

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** ROHN STATE LD03-62-1HN

**Location** SESE SEC 4 T9N R58W

**State** COLORADO

**County** WELD

**Country** USA

**Rig Number** H&P 273

**API Number** 05-123-37452

**Field** WILDCAT

**Region** DJ BASIN

**Drilling Completed** 9/23/2014

**Spud Date** 9/22/2014

**Surface Coordinates** 699' FSL; 330' FEL

**Bottom Hole Coordinates** 330' FFSLL; 660' FFELL

**Ground Elevation** 4706'

**K.B. Elevation** 4730'

**Logged Interval** 1221' To 4980'

**Total Depth** 4980'

**Formation** NIOBRARA

**Type of Drilling Fluid** LSND

## Other Symbols

### Oil Show

- DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

### Porosity

- E EARTHY
- F FENESTRAL
- F FRACTURE
- X INTERCRYSTALLINE
- Q INTEROOLITIC

- MOLDIC
- ORGANIC
- PINPOINT
- VUGGY

### Engineering

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

- FAULT
- FORMATION TOP
- GAS SHOW
- MINDEPTH MN DEPTH
- NORMAL FAULT
- OIL SHOW
- OVERTURNED STRATA
- REVERSE FAULT
- SIDEWALL CORE (LEFT)
- SIDEWALL CORE (RIGHT)
- SLIDE
- SURVEY
- TRIP GAS

### Rounding

- ANGULAR
- ROUNDED
- SUBANG
- SUBRND

### Textures

- BOUNDSTONE
- CHALKY
- CRYPTOXLN

- WIRELINE TESTED - LEFT
- WIRELINE TESTED - RT
- E EARTHY
- FINELYXLN

- GRAINSTONE
- L LITHOGRAPHIC
- MX MICROXLN
- MS MUDSTONE
- PS PACKSTONE
- WS WACKESTONE

### Sorting

- M MODERATE
- P POOR
- W WELL

## Zone Color Coding

- Oil
- Condensate
- Gas
- Note
- Core
- Pressure
- Error
- Water
- Seal

## Accessories

### Fossils

- ALGAE
- AMPHIPORA
- BELEMNITE
- BIOCLASTIC
- BRACHIOPOD

- FOSSIL
- GASTROPOD
- INOCERAMUS
- OOOLITE
- OSTRACOD
- PELECYPOD
- PELLET

- ANHYDRITIC
- ARGILLACEOUS
- ARGILLITE GRAIN
- BENTONITE
- BITUMENOUS SUBSTANCE
- BRECCIA FRAGMENTS
- CAL CAREOUS

- FERRUGINOUS
- GLAUCONITE
- GYPSIFEROUS
- HEAVY MINERAL
- KAOLIN
- MARLSTONE
- MINERAL CRYSTALS

- TUFFACEOUS

### Stringer

- ANHYDRITE STRINGER
- BENTONITE STRINGER
- COAL STRINGER
- DOLOMITE STRINGER

↑ BRYOZOA  
🐙 CEPHALOPOD  
🪸 CORAL  
🪼 CRINOID  
🐚 ECHINOID  
🐟 FISH  
🔍 FORAMINIFERA

🔍 PISOLITE  
🌿 PLANT REMAINS  
🍄 PLANT SPORES  
🐚 SCAPHOPOD  
🪸 STROMATOPOROID

## Minerals

■ CARBONACEOUS FLAKES  
▲ CHTDK  
▲ CHTLT  
— COAL - THIN BEDS  
🔍 DOLOMITIC  
+ FELDSPAR  
● FERRUGINOUS PELLET

🔍 NODULES  
● PHOSPHATE PELLETS  
🔍 PYRITE  
🔍 SALT CAST  
· SANDY  
🔍 SILICEOUS  
+ SILTY

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

## Rock Types

🔍 UNKNOWN  
🔍 CHALK  
🔍 MARLSTONE  
🔍 SANDSTONE  
🔍 SHALY SANDSTONE  
🔍 SILTY SHALE  
🔍 ANHYDRITE  
🔍 BENTONITE  
🔍 BRECCIA

🔍 CEMENT  
🔍 CHERT  
🔍 CLAY CHOKE SAND  
🔍 CLAYSTONE  
🔍 COAL  
🔍 CONGLOMERATE  
🔍 DOLOMITE  
🔍 GRANITE  
🔍 GYPSUM

🔍 IGNEOUS  
🔍 LIMESTONE  
🔍 SIDERITE or LIMONITE  
🔍 METAMORPHIC  
X X X X X X NO SAMPLE  
🔍 SALT  
🔍 SALT- PEPPER SAND  
🔍 SHALE  
🔍 SHALE COLORED

🔍 SHALE GRAY  
🔍 SHALY SILTSTONE  
🔍 SILTSTONE  
🔍 TILL  
🔍 TUFF  
🔍 WELDED TUFF

## Operator

**Company** NOBLE ENERGY INC.

**Address** 1625 Broadway Suite 2200  
Denver, CO 80202

## Other

**Wellsite Geologist #1** Laura Kellogg

**Wellsite Geologist #2** Garrett Luallen

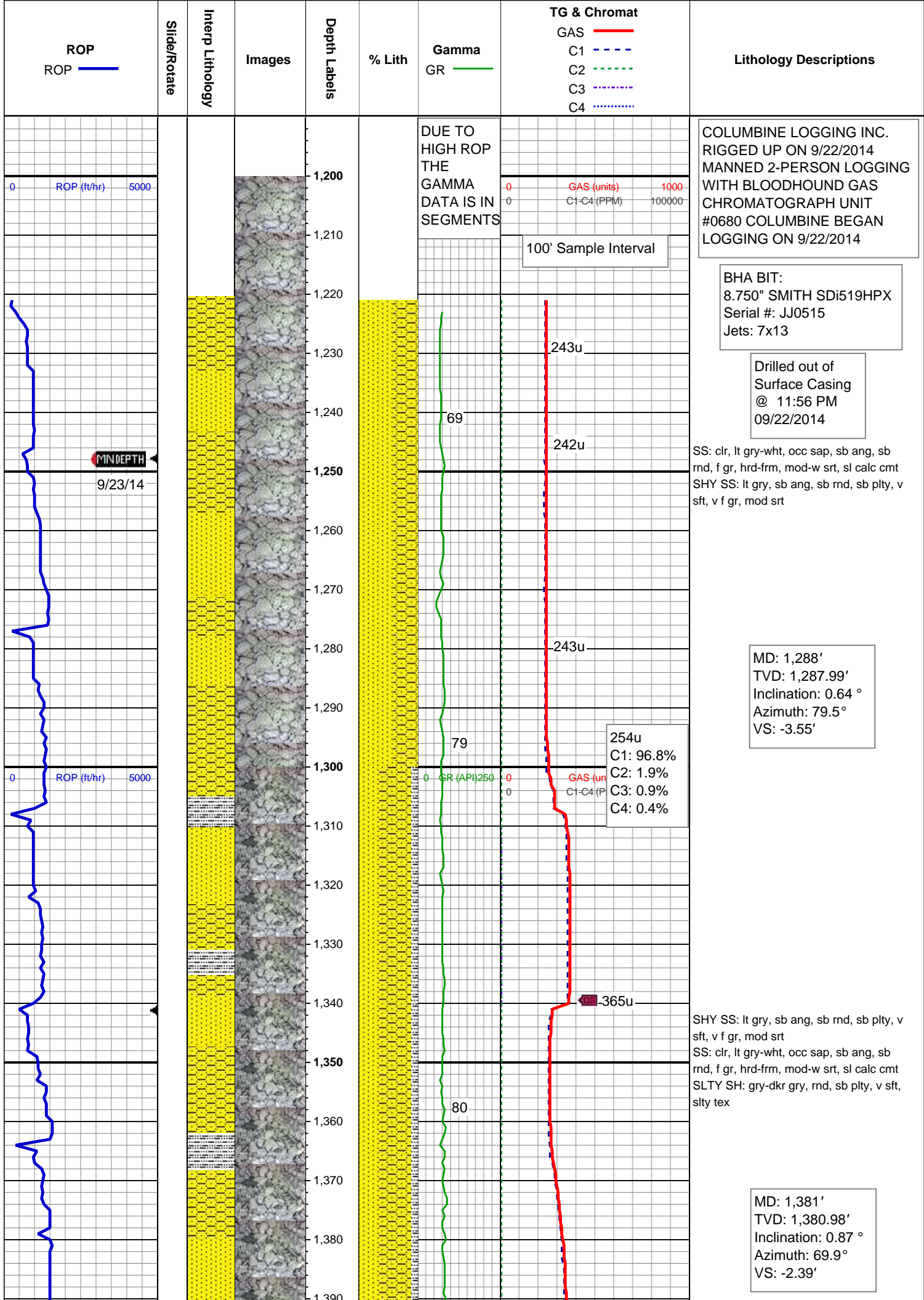
**Wellsite Geological Services Provided By** Columbine Logging Inc.

## Geologist

**Name** RENEE CLACKER

**Company** NOBLE ENERGY INC.

**Address** 1625 Broadway Suite 2200  
Denver, CO 80202



COLUMBINE LOGGING INC.  
RIGGED UP ON 9/22/2014  
MANNED 2-PERSON LOGGING  
WITH BLOODHOUND GAS  
CHROMATOGRAPH UNIT  
#0680 COLUMBINE BEGAN  
LOGGING ON 9/22/2014

BHA BIT:  
8.750" SMITH SDi519HPX  
Serial #: JJ0515  
Jets: 7x13

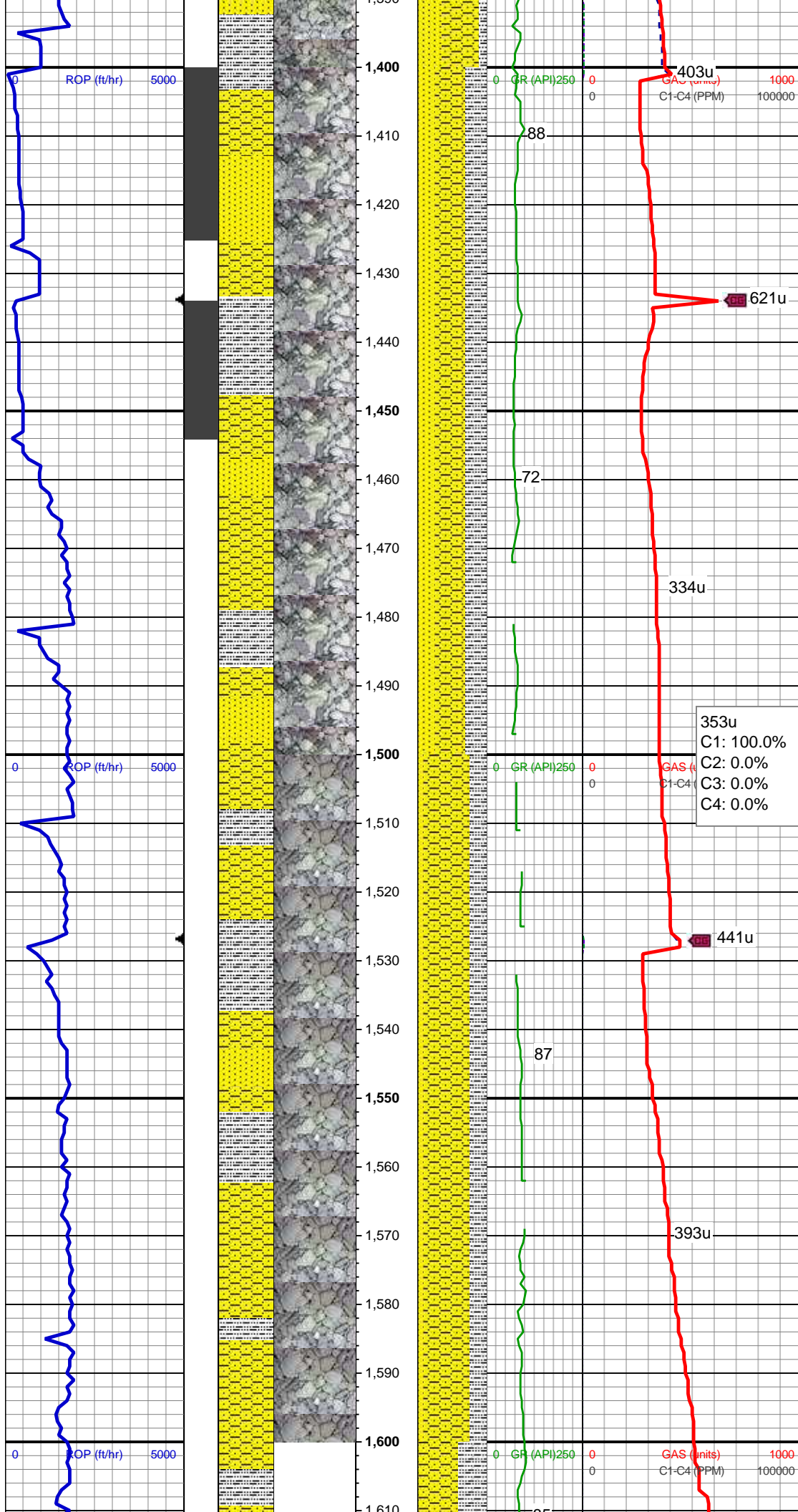
Drilled out of  
Surface Casing  
@ 11:56 PM  
09/22/2014

SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt  
SHY SS: lt gry, sb ang, sb rnd, sb plty, v  
sft, v f gr, mod srt

MD: 1,288'  
TVD: 1,287.99'  
Inclination: 0.64 °  
Azimuth: 79.5 °  
VS: -3.55'

SHY SS: lt gry, sb ang, sb rnd, sb plty, v  
sft, v f gr, mod srt  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sly tex

MD: 1,381'  
TVD: 1,380.98'  
Inclination: 0.87 °  
Azimuth: 69.9 °  
VS: -2.39'



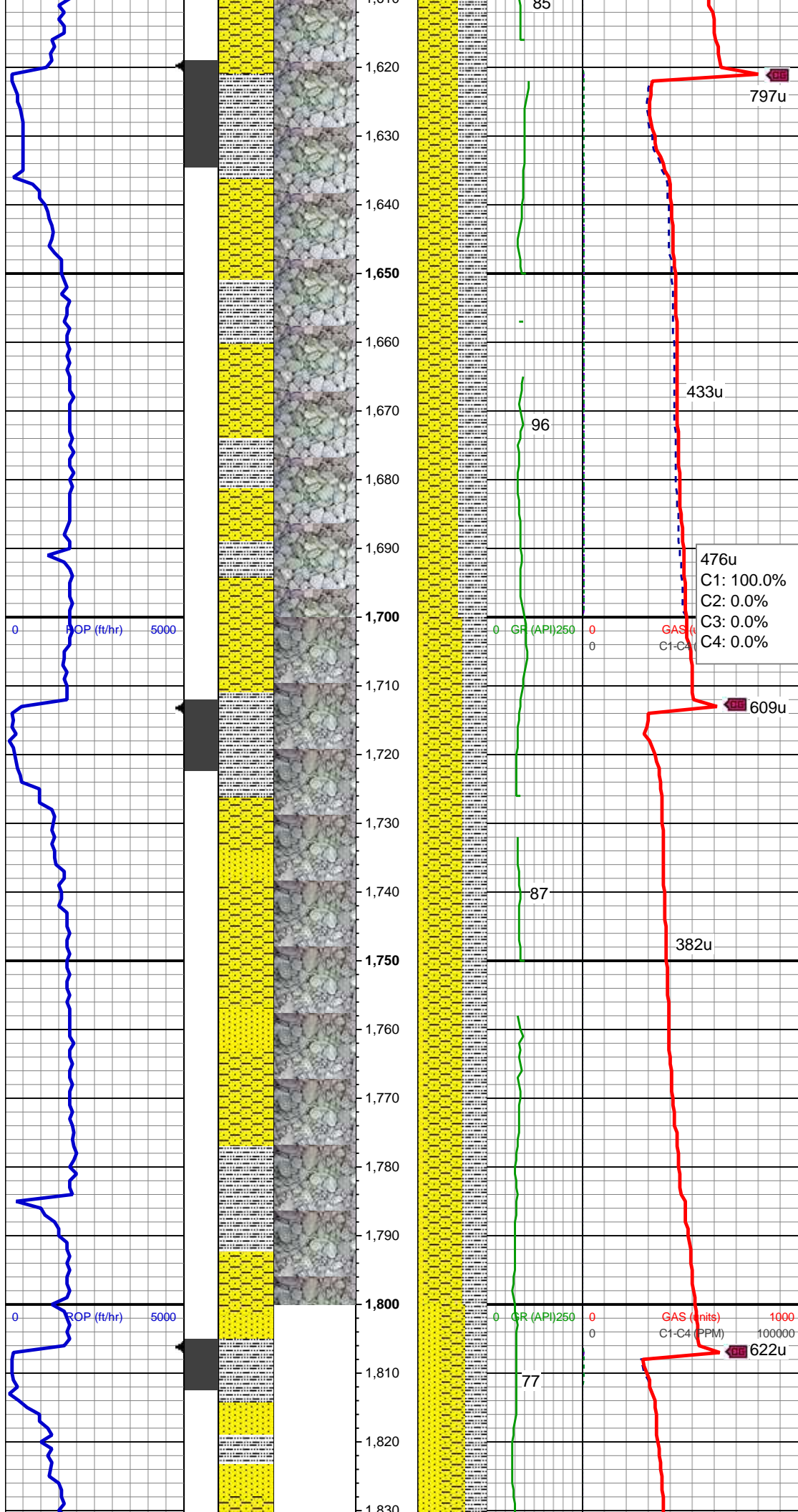
SHY SS: lt gry, sb ang, sb rnd, sb plty, v  
sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sfty tex  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd frm, mod-w srt, sl calc cmt,  
tr pyr

MD: 1,473'  
TVD: 1,472.78'  
Inclination: 6.58 °  
Azimuth: 180.73 °  
VS: -1.56'

353u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

SHY SS: lt gry, sb ang, sb rnd, sb plty, v  
sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sfty tex  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd frm, mod-w srt, sl calc cmt

MD: 1,566'  
TVD: 1,565.17'  
Inclination: 6.61 °  
Azimuth: 182.91 °  
VS: -1.37'



SHY SS: lt gry, sb ang, sb rnd, sb plty, v  
sft, v f gr, mod srt, tr pyr  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sly tex

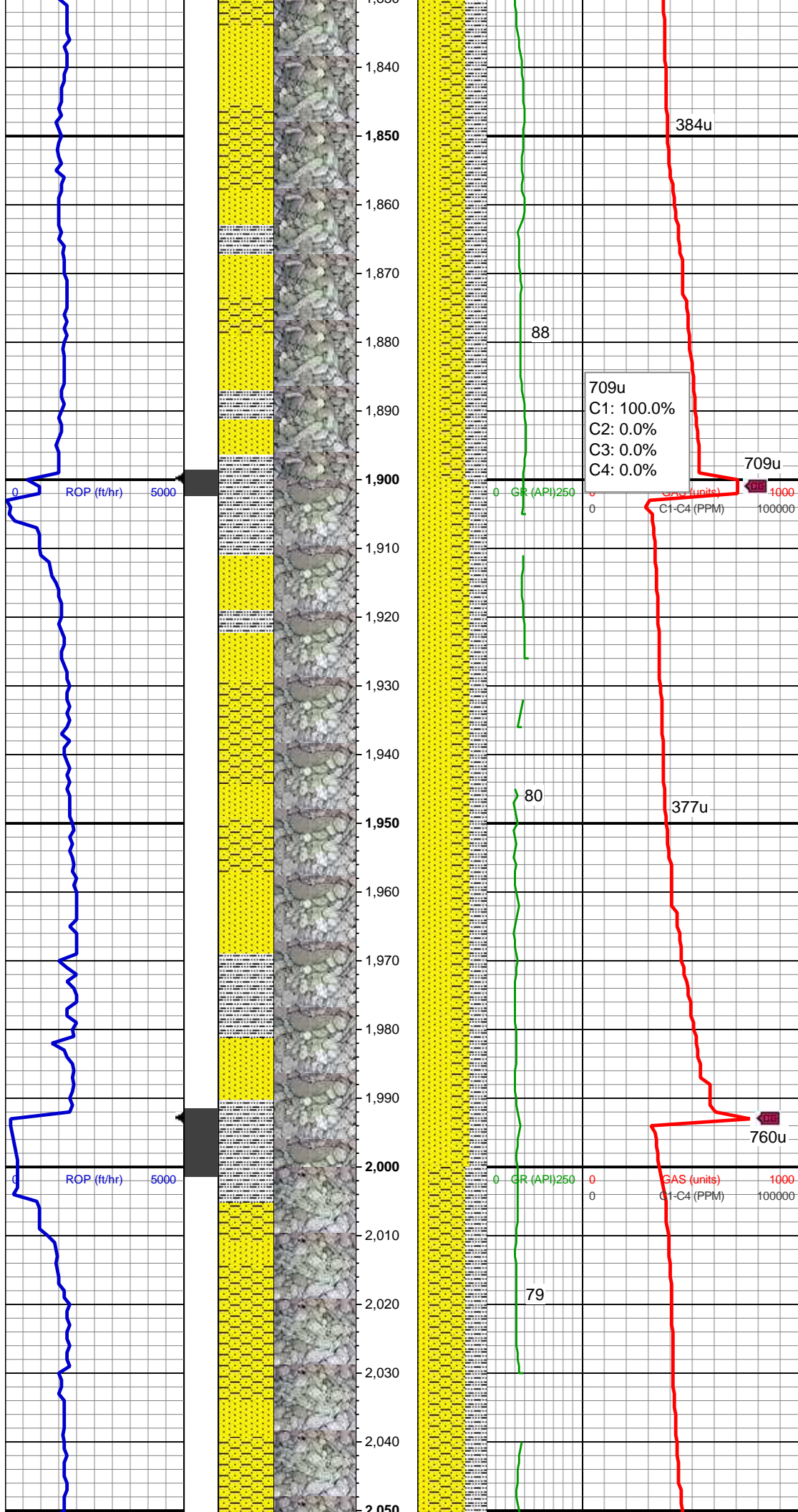
MD: 1,659'  
TVD: 1,657.55'  
Inclination: 8.43 °  
Azimuth: 168.37 °  
VS: -1.59'

476u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

SHY SS: lt gry, sb ang, sb rnd, sb plty, v  
sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sly tex  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd frm, mod-w srt, sl calc cmt

MD: 1,752'  
TVD: 1,749.92'  
Inclination: 9.28 °  
Azimuth: 158.21 °  
VS: -2.22'

MD: 1,845'  
TVD: 1,842.28'



Inclination: 9.58 °  
Azimuth: 150.21 °  
VS: -3.26'

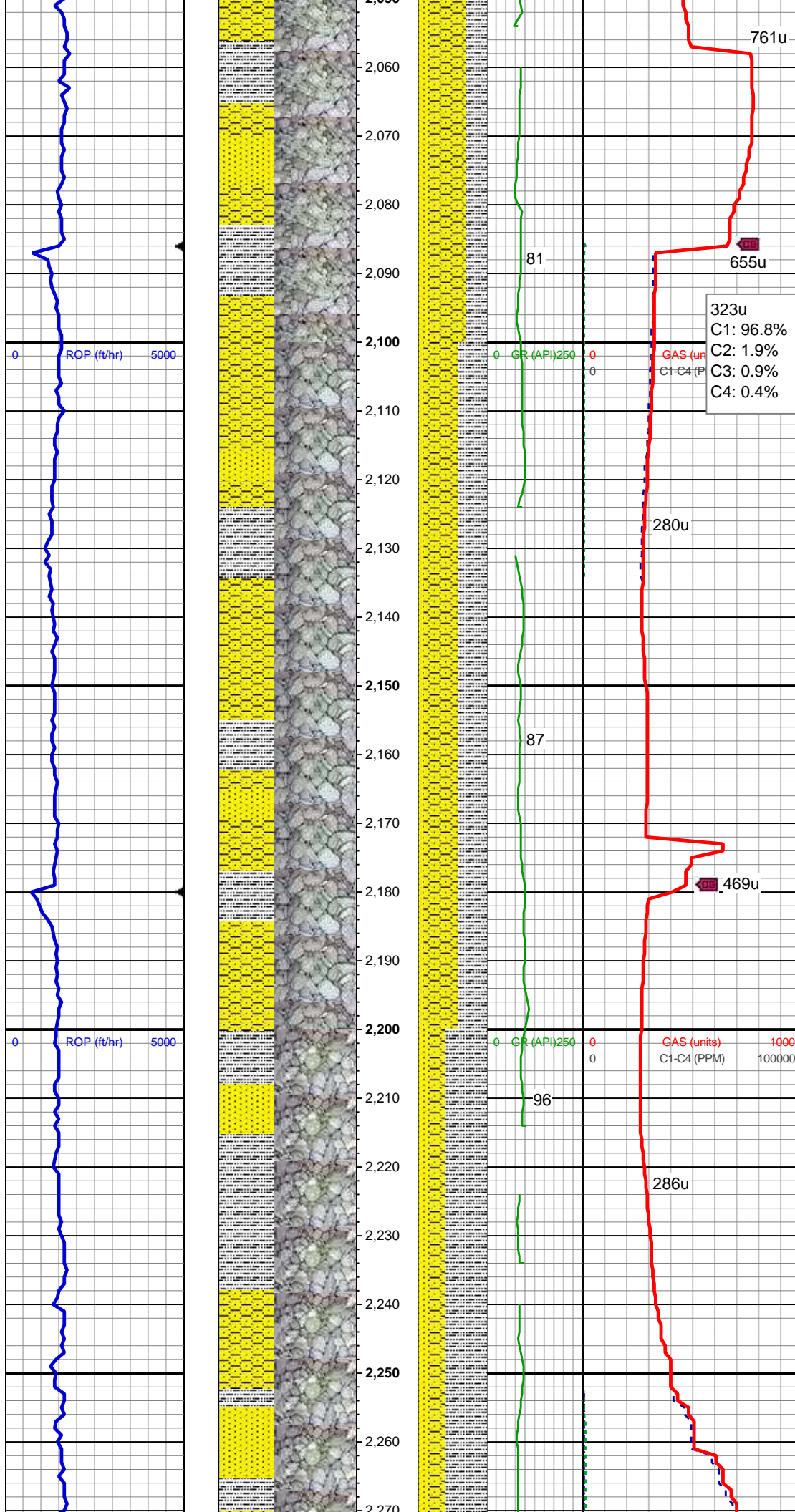
SHY SS: lt gry, sb ang, sb rnd, sb plty, v  
sft, v f gr, mod srt  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd frm, mod-w srt, sl calc cmt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sly tex, occ pyr

MD: 1,938'  
TVD: 1,934.64'  
Inclination: 9.14 °  
Azimuth: 150 °  
VS: -4.57'

SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd frm, mod-w srt, sl calc cmt  
SHY SS: lt gry, sb ang, sb rnd, sb plty, v  
sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sly tex

MD: 2,030'  
TVD: 2,026'  
Inclination: 7.88 °  
Azimuth: 159.86 °  
VS: -5.89'

SHY SS: lt gry, sb ang, sb rnd, sb plty, v  
sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,



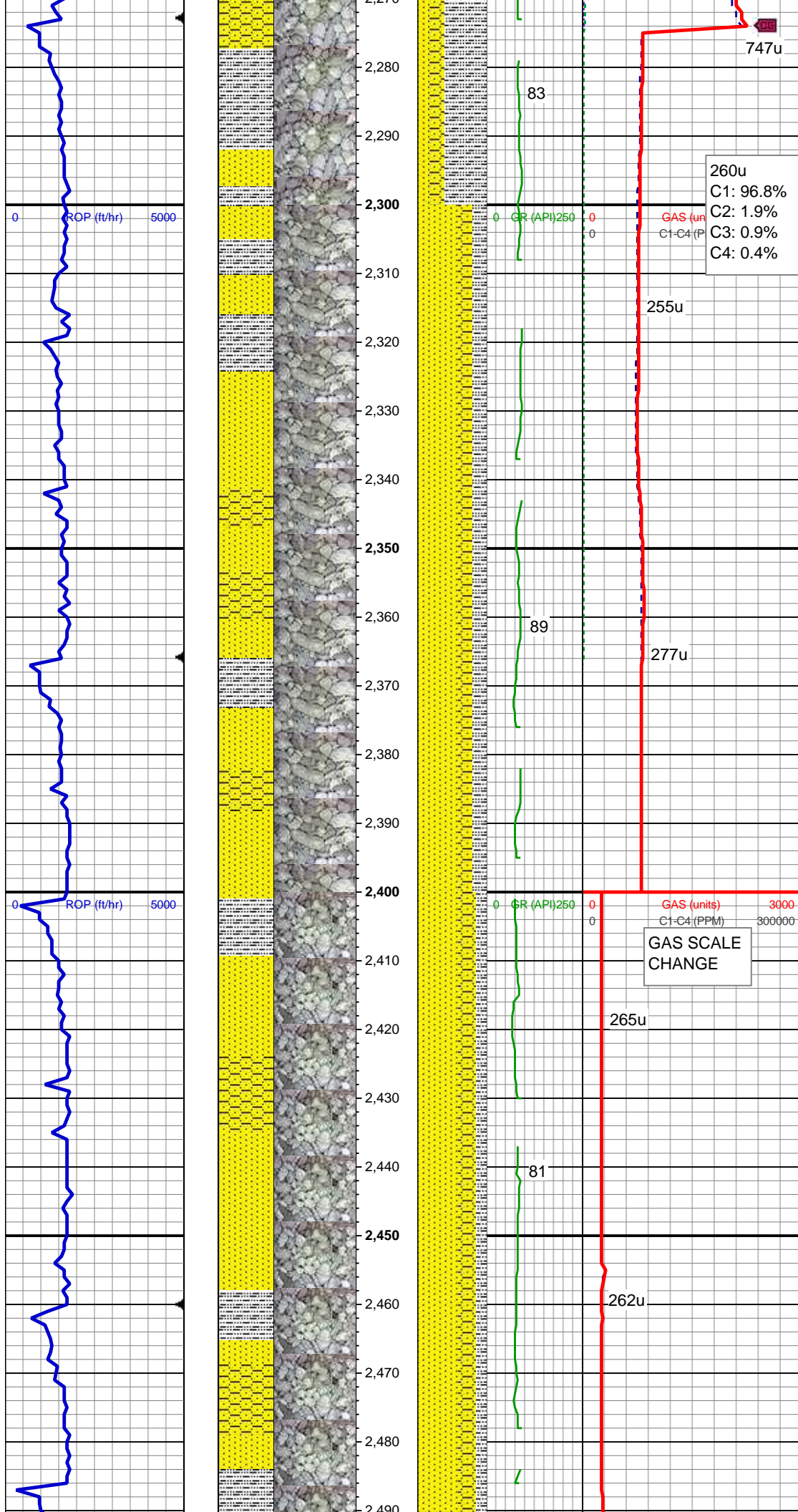
slty tex  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt

323u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

MD: 2,122'  
TVD: 2,114.91'  
Inclination: 7.83 °  
Azimuth: 159.29 °  
VS: 31.97'

SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
slty tex  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt

SLTY SH: gry-dkr gry, occ blk incl, rnd,  
sb plty, v sft, slty tex  
SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt

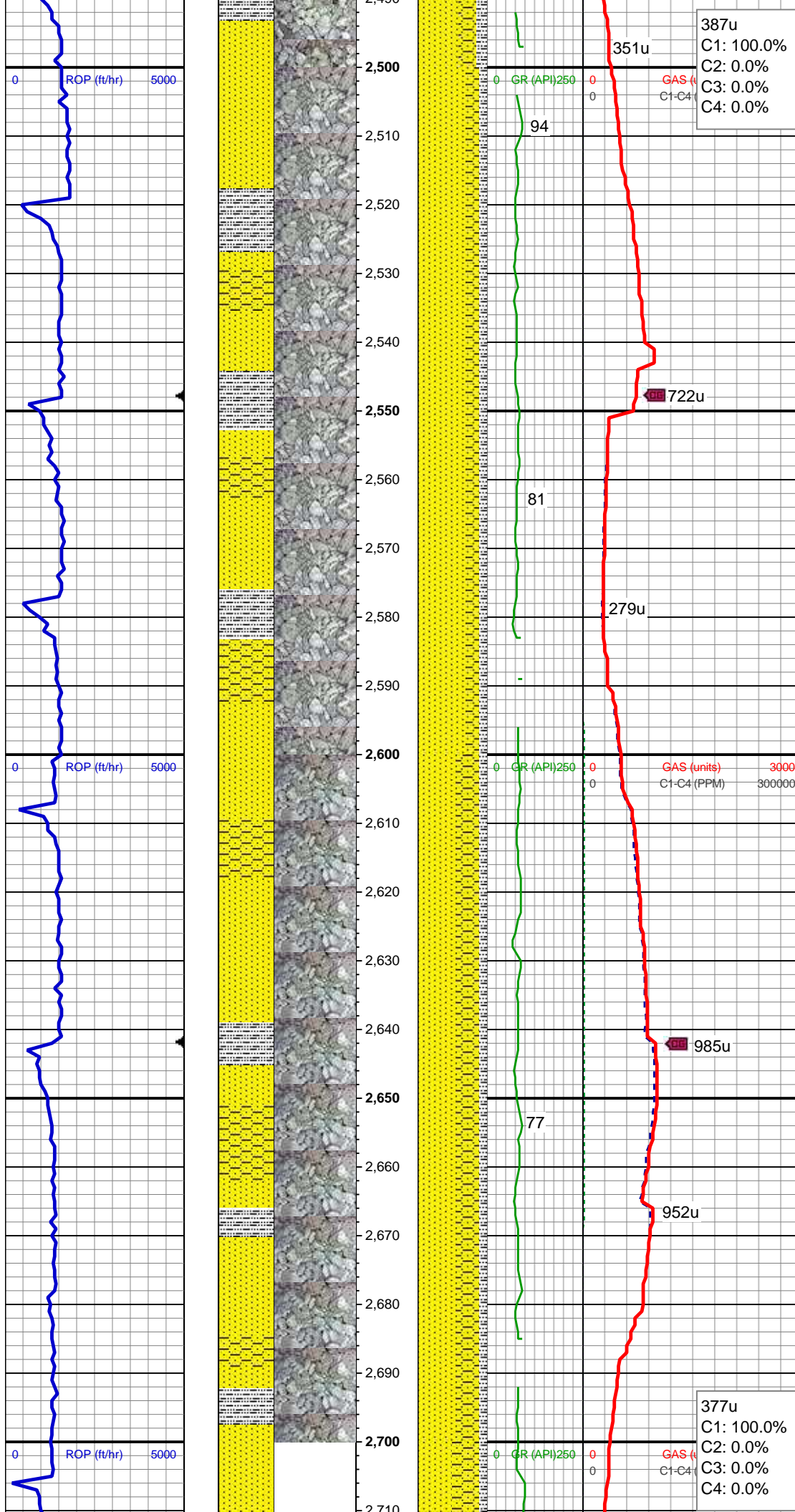


260u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt  
SLTY SH: gry-dkr gry, occ blk incl, rnd,  
sb plty, v sft, slty tex  
SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt

MD: 2,402'  
TVD: 2,392.33'  
Inclination: 7.75 °  
Azimuth: 154.9 °  
VS: 48.42'

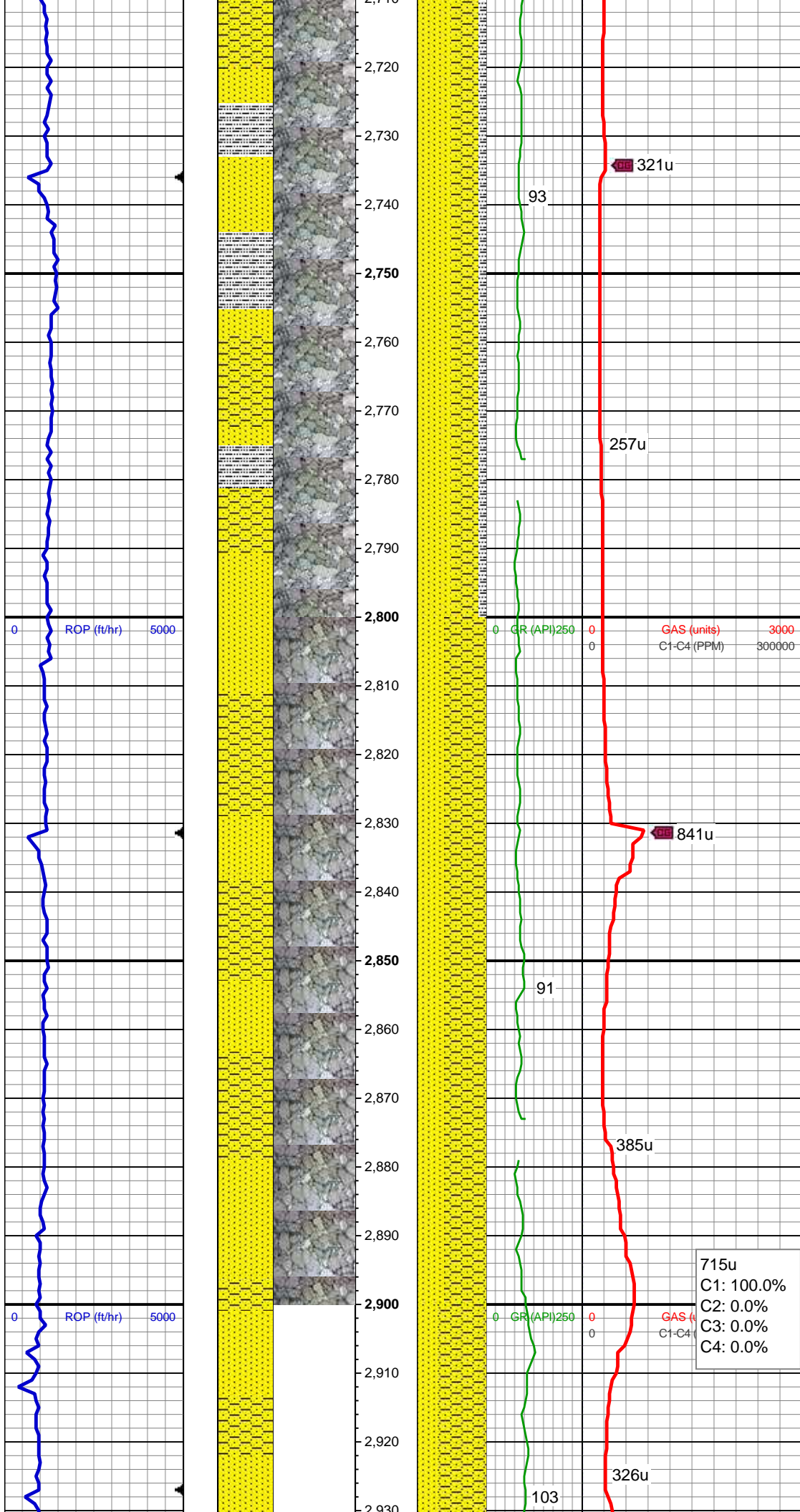
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt  
SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, occ blk incl, rnd,  
sb plty, v sft, slty tex



SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt  
SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, occ blk incl, rnd,  
sb plty, v sft, slty tex

SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt  
SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, occ blk incl, rnd,  
sb plty, v sft, slty tex

MD: 2,679'  
TVD: 2,666.9'  
Inclination: 7.44 °  
Azimuth: 154.43 °  
VS: 65.68'

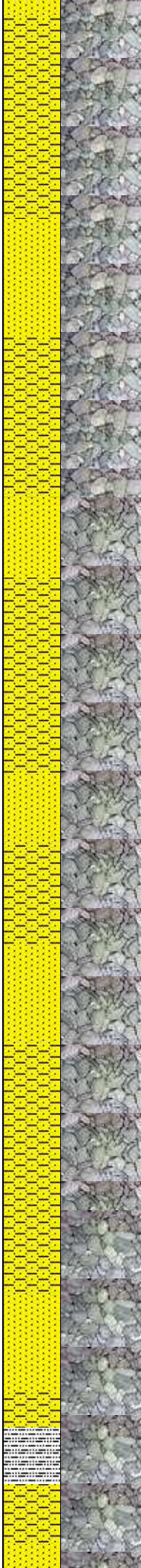
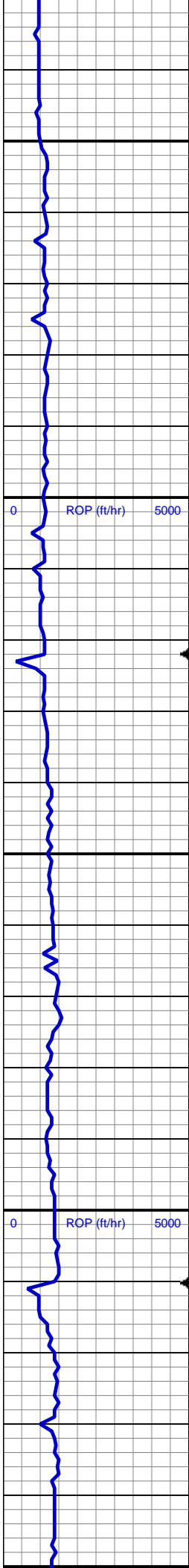


SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt  
SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, occ blk incl, rnd,  
sb plty, v sft, slty tex

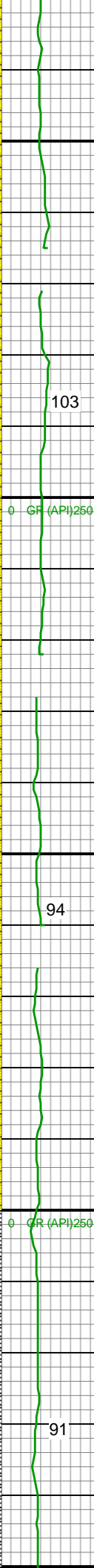
MD: 2,774'  
TVD: 2,761.09'  
Inclination: 7.52 °  
Azimuth: 155 °  
VS: 71.5'

SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt

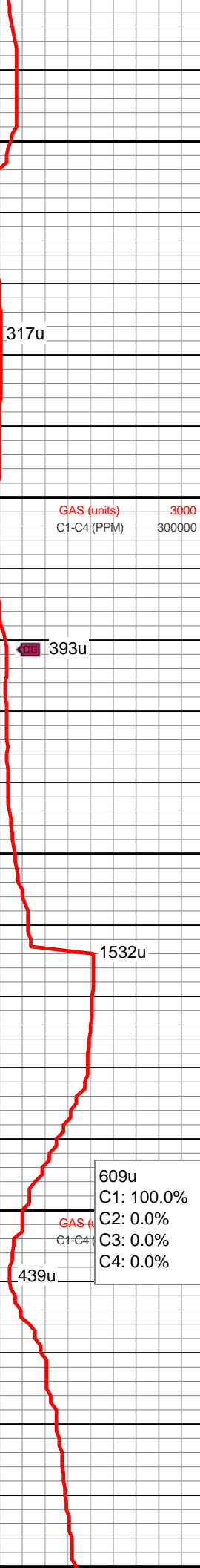
715u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%



2,930  
2,940  
2,950  
2,960  
2,970  
2,980  
2,990  
3,000  
3,010  
3,020  
3,030  
3,040  
3,050  
3,060  
3,070  
3,080  
3,090  
3,100  
3,110  
3,120  
3,130  
3,140  
3,150



0 GR (API) 250



317u

103

0 GAS (units) 3000  
0 C1-C4 (PPM) 300000

393u

94

609u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

439u

91

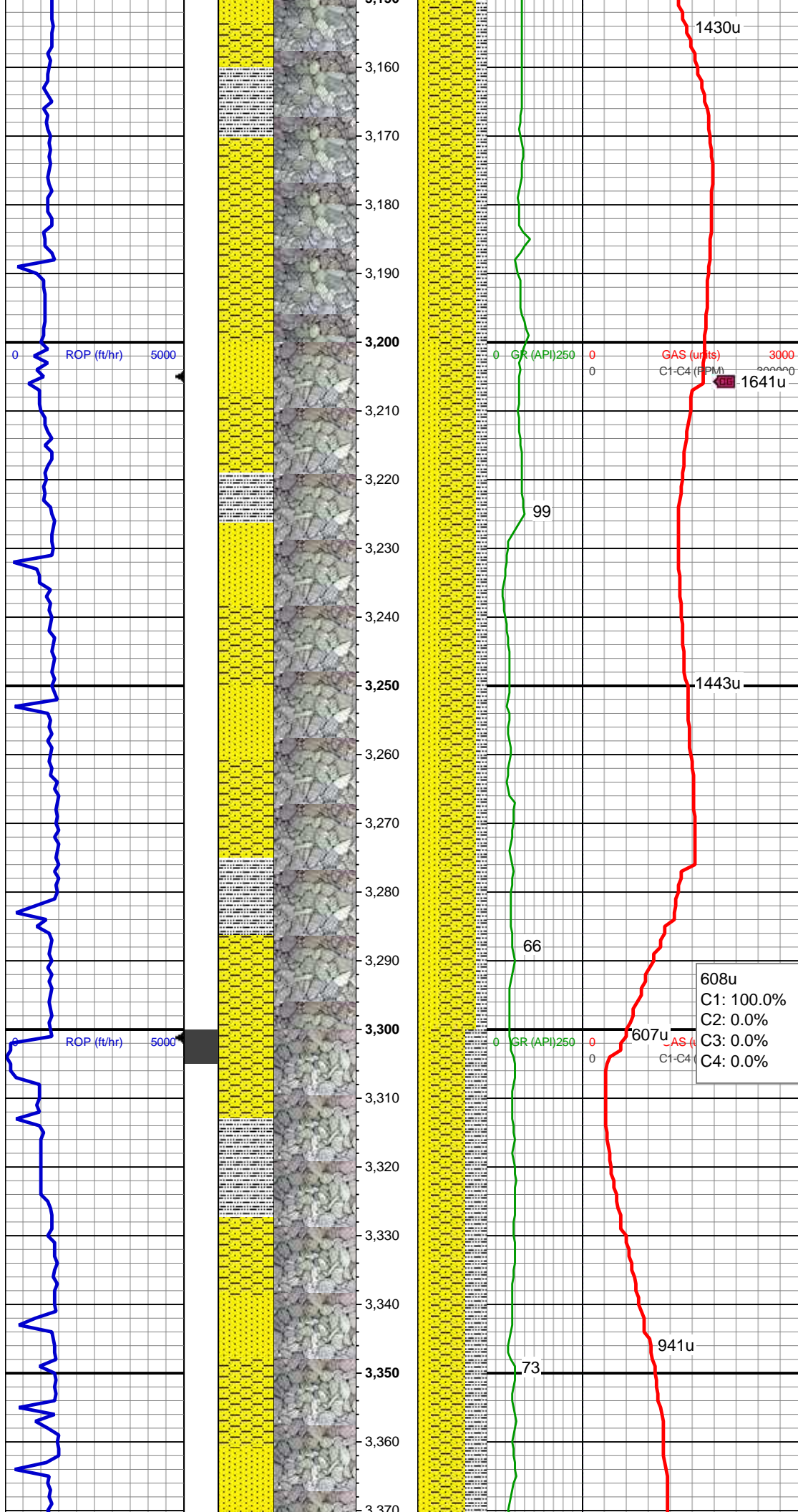
SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt

MD: 2,963'  
TVD: 2,948.58'  
Inclination: 6.96 °  
Azimuth: 153.43 °  
VS: 82.9'

SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt

MD: 3,058'  
TVD: 3,042.87'  
Inclination: 7.01 °  
Azimuth: 154.15 °  
VS: 88.5'

SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SS: clr, lt gry-wht, occ sap, sb ang, sb

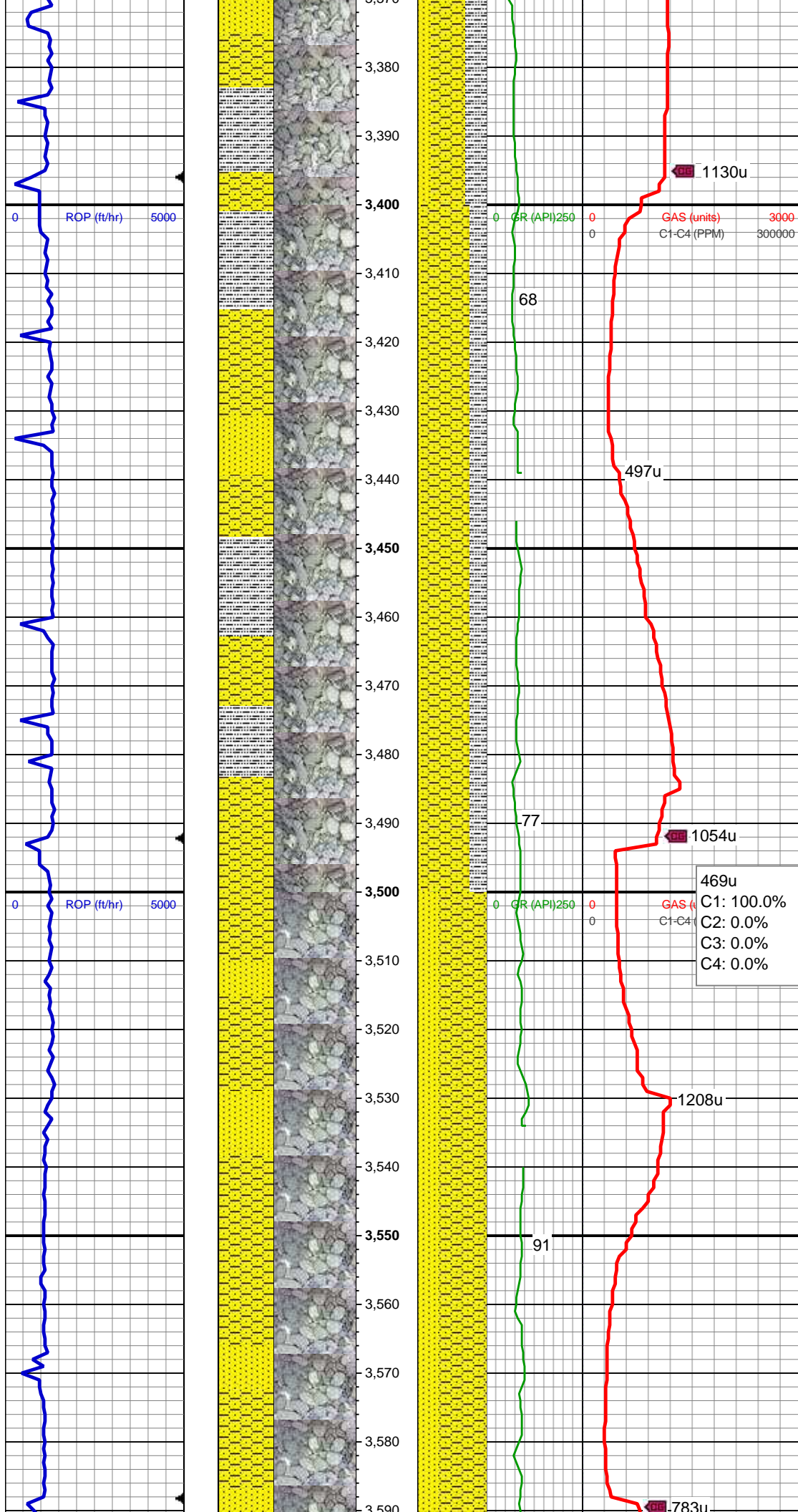


rnd, f gr, hrd-frm, mod-w srt, sl calc cmt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sfty tex

MD: 3,247'  
TVD: 3,230.5'  
Inclination: 6.82 °  
Azimuth: 153.39 °  
VS: 99.54'

SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sfty tex

SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sfty tex  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt



MD: 3,436'  
TVD: 3,417.96'  
Inclination: 7.79 °  
Azimuth: 155.92 °  
VS: 110.85'

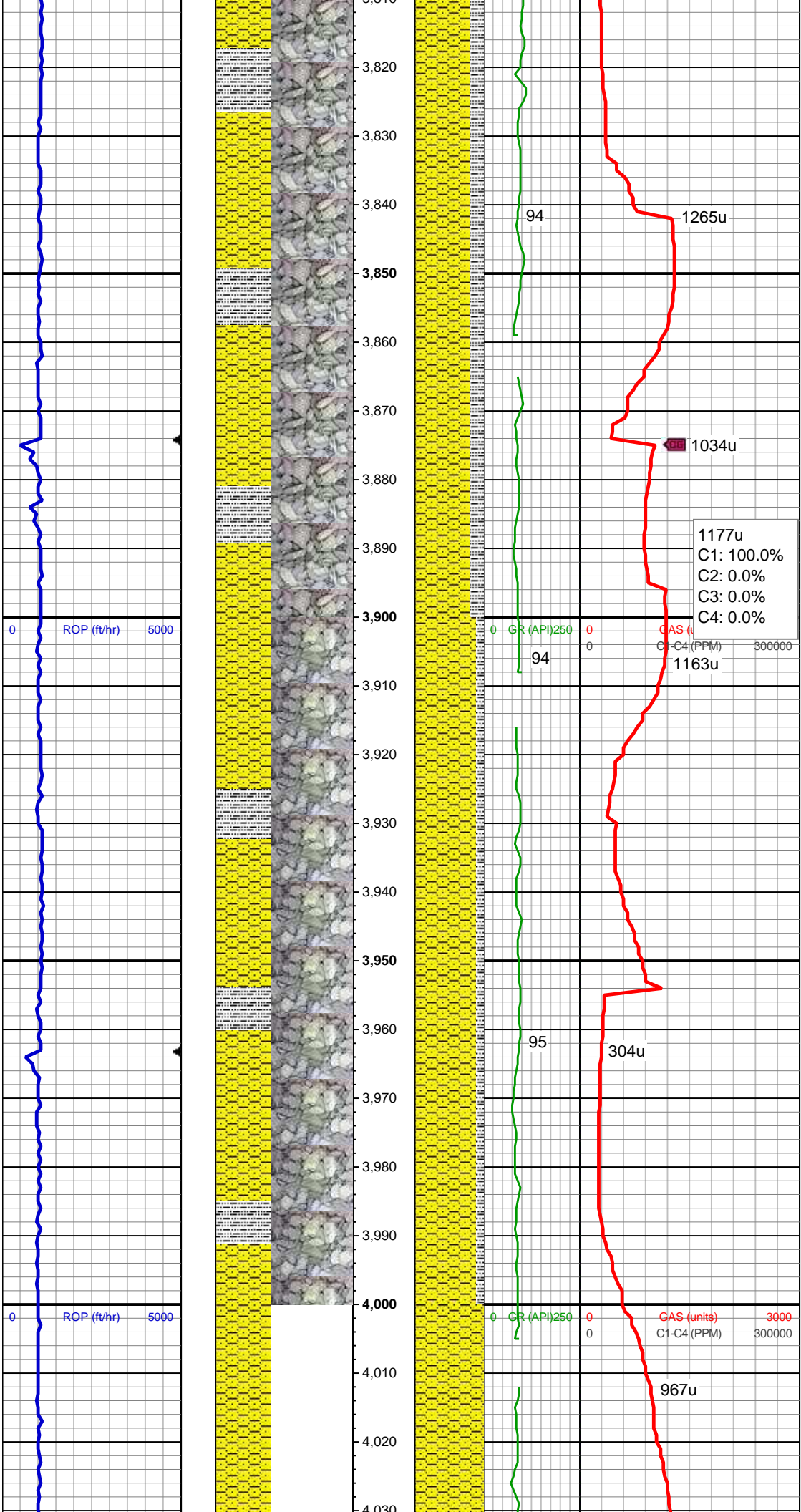
SHY SS: lt gry, occ sap, sb ang, sb rnd, sb plty, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft, slty tex  
SS: clr, lt gry-wht, occ sap, sb ang, sb rnd, f gr, hrd-frm, mod-w srt, sl calc cmt

MD: 3,531'  
TVD: 3,512.05'  
Inclination: 8.1 °  
Azimuth: 157.95 °  
VS: 116.57'

SHY SS: lt gry, occ sap, sb ang, sb rnd, sb plty, v sft, v f gr, mod srt  
SS: clr, lt gry-wht, occ sap, sb ang, sb rnd, f gr, hrd-frm, mod-w srt, sl calc cmt

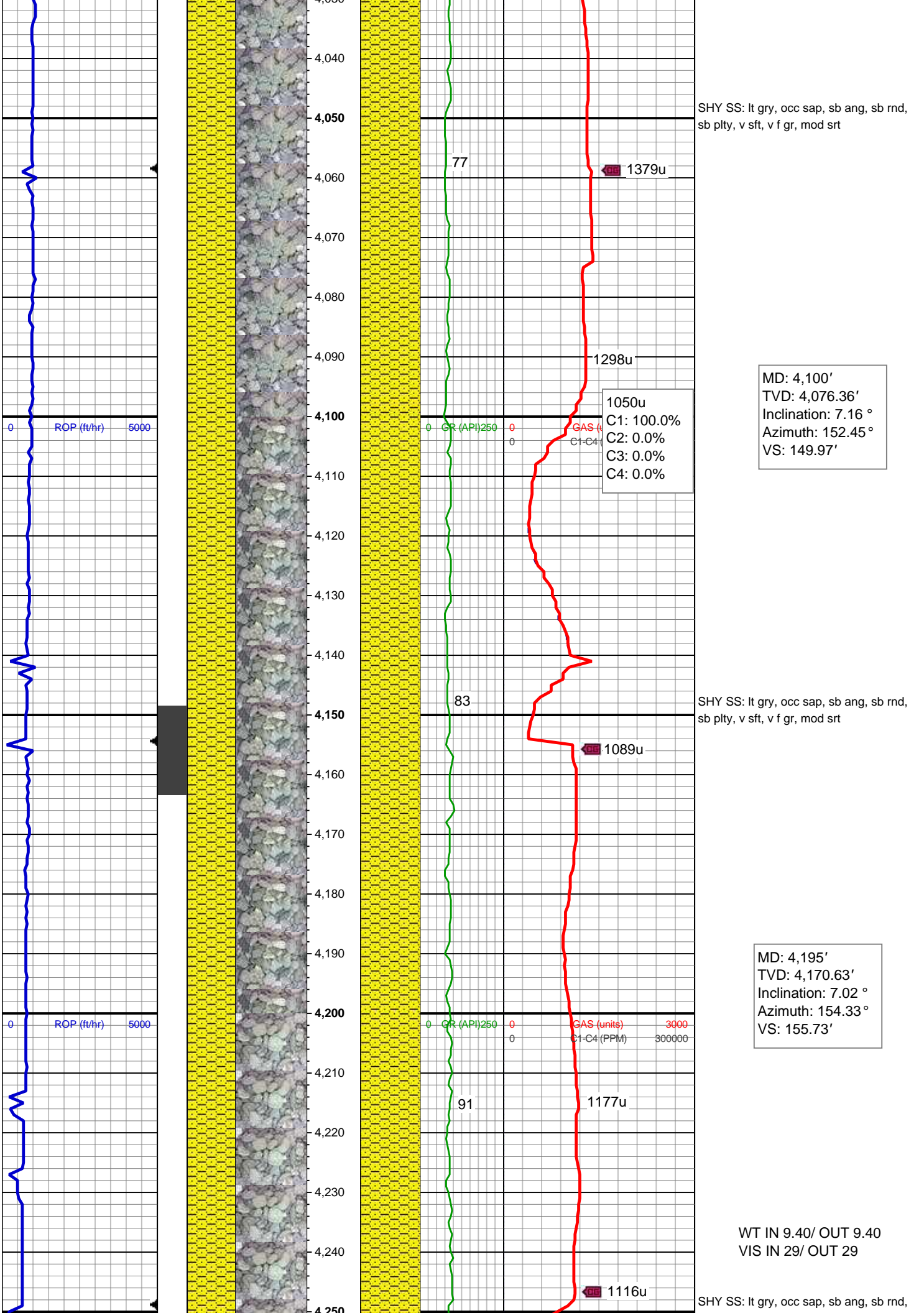


MD: 3,816'  
TVD: 3,794.51'  
Inclination: 6.95 °  
Azimuth: 156.8 °  
VS: 133.49'



SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
silty tex

SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
silty tex



SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt

77

1379u

1298u

1050u

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

83

SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt

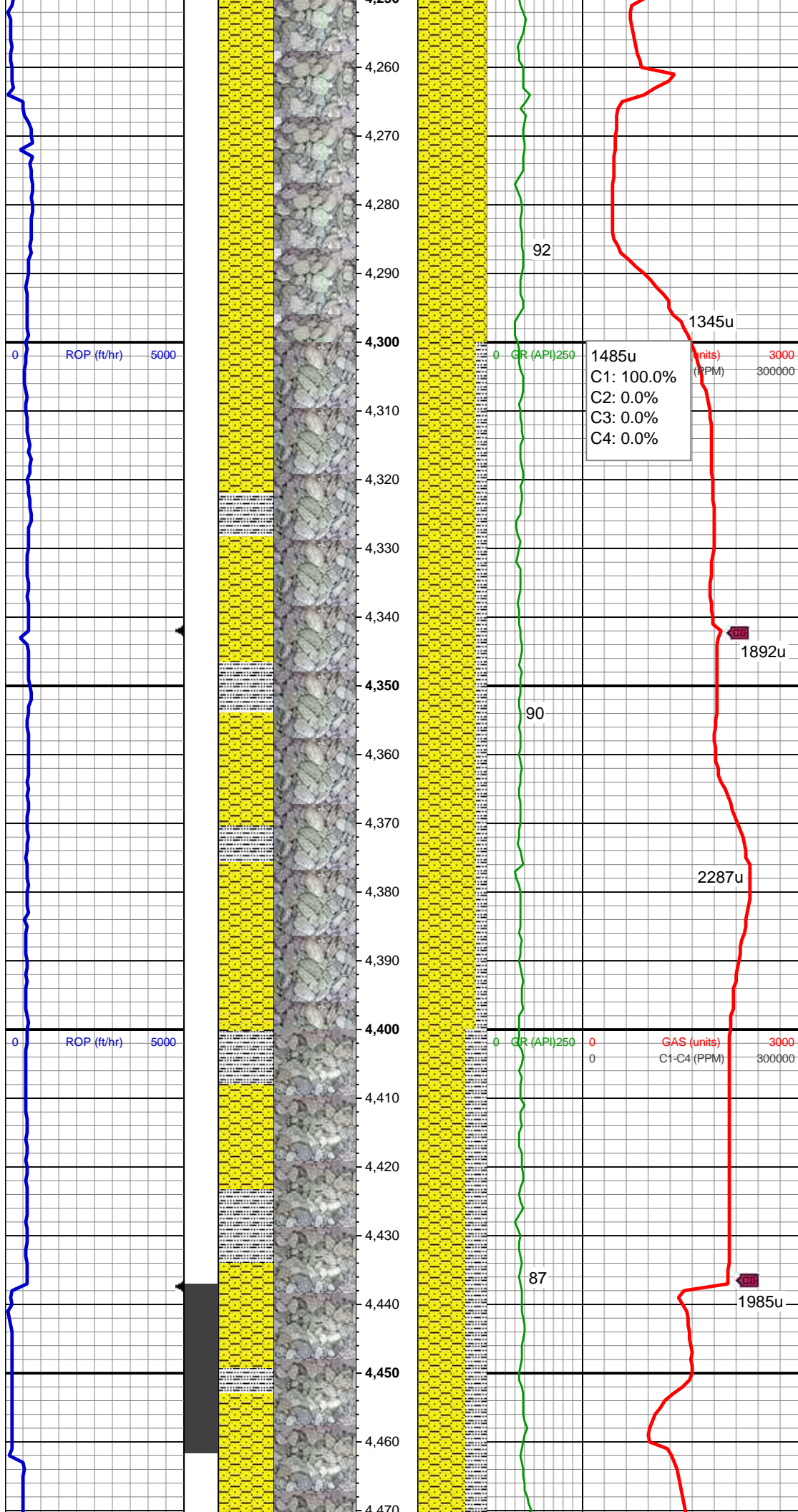
1089u

91

1177u

1116u

SHY SS: lt gry, occ sap, sb ang, sb rnd,

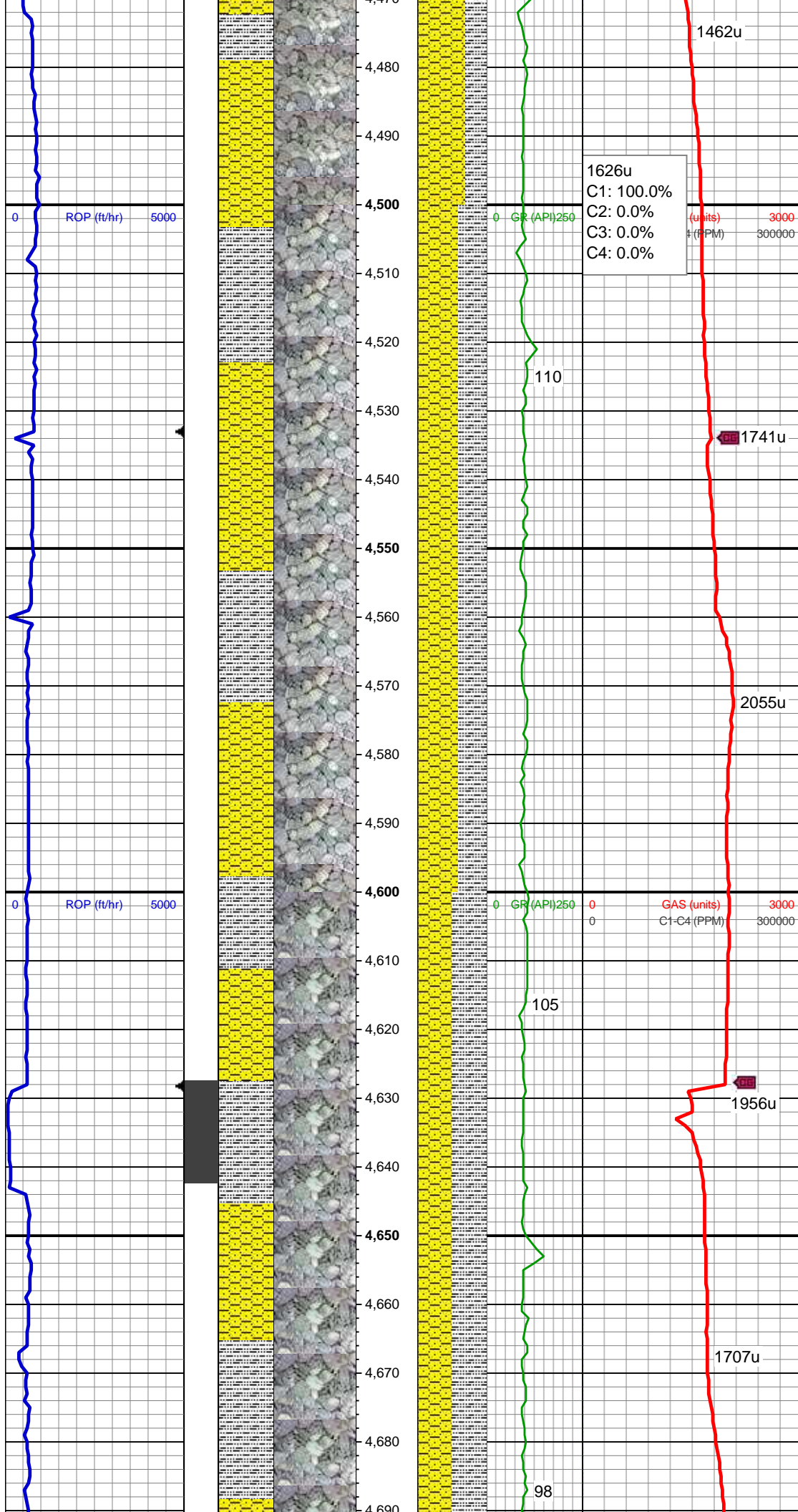


MD: 4,289'  
TVD: 4,264'  
Inclination: 6.35 °  
Azimuth: 142.07 °  
VS: 161.86'

SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sly tex

MD: 4,384'  
TVD: 4,358.42'  
Inclination: 6.26 °  
Azimuth: 142.44 °  
VS: 168.65'

WT IN 9.65/ OUT 9.65  
VIS IN 30/ OUT 30  
SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt, tr glauc, abnt  
lith frag  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sly tex



MD: 4,479'  
TVD: 4,453.11'  
Inclination: 2.87 °  
Azimuth: 129.41 °  
VS: 173.92'

1626u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

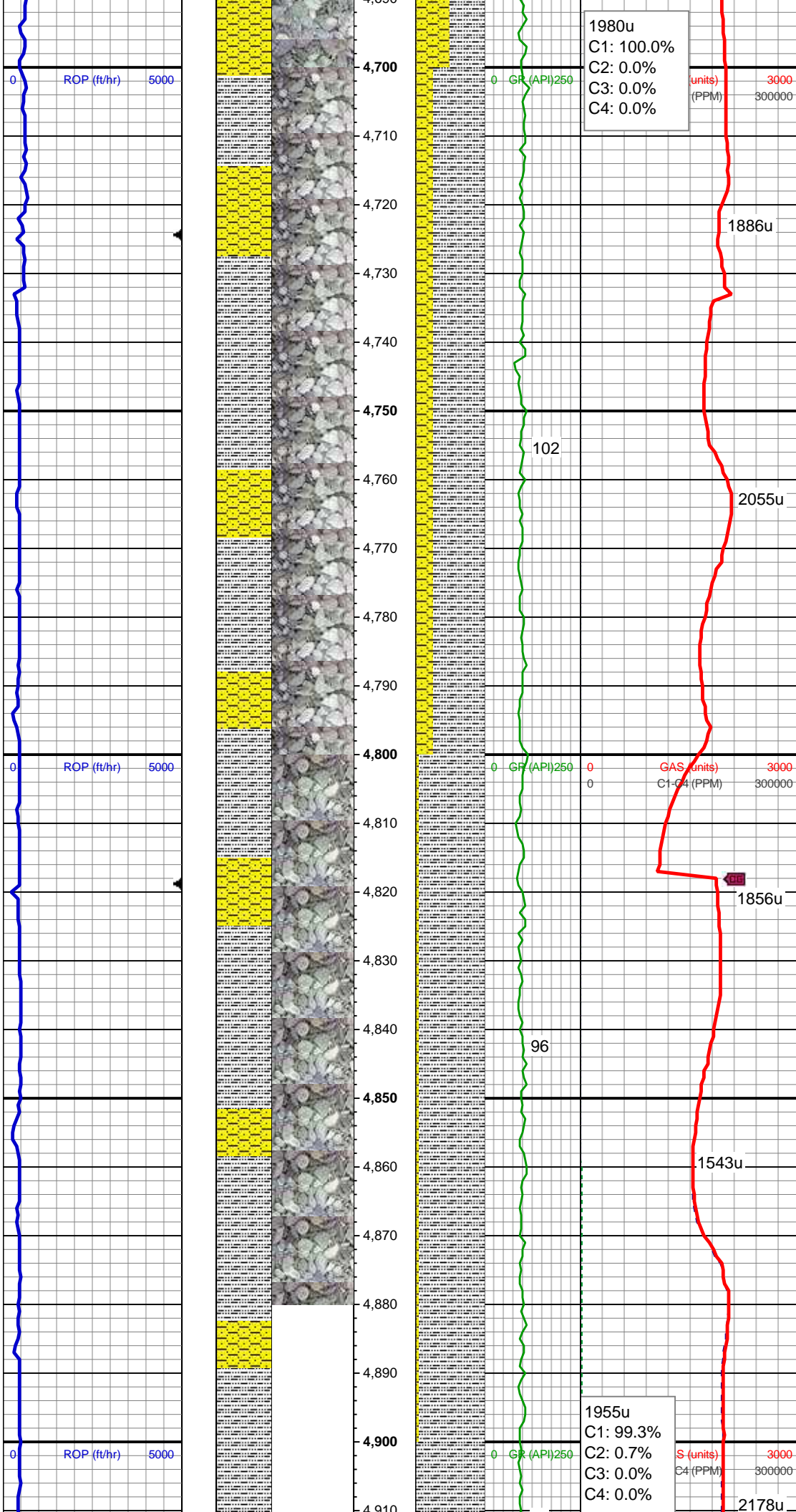
(units) 3000  
# (PPM) 300000

SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt, tr glauc, abnt  
lith frag  
SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sly tex

MD: 4,574'  
TVD: 4,548.01'  
Inclination: 2.37 °  
Azimuth: 131.42 °  
VS: 177.36'

0 GR (API) 250 0 GAS (units) 3000  
0 C1-C4 (PPM) 300000

SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sly tex  
SHY SS: lt gry, occ sap, sb ang, sb rnd,  
sb plty, v sft, v f gr, mod srt, tr glauc, abnt  
lith frag



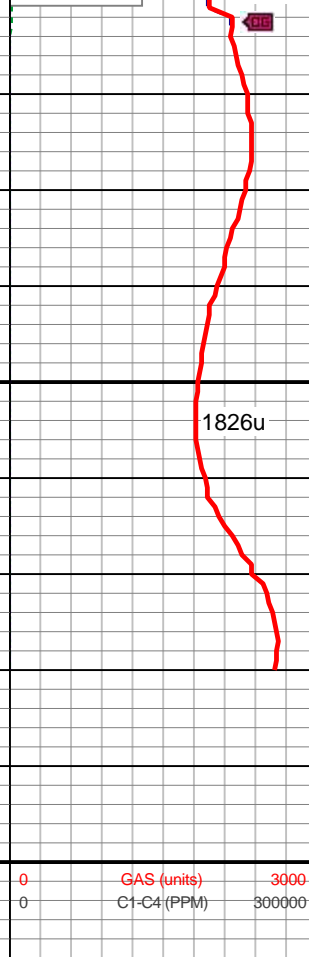
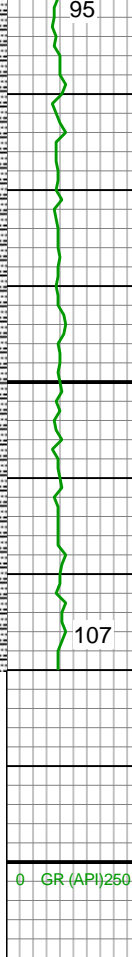
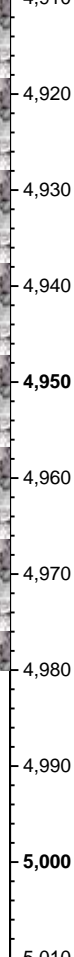
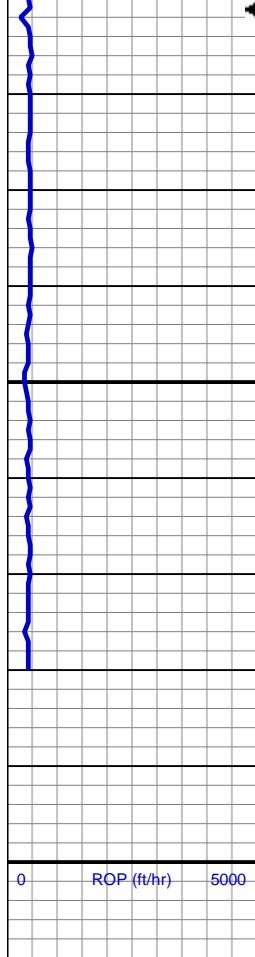
WT IN 10.10/ OUT 10.10  
VIS IN 33/ OUT 33

SLTY SH: gry-dkr gry, rnd, sb plty, v sft, slty tex  
SHY SS: lt gry, occ sap, sb ang, sb rnd, sb plty, v sft, v f gr, mod srt, tr glauc, abnt lith frag

MD: 4,764'  
TVD: 4,737.95'  
Inclination: 0.87 °  
Azimuth: 44.38 °  
VS: 181.38'

SLTY SH: gry-dkr gry, rnd, sb plty, v sft, slty tex  
SHY SS: lt gry, occ sap, sb ang, sb rnd, sb plty, v sft, v f gr, mod srt, tr glauc, abnt lith frag

MD: 4,859'  
TVD: 4,832.94'  
Inclination: 0.78 °  
Azimuth: 36.6 °  
VS: 182.21'



SLTY SH: gry-dkr gry, rnd, sb plty, v sft,  
sly tex, occ shy ss

MD: 4,953'  
TVD: 4,926.93'  
Inclination: 0.57 °  
Azimuth: 37.66 °  
VS: 182.84'

WT IN 10.20/ OUT 10.20  
VIS IN 34/ OUT 34

ENDED VERT @ 4980' MD  
09/23/2014 @ 9:05 AM

LOG CONTINUES ON M PLOT  
"ROHN STATE LD03-62-1HN  
HORZ"

0 ROP (ft/hr) 5000

0 GR (API) 250 0 GAS (units) 3000  
0 C1-C4 (PPM) 30000