

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Mahalo State AA09-72-1AHNB

**Location** SESE SEC4 T6N R63W

**State** CO

**County** WELD

**Country** USA

**Rig Number** PRECISION 828

**API Number** 05-123-39012

**AFE #** 200342

**Region** DENVER-JULESBURG BASIN

**Field** WATTENBERG

**Spud Date** 1/8/2015

**Drilling Completed** 1/16/2014

**Surface Coordinates** 325' FSL, 1253' FEL

Lat/Long: 40.50951/-104.43667

**Bottom Hole Coordinates** 30' FNL, 2510 FEL

**Ground Elevation** 4700'

**K.B. Elevation** 4716'

**Logged Interval** 831' To 11883'

**Total Depth** 11883'

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

**Type of Drilling Fluid** FRESH WATER, LSND

## Other Symbols

### Oil Show

- DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

### Porosity

- E EARTHY
- F FENESTRAL
- F FRACTURE
- INTERCRYSTALLINE
- INTEROOLITIC
- MOLDIC

ORGANIC

P PINPOINT

V 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

MN DEPTH MN DEPTH

MN DEPTH MN DEPTH (RIGHT)

NORMAL FAULT

OVERTURNED STRATA

REVERSE FAULT

CASING

SIDEWALL CORE (LEFT)

SIDEWALL CORE (RIGHT)

SLIDE

SURVEY

DST DRILL STEM TEST

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

## Accessories

### Fossils

- ALGAE
- AMPHIBORA

GASTROPOD

INOCERAMUS

OOLITE

OSTRACOD

ARGILLITE GRAIN

B BENTONITE

BITUMENOUS SUBSTANCE

BRECCIA FRAGMENTS

HEAVY MINERAL

K KAOLIN

MARLSTONE

MICACEOUS

ANHYDRITE STRINGER

BENTONITE STRINGER

COAL STRINGER

DOLomite STRINGER

AMPHIBOLITE  
BELEMNITE  
BIOCLASTIC  
BRACHIOPOD  
BRYOZOA  
CEPHALOPOD  
CORAL  
CRINOID  
ECHINOID  
FISH  
FORAMINIFERA  
FOSSIL

CONRADUS  
PELECYPOD  
PELLET  
PISOLITE  
PLANT REMAINS  
PLANT SPORES  
SCAPHOPOD  
STROMATOPOROID

## Minerals

ANHYDRITIC  
ARGILLACEOUS

BRECCIA FRAGMENTS  
CALCAREOUS  
CARBONACEOUS FLAKES  
CHTDK  
CHTLT  
COAL - THIN BEDS  
DOLOMITIC  
FELDSPAR  
FERRUGINOUS PELLET  
FERRUGINOUS  
GLAUCONITE  
GYPSIFEROUS

MORCEOUS  
MINERAL CRYSTALS  
NODULES  
PHOSPHATE PELLETS  
PYRITE  
SALT CAST  
SANDY  
SILICEOUS  
SILTY  
TUFACEOUS

## Stringer

DOLOMITIC STRINGER  
GYPSUM STRINGER  
LIMESTONE STRINGER  
MARLSTONE (CALC) STRG  
MARLSTONE (DOL) STRG  
SANDSTONE STRINGER  
SHALE STRINGER  
SILTSTONE STRINGER

## Other

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

LOG CONTINUES ON FILE: Mahalo State AA09-72-1AHNB Horiz.mplot

GEOLOGICAL SERVICES PROVIDED BY COLUMBINE LOGGING, INC.

## Rock Types

UNKNOWN  
SANDSTONE  
SHALY SANDSTONE  
SHALY SILTSTONE  
SILTY SHALE  
ANHYDRITE  
BENTONITE  
BRECCIA  
CEMENT

CHALK  
CHERT  
CLAY CHOKE SAND  
CLAYSTONE  
COAL  
CONGLOMERATE  
DOLOMITE  
DOLOMITIC LIMESTONE  
GRANITE

GYPSUM  
IGNEOUS  
LIMESTONE  
SIDERITE or LIMONITE  
MARLSTONE  
METAMORPHIC  
NO SAMPLE  
SALT  
SALT- PEPPER SAND

SHALE  
SHALE COLORED  
SHALE GRAY  
SILTSTONE  
TILL  
TUFF  
WELDED TUFF

## Operator

**Company** Noble Energy Inc

**Address** 1625 Broadway  
Denver, CO 80202

## Geologist

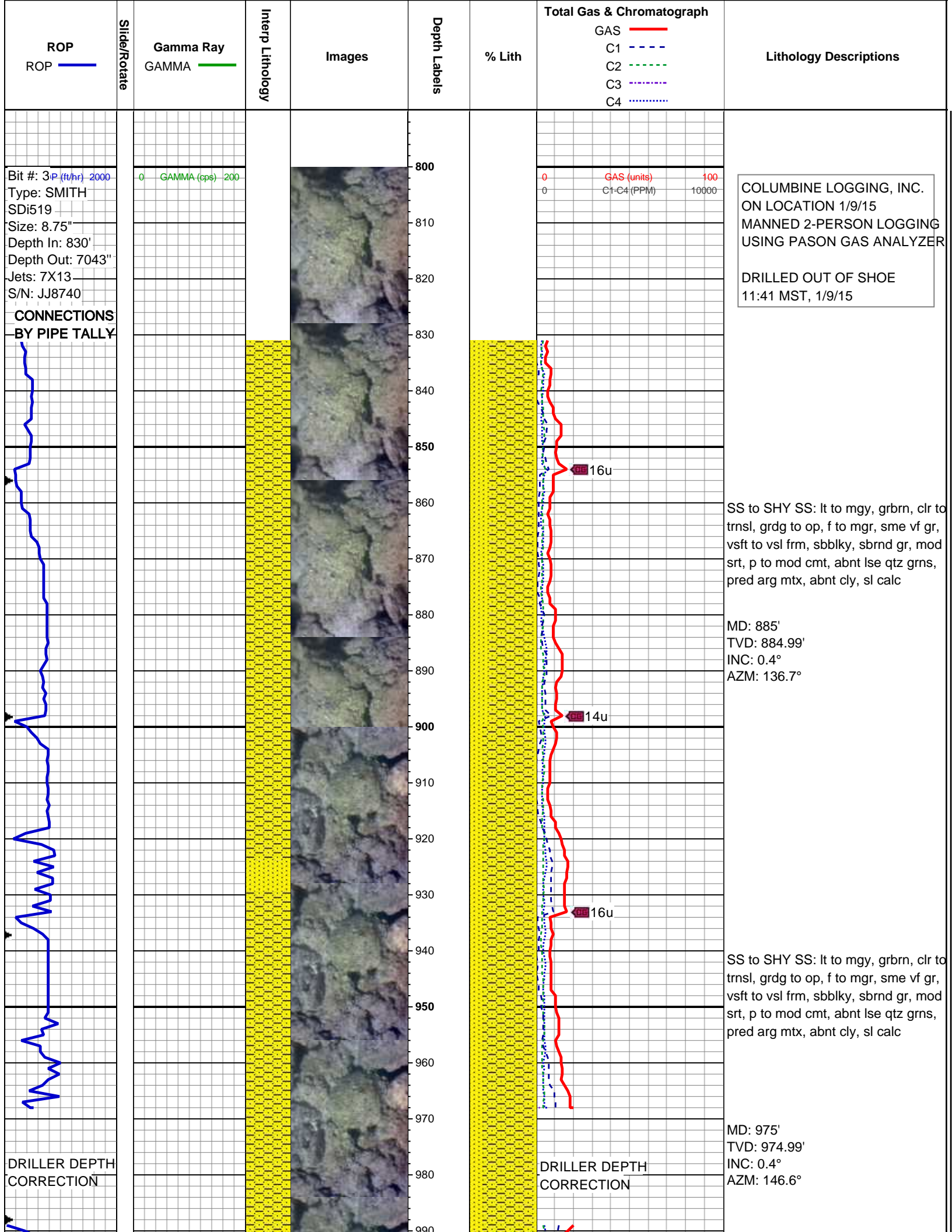
**Name** JAMES TAYLOR

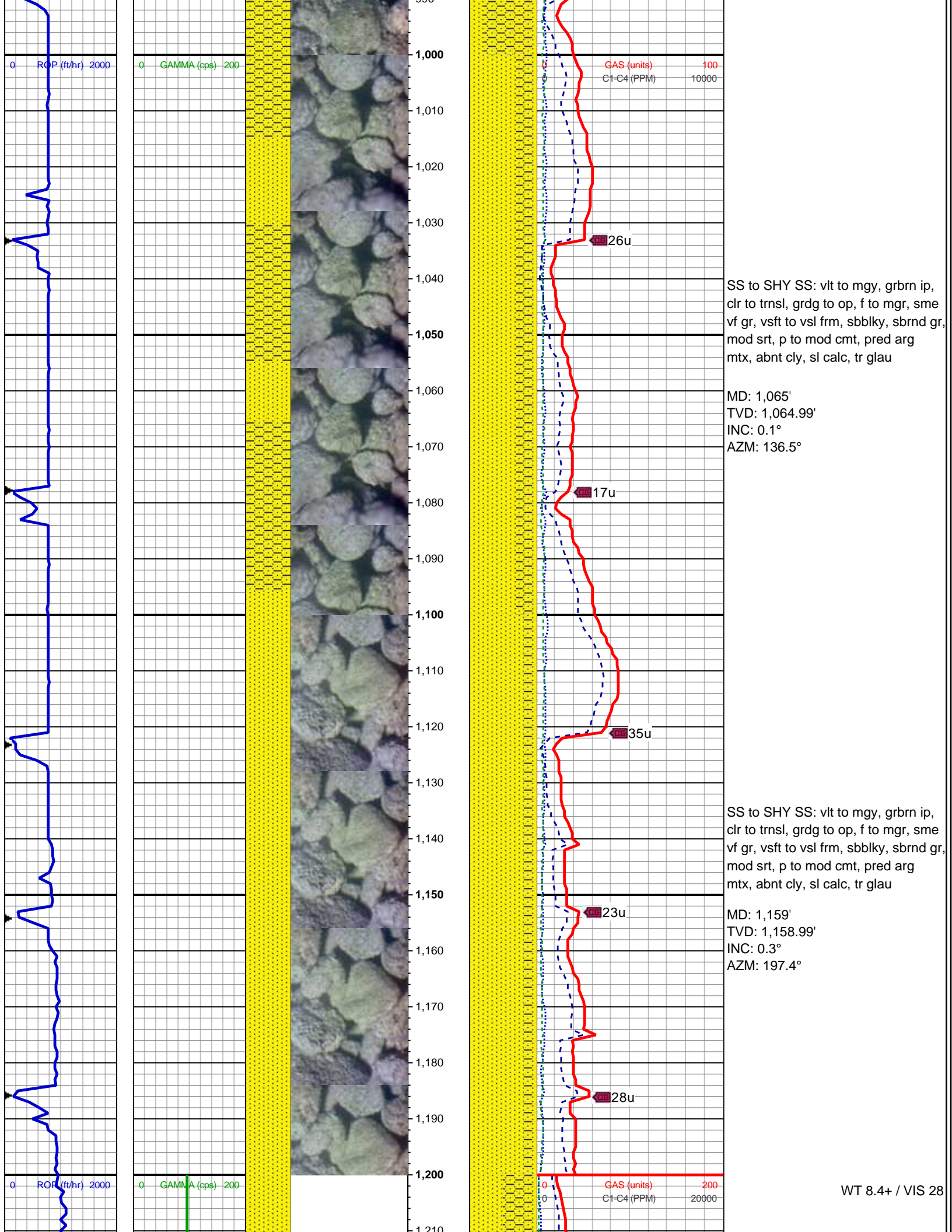
**Company** NOBLE ENERGY, INC.

**Address** 1625 Broadway  
Denver, CO 80202

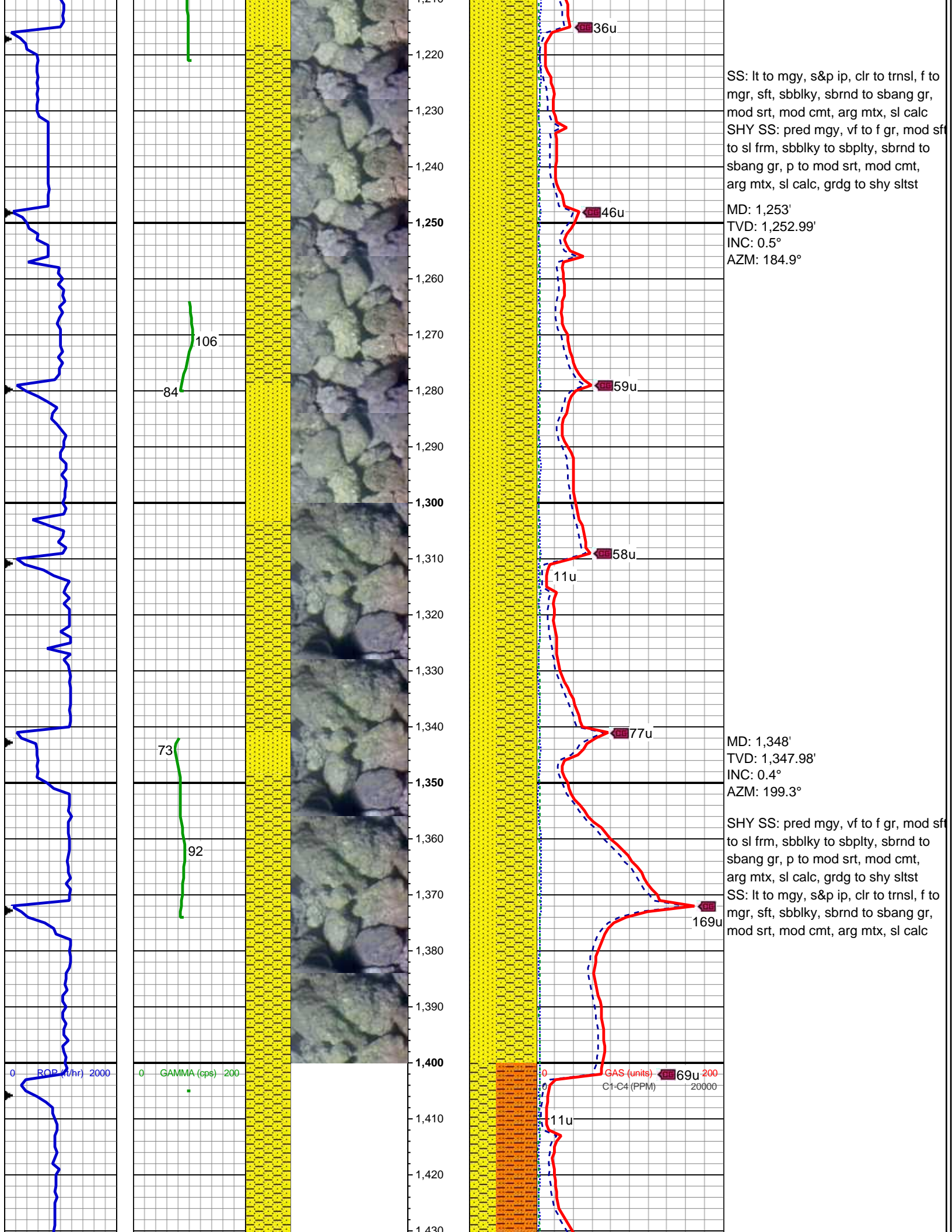
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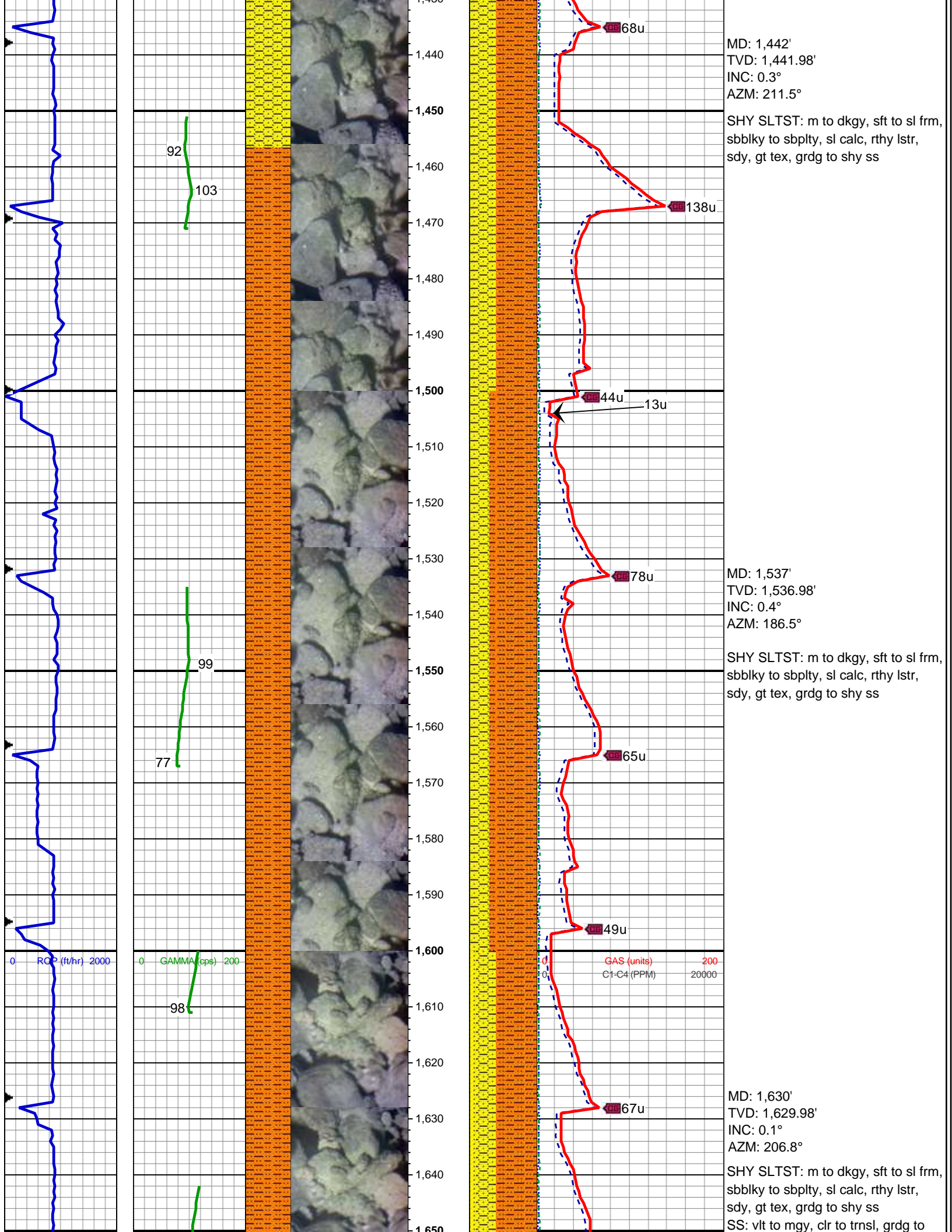
Oil	Condensate	Gas
Note	Core	Pressure
Error	Water	Seal



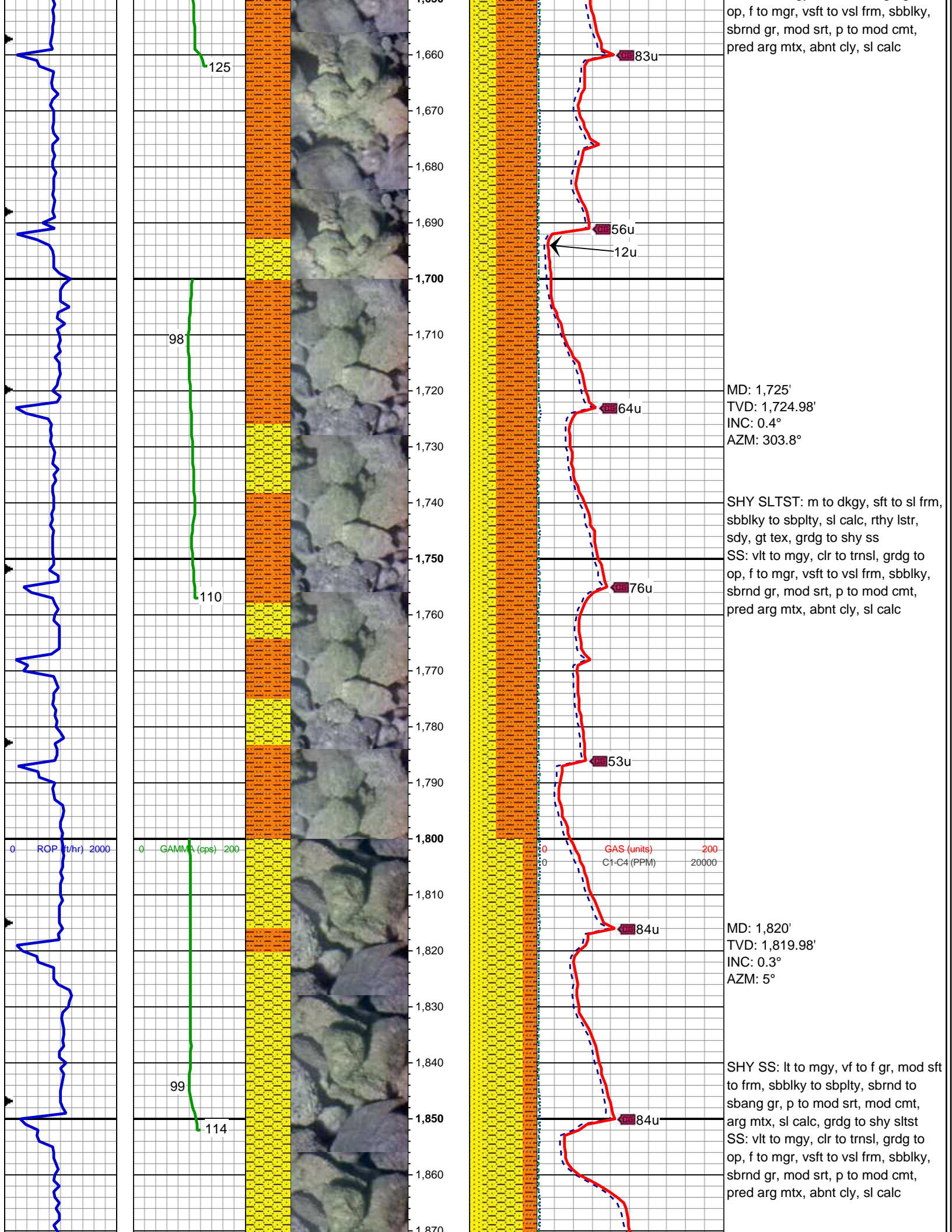


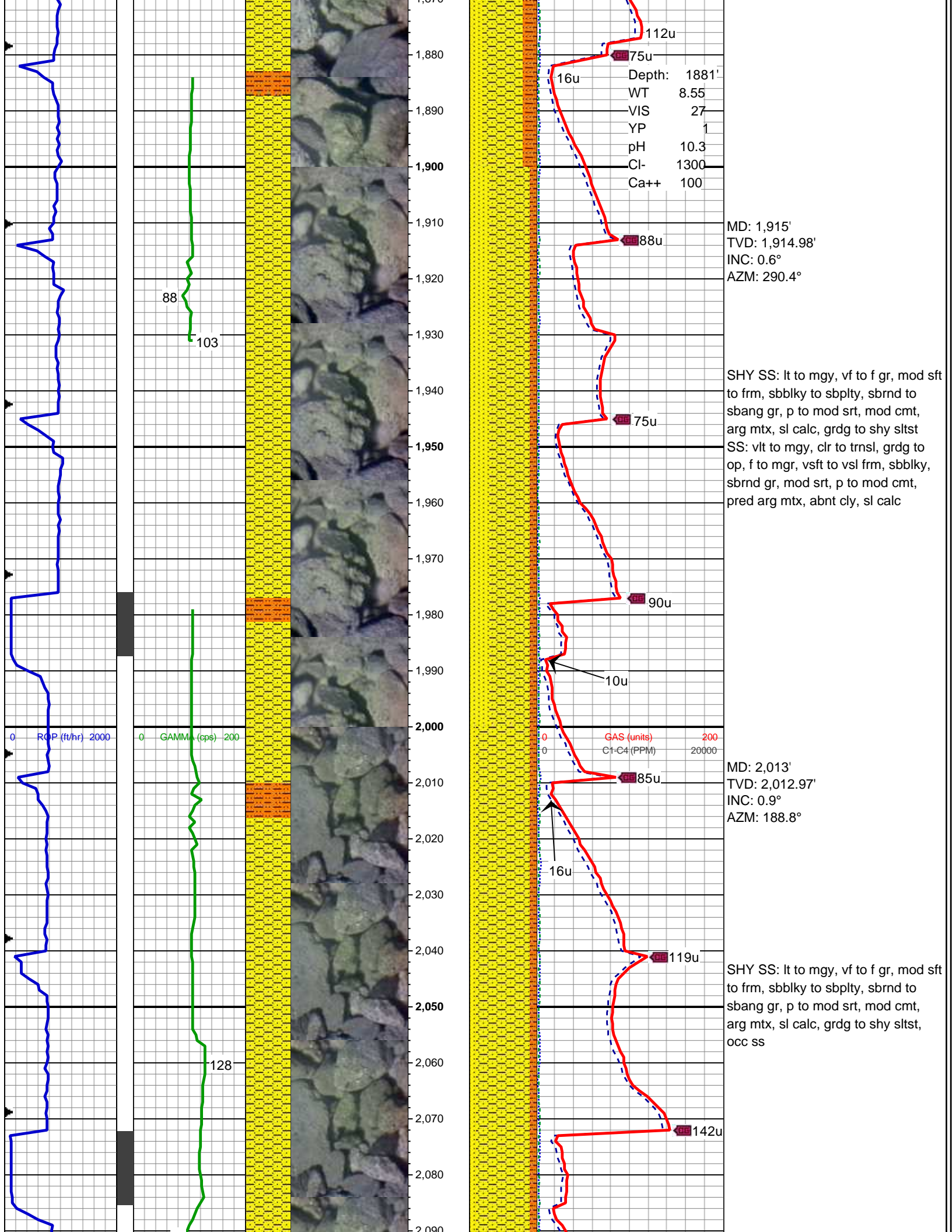




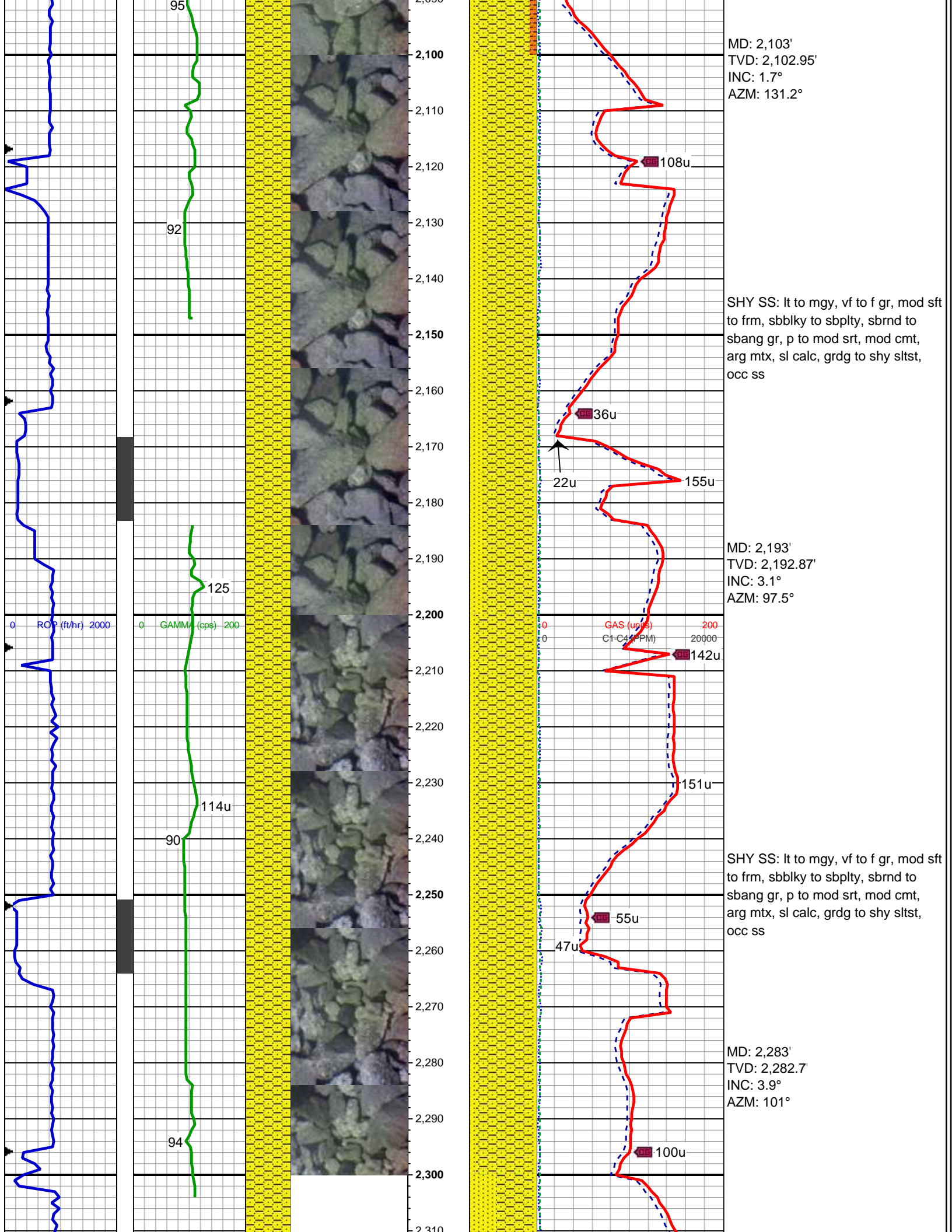


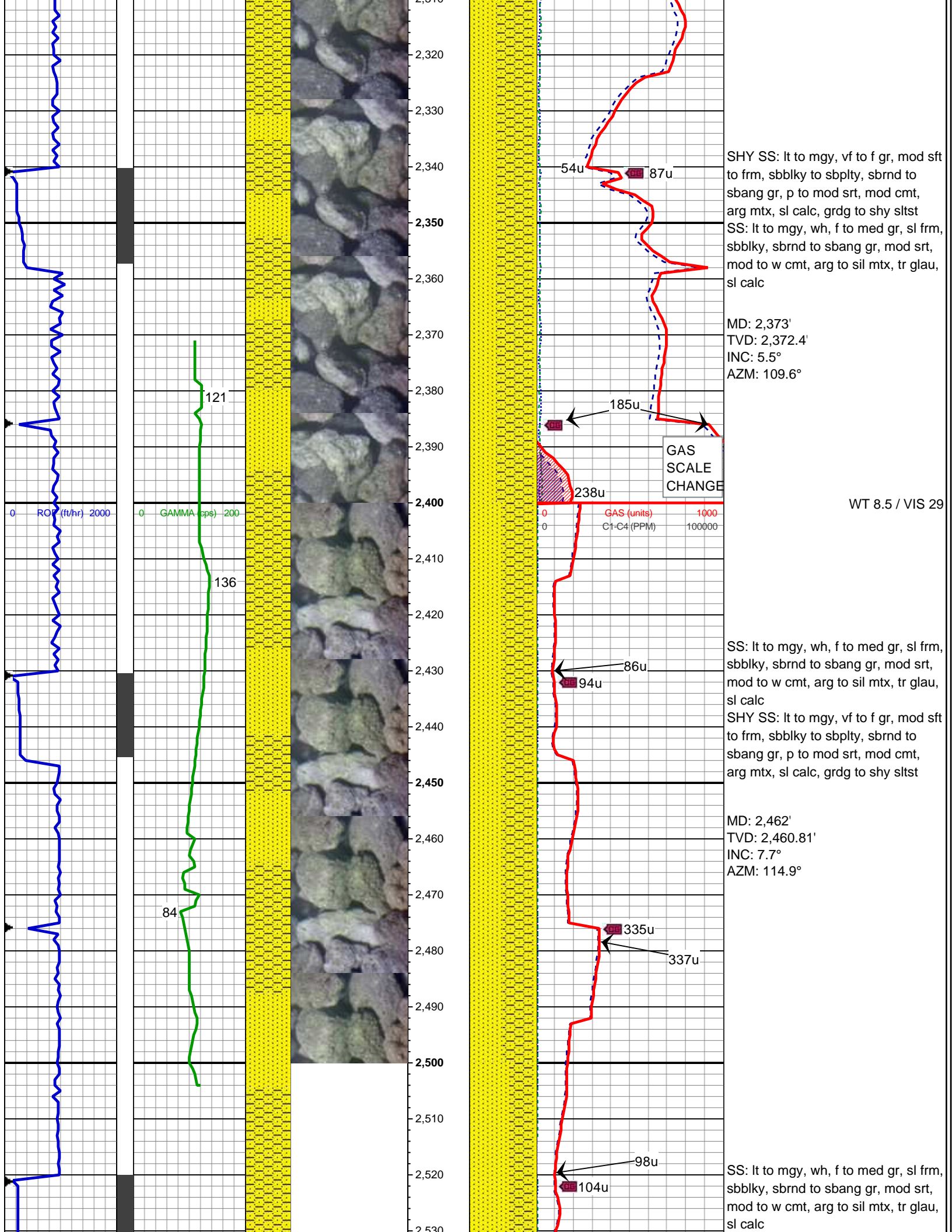




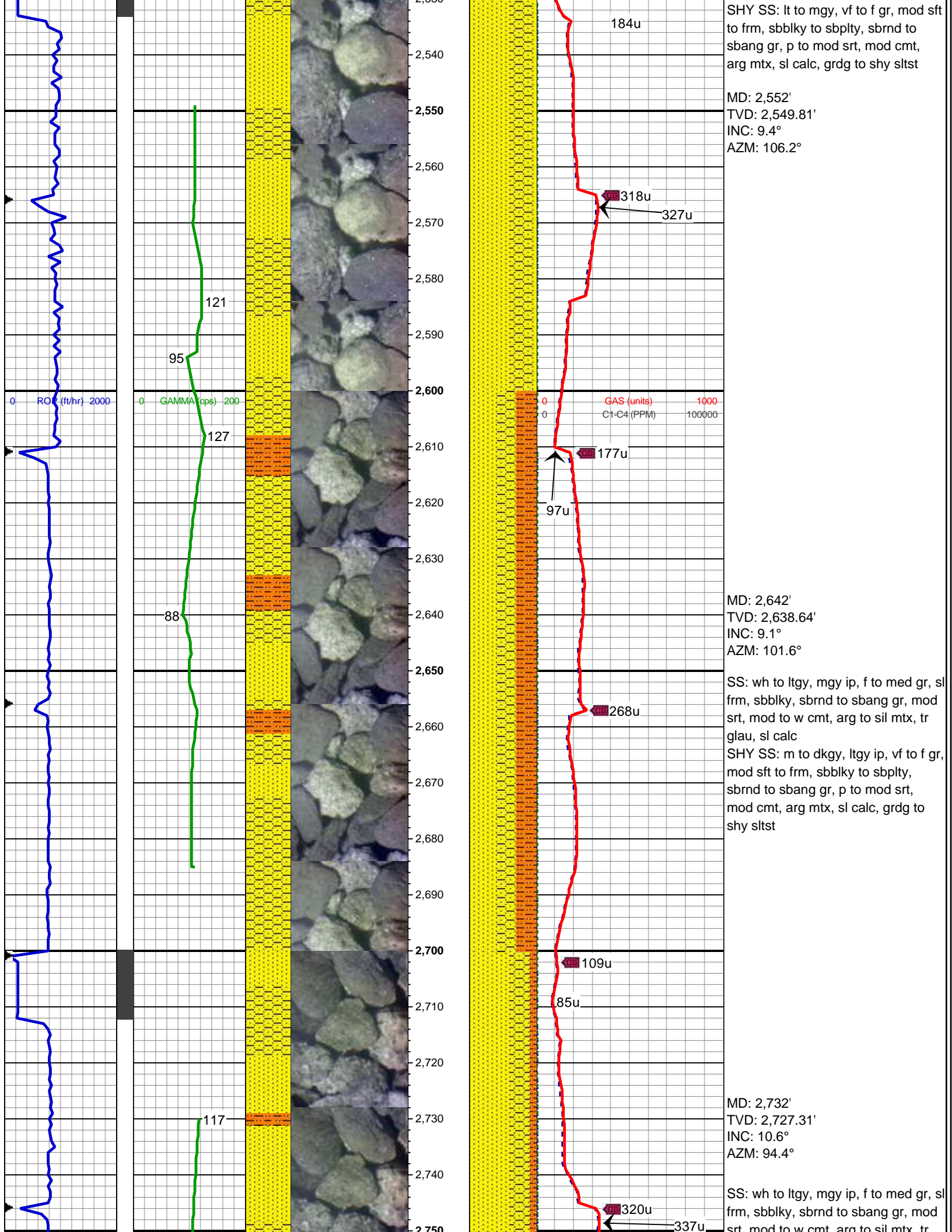


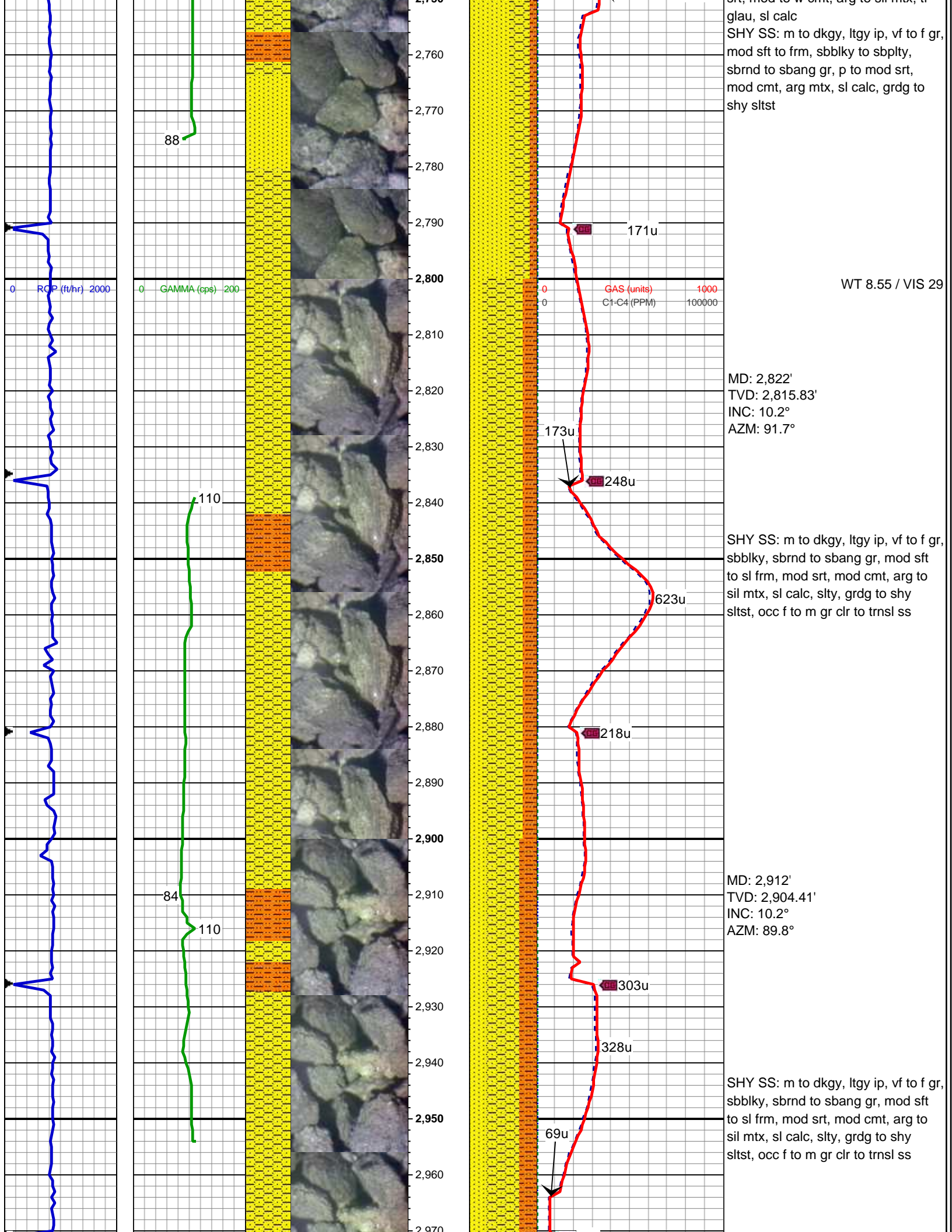




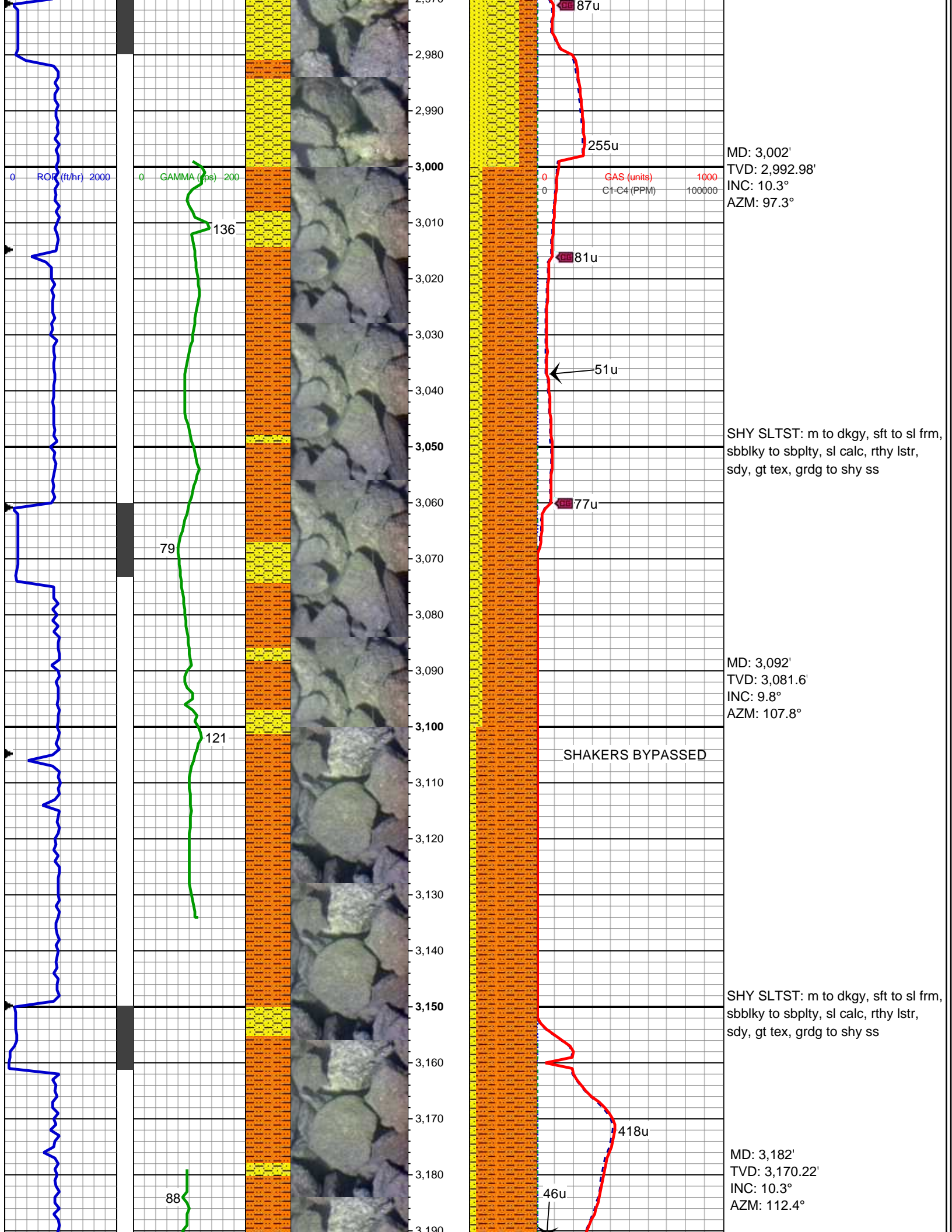


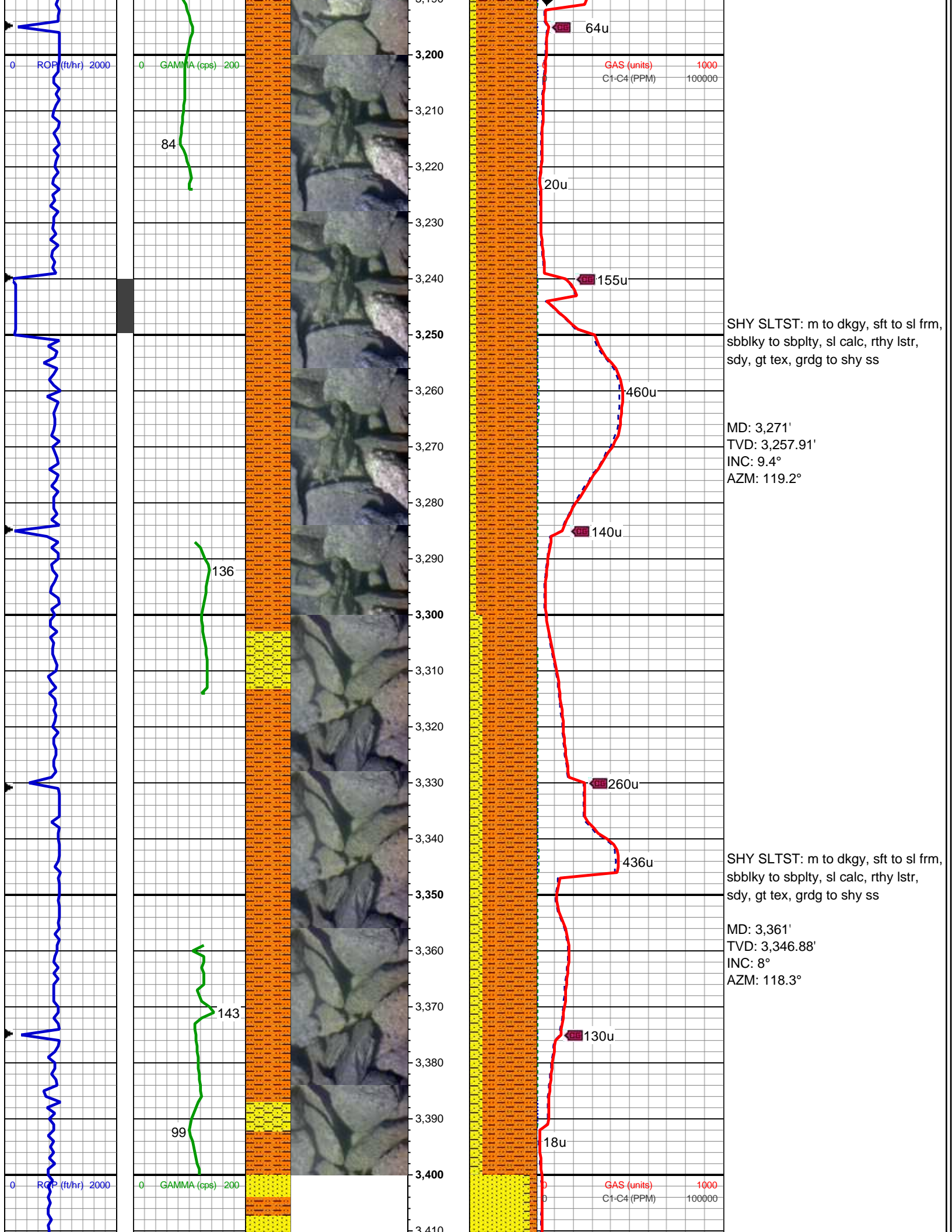




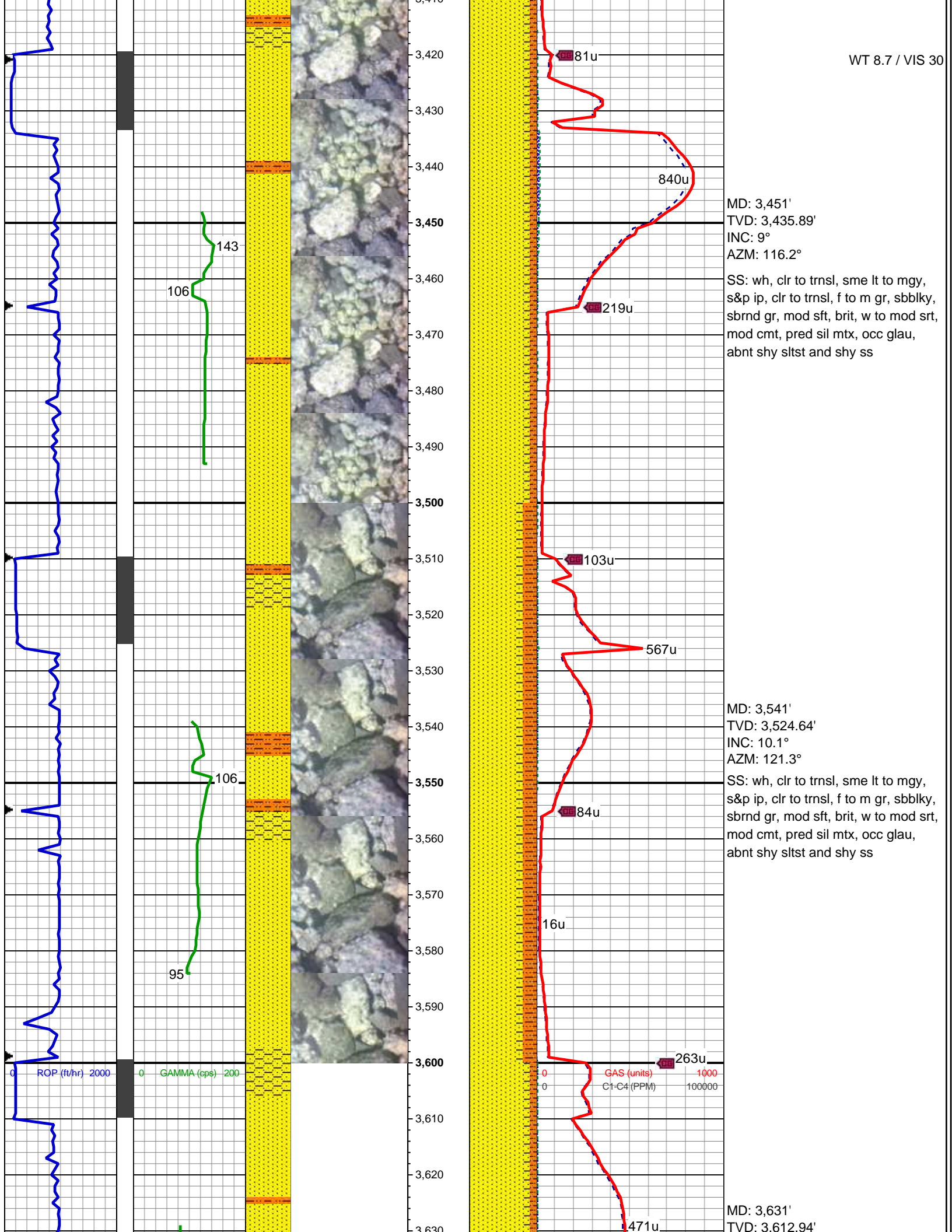


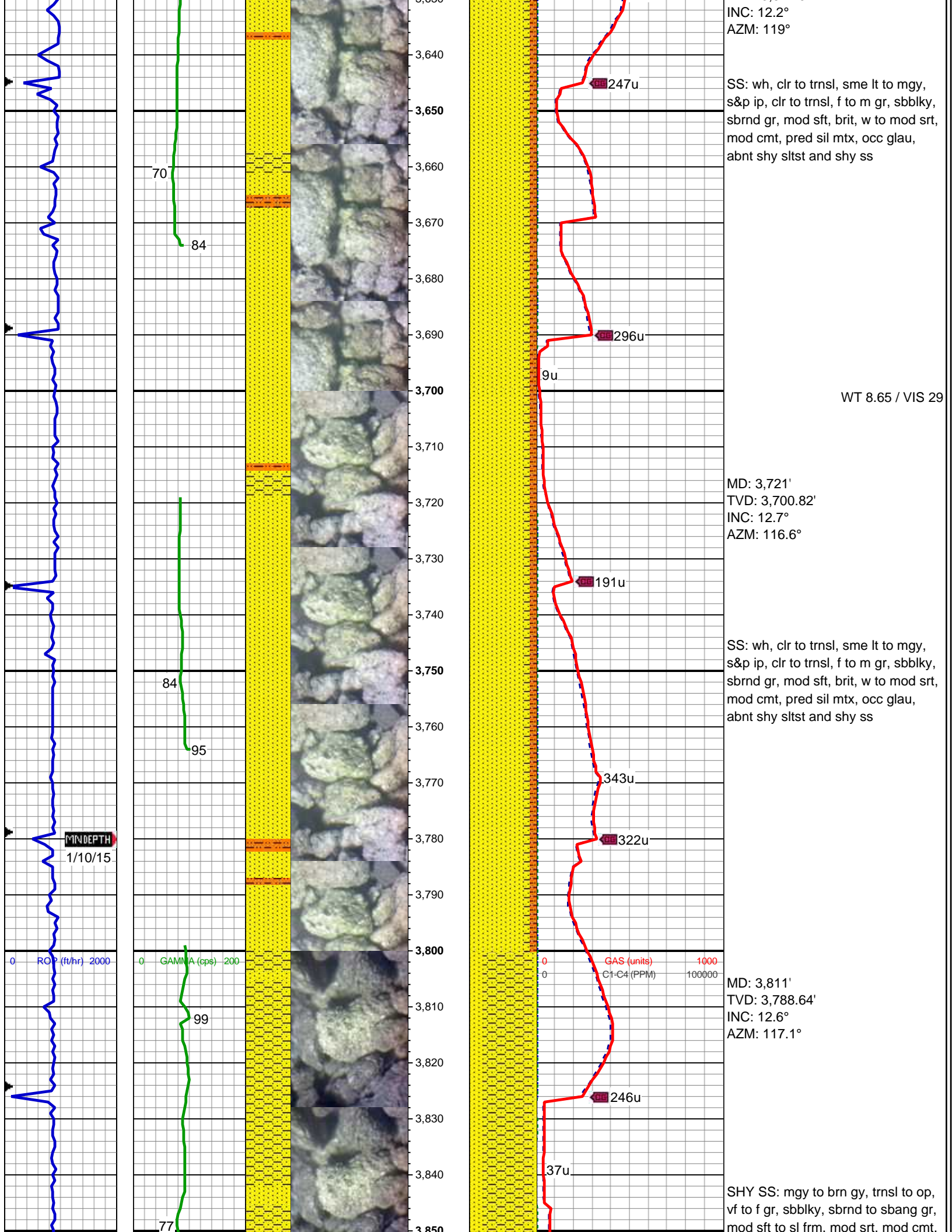




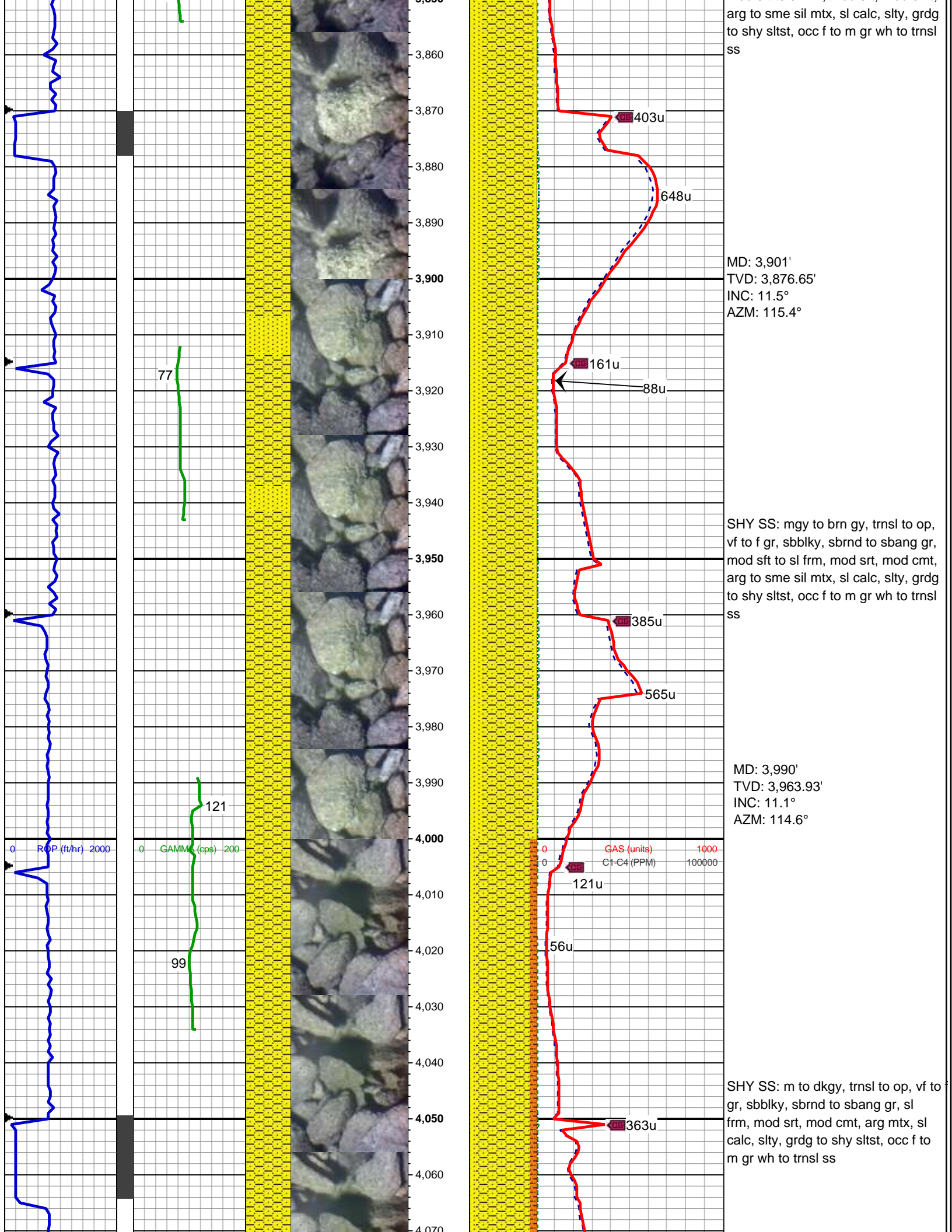


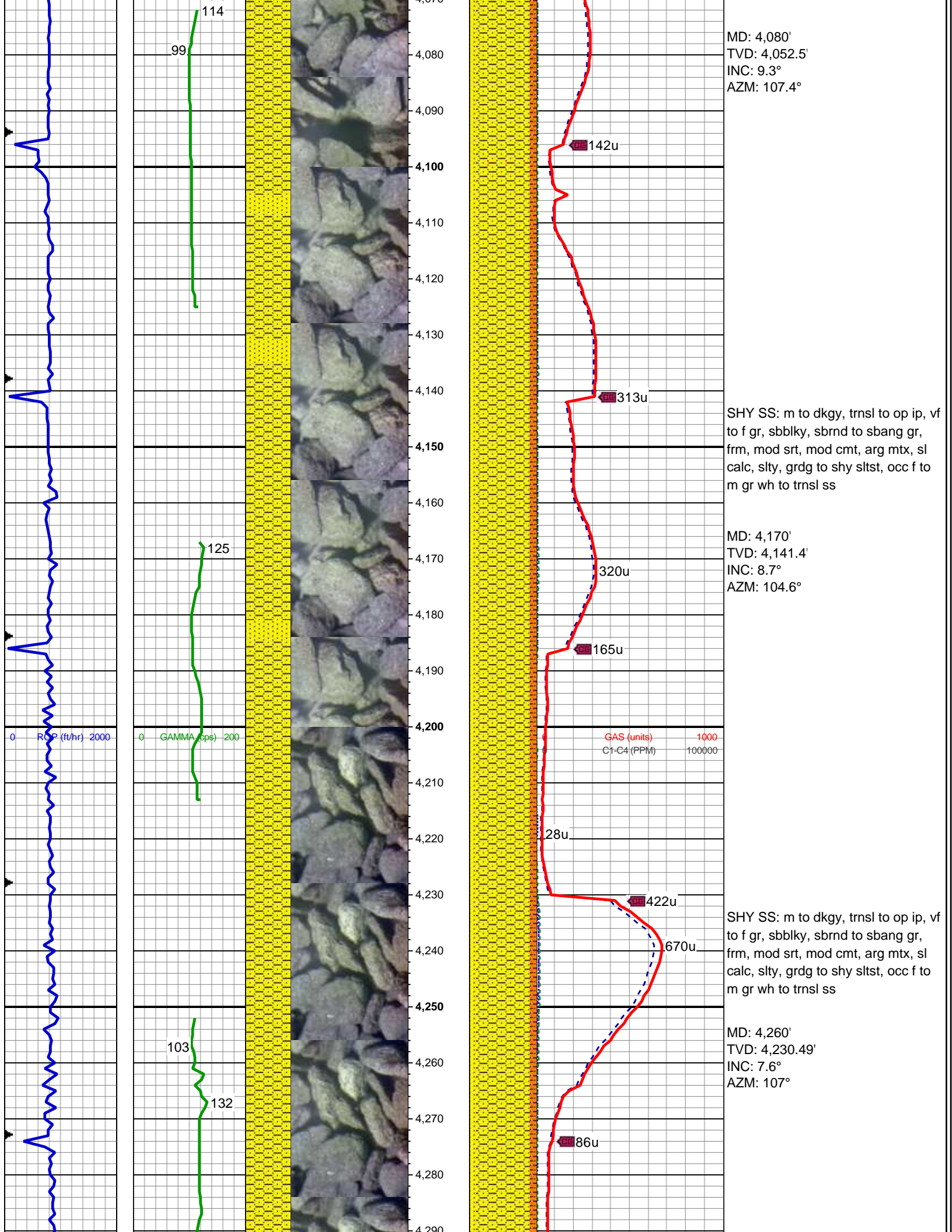




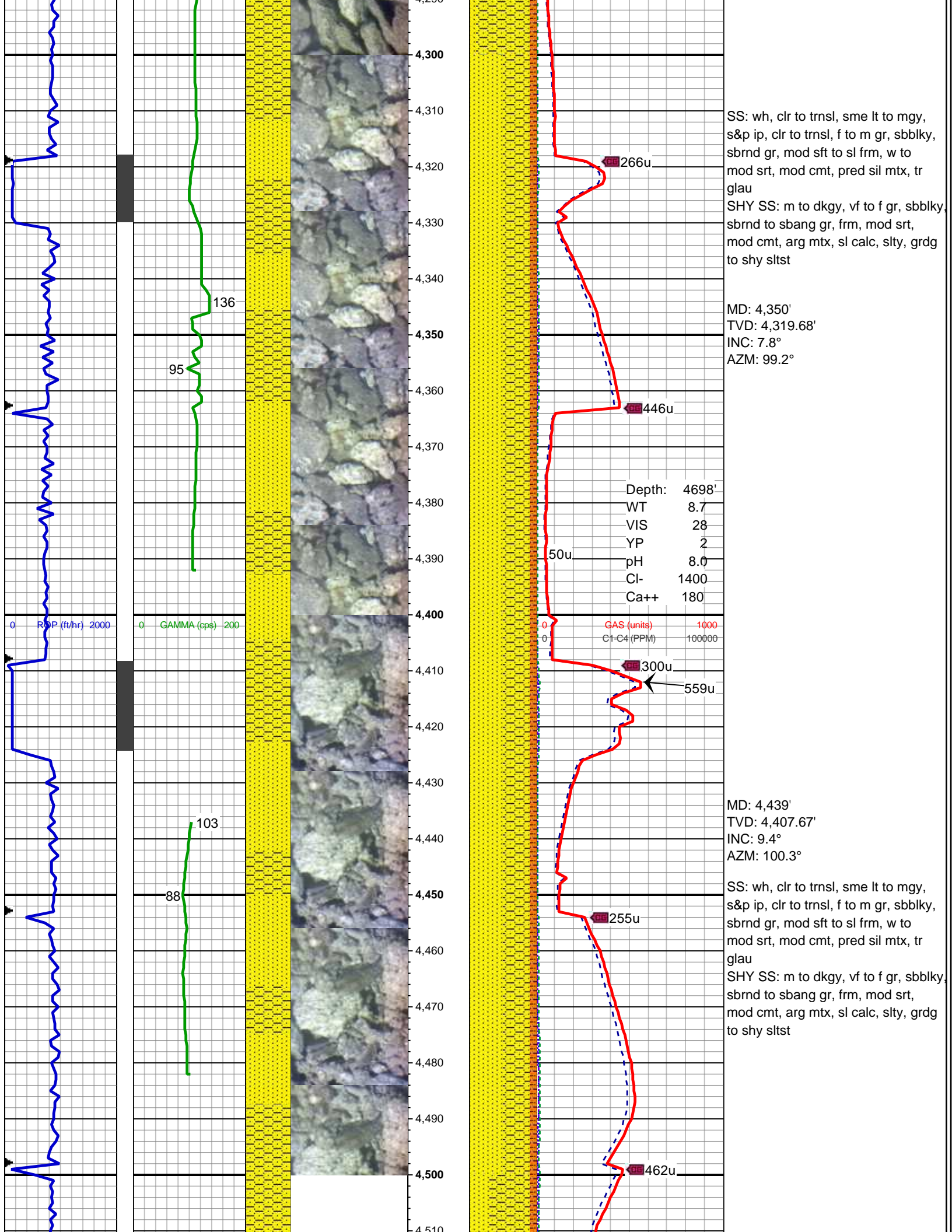


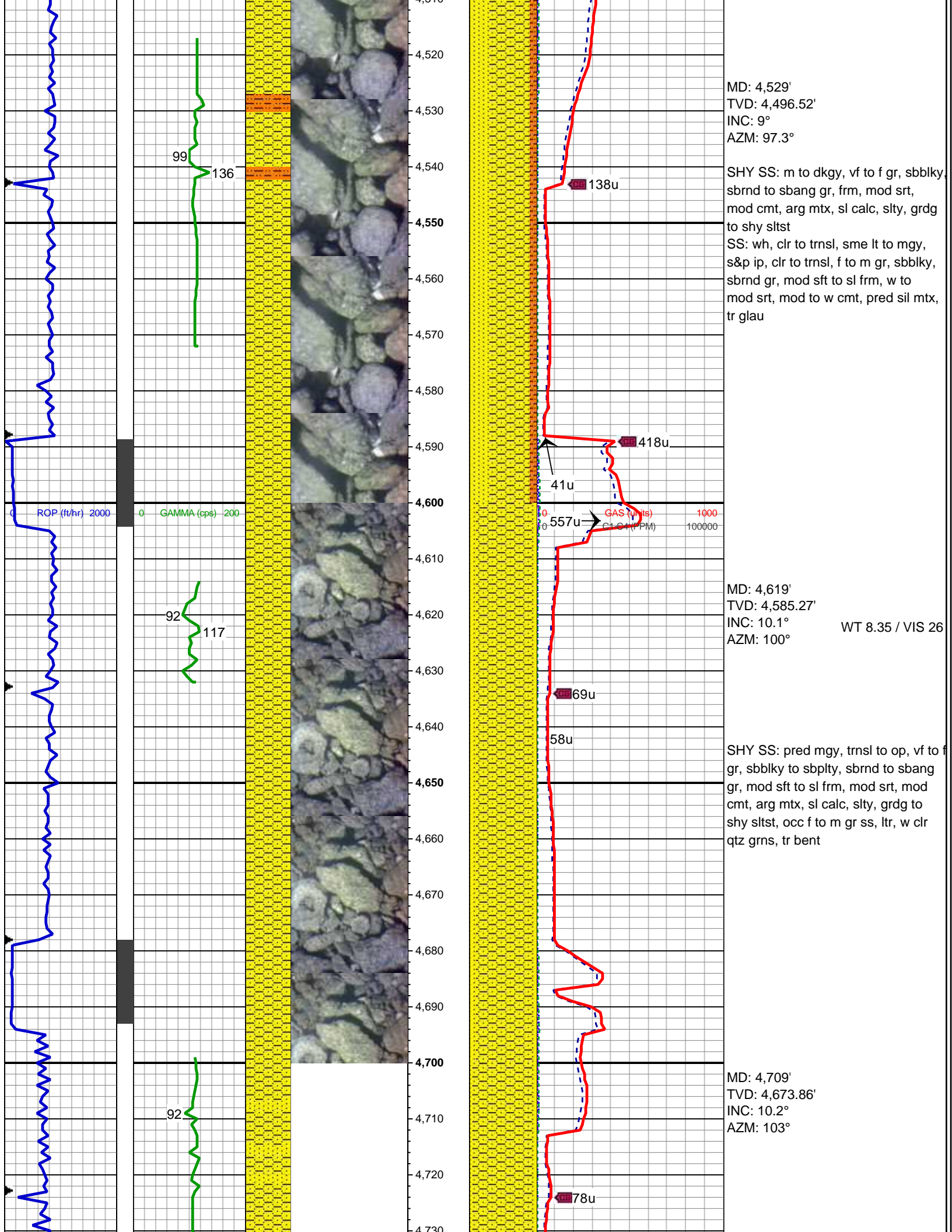




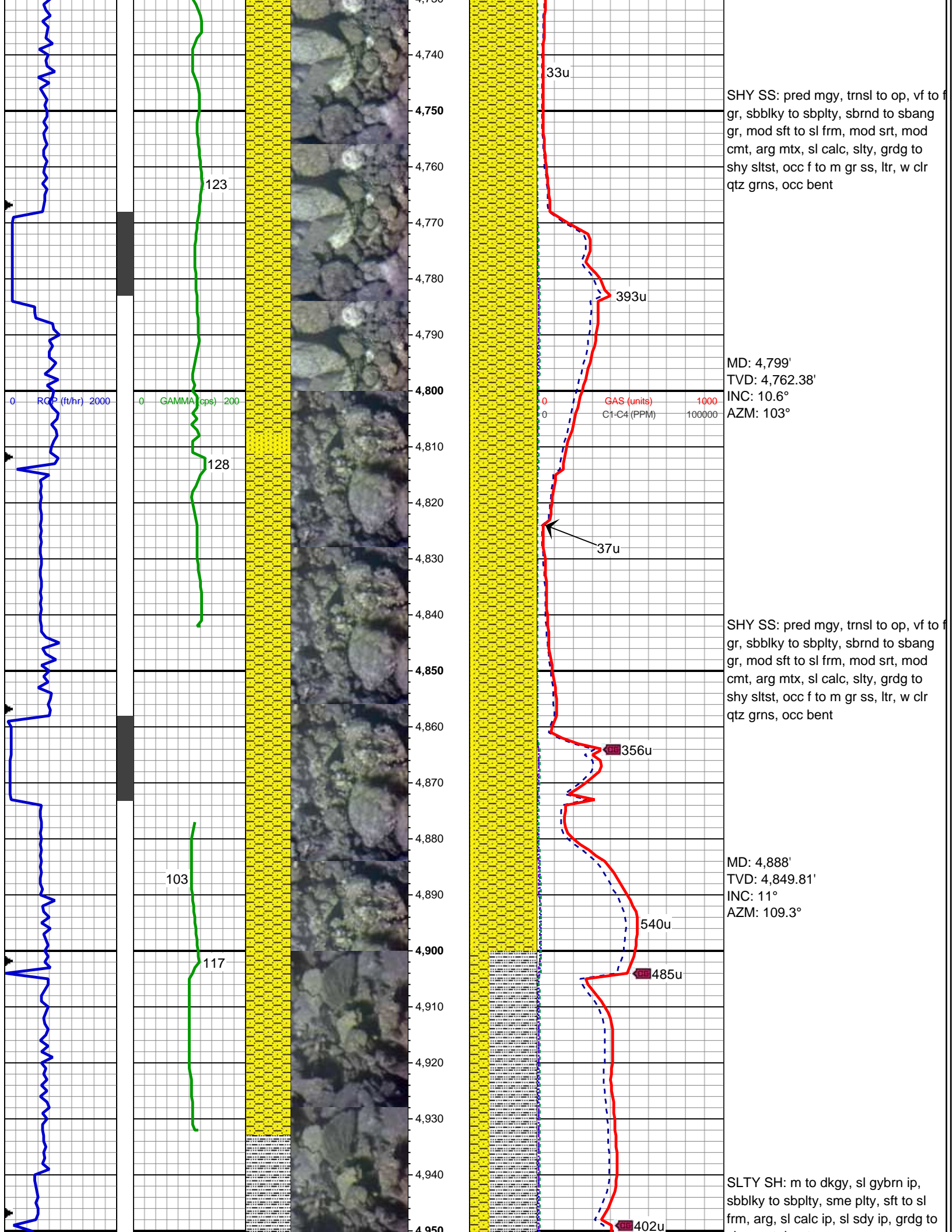


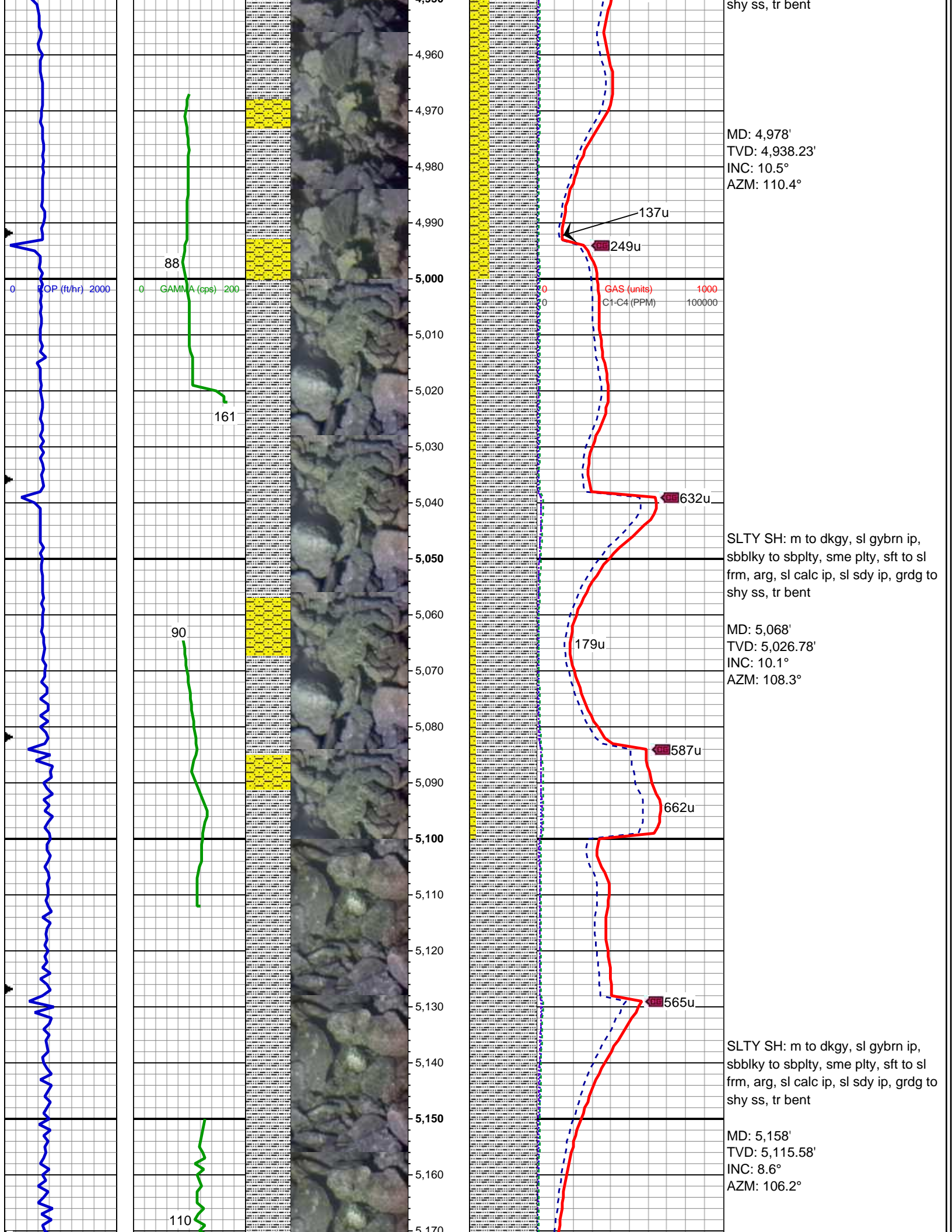




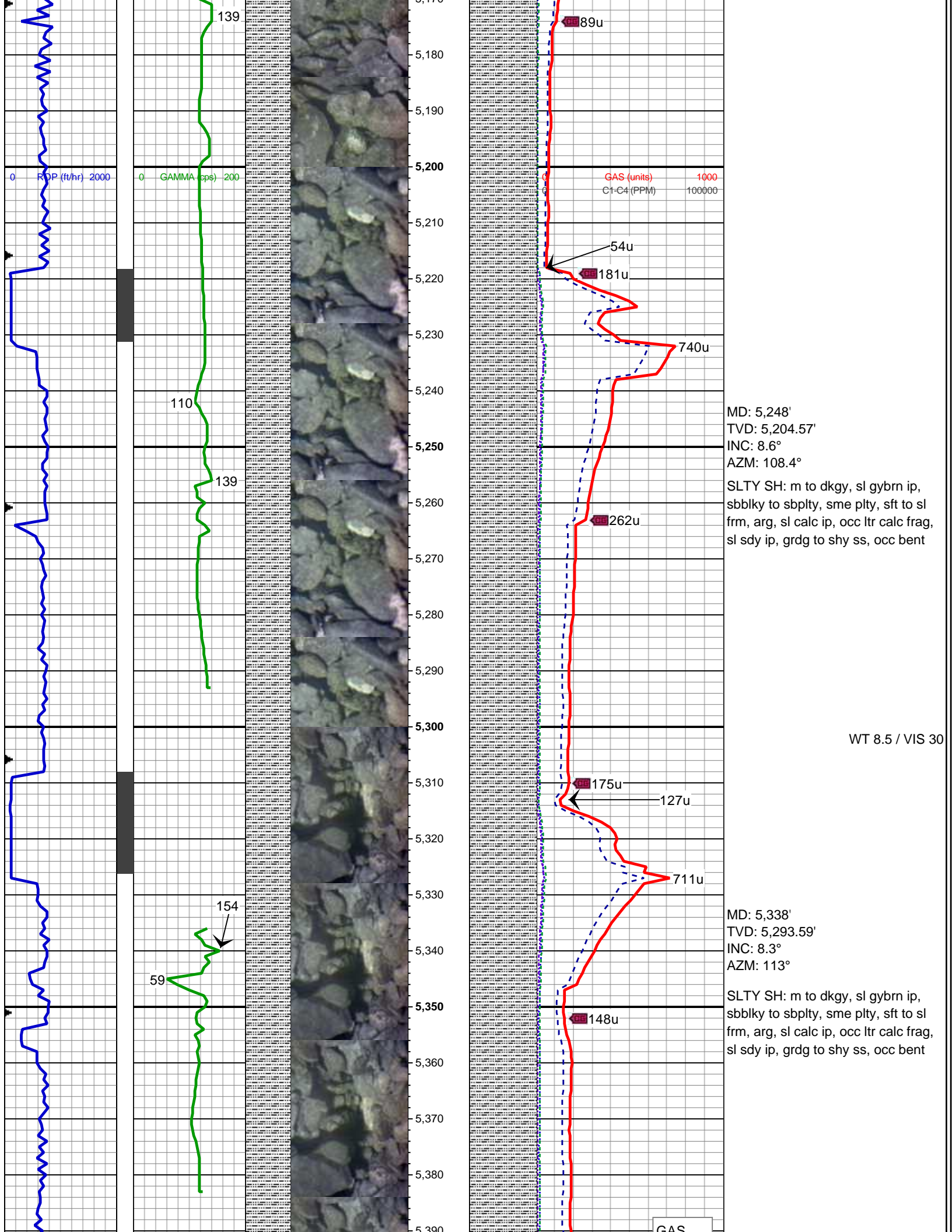


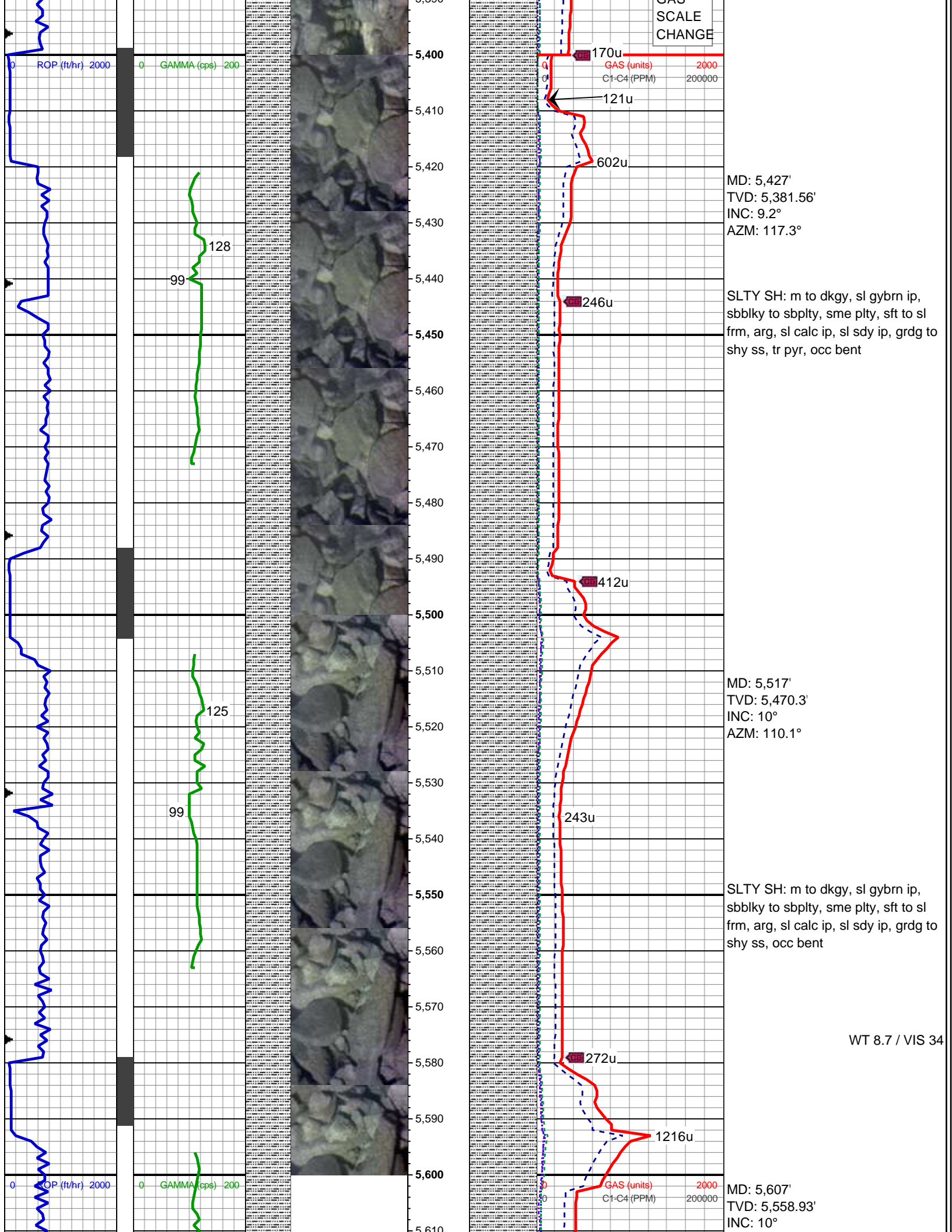




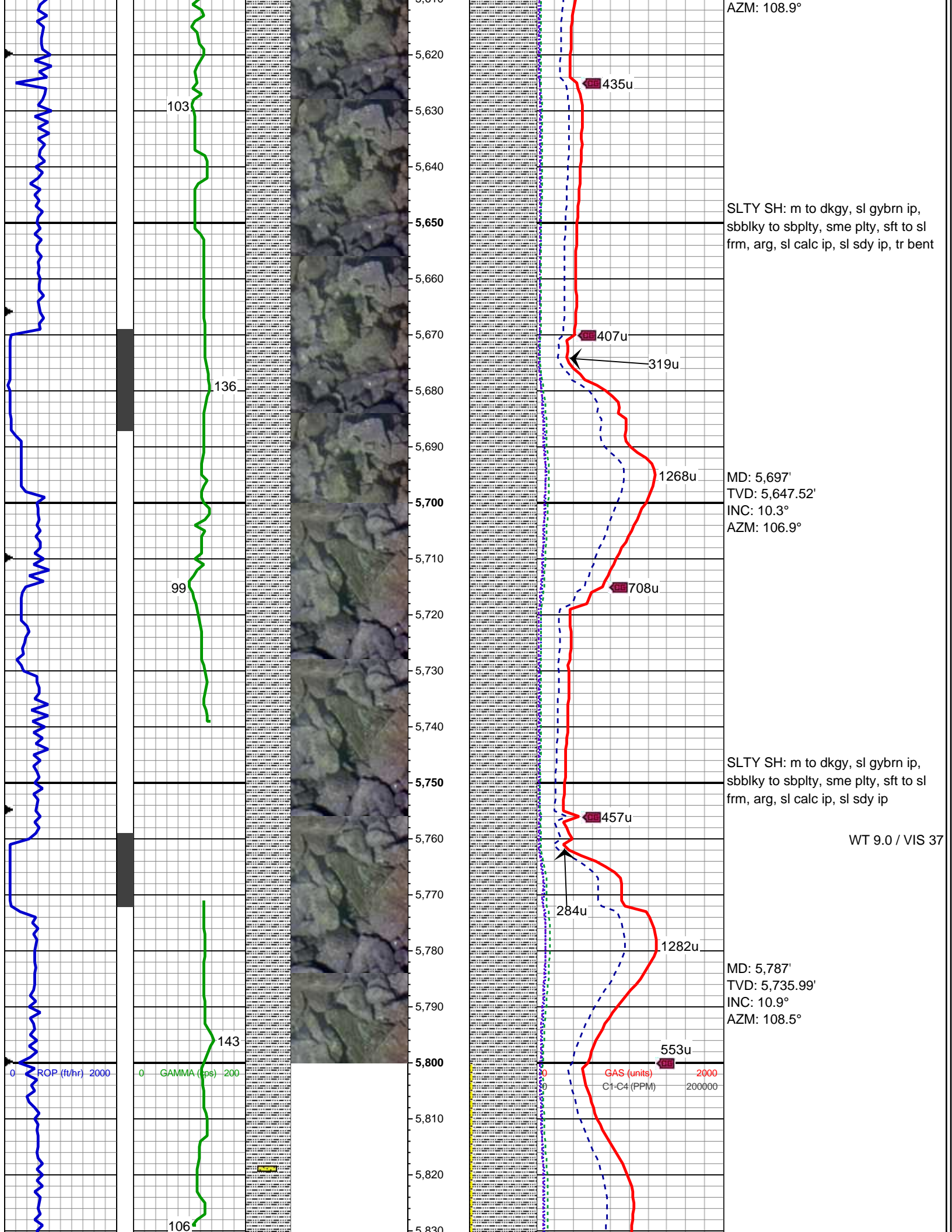


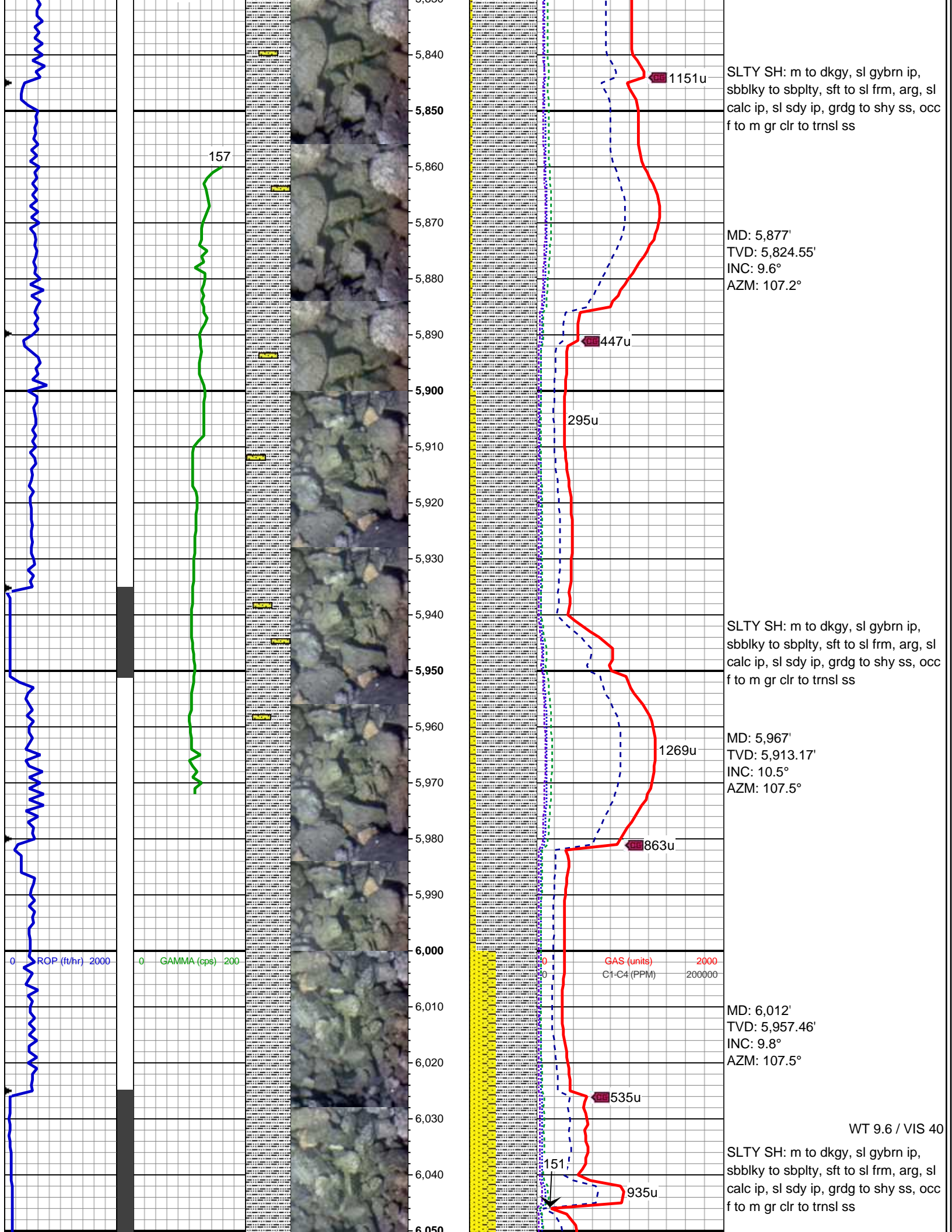




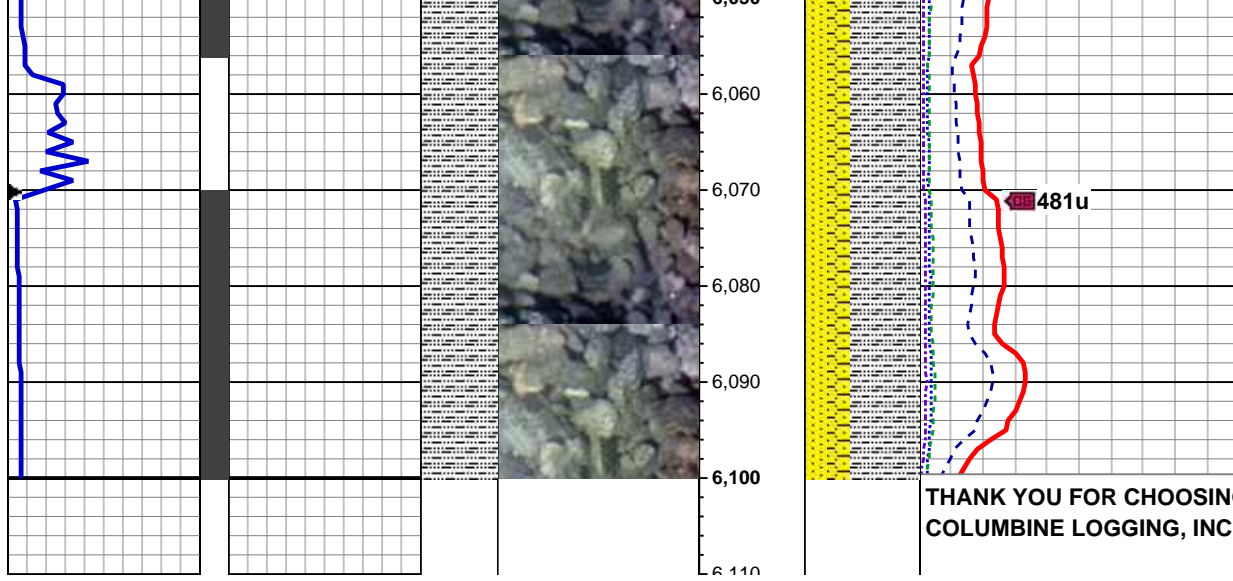












MD: 6,057'  
TVD: 6,001.7'  
INC: 11.3°  
AZM: 116.6°

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Horiz.mplot

THANK YOU FOR CHOOSING  
COLUMBINE LOGGING, INC.