

# 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** 05-123-42350

**Field** Wattenberg

**Geographic Region** D.J. Basin

**Drilling Completed** 11/27/2015

**Spud Date** 11/8/2015

**Surface Coordinates** 1286 FNL x 750 FEL (Lat: 40.36103, -104.22621)

**Bottom Hole Coordinates** 2002 FNL x 2221 FEL (Lat: 40.35894, -104.25012)

**Ground Elevation** 4,565

**K.B. Elevation** 4,582

**Logged Interval** 6549 To 13,343

**Total Depth** 13,343

**Formation** Niobrara "B" Chalk

**Type of Drilling Fluid** Water Based Mud

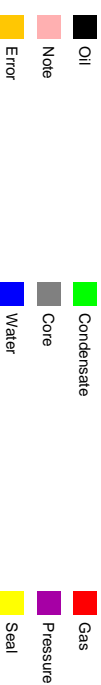
## Operator

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

## Geologist

**Name** Dan Kabala & Brian Spitzmiller  
**Company** Décollement Consulting Inc.  
**Address** 13300 Braun Rd.  
Golden, CO. 80401

## Zone Color Coding



## Rock Types

Blank



CHALK

CEMENT



LIMESTONE



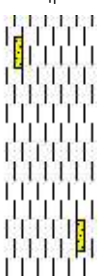
SANDSTONE



CPF MARLSTONE SHALE



MPF



SHALE S



SHALE SF



## Fossils

- ALGAE
- AMPHIPORA
- BELEMITE
- BIOCLASTIC
- BRACHIOPOD
- BRYOZOA
- CEPHALOPOD
- CORAL
- CRINOID
- ECHINOID
- FISH
- FORAMINIFERA

## Accessories

- F FOSSIL
- GASTROPOD
- OOLITE
- OSTRACOD
- PELECYPOD
- PELLET
- PISOLITE
- PLANT REMAINS
- PLANT SPORES
- SCAPHOPOD
- STROMATOPOROID
- ARGILLACEOUS
- ARGILLITE GRAIN
- B 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

ORGANIC	FORMATION TOP	LITHOGRAPHIC
SHOW		

PINPOINT	GAS SHOW	MICROXLN
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LEAD	VUGGY	MN DEPTH	ANGULAR	MUDSTONE
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VEN	NORMAL FAULT	ROUNDED	PACKSTONE
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QUESTIONABLE	OIL SHOW	SUBANG	WACKESTONE
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SPOTTED STAINING	BIT	OVERTURNED STRATA	SUBRND
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CASING	REVERSE FAULT
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osity	Textures
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CONNECTION (LEFT)	SIDEWALL CORE (LEFT)	MODERATE
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CONNECTION (RIGHT)	SIDEWALL CORE (RIGHT)	BOUNDSTONE	POOR
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CONNECTION GAS	SLIDE	CHALKY	WELL
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RACTURE	CORE - LOST	SURVEY	CRYPTOXLN
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INTERCRYSTALLINE	CORE - RECOVERED	TRIP GAS	EARTHY
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INTEROOLITIC	DST INTERVAL	WIRELINE TESTED - LEFT	FINELYXLN
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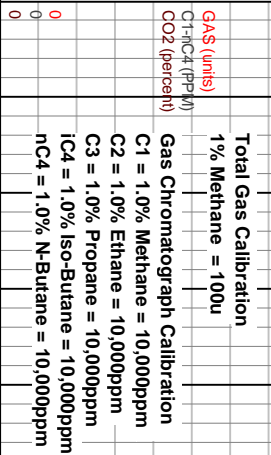
OLDIC	FAULT	WIRELINE TESTED - RT	GRAINSTONE
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Depth



Total Gas & Chromatography

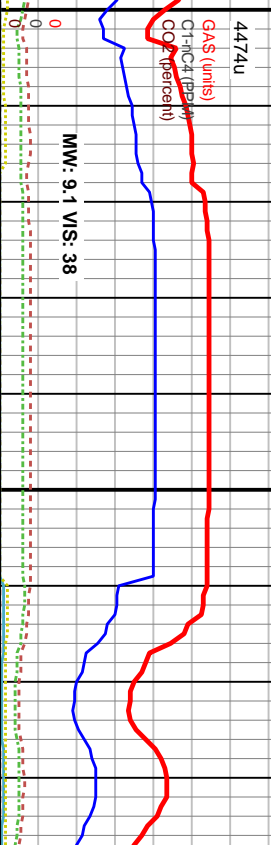
GAS  
C1  
C2  
C3  
iC4  
nC4  
CO2



Black = Slide  
White = Rotate

Running Through Gas Buster

C1: 65.5%  
C2: 16.3%  
C3: 13.9%  
iC4: 4.3%  
nC4: 0.0%

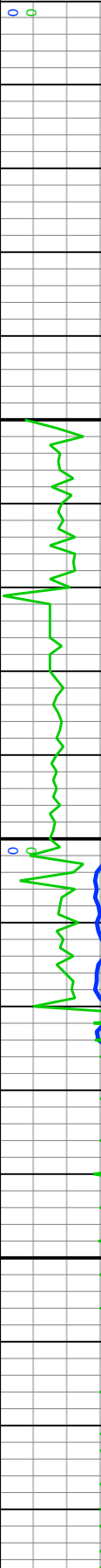


MOB 24  
RPM 0  
SPM 2806  
SPM 0/89

Curves  
ROP  
Gamma

ROP (t/hr)  
Gamma (AFI)

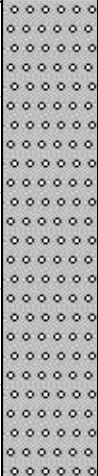
Decollement Consulting on location and rigged up with Bloodhound #5726 on 11/25/2015.  
Start logging at 6,549' MD on 11/25/2015 at 23:09 hours.



Depth Labels



Interpretive Lithology



Well Bore  
TVD

Bit #: 3  
Size: 6.125  
Mfr.: VAREL  
Type: VS513DG  
Depth In: 6,549'  
Depth Out: 13,343'  
Hours: 31.1 hrs  
Avg Ft/Hr: 218.5 '/hr  
Jets: 5X18  
S/N: 4008889

95% CHK: lt gy, mottld wh, sft- mod frm, ooc brlt, sb ply-sb blkly, rthy lstr, v calc, sl brn/blk sin 5% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grty, com mottld carb mat.

95% CHK: lt gy, mottld wh, sft- mod frm, ooc brlt, sb ply-sb blkly, rthy lstr, v calc, sl brn/blk sin 5% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grty, com mottld carb mat.

95% CHK: lt gy, mottld wh, sft- mod frm, sb ply-sb blkly, rthy lstr, v calc, sl brn/blk sin 5% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grty, com mottld carb mat.

inst blu-whi milky cut, thick yel whi resid ring.

inst blu-whi milky cut, thick yel whi resid ring.

inst blu-whi milky cut, thick yel whi resid

6,690 6,700 6,710 6,720 6,730 6,740 6,750 6,760 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

11/26/2015

100

5204u

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

C1: 66.0%  
C2: 16.5%  
C3: 13.8%  
iC4: 3.7%  
nC4: 0.0%

5212u

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

5022u

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

MW: 9.1 VIS: 39

WOB 27  
RPM 0  
SPM 2885  
SPM 0/89

WOB 26  
RPM 80  
SPM 3334  
SPM 0/89

WOB 22  
RPM 81  
SPM 3267  
SPM 0/89

ROP (t/hr)  
Gamma (AFI)

84

ROP (t/hr)  
Gamma (AFI)

102

ROP (t/hr)  
Gamma (AFI)

6,690 6,700 6,710 6,720 6,730 6,740 6,750 6,760 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

6000

MD: 6,710'  
Inclination: 91.79°  
Azimuth: 270.42°  
TVD: 6,045.84'  
VS: 155.96'

6000

MD: 6,796'  
Inclination: 92.5°  
Azimuth: 271.33°  
TVD: 6,042.62'  
VS: 241.2'

6000

MD: 6,883'  
Inclination: 91.6°  
Azimuth: 271.77°  
TVD: 6,039.51'  
VS: 327.3'

TVD (ft)

95% CHK: lt gy, mottld wh, sft- mod frm, occ brlt, 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, grtly, 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/bk sin 10% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grtly, com mottld carb mat.

tr calc frags.

inst blu-whi milky cut, thick yel whi resid ring.

tr calc frags.

inst blu-whi milky cut, thick yel whi resid ring.

tr calc frags.

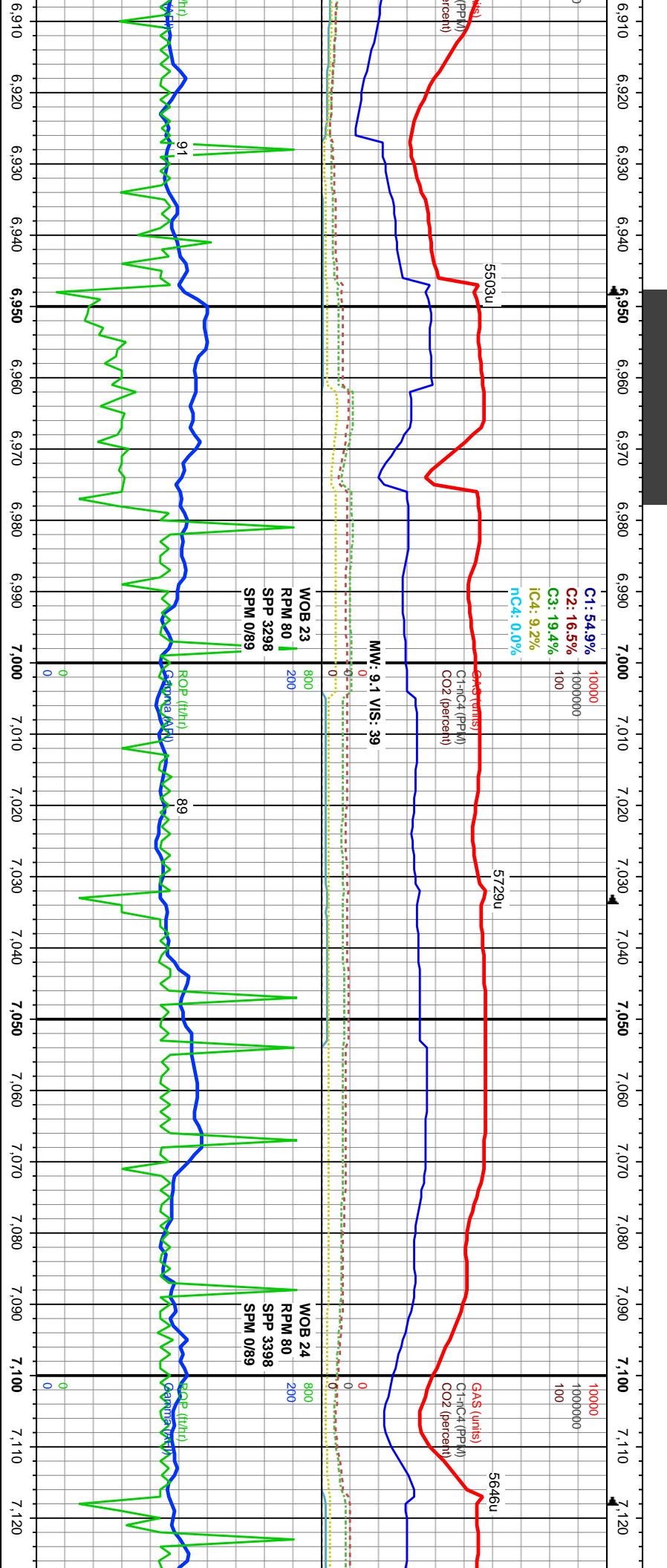
inst blu-whi milky cut, thick yel whi resid ring.

TVD (ft)

90% CHK: lt gy, mottld wh, sft- mod frm, occ brlt, 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, grtly, com mottld carb mat.

tr calc frags.

inst blu-whi milky cut, thick yel whi resid ring.



MD: 6.969 Inclination: 90.25° Azimuth: 271.65° TVD: 6.038.12' VS: 412.42'		MD: 7.054 Inclination: 90.25° Azimuth: 270.99° TVD: 6.037.75' VS: 496.64'	
95% CHK: lt gy, mottld wh, sft- mod frm, occ brlt, 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, grtty, com mottld carb mat.		95% CHK: lt gy, mottld wh, sft- mod frm, occ brlt, 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, grtty, com mottld carb mat.	
tr calc frags.		tr calc frags.	
inst blu-whi milky cut, thick yel whi resid ring.		inst blu-whi milky cut, thick yel whi resid ring.	
6100		6100	



7.130 7.140 7.150 7.160 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

C1: 66.7%  
C2: 15.8%  
C3: 12.3%  
iC4: 2.5%  
nC4: 2.1%

MW: 9.1 VIS: 39

WOB 21  
RPM 80  
SPM 3169  
SPM 0/89

ROP (t/hr)  
Gamma (AFI)

ROP (t/hr)  
Gamma (AFI)

WOB 8  
RPM 80  
SPM 3014  
SPM 0/89

ROP (t/hr)  
Gamma (AFI)

MW: 9.1 VIS: 40

MD: 7.141'  
Inclination: 90.77°  
Azimuth: 271.36°  
TVD: 6.036.97'  
VS: 582.87'

MD: 7.226'  
Inclination: 90.59°  
Azimuth: 271.32°  
TVD: 6.036.96'  
VS: 667.08'

MD: 7.312'  
Inclination: 89.45°  
Azimuth: 270.86°  
TVD: 6.035.93'  
VS: 752.34'

80% MARL: dk brn/gy, frm-sft, sb pily-sb blk, rthy lst, grty, com mottld carb mat. 20% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb pily-sb blk, rthy lst, v calc, sl brn/blk sin	90% MARL: dk brn/gy, frm-sft, sb pily-sb blk, rthy lst, grty, com mottld carb mat. 10% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb pily-sb blk, rthy lst, v calc, sl brn/blk sin	95% MARL: dk brn/gy, frm-sft, sb pily-sb blk, rthy lst, grty, com mottld carb mat. 5% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb pily-sb blk, rthy lst, v calc, sl brn/blk sin
rr calc frags, rr pyr nodes	rr calc frags, rr pyr nodes	rr calc frags, rr pyr nodes
inst blu-whi milky cut, thick yel whi resid ring.	v fst blu-whi milky cut, thick yel whi resid ring.	v fst blu-whi milky cut, thick yel whi resid ring.

7.350 7.360 7.370 7.380 7.390 7.400 7.410 7.420 7.430 7.440 7.450 7.460 7.470 7.480 7.490 7.500 7.510 7.520 7.530 7.540 7.550 7.560

C1: 72.5%  
C2: 14.2%  
C3: 10.5%  
iC4: 2.9%  
nC4: 0.0%

10000  
1000000  
100

5396u

5629u

5259u

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

MW: 9.2 VIS: 39

WOB 15  
RPM 80  
SPP 3197  
SPM 0/89

WOB 11  
RPM 80  
SPP 3098  
SPM 0/89

ROP (t/hr)  
Gamma (AFI)

ROP (t/hr)  
Gamma (AFI)

131

59

MD: 7.397'

Inclination: 91.36°  
Azimuth: 270.36°  
TVD: 6.035.33'  
VS: 836.69'

MD: 7.482'

Inclination: 92.06°  
Azimuth: 269.86°  
TVD: 6.032.8'  
VS: 921.1'

MD: 7.562'

Inclination: 92.06°  
Azimuth: 269.86°  
TVD: 6.032.8'  
VS: 921.1'

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

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

95% CHK: lt gy, mottld wh, sft- mod frm, occ brit,  
sb ply-sb blk, rthy lst, v calc, sl brn/bk sin  
5% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy  
lst, grty, com mottld carb mat.

95% CHK: lt gy, mottld wh, sft- mod frm, occ brit,  
sb ply-sb blk, rthy lst, v calc, sl brn/bk sin  
5% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy  
lst, grty, com mottld carb mat.

100% CHK: lt gy, mottld wh, sft- mod frm, occ brit,  
sb ply-sb blk, rthy lst, v calc, sl brn/bk sin  
tr MARL: dk brn/gy, com mottld carb mat.

rr calc frags, rr pyr nodes  
v fst blu-whi milky cut, thck yel whi resid ring.

tr calc frags, rr BENT  
inst blu-whi milky cut, thck yel whi resid ring.

tr calc frags.  
inst blu-whi milky cut, thck yel whi resid ring.

tr calc frags.  
inst blu-whi milky cut, thck yel whi resid ring.

tr calc frags.  
inst blu-whi milky



7.570 7.580 7.590 7.600 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

C1: 57.9%  
C2: 15.6%  
C3: 17.6%  
iC4: 8.8%  
nC4: 0.0%

10000  
1000000  
100

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

5726u

MM: 9.3 VIS: 36

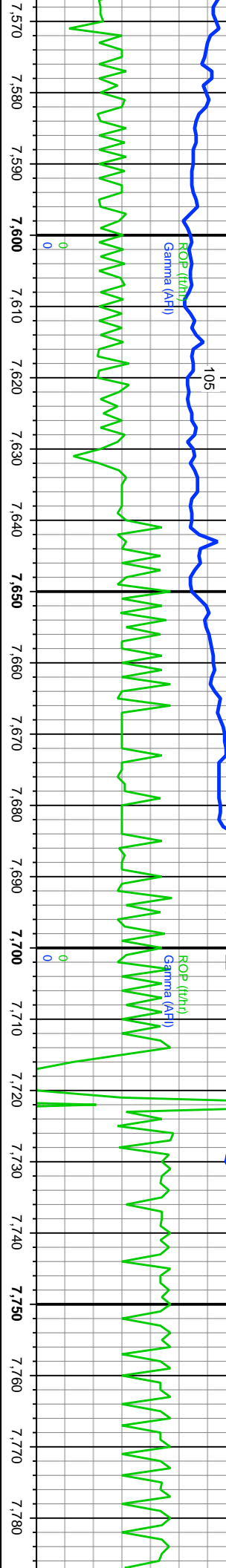
0

WOB 12  
RPM 80  
SPM 3192  
SPM 0/90

800  
200

ROP (t/hr)  
Gamma (AFI)

105



10000  
1000000  
100

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

5732u

WOB 17  
RPM 80  
SPM 3491  
SPM 0/90

800  
200

ROP (t/hr)  
Gamma (AFI)

139



8'  
n: 90.71°  
270.03°  
30.72'  
6.54'

6000

MD: 7.653'  
Inclination: 90.52°  
Azimuth: 270.37°  
TVD: 6.029.8'  
VS: 1.090.96'

6000

MD: 7.739'  
Inclination: 90.74°  
Azimuth: 270.74°  
TVD: 6.028.86'  
VS: 1.176.31'

TVD (ft)

90% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blkly, rthy lst, v calc, sl brn/bk sin 10% MARL: dk brngy, frm-sft, sb ply-sb blkly, rthy lst, grty, com mottld carb mat.

tr calc frags.

inst blu-whi milky cut, thick yel whi resid ring.

TVD (ft)

70% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blkly, rthy lst, v calc, sl brn/bk sin 30% MARL: dk brngy, frm-sft, sb ply-sb blkly, rthy lst, grty, com mottld carb mat.

tr calc frags.

inst blu-whi milky cut, thick yel whi resid ring.

60% CHK: lt gy, mottld wh, sft- mod frm, sb ply-sb blkly, rthy lst, v calc, sl brn/bk sin 40% MARL: dk brngy, frm-sft, sb ply-s

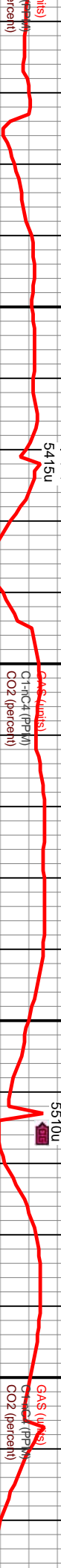
tr calc frags.

inst blu-whi milky cut, thick yel whi resid r



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 8.150 8.160 8.170 8.180 8.190 8.200 8.210 8.220

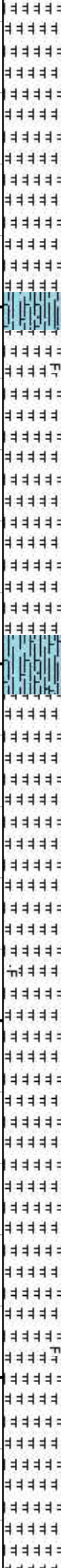
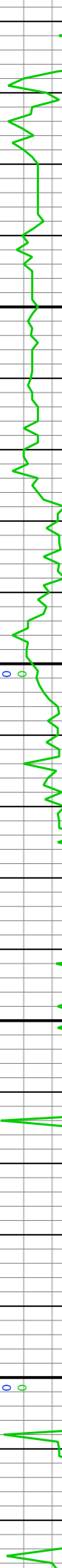
C1: 67.2%  
C2: 15.2%  
C3: 12.6%  
iC4: 2.9%  
nC4: 2.0%



MMW: 9.4 VIS: 38

WOB 13  
RPM 0  
SPP 3200  
SPM 0/90

ROP (t/hr)  
Gamma (AFI)



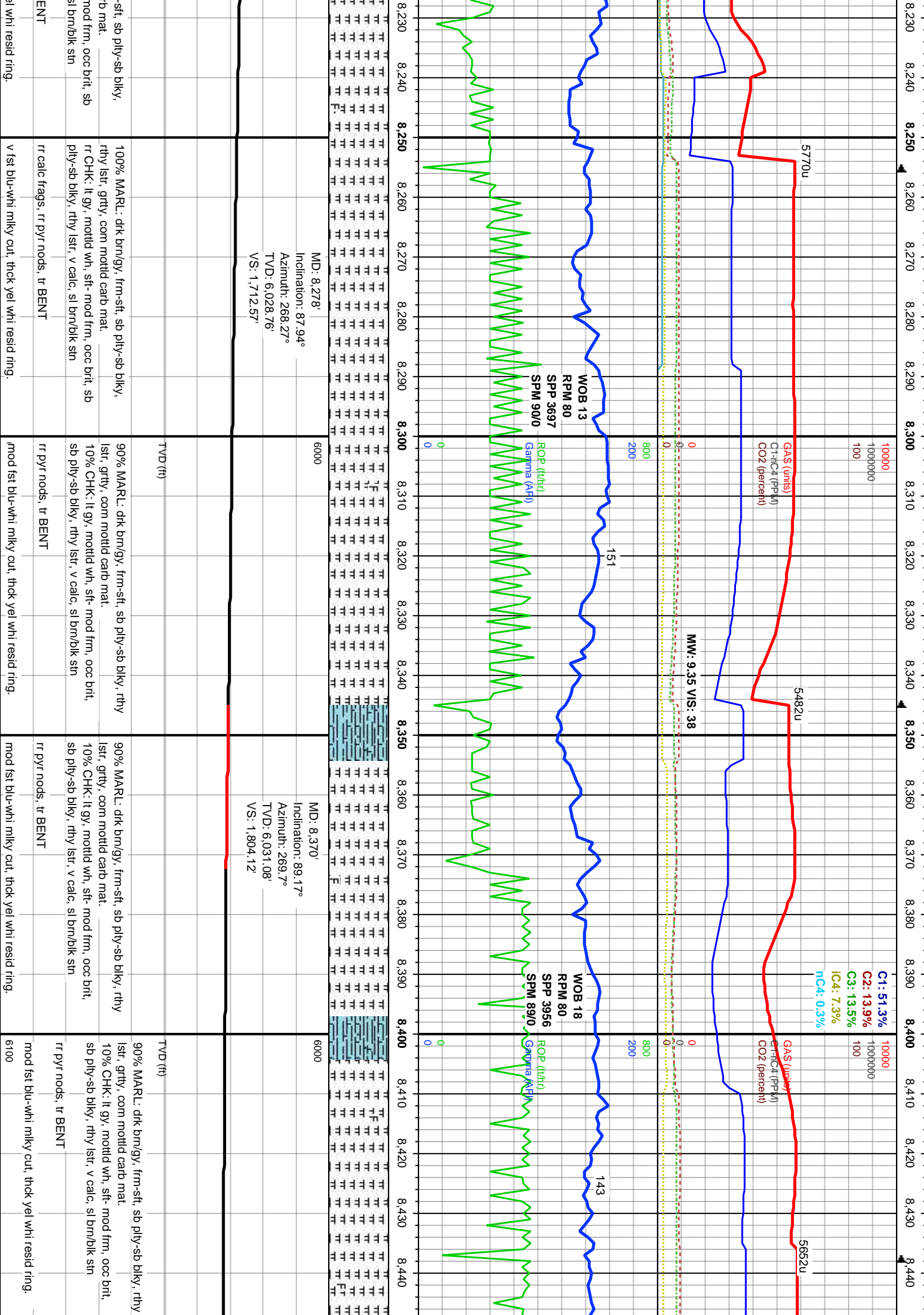
MD: 8.097' 6000  
Inclination: 89.44°  
Azimuth: 267.96°  
TVD: 6.024.02  
VS: 1.532.18'

MD: 8.187' 6000  
Inclination: 88.31°  
Azimuth: 267.87°  
TVD: 6.025.78'  
VS: 1.621.9'

90% MARL: dk brn/gy, frm-sft, sb pily-sb blk, rthy  
lstr, grty, com mottld carb mat.  
10% CHK: lt gy, mottld wh, sft- mod frm, occ brit,  
sb pily-sb blk, rthy lstr, v calc, sl brn/bk sin  
rr calc frags, rr pyr nodes  
v fst blu-whi milky cut, thick yel whi resid ring.

90% MARL: dk brn/gy, frm-sft, sb pily-sb blk, rthy  
lstr, grty, com mottld carb mat.  
10% CHK: lt gy, mottld wh, sft- mod frm, occ brit,  
sb pily-sb blk, rthy lstr, v calc, sl brn/bk sin  
rr calc frags, rr pyr nodes  
v fst blu-whi milky cut, thick yel whi resid ring.

100% MARL: dk brn/gy, frm-sft, sb pily-sb blk,  
rthy lstr, grty, com mottld carb mat.  
rr CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb  
pily-sb blk, rthy lstr, v calc, sl brn/bk sin  
rr calc frags, rr pyr nodes  
v fst blu-whi milky cut, thick yel whi resid ring.





8,450 8,460 8,470 8,480 8,490 8,500 8,510 8,520 8,530 8,540 8,550 8,560 8,570 8,580 8,590 8,600 8,610 8,620 8,630 8,640 8,650 8,660

10000  
1000000  
100

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

5681u

MW: 9.4 VIS: 38

WOB 19  
RPM 81  
SPM 3947  
SPM 89/0

ROP (ft/hr)  
Gamma Ray

0  
0

6000

MD: 8,462'  
Inclination: 89.23°  
Azimuth: 270.09°  
TVD: 6,032.37'  
VS: 1,895.55'

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 brt,  
sb pty-sb blk, rthy lstr, v calc, sl brn/blk sin

rr pyr mods, tr BENT  
mod fst blu-whi milky cut, thick yel whi resid ring.

10000  
1000000  
100

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

5658u

C1: 65.8%  
C2: 16.1%  
C3: 13.5%  
iC4: 3.9%  
nC4: 0.0%

WOB 24  
RPM 80  
SPM 4109  
SPM 89/0

ROP (ft/hr)  
Gamma Ray

0  
0

6000

MD: 8,554'  
Inclination: 90.28°  
Azimuth: 270.43°  
TVD: 6,032.76'  
VS: 1,986.92'

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 brt,  
sb pty-sb blk, rthy lstr, v calc, sl brn/blk sin

tr calc frag.  
mod fst blu-whi milky cut, thick yel whi resid ring.

10000  
1000000  
100

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

5658u

C1: 65.8%  
C2: 16.1%  
C3: 13.5%  
iC4: 3.9%  
nC4: 0.0%

WOB 24  
RPM 80  
SPM 4109  
SPM 89/0

ROP (ft/hr)  
Gamma Ray

0  
0

6000

MD: 8,645'  
Inclination: 90.71°  
Azimuth: 270.18°  
TVD: 6,031.97'  
VS: 2,077.29'

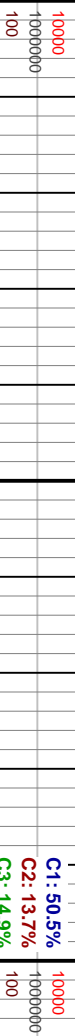
95% MARL: dk b  
lsr, grty, com mo  
5% CHK: lt gy, m  
sb pty-sb blk, rth

tr calc frag.  
mod fst blu-whi m

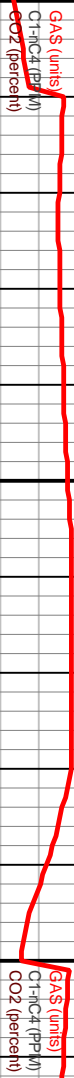
8,650 8,660



8,670 8,680 8,690 8,700 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



C1: 50.5%  
C2: 13.7%  
C3: 14.9%  
iC4: 8.5%  
nC4: 0.0%



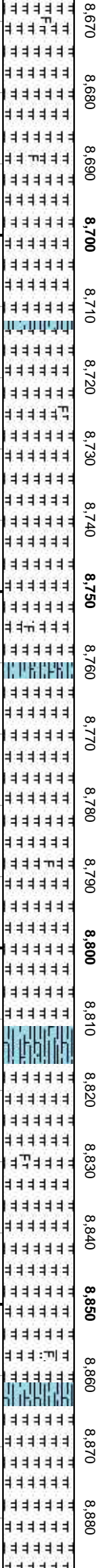
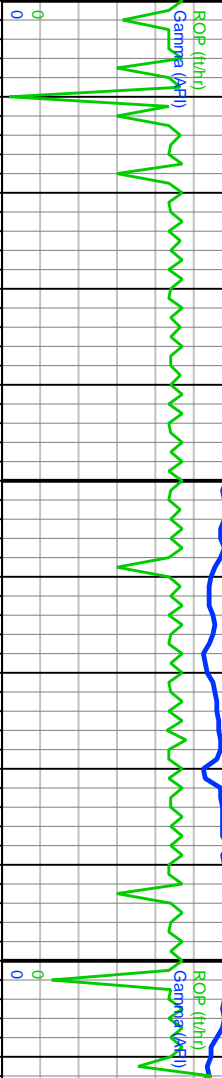
MMV: 9.5 V/S: 38

WOB 23  
RPM 80  
SPM 4088  
SPM 890

WOB 22  
RPM 80  
SPM 4087  
SPM 900

130

152



MD: 8,737'  
Inclination: 90.37°  
Azimuth: 270.4°  
TVD: 6,031.11'  
VS: 2,168.65'

MD: 8,828'  
Inclination: 90.31°  
Azimuth: 270.61°  
TVD: 6,030.57'  
VS: 2,258.98'

TVD (ft)

TVD (ft)

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 lstr, v calc, sl brn/blk sn

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 lstr, v calc, sl brn/blk sn

tr calc frag.

sb pty-sb blk, rthy lstr, v calc, sl brn/blk

mod fst blu-whi milky cut, thick yel whi resid ring.

mod fst blu-whi milky cut, thick yel whi resid ring.

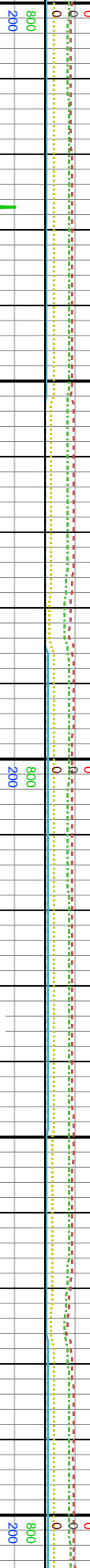
m/gy, frm-sft, sb pty-sb blk, rthy  
mottld carb mat.  
lsr, grty, com mottld carb mat.  
5% CHK: lt gy, mottld wh, sft- mod frm, occ brit,  
sb pty-sb blk, rthy lstr, v calc, sl brn/blk sn  
tr calc frag.  
mod fst blu-whi milky cut, thick yel whi resid ring.

mod fst blu-whi milky cut, thick yel whi resid ring.

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 9,030 9,040 9,050 9,060 9,070 9,080 9,090 9,100



MW: 9.45 VIS: 38



MD: 8,920'  
Inclination: 90.89°  
Azimuth: 269.84°  
TVD: 6,029.6'  
VS: 2,350.35'

MD: 9,013'  
Inclination: 90.58°  
Azimuth: 270.01°  
TVD: 6,028.41'  
VS: 2,442.77'

MD: 9,105'  
Inclination: 9°  
Azimuth: 26°  
TVD: 6,026'  
VS: 2,534.22'

90% MARL: dk brn/gy, frm-sft, sb pily-sb blk, rthy  
lstr, grty, com mottld carb mat.  
10% CHK: lt gy, mottld wh, sft- mod frm, occ brt,  
sb pily-sb blk, rthy lstr, v calc, sl brn/bk sin

90% MARL: dk brn/gy, frm-sft, sb pily-sb blk, rthy  
lstr, grty, com mottld carb mat.  
10% CHK: lt gy, mottld wh, sft- mod frm, occ brt,  
sb pily-sb blk, rthy lstr, v calc, sl brn/bk sin

90% MARL: dk brn/gy, frm-sft, sb pily-sb blk, rthy  
lstr, grty, com mottld carb mat.  
10% CHK: lt gy, mottld wh, sft- mod frm, occ brt,  
sb pily-sb blk, rthy lstr, v calc, sl brn/bk sin

mod fst blu-whi mlky cut, thick yel whi resid ring.

mod fst blu-whi mlky cut, thick yel whi resid ring.

mod fst blu-whi mlky cut, thick yel whi resid ring.

9,110 9,120 9,130 9,140 9,150 9,160 9,170 9,180 9,190 9,200 9,210 9,220 9,230 9,240 9,250 9,260 9,270 9,280 9,290 9,300 9,310 9,320

C1: 58.6%  
C2: 14.9%  
C3: 12.8%  
iC4: 4.6%  
nC4: 2.5%

100000  
1000000  
100

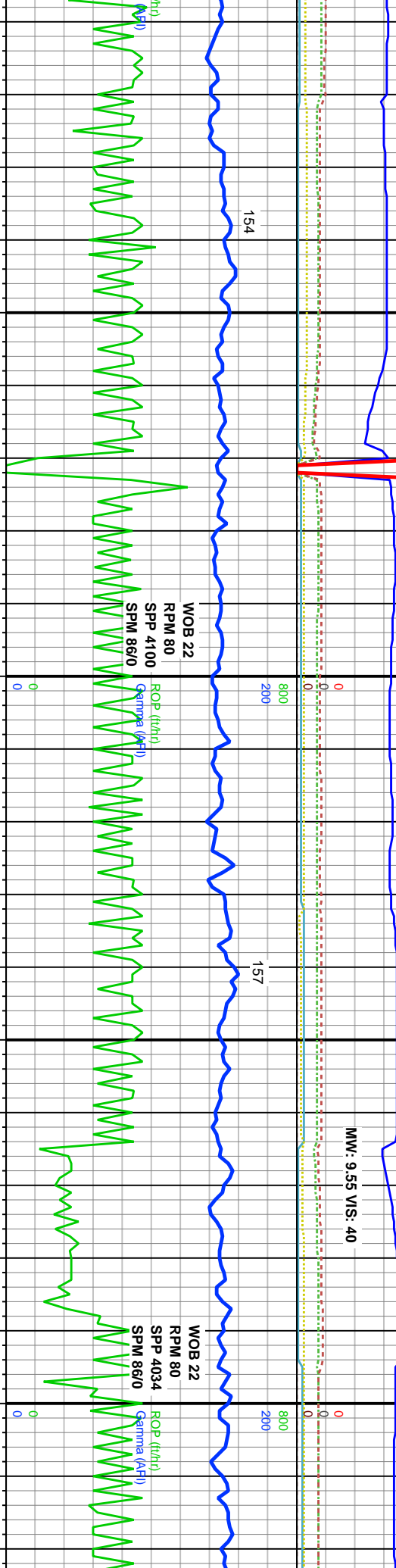
GAS (turns)  
C1+IC4 (PP4)  
CO2 (percent)

5734u

MW: 9.55 VIS: 40

100000  
1000000  
100

GAS (turns)  
C1+IC4 (PP4)  
CO2 (percent)



9,110 9,120 9,130 9,140 9,150 9,160 9,170 9,180 9,190 9,200 9,210 9,220 9,230 9,240 9,250 9,260 9,270 9,280 9,290 9,300 9,310 9,320

MD: 9,197'  
Inclination: 91.63°  
Azimuth: 268.41°  
TVD: 6,024.31'  
VS: 2,625.89'

MD: 9,289'  
Inclination: 90.25°  
Azimuth: 267.34°  
TVD: 6,022.8'  
VS: 2,717.61'

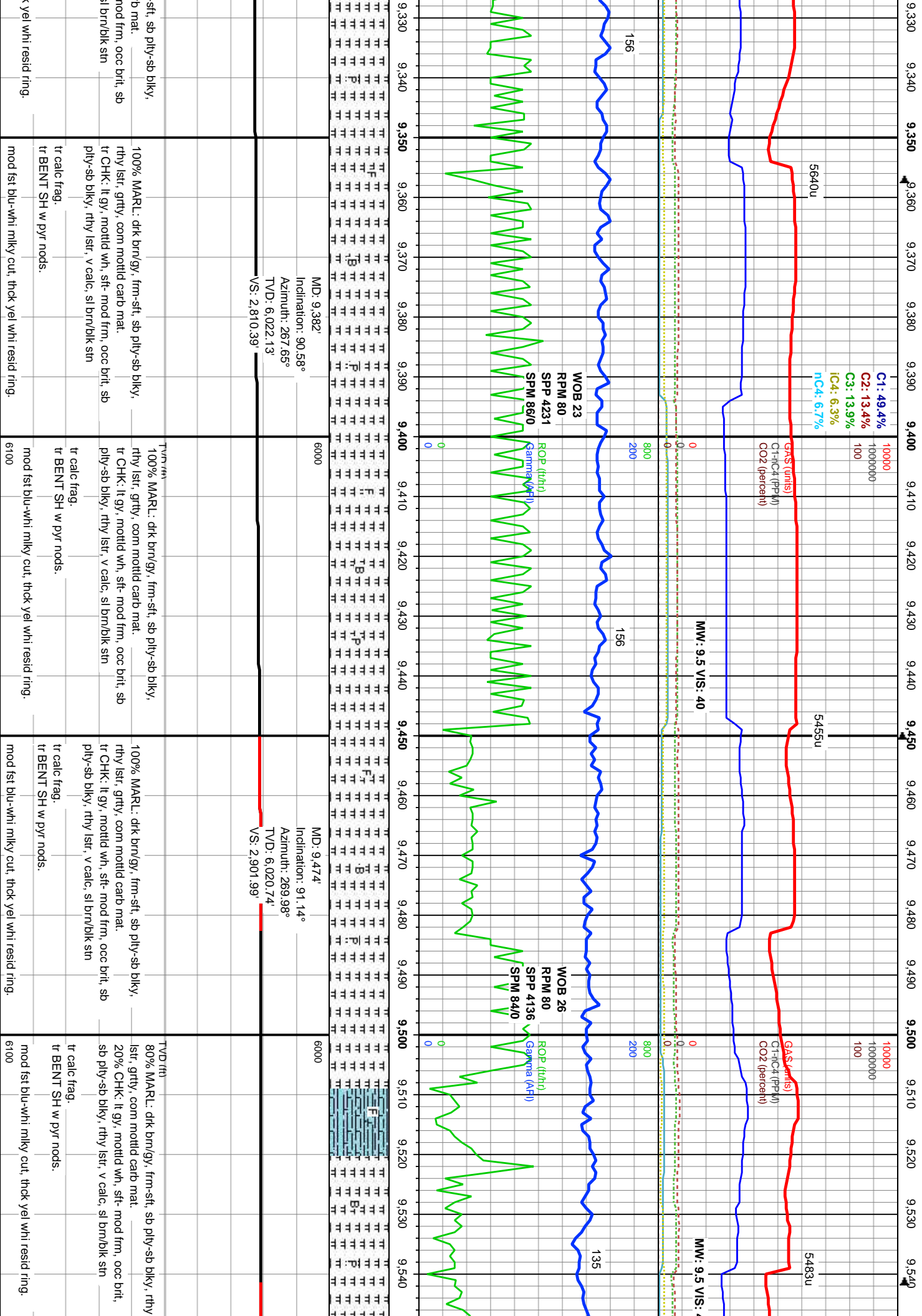
1.45°  
8.77°  
78'  
3

MARL: dk brn/gy, frm-sft, sb pty-sb blkly, r, gttly, com motild carb mat.  
: it gy, motild wh, sft- mod frm, occ brt, sb blkly, rthy lstr, v calc, sl brn/bk stn  
frag.

100% MARL: dk brn/gy, frm-sft, sb pty-sb blkly, rthy lstr, gttly, com motild carb mat.  
tr CHK: it gy, motild wh, sft- mod frm, occ brt, sb pty-sb blkly, rthy lstr, v calc, sl brn/bk stn  
tr calc frag.  
tr BENT SH w pyr nods.  
mod fst blu-whi milky cut, thck yel whi resid ring.

100% MARL: dk brn/gy, frm-sft, sb pty-sb blkly, rthy lstr, gttly, com motild carb mat.  
tr CHK: it gy, motild wh, sft- mod frm, occ brt, sb pty-sb blkly, rthy lstr, v calc, sl brn/bk stn  
tr calc frag.  
tr BENT SH w pyr nods.  
mod fst blu-whi milky cut, thck yel whi resid ring.

100% MARL: dk brn/gy, frm-sft, sb pty-sb blkly, rthy lstr, gttly, com motild carb mat.  
tr CHK: it gy, motild wh, sft- mod frm, occ brt, sb pty-sb blkly, rthy lstr, v calc, sl brn/bk stn  
tr calc frag.  
tr BENT SH w pyr nods.  
mod fst blu-whi milky cut, thck yel whi resid ring.





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 9.690 9.700 9.710 9.720 9.730 9.740 9.750 9.760

C1: 58.5%  
C2: 13.6%  
C3: 13.1%  
iC4: 5.6%  
nC4: 3.5%

10000  
1000000  
100

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

5758u

10000  
1000000  
100

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

5871u

MMW: 9.5 VIS: 40

WOB 19  
RPM 81  
SPM 4131

ROP (t/hr)  
Gamma (AF)

149

WOB 22  
RPM 80  
SPM 4190

ROP (t/hr)  
Gamma (AF)

120

MD: 9.565'  
Inclination: 88.95°  
Azimuth: 271.09°  
TVD: 6.020.67'  
VS: 2.992.31'

6000

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

tr calc frag.  
tr BENT SH w pyr nods.

mod fst blu-whi milky cut, thick yel whi resid ring.

MD: 9.657'  
Inclination: 88.83°  
Azimuth: 271.68°  
TVD: 6.022.46'  
VS: 3.083.43'

6000

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

tr calc frag.  
tr BENT SH w pyr nods.

mod fst blu-whi milky cut, thick yel whi resid ring.

MD: 9.749'  
Inclination: 89.57°  
Azimuth: 270.87°  
TVD: 6.023.74'  
VS: 3.174.59'

6000

90% CHK: lt gy, r  
sb pily-sb blk, rth  
10% MARL: dk brn/gy, frm-sft, sb pily-sb blk, rthy  
lstr, grty, com mottld carb mat.

tr calc frags.

inst blu-whi milky c





9.990 10.000 10.010 10.020 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

C1: 60.9% C2: 15.0% C3: 13.3% iC4: 4.2% nC4: 3.6% C1: 58.6% C2: 13.6% C3: 13.6% iC4: 5.9% nC4: 4.0%

4766u 5773u 5936u

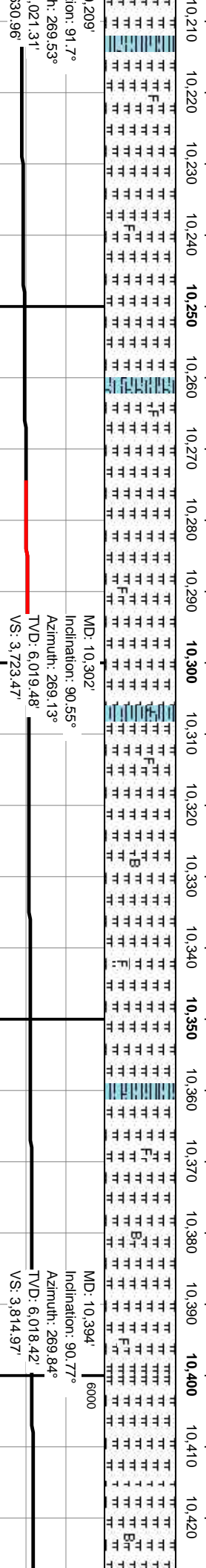
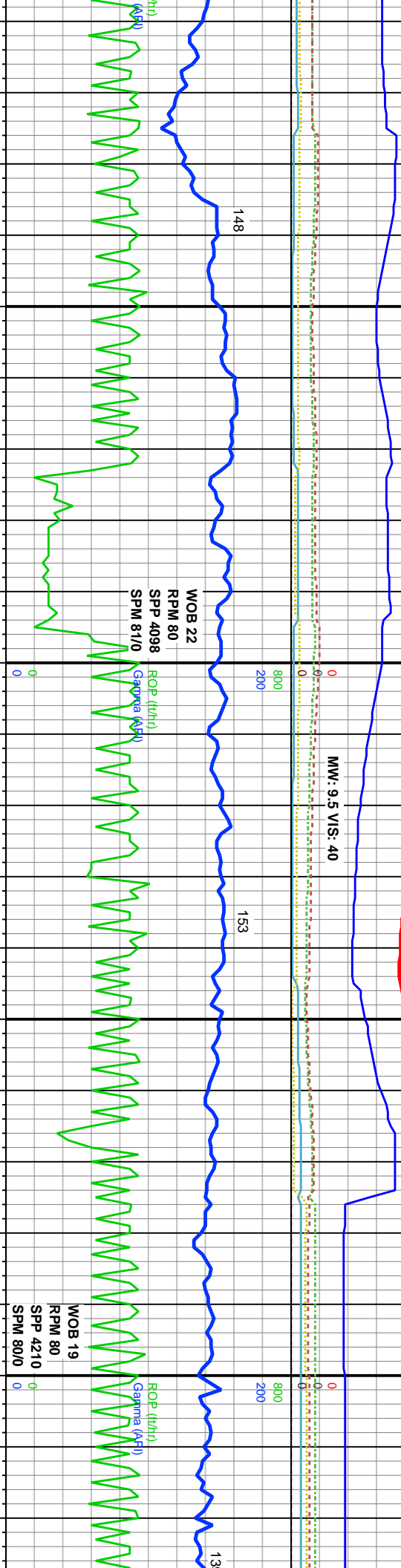
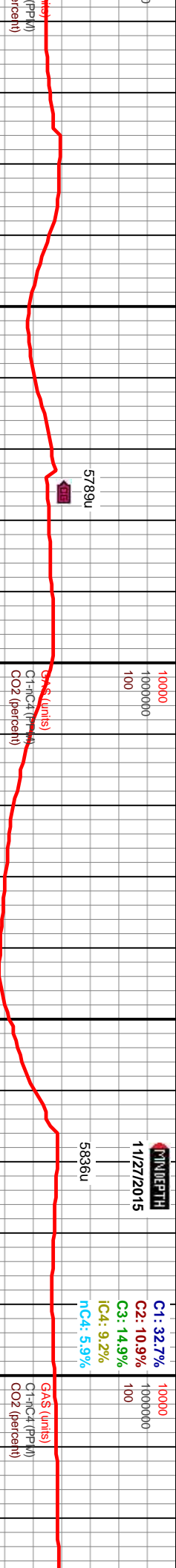
WOB 43 RPM 20 SPM 3565 SPM 830 WOB 90 RPM 20 SPM 3790 SPM 830 WOB 20 RPM 80 SPM 4116 SPM 800

ROP (t/h) Gamma (AFI) ROP (t/h) Gamma (AFI) ROP (t/h) Gamma (AFI)

6000	MD: 10.026' Inclination: 90.83° Azimuth: 271.41° TVD: 6.025.25' VS: 3.449.17'	6000	MD: 10.117' Inclination: 91.2° Azimuth: 269.53° TVD: 6.023.63' VS: 3.539.49'	MD: Incl: Azim: TVD VS:
inst blu-whi milky cut, thick yel whi resid ring. 6100	inst blu-whi milky cut, thick yel whi resid ring. 6100	inst blu-whi milky cut, thick yel whi resid ring. 6100	inst blu-whi milky cut, thick yel whi resid ring. 6100	moc tr ce 6100
TVD (ft)	70% CHK: lt gy, mottld wh, sft- mod frm, ooc brit, sb ply-sb blkly, rthy lstr, v calc, sl brn/blk sin 30% MARL: dtk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grtty, com mottld carb mat.	TVD (ft)	70% CHK: lt gy, mottld wh, sft- mod frm, ooc brit, sb ply-sb blkly, rthy lstr, v calc, sl brn/blk sin 30% MARL: dtk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grtty, com mottld carb mat.	TVD
90% CHK: lt gy, mottld wh, sft- mod frm, ooc brit, sb ply-sb blkly, rthy lstr, v calc, sl brn/blk sin 10% MARL: dtk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grtty, com mottld carb mat.	tr Calc xls. tr BENT Sh w pyr nodes.	tr Calc xls. tr BENT Sh w pyr nodes.	50% CHK: lt gy, mottld wh, sft- mod frm, ooc brit, sb ply-sb blkly, rthy lstr, v calc, sl brn/blk sin 50% MARL: dtk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grtty, com mottld carb mat.	95% lstr, 5% sb p

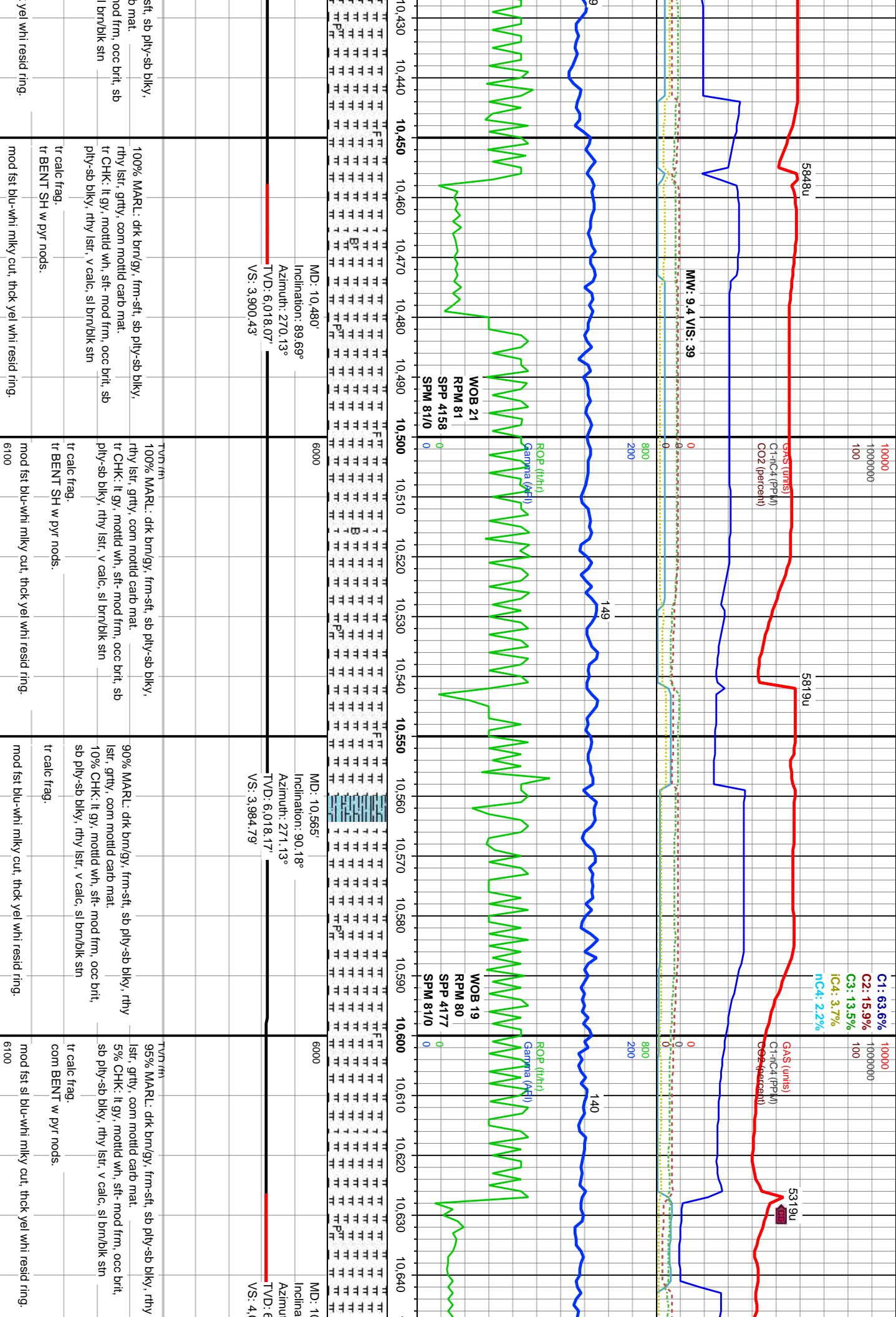
90% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb ply-sb blkly, rthy lstr, v calc, sl brn/bk sin 10% MARL: dk brn/gy, frm-sft, sb ply-sb blkly, rthy lstr, grtty, com mottld carb mat.

10.210 10.220 10.230 10.240 10.250 10.260 10.270 10.280 10.290 10.300 10.310 10.320 10.330 10.340 10.350 10.360 10.370 10.380 10.390 10.400 10.410 10.420



95% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lstr, grty, com mottld carb mat. 5% CHK: lt gy, mottld wh, sft- mod frm, occ brt, sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin frag.	95% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lstr, grty, com mottld carb mat. 5% CHK: lt gy, mottld wh, sft- mod frm, occ brt, sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin frag.	95% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lstr, grty, com mottld carb mat. 5% CHK: lt gy, mottld wh, sft- mod frm, occ brt, sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin frag.	100% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lstr, grty, com mottld carb mat. tr CHK: lt gy, mottld wh, sft- mod frm, occ brt, sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin frag.	100% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy lstr, grty, com mottld carb mat. tr CHK: lt gy, mottld wh, sft- mod frm, occ brt, sb ply-sb blk, rthy lstr, v calc, sl brn/blk sin frag.	mod fst blu-whi milky cut, thck yel whi resid ring.	mod fst blu-whi milky cut, thck yel whi resid ring.	mod fst blu-whi milky cut, thck yel whi resid ring.	mod fst blu-whi milky cut, thck yel whi resid ring.	mod fst blu-whi milky cut, thck yel whi resid ring.
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10,430 10,440 10,450 10,460 10,470 10,480 10,490 10,500 10,510 10,520 10,530 10,540 10,550 10,560 10,570 10,580 10,590 10,600 10,610 10,620 10,630 10,640



C1: 63.6%  
C2: 15.9%  
C3: 13.5%  
iC4: 3.7%  
nC4: 2.2%

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

5848u

5819u

5319u

MW: 9.4 VIS: 39

ROP (ft/hr)  
Gamma (API)

WOB 21  
RPM 81  
SPP 4158  
SPM 81/0

WOB 19  
RPM 80  
SPP 4177  
SPM 81/0

MD: 10,480'  
Inclination: 89.69°  
Azimuth: 270.13°  
TVD: 6,018.07'  
VS: 3,900.43'

MD: 10,565'  
Inclination: 90.18°  
Azimuth: 271.13°  
TVD: 6,018.17'  
VS: 3,984.79'

MD: 10,640'  
Inclination: 90.18°  
Azimuth: 271.13°  
TVD: 6,018.17'  
VS: 4,068.92'

100% MARL: dkk brn/gy, frm-sft, sb pily-sb blkly, rthy lstr, grtty, com mottld carb mat. tr CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb pily-sb blkly, rthy lstr, v calc, sl brn/blk stn

100% MARL: dkk brn/gy, frm-sft, sb pily-sb blkly, rthy lstr, grtty, com mottld carb mat. tr CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb pily-sb blkly, rthy lstr, v calc, sl brn/blk stn

90% MARL: dkk brn/gy, frm-sft, sb pily-sb blkly, rthy lstr, grtty, com mottld carb mat. 10% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb pily-sb blkly, rthy lstr, v calc, sl brn/blk stn

95% MARL: dkk brn/gy, frm-sft, sb pily-sb blkly, rthy lstr, grtty, com mottld carb mat. 5% CHK: lt gy, mottld wh, sft- mod frm, occ brit, sb pily-sb blkly, rthy lstr, v calc, sl brn/blk stn



10,650 10,660 10,670 10,680 10,690 10,700 10,710 10,720 10,730 10,740 10,750 10,760 10,770 10,780 10,790 10,800 10,810 10,820 10,830 10,840 10,850 10,860

1-2 Flare

10000  
1000000  
100

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

C1: 59.5%  
C2: 15.6%  
C3: 12.9%  
iC4: 4.7%  
nC4: 0.7%

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

MW: 9.5 VIS: 39

800  
200

800  
200

ROP (t/hr)  
Gamma (AFI)

ROP (t/hr)  
Gamma (AFI)

WOB 20  
RPM 80  
SPM 4104  
SPM 81/0

WOB 22  
RPM 80  
SPM 4126  
SPM 81/0

0.650'  
Inclination: 89.14°  
Azimuth: 270.02°  
TVD: 6,018.68'

6000  
MD: 10,735'  
Inclination: 88.65°  
Azimuth: 269.51°  
TVD: 6,020.31'  
VS: 4,153.63'

6000  
MD: 10,820'  
Inclination: 88.8°  
Azimuth: 268.58°  
TVD: 6,022.21'  
VS: 4,238.22'

95% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy  
lsfr, grty, com mottld carb mat.  
5% CHK: lt gy, mottld wh, sft- mod frm, occ brt,  
sb ply-sb blk, rthy lsfr, v calc, sl brn/blk sin  
tr calc frag.  
com BENT w pyr nods.  
mod fst blu-whi milky cut, thick yel whi resid ring.

TVD (ft)  
95% MARL: dk brn/gy, frm-sft, sb ply-sb blk, rthy  
lsfr, grty, com mottld carb mat.  
5% CHK: lt gy, mottld wh, sft- mod frm, occ brt,  
sb ply-sb blk, rthy lsfr, v calc, sl brn/blk sin  
tr calc frag.  
com BENT w pyr nods.  
mod fst blu-whi milky cut, thick yel whi resid ring.

100% MARL: dk brn/gy, frm-sft, sb ply-sb blk,  
rthy lsfr, grty, com mottld carb mat.  
r CHK: lt gy, mottld wh, sft- mod frm, occ brt, sb  
ply-sb blk, rthy lsfr, v calc, sl brn/blk sin  
tr calc frag.  
com BENT w pyr nods.  
mod fst blu-whi milky cut, thick yel whi resid ring.

TVD (ft)  
100% MARL: dk brn/gy, frm-sft, sb ply-sb blk,  
rthy lsfr, grty, com mottld carb mat.  
r CHK: lt gy, mottld wh, sft- mod frm, occ brt, sb  
ply-sb blk, rthy lsfr, v calc, sl brn/blk sin  
tr calc frag.  
occ BENT w pyr nods.  
mod fst blu-whi milky cut, thick yel whi resid ring.

100% MARL: dk  
rthy lsfr, grty, com  
r CHK: lt gy, mottld wh, sft- mod frm, occ brt, sb  
ply-sb blk, rthy lsfr, v calc, sl brn/blk sin  
tr calc frag.  
com BENT w pyr  
mod fst blu-whi milky cut, thick yel whi resid ring.

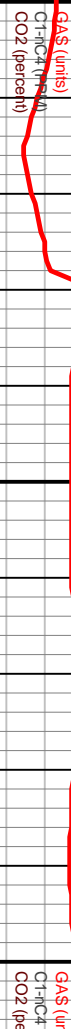




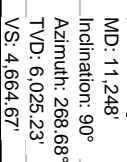
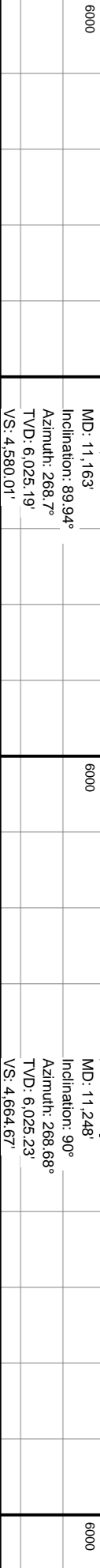
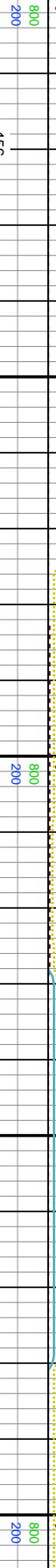
11,090 11,100 11,110 11,120 11,130 11,140 11,150 11,160 11,170 11,180 11,190 11,200 11,210 11,220 11,230 11,240 11,250 11,260 11,270 11,280 11,290 11,300



C1: 67.3%  
C2: 14.2%  
C3: 11.3%  
iC4: 3.5%  
nC4: 0.2%



MW: 9.5 VIS: 37



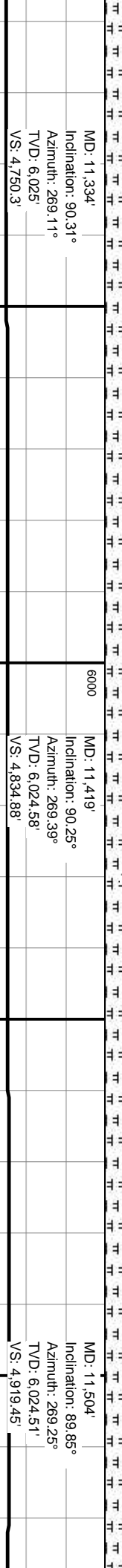
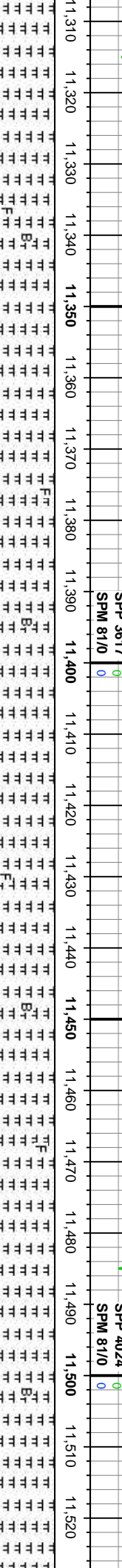
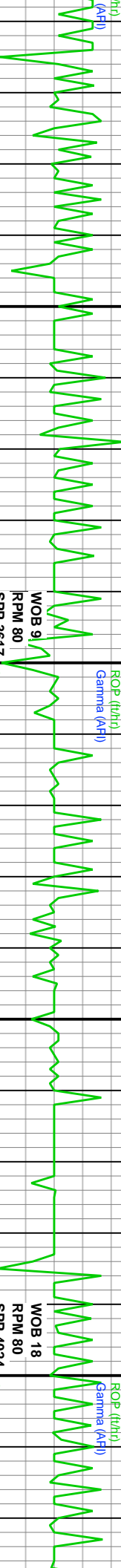
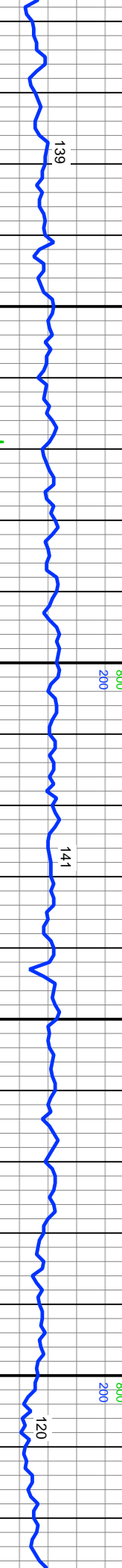
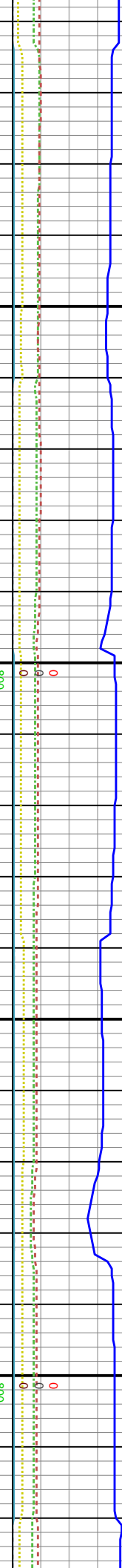
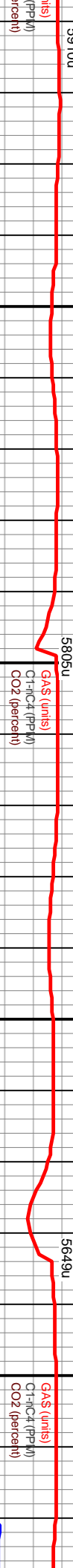
TVD (ft)  
100% MARL: dk brn/g, frm-sft, sb ply-sb blk, rthy lstr, gttty, com mottd carb mat.  
r CHK: lt gy, mottd wh, sft- mod frm, occ brt, sb ply-sb blk, rthy lstr, v calc, sl brn/bk stn  
tr calc frag.  
com BENT w pyr nods.  
mod fst blu-whi milky cut, thck yel whi resid ring.

TVD (ft)  
100% MARL: dk brn/g, frm-sft, sb ply-sb blk, rthy lstr, gttty, com mottd carb mat.  
r CHK: lt gy, mottd wh, sft- mod frm, occ brt, sb ply-sb blk, rthy lstr, v calc, sl brn/bk stn  
tr calc frag.  
com BENT w pyr nods.  
mod fst blu-whi milky cut, thck yel whi resid ring.

TVD (ft)  
100% MARL: dk brn/g, frm-sft, sb ply-sb blk, rthy lstr, gttty, com mottd carb mat.  
r CHK: lt gy, mottd wh, sft- mod frm, occ brt, sb ply-sb blk, rthy lstr, v calc, sl brn/bk stn  
tr calc frag.  
com BENT w pyr nods.  
mod fst blu-whi milky cut, thck yel whi resid ring.

11.310 11.320 11.330 11.340 11.350 11.360 11.370 11.380 11.390 11.400 11.410 11.420 11.430 11.440 11.450 11.460 11.470 11.480 11.490 11.500 11.510 11.520

C1: 62.1%  
C2: 15.7%  
C3: 13.6%  
iC4: 5.3%  
nC4: 0.6%



MD: 11,334'  
Inclination: 90.31°  
Azimuth: 269.11°  
TVD: 6.025'  
VS: 4.750.3'

100% MARL: dk brn/gy, frm-sft, sb pily-sb blkly,  
rthy lstr, grtty, com motild carb mat.  
tr CHK: lt gy, motild wh, sft- mod frm, occ brli, sb  
pily-sb blkly, rthy lstr, v calc, sl brn/blk sn  
tr calc frag.  
abndt BENT w pyr nods.  
mod fst blu-whi mlky cut, thck yel whi resid ring.





11,750 11,760 11,770 11,780 11,790 11,800 11,810 11,820 11,830 11,840 11,850 11,860 11,870 11,880 11,890 11,900 11,910 11,920 11,930 11,940 11,950 11,960

C1: 46.1%  
C2: 13.8%  
C3: 15.8%  
iC4: 11.0%  
nC4: 1.2%

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

551.3u

MW: 9.45 VIS: 34

MW: 9.5 VIS: 35

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

567.8u

ROP (t/hr)  
Gamma (AFI)

ROP (t/hr)  
Gamma (AFI)

WOB 10  
RPM 81  
SPM 3733  
SPM 81/0

WOB 17  
RPM 80  
SPM 3935  
SPM 81/0

6000

6000

MD: 11,846'  
Inclination: 89.48°  
Azimuth: 269.32°  
TVD: 6,026.15'  
VS: 5,259.71'

MD: 11,932'  
Inclination: 89.94°  
Azimuth: 269.42°  
TVD: 6,026.59'  
VS: 5,345.27'

100% MARL: dk brn/gy, frm-sft, sb pily-sb blkly, rthy lstr, gttly, com mottld carb mat.  
com CHK: lt gy, mottld wh, sft- mod frm, occ brlt, sb pily-sb blkly, rthy lstr, v calc, sl brn/blk str

100% MARL: dk brn/gy, frm-sft, sb pily-sb blkly, rthy lstr, gttly, com mottld carb mat.  
tr CHK: lt gy, mottld wh, sft- mod frm, occ brlt, sb pily-sb blkly, rthy lstr, v calc, sl brn/blk str

95% MARL: dk brn/gy, frm-sft, sb pily-sb blkly, rthy lstr, gttly, com mottld carb mat.  
5% CHK: lt gy, mottld wh, sft- mod frm, occ brlt, sb pily-sb blkly, rthy lstr, v calc, sl brn/blk str

95% MARL: dk brn/gy, frm-sft, sb pily-sb blkly, rthy lstr, gttly, com mottld carb mat.  
5% CHK: lt gy, mottld wh, sft- mod frm, occ brlt, sb pily-sb blkly, rthy lstr, v calc, sl brn/blk str

100% MARL: dk rthy lstr, gttly, com mottld carb mat.  
tr CHK: lt gy, mottld wh, sft- mod frm, occ brlt, sb pily-sb blkly, rthy lstr, v calc, sl brn/blk str

tr calc frag.  
com BENT w pyr nods.  
mod fst blu-whi milky cut, thick yel whi resid ring.

tr calc frag.  
abndt BENT w pyr nods.  
mod fst blu-whi milky cut, thick yel whi resid ring.

tr calc frag.  
com BENT w pyr nods.  
mod fst blu-whi milky cut, thick yel whi resid ring.

tr calc frag.  
com BENT w pyr nods.  
mod fst blu-whi milky cut, thick yel whi resid ring.

tr calc frag.  
com BENT w pyr nods.  
mod fst blu-whi milky cut, thick yel whi resid ring.













12,850 12,860 12,870 12,880 12,890 12,900 12,910 12,920 12,930 12,940 12,950 12,960 12,970 12,980 12,990 13,000 13,010 13,020 13,030 13,040 13,050 13,060

10000  
1000000  
100

5764u

GAS (units)  
CH4-C4 (PP4M)  
CO2 (percent)

C1: 49.1%  
C2: 12.6%  
C3: 13.5%  
iC4: 6.2%  
nC4: 6.1%

GAS (units)  
CH4-C4 (PP4M)  
CO2 (percent)

5097u

MW: 9.4 VIS: 41

MW: 9.4 VIS: 40

MW: 9.4 VIS: 40

0

159

0

151

ROP (t/hr)  
Gamma (AFI)

ROP (t/hr)  
Gamma (AFI)

WOB 22

WOB 10

RPM 80  
SPM 4116  
SPM 0/80

RPM 80  
SPM 3763  
SPM 0/80



MD: 12,872'  
Inclination: 89.94°  
Azimuth: 269.35°  
TVD: 6,029.24'  
VS: 6,279.87'

MD: 12,958'  
Inclination: 90°  
Azimuth: 268.82°  
TVD: 6,029.28'  
VS: 6,365.47'

MD: 13,044'  
Inclination: 89.88°  
Azimuth: 269.14°  
TVD: 6,029.37'  
VS: 6,451.08'

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

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

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

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 strn

90% CHK: lt gy, n sb ply-sb blkly, rthy lstr, grtty, com m

tr Calc xls.  
tr BENT Sh w pyr nodes.  
inst blu-whi milky cut, thick yel whi resid ring.

tr Calc xls.  
tr BENT Sh w pyr nodes.  
inst blu-whi milky cut, thick yel whi resid ring.

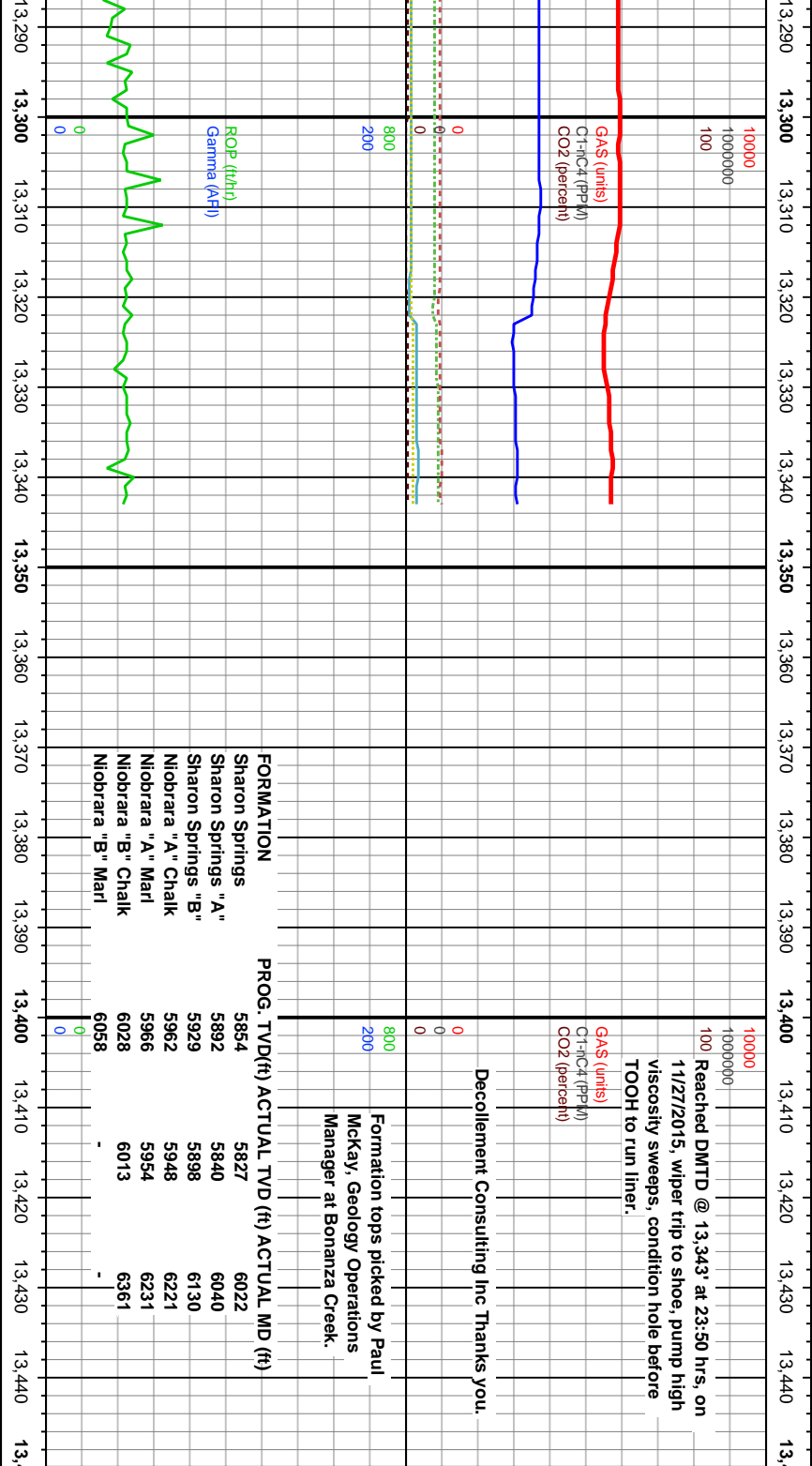
tr Calc xls.  
tr BENT Sh w pyr nodes.  
inst blu-whi milky cut, thick yel whi resid ring.

tr Calc frag.  
com BENT w pyr nodes.  
mod fst blu-whi milky cut, thick yel whi resid ring.

tr Calc xls.  
tr BENT Sh w pyr  
inst blu-whi milky







Decollement Consulting Inc Thanks you.  
Formation tops picked by Paul  
McKay, Geology Operations  
Manager at Bonanza Creek.

FORMATION	PROG.	TVD(ft)	ACTUAL	TVD (ft)	ACTUAL	MD (ft)
Sharon Springs		5854	5827		6022	
Sharon Springs "A"		5892		5840		6040
Sharon Springs "B"		5929		5898		6130
Niobrara "A" Chalk		5962		5948		6221
Niobrara "A" Marl		5966		5954		6231
Niobrara "B" Chalk		6028		6013		6361
Niobrara "B" Marl		6058				

MD: 13,343'  
Inclination: 89.05°  
Azimuth: 269.56°  
TVD: 6,032.83'  
VS: 6,748.56'

Projection to Bit

Bottoms Up Sample @ 13343'MD

TVD (ft)  
95% CHK: lt gy, mottled wh, sft- mod frm, occ brlt,  
sb ply-sb blkly, rthy lstf, v calc, sl brn/blk stn  
5% MARL: drk brn/gy, frm-sft, sb ply-sb blkly, rthy  
lstf, grtly, com mottled carb mat.

tr Calc xls.  
tr BENT Sh w pyr rods.

inst blu-whi milky cut, thck yel whi resid ring.  
ing. 6100