

Décollement Consulting Inc.



Scale: 5" / 100'
Measured Depth Log

Well Name State Pronghorn 42-32-31 MRLNB_Lateral

Location NE/NE Section 32, T5N - R61W

State CO

County Weld

Country USA

Rig Number Xtreme 22

API Number 05-123-42531

Field Wattenberg

Geographic Region D.J. Basin

Drilling Completed 12/1/2015

Spud Date 11/4/2015

Surface Coordinates 1306 FNL x 753 FEL (Lat: 40.36097, -104.22607)

Bottom Hole Coordinates 2650 FSL x 860 FEL (Lat: 40.35713, -104.24522)

Ground Elevation 4565

K.B. Elevation 4582

Logged Interval 6,800' To 11,989'

Total Depth 11,989'

Formation Niobrara "B" Chalk

Type of Drilling Fluid Water Based Mud

Operator

Address Bonanza Creek Energy, Inc.
410 17th Street, Suite 1500
Denver, Colorado 80202

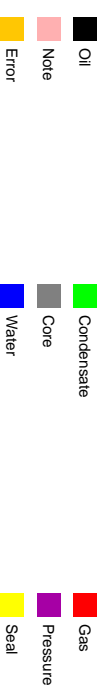
Geologist

Name Dan Kabala & Brian Spitzmiller

Company Decollement Consulting Inc.

Address 13300 Braun Rd.
Golden, CO. 80401

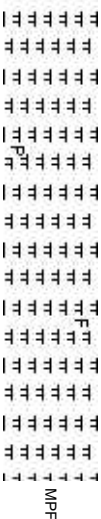
Zone Color Coding



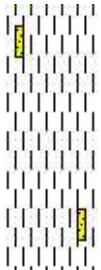
Rock Types

Blank

CEMENT



SHALE S



CHALK

LIMESTONE

SANDSTONE

SHALE SF



CPF MARLSTONE



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

CHITDK

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

O ORGANIC

FORMATION TOP

L LITHOGRAPHIC

Oil Show

P PINPOINT

GAS SHOW

MX MICROXLN

Rounding

DEAD

VUGGY

MINDEPTH

MN DEPTH

A ANGULAR

MS MUDSTONE

EVEN

NORMAL FAULT

R ROUNDED

PS PACKSTONE

Engineering

QUESTIONABLE

OIL SHOW

B SUBANG

WS WACKESTONE

SPOTTED STAINING

BIT

OVERTURNED STRATA

R SUBRND

Sorting

CASING

REVERSE FAULT

Porosity

CONNECTION (LEFT)

SIDEWALL CORE (LEFT)

M MODERATE

EARTHY

CONNECTION (RIGHT)

SIDEWALL CORE (RIGHT)

BS BOUNDSTONE

P POOR

FENESTRAL

CONNECTION GAS

SLIDE

C CHALKY

W WELL

FRACTURE

CORE - LOST

SURVEY

CX CRYPTOXLN

INTERCRYSTALLINE

CORE - RECOVERED

TRIP GAS

E EARTHY

INTEROOLITIC

DST INTERVAL

WIRELINE TESTED - LEFT

FX FINELYXLN

MOLDIC

FAULT

WIRELINE TESTED - RT

GS GRAINSTONE

Slide/Rotate

Depth

6,770 6,780 6,790 6,800 6,810 6,820 6,830 6,840 6,850 6,860 6,870 6,880 6,890 6,900 6,910 6,920 6,930 6,940

Black = Slide
White = Rotate

Venting through Gas Buster
Due to Leaking Rotating Head

Total Gas & Chromatography

GAS
C1
C2
C3
iC4
nC4
CO2

Total Gas Calibration
1% Methane = 100u

Gas Chromatograph Calibration
C1 = 1.0% Methane = 10,000ppm
C2 = 1.0% Ethane = 10,000ppm
C3 = 1.0% Propane = 10,000ppm
iC4 = 1.0% Iso-Butane = 10,000ppm
nC4 = 1.0% N-Butane = 10,000ppm

GAS (units)
C1-iC4 (PPM)
CO2 (percent)

C1: 96.8%
C2: 1.9%
C3: 0.9%
iC4: 0.1%
nC4: 0.3%

GAS (units)
C1-iC4 (PPM)
CO2 (percent)

MW: 8.9 V/S: 34

2464u

Curves
ROP
Gamma

Decollement Consulting on location and rigged up with Bloodhound #5726 on 11/29/2015.
Start logging at 6,800' MD on 11/30/2015 at 01:56 hours.

ROP (ft/hr)
Gamma (AFI)

WOB 32
RPM 0
SPR 2218
SPM 0/89

ROP (ft/hr)
Gamma (AFI)

115

Depth Labels

6,770 6,780 6,790 6,800 6,810 6,820 6,830 6,840 6,850 6,860 6,870 6,880 6,890 6,900 6,910 6,920 6,930 6,940

Interpretive Lithology

Landed in B Chalk

Well Bore
TVD

Bit #: 1
Size: 6.12
Mfr.: VAREL
Type: VS513DGU
Depth In: 6,807'
Depth Out: 11,989'
Hours: 26.4 hrs
Avg Ft/Hr: 196.3 /hr
Jets: 5X22
S/N: 4008151

Drill out Target: 6030' TVD

MD: 6,876'
Inclination: 86.03°
Azimuth: 276.1°
TVD: 6,043.55'
VS: 520.27'

TVD (ft)
90% CHK: lt gy, mottld wh, sft- mod frm, occ brlt, sb ply-sb blkly, rthy lstr, v calc, sl brn/blk str
10% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, gttty, com mottld carb mat.

90% CHK: lt gy, mottld wh, sft- mod frm, occ brlt, sb ply-sb blkly, rthy lstr, v calc, sl brn/blk str
10% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, gttty, com mottld carb mat.

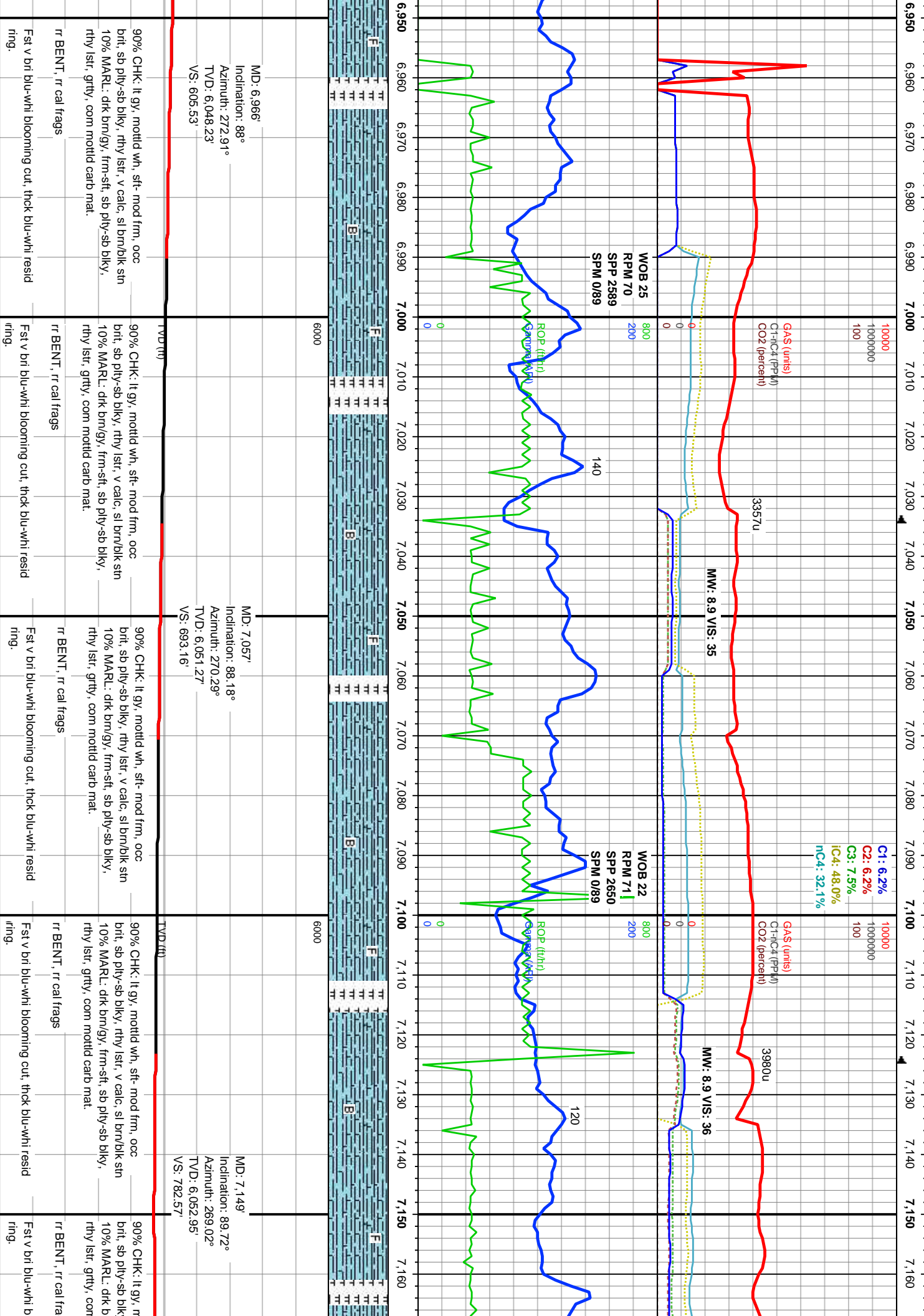
90% CHK: lt gy, mottld wh, sft- mod frm, occ brlt, sb ply-sb blkly, rthy lstr, v calc, sl brn/blk str
10% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, gttty, com mottld carb mat.

Oil Show

rr BENT, rr cal frags
Fst v bri blu-whi blooming cut, thck blu-whi resid ring.

rr BENT, rr cal frags
Fst v bri blu-whi blooming cut, thck blu-whi resid ring.

rr BENT, rr cal frags
Fst v bri blu-whi blooming cut, thck blu-whi resid ring.



7.170 7.180 7.190 7.200 7.210 7.220 7.230 7.240 7.250 7.260 7.270 7.280 7.290 7.300 7.310 7.320 7.330 7.340 7.350 7.360 7.370 7.380

10000
1000000
100

Gas (units)
C1-HC4 (PPM)
CO2 (percent)

4110u

C1: 26.2%
C2: 24.3%
C3: 23.8%
iC4: 5.4%
nC4: 20.3%

Gas (units)
C1-HC4 (PPM)
CO2 (percent)

3159u

MW: 8.9 VIS: 37

WOB 26
RPM 70
SPM 3045
SPM 89/0

ROP (ft/hr)
Gamma (API)

WOB 24
RPM 70
SPM 3029
SPM 89/0

ROP (ft/hr)
Gamma (API)

7.170 7.180 7.190 7.200 7.210 7.220 7.230 7.240 7.250 7.260 7.270 7.280 7.290 7.300 7.310 7.320 7.330 7.340 7.350 7.360 7.370 7.380

B

F

B

F

B

F

B

Marl Stringer within B Chalk

MD: 7.240'
Inclination: 91.32°
Azimuth: 271.24°
TVD: 6,052.13'
VS: 870.83'

MD: 7.333'
Inclination: 92.34°
Azimuth: 271.06°
TVD: 6,049.16'
VS: 960.59'

mottld wh, sft- mod frm, occ
bri, rthy lstr, v calc, sl brn/blk sin
m/gy, frm-sft, sb ply-sb blkly,
n mottld carb mat.

90% CHK: lt gy, mottld wh, sft- mod frm, occ
bri, sb ply-sb blkly, rthy lstr, v calc, sl brn/blk sin
10% MARL: drk brn/gy, frm-sft, sb ply-sb blkly,
rthy lstr, grty, com mottld carb mat.

rr BENT, rr cal frags

Fst v bri blu-whi blooming cut, thick blu-whi resid
ering.

90% CHK: lt gy, mottld wh, sft- mod frm, occ
bri, sb ply-sb blkly, rthy lstr, v calc, sl brn/blk sin
10% MARL: drk brn/gy, frm-sft, sb ply-sb blkly,
rthy lstr, grty, com mottld carb mat.

rr BENT, rr cal frags

Fst v bri blu-whi blooming cut, thick blu-whi resid
ring.

60% CHK: lt gy, mottld wh, sft- mod frm, occ bri,
sb ply-sb blkly, rthy lstr, v calc, sl brn/blk sin
40% MARL: drk brn/gy, frm-sft, sb ply-sb blkly, rthy
lstr, grty, com mottld carb mat.

rr BENT, rr cal frags

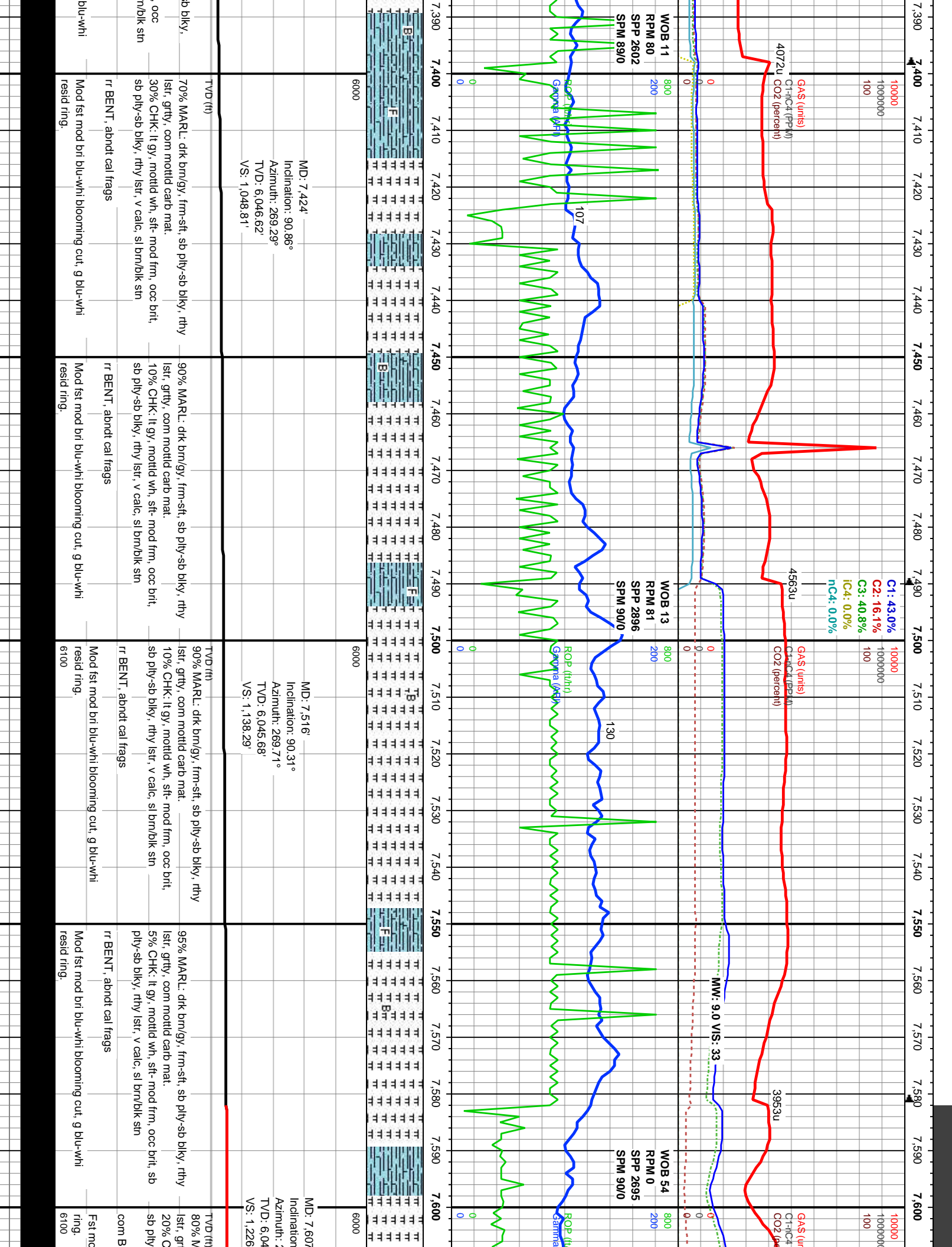
Fst v bri blu-whi blooming cut, thick blu-whi resid
ring.

60% MARL: drk brn/gy, frm-sft, sb ply-s
rthy lstr, grty, com mottld carb mat.
40% CHK: lt gy, mottld wh, sft- mod frm
bri, sb ply-sb blkly, rthy lstr, v calc, sl br

rr BENT, abndt cal frags

Mod fst mod bri blu-whi blooming cut, g
resid ring.

blooming cut, thick blu-whi resid



7.610 7.620 7.630 7.640 7.650 7.660 7.670 7.680 7.690 7.700 7.710 7.720 7.730 7.740 7.750 7.760 7.770 7.780 7.790 7.800 7.810 7.820

C1: 23.3%
C2: 21.0%
C3: 34.8%
iC4: 9.3%
nC4: 11.5%

GAS (units)
C1-C4 (PPM)
CO2 (percent)

GAS (units)
C1-C4 (PPM)
CO2 (percent)

4311u

4147u

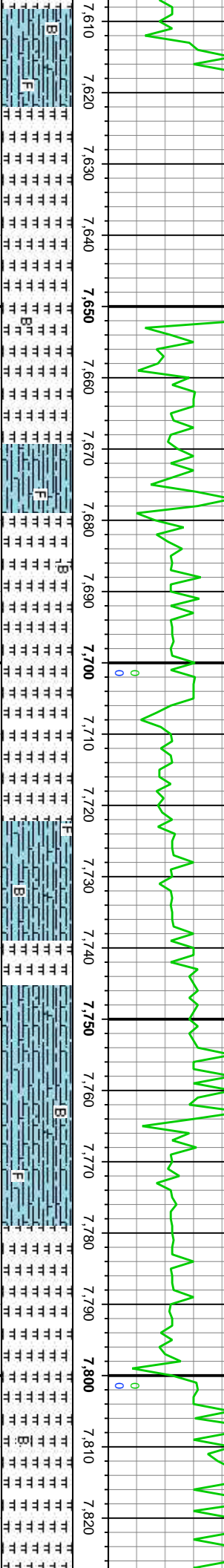
MW: 9.0 VIS: 33

WOB 15
RPM 80
SPM 3012
SPM 90/0

WOB 7
RPM 80
SPM 2762
SPM 90/0

ROP (ft/hr)
Gamma (AFI)

ROP (ft/hr)
Gamma (AFI)



MD: 7.699
Inclination: 89.91°
Azimuth: 267.93°
TVD: 6,043.88'
VS: 1,316.53'

MD: 7,792.21'
Inclination: 92.22°
Azimuth: 268.32°
TVD: 6,042.14'
VS: 1,407.66'

80% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lstr, grty, com mottld carb mat. 20% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin	60% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lstr, grty, com mottld carb mat. 40% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin	60% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lstr, grty, com mottld carb mat. 40% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin
com BENT, abndt cal frags	com BENT, abndt cal frags	com BENT, abndt cal frags
Fst mod bri blu-whi mlky cut, thick blu-whi resid ring.	Fst mod bri blu-whi rad strng cut, thick blu-whi resid ring.	Fst mod bri blu-whi blooming resid ring.

7.830 7.840 7.850 7.860 7.870 7.880 7.890 7.900 7.910 7.920 7.930 7.940 7.950 7.960 7.970 7.980 7.990 8.000 8.010 8.020 8.030 8.040

C1: 22.6%
C2: 6.1%
C3: 71.3%
iC4: 0.0%
nC4: 0.0%

10000
1000000
100

GAS (units)
C1-iC4 (PPM)
CO2 (percent)

5308u

5263u

5371u

WOB 15
RPM 81
SPM 3295
SPM 890

WOB 11
RPM 80
SPM 3194
SPM 900

ROP (t/hr)
Gamma (API)

ROP (t/hr)
Gamma (API)

122



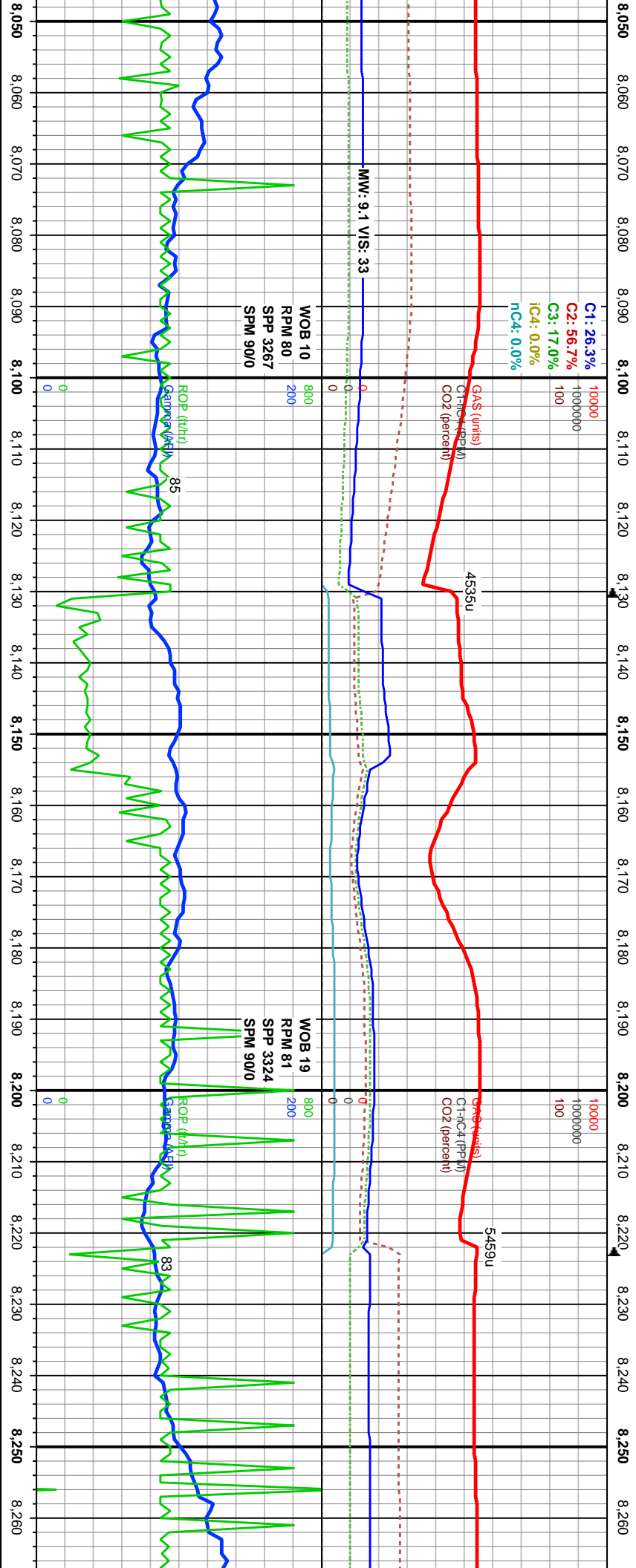
MD: 7.884
Inclination: 91.51°
Azimuth: 267.46°
TVD: 6,039.15'
VS: 1,497.46'

MD: 7.976
Inclination: 91.29°
Azimuth: 267.34°
TVD: 6,036.9'
VS: 1,587.65'

ft., sb ply-sb blkly, rthy
at.
t- mod frm, occ brit,
c, sl brn/bk sin
80% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blkly, rthy lstr, v calc, sl brn/bk sin
20% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy
lstr, grty, com mottld carb mat.
com BENT, abndt cal frags
Fst v bri blu-whi blooming cut, thck blu-whi resid
ring.

TVD (ft)
90% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blkly, rthy lstr, v calc, sl brn/bk sin
10% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy
lstr, grty, com mottld carb mat.
com BENT, abndt cal frags
Fst v bri blu-whi blooming cut, thck blu-whi resid
ring.
6100

TVD (ft)
90% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blkly, rthy lstr, v calc, sl brn/bk sin
10% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy
lstr, grty, com mottld carb mat.
com BENT, abndt cal frags
Fst v bri blu-whi blooming cut, thck blu-whi resid
ring.
6100



MD: 8.068' Inclination: 91.39° Azimuth: 267.98° TVD: 6,034.75' VS: 1,677.75'	6000	TVD (ft) 95% CHK: lt gy, mottld wh, sft- mod frm, ooc brit, sb ply-sb blkly, rthy lstr, v calc, sl brn/bk sin 5% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grty, com mottld carb mat. com BENT, abndt cal frags Fst v bri blu-whi blooming cut, thck blu-whi resid ring.	MD: 8.161' Inclination: 90.06° Azimuth: 269.17° TVD: 6,033.58' VS: 1,768.53'	6000	TVD (ft) 95% CHK: lt gy, mottld wh, sft- mod frm, ooc brit, sb ply-sb blkly, rthy lstr, v calc, sl brn/bk sin 5% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grty, com mottld carb mat. com BENT, abndt cal frags Fst v bri blu-whi blooming cut, thck blu-whi resid ring.
MD: 8.253' Inclination: 89.45° Azimuth: 269.28° TVD: 6,033.97' VS: 1,858.12'	6000	TVD (ft) 90% CHK: lt gy, n sb ply-sb blkly, rth lstr, v calc, sl brn/bk sin 10% MARL: dk b lstr, grty, com mc com BENT, abndt cal frags Fst v bri blu-whi blooming cut, thck blu-whi resid ring.	MD: 8.161' Inclination: 90.06° Azimuth: 269.17° TVD: 6,033.58' VS: 1,768.53'	6000	TVD (ft) 95% CHK: lt gy, mottld wh, sft- mod frm, ooc brit, sb ply-sb blkly, rthy lstr, v calc, sl brn/bk sin 5% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grty, com mottld carb mat. com BENT, abndt cal frags Fst v bri blu-whi blooming cut, thck blu-whi resid ring.

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 8,480

C1: 0.0%
C2: 24.7%
C3: 75.3%
iC4: 0.0%
nC4: 0.0%

10000
1000000
100

Gas (units)
C1-iC4 (PPM)
CO2 (percent)

4461 u

MW: 9.15 VIS: 35

10000
1000000
100

Gas (units)
C1-iC4 (PPM)
CO2 (percent)

4879 u (s)

WOB 18
RPM 80
SPP 3531
SPM 90/0

800
200

ROP (t/hr)

130

WOB 16
RPM 80
SPP 3506
SPM 90/0

800
200

ROP (t/hr)

Georgia (AFI)

78

6000

MD: 8,344'
Inclination: 89.57°
Azimuth: 269.46°
TVD: 6,034.75'
VS: 1,946.68'

6000

MD: 8,436'
Inclination: 90.86°
Azimuth: 269.45°
TVD: 6,034.4'
VS: 2,036.18'

6000

mottld wh, sft- mod frm, occ brit,
vly istr, v calc, sl brn/bk sin
rm/gy, frm-sft, sb ply-sb blkly, rthy
mottld carb mat.

TVD (ft)

60% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blkly, rthy istr, v calc, sl brn/bk sin
40% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy
istr, grty, com mottld carb mat.

cal frags

looming cut, thick blu-whi resid

com BENT, abndt cal frags

Fst v bri blu-whi blooming cut, thick blu-whi resid
ring.

80% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blkly, rthy istr, v calc, sl brn/bk sin
20% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy
istr, grty, com mottld carb mat.

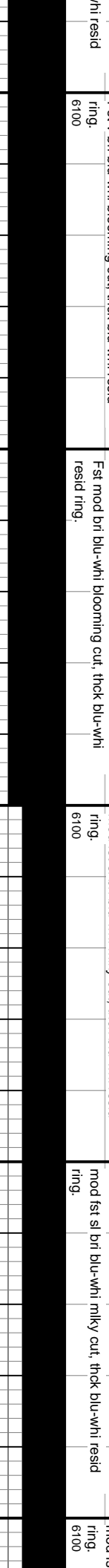
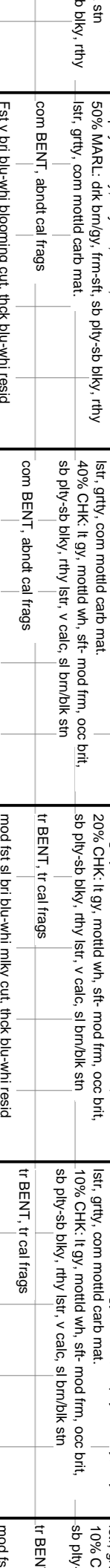
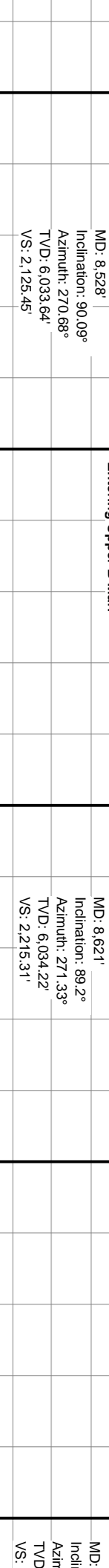
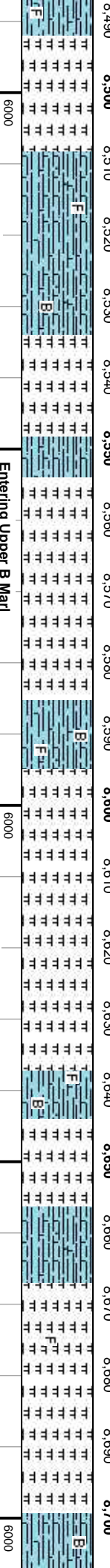
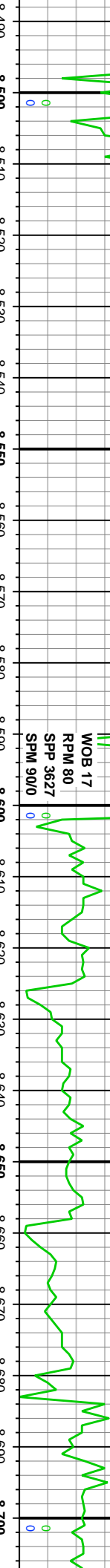
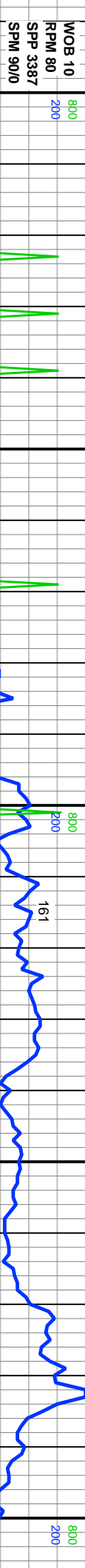
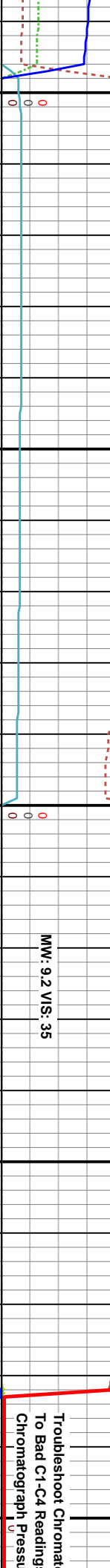
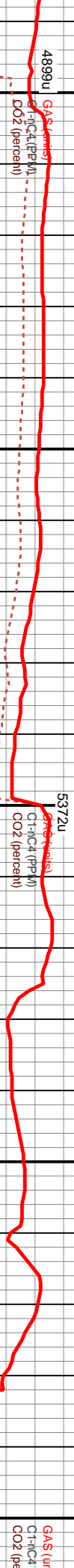
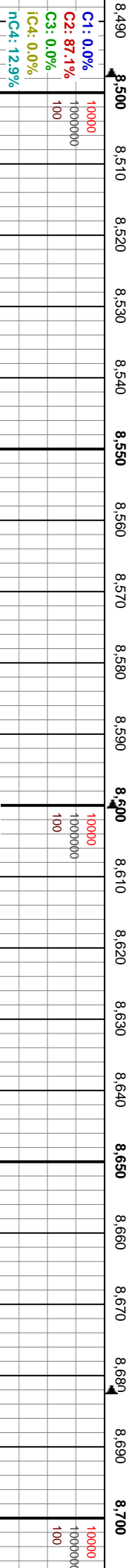
TVD (ft)

com BENT, abndt cal frags

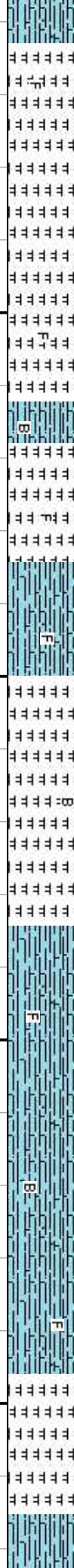
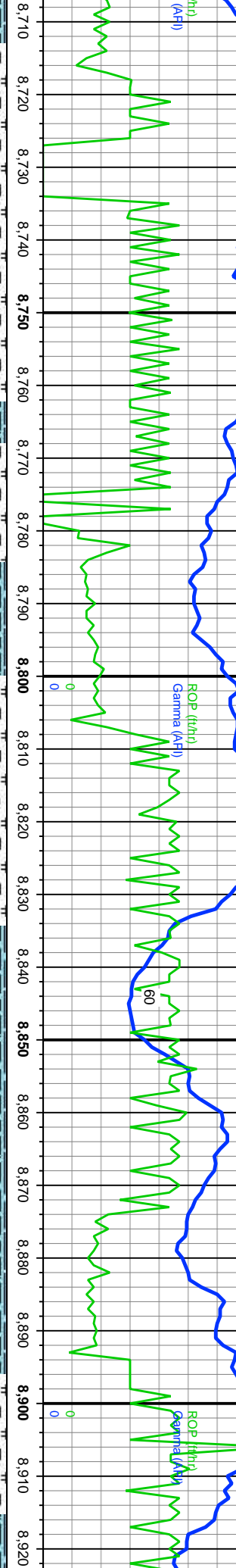
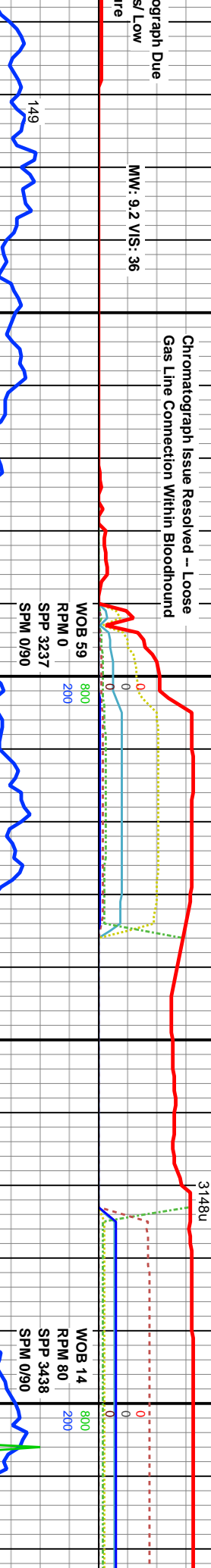
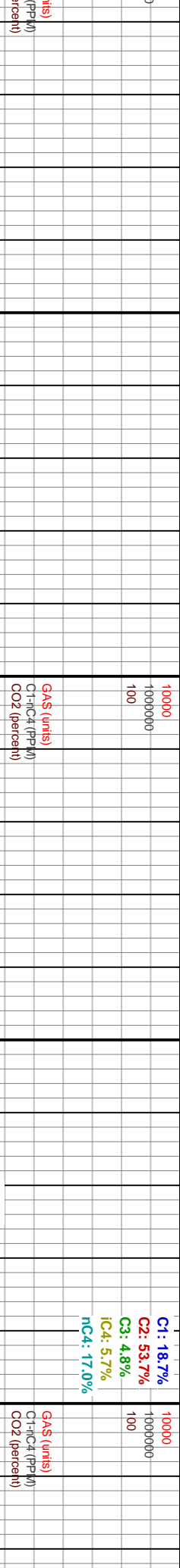
Fst v bri blu-whi blooming cut, thick blu-whi resid
ring.

com BENT, abndt cal frags

Fst v bri blu-whi blooming cut, thick blu-w-



8.710 8.720 8.730 8.740 8.750 8.760 8.770 8.780 8.790 8.800 8.810 8.820 8.830 8.840 8.850 8.860 8.870 8.880 8.890 8.900 8.910 8.920



8.712' MD: 8.805' Inclination: 90.03° Azimuth: 269.59° TVD: 6.035.97' VS: 2.393.73'

8.710' MD: 8.898.3' Inclination: 90.43° Azimuth: 269.52° TVD: 6.035.59' VS: 2.484.46'

8.710' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.720' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.730' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.740' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.750' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.760' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.770' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.780' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.790' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.800' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.810' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.820' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.830' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.840' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.850' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.860' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.870' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.880' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.890' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.900' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.910' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
8.920' MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy

8,930 8,940 8,950 8,960 8,970 8,980 8,990 9,000 9,010 9,020 9,030 9,040 9,050 9,060 9,070 9,080 9,090 9,100 9,110 9,120 9,130 9,140

10000
1000000
100

GAS (units)
C1+HC4 (PPM)
CO2 (percent)

MW: 9.3 VIS: 35

3115u

3216u

314

C1: 49.7%
C2: 45.5%
C3: 3.7%
iC4: 0.0%
nC4: 0.1%

GAS (units)
C1+HC4 (PPM)
CO2 (percent)

WOB 17
RPM 80
SPP 3600
SPM 0/90

WOB 15
RPM 80
SPP 3695
SPM 0/90

119

168

145

ROP (ft/hr)
Gamma (API)

ROP (ft/hr)
Gamma (API)

6000

6000

MD: 8,968'
Inclination: 90.83°
Azimuth: 269.61°
TVD: 6,034.59'
VS: 2,571.69'

MD: 9,081'
Inclination: 90.15°
Azimuth: 270.38°
TVD: 6,033.8'
VS: 2,661.95'

ft- mod frm, occ brit,
c, sl brn/bk sin
sb ply-sb blkly, rthy
40% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy
lstr, grty, com mottld carb mat.
rr BENT, tr cal frags
Fst v bri blu-whi blooming cut, thck blu-whi resid
ring.

TVD (ft)
50% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blkly, rthy lstr, v calc, sl brn/bk sin
50% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy
lstr, grty, com mottld carb mat.
rr BENT, tr cal frags
Fst v bri blu-whi blooming cut, thck blu-whi resid
ring.
6100

90% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy
lstr, grty, com mottld carb mat.
10% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blkly, rthy lstr, v calc, sl brn/bk sin
com BENT, abndt cal frags
mod fst sl bri blu-whi mlky cut, thck blu-whi resid
ring.

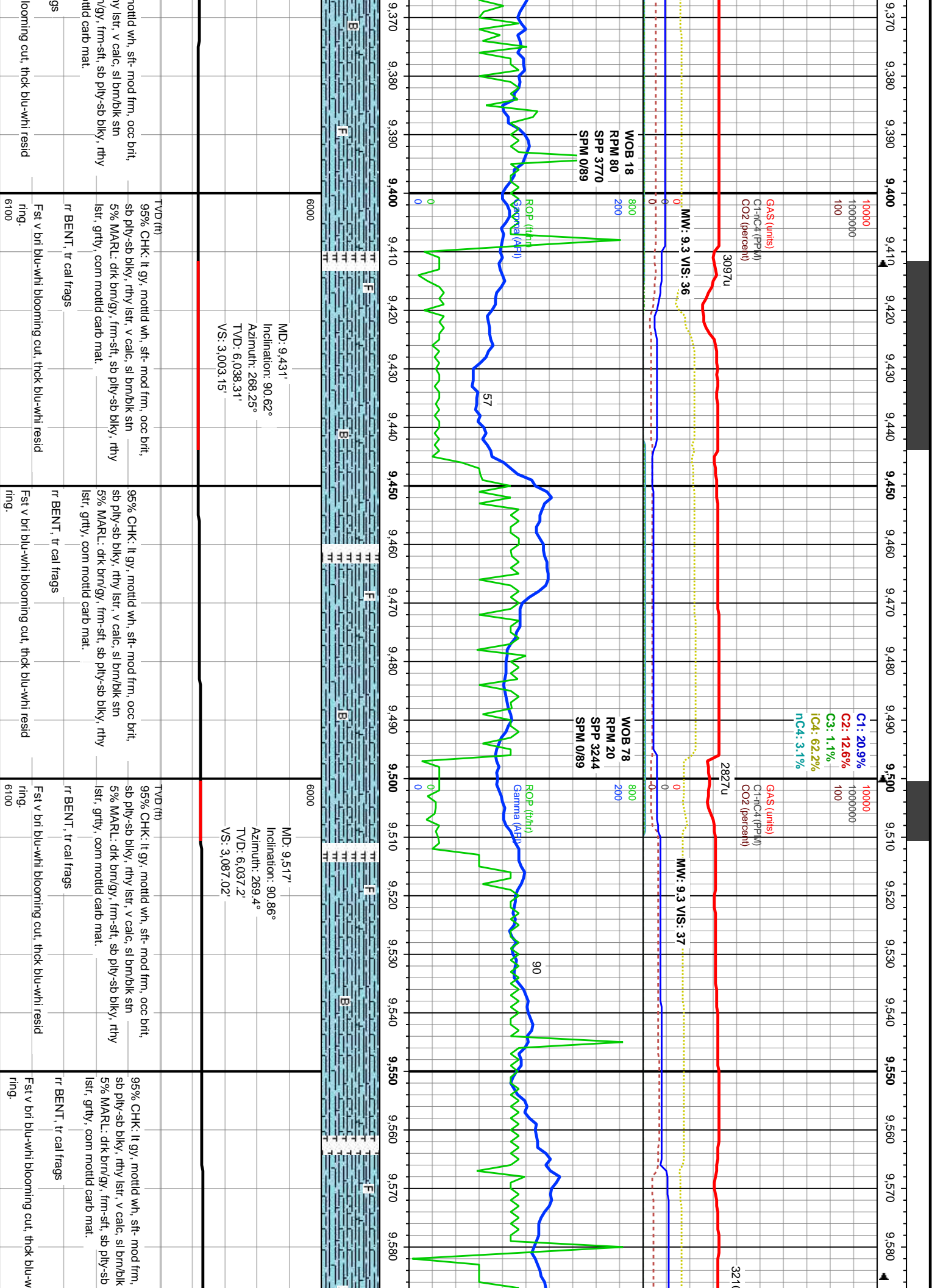
TVD (ft)
90% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy
lstr, grty, com mottld carb mat.
10% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blkly, rthy lstr, v calc, sl brn/bk sin
com BENT, abndt cal frags
mod fst sl bri blu-whi mlky cut, thck blu-whi resid
ring.
6100

t, thck blu-whi resid

Fst v bri blu-whi blooming cut, thck blu-whi resid
ring.

mod fst sl bri blu-whi mlky cut, thck blu-whi resid
ring.

mod fst sl bri blu-whi mlky cut, thck blu-whi resid
ring.



9,590 9,600 9,610 9,620 9,630 9,640 9,650 9,660 9,670 9,680 9,690 9,700 9,710 9,720 9,730 9,740 9,750 9,760 9,770 9,780 9,790 9,800

10000
1000000
100

GAS (units)
C1+IC4 (PPM)
CO2 (percent)

C1: 15.5%
C2: 12.7%
C3: 1.1%
iC4: 69.7%
nC4: 1.0%

GAS (units)
C1+IC4 (PPM)
CO2 (percent)

10000
1000000
100

GAS (units)
C1+IC4
CO2 (percent)

2076u

MW: 9.3 VIS: 42

MW: 9.3 VIS: 41

MOB 24
RPM 80
SPM 3949
SPM 0/89

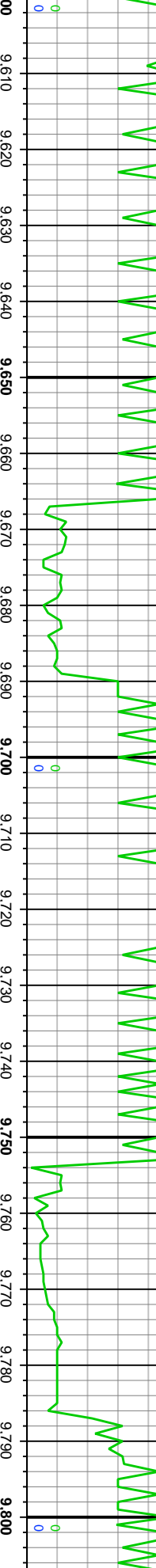
WOB 20
RPM 80
SPM 3901
SPM 89/0

WOB 21
RPM 65
SPM 3875
SPM 89/0

ROP (ft/hr)
Gamma Ray

ROP (ft/hr)
Gamma Ray

ROP (ft/hr)
Gamma Ray



6000

MD: 9.602'
Inclination: 89.82°
Azimuth: 269.95°
TVD: 6.036.7'
VS: 3.169.64'

New Target: 6037TVD

6000

MD: 9.689'
Inclination: 89.57°
Azimuth: 269.79°
TVD: 6.037.16'
VS: 3.254.13'

6000

MD: 9.775'
Inclination: 91.11°
Azimuth: 269.68°
TVD: 6.036.65'
VS: 3.337.7'

TVD (ft)
95% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb pily-sb blkly, rthy lstr, v calc, sl brn/bk sin 5% MARL: dk brn/gy, frm-sft, sb pily-sb blkly, rthy lstr, grtly, com mottld carb mat.

TVD (ft)
95% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb pily-sb blkly, rthy lstr, v calc, sl brn/bk sin 5% MARL: dk brn/gy, frm-sft, sb pily-sb blkly, rthy lstr, grtly, com mottld carb mat.

TVD (ft)
70% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb pily-sb blkly, rthy lstr, v calc, sl brn/bk sin 30% MARL: dk brn/gy, frm-sft, sb pily-sb blkly, rthy lstr, grtly, com mottld carb mat.

TVD (ft)
50% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb pily-sb blkly, rthy lstr, v calc, sl brn/bk sin 50% MARL: dk brn/gy, frm-sft, sb pily-sb blkly, rthy lstr, grtly, com mottld carb mat.

TVD (ft)
80% C
sb pily-sb blkly, rthy lstr, v calc, sl brn/bk sin 20% MARL: dk brn/gy, frm-sft, sb pily-sb blkly, rthy lstr, grtly, com mottld carb mat.

hi resid
ring.
6100

inst bri blu-whi blooming cut, thick blu-whi resid
ring.
6100

inst bri
ring.
6100

9,810 9,820 9,830 9,840 9,850 9,860 9,870 9,880 9,890 9,900 9,910 9,920 9,930 9,940 9,950 9,960 9,970 9,980 9,990 10,000 10,010 10,020

10000
MINDEPTH
Running T
10000042/1/2015

C1: 27.0%
C2: 16.5%
C3: 0.0%
C4: 56.5%
nC4: 0.0%

GAS (units)
C1+NC4 (PPM)
CO2 (percent)

GAS (units)
C1+NC4 (PPM)
CO2 (percent)

3009u

MW: 9.3 VS: 41

MW: 9.3 VS: 40

WOB 23
RPM 70
SPP 375
SPM 850

WOB 24
RPM 80
SPP 3785
SPM 850

ROP (t/hr)
Gamma (API)

ROP (t/hr)
Gamma (API)

121

89



MD: 9,860'
Inclination: 91.2°
Azimuth: 270.71°
TVD: 6,034.94'
VS: 3,420.11'

MD: 9,945'
Inclination: 89.38°
Azimuth: 270.94°
TVD: 6,034.51'
VS: 3,502.31'

MD: 10,000'
Inclination: 89.38°
Azimuth: 270.94°
TVD: 6,034.51'
VS: 3,502.31'

HK: lt gy, mottld wh, sft- mod frm, occ brit, sb blkly, rthy lstr, v calc, sl brn/bk sin
MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, com mottld carb mat.

TVD (ft)
95% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blkly, rthy lstr, v calc, sl brn/bk sin
5% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grrty, com mottld carb mat.

50% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blkly, rthy lstr, v calc, sl brn/bk sin
50% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grrty, com mottld carb mat.

TVD (ft)
70% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blkly, rthy lstr, v calc, sl brn/bk sin
20% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grrty, com mottld carb mat.

NNT SH w pyr nodes, tr cal frags
blu-whi blooming cut, thick blu-whi resid ring.

abn BENT SH w pyr nodes, tr cal frags
inst bri blu-whi blooming cut, thick blu-whi resid ring.

abn fib calc frags.
good bri blu-whi blooming cut, thick blu-whi resid ring.

10% fib calc frags, tr ammt
inst bri blu-whi blooming cut, thick blu-whi resid ring.

10,030 10,040 10,050 10,060 10,070 10,080 10,090 10,100 10,110 10,120 10,130 10,140 10,150 10,160 10,170 10,180 10,190 10,200 10,210 10,220 10,230 10,240

through Gas Buster

C1: 22.2%
C2: 18.3%
C3: 1.9%
iC4: 57.3%
nC4: 0.2%

GAS (units)
C1+IC4 (PPM)
CO2 (percent)

2902u

3149u

GAS (units)
C1+IC4 (PPM)
CO2 (percent)

WOB 75
RPM 20
SPM 2880
SPM 85/0

WOB 24
RPM 80
SPM 3649
SPM 85/0

100

121

800

139

ROP (t/h)
Gamma (API)

ROP (t/h)
Gamma (API)



0.031' 6000 6000

ation: 88.71°
uth: 271.01°
6.036.94'
.585.41'

MD: 10.116°
Inclination: 90.18°
Azimuth: 271.08°
TVD: 6.036.76'
VS: 3.667.52'

MD: 10.202°
Inclination: 89.72°
Azimuth: 270.78°
TVD: 6.036.84'
VS: 3.750.64'

it- mod frm, occ brit,
c, sl brn/bk stn
sb ply-sb blkly, rthy
at
ch frags.
thick blu-whi resid

70% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blkly, rthy lstr, v calc, sl brn/bk stn
20% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy
lstr, grtty, com mottld carb mat.
10% fib calc frags, tr ammnt clr frags.
inst brt blu-whi blooming cut, thick blu-whi resid
ring.

TVD (ft)
50% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blkly, rthy lstr, v calc, sl brn/bk stn
50% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy
lstr, grtty, com mottld carb mat.
abn fib calc frags.
good brt blu-whi blooming cut, thick blu-whi resid
ring.
6100

TVD (ft)
80% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy
lstr, grtty, com mottld carb mat.
20% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blkly, rthy lstr, v calc, sl brn/bk stn
abn calc frags.
fst brt blu-whi mlky cut, thick blu-whi resid ring.
6100

TVD (ft)
70% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy
lstr, grtty, com mottld carb mat.
30% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blkly, rthy lstr, v calc, sl brn/bk stn
abn calc frags.
mod fst brt blu-whi mlky cut, thick blu-whi resid ring.
6100

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 10,460

C1: 19.1%
C2: 11.9%
C3: 0.0%
iC4: 67.8%
nC4: 1.1%

GAS (units)
C1+IC4 (PPM)
CO2 (percent)

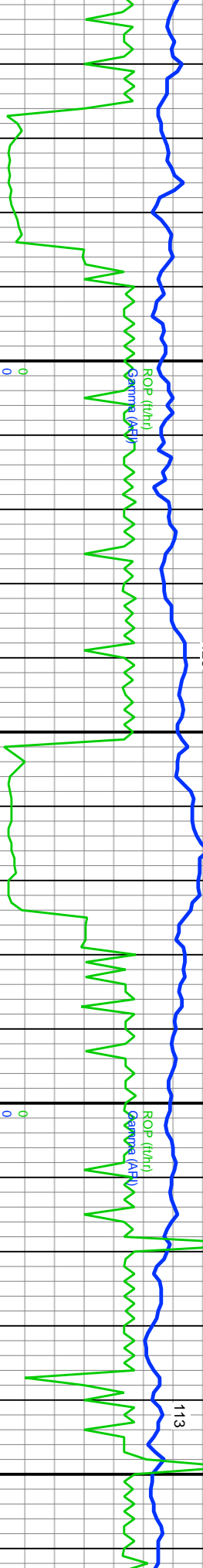
MW: 9.3 VIS: 39

WOB 26
RPM 80
SPM 3726
SPM 85/0

MW: 9.3 VIS: 39

WOB 24
RPM 80
SPM 3625
SPM 85/0

MW: 9.3 VIS: 38



MD: 10,287'
Inclination: 89.97°
Azimuth: 271.14°
TVD: 6,037.07'
VS: 3,832.79'

MD: 10,372'
Inclination: 90.68°
Azimuth: 271.37°
TVD: 6,036.59'
VS: 3,914.83'

MD: 10,457'
Inclination: 89.75°
Azimuth: 271.02°
TVD: 6,036.27'
VS: 3,996.88'

70% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
lstr, grty, com mottld carb mat.
30% CHK: lt gy, mottld wh, sft- mod frm, occ brlt,
sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin
abn calc frags.
mod lstr bri blu-whi milky cut, thick blu-whi resid ring.

50% CHK: lt gy, mottld wh, sft- mod frm, occ brlt,
sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin
50% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
lstr, grty, com mottld carb mat.
abn fib calc frags.
good bri blu-whi blooming cut, thick blu-whi resid ring.

70% CHK: lt gy, mottld wh, sft- mod frm, occ brlt,
sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin
30% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
lstr, grty, com mottld carb mat.
cmnn fib calc frags.
inst bri blu-whi blooming cut, thick blu-whi resid ring.

70% CHK: lt gy, mottld wh, sft- mod frm, occ brlt,
sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin
30% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
lstr, grty, com mottld carb mat.
cmnn fib calc frags.
inst bri blu-whi blooming cut, thick blu-whi resid ring.

70% CHK: lt gy, mottld wh, sft- mod frm, occ brlt,
sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin
30% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
lstr, grty, com mottld carb mat.
cmnn fib calc frags.
inst bri blu-whi blooming cut, thick blu-whi resid ring.

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 10,680

C1: 23.6%
C2: 15.7%
C3: 0.7%
iC4: 58.3%
nC4: 1.7%

GAS (units)
C1-iC4 (PPM)
CO2 (percent)

3141u

WOB 21
RPM 80
SPM 3711
SPM 850

ROP (ft/hr)
Gamma (AFI)

112

1-2 Flare

GAS (units)
C1-iC4 (PPM)
CO2 (percent)

3131u

WOB 23
RPM 80
SPM 3620
SPM 850

ROP (ft/hr)
Gamma (AFI)

117

New Target: 6,042' TVD

6000

MD: 10,543'
Inclination: 89.48°
Azimuth: 270.36°
TVD: 6,036.84'
VS: 4,080.1'

6000

MD: 10,628'
Inclination: 88.73°
Azimuth: 269.62°
TVD: 6,038.17'
VS: 4,162.6'

mottld wh, sft- mod frm, occ brit,
y lstr, v calc, sl brn/blk sin
m/gy, frm-sft, sb ply-sb blk, rthy
mottld carb mat.

TVD (ft)

80% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin
20% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
lstr, grty, com mottld carb mat.

ss.

oming cut, thick blu-whi resid
ring.

cmnm fib calc frags, rr BENT

inst bri blu-whi blooming cut, thick blu-whi resid
ring.

rr fib calc frags, rr BENT

inst bri blu-whi blooming cut, thick blu-whi resid
ring.

TVD (ft)

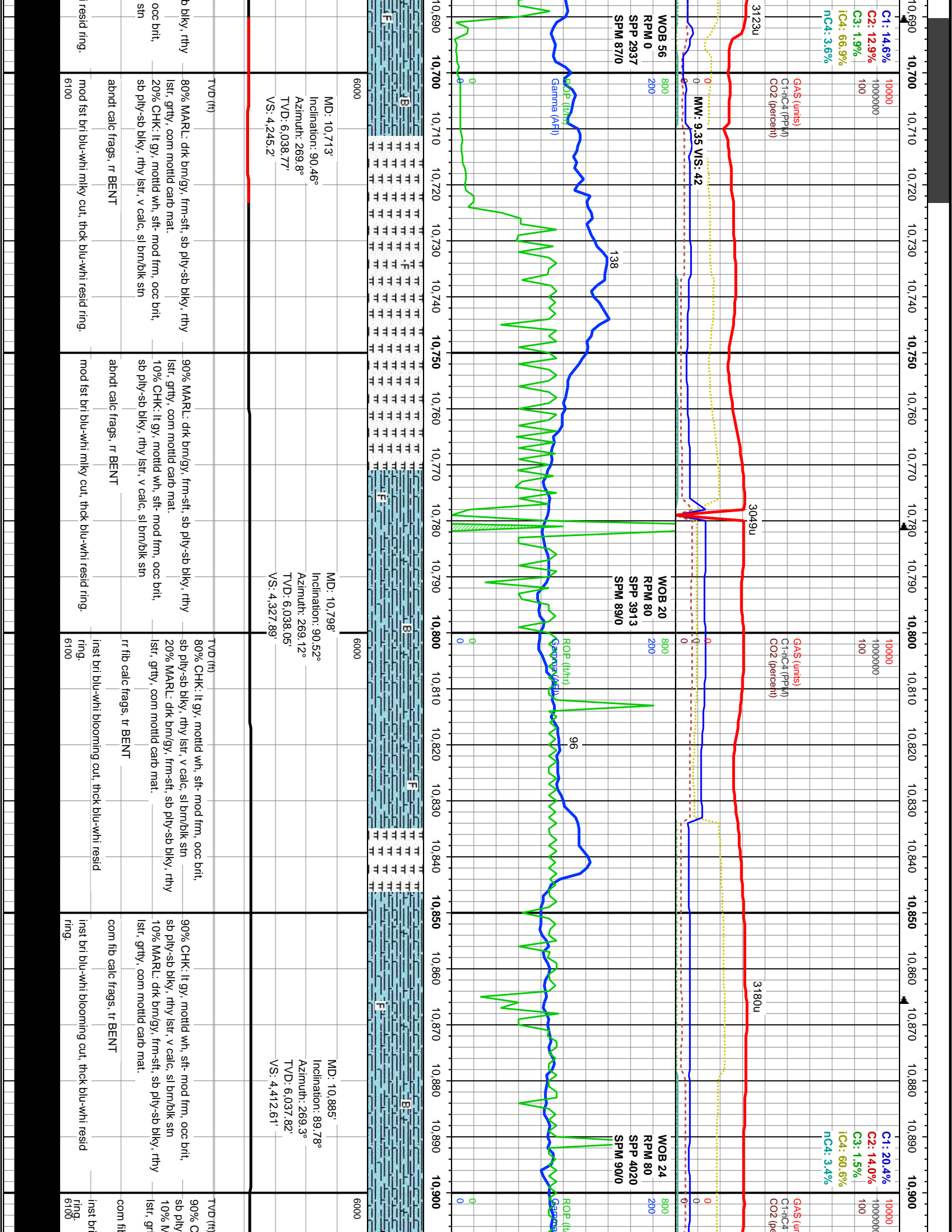
60% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin
40% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy
lstr, grty, com mottld carb mat.

rr fib calc frags, rr BENT

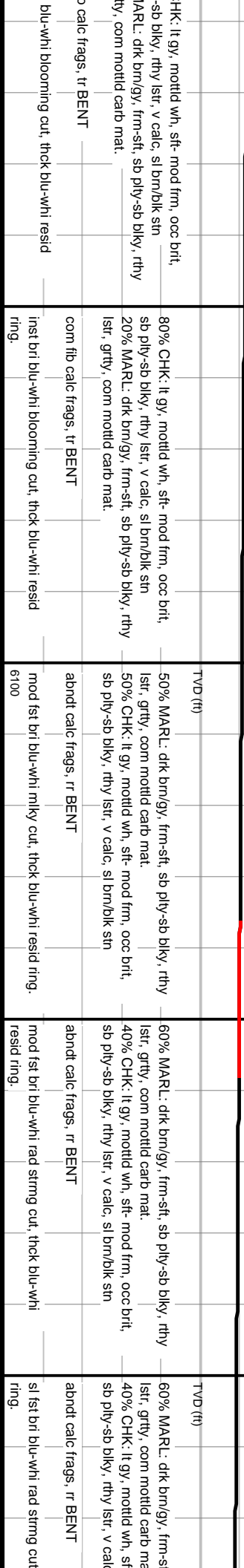
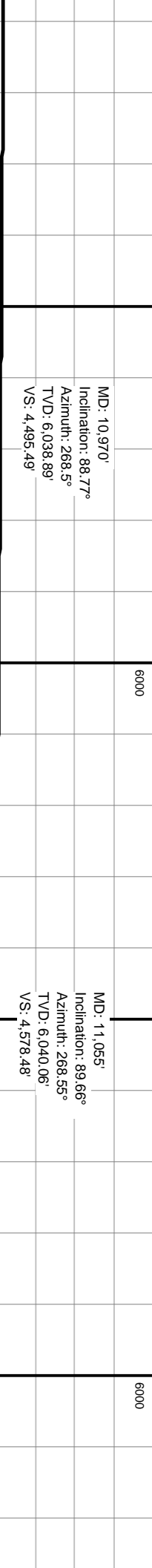
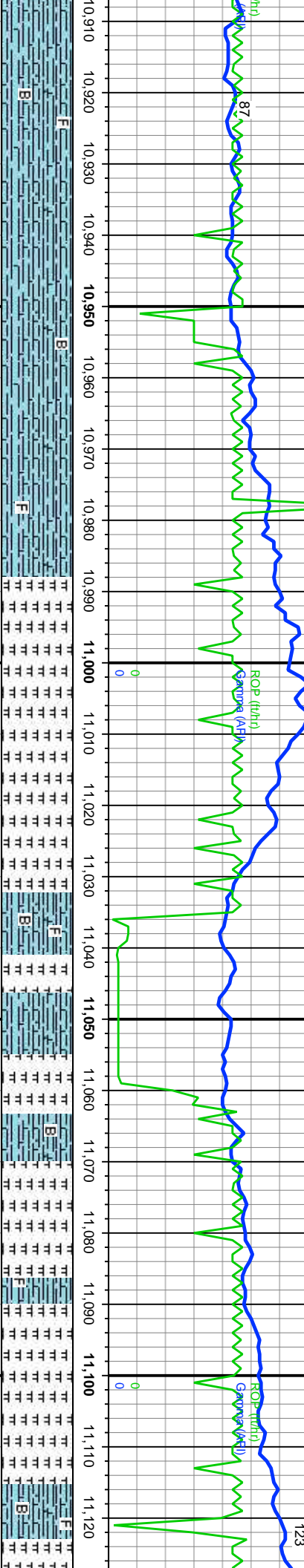
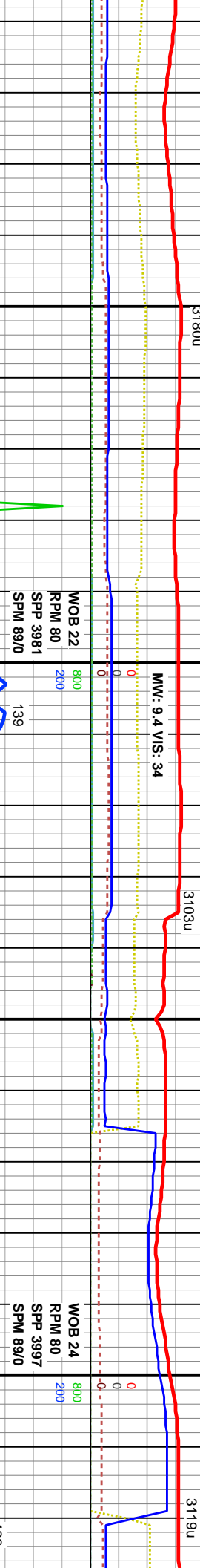
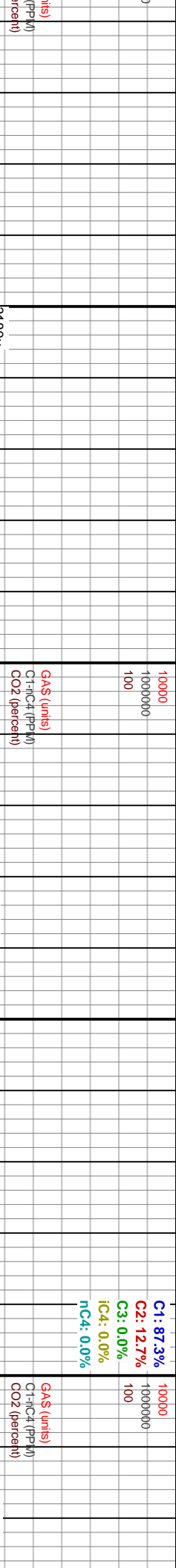
inst bri blu-whi blooming cut, thick blu-whi resid
ring.

about calc frags, rr BENT

mod fst bri blu-whi milky cut, thick blu-whi



10,910 10,920 10,930 10,940 10,950 10,960 10,970 10,980 10,990 11,000 11,010 11,020 11,030 11,040 11,050 11,060 11,070 11,080 11,090 11,100 11,110 11,120



HK: lt gy, mottld wh, sft- mod frm, occ brit, sb blk, rthy lstr, v calc, sl brn/bk sn
MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lstr, com mottld carb mat.
o calc frags, tr BENT
blu-whi blooming cut, thick blu-whi resid

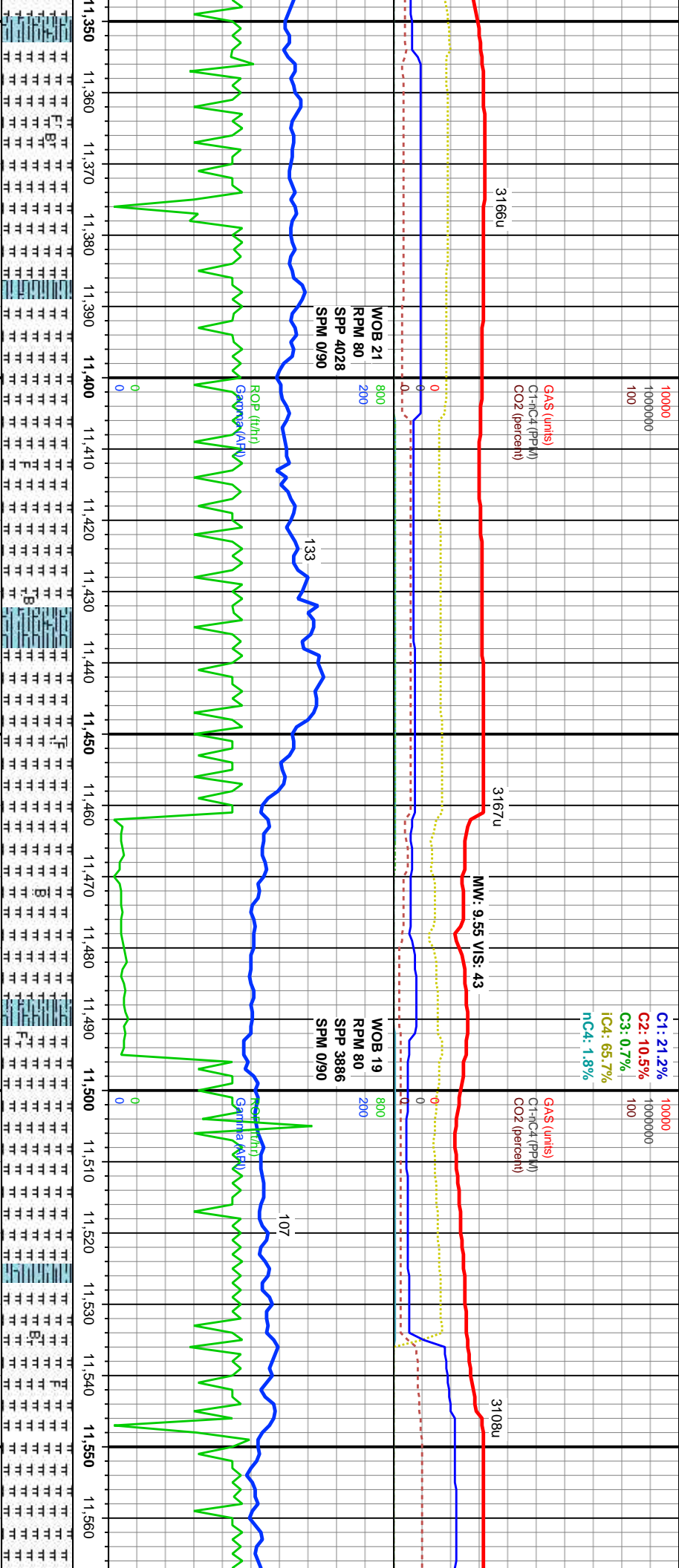
80% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blk, rthy lstr, v calc, sl brn/bk sn
20% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lstr, grty, com mottld carb mat.
com filb calc frags, tr BENT
inst bri blu-whi blooming cut, thick blu-whi resid ring.

50% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lstr, grty, com mottld carb mat.
50% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blk, rthy lstr, v calc, sl brn/bk sn
abndt calc frags, tr BENT
mod fst bri blu-whi milky cut, thick blu-whi resid ring.

60% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lstr, grty, com mottld carb mat.
40% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blk, rthy lstr, v calc, sl brn/bk sn
abndt calc frags, tr BENT
mod fst bri blu-whi rad strmg cut, thick blu-whi resid ring.

60% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lstr, grty, com mottld carb mat.
40% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blk, rthy lstr, v calc, sl brn/bk sn
abndt calc frags, tr BENT
sl fst bri blu-whi rad strmg cut ring.

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 11.560



MD: 11.397'
Inclination: 89.29°
Azimuth: 267.3°
TVD: 6.042.45'
VS: 4.912.83'

MD: 11.482'
Inclination: 90.28°
Azimuth: 269.15°
TVD: 6.042.77'
VS: 4.995.92'

MD: 11.550'
Inclination: 90.28°
Azimuth: 269.15°
TVD: 6.042.77'
VS: 4.995.92'

90% MARL: dk brn/gy, frm-sft, sb pty-sb blk, rthy
lsr, grty, com mottld carb mat.
10% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb pty-sb blk, rthy lsr, v calc, sl brn/bk strn
abndt calc frags, com BENT
mod fst bri blu-whi milky cut, thck blu-whi resid ring.

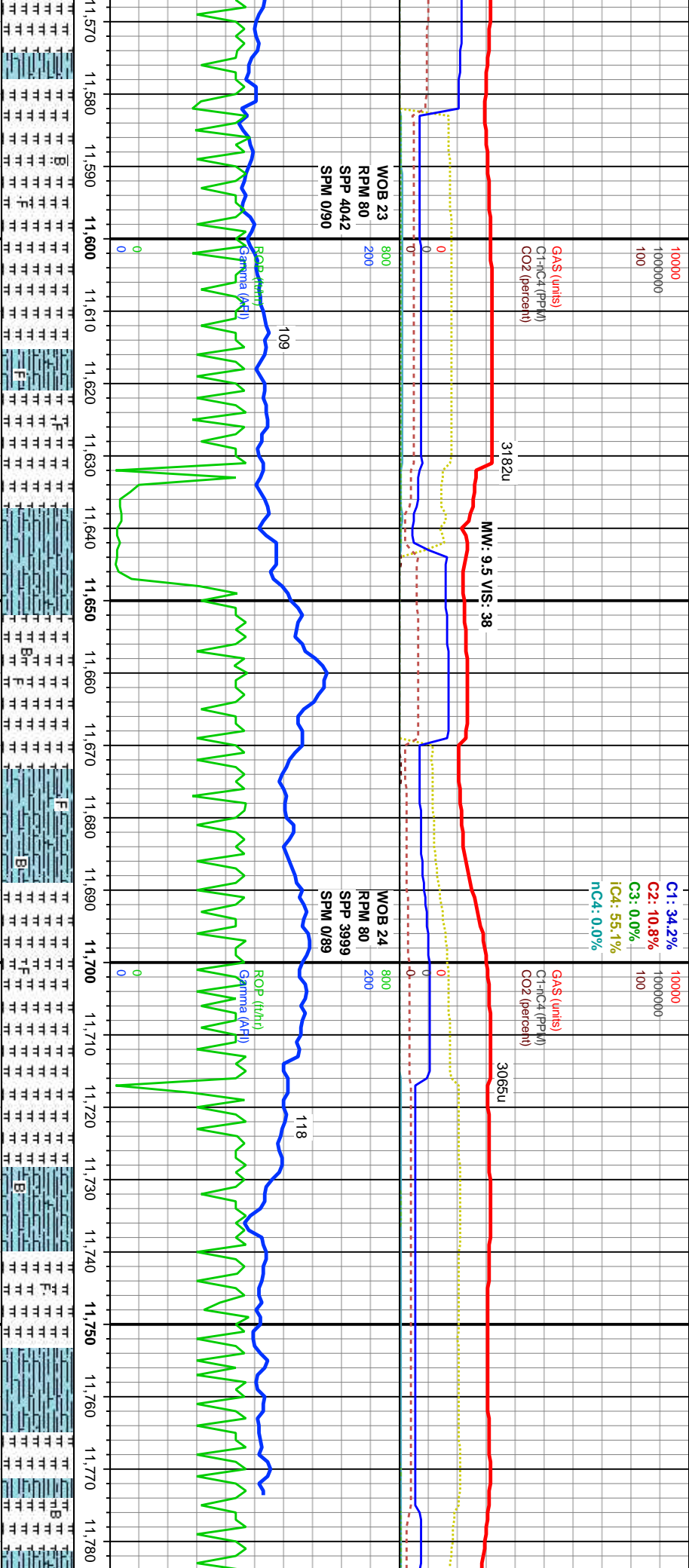
90% MARL: dk brn/gy, frm-sft, sb pty-sb blk, rthy
lsr, grty, com mottld carb mat.
10% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb pty-sb blk, rthy lsr, v calc, sl brn/bk strn
abndt calc frags, com BENT
mod fst bri blu-whi rad strng cut, thck blu-whi
resid ring.

95% MARL: dk brn/gy, frm-sft, sb pty-sb blk, rthy
lsr, grty, com mottld carb mat.
5% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb
pty-sb blk, rthy lsr, v calc, sl brn/bk strn
abndt calc frags, com BENT
mod fst bri blu-whi milky cut, thck blu-whi resid ring.

95% MARL: dk brn/gy, frm-sft, sb pty-sb blk, rthy
lsr, grty, com mottld carb mat.
5% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb
pty-sb blk, rthy lsr, v calc, sl brn/bk strn
abndt calc frags, com BENT
mod fst bri blu-whi cidly cut, thck blu-whi resid ring.

95% MARL: dk brn/gy, frm-sft, sb pty-sb blk, rthy
lsr, grty, com mottld carb mat.
5% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb
pty-sb blk, rthy lsr, v calc, sl brn/bk strn
abndt calc frags, com BENT
mod fst bri blu-whi milky cut, thck blu-whi resid ring.

11,570 11,580 11,590 11,600 11,610 11,620 11,630 11,640 11,650 11,660 11,670 11,680 11,690 11,700 11,710 11,720 11,730 11,740 11,750 11,760 11,770 11,780



6000	6000	6000
MD: 11,653° Inclination: 91.08° Azimuth: 271.26° TVD: 6,041.89' VS: 5,161.91'	MD: 11,739° Inclination: 90.49° Azimuth: 270.75° TVD: 6,040.72' VS: 5,245'	

95% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lsr, grty, com mottld carb mat. 5% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blk, rthy lsr, v calc, sl brn/blk str	60% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lsr, grty, com mottld carb mat. 40% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blk, rthy lsr, v calc, sl brn/blk str	80% MARL: dk brn/gy, frm-sft, sb ply-s lsr, grty, com mottld carb mat. 20% CHK: lt gy, mottld wh, sft- mod frm, sb ply-sb blk, rthy lsr, v calc, sl brn/blk
abndt calc frags, com BENT	abndt calc frags, tr BENT	abndt calc frags, tr BENT
mod fst bri blu-whi cidy cut, thck blu-whi resid ring. 6100	mod fst bri blu-whi rad strmg cut, thck blu-whi resid ring.	mod fst bri blu-whi milky cut, thck blu-whi

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 11,940 11,950 11,960 11,970 11,980 11,990 12,000

10000
1000000
100

GA\$ (units)
C1-HC4 (PPM)
CO2 (percent)

3150u

MW: 9.5 V/S: 38

2842u

3172u

Reached DMTD @ 11,989' at 17:42 hrs, on 12/1/2015, wiper trip to shoe, pump high viscosity sweeps, condition hole before TOO H to run liner.

Decollement Consulting Inc Thanks you.

Formation tops picked by Paul McKay, Geology Operations Manager at Bonanza Creek.

PROG. TVD(ft) ACTUAL TVD (ft) ACTUAL MD (ft)

FORMATION
Sharon Springs "A"
Sharon Springs "B"
Niobrara "A" Chalk
Niobrara "A" Marl
Niobrara "B" Chalk
Niobrara "B" Marl

5807 5837 5879 5927 5936 5996 6025
5857 5885 5964 5968 6030 6025
6271 6314 6461 6470 6740

WOB 24
RPM 80
SPM 4062
SPM 0/89

WOB 19
RPM 80
SPM 3830
SPM 0/89

ROP (ft/hr)
Gamma (API)

ROP (ft/hr)
Gamma (API)



MD: 11,824'
Inclination: 88.98°
Azimuth: 269.98°
TVD: 6,041.11'
VS: 5.327.37'

MD: 11,921'
Inclination: 88.86°
Azimuth: 270.66°
TVD: 6,042.94'
VS: 5.421.37'

Projection to Bit
MD: 11,989'
Inclination: 88.86°
Azimuth: 270.66°
TVD: 6,044.29'
VS: 5.487.17'

b blkly, rthy
occ brit,
shn
abndt calc frags, tr BENT
mod fst bri blu-whi mlky cut, thck blu-whi resid ring.
6100

80% MARL: dk brn/gy, frm-sft, sb pty-sb blkly, rthy
lstr, grty, com mottld carb mat.
20% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb pty-sb blkly, rthy lstr, v calc, sl brn/bk sin
abndt calc frags, tr BENT
mod fst bri blu-whi mlky cut, thck blu-whi resid ring.
6100

60% MARL: dk brn/gy, frm-sft, sb pty-sb blkly, rthy
lstr, grty, com mottld carb mat.
40% CHK: lt gy, mottld wh, sft- mod frm, occ brit,
sb pty-sb blkly, rthy lstr, v calc, sl brn/bk sin
abndt calc frags, tr BENT
mod fst bri blu-whi mlky cut, thck blu-whi resid ring.
6100

60% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb pty-sb blkly, rthy lstr, v calc, sl brn/bk sin
40% MARL: dk brn/gy, frm-sft, sb pty-sb blkly, rthy lstr, grty, com mottld carb mat.
com fib calc frags, tr BENT
einst bri blu-whi blooming cut, thck blu-whi resid ring.