

Logger On Shift		ROP (Ft/Hr) Gamma (API)		Drill Depth v. Time		Survey Data		Depth		Lithology		Lithology Percentages		Sample Photographs		Porosity		Geological Description		Connections		TG (1-8) C1 (units) C2 (units) C3 (units) C4 (units)		Total Gas, C1-C4	
0	0	ROP (Ft/Hr) Gamma (API)	1500 350					24										NOBLE ENERGY WELLS RANCH AE30-65-1AHNB 29-T6N-R62W 2015' FSL, 65' FWL WELD COUNTY, CO H&P 321 LOGGERS: HANNAH BLATCHFORD JOE KLUMPSTRA CALLED OUT BY COMPANY MAN 04/18/14 COMMENCED LOGGING @ 8:00 AM	-30	TG, C1-C4	270				
SLIDE=RED ROTATE=WHITE																			CONNECTIONS ARE MARKED WITH RED TRIANGLES						
ROP SCALE: 0 TO 1500 (FT/HR)																			GAS SCALE: -30 TO 270 30 UNITS/DIVISION						
GAMMA SCALE: 0 TO 350 (GAMMA DATA AS RECEIVED)																			DRILLING ON WATER-BASED MUD						

COMMENCED LOGGING @ 6:00 AM  
@ 2500' MD ON 04/19/14 W/BIT # 1  
8.75 ULTERRA U519S S/N 22729 IN  
@ 649' MD

**PIERRE**  
BEFORE LOGGING DEPTH

MD 890'  
WT 8.65  
VIS 32.0  
PH 11.6  
FIL 22.8  
CL 1400  
CAL 80.0  
H2O 96.4  
OIL 0.0  
SOL 3.3  
CAKE 1/0  
GELS 1/3/4  
PV 3.0  
YP 3.0

CG 56u

CG 109u

2500'- 2600': SS: 60%: PRED GY -  
LTKGY - OPQ, MOD CONS, FN TO  
MED GRN, SUBANG, W TO MODY  
SRTD, CALC CMT, SILTY, TRC IMBD  
PYR, INTGR POR, NO STN, NO  
FLOR, NO O FLOR, NO CUT, NO  
RNG

2600'- 2700': SS: 60%: PRED GY -  
LTKGY - OPQ, MOD CONS, FN TO  
MED GRN, SUBANG, W TO MODY  
SRTD, CALC CMT, SILTY, TRC IMBD  
PYR, INTGR POR, NO STN, NO  
FLOR, NO O FLOR, NO CUT, NO  
RNG

Pierre (2500' MD - 2600' MD)

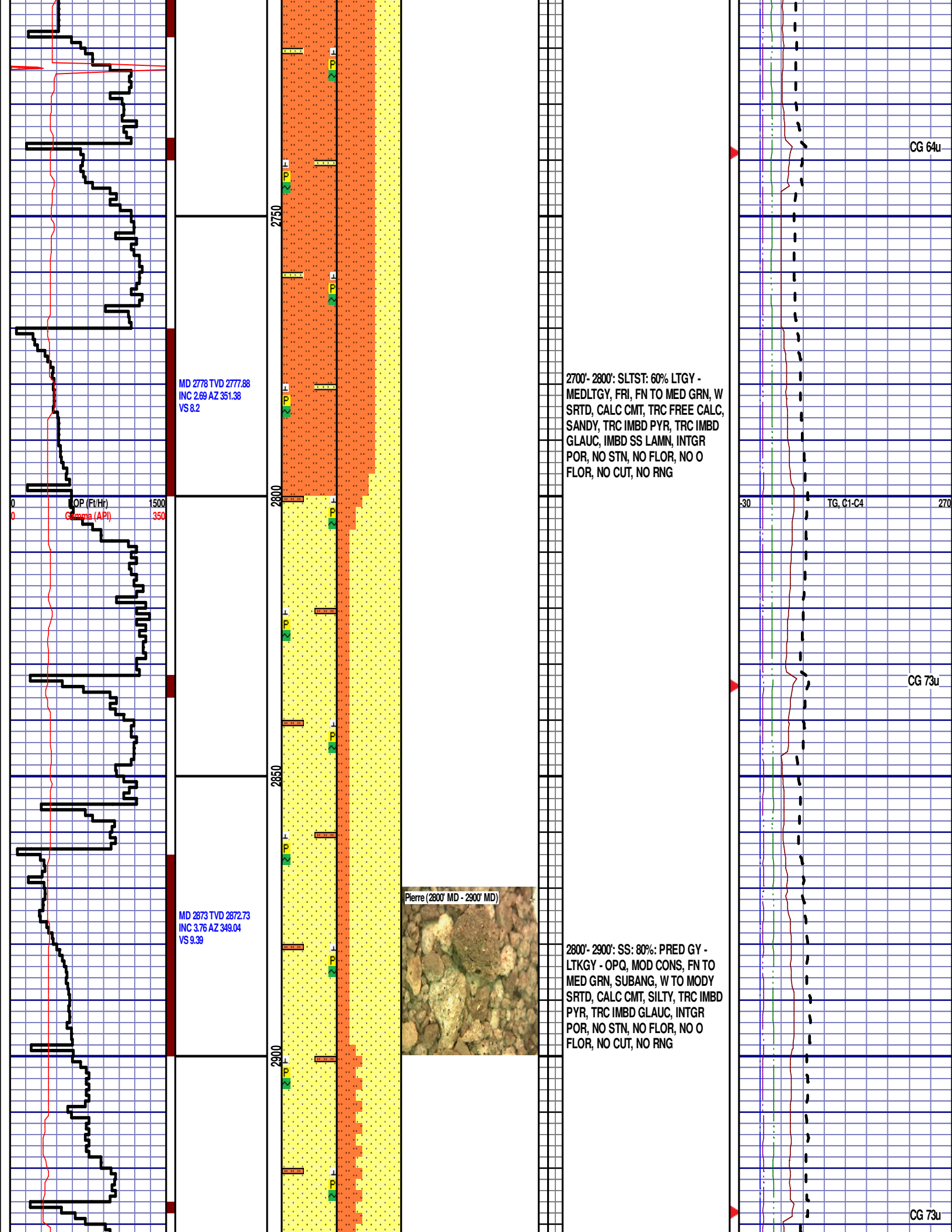


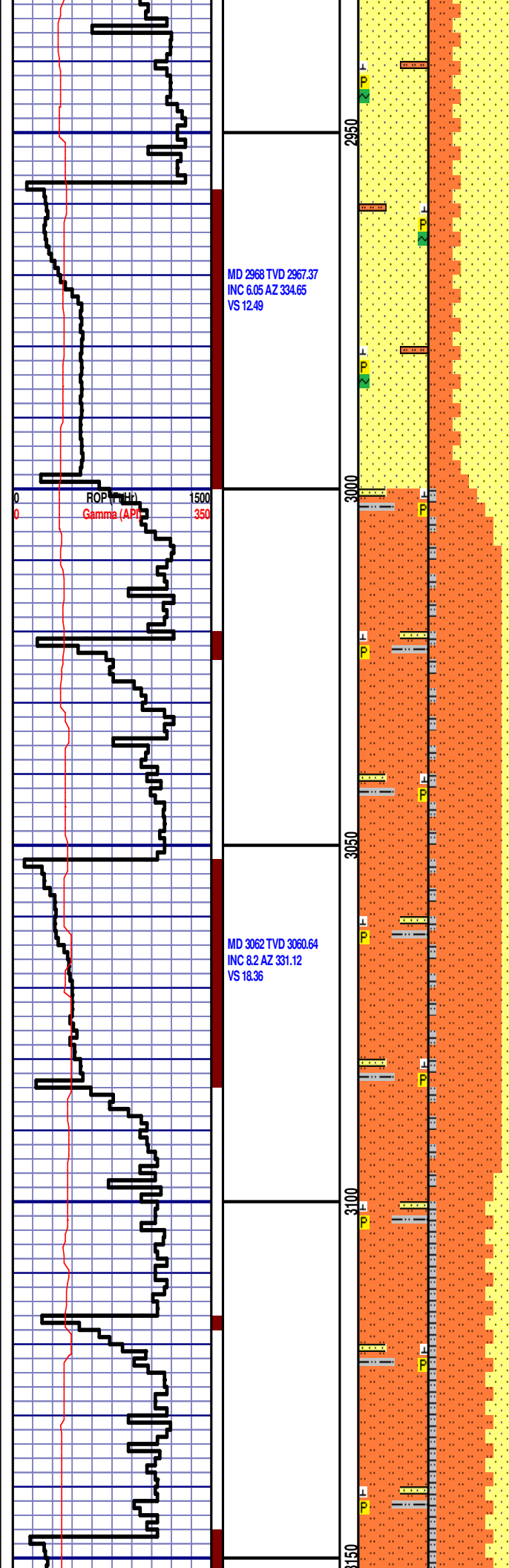
MD 2589 TVD 2588.91  
INC 0.59 AZ 130  
VS 7.72

MD 2683 TVD 2682.91  
INC 0.28 AZ 251.46  
VS 7.55

12:01 AM  
4/19/2014  
0 FT/24 HRS  
DAY 02  
WOB 4.3K  
PP 1901  
RPM 60  
SPM 66/66

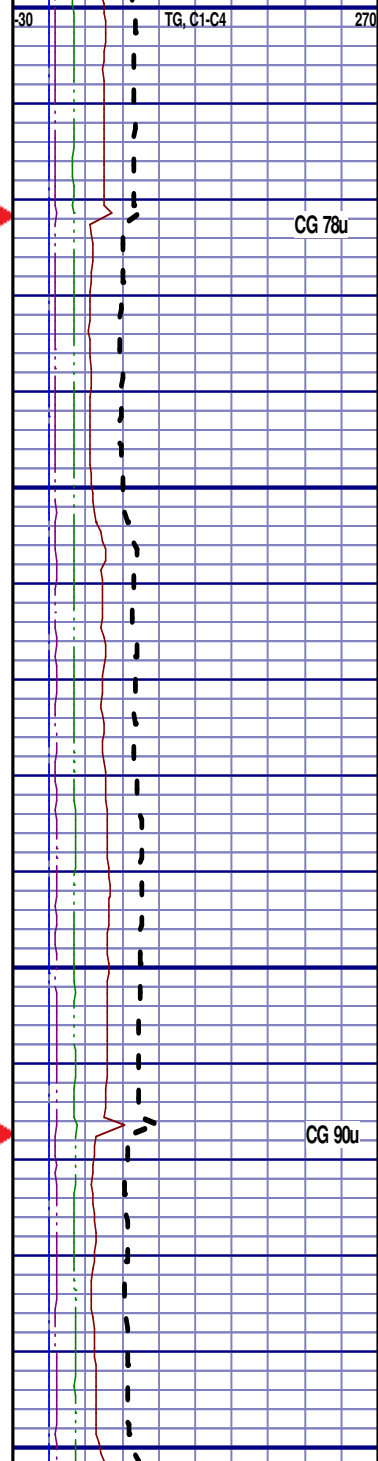
ROP (Ft/Hr)  
Gamma (API)





2900'- 3000': SS: 65%: PRED GY -  
LTKGY - OPQ, MOD CONS, FN TO  
MED GRN, SUBANG, W TO MODY  
SRTD, CALC CMT, TRC FREE CALC,  
SILTY, TRC IMBD PYR, TRC IMBD  
GLAUC, INTGR POR, NO STN, NO  
FLOR, NO O FLOR, NO CUT, NO  
RNG

3000'- 3100': SLTST: 85% LTGY -  
MEDLTGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, TRC FREE CALC,  
SANDY, TRC IMBD PYR, IMBD SS  
LAMN, INTGR POR, NO STN, NO  
FLOR, NO O FLOR, NO CUT, NO  
RNG



MD 3157 TVD 3154.68  
INC 8.19 AZ 342.12  
VS 24.31

ROP (Ft/Hr)  
Gamma (API)

1500  
350

MD 3252 TVD 3248.64  
INC 8.76 AZ 349.31  
VS 28.39

MD 3347 TVD 3342.52  
INC 8.88 AZ 350.54  
VS 31.64

Pierre (3100' MD - 3200' MD)



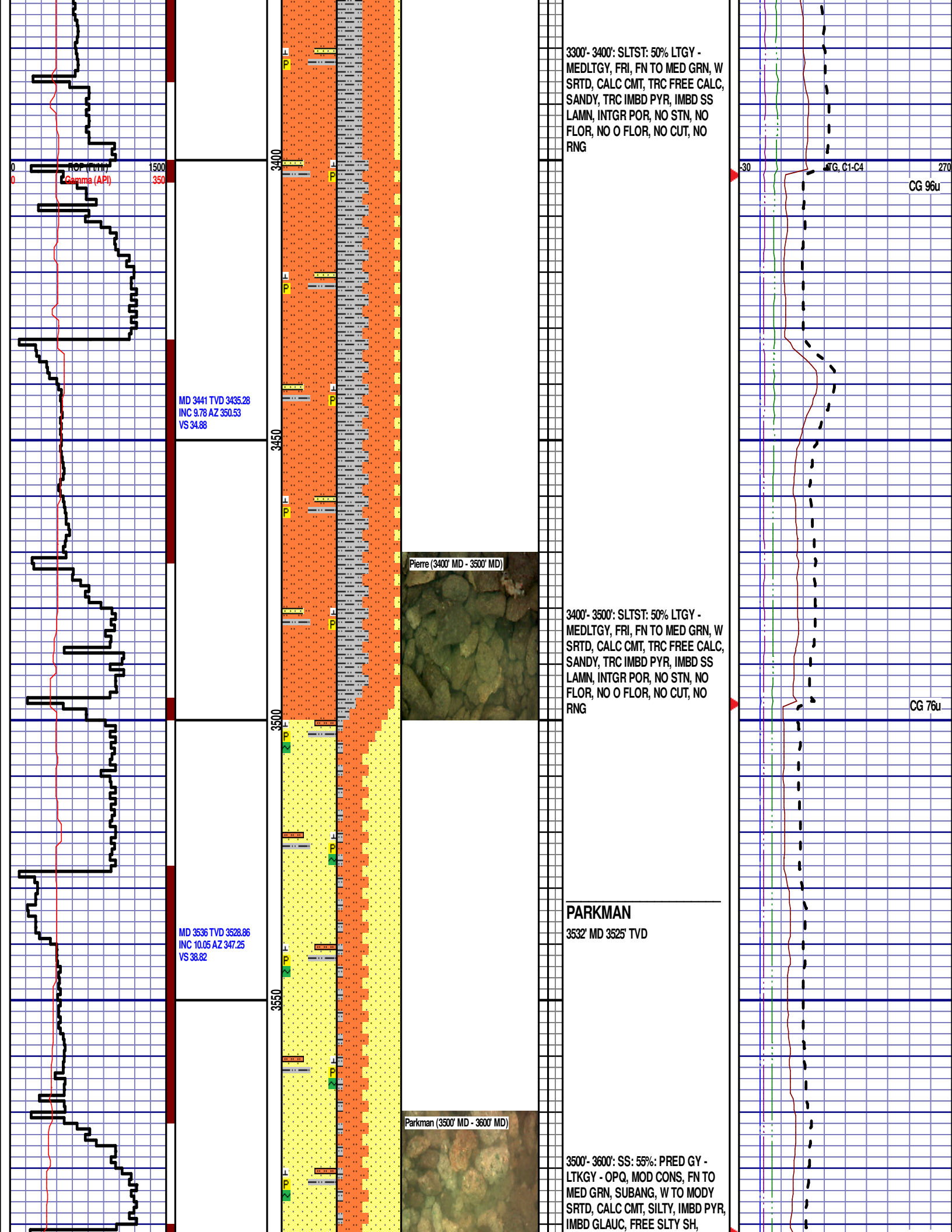
3100'- 3200': SLTST: 65% LTGY -  
MEDLTGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, TRC FREE CALC,  
SANDY, TRC IMBD PYR, IMBD SS  
LAMN, INTGR POR, NO STN, NO  
FLOR, NO O FLOR, NO CUT, NO  
RNG

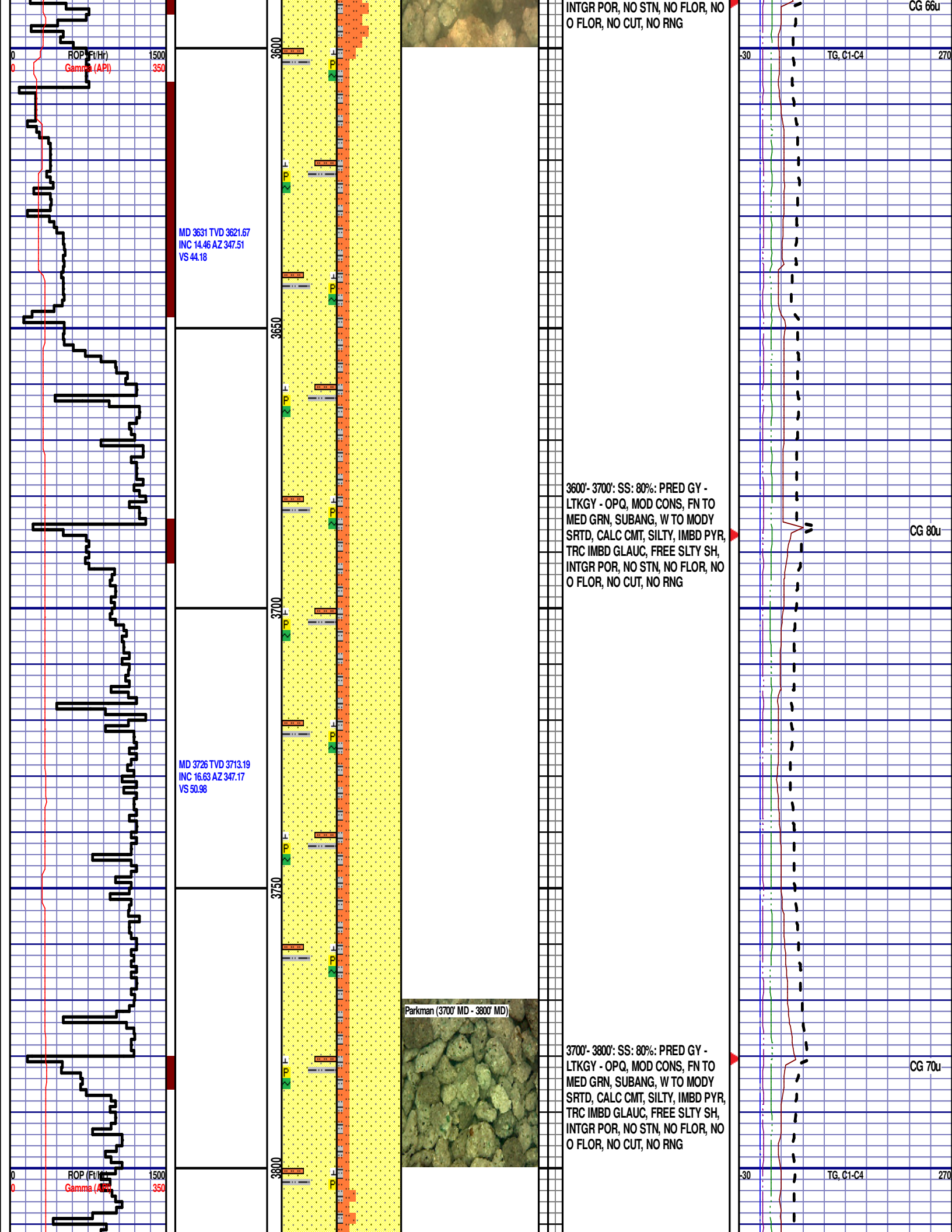
3200'- 3300': SLTST: 60% LTGY -  
MEDLTGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, TRC FREE CALC,  
SANDY, TRC IMBD PYR, IMBD SS  
LAMN, INTGR POR, NO STN, NO  
FLOR, NO O FLOR, NO CUT, NO  
RNG

30 TG, C1-C4 270

CG 95u

CG 100u





MD 3819 TVD 3801.95  
INC 18.08 AZ 346.63  
VS 58.6

MD 3914 TVD 3892.71  
INC 16.27 AZ 346.52  
VS 66.44

MD 4009 TVD 3984.37  
INC 14.19 AZ 344.43  
VS 73.85

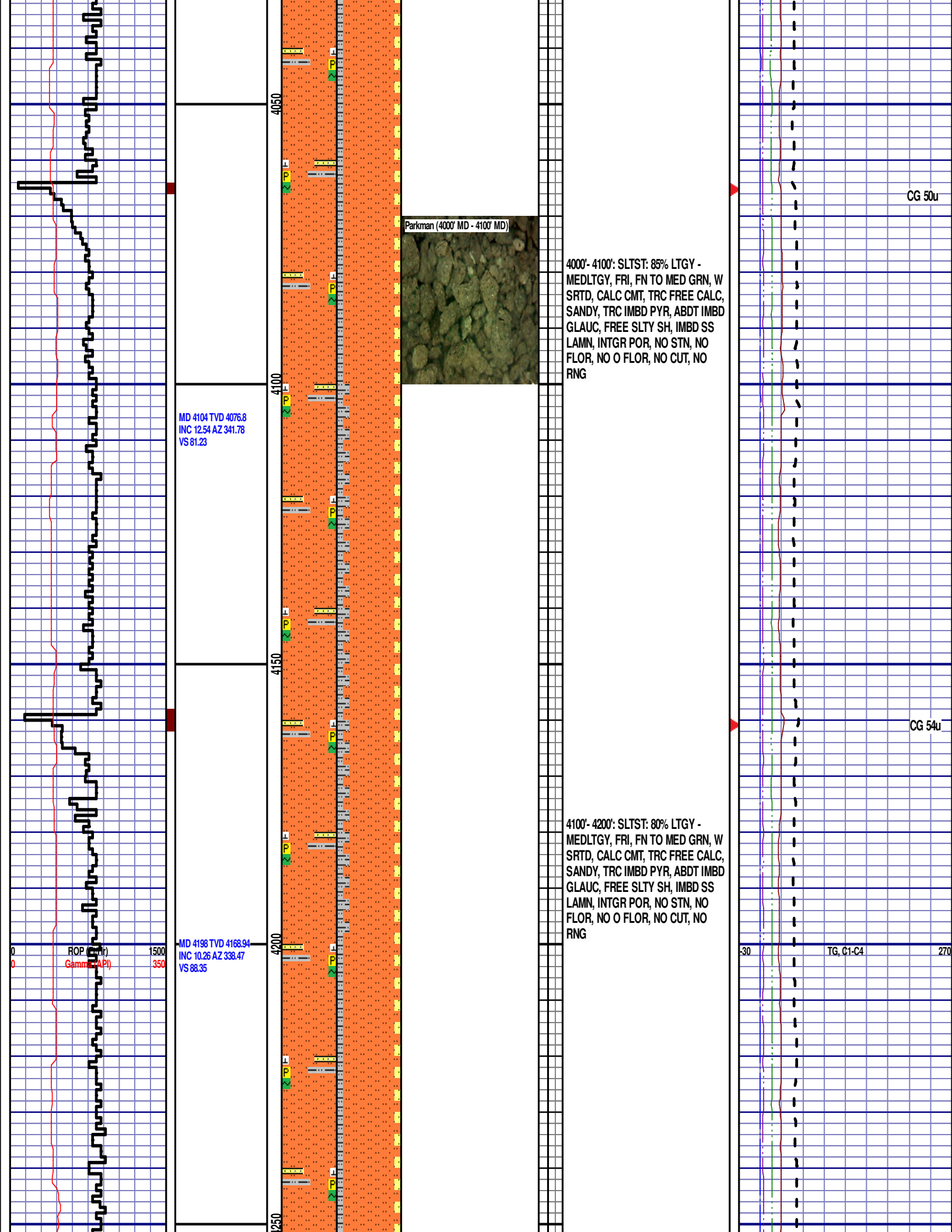
3800'- 3900': SS: 75%: PRED GY -  
LTKGY - OPQ, MOD CONS, FN TO  
MED GRN, SUBANG, W TO MODY  
SRTD, CALC CMT, SILTY, IMBD PYR,  
FREE SLTY SH, INTGR POR, NO  
STN, NO FLOR, NO O FLOR, NO  
CUT, NO RNG

3900'- 4000': SLTST: 80% LTGY -  
MEDLTGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, TRC FREE CALC,  
SANDY, TRC IMBD PYR, IMBD  
GLAUC, FREE SLTY SH, IMBD SS  
LAMN, INTGR POR, NO STN, NO  
FLOR, NO O FLOR, NO CUT, NO  
RNG

CG 48u

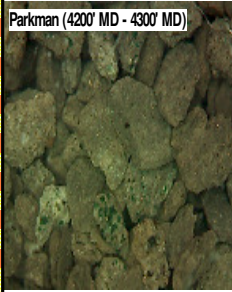
CG 48u

TG, C1-C4



CG 55u

Parkman (4200' MD - 4300' MD)

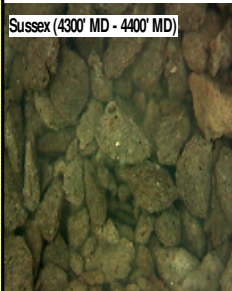


4200'- 4300': SLTST: 85% LTGY -  
MEDLTGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, TRC FREE CALC,  
SANDY, TRC IMBD PYR, ABDT IMBD  
GLAUC, FREE SLTY SH, IMBD SS  
LAMN, INTGR POR, NO STN, NO  
FLOR, NO O FLOR, NO CUT, NO  
RNG

### SUSSEX

4320' MD 4289' TVD

Sussex (4300' MD - 4400' MD)



4300'- 4400': SLTST: 65% LTGY -  
MEDLTGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, TRC FREE CALC,  
SANDY, TRC IMBD PYR, FREE SLTY  
SH, IMBD SS LAMN, INTGR POR,  
NO STN, NO FLOR, NO O FLOR,  
SLOW LZY CUT, DIM YLW RNG

MD 4293 TVD 4262.63  
INC 8.81 AZ 333.34  
VS 95.41

MD 4388 TVD 4356.34  
INC 10.04 AZ 334.44  
VS 102.93

ROP (ft/hr)  
Gamma (API)

1500  
350

CG 67u

MD 4367'  
WT 8.9  
VIS 32.0  
PH 10.0  
FIL 19.6  
CL 1550  
CAL 40.0  
H2O 96.4  
OIL 0.0  
SOL 3.3  
CAKE 2/0  
GELS 2/5/8  
PV 4.0  
YP 4.0

TG, C1-C4

CG 111u

MD 4483 TVD 4449.75  
INC 10.99 AZ 332.32  
VS 111.46

MD 4577 TVD 4542.09  
INC 10.52 AZ 332.25  
VS 120.38

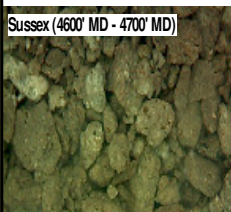
MD 4672 TVD 4635.59  
INC 9.88 AZ 334.87  
VS 128.61

4400'- 4500': SS: 60%: PRED GY -  
LTKGY - OPQ, MOD CONS, FN TO  
MED GRN, SUBANG, W TO MODY  
SRTD, CALC CMT, SILTY, TRC IMBD  
PYR, TRC IMBD GLAUC, INTGR  
POR, NO STN, NO FLOR, NO O  
FLOR, SLOW LZY CUT, DIM YLW  
RNG

4500'- 4600': SLTST: 55% LTGY -  
MEDLTGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, TRC FREE CALC,  
SANDY, TRC IMBD PYR, FREE SLTY  
SH, IMBD SS LAMN, INTGR POR,  
NO STN, NO FLOR, NO O FLOR,  
SLOW LZY CUT, DIM YLW RNG

4600'- 4700': SLTST: 75% LTGY -  
MEDLTGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, TRC FREE CALC,  
SANDY, TRC IMBD PYR, FREE SLTY  
SH, IMBD SS LAMN, INTGR POR,  
NO STN, NO FLOR, NO O FLOR,  
SLOW LZY CUT, DIM YLW RNG

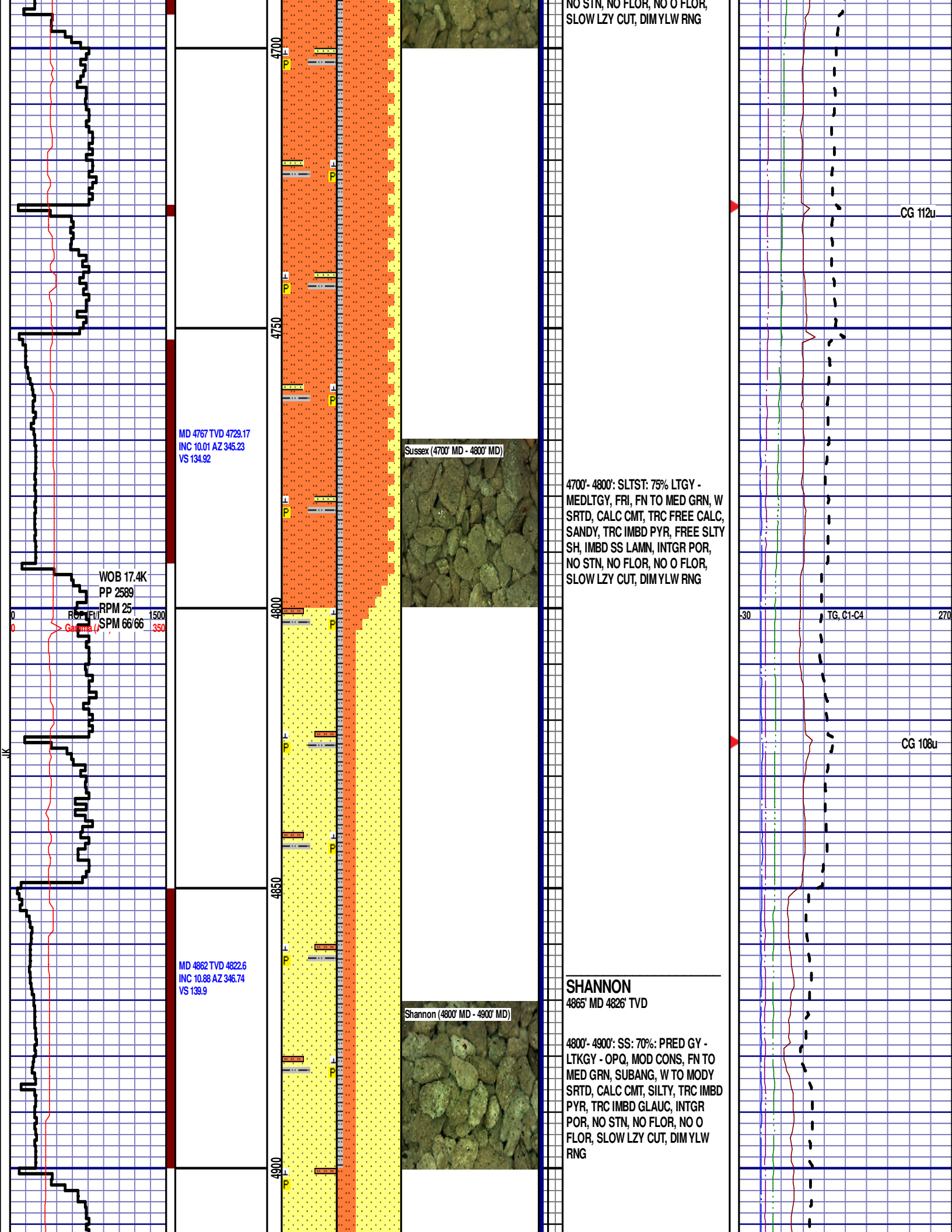
Sussex (4600' MD - 4700' MD)

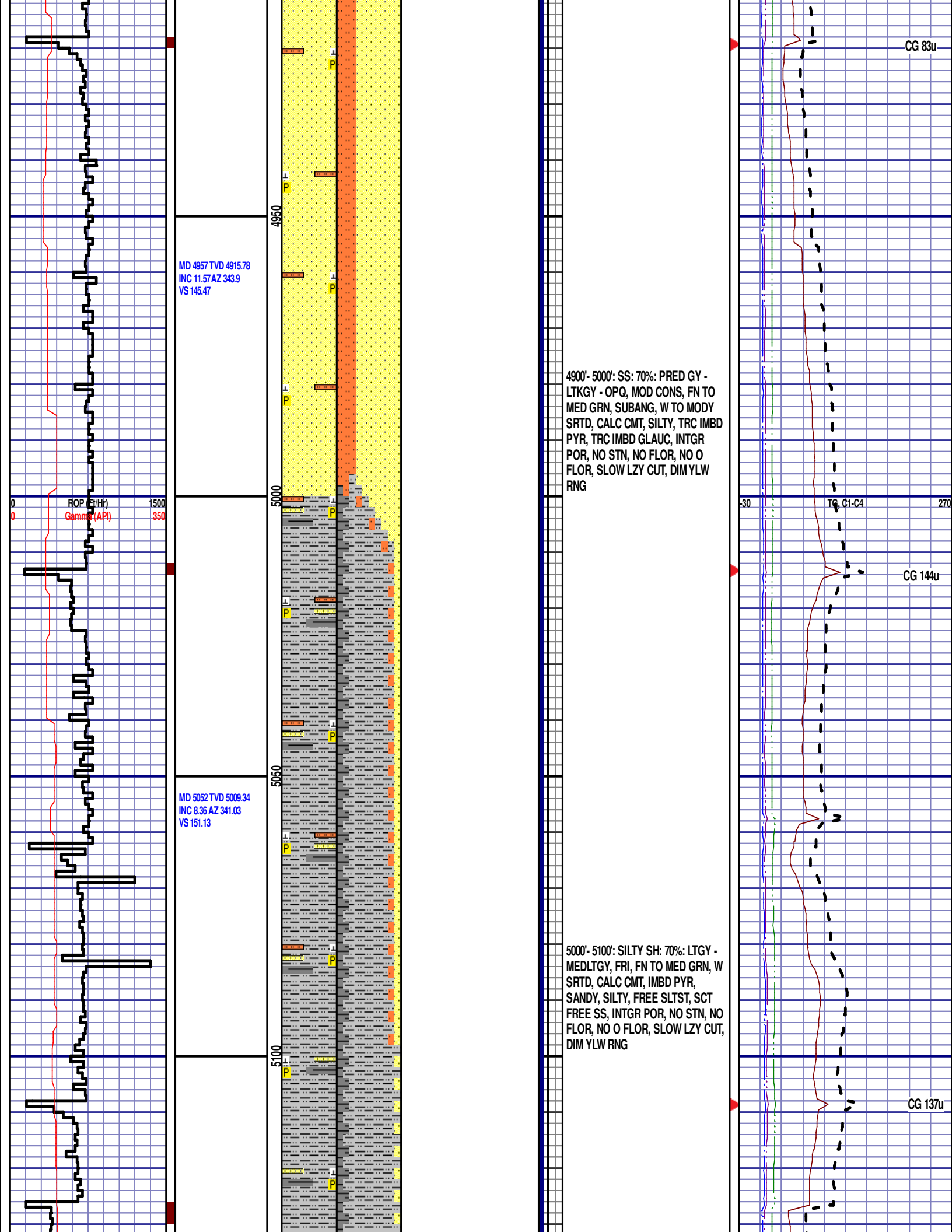


CG 152u

CG 150u

-30 TG, C1-C4 270





MD 5146 TVD 5102.61  
INC 5.82 AZ 339.89  
VS 155.52

ROF (Ft/Hr)  
Gamma (API)

MD 5241 TVD 5197.09  
INC 6.21 AZ 343.03  
VS 159.14

MD 5336 TVD 5291.43  
INC 7.27 AZ 348.67  
VS 162.35

Shannon (5100' MD - 5200' MD)

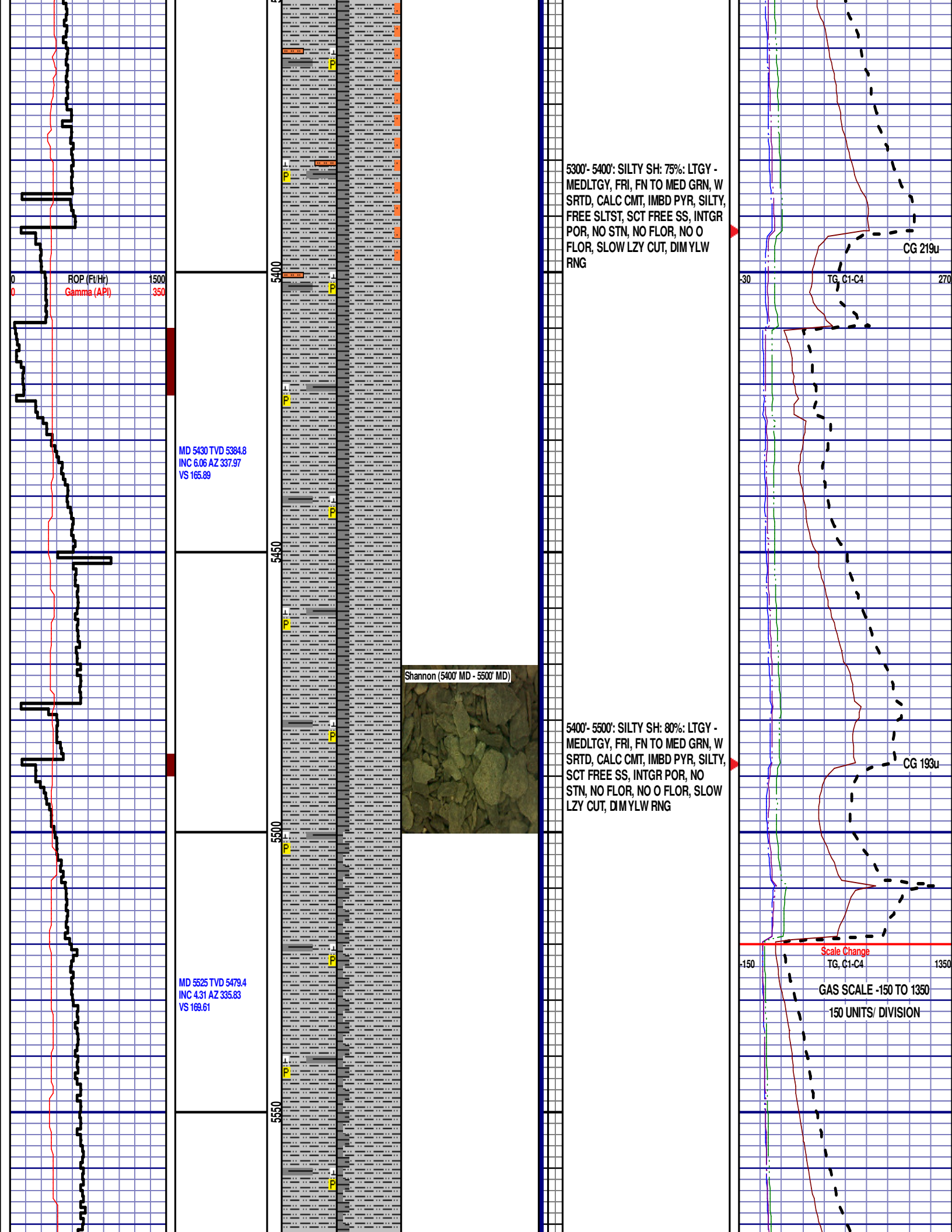


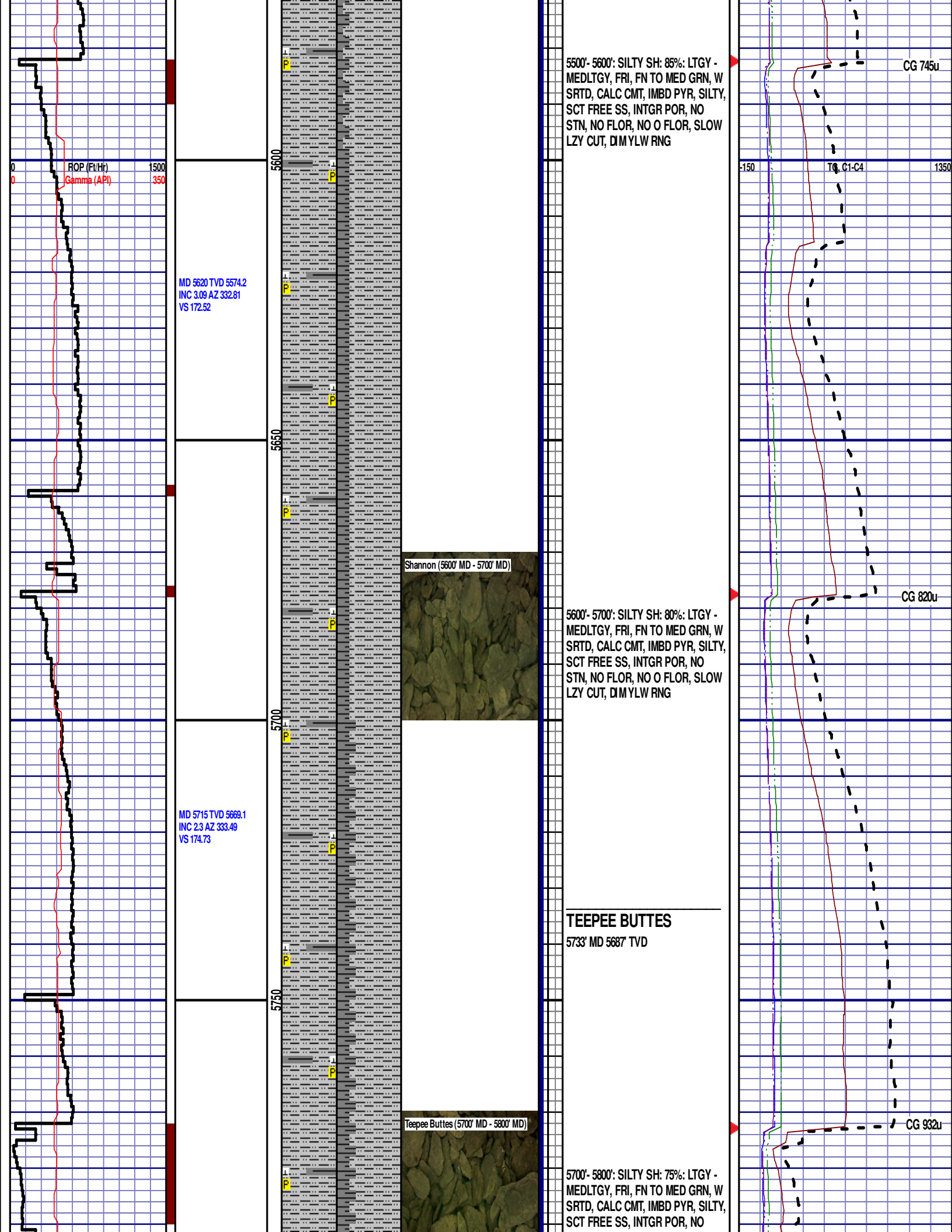
5100'- 5200': SILTY SH: 80%: LTGY -  
MEDLTGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, IMBD PYR,  
SANDY, SILTY, FREE SLTST, SCT  
FREE SS, INTGR POR, NO STN, NO  
FLOR, NO O FLOR, SLOW LZ CUT,  
DIM YLW RNG

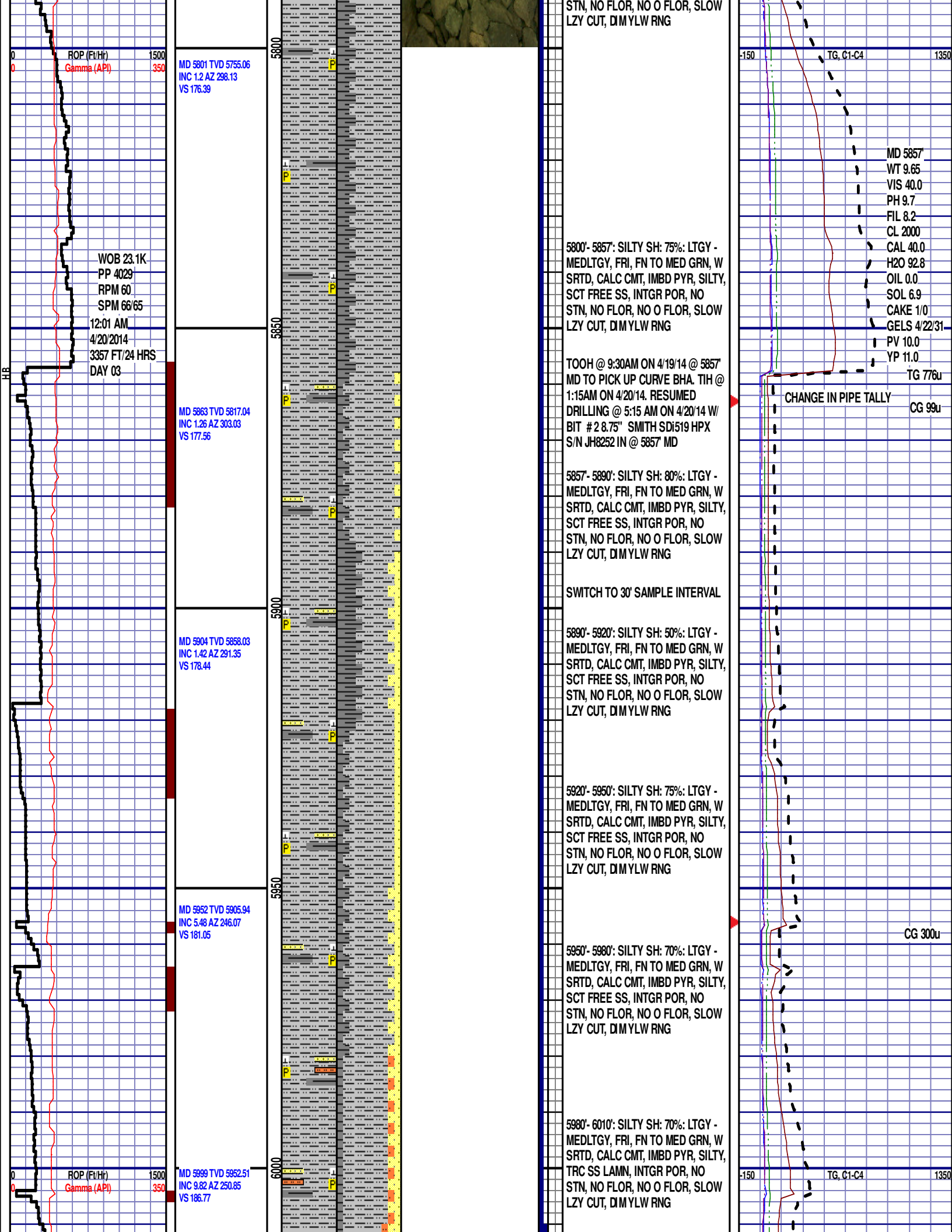
5200'- 5300': SILTY SH: 70%: LTGY -  
MEDLTGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, IMBD PYR, TRC  
SANDY, SILTY, FREE SLTST, SCT  
FREE SS, INTGR POR, NO STN, NO  
FLOR, NO O FLOR, SLOW LZ CUT,  
DIM YLW RNG

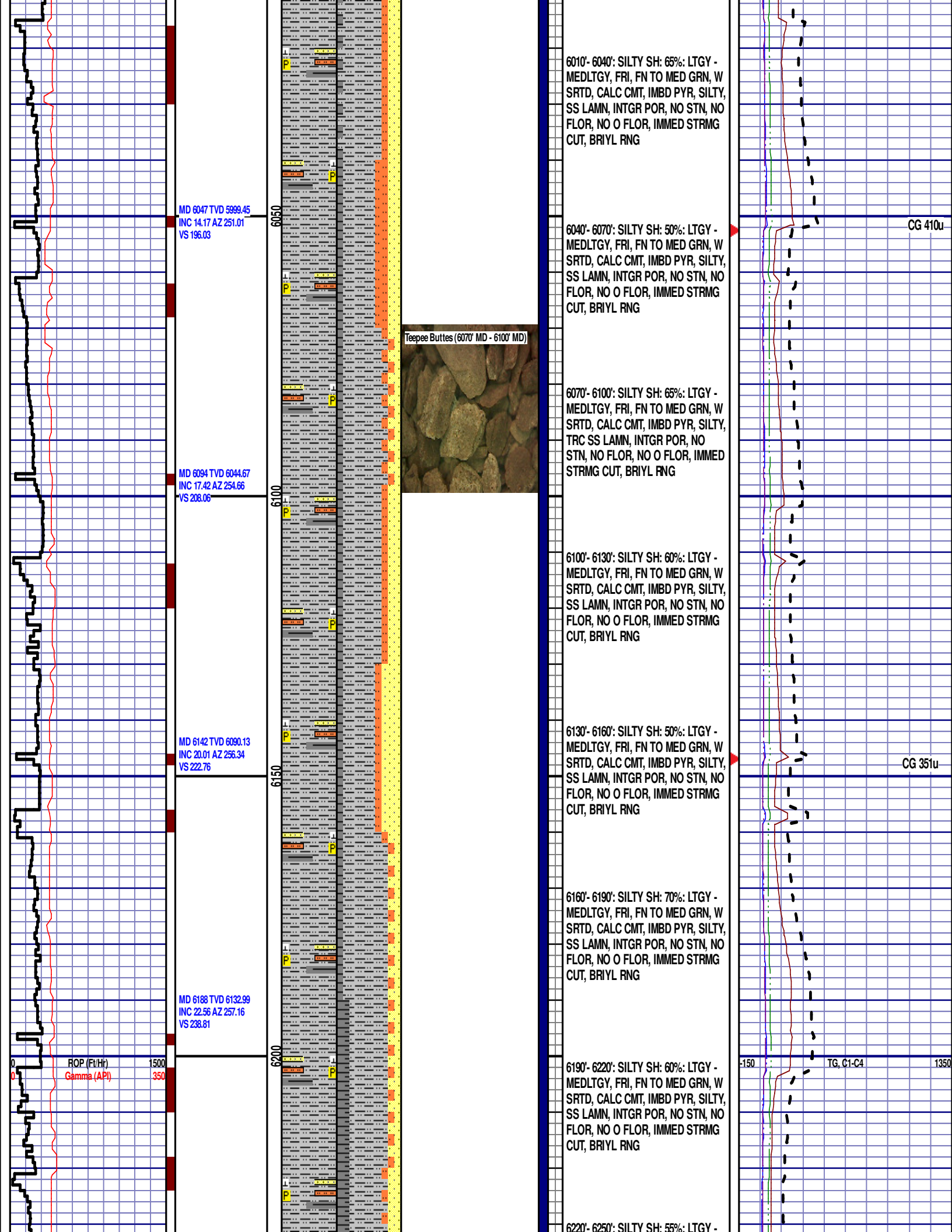
TG, C1-C4  
CG 128u

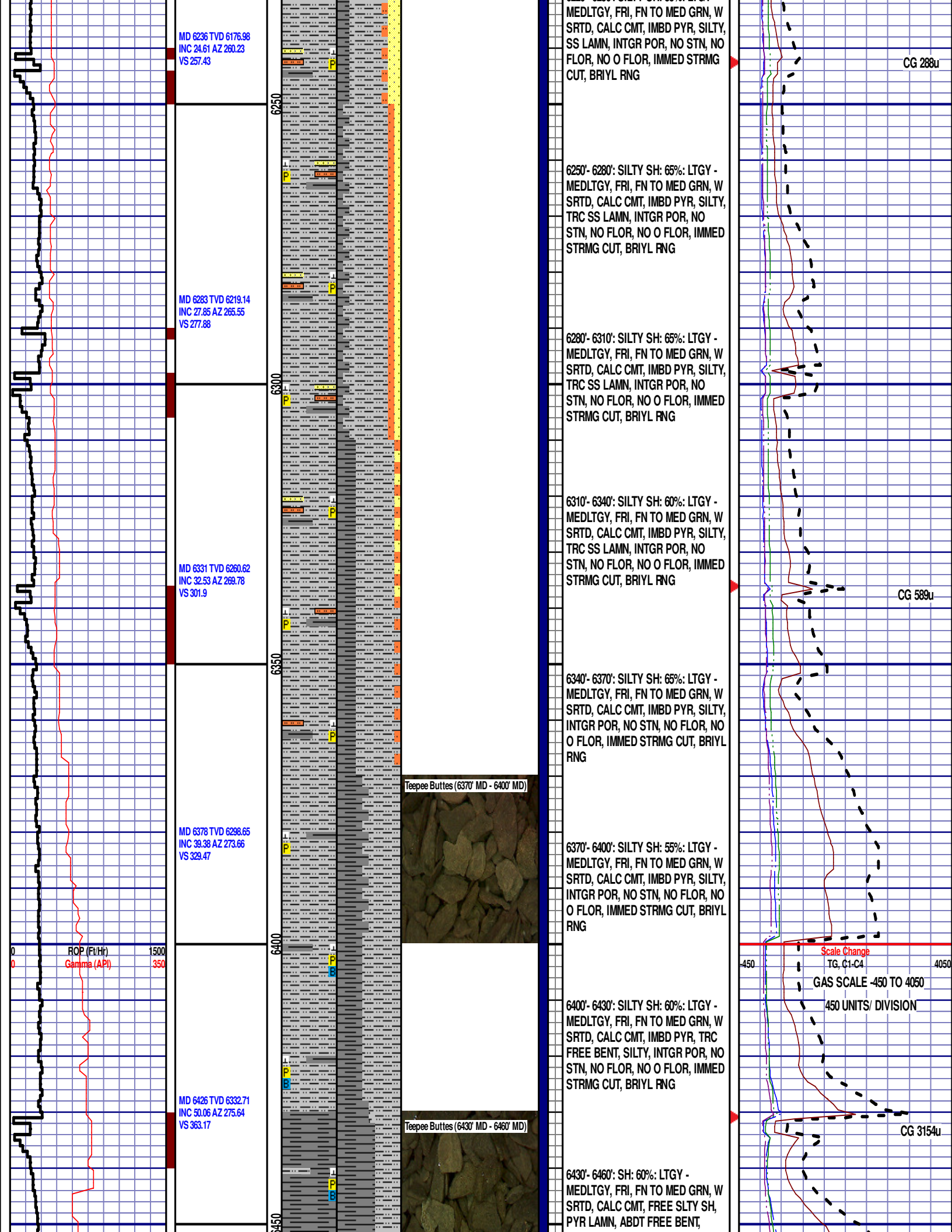
CG 122u

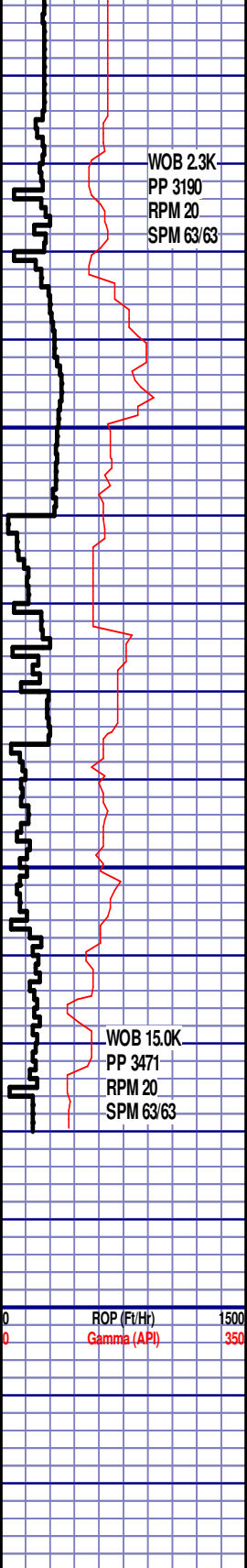












WOB 2.3K  
PP 3190  
RPM 20  
SPM 63/63

MD 6473 TVD 6360.6  
INC 57.09 AZ 277.34  
VS 400.88

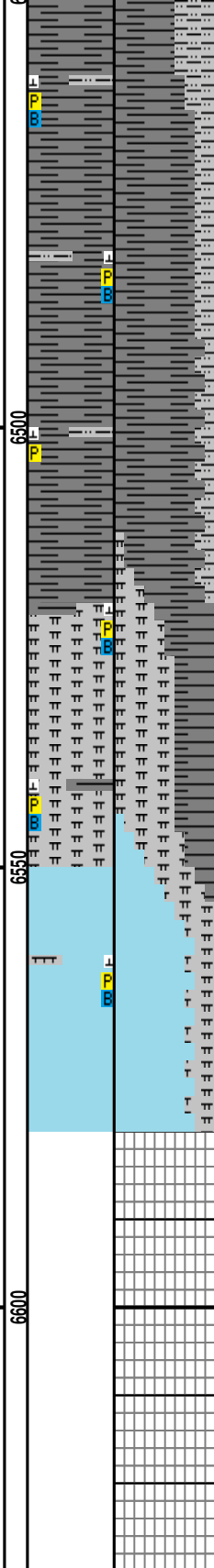
MD 6521 TVD 6385.87  
INC 59.37 AZ 276.75  
VS 441.58

WOB 15.0K  
PP 3471  
RPM 20  
SPM 63/63

MD 6568 TVD 6409.06  
INC 61.51 AZ 273.06  
VS 482.42

ROP (Ft/Hr)  
Gamma (API)

1500  
350



6500

6550

6600



Sharon Springs (6480' MD - 6490' MD)

Sharon Springs (6520' MD - 6550' MD)

Niobrara A Chalk (6550' MD - 6580' MD)

INTGR POR, NO STN, 10% FLOR,  
NO O FLOR, IMMED STRMG CUT,  
BRIYL RNG

### SHARON SPRINGS

6483' MD 6366' TVD

6460' - 6490': SH: 80%: LTGY -  
MEDLTGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, FREE SLTY SH,  
PYR LAMN, ABDT FREE BENT,  
INTGR POR, NO STN, 10% FLOR,  
NO O FLOR, IMMED STRMG CUT,  
BRIYL RNG

6490' - 6520': SH: 85%: LTGY -  
MEDLTGY, FRI, FN TO MED GRN, W  
SRTD, CALC CMT, FREE SLTY SH,  
PYR LAMN, ABDT FREE BENT,  
INTGR POR, NO STN, 10% FLOR,  
NO O FLOR, IMMED STRMG CUT,  
BRIYL RNG

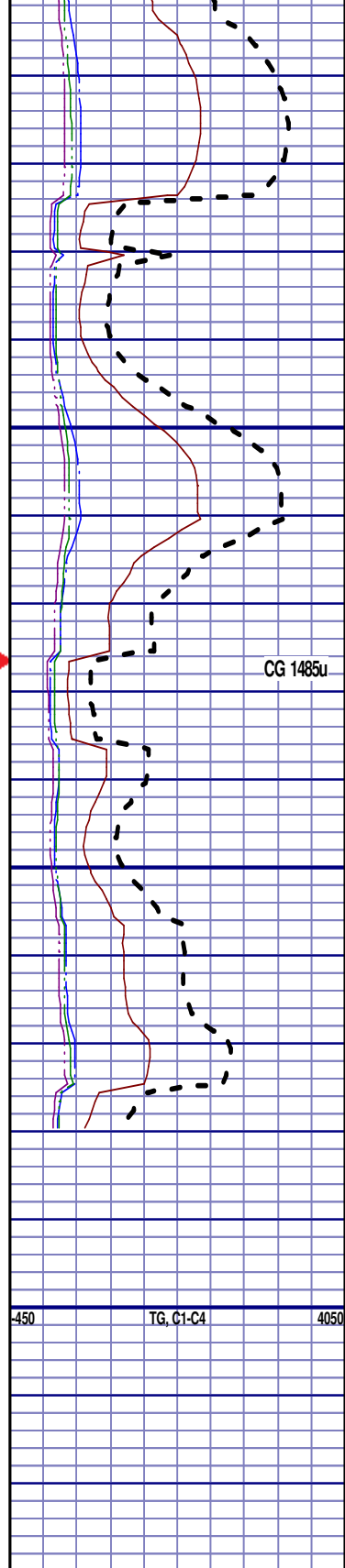
6520' - 6550': MRST: 60% MEDDRKGY -  
MEDLTGY, BLKY TO SUBBLKY,  
GRTY TO SLTY TXT, FRM TO BRIT,  
IMBD PYR, FREE BENT, IMBD  
CALC, 40% FREE SH, NO STN, 5%  
FLOR, NO O FLOR, IMMED STRMG  
CUT, BRIYL RNG

### NIOBRARA A CHALK

6550' MD 6400' TVD

6550' - 6580': CHK: 75% MEDDRKGY -  
MEDLTGY, BLKY TO SUBBLKY,  
GRTY TO SLTY TXT, FRM TO BRIT,  
TRC FREE BENT, IMBD CALC, IMBD  
PYR, 25% FREE MRL, NO STN, TRC  
FLOR, NO O FLOR, IMMED STRMG  
CUT, BRIYL RNG

END OF VERTICAL LOG @ 6580' MD  
ON 4/20/14. CONTINUED ON  
HORIZONTAL LOG.



CG 1485u

450 TG, C1-C4 4050