

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name Morton State LD01-78-1AHN

Location SWSW SEC1 T9N R58W

State CO

County WELD

Country USA

Rig Number PRECISION 828

API Number 05-123-39896

AFE # 200168

Region DENVER-JULESBURG BASIN

Field WILDCAT

Spud Date 11/23/2014

Drilling Completed 12/1/2014

Surface Coordinates 400' FSL, 390' FWL

Lat/Long: 40.77445/-103.82025

Ground Elevation 4656'

K.B. Elevation 4672'

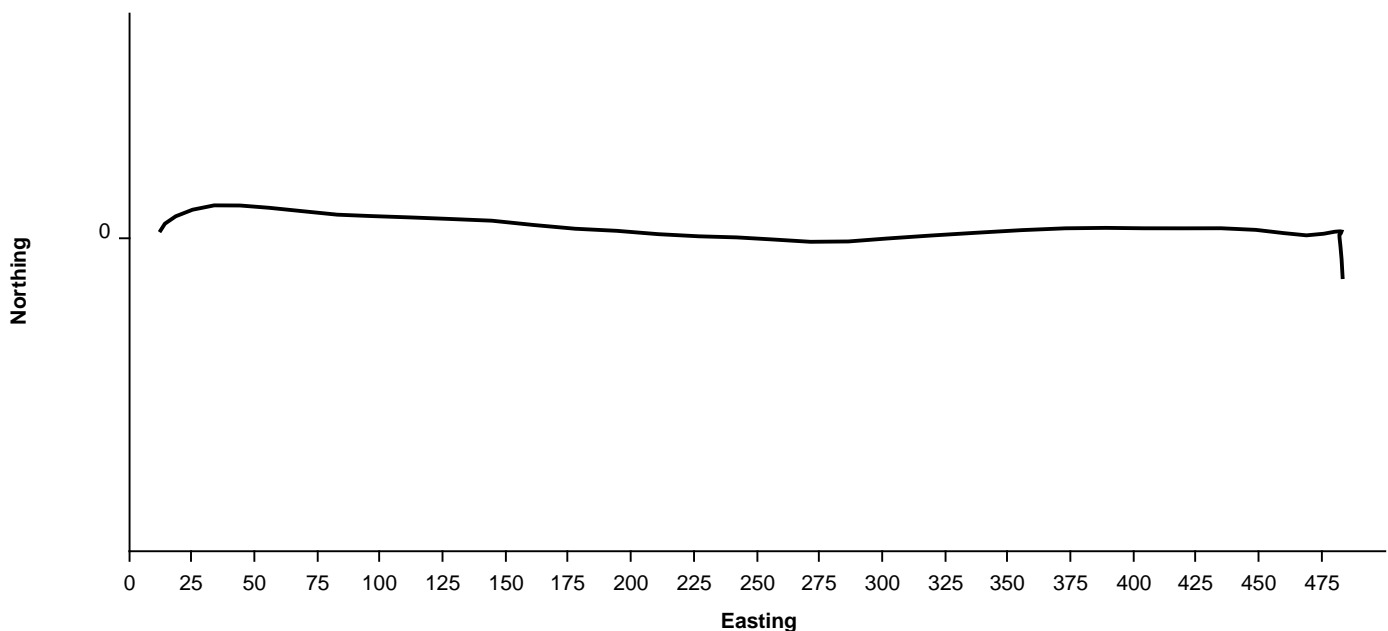
Logged Interval 1212' To 5000'

Total Depth 14656'

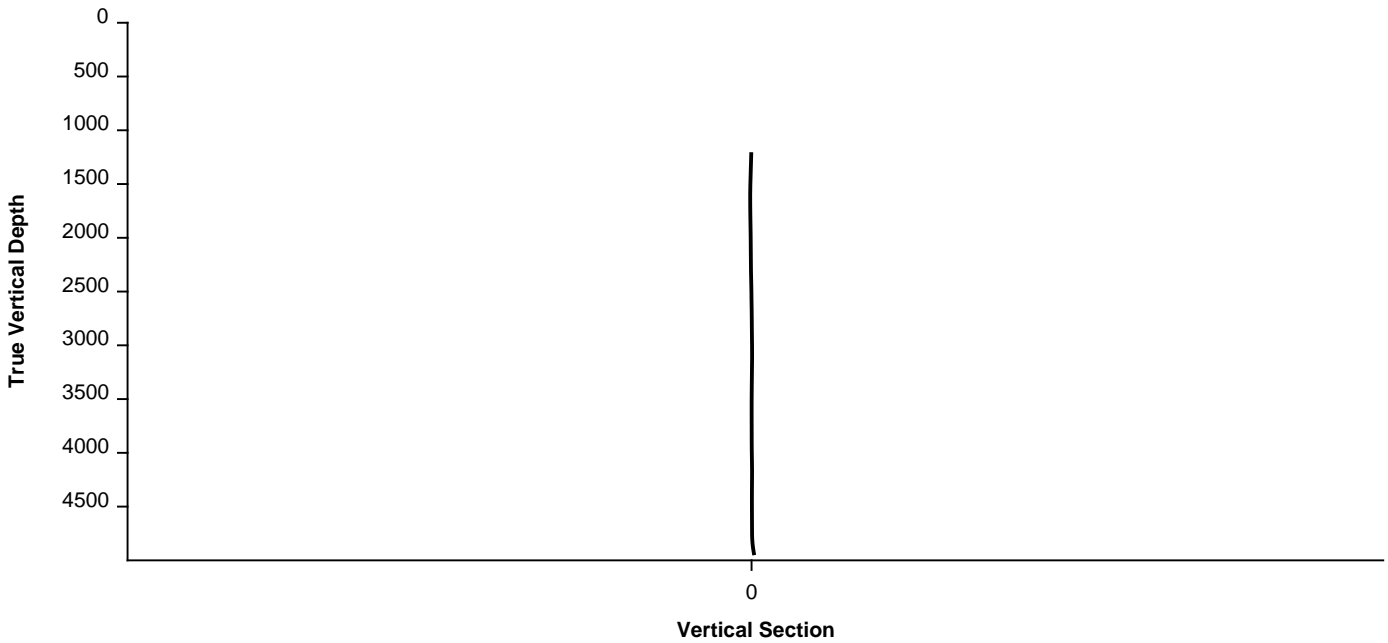
Formation FOX HILLS, PIERRE (PARKMAN, SUSSEX, SHANNON, TEEPEE BUTTES)

Type of Drilling Fluid FRESH WATER, LSND

Survey Plan



Survey Elevation



Other Symbols

Oil Show

- ◻ DEAD
- EVEN
- QUESTIONABLE
- ◐ SPOTTED STAINING

Porosity

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

◻ ORGANIC

P PINPOINT

∨ VUGGY

Engineering

- ▲ BIT CHANGE
- ◀ CONNECTION (LEFT)
- ▶ CONNECTION (RIGHT)
- ◻ CONNECTION GAS
- ◻ TRIP GAS
- ⏸ DOWN TIME GAS
- ↓ CORE - LOST
- CORE - RECOVERED
- ⋮ DST INTERVAL

↗ FAULT

↔ FORMATION TOP

⚡ GAS SHOW

● OIL SHOW

MINDEPTH MN DEPTH

MINDEPTH MN DEPTH (RIGHT)

↗ NORMAL FAULT

↕ OVERTURNED STRATA

↘ REVERSE FAULT

▣ CASING

◀ SIDEWALL CORE (LEFT)

▶ SIDEWALL CORE (RIGHT)

▣ SLIDE

DS SURVEY

DST DRILL STEM TEST

◁ WIRELINE TESTED - LEFT

▷ WIRELINE TESTED - RT

Rounding

- ▲ ANGULAR
- ▣ ROUNDED
- ▣ SUBANG
- ▣ SUBRND

Textures

- BS BOUNDSTONE
- CHALKY
- ⊗ CRYPTOXLN

E EARTHY

FX FINELYXLN

GS GRAINSTONE

L LITHOGRAPHIC

MX MICROXLN

MS MUDSTONE

PS PACKSTONE

WS WACKESTONE

Sorting

- M MODERATE
- P POOR
- W WELL

Accessories

Fossils

- ALGAE
- AMPHIPORA
- BELEMNITE
- BIOCLASTIC
- BRACHIOPOD
- BRYOZOA
- CEPHALOPOD
- CORAL
- CRINOID
- ECHINOID

GASTROPOD

INOCERAMUS

OOOLITE

OSTRACOD

PELECYPOD

PELLET

PISOLITE

PLANT REMAINS

PLANT SPORES

SCAPHOPOD

STROMATOPOROID

Minerals

ARGILLITE GRAIN

BENTONITE

BITUMENOUS SUBSTANCE

BRECCIA FRAGMENTS

CALCAREOUS

CARBONACEOUS FLAKES

CHTDK

CHTLT

COAL - THIN BEDS

DOLOMITIC

FELDSPAR

FERRUGINOUS PELLETT

HEAVY MINERAL

KAOLIN

MARLSTONE

MICACEOUS

MINERAL CRYSTALS

NODULES

PHOSPHATE PELLETS

PYRITE

SALT CAST

SANDY

SILICEOUS

SILTY

ANHYDRITE STRINGER

BENTONITE STRINGER

COAL STRINGER

DOLOMITE STRINGER

GYPSUM STRINGER

LIMESTONE STRINGER

MARLSTONE (CALC) STRG

MARLSTONE (DOL) STRG

SANDSTONE STRINGER

SHALE STRINGER

SILTSTONE STRINGER

FISH
 FORAMINIFERA
 FOSSIL
 ANHYDRITIC
 ARGILLACEOUS
 FERRUGINOUS
 GLAUCONITE
 GYPSIFEROUS

Stringer

Other

WELLSITE GEOLOGISTS: GARY L. MYERS
C.S. METZ

LOG CONTINUES ON FILE: Morton State LD01-78-1AHN Horiz.mplot

GEOLOGICAL SERVICES PROVIDED BY COLUMBINE LOGGING, INC.

Rock Types

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

Operator

Company Noble Energy Inc

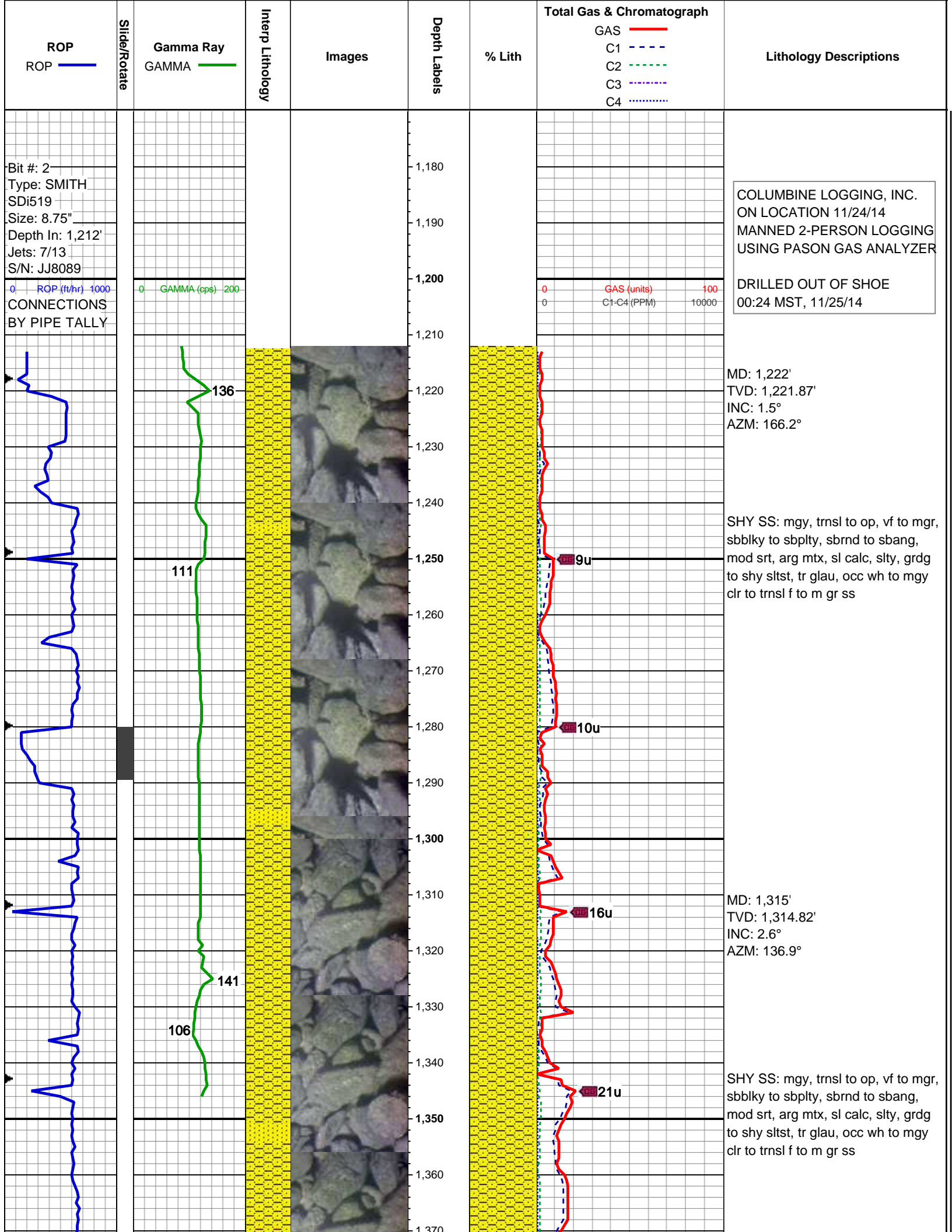
Address 1625 Broadway
Denver, CO 80202

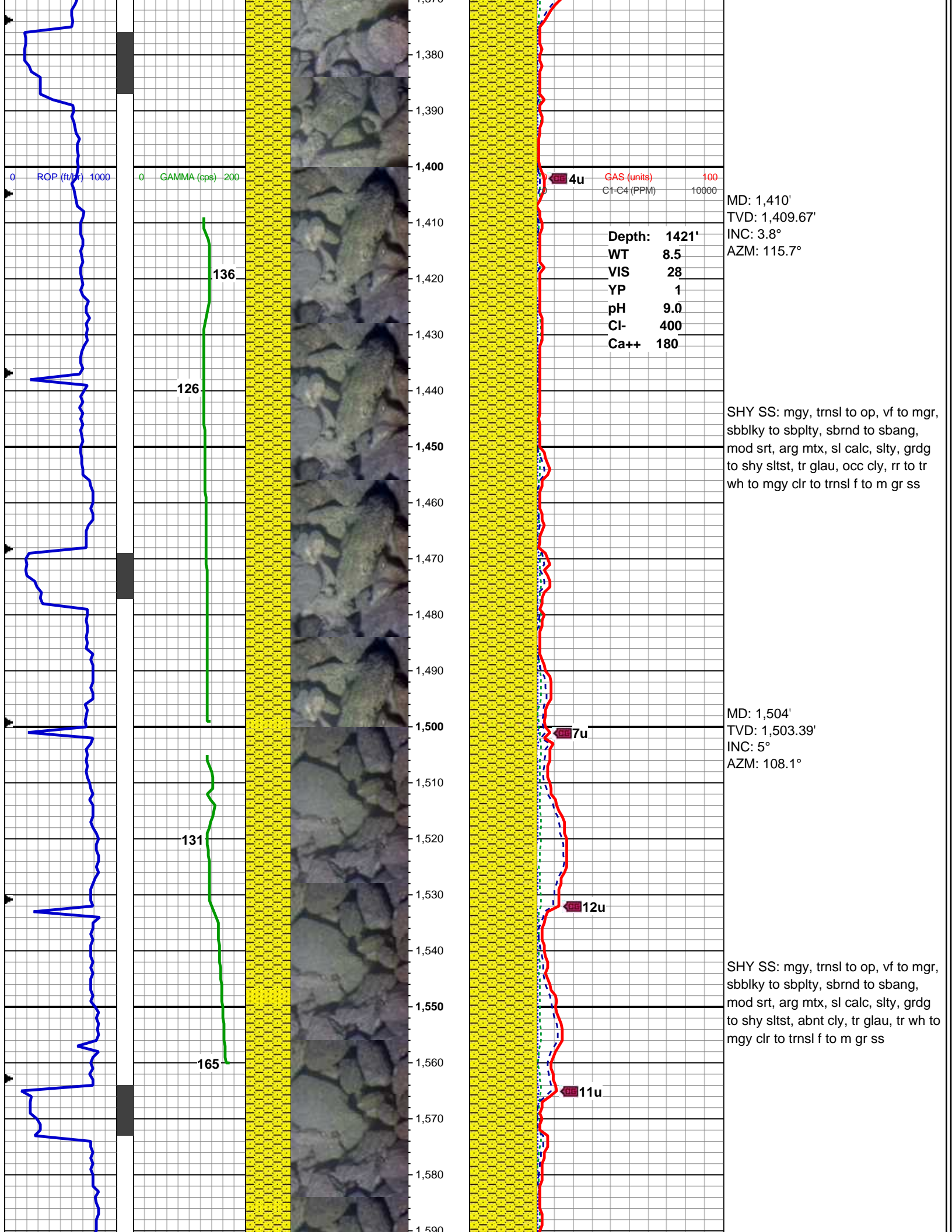
Geologist

Name TERESA MALESARDI

Company NOBLE ENERGY, INC.

Address 1625 Broadway
Denver, CO 80202





ROP (ft/hr) 1000

GAMMA (cps) 200

GAS (units) 100
C1-C4 (PPM) 10000

Depth: 1421'
WT 8.5
VIS 28
YP 1
pH 9.0
Cl- 400
Ca++ 180

MD: 1,410'
TVD: 1,409.67'
INC: 3.8°
AZM: 115.7°

136

126

131

165

4u

7u

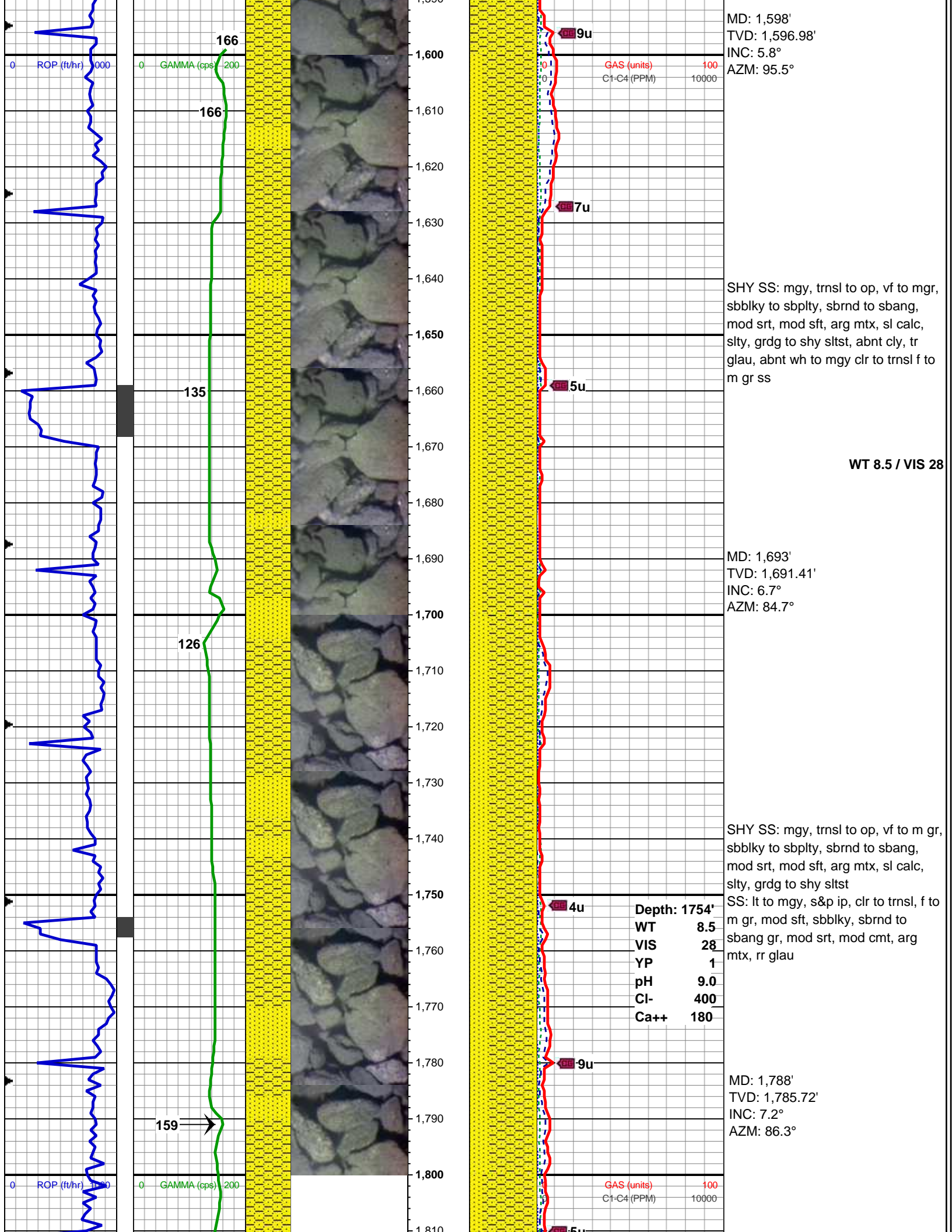
12u

11u

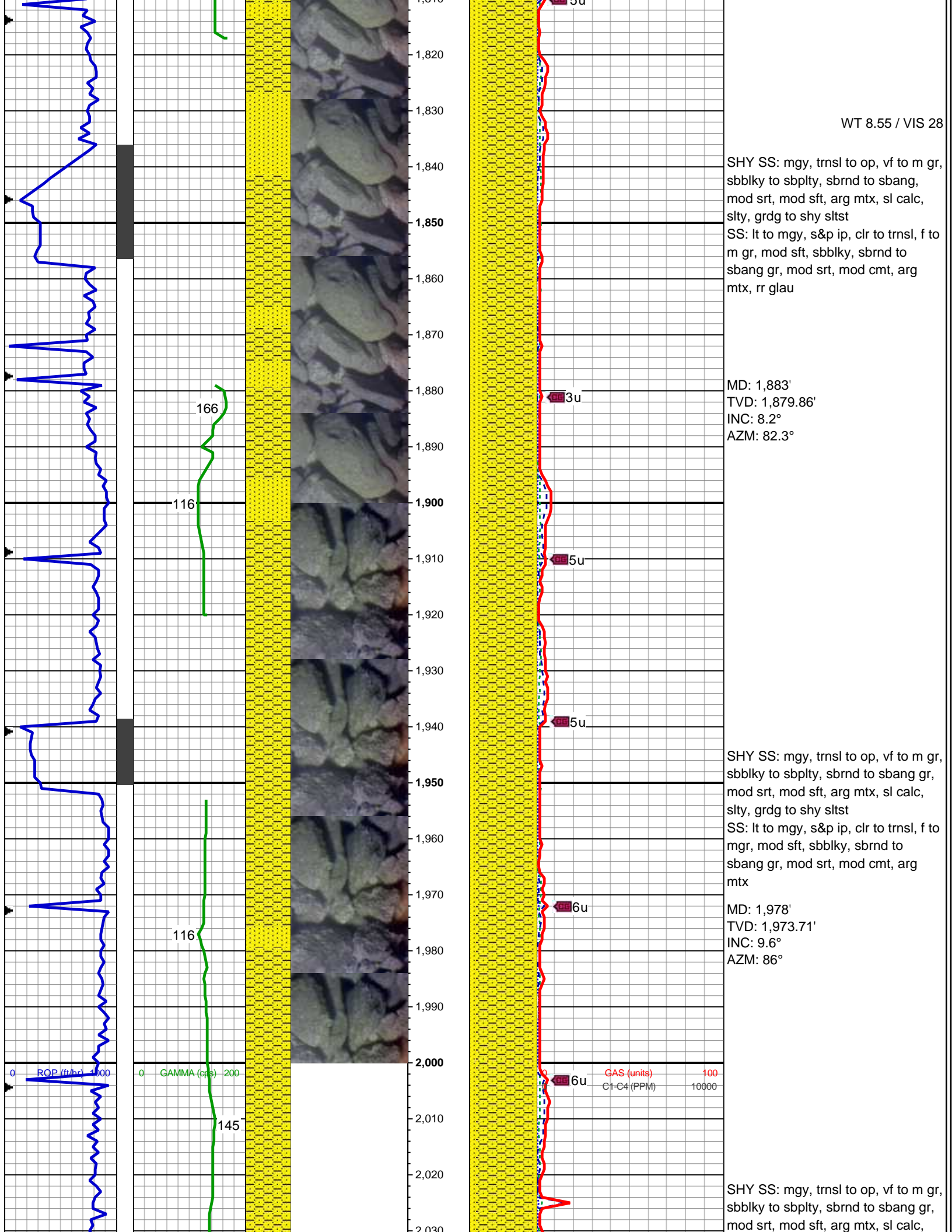
SHY SS: mgy, trnsl to op, vf to mgr, sbbkly to sbplty, sbrnd to sbang, mod srt, arg mtx, sl calc, slty, grdg to shy sltst, tr glau, occ cly, rr to tr wh to mgy clr to trnsl f to m gr ss

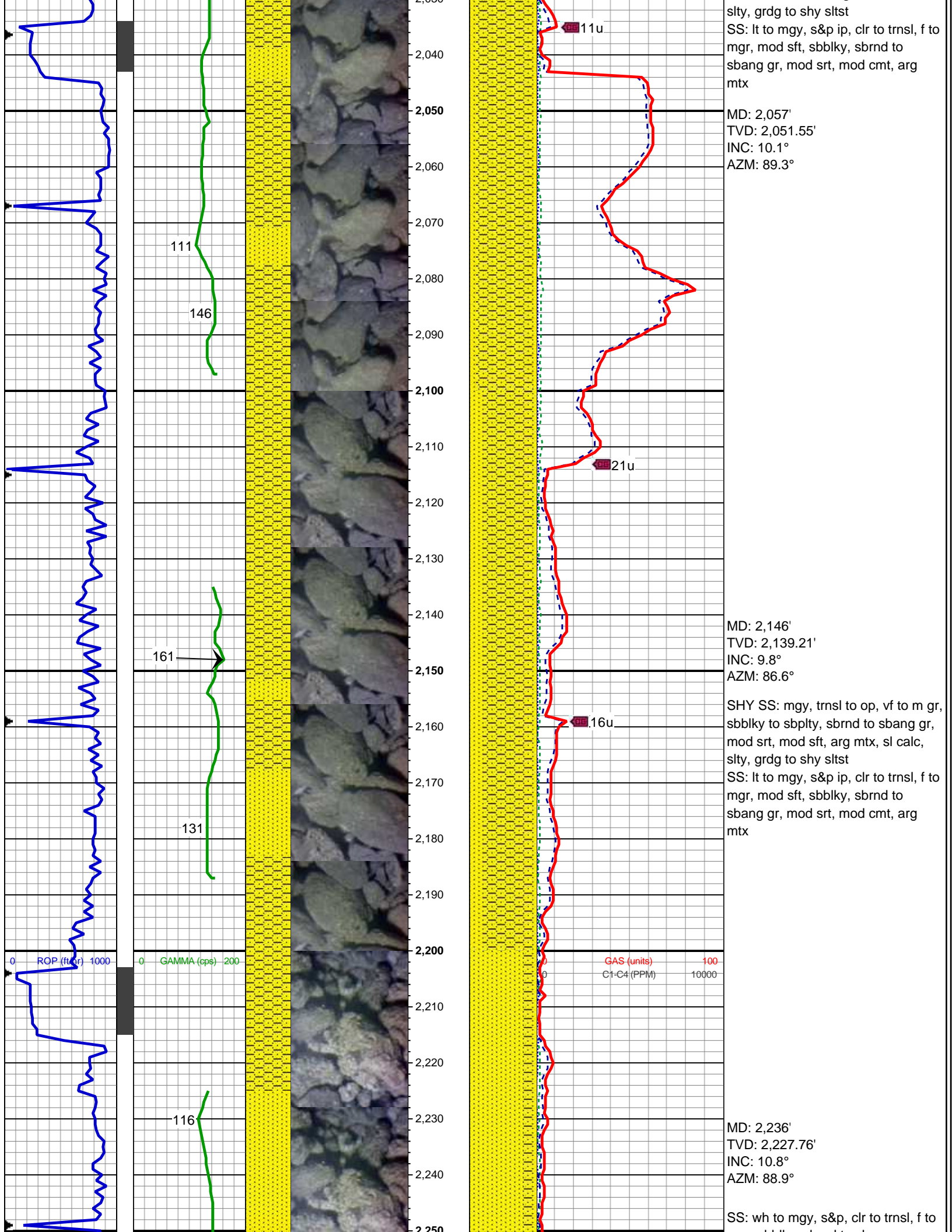
MD: 1,504'
TVD: 1,503.39'
INC: 5°
AZM: 108.1°

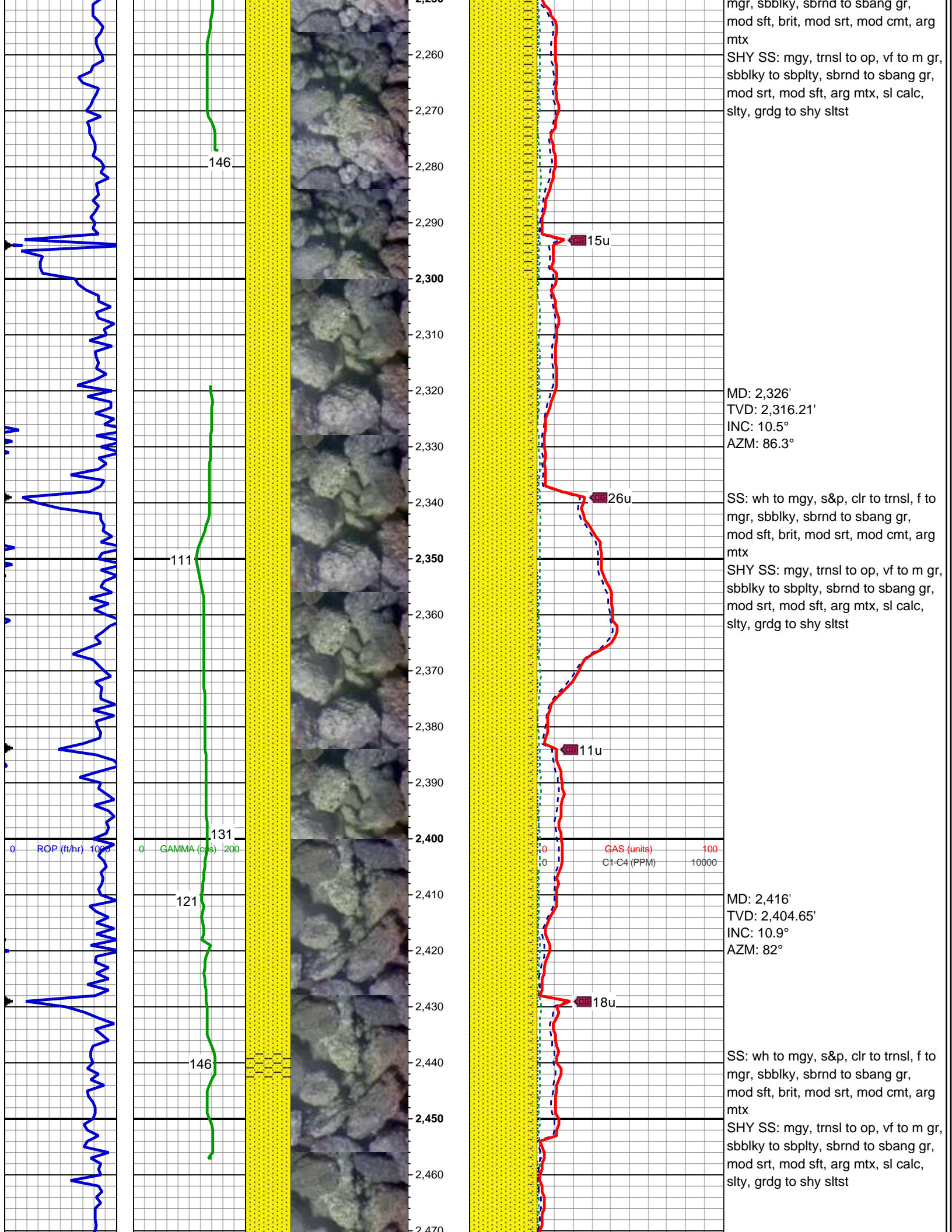
SHY SS: mgy, trnsl to op, vf to mgr, sbbkly to sbplty, sbrnd to sbang, mod srt, arg mtx, sl calc, slty, grdg to shy sltst, abnt cly, tr glau, tr wh to mgy clr to trnsl f to m gr ss

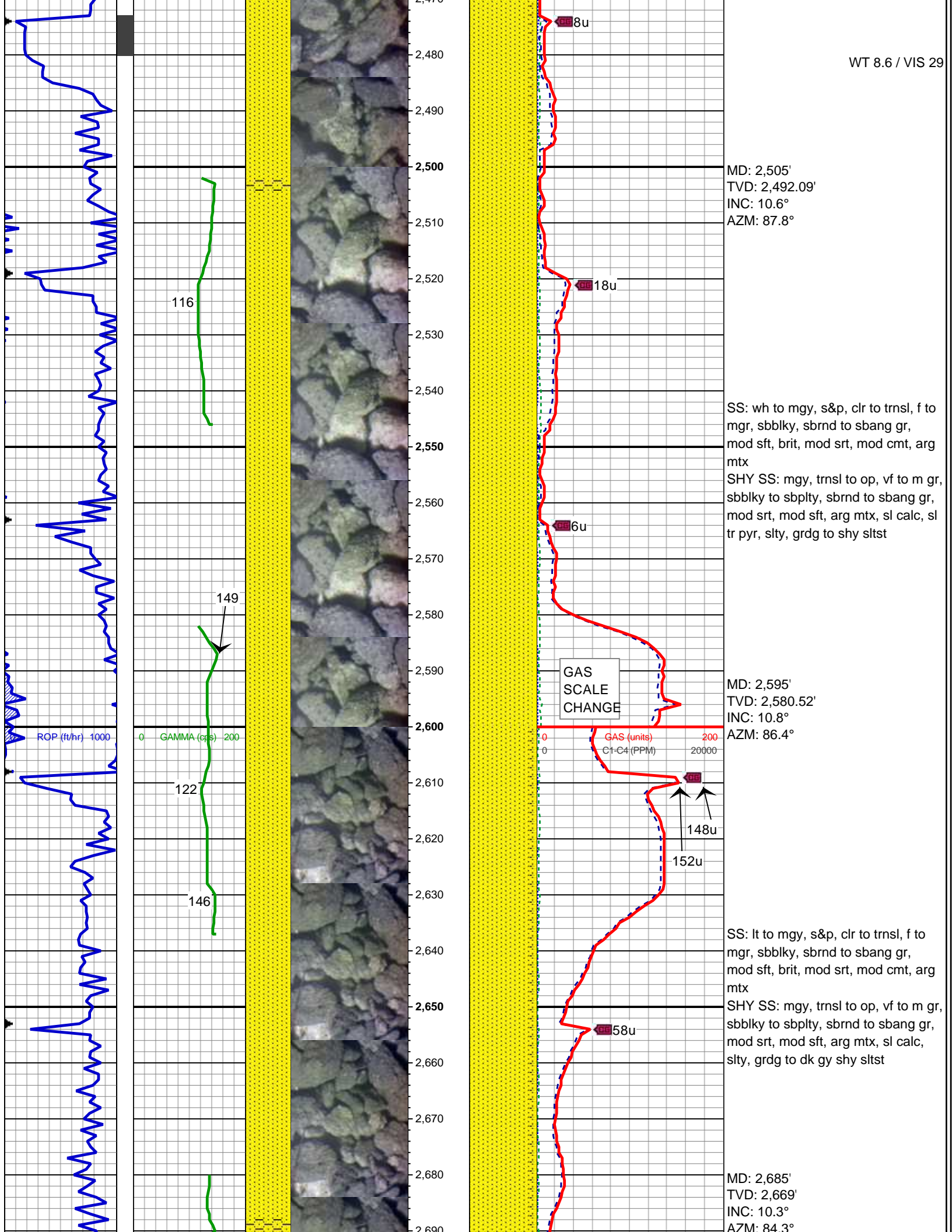


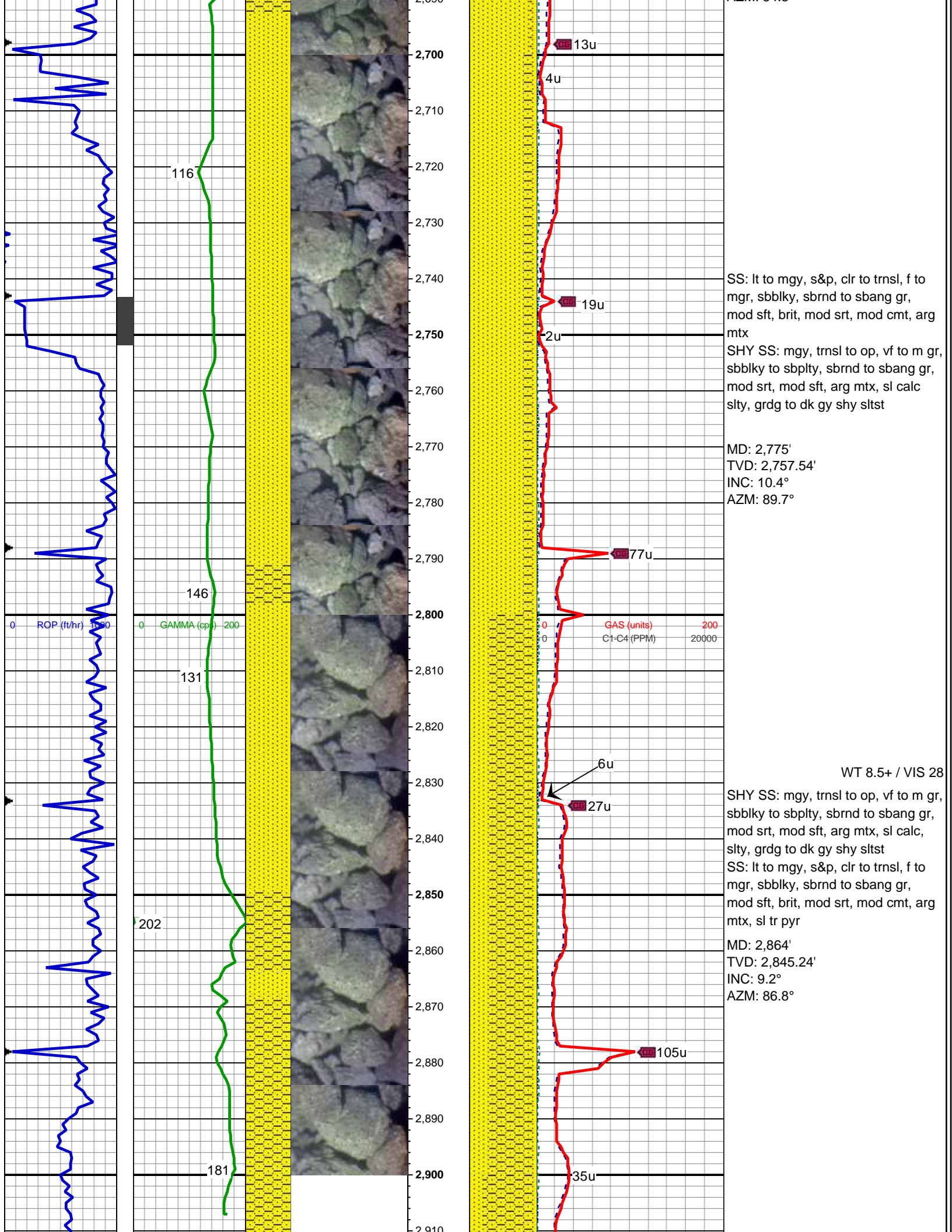
WT 8.55 / VIS 28

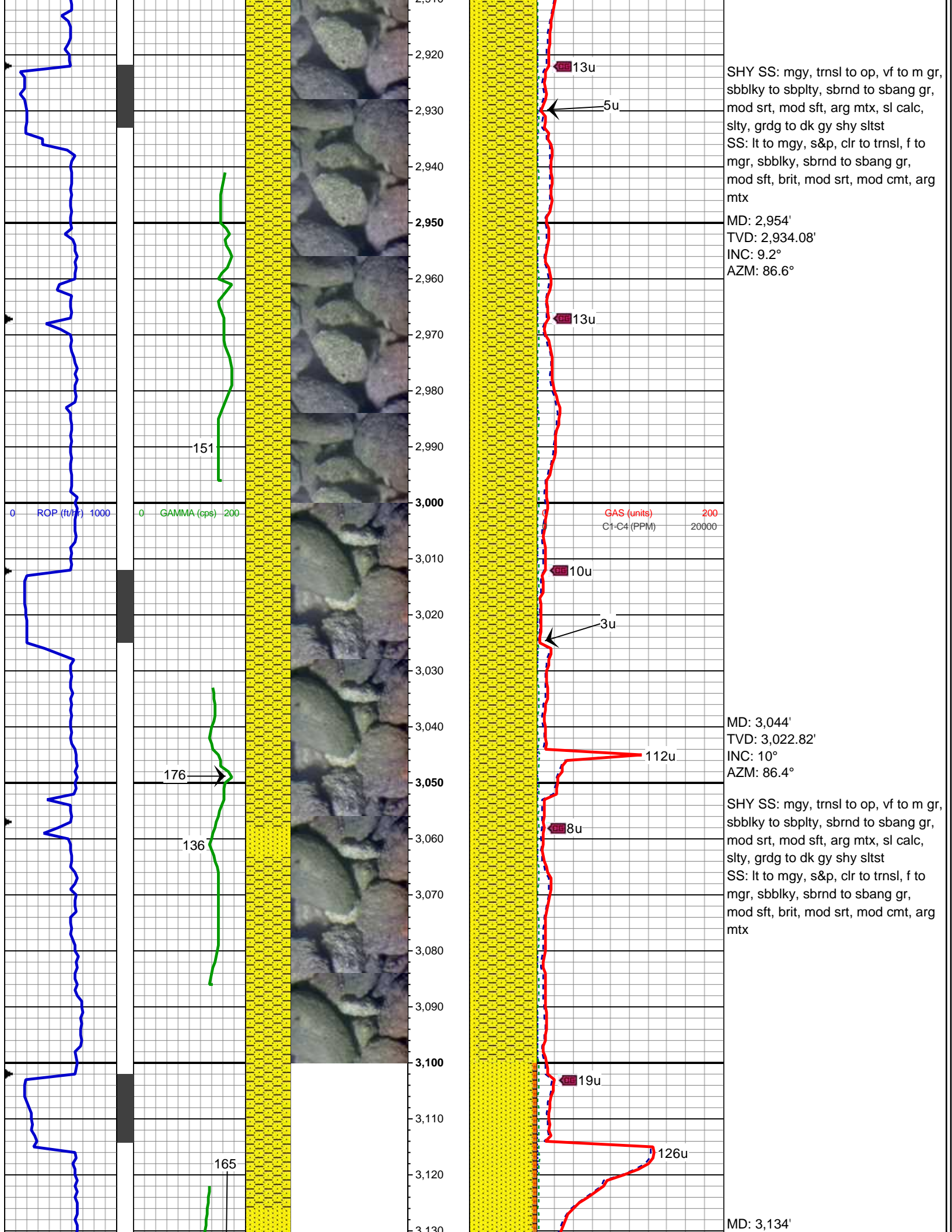


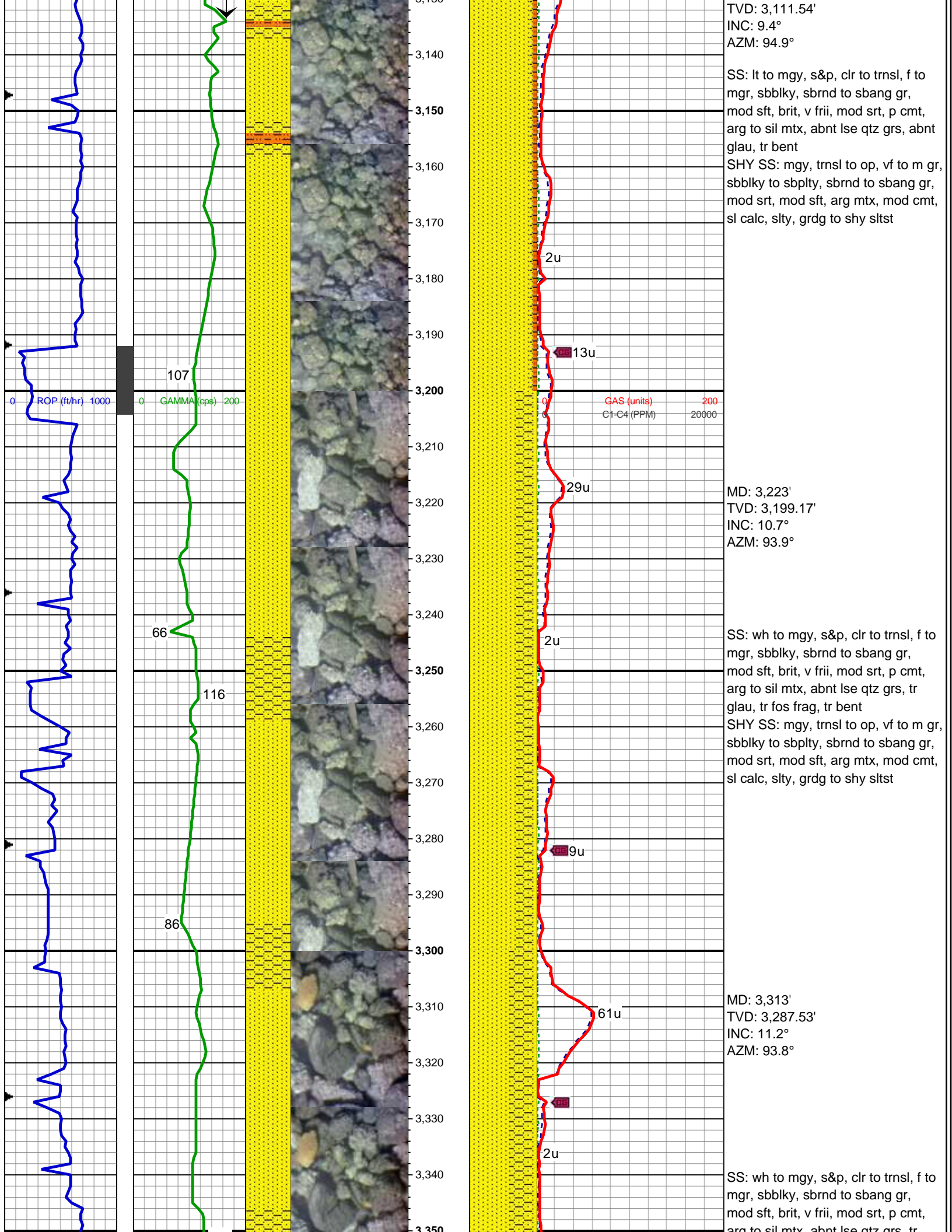


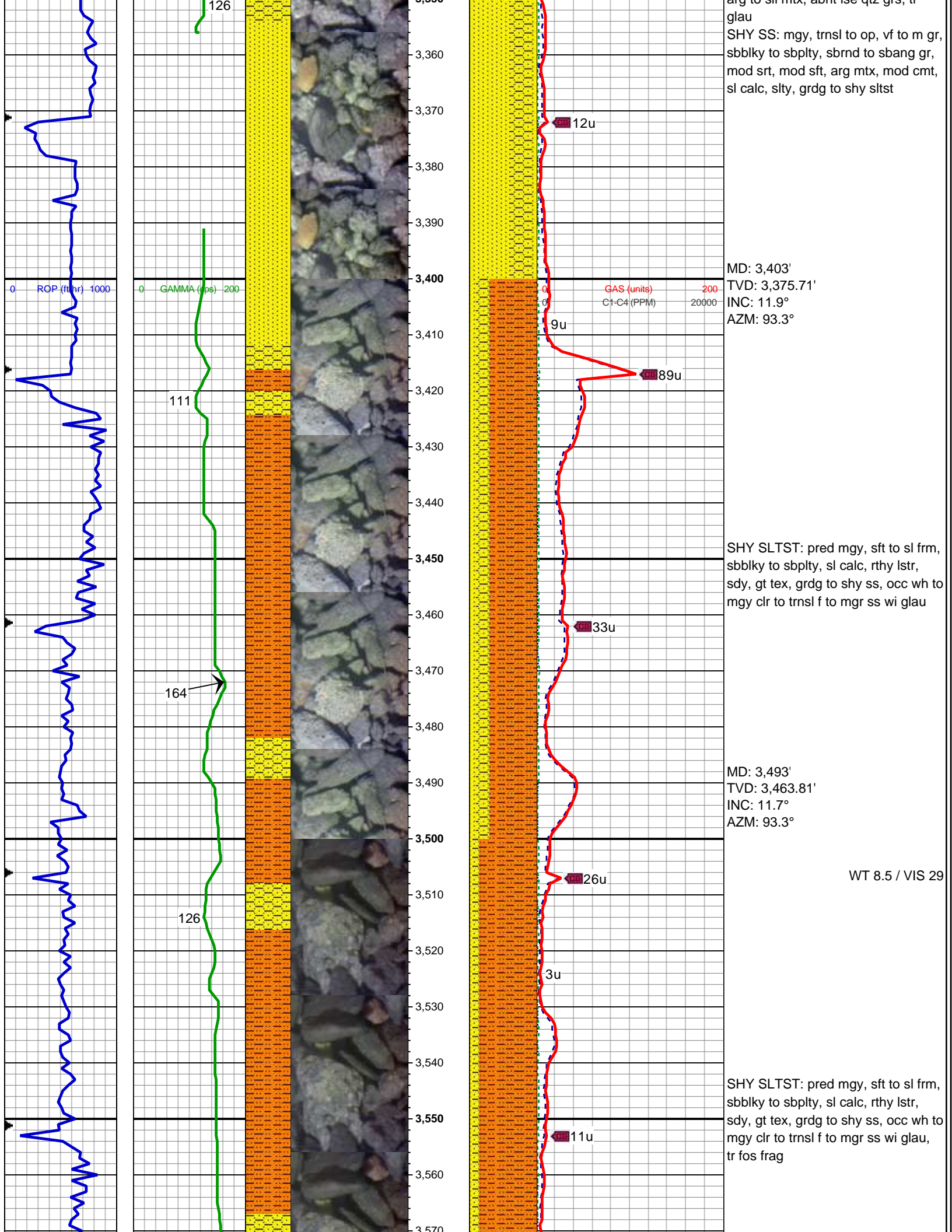


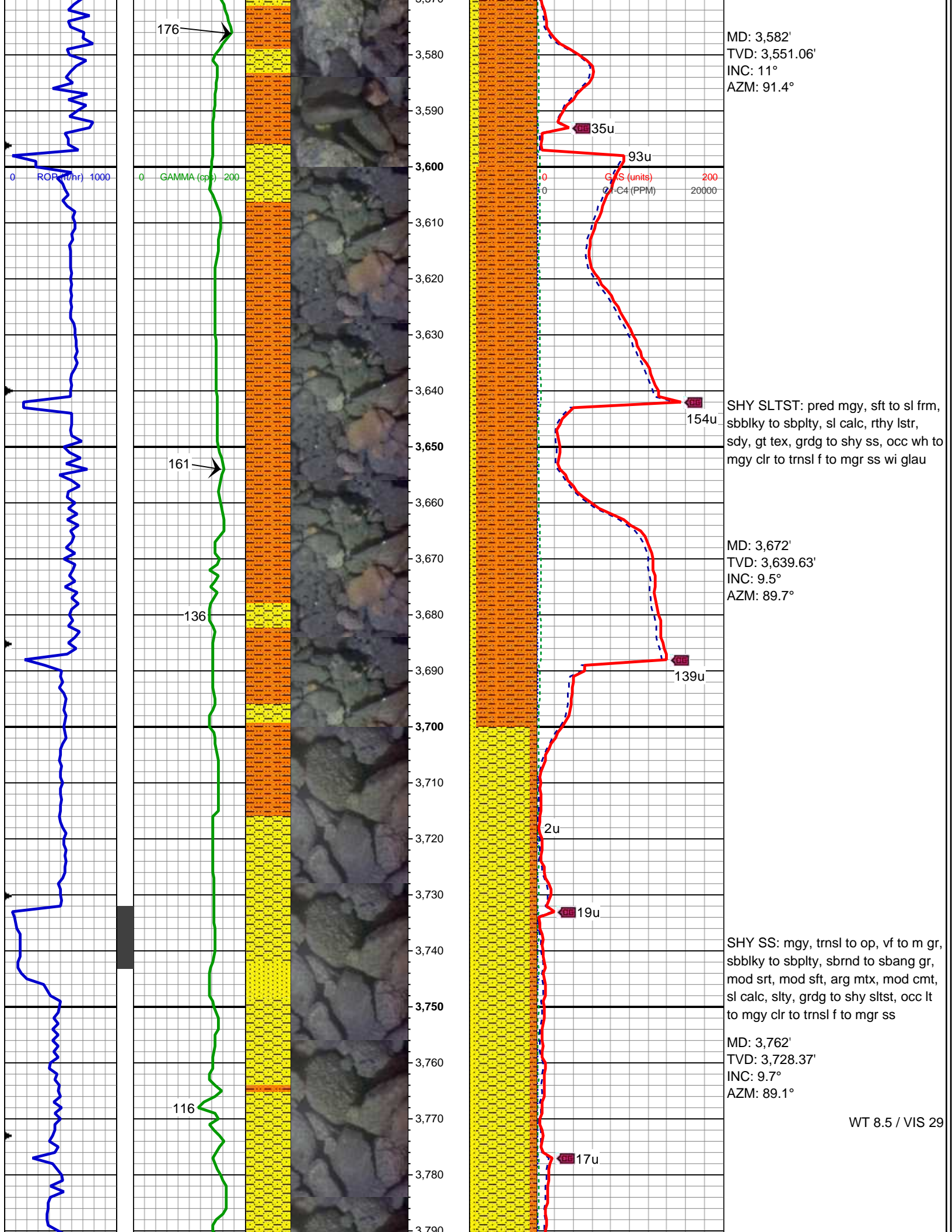


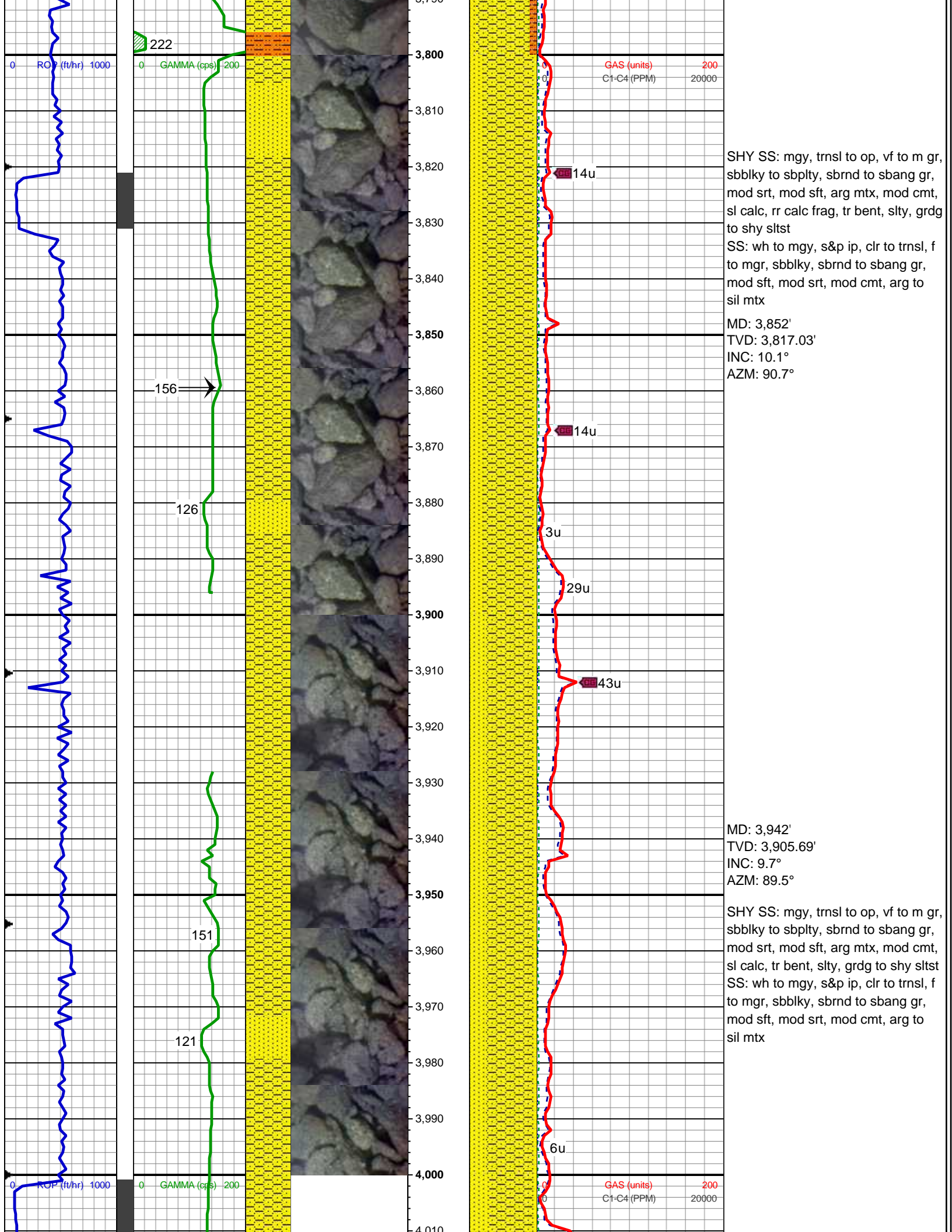












222

GAMMA (cps) 200

156

126

151

121

GAS (units) 200
C1-C4 (PPM) 20000

14u

14u

3u

29u

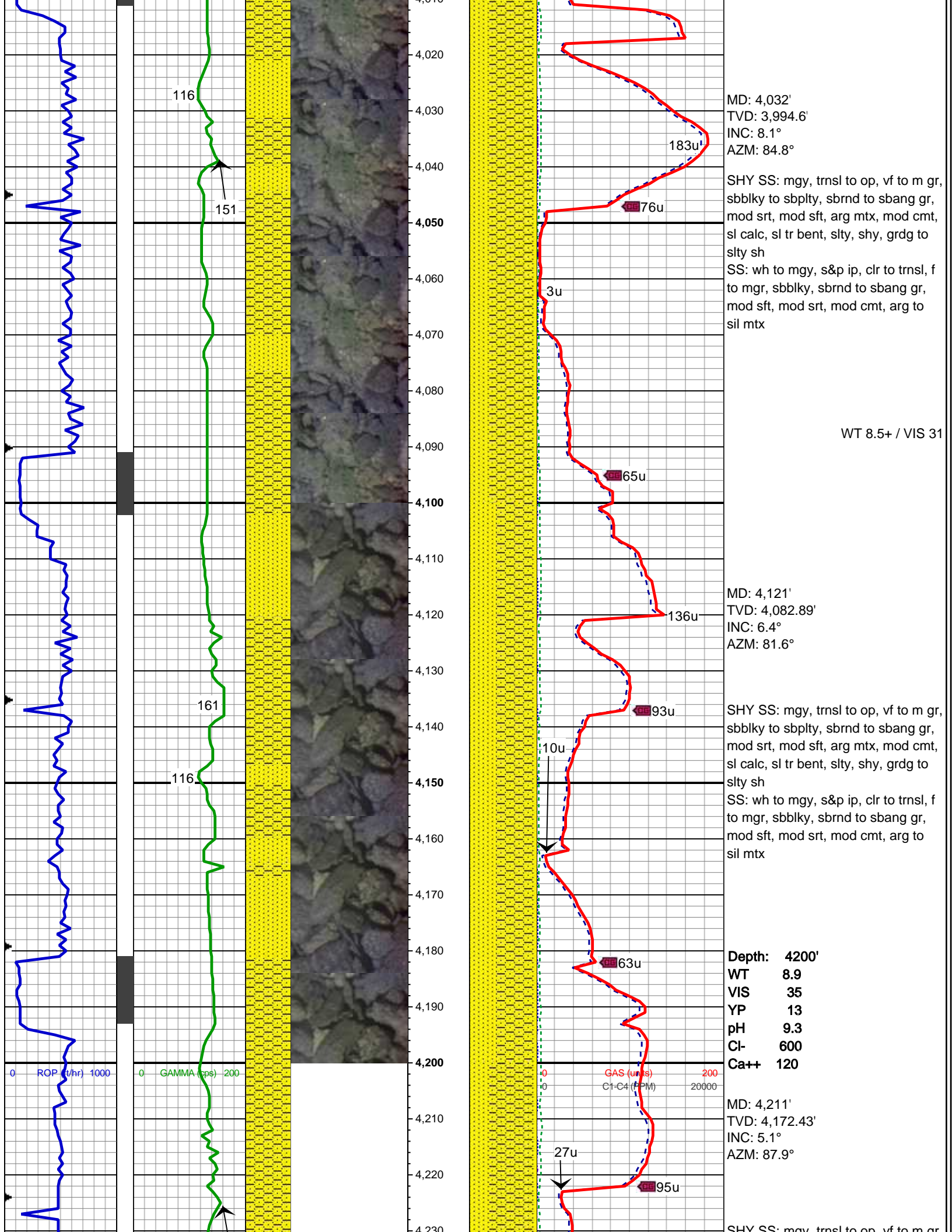
43u

6u

SHY SS: mgy, trnsl to op, vf to m gr, sbbly to sbply, sbrnd to sbang gr, mod srt, mod sft, arg mtx, mod cmt, sl calc, rr calc frag, tr bent, slty, grdg to shy sltst
 SS: wh to mgy, s&p ip, clr to trnsl, f to mgr, sbbly, sbrnd to sbang gr, mod sft, mod srt, mod cmt, arg to sil mtx
 MD: 3,852'
 TVD: 3,817.03'
 INC: 10.1°
 AZM: 90.7°

MD: 3,942'
 TVD: 3,905.69'
 INC: 9.7°
 AZM: 89.5°

SHY SS: mgy, trnsl to op, vf to m gr, sbbly to sbply, sbrnd to sbang gr, mod srt, mod sft, arg mtx, mod cmt, sl calc, tr bent, slty, grdg to shy sltst
 SS: wh to mgy, s&p ip, clr to trnsl, f to mgr, sbbly, sbrnd to sbang gr, mod sft, mod srt, mod cmt, arg to sil mtx



MD: 4,032'
 TVD: 3,994.6'
 INC: 8.1°
 AZM: 84.8°

SHY SS: mgy, trnsl to op, vf to m gr,
 sbbkly to sbply, sbrnd to sbang gr,
 mod srt, mod sft, arg mtx, mod cmt,
 sl calc, sl tr bent, stly, shy, grdg to
 stly sh
 SS: wh to mgy, s&p ip, clr to trnsl, f
 to mgr, sbbkly, sbrnd to sbang gr,
 mod sft, mod srt, mod cmt, arg to
 sil mtx

WT 8.5+ / VIS 31

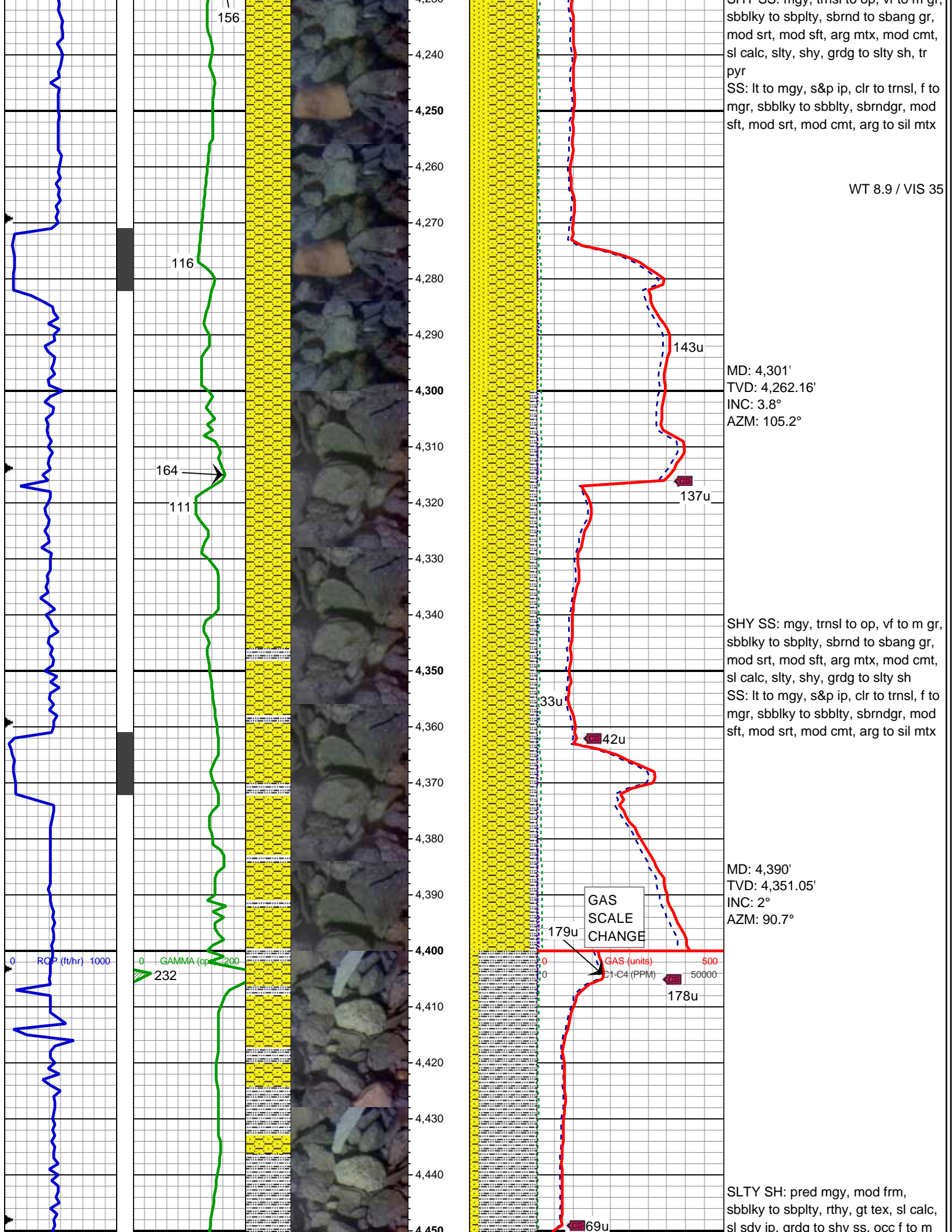
MD: 4,121'
 TVD: 4,082.89'
 INC: 6.4°
 AZM: 81.6°

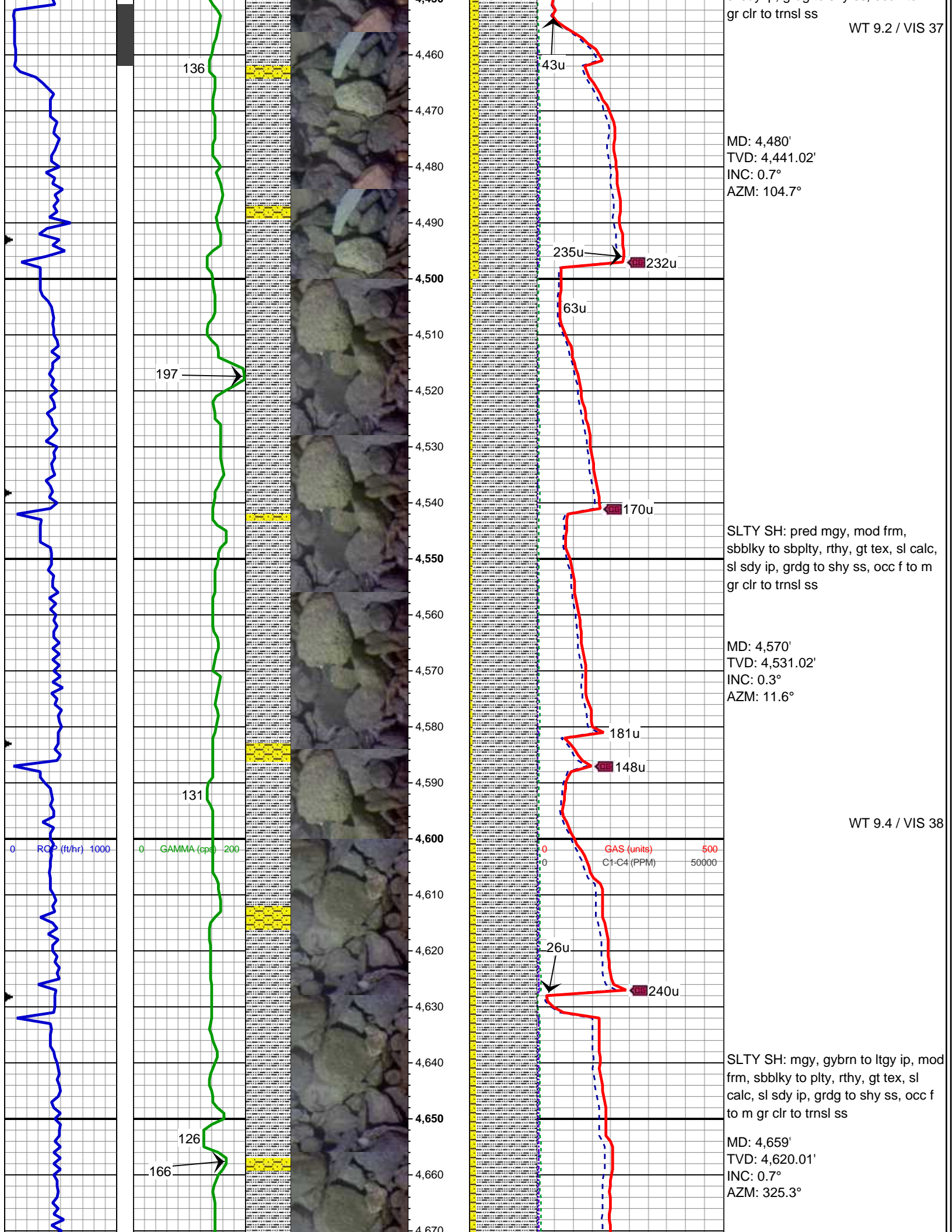
SHY SS: mgy, trnsl to op, vf to m gr,
 sbbkly to sbply, sbrnd to sbang gr,
 mod srt, mod sft, arg mtx, mod cmt,
 sl calc, sl tr bent, stly, shy, grdg to
 stly sh
 SS: wh to mgy, s&p ip, clr to trnsl, f
 to mgr, sbbkly, sbrnd to sbang gr,
 mod sft, mod srt, mod cmt, arg to
 sil mtx

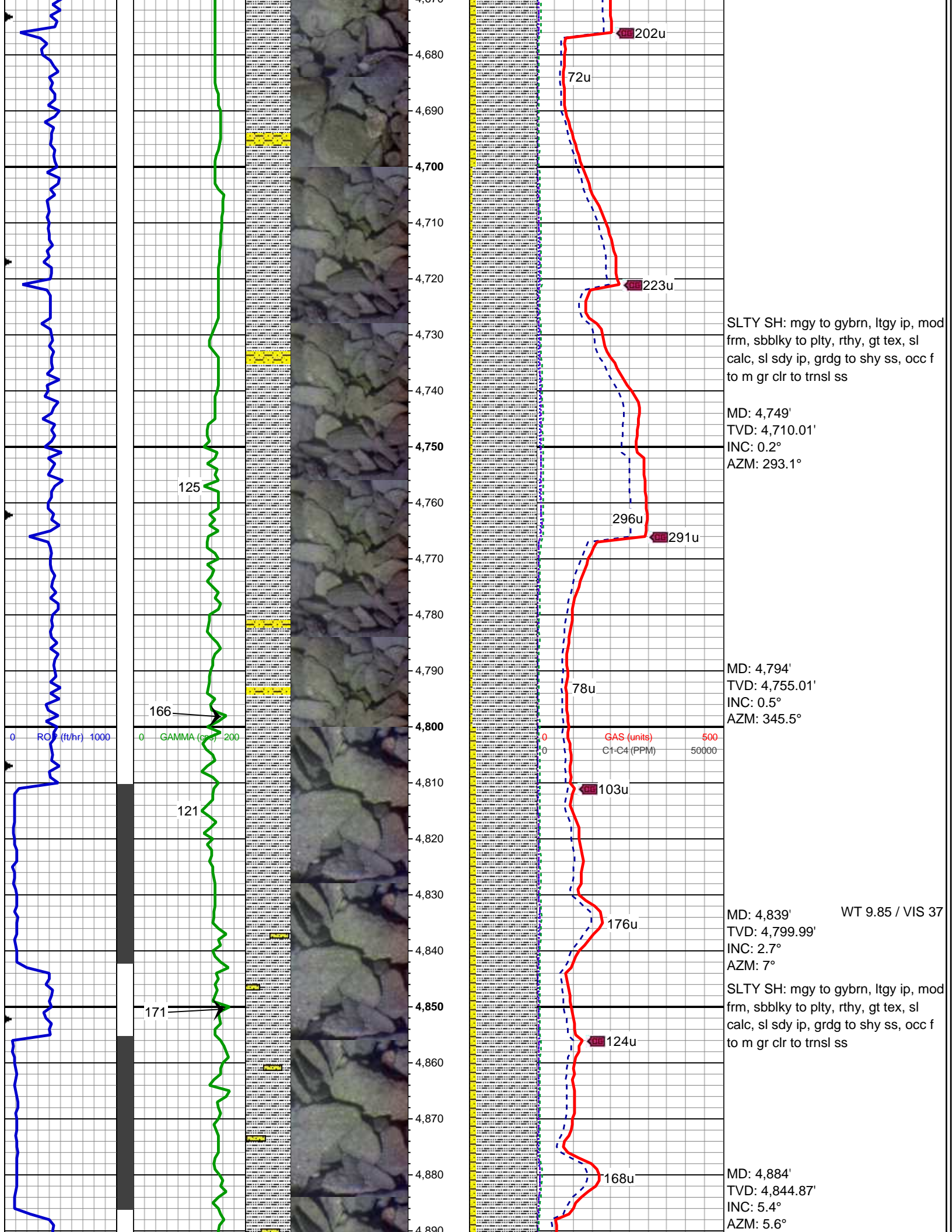
Depth: 4200'
 WT 8.9
 VIS 35
 YP 13
 pH 9.3
 Cl- 600
 Ca++ 120

MD: 4,211'
 TVD: 4,172.43'
 INC: 5.1°
 AZM: 87.9°

SHY SS: mgy, trnsl to op, vf to m gr,







125

166

121

171

202u

72u

223u

296u

291u

78u

103u

176u

124u

168u

SLTY SH: mgy to gybrn, ltgy ip, mod
frm, sbblky to plty, rthy, gt tex, sl
calc, sl sdy ip, grdg to shy ss, occ f
to m gr clr to trnsl ss

MD: 4,749'
TVD: 4,710.01'
INC: 0.2°
AZM: 293.1°

MD: 4,794'
TVD: 4,755.01'
INC: 0.5°
AZM: 345.5°

MD: 4,839' WT 9.85 / VIS 37
TVD: 4,799.99'
INC: 2.7°
AZM: 7°

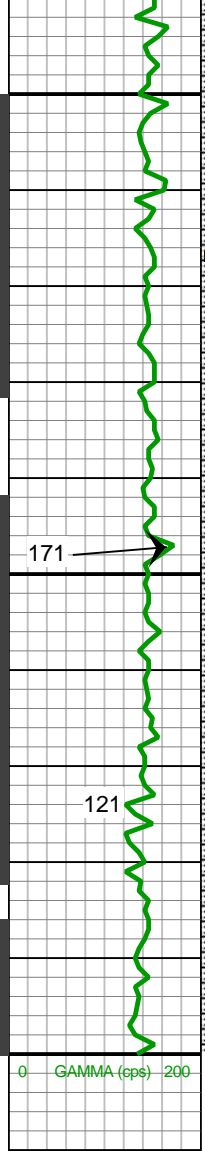
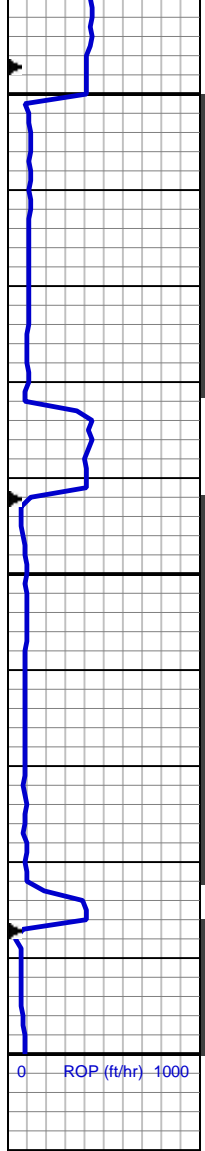
SLTY SH: mgy to gybrn, ltgy ip, mod
frm, sbblky to plty, rthy, gt tex, sl
calc, sl sdy ip, grdg to shy ss, occ f
to m gr clr to trnsl ss

MD: 4,884'
TVD: 4,844.87'
INC: 5.4°
AZM: 5.6°

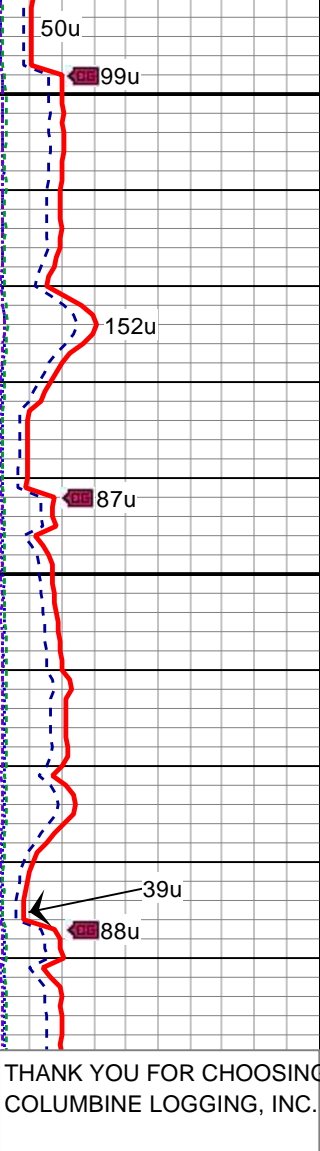
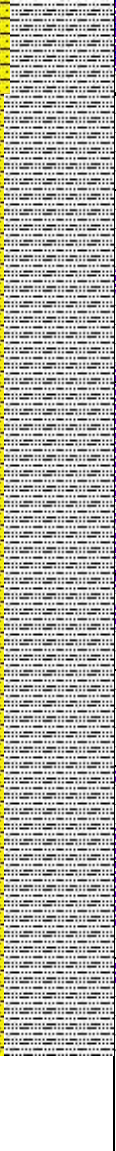
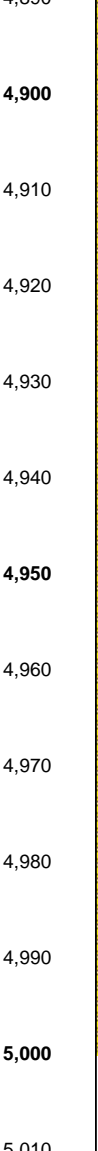
0 RO (ft/hr) 1000

0 GAMMA (cps) 200

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



Wellbore data and logs including depth, tool bit, and other parameters. The text is small and dense, providing detailed technical information for each depth interval.



MD: 4,929'
 TVD: 4,889.57'
 INC: 7.9°
 AZM: 4.7°

SLTY SH: mgy to gybrn, ltgy ip, mod
 frm, sbblky to plty, rthy, gt tex, sl
 calc, sl sdy ip, grdg to shy ss, occ f
 to m gr clr to trnsl ss

MD: 4,974'
 TVD: 4,933.99'
 INC: 10.4°
 AZM: 2.1°

WT 9.8 / VIS 39

THANK YOU FOR CHOOSING COLUMBINE LOGGING, INC. LOG CONTINUES ON FILE:
 Morton State LD01-78-1AHN Horiz.mplot

ROP (ft/hr) 1000

GAMMA (cps) 200

5,010