



# RESERVOIR GROUP

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Critter Creek 202-1807H\_Vertical

**Location** SEC.18-T11N-R63W

**State** Colorado

**County** Weld

**Country** United States of America

**Rig Number** Unit 406

**API Number** 051234493500

**AFE #** 22017012

**Geographic Region** Rockies

**Field** Hereford

**Spud Date** 11/29/2017

**Drilling Completed** 12/2/2017

**Surface Coordinates** Lat: 40.915606, Long: -104.482342  
215 FSL 828 FWL

**Bottom Hole Coordinates** Sec: 7 Twp: 11N 63W  
300 FFNLL 1,000 FFWLL

**Ground Elevation** 5,336'

**K.B. Elevation** 5,357'

**Logged Interval** 3,000' **To** 17,965'

**Total Depth** 17,965'

**Formation** Niobrara B Chalk

**Type of Drilling Fluid** Oil Based Mud

## Operator

**Company** Fifth Creek Energy

**Address** 5251 DTC Parkway, Suite 420  
Greenwood Village, Colorado 80111



## Geologist

**Name** Ben Burke, Aryn Rowe

**Company** Fifth Creek Energy

## Zone Color Coding

Oil	Condensate	Gas
Note	Core	Pressure

**Address** 5251 DTC Parkway, Suite 420  
Greenwood Village, Colorado 80111



Error Water Seal

## Other

**Logging Services Provided By:** ALS Oil & Gas Byron Pitulski / Reed Pellicore

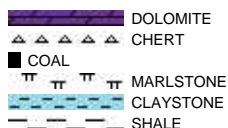
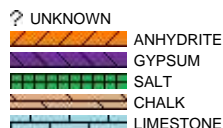
**Services Provided:** Logging  
Massspectrometry  
Gas Monitoring ML-557 & ML-545  
XRD & XRF  
Pyrolysis

**Service Start Date** 11/29/2017

**Service End Date:** 12/2/2017

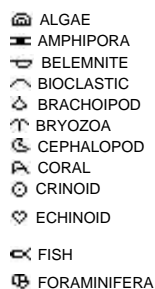
**Job #** 0846RK1711

## Rock Types



## Accessories

### Fossils



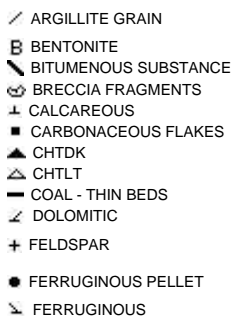
### Fossil



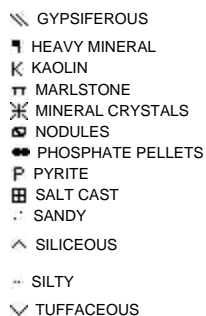
### Minerals



### Argillaceous



### Glauconite

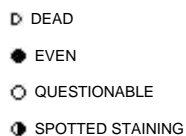


### Stringer



## Other Symbols

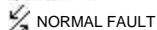
### Oil Show



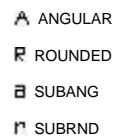
### Organic



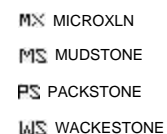
### Engineering



### Rounding




### Lithographic




### Sorting

Porosity

- E EARTHY
- ▣ FENESTRAL
- F FRACTURE
- × INTERCRYSTALLINE
- ⊕ INTEROOLITIC
- ~ MOLDIC

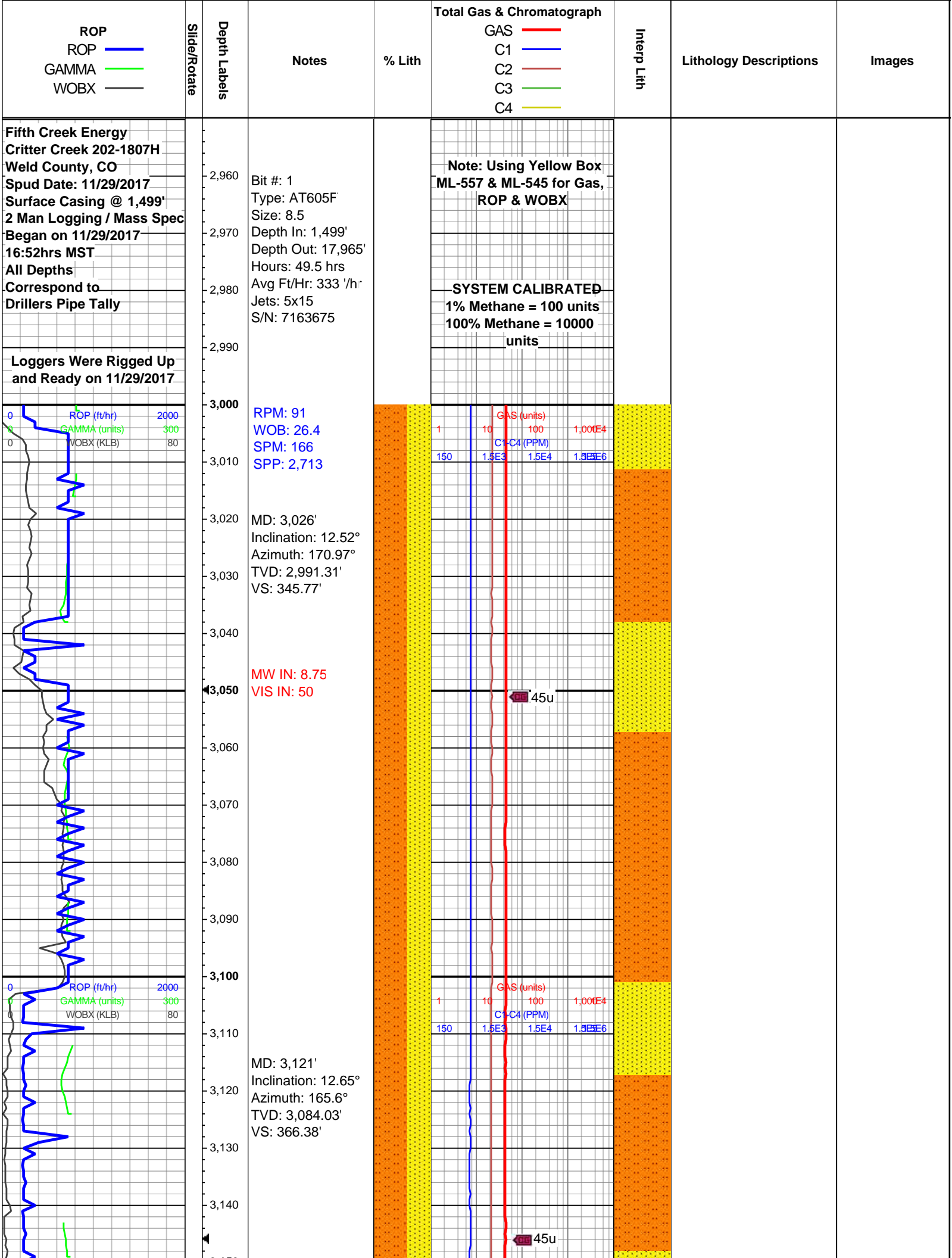
-  CASING
- ◀ CONNECTION (LEFT)
- ▶ CONNECTION (RIGHT)
- ⬅ CONNECTION GAS
- ⬇ CORE - LOST
- CORE - RECOVERED
- ⋮ DST INTERVAL
- ⬇ / ⬆ FAULT

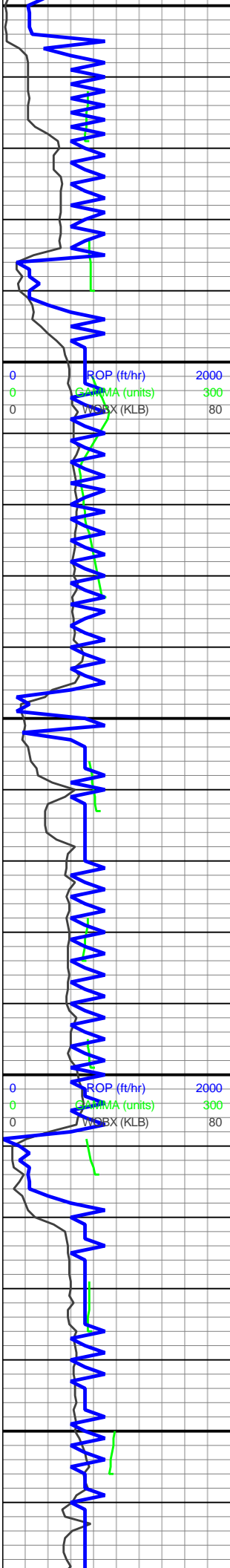
-  REVERSE FAULT
- ◀ SIDEWALL CORE (LEFT)
- ▶ SIDEWALL CORE (RIGHT)
- ▨ SLIDE
- 05 SURVEY
- ⬇ TRIP GAS
- ◀ WIRELINE TESTED - LEFT
- ▶ WIRELINE TESTED - RT

Textures

- BS BOUNDSTONE
- CHALKY
- ⊗ CRYPTOXLN
- E EARTHY
- F× FINELYXLN
- GS GRAINSTONE

- M MODERATE
- P POOR
- W WELL





3,150  
3,160  
3,170  
3,180  
3,190  
3,200  
3,210  
3,220  
3,230  
3,240  
3,250  
3,260  
3,270  
3,280  
3,290  
3,300  
3,310  
3,320  
3,330  
3,340  
3,350  
3,360

RPM: 91  
WOB: 28.9  
SPM: 166  
SPP: 2,727  
MD: 3,215'  
Inclination: 12.38°  
Azimuth: 161.33°  
TVD: 3,175.8'  
VS: 386.47'

MD: 3,310'  
Inclination: 12.6°  
Azimuth: 157.67°  
TVD: 3,268.55'  
VS: 406.45'

GAS (units)			
1	10	100	1,000E4
C1-C4 (PPM)			
150	1.5E3	1.5E4	1.5E5E6

GAS (units)			
1	10	100	1,000E4
C1-C4 (PPM)			
150	1.5E3	1.5E4	1.5E5E6

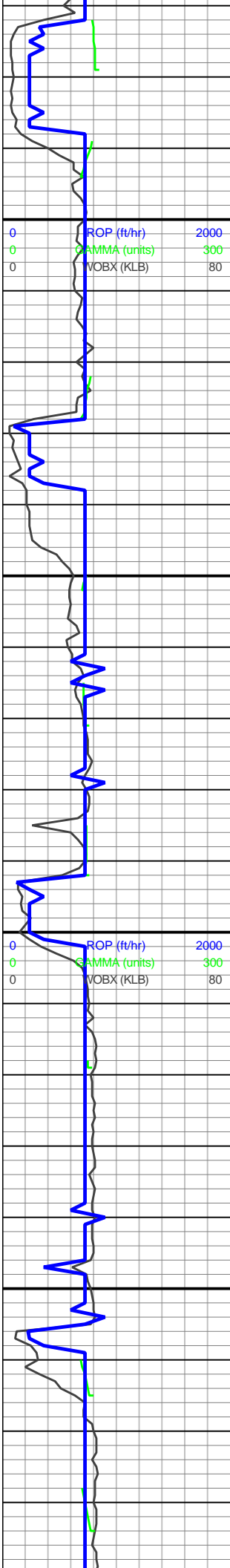
3000-3200 60% SLTST:  
lt-med gy, sb blkly-sb plty,  
non calc, grdg to ss ip;  
40% SS: predy med-dk  
gy, sme lt gy, w cons cls,  
cons silc-arg cmt, pred  
mtx sup, vf-f, sb ang-sb  
rnd, grdg to slt, xln; tr SA



44u

43u





3,370  
3,380  
3,390  
3,400  
3,410  
3,420  
3,430  
3,440  
3,450  
3,460  
3,470  
3,480  
3,490  
3,500  
3,510  
3,520  
3,530  
3,540  
3,550  
3,560  
3,570  
3,580

RPM: 92  
WOB: 35.8  
SPM: 166  
SPP: 2,860  
MD: 3,405'  
Inclination: 12.67°  
Azimuth: 152.79°  
TVD: 3,361.26'  
VS: 426.25'

MW IN: 8.7  
VIS IN: 49

MD: 3,501'  
Inclination: 12.34°  
Azimuth: 146.35°  
TVD: 3,454.98'  
VS: 445.33'

MD: 3,596'  
Inclination: 12.38°

GAS (units)			
1	10	100	1,000E4
C1-C4 (PPM)			
150	1.5E3	1.5E4	1.5E6

43u

GAS (units)			
1	10	100	1,000E4
C1-C4 (PPM)			
150	1.5E3	1.5E4	1.5E6

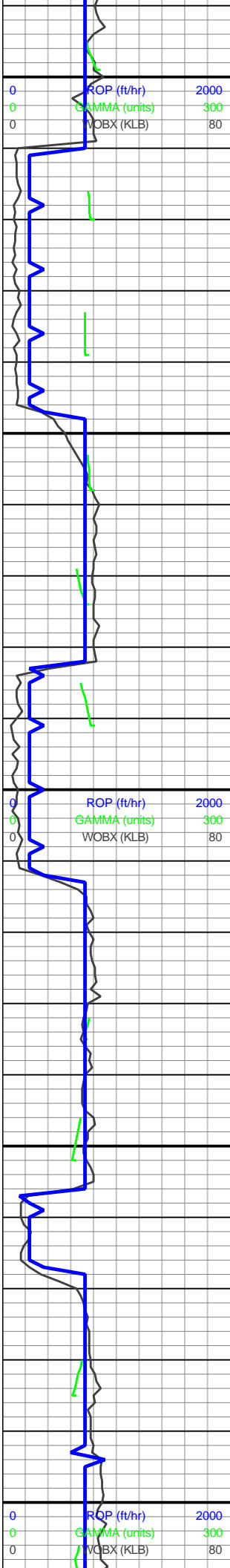
43u

3200-3400 70% SS:  
predy med-dk gy, sme lt  
gy, w cons cls, cons  
silc-arg cmt, pred mtx  
sup, vf-f, sb ang-sb rnd,  
grdg to slt, xln; 30%  
SLTST: lt-med gy, sb  
blky-sb plty, non calc,  
grdg to ss ip



3400-3600 80% SS:  
predy med-dk gy, sme lt  
gy, w cons cls, cons  
silc-arg cmt, pred mtx  
sup, vf-f, sb ang-sb rnd,





3,590  
Azimuth: 149.68°  
TVD: 3,547.78'  
VS: 463.78'

3,600  
RPM: 91  
WOB: 29  
SPM: 166  
SPP: 2,775

3,610

3,620

3,630

3,640

3,650

3,660

3,670

3,680

3,690  
MD: 3,691'  
Inclination: 12.51°  
Azimuth: 154.11°  
TVD: 3,640.55'  
VS: 482.89'

3,700

3,710

3,720

3,730  
Pierre A  
3,734'MD / 3,681'TVD

3,740

3,750

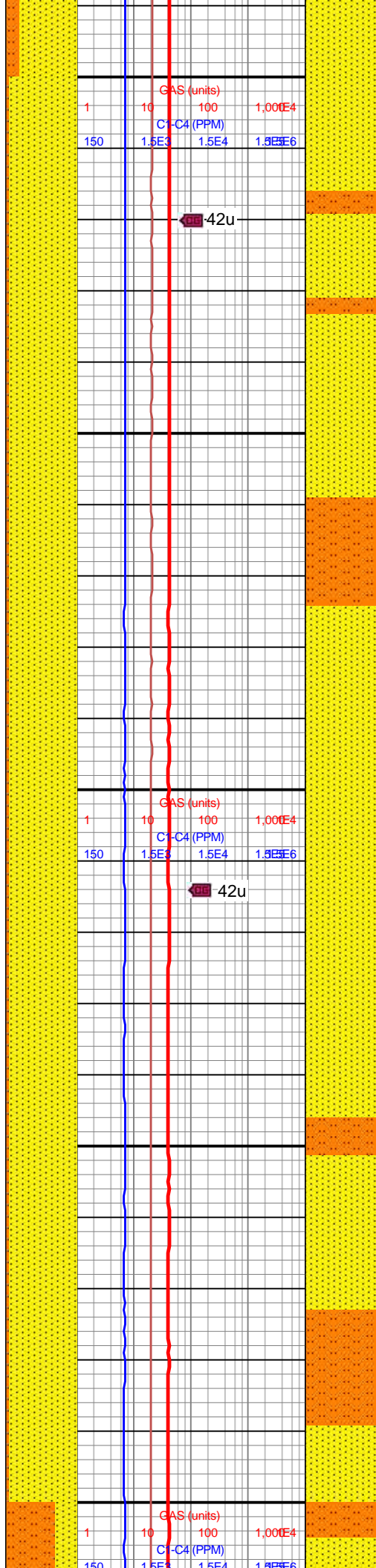
3,760

3,770

3,780  
MD: 3,786'  
Inclination: 10.75°  
Azimuth: 152.21°  
TVD: 3,733.6'  
VS: 500.93'

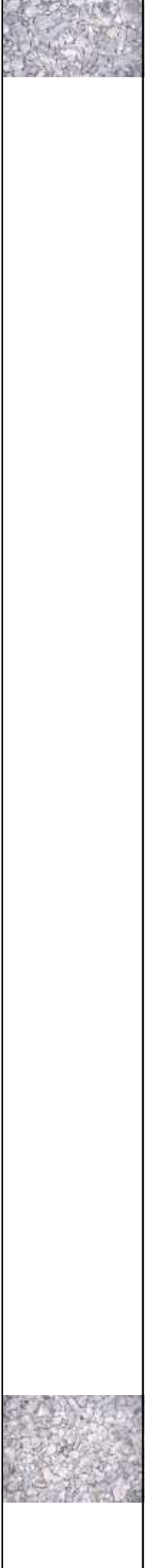
3,790

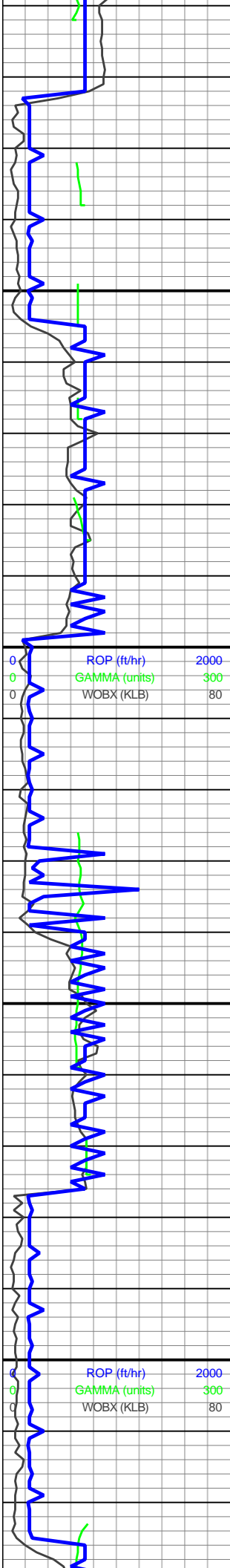
3,800  
RPM: 93  
WOB: 30  
SPM: 166  
SPP: 2,734



grdg to slt, xln; 20%  
SLTST: lt-med gy, sb  
blky-sb plty, non calc,  
grdg to ss

3600-3800 95% SS:  
predy med-dk gy, sme lt  
gy, w cons cls, cons  
silc-arg cmt, pred mtz  
sup, vf-f, sb ang-sb rnd,  
grdg to slt, xln; 5%  
SLTST: lt-med gy, sb  
blky-sb plty, non calc,  
grdg to ss; tr SA





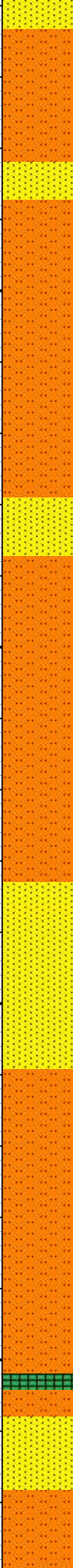
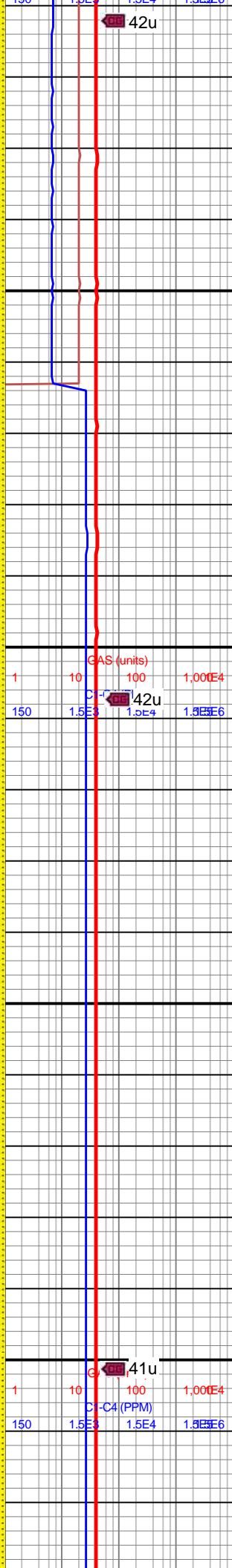
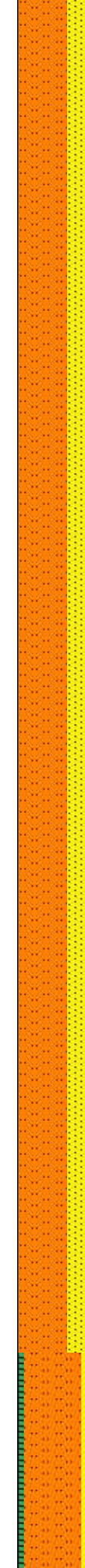
3,810  
3,820  
3,830  
3,840  
3,850  
3,860  
3,870  
3,880  
3,890  
3,900  
3,910  
3,920  
3,930  
3,940  
3,950  
3,960  
3,970  
3,980  
3,990  
4,000  
4,010  
4,020

MW IN: 8.7+  
VIS IN: 48

MD: 3,882'  
Inclination: 9.13°  
Azimuth: 154.93°  
TVD: 3,828.16'  
VS: 516.57'

MD: 3,977'  
Inclination: 6.81°  
Azimuth: 160.47°  
TVD: 3,922.23'  
VS: 529.24'

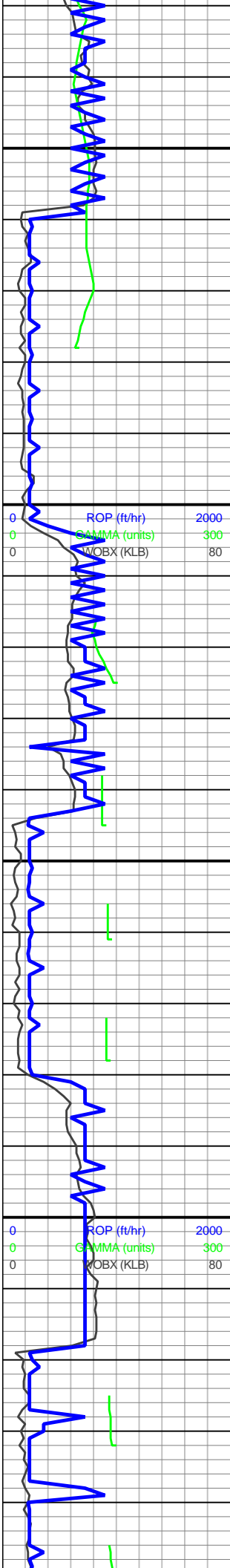
RPM: 96  
WOB: 34.1  
SPM: 166  
SPP: 2,987



3800-4000 70% SLTST:  
lt-med gy, sb blkly-sb plty,  
non calc, grdg to ss ip;  
30% SS: predy med-dk  
gy, sme lt gy, w cons cls,  
cons silc-arg cmt, pred  
mtx sup, vf-f, sb ang-sb  
rnd, grdg to slt, xln; tr SA





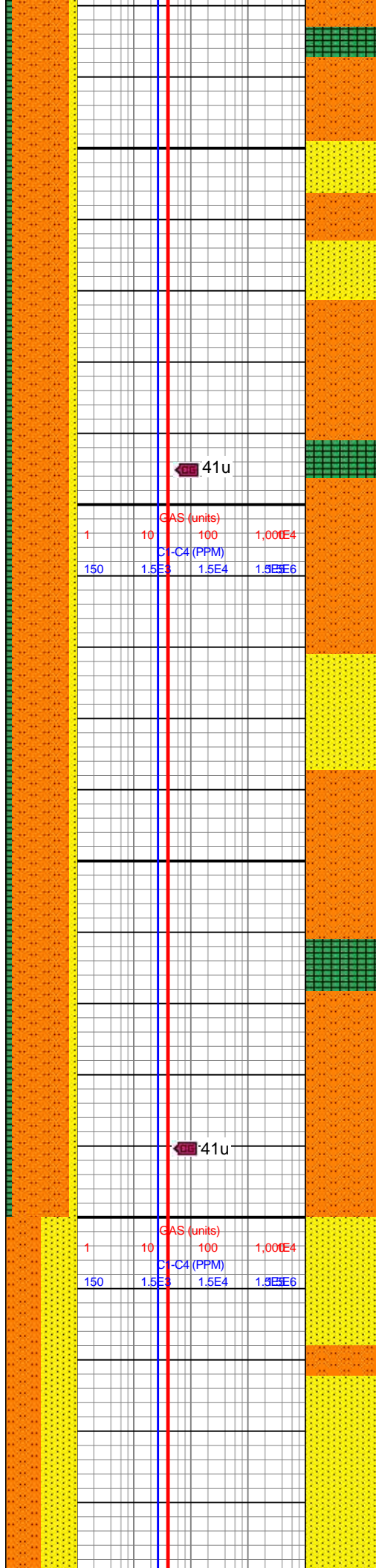


4,030  
4,040  
4,050  
4,060  
4,070  
4,080  
4,090  
4,100  
4,110  
4,120  
4,130  
4,140  
4,150  
4,160  
4,170  
4,180  
4,190  
4,200  
4,210  
4,220  
4,230  
4,240  
4,250

MD: 4,072'  
Inclination: 6.15°  
Azimuth: 174.42°  
TVD: 4,016.63'  
VS: 539.83'

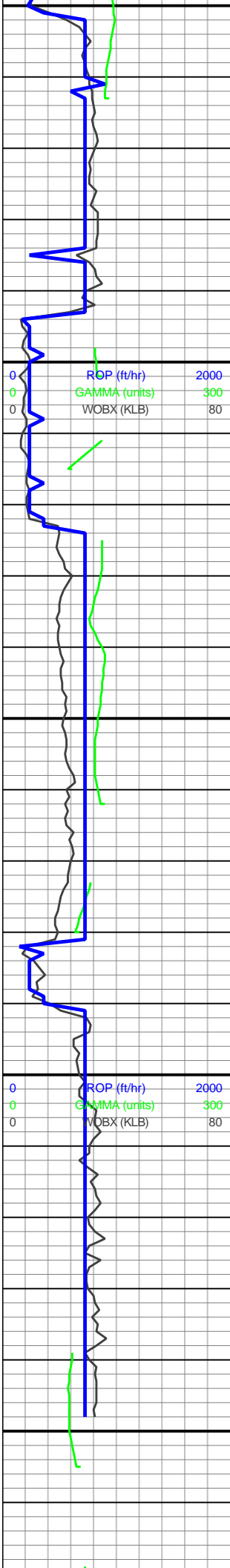
MD: 4,166'  
Inclination: 3.69°  
Azimuth: 170.67°  
TVD: 4,110.28'  
VS: 547.89'

RPM: 94  
WOB: 8  
SPM: 166  
SPP: 2,413



4000-4200 80% SLTST:  
lt-med gy, sb blkly-sb plty,  
non calc, grdg to ss ip;  
10% SS: predy med-dk  
gy, sme lt gy, w cons cls,  
cons silc-arg cmt, pred  
mtx sup, sb ang-sb rnd,  
vf-f, grdg to slt, xln; 10%  
SA xls





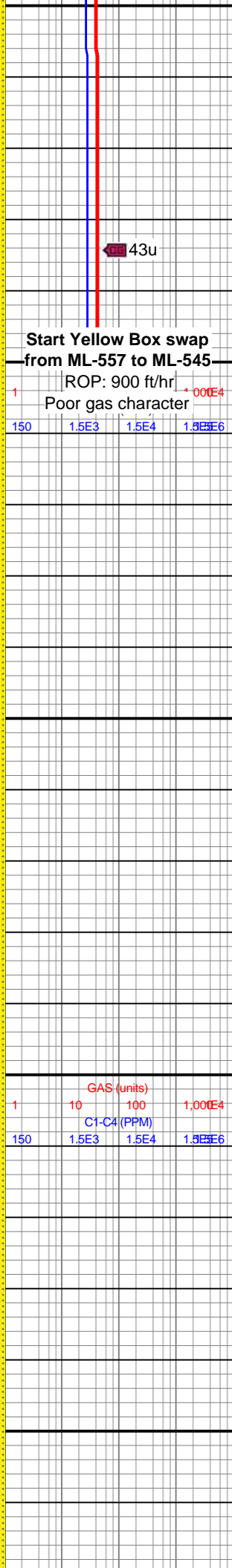
MD: 4,261'  
Inclination: 2.03°  
Azimuth: 131.9°  
TVD: 4,205.16'  
VS: 552.22'

MD: 4,356'  
Inclination: 0.34°  
Azimuth: 321.88°  
TVD: 4,300.15'  
VS: 553.25'

**Parkman**  
4,359'MD / 4,303'TVD

RPM: 92  
WOB: 28.2  
SPM: 166  
SPP: 2,903

MD: 4,450'  
Inclination: 0.14°  
Azimuth: 40.58°  
TVD: 4,393.9'  
VS: -531.12'



43u

**Start Yellow Box swap  
from ML-557 to ML-545**

ROP: 900 ft/hr

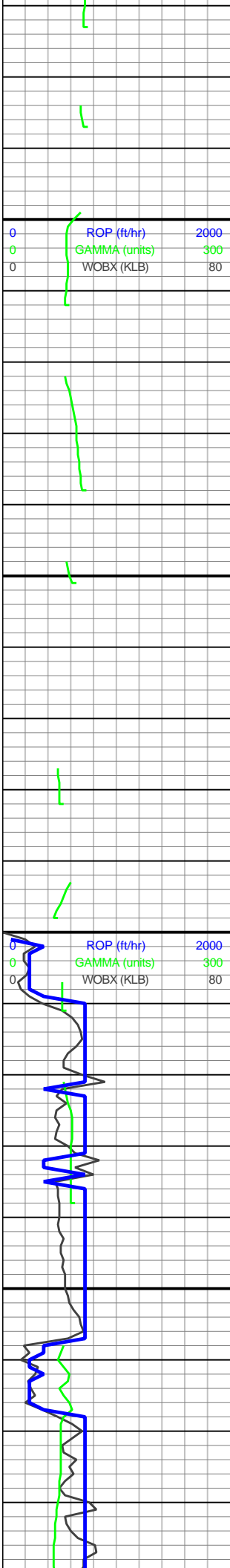
Poor gas character

	150	1.5E3	1.5E4	1.5E6
GAS (units)	1	10	100	1,000E4
C1-C4 (PPM)	150	1.5E3	1.5E4	1.5E6

	150	1.5E3	1.5E4	1.5E6
GAS (units)	1	10	100	1,000E4
C1-C4 (PPM)	150	1.5E3	1.5E4	1.5E6

4200-4400 50% SLTST:  
lt-med gy, sb blkly-sb plty,  
non calc, grdg to ss ip;  
50% SS: predy med-dk  
gy, sme lt gy, w cons cls,  
cons silc-arg cmt, pred  
mtx sup, vf-f, sb ang-sb  
rnd, grdg to slt, xln





4,470  
4,480  
4,490  
4,500  
4,510  
4,520  
4,530  
4,540  
4,550  
4,560  
4,570  
4,580  
4,590  
4,600  
4,610  
4,620  
4,630  
4,640  
4,650  
4,660  
4,670  
4,680

MW IN: 8.7  
VIS IN: 47

MD: 4,545'  
Inclination: 0.06°  
Azimuth: 140.46°  
TVD: 4,488.9'  
VS: -531.07'

RPM: 94  
WOB: 29.3  
SPM: 166  
SPP: 2,760

MD: 4,639'  
Inclination: 0°  
Azimuth: 8.23°  
TVD: 4,582.9'  
VS: -531.1'

GAS (units)			
1	10	100	1,000E4
C1-C4 (PPM)			
150	1.5E3	1.5E4	1.5E6

GAS (units)			
1	10	100	1,000E4
C1-C4 (PPM)			
150	1.5E3	1.5E4	1.5E6

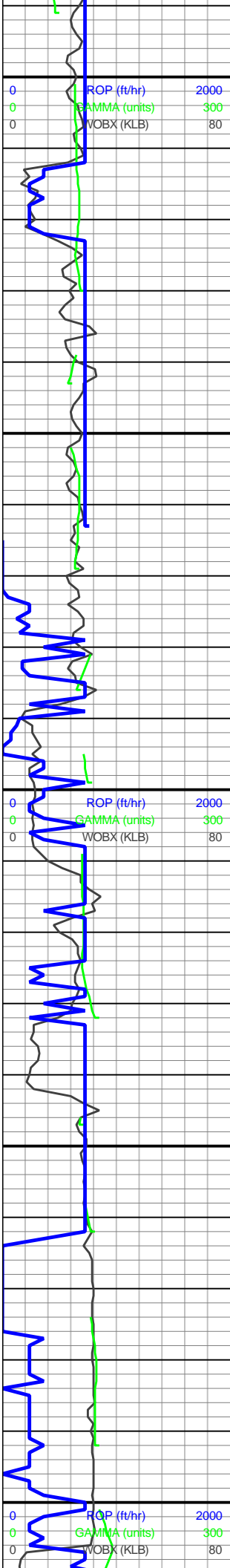
Begin ML-545 logging

16u

4400-4600 90% SS:  
predy med-dk gy, sme lt  
gy, w cons cls, cons  
silc-arg cmt, pred mtx  
sup, vf-f, sb ang-sb rnd,  
grdg to slt, xln; 10%  
SLTST: med-dk gy, sb  
blky-sb plty, non calc,  
grdg to ss





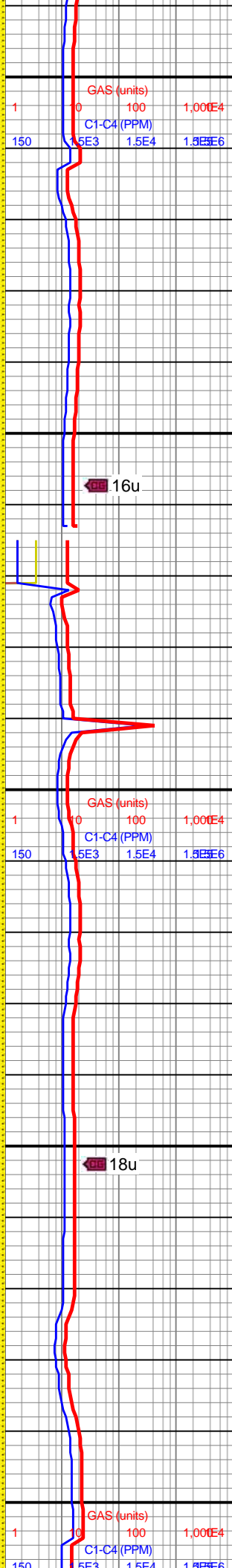


4,690  
4,700  
4,710  
4,720  
4,730  
4,740  
4,750  
4,760  
4,770  
4,780  
4,790  
4,800  
4,810  
4,820  
4,830  
4,840  
4,850  
4,860  
4,870  
4,880  
4,890  
4,900

MD: 4,733'  
Inclination: 0.13°  
Azimuth: 102.18°  
TVD: 4,676.9'  
VS: -531.13'

RPM: 93  
WOB: 32  
SPM: 166  
SPP: 2,988

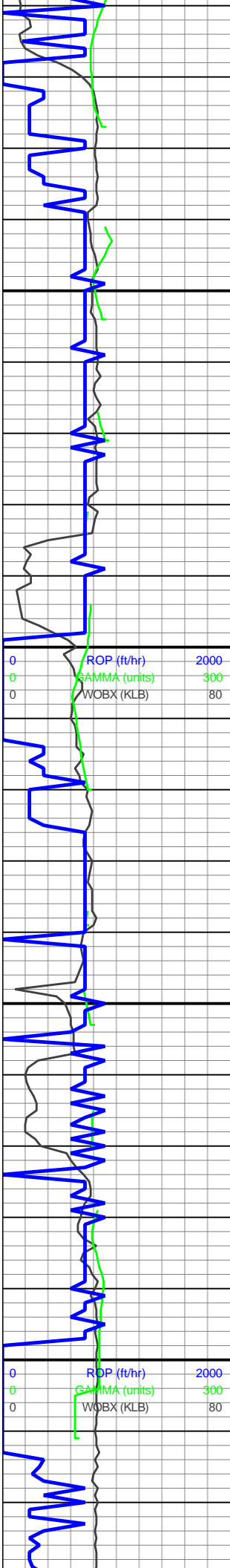
MD: 4,828'  
Inclination: 0°  
Azimuth: 8.23°  
TVD: 4,771.9'  
VS: -531.15'



4600-4800 80% SLTST:  
med-dk gy, sb blk-y-sb  
ply, non calc, grdg to ss;  
20% SS: predy med-dk  
gy, sme lt gy, w cons cls,  
cons silc-arg cmt, pred  
mtx sup, vf-f, sb ang-sb  
rnd, grdg to slt, xln







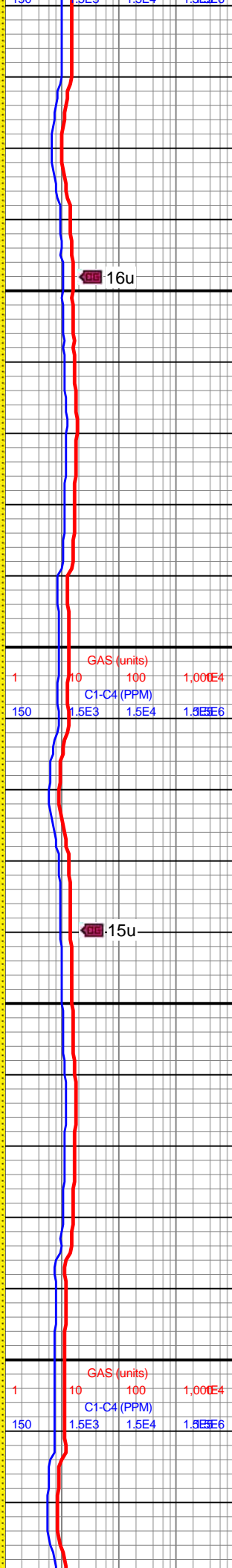
4,910  
4,920  
4,930  
4,940  
4,950  
4,960  
4,970  
4,980  
4,990  
5,000  
5,010  
5,020  
5,030  
5,040  
5,050  
5,060  
5,070  
5,080  
5,090  
5,100  
5,110  
5,120

MD: 4,923'  
Inclination: 0.03°  
Azimuth: 237.22°  
TVD: 4,866.9'  
VS: -531.16'

RPM: 94  
WOB: 29.6  
SPM: 166  
SPP: 3,142

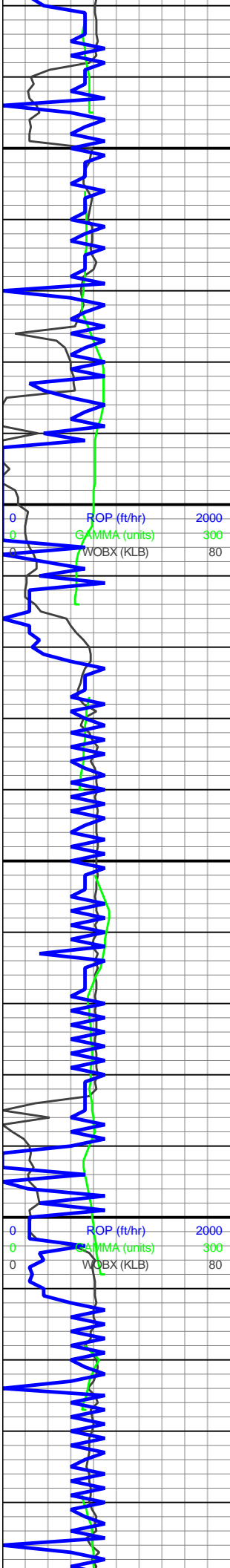
MD: 5,017'  
Inclination: 0.04°  
Azimuth: 250.26°  
TVD: 4,960.9'  
VS: -531.19'

MD: 5,112'  
Inclination: 0.04°  
Azimuth: 330.65°  
TVD: 5,055.9'  
VS: -531.17'



4800-5000 85% SLTST:  
med-dk gy, sb blk-y-sb  
plty, non calc, grdg to SS;  
15% SS: predy med-dk  
gy, sme lt gy, w cons cls,  
cons silc-arg cmt, pred  
mtx sup, vf-f, sb ang-sb  
rnd, grdg to slt, xln



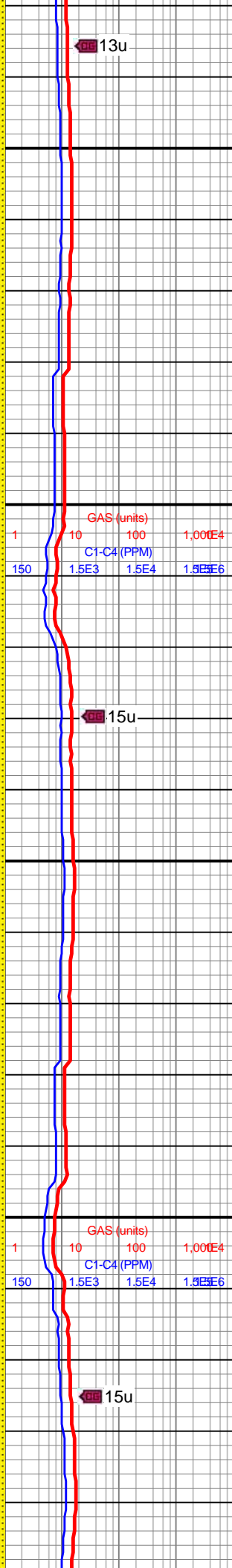


5,130  
5,140  
5,150  
5,160  
5,170  
5,180  
5,190  
5,200  
5,210  
5,220  
5,230  
5,240  
5,250  
5,260  
5,270  
5,280  
5,290  
5,300  
5,310  
5,320  
5,330  
5,340

RPM: 94  
WOB: 34.2  
SPM: 166  
SPP: 3,237

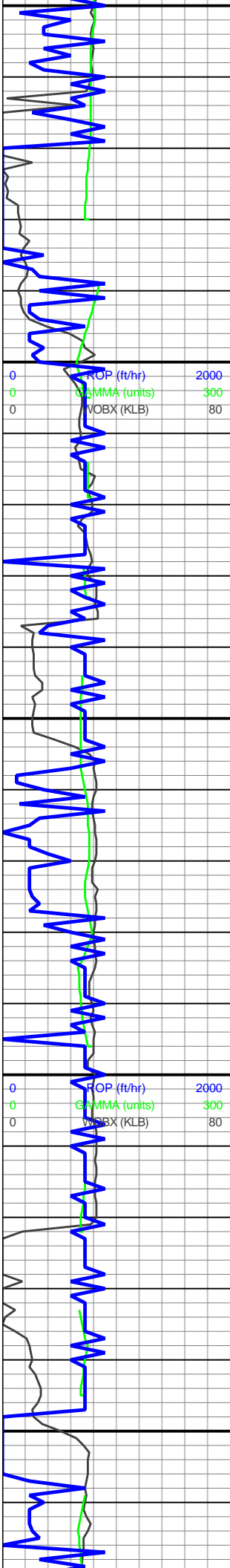
MD: 5,206'  
Inclination: 0.1°  
Azimuth: 232.35°  
TVD: 5,149.9'  
VS: -531.19'

MD: 5,301'  
Inclination: 0.03°  
Azimuth: 85.75°  
TVD: 5,244.9'  
VS: -531.24'



5000-5200 90% SLTST:  
lt-med gy, sb blkly-sb plty,  
non calc, grdg to ss ip;  
10% SS: predy med-dk  
gy, sme lt gy, w cons cls,  
cons silc-arg cmt, pred  
mtx sup, sb ang-sb rnd,  
vf-f, grdg to slt, xln





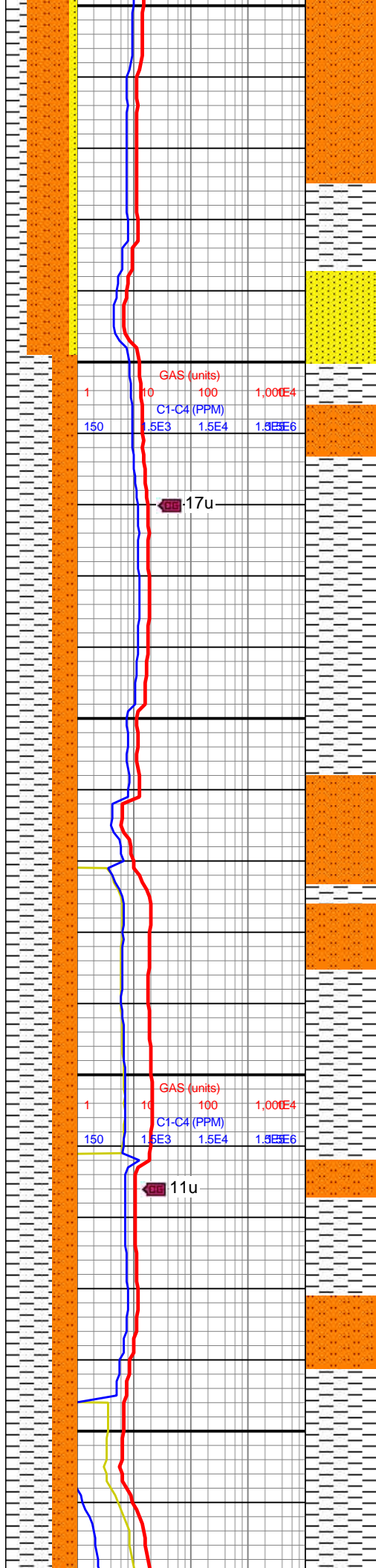
5,350  
5,360  
5,370  
5,380  
5,390  
5,400  
5,410  
5,420  
5,430  
5,440  
5,450  
5,460  
5,470  
5,480  
5,490  
5,500  
5,510  
5,520  
5,530  
5,540  
5,550  
5,560

MD: 5,396'  
Inclination: 0.03°  
Azimuth: 197.43°  
TVD: 5,339.9'  
VS: -531.26'

RPM: 94  
WOB: 33  
SPM: 166  
SPP: 3,149

MW IN: 8.7'  
VIS IN: 48

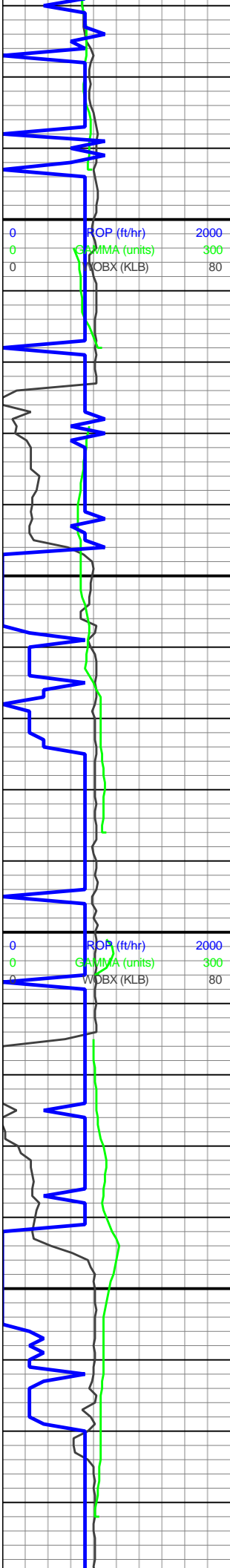
MD: 5,492'  
Inclination: 0.04°  
Azimuth: 237.17°  
TVD: 5,435.9'  
VS: -531.31'



5200-5400 60% SLTST:  
med-dk gy, sb blkly-sb  
plty, non calc, grdg to ss,  
mnr lamn, tr cal frac fill, tr  
pp & pyr nod, micmica;  
30% SLTY SH: med-dk  
gy, sb plty-sb tab, frm-hd,  
slty-sl rgh, mmica; 10%  
SS: predy med-dk gy,  
sme lt gy, w cons cls,  
cons silc-arg cmt, pred  
mtx sup, vf-f, sb ang-sb  
rnd, grdg to slt, xln; tr SA







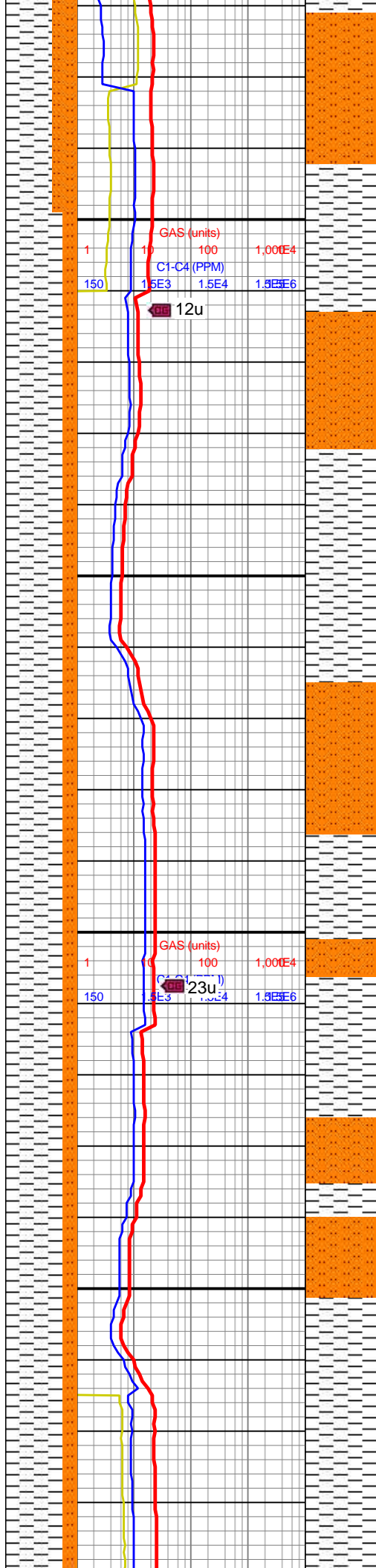
5,570  
5,580  
5,590  
5,600  
5,610  
5,620  
5,630  
5,640  
5,650  
5,660  
5,670  
5,680  
5,690  
5,700  
5,710  
5,720  
5,730  
5,740  
5,750  
5,760  
5,770  
5,780

MD: 5,587'  
Inclination: 0.03°  
Azimuth: 4.61°  
TVD: 5,530.9'  
VS: -531.3'

RPM: 93  
WOB: 34.4  
SPM: 166  
SPP: 3,267

MD: 5,683'  
Inclination: 0.03°  
Azimuth: 210.63°  
TVD: 5,626.9'  
VS: -531.3'

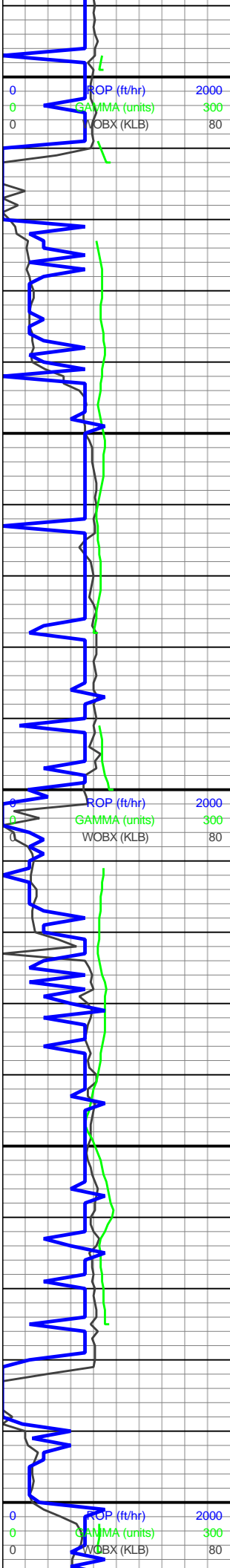
MD: 5,778'  
Inclination: 0.03°  
Azimuth: 309.53°  
TVD: 5,721.9'  
VS: -531.3'



5400-5600 65% SLTY  
SH: med-dk gy, sb plty-sb  
tab, frm-hd, slty-sl abrsv,  
mmica; 35% SLTST:  
med-dk gy, sb blk-y-sb  
plty, non calc, grdg to ss,  
mnr lamn, tr cal frac fl,  
micmica; tr SS

5600-5800 80% SLTY  
SH: med-dk gy, sb plty-sb  
tab, frm-hd, slty-sl abrsv,  
mmica; 20% SLTST:  
med-dk gy, sb blk-y-sb  
plty, non calc, grdg to ss,





5,790  
5,800  
5,810  
5,820  
5,830  
5,840  
5,850  
5,860  
5,870  
5,880  
5,890  
5,900  
5,910  
5,920  
5,930  
5,940  
5,950  
5,960  
5,970  
5,980  
5,990  
6,000

RPM: 94  
WOB: 31.3  
SPM: 166  
SPP: 3,286

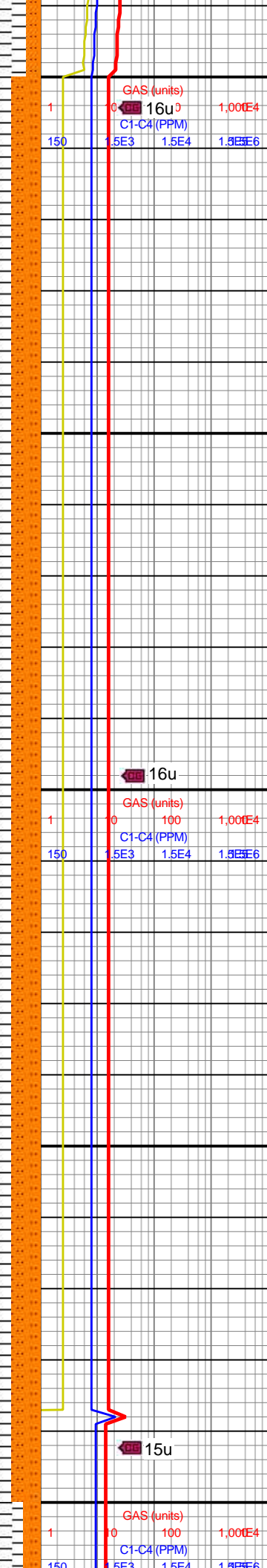
MD: 5,874'  
Inclination: 0.04°  
Azimuth: 150.72°  
TVD: 5,817.9'  
VS: -531.31'

11/30/2017

MW IN: 8.7  
VIS IN: 48

MD: 5,969'  
Inclination: 0.07°  
Azimuth: 206.72°  
TVD: 5,912.9'  
VS: -531.4'

RPM: 92  
WOB: 11.1  
SPM: 166  
SPP: 2,811



GAS (units)  
C1-C4 (PPM)  
16u

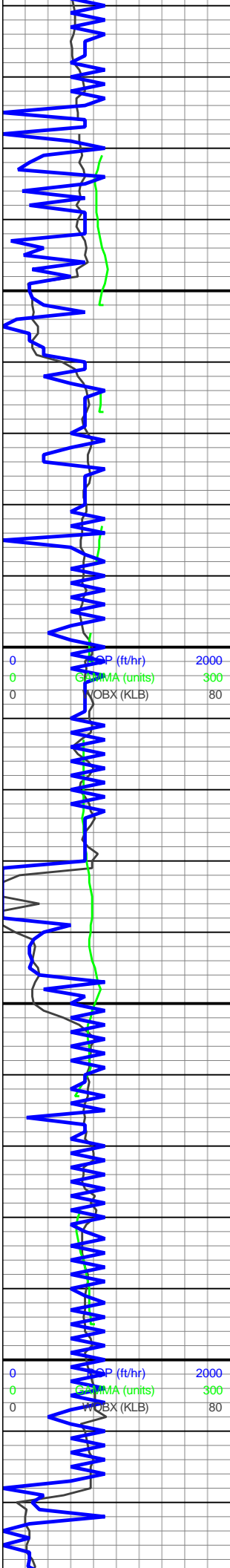
16u

15u

GAS (units)  
C1-C4 (PPM)  
16u

ply, non calc, grg to ss,  
mnr lamn, tr cal frac fl, tr  
pp & pyr nod, micmica; tr  
SS

5800-6000 60% SLTY  
SH: med-dk gy, sb ply-sb  
tab, frm-hd, slty-sl  
abrsv,mmica; 40%  
SLTST lt-med gy, blk,  
non calc, arg mtx, grdg to  
ss ip

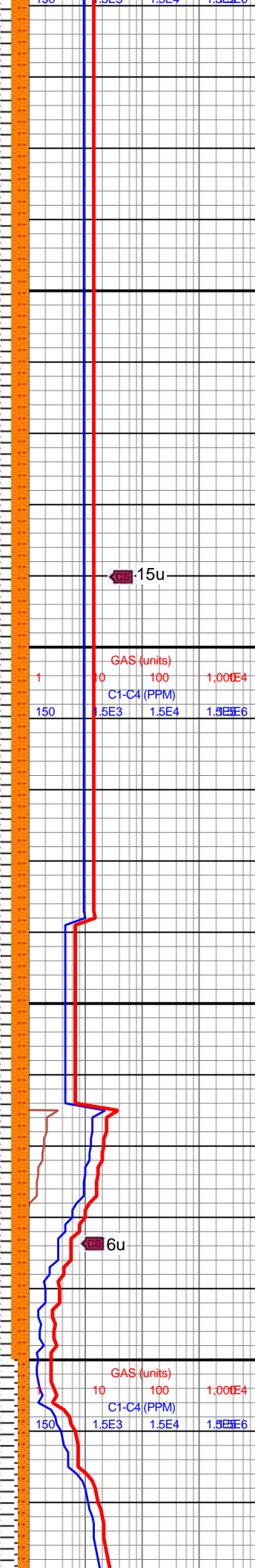


6,010  
6,020  
6,030  
6,040  
6,050  
6,060  
6,070  
6,080  
6,090  
6,100  
6,110  
6,120  
6,130  
6,140  
6,150  
6,160  
6,170  
6,180  
6,190  
6,200  
6,210  
6,220

MD: 6,065'  
Inclination: 0.04°  
Azimuth: 190.11°  
TVD: 6,008.9'  
VS: -531.48'

MD: 6,160'  
Inclination: 0.07°  
Azimuth: 267.01°  
TVD: 6,103.9'  
VS: -531.52'

RPM: 93  
WOB: 22.9  
SPM: 166  
SPP: 3,063

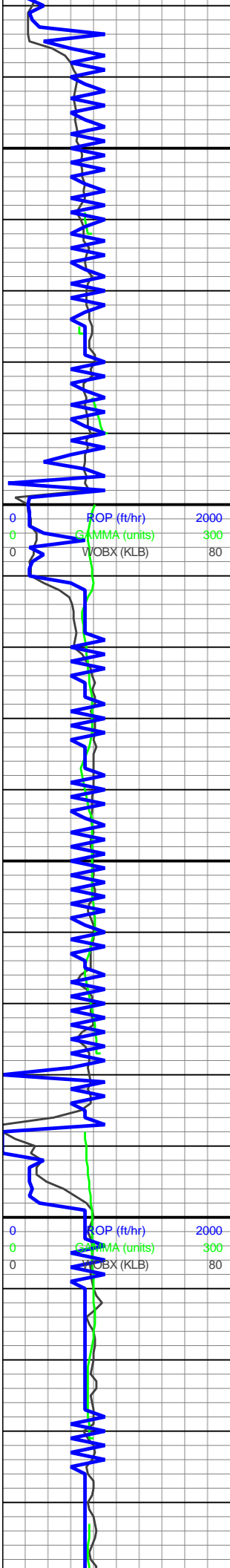


15u

6u

6000-6200 75% SLTY  
SH: med-dk gy, sb plty-sb  
tab, frm-hd, slty-sl grity,  
mmica; 25% SLTST:  
med-dk gy, sb blkgy-sb  
plty, non calc, grdg to ss,  
mnr lamn, tr cal frac fl, tr  
pp & pyr nod, micmica





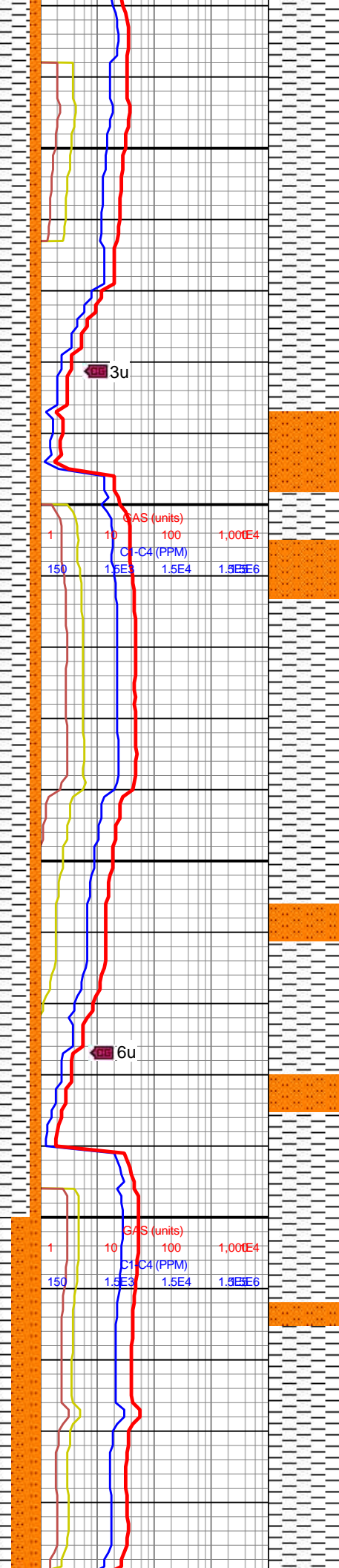
6,230  
6,240  
6,250  
6,260  
6,270  
6,280  
6,290  
6,300  
6,310  
6,320  
6,330  
6,340  
6,350  
6,360  
6,370  
6,380  
6,390  
6,400  
6,410  
6,420  
6,430  
6,440

MD: 6,256'  
Inclination: 0.06°  
Azimuth: 86.37°  
TVD: 6,199.9'  
VS: -531.52'

MD: 6,351'  
Inclination: 0°  
Azimuth: 8.23°  
TVD: 6,294.9'  
VS: -531.51'

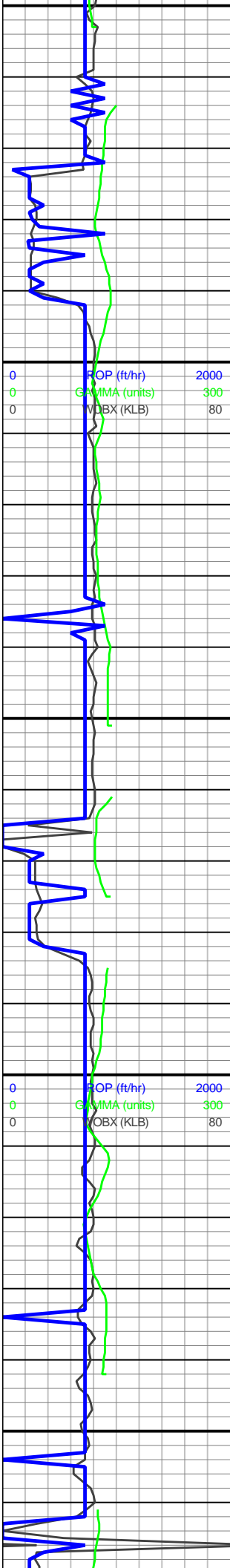
RPM: 95  
WOB: 33.2  
SPM: 166  
SPP: 3,413

MD: 6,447'  
Inclination: 0.03°  
Azimuth: 46.97°



6200-6400 85% SLTY  
SH: med-dk gy, sb plty-sb  
tab, frm-hd, slty-sl abrsv,  
mmica; 15% SLTST:  
med-dk gy, sb blkgy-sb  
plty, non calc, grdg to ss,  
mnr lamn, tr cal frac fl, tr  
pp & pyr nod, micmica; tr  
SA, tr SS





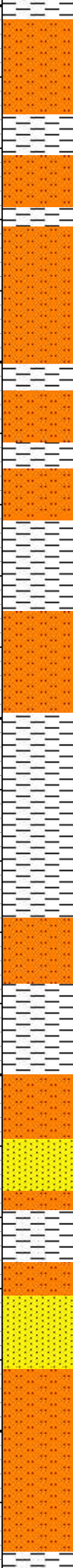
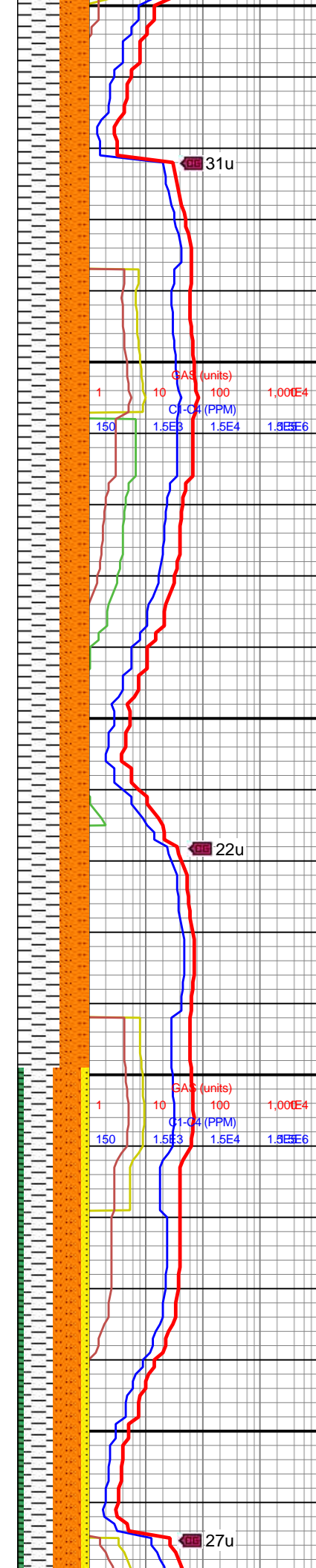
6,450  
6,460  
6,470  
6,480  
6,490  
6,500  
6,510  
6,520  
6,530  
6,540  
6,550  
6,560  
6,570  
6,580  
6,590  
6,600  
6,610  
6,620  
6,630  
6,640  
6,650  
6,660

TVD: 6,390.9'  
VS: -531.5'

MD: 6,543'  
Inclination: 0.04°  
Azimuth: 325.8°  
TVD: 6,486.9'  
VS: -531.45'

RPM: 94  
WOB: 34.1  
SPM: 166  
SPP: 3,384

MD: 6,639'  
Inclination: 0°  
Azimuth: 8.23°  
TVD: 6,582.9'  
VS: -531.42'



6400-6600 60% SLTY  
SH: med-dk gy, sb plty-sb  
tab, frm-hd, slty-sl abrsv,  
mmica; 40% SLTST:  
med-dk gy, sb blk-y-sb  
plty, non calc, grdg to ss,  
mnr lamn, tr cal frac fl, tr  
pp & pyr nod, micmica; tr  
SS

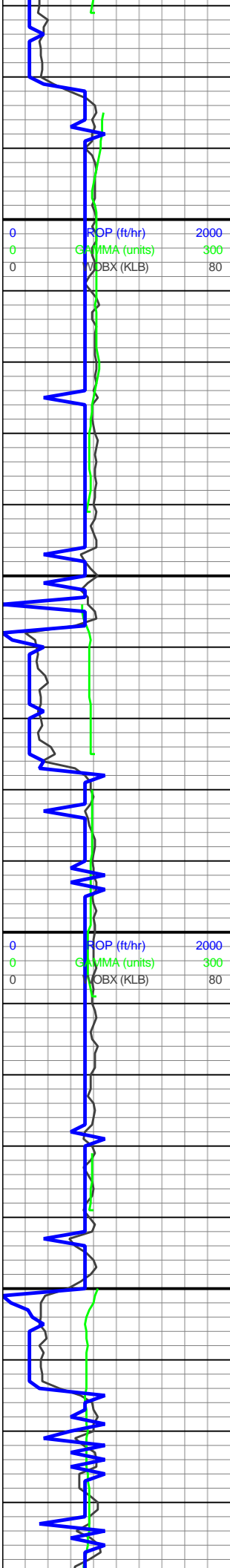


31u

22u

27u





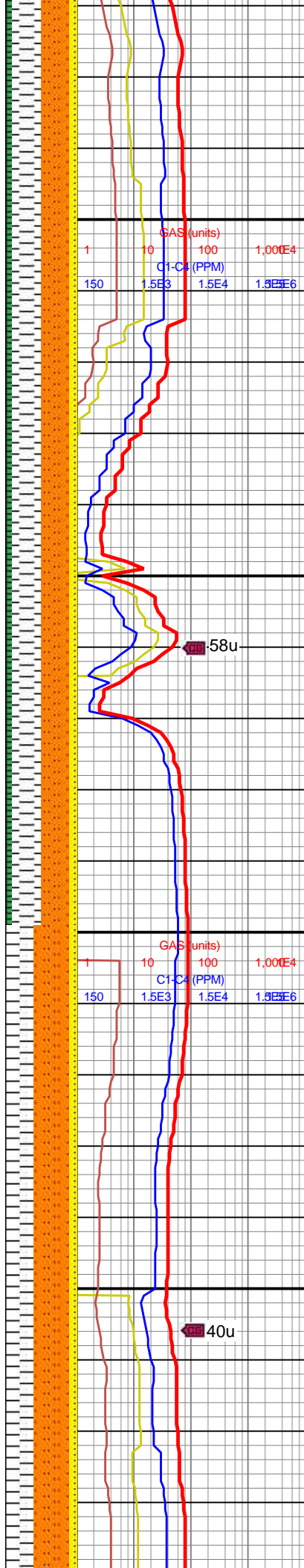
6,670  
6,680  
6,690  
6,700  
6,710  
6,720  
6,730  
6,740  
6,750  
6,760  
6,770  
6,780  
6,790  
6,800  
6,810  
6,820  
6,830  
6,840  
6,850  
6,860  
6,870  
6,880

MD: 6,735'  
Inclination: 0.09°  
Azimuth: 242.98°  
TVD: 6,678.9'  
VS: -531.46'

MW IN: 8.7'  
VIS IN: 48

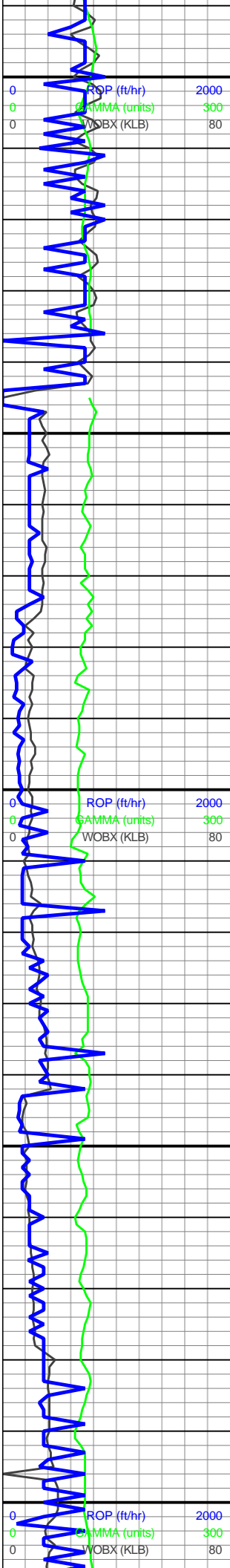
RPM: 94  
WOB: 35.7  
SPM: 166  
SPP: 3,418

MD: 6,830'  
Inclination: 0.07°  
Azimuth: 36.09°  
TVD: 6,773.9'  
VS: -531.45'



6600-6800 40% SLTST: med-dk gy, sb blkgy-sb plty, non calc, grd to ss, mnrl lamn, tr cal frac fl, tr pp & pyr nod, micmica; 40% SLTY SH: med-dk gy, sb plty-sb tab, frm-hd, slty-sl abrsv, mmica; 10% SS: predy med-dk gy, sme lt gy, w cons cls, cons silc-arg cmt, pred mtz sup, vf-f, sb ang-sb rnd, grd to slt, xln; 10% SA





6,890  
6,900  
6,910  
6,920  
6,930  
6,940  
6,950  
6,960  
6,970  
6,980  
6,990  
7,000  
7,010  
7,020  
7,030  
7,040  
7,050  
7,060  
7,070  
7,080  
7,090  
7,100

MD: 6,925'  
Inclination: 0.04°  
Azimuth: 345.84°  
TVD: 6,868.9'  
VS: -531.37'

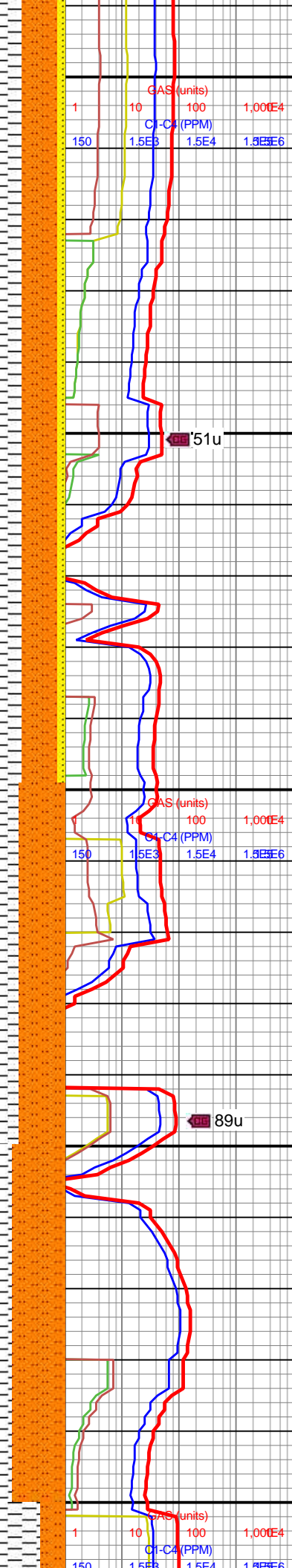
**KOP**  
**6,977' MD**  
**6,921' TVD**  
**02:51 hrs**

RPM: 92  
WOB: 9.6  
SPM: 166  
SPP: 2,739

MD: 7,021'  
Inclination: 5.93°  
Azimuth: 333.71°  
TVD: 6,964.73'  
VS: -526.92'

MW IN: 8.7  
VIS IN: 46

MD: 7,115'

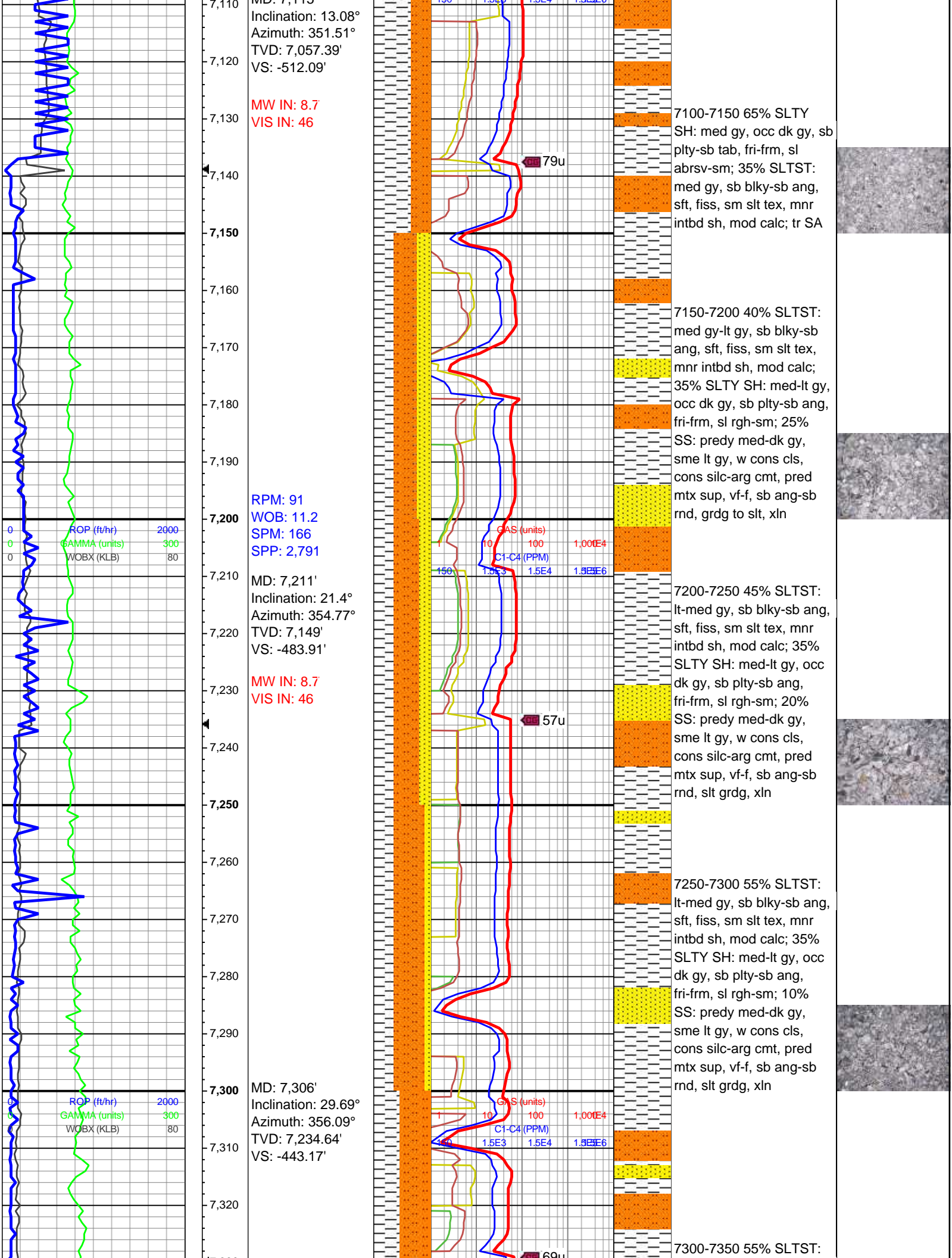


6800-7000 50% SLTST:  
med-dk gy, sb blkgy-sb  
plty, non calc, grdg to ss,  
mnr lamn, tr cal frac fl, tr  
pp & pyr nod, micmica;  
40% SLTY SH: med-dk  
gy, sb plty-sb tab, frm-hd,  
silty-sl abrsv, mmica;  
10% SS: predy med-dk  
gy, sme lt gy, w cons cls,  
cons silc-arg cmt, pred  
mtx sup, vf-f, sb ang-sb  
rnd, grdg to slt, xln

7000-7050 65% SLTST:  
med gy, sb blkgy-sb ang,  
grdg to sh, mnr lamn,  
micmica, non calc; 35%  
SLTY SH: med-dk gy, sb  
plty-sb tab, fri-frm, silty-sl  
abrsv, mmica

7050-7100 75% SLTST:  
med gy, sb blkgy-sb ang,  
grdg to sh, mnr lamn,  
micmica, non calc; 25%  
SLTY SH: med-dk gy, sb  
plty-sb tab, fri-frm, silty-sl  
abrsv, mmica; tr SA





MD: 7,113  
Inclin: 13.08°  
Azimuth: 351.51°  
TVD: 7,057.39'  
VS: -512.09'

MW IN: 8.7  
VIS IN: 46

RPM: 91  
WOB: 11.2  
SPM: 166  
SPP: 2,791

MD: 7,211'  
Inclin: 21.4°  
Azimuth: 354.77°  
TVD: 7,149'  
VS: -483.91'

MW IN: 8.7  
VIS IN: 46

MD: 7,306'  
Inclin: 29.69°  
Azimuth: 356.09°  
TVD: 7,234.64'  
VS: -443.17'

7100-7150 65% SLTY  
SH: med gy, occ dk gy, sb  
pty-sb tab, fri-frm, sl  
abrsv-sm; 35% SLTST:  
med gy, sb blkly-sb ang,  
sft, fiss, sm slt tex, mnr  
intbd sh, mod calc; tr SA

7150-7200 40% SLTST:  
med gy-lt gy, sb blkly-sb  
ang, sft, fiss, sm slt tex,  
mnr intbd sh, mod calc;  
35% SLTY SH: med-lt gy,  
occ dk gy, sb pty-sb ang,  
fri-frm, sl rgh-sm; 25%  
SS: predy med-dk gy,  
sme lt gy, w cons cls,  
cons silc-arg cmt, pred  
mtx sup, vf-f, sb ang-sb  
rnd, grdg to slt, xln

7200-7250 45% SLTST:  
lt-med gy, sb blkly-sb ang,  
sft, fiss, sm slt tex, mnr  
intbd sh, mod calc; 35%  
SLTY SH: med-lt gy, occ  
dk gy, sb pty-sb ang,  
fri-frm, sl rgh-sm; 20%  
SS: predy med-dk gy,  
sme lt gy, w cons cls,  
cons silc-arg cmt, pred  
mtx sup, vf-f, sb ang-sb  
rnd, slt grdg, xln

7250-7300 55% SLTST:  
lt-med gy, sb blkly-sb ang,  
sft, fiss, sm slt tex, mnr  
intbd sh, mod calc; 35%  
SLTY SH: med-lt gy, occ  
dk gy, sb pty-sb ang,  
fri-frm, sl rgh-sm; 10%  
SS: predy med-dk gy,  
sme lt gy, w cons cls,  
cons silc-arg cmt, pred  
mtx sup, vf-f, sb ang-sb  
rnd, slt grdg, xln

7300-7350 55% SLTST:

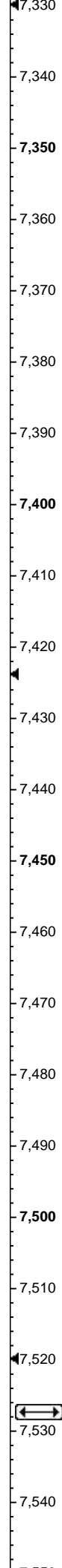
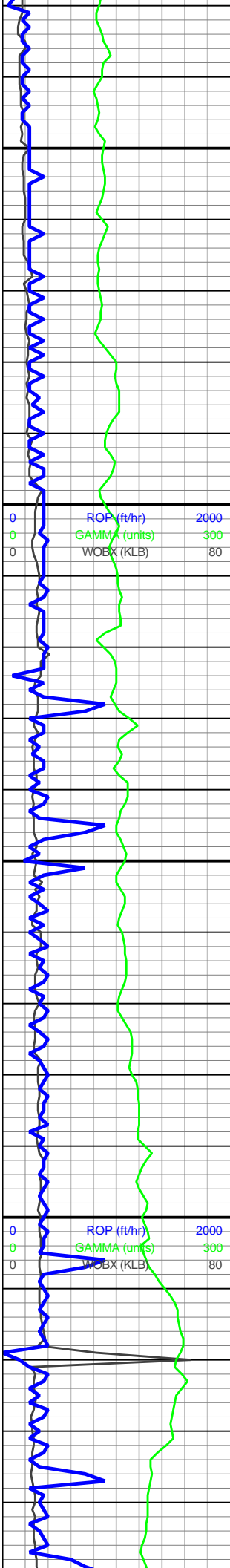
ROP (ft/hr)	2000
GAMMA (units)	300
WOBX (KLB)	80

ROP (ft/hr)	2000
GAMMA (units)	300
WOBX (KLB)	80

GAS (units)	100	1,000E4
C1-C4 (PPM)	1.5E3	1.5E4

GAS (units)	100	1,000E4
C1-C4 (PPM)	1.5E3	1.5E4





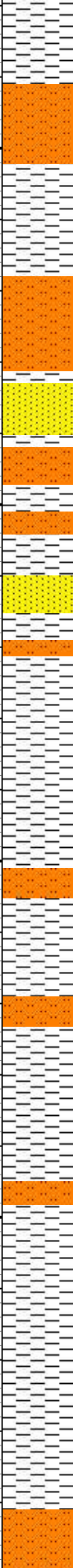
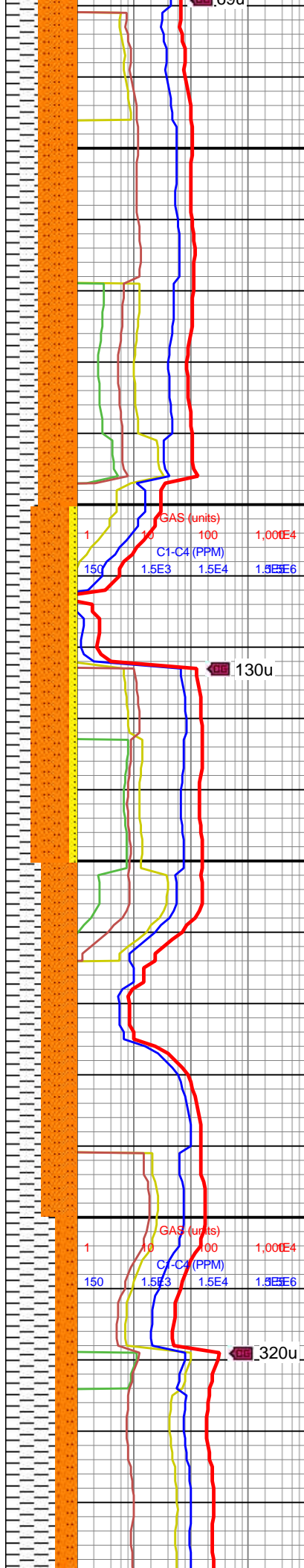
MD: 7,400'  
Inclination: 38.65°  
Azimuth: 356°  
TVD: 7,312.34'  
VS: -390.62'

RPM: 91  
WOB: 14.6  
SPM: 166  
SPP: 2,853

MW IN: 8.65  
VIS IN: 43

MD: 7,495'  
Inclination: 46.77°  
Azimuth: 357.33°  
TVD: 7,382.08'  
VS: -326.42'

Lower Sharon  
Springs GR  
Marker  
7,527'MD / 7,402'TVD



lt-med gy, sb blkly-sb ang, sft, fiss, sm slt tex, mnr intbd sh, mod calc; 45% SLTY SH: med-lt gy, occ dk gy, sb plty-sb ang, fri-frm, sl rgh-sm, wk calc; tr SA

7350-7400 55% SLTST: lt-med gy, sb blkly-sb ang, sft, fiss, sm slt tex, mnr intbd sh, mod calc; 45% SLTY SH: med-lt gy, occ dk gy, sb plty-sb ang, fri-frm, sl rgh-sm, wk calc; tr SA, tr SS

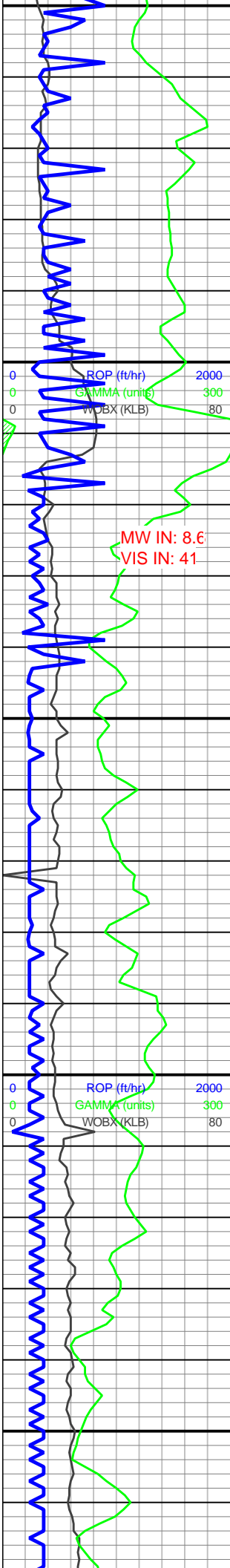
7400-7450 55% SLTST: lt-med gy, sb blkly-sb ang, sft, fiss, sm slt tex, mnr intbd sh, mod calc; 35% SLTY SH: med-lt gy, occ dk gy, sb plty-sb ang, fri-frm, sl rgh-sm; 10% SS: predy med-dk gy, sme lt gy, w cons cls, cons silc-arg cmt, pred mtx sup, vf-f, sb ang-sb rnd, slt grd, xln

7450-7500 55% SLTST: lt-med gy, blkly-sb blkly-sb ang, sft, fiss, sm slty tex, com intbd sh, mod calc; 45% SLTY SH: med-lt gy, occ dk gy, sb ang-sb plty, fri-frm, sl rgh, slty-sm, wk calc; tr SS

7500-7550 70% SLTY SH: med-lt gy, occ dk gy, sb ang-sb plty, fri-frm, sl rgh, slty-sm, hi calc; 30% SLTST: lt-med gy, blkly-sb blkly-sb ang, sft, fiss, sm slty tex, com intbd sh, v







7,550  
7,560  
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

RPM: 94  
WOB: 25  
SPM: 166  
SPP: 3,131

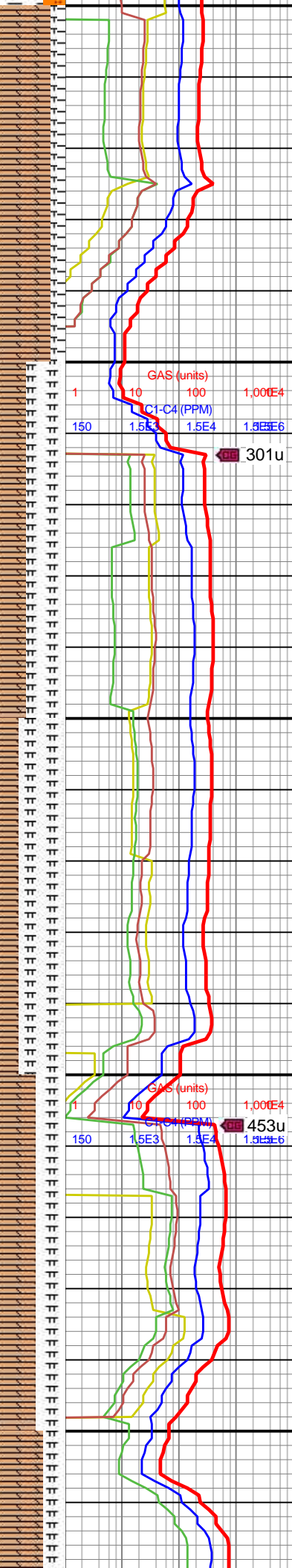
MD: 7,590'  
Inclination: 55.32°  
Azimuth: 358.32°  
TVD: 7,441.76'  
VS: -252.72'

**Niobrara A Chalk**  
7,597'MD / 7,445'TVD

**Niobrara A Marl**  
7,609'MD / 7,451'TVD

MD: 7,684'  
Inclination: 63.65°  
Azimuth: 357.92°  
TVD: 7,489.44'  
VS: -171.91'

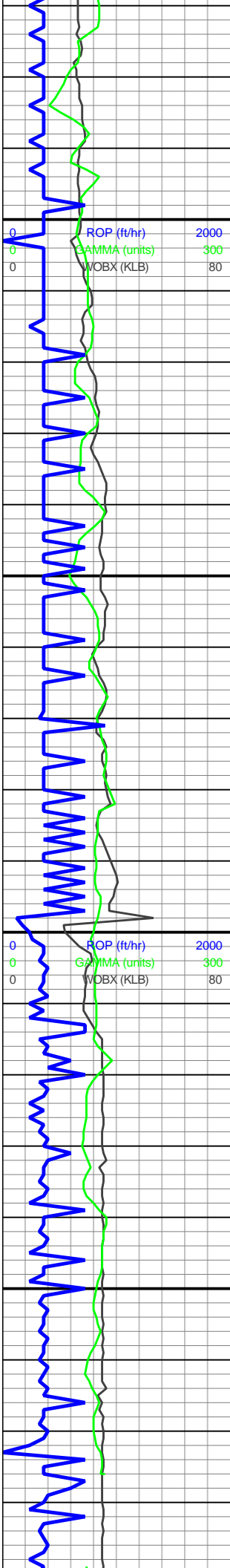
**Niobrara B Chalk**  
7,718'MD / 7,502'TVD



7,550  
7,560  
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

calc  
7550-7600 80% CHK: lt gy-med gy, sme offwht, blk-ymd ply, frm-sft, chky tex, mnr intbd MRLST, hi calc; 10% MRLST: dk gyshbn-med gy, ply-sb blk, rgh tex, com intbd CHK lam, calc; 10% SLTY SH: med-lt gy, occ dk gy, ang-sb ply, fri-frm, rgh tex, sme slty-sm, hi calc  
7600-7650 55% MRLST: dk gyshbn-med gy, ply-sb blk, rgh tex, com intbd CHK lam, calc; 45% CHK: lt gy-med gy, sme offwht, blk-ymd ply, frm-sft, chky tex, mnr intbd MRLST, hi calc  
7650-7700 65% MRLST: dk gyshbn-med gy, ply-sb blk, rgh tex, mot, com intbd CHK lam, calc; 35% CHK: lt gy-med gy, sme offwht frag, blk-ymd ply, frm-sft, rgh-chky tex, com intbd MRLST, hi calc  
7700-7750 60% CHK: lt gy-med gy, sme offwht frag, blk-ymd ply, frm-sft, rgh-chky tex, com intbd MRLST, hi calc; 40% MRLST: dk gyshbn-med gy, ply-sb blk, rgh tex, mot, com intbd CHK lam, calc





MD: 7,779'  
 Inclination: 72.79°  
 Azimuth: 358.94°  
 TVD: 7,524.66'  
 VS: -83.87'

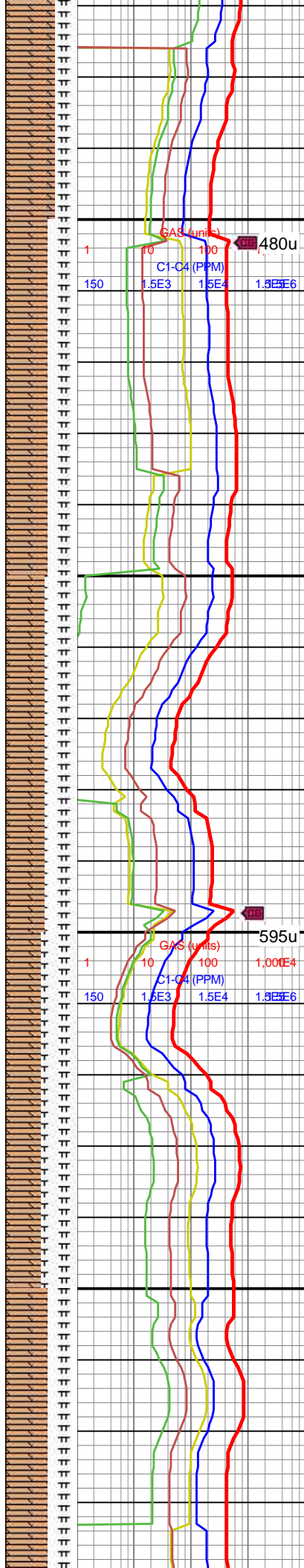
RPM: 91  
 WOB: 28  
 SPM: 166  
 SPP: 3,136

MD: 7,874'  
 Inclination: 81.63°  
 Azimuth: 2.07°  
 TVD: 7,545.67'  
 VS: 8.67'

**Niobrara B Marl**  
 7,961' MD / 7,552' TVD

**Land Curve**  
 7,969' MD  
 7,552' TVD  
 09:49 hrs

MD: 7,969'  
 Inclination: 90°



7750-7800 70% CHK: lt gy-med gy, sme offwht frag, blk-y-sme plty, frm-sft, rgh-chky tex, com intbd MRLST, hi calc; 30% MRLST: dk gyshbn-med gy, plty-sb blk-y, rgh tex, mot, com intbd CHK lam, calc

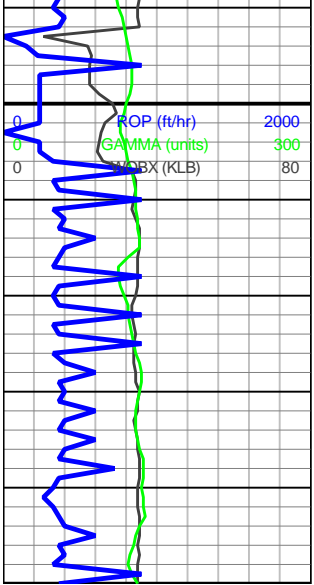
7800-7850 60% CHK: med-lt gy, occ scat wht frag, sb blk-y-plty, frm-sft, rgh-chky tex, com intbd MRLST, calc; 40% MRLST: gyshbn-dk gy, sb ang, plty, occ sb blk-y, mot rgh tex, com intbd CHK, calc; tr intbdd mic pp pyr

7850-7900 55% CHK: med-lt gy, occ scat wht frag, sb blk-y-plty, frm-sft, rgh-chky tex, com intbd MRLST, calc; 45% MRLST: gyshbn-dk gy, sb ang, plty, occ sb blk-y, mot rgh tex, com intbd CHK, calc

7900-7950 50% MRLST: gyshbn-dk gy, sb ang, plty, occ sb blk-y, mot rgh tex, com intbd CHK, calc; 50% CHK: med-lt gy, occ scat wht frag, sb blk-y-plty, frm-sft, rgh-chky tex, com intbd MRLST, calc

7950-8000 60% MRLST: gyshbn-dk gy, sb blk-y-ang, plty, occ sb blk-y, mot rgh tex, com intbd CHK, calc; 40% CHK:





7,990 Azimuth: 3.18°  
TVD: 7,552.6'  
VS: 103.29'

8,000 RPM: 92  
WOB: 27  
SPM: 166  
SPP: 3,053

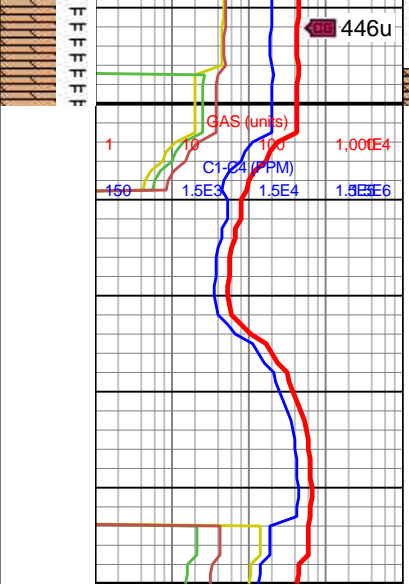
8,010 MW IN: 8.65  
VIS IN: 41

8,020 Continued on  
horizontal log

8,030

8,040

8,050



med-lt gy, occ scat wht  
frags, sb blk-y-sb ang,  
frm-sft, rgh-chky tex, com  
intbd MRLST, calc

