



Scale: 5" / 100'
Measured Depth Log

Well Name Ruegge 3I-4H-N165

Location Sec. 4 T1N R65W

State Colorado

County Weld

Country USA

Rig Number Ensign 140

API Number 0512346559000

AFE # 16190985

Geographic Region Rockies

Field Wattenberg

Spud Date 6/20/2018

Drilling Completed 6/23/2018

Surface Coordinates Lat/Long: 40.075249/-104.670844
SHL: Sec: 4 Twp: 1N 65W
Footage: 703 FSL 2116 FWL

Bottom Hole Coordinates Proposed BHL: Sec: 4 Twp: 1N 65W
Footages: 460 FNL 1820 FWL

Ground Elevation 4,916'

K.B. Elevation 4,939'

Logged Interval 6,400' **To** 11,910'

Total Depth 11,910'

Formation C Chalk

Type of Drilling Fluid Synthetic Oil Based Mud

Operator

Company Crestone Peak Resources

Address 370 17th Street #2170
Denver, CO 80202



CRESTONE PEAK
RESOURCES

Geologist

Zone Color Coding

Name John Ready

Company Crestone Peak Resources

Address 370 17th Street #2170
Denver, CO 80202



Oil



Condensate



Gas



Note



Core



Pressure



Error



Water



Seal

Other

Loggers: Nicholas Watkins / Brian Ferwerda

Services Provided: 2-Man Mudlogging / Geosteering

Equipment: ML-522

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

Rock Types

? UNKNOWN

ANHYDRITE

GYPSUM

SALT

SIDERITE or LIMONITE

LIMESTONE

DOLOMITE

CHERT

COAL

MARLSTONE

CHALK

SHALE

SHALE GRAY

SHALE COLORED

SILTSTONE

SANDSTONE

CONGLOMERATE

BRECCIA

TILL

BENTONITE

TUFF

IGNEOUS

METAMORPHIC

CEMENT

Accessories

Fossils

ALGAE

AMPHIPORA

BELEMNITE

BIOCLASTIC

BRACHIOPOD

BRYOZOA

CEPHALOPOD

CORAL

CRINOID

ECHINOID

FISH

FORAMINIFERA

F FOSSIL

GASTROPOD

OOLITE

OSTRACOD

PELECYPOD

PELLET

PISOLITE

PLANT REMAINS

PLANT SPORES

SCAPHOPOD

STROMATOPOROID

Minerals

ANHYDRITIC

ARGILLACEOUS

ARGILLITE GRAIN

BENTONITE

BITUMENOUS SUBSTANCE

BRECCIA FRAGMENTS

CALCAREOUS

CARBONACEOUS FLAKES

CHTDK

CHTLT

COAL - THIN BEDS

DOLOMITIC

FELDSPAR

FERRUGINOUS PELLET

FERRUGINOUS

GLAUCONITE

GYPSIFEROUS

HEAVY MINERAL

KAOLIN

MARLSTONE

MINERAL CRYSTALS

NODULES

PHOSPHATE PELLETS

PYRITE

SALT CAST

SANDY

SILICEOUS

SILTY

TUFFACEOUS

Stringer

ANHYDRITE STRINGER

BENTONITE STRINGER

COAL STRINGER

DOLOMITE STRINGER

GYPSUM STRINGER

LIMESTONE STRINGER

MARLSTONE (CALC) STRG

MARLSTONE (DOL) STRG

SANDSTONE STRINGER

SHALE STRINGER

SILTSTONE STRINGER

Other Symbols

Other Symbols

Oil Show

- DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

Porosity

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

- ORGANIC
- P PINPOINT
- V VUGGY

Engineering

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

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

Rounding

- ANGULAR
- ROUNDED
- SUBANG
- SUBRND

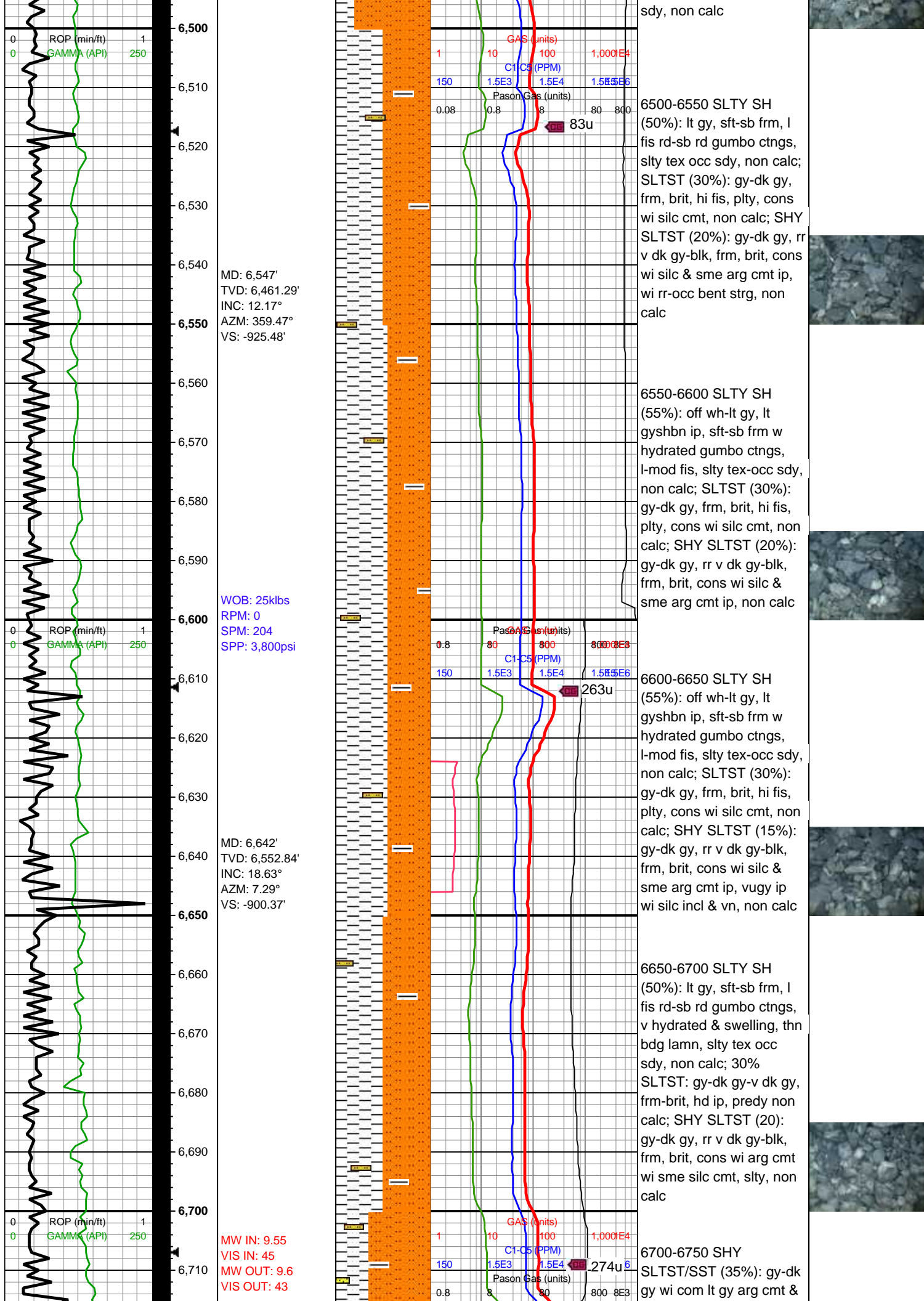
Textures

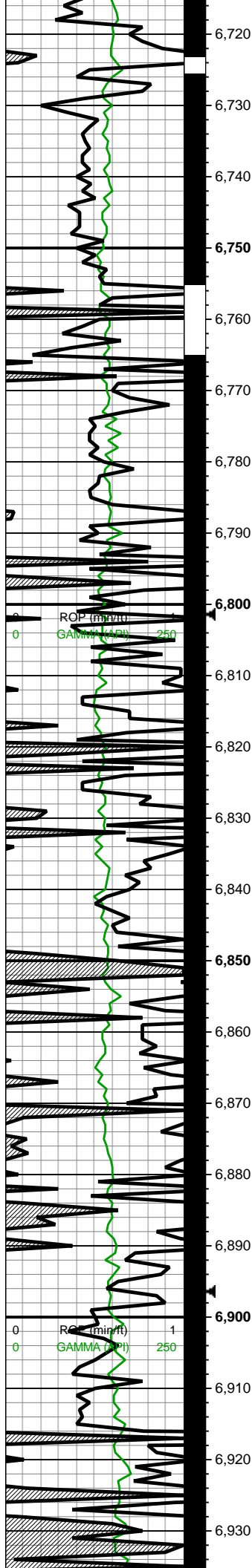
- BOUNDSTONE
- CHALKY
- CRYPTOXLN
- E EARTHY
- FINELYXLN
- GRAINSTONE

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

Sorting

- M MODERATE
- P POOR
- W WELL





MD: 6,737'
TVD: 6,641.46'
INC: 23.51°
AZM: 7.82°
VS: -866.49'

WOB: 0klbs
RPM: 31
SPM: 204
SPP: 3,430psi

MW IN: 9.6
VIS IN: 46
MW OUT: 9.6+
VIS OUT: 44

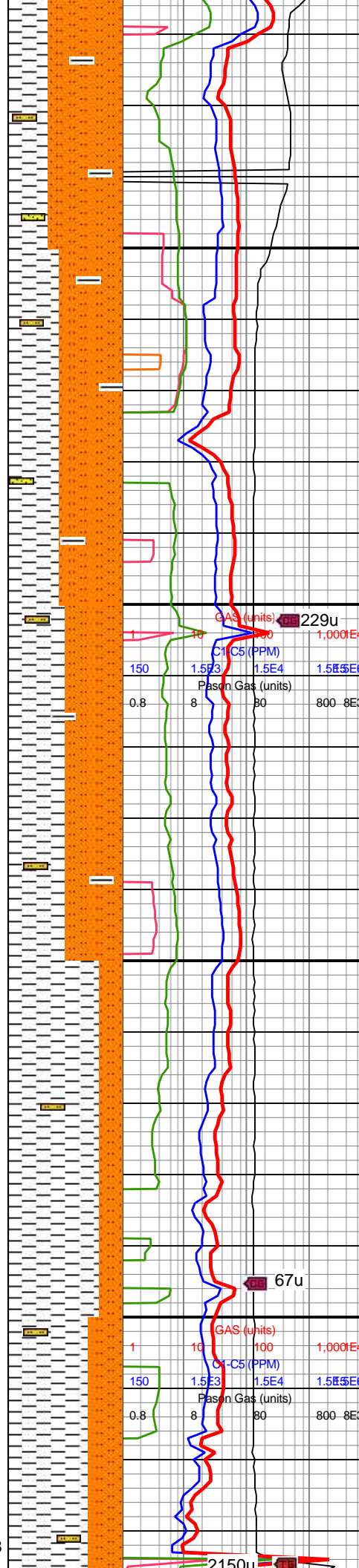
MD: 6,832'
TVD: 6,727.45'
INC: 26.76°
AZM: 8.43°
VS: -826.51'

MW IN: 9.7+
VIS IN: 45
MW OUT: 9.6+
VIS OUT: 43

MW IN: 9.9
VIS IN: 43
MW OUT: 10.0
VIS OUT: 44

MD: 6,926'
TVD: 6,807.93'
INC: 35.38°
AZM: 16.96°
VS: -779.35'

TOOH for BHA
19:45hrs 6/22/18



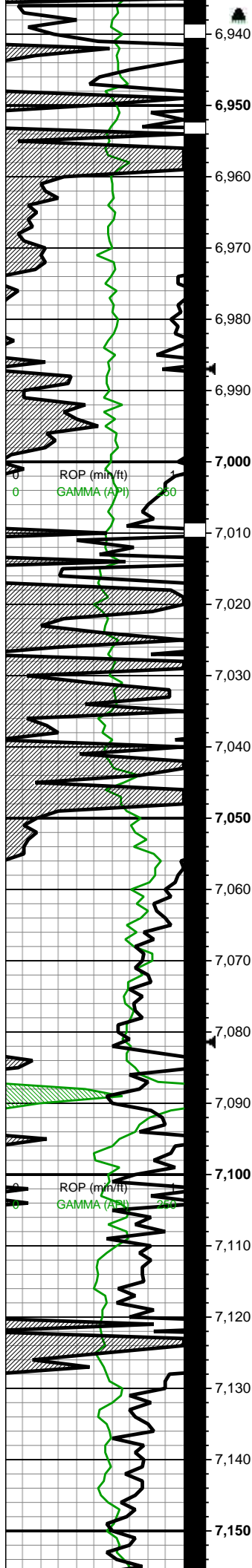
intbds thru, rr v dk gy-blk,
sft-sb frm-frm, brit,
silty-sdy, non calc; SLTY
SH (35%): lt gy, sft-sb
frm-gumbo, l fis rd-sb rd
gumbo ctngs, v water
solu, thn bdg lamn, slty
tex occ sdy, non calc;
35% SLTST: gy-dk gy-v
dk gy, frm-brit, hd ip,
predy non calc

6750-6800 SHY SLTST
(45%): lt gy-gy-dk gy, dk
gy ip, frm, brit, cons wi hd
silc cmt wi arg intbds,
non calc; SLTY SH
(45%): lt gy, sft-sb frm, l
fis rd-sb rd ctngs, v
hydrated & water solu,
silty tex, non calc; 10%
SLTST: v dk gy-blk, hd,
silc vn ip, non-l calc

6800-6850 SLTY SH
(50%): lt gy, sft-sb frm, l
fis rd-sb rd ctngs, v
hydrated, swelling, slty
tex, non calc, wi decr cly
grdg to shy sltst; SHY
SLTST (40%): gy-dk gy, rr
v dk gy, frm, brit, cons wi
hd silc cmt, sl arg, non
calc; SLTST (10%): v dk
gy-blk, hd, lt gy silc vn ip,
non-l calc

6850-6900 SLTY SH
(80%): gy-dk gy, sme v dk
gy-blk, frm, fri-brit ip, blk,
sme pty, non calc, slty,
rgh tex, com micmica;
SLTST (20%): gy-dk gy,
frm-sl hrd, blk, v ltly
calc-non calc, rgh tex

6900-6950 SLTY SH
(75%): gy-gyshbn, occ lt
gyshbn, sft-sb frm, w
hydrated water solu
mod bi fis blk, tab ctngs



MINDEPTH 6/23/18
Bit #: 2
Type: U516M
Size: 8 1/2
Depth In: 6,934'
Depth Out: 11,910'
Hours: 25.8 hrs
Avg Ft/Hr: 192 'h
Jets: 6x13
S/N: 37241

WOB: 23klbs
RPM: 0
SPM: 186
SPP: 3,010psi

MW IN: 9.95
VIS IN: 49
MW OUT: 10.0
VIS OUT: 47

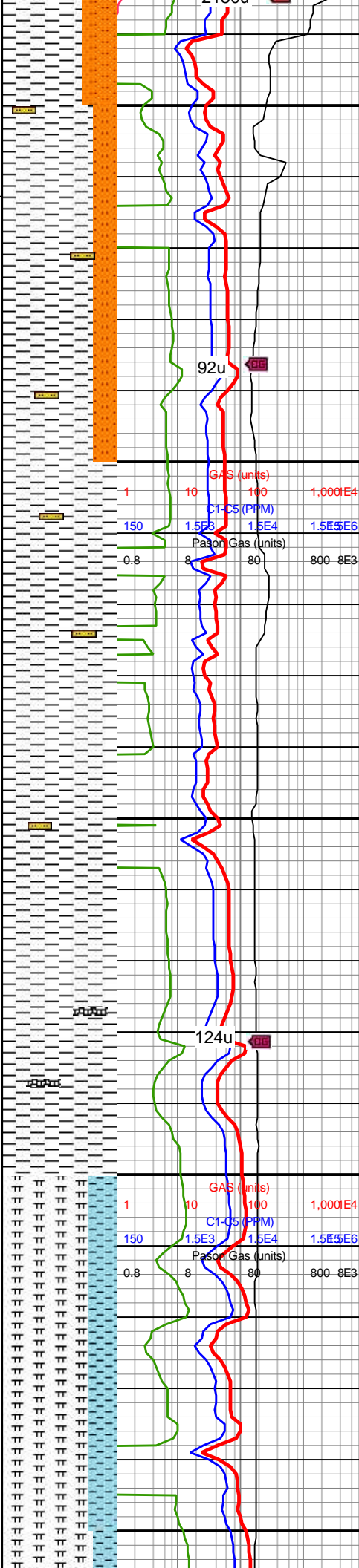
MD: 7,020'
TVD: 6,880.27'
INC: 43.9°
AZM: 11.6°
VS: -721.15'

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

Sharon Springs
7050 MD/6901 TVD

Niobrara
7093 MD/6929 TVD

MD: 7,115'
TVD: 6,942.3'
INC: 54.49°
AZM: 5.09°
VS: -650.05'



med-hi fis blkly-tab ctngs,
thn lt gy arg lamn, slty arg
tex, occ sdy, non calc;
SLTST (30%): gy-dk gy,
frm, brit, plty, non calc

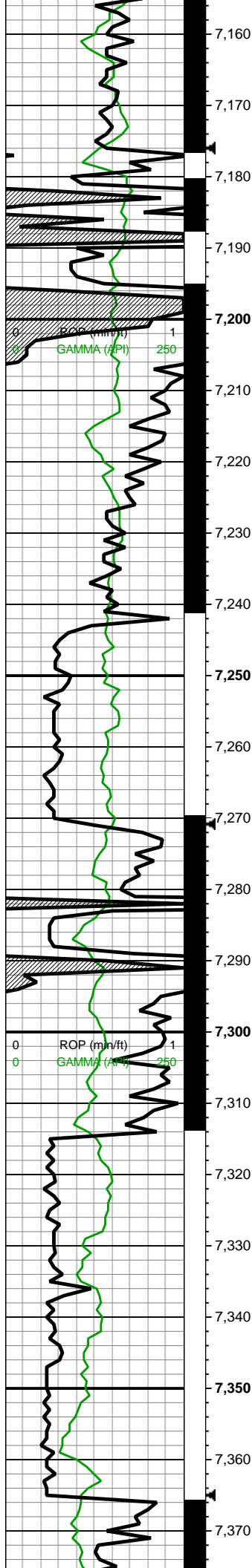
6950-7000 SLTY SH
(80%): lt
gyshbn-gy-gyshbn,
med-hi fis sft-sb frm w
hydrated water solu
med-hi fis blkly-tab ctngs,
thn lt gy arg lamn, slty arg
tex, occ sdy, non calc;
SLTST (20%): gy-dk gy, tr
blk wi gy vugy silc vn, frm,
brit, plty, non calc

7000-7050 SLTY SH
(100%): gy-gyshbn, sft-sb
frm, w hydrated water
solu med-hi fis blkly-tab
ctngs, wxy lstr, slty arg
tex, occ sdy, rr tn bent,
non calc

7050-7100 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, rr-occ tn bent, mod
calc

7100-7150 MRLST
(75%): gyshbn-dk gy-dk
gyshbn, sb frm-frm,
l-mod fis sb rd-sb
blkly-blky ctngs, occ brn
sp marl incl & thn chky
lamn ip, tr bent, mod calc
wi brn mrly resdl; CHK
(25%): dk gy wi f-elong
wh chky incl, sb frm-frm,
brit, tr vf pyr, hi calc





MW IN: 9.9
VIS IN: 44
MW OUT: 9.95
VIS OUT: 42

WOB: 26klbs
RPM: 0
SPM: 186
SPP: 2,910psi

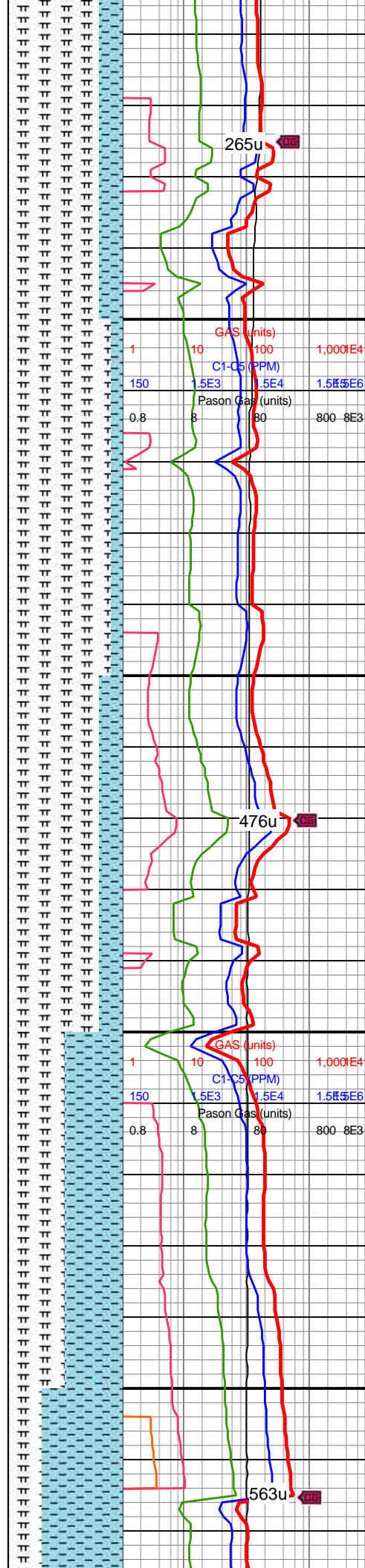
MD: 7,209'
TVD: 6,990.38'
INC: 63.94°
AZM: 0.44°
VS: -569.48'

MW IN: 9.9
VIS IN: 44
MW OUT: 9.95
VIS OUT: 41

MD: 7,304'
TVD: 7,027.63'
INC: 69.87°
AZM: 357.45°
VS: -482.17'

↔
B Chalk
7328 MD/7035 TVD

MW IN: 9.8
VIS IN: 43
MW OUT: 9.9
VIS OUT: 42



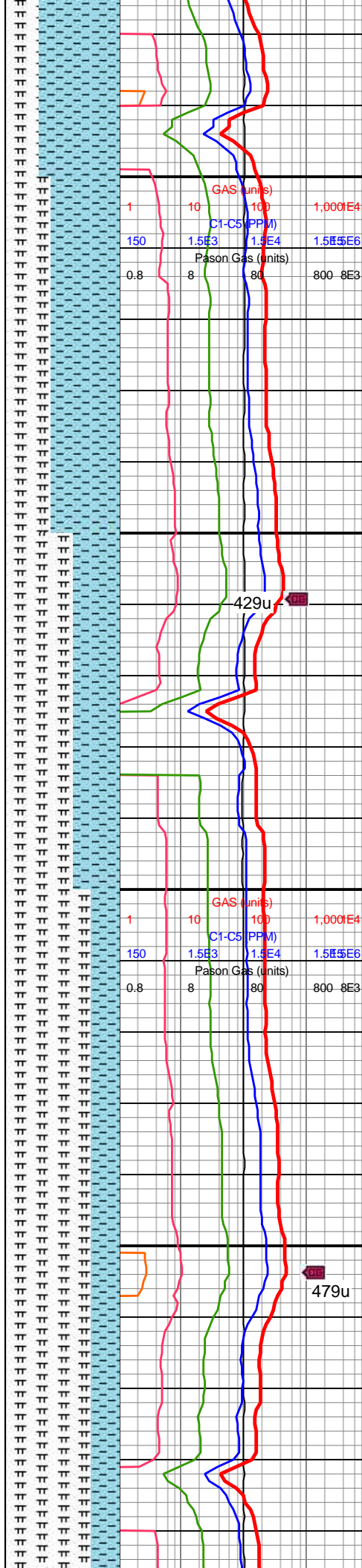
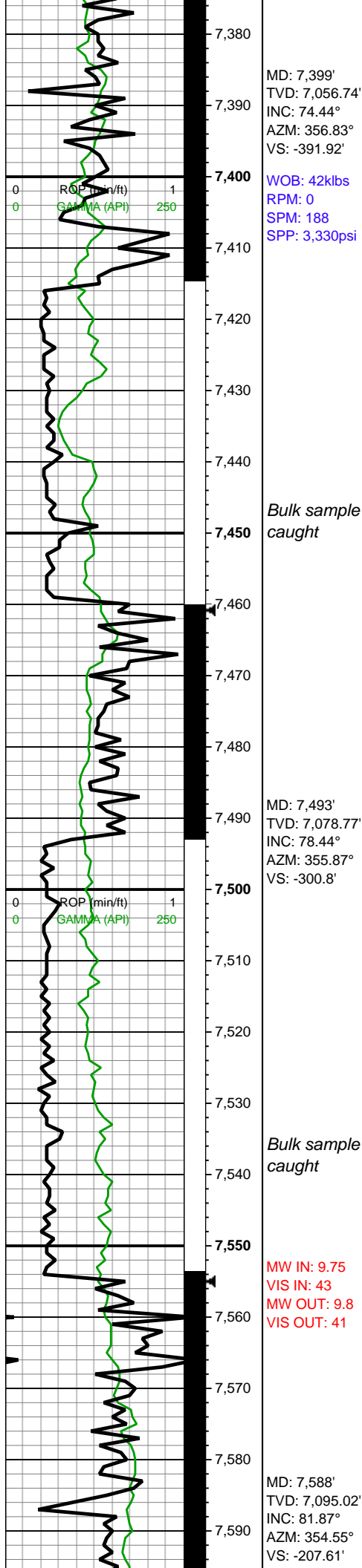
7150-7200 MRLST
(80%): gyshbn-dk gy-dk
gyshbn wi occ c brn marl
incl, sb frm-frm, l-mod fis
sb rd-sb blkly-blky ctngs,
thn lamn, tr bent, mod
calc wi brn mrly resdl;
CHK (20%): dk gy wi
f-elong wh chky incl, sb
frm-frm, brit, tr vf pyr, hi
calc

7200-7250 MRLST
(90%): gyshbn-dk gy-dk
gyshbn, sb frm-frm,
l-mod fis sb rd-sb
blkly-blky ctngs, occ brn
sp marl incl & thn chky
lamn ip, tr bent, mod calc
wi brn mrly resdl; CHK
(10%): dk gy wi f-elong
wh chky incl, sb frm-frm,
brit, tr vf pyr, hi calc

7250-7300 MRLST
(80%): gyshbn-dk gy-dk
gyshbn wi occ c brn marl
incl, sb frm-frm, l-mod fis
sb rd-sb blkly-blky ctngs,
thn lamn, tr bent, mod
calc wi brn mrly resdl;
CHK (20%): dk gy wi
f-elong wh chky incl, sb
frm-frm, brit, tr vf pyr, hi
calc

7300-7350 CHK (50%):
med gy-dk gy wi f wh chky
incl, frm, brit, mod fis
ang-sb blkly ctngs, tr vf
pyr, tr fos frags & tr
forams, hi calc; MRLST
(50%): dk gy-dk gyshbn,
frm, brit, mod fis sb
blkly-blky ctngs, tr vf pyr,
mod calc wi brn mrly
resdl

7350-7400 CHK (70%): lt



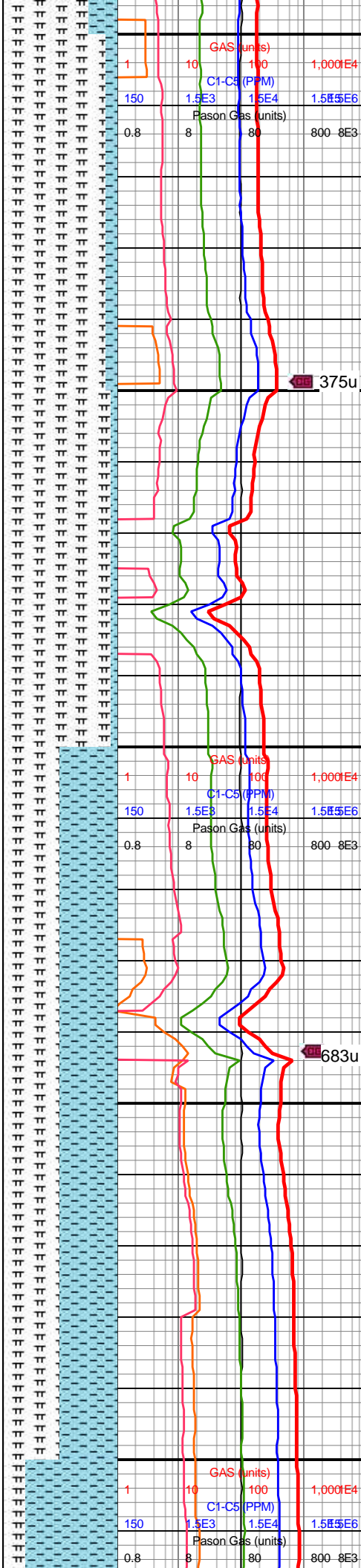
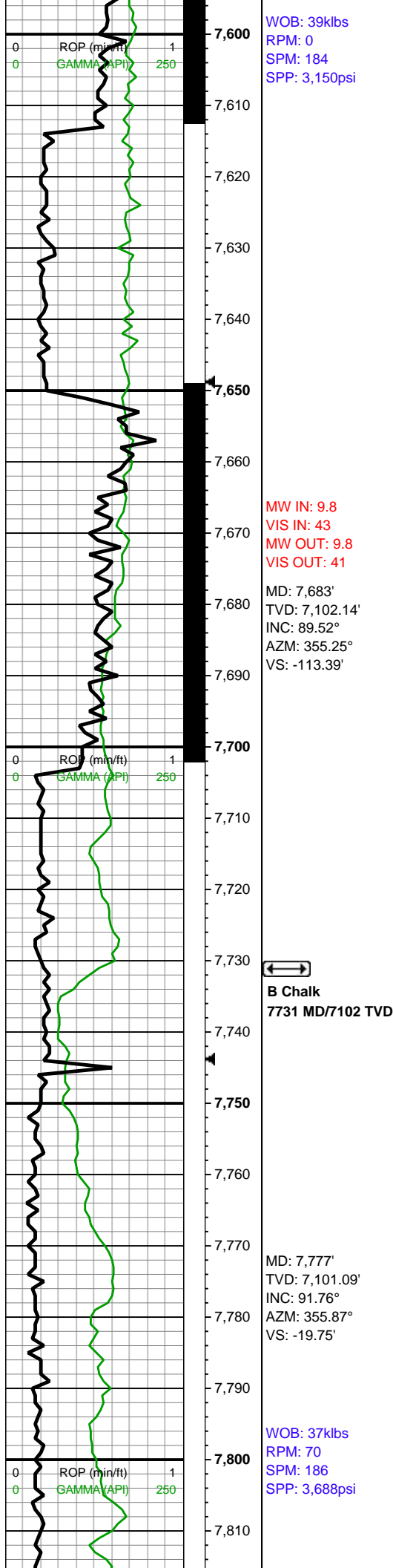
gy-med gy, frm, brit, mod
fis sb ang-sb blkly ctngs,
tr vf pyr, hi calc; MRLST
(30%): dk gy-dk gyshbn,
frm, brit, mod fis sb
blkly-blky ctngs, tr vf pyr,
mod calc wi brn mrlly
resdl

7400-7450 CHK (60%): lt
gy-med gy, sb
frm-frm-brit, mod fis sb
rd-sb blkly ctngs, rr-occ
forams & inoc fos frags,
tr vf pyr, hi calc; MRLST
(40%): dk gy-dk gyshbn,
frm, brit, mod fis sb
blkly-blky ctngs, tr vf pyr,
mod calc wi brn mrlly
resdl

7450-7500 MRLST
(60%): dk gy-dk gyshbn,
frm-brit-hd, mod fis sb
blkly-blky ctngs, rr-occ vf
pyr, com sp brn marl incl,
rr vf chky incl, rr-tr bent,
mod calc wi brn mrlly
resdl; CHK (40%): dk gy
wi f-elong wh chky incl,
sb frm-frm, brit, tr vf pyr, hi
calc

7500-7550 MRLST
(60%): dk gy-dk gyshbn,
frm-brit-hd, mod fis sb
blkly-blky ctngs, rr-occ vf
pyr, com sp brn marl incl,
rr vf chky incl, rr-tr bent,
mod calc wi brn mrlly
resdl; CHK (40%): dk gy
wi f-elong wh chky incl,
sb frm-frm, brit, tr vf pyr, hi
calc

7550-7600 MRLST
(75%): dk gy-dk gyshbn,
frm-brit-hd, mod fis sb
blkly-blky ctngs, rr-occ vf
pyr, com sp brn marl incl,
rr vf chky incl, rr-tr bent,
mod calc wi brn mrlly
resdl; CHK (25%): dk gy
wi f-elong wh chky incl,
sb frm-frm, brit, tr vf pyr, hi

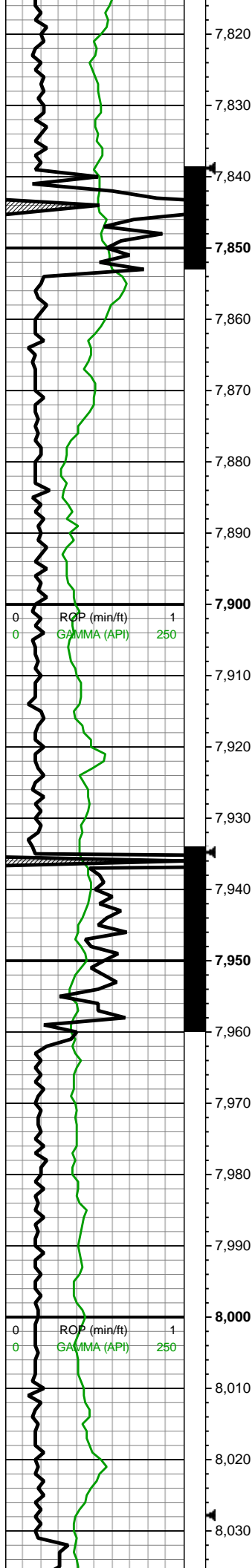


calc

7600-7650 MRLST
(90%): v dk gy-blk,
frm-brit-hd, mod fis sb
blky-blky ctngs, rr-occ vf
pyr, rr sp brn marl incl, rr
bent wi occ pyr strg, mod
calc wi brn mrly resdl;
CHK (10%): dk gy wi
f-elong wh chky incl, sb
frm-frm, brit, tr vf pyr, hi
calc

7650-7700 MRLST
(95%): med-v dk gry,
predy blky wi com lamn, v
brit-hrd, micmica, hily
calc; CHK (5%) pred
ltgy-occ gyshbn wi sme
com lt thn chky lamn, sb
blky-blky with occ plty, v
soft-ltly frm, rgh tex wi
rr-pp pyr, hily calc

7700-7800 MRLST
(50%): med gy-dk gy, frm,
brit, med-hi fis sb blky-sb
plty ctngs, mod calc; CHK
(50%): predy med
gy-gyshbn, occ thn wh
chky lamn ip, sb frm-frm,
sb blky, sm-sl slty bdd
tex, tr vf pyr, hi calc



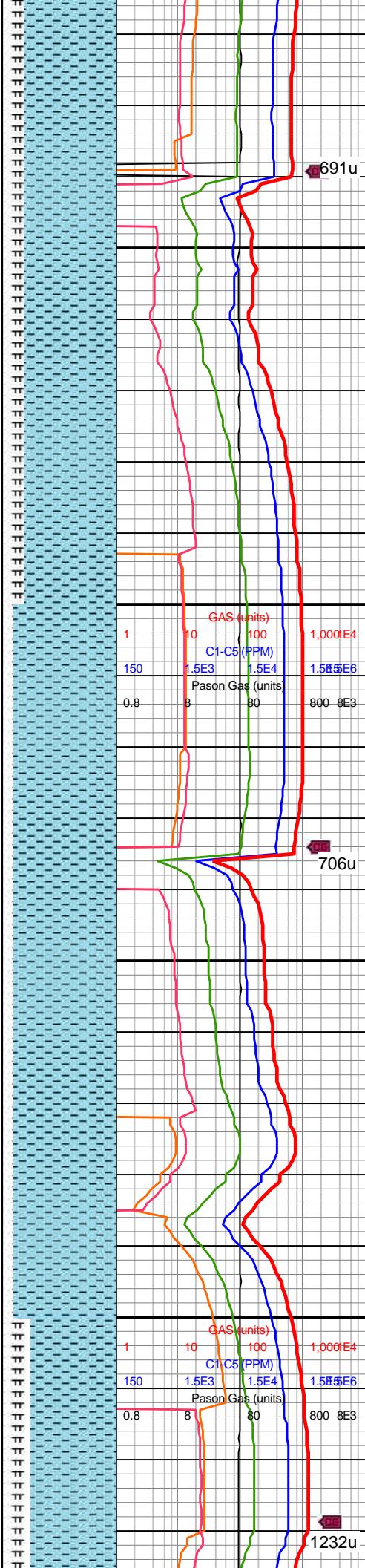
MW IN: 9.8
VIS IN: 43
MW OUT: 9.8
VIS OUT: 41

MD: 7,872'
TVD: 7,098.22'
INC: 91.71°
AZM: 356.36°
VS: 74.93'

MD: 7,967'
TVD: 7,097.56'
INC: 89.08°
AZM: 356.92°
VS: 169.71'

WOB: 36.2klbs
RPM: 70
SPM: 186
SPP: 3,694psi

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



691u

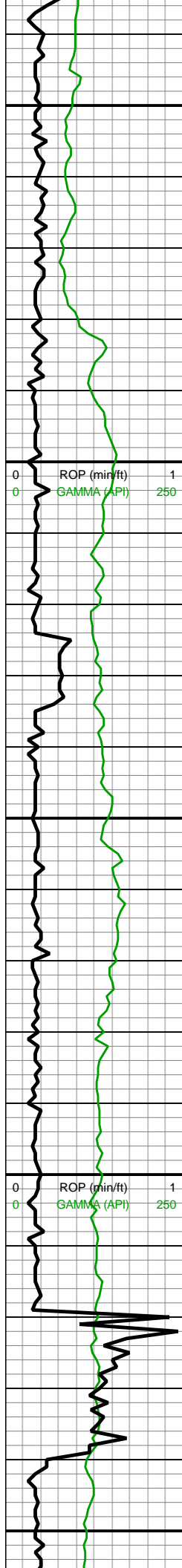
706u

1232u

7800-7900 CHK(80%):
med gy-sl gyshbn, sub
blky-sub plty med fis
ctngs, frm, occ-com fos
frags, rr forams, tr vf-uf
pyr, hi calc; MRLST
(20%): dk gyshbn-dk gy,
frm-sl hd-brit, mod calc, tr
CHK incl

7900-8000 CHK (90%):
predy gyshbn-lt gy, mot,
scat offwht, sb blky-sb
ang ctngs, fri-frm, sm
chky tex, com inoc fos
frags, calc; MRLST
(10%): dk gyshbn-dk gy,
frm-sl hd, sb blky-ang
ctngs, sl sm-rgh tex, com
intbd CHK, scat pyrc nod,
scat frac fl cal, hi calc





8,040
8,050
8,060
8,070
8,080
8,090
8,100
8,110
8,120
8,130
8,140
8,150
8,160
8,170
8,180
8,190
8,200
8,210
8,220
8,230
8,240
8,250

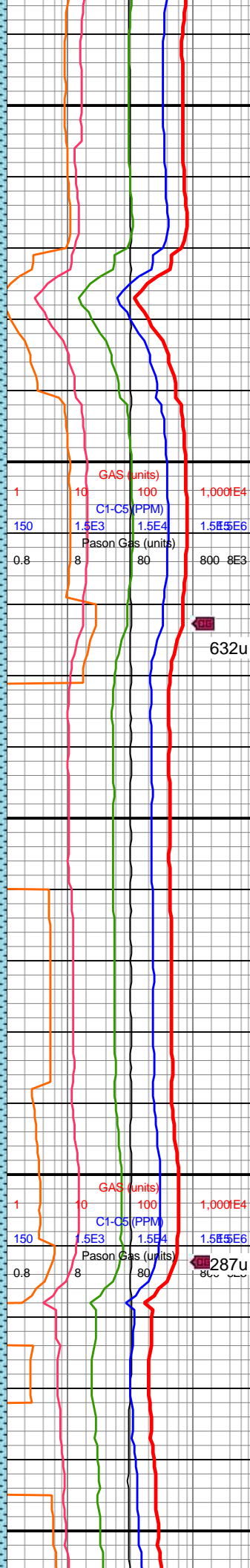
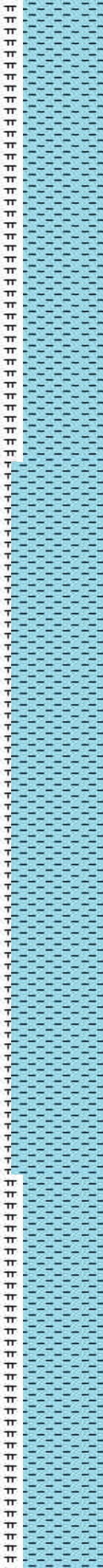
MD: 8,061'
TVD: 7,099.18'
INC: 88.95°
AZM: 356.39°
VS: 263.48'

MD: 8,156'
TVD: 7,101.43'
INC: 88.33°
AZM: 355.55°
VS: 358.16'

WOB: 36.8klbs
RPM: 70
SPM: 186
SPP: 3,735psi

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

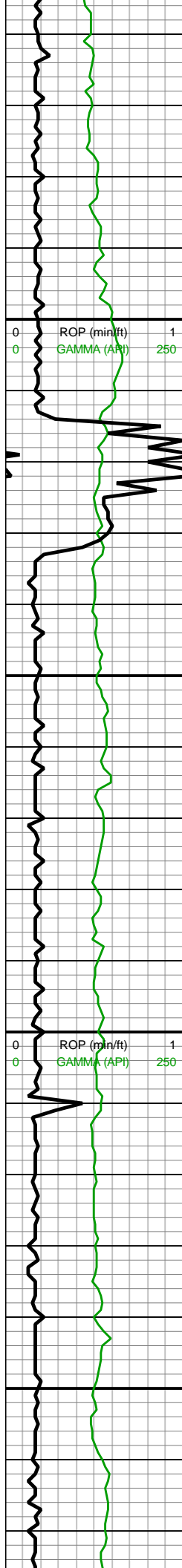
MD: 8,251'
TVD: 7,104.13'
INC: 88.42°
AZM: 358.85°



8000-8100 CHK (75%):
med gy-sl gyshbn, sme lt
gy-offwht, sb blk-y-sb plty
med fis ctngs, frm,
occ-com fos frags, scat
foram, tr vf-uf pyr, hi calc;
MRLST (25%): dk
gyshbn-dk gy, frm-sl
hd-brit, mod calc, tr CHK
incl

8100-8200 CHK (85%)
med gyshbn-lt gy, mot,
sb blk-y wi occ plty, v chky
tex, v sft-sl frm, scat-com
inoc fos frags, tr-rr pyr, v
calc; MRLST (15%)
med-dk gry wi sme lt gy,
sb-blky, sl lam-v
micmica, v calc, sme
scat cal





VS: 452.96'

8,260

8,270

8,280

8,290

8,300

8,310

8,320

8,330

8,340

8,350

8,360

8,370

8,380

8,390

8,400

8,410

8,420

8,430

8,440

8,450

8,460

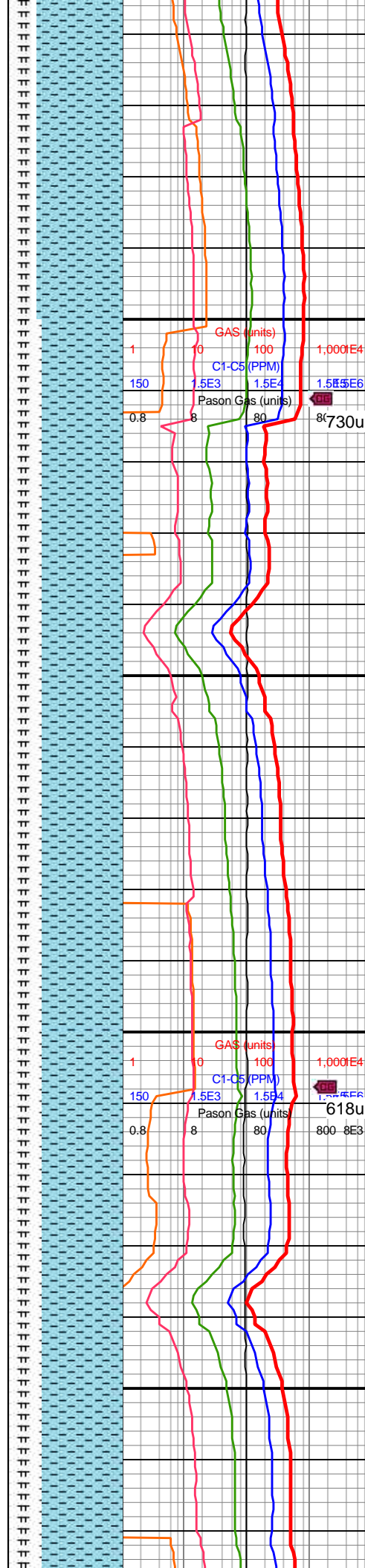
8,470

MD: 8,346'
TVD: 7,105.83'
INC: 89.52°
AZM: 357.18°
VS: 547.85'

MW IN: 9.8
VIS IN: 43
MW OUT: 9.8
VIS OUT: 42

WOB: 36.5klbs
RPM: 70
SPM: 185
SPP: 3,808psi

MD: 8,440'
TVD: 7,105.87'
INC: 90.44°
AZM: 356.48°
VS: 641.66'

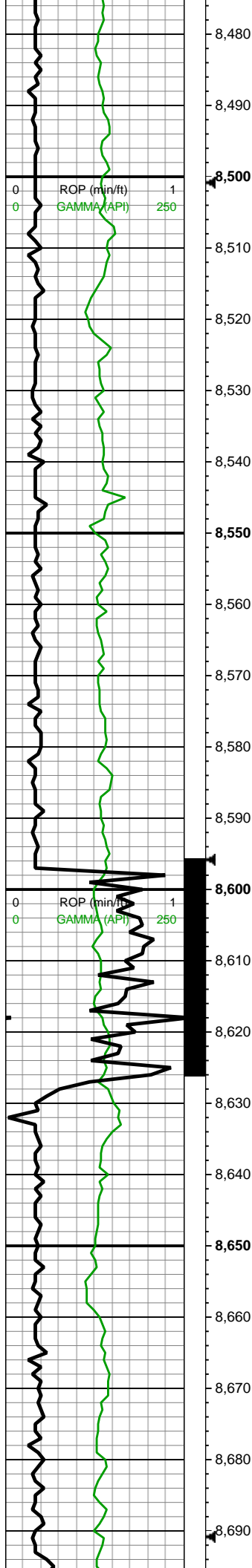


8200-8300 CHK (75%):
med-lt gy, thn bri wh chky
incl thru, brit-mod fis, sb
blky-blky, sb ang, sm
arg-sl slty tex ip, hi calc;
MRLST (25%): med gy-dk
gy, mot wi brn mrly incl ip,
frm, brit, l-mod fis, com
chky lamn, mod calc

8300-8400 CHK (70%);
pred lt gy-gyshbn wi occ
offwht-crm, sub blky-blky
wi rr plty, v frm-frm, rr lam,
scatt pp-occ pyr; MRLST
(30%) pred med-dk gy wi
sme v dk gry, occ
plty-blky, v hrd, sme pp
pyr, com micmica

8400-8500 CHK (70%):
med gy-lt gy, offwht ip,
mot, tr lt gyshbn, frm brit



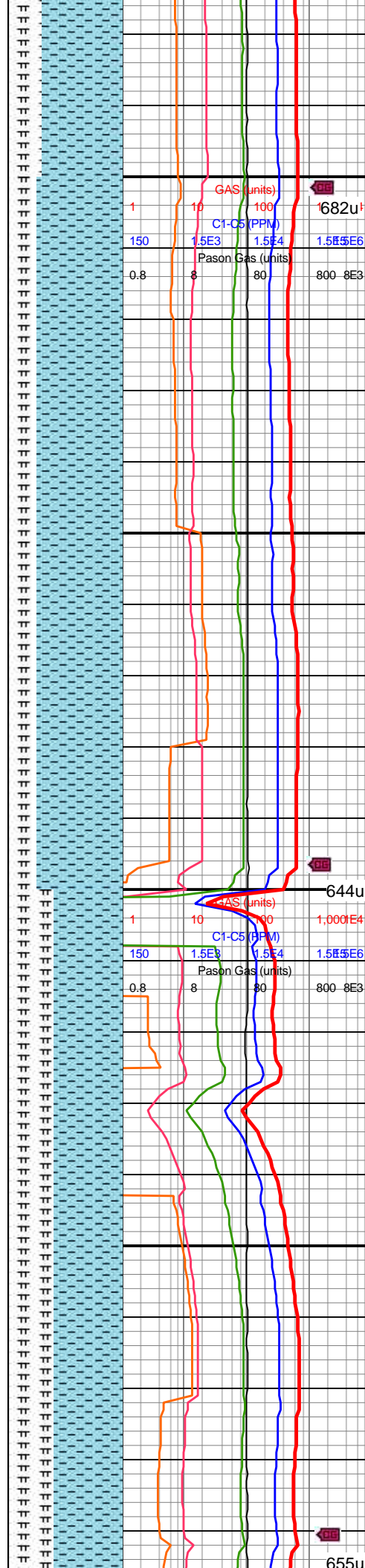


MD: 8,535'
TVD: 7,104.88'
INC: 90.75°
AZM: 356.22°
VS: 736.41'

WOB: 40.4klbs
RPM: 0
SPM: 186
SPP: 3,434psi

MW IN: 9.8
VIS IN: 43
MW OUT: 9.8
VIS OUT: 42

MD: 8,630'
TVD: 7,104.66'
INC: 89.52°
AZM: 359.65°
VS: 831.3'

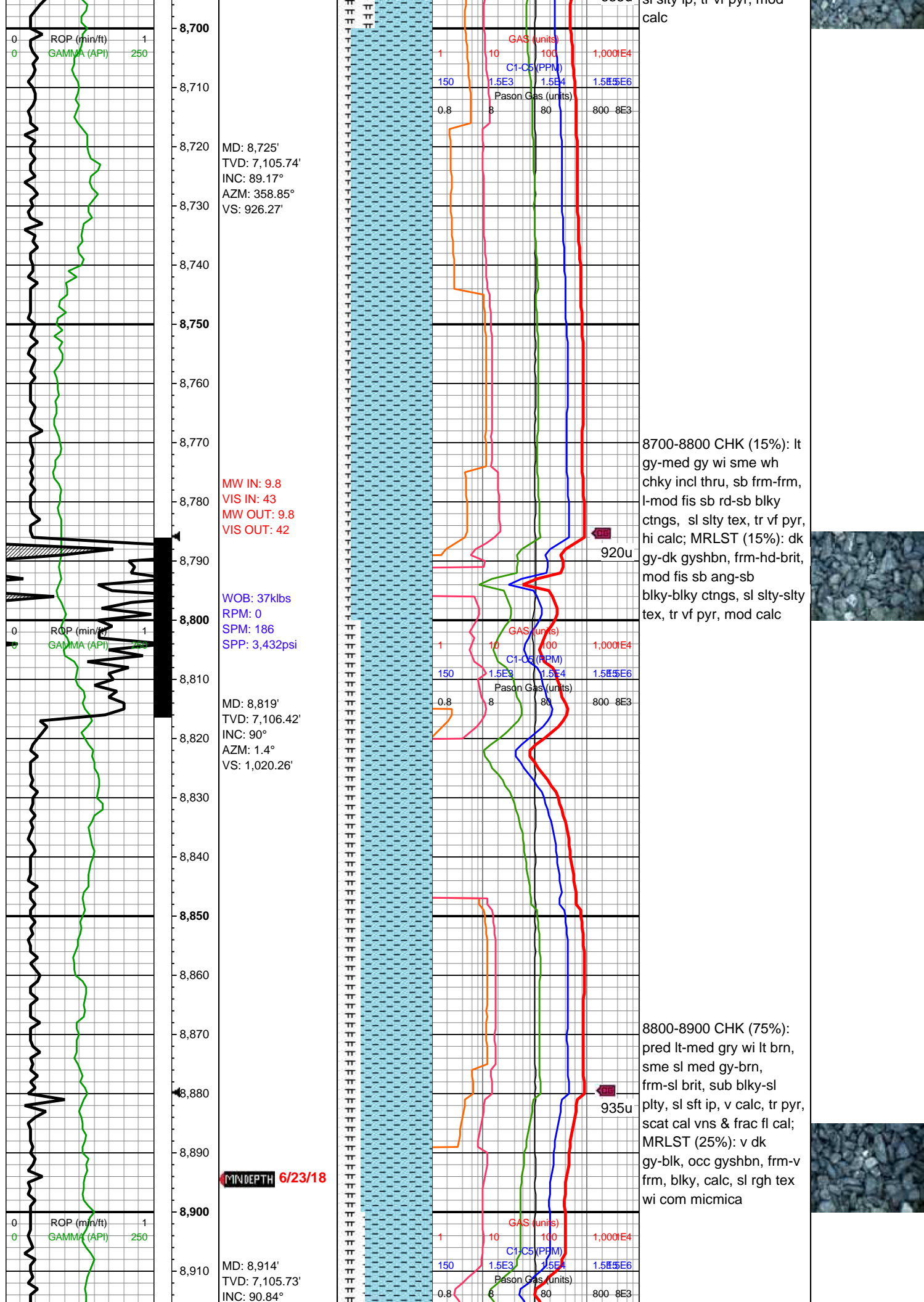


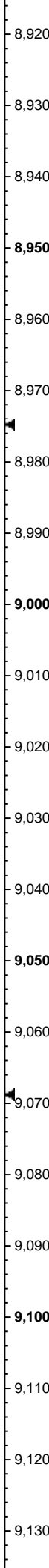
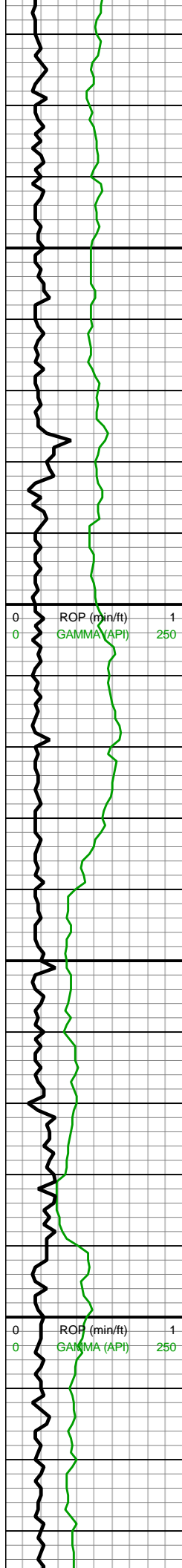
mot, tr lt gyshbn, frm-brit, sb blkly-blky ctngs, occ foram, tr vf pyr, scat lse cal, hi calc; MRLST (30%): dk gy-gyshbn ip, sb frm-frm, brit ip, blkly, sm-sl slty arg tex, mot wi brn mrly incl ip, v calc

8900-8600 CHK (75%): pred lt gry wi lt brn, sme sl med gy-brn, frm-sl brit, sb blkly-sl plty, sl sft ip, v calc, tr pyr, scat lse cal; MRLST (25%): v dk gy-blk, occ gyshbn, frm-v frm, blkly, calc, sl rgh tex wi com micmica

8600-8700 CHK (60%): lt-med gy wi occ f wh chky incl, frm-brit, sb blkly-blky ctngs, tr foram, v tr fos frag, tr vf pyr, hi calc; MRLST (40%): dk gy, rr blk, frm-brit, blkly-sb blkly ctngs, predy sm arg tex, sl slty ip, tr vf pyr, mod







AZM: 1.23°
VS: 1,115.24'

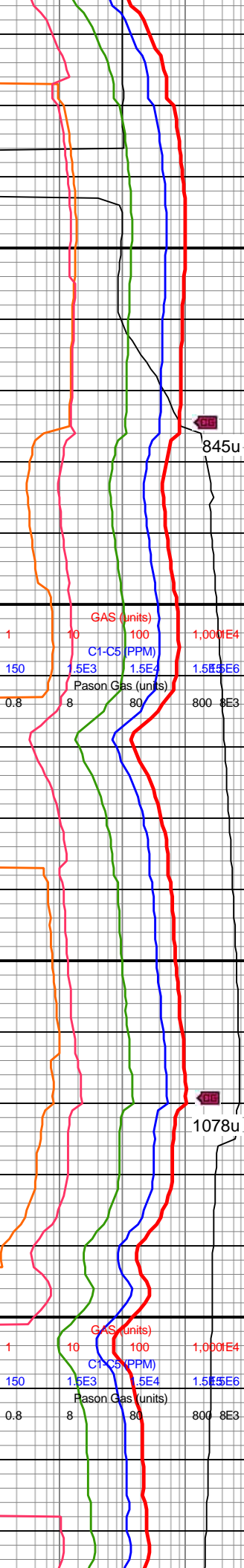
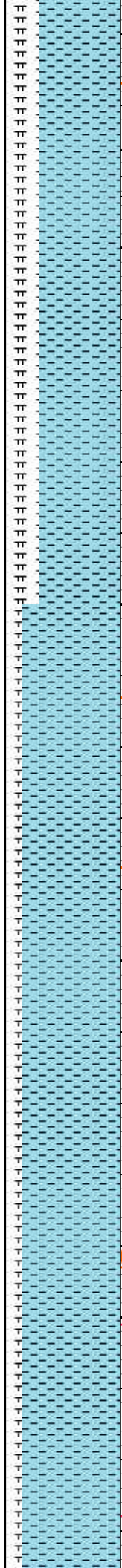
WOB: 38.7klbs
RPM: 70
SPM: 188
SPP: 33,940psi

MD: 9,008'
TVD: 7,104.5'
INC: 90.66°
AZM: 1.05°
VS: 1,209.23'

MW IN: 9.7+
VIS IN: 43
MW OUT: 9.8
VIS OUT: 43

On Buster

MD: 9,103'
TVD: 7,103.55'
INC: 90.48°
AZM: 0.35°
VS: 1,304.22'

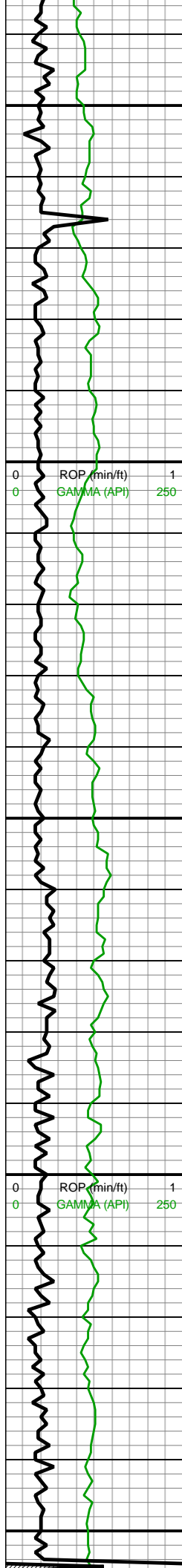


8900-9000 CHK (70%);
pred lt gy-gyshbn wi occ
med brn, sub blkyl-blky wi
rr plty, v frm-frm, rr lam,
scatt pp-occ pyr; MRLST
(30%) pred med-dk gy wi
sme v dk gry, occ
plty-blky, v hrd, sme pp
pyr, com micmica



9000-9100 CHK (85%):
med gy-dk gy, occ lt gy,
sb frm-frm, l-mod fis sb
rd-sb blkyl ctngs wi occ f
wh chky incl, tr vf pyr, hi
calc; MRLST (15%): dk
gy-v dk gy, mod fis sb
ang-sb blkyl-blky,
frm-brit-hd, sl slty-slty tex,
tr vf pyr, mod calc





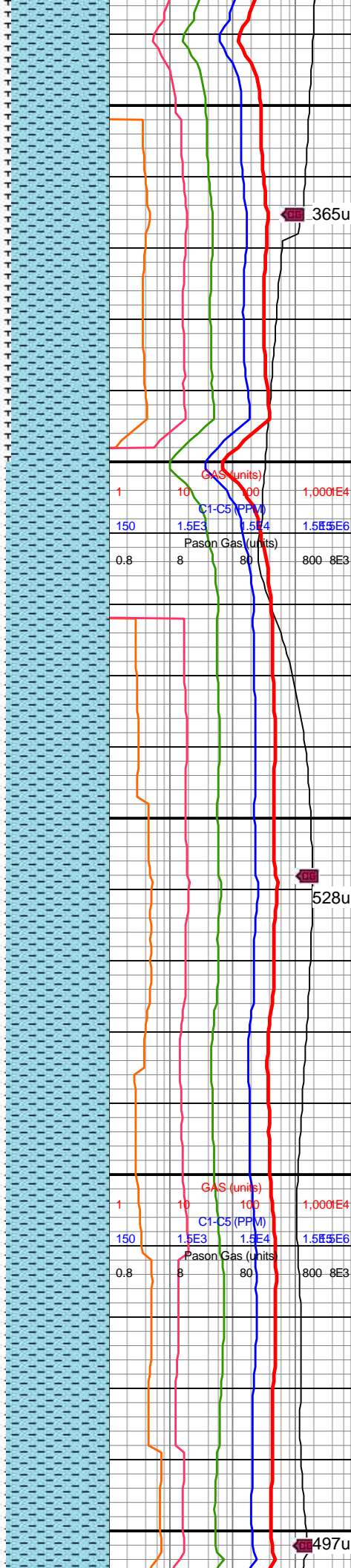
9,140
9,150
9,160
9,170
9,180
9,190
9,200
9,210
9,220
9,230
9,240
9,250
9,260
9,270
9,280
9,290
9,300
9,310
9,320
9,330
9,340
9,350

MD: 9,197'
TVD: 7,103.55'
INC: 89.52°
AZM: 359.21°
VS: 1,398.21'

WOB: 38.3klbs
RPM: 70
SPM: 184
SPP: 3,959psi

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

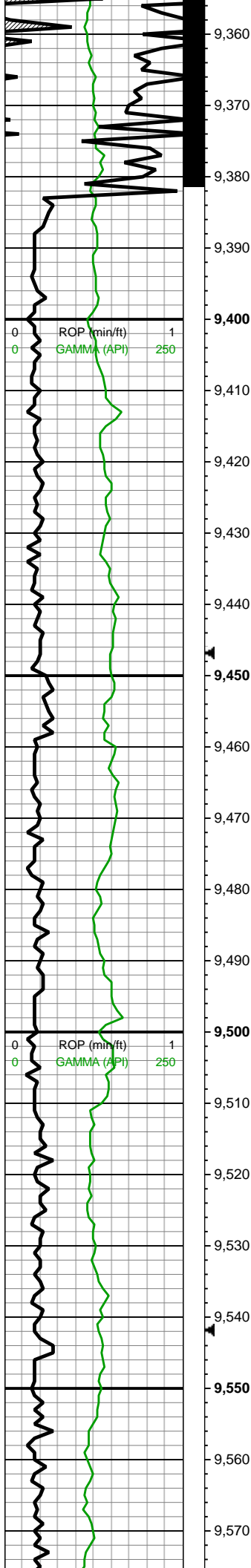
MD: 9,292'
TVD: 7,104.71'
INC: 89.08°
AZM: 358.94°
VS: 1,493.18'



9100-9200 CHK (85%)
med gyshbn-lt gy, mot,
sb blkly wi occ plty, v chky
tex, v sft-sl frm, scat-com
inoc fos frags, tr-rr pyr, v
calc; MRLST (15%)
med-dk gry wi sme lt gy,
sb-blkly, sl lam-v
micmica, v calc, sme
scat cal

9200-9300 CHK (90%):
med gy, lt gy ip, frm, brit,
sb blkly mod fis ctngs,
blkly ip, f-elong wh chky
incl ip, hi calc; MRLST
(10%): dk gy, dk gyshbn
ip, sb frm-frm, brit ip,
mod fis sb blkly-blkly, slty
tex, rr vf pyr, mod calc





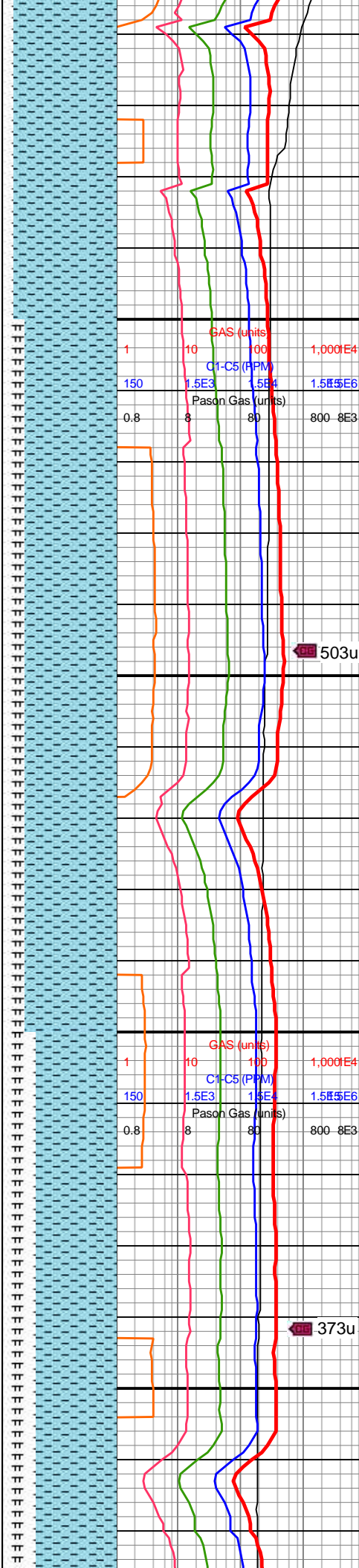
MW IN: 9.8
VIS IN: 43
MW OUT: 9.8
VIS OUT: 42

MD: 9,386'
TVD: 7,105.72'
INC: 89.69°
AZM: 2.98°
VS: 1,587.15'

WOB: 37.7klbs
RPM: 70
SPM: 188
SPP: 4,055psi

MD: 9,481'
TVD: 7,106.74'
INC: 89.08°
AZM: 2.19°
VS: 1,682.08'

MD: 9,576'
TVD: 7,108.67'

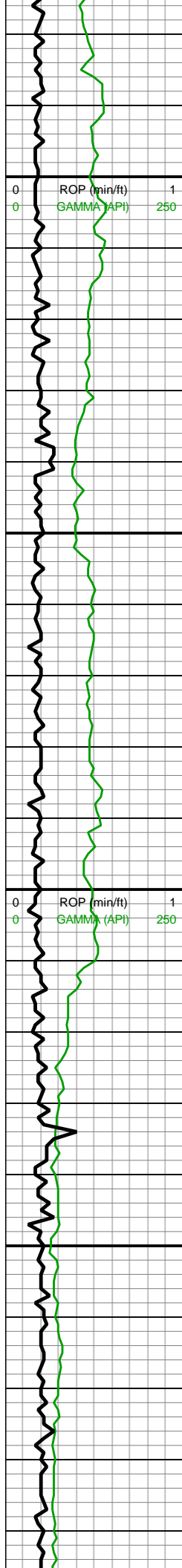


9300-9400 CHK (90%);
pred lt gy-gyshbn wi occ
med brn,com lt gy, mot,
com chky incl, sub
blky-blky wi rr plty, v
frm-frm, rr lam, scatt
pp-occ pyr; MRLST (10%)
pred med-dk gy wi sme v
dk gry, occ plty-blky, v hrd,
sme pp pyr, com
micmica

9400-9500 CHK (80%): lt
gyshbn, occ lt gy-dk gy wi
occ chky incl, sft-sb
frm-frm-brit, mod fis sb
ang-sb blky ctngs, tr vf
pyr, hi calc; MRLST
(20%): predy dk gy, occ
med-dk gyshbn,
frm-hd-brit, sm sl slty tex,
slty tex ip, mod calc

9500-9600 CHK (70%):
med gy-gyshbn, mot lt
av-av frm-brit sb





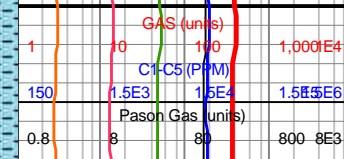
INC: 88.59°
AZM: 1.75°
VS: 1,777.03'

WOB: 37.2klbs
RPM: 70
SPM: 186
SPP: 4,135psi

MD: 9,671'
TVD: 7,111.26'
INC: 88.29°
AZM: 1.4°
VS: 1,871.97'

MW IN: 9.8+
VIS IN: 44
MW OUT: 9.9
VIS OUT: 44

MD: 9,766'
TVD: 7,113.88'
INC: 88.55°
AZM: 1.49°
VS: 1,966.92'



394u

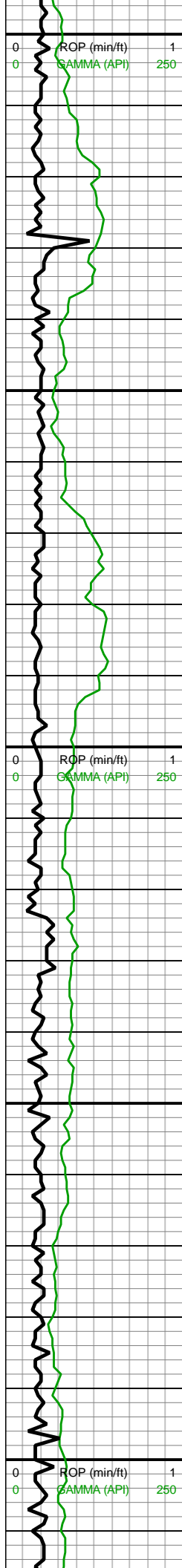
520u

gy, gy, med brn, sb
blky-blky mod fiss, mot
wi occ f wh chky incl, tr
fos frags, hi calc; MRLST
(30%): med gy-dk gy,
frm-brit, sb blky-blky, pred
sm-sl slty tex, tr vf pyr,
mod calc

9600-9700 CHK (65%):
predy med brn-lt gyshbn,
com lt gy, mot,
blky-tab-elg ctngs, chky
tex, frm-sl sft, tr diss
mic pyr, v calc; MRLST
(35%): predy dk gy, med
gy, frm-sl hrd, blky-sb tab,
tr CHK incl, mod-v calc, tr
imbd/pp pyr

9700-9800 CHK (90%): lt
gy-gyshbn-med gy wi occ
f wh chky incl thru,
frm-brit l-mod fis sb rd-sb
blky-blky ctngs, scat
foram, tr fos frags, v calc;
MRLST (10%): med
gyshbn-dk gy, frm-brit,
blky-sb blky, sm arg-sl



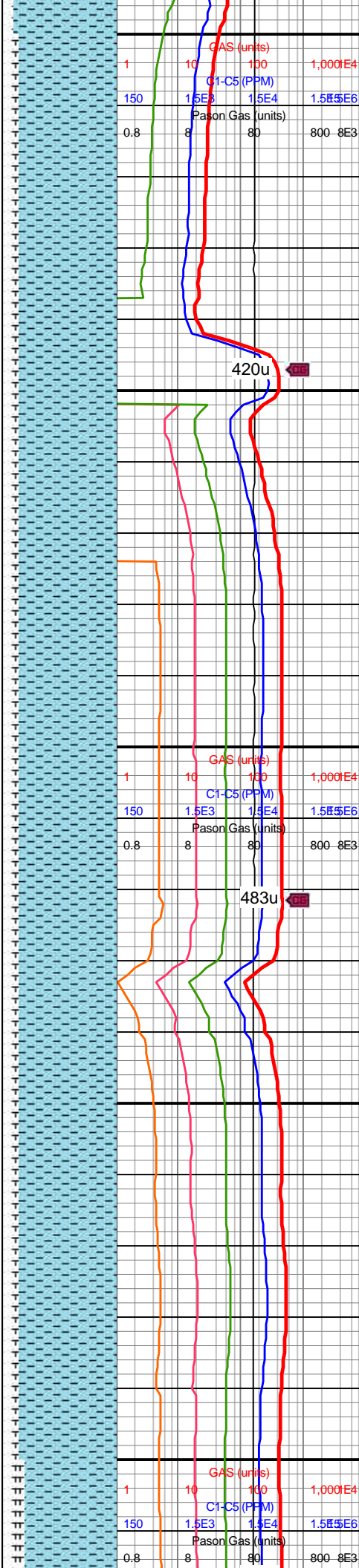


WOB: 39.3klbs
RPM: 70
SPM: 183
SPP: 4,086psi

MD: 9,860'
TVD: 7,115.64'
INC: 89.3°
AZM: 1.4°
VS: 2,060.89'

MD: 9,955'
TVD: 7,117.71'
INC: 88.2°
AZM: 0.96°
VS: 2,155.86'

WOB: 33.6klbs
RPM: 70
SPM: 185
SPP: 4,129psi

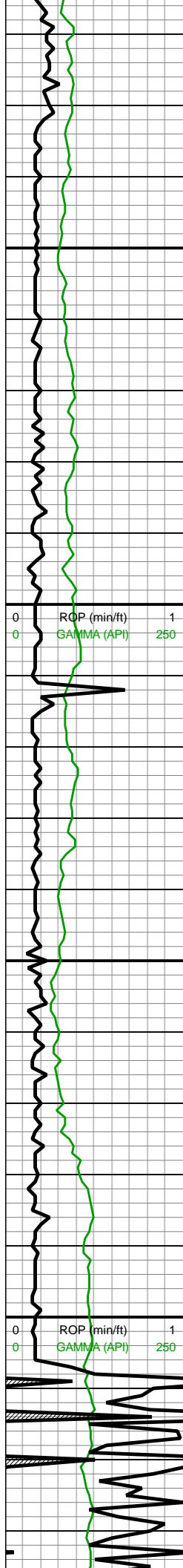


slty tex, mod calc

9800-9900 CHK (85%):
lt-med gy wi occ f wh chky
incl, frm-brit, sb blkly-blky
ctngs, tr foram, v tr fos
frag, tr vf pyr, hi calc;
MRLST (15%): dk gy, rr
blk, frm-brit, blkly-sb blkly
ctngs, predy sm arg tex,
sl slty ip, tr vf pyr, mod
calc

9900-10000 CHK (85%):
lt gy-gyshbn-med gy wi
occ f wh chky incl thru,
frm-brit sb blkly-blky
ctngs, chky tex, occ
cryptoxln, rr-tr foram, tr
fos frags, v calc; MRLST
(15%): med gyshbn-dk
gy, frm-brit, blkly-sb blkly,
sm arg-sl slty tex, mod
calc





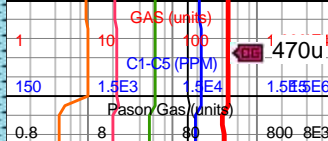
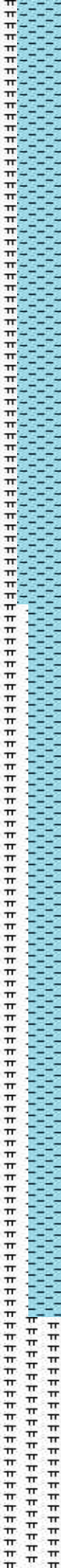
MW IN: 9.9
VIS IN: 44
MW OUT: 9.9
VIS OUT: 44

MD: 10,049'
TVD: 7,120.67'
INC: 88.2°
AZM: 0.17°
VS: 2,249.81'

MD: 10,144'
TVD: 7,123.8'
INC: 88.02°
AZM: 359.91°
VS: 2,344.76'

WOB: 35klbs
RPM: 70
SPM: 184
SPP: 4,160psi

MD: 10,239'

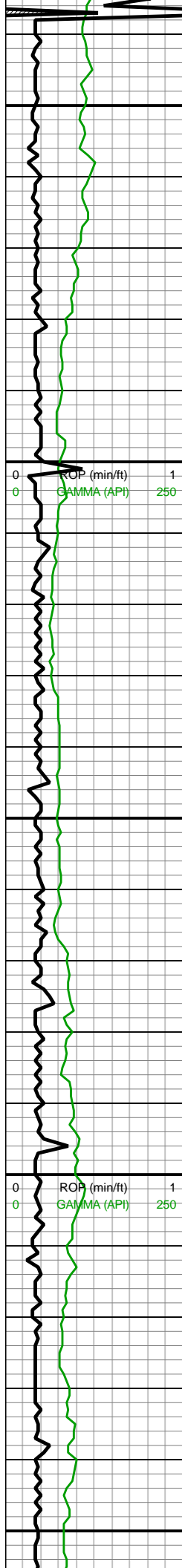


10000-10100 CHK
(80%): lt gy-med gy, occ
dk gy wi f wh chky incl,
frm, brit, mod fis sb
ang-sb blkly ctngs, sl slty
tex, hi calc; MRLST
(20%): dk gy-dk gyshbn,
frm, brit, mod fis sb
blkly-blky ctngs, sm sl slty
tex, tr bent, mod calc wi
brn mrly resdl



10100-10200 CHK
(70%): lt gy-med gy, med
gyshbnip ip-occ dk gy wi f
wh chky incl, frm, brit,
mod fis sb ang-sb blkly
ctngs, sl slty tex, hi calc;
MRLST (30%): dk gy-dk
gyshbn, frm, brit, mod fis
sb blkly-blky ctngs, sm sl
slty tex, rr-tr tn bent, mod
calc wi brn mrly resdl





TVD: 7,124.13'
INC: 91.58°
AZM: 1.32°
VS: 2,439.74'

10,240

10,250

10,260

10,270

10,280

10,290

10,300

10,310

10,320

10,330

10,340

10,350

10,360

10,370

10,380

10,390

10,400

10,410

10,420

10,430

10,440

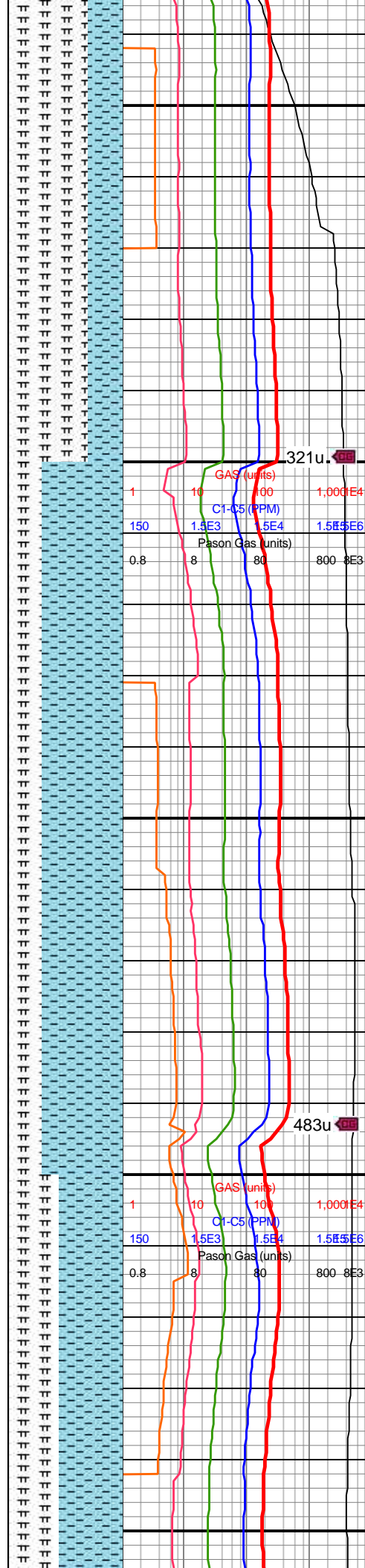
10,450

MD: 10,333'
TVD: 7,121.39'
INC: 91.76°
AZM: 0.88°
VS: 2,533.69'

MW IN: 10
VIS IN: 44
MW OUT: 10.0
VIS OUT: 43

WOB: 35klbs
RPM: 70
SPM: 186
SPP: 4,110psi

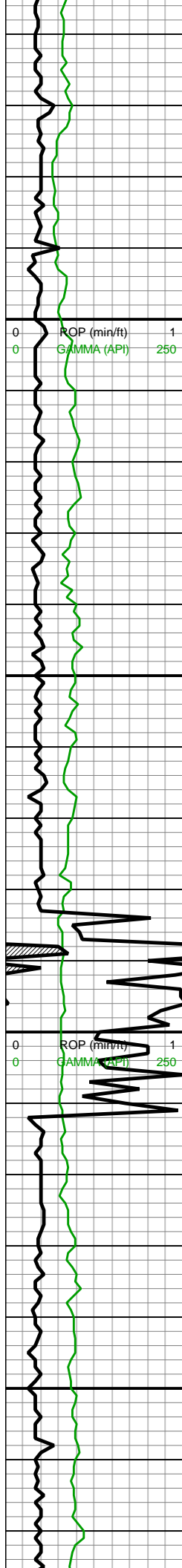
MD: 10,428'
TVD: 7,118.18'
INC: 92.11°
AZM: 1.32°
VS: 2,628.63'



10200-10300 MARLST
(70%): dk gy, frm to hd,
sb ang, arg to slty tex,
mod calc; CHK (30%): lt
gy to mod dk gry, fri to
mod frm, rd to sb ang,
sm sl slty tex, calc

10300-10400 CHK
(70%): lt gy to mod dk gry,
fri to mod frm, rd to sb
ang, sm sl slty tex, calc;
MRLST (30%): dk gy, frm
to hd, sb ang, arg to slty
tex, mod calc





10,460
10,470
10,480
10,490
10,500
10,510
10,520
10,530
10,540
10,550
10,560
10,570
10,580
10,590
10,600
10,610
10,620
10,630
10,640
10,650
10,660
10,670

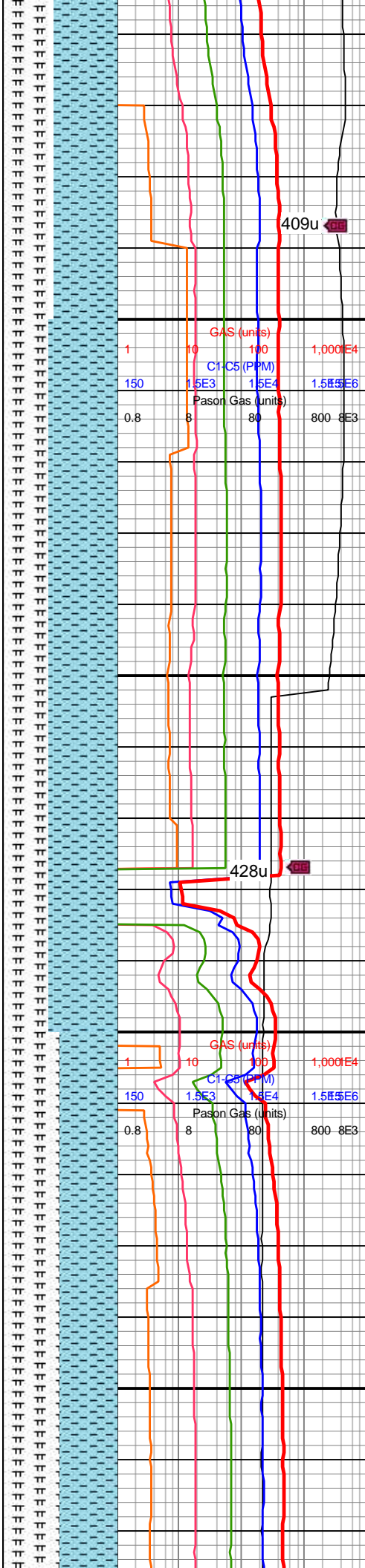
6" DTN

MD: 10,523'
TVD: 7,114.11'
INC: 92.81°
AZM: 1.23°
VS: 2,723.54'

MW IN: 10
VIS IN: 44
MW OUT: 10.0
VIS OUT: 42

WOB: 47klbs
RPM: 0
SPM: 190
SPP: 3,890psi

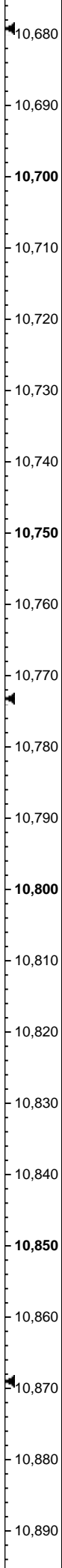
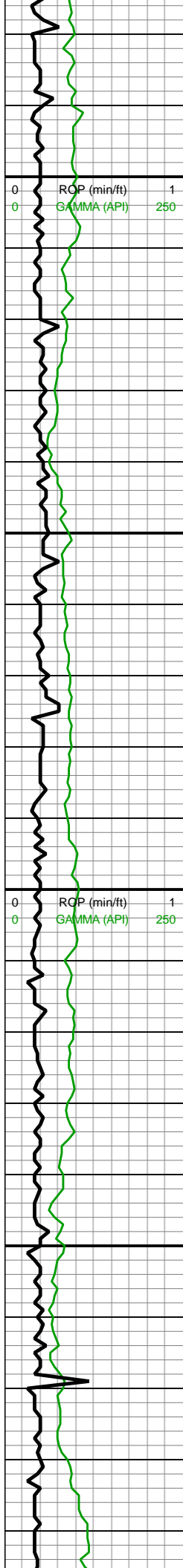
MD: 10,618'
TVD: 7,112.72'
INC: 88.86°
AZM: 1.4°
VS: 2,818.5'



10400-10500 CHK
(55%): lt gy-med gy, frm,
brit, mod fis sb ang-sb
blky ctngs, sm sl slty tex,
tr forams, hi calc; MRS LT
(45%): brn-dk gyshbn-dk
gy, frm-hd-brit, mod fis,
sb blky, dul rthy-wxy lstr,
mod calc wi brn mrly
resdl

10500-10600 CHK
(60%): med gy, frm, brit,
mod fis sb ang-sb blky
ctngs, sm sl slty tex, tr
forams, hi calc; MRS LT
(40%): brn-dk gyshbn-dk
gy, frm-hd, mod fis, sb
blky, dul rthy-wxy lstr,
mod calc wi brn mrly
resdl

10600-10700 CHK
(52%): med gy, frm, brit,
mod fis sb ang-sb blky
ctngs, sm sl slty tex, tr
forams, hi calc; MRS LT
(48%): brn-dk gyshbn-dk
gy, frm-hd, mod fis, sb
blky, dul rthy-wxy lstr,
mod calc wi brn mrly
resdl

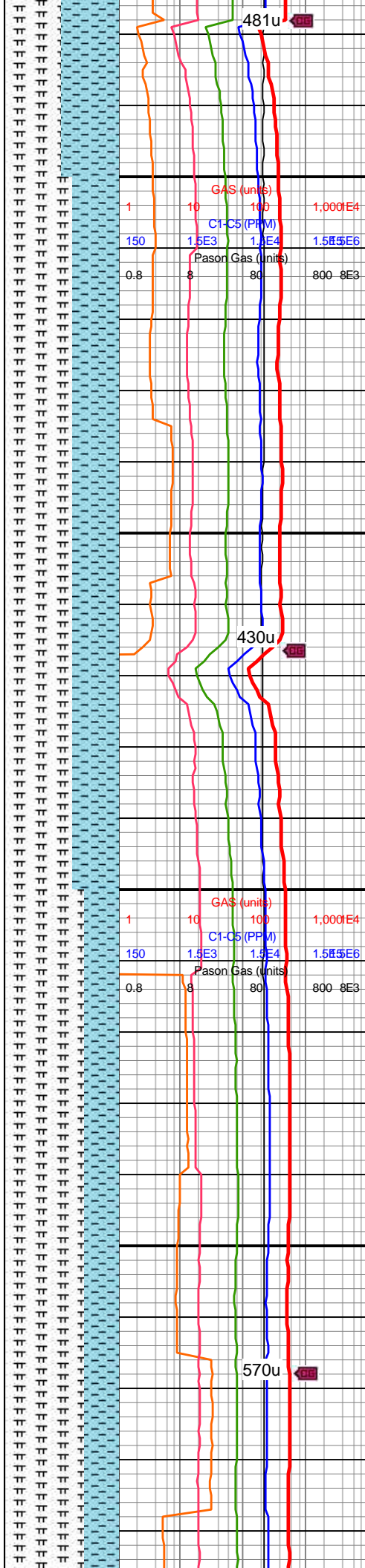


MD: 10,712'
TVD: 7,114.99'
INC: 88.37°
AZM: 1.23°
VS: 2,912.46'

WOB: 37klbs
RPM: 70
SPM: 188
SPP: 4,310psi

MD: 10,807'
TVD: 7,117.99'
INC: 88.02°
AZM: 0.79°
VS: 3,007.41'

MW IN: 10
VIS IN: 43
MW OUT: 10.0
VIS OUT: 41

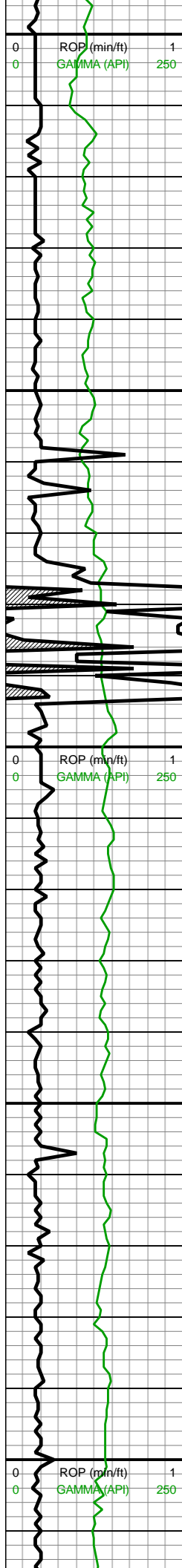


(50%): med gy, frm-brit, mod fis sb ang-sb blkly ctngs, sm sl slty tex, tr forams, hi calc; MRS LT (50%): gyshbn-dk gy, frm-hd, mod fis, sb blkly, dul rthy lstr, mod calc wi brn mrly resdl

10700-10800 CHK (40%): med gy, frm-brit, mod fis sb ang-sb blkly ctngs, sm sl slty tex, tr forams, hi calc; MRS LT (60%): gyshbn-dk gy, frm-hd, mod fis, sb blkly, dul rthy lstr, mod calc wi brn mrly resdl

10800-10900 MRS LT (70%): dk gy-md gy, v frm-mod hd, blk-sb ang ctngs, sl slty tex, hi calc; CHK (30%): lt gy-med gy,





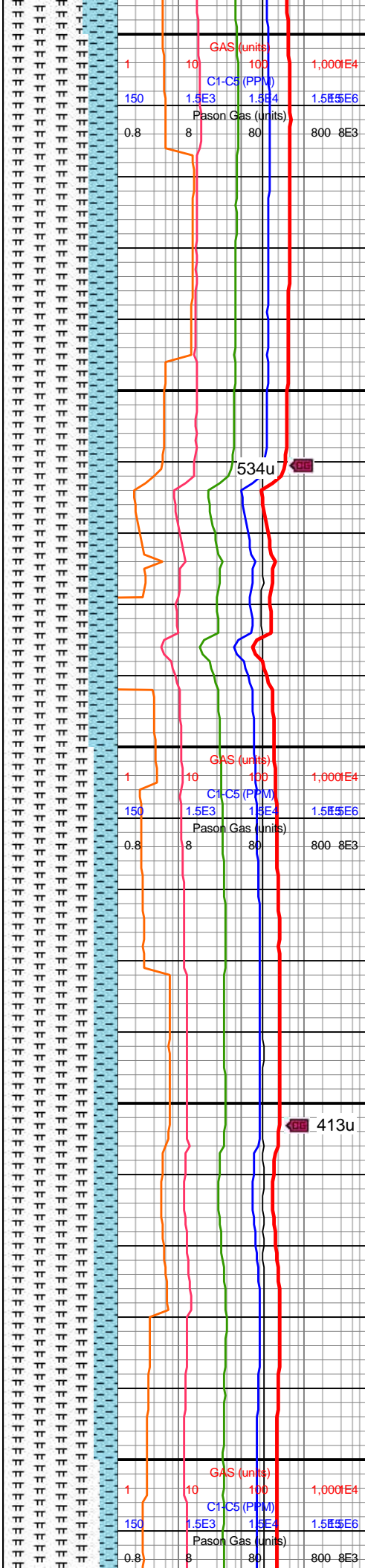
MD: 10,902'
TVD: 7,121.3'
INC: 87.98°
AZM: 0.17°
VS: 3,102.35'

MD: 10,996'
TVD: 7,122.67'
INC: 90.35°
AZM: 359.38°
VS: 3,196.32'

WOB: 32klbs
RPM: 70
SPM: 186
SPP: 4,220psi

MW IN: 10
VIS IN: 42
MW OUT: 10.0
VIS OUT: 40

MD: 11,090'
TVD: 7,122.02'
INC: 90.44°
AZM: 359.29°
VS: 3,290.3'

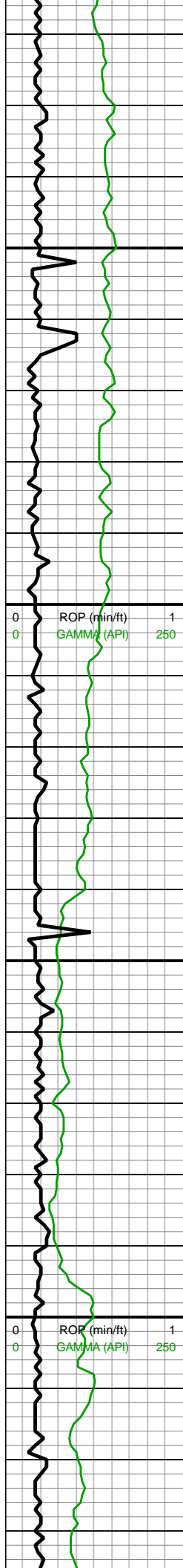


frm-v frm,mod plty-blky
ctngs, rthy tex, hi calc

10900-11000 MRS LT
(75%): dk gy-md gy, v
frm-mod hd, blk-sb ang
ctngs, sl slty tex, hi calc;
CHK (25%): lt gy-med gy,
frm-v frm,mod plty-blky
ctngs, rthy tex, hi calc

11000-11100 mrlst
(80%) gy-dk gy, v
frm-mod hd, blkky, mod
slty tex, calc tr bent; chk
(20%) lt gy, sft-fri, rnd-blky,
sl slty tex, hi calc





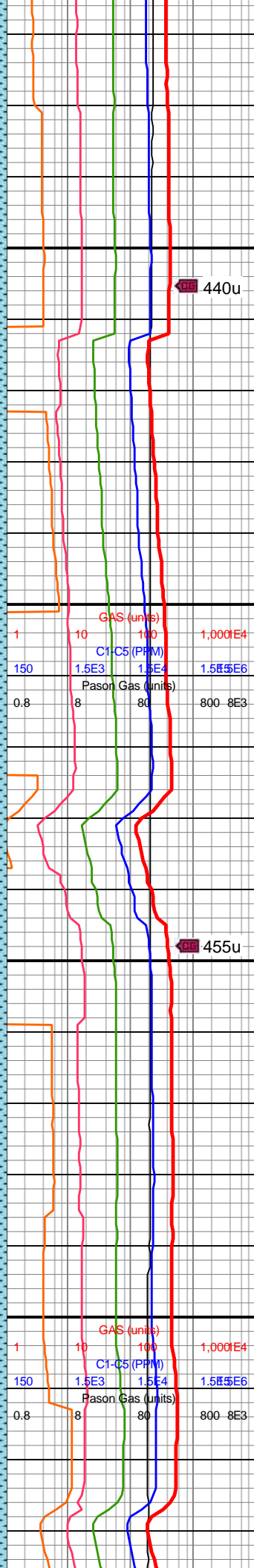
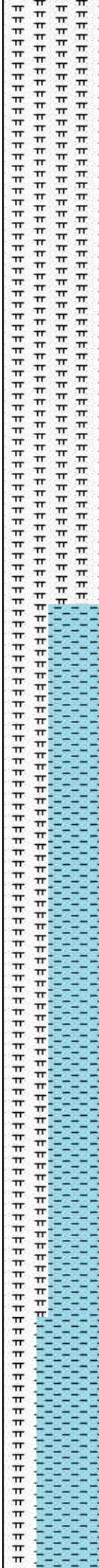
11,120
11,130
11,140
11,150
11,160
11,170
11,180
11,190
11,200
11,210
11,220
11,230
11,240
11,250
11,260
11,270
11,280
11,290
11,300
11,310
11,320
11,330

MD: 11,185'
TVD: 7,121.04'
INC: 90.75°
AZM: 360°
VS: 3,385.29'

WOB: 36klbs
RPM: 70
SPM: 186
SPP: 4,300psi

MW IN: 9.95
VIS IN: 43
MW OUT: 10.0
VIS OUT: 41

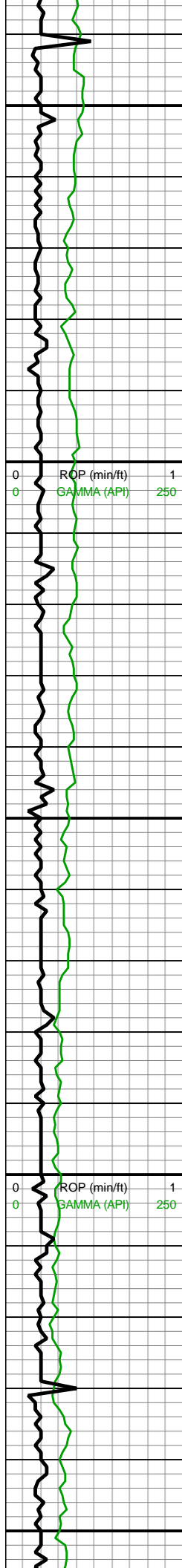
MD: 11,279'
TVD: 7,119.27'
INC: 91.41°
AZM: 0.88°
VS: 3,479.27'



11100-11200 mrlst
(85%) gy-dk gy, v
frm-mod hd, blkly,mod
sly tex, calc tr bent; chk
(15%)lt gy, sft-fri, rnd-blky,
sl sly tex, hi calc

11200-11300 chk (60%)lt
gy, sft-fri, rnd-blky, sl sly
tex, hi calc; mrlst (40%)
gy-dk gy, v frm-mod hd,
splintery-blky, mod sly
tex, calc



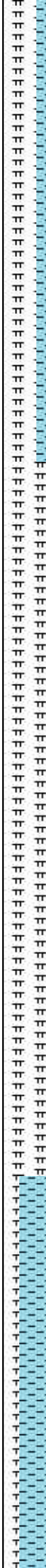


11,340
11,350
11,360
11,370
11,380
11,390
11,400
11,410
11,420
11,430
11,440
11,450
11,460
11,470
11,480
11,490
11,500
11,510
11,520
11,530
11,540
11,550

MD: 11,374'
TVD: 7,117.29'
INC: 90.97°
AZM: 0.44°
VS: 3,574.25'

WOB: 36klbs
RPM: 70
SPM: 184
SPP: 4,311psi

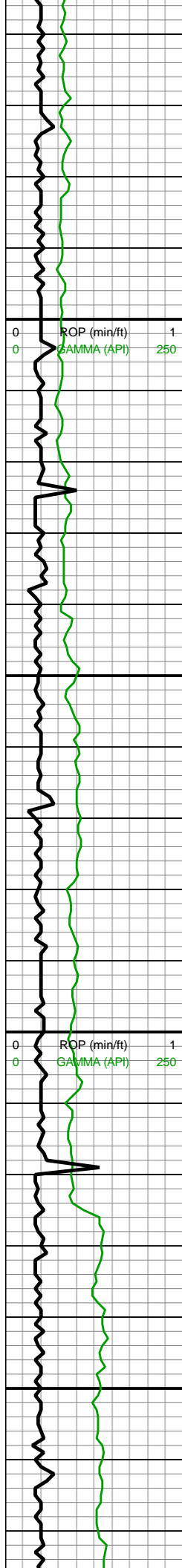
MD: 11,469'
TVD: 7,115.73'
INC: 90.92°
AZM: 0.17°
VS: 3,669.23'



11300-11400 CHK
(70%)lt gy, sft-fri,md-blky,
sl slty tex, hi calc; MRLST
(30%) gy-dk gy, v
frm-mod hd,
splintery-blky, mod slty
tex, mod calc

11400-11500 CHK (60%)
dk gy,frm-mod hd, blky,
lam tex, hi calc; MRLST
(40%) lt gy-gy, sft-fis, sub
rd, free drop o, rthy tex, hi
calc





MD: 11,563'
TVD: 7,113.93'
INC: 91.27°
AZM: 358.15°
VS: 3,763.19'

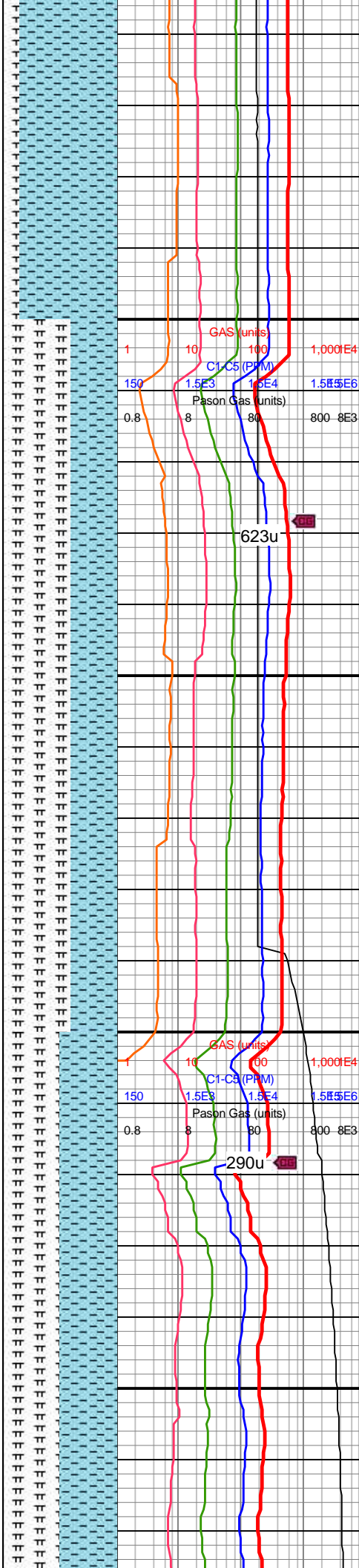
WOB: 36klbs
RPM: 70
SPM: 186
SPP: 4,370psi

MW IN: 10
VIS IN: 43
MW OUT: 10.0
VIS OUT: 41

MD: 11,657'
TVD: 7,111.77'
INC: 91.36°
AZM: 357.36°
VS: 3,857.06'

5' DTS

MD: 11,752'
TVD: 7,109.59'
INC: 91.27°
AZM: 357.54°
VS: 3,951.9'

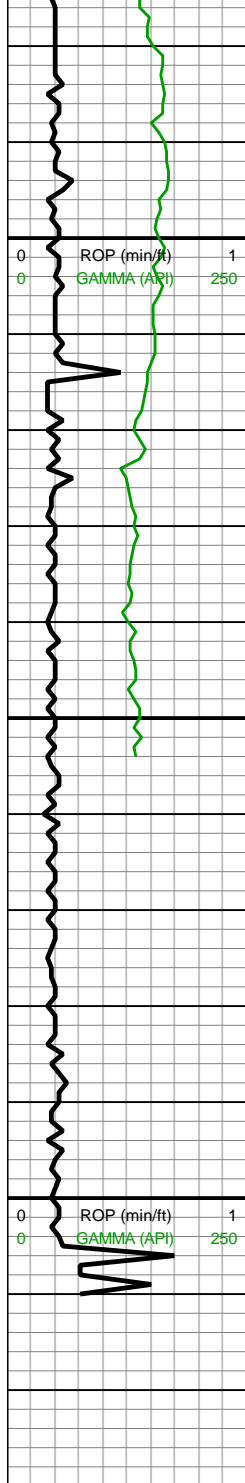


11500-11600 CHK (85%)
dk gy, frm-mod hd, blk, lam tex, hi calc; MRLST (15%) lt gy-gy, sft-fis, sub rd, free drop o, rthy tex, hi calc



11600-11700 MRLST (60%) dk gy, frm-hd, mod blk, lam ip, hi calc; CHK (40%) lt gy, brit-sft, rthy, hi calc





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

WOB: 36klbs
RPM: 70
SPM: 188
SPP: 4,410psi

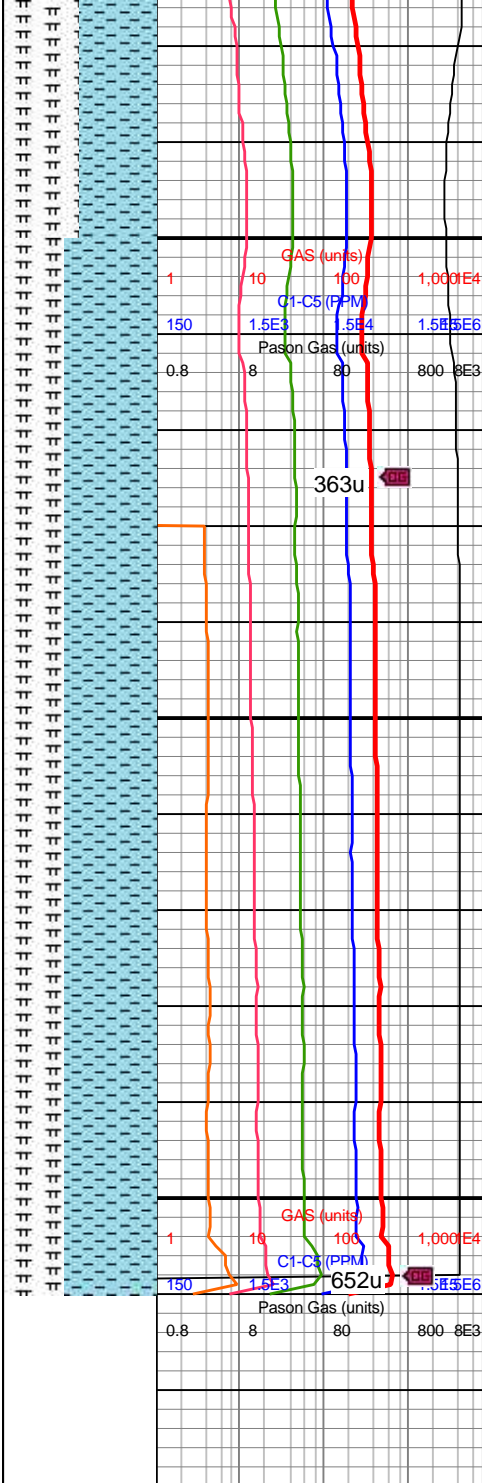
MW IN: 10
VIS IN: 43
MW OUT: 10.0
VIS OUT: 41

MD: 11,849'
TVD: 7,107.03'
INC: 91.76°
AZM: 357.27°
VS: 4,048.73'

Bit Projection

MD: 11,910'
TVD: 7,105.15'
INC: 91.76°
AZM: 357.27°
VS: 4,109.6'

Reach TD @
14:45 hrs on
6/23/18



11700-11800 MRLST
(50%) dk gy, frm-hd, mod
blky, lam ip, hi calc; CHK
(50%) lt gy, brit-sft, rthy, hi
calc

11800-11910 CHK
(60%): predy lt gy, med gy
ip, sb frm-frm, crunchy ip,
mod fis sb rd-sb ang-sb
blky ctngs, sl slty-sdy tex,
thn wh chky lamn, tr
forams, tr-rr pyr strg, hi
calc; MRLST (40%):
brn-gyshbn-dk gy-dk
gyshbn, frm-brit-hd,
sm-sl slty tex, tr-rr vf pyr,
mod calc wi brn mrly
resdl

