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Customer Information

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

Geologist: Renee Clackler
Noble Energy Inc.

Mud Logging Details

Logger: Ross Apodaca &
Dan King

Log Interval: 2500' MD to 6560' MD

Start Date: June 28, 2014

Release Date: July 4, 2014

Well Information

Well Name: Wells Ranch
AE30-64-1AHNA

Location: 30-6N-62W
1160' FSL, 65' FWL

County: Weld
State: Colorado

Drilling Rig: H&P 277

Total Depth: 11968' MD

TD Date: July 4, 2014

Formation: Niobrara A Marl

KB Elevation: 4778'

GR Elevation: 4754'

API Number: 05-123-38689-0000

ROCK TYPES

Anhy
Bent
Cht
Clyst
Coal
Congl
Dol

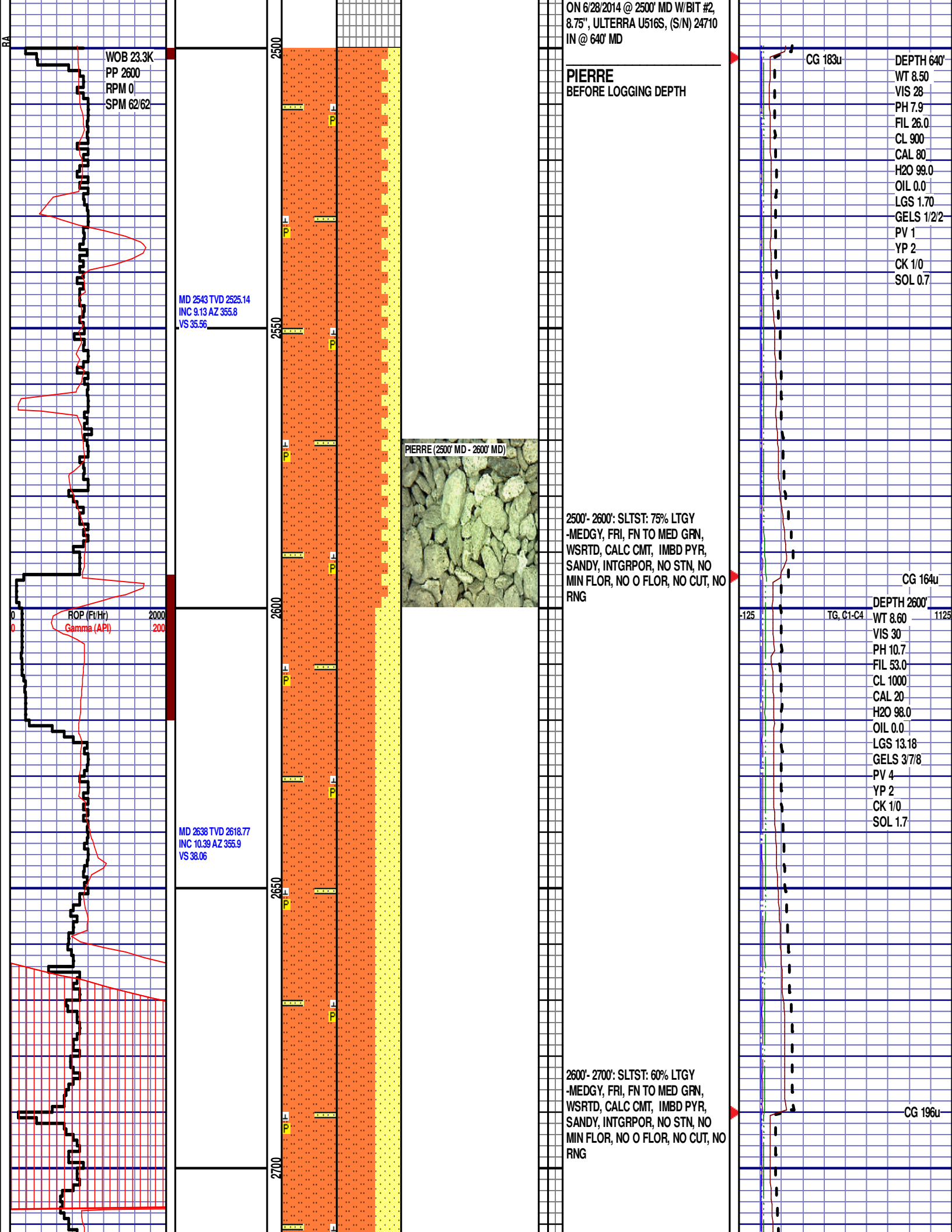
Gyp
Igne
Lmst
Meta
Mrlst
Salt
Shale

Shcol
Chalk
Slstst
Ss
Till
gw
lmywash

ogw
olmywash
oshly gw
shly gw
sdygw
hvyrcbsh
nosmpl

Lsdetrit
sltst
sdy sh

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)	2000 200		24					NOBLE ENERGY INC WELLS RANCH AE30-64-1AHNA 30-6N-62W 1160' FSL, 65' FWL WELD CO., CO H&P 277 LOGGERS: ROSS APODACA DAN KING CALLED OUT BY COMPANY MAN ON 6/28/2014 @ 12:30 AM COMMENCED LOGGING @ 12:35 PM	-125 1125	TG, C1-C4
SLIDE=RED ROTATE=WHITE								CONNECTIONS ARE MARKED WITH RED TRIANGLES		
ROP SCALE: 0 TO 2000 GAMMA SCALE: 0 TO 200 (GAMMA DATA AS RECEIVED)								GAS SCALE: -125 TO 1125 125 UNITS/DIVISION		
								DRILLING ON WATER BASED MUD		



MD 2732 TVD 2711.37
INC 9.38 AZ 353.62
VS 40.84

ROP (Ft/Hr)
Gamma (API)

MD 2826 TVD 2804
INC 10.2 AZ 356.65
VS 43.5

MD 2921 TVD 2897.56
INC 9.82 AZ 355.06
VS 46.05

2750

2800

2850

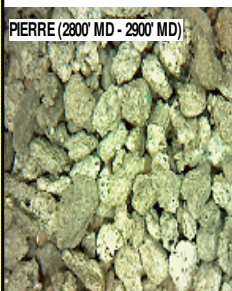
2900

2700'- 2800': SLTST: 60% LTGY
-MEDGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
SANDY, INTGRPOR, NO STN, NO
MIN FLOR, NO O FLOR, NO CUT, NO
RNG

CG 164u

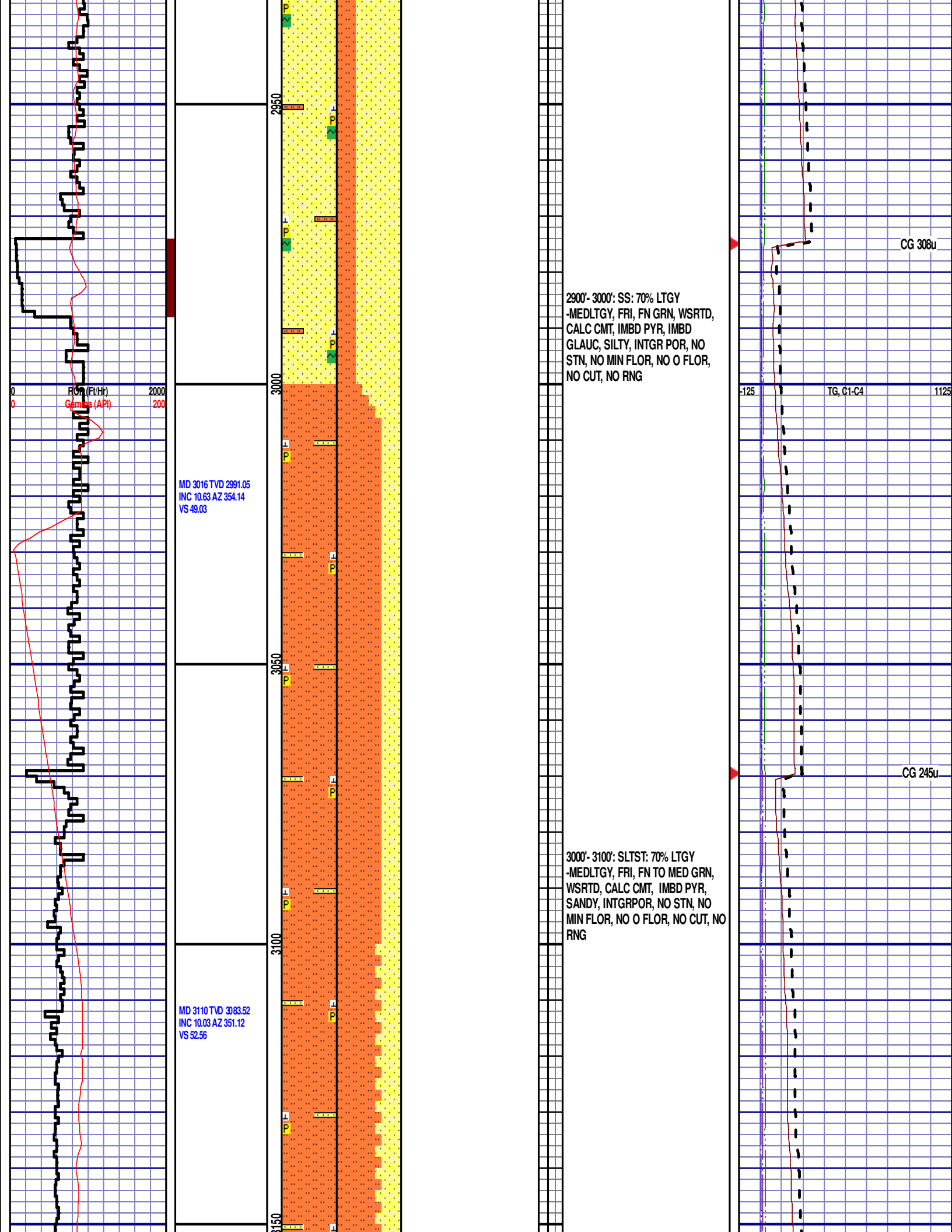
TG, C1-C4

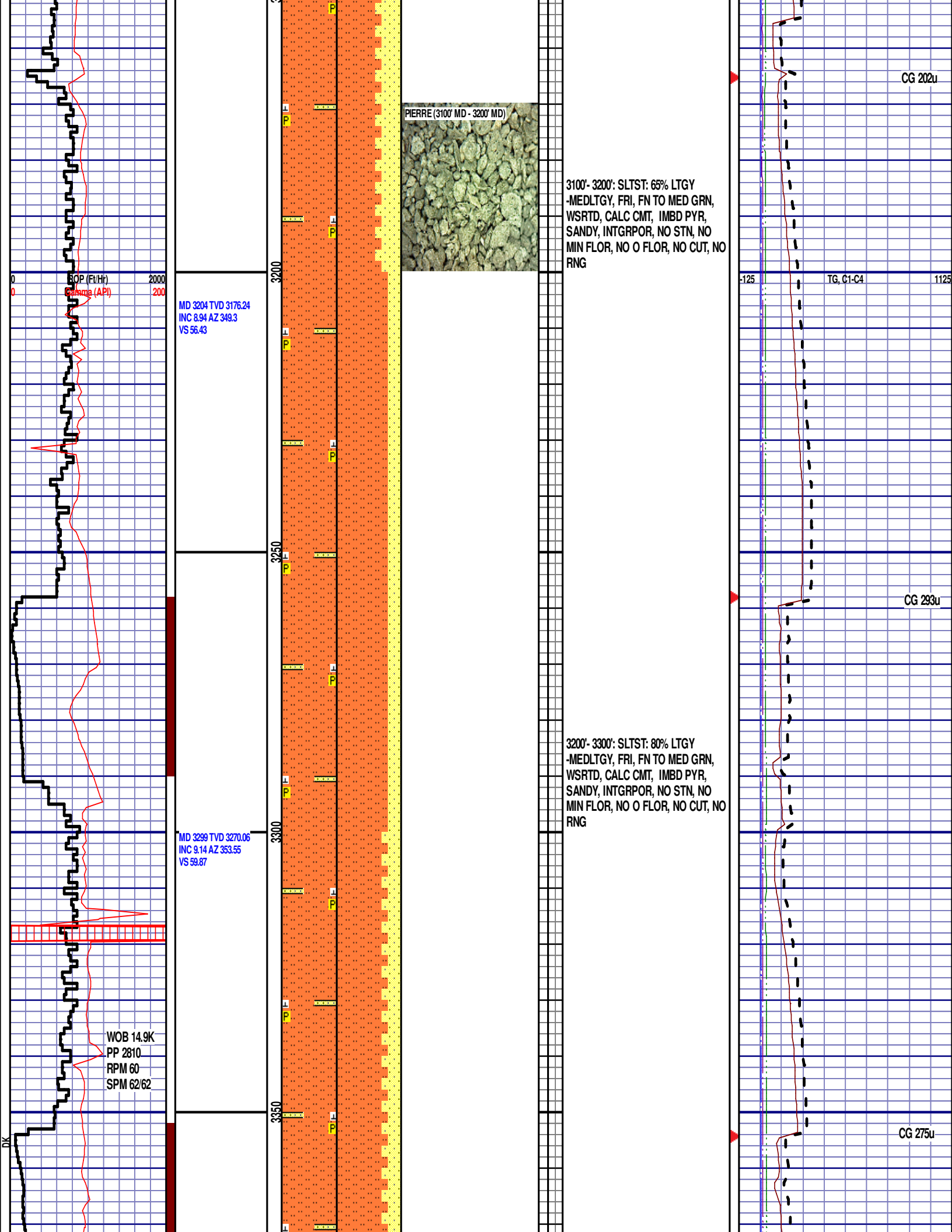
PIERRE (2800' MD - 2900' MD)

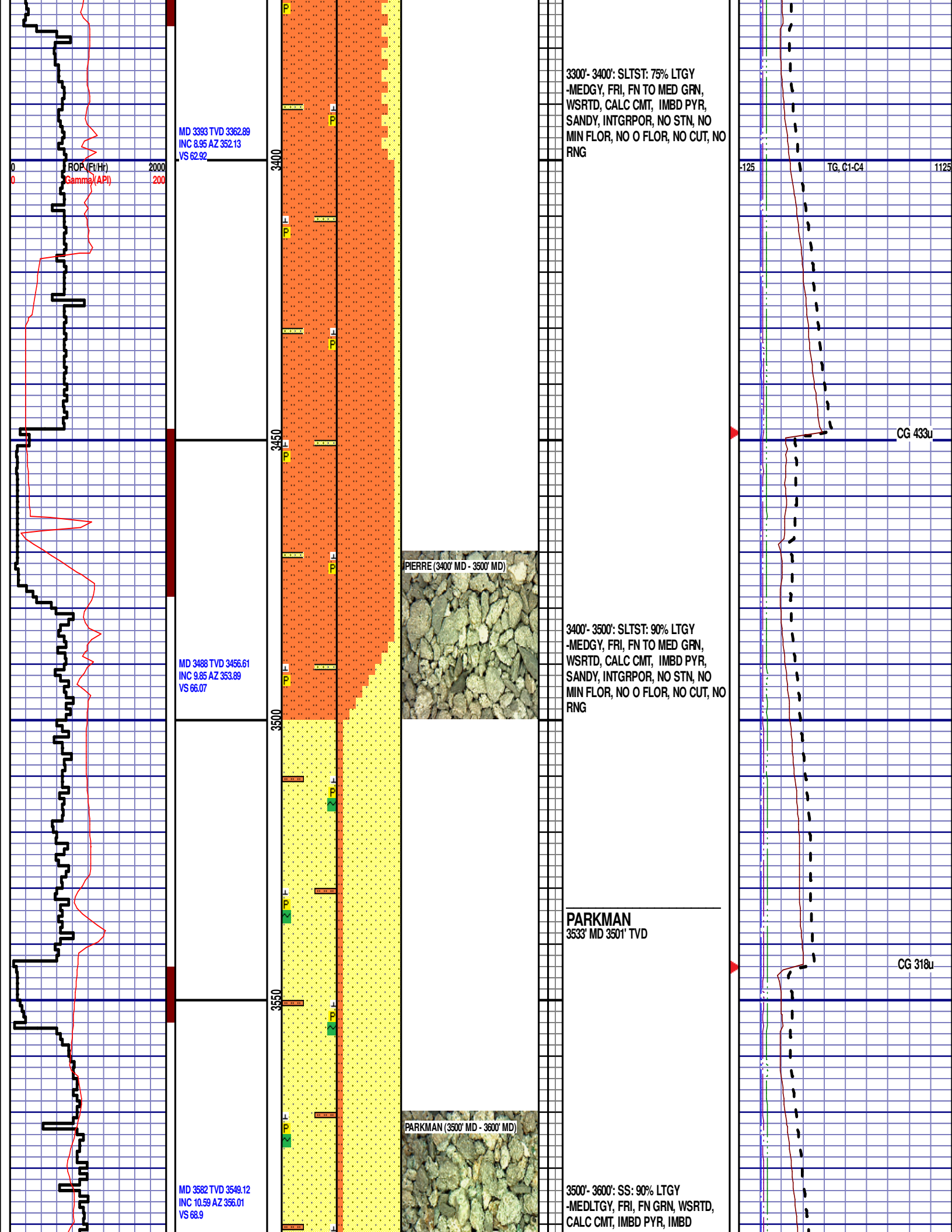


2800'- 2900': SS: 60% LTGY
-MEDLTGY, FRI, FN GRN, WSRTD,
CALC CMT, IMBD PYR, IMBD
GLAUC, SILTY, INTGR POR, NO
STN, NO MIN FLOR, NO O FLOR,
NO CUT, NO RNG

CG 285u







MD 3393 TVD 3362.89
INC 8.95 AZ 352.13
VS 62.92

ROP (Fu/Hr)
Gamma (API)

2000
200

3400

3300'- 3400': SLTST: 75% LTGY
-MEDGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
SANDY, INTGRPOR, NO STN, NO
MIN FLOR, NO O FLOR, NO CUT, NO
RNG

-125

TG, C1-C4

1125

3450

CG 433u

MD 3488 TVD 3456.61
INC 9.85 AZ 353.89
VS 66.07

3500

3400'- 3500': SLTST: 90% LTGY
-MEDGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
SANDY, INTGRPOR, NO STN, NO
MIN FLOR, NO O FLOR, NO CUT, NO
RNG

PIERRE (3400' MD - 3500' MD)



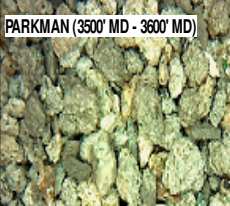
3550

PARKMAN
3533' MD 3501' TVD

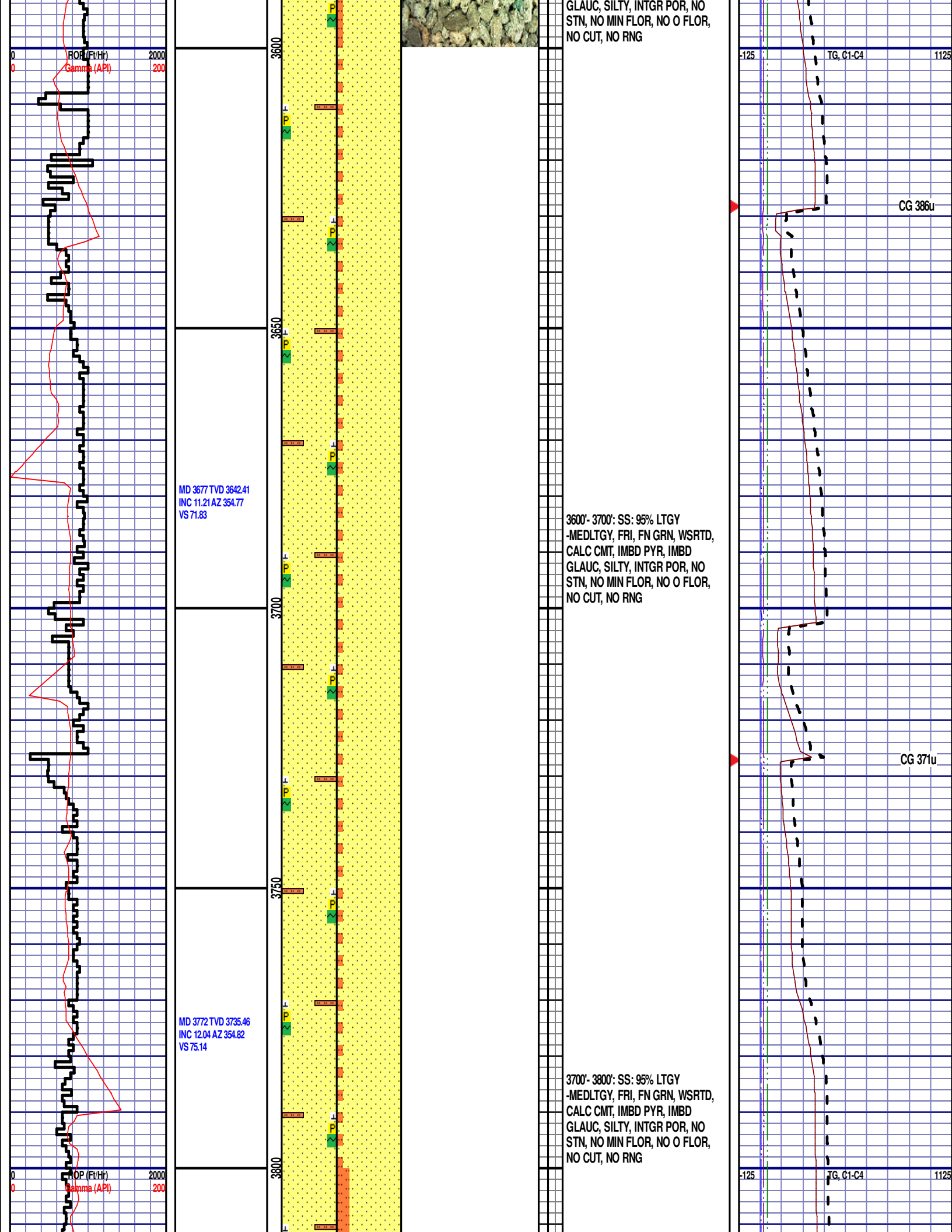
CG 318u

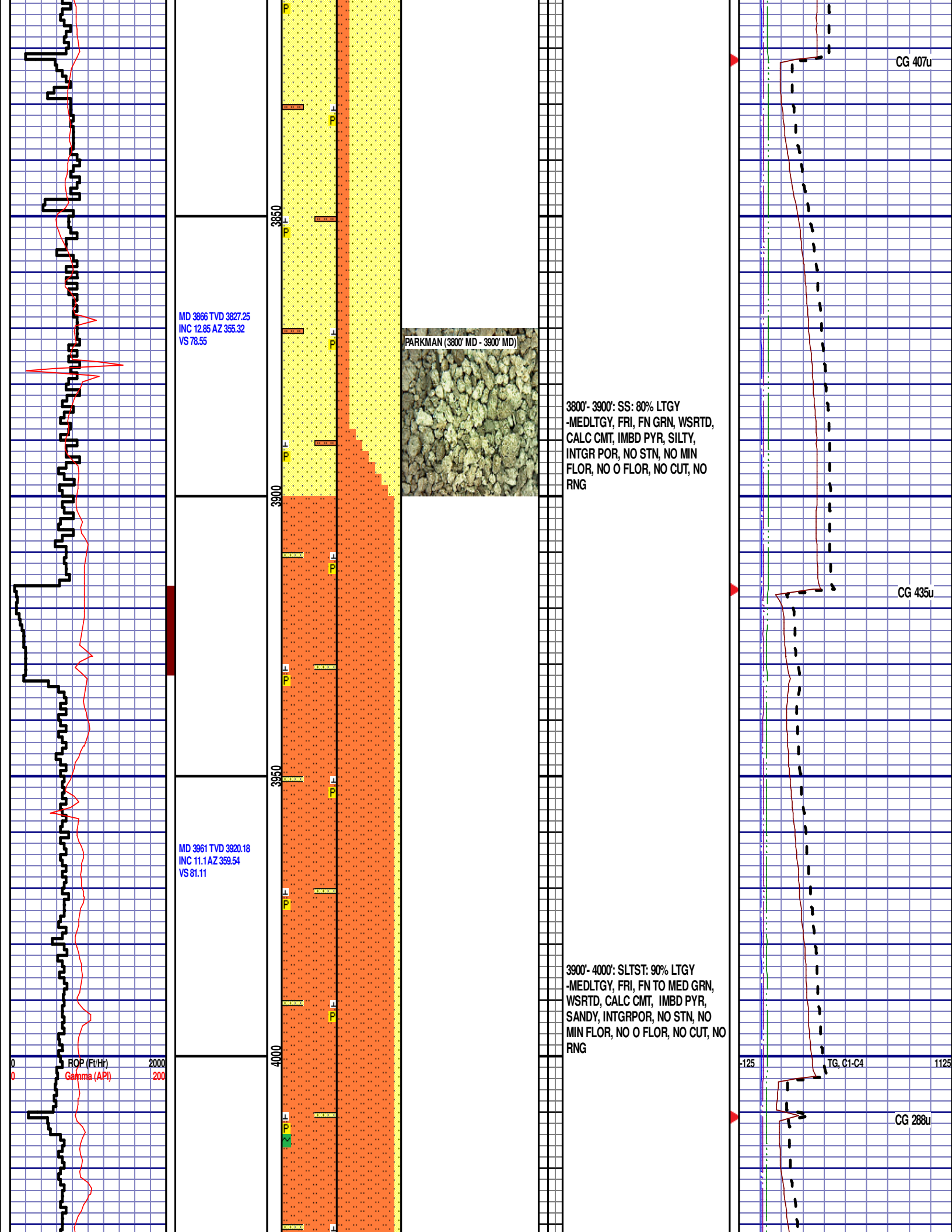
MD 3582 TVD 3549.12
INC 10.59 AZ 356.01
VS 66.9

PARKMAN (3500' MD - 3600' MD)



3500'- 3600': SS: 90% LTGY
-MEDLTGY, FRI, FN GRN, WSRTD,
CALC CMT, IMBD PYR, IMBD





MD 4055 TVD 4012.54
INC 10.3 AZ 359.36
VS 82.73

MD 4150 TVD 4106.16
INC 9.26 AZ 0.19
VS 84.14

WOB 12.0K
PP 2327
RPM 50
SPM 30/30

ROP (Ft/Hr) 2000
Gamma (API) 200

MD 4244 TVD 4198.85
INC 9.93 AZ 353.71
VS 86.29

4000'- 4100': SLTST: 90% LTGY
-MEDLTGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
IMBD GLAUC, SANDY, INTGRPOR,
NO STN, NO MIN FLOR, NO O
FLOR, NO CUT, NO RNG

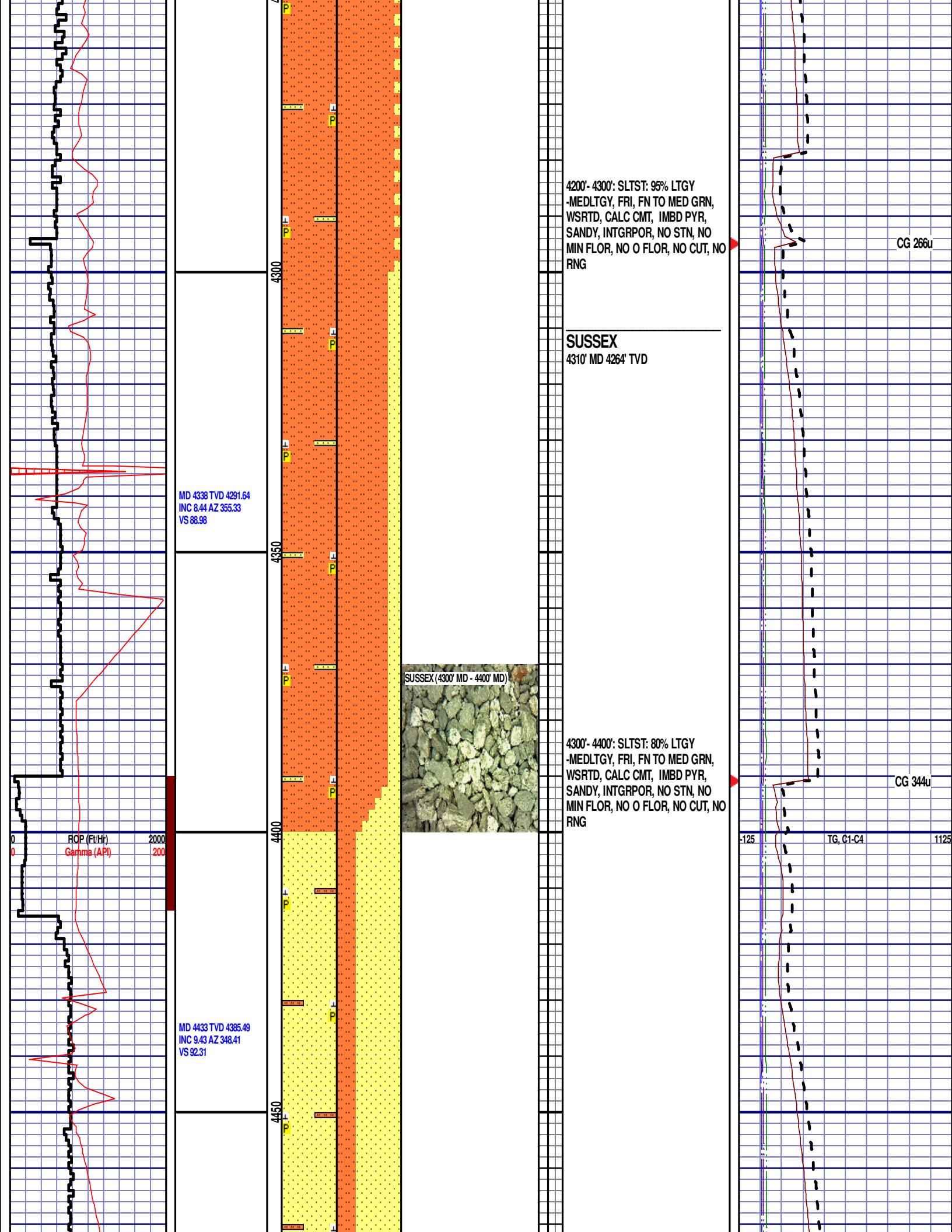
PARKMAN (4100' MD - 4200' MD)

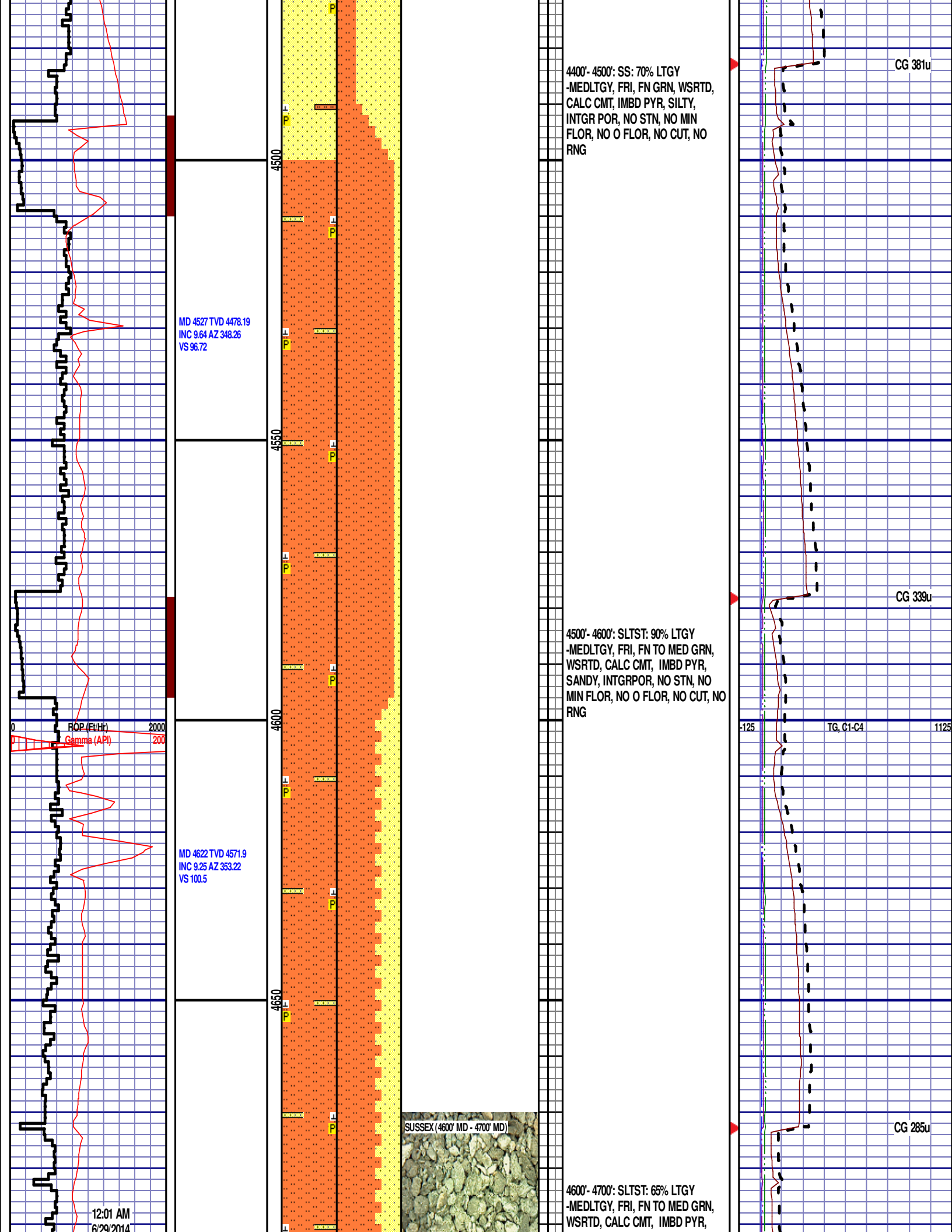


4100'- 4200': SLTST: 95% LTGY
-MEDLTGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
IMBD GLAUC, SANDY, INTGRPOR,
NO STN, NO MIN FLOR, NO O
FLOR, NO CUT, NO RNG

CG 273u

TG, C1-C4 CG 231u₁₁₂₅





02/25/14
FT/24 HRS 2182
DAY 02

MD 4716 TVD 4664.87
INC 7.73 AZ 351.13
VS 103.5

MD 4810 TVD 4758.12
INC 6.71 AZ 347.47
VS 106.62

MD 4905 TVD 4852.55
INC 5.9 AZ 345.5
VS 100.88

4700
4750
4800
4850
4900



SANDY, INTGRPOR, NO STN, NO
MIN FLOR, NO O FLOR, NO CUT, NO
RNG

4700'- 4800': SLTST: 90% LTGY
-MEDLTGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
SANDY, INTGRPOR, NO STN, NO
MIN FLOR, NO O FLOR, NO CUT, NO
RNG

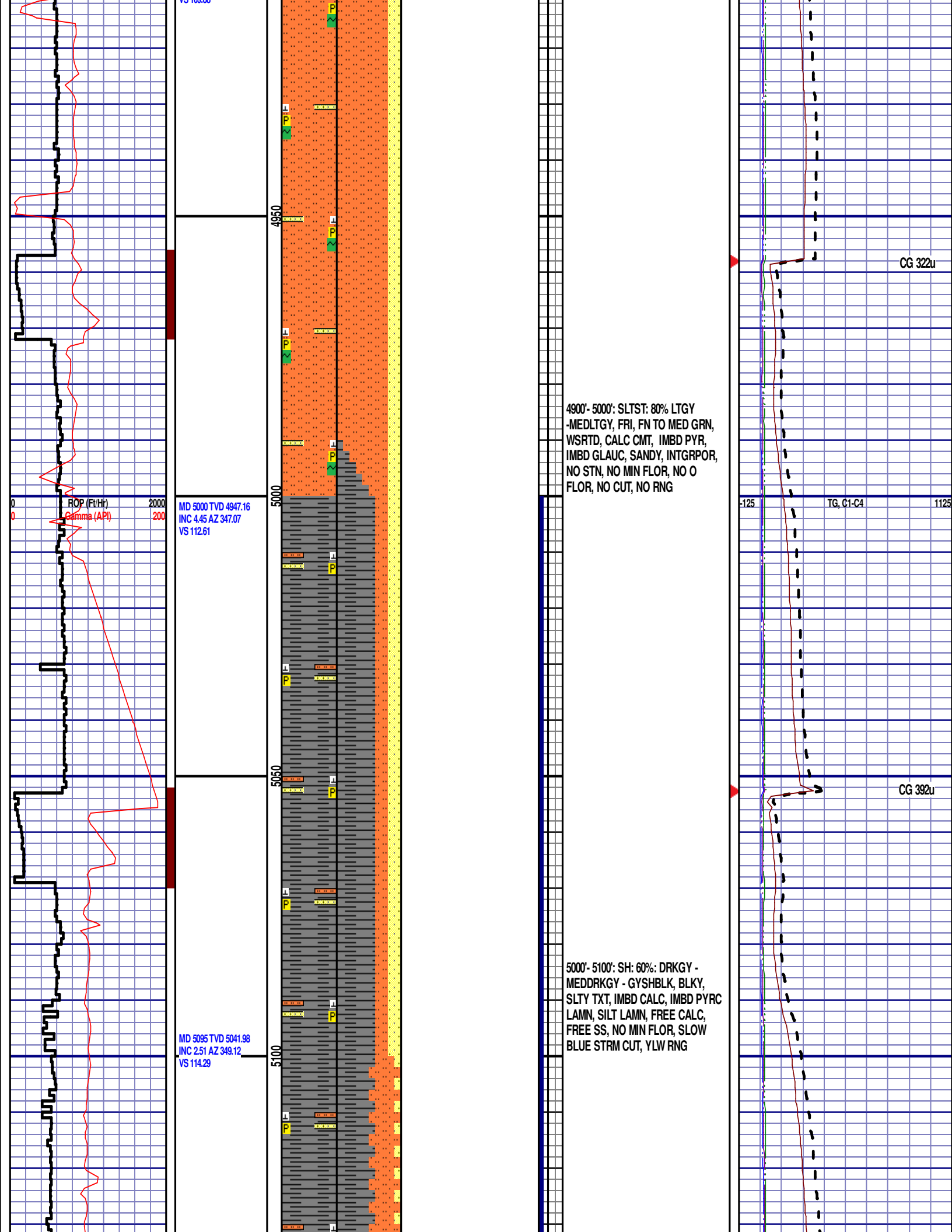
SHANNON
4853' MD 4801' TVD

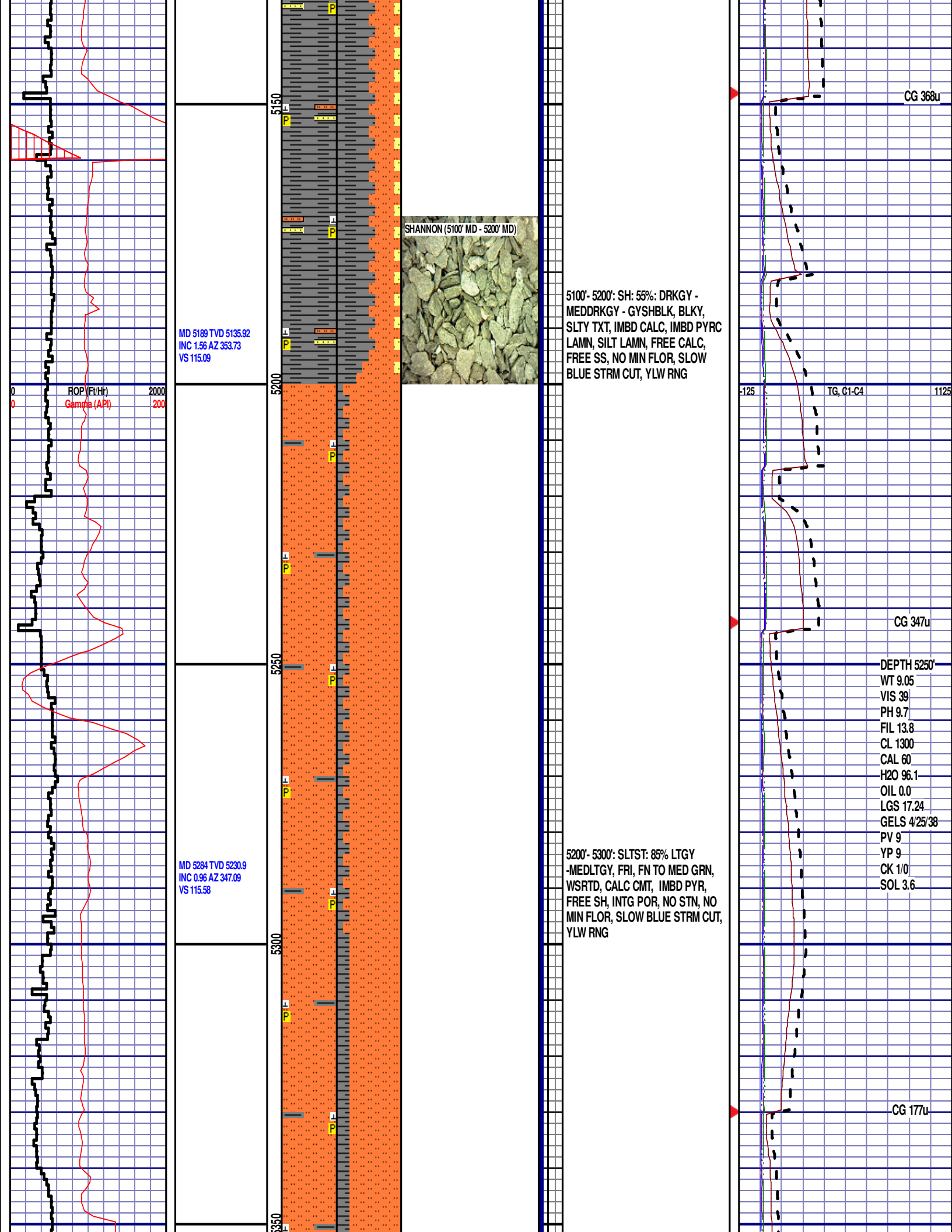
4800'- 4900': SS: 55% LTGY
-MEDLTGY, FRI, FN GRN, WSRTD,
CALC CMT, IMBD PYR, IMBD
GLAUC, SILTY, INTGR POR, NO
STN, NO MIN FLOR, NO O FLOR,
NO CUT, NO RNG

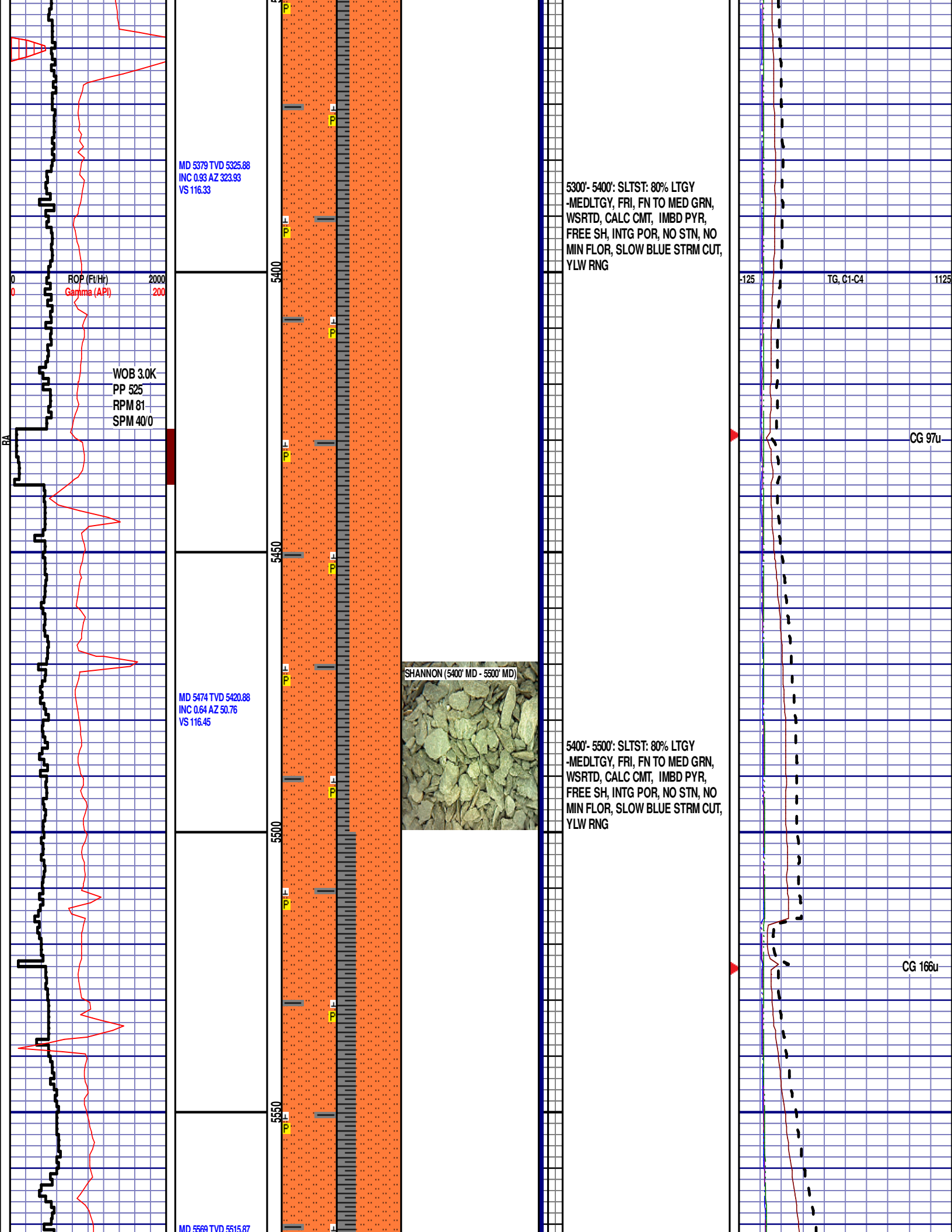
CG 271u

TG, C1-C4

CG 292u







INC 0.83 AZ 82.59
VS 115.39

ROP (Ft/Hr)
Gamma (API)

MD 5664 TVD 5610.86
INC 0.75 AZ 137.87
VS 114.27

MD 5758 TVD 5704.86
INC 0.66 AZ 144.1
VS 113.46

5600

5650

5700

5750

SHANNON (5600' MD - 5700' MD)

TEEPEE BUTTES (5700' MD - 5800' MD)

5500'- 5600': SLTST: 70% LTGY
-MEDLTGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
FREE SH, INTG POR, NO STN, NO
MIN FLOR, SLOW BLUE STRM CUT,
YLW RNG

5600'- 5700': SLTST: 85% LTGY
-MEDLTGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
FREE SH, INTG POR, NO STN, NO
MIN FLOR, SLOW BLUE STRM CUT,
YLW RNG

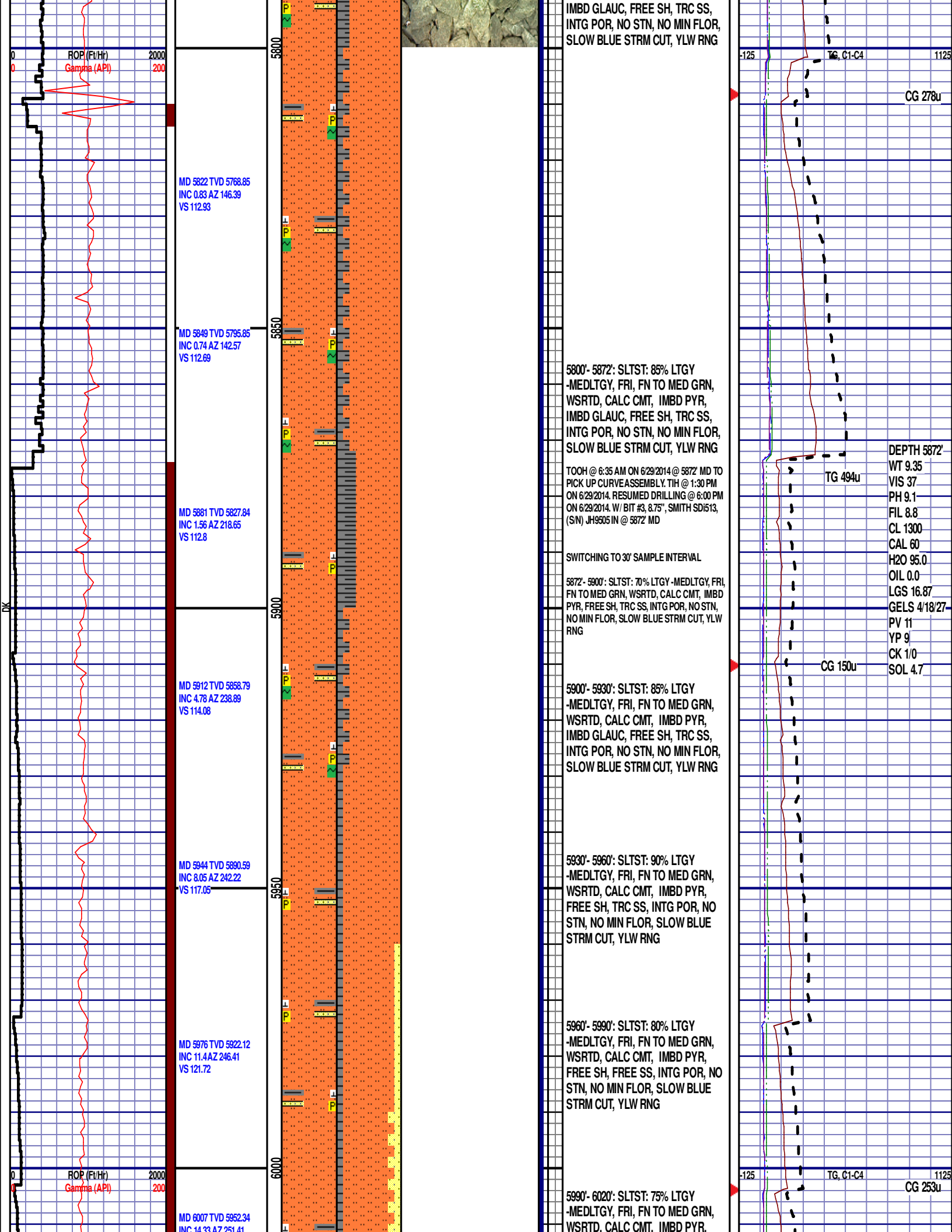
TEEPEE BUTTES
5712' MD 5659' TVD

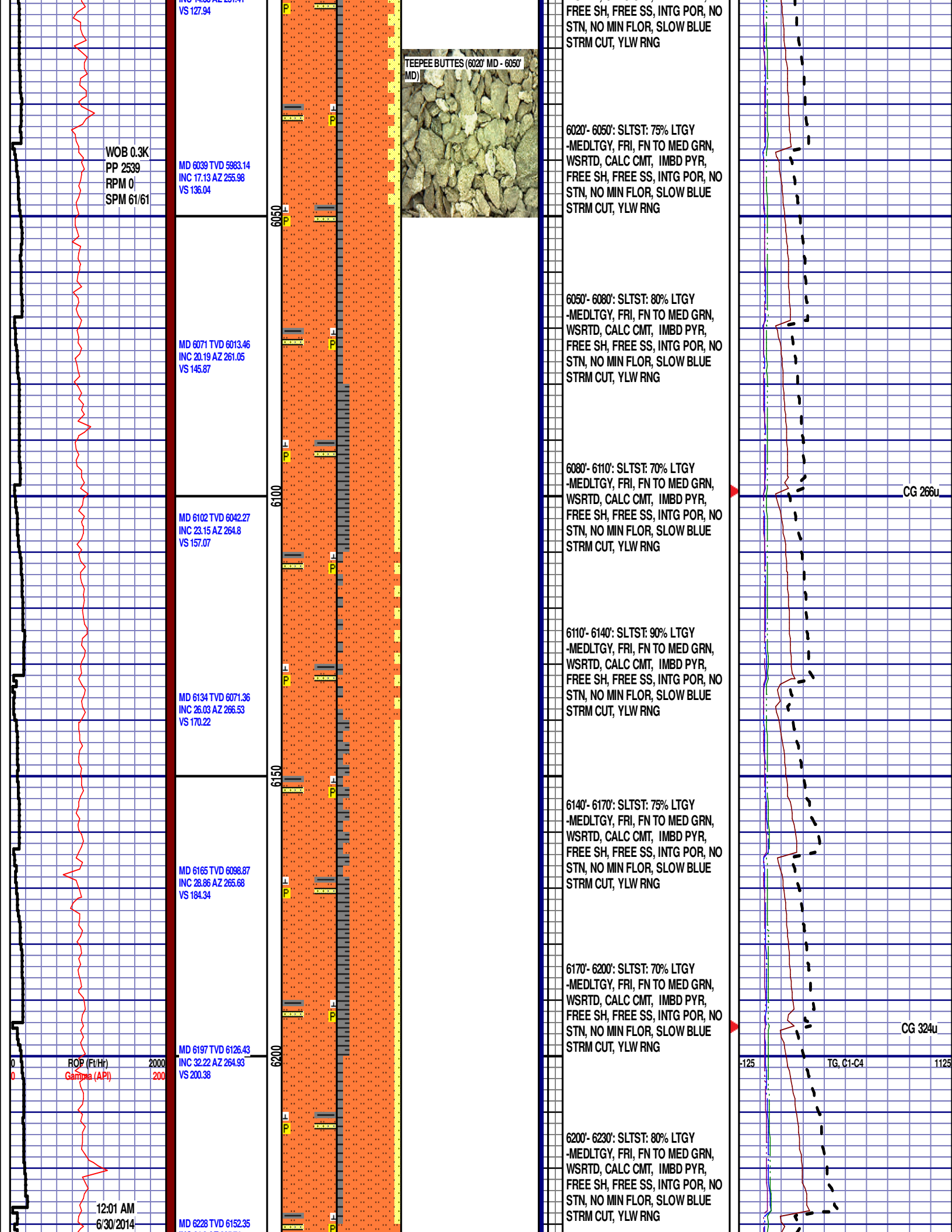
5700'- 5800': SLTST: 80% LTGY
-MEDLTGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,

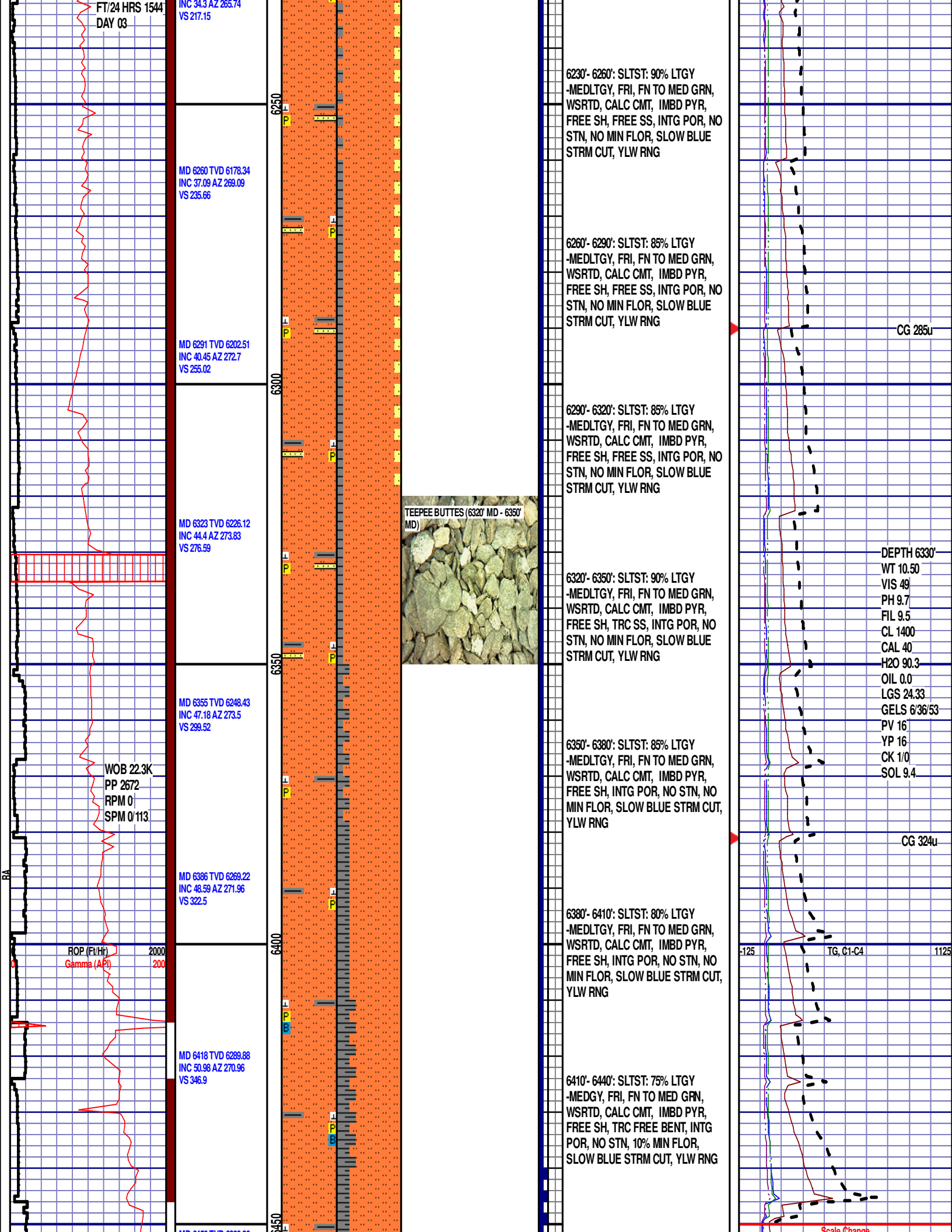
-125 TG, C1-C4 1125

CG 333u

CG 358u



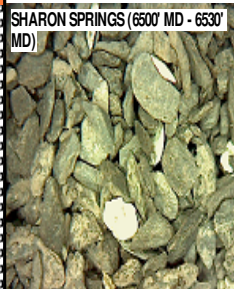
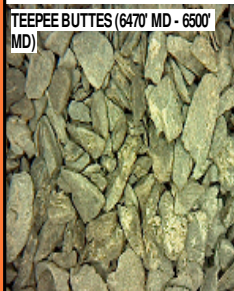
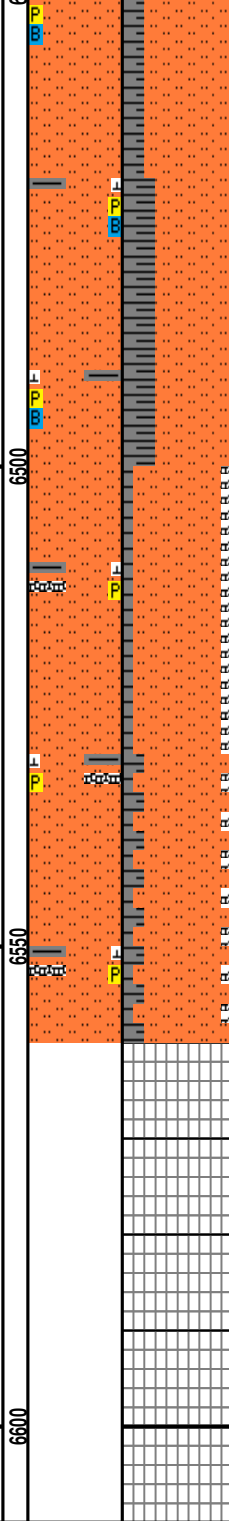




MD 6450 TVD 6309.36
INC 54.01 AZ 271.06
VS 372.22

MD 6481 TVD 6326.97
INC 56.78 AZ 271.99
VS 397.68

MD 6513 TVD 6344.04
INC 58.75 AZ 271.02
VS 424.68



6440'- 6470': SLTST: 80% LTGY
-MEDGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
FREE SH, TRC FREE BENT, INTG
POR, NO STN, 5% MIN FLOR, BLUE
STRM CUT, YLW RNG

6470'- 6500': SLTST: 70% LTGY
-MEDGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
FREE SH, FREE BENT, INTG POR,
NO STN, 20% MIN FLOR, BLUE
STRM CUT, YLW RNG

SHARON SPRINGS

6516' MD 6346' TVD

6500'- 6530': SLTST: 80% LTGY
-MEDGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
10% FREE SH, 10% FREE BENT,
INTG POR, NO STN, 25% MIN FLOR,
BLUE STRM CUT, YLW RNG

6530'- 6560': SLTST: 80% LTGY
-MEDGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
15% FREE SH, 5% FREE BENT,
INTG POR, NO STN, 20% MIN FLOR,
BLUE STRM CUT, YLW RNG

END OF VERTICAL LOG @ 6560' MD
ON 6/30/2014, CONTINUED ON
HORIZONTAL LOG.

Scale Change:
TG, C1-C4
GAS SCALE CHANGE:
-350 TO 3150
(350 UNITS/DIVISION)

CG 920u

ROP (Ft/Hr)
Gamma (API)

TG, C1-C4