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Customer Information

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

Geologist: Teresa Malesardi
Noble Energy Inc.

Mud Logging Details

Logger: Scott Haney &
Jeremy Meshew
Log Interval: 2500' MD to 6480' MD
Start Date: September 1, 2015
Release Date: September 6, 2015

Well Information

Well Name: Wells Ranch AE32-635

Location: 32-T6N-R62W
2010' FSL 650' FWL

County: Weld
State: Colorado

Drilling Rig: H&P 343
Total Depth: 15973' MD
TD Date: September 6, 2015
Formation: Niobrara B Chalk
KB Elevation: 4746'
GR Elevation: 4722'
API Number: 05-123-41725-0000

ROCK TYPES

Anhy
 Ash
 Bent
 Brec
 Carb sh
 Chlk

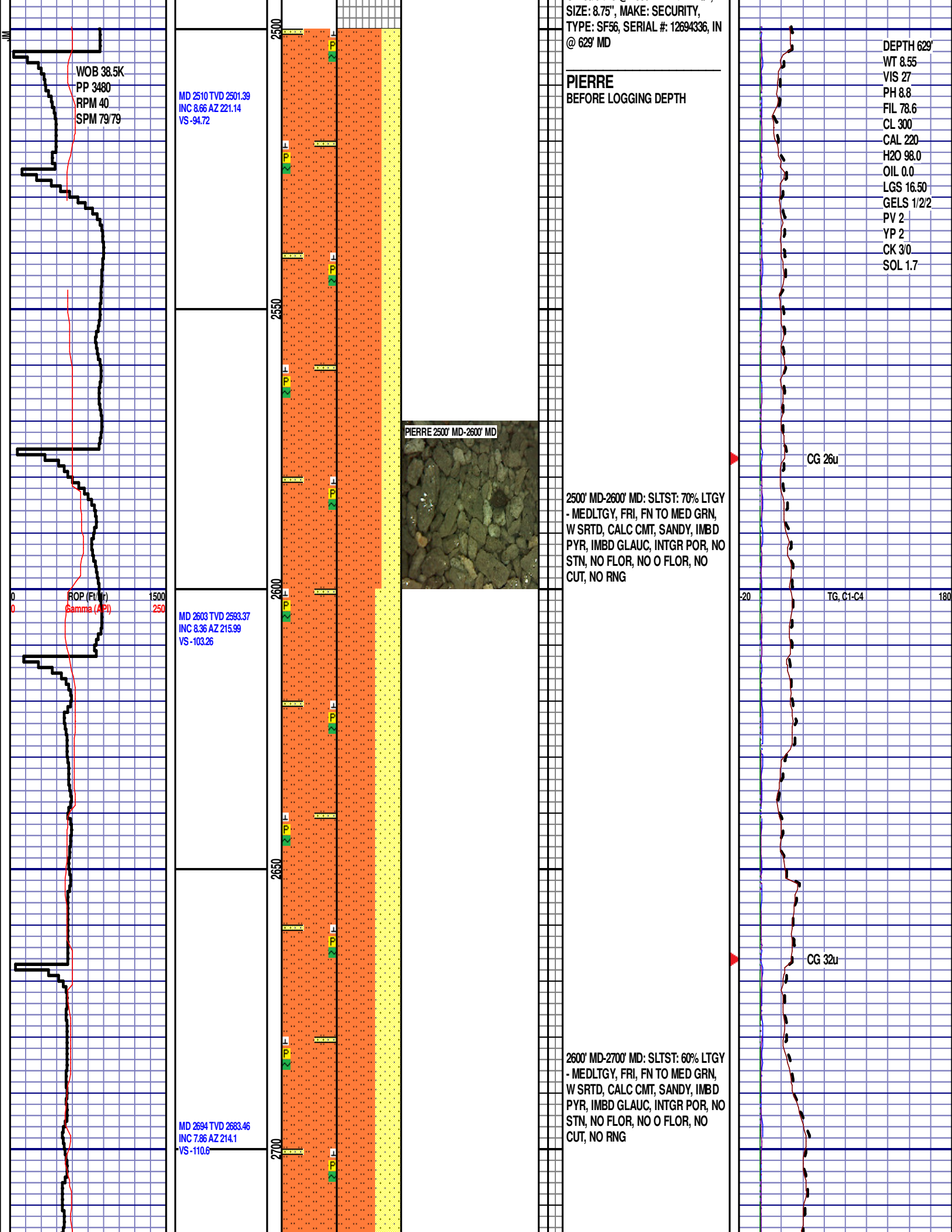
Cht
 Clyst
 Cmmt
 Coal
 Congl
 Dol

Gyp
 Igne
 Lmst
 Meta
 Mrlst
 NO SMPL No smpl

Rd sh
 Salt
 Sh
 Sltly sh
 Sltst
 Ss

Trp cht
 Till

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
	Core	Face							Connections					
0	ROP (Ft/Hr)	1500			24						NOBLE ENERGY INC. WELLS RANCH AE32-635 32-T6N-R62W 2010' FSL, 650' FWL WELD CO., CO	20	TG, C1-C4	180
0	Gamma (API)	250												
	SLIDE=RED ROTATE=WHITE												CONNECTIONS ARE MARKED WITH RED TRIANGLES	
	ROP SCALE: 0 TO 1500												GAS SCALE: -20u TO 180u (20 UNITS/DIVISION)	
	GAMMA SCALE: 0 TO 250													
	GAMMA DATA AS RECEIVED												DRILLING ON WATER BASED MUD	



WOB 38.5K
PP 3480
RPM 40
SPM 79/79

MD 2510 TVD 2501.39
INC 8.66 AZ 221.14
VS -94.72

ROP (Feet)
Gamma (API)

MD 2603 TVD 2593.37
INC 8.36 AZ 215.99
VS -103.26

PIERRE 2500' MD-2600' MD

2500' MD-2600' MD: SLTST: 70% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRD, CALC CMT, SANDY, IMBD
PYR, IMBD GLAUC, INTGR POR, NO
STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

MD 2694 TVD 2683.46
INC 7.86 AZ 214.1
VS -110.6

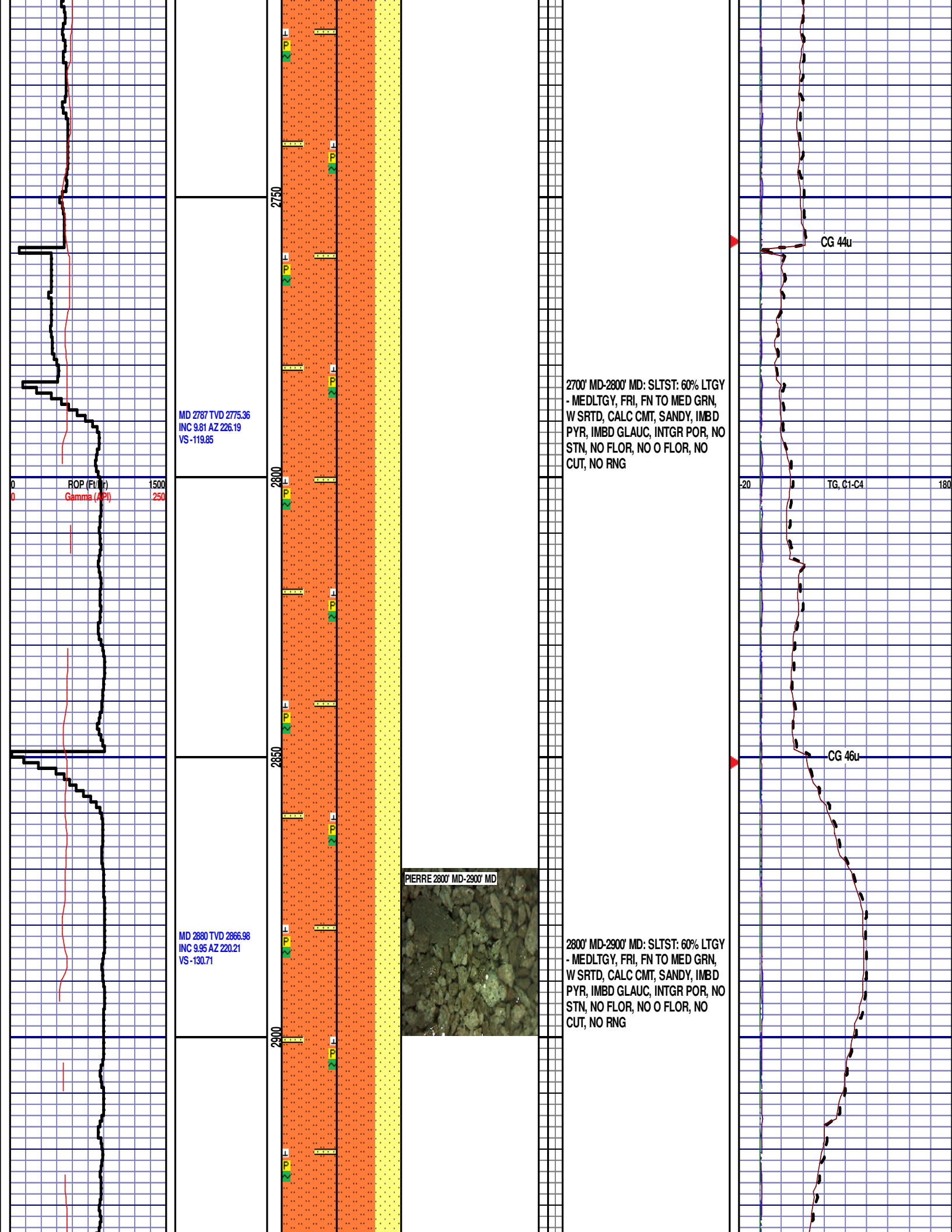
2600' MD-2700' MD: SLTST: 60% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRD, CALC CMT, SANDY, IMBD
PYR, IMBD GLAUC, INTGR POR, NO
STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

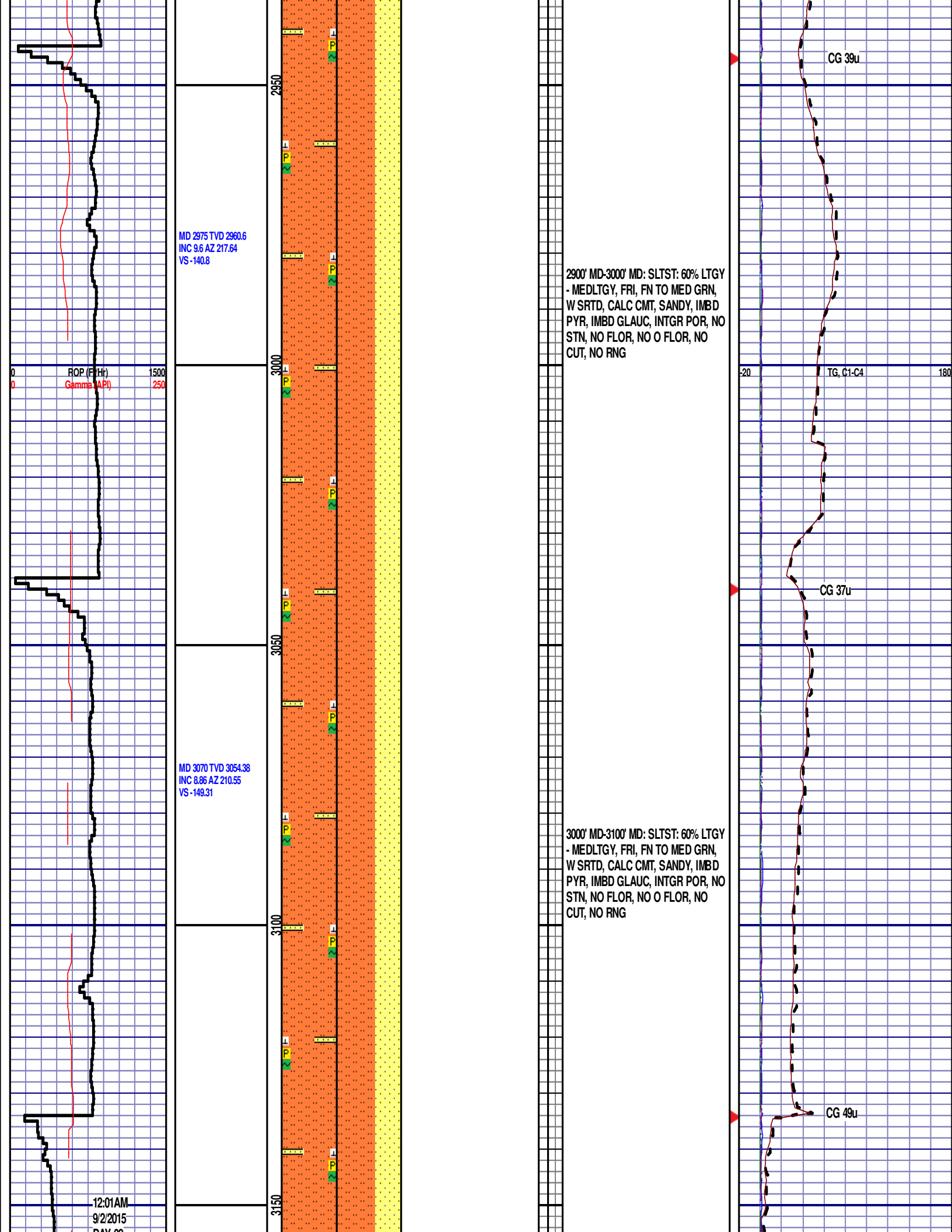
DEPTH 629'
WT 8.55
VIS 27
PH 8.8
FIL 78.6
CL 300
CAL 220
H2O 98.0
OIL 0.0
LGS 16.50
GELS 1/2/2
PV 2
YP 2
CK 3/0
SOL 1.7

CG 26u

TG, C1-C4

CG 32u





DAY 02
2551 FT/24HRS
WOB 37.7K
PP 3898
RPM 40
SPM 78/79

MD 3164 TVD 3147.14
INC 9.81 AZ 225.74
VS -158.68

PIERRE 3100' MD-3200' MD



3100' MD-3200' MD: SLTST: 60% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, SANDY, IMBD
PYR, IMBD GLAUC, INTGR POR, NO
STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

TROUBLESHOOT LOW
GAS, SEDIMENT
ACCUMULATION IN
POSSUM BELLY

ROP (ft/Hr)
Gamma (API)

1500
250

3200

3250

3300

3350

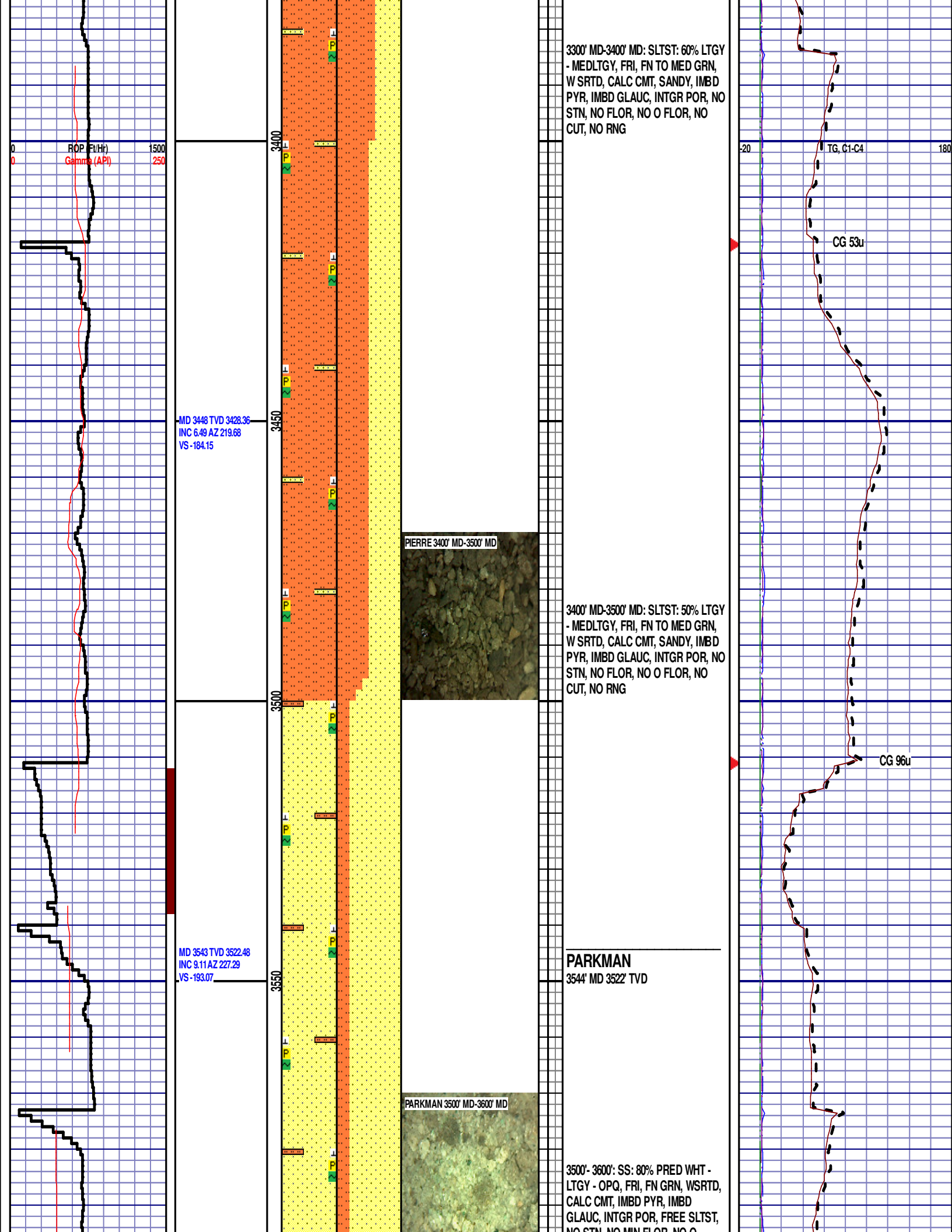
MD 3259 TVD 3240.95
INC 8.36 AZ 218.87
VS -168.78

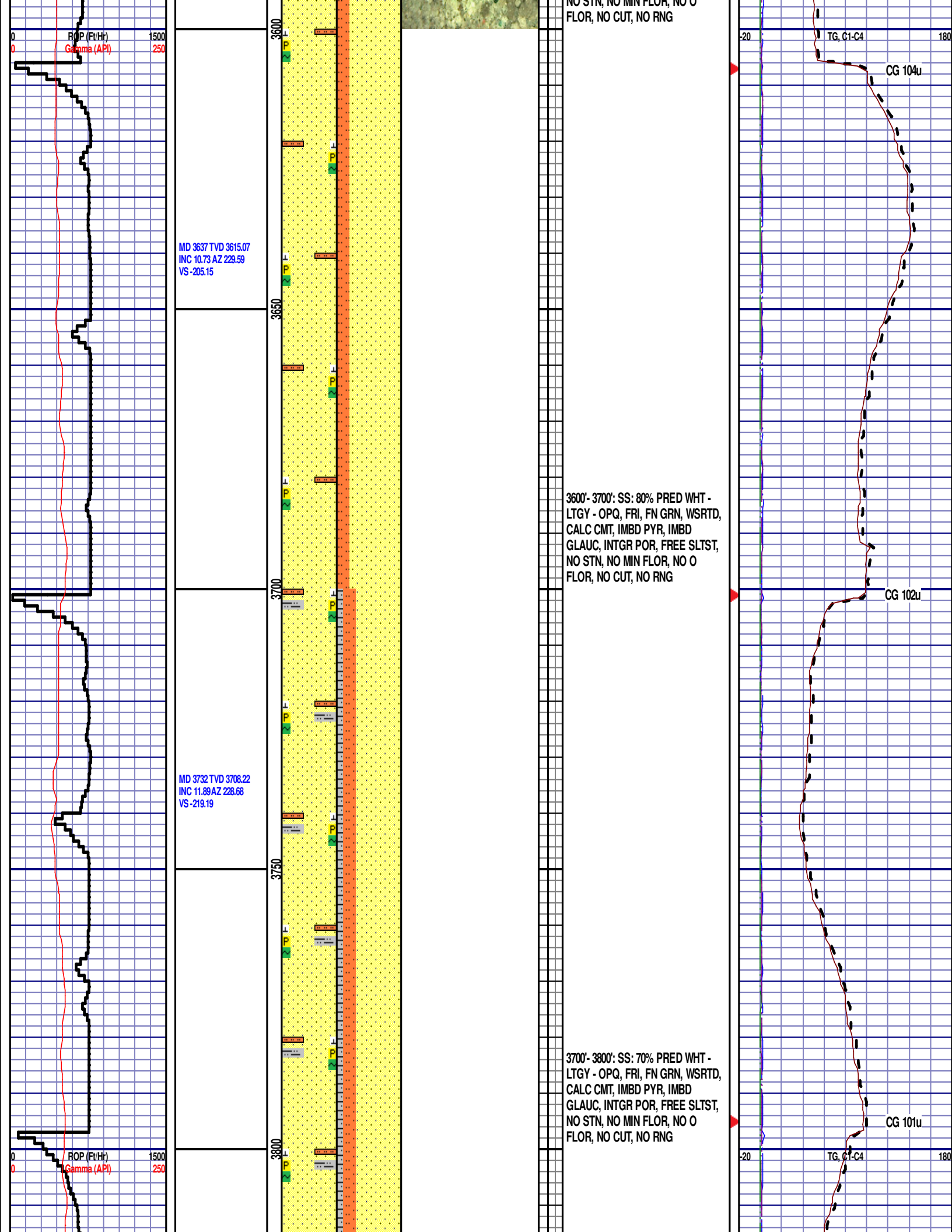
3200' MD-3300' MD: SLTST: 60% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, SANDY, IMBD
PYR, IMBD GLAUC, INTGR POR, NO
STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

TG, C1-C4

CG 26u

CG 143u



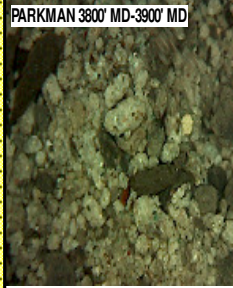


MD 3826 TVD 3799.98
INC 13.2 AZ 228.28
VS -234.42

MD 3921 TVD 3892.77
INC 11.55 AZ 227.62
VS -249.5

MD 4015 TVD 3985.27
INC 8.86 AZ 229.83
VS -261.94

PARKMAN 3800' MD-3900' MD



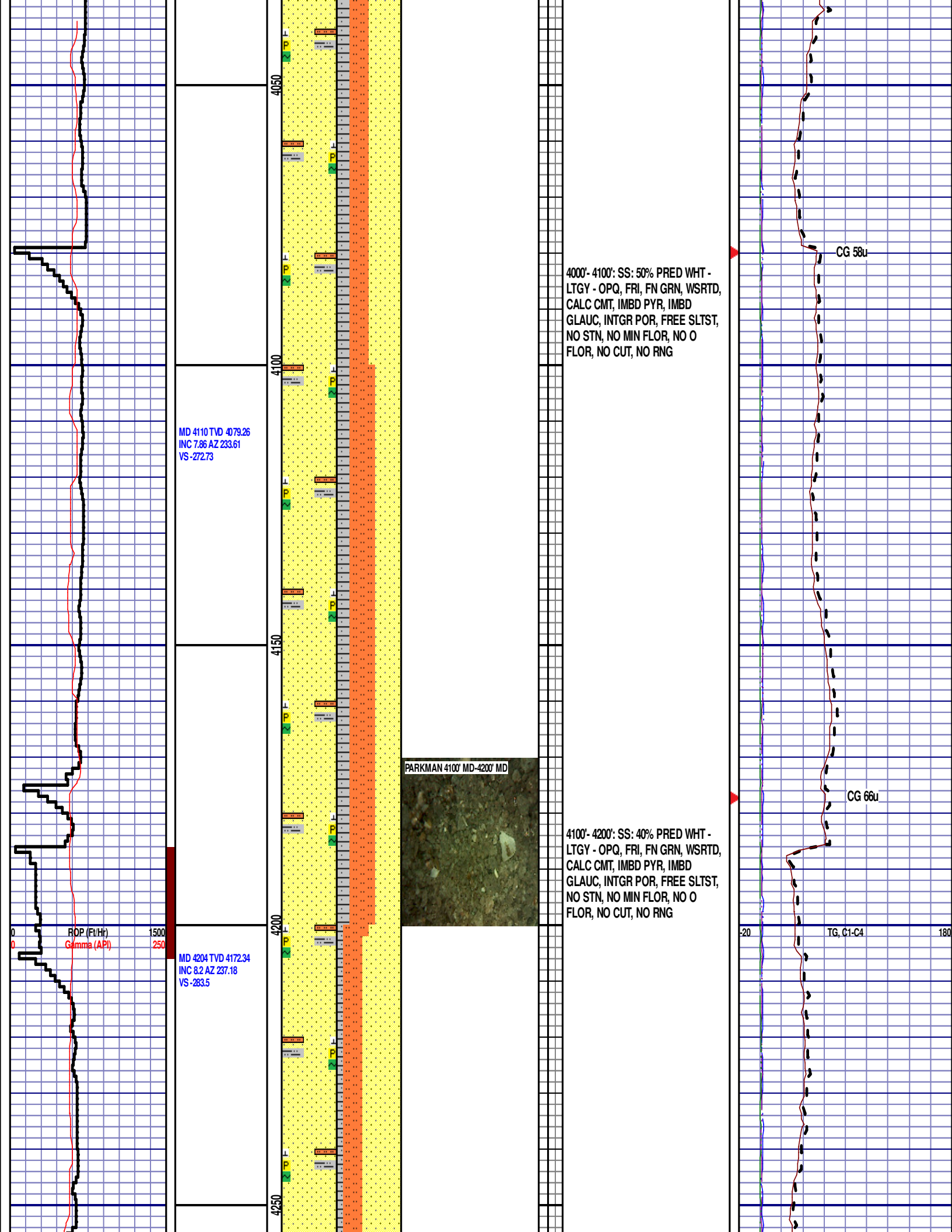
3800'- 3900': SS: 70% PRED WHT -
LTGY - OPQ, FRI, FN GRN, WSRTD,
CALC CMT, IMBD PYR, IMBD
GLAUC, INTGR POR, FREE SLTST,
NO STN, NO MIN FLOR, NO O
FLOR, NO CUT, NO RNG

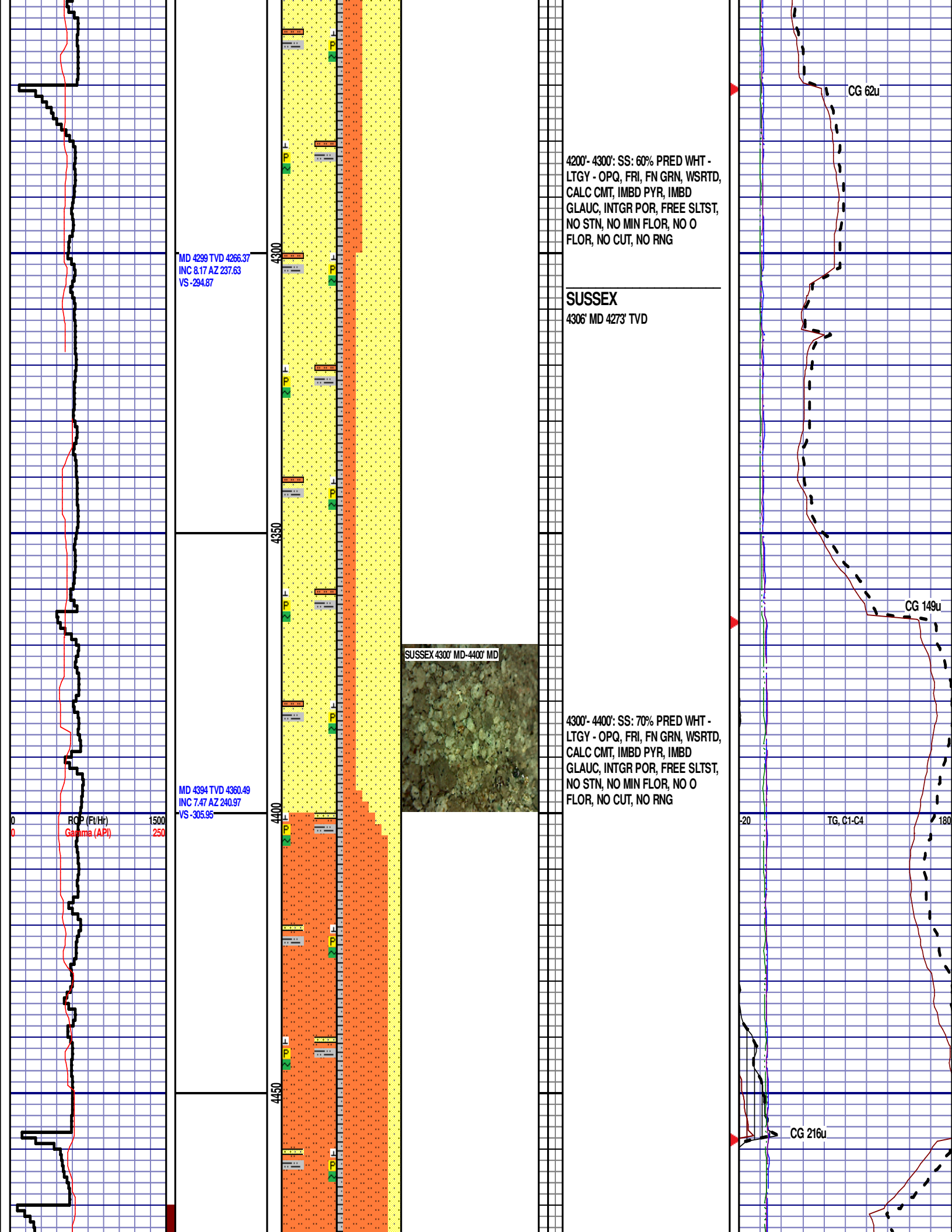
3900'- 4000': SS: 60% PRED WHT -
LTGY - OPQ, FRI, FN GRN, WSRTD,
CALC CMT, IMBD PYR, IMBD
GLAUC, INTGR POR, FREE SLTST,
NO STN, NO MIN FLOR, NO O
FLOR, NO CUT, NO RNG

CG 119u

CG 71u

TG, C1-C4





MD 4488 TVD 4453.54
INC 8.79 AZ 236.11
VS -317.23

MD 4583 TVD 4547.5
INC 8.21 AZ 236.12
VS -328.86

MD 4678 TVD 4641.6
INC 7.56 AZ 238.63
VS -339.8

4400' MD-4500' MD: SLTST: 70% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, SANDY, FREE
SLTYSH, IMBD PYR, TR IMBD
GLAUC, INTGR POR, NO STN, NO
FLOR, NO O FLOR, NO CUT, NO
RNG

SHANNON
4563' MD 4528' TVD

SHANNON 4500' MD-4600' MD

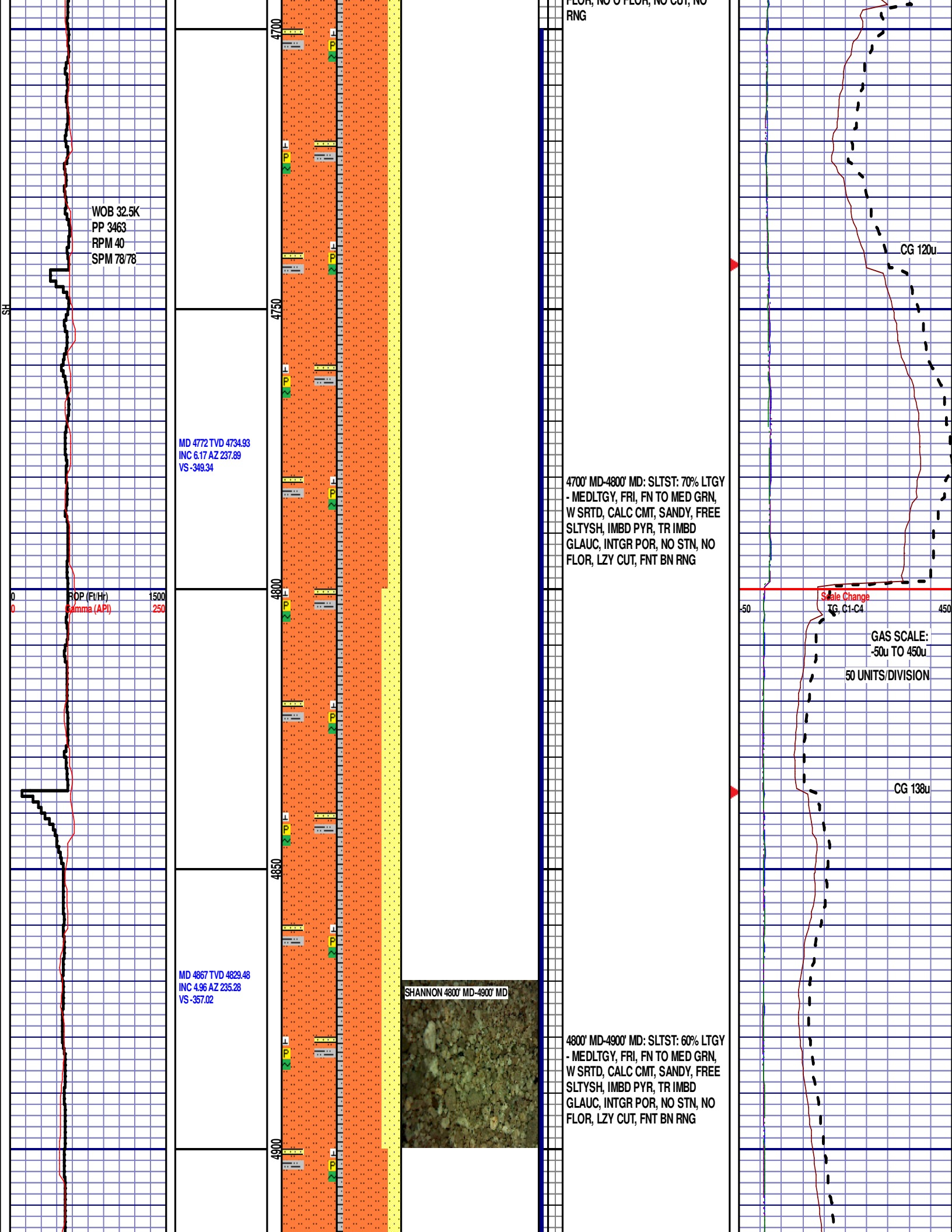
4500' MD-4600' MD: SLTST: 50% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, SANDY, FREE
SLTYSH, IMBD PYR, TR IMBD
GLAUC, INTGR POR, NO STN, NO
FLOR, NO O FLOR, NO CUT, NO
RNG

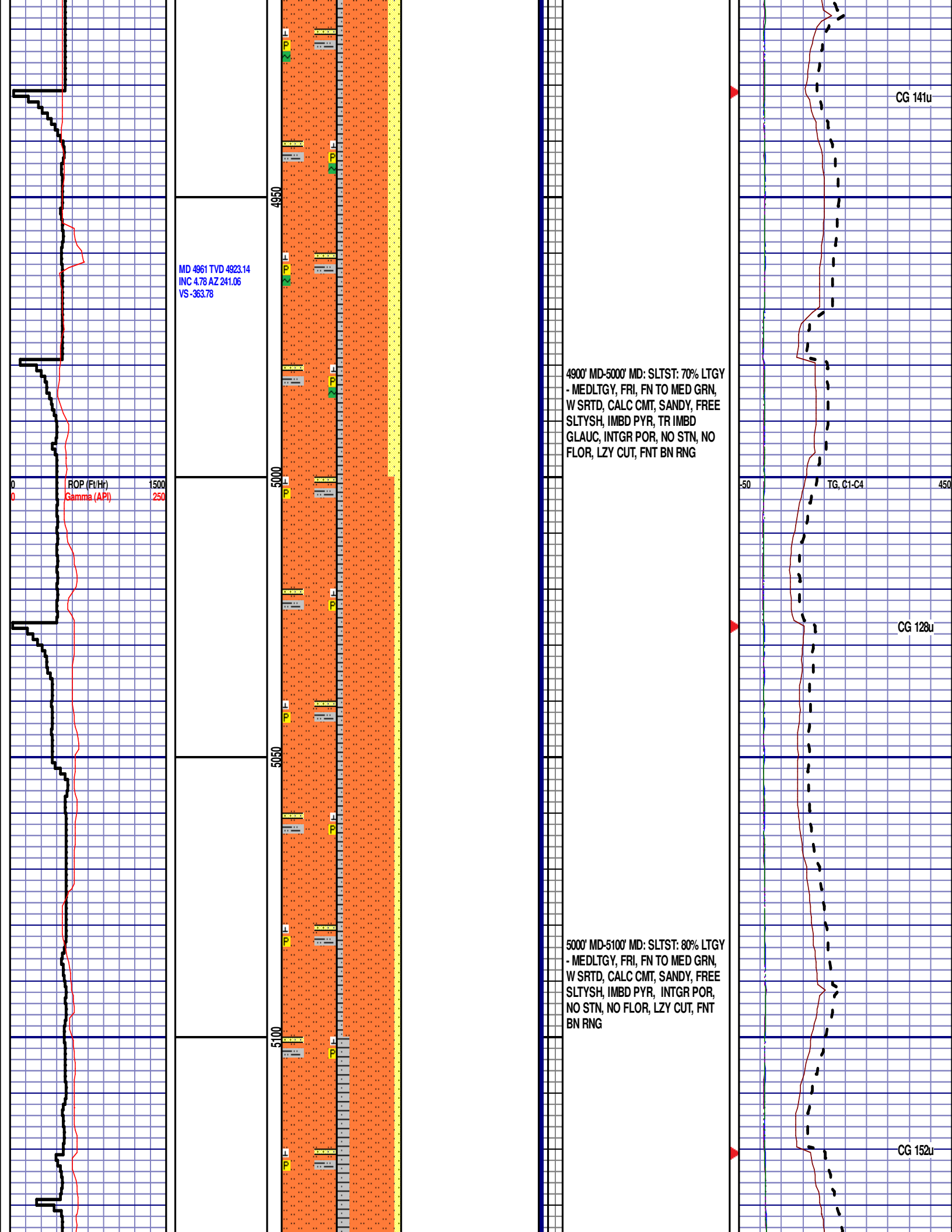
4600' MD-4700' MD: SLTST: 70% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, SANDY, FREE
SLTYSH, IMBD PYR, TR IMBD
GLAUC, INTGR POR, NO STN, NO
FLOR, NO O FLOR, NO CUT, NO
RNG

CG 140u

TG, C1-C4

CG 102u





MD 5151 TVD 5112.65
INC 3.39 AZ 238.74
VS -375.49

ROP (Ft/Hr)
Gamma (API)

1500
250

MD 5245 TVD 5206.57
INC 0.95 AZ 256.38
VS -378.62

MD 5340 TVD 5301.56
INC 0.75 AZ 272.32
VS -380.01

SHANNON 5100' MD-5200' MD



5100' MD-5200' MD: SLTST: 70% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, SANDY, FREE
SLTYSH, IMBD PYR, INTGR POR,
NO STN, NO FLOR, LZY CUT, FNT
BN RNG

5200' MD-5300' MD: SLTST: 70% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, SANDY, FREE
SLTYSH, IMBD PYR, INTGR POR,
NO STN, NO FLOR, LZY CUT, FNT
BN RNG

DEPTH 5280'

WT 8.90
VIS 27
PH 8.9
FIL 56.0
CL 600
CAL 80
H2O 95.5
OIL 0.0
LGS 39.3
GELS 2/4/6
PV 3
YP 2
CK 4/0
SOL 4.3

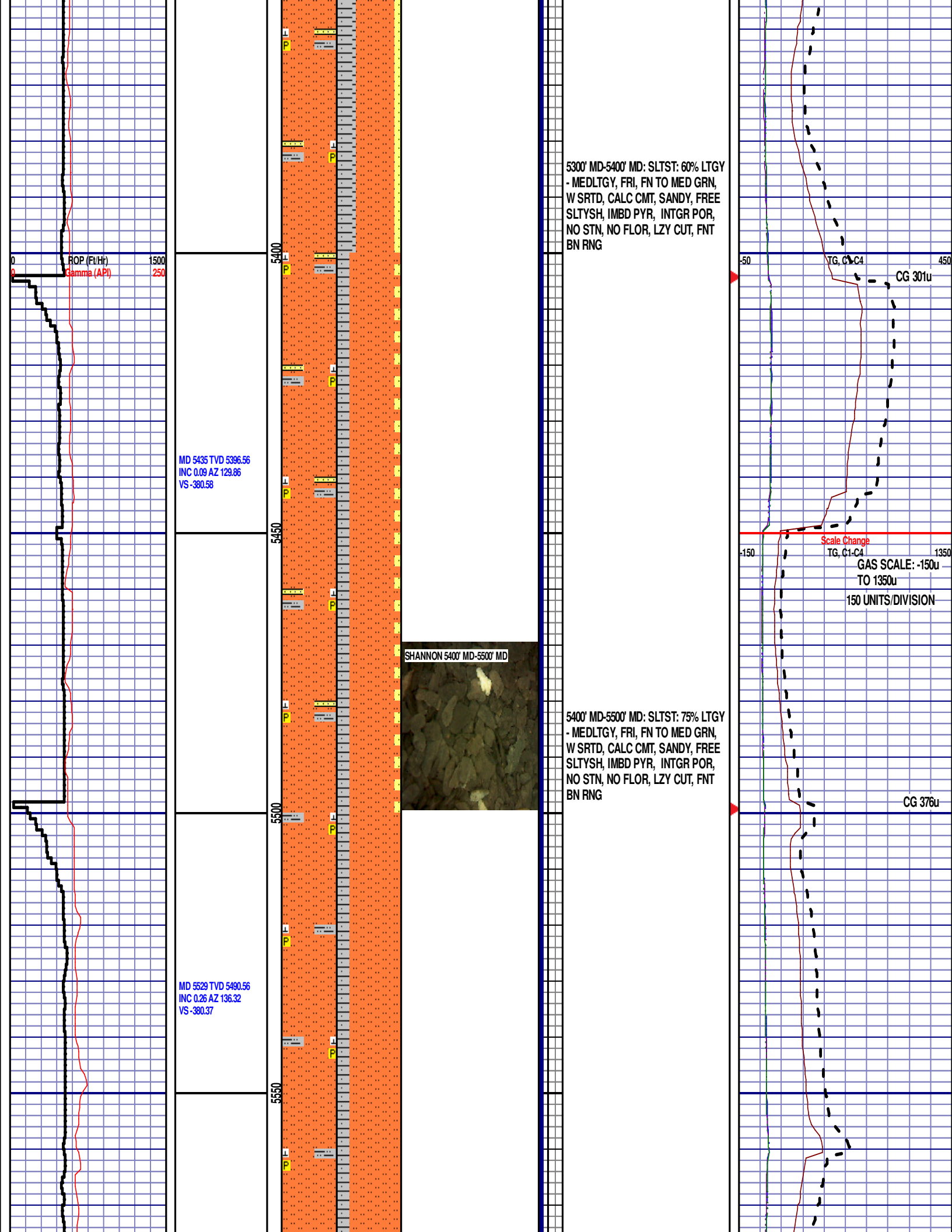
CG 200u

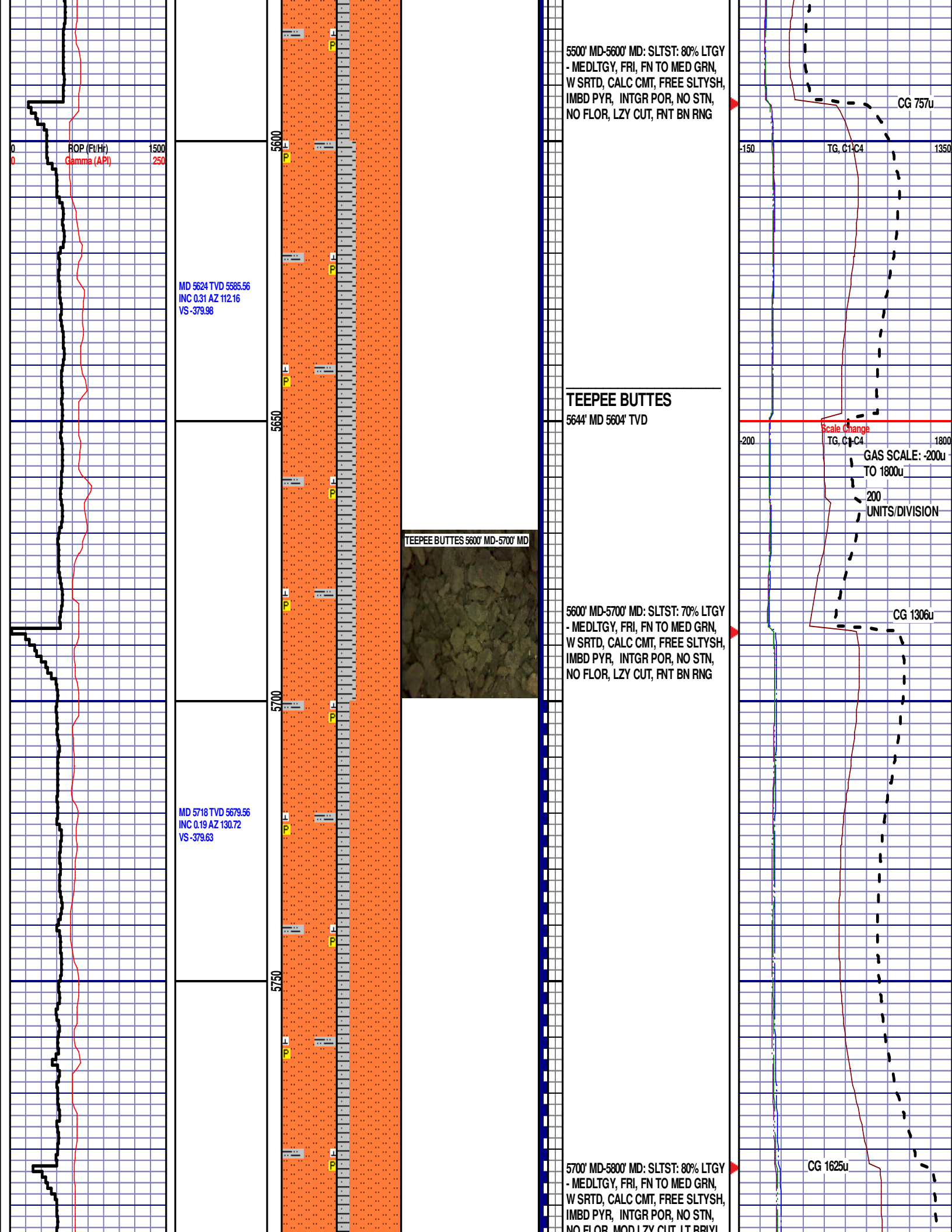
CG 203u

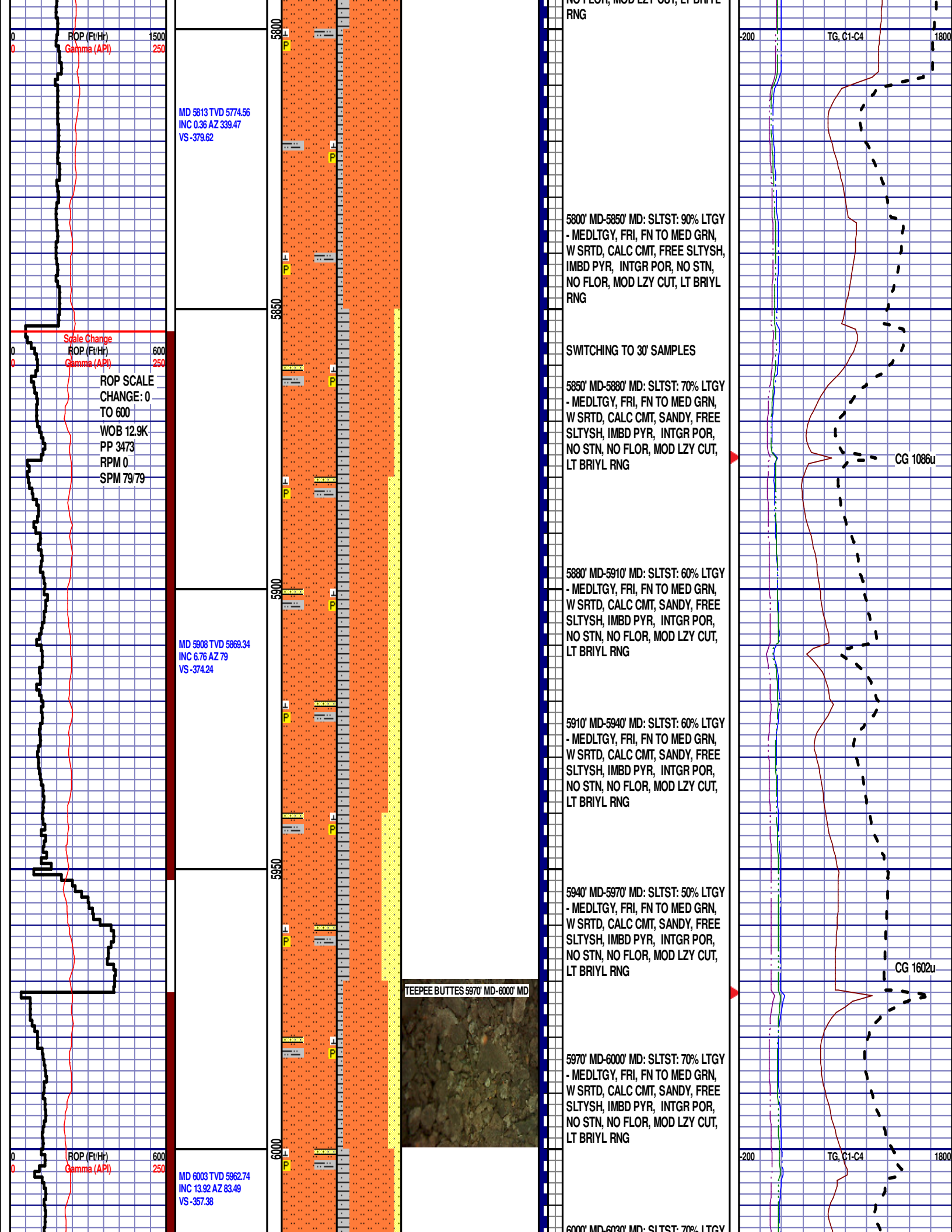
TG, C11C4

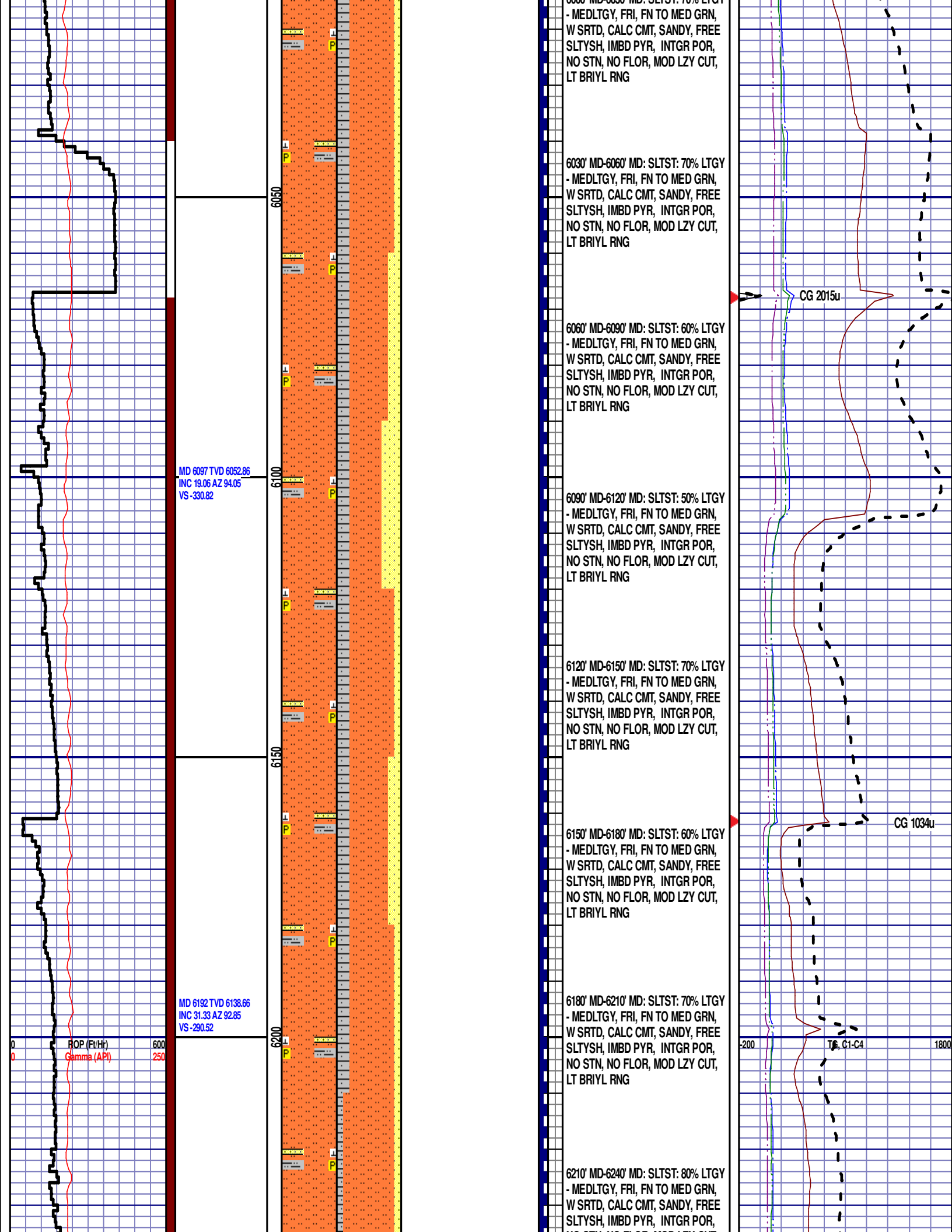
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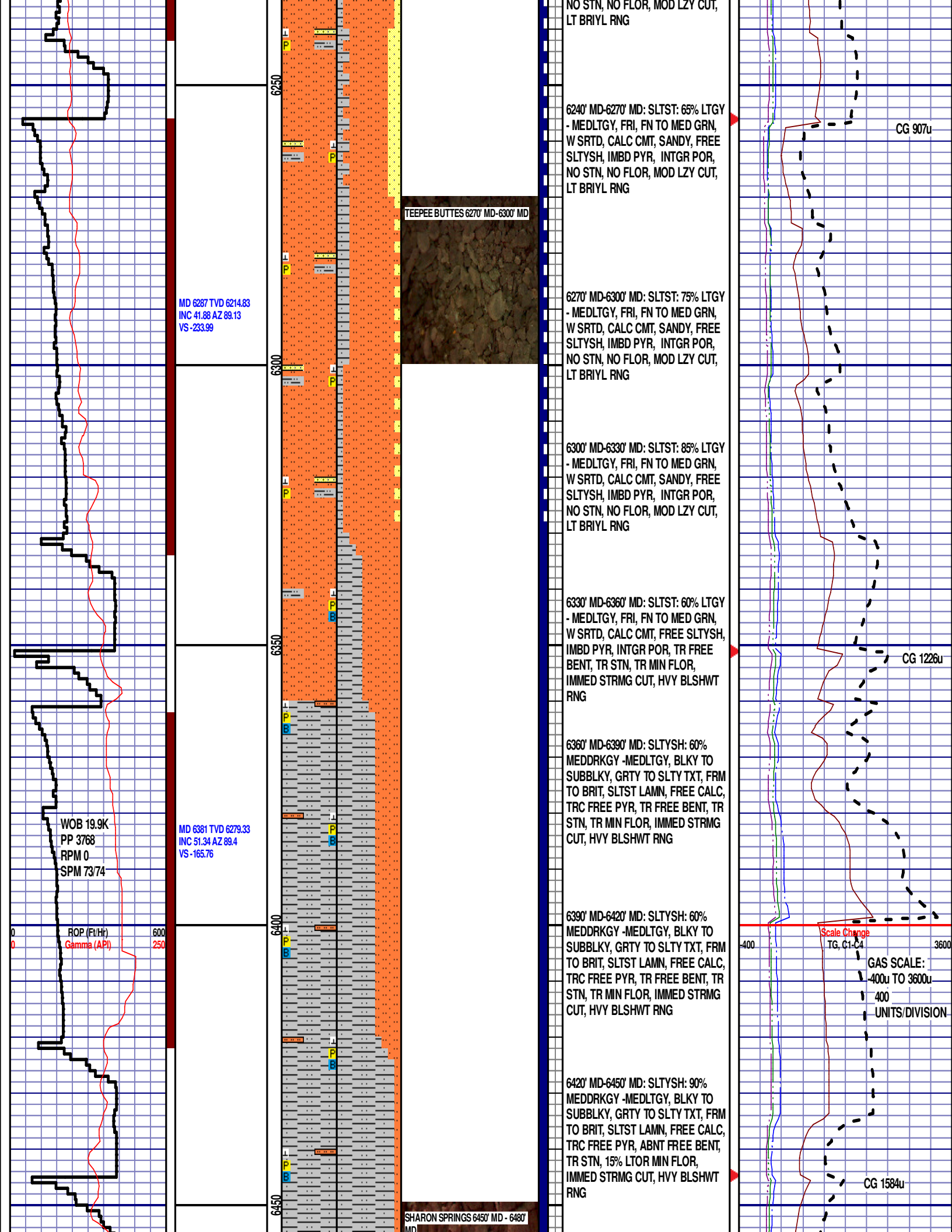
-50











6500

END OF VERTICAL LOG @ 6480' MD ON
09/02/15, CONTINUED ON HORIZONTAL LOG