

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

Well Name ROHN STATE LD10-69HN

Location SESE SEC 4 T9N R58W

State COLORADO

County WELD

Country USA

Rig Number H&P 273

API Number 05-123-37476

Field WILDCAT

Region DJ BASIN

Drilling Completed 9/29/2014

Spud Date 9/28/2014

Surface Coordinates 661' FSL 330' FEL

Ground Elevation 4707'

K.B. Elevation 4731'

Logged Interval 1212' To 5050'

Total Depth 5050'

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
- ◇ INTEROOLITIC

- MOLDIC
- ORGANIC
- PINPOINT
- 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
- SLIDE
- SURVEY
- TRIP GAS

- 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 WACKSTONE

### 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
- BRYOZOA
- CEPHALOPOD
- CORDIA
- FOSSIL
- GASTROPOD
- INOCERAMUS
- OOLITE
- OSTRACOD
- PELECYPOD
- PELLET
- PISOLITE
- PLANT REMAINS
- PLANT PROPOD

- ANHYDRITIC
- ARGILLACEOUS
- ARGILLITE GRAIN
- BENTONITE
- BITUMENOUS SUBSTANCE
- BRECCIA FRAGMENTS
- CALCAREOUS
- CARBONACEOUS FLAKES
- CHTDK
- OUTLT

- FERRUGINOUS
- GLAUCONITE
- GYPSIFEROUS
- HEAVY MINERAL
- KAOLIN
- MARLSTONE
- MINERAL CRYSTALS
- NODULES
- PHOSPHATE PELLETS
- TYNITE

- TUFFACEOUS

### Stringer

- ANHYDRITE STRINGER
- BENTONITE STRINGER
- COAL STRINGER
- DOLOMITE STRINGER
- GYPSUM STRINGER
- LIMESTONE STRINGER
- MARLSTONE (OIL) STRINGER

CORAL  
CRINOID  
ECHINOID  
FISH  
FORAMINIFERA

PLANT SPORES  
SCAPHOPOD  
STROMATOPOROID

## Minerals

CHERT  
COAL - THIN BEDS  
DOLOMITIC  
FELDSPAR  
FERRUGINOUS PELLET

PYRITE  
SALT CAST  
SANDY  
SILICEOUS  
SILTY

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  
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** John Sabroske

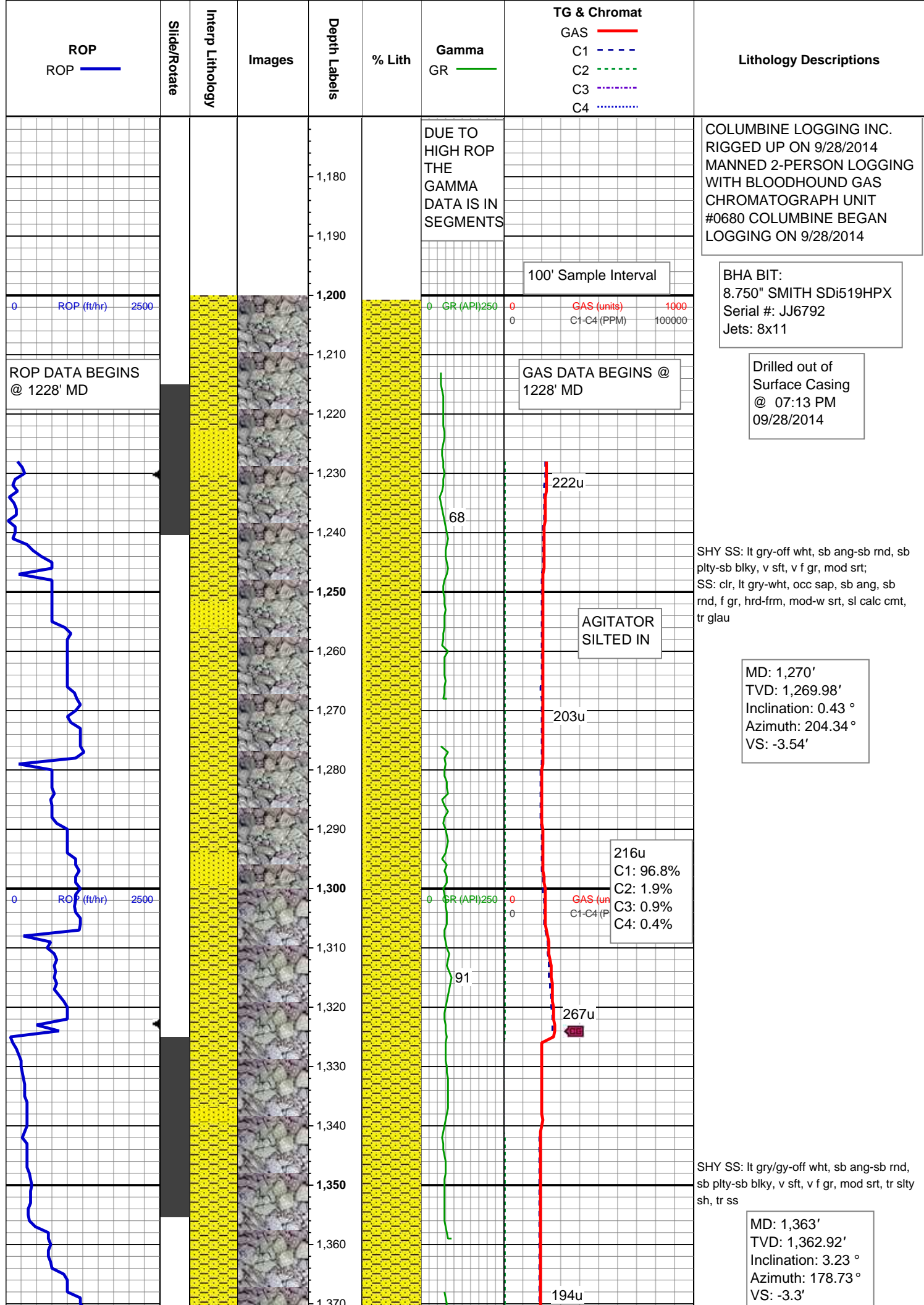
**Wellsite Geological Services Provided By** Columbine Logging Inc.

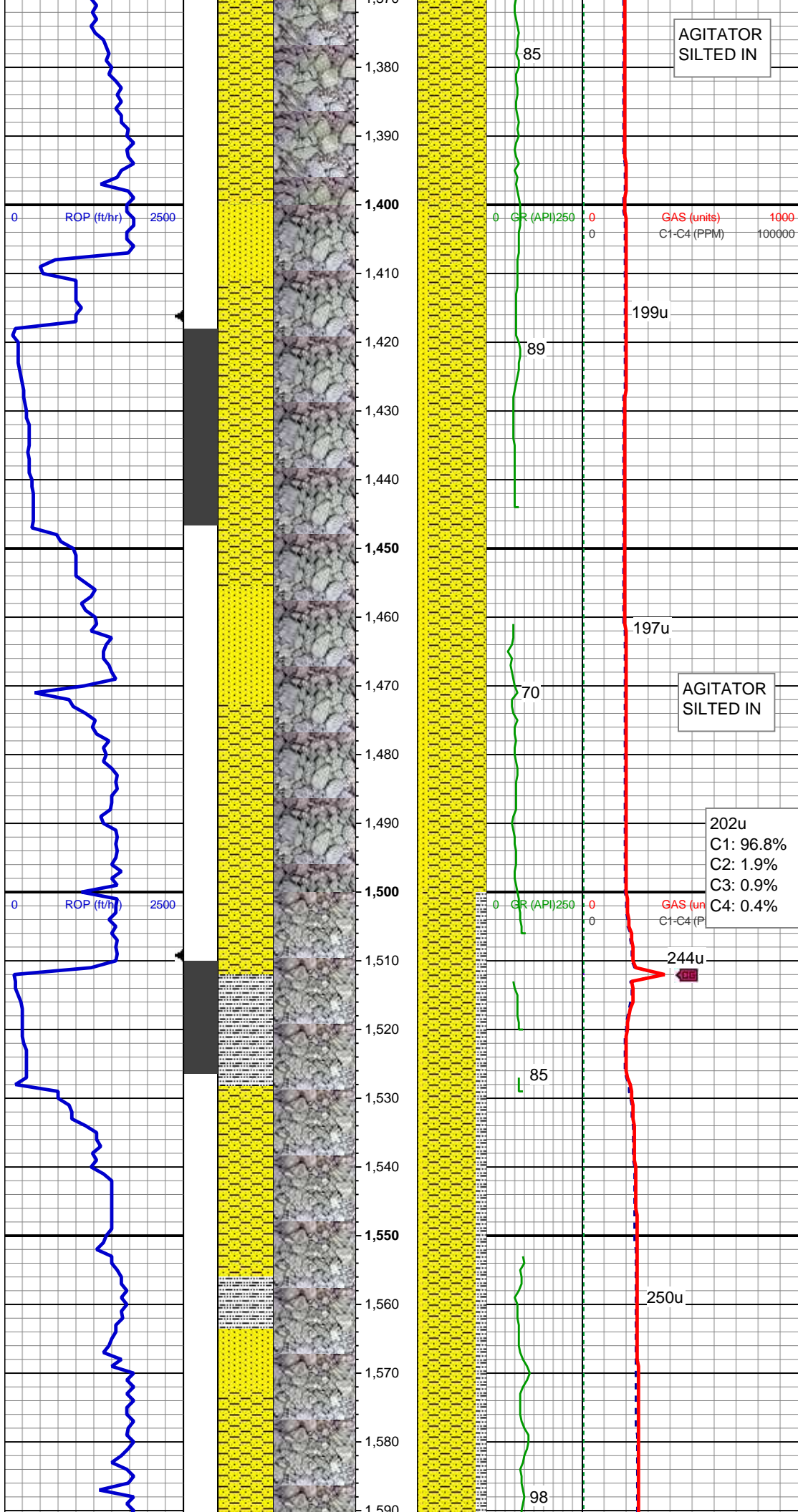
## Geologist

**Name** RENEE CLACKER

**Company** NOBLE ENERGY INC.

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





AGITATOR  
SILTED IN

ROP (ft/hr)

GR (API)

GAS (units)  
C1-C4 (PPM)

ROP (ft/hr)

GR (API)

GAS (units)  
C1-C4 (PPM)

SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
plty-sb blk, 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,  
tr glau

MD: 1,455'  
TVD: 1,454.59'  
Inclination: 6.31 °  
Azimuth: 170.19 °  
VS: -1.57'

AGITATOR  
SILTED IN

202u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

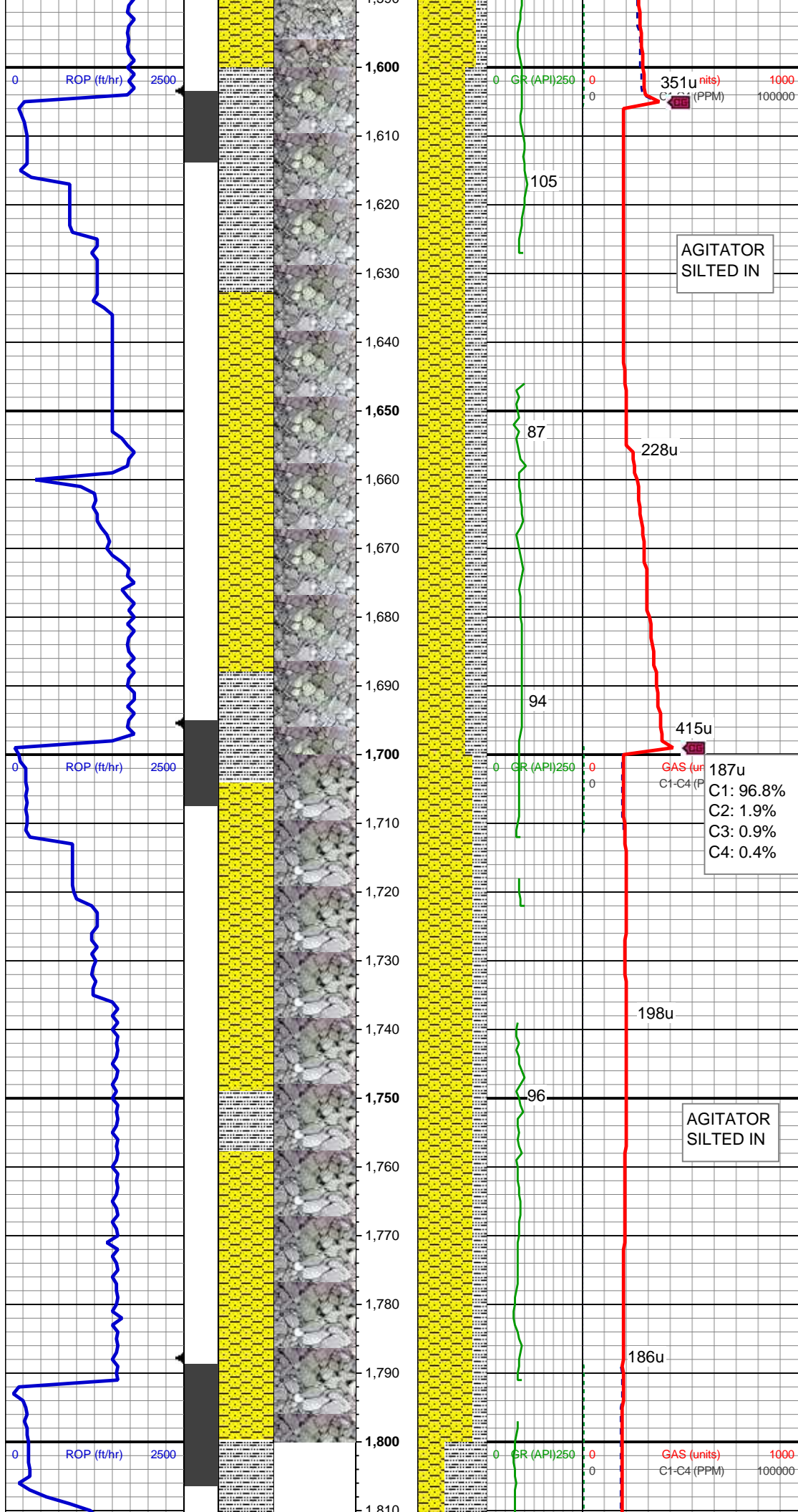
244u

MD: 1,547'  
TVD: 1,545.83'  
Inclination: 8.45 °  
Azimuth: 171.83 °  
VS: 1.5'

SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
plty-sb blk, 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,  
tr pyr

98



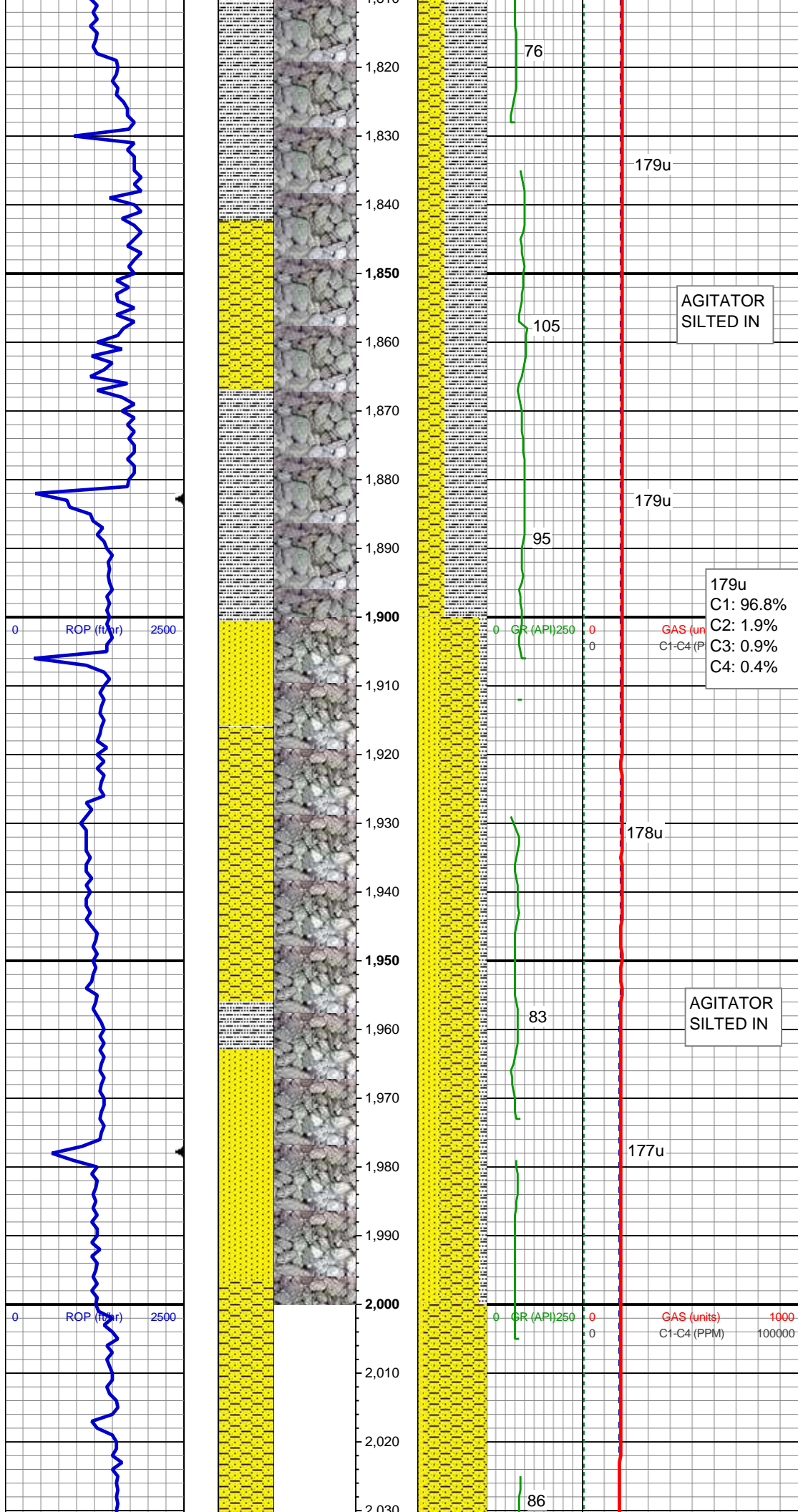


MD: 1,640'  
TVD: 1,637.64'  
Inclination: 9.85 °  
Azimuth: 166.17 °  
VS: 5.92'

SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
pty-sb blk, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, rnd, sb pty, v sft,  
sly tex, tr ss

MD: 1,733'  
TVD: 1,729.14'  
Inclination: 10.8 °  
Azimuth: 166.9 °  
VS: 11.52'

SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
pty-sb blk, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, tr blk, rnd, sb pty, v  
sft, sly tex



MD: 1,828'  
TVD: 1,822.12'  
Inclination: 12.82 °  
Azimuth: 168.71 °  
VS: 17.63'

SLTY SH: gry-dkr gry, tr blk, rnd, sb plty, v sft, slty tex  
SHY SS: lt gry-off wht, sb ang-sb rnd, sb plty-sb blk, v sft, v f gr, mod srt

AGITATOR  
SILTED IN

179u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

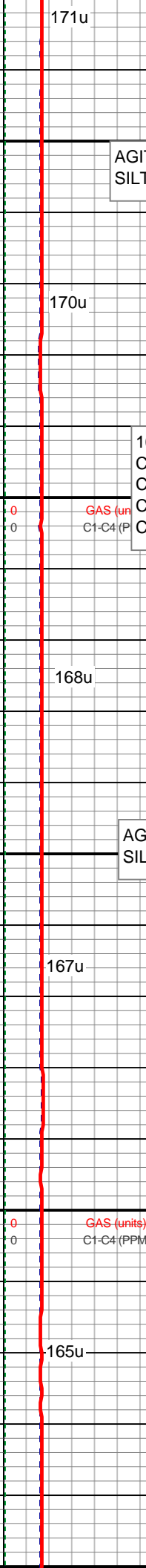
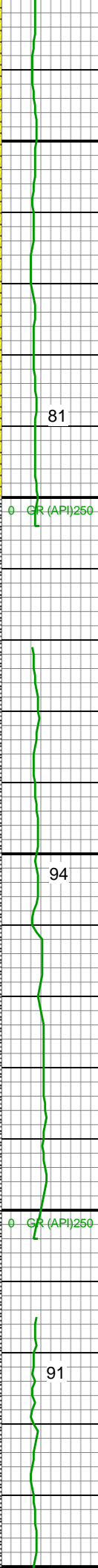
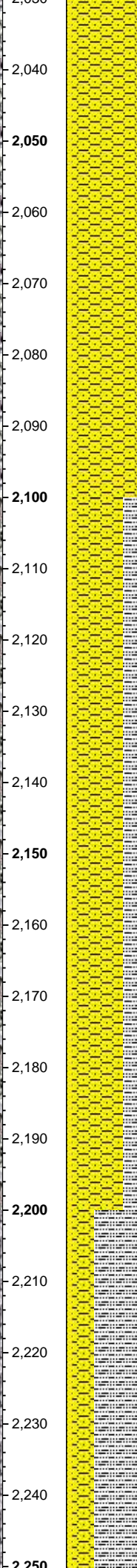
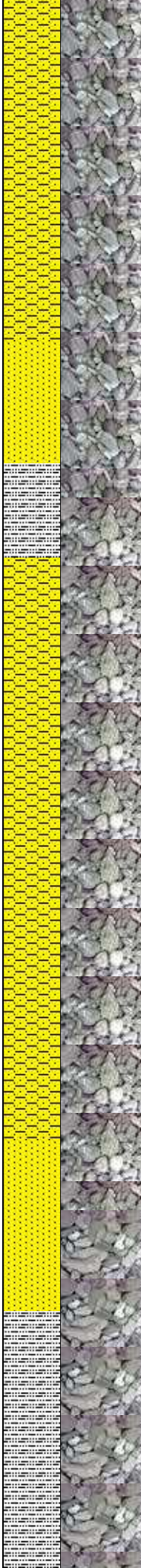
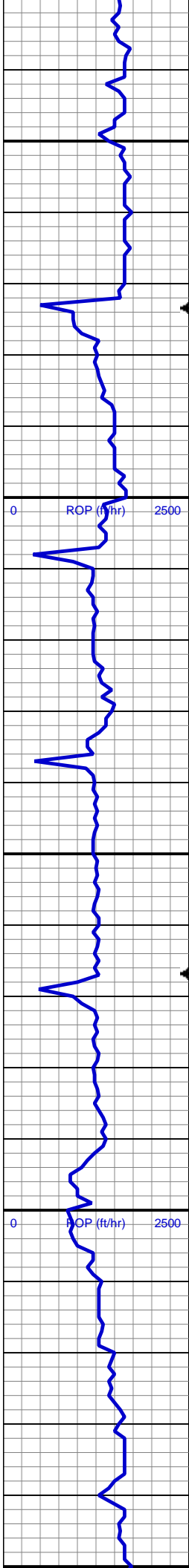
MD: 1,922'  
TVD: 1,913.77'  
Inclination: 12.85 °  
Azimuth: 167.65 °  
VS: 24.08'

SHY SS: lt gry-off wht, sb ang-sb rnd, sb plty-sb blk, 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, slty tex

AGITATOR  
SILTED IN

MD: 2,017'  
TVD: 2,006.34'  
Inclination: 13.12 °  
Azimuth: 165.02 °  
VS: 31.34'





AGITATOR  
SILTED IN

169u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

AGITATOR  
SILTED IN

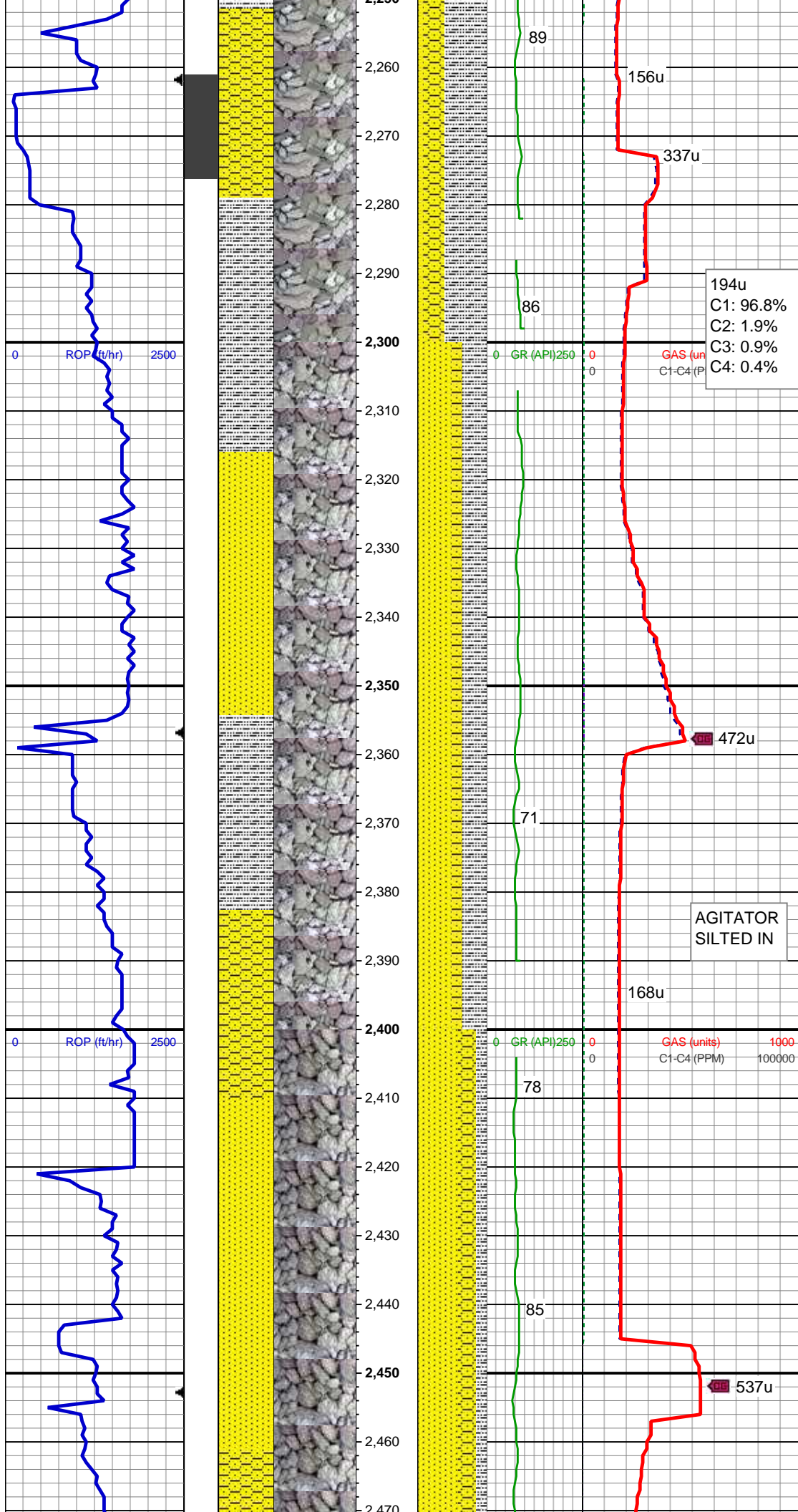
SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
plty-sb blk, v sft, v f gr, mod srt;  
SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt,  
tr glau

MD: 2,112'  
TVD: 2,098.89'  
Inclination: 12.96 °  
Azimuth: 164.24 °  
VS: 39.22'

SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
plty-sb blk, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, tr blk, 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: 2,206'  
TVD: 2,190.57'  
Inclination: 12.57 °  
Azimuth: 163.8 °  
VS: 47.05'

SLTY SH: gry-dkr gry, tr blk, rnd, sb plty, v  
sft, slty tex  
SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
plty-sb blk, v sft, v f gr, mod srt

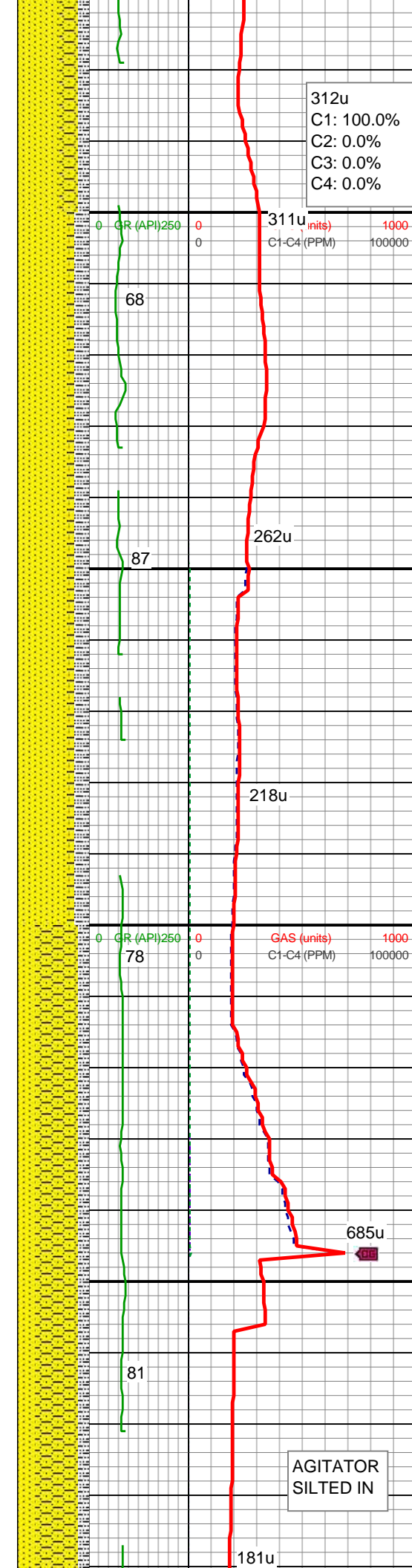
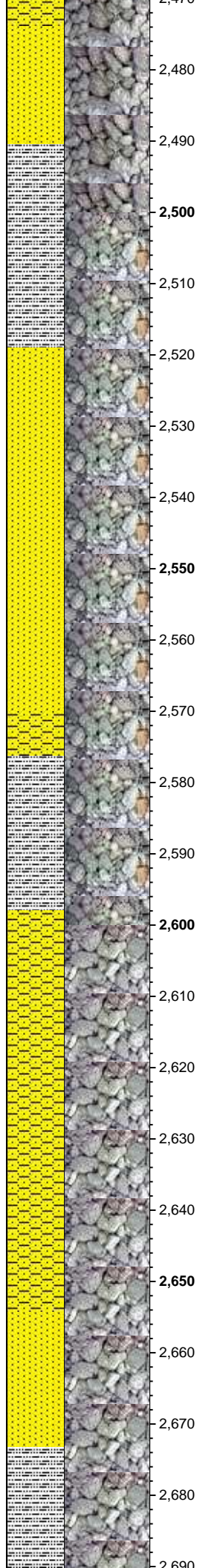
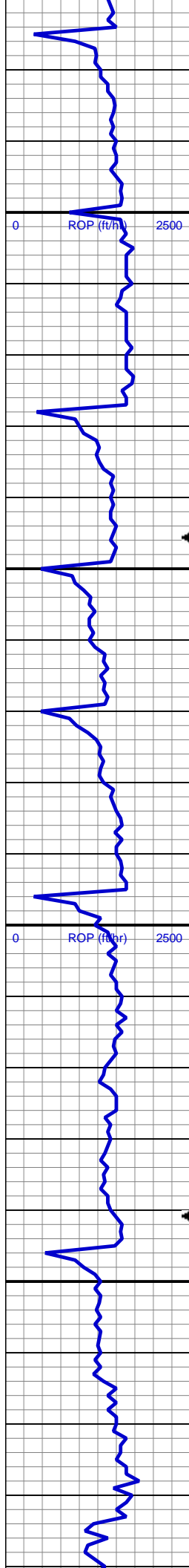


SS: clr, lt gry-wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt

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, tr blk, rnd, sb plty, v  
sft, slty tex  
SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
plty-sb blk, v sft, v f gr, mod srt

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





MD: 2,491'  
TVD: 2,468.65'  
Inclination: 12.62 °  
Azimuth: 172.3 °  
VS: 63.55'

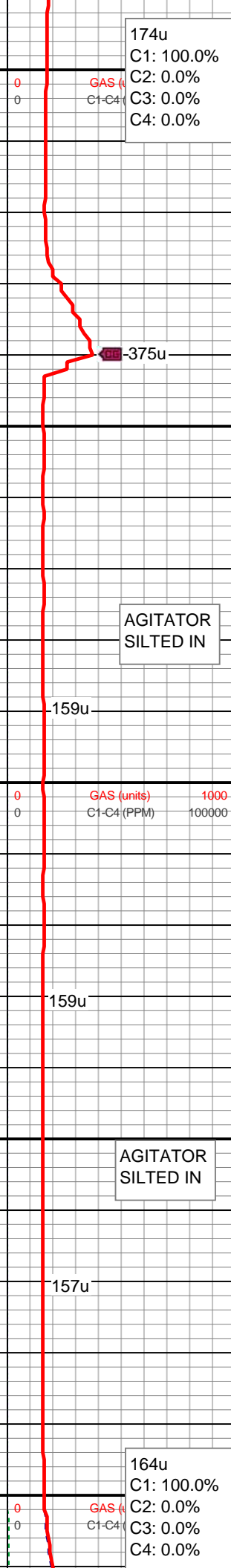
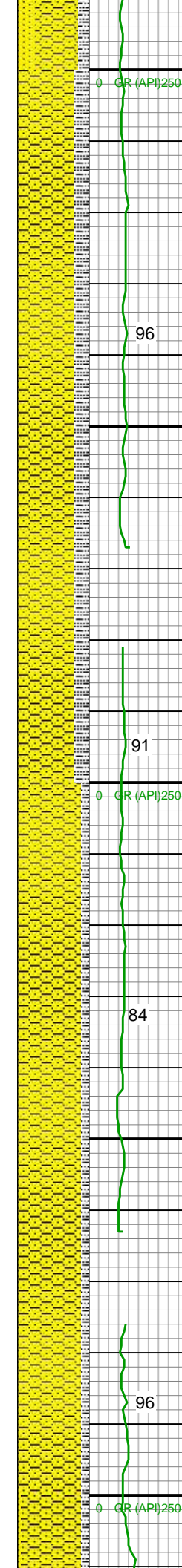
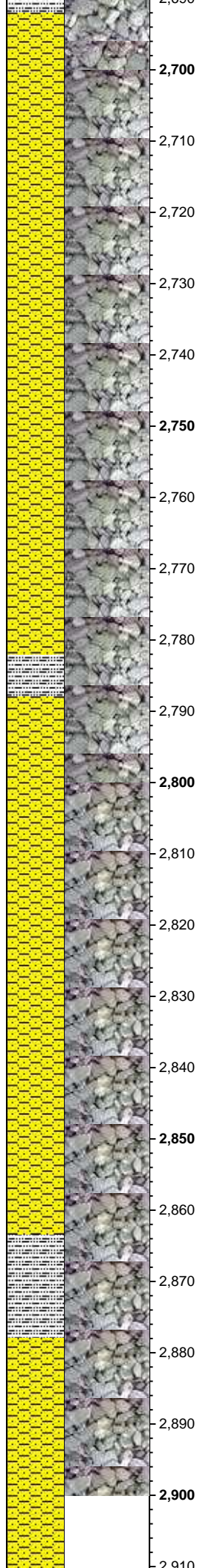
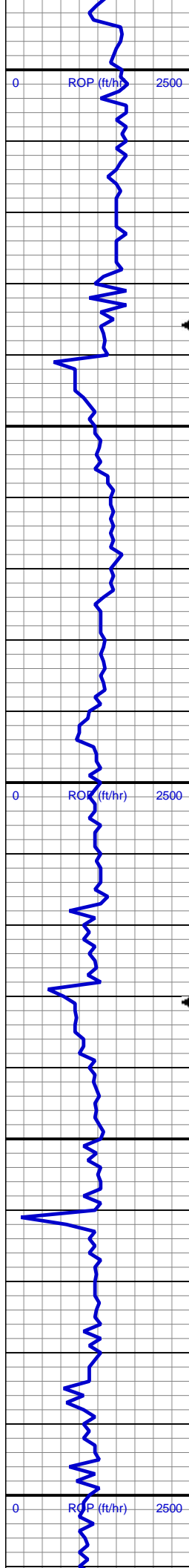
SS: clr, lt gry-off wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt,  
tr glau  
SLTY SH: gry-dkr gry, tr blk, rnd, sb plty, v  
sft, slty tex  
SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
plty-sb blk, v sft, v f gr, mod srt

MD: 2,586'  
TVD: 2,561.33'  
Inclination: 12.74 °  
Azimuth: 172.39 °  
VS: 68.54'

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

AGITATOR  
SILTED IN

MD: 2,680'  
TVD: 2,652.98'  
Inclination: 12.95 °  
Azimuth: 171.41 °  
VS: 73.69'



174u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

96

96-375u

SHY SS: lt gry-off wht, sb ang-sb rnd, sb plty-sb blk, v sft, v f gr, mod srt, occ lithic frags  
SLTY SH: gry-dkr gry, tr blk, rnd, sb plty, v sft, slty tex, tr ss

AGITATOR SILTED IN

159u

91

84

159u

AGITATOR SILTED IN

157u

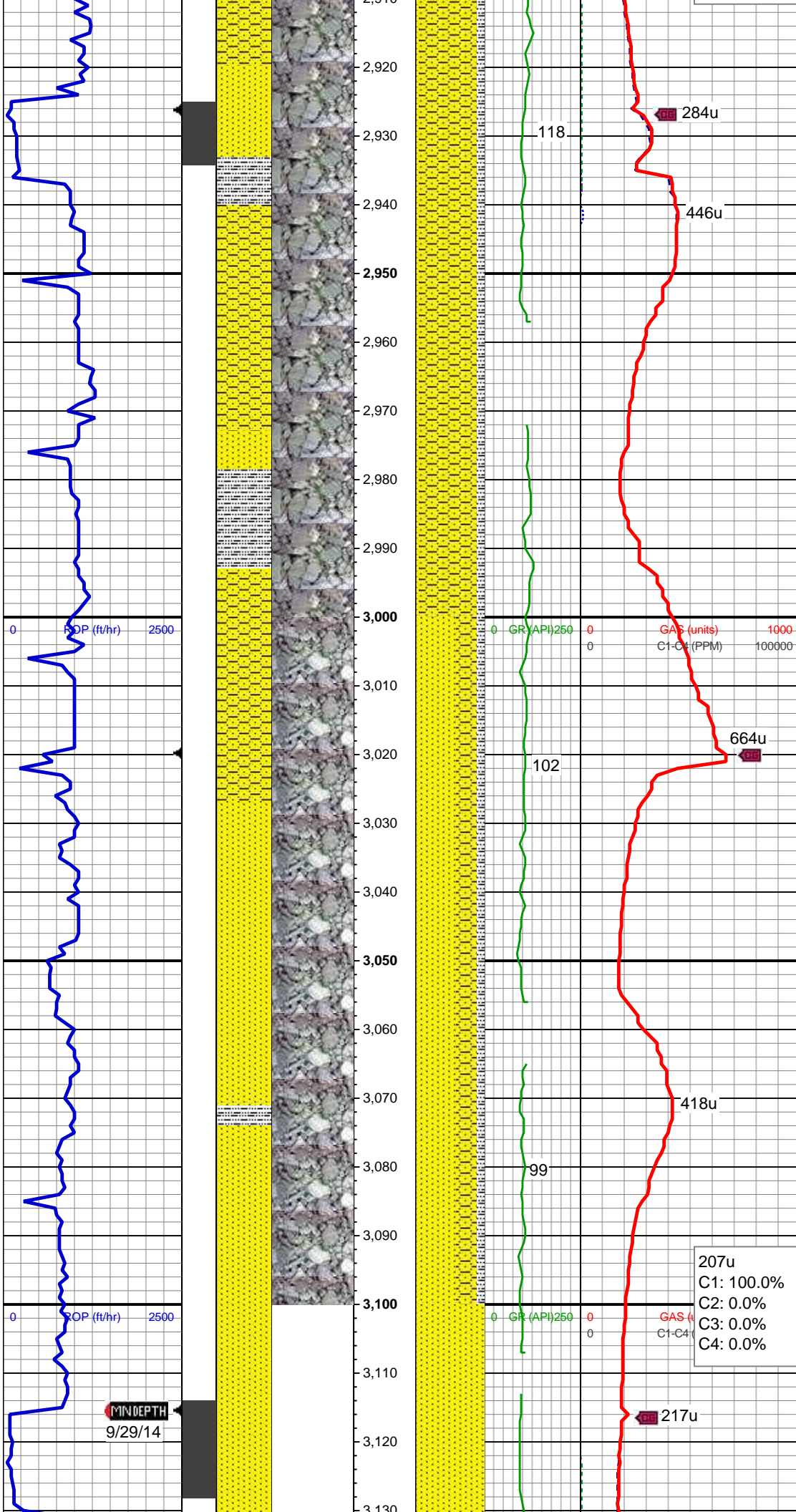
96

164u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

MD: 2,775'  
TVD: 2,745.62'  
Inclination: 12.65 °  
Azimuth: 171.24 °  
VS: 79.09'

MD: 2,870'  
TVD: 2,838.35'  
Inclination: 12.42 °  
Azimuth: 171.69 °  
VS: 84.34'





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

MD: 2,965'  
TVD: 2,931.17'  
Inclination: 12.22 °  
Azimuth: 165.94 °  
VS: 90.37'

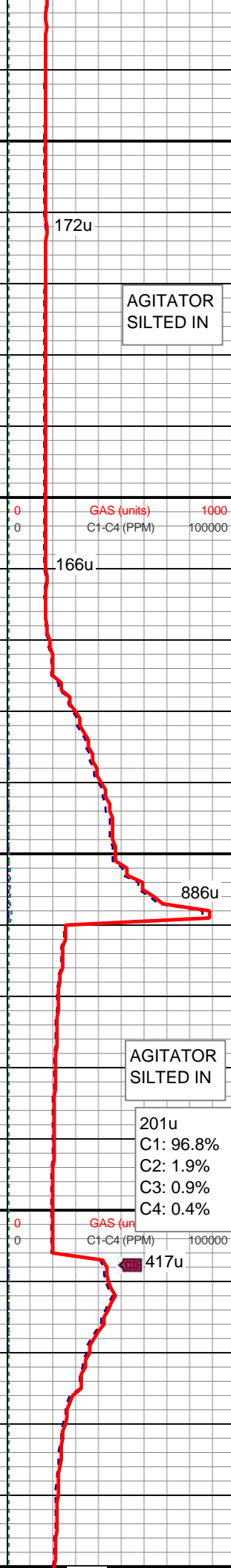
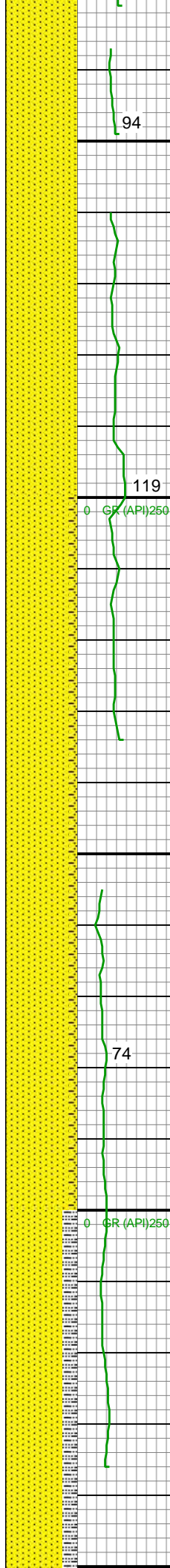
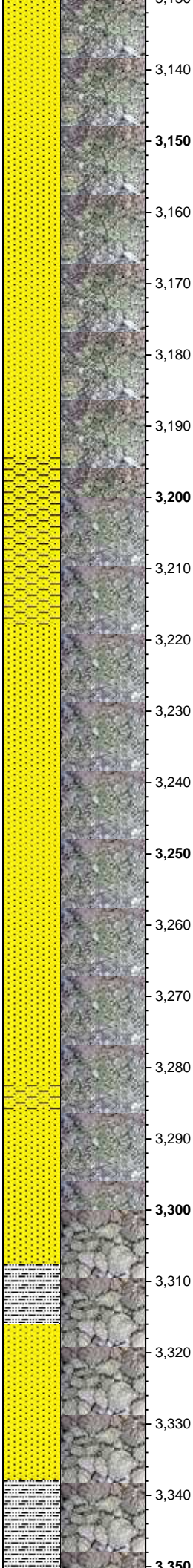
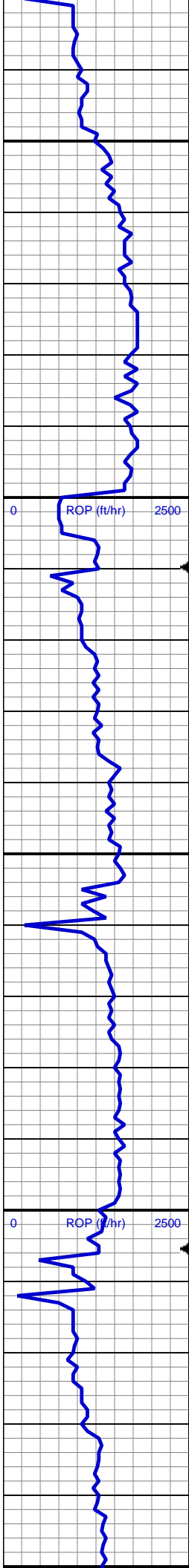
SS: clr, lt gry-off wht, occ sap, sb ang, sb  
rnd, f gr, hrd frm, mod-w srt, sl calc cmt,  
tr glau  
SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
plty-sb blk, v sft, v f gr, mod srt  
SLTY SH: gry-dkr gry, tr blk, rnd, sb plty, v  
sft, slty tex

MD: 3,059'  
TVD: 3,023.14'  
Inclination: 11.63 °  
Azimuth: 166.28 °  
VS: 97.05'

207u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

WT IN 9.70 WT OUT 9.70  
VIS IN 35 VIS OUT 35





SS: clr, lt gry-off wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frn, mod-w srt, sl calc cmt,  
occ glau

MD: 3,154'  
TVD: 3,115.92'  
Inclination: 13.18 °  
Azimuth: 166.94 °  
VS: 103.88'

AGITATOR  
SILTED IN

94

172u

119

166u

886u

SS: clr, lt gry-off wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frn, mod-w srt, sl calc cmt,  
tr glau

SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
ppty-sb blkly, v sft, v f gr, mod srt

AGITATOR  
SILTED IN

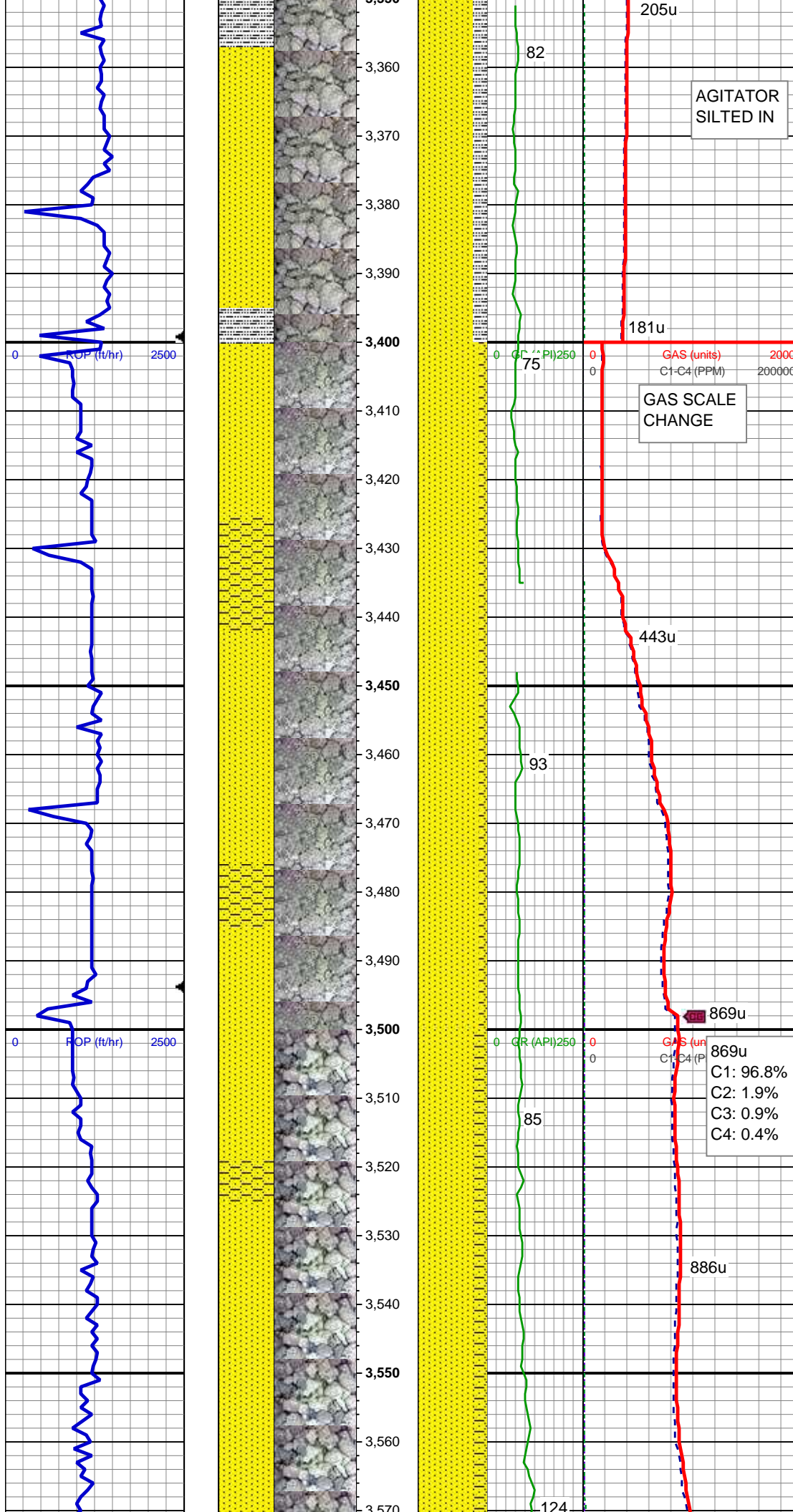
201u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

74

417u

MD: 3,344'  
TVD: 3,300.7'  
Inclination: 13.74 °  
Azimuth: 165.79 °  
VS: 118.89'

SS: clr, lt gry-off wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frn, mod-w srt, sl calc cmt,  
occ glau;

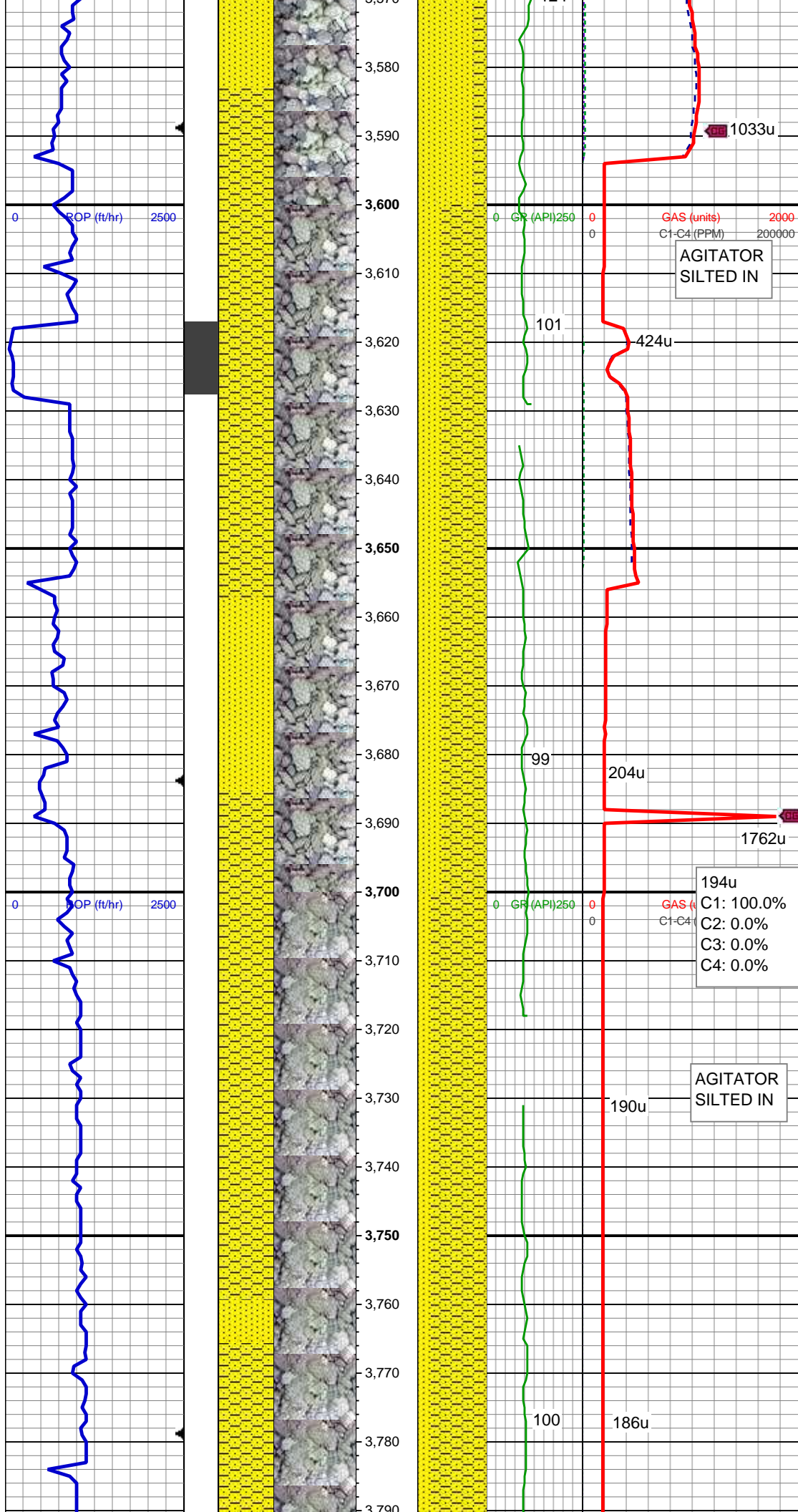


SLTY SH: gry-dkr gry, tr blk, rnd, sb plty, v sft, slty tex

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

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





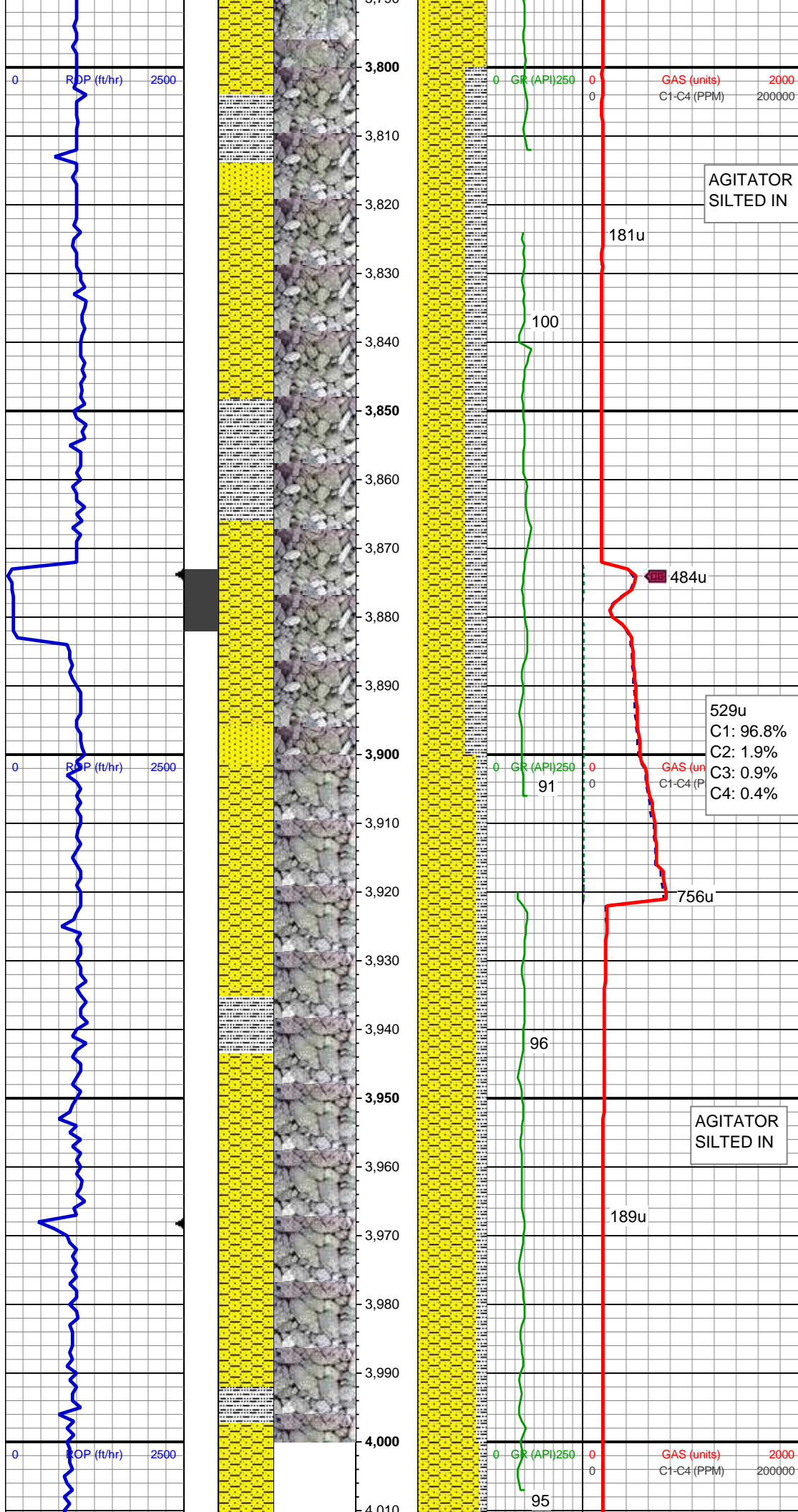
MD: 3,628'  
TVD: 3,576.36'  
Inclination: 12.87 °  
Azimuth: 164.1 °  
VS: 143.17'

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

MD: 3,723'  
TVD: 3,669.14'  
Inclination: 11.95 °  
Azimuth: 164.15 °  
VS: 150.84'

SHY SS: lt gry-off wht, occ med gy/gy, sb  
ang-sb rnd, sb plty-sb blk, v sft, v f gr,  
mod srt, occ lithic frags  
SS: clr, lt gry-off wht, occ sap, sb ang, sb  
rnd, f gr, hrd-frm, mod-w srt, sl calc cmt,  
tr glau





MD: 3,818'  
TVD: 3,762.19'  
Inclination: 11.3 °  
Azimuth: 165.34 °  
VS: 157.84'

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

529u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

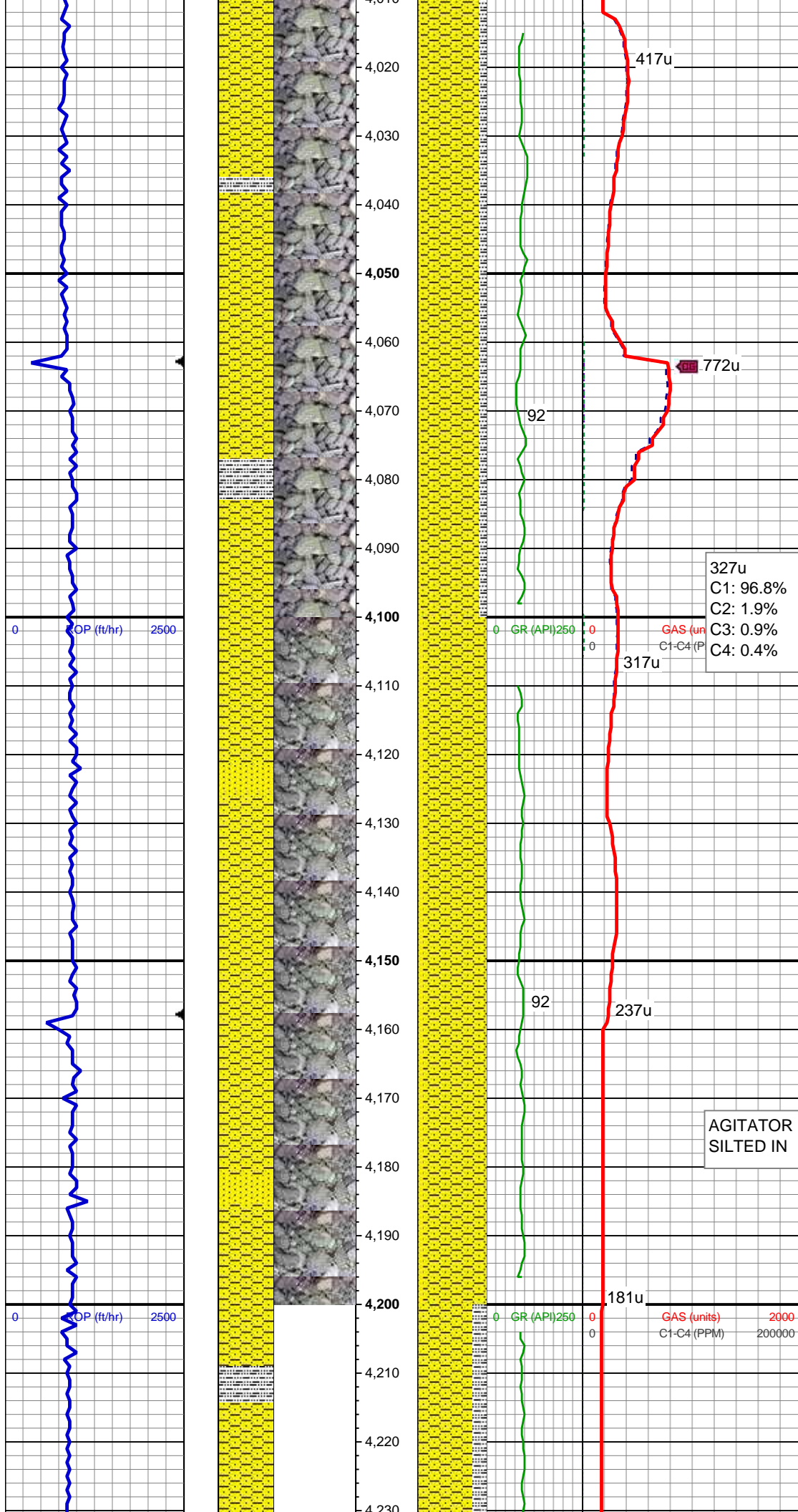
MD: 3,913'  
TVD: 3,855.22'  
Inclination: 12.04 °  
Azimuth: 167.96 °  
VS: 164.25'

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

AGITATOR  
SILTED IN

WT IN 9.80 WT OUT 9.80  
VIS IN 40 VIS OUT 40

MD: 4,008'  
TVD: 3,948.12'



Inclination: 12.15 °  
Azimuth: 168.12 °  
VS: 170.45'

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

327u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

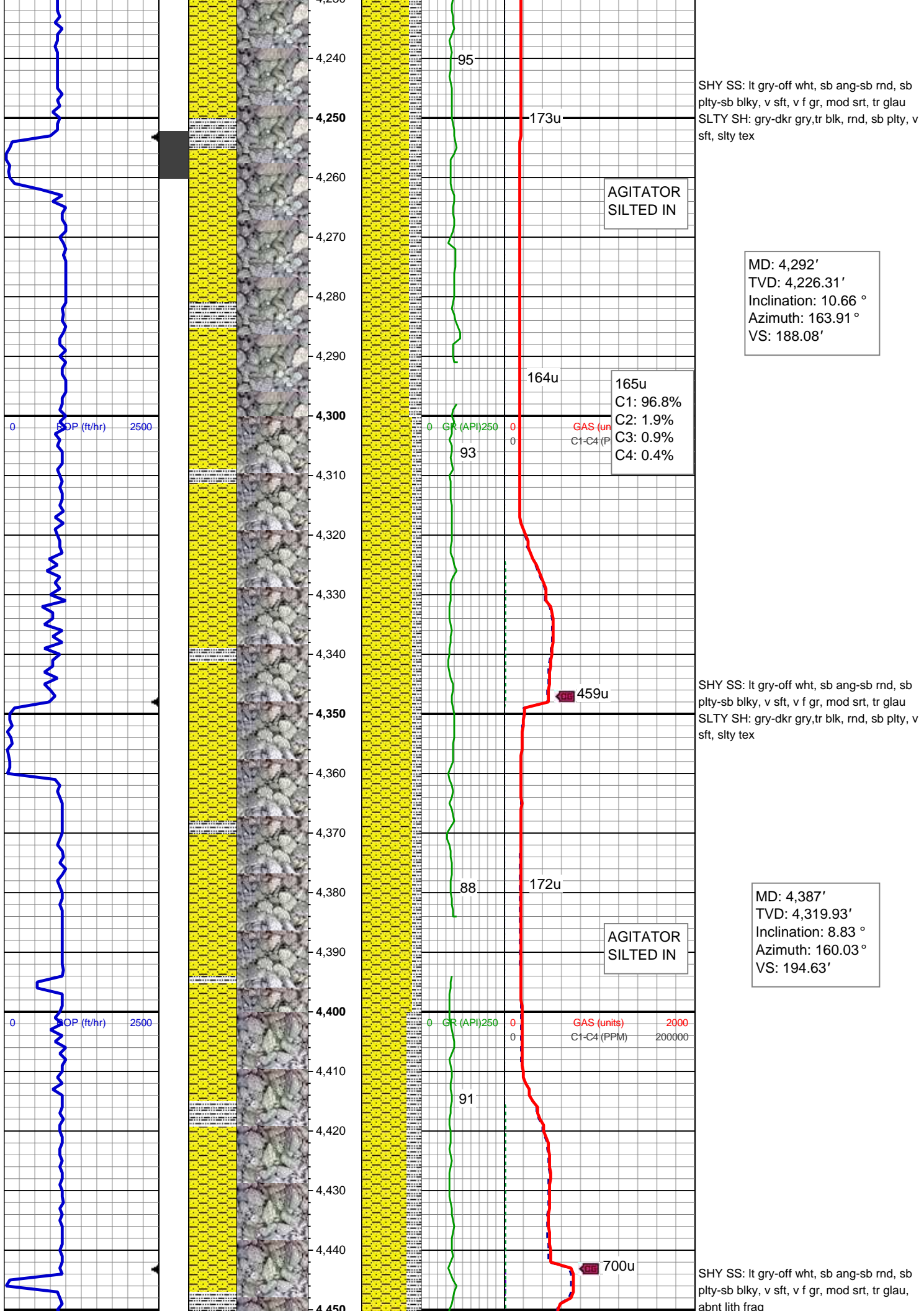
MD: 4,103'  
TVD: 4,041.04'  
Inclination: 11.87 °  
Azimuth: 169.01 °  
VS: 176.44'

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

AGITATOR  
SILTED IN

MD: 4,197'  
TVD: 4,133.08'  
Inclination: 11.53 °  
Azimuth: 169.41 °  
VS: 182'





SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
plty-sb blk, v sft, v f gr, mod srt, tr glau  
SLTY SH: gry-dkr gry, tr blk, rnd, sb plty, v  
sft, slty tex

MD: 4,292'  
TVD: 4,226.31'  
Inclination: 10.66 °  
Azimuth: 163.91 °  
VS: 188.08'

AGITATOR  
SILTED IN

165u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
plty-sb blk, v sft, v f gr, mod srt, tr glau  
SLTY SH: gry-dkr gry, tr blk, rnd, sb plty, v  
sft, slty tex

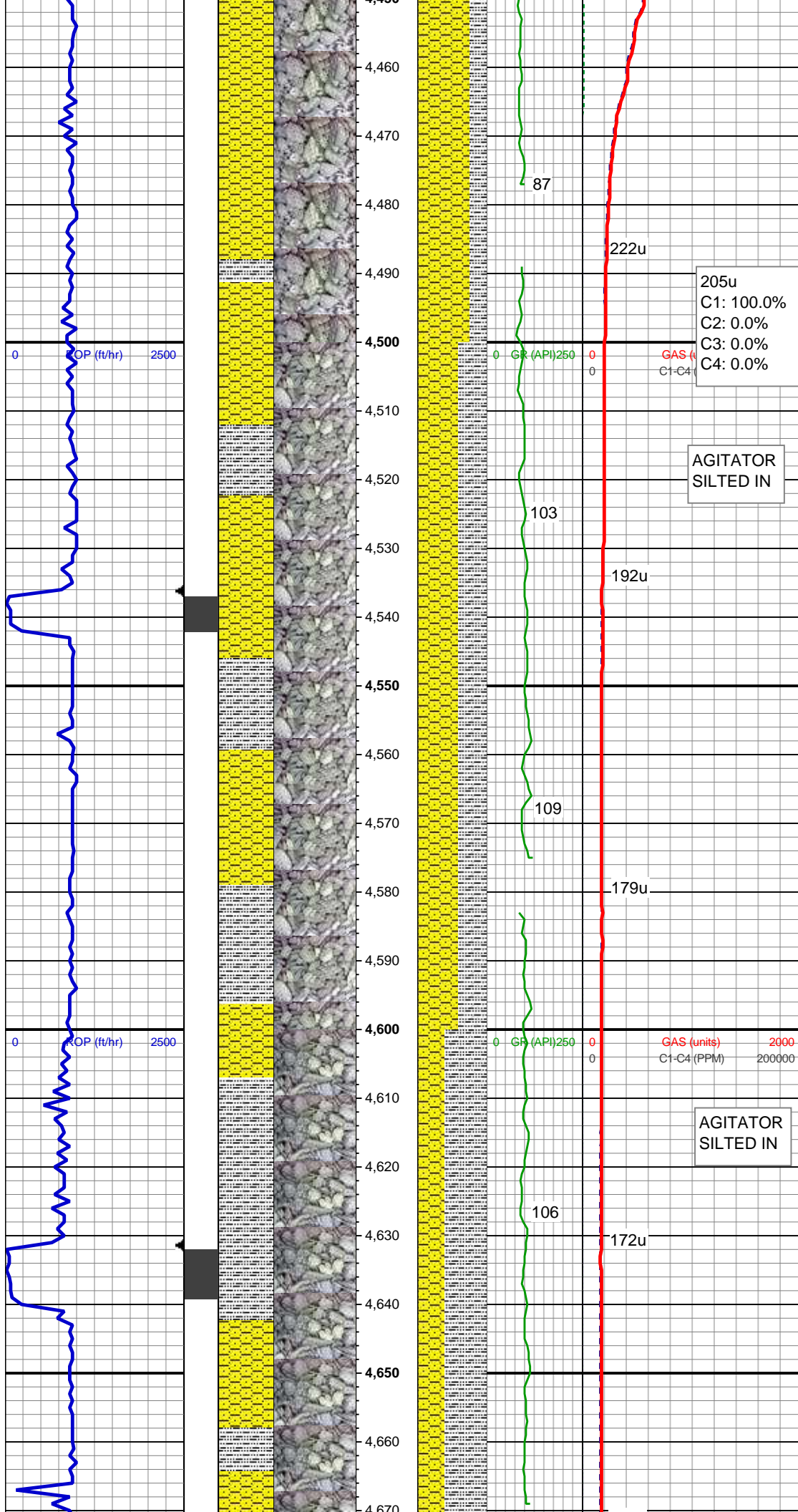
MD: 4,387'  
TVD: 4,319.93'  
Inclination: 8.83 °  
Azimuth: 160.03 °  
VS: 194.63'

AGITATOR  
SILTED IN

GAS (units)  
C1-C4 (PPM)

SHY SS: lt gry-off wht, sb ang-sb rnd, sb  
plty-sb blk, v sft, v f gr, mod srt, tr glau,  
abnt lith frag





SLTY SH: gry-dkr gry, tr blk, rnd, sb plty, v sft, slty tex

MD: 4,482'  
TVD: 4,413.96'  
Inclination: 7.57 °  
Azimuth: 159.68 °  
VS: 200.64'

205u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

AGITATOR  
SILTED IN

WT IN 10.00 WT OUT 10.00  
VIS IN 43 VIS OUT 43

SHY SS: lt gry-off wht, sb ang-sb rnd, sb plty-sb blk, v sft, v f gr, mod srt, tr glau, abnt lith frag  
SLTY SH: gry-dkr gry, tr blk, rnd, sb plty, v sft, slty tex

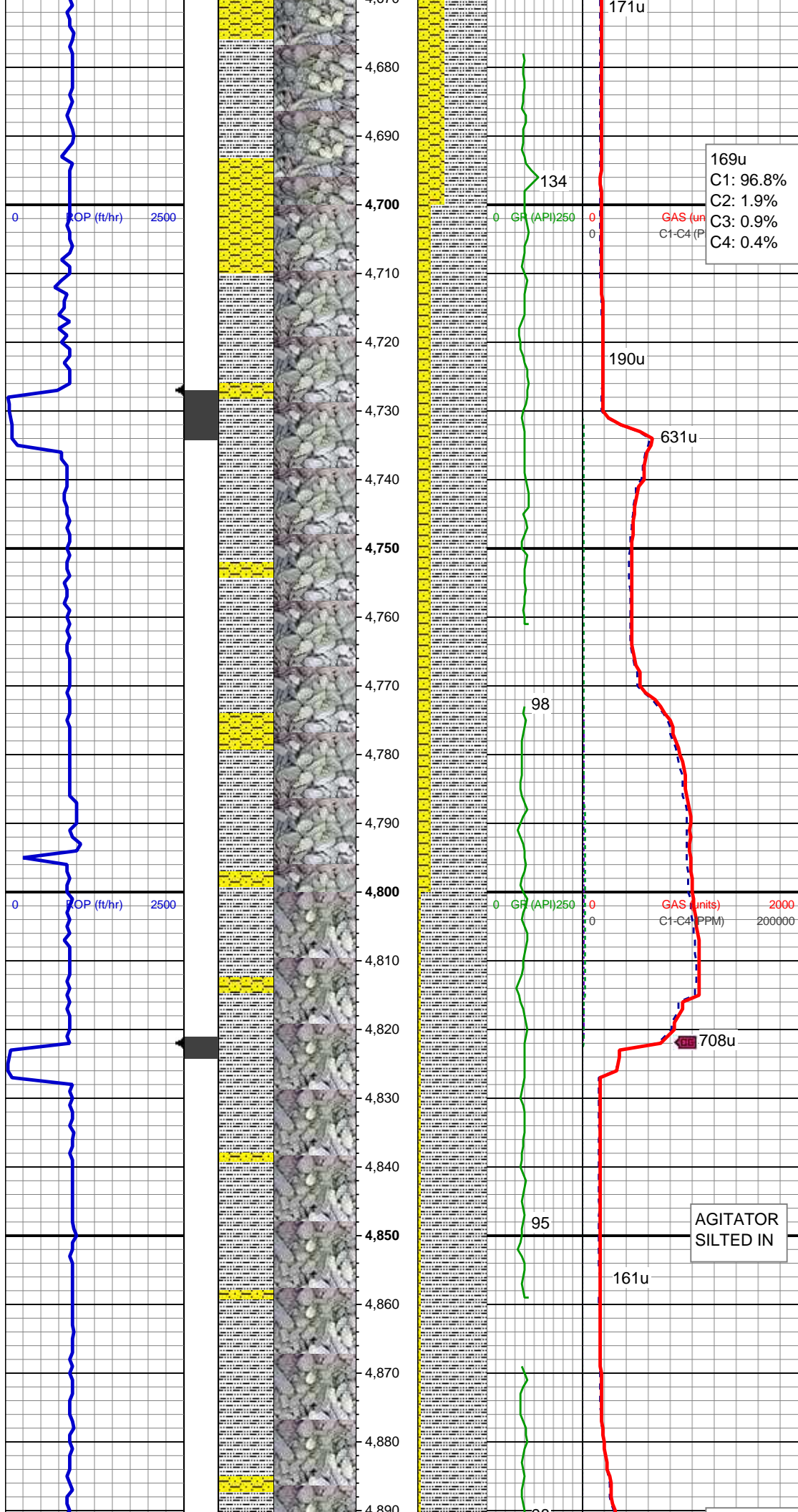
MD: 4,577'  
TVD: 4,508.29'  
Inclination: 5.97 °  
Azimuth: 163.27 °  
VS: 205.36'

GAS (units) 2000  
C1-C4 (PPM) 200000

AGITATOR  
SILTED IN

SLTY SH: gry-dkr gry, tr blk, rnd, sb plty, v sft, slty tex  
SHY SS: lt gry-off wht, sb ang-sb rnd, sb plty-sb blk, v sft, v f gr, mod srt, tr glau, abnt lith frag

MD: 4,672'  
TVD: 4,602.93'



Inclination: 3.93 °  
Azimuth: 158.53 °  
VS: 208.79'

169u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

WT IN 10.05 WT OUT 10.05  
VIS IN 45 VIS OUT 45

SLTY SH: gry-dkr gry, tr blk, rnd, sb plty, v sft, slty tex  
SHY SS: lt gry-off wht, sb ang-sb rnd, sb plty-sb blk, v sft, v f gr, mod srt, tr glau, abnt lith frag

MD: 4,766'  
TVD: 4,696.8'  
Inclination: 2 °  
Azimuth: 155.58 °  
VS: 211.12'

AGITATOR  
SILTED IN

SLTY SH: gry-dkr gry, tr blk, rnd, sb plty, v sft, slty tex  
SHY SS: lt gry-off wht, sb ang-sb rnd, sb plty-sb blk, v sft, v f gr, mod srt, tr glau, abnt lith frag

MD: 4,861'  
TVD: 4,791.77'  
Inclination: 1.18 °  
Azimuth: 166.48 °  
VS: 212.3'



