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Customer Information

Operator: Noble Energy Inc.
1625 Broadway
Suite 2200
Denver, Colorado 80202

Geologist: Holly Duncan
Noble Energy Inc.

Mud Logging Details

Logger: Sam Stelzer &
Zack St.Clair

Log Interval: 2500' MD to 6750' MD

Start Date: November 29, 2014

Release Date: December 08, 2014

Well Information

Well Name: Wells Ranch AE19-685

Location: 20-T6N-R62W
538' FNL, 65' FWL

County: Weld
State: Colorado

Drilling Rig: H&P 321

Total Depth: 17060' MD

TD Date: December 08, 2014

Formation: Niobrara B Chalk

KB Elevation: 4871'

GR Elevation: 4841'

API Number: 05-123-39894

ROCK TYPES

Siltysh
Anhy
Bent
Brec
Cht
Clyst
Coal

Congl
Dol
Gyp
Igne
Lmst
Meta
Chk

Mrlst
Salt
Shale
Shcol
Shgy
Sltst
Ss

Till
gw
lmywash
ogw
olmywash
oshly gw
shly gw

sdylgw
hvyrcrbsh
nosmpl
Lsdetrst
sltst
sdy sh

Logger On Shift		ROP (Ft/Hr) Gamma (API)	Drill Depth v. Time	Survey Data	Depth	Lithology	Lithology Percentages	Sample Photographs	Porosity	Geological Description	TG (1-8) C1 (units) C2 (units) C3 (units) C4 (units)	Total Gas, C1-C4
		ROP (Ft/Hr) Gamma (API)	1500 250		24							
		SLIDE=RED ROTATE=WHITE								NOBLE ENERGY INC. WELLS RANCH AE19-685 20-T6N-R62W 538' FNL, 65' FWL WELD COUNTY, CO		
		ROP SCALE: 0 TO 1500 (FT/HR)								H&P 321 LOGGERS: SAM STELZER ZACK ST.CLAIR		
		GAMMA SCALE: 0 TO 250 (GAMMA DATA AS RECEIVED)								CALLED OUT BY COMPANY MAN @ 11:00 AM ON 11/29/14. COMMENCED LOGGING @ 5:10 AM @ 2500' MD ON		
		12:01 AM										

11/30/14
128 FT/24 HRS
DAY 02

WOB 6.1K
PP 3475
RPM 80
SPM 78/78

MD 2585 TVD 2584.75
INC 1.51 AZ 296.71
VS 12.52

ROP (Ft/hr)
Gamma (API)

1500
250

MD 2680 TVD 2679.71
INC 1.89 AZ 291.5
VS 15.1

2500
2550
2600
2650
2700



PIERRE

BEFORE LOGGING DEPTH

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

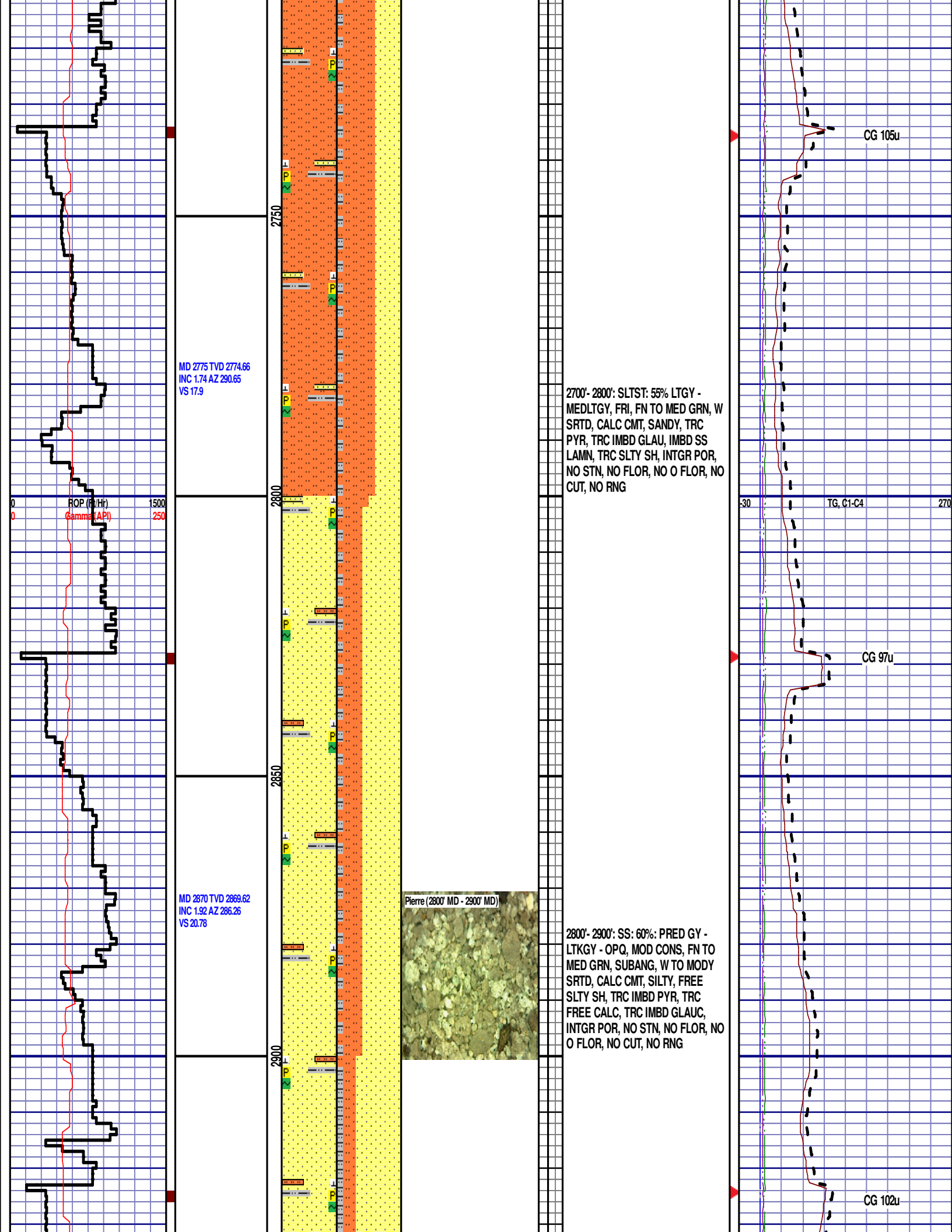
2600'- 2700': SLTST: 65% LTGY -
MEDLTGY, FRI, FN TO MED GRN, W
SRTD, CALC CMT, SANDY, TRC
PYR, TRC IMBD GLAU, IMBD SS
LAMN, TRC SLTY SH, INTGR POR,
NO STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

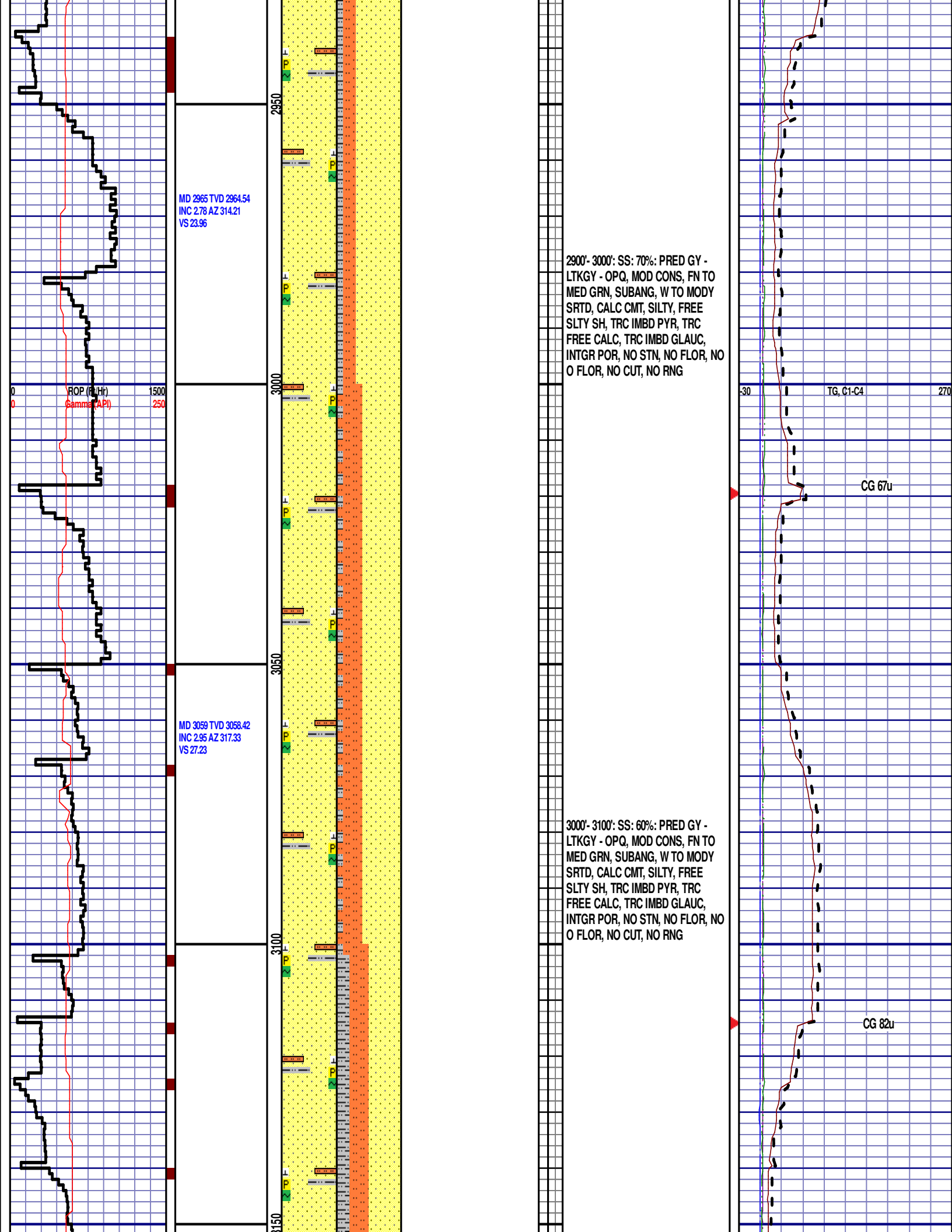
MD 1902'
WT 8.80
VIS 34.0
PH 10.3
FIL 8.1
CL 1400
CAL 60.0
H2O 96.7
OIL 0.0
SOL 1.8
LGS 23.06
GELS 2/4/5
PV 5.0
YP 5.0
SOLS 3.0
CAKE 2/0

CG 104u

TG, C1-C4

CG 87u





MD 3154 TVD 3153.21
INC 4.55 AZ 311.96
VS 31.68

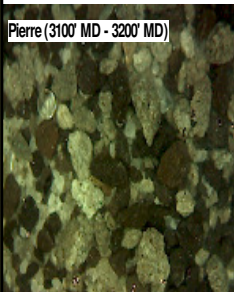
ROP (Ft/H)
Gamma (API)

1500
250

MD 3249 TVD 3247.8
INC 6.15 AZ 305.46
VS 38.62

MD 3344 TVD 3342.1
INC 7.73 AZ 304.2
VS 48.04

Pierre (3100' MD - 3200' MD)



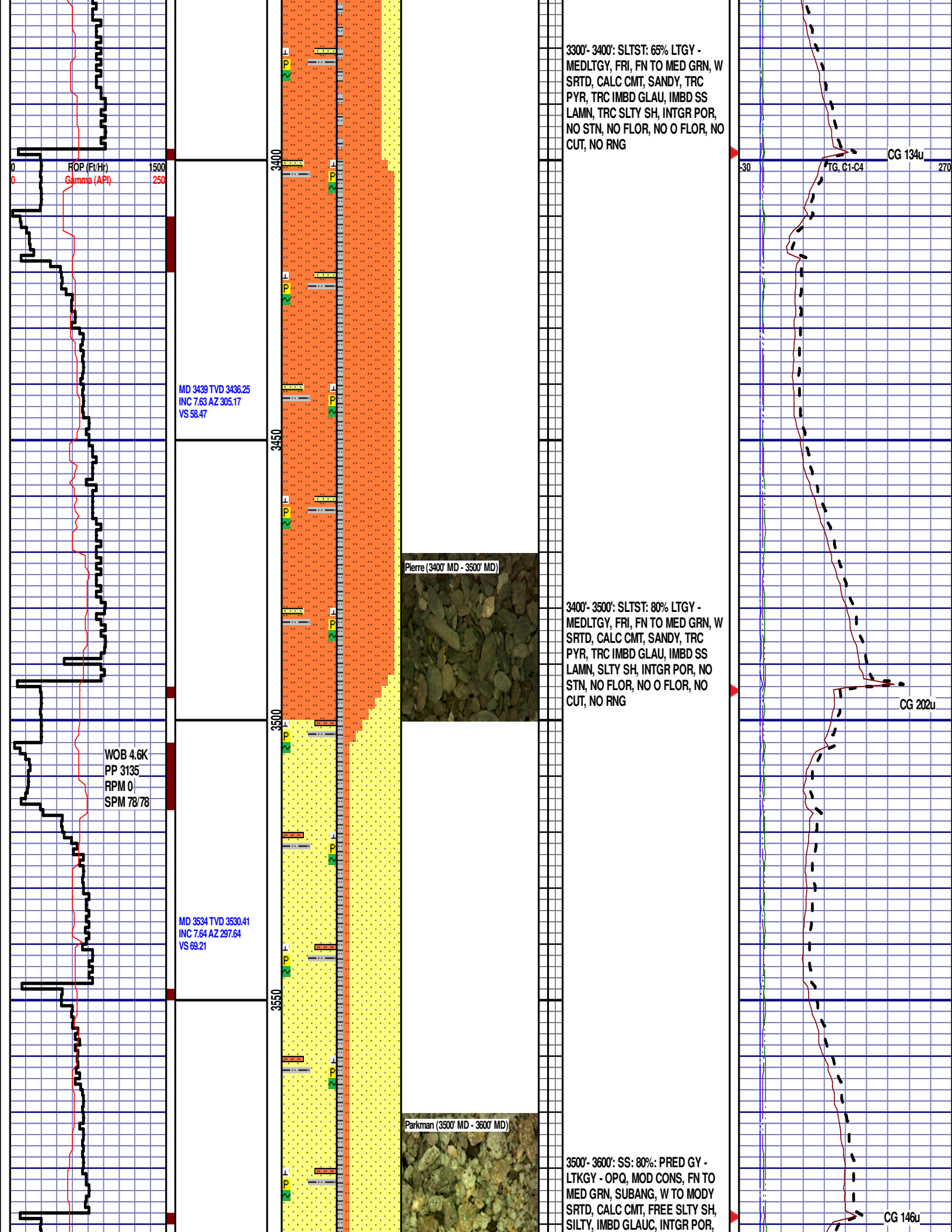
3100'- 3200': SS: 50%: PRED GY -
LTKGY - OPQ, MOD CONS, FN TO
MED GRN, SUBANG, W TO MODY
SRTD, CALC CMT, SILTY, FREE
SLTY SH, TRC IMBD PYR, TRC
FREE CALC, TRC IMBD GLAUC,
INTGR POR, NO STN, NO FLOR, NO
O FLOR, NO CUT, NO RNG

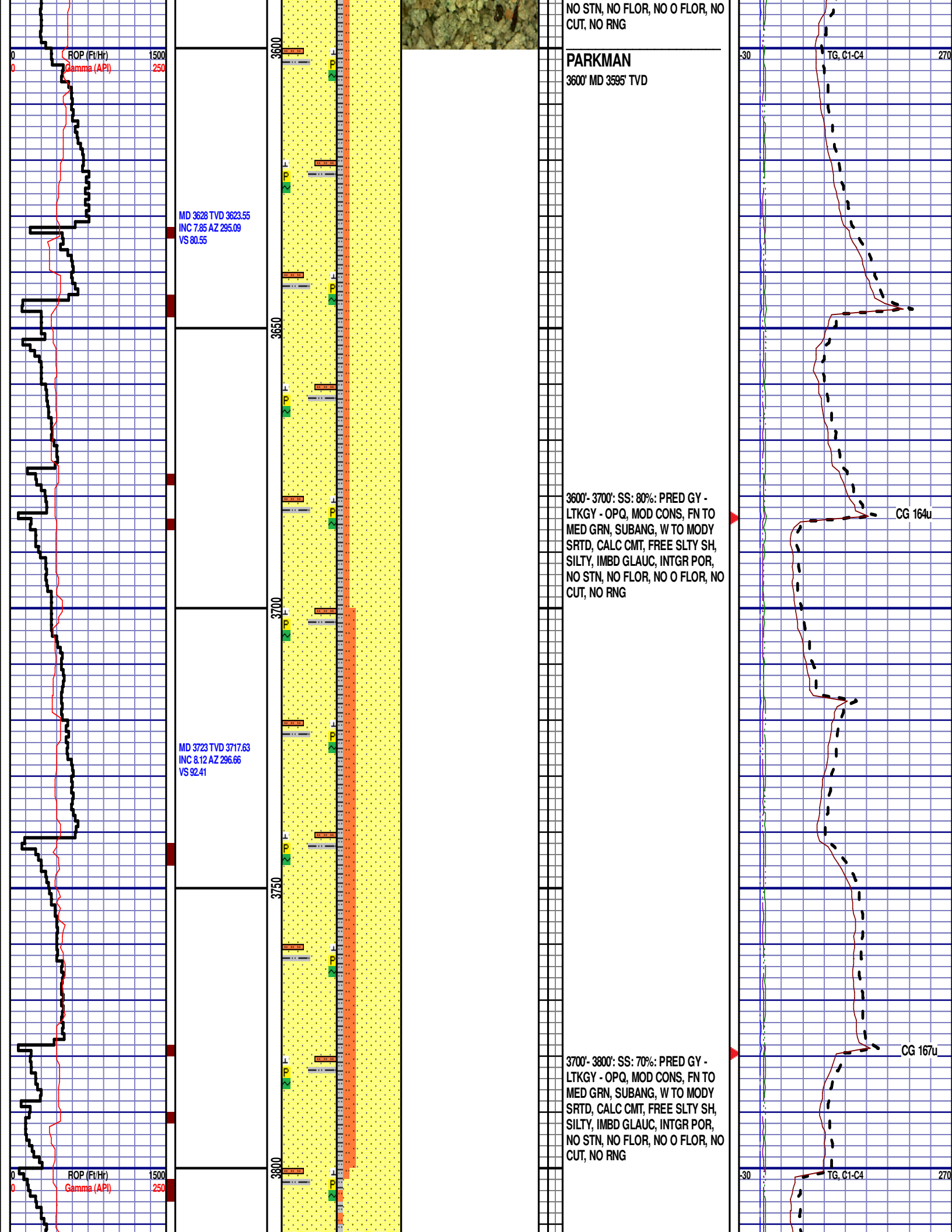
3200'- 3300': SLTST: 50% LTGY -
MEDLTGY, FRI, FN TO MED GRN, W
SRTD, CALC CMT, SANDY, TRC
PYR, TRC IMBD GLAU, IMBD SS
LAMN, SLTY SH, INTGR POR, NO
STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

30 TG, C1-C4 270

CG 111u

CG 104u





MD 3818 TVD 3811.63
INC 8.53 AZ 297.98
VS 104.62

MD 3912 TVD 3904.68
INC 7.73 AZ 297.78
VS 116.36

MD 4007 TVD 3998.83
INC 7.62 AZ 295.74
VS 127.68

Parkman (3800' MD - 3900' MD)

3800'- 3900': SS: 90%: PRED GY -
LTKGY - OPQ, MOD CONS, FN TO
MED GRN, SUBANG, W TO MODY
SRTD, CALC CMT, FREE SLTY SH,
SILTY, IMBD GLAUC, INTGR POR,
NO STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

3900'- 4000': SS: 60%: PRED GY -
LTKGY - OPQ, MOD CONS, FN TO
MED GRN, SUBANG, W TO MODY
SRTD, CALC CMT, FREE SLTY SH,
SILTY, IMBD GLAUC, INTGR POR,
NO STN, NO FLOR, NO O FLOR,
SLOW LZV CUT, DIM YLW RNG

CG 184u

CG 223u

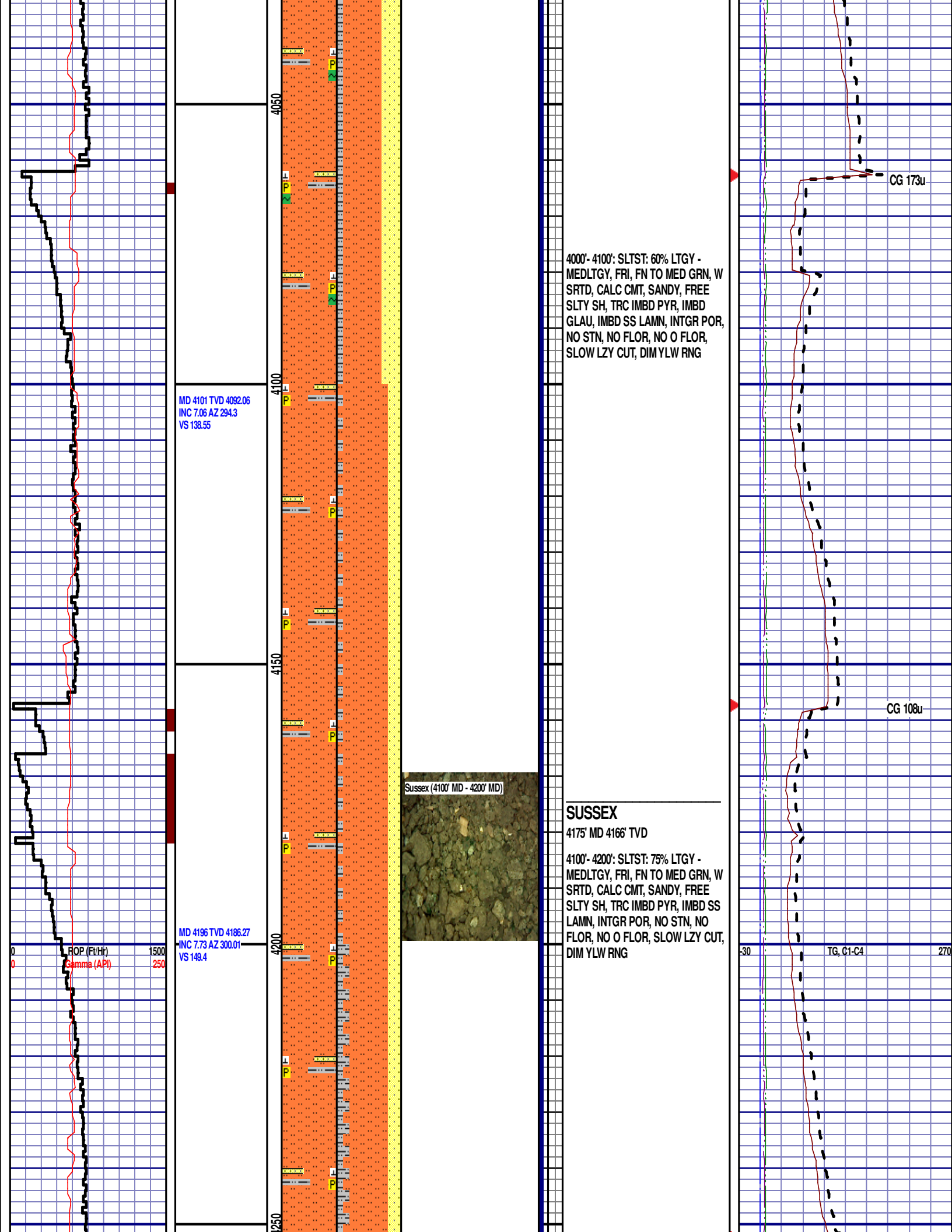
ROP (Ft/Hr)
Gamma (API)

1500
250

-30

TG, C1-C4

270



MD 4101 TVD 4092.06
INC 7.06 AZ 294.3
VS 138.55

MD 4196 TVD 4186.27
INC 7.73 AZ 300.01
VS 149.4

4000'- 4100': SLTST: 60% LTGY -
MEDLTGY, FRI, FN TO MED GRN, W
SRTD, CALC CMT, SANDY, FREE
SLTY SH, TRC IMBD PYR, IMBD
GLAU, IMBD SS LAMN, INTGR POR,
NO STN, NO FLOR, NO O FLOR,
SLOW LZY CUT, DIM YLW RNG

Sussex (4100' MD - 4200' MD)

SUSSEX

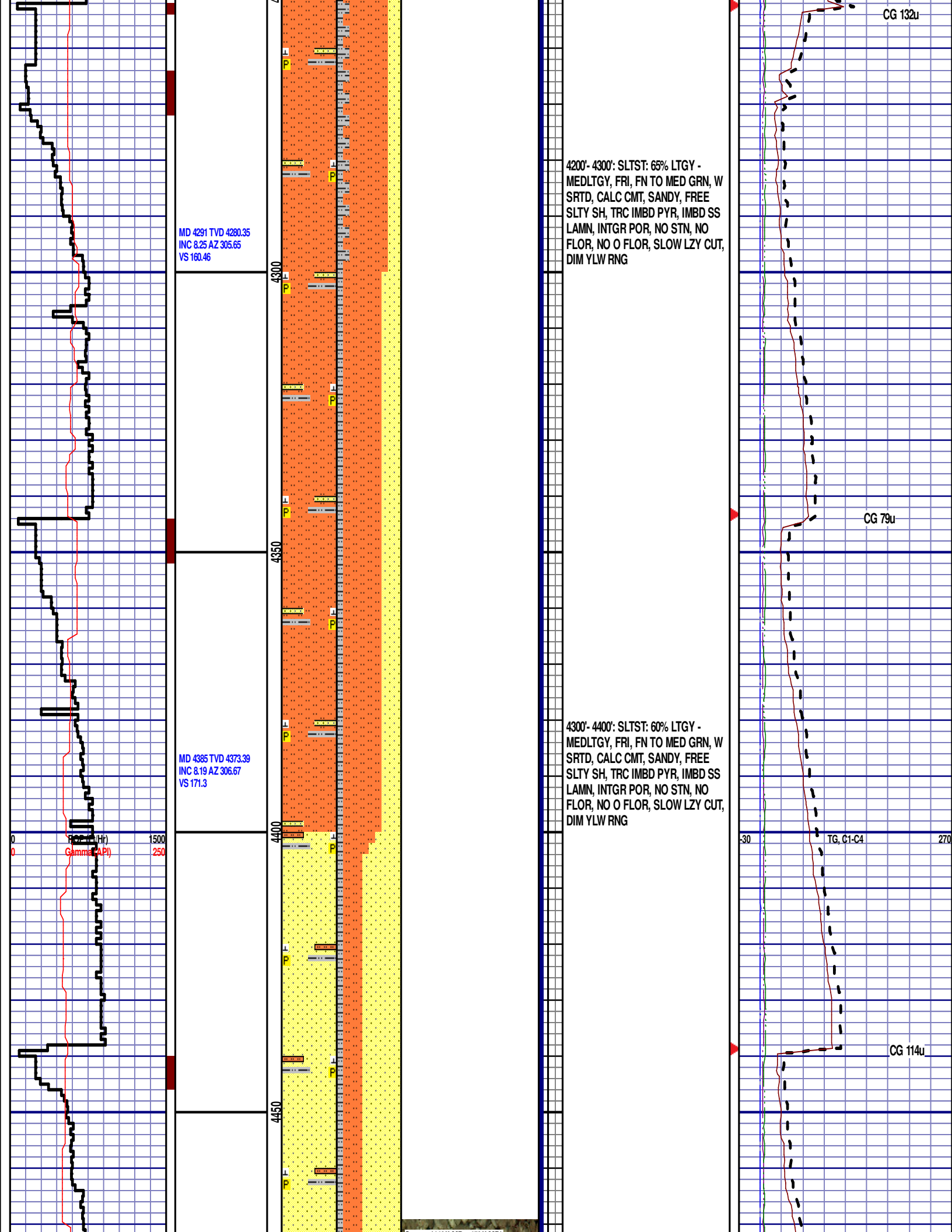
4175' MD 4166' TVD

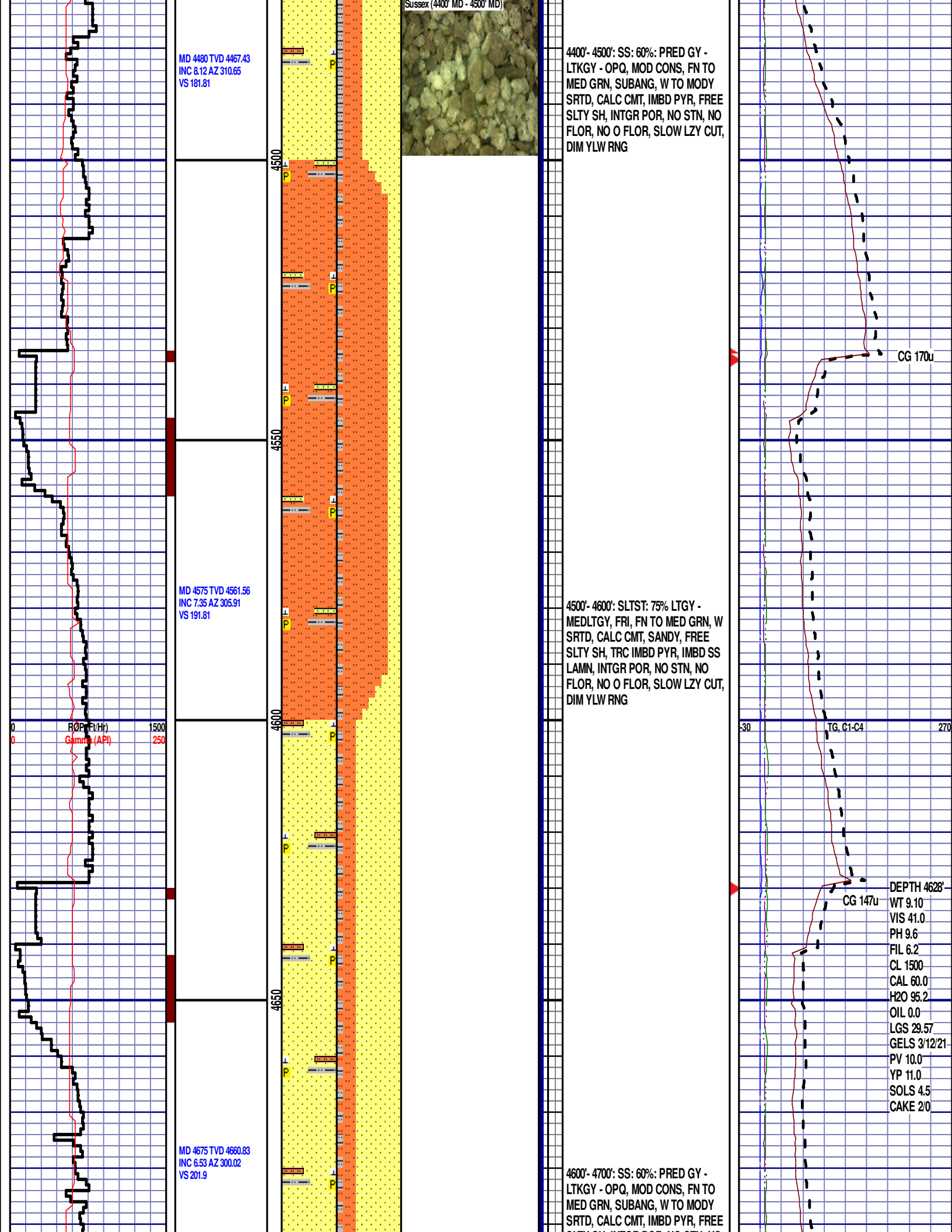
4100'- 4200': SLTST: 75% LTGY -
MEDLTGY, FRI, FN TO MED GRN, W
SRTD, CALC CMT, SANDY, FREE
SLTY SH, TRC IMBD PYR, IMBD SS
LAMN, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW LZY CUT,
DIM YLW RNG

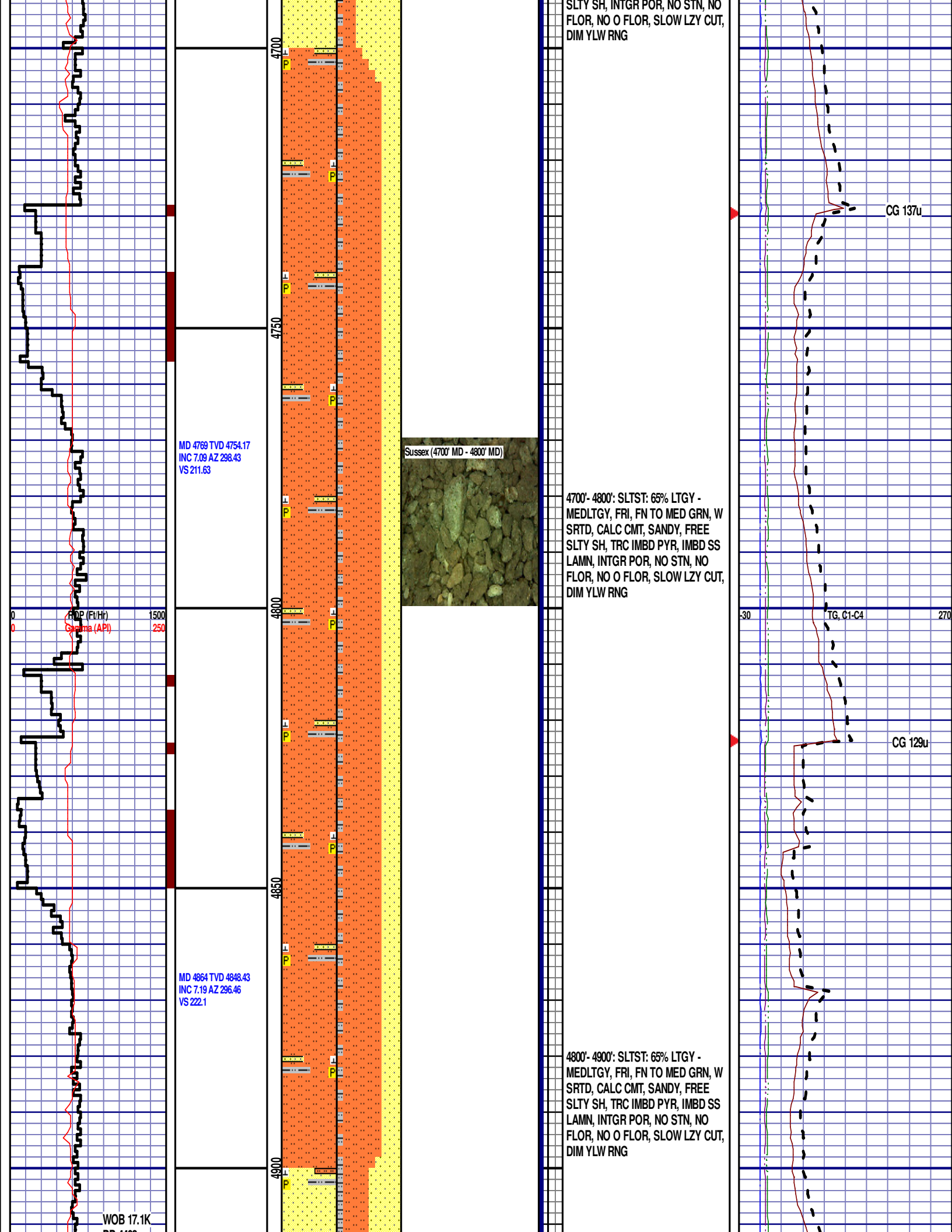
CG 173u

CG 108u

TG, C1-C4



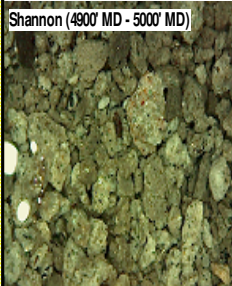




PP 4402
RPM 80
SPM 76/76

MD 4959 TVD 4942.57
INC 8.19 AZ 298.79
VS 233.34

Shannon (4900' MD - 5000' MD)

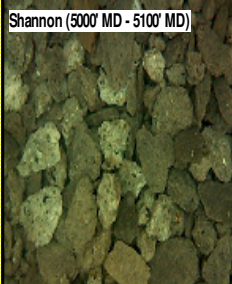


SHANNON

4972' MD 4954' TVD

4900' - 5000': SS: 50%: PRED GY -
LTKGY - OPQ, MOD CONS, FN TO
MED GRN, SUBANG, W TO MODY
SRTD, CALC CMT, IMBD PYR, IMBD
SLTST, FREE SLTY SH, INTGR POR,
NO STN, NO FLOR, NO O FLOR,
SLOW LZY CUT, DIM YLW RNG

Shannon (5000' MD - 5100' MD)



5000' - 5100': SILTY SH: 40%: LTGY -
MEDLTGY, FRI, FN TO MED GRN, W
SRTD, CALC CMT, TRC FREE CALC,
IMBD PYR, FREE SLTST, FREE SS,
SILTY, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW LZY CUT,
DIM YLW RNG

CG 105u

CG 146u

CG 161u

