

LOG created using LPLLOT VH Version 3.0, April 02, 2013, Copyright (C) 1999-2009 Pason Systems Corp.

**OPERATOR:** NOBLE ENERGY INC.  
**WELL:** SAUER F33-77HN  
**LOCATION:** SESW SEC 33 T5N R65W  
**COUNTY:** WELD  
**STATE:** COLORADO  
**SPOT:** 238' FSL, 1,587' FWL  
**ELEVATION:** 4,671' GL, 4,683' KB  
**FIELD:** WATTENBERG  
**SPUD DATE:** 03/21/2013  
**TD DATE:** 03/29/2013  
**DATES LOGGED:** 03/23/2013 - 03/29/2013  
**DEPTHS LOGGED:** 626' - 11,354'  
**LOGGERS:** KYLE KNIGHT, RYAN SHILLING  
**DRILLING FLUID:** FW, LSND  
**DRILLING RIG:** ENSIGN 121  
**API:** 05-123-36442  
**LOG TYPE:** VERTICAL  
**SCALE:** 1:240 (5 inches per 100 feet)  
**REMARKS:** Wellsite Geological Services Provided By Columbine Logging Inc.  
 LAT, LONG: 40.34913/-104.67216

### LITHOLOGIES



No Sample



Sandstone



Shaly Sandstone



Shaly Siltstone



Silty Shale

### ENGINEERING SYMBOLS



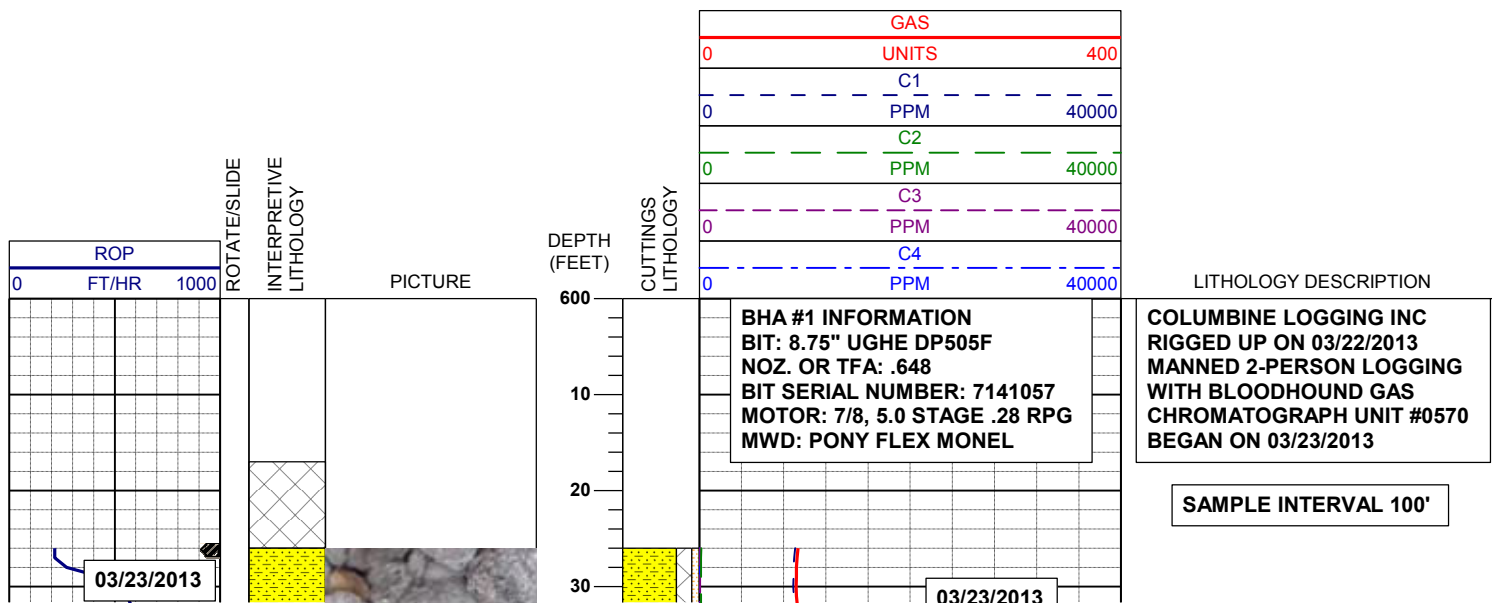
Connection

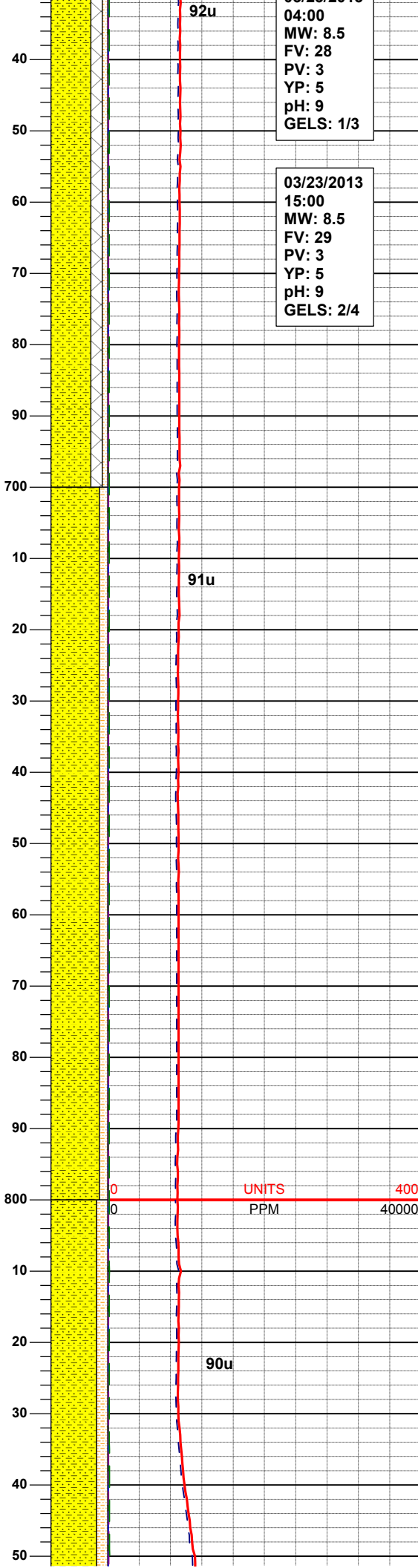
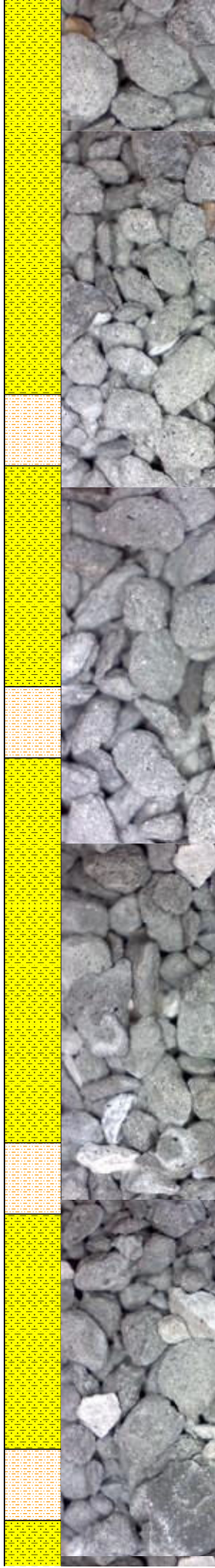
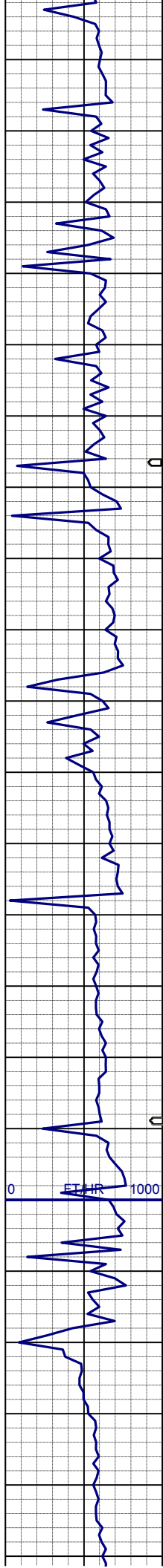


Connection Gas



Midnight Depth





03/23/2013  
04:00  
MW: 8.5  
FV: 28  
PV: 3  
YP: 5  
pH: 9  
GELS: 1/3

03/23/2013  
15:00  
MW: 8.5  
FV: 29  
PV: 3  
YP: 5  
pH: 9  
GELS: 2/4

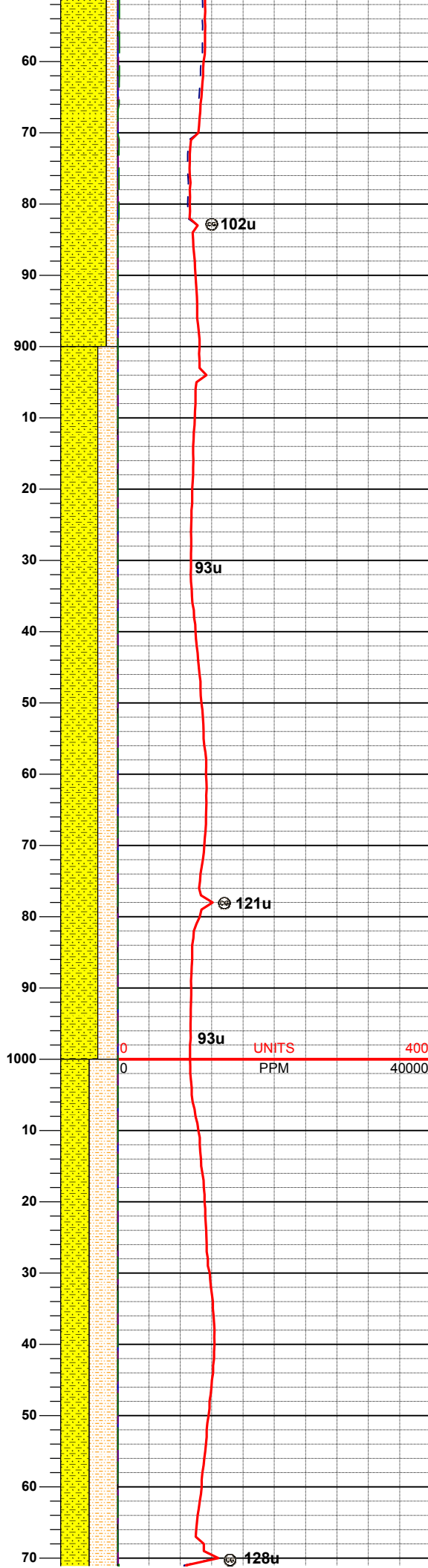
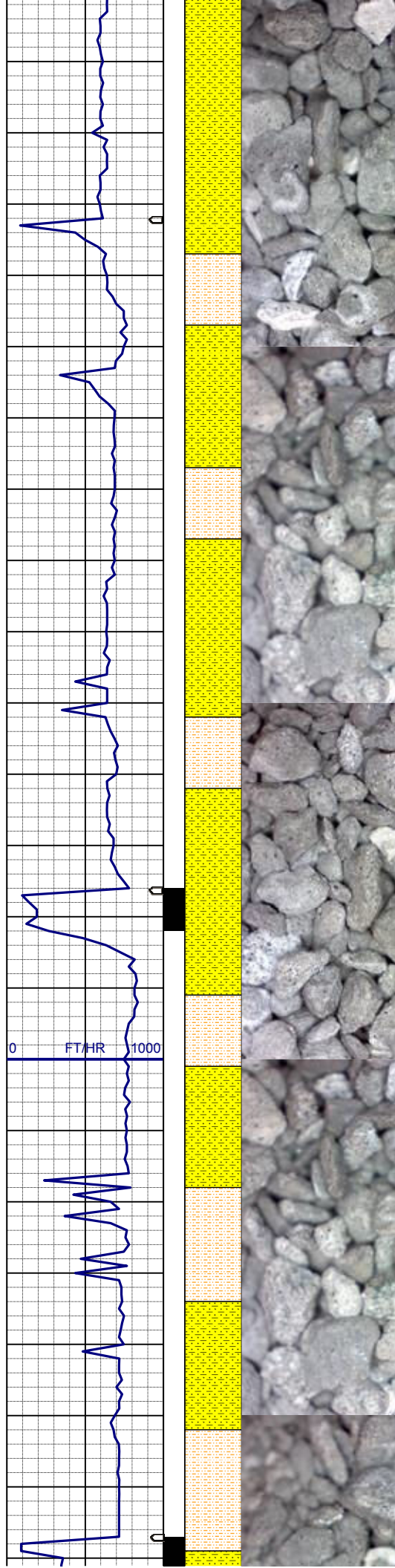
SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog, grd to  
SHYSLTST: lt-mgy, occ dk gy, f-vfgr,  
sbrd-sbang, mod srt, arg mtz  
CMT:

**SURVEY**  
MD 739'  
INC 0.6°  
AZI 140.4°  
TVD 739.00'

SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog, grd to  
SHYSLTST: lt-mgy, occ dk gy, f-vfgr,  
sbrd-sbang, mod srt, arg mtz, sme pyr  
ctd, tr ss

**SURVEY**  
MD 832'  
INC 0.9°  
AZI 128.1°  
TVD 831.99'

SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog, grd to



SHYSLTST: lt-mgy, occ dk gy, f-vfgr,  
sbrd-sbang, mod srt, arg mtx, sme pyr  
ctd, tr ss

**SURVEY**  
**MD 925'**  
**INC 0.6°**  
**AZI 150.6°**  
**TVD 924.98'**

SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog, grd to  
SHYSLTST: lt-mgy, occ dk gy, f-vfgr,  
sbrd-sbang, mod srt, arg mtx, sme pyr  
ctd, tr ss

**SURVEY**  
**MD 1018'**  
**INC 1.3°**  
**AZI 336.80°**  
**TVD 1017.96'**

SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog, grd to  
SHYSLTST: lt-mgy, occ dk gy, f-vfgr,  
sbrd-sbang, mod srt, arg mtx, sme pyr  
ctd, tr ss



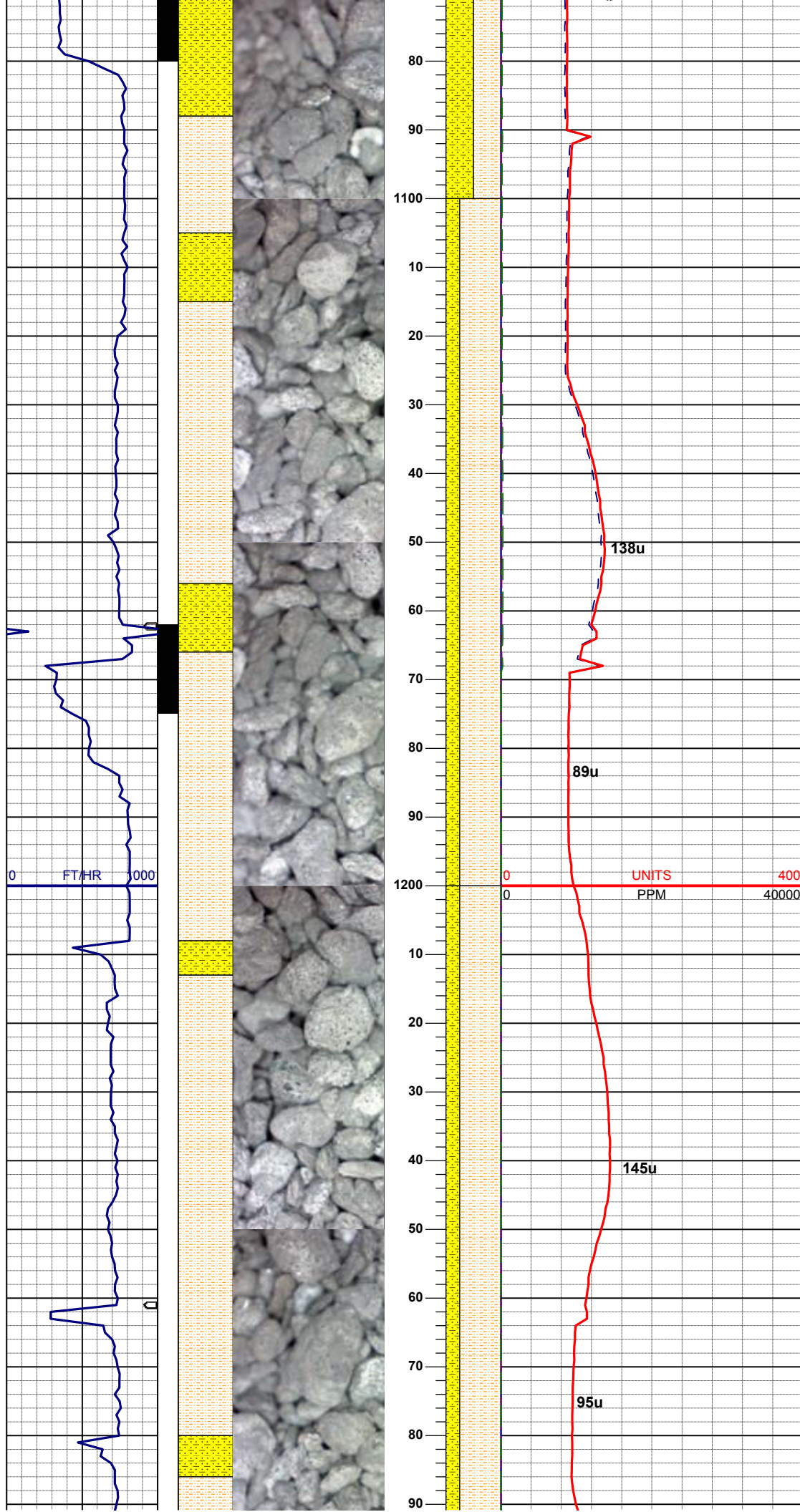
MUD WT: 8.55 VIS: 29 IN  
MUD WT: 8.60 VIS: 28 OUT

SURVEY  
MD 1112'  
INC 0.9°  
AZI 320.2°  
TVD 1111.95'

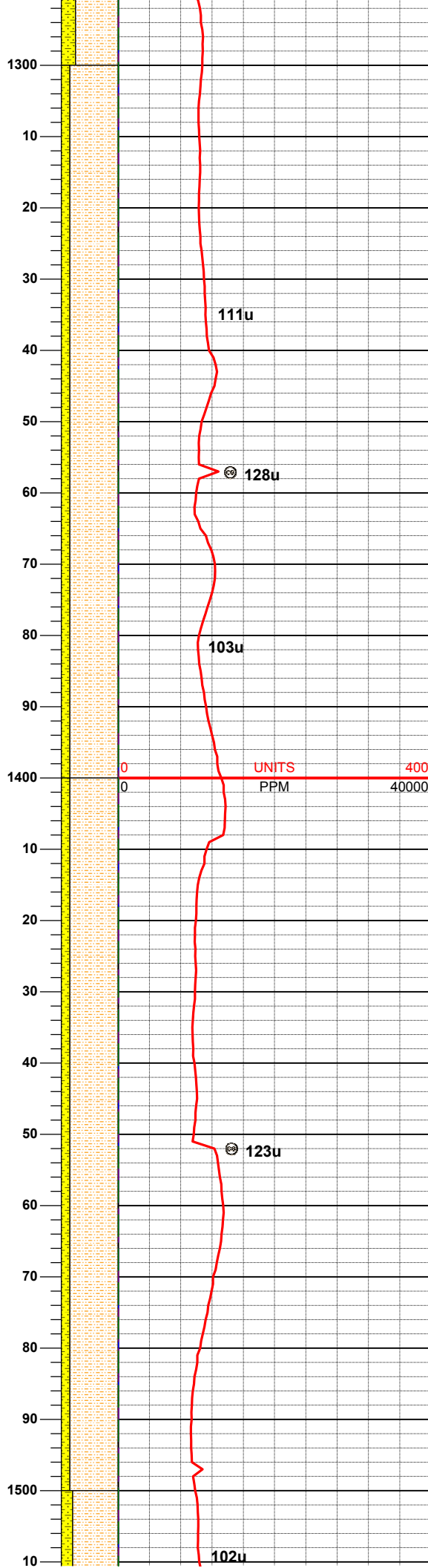
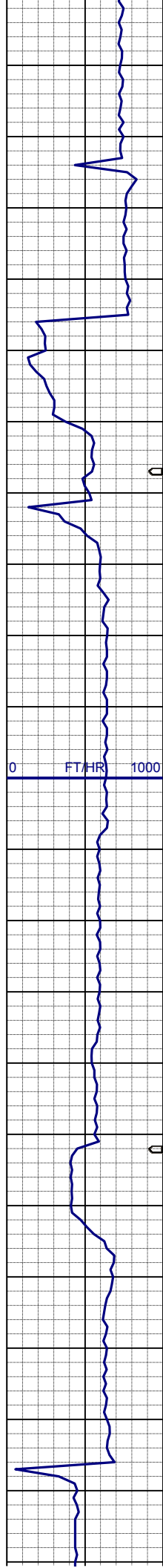
SHYSLTST: lt-mgy, occ dk gy, f-vfgr,  
sbrd-sbang, mod srt, arg mtx, tr pyr  
ctd, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog, tr ss

SURVEY  
MD 1212'  
INC 0.4°  
AZI 277.3°  
TVD 1211.94'

SHYSLTST: lt-mgy, occ dk gy, f-vfgr,  
sbrd-sbang, mod srt, arg mtx, tr pyr  
ctd, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog, tr ss







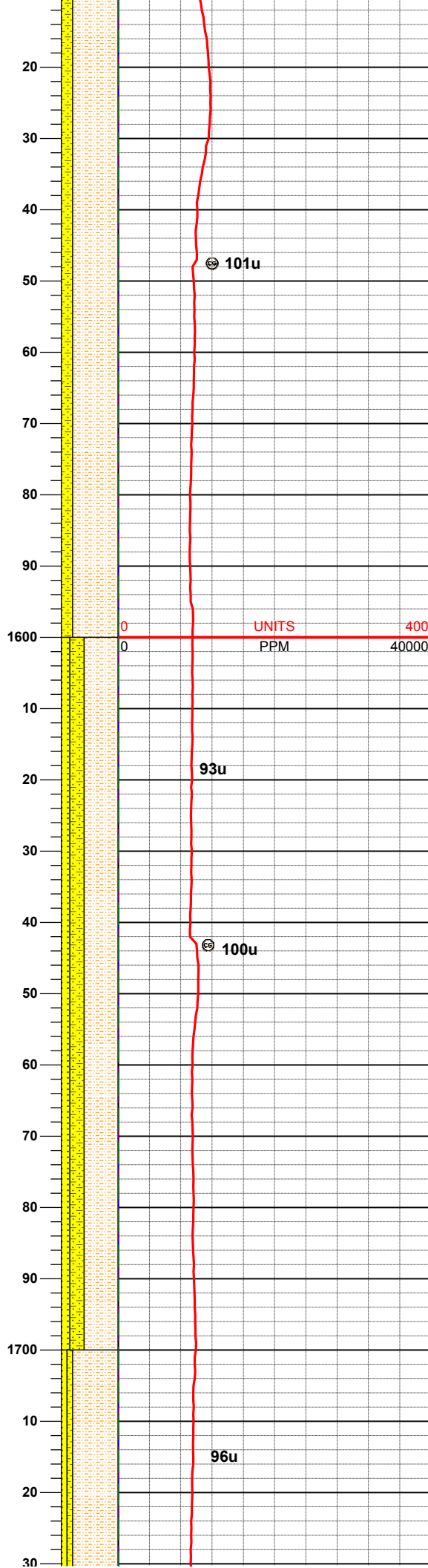
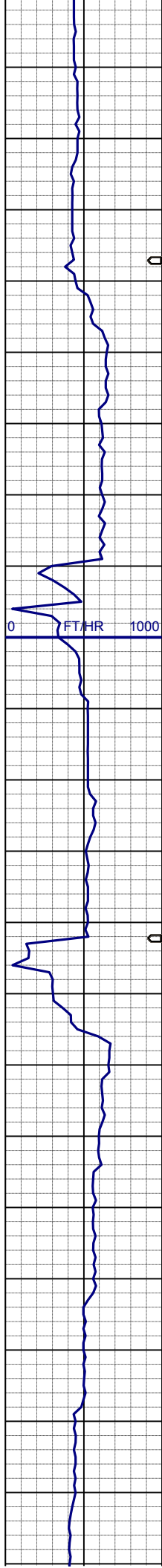
**SURVEY**  
**MD 1306'**  
**INC 0.4°**  
**AZI 288.1°**  
**TVD 1305.94'**

SHYSLTST: lt-mgy, occ dk gy, f-vfgr,  
sbrd-sbang, mod srt, arg mtx, tr pyr  
ctd, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcm, slcalc,  
phlog, tr ss

**SURVEY**  
**MD 1401'**  
**INC 0.7°**  
**AZI 290.0°**  
**TVD 1400.93'**

SHYSLTST: lt-mgy, occ dk gy, f-vfgr,  
sbrd-sbang, mod srt, arg mtx, tr pyr  
ctd, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcm, slcalc,  
phlog, tr ss

**SURVEY**  
**MD 1496'**  
**INC 0.2°**  
**AZI 25.1°**  
**TVD 1495.93'**



SHYSLTST: lt-mgy, occ dk gy, f-vfgr,  
sbrd-sbang, mod srt, arg mtx, tr pyr  
ctd, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog, tr ss

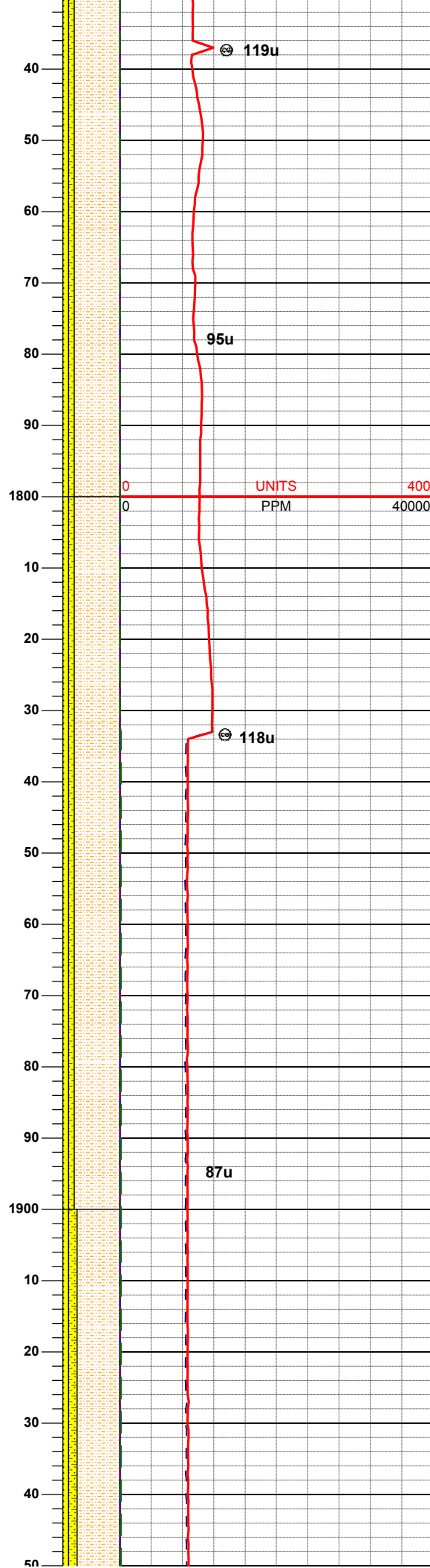
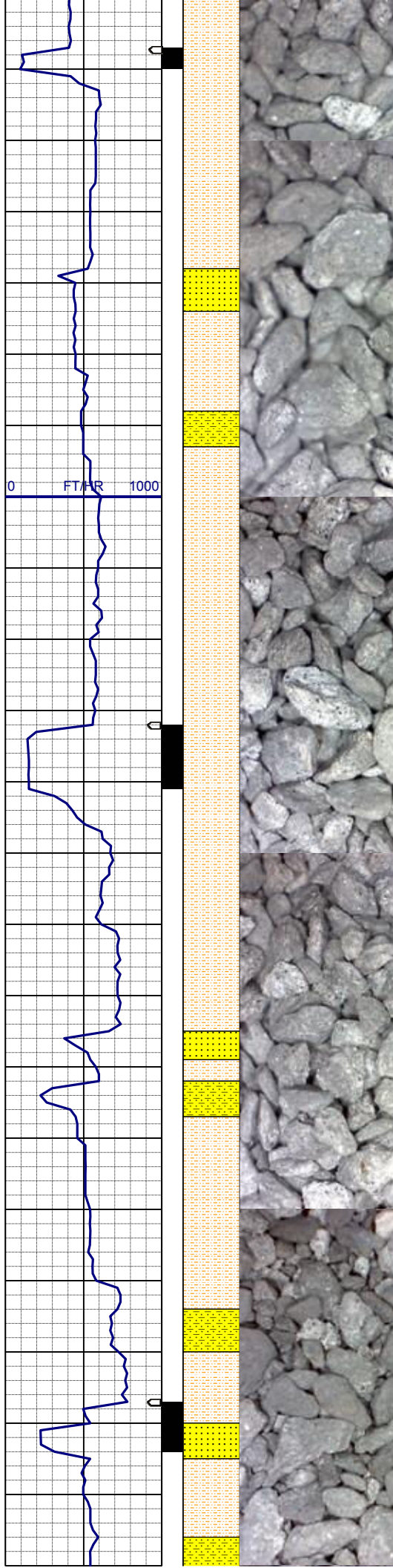
**SURVEY**  
**MD 1591'**  
**INC 0.8°**  
**AZI 33.2°**  
**TVD 1590.93'**

**MUD WT: 8.55 VIS: 28 IN**  
**MUD WT: 8.70 VIS: 27 OUT**

SHYSLTST: lt-mgy, occ tan, f-vfgr,  
sbrd-sbang, mod srt, arg mtx, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-  
wsrt, ppor, argcmt, slcalc, phlog, tr  
glau

**SURVEY**  
**MD 1686'**  
**INC 1.4°**  
**AZI 293.3°**  
**TVD 1685.91'**





SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtz, grd to SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau

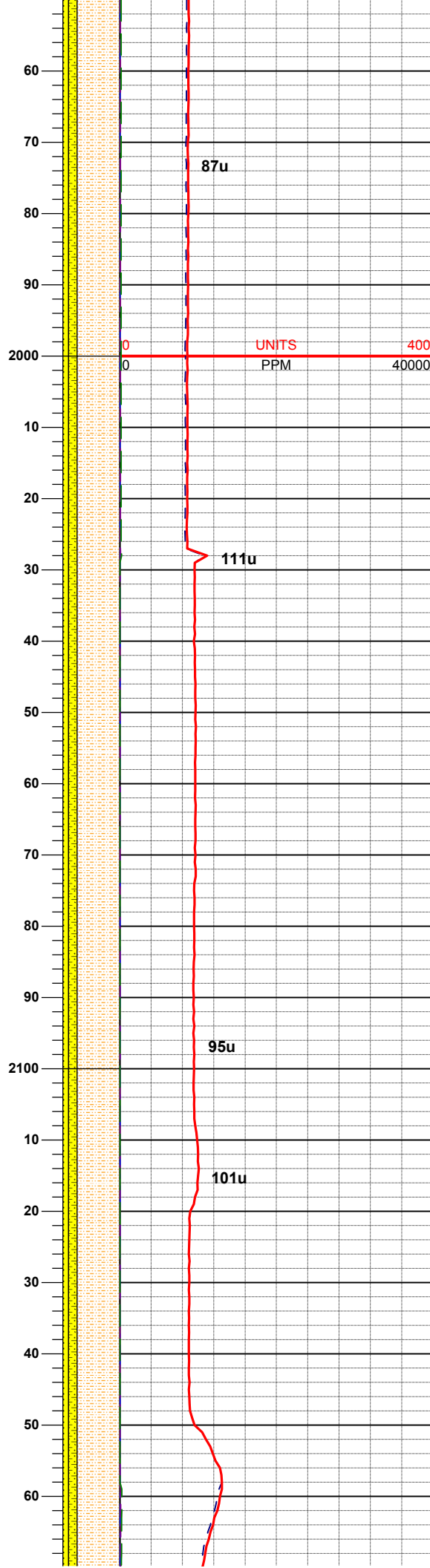
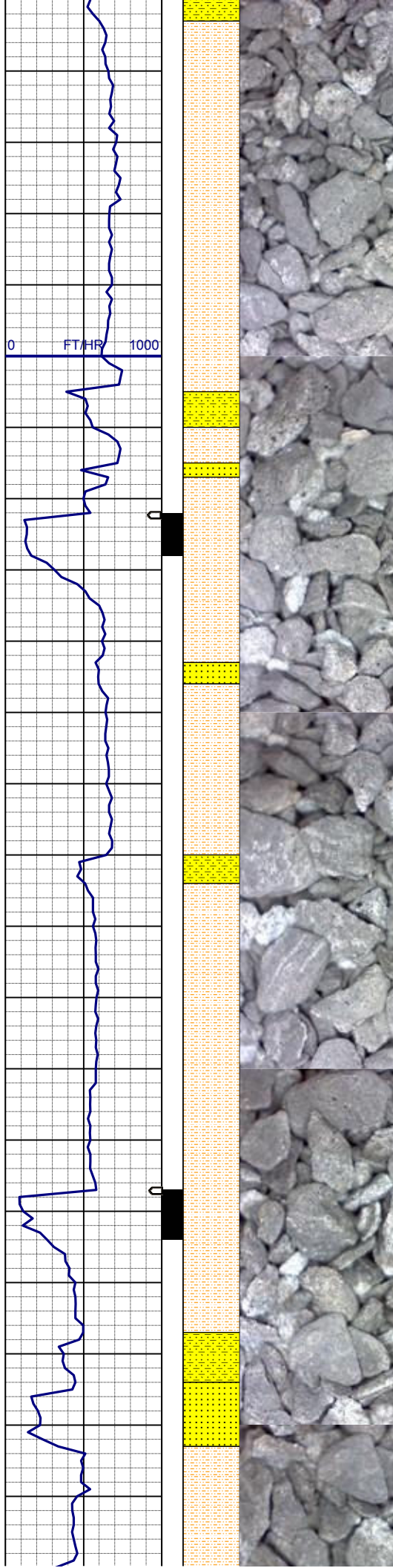
**SURVEY**  
**MD 1781'**  
**INC 1.8°**  
**AZI 268.4°**  
**TVD 1780.88'**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtz, grd to SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau

**SURVEY**  
**MD 1876'**  
**INC 3.3°**  
**AZI 243.9°**  
**TVD 1875.78'**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtz, grd to SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog





phlog  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-  
wsrt, ppor, argcmt, slcalc, phlog, tr  
glau

**SURVEY**  
**MD 1971'**  
**INC 4.5°**  
**AZI 250.4°**  
**TVD 1970.56'**

SHYSLTST: lt-mgy, occ tan, f-vfgr,  
sbrd-sbang, mod srt, arg mtx, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-  
wsrt, ppor, argcmt, slcalc, phlog, tr  
glau

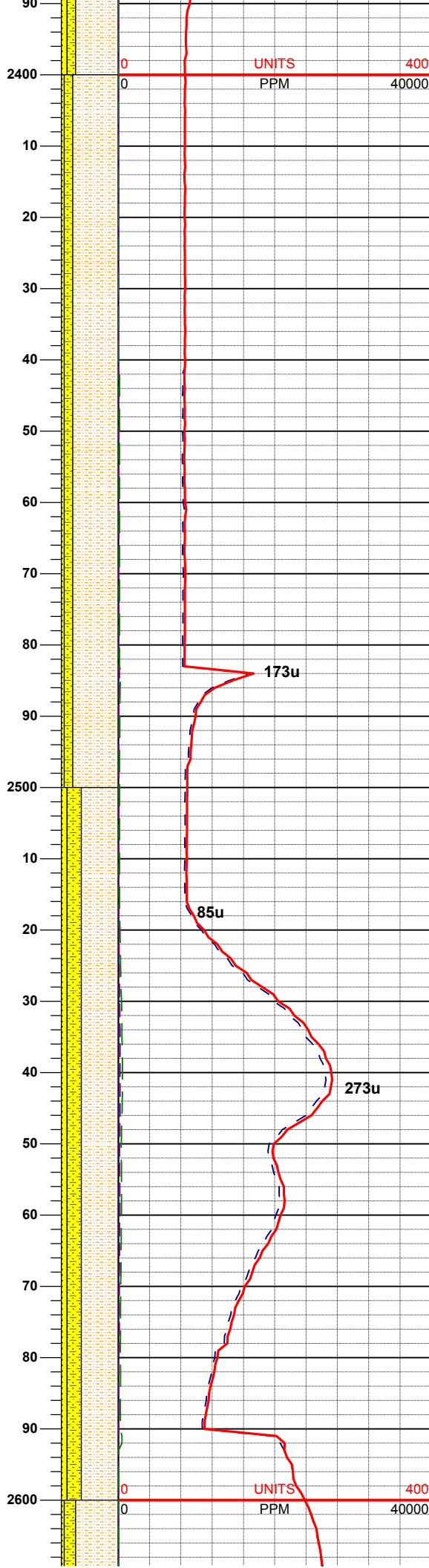
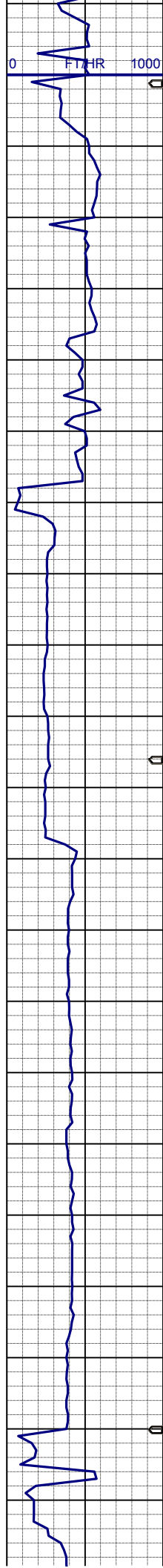
**SURVEY**  
**MD 2066'**  
**INC 6.3°**  
**AZI 247.8°**  
**TVD 2065.14'**

SHYSLTST: lt-mgy, occ tan, f-vfgr,  
sbrd-sbang, mod srt, arg mtx, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-  
wsrt, ppor, argcmt, slcalc, phlog, tr  
glau

**SURVEY**  
**MD 2161'**  
**INC 6.6°**







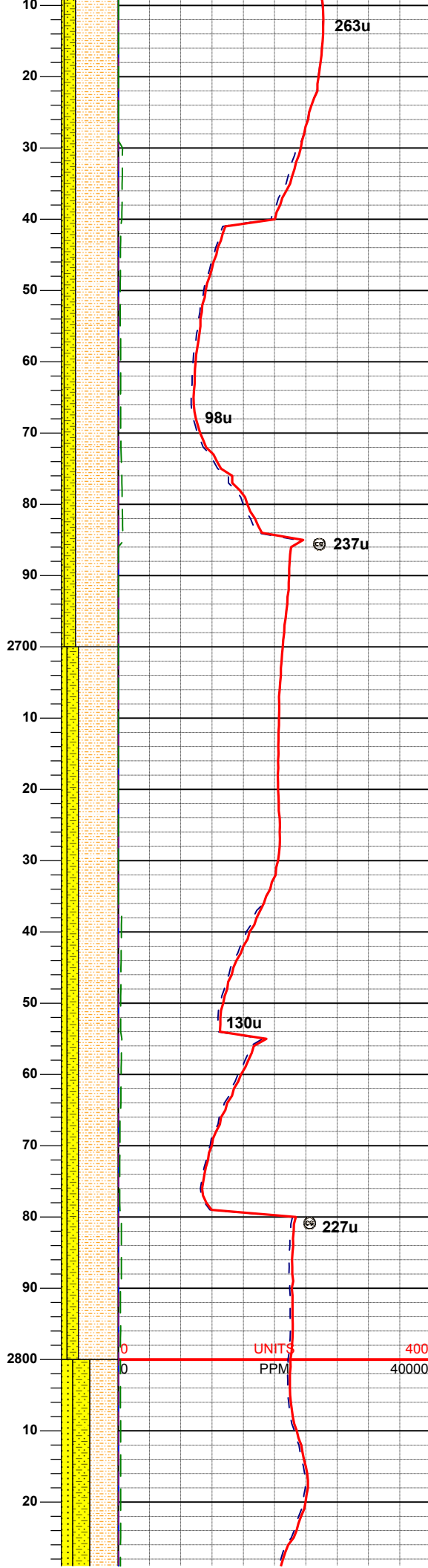
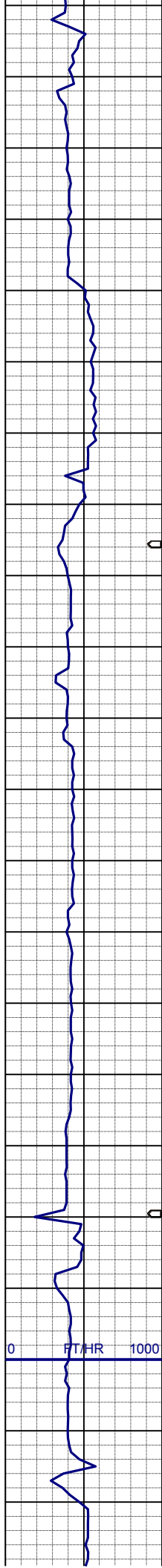
**SURVEY**  
**MD 2445'**  
**INC 6.0°**  
**AZI 226.7°**  
**TVD 2441.83'**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtx, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau

**SURVEY**  
**MD 2540'**  
**INC 5.8°**  
**AZI 225.3°**  
**TVD 2536.32'**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtx, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau





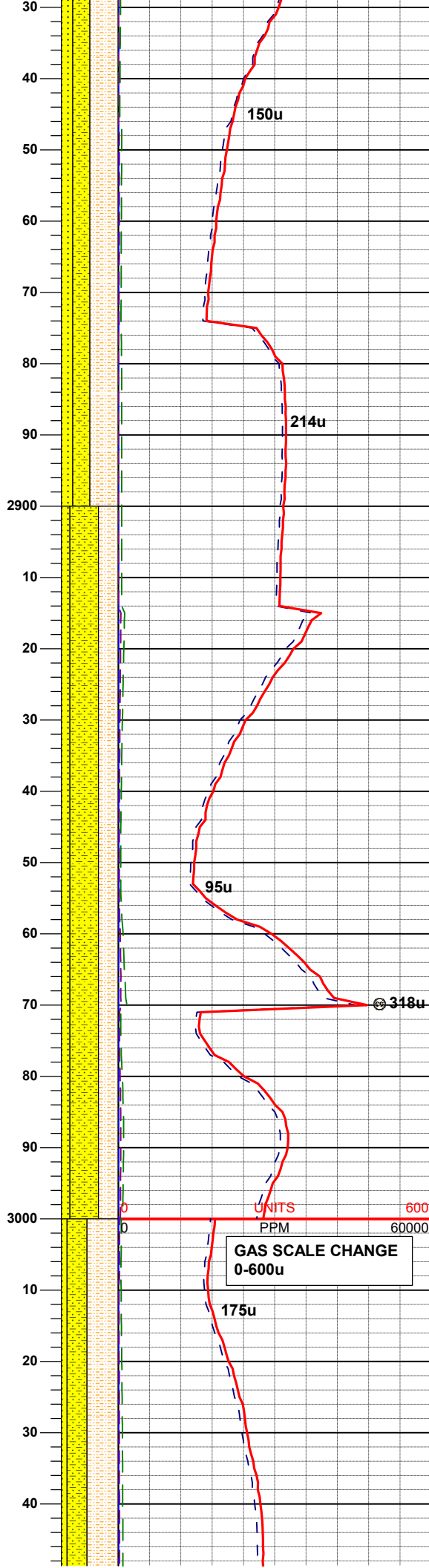
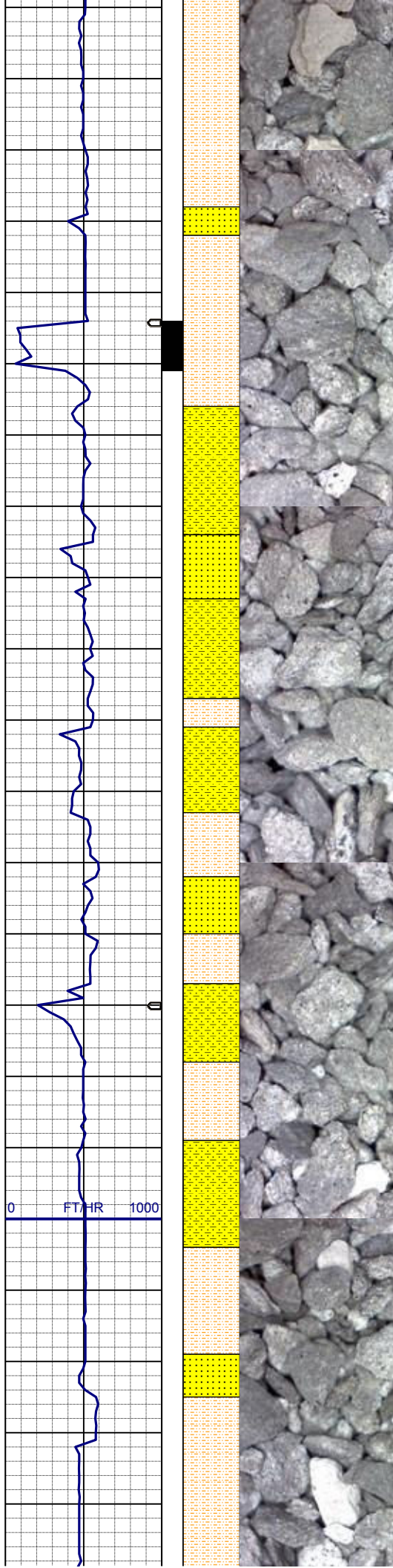
**SURVEY**  
**MD 2634'**  
**INC 6.2°**  
**AZI 233.9°**  
**TVD 2629.81'**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtx, grd to SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau

**SURVEY**  
**MD 2729'**  
**INC 6.0°**  
**AZI 232.9°**  
**TVD 2724.27'**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtx, grd to SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau

**SURVEY**  
**MD 2824'**  
**INC 5.6°**  
**AZI 233.9°**  
**TVD 2818.79'**



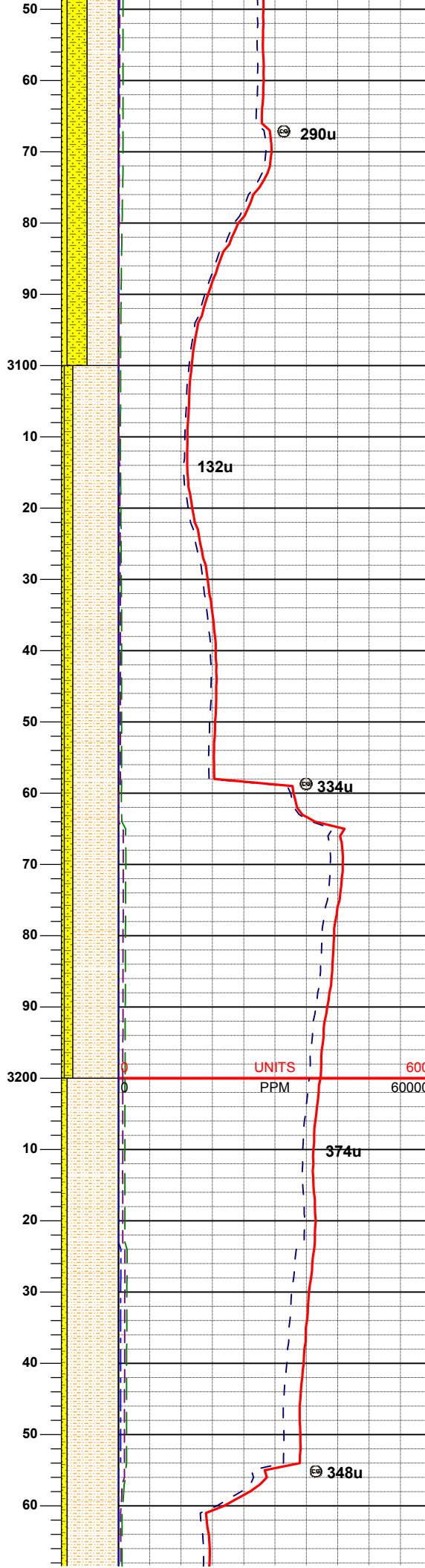
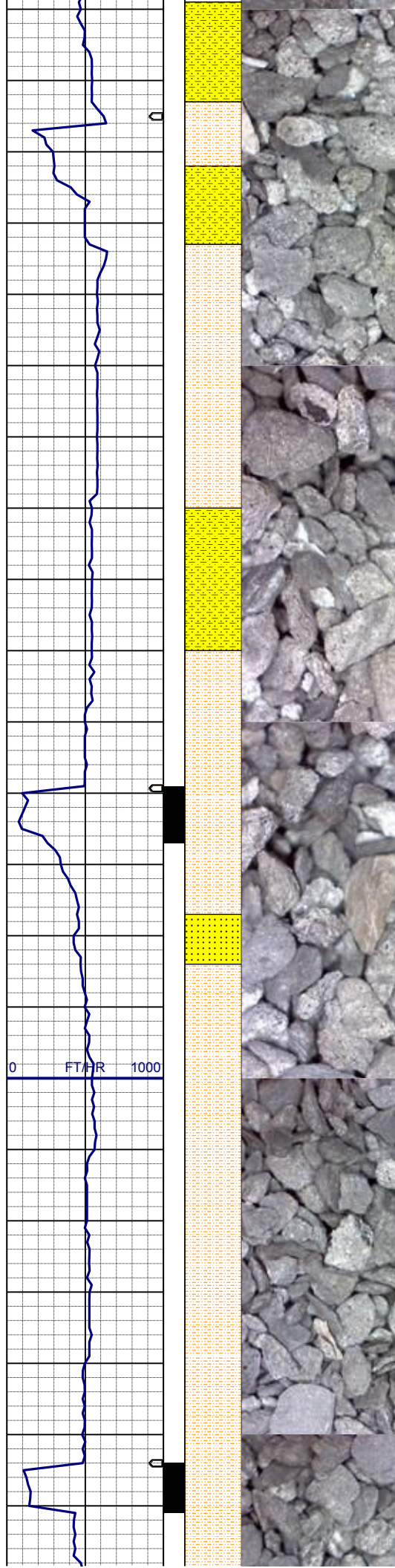
SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog, grd to  
SHYSLTST: lt-mgy, occ tan, f-vfgr,  
sbrd-sbang, mod srt, arg mtX,  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-  
wsrt, ppor, argcmt, slcalc, phlog, tr  
glau

**SURVEY**  
**MD 2919'**  
**INC 6.4°**  
**AZI 237.1°**  
**TVD 2913.26'**

**SURVEY**  
**MD 3014'**  
**INC 6.2°**  
**AZI 233.9°**  
**TVD 3007.69'**

SHYSLTST: lt-mgy, occ tan, f-vfgr,  
sbrd-sbang, mod srt, arg mtX, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc





med pprt, srt, ppor, argcmt, slcalc, phlog  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau

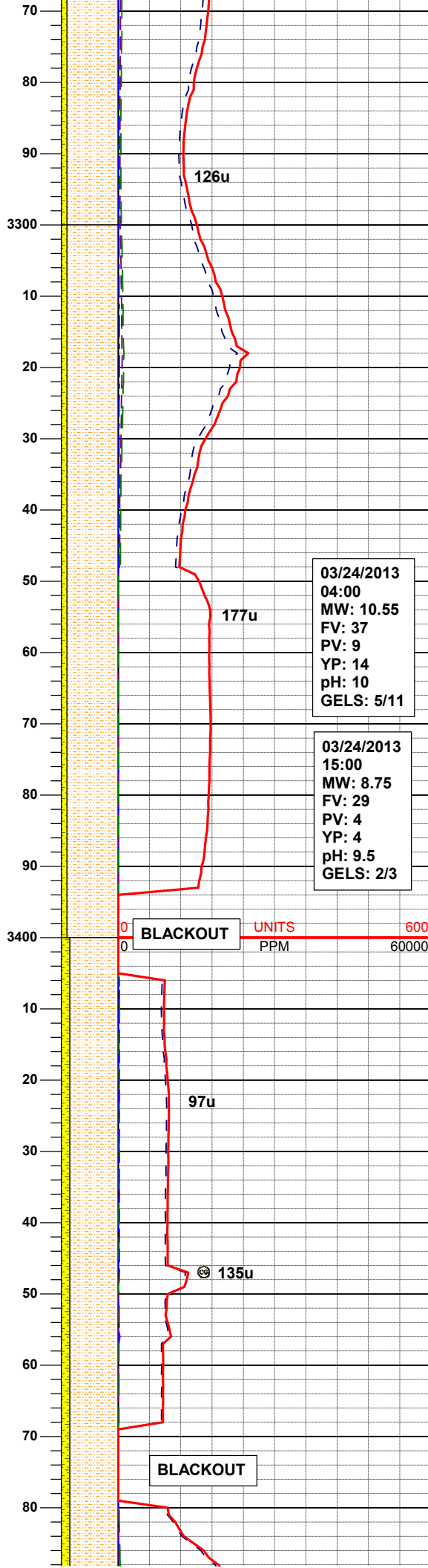
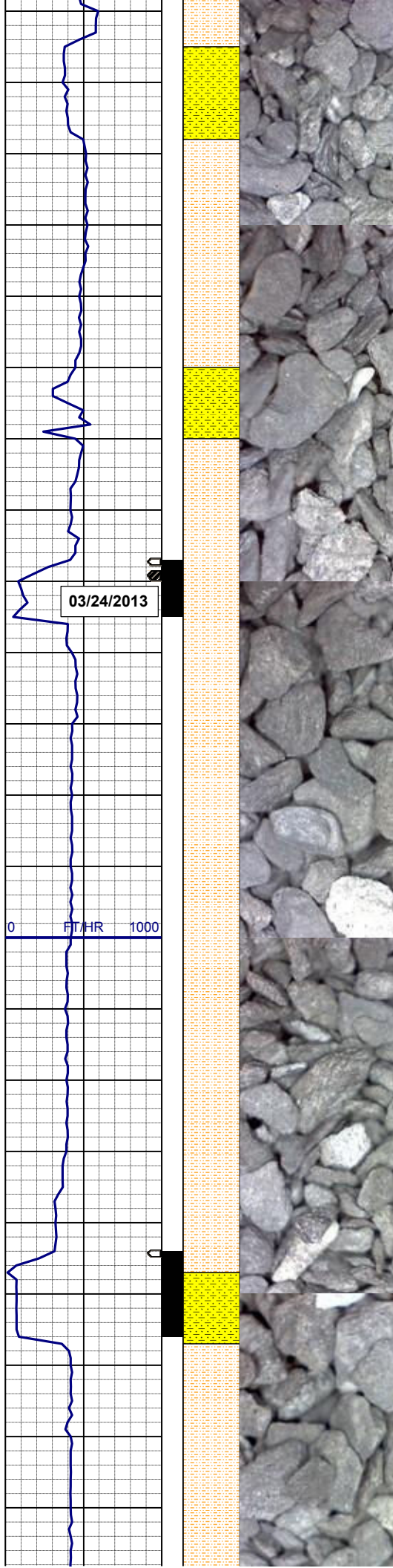
**SURVEY**  
**MD 3108'**  
**INC 5.7°**  
**AZI 229.9°**  
**TVD 3101.19'**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtx, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau

**SURVEY**  
**MD 3203'**  
**INC 6.1°**  
**AZI 229.9°**  
**TVD 3195.68'**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtx, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog, sme ss





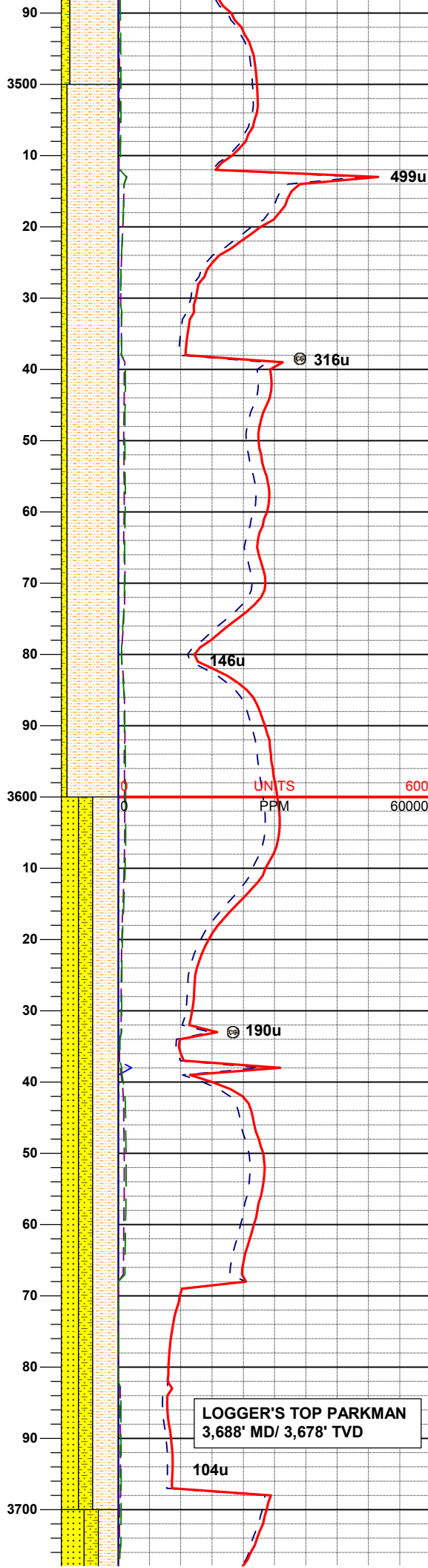
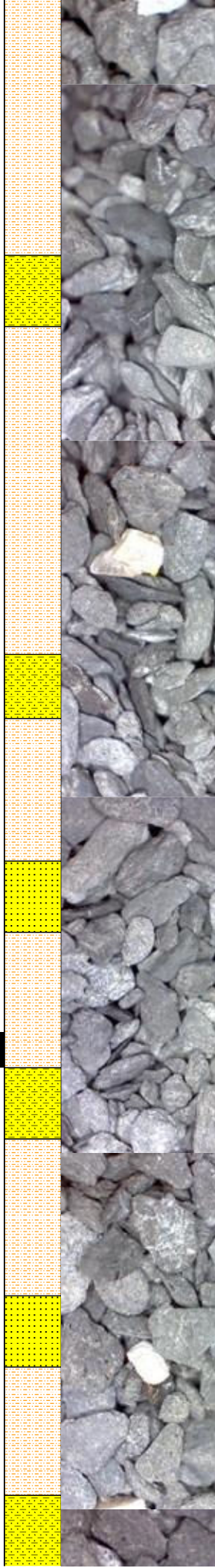
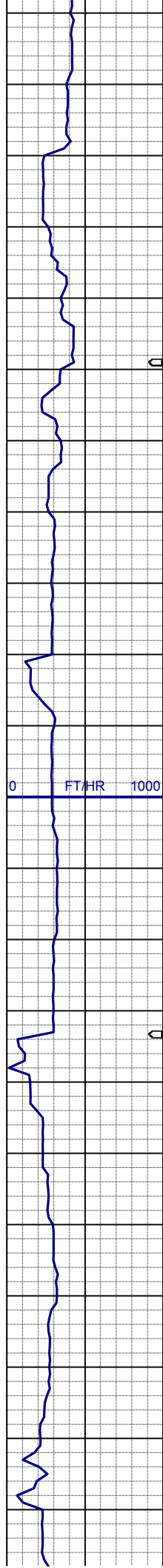
**SURVEY**  
**MD 3298'**  
**INC 5.3°**  
**AZI 239.9°**  
**TVD 3290.21'**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtx, grd to SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmnt, slcalc, phlog, sme ss

**SURVEY**  
**MD 3393'**  
**INC 4.9°**  
**AZI 243.8°**  
**TVD 3384.84'**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtx, grd to SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmnt, slcalc, phlog, sme ss

**SURVEY**  
**MD 3488'**  
**INC 6.2°**



AZI 240.2°  
TVD 3479.39'

MUD WT: 8.5 VIS: 28 IN  
MUD WT: 8.5+ VIS: 27 OUT

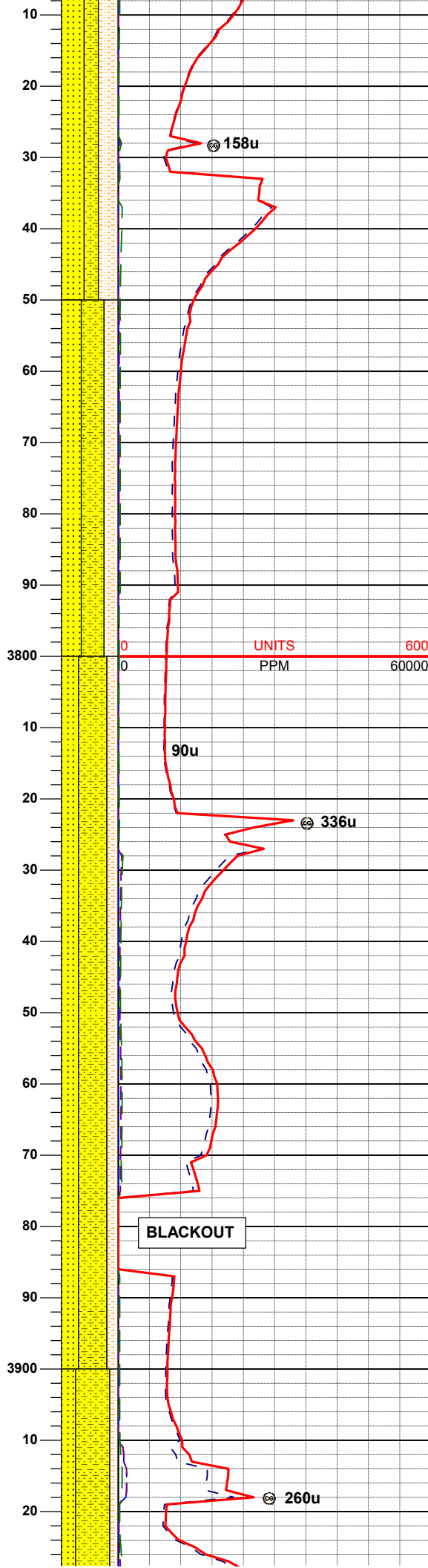
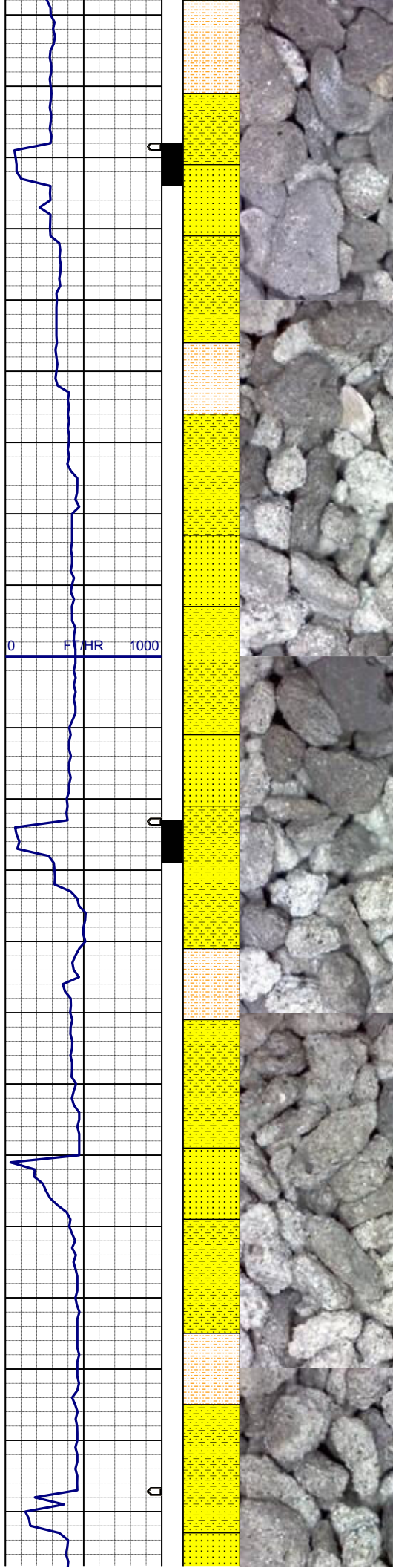
SHYSLTST: lt-mgy, occ tan, f-vfgr,  
sbrd-sbang, mod srt, arg mtx, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog, sme ss

SURVEY  
MD 3582'  
INC 5.5°  
AZI 234.8°  
TVD 3572.90'

SHYSLTST: lt-mgy, occ tan, f-vfgr,  
sbrd-sbang, mod srt, arg mtx, grd to  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-  
wsrt, ppor, argcmt, slcalc, phlog, tr  
glau  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang,  
mod-psrt, sft, ppor, argcmt, slcalc,  
phlog

SURVEY  
MD 3677'  
INC 5.3°  
AZI 242.5°  
TVD 3667.48'





SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau, grd to  
SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtz,  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog

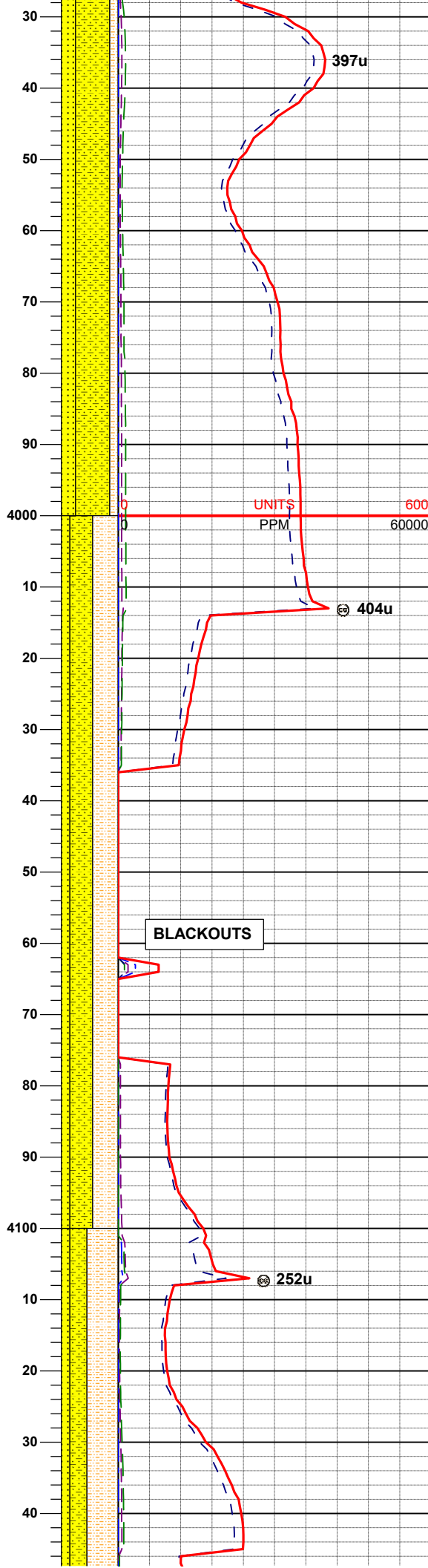
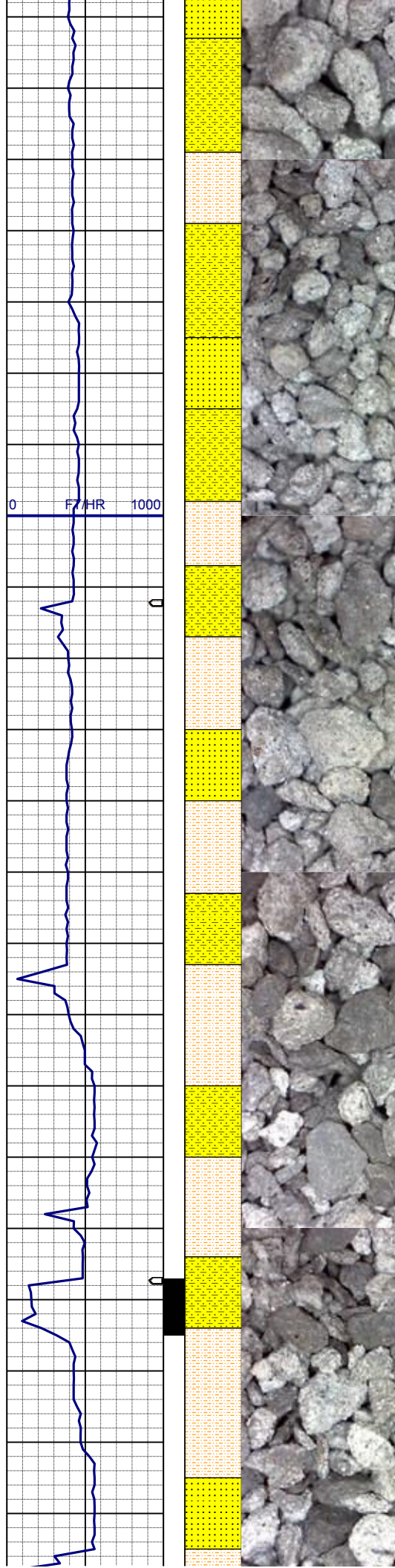
**SURVEY**  
**MD 3772'**  
**INC 6.1°**  
**AZI 244.8°**  
**TVD 3762.01'**

**MUD WT: 8.5 VIS: 28 IN**  
**MUD WT: 8.5 VIS: 29 OUT**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtz, grd to  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau,  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog

**SURVEY**  
**MD 3867'**  
**INC 6.9°**  
**AZI 242.7°**  
**TVD 3856.40'**

**BLACKOUT**



SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtx, grd to SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau

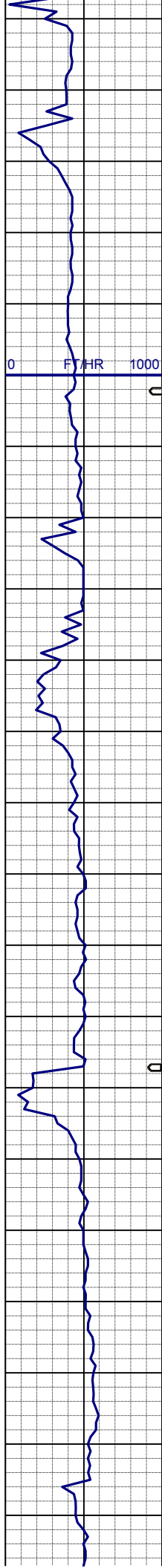
**SURVEY**  
**MD 3962'**  
**INC 6.5°**  
**AZI 242.9°**  
**TVD 3950.75'**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtx, grd to SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau

**SURVEY**  
**MD 4056'**  
**INC 6.2°**  
**AZI 238.1°**  
**TVD 4044.17'**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtx, grd to SHYSS: lt-mgy, f-mfgr, sbrd-sbang,





mod-psrt, sft, ppor, argcmt, slcalc, phlog  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau

**SURVEY**  
**MD 4151'**  
**INC 6.9°**  
**AZI 242.4°**  
**TVD 4138.55'**

**MUD WT: 8.4 VIS: 28 IN**  
**MUD WT: 8.4 VIS: 28 OUT**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtz, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau

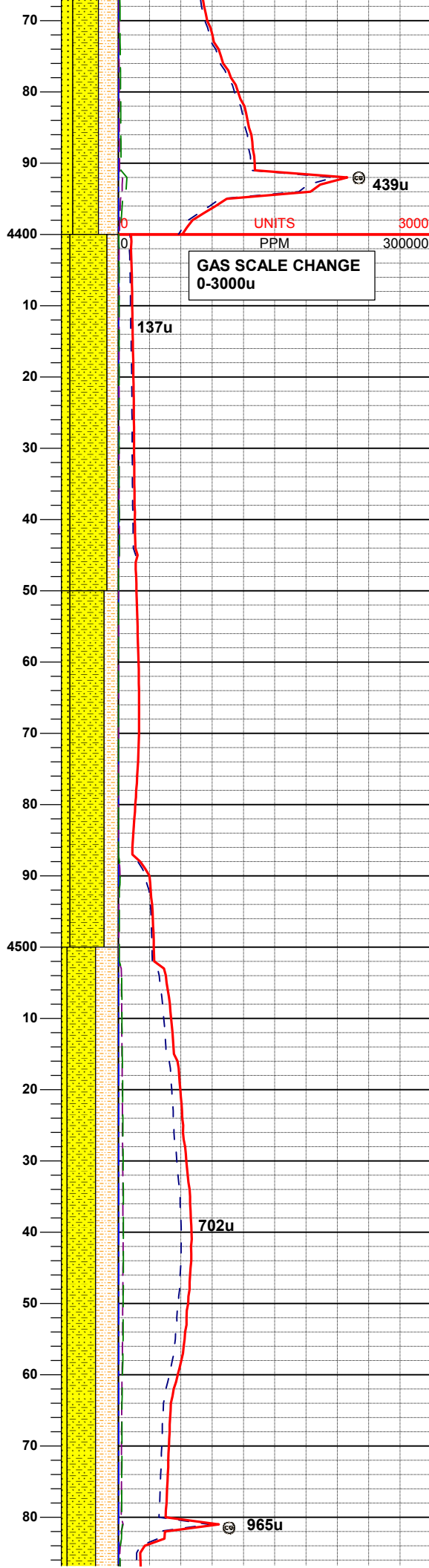
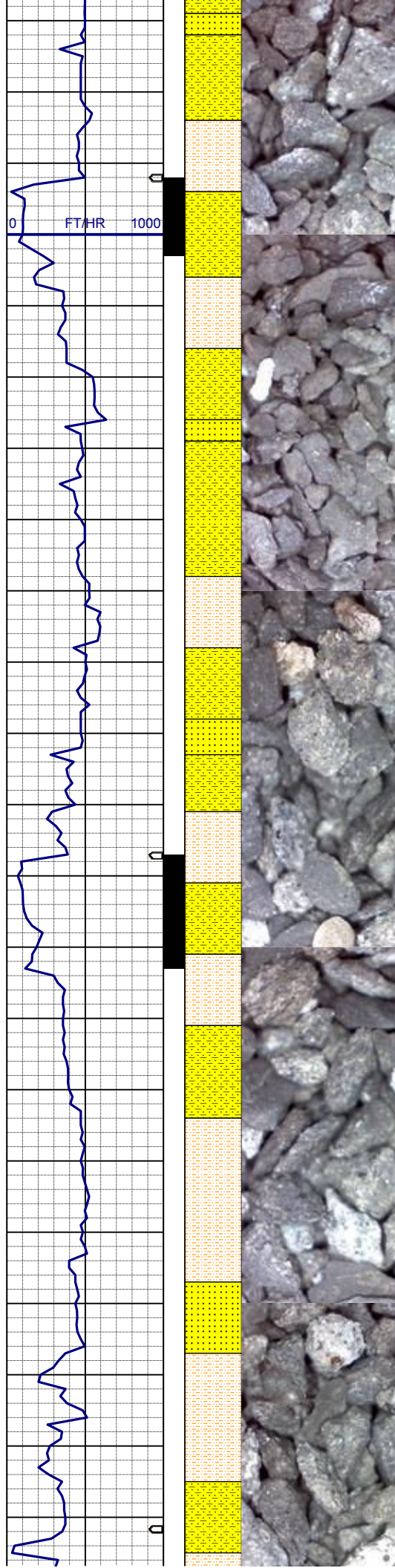
**SURVEY**  
**MD 4246'**  
**INC 6.3°**  
**AZI 234.8°**  
**TVD 4232.93'**

SHYSLTST: lt-mgy, occ tan, f-vfgr, sbrd-sbang, mod srt, arg mtz, grd to  
SHYSS: lt-mgy, f-mfgr, sbrd-sbang, mod-psrt, sft, ppor, argcmt, slcalc, phlog  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, slcalc, phlog, tr glau

**LOGGER'S TOP SUSSEX**  
**4,299' MD/ 4,285' TVD**

SHYSS: lt-mgy, f-mggr, sbrd-sbang, mod-psrt, ppor, argcmt, grd to  
SHYSLTST: lt-mgy, sme tan, f-vfgr, sbrd-sbang, mod-psrt, arg mtz, occ phlog, sme pyr ctd  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, sl calc, tr glau

**SURVEY**  
**MD 4341'**  
**INC 7.5°**  
**AZI 231.5°**  
**TVD 4327.24'**



SHYSS: lt-mgy, f-mggr, sbrd-sbang, mod-psrt, ppor, argcmt, grd to SHYSLTST: lt-mgy, sme tan, f-vfgr, sbrd-sbang, mod-psrt, arg mt, occ phlog, sme pyr ctd SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, sl calc, tr glau

SHYSS: lt-mgy, f-mggr, sbrd-sbang, mod-psrt, ppor, argcmt, grd to SHYSLTST: lt-mgy, sme tan, f-vfgr, sbrd-sbang, mod-psrt, arg mt, occ phlog, sme pyr ctd SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, sl calc, tr glau

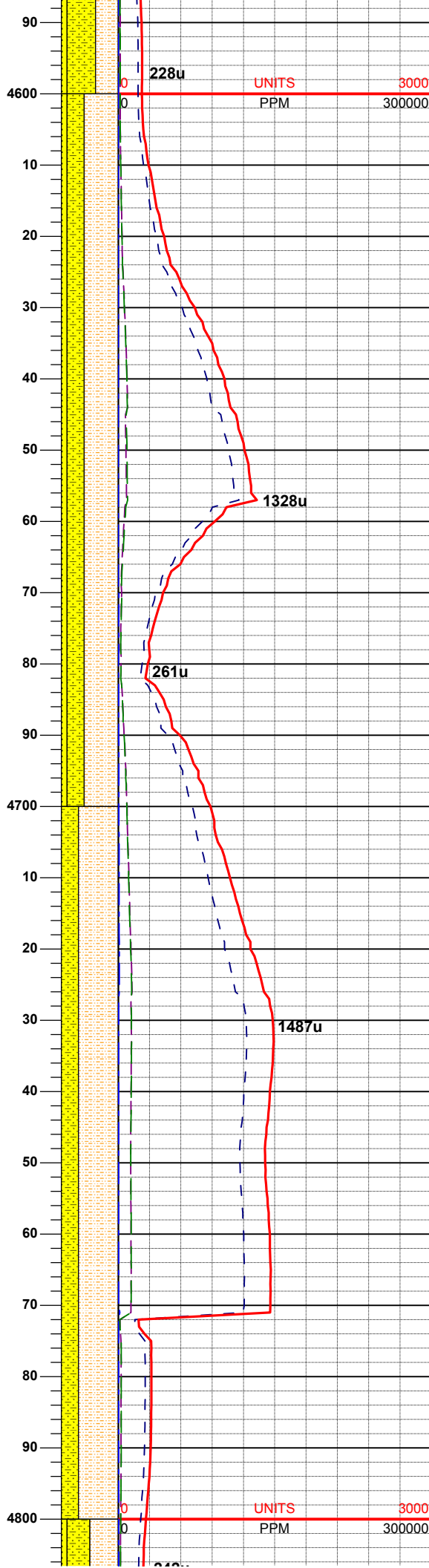
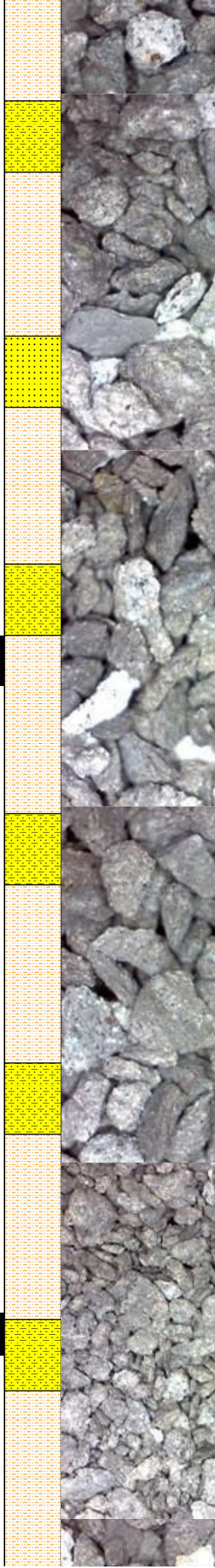
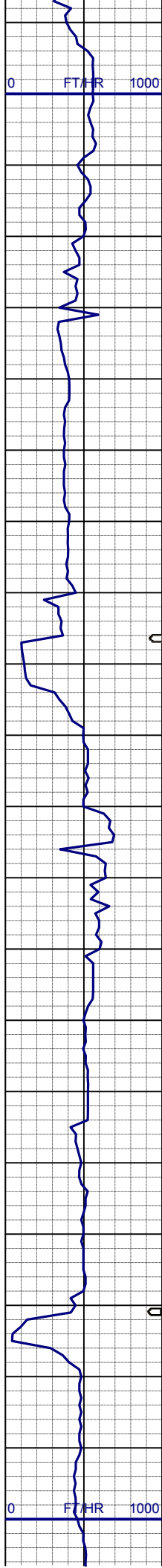
**SURVEY**  
**MD 4436'**  
**INC 8.3°**  
**AZI 229.3°**  
**TVD 4421.33'**

SHYSS: lt-mgy, f-mggr, sbrd-sbang, mod-psrt, ppor, argcmt, grd to SHYSLTST: lt-mgy, sme tan, f-vfgr, sbrd-sbang, mod-psrt, arg mt, occ phlog, sme pyr ctd SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, sl calc, tr glau

**SURVEY**  
**MD 4530'**  
**INC 6.7°**  
**AZI 236.6°**  
**TVD 4514.53'**

SHYSS: lt-mgy, f-mggr, sbrd-sbang, mod-psrt, ppor, argcmt, grd to SHYSLTST: lt-mgy, sme tan, f-vfgr, sbrd-sbang, mod-psrt, arg mt, occ phlog, sme pyr ctd SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, sl calc, tr glau





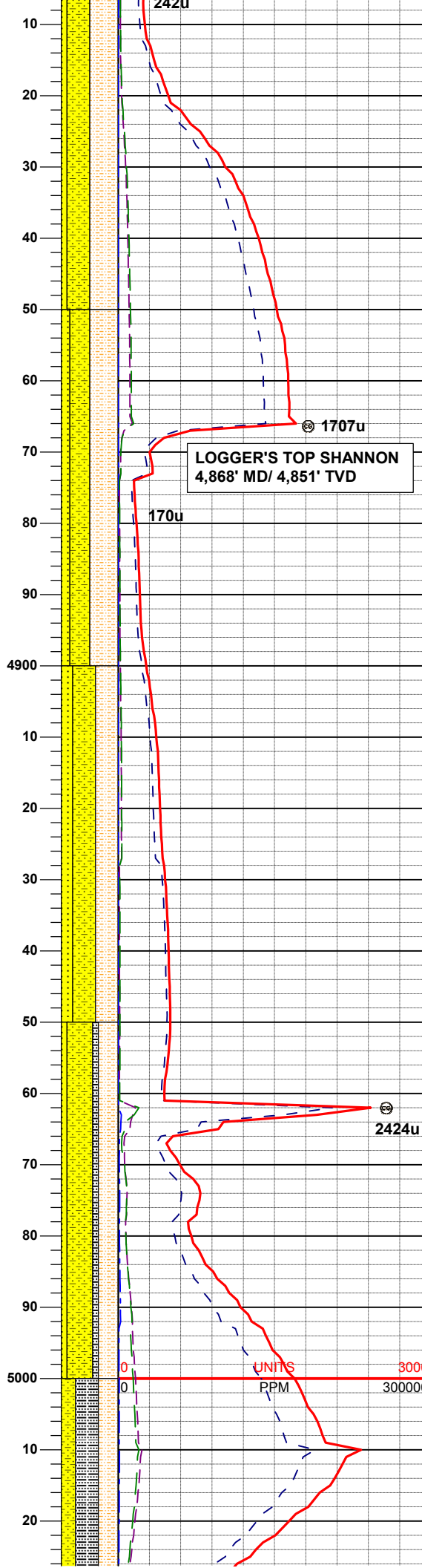
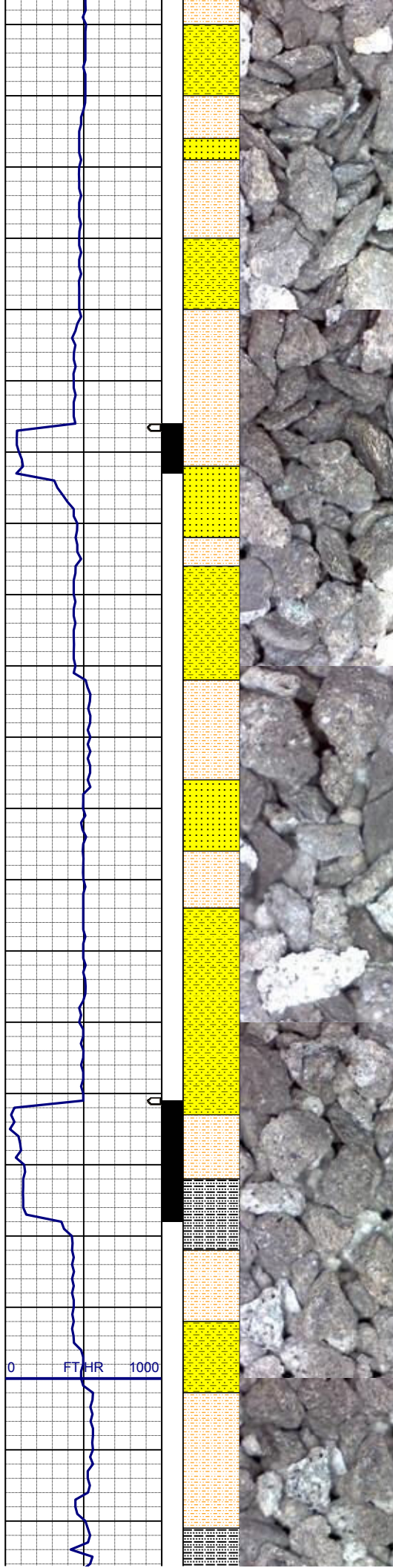
**SURVEY**  
**MD 4625'**  
**INC 6.3°**  
**AZI 226.9°**  
**TVD 4608.92'**

SHYSS: lt-mgy, f-mggr, sbrd-sbang, mod-psrt, ppor, argcmt, grd to  
SHYSLTST: lt-mgy, sme tan, f-vfgr, sbrd-sbang, mod-psrt, arg mtx, occ phlog, sme pyr ctd  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, sl calc, tr glau

**SURVEY**  
**MD 4720'**  
**INC 4.7°**  
**AZI 227.8°**  
**TVD 4703.48'**

SHYSLTST: lt-mgy, sme tan, f-vfgr, sbrd-sbang, mod-psrt, arg mtx, occ phlog, sme pyr ctd, grd to  
SHYSS: lt-mgy, f-mggr, sbrd-sbang, mod-psrt, ppor, argcmt, tr wh ss

**SURVEY**



MD 4815'  
INC 4.8°  
AZI 231.5°  
TVD 4798.15'

SHYSLTST: lt-mgy, sme tan, f-vfgr, sbrd-sbang, mod-psrt, arg mtx, occ phlog, grd to  
SHYSS: lt-mgy, f-mggr, sbrd-sbang, mod-psrt, ppor, argcmt  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, sl calc, tr glau, tr pyr ctd

SHYSLTST: lt-mgy, sme tan, f-vfgr, sbrd-sbang, mod-psrt, arg mtx, occ phlog, grd to  
SHYSS: lt-mgy, f-mggr, sbrd-sbang, mod-psrt, ppor, argcmt  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, sl calc, tr glau, tr pyr ctd, vtr bent

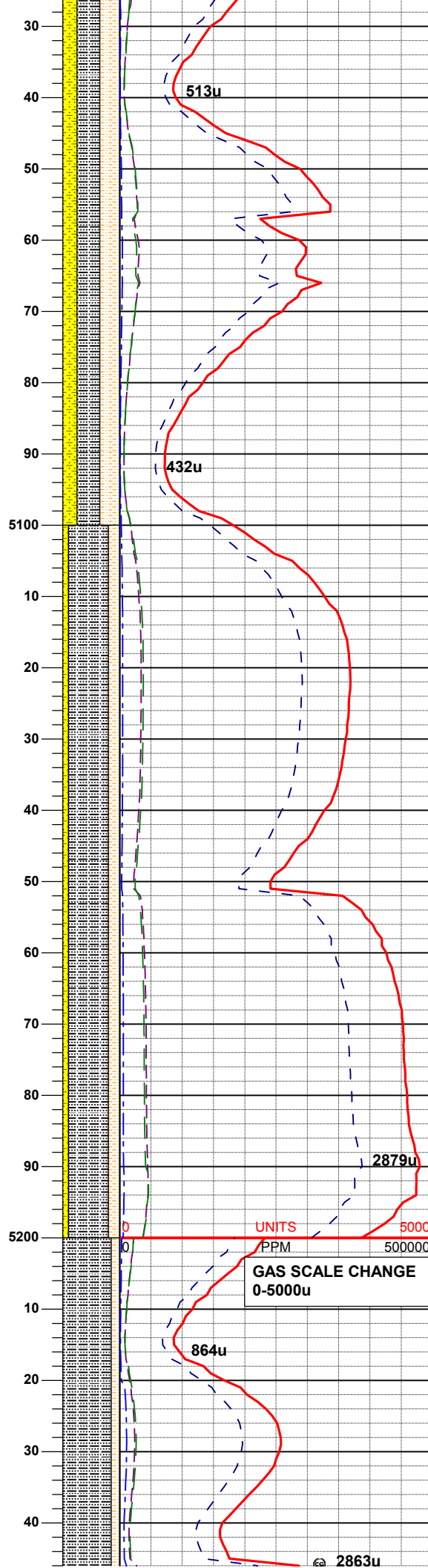
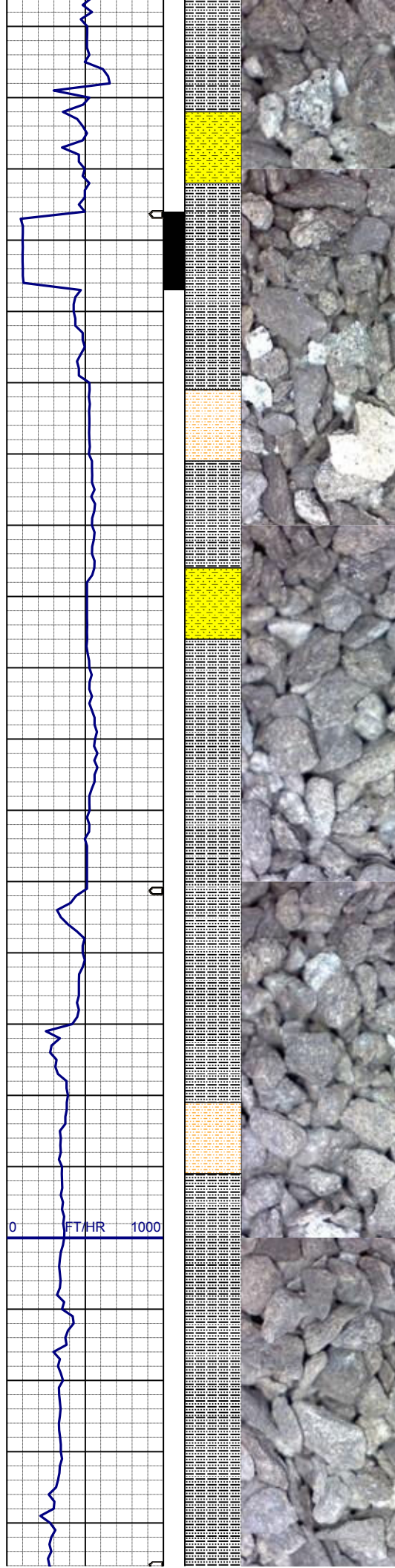
SURVEY  
MD 4910'  
INC 3.3°  
AZI 239.5°  
TVD 4892.92'

SHYSS: lt-mgy, f-mggr, sbrd-sbang, mod-psrt, ppor, argcmt, grd to  
SHYSLTST: lt-mgy, sme tan, f-vfgr, sbrd-sbang, mod-psrt, arg mtx, occ phlog,  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, sl calc, tr glau, tr pyr ctd, vtr bent

SHYSS: lt-mgy, f-mggr, sbrd-sbang, mod-psrt, ppor, argcmt, grd to  
SHYSLTST: lt-mgy, sme tan, f-vfgr, sbrd-sbang, mod-psrt, arg mtx, occ phlog,  
SLTYSH: lt - mgy, dk gy, occ tan, v f gr, fri-brit, sbplty-sbblky, sl calc,  
SS: w-ltgy, s&p, mf-c gr, sbrd, mod-wsrt, ppor, argcmt, sl calc, tr glau, tr pyr ctd

SURVEY  
MD 5005'  
INC 2.2°  
AZI 224.6°  
TVD 4987.81'





SLTYSH: lt - mgy, dk gy, occ tan, v f  
gr, fri-brit, sbply-sbbiky, sl calc, grd to  
SHYSLTST: lt-mgy, sme tan, f-vfgr,  
sbrd-sbang, mod-psrt, arg mtx,  
SHYSS: lt-mgy, f-mggr, sbrd-sbang,  
mod-psrt, ppor, argcm, occ phlog, tr  
pyr ctd

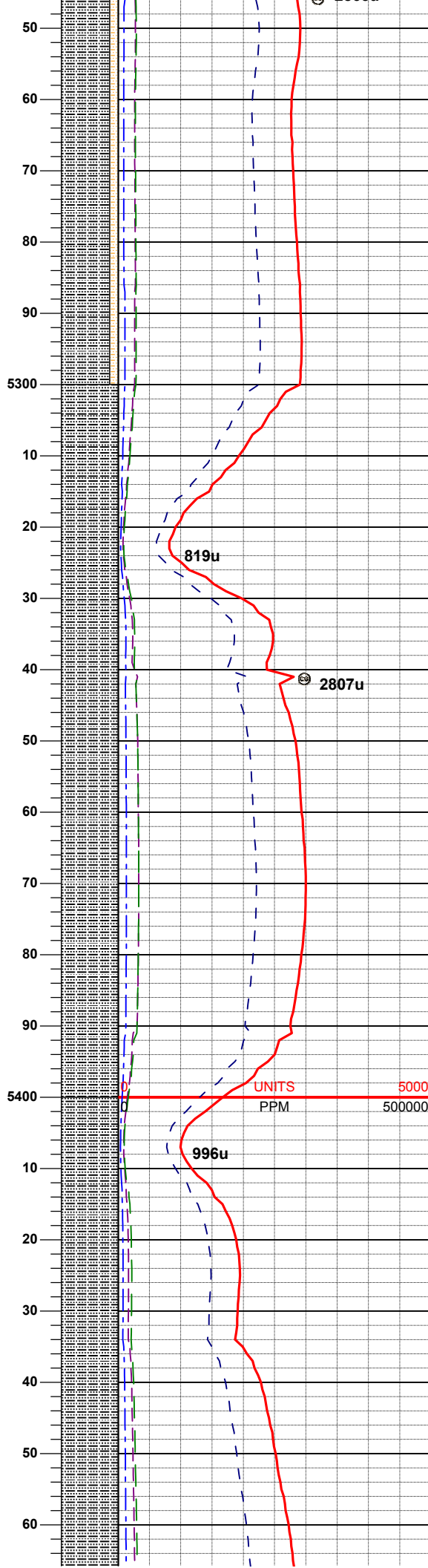
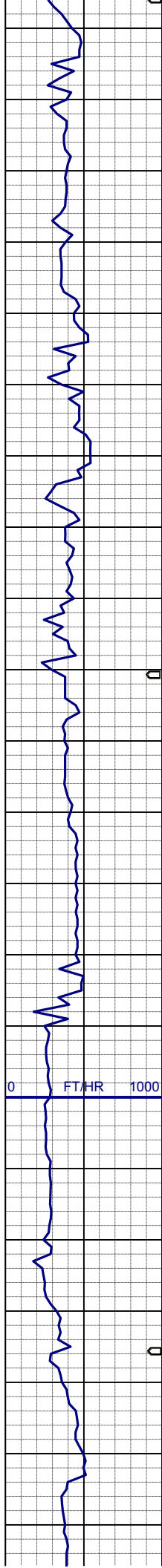
**SURVEY**  
**MD 5100'**  
**INC 1.1°**  
**AZI 187.5°**  
**TVD 5082.77'**

SLTYSH: lt - mgy, dk gy, occ tan, v f  
gr, fri-brit, sbply-sbbiky, sl calc  
SHYSLTST: lt-mgy, sme tan, f-vfgr,  
sbrd-sbang, mod-psrt, arg mtx  
SHYSS: lt-mgy, f-mggr, sbrd-sbang,  
mod-psrt, ppor, argcm, occ phlog, tr  
pyr ctd

**SURVEY**  
**MD 5194'**  
**INC 0.6°**  
**AZI 197.4°**  
**TVD 5176.76'**

UNITS  
PPM  
GAS SCALE CHANGE  
0-5000u

SL TYSH: lt - mav, dk av, occ tan, v f



gr, fri-brit, sbplty-sbbiky, sl calc, grd to  
SHYSLTST: lt-mgy, sme tan, f-vfgr,  
sbrd-sbang, mod-psrt, arg mtx, occ  
phlog, sme shyss, tr pyr ctd

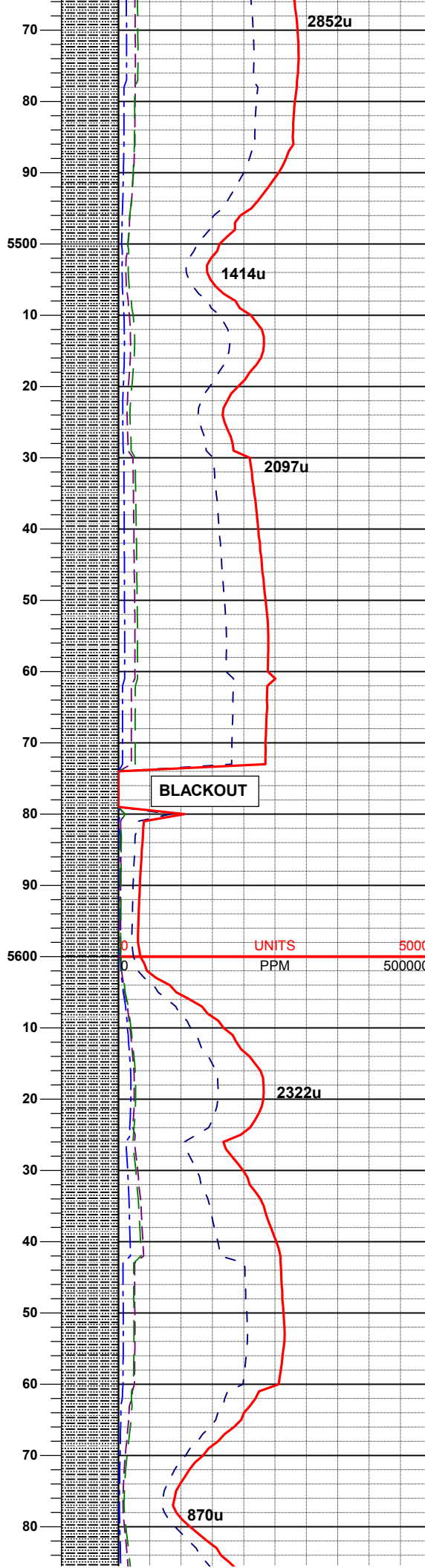
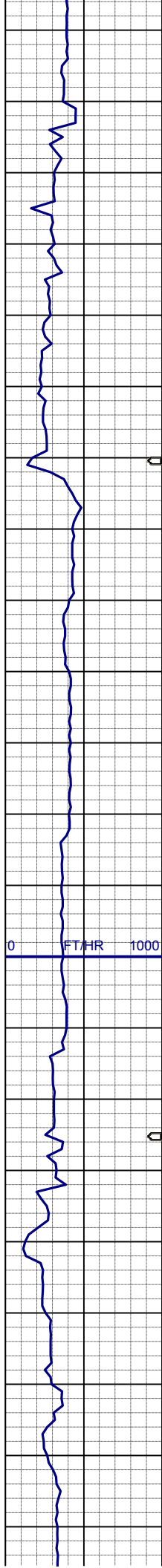
**SURVEY**  
**MD 5289'**  
**INC 0.8°**  
**AZI 180.5°**  
**TVD 5271.75'**

SLTYSH: lt - mgy, dk gy, occ tan, v f  
gr, fri-brit, sbplty-sbbiky, sl calc, tr  
shysltst, tr shyss, tr pyr ctd

**SURVEY**  
**MD 5384'**  
**INC 0.6°**  
**AZI 164.0°**  
**TVD 5366.74'**

SLTYSH: lt - mgy, dk gy, occ tan, v f  
gr, fri-brit, sbplty-sbbiky, sl calc, tr  
shysltst, tr shyss, tr pyr ctd





SURVEY  
MD 5479'  
INC 0.4°  
AZI 152.9°  
TVD 5461.74'

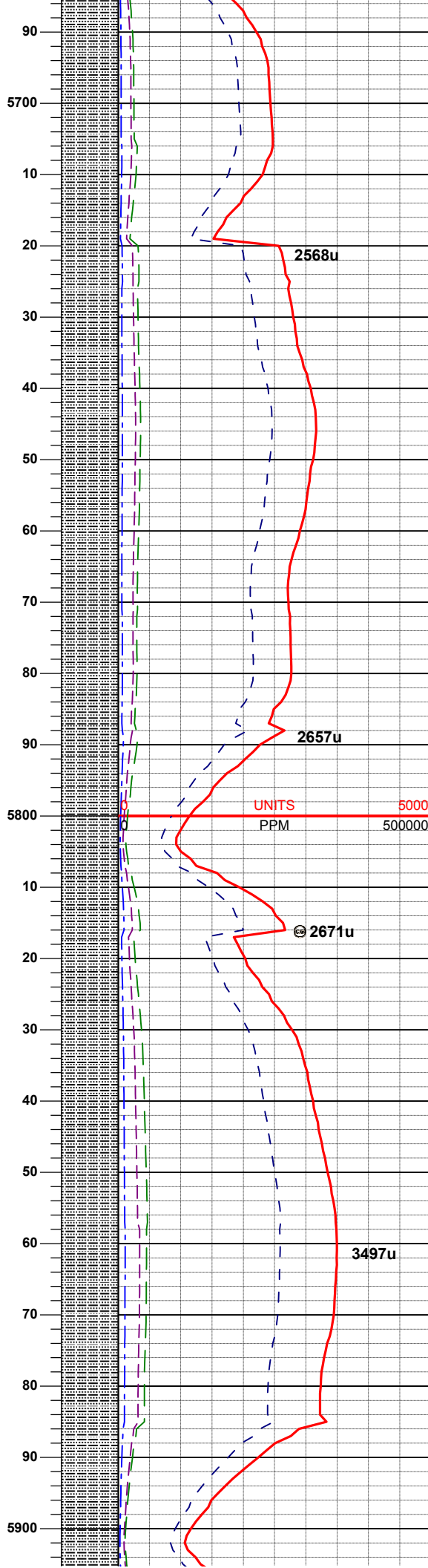
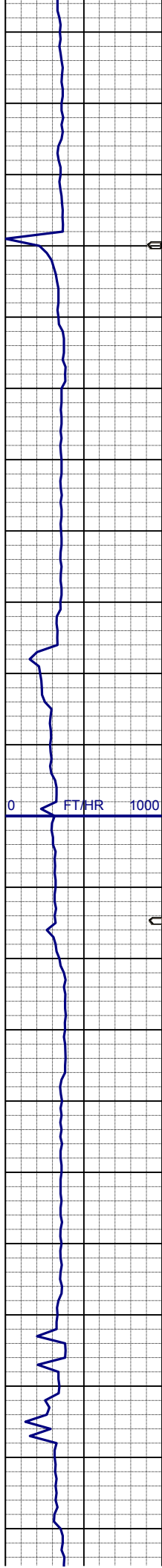
MUD WT: 9.0 VIS: 29 IN  
MUD WT: 8.8 VIS: 28 OUT

SLTYSH: lt - mgy, dk gy, occ tan, v f  
gr, fri-brit, sbplty-sbblky, sl calc, tr  
shysltst, tr shyss, tr pyr ctd, vtr bent

SURVEY  
MD 5574'  
INC 0.5°  
AZI 148.8°  
TVD 5556.74'

SLTYSH: lt - mgy, dk gy, occ tan, v f  
gr, fri-brit, sbplty-sbblky, sl calc, tr  
shysltst, tr shyss, tr pyr ctd

SURVEY  
MD 5669'  
INC 0.7°  
AZI 126.0°  
TVD 5651.73'



MUD WT: 9.5 VIS: 30 IN  
MUD WT: 9.3 VIS: 29 OUT

SLTYSH: lt - mgy, dk gy, occ tan, v f  
gr, fri-brit, sbpity-sbbiky, sl calc, tr  
shysltst, tr shyss, tr pyr ctd

**SURVEY**  
MD 5763'  
INC 0.4°  
AZI 120.2°  
TVD 5745.73'

SLTYSH: lt - mgy, dk gy, occ tan, v f  
gr, fri-brit, sbpity-sbbiky, sl calc, tr  
shysltst, tr shyss, tr pyr ctd

**SURVEY**  
MD 5858'  
INC 0.5°  
AZI 111.6°  
TVD 5840.72'

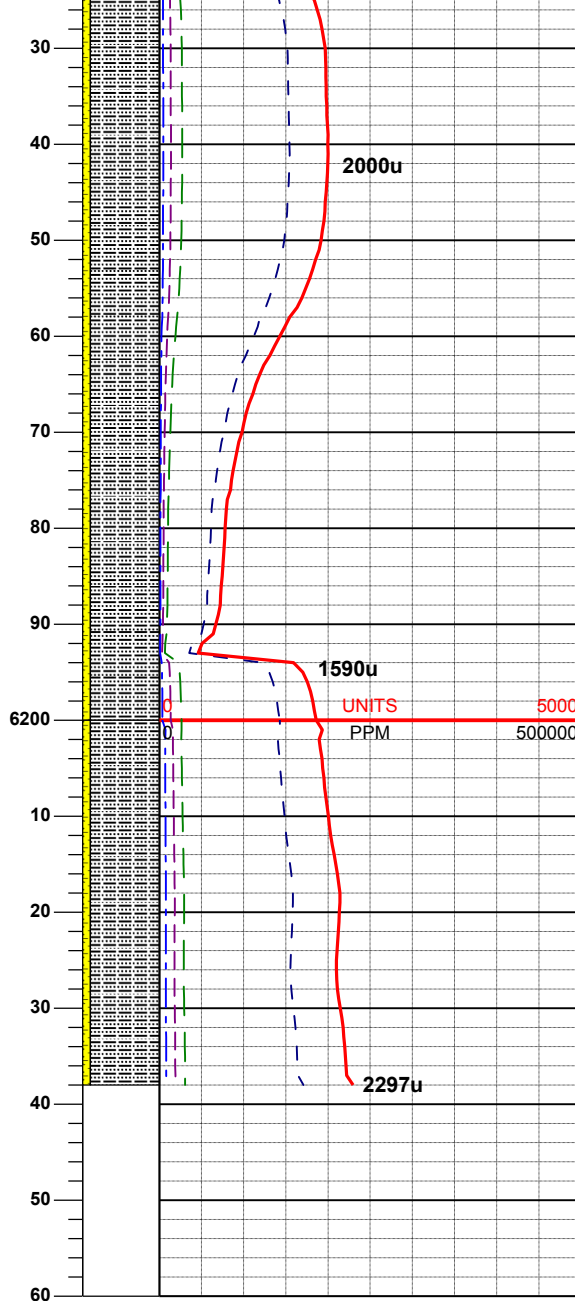
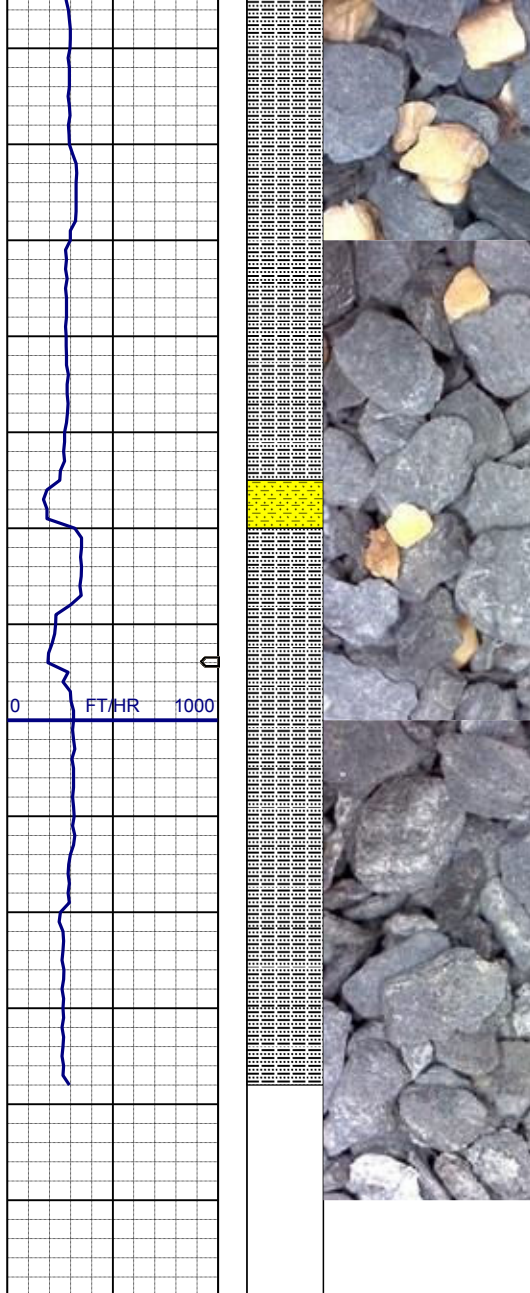
MUD WT: 9.8+ VIS: 30 IN



**SURVEY**  
**MD 5953'**  
**INC 0.3°**  
**AZI 48.6°**  
**TVD 5935.72'**

**SURVEY**  
**MD 6048'**  
**INC 0.2°**  
**AZI 12.1°**  
**TVD 6030.72'**

SLTYSH: lt - mgy, dk gy, occ tan, v f  
gr, fri-brit, sbply-sbbkly, sl calc, occ  
pyr ctd  
SHYSS: lt-mgy, f-mggr, sbrd-sbang,  
mod-psrt, ppor, argcmt



**SURVEY**  
**MD 6143'**  
**INC 0.4°**  
**AZI 9.1°**  
**TVD 6125.72'**

SLTYSH: lt - mgy, dk gy, occ tan, v f  
gr, fri-brit, sbply-sbbiky, sl calc, occ  
pyr ctd  
SHYSS: lt-mgy, f-mggr, sbdr-sbang,  
mod-psrt, ppor, argcmt

**MUD WT: 9.8 VIS: 28 IN**  
**MUD WT: 9.8 VIS: 29 OUT**

**SURVEY**  
**MD 6237'**  
**INC 1.6°**  
**AZI 7.5°**  
**TVD 6219.70'**

**TD VERTICAL @ 6,238' MD**  
**03/24/2013 18:42 MST**

**LOG CONTINUES ON L PLOT**  
**SAUER F33-77HN HORIZONTAL**

**THANK YOU FOR USING**  
**COLUMBINE LOGGING INC.**