



Scale: 5" / 100'
Measured Depth Log

Well Name BEF West 15

Location Section 2, Township 1S, Range 66W

State Colorado

County Adams

Country USA

Rig Number True 33

API Number 05-001-10219

AFE # 10219

Geographic Region Rockies

Field Wattenberg

Spud Date 12/26/2018

Drilling Completed 1/12/2019

Surface Coordinates 2152' FNL & 322' FEL, Sec. 2, T1S, R66W
Latitude: 39.99463, Longitude: -104.7347

Bottom Hole Coordinates 1632' FNL & 460' FWL, Sec. 2, T1S, R66W

Ground Elevation 5,049'

K.B. Elevation 5,076'

Logged Interval 5,000' **To** 8,150'

Total Depth 15,525'

Formation Codell

Type of Drilling Fluid Water Based Mud

Operator

Company Petro Operating Company, LLC

Address 9033 East Easter Place, Suite 112
Centennial, CO 80112-2105

**Petro  operating
Company, LLC**

Geologist

Name Michael Domenick

Company Petro Operating Company, LLC

Address 9033 East Easter Place, Suite 112
Centennial, CO 80112-2105

Zone Color Coding

 Oil	 Condensate	 Gas
 Note	 Core	 Pressure
 Error	 Water	 Seal

Petro perating Company, LLC

Other

Loggers: Byron Pitulski/Greg Diefenbach

Services Provided: 2 Man Logging, Geosteering

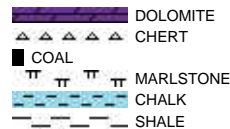
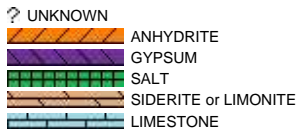
Equipment: ML-531

Start Date 01/10/2018

Release Date: 01/13/2019

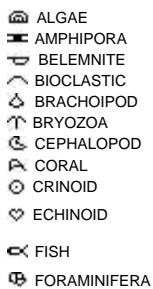
Job #: 1853RK1812

Rock Types



Accessories

Fossils



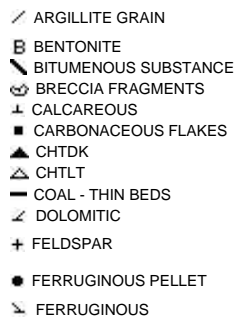
Fossil



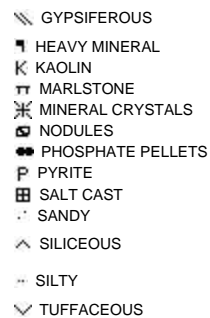
Minerals



Argillaceous



Glaucconite

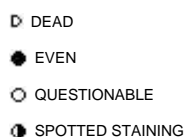


Stringer

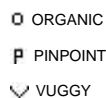


Other Symbols

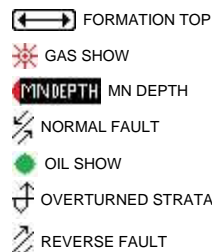
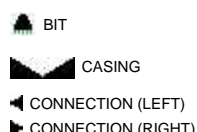
Oil Show



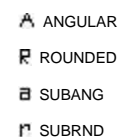
Porosity



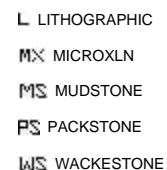
Engineering



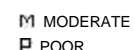
Rounding



Textures



Sorting



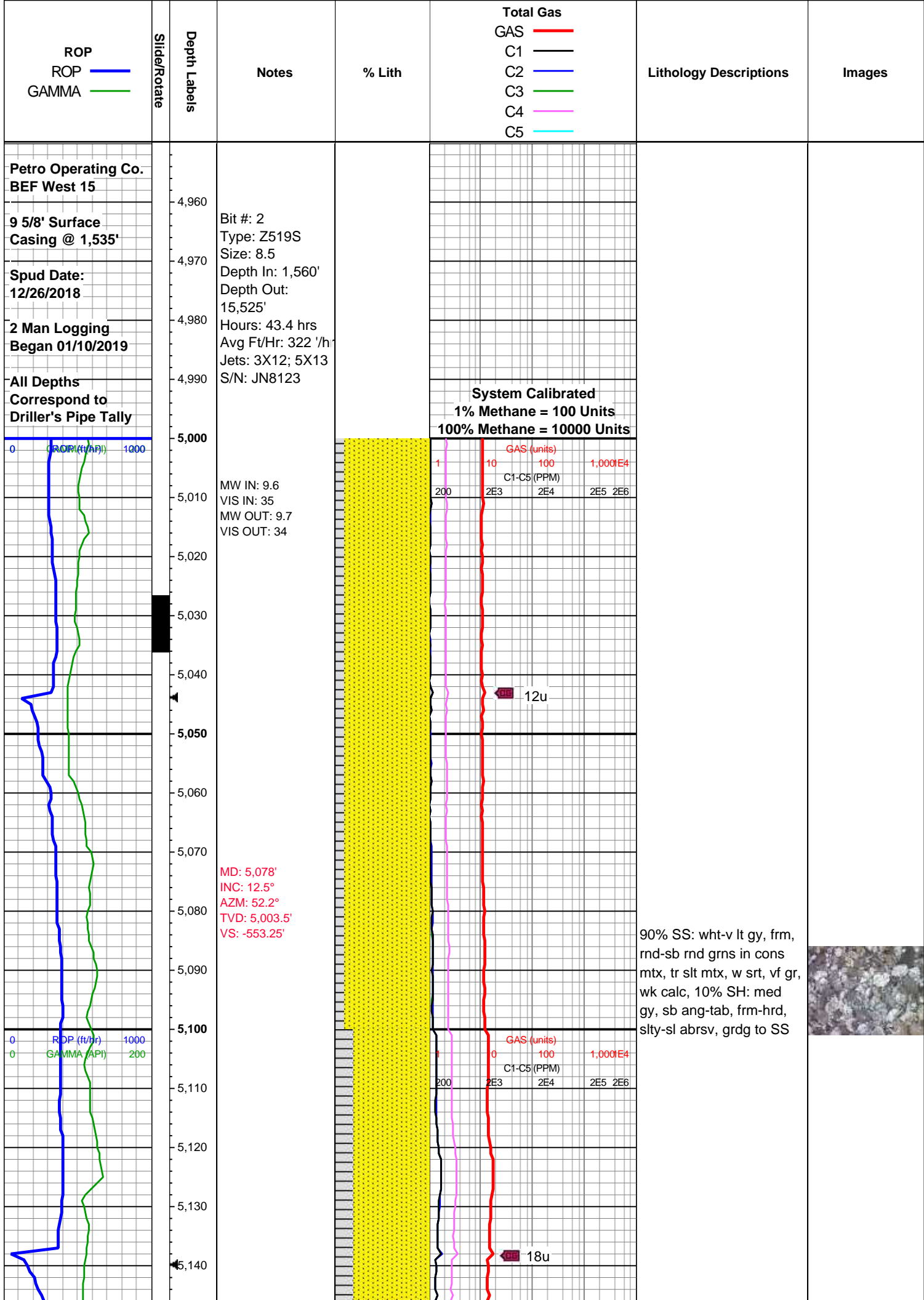
E EARTH
F FENESTRAL
F FRACTURE
X INTERCRYSTALLINE
O INTEROOLITIC
M MOLDIC

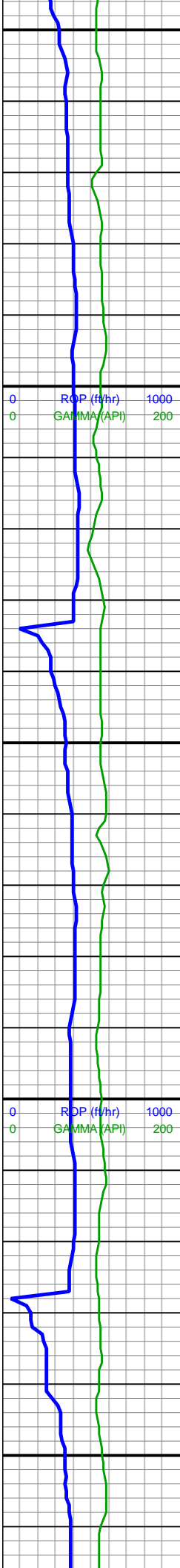
C CONNECTION (RGH)
CG CONNECTION GAS
CORE - LOST
CORE - RECOVERED
DST INTERVAL
FAULT

SLIDE
SURVEY
TRIP GAS
WIRELINE TESTED - LEFT
WIRELINE TESTED - RT

CHALKSTONE
CHALKY
CRYPTOXLN
E EARTHY
FINELYXLN
GRAINSTONE

W WELL





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
5,340
5,350
5,360

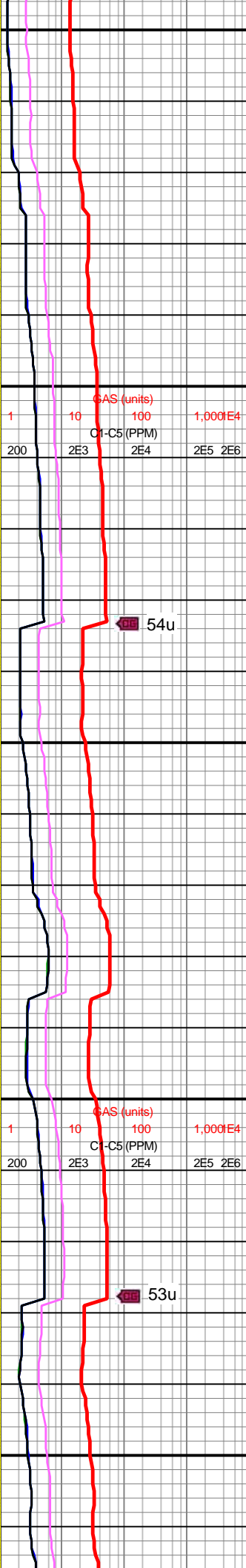
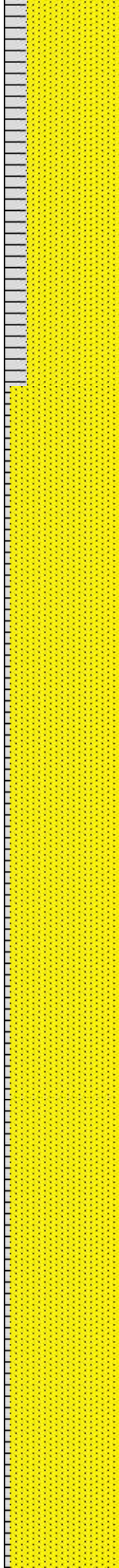
MD: 5,173'
INC: 11.9°
AZM: 51°
TVD: 5,096.36'
VS: -567.49'

WOB: 22klbs
RPM: 60
SPM: 170
SPP: 2,264psi

MW IN: 9.6+
VIS IN: 35
MW OUT: 9.8
VIS OUT: 35

MD: 5,268'
INC: 11.1°
AZM: 49°
TVD: 5,189.45'
VS: -580.55'

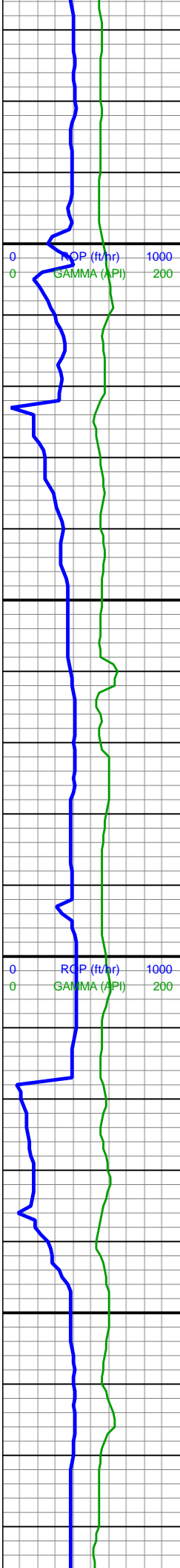
MD: 5,363'
INC: 10.1°
AZM: 47.3°
TVD: 5,282.22'



80% SS: predy med gy,
sme lt brn-gyshbn, frm
cons clus, rnd-sb rnd,
occ sb ang, tr slt mtx, w
srt, vf gr, v wk calc; 20%
SH: med gy, sb ang-tab,
frm-hrd, slty-sl abrsv,
grdg to SS

95% SS: predy med gy,
sme lt brn-gyshbn, frm
cons clus, rnd-sb rnd,
occ sb ang, tr slt mtx, w
srt, vf gr, v wk calc; 5%
SH: med gy, sb ang-tab,
frm-hrd, slty-sl abrsv,
incrg grdg to SS





5,370
5,380
5,390
5,400
5,410
5,420
5,430
5,440
5,450
5,460
5,470
5,480
5,490
5,500
5,510
5,520
5,530
5,540
5,550
5,560
5,570
5,580

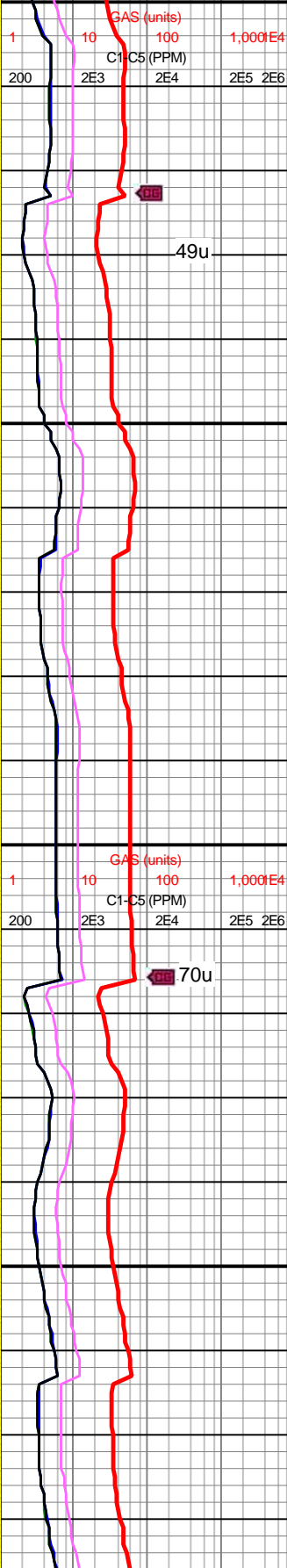
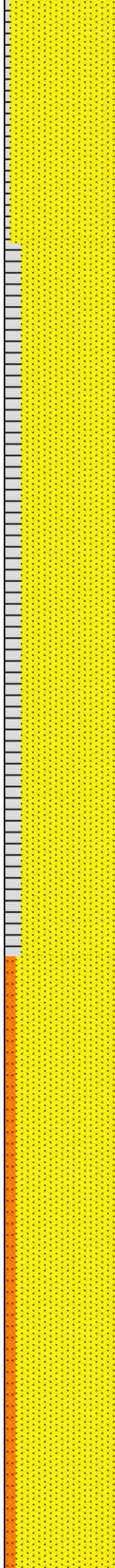
VD: 5,282.83'
VS: -592.19'

WOB: 29klbs
RPM: 60
SPM: 170
SPP: 2,857psi

MW IN: 9.6+
VIS IN: 35
MW OUT: 9.8
VIS OUT: 35

MD: 5,457'
INC: 9.4°
AZM: 43.2°
TVD: 5,375.47'
VS: -602.18'

MD: 5,551'
INC: 6.6°
AZM: 48.9°
TVD: 5,468.55'
VS: -610.42'

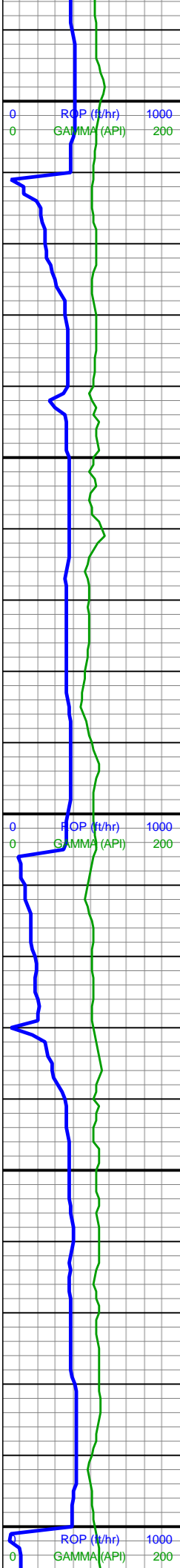


95% SS: med-lt gy, sme
lt brn-gyshbn, frm, rnd-sb
rnd, occ sb ang, gr sup
mtx, w srt, vf gr, wk calc;
5% SH: med gy, sb
ang-tab, frm-hrd, slty-sl
abrsv, incrg grdg to SS

85% SS: med-lt gy, sme
lt brn-gyshbn, frm cons
clus, rnd-sb rnd, occ sb
ang, tr slt mtx, w srt, vf gr,
wk calc, 15% SLTY SH:
med gy, sb ang-tab,
frm-hrd, slty-sl abrsv,
incrg grdg to SS

90% SS: med-lt gy, sme
lt gyshbn, wbt frm, rnd sb





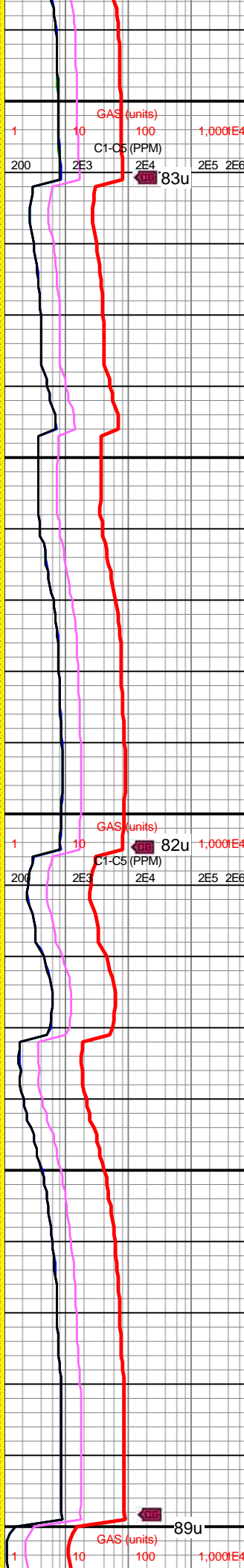
WOB: 24klbs
RPM: 60
SPM: 171
SPP: 2,739psi

MD: 5,645'
INC: 6.4°
AZM: 44.6°
TVD: 5,561.94'
VS: -617.31'

MW IN: 9.6+
VIS IN: 35
MW OUT: 9.7
VIS OUT: 35

MD: 5,740'
INC: 4.4°
AZM: 69.8°
TVD: 5,656.53'
VS: -623.84'

WOB: 18klbs
RPM: 60

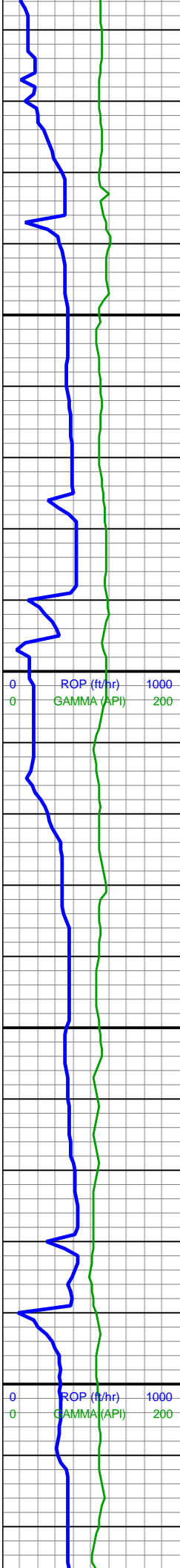


lt gyshbn-wht, frm, rnd-sb
rnd, occ sb ang, gr sup
mtx, w srt, vf gr, v wk calc;
10% SLTST: v slty wash
away when cleaned

85% SS: lt brn-gyshbn,
med-lt gy, frm, rnd-sb
rnd, occ sb ang, gr sup
mtx, w srt, f gr, v wk calc;
15% SLTST: v slty wash
away when cleaned

90% SS: lt gyshbn, med
gy-wht, frm, rnd-sb rnd,
occ sb ang, f gr sup mtx,
w srt, v wk calc; 10%
SLTST: v slty wash away
when cleaned





SPM: 171
SPP: 2,585psi

MD: 5,835'
INC: 2°
AZM: 64.7°
TVD: 5,751.37'
VS: -628.5'

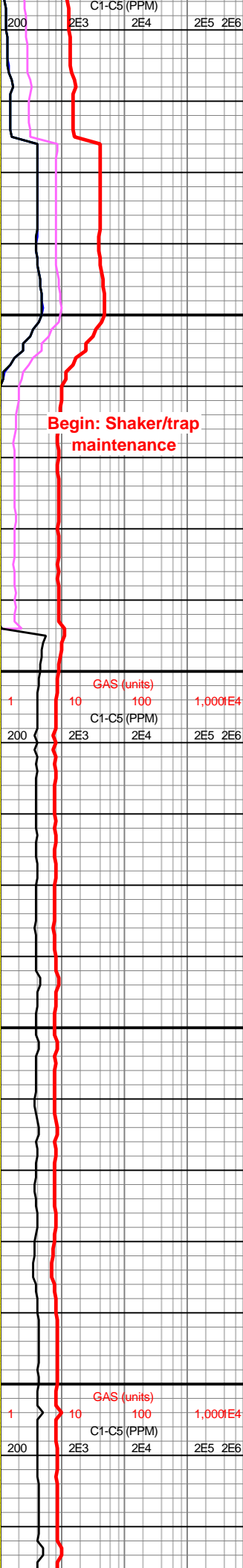
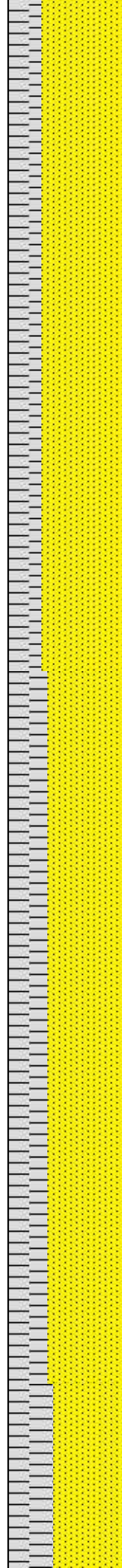
MW IN: 9.6+
VIS IN: 35
MW OUT: 9.7
VIS OUT: 35

MD: 5,930'
INC: 0.6°
AZM: 160.8°
TVD: 5,846.35'
VS: -630.13'

MW IN: 9.6
VIS IN: 35
MW OUT: 9.7+
VIS OUT: 35

WOB: 20klbs
RPM: 60
SPM: 169
SPP: 2,555psi

MD: 6,024'
INC: 0.4°
AZM: 191.4°

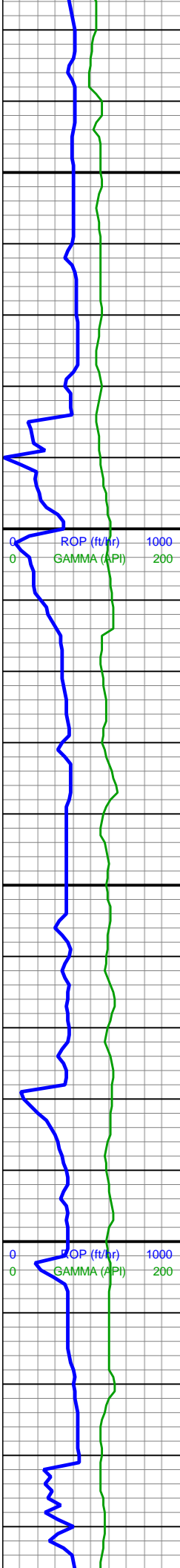


Begin: Shaker/trap
maintenance

70% SS: lt gyshbn, med
gy-wht, frm, rnd-sb rnd,
occ sb ang, f gr sup mtx,
v w srt; 30% SH: med gy,
sb ang, tab, frm-hrd,
silty-sl abrsv, grdg to SS,
tr mmica

65% SS: lt gyshbn, med
gy-wht, frm, rnd-sb rnd,
occ sb ang, f gr sup mtx,
v w srt; tr mic pp pyr, 35%
SH: med gy, sb ang, tab,
frm-hrd, silty-sl abrsv,
grdg to SS, tr mmica





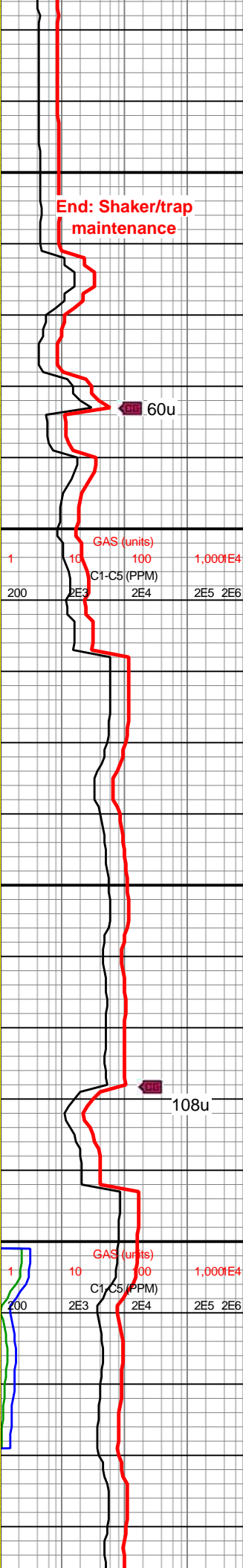
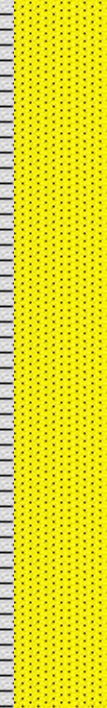
TVD: 5,940.35'
VS: -630.31'

MD: 6,119'
INC: 0.4°
AZM: 232.4°
TVD: 6,035.35'
VS: -630.05'

MW IN: 9.5+
VIS IN: 35
MW OUT: 9.7
VIS OUT: 35

WOB: 22.6klbs
RPM: 60
SPM: 172
SPP: 2,746psi

MD: 6,212'
INC: 0.6°
AZM: 238.4°
TVD: 6,128.35'
VS: -629.43'



End: Shaker/trap maintenance

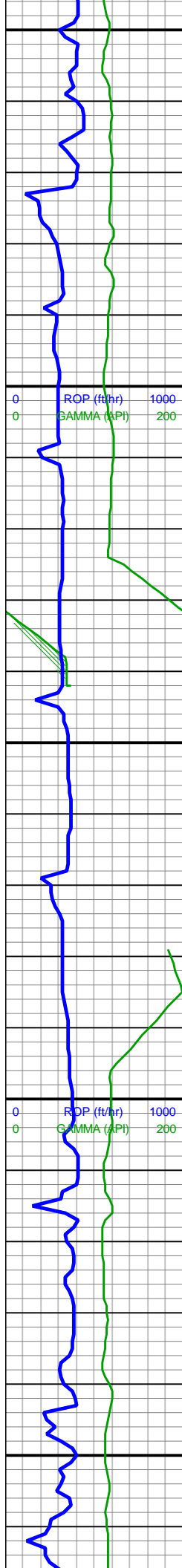
60u

108u

60% SS: lt gyshbn, med gy-wht, frm, rnd-sb rnd, occ sb ang, f gr sup mtx, v w srt; 40% SH: med gy, sb ang, tab, frm-hrd, slty-sl abrsv, grdg to SS

85% SH: med gy, sb ang, tab, frm-hrd, slty-sl abrsv, rr grdg to SS, tr pp pyr nod; 15% SS: lt-med gyshbn, sme wht, frm cons clus, rnd-sb rnd, occ sb ang, w srt f gr





6,250

6,260

6,270

6,280

6,290

6,300

6,310

6,320

6,330

6,340

6,350

6,360

6,370

6,380

6,390

6,400

6,410

6,420

6,430

6,440

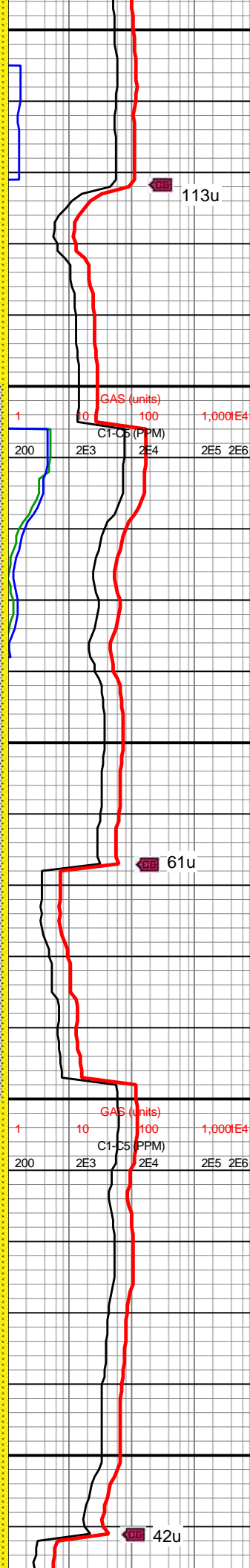
6,450

6,460

MW IN: 9
VIS IN: 35
MW OUT: 9.6
VIS OUT: 35

WOB: 18.8klbs
RPM: 60
SPM: 172
SPP: 2,607psi

MD: 6,402'
INC: 0.7°
AZM: 253.3°
TVD: 6,318.33'
VS: -627.58'



113u

GAS (units)
C1-C5 (PPM)
10 100 1,000E4
2E3 2E4 2E5 2E6

61u

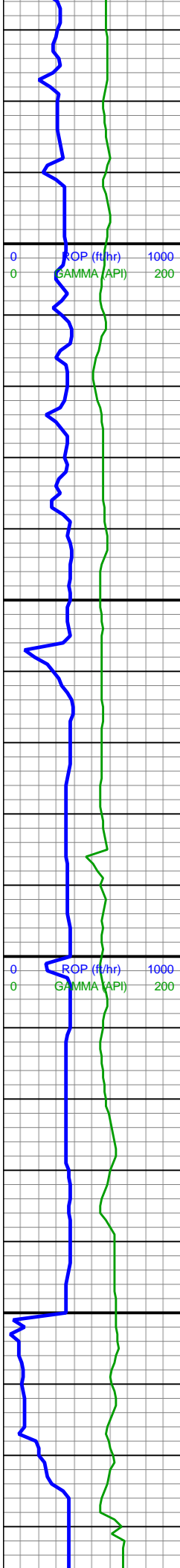
GAS (units)
C1-C5 (PPM)
10 100 1,000E4
2E3 2E4 2E5 2E6

42u

90% SH: med gy, sb
ang, tab, frm-hrd, slty-sl
abrsv, sl grdg to SS, tr pp
pyr nod; 10% SS: lt-med
gyshbn, sme wht, frm
cons clus, rnd-sb rnd,
occ sb ang, w srt, f gr, sl
calc, LCM

95% SH: med gy, sb ang,
ply fis, suc, frm-hrd,
slty-sl abrsv, sl grdg to
SS, tr pp pyr nod; 5% SS:
lt-med gyshbn, sme wht,
frm cons clus, rnd-sb
rnd, occ sb ang, w srt, f
gr, sl calc, LCM





6,470
6,480
6,490
6,500
6,510
6,520
6,530
6,540
6,550
6,560
6,570
6,580
6,590
6,600
6,610
6,620
6,630
6,640
6,650
6,660
6,670
6,680

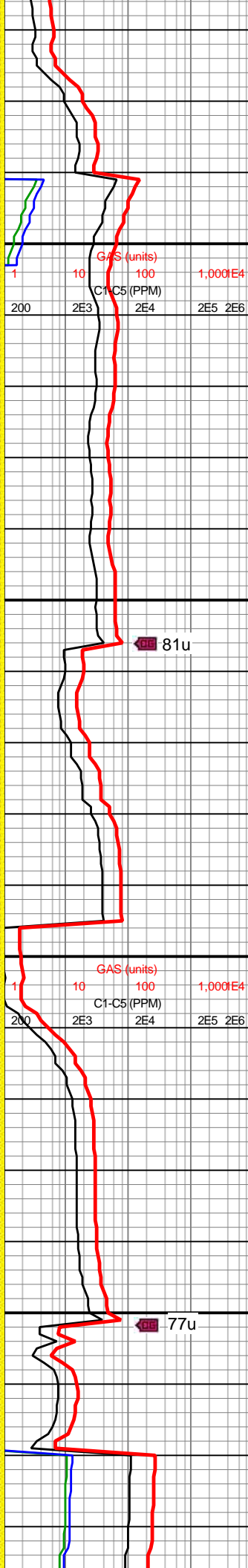
MD: 6,496'
INC: 0.9°
AZM: 235.2°
TVD: 6,412.32'
VS: -626.5'

MW IN: 9.6
VIS IN: 36
MW OUT: 9.6
VIS OUT: 36

MD: 6,590'
INC: 1.2°
AZM: 254.2°
TVD: 6,506.31'
VS: -625.03'

WOB: 25.1klbs
RPM: 60
SPM: 169
SPP: 2,754psi

MW IN: 9.5
VIS IN: 36
MW OUT: 9.6
VIS OUT: 36

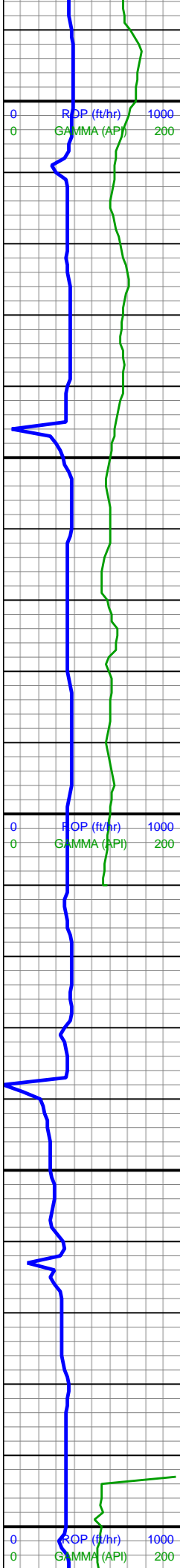


90% SH: med gy, sb ang,
ply fis, suc, frm-hrd,
silty-sl abrsv, sl grdg to
SS, tr pp pyr nod; 10%
SS: lt-med gyshbn, sme
wht, frm cons clus,
rnd-sb rnd, occ sb ang, w
srt, f gr, sl calc, LCM

90% SH: med gy, sb ang,
ply fis, suc, frm-hrd,
silty-sl abrsv, sl grdg to
SS, tr pp pyr nod; 10%
SS: lt-med gyshbn, sme
wht, frm cons clus,
rnd-sb rnd, occ sb ang, w
srt, f gr, sl calc, LCM

95% SH: med gy, sb ang,
ply fis, suc, frm-hrd,
silty-sl abrsv, sl grdg to
SS, tr pp pyr nod; 5% SS:





MD: 6,684'
INC: 0.9°
AZM: 313.4°
TVD: 6,600.29'
VS: -623.53'

MW IN: 9.5
VIS IN: 36
MW OUT: 9.6
VIS OUT: 36

MD: 6,802'
INC: 0.8°
AZM: 312.5°
TVD: 6,718.28'
VS: -622.12'

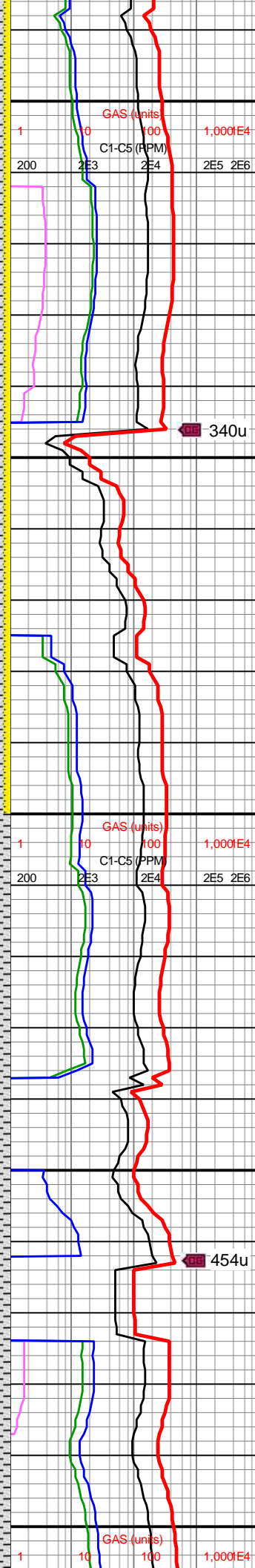
WOB: 16.5klbs
RPM: 61
SPM: 171
SPP: 2,681psi

TOOH for Agitator

MIN DEPT 01/11/2019

MW IN: 9.8
VIS IN: 45
MW OUT: 9.8
VIS OUT: 45

MD: 6,885'

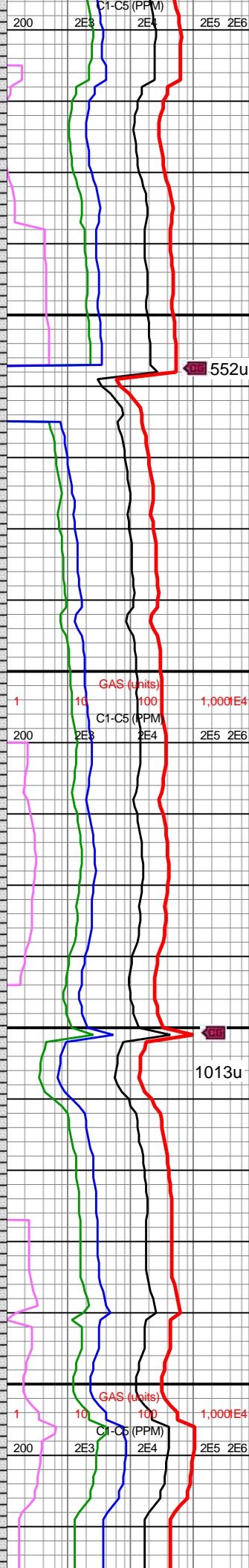
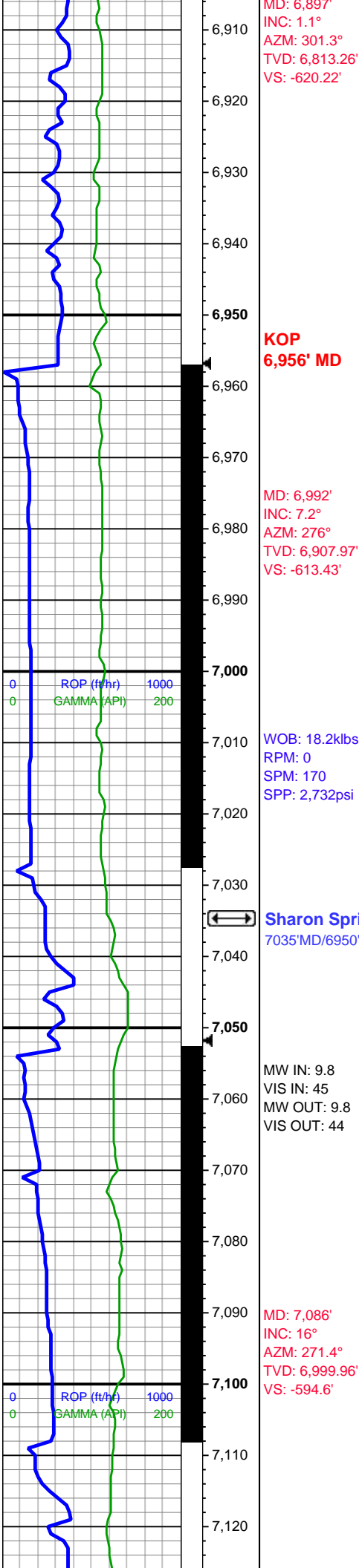


lt-med gyshbn, sme wht,
frm cons clus, rnd-sb
rnd, occ sb ang, w srt, f
gr, sl calc, LCM

95% SH: med gy, sb ang,
ply fis, suc, frm-hrd,
sly-sl abrsv, sl grdg to
SS, tr pp pyr nod; 5% SS:
lt-med gyshbn, sme wht,
frm cons clus, rnd-sb
rnd, occ sb ang, w srt, f
gr, sl calc, LCM

100% SH: med gy, sb
blky-sb ang, ply fis, suc,
frm-hrd, sly-sl abrsv, lam
silc ip, calc vn ip; LCM



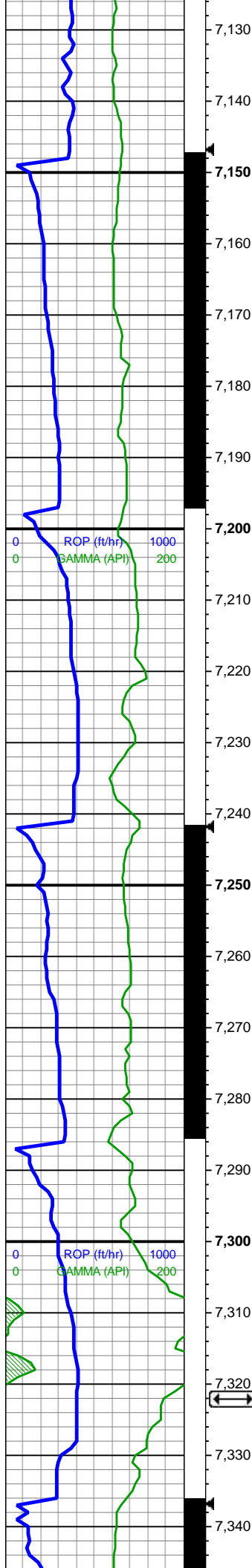


100% SH: med gy, sb
blky-sb ang, ply fis, suc,
frm-hrd, slty-sl abrsv, lam
silc ip, calc vn ip; LCM



100% SH: med gy, sb
blky-sb ang, ply fis, suc,
frm-hrd, slty-sl abrsv, lam
silc ip, incrg calc; walnut
LCM





MD: 7,181'
INC: 23.1°
AZM: 266.1°
TVD: 7,089.44'
VS: -563.18'

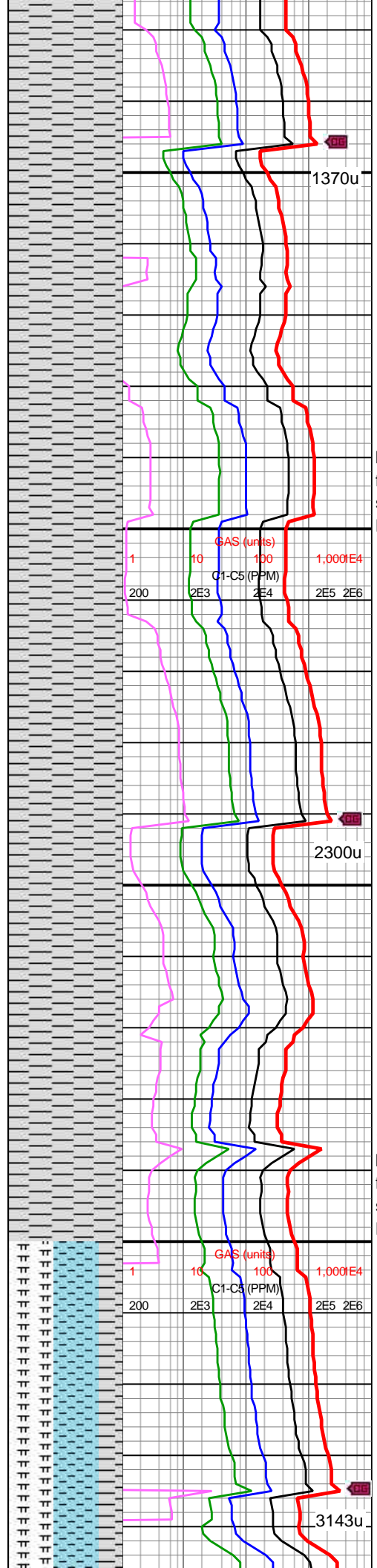
WOB: 10klbs
RPM: 30
SPM: 169
SPP: 2,850psi

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

MD: 7,276'
INC: 28.3°
AZM: 263.3°
TVD: 7,175.01'
VS: -522.89'

Niobrara A
7320°MD/7213°TVD

MW IN: 9.9+



1370u

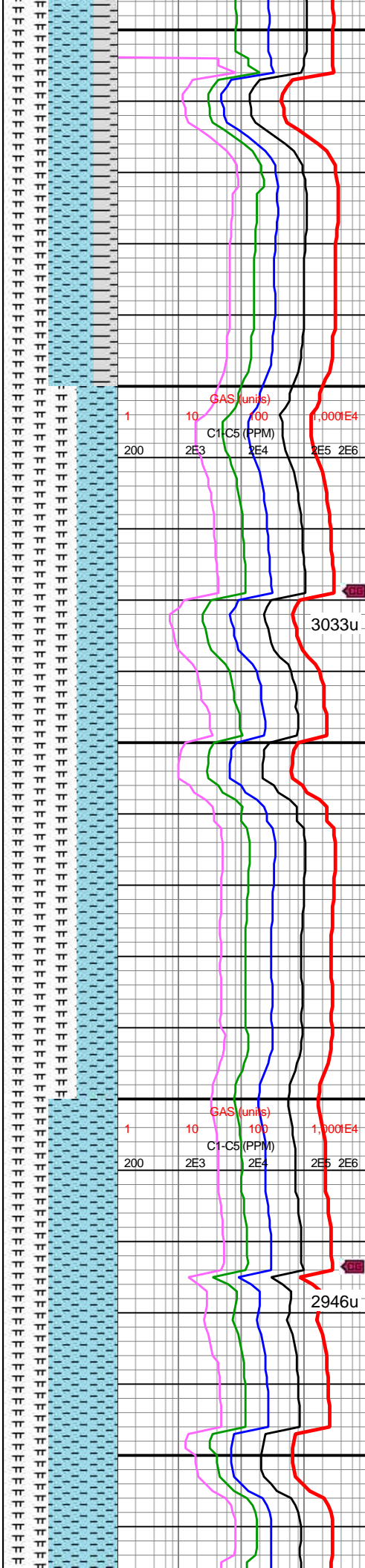
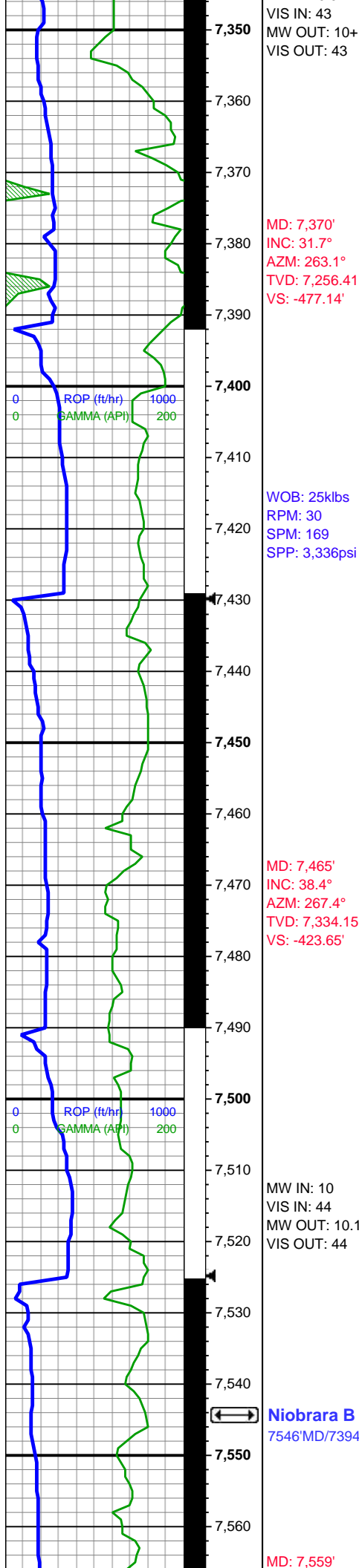
2300u

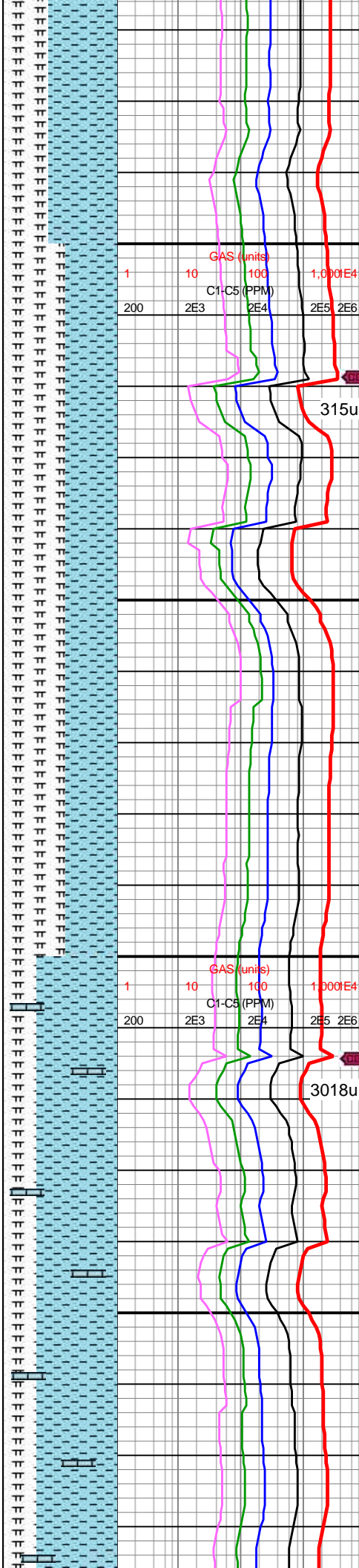
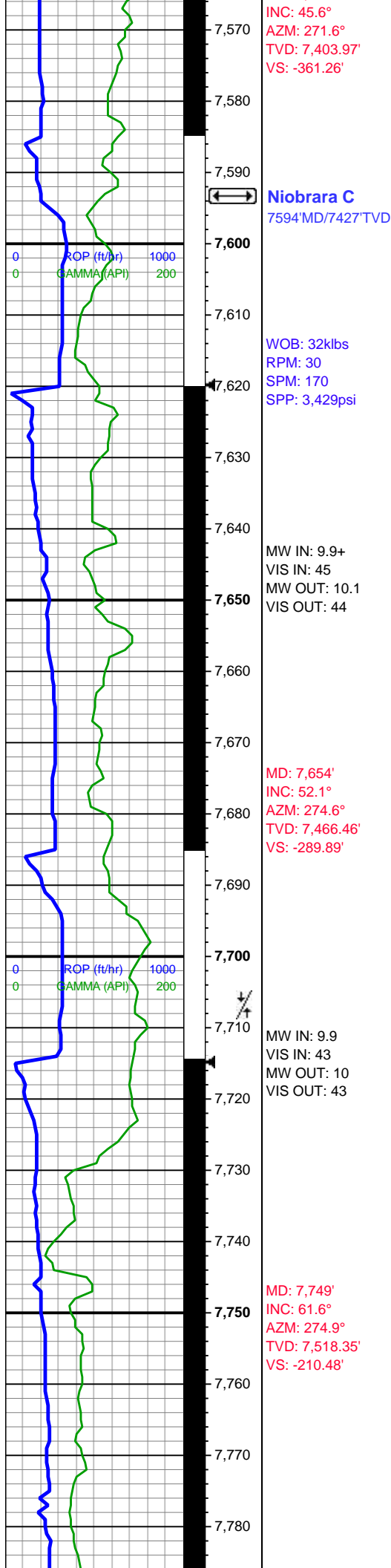
3143u

100% SH: med gy, sb
blk-y-sb ang, ply fis, suc,
frm-hrd, slty-sl abrsv, lam
silc ip, hi calc; walnut
LCM

100% SH: med gy, sb
blk-y-sb ang, hd-fri,
frm-hrd, slty-sl abrsv, lam
silc ip, hi calc; walnut
LCM







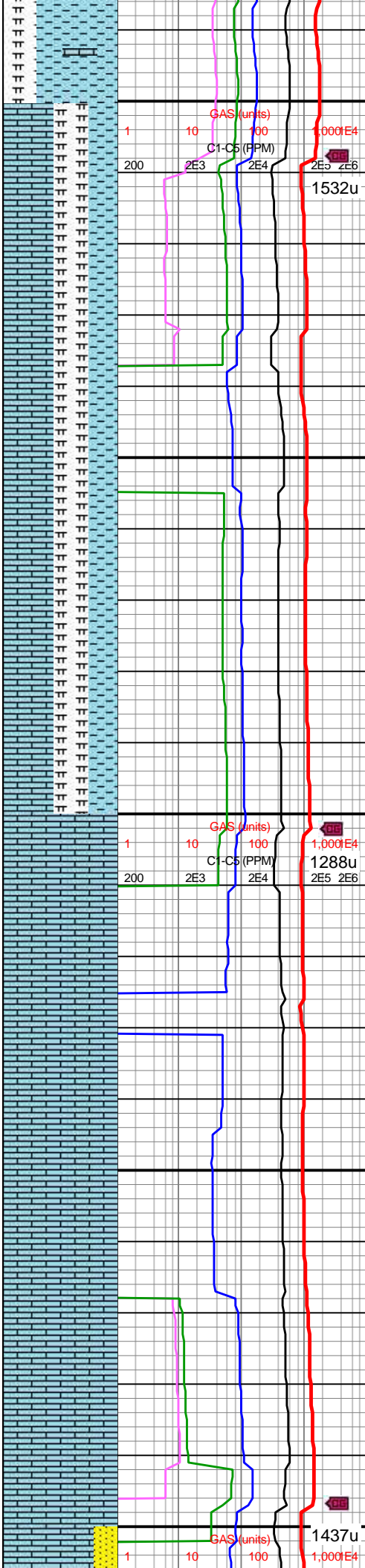
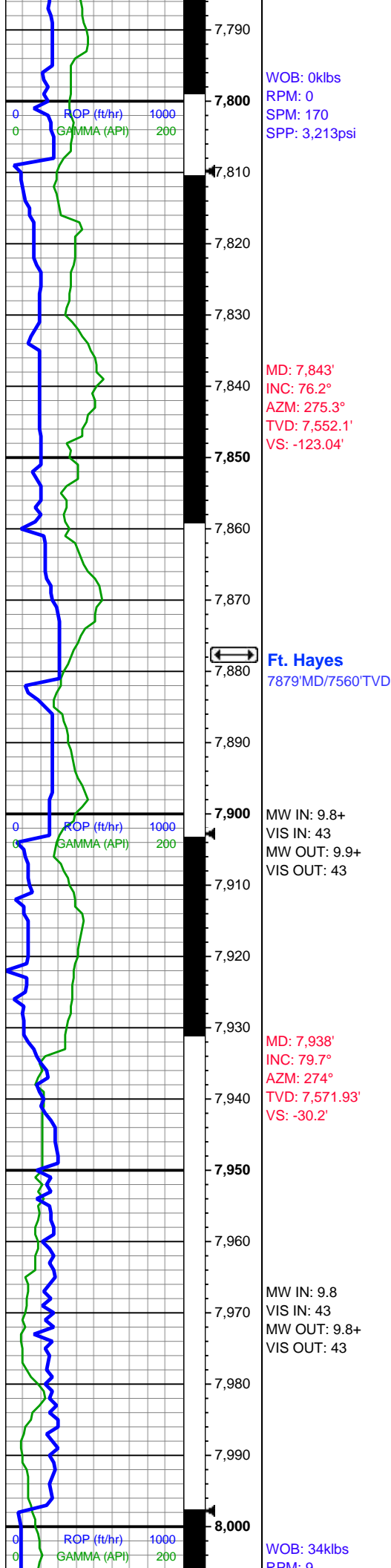
60% CHK: offwht, amor,
sft-med frm, vf-f; 40%
MRLST: gry-dk gry, slty,
amor, f-med, mnr pyr,
abnt free chk



55% MRLST: gry-dk gry,
amor, fy lam chk, diss
sil, mnr pyr; 45% CHK:
offwht to lt brn, amor,
sft-med frm, vugy, occ
free chk



70% CHK: offwht to lt brn,

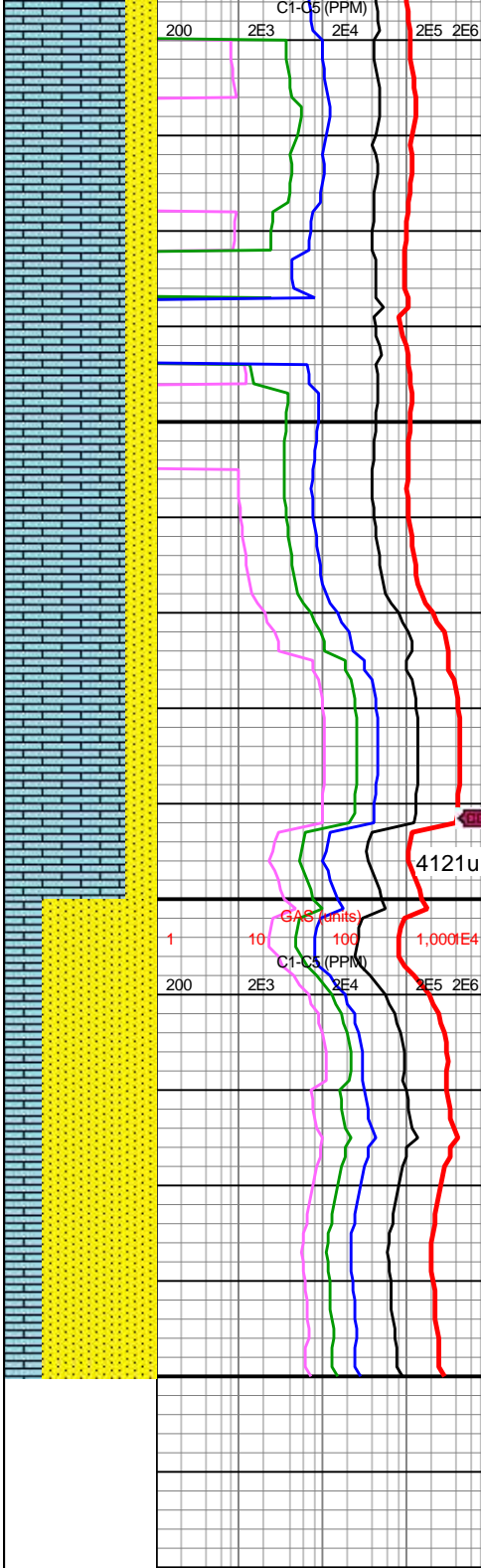
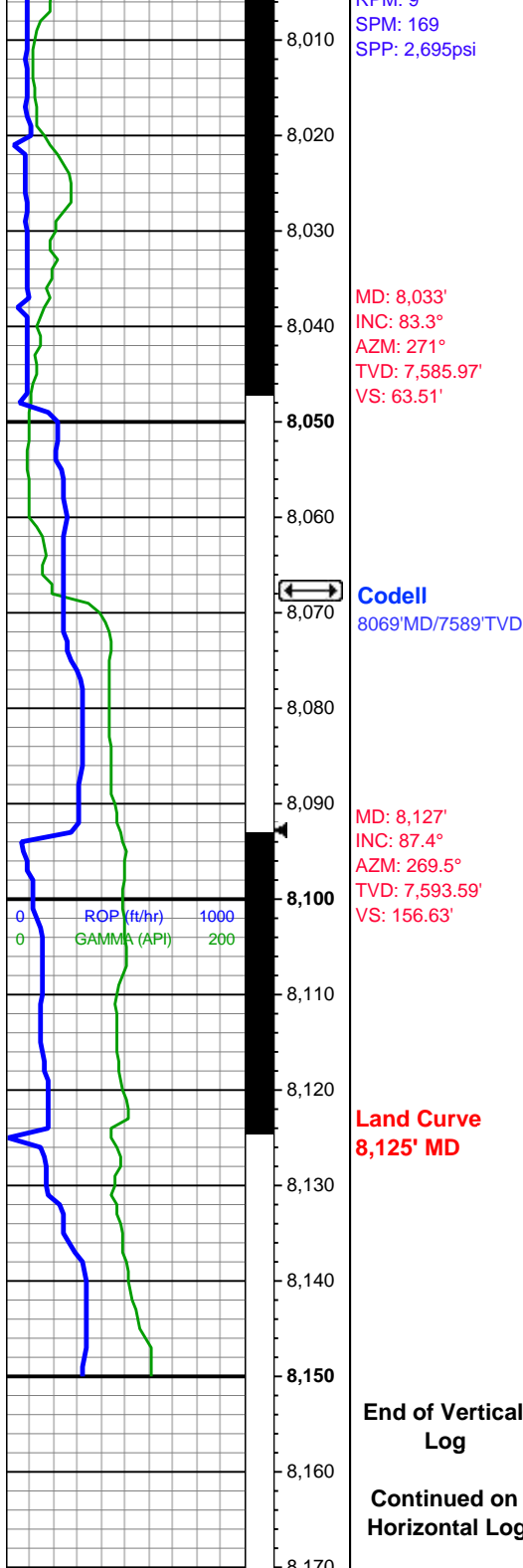


amor, sft-med frm, vugy,
occ free chk; 30%
MRLST: gry-dk gry, amor,
fy lam chk, dissil sil, mn
pyr; tr LS strgs

45% LS: offwht to lt gry,
dk gry ip, mas, occ
silty-sdy, dolc ip; 30%
MRLST: gry-dk gry, amor,
fy lam chk, dissil sil, mn
pyr; 25% CHK: offwht to lt
brn, amor, sft-med frm,
vugy, occ free chk

100% LS: offwht to lt gry,
dk gry ip, mas, occ
silty-sdy, dolc ip





80% LS: offwht to lt gry, dk gry ip, mas, occ slty-sdy, dolc ip; 20% SS: gyshbn-lt brn, mot med brn, vf-f gr, sb ang-sb rd, sb frm-frm, mod srted, grn sup, silc cmt, tr pp mic pyr nod, sme med gy-dk gy gr sup ss clus, mod calc

