



RESERVOIR GROUP

Scale: 5" / 100'
Measured Depth Log

Well Name Sam 3N-25H-M166_Mudlog_COGCC

Location Sec. 25 T1N R66W

State Colorado

County Weld

Country USA

Rig Number Ensign 140

API Number 05123461220000

AFE # 16190878

Geographic Region Rockies

Field Wattenberg

Spud Date 9/18/2018

Drilling Completed 9/20/2018

Surface Coordinates Lat/Long: 40.018538/-104.733856
SHL: Sec. 25 T1N R66W
Footage: 1283 FSL 309 FWL

Bottom Hole Coordinates Proposed BHL: Sec. 25 T1N R66W
Footages: 225 FFSLL 460 FFELL

Ground Elevation 5,080'

K.B. Elevation 5,109'

Logged Interval 6,950' **To** 12,098'

Total Depth 12,098'

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

Zone Color Coding

Oil	Condensate	Gas
Note	Core	Pressure
Error	Water	Seal

Other

Loggers: Nicholas Watkins / Thomas Yull

Services Provided: 2-Man Mudlogging / Geosteering

Equipment: ML-533

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

Service Start Date: 9/18/2018

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
 BRACHIOIPOD
 BRYOZOA
 CEPHALOPOD
 CORAL
 CRINOID
 ECHINOID
 FISH
 FORAMINIFERA

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
- INTEROOLITIC
- MOLDIC

- ORGANIC
- PINPOINT
- VUGGY

Engineering

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

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

Rounding

- ANGULAR
- ROUNDED
- SUBANG
- SUBRND

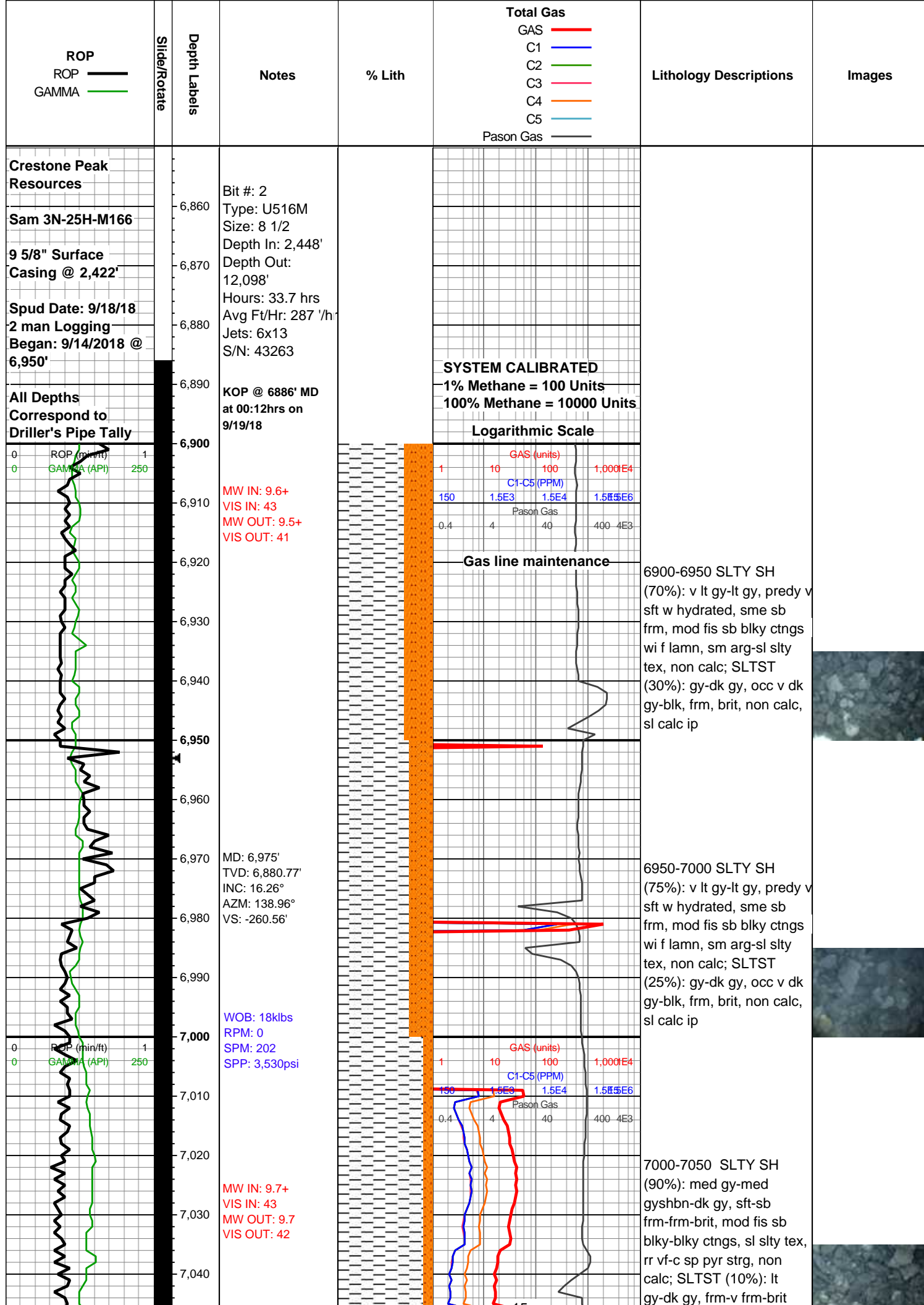
Textures

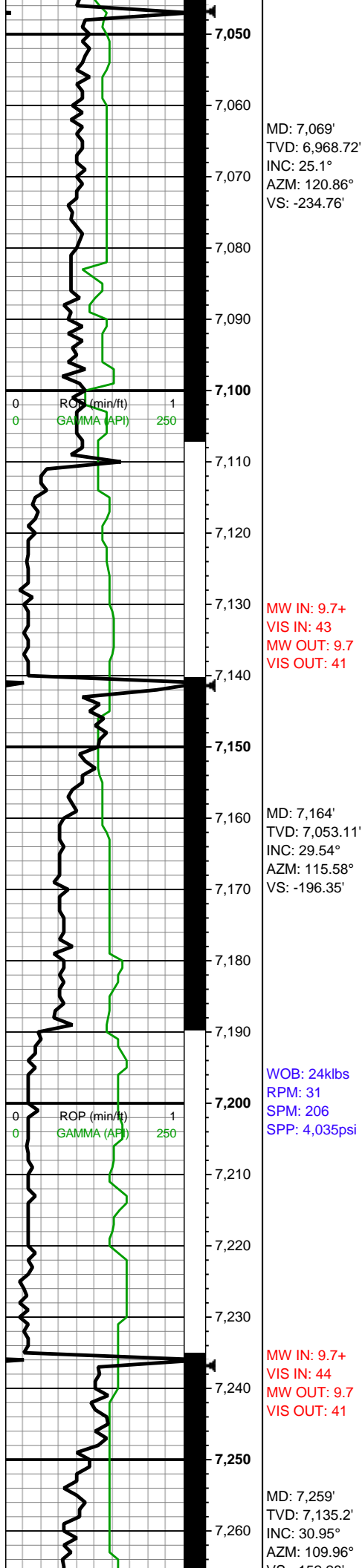
- BOUNDSTONE
- CHALKY
- CRYPTOXLN
- E EARTHY
- FINELYXLN
- GRAINSTONE

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

Sorting

- M MODERATE
- P POOR
- W WELL





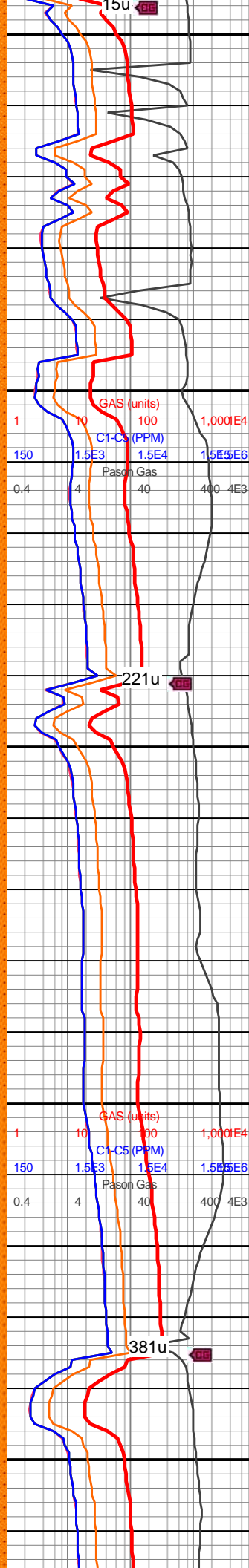
MD: 7,069'
TVD: 6,968.72'
INC: 25.1°
AZM: 120.86°
VS: -234.76'

MW IN: 9.7+
VIS IN: 43
MW OUT: 9.7
VIS OUT: 41

WOB: 24klbs
RPM: 31
SPM: 206
SPP: 4,035psi

MW IN: 9.7+
VIS IN: 44
MW OUT: 9.7
VIS OUT: 41

MD: 7,259'
TVD: 7,135.2'
INC: 30.95°
AZM: 109.96°
VS: -158.20'



silc sltst, non calc

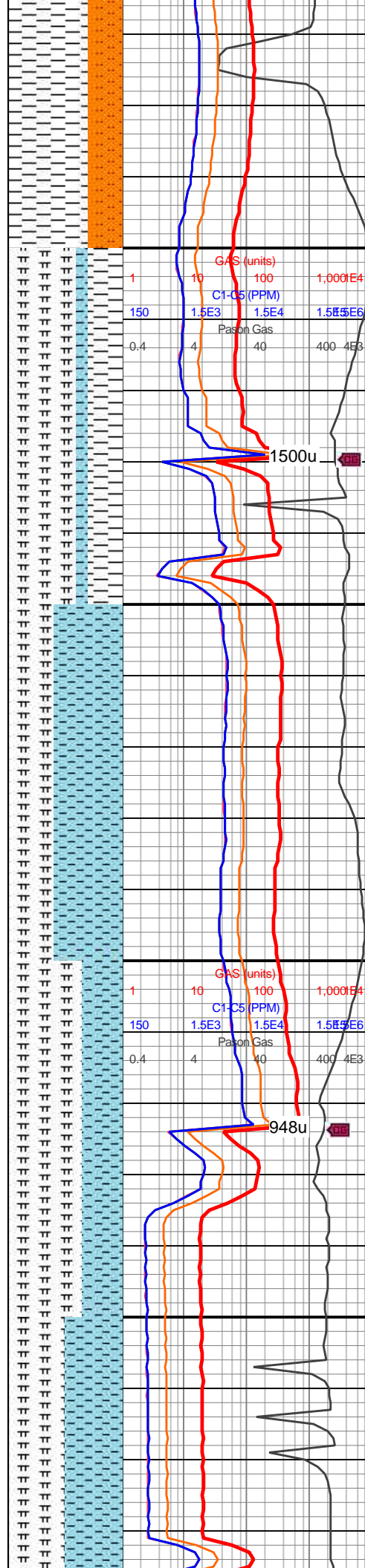
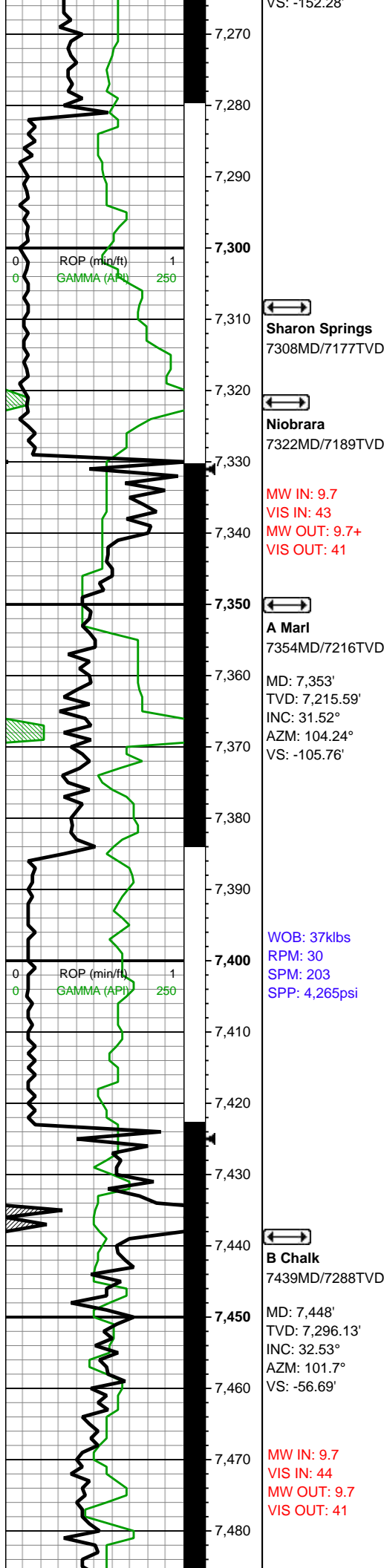
7050-7100 SLTY SH
(70%): predy gy-gyshbn
sb frm-frm mod fis sb
blky-sb plty ctngs, occ off
wh-v lt gy sft w hydrated
gumbo slty sh, thn lamn,
slty arg tex, non calc;
SLTST (30%): gy-dk gy,
frm-brit, sb plty-plty, brit,
occ v dk gy wi vugy silc
vn, tr vf pyr, non calc

7100-7150 SLTY SH
(70%): predy gy-gyshbn
sb frm-frm mod fis sb
blky-sb plty ctngs, occ off
wh-v lt gy sft w hydrated
gumbo slty sh, thn lamn,
slty arg tex, non calc;
SLTST (30%): gy-dk gy,
frm-brit, sb plty-plty, brit,
occ v dk gy wi vugy silc
vn, tr vf pyr, non calc

7150-7200 SLTY SH
(70%): predy gy-gyshbn
sb frm-frm mod fis sb
blky-sb plty ctngs, occ off
wh-v lt gy sft w hydrated
gumbo slty sh, thn lamn,
slty arg tex, non calc;
SLTST (30%): gy-dk gy,
frm-brit, sb plty-plty, brit,
occ v dk gy wi vugy silc
vn, tr vf pyr, non calc

7200-7250 SLTY SH
(65%): predy gy-gyshbn
sb frm-frm mod fis sb
blky-sb plty ctngs, occ off
wh-v lt gy sft w hydrated
gumbo slty sh, thn lamn,
slty arg tex, non calc;
SLTST (35%): gy-dk gy,
frm-brit, sb plty-plty, brit,
occ v dk gy wi vugy silc
vn, tr vf pyr, non calc

7250-7300 SLTY SH



7250-7300 SELT SH
(70%): predy gy-gyshbn
sb frm-frm mod fis sb
blky-sb plty ctngs, occ off
wh-v lt gy sft w hydrated
gumbo slty sh, thn lamn,
slty arg tex, non calc;
SLTST (30%): gy-dk gy,
frm-brit, sb plty-plty, brit,
occ v dk gy wi vugy silc
vn, tr vf pyr, non calc

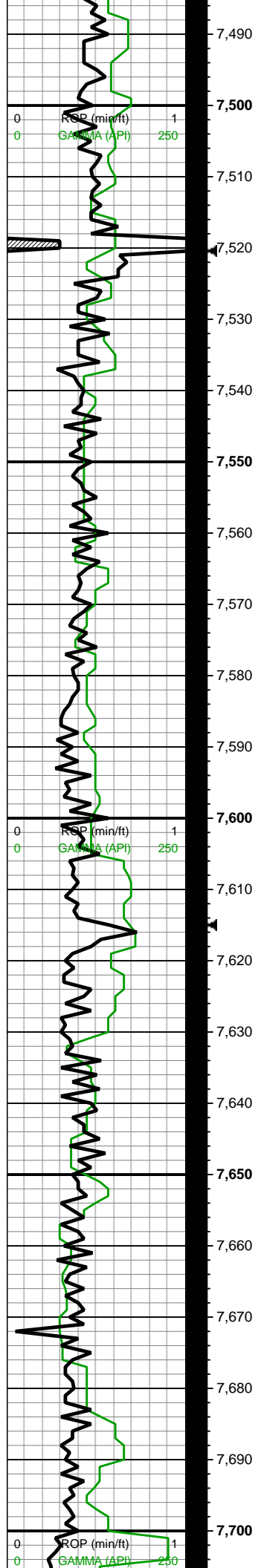
7300-7350 MRLST
(60%): dk gy-dk gyshbn,
sb blky-splty ctngs, sl hd,
brit, mnv chk intbds, tr
dissm mic pyr, mod-hi
calc; SH (30%): gy-dk gy,
frm, brit, mod fis, sb
blky-blky, wh silc vn ip, rr
bent, mod calc; CHK
(10%): med gy-gyshbn,
mot, sb blky-sb tab ctngs,
sl frm-frm, brit, mnv vf
lam, hi calc

7350-7400 CHK (60%): lt
gy-med gy, dk gy ip mot
wi wh chky incl & forams,
sb frm-frm-brit, l-mod fis
sb rd-sb blky-blky ctngs,
sl slty tex, rr forams, tr fos
frags, tr vf pyr, hi calc;
MRLST (40%): gy-dk
gy-dk gyshbn, frm-brit,
mod fis sb blky ctngs,
sm-sl slty tex, rr bent,
mod calc wi brn mrly
resdl

7400-7450 MRLST
(65%): dk gyshbn-dk gy,
sb frm-frm, brit, med fis
ang-sb blky-blky ctngs,
thn mrly lamn, sl
slty-bmpy text, rr f pyr,
mod calc; CHK (35%): dk
gy wi thn wh chky lamn,
frm, brit, mod fis sb blky
ctngs, sl slty tex, hi calc

7450-7500 MRLST
(50%): dk gy-dk gyshbn,
sb frm-frm, mod fis sb
blky-blky ctngs, sl slty tex,
rr f pyr, tr bent, mod calc
wi brn mrly resdl; CHK
(50%): dk gy wi thn wh



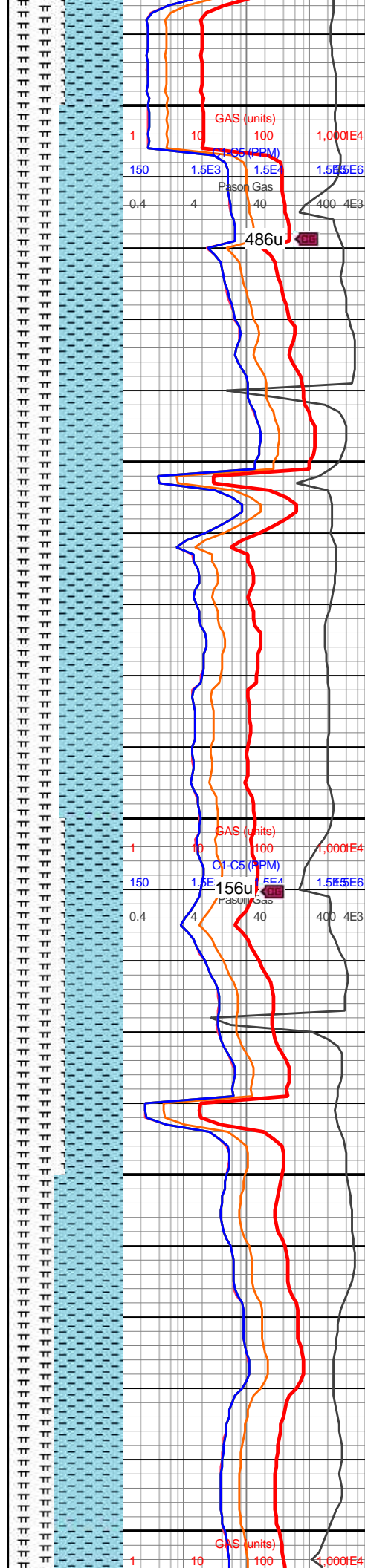


MD: 7,543'
TVD: 7,371.85'
INC: 41.63°
AZM: 98.27°
VS: -0.34'

WOB: 30klbs
RPM: 0
SPM: 204
SPP: 3,800psi

MD: 7,637'
TVD: 7,436.9'
INC: 50.68°
AZM: 98.97°
VS: 66.59'

MW IN: 9.55



(55%): dk gy w/ thin wh chky lamn, frm, brit, mod fis sb blkly ctngs, sl slty tex, tr forams, hi calc

7500-7550 CHK (55%): lt gy-lt gyshbn, occ med gy wi f wh chky incl & lamn, frm, brit, med-hi fis blkly-sb plty ctngs, sl slty tex, hi calc; MRLST (45%): v dk gy, mot wi brn marly incl ip, frm-hd, brit, med fis ang-sb blkly-blky ctngs, thn mrly lamn, sl slty tex, rr f pyr, mod calc

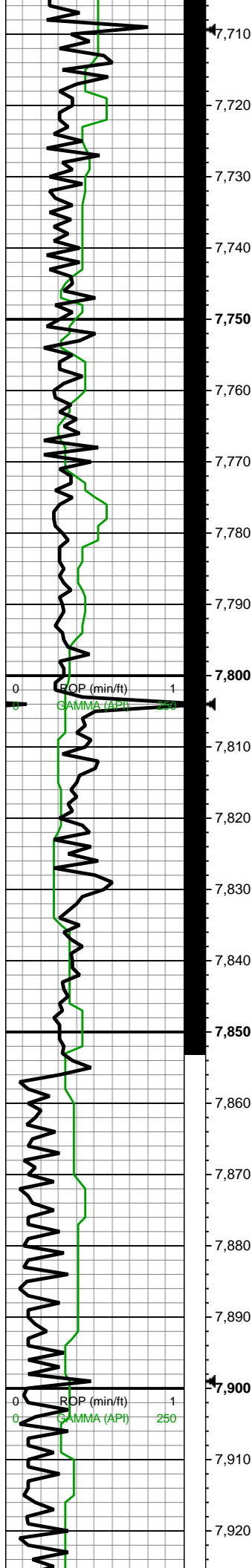
7550-7600 CHK (55%): lt gy-lt gyshbn, occ med gy wi f wh chky incl & lamn, frm, brit, med-hi fis blkly-sb plty ctngs, sl slty tex, rr-tr f-euhed lse pyr strg, hi calc; MRLST (45%): v dk gy, frm-hd, brit, med fis ang-sb blkly-blky ctngs, thn mrly lamn, sl slty tex, rr f pyr, mod calc wi brn mrly resdl

7600-7650 CHK (50%): lt gy-med gy, frm-brit, mod fis sb blkly-blky ctngs, sl slty tex, rr forams, tr vf pyr, hi calc; MRLST (50%): dk gy, frm-brit, mod fis sb blkly ctngs, sm-sl slty tex, mod calc wi brn mrly resdl

7650-7700 CHK (60%): off wh-v lt gy-lt gy, sb frm-frm, mod fis sb blkly-blky-sb plty water solu ctngs, sm arg-sl slty tex, tr vf pyr, hi calc; MRLST (40%): v dk gy-blk, frm-brit, mod fis sb blkly ctngs, sm-sl slty tex, mod calc wi brn mrly resdl

7700-7750 CHK (60%):





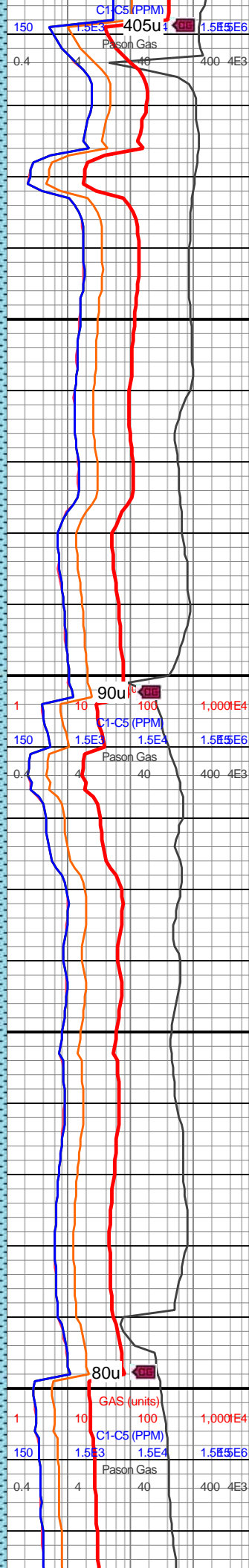
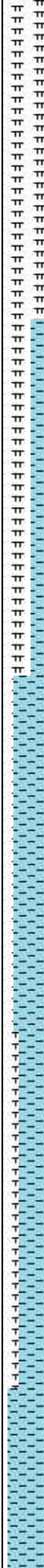
VIS IN: 42
MW OUT: 9.55
VIS OUT: 42

MD: 7,732'
TVD: 7,489.86'
INC: 61.45°
AZM: 97.92°
VS: 144.43'

WOB: 23klbs
RPM: 0
SPM: 202
SPP: 3,640psi

MD: 7,826'
TVD: 7,525.08'
INC: 74.46°
AZM: 93.43°
VS: 230.92'

MD: 7,921'
TVD: 7,548.46'
INC: 77.05°
AZM: 91.06°



7700-7750 CHK (80%):
off wh-v lt gy-lt gy, sb
frm-frm, mod fis sb
blky-blky-sb plty water
solu ctngs, sm arg-sl slty
tex, tr vf pyr, hi calc;
MRLST (40%): v dk
gy-blk, frm-brit, mod fis
sb blky ctngs, sm-sl slty
tex, mod calc

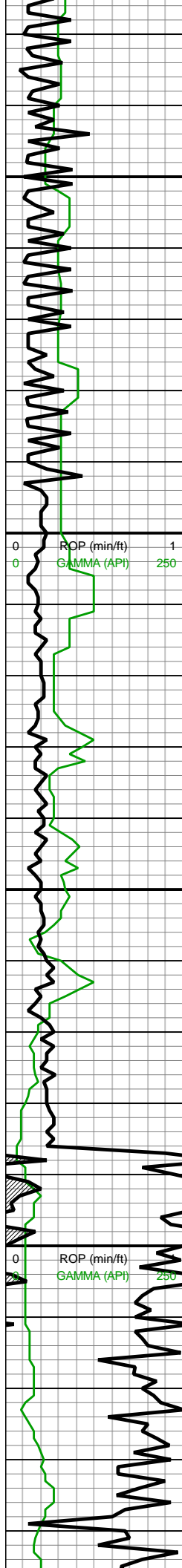
7750-7800 CHK (75%):
off wh-v lt gy-lt gy, sb
frm-frm, mod fis sb
blky-blky-sb plty water
solu ctngs, sm arg-sl slty
tex, tr vf pyr, hi calc;
MRLST (25%): v dk
gy-blk, frm-brit, mod fis
sb blky ctngs, sm-sl slty
tex, mod calc wi brn mrlly
resdl

7800-7850 CHK (90%):
off wh-v lt gy-lt gy, sb
frm-frm water solu ctngs,
mod fis, sb blky-blky-sb
plty, sm arg-sl slty tex, tr
vf pyr, hi calc; MRLST
(10%): v dk gy-blk,
frm-brit, mod fis sb blky
ctngs, sm-sl slty tex, mod
calc

7850-7900 CHK (85%):
off wh-v lt gy-lt gy, sb
frm-frm, mod fis sb
blky-blky-sb plty water
solu ctngs, sm arg-sl slty
tex, tr vf pyr, hi calc;
MRLST (15%): v dk
gy-blk, frm-brit, mod fis
sb blky ctngs, sm-sl slty
tex, mod calc

7900-7950 CHK (95%):
off wh-v lt gy-lt gy, sb
frm-frm water solu ctngs,
mod fis, sb blky-blky-sb
plty, sm arg-sl slty tex, tr
vf pyr, hi calc, wi rr mrlst;
MRLST (rr): v dk gy-blk,





7,930
7,940
7,950
7,960
7,970
7,980
7,990
8,000
8,010
8,020
8,030
8,040
8,050
8,060
8,070
8,080
8,090
8,100
8,110
8,120
8,130
8,140

VS: 322.9'

MW IN: 9.75
VIS IN: 43
MW OUT: 9.6
VIS OUT: 42

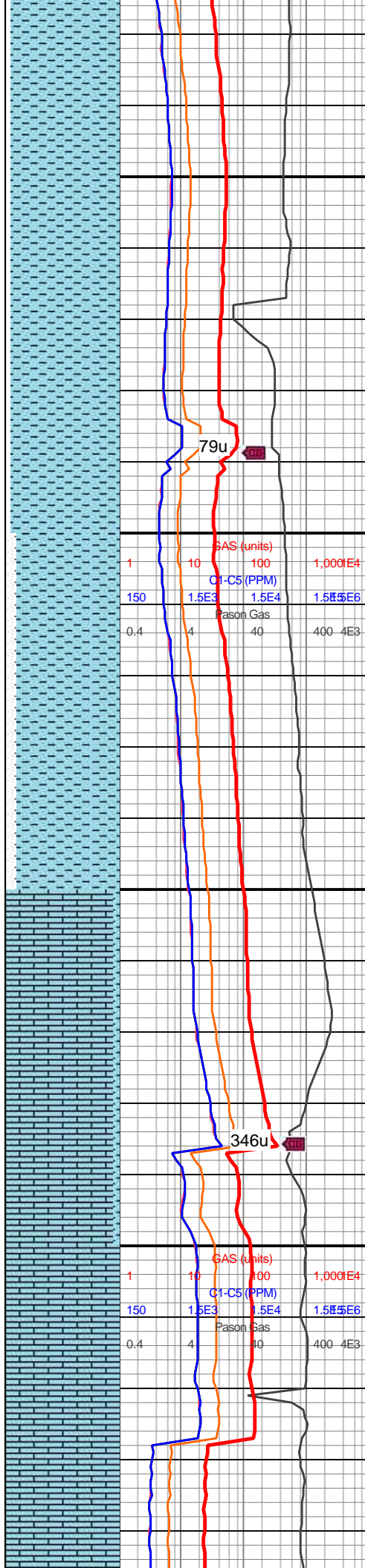
WOB: 39klbs
RPM: 31
SPM: 202
SPP: 4,330psi

MD: 8,015'
TVD: 7,570.57'
INC: 75.74°
AZM: 91.24°
VS: 414.24'

Fort Hays
8064MD/7582TVD

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

MD: 8,110'
TVD: 7,592.06'
INC: 78.11°
AZM: 91.59°
VS: 506.74'



frm-brit, mod fis sb blkly
ctngs, sm-sl slty tex, mod
calc

7950-8000 CHK (85%):
off wh-v lt gy-lt gy, sb
frm-frm, mod fis sb
blkly-blky-sb plty water
solu ctngs, sm arg-sl slty
tex, tr vf pyr, hi calc;
MRLST (15%): v dk
gy-blk, frm-brit, mod fis
sb blkly ctngs, sm-sl slty
tex, mod calc

79u

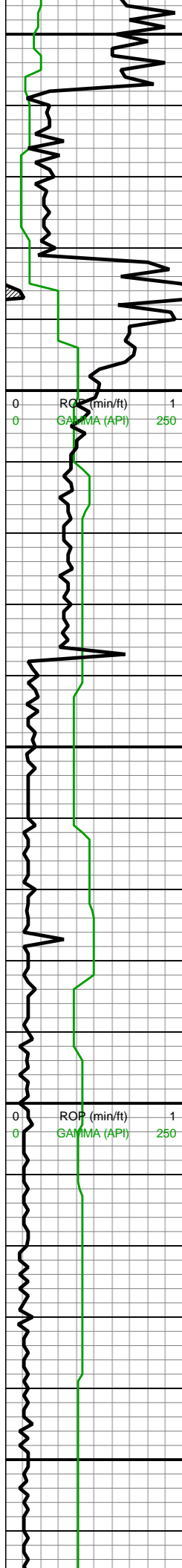
8000-8050 CHK (90%): v
lt gy-lt gy, off wh ip, mod
fis sb blkly-blky-sb plty
water solu sft-sb frm-frm
ctngs, sm arg-sl slty tex,
tr vf pyr, hi calc; MRLST
(10%): v dk gy-blk,
frm-brit, mod fis sb blkly
ctngs, sm-sl slty tex, mod
calc wi brn mrly resdl

346u

8050-8100 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; CHK (10%):
lt gy, sb frm-frm, water
solu mod fis ctngs, sm
arg-sl slty tex, hi calc

8100-8150 LS (100%):
crm-tn-lt brn, frm-hd, brit,
sb rd-sb blkly-blky crpxln
mudst, wkst ip, wxy lstr, rr





MW IN: 9.75
VIS IN: 43
MW OUT: 9.75
VIS OUT: 42



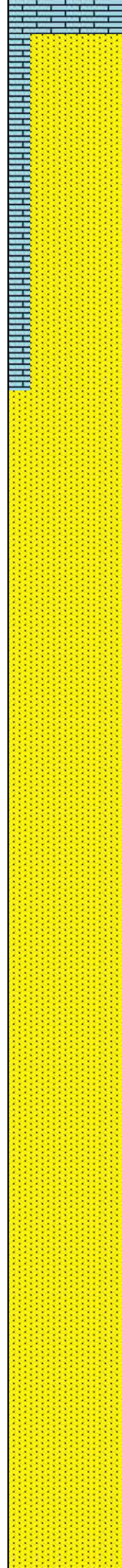
Codell
8193MD/7603TVD

MD: 8,204'
TVD: 7,603.59'
INC: 87.78°
AZM: 90.01°
VS: 599.91'

WOB: 34klbs
RPM: 0
SPM: 202
SPP: 3,750psi

Curve landed
8232' MD @
13:41hrs on
9/19/18

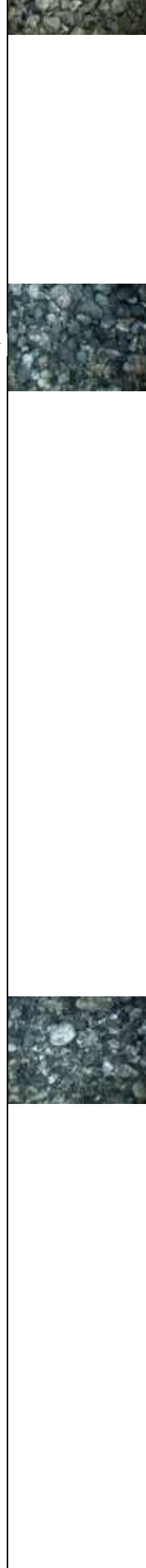
MD: 8,299'
TVD: 7,603.66'
INC: 92.13°
AZM: 88.16°
VS: 694.87'

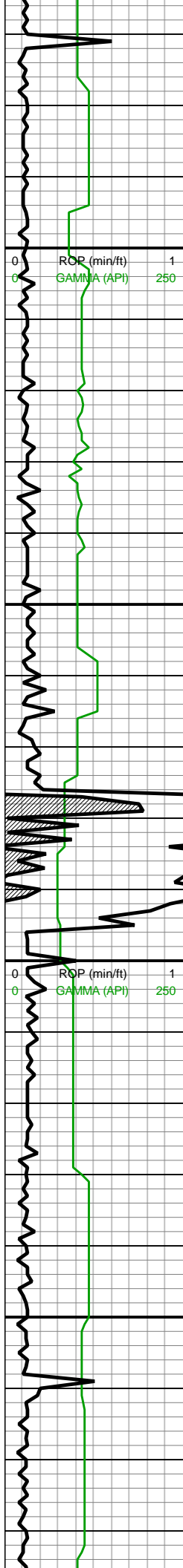


f pyr, hi calc

8150-8200 SST (80%):
off wh-lt gy-med gy, dk gy
s&p ip, sft v arg mtx sup
sst-frm sli fri gr sup sst
clus cons wi silc cmt, p
srt'd vf-slt'y-f grs, predy
non calc; LS (20%):
crm-t'n-lt brn, frm-hd, brit,
sb rd-sb blk'y-blk'y crpxln
mudst, wkst ip, wxy lstr, rr
f pyr, hi calc

8200-8300 SST (100%):
predy lt gy-gyshbn-gy
frm-sli fri gr sup sst clus
cons wi silc cmt, dk gy
s&p ip, occ-com sft v arg
mtx sup sst, p srt'd
vf-slt'y-f grs, predy non
calc





On gas buster

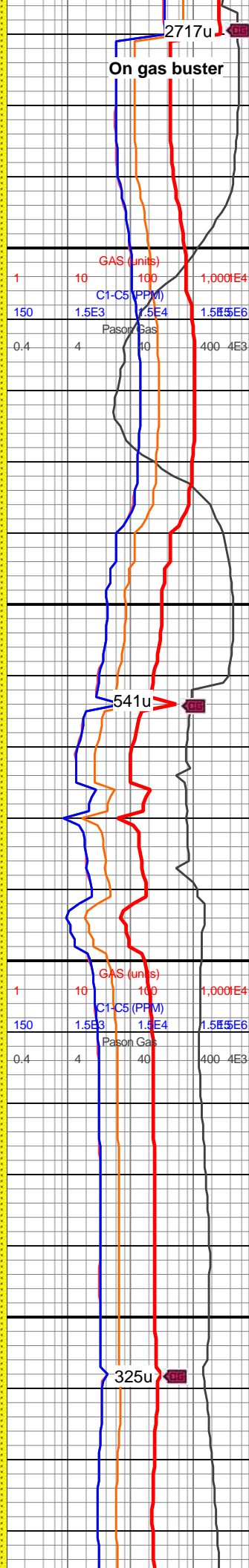
MD: 8,393'
TVD: 7,599.73'
INC: 92.66°
AZM: 88.07°
VS: 788.74'

WOB: 42klbs
RPM: 66
SPM: 202
SPP: 4,420psi

MW IN: 9.75
VIS IN: 43
MW OUT: 9.75
VIS OUT: 42

MD: 8,488'
TVD: 7,597.65'
INC: 89.85°
AZM: 85.96°
VS: 883.58'

MD: 8,582'
TVD: 7,598.84'
INC: 88.7°
AZM: 84.56°



On gas buster

2717u

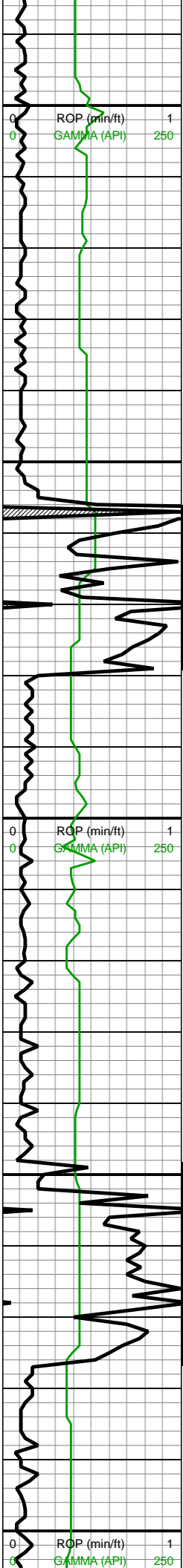
541u

325u

8300-8400 SST (100%):
predy lt gy-gyshbn-gy
frm-sli fri f-u f gr sup sst
clus cons wi silc cmt, dk
gy s&p ip, occ-com sft v
arg mtX sup slty-vf gr sst,
predy non calc

8400-8500 SST (100%):
tn-lt gy-med gy, dk gy ip,
frm-hd sli fri gr sup sst
clus cons wi silc cmt,
occ-com sft mtX sup clus
cons wi arg cmt, slty-vf-u f
sd grs, predy non calc, rr
sl calc ip

8500-8600 SST (100%):
predy lt gy-gyshbn-gy
frm-sli fri gr sup sst clus
cons wi silc cmt, dk gy



VS: 977.26'

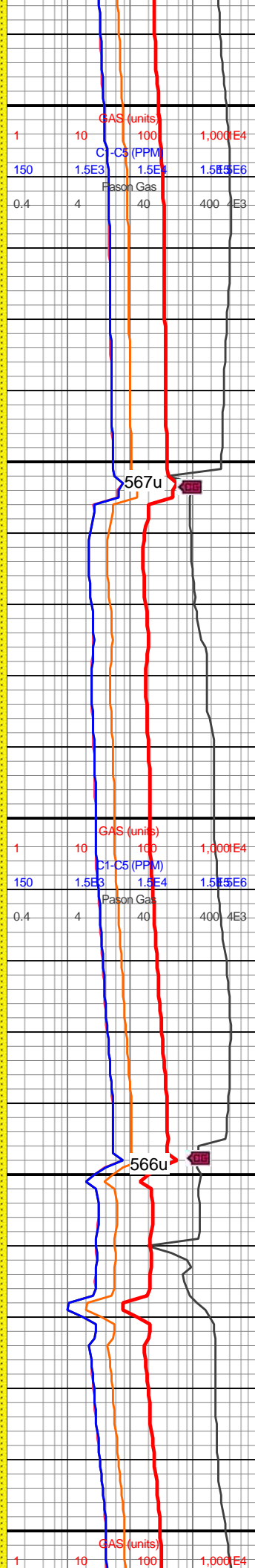
WOB: 35klbs
RPM: 65
SPM: 204
SPP: 4,470psi

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

MD: 8,676'
TVD: 7,600.57'
INC: 89.19°
AZM: 86.84°
VS: 1,070.98'

MD: 8,771'
TVD: 7,601.08'
INC: 90.2°
AZM: 90.36°
VS: 1,165.94'

WOB: 35klbs
RPM: 65
SPM: 203
SPP: 4,520psi

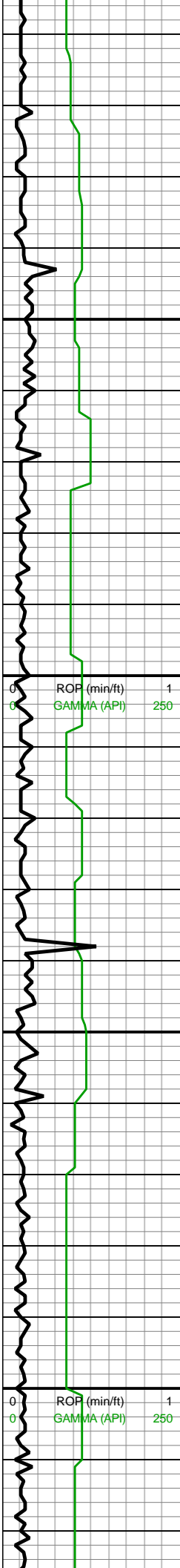


s&p ip, occ-com sft v arg
mtx sup sst, p srt
vf-slt-y-f grs, predy non
calc

8600-8700 SST (100%):
predy med gy-dk gy
frm-sli fri gr sup sst clus
cons wi silc cmt, gy s&p
ip, occ lt gy sft-sb frm mtx
sup arg sst clus, thn
lamn & intbds, non calc,
sl calc ip

8700-8800 SST (100%):
predy med gy-dk gy
frm-sli fri gr sup sst clus
cons wi silc cmt, gy s&p
ip, occ lt gy sft-sb frm mtx
sup arg sst clus, thn
lamn & intbds, non calc,
sl calc ip





8,810

8,820

8,830

8,840

8,850

8,860

8,870

8,880

8,890

8,900

8,910

8,920

8,930

8,940

8,950

8,960

8,970

8,980

8,990

9,000

9,010

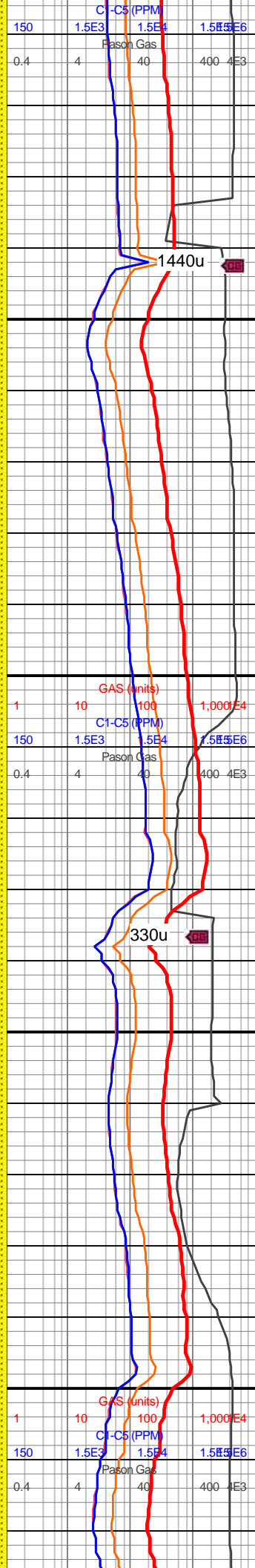
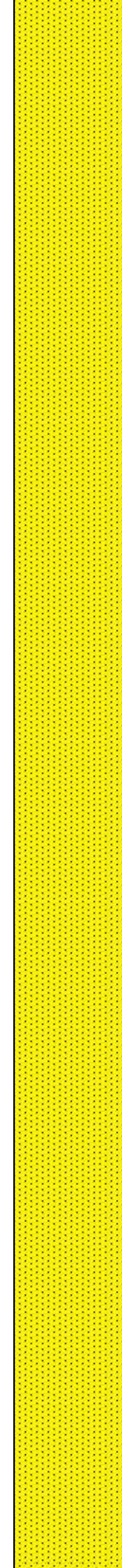
9,020

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

MD: 8,866'
TVD: 7,600.72'
INC: 90.24°
AZM: 89.57°
VS: 1,260.94'

MD: 8,960'
TVD: 7,600.07'
INC: 90.55°
AZM: 89.3°
VS: 1,354.94'

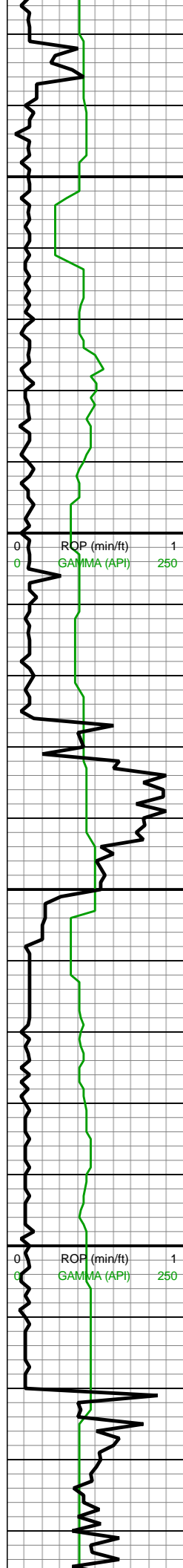
WOB: 41klbs
RPM: 65
SPM: 203
SPP: 4,598psi



8800-8900 SST (100%):
predy med gy-dk gy
frm-sli fri gr sup sst clus
cons wi silc cmt, gy s&p
ip, occ lt gy sft-sb frm mtx
sup arg sst clus, thn
lamn & intbds, non calc,
sl calc ip

8900-9000 SST (100%)
gy-dk gry-med-gy brn,
mod srtd sb ang-sb rnd,
firm, frm sli fri gr sup sst
clus cons wi silc cmt, arg
ip, vf ip grdg to sltst,
predy rr mod calc ip





MD: 9,056'
TVD: 7,598.89'
INC: 90.86°
AZM: 89.22°
VS: 1,450.92'

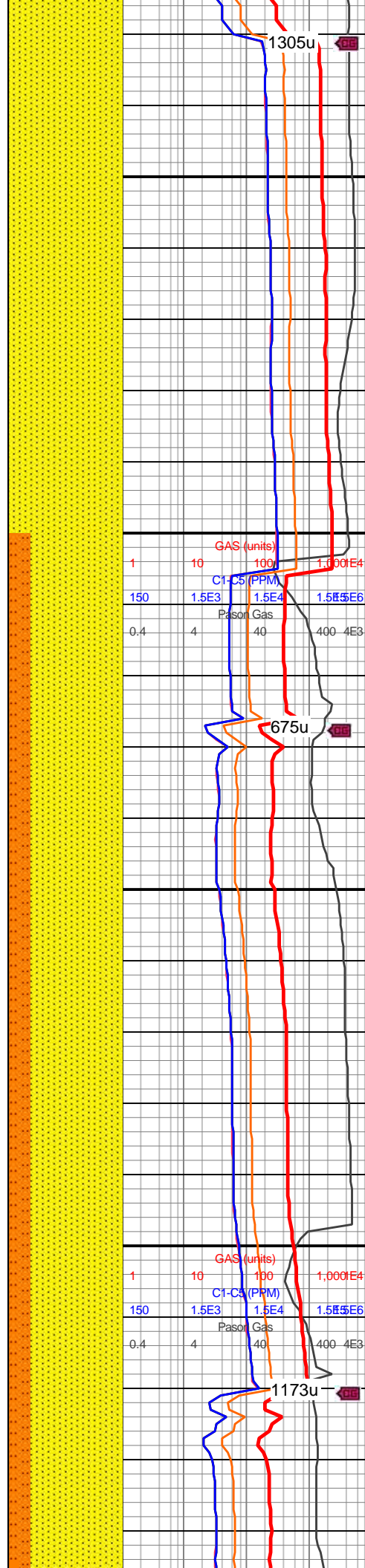
MW IN: 9.8
VIS IN: 44
MW OUT: 9.8+
VIS OUT: 41

MD: 9,150'
TVD: 7,597.88'
INC: 90.37°
AZM: 90.62°
VS: 1,544.91'

WOB: 36klbs
RPM: 65
SPM: 204
SPP: 4,593psi

MW IN: 9.8+
VIS IN: 46
MW OUT: 9.8+
VIS OUT: 42

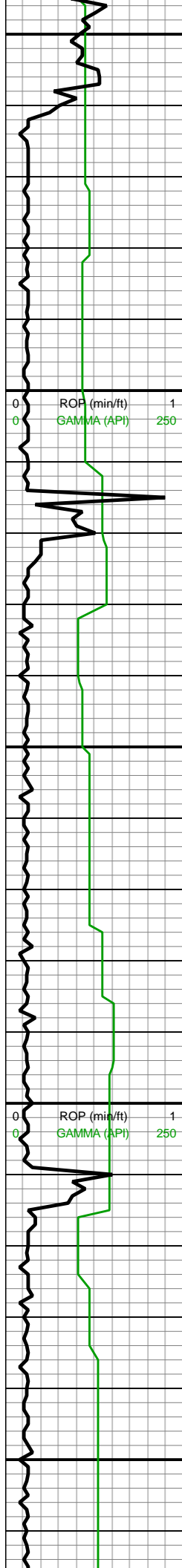
MD: 9,245'
TVD: 7,599.26'
INC: 90.83°
AZM: 89.22°
VS: 1,639.92'



9000-9100 SST (100%)
gy-dk gry-med-gy brn,
mod srtd sb ang-sb rnd,
firm, frm sli fri gr sup sst
clus cons wi silc cmt, arg
ip, vf ip grdg to sltst,
predy rr mod calc ip

9100-9200 SST (80%):
off wh-lt gy, med gy-dk
gy-dk gyshbn, mod srtd
sb ang-sb rd-rd vf-f sd
grs, frm sli fri gr sup sst
clus cons wi silc cmt, arg
ip, vf ip grdg to sltst,
predy non calc, rr mod
calc ip; SLTST (20%):
gy-dk gy, frm, brit, mod fis
silc ctngs, slty tex, non
calc





9,250
9,260
9,270
9,280
9,290
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

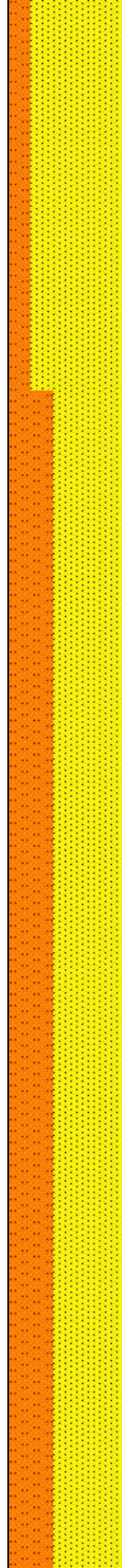
INC: 87.96°
AZM: 90.8°
VS: 1,639.89'

MD: 9,340'
TVD: 7,603.08'
INC: 87.43°
AZM: 90.71°
VS: 1,734.8'

MW IN: 9.8
VIS IN: 45
MW OUT: 9.8+
VIS OUT: 43

WOB: 39klbs
RPM: 65
SPM: 204
SPP: 4,629psi

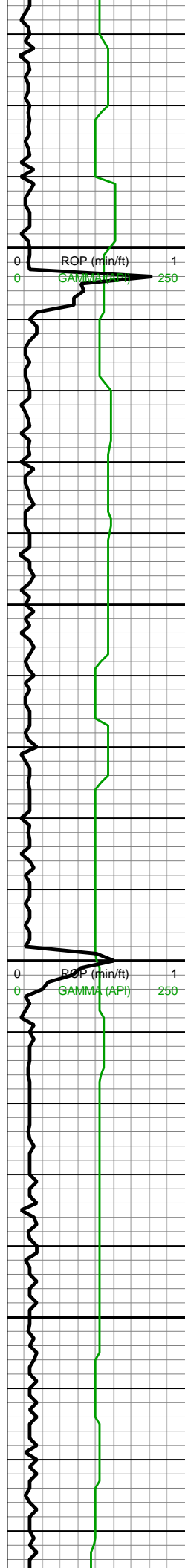
MD: 9,435'
TVD: 7,606.94'
INC: 87.91°
AZM: 90.18°
VS: 1,829.72'



9200-9300 SST (80%):
off wh-lt gy, med gy-dk
gy-dk gyshbn, mod srtd
sb ang-sb rd-rd vf-f sd
grs, frm sli fri gr sup sst
clus cons wi silc cmt, arg
ip, vf ip grdg to sltst,
predy non calc, rr mod
calc ip; SLTST (20%):
gy-dk gy, frm, brit, mod fis
silc ctngs, slty tex, non
calc

9300-9400 SST (60%):
off wh-lt gy, med gy-dk
gy-dk gyshbn, mod srtd
sb ang-sb rd-rd vf-f sd
grs, frm sli fri gr sup sst
clus cons wi silc cmt, arg
ip, vf ip grdg to sltst,
predy non calc, rr mod
calc ip; SLTST (40%):
gy-dk gy, frm, brit, mod fis
silc ctngs, slty tex, non
calc

9400-9500 SST (60%):
off wh-lt gy, med gy-dk



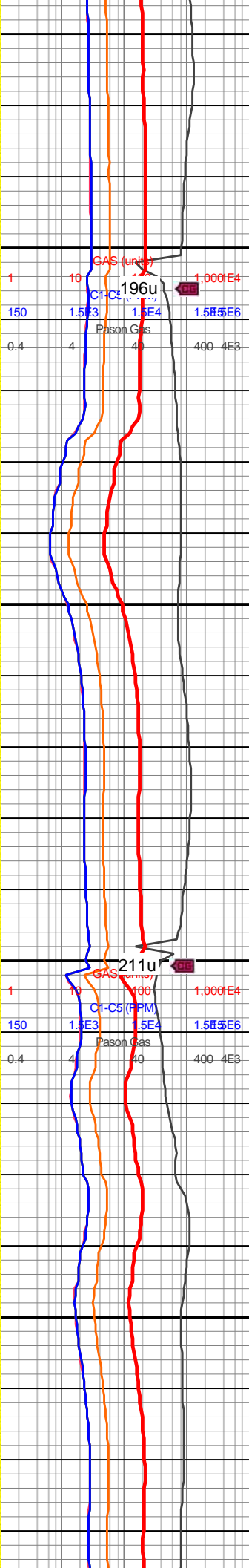
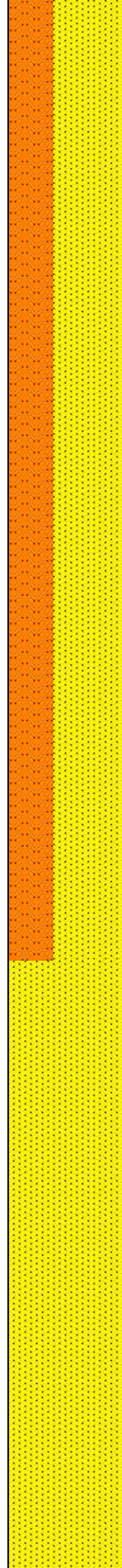
9,470
9,480
9,490
9,500
9,510
9,520
9,530
9,540
9,550
9,560
9,570
9,580
9,590
9,600
9,610
9,620
9,630
9,640
9,650
9,660
9,670
9,680

MD: 9,529'
TVD: 7,609.91'
INC: 88.48°
AZM: 90.01°
VS: 1,923.67'

WOB: 15klbs
RPM: 60
SPM: 202
SPP: 4,052psi

MD: 9,623'
TVD: 7,611.57'
INC: 89.49°
AZM: 90.09°
VS: 2,017.65'

MW IN: 9.8+
VIS IN: 44



on wh-lt gy, med gy-dk
gy-dk gyshbn, mod srtld
sb ang-sb rd-rd vf-f sd
grs, frm sli fri gr sup sst
clus cons wi silc cmt, arg
ip, vf ip grdg to sltst,
predy non calc, rr mod
calc ip; SLTST (40%):
gy-dk gy, frm, brit, mod fis
silc ctngs, slty tex, non
calc

9500-9600 SST (60%):
off wh-lt gy, med gy-dk
gy-dk gyshbn, mod srtld
sb ang-sb rd-rd vf-f sd
grs, frm sli fri gr sup sst
clus cons wi silc cmt, arg
ip, vf ip grdg to sltst,
predy non calc, rr mod
calc ip; SLTST (40%):
gy-dk gy, frm, brit, mod fis
silc ctngs, slty tex, non
calc

9600-9700 SST (100%)
gy-dk gry-med-gy brn,
mod srtld sb ang-sb rnd,



MW OUT: 9.8
VIS OUT: 42

MD: 9,717'
TVD: 7,611.64'
INC: 90.42°
AZM: 90.62°
VS: 2,111.65'

WOB: 37klbs
RPM: 64
SPM: 204
SPP: 6,485psi

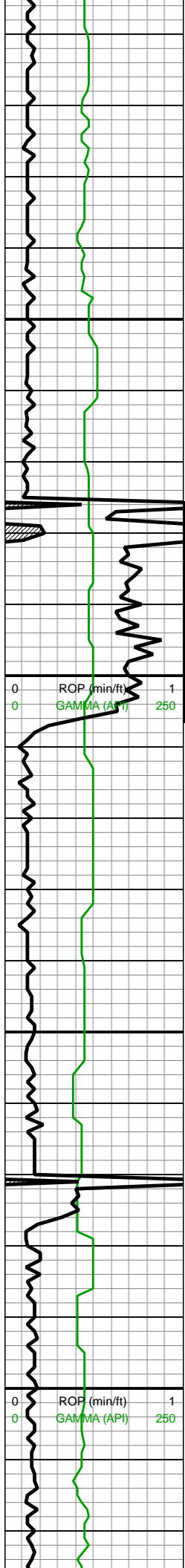
MD: 9,812'
TVD: 7,610.26'
INC: 91.25°
AZM: 91.15°
VS: 2,206.62'

MD: 9,906'
TVD: 7,607.23'

firm, frm sli fri gr sup sst
clus cons wi silc cmt, arg
ip, vf ip grdg to sltst,
predy rr mod calc ip

9700-9800 SST (100%)
gy-dk gry-med-gy brn,
mod srtd sb ang-sb rnd,
firm, frm sli fri gr sup sst
clus cons wi silc cmt, arg
ip, vf ip grdg to sltst,
predy rr mod calc ip

9800-9900 SST (100%)
gy-dk gry-med-gy brn,
mod srtd sb ang-sb rnd,
firm, frm sli fri gr sup sst
clus cons wi silc cmt, arg
ip, vf ip grdg to sltst,
predy rr mod calc ip



INC: 92.44°
AZM: 92.2°
VS: 2,300.53'

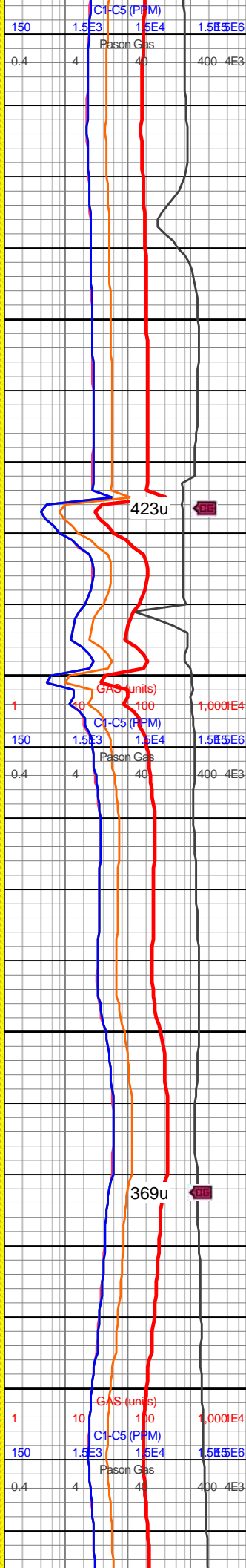
MW IN: 9.8+
VIS IN: 45
MW OUT: 9.8+
VIS OUT: 43

WOB: 425klbs
RPM: 0
SPM: 202
SPP: 4,080psi

MD: 10,001'
TVD: 7,604.79'
INC: 90.51°
AZM: 90.09°
VS: 2,395.46'

MW IN: 9.8+
VIS IN: 48
MW OUT: 9.8+
VIS OUT: 43

MD: 10,096'
TVD: 7,602.86'
INC: 91.82°
AZM: 92.12°
VS: 2,490.42'

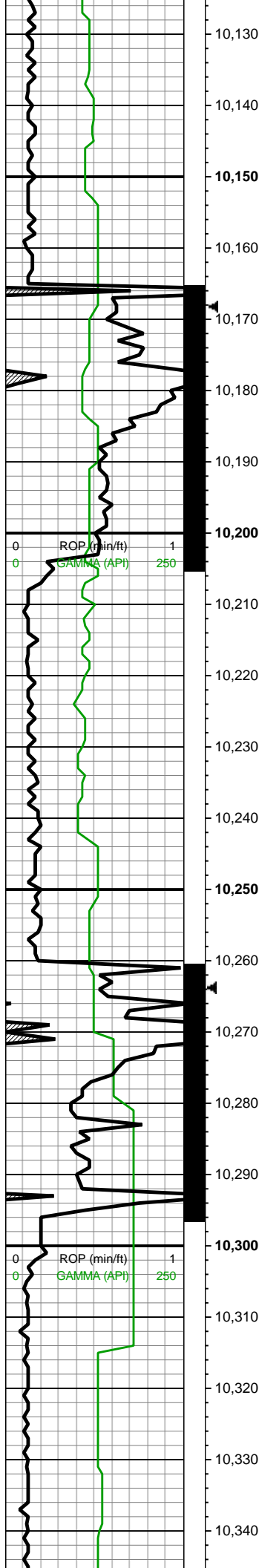


423u

369u

9900-10000 SST (100%)
gy-dk gry-med-gy brn,
mod srted sb ang-sb rnd,
firm, frm sli fri gr sup sst
clus cons wi silc cmt, arg
ip, vf ip grdg to sltst,
predy rr mod calc ip

10000-10100 SST (90%):
pred dk gy-dk gy brn wi f
sb rd qtz sd gr incl, fri-sli
fri gr sup shy ss clus
cons wi arg & silc cmt,
occ lt gy-gy mtx sup shy
ss cons wi arg cmt, p
srted vf-f sd grs, com
uncons sd, non calc;
SLTST (10%): lt gy-med
gy sb frm-frm silc-arg
sltst, occ frm-brit silc sltst



9/20/2018

MINDEPTH

MW IN: 9.8+

VIS IN: 46

MW OUT: 9.8+

VIS OUT: 43

MD: 10,191'

TVD: 7,600.24'

INC: 91.34°

AZM: 90.62°

WOVS: 2,585.35'

RPM: 65

SPM: 200

SPP: 4,240psi

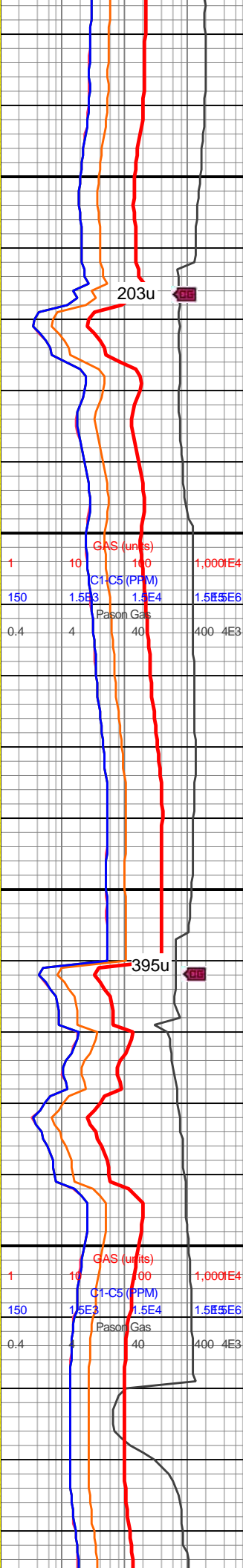
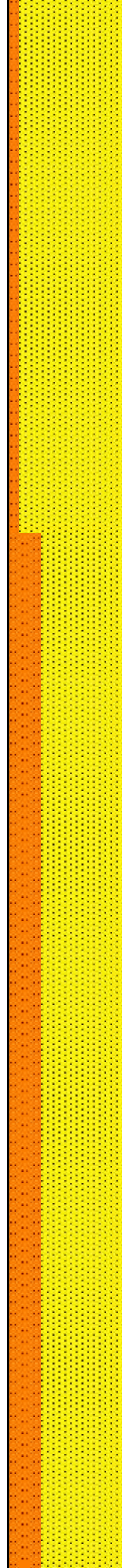
MD: 10,285'

TVD: 7,600.06'

INC: 88.88°

AZM: 89.39°

VS: 2,679.34'

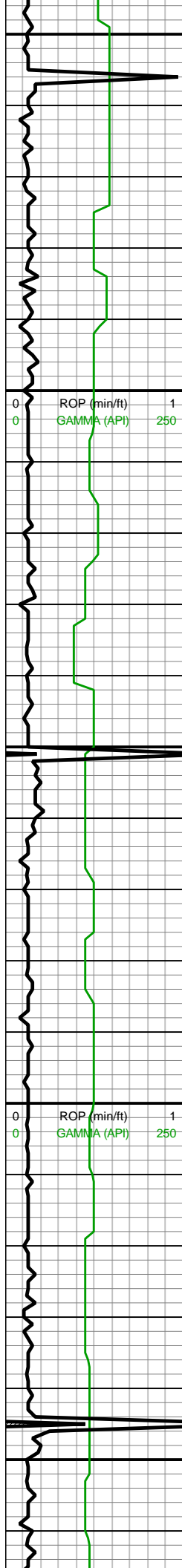


10100-10200 SST (90%):

pred dk gy-dk gy brn wi f
sb rd qtz sd gr incl, fri-sli
fri gr sup shy ss clus
cons wi arg & silc cmt,
occ lt gy-gy mtx sup shy
ss cons wi arg cmt, p
srted vf-f sd grs, com
uncons sd, non calc;
SLTST (10%): lt gy-med
gy sb frm-frm silc-arg
sltst, occ frm-brit silc sltst

10200-10300 SST (70%):

pred dk gy-dk gy brn wi f
sb rd qtz sd gr incl, fri-sli
fri gr sup shy ss clus
cons wi arg & silc cmt,
occ lt gy-gy mtx sup shy
ss cons wi arg cmt, p
srted vf-f sd grs, com
uncons sd, non calc;
SLTST (30%): lt gy-med
gy sb frm-frm silc-arg
sltst, occ frm-brit silc sltst

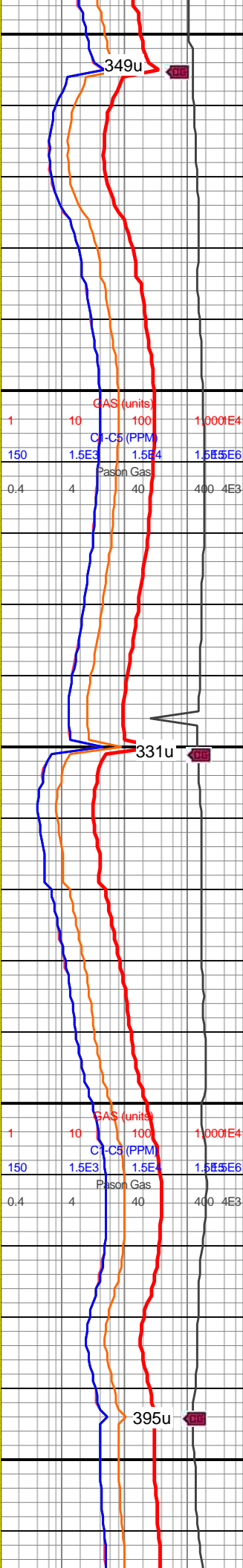
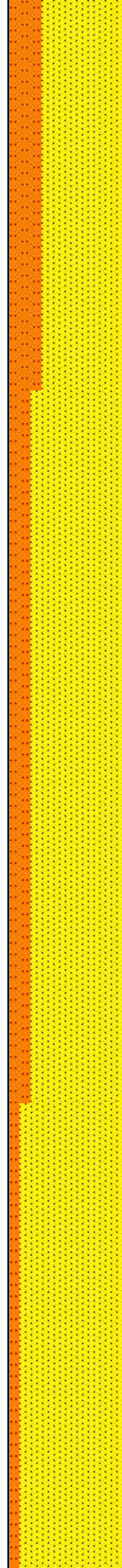


MW IN: 9.8
VIS IN: 46
MW OUT: 9.8
VIS OUT: 43

MD: 10,380'
TVD: 7,602.57'
INC: 88.09°
AZM: 89.04°
VS: 2,774.3'

WOB: 37klbs
RPM: 65
SPM: 200
SPP: 4,560psi

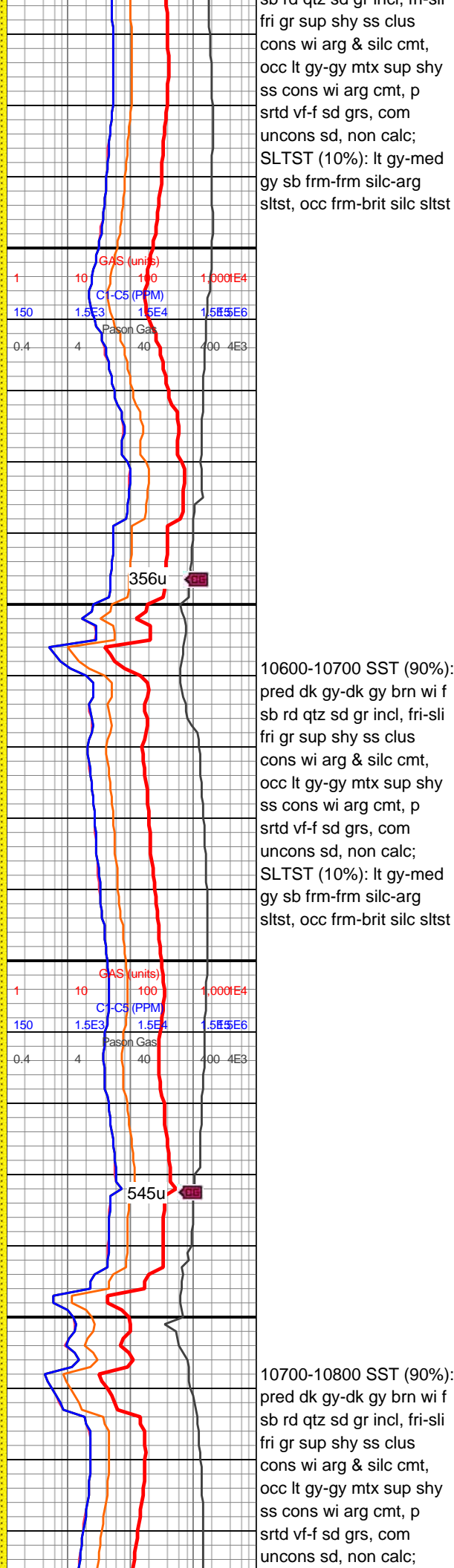
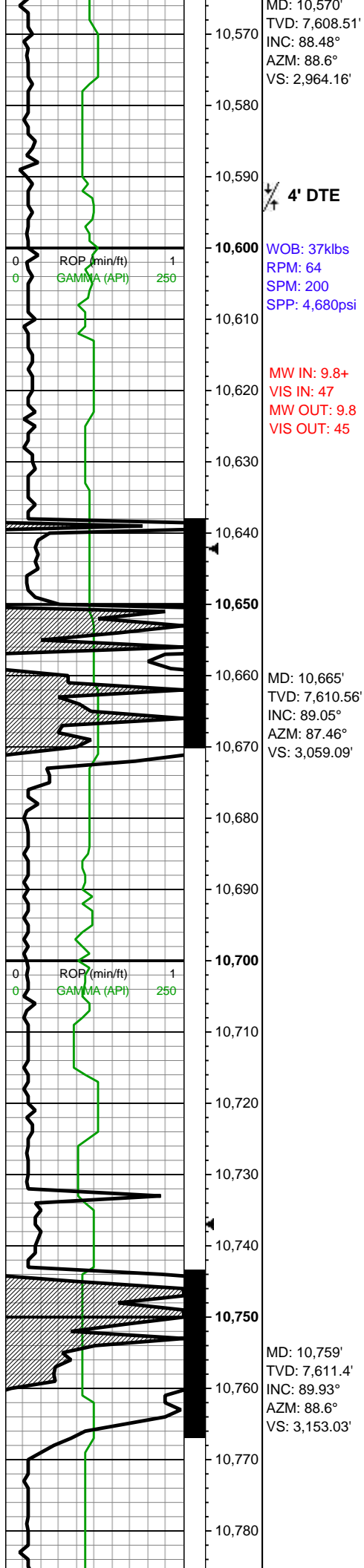
MD: 10,475'
TVD: 7,605.7'
INC: 88.13°
AZM: 88.69°
VS: 2,869.23'

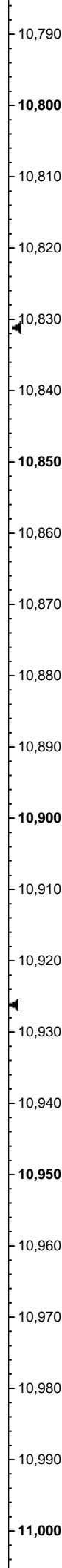
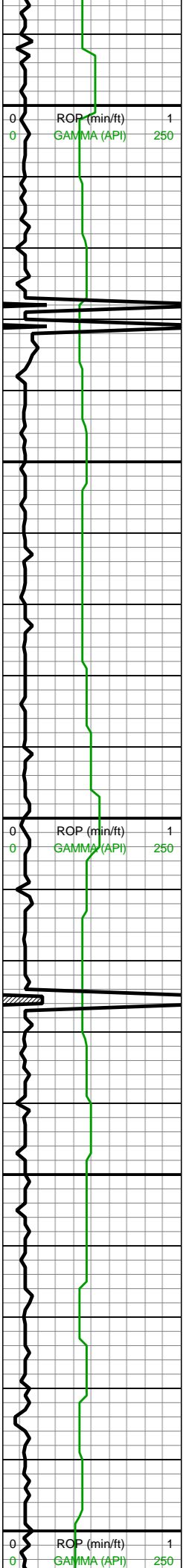


10300-10400 SST (70%):
pred dk gy-dk gy brn wi f
sb rd qtz sd gr incl, fri-sli
fri gr sup shy ss clus
cons wi arg & silc cmt,
occ lt gy-gy mtx sup shy
ss cons wi arg cmt, p
srted vf-f sd grs, com
unconsd sd, non calc;
SLTST (30%): lt gy-med
gy sb frm-frm silc-arg
sltst, occ frm-brit silc sltst

10400-10500 SST (80%):
pred dk gy-dk gy brn wi f
sb rd qtz sd gr incl, fri-sli
fri gr sup shy ss clus
cons wi arg & silc cmt,
occ lt gy-gy mtx sup shy
ss cons wi arg cmt, p
srted vf-f sd grs, com
unconsd sd, non calc;
SLTST (20%): lt gy-med
gy sb frm-frm silc-arg
sltst, occ frm-brit silc sltst

10500-10600 SST (90%):
pred dk gy-dk gy brn wi f
sb rd qtz sd gr incl, fri-sli

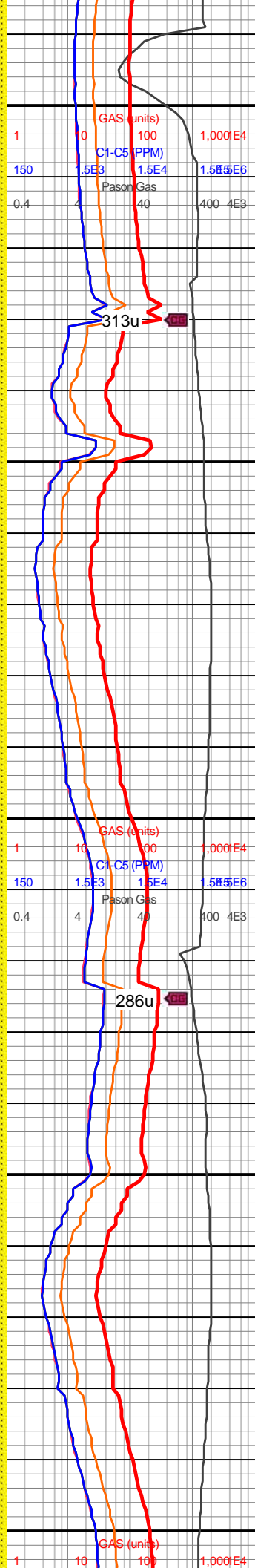
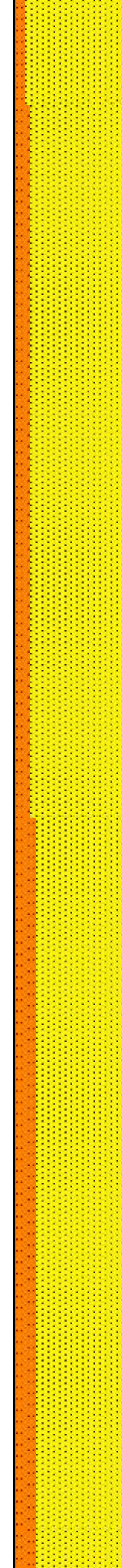




MD: 10,854'
TVD: 7,611'
INC: 90.55°
AZM: 88.78°
VS: 3,248.01'

MW IN: 9.7
VIS IN: 50
MW OUT: 9.75
VIS OUT: 45

WOB: 39klbs
RPM: 66
SPM: 204
SPP: 4,830psi

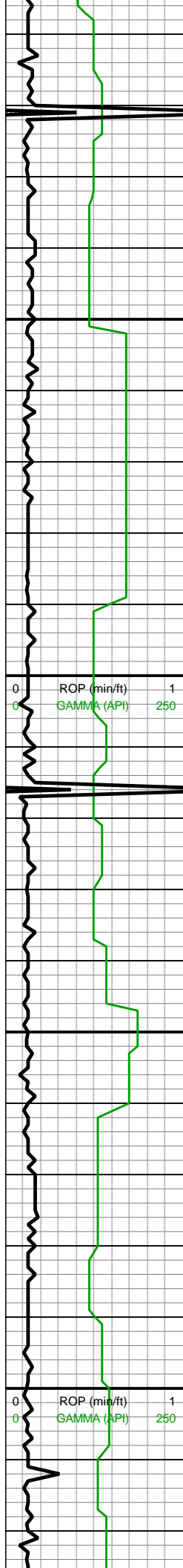


SLTST (10%): lt gy-med
gy sb frm-frm silc-arg
sltst, occ frm-brit silc sltst

10800-10900 SST (85%):
predy lt gy-gy, sft-sb frm
mtx sup arg sst clus, sft
gyshbn-dk gy intbds &
lamn ip, slty-vf-f gr sd, rr
gy frm-sli fri silc gr sup
sst clus, tr pyr strg, sl
calc; SLTST (15%): gy-dk
gy, frm, brit, silc, tr vf pyr,
non calc-sl calc

10900-11000 SST (80%):
lt gy-gy, sft-sb frm, mtx
sup sst cons wi arg cmt,
gyshbn-dk gy intbds &
lamn, slty-vf-f gr sd, rr gy
frm-sli fri silc gr sup sst
clus, tr pyr strg, sl calc,
intbdd wi thn sltst intbds;
SLTST (20%): gy-dk gy,
frm, brit, silc, tr vf pyr, non
calc-sl calc





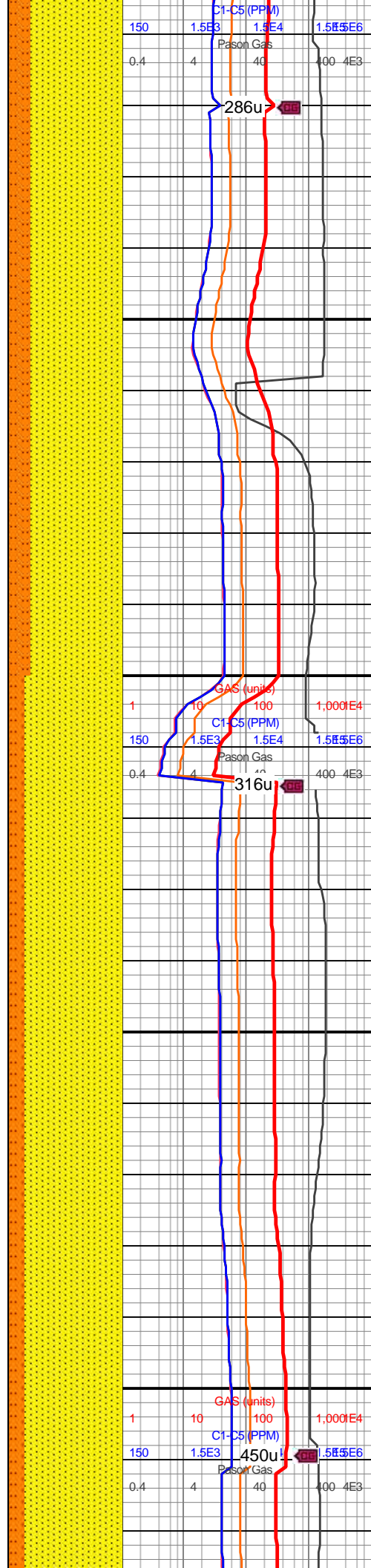
MD: 11,043'
TVD: 7,607.87'
INC: 91.34°
AZM: 87.72°
VS: 3,436.9'

5' DTW

MD: 11,137'
TVD: 7,605.46'
INC: 91.6°
AZM: 87.28°
VS: 3,530.79'

MW IN: 9.65
VIS IN: 48
MW OUT: 9.65
VIS OUT: 45

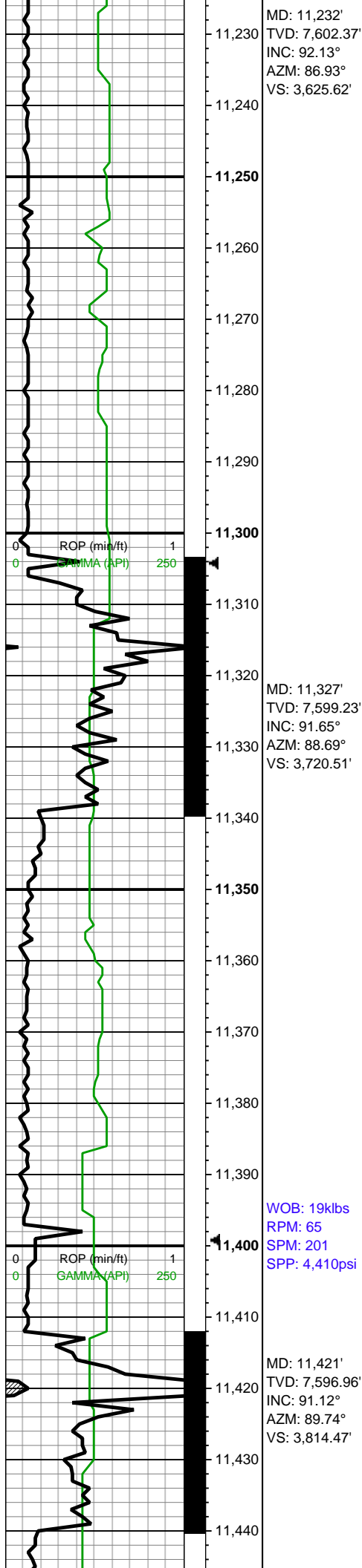
WOB: 38klbs
RPM: 65
SPM: 202
SPP: 4,780psi



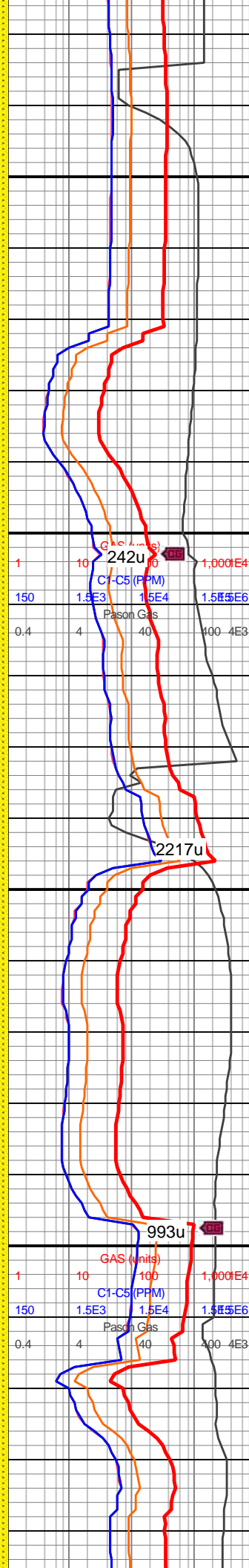
11000-11100 SST (80%):
predy lt gy-gy, sft-sb frm
mtx sup arg sst clus, sft
gyshbn-dk gy intbds &
lamn ip, slty-vf-f gr sd, rr
gy frm-sli fri silc gr sup
sst clus, tr pyr strg, sl
calc; SLTST (20%): gy-dk
gy, frm, brit, silc, tr vf pyr,
non calc-sl calc

11100-11200 SST (85%):
lt gy-gy, sft-sb frm, mtx
sup sst cons wi arg cmt,
gyshbn-dk gy intbds &
lamn, slty-vf-f gr sd, rr gy
frm-sli fri silc gr sup sst
clus, tr pyr strg, sl calc,
intbdd wi thn sltst intbds;
SLTST (15%): gy-dk gy,
frm, brit, silc, tr vf pyr, non
calc-sl calc





WOB: 19klbs
RPM: 65
SPM: 201
SPP: 4,410psi

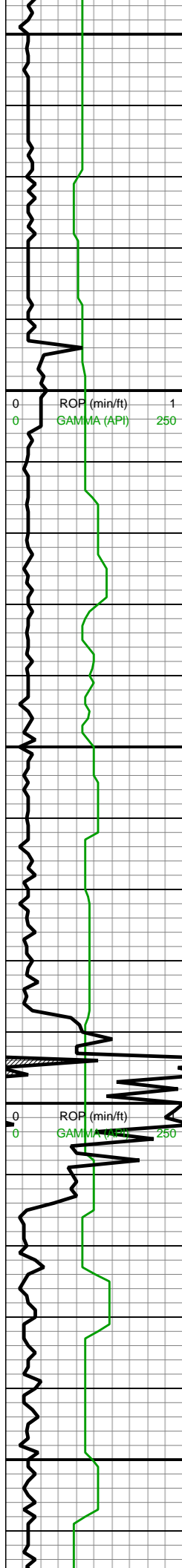


11200-11300 SST (85%):
predy lt gy-gy sft-sb frm
mtx sup sst clus cons wi
arg cmt, occ gyshbn-dk
gy vf gr arg-silc mtx-gr
sup sst clus grdg to sltst,
tr pyr strg, sl calc; SLTST
(15%): gy-dk gy, frm, brit,
silc, tr vf-f pyr strg, non
calc-sl calc



11300-11400 SST (90%):
predy lt gy-gy sft-sb frm
mtx sup sst clus cons wi
arg cmt, occ gyshbn-dk
gy vf gr arg-silc mtx-gr
sup sst clus grdg to sltst,
tr pyr strg, sl calc; SLTST
(10%): gy-dk gy, frm, brit,
silc, arg ip grdg up to vf gr
sst, tr vf pyr, non calc-sl
calc





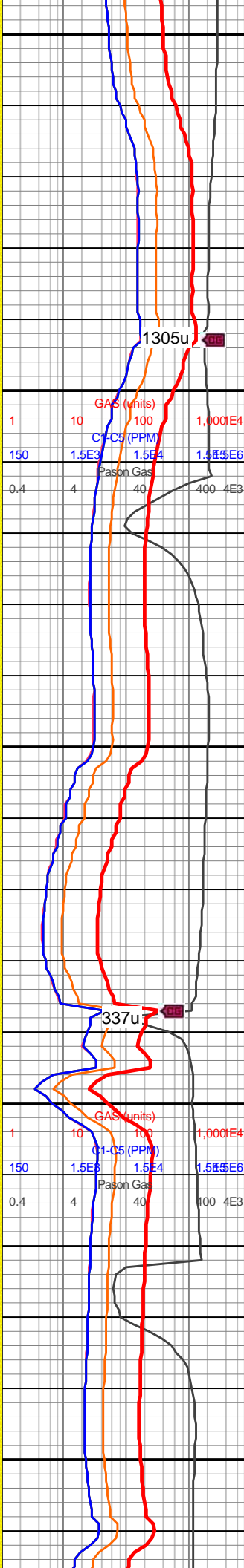
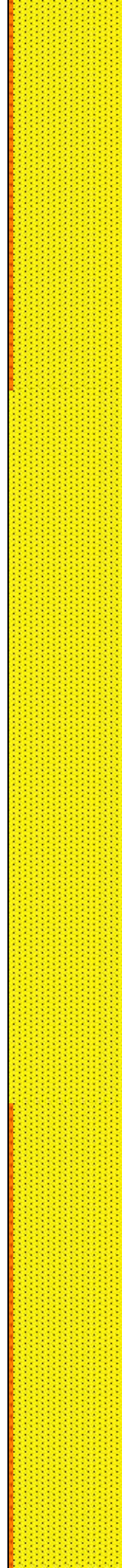
11,450
11,460
11,470
11,480
11,490
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11,520
11,530
11,540
11,550
11,560
11,570
11,580
11,590
11,600
11,610
11,620
11,630
11,640
11,650
11,660

MD: 11,516'
TVD: 7,595.39'
INC: 90.77°
AZM: 90.45°
VS: 3,909.45'

MW IN: 9.85
VIS IN: 46
MW OUT: 9.8
VIS OUT: 45

WOB: 35klbs
RPM: 0
SPM: 201
SPP: 4,320psi

MD: 11,611'
TVD: 7,596.02'
INC: 88.48°
AZM: 90.53°
VS: 4,004.44'



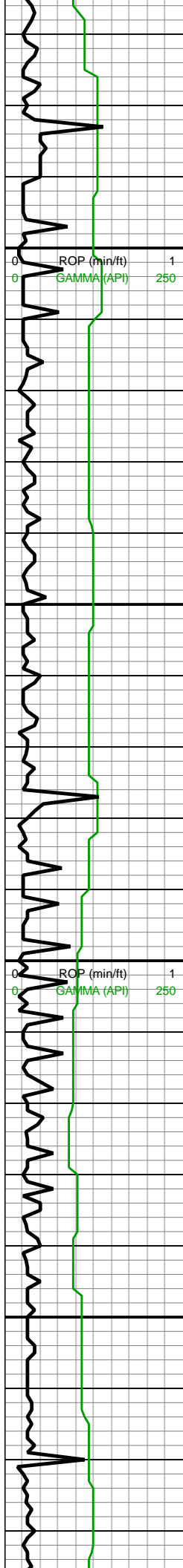
11400-11500 SST (95%):
predy med gy-med
gyshbn, s&p ip, vf-f gr
sup silc sst clus, occ u f
micmica ip, occ v dk gy vf
gr silc-arg sst grdg to
sltst, tr pyr strg, sl calc;
SLTST (rr): gy-dk gy, frm,
brit, silc, arg ip grdg up to
vf gr sst, tr vf pyr, non
calc-sl calc



11500-11600 SST
(100%): med gy-med
gyshbn-dk gy, p-mod srtd
vf-f sd grs, occ u f
micmica ip, predy vf-f gr
sup sst clus cons wi silc
cmt, occ vf gr-mtx sup
sltst cons wi silc-arg cmt,
tr pyr strg, sl calc, non
calc ip



11600-11700 SST (95%):
lt gy-med gy, occ dk gy,
med srtd vf-f gr grdg to

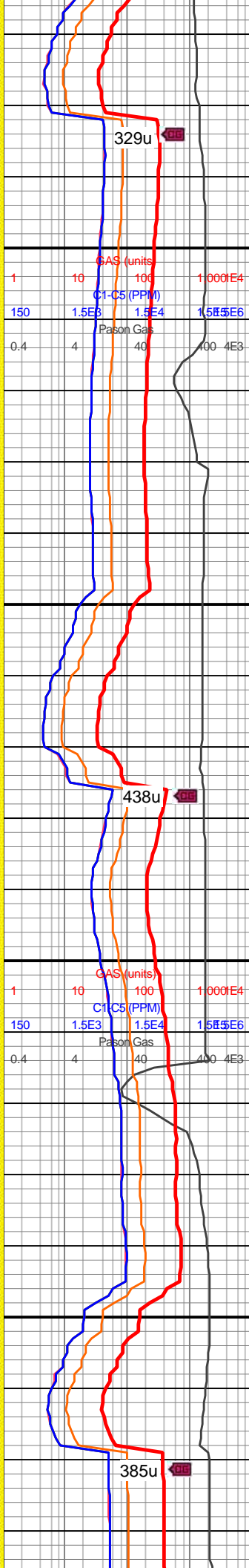
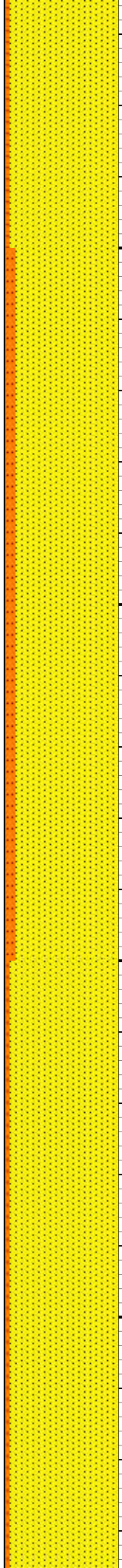


11,670
11,680
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11,790
11,800
11,810
11,820
11,830
11,840
11,850
11,860
11,870
11,880

MD: 11,705'
TVD: 7,598.65'
INC: 88.31°
AZM: 90.45°
VS: 4,098.4'

WOB: 24klbs
RPM: 65
SPM: 202
SPP: 5,060psi

MD: 11,800'
TVD: 7,601.23'
INC: 88.57°
AZM: 90.53°
VS: 4,193.36'

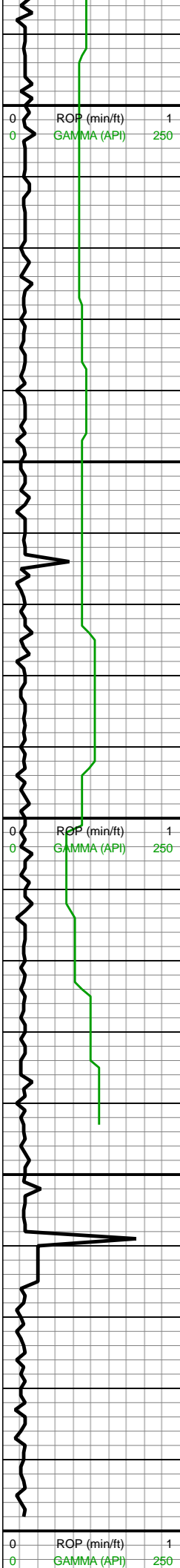


mod srtd vf sd grs grdg to
slt ip, predy sft w
hydrated water solu mtx
sup sst cons wi arg cmt,
thn lamn ip, rr gy-dk gy gr
sup silc clus grdg to
rr-occ sltst, sl-l-mod calc;
SLTST (rr): gy-dk gy, frm,
brit, silc, arg ip grdg up to
vf gr sst, tr vf pyr, non
calc-sl calc

11700-11800 SST (90%):
lt gy-med gy, occ dk gy,
mod srtd vf sd grs grdg to
slt ip, predy sft w
hydrated water solu mtx
sup sst cons wi arg cmt,
thn lamn ip, rr gy-dk gy gr
sup silc clus grdg to
rr-occ sltst, sl-l-mod calc;
SLTST (10%): gy-dk gy,
frm, brit, silc, arg ip grdg
up to vf gr sst, tr vf pyr,
non calc-sl calc

11800-11900 SST (95%):
lt gy-gyshbn-med gy mod
srtd vf sd grs grdg to slt
ip, predy sb frm-frm gr
sup sst clus cons wi silc
& sme arg cmt, thn lamn
ip, sl-l-mod calc; SLTST
(rr): gy-dk gy, frm, brit





MD: 11,894'
TVD: 7,603.58'
INC: 88.57°
AZM: 90.36°
VS: 4,287.33'

MD: 11,989'
TVD: 7,605.84'
INC: 88.7°
AZM: 90.45°
VS: 4,382.3'

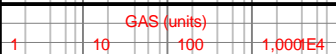
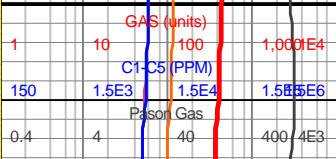
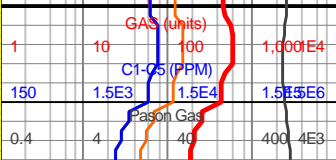
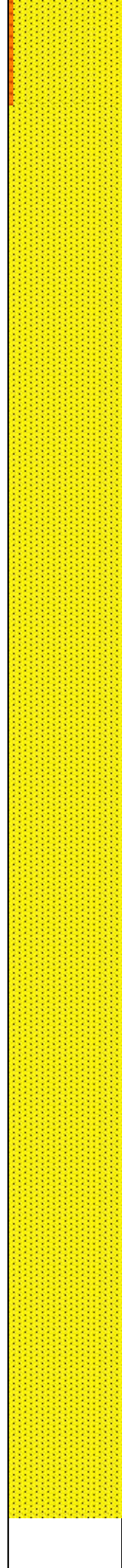
WOB: 43klbs
RPM: 65
SPM: 202
SPP: 5,280psi

MD: 12,026'
TVD: 7,606.62'
INC: 88.88°
AZM: 90.71°
VS: 4,419.28'

MW IN: 9.85
VIS IN: 43
MW OUT: 9.95
VIS OUT: 42

Reach TD @
10:50hrs on
9/20/18

MD: 12,098'
TVD: 7,608.03'
INC: 88.88°
AZM: 90.71°



(100%): lt gy-lt
silc, arg ip grdg up to vf gr
sst, tr vf pyr, non calc-sil
calc

11900-12000 SST
(100%): lt gy-lt
gyshbn-med gy-med
gyshbn, sb frm-frm, occ
frm sli fri sst clus, mod
srted vf-f gr, gr sup sst
clus wi arg & silc cmt,
l-mod calc

12000-12098 SST
(100%): lt gyshbn-med
gy-gyshbn, predy mod
srted vf-f gr sb frm-frm gr
sup sst cons wi silc &
sme arg cmt ip, rr-occ
frm-sli fri gr sup silc sst
wi f-u f sd grs, l-mod calc



[illegible]

12 110

VS: 4,491.26'

C1-C5 (PPM)				
150	1.5E3	1.5E4	1.5E5	1.5E6