

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Rohn State LD09-64-1HN(VERT)

**Location** NE SE SEC. 9, T9N, R58W

**State** COLORADO

**County** WELD

**Country** USA

**Rig Number** H&P 326

**API Number** 05-123-37528

**AFE #** 139472

**Region** DJ BASIN

**Field** WILDCAT

**Spud Date** 10/31/2013

**Drilling Completed** 11/6/2013

**Surface Coordinates** 2,050' FSL, 480' FEL  
Lat 40.76421 N, Long 103.86165 W

**Bottom Hole Coordinates** 1,650' FSL, 660' FWL  
Lat 40.76312 N, Long 103.87649 W

**Ground Elevation** 4716'

**K.B. Elevation** 4746'

**Logged Interval** 1300' **To** 9687'

**Total Depth** 9687'

**Formation** NIOBRARA B

**Type of Drilling Fluid** LSND

## Operator

**Company** NOBLE ENERGY INC.

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

## Geologist

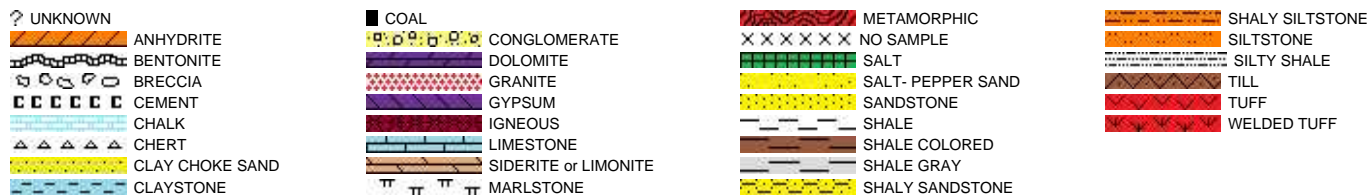
**Name** EVAN HOWELL

**Company** NOBLE ENERGY INC.

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

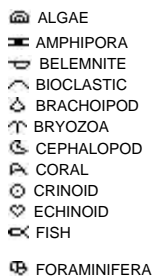
Chris Willatt  
Jessica Silvey

## Rock Types

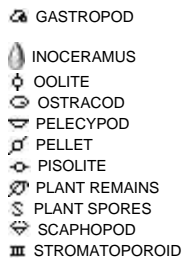


## Accessories

### Fossils

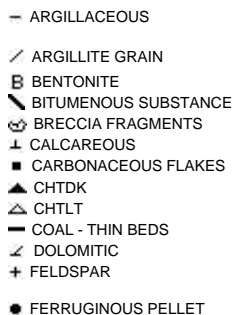


### FOSSIL



### Minerals

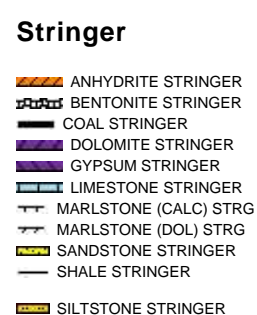
### ANHYDRITIC



### FERRUGINOUS



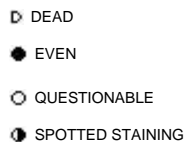
### TUFFACEOUS



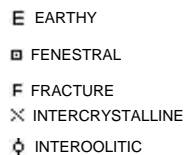
### Stringer

## Other Symbols

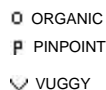
### Oil Show



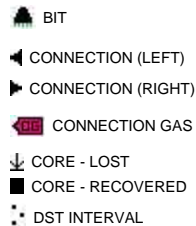
### Porosity



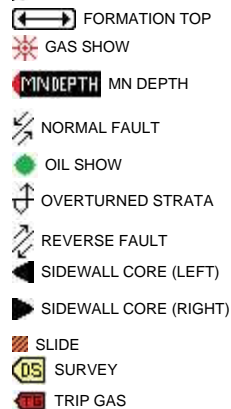
### MOLDIC



### Engineering



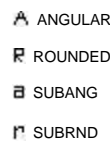
### FAULT



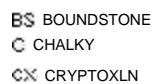
### WIRELINE TESTED - LEFT



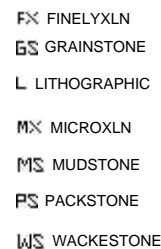
### Rounding



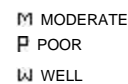
### Textures

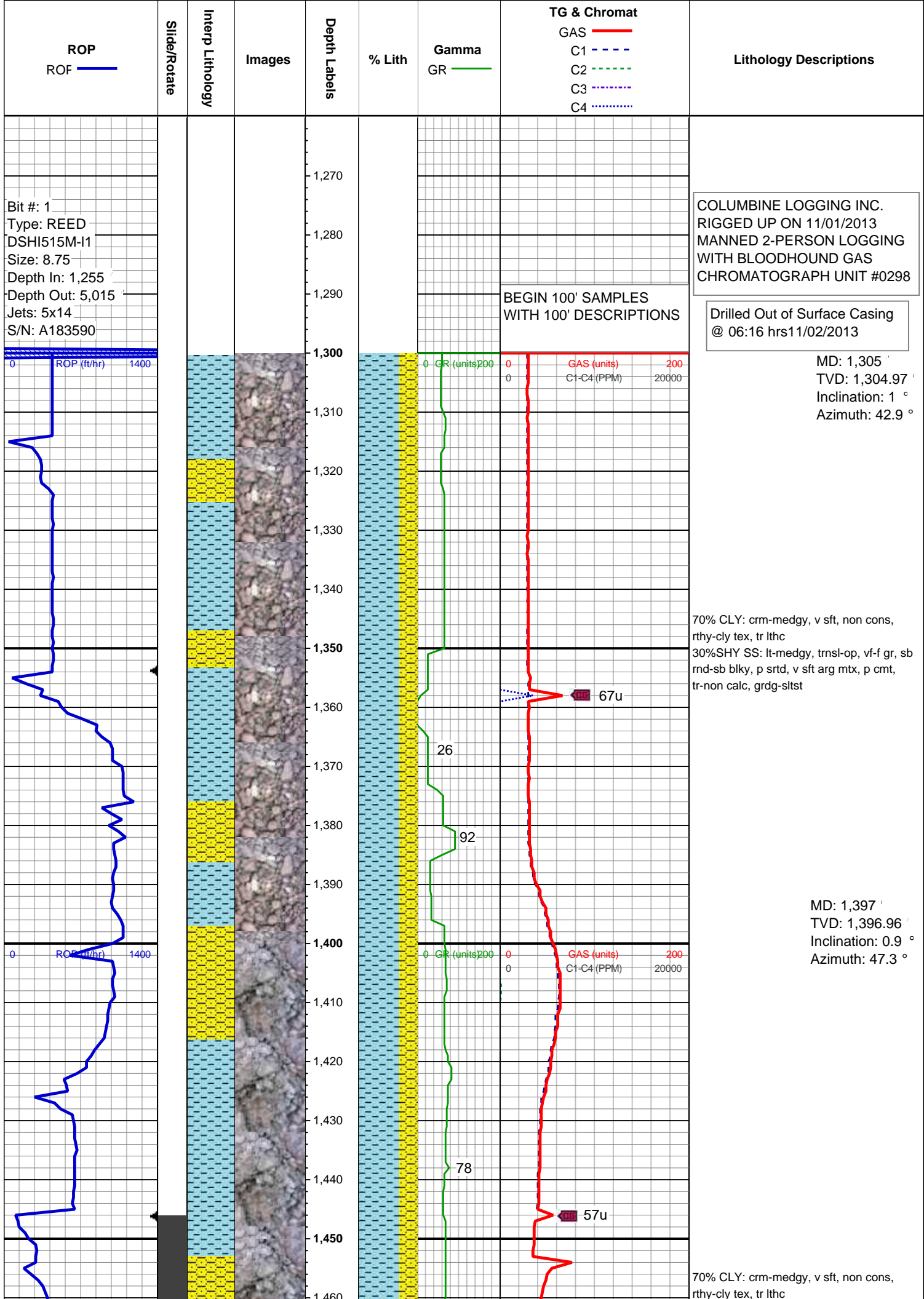


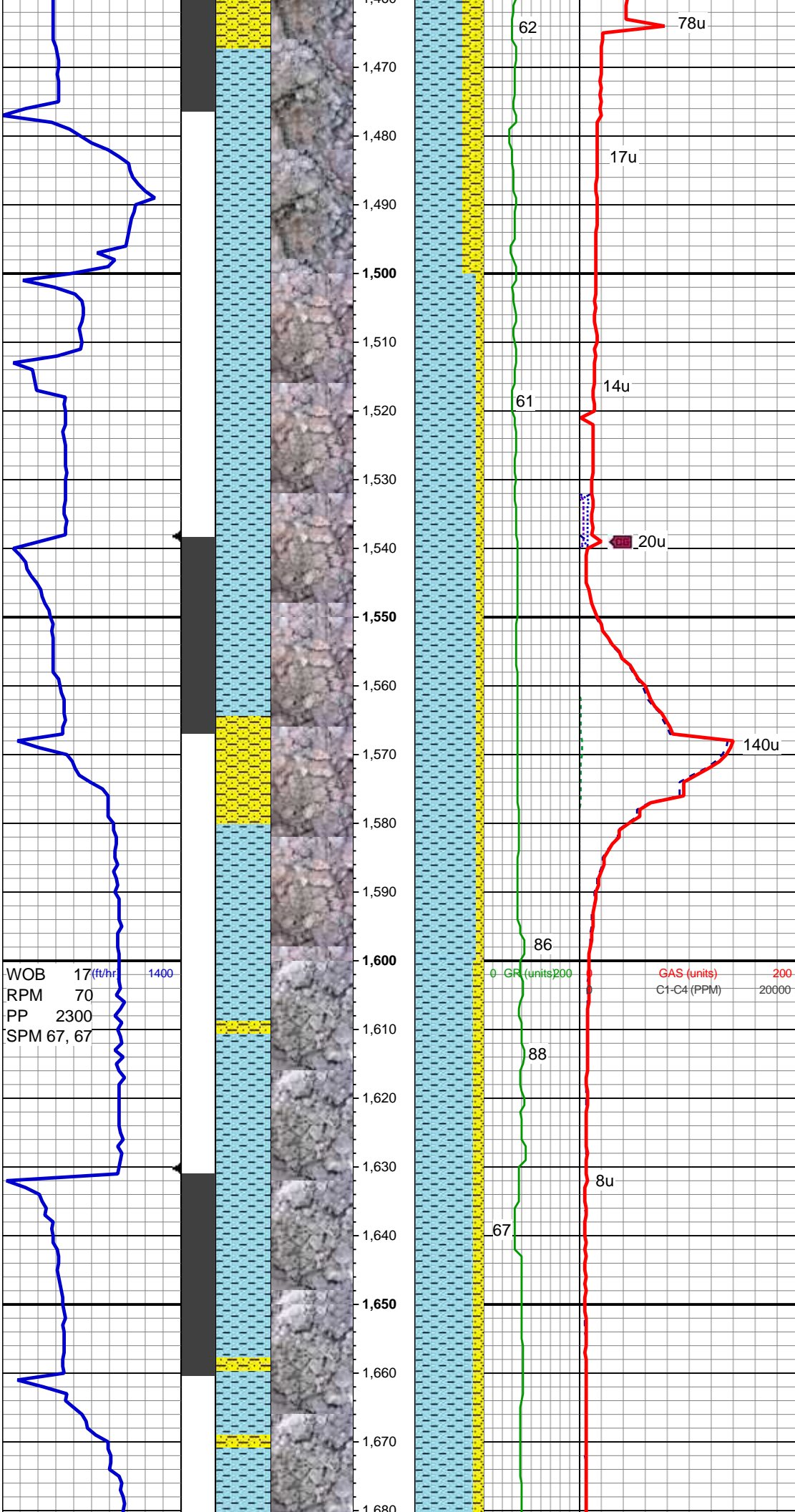
### E EARTHY



### Sorting







30%SHY SS: lt-medgy, trns-op, vf-f gr, sb  
rnd-sb blk, p srt, v sft arg mtx, p cmt,  
tr-non calc, grdg-sltst

MD: 1,489 '  
TVD: 1,488.93 '  
Inclination: 2.3 °  
Azimuth: 152.9 °

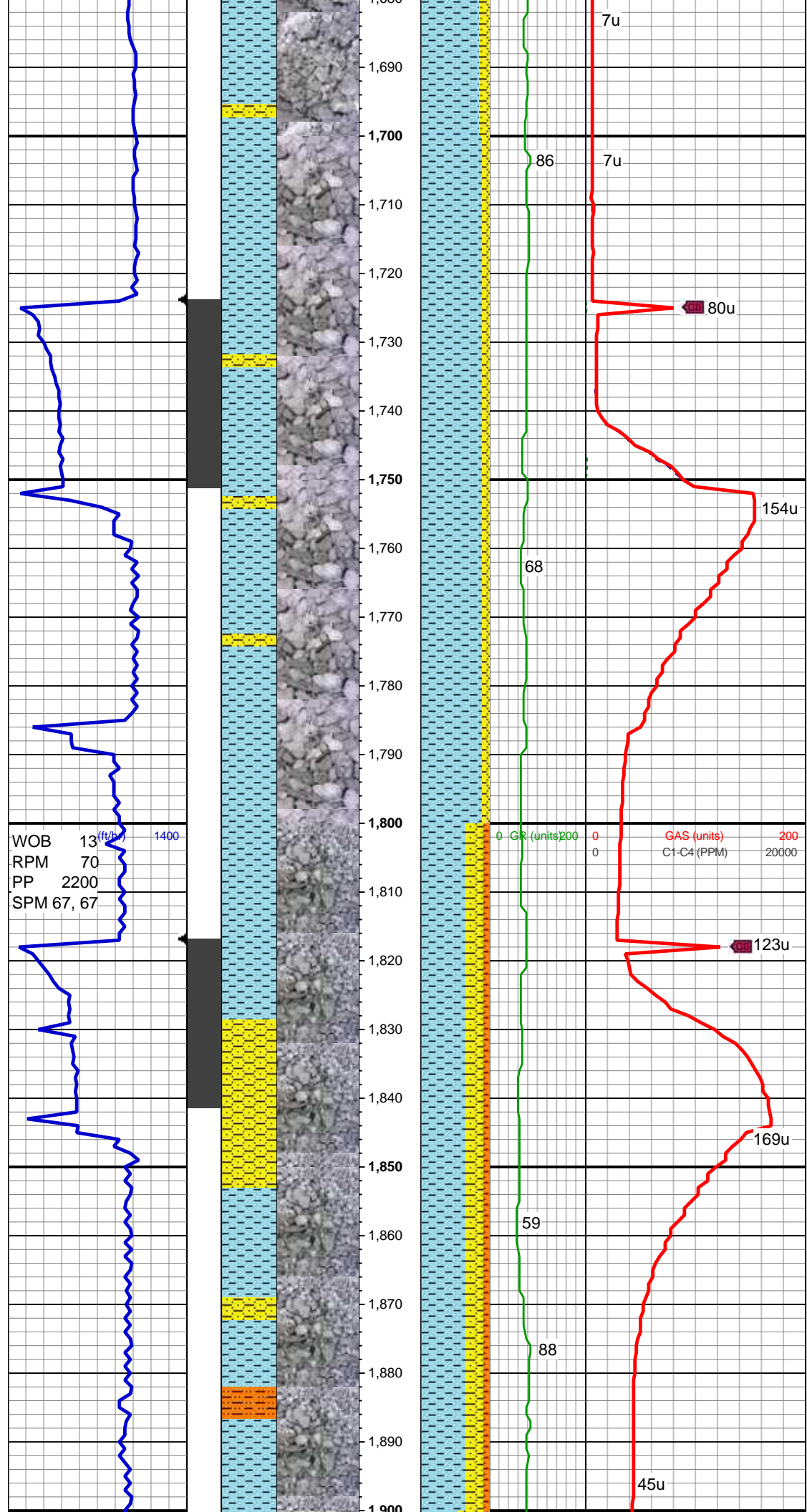
90% CLY: crm-medgy, v sft, non cons,  
rthy-cly tex, mod fiss, tr lthc  
10%SHY SS: lt-medgy, trns-op, vf-f gr, sb  
rnd-sb blk, p srt, v sft arg mtx, p cmt,  
tr-non calc, grdg-sltst

MD: 1,581 '  
TVD: 1,580.75 '  
Inclination: 4.8 °  
Azimuth: 164.2 °

85% CLY: crm-medgy, v sft, non cons,  
rthy-cly tex, mod fiss, tr lthc  
15%SHY SS: lt-medgy, trns-op, vf-f gr, sb  
rnd-sb blk, p srt, v sft arg mtx, p cmt,  
tr-non calc, grdg-sltst

MD: 1,675 '  
TVD: 1,674.19 '  
Inclination: 7.6 °  
Azimuth: 165.9 °

WT: 8.5 VIS: 30

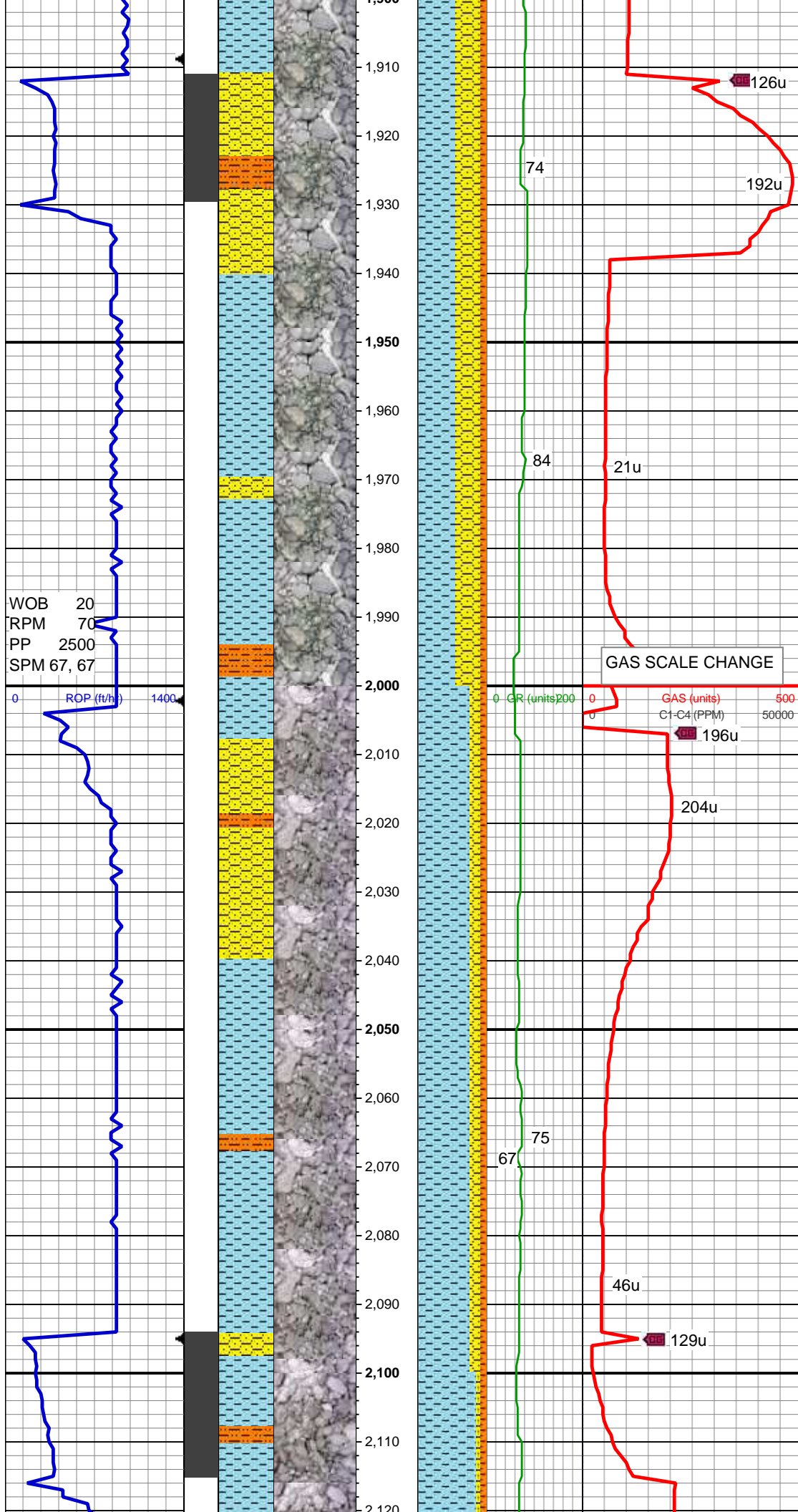


90% CLY: crm-medgy, v sft, non cons, rthy-cly tex, mod fiss, tr lthc  
10%SHY SS: lt-medgy, trns-op, vf-f gr, sb rnd-sb blk, p srted, v sft arg mtx, p cmt, tr-non calc, grdg-sltst, tr SS

MD: 1,768 '  
TVD: 1,766.08 '  
Inclination: 10.1 °  
Azimuth: 167.3 °

65% CLY: crm-medgy, v sft, non cons, rthy-cly tex, mod fiss, tr lthc  
25%SHY SS: lt-medgy, trns-op, vf-f gr, sb rnd-sb blk, p srted, v sft arg mtx, p cmt, tr-non calc, grdg-sltst, tr diss pyr  
10% SHY SLTST:lt-dk gy,sb blk-sb plty, v sft, mod arg, tr calc

MD: 1,860 '  
TVD: 1,856.29 '  
Inclination: 12.5 °  
Azimuth: 167.2 °



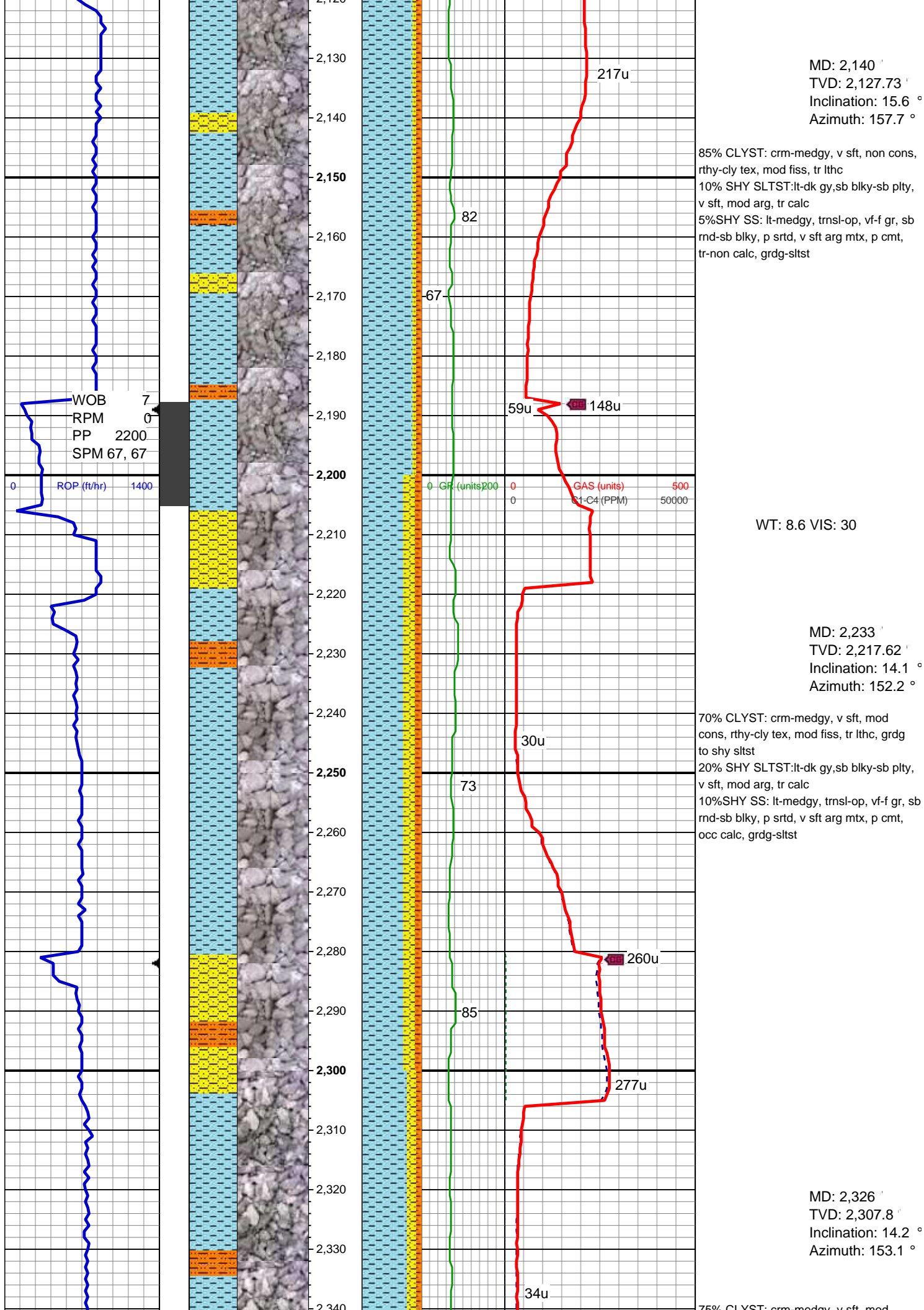
55% CLY: crm-medgy, v sft, non cons,  
rthy-cly tex, mod fiss, tr lthc  
35%SHY SS: lt-medgy, trnsf-op, vf-f gr, sb  
rnd-sb blk, p srt, v sft arg mt, p cmt,  
tr-non calc, grdg-sltst, tr diss pyr, tr glau  
10% SHY SLTST:lt-dk gy,sb blk-sb plty,  
v sft, mod arg, tr calc

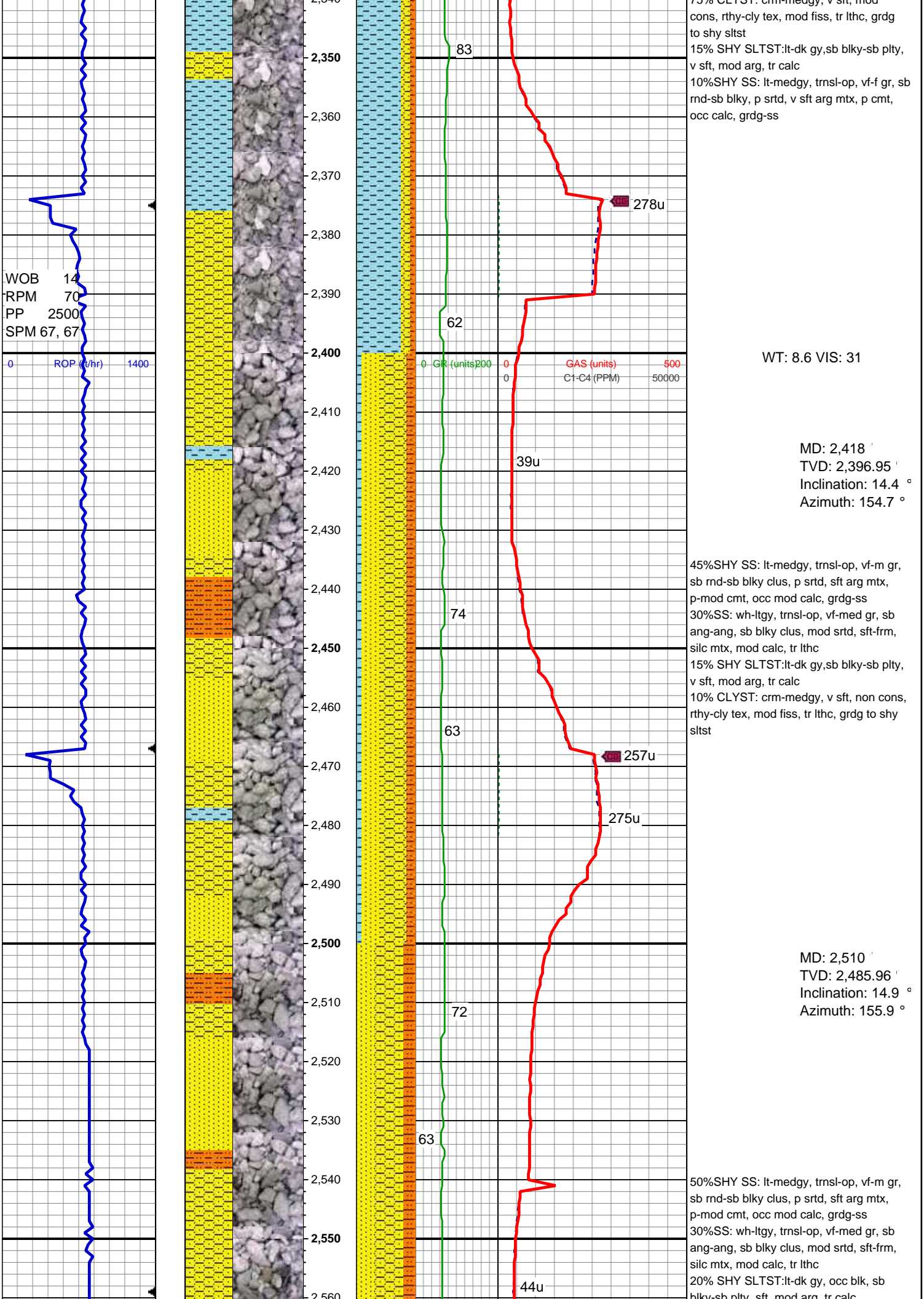
MD: 1,953 '  
TVD: 1,946.81 '  
Inclination: 14 °  
Azimuth: 163.6 °

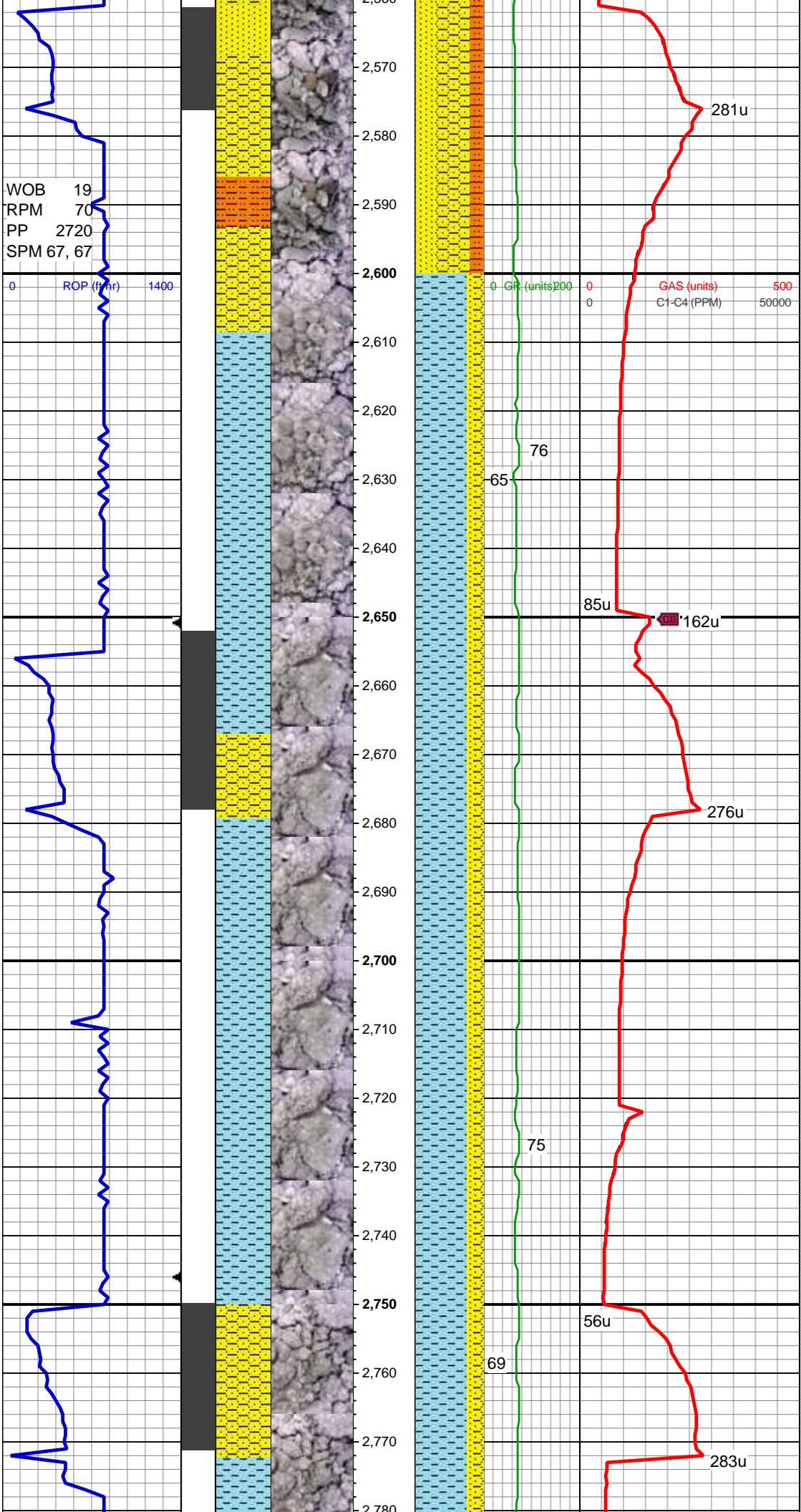
WT: 8.6 VIS: 30

MD: 2,046 '  
TVD: 2,036.95 '  
Inclination: 14.5 °  
Azimuth: 164.3 °

75% CLY: crm-medgy, v sft, non cons,  
rthy-cly tex, mod fiss, tr lthc  
15%SHY SS: lt-medgy, trnsf-op, vf-f gr, sb  
rnd-sb blk, p srt, v sft arg mt, p cmt,  
tr-non calc, grdg-sltst  
10% SHY SLTST:lt-dk gy,sb blk-sb plty,  
v sft, mod arg, tr calc







MD: 2,602 '  
TVD: 2,574.95 '  
Inclination: 14.5 °  
Azimuth: 154.9 °

75% CLYST: crm-medgy, v sft, mod  
cons, rthy-cly tex, mod fiss, tr lithc, grdg  
to shy sltst  
15%SHY SS: lt-medgy, trnsi-op, vf-m gr,  
sb rnd-sb blkly clus, p srted, sft arg mtz,  
p-mod cmt, occ mod calc, grdg-ss  
10%SS: wh-ltgy, trnsi-op, vf-med gr, sb  
ang-ang, sb blkly clus, mod srted, sft-frn,  
silc mtz, mod calc, grdg to shy sltst

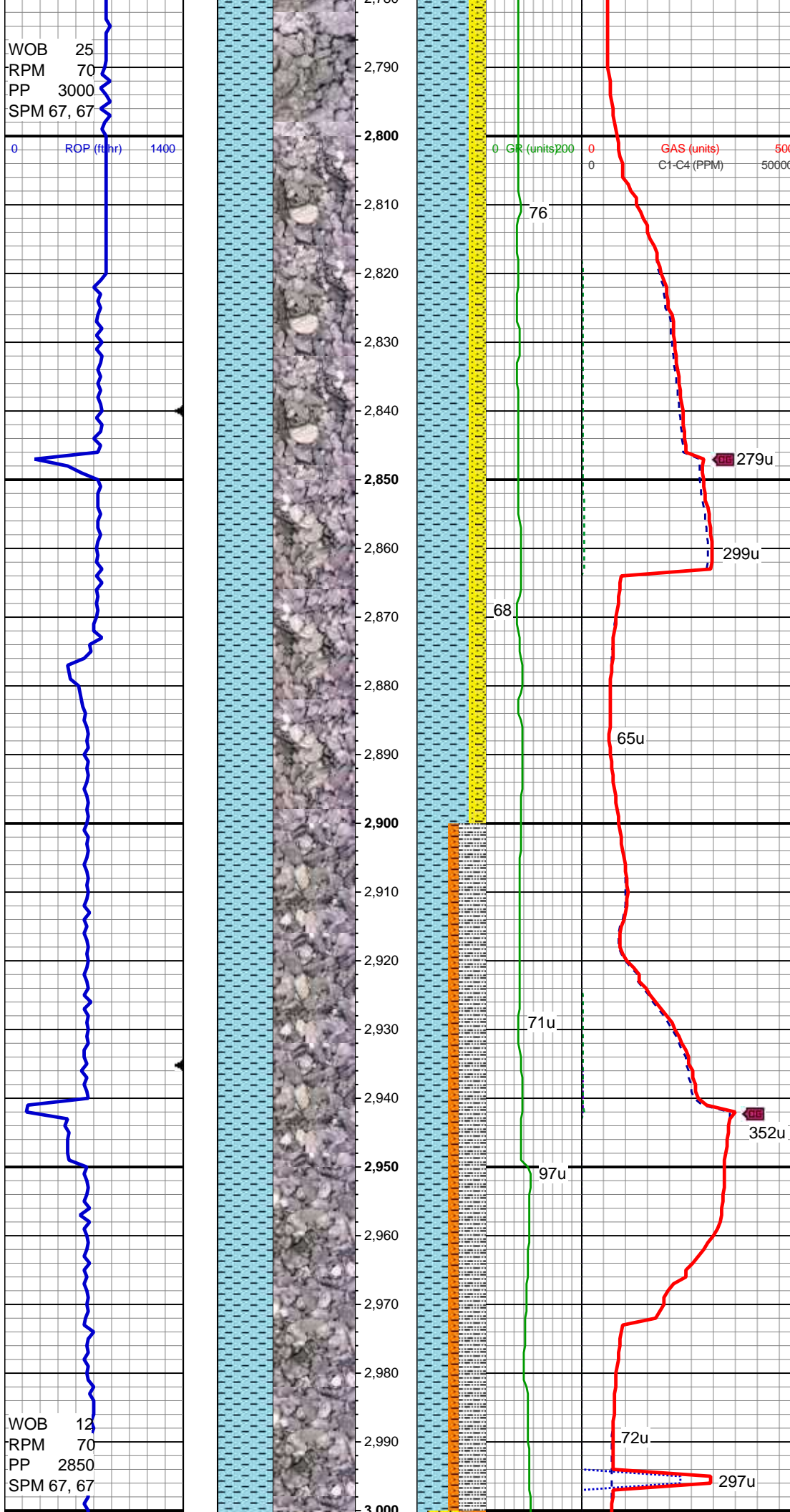
MD: 2,697 '  
TVD: 2,667.17 '  
Inclination: 13.3 °  
Azimuth: 149.6 °

WT: 8.6 VIS: 31

75% CLYST: crm-medgy, v sft, mod  
cons, rthy-cly tex, mod fiss, tr lithc, grdg  
to shy sltst  
15%SHY SS: lt-medgy, trnsi-op, vf-m gr,  
sb rnd-sb blkly clus, p srted, sft arg mtz,  
p-mod cmt, occ mod calc, grdg-ss  
10%SS: wh-ltgy, trnsi-op, vf-med gr, sb  
ang-ang, sb blkly clus, mod srted, sft-frn,  
silc mtz, mod calc, grdg to shy sltst

0	ROP (ft/yr)	1400
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WT: 8.6 VIS: 31



75% CLYST: crm-medgy, v sft, mod  
cons, rthy-cly tex, mod fiss, tr lthc, grdg  
to shy sltst

15%SHY SS: lt-medgy, trnsf-op, vf-m gr,  
sb rnd-sb blkly clus, p srted, sft arg mtx,  
p-mod cmt, occ mod calc, grdg-ss

10%SS: wh-ltgy, trnsf-op, vf-med gr, sb  
ang-ang, sb blkly clus, mod srted, sft-frm,  
slc mtz, mod calc, grdg to shy sltst

MD: 2,886 '  
TVD: 2,852.22 '  
Inclination: 11 °  
Azimuth: 144.7 °

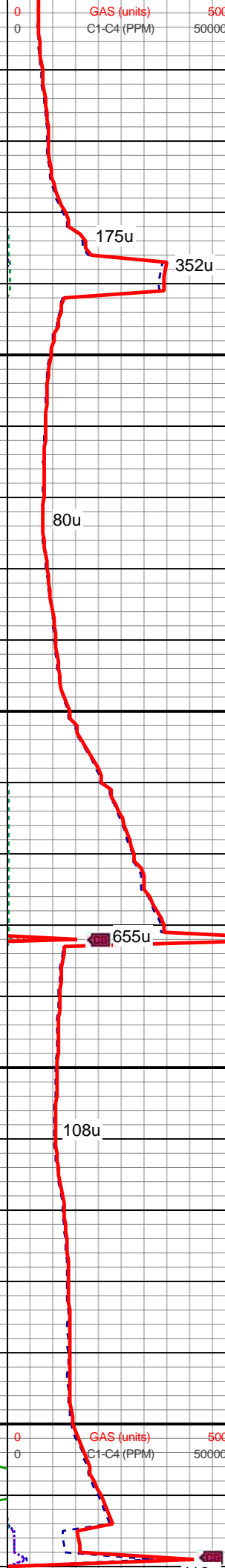
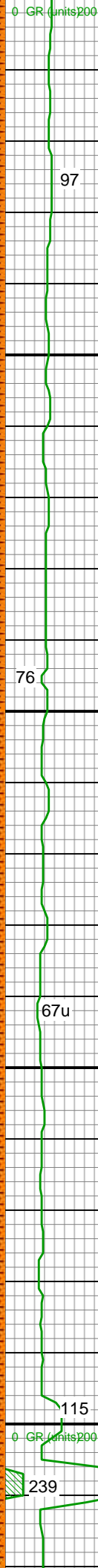
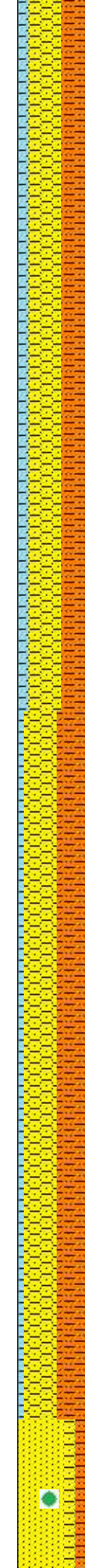
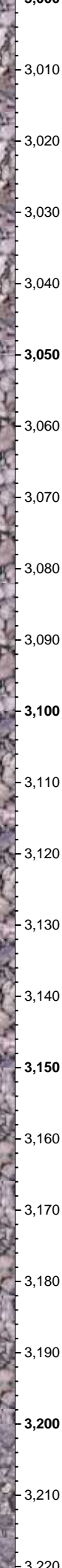
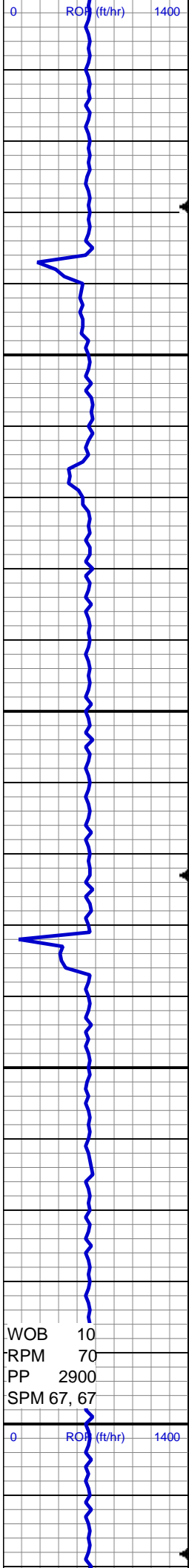
45%CLYST: lt-medgy, v sft, mod cons,  
rthy-cly tex, occ fiss, tr lthc, grgd to shy  
slst

40%SLTY SH:dk gy-blk, sft-mod frm, sb  
pty-pty, mod arg, rthy tex, non calc, occ  
grgd to shy ss

15% SHY SLTST:lt-dk gy, occ blk, sb  
bky-sb pty, sft, mod arg, tr calc

MD: 2,980 '  
TVD: 2,944.66 '  
Inclination: 9.9 °  
Azimuth: 145.4 °

WOB	12
RPM	70
PP	2850
SPM	67, 67

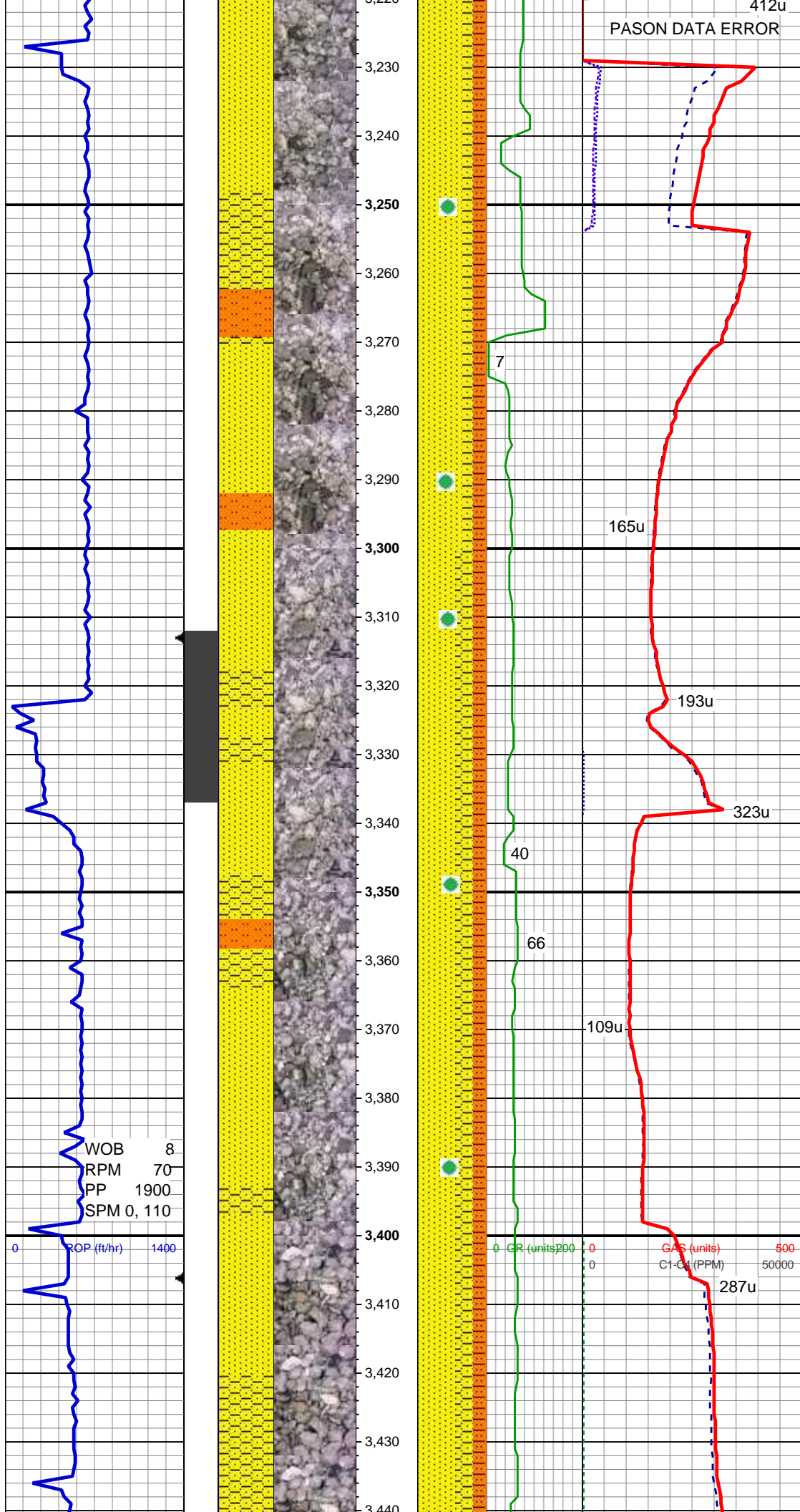


45%SHY SS: lt-medgy, trns-op, vf-m gr, sb rnd-sb blkly clus, p srted, arg mtx, p-mod cmt, occ mod calc, grd-g-ss  
40% SHY SLTST:lt-dk gy, occ blk, sb blkly-sb plty, sft-med frm, mod arg, tr calc  
15%CLYST: lt-medgy, v sft, mod cons, rthy-cly tex, occ fiss, tr lithc, grd-g to shy sltst

MD: 3,074 '  
TVD: 3,037.39 '  
Inclination: 8.9 °  
Azimuth: 145.7 °

WT: 8.8 VIS: 30

MD: 3,169 '  
TVD: 3,131.26 '  
Inclination: 8.8 °  
Azimuth: 144.1 °



65%SS: wh-ltgy, occ brn, trns-l-op, vf-med gr, sb ang-ang, sb blkly clus, p srted, sft-frm, silc mtx, non to mod calc, tr lthc, mod o show, mod glau  
15%SHY SS: lt-medgy, mod brn, trns-l-op, vf-m gr, sb rnd-sb blkly clus, p srted, arg mtx, p-mod cmt, occ mod calc, grdg-ss, mod to v calc, mod o show  
20% SHY SLTST:lt-dk gy, occ blk, sb blkly-sb plty, sft-med frm, mod arg, tr calc, mod diss mpyr

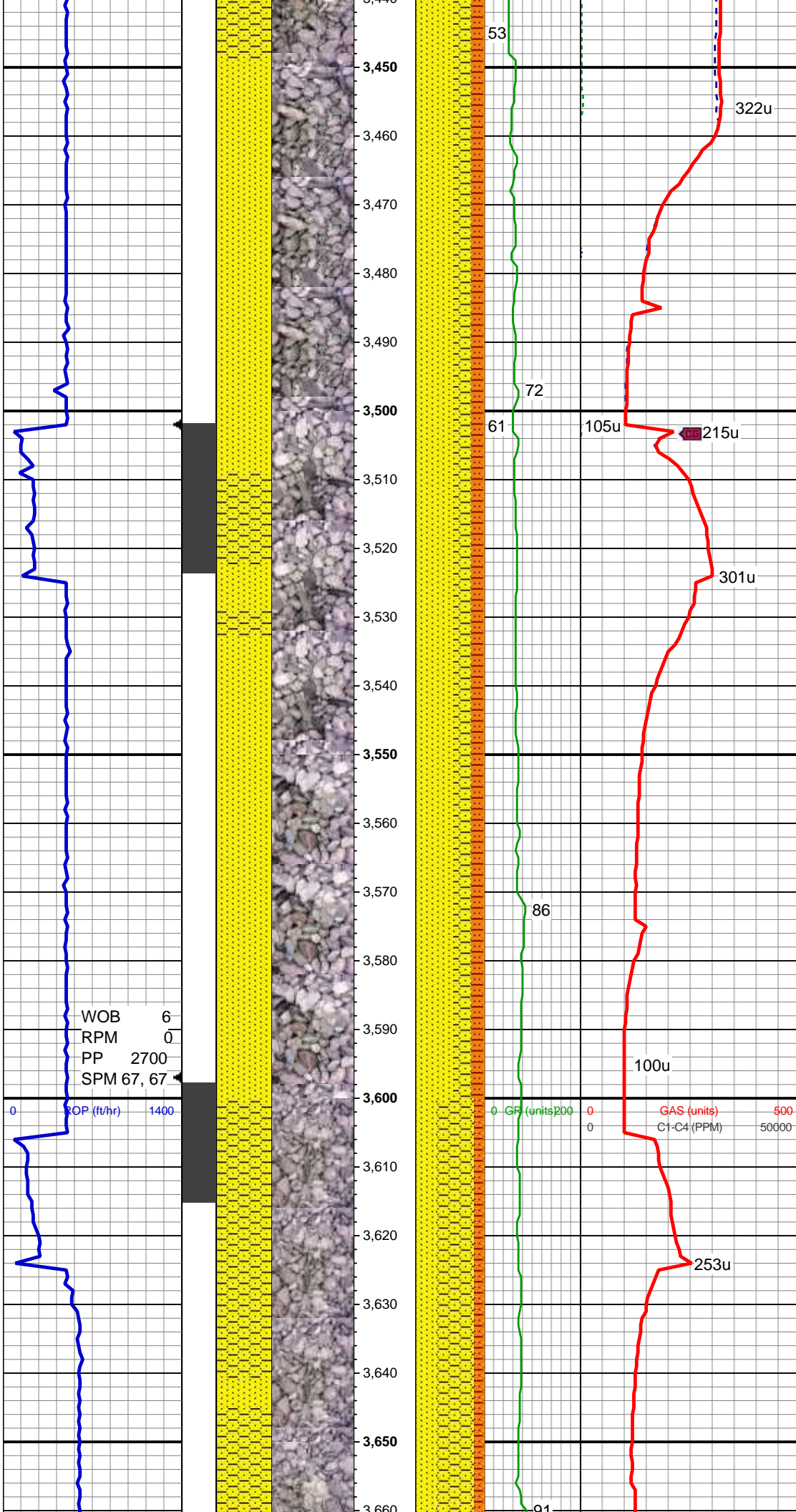
MD: 3,264 '  
TVD: 3,225.11 '  
Inclination: 9.1 °  
Azimuth: 144.5 °

55%SS: wh-ltgy, occ brn, trns-l-op, vf-c gr, sb ang-ang, sb blkly clus, p srted, sft-frm, silc mtx, non to mod calc, tr lthc, mod o show, mod glau  
25%SHY SS: lt-medgy, mod brn, trns-l-op, vf-c gr, sb rnd-sb blkly clus, p srted, arg mtx, p-mod cmt, occ mod calc, grdg-ss, mod to v calc, mod o show  
20% SHY SLTST:lt-dk gy, occ blk, sb blkly-sb plty, sft-med frm, mod arg, tr calc, mod diss mpyr

MD: 3,359 '  
TVD: 3,318.94 '  
Inclination: 8.9 °  
Azimuth: 151.7 °

WT: 8.9 VIS: 29

55%SS: wh-ltgy, occ brn, trns-l-op, vf-c gr,



sb ang-ang, sb blkly clus, p srted, sft-frm, silc mtx, non to mod calc, tr lthc, mod o show, mod glau  
25%SHY SS: lt-medgy, mod brn, trnsi-op, vf-c gr, sb rnd-sb blkly clus, p srted, arg mtx, p-mod cmt, occ mod calc, grdg-ss, mod to v calc, mod o show  
20% SHY SLTST:lt-dk gy, occ blk, sb blkly-sb plty, sft-med frm, mod arg, tr calc, mod dissim pyr

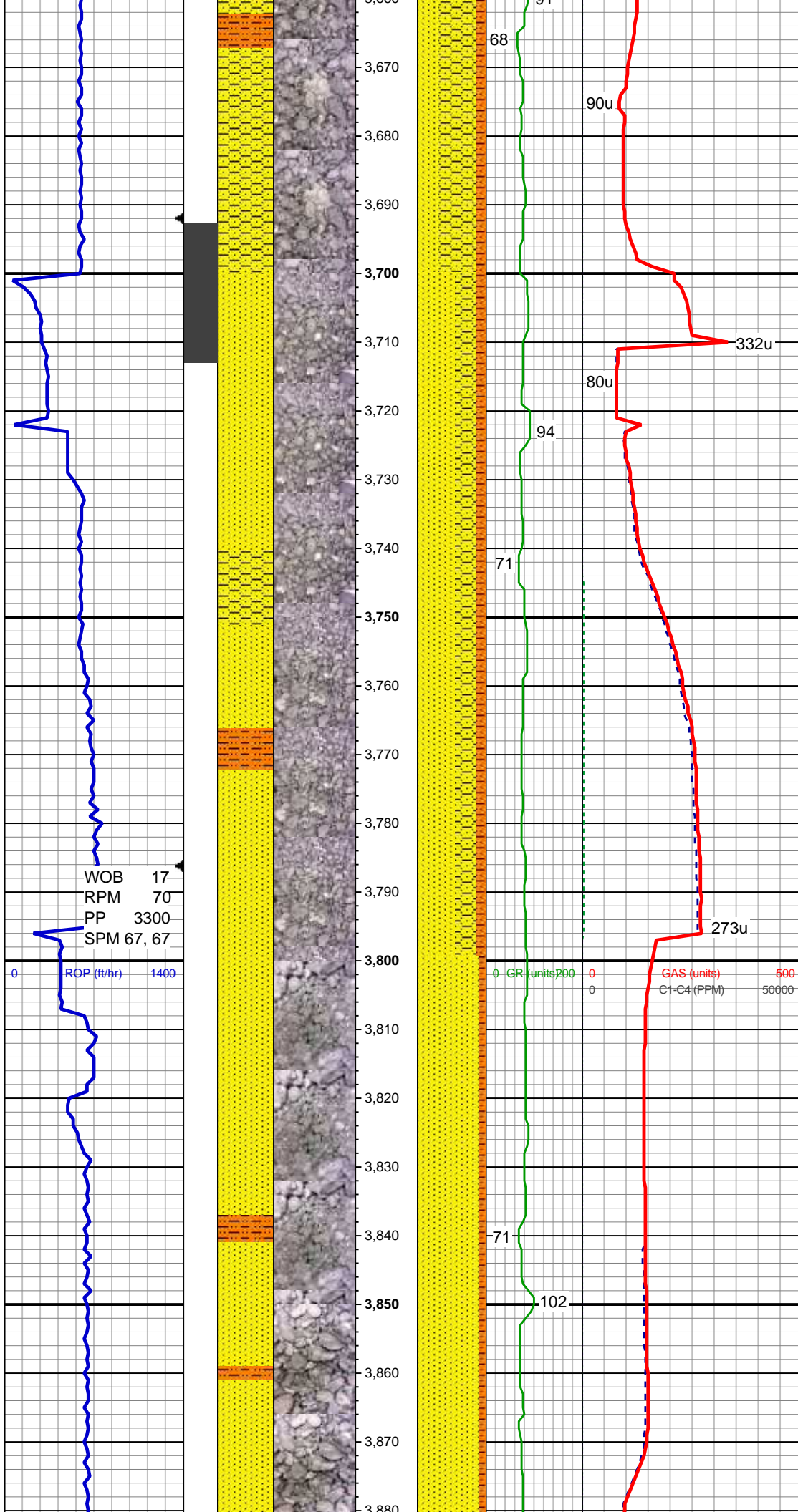
MD: 3,453 '  
TVD: 3,411.78 '  
Inclination: 9.1 °  
Azimuth: 153.8 °

55%SS: wh-ltgy, occ brn, trnsi-op, vf-c gr, sb ang-ang, sb blkly clus, p srted, sft-frm, silc mtx, non to mod calc, tr lthc, mod o show, mod glau  
25%SHY SS: lt-medgy, mod brn, trnsi-op, vf-c gr, sb rnd-sb blkly clus, p srted, arg mtx, p-mod cmt, occ mod calc, grdg-ss, mod to v calc, mod o show  
20% SHY SLTST:lt-dk gy, occ blk, sb blkly-sb plty, sft-med frm, mod arg, tr calc, mod dissim pyr

MD: 3,548 '  
TVD: 3,505.72 '  
Inclination: 8 °  
Azimuth: 154.1 °

55%SHY SS: lt-medgy, mod brn, trnsi-op, vf-f gr, sb rnd-sb blkly clus, p srted, arg mtx, p-mod cmt, occ mod calc, mod to v calc  
30%SS: wh-ltgy, trnsi-op, vf-c gr, sb ang-ang, sb blkly clus, p srted, sft-frm, silc mtx, non to mod calc, tr lthc  
15% SHY SLTST:lt-dk gy, occ blk, sb blkly-sb plty, sft-med, mod arg, tr calc

MD: 3,643 '  
TVD: 3,599.86 '  
Inclination: 7.5 °  
Azimuth: 148 °



WOB 17  
RPM 70  
PP 3300  
SPM 67, 67

ROP (ft/hr) 1400

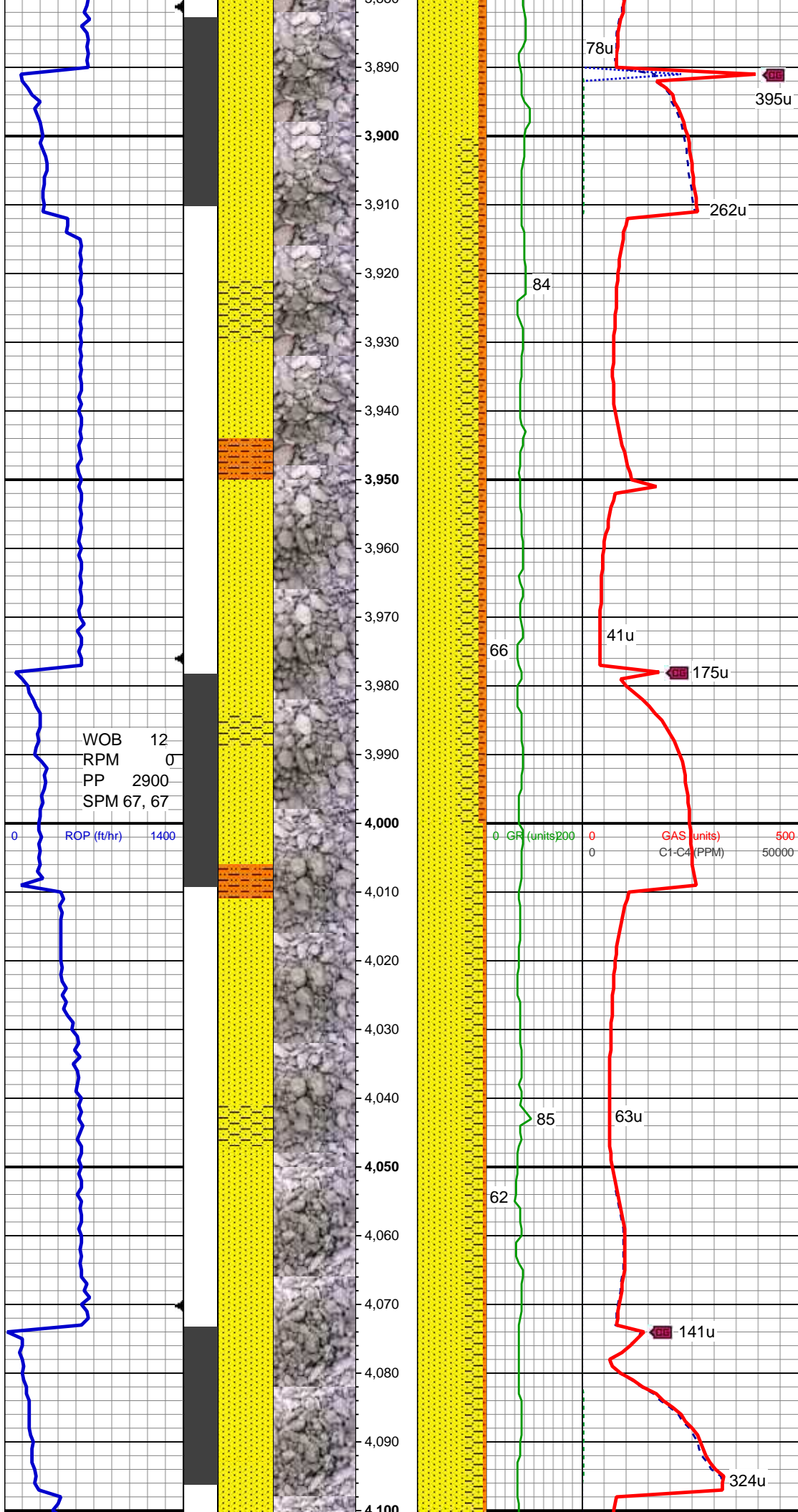
MD: 3,737 '  
TVD: 3,693.26 '  
Inclination: 5.4 °  
Azimuth: 154.7 °

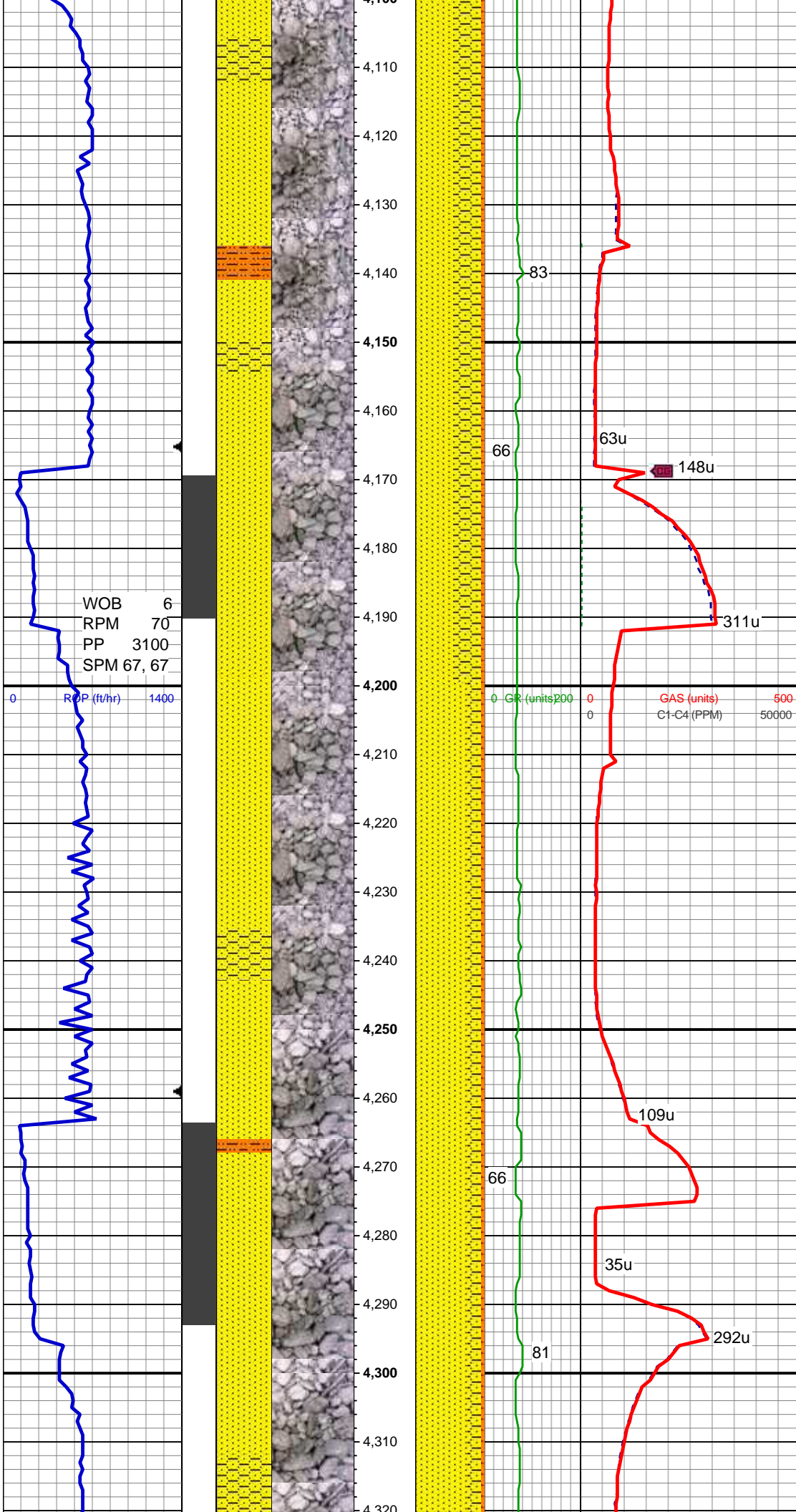
55%SS: wh-ltgy, trns-l-op, vf-c gr, sb  
ang-ang, sb blk-y clus, p srt-d, sft-frm, silc  
mtx, non to mod calc, tr lthc  
30%SHY SS: lt-medgy, mod brn, trns-l-op,  
vf-f gr, sb rnd-sb blk-y clus, p srt-d, arg mtx,  
p-mod cmt, occ mod calc, mod to v calc  
15% SHY SLTST:lt-dk gy, occ blk, sb  
blk-y-sb plty, sft-med, mod arg, tr calc

MD: 3,832 '  
TVD: 3,787.88 '  
Inclination: 4.9 °  
Azimuth: 157.7 °

90%SS: wh-ltgy, trns-l-op, vf-c gr, sb  
ang-ang, sb blk-y clus, p srt-d, tr plty,  
sft-frm, silc mtx, non to mod calc, tr lthc  
10% SHY SLTST: dk gy, occ blk, sb  
blk-y-sb plty, sft-med, mod arg, tr calc

WT: 8.9 VIS: 30





MD: 4,116 '  
TVD: 4,071.5 '  
Inclination: 1.5 °  
Azimuth: 85.6 °

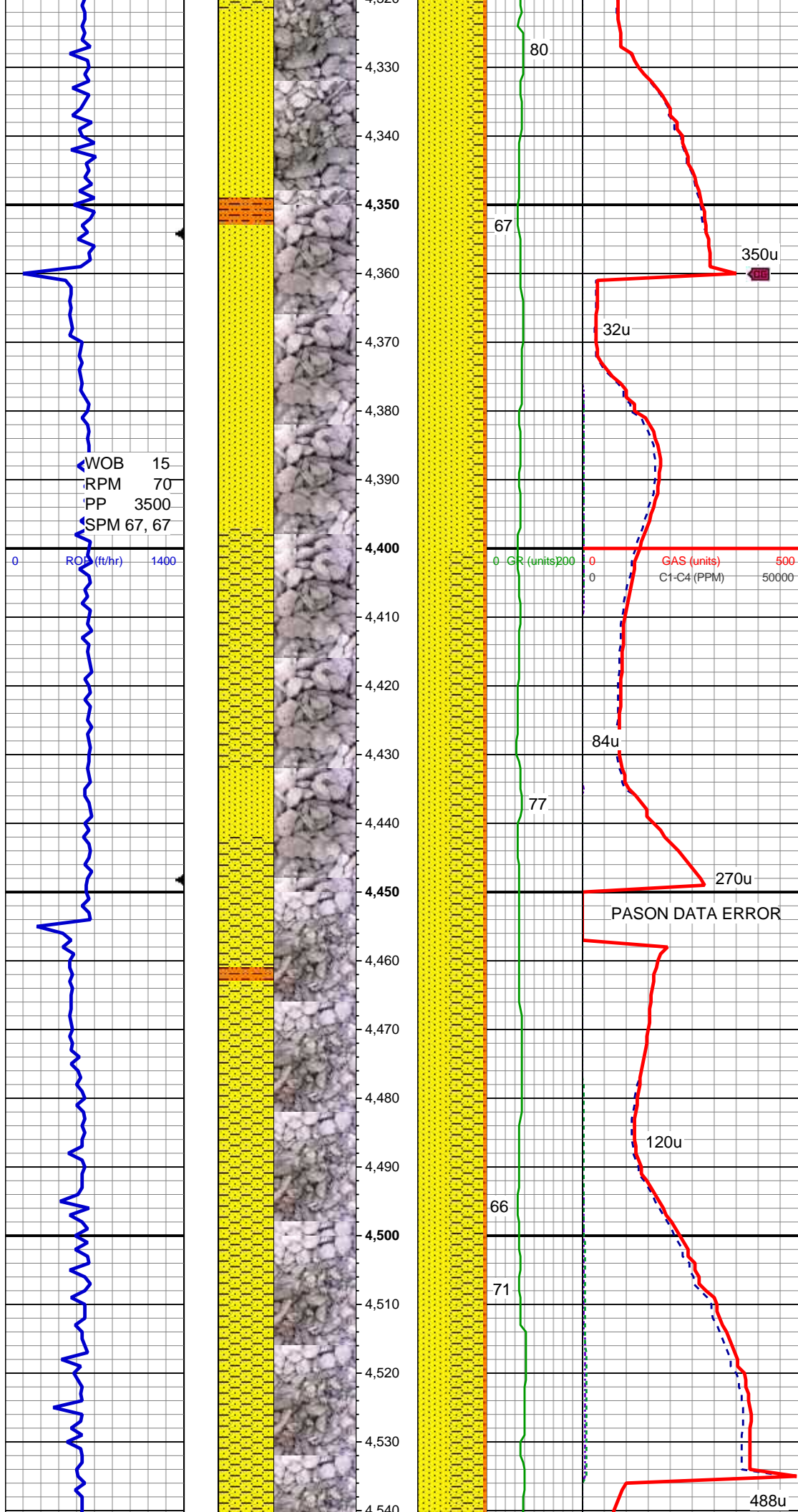
55%SS: wh-ltgy, trns-op, vf-c gr, sb ang-ang, sb blkly clus, p-mod srted, sft-frm, silc mtx, non to mod calc, tr lthc, tr glau  
45%SHY SS: lt-medgy, trns-op, vf-med gr, sb rnd-sb blkly, p srted, arg mtx, p-mod cmt, occ mod calc, mod to v calc  
5% SHY SLTST:lt-dk gy, sb blkly-sb plty, sft-med frm, mod arg, tr calc

MD: 4,210 '  
TVD: 4,165.47 '  
Inclination: 1.8 °  
Azimuth: 21.1 °

WT IN: 8.85 VIS IN: 29  
WT OUT: 9.15 VIS OUT: 30

75%SS: lt gry-drkgy, trns-op, vf-c gr, sb ang-ang, p-mod srted, sft-frm, silc mtx, non to mod calc, tr lthc, occ glau  
20%SHY SS: lt-medgy, trns-op, vf-c gr, sb rnd-sb blkly, p srted, arg mtx, p-mod cmt, occ mod calc, mod to v calc  
5% SHY SLTST:lt-dk gy, sb blkly-sb plty, sft-med frm, mod arg, tr calc

MD: 4,305 '  
TVD: 4,260.45 '  
Inclination: 1.3 °  
Azimuth: 263 °



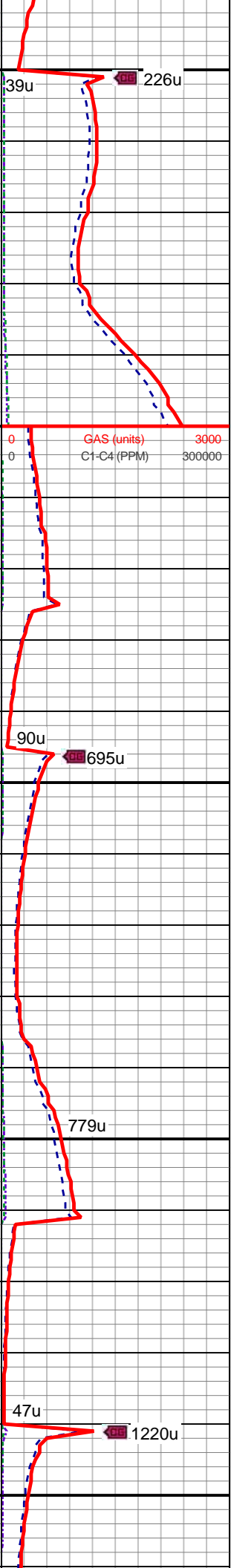
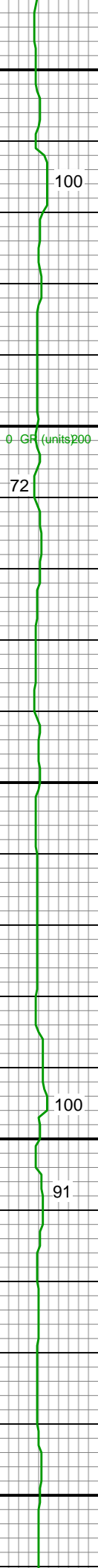
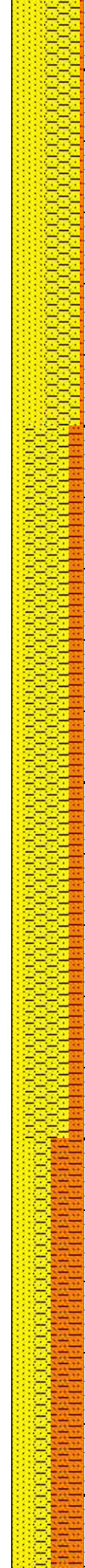
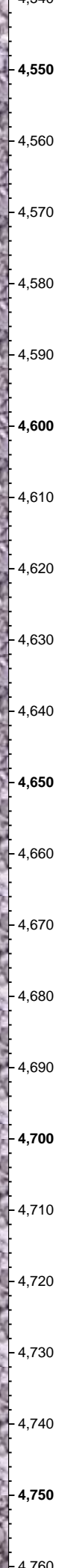
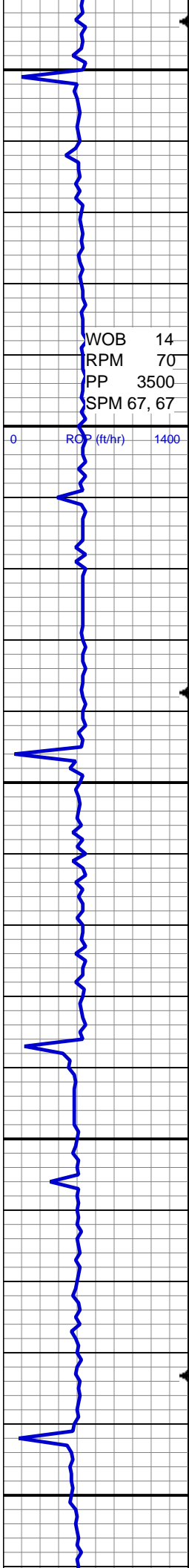
75%SS: lt gry-drkgy, trnsl-op, vf-c gr, sb ang-ang, p-mod srted, sft frm, silc mtx, non to mod calc, tr lthc, occ glau  
20%SHY SS: lt-medgy, trnsl-op, vf-c gr, sb rnd-sb blkly, p srted, arg mtx, p-mod cmt, occ mod calc, mod to v calc  
5% SHY SLTST:lt-dk gy, sb blkly-sb plty, sft-med frm, mod arg, tr calc

MD: 4,399 '  
TVD: 4,354.42 '  
Inclination: 1.5 °  
Azimuth: 264.9 °

50%SHY SS: lt-medgy, trnsl-op, vf-c gr, sb rnd-sb blkly, p srted, arg mtx, p-mod cmt, occ mod calc, mod to v calc  
45%SS: lt gry-drkgy, trnsl-op, vf-c gr, sb ang-ang, p-mod srted, sft frm, silc mtx, non to mod calc, tr lthc, tr glau  
5% SHY SLTST:lt-dk gy, sb blkly-sb plty, sft-med frm, mod arg, tr calc

MD: 4,494 '  
TVD: 4,449.38 '  
Inclination: 1.7 °  
Azimuth: 255.2 °

50%SHY SS: lt-medgy, trnsl-op, vf-c gr,



sb rnd-sb blkly, p srted, arg mtx, p-mod cmt, occ mod calc, mod to v calc  
45%SS: wh-lt gry, trnsi-op, vf-c gr, sb ang-ang, p-mod srted, sft-frm, silc mtx, non to mod calc, tr lthc, occ glau  
5% SHY SLTST:lt-dk gy, sb blkly-sb plty, sft-med frm, mod arg, tr calc

MD: 4,588 '  
TVD: 4,543.34 '  
Inclination: 1.8 °  
Azimuth: 266.5 °

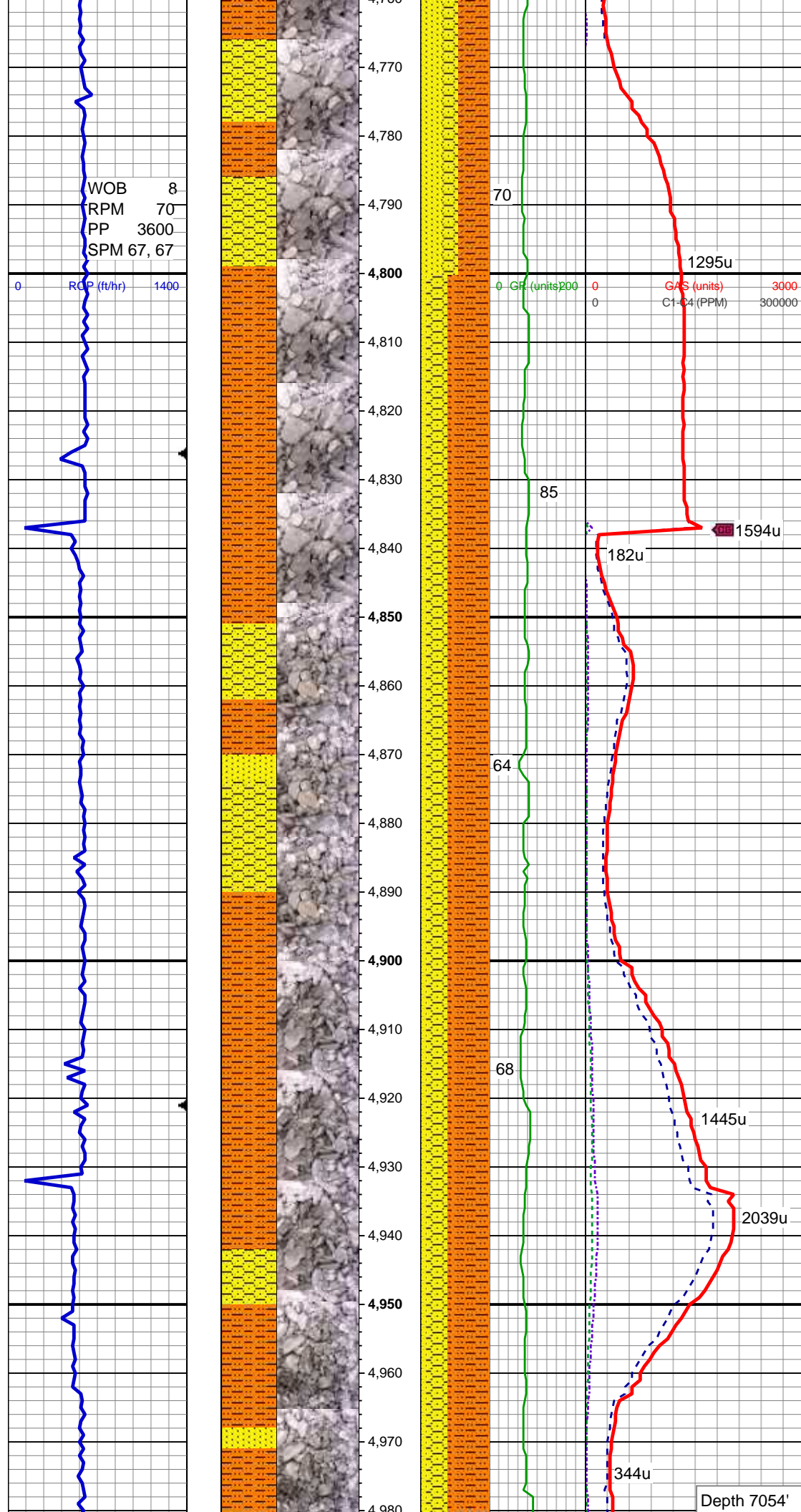
WT: 9.05 VIS: 37

60%SHY SS: lt-medgy,occ brn, trnsi-op, vf-c gr, sb rnd-sb blkly,occ plty p srted, arg mtx, p-mod cmt, occ mod calc, mod to v calc  
20%SS: wh-lt gry, trnsi-op, vf-c gr, sb ang-ang, p-mod srted, sft-frm, silc mtx, non to mod calc, tr lthc, occ glau, tr pyr  
20% SHY SLTST:lt-dk gy, sb blkly-sb plty, sft-med frm, mod arg, tr calc

MD: 4,683 '  
TVD: 4,638.3 '  
Inclination: 1.5 °  
Azimuth: 270.7 °

45% SHY SLTST:lt-dk gy, sb blkly-sb plty, sft-med frm, mod arg, tr calc  
30%SS: wh-lt gry, trnsi-op, vf-med gr, sb ang-ang, p-mod srted, sft-frm, silc mtx, non to mod calc, tr lthc, tr glau  
25%SHY SS: lt-medgy, trnsi-op, vf-c gr, sb rnd-sb blkly,occ plty, p srted, arg mtx, p-mod cmt, occ mod calc, mod to v calc

p mod cmt, occ mod calc, mod to v calc



MD: 4,777 '  
TVD: 4,732.27 '  
Inclination: 1.5 °  
Azimuth: 276 °

WT: 9.25 VIS: 35

60% SHY SLTST:lt-dk gy, sb blk-y-sb plty, sft-med frm, mod arg, tr calc  
30%SHY SS: lt-medgy,occ brn, trns-op, vf-med gr, sb rnd-sb blk-y,occ plty, p srt-d, arg mt-x, p-mod cmt, occ mod calc, mod to v calc  
10%SS: lt gry, trns-op, vf-med gr, sb ang-ang, p-mod srt-d, sft-frm, silc mt-x, non to mod calc, tr lthc

MD: 4,872 '  
TVD: 4,827.24 '  
Inclination: 1.5 °  
Azimuth: 290.9 °

60% SHY SLTST:lt-dk gy, sb blk-y-sb plty, sft-med frm, mod arg, tr calc  
30%SHY SS: lt-medgy,occ brn, trns-op, vf-med gr, sb rnd-sb blk-y,occ plty, p srt-d, arg mt-x, p-mod cmt, occ mod calc, mod to v calc  
10%SS: lt gry, trns-op, vf-med gr, sb ang-ang, p-mod srt-d, sft-frm, silc mt-x, non to mod calc

MD: 4,966 '  
TVD: 4,921.21 '  
Inclination: 1 °  
Azimuth: 285.1 °

