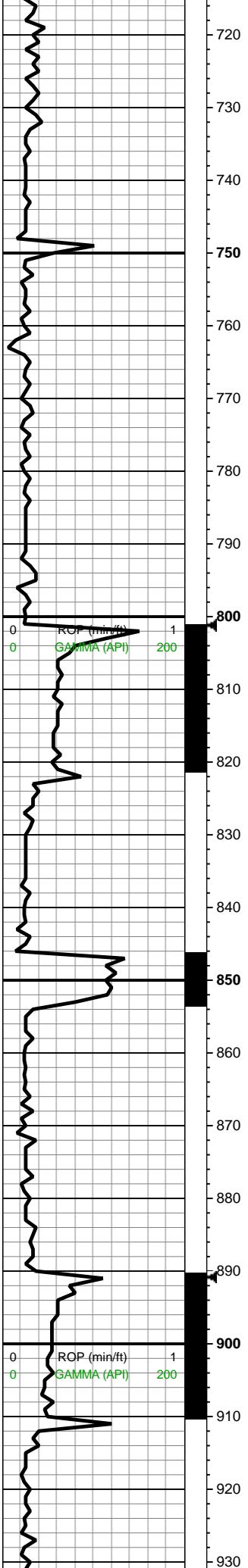
535-600 SST (100%): off
wh-v lt gy, trnsl wh-op
wh-clr v w srtd sb rd-rd
f-u f gr predy qtz sd,
uncons, non calc

600-650 SST (100%): off
wh-v lt gy, w srtd vf-f gr
ang-sb ang-sb rd-rd sd
grs, occ u f, frm sst clus
cons wi silc cmt, non
calc, wi tr blk coal

650-700 SST (100%): off
wh-v lt gy, w srtd vf-f gr
ang-sb ang-sb rd-rd sd
grs, occ u f, frm sst clus
cons wi silc cmt, non calc

700-750 SST (100%): off
wh-lt gy intbdd wi lt
gyshbn-med gy-med
gyshbn, w srtd grdd bds



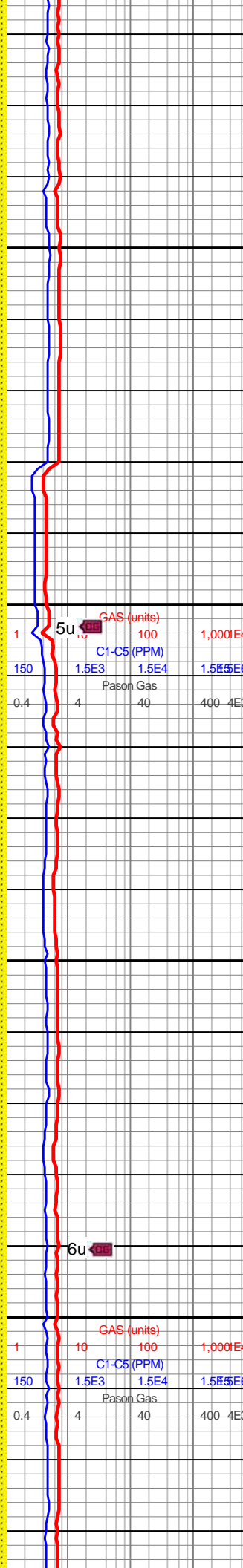
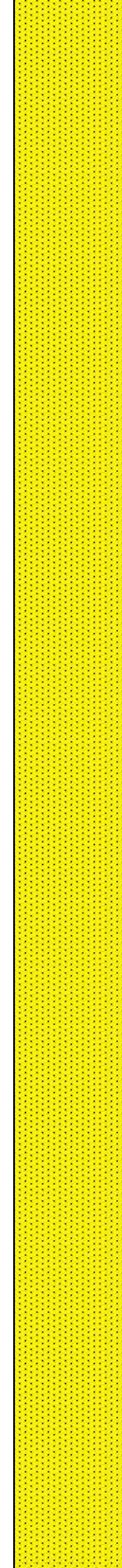


MD: 764'
 INC: 1.06°
 AZM: 324.05°

WOB: 12klbs
 RPM: 51
 SPM: 206
 SPP: 970psi

MD: 853'
 INC: 2.46°
 AZM: 22.24°

MW IN: 8.6
 VIS IN: 28
 MW OUT: 8.7
 VIS OUT: 28



srted from vf-u f sd grs, sb ang-sb rd-rd sd grs, predy gr sup sst clus cons wi silc cmt, rr mtx sup u f gr sst clus wi silc cmt, non calc

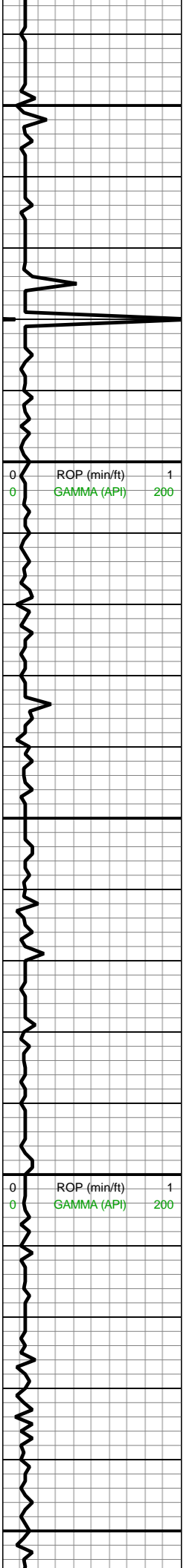
750-800 SST (100%): predy lt gy-gy, occ off wh, occ dk gy, w srted grdd vf-u f sb ang-sb rd-rd sd grs, predy gr sup sst clus cons wi silc cmt, rr mtx sup u f gr sst clus wi silc cmt, non calc

800-850 SST (100%): off wh-lt gy intbdd wi med gy, w srted grdd bds srted from vf-u f sd grs, sb ang-sb rd-rd sd grs, predy gr sup sst clus cons wi silc cmt, rr mtx sup u f gr sst clus wi silc cmt, non calc

850-900 SST (100%): predy med gy frm vf-f gr gr-mtx sup sst clus cons wi silc & sl arg cmt, occ off wh f-u f sb ang gr sl fri gr sup sst clus cons wi silc cmt, non calc

900-950 SST (100%): lt-med gy, frm vf-f gr gr-mtx sup sst clus cons wi silc & sl arg cmt, occ off wh f-u f sb ang gr sl fri gr sup sst clus cons wi silc cmt, non calc



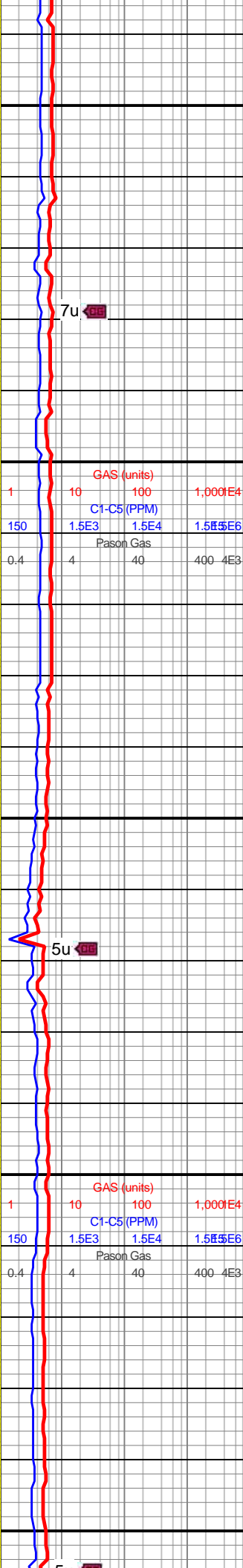
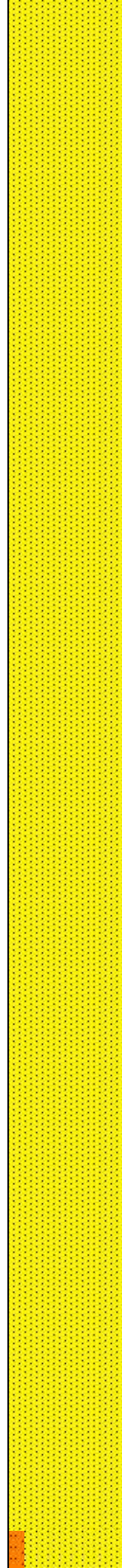


MD: 942'
 INC: 5.1°
 AZM: 36.3°

WOB: 12klbs
 RPM: 50
 SPM: 208
 SPP: 1,060psi

MD: 1,031'
 INC: 5.28°
 AZM: 34.89°

MD: 1,120'
 INC: 5.72°
 AZM: 33.22°



GAS (units)			
1	10	100	1,000E4
C1-C5 (PPM)			
150	1.5E3	1.5E4	1.5E6
Pason Gas			
0.4	4	40	400 4E3

950-1000 SST (100%):
 predy med gy-gy wi sl brn hue, frm vf-f gr gr-mtx sup sst clus cons wi silc & sl arg cmt, occ off wh f-u f sb ang gr sl fri gr sup sst clus cons wi silc cmt, non calc, l calc ip

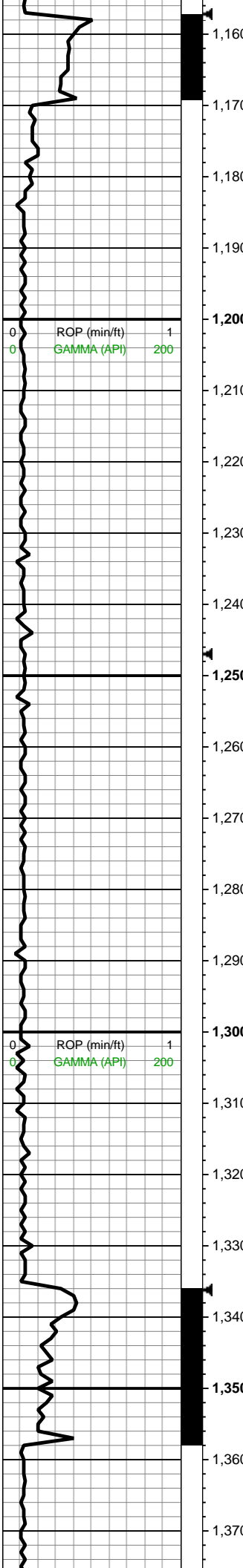
1000-1050 SST (100%):
 med gy-gy wi sl brn hue, occ off wh-lt gy u f gr sup sst, frm vf-f gr gr-mtx sup sst clus cons wi silc & sl arg cmt, occ off wh f-u f sb ang gr sl fri gr sup sst clus cons wi silc cmt, non calc

1050-1100 SST (100%):
 predy med gy-gy wi sl brn hue, frm vf-f gr gr-mtx sup sst clus cons wi silc & sl arg cmt, occ off wh f-u f sb ang gr sl fri gr sup sst clus cons wi silc cmt, non calc, occ l calc

1100-1150 SST (100%):
 predy lt-med gy frm sli fri gr sup f-u f gr sst cons wi silc cmt, frm med gysbhn vf-f gr gr-mtx sup sst clus cons wi silc & sl arg cmt, non calc, occ l calc

1150-1200 SST (85%):
 predy med gy-gy wi sl brn hue, frm vf-f gr gr-mtx sup sst clus cons wi silc & sl arg cmt, non calc, occ l calc





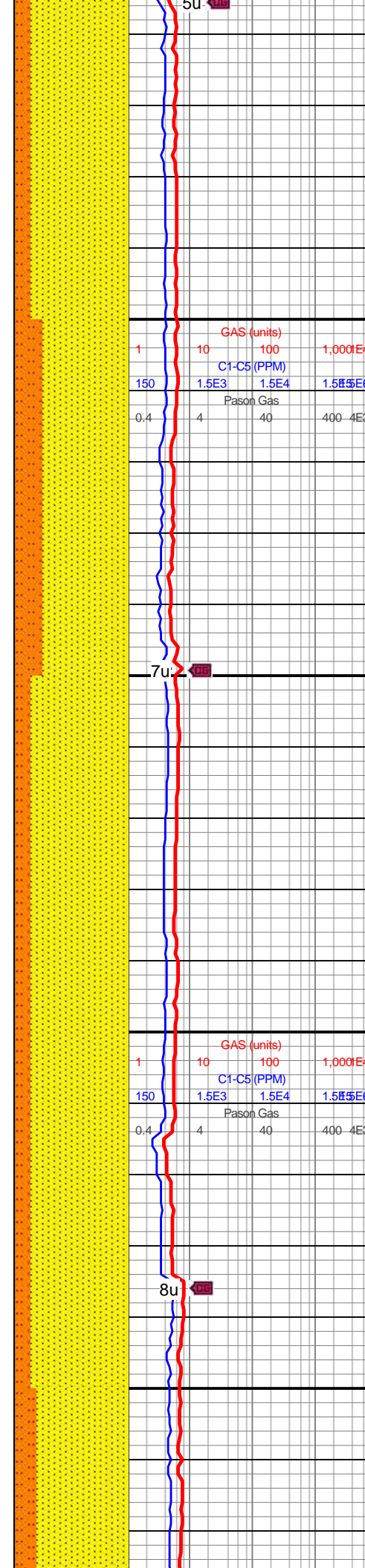
MD: 1,189'
INC: 5.95°
AZM: 43.22°

WOB: 23klbs
RPM: 50
SPM: 208
SPP: 1,230psi

MD: 1,278'
INC: 5.33°
AZM: 40.99°

ROP (min/ft) 1
GAMMA (API) 200

MD: 1,368'
INC: 7.77°
AZM: 43.54°



predy gy-uk gy, rr oil wh
f-u f gr sup sst clus cons
wi silc cmt, sb frm-frm
gr-mtx sup vf gr sst clus
cons wi silc & incr arg
cmt, tr micmica ip, predy
non calc, rr sl calc;
SLTST (15%): med-dk gy,
sb frm-frm-brit, silc-arg
sltst, non calc

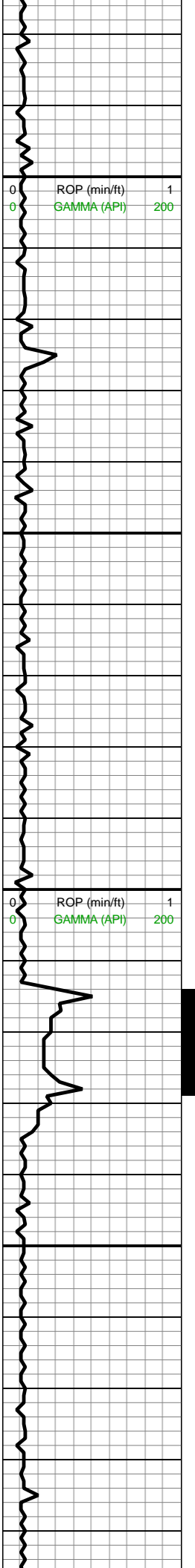
1200-1250 SST (75%):
predy gy-dk gy, rr off wh
f-u f gr sup sst clus cons
wi silc cmt, sb frm-frm
gr-mtx sup vf gr sst clus
cons wi silc & incr arg
cmt, tr micmica ip, predy
non calc, rr sl calc;
SLTST (25%): med-dk gy,
sb frm-frm-brit, silc-arg
sltst, non calc

1250-1300 SST (85%): It
gy-med gy, occ dk gy, rr
off wh f-u f gr sup sst clus
cons wi silc cmt, sb
frm-frm gr-mtx sup vf gr
sst clus cons wi silc &
incr arg cmt, tr micmica
ip, predy non calc, rr sl
calc; SLTST (15%):
med-dk gy, sb
frm-frm-brit, silc-arg sltst,
non calc

1300-1350 SST (85%):
predy gy-dk gy, rr off wh
f-u f gr sup sst clus cons
wi silc cmt, sb frm-frm
gr-mtx sup vf gr sst clus
cons wi silc & incr arg
cmt, tr micmica ip, predy
non calc, rr sl calc;
SLTST (15%): med-dk gy,
sb frm-frm-brit, silc-arg
sltst, non calc

1350-1400 SST (80%): It
gy-med gy, rr off wh-dk gy,
mod srt'd & grdd vf-f
sd grs cons wi arg & silc
cmt, sb frm-frm gr-mtx
sup sst clus, tr micmica
ip, predy non calc, rr sl
calc; SLTST (20%):





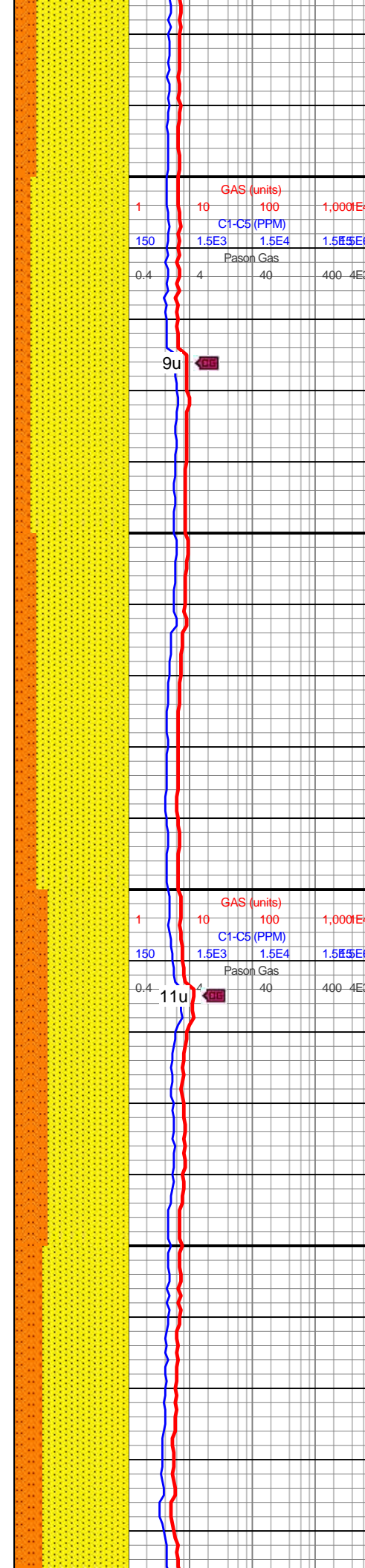
1,380
1,390
1,400
1,410
1,420
1,430
1,440
1,450
1,460
1,470
1,480
1,490
1,500
1,510
1,520
1,530
1,540
1,550
1,560
1,570
1,580
1,590

WOB: 24klbs
RPM: 51
SPM: 208
SPP: 1,300psi

MW IN: 8.6
VIS IN: 28
MW OUT: 8.9
VIS OUT: 29

MD: 1,457'
INC: 7.58°
AZM: 39.08°

MD: 1,546'
INC: 10.12°
AZM: 42.31°



med-dk gy, sb
frm-frm-brit, silc-arg sltst,
non calc

1400-1450 SST (85%): lt
gy-med gy, sb frm-frm
gr-mtx sup sst clus cons
wi silc & arg cmt, mod
srt'd & grdd vf-f sd grs,
predy non calc, rr sl calc;
SLTST (15%): med-dk gy,
sb frm-frm-brit, silc-arg
sltst, tr c pyr strg, non
calc

1450-1500 SST (85%): lt
gy-med gy, mod srt'd vf-f
grs, u f ip, predy sb rd
grs, sb frm-frm gr-mtx
sup sst clus cons wi silc
& arg cmt, non calc;
SLTST (15%): med-dk gy,
gyshbn ip, sb
frm-frm-brit, silc-arg sltst,
non calc

1500-1550 SST (70%): lt
gy-med gy intbds, mod
srt'd vf-f grs & grgd to u f
intbds ip, sb frm-frm
gr-mtx sup sst clus cons
wi silc & arg cmt, non
calc, wi intbdd sltst;
SLTST (30%): med-dk gy,
gyshbn ip, sb
frm-frm-brit, silc-arg sltst,
non calc

1550-1600 SST (75%):
predy mod w srt'd off wh-lt
gy sli fri gr sup sst clus
cons wi silc cmt, f-u f grs,
com lt gy-gy p-mod srt'd
gr-mtx sup vf-f gr sst
cons wi arg & silc cmt,
predy non calc, mod calc
ip; SLTST (25%): med gy,
sb frm-frm-fri, silc-arg
sltst, occ vf-f sd grs, non
calc



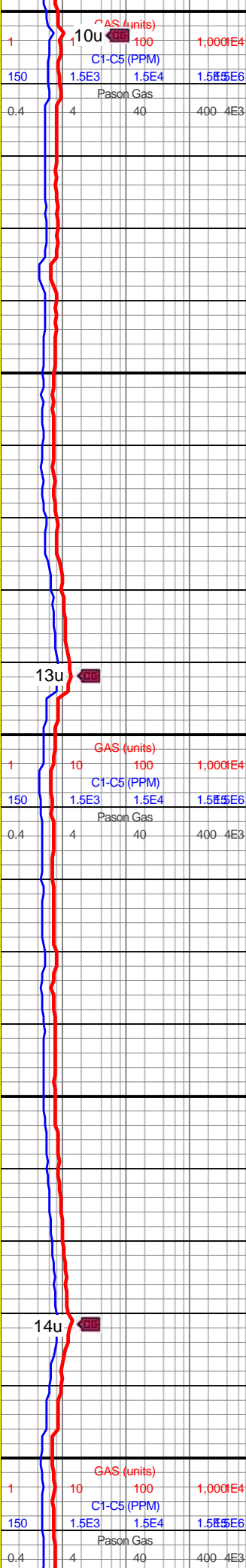
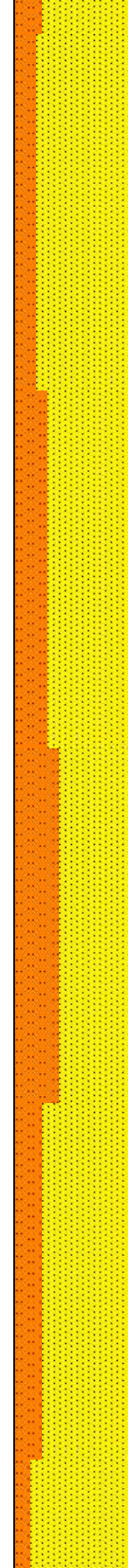
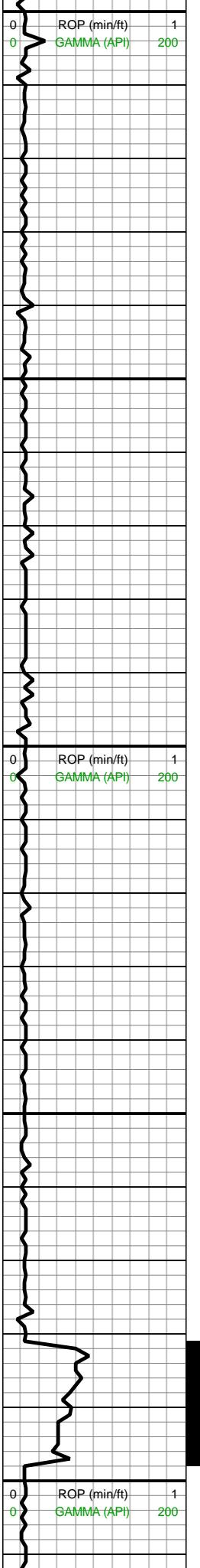
WOB: 23klbs
 RPM: 51
 SPM: 208
 SPP: 1,320psi

MD: 1,635'
 INC: 10.26°
 AZM: 37.48°

MD: 1,724'
 INC: 10.06°
 AZM: 29.28°

WOB: 27klbs
 RPM: 50
 SPM: 208
 SPP: 1,360psi

MD: 1,813'
 INC: 10.95°



1600-1650 SST (80%):
 predy mod w srted off wh-lt
 gy sli fri gr sup sst clus
 cons wi silc cmt, f-u f grs,
 com lt gy-gy p-mod srted
 gr-mtx sup vf-f gr sst
 cons wi arg & silc cmt,
 predy non calc, mod calc
 ip; SLTST (20%): med gy,
 sb frm-frm-fri, silc-arg
 sltst, occ vf-f sd grs, non
 calc

1650-1700 SST (70%):
 off wh-lt gy mod w srted f-u
 f gr sli fri gr sup sst clus
 cons wi silc cmt, com gy
 p-mod srted gr-mtx sup vf-f
 gr sst cons wi arg & silc
 cmt, predy non calc, mod
 calc ip; SLTST (30%):
 med gy, sb frm-frm-fri,
 silc-arg sltst, occ vf-f sd
 grs, non calc

1700-1750 SST (60%):
 predy mod w srted off wh-lt
 gy sli fri gr sup sst clus
 cons wi silc cmt, f-u f grs,
 com lt gy-gy p-mod srted
 gr-mtx sup vf-f gr sst
 cons wi arg & silc cmt,
 predy non calc, mod calc
 ip; SLTST (40%): med gy,
 sb frm-frm-fri, silc-arg
 sltst, occ vf-f sd grs, non
 calc

1750-1800 SST (75%):
 predy off wh-lt gy mod w
 srted sl fri gr sup f-u f gr
 sup sst cons wi silc cmt,
 com med gy mod srted &
 grdd vf-f sd grs cons wi
 arg & silc cmt grdg down
 to sltst ip, predy non calc,
 rr sl calc; SLTST (25%):
 med-dk gy, sb
 frm-frm-brit, silc-arg sltst,
 rr-tr vf pyr, non calc

1800-1850 SST (85%):
 lt gy-med gy, rr off wh-dk
 gy, mod srted & grdd vf-f
 sd grs cons wi arg & silc
 cmt, sb frm-frm gr-mtx



AZM: 30.97°

1,820
1,830
1,840
1,850
1,860
1,870
1,880
1,890
1,900
1,910
1,920
1,930
1,940
1,950
1,960
1,970
1,980
1,990
2,000
2,010
2,020
2,030

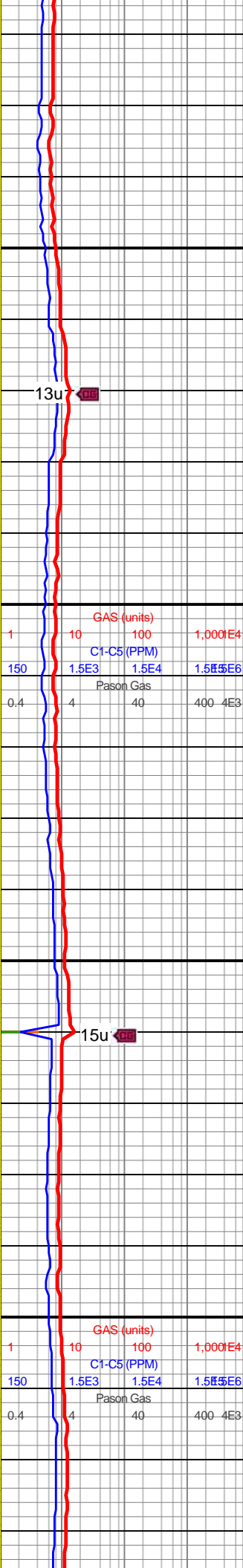
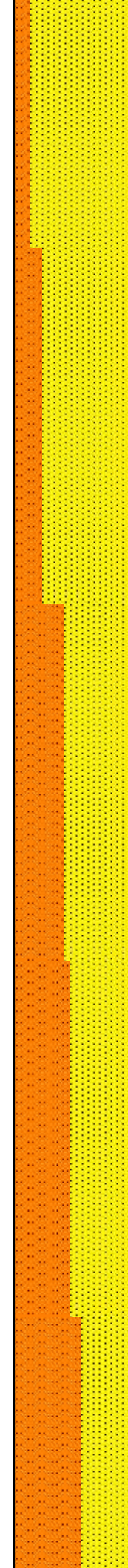
ROP (min/ft) 1
GAMMA (API) 200

MD: 1,902'
INC: 10.9°
AZM: 32.71°

ROP (min/ft) 1
GAMMA (API) 200

MD: 1,991'
INC: 10.33°
AZM: 23.68°
WOB: 23klbs
RPM: 51
SPM: 208
SPP: 1,480psi

MW IN: 8.6
VIS IN: 28
MW OUT: 8.8
VIS OUT: 29



13u
15u

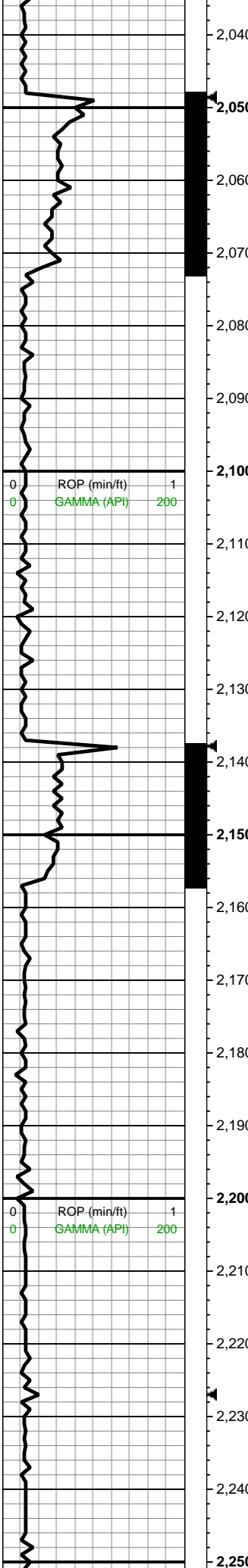
1850-1900 SST (75%):
off wh-lt gy-med gy, mod w srted sl fri gr sup f-u f gr sup sst cons wi silc cmt, com med gy mod srted & grdd vf-f sd grs cons wi arg & silc cmt grdg down to sltst ip, mod calc, non calc ip; SLTST (25%): med-dk gy, sb frm-frm-brit, silc-arg sltst, rr-tr vf pyr, non calc

1900-1950 SST (55%):
off wh-lt gy-med gy, mod w srted sl fri gr sup f-u f gr sup sst cons wi silc cmt, com med gy mod srted & grdd vf-f sd grs cons wi arg & silc cmt grdg down to sltst ip, mod calc, non calc ip; SLTST (45%): med-dk gy, sb frm-frm-brit, silc-arg sltst, rr-tr vf pyr, shy sltst ip, non calc

1950-2000 SST (50%):
lt gy-med gy, mod w srted vf-f grs, sb frm-frm-sl fri gr-mtx sup sst cons wi predy arg cmt & sme silc cmt, grdg down to sltst ip, non-mod calc; SLTST (50%): med gy-occ dk gy, sb plty-plty-blky ctngs, sb frm-frm-brit, incr arg sltst grdg to shy sltst ip, tr vf pyr, non-sl calc calc

2000-2050 SLTST (60%):
med gy-occ dk gy, sb plty-plty-blky ctngs, sb frm-frm-brit, incr arg sltst grdg to shy sltst ip, tr vf pyr, non-sl calc calc; SST (40%): lt gy-med gy, mod w srted vf-f grs, sb frm-frm-sl fri gr-mtx sup sst cons wi predy arg cmt & sme silc cmt, grdg

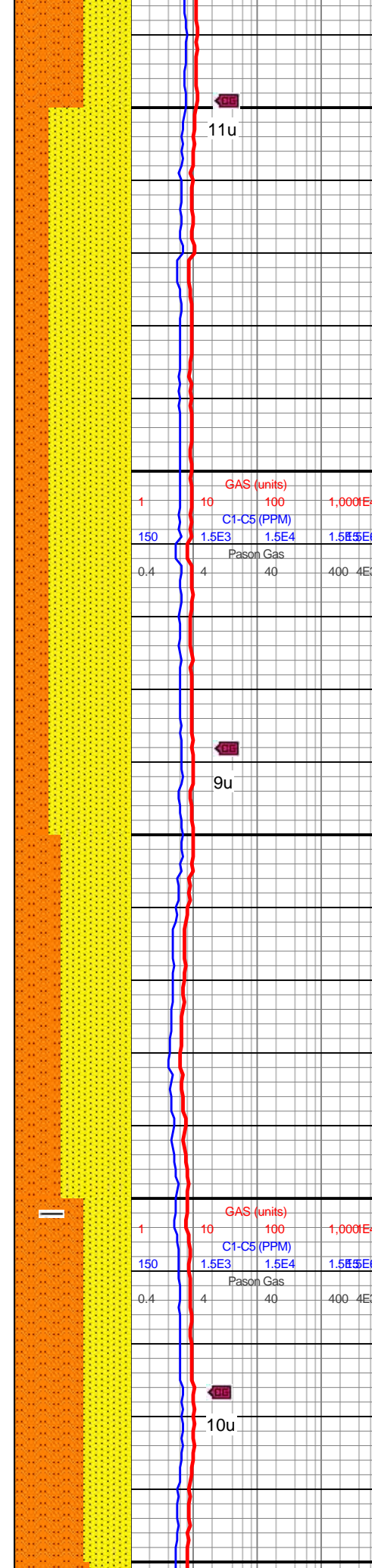




MD: 2,080'
INC: 11.11°
AZM: 27.98°

MD: 2,169'
INC: 11.32°
AZM: 36.82°

WOB: 24klbs
RPM: 50
SPM: 206
SPP: 1,400psi



down to sltst ip, non-mod calc

2050-2100 SST (70%):
off wh-lt gy mod w srted f-u
f gr sli fri gr sup sst clus
cons wi silc cmt, com gy
p-mod srted gr-mtx sup vf-f
gr sst cons wi arg & silc
cmt, predy non calc, mod
calc ip; SLTST (30%):
med gy, sb frm-frm-fri,
silc-arg sltst, occ vf-f sd
grs, non calc

2100-2150 SST (70%): It
gy-med gy intbds, mod
srted vf-f grs & grdg to u f
intbds ip, sb frm-frm
gr-mtx sup sst clus cons
wi silc & arg cmt, non
calc, wi intbdd sltst;
SLTST (30%): med-dk gy,
gyshbn ip, sb
frm-frm-brit, silc-arg sltst,
non calc

2150-2200 SST (60%): It
gy-med gy, occ off wh fri
gr sup u f sst cons wi silc
cmt, mod srted vf-f grs, sb
frm-frm-sl fri gr-mtx sup
sst cons wi predy arg cmt
& sme silc cmt, grdg
down to sltst ip, noncalc;
SLTST (40%): med
gy-occ dk gy, sb
pty-pty-blky ctngs, sb
frm-frm-brit, incr arg sltst
grdg to shy sltst ip, tr vf
pyr, noncalc

2200-2250 SLTST (60%):
med gy-occ dk gy, sb
pty-pty-blky ctngs, sb
frm-frm-brit, incr arg sltst
grdg to shy sltst ip, tr vf
pyr, non-sl calc calc; SST
(40%): It gy-med gy, mod
w srted vf-f grs, sb
frm-frm-sl fri gr-mtx sup
sst cons wi predy arg cmt
& sme silc cmt, grdg
down to sltst ip, non-mod
calc

2250-2300 SLTST (65%):



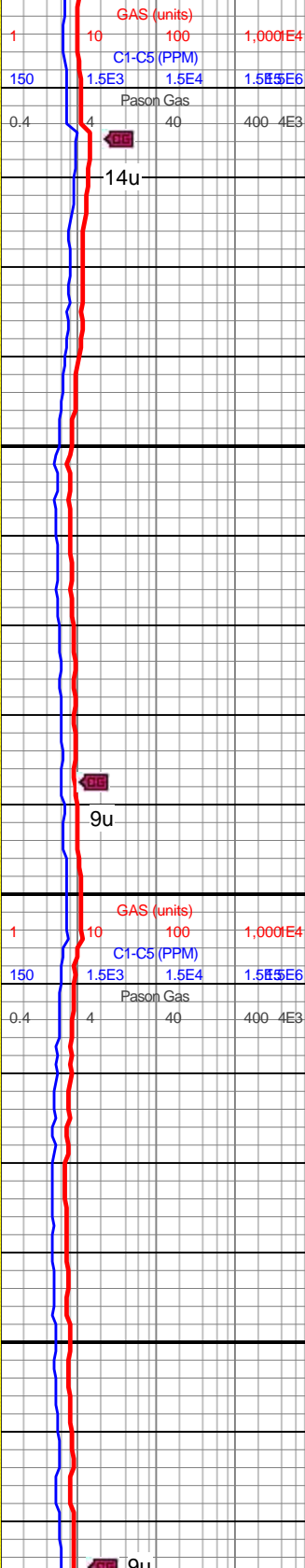
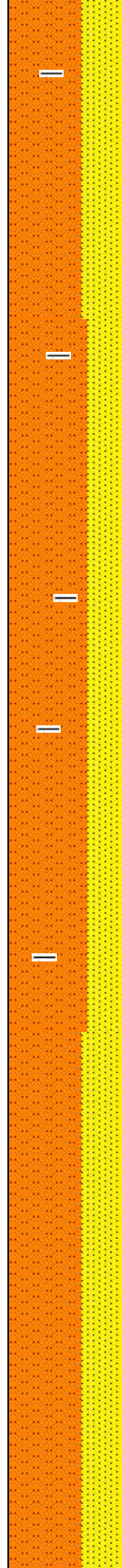
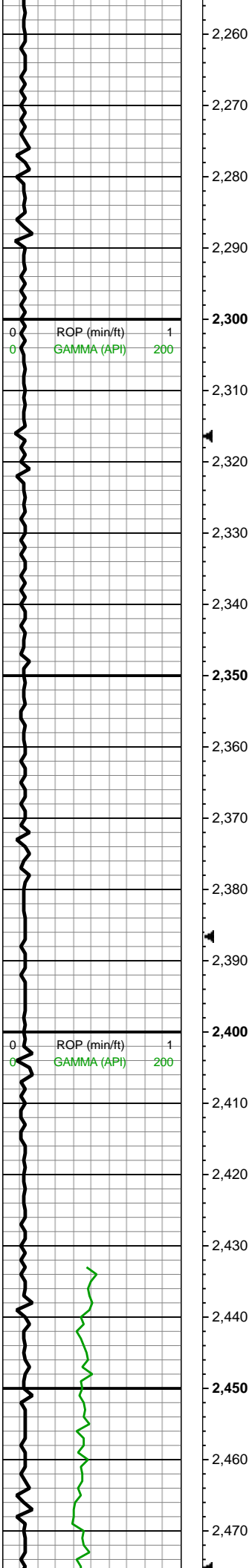
MD: 2,258'
INC: 11.33°
AZM: 32.48°

MD: 2,348'
INC: 11.11°
AZM: 27.68°

WOB: 30klbs
RPM: 50
SPM: 206
SPP: 1,600psi

MD: 2,437'
INC: 11.04°
AZM: 21.92°

MD: 2,483'



med gy-gyshbn-occ dk gy, sb frm-frm, occ vf-f sdy incl ip, non calc; SST (35%): lt gy-med gy, p-mod srted vf-f grs, sb frm-frm-sl fri gr-mtx sup sst cons wi predy arg cmt & sme silc cmt, grdg down to sltst ip, non-mod calc

2300-2350 SHY SLTST (70%): med gy-occ dk gy, sb plty-plty-blky ctngs, sb frm-frm-brit, incr arg sltst grdg to shy sltst ip, tr vf pyr, non-sl calc calc; SST (30%): lt gy-med gy, mod w srted vf-f grs, sb frm-frm-sl fri gr-mtx sup sst cons wi predy arg cmt & sme silc cmt, grdg down to sltst ip, non-mod calc

2350-2400 SHY SLTST (70%): med gy-gyshbn-occ dk gy, sb frm-frm, occ vf-f sdy incl ip, non calc; SST (30%): lt gy-med gy, p-mod srted vf-f grs, sb frm-frm-sl fri gr-mtx sup sst cons wi predy arg cmt & sme silc cmt, grdg down to sltst, non-mod calc

2400-2450 SLTST (65%): med gy-gyshbn-occ dk gy, sb frm-frm, occ vf-f sdy incl ip, non calc; SST (35%): lt gy-med gy, p-mod srted vf-f grs, sb frm-frm-sl fri gr-mtx sup sst cons wi predy arg cmt & sme silc cmt, grdg down to sltst ip, non-mod calc

2450-2500 SLTST (65%): med gy-gyshbn-occ dk gy, sb frm-frm, occ vf-f sdy incl ip, non calc; SST (35%): lt gy-med gy, p-mod srted vf-f grs, sb frm-frm-sl fri gr-mtx sup sst cons wi predy arg cmt



TVD: 2,462.09'
 INC: 10.9°
 AZM: 20.13°
 VS: -205.31'

Reach surface
 TD @ 14:27hrs
 on 11/3/18

Resume drilling
 intermediate on
 01/05/2019 @
 18:00hrs

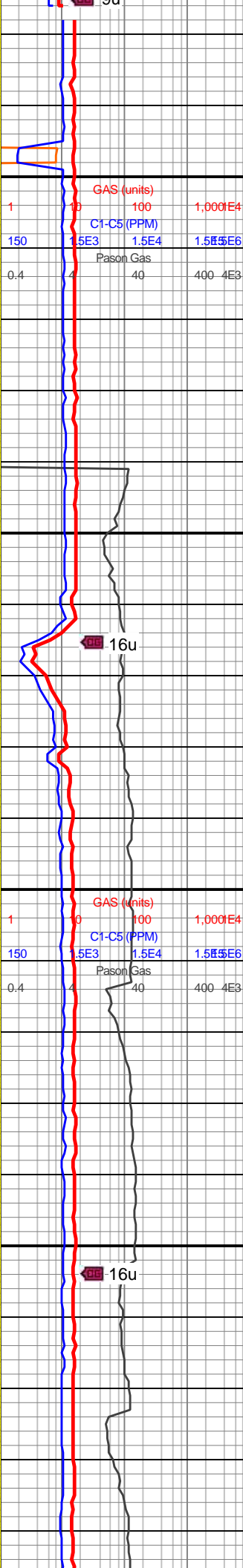
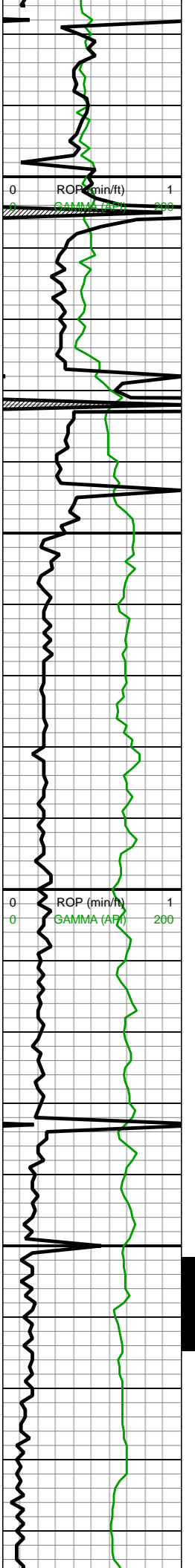
Bit #: 2
 Type: CF516
 Size: 8.75
 Depth In: 2,540'
 Depth Out:
 10,877'
 Hours: 27.7 hrs
 Avg Ft/Hr: 301 1/2
 Jets: 7X12
 S/N: 45203

MD: 2,596'
 TVD: 2,573.15'
 INC: 10.37°
 AZM: 13.88°
 VS: -224.74'

WOB: 12.8klbs
 RPM: 41
 SPM: 155
 SPP: 1,348psi

MW IN: 9.8
 VIS IN: 52
 MW OUT: 9.8
 VIS OUT: 54

MD: 2,685'
 TVD: 2,660.59'
 INC: 11.16°
 AZM: 18.89°
 VS: -240.3'



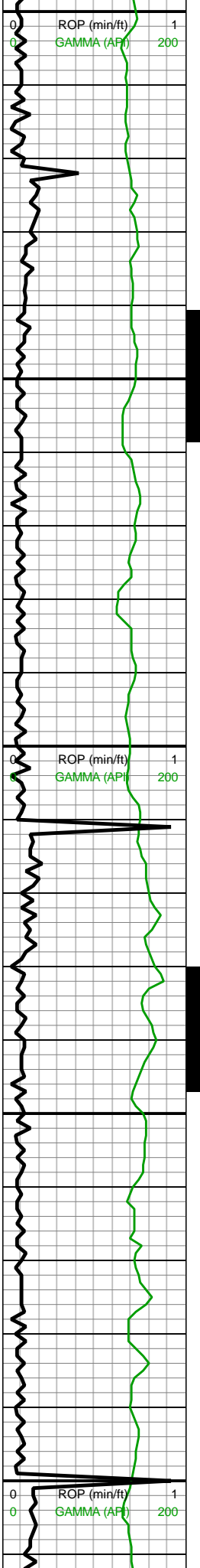
sst cons wi predy arg cmt
 & sme silc cmt, grd
 down to sltst ip, non-mod
 calc

2500-2540 SHY SLTST
 (70%): gy-dk gy, sb
 frm-frm, sb rd-sb
 blk-pty, arg sltst wi occ
 silc cmt ip, occ vf-f sdy
 incl ip, non calc; SST
 (30%): lt gy-med gy,
 p-mod srtd vf-f grs, sb
 frm-frm-sl fri gr-mtx sup
 sst cons wi predy arg cmt
 & sme silc cmt, grd
 down to sltst, predy non
 calc, mod calc ip

2540-2600 SLTST (60%):
 med gy-gyshbn, occ dk
 gy, occ lt gy slty-sdy lamn
 ip, frm-crunchy silc sltst
 ctngs wi sl arg cmt ip,
 non calc; SST (20%):
 trnsl-off wh-lt gy, s&p ip,
 frm-hd fri-sli fri gr sup ss
 clus cons wi silc cmt,
 dolc ip, mod w srtd vf-u f
 sb ang-sb rd sd grs, mod
 por, non-sl-l calc; SLTY
 SH (20%): predy med gy,
 sme lt gy-gyshbn, occ dk
 gy, sb frm-frm, sb
 crunchy ip, l-mod fis f sb
 rd-sb blk-pty ctngs, slty-sl
 sdy tex ip, non calc

2600-2700 SHY SLTST
 (70%): gy-dk gy, sb
 frm-frm, sb rd-sb
 blk-pty, arg sltst wi occ
 silc cmt ip, occ vf-f sdy
 incl ip, non calc; SST
 (30%): lt gy-med gy,
 p-mod srtd vf-f grs, sb
 frm-frm-sl fri gr-mtx sup
 sst cons wi predy arg cmt
 & sme silc cmt, grd
 down to sltst, predy non
 calc, mod calc ip





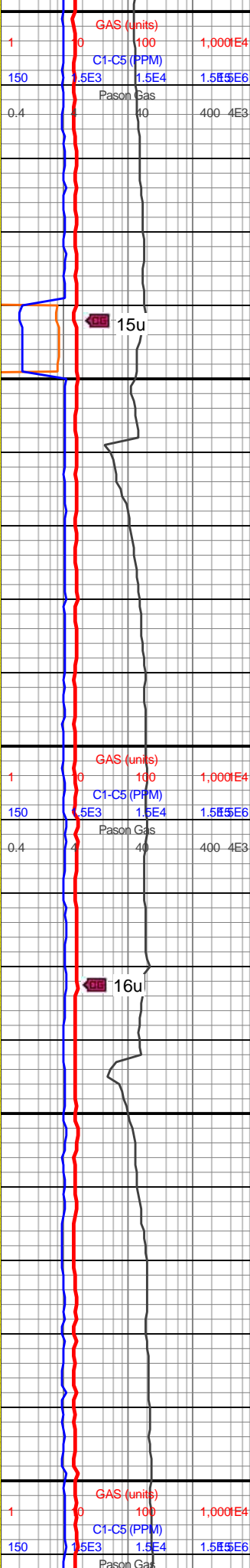
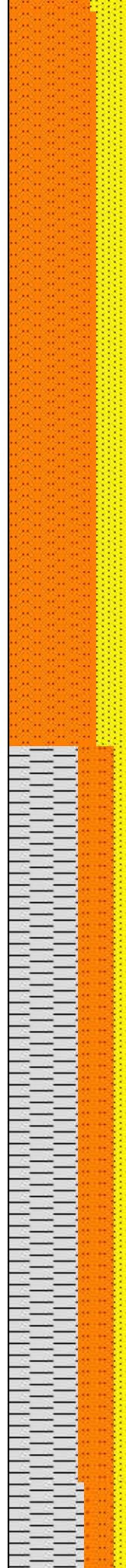
2,700
2,710
2,720
2,730
2,740
2,750
2,760
2,770
2,780
2,790
2,800
2,810
2,820
2,830
2,840
2,850
2,860
2,870
2,880
2,890
2,900
2,910

MD: 2,775'
TVD: 2,748.77'
INC: 11.91°
AZM: 24.16°
VS: -256.52'

WOB: 29klbs
RPM: 51
SPM: 186
SPP: 2,490psi

MW IN: 9.5
VIS IN: 53
MW OUT: 9.8
VIS OUT: 53

MD: 2,864'
TVD: 2,836.01'
INC: 10.9°
AZM: 26.8°
VS: -271.85'

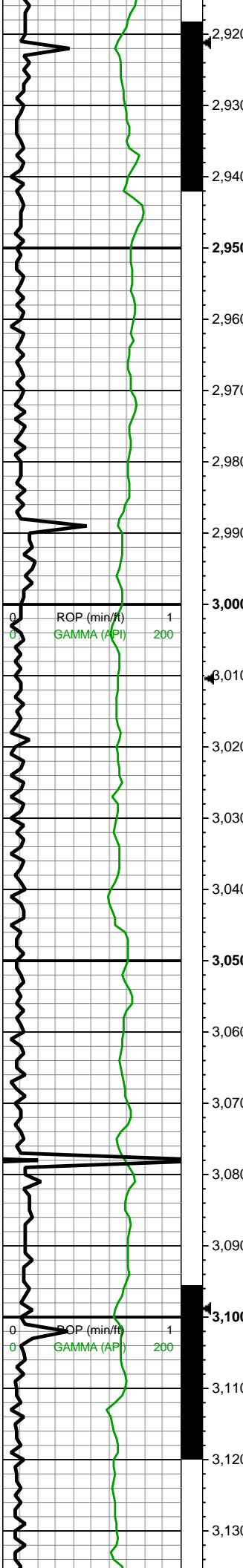


2700-2800 SHY SLTST
(75%): gy-dk gy, sb frm-frm, sb rd-sb blkly-pty, arg sltst wi occ silc cmt ip, occ vf-f sdy incl ip, non calc; SST (25%): lt gy-med gy, p-mod srted vf-f grs, sb frm-frm-sl fri gr-mtx sup sst cons wi predy arg cmt & sme silc cmt, grd down to sltst, predy non calc, mod calc ip

2800-2900 SLTY SH
(60%): predy med gy, sme lt gy-gyshbn, occ dk gy, sb frm-frm, l-mod fis f sb rd-sb blkly ctngs, slty-sl sdy tex ip, non calc; SLTST (30%): med gy-gyshbn, occ dk gy, occ lt gy slty-sdy lamn ip, frm-crunchy silc sltst ctngs wi sl arg cmt ip; SST (10%): trnsl-off wh-lt gy, s&p ip, frm-hd fri-sli fri gr sup ss clus cons wi silc cmt, dolc ip, mod w srted vf-u f sb ang-sb rd sd grs, mod por, non-sl-l calc

2900-3000 SLTY SH





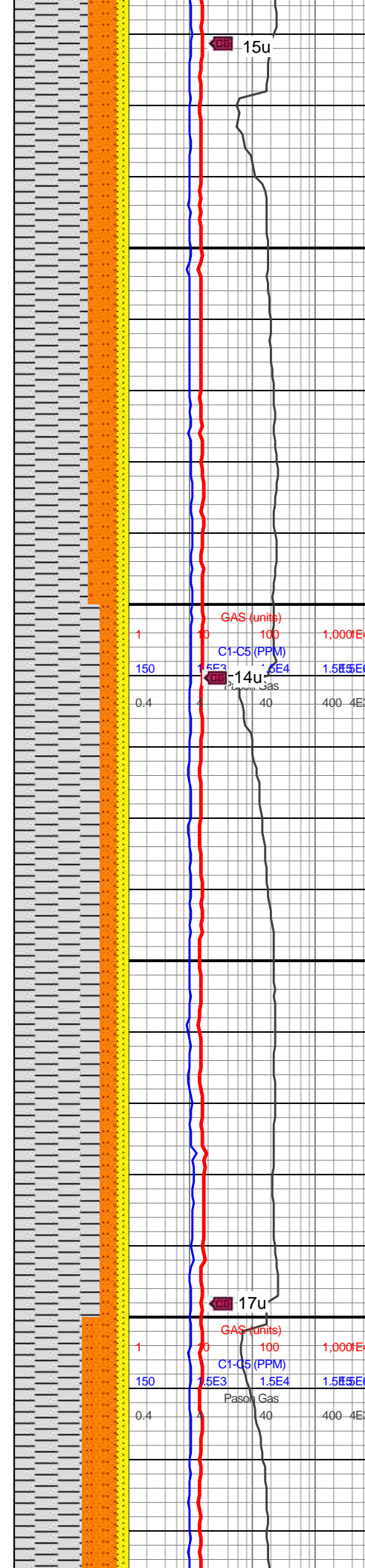
MD: 2,953'
 TVD: 2,923.44'
 INC: 10.72°
 AZM: 37.61°
 VS: -285.27'

WOB: 28klbs
 RPM: 50
 SPM: 182
 SPP: 2,450psi

MD: 3,042'
 TVD: 3,011.03'
 INC: 9.76°
 AZM: 34.62°
 VS: -297.35'

MW IN: 9.8
 VIS IN: 53
 MW OUT: 9.8
 VIS OUT: 52

MD: 3,131'
 TVD: 3,098.6'
 INC: 10.85°
 AZM: 46.4°



(65%): predy med gy, sme lt gy-gyshbn, occ dk gy, sb frm-frm, l-mod fis f sb rd-sb blkly ctngs, slty-sl sdy tex ip, non calc; SLTST (25%): med gy-gyshbn, occ dk gy, occ lt gy slty-sdy lamn ip, frm-crunchy silc sltst ctngs wi sl arg cmt ip; SST (10%): trnsl-off wh-lt gy, s&p ip, frm-hd fri-sli fri gr sup ss clus cons wi silc cmt, dolc ip, mod w srtd vf-u f sb ang-sb rd sd grs, mod por, non-sl-l calc

3000-3100 SLTY SH (75%): predy med gy, sme lt gy-gyshbn, occ dk gy, sb frm-frm, l-mod fis f sb rd-sb blkly ctngs, slty-sl sdy tex ip, non calc; SLTST (15%): med gy-gyshbn, occ dk gy, occ lt gy slty-sdy lamn ip, frm-crunchy silc sltst ctngs wi sl arg cmt ip; SST (10%): trnsl-off wh-lt gy, s&p ip, frm-hd fri-sli fri gr sup ss clus cons wi silc cmt, dolc ip, mod w srtd vf-u f sb ang-sb rd sd grs, mod por, non-sl-l calc

3100-3200 SLTY SH (60%): predy med gy, sme lt gy-gyshbn, occ dk gy, sb frm-frm, l-mod fis f sb rd-sb blkly ctngs, slty-sl sdy tex ip, non calc; SLTST (30%): med gy-gyshbn, occ dk gy, occ lt gy slty-sdy lamn ip



ROP (min/ft) 1
 GAMMA (API) 200

ROP (min/ft) 1
 GAMMA (API) 200

GAS (units) 100 1,000E4
 C1-C5 (PPM) 150 1.5E6
 Pason Gas 40 400 4E3

GAS (units) 100 1,000E4
 C1-C5 (PPM) 150 1.5E6
 Pason Gas 40 400 4E3

15u

14u

17u

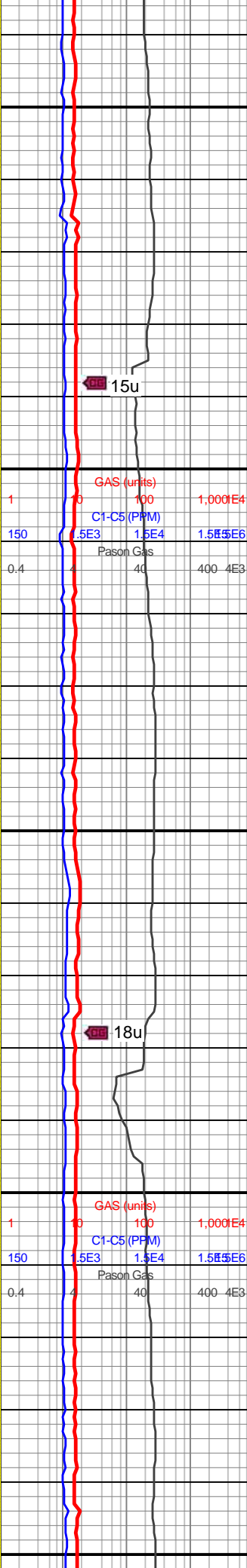
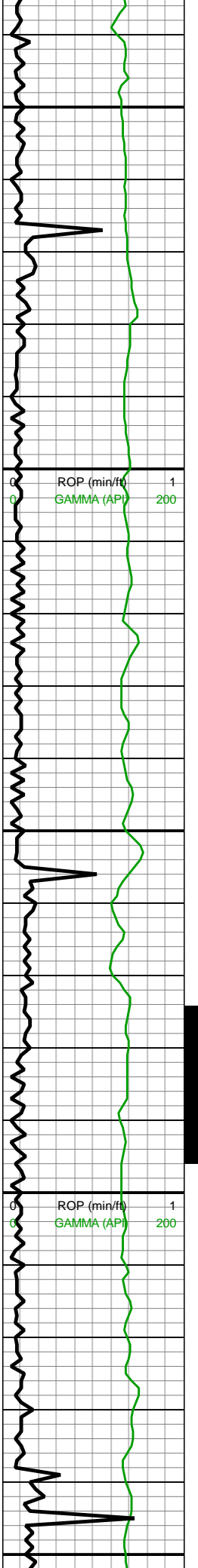
VS: -308.59'

3,140
3,150
3,160
3,170
3,180
3,190
3,200
3,210
3,220
3,230
3,240
3,250
3,260
3,270
3,280
3,290
3,300
3,310
3,320
3,330
3,340
3,350

WOB: 18.2klbs
RPM: 51
SPM: 186
SPP: 4,350psi

MD: 3,220'
TVD: 3,186.2'
INC: 9.45°
AZM: 43.5°
VS: -318.87'

MD: 3,309'
TVD: 3,273.96'
INC: 9.71°
AZM: 46.13°
VS: -328.62'



lt gy slty-sdy lamn ip,
frm-crunchy silc sltst
ctngs wi sl arg cmt ip;
SST (10%): trnsl-off wh-lt
gy, s&p ip, frm-hd fri-sli fri
gr sup ss clus cons wi
silc cmt, dolc ip, mod w
srted vf-u f sb ang-sb rd sd
grs, mod por, non calc

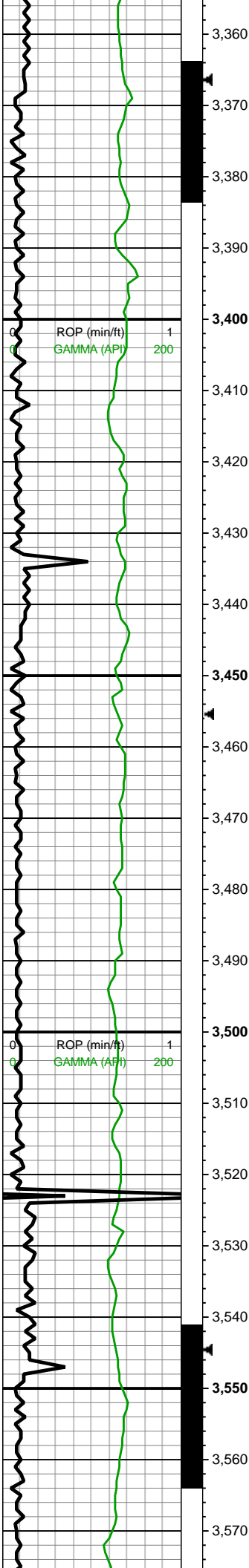
3200-3300 SLTY SH
(65%): predy med gy,
sme lt gy-gyshbn, occ dk
gy, sb frm-frm, l-mod fis f
sb rd-sb blkly ctngs,
slty-sl sdy tex ip, non
calc; SLTST (15%): med
gy-gyshbn, occ dk gy, occ
lt gy slty-sdy lamn ip,
frm-crunchy silc sltst
ctngs wi sl arg cmt ip;
SST (20%): trnsl-off wh-lt
gy, s&p ip, frm-hd fri-sli fri
gr sup ss clus cons wi
silc cmt, dolc ip, mod w
srted vf-u f sb ang-sb rd sd
grs, mod por, non calc

3300-3400 SLTY SH
(70%): predy med gy,
sme lt gy-gyshbn, occ dk
gy, sb frm-frm, l-mod fis f
sb rd-sb blkly ctngs,
slty-sl sdy tex ip, non
calc; SLTST (15%): med
gy-gyshbn, occ dk gy, occ
lt gy slty-sdy lamn ip,
frm-crunchy silc sltst
ctngs wi sl arg cmt ip;
SST (15%): trnsl-off wh-lt
gy, s&p ip, frm-hd fri-sli fri
gr sup ss clus cons wi

15u

18u





MD: 3,398'
 TVD: 3,361.5'
 INC: 11.07°
 AZM: 44.46°
 VS: -339.11'

WOB: 28klbs
 RPM: 51
 SPM: 184
 SPP: 2,660psi

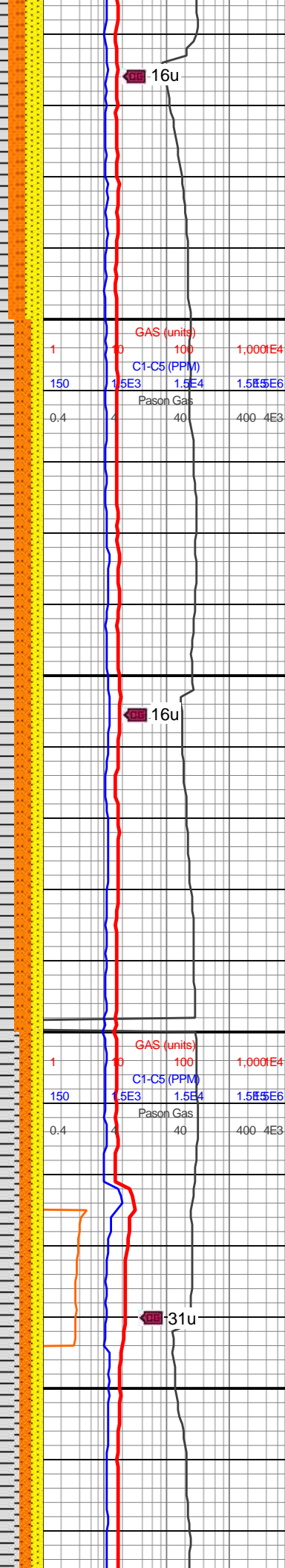
ROP (min/ft) 1
 GAMMA (API) 200

MD: 3,487'
 TVD: 3,449.08'
 INC: 9.45°
 AZM: 41.91°
 VS: -349.86'

MW IN: 9.8
 VIS IN: 52
 MW OUT: 9.8
 VIS OUT: 49

ROP (min/ft) 1
 GAMMA (API) 200

MD: 3,576'
 TVD: 3,536.66'



silc cmt, dolc ip, mod w
 srtd vf-u f sb ang-sb rd sd
 grs, mod por, non calc

16u

GAS (units)	C1-C5 (PPM)	Pason Gas
100	1.5E4	40
1,000E4	1.5E6	400-4E3

3400-3500 SLTY SH
 (75%): predy med gy,
 sme lt gy-gyshbn, occ dk
 gy, sb frm-frm, l-mod fis f
 sb rd-sb blk cytns,
 slty-sl sdy tex ip, non
 calc; SLTST (15%): med
 gy-gyshbn, occ dk gy, occ
 lt gy slty-sdy lamn ip,
 frm-crunchy silc sltst
 ctngs wi sl arg cmt ip;
 SST (10%): trnsl-off wh-lt
 gy, s&p ip, frm-hd fri-sli fri
 gr sup ss clus cons wi
 silc cmt, dolc ip, mod w
 srtd vf-u f sb ang-sb rd sd
 grs, mod por, non calc

16u

GAS (units)	C1-C5 (PPM)	Pason Gas
100	1.5E4	40
1,000E4	1.5E6	400-4E3

3500-3600 SLTY SH
 (80%): predy med gy,
 sme lt gy-gyshbn, occ dk
 gy, sb frm-frm, l-mod fis f
 sb rd-sb blk cytns,
 slty-sl sdy tex ip, non
 calc; SLTST (10%): med
 gy-gyshbn, occ dk gy, occ
 lt gy slty-sdy lamn ip,
 frm-crunchy silc sltst
 ctngs wi sl arg cmt ip;
 SST (10%): trnsl-off wh-lt
 gy, s&p ip, frm-hd fri-sli fri
 gr sup ss clus cons wi
 silc cmt, dolc ip, mod w
 srtd vf-u f sb ang-sb rd sd
 grs, mod por, non calc

31u

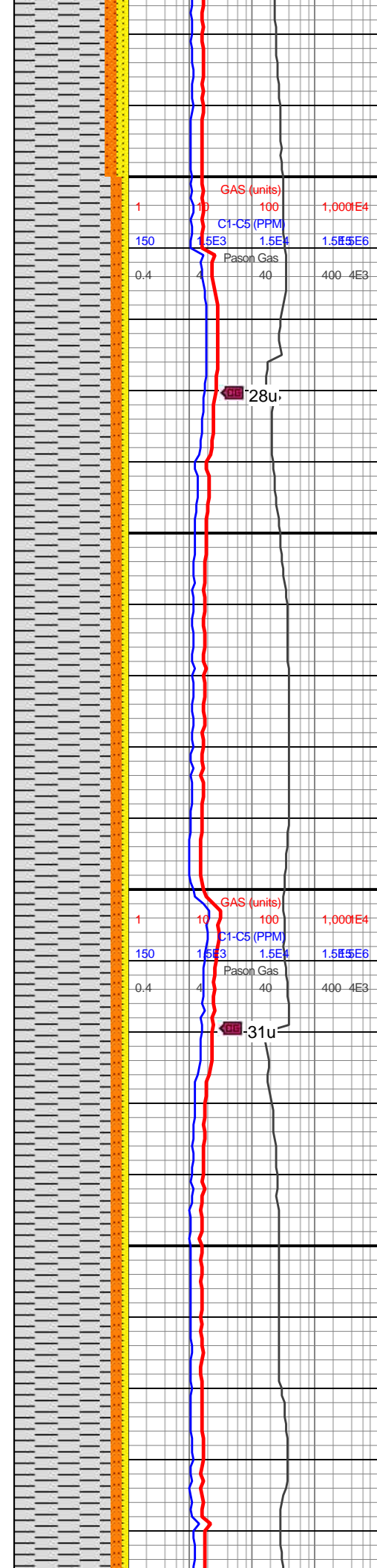
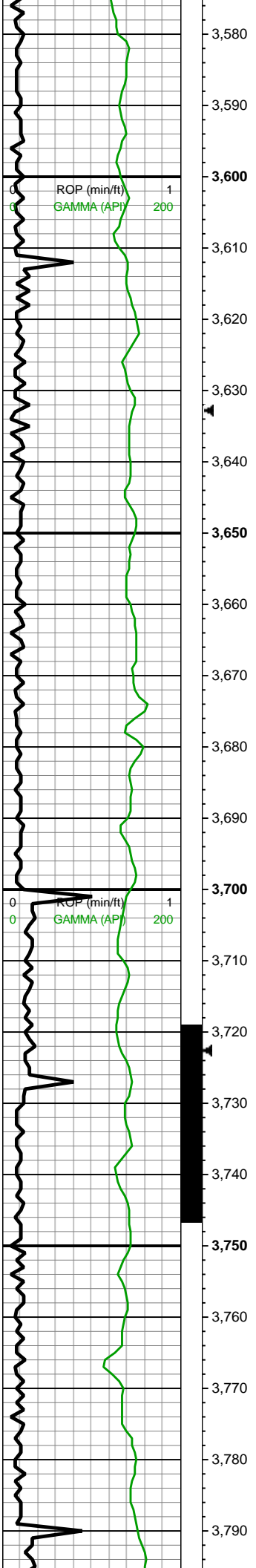


VD: 3,580.00'
 INC: 10.99°
 AZM: 38.66°
 VS: -361.19'

WOB: 27klbs
 RPM: 51
 SPM: 184
 SPP: 2,690psi

MD: 3,665'
 TVD: 3,624.33'
 INC: 8.83°
 AZM: 37.87°
 VS: -372.52'

MD: 3,754'
 TVD: 3,712.08'
 INC: 10.37°
 AZM: 37.26°
 VS: -383.63'



3600-3700 SLTY SH
 (85%): predy med gy, sme lt gy-gyshbn, occ dk gy, sb frm-frm, l-mod fis f sb rd-sb blkly ctngs, slty-sl sdy tex ip, non calc; SLTST (10%): med gy-gyshbn, occ dk gy, occ lt gy slty-sdy lamn ip, frm-crunchy silc sltst ctngs wi sl arg cmt ip; SST (5%): trnsl-off wh-lt gy, s&p ip, frm-hd fri-sli fri gr sup ss clus cons wi silc cmt, dolc ip, mod w srted vf-u f sb ang-sb rd sd grs, mod por, non calc

3700-3800 SLTY SH
 (85%): predy med gy, sme lt gy-gyshbn, occ dk gy, sb frm-frm, l-mod fis f sb rd-sb blkly ctngs, slty-sl sdy tex ip, non calc; SLTST (10%): med gy-gyshbn, occ dk gy, occ lt gy slty-sdy lamn ip, frm-crunchy silc sltst ctngs wi sl arg cmt ip; SST (5%): trnsl-off wh-lt gy, s&p ip, frm-hd fri-sli fri gr sup ss clus cons wi silc cmt, dolc ip, mod w srted vf-u f sb ang-sb rd sd grs, mod por, non calc



WOB: 28klbs
RPM: 51
SPM: 188
SPP: 2,740psi

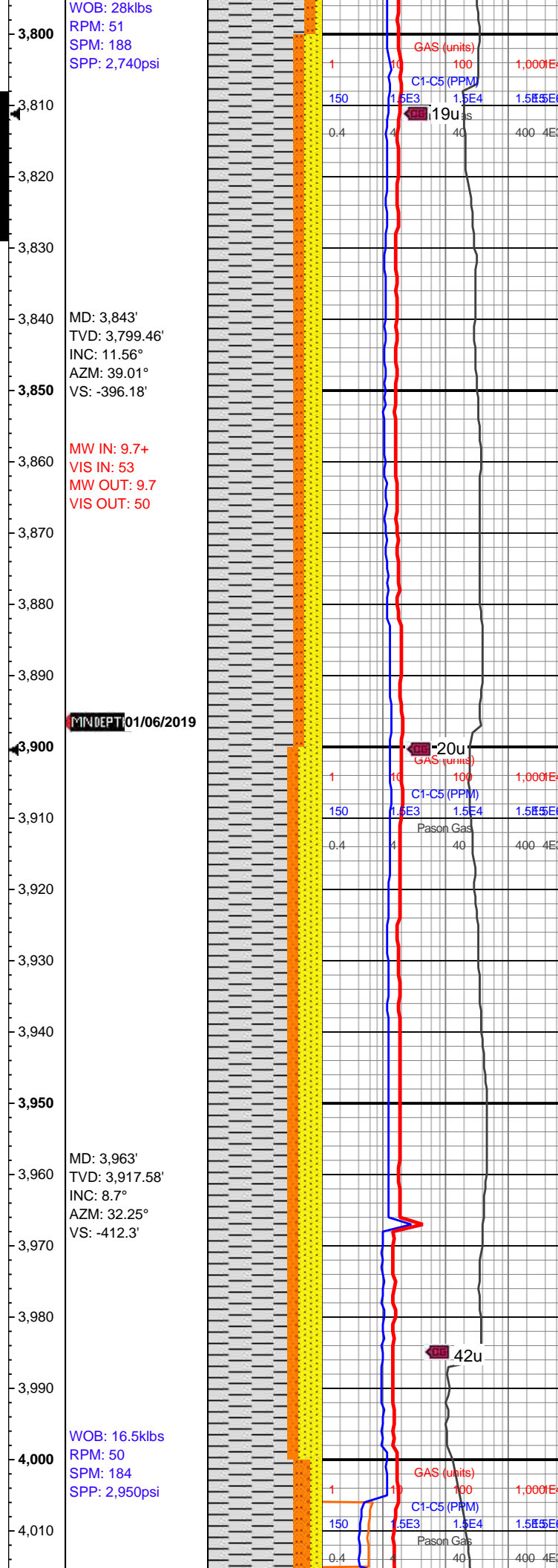
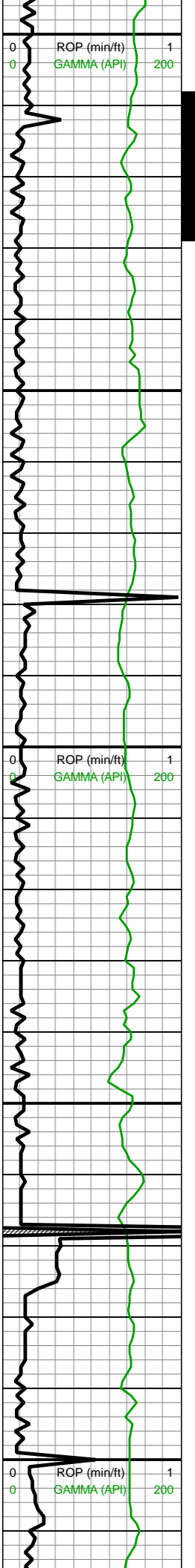
MD: 3,843'
TVD: 3,799.46'
INC: 11.56°
AZM: 39.01°
VS: -396.18'

MW IN: 9.7+
VIS IN: 53
MW OUT: 9.7
VIS OUT: 50

MIN DEPT 01/06/2019

MD: 3,963'
TVD: 3,917.58'
INC: 8.7°
AZM: 32.25°
VS: -412.3'

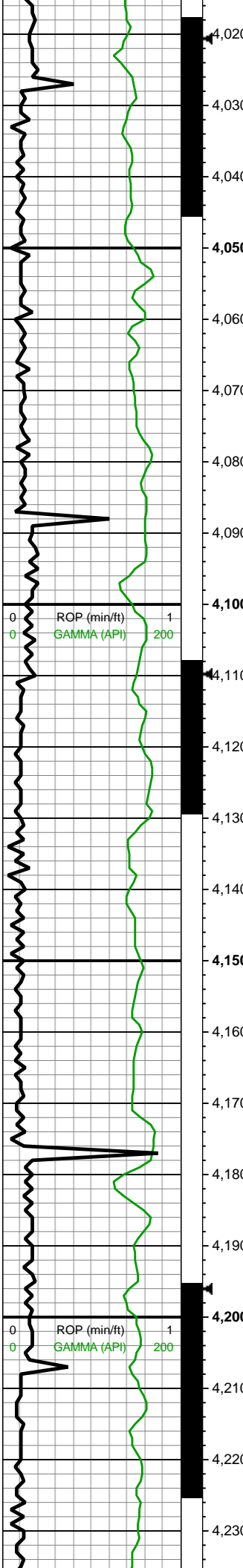
WOB: 16.5klbs
RPM: 50
SPM: 184
SPP: 2,950psi



3800-3900 SLTY SH (75%): predy med gy, sme lt gy-gyshbn, occ dk gy, sb frm-frm, l-mod fis f sb rd-sb blk cy ctngs, slty-sl sdy tex ip, non calc; SLTST (10%): med gy-gyshbn, occ dk gy, occ lt gy slty-sdy lamn ip, frm-crunchy silc sltst ctngs wi sl arg cmt ip; SST (15%): trnsl-off wh-lt gy, s&p ip, frm-hd fri-sli fri gr sup ss clus cons wi silc cmt, dolc ip, mod w srt d vf-u f sb ang-sb rd sd grs, mod por, non calc

3900-4000 SLTY SH (70%): predy med gy, sme lt gy-gyshbn, occ dk gy, sb frm-frm, l-mod fis f sb rd-sb blk cy ctngs, slty-sl sdy tex ip, non calc; SLTST (10%): med gy-gyshbn, occ dk gy, occ lt gy slty-sdy lamn ip, frm-crunchy silc sltst ctngs wi sl arg cmt ip; SST (20%): trnsl-off wh-lt gy, s&p ip, frm-hd fri-sli fri gr sup ss clus cons wi silc cmt, dolc ip, mod w srt d vf-u f sb ang-sb rd sd grs, mod por, non calc

4000-4100 SLTY SH (75%): predy med gy.

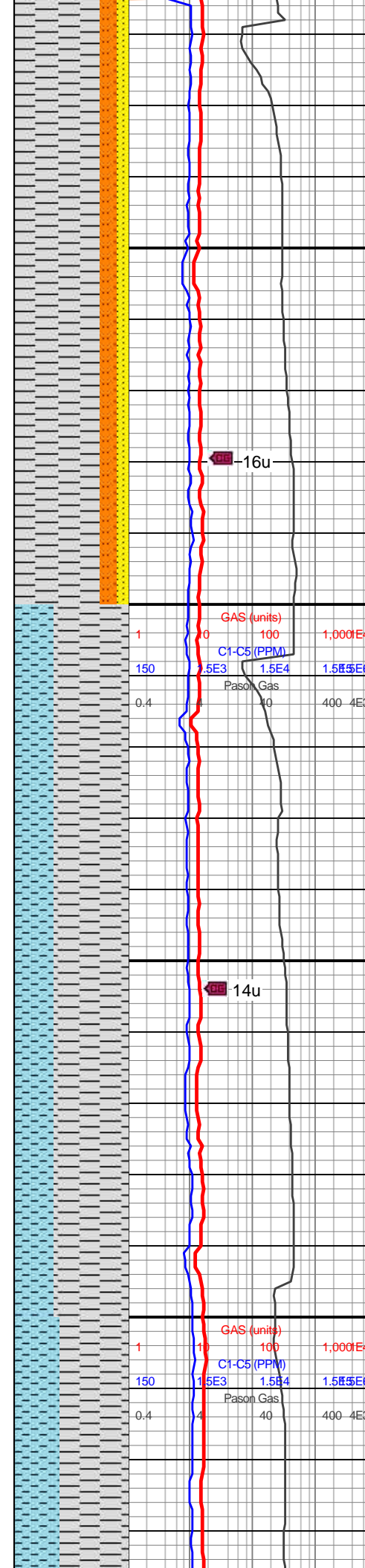


MD: 4,052'
 TVD: 4,005.4'
 INC: 9.93°
 AZM: 34.36°
 VS: -423.75'
 MW IN: 9.8
 VIS IN: 56
 MW OUT: 9.8
 VIS OUT: 52

MD: 4,141'
 TVD: 4,093.01'
 INC: 10.37°
 AZM: 32.42°
 VS: -436.21'

WOB: 21.4kbs
 RPM: 0
 SPM: 186
 SPP: 3,180psi

MD: 4,230'
 TVD: 4,180.56'
 INC: 10.33°
 AZM: 32.95°
 VS: -449.04'



sme lt gy-gyshbn, occ dk gy, sb frm-frm, l-mod fis f sb rd-sb blk ctngs, slty-sl sdy tex ip, non calc; SLTST (15%): med gy-gyshbn, occ dk gy, occ lt gy slty-sdy lamn ip, frm-crunchy silc sltst ctngs wi sl arg cmt ip; SST (15%): trnsf-off wh-lt gy, s&p ip, frm-hd fri-sli fri gr sup ss clus cons wi silc cmt, dolc ip, mod w srtd vf-u f sb ang-sb rd sd grs, mod por, non calc

(4100-4200) SH (65%) lt gy-gy, hd-v frm, w srt, w cons, plty-flky ctng, sdy txt; CLY (35%) lt gy, sft, lsy cons, gmb and sdy txt, calc; cal (tr) yel, hd, rhmb xtl

(4200-4300) SH (60%) lt gy-gy, hd-v frm, w srt, w cons, plty-flky ctng, sdy txt; CLY (40%) lt gy, sft,



16u

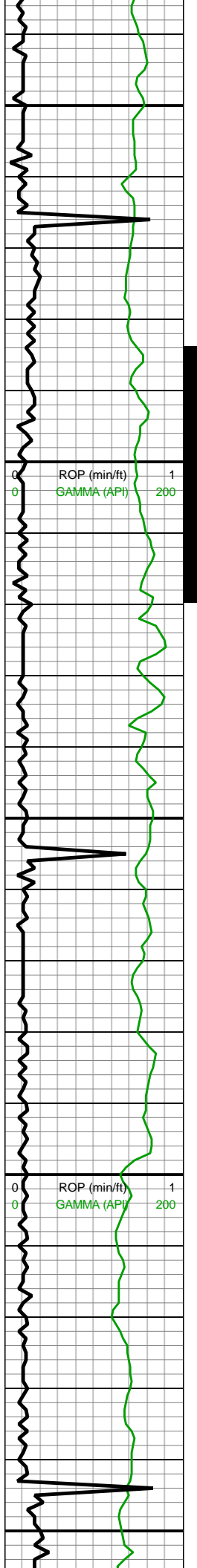
14u

GAS (units) 100 1,000E4
 C1-C5 (PPM) 150 1.5E4 1.5E6

Pason Gas 0.4 40 400 4E3

GAS (units) 100 1,000E4
 C1-C5 (PPM) 150 1.5E4 1.5E6

Pason Gas 0.4 40 400 4E3



3. -449.04

4,240

4,250

4,260

4,270

4,280

4,290

4,300

4,310

4,320

4,330

4,340

4,350

4,360

4,370

4,380

4,390

4,400

4,410

4,420

4,430

4,440

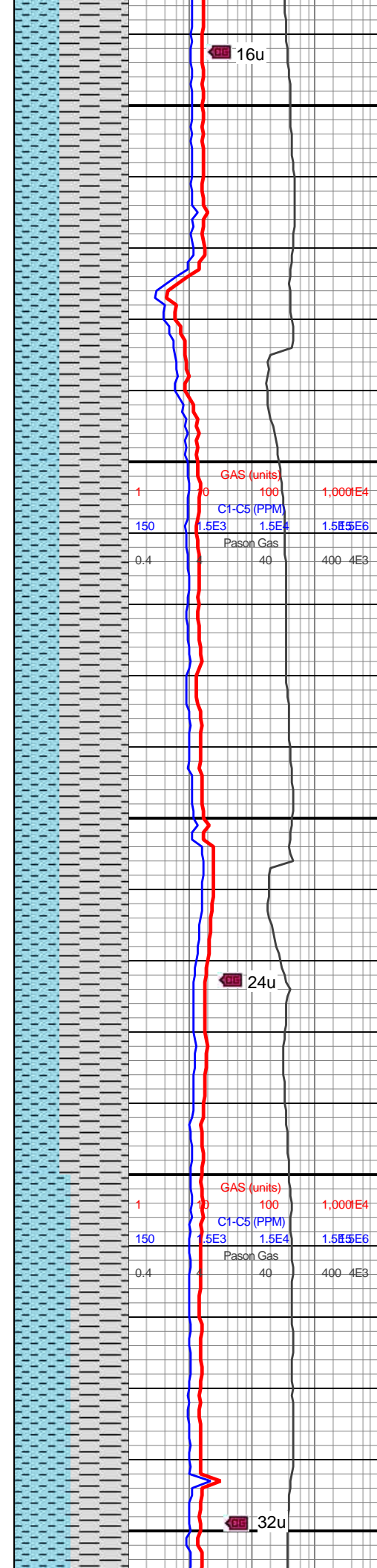
4,450

MD: 4,319'
 TVD: 4,268.01'
 INC: 11.12°
 AZM: 31.72°
 VS: -462.39'

MW IN: 9.8+
 VIS IN: 56
 MW OUT: 9.8+
 VIS OUT: 54

WOB: 33klbs
 RPM: 51
 SPM: 188
 SPP: 3,530psi

MD: 4,408'
 TVD: 4,355.66'
 INC: 8.79°
 AZM: 29.35°
 VS: -475.04'



1	0	100	1,000E4
150	1.5E3	1.5E4	1.5E6
0.4	40	400	4E3

Isy cons, gmb and sdy txt, sl calc

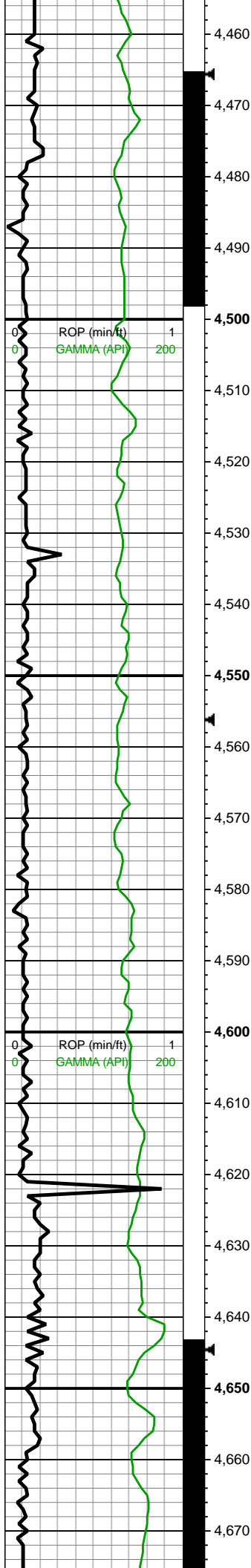
(4300-4400) SH (60%) lt gy-gy, hd-v frm, w srt, w cons, plty-filky ctng, sdy txt; CLY (40%) lt gy, sft, lsy cons, gmb and sdy txt, sl calc

(4400-4500) SH (50%) lt gy-gy, hd-v frm, w srt, w cons, plty-filky ctng, sdy txt; CLY (50%) lt gy, sft, lsy cons, gmb and sdy txt, sl calc

16u

24u

32u

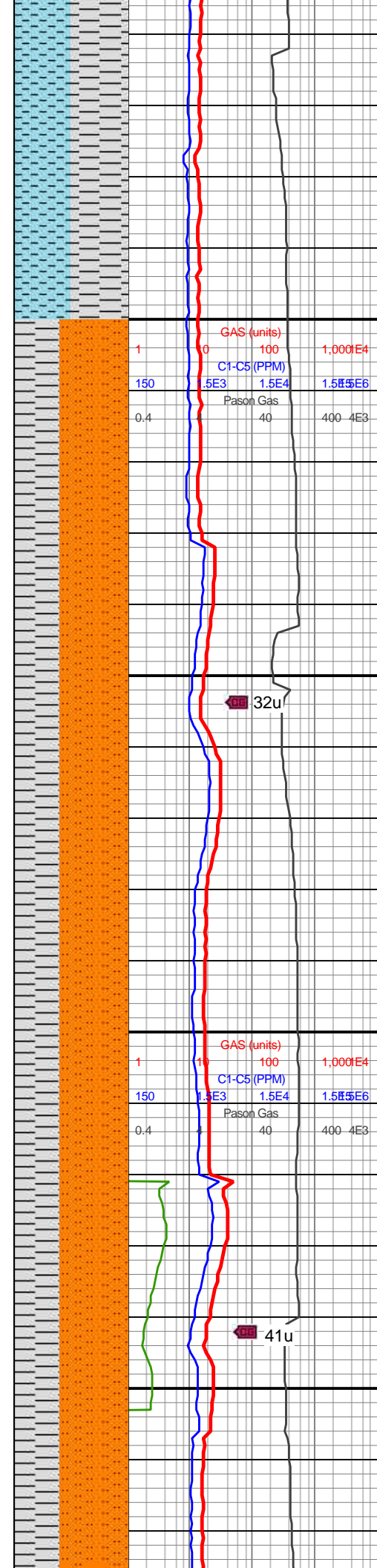


MD: 4,497'
 TVD: 4,443.37'
 INC: 10.68°
 AZM: 33.57°
 VS: -487.26'

MD: 4,587'
 TVD: 4,532.01'
 INC: 9.32°
 AZM: 29.08°
 VS: -499.98'

WOB: 33kbs
 RPM: 50
 SPM: 185
 SPP: 3,370psi

MD: 4,676'
 TVD: 4,619.85'



1	10	100	1,000
150	1.5E3	1.5E4	1.5E5E6
0.4		40	400 4E3

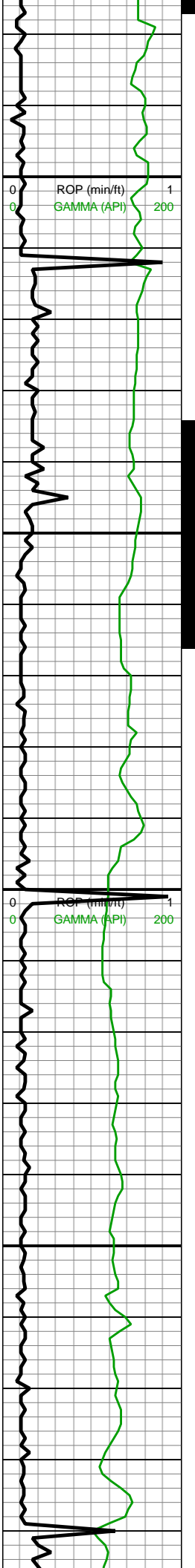
1	10	100	1,000
150	1.5E3	1.5E4	1.5E5E6
0.4		40	400 4E3

(4500-4600) SH (60%) It gy-gy, hd-v frm, w srt, w cons, plty-flky ctng, sdy txt; CLY (40%) It gy, sft, lsy cons, gmb and sdy txt, sl calc

(4600-4700) SH (60%) It gy-gy, hd-v frm, w srt, w cons, plty-flky ctng, sdy txt; CLY (40%) It gy, sft, lsy cons, gmb and sdy txt, sl calc

32u

41u



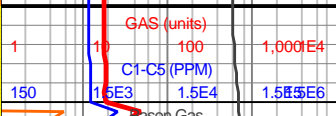
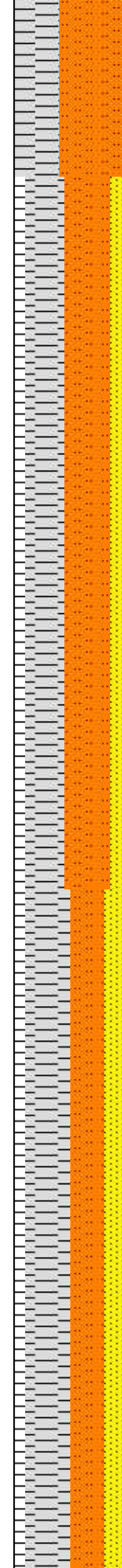
INC: 9.19°
 AZM: 35.85°
 VS: -511.48'

MW IN: 9.85
 VIS IN: 56
 MW OUT: 9.85
 VIS OUT: 54

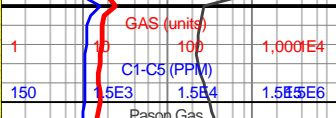
MD: 4,765'
 TVD: 4,707.48'
 INC: 10.9°
 AZM: 35.32°
 VS: -523.45'

WOB: 33klbs
 RPM: 51
 SPM: 186
 SPP: 3,470psi

MD: 4,854'
 TVD: 4,795.15'
 INC: 8.97°
 AZM: 31.72°
 VS: -535.6'



43u

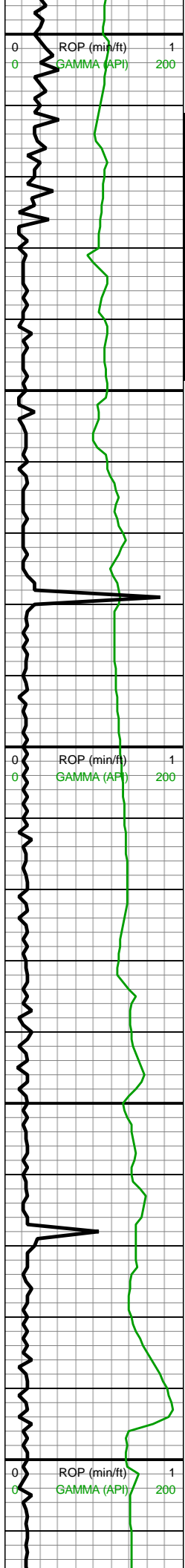


28u

4700-4800 SHY SST (60%): predy lt gy-gy, sft-sb frm w hydrated gr-mtx sup arg sst cons wi predy arg cmt & silc ip, predy non calc, sl calc ip; SHY SLTST (40%): gy-dk gy, frm, brit, ang-sb blkly silc sltst ctngs, arg ip grd to shy sltst, sdy ip, non calc, sl calc ip

4800-4900 SHY SST (70%): wh-lt gy-gy, sft-sb frm w hydrated gr-mtx sup arg sst cons wi predy arg cmt & silc ip, predy non calc, sl calc ip; SHY SLTST (30%): gy-dk gy, frm, brit, ang-sb blkly silc sltst ctngs, arg ip grd to shy sltst, sdy ip, non calc, sl calc ip





4,900
4,910
4,920
4,930
4,940
4,950
4,960
4,970
4,980
4,990
5,000
5,010
5,020
5,030
5,040
5,050
5,060
5,070
5,080
5,090
5,100
5,110

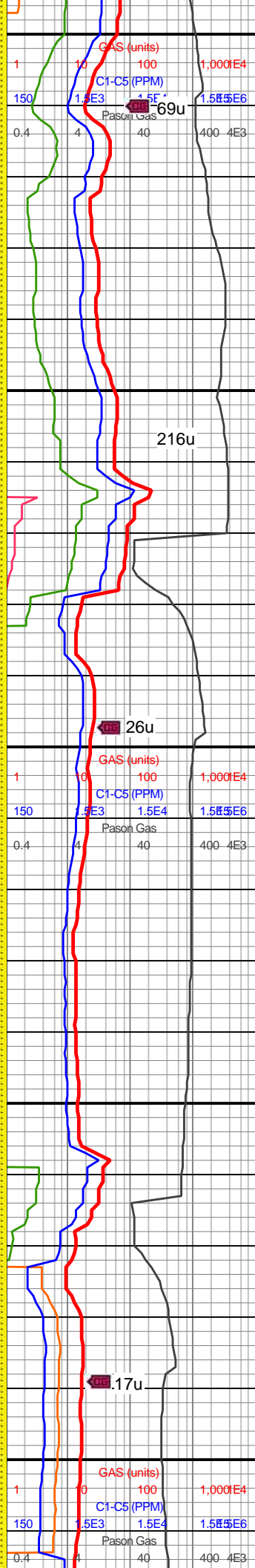
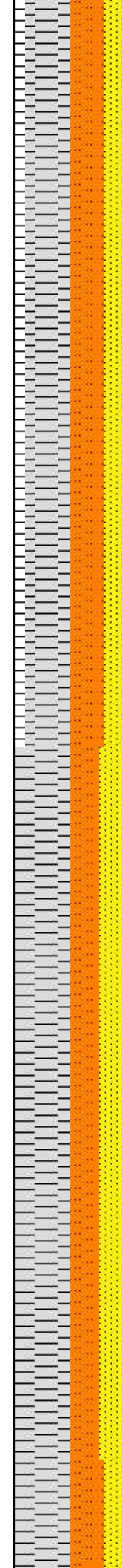
MD: 4,943'
TVD: 4,882.7'
INC: 11.65°
AZM: 37.08°
VS: -548.01'

MW IN: 9.8
VIS IN: 54
MW OUT: 9.8
VIS OUT: 52

WOB: 20klbs
RPM: 51
SPM: 182
SPP: 3,080psi

MD: 5,032'
TVD: 4,969.93'
INC: 11.25°
AZM: 35.59°
VS: -561.48'

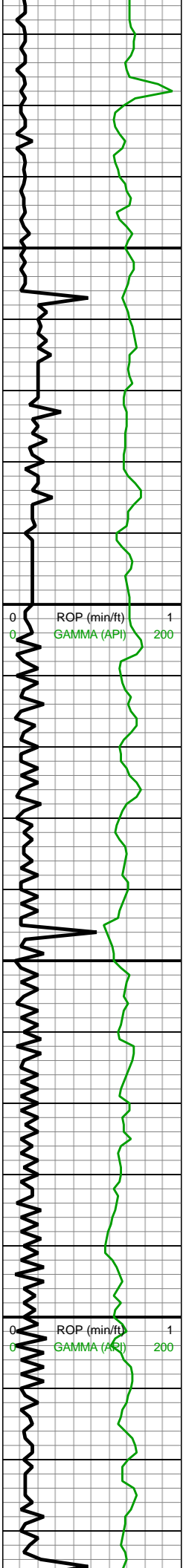
MD: 5,121'



4900-5000 SHY SST (70%): predy lt gy-gy, wh ip, sft-sb frm w hydrated gr-mtx sup arg sst cons wi predy arg cmt & silc ip, predy non calc, sl calc ip; SHY SLTST (30%): gy-dk gy, frm, brit, ang-sb blkly silc sltst ctngs, arg ip grdg to shy sltst, sdy ip, non calc, sl calc ip

5000-5100 SST/SHY SST (50%): lt gy-gy, rr off wh, sft-sb frm-crunchy v w hydrated v arg sst, gr sup silc sst clus-mtx sup uncons sst wi arg mtx washed out, non calc; SLTST/SHY SLTST (50%): lt gy-gy, dk gy ip, sft-sb frm, brit ip, predy w hydrated v arg sltst washes out, resdl brit silc sltst, rr sdy, non calc





5,120
 5,130
 5,140
 5,150
 5,160
 5,170
 5,180
 5,190
 5,200
 5,210
 5,220
 5,230
 5,240
 5,250
 5,260
 5,270
 5,280
 5,290
 5,300
 5,310
 5,320
 5,330

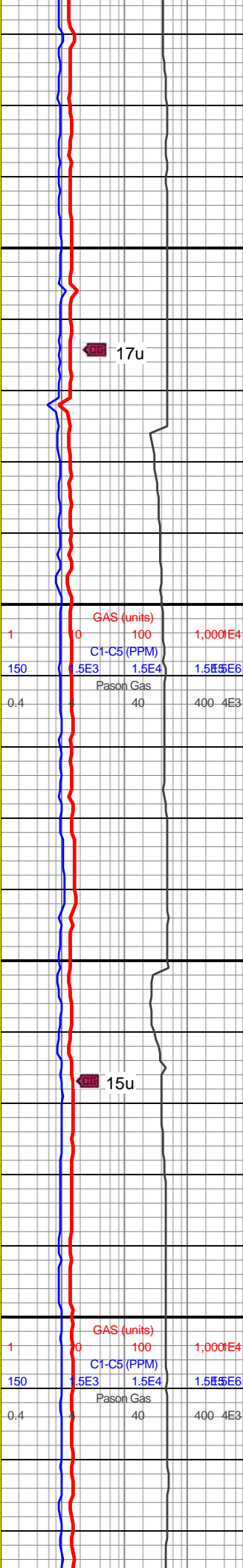
MD: 5,121'
 TVD: 5,057.48'
 INC: 9.45°
 AZM: 33.21°
 VS: -573.99'

MW IN: 9.85
 VIS IN: 56
 MW OUT: 9.85
 VIS OUT: 54

WOB: 24klbs
 RPM: 0
 SPM: 186
 SPP: 3,240psi

MD: 5,210'
 TVD: 5,145.05'
 INC: 11.07°
 AZM: 35.41°
 VS: -586.42'

MD: 5,299'
 TVD: 5,232.64'
 INC: 9.36°
 AZM: 33.92°
 VS: -598.73'



5100-5200 SLTST/SHY
 SLTST (55%): lt gy-gy, dk gy ip, sft-sb frm, brit ip, predy w hydrated v arg sltst washes out, resdl brit silc sltst, rr sdy, non calc; SST/SHY SST (45%): lt gy-gy, rr off wh, sft-sb frm-crunchy v w hydrated v arg sst, gr sup silc sst clus-mtx sup uncons sst wi arg mtx washed out, non calc

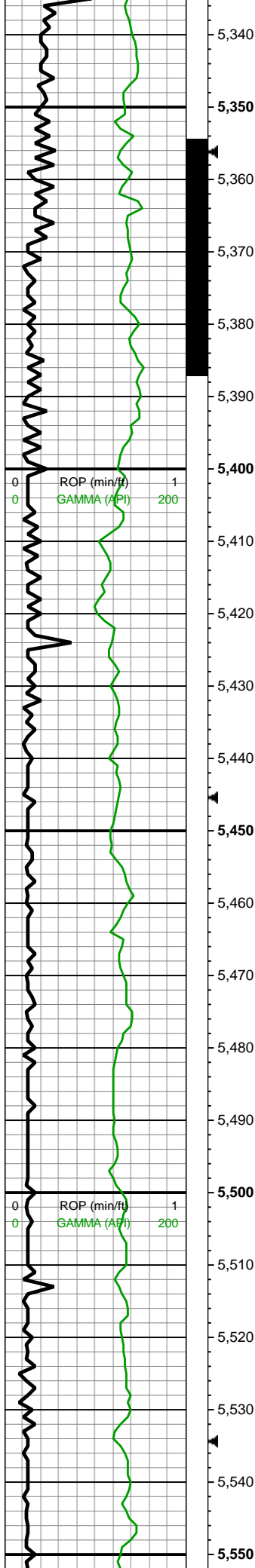
17u

5200-5300 SLTST/SHY
 SLTST (65%): lt gy-gy, dk gy ip, sft-sb frm, brit ip, predy w hydrated v arg sltst washes out, resdl brit silc sltst, rr sdy, non calc; SST/SHY SST (35%): lt gy-gy, rr off wh, sft-sb frm-crunchy v w hydrated v arg sst, gr sup silc sst clus-mtx sup uncons sst wi arg mtx washed out, non calc

15u

5300-5400 SLTST/SHY
 SLTST (55%): lt gy-gy, dk gy ip, sft-sb frm, brit ip, predy w hydrated v arg sltst washes out, resdl





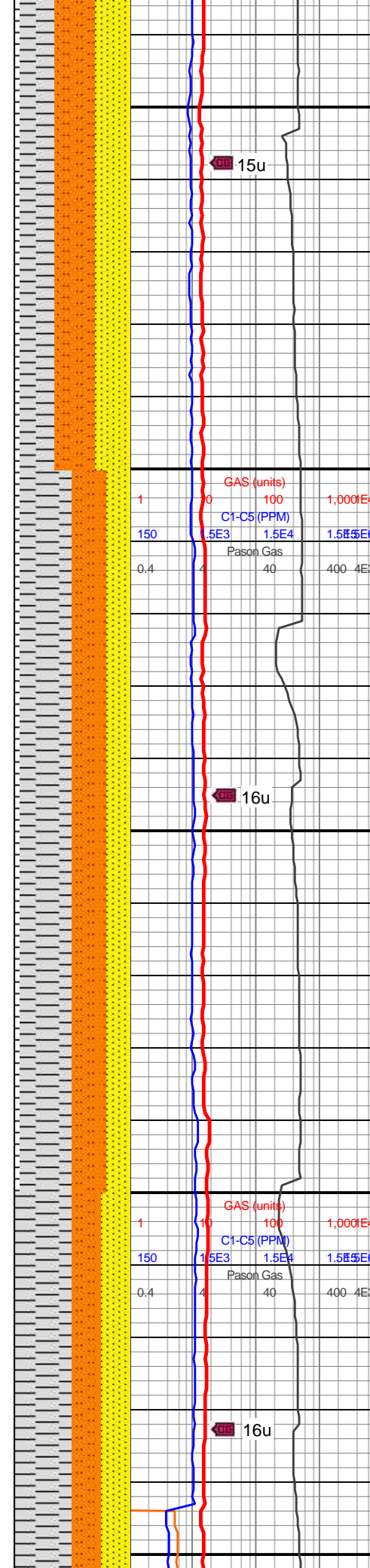
MD: 5,388'
TVD: 5,320.16'
INC: 11.56°
AZM: 42.62°
VS: -610.57'

WOB: 22klbs
RPM: 51
SPM: 186
SPP: 3,340psi

MW IN: 9.85
VIS IN: 55
MW OUT: 9.9
VIS OUT: 51

MD: 5,477'
TVD: 5,407.46'
INC: 10.9°
AZM: 40.42°
VS: -622.71'

ROP (min/ft) 1
GAMMA (API) 200



brit silc sltst, rr sdy, non calc; SST/SHY SST (45%): lt gy-gy, rr off wh, sft-sb frm-crunchy v w hydrated v arg sst, gr sup silc sst clus-mtx sup uncons sst wi arg mtx washed out, non calc

5400-5500 SLTST/SHY SLTST (70%): lt gy-gy, dk gy ip, sft-sb frm, brit ip, predy w hydrated v arg sltst washes out, resdl brit silc sltst, rr sdy, non calc; SST/SHY SST (30%): lt gy-gy, rr off wh, sft-sb frm-crunchy v w hydrated v arg sst, gr sup silc sst clus-mtx sup uncons sst wi arg mtx washed out, non calc

5500-5600 SST/SHY SST (50%): off wh-lt gy-gy, sft-sb frm-crunchy, washed out mtx sup uncons arg sst-occ gr sup silc sst clus, non calc; SLTSY/SHY SLTST (50%): lt gy-gy, dk gy ip, sft-sb frm, brit ip, predy w hydrated v arg sltst washes out, resdl brit



silic sltst, rr sdy, non calc

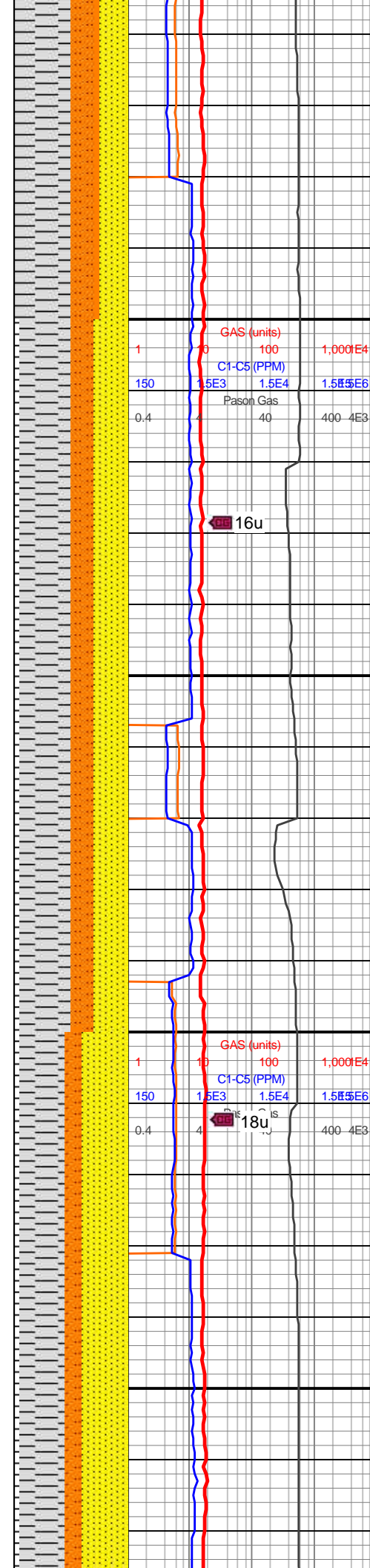
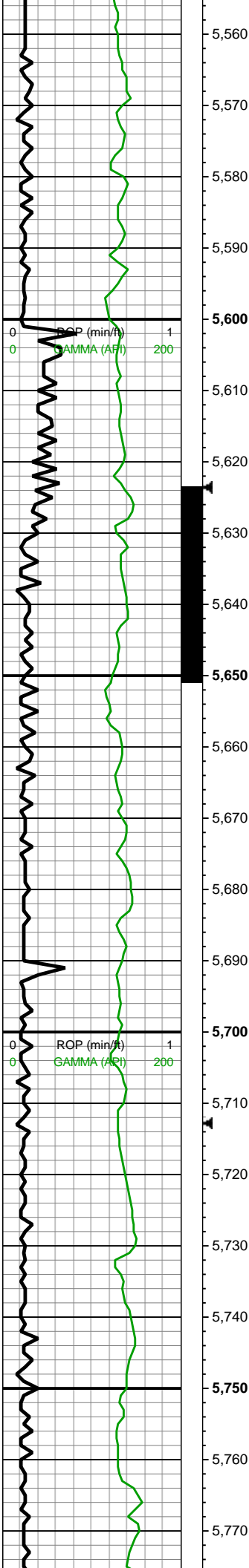
MD: 5,566'
TVD: 5,495.11'
INC: 9.01°
AZM: 36.29°
VS: -634.04'

WOB: 30klbs
RPM: 56
SPM: 188
SPP: 3,510psi

MD: 5,655'
TVD: 5,582.84'
INC: 10.42°
AZM: 35.94°
VS: -645.53'

MD: 5,744'
TVD: 5,670.66'
INC: 8.22°
AZM: 33.65°
VS: -656.75'

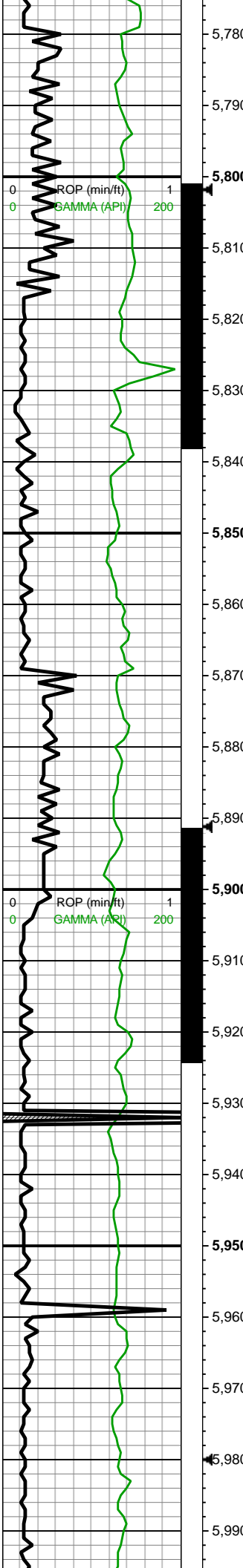
MW IN: 9.9
VIS IN: 54
MW OUT: 9.85
VIS OUT: 52



5600-5700 SHY SST (65%): wh-lt gy-gy, sft-sb frm w hydrated gr-mtx sup arg sst cons wi predy arg cmt & silc ip, predy non calc, sl calc ip; SLTST (25%): lt gy-gy, frm-brit, rr sdy, non calc

5700-5800 SST/SHY SST (75%): off wh-lt gy-gy, sft-sb frm-crunchy, washed out mtx sup uncons arg sst-occ gr sup silc sst clus, non calc; SLTST (25%): lt gy-gy, frm-brit, rr sdy, non calc





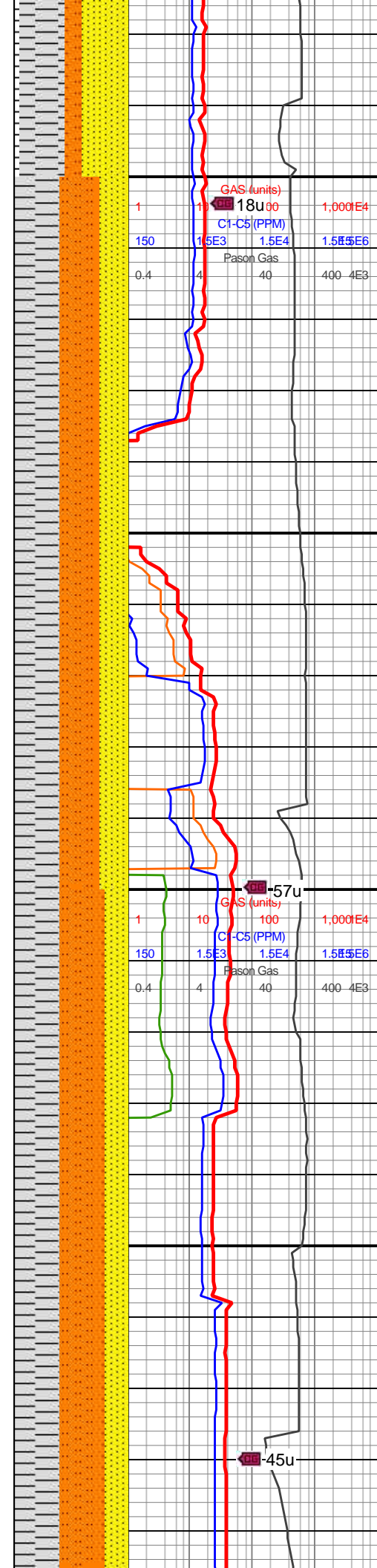
WOB: 20klbs
 RPM: 0
 SPM: 188
 SPP: 3,180psi

MD: 5,833'
 TVD: 5,758.69'
 INC: 8.7°
 AZM: 35.41°
 VS: -666.99'

MD: 5,922'
 TVD: 5,846.24'
 INC: 11.91°
 AZM: 28.64°
 VS: -679.93'

MW IN: 9.9
 VIS IN: 52
 MW OUT: 9.9
 VIS OUT: 53

WOB: 32klbs



GAS (units) 18u00 1,000E4
 C1-C5 (PPM) 1.5E3 1.5E4 1.5E5E6
 Pason Gas 0.4 4 40 400 4E3

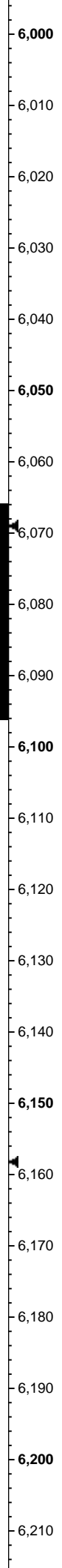
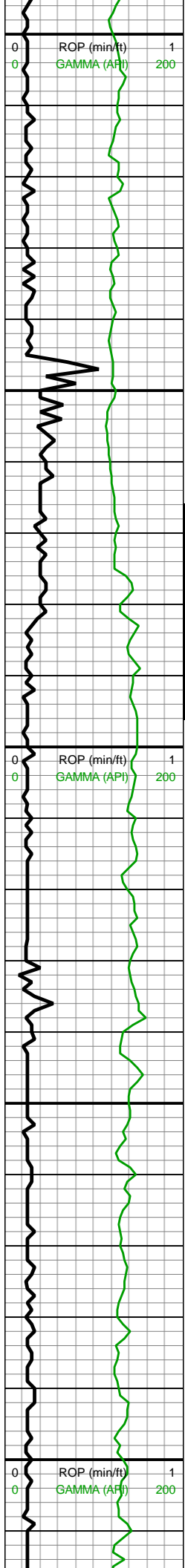
GAS (units) 57u 100 1,000E4
 C1-C5 (PPM) 1.5E3 1.5E4 1.5E5E6
 Pason Gas 0.4 4 40 400 4E3

45u

5800-5900 SLTST/SHY
 SLTST (55%): lt gy-gy, frm-brit, sb frm v arg sltst ip, rr sdy, non calc; SHY SST (45%): lt gy-gy, sft-sb frm w hydrated gr-mtx sup arg sst cons wi predy arg cmt & silc ip, predy non calc, sl calc ip

5900-6000 SLTST/SHY
 SLTST (65%): lt gy-gy, frm-brit, rr sdy, non calc; SST/SHY SST (35%): off wh-lt gy-gy, sft-sb frm-crunchy, w srtd gr sup sb ang f gr sup silc sst-washed out mtx sup uncons arg sst, non calc





RPM: 55
SPM: 188
SPP: 3,420psi

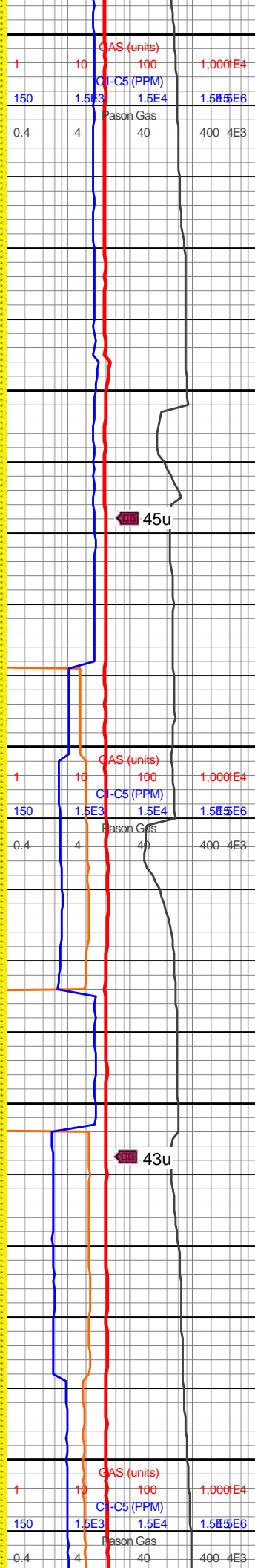
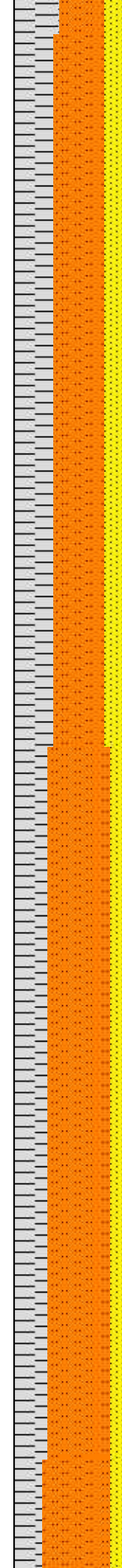
MD: 6,011'
TVD: 5,933.65'
INC: 9.76°
AZM: 24.34°
VS: -694.31'

MD: 6,100'
TVD: 6,021.18'
INC: 11.12°
AZM: 31.02°
VS: -707.98'

MW IN: 9.85
VIS IN: 51
MW OUT: 9.9
VIS OUT: 49

MD: 6,190'
TVD: 6,109.82'
INC: 8.79°
AZM: 25.48°
VS: -721.08'

WOB: 36klbs
RPM: 55
SPM: 188
SPP: 3,520psi



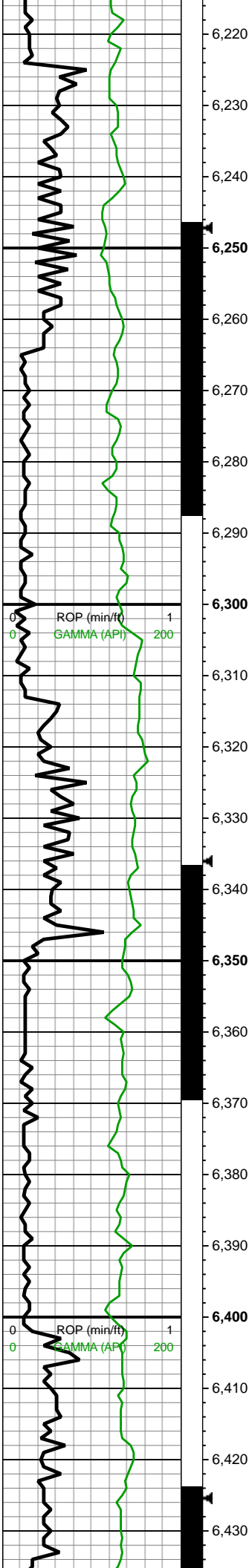
6000-6100 SLTST/SHY
SLTST (70%): lt gy-gy,
frm-brit, sb frm v arg sltst
ip, rr sdy, non calc; SHY
SST (30%): lt gy-gy,
p-mod srted grdd sft-sb
frm w hydrated gr-mtx
sup arg sst cons wi
predy arg cmt, com w
srted f gr sb ang gr sup
sst clus cons wi silc cmt,
predy non calc, sl calc ip

6100-6200 SLTST/SHY
SLTST (80%): lt gy-gy,
frm-brit, rr sdy, non calc;
SST/SHY SST (20%): off
wh-lt gy-gy, sft-sb
frm-crunchy, w srted gr
sup sb ang f gr sup silc
sst-washed out mtx sup
uncons arg sst, non calc

45u

43u

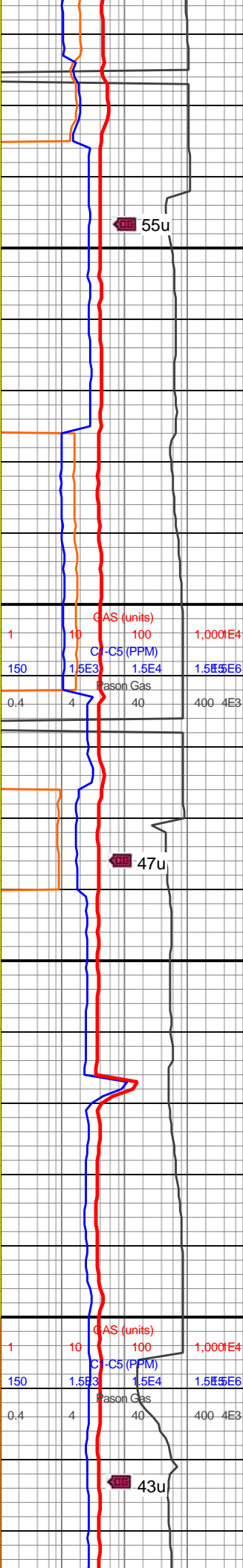
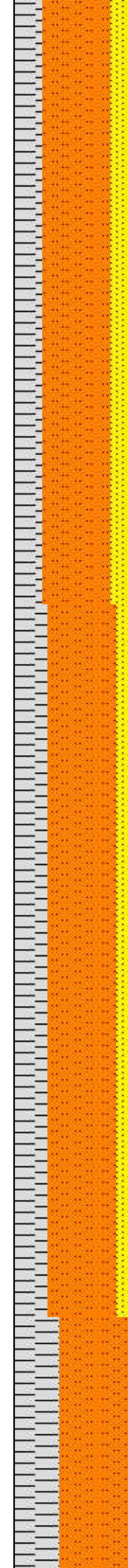




MD: 6,279'
 TVD: 6,197.65'
 INC: 9.84°
 AZM: 29.26°
 VS: -733.36'

MD: 6,368'
 TVD: 6,285.5'
 INC: 8.57°
 AZM: 31.54°
 VS: -745.12'

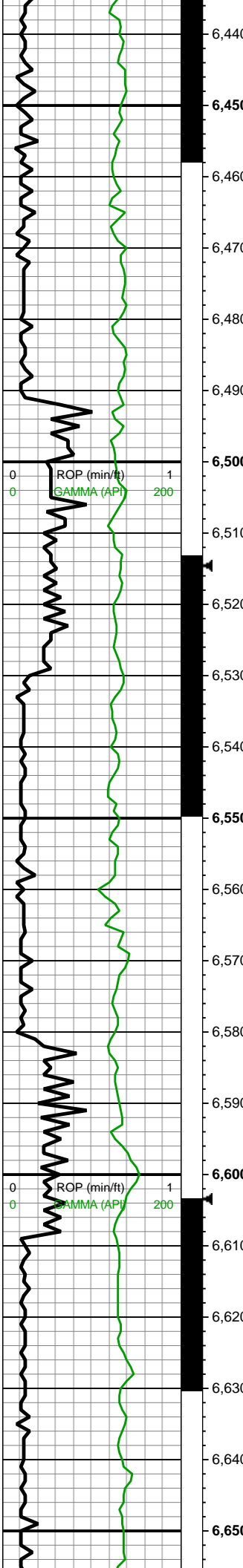
WOB: 30klbs
 RPM: 55
 SPM: 188
 SPP: 3,440psi



6200-6300 SLTST/SHY
 SLTST (85%): lt gy-gy, predy frm-brit, occ sb frm v arg sltst ip, rr sdy, non calc; SHY SST (15%): lt gy-gy, p-mod srted grdd sft-sb frm w hydrated gr-mtx sup arg sst cons wi predy arg cmt, com w srted f gr sb ang gr sup sst clus cons wi silc cmt, predy non calc, sl calc ip

6300-6400 SLTST/SHY
 SLTST (90%): lt gy-gy, predy frm-brit, occ sb frm v arg sltst ip, rr sdy, non calc; SHY SST (10%): lt gy-gy, p-mod srted grdd sft-sb frm w hydrated gr-mtx sup arg sst cons wi predy arg cmt, com w srted f gr sb ang gr sup sst clus cons wi silc cmt, predy non calc, sl calc ip





MW IN: 9.85
 VIS IN: 51
 MW OUT: 9.85
 VIS OUT: 49

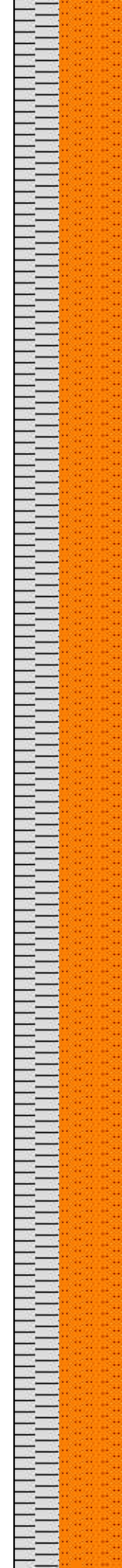
MD: 6,457'
 TVD: 6,373.45'
 INC: 9.05°
 AZM: 34.8°
 VS: -755.97'

MD: 6,546'
 TVD: 6,461.14'
 INC: 10.64°
 AZM: 32.77°
 VS: -768.01'

WOB: 22klbs
 RPM: 0
 SPM: 188
 SPP: 2,970psi

MD: 6,635'
 TVD: 6,548.61'
 INC: 10.64°
 AZM: 40.51°
 VS: -780.46'

MW IN: 9.8
 VIS IN: 51
 MW OUT: 9.8
 VIS OUT: 50

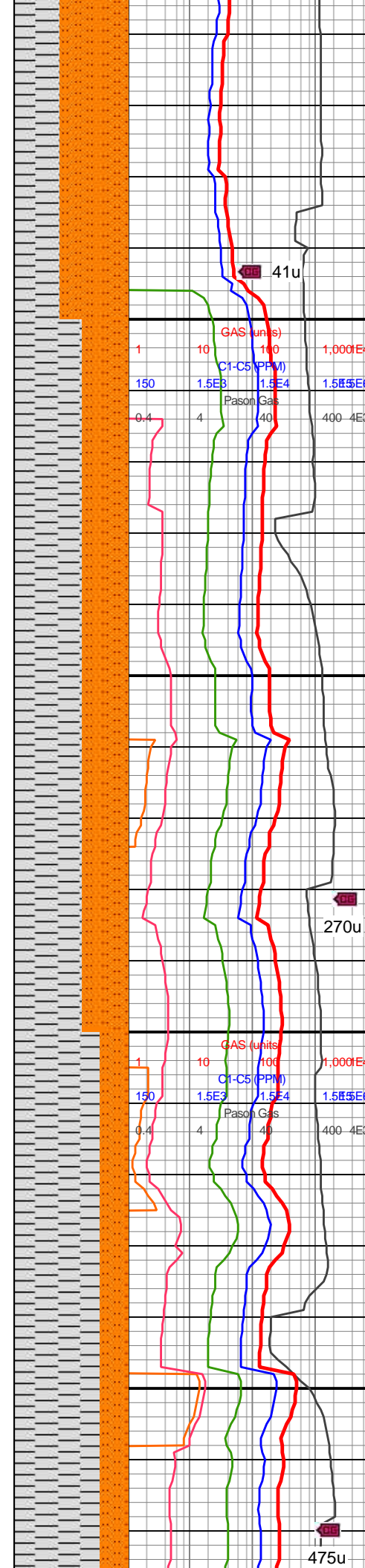
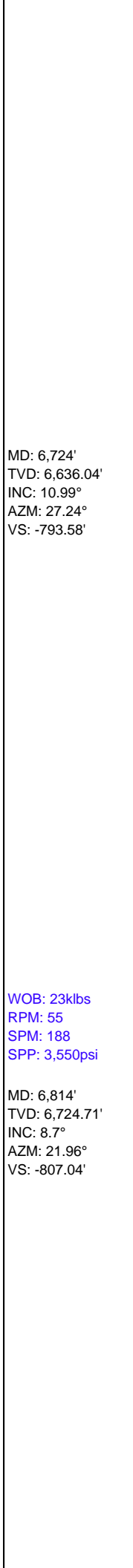
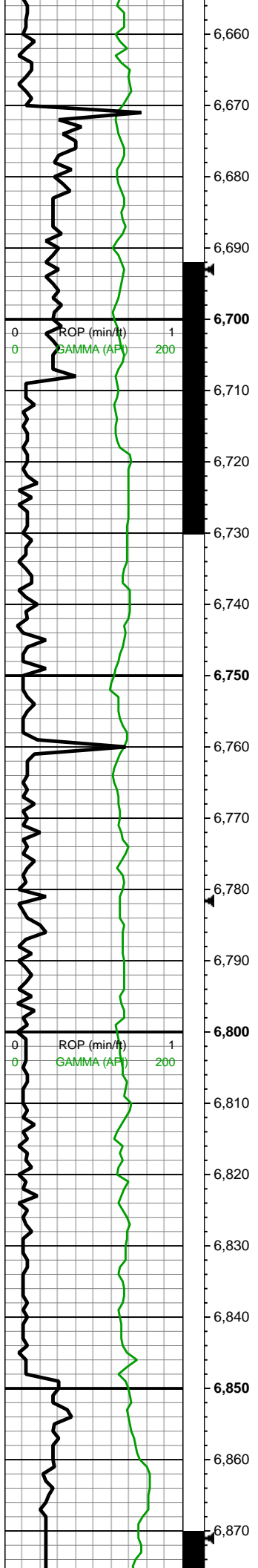


6400-6500 SLTY SH
 (75%): v lt gy-lt gy, predy v sft w hydrated, sme sb frm, mod fis sb blkly ctngs wi f lamn, sm arg-sl slty tex, non calc; SLTST (25%): gy-dk gy, occ v dk gy-blk, frm, brit, non calc, sl calc ip

6500-6600 SLTY SH
 (75%): v lt gy-lt gy-lt gyshbn, predy v sft w hydrated, sme sb frm, mod fis sb blkly ctngs wi f lamn, sm arg-sl slty tex, non calc; SLTST (25%): gy-dk gy, occ v dk gy, frm, brit, non calc, sl calc ip

6600-6700 SLTY SH
 (75%): v lt gy-lt gy, predy v sft w hydrated, sme sb frm, mod fis sb blkly ctngs wi f lamn, sm arg-sl slty tex, non calc; SLTST (25%): gy-dk gy, occ v dk gy-blk, frm, brit, non calc, sl calc ip

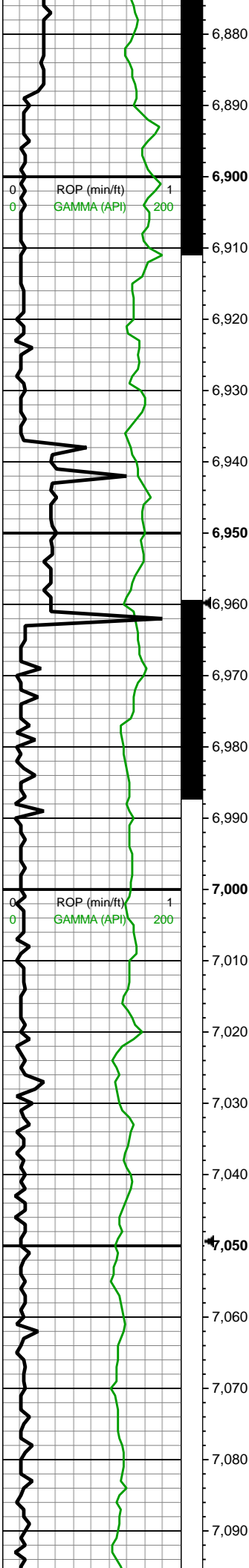




6700-6800 SLTY SH
 (70%): v lt gy-lt gy-lt
 gyshbn, predy v sft w
 hydrated, sme sb frm,
 mod fis sb blkly ctngs wi f
 lamn, sm arg-sl stly tex,
 non calc; SLTST (30%):
 gy-dk gy, occ v dk gy, frm,
 brit, non calc, sl calc ip

6800-6900 SLTY SH
 (75%): v lt gy-lt gy-lt
 gyshbn, predy v sft w
 hydrated, sme sb frm,
 mod fis sb blkly ctngs wi f
 lamn, sm arg-sl stly tex,
 non calc; SLTST (25%):
 gy-dk gy, occ v dk gy, frm,
 brit, sl calc ip





MD: 6,903'
 TVD: 6,812.48'
 INC: 10.42°
 AZM: 31.37°
 VS: -819.66'

MW IN: 9.75
 VIS IN: 51
 MW OUT: 9.8
 VIS OUT: 49

MD: 6,992'
 TVD: 6,899.96'
 INC: 10.77°
 AZM: 29.96°
 VS: -833.12'

WOB: 24klbs
 RPM: 55
 SPM: 186
 SPP: 3,460psi

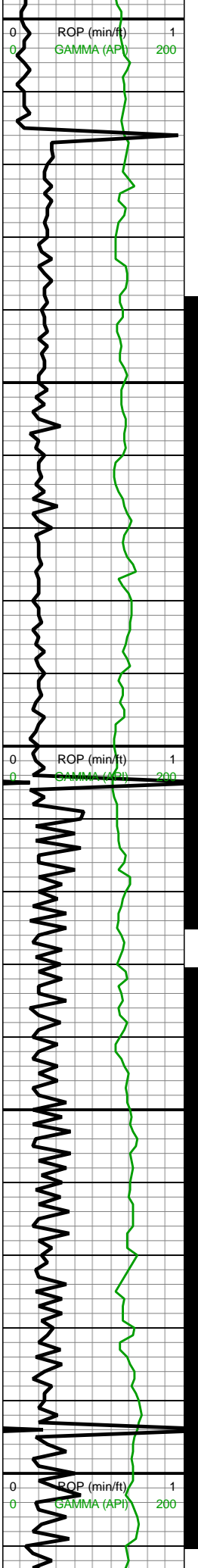
MD: 7,081'
 TVD: 6,987.72'
 INC: 8.39°
 AZM: 18.01°
 VS: -846.04'



6900-7000 SLTY SH
 (70%): v lt gy-lt gy-lt
 gyshbn, predy v sft w
 hydrated, sme sb frm,
 mod fis sb blkly ctngs wi f
 lamn, sm arg-sl slty tex,
 non calc; SLTST (30%):
 gy-dk gy, occ v dk gy, frm,
 brit, sl calc ip

7000-7100 SLTY SH
 (70%): v lt gy-lt gy, lt
 gyshbn-tn ip, v sft w
 hydrated v arg sltsy, sme
 sb frm grdg to sltst,
 slty-sdy ip, mod fis sb
 blkly ctngs wi f lamn, sm
 arg-sl slty tex, non calc;
 SLTST (30%): gy-dk gy,
 occ v dk gy-blk, slty-sdy
 ip, frm, brit, non calc, sl
 calc ip



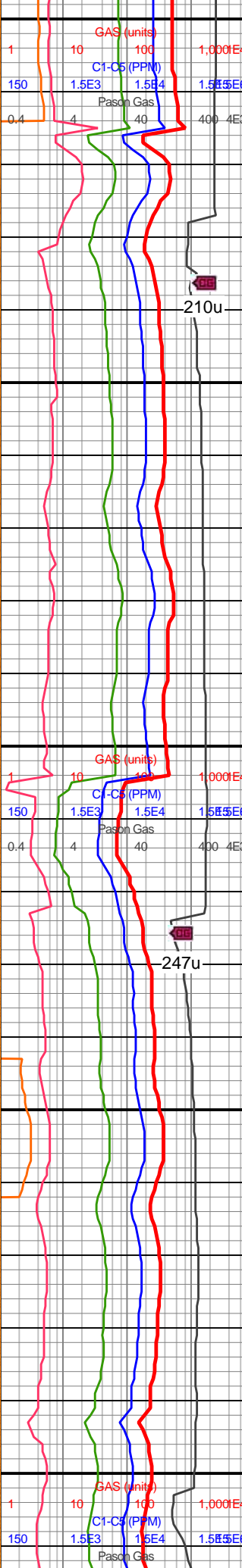
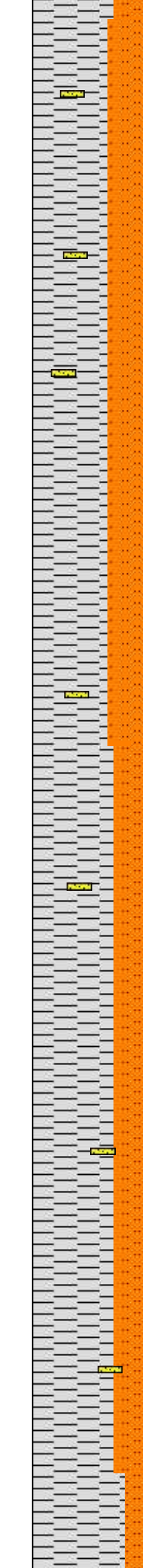


MW IN: 9.7+
 VIS IN: 50
 MW OUT: 9.7+
 VIS OUT: 50

MD: 7,170'
 TVD: 7,075.68'
 INC: 9.36°
 AZM: 36.9°
 VS: -857.54'

WOB: 19klbs
 RPM: 0
 SPM: 184
 SPP: 3,179psi

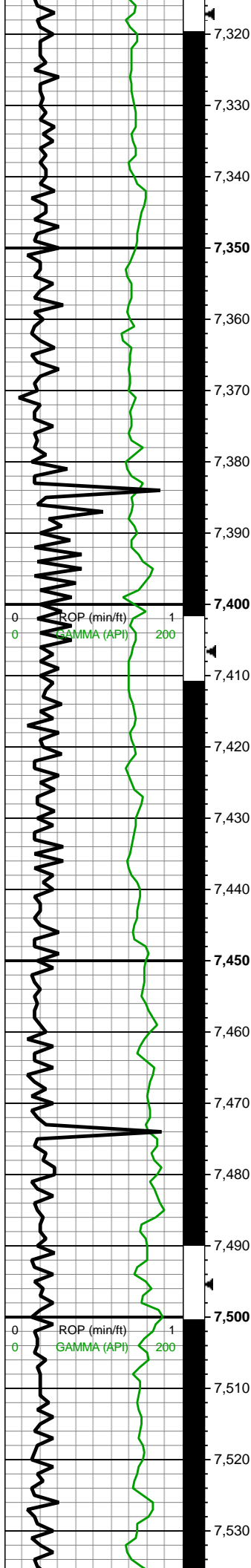
MD: 7,260'
 TVD: 7,164.06'
 INC: 13.4°
 AZM: 82.7°
 VS: -863.69'



7100-7200 SLTY SH
 (65%): v lt gy-lt gy, lt
 gyshbn-tn ip, v sft w
 hydrated v arg sltsy, sme
 sb frm grd to sltst,
 slty-sdy ip, mod fis sb
 blkly ctngs wi f lamn, sm
 arg-sl slty tex, non calc;
 SLTST (35%): gy-dk gy,
 occ v dk gy-blk, slty-sdy
 ip, frm, brit, non calc, sl
 calc ip

7200-7300 SLTY SH
 (70%): v lt gy-lt gy, lt
 gyshbn-tn ip, v sft w
 hydrated v arg sltsy, sme
 sb frm grd to sltst,
 slty-sdy ip, mod fis sb
 blkly ctngs wi f lamn, sm
 arg-sl slty tex, non calc;
 SLTST (30%): gy-dk gy,
 occ v dk gy-blk, slty-sdy
 ip, frm, brit, non calc, tr sl
 calc ip

7300-7350 SLTY SH
 (70%): v lt gy-lt gy, lt
 gyshbn-tn ip, v sft w
 hydrated v arg sltsy, sme
 sb frm grd to sltst,



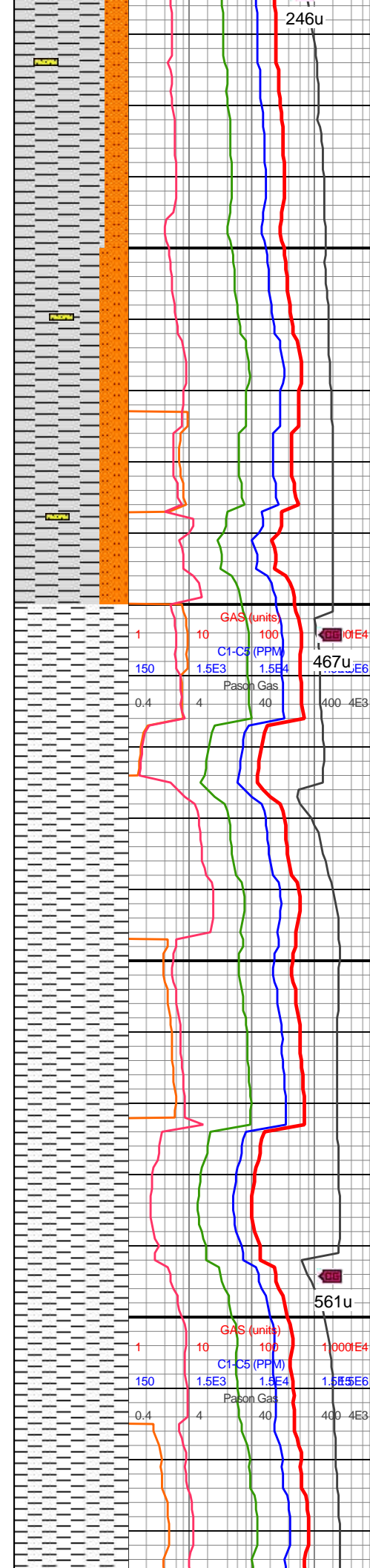
MD: 7,349'
 TVD: 7,250.01'
 INC: 17.18°
 AZM: 111.26°
 VS: -858.67'

WOB: 38klbs
 RPM: 0
 SPM: 182
 SPP: 3,180psi

MW IN: 9.8
 VIS IN: 52
 MW OUT: 9.8+
 VIS OUT: 49

MD: 7,438'
 TVD: 7,334.75'
 INC: 19.12°
 AZM: 139.82°
 VS: -841.27'

MD: 7,527'
 TVD: 7,417.87'
 INC: 23.16°
 AZM: 161.97°
 VS: -812.47'



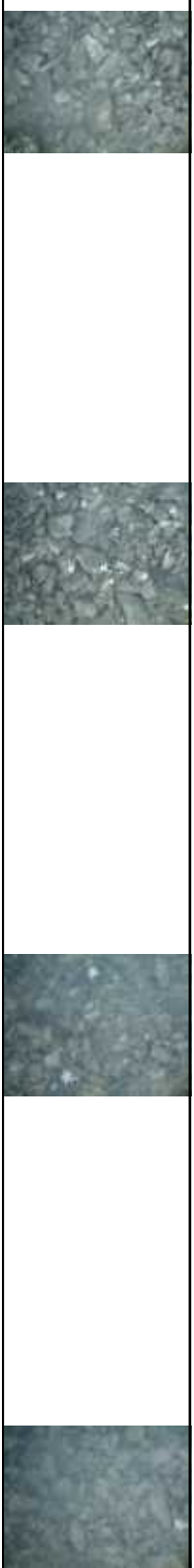
slty-sdy ip, mod fis sb
 blkly ctngs wi f lamn, sm
 arg-sl slty tex, non calc;
 SLTST (30%): gy-dk gy,
 occ v dk gy-blk, slty-sdy
 ip, frm, brit, non calc, tr sl
 calc ip

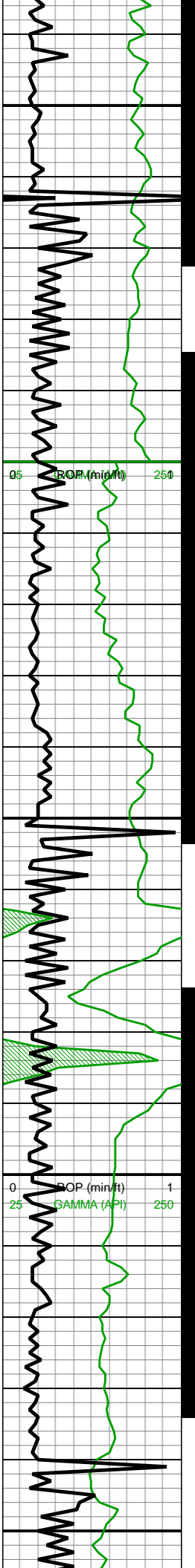
7350-7400 SLTY SH
 (75%): lt gy-med gy,
 gyshbn ip, sft-sb frm w
 hydrated water solu
 gumbo ctngs, sl slty tex,
 tr micmica ip, non calc;
 SLTST (25%): lt gy-dk gy,
 frm-v frm-brit sltst, sdy ip,
 rr pp pyr & micmica, non calc

7400-7450 SLTY SH
 (100%): gy-gyshbn wi sp
 blk lith incl, frm, brit, sb
 frm ip, med-hi fis blkly-tab
 ctngs wi wxy lstr, slty arg
 tex, mod calc

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

7500-7550 SLTY SH
 (100%): gy-gyshbn wi sp
 blk lith incl, frm, brit, sb
 frm ip, med-hi fis blkly-tab
 ctngs wi wxy lstr, slty arg
 tex, non calc





7,540
7,550
7,560
7,570
7,580
7,590
7,600
7,610
7,620
7,630
7,640
7,650
7,660
7,670
7,680
7,690
7,700
7,710
7,720
7,730
7,740
7,750

MW IN: 9.7+
VIS IN: 52
MW OUT: 9.8
VIS OUT: 49

WOB: 26klbs
RPM: 0
SPM: 188
SPP: 3,150psi

MD: 7,616'
TVD: 7,497.58'
INC: 29.88°
AZM: 179.29°
VS: -773.26'

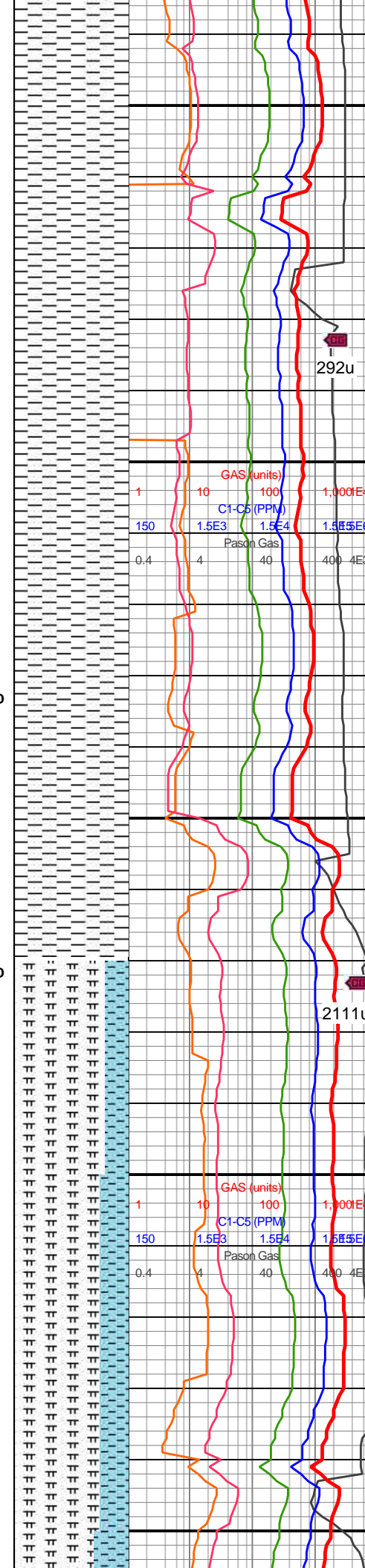
Sharon Springs,
7627'MD, 7507'TVD

Niobrara,
7666'MD, 7540'TVD

A Marl, 7682'MD,
7554'TVD

MD: 7,705'
TVD: 7,572.68'
INC: 34.98°
AZM: 182.54°
VS: -725.74'

MW IN: 9.9
VIS IN: 52
MW OUT: 9.8
VIS OUT: 48



7550-7600 SLTY SH
(100%): gyshbn-med gy,
mot lt gy, lam dk brn,
blky-sb tab ctngs, sl
frm-frm, stri, vf lam, sl slty
tex, sl micmica, non-sl
calc, mnr imbd/dissm
mic pyr

7600-7650 SLTY SH
(100%): gyshbn-med gy,
mot lt gy, lam dk brn,
blky-sb tab ctngs, sl
frm-frm, stri, vf lam, sl slty
tex, sl micmica, non-sl
calc, mnr imbd/dissm
mic pyr

7650-7700 MRLST
(80%): med gy-dk gy-occ
blk, frm-hd-brit, med fis
sb blky-blky, sm-sl slty
tex, mod calc; CHK
(20%): gy-dk gy,rr lt gy,tn
hue thru, wxy lmsl lstr, sb
frm-frm-brit, hi fis, blky-sb
plty-plty, chky tex, mod
calc

7700-7750 MRLST
(75%): dk gy-dk gyshbn,
sl hd-v frm, mod fis, sb
blky-tab ctngs, sm arg
tex, mod calc, tr pp mic
pyr; CHK (25%): med
brn-gyshbn, frm-sft, mod
fis, tab-sb blky, tr free
CHK, v calc

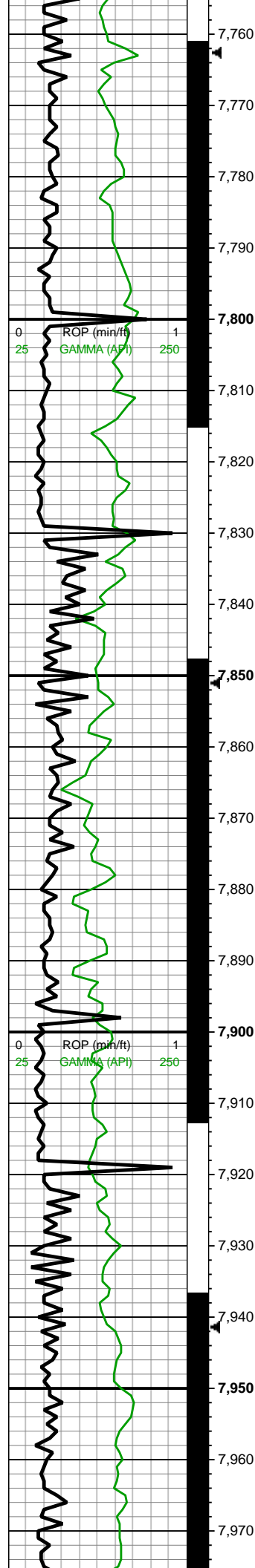


292u

2111u

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

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



MD: 7,794'
 TVD: 7,643.39'
 INC: 39.77°
 AZM: 180.34°
 VS: -671.98'

WOB: 41klbs
 RPM: 0
 SPM: 184
 SPP: 3,275psi

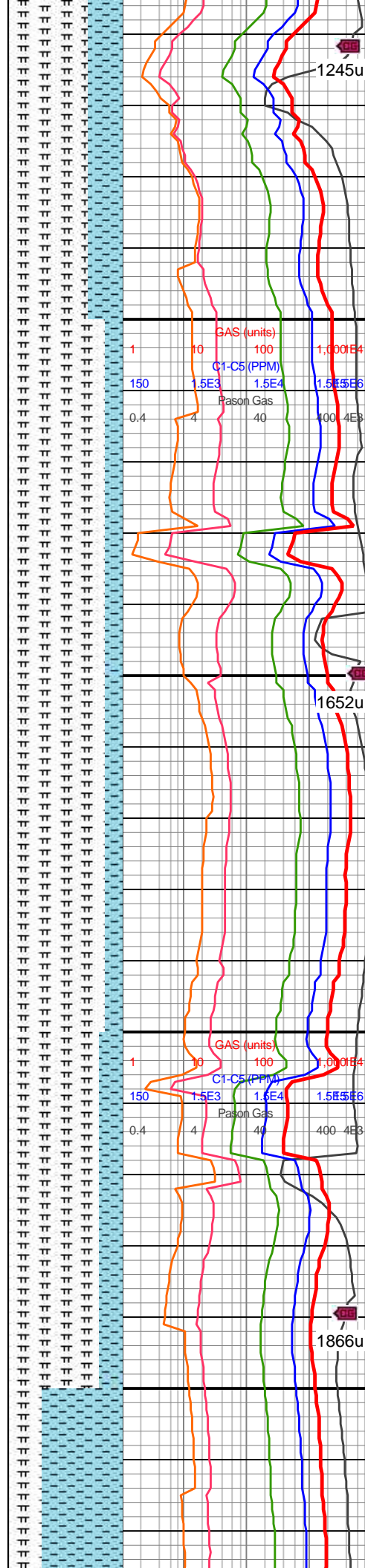
↔
**B Chalk, 7855'MD,
 7689'TVD**

MD: 7,884'
 TVD: 7,709.54'
 INC: 45.57°
 AZM: 178.85°
 VS: -611.12'

↔
**B Marl, 7885'MD,
 7710'TVD**

MW IN: 9.9+
 VIS IN: 51
 MW OUT: 9.9
 VIS OUT: 49

MD: 7,973'
 TVD: 7,768.05'
 INC: 52.16°



7750-7800 MRLST
 (70%): dk gy-dk gyshbn, sl hd-v frm, mod fis, sb blk- tab ctngs, sm arg tex, mod calc, tr pp mic pyr; CHK (30%): med brn-gyshbn, frm-sft, mod fis, tab-sb blk, tr free CHK, mod calc

7800-7850 MRLST
 (85%): pred med-sme dk gry, blk-sb blk, brit-sl hrd, mod calc, chky lam wi sme chky tex; CHK (15%): pred lt med gy-sme occ lt brn, sl sft-frm, blk, v-hi calc, v rr-occ pyrc nod wi sme tr pyr

7850-7900 MRLST
 (85%): pred med-sme dk gry, blk-sb blk, brit-sl hrd, mod calc, chky lam wi sme chky tex; CHK (15%): pred lt med gy-sme occ lt brn, sl sft-frm, blk, v-hi calc, v rr-occ pyrc nod wi sme tr pyr

7950-7950 MRLST
 (75%): pred med-sme dk gry, blk-sb blk, brit-sl hrd, mod calc, chky lam wi sme chky tex; CHK (25%): pred lt med gy-sme occ lt brn, sl sft-frm, blk, v-hi calc, v rr-occ pyrc nod wi sme tr pyr

7950-8000 CHK (70%): lt gy-gyshbn-med gy wi occ f wh chky incl thru, frm, sb blk-blky ctngs, chky tex, rr-tr foram, tr fos frags, v calc; MRLST (30%): med gyshbn-dk gy, frm-brit,

1245u

1652u

1866u



AZM: 178.76°
VS: -544.21'

WOB: 43klbs
RPM: 0
SPM: 185
SPP: 3,375psi

C Chalk, 8009'MD,
7789'TVD

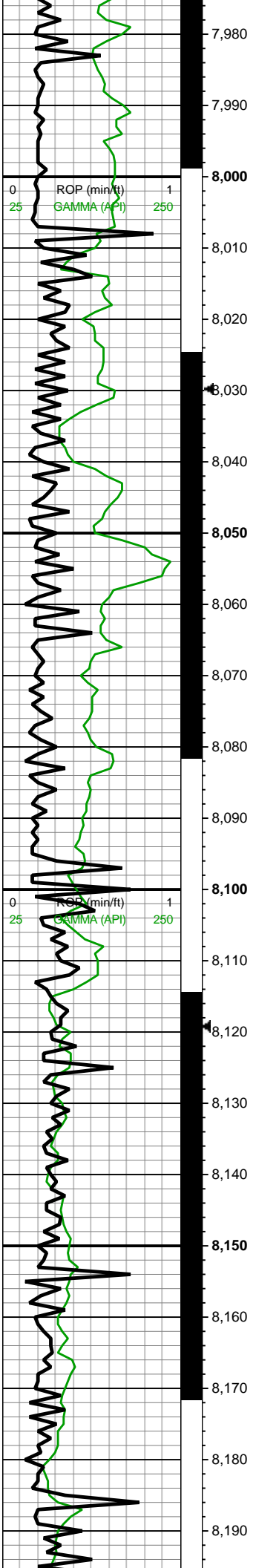
C Marl, 8042'MD,
7808'TVD

MD: 8,062'
TVD: 7,818.44'
INC: 58.84°
AZM: 181.66°
VS: -471.11'

D Chalk, 8117'MD,
7845'TVD

MD: 8,150'
TVD: 7,859.88'
INC: 64.95°
AZM: 179.38°
VS: -393.77'

MINO DEPT 01/07/2019



blky-sb blky, sm arg-sl
silty tex, mod calc

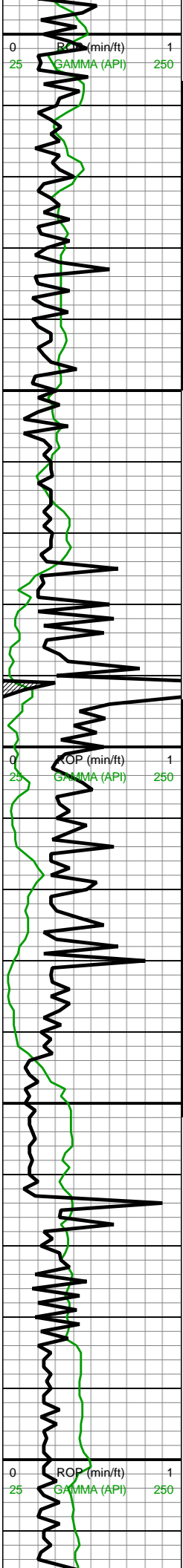
8000-8050 CHK (70%): lt
gy-gyshbn-med gy wi occ
f wh chky incl thru, frm, sb
blky-blky ctngs, chky tex,
rr-tr foram, tr fos frags, v
calc; MRLST (30%): med
gyshbn-dk gy, frm-brit,
blky-sb blky, sm arg-sl
silty tex, hily calc

8050-8100 MRLST
(75%): v dk gy-blk,
frm-hd-brit, sm arg-sl silty
tex, rr f wh chky incl ip,
mod calc; CHK (25%): lt
gy-med gy occ dk gy, sb
frm-frm, blky, sm arg-sl
silty tex, tr-rr vf pyr strg ip,
hi calc

8100-8150 MRLST
(65%): dk gy-dk gyshbn,
sl hd-v frm, mod fis, sb
blky-tab ctngs, sm arg
tex, mod calc, tr pp mic
pyr; CHK (35%): med
gy-lt gy, sme offwht,
frm-sft, mod fis, tab-sb
blky, tr free CHK, v calc

8150-8200 CHK (70%):
wht ip- lt gy-gy, sb rnd,
frm-fri-sft, dull-rthy, shky
tex, calc; MRLST (30%):
med gy-dk gy, sb
rnd-blkgy, frm-hd,
dull-rthy, v calc, occ silty,
tr-rr pyrc nod





WOB: 24kbs
 RPM: 30
 SPM: 185
 SPP: 3,475psi

MD: 8,240'
 TVD: 7,893.38'
 INC: 71.32°
 AZM: 180.87°
 VS: -310.51'

Fort Hayes,
 8281'MD, 7905'TVD

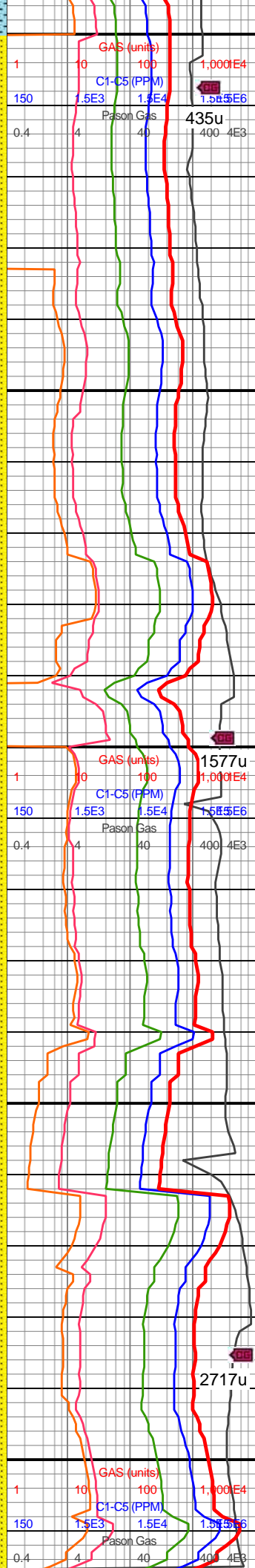
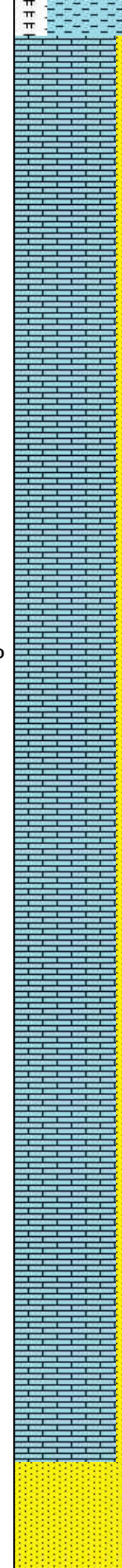
MW IN: 9.9+
 VIS IN: 53
 MW OUT: 9.9
 VIS OUT: 51

MD: 8,329'
 TVD: 7,918.63'
 INC: 75.72°
 AZM: 179.29°
 VS: -225.4'

Codell, 8347'MD,
 7923'TVD

WOB: 36kbs
 RPM: 0
 SPM: 186
 SPP: 3,030psi

MD: 8,418'

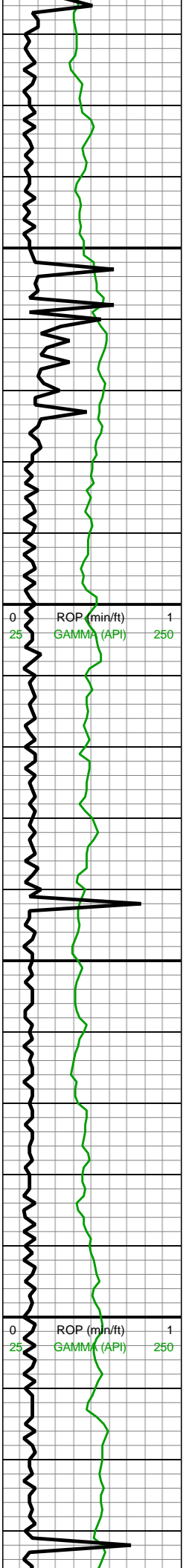


8200-8250 LS (70%):
 tn-lt brn, frm, brit, ang
 ctngs, crpxln mudst, occ
 wkst, tr vf pyr, hi calc;
 CHK (30%): off wh-lt gy,
 sft-sb frm-frm-brit mod fis
 sb blkly-blky ctngs,
 occ-com wh chky incl, sm
 chky-sl slty-sl gt tex, tr vf
 pyr, hi calc

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

8300-8400 LS (90%)
 med gry-tn wht ip, hd-brit,
 v ang-blky, cryptoxln tex,
 hi calc; SST (10%): pred
 med gy-dk gy brn, fri-sli fri
 gr sup clus cons wi arg &
 silc cmt, occ lt gy-gy mtx
 sup ss cons wi arg cmt,
 ply srtd vf-f sd grs, calc





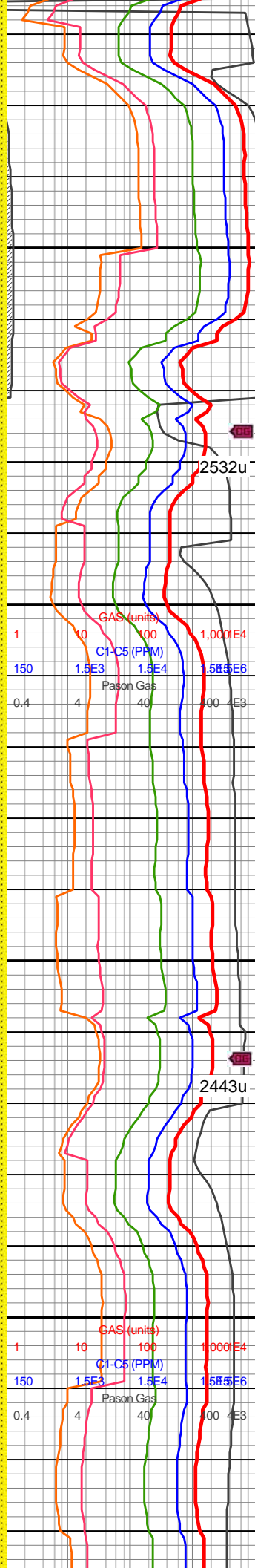
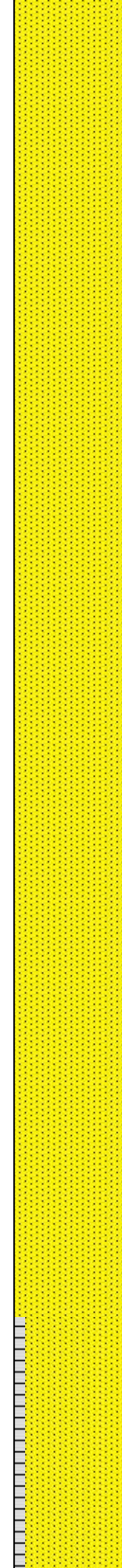
TVD: 7,933.79'
 INC: 84.64°
 AZM: 179.02°
 VS: -137.92'

MW IN: 10.1
 VIS IN: 53
 MW OUT: 9.9+
 VIS OUT: 50

MD: 8,507'
 TVD: 7,938.63'
 INC: 89.12°
 AZM: 180.34°
 VS: -49.26'

MD: 8,596'
 TVD: 7,940.48'
 INC: 88.51°
 AZM: 180.08°
 VS: 39.48'

WOB: 32.8klbs
 RPM: 50
 SPM: 186
 SPP: 3,620psi



8400-8500 SST (100%):
 dk gy-dk gy brn gr-mtx
 sup clus, occ lt gy-gy mtx
 sup sst, pred dk gy wi f
 sb rd qtz sd gr incl, p srt
 vf-f sd grs, pred sb rd-rd
 sli fri gr sup ss clus cons
 wi silc & arg cmt, uncons
 ip, non calc

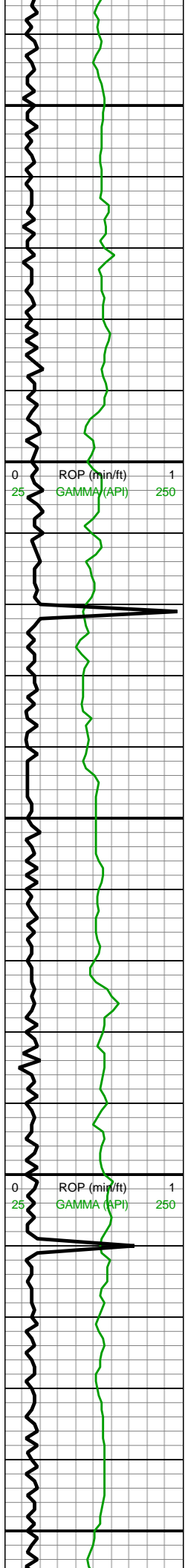
2532u

8500-8600 SST (100%):
 dk gy-dk gy brn gr-mtx
 sup clus, occ lt gy-gy mtx
 sup sst, pred dk gy wi f
 sb rd qtz sd gr incl, p srt
 vf-f sd grs, pred sb rd-rd
 sli fri gr sup ss clus cons
 wi silc & arg cmt, uncons
 ip, non calc

2443u

8600-8700 SST (90%):
 gy-dk gy, occ v dk gy,
 frm-sli fri predy gr sup sst
 clus cons wi silc cmt,
 vf-f-u f p srt ang-sb
 ang-sb rd sd grs, tr vf pyr,
 mod calc: SHY SST





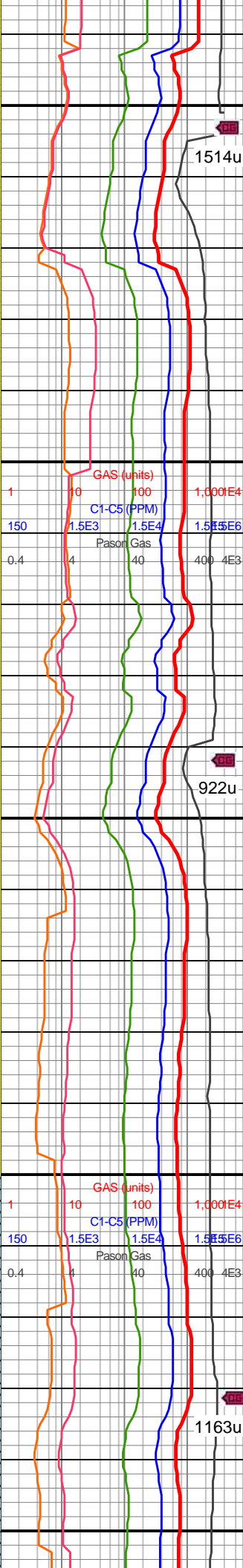
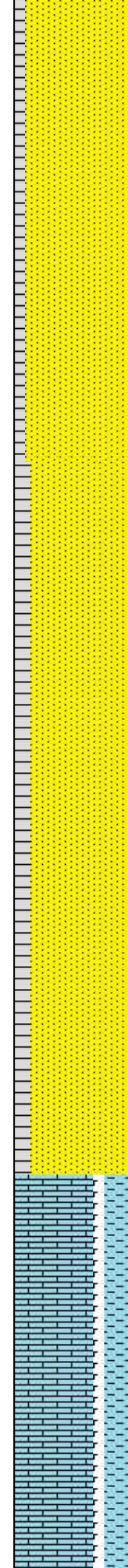
8,640
8,650
8,660
8,670
8,680
8,690
8,700
8,710
8,720
8,730
8,740
8,750
8,760
8,770
8,780
8,790
8,800
8,810
8,820
8,830
8,840
8,850

MW IN: 10.2+
VIS IN: 54
MW OUT: 10.1
VIS OUT: 52

MD: 8,685'
TVD: 7,942.79'
INC: 88.51°
AZM: 179.73°
VS: 128.25'

MD: 8,774'
TVD: 7,945.07'
INC: 88.55°
AZM: 181.05°
VS: 216.96'

WOB: 32klbs
RPM: 61
SPM: 184
SPP: 3,585psi



(10%): lt gy-med gy, sft-sb frm, mtx sup v arg sst, slty-sdy, non calc

8700-8800 SST (85%): gy-dk gy, occ v dk gy, frm-sli fri predy gr sup sst clus cons wi silc cmt, vf-f-u f p srtd ang-sb ang-sb rd sd grs, tr vf pyr, mod calc; SHY SST (15%): lt gy-med gy, sft-sb frm, mtx sup v arg sst, slty-sdy, non calc

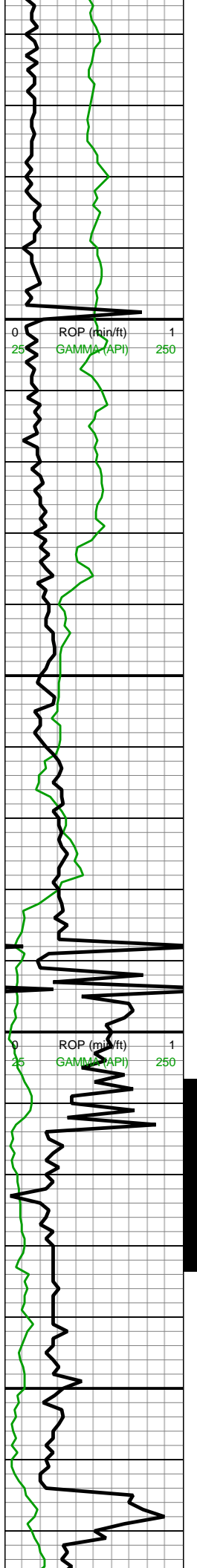
8800-8900 LMST (70%): lt gy-tn-lt gyshbn, rr dk gy lmst, crpxln mudst, occ wkst, tr vf pyr, hi calc; CHK (20%): wht ip- lt gy-gy, sb rnd, frm-fri-sft, dull-rthy, shky tex, calc; MRLST (10%): med gy-dk gy, sb rnd-blkgy, frm-hd, dull-rthy, v calc, occ slty

1514u

922u

1163u

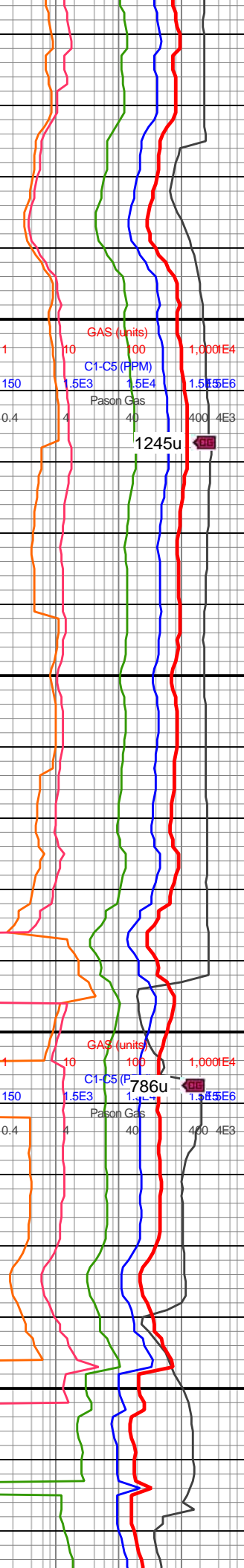




MD: 8,863'
 TVD: 7,947.53'
 INC: 88.29°
 AZM: 180.17°
 VS: 305.64'

MD: 8,952'
 TVD: 7,950.66'
 INC: 87.67°
 AZM: 179.02°
 VS: 394.41'

MD: 9,041'
 TVD: 7,952.23'
 INC: 90.31°
 AZM: 179.55°
 VS: 483.24'



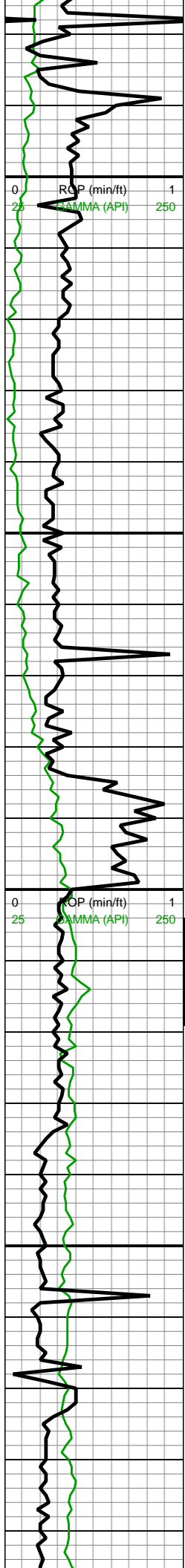
MW IN: 10.2+
 VIS IN: 55
 MW OUT: 10.2
 VIS OUT: 52

8900-9000 LMST
 (100%): lt gy-tn-lt gyshbn,
 rr dk gy lmst, crpxln
 mudst, occ wkst, tr vf pyr,
 hi calc

WOB: 36klbs
 RPM: 60
 SPM: 188
 SPP: 3,550psi

9000-9100 LS (100%):
 predy off wh-lt gy-occ
 tn-bf-lt brn crpxln-micxln
 mudst, occ dk calc sltst
 intbds, hi calc





9,080
9,090
9,100
9,110
9,120
9,130
9,140
9,150
9,160
9,170
9,180
9,190
9,200
9,210
9,220
9,230
9,240
9,250
9,260
9,270
9,280
9,290

MW IN: 10.2
VIS IN: 57
MW OUT: 10.35
VIS OUT: 56

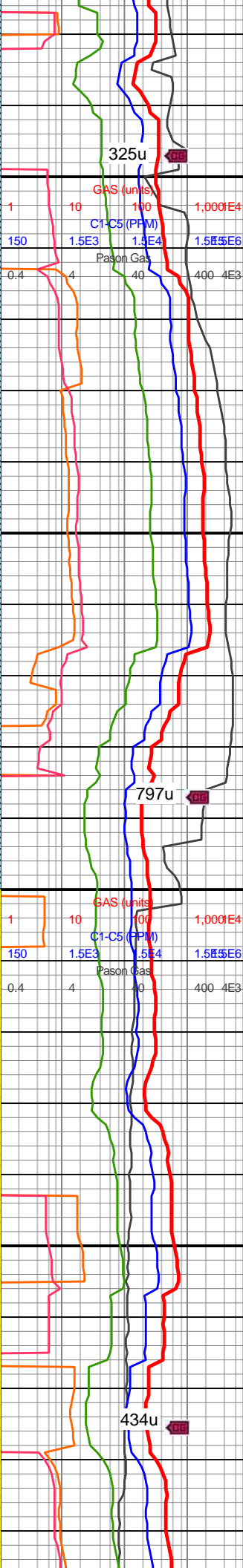
MD: 9,130'
TVD: 7,951.85'
INC: 90.18°
AZM: 179.29°
VS: 572.08'

MW IN: 10.15
VIS IN: 57
MW OUT: 10.1
VIS OUT: 56

WOB: 29klbs
RPM: 50
SPM: 180
SPP: 3,350psi

MD: 9,219'
TVD: 7,952.67'
INC: 88.77°
AZM: 179.99°
VS: 660.9'

MW IN: 10.1
VIS IN: 54
MW OUT: 10.15
VIS OUT: 53



325u

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

1 10 100 1,000E4
150 1.5E3 1.5E4 1.5E6
0.4 4 40 400 4E3

797u

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

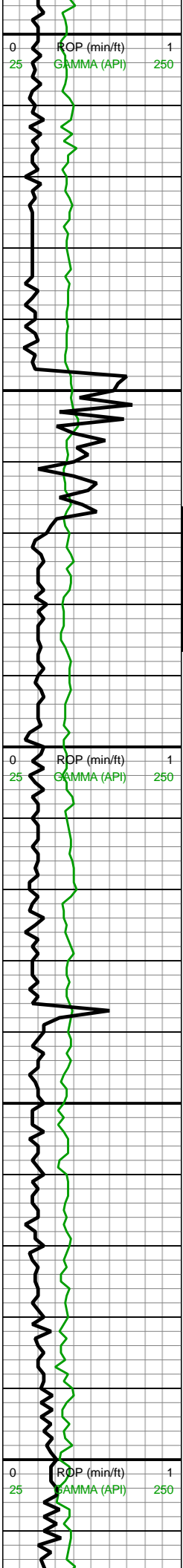
1 10 100 1,000E4
150 1.5E3 1.5E4 1.5E6
0.4 4 40 400 4E3

434u

9100-9200 LS (100%):
predy tn-lt brn crpxln
mudst, occ lt gy pkst-wkst
wi micxln ip, com sdy-sm
wh incl ip, occ dk calc
sltst intbds, hi calc

9200-9300 SST (90%):
off wh-lt gy-gy-dk gy ip,
p-mod srted vf-f sd grs
grdg down to slty, sli frm
frm gr-mtx sup sst clus
cons wi silc arg cmt, s&p
ip, uncons ip, non-mod
calc; LS (10%): lt gy-lt
gyshbn-tn-bf, crpxln
mudst, wxy lstr, hi calc





9,300
9,310
9,320
9,330
9,340
9,350
9,360
9,370
9,380
9,390
9,400
9,410
9,420
9,430
9,440
9,450
9,460
9,470
9,480
9,490
9,500
9,510

MD: 9,309'
TVD: 7,954.67'
INC: 88.68°
AZM: 178.94°
VS: 750.71'

MW IN: 10.25
VIS IN: 54
MW OUT: 10.2
VIS OUT: 53

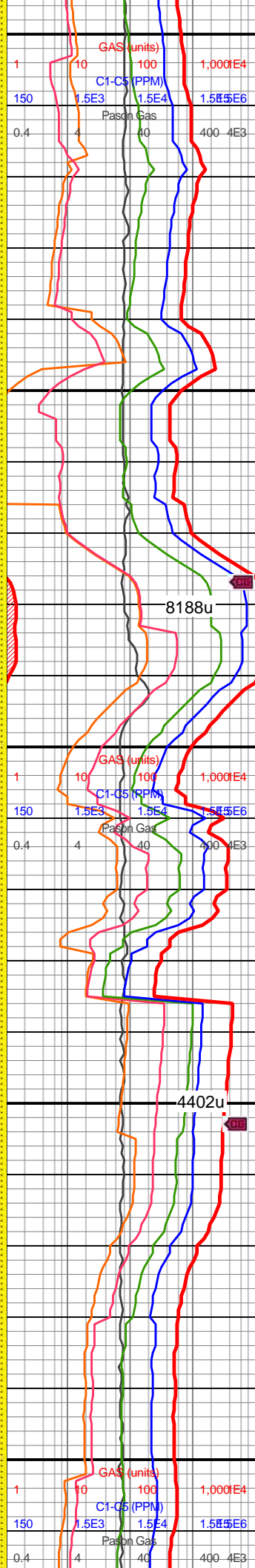
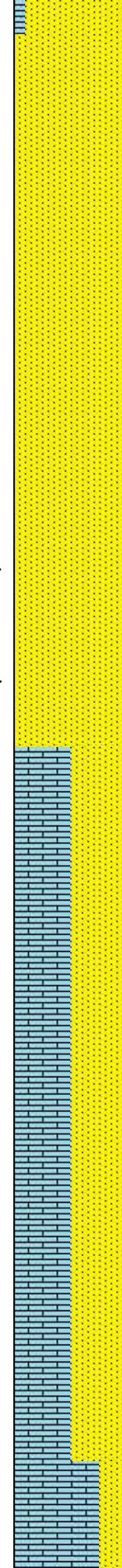
Off gas buster

On gas buster

WOB: 25klbs
RPM: 50
SPM: 170
SPP: 3,020psi

MD: 9,398'
TVD: 7,956.41'
INC: 89.08°
AZM: 181.22°
VS: 839.46'

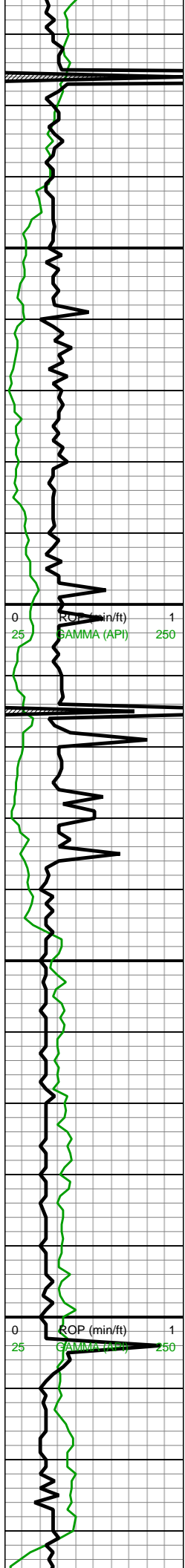
MD: 9,487'
TVD: 7,957.88'
INC: 89.03°
AZM: 180.43°
VS: 928.14'



9300-9400 SST (100%):
off wh-lt gy-gy-dk gy ip,
p-mod srted vf-f sd grs
grdg down to slty sst, sli
frm frm gr-mtx sup sst
clus cons wi silc arg cmt,
s&p ip, com clr sb rd-rd f
gr unconcs sd, non-mod
calc

9400-9500 SST (90%): lt
gy sb frm mtx sup p srted
arg sst-gy-dk gy sli fri gr
mod srted gr sup sst wi
silc cmt, s&p ip, unconcs
ip, non-mod calc; LS
(10%): lt gy-lt
gyshbn-tn-bf, crpxln
mudst, wxy lstr, hi calc





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
9,730

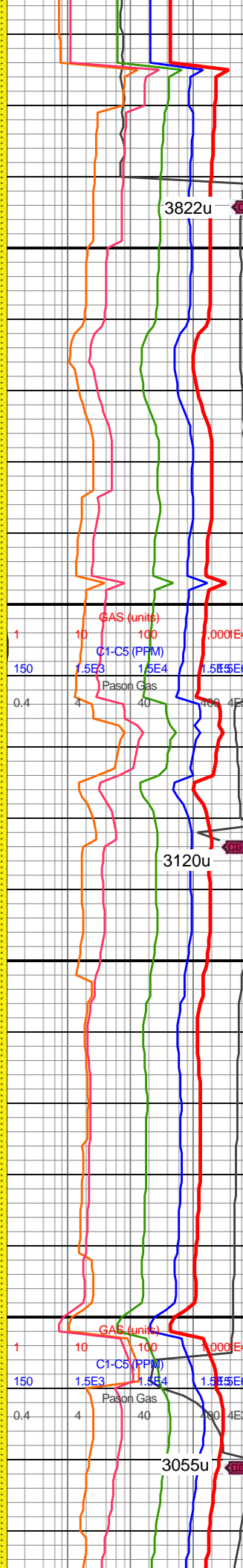
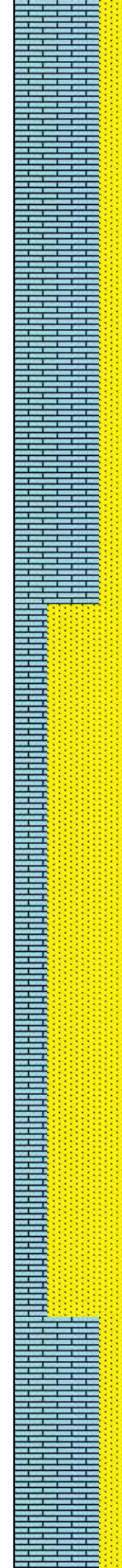
MW IN: 10.25
VIS IN: 52
MW OUT: 10.25
VIS OUT: 52

MD: 9,576'
TVD: 7,959.86'
INC: 88.42°
AZM: 179.55°
VS: 1,016.9'

WOB: 33klbs
RPM: 50
SPM: 168
SPP: 3,060psi

MW IN: 10.4
VIS IN: 52
MW OUT: 10.3
VIS OUT: 54

MD: 9,665'
TVD: 7,962.31'
INC: 88.42°
AZM: 178.76°
VS: 1,105.73'



9500-9600 SST (50%):
off wh-lt gy-gy-dk gy ip,
p-mod srted vf-f sd grs
grdg down to slty, sli frm
frm gr-mtx sup sst clus
cons wi silc arg cmt, s&p
ip, uncons ip, non-mod
calc; LS (50%): lt gy-lt
gyshbn-tn-bf, crpxln
mudst, wxy lstr, hi calc

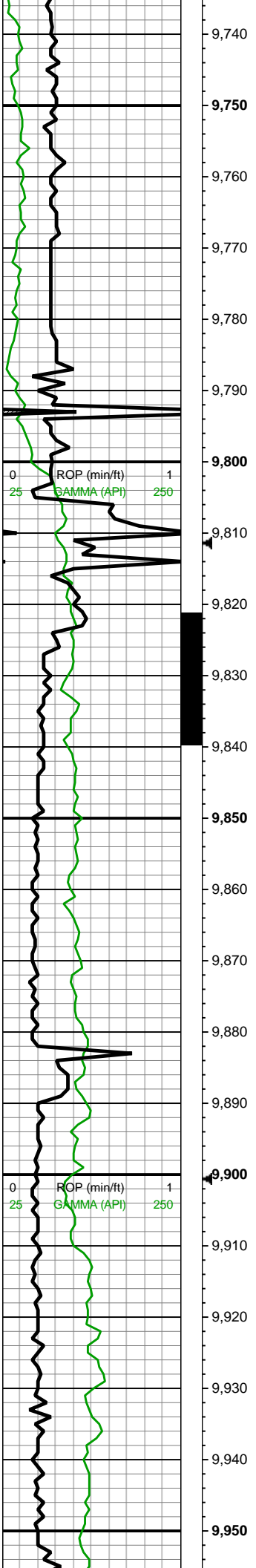
9600-9700 SST (70%): lt
gy sb frm mtx sup p srted
arg sst-gy-dk gy sli fri gr
mod srted gr sup sst wi
silc cmt, s&p ip, uncons
ip, non-mod calc; LS
(30%): lt gy-lt
gyshbn-tn-bf, crpxln
mudst, wxy lstr, hi calc

3822u

3120u

3055u





MD: 9,754'
 TVD: 7,964.46'
 INC: 88.81°
 AZM: 178.23°
 VS: 1,194.63'

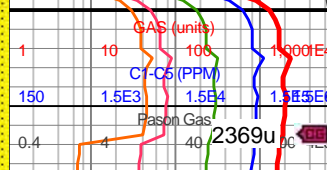
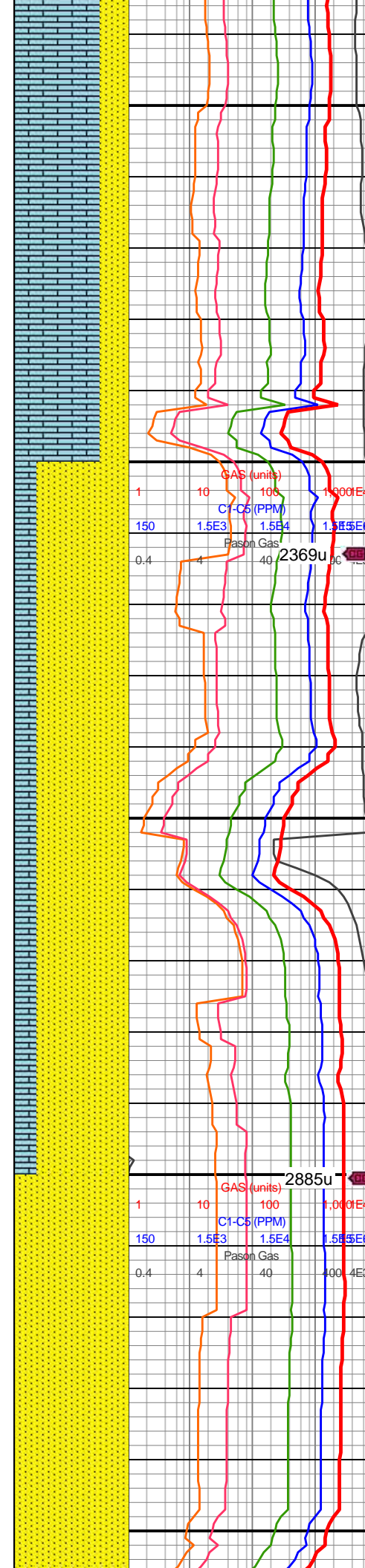
MW IN: 10.4
 VIS IN: 52
 MW OUT: 10.3
 VIS OUT: 50

WOB: 36klbs
 RPM: 51
 SPM: 188
 SPP: 3,570psi

MD: 9,843'
 TVD: 7,967.16'
 INC: 87.72°
 AZM: 180.34°
 VS: 1,283.43'

MW IN: 10.3
 VIS IN: 52
 MW OUT: 10.4
 VIS OUT: 51

MD: 9,932'
 TVD: 7,970.74'
 INC: 87.67°
 AZM: 180.25°
 VS: 1,372.11'

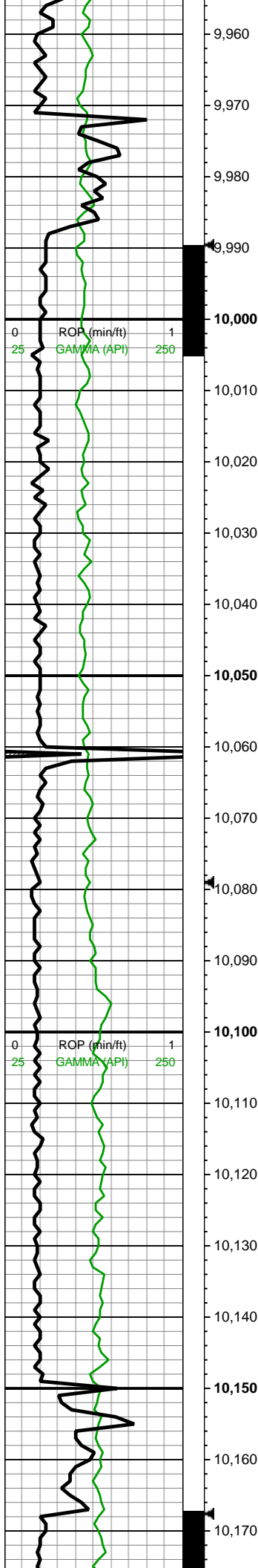


9700-9800 LS (75%): lt gy-lt gyshbn-tn-bf, crpxln mudst, wxy lstr, hi calc; SST (25%): lt gy sb frm mtx sup p srted arg sst-gy-dk gy sli fri gr mod srted gr sup sst wi silc cmt, s&p ip, unconc ip, non-mod calc

9800-9900 SST (80%): off wh-lt gy-gy-dk gy ip, p-mod srted vf-f sd grs grdg down to slty sst, sli frm gr-mtx sup sst clus cons wi silc arg cmt, s&p ip, com clr sb rd-rd f gr unconc sd, non-mod calc; LMST (20%): lt gy-tn-lt gyshbn, rr dk gy lmst, crpxln mudst, occ wkst, tr vf pyr, hi calc

9900-10000 SST (100%): predy gy-dk gy frm f gr sli fri mod srted gr sup sst

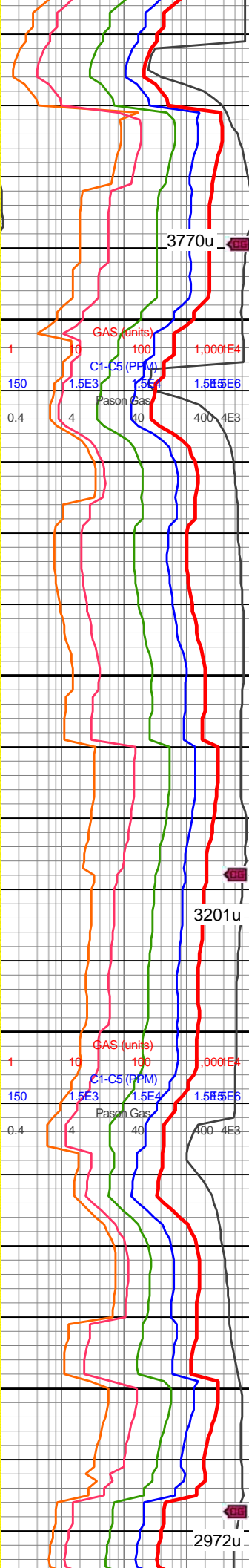
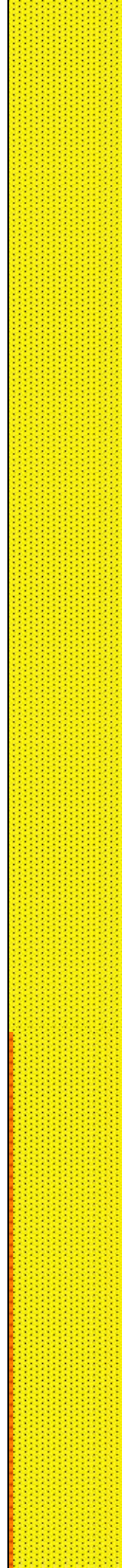




WOB: 52klbs
 RPM: 0
 SPM: 178
 SPP: 3,040psi

MD: 10,021'
 TVD: 7,972.89'
 INC: 89.56°
 AZM: 180.34°
 VS: 1,460.84'

MD: 10,110'
 TVD: 7,973.67'
 INC: 89.43°
 AZM: 179.2°
 VS: 1,549.64'



clus cons wi silc cmt &
 arg ip, com lt gy-lt gyshbn
 p-mod srtd vf-f sd gr sst
 wi arg mtx that washes
 out wi uncons sd, grdg
 down to slty sst,
 non-mod calc

10000-10100 SST
 (100%): predy dk gy, com
 off wh-lt gy, p-mod srtd
 vf-f sd grs grdg down to
 slty sst, dk gy sli frm
 gr-mtx sup sst clus cons
 wi silc arg cmt, s&p ip,
 com lt gy sft-sb frm mtx
 sup arg sst clus, uncons
 ip, predy non calc-v sl
 calc, rr mod calc

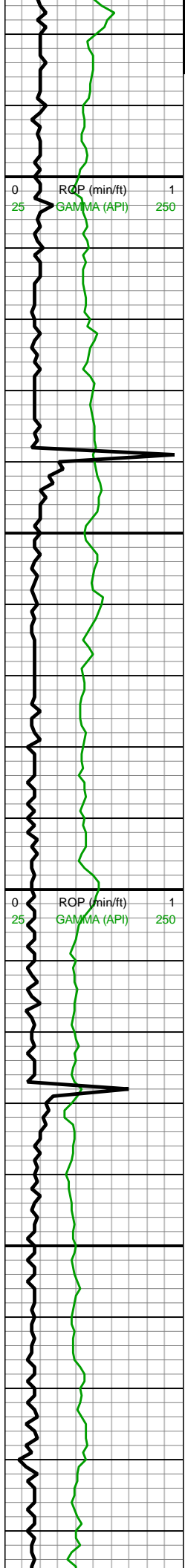
10100-10200 SST (95%):
 pred med gyshbn, occ lt
 gy-lt brn, sme red-brn,
 frm-v frm, blk, pred
 mod-w cons gr sup cls
 cons wi silc cmt non



3770u

3201u

2972u



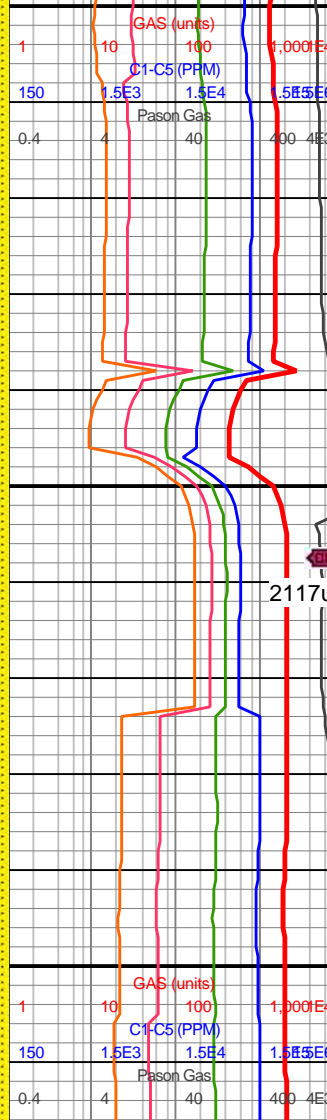
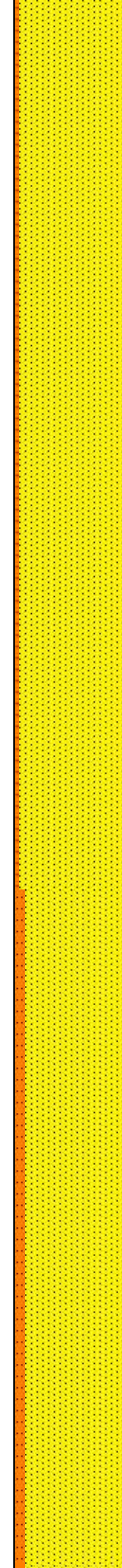
MD: 10,199'
 TVD: 7,973.16'
 INC: 91.23°
 AZM: 179.99°
 VS: 1,638.46'

WOB: 31kibs
 RPM: 50
 SPM: 178
 SPP: 3,480psi

MD: 10,288'
 TVD: 7,971.08'
 INC: 91.45°
 AZM: 179.38°
 VS: 1,727.26'

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

MD: 10,377'
 TVD: 7,968.49'
 INC: 91.89°
 AZM: 178.5°
 VS: 1,816.1'



calc, vf-f grnd, occ grdg to slt, com micmica, tr imbd pyr, scat sh frags; SLTST (5%): lt gy-med gy, sft, silc-arg sltst, occ frm-brit silc sltst

10200-10300 SST (95%): 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; SLTST (5%): lt gy-med gy, sft, silc-arg sltst, occ frm-brit silc sltst

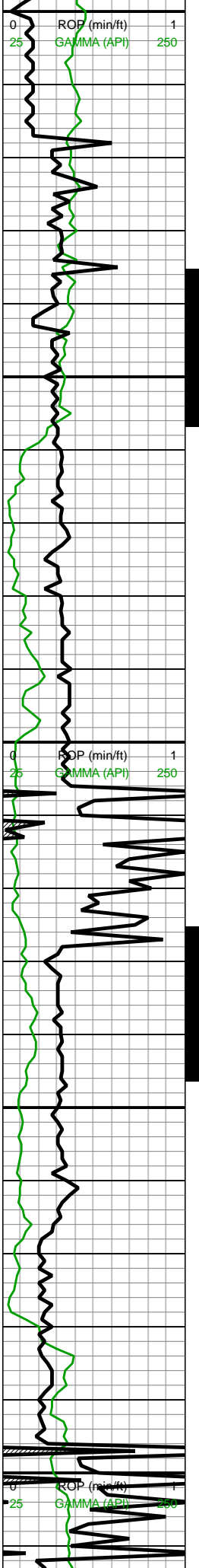
10300-10400 SST (90%): pred med gyshbn, occ lt gy-lt brn, sme red-brn, frm-v frm, blk, pred mod-w cons gr sup cls cons wi silc cmt, sl calc, vf-f grnd, occ grdg to slt, com micmica, tr imbd pyr, scat sh frags; SLTST (10%): lt gy-med gy, sft, silc-arg sltst, occ frm-brit silc sltst



2117u

2782u

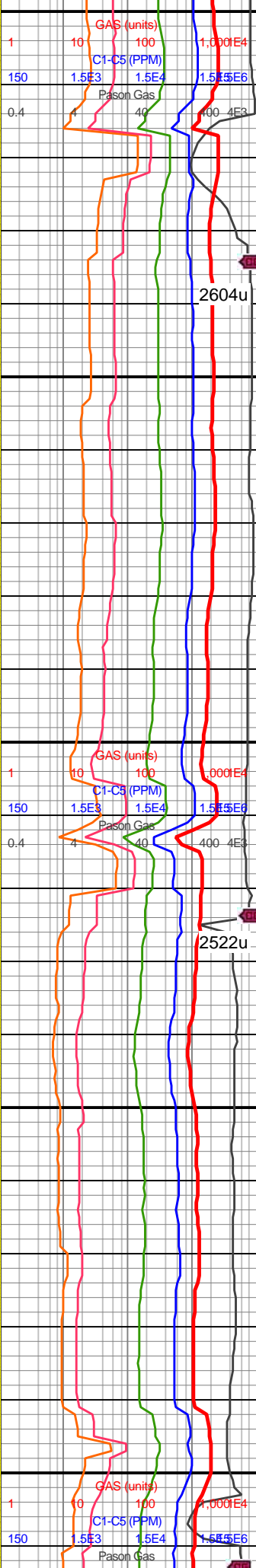
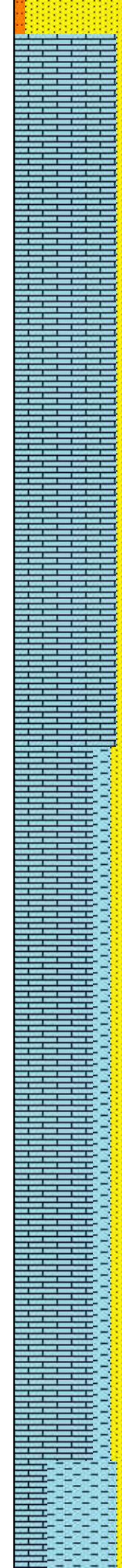
WOB: 27kbs
RPM: 50
SPM: 178
SPP: 3,500psi



MD: 10,467'
TVD: 7,965.72'
INC: 91.63°
AZM: 179.55°
VS: 1,905.93'

MD: 10,556'
TVD: 7,964.21'
INC: 90.31°
AZM: 180.34°
VS: 1,994.71'

WOB: 33kbs
RPM: 60
SPM: 178
SPP: 3,648psi

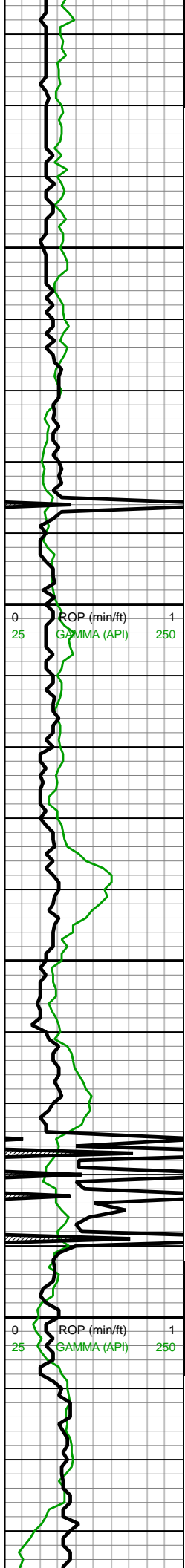


10400-10500 LS (90%):
crm-tn-lt brn, frm-hd, brit,
sb rd-sb blkly-blky crpxln
mudst, wkst ip, wxy lstr, rr
f pyr, hi calc; SST (10%):
off wh-lt gy-med gy, dk gy
s&p ip, sft v arg mtz sup
sst frm sl fri gr sup sst
clus cons wi silc cmt, p
srted vf-slty-f grs, predy
non calc

10500-10600 LS (70%):
crm-tn-lt brn, frm-hd, brit,
sb rd-sb blkly-blky crpxln
mudst, wkst ip, wxy lstr, rr
f pyr, hi calc; SST (15%):
off wh-lt gy-med gy, dk gy
s&p ip, sft v arg mtz sup
sst frm sl fri gr sup sst
clus cons wi silc cmt, p
srted vf-slty-f grs, predy
non calc; CHK (15%): off
wh-lt gy, occ dk gy mrlst
intbds, l fis rd-sb rd mod
hydrated ctngs,
slty-sdy-gran, hi calc

2604u

2522u



10,620
10,630
10,640
10,650
10,660
10,670
10,680
10,690
10,700
10,710
10,720
10,730
10,740
10,750
10,760
10,770
10,780
10,790
10,800
10,810
10,820
10,830

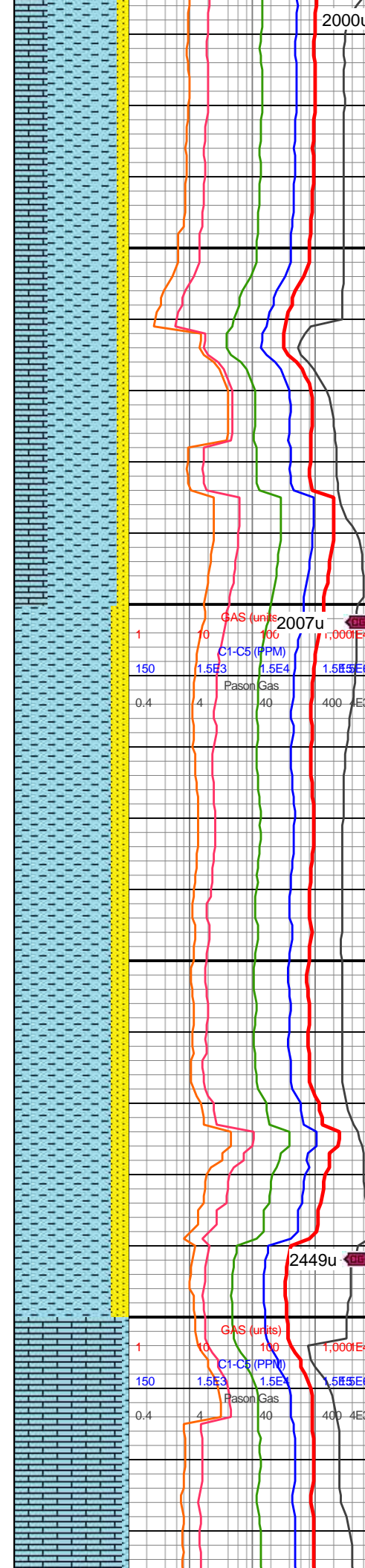
MD: 10,645'
TVD: 7,964.86'
INC: 88.86°
AZM: 180.96°
VS: 2,083.41'

MW IN: 10.3+
VIS IN: 54
MW OUT: 10.3+
VIS OUT: 48

MD: 10,734'
TVD: 7,967.55'
INC: 87.67°
AZM: 179.82°
VS: 2,172.11'

WOB: 62klbs
RPM: 44
SPM: 182
SPP: 3,345psi

MD: 10,823'
TVD: 7,970.86'
INC: 88.07°
AZM: 179.46°
VS: 2,260.87'

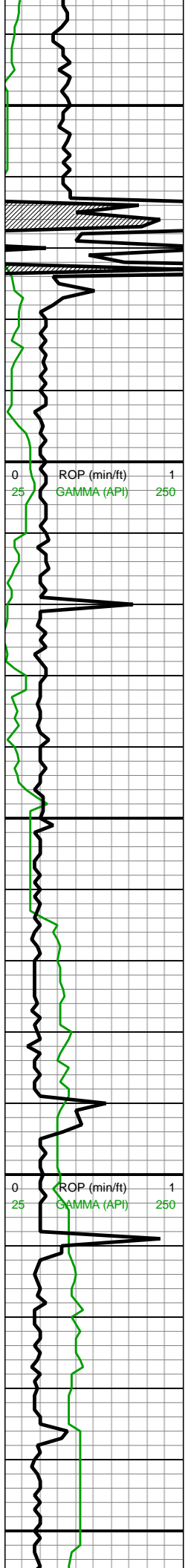


2000u
10600-10700 CHK
(60%): off wh-lt gy, occ dk gy mrlst intbds, l fis rd-sb rd mod hydrated ctngs, slty-sdy-gran, hi calc; LS (30%): crm-tn-lt brn, frm-hd, brit, sb rd-sb blk-blk crpxln mudst, wkst ip, wxy lstr, rr f pyr, hi calc; SST (10%): off wh-lt gy-med gy, dk gy s&p ip, sft v arg mtz sup sst-frm sl fri gr sup sst clus cons wi silc cmt, p srtd vf-slty-f grs, predy non calc

10700-10800 CHK
(85%): off wh-lt gy, occ dk gy mrlst intbds, l fis rd-sb rd mod hydrated ctngs, slty-sdy-gran, hi calc; SST (15%): off wh-lt gy-med gy, dk gy s&p ip, sft v arg mtz sup sst-frm sl fri gr sup sst clus cons wi silc cmt, p srtd vf-slty-f grs, predy non calc

10800-10900 LS (95%): off wh-lt gy, occ dk gy-dk gyshbn, predy crpxln mudst, occ wh microxln-wkst, hi calc; CHK (rr): lt gy-lt gyshbn,





MD: 10,845'
 TVD: 7,971.6'
 INC: 88.09°
 AZM: 179.29°
 VS: 2,282.82'

MW IN: 10.3
 VIS IN: 50
 MW OUT: 10.3+
 VIS OUT: 51

10877' MD
 TOOH to wire
 line at 21:08 on
 01/07/2019

01/07-11/2019
 MINDEPTH

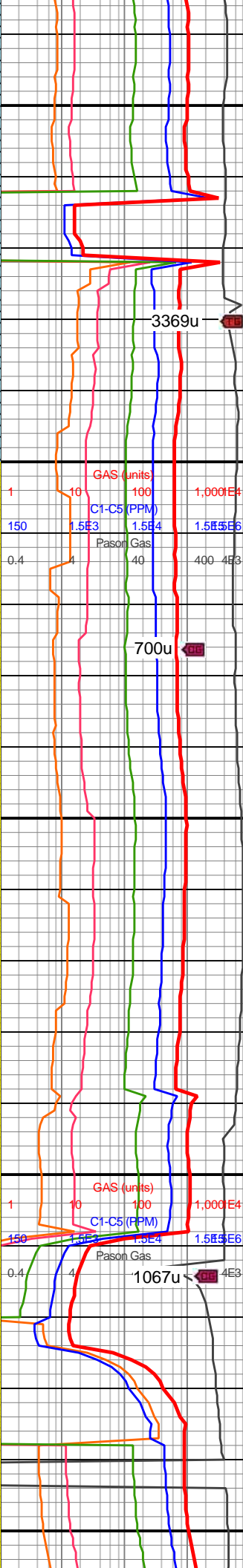
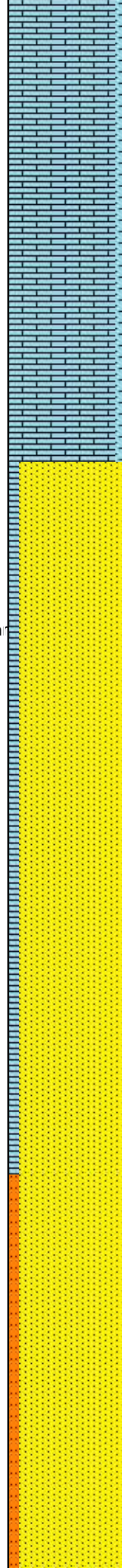
Resume drilling
 @ 10:00hrs on
 1/11/19

Bit #: 5
 Type: U516M
 Size: 8 3/4
 Depth In: 10,877'
 Depth Out:
 17,796'
 Hours: 30 hrs
 Avg Ft/Hr: 230 'h
 Jets: 3x12 3x13
 S/N: 43492

MD: 10,934'
 TVD: 7,974.19'
 INC: 88.57°
 AZM: 179.02°
 VS: 2,371.65'

WOB: 15kbs
 RPM: 80
 SPM: 178
 SPP: 2,960psi

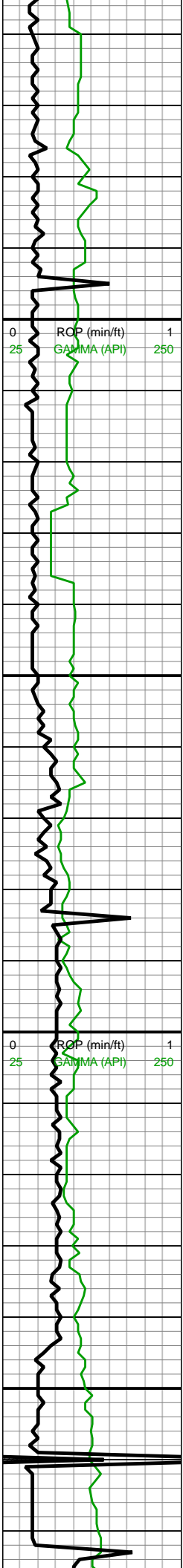
MD: 11,023'
 TVD: 7,974.98'
 INC: 90.42°
 AZM: 178.94°
 VS: 2,460.52'



sft-sb frm l fis rd-sb rd
 ctngs, slty-sdy ip, hi calc

10900-11000 SST (90%):
 off wh-lt gy-dk gy, p-mod
 srtd slty-f gr sb frm off
 wh-lt gy mtx sup sst cons
 wi arg cmt-vf-f gr sli fri
 mod srtd gr sup sst clus
 cons wi silc cmt & arg ip,
 non-sl calc, LS (10%): lt
 gy-tn crpxln mudst-off wh
 microxln-wkst, hi calc

11000-11100 SST (90%):
 off wh-lt gy sb frm mtx
 sup sst cons wi arg
 cmt-lt gy-dk gy frm sli fri
 gr sup sst clus cons wi
 silc cmt grdg wi arg ip,
 p-mod srtd slty-f gr sd
 grs. non-l-mod calc:



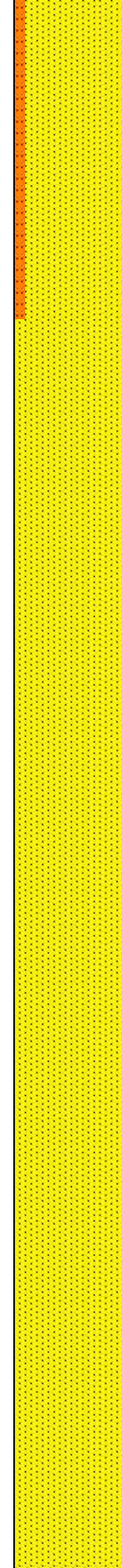
11,060
11,070
11,080
11,090
11,100
11,110
11,120
11,130
11,140
11,150
11,160
11,170
11,180
11,190
11,200
11,210
11,220
11,230
11,240
11,250
11,260
11,270

MD: 11,112'
TVD: 7,973.1'
INC: 92°
AZM: 179.55°
VS: 2,549.36'

MW IN: 10.45
VIS IN: 45
MW OUT: 10.45
VIS OUT: 45

WOB: 23kibs
RPM: 80
SPM: 180
SPP: 3,070psi

MD: 11,202'
TVD: 7,970.06'
INC: 91.87°
AZM: 179.2°
VS: 2,639.16'

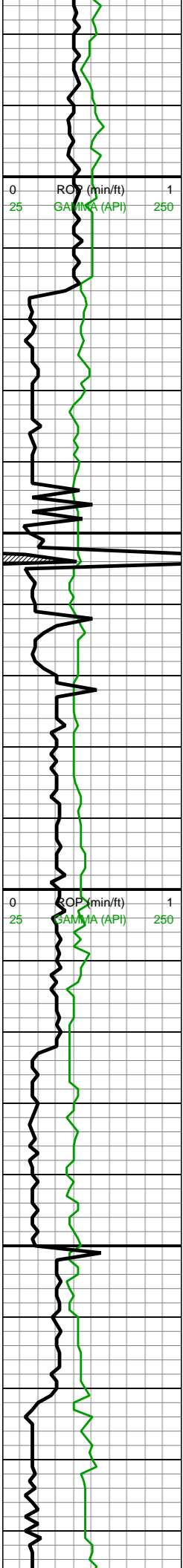


SLTST (10%): v dk gy, frm-brit sb plty-plty-splty ctngs, sdy ip, non calc

11100-11200 SST (100%): predy gy-dk gy-occ lt gyshbn mod w srted f gr sli fri gr sup sst clus cons wi silc cmt sp wi wh grs thru, rr mtx sup arg sst, predy non calc, sl-I calc ip

11200-11300 SST (100%): predy gy-dk gy-occ lt gyshbn mod w srted f gr sli fri gr sup sst clus cons wi silc cmt sp wi wh grs thru, predy non calc, sl-I calc ip





11,280
 11,290
 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
 11,490

MD: 11,291'
 TVD: 7,967.26'
 INC: 91.74°
 AZM: 178.94°
 VS: 2,727.98'

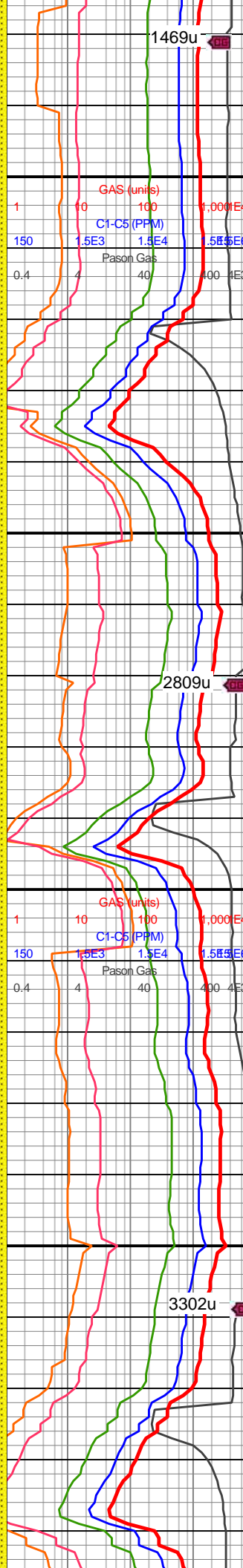
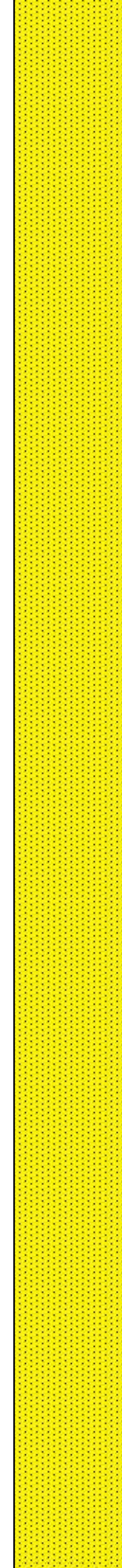
MW IN: 10.45
 VIS IN: 47
 MW OUT: 10.5
 VIS OUT: 47

MD: 11,380'
 TVD: 7,964.86'
 INC: 91.34°
 AZM: 179.11°
 VS: 2,816.83'

WOB: 18klbs
 RPM: 60
 SPM: 186
 SPP: 3,130psi

MW IN: 10.5
 VIS IN: 47
 MW OUT: 10.4
 VIS OUT: 46

MD: 11,469'
 TVD: 7,962.95'
 INC: 91.12°
 AZM: 179.46°
 VS: 2,905.66'



1469u

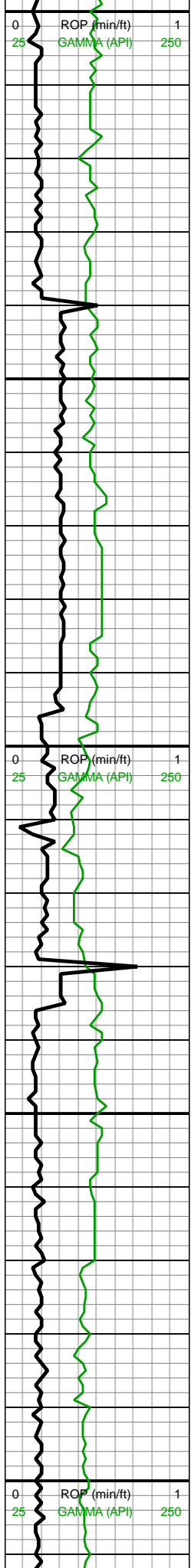
2809u

3302u

11300-11400 SST
 (100%): predy gy-dk
 gy-occ lt gyshbn mod w
 srtd f gr sli fri gr sup sst
 clus cons wi silc cmt sp
 wi wh grs thru, rr mtx sup
 arg sst, predy non calc,
 sl-l calc ip

11400-11500 SST
 (100%): predy gy-dk sli fri
 gr sup sst clus cons wi
 silc cmt sp wi wh grs
 thru, occ lt gy sb frm arg
 mtx-gr sup arg sst intbds,
 mod w srtd f gr, predy
 non calc, sl-l calc ip





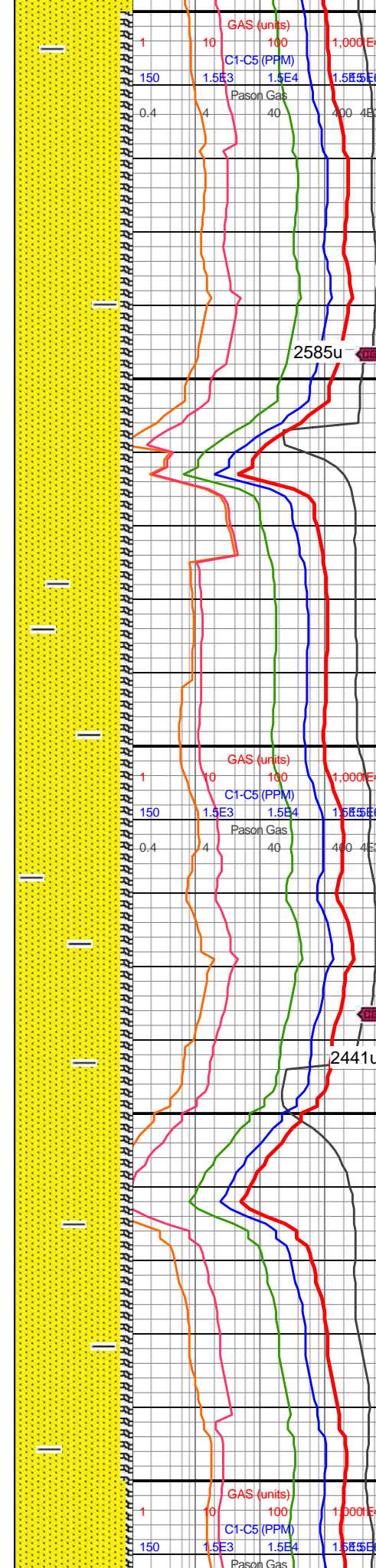
11,500
11,510
11,520
11,530
11,540
11,550
11,560
11,570
11,580
11,590
11,600
11,610
11,620
11,630
11,640
11,650
11,660
11,670
11,680
11,690
11,700
11,710

MD: 11,558'
TVD: 7,961.28'
INC: 91.03°
AZM: 179.99°
VS: 2,994.46'

WOB: 26klbs
RPM: 80
SPM: 185
SPP: 3,170psi

MW IN: 10.5
VIS IN: 46
MW OUT: 10.5
VIS OUT: 45

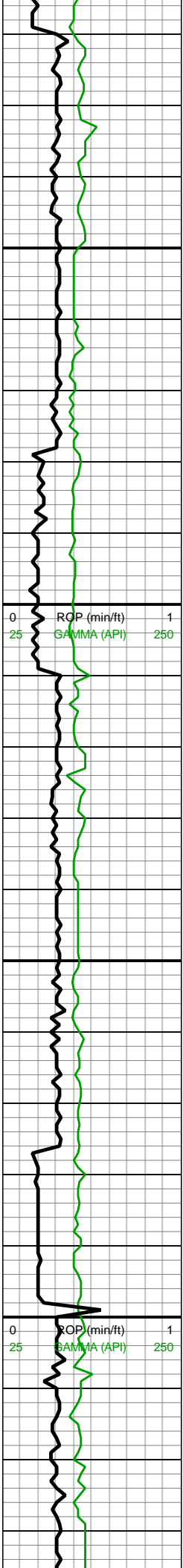
MD: 11,647'
TVD: 7,959.85'
INC: 90.81°
AZM: 180.61°
VS: 3,083.2'



11500-11600 SHY SST
(60%): gy-dk gy, sb frm sb blk y mtx sup vf gr v arg sst grd g to shy sltst, predy non calc, l calc ip; 30% SST: gy-dk gy-occ lt gyshbn mod w srtd f gr sli fri gr sup sst clus cons wi silc cmt sp wi wh grs thru, rr mtx sup arg sst, predy non calc, sl-l calc ip; BENT (10%): off wh, ang-pty ctngs, non calc, yel flor

11600-11700 SHY SST
(80%): lt gy-gy-dk gy, sb frm sb blk y mtx sup vf gr v arg sst grd g to shy sltst, predy non calc, l calc ip; SST (10%): gy-dk gy-occ lt gyshbn mod w srtd f gr sli fri gr sup sst clus cons wi silc cmt sp wi wh grs thru, rr mtx sup arg sst, predy non calc, sl-l calc ip; BENT (10%): off wh, sft-sb frm, gran ip, ang-pty ctngs, non calc, yel flor

11700-11800 SHY SST
(70%): lt gy-gy-dk gy, sb



11,720
11,730
11,740
11,750
11,760
11,770
11,780
11,790
11,800
11,810
11,820
11,830
11,840
11,850
11,860
11,870
11,880
11,890
11,900
11,910
11,920
11,930

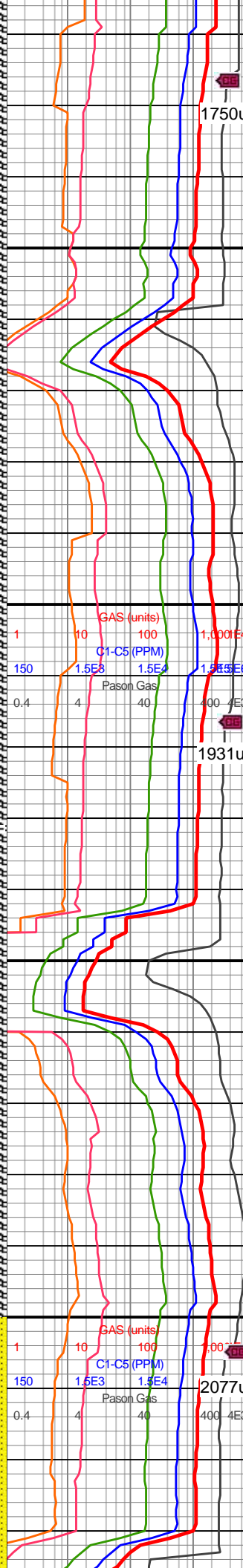
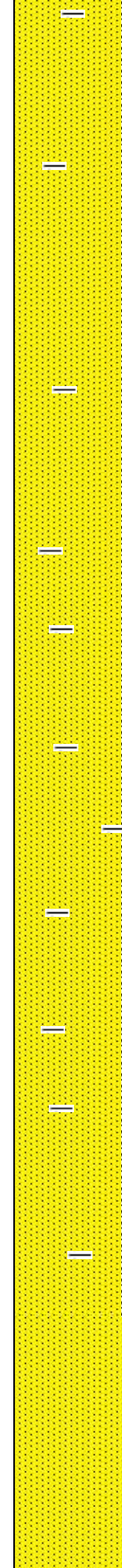
MD: 11,736'
TVD: 7,958.87'
INC: 90.46°
AZM: 181.4°
VS: 3,171.86'

WOB: 34klbs
RPM: 80
SPM: 186
SPP: 3,480psi

MD: 11,825'
TVD: 7,957.98'
INC: 90.68°
AZM: 182.28°
VS: 3,260.4'

MW IN: 10.5
VIS IN: 47
MW OUT: 10.5
VIS OUT: 45

MD: 11,914'
TVD: 7,957'
INC: 90.59°
AZM: 182.45°
VS: 3,348.85'

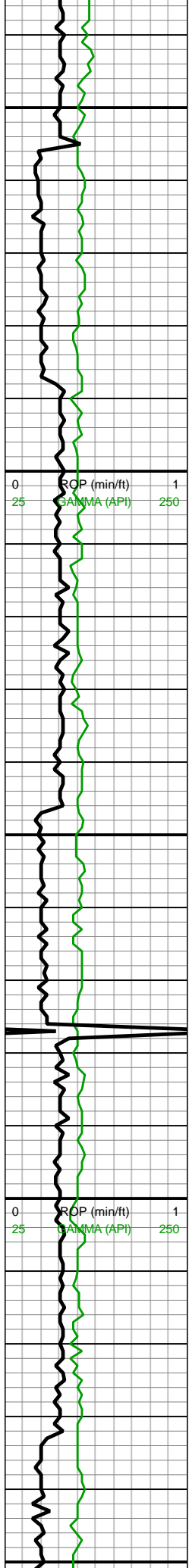


(70%): lt gy-gy-dk gy, sb
frm sb blkly mtz sup vf gr v
arg sst grd to shy sltst,
predy non calc, l calc ip;
SST (20%): gy-dk gy-occ
lt gysbhn mod w srtd f gr
sli fri gr sup sst clus
cons wi silc cmt sp wi wh
grs thru, rr mtz sup arg
sst, predy non calc, sl-l
calc ip; BENT (10%): off
wh, sft-sb frm, gran ip,
ang-pty ctngs, non calc

11800-11900 SHY SST
(75%): lt gy-gy-dk gy, sb
frm sb blkly mtz sup vf gr v
arg sst grd to shy sltst,
predy non calc, l calc ip;
SST (20%): gy-dk gy-occ
lt gysbhn mod w srtd f gr
sli fri gr sup sst clus
cons wi silc cmt sp wi wh
grs thru, rr mtz sup arg
sst, predy non calc, sl-l
calc ip; BENT (5%): off
wh, sft-sb frm, gran ip,
ang-pty ctngs, non calc

11900-12000 SST
(100%): predy gy-dk sli fri
gr sup sst clus cons wi
silc cmt sp wi wh grs



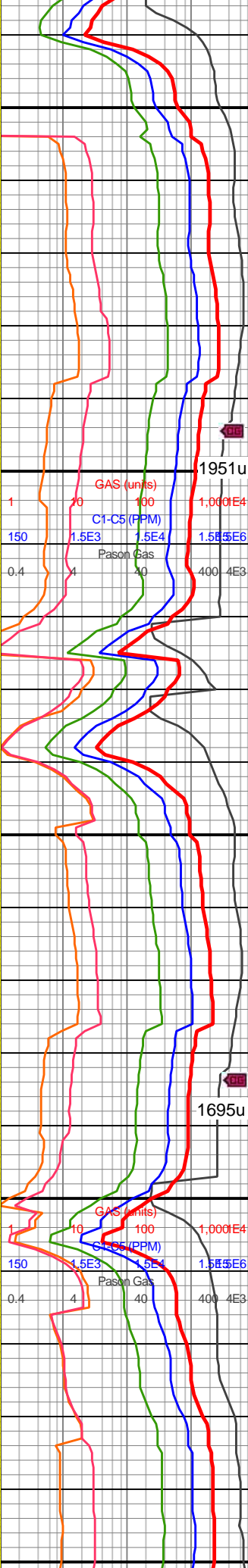
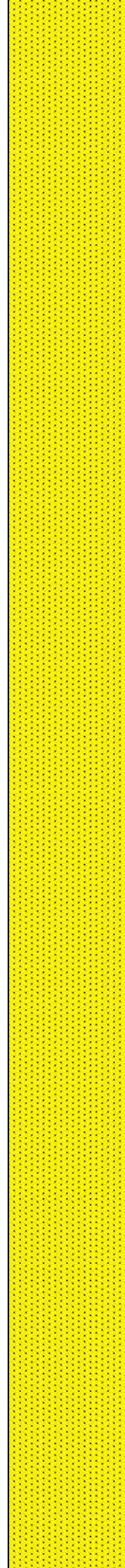


11,940
11,950
11,960
11,970
11,980
11,990
12,000
12,010
12,020
12,030
12,040
12,050
12,060
12,070
12,080
12,090
12,100
12,110
12,120
12,130
12,140
12,150

MD: 12,004'
TVD: 7,956.2'
INC: 90.42°
AZM: 182.8°
VS: 3,438.24'
WOB: 23kbs
RPM: 80
SPM: 176
SPP: 3,005psi

MW IN: 10.4
VIS IN: 44
MW OUT: 10.5
VIS OUT: 44

MD: 12,093'
TVD: 7,956.06'
INC: 89.76°
AZM: 182.63°
VS: 3,526.64'

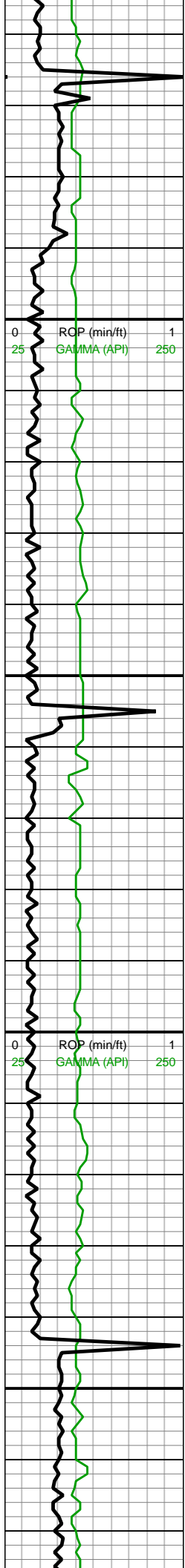


thru, occ lt gy sb frm arg
mtx-gr sup arg sst intbds,
mod w srted f gr, predy
non calc, sl-l calc ip

12000-12100 SST
(100%): predy gy-dk sli fri
gr sup sst clus cons wi
silc cmt sp wi wh grs
thru, occ lt gy sb frm arg
mtx-gr sup arg sst intbds,
mod w srted f gr, predy
non calc, sl-l calc ip

12100-12200 SST
(100%): predy gy-dk sli fri
gr sup sst clus cons wi
silc cmt sp wi wh grs
thru, occ lt gy sb frm arg
mtx-gr sup arg sst intbds,
mod w srted f gr, predy
non calc, sl-mod calc ip





12,160
12,170
12,180
12,190
12,200
12,210
12,220
12,230
12,240
12,250
12,260
12,270
12,280
12,290
12,300
12,310
12,320
12,330
12,340
12,350
12,360
12,370

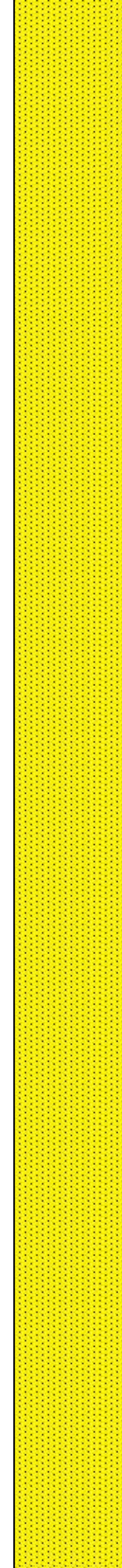
MD: 12,182'
TVD: 7,956.71'
INC: 89.41°
AZM: 182.01°
VS: 3,615.1'

WOB: 24kibs
RPM: 80
SPM: 176
SPP: 33,235psi

MD: 12,271'
TVD: 7,957.56'
INC: 89.49°
AZM: 182.01°
VS: 3,703.61'

MW IN: 10.4
VIS IN: 45
MW OUT: 10.4+
VIS OUT: 44

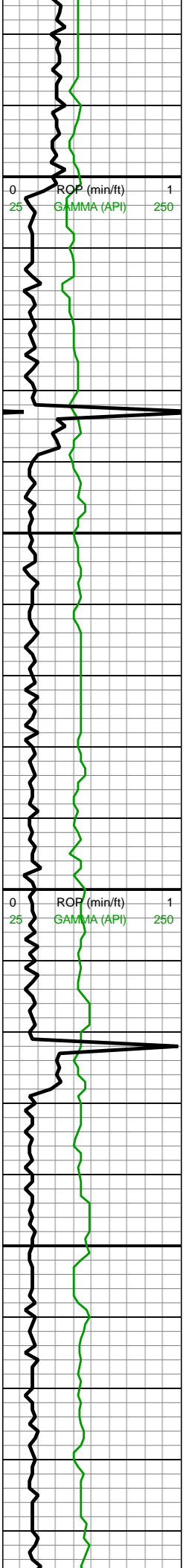
MD: 12,360'
TVD: 7,958.53'
INC: 89.27°
AZM: 181.4°
VS: 3,792.16'



12200-12300 SST
(100%): predy gy-dk sli fri
gr sup sst clus cons wi
silc cmt sp wi wh grs
thru, occ lt gy sb frm arg
mtx-gr sup arg sst intbds,
mod w srted f gr, predy
non calc, sl-mod calc ip

12300-12400 SST
(100%): predy gy-dk sl fri
gr sup sst clus cons wi
silc cmt sp wi wh grs
thru, occ lt gy sb frm arg
mtx-gr sup arg sst intbds,
mod w srted f gr, predy
non calc, sl-mod calc ip



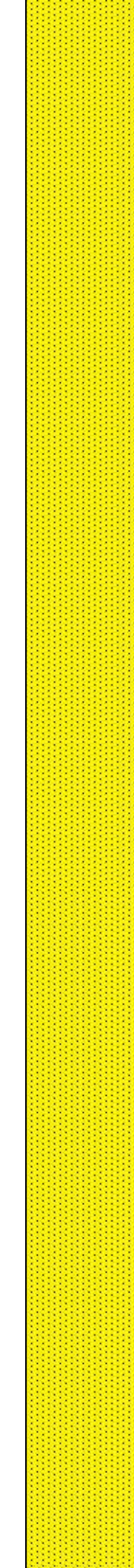


12,380
12,390
12,400
12,410
12,420
12,430
12,440
12,450
12,460
12,470
12,480
12,490
12,500
12,510
12,520
12,530
12,540
12,550
12,560
12,570
12,580
12,590

WOB: 26klbs
RPM: 80
SPM: 182
SPP: 3,110psi

MD: 12,449'
TVD: 7,959.08'
INC: 90.02°
AZM: 182.01°
VS: 3,880.72'

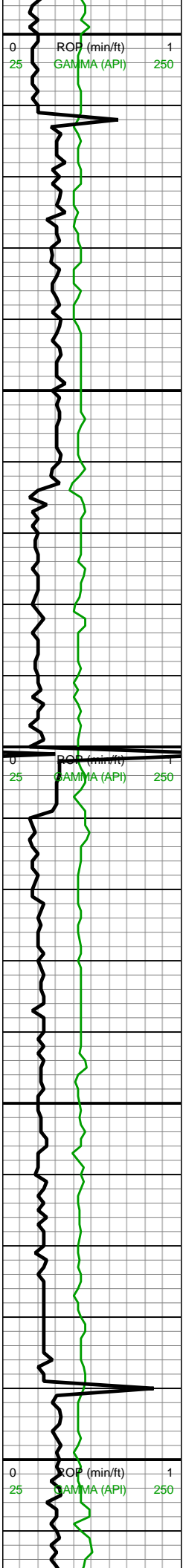
MD: 12,538'
TVD: 7,959.18'
INC: 89.85°
AZM: 182.71°
VS: 3,969.18'



12400-12500 SST
(100%): predy gy-dk sl fri
gr sup sst clus cons wi
silc cmt sp wi wh grs
thru, occ lt gy sb frm arg
mtx-gr sup arg sst intbds,
mod w srted f gr, predy
non calc, mod calc ip

12500-12600 SST
(100%): predy gy-dk
gy-occ lt gysbn mod w
srted f gr sli fri gr sup sst
clus cons wi silc cmt sp
wi wh grs thru, predy non
calc, sl-l calc ip





WOB: 33.5klbs
 RPM: 80
 SPM: 178
 SPP: 3,407psi

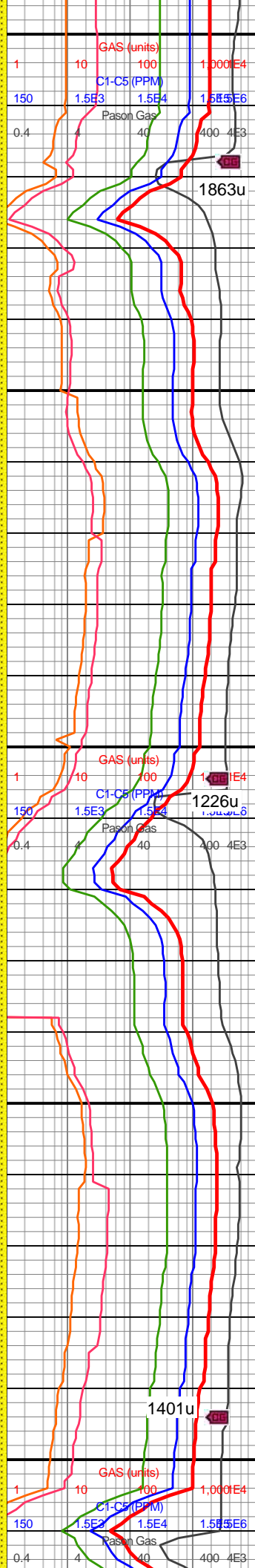
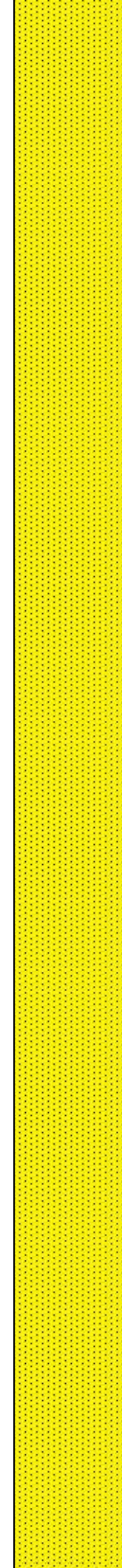
MD: 12,627'
 TVD: 7,959.79'
 INC: 89.36°
 AZM: 182.45°
 VS: 4,057.59'

MW IN: 10.3+
 VIS IN: 45
 MW OUT: 10.4
 VIS OUT: 43

MD: 12,716'
 TVD: 7,960.54'
 INC: 89.67°
 AZM: 182.45°
 VS: 4,146.03'

WOB: 24.5klbs
 RPM: 80
 SPM: 180
 SPP: 3,068psi

MD: 12,805'
 TVD: 7,961.06'
 INC: 89.67°



12600-12700 SST
 (100%): predy gy-dk
 gy-occ lt gyshbn mod w
 srtd f gr sli fri gr sup sst
 clus cons wi silc cmt sp
 wi wh grs thru, predy non
 calc, sl-mod calc ip

12700-12800 SST
 (100%): predy gy-dk
 gy-occ lt gyshbn mod w
 srtd f gr sl fri gr sup sst
 clus cons wi silc cmt sp
 wi wh grs thru, predy non
 calc, sl-mod calc ip, rr
 bent, off wh, sft.



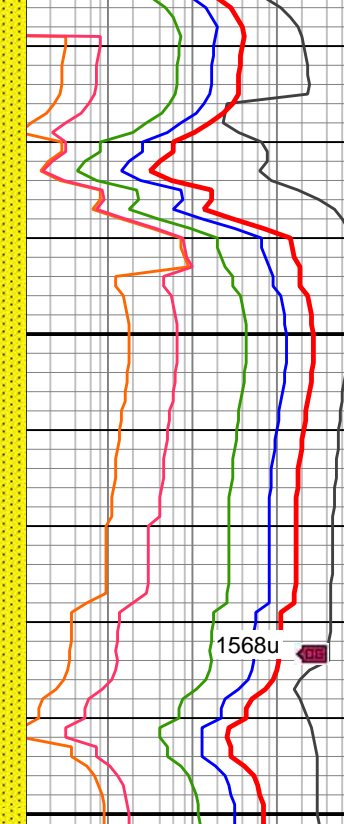
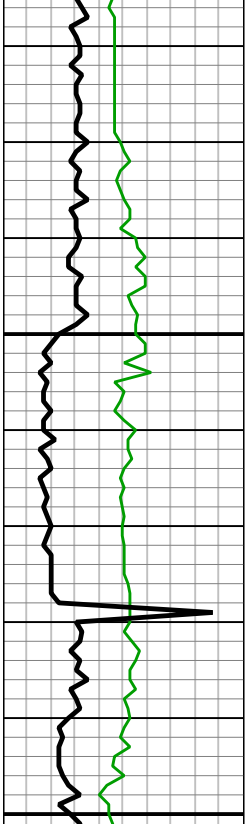
AZM: 182.36°
VS: 4,234.48'

12,820
12,830
12,840
12,850
12,860
12,870
12,880
12,890

MW IN: 10.4
VIS IN: 44
MW OUT: 10.4
VIS OUT: 43

MD: 12,894'
TVD: 7,961.23'
INC: 90.11°
AZM: 182.19°
VS: 4,322.95'

ROP (min/ft) 0 1
GAMMA (API) 25 250

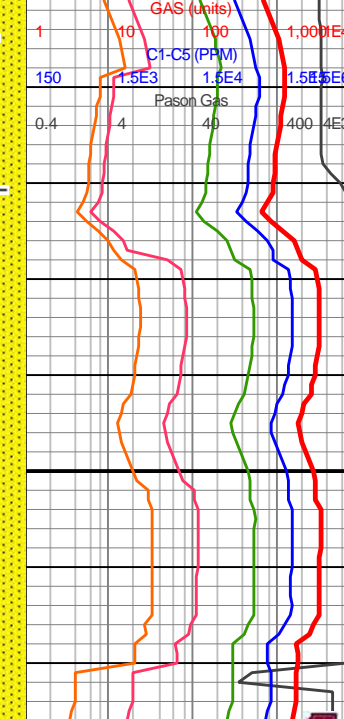


12800-12900 SST
(100%): predy gy-dk
gy-occ lt gyshbn mod w
srtd f gr sl fri gr sup sst
clus cons wi silc cmt sp
wi wh grs thru, predy non
calc, sl-mod calc ip, rr
bent, off wh, sft

12,900
12,910
12,920
12,930
12,940
12,950
12,960
12,970

MD: 12,984'
TVD: 7,960.16'
INC: 91.25°
AZM: 181.31°
VS: 4,412.49'

ROP (min/ft) 0 1
GAMMA (API) 25 250

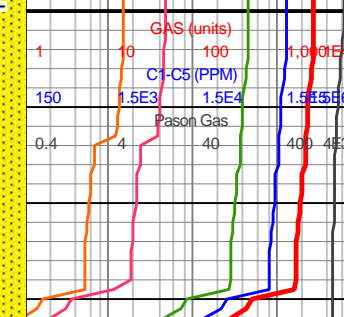
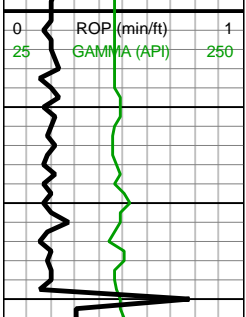


12900-13000 SHY SST
(70%): lt gy-gy-dk gy, sb
frm sb blkly mtz sup vf gr v
arg sst grdg to shy sltst,
predy non calc, l calc ip;
SST (25%): gy-dk gy-occ
lt gyshbn mod w srtd f gr
sli fri gr sup sst clus
cons wi silc cmt sp wi wh
grs thru, rr mtz sup arg
sst, predy non calc, sl-l
calc ip; BENT (5%): off
wh, sft-sb frm, gran ip,
ang-pty ctngs, non calc

13,000
13,010
13,020
13,030

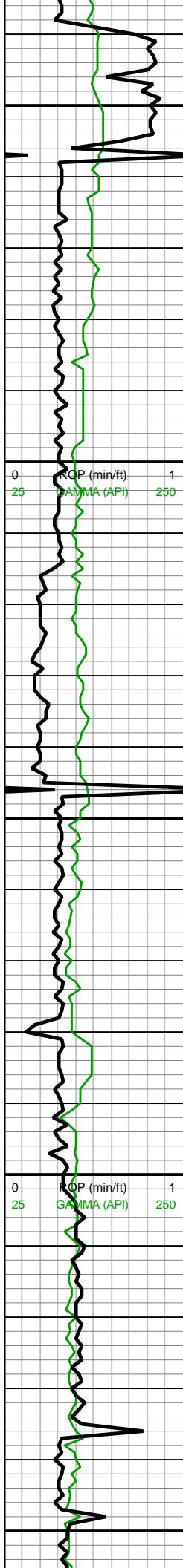
WOB: 31klbs
RPM: 80
SPM: 186
SPP: 3,460psi

ROP (min/ft) 0 1
GAMMA (API) 25 250



13000-13100 SHY SST
(70%): lt gy-gy-dk gy, sb
frm sb blkly mtz sup vf gr v
arg sst grdg to shy sltst,
predy non calc, l calc ip;
SST (25%): gy-dk gy-occ





MW IN: 10.3+
 VIS IN: 45
 MW OUT: 10.3+
 VIS OUT: 43

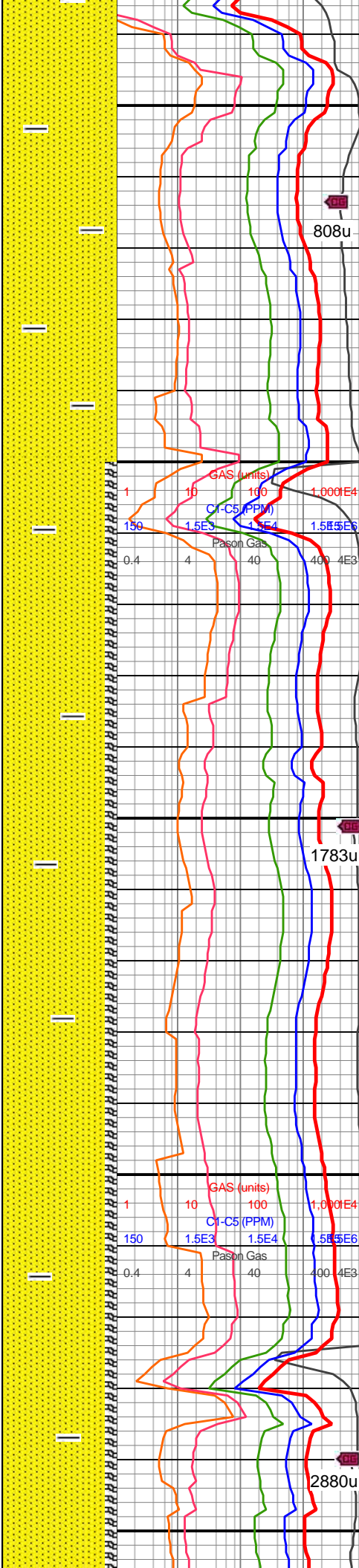
MIN DEPT 01/12/2019

MD: 13,073'
 TVD: 7,957.46'
 INC: 92.22°
 AZM: 179.55°
 VS: 4,501.18'

WOB: 17kbs
 RPM: 80
 SPM: 184
 SPP: 3,120psi

MD: 13,162'
 TVD: 7,953.75'
 INC: 92.57°
 AZM: 178.06°
 VS: 4,589.99'

MD: 13,251'
 TVD: 7,949.86'
 INC: 92.44°
 AZM: 177.18°



lt gyshbn mod w srted f gr
 sli fri gr sup sst clus
 cons wi silc cmt sp wi wh
 grs thru, rr mtz sup arg
 sst, predy non calc, sl-l
 calc ip; BENT (5%): off
 wh, sft-sb frm, gran ip,
 ang-pty ctngs, non calc

808u

13100-13200 SHY SST
 (80%): lt gy-gy-dk gy, sb
 frm sb blkly mtz sup vf gr v
 arg sst grd to shy sltst,
 predy non calc, sl calc ip,
 tr pyr; SST (10%): gy-dk
 gy-occ lt gyshbn mod w
 srted f gr sl fri gr sup sst
 clus cons wi silc cmt sp
 wi wh grs thru, rr mtz sup
 arg sst, predy non calc,
 sl-l calc ip; BENT (10%):
 off wh, sft-sb frm, gran ip,
 ang-pty ctngs, non calc

1783u

13200-13300 SHY SST
 (80%): lt gy-gy-dk gy, sb
 frm sb blkly mtz sup vf gr v
 arg sst grd to shy sltst,
 predy non calc, sl calc ip,
 tr pyr; SST (10%): gy-dk
 gy-occ lt gyshbn mod w
 srted f gr sl fri gr sup sst
 clus cons wi silc cmt sp
 wi wh grs thru, rr mtz sup
 arg sst, predy non calc,
 sl-l calc ip; BENT (10%):

2880u

VS: 4,678.87'

SI-I calc ip, BENT (10%):
off wh, sft-sb frm, gran ip,
ang-pty ctngs, non calc

13,260
13,270
13,280
13,290
13,300
13,310
13,320
13,330
13,340
13,350
13,360
13,370
13,380
13,390
13,400
13,410
13,420
13,430
13,440
13,450
13,460
13,470

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

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

Off gas buster

MW IN: 10.4
VIS IN: 45
MW OUT: 10.4
VIS OUT: 43

MD: 13,340'
TVD: 7,946.89'
INC: 91.38°
AZM: 176.3°
VS: 4,767.81'

WOB: 25klbs
RPM: 80
SPM: 183
SPP: 3,460psi

MD: 13,429'
TVD: 7,944.88'
INC: 91.21°
AZM: 175.77°
VS: 4,856.79'

On gas buster

GAS (units) 1, 10, 100, 1,000E4
C1-C5 (PPM) 1.5E3, 1.5E4, 1.5E6
Pason Gas 0.4, 4, 40, 400 4E3

GAS (units) 1, 10, 100, 1,000E4
C1-C5 (PPM) 1.5E3, 1.5E4, 1.5E6
Pason Gas 0.4, 4, 40, 400 4E3

13300-13400 SHY SST (75%): lt gy-gy-dk gy, sb frm sb blkly mtz sup vf gr v arg sst grd to shy sltst, predy non calc, sl calc ip, tr pyr; SST (20%): gy-dk gy-occ lt gyshbn mod w srted f gr sl fri gr sup sst clus cons wi silc cmt sp wi wh grs thru, rr mtz sup arg sst, predy non calc, SI-I calc ip; BENT (5%): off wh, sft-sb frm, gran ip, ang-pty ctngs, non calc

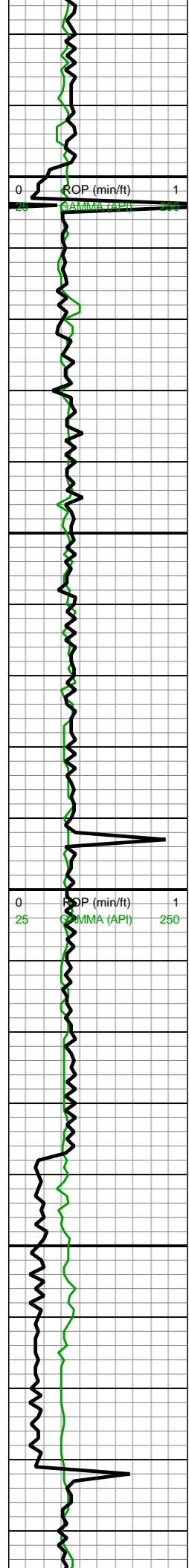
13400-13500 SHY SST (70%): lt gy-gy-dk gy, sb frm sb blkly mtz sup vf gr v arg sst grd to shy sltst, predy non calc, sl calc ip, tr pyr; SST (20%): gy-dk gy-occ lt gyshbn mod w srted f gr sl fri gr sup sst



1756u

7638u

6169u



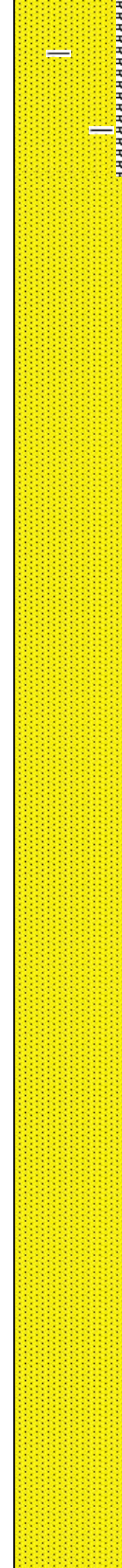
13,480
13,490
13,500
13,510
13,520
13,530
13,540
13,550
13,560
13,570
13,580
13,590
13,600
13,610
13,620
13,630
13,640
13,650
13,660
13,670
13,680
13,690

MW IN: 10.5
VIS IN: 46
MW OUT: 10.5
VIS OUT: 43

MD: 13,518'
TVD: 7,943.31'
INC: 90.81°
AZM: 175.07°
VS: 4,945.77'

WOB: 24klbs
RPM: 80
SPM: 186
SPP: 3,355psi

MD: 13,696'
TVD: 7,943.53'



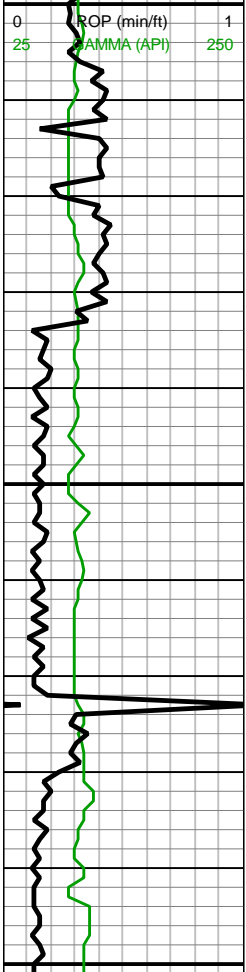
clus cons wi silc cmt sp
wi wh grs thru, rr mtx sup
arg sst, predy non calc,
sl-l calc ip; BENT (10%):
off wh, sft-sb frm, gran ip,
ang-pty ctngs, non calc

13500-13600 SST
(100%): predy gy-dk
gy-occ lt gyshbn mod w
srted f gr sl fri gr sup sst
clus cons wi silc cmt sp
wi wh grs thru, sl arg
predy non calc, sl-mod
calc ip, rr pyr,

13600-13700 SST
(100%): predy gy-dk
gy-occ lt gyshbn mod w
srted f gr sl fri gr sup sst
clus cons wi silc cmt sp
wi wh grs thru, sl arg
predy non calc, sl-mod



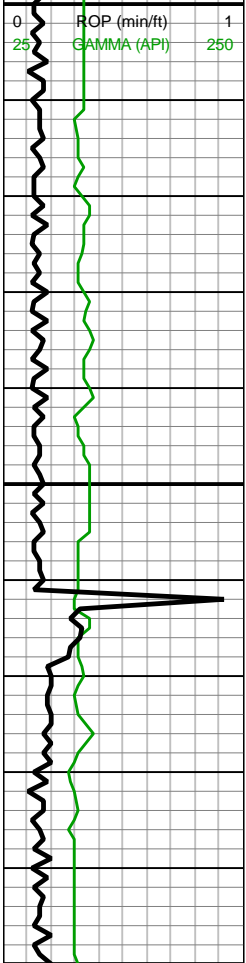
INC: 89.05°
AZM: 172.96°
VS: 5,123.64'



13,700
13,710
13,720
13,730
13,740
13,750
13,760
13,770
13,780
13,790

MD: 13,786'
TVD: 7,946.14'
INC: 89.19°
AZM: 173.66°
VS: 5,213.49'

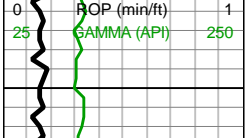
WOB: 30kbs
RPM: 80
SPM: 185
SPP: 3,765psi



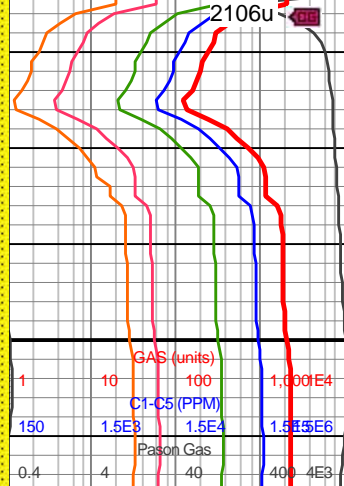
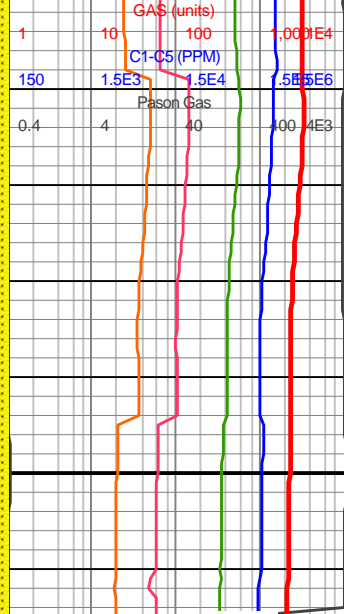
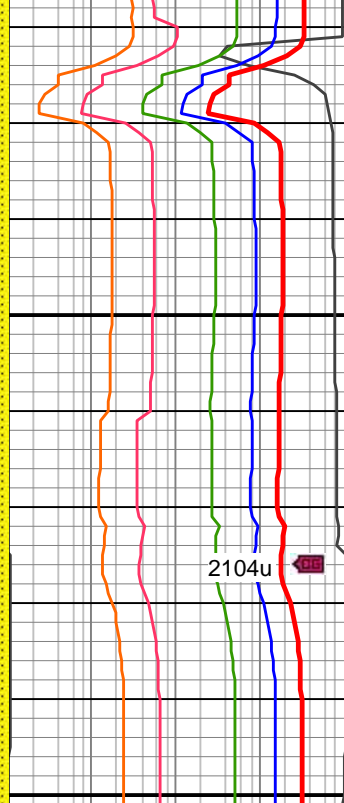
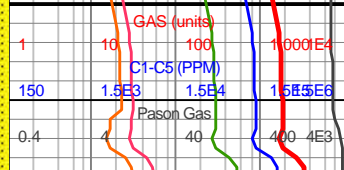
13,800
13,810
13,820
13,830
13,840
13,850
13,860
13,870
13,880
13,890

MD: 13,875'
TVD: 7,947.5'
INC: 89.05°
AZM: 174.89°
VS: 5,302.44'

MW IN: 10.5
VIS IN: 46
MW OUT: 10.5
VIS OUT: 44



13,900
13,910



calc ip, rr pyr,

13700-13800 SST
(100%): lt gy-lt
gyshbn-gy-dk gy, predy
mod srtd vf-f grs, slty ip,
sb frm sli hydrated
mtx-occ gr sup arg sst,
com gy-dk gy sli fri gr sup
sst clus cons wi silc cmt
& sl arg, non-mod calc

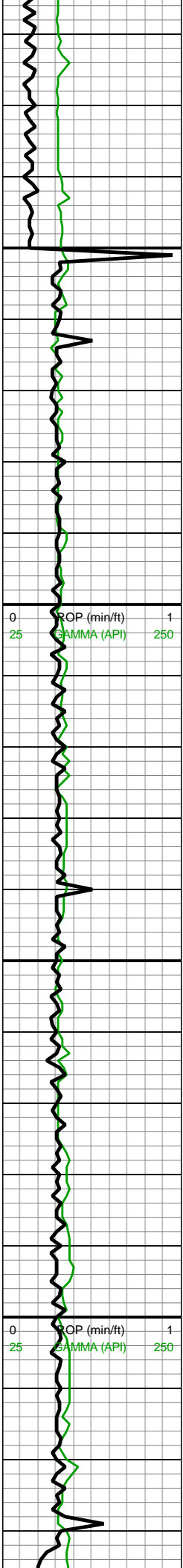
2104u

13800-13900 SST
(100%): lt gy-lt
gyshbn-gyshbn-gy sb frm
mtx-occ gr sup arg sst,
com gy-dk gy sli fri gr sup
sst clus cons wi silc & sl
arg cmt, mod srtd vf-f grs,
slty ip, non-mod calc

2106u

13900-14000 SST
(100%): lt gy-lt
gyshbn-gy-dk gy, predy





13,920
13,930
13,940
13,950
13,960
13,970
13,980
13,990
14,000
14,010
14,020
14,030
14,040
14,050
14,060
14,070
14,080
14,090
14,100
14,110
14,120
14,130

MD: 13,964'
TVD: 7,948.77'
INC: 89.32°
AZM: 176.47°
VS: 5,391.42'

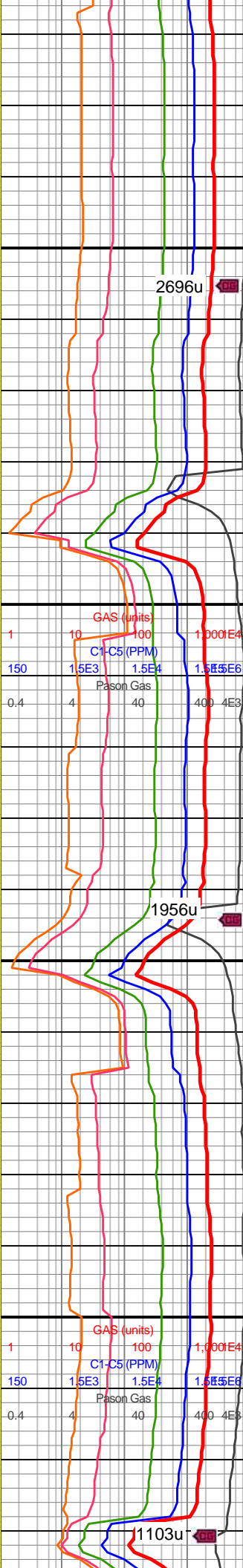
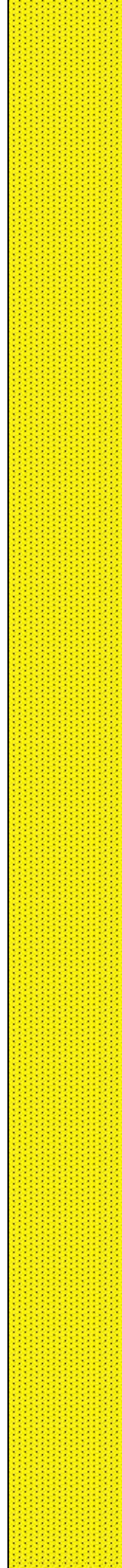
WOB: 15klbs
RPM: 100
SPM: 188
SPP: 3,370psi

MW IN: 10.55
VIS IN: 47
MW OUT: 10.55
VIS OUT: 45

MD: 14,053'
TVD: 7,950'
INC: 89.1°
AZM: 177.97°
VS: 5,480.39'

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

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

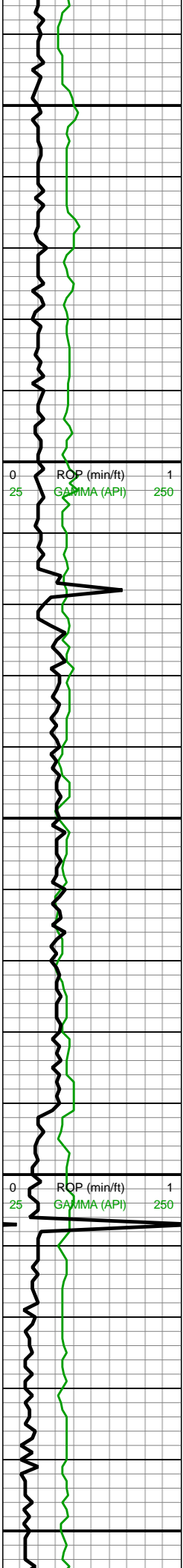


mod srt'd vf-f grs, slty ip,
sb frm sli hydrated
mtx-occ gr sup arg sst,
com gy-dk gy sli fri gr sup
sst clus cons wi silc cmt
& sl arg, non-mod calc

14000-14100 SST
(100%): lt gy-lt gyshbn sb
frm mtx-occ gr sup arg
sst, com gy-dk gy sli fri gr
sup sst clus cons wi silc
& sl arg cmt, mod srt'd vf-f
grs, slty ip, non-mod calc

14100-14200 SST
(100%): predy gy-lt





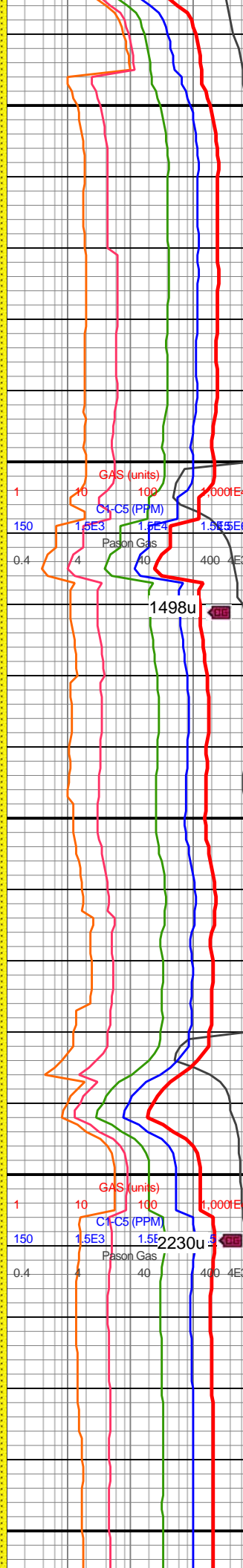
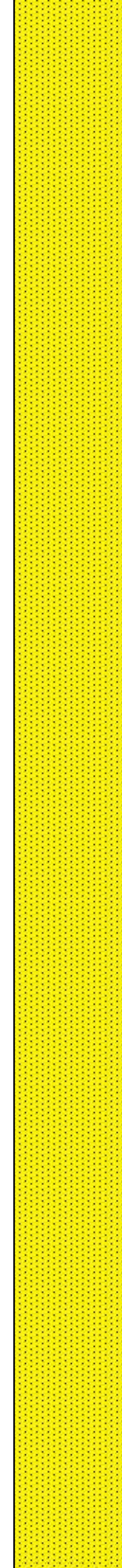
MD: 14,142'
 TVD: 7,951.15'
 INC: 89.41°
 AZM: 179.81°
 VS: 5,569.27'

MW IN: 10.55
 VIS IN: 48
 MW OUT: 10.55
 VIS OUT: 47

WOB: 22klbs
 RPM: 100
 SPM: 186
 SPP: 3,400psi

MD: 14,231'
 TVD: 7,951.67'
 INC: 89.93°
 AZM: 181.92°
 VS: 5,657.94'

MD: 14,320'
 TVD: 7,951.7'
 INC: 90.02°
 AZM: 182.19°
 VS: 5,746.45'

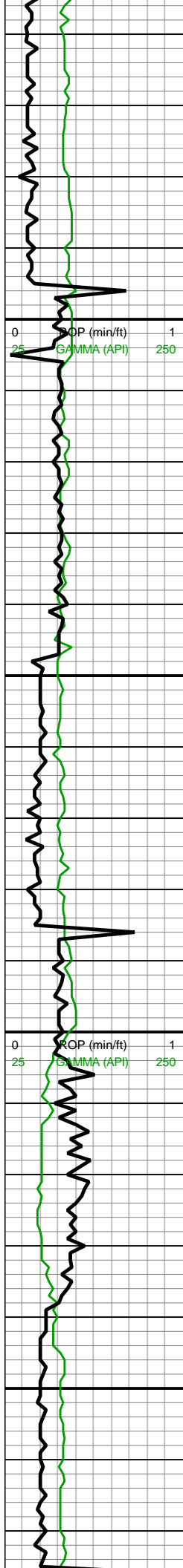


gyshbn sb frm rd mtx-occ
 gr sup arg sst, occ
 gyshbn-dk gy sli fri gr sup
 sst clus cons wi silc cmt,
 vf-f mod srtd sd grs, non
 calc-l calc ip

14200-14300 SST
 (100%): predy gy-lt
 gyshbn sb frm rd mtx-occ
 gr sup arg sst, occ
 gyshbn-dk gy sli fri gr sup
 sst clus cons wi silc cmt,
 vf-f mod srtd sd grs, non
 calc-l calc ip

14300-14400 SST
 (100%): predy gy-dk
 gy-occ lt gyshbn mod w
 srtd f gr sli fri gr sup sst
 clus cons wi silc cmt sp
 wi wh grs thru, predy non
 calc, sl-l calc ip





14,360
14,370
14,380
14,390
14,400
14,410
14,420
14,430
14,440
14,450
14,460
14,470
14,480
14,490
14,500
14,510
14,520
14,530
14,540
14,550
14,560
14,570

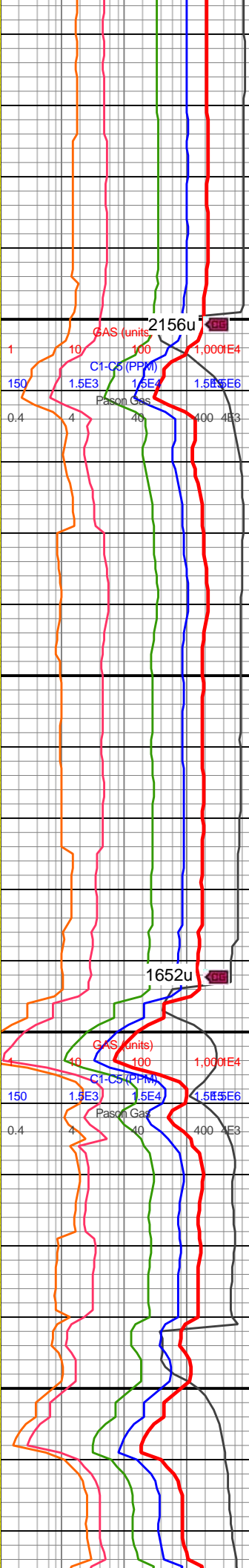
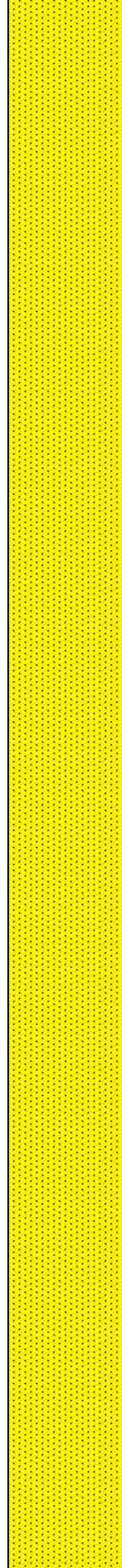
WOB: 7klbs
RPM: 80
SPM: 180
SPP: 3,080psi

MD: 14,409'
TVD: 7,951.43'
INC: 90.33°
AZM: 181.75°
VS: 5,834.97'

MW IN: 10.45
VIS IN: 46
MW OUT: 10.55
VIS OUT: 45

MD: 14,498'
TVD: 7,951.53'
INC: 89.54°
AZM: 180.34°
VS: 5,923.63'

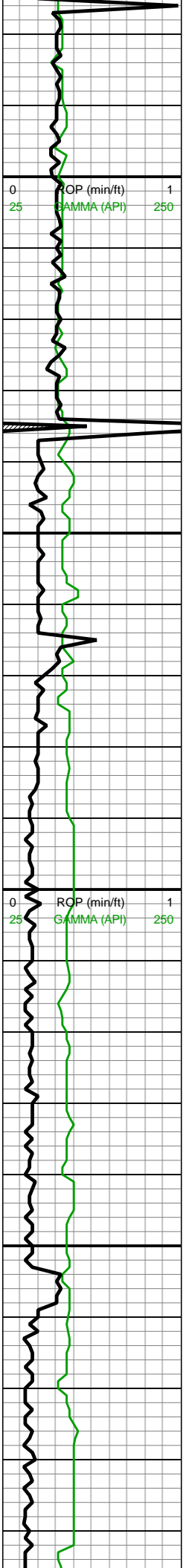
MW IN: 10.5
VIS IN: 47
MW OUT: 10.55
VIS OUT: 47



14400-14500 SST
(100%): predy dk gy, com off wh-lt gy, p-mod srted vf-f sd grs grdg down to slty sst, dk gy sli frm gr-mtx sup sst clus cons wi silc arg cmt, s&p ip, com lt gy sft-sb frm mtx sup arg sst clus, uncons ip, predy non calc-v sl calc, rr mod calc

14500-14600 SST
(100%): lt gy-gyshbn-gy-dk gy, mod srted vf-f sd grs, predy sft-sb frm mtx-occ gr sup arg sst clus, com sli fri gr sup sst clus cons wi silc cmt & arg cmt ip, predy non calc, mod calc ip





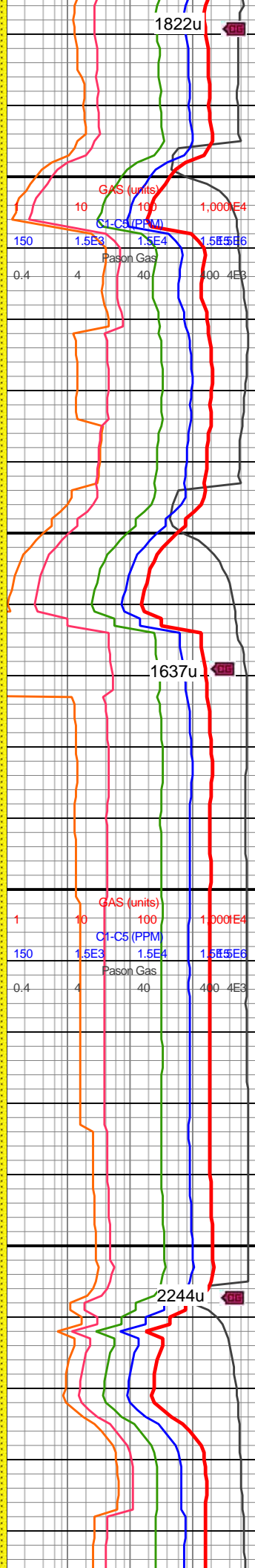
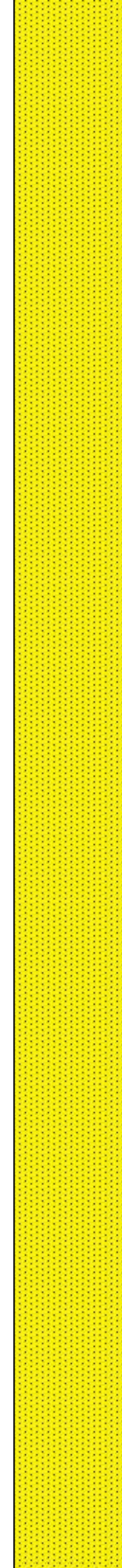
MD: 14,587'
 TVD: 7,952.76'
 INC: 88.88°
 AZM: 179.46°
 VS: 6,012.41'

WOB: 23klbs
 RPM: 29
 SPM: 179
 SPP: 3,260psi

MD: 14,677'
 TVD: 7,954.66'
 INC: 88.7°
 AZM: 179.73°
 VS: 6,102.22'

MW IN: 10.5
 VIS IN: 47
 MW OUT: 10.5
 VIS OUT: 46

MD: 14,766'
 TVD: 7,956.51'
 INC: 88.92°
 AZM: 180.52°
 VS: 6,190.97'

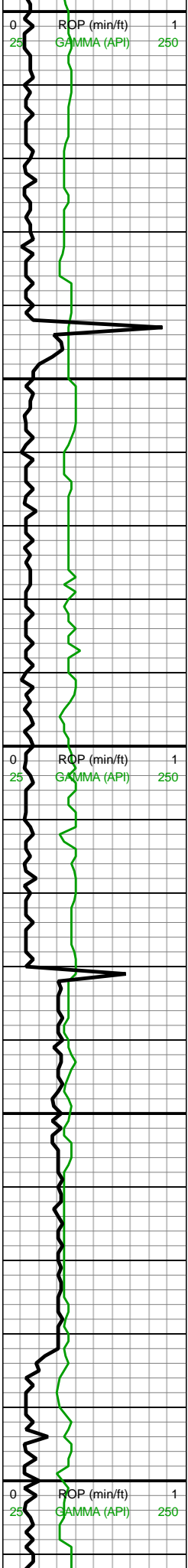


14600-14700 SST
 (100%): off wh-lt
 gy-gyshbn sb frm mtx
 sup sst cons wi arg
 cmt-lt gy-dk gy frm sli fri
 gr sup sst clus cons wi
 silc cmt grd to arg ip,
 p-mod srted slty-f gr sd
 grs, non-l-mod calc

14700-14800 SST
 (100%): lt gy-lt
 gyshbn-gyshbn sb frm
 mtx sup arg sst, com
 gy-dk gy-gyshbn frm sli fri
 gr sup sst clus cons wi
 silc cmt wi arg strg thru,
 mod srted slty-f gr sd grs,
 tr pyrc strg, non-l-mod
 calc



WOB: 23klbs
 RPM: 80
 SPM: 178
 SPP: 3,610psi



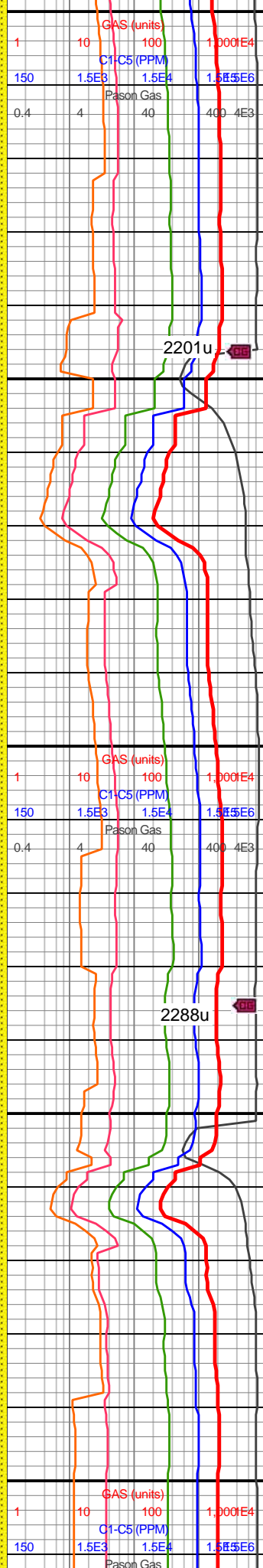
14,800
 14,810
 14,820
 14,830
 14,840
 14,850
 14,860
 14,870
 14,880
 14,890
 14,900
 14,910
 14,920
 14,930
 14,940
 14,950
 14,960
 14,970
 14,980
 14,990
 15,000
 15,010

MD: 14,855'
 TVD: 7,957.78'
 INC: 89.45°
 AZM: 181.31°
 VS: 6,279.63'

MD: 14,944'
 TVD: 7,958.19'
 INC: 90.02°
 AZM: 182.19°
 VS: 6,368.19'

MW IN: 10.4
 VIS IN: 51
 MW OUT: 10.5
 VIS OUT: 49

WOB: 28klbs
 RPM: 80
 SPM: 178
 SPP: 3,650psi



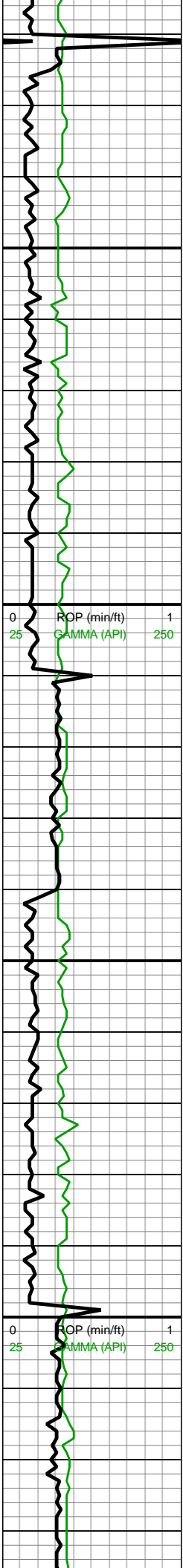
14800-14900 SST
 (100%): off wh-lt
 gy-gyshbn sb frm mtx
 sup sst cons wi arg
 cmt-lt gy-dk gy frm sli fri
 gr sup sst clus cons wi
 silc cmt grd to arg ip,
 p-mod srtd slty-f gr sd
 grs, non-l-mod calc

14900-15000 SST
 (100%): lt
 gy-gyshbn-gy-dk gy, mod
 srtd vf-f sd grs, predy
 sft-sb frm mtx-occ gr sup
 arg sst clus, com sli fri gr
 sup sst clus cons wi silc
 cmt & arg cmt ip, predy
 non calc, mod calc ip

2201u

2288u





15,020
15,030
15,040
15,050
15,060
15,070
15,080
15,090
15,100
15,110
15,120
15,130
15,140
15,150
15,160
15,170
15,180
15,190
15,200
15,210
15,220
15,230

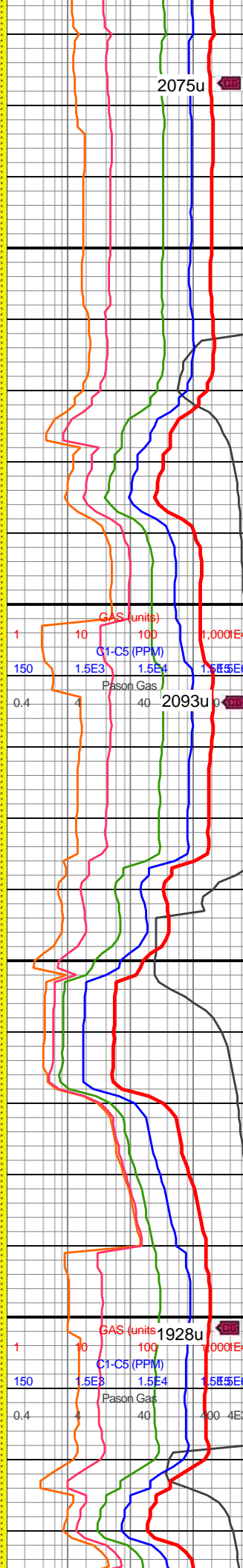
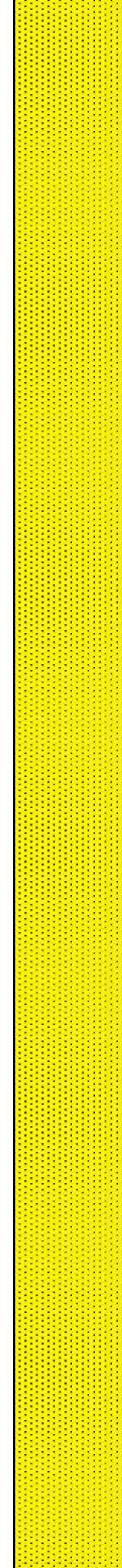
MD: 15,033'
TVD: 7,958.4'
INC: 89.71°
AZM: 182.36°
VS: 6,456.66'

MD: 15,122'
TVD: 7,959.8'
INC: 88.48°
AZM: 181.31°
VS: 6,545.18'

WOB: 10klbs
RPM: 80
SPM: 178
SPP: 2,930psi

MD: 15,211'
TVD: 7,962.91'
INC: 87.52°
AZM: 181.05°
VS: 6,633.77'

MW IN: 10.5
VIS IN: 49
MW OUT: 10.6



2075u
15000-15100 SST
(100%): lt gy-lt
gyshbn-gyshbn sb frm
mtx sup arg sst , com
gy-dk gy-gyshbn frm sli fri
gr sup sst clus cons wi
silc cmt wi arg strg thru,
mod srted slty-f gr sd grs,
tr pyrc strg, rr sltst,
non-l-mod calc

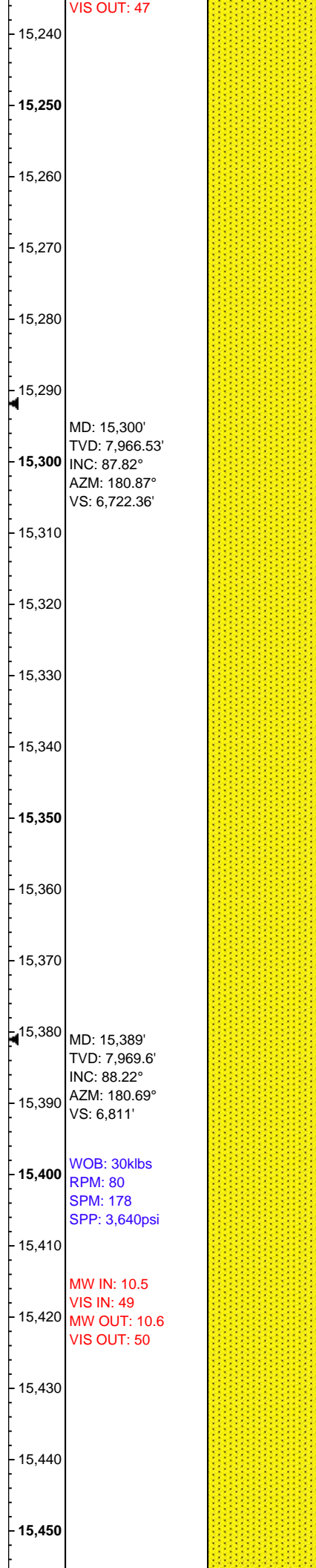
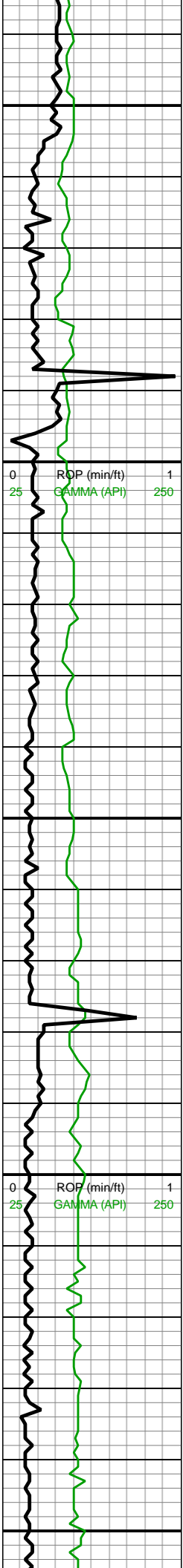
2093u
15100-15200 SST
(100%): lt gy-lt
gyshbn-gy-dk gy, mod
srted vf-f sd grs, gr-mtx
sup sst cons wi arg &
silc cmt, predy non calc,
l-mod calc ip

1928u
15200-15300 SST
(100%): lt gy-lt
gyshbn-gyshbn sb frm
mtx sup arg sst , com
gy-dk gy-gyshbn frm sli fri
gr sup sst clus cons wi
silc cmt wi arg strg thru,
mod srted slty-f gr sd grs,



VIS OUT: 47

non-l-mod calc



MD: 15,300'
 TVD: 7,966.53'
 INC: 87.82°
 AZM: 180.87°
 VS: 6,722.36'

MD: 15,389'
 TVD: 7,969.6'
 INC: 88.22°
 AZM: 180.69°
 VS: 6,811'

WOB: 30klbs
 RPM: 80
 SPM: 178
 SPP: 3,640psi

MW IN: 10.5
 VIS IN: 49
 MW OUT: 10.6
 VIS OUT: 50

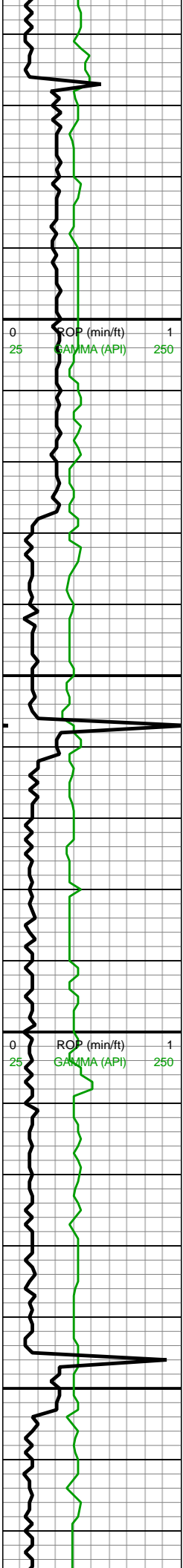
2585u

1919u

15300-15400 SST
 (100%): lt gy-gyshbn sb
 frm mtx sup sst cons wi
 arg cmt-lt gy-dk gy frm sli
 fri gr sup sst clus cons wi
 silc cmt grd to arg ip,
 mod srtd slty-f gr sd grs,
 non-l-mod calc

15400-15500 SST
 (100%): lt gy-lt
 gyshbn-gyshbn sb frm
 mtx sup arg sst-com
 gy-dk gy-gyshbn frm sli fri
 gr sup sst clus cons wi
 silc cmt thru, sl arg thru,
 mod srtd slty-vf-f gr sd
 grs, tr pyrc strg, rr sltst





15,460
 15,470
 15,480
 15,490
 15,500
 15,510
 15,520
 15,530
 15,540
 15,550
 15,560
 15,570
 15,580
 15,590
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 15,610
 15,620
 15,630
 15,640
 15,650
 15,660
 15,670

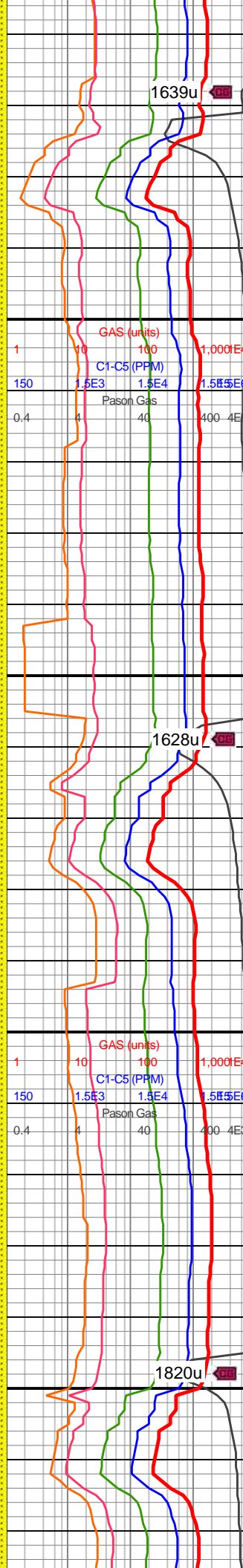
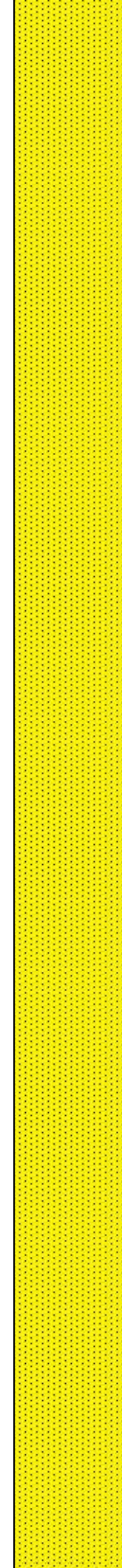
MD: 15,478'
 TVD: 7,972.3'
 INC: 88.31°
 AZM: 180.96°
 VS: 6,899.65'

MW IN: 10.5
 VIS IN: 47
 MW OUT: 10.65
 VIS OUT: 51

MD: 15,568'
 TVD: 7,975.23'
 INC: 87.96°
 AZM: 180.61°
 VS: 6,989.29'

WOB: 31kibs
 RPM: 80
 SPM: 180
 SPP: 3,760psi

MD: 15,657'
 TVD: 7,978.05'
 INC: 88.4°
 AZM: 180.25°
 VS: 7,077.98'



grs, lt pyr slt, lt sltst,
 predy non calc, occ
 sl-l-mod calc

1639u

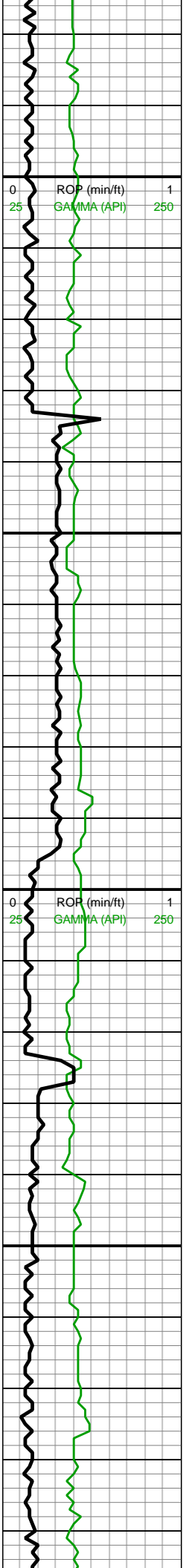
1628u

1820u

15500-15600 SST
 (100%): lt gy-lt gyshbn sb
 frm mtx-occ gr sup arg
 sst, com gy-dk gy sli fri gr
 sup sst clus cons wi silc
 & sl arg cmt, sme
 uncons mod srtd vf-f grs,
 slty ip, non-mod calc

15600-15700 SST
 (100%): predy gy-dk
 gy-occ lt gyshbn mod w
 srtd f gr sli fri gr sup sst
 clus cons wi silc cmt sp
 wi wh grs thru, rr mtx sup
 arg sst, uncons ip, predy
 non calc, sl-l calc ip





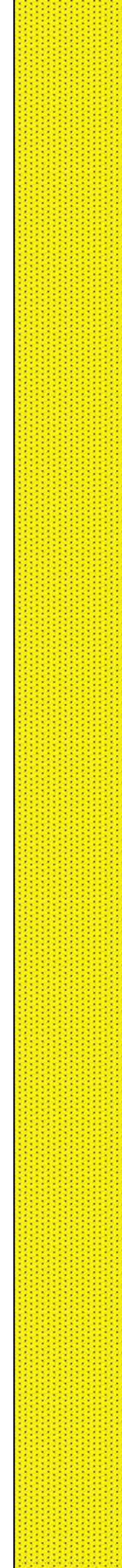
15,680
15,690
15,700
15,710
15,720
15,730
15,740
15,750
15,760
15,770
15,780
15,790
15,800
15,810
15,820
15,830
15,840
15,850
15,860
15,870
15,880
15,890

MD: 15,746'
TVD: 7,980.82'
INC: 88.04°
AZM: 180.43°
VS: 7,166.69'

MW IN: 10.5
VIS IN: 47
MW OUT: 10.65
VIS OUT: 51

WOB: 27klbs
RPM: 80
SPM: 180
SPP: 3,530psi

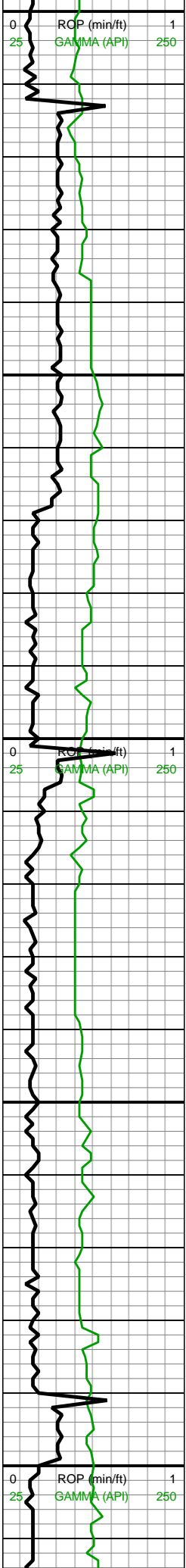
MD: 15,835'
TVD: 7,983.96'
INC: 87.91°
AZM: 180.25°
VS: 7,255.38'



15700-15800 SST
(100%): predy dk gy, com off wh-lt gy, p-mod srtd vf-f sd grs grd down to slty sst, dk gy sli frm gr-mtx sup sst clus cons wi silc arg cmt, s&p ip, com lt gy sft-sb frm mtx sup arg sst clus, uncons ip, predy non calc-v sl calc, rr mod calc

15800-15900 SST
(100%): lt gy-lt gyshbn-gyshbn sb frm mtx sup arg sst-com gy-dk gy-gyshbn frm sli fri gr sup sst clus cons wi silc cmt thru, sl arg thru, mod srtd slty-vf-f gr sd grs, rr sltst, predy non calc, rr sl-l calc





15,900
15,910
15,920
15,930
15,940
15,950
15,960
15,970
15,980
15,990
16,000
16,010
16,020
16,030
16,040
16,050
16,060
16,070
16,080
16,090
16,100
16,110

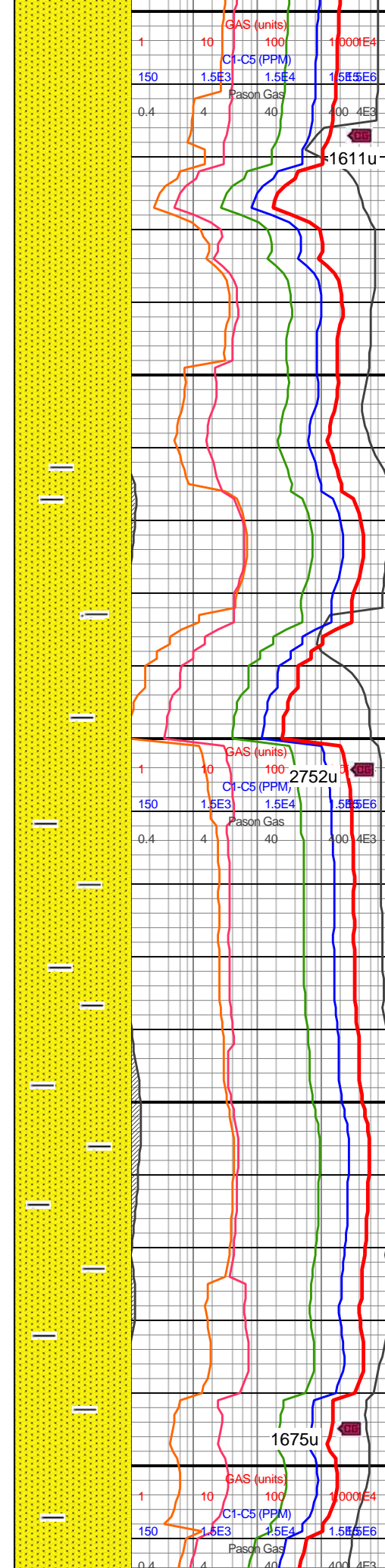
MW IN: 10.5
VIS IN: 51
MW OUT: 10.65
VIS OUT: 47

MD: 15,924'
TVD: 7,986.94'
INC: 88.26°
AZM: 180.87°
VS: 7,344.05'

WOB: 36klbs
RPM: 80
SPM: 178
SPP: 3,730psi

MD: 16,013'
TVD: 7,989.77'
INC: 88.09°
AZM: 181.22°
VS: 7,432.66'

MD: 16,102'
TVD: 7,992.78'
INC: 88.04°
AZM: 181.57°
VS: 7,521.22'



15900-16000 SST
(100%): predy dk gy, com off wh-lt gy, p-mod srtd vf-f sd grs grdg down to slty sst, dk gy sli frm gr-mtx sup sst clus cons wi silc arg cmt, s&p ip, com lt gy sft-sb frm mtx sup arg sst clus, uncons ip, predy non calc-v sl calc, rr mod calc

16000-16100 SHY SST
(75%): lt gy-gy-dk gy, sb frm sb rnd mtx sup vf gr v arg sst grdg to shy sltst, predy non calc, l calc ip; SST (25%): gy-dk gy-occ lt gyshbn, mod w srtd, f gr, sl fri, sup sst clus cons wi silc cmt, sp wi wh grs thru, rr mtx sup arg sst, predy non calc, sl-l calc ip



16,120
16,130
16,140
16,150
16,160
16,170
16,180
16,190
16,200
16,210
16,220
16,230
16,240
16,250
16,260
16,270
16,280
16,290
16,300
16,310
16,320
16,330

MW IN: 10.4+
VIS IN: 50
MW OUT: 10.5+
VIS OUT: 49

MD: 16,191'
TVD: 7,995.68'
INC: 88.22°
AZM: 182.1°
VS: 7,609.71'

WOB: 36klbs
RPM: 80
SPM: 176
SPP: 3,679psi

Off gas buster

MD: 16,280'
TVD: 7,998.2'
INC: 88.53°
AZM: 183.07°
VS: 7,698.09'

On gas buster

ROP (min/ft) 0 1
GAMMA (API) 25 250

ROP (min/ft) 0 1
GAMMA (API) 25 250



410u

828u

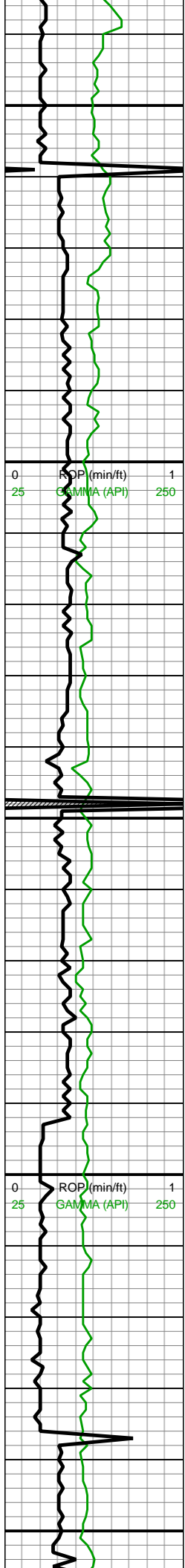
GAS (units) 10 100 1,000 E4
C1-C5 (PPM) 1.5E3 1.5E4 1.5E6
Pason Gas 0.4 4 40 400 4E3

GAS (units) 10 100 1,000 E4
C1-C5 (PPM) 1.5E3 1.5E4 1.5E6
Pason Gas 0.4 4 40 400 4E3

16100-16200 SHY SST (75%): lt gy-gy-dk gy, sb frm sb rnd mtx sup vf gr v arg sst grd to shy sltst, predy non calc, l calc ip; SST (25%): gy-dk gy-occ lt gyshbn, mod w srted, f gr, sl fri, sup sst clus cons wi silc cmt, sp wi wh grs thru, rr mtx sup arg sst, predy non calc, sl-l calc ip

16200-16300 SHY SST (80%): lt gy-gy-dk gy, sb frm sb blkly mtx sup vf gr v arg sst grd to shy sltst, predy non calc, l calc ip; SST (15%): gy-dk gy-occ lt gyshbn mod w srted f gr sli fri gr sup sst clus cons wi silc cmt sp wi wh grs thru, rr mtx sup arg sst, predy non calc, sl-l calc ip; BENT (5%): off wh, sft-sb frm, gran ip, ang-pty ctngs, non calc

16300-16400 SHY SST (75%): lt gy-gy-dk gy, sb frm sb blkly mtx sup vf gr v arg sst grd to shy sltst,



16,340
16,350
16,360
16,370
16,380
16,390
16,400
16,410
16,420
16,430
16,440
16,450
16,460
16,470
16,480
16,490
16,500
16,510
16,520
16,530
16,540
16,550

MD: 16,369'
TVD: 8,000.73'
INC: 88.22°
AZM: 183.07°
VS: 7,786.39'

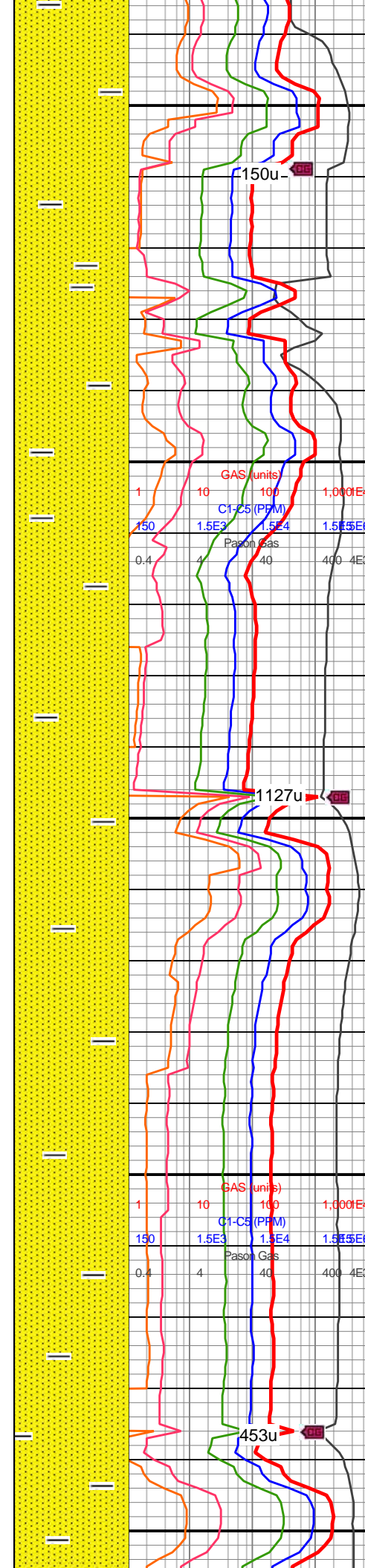
WOB: 24kibs
RPM: 80
SPM: 179
SPP: 3,439psi

MW IN: 10.4
VIS IN: 48
MW OUT: 10.4
VIS OUT: 51

MD: 16,459'
TVD: 8,002.93'
INC: 88.97°
AZM: 183.51°
VS: 7,875.63'

MW IN: 10.4+
VIS IN: 52
MW OUT: 10.5
VIS OUT: 49

MD: 16,548'
TVD: 8,004.4'
INC: 89.14°
AZM: 183.59°
VS: 7,963.86'



predy non calc, l calc ip;
SST (20%): gy-dk gy-occ
lt gyshbn mod w srtd f gr
sli fri gr sup sst clus
cons wi silc cmt sp wi wh
grs thru, rr mtx sup arg
sst, predy non calc, sl-l
calc ip; BENT (5%): off
wh, sft-sb frm, gran ip,
ang-pty cntgs, non calc

150u

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

1,000E4
1.5E6
1.5E3
1.5E4
150
150
0.4
4
40
400 4E3

16400-16500 SHY SST
(85%): lt gy-gy-dk gy, sb
frm sb blkx mtx sup vf gr v
arg sst grd to shy sltst,
predy non calc, l calc ip;
SST (10%): gy-dk gy-occ
lt gyshbn mod w srtd f gr
sli fri gr sup sst clus
cons wi silc cmt sp wi wh
grs thru, rr mtx sup arg
sst, predy non calc, sl-l
calc ip; BENT (10%): off
wh, sft-sb frm, gran ip,
ang-pty cntgs, non calc

1127u

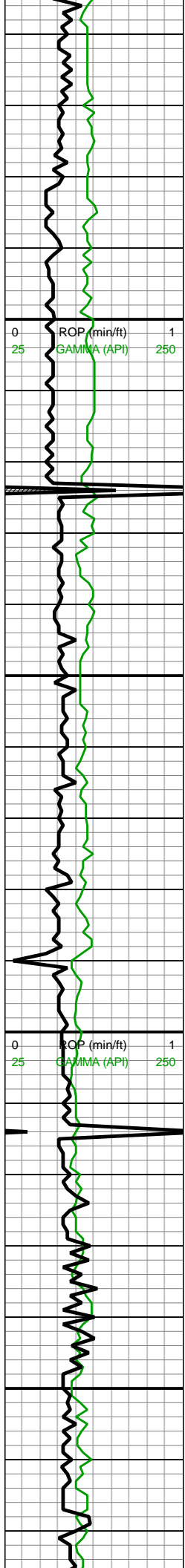
GAS (units)
C1-C5 (PPM)
Pason Gas

1,000E4
1.5E6
1.5E3
1.5E4
150
150
0.4
4
40
400 4E3

16500-16600 SHY SST
(80%): lt gy-gy-dk gy, sb
frm sb blkx mtx sup vf gr v
arg sst grd to shy sltst,
predy non calc, l calc ip;
SST (15%): gy-dk gy-occ
lt gyshbn mod w srtd f gr
sli fri ar sup sst clus

453u





16,560
16,570
16,580
16,590
16,600
16,610
16,620
16,630
16,640
16,650
16,660
16,670
16,680
16,690
16,700
16,710
16,720
16,730
16,740
16,750
16,760
16,770

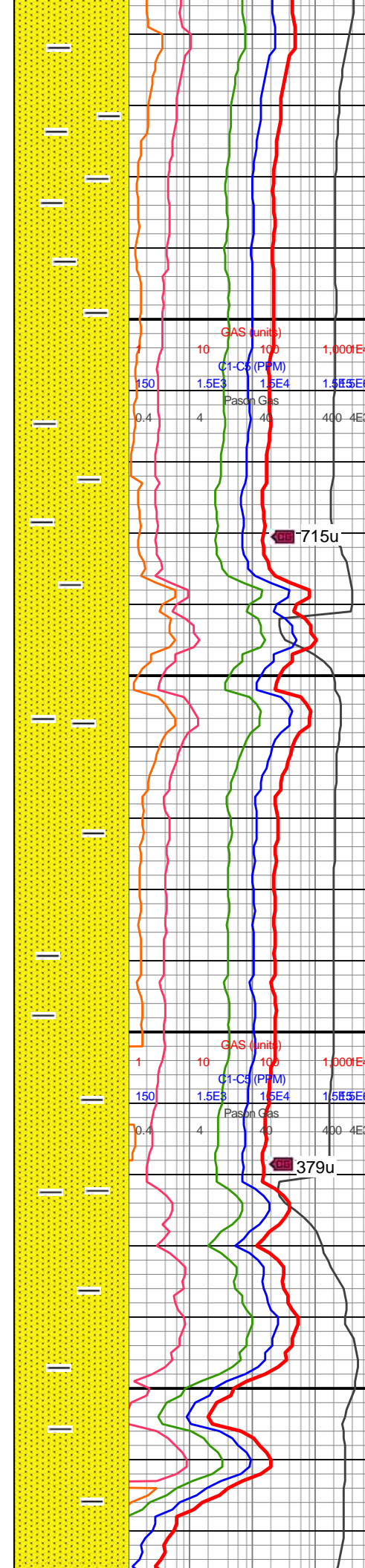
WOB: 34klbs
RPM: 80
SPM: 182
SPP: 3,497psi

MW IN: 10.4+
VIS IN: 52
MW OUT: 10.4+
VIS OUT: 48

MD: 16,637'
TVD: 8,005.81'
INC: 89.05°
AZM: 183.51°
VS: 8,052.08'

MD: 16,726'
TVD: 8,006.53'
INC: 90.02°
AZM: 183.86°
VS: 8,140.28'

MW IN: 10.4
VIS IN: 49
MW OUT: 10.4+
VIS OUT: 47

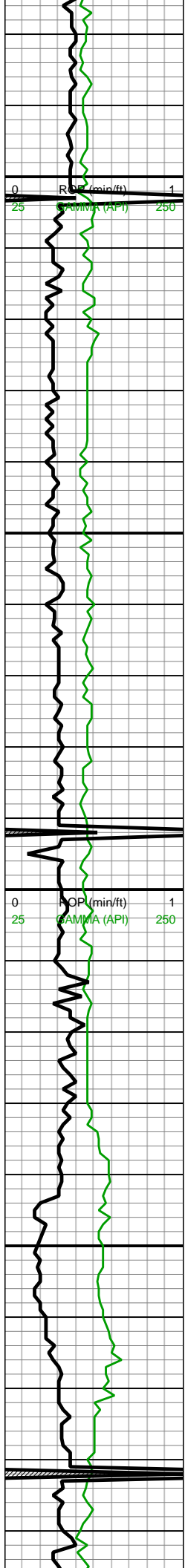


cons wi silc cmt sp wi wh
grs thru, rr mtx sup arg
sst, predy non calc, sl-l
calc ip; BENT (5%): off
wh, sft-sb frm, gran ip,
ang-pty ctngs, non calc

16600-16700 SHY SST
(75%): lt gy-gy-dk gy, sb
frm sb blkly mtx sup vf gr v
arg sst grd to shy sltst,
predy non calc, l calc ip;
SST (20%): gy-dk gy-occ
lt gyshbn mod w srtd f gr
sli fri gr sup sst clus
cons wi silc cmt sp wi wh
grs thru, rr mtx sup arg
sst, predy non calc, sl-l
calc ip; BENT (5%): off
wh, sft-sb frm, gran ip,
ang-pty ctngs, non calc

16700-16800 SHY SST
(75%): lt gy-gy-dk gy, sb
frm sb blkly mtx sup vf gr v
arg sst grd to shy sltst,
predy non calc, l calc ip;
SST (20%): gy-dk gy-occ
lt gyshbn mod w srtd f gr
sli fri gr sup sst clus
cons wi silc cmt sp wi wh
grs thru, rr mtx sup arg
sst, predy non calc, sl-l
calc ip; BENT (5%): off
wh, sft-sb frm, gran ip,
ang-pty ctngs, non calc





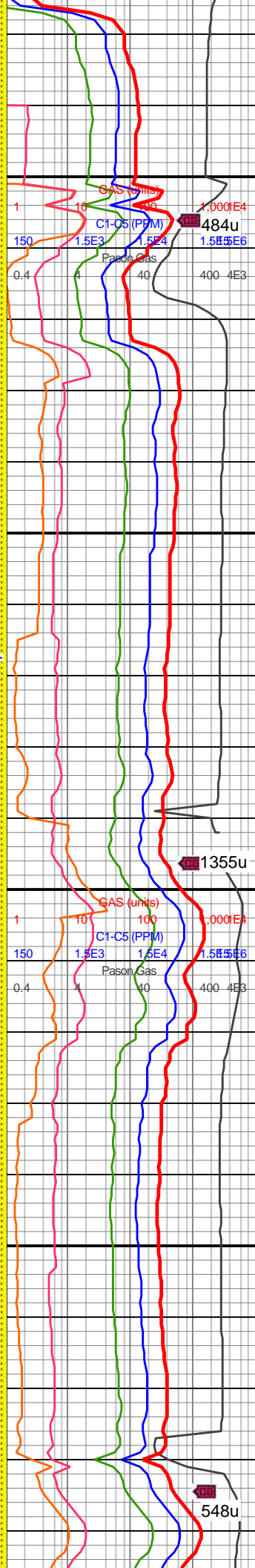
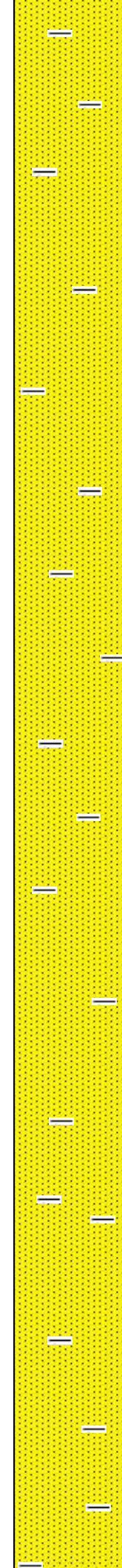
16,780
16,790
16,800
16,810
16,820
16,830
16,840
16,850
16,860
16,870
16,880
16,890
16,900
16,910
16,920
16,930
16,940
16,950
16,960
16,970
16,980
16,990

WOB: 36klbs
RPM: 80
SPM: 181
SPP: 3,465psi
MD: 16,815'
TVD: 8,006.09'
INC: 90.55°
AZM: 182.98°
VS: 8,228.53'

MD: 16,904'
TVD: 8,004.86'
INC: 91.03°
AZM: 181.84°
VS: 8,316.97'

MD: 16,993'
TVD: 8,002.92'
INC: 91.47°
AZM: 180.78°
VS: 8,405.57'

WOB: 35klbs



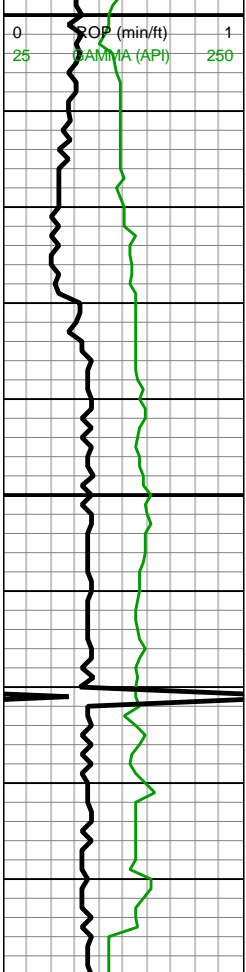
16800-16900 SHY SST (75%): lt gy-gy-dk gy, sb frm sb blkly mtx sup vf gr v arg sst grd to shy sltst, rr pyr, predy non calc, l calc ip; SST (10%): gy-dk gy-occ lt gyshbn mod w srtd f gr sli fri gr sup sst clus cons wi silc cmt sp wi wh grs thru, rr mtx sup arg sst, predy non calc, sl-l calc ip; BENT (15%): off wh, sft-sb frm, gran ip, ang-plty ctngs, non calc

16900-17000 SHY SST (65%): lt gy-gy-dk gy, sb frm-frm, sb rnd- sb blkly, mtx sup vf gr, v arg sst grd to shy sltst, rr pyr, predy non calc, l calc ip; SST (20%): gy-dk gy-occ lt gyshbn mod w srtd f gr sli fri gr sup sst clus cons wi silc cmt sp wi wh grs thru, rr mtx sup arg sst, predy non calc, sl-l calc ip; BENT (15%): off wh, sft-sb frm, gran ip, ang-plty ctngs, non calc

484u
1355u
548u



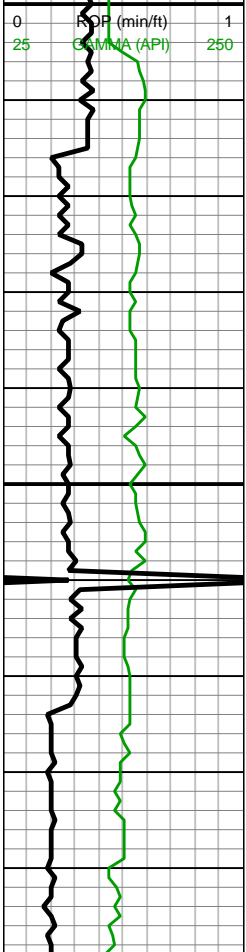
WOB: 30kbs
RPM: 80
SPM: 177
SPP: 3,412psi



17,000
17,010
17,020
17,030
17,040
17,050
17,060
17,070

MW IN: 10.4+
VIS IN: 51
MW OUT: 10.4
VIS OUT: 47

MD: 17,083'
TVD: 7,999.85'
INC: 92.44°
AZM: 180.25°
VS: 8,495.24'

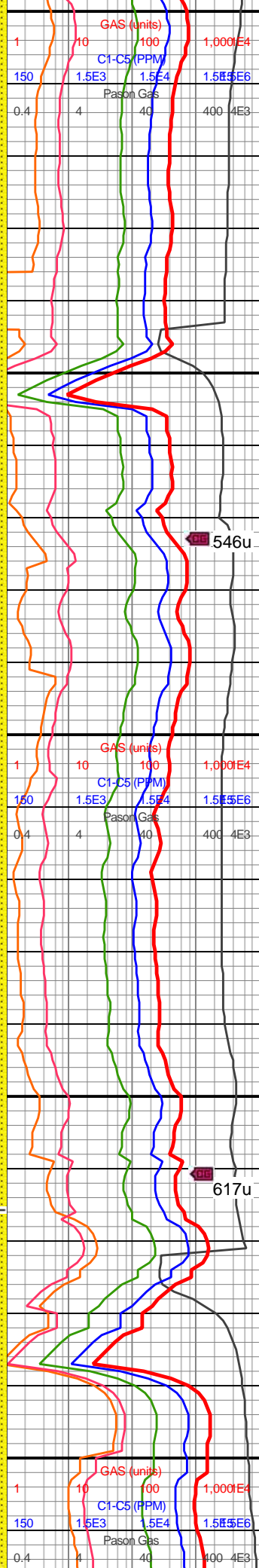
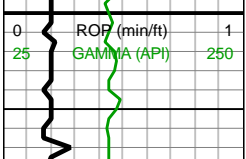


17,100
17,110
17,120
17,130
17,140
17,150
17,160
17,170
17,180
17,190
17,200

MIN DEPT 01/13/2019

MD: 17,171'
TVD: 7,995.85'
INC: 92.75°
AZM: 189.81°
VS: 8,581.96'

WOB: 34kbs
RPM: 80
SPM: 180
SPP: 3,629psi

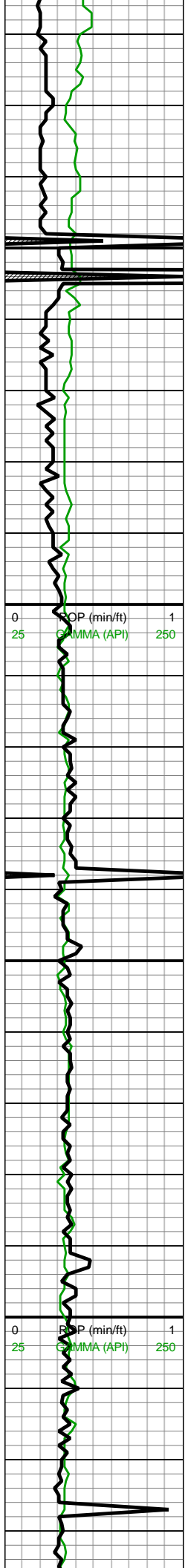


17000-17100 SHY SST
(65%): lt gy-gy-dk gy, sb frm-frm, sb rnd- sb blkly, mtx sup vf gr, v arg sst grd to shy sltst, rr pyr, predy non calc, l calc ip; SST (20%): gy-dk gy-occ lt gysbhn mod w srtd f gr sli fri gr sup sst clus cons wi silc cmt sp wi wh grs thru, rr mtx sup arg sst, predy non calc, sl-l calc ip; BENT (15%): off wh, sft-sb frm, gran ip, ang-plty ctngs, non calc

546u

17100-17200 SHY SST
(70%): lt gy-gy-dk gy, sb frm-frm, sb rnd- sb blkly, mtx sup vf gr, v arg sst grd to shy sltst, rr pyr, predy non calc, l calc ip; SST (20%): gy-dk gy-occ lt gysbhn mod w srtd f gr sli fri gr sup sst clus cons wi silc cmt sp wi wh grs thru, rr mtx sup arg sst, predy non calc, sl-l calc ip; BENT (10%): off wh, sft-sb frm, gran ip, ang-plty ctngs, non calc

617u



MW IN: 10.4
 VIS IN: 50
 MW OUT: 10.4+
 VIS OUT: 47

MD: 17,261'
 TVD: 7,991.77'
 INC: 92.44°
 AZM: 179.2°
 VS: 8,670.76'

ROP (min/ft) 0 1
 MMA (API) 25 250

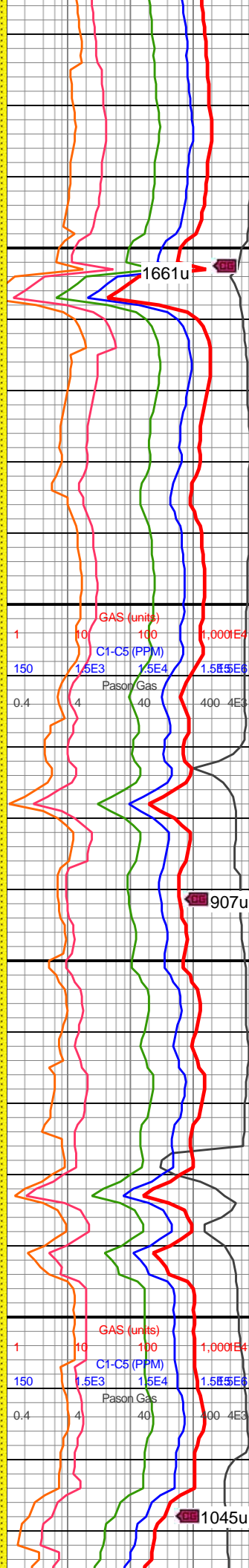
MD: 17,350'
 TVD: 7,989.42'
 INC: 90.59°
 AZM: 178.14°
 VS: 8,759.63'

ROP (min/ft) 0 1
 MMA (API) 25 250

WOB: 35klbs
 RPM: 80
 SPM: 185
 SPP: 3.655psi

MW IN: 10.4
 VIS IN: 48
 MW OUT: 10.4+
 VIS OUT: 48

MD: 17,439'



1661u

GAS (units) 1 10 100 1,000E4
 C1-C5 (PPM) 150 1.5E3 1.5E4 1.5E6
 Pason Gas 0.4 4 40 400 4E3

907u

GAS (units) 1 10 100 1,000E4
 C1-C5 (PPM) 150 1.5E3 1.5E4 1.5E6
 Pason Gas 0.4 4 40 400 4E3

1045u

17200-17300 SST
 (100%): predy dk gy, com
 off wh-lt gy, p-mod srt'd,
 vf-f sd grs grd'g down to
 slty sst, dk gy sl frm
 gr-mtx sup sst clus cons
 wi silc arg cmt, s&p ip,
 com lt gy sft-sb frm mtx
 sup arg sst clus, uncons
 ip, predy non calc-v sl
 calc, rr mod calc

17300-17400 SST
 (100%): predy dk gy, com
 off wh-lt gy, p-mod srt'd,
 vf-f sd grs grd'g down to
 slty sst, dk gy sl frm
 gr-mtx sup sst clus cons
 wi silc arg cmt, s&p ip,
 com lt gy sft-sb frm mtx
 sup arg sst clus, uncons
 ip, predy non calc-v sl
 calc, rr mod calc

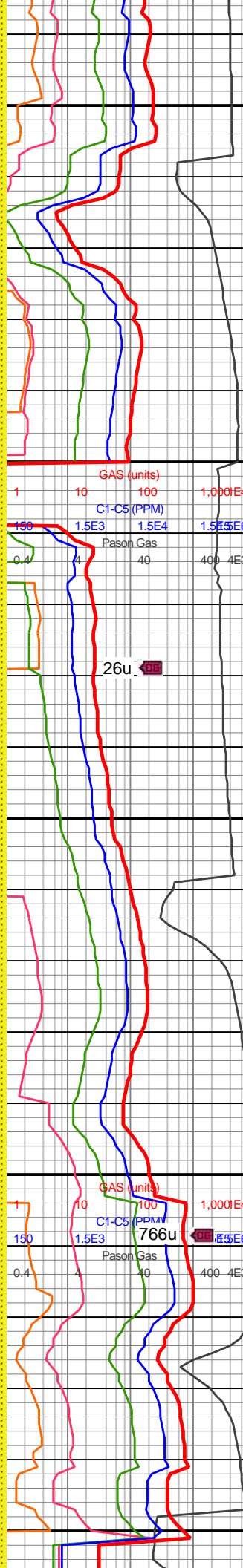
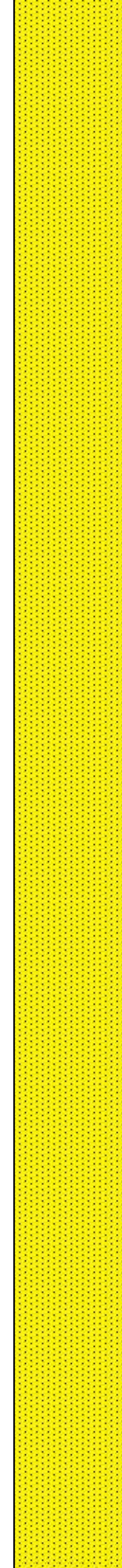
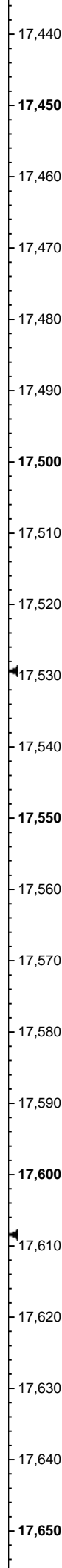
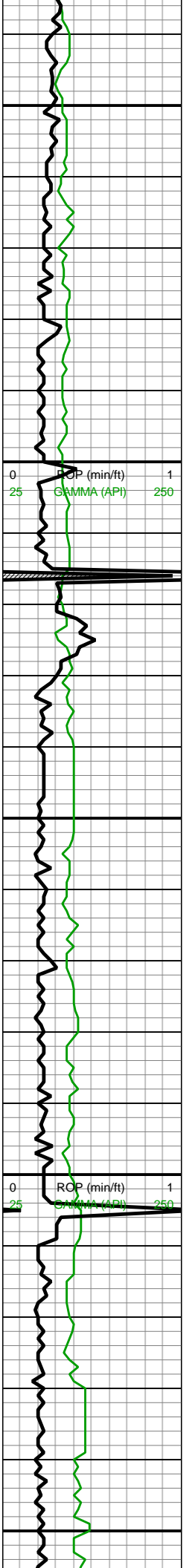
17400-17500 SST
 (100%): predy dk gy, com
 off wh-lt gy, p-mod srt'd,



TVD: 7,990.41'
 INC: 88.13°
 AZM: 176.74°
 VS: 8,848.59'

MD: 17,528'
 TVD: 7,993.73'
 INC: 87.6°
 AZM: 176.12°
 VS: 8,937.52'

WOB: 34klbs
 RPM: 80
 SPM: 188
 SPP: 3,805psi

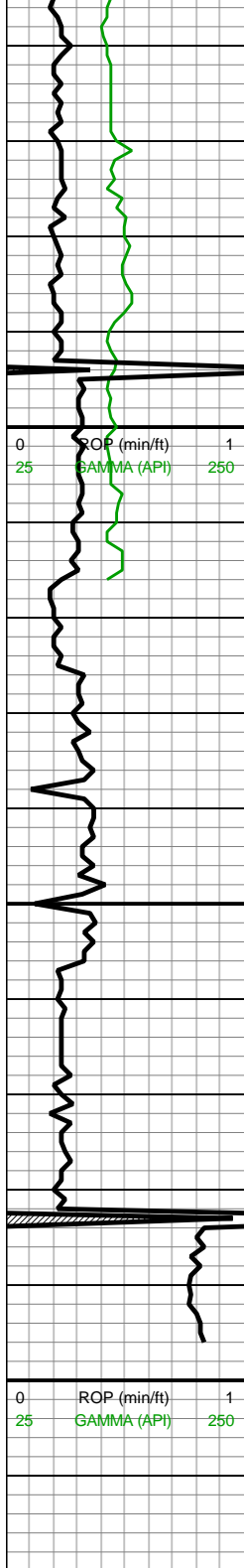


on wh-lt gy, p-mod srted,
 vf-f sd grs grd down to
 slty sst, dk gy sl frm
 gr-mtx sup sst clus cons
 wi silc arg cmt, s&p ip,
 com lt gy sft-sb frm mtx
 sup arg sst clus, uncons
 ip, predy non calc-v sl
 calc, rr mod calc

17500-17600 SST
 (100%): predy dk gy, com
 off wh-lt gy, p-mod srted,
 vf-f sd grs grd down to
 slty sst, dk gy sl frm
 gr-mtx sup sst clus cons
 wi silc arg cmt, s&p ip,
 com lt gy sft-sb frm mtx
 sup arg sst clus, uncons
 ip, predy non calc-v sl
 calc, rr mod calc

17600-17700 SST
 (100%): predy dk gy, com
 off wh-lt gy, p-mod srted,
 vf-f sd grs grd down to
 slty sst, dk gy sl frm
 gr-mtx sup sst clus cons
 wi silc arg cmt, s&p ip,
 com lt gy sft-sb frm mtx
 sup arg sst clus, uncons





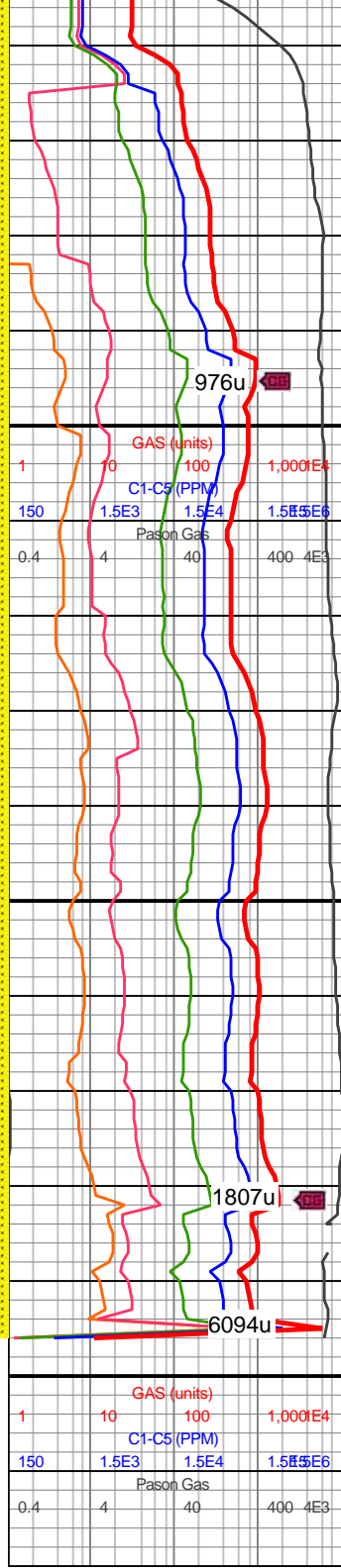
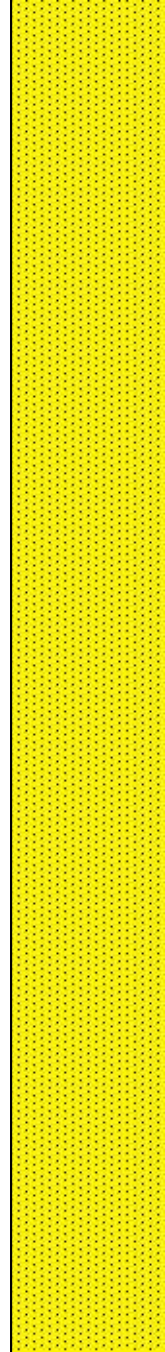
17,660
17,670
17,680
17,690
17,700
17,710
17,720
17,730
17,740
17,750
17,760
17,770
17,780
17,790
17,800
17,810
17,820

MW IN: 10.4+
VIS IN: 49
MW OUT: 10.4+
VIS OUT: 48

MD: 17,716'
TVD: 8,001.63'
INC: 87.56°
AZM: 175.68°
VS: 9,125.35'

MW IN: 10.4+
VIS IN: 48
MW OUT: 10.5
VIS OUT: 50

Projection to Bit
MD: 17,796'
TVD: 8,005.04'
INC: 87.56°
AZM: 175.95°
VS: 9,205.28'
17796'MD TD well
at 04:37am on
01/13/2019



sup arg sst clus, uncours
ip, predy non calc-v sl
calc, rr mod calc

17700-17796 SST
(100%): dk gy-dk gyshbn,
sb frm-occ frm predy mtx
sup arg sst grd to shy
sst, p-mod srted slty-vf-f-u
f sb rd-rd grs, rr gr sup
clus cons wi sl hydrated
arg cmt, tr dk gy-blk sltst,
tr vf-f pyr, predy non calc,
sl calc ip

