

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name Rainbow LC28-79-1HNA

Location SWSW SEC 28, T9N, R59W

State COLORADO

County WELD

Country USA

Rig Number H&P 326

API Number 05-123-38853

Region DJ BASIN

Field WILDCAT

Spud Date 8/2/2014

Drilling Completed 8/3/2014

Surface Coordinates 340' FSL, 1318' FWL
SWSW SEC 28, T9N, R59W
40.71499 -103.98764

Ground Elevation 4854

K.B. Elevation 4892'

Logged Interval 639' **To** 6100'

Total Depth 10108'

Formation NIOBRARA-A MARL

Type of Drilling Fl... LSND

Operator

Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202

Geologist

Name EVAN HOWELL

Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202

Other

Rock Types

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

Accessories

Fossils

ALGAE
AMPHIPORA
BELEMNITE
BIOCLASTIC
BRACHIOIPOD
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

O ORGANIC
P PINPOINT
V 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

A ANGULAR
R ROUNDED
S SUBANG
P SUBRND

Textures

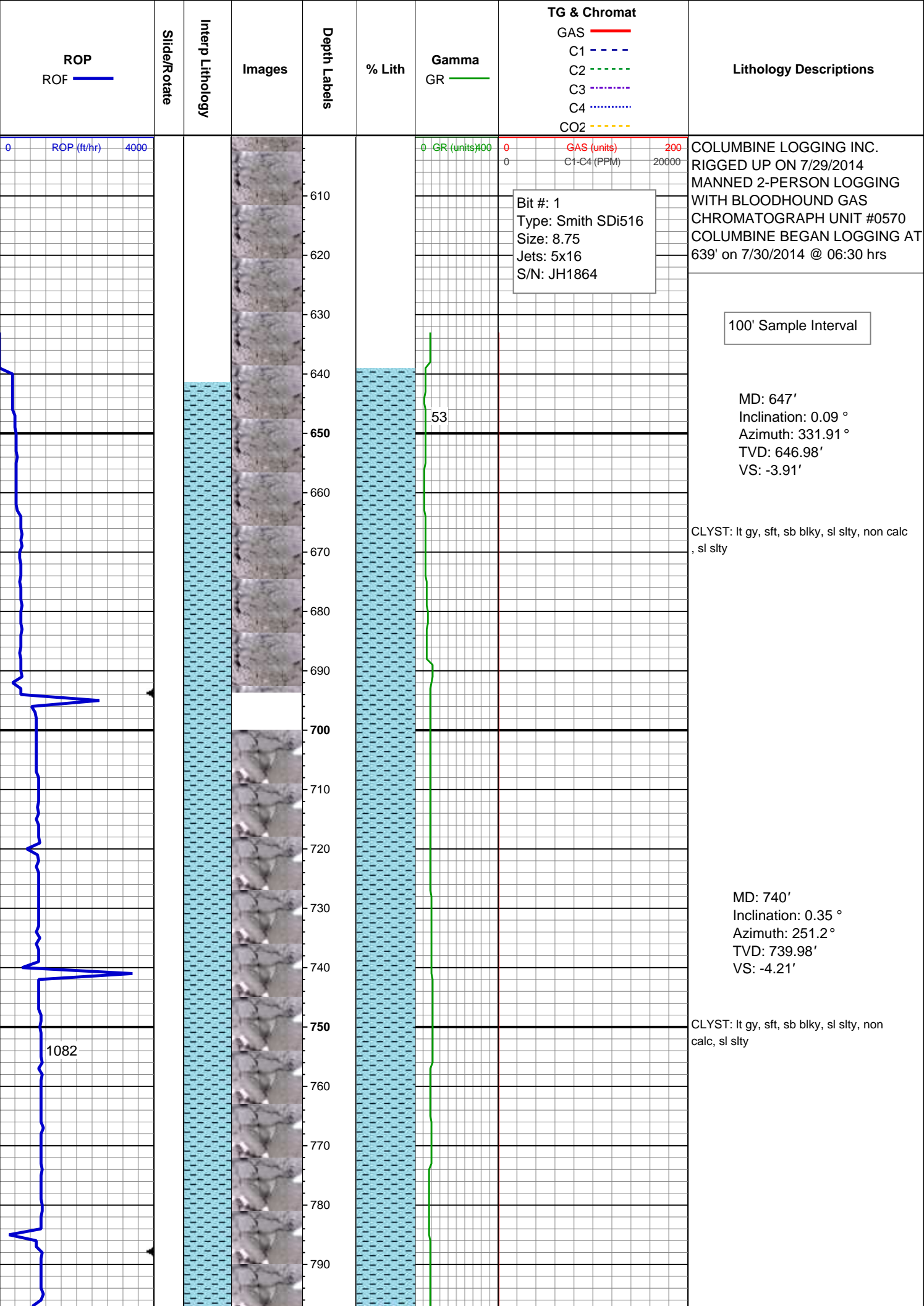
B BOUNDSTONE
C CHALKY
C CRYPTOXLN

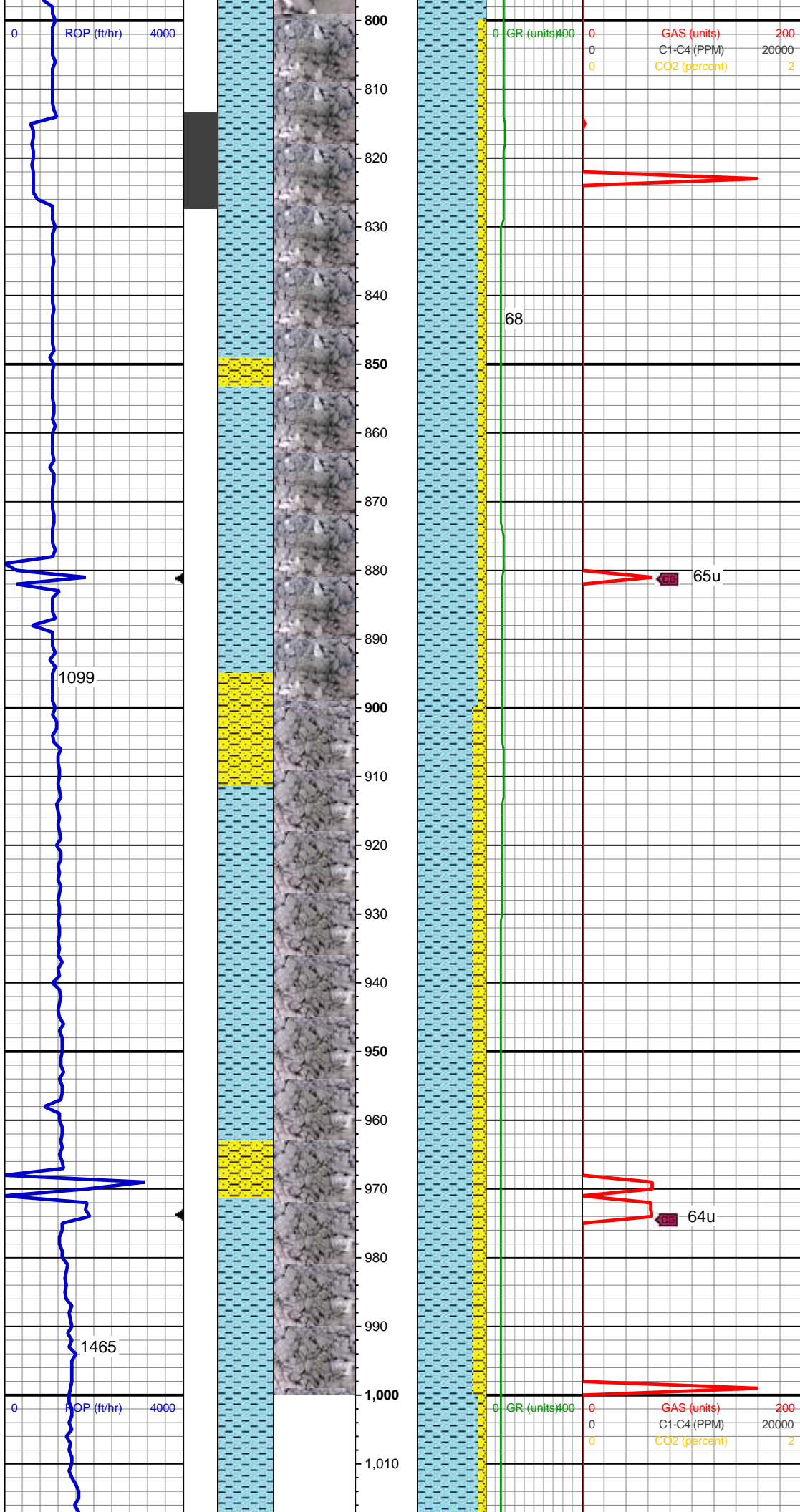
Earthy

F FINELYXLN
G GRAINSTONE
L LITHOGRAPHIC
M MICROXLN
M MUDSTONE
P PACKSTONE
W WACKESTONE

Sorting

M MODERATE
P POOR
W WELL





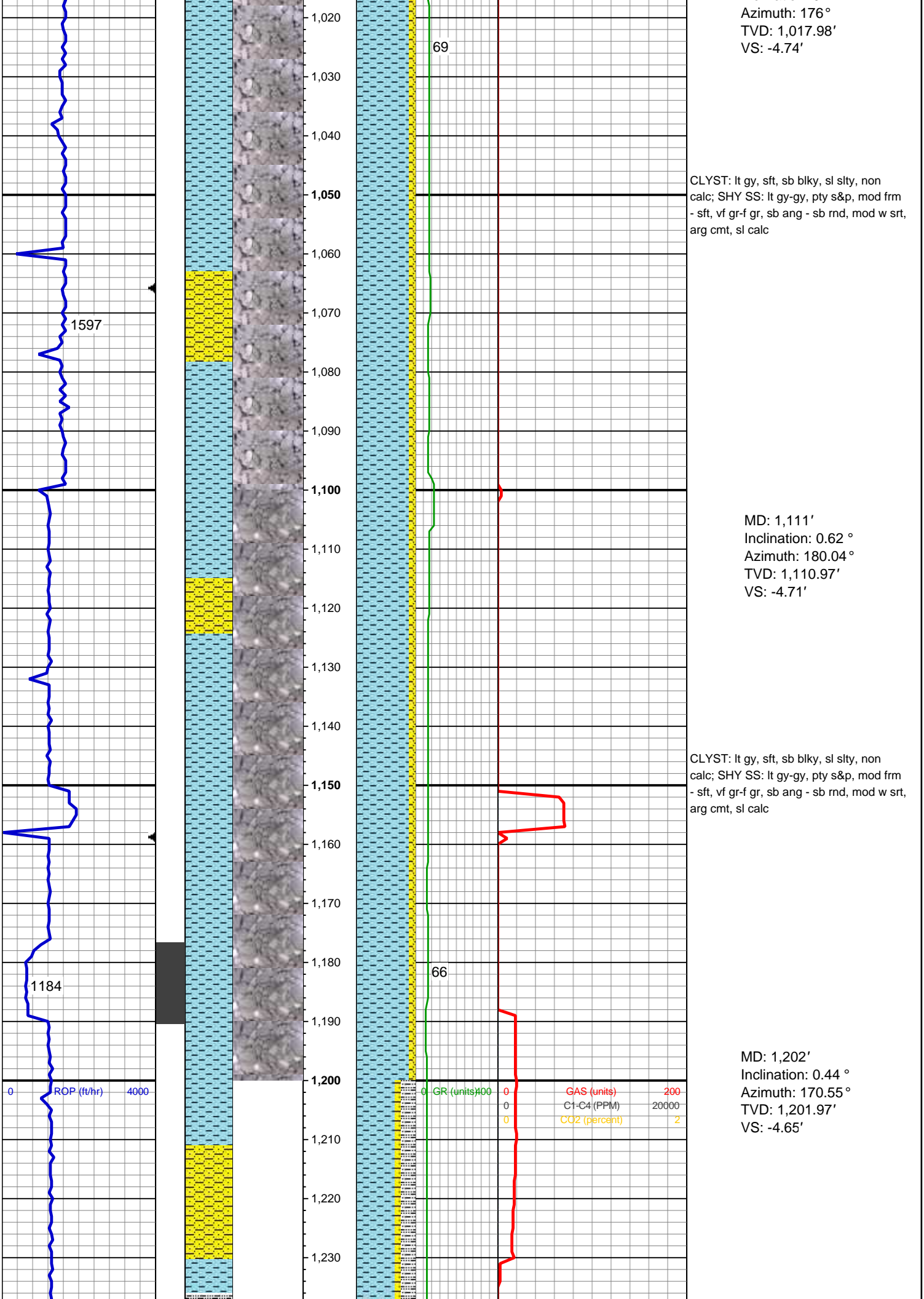
MD: 833'
Inclination: 0.18 °
Azimuth: 287.97 °
TVD: 832.98'
VS: -4.62'

CLYST: lt gy, sft, sb blk, sl slty, non
calc; SHY SS: lt gy-gy, pty s&p, mod frm
- sft, vf gr-f gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc

MD: 927'
Inclination: 0 °
Azimuth: 41.7 °
TVD: 926.98'
VS: -4.76'

CLYST: lt gy, sft, sb blk, sl slty, non
calc; SHY SS: lt gy-gy, pty s&p, mod frm
- sft, vf gr-f gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc

MD: 1,018'
Inclination: 0.44 °

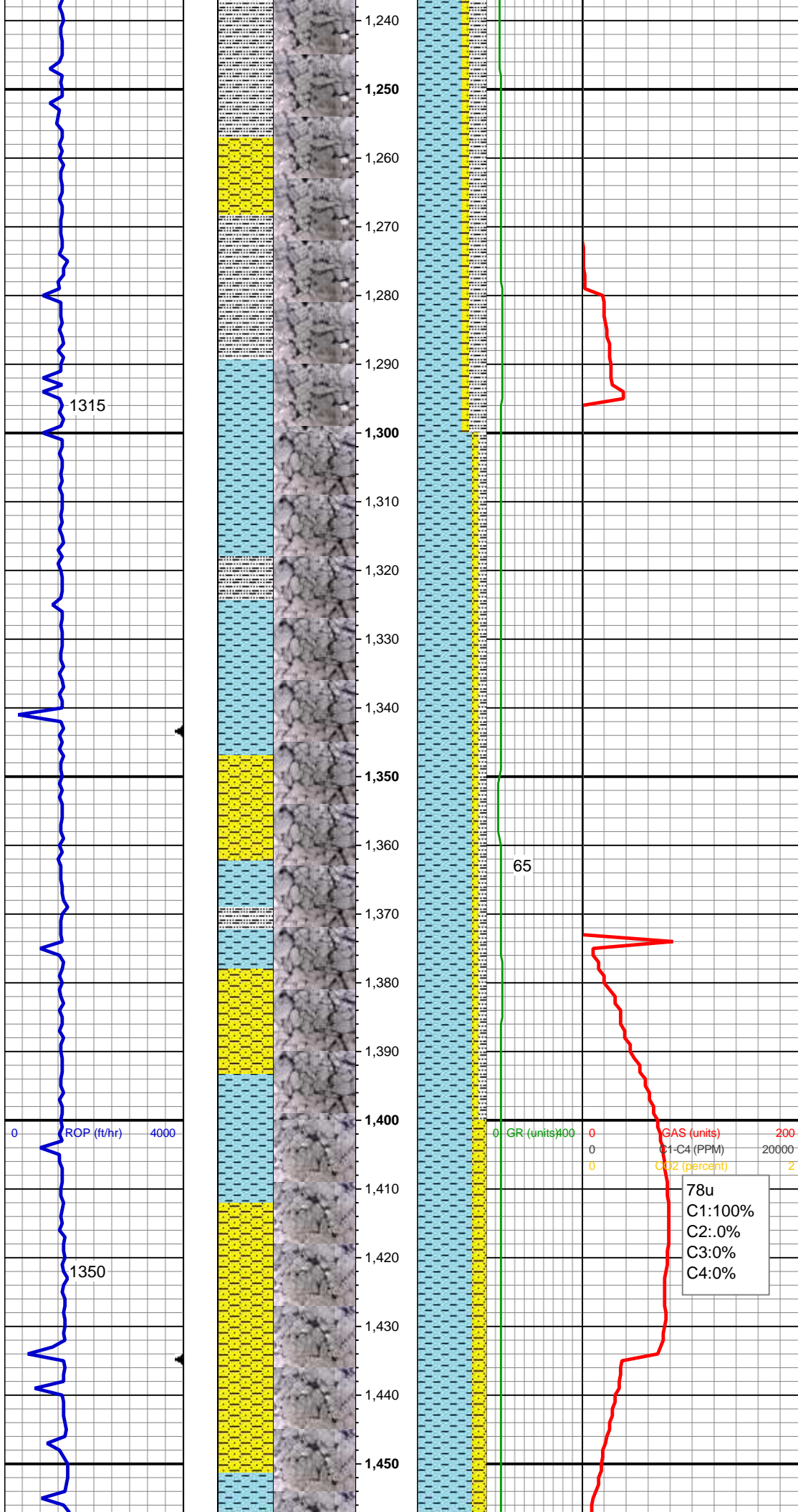


Azimuth: 176°
TVD: 1,017.98'
VS: -4.74'

MD: 1,111'
Inclination: 0.62°
Azimuth: 180.04°
TVD: 1,110.97'
VS: -4.71'

CLYST: lt gy, sft, sb blk, sl slty, non calc; SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc

MD: 1,202'
Inclination: 0.44°
Azimuth: 170.55°
TVD: 1,201.97'
VS: -4.65'



CLYST: lt gy, sft, sb blk, sl slty, non
calc; SHY SS: lt gy-gy, pty s&p, mod frm
- sft, vf gr-f gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc SLTY SH: lt-dk gy, occ
tan, sft-frm, sb blk-sb plty, gritty, tr sdy ip

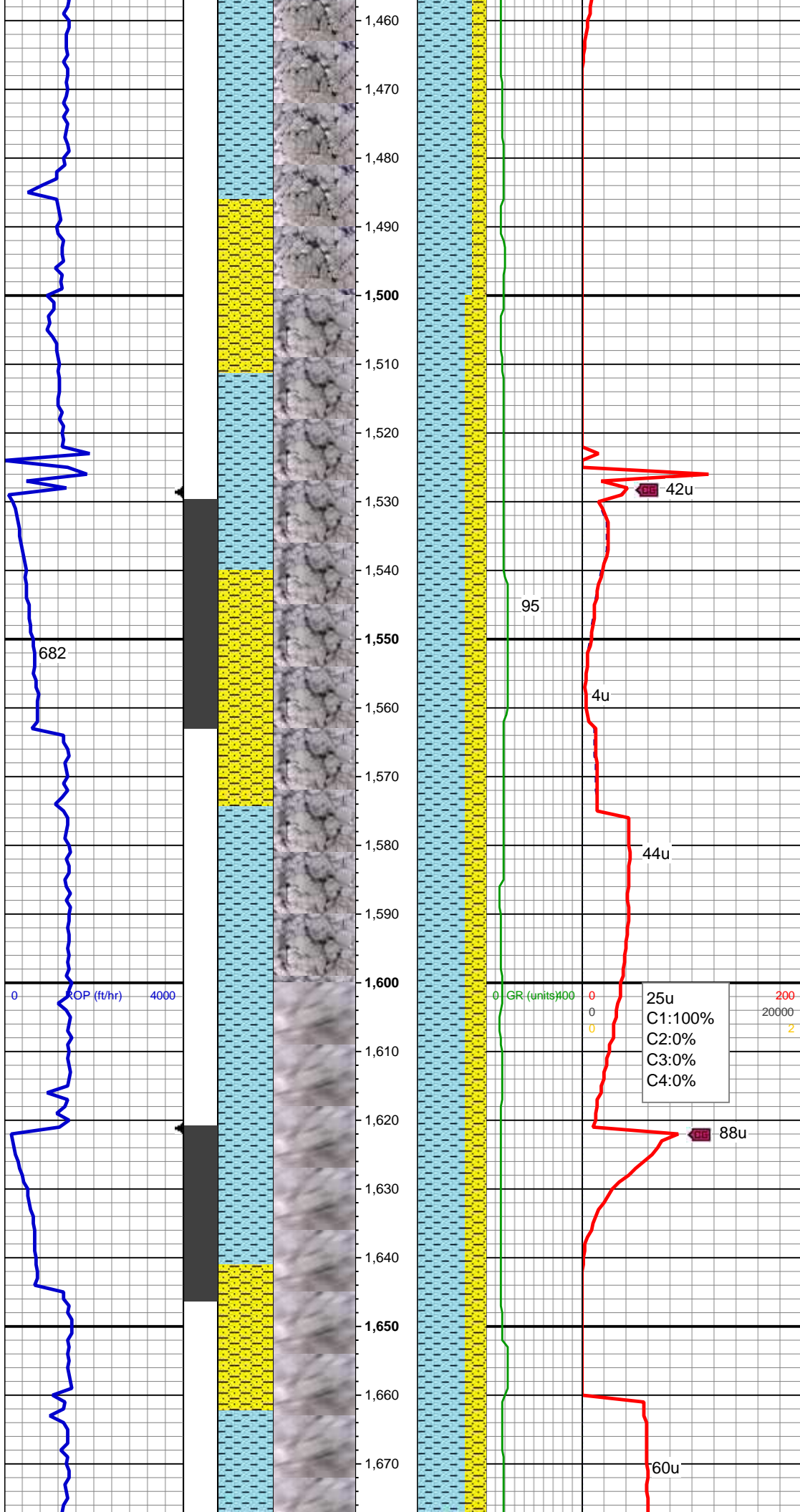
MD: 1,295'
Inclination: 0.35 °
Azimuth: 207.28 °
TVD: 1,294.97'
VS: -4.73'

CLYST: lt gy, sft, sb blk, sl slty, non
calc; SHY SS: lt gy-gy, pty s&p, mod frm
- sft, vf gr-f gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc SLTY SH: lt-dk gy, occ
tan, sft-frm, sb blk-sb plty, gritty, tr sdy ip

Mud Wt: 8.75 / 30 Vis

MD: 1,387'
Inclination: 0.53 °
Azimuth: 241.91 °
TVD: 1,386.96'
VS: -5.23'

CLYST: lt gy, sft, sb blk, sl slty, non
calc; SHY SS: lt gy-gy, pty s&p, mod frm
- sft, vf gr-f gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc



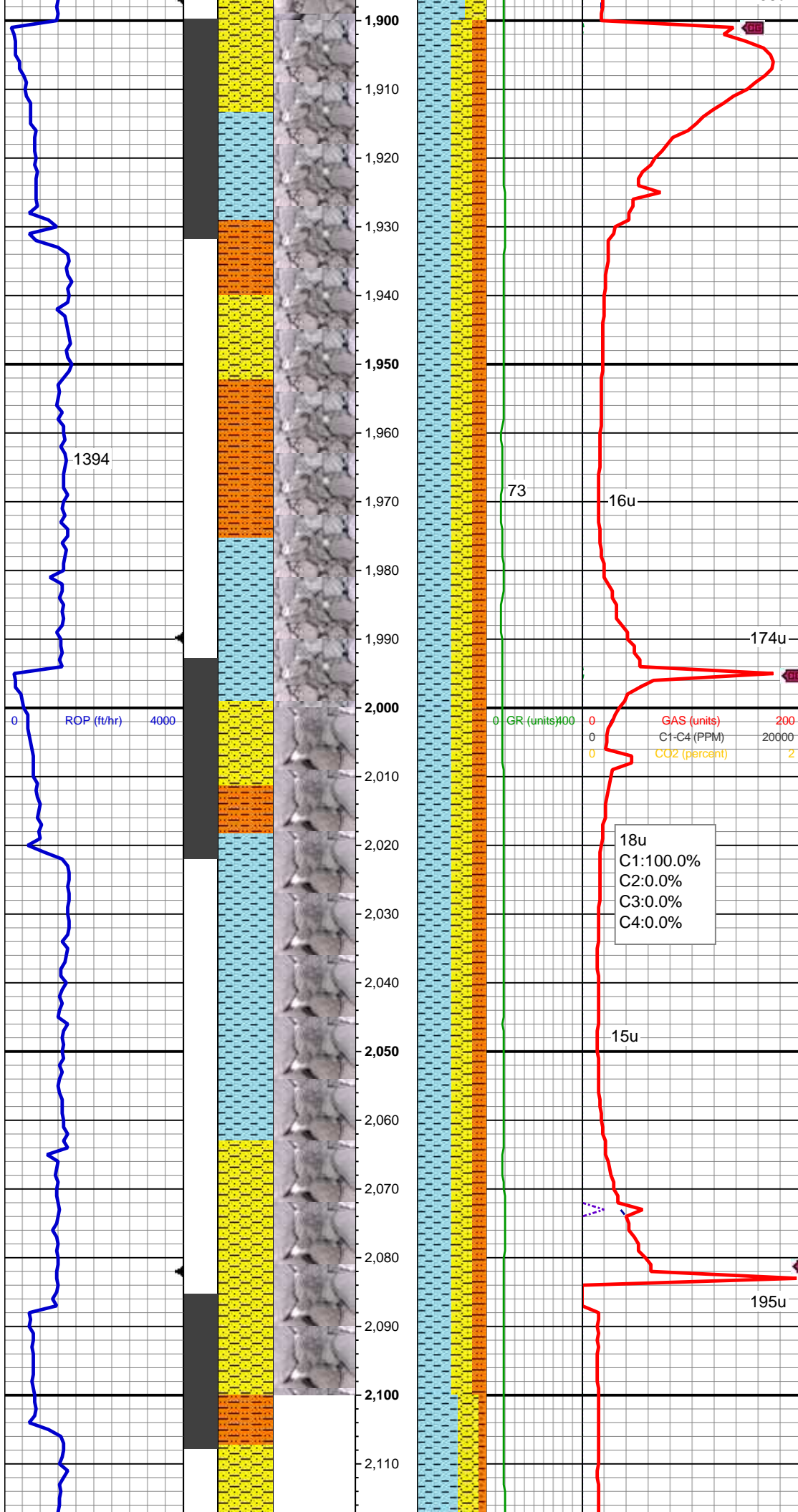
MD: 1,481'
Inclination: 0.44 °
Azimuth: 240.33 °
TVD: 1,480.96'
VS: -5.93'

CLYST: lt gy, sft, sb blk, sl slty, non
calc; SHY SS: lt gy-gy, pty s&p, mod frm
- sft, vf gr-f gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc

MD: 1,573'
Inclination: 2.81 °
Azimuth: 307.13 °
TVD: 1,572.92'
VS: -8.03'

CLYST: lt gy, sft, sb blk, sl slty, non
calc; SHY SS: lt-med gy, pty s&p, frm -
sft, vf gr-f gr, occ med grs, sb ang - sb
rnd, mod w srt, arg cmt, sl calc

MD: 1,665'
Inclination: 4.31 °
Azimuth: 299.57 °
TVD: 1,664.74'
VS: -12.84'

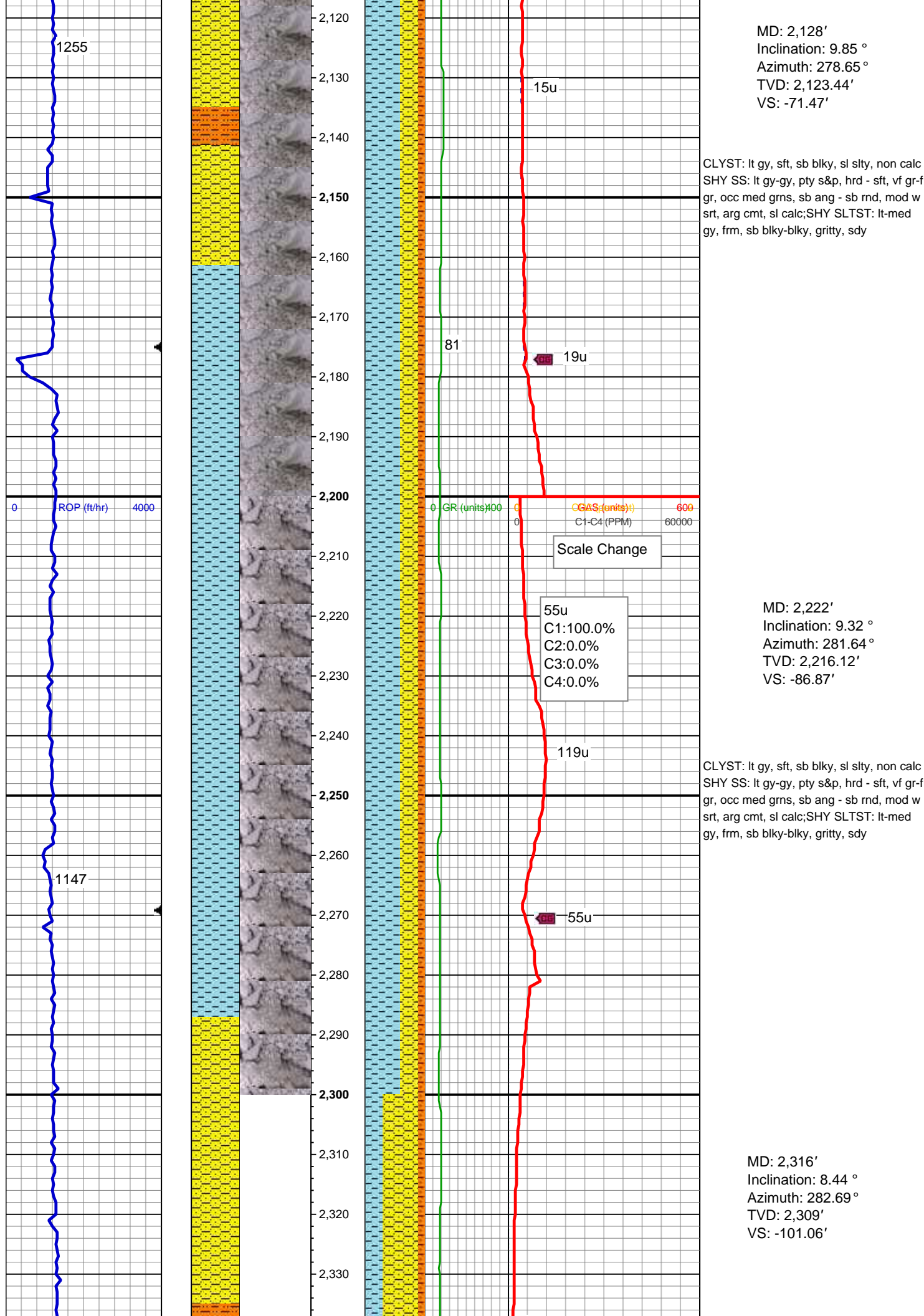


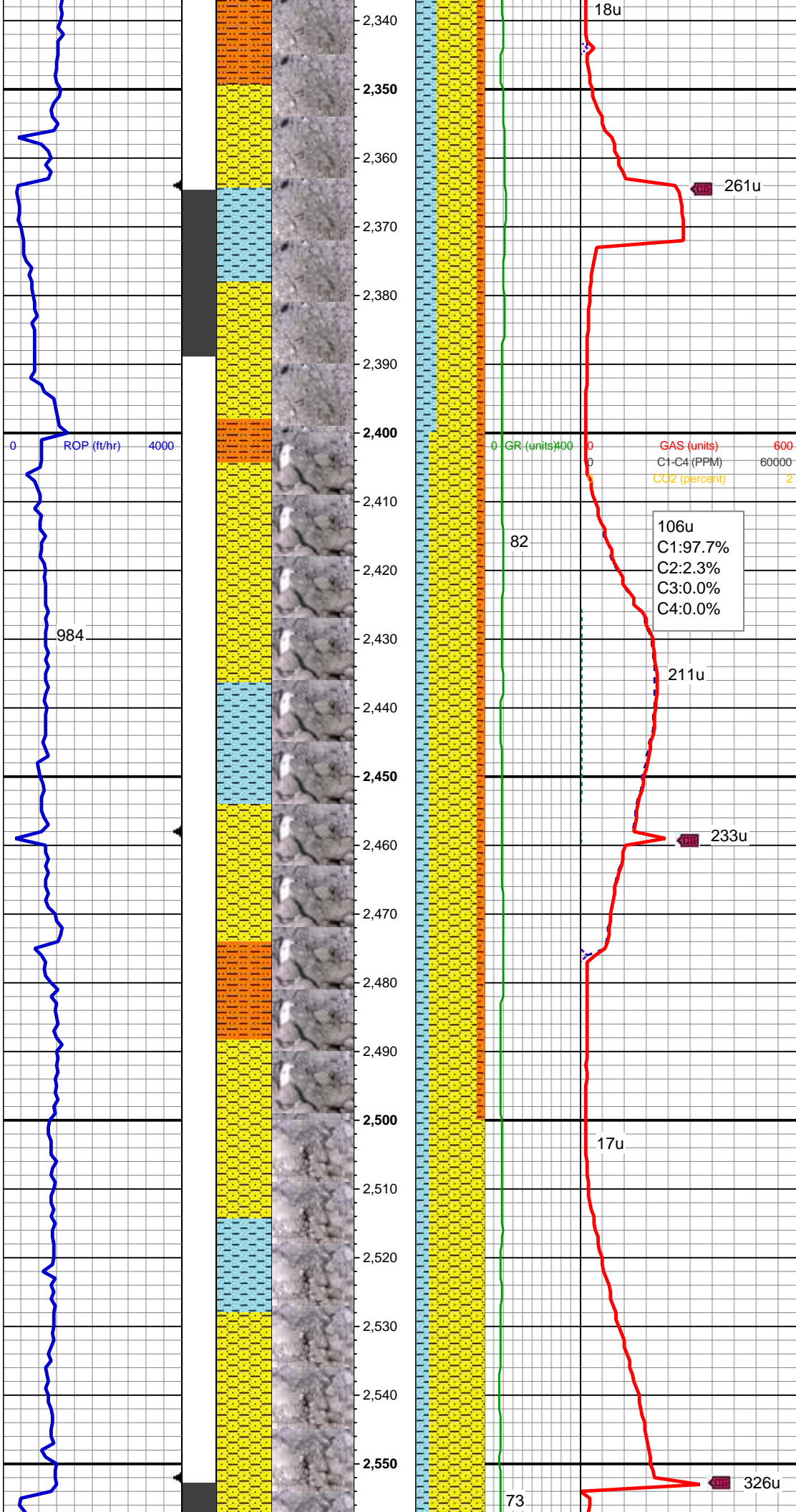
MD: 1,943'
Inclination: 8.53 °
Azimuth: 283.05 °
TVD: 1,941.01'
VS: -41.43'

CLYST: lt gy, sft, sb blkly, sl slty, non calc
SHY SS: lt gy-gy, pty s&p, mod frm - sft,
vf gr-f gr, sb ang - sb rnd, mod w srt, arg
cmt, sl calc;SHY SLTST: lt gy-gy, frm, sb
blkly-blky, gritty, sdy

MD: 2,035'
Inclination: 9.94 °
Azimuth: 283.4 °
TVD: 2,031.82'
VS: -55.8'

CLYST: lt gy, sft, sb blkly, sl slty, non calc
SHY SS: lt gy-gy, pty s&p, hrd - sft, vf gr-f
gr, occ med grns, sb ang - sb rnd, mod w
srt, arg cmt, sl calc;SHY SLTST: lt-med
gy, frm, sb blkly-blky, gritty, sdy





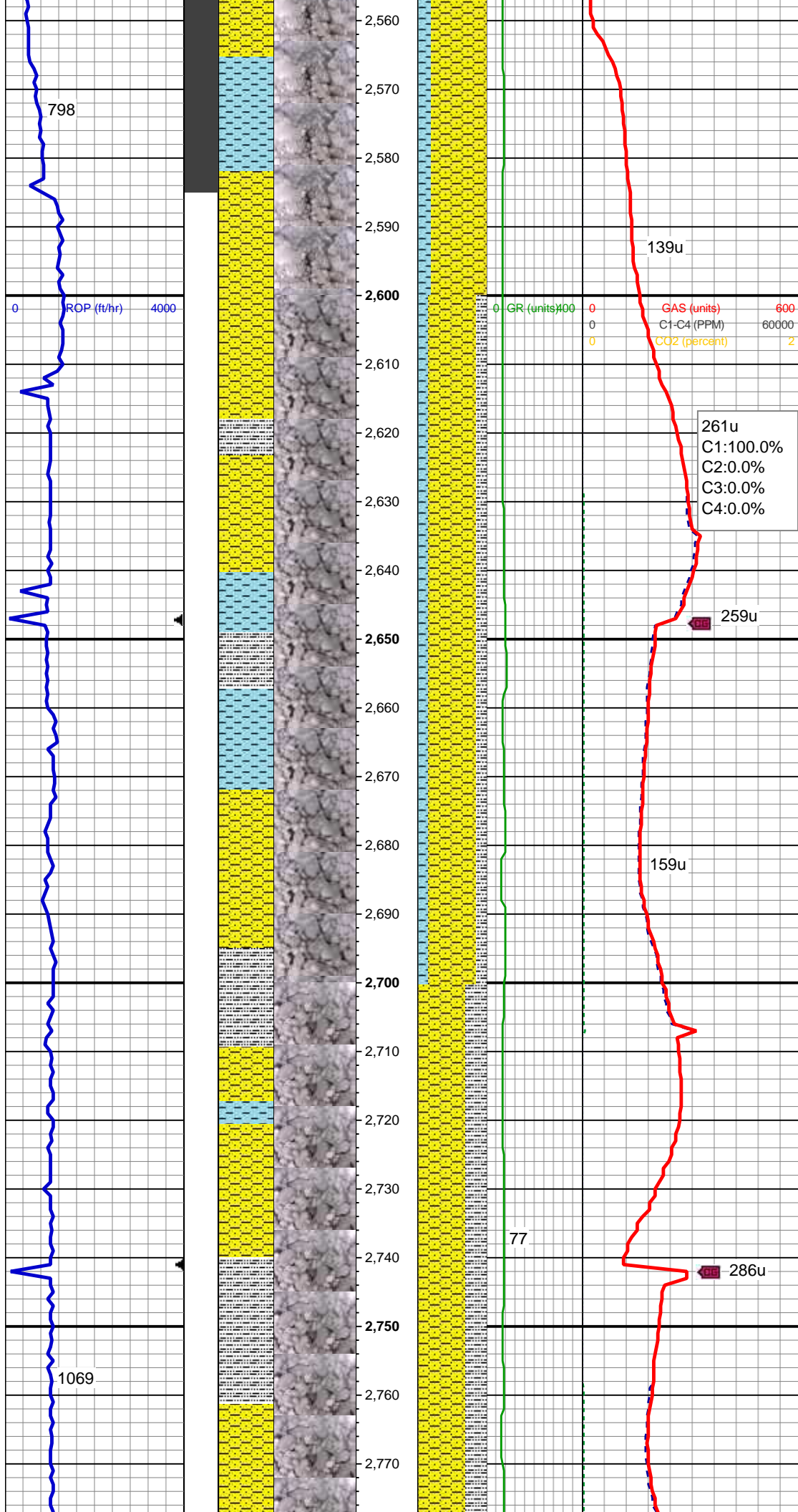
CLYST: lt gy, sft, sb blkly, sl slty, non calc
SHY SS: lt-med gy, hrd - sft, vf gr-f gr,
occ med grns, sb ang - sb rnd, mod w srt,
arg cmt, sl calc;SHY SLTST: lt-med gy,
frm-hd, sb blkly-blky, gritty, sdv

MD: 2,411'
Inclination: 9.41 °
Azimuth: 279 °
TVD: 2,402.85'
VS: -115.53'

CLYST: lt gy, sft, sb blkly, sl slty, non calc
SHY SS: lt-med gy, hrd - sft, vf gr-f gr,
occ med grns, sb ang - sb rnd, mod w srt,
arg cmt, sl calc;SHY SLTST: lt-med gy,
frm-hd, sb blkly-blky, gritty, sdv

MD: 2,505'
Inclination: 8.62 °
Azimuth: 280.41 °
TVD: 2,495.68'
VS: -130.05'

SHY SS: lt-med gy, hrd - sft, vf gr-f gr,
occ med grns, sb ang - sb rnd, mod w srt,
arg cmt, sl calc CLYST: lt gy, sft, sb
blkly-blky, sl slty, non calc

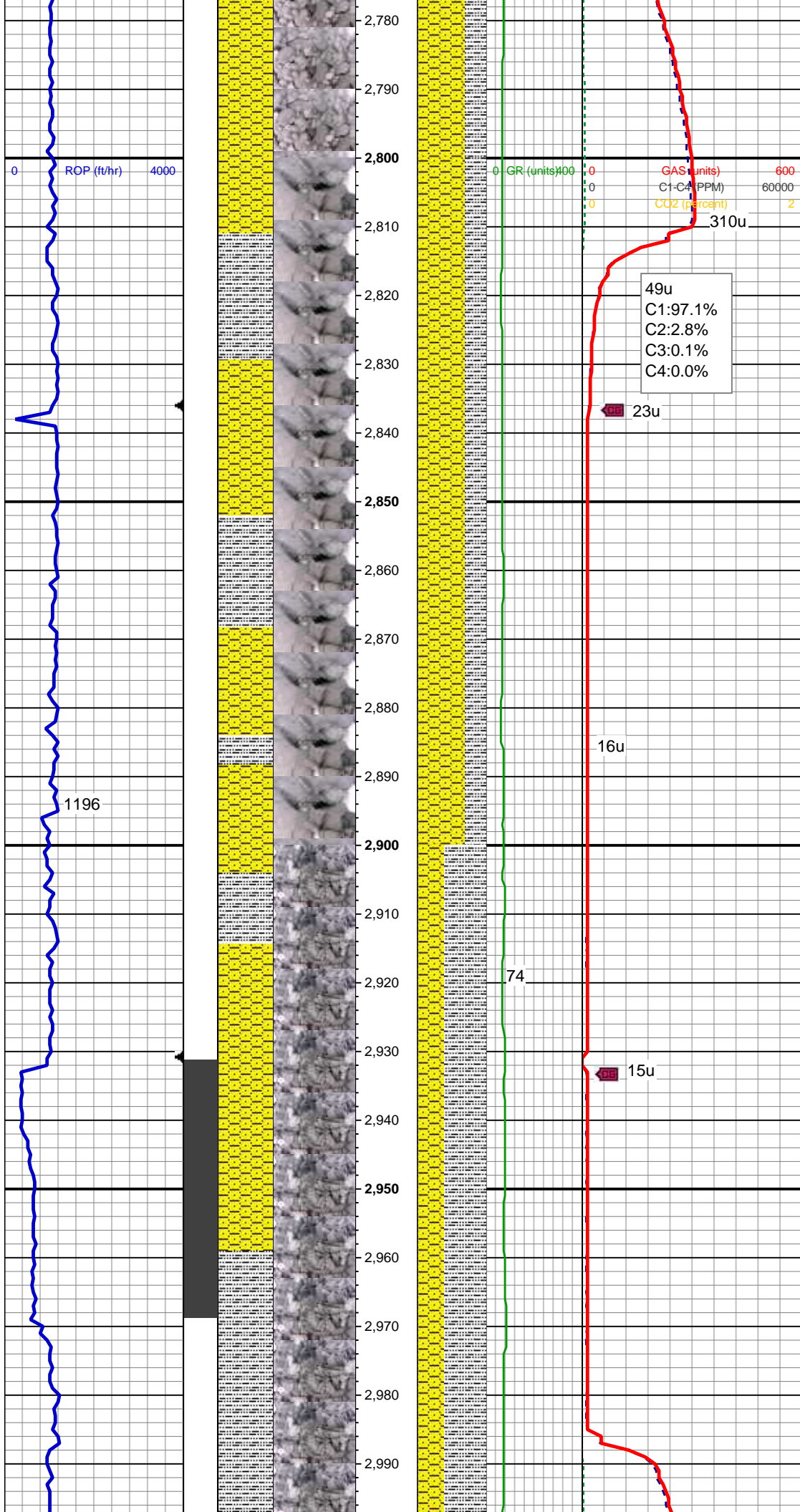


MD: 2,600'
Inclination: 10.2 °
Azimuth: 275.31 °
TVD: 2,589.4'
VS: -145.43'

SHY SS: lt-med gy, mod frm - sft, vf gr-f
gr, sb ang - sb rnd, mod w srt, arg cmt, sl
calc CLYST: lt gry, sft, sub-blky, non calc
SLTY SH: lt-dk gy, sft-frm, sb blk-y-sb plty,
gritty

MD: 2,694'
Inclination: 10.11 °
Azimuth: 274.61 °
TVD: 2,681.93'
VS: -161.94'

SHY SS: lt-med gy, mod frm - sft, vf gr-f
gr, occ med grns, sb ang - sb rnd, mod w
srt, arg cmt, sl calc SLTY SH: lt-dk gy,
sft-frm, sb blk-y-sb plty, gritty

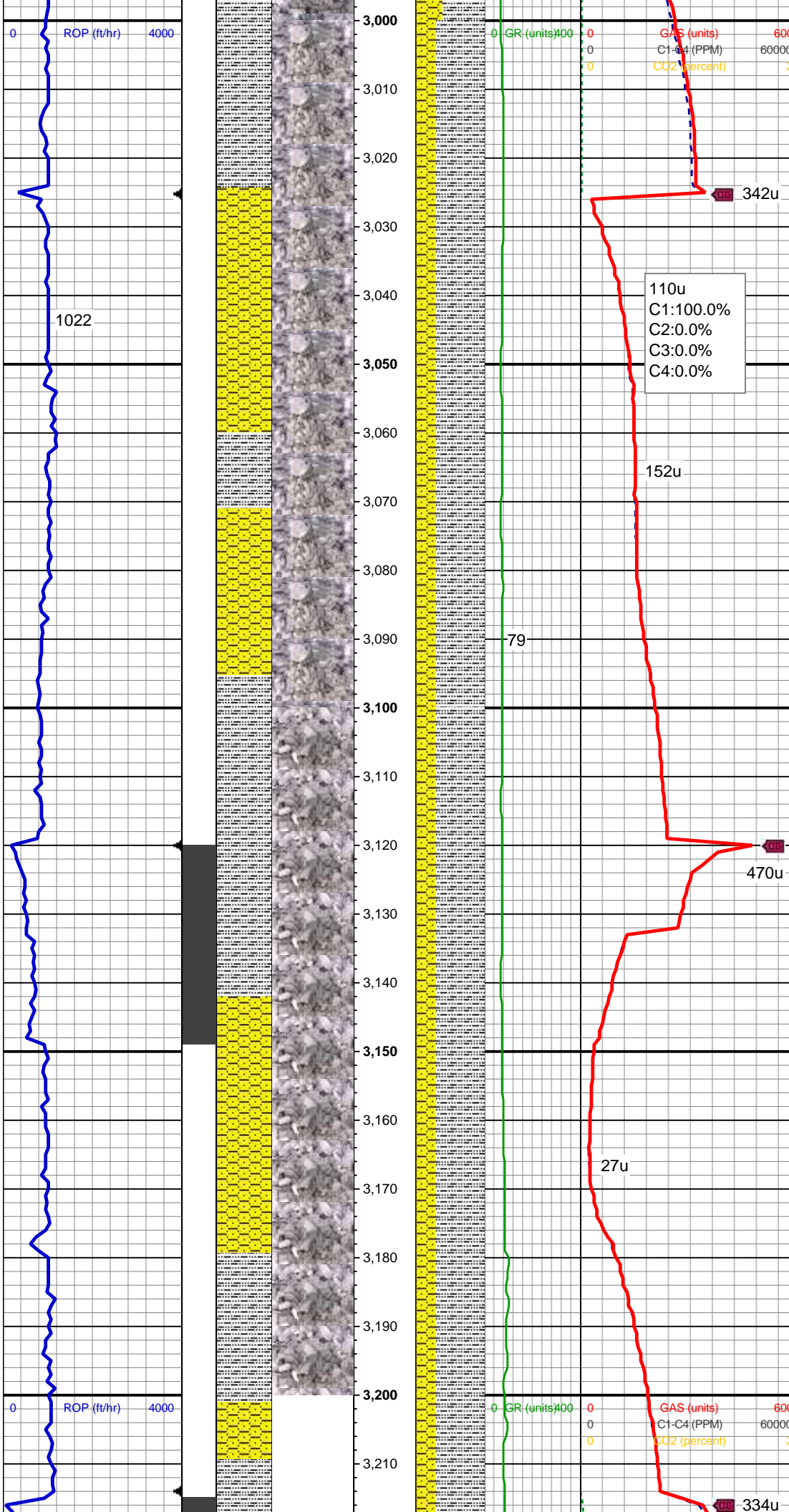


MD: 2,789'
Inclination: 10.11 °
Azimuth: 274.08 °
TVD: 2,775.46'
VS: -178.57'

SHY SS: lt-med gy, mod frm - sft, vf gr-f
gr, occ med grns, sb ang - sb rnd, mod w
srt, arg cmt, sl calc SLTY SH: lt-dk gy,
sft-frm, sb blkly-sb plty, gritty

MD: 2,883'
Inclination: 9.94 °
Azimuth: 271.97 °
TVD: 2,868.02'
VS: -194.91'

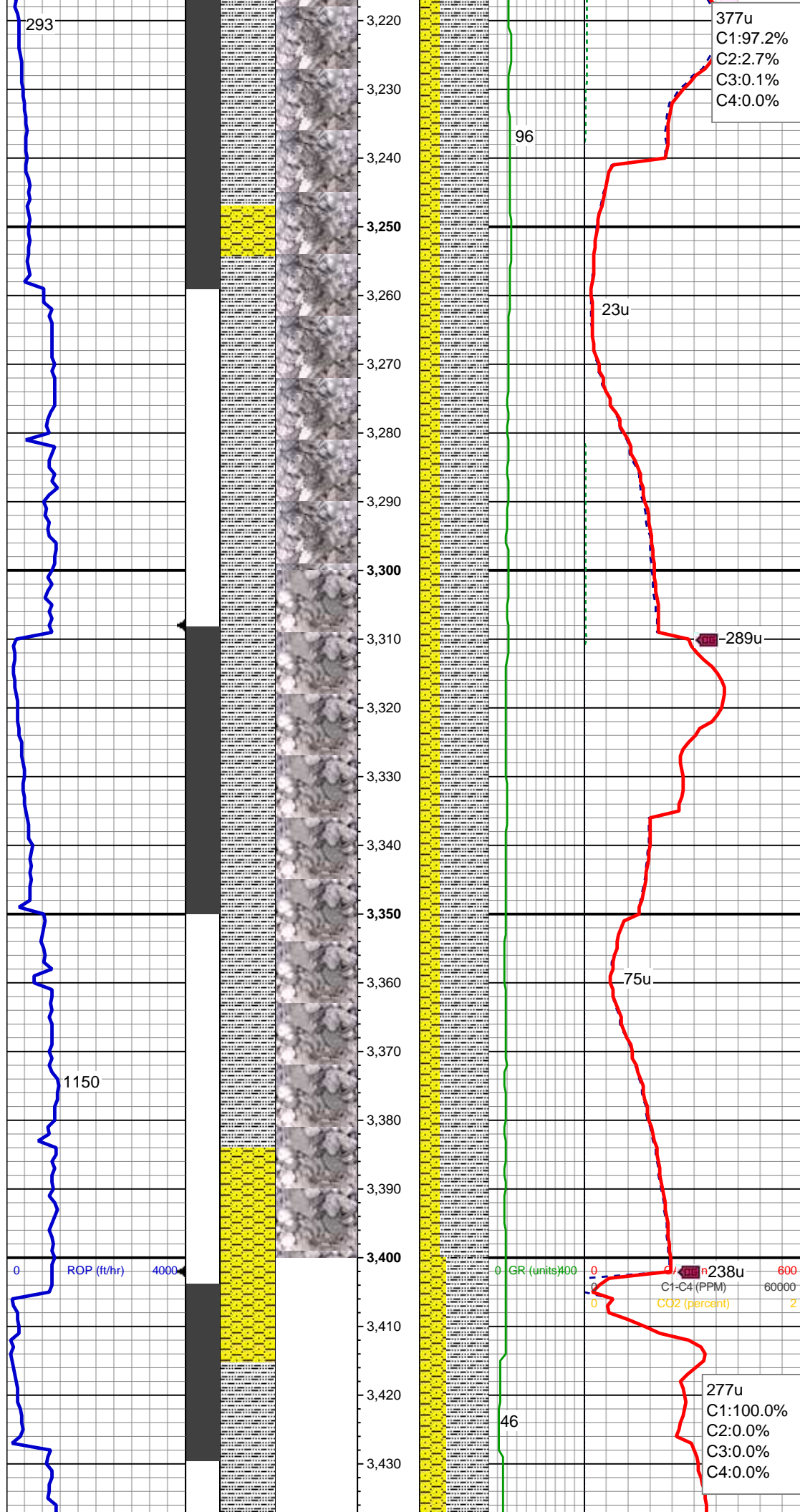
MD: 2,978'
Inclination: 10.99 °
Azimuth: 277.95 °
TVD: 2,961.44'
VS: -212.07'



SHY SS: lt-med gy, mod frm - sft, vf gr-gr, occ med grns, sb ang - sb rnd, mod w srt, arg cmt, sl calc SLTY SH: lt-dk gy, sft-frm, sb blk-y-sb plty, gritty

MD: 3,072'
Inclination: 9.67 °
Azimuth: 276.89 °
TVD: 3,053.92'
VS: -228.78'

MD: 3,167'
Inclination: 6.77 °
Azimuth: 267.93 °
TVD: 3,147.94'
VS: -242.3'



SHY SS: lt-med gy, mod frm - sft, vf gr-f
gr, occ med grns, sb ang - sb rnd, mod w
srt, arg cmt, sl calc SLTY SH: lt-dk gy,
sft-frm, sb blk-y-sb plty, gritty

MD: 3,261'
Inclination: 7.74 °
Azimuth: 287.09 °
TVD: 3,241.2'
VS: -253.89'

MD: 3,355'
Inclination: 9.94 °
Azimuth: 281.64 °
TVD: 3,334.07'
VS: -267.89'

377u
C1:97.2%
C2:2.7%
C3:0.1%
C4:0.0%

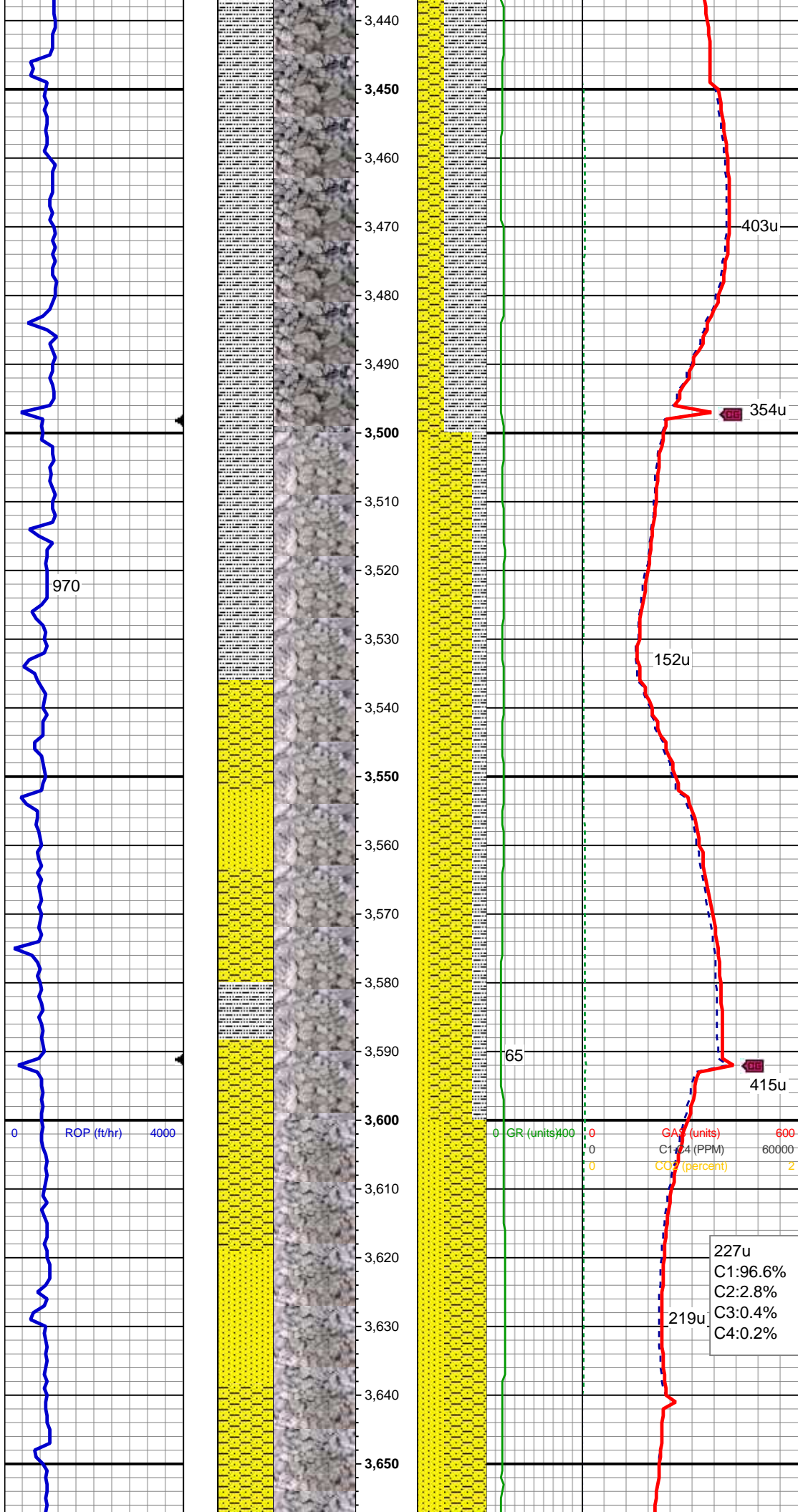
289u

23u

75u

238u
C1-C4 (PPM)
CO2 (percent)

277u
C1:100.0%
C2:0.0%
C3:0.0%
C4:0.0%



SHY SS: lt-med gy, mod frm - sft, vf gr-f gr, occ med grns, sb ang - sb rnd, mod w srt, arg cmt, sl calc SLTY SH: lt-dk gy, sft-frm, sb blk-y-sb plty, gritty

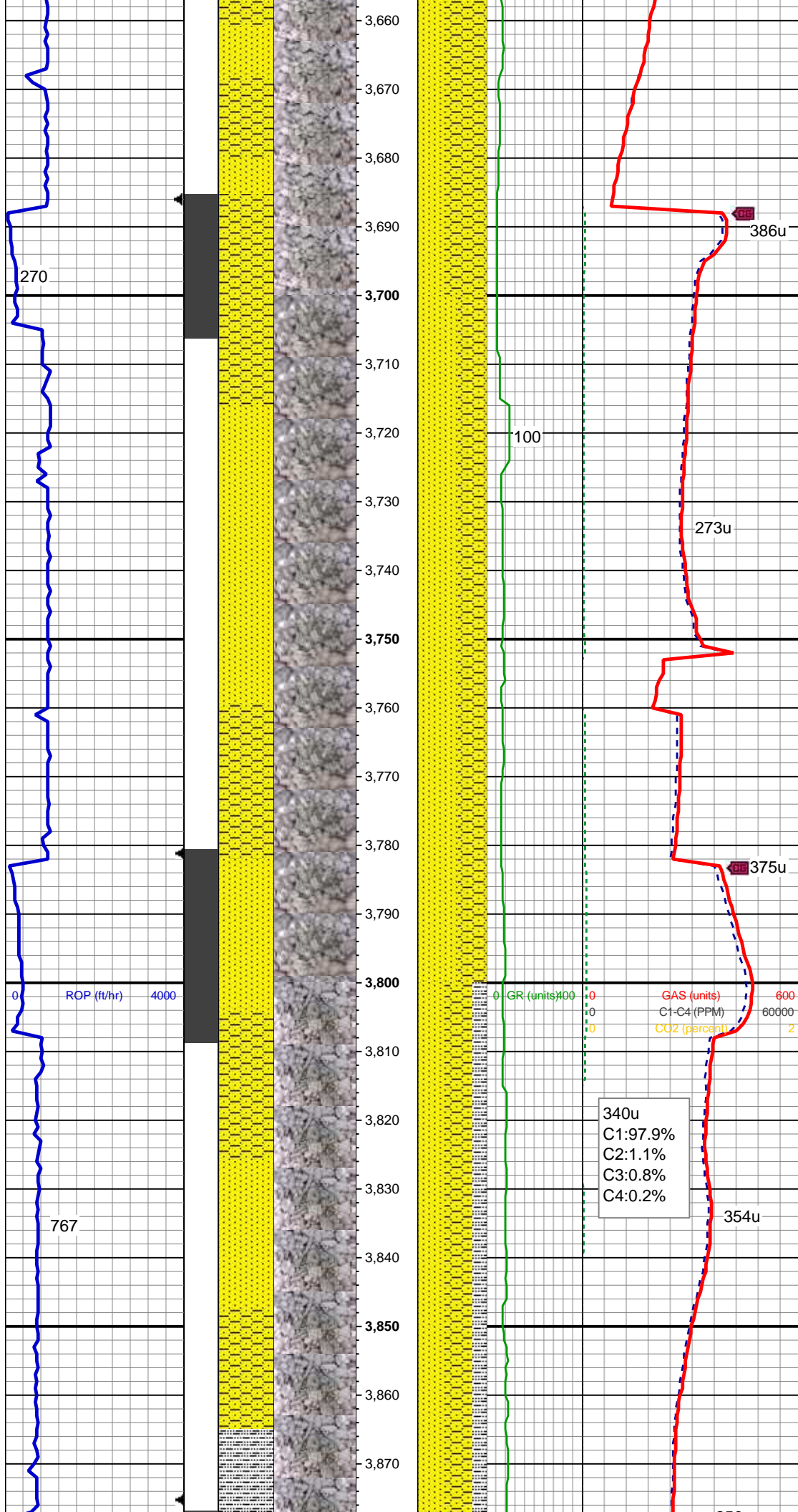
MD: 3,450'
Inclination: 11.7 °
Azimuth: 280.06 °
TVD: 3,427.38'
VS: -285.41'

MD: 3,544'
Inclination: 12.84 °
Azimuth: 279.71 °
TVD: 3,519.23'
VS: -305.09'

SHY SS: lt-med gy, mod frm - sft, vf gr-f gr, occ med grns, sb ang - sb rnd, mod w srt, arg cmt, sl calc SLTY SH: lt-dk gy, sft-frm, sb blk-y-sb plty, gritty SS:lt-gy, frm,vf gr-f gr, rare med grns, sb ang-sb rnd, mod w srt, tr pyr

MD: 3,639'
Inclination: 13.72 °
Azimuth: 278.12 °
TVD: 3,611.69'
VS: -326.64'

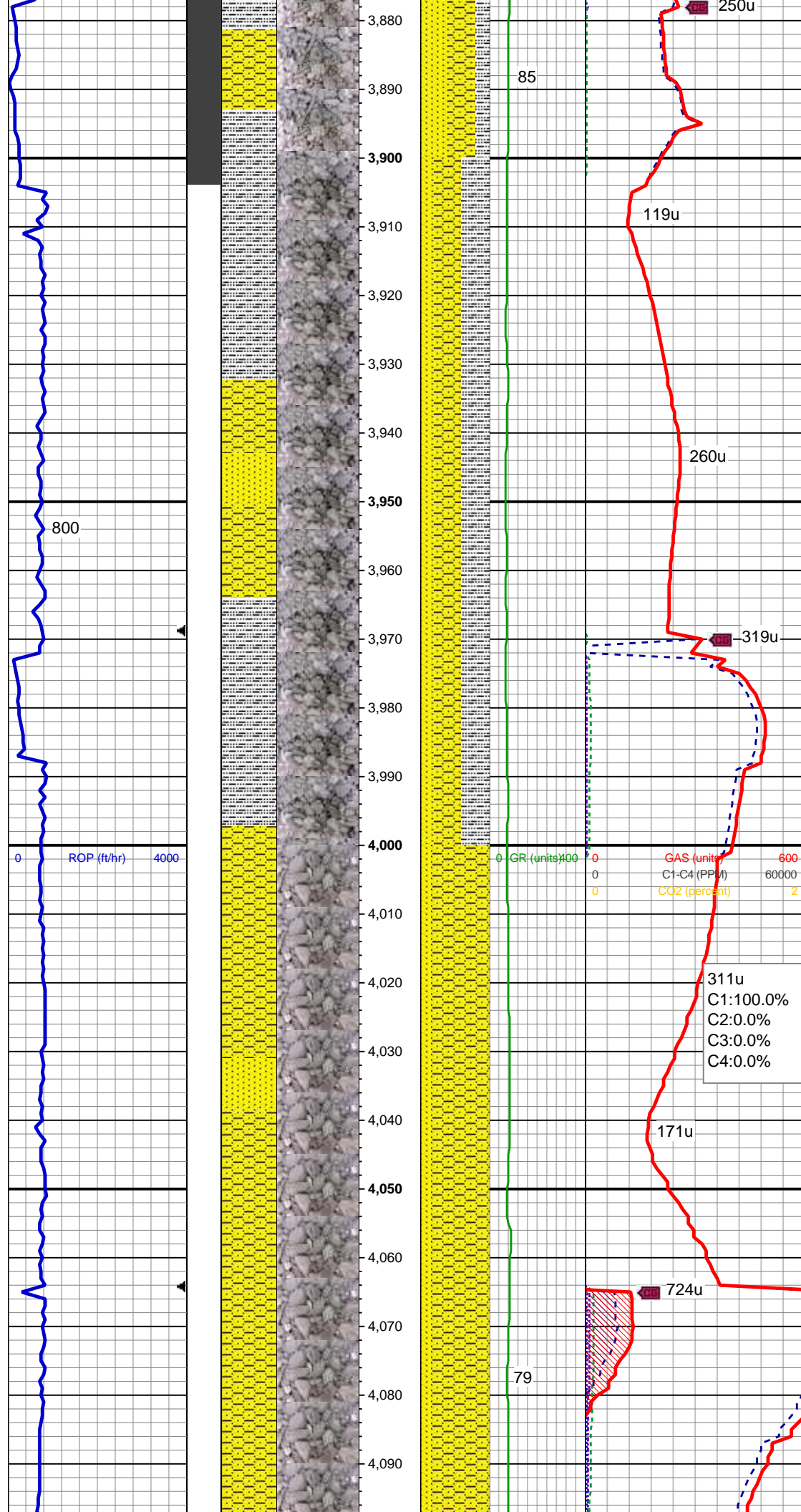
SHY SS: lt-med gy, mod frm - sft, vf gr-f gr, occ med grns, sb ang - sb rnd, mod w srt, arg cmt, sl calc SS:lt-gy-trnsl, frm,vf gr-f gr, rare med grns, sb ang-sb rnd, mod w srt, tr pyr



MD: 3,733'
Inclination: 12.93 °
Azimuth: 278.3 °
TVD: 3,703.16'
VS: -348.09'

MD: 3,828'
Inclination: 11.34 °
Azimuth: 283.4 °
TVD: 3,796.04'
VS: -367.69'

340u
C1:97.9%
C2:1.1%
C3:0.8%
C4:0.2%



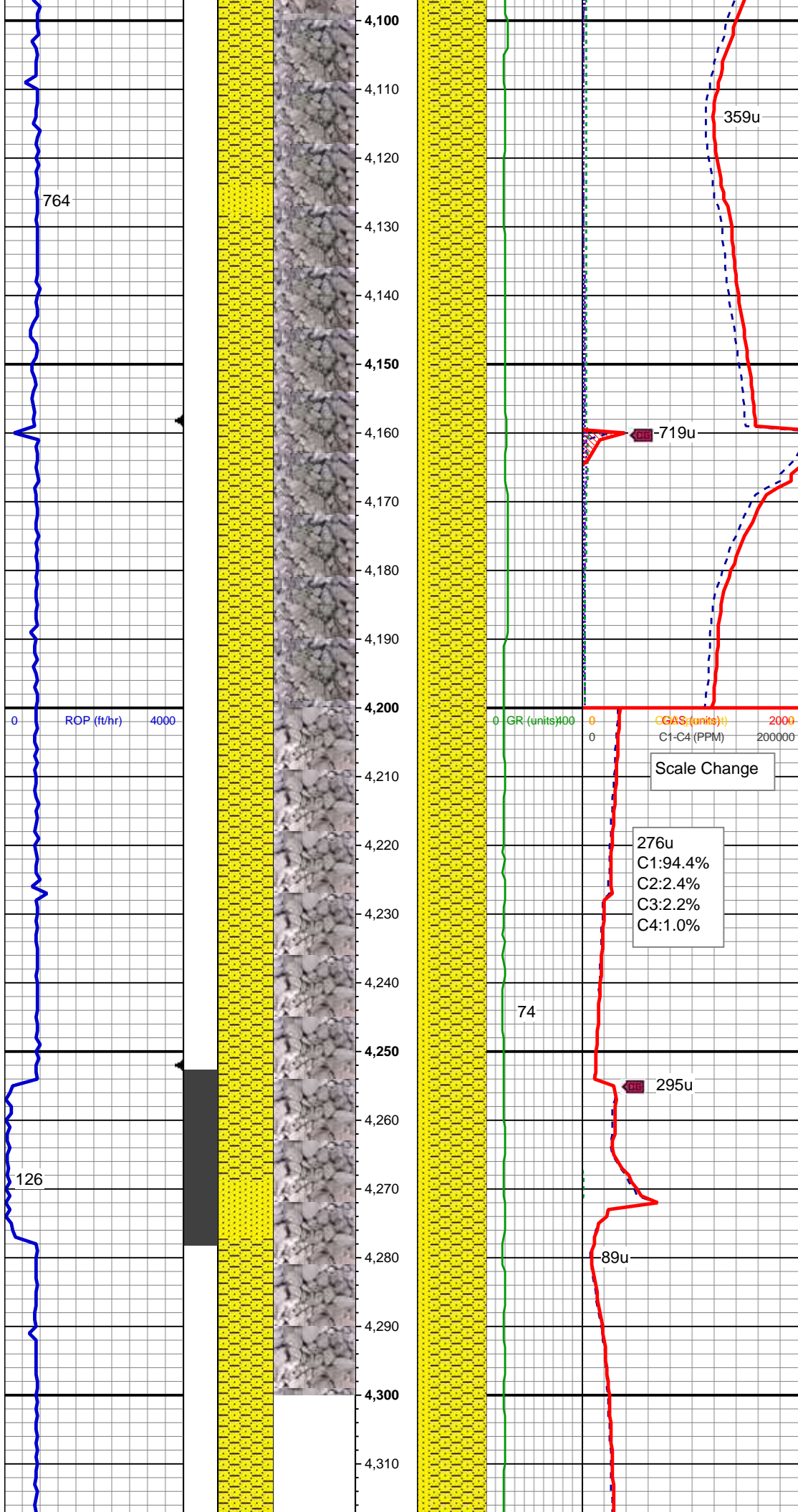
MD: 3,922'
Inclination: 9.85 °
Azimuth: 282.69 °
TVD: 3,888.43'
VS: -384.53'

SLTY SH: lt-dk gy, sft frm, sb blk-y-sb plty, gritty SHY SS: lt-med gy, mod frm - sft, vf gr-f gr, occ med grns, sb ang - sb rnd, mod w srt, arg cmt, sl calc SS:lt-gy-trnsl, frm,vf gr-f gr, rare med grns, sb ang-sb rnd, mod w srt, tr pyr

MD: 4,017'
Inclination: 8.53 °
Azimuth: 276.54 °
TVD: 3,982.21'
VS: -399.45'

SHY SS: lt-med gy, mod frm - sft, vf gr-f gr, occ med grns, sb ang - sb rnd, mod w srt, arg cmt, sl calc SS:lt-gy-trnsl, frm,vf gr-f gr, rare med grns, sb ang-sb rnd, mod w srt, glau

GR (units)	0	GAS (units)	600
	0	C1-C4 (PPM)	60000
	0	CO2 (percent)	2



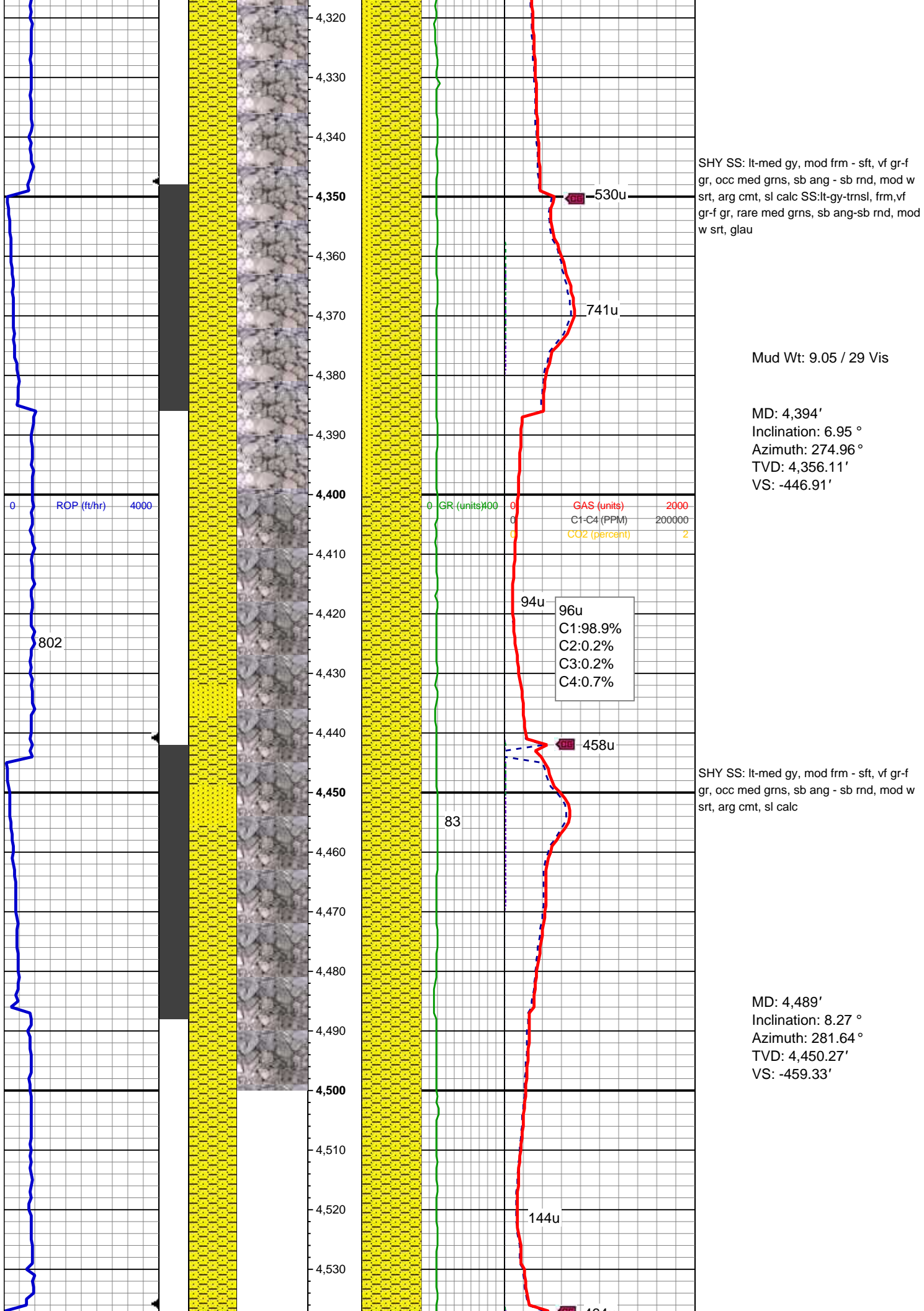
MD: 4,111'
Inclination: 8.09 °
Azimuth: 281.82 °
TVD: 4,075.23'
VS: -412.85'

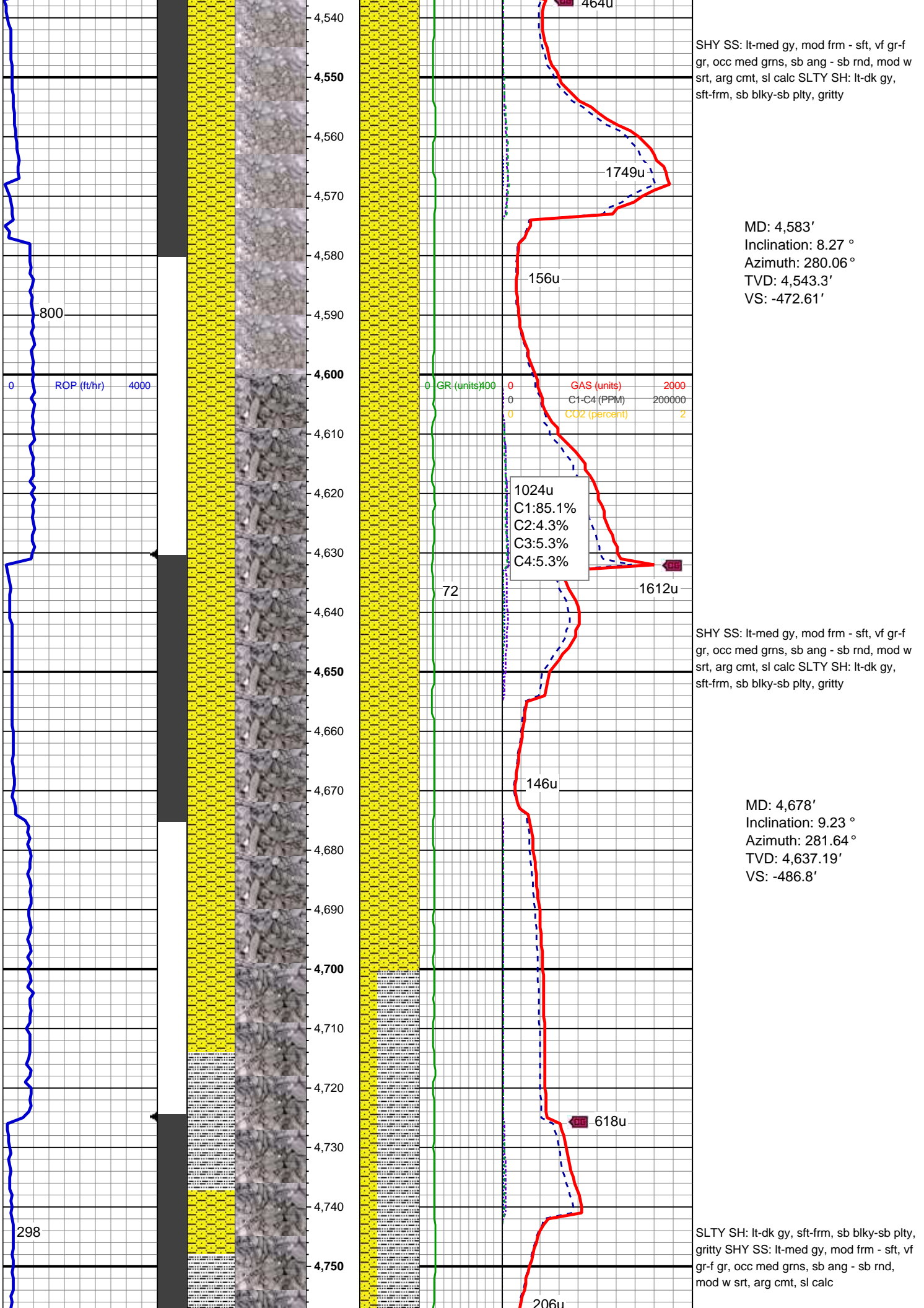
SHY SS: lt-med gy, mod frm - sft, vf gr-f gr, occ med grns, sb ang - sb rnd, mod w srt, arg cmt, sl calc SS:lt-gy-trnsl, frm,vf gr-f gr, rare med grns, sb ang-sb rnd, mod w srt, glau

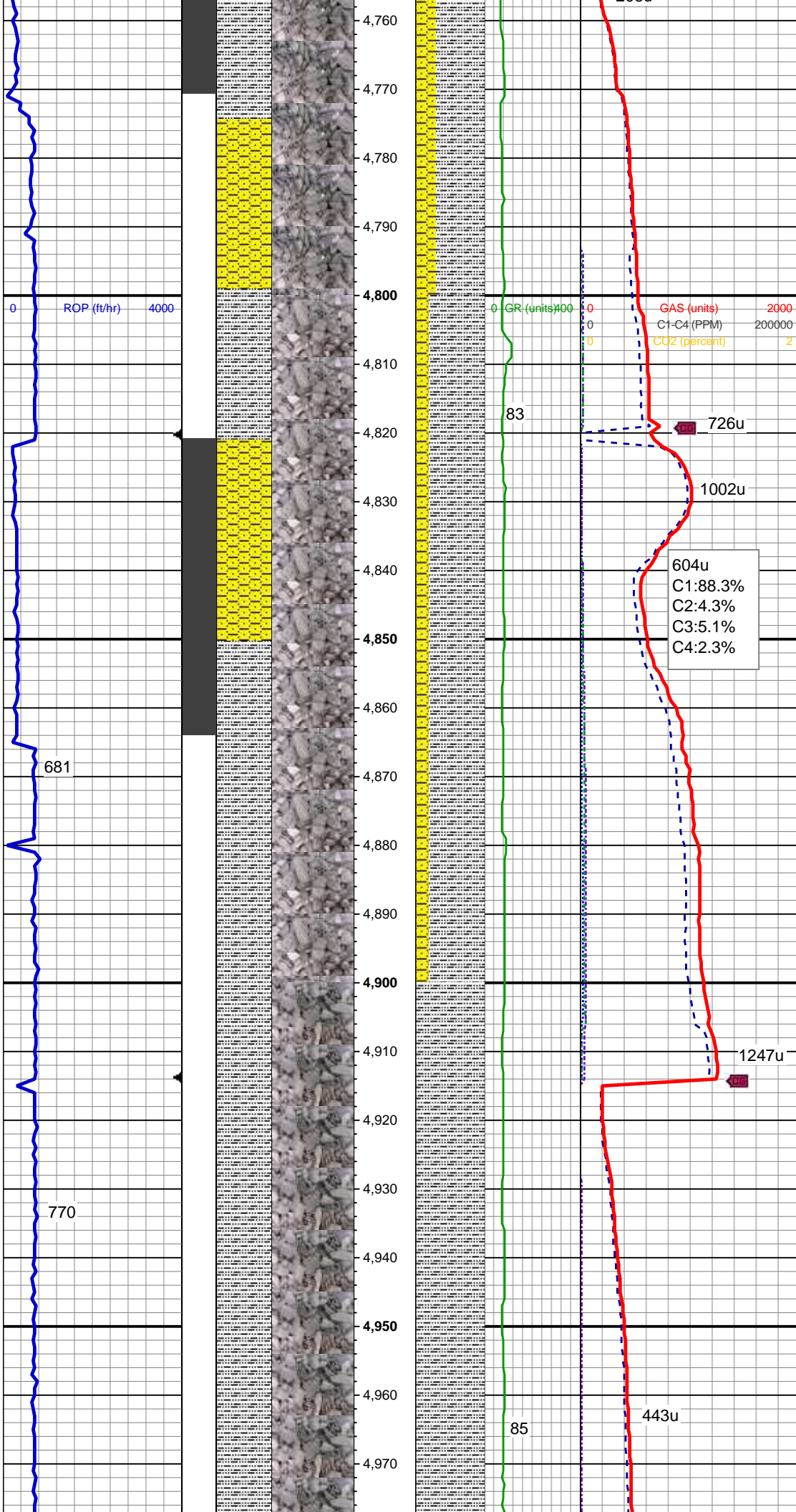
MD: 4,205'
Inclination: 7.3 °
Azimuth: 280.23 °
TVD: 4,168.38'
VS: -425.21'

SHY SS: lt-med gy, mod frm - sft, vf gr-f gr, occ med grns, sb ang - sb rnd, mod w srt, arg cmt, sl calc SS:lt-gy-trnsl, frm,vf gr-f gr, rare med grns, sb ang-sb rnd, mod w srt, glau

MD: 4,299'
Inclination: 6.16 °
Azimuth: 275.14 °
TVD: 4,261.73'
VS: -436.11'







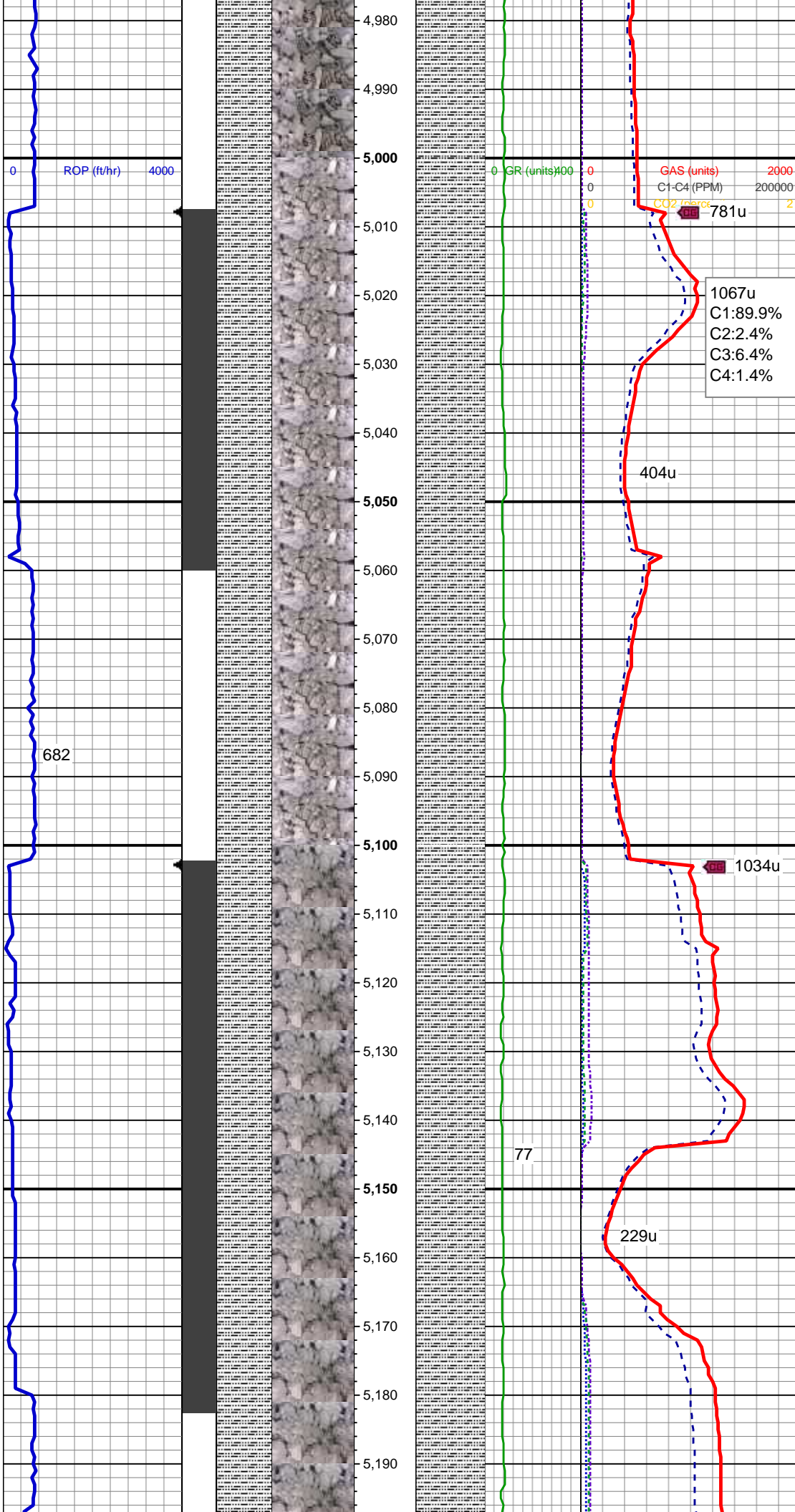
MD: 4,772'
Inclination: 9.94 °
Azimuth: 283.05 °
TVD: 4,729.88'
VS: -502.08'

SLTY SH: lt-dk gy, sft frm, sb blkly-sb plty,
gritty SHY SS: lt-med gy, mod frm - sft, vf
gr-f gr, occ med grns, sb ang - sb rnd,
mod w srt, arg cmt, sl calc

MD: 4,867'
Inclination: 9.85 °
Azimuth: 270.04 °
TVD: 4,823.48'
VS: -518.2'

SLTY SH: lt-dk gy, sft frm, sb blkly-sb plty,
gritty, rthy

MD: 4,961'
Inclination: 7.47 °
Azimuth: 264.59 °
TVD: 4,916.4'
VS: -532.32'



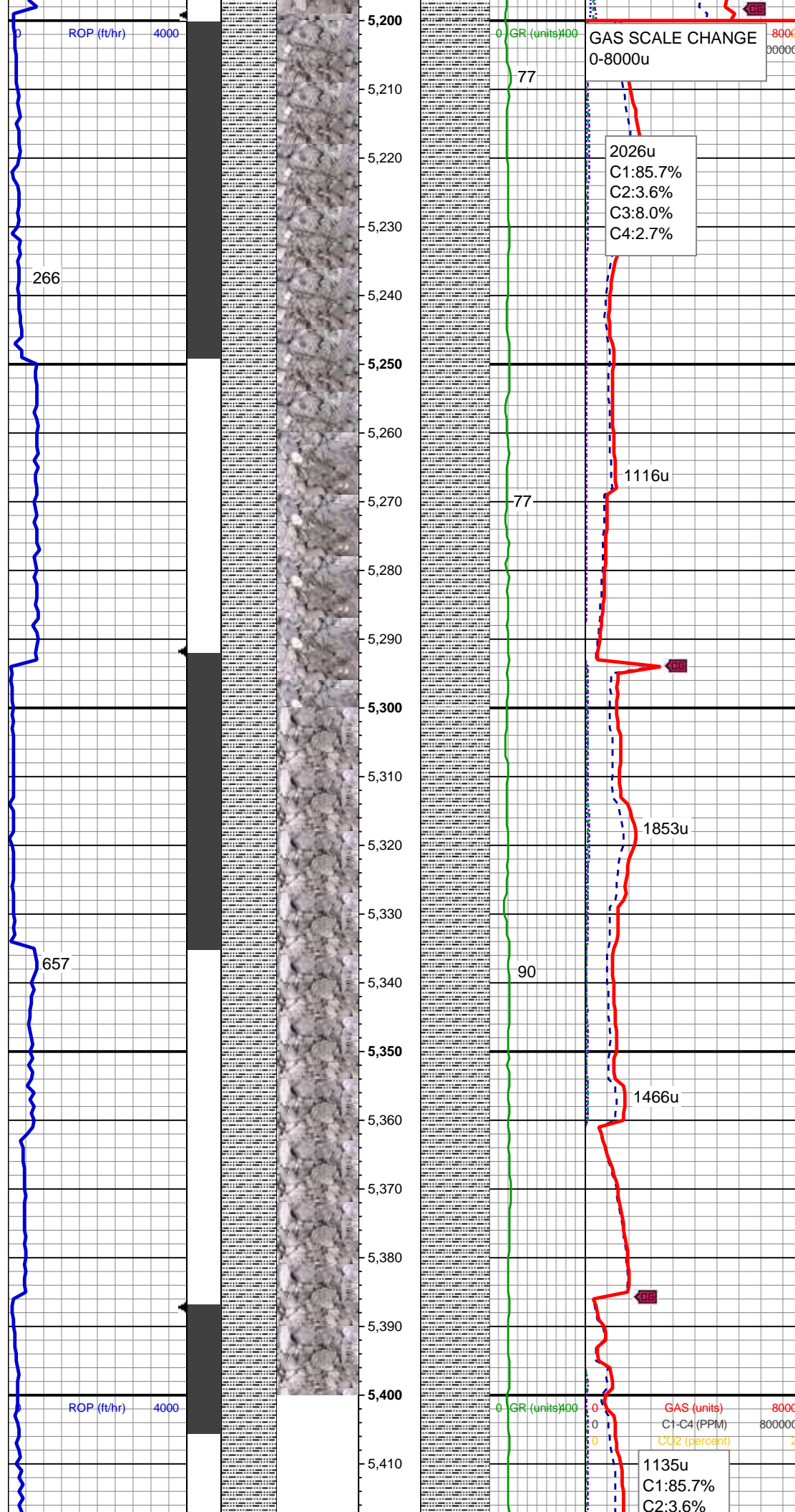
SLTY SH: lt-dk gy, sft frm, sb blk-y-sb plty,
gritty, rthy

MD: 5,056'
Inclination: 7.65 °
Azimuth: 267.75 °
TVD: 5,010.57'
VS: -544.79'

MD: 5,151'
Inclination: 6.86 °
Azimuth: 273.55 °
TVD: 5,104.81'
VS: -556.77'

SLTY SH: lt-dk gy, sft frm, sb blk-y-sb plty,
gritty, rthy

Mud Wt: 9.25 / 34 Vis



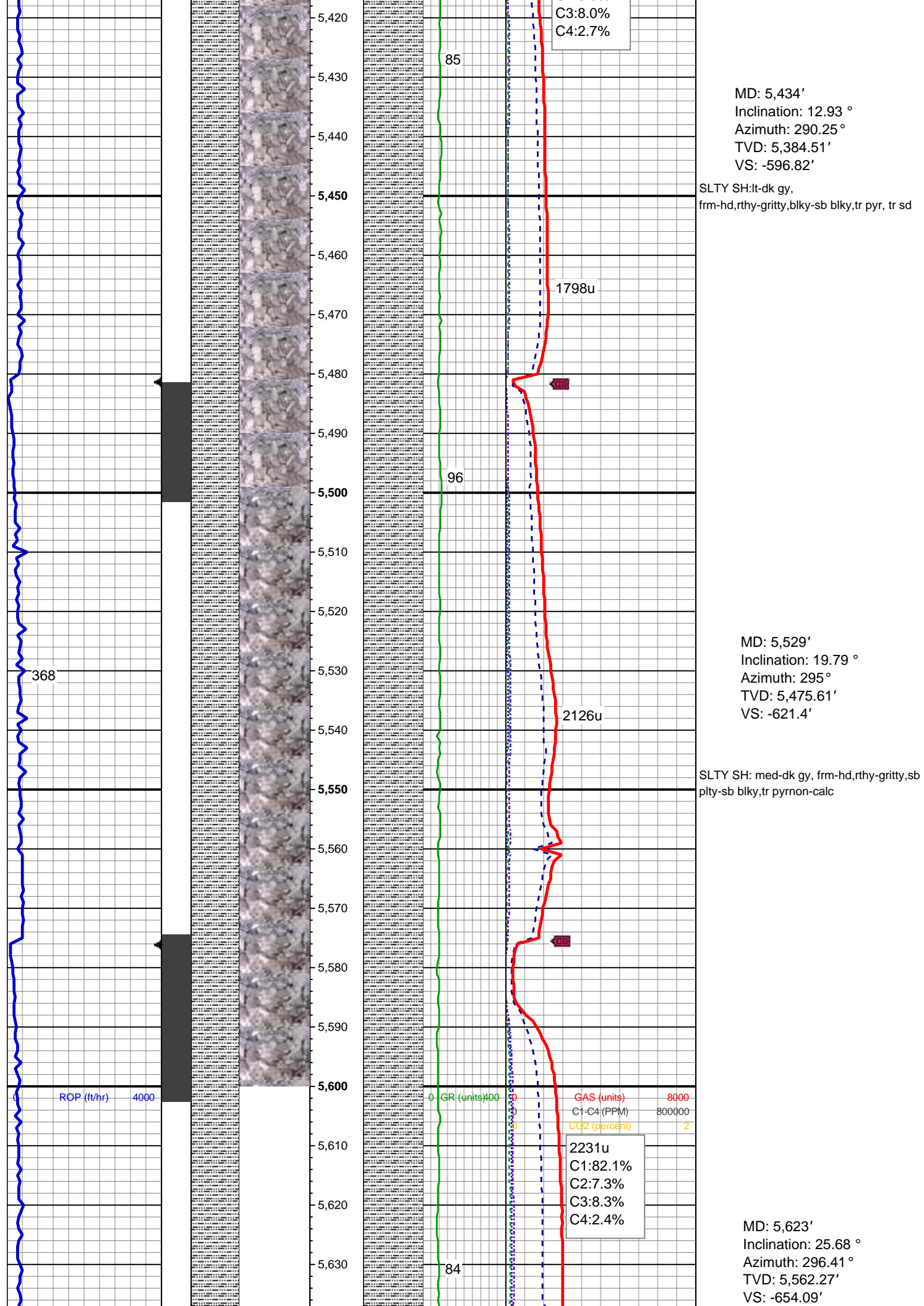
MD: 5,246'
Inclination: 7.74 °
Azimuth: 286.74 °
TVD: 5,199.05'
VS: -568.56'

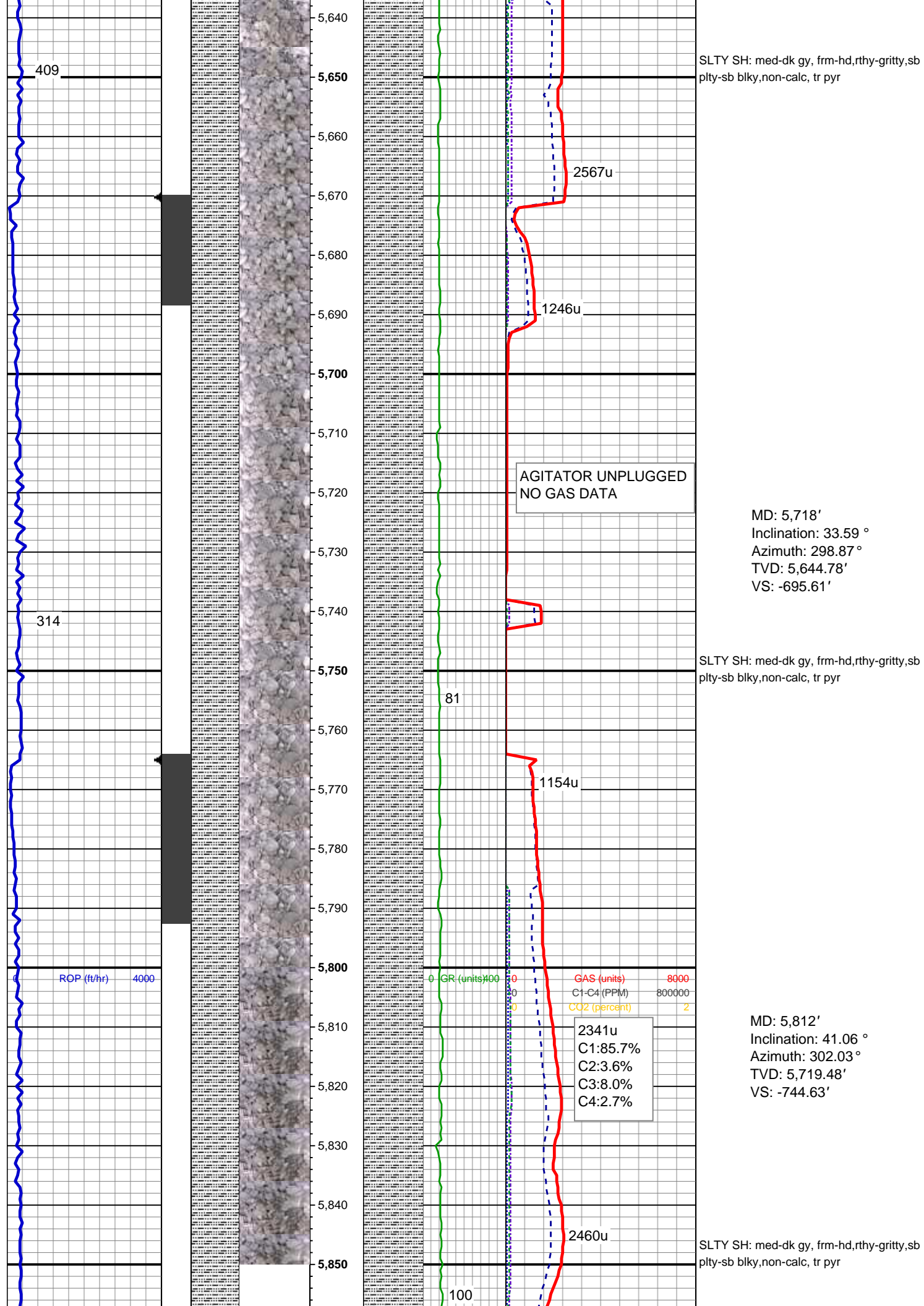
SLTY SH: lt-dk gy, sft frm, sb blk-y-sb plty, gritty, rthy

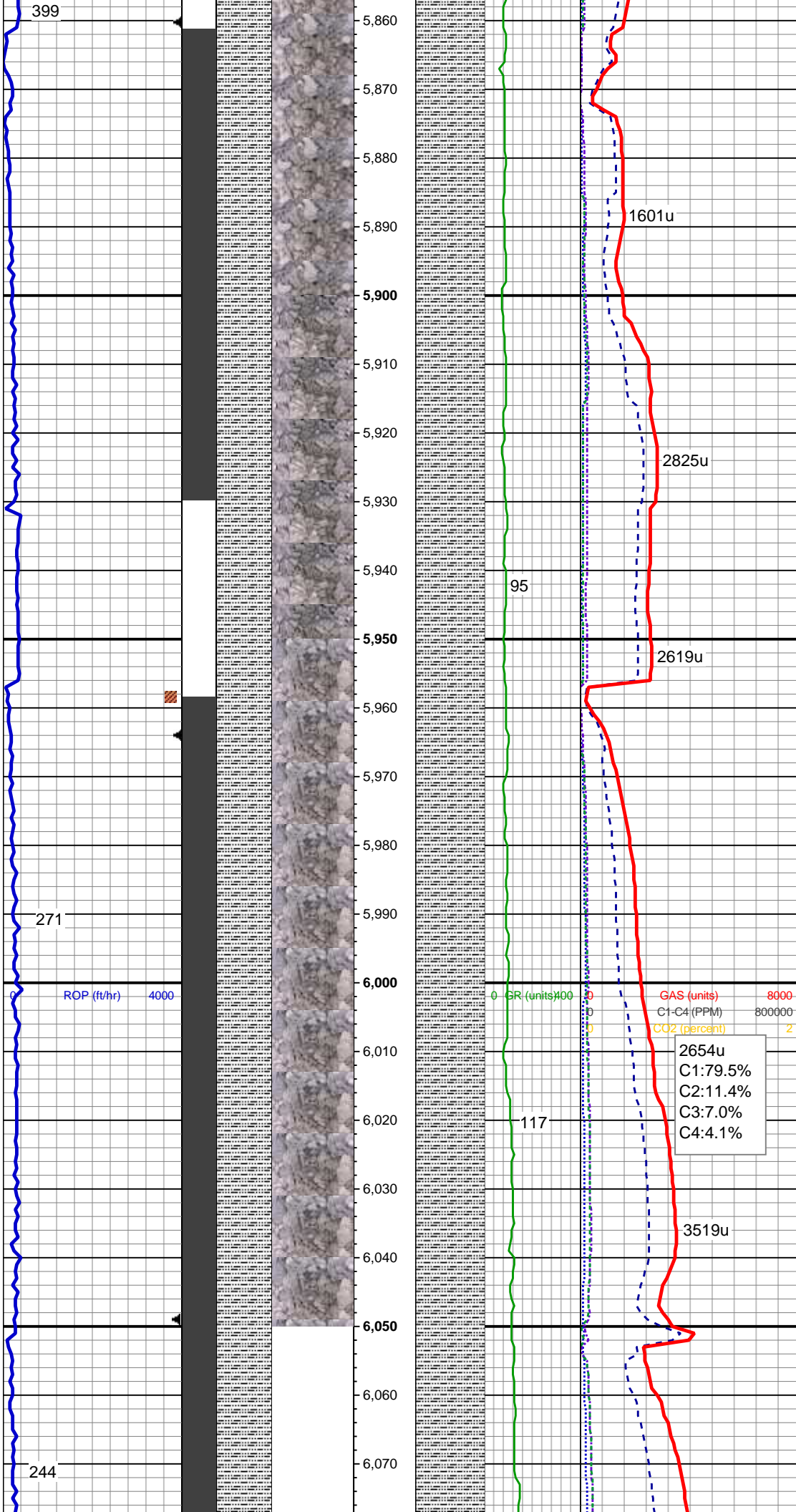
MD: 5,313'
Inclination: 7.91 °
Azimuth: 292.89 °
TVD: 5,265.43'
VS: -577.13'

MD: 5,339'
Inclination: 8.35 °
Azimuth: 293.42 °
TVD: 5,291.16'
VS: -580.51'

TOOH FOR BHA #2 @ 5360' MD
LOG CONTINUES ON MPLLOT
Rainbow LC28-79-1HNA Horz





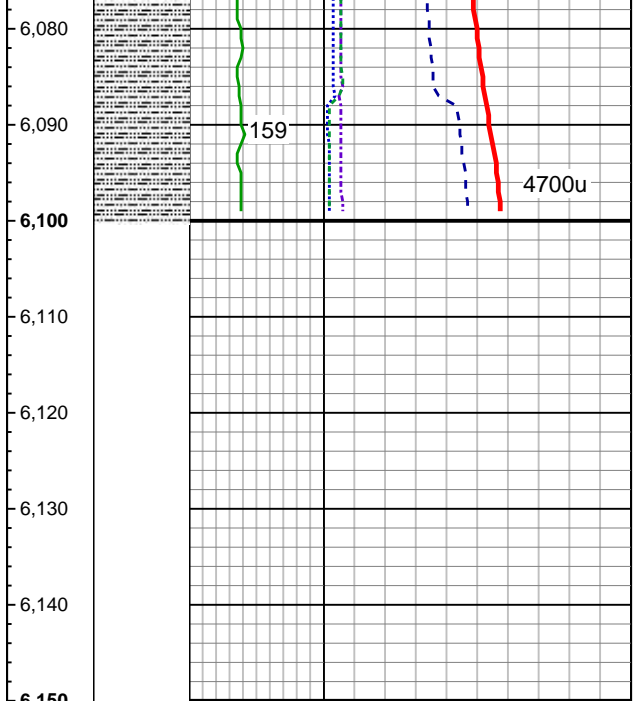
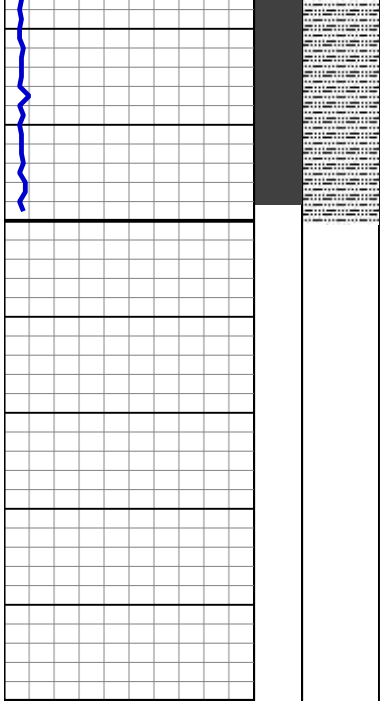


MD: 5,907'
Inclination: 42.12 °
Azimuth: 310.64 °
TVD: 5,790.59'
VS: -795.3'

SLTY SH: med-dk gy, frm-hd, rthy-gritty, sb
pty-sb blk, non-calc, tr pyr

MD: 6,002'
Inclination: 47.04 °
Azimuth: 315.74 °
TVD: 5,858.26'
VS: -843.78'

SLTY SH: med-dk gy, frm-hd, rthy-gritty, sb
pty-sb blk, non-calc, tr pyr



MD: 6,096'
Inclination: 59 °
Azimuth: 325.23 °
TVD: 5,914.78'
VS: -891'

LOG CONTINUES ON MPlot
Rainbow LC28-79-1HNA Horz