

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Castor Federal LD15-73-1HN

**Location** NENE SEC 15 T9N R58W

**State** COLORADO

**County** WELD

**Country** UNITED STATES

**Rig Number** H&P 273

**API Number** 05-123-37432

**Region** DJ BASIN

**Field** WILDCAT

**Spud Date** 12/17/2013

**Drilling Completed** 12/18/2013

**Surface Coordinates** 300' FNL; 698' FEL

**Ground Elevation** 4706'

**K.B. Elevation** 4730'

**Logged Interval** 1225' **To** 4838'

**Total Depth** 4838'

**Formation** NIOBRARA

**Type of Drilling Fl...** LSND

## Operator

**Company** NOBLE ENERGY INC.

**Address** 1625 Broadway Suite 2200  
Denver, CO 80202

## Geologist

**Name** SARAH COMPTON

**Company** NOBLE ENERGY INC.

**Address** 1625 Broadway Suite 2200  
Denver, CO 80202

## Other

Wellsite Geologist #1: LAURA KELLOGG

Wellsite Geologist #2: CONOR PESICKA

## Rock Types

UNKNOWN	CEMENT	IGNEOUS	SHALE GRAY
CHALK	CHERT	LIMESTONE	SHALY SILTSTONE
MARLSTONE	CLAY CHOKE SAND	SIDERITE or LIMONITE	SILTSTONE
SANDSTONE	CLAYSTONE	METAMORPHIC	TILL
SHALY SANDSTONE	COAL	NO SAMPLE	TUFF
SILTY SHALE	CONGLOMERATE	SALT	WELDED TUFF
ANHYDRITE	DOLOMITE	SALT- PEPPER SAND	
BENTONITE	GRANITE	SHALE	
BRECCIA	GYPSUM	SHALE COLORED	

## Accessories

### Fossils

ALGAE
AMPHIPORA
BELEMNITE
BIOCLASTIC
BRACHIOPOD
BRYOZOA
CEPHALOPOD
CORAL
CRINOID
ECHINOID
FISH
FORAMINIFERA

### Fossil

GASTROPOD
INOCERAMUS
OOLITE
OSTRACOD
PELECYPOD
PELLET
PISOLITE
PLANT REMAINS
PLANT SPORES
SCAPHOPOD
STROMATOPOROID

### Minerals

### ANHYDRITIC

ARGILLACEOUS
ARGILLITE GRAIN
BENTONITE
BITUMENOUS SUBSTANCE
BRECCIA FRAGMENTS
CALCAREOUS
CARBONACEOUS FLAKES
CHTDK
CHTLT
COAL - THIN BEDS
DOLOMITIC
FELDSPAR
FERRUGINOUS PELLET

### FERRUGINOUS

GLAUCONITE
GYPSIFEROUS
HEAVY MINERAL
KAOLIN
MARLSTONE
MINERAL CRYSTALS
NODULES
PHOSPHATE PELLETS
PYRITE
SALT CAST
SANDY
SILICEOUS
SILTY

### TUFFACEOUS

### Stringer

ANHYDRITE STRINGER
BENTONITE STRINGER
COAL STRINGER
DOLOMITE STRINGER
GYPSUM STRINGER
LIMESTONE STRINGER
MARLSTONE (CALC) STRG
MARLSTONE (DOL) STRG
SANDSTONE STRINGER
SHALE STRINGER
SILTSTONE STRINGER

## Other Symbols

### Oil Show

DEAD
EVEN
QUESTIONABLE
SPOTTED STAINING

### Porosity

E EARTHY
F FENESTRAL
F FRACTURE
X INTERCRYSTALLINE
INTEROOLITIC

### MOLDIC

ORGANIC
P PINPOINT
VUGGY

### Engineering

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

### FAULT

FORMATION TOP
GAS SHOW
MN DEPTH 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

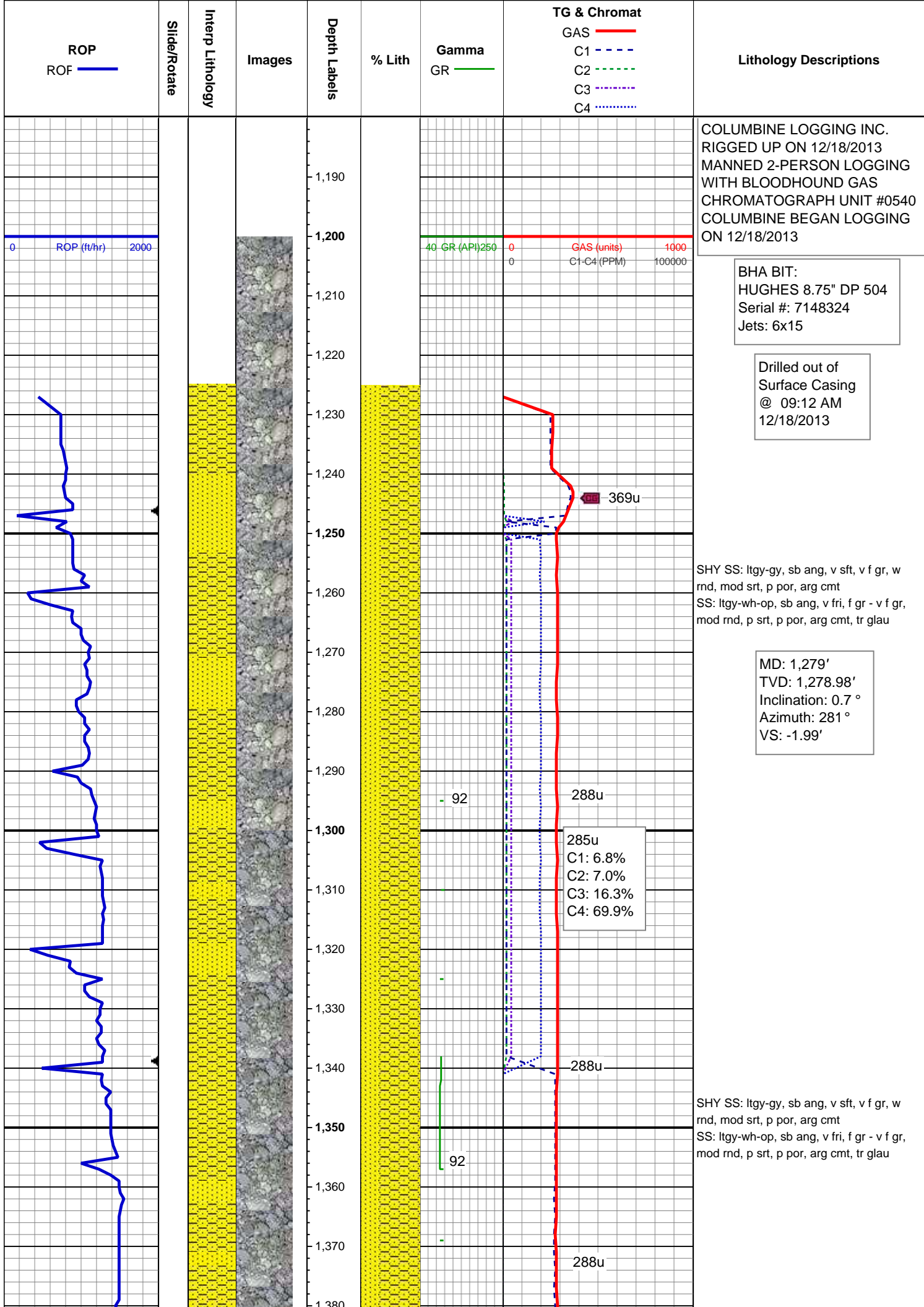
BOUNDSTONE
CHALKY
CRYPTOXLN

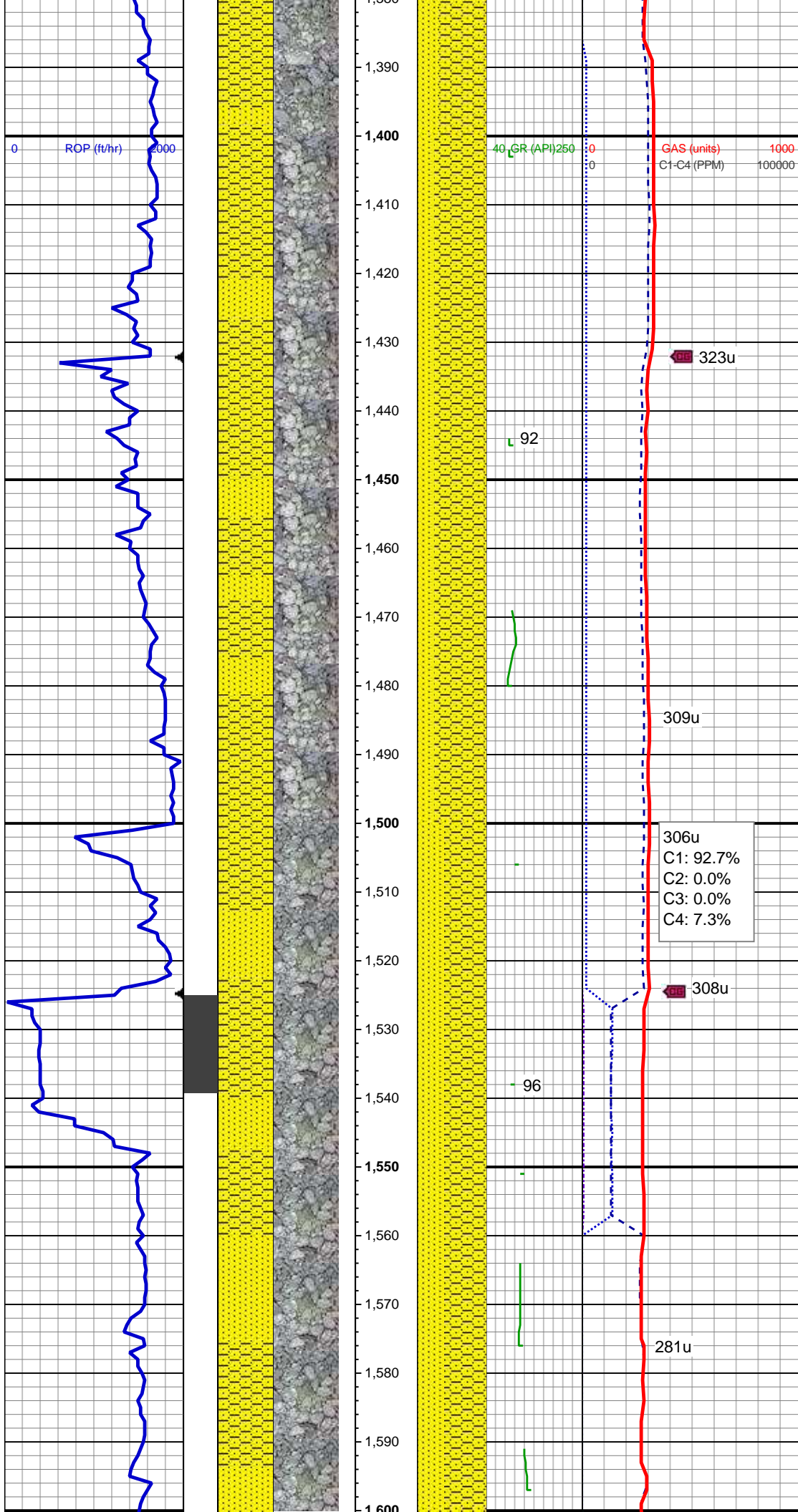
### E EARTHY

FINELYXLN
GRAINSTONE
L LITHOGRAPHIC
MX MICROXLN
MS MUDSTONE
PS PACKSTONE
WS WACKESTONE

### Sorting

M MODERATE
P POOR
W WELL





SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SS: ltgy-wh-op, sb ang, v fri, f gr - v f gr,  
mod rnd, p srt, p por, arg cmt, tr glau, tr  
lith frag

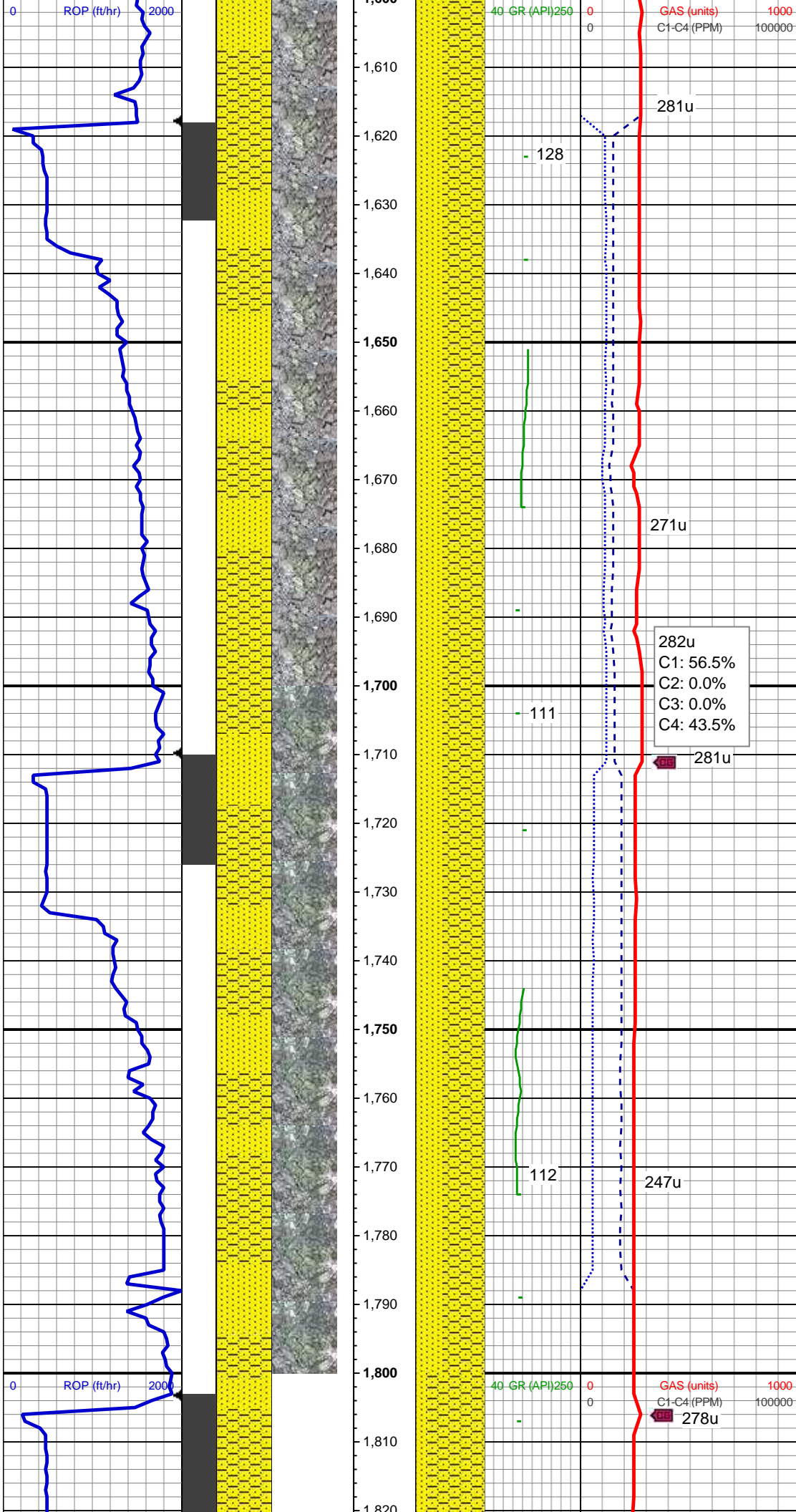
MD: 1,465'  
TVD: 1,464.97'  
Inclination: 0.8 °  
Azimuth: 272.2 °  
VS: -2.19'

306u  
C1: 92.7%  
C2: 0.0%  
C3: 0.0%  
C4: 7.3%

SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SS: ltgy-wh-op, sb ang, v fri, f gr - v f gr,  
mod rnd, p srt, p por, arg cmt, tr glau, tr  
lith frag

MD: 1,558'  
TVD: 1,557.94'  
Inclination: 2 °  
Azimuth: 308.1 °  
VS: -3.15'





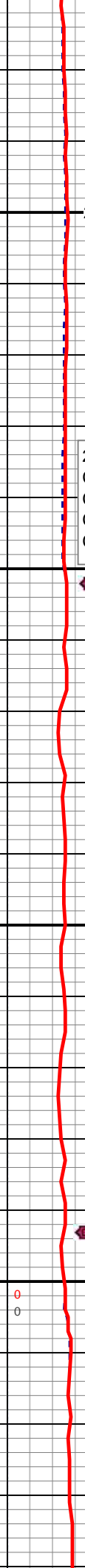
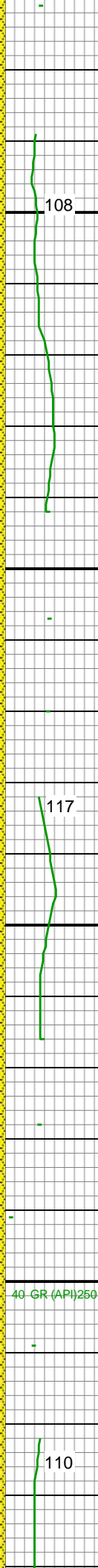
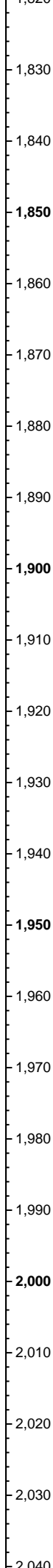
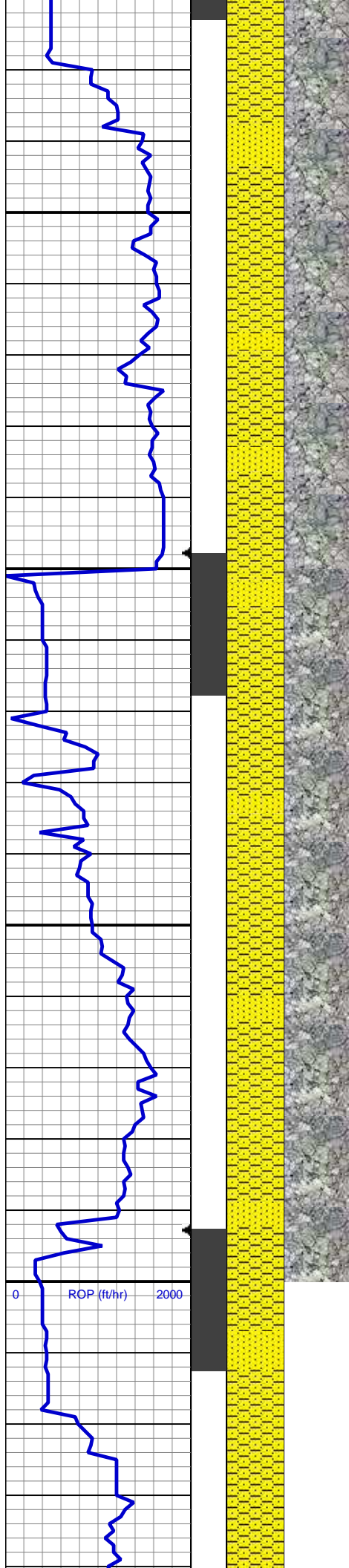
MD: 1,650'  
TVD: 1,649.85'  
Inclination: 2.9 °  
Azimuth: 311.6 °  
VS: -5.6'

SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SS: ltgy-wh-op, sb ang, v fri, f gr - v f gr,  
mod rnd, p srt, p por, arg cmt, tr glau, tr  
lith frag

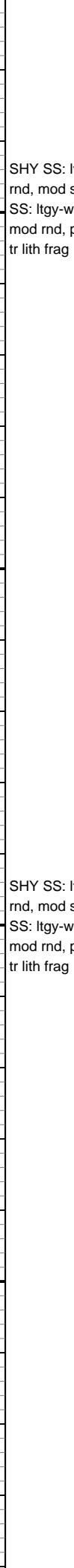
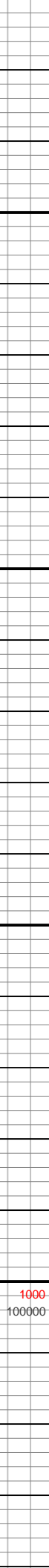
WT IN 8.60/ OUT 8.60  
VIS IN 27/ OUT 27

MD: 1,743'  
TVD: 1,742.68'  
Inclination: 4 °  
Azimuth: 312.1 °  
VS: -9.21'

SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SS: ltgy-wh-op, sb ang, v fri, f gr - v f gr,  
mod rnd, p srt, p por, arg cmt, tr glau, tr  
lith frag



253u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%



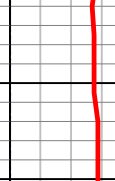
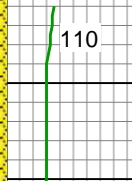
MD: 1,838'  
TVD: 1,837.35'  
Inclination: 5.5 °  
Azimuth: 306.5 °  
VS: -13.95'

SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SS: ltgy-wh-op, sb ang, v fri, f gr - v f gr,  
mod rnd, p srt, p por, arg cmt, occ glau,  
tr lith frag

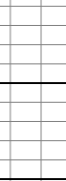
MD: 1,933'  
TVD: 1,931.82'  
Inclination: 6.6 °  
Azimuth: 300.4 °  
VS: -19.16'

SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SS: ltgy-wh-op, sb ang, v fri, f gr - v f gr,  
mod rnd, p srt, p por, arg cmt, occ glau,  
tr lith frag

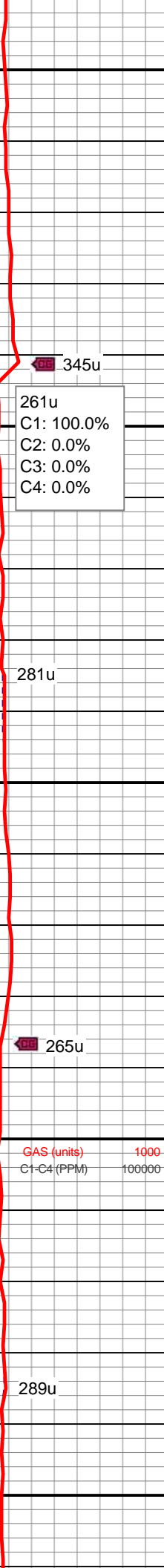
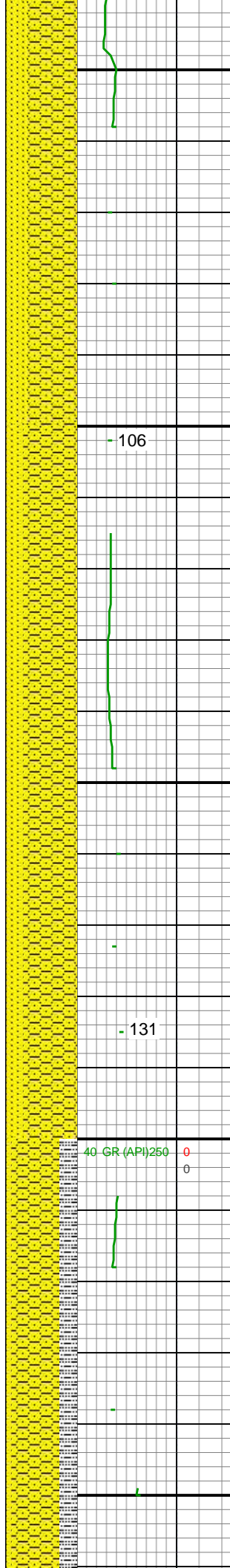
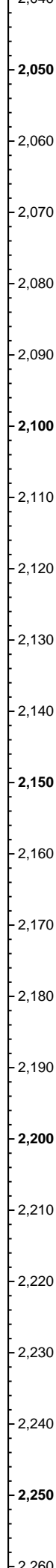
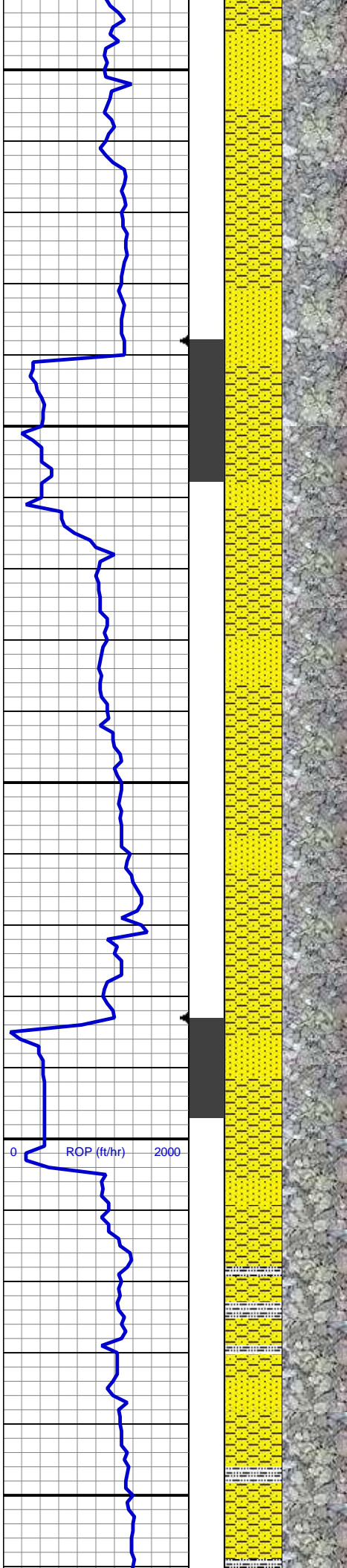
MD: 2,028'  
TVD: 2,026.03'  
Inclination: 8.2 °  
Azimuth: 308.8 °  
VS: -25.87'



291u







SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SS: ltgy-wh-op,s&p ip, sb ang, v fri, f gr -  
v f gr, mod rnd, p srt, p por, arg cmt, occ  
glau, tr lith frag

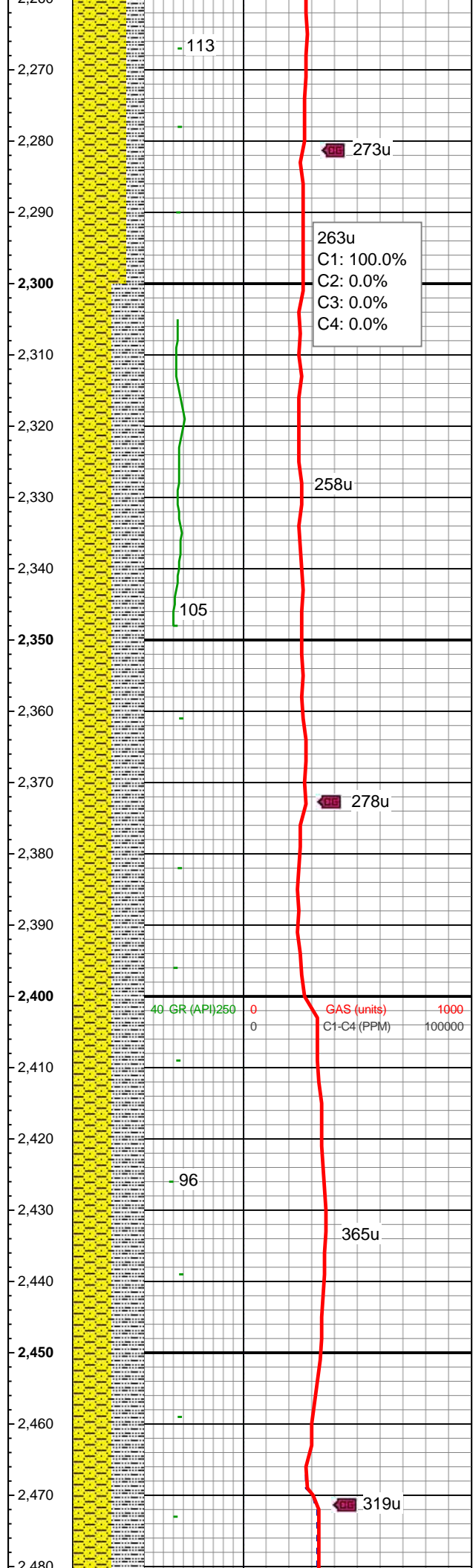
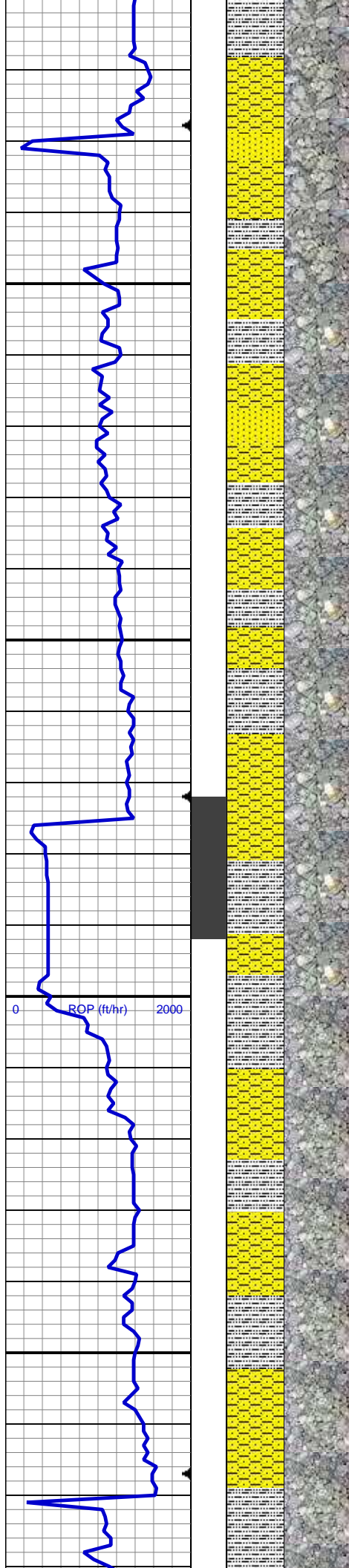
261u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

MD: 2,123'  
TVD: 2,120.04'  
Inclination: 8.4 °  
Azimuth: 301.6 °  
VS: -33.41'

SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SS: ltgy-wh-op,s&p ip, sb ang, v fri, f gr -  
v f gr, mod rnd, p srt, p por, arg cmt, occ  
glau, tr lith frag

MD: 2,218'  
TVD: 2,214.02'  
Inclination: 8.4 °  
Azimuth: 306.2 °  
VS: -40.79'

SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
slty tex, arg cmt  
SS: ltgy-wh-op,s&p ip, sb ang, v fri, f gr -  
v f gr, mod rnd, p srt, p por, arg cmt, occ  
glau, tr lith frag



WT IN 8.55/ OUT 8.55  
VIS IN 27/ OUT 27

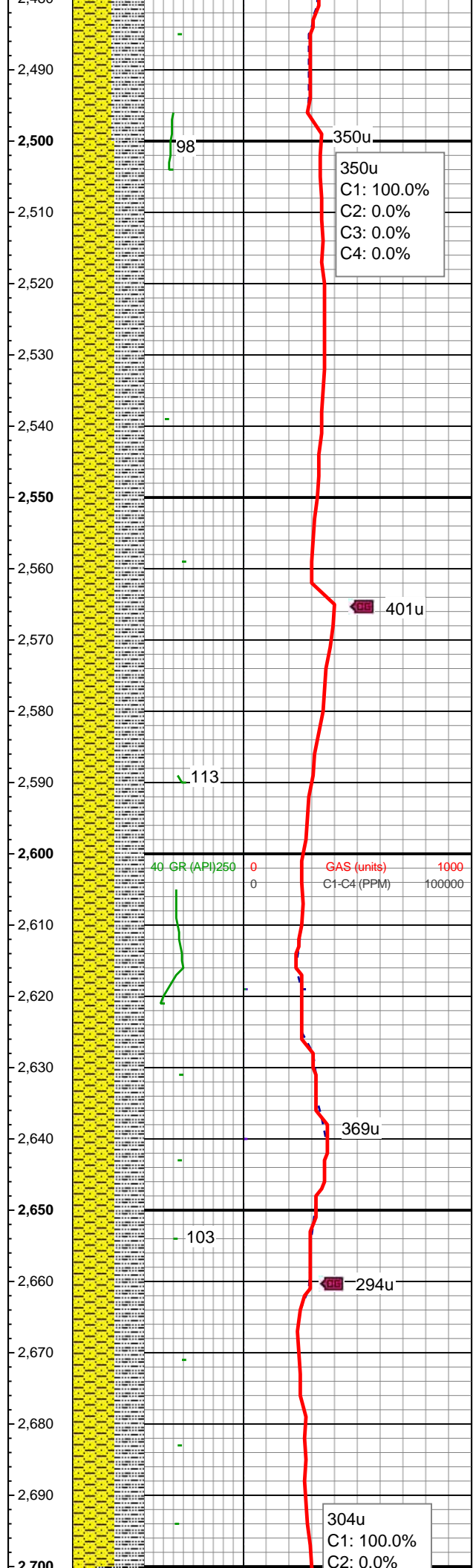
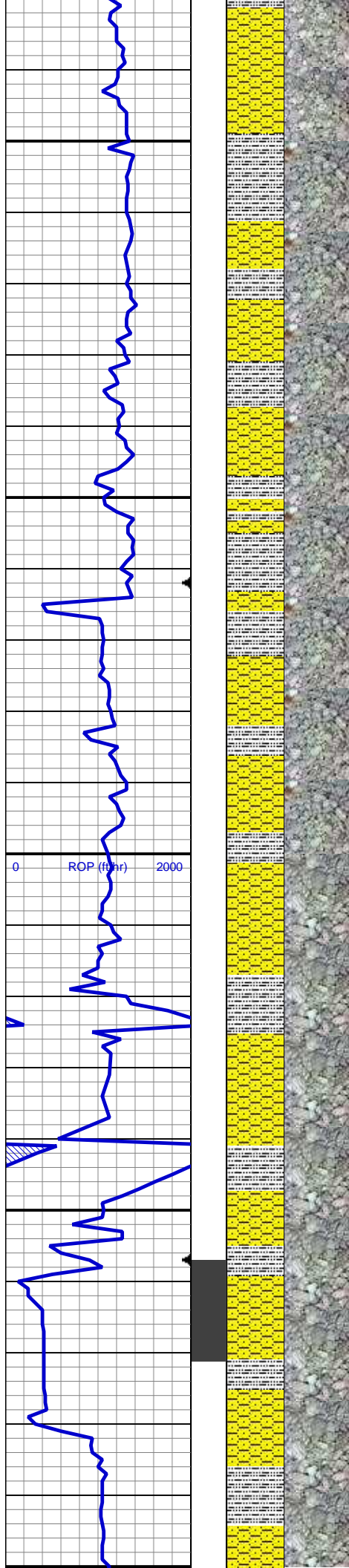
MD: 2,312'  
TVD: 2,307.13'  
Inclination: 7.4 °  
Azimuth: 306.9 °  
VS: -48.16'

SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
sfty tex, arg cmt  
SS: ltgy-wh-op,s&p ip, sb ang, v fri, f gr -  
v f gr, mod rnd, p srt, p por, arg cmt, occ  
glau, tr lith frag

MD: 2,407'  
TVD: 2,401.17'  
Inclination: 8.9 °  
Azimuth: 307.7 °  
VS: -56.01'

SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
sfty tex, arg cmt





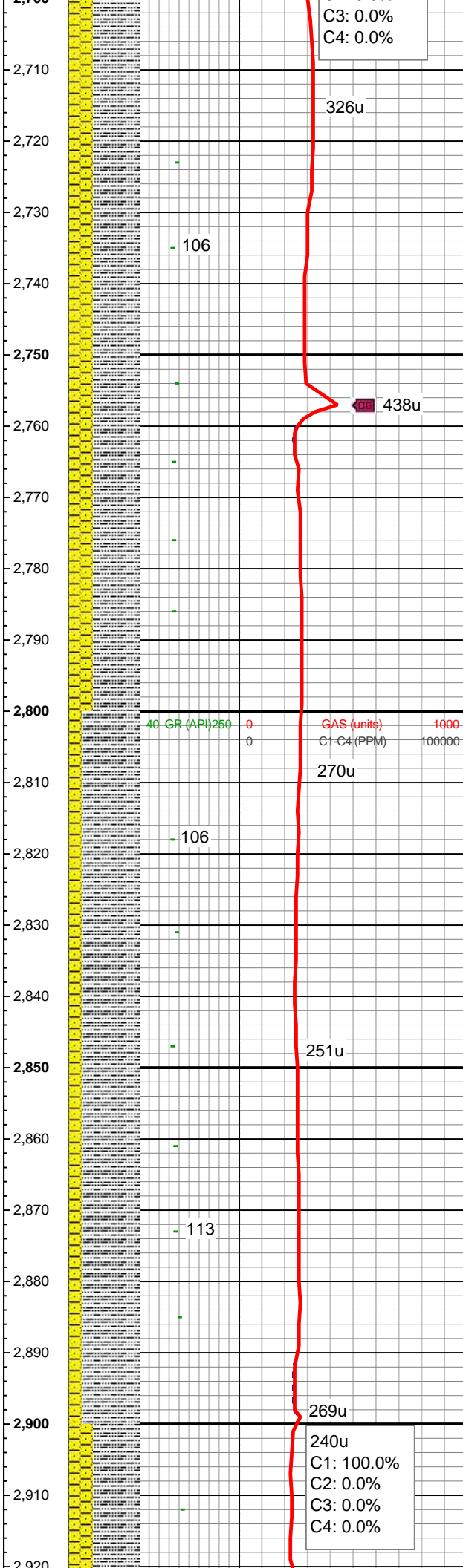
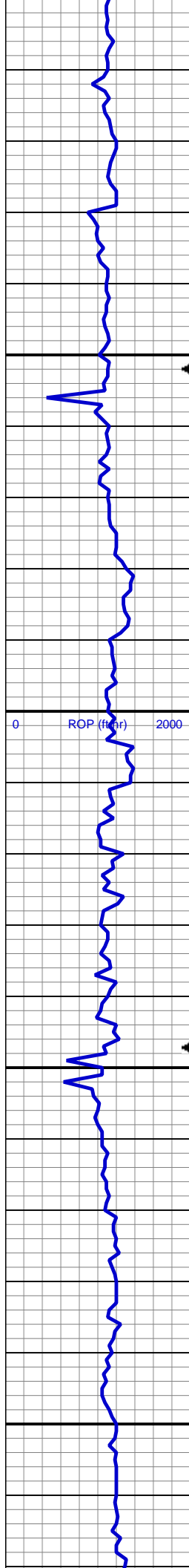
MD: 2,502'  
TVD: 2,495.04'  
Inclination: 8.8 °  
Azimuth: 306 °  
VS: -64.41'

SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
sly tex, arg cmt

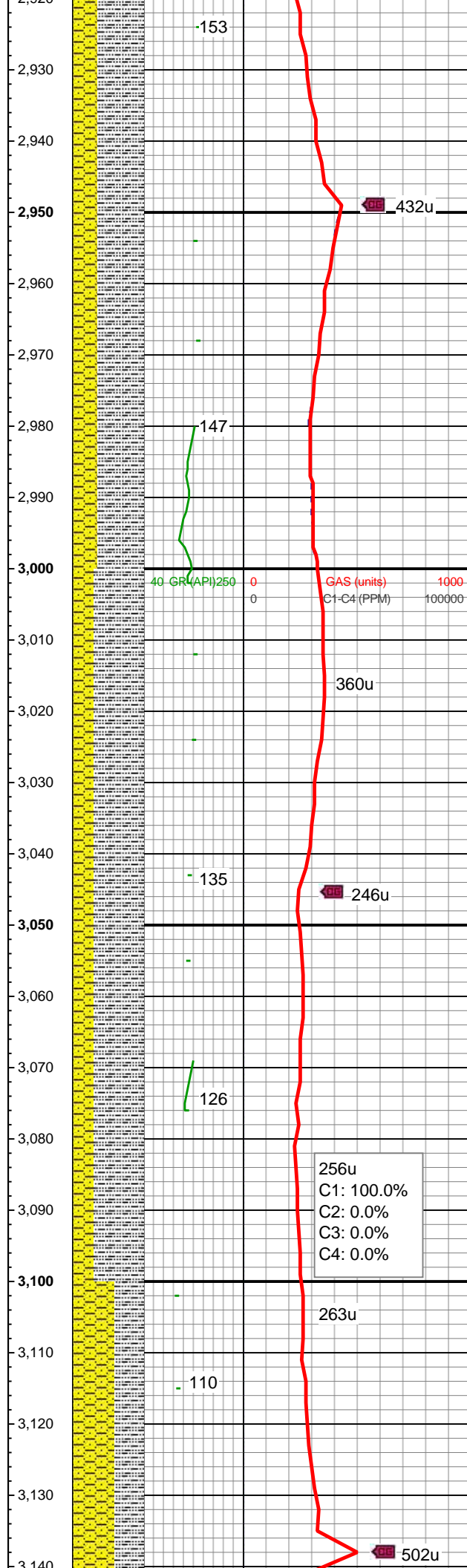
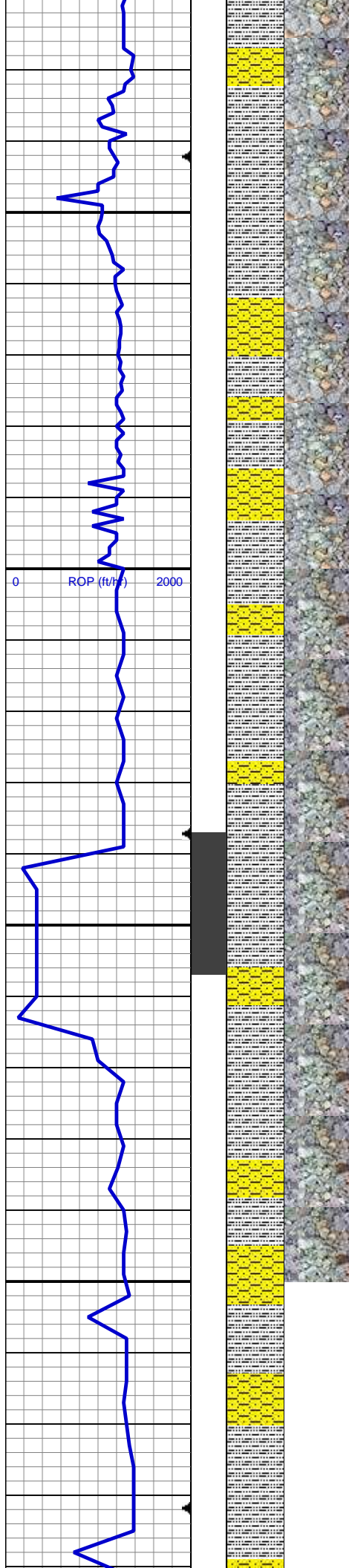
MD: 2,597'  
TVD: 2,588.96'  
Inclination: 8.5 °  
Azimuth: 306.7 °  
VS: -72.53'

SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
sly tex, arg cmt

MD: 2,692'  
TVD: 2,682.78'  
Inclination: 9.5 °  
Azimuth: 305.8 °  
VS: -80.95'







SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
slyt tex, arg cmt  
SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt

MD: 2,977'  
TVD: 2,964.4'  
Inclination: 7.9 °  
Azimuth: 299.3 °  
VS: -103.63'

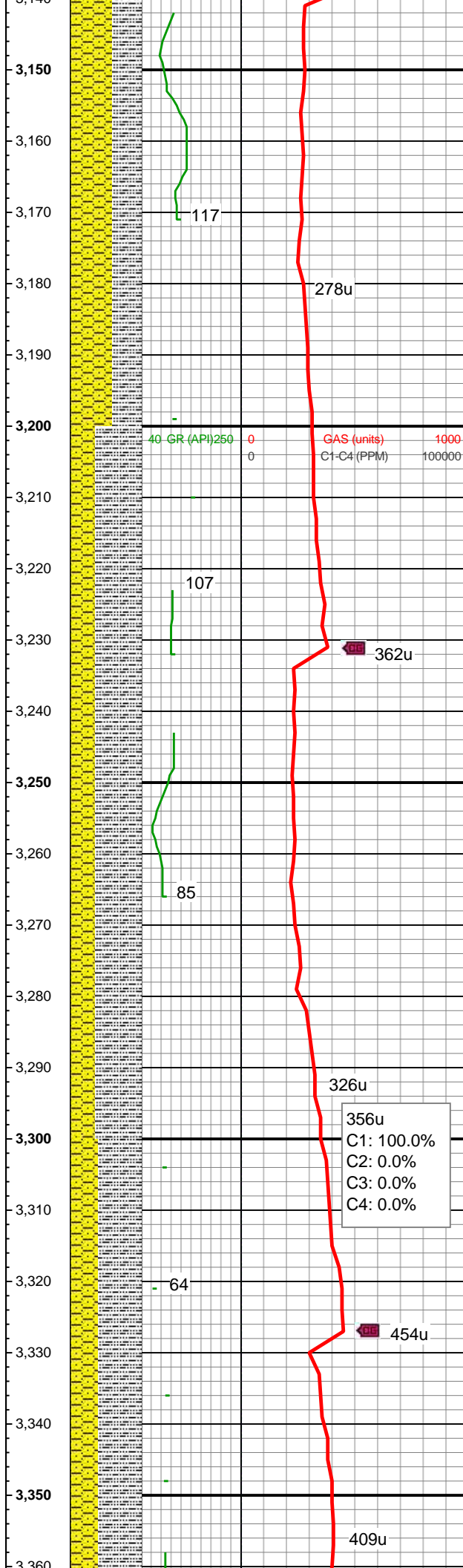
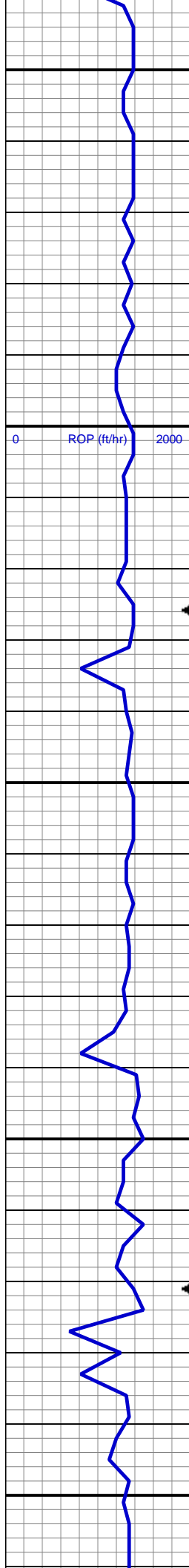
SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
slyt tex, arg cmt  
SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt

MD: 3,071'  
TVD: 3,057.35'  
Inclination: 9.2 °  
Azimuth: 303.5 °  
VS: -110.57'

WT IN 8.50/ OUT 8.50  
VIS IN 27/ OUT 27

256u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%





SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
sly tex, arg cmt

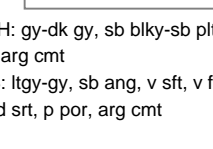
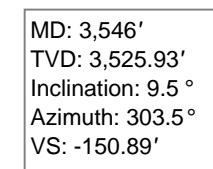
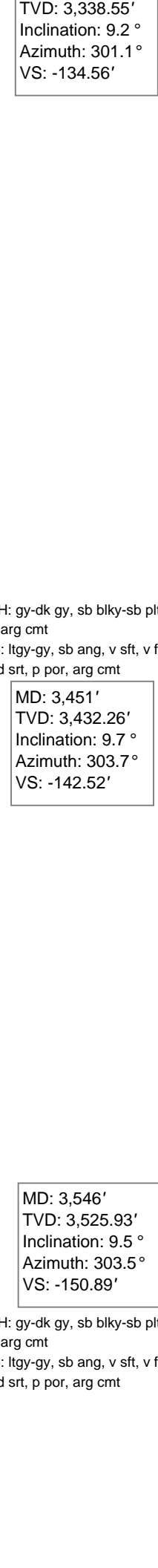
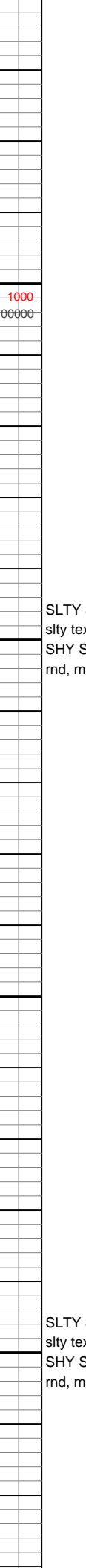
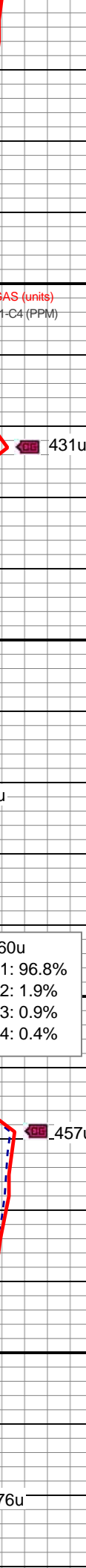
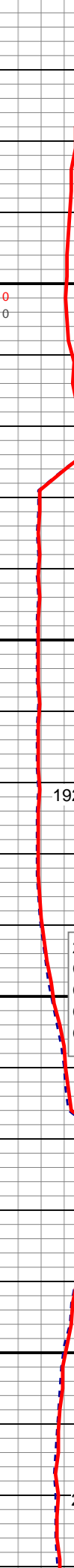
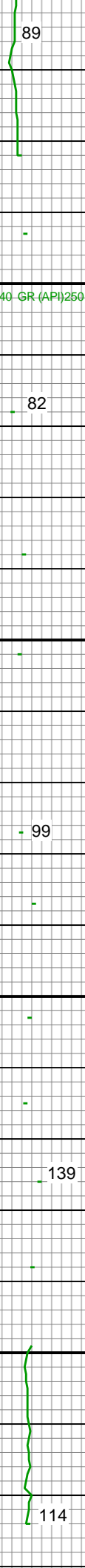
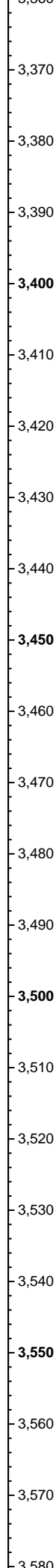
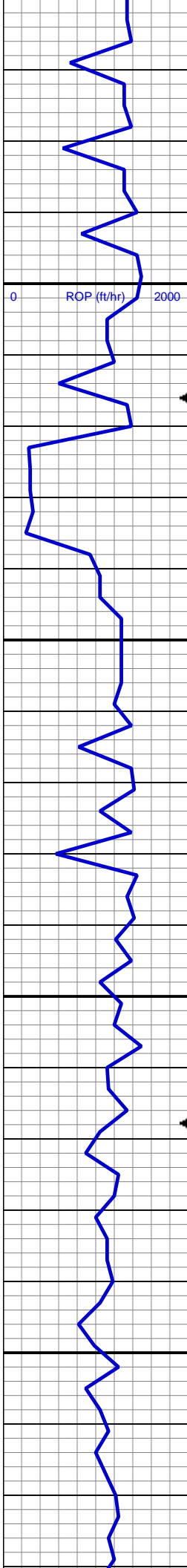
MD: 3,166'  
TVD: 3,151.08'  
Inclination: 9.6 °  
Azimuth: 303.3 °  
VS: -118.72'

SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
sly tex, arg cmt  
SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt

MD: 3,261'  
TVD: 3,244.79'  
Inclination: 9.3 °  
Azimuth: 303 °  
VS: -126.85'

SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
sly tex, arg cmt  
SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt

MD: 3,356'



89

82

431u

192u

99

260u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

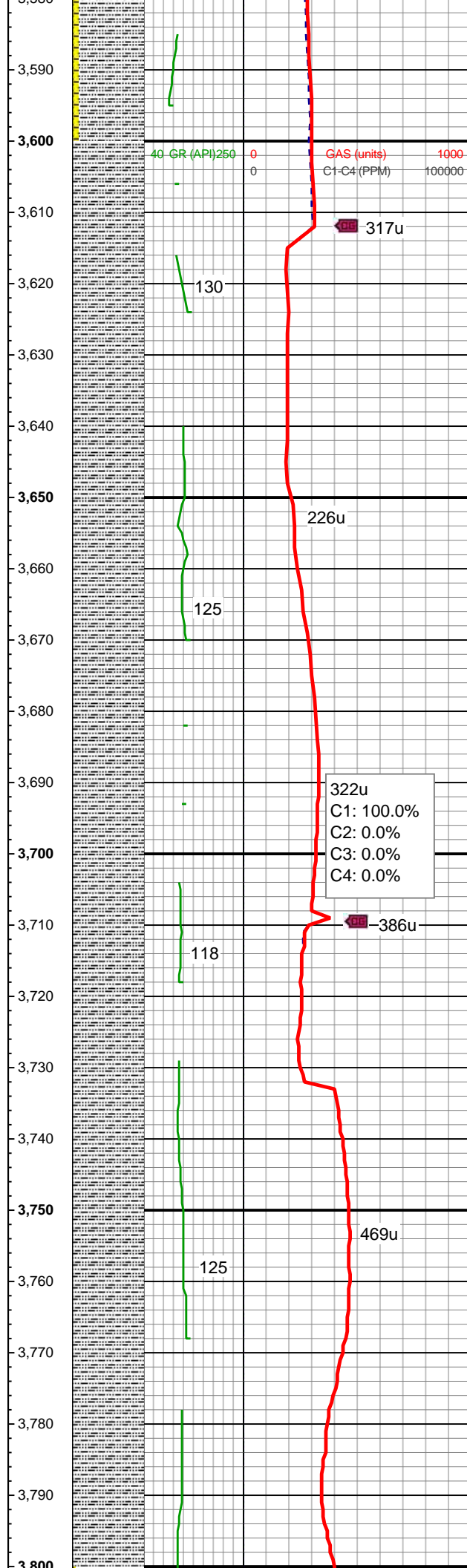
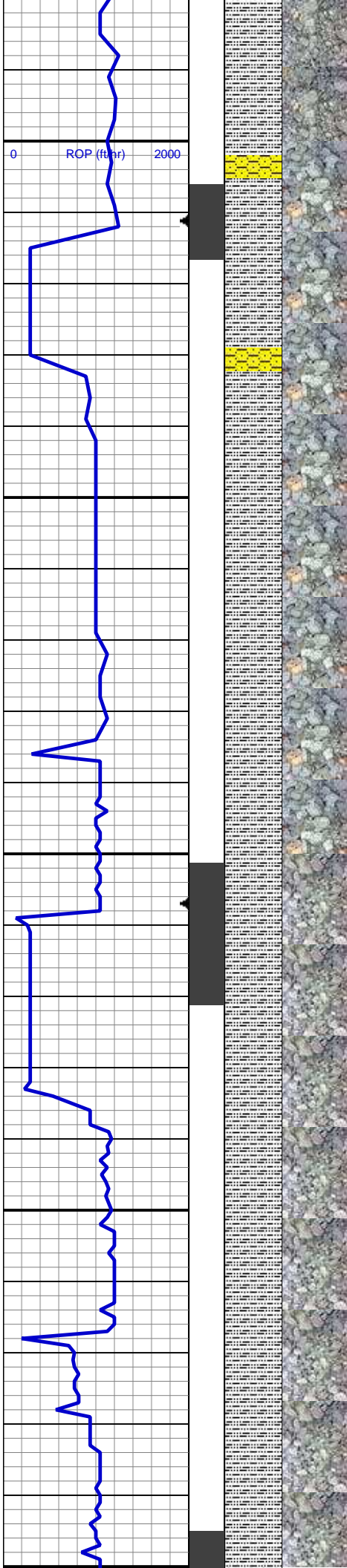
457u

139

114

276u





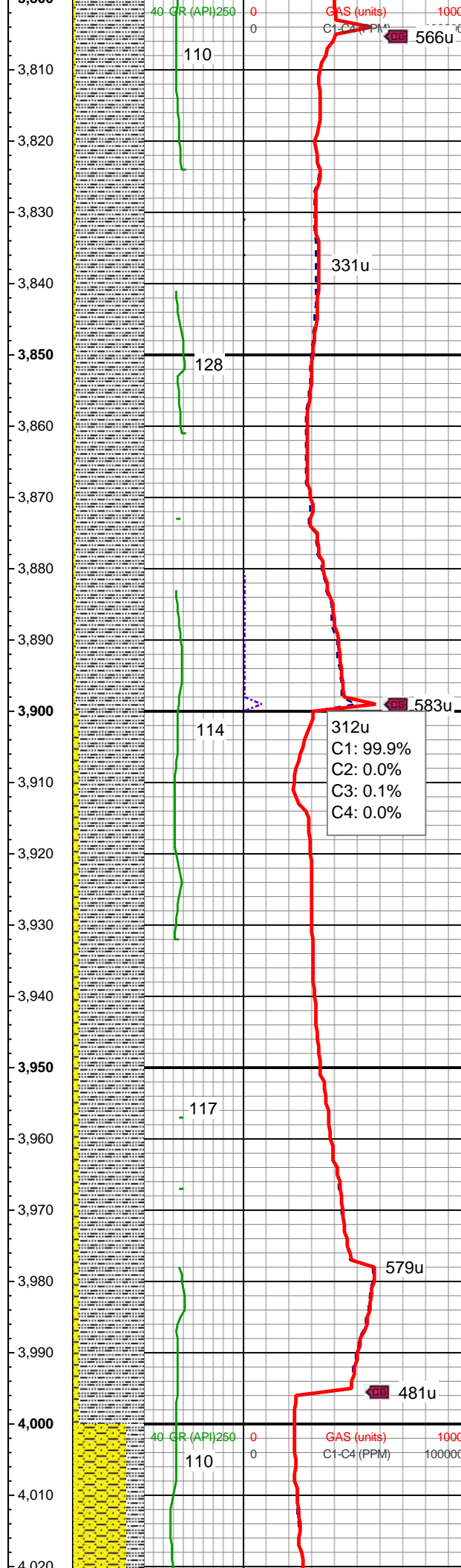
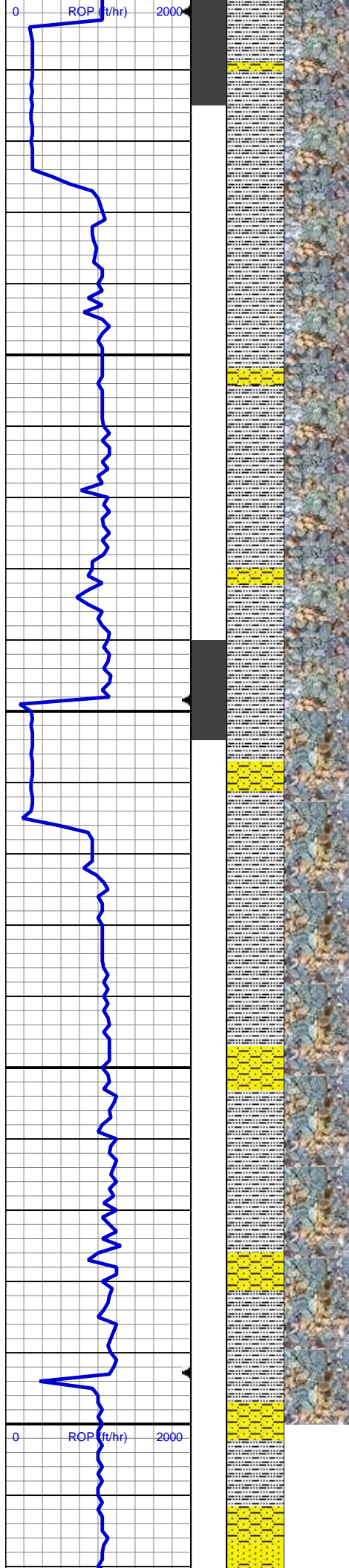
MD: 3,641'  
TVD: 3,619.83'  
Inclination: 8 °  
Azimuth: 295.8 °  
VS: -157.71'

SLTY SH: gy-dk gy, sb blk-y-sb plty, v sft,  
silty tex, arg cmt

MD: 3,736'  
TVD: 3,713.96'  
Inclination: 7.5 °  
Azimuth: 308.1 °  
VS: -164.09'

SLTY SH: gy-dk gy, sb blk-y-sb plty, v sft,  
silty tex, arg cmt





VIS IN 28/ OUT 28

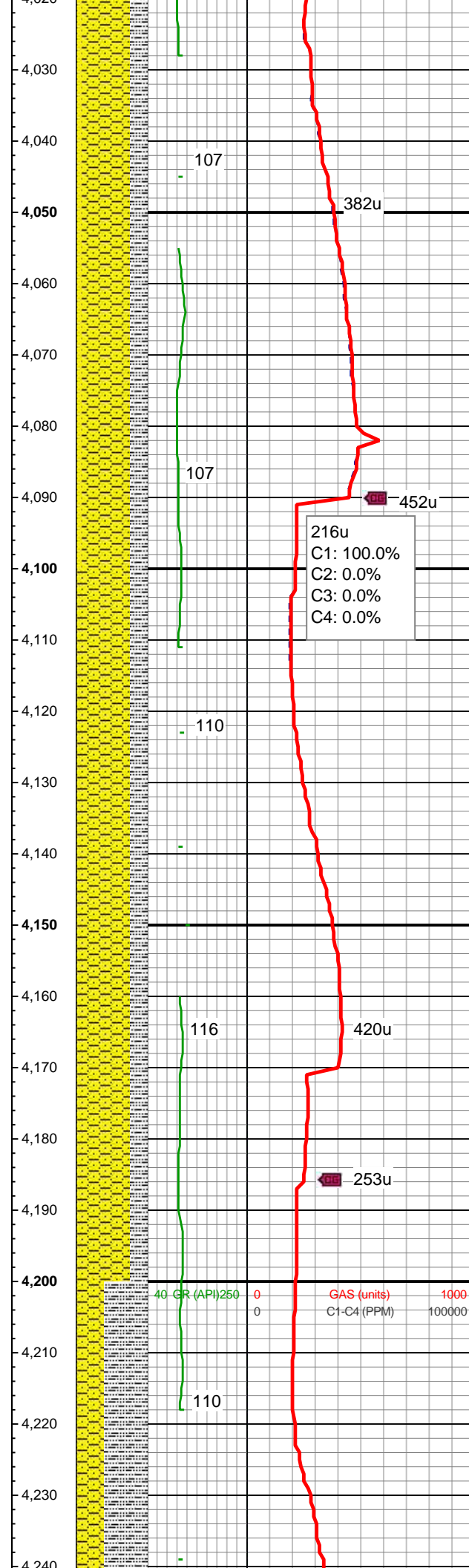
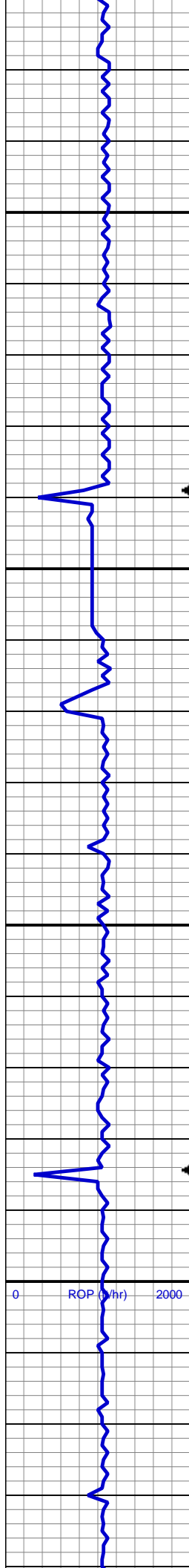
MD: 3,830'  
TVD: 3,807.17'  
Inclination: 7.4 °  
Azimuth: 306.9 °  
VS: -171.21'

SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
slyt tex, arg cmt  
SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt

MD: 3,925'  
TVD: 3,901.34'  
Inclination: 7.8 °  
Azimuth: 308.8 °  
VS: -178.62'

SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
slyt tex, arg cmt  
SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt

MD: 4,020'  
TVD: 3,995.57'  
Inclination: 6.8 °



Azimuth: 309 °  
VS: -185.91'

SLTY SH: gy-dk gy, sb blk-y-sb plty, v sft,  
slty tex, arg cmt  
SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt  
SS: ltgy-wh-op, sb ang-ang, v fri, f gr,  
mod rnd, mod srt, p por, arg cmt

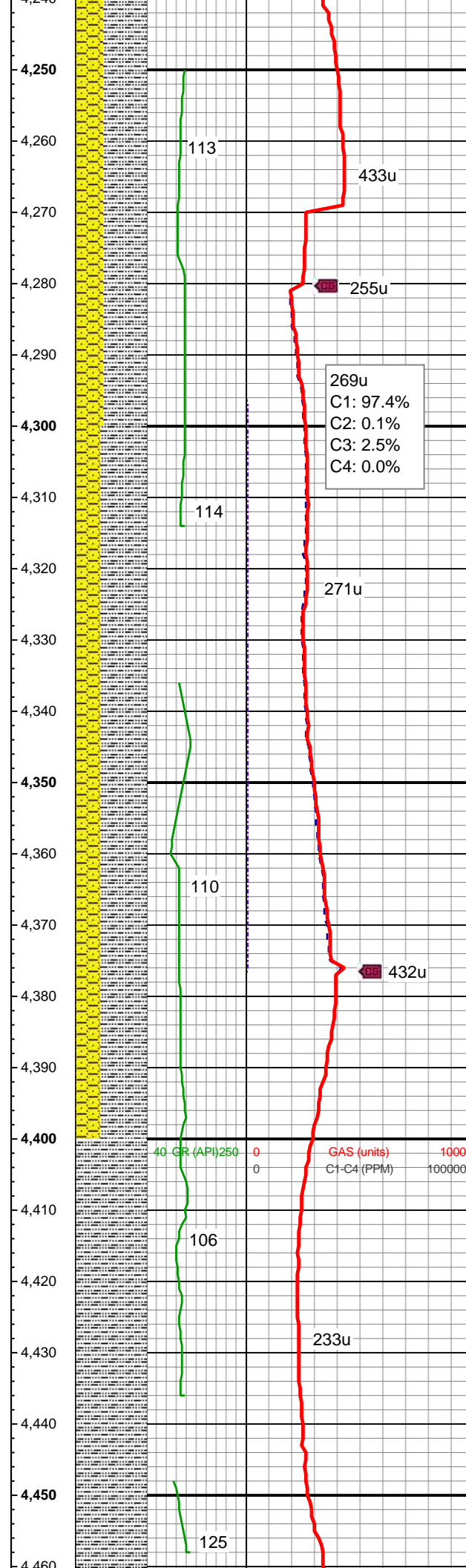
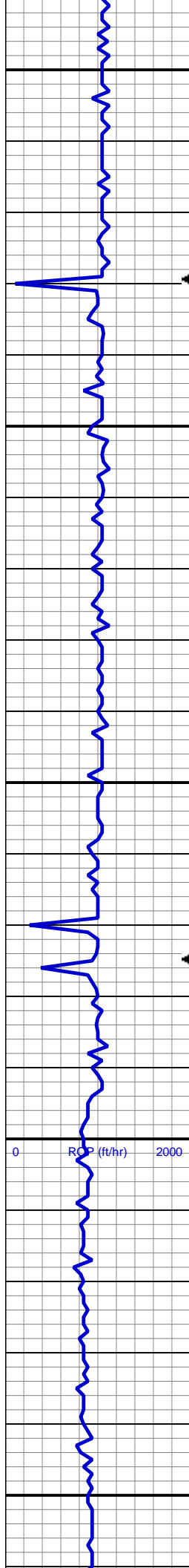
216u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

MD: 4,115'  
TVD: 4,089.96'  
Inclination: 6.1 °  
Azimuth: 309.9 °  
VS: -192.44'

SLTY SH: gy-dk gy, sb blk-y-sb plty, v sft,  
slty tex, arg cmt  
SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt

MD: 4,210'  
TVD: 4,184.52'  
Inclination: 4.9 °  
Azimuth: 309 °  
VS: -198.01'





SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
slyt tex, arg cmt  
SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt

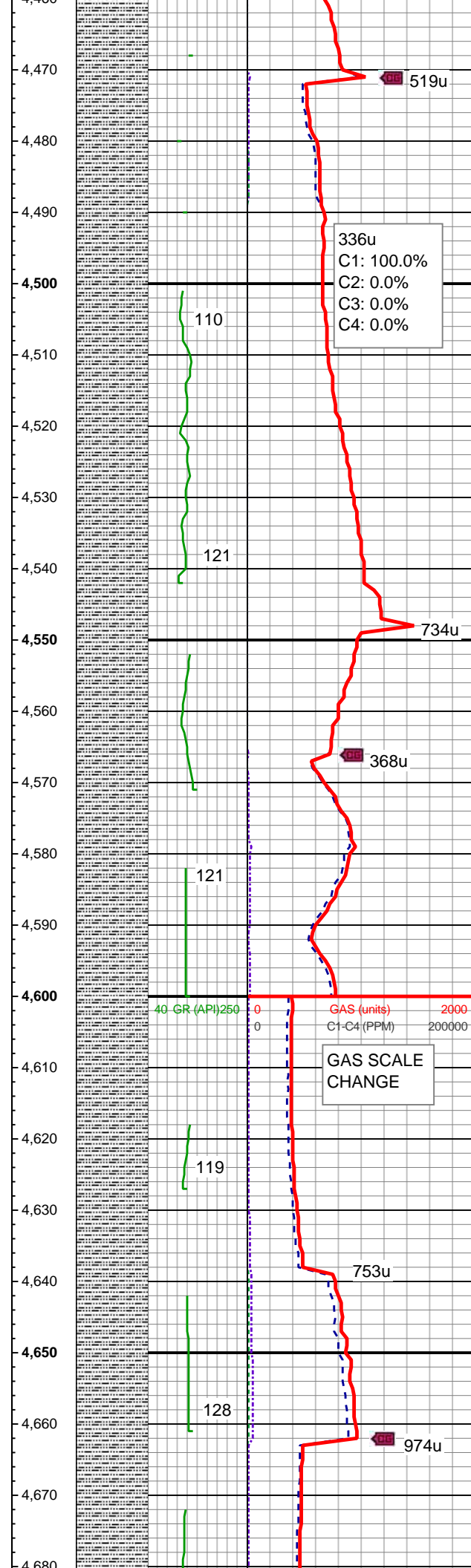
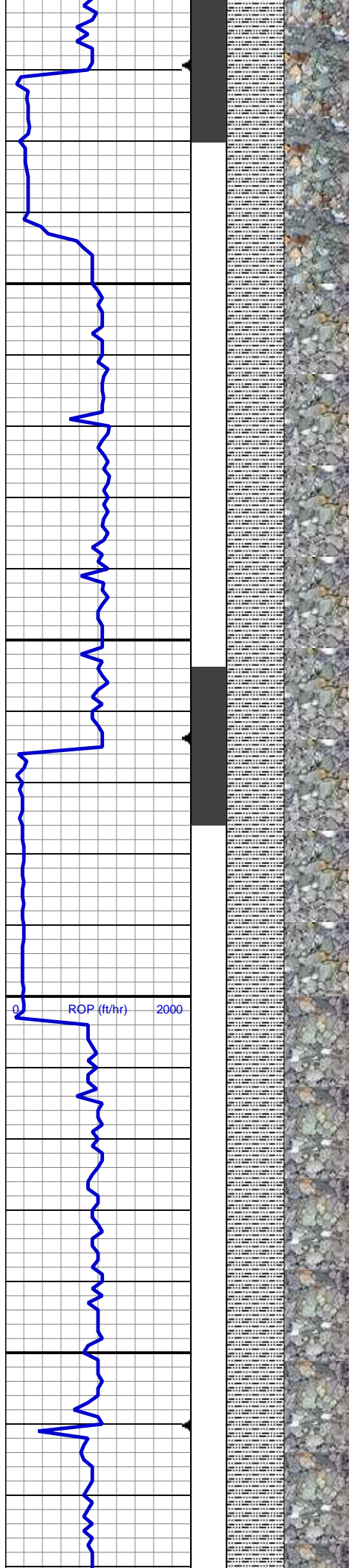
MD: 4,305'  
TVD: 4,279.24'  
Inclination: 4 °  
Azimuth: 310.2 °  
VS: -202.53'

SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
slyt tex, arg cmt  
SHY SS: ltgy-gy, sb ang, v sft, v f gr, w  
rnd, mod srt, p por, arg cmt

MD: 4,400'  
TVD: 4,374.04'  
Inclination: 3.4 °  
Azimuth: 303.9 °  
VS: -206.09'

SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
slyt tex, arg cmt





WT IN 8.85/ OUT 8.85  
VIS IN 28/ OUT 28

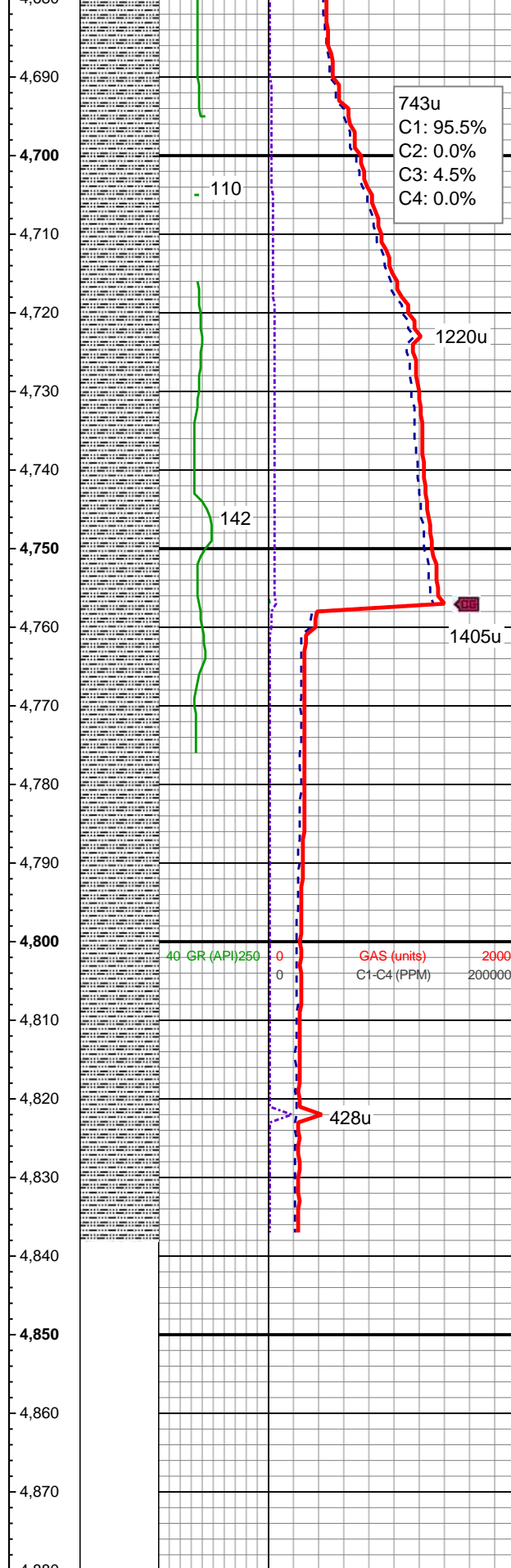
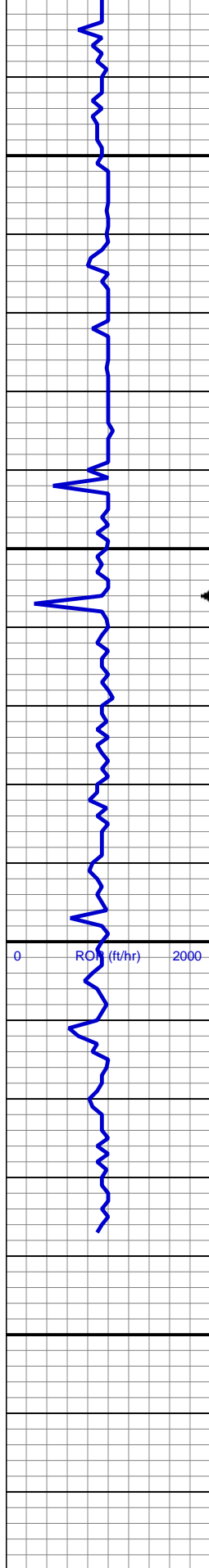
MD: 4,494'  
TVD: 4,467.88'  
Inclination: 3.4 °  
Azimuth: 289.6 °  
VS: -208.43'

SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
silty tex, arg cmt

MD: 4,589'  
TVD: 4,562.78'  
Inclination: 1.7 °  
Azimuth: 294 °  
VS: -209.83'

SLTY SH: gy-dk gy, sb blkly-sb plty, v sft,  
silty tex, arg cmt

MD: 4,684'



TVD: 4,657.75'  
Inclination: 1.3 °  
Azimuth: 303.2 °  
VS: -210.93'

743u  
C1: 95.5%  
C2: 0.0%  
C3: 4.5%  
C4: 0.0%

SLTY SH: gy-dk gy, sb blk-y-sb plty, v sft,  
sly tex, arg cmt

MD: 4,779'  
TVD: 4,752.73'  
Inclination: 1.1 °  
Azimuth: 336.6 °  
VS: -212.32'

SLTY SH: gy-dk gy, sb blk-y-sb plty, v sft,  
sly tex, arg cmt

WT IN 9.40/ OUT 9.40  
VIS IN 31/ OUT 31

TD @ 4838' MD  
12/18/2013 @ 05:34 PM

LOG CONTINUES ON MPLIT  
"CASTOR FEDERAL LD15-73-1HN  
HORZ"