

[illegible]

12/23-24/13  
DAY 01-02  
FT/48HRS 0

WOB 17.0K  
PP 2955  
RPM 80  
SPM 67/67

ROP (Ft/Hr)  
Gamma (API)

MD 2593 TVD 2581.15  
INC 8.73 AZ 127.08  
VS -100.87

MD 2688 TVD 2674.9  
INC 9.84 AZ 133.99  
VS -110.51

8.75", SMITH, MD1516 (S/N) JH0413 IN  
@ 687 MD

PIERRE  
CAME IN BEFORE LOGGING  
DEPTH

DEPTH 1675'  
WT 8.75  
VIS 30  
PH 10.7  
FIL 24.0  
CL 1200  
CAL 80  
H2O 97.3  
OIL 0.0  
LGS 16.67  
GEL 3/13/18  
PV 5  
YP 2  
CK 1/0  
SOL 2.5

CG 35u

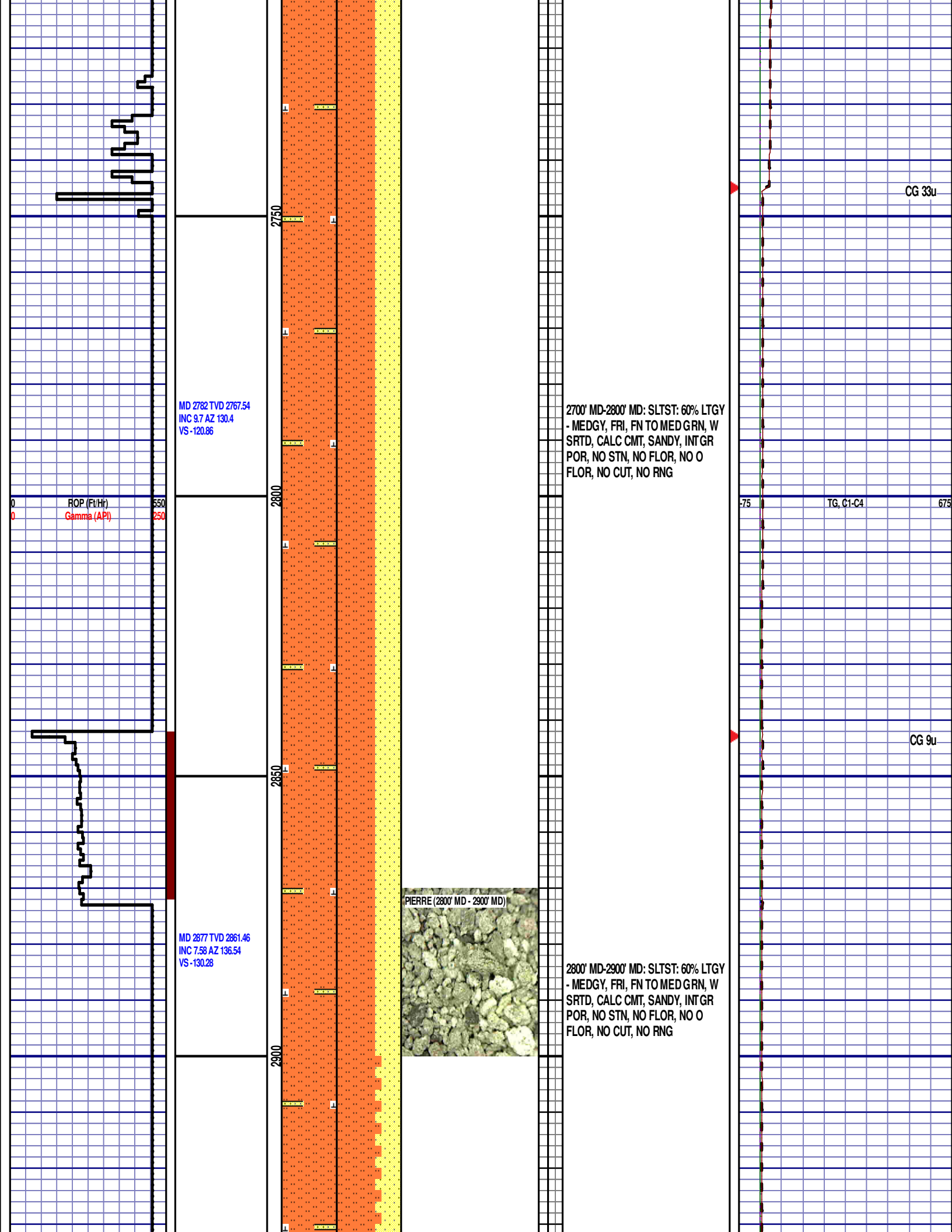


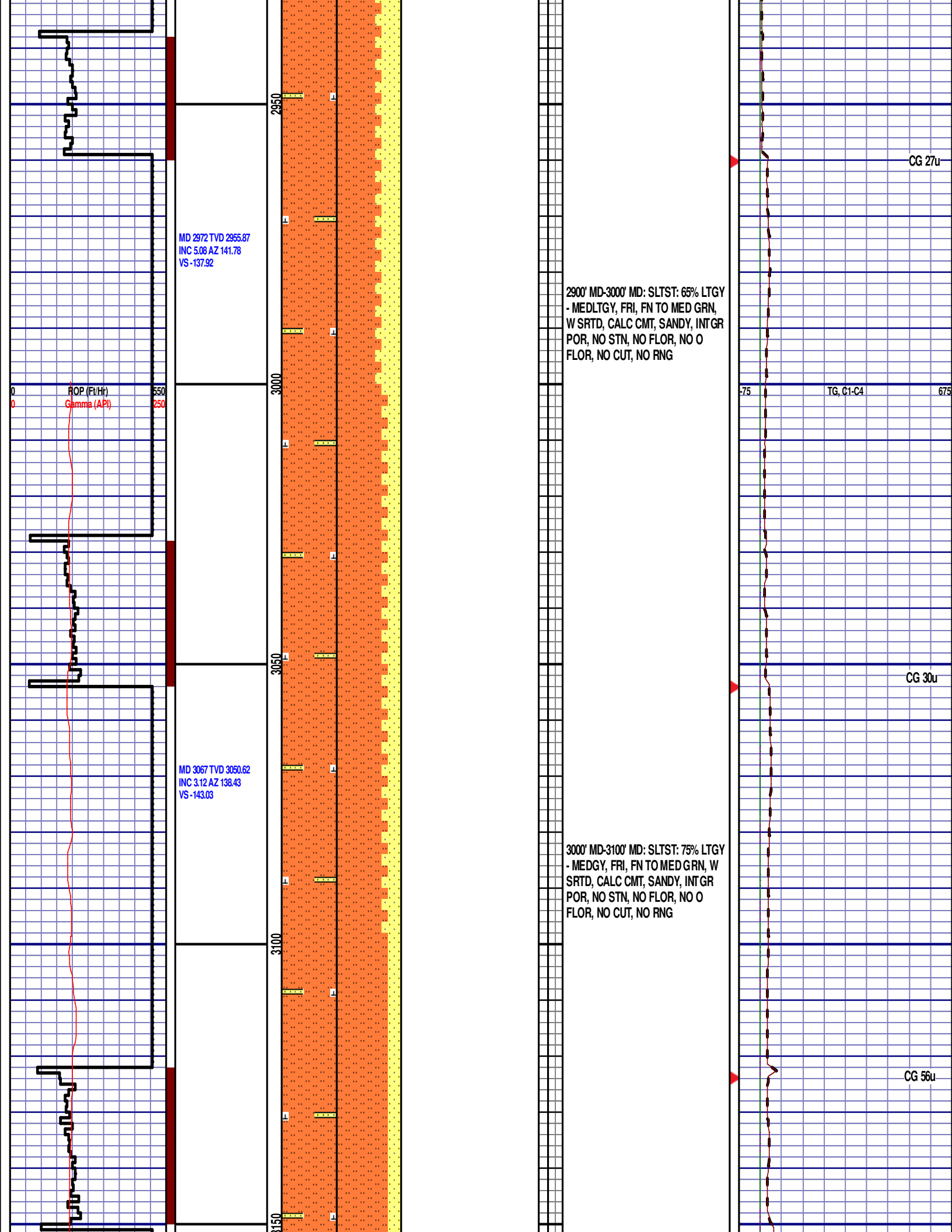
2500' MD-2600' MD: SLTST: 60% LTGY  
- MEDGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, SANDY, INTGR  
POR, NO STN, NO FLOR, NO O  
FLOR, NO CUT, NO RNG

TG, C1-C4

CG 37u

2600' MD-2700' MD: SLTST: 70% LTGY  
- MEDGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, SANDY, INTGR  
POR, NO STN, NO FLOR, NO O  
FLOR, NO CUT, NO RNG





MD 3162 TVD 3145.57  
INC 0.57 AZ 131.82  
VS -145.22

ROP (Ft/Hr)  
Gamma (API)

550  
250

3200

PIERRE (3100' MD - 3200' MD)



3100' MD-3200' MD: SLTST: 80% LTGY  
- MEDGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, SANDY, INTGR  
POR, NO STN, NO FLOR, NO O  
FLOR, NO CUT, NO RNG

75

TG, C1-C4

675

CG 99u

MD 3257 TVD 3240.56  
INC 0.71 AZ 99.12  
VS -145.6

3250

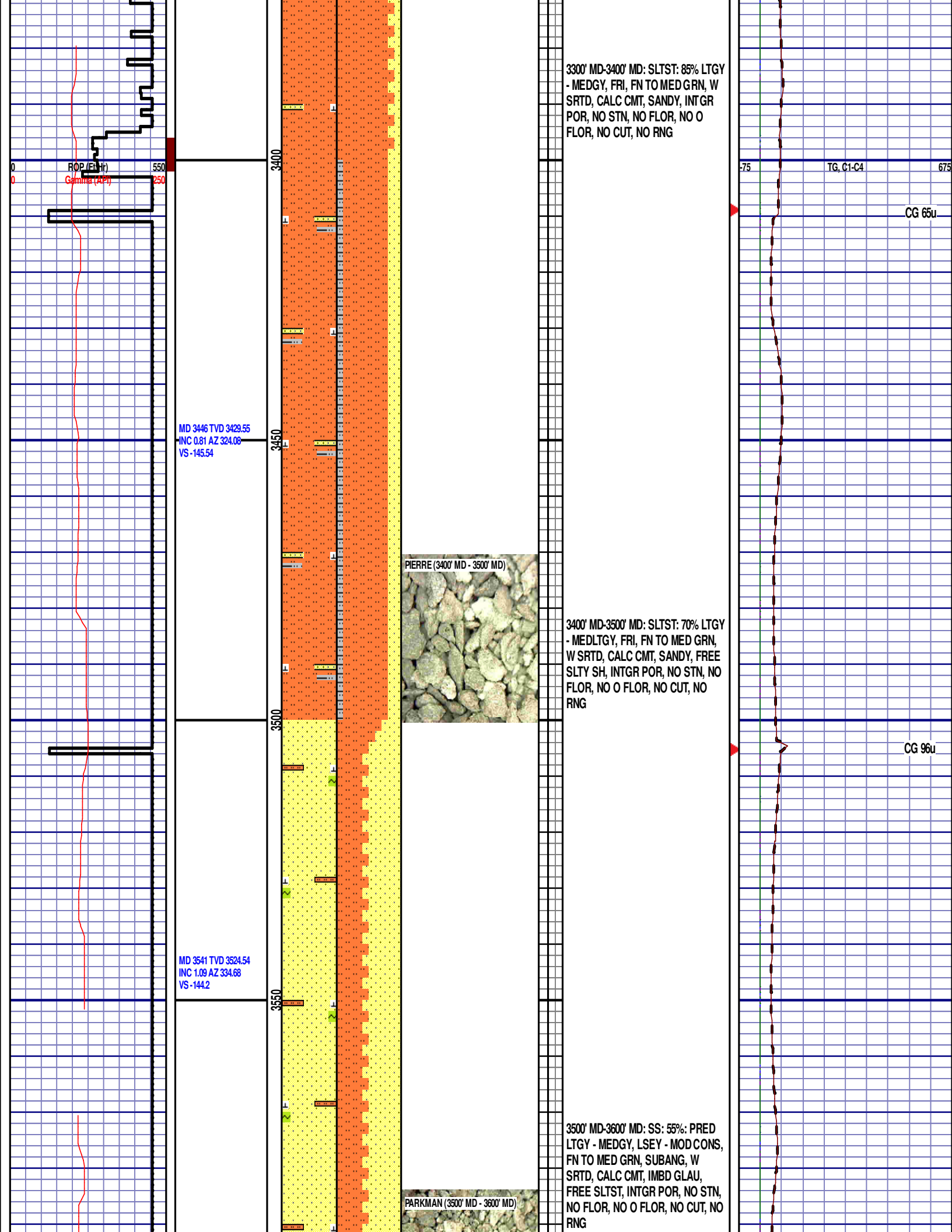
3200' MD-3300' MD: SLTST: 80% LTGY  
- MEDGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, SANDY, INTGR  
POR, NO STN, NO FLOR, NO O  
FLOR, NO CUT, NO RNG

3300

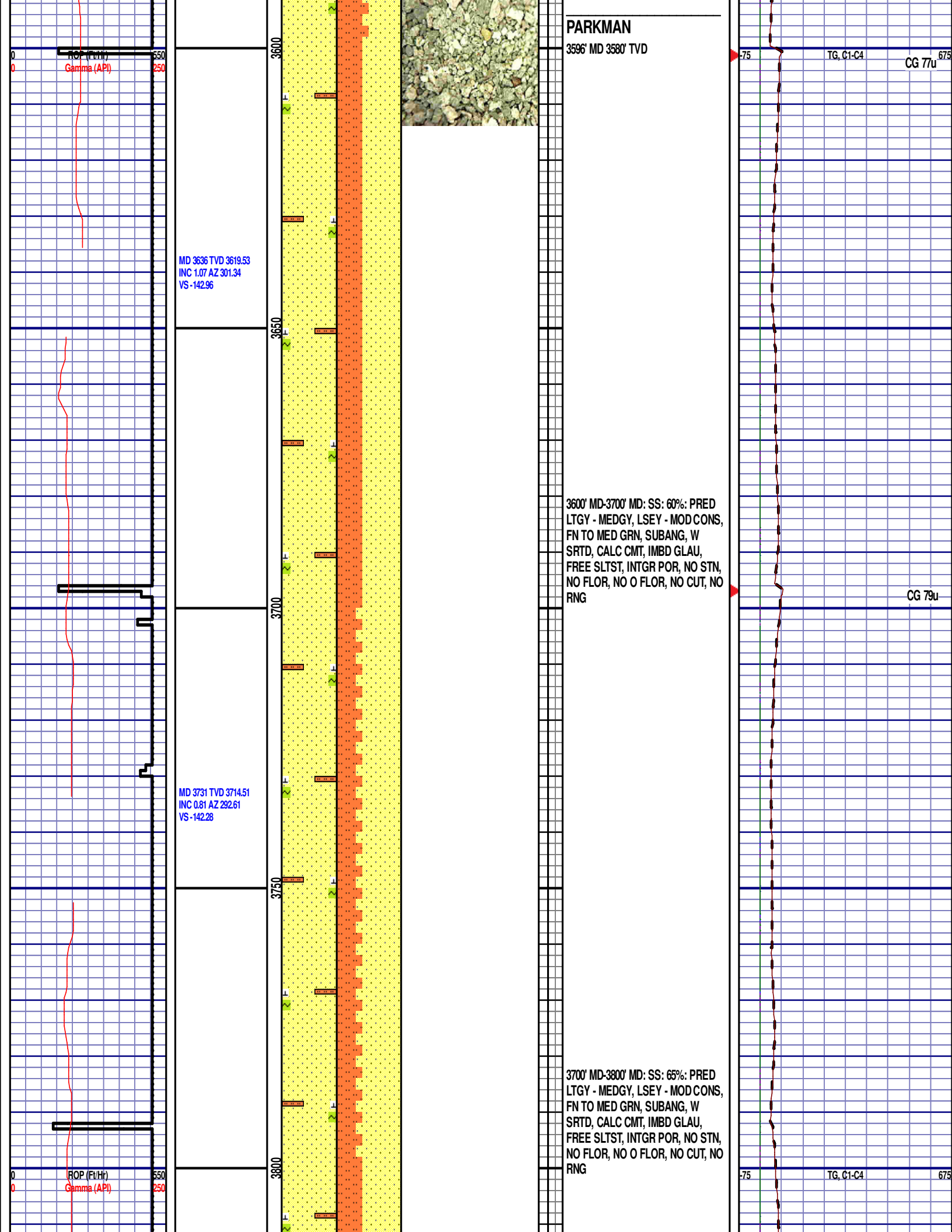
CG 113u

MD 3352 TVD 3335.56  
INC 0.24 AZ 189.77  
VS -145.87

3350







MD 3825 TVD 3808.5  
INC 1.3 AZ 299.4  
VS -141.55

MD 3920 TVD 3903.47  
INC 1.13 AZ 302.52  
VS -140.57

MD 4015 TVD 3998.46  
INC 0.97 AZ 323.2  
VS -139.46

PARKMAN (3800' MD - 3900' MD)



3800' MD-3900' MD: SS: 60%: PRED  
LTGY - MEDGY, LSEY - MOD CONS,  
FN TO MED GRN, SUBANG, W  
SRTD, CALC CMT, IMBD GLAU,  
FREE SLTST, INTGR POR, NO STN,  
NO FLOR, NO O FLOR, NO CUT, NO  
RNG

3900' MD-4000' MD: SS: 70%: PRED  
LTGY - MEDGY, LSEY - MOD CONS,  
FN TO MED GRN, SUBANG, W  
SRTD, CALC CMT, IMBD GLAU,  
FREE SLTST, INTGR POR, NO STN,  
NO FLOR, NO O FLOR, NO CUT, NO  
RNG

CG 67u

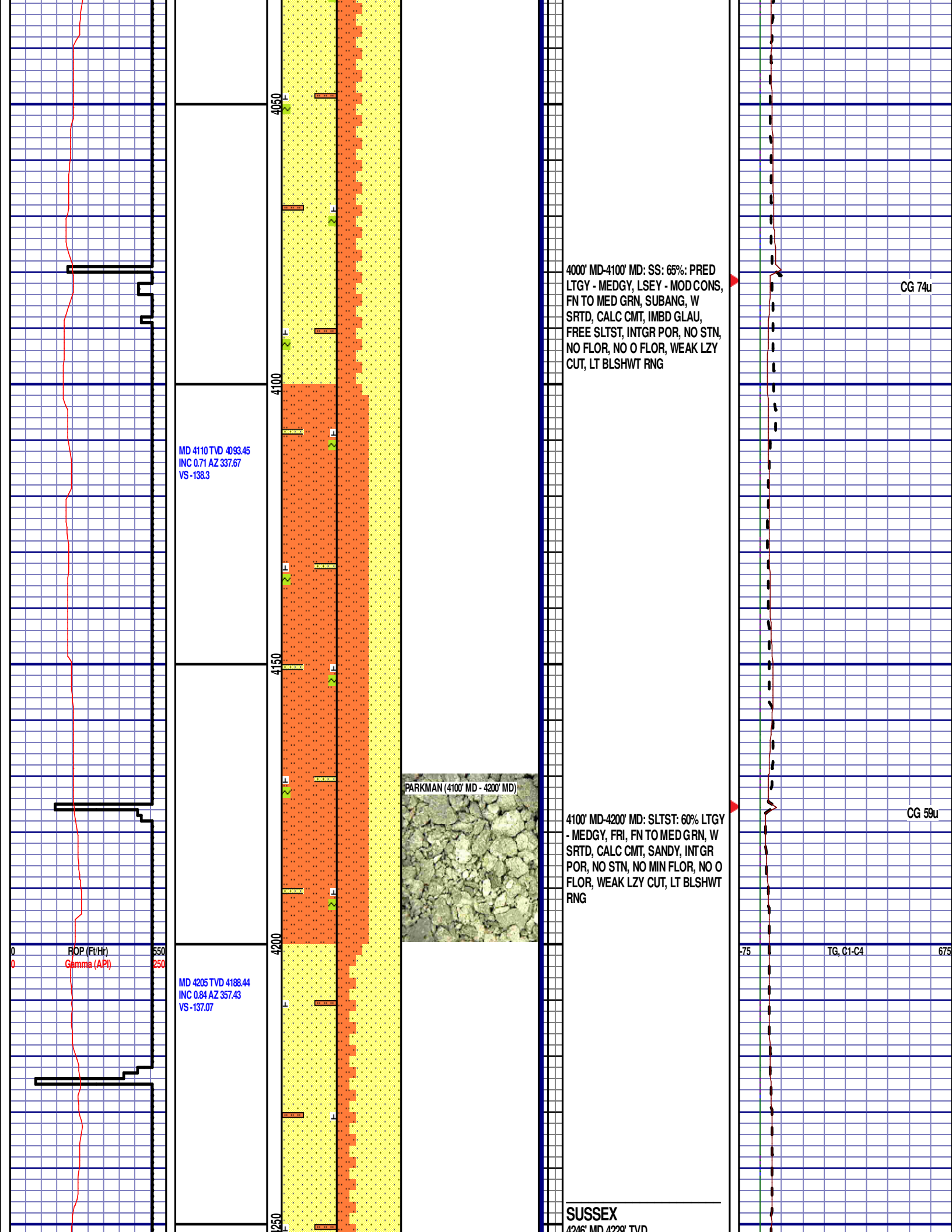
CG 62u

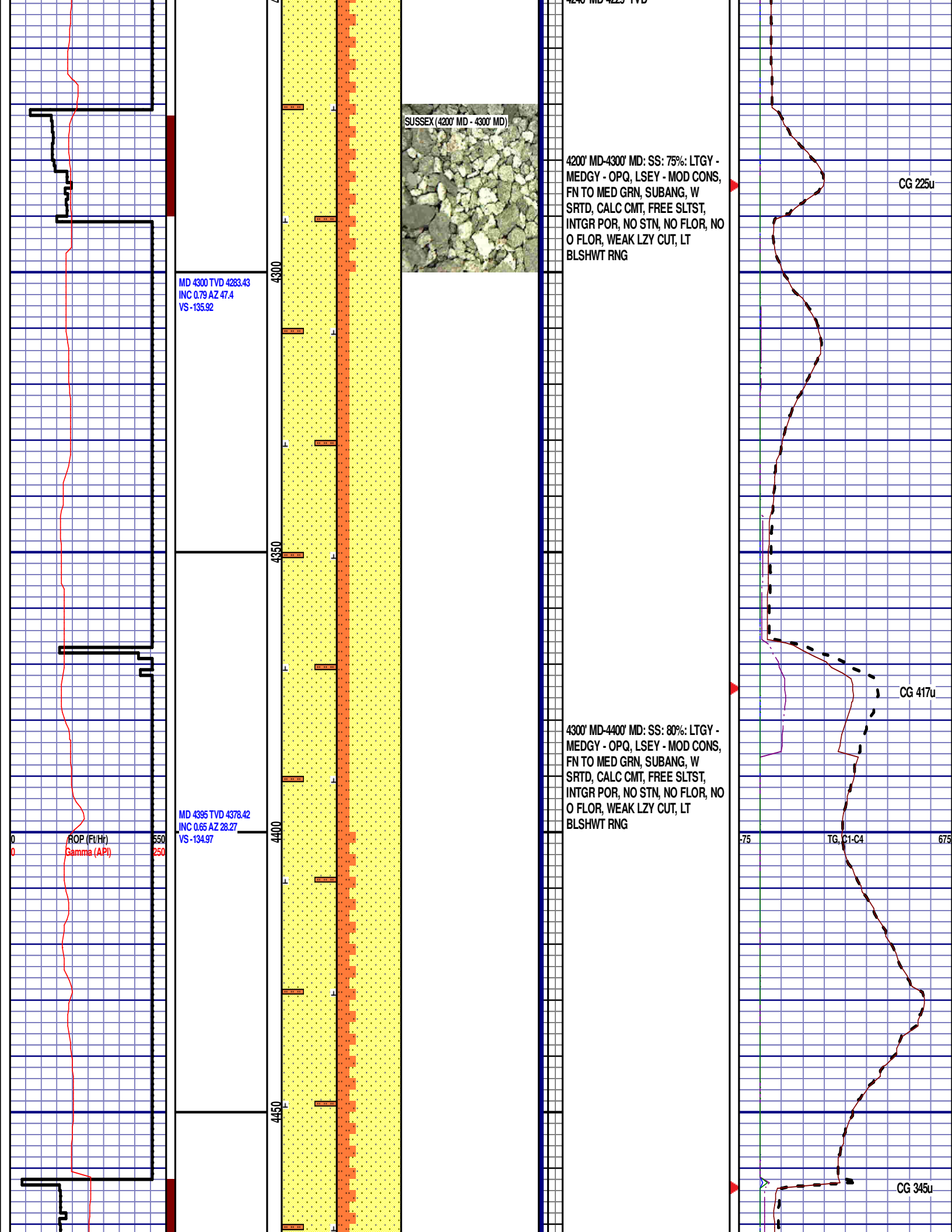
CG 66u

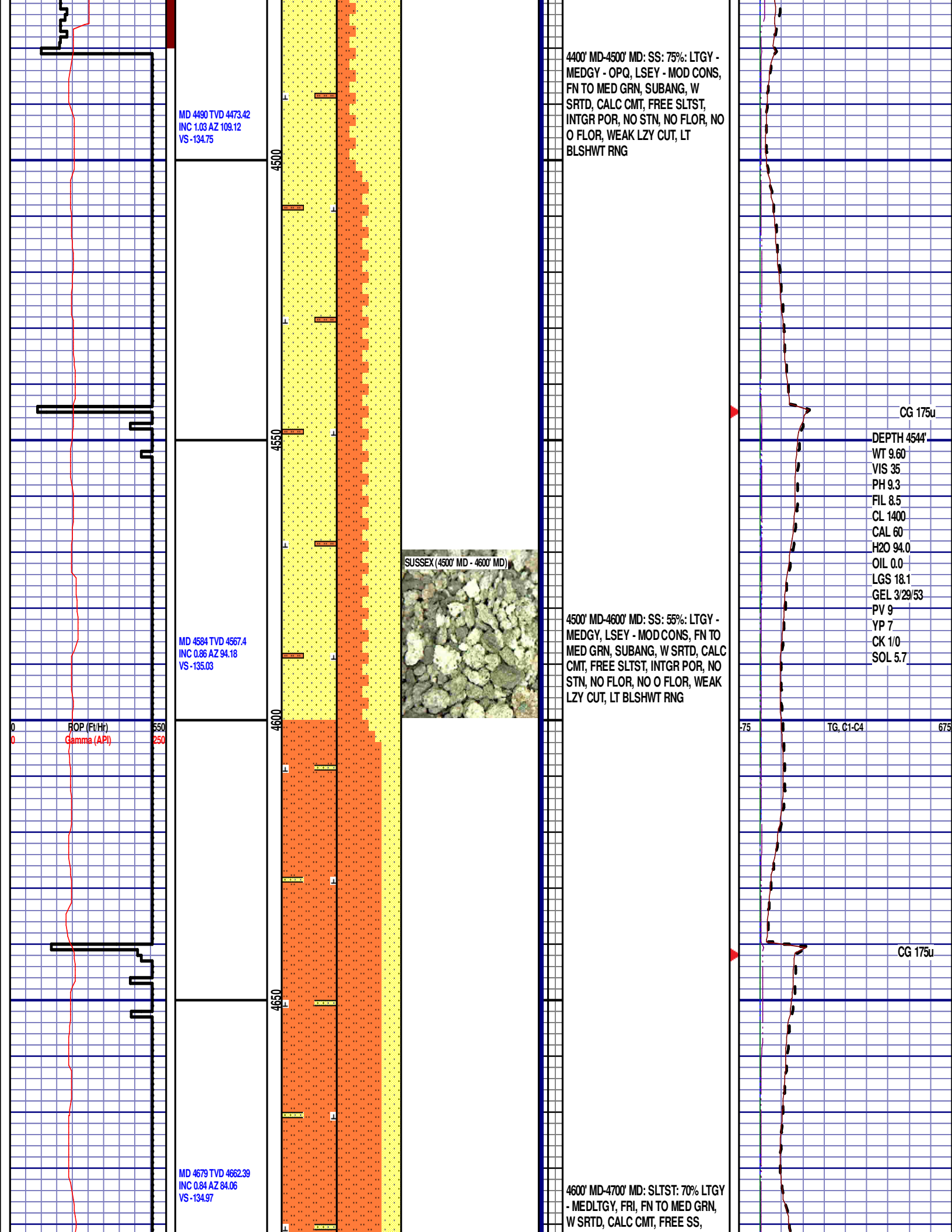
ROP (Ft/Hr)  
Gamma (API)

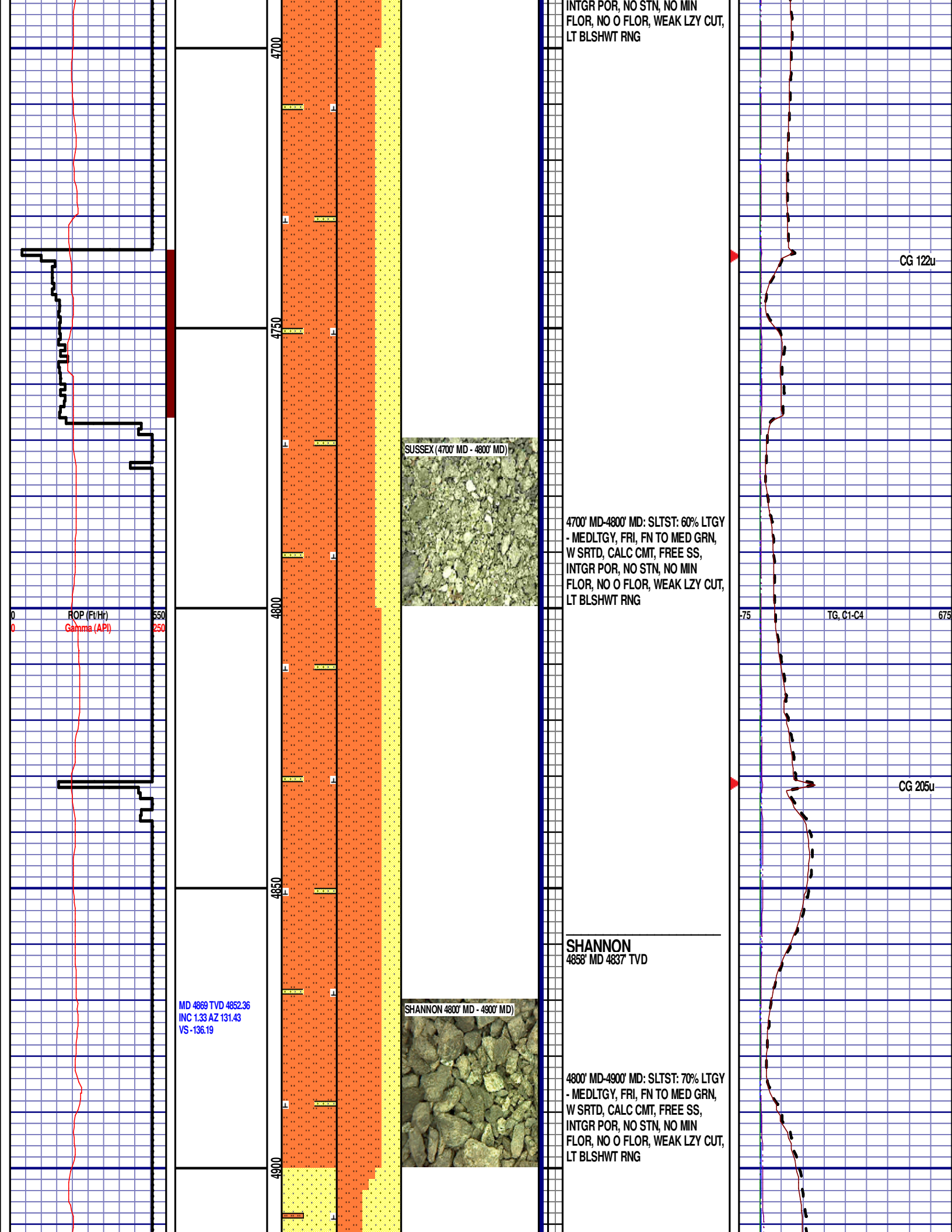
TG, C1-C4

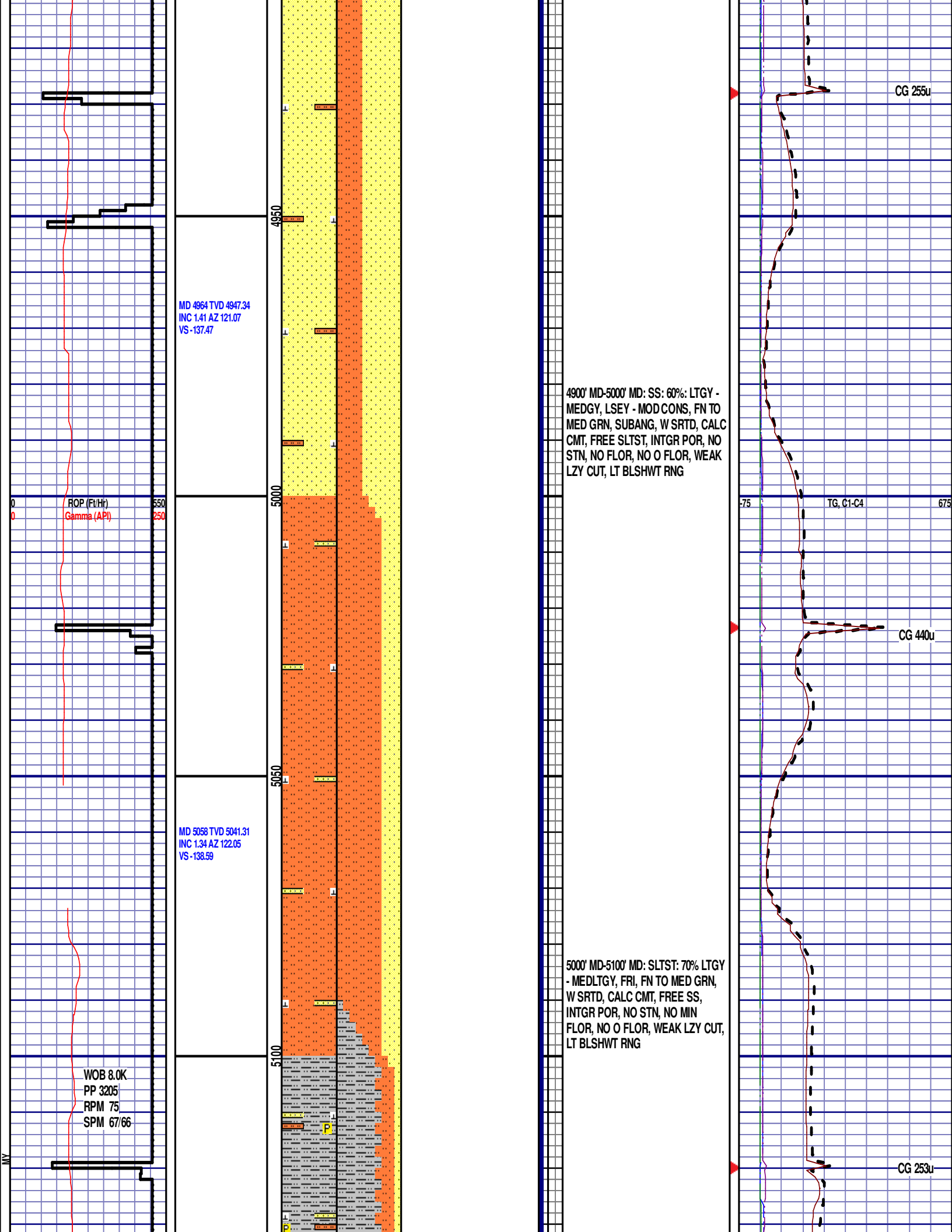




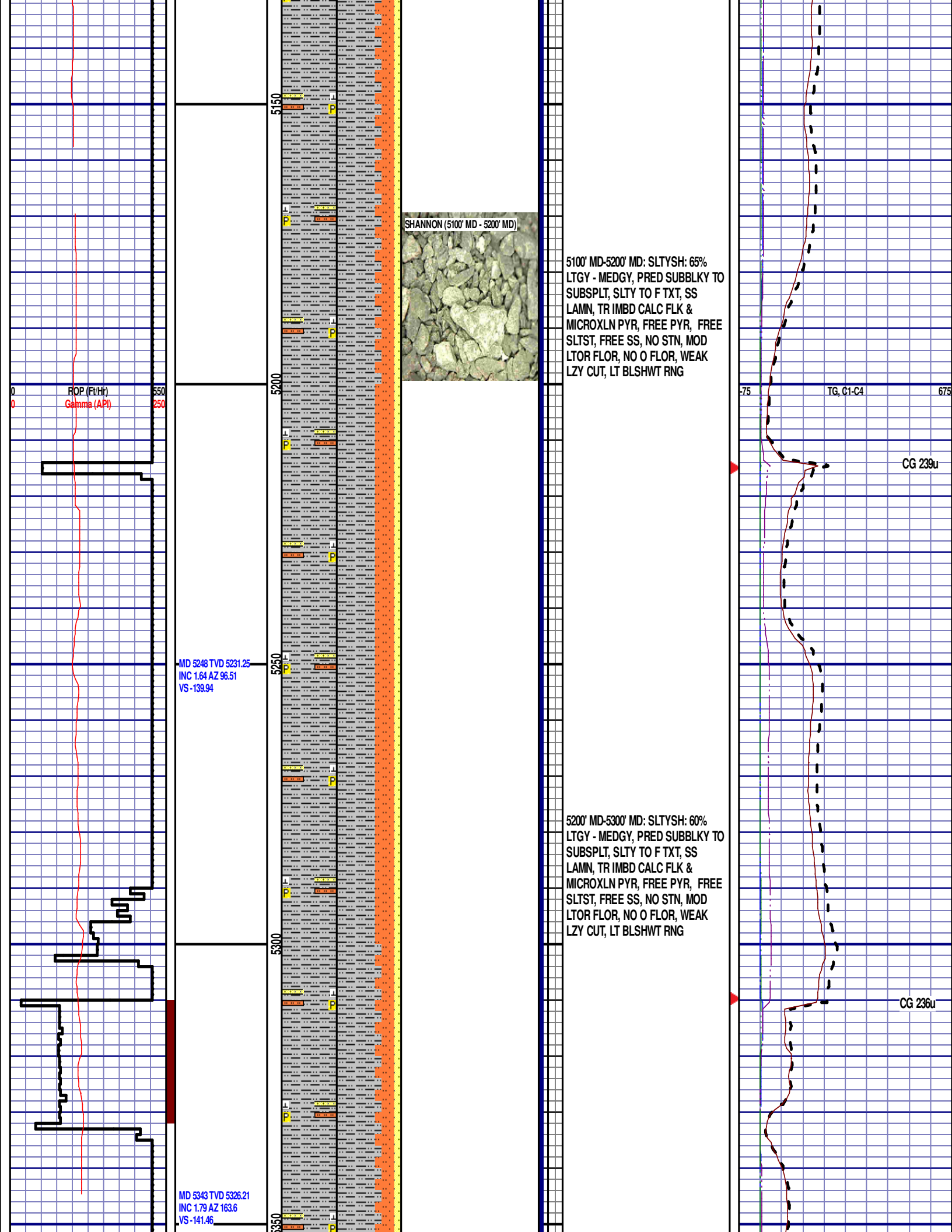




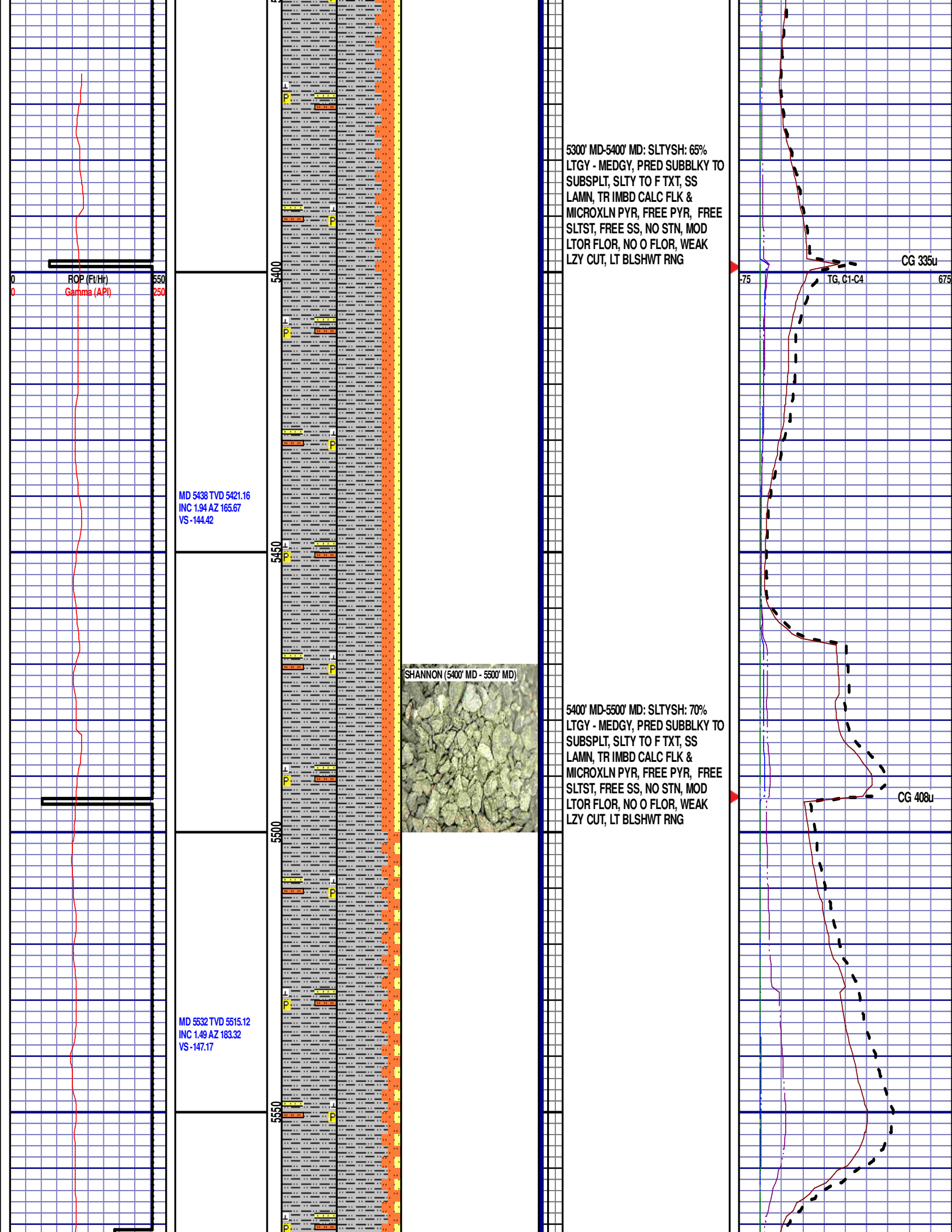


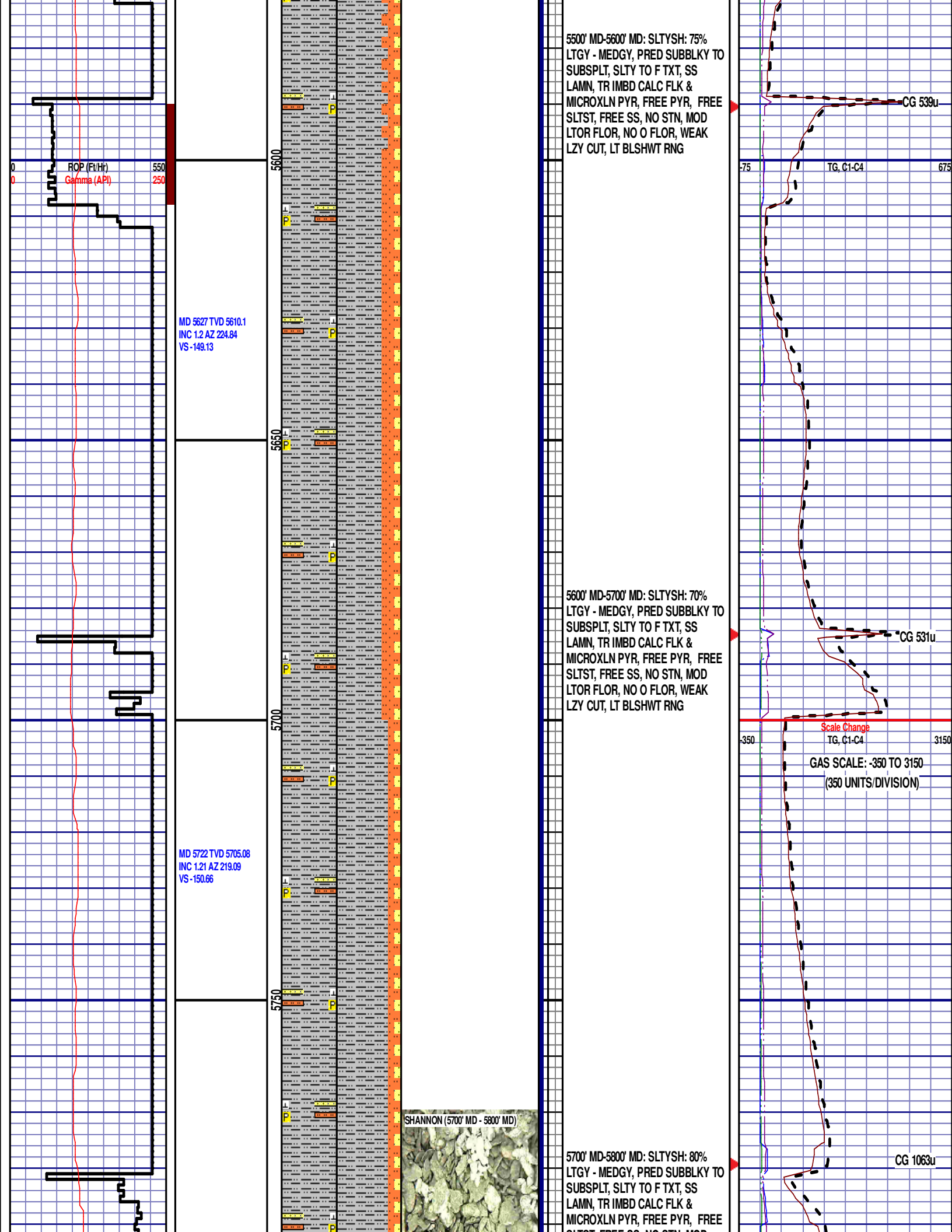


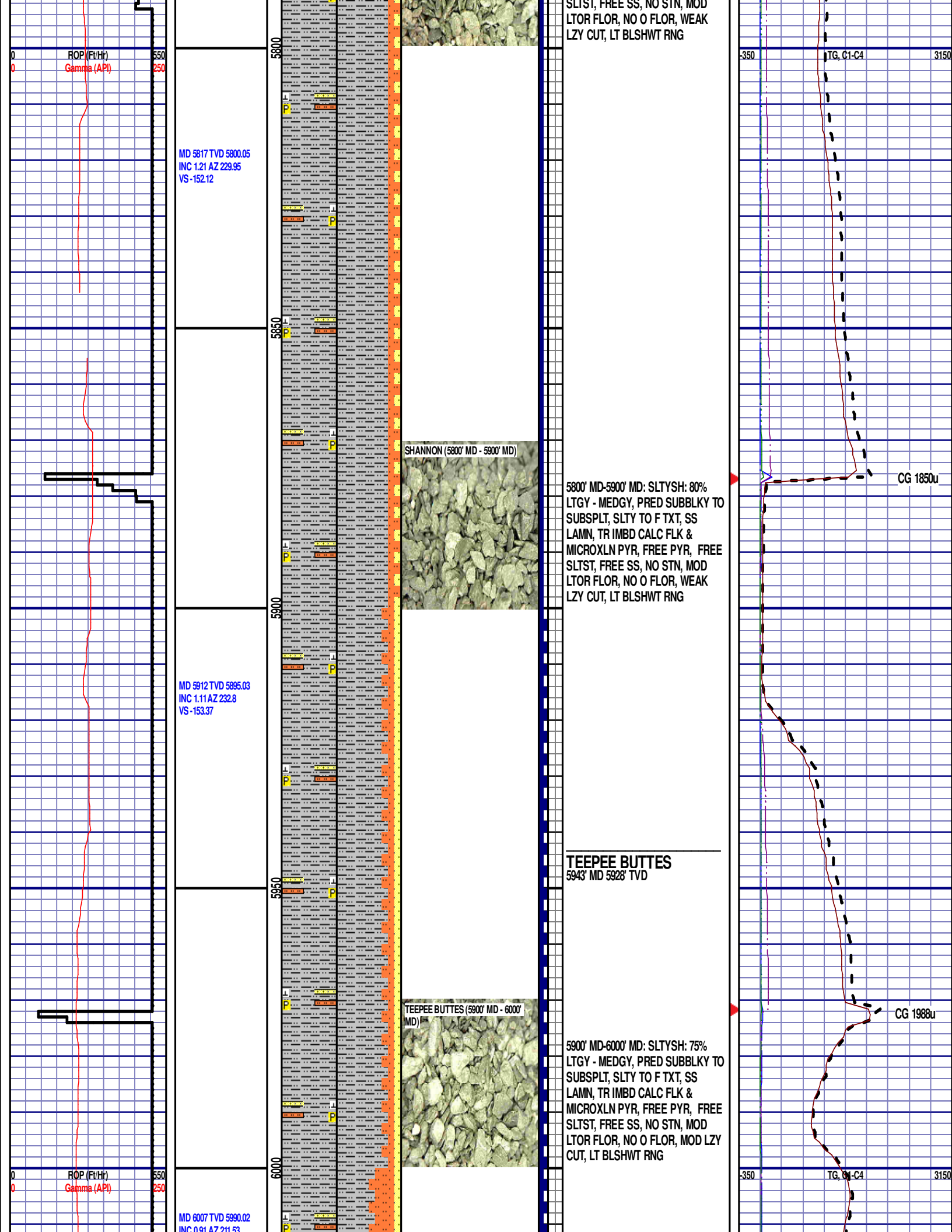












VS -154.61

MD 6101 TVD 6084.01  
INC 0.74 AZ 200.04  
VS -155.83

ROP (Ft/Hr)  
Gamma (API)

550  
250

6050

6100

6150

6200

6000' MD-6100' MD: SLTYSH: 55%  
LTGY - MEDGY, PRED SUBBLKY TO  
SUBSPLT, SLTY TO F TXT, SS  
LAMN, TR IMBD CALC FLK &  
MICROXLN PYR, FREE PYR, FREE  
SLTST, FREE SS, NO STN, MOD  
LTOR FLOR, NO O FLOR, MOD LZ  
CUT, LT BLSHWT RNG

6100' MD-6200' MD: SLTST: 60%  
PRED DRKGY - MEDLTGY, FRI, FN  
TO MED GRN, W SRTD, CALC CMT,  
SANDY, FREE SLTY SH, INTGR  
POR, NO STN, NO FLOR, NO O  
FLOR, MOD LZ CUT, LT BRIYL RNG

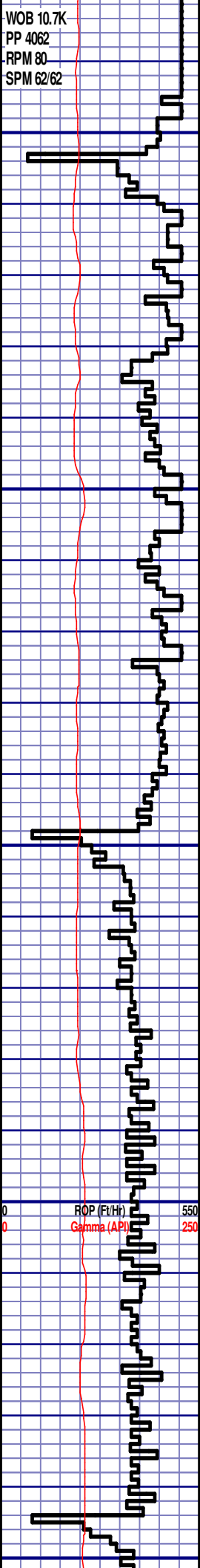
CG 1953u

CG 1161u

TG, C1-C4

3150

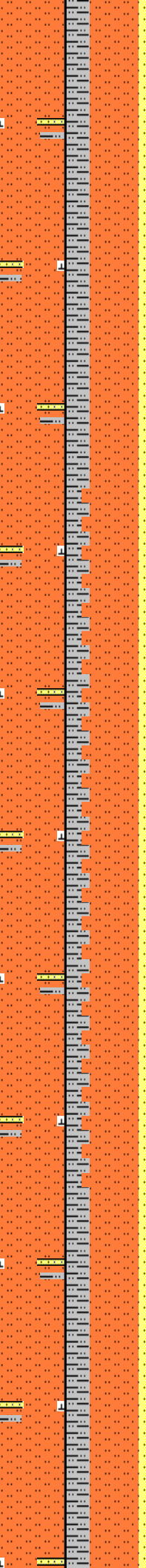
WOB 10.7K  
PP 4062  
RPM 80  
SPM 62/62



MD 6291 TVD 6274  
INC 0.64 AZ 350.11  
VS -155.96

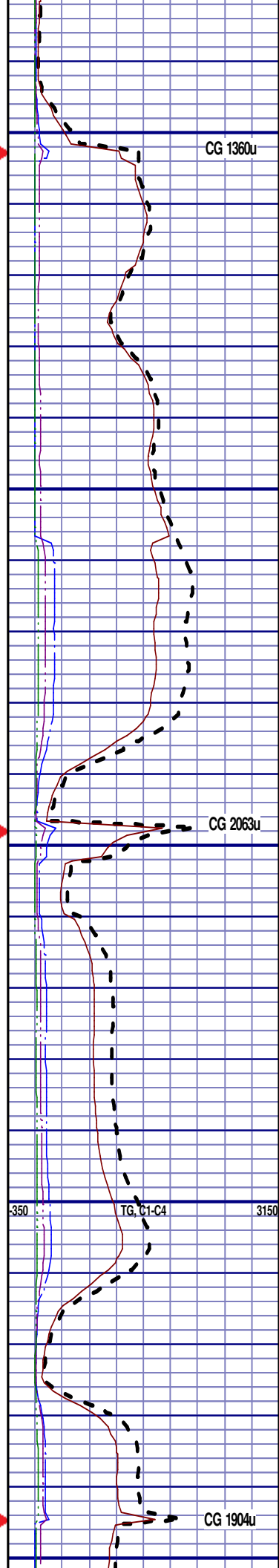
MD 6385 TVD 6368  
INC 0.13 AZ 290.83  
VS -155.41

6250  
6300  
6350  
6400  
6450

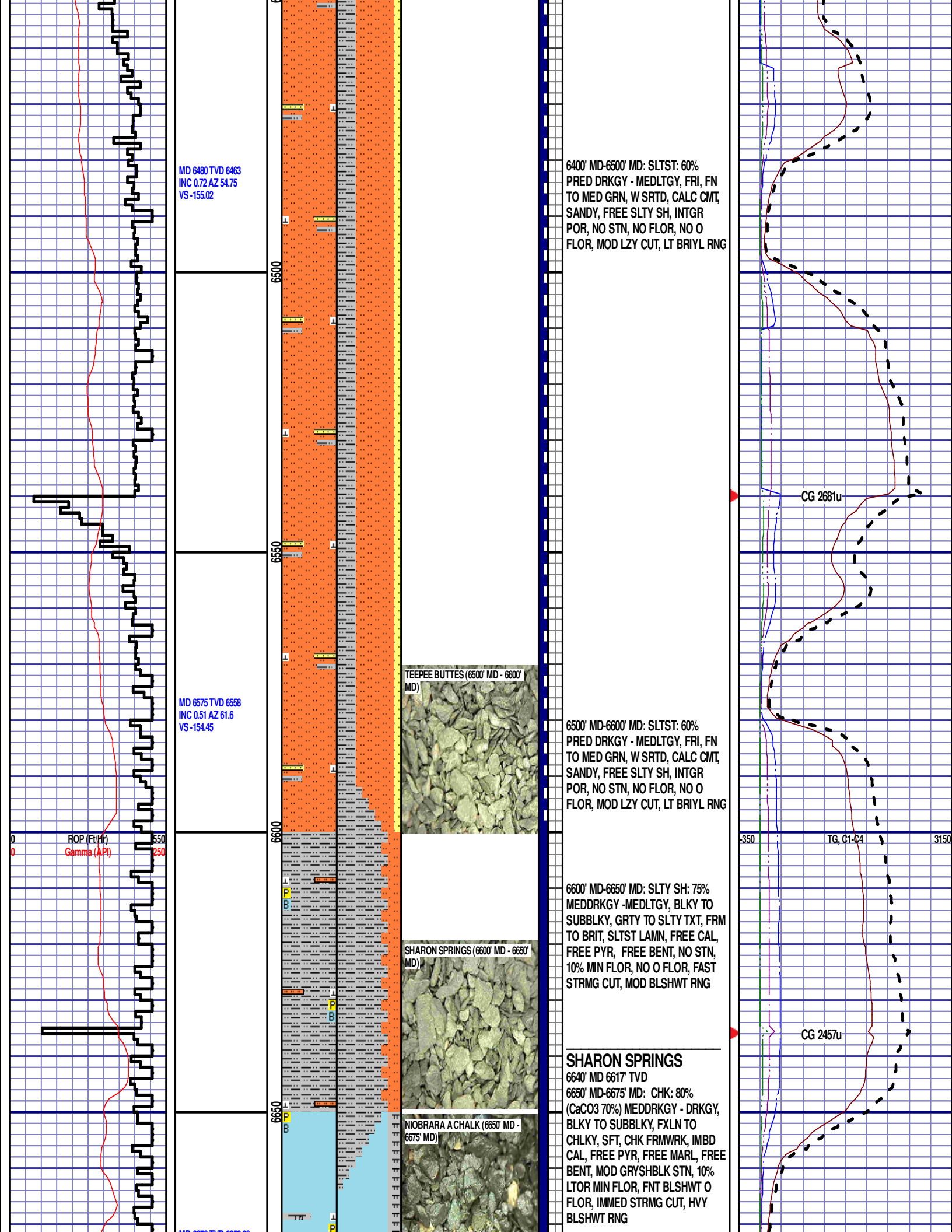


6200' MD-6300' MD: SLTST: 60%  
PRED DRKGY - MEDLTGY, FRI, FN  
TO MED GRN, W SRTD, CALC CMT,  
SANDY, FREE SLTY SH, INTGR  
POR, NO STN, NO FLOR, NO O  
FLOR, MOD LZ CUT, LT BRIYL RNG

6300' MD-6400' MD: SLTST: 65%  
PRED DRKGY - MEDLTGY, FRI, FN  
TO MED GRN, W SRTD, CALC CMT,  
SANDY, FREE SLTY SH, INTGR  
POR, NO STN, NO FLOR, NO O  
FLOR, MOD LZ CUT, LT BRIYL RNG









MD 6670 TVD 6652.99  
INC 0.35 AZ 2.92  
VS -153.95

MD 6765 TVD 6747.99  
INC 0.29 AZ 62.65  
VS -153.54

MD 6860 TVD 6842.99  
INC 0.42 AZ 115.13  
VS -153.56

ROP (Ft/Hr)  
Gamma (API)

550  
250

6700

6750

6800

6850

NIOBRARA A MARL (6675' MD - 6700' MD)

NIOBRARA B CHALK & NIOBRARA B MARL (6700' MD - 6750' MD)

NIOBRARA C CHALK & NIOBRARA C MARL (6800' MD 6850' MD)

NIOBRARA D CHALK (6850' MD - 6900' MD)

## NIOBRARA A CHALK

6674' MD 6657' TVD

## NIOBRARA A MARL

6690' MD 6670' TVD

## NIOBRARA B CHALK

6704' MD 6687' TVD

6675' MD-6700' MD: CHK: 80%  
(CaCO<sub>3</sub> 70%) MEDDRKGY - DRKGY,  
BLKY TO SUBBLKY, FXLN TO  
CHLKY, SFT, CHK FRMWRK, IMBD  
CAL, FREE PYR, FREE MARL, FREE  
BENT, MOD GRYSBLK STN, 10%  
LTOR MIN FLOR, FNT BLSHWT O  
FLOR, IMMED STRMG CUT, HVY  
BLSHWT RNG

## NIOBRARA B MARL

6740' MD 6724' TVD

6700' MD-6750' MD: MRL: 60%  
(CaCO<sub>3</sub> 55%) MEDDRKGY - DRKGY,  
BLKY TO SUBBLKY, FXLN TO  
CHLKY, SFT, CHK FRMWRK, IMBD  
CAL, FREE PYR, FREE BENT, FREE  
CHALK, NO STN, 15% LTOR MIN  
FLOR, FNT BLSHWT O FLOR,  
IMMED STRMG CUT

6750' MD-6800' MD: CHK: 90%  
(CaCO<sub>3</sub> 75%) MEDDRKGY - DRKGY,  
BLKY TO SUBBLKY, FXLN TO  
CHLKY, SFT, CHK FRMWRK, IMBD  
CAL, FREE PYR, FREE MARL, FREE  
BENT, MOD GRYSBLK STN, 10%  
LTOR MIN FLOR, FNT BLSHWT O  
FLOR, IMMED STRMG CUT, HVY  
BLSHWT RNG

## NIOBRARA C CHALK

6802' MD 6785' TVD

## NIOBRARA C MARL

6830' MD 6813' TVD

6800' MD-6850' MD: CHK: 50%  
(CaCO<sub>3</sub> 60%) MEDDRKGY - DRKGY,  
BLKY TO SUBBLKY, FXLN TO  
CHLKY, SFT, CHK FRMWRK, IMBD  
CAL, FREE PYR, FREE MARL, FREE  
BENT, MOD GRYSBLK STN, 10%  
LTOR MIN FLOR, FNT BLSHWT O  
FLOR, IMMED STRMG CUT, HVY  
BLSHWT RNG

## NIOBRARA D CHALK

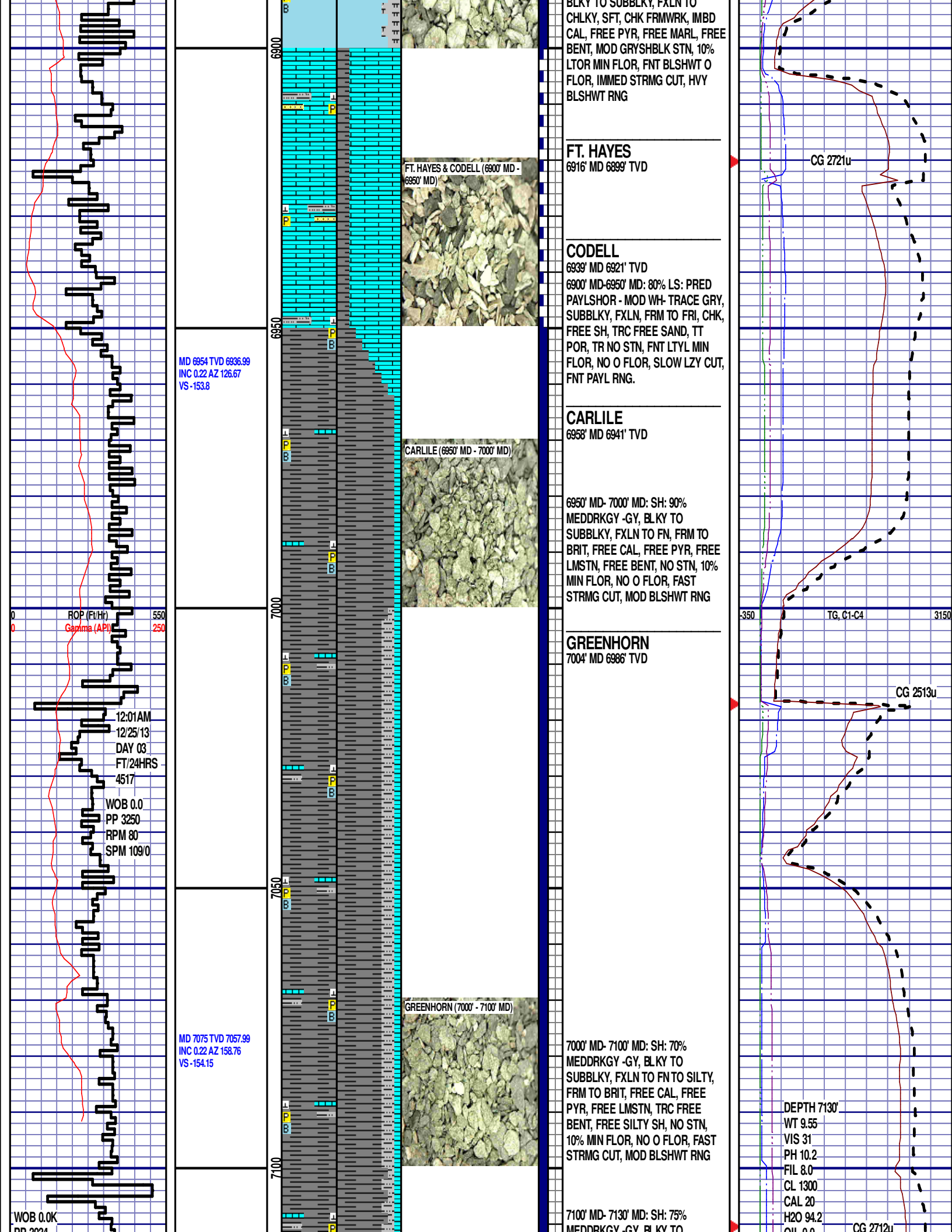
6876' MD 6856' TVD

6850' MD-6900' MD: CHK: 75%  
(CaCO<sub>3</sub> 70%) MEDDRKGY - DRKGY,  
BLKY TO SUBBLKY, FXLN TO

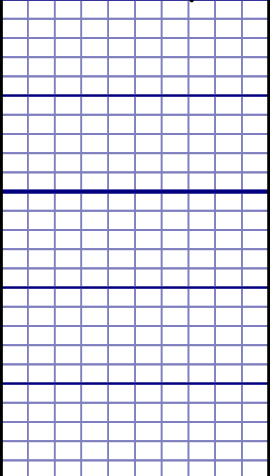
CG 2888u

CG 2566u

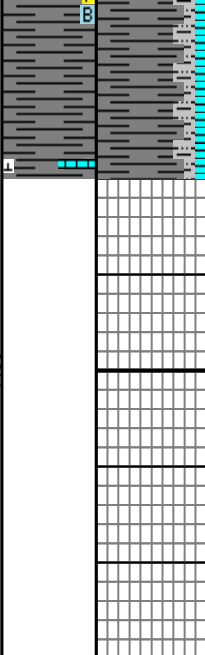
TG, C1-C4



PP 3034  
RPM 80  
SPM 112/0  
12:01AM  
12/26-29/13  
DAY 04-07  
FT/96HRS 0



7150



MEDDING CUT, BENT TO  
SUBBLKY, FXLN TO FN TO SILTY,  
FRM TO BRIT, FREE CAL, FREE  
PYR, FREE LMSTN, TRC FREE  
BENT, FREE SILTY SH, NO STN,  
10% MIN FLOR, NO O FLOR, FAST  
STRMG CUT, MOD BLSHWT RNG

TOOH @ 7130' MD @ 2:30 AM ON  
12/25/2013 FOR REAMER AND  
WIRELINE RUN.

END OF VERTICAL LOG @ 7130' MD  
ON 12/25/2013. CEMENTED BACK TO  
5868' MD TO START HORIZONTAL  
MARIE D04-74-1HN.

OIL 0.0  
LGS 17.9  
GEL 1/1/1  
PV 6  
YP 2  
CK 1/0  
SOL 5.5

