

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name TREBOR B11-67-1HN VERT

Location SEC 11 T5N R64W

State COLORADO

County WELD

Country USA

Rig Number H&P 315

API Number 05-123-36299

AFE # 136854

Region DJ BASIN

Field WATTENBERG

Spud Date 7/4/2013

Drilling Completed 7/6/2013

Surface Coordinates LAT/LON 40.415290/-104.524320

SWNW SEC 11 T5N R64W
2112' FNL; 761' FWL

Bottom Hole Coordinates SENE SEC 11 T5N R64W

Ground Elevation 4601'

K.B. Elevation 4625'

Logged Interval 2000' **To** 5978'

Total Depth 5978'

Formation NIOBRARA B CHALK

Type of Drilling Fluid LSND

Operator

Company Noble Energy Inc

Address 1625 Broadway Suite 2200
Denver, CO 80202

Geologist

Name CHRIS SCAHEL, MARK COLE

Company COLUMBINE LOGGING, INC

Address 2385 S Lipan St
Denver, CO 80223

Rock Types

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

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
O INTEROOLITIC

Moldic

ORGANIC
PINPOINT
VUGGY

Engineering

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

Fault

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

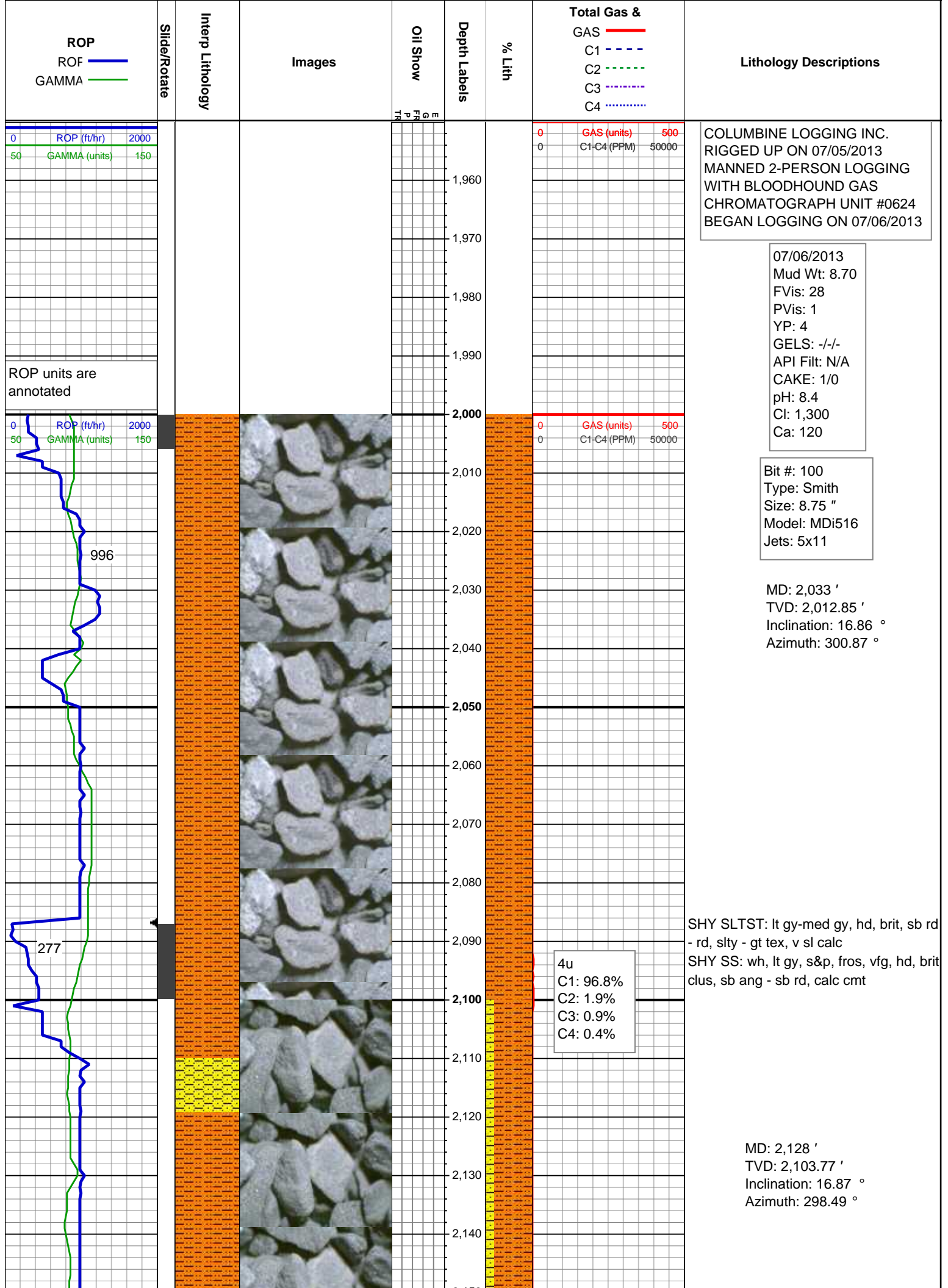
BOUNDSTONE
CHALKY
CRYPTOXLN

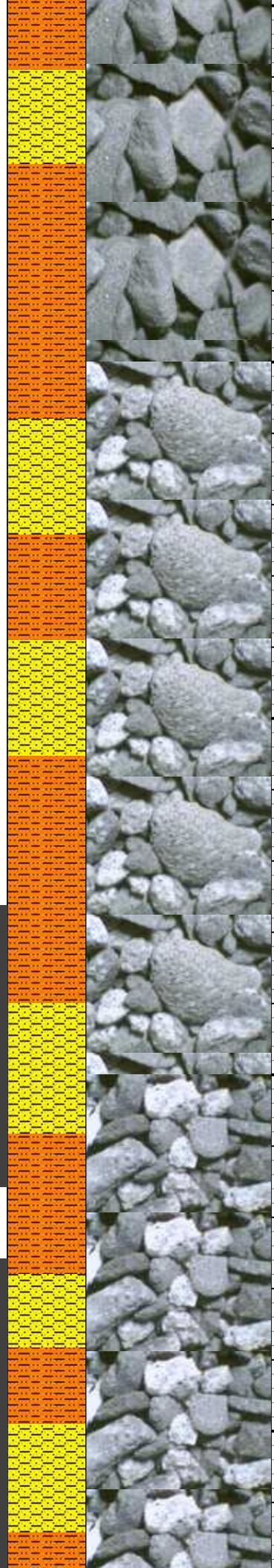
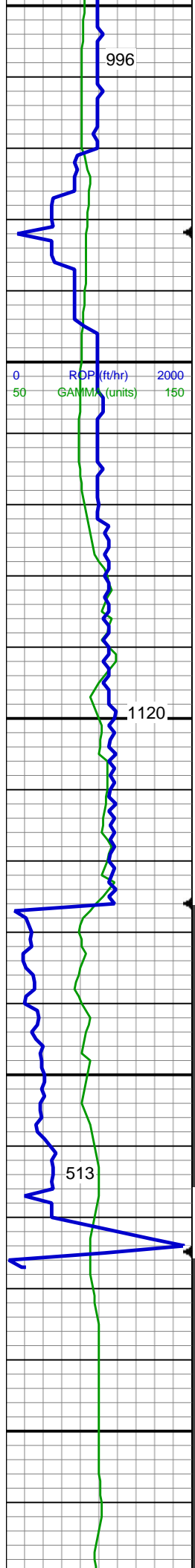
Earthy

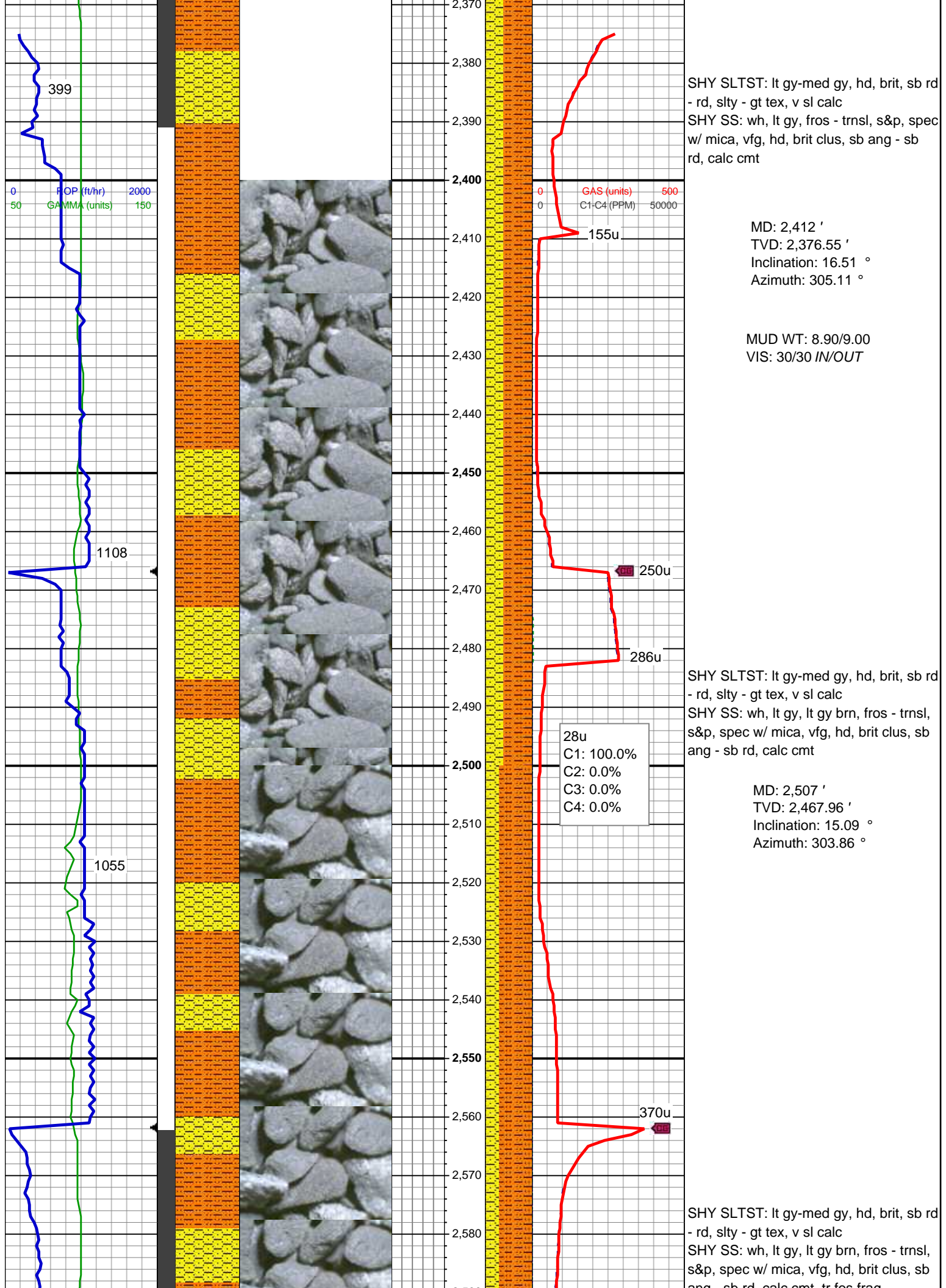
FINELYXLN
GRAINSTONE
L LITHOGRAPHIC
MICROXLN
MUDSTONE
PACKSTONE
WACKESTONE

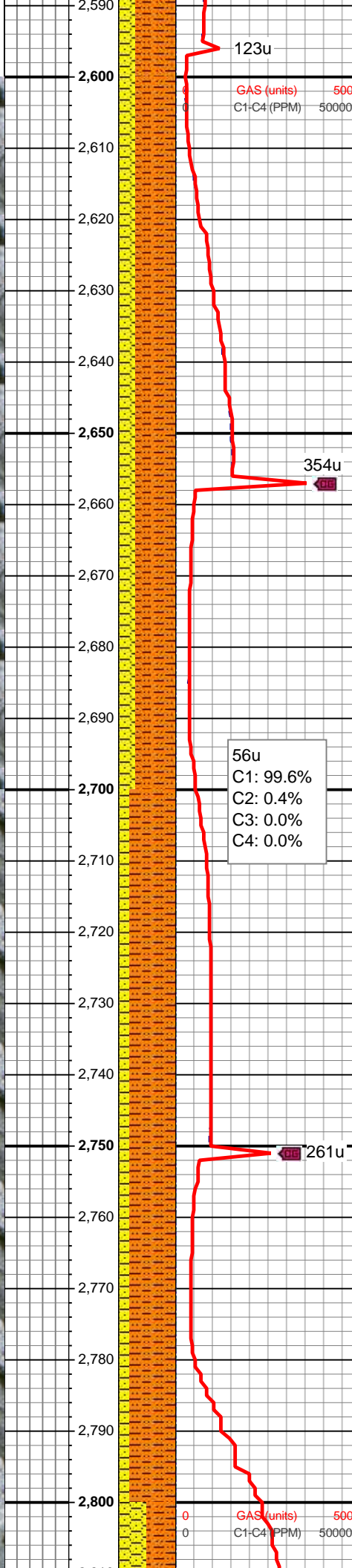
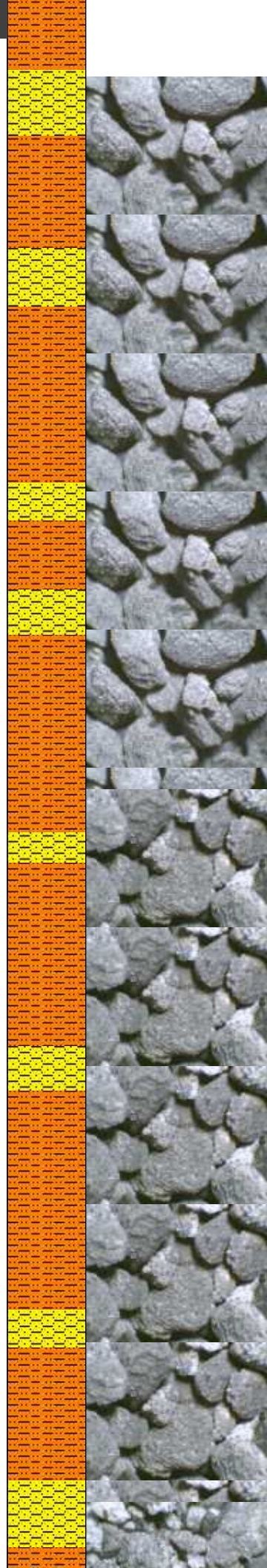
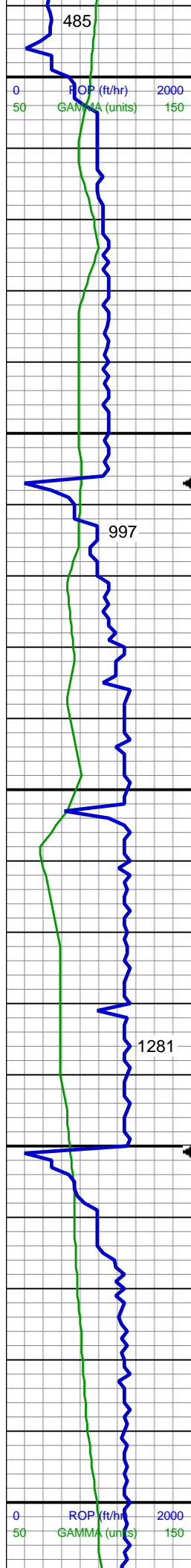
Sorting

MODERATE
POOR
WELL









ang - sb rd, calc cmt, tr fos frag

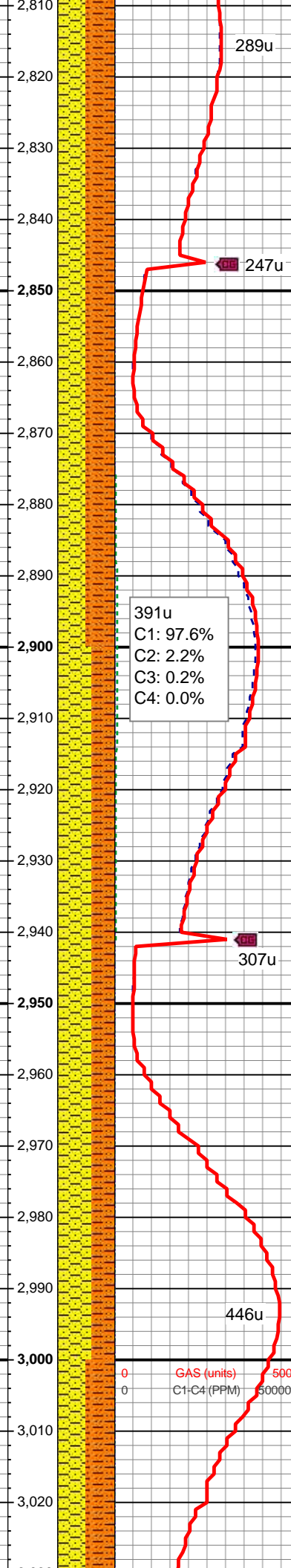
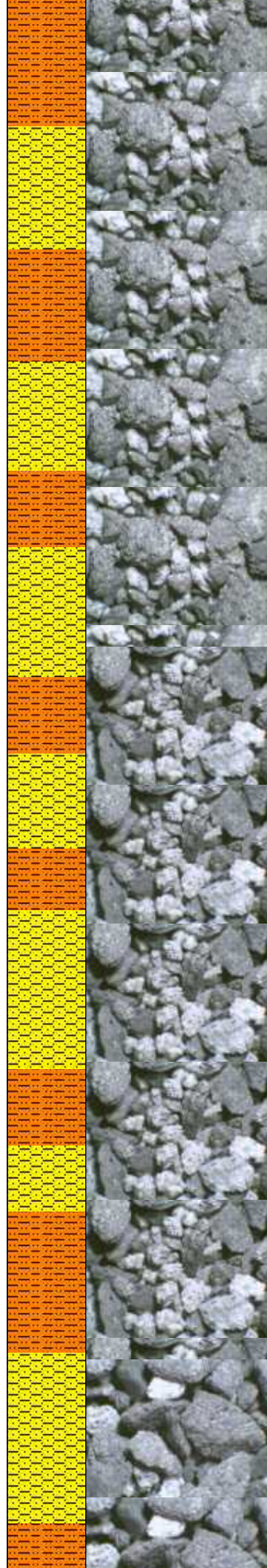
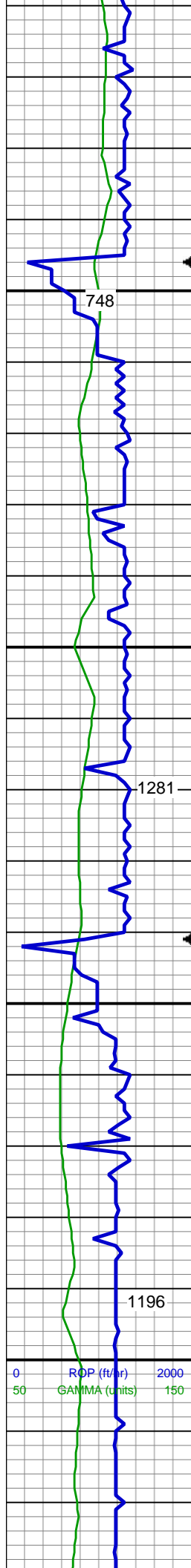
MD: 2,602 '
TVD: 2,559.2 '
Inclination: 17.22 °
Azimuth: 305.62 °

SHY SLTST: lt gy-med gy, hd, brit, sb rd
- rd, slty - gt tex, v sl calc
SHY SS: wh, lt gy, lt gy brn, fros - trnsl,
s&p, spec w/ mica, vfg, hd, brit clus, sb
ang - sb rd, calc cmt, tr fos frag

MD: 2,697 '
TVD: 2,649.91 '
Inclination: 17.34 °
Azimuth: 305.58 °

SHY SLTST: lt gy-med gy, hd, brit, sb rd
- rd, slty - gt tex, v sl calc
SHY SS: wh, lt gy, lt gy brn, fros - trnsl,
s&p, spec w/ mica, vfg, hd, brit clus, sb
ang - sb rd, calc cmt, tr fos frag

MD: 2,792 '
TVD: 2,740.56 '
Inclination: 17.46 °
Azimuth: 305.86 °

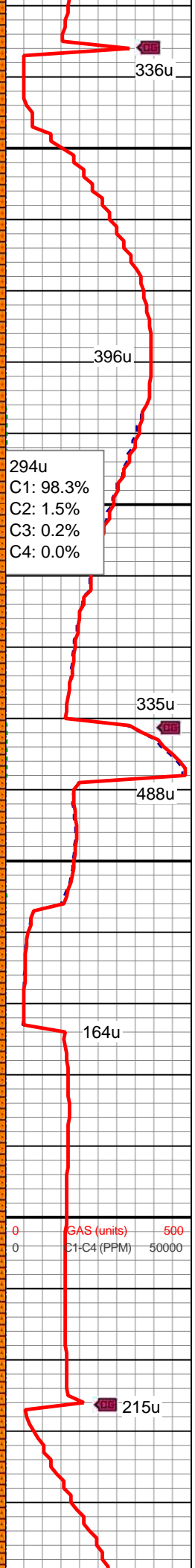
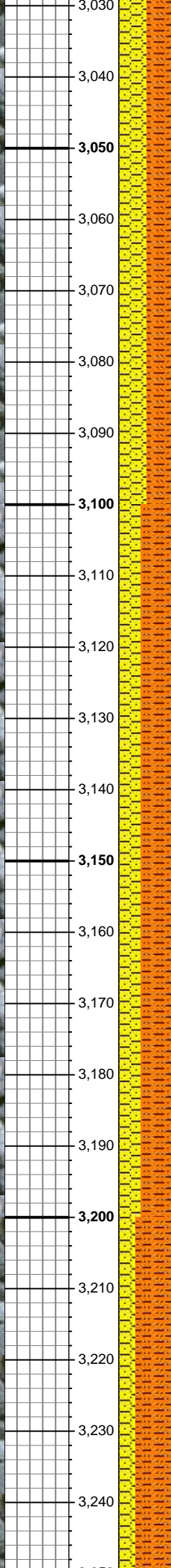
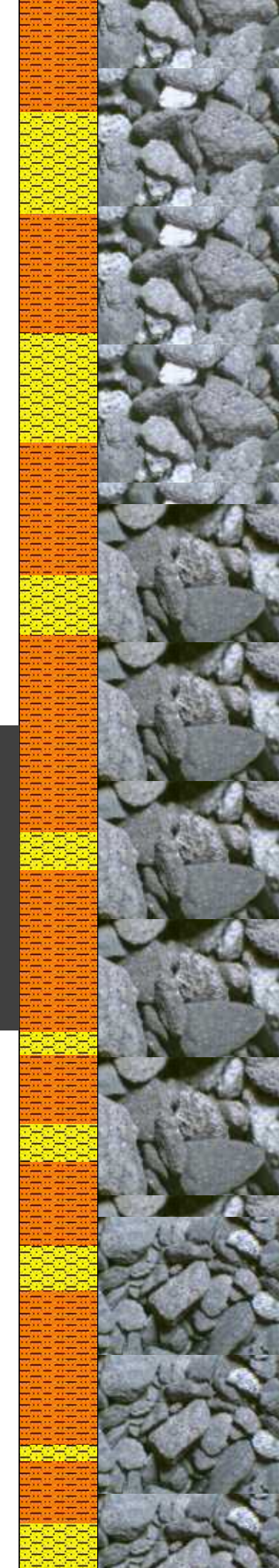
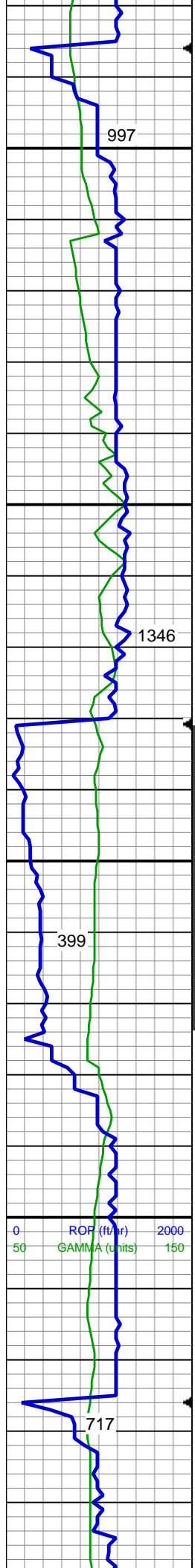


SHY SLTST: lt gy-med gy, hd, brit, sb rd
- rd, slty - gt tex, v sl calc
SHY SS: wh, lt gy, lt gy brn, fros - trnsl,
spec w/ mica, tr dk gn xl glau, f-vfg, hd,
brit clus, sb ang - sb rd, calc cmt, tr fos
frag

MD: 2,887 '
TVD: 2,831.43 '
Inclination: 16.46 °
Azimuth: 304.82 °

SHY SS: wh, lt gy, lt gy brn, fros - trnsl,
spec w/ mica, tr dk gn xl glau, f-vfg, hd,
brit clus, sb ang - sb rd, calc cmt
SHY SLTST: lt gy-med gy, hd, brit, sb rd
- rd, slty - gt tex, v sl calc, tr fos frag

MD: 2,982 '
TVD: 2,922.71 '
Inclination: 15.71 °
Azimuth: 304.71 °



MD: 3,077 '
TVD: 3,014.49 '
Inclination: 14.22 °
Azimuth: 303.84 °

SHY SLTST: lt gy-med gy, hd, brit, sb rd
- rd, slty - gt tex, v sl calc
SHY SS: wh, lt gy, lt gy brn, fros - trnsf,
spec w/ mica, tr dk gn xl glau, f-vfg, hd,
brit clus, sb ang - sb rd, calc cmt, tr fos
frag

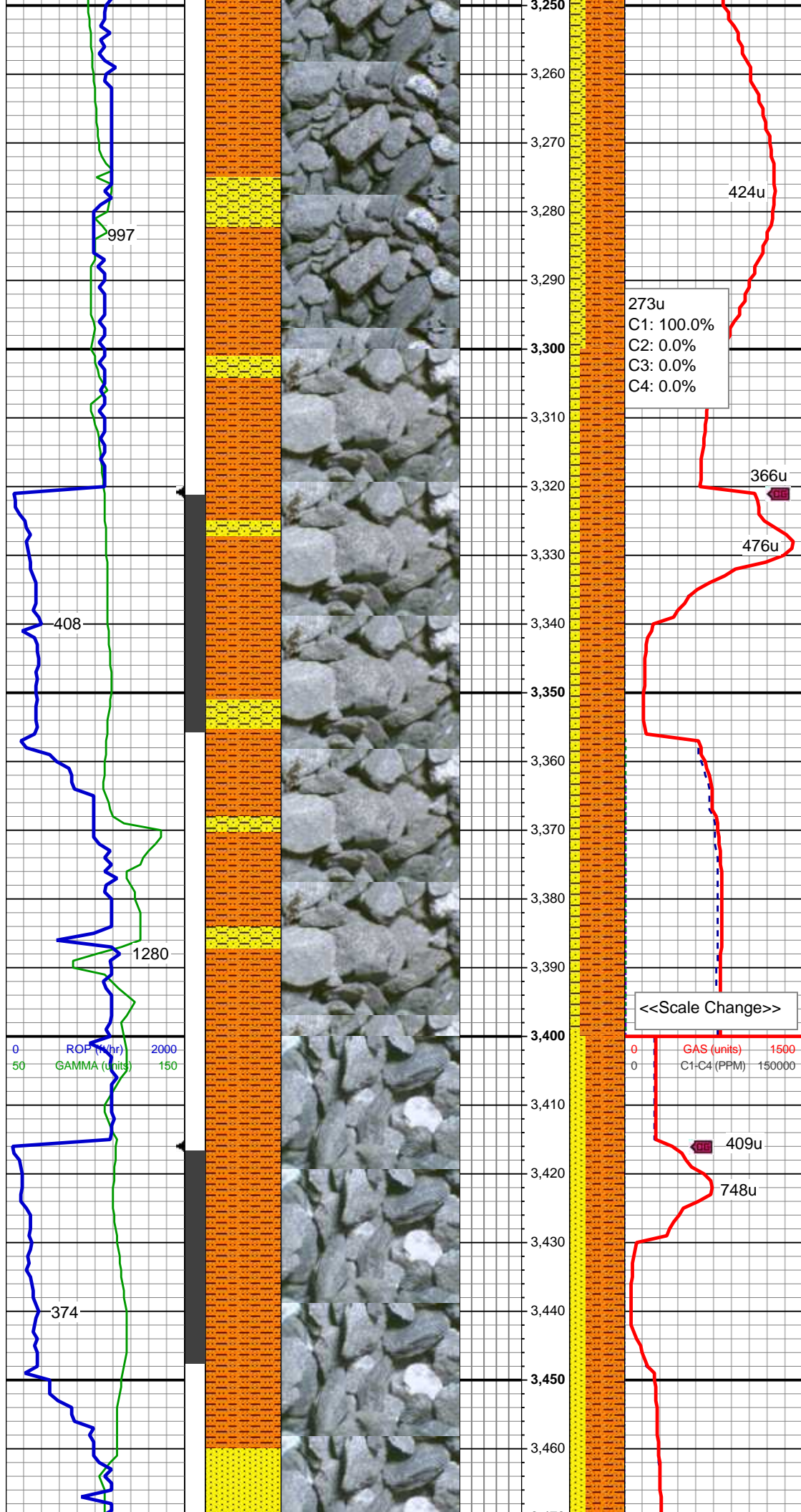
MUD WT: 8.90/9.20
VIS: 30/32 IN/OUT

MD: 3,172 '
TVD: 3,106.3 '
Inclination: 15.54 °
Azimuth: 306.87 °

SHY SLTST: lt gy-med gy, hd, brit, sb rd
- rd, slty - gt tex, v sl calc
SHY SS: wh, lt gy, lt gy brn, fros - trnsf,
spec w/ mica, vfg, hd, brit clus, sb ang -
sb rd, calc cmt, tr fos frag

294u
C1: 98.3%
C2: 1.5%
C3: 0.2%
C4: 0.0%

0 GAS (units) 500
0 C1-C4 (PPM) 50000



MD: 3,267 '
TVD: 3,198.31 '
Inclination: 13.28 °
Azimuth: 303.23 °

SHY SLTST: lt gy-dk gy, hd, brit, sb rd -
rd, slty - gt tex, v sl calc
SHY SS: wh, lt gy, lt gy brn, fros - trnsl,
spec w/ mica, vfg, hd, brit clus, sb ang -
sb rd, calc cmt, tr fos frag

273u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

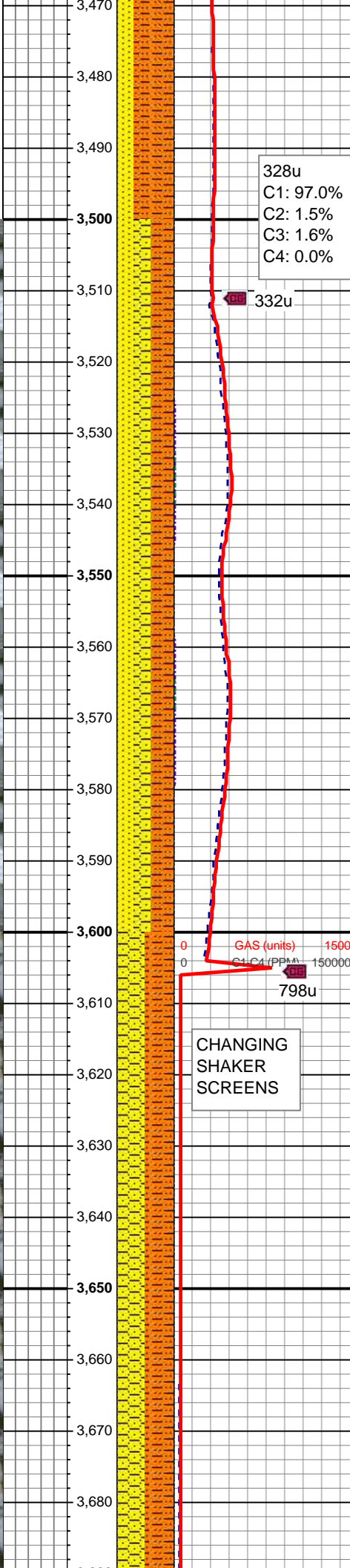
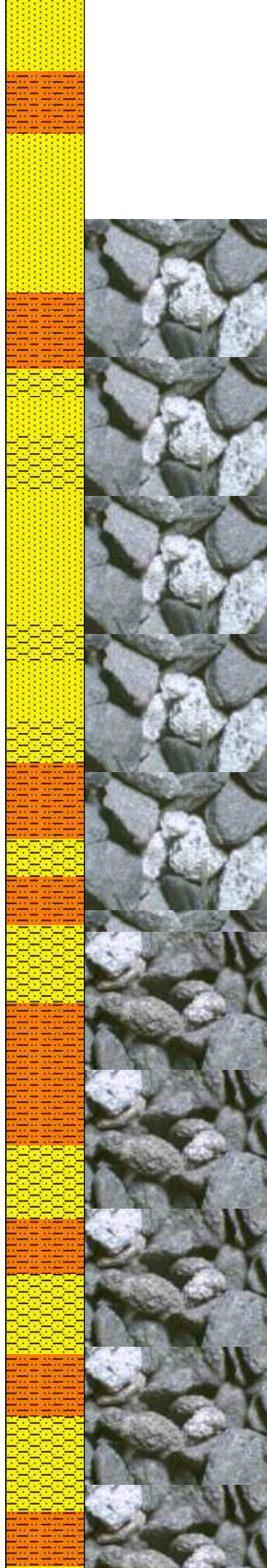
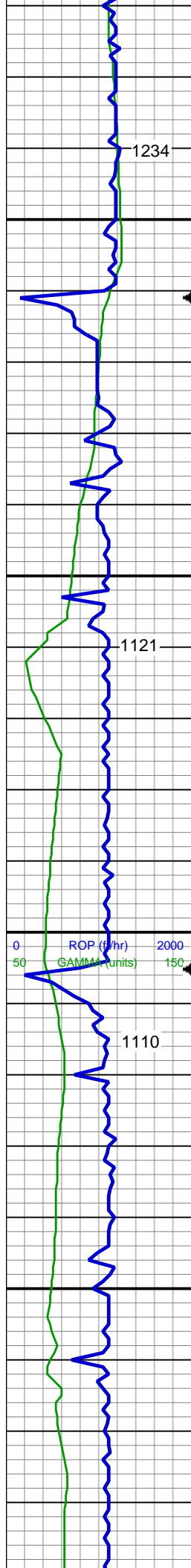
MD: 3,361 '
TVD: 3,289.55 '
Inclination: 14.55 °
Azimuth: 306.47 °

SHY SLTST: lt gy-dk gy, hd, brit, sb rd -
sb plty, slty - gt tex, v sl calc
SHY SS: wh, lt gy, lt gy brn, fros - trnsl,
spec w/ mica, vfg, hd, brit clus, sb ang -
sb rd, calc cmt, tr fos frag

<<Scale Change>>

MUD WT: 9.00/9.00
VIS: 30/30 IN/OUT

MD: 3,456 '
TVD: 3,381.1 '
Inclination: 16.43 °
Azimuth: 304.16 °



SHY SLTST: lt gy-dk gy, hd, brit, sb rd -
sb plty, slty - gt tex, v sl calc
SS: wh, lt gy, fros - trns, spec w/ mica,
tr dk gn xl glau, f-vfg, hd, brit clus, sb
ang - ang, v calc cmt, tr fos frag

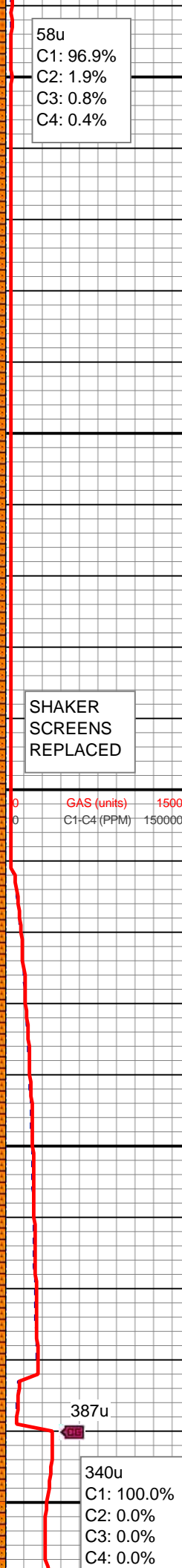
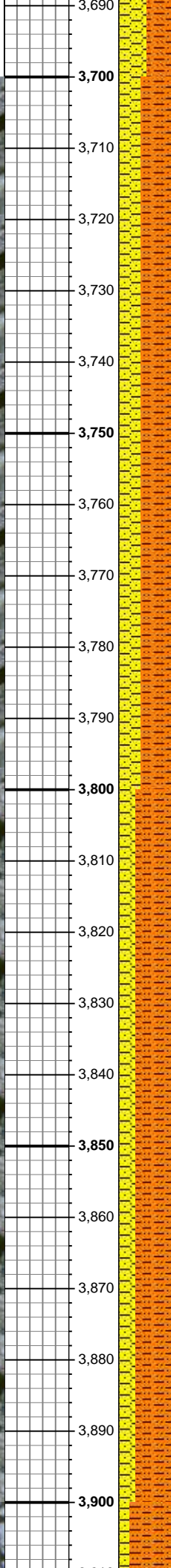
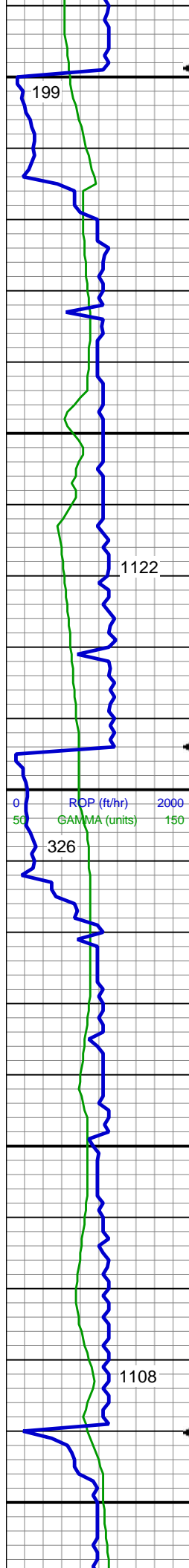
Parkman Top @
3541' MD; 3463' TVD

MD: 3,551 '
TVD: 3,472.47 '
Inclination: 15.36 °
Azimuth: 303.93 °

SHY SLTST: lt gy-dk gy, hd, brit, sb rd -
sb plty, slty - gt tex, v sl calc
SHY SS: wh, lt gy, lt gy brn, fros ip, s&p
ip, vfg, hd, brit clus, sb ang - sb rd, calc
cmt
SS: wh, lt gy, fros - trns, spec w/ mica,
tr dk gn xl glau, f-vfg, hd, brit clus, sb
ang - ang, v calc cmt, tr fos frag

MD: 3,646 '
TVD: 3,563.84 '
Inclination: 16.4 °
Azimuth: 303.63 °

SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc
SHY SS: wh, lt gy- med gy, gy brn,
fros-trns ip, spec w mica, tr dk gn xl



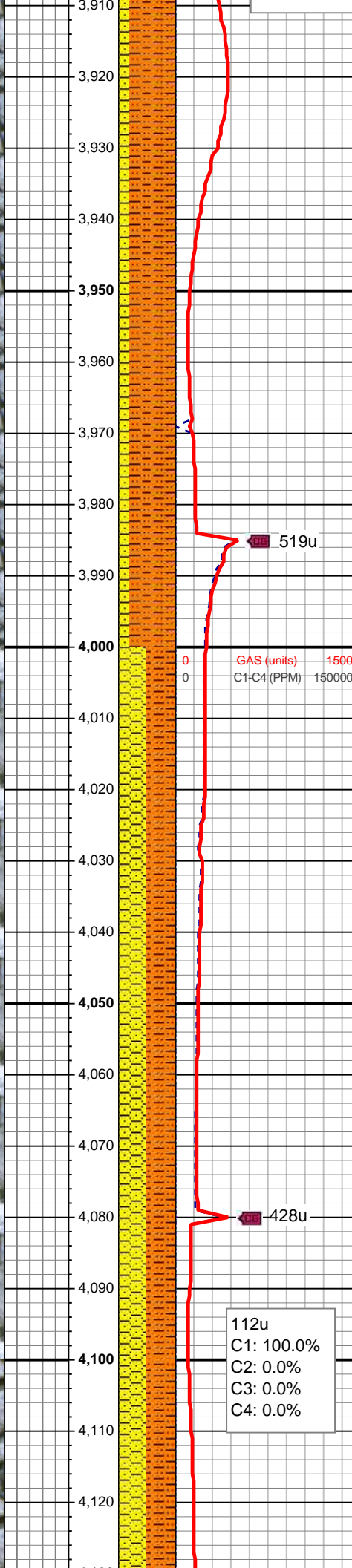
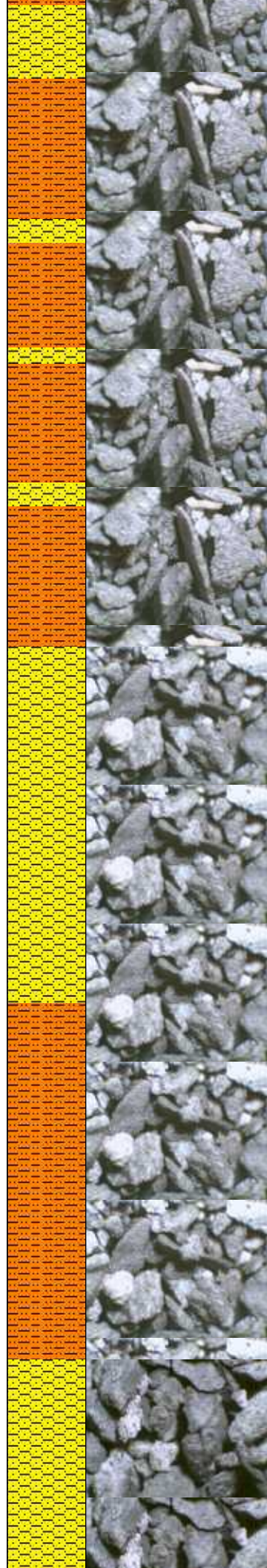
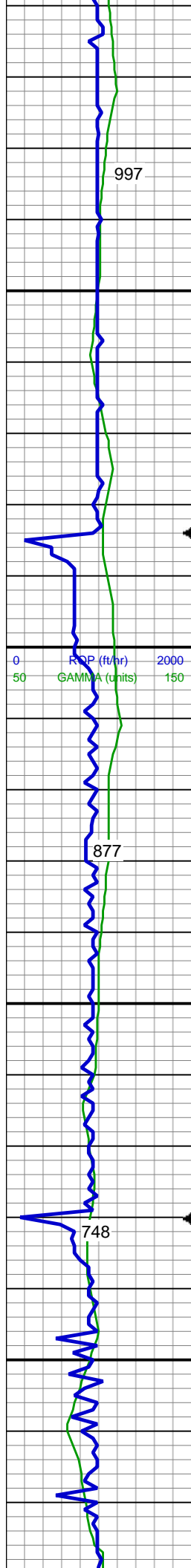
glau, f-vfg, hd, brit clus, sb ang - sb rd, calc cmt, tr fos frag

MD: 3,741 '
TVD: 3,655.21 '
Inclination: 15.36 °
Azimuth: 304.97 °

SHY SLTST: lt gy-dk gy, gy brn, hd, brit, sb rd - sb plty, slty - gt tex, v sl calc
SHY SS: wh, lt gy- med gy, gy brn, fros-trnsl ip, spec w mica, tr dk gn xl glau, f-vfg, hd, brit clus, sb ang - sb rd, calc cmt, tr fos frag

MD: 3,836 '
TVD: 3,747.13 '
Inclination: 13.9 °
Azimuth: 304.29 °

SHY SLTST: lt gy-dk gy, gy brn, hd, brit, sb rd - sb plty, slty - gt tex, v sl calc
SHY SS: wh, lt gy- med gy, gy brn, fros-trnsl ip, spec w mica, f-vfg, hd, brit clus, sb ang - sb rd, calc cmt, tr fos frag



MD: 3,931 '
TVD: 3,839.45 '
Inclination: 13.36 °
Azimuth: 305.12 °

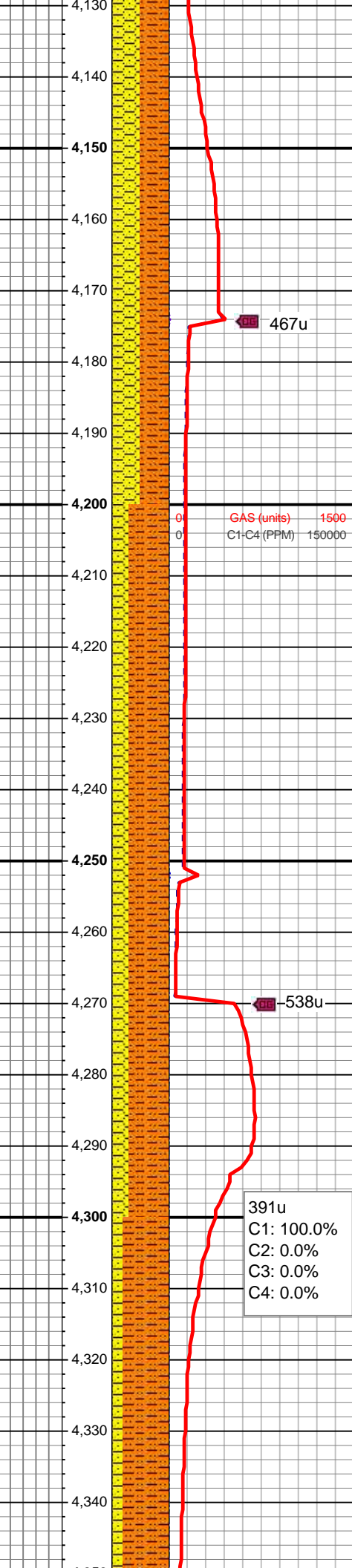
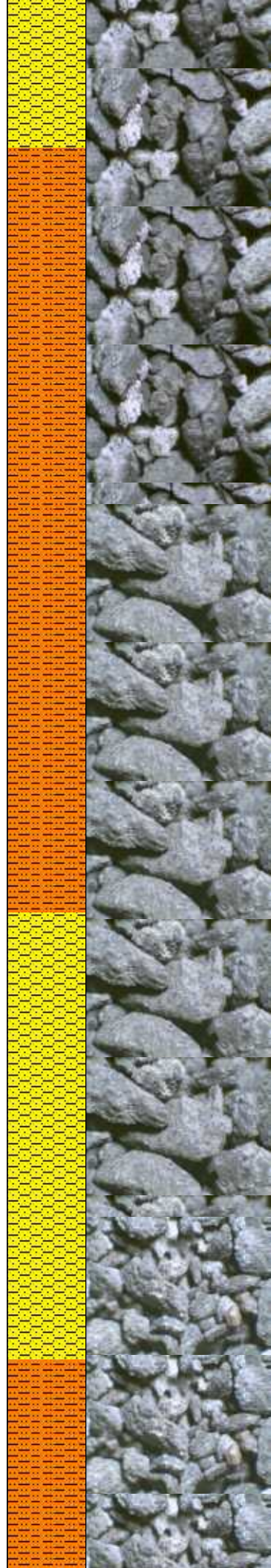
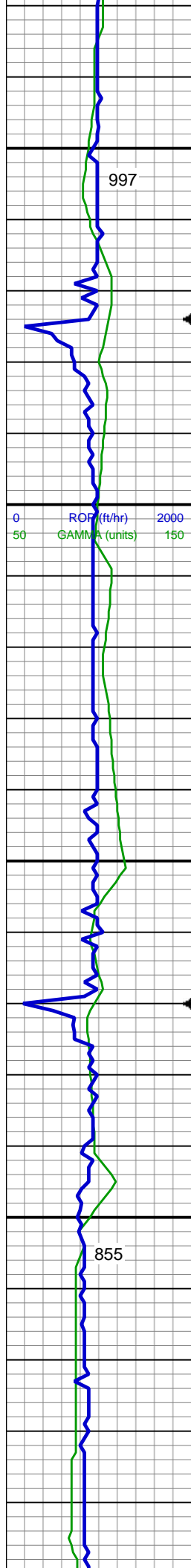
SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc
SHY SS: wh, lt gy- med gy, gy brn,
fros-trnsl ip, spec w mica, f-vfg, hd, brit
clus, sb ang - sb rd, calc cmt, tr fos frag

MD: 4,026 '
TVD: 3,932.18 '
Inclination: 11.75 °
Azimuth: 305.1 °

SHY SLTST: pred lt gy, med gy - gy brn,
hd, brit, sb rd - sb plty, slty - gt tex, v sl
calc
SHY SS: wh, lt gy, gy brn, fros-trnsl ip,
spec w mica, f-vfg, hd, brit clus, sb ang
- sb rd, calc cmt, tr fos frag

112u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

MD: 4,121 '
TVD: 4,025.46 '
Inclination: 10.06 °
Azimuth: 304.71 °



07/06/2013
Mud Wt: 8.70
FVis: 29
PVis: 4
YP: 3
GELS: -/-
API Filt: N/A
CAKE: 1/0
pH: 9.5
Cl: 1,500
Ca: 100

SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc
SHY SS: wh, lt gy- med gy, gy brn,
fros-trnsl ip, spec w mica, tr dk gn xl
glau, f-vfg, hd, brit clus, sb ang - sb rd,
calc cmt, tr fos frag

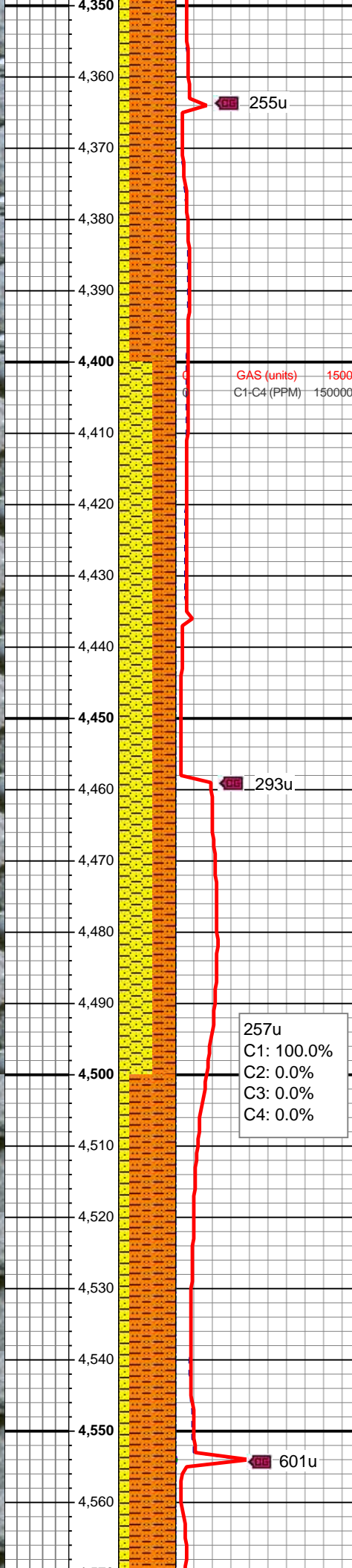
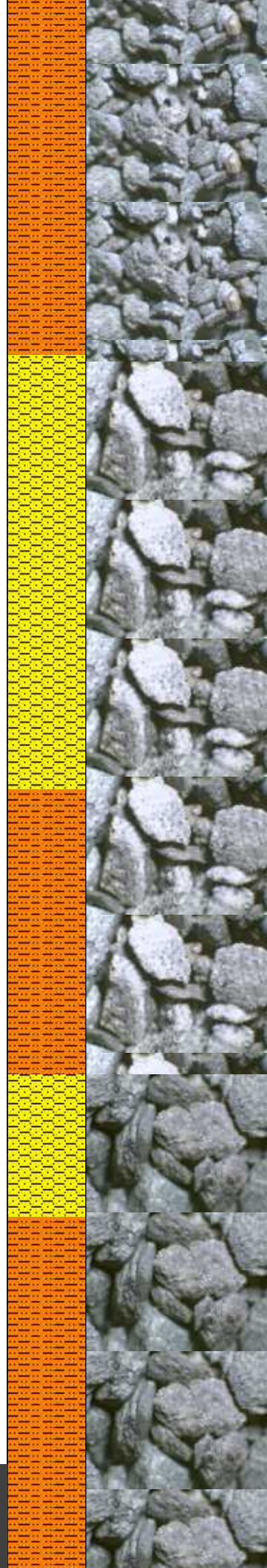
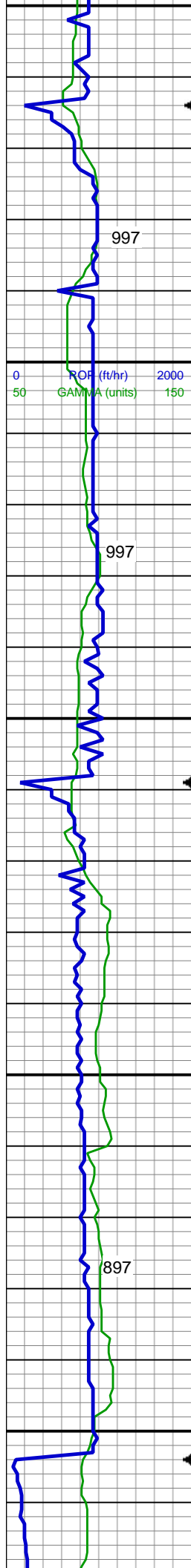
MD: 4,216 '
TVD: 4,119.19 '
Inclination: 8.67 °
Azimuth: 303.21 °

Sussex Top @
4257' MD; 4160' TVD

SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc
SHY SS: wh, lt gy- med gy, gy brn,
fros-trnsl ip, spec w mica, vfg, hd, brit
clus, sb ang - sb rd, calc cmt, tr fos frag

MD: 4,310 '
TVD: 4,212.21 '
Inclination: 7.91 °
Azimuth: 304.59 °

391u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%



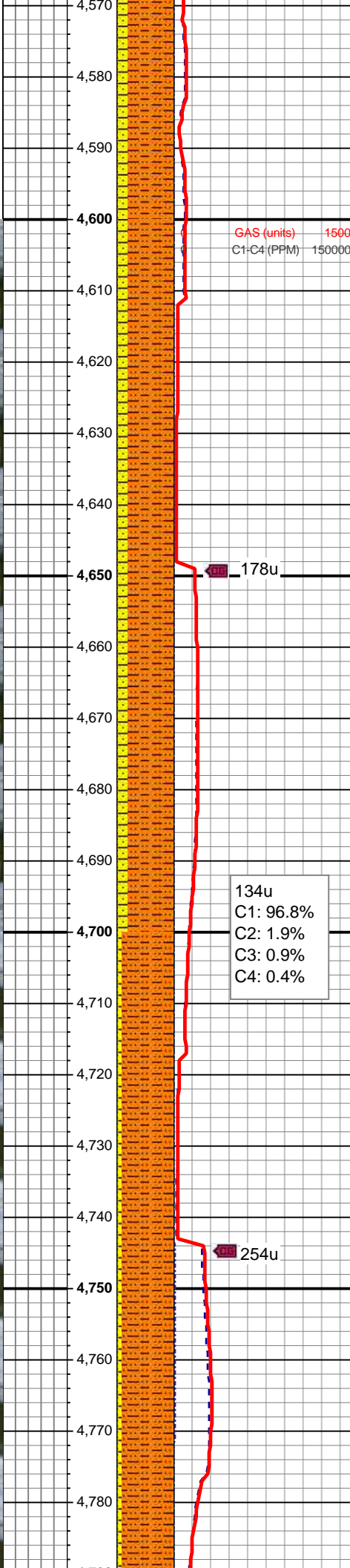
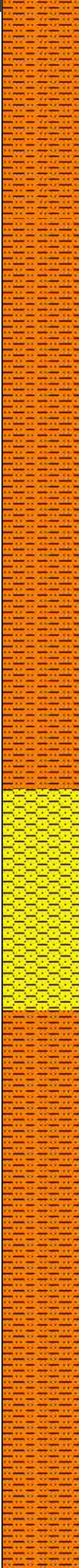
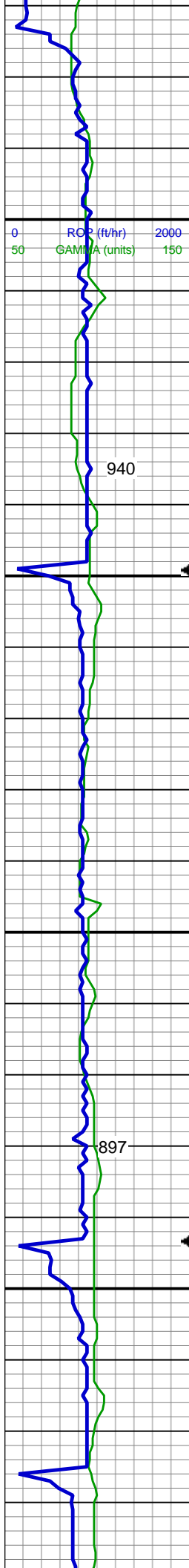
SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc
SHY SS: wh, lt gy- med gy, gy brn, fros
ip, spec w mica, vfg, hd, brit clus, sb
ang - sb rd, calc cmt, tr fos frag

MD: 4,405 '
TVD: 4,306.37 '
Inclination: 7.38 °
Azimuth: 305.6 °

MUD WT: 9.0/9.1
VIS: 30/31 IN/OUT

SHY SS: wh, lt gy- med gy, gy brn, fros
ip, spec w mica, vfg, hd, brit clus, sb
ang - sb rd, calc cmt, tr fos frag
SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc

MD: 4,500 '
TVD: 4,400.68 '
Inclination: 6.36 °
Azimuth: 310.67 °



SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc
SHY SS: wh, lt gy- med gy, gy brn, fros
ip, spec w mica, vfg, hd, brit clus, sb
ang - sb rd, calc cmt, tr fos frag

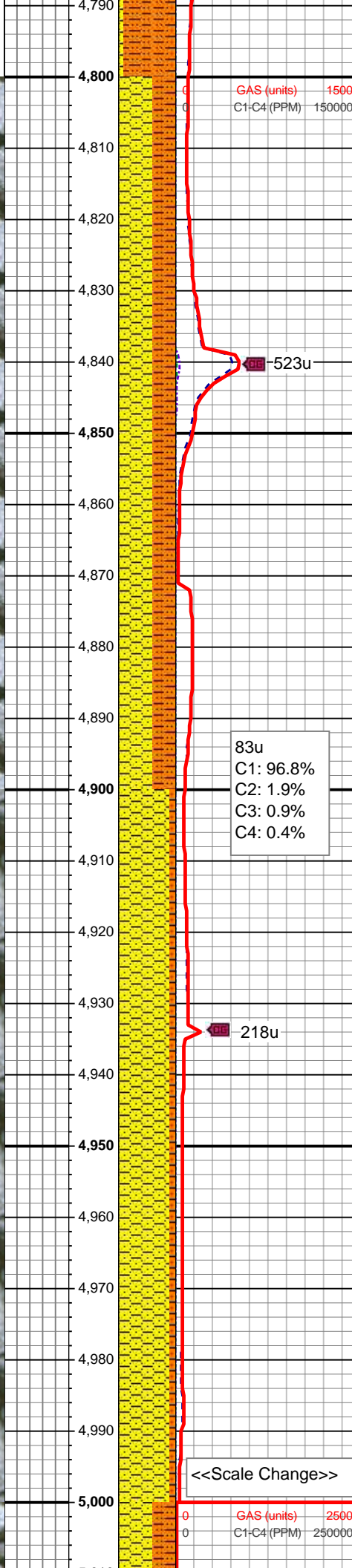
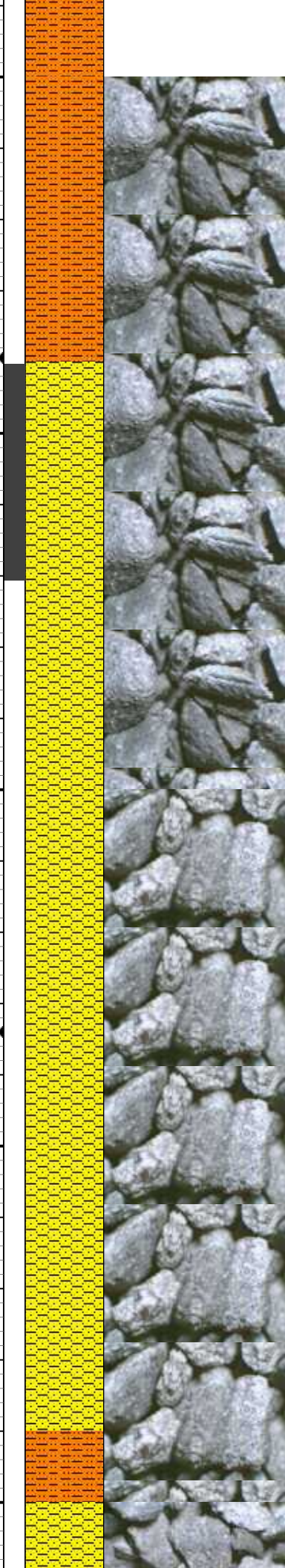
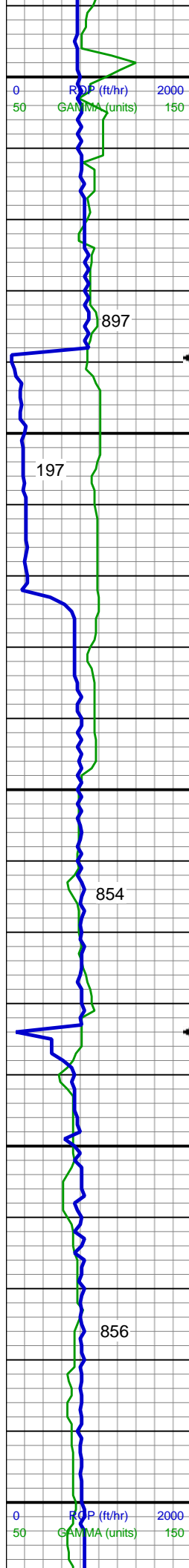
MD: 4,595 '
TVD: 4,495.3 '
Inclination: 3.87 °
Azimuth: 307.75 °

SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc
SHY SS: wh, lt gy- med gy, gy brn, fros
ip, spec w mica, vfg, hd, brit clus, sb
ang - sb rd, calc cmt, tr bent

MD: 4,690 '
TVD: 4,590.12 '
Inclination: 3.05 °
Azimuth: 298.05 °

SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc
SHY SS: wh, lt gy- med gy, gy brn, fros

MD: 4,785 '
TVD: 4,684.99 '
Inclination: 3.11 °
Azimuth: 273.61 °



SHY SS: wh, lt gy- med gy, gy brn, fros
ip, spec w mica, vfg, hd, brit clus, sb
ang - sb rd, calc cmt, tr bent

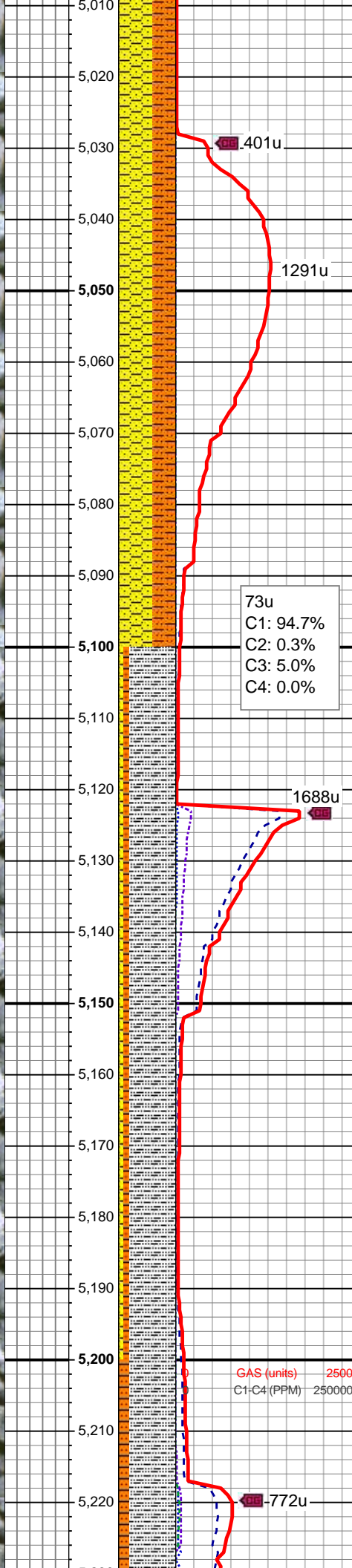
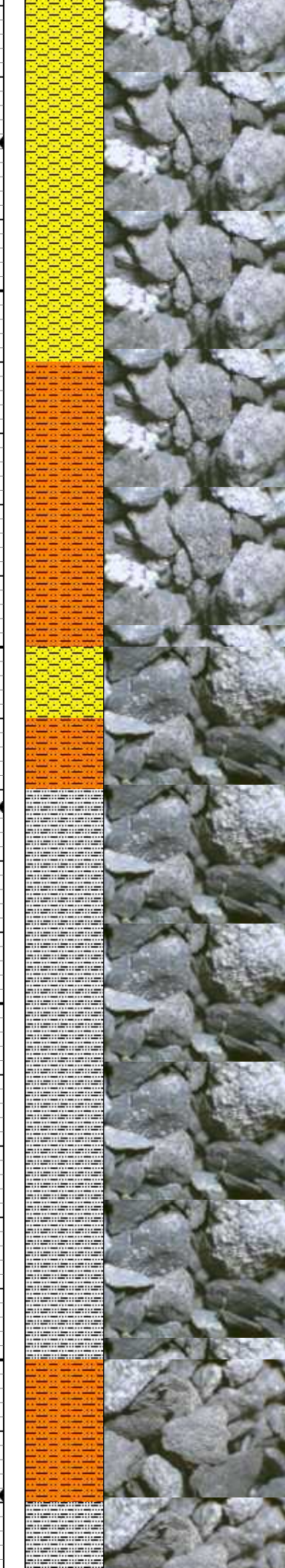
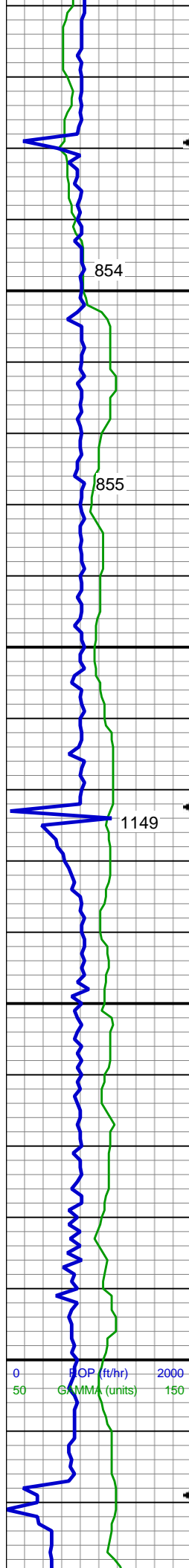
Shannon Top @
4840' MD; 4740' TVD

MD: 4,880 '
TVD: 4,779.94 '
Inclination: 0.8 °
Azimuth: 348.92 °

SHY SS: wh, lt gy- med gy, gy brn, fros
ip, spec w mica, vfg, hd, brit clus, sb
ang - sb rd, calc cmt, tr bent
SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc

MD: 4,975 '
TVD: 4,874.93 '
Inclination: 0.34 °
Azimuth: 29.63 °

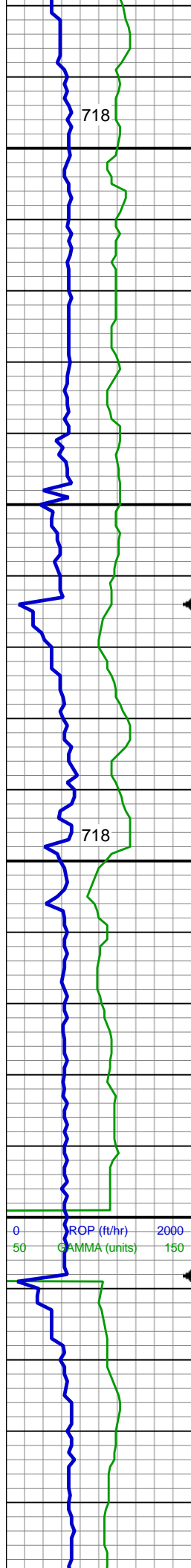
SHY SS: wh, lt gy- med gy, gy brn, fros
ip, spec w mica, vfg, hd, brit clus, sb
ang - sb rd, calc cmt, tr bent
SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc



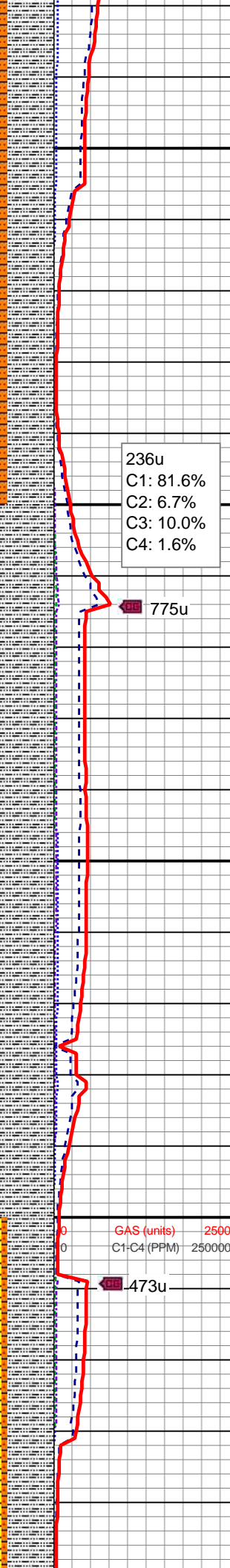
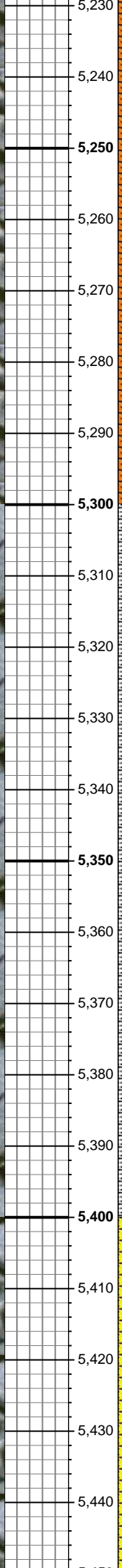
MD: 5,070 '
TVD: 4,969.93 '
Inclination: 0.46 °
Azimuth: 326.56 °

SHY SS: wh, lt gy- med gy, gy brn, fros
ip, spec w mica, vfg, hd, brit clus, sb
ang - sb rd, calc cmt, tr bent
SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc

SLTY SH: lt-med gy, occ dk gy, frm -
mod hd, sb plty - plty, slty - gt tex, v sl
calc
SHY SS: wh, lt gy- med gy, gy brn, fros
ip, spec w mica, vfg, hd, brit clus, sb
ang - sb rd, calc cmt, tr bent
SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc



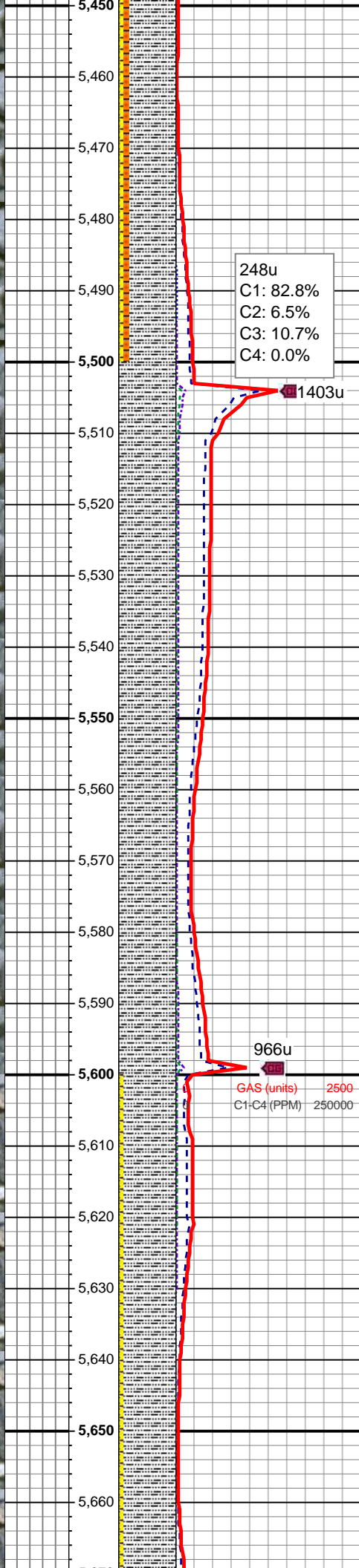
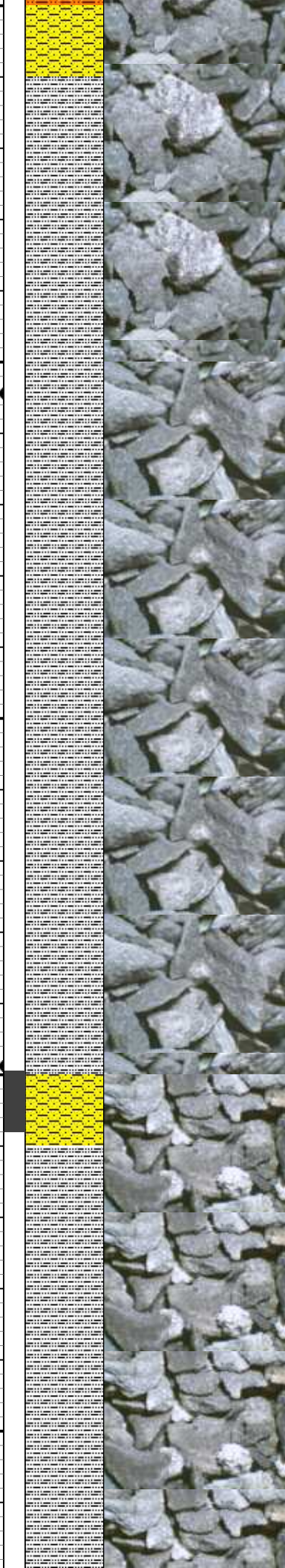
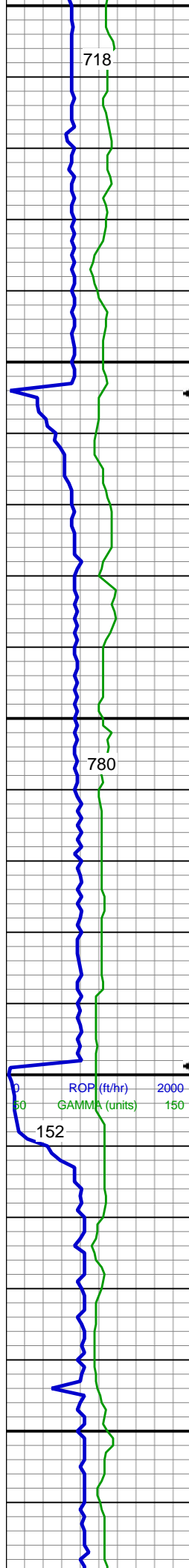
5,230
5,240
5,250
5,260
5,270
5,280
5,290
5,300
5,310
5,320
5,330
5,340
5,350
5,360
5,370
5,380
5,390
5,400
5,410
5,420
5,430
5,440



SLTY SH: lt-med gy, occ dk gy, frm -
mod hd, sb plty - plty, slty - gt tex, v sl
calc
SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc

MD: 5,354 '
TVD: 5,253.92 '
Inclination: 1.02 °
Azimuth: 185.78 °

SLTY SH: lt-med gy, occ dk gy, frm -
mod hd, sb plty - plty, slty - gt tex, v sl
calc



248u
C1: 82.8%
C2: 6.5%
C3: 10.7%
C4: 0.0%

1403u

966u

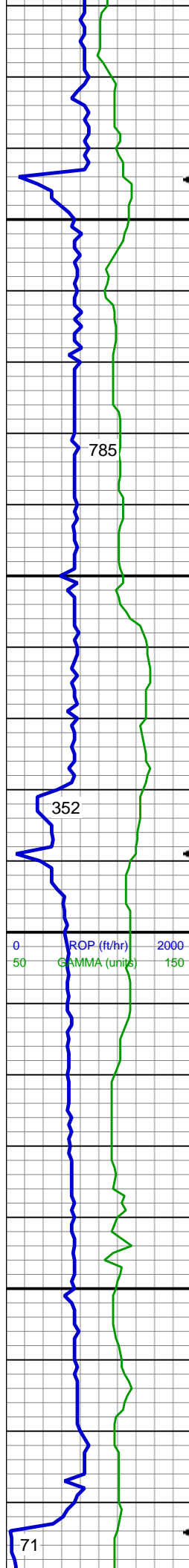
GAS (units) 2500
C1-C4 (PPM) 250000

SLTY SH: lt-med gy, occ dk gy, frm -
mod hd, sb plty - plty, slty - gt tex, v sl
calc
SHY SS: wh, lt gy- med gy, gy brn, fros
ip, spec w mica, vfg, hd, brit clus, sb
ang - sb rd, calc cmt
SHY SLTST: lt gy-dk gy, gy brn, hd, brit,
sb rd - sb plty, slty - gt tex, v sl calc

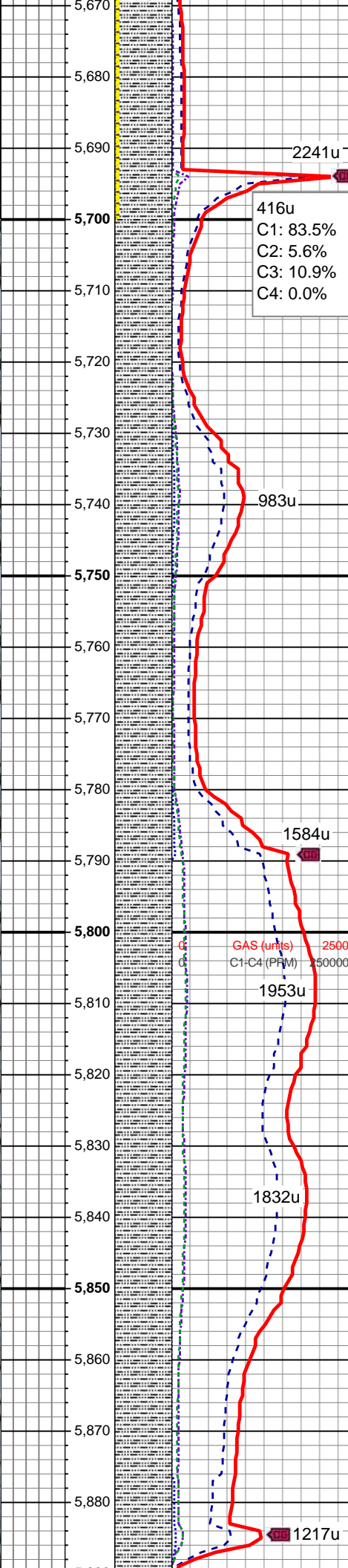
MUD WT: 9.20
VIS: 29 IN/OUT

SLTY SH: lt-med gy, occ dk gy, frm -
mod hd, sb plty - plty, slty - gt tex, v sl
calc

MD: 5,639 '
TVD: 5,538.87 '
Inclination: 1.19 °
Azimuth: 197.44 °

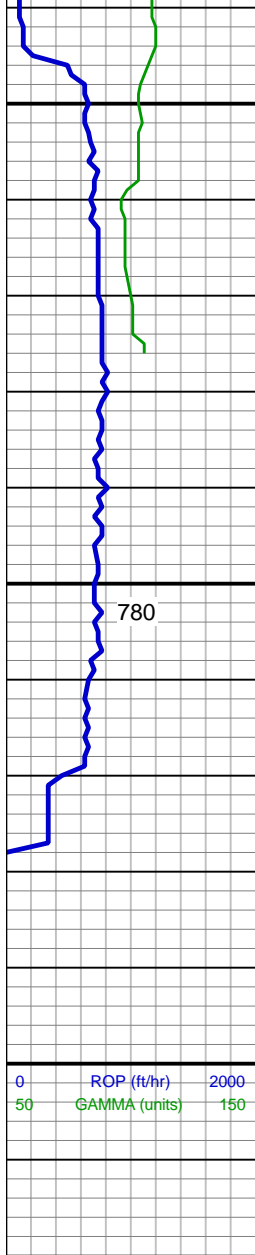


SLTY SH: lt-med gy, occ dk gy, frm - mod hd, sb plty - plty, slty - gt tex, v sl calc, tr bent
SHY SS: wh, lt gy- med gy, gy brn, fros ip, spec w mica, vfg, hd, brit clus, sb ang - sb rd, calc cmt



SLTY SH: lt-med gy, occ dk gy, frm - mod hd, sb plty - plty, slty - gt tex, v sl calc, tr bent
SHY SS: wh, lt gy- med gy, gy brn, fros ip, spec w mica, vfg, hd, brit clus, sb ang - sb rd, calc cmt

SLTY SH: lt-med gy, occ dk gy, frm - mod hd, sb plty - plty, slty - gt tex, v sl calc, tr bent



171u
C1: 67.3%
C2: 13.4%
C3: 12.4%
C4: 7.0%

