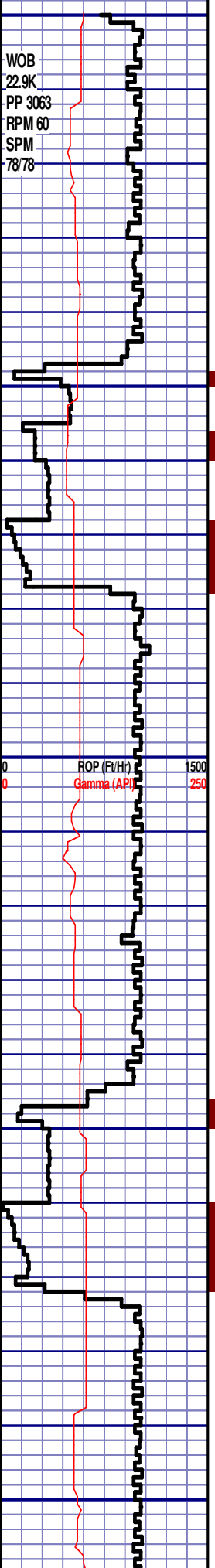


2500' MD @ 2100' IN @ 2500' MD ON
12/13/14 W/BIT # 2 8.75" SMITH
SDi519HPX S/N JJ353 IN @ 1250' MD

WOB
22.9K
PP 3063
RPM 60
SPM
78/78

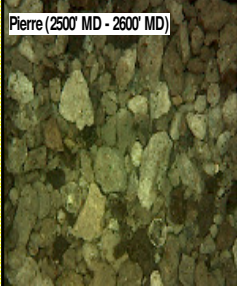


MD 2590 TVD 2589.72
INC 1.55 AZ 351.19
VS -1.57

MD 2681 TVD 2680.65
INC 2.92 AZ 348.71
VS -0.83

PIERRE

BEFORE LOGGING DEPTH



2500'- 2600': SLTST: 60% 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

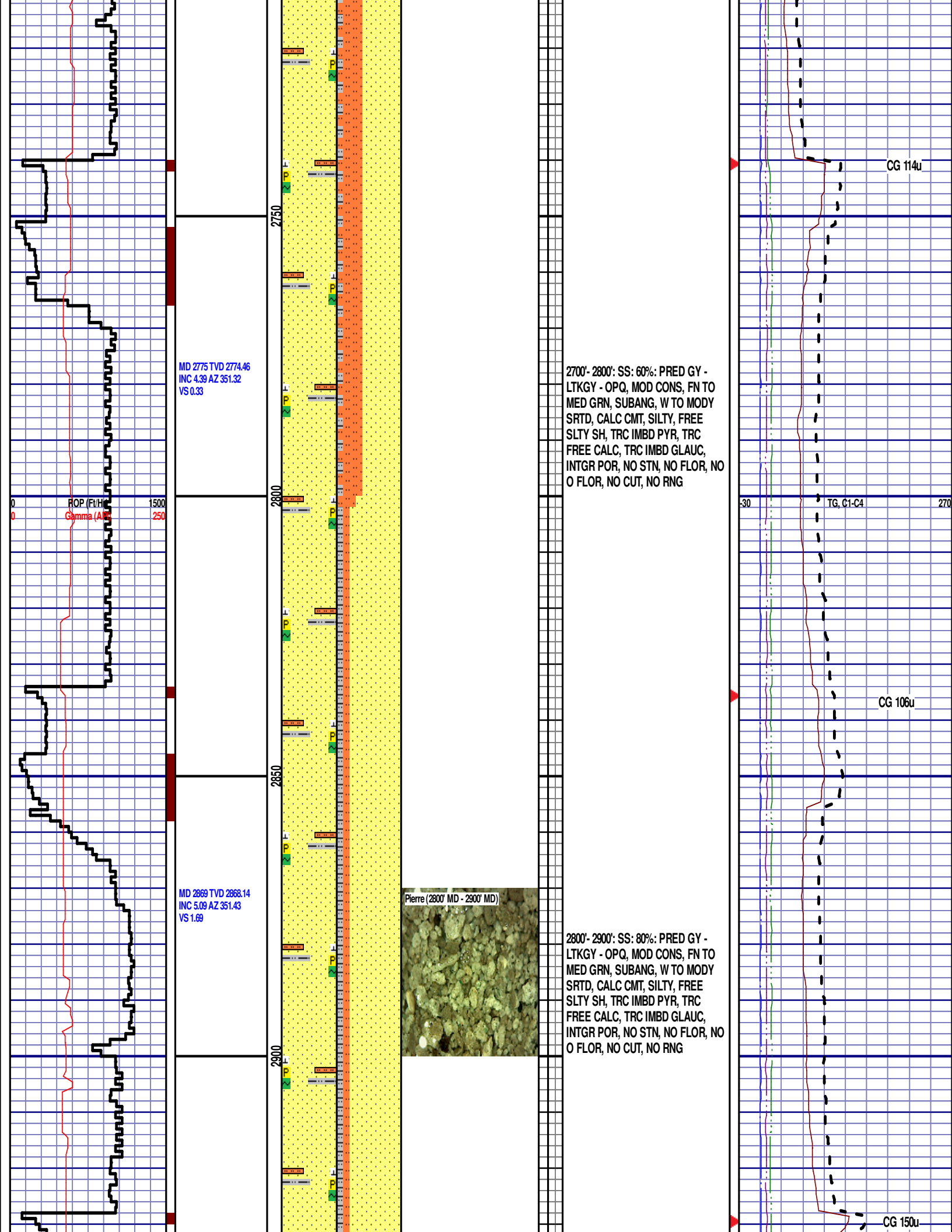
2600'- 2700': SLTST: 65% LTGY -
MEDLTGY, FRI, FN TO MED GRN, W
SRTD, CALC CMT, SANDY, TRC
PYR, TRC IMBD GLAU, IMBD SS
LAMN, TRC SLTY SH, INTGR POR,
NO STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

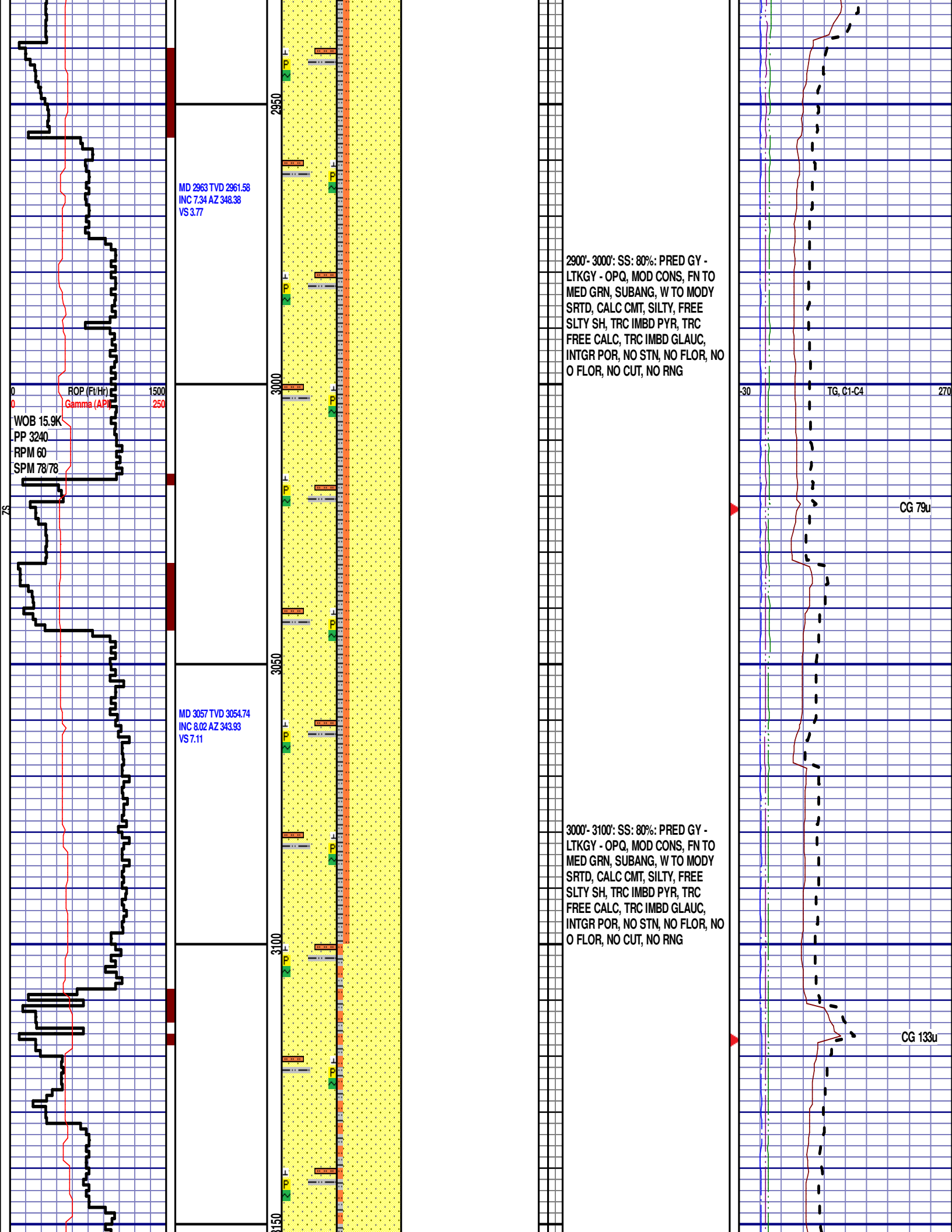
DEPTH 2370'
WT 8.60
VIS 35.0
PH 11.9
FIL 18.0
CL 1200
CAL 40.0
H2O 98.2
OIL 0.0
LGS 9.25
GELS 2/3/4
PV 4.0
YP 5.0
SOLS 1.5 CAKE
1/0

CG 92u

TG, C1-C4

CG 90u





MD 2963 TVD 2961.58
INC 7.34 AZ 348.38
VS 3.77

MD 3057 TVD 3054.74
INC 8.02 AZ 343.93
VS 7.11

ROP (Fe/Hr) 1500
Gamma (API) 250

WOB 15.9K
PP 3240
RPM 60
SPM 78/78

2900'- 3000': SS: 80%: 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

3000'- 3100': SS: 80%: 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

30 TG, C1-C4 270

CG 79u

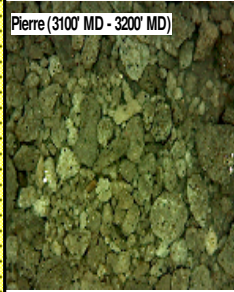
CG 133u

MD 3152 TVD 3148.86
INC 7.54 AZ 345.1
VS 10.86

MD 3247 TVD 3242.96
INC 8.23 AZ 344.23
VS 14.63

MD 3342 TVD 3336.89
INC 8.98 AZ 343.28
VS 18.95

Pierre (3100' MD - 3200' MD)

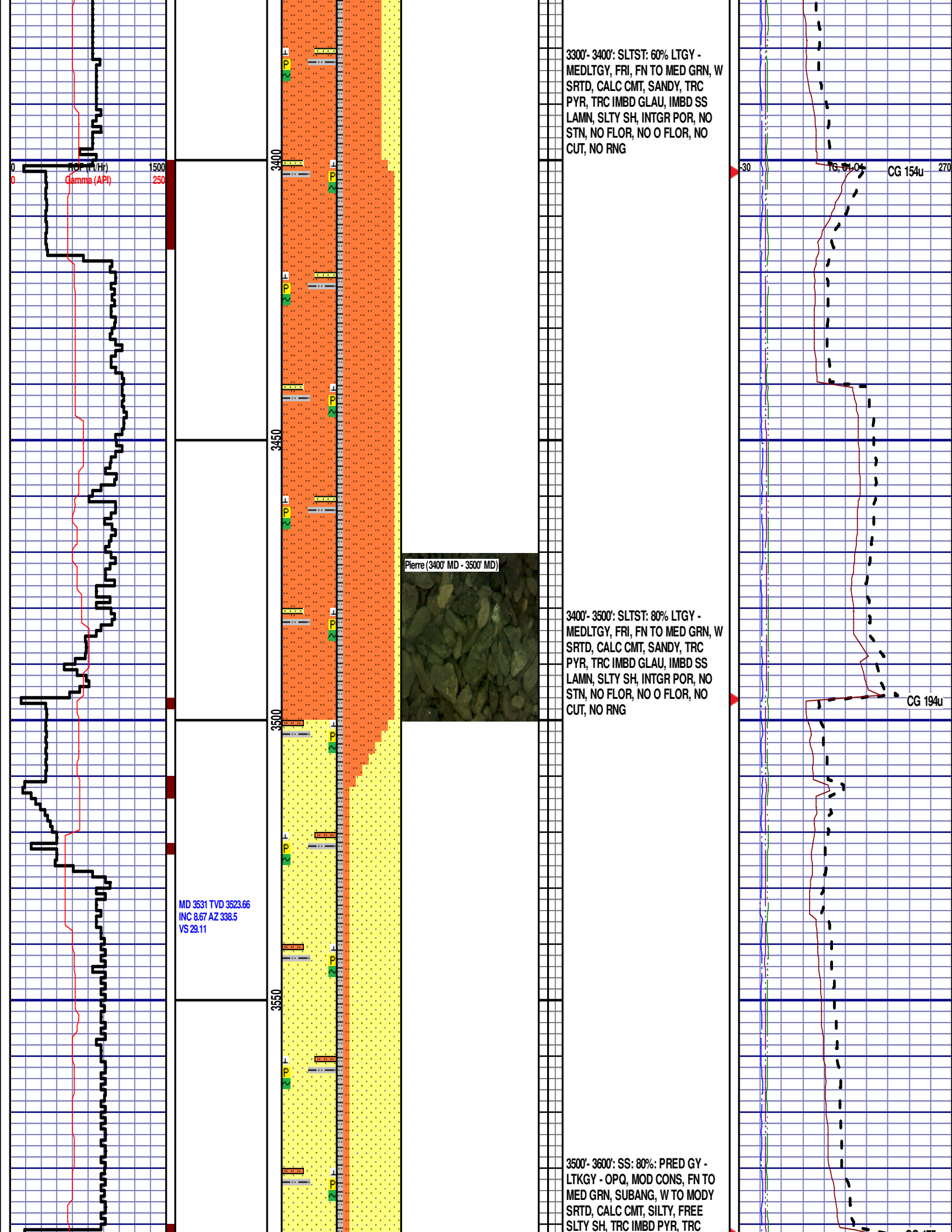


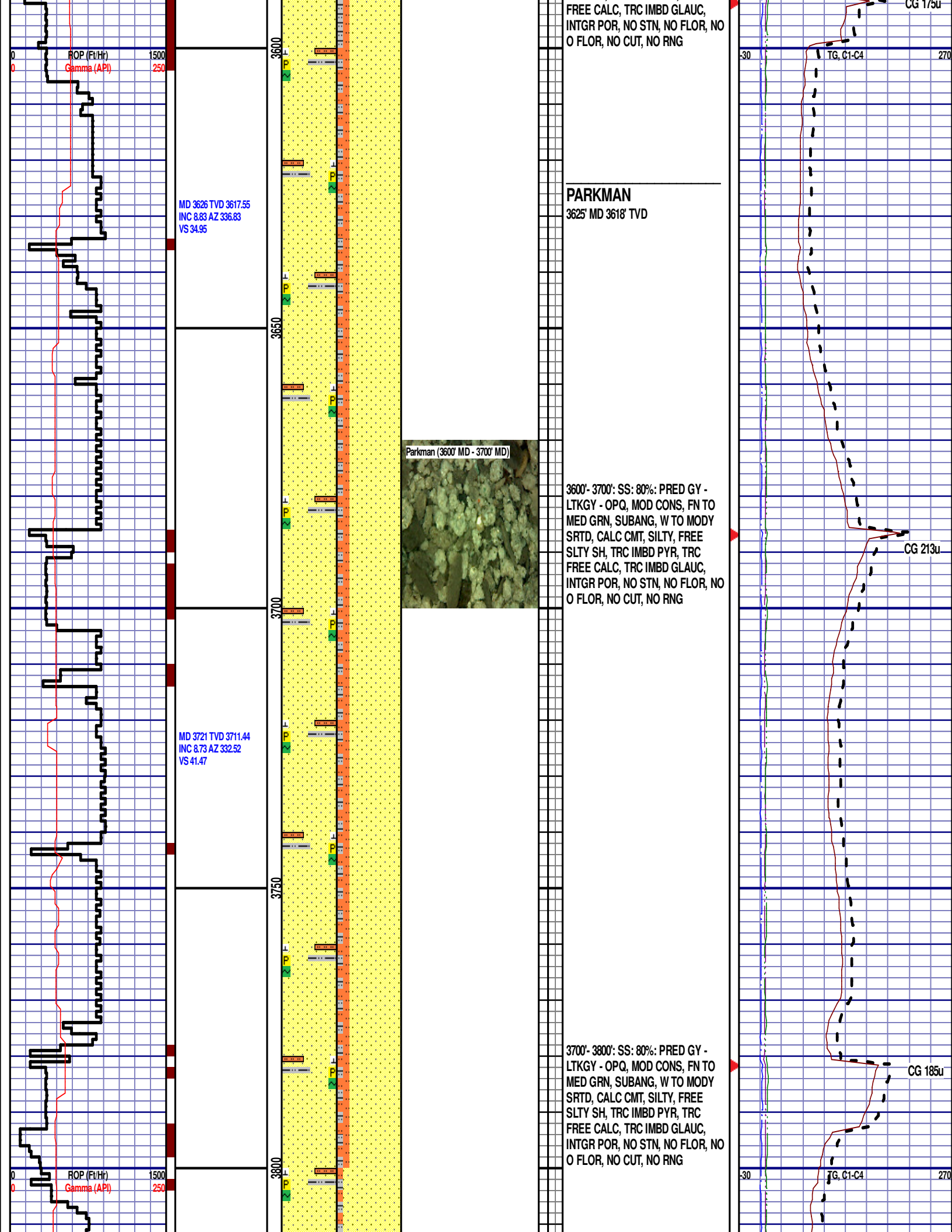
3100'- 3200': SS: 90%: PRED GY -
LTKGY - OPQ, MOD CONS, FN TO
MED GRN, SUBANG, W TO MODY
SRTD, CALC CMT, SILTY, FREE
SLTY SH, TRC IMBD PYR, TRC
FREE CALC, TRC IMBD GLAUC,
INTGR POR, NO STN, NO FLOR, NO
O FLOR, NO CUT, NO RNG

3200'- 3300': SS: 80%: 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

CG 112u

CG 118u





MD 3815 TVD 3804.35
INC 8.75 AZ 337.12
VS 47.87

MD 3910 TVD 3898.22
INC 8.97 AZ 336.04
VS 54.03

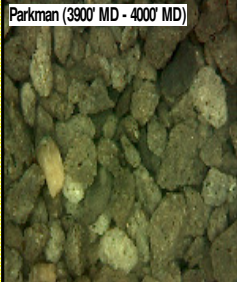
MD 4005 TVD 3992.11
INC 8.54 AZ 336.57
VS 60.18

WOB 11.9K
PP 3369
RPM 60
SPM 78/78

ROP: ft/Hr
Gamma (API)

1500
250

3850
3900
3950
4000



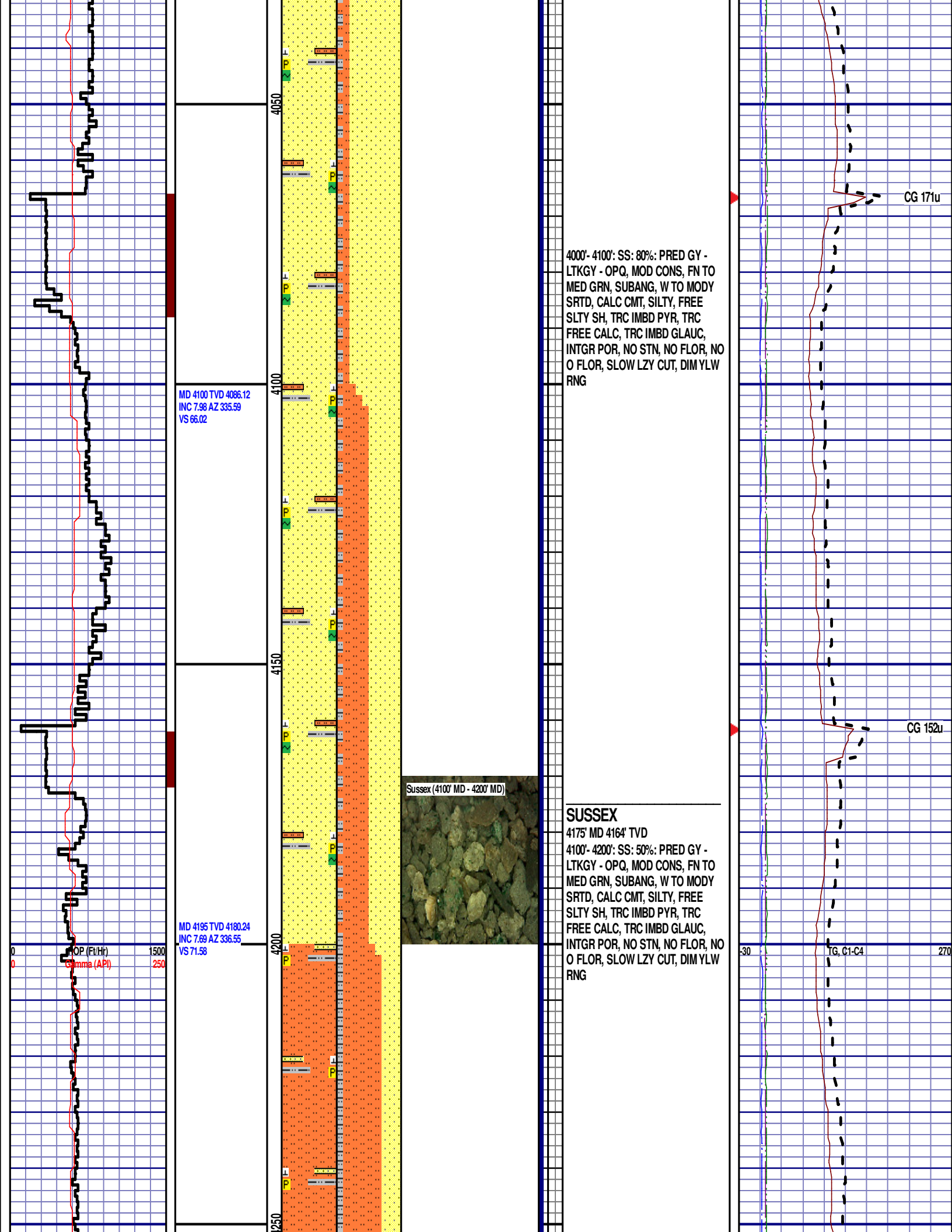
3800'- 3900': SS: 90%: PRED GY -
LTKGY - OPQ, MOD CONS, FN TO
MED GRN, SUBANG, W TO MODY
SRTD, CALC CMT, SILTY, FREE
SLTY SH, TRC IMBD PYR, TRC
FREE CALC, TRC IMBD GLAUC,
INTGR POR, NO STN, NO FLOR, NO
O FLOR, NO CUT, NO RNG

3900'- 4000': SS: 90%: 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, SLOW LZY CUT, DIM YLW
RNG

CG 194u

CG 177u

30 TG, C1-C4 270

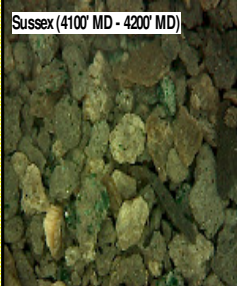


MD 4100 TVD 4086.12
INC 7.98 AZ 335.59
VS 66.02

MD 4195 TVD 4180.24
INC 7.69 AZ 336.55
VS 71.58

4000'- 4100': SS: 80%: 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, SLOW LZY CUT, DIM YLW
RNG

Sussex (4100' MD - 4200' MD)



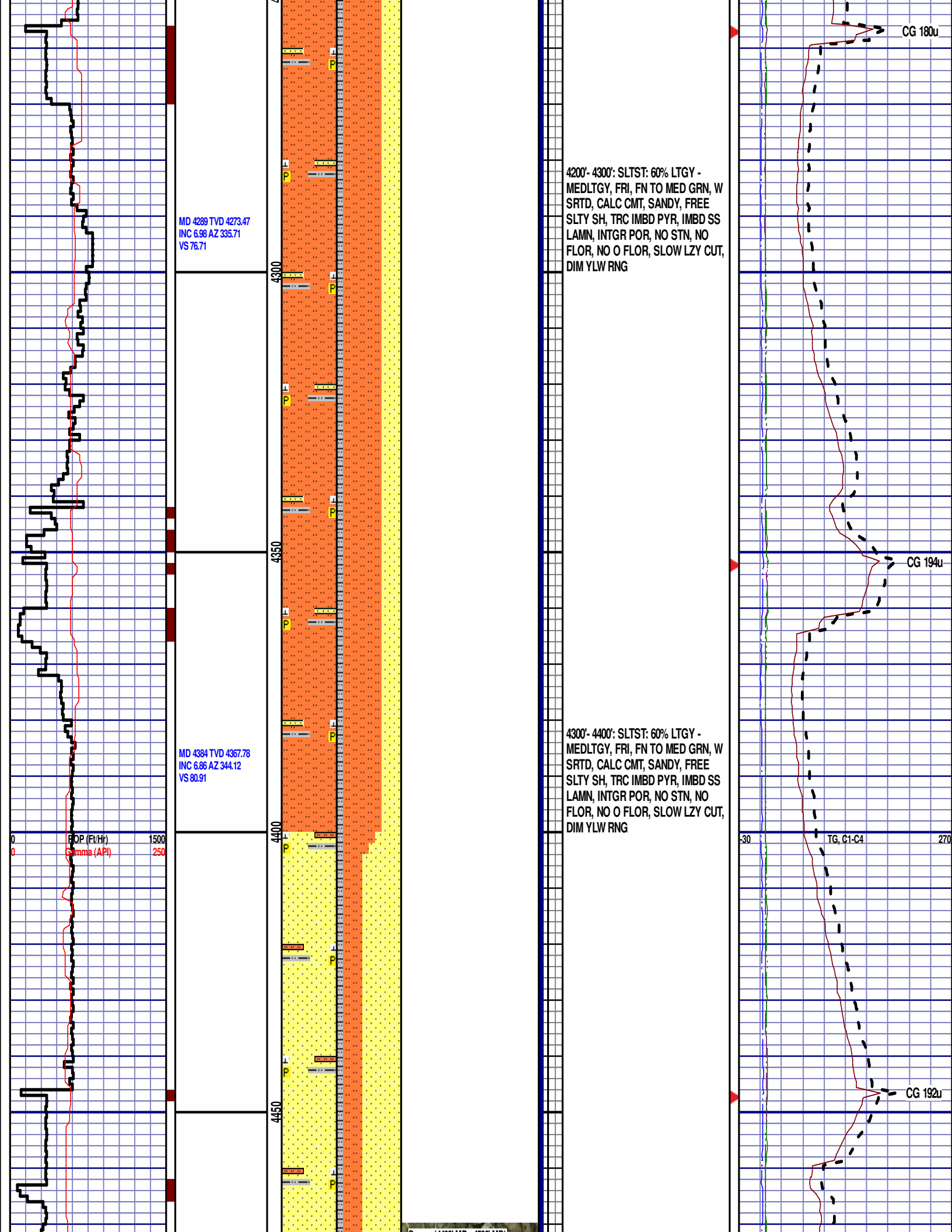
SUSSEX
4175' MD 4164' TVD
4100'- 4200': SS: 50%: PRED GY -
LTKGY - OPQ, MOD CONS, FN TO
MED GRN, SUBANG, W TO MODY
SRTD, CALC CMT, SILTY, FREE
SLTY SH, TRC IMBD PYR, TRC
FREE CALC, TRC IMBD GLAUC,
INTGR POR, NO STN, NO FLOR, NO
O FLOR, SLOW LZY CUT, DIM YLW
RNG

CG 171u

CG 152u

G, C1-C4

270



MD 4289 TVD 4273.47
INC 6.98 AZ 335.71
VS 76.71

MD 4384 TVD 4367.78
INC 6.86 AZ 344.12
VS 80.91

POP (Ft/Hr)
Gamma (API)

1500
250

4200'- 4300': SLTST: 60% 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

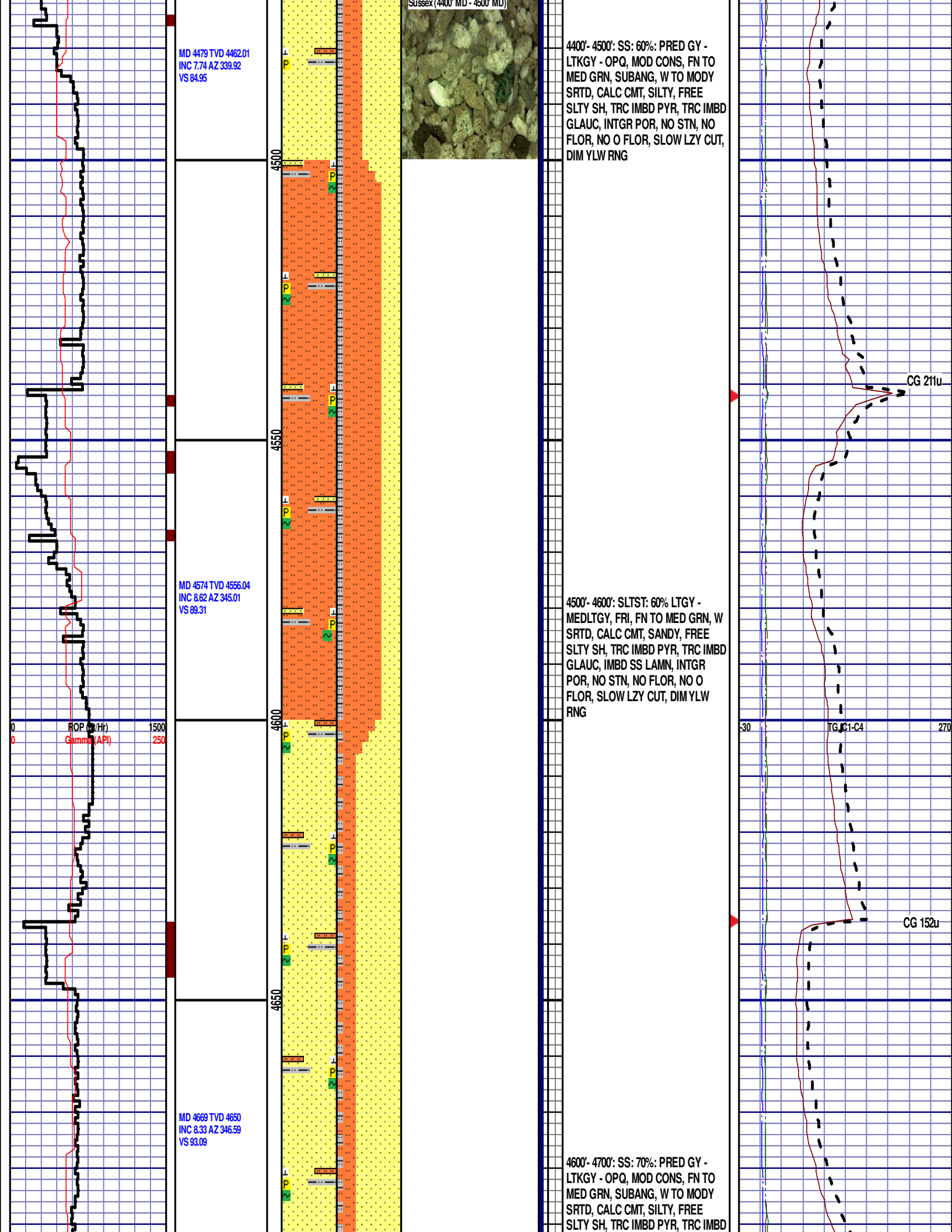
4300'- 4400': SLTST: 60% LTGY -
MEDLTGY, FRI, FN TO MED GRN, W
SRTD, CALC CMT, SANDY, FREE
SLTY SH, TRC IMBD PYR, IMBD SS
LAMN, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW LZY CUT,
DIM YLW RNG

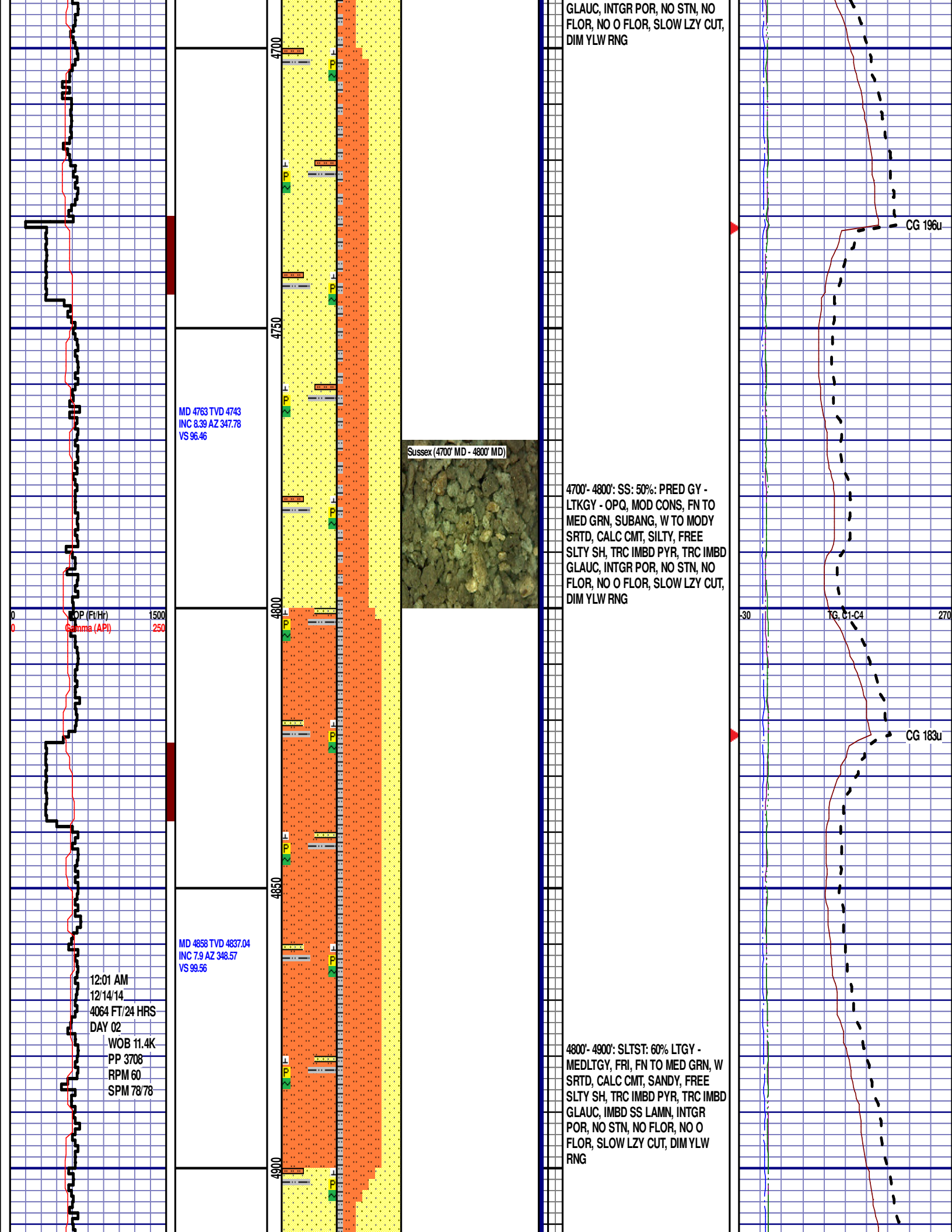
CG 180u

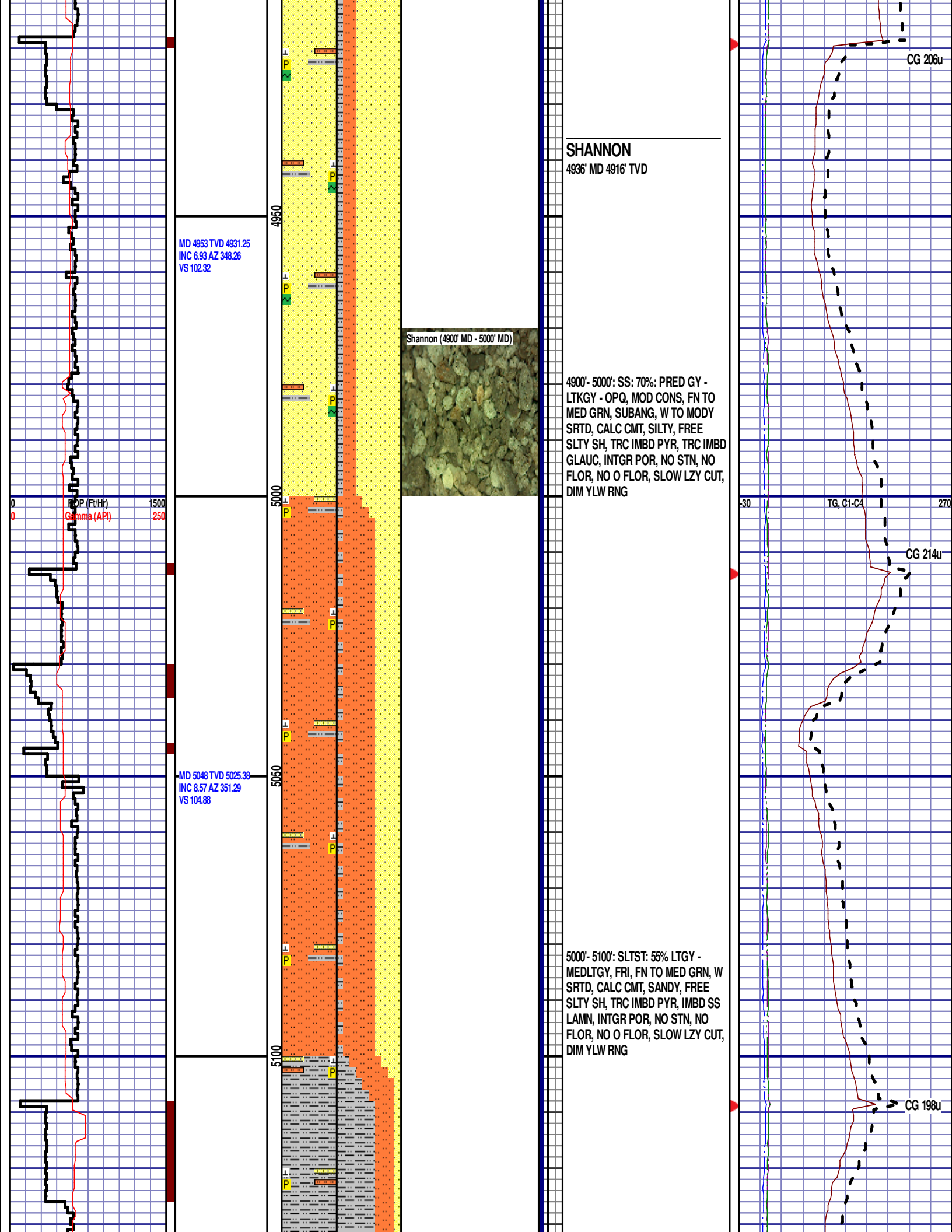
CG 194u

30 TG, C1-C4 270

CG 192u







MD 5142 TVD 5118.46
INC 7.45 AZ 349.53
VS 107.38

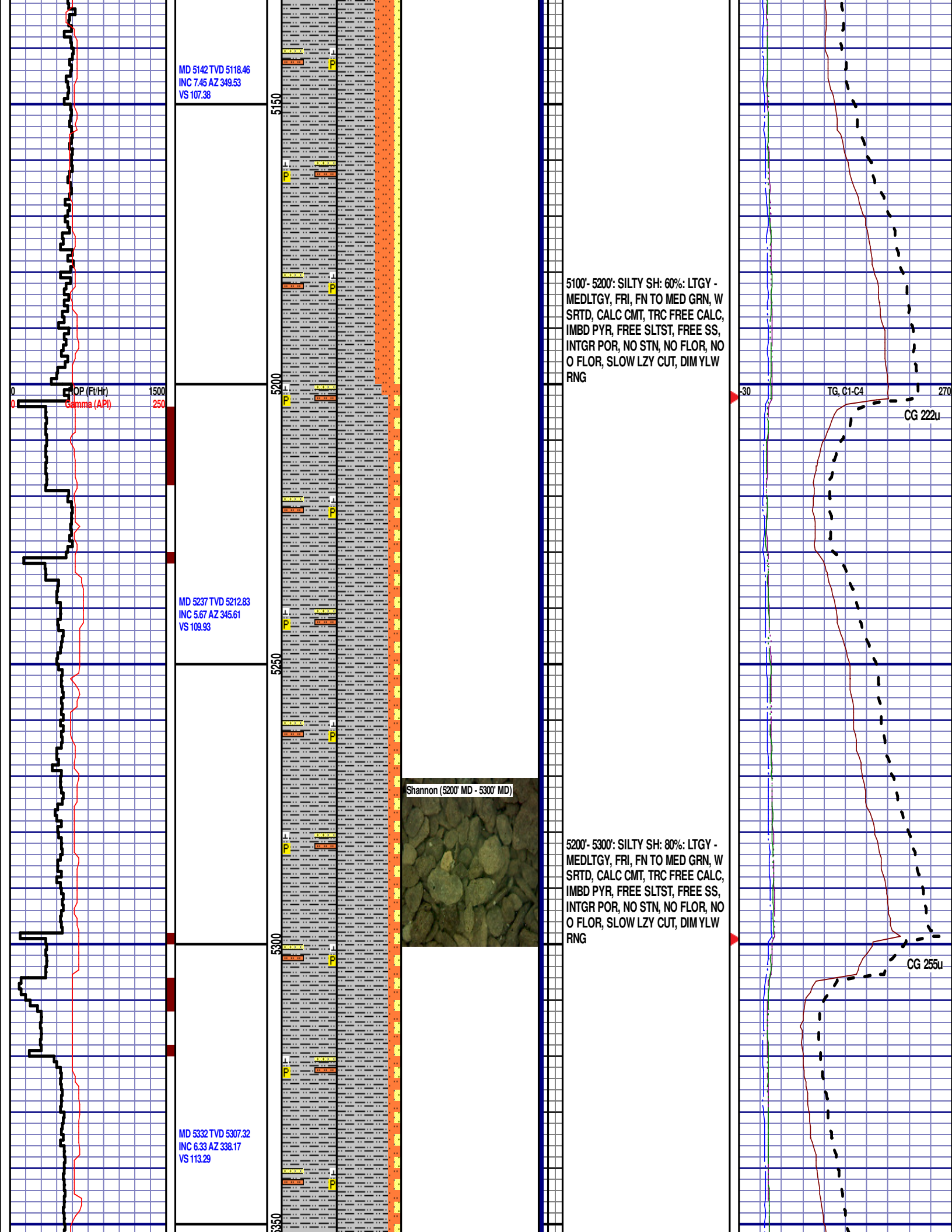
MD 5237 TVD 5212.83
INC 5.67 AZ 345.61
VS 109.93

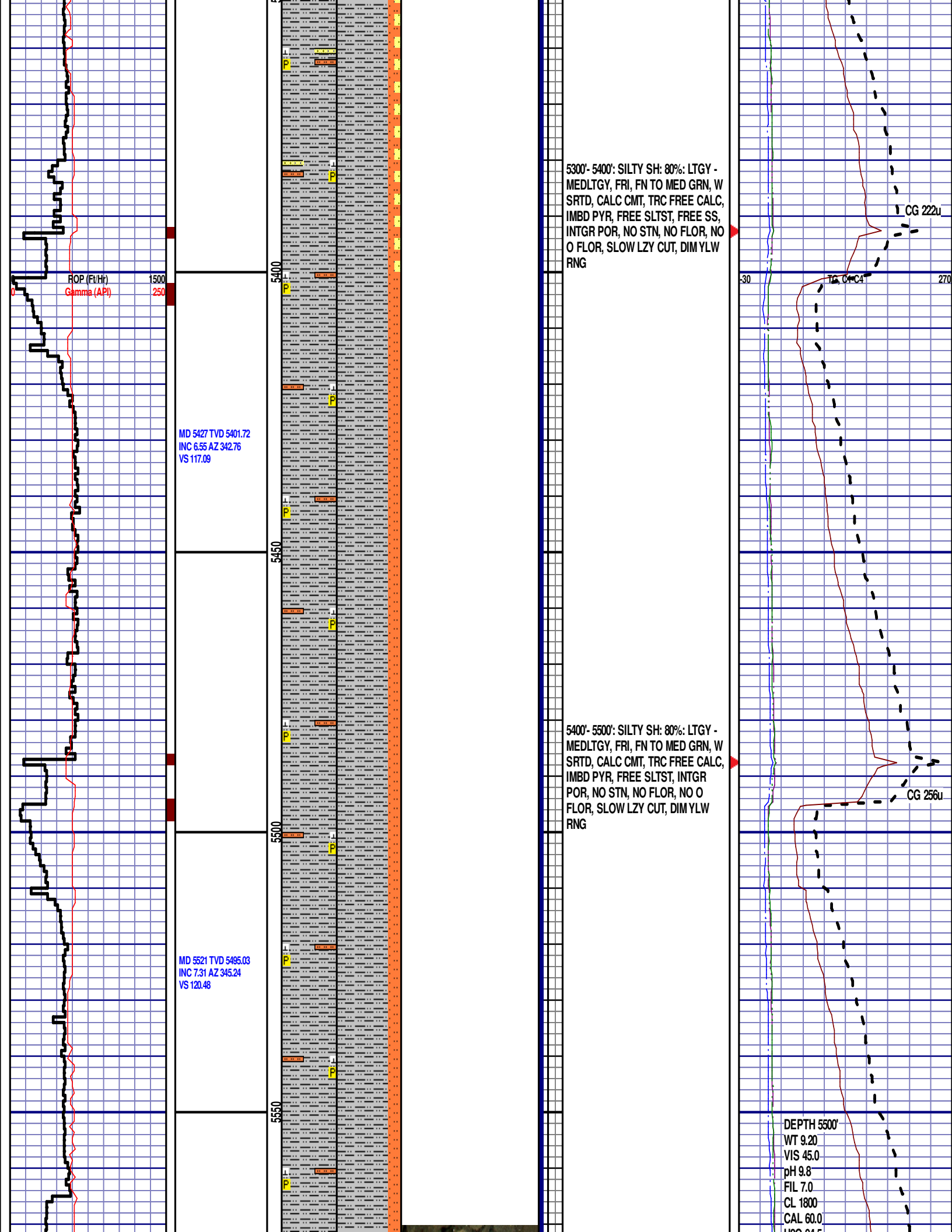
MD 5332 TVD 5307.32
INC 6.33 AZ 338.17
VS 113.29

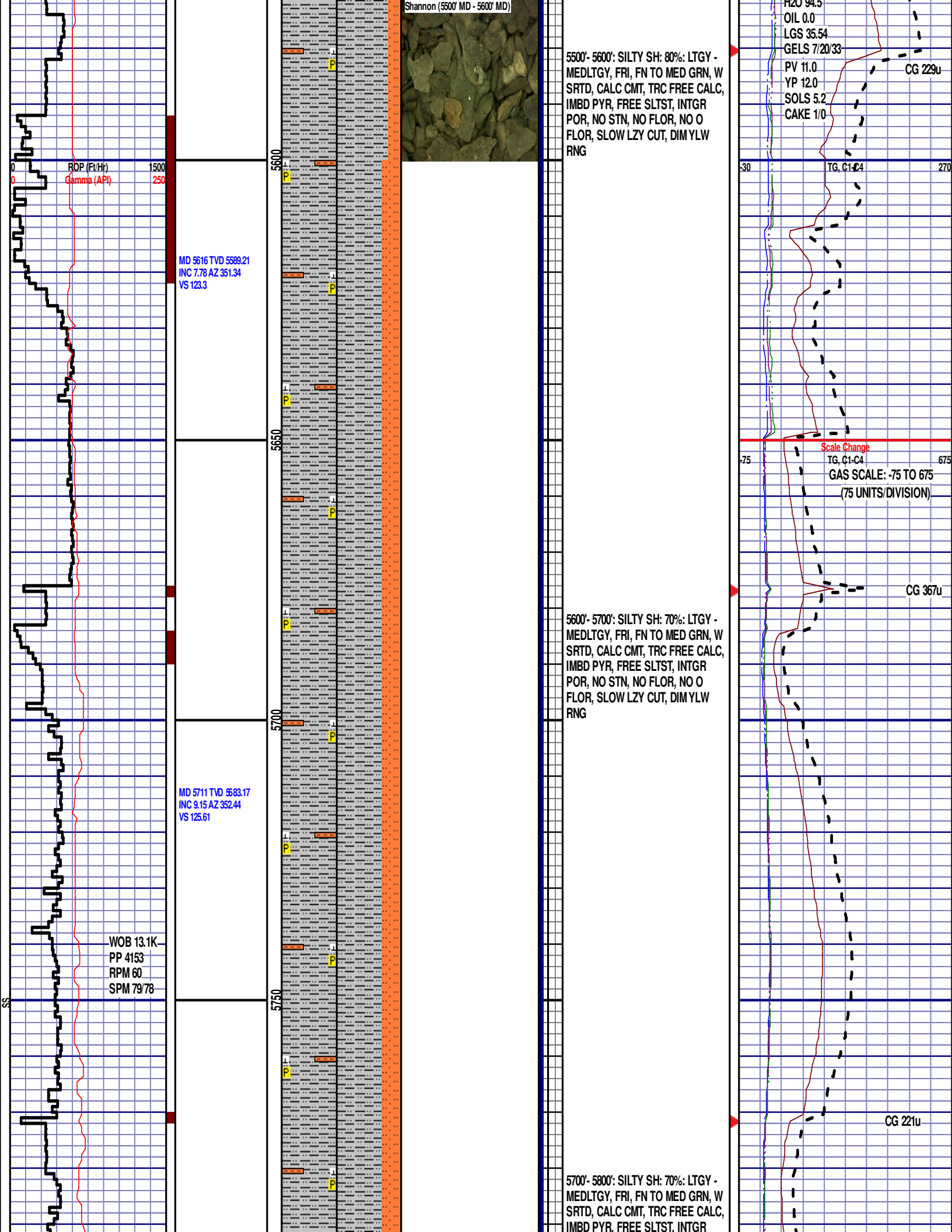
5100'- 5200': SILTY SH: 60%: LTGY -
MEDLTGY, FRI, FN TO MED GRN, W
SRTD, CALC CMT, TRC FREE CALC,
IMBD PYR, FREE SLTST, FREE SS,
INTGR POR, NO STN, NO FLOR, NO
O FLOR, SLOW LZ Y CUT, DIM YLW
RNG

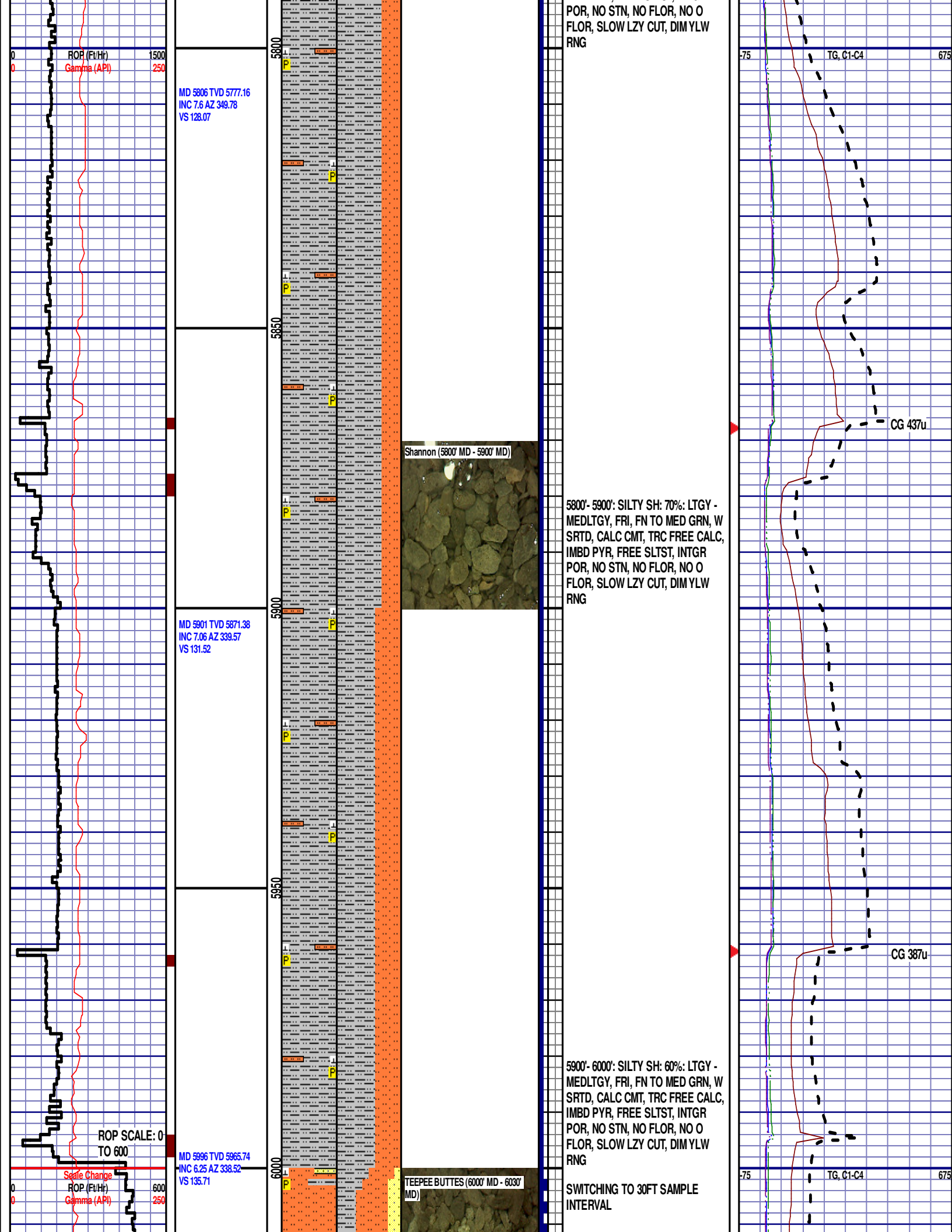
5200'- 5300': SILTY SH: 80%: LTGY -
MEDLTGY, FRI, FN TO MED GRN, W
SRTD, CALC CMT, TRC FREE CALC,
IMBD PYR, FREE SLTST, FREE SS,
INTGR POR, NO STN, NO FLOR, NO
O FLOR, SLOW LZ Y CUT, DIM YLW
RNG

Shannon (5200' MD - 5300' MD)









ROP (Ft/Hr)
Gamma (API)

MD 5806 TVD 5777.16
INC 7.6 AZ 349.78
VS 128.07

MD 5901 TVD 5871.38
INC 7.06 AZ 339.57
VS 131.52

MD 5996 TVD 5965.74
INC 6.25 AZ 338.52
VS 135.71

ROP SCALE: 0
TO 600

Scale Change
ROP (Ft/Hr)
Gamma (API)

Shannon (5800' MD - 5900' MD)

TEEPEE BUTTES (6000' MD - 6030'
MD)

POR, NO STN, NO FLOR, NO O
FLOR, SLOW LZY CUT, DIM YLW
RNG

5800'- 5900': SILTY SH: 70%: LTGY -
MEDLTGY, FRI, FN TO MED GRN, W
SRTD, CALC CMT, TRC FREE CALC,
IMBD PYR, FREE SLTST, INTGR
POR, NO STN, NO FLOR, NO O
FLOR, SLOW LZY CUT, DIM YLW
RNG

5900'- 6000': SILTY SH: 60%: LTGY -
MEDLTGY, FRI, FN TO MED GRN, W
SRTD, CALC CMT, TRC FREE CALC,
IMBD PYR, FREE SLTST, INTGR
POR, NO STN, NO FLOR, NO O
FLOR, SLOW LZY CUT, DIM YLW
RNG

SWITCHING TO 30FT SAMPLE
INTERVAL

TG, C1-C4

CG 437u

CG 387u

TG, C1-C4

TEEPEE BUTTES

6018' MD 5986' TVD

6000'-6060': SLTST: 50% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, IMBD
PYR, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW STRMG
CUT, DIM YLW RNG

CG 239u

6060'-6090': SLTST: 60% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, IMBD
PYR, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW STRMG
CUT, DIM YLW RNG

6090'-6120': SLTST: 70% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, IMBD
PYR, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW STRMG
CUT, DIM YLW RNG

6120'-6150': SLTST: 75% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, IMBD
PYR, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW STRMG
CUT, DIM YLW RNG

CG 303u

6150'-6180': SLTST: 60% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, TRC
FREE SH, IMBD PYR, INTGR POR,
NO STN, NO FLOR, NO O FLOR,
SLOW STRMG CUT, DIM YLW RNG

6180'-6210': SLTST: 60% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, TRC
FREE SH, IMBD PYR, INTGR POR,
NO STN, NO FLOR, NO O FLOR,
SLOW STRMG CUT, DIM YLW RNG

6210'-6240': SLTST: 60% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, IMBD

MD 6044 TVD 6013.38
INC 7.85 AZ 320.94
VS 138.86

MD 6090 TVD 6058.56
INC 13.64 AZ 319.95
VS 144.5

MD 6138 TVD 6104.65
INC 18.64 AZ 317.79
VS 153.55

MD 6185 TVD 6148.82
INC 21.33 AZ 311.5
VS 165.29

WOB 14.7K
PP 3596
RPM 20
SPM 78/79

ROP (Ft/Hr)
Gamma (API)

600
250

6050

6100

6150

6200

75

TG, 01-C4

675

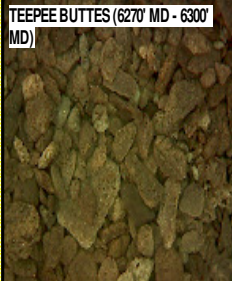
MD 6233 TVD 6193.14
INC 23.92 AZ 301.57
VS 180.39

MD 6280 TVD 6235.72
INC 26.3 AZ 291.12
VS 198.45

MD 6328 TVD 6278.58
INC 27.29 AZ 281.76
VS 219.3

MD 6375 TVD 6320.12
INC 28.61 AZ 273.41
VS 241.16

MD 6423 TVD 6362.21
INC 28.83 AZ 275.05
VS 264.2



PYR, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW STRMG
CUT, DIM YLW RNG

6240'-6270': SLTST: 65% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, IMBD
PYR, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW STRMG
CUT, DIM YLW RNG

6270'-6300': SLTST: 75% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, IMBD
PYR, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW STRMG
CUT, DIM YLW RNG

6300'-6330': SLTST: 70% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, IMBD
PYR, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW STRMG
CUT, DIM YLW RNG

6330'-6360': SLTST: 80% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, IMBD
PYR, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW STRMG
CUT, DIM YLW RNG

6360'-6390': SLTST: 80% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, IMBD
PYR, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW STRMG
CUT, DIM YLW RNG

6390'-6420': SLTST: 70% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, IMBD
PYR, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW STRMG
CUT, DIM YLW RNG

6420'-6450': SLTST: 65% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, SANDY,
CALC CMT, FREE SLTY SH, IMBD
PYR, INTGR POR, NO STN, NO
FLOR, NO O FLOR, SLOW STRMG
CUT, DIM YLW RNG

CG 269u

CG 480u

CG 524u

ROP (Ft/Hr)
Gamma (API)

75 TG, C1-C4 675

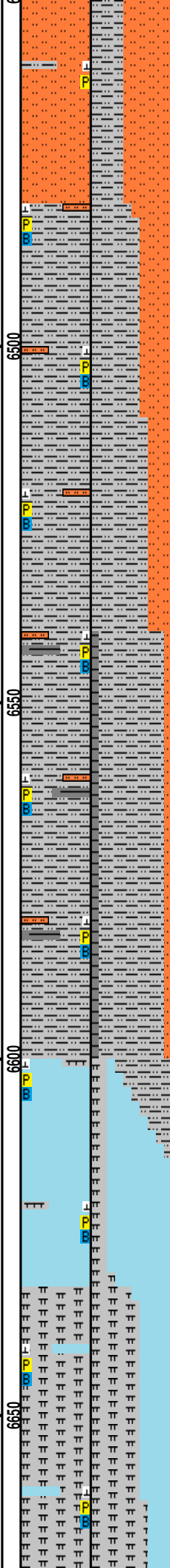
MD 6470 TVD 6402.93
INC 31.1 AZ 273.9
VS 287.64

MD 6518 TVD 6442.88
INC 36.17 AZ 271.66
VS 314.21

MD 6565 TVD 6479.54
INC 41.27 AZ 270.09
VS 343.59

MD 6613 TVD 6514.33
INC 45.82 AZ 267.16
VS 376.6

MD 6659 TVD 6545.04
INC 50.39 AZ 265.31
VS 410.69



Sharon Springs (6540' MD - 6570' MD)



Niobrara A Chalk (6600' MD - 6630' MD)



Niobrara A Marl (6630' MD - 6630' MD)



6450'-6480': SLTST: 60% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, CALC
CMT, FREE SLTY SH, IMBD PYR,
INTGR POR, NO STN, NO FLOR, NO
O FLOR, SLOW STRMG CUT, DIM
YLW RNG

6480'-6510': SLTY SH: 60% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, CALC
CMT, FREE SLT ST, IMBD PYR, TRC
FREE BENT, INTGR POR, NO STN,
NO FLOR, NO O FLOR, IMMED
STRMG CUT, BRIYL RNG

6510'-6540': SLTY SH: 70% PRED
DRKGY - MEDLTGY - OCC WH, FRI,
FN TO MED GRN, W SRTD, CALC
CMT, FREE SLT ST, IMBD PYR, TRC
FREE BENT, INTGR POR, NO STN,
NO FLOR, NO O FLOR, IMMED
STRMG CUT, BRIYL RNG

SHARON SPRINGS

6556' MD 6471' TVD

6540'-6570': SLTY SH: 80% PRED DRKGY -
MEDLTGY - OCC WH, FRI, FN TO MED GRN,
W SRTD, CALC CMT, FREE SLT ST, FREE SH,
IMBD PYR, TRC BENT, INTGR POR, NO STN,
NO FLOR, NO O FLOR, IMMED STRMG CUT,
BRIYL RNG

6570'-6600': SLTY SH: 80% PRED DRKGY -
MEDLTGY - OCC WH, FRI, FN TO MED GRN,
W SRTD, CALC CMT, FREE SLT ST, FREE SH,
IMBD PYR, TRC BENT, INTGR POR, NO STN,
NO FLOR, NO O FLOR, IMMED STRMG CUT,
BRIYL RNG

NIOBRARA A CHALK

6610' MD 6511' TVD

6600'-6630': CHK: 80% MEDDRKGY -
MEDLTGY, B LKYTO SUBBLKY, GRTY TO
SLTY TXT, FRM TO BRIT, TRC FREE BENT,
IMBD CALC, IMBD PYR, 20% FREE MRL, NO
STN, TRC MIN FLOR, NO O FLOR, IMMED
STRMG CUT, HVY BLSHWRT RNG

NIOBRARA A MARL

6650' MD 6538' TVD

6630'-6660': MRST: 60% MEDDRKGY -
MEDLTGY, B LKYTO SUBBLKY, GRTY TO
SLTY TXT, FRM TO BRIT, CALC CMT, IMBD
PYR, TRC FREE BENT, 40% FREE CHK, NO
STN, 5% FLOR, NO O FLOR, IMMED STRMG
CUT, BRIYL RNG

Scale Change
TG, C1-C4

SCALE: 350 TO 3150
(350 UNITS/DIVISION)

DEPTH 6570'

WT 11.00

VIS 42.0

PH 9.4

FIL 7.0

CL 1700

CAL 60.0

H2O 87.0

OIL 0.5

LGS 36.30

GELS 6/24/38

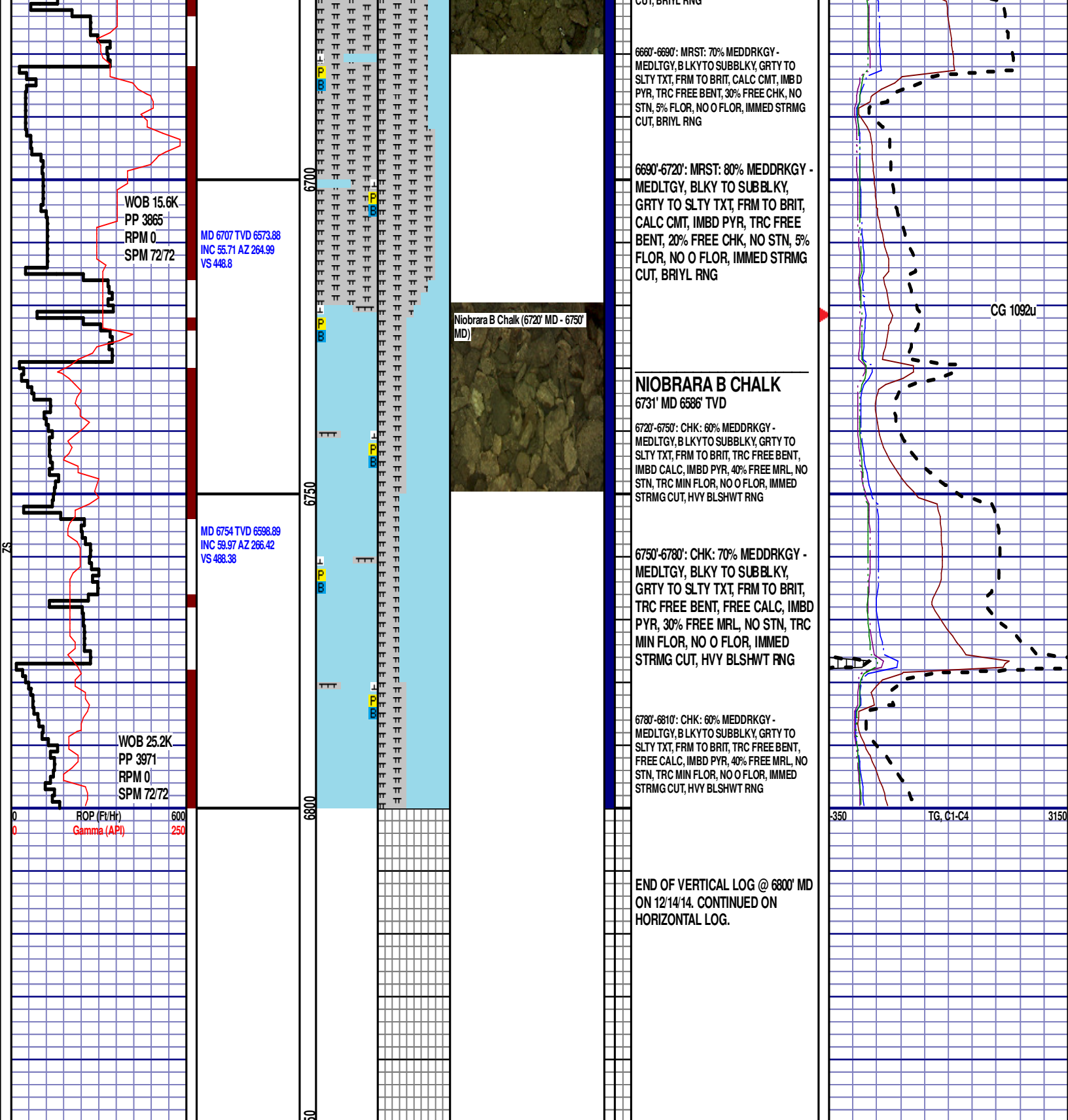
PV 11.0

YP 9.0

SOLS 12.2

CAKE 1/0

CG 2783u



WOB 15.6K
PP 3865
RPM 0
SPM 72/72

MD 6707 TVD 6573.88
INC 55.71 AZ 264.99
VS 448.8

MD 6754 TVD 6598.89
INC 59.97 AZ 266.42
VS 488.38

WOB 25.2K
PP 3971
RPM 0
SPM 72/72

ROP (Ft/Hr)
Gamma (API)

600
250

6700

6750

6800

Niobrara B Chalk (6720' MD - 6750' MD)

6660'-6690': MRST: 70% MEDDRKGY -
MEDLTGY, B LKY TO SUBBLKY, GRTY TO
SLTY TXT, FRM TO BRIT, CALC CMT, IMB D
PYR, TRC FREE BENT, 30% FREE CHK, NO
STN, 5% FLOR, NO O FLOR, IMMED STRMG
CUT, BRIYL RNG

6690'-6720': MRST: 80% MEDDRKGY -
MEDLTGY, BLKY TO SUBBLKY,
GRTY TO SLTY TXT, FRM TO BRIT,
CALC CMT, IMBD PYR, TRC FREE
BENT, 20% FREE CHK, NO STN, 5%
FLOR, NO O FLOR, IMMED STRMG
CUT, BRIYL RNG

NIOBRARA B CHALK 6731' MD 6586' TVD

6720'-6750': CHK: 60% MEDDRKGY -
MEDLTGY, B LKY TO SUBBLKY, GRTY TO
SLTY TXT, FRM TO BRIT, TRC FREE BENT,
IMBD CALC, IMBD PYR, 40% FREE MRL, NO
STN, TRC MIN FLOR, NO O FLOR, IMMED
STRMG CUT, HVY BLSHWT RNG

6750'-6780': CHK: 70% MEDDRKGY -
MEDLTGY, BLKY TO SUBBLKY,
GRTY TO SLTY TXT, FRM TO BRIT,
TRC FREE BENT, FREE CALC, IMBD
PYR, 30% FREE MRL, NO STN, TRC
MIN FLOR, NO O FLOR, IMMED
STRMG CUT, HVY BLSHWT RNG

6780'-6810': CHK: 60% MEDDRKGY -
MEDLTGY, B LKY TO SUBBLKY, GRTY TO
SLTY TXT, FRM TO BRIT, TRC FREE BENT,
FREE CALC, IMBD PYR, 40% FREE MRL, NO
STN, TRC MIN FLOR, NO O FLOR, IMMED
STRMG CUT, HVY BLSHWT RNG

END OF VERTICAL LOG @ 6800' MD
ON 12/14/14. CONTINUED ON
HORIZONTAL LOG.

CG 1092u

350 TG, C1-C4 3150