

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name Mahalo State AA09-72-1BHNC

Location SESE SEC4 T6N R63W

State CO

County WELD

Country USA

Rig Number PRECISION 828

API Number 05-123-39018

AFE # 200341

Region DENVER-JULESBURG BASIN

Field WATTENBERG

Spud Date 12/28/2014

Drilling Completed 1/5/2015

Surface Coordinates 325' FSL, 1215' FEL

Lat/Long: 40.50952/-104.43654

Ground Elevation 4700'

K.B. Elevation 4716'

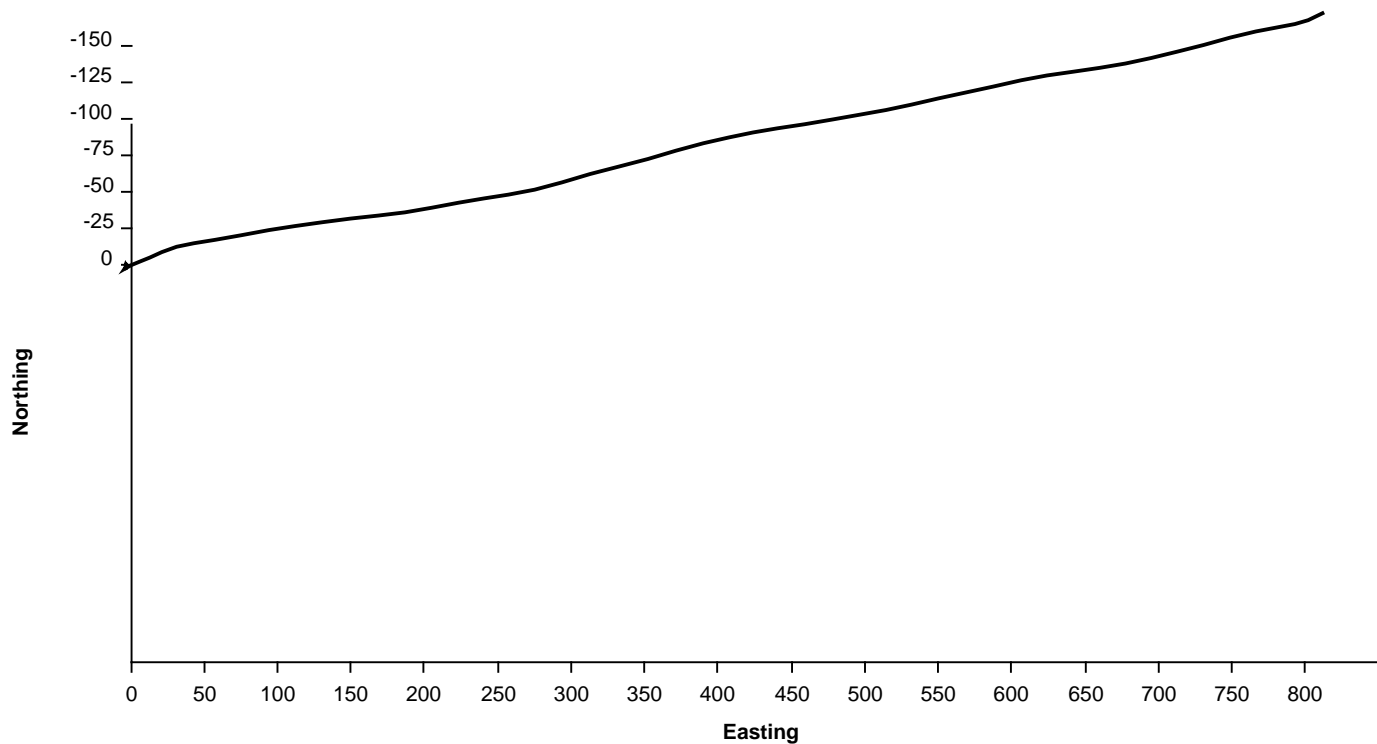
Logged Interval 844' **To** 6200'

Total Depth 12036'

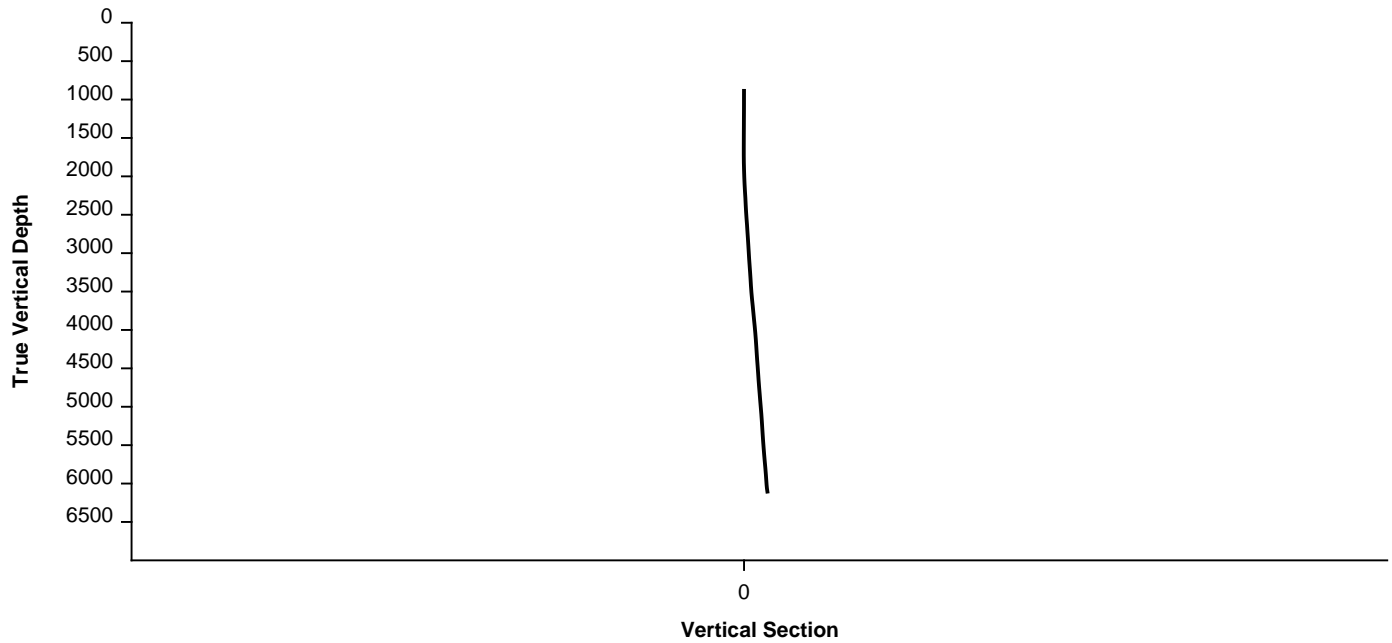
Formation FOX HILLS, PIERRE (PARKMAN, SUSSEX, SHANNON, TEEPEE BUTTES)

Type of Drilling Fluid FRESH WATER, LSND

Survey Plan



Survey Elevation



Other Symbols

Oil Show

- DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

Porosity

- E EARTHY
- F FENESTRAL
- F FRACTURE
- X 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 (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
- 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 PELLET

- HEAVY MINERAL
- KAOLIN
- MARLSTONE
- MICACEOUS
- MINERAL CRYSTALS
- NODULES
- PHOSPHATE PELLETS
- PYRITE
- SALT CAST
- SANDY
- SILICEOUS
- SILTY

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

FISH

FORAMINIFERA

FOSSIL

ANHYDRITIC

ARGILLACEOUS

FERRUGINOUS

GLAUCONITE

GYPSIFEROUS

TUFFACEOUS

Stringer

Other

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

LOG CONTINUES ON FILE: Mahalo State AA09-72-1BHNC 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

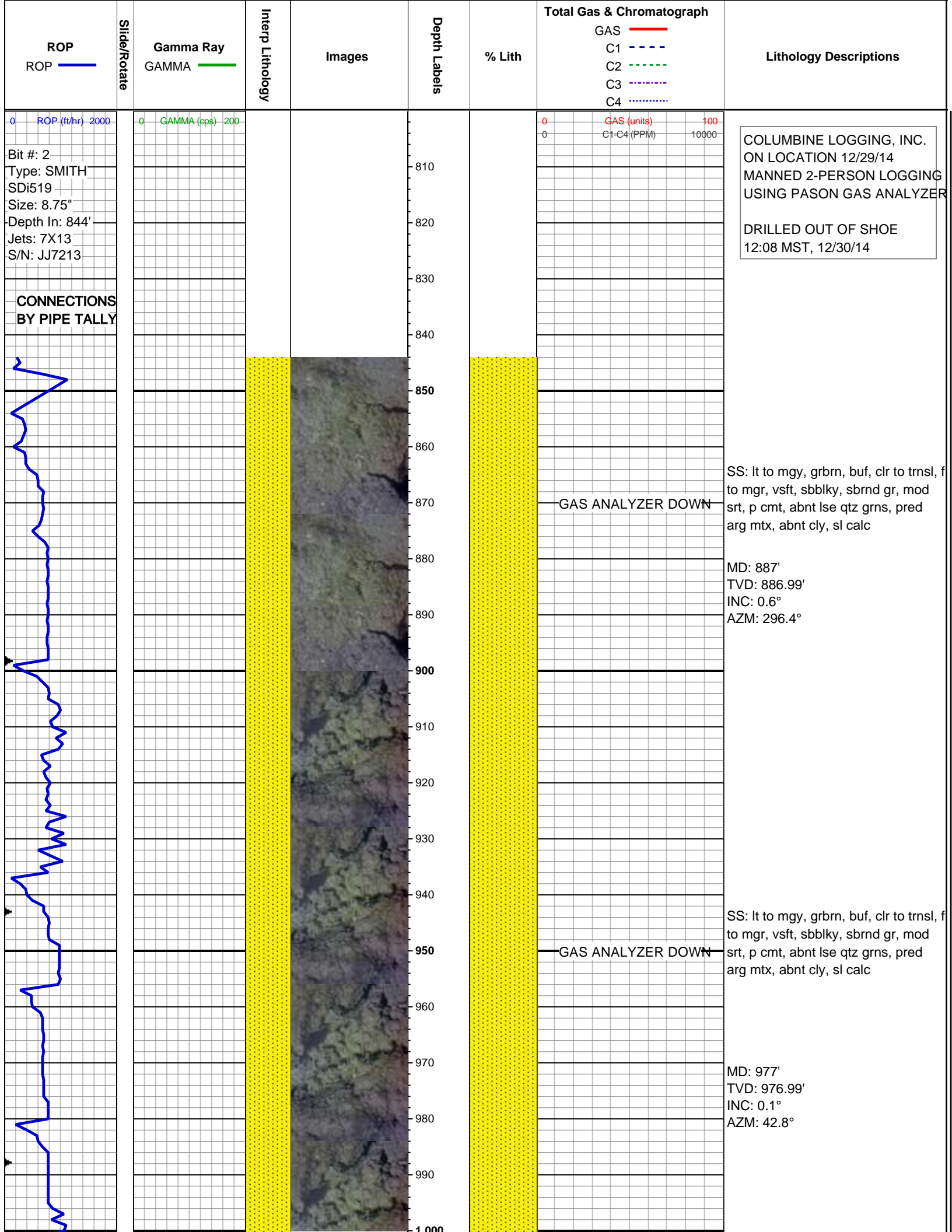
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Denver, CO 80202

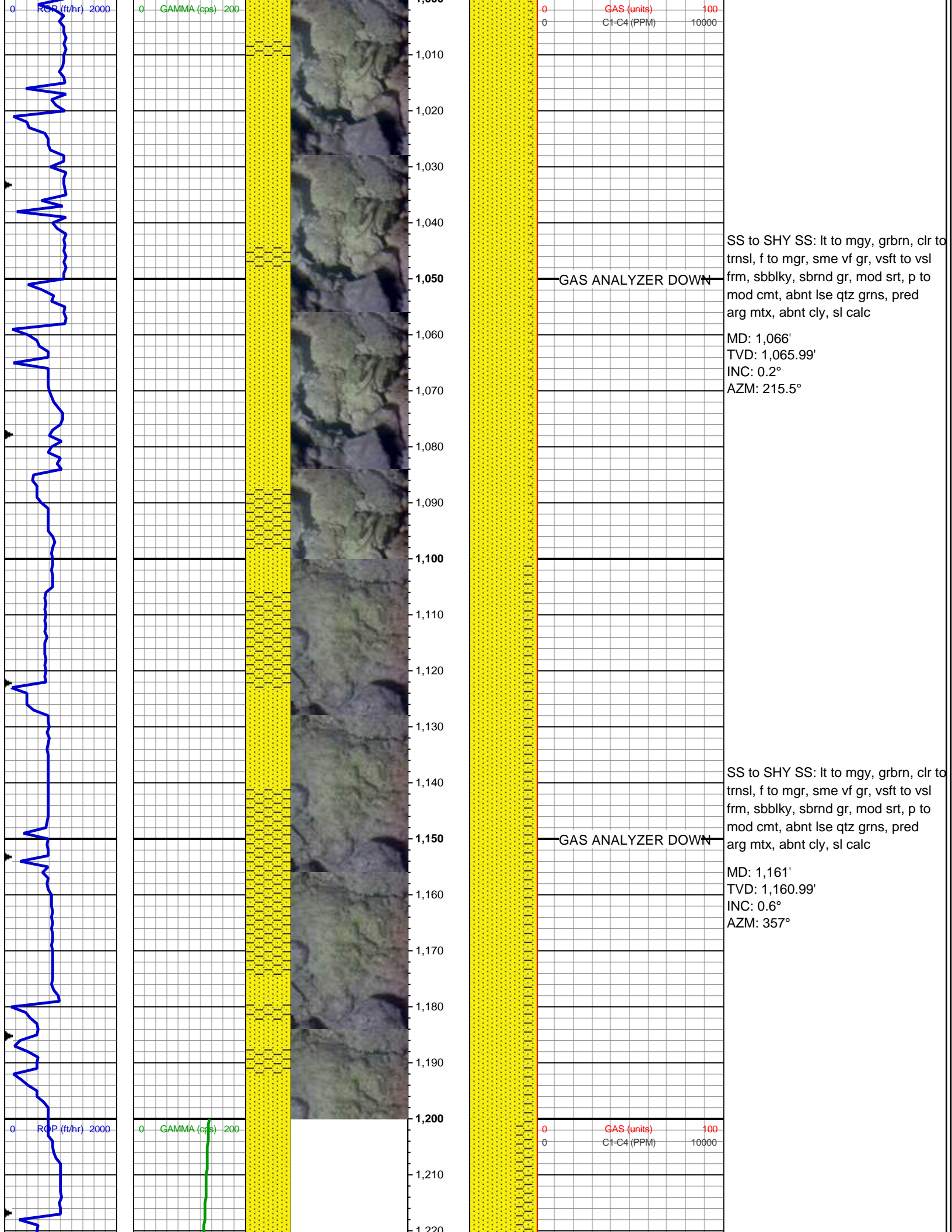
Geologist

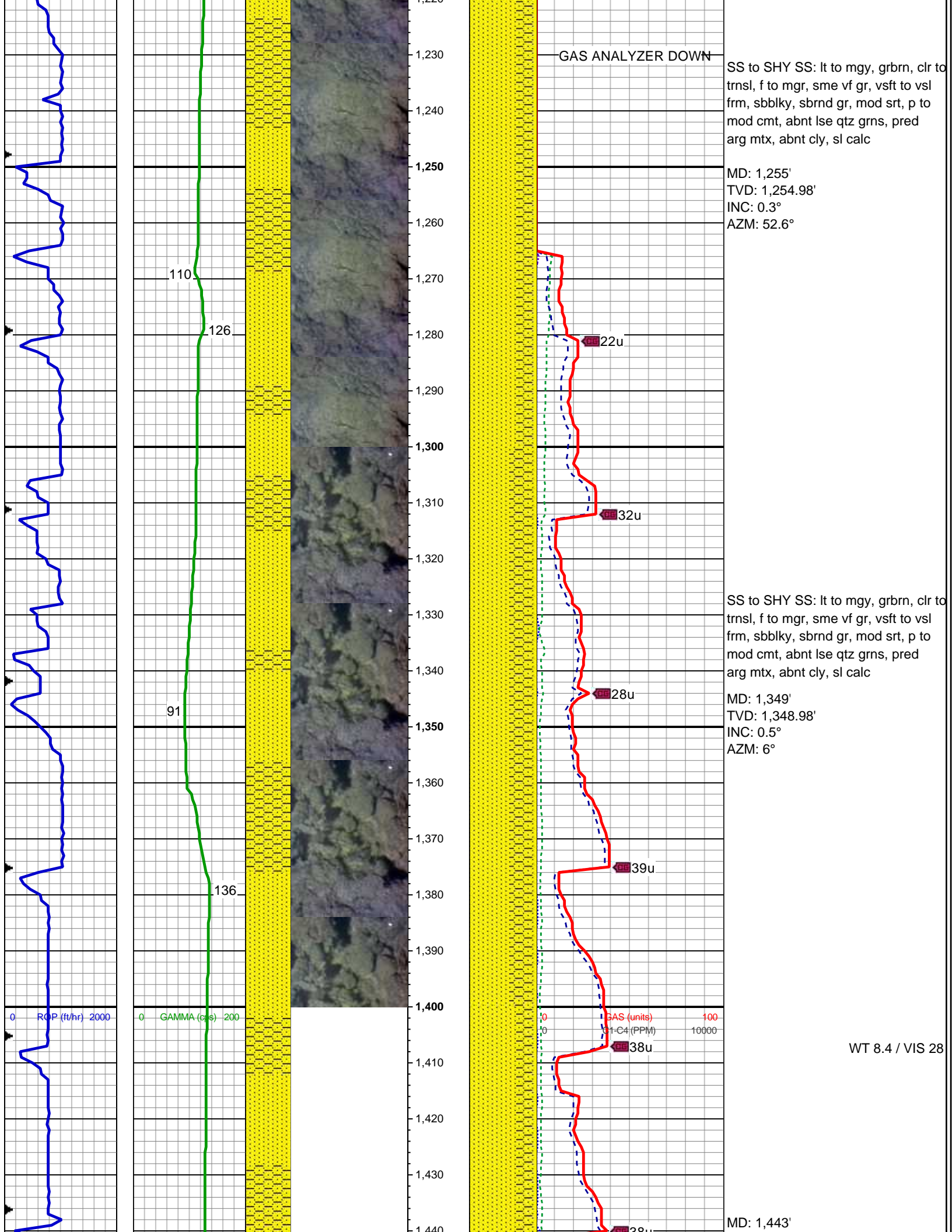
Name JAMES TAYLOR

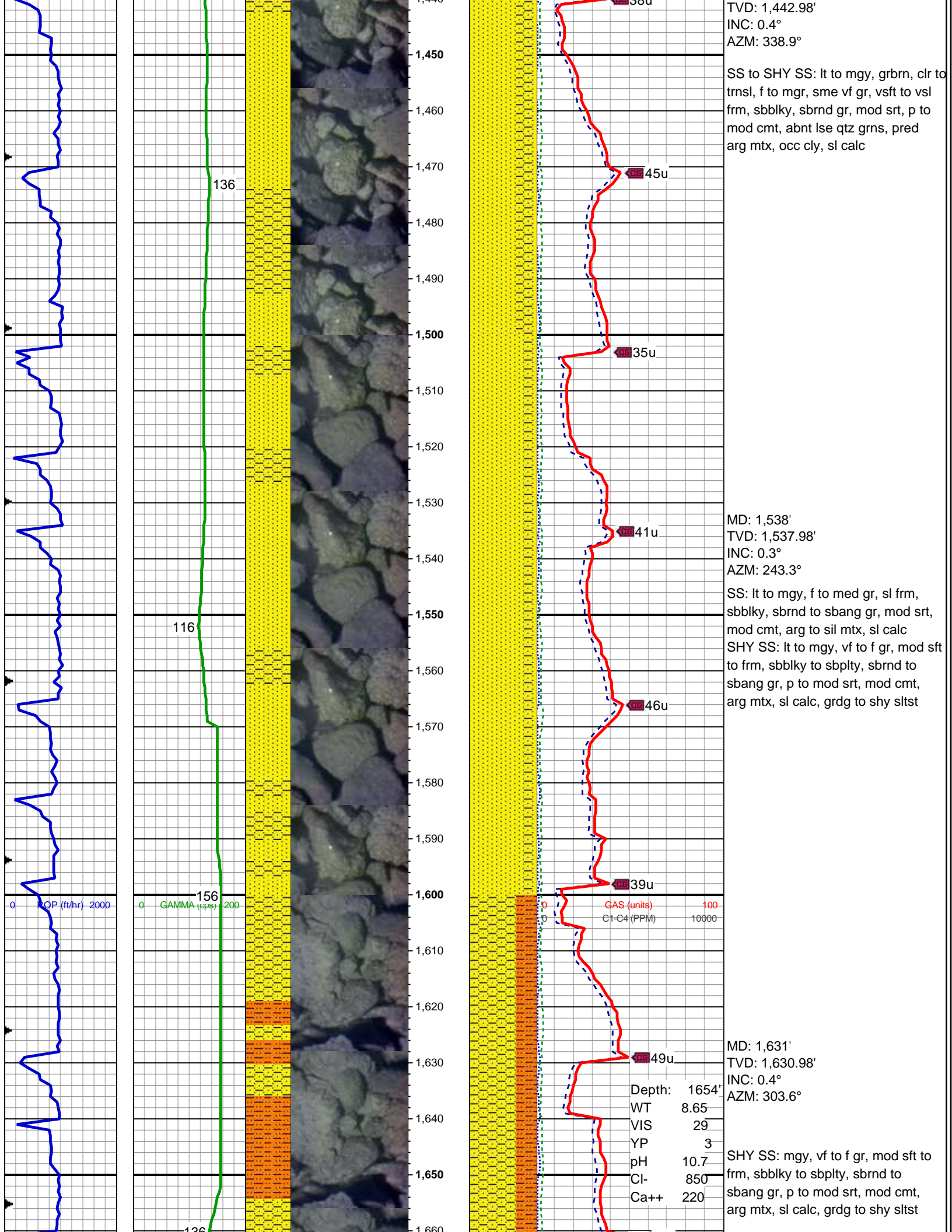
Company NOBLE ENERGY, INC.

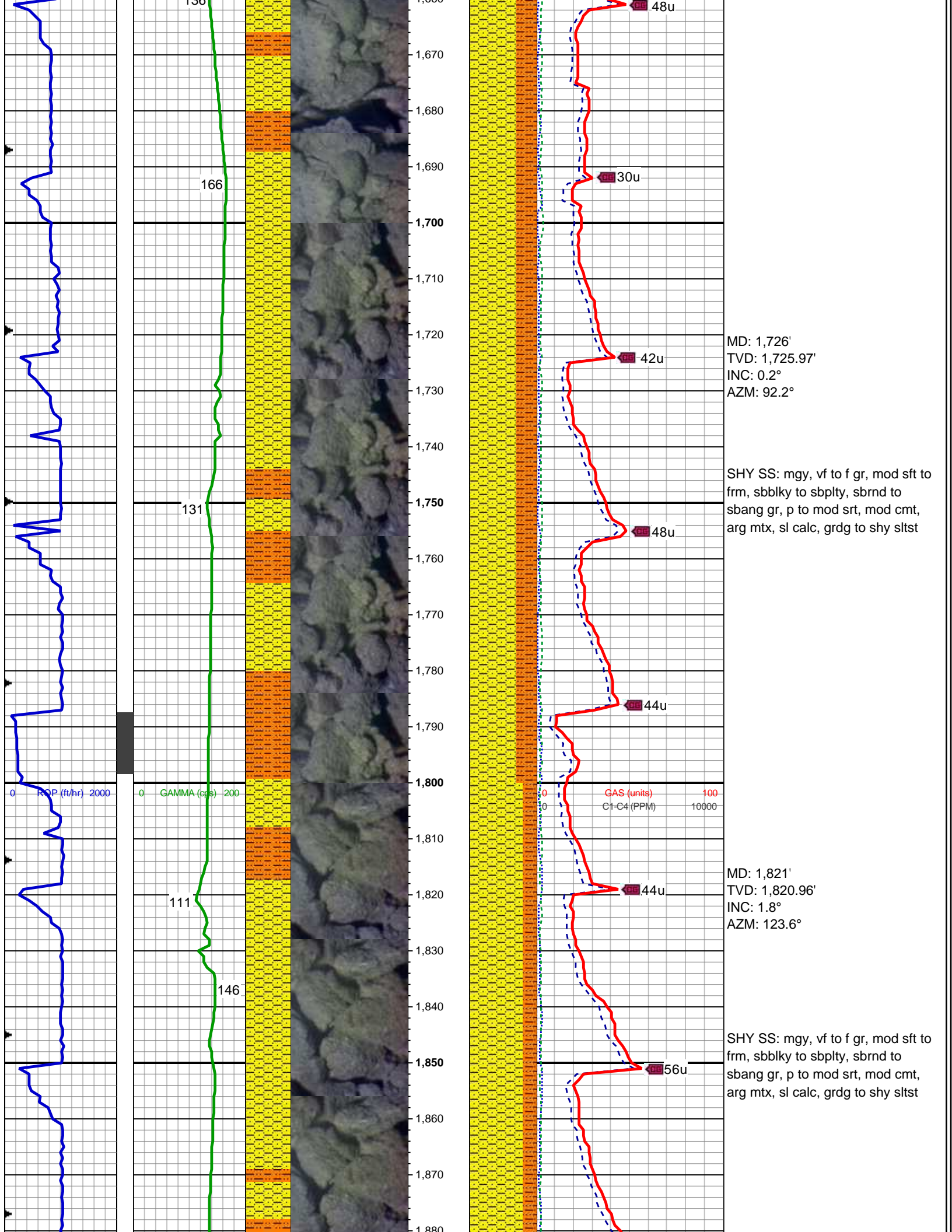
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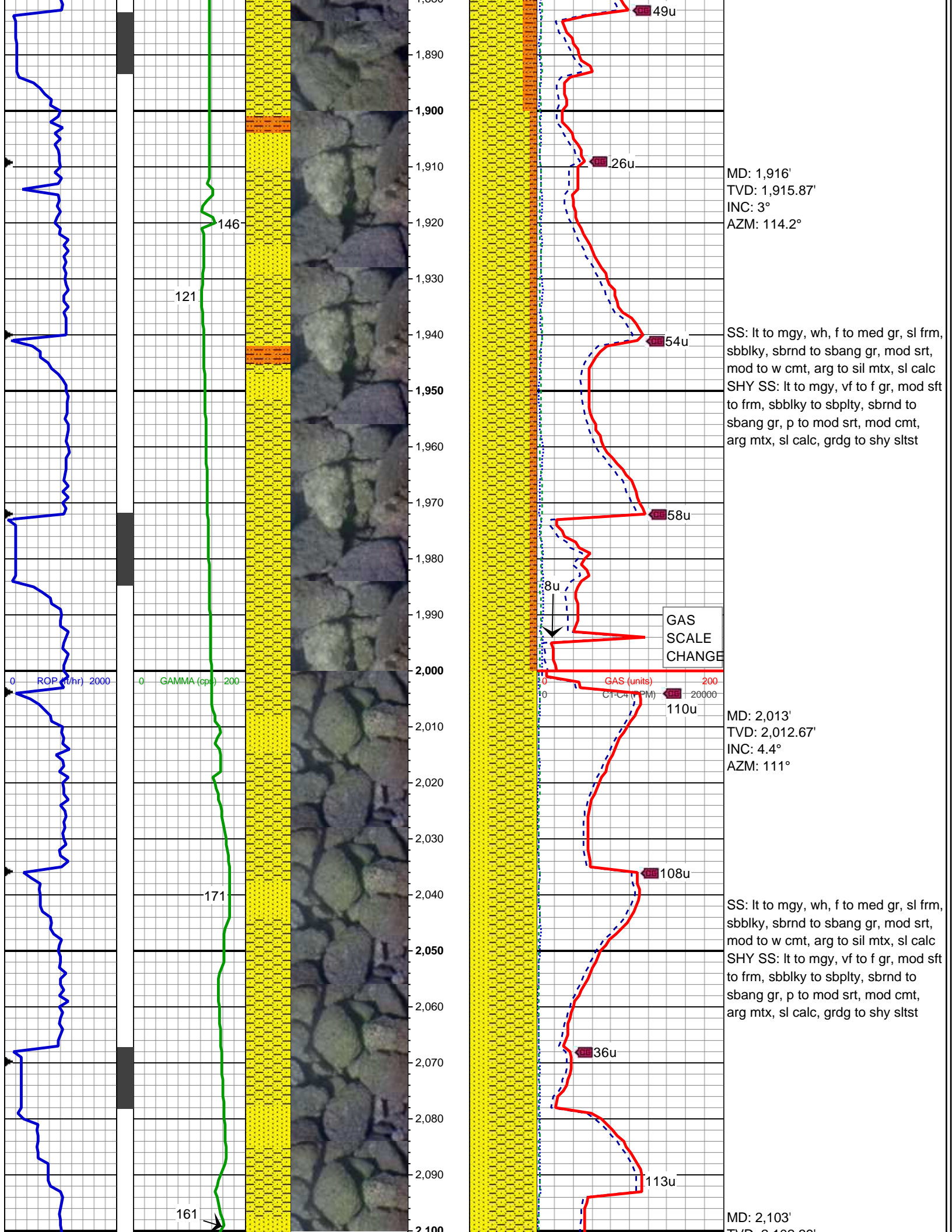


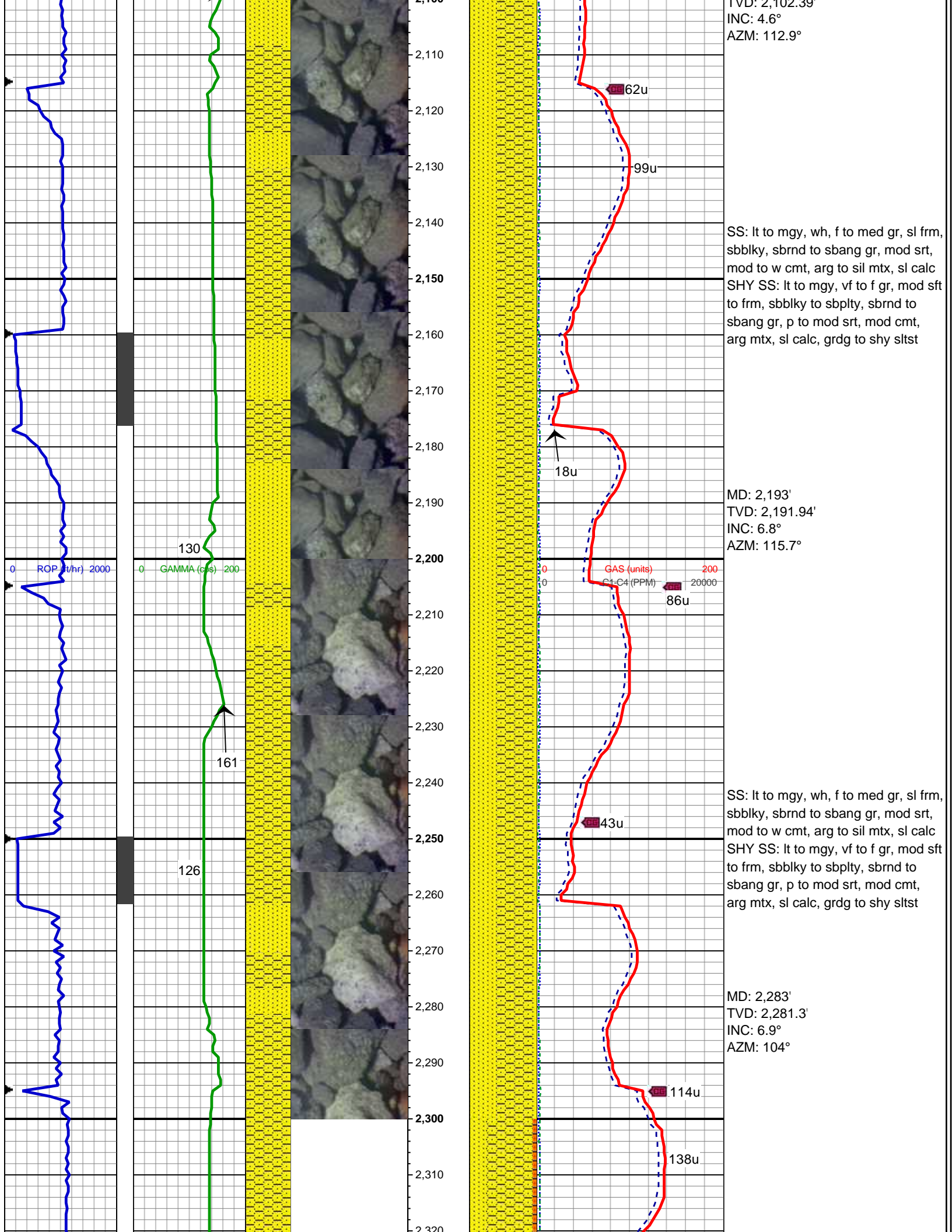


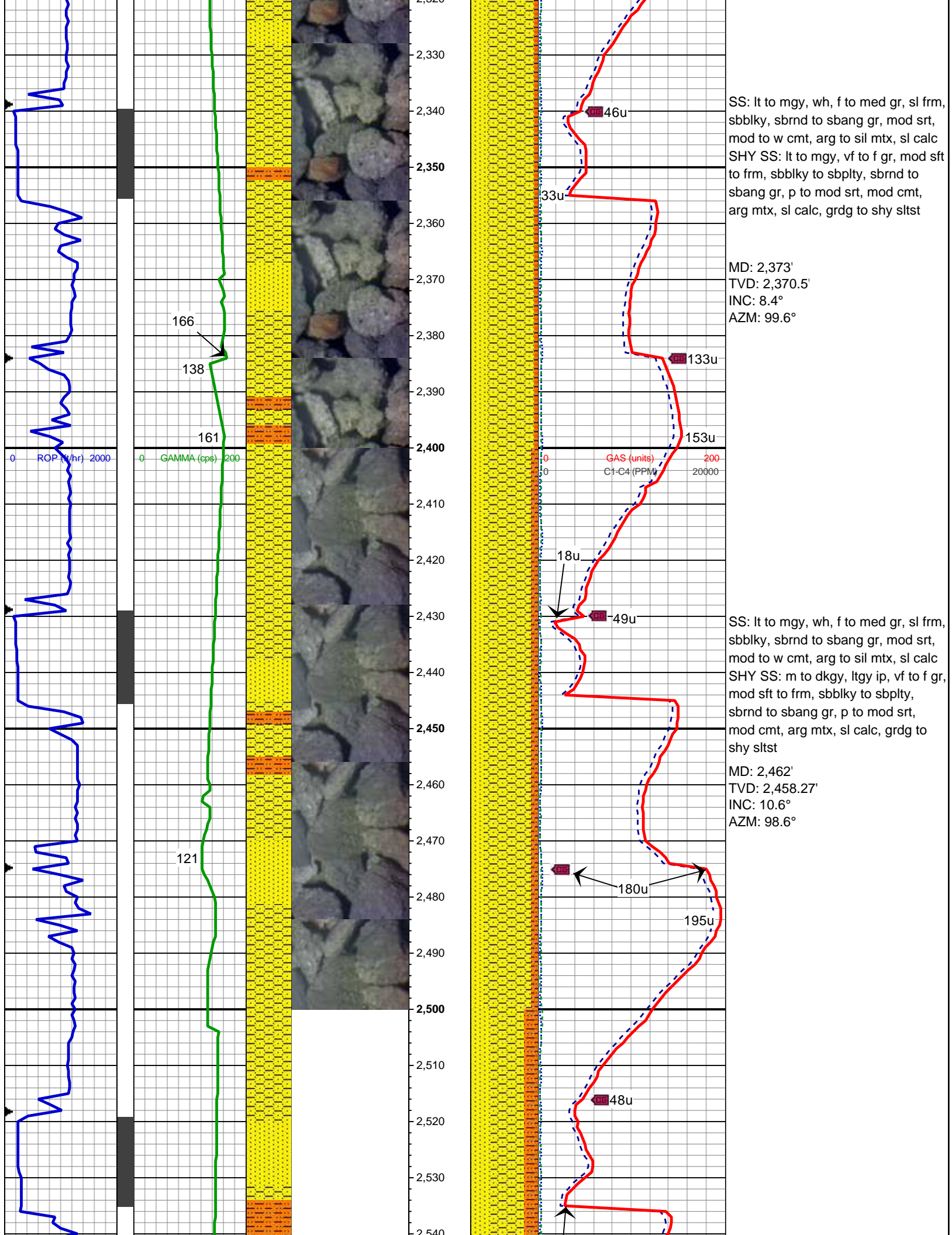


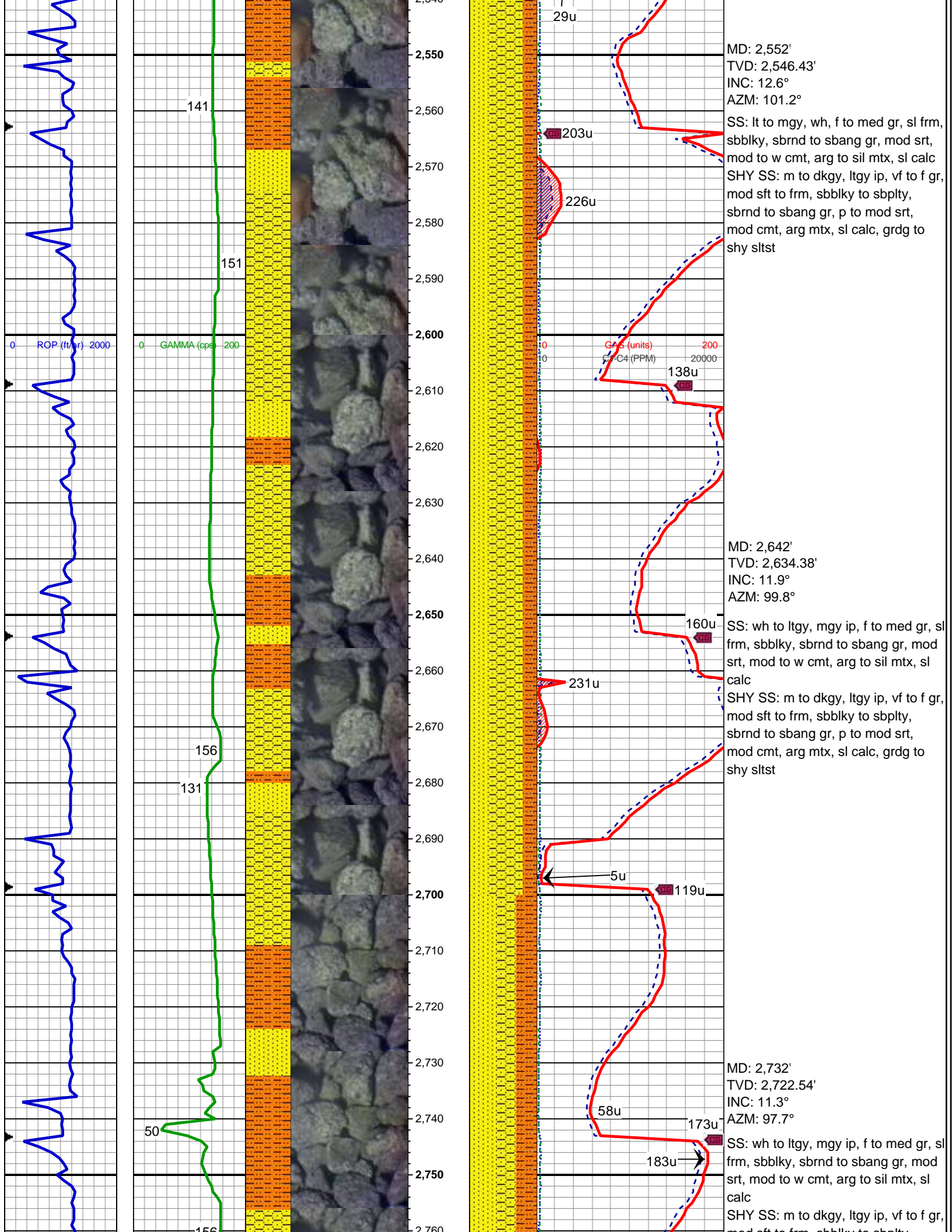


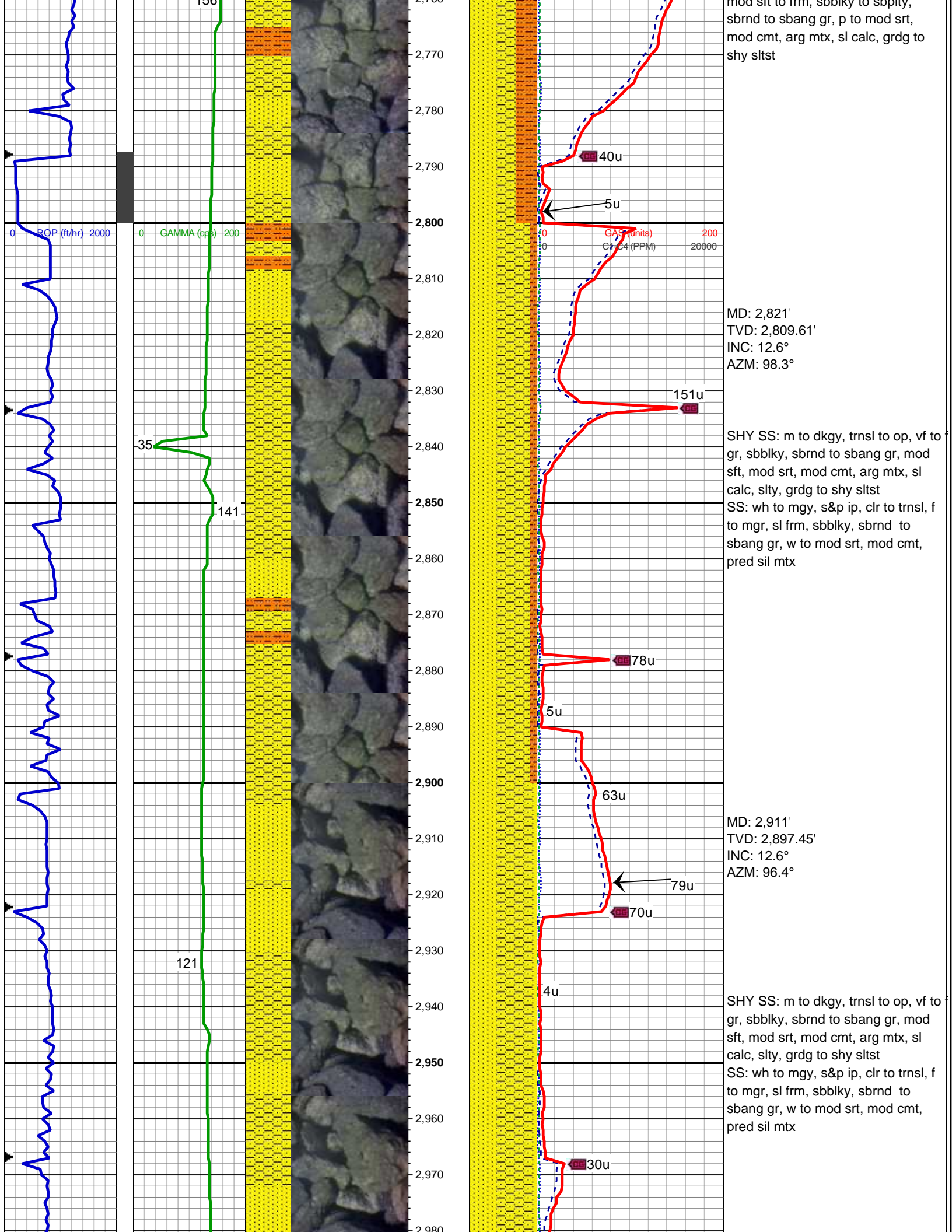


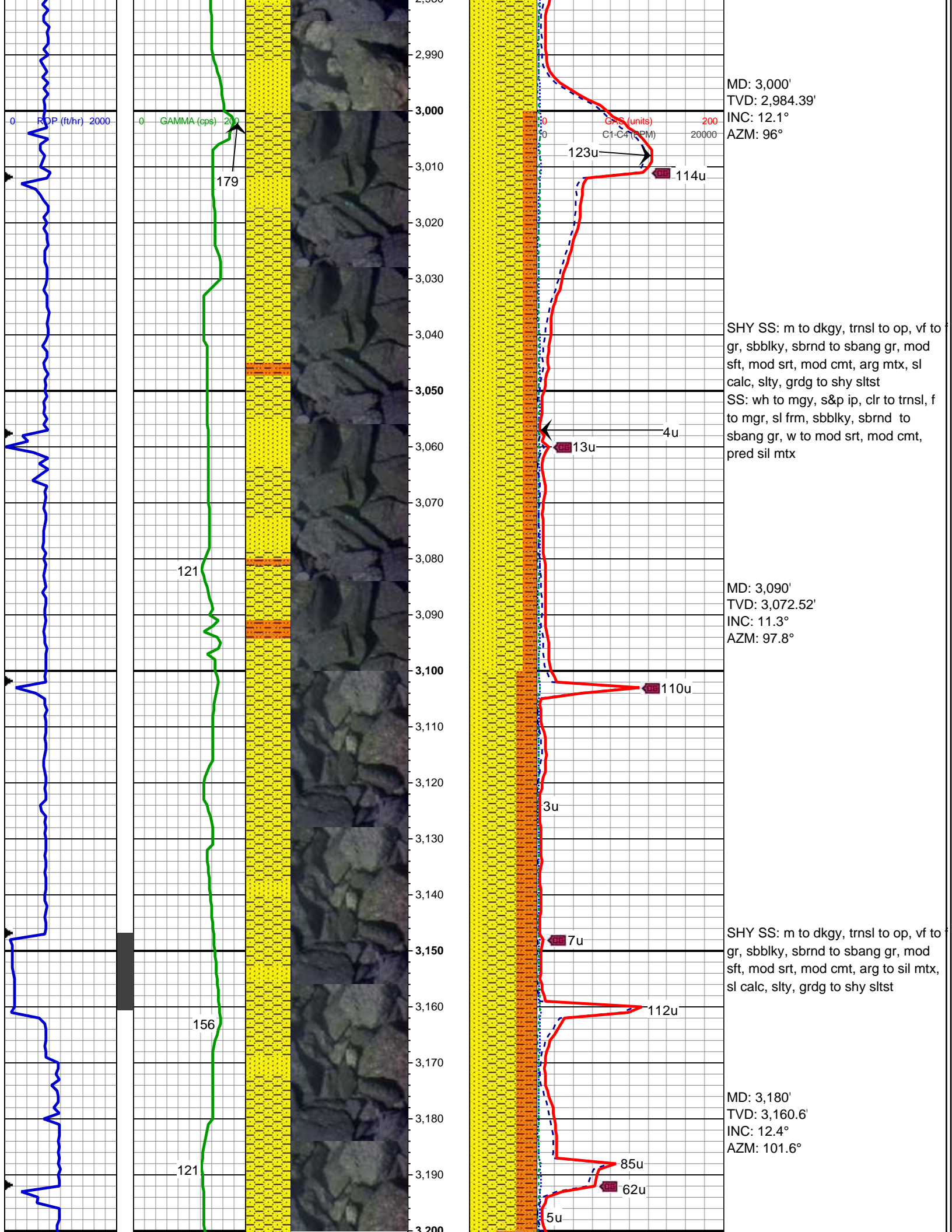


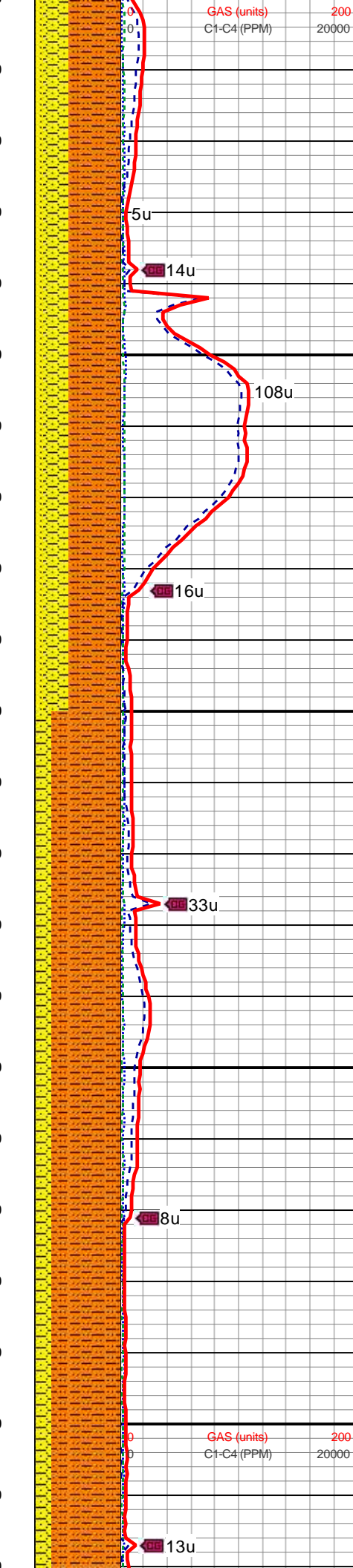
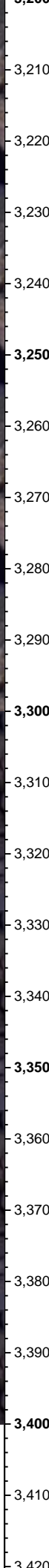
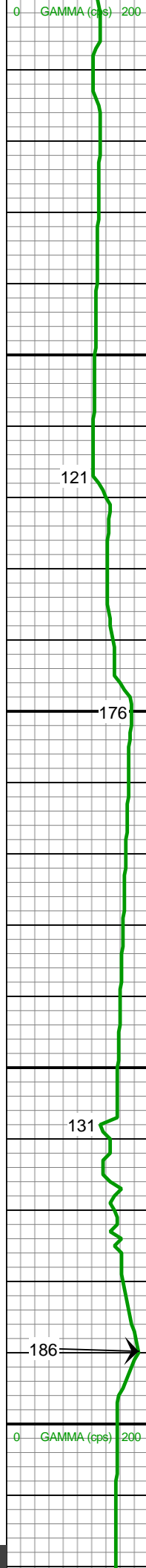
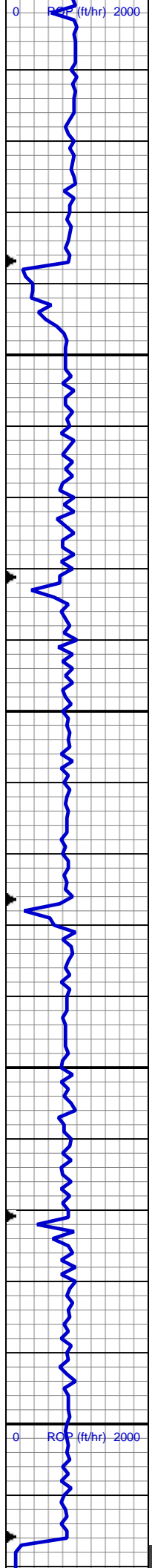












SHY SS: m to dkgy, trnsl to op, vf to gr, sbblky, sbrnd to sbang gr, mod sft, mod srt, mod cmt, arg to sil mtx, sl calc, slty, grdg to shy sltst

SHY SLTST: m to dkgy, sft to sl frm, sbblky to sbplty, sl calc, rthy lstr, sdy, gt tex, grdg to shy ss

MD: 3,270'

TVD: 3,248.58'

INC: 11.9°

AZM: 99.6°

SHY SS: m to dkgy, trnsl to op, vf to gr, sbblky, sbrnd to sbang gr, mod sft, mod srt, mod cmt, arg to sil mtx, sl calc, slty, grdg to shy sltst

SHY SLTST: m to dkgy, sft to sl frm, sbblky to sbplty, sl calc, rthy lstr, sdy, gt tex, grdg to shy ss

MD: 3,360'

TVD: 3,336.92'

INC: 10.1°

AZM: 99.4°

121

176

131

186

5u

14u

108u

16u

33u

8u

13u

