



# RESERVOIR GROUP

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Little Lady 22-1NH

**Location** T11N-64W-Sec 22

**State** Colorado

**County** Weld

**Country** U.S.A.

**Rig Number** Savanna 802

**API Number** 05-123-49881

**AFE #** N/A

**Geographic Region** Rockies

**Field** Wattenberg

**Spud Date** 9/2/2019

**Drilling Completed** 9/6/2019

**Surface Coordinates** Latitude: 40.90006  
Longitude: -104.54285  
405 FSL, 355 FEL

**Bottom Hole Coordinates** Latitude: 40.91271  
Longitude: -104.54028  
330 FNL, 330 FWL

**Ground Elevation** 5,380'

**K.B. Elevation** 5,398'

**Logged Interval** 1,564' **To** 8,050'

**Total Depth** 12,575'

**Formation** Niobrara B Chalk

**Type of Drilling Fluid** Oil Based Mud

## Operator

**Company** Tom Taylor

**Address** 424 South Main Street  
Boerne, TX 78006



**Geologist**

**Color Coding**

## Geologist

**Name** Tom Taylor

**Company** Upland Exploration

**Address** 424 South Main Street  
Boerne, TX 78006



## Color Coding



Oil



Condensate



Gas



Note



Core



Pressure



Error



Water



Seal

## Other

**Services Provided** 2-Man Logging

**Loggers:** Byron Pitulski / Micah Morgan

**Equipment:** ML-587

**Address** Reservoir Group - Empirica  
6360 West Sam Houston Pkwy N  
Houston, Texas 77041

**Service Start Date:** 09/02/2019

**Service End Date:** 09/06/2019

**Job Number** 2445RK1909

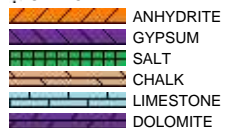
## Hole Profile

### Casing Records

Size	Wgt	From	To	Test
9 5/8	36	0	1549	0

## Rock Types

? UNKNOWN



▲▲▲▲▲▲▲▲▲▲ CHERT

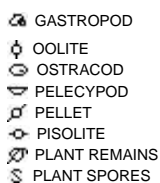


## Accessories

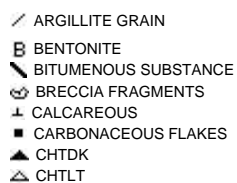
### Fossils



F FOSSIL



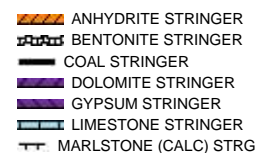
— ARGILLACEOUS



∩ GLAUCONITE



### Stringer



CORAL  
CRINOID  
ECHINOID  
FISH  
FORAMINIFERA

SCAPHOPOD  
STROMATOPOROID  
**Minerals**  
ANHYDRITIC

COAL - THIN BEDS  
DOLOMITIC  
FELDSPAR  
FERRUGINOUS PELLET  
FERRUGINOUS

SALT CAST  
SANDY  
SILICEOUS  
SILTY  
TUFFACEOUS

MARLSTONE (DOL) STRG  
SANDSTONE STRINGER  
SHALE STRINGER  
SILTSTONE STRINGER

## Oil Show

DEAD  
EVEN  
QUESTIONABLE  
SPOTTED STAINING

## Porosity

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

ORGANIC  
PINPOINT  
VUGGY

## Engineering

BIT  
CASING  
CONNECTION (LEFT)  
CONNECTION (RIGHT)  
CONNECTION GAS  
CORE - LOST  
CORE - RECOVERED  
DST INTERVAL  
FAULT

## Other Symbols

FORMATION TOP  
GAS SHOW  
MN DEPTH  
NORMAL FAULT  
OIL SHOW  
OVERTURNED STRATA  
REVERSE FAULT  
SIDEWALL CORE (LEFT)  
SIDEWALL CORE (RIGHT)  
SLIDE  
SURVEY  
TRIP GAS  
WIRELINE TESTED - LEFT  
WIRELINE TESTED - RT

## Rounding

ANGULAR  
ROUNDED  
SUBANG  
SUBRND

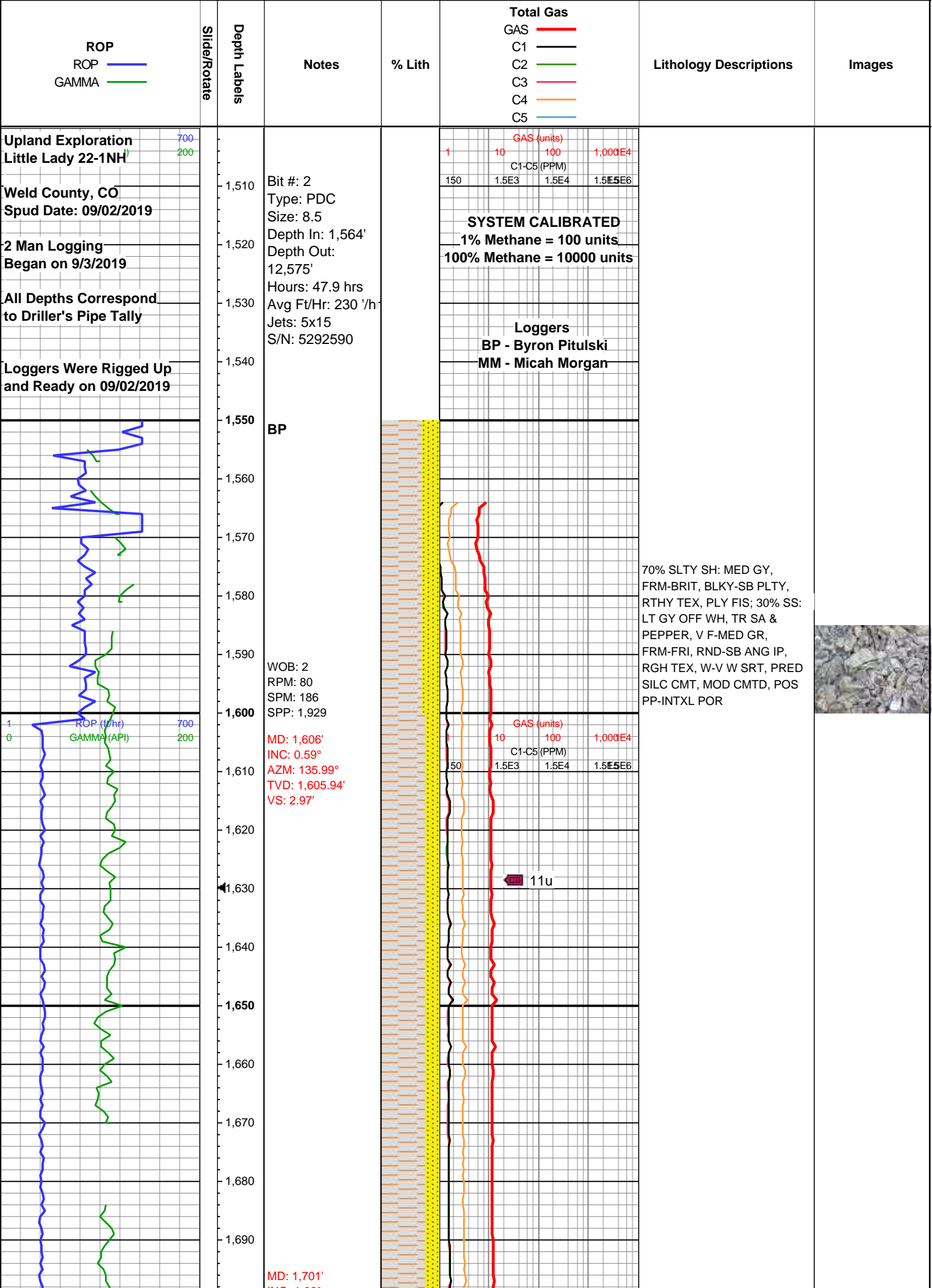
## Textures

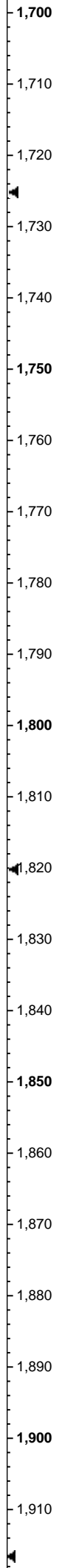
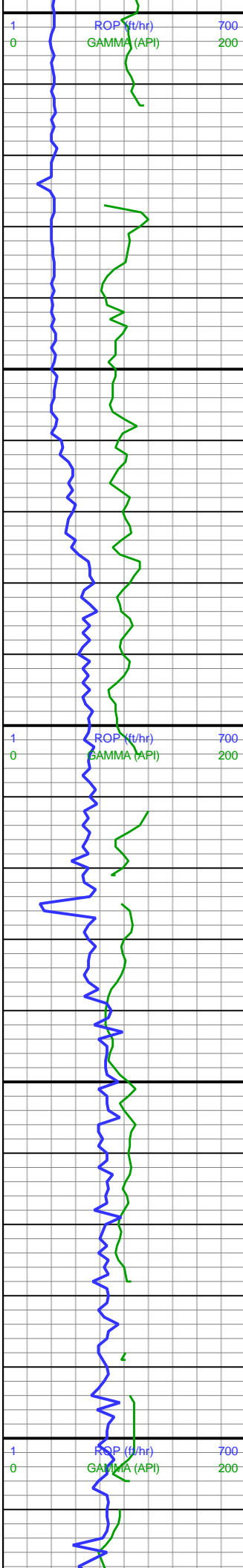
BOUNDSTONE  
CHALKY  
CRYPTOXLN  
E EARTHY  
FINELYXLN  
GRAINSTONE

L LITHOGRAPHIC  
MX MICROXLN  
MS MUDSTONE  
PS PACKSTONE  
WS WACKSTONE

## Sorting

M MODERATE  
P POOR  
W WELL





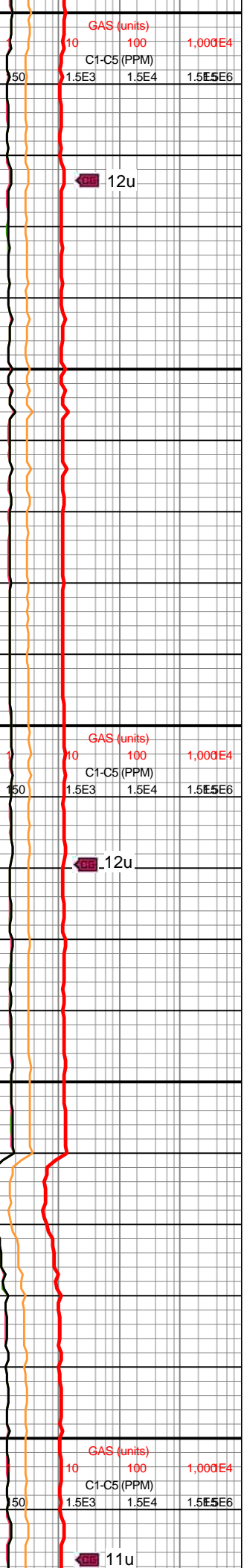
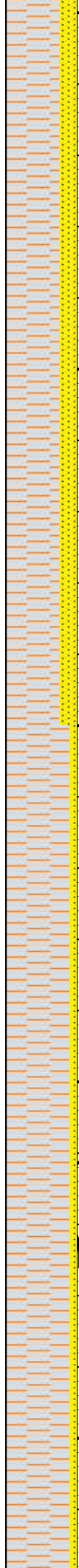
INC: 1.06°  
AZM: 150.9°  
TVD: 1,700.93'  
VS: 1.97'

VIS: 67  
MW: 9.45

MD: 1,796'  
INC: 3.59°  
AZM: 118.33°  
TVD: 1,795.85'  
VS: 0.25'

WOB: 3  
RPM: 80  
SPM: 186  
SPP: 1,928

MD: 1,892'  
INC: 5.1°  
AZM: 118.19°  
TVD: 1,891.57'  
VS: -2.24'



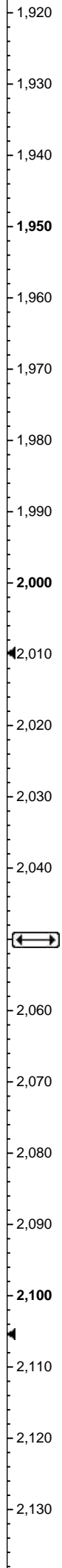
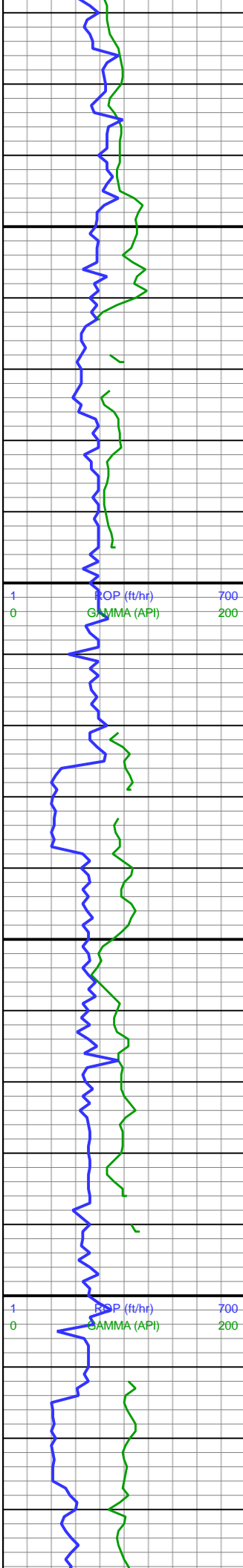
75% SLTY SH: MED GY,  
FRM-BRIT, TR HD, BLKY-SB  
PLTY, RTHY TEX, PLY FIS;  
25% SS: LT GY OFF WH, TR  
SA & PEPPER, V F-MED GR,  
FRM-FRI, RND-SB ANG IP,  
RGH TEX, W-V W SRT, PRED  
SILC CMT, MOD CMTD, POS  
PP-INTXL POR



12u

12u

11u



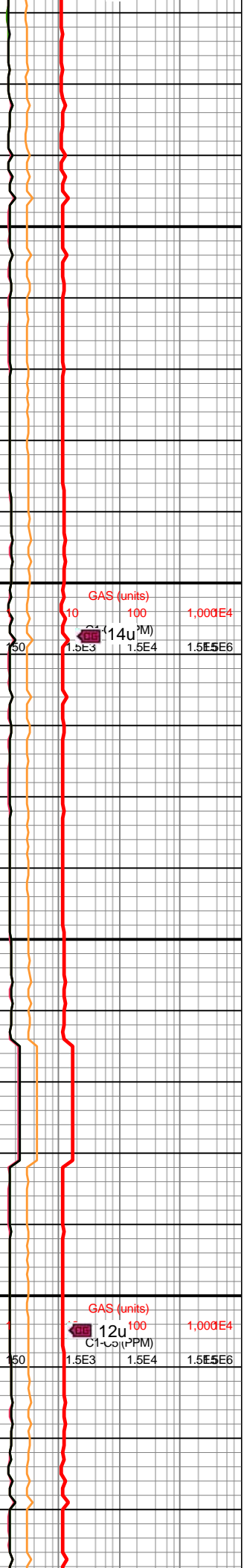
MD: 1,986'  
INC: 6.11°  
AZM: 128.86°  
TVD: 1,985.12'  
VS: -6.22'

WOB: 2  
RPM: 80  
SPM: 186  
SPP: 2,020

 **Pierre Shale**  
2050'MD/2049'TVD

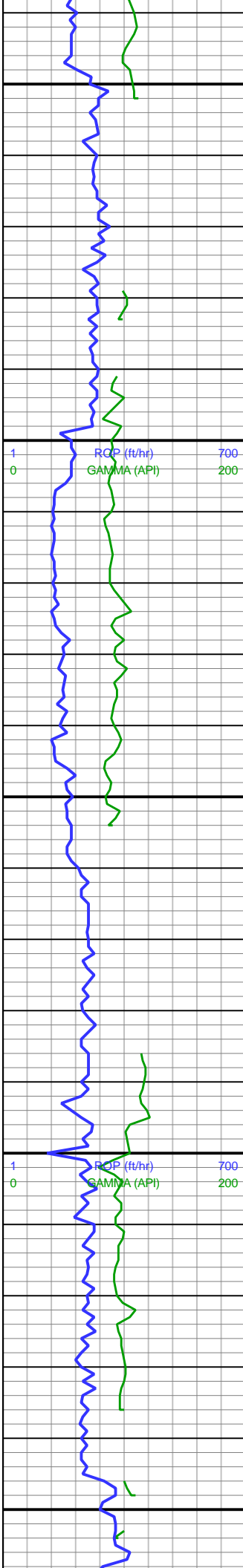
MD: 2,081'  
INC: 7.22°  
AZM: 138.99°  
TVD: 2,079.48'  
VS: -12.7'

VIS: 64  
MW: 9.45



90% SLTY SH: PRED MED-LT  
GY, FRM-BRIT, BLKY-SB  
PLTY, RR PLTY, RTHY TEX,  
PLY FIS; 10% SS: OFF WH-LT  
GY, V TR SA & PEPPER, V  
F-F GR, FRM-FRI, RND-SB  
RND, RGH TEX, W-V W SRT,  
PRED SILC CMT, MOD  
CMTD, POS PP-INTXL POR





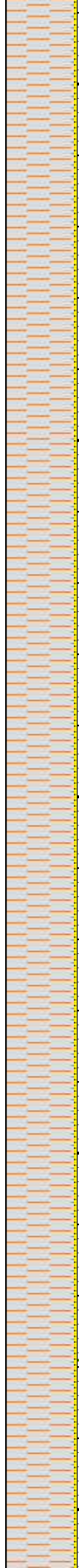
2,140  
2,150  
2,160  
2,170  
2,180  
2,190  
2,200  
2,210  
2,220  
2,230  
2,240  
2,250  
2,260  
2,270  
2,280  
2,290  
2,300  
2,310  
2,320  
2,330  
2,340  
2,350

MD: 2,176'  
INC: 11.36°  
AZM: 146.68°  
TVD: 2,173.22'  
VS: -23.6'

WOB: 1  
RPM: 80  
SPM: 186  
SPP: 2,063

MD: 2,271'  
INC: 10.64°  
AZM: 120.34°  
TVD: 2,266.53'  
VS: -33.91'

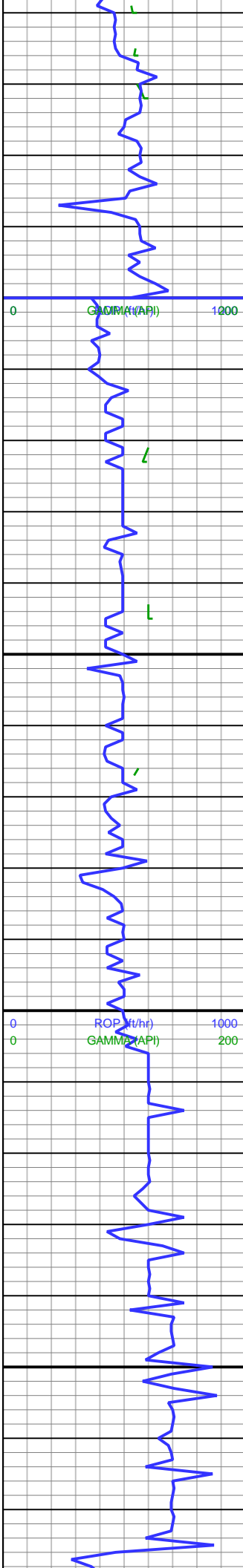
VIS: 62  
MW: 9.4



95% SLTY SH: PRED MED-LT  
GY IP, FRM-BRIT, BLKY-SB  
PLTY, TR PLTY, RTHY TEX,  
V PLY FIS; 5% SS: OFF WH-V  
LT GY, TR WH-LT GY, V F-F  
GR, FRM-FRI, RND-SB RND,  
RGH TEX, W-V W SRT, PRED  
SILC CMT, POS PP-INTXL  
POR, MOD-W CMTD







2,360  
2,370  
2,380  
2,390  
2,400  
2,410  
2,420  
2,430  
2,440  
2,450  
2,460  
2,470  
2,480  
2,490  
2,500  
2,510  
2,520  
2,530  
2,540  
2,550  
2,560  
2,570

MD: 2,366'  
INC: 10.22°  
AZM: 118.02°  
TVD: 2,359.96'  
VS: -40.07'

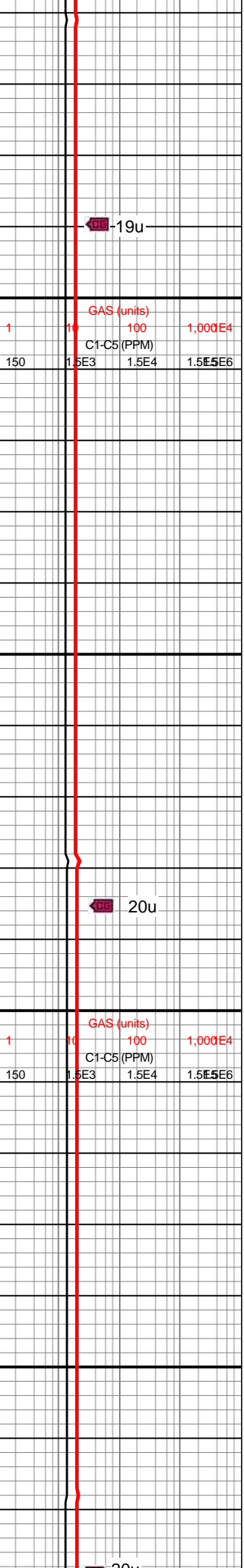
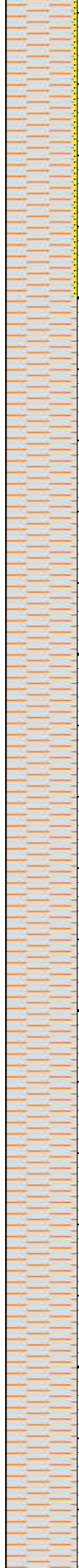
ROP SCALE  
CHANGE

WOB: 1  
RPM: 80  
SPM: 186  
SPP: 2,200

MD: 2,461'  
INC: 10.84°  
AZM: 119.26°  
TVD: 2,453.36'  
VS: -46.13'

VIS: 65  
MW: 9.4

MD: 2,556'  
INC: 11.08°  
AZM: 113.84°  
TVD: 2,546.63'  
VS: -51.8'



19u

20u

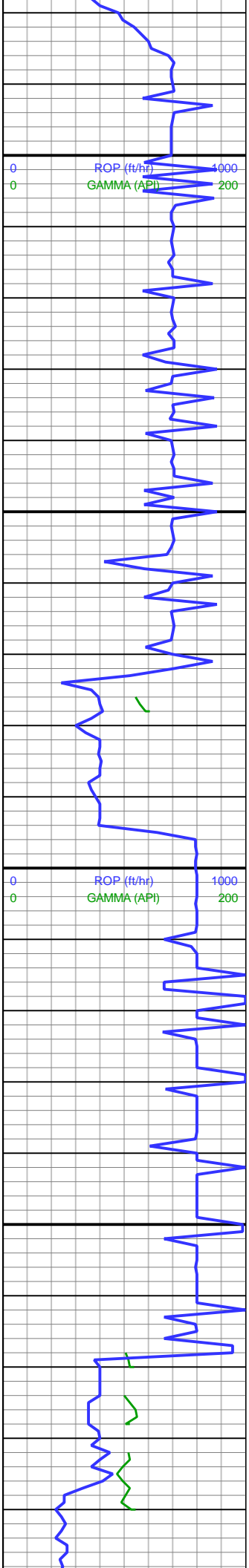
95% SLTY SH: PRED MED  
GY, FRM-BRIT, BLKY-SB  
PLTY, RR PLTY, RTHY TEX,  
V PLY FIS; 5% SS: OFF WH-V  
LT GY, V F-F GR, FRM-FRI,  
RND-SB RND, RGH TEX, W-V  
W SRT, PRED SILC CMT,  
MOD-W CMTD, POS  
PP-INTXL POR



	GAS (units)		
1	10	100	1,000E4
150	1.5E3	1.5E4	1.5E5E6

	GAS (units)		
1	10	100	1,000E4
150	1.5E3	1.5E4	1.5E5E6





2,580  
2,590  
2,600  
2,610  
2,620  
2,630  
2,640  
2,650  
2,660  
2,670  
2,680  
2,690  
2,700  
2,710  
2,720  
2,730  
2,740  
2,750  
2,760  
2,770  
2,780  
2,790

MM

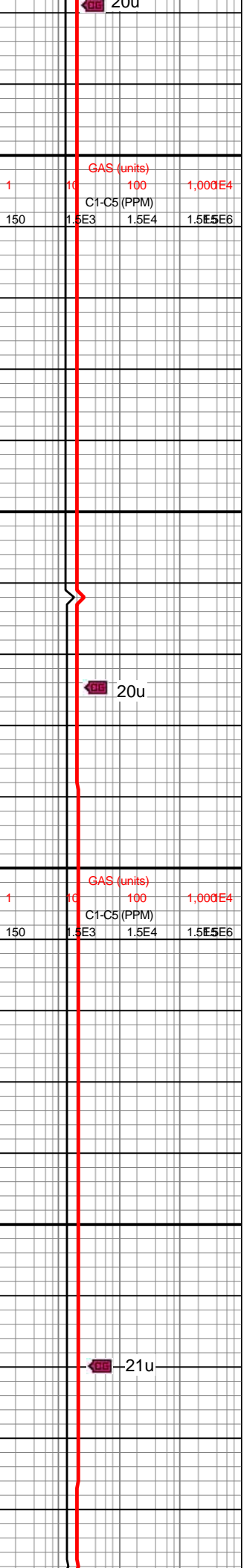
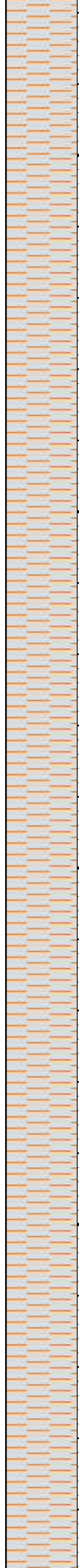
WOB: 9  
RPM: 80  
SPM: 186  
SPP: 2,450

MD: 2,652'  
INC: 10.15°  
AZM: 115.07°  
TVD: 2,640.99'  
VS: -56.74'

VIS: 65  
MW: 9.4

MD: 2,746'  
INC: 9.1°  
AZM: 116.02°  
TVD: 2,733.66'  
VS: -61.41'

WOB: 0.2

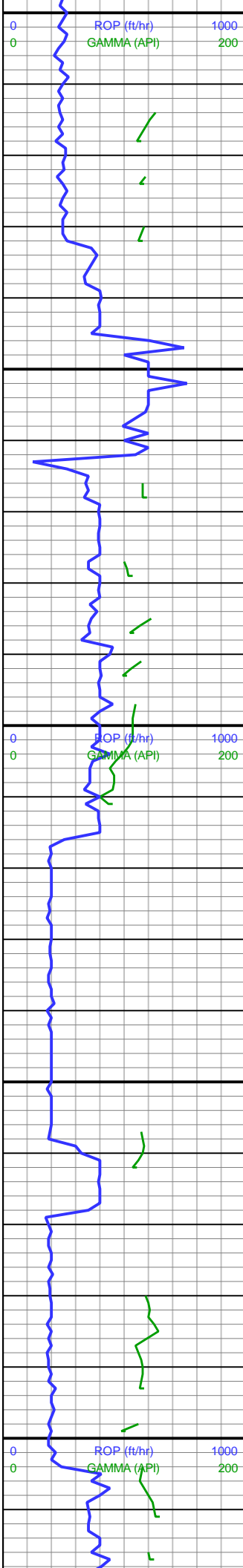


100% SLTY SH: PRED MED  
GY, FRM-BRIT, SL HRD IP,  
SB BLKY-SB PLTY, RR PLTY,  
DULL TO RTHY TEX, SL FIS



100% SLTY SH: PRED MED  
GY, SME DK GY, FRM-BRIT,  
SB BLKY-SB PLTY, RR PLTY,  
DULL TO RTHY TEX, SL FIS,  
SL CALC IP





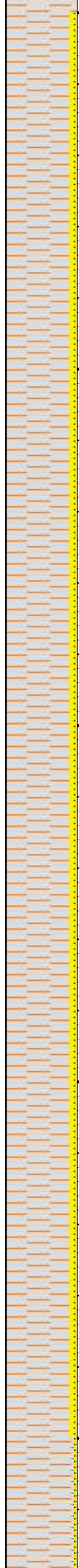
RPM: 81  
SPM: 186  
SPP: 2,244

MD: 2,841'  
INC: 9.92°  
AZM: 125.42°  
TVD: 2,827.36'  
VS: -67.45'

VIS: 51  
MW: 9.3+

MD: 2,936'  
INC: 11.08°  
AZM: 136.78°  
TVD: 2,920.78'  
VS: -76.88'

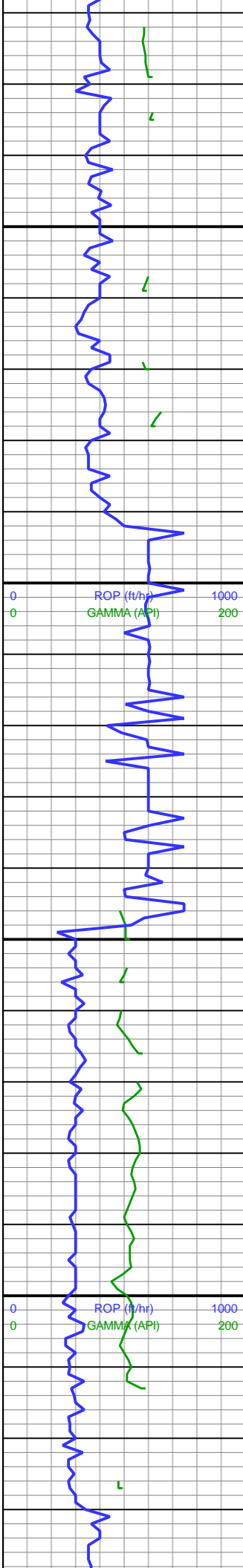
WOB: 4  
RPM: 81  
SPM: 170  
SPP: 1,968



GAS (units)			
1	10	100	1,000E4
C1-C5 (PPM)			
150	1.5E3	1.5E4	1.5E5E6
18u			
GAS (units)			
1	10	100	1,000E4
C1-C5 (PPM)			
150	1.5E3	1.5E4	1.5E5E6
14u			
GAS (units)			
1	10	100	1,000E4
C1-C5 (PPM)			
150	1.5E3	1.5E4	1.5E5E6

90% SLTY SH: PRED LT TO  
MED GY, FRM-BRIT, SB  
BLKY-SB PLTY, RR PLTY,  
RTHY TEX, PLY FIS; 10% SS:  
OFF WH-V LT GY, VF-F GR,  
FRM-FRI, SB RND-SB ANG,  
W-V W SRT, PRED SILC CMT,  
MOD-W CMTD





3,020  
3,030  
3,040  
3,050  
3,060  
3,070  
3,080  
3,090  
3,100  
3,110  
3,120  
3,130  
3,140  
3,150  
3,160  
3,170  
3,180  
3,190  
3,200  
3,210  
3,220  
3,230

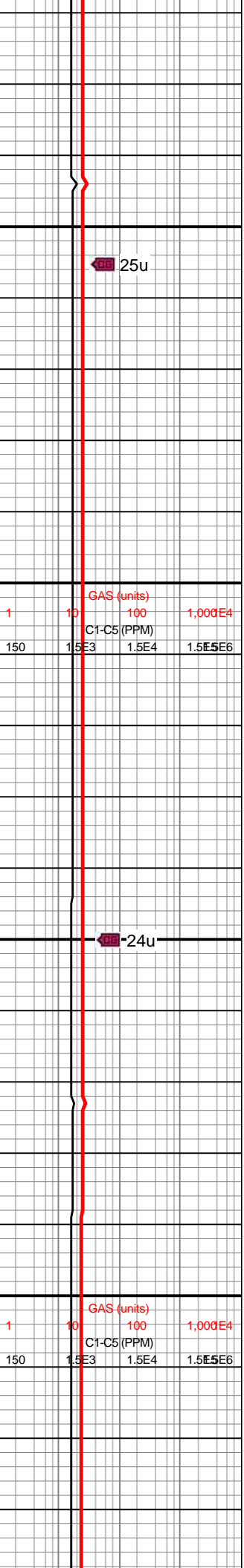
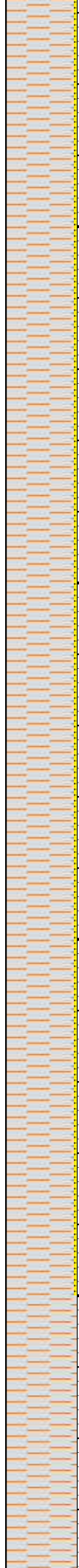
MD: 3,031'  
INC: 10.5°  
AZM: 116.32°  
TVD: 3,014.13'  
VS: -85.26'

VIS: 51  
MW: 9.3+

MD: 3,126'  
INC: 10.98°  
AZM: 121.56°  
TVD: 3,107.47'  
VS: -91.53'

WOB: 2  
RPM: 80  
SPM: 170  
SPP: 2,067

MD: 3,222'  
INC: 9.9°  
AZM: 117.51°  
TVD: 3,201.88'  
VS: -97.88'



25u

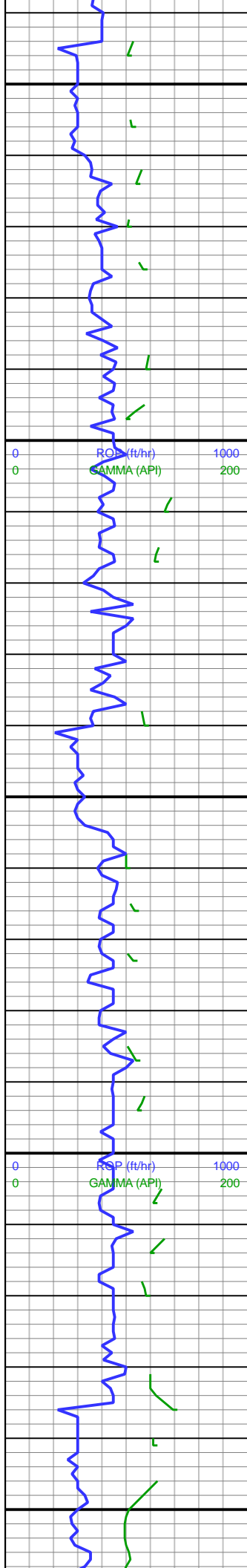
24u

GAS (units)			
1	10	100	1,000E4
C1-C5 (PPM)			
150	1.5E3	1.5E4	1.5E5E6

GAS (units)			
1	10	100	1,000E4
C1-C5 (PPM)			
150	1.5E3	1.5E4	1.5E5E6

95% SLTY SH: PRED MED  
GY, FRM, SB BLKY-SB PLTY,  
DULL-RTHY TEX, PLY FIS;  
5% SS: LT GY, VF GR,  
FRM-FRI, SB RND-SB ANG, V  
W SRT, PRED SILC CMT, W  
CMTD





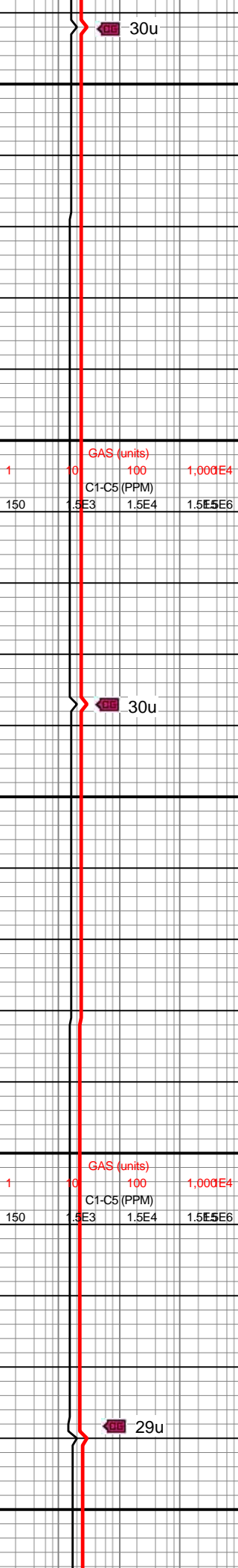
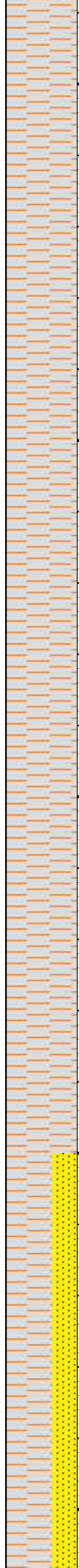
3,240  
3,250  
3,260  
3,270  
3,280  
3,290  
3,300  
3,310  
3,320  
3,330  
3,340  
3,350  
3,360  
3,370  
3,380  
3,390  
3,400  
3,410  
3,420  
3,430  
3,440  
3,450

VIS: 50  
MW: 9.3

MD: 3,317'  
INC: 10.2°  
AZM: 114.95°  
TVD: 3,295.42'  
VS: -103'

WOB: 6  
RPM: 80  
SPM: 170  
SPP: 2,199

MD: 3,412'  
INC: 11.16°  
AZM: 123.58°  
TVD: 3,388.78'  
VS: -109.36'



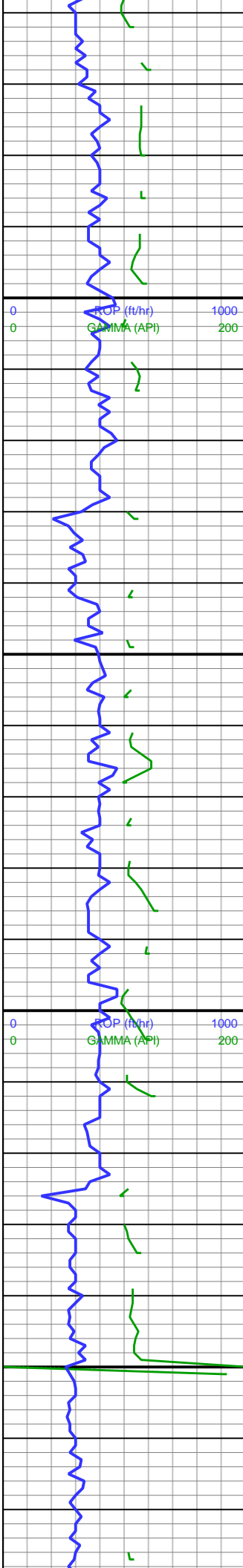
30u

30u

29u

100% SLTY SH: PRED MED  
GY, FRM-SL FRI, SB  
BLKY-SB PLTY, DULL-RTHY  
TEX, PLY FIS, SL CALC





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  
3,590  
3,610  
3,620  
3,630  
3,640  
3,650  
3,660  
3,670

VIS: 50  
MW: 9.3

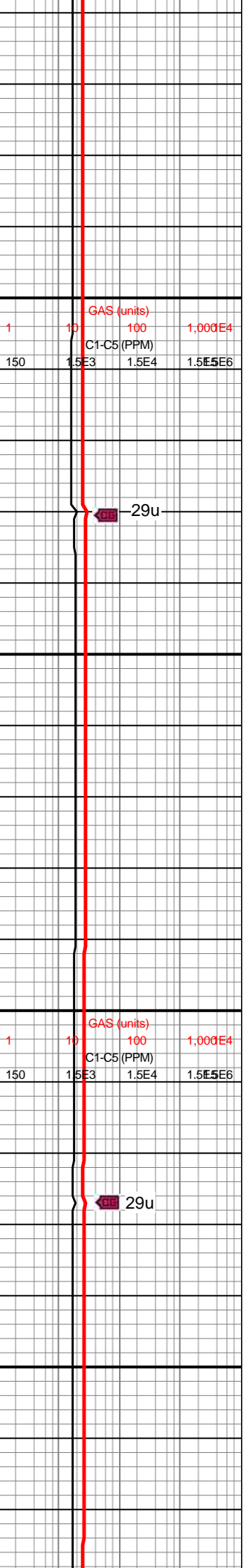
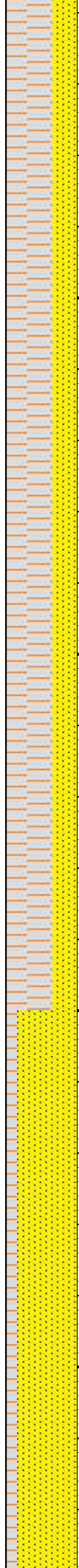
MD: 3,507'  
INC: 9.61°  
AZM: 112.88°  
TVD: 3,482.23'  
VS: -115.31'

WOB: 4  
RPM: 80  
SPM: 170  
SPP: 2,274

MD: 3,602'  
INC: 11.64°  
AZM: 124.03°  
TVD: 3,575.61'  
VS: -121.49'

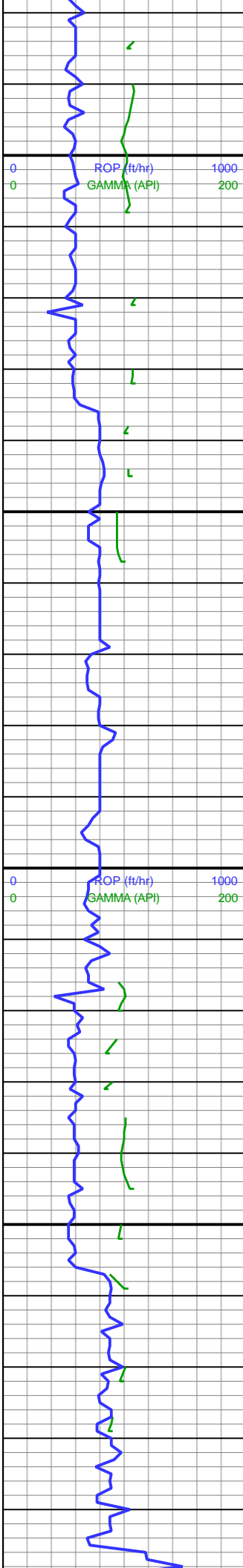


Hygiene  
3600'MD/3574'TVD



65% SLTY SH: PRED MED  
GY, SME DK GY, FRM-SL  
FRI, SB BLKY-SB PLTY,  
RTHY TEX, PLY FIS; 35% SS:  
MED GY, VF-F GR, SFT-FRI,  
SB RND-SB ANG, V W SRT,  
PRED SILC CMT, SME CALC  
CMT, PLY-FR CMTD





3,680  
3,690  
3,700  
3,710  
3,720  
3,730  
3,740  
3,750  
3,760  
3,770  
3,780  
3,790  
3,800  
3,810  
3,820  
3,830  
3,840  
3,850  
3,860  
3,870  
3,880  
3,890

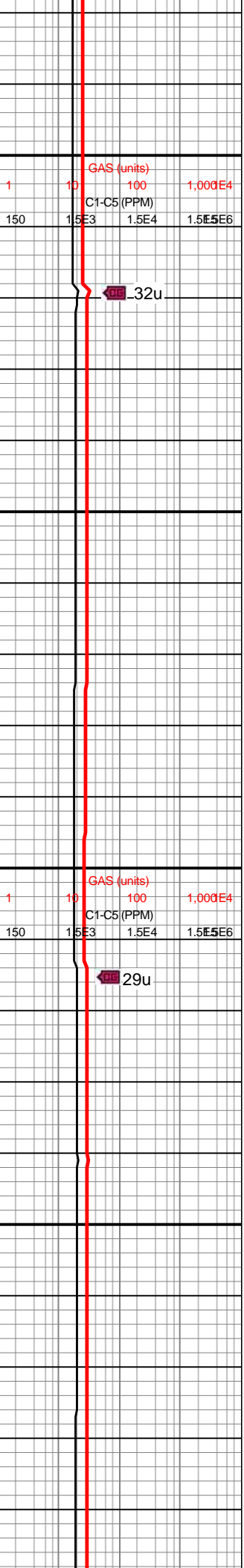
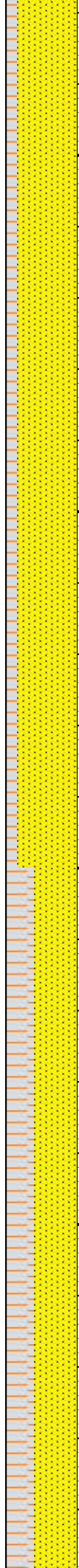
VIS: 50  
MW: 9.3  
  
MD: 3,698'  
INC: 10.4°  
AZM: 116.61°  
TVD: 3,669.84'  
VS: -128.44'

MD: 3,793'  
INC: 10.6°  
AZM: 116.49°  
TVD: 3,763.25'  
VS: -133.88'

WOB: 9  
RPM: 80  
SPM: 170  
SPP: 2,234

MD: 3,888'  
INC: 10.58°  
AZM: 117.65°  
TVD: 3,856.63'  
VS: -139.52'

VIS: 50



GAS (units)  
C1-C5 (PPM)  
1 10 100 1,000E4  
150 1.5E3 1.5E4 1.5E5E6

32u

GAS (units)  
C1-C5 (PPM)  
1 10 100 1,000E4  
150 1.5E3 1.5E4 1.5E5E6

29u

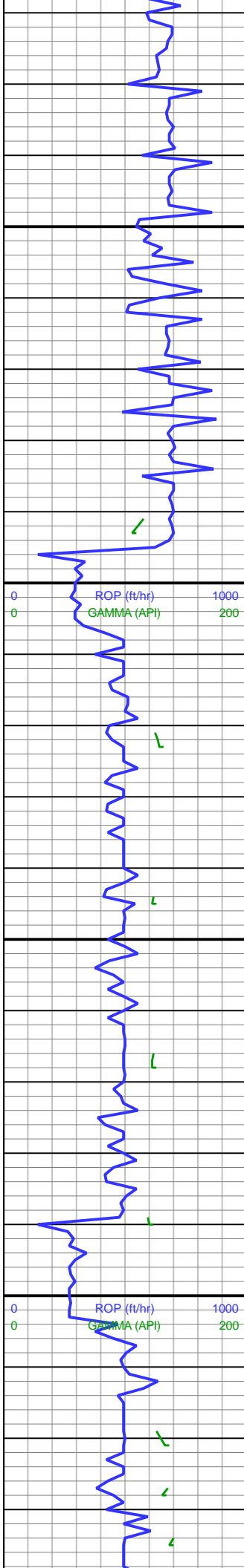
85% SS: MED GY, VF-F GR,  
SFT, SB RND-SB ANG, V W  
SRT, PRED SILC CMT, SME  
CALC CMT, PLY-FR CMTD;  
15% SLTY SH: PRED LT GY,  
FRM-SL FRI, SB BLKY-SB  
PLTY, DULL TEX, PLY FIS, V  
SLTY











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  
4,260  
4,270  
4,280  
4,290  
4,300  
4,310  
4,320  
4,330

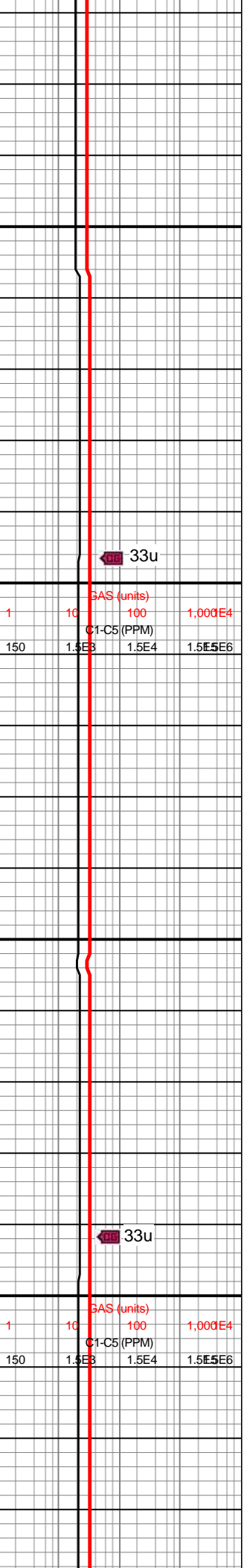
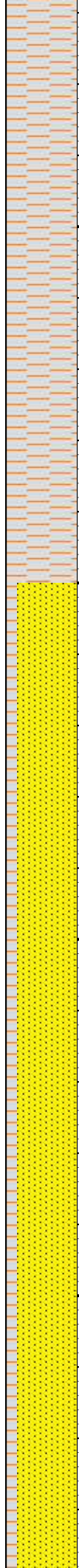
MD: 4,173'  
INC: 10.34°  
AZM: 117.99°  
TVD: 4,136.94'  
VS: -156.11'

WOB: 6  
RPM: 80  
SPM: 170  
SPP: 2,401

MD: 4,268'  
INC: 10.07°  
AZM: 117.33°  
TVD: 4,230.44'  
VS: -161.71'

VIS: 53  
MW: 9.3

9/4/2019  
4,303 MD



100% SLTY SH: PRED MED  
GY, FRM-SL FRI, SL HD IP,  
SB BLKY-SB PLTY, PLTY IP,  
DULL-RTHY TEX, PLY FIS, V  
SLTY; TR SS

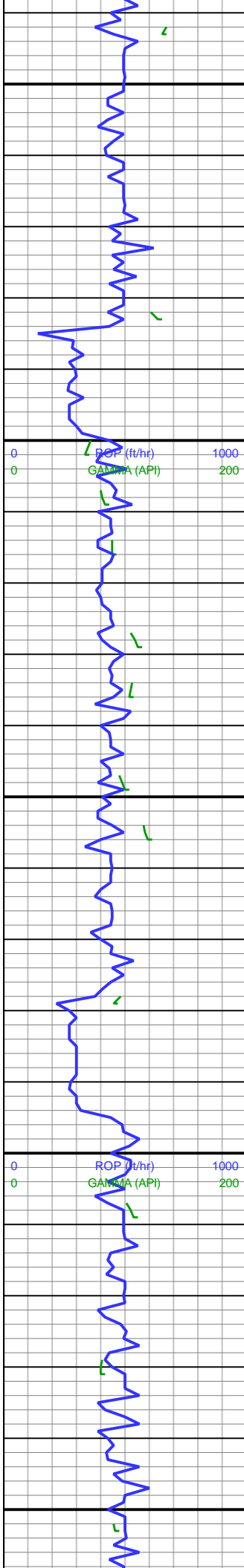


33u

33u

GAS (units)			
1	10	100	1,000E4
C1-C5 (PPM)			
150	1.5E3	1.5E4	1.5E5E6

GAS (units)			
1	10	100	1,000E4
C1-C5 (PPM)			
150	1.5E3	1.5E4	1.5E5E6



4,340  
4,350  
4,360  
4,370  
4,380  
4,390  
4,400  
4,410  
4,420  
4,430  
4,440  
4,450  
4,460  
4,470  
4,480  
4,490  
4,500  
4,510  
4,520  
4,530  
4,540  
4,550

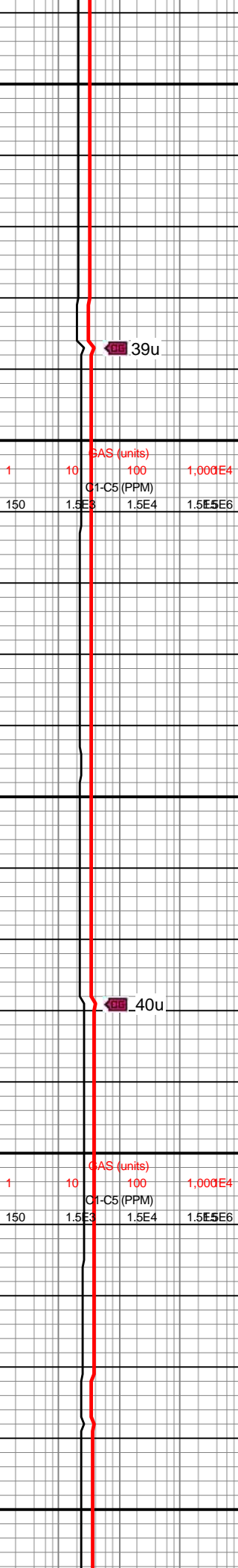
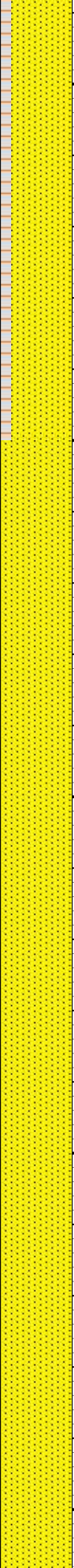
MD: 4,364'  
INC: 9.79°  
AZM: 118.63°  
TVD: 4,325'  
VS: -167.3'

WOB: 9  
RPM: 80  
SPM: 170  
SPP: 2,554

MD: 4,459'  
INC: 10.48°  
AZM: 116.56°  
TVD: 4,418.52'  
VS: -172.84'

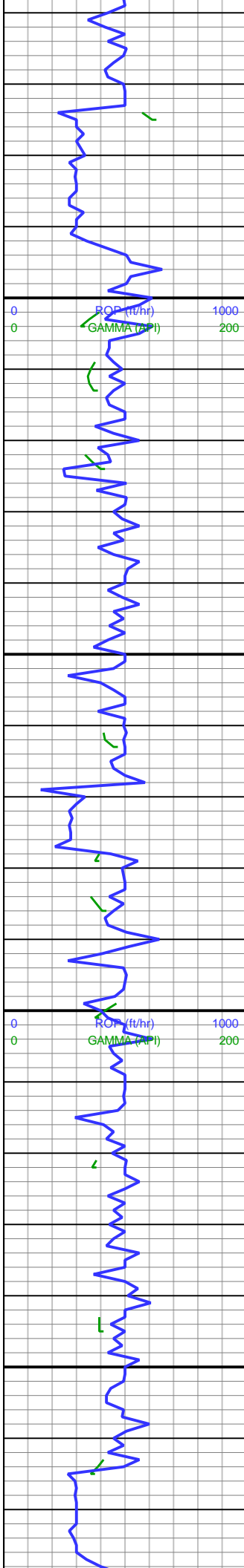
VIS: 53  
MW: 9.3

MD: 4,554'  
INC: 10.72°  
AZM: 115.2°  
TVD: 4,511.9'



85% SS: MED GY, VF-F GR,  
FRI-SL HD, SB RND-SB ANG,  
V W SRT, PRED CALC CMT,  
MOD CMTD; 15% SLTY SH:  
PRED MED GY, FRM-SL FRI,  
SB BLKY-SB PLTY, RTHY  
TEX, PLY FIS, V SLTY





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  
4,690  
4,700  
4,710  
4,720  
4,730  
4,740  
4,750  
4,760  
4,770

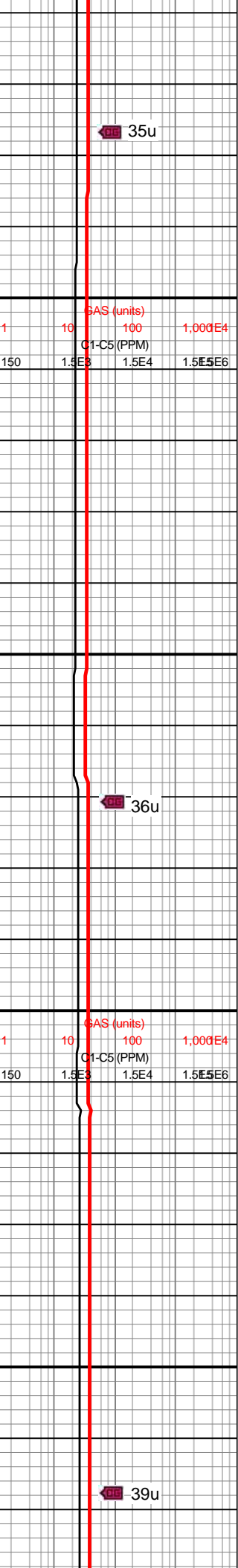
TVD: 4,511.9'  
VS: -178.14'

WOB: 13  
RPM: 80  
SPM: 170  
SPP: 2,644

MD: 4,649'  
INC: 10.54°  
AZM: 115.3°  
TVD: 4,605.27'  
VS: -183.27'

VIS: 53  
MW: 9.3

MD: 4,744'  
INC: 11.03°  
AZM: 114.51°  
TVD: 4,698.59'  
VS: -188.37'



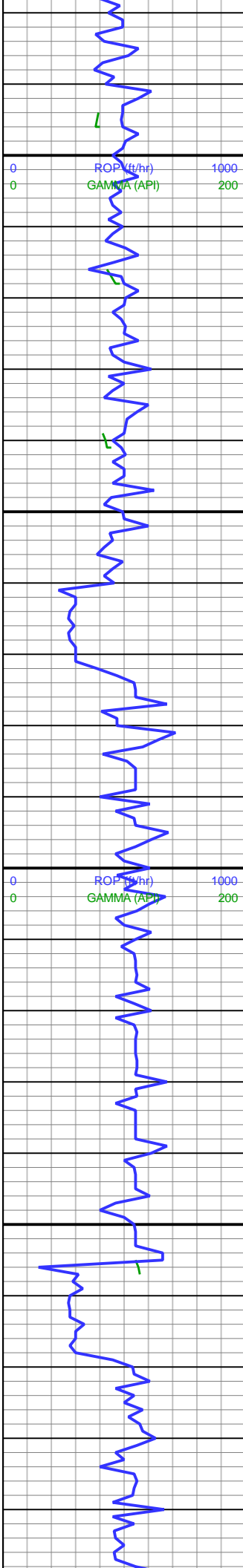
100% SS: OFF WHT-MED GY,  
VF-F GR, FRI-SL HD, SB  
RND-SB ANG, V W SRT,  
PRED CALC CMT, MOD  
CMTD



35u

36u

39u



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  
4,910  
4,920  
4,930  
4,940  
4,950  
4,960  
4,970  
4,980  
4,990

WOB: 16  
RPM: 91  
SPM: 170  
SPP: 2,747

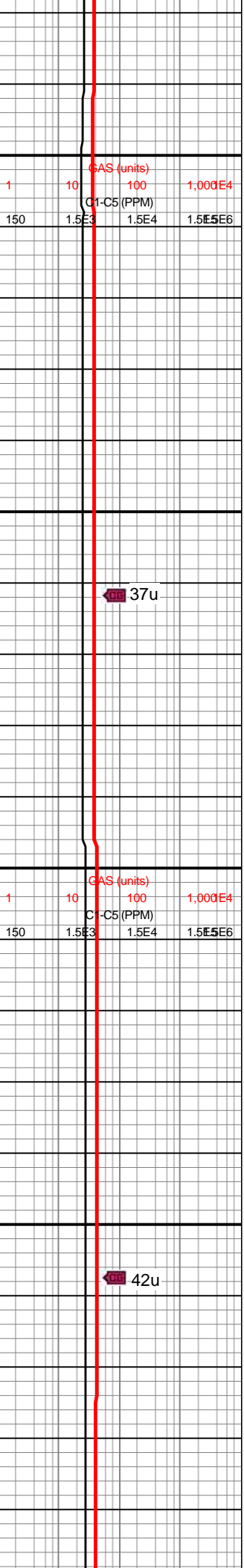
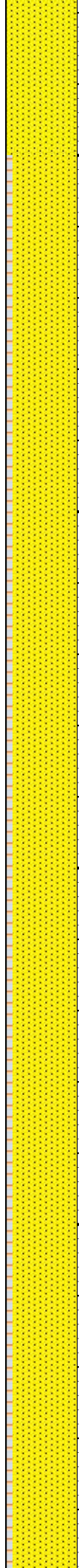
MD: 4,839'  
INC: 10.45°  
AZM: 116.26°  
TVD: 4,791.93'  
VS: -193.59'

VIS: 53  
MW: 9.3

**BP**

MD: 4,933'  
INC: 10.1°  
AZM: 114.62°  
TVD: 4,884.42'  
VS: -198.56'

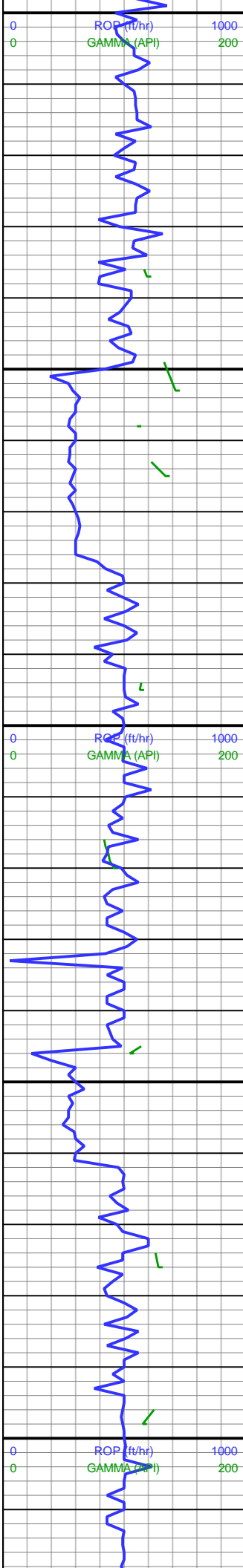
WOB: 19  
RPM: 91  
SPM: 170  
SPP: 2,747



100% SS: MED-DK GY, VF-F  
GR, SFT-FRI IP, SB RND-SB  
ANG, V W SRT, PRED CALC  
CMT, MOD CMTD

90% SS: LT-MED GY, VF-F  
GR, FRM-FRI, SB RND-SB  
ANG, V W SRT, PRED CALC  
CMT, MOD CMTD; 10% SLTY  
SH: PRED MED-DK GY,  
FRM-SL FRI, SB BLKY-SB  
PLTY, DULL-RTHY TEX, PLY  
FIS, V SLTY





RPM: 90  
SPM: 170  
SPP: 2,999

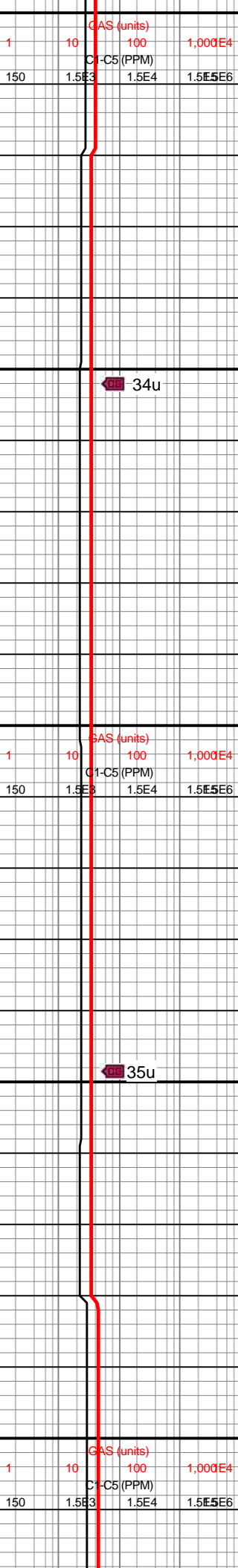
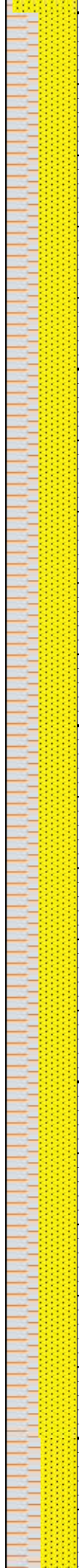
MD: 5,029'  
INC: 10.55°  
AZM: 115.58°  
TVD: 4,978.86'  
VS: -203.55'

VIS: 53  
MW: 9.3

MD: 5,124'  
INC: 10.92°  
AZM: 115.44°  
TVD: 5,072.2'  
VS: -208.81'

WOB: 10  
RPM: 91  
SPM: 170  
SPP: 2,804

MD: 5,219'  
INC: 10.59°



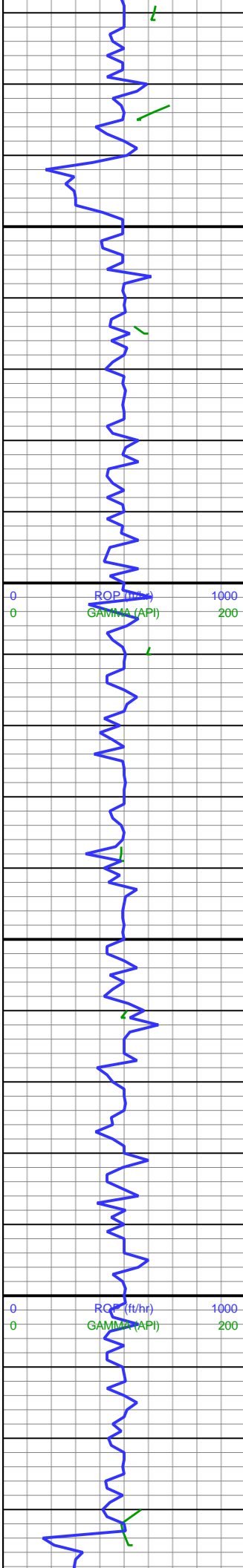
34u

35u

55% SS: MED GY, VF-F GR,  
FRM-FRI, SB RND, V W SRT,  
PRED CALC CMT, MOD  
CMTD; 45% SLTY SH: PRED  
MED GY, FRM-SL FRI, SB  
BLKY-SB PLTY, DULL TEX,  
PLY FIS, V SLTY







5,220  
5,230  
5,240  
5,250  
5,260  
5,270  
5,280  
5,290  
5,300  
5,310  
5,320  
5,330  
5,340  
5,350  
5,360  
5,370  
5,380  
5,390  
5,400  
5,410  
5,420  
5,430

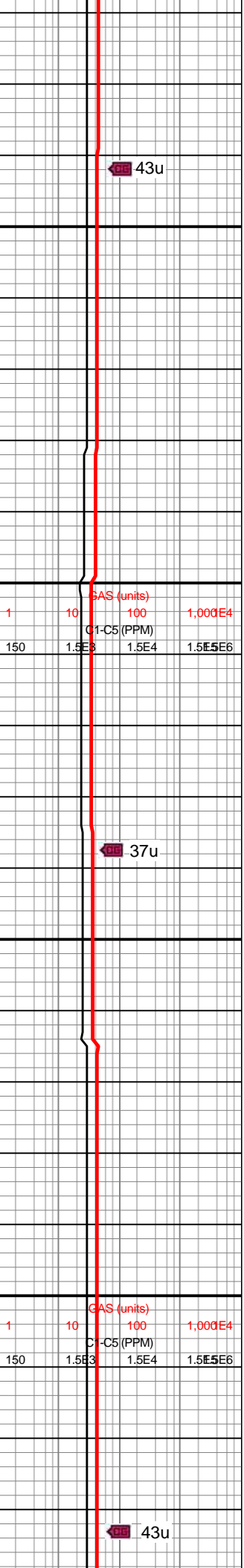
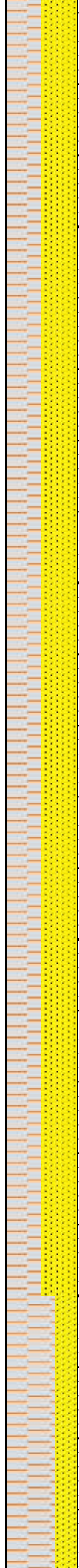
AZM: 114.07°  
TVD: 5,165.53'  
VS: -213.86'

VIS: 60  
MW: 9.3+

MD: 5,314'  
INC: 10.56°  
AZM: 115.76°  
TVD: 5,258.92'  
VS: -218.87'

WOB: 17  
RPM: 91  
SPM: 170  
SPP: 2,985

MD: 5,410'  
INC: 10.48°  
AZM: 114.09°  
TVD: 5,353.31'  
VS: -223.91'



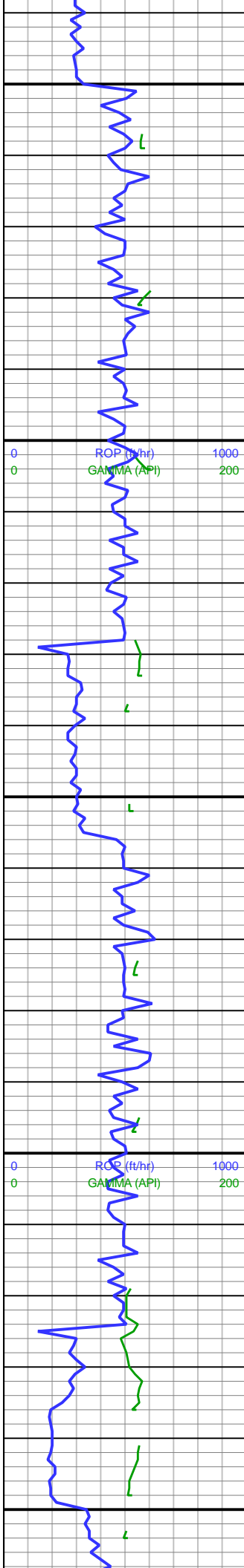
43u

37u

43u

50% SS: MED GY, VF-F GR,  
FRI-HD, SB RND-SB ANG, V W  
SRT, PRED CALC CMT, MOD  
CMTD; 50% SLTY SH: PRED  
MED GY, HD, SB BLKY-SB  
PLTY, RTHY TEX, PLY FIS, V  
SLTY



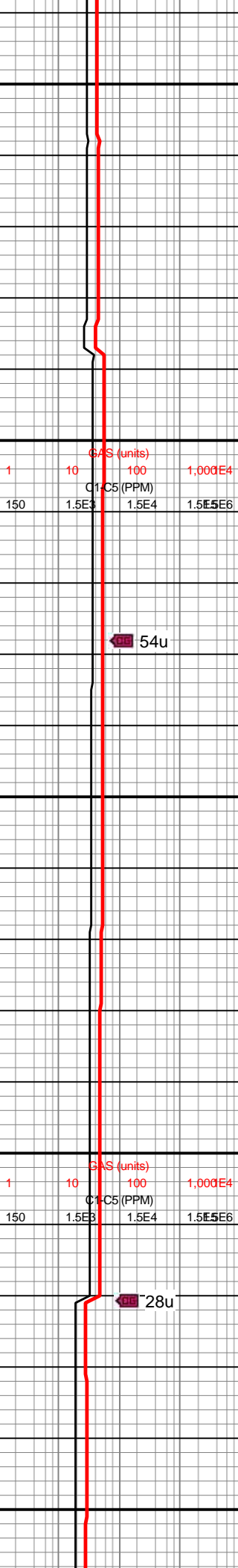
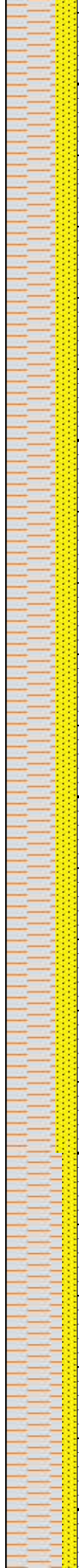


5,440  
5,450  
5,460  
5,470  
5,480  
5,490  
5,500  
5,510  
5,520  
5,530  
5,540  
5,550  
5,560  
5,570  
5,580  
5,590  
5,600  
5,610  
5,620  
5,630  
5,640  
5,650

MD: 5,505'  
INC: 10.6°  
AZM: 116.08°  
TVD: 5,446.7'  
VS: -228.95'

MD: 5,600'  
INC: 4.07°  
AZM: 124.97°  
TVD: 5,540.88'  
VS: -233.15'

WOB: 18  
RPM: 91  
SPM: 170  
SPP: 3,108



GAS (units)  
1 10 100 1,000E4  
C1-C5 (PPM)  
150 1.5E3 1.5E4 1.5E5E6

GAS (units)  
1 10 100 1,000E4  
C1-C5 (PPM)  
150 1.5E3 1.5E4 1.5E5E6

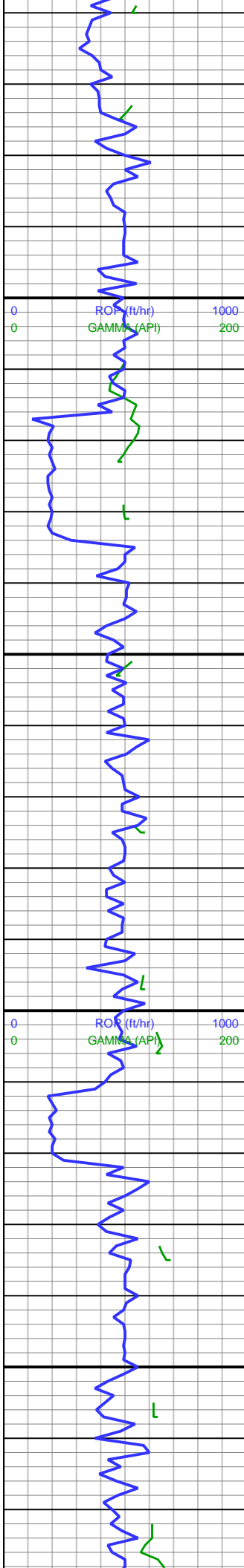
54u

28u

70% SLTY SH: PRED LT-MED  
GY, FRM-FRI, SB BLKY-SB  
PLTY, DULL-RTHY TEX, PLY  
FIS, V SLTY; 30% SS: MED  
GY, VF GR, FRI-HD, SB RND,  
V W SRT, PRED CALC CMT,  
MOD CMTD





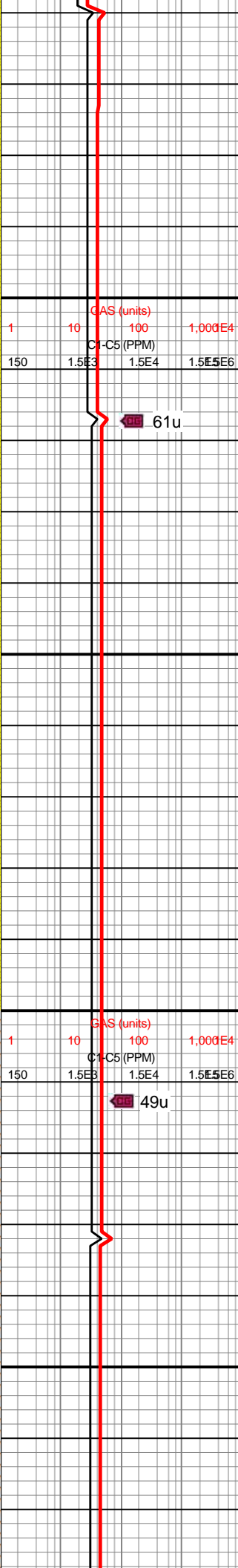
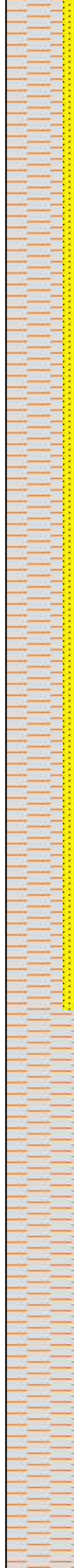


5,660  
5,670  
5,680  
5,690  
5,700  
5,710  
5,720  
5,730  
5,740  
5,750  
5,760  
5,770  
5,780  
5,790  
5,800  
5,810  
5,820  
5,830  
5,840  
5,850  
5,860  
5,870

MD: 5,694'  
INC: 6.5°  
AZM: 118.78°  
TVD: 5,634.47'  
VS: -236.52'

MD: 5,789'  
INC: 10.3°  
AZM: 115.07°  
TVD: 5,728.44'  
VS: -240.87'

WOB: 28  
RPM: 92  
SPM: 170  
SPP: 3,217



GAS (units)  
1 10 100 1,000E4  
C1-C5 (PPM)  
150 1.5E3 1.5E4 1.5E5E6

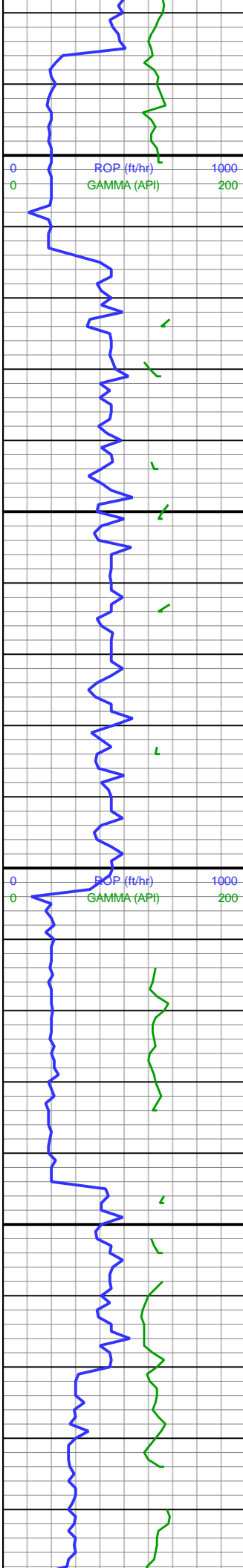
61u

GAS (units)  
1 10 100 1,000E4  
C1-C5 (PPM)  
150 1.5E3 1.5E4 1.5E5E6

49u

80% SLTY SH: MED GY,  
FRM-FRI, SB BLKY-SB PLTY,  
DULL TEX, PLY FIS, SLTY;  
20% SS: LT-MED GY, VF GR,  
FRI, SB RND-SB ANG, V W  
SRT, PRED CALC CMT, MOD  
CMTD





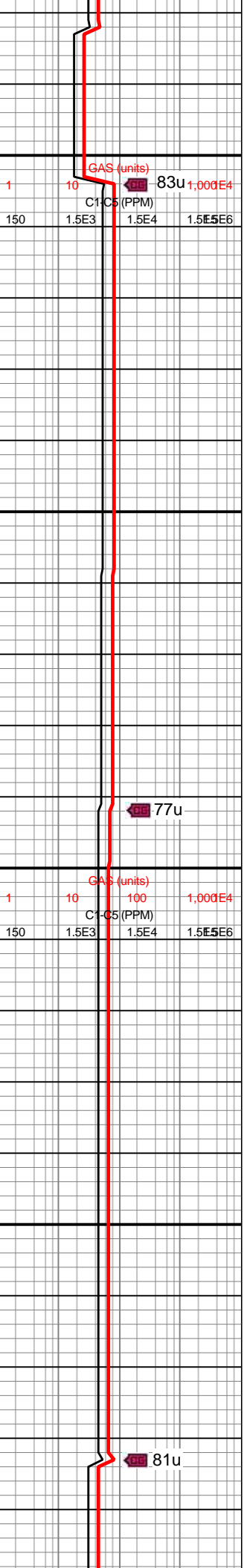
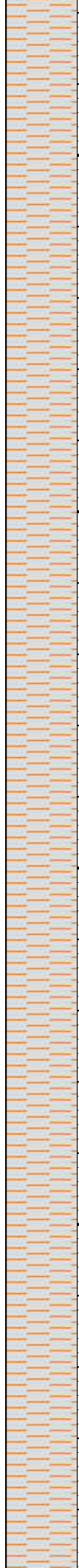
5,880  
5,890  
5,900  
5,910  
5,920  
5,930  
5,940  
5,950  
5,960  
5,970  
5,980  
5,990  
6,000  
6,010  
6,020  
6,030  
6,040  
6,050  
6,060  
6,070  
6,080  
6,090

MD: 5,885'  
INC: 4.19°  
AZM: 111.81°  
TVD: 5,823.62'  
VS: -244.19'

MD: 5,979'  
INC: 7.38°  
AZM: 119.75°  
TVD: 5,917.14'  
VS: -247.21'

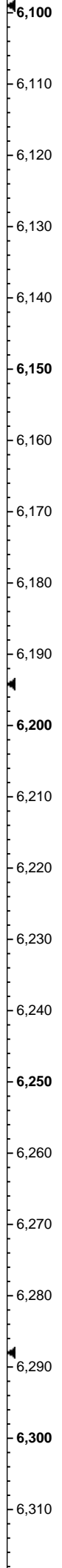
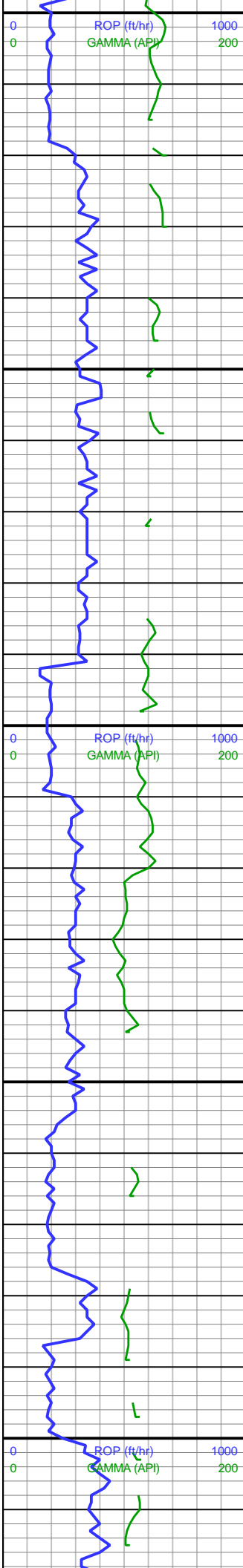
WOB: 20  
RPM: 90  
SPM: 186  
SPP: 3,391

MD: 6,075'  
INC: 6.59°  
AZM: 118.74°  
TVD: 6,012.42'  
VS: -251.41'



100% SLTY SH: MED-DK GY,  
FRI, SB BLKY-SB PLTY,  
DULL TEX, PLY FIS, F SLT  
CTG, WK-MOD CALC



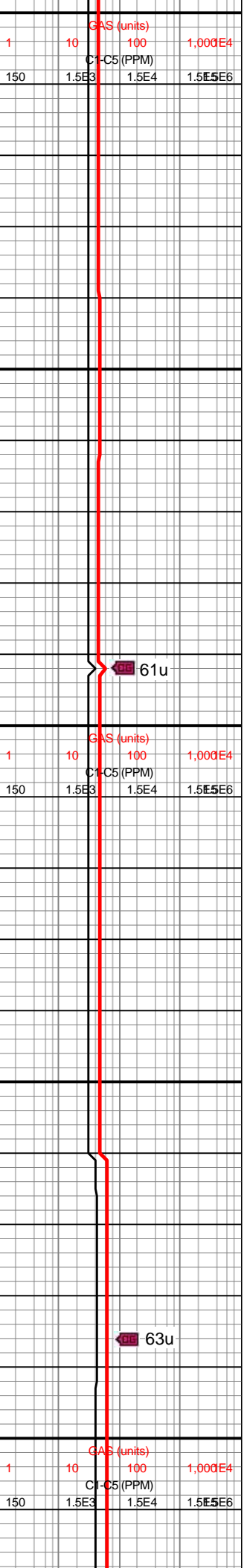
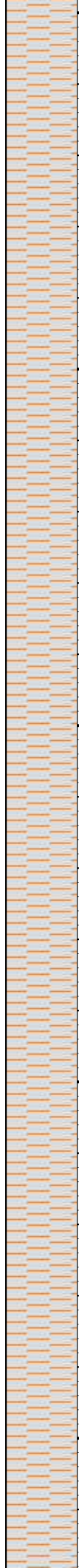


VIS: 58  
MW: 9.25

MD: 6,170'  
INC: 7.6°  
AZM: 116.49°  
TVD: 6,106.69'  
VS: -255.29'

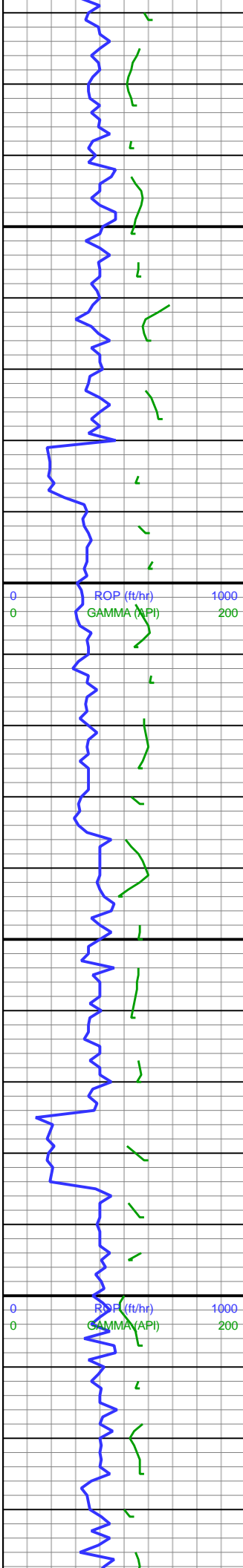
WOB: 10  
RPM: 91  
SPM: 186  
SPP: 3,114

MD: 6,264'  
INC: 7.62°  
AZM: 115.33°  
TVD: 6,199.87'  
VS: -259.07'



100% SLTY SH: MED-DK GY,  
FRM-FRI, SB BLKY-SB PLTY,  
DULL TEX, PLY FIS, F SLT  
CTG, WK CALC





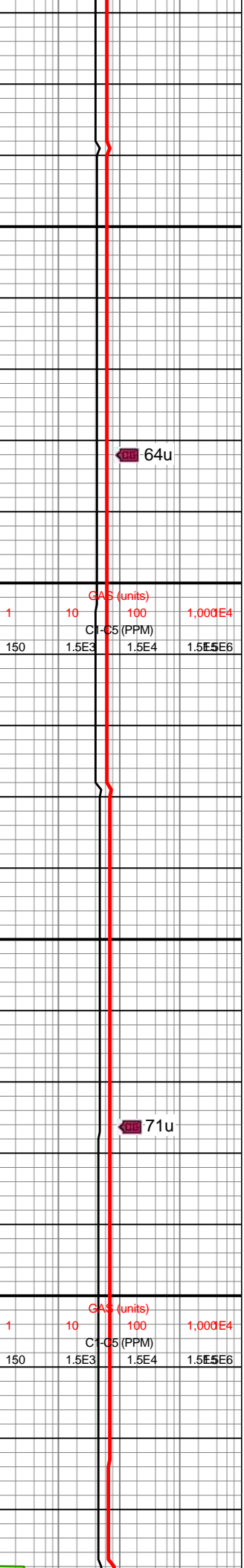
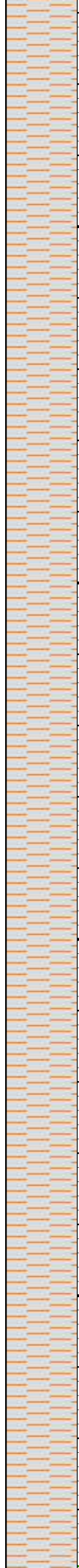
6,320  
6,330  
6,340  
6,350  
6,360  
6,370  
6,380  
6,390  
6,400  
6,410  
6,420  
6,430  
6,440  
6,450  
6,460  
6,470  
6,480  
6,490  
6,500  
6,510  
6,520  
6,530

MD: 6,359'  
INC: 7.71°  
AZM: 104.94°  
TVD: 6,294.02'  
VS: -261.67'

VIS: 55  
MW: 9.2

WOB: 13  
RPM: 90  
SPM: 186  
SPP: 44

MD: 6,454'  
INC: 7.43°  
AZM: 109.34°  
TVD: 6,388.19'  
VS: -263.6'



64u

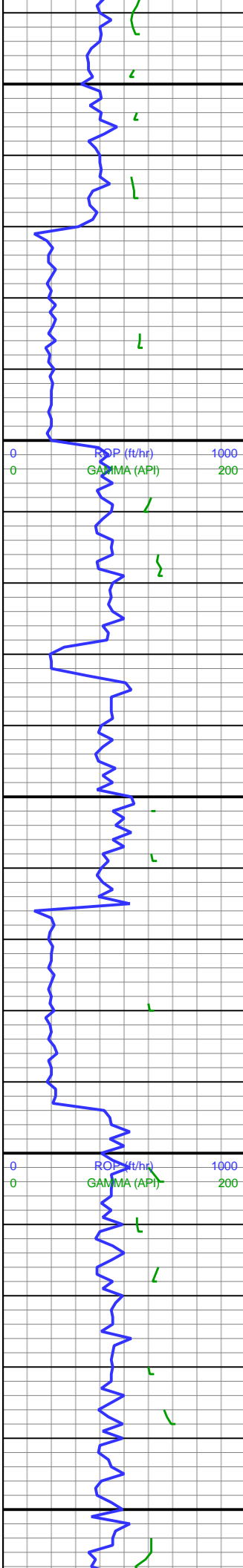
GAS (units)  
C1-C5 (PPM)  
1 10 100 1,000E4  
150 1.5E3 1.5E4 1.5E5E6

71u

GAS (units)  
C1-C5 (PPM)  
1 10 100 1,000E4  
150 1.5E3 1.5E4 1.5E5E6

100% SLTY SH: MED GY,  
FRM-FRI, SB BLKY-SB PLTY,  
SB ANG, DULL TEX, SM BLK  
CTNG, PLY FIS, F SLT CTG,  
V WK CALC





6,540  
6,550  
6,560  
6,570  
6,580  
6,590  
6,600  
6,610  
6,620  
6,630  
6,640  
6,650  
6,660  
6,670  
6,680  
6,690  
6,700  
6,710  
6,720  
6,730  
6,740  
6,750

MD: 6,548'  
INC: 7.75°  
AZM: 110.11°  
TVD: 6,481.37'  
VS: -266.08'

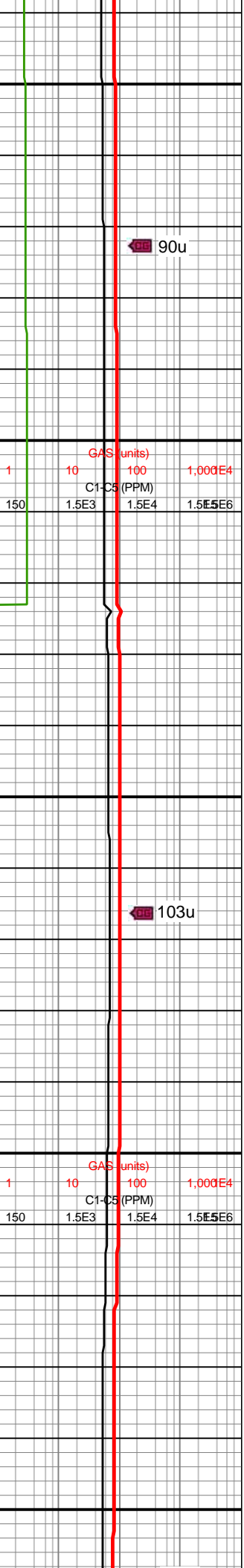
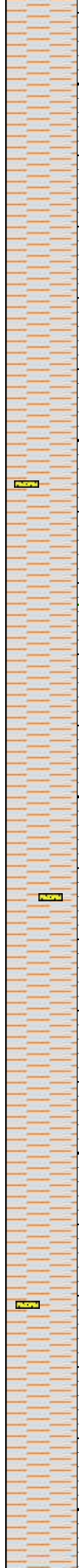
WOB: 9  
RPM: 91  
SPM: 186  
SPP: 3,243

BP

MD: 6,643'  
INC: 4.81°  
AZM: 105.59°  
TVD: 6,575.79'  
VS: -267.91'

VIS: 56  
MW: 9.2

MD: 6,738'  
INC: 2.83°  
AZM: 108.85°  
TVD: 6,670.57'  
VS: -268.85'

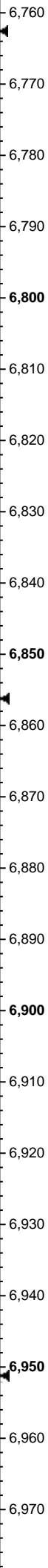
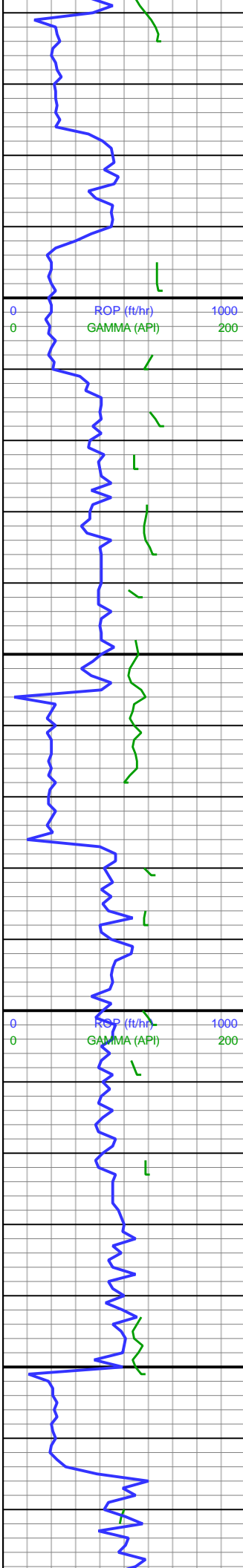


90u

103u

100% SLTY SH: MED GY,  
FRM-FRI, SB BLKY-SB PLTY,  
SB ANG, DULL TEX, SM BLK  
CTNG, PLY FIS, F SLT CTG,  
V WK CALC, TR SS STRG

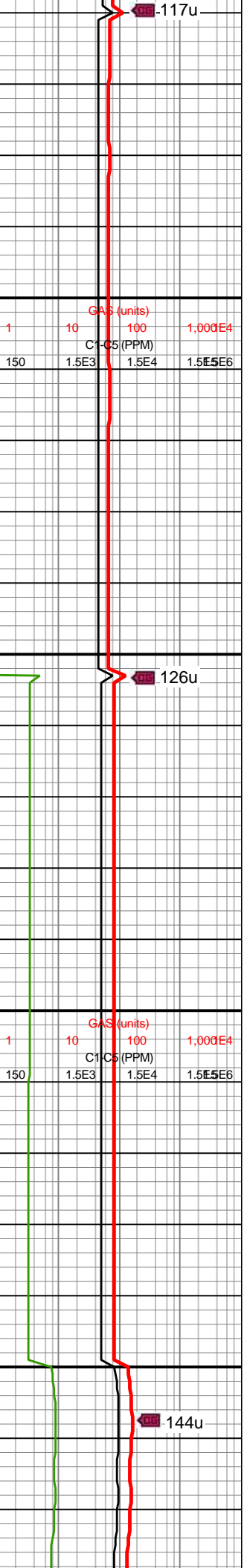
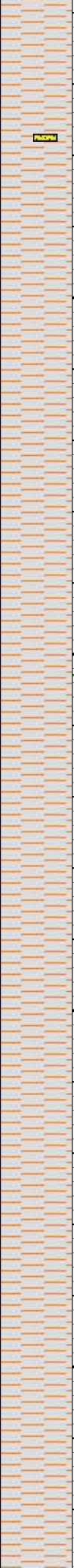




WOB: 12  
RPM: 90  
SPM: 186  
SPP: 2,792

MD: 6,832'  
INC: 1.96°  
AZM: 84.46°  
TVD: 6,764.49'  
VS: -268.9'

MD: 6,927'  
INC: 0.09°  
AZM: 180.84°  
TVD: 6,859.48'  
VS: -268.58'



100% SLTY SH: MED GY,  
FRM-FRI, SB BLKY-SB PLTY,  
SB ANG, DULL TEX, SM BLK  
CTNG, PLY FIS, F SLT CTG,  
TR SS STRG

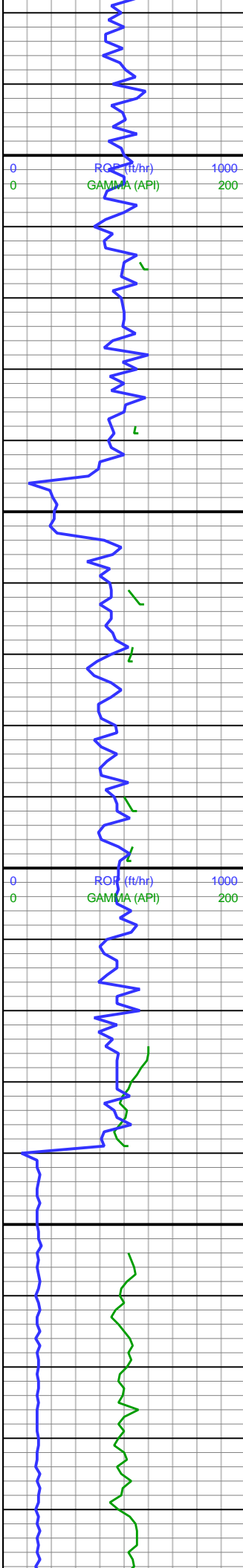


117u

126u

144u





VIS: 55  
MW: 9.15

WOB: 27  
RPM: 91  
SPM: 186  
SPP: 3,791

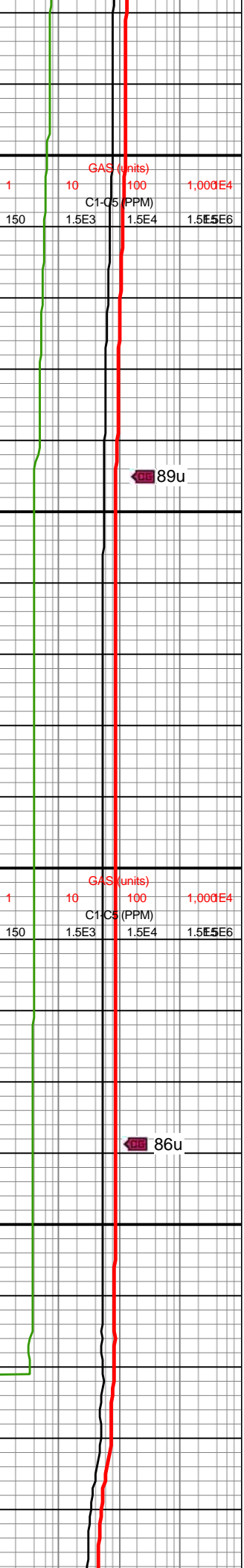
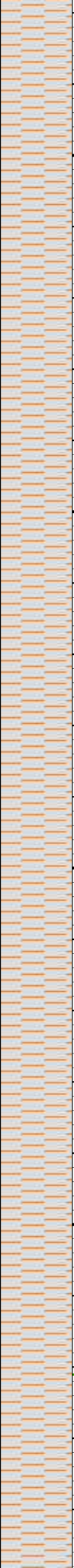
MD: 7,021'  
INC: 0.07°  
AZM: 173.75°  
TVD: 6,953.48'  
VS: -268.71'

MD: 7,116'  
INC: 0.06°  
AZM: 228.76°  
TVD: 7,048.48'  
VS: -268.81'

**KOP**  
7168'MD/7100'TVD

VIS: 55  
MW: 9.1

WOB: 10

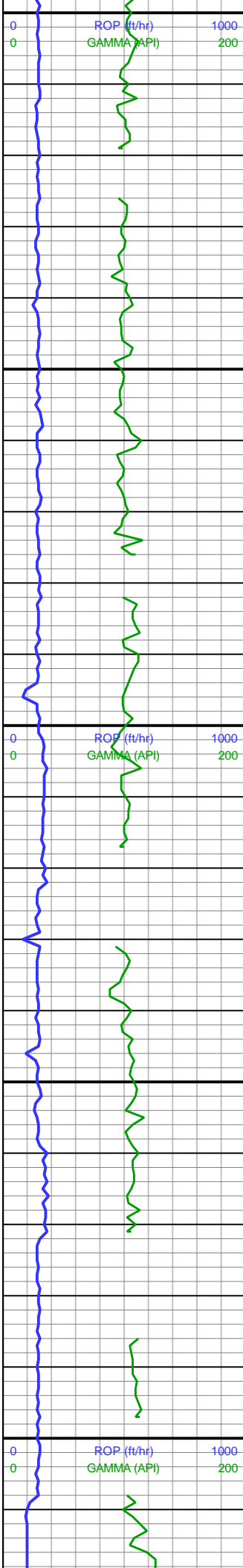


100% SLTY SH: MED GY, SM  
BLK CTNG, BRN IP, SM TO  
SL GR TY TEX, DULL TO  
RTHY LSTR, SFT TO FRM,  
SB BLKY TO BLKY, AMOR,  
SB FISS TO FISS, F SLT  
CTG, SL CALC, SL H2O SENS

100% SLTY SH: MED GY,  
BRN IP, SM BLK CTNG, SM  
TO SL GR TY TEX, DULL TO  
RTHY LSTR, SFT TO FRM,  
SB BLKY TO BLKY, AMOR,  
SB FISS TO FISS, F SLT  
CTG, SL H2O SENS







RPM: 90  
SPM: 186  
SPP: 3,276

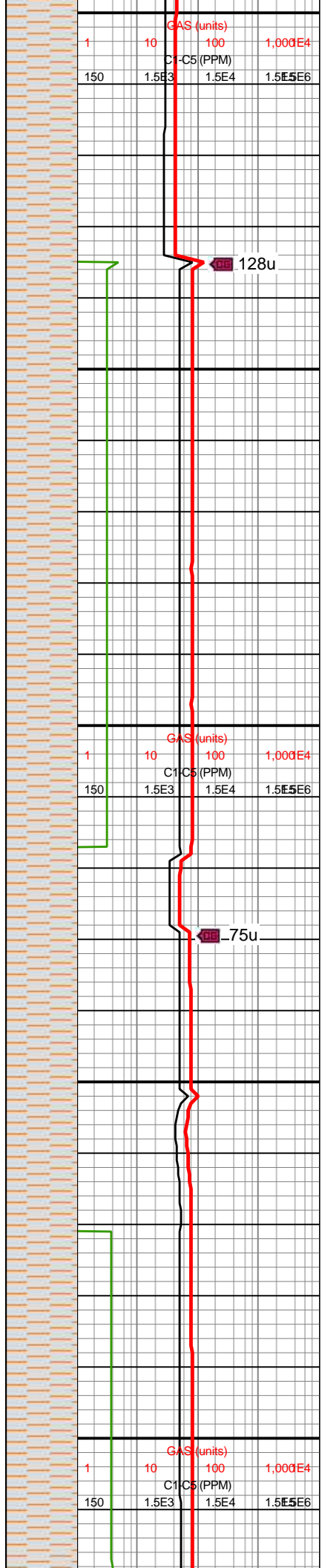
MD: 7,211'  
INC: 4.63°  
AZM: 333.31°  
TVD: 7,143.37'  
VS: -265.7'

VIS: 54  
MW: 9.15

MD: 7,306'  
INC: 13.65°  
AZM: 0.32°  
TVD: 7,237.1'  
VS: -251.42'

WOB: 13  
RPM: 90  
SPM: 130  
SPP: 2,052

MD: 7,401'  
INC: 22.02°  
AZM: 2.11°  
TVD: 7,327.46'  
VS: -222.55'



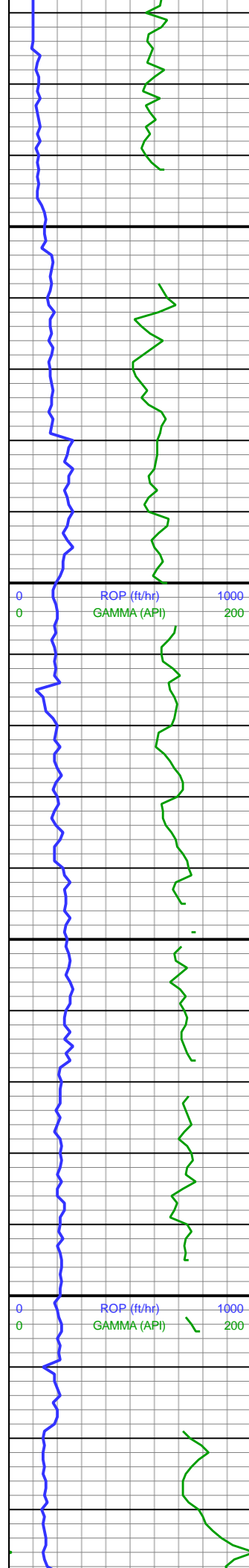
100% SLTY SH: DK GY,  
INCRG BRN IP, SM BLK  
CTNG, SM TO SL GR TY TEX,  
DULL TO RTHY LSTR, SFT  
TO FRM, SB BLKY TO BLKY,  
AMOR, SB FISS TO FISS, F  
SLT CTG, WK CALC, MNR  
H2O SENS

100% SLTY SH: MED-DK GY,  
BRN IP, SM BLK CTNG, SM  
TO SL GR TY TEX, DULL TO  
RTHY LSTR, SFT TO FRM,  
SB BLKY TO BLKY, AMOR,  
SB FISS TO FISS, F SLT  
CTG, WK CALC, MNR H2O  
SENS

100% SLTY SH: MED GY,  
BRN IP, SM BLK CTNG, SM  
TO SL GR TY TEX, DULL TO  
RTHY LSTR, PREDY SFT,  
FRM, SB BLKY TO BLKY,  
AMOR, SB FISS TO FISS, F  
SLT CTG, V WK CALC, MNR  
H2O SENS

100% SLTY SH: MED GY,  
BRN IP, SM BLK CTNG, SM  
TO SL GR TY TEX, DULL TO  
RTHY LSTR, PREDY SFT,  
FRM, SB BLKY TO BLKY,  
AMOR, SB FISS TO FISS, F  
SLT CTG, V WK CALC, MNR  
H2O SENS





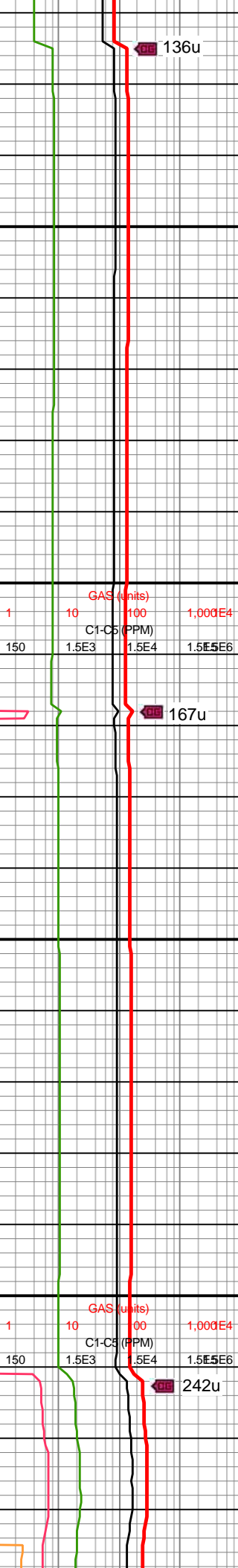
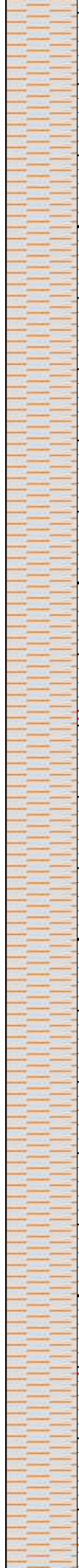
7,420  
7,430  
7,440  
7,450  
7,460  
7,470  
7,480  
7,490  
7,500  
7,510  
7,520  
7,530  
7,540  
7,550  
7,560  
7,570  
7,580  
7,590  
7,600  
7,610  
7,620  
7,630

MD: 7,496'  
INC: 32.13°  
AZM: 357.65°  
TVD: 7,411.94'  
VS: -179.9'

MD: 7,590'  
INC: 41.39°  
AZM: 3.06°  
TVD: 7,487.19'  
VS: -124.24'

WOB: 9  
RPM: 90  
SPM: 186  
SPP: 3,428

VIS: 58  
MW: 9.2



100% SLTY SH: DK GY, SM TO SL GR TY TEX, DULL TO RTHY LSTR, PREDY SFT, FRM, SB BLKY TO BLKY, AMOR, SB FISS TO FISS, F SLT CTG, SM BLK CTNG

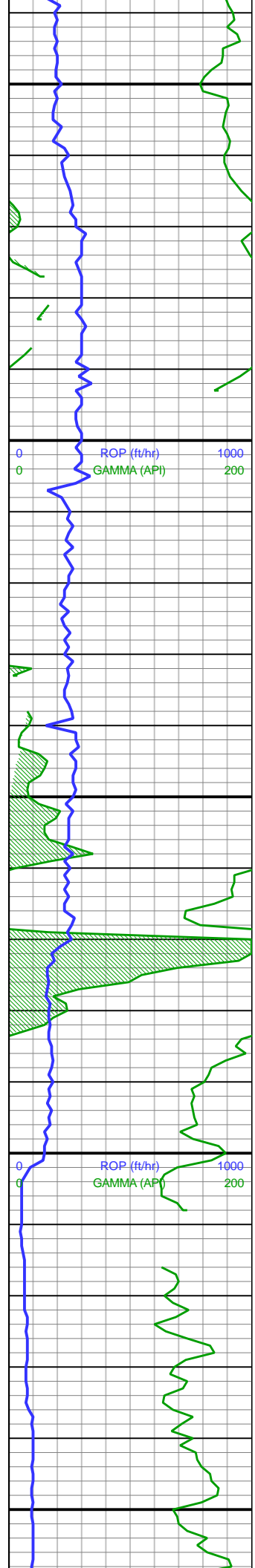
100% SLTY SH: DK GY, GR TY TEX, DULL TO RTHY LSTR, PREDY SFT, FRM, SB BLKY TO BLKY, AMOR, SB FISS TO FISS, F SLT CTG, MNR H2O SENS, SM BLK CTNG

100% SLTY SH: DK GY, SM TO SL GR TY TEX, DULL TO RTHY LSTR, PREDY SFT, FRM, SB BLKY TO BLKY, AMOR, SB FISS TO FISS, F SLT CTG, MNR H2O SENS, SM CTNG

100% SLTY SH: DK GY, GR TY-SM TEX, DULL TO RTHY LSTR, PREDY SFT, FRM, SB BLKY TO BLKY, AMOR, SB FISS TO FISS, F SLT CTG, MNR H2O SENS, SM BLK CTNG

100% SLTY SH: DK GY, COM





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  
7,830  
7,840  
7,850

**Sharon Springs**  
7678'MD/7548'TVD

MD: 7,684'  
INC: 52.1°  
AZM: 6.5°  
TVD: 7,551.52'  
VS: -56.01'

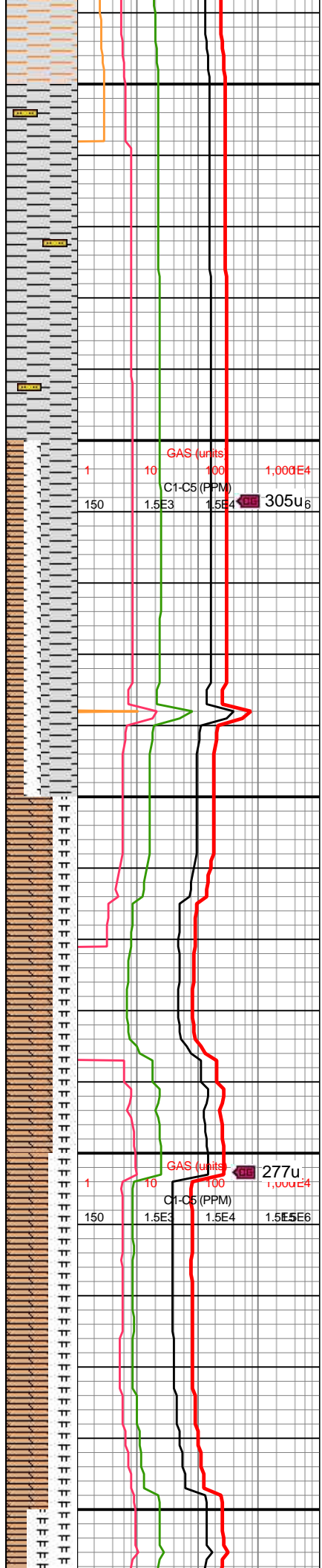
**Niobrara**  
7760'MD/7595'TVD

MD: 7,779'  
INC: 59.28°  
AZM: 6.5°  
TVD: 7,605.03'  
VS: 22.37'

WOB: 17  
RPM: 90  
SPM: 186  
SPP: 3,438

**MM**

VIS: 57  
MW: 9.15



SM TEX, DULL TO RTHY  
LSTR, PREDY SFT, FRM, SB  
BLKY TO BLKY, AMOR, SB  
FISS TO FISS, F SLT CTG

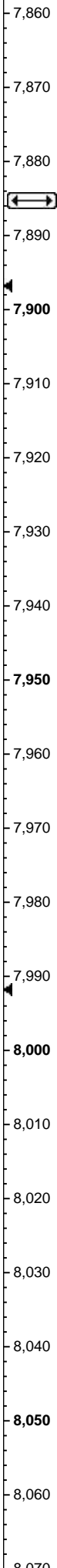
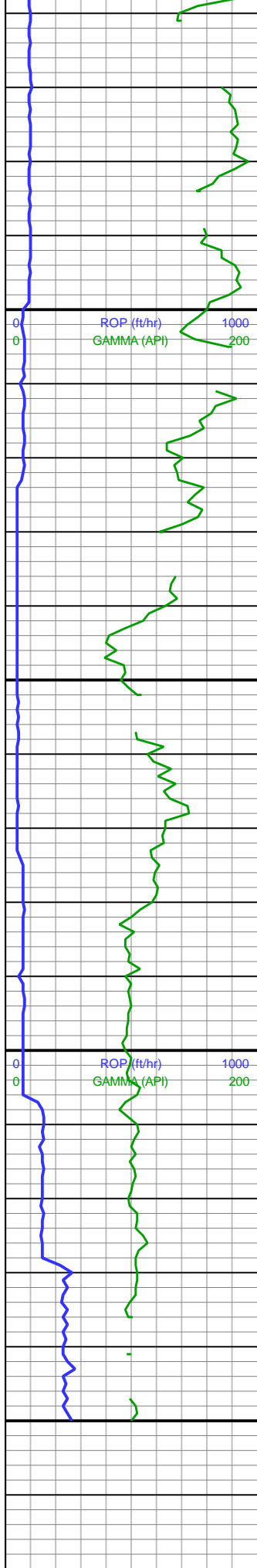
100% SH: PREDY DK  
GY-MED LT GY, INCRG BRN,  
SM TEX, DULL TO RTHY  
LSTR, PREDY SFT, RR FRM,  
SB BLKY-BLKY, AMOR, SB  
FISS TO FISS, NO CALC

50% SH: PREDY DK GY-MED  
LT GY, INCRG BRN, SM TEX,  
DULL TO RTHY LSTR,  
PREDY SFT, RR FRM, AMOR,  
SB FISS TO FISS; 25%  
MRLST: DK GY, FRM-HD,  
MOT, COM INTBD CHK, HI  
LSTR, RTHY TEX, HI CALC;  
25% CHK: OFFWHT-BRN,  
DULL LSTR, CHKY TEX, MOD  
CALC; TR PP PYR NOD

65% CHK: OFFWHT-GYSHBN,  
DULL LSTR, CHKY TEX,  
VUGY, MRLST INTBD, MOD  
CALC; 35% MRLST: DK GY,  
FRM-HD, MOT, COM CHK  
LAM, HI LSTR, RTHY TEX, HI  
CALC; TR PP PYR NOD

55% CHK: GYSHBN-MED GY,  
DULL-RTHY LSTR, FRM,  
CHKY TEX, VUGY, MRLST  
INTBD, MOD CALC; 45%  
MRLST: DK GY, FRM-HD,  
MOT, OCC CHK LAM, HI  
LSTR, RTHY TEX, HI CALC





MD: 7,873'  
INC: 71.7°  
AZM: 1.43°  
TVD: 7,643.97'  
VS: 107.45'



**Niobrara B**  
7886'MD/7648'TVD

MD: 7,968'  
INC: 84.85°  
AZM: 357.91°  
TVD: 7,663.24'  
VS: 199.21'

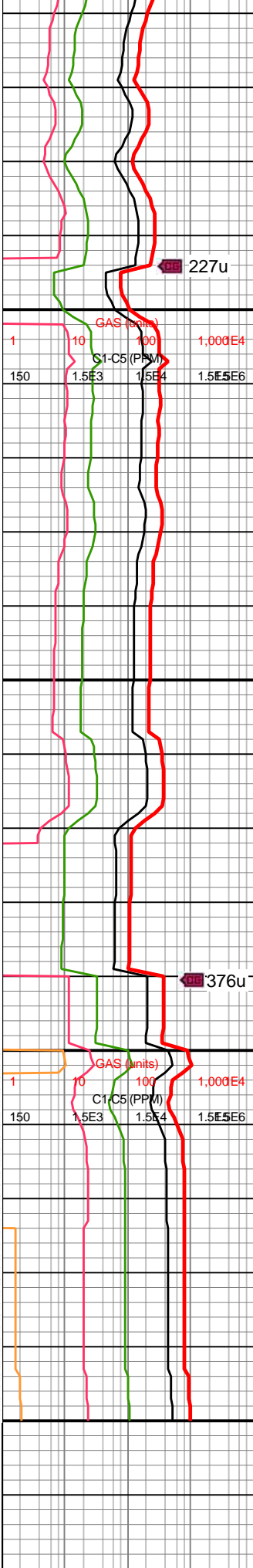
WOB: 16  
RPM: 109  
SPM: 172  
SPP: 3,018

MD: 8,031'  
INC: 89.6°  
AZM: 354.6°  
TVD: 7,666.29'  
VS: 260.74'

**LAND CURVE**  
8031'MD/7,666'TVD

**End of Vertical Log**

**Continued on Horizontal Log**



70% MRLST: DK GY, FRM-HD, MOT IP, RR CHK LAM, DULL-HI LSTR, RTHY-SL SM TEX, HI CALC; 30% CHK: MED GY, RTHY LSTR, FRM, CHKY TEX, VUGY, MRLST INTBD IP, MOD CALC

85% MRLST: DK GY, SME BLK IP, FRM-HD, RR CHK LAM, DULL-HI LSTR, RTHY-SL SM TEX, HI CALC; 15% CHK: MED-DK GY, RTHY LSTR, FRM, CHKY TEX, VUGY IP, MOD CALC

85% MRLST: DK GY, SME BLK IP, MOT IP, HD, OCC CHK LAM, HI LSTR, RTHY TEX, HI CALC; 15% CHK: OFF WHT-MED GY, DULL-RTHY LSTR, FRM, CHKY TEX, VUGY IP, MOD CALC

50% CHK: OFF WHT-MED GY, MOT, DULL LSTR, FRM-HD IP, CHKY TEX, OCC INTRBDD MRLST, VUGY, MOD CALC; 50% MRLST: DK GY, SME BLK IP, MOT IP, HD, OCC CHK LAM, HI LSTR, RTHY-SL SM TEX, HI CALC

