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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: Sam Stelzer &
Scott Haney

Log Interval: 2500' MD to 7000' MD

Start Date: February 14, 2015

Release Date: February 19, 2015

Well Information

Well Name: Reliance E23-63-1HNC

Location: 23-T6N-R65W
1217' FSL, 256' FEL

County: Weld
State: Colorado

Drilling Rig: H&P 321

Total Depth: 11402' MD

TD Date: February 19, 2015

Formation: Niobrara C Marl

KB Elevation: 4724'

GR Elevation: 4694'

API Number: 05-123-38222-0000

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

sdycgw
hvycrbsh
NO SMPL
nosmpl
Lsdetrst
sltst
sdy sh

LOGGING ON SHIFT	ROP (Ft/Hr) Gamma (API)	Drill Depth v. Time	Survey Data	Depth	Lithology	Lithology Percentages	Sample Photographs	Col Fair Good	Porosity	Geological Description	TG (1-8) C1 (units) C2 (units) C3 (units) C4 (units)	Total Gas, C1-C4	CONNECTIONS
	ROP (Ft/Hr) Gamma (API)	1500 250		24						NOBLE ENERGY INC. RELIANCE E23-63-1HNC 23-T6N-R65W 1217' FSL, 256' FEL WELD CO., CO	50	TG, C1-C4	450
										H&P 321 LOGGERS: SAM STELZER SCOTT HANEY			
										SLIDE-RED ROTATE-WHITE			
										ROP SCALE: 0 TO 1500 (FT/HR)			
										GAMMA SCALE: 0 TO 250 (GAMMA DATA AS RECEIVED)			
										12:01 AM			
										CONNECTIONS ARE MARKED WITH RED TRIANGLES			
										GAS SCALE: 50u TO 450u (50 UNITS/DIVISION)			
										DRILLING ON WATER-BASED MUD			

02/15/2015
DAY 02
0 FT/24HRS

2500' MD @ 11.77 AZ @ 2600' MD SW
02/15/15 W/BIT #2 8.75" SMITH
SDi519HPX S/N JJ7987 IN @ 842' MD

WOB 20.3K
PP 2704
RPM 60
SPM 79/79

PIERRE
BEFORE LOGGING DEPTH

DEPTH 842'
WT 9.10
VIS 34.0
PH 8.8
FIL 9.2
CL 1500
CAL 80.0
H2O 94.8
OIL 0.0
LGS 37.13
GELS 2/4/6
PV 5.0
YP 5.0
SOLS 4.9
CAKE 1/0

MD 2583 TVD 2565.07
INC 12.46 AZ 139.86
VS -120.06

Pierre (2500' MD - 2600' MD)

2500' MD-2600' MD: SLTST: 50% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, TRC PYR, TRC
IMBD GLAU, SANDY, TRC FREE
SLTYSH, INTGR POR, NO STN, NO
FLOR, NO O FLOR, NO CUT, NO
RNG

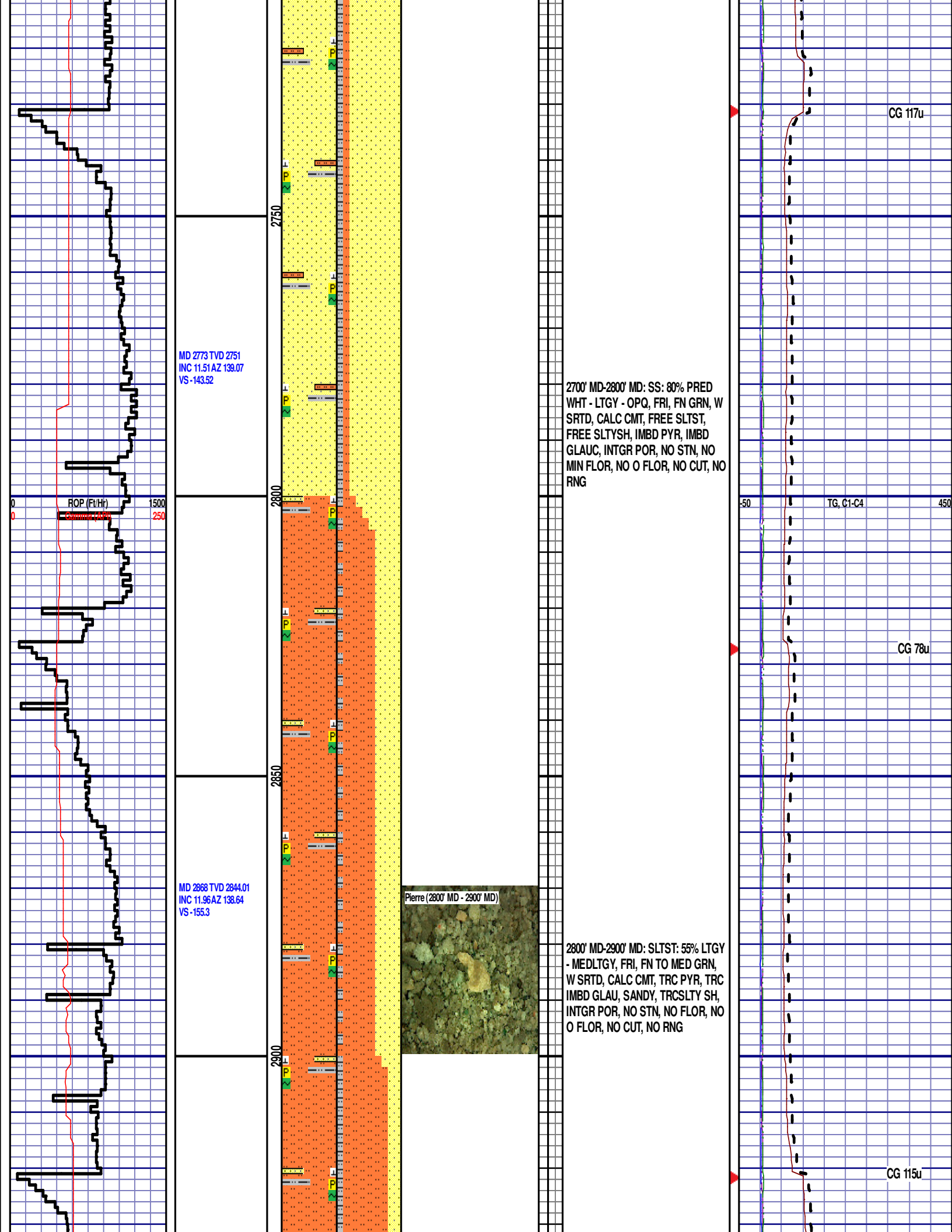
ROP (Ft/Hr)
Gamma (API)

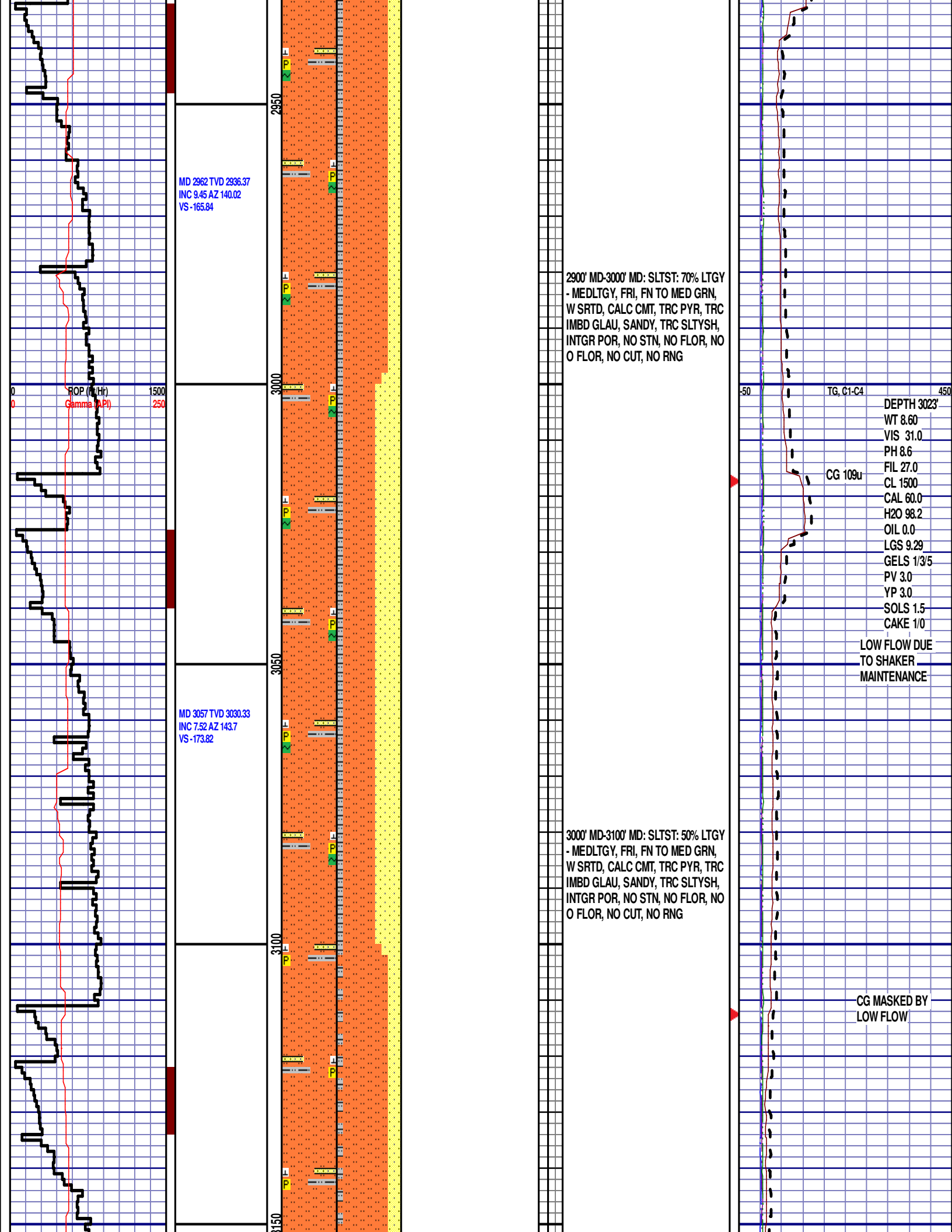
50 TG, C1-C4 450

MD 2678 TVD 2657.95
INC 11.77 AZ 139.55
VS -131.97

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

CG 114u
CG 118u





MD 3152 TVD 3124.7
INC 5.57 AZ 141.75
VS -179.8

ROP (FHR)
Gamma (API)

1500
250

MD 3247 TVD 3219.45
INC 2.63 AZ 139.95
VS -183.71

MD 3342 TVD 3314.31
INC 3.51 AZ 154
VS -186.12

Pierre (3100' MD - 3200' MD)



3100' MD-3200' MD: SLTST: 75% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, TRC PYR,
SANDY, TRC SLTYSH, INTGR POR,
NO STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

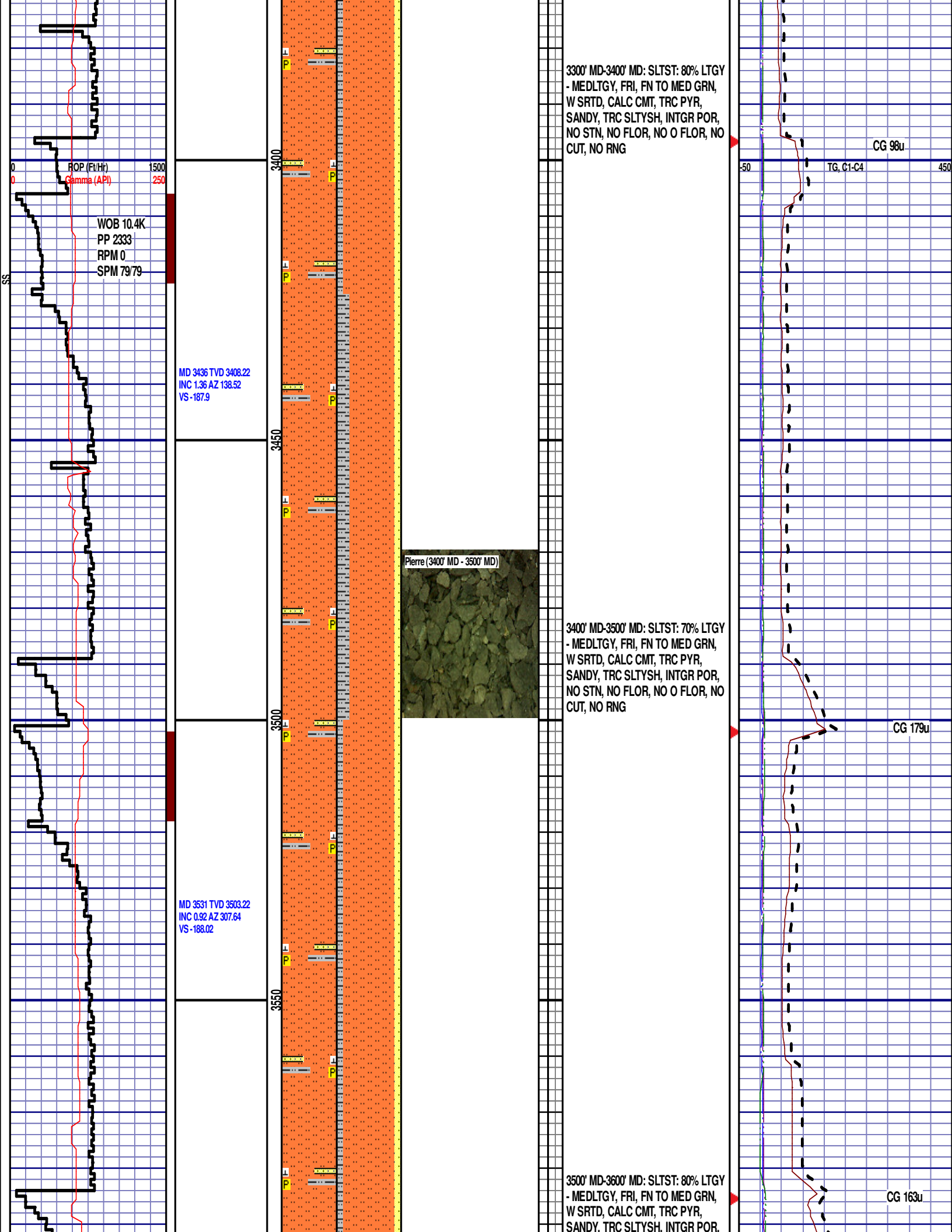
FLOW TO SHAKER
RESTORED

TG, C1-C4

CG 79u

3200' MD-3300' MD: SLTST: 70% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, TRC PYR,
SANDY, TRC SLTYSH, INTGR POR,
NO STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

CG 92u



3300' MD-3400' MD: SLTST: 80% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, TRC PYR,
SANDY, TRC SLTYSH, INTGR POR,
NO STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

CG 98u

TG, C1-C4

MD 3436 TVD 3408.22
INC 1.36 AZ 138.52
VS -187.9

Pierre (3400' MD - 3500' MD)

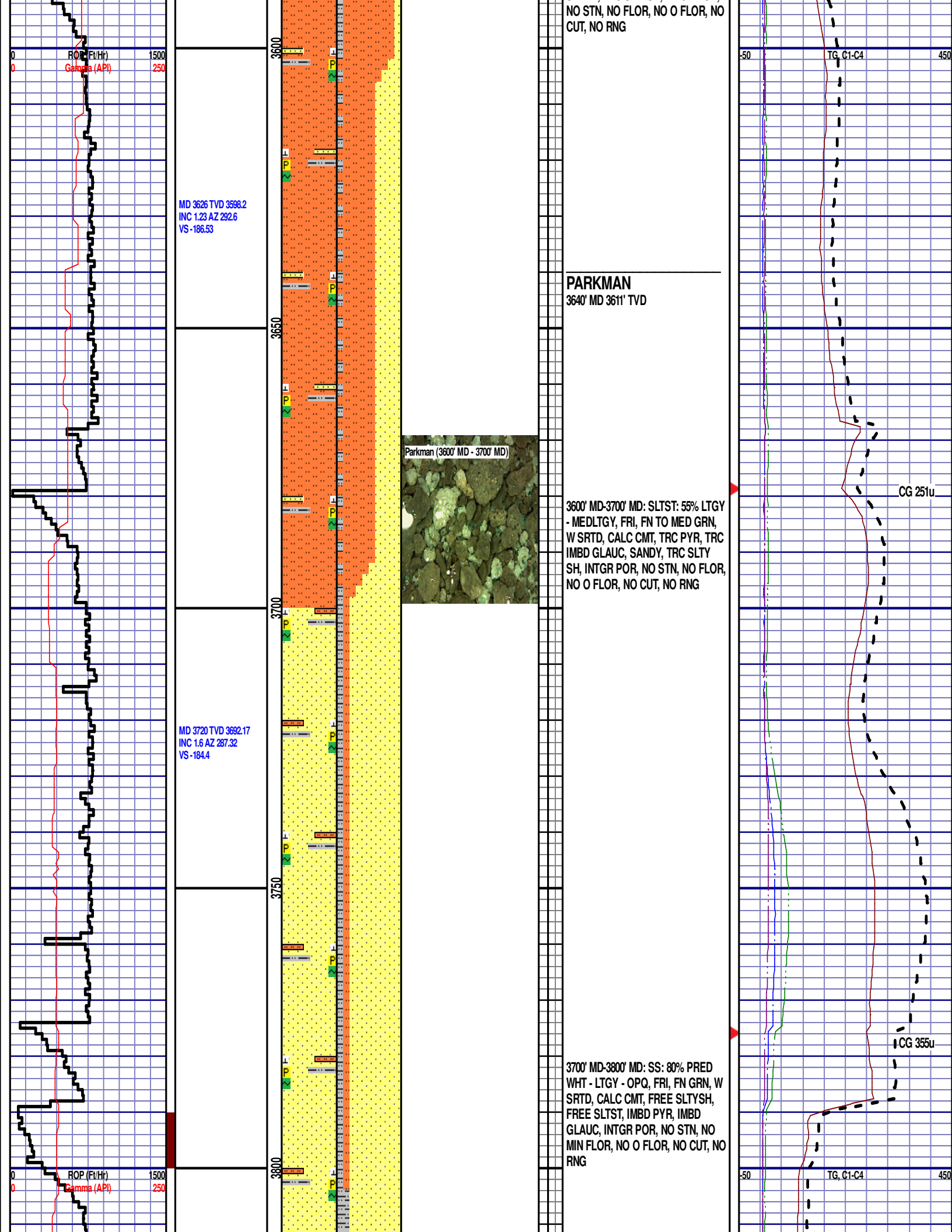
3400' MD-3500' MD: SLTST: 70% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, TRC PYR,
SANDY, TRC SLTYSH, INTGR POR,
NO STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

CG 179u

MD 3531 TVD 3503.22
INC 0.92 AZ 307.64
VS -188.02

3500' MD-3600' MD: SLTST: 80% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, TRC PYR,
SANDY, TRC SLTYSH, INTGR POR,

CG 163u



MD 3815 TVD 3787.14
INC 1.05 AZ 292.26
VS -182.38

MD 3910 TVD 3882.13
INC 0.81 AZ 291.88
VS -180.99

MD 4005 TVD 3977.12
INC 0.88 AZ 292.78
VS -179.73

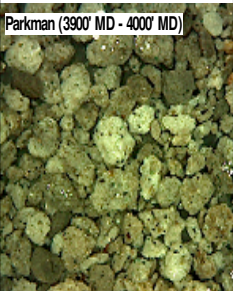
3850

3900

3950

4000

Parkman (3900' MD - 4000' MD)



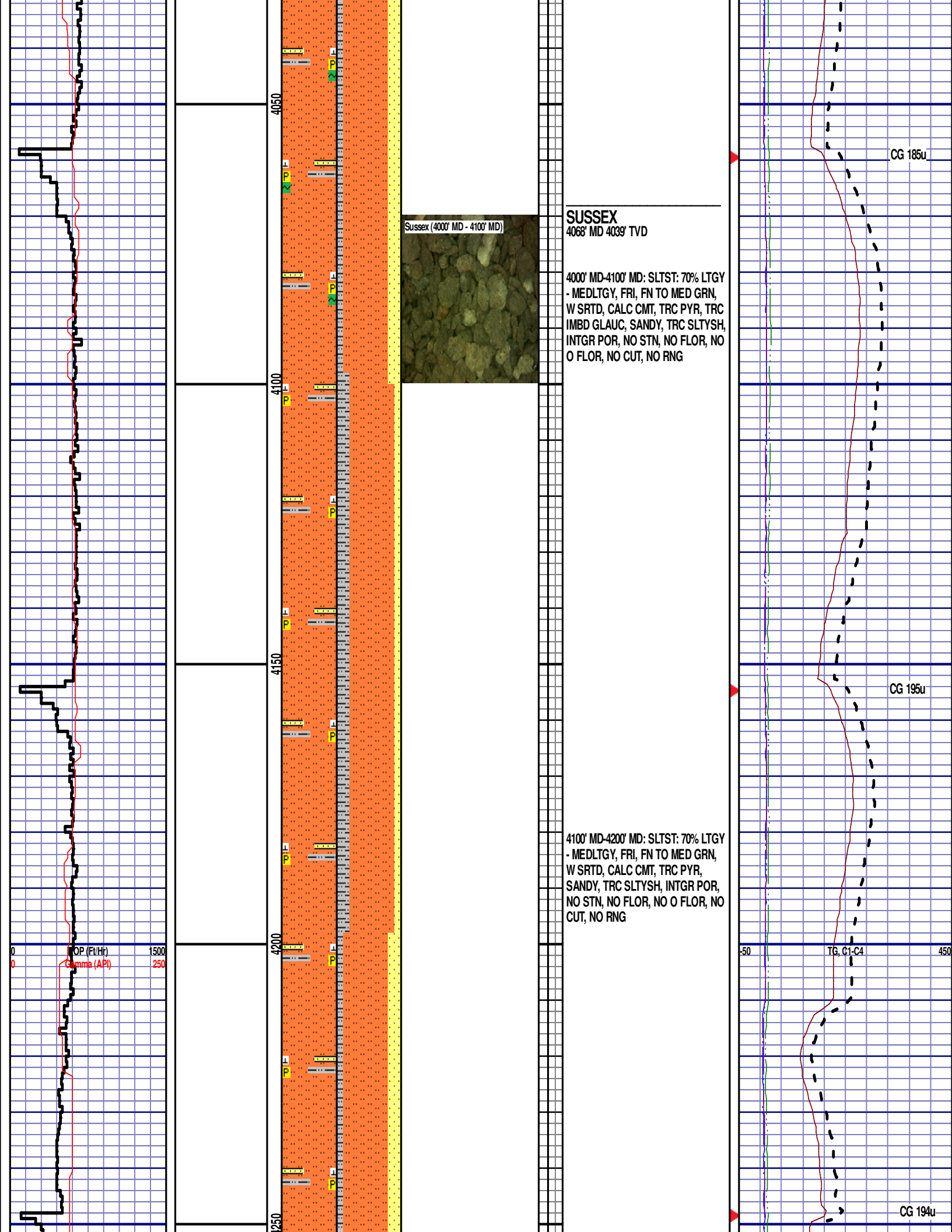
3800' MD-3900' MD: SS: 80% PRED
WHT - LTGY - OPQ, FRI, FN GRN, W
SRTD, CALC CMT, FREE SLTYSH,
IMBD PYR, IMBD GLAUC, INTGR
POR, NO STN, NO MIN FLOR, NO O
FLOR, NO CUT, NO RNG

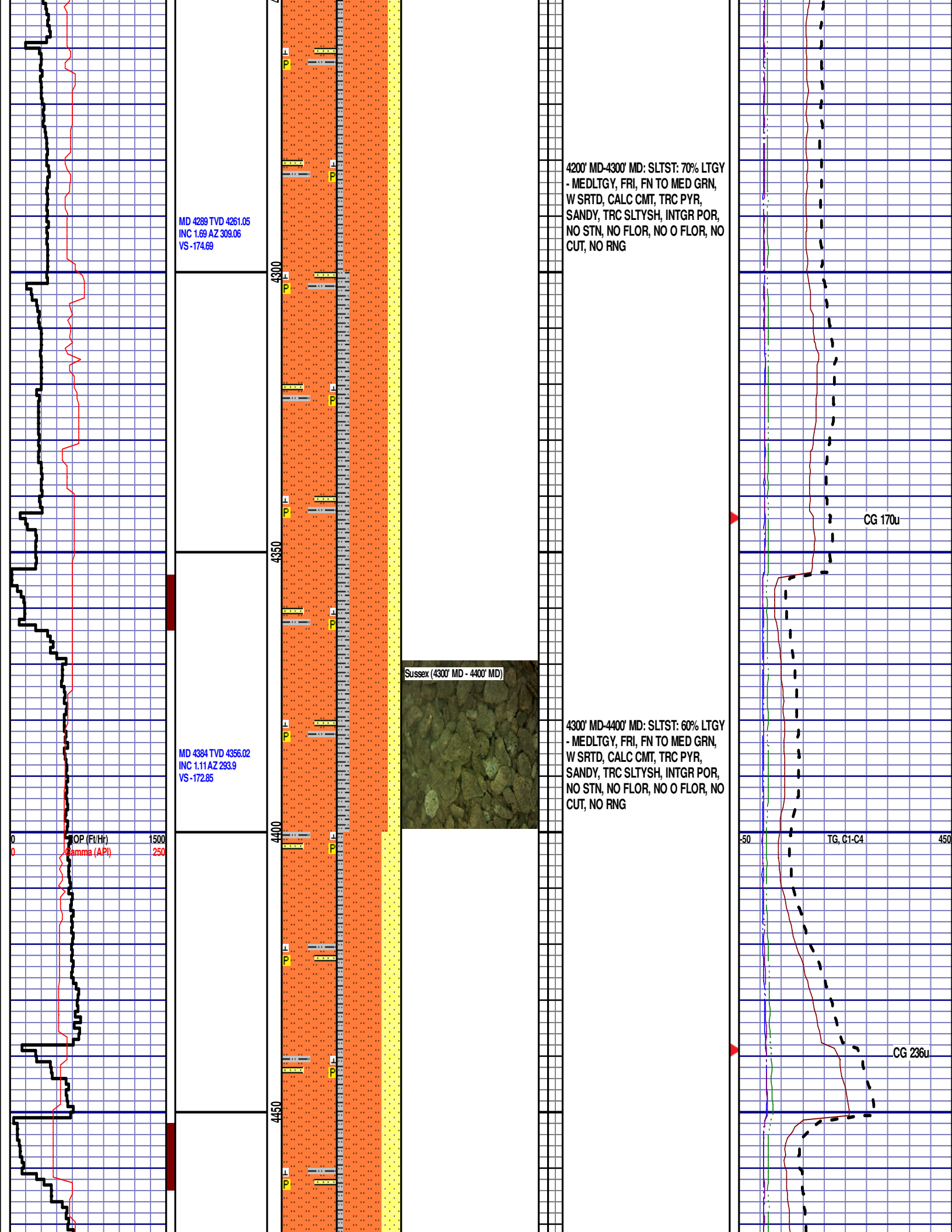
3900' MD-4000' MD: SS: 90% PRED
WHT - LTGY - OPQ, FRI, FN GRN, W
SRTD, CALC CMT, FREE SLTYSH,
IMBD PYR, IMBD GLAUC, INTGR
POR, NO STN, NO MIN FLOR, NO O
FLOR, NO CUT, NO RNG

CG 187u

CG 219u

TG, C1-C4





MD 4479 TVD 4451.01
INC 0.42 AZ 1.58
VS -172.06

MD 4574 TVD 4546.01
INC 0.71 AZ 346.44
VS -171.99

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

WOB 16.9K
PP 3363
RPM 60
SPM 78/78

4500

4550

4600

4650

4400' MD-4500' MD: SLTST: 60% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, TRC PYR,
SANDY, TRC SLTYSH, INTGR POR,
NO STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

4500' MD-4600' MD: SLTST: 80% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, TRC PYR,
SANDY, TRC SLTYSH, INTGR POR,
NO STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

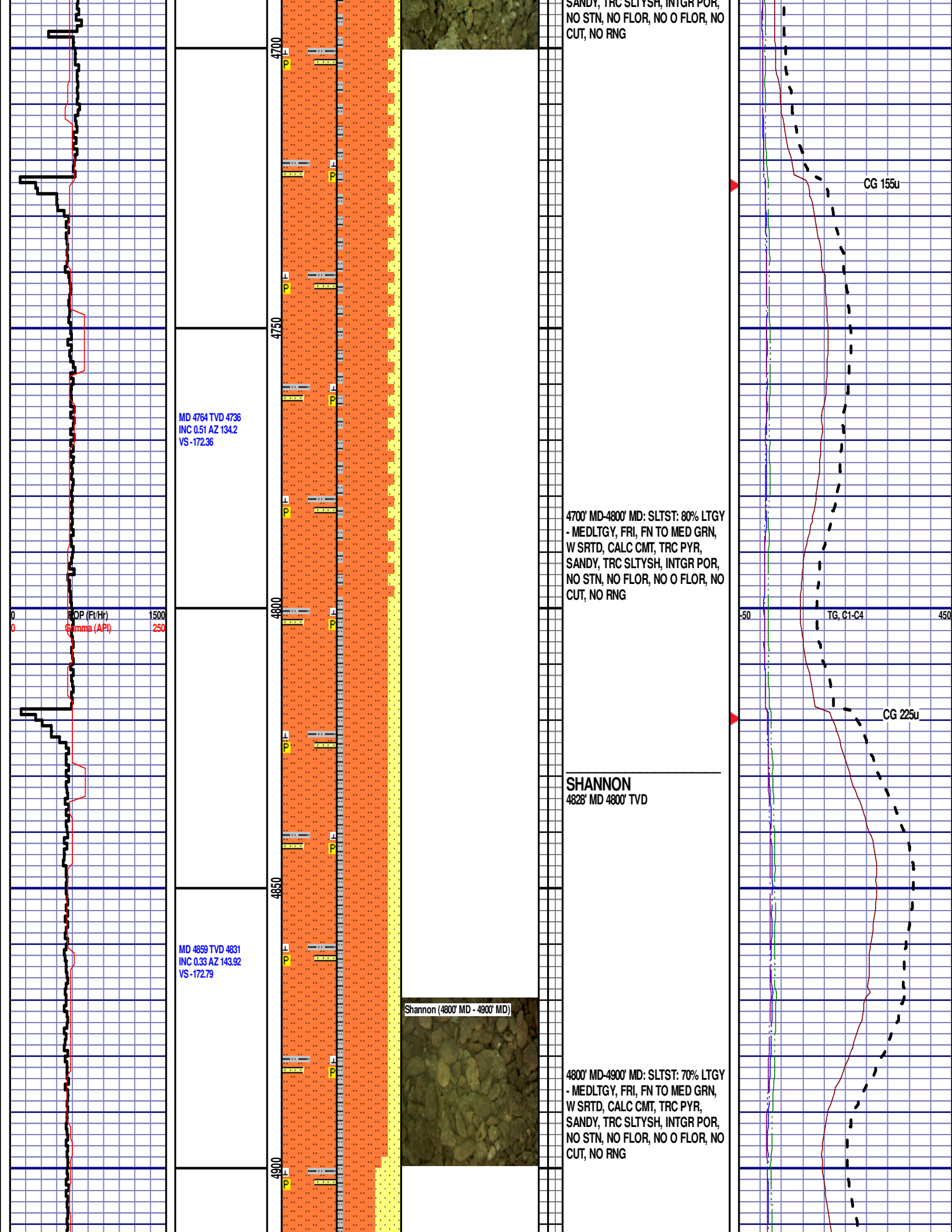
Sussex (4600' MD - 4700' MD)

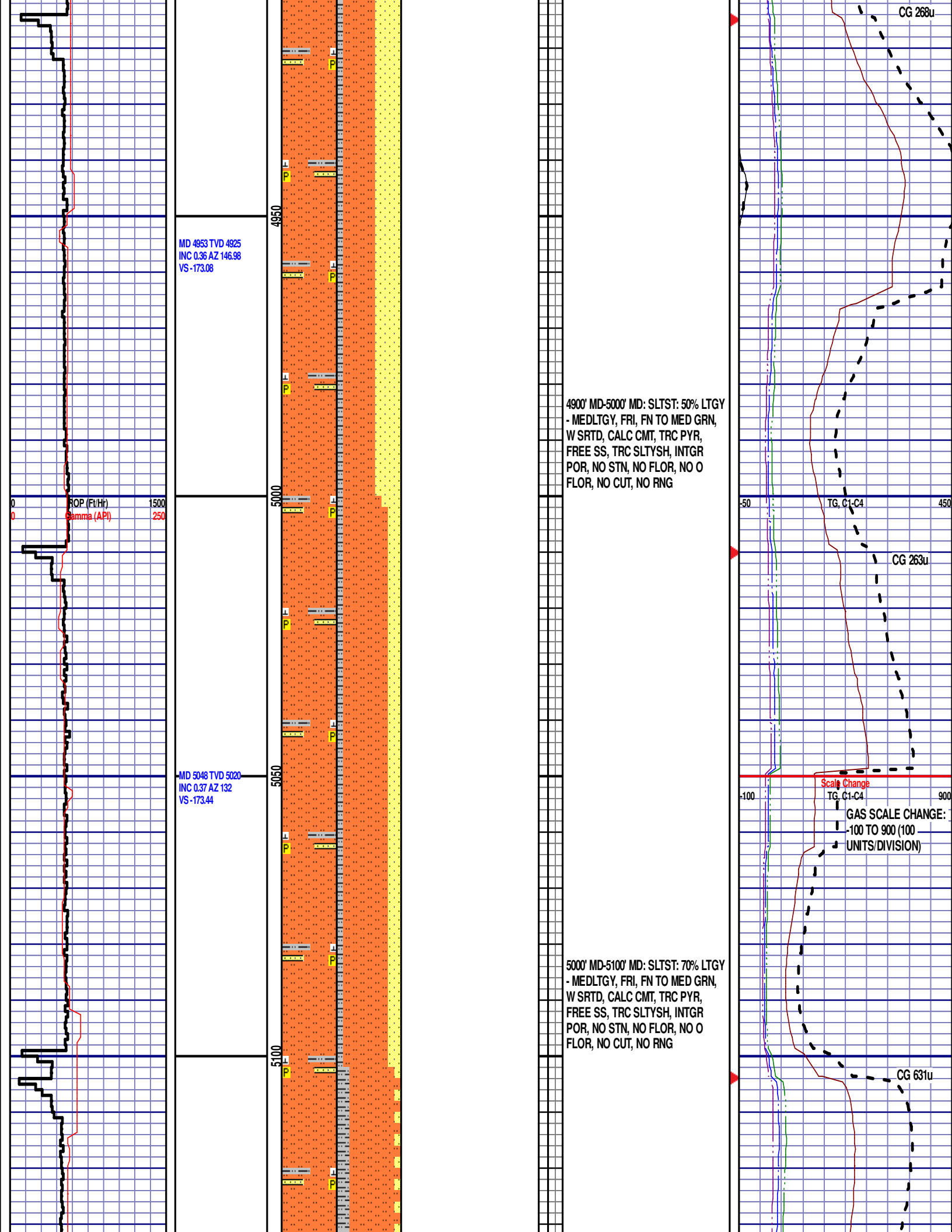
4600' MD-4700' MD: SLTST: 85% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, TRC PYR,
SANDY, TRC SLTYSH, INTGR POR,
NO STN, NO FLOR, NO O FLOR, NO
CUT, NO RNG

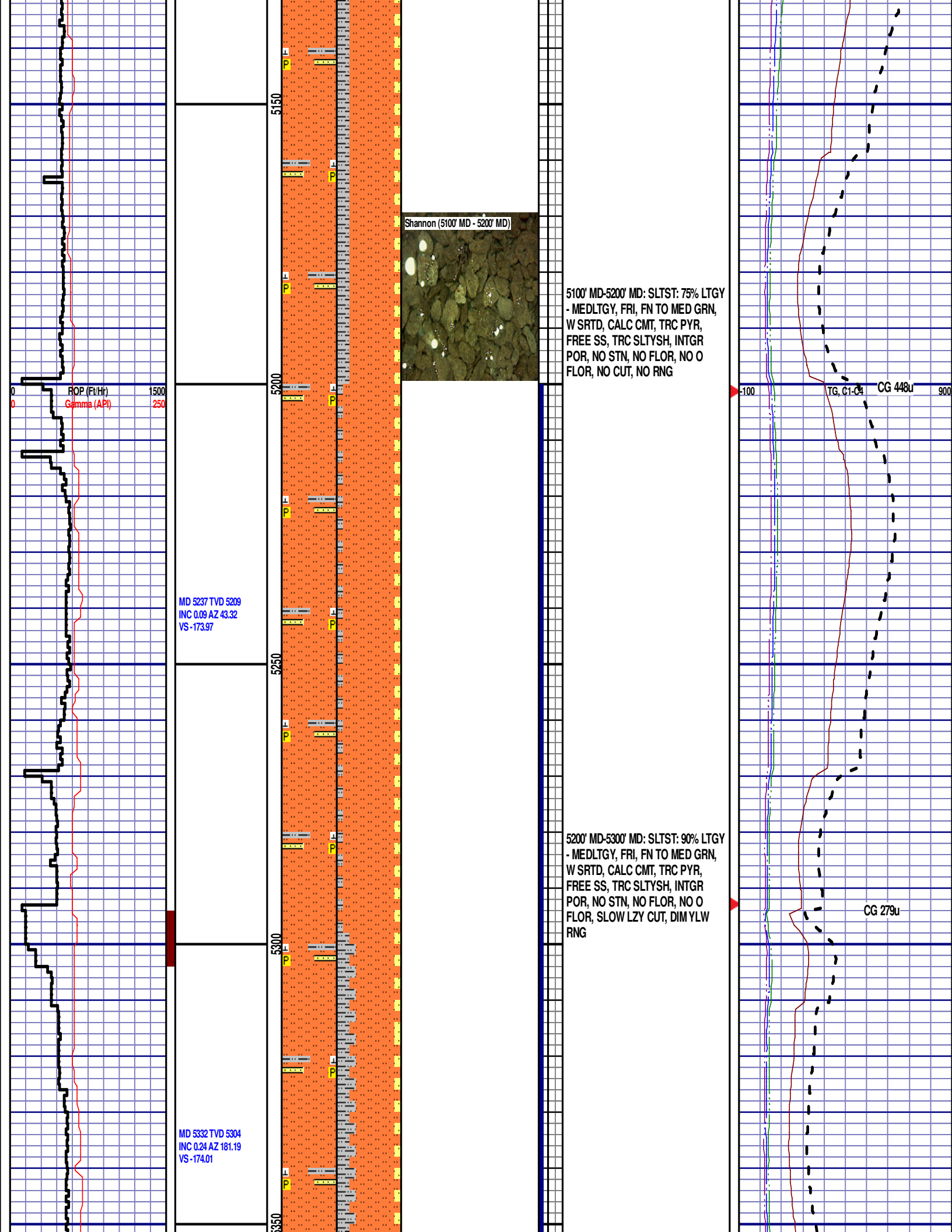
CG 109u

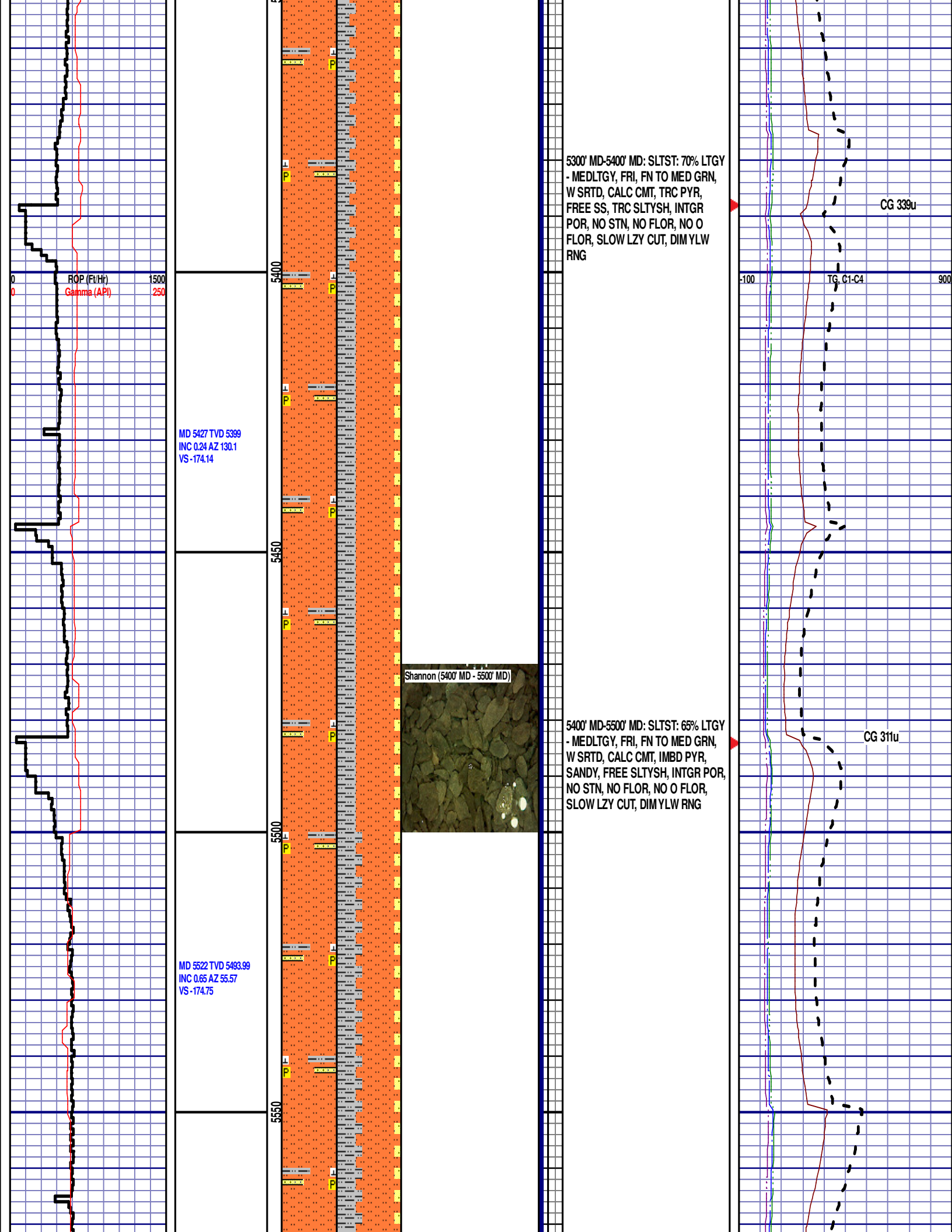
TG, C1-C4

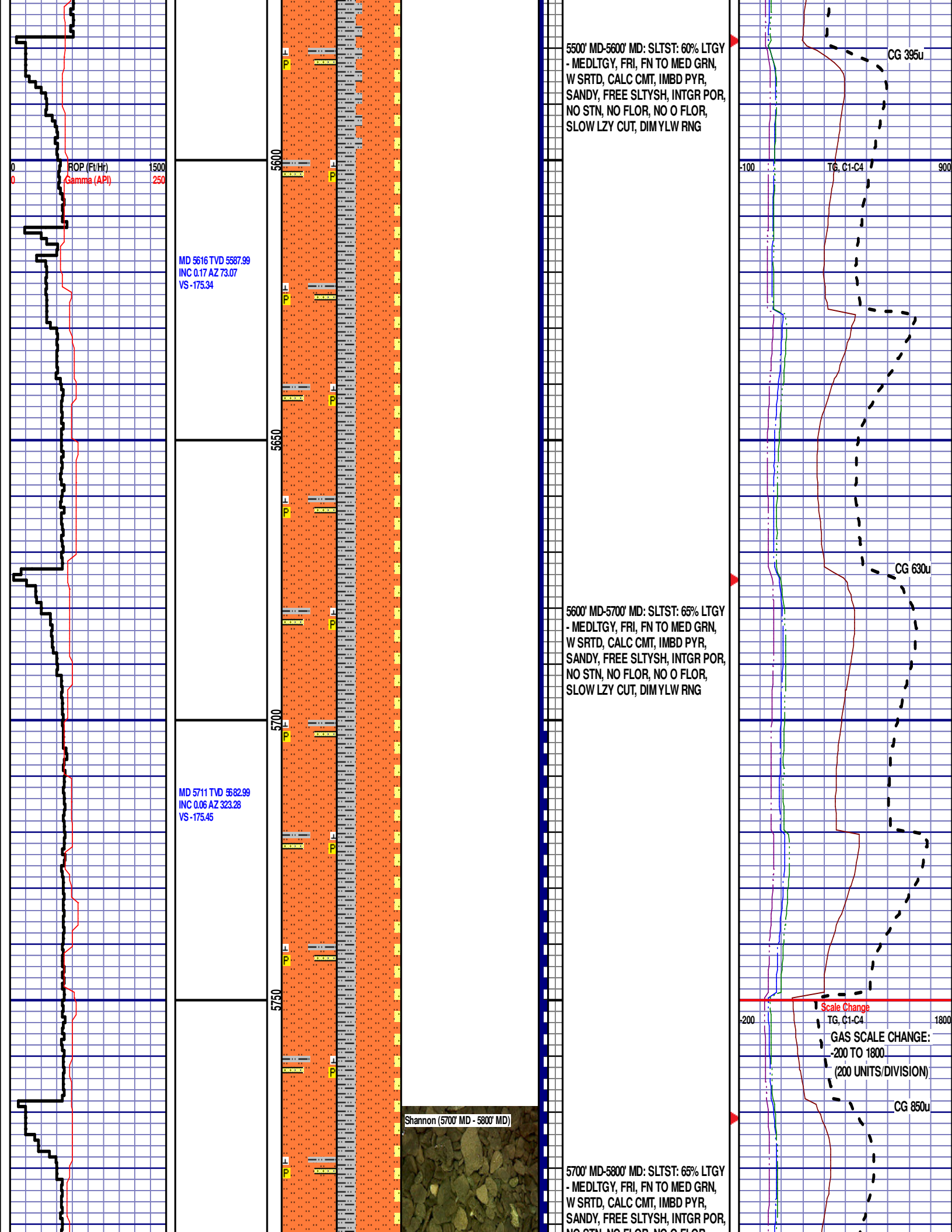
CG 233u

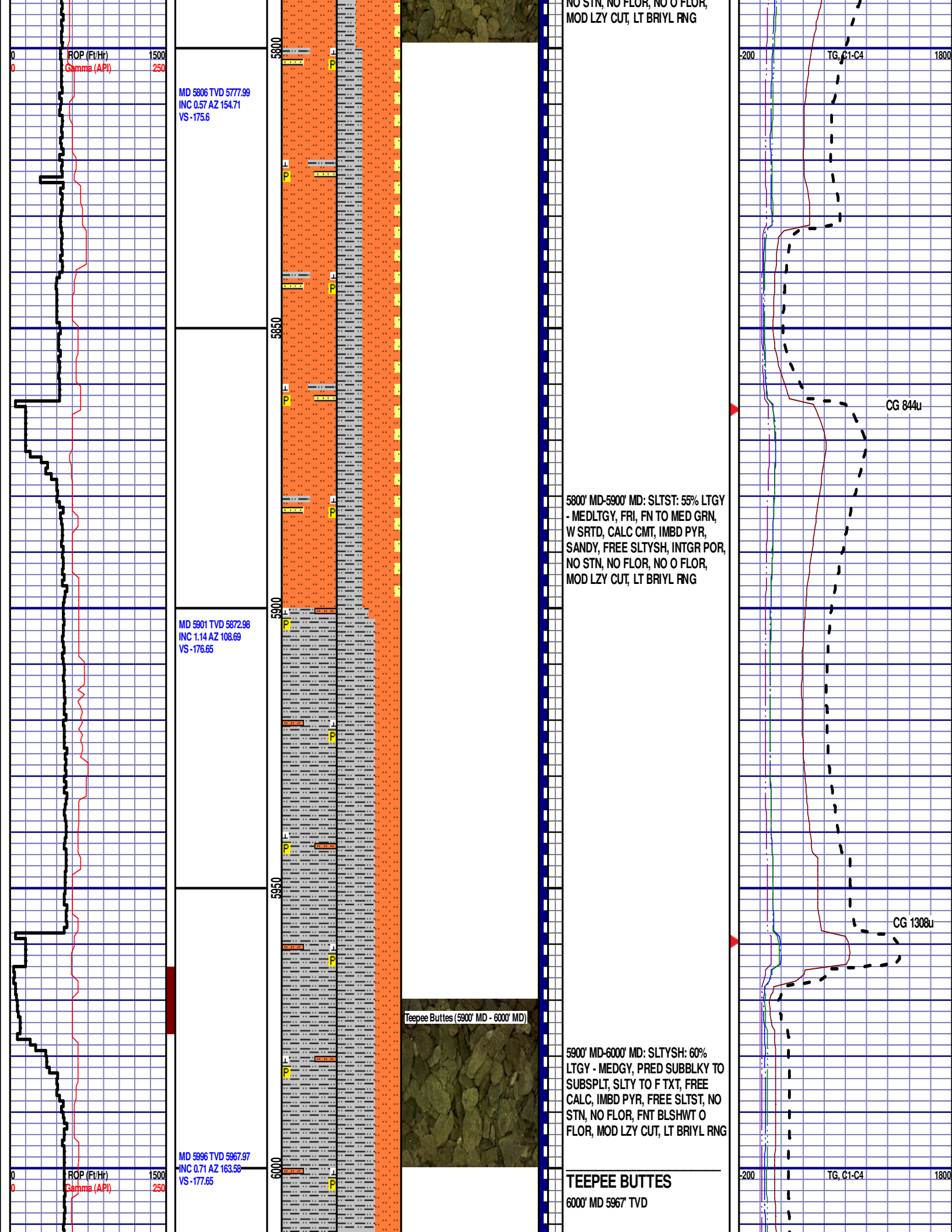


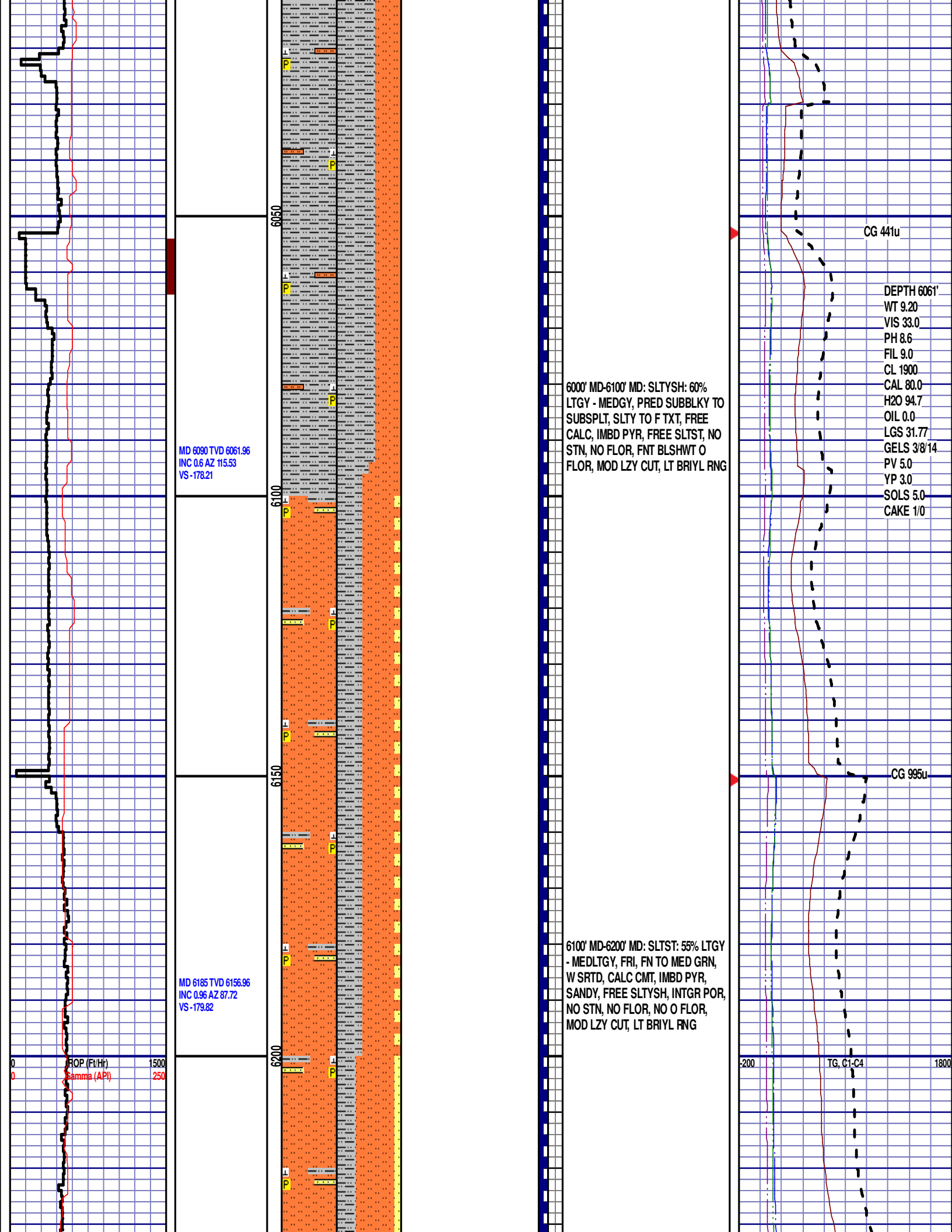


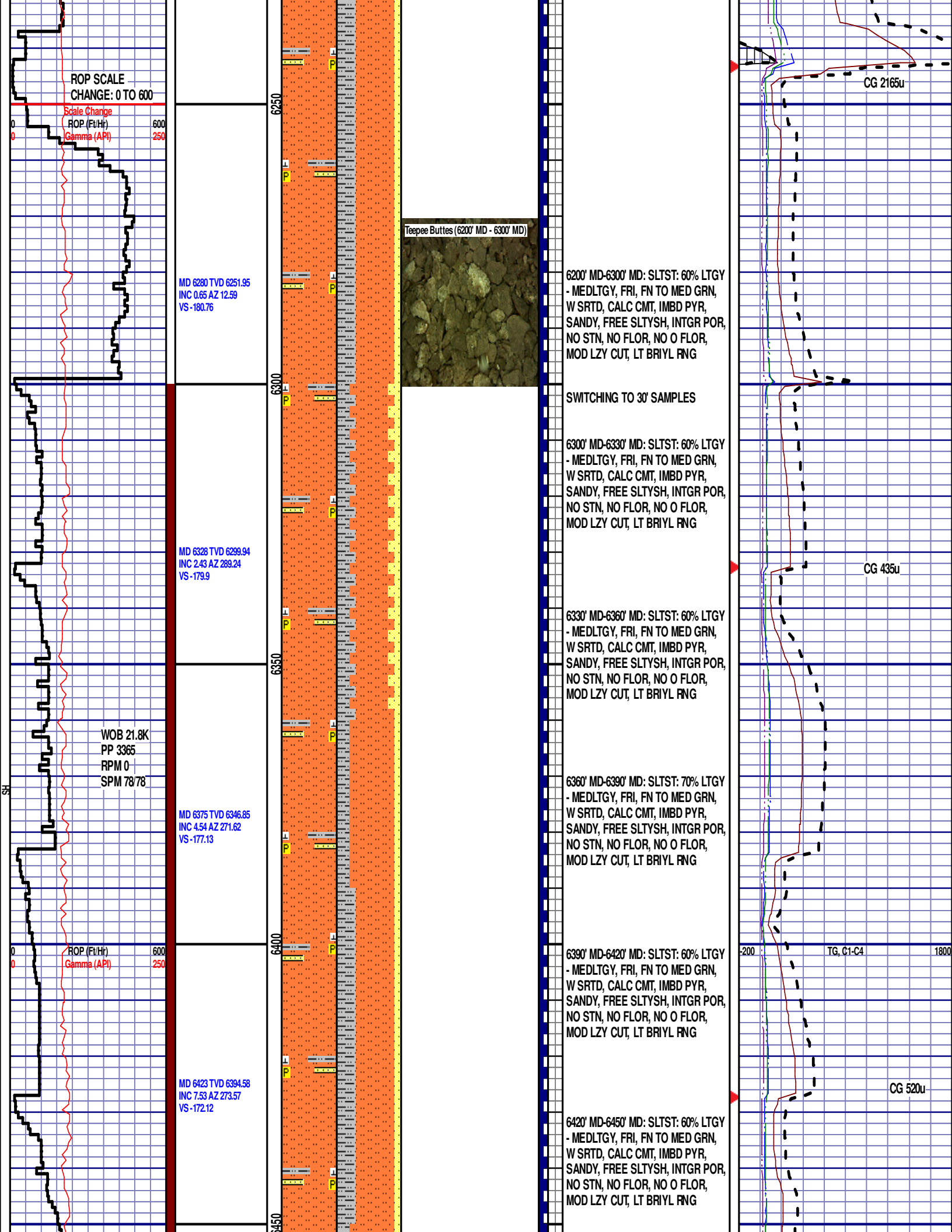


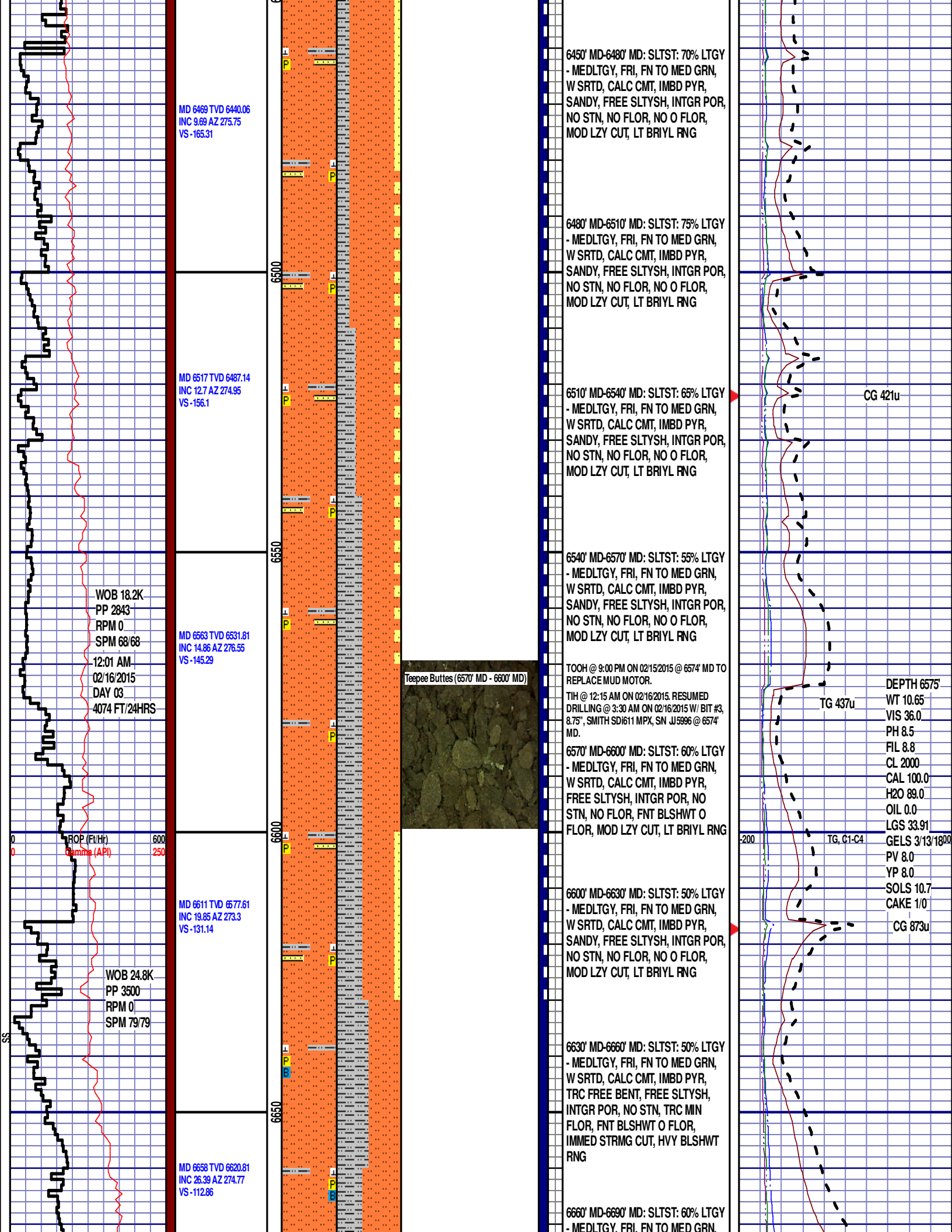












MD 6469 TVD 6440.06
INC 9.69 AZ 275.75
VS -165.31

MD 6517 TVD 6487.14
INC 12.7 AZ 274.95
VS -156.1

MD 6563 TVD 6531.81
INC 14.86 AZ 276.55
VS -145.29

MD 6611 TVD 6577.61
INC 19.85 AZ 273.3
VS -131.14

MD 6658 TVD 6620.81
INC 26.39 AZ 274.77
VS -112.86

WOB 18.2K
PP 2843
RPM 0
SPM 68/68
12:01 AM
02/16/2015
DAY 03
4074 FT/24HRS

ROP (Ft/Hr)
Gamma (API)

WOB 24.8K
PP 3500
RPM 0
SPM 79/79

Teepee Buttes (6570' MD - 6600' MD)



6450' MD-6480' MD: SLTST: 70% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, IMBD PYR,
SANDY, FREE SLTYSH, INTGR POR,
NO STN, NO FLOR, NO O FLOR,
MOD LZY CUT, LT BRIYL RNG

6480' MD-6510' MD: SLTST: 75% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, IMBD PYR,
SANDY, FREE SLTYSH, INTGR POR,
NO STN, NO FLOR, NO O FLOR,
MOD LZY CUT, LT BRIYL RNG

6510' MD-6540' MD: SLTST: 65% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, IMBD PYR,
SANDY, FREE SLTYSH, INTGR POR,
NO STN, NO FLOR, NO O FLOR,
MOD LZY CUT, LT BRIYL RNG

6540' MD-6570' MD: SLTST: 55% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, IMBD PYR,
SANDY, FREE SLTYSH, INTGR POR,
NO STN, NO FLOR, NO O FLOR,
MOD LZY CUT, LT BRIYL RNG

TOOH @ 9:00 PM ON 02/15/2015 @ 6574' MD TO
REPLACE MUD MOTOR.
TIH @ 12:15 AM ON 02/16/2015. RESUMED
DRILLING @ 3:30 AM ON 02/16/2015 W/ BIT #3,
8.75", SMITH SD1611 MPX, SN JJ5996 @ 6574'
MD.

6570' MD-6600' MD: SLTST: 60% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, IMBD PYR,
FREE SLTYSH, INTGR POR, NO
STN, NO FLOR, FNT BLSHWT O
FLOR, MOD LZY CUT, LT BRIYL RNG

6600' MD-6630' MD: SLTST: 50% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, IMBD PYR,
SANDY, FREE SLTYSH, INTGR POR,
NO STN, NO FLOR, NO O FLOR,
MOD LZY CUT, LT BRIYL RNG

6630' MD-6660' MD: SLTST: 50% LTGY
- MEDLTGY, FRI, FN TO MED GRN,
W SRTD, CALC CMT, IMBD PYR,
TRC FREE BENT, FREE SLTYSH,
INTGR POR, NO STN, TRC MIN
FLOR, FNT BLSHWT O FLOR,
IMMED STRMG CUT, HVY BLSHWT
RNG

6660' MD-6690' MD: SLTST: 60% LTGY
- MEDLTGY, FRI, FN TO MED GRN,

CG 421u

TG 437u

TG, C1-C4

DEPTH 6575'
WT 10.65
VIS 36.0
PH 8.5
FIL 8.8
CL 2000
CAL 100.0
H2O 89.0
OIL 0.0
LGS 33.91
GELS 3/13/1800
PV 8.0
YP 8.0
SOLS 10.7
CAKE 1/0
CG 873u

