LOG created using LPLOT VH Version 3.0, February 24, 2012, Copyright (C) 1999-2009 Pason Systems Corp.

OPERATOR:	**ENCANA OIL & GAS (USA) INC.**
WELL:	**GRATTAN 4B-30H**
LOCATION:	**SESE S30 T2N-R64W**
COUNTY:	**WELD**
STATE:	**COLORADO**
SPOT:	**622' FSL, 488' FEL**
ELEVATION:	**4935' GL, 4948' KB**
FIELD:	**WATTENBERG**
SPUD DATE:	**02/10/12 @ 0900 HRS**
TD DATE:	**02/23/12 @ 1730 HRS**
DATES LOGGED:	**02/12/12 - 02/23/12**
DEPTHS LOGGED:	**1022' - 11408'**
LOGGERS:	**MICHAEL ANDERSON**
DRILLING FLUID:	**H20, LSND**
DRILLING RIG:	**ENSIGN #135**
API:	**05-123-34362**
LOG TYPE:	**VERTICAL**
SCALE:	**1:240 (5 inches per 100 feet)**
REMARKS:	**Continued on Grattan 4B-30H Horizontal.**

LITHOLOGIES

Bentonite | No Sample | Sandstone | Shale

Shaly Sandstone | Siltstone | Silty Shale

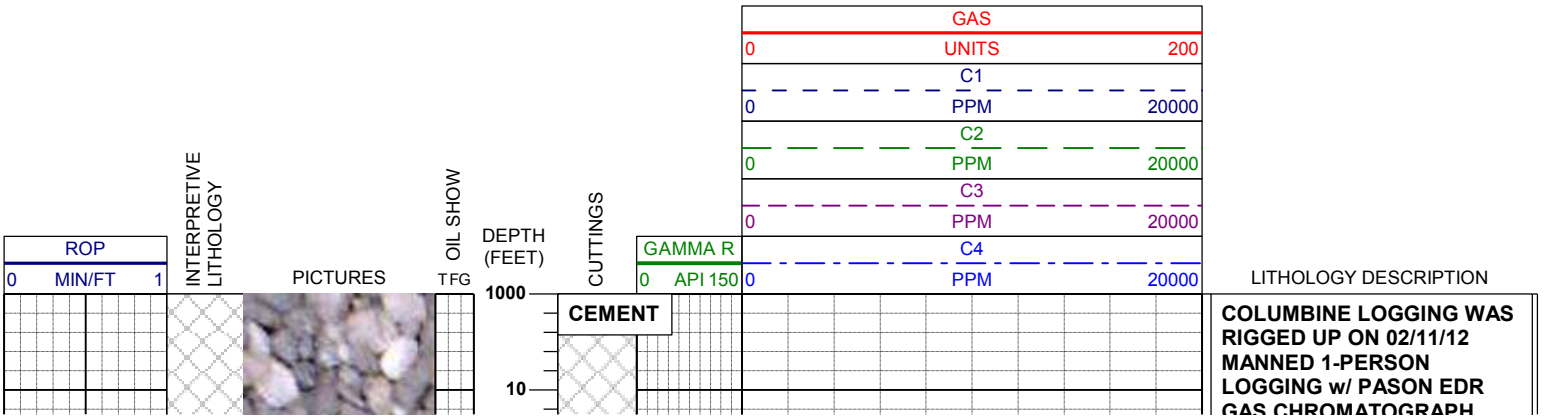
MODIFIERS

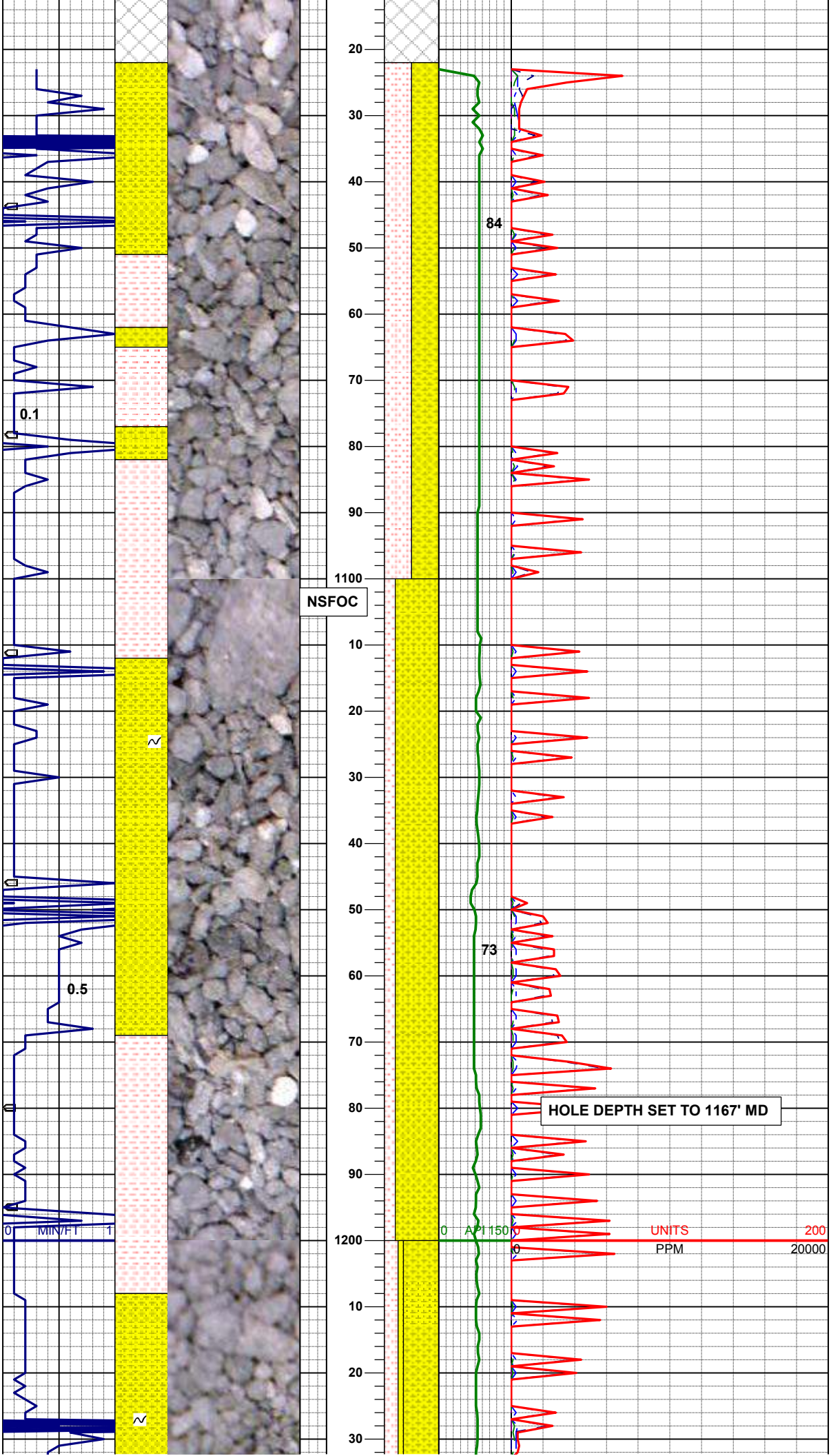
B Bentonite | Glauconite | Sandstone Stringers

Sandy | Silt Stringers

ENGINEERING SYMBOLS

Bit Change | Connection | Connection Gas | Midnight Depth





GAS CHROMATOGRAPH UNIT #000031

9.625" SURFACE CASING SET to 1022' MD

BEGIN LOGGING f/1100' MD ON 02/12/2012 @ 0245 hrs

CATCHING 100 FT LAGGED SAMPLES

DRLG w/ WATER

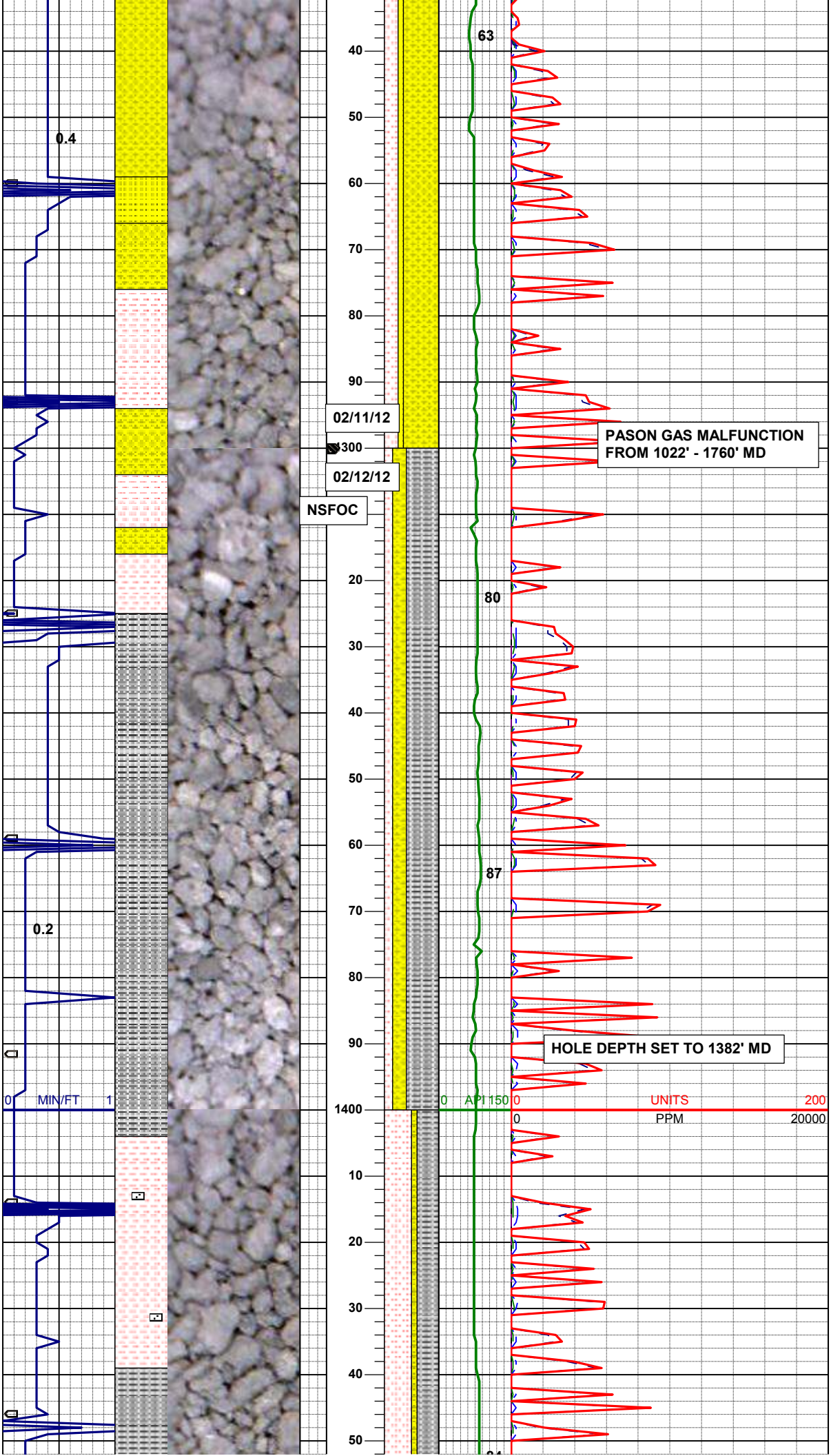
SHYSS: lt gy- gy, s&p thru, vf gr, sbrd - rd, w srt, pred sft, smwt firm ip, fri, wk-mod consol, slty-arg mtx, sl calc, tr lt gn glauc, grdg to SLTST: gy, vf gr, rd, arg mtx, tr pyr, no flor, no cut

MD 1084'
TVD 1083.99'
INC 0.30°
AZM 161.10°
VS 2.34'

MUD DATA
WT 8.7
VIS 27
YP 2
CK -
pH 7.8
Chl 200

SHYSS: lt gy- gy, s&p thru, vf gr, sbrd - rd, w srt, pred sft, smwt firm ip, fri, wk-mod consol, slty-arg mtx, sl calc, tr lt gn glauc, grdg to SLTST: gy, vf gr, rd, arg mtx, tr pyr, no flor, no cut

MD 1176.00'
TVD 1175.96'
INC 2.40°
AZM 236.70°
VS 1.51'



SHYSS: lt gy-gy, s&p thru, vf gr, sbrd - rd, w srt, pred sft, smwt firm ip, fri, wk-mod consol, slty-arg mtx, sl calc, tr lt gn glauc, grdg to SLTST: gy, vf gr, rd, arg mtx, SS: wh-clr, trans-trnsl, f gr, v sft, v fri, sbang-sbrd, p consol, p srt, mica thru, no flor, no cut

MD 1268'
TVD 1267.77'
INC 4.8°
AZM 241.50°
VS 0.08'

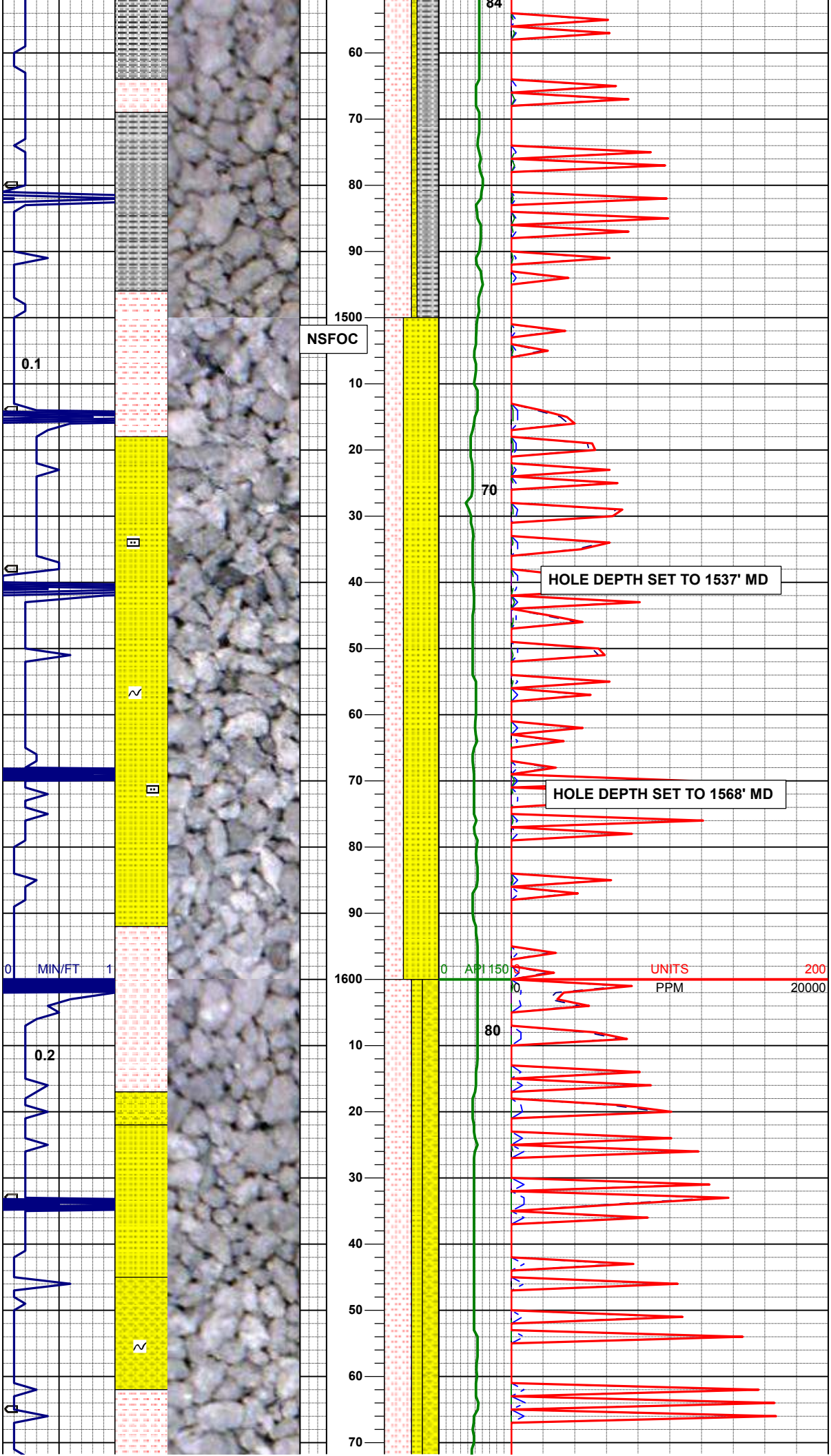
MUD DATA
WT 8.75
VIS 28
YP 4
CK -
pH 10.5
Chl 100

SLTY SH: ltgy - gy, lt gybrn, sdy ip, sft-m firm, sbplty- sbblky, slty tex, sndy, grdg - SHYSS: lt gy-gy, wh, spec pk, s&p ip, vf-f gr, sbang-sbrd , mod srt, sft-firm ip, fri, wk-mod consol, slty-arg mtx, tr lt gn glauc, grdg to SLTST: gy, vf gr, rd, arg mtx, calc ip thru, tr pyr, mica thru, no flor, no cut

MD 1360'
TVD 1359.33'
INC 6.4°
AZM 243.7°
VS -1.70'

SLTST: lt gy, spec blk w/ mica frag, sdy ip, vf gr, rd, w srt, arg mtx, SLTY SH: gy, lt gybrn, sft-firm, sbplty- sbblky, slty tex, SHYSS: wh, vf-f gr, sbang-sbrd, mod srt, sft-firm ip, fri, wk-mod consol, slty-arg mtx, spec lt gn glauc, calc ip thru, tr pyr, mica thru, no flor, no cut

MD 1452'
TVD 1450.58'

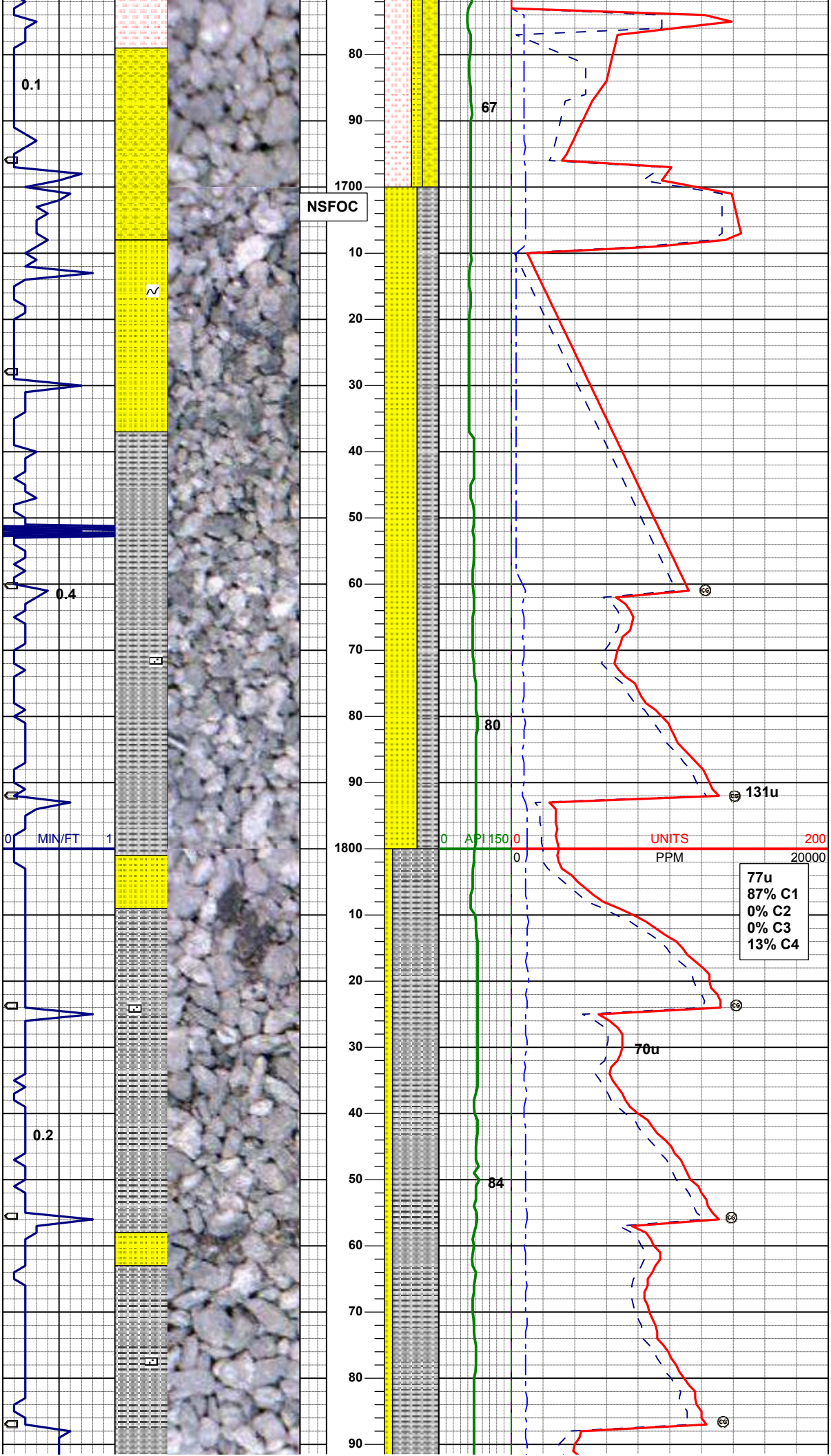


MD 1547'
TVD 1544.36'
INC 10.2°
AZM 253.7°
VS -2.83'

SS: wh-clr, trnsp-trnsl, occ s&p, vf-f gr, sbang-sbrd, p srt, firm, brit-fri, wk-mod consol, tt clus, slty-arg mtx, spec lt gn w/ glauc frag, SLTST: lt gy, spec blk w/ mica frag, sdy ip, vf gr, rd, w srt, arg mtx, calc thru, mica ip, no flor, no cut

MD 1642'
TVD 1637.44'
INC 12.8°
AZM 254.0°
VS -2.96'

SLTST: lt gy, spec blk w/ mica frag, sdy ip, vf gr, rd, w srt, arg mtx, SHYSS: gy, s&p ip, vf gr, sbang-sbrd , mod srt, sft-firm ip, fri, mod consol, arg mtx, SS: wh-clr, vf-f gr, sbang-sbrd, p srt, firm, brit-fri, mod consol, tt clus, slty-arg mtx, spec lt gn w/ glauc frag, calc thru, mica ip, no flor, no cut

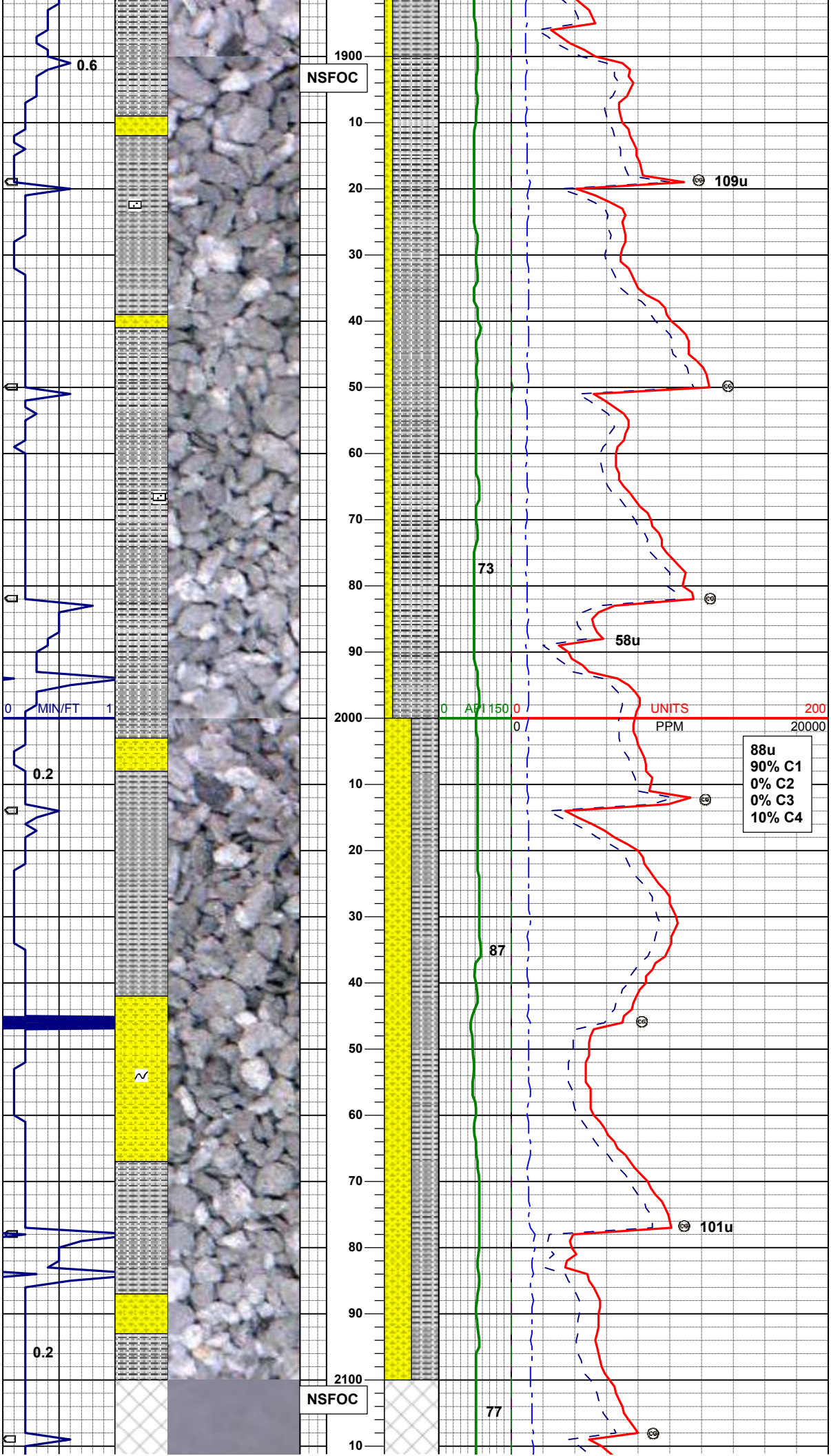


MD 1738'
TVD 1730.77'
INC 14.3°
AZM 253.2°
VS -3.22'

SS: wh-clr, s&p ip, vf-f gr, sbang-sbrd, p srt, sft-firm, brit-fri, mod consol, slty-arg mtx, spec lt gn w/ glauc frag, SLTY SH: ltgy-gy, lt gybrn, sft, fri, sbplty- sbblky, slty tex, calc thru, mica ip, no flor, no cut

MD 1833'
TVD 1822.80'
INC 14.4°
AZM 251.5°
VS -4.00'

SLTY SH: ltgy-gy, lt gybrn, sft, fri, sbplty- sbblky, slty tex, SS: wh-clr, s&p ip, vf-f gr, sbang-sbrd, p srt, sft-firm, brit-fri, mod consol, slty-arg mtx, spec lt gn w/ glauc frag, calc thru, mica ip, no flor, no cut



MD 1928'
TVD 1914.88'
INC 14.1°
AZM 253.8°
VS -4.66'

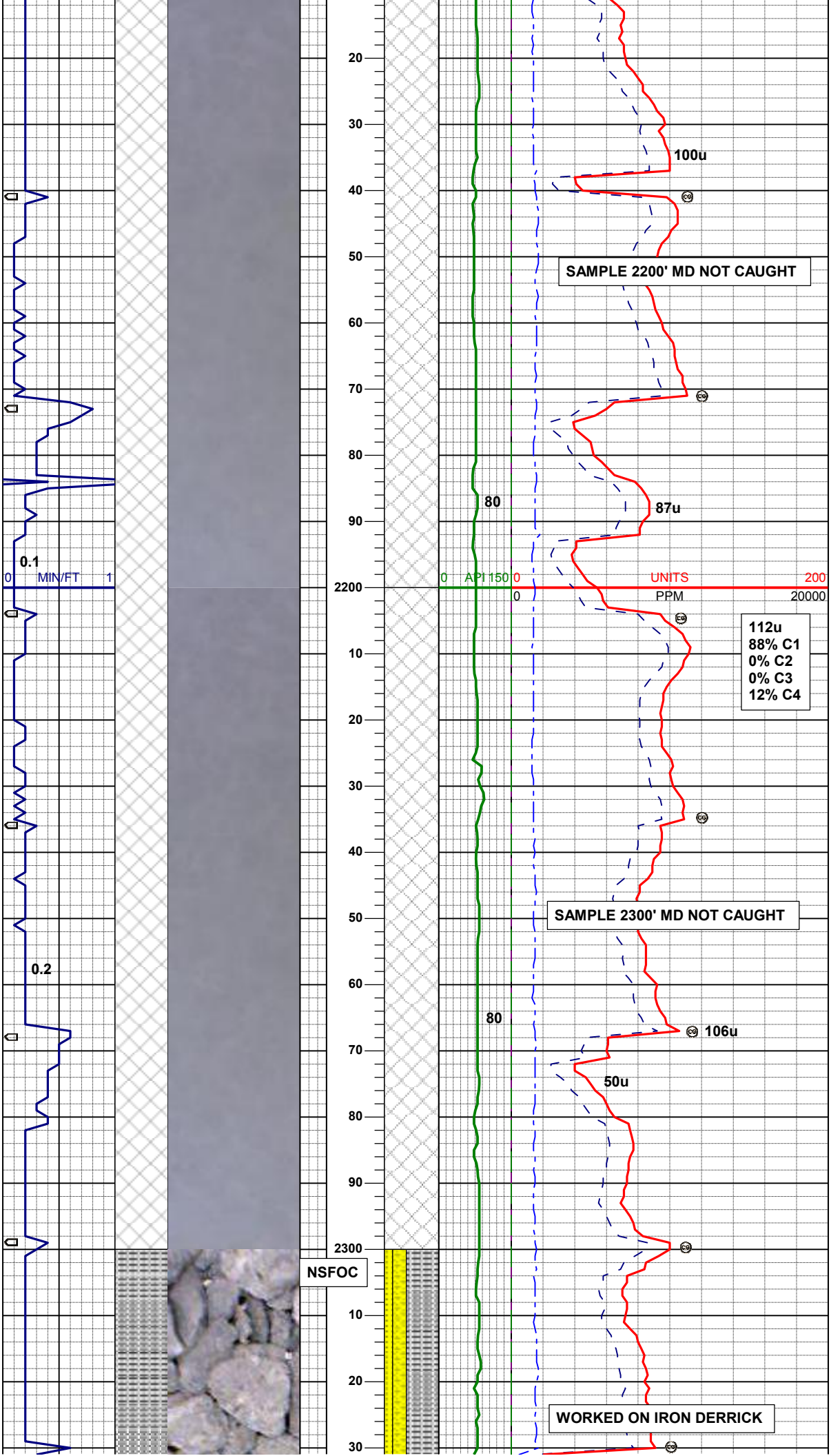
SLTYSH: ltgy-m gy, sft-firm, v fri, sbplty- sbblky, slty-gt tex, grdg - & intlam w/ SHLYSS: wh, s&p ip, vf-f gr, sbrd-rd, mod srt, sft-firm, brit-fri, mod consol, slty-arg mtx, calc ip, mica ip, no flor, no cut

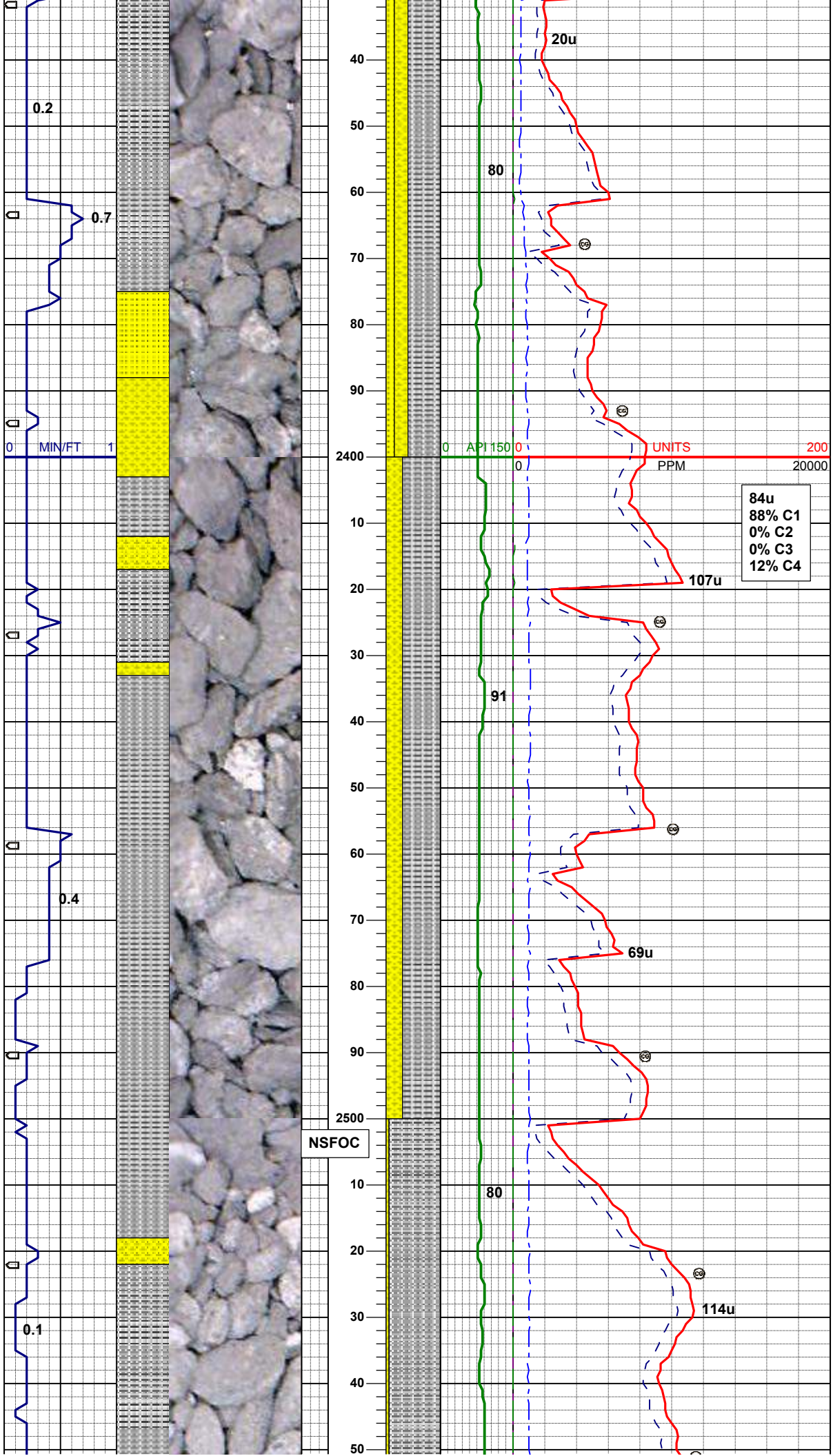
MUD DATA
WT 8.85
VIS 28
YP 4
CK -
pH 10.0
Chl 200

88u
90% C1
0% C2
0% C3
10% C4

MD 2023'
TVD 2007.22'
INC 13.1°
AZM 258.8°
VS -3.90'

SLTYSH: ltgy-m gy, occ blk, sft-mod firm, v fri, sbplty- sbblky, slty -gt tex, intlam w/ SHLYSS: wh, s&p ip, vf gr, sbrd-rd, mod srt, firm, brit-fri, mod consol, slty-arg mtx, calc ip, tr lt gn glauc, mica ip, no flor, no cut


MD 2119'
TVD 2100.80'
INC 12.7°
AZM 258.60°
VS -2.23'
100u
SAMPLE 2200' MD NOT CAUGHT
80
87u
0.1
0 MIN/FT 1
0 API 150 0 UNITS 200
0 PPM 20000
2200
112u
88% C1
0% C2
0% C3
12% C4
MD 2214'
TVD 2193.44'
INC 12.9°
AZM 260.50°
VS -0.29'
SAMPLE 2300' MD NOT CAUGHT
0.2
80
106u
50u
2300
NSFOC
MD 2311'
TVD 2288.06'
INC 12.5°
AZM 258.7°
VS 1.71'
WORKED ON IRON DERRICK



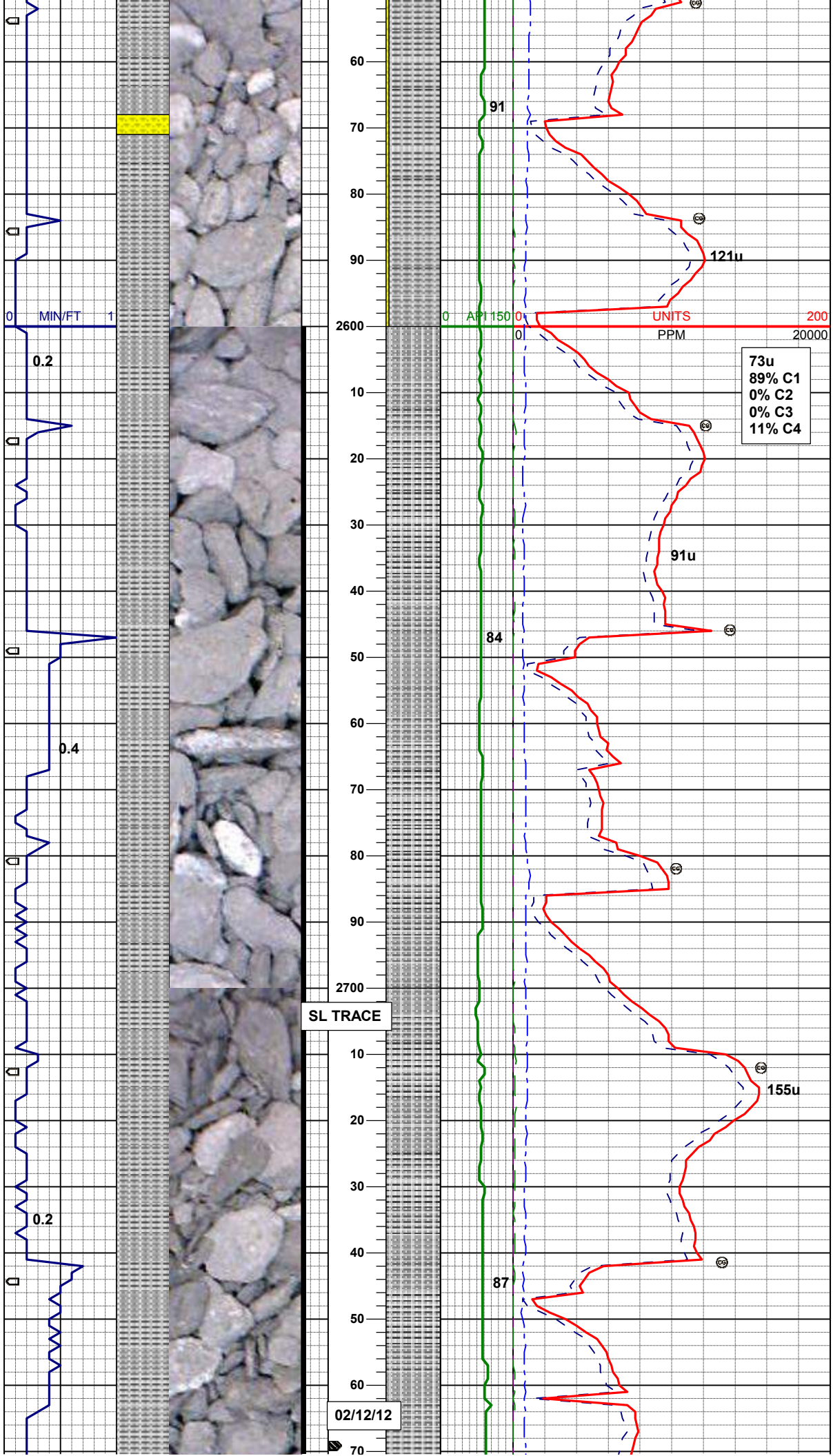
SLTYSH: ltgy-m gy, gybrn, sft-mod firm, fri, sbplty- sbblky, slty-gt tex, intlam w/ SHLYSS: wh, lt gy-lt gybrn, vf-f gr, sbrd-rd, mod srt, firm-hd, brit-fri, mod consol, slty-arg mtx, calc ip, occ free calcite, tr pyr, tr lt gn glauc, mica ip, spec yel-orng ss flor, no cut

MD 2404'
TVD 2378.88'
INC 12.4°
AZM 256.3°
VS 2.83'

SLTYSH: ltgy-m gy, gybrn, sft-mod firm, fri, sbplty- sbblky, slty-gt tex, grdg - SHLYSS: sped lt gy-lt gybrn, sme wh, vf-f gr, sbrd-rd, mod srt, firm-hd, brit-fri, mod consol, slty-arg mtx, sl calc ip, tr pyr, tr lt gn glauc, mica ip, spec yel-orng ss flor, no cut

MD 2499'
TVD 2471.54'
INC 13.1°
AZM 255.3°
VS 3.39'

SLTYSH: ltgy-m gy, spec brn-blk w/ mica frag thru, sft-mod firm, fri, calc-arg cmt, sbplty- sbblky,



rthy-gt tex, sl calc ip, tr shlyss, tr pyr, no flor, no cut

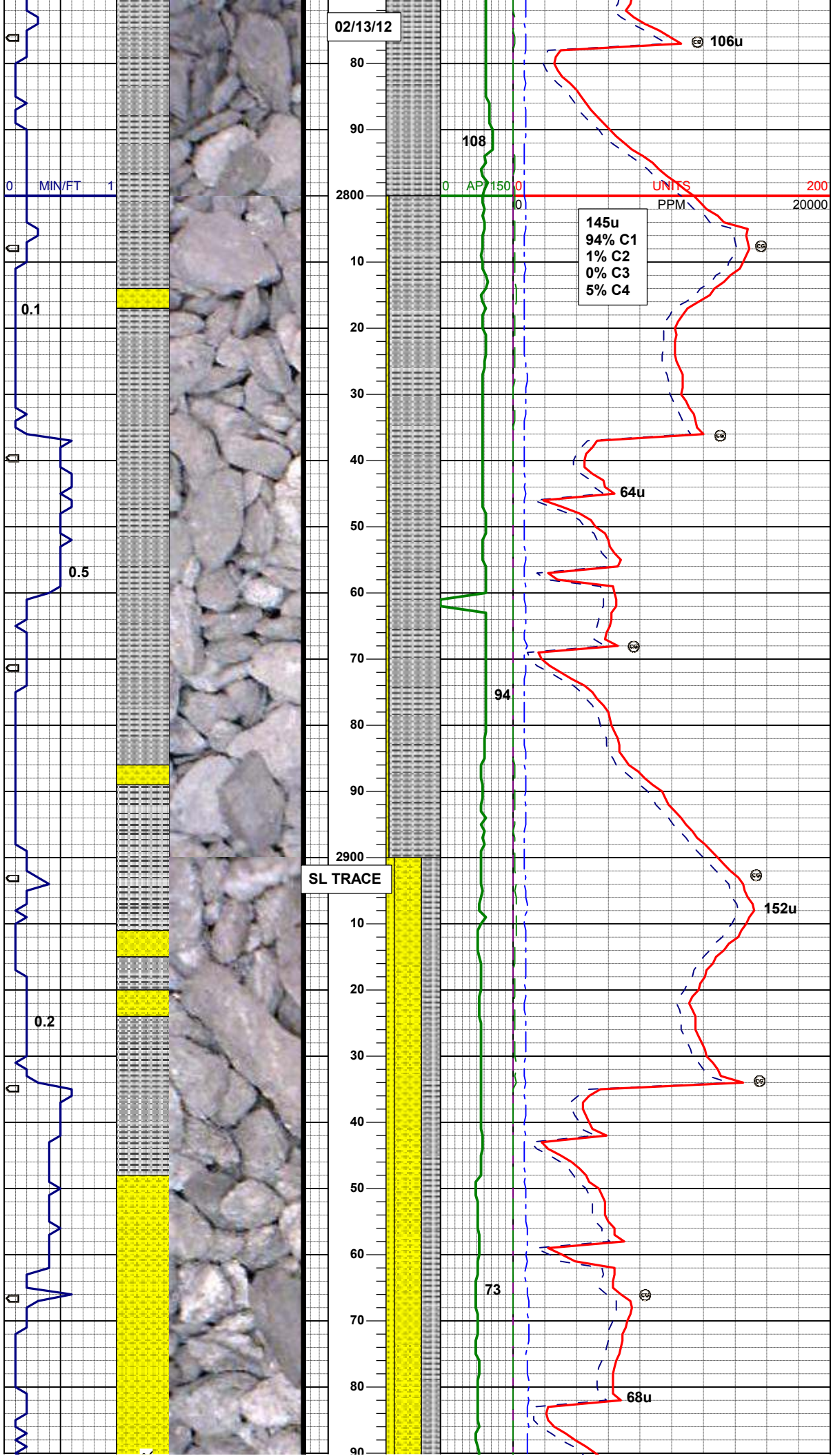
MD 2595'
TVD 2565.19'
INC 12.3°
AZM 254.7°
VS 3.67'

73u
89% C1
0% C2
0% C3
11% C4

SLTYSH: pred ltgybrn, occ gyblk, spec brn-blk w/ s mica frag thru, sft-mod firm, fri, calc-arg cmt, pred sbplty-sbfis ip, sme sbblky, rthy-gt tex, sl calc ip, tr wh cly, tr shlyss, tr pyr, no flor, slow diffuse mod bri blwh mky cut

MD 2690'
TVD 2658.08'
INC 11.9°
AZM 252.0°
VS 3.37'

SLTYSH: pred ltgybrn, rr blk, s&p ip, lam brn-blk w/ mica. ip, sft-mod firm, smwt fri, arg cmt, pred sbplty-sbfis ip, sme sbblky, rthy-gt tex, non calc, tr shlyss, tr pyr, no flor, v slow diffuse dul mky cut



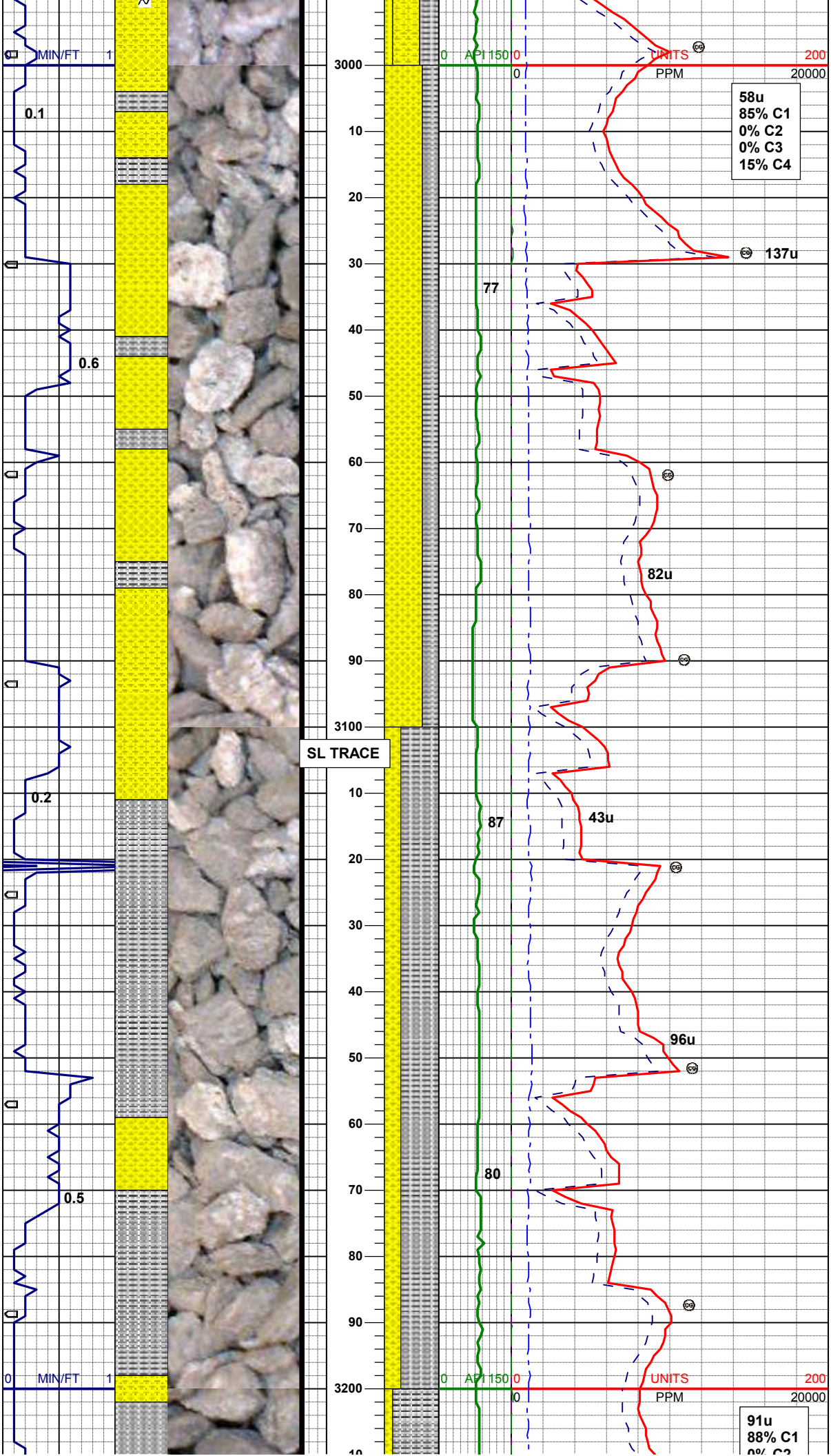
MD 2785'
TVD 2750.98'
INC 12.2°
AZM 254.9°
VS 3.09'

SLTYSH: lt gy-dk gy, s&p ip, spec blk ip, sft-firm, arg mtx, pred sbplty-sbfis ip, sme sbblky, rthy-gt tex, non calc, tr shlyss, tr wh cly, no flor, slow diffuse wh mky cut

MD 2880'
TVD 2843.96'
INC 11.5°
AZM 254.8°
VS 3.30'

SHLYSS: lt gy-lt gybrn, s&p ip, vf gr, sbang-sbrd, mod srt, firm, brit -fri, w consol, slty-arg mtx, calc cmt, SLTYSH: ltgy-dk gy, sft-firm, sbplty- sbblky, rthy-gt tex, SS: wh, vf-f gr, sbang-sbrd, mod srt, hd, brit-fri, mod consol, calc thru, tr lt gn glauc, mica ip, tr fos, spec dul orng ss flor, slow diffuse mod bri wh mky cut

MD 2976'
TVD 2937.98'
INC 11.8°
AZM 251.1°
VS 2.85'



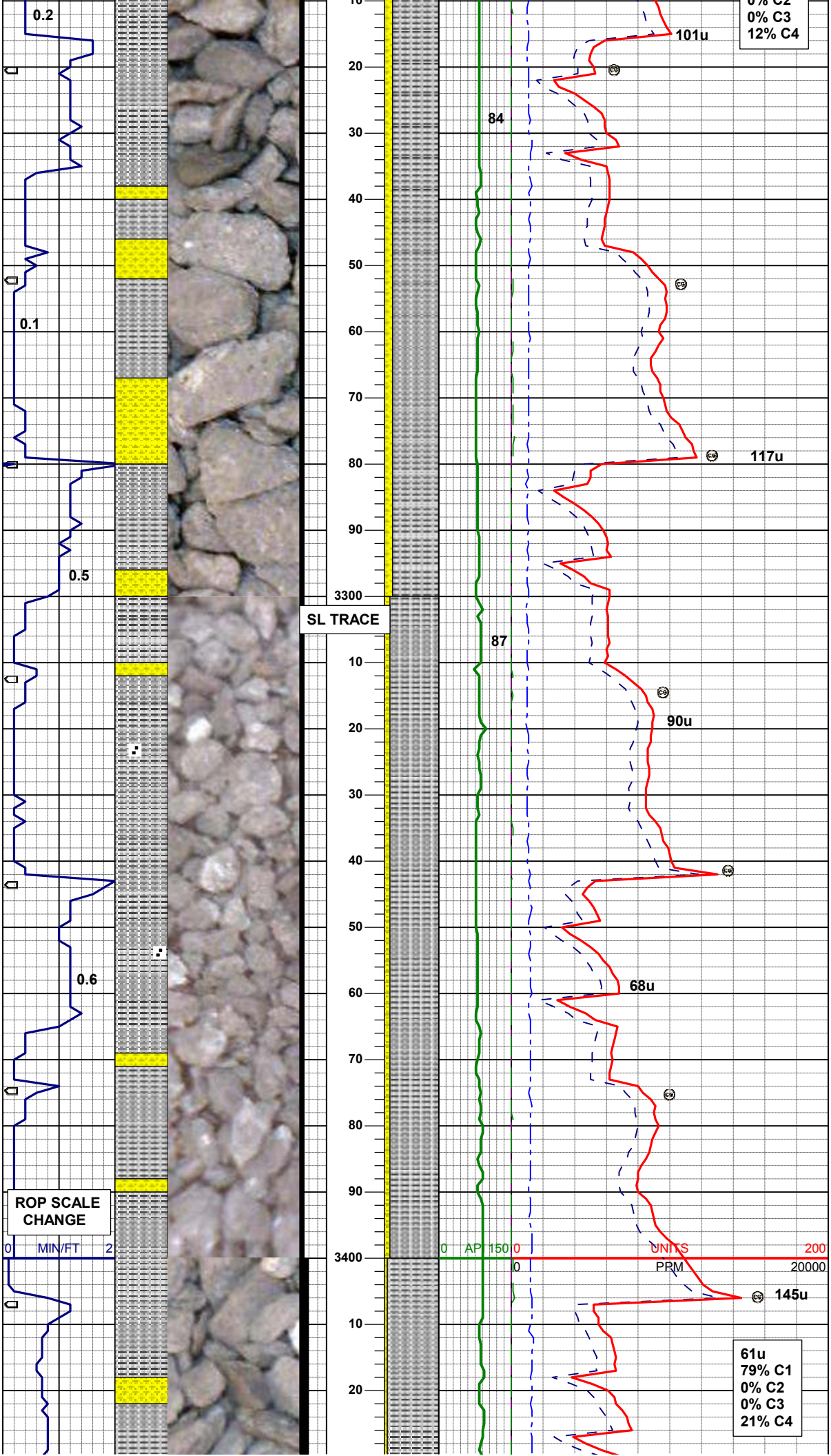
MD 3039'
TVD 2999.58'
INC 12.4°
AZM 249.5°
VS 1.94'

SHLYSS: wh, clr-trnsl, lt gy-lt gybrn, s&p ip, vf gr, sbang-sbrd, mod srt, firm, brit-fri, w consol, slty-arg mtx, calc cmt, intlam w/ SLTYSH: ltgy-dk gy, sft-firm, sbplty- sbblky, rthy-gt tex, calc thru, tr lt gn glauc, mica ip, tr fos, spec dul orng ss flor, slow diffuse mod bri wh mky cut

MD 3103'
TVD 3062.09'
INC 12.4°
AZM 249.6°
VS 0.81'

SHLYSS: wh, clr-trnsl, lt gy-lt gybrn, s&p ip, vf gr, sbrd-rd, w srt, firm, fri, mod consol, slty-arg mtx, intlam w/ SLTYSH: ltgy-gybrn, firm, sbplty-sbblky, gt tex, non calc, tr lt gn glauc, mica ip, tr fos, spec dul orng ss flor, slow diffuse lt blwh mky cut

MD 3166'
TVD 3123.61'
INC 12.5°
AZM 252.6°
VS 0.07'



MD 3230'
TVD 3186.10'
INC 12.4°
AZM 252.1°
VS -0.39'

SLTYSH: ltgy-gybrn, firm, sbplty-sbblky, gt tex, intlam w/ SHLYSS: wh, clr-trnsl, lt gy-lt gybrn, s&p ip, vf gr, sbrd-rd, w srt, firm, fri, mod consol, slty-arg mtx, non calc, tr lt gn glauc, mica ip, tr fos, spec dul orng ss flor, slow diffuse lt blwh mky cut

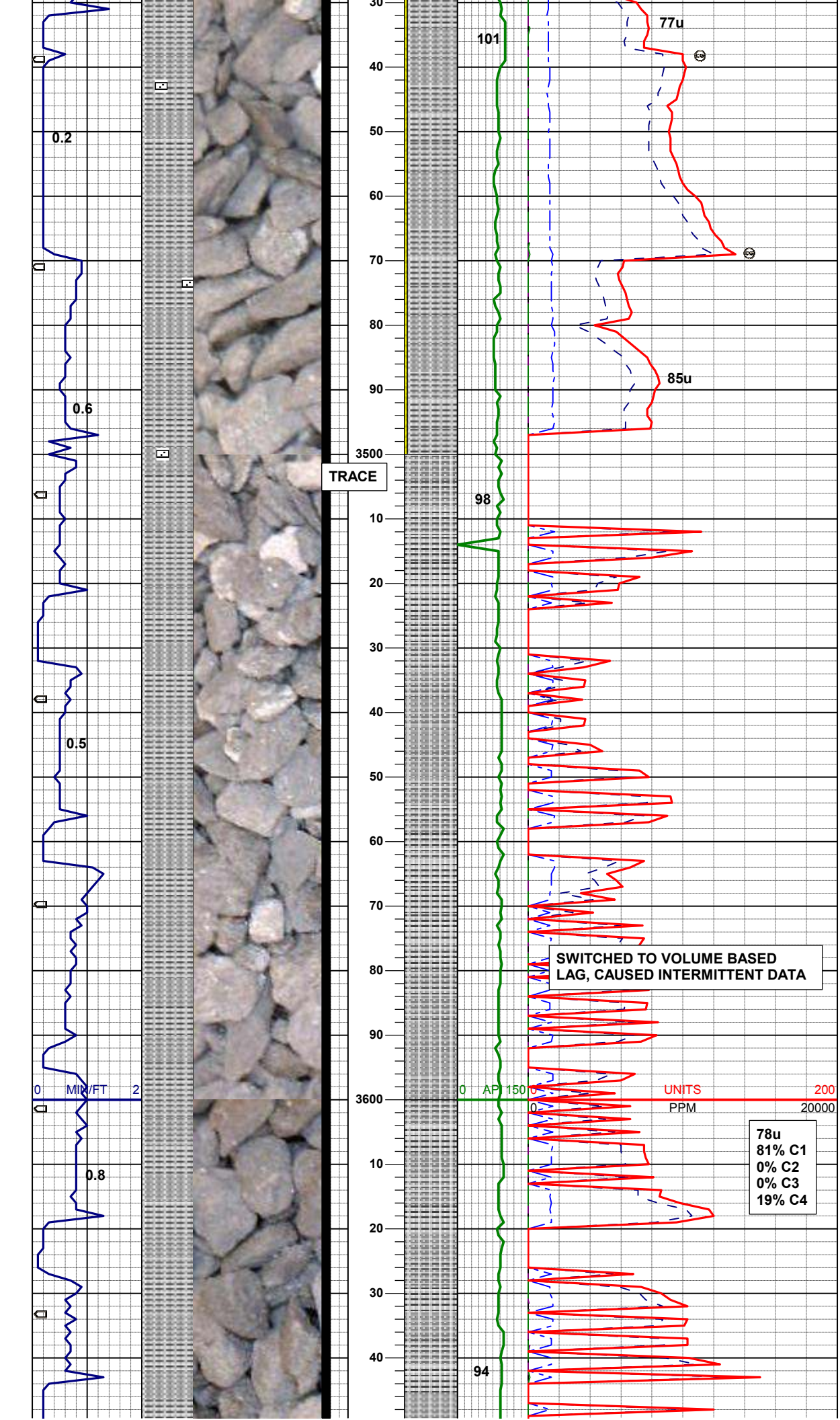
MD 3293'
TVD 3247.74'
INC 11.5°
AZM 252.6°
VS -0.82'

SLTYSH: ltgy-gybrn, firm, sbplty-sbblky, gt tex, intlam w/ SHLYSS: wh, clr-trnsl, lt gy-lt gybrn, s&p ip, vf gr, sbrd-rd, w srt, firm, fri, mod consol, slty-arg mtx, non calc, tr lt gn glauc, mica ip, tr fos, no flor, v sl stmg lt blwh mky cut

MD 3357'
TVD 3310.49'
INC 11.2°
AZM 252.2°
VS -1.23'

MD 3420'
TVD 3372.33'
INC 10.8°
AZM 253.9°
VS -1.49'

SLTYSH: m gy-dk gy, gyblk, firm



SLTYSH: m gy-dk gy, gyblk, firm, sbplty-sbfis ip, occ sbblky, sbwxy -gt tex, non calc, sme aren grdg - shlyss, mica ip, tr pyr, tr fos, tr carb cly, dul orng cly flor, v lt bl mky cut

MD 3452'
TVD 3403.77'
INC 10.7°
AZM 253.0°
VS -1.57'

MUD DATA
WT 9.30
VIS 35
YP 18
CK -
pH 8.5
Chl 200

MD 3484'
TVD 3435.20'
INC 10.9°
AZM 254.3°
VS -1.63'

MD 3515'
TVD 3465.64'
INC 10.90°
AZM 254.3°
VS -1.63'

SLTYSH: m gy-dk gy, gyblk, firm, sbplty-sbfis ip, occ sbblky, sbwxy -gt tex, non calc, sme aren grdg - shlyss, mica ip, tr pyr, tr fos, tr carb cly, dul orng cly flor, v lt bl mky cut

MD 3547'
TVD 3497.03'
INC 11.6°
AZM 251.8°
VS -1.76'

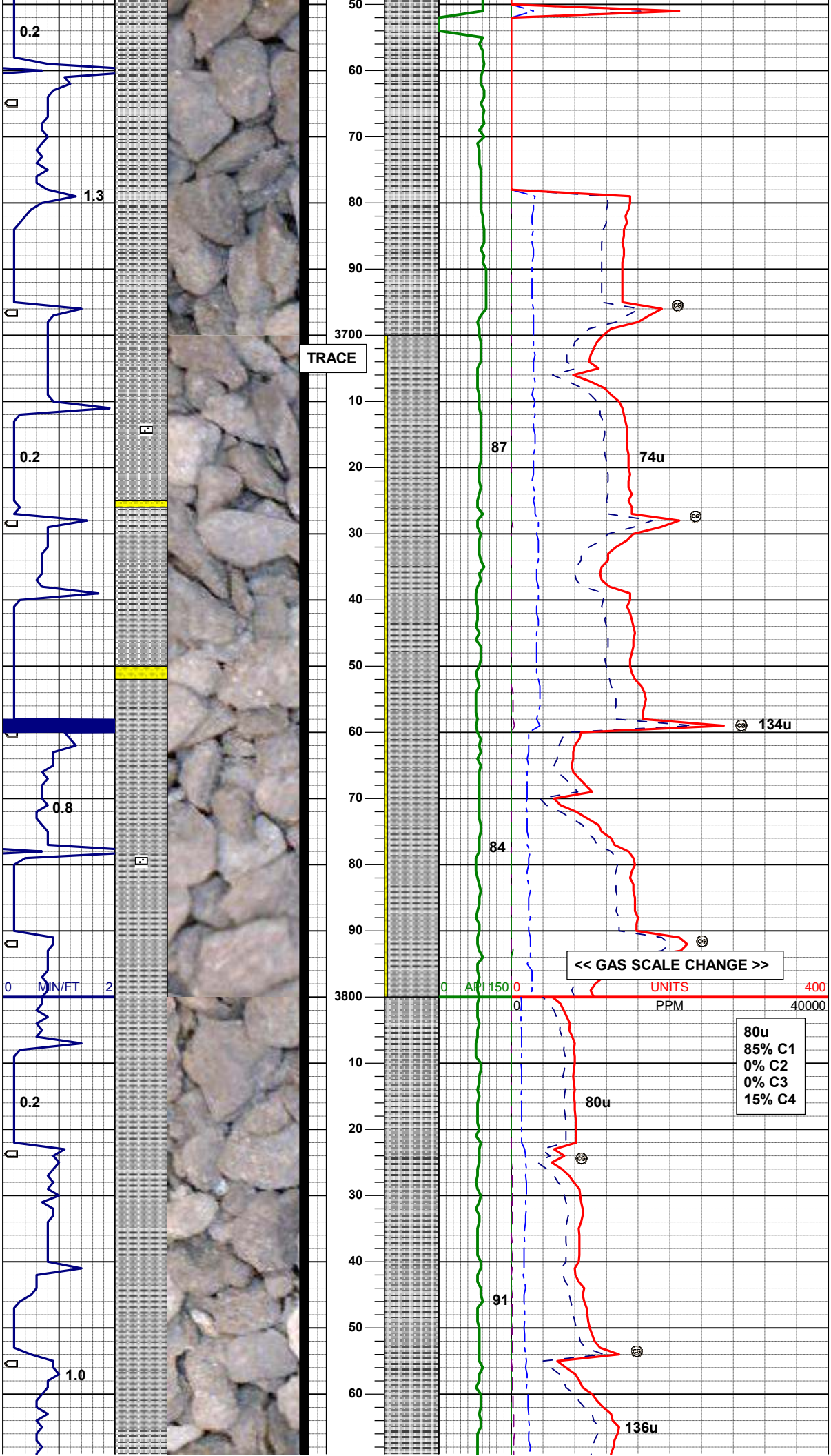
SWITCHED TO VOLUME BASED LAG, CAUSED INTERMITTENT DATA

MD 3579'
TVD 3528.35'
INC 12.0°
AZM 254.0°
VS -1.91'

78u
81% C1
0% C2
0% C3
19% C4

MD 3611'
TVD 3559.63'
INC 12.3°
AZM 255.8°
VS -1.83'

MD 3642'
TVD 3589.93'
INC 12.2°
AZM 258.3°
VS -1.51'



SLTYSH: m gy-dk gy, gyblk, firm, sbplty-sbfis ip, occ sbblky, sbwxy -gt tex, non calc, sme aren grdg - shlyss, mica ip, tr pyr, tr fos, tr carb cly, dul orng cly flor, v lt bl mky cut

MD 3674'
TVD 3621.18'
INC 12.6°
AZM 258.6°
VS -1.01'

MD 3706'
TVD 3652.40'
INC 12.7°
AZM 259.0°
VS -0.45'

MD 3737'
TVD 3682.66'
INC 12.4°
AZM 259.1°
VS 0.11'

SLTYSH: m gy-dk gy, gyblk, firm, sbplty-sbblky, slty-gt tex, v sl calc, sme aren grdg - shlyss, mica ip, tr pyr, tr carb, dul orng ss flor, sl stmg lt bl mky cut

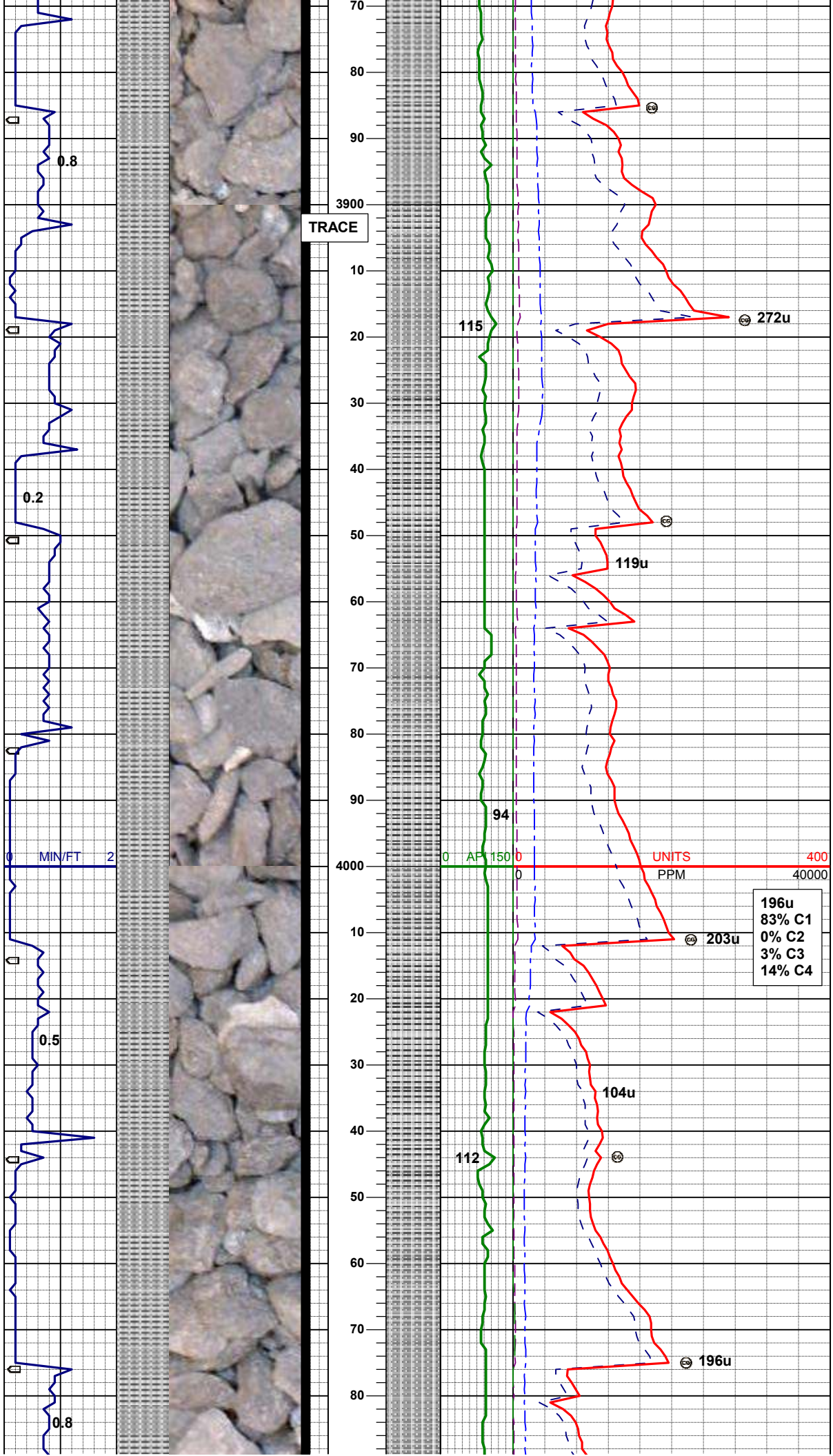
MD 3769'
TVD 3713.92'
INC 12.4°
AZM 260.1°
VS 0.75'

MD 3801'
TVD '3745.15
INC 12.7°
AZM 258.5°
VS 1.36'

MD 3833'
TVD 3776.37'
INC 12.7°
AZM 258.0°
VS 1.85'

SLTYSH: lt gy-dk gy, firm, sbplty-plty, occ fis, slty-gt tex, v sl calc, mica ip, tr pyr, tr carb, no flor, slow diffuse wh mky cut

MD 3865'
TVD 3807.59'
INC 12.7°
AZM 257.5°



AZM 257.5
VS 2.28'

MD 3896'
TVD 3837.82'
INC 12.8°
AZM 256.9°
VS 2.63'

SLTYSH: lt gy-m gy, occ dk gy, firm, sbplty-sbblky, sme plty, gt tex-sbwxy ip, v sl calc, mica ip, tr shyss, tr wh cly, tr pyr, tr carb, no flor, slow diffuse wh mky cut

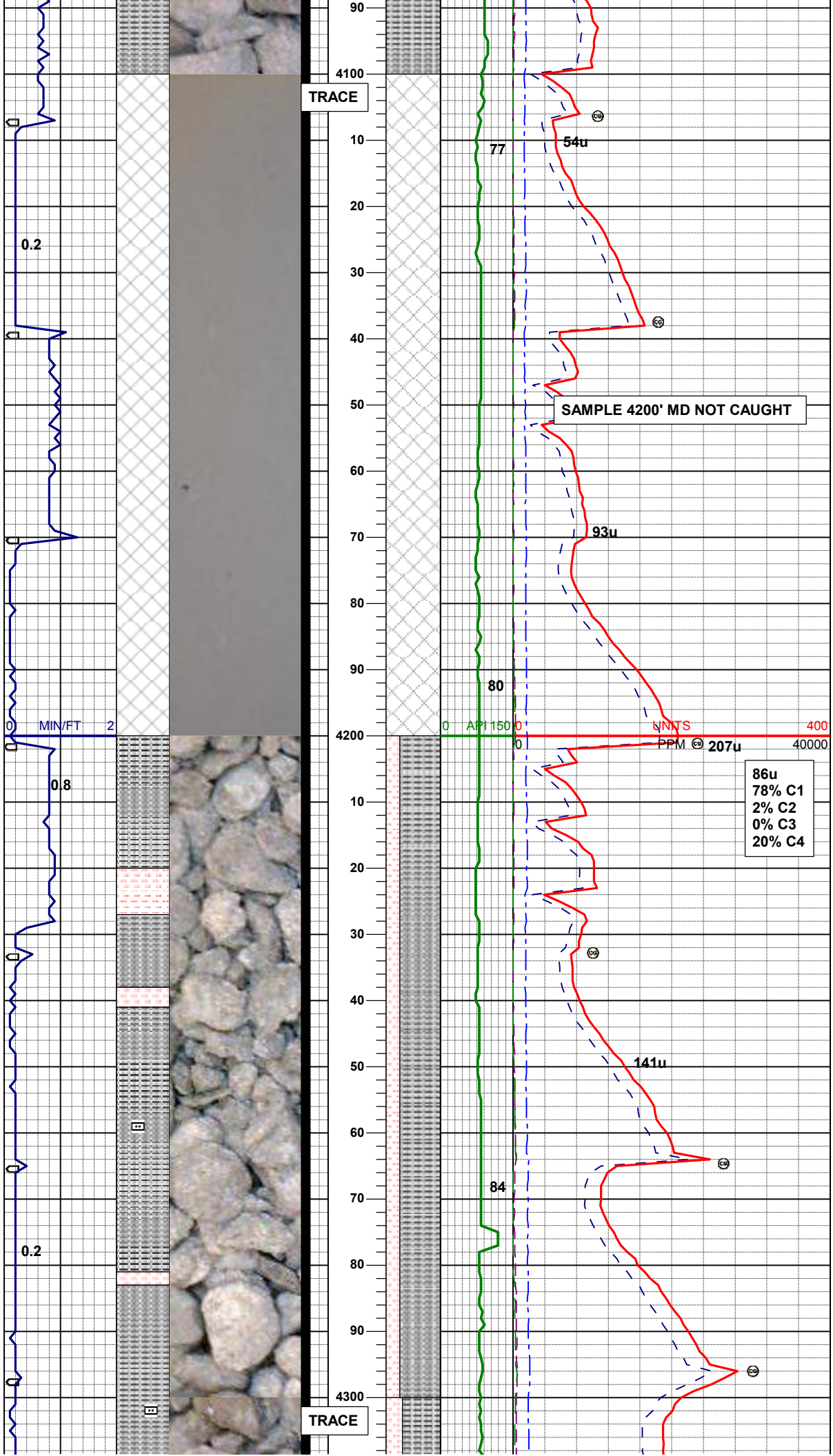
MD 3960'
TVD 3900.23'
INC 12.8°
AZM 256.4°
VS 3.23'

196u
83% C1
0% C2
3% C3
14% C4

MD 4023'
TVD 3961.71'
INC 12.4°
AZM 257.1°
VS 3.82'

SLTYSH: lt gy-m gy, occ dk gy, firm, sbplty-sbblky, gt tex-sbwxy ip, calc thru, mica ip, tr shyss, fair amt wh cly, occ fos frag, tr pyr, tr carb, spec bri yel-gn mnrl flor, slow diffuse wh mky cut

MD 4055'
TVD '
INC 11.9°
AZM 257.2°
VS '



MD 4119'
TVD '
INC 12.4°
AZM 256.8°
VS '

MD 4150'
TVD 4085.70'
INC 12.8°
AZM 256.2°
VS 5.01'

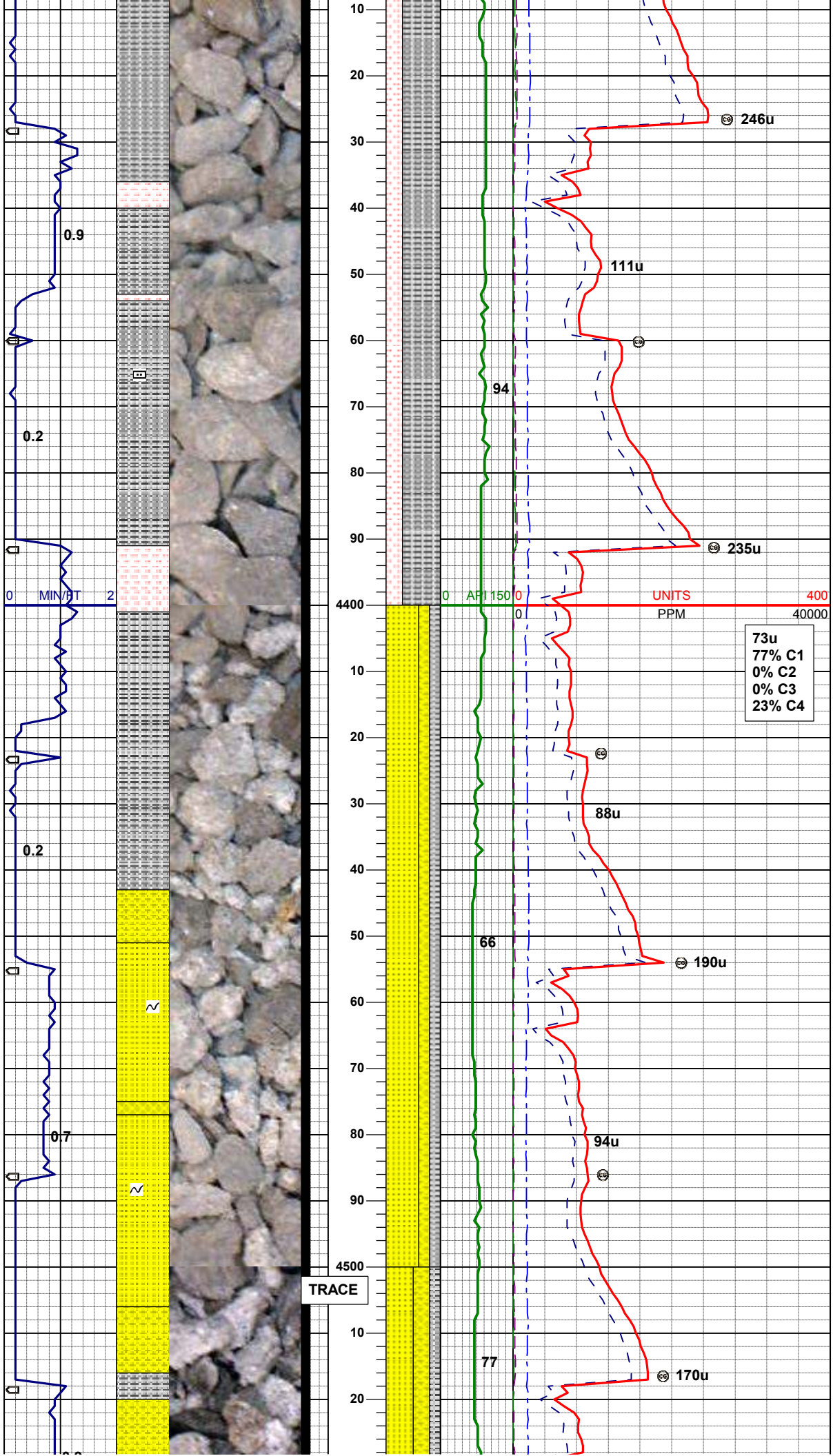
86u
78% C1
2% C2
0% C3
20% C4

MD 4214'
TVD 4147.95'
INC 14.1°
AZM 255.4°
VS 5.41'

MUD DATA
WT 8.90
VIS 27
YP 3
CK -
pH 8.2
Chl 200

SLTYSH: lt gy-m gy, occ dk gy, firm, sbplty-sbblky, sbwxy ip, grdg - SLTST: v lt gy, sdy ip, gt tex, vf gr, rd, w srt, arg mtx, calc thru, mica ip, abnt fos frag, tr pyr, tr carb, tr bri yel-gn mnrl flor, slow diffuse wh mky cut

MD 4277'
TVD 4209.14'
INC 13.4°
AZM 256.1°
VS 5.80'



MD 4341'
TVD 4271.53'
INC 12.4°
AZM 256.8°
VS 6.34'

SLTYSH: lt gy-m gy, occ dk gy, firm, sbplty-sbblky, sbwxy ip, grdg - SLTST: v lt gy, sdy ip, gt tex, vf gr, rd, w srt, arg mtx, calc thru, mica ip, abnt fos frag, tr pyr, tr carb, tr bri yel-gn mnrl flor, slow diffuse lt bl mky cut

MD 4404'
TVD 4333.13'
INC 11.8°
AZM 252.5°
VS 6.45'

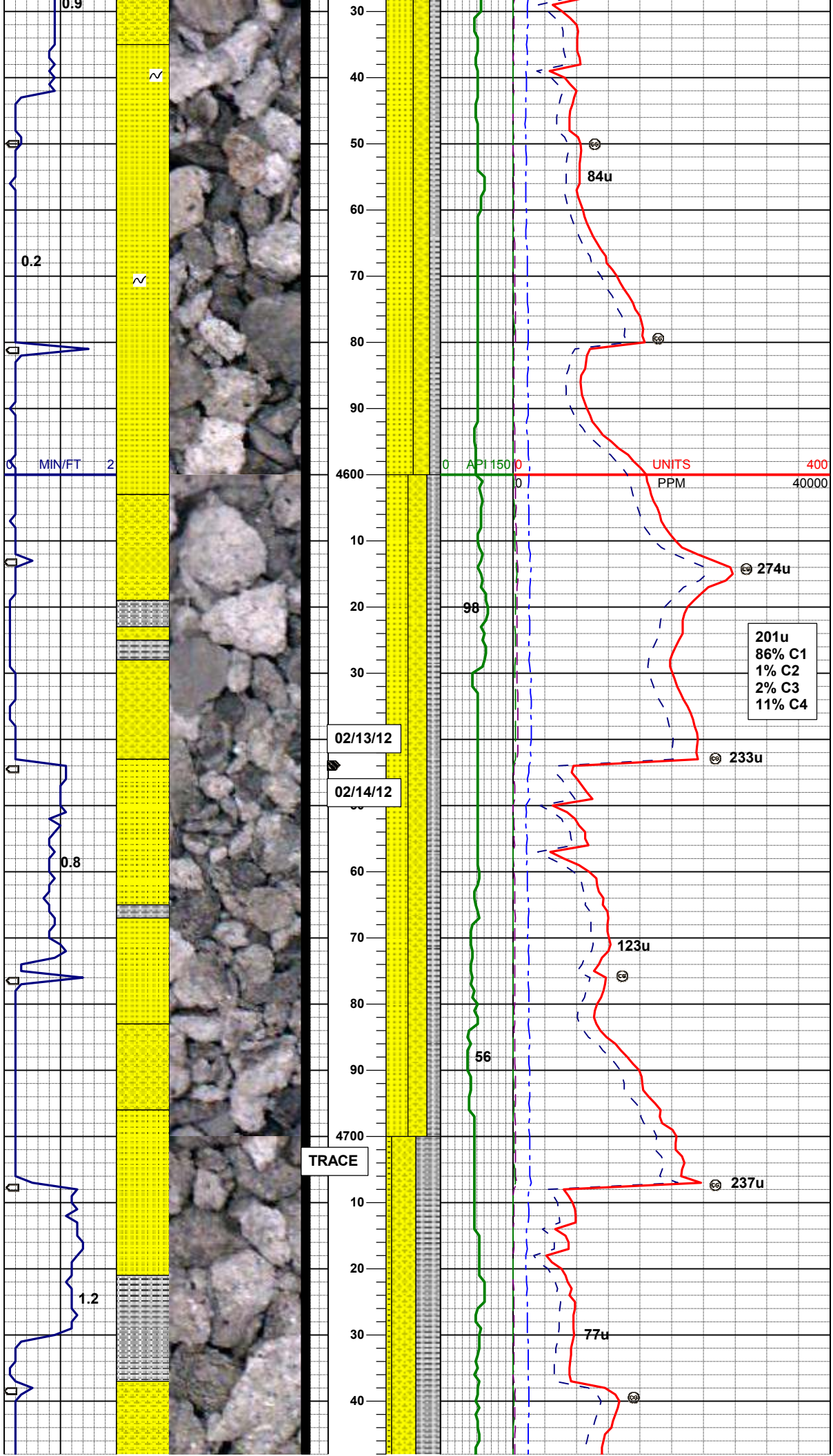
73u
77% C1
0% C2
0% C3
23% C4

PROG TOP SUSSEX @ 4379' TVD; LOGGER TOP @ 4363' TVD

SS: lt gy-wh, trnsl, sbplty, tt clus, pr srt, p por, sbang-sbrnd, arg mtx, v sl calc cmt, gt tex, spec gn w/ glauc, intbd w/ SHYSS: gy-m gy, vf gr, mod srt, brit, tt clus, SLTYSH: lt gy-m gy, occ dk gy, firm, sbplty-sbblky, gt-sbwxy tex, tr pyr, spec bri yel-gn mnrl flor, fnt slow mky wh cut

MD 4468'
TVD 4395.67'
INC 12.7°
AZM 252.7°
VS 6.06'

MD 4531'



TVD 4457.02
INC 13.6°
AZM 252.1°
VS 5.59'

SS: lt gy-wh, trnsl, sbplty, tt clus, pr srt, p por, sbang-sbrnd, arg mtx, v sl calc cmt, gt tex, spec gn w/ glauc, intbd w/ SHYSS: gy-m gy, vf gr, mod srt, brit, tt clus, SLTYSH: lt gy-m gy, occ dk gy, firm, sbplty-sbblky, gt-sbwxy tex, tr pyr, mica thru, spec bri yel-gn mnrl flor, fnt slow purp-wh mky cut

MD 4595'
TVD 4519.29'
INC 13.1°
AZM 249.8°
VS 4.75'

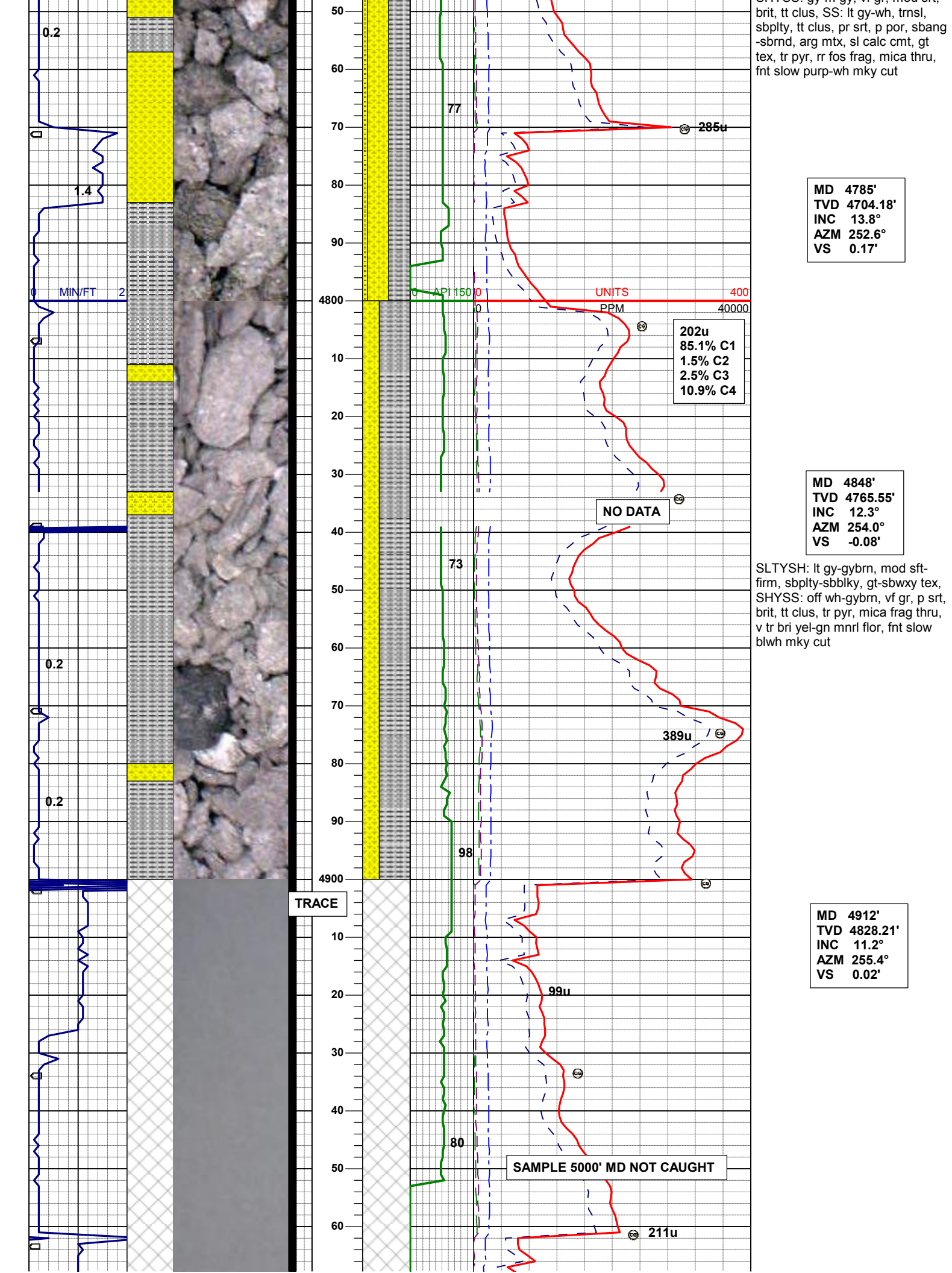
201u
86% C1
1% C2
2% C3
11% C4

SS: lt gy-wh, trnsl, sbplty, tt clus, pr srt, p por, sbang-sbrnd, arg mtx, v sl calc cmt, gt tex, intbd w/ SHYSS: gy-m gy, vf gr, mod srt, brit, tt clus, SLTYSH: lt gy-m gy, occ dk gy, firm, sbplty-sbblky, gt-sbwxy tex, tr pyr, mica thru, fnt slow purp-wh mky cut

MD 4658'
TVD 4580.69'
INC 12.8°
AZM 245.1°
VS 3.08'

MD 4721'
TVD 4642.01'
INC 13.7°
AZM 248.2°
VS 1.19'

SLTYSH: lt gy-m gy, occ dk gy, firm, sbplty-sbblky, gt-sbwxy tex, SHYSS: gy-m gy, vf gr, mod srt,



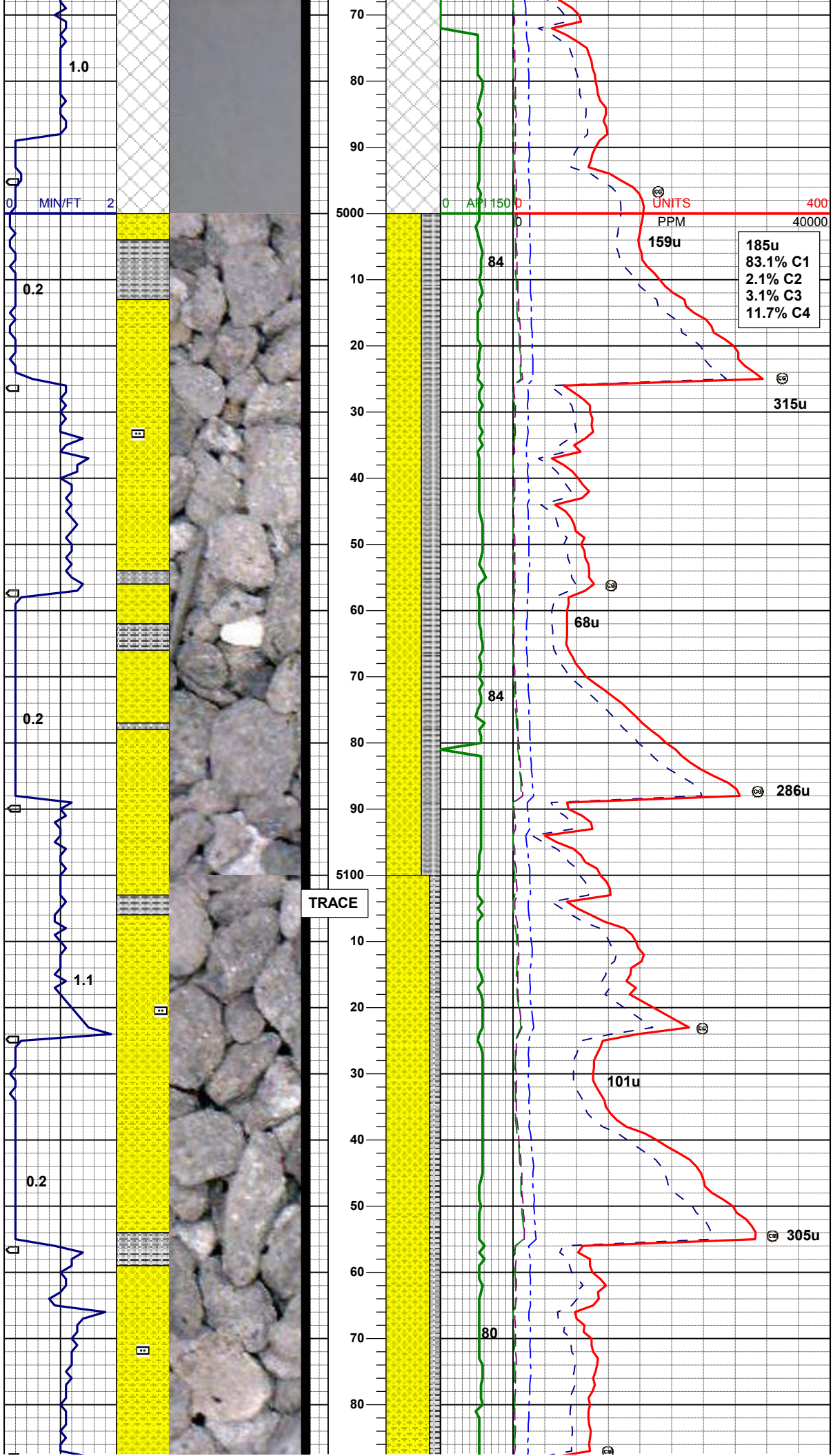
brit, tt clus, SS: lt gy-wh, trnsl, sbplty, tt clus, pr srt, p por, sbang -sbrnd, arg mtx, sl calc cmt, gt tex, tr pyr, rr fos frag, mica thru, fnt slow purp-wh mky cut

MD 4785'
TVD 4704.18'
INC 13.8°
AZM 252.6°
VS 0.17'

MD 4848'
TVD 4765.55'
INC 12.3°
AZM 254.0°
VS -0.08'

SLTYSH: lt gy-gybrn, mod sft-firm, sbplty-sbblky, gt-sbwxy tex, SHYSS: off wh-gybrn, vf gr, p srt, brit, tt clus, tr pyr, mica frag thru, v tr bri yel-gn mnrl flor, fnt slow blwh mky cut

MD 4912'
TVD 4828.21'
INC 11.2°
AZM 255.4°
VS 0.02'



MD 4975'
TVD 4890.01'
INC 11.2°
AZM 257.6°
VS 0.50'

MD 5039'
TVD 4952.90'
INC 10.1°
AZM 258.5°
VS 1.28'

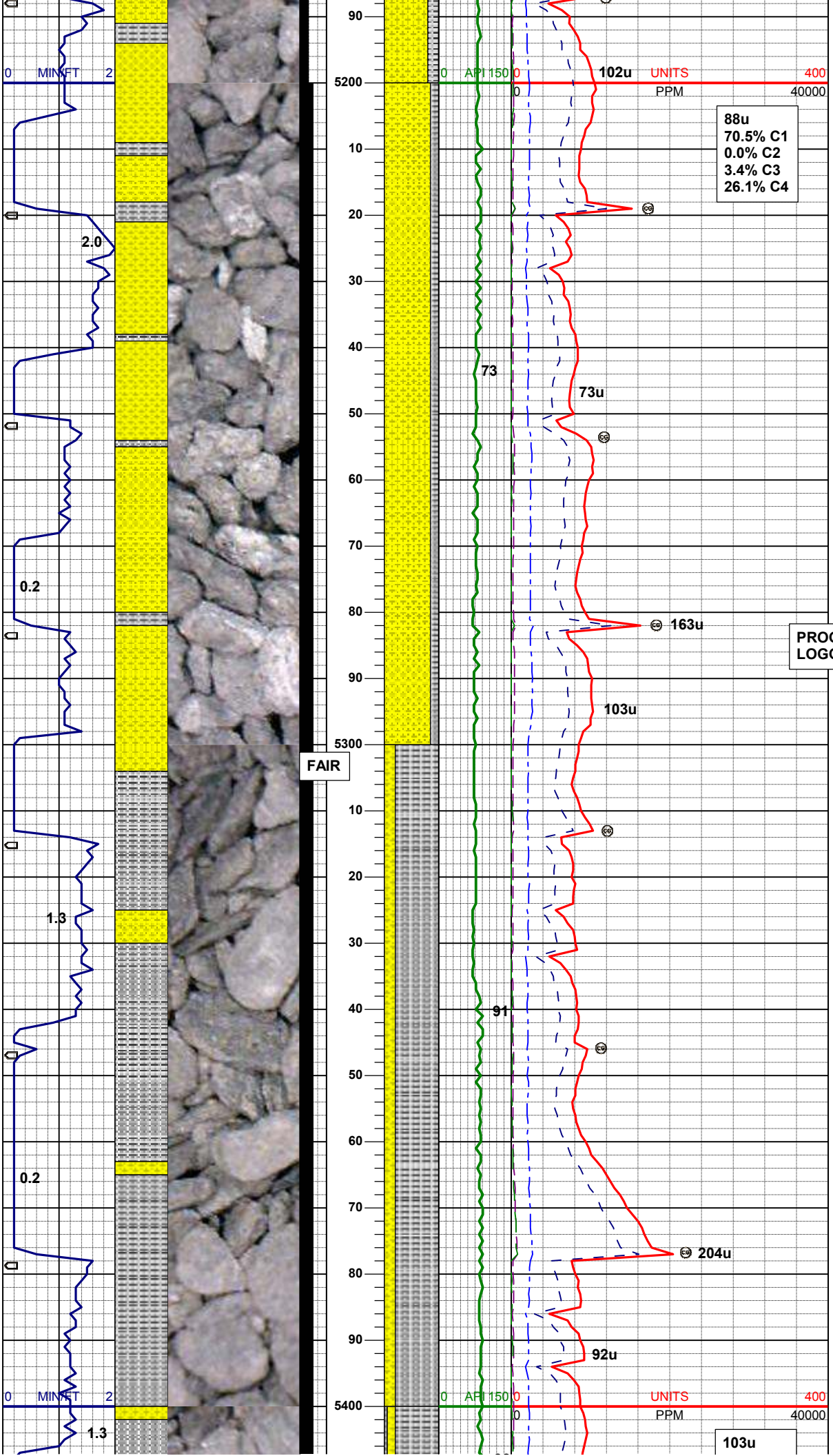
SHYSS: lt gybrn-gybrn, off. wh, vf-f gr, sbrd-sbang, mod srt, firm, brit-smwt fri, tt clus, slty-cly mtx, spec lt gn glauc thru, SLTYSH: lt gy-gybrn, firm, sbplty-sbblky, occ plty, gt-sbwxy tex, tr pyr, tr fos, mica frag thru, spec bri yel mnrl flor, fnt slow blwh mky cut

MD 5102'
TVD 5014.94'
INC 10.1°
AZM 258.5°
VS 2.14'

MD 5134'
TVD 5046.48'
INC 9.5°
AZM 258.3°
VS 2.56'

SHYSS: lt gybrn-gybrn, off. wh, vf-f gr, sbrd-sbang, mod srt, firm, brit-smwt fri, tt clus, slty-cly mtx, spec lt gn glauc thru, intlam w/ SLTYSH: lt gy-gybrn, dk gybrn, sme sd frag thru, firm, sbplty-sbblky, occ plty, gt-sbwxy tex, tr pyr, mica frag thru, rr bri yel mnrl flor, fnt slow blwh mky cut

MD 5166'
TVD 5078.04'
INC 9.5°
AZM 259.4°
VS 2.98'



MD 5197'
TVD 5108.57'
INC 10.4°
AZM 257.8°
VS 3.38'

MD 5229'
TVD 5140.01'
INC 11.0°
AZM 257.9°
VS 3.76'

SHYSS: lt gy-gy, gybrn, off. wh, vf-f gr, sbrd-sbang, p-mod srt, firm, brit-smwt fri, tt clus, slty-cly mtx, spec lt gn glauc thru, intlam w/ SLTYSH: lt gy-gybrn, dk gybrn, firm, sbplty-sbblky, occ plty, gt-sbwxy tex, tr pyr, mica frag thru, rr bri yel mnrl flor, fnt slow sl stmg bl mky cut

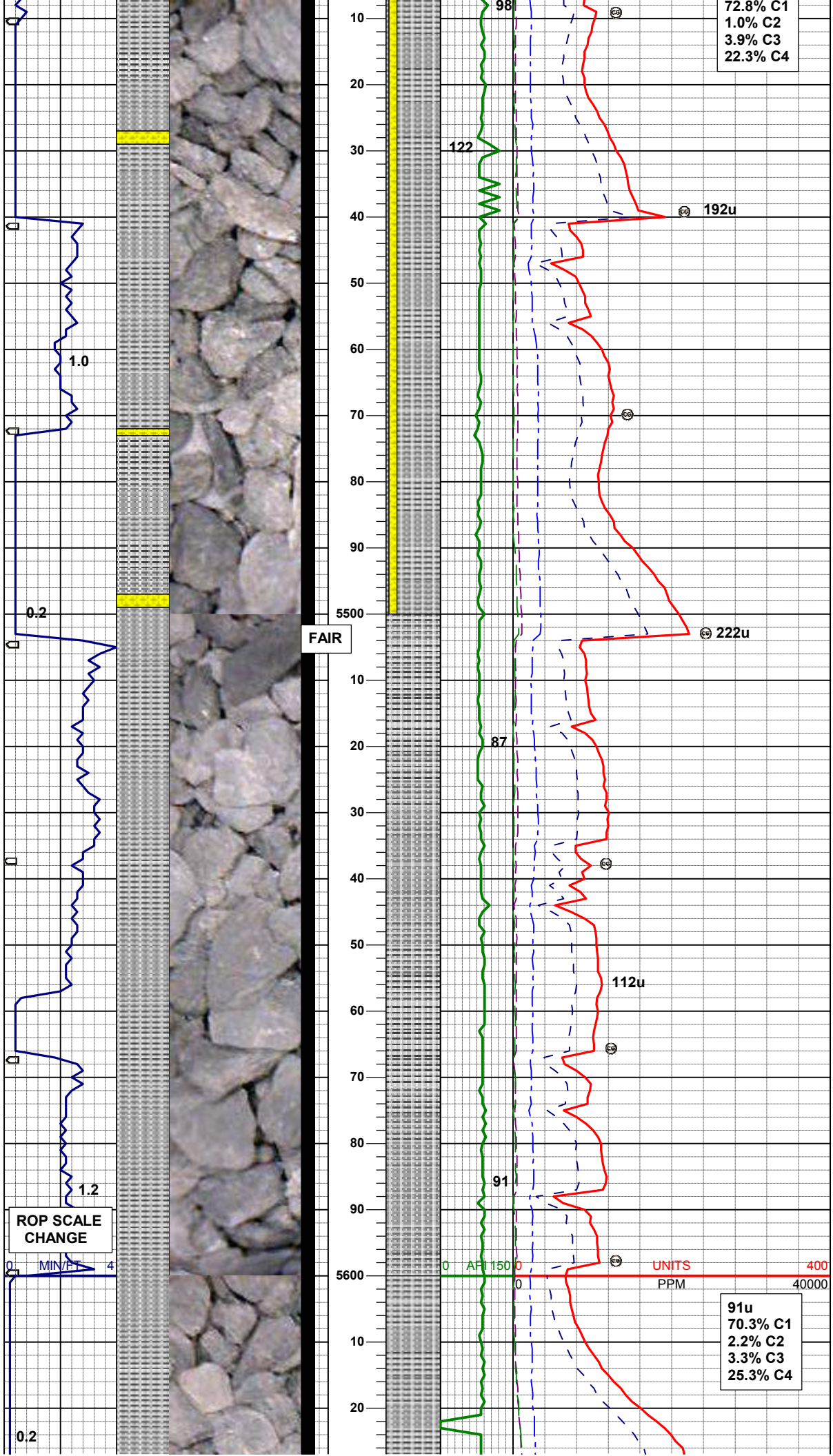
MD 5261'
TVD 5171.40'
INC 11.4°
AZM 256.5°
VS 4.07'

PROG SHANNON TOP @ 5193' TVD
LOGGER TOP @ 5183' TVD

MD 5324'
TVD 5233.05'
INC 12.4°
AZM 254.6°
VS 4.07'

SLTYSH: lt gy-m gy, firm, sbplty-sbblky, occ plty, gt-sbwxy tex, SHYSS: lt gy-gy, gybrn, off. wh, vf-f gr, sbrd-sbang, p-mod srt, firm, brit-smwt fri, tt clus, slty-cly mtx, occ pyr, no flor, slow mod bri bl mky cut

MD 5388'
TVD 5295.62'
INC 11.9°
AZM 253.7°
VS 4.34'



MD 5451'
TVD 5357.30'
INC 11.6°
AZM 252.3°
VS 4.06'

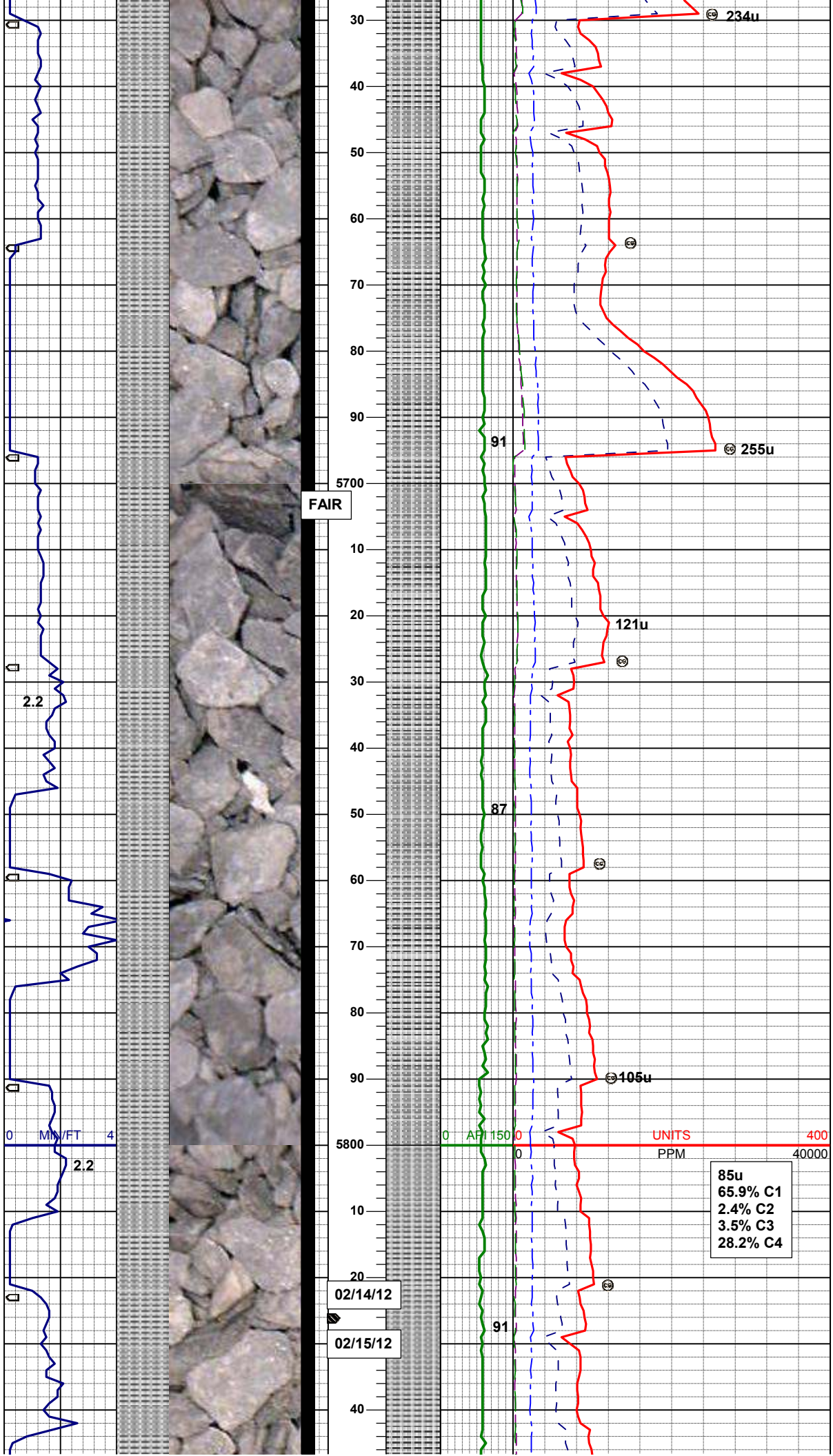
SLTYSH: lt gy-m gy, firm, sbplty-sbblky, occ plty, gt-sbwxy tex, SHYSS: lt gy-gy, gybrn, off. wh, vf-f gr, sbrd-sbang, p-mod srt, firm, brit-smwt fri, tt clus, slty-cly mtx, SH: dk gy-blk, firm, sbwxy tex, sbplty, occ pyr, v tr bri yel-gn mnrl flor, slow mod bri bl mky cut

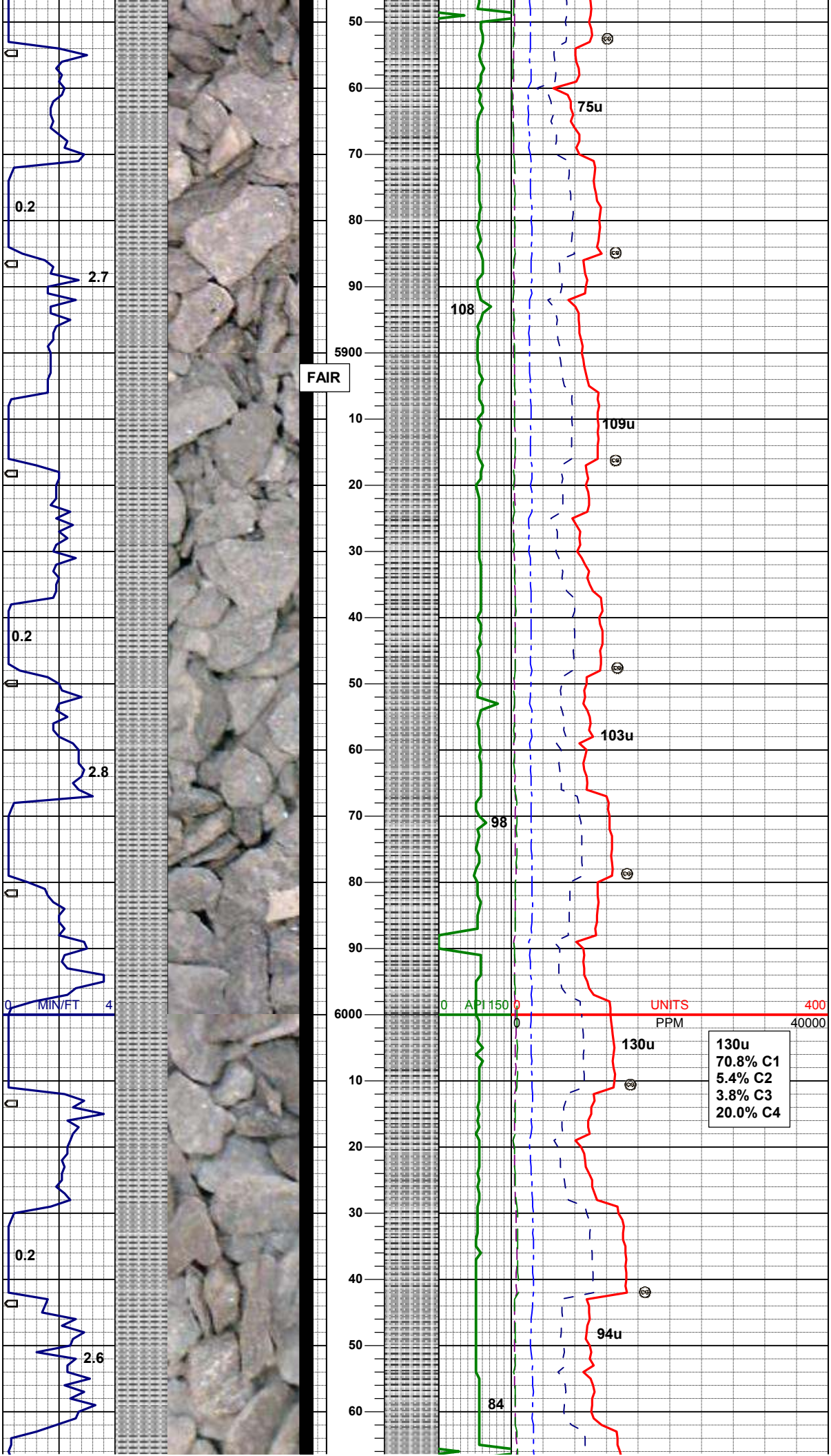
MD 5483'
TVD 5388.65'
INC 11.4°
AZM 253.3°
VS 3.90'

MD 5515'
TVD 5420.00'
INC 11.7°
AZM 253.8°
VS 3.82'

SLTYSH: lt gy-dk gy, firm, pred sbplty-plty, occ sbblky, sbwxy-smwt gt tex, tr pyr, rr bri yel-gn mnrl flor, slow sl stmg dul bl mky cut

MD 5578'
TVD 5481.63'
INC 12.3°
AZM 254.0°
VS 3.74'


234u
MD 5642'
TVD 5544.27'
INC 11.4°
AZM 248.7°
VS 3.10'
SLTYSH: lt gy-dk gy, firm, pred sbplty-plty, occ sbblky, sbwxy-smwt gt tex, tr pyr, rr bri yel-gn mnrl flor, slow sl stmg dul bl mky cut
MD 5673'
TVD 5574.67'
INC 11.0°
AZM 246.7°
VS 2.41'
91
255u
5700
FAIR
MD 5705'
TVD 5606.08'
INC 11.2°
AZM 247.40°
VS 1.64'
121u
2.2
MD 5737'
TVD 5637.46'
INC 11.3°
AZM 245.9°
VS 0.82'
87
SLTYSH: lt gy-dk gy, firm, pred sbplty-plty, occ sbblky, sbwxy-smwt gt tex, slty-arg mtx, v sl clac ip, tr pyr, tr fos frag, no flor, sl stmg mod bri bl mky cut
MD 5769'
TVD 5668.82'
INC 11.7°
AZM 244.3°
VS -0.20'
MUD DATA
WT 9.1
VIS 40
YP 16
CK 2.0
pH 8.0
Chl 200
105u
0 MIN/FT 4
0 API 150
0 UNITS 400
0 PPM 40000
MD 5800'
TVD 5699.18'
INC 11.6°
AZM 247.3°
VS -1.12'
2.2
85u
65.9% C1
2.4% C2
3.5% C3
28.2% C4
WT IN 9.2/9.2 OUT
VIS IN 44/44 OUT
02/14/12
02/15/12
91
MD 5832'
TVD 5730.53'
INC 11.6°
AZM 245.9°
VS -1.98'
SLTYSH: lt gy-dk gy, firm, pred sbplty-plty, occ sbblky, sbwxy-



smwt gt tex, hom thru, slty-arg mtx, v sl calc ip, tr pyr, tr fos frag, occ wh cly, spec bri yel-gn mnrl flor, sl stmg mod bri bl mky cut

MD 5864'
TVD 5761.87'
INC 11.6°
AZM 248.5°
VS -2.77'

WT IN 9.6/9.3+ OUT
VIS IN 41/42 OUT

MD 5896'
TVD 5793.22'
INC 11.6°
AZM 251.6°
VS -3.24'

WT IN 9.8/9.7 OUT
VIS IN 43/44 OUT

MD 5927'
TVD 5823.56'
INC 12.1°
AZM 253.8°
VS -3.41'

SLTYSH: lt gy-dk gy, firm, pred sbplty-plty-sbfis, occ sbblky, sbwxy-smwt gt tex, hom thru, slty-arg mtx, non calc, dism pyr thru, occ fos frag, no flor, sl stmg mod bri bl mky cut

MD 5959'
TVD 5854.83'
INC 12.4°
AZM 253.9°
VS -3.45'

WT IN 9.7/9.7 OUT
VIS IN 42/43 OUT

MD 5991'
TVD 5886.07'
INC 12.6°
AZM 252.8°
VS -3.56'

WT IN 9.8/9.7 OUT
VIS IN 42/43 OUT

130u
70.8% C1
5.4% C2
3.8% C3
20.0% C4

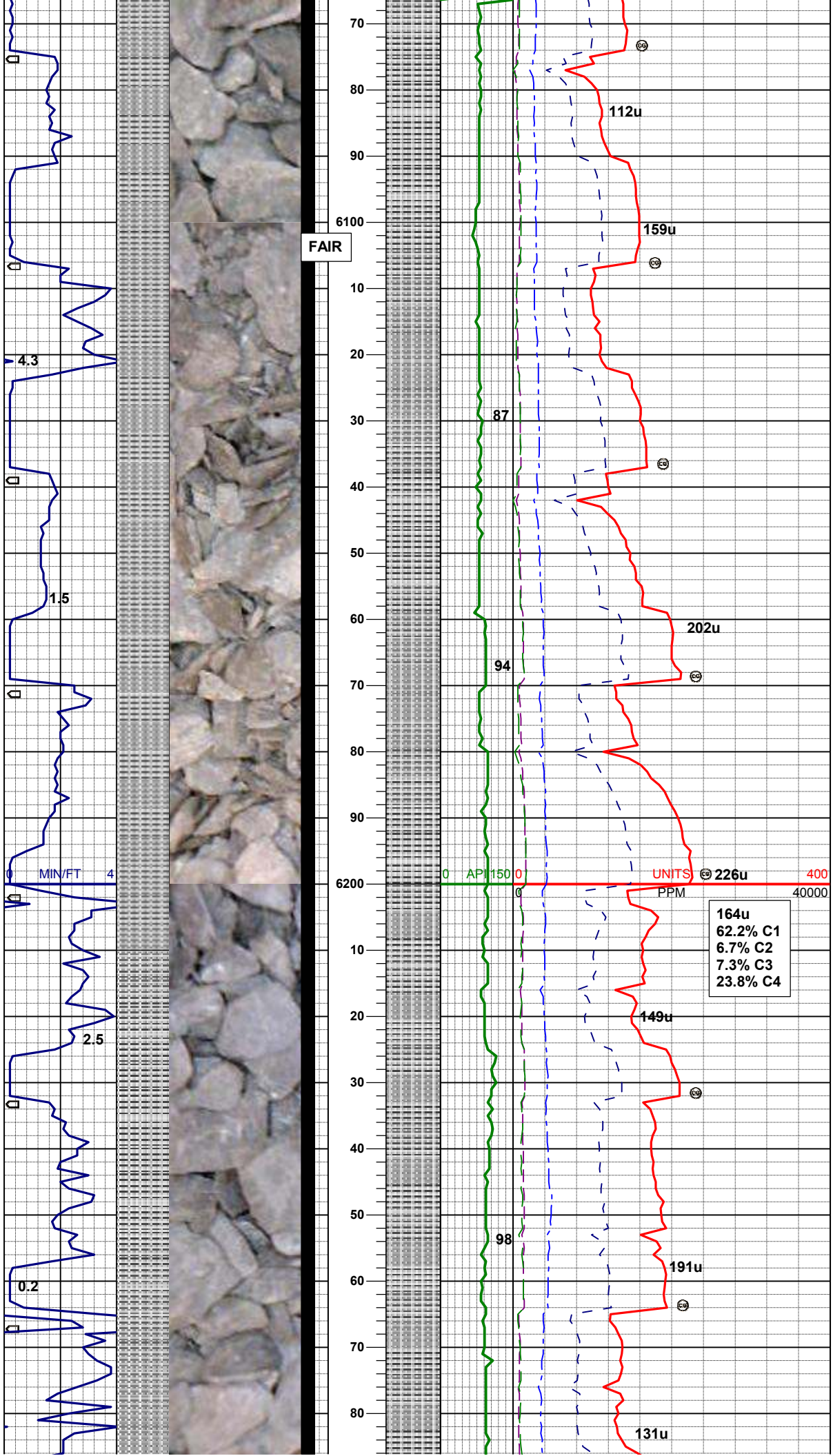
MD 6022'
TVD 5916.32'
INC 12.7°
AZM 253.7°
VS -3.68'

MUD DATA
WT 9.65
VIS 41
YP 21
CK 2.0
pH 8.0
Chl 800

WT IN 10.0/9.8 OUT
VIS IN 42/43 OUT

SLTYSH: lt gy-dk gy, firm, pred sbplty-plty-sbfis, occ sbblky, sbwxy-smwt gt tex, hom thru, slty-arg mtx, non calc, dism pyr thru, tr fos frag, no flor, sl stmg mod bri bl mky cut

MD 6054'



TVD 5947.56'
INC 12.4°
AZM 254.2°
VS -3.72'

WT IN 10.1/10.0 OUT
VIS IN 42/43 OUT

MD 6086'
TVD 5978.80'
INC 12.5°
AZM 253.5°
VS -3.77'

MD 6118'
TVD 6010.06'
INC 12.3°
AZM 253.2°
VS -3.87'

WT IN 10.1/10.1 OUT
VIS IN 41/42 OUT

MD 6149'
TVD 6040.34'
INC 12.4°
AZM 253.3°
VS -3.99'

SLTYSH: pred lt gy, occ m gy-dk gy, firm, pred sbplty-plty, sme fis, rr sbblky, sbwxy-smwt gt tex, hom thru, arg-smwt slty mtx, non calc, occ pyr thru, tr fos frag, no flor, sl stmg mod bri bl mky cut

MD 6181'
TVD 6071.58'
INC 12.7°
AZM 253.5°
VS -4.09'

WT IN 10.1/10.1 OUT
VIS IN 42/42 OUT

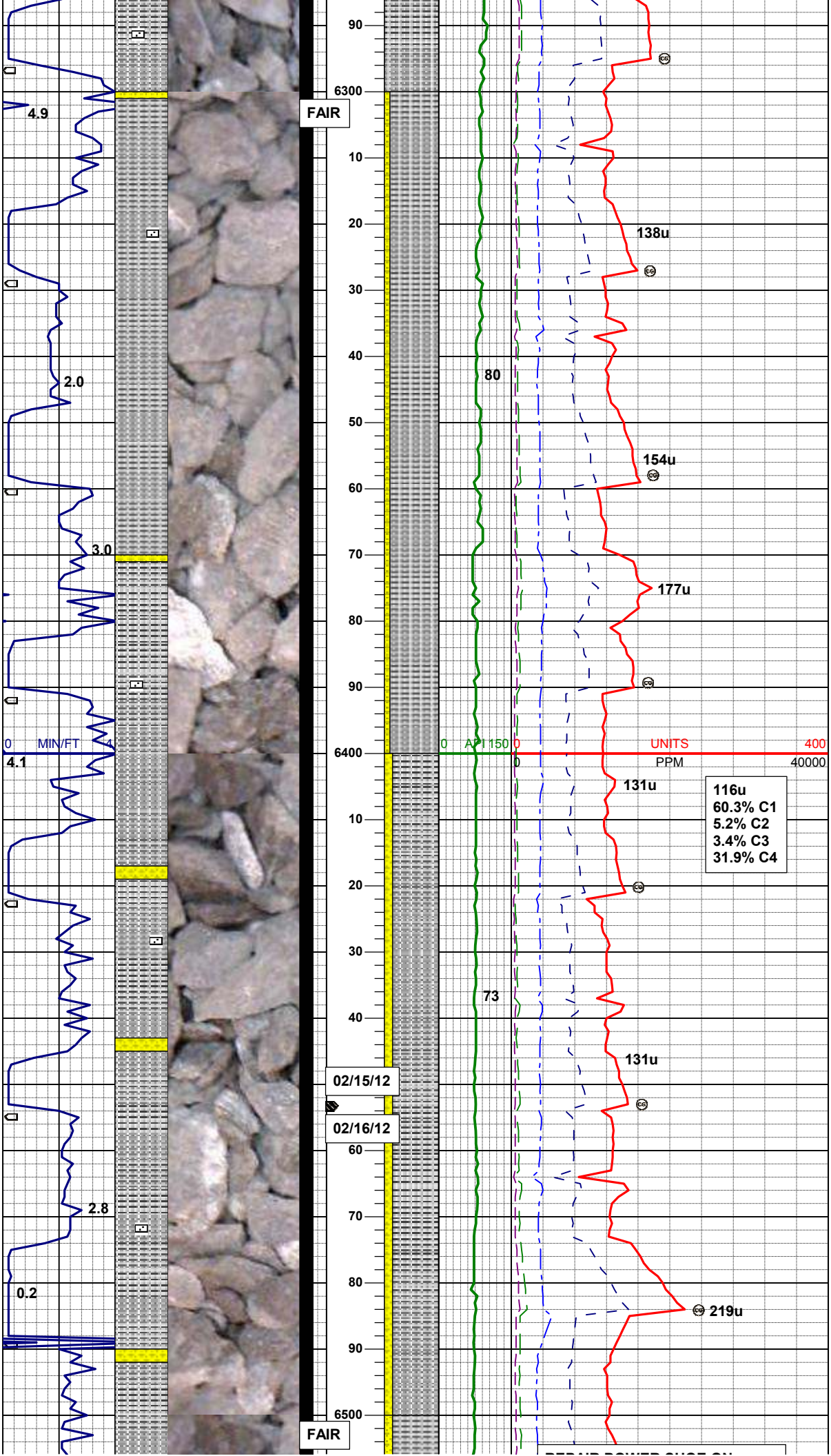
MD 6213'
TVD 6102.77'
INC 13.0°
AZM 254.0°
VS -4.15'

MD 6245'
TVD 6133.94'
INC 13.2°
AZM 255.0°
VS -4.12'

SLTYSH: pred lt gy, occ m-dk gy, sbplty-plty, rr sbblky, firm, gt-sbwxy tex, arg-smwtslty mtx, occ pyr thru, non calc, no flor, sl stmg mod bri bl mky cut

WT IN 10.2/10.2 OUT
VIS IN 44/43 OUT

MD 6276'
TVD 6164.13'
INC 13.1°
AZM 255.4°
VS -4.01'



MUD DATA
WT 10.4
VIS 41
YP 20
CK 2.0
pH 8.2
Chl 700

MD 6308'
TVD 6195.29'
INC 13.2°
AZM 254.7°
VS -3.90'

WT IN 10.3+/10.3+ OUT
VIS IN 42/42 OUT

MD 6340'
TVD 6226.46'
INC 13.0°
AZM 255.6°
VS -3.79'

SLTYSH: lt gy-gybrn, firm, pred sbplty, sme sbblky, sbwxy-smwt gt tex, arg-slty mtx, intlam w/ SHYSS: lt gy-gy, off. wh, vf gr, sbrd-sbang, mod srt, v hd, brit slty-cly mtx, non calc, no flor, sl stmg bri blwh mky cut

MD 6372'
TVD 6257.65'
INC 12.8°
AZM 256.0°
VS -3.60'

WT IN 10.5/10.5 OUT
VIS IN 40/42 OUT

MD 6403'
TVD 6287.87'
INC 12.9°
AZM 256.5°
VS -3.36'

WT IN 10.5/10.5 OUT
VIS IN 40/40 OUT

MD 6435'
TVD 6319.04'
INC 13.3°
AZM 256.2°
VS -3.09'

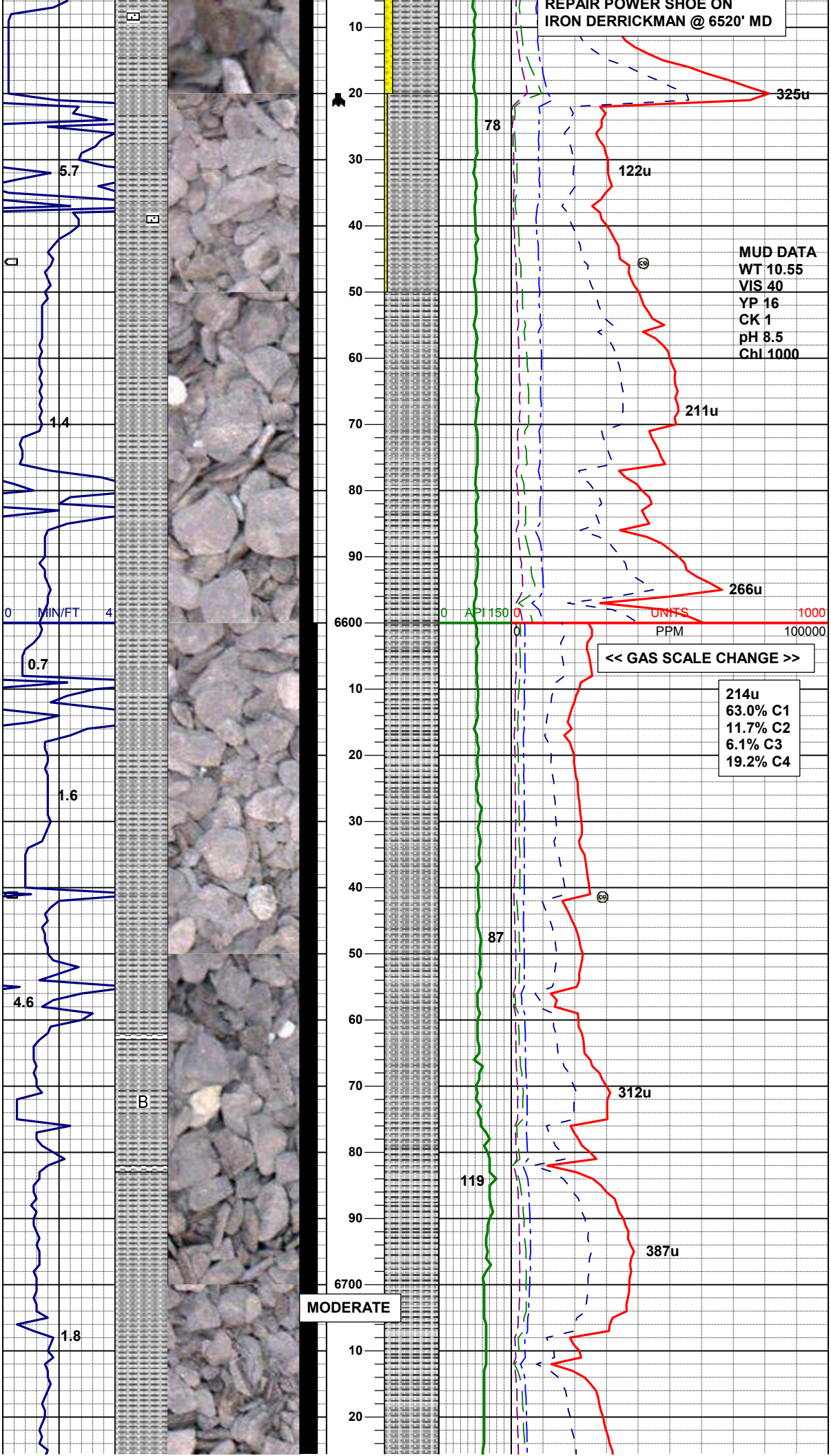
SLTYSH: lt gy-gybrn, firm, pred sbplty, sme sbblky, rthy-gt tex, arg-slty mtx, intlam w/ SHYSS: lt gy-gy, off. wh, vf gr, sbrd-sbang, mod srt, v hd, brit slty-cly mtx, non calc, no flor, sl stmg bri blwh mky cut

MD 6467'
TVD 6350.17'
INC 13.5°
AZM 257.1°
VS -2.78'

MD 6492'
TVD 6374.50'
INC 13.1°
AZM 256.0°
VS -2.55'

WT IN 10.5/10.5 OUT
VIS IN 41/41 OUT

6520' MD: TOOH for Curve Assembly @ 0300hrs on



02/16/12; TIH w/ new motor and bit @ 2010hrs on 02/16/12

Began drilling curve @ 0454hrs on 02/17/12

COLLECTING 50' LAGGED SAMPLES

SLTYSH: lt gy-gybrn, firm, pred sbplty, sme sbblky, rthy-gt tex, arg-slty mtx, intlam w/ SHYSS: lt gy-gy, off. wh, vf gr, sbrd, w srt, v hd, brit-fri, slty-cly mtx, v sl calc, no flor, fast stmg bri blwh mky cut

MD 6523'	MD 6555'
TVD 6404.67'	TVD 6435.71'
INC 13.5°	INC 14.8°
AZM 260.2°	AZM 274.3°
VS -2.07'	VS -0.28'

SLTYSH: lt gy-gybrn, firm, sbplty-sbblky, rthy-gt tex, arg-slty mtx, intlam w/ tr shlyss, sl calc ip, rr fos frag, tr pyr, no flor, sl stmg mod bri blwh mky cut

WT IN 10.7/10.7 OUT
VIS IN 42/43 OUT

MD 6587'
TVD 6466.55'
INC 16.1°
AZM 285.0°
VS 3.39'

SLTYSH: lt gy-gybrn, firm, sbplty-sbblky, rthy-gt tex, arg-slty mtx, intlam w/ tr shlyss, non calc, rr fos frag, tr pyr, no flor, sl stmg mod bri blwh mky cut

MD 6618'
TVD 6496.26'
INC 17.2°
AZM 296.1°
VS 8.65'

WT IN 10.6/10.7 OUT
VIS IN 42/43 OUT

MD 6650'
TVD 6526.67'
INC 19.1°
AZM 305.1°
VS 15.87'

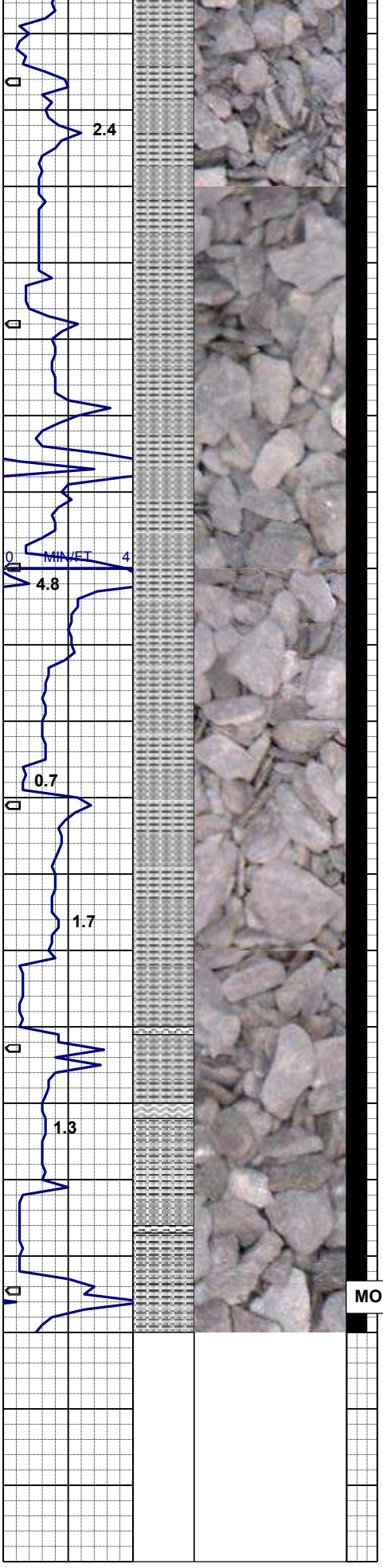
WT IN 10.5/10.5 OUT
VIS IN 40/43 OUT

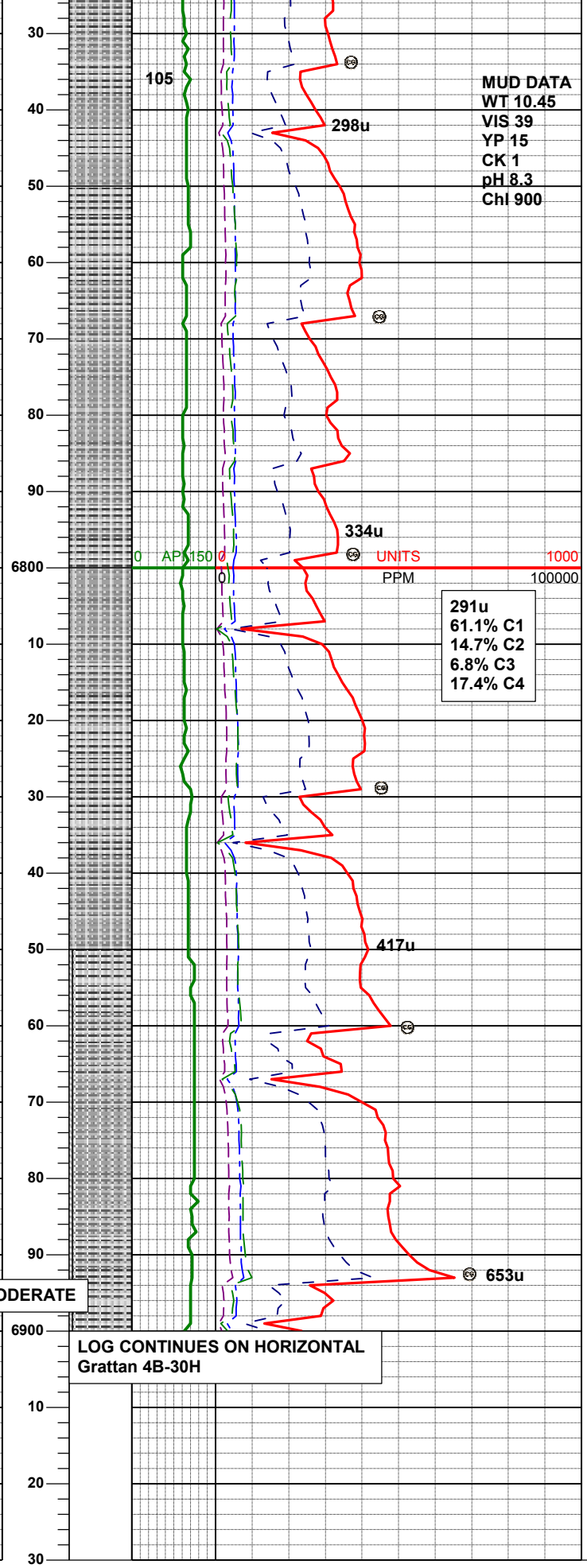
SLTYSH: lt gy-gybrn, blk strg ip, firm, sbplty-sbblky, rthy-gt tex, smwt lam, arg-slty mtx, intlam w/ tr shlyss, non calc, rr fos frag, occ bent w/ dism pyr, spec bri yel -gold mnrl flor, sl stmg mod bri blwh mky cut

MD 6682'
TVD 6556.73'
INC 21.1°
AZM 313.1°
VS 24.86'

WT IN 10.4+/10.5 OUT
VIS IN 40/40 OUT

MD 6714'
TVD 6586.33'
INC 23.6°
AZM 319.5°
VS 35.61'





MUD DATA
WT 10.45
VIS 39
YP 15
CK 1
pH 8.3
Chl 900

SLTYSH: pred lt gy, m gy, blk mica strg ip, firm, sbplty-sbblky, sme plty-sbfis, rthy-gt tex, arg-slty mtx, v sl calc, rr fos frag, rr bent frag w/ dism pyr, rr bri yel mnrl flor, sl stmg mod bri blwh mky cut

MD 6745'
TVD 6614.48'
INC 25.9°
AZM 324.3°
VS 47.61'

WT IN 10.4+/10.4+ OUT
VIS IN 38/42 OUT

MD 6777'
TVD 6642.93'
INC 28.6°
AZM 329.1°
VS 61.58'

SLTYSH: pred lt gy, m gy, blk mica strg ip, firm, sbplty-sbblky, sme plty-sbfis, rthy-gt tex, arg-slty mtx, v sl calc, sl stmg mod bri blwh mky cut

MD 6808'
TVD 6669.81'
INC 31.2°
AZM 334.5°
VS 76.66'

SLTYSH: pred lt gy, sme gy, firm, sbplty-sbblky, rthy-gt tex, arg-slty mtx, v sl calc, sl stmg mod bri blwh mky cut

WT IN 10.4/10.4+ OUT
VIS IN 38/39 OUT

MD 6840'
TVD 6696.80'
INC 33.8°
AZM 338.9°
VS 93.70'

SLTYSH: pred lt gy, sme gy, firm, sbplty-sbblky, rthy-gt tex, arg-slty mtx, v sl calc, occ bent w/ dism pyr, spec bri yel-gold mnrl flor, sl stmg mod bri blwh mky cut

MD 6872'
TVD 6723.04'
INC 36.0°
AZM 342.0°
VS 111.96'

WT IN 10.5/10.5 OUT
VIS IN 38/39 OUT

BEGIN COLLECTING 30' LAGGED SAMPLES

MODERATE

LOG CONTINUES ON HORIZONTAL
Grattan 4B-30H