



Scale: 5" / 100'
Measured Depth Log

Well Name BEF West 14

Location Section 2, Township 1S, Range 66W

State Colorado

County Adams

Country USA

Rig Number True 33

API Number 05-001-10215

AFE # 10215

Geographic Region Rockies

Field Wattenberg

Spud Date 12/28/2018

Drilling Completed 1/5/2019

Surface Coordinates 2168' FNL & 322' FEL, Sec. 2, T1S, R66W
Latitude: 39.99459, Longitude: -104.7347

Bottom Hole Coordinates 1890' FNL & 460' FWL, Sec. 2, T1S, R66W

Ground Elevation 5,049'

K.B. Elevation 5,076'

Logged Interval 5,000' To 7,900'

Total Depth 12,244'

Formation Niobrara C

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 01/01/2018

Release Date: 01/07/2019













Job #: 1852RK1812

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

Oil Show

 DEAD
 EVEN
 QUESTIONABLE
 SPOTTED STAINING




Porosity

 ORGANIC
 PINPOINT
 VUGGY





Engineering

 BIT
 CASING
 CONNECTION (LEFT)

 FORMATION TOP





 GAS SHOW
 MN DEPTH
 NORMAL FAULT
 OIL SHOW
 OVERTURNED STRATA
 REVERSE FAULT
 SIDEWALL CORE (LEFT)

Rounding

 ANGULAR
 ROUNDED
 SUBANG
 SUBRND

Textures

 LITHOGRAPHIC

 MICROXLN
 MUDSTONE
 PACKSTONE
 WACKESTONE

Sorting

 MODERATE

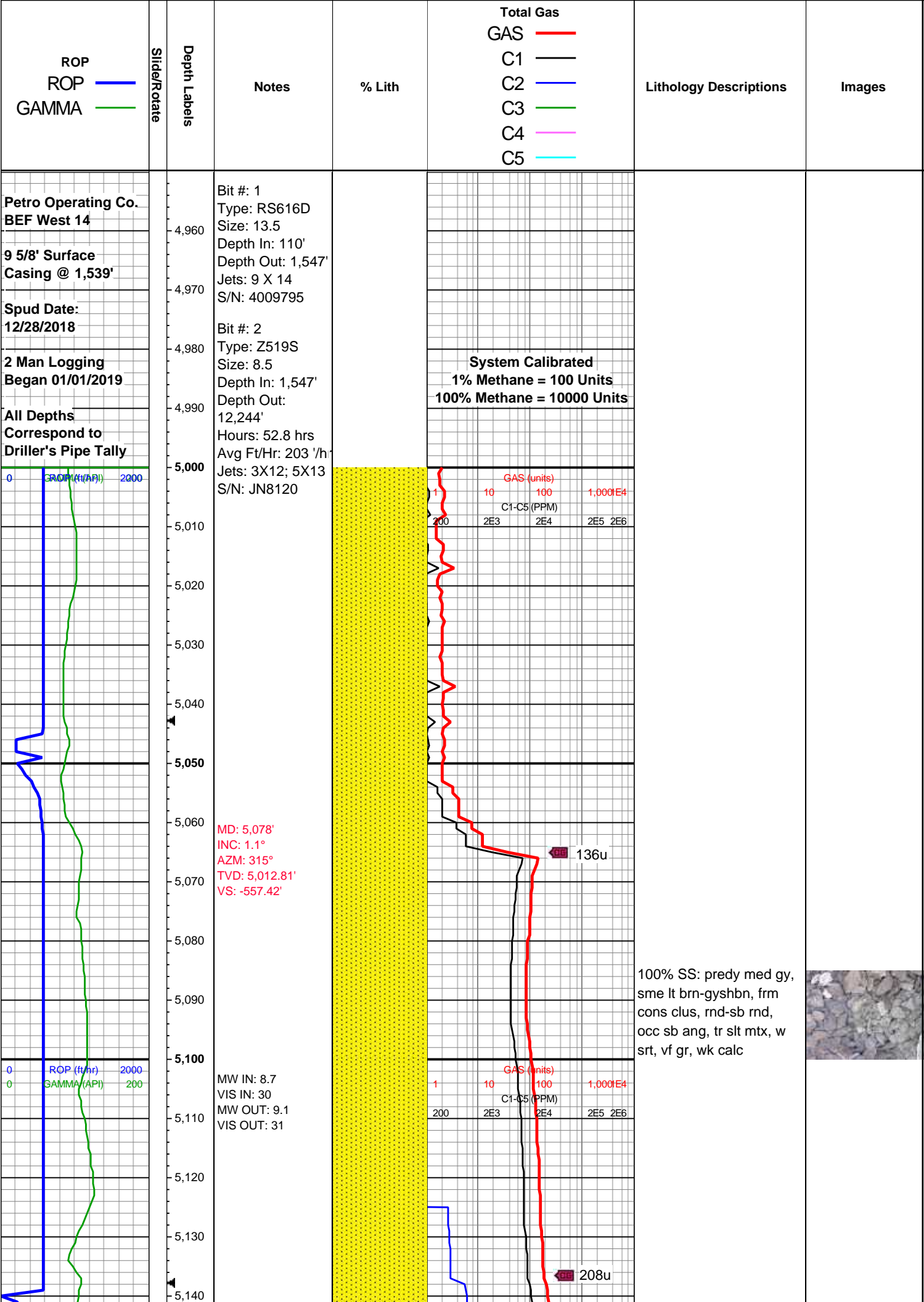
E EARTHY
F FENESTRAL
F FRACTURE
X INTERCRYSTALLINE
Φ INTEROOLITIC
M MOLDIC

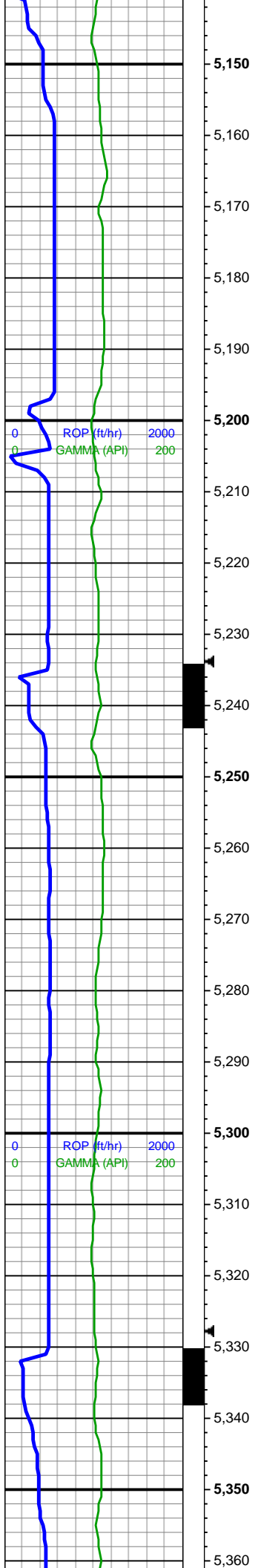
▶ CONNECTION (RIGHT)
CONNECTION GAS
↓ CORE - LOST
■ CORE - RECOVERED
DST INTERVAL
FAULT

▶ SIDEWALL CORE (RIGHT)
SLIDE
SURVEY
TRIP GAS
WIRELINE TESTED - LEFT
WIRELINE TESTED - RT

BS BOUNDSTONE
C CHALKY
CX CRYPTOXLN
E EARTHY
FX FINELYXLN
GS GRAINSTONE

P POOR
W WELL



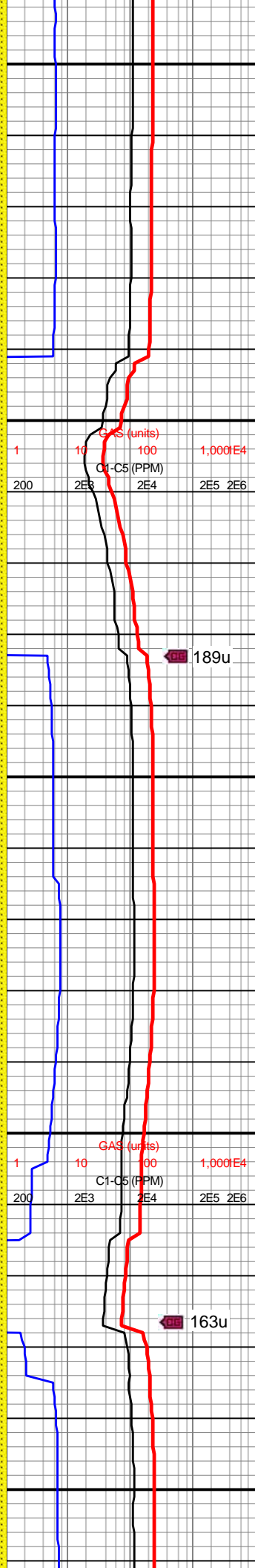


MD: 5,173'
INC: 0.9°
AZM: 315.3°
TVD: 5,107.79'
VS: -556.18'

WOB: 42klbs
RPM: 60
SPM: 173
SPP: 3,898psi

MD: 5,268'
INC: 1.1°
AZM: 302°
TVD: 5,202.78'
VS: -554.83'

MD: 5,363'
INC: 1.8°
AZM: 302.50°
TVD: 5,298.50'



100% 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

100% 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



189u

163u



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

AZM: 280.5°
TVD: 5,297.75'
VS: -552.54'

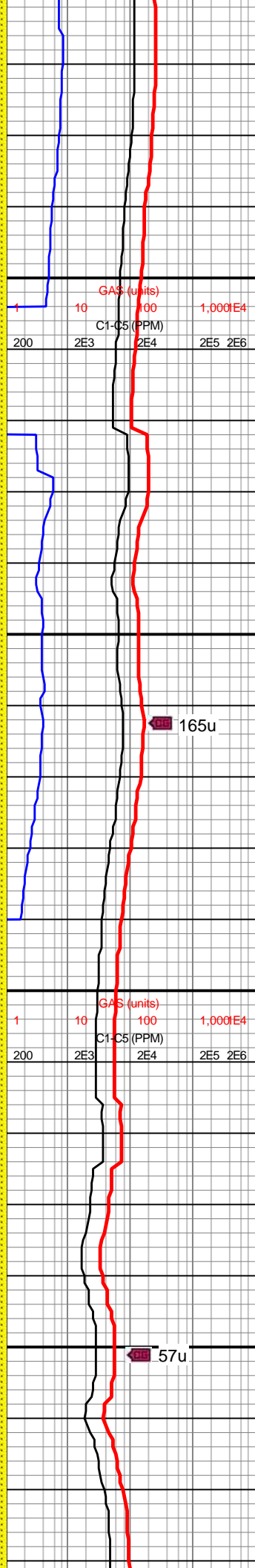
WOB: 23klbs
RPM: 61
SPM: 173
SPP: 2,601psi

MD: 5,497'
INC: 2.5°
AZM: 280.2°
TVD: 5,431.65'
VS: -547.55'

Pick up
Resistivity Tool

MW IN: 8.7
VIS IN: 30
MW OUT: 8.9
VIS OUT: 31

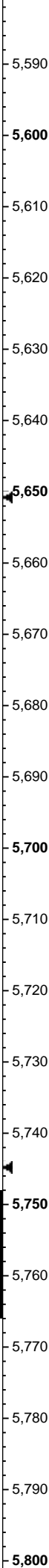
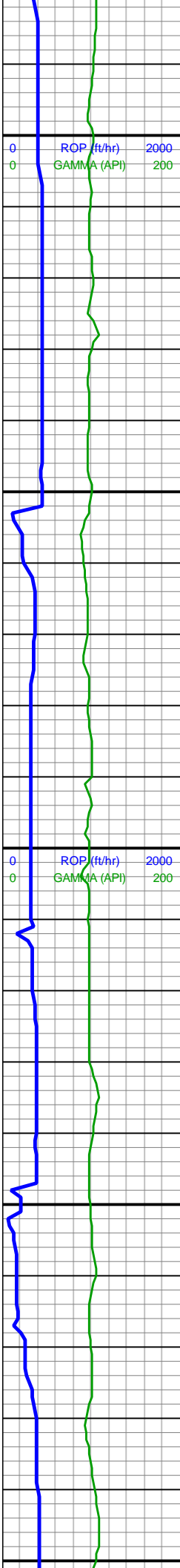
MD: 5,592'
INC: 0.9°
AZM: 230.1°
TVD: 5,526.61'



100% SS: med-lt gy, sme
lt brn-gyshbn, frm, rnd-sb
rnd, occ sb ang, gr sup
mtx, w srt, vf gr, wk calc

100% 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





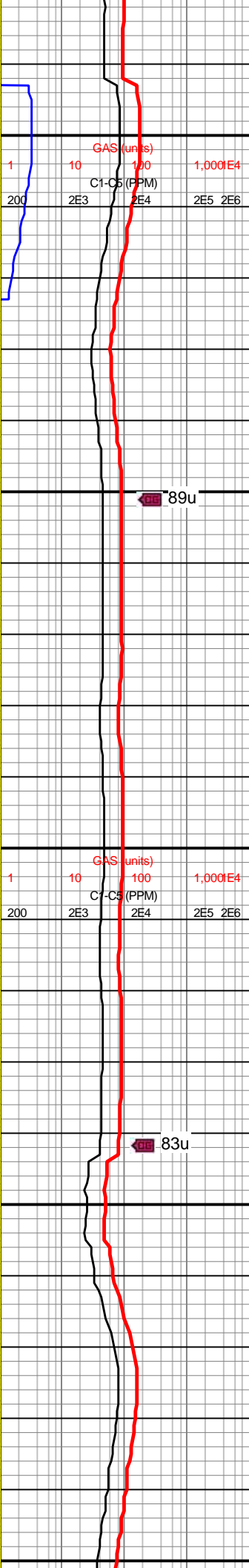
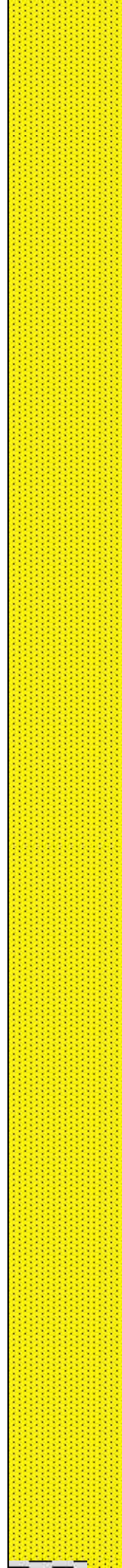
VS: -544.95'

WOB: 18klbs
RPM: 61
SPM: 171
SPP: 2,402psi

MW IN: 8.8
VIS IN: 33
MW OUT: 8.8
VIS OUT: 31

MD: 5,686'
INC: 1.1°
AZM: 247.1°
TVD: 5,620.6'
VS: -543.61'

MD: 5,781'
INC: 1.1°
AZM: 185.4°
TVD: 5,715.58'
VS: -542.76'

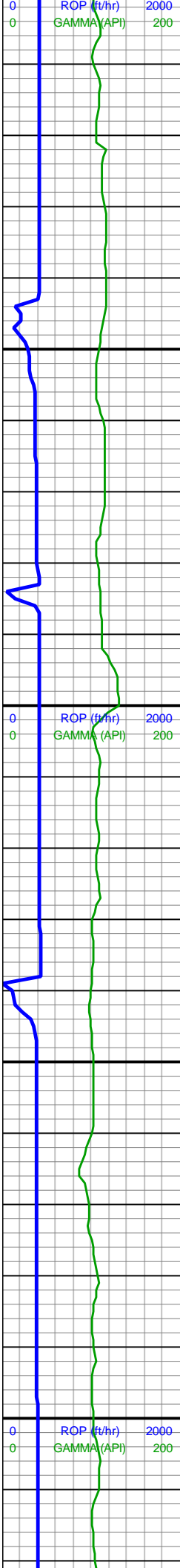


100% SS: med-lt gy, sme
lt gyshbn-wht, frm, rnd-sb
rnd, occ sb ang, gr sup
mtx, w srt, vf gr, v wk calc

100% SS: lt brn-gyshbn,
med-lt gy, frm, rnd-sb
rnd, occ sb ang, gr sup
mtx, w srt, f gr, v wk calc

100% SS: lt gyshbn, med
gy-wht, frm, rnd-sb rnd,
occ sb ang, f gr sup mtx,
w srt, v wk calc



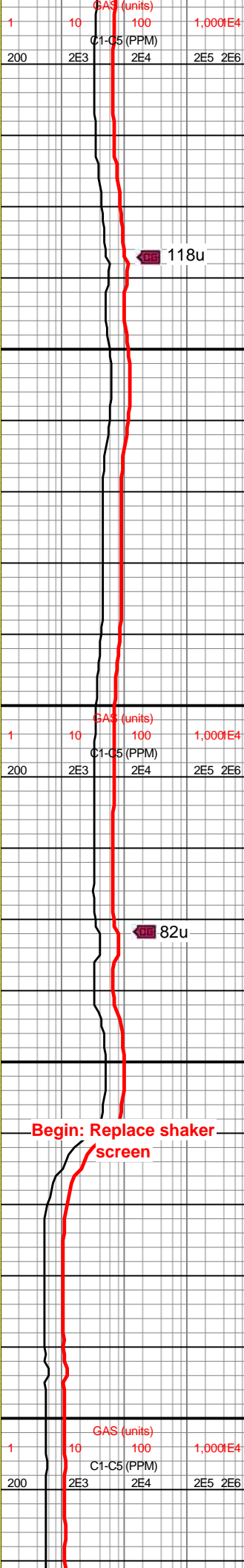


SPM: 171
SPP: 2,298psi

MD: 5,875'
INC: 0.8°
AZM: 160.7°
TVD: 5,809.57'
VS: -542.98'

MD: 5,970'
INC: 0.8°
AZM: 155.2°
TVD: 5,904.56'
VS: -543.55'

WOB: 16klbs
RPM: 62
SPM: 173
SPP: 2,399psi



118u

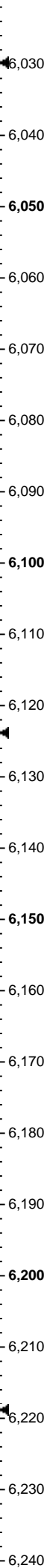
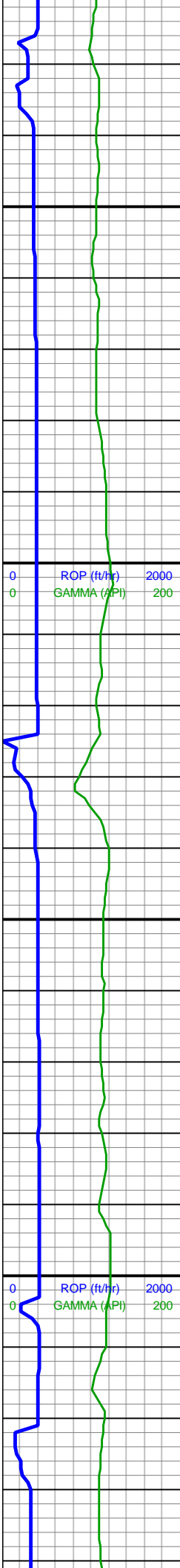
82u

Begin: Replace shaker
screen

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

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



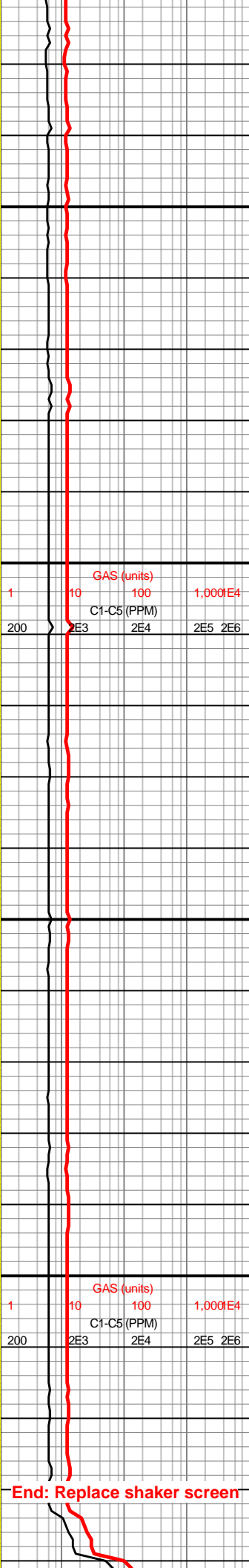
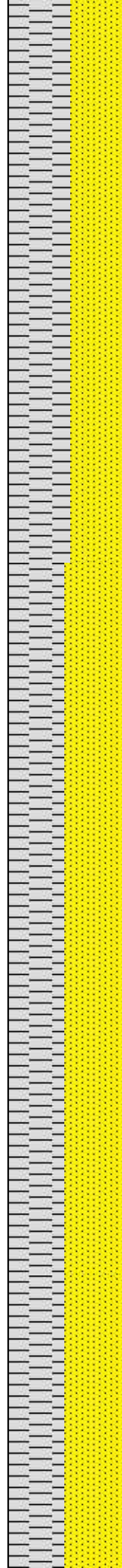


MW IN: 8.9
VIS IN: 35
MW OUT: 8.9
VIS OUT: 33

MD: 6,064'
INC: 0.5°
AZM: 185.3°
TVD: 5,998.55'
VS: -543.84'

MD: 6,159'
INC: 0.5°
AZM: 199.2°
TVD: 6,093.55'
VS: -543.71'

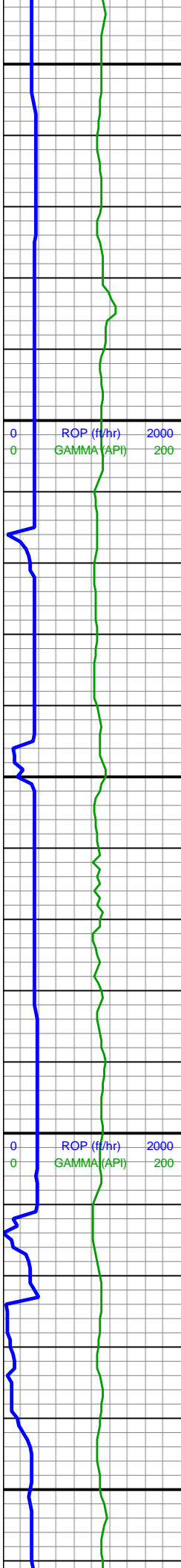
WOB: 21klbs
RPM: 61
SPM: 175
SPP: 2,707psi



55% SH: med gy, sb ang, tab, frm-hrd, slty-sl abrsv, grdg to SS; 45% SS: lt gyshbn, med gy-wht, frm, rnd-sb rnd, occ sb ang, f gr sup mtx, v w srt; tr mic pp pyr

50% SH: med gy, sb ang, tab, frm-hrd, slty-sl abrsv, grdg to SS; 50% SS: lt-med gyshbn, frm, rnd-sb rnd, occ sb ang, v w srt; tr mic pp pyr

End: Replace shaker screen



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

MD: 6,253'
INC: 0.3°
AZM: 190.9°
TVD: 6,187.55'
VS: -543.57'

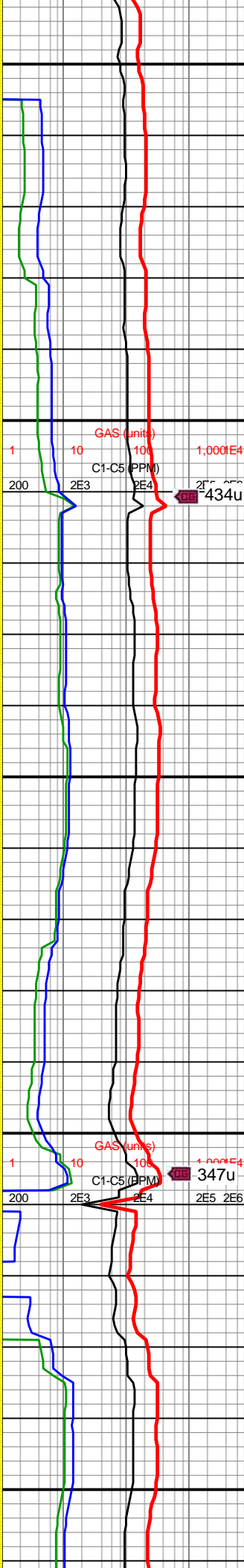
MW IN: 8.9
VIS IN: 38
MW OUT: 8.9
VIS OUT: 37

MD: 6,348'
INC: 0.7°
AZM: 277.9°
TVD: 6,282.55'
VS: -542.96'

WOB: 15klbs
RPM: 62
SPM: 171
SPP: 2,619psi

MW IN: 8.9
VIS IN: 38
MW OUT: 8.9
VIS OUT: 38

MD: 6,442'
INC: 0.5°
AZM: 110°
TVD: 6,376.54'
VS: -542.78'

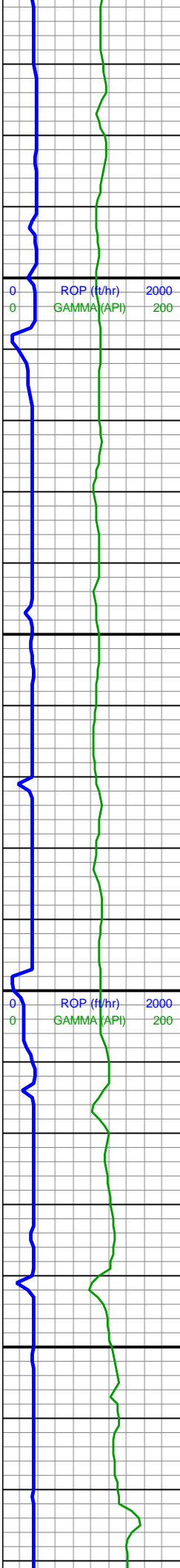


50% SH: med gy, sb ang, tab, frm-hrd, slty-sl abrsv, grdg to SS; 50% SS: lt-med gyshbn, frm, rnd-sb rnd, occ sb ang, w srt



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





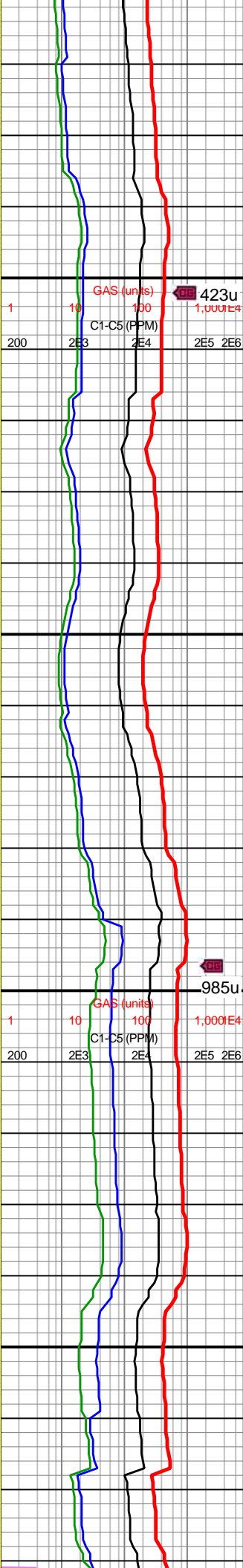
6,470
6,480
6,490
6,500
6,510
6,520
6,530
6,540
6,550
6,560
6,570
6,580
6,590
6,600
6,610
6,620
6,630
6,640
6,650
6,660
6,670
6,680

MD: 6,537'
INC: 0.7°
AZM: 107.6°
TVD: 6,471.54'
VS: -543.74'

WOB: 112klbs
RPM: 38
SPM: 171
SPP: 2,317psi

MD: 6,631'
INC: 0.7°
AZM: 125.9°
TVD: 6,565.53'
VS: -544.78'

MW IN: 9.5
VIS IN: 38
MW OUT: 9.5
VIS OUT: 38



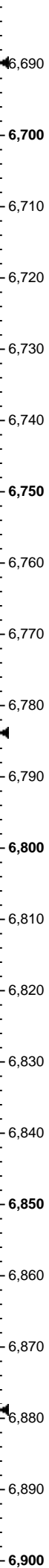
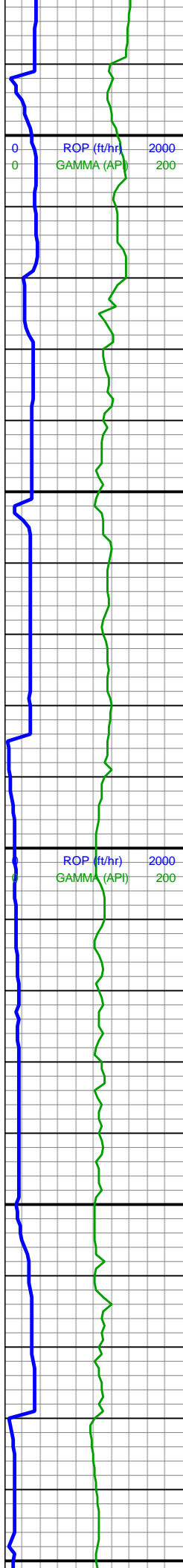
60% SS: lt-med gyshbn, sme wht, frm cons clus, rnd-sb rnd, occ sb ang, w srt f gr; 40% SH: med gy, sb ang, tab, frm-hrd, slty-sl abrsv, grdg to SS, tr slt mtx



55% SS: lt-med gyshbn, sme wht, frm cons clus, rnd-sb rnd, occ sb ang, w srt f gr; 45% SH: med gy, sb ang, tab, frm-hrd, slty-sl abrsv, grdg to SS, tr pp pyr nod



75% SH: med gy, lt gy



MD: 6,725'
INC: 0.4°
AZM: 134.5°
TVD: 6,659.53'
VS: -545.51'

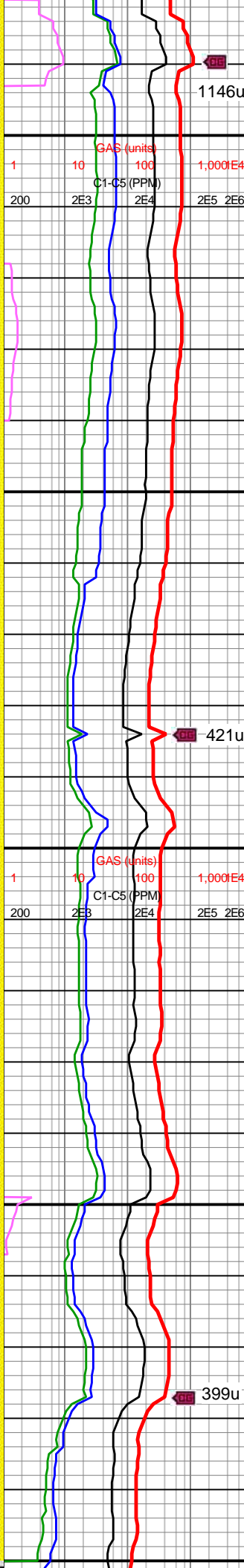
MW IN: 9.5
VIS IN: 38
MW OUT: 9.5
VIS OUT: 38

KOP
6,785' MD

WOB: 19klbs
RPM: 0
SPM: 171
SPP: 1,999psi

MD: 6,819'
INC: 5.4°
AZM: 272.5°
TVD: 6,753.39'
VS: -541.33'

MW IN: 9.6+
VIS IN: 38
MW OUT: 9.6
VIS OUT: 39

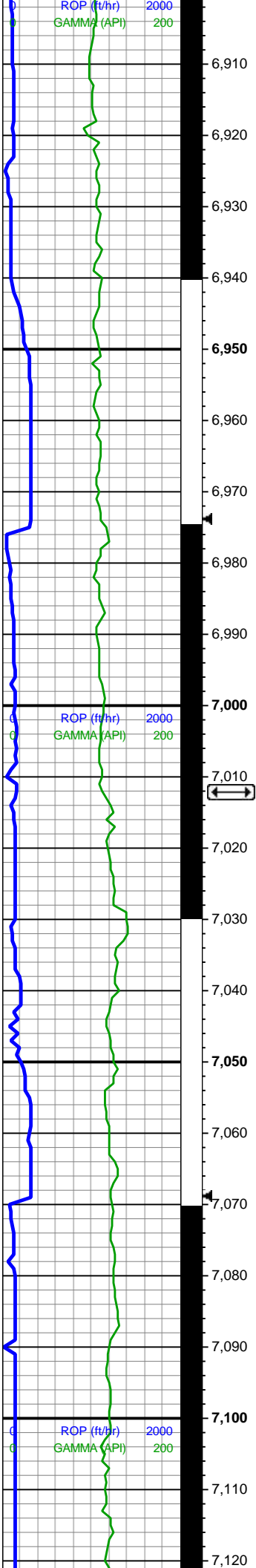


mot, sb ang, tab, frm-hrd,
silty-sl abrsv, grd to SS,
tr pp pyr nod; 25% SS:
lt-med gyshbn, sme wht,
frm cons clus, rnd-sb
rnd, occ sb ang, w srt f gr

60% SH: med gy, lt gy
mot, sb ang, tab, frm-hrd,
silty-sl abrsv, grd to SS,
tr pp pyr nod; 40% SS:
lt-med gyshbn, sme wht,
frm cons clus, rnd-sb
rnd, occ sb ang, w srt f gr

65% SH: med gy, lt gy
mot, sb ang, mod fis,
frm-hrd, silty-sl abrsv,
grdg to SS, tr pp pyr nod;
35% SS: lt-med gyshbn,
wht ip, frm cons clus,
rnd-sb rnd, occ sb ang, w
srt, f gr; ns





MD: 6,913'
INC: 12.6°
AZM: 270.2°
TVD: 6,846.18'
VS: -526.65'

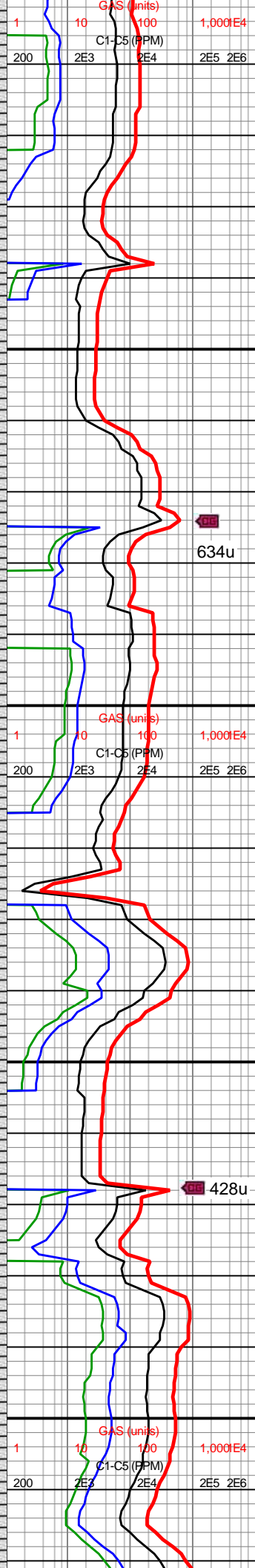
WOB: 23.4klbs
RPM: 0
SPM: 171
SPP: 1,937psi

Sharon Springs
7011' MD/6940' TVD

MD: 7,008'
INC: 19.9°
AZM: 267.4°
TVD: 6,937.32'
VS: -500.19'

MW IN: 9.6
VIS IN: 39
MW OUT: 9.6
VIS OUT: 39

MD: 7,103'
INC: 27.5°
AZM: 264.2°
TVD: 7,024.25'
VS: -462.4'



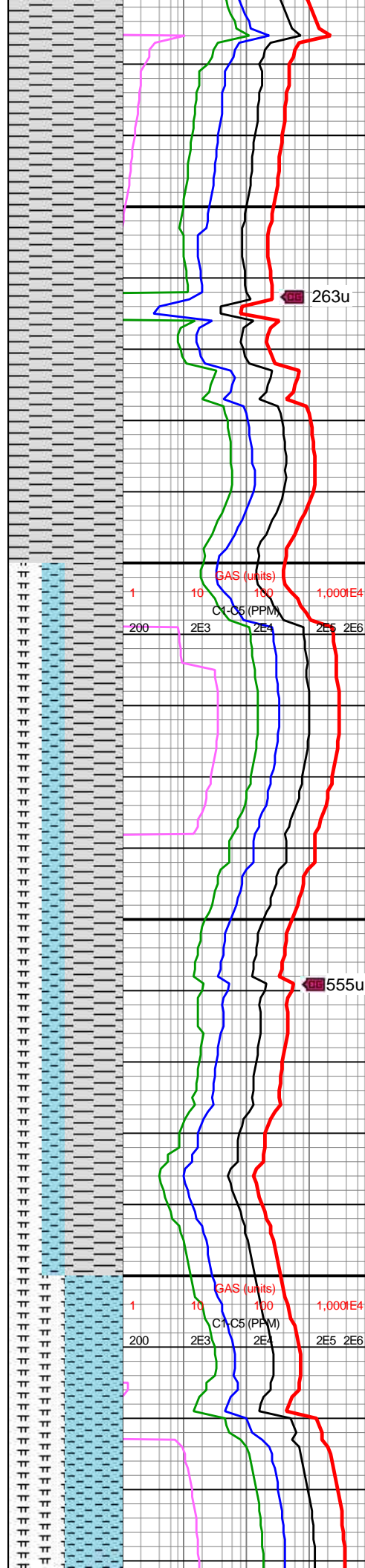
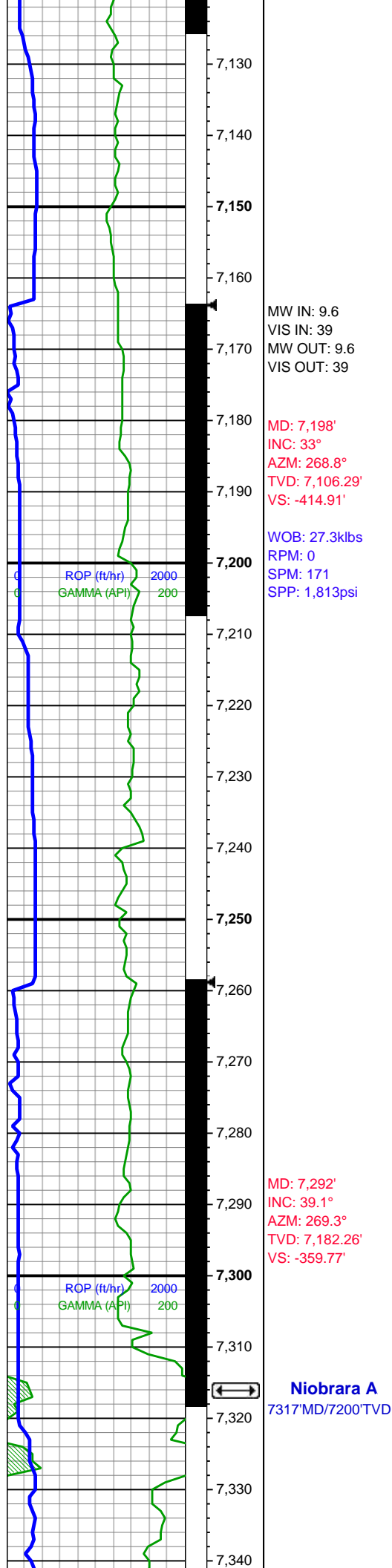
634u

428u

100% SH: dk gy-med gy,
mod fis, sb ang-sb blkly,
frm-hd, sm-slty, grty ip,
abnt silc vns, sl calc, ns

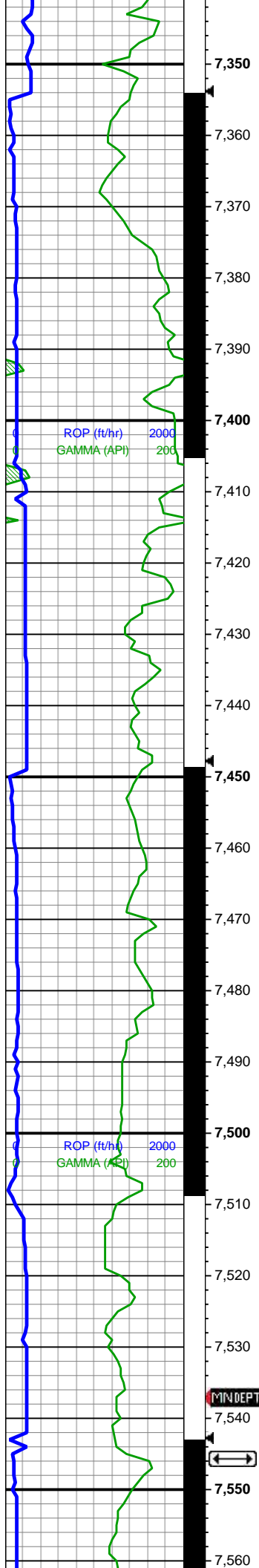
100% SH: dk gy-med gy,
mod fis, sb ang-sb blkly,
frm-hd, sm-slty, grty ip,
abnt silc vns, sl calc, ns





100% SH: dk gy-med gy,
mod fis, sb ang-sb blky,
frm-hd, sm-slty, grty ip,
abnt silc vns, sl calc, ns

50% SH: dk gy-med gy,
mod fis, sb ang-sb blkly,
frm-hd, sm-sltly, grty ip,
abnt silc vns; 30%
MRLST: dk gy-v dk gy,
mot, slty tex, frm-sl hd,
tab-blkly, brit, tr CHK incl,
mod calc, tr cal frac fl;
20% CHK: med
gy-gyshbn, off wht-orng
brn frags, frm-fri, mnr
MRLST lamn, sb blkly-sb
plty, Cut FLOR: yel-yel
wht, ylsh gn



MW IN: 9.6
VIS IN: 39
MW OUT: 9.6
VIS OUT: 39

MD: 7,387'
INC: 46.2°
AZM: 266.7°
TVD: 7,252.09'
VS: -295.75'

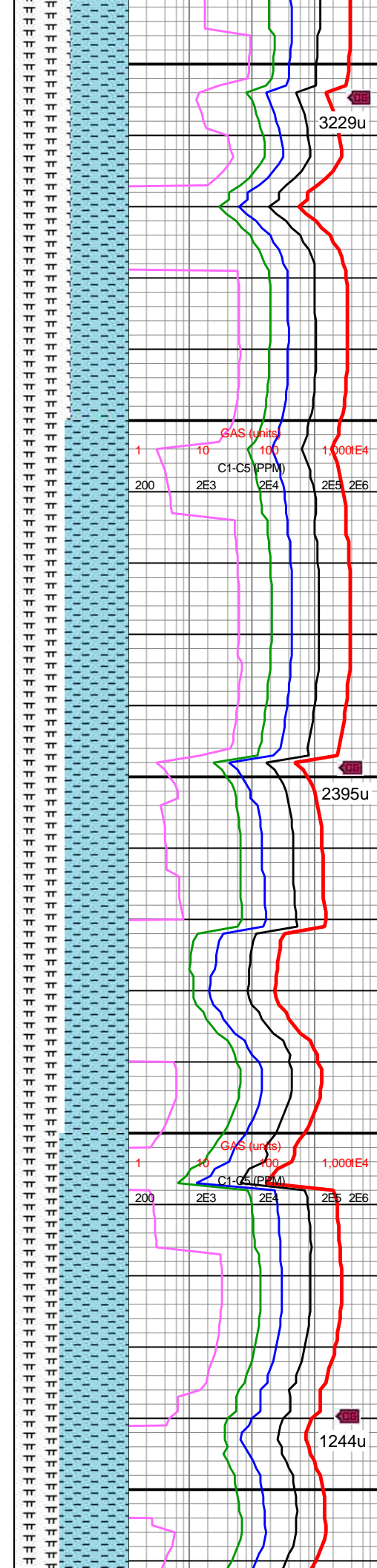
WOB: 22.3klbs
RPM: 31
SPM: 171
SPP: 2,271psi

MW IN: 9.6
VIS IN: 40
MW OUT: 9.6
VIS OUT: 39

MD: 7,481'
INC: 52.6°
AZM: 268.4°
TVD: 7,313.23'
VS: -224.78'

MINDEPTH 01/03/2019

Niobrara B
7546' MD/7349' TVD



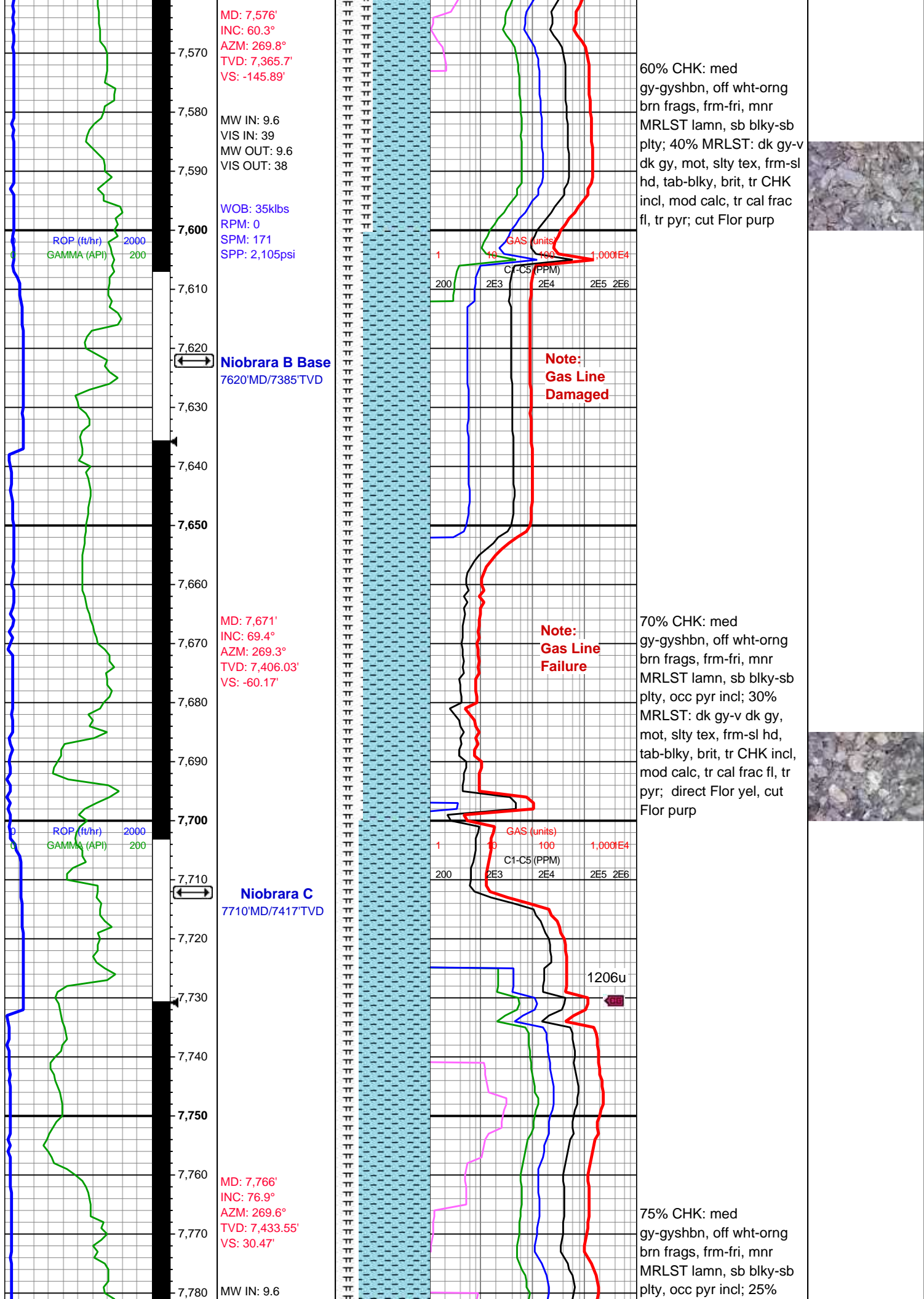
3229u

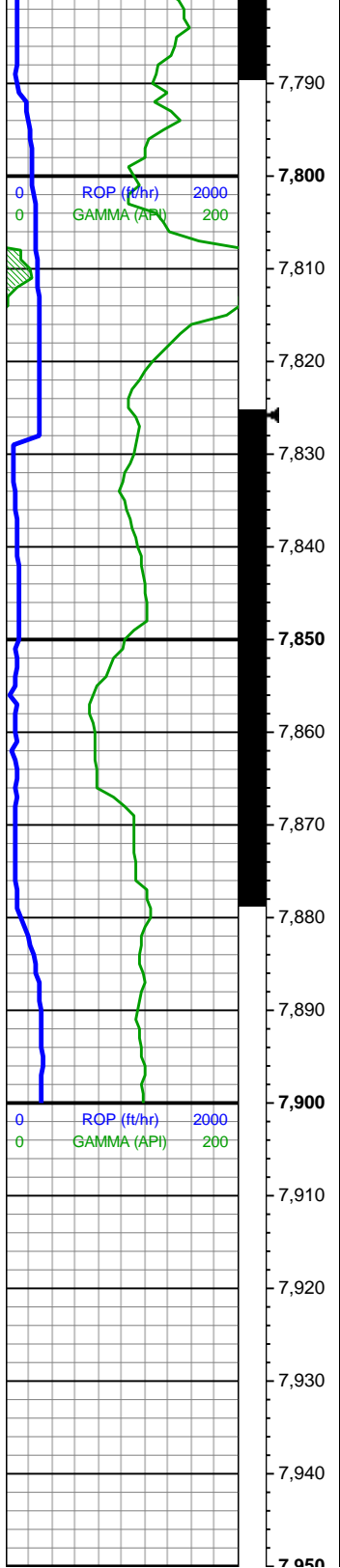
50% CHK: med
gy-gyshbn, off wht-orng
brn frags, frm-fri, mnr
MRLST lamn, sb blk-y-sb
plty; 50% MRLST: dk gy-v
dk gy, mot, slty tex, frm-sl
hd, tab-blky, brit, tr CHK
incl, mod calc, tr cal frac
fl, tr pyr; cut Flor purp

2395u

55% CHK: med
gy-gyshbn, off wht-orng
brn frags, frm-fri, mnr
MRLST lamn, sb blk-y-sb
plty; 45% MRLST: dk gy-v
dk gy, mot, slty tex, frm-sl
hd, tab-blky, brit, tr CHK
incl, mod calc, tr cal frac
fl, tr pyr; cut Flor purp

1244u





VIS IN: 39
MW OUT: 9.5
VIS OUT: 39

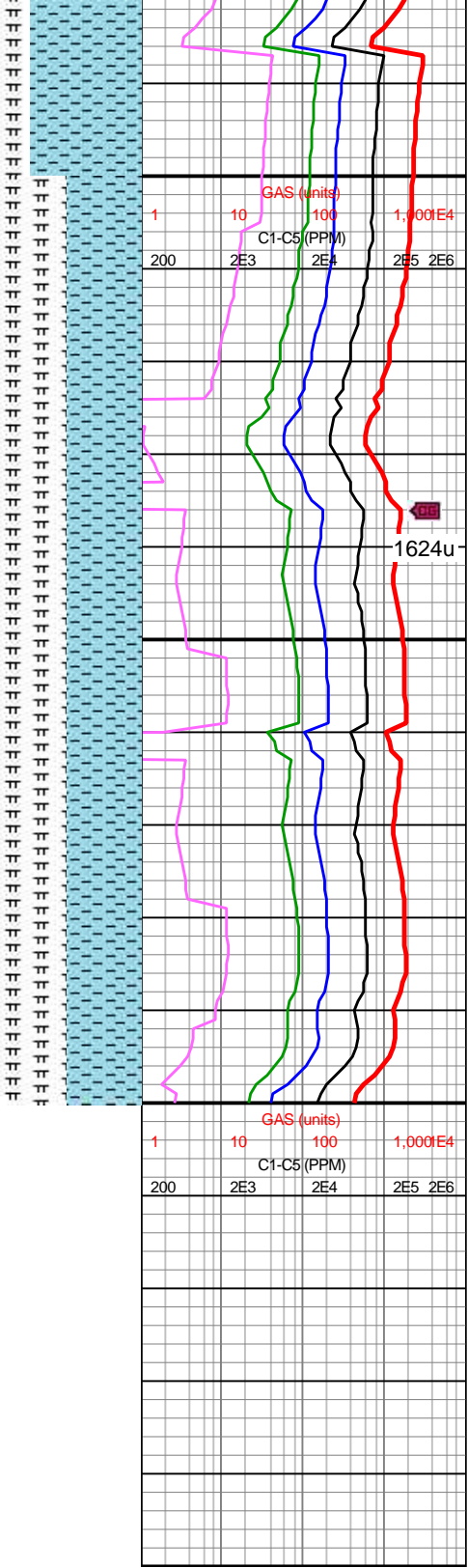
WOB: 23.6klbs
RPM: 30
SPM: 171
SPP: 1,913psi

MD: 7,860'
INC: 86.4°
AZM: 271.8°
TVD: 7,447.19'
VS: 123.27'

Land Curve
7,876' MD

End of Vertical
Log

Continued on
Horizontal Log



MRLST: dk gy-v dk gy,
mot, slty tex, frm-sl hd,
tab-blky, brit, tr CHK incl,
mod calc, tr cal frac fl, tr
pyr; direct Flor yel, cut
Flor purp

50% CHK: predy med-lt
gy, gyshbn-offwht intbds,
frm-fri, sm chky tex, com
MRLST lamn, sb blky-sb
plty, occ pp pyr incl; 50%
MRLST: dk gy-v dk gy, sl
hd-frm, mot, slty tex,
tab-blky, tr CHK incl, hi
calc, com cal frac fl, tr pyr
nod; fast streaming cut, rr
scat bri yel frag

