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Customer Information

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

Geologist: Melanie Peterson
Noble Energy Inc.

Mud Logging Details

Logger: Ross Apodaca &
Dan King

Log Interval: 2500' MD to 6630' MD

Start Date: June 19, 2014

Release Date: June 24, 2014

Well Information

Well Name: Wells Ranch
AE30-64-1HNC

Location: 30-6N-62W
1123' FSL, 65' FWL

County: Weld
State: Colorado

Drilling Rig: H&P 277

Total Depth: 12063' MD

TD Date: June 24, 2014

Formation: Niobrara C Chalk

KB Elevation: 4777'

GR Elevation: 4753'

API Number: 05-123-38691-0000

ROCK TYPES

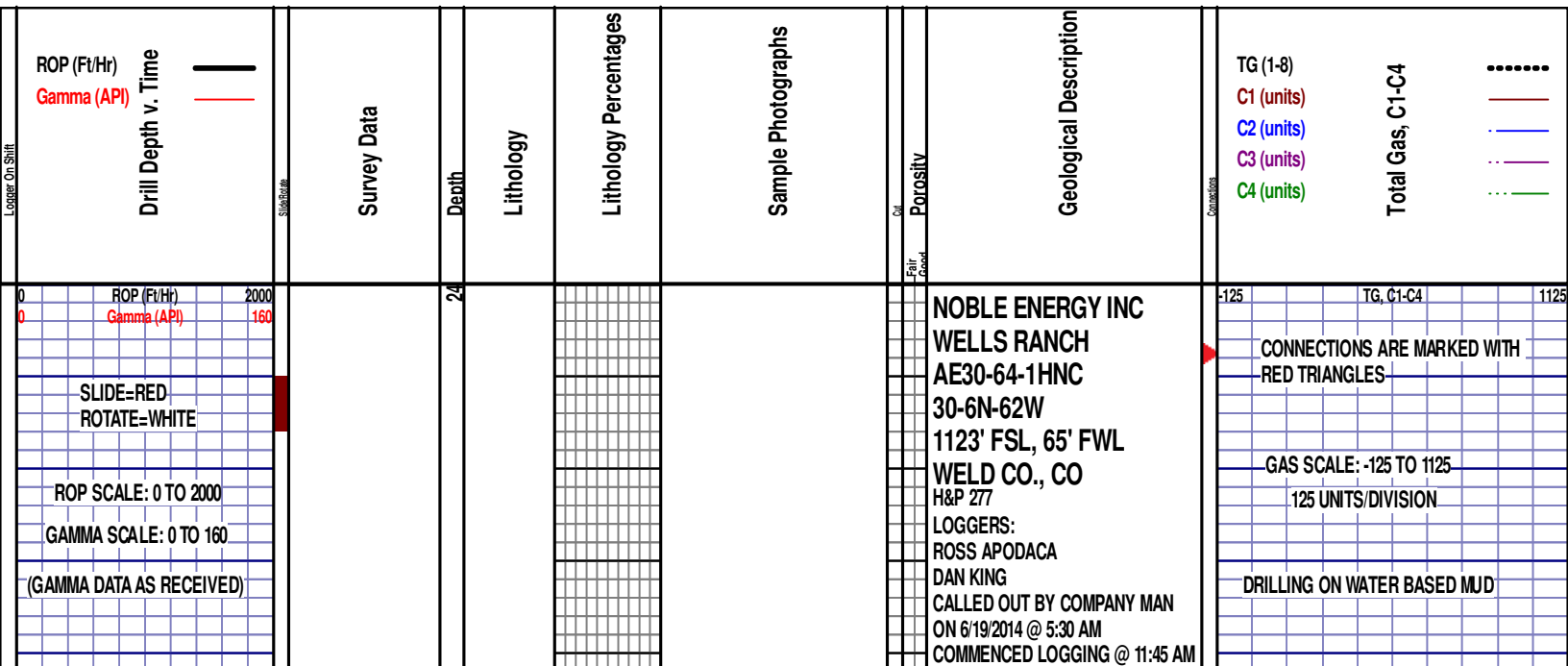
Anhy
Bent
Cht
Clyst
Coal
Congl
Dol

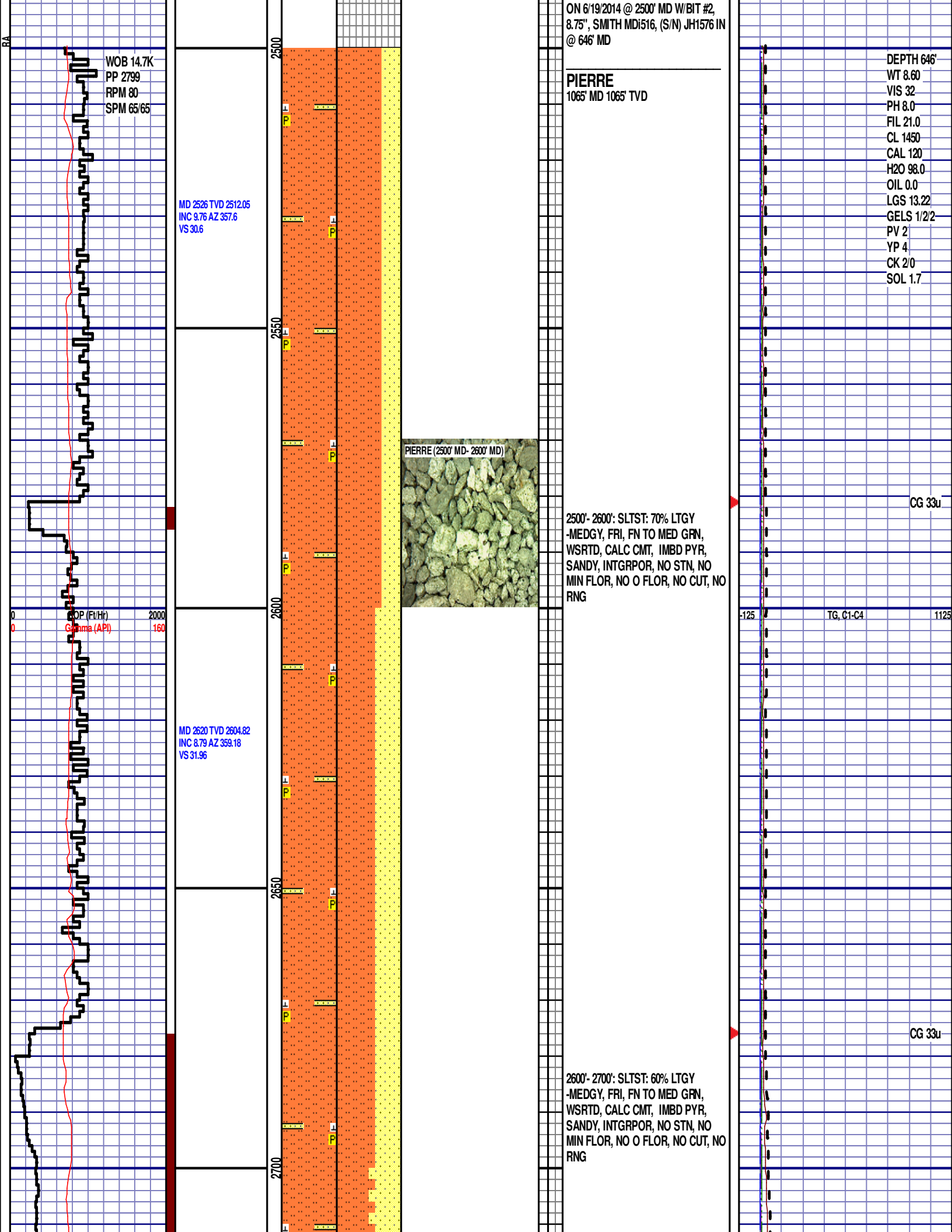
Gyp
Igne
Lmst
Meta
Mrlst
Salt
Shale

Shcol
Chalk
Slst
Ss
Till
gw
lmywash

ogw
olmywash
oshly gw
shly gw
sdygw
hvyrcbsh
nosmpl

Lsdetrit
sltst
sdy sh





MD 2715 TVD 2698.46
INC 10.64 AZ 353.56
VS 34.03

MD 2809 TVD 2790.93
INC 10.02 AZ 353.29
VS 36.98

MD 2904 TVD 2884.51
INC 9.85 AZ 354.17
VS 39.76

ROP (Ft/Hr)
Gamma (API)

2000
160

2750

2800

2850

2900

PIERRE (2800' MD - 2900' MD)



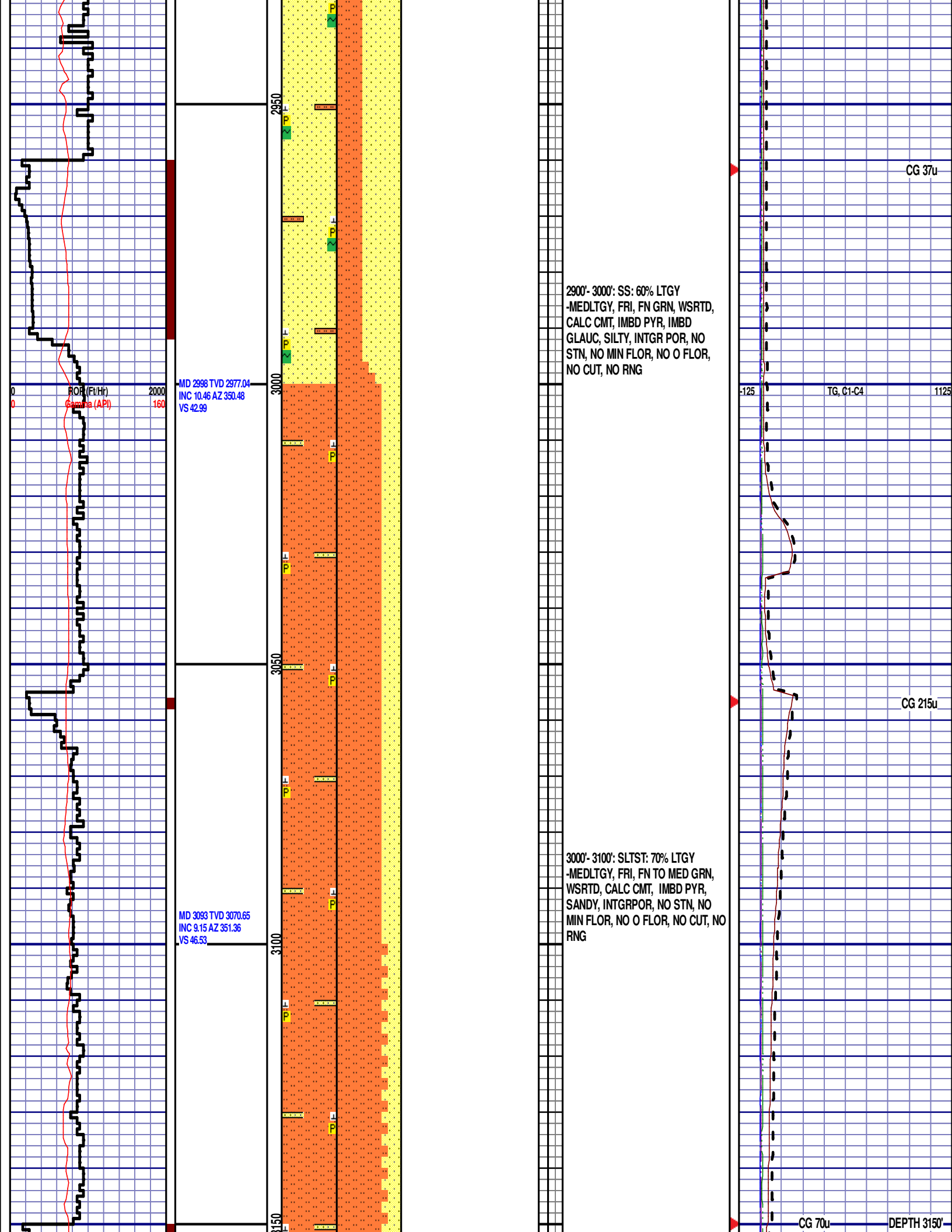
2700'- 2800': SLTST: 55% LTGY
-MEDGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
SANDY, INTGRPOR, NO STN, NO
MIN FLOR, NO O FLOR, NO CUT, NO
RNG

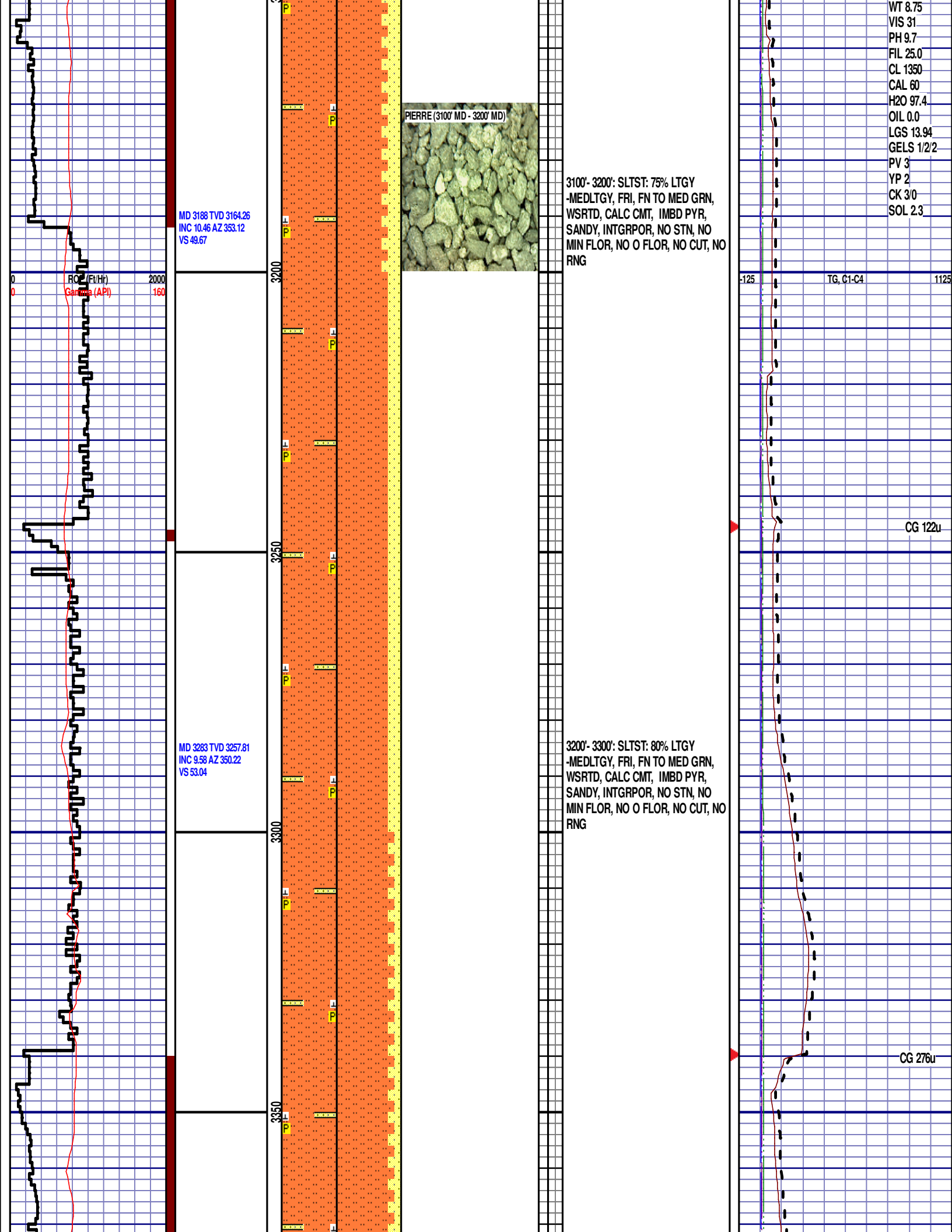
2800'- 2900': SS: 60% LTGY
-MEDLTGY, FRI, FN GRN, WSRTD,
CALC CMT, IMBD PYR, IMBD
GLAUC, SILTY, INTGR POR, NO
STN, NO MIN FLOR, NO O FLOR,
NO CUT, NO RNG

CG 159u

TG, C1-C4

CG 39u





MD 3379 TVD 3352.49
INC 9.41 AZ 349.78
VS 56.74

R.P.P. (Ft/Hr)
Galena (API)

2000
160

3400

3450

3500

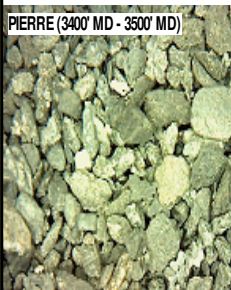
3550

MD 3473 TVD 3445.05
INC 10.64 AZ 347.4
VS 60.97

MD 3568 TVD 3538.45
INC 10.46 AZ 346.52
VS 65.93

3300'- 3400': SLTST: 85% 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

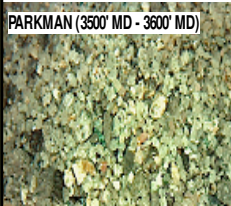
PIERRE (3400' MD - 3500' MD)



3400'- 3500': SLTST: 80% 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

PARKMAN
3532' MD 3503' TVD

PARKMAN (3500' MD - 3600' MD)



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

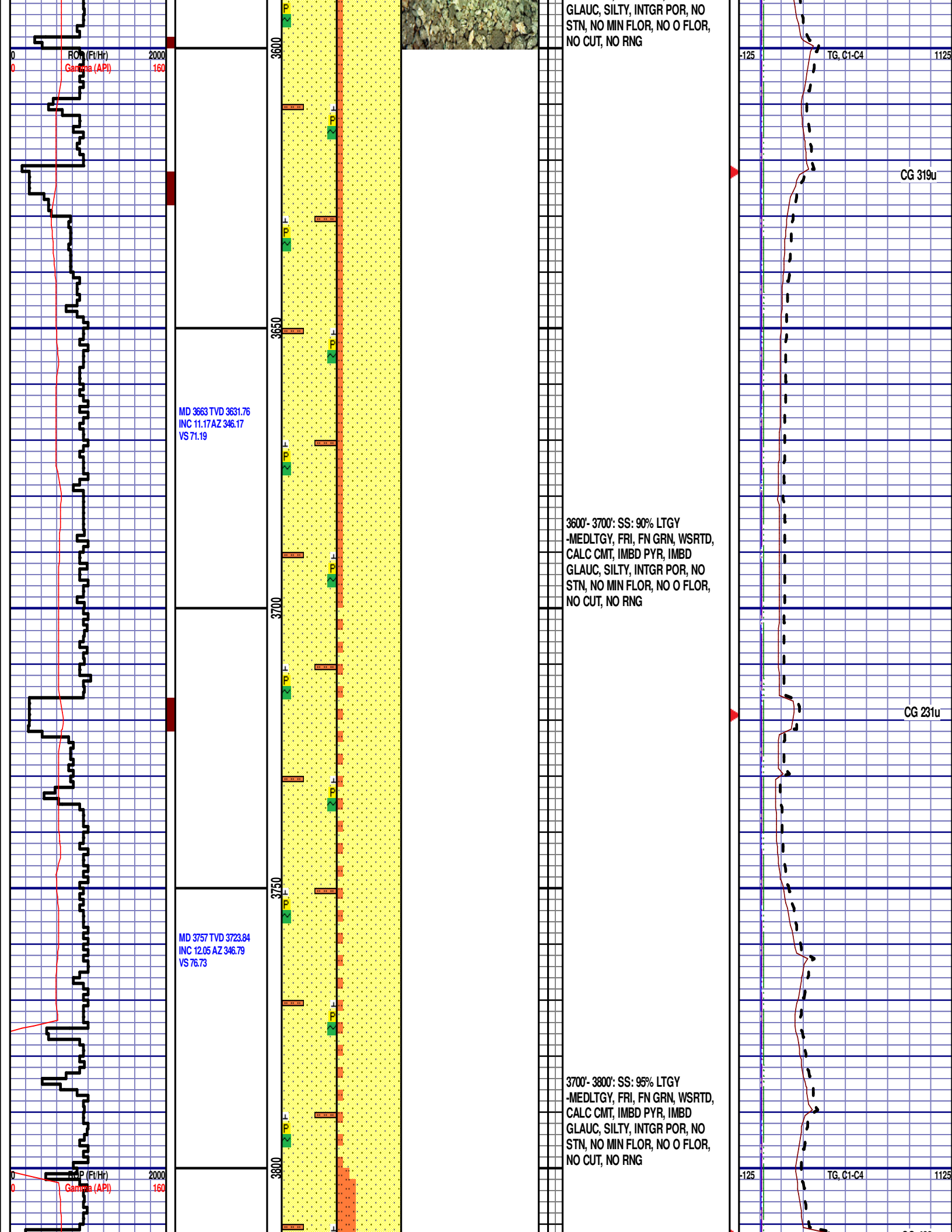
-125

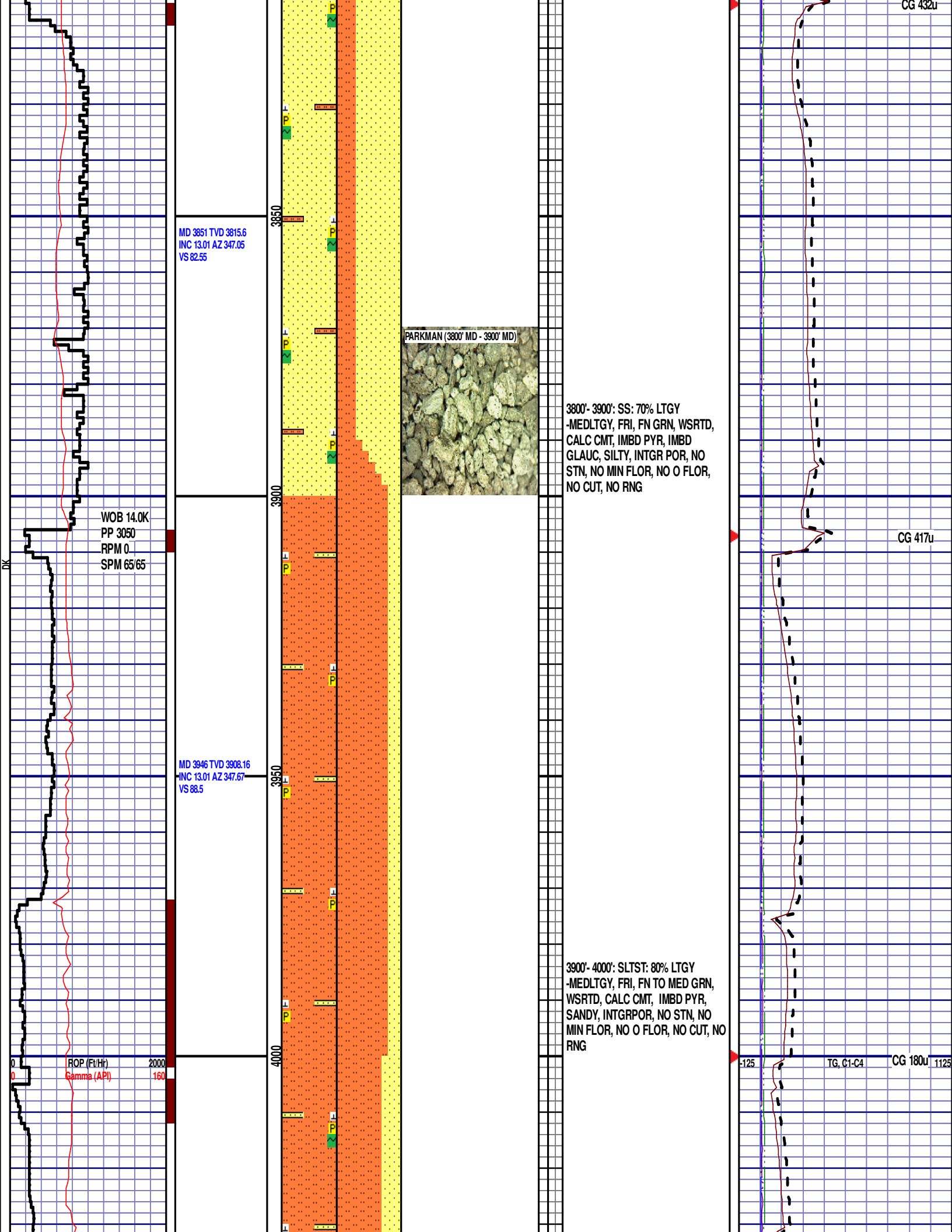
TG, C1-C4

1125

CG 416u

CG 263u





MD 4040 TVD 4000.26
INC 10.02 AZ 350.3
VS 93.25

12:01 AM 6/20/2014
FT/24 HRS 1599
DAY 02

MD 4135 TVD 4094.01
INC 8.53 AZ 350.92
VS 96.68

ROP (Ft/Hr)
Gamma (API)

MD 4229 TVD 4187.06
INC 7.83 AZ 347.75
VS 99.94

4000'- 4100': SLTST: 70% 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

TOOH @ 7:00 PM ON 6/19/2014 @
4099' MD TO REPLACE MWD TOOL.
TIH @ 12:00 AM ON 6/20/2014.
RESUMED DRILLING @ 2:00 AM ON
6/20/2014. W/ BIT #3, 8.75", SMITH
SDi513, (S/N) JH9203 IN @ 4099' MD

PARKMAN (4100' MD- 4200' MD)



4100'- 4200': 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

CG 159u

TG 272u

(NEW PIPE TALLY)

CG 99u

DEPTH 4129'

WT 9.00

VIS 30

PH 8.5

FIL 23.4

CL 1350

CAL 40

H2O 96.2

OIL 0.0

LGS 18.82

GELS 1/2/3

PV 3

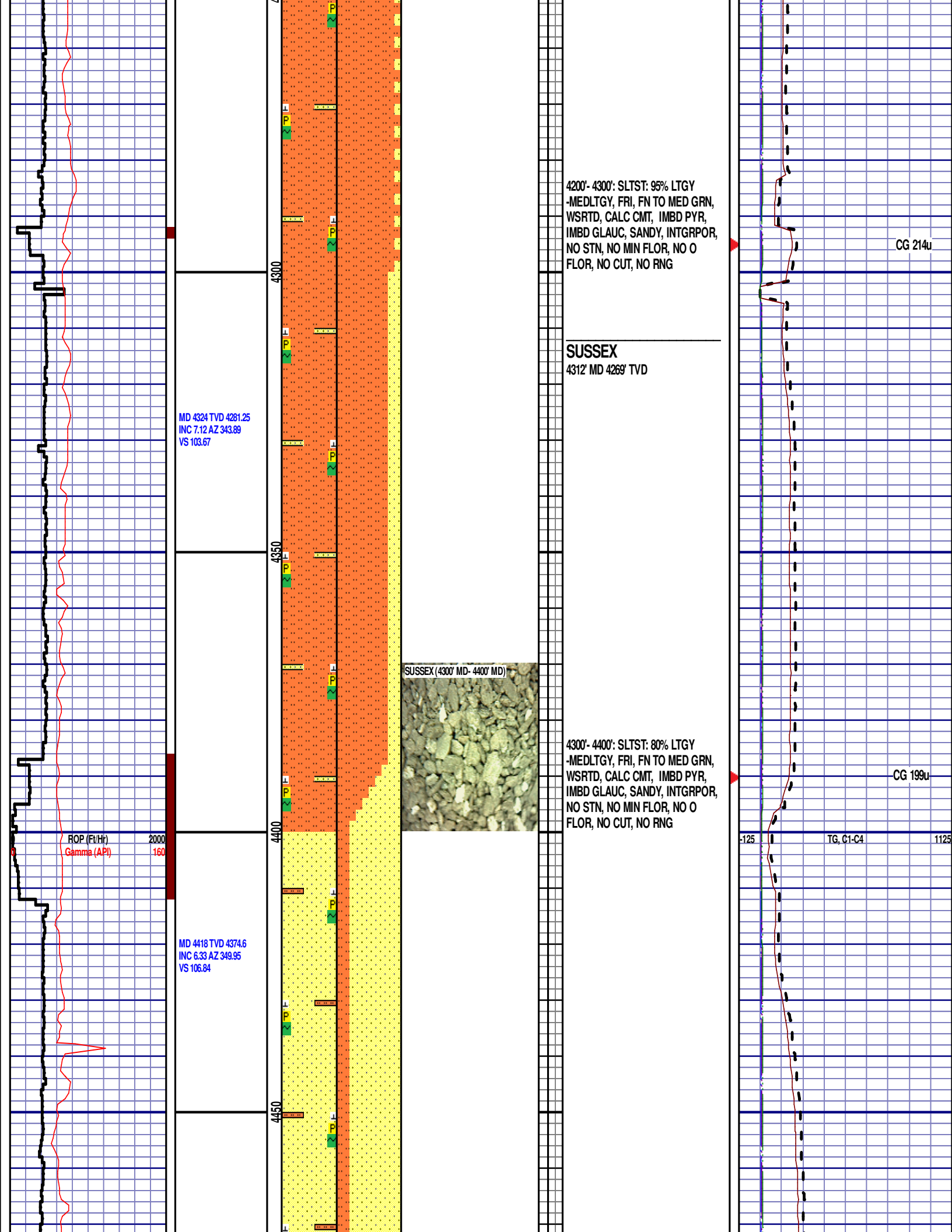
YP 4

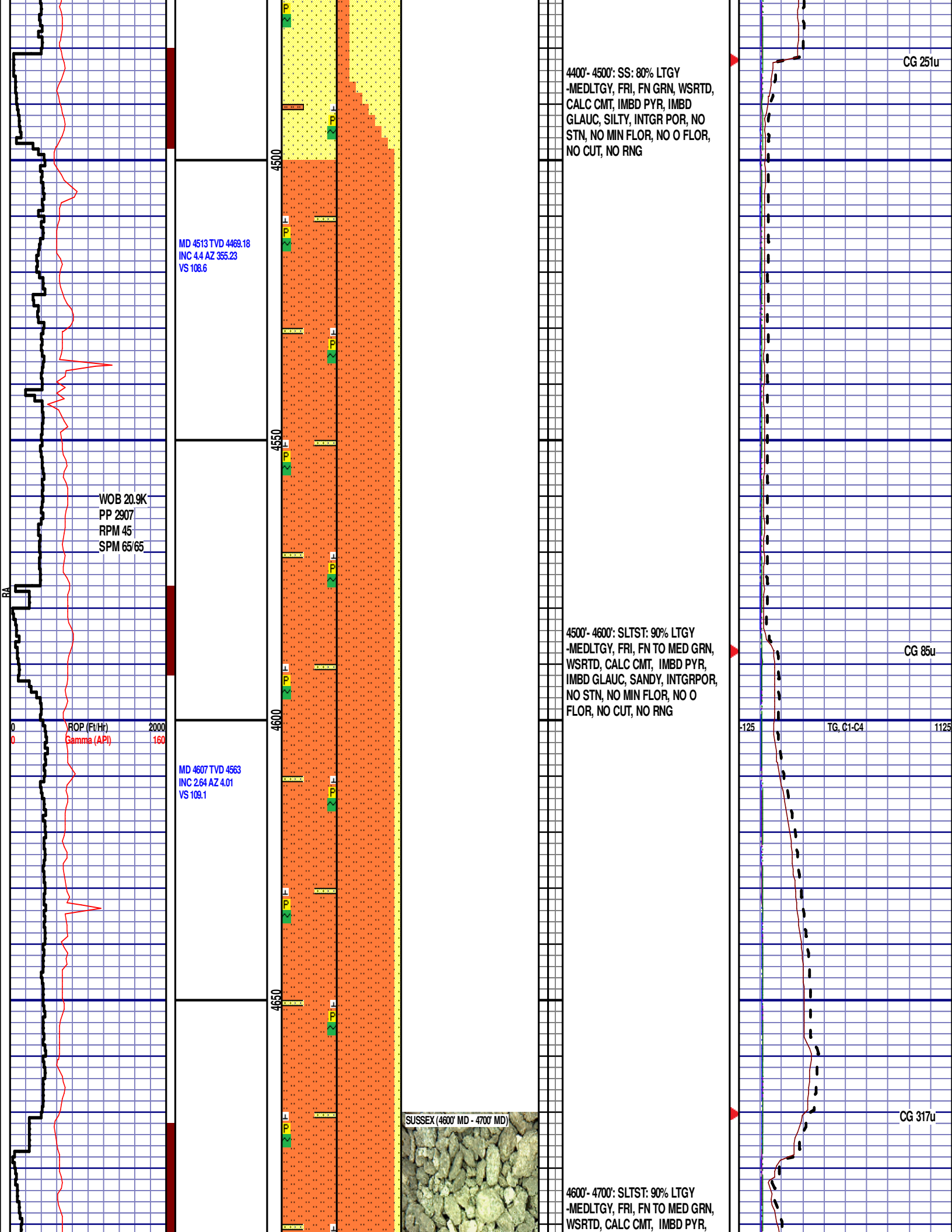
CK 2/0

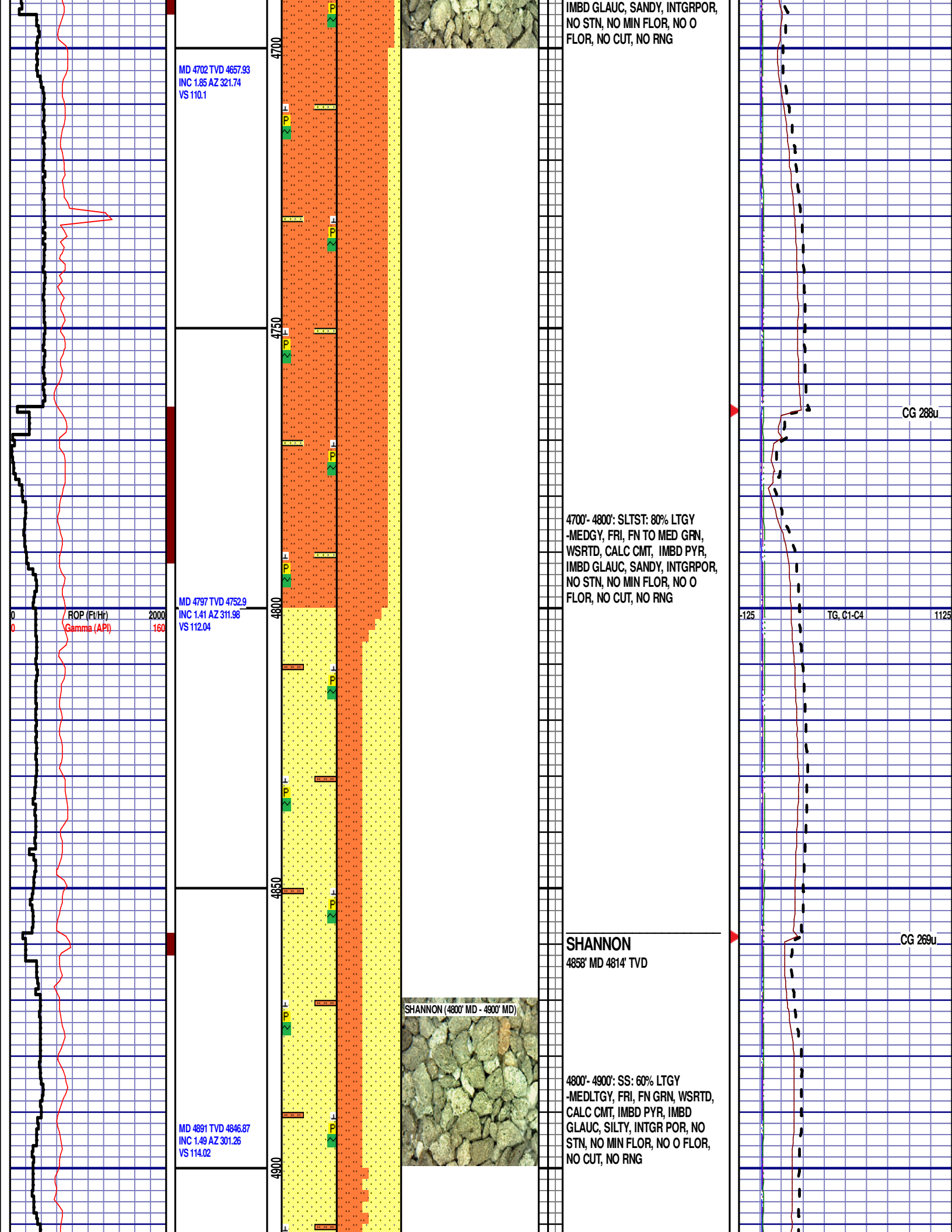
SOL 3.5

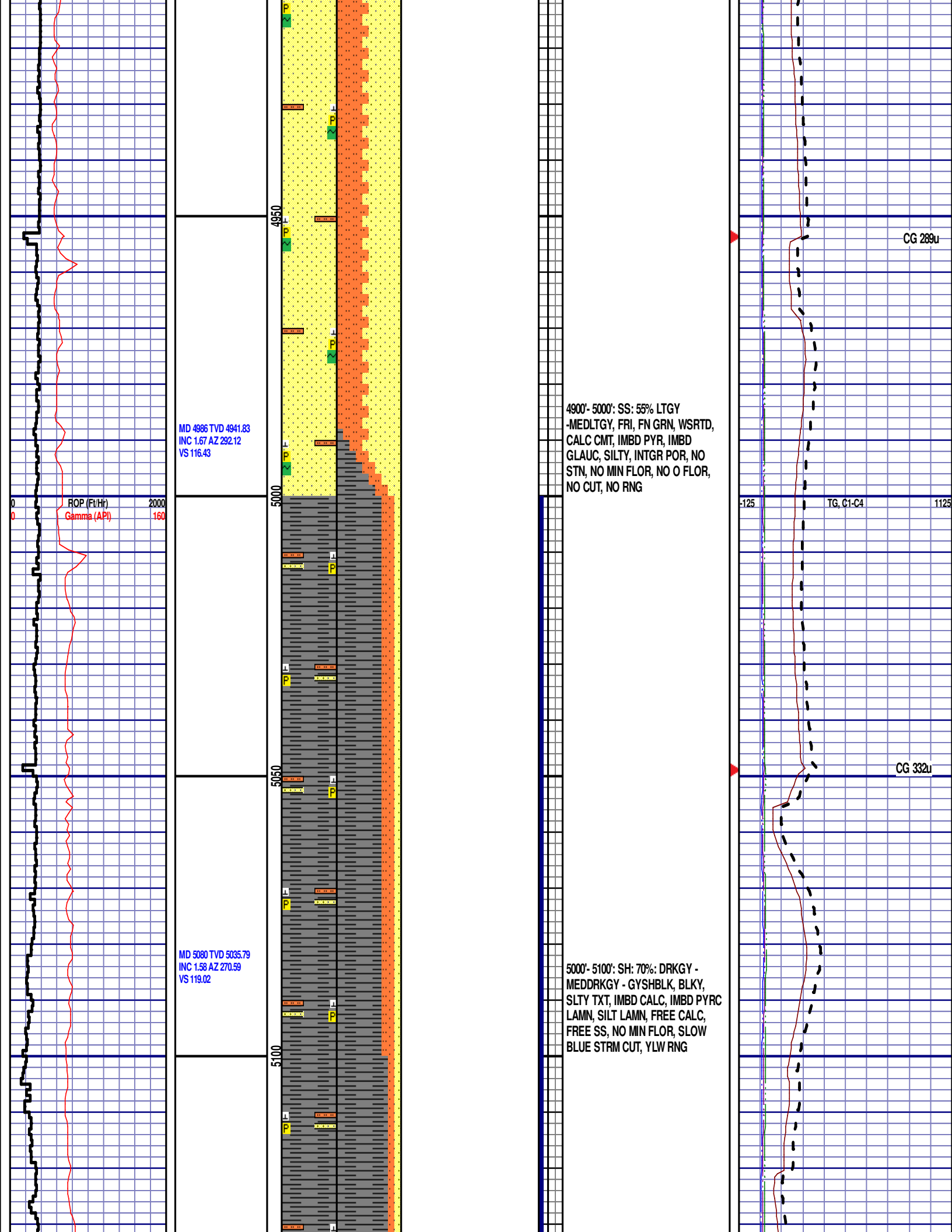
CG 177u

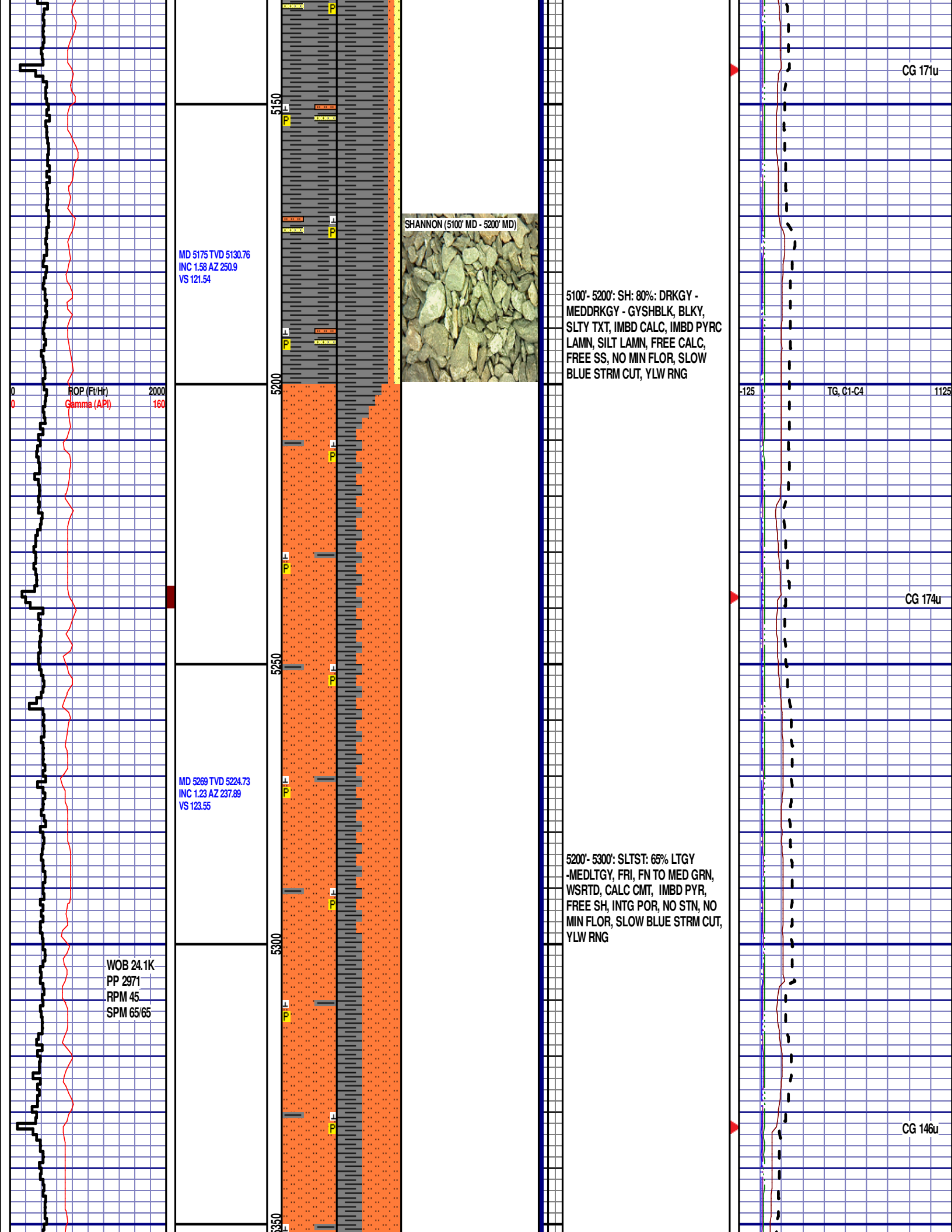
TG, C1-C4











MD 5175 TVD 5130.76
INC 1.58 AZ 250.9
VS 121.54

SHANNON (5100' MD - 5200' MD)

5100'- 5200': SH: 80%: DRKGY -
MEDDRKGY - GYSHBLK, BLKY,
SLTY TXT, IMBD CALC, IMBD PYRC
LAMN, SILT LAMN, FREE CALC,
FREE SS, NO MIN FLOR, SLOW
BLUE STRM CUT, YLW RNG

MD 5269 TVD 5224.73
INC 1.23 AZ 237.89
VS 123.55

WOB 24.1K
PP 2971
RPM 45
SPM 65/65

5200'- 5300': SLTST: 65% 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

CG 171u

TG, C1-C4

CG 174u

CG 146u

MD 5363 TVD 5318.71
INC 0.97 AZ 224.09
VS 124.89

ROP (Ft/Hr) 2000
Gamma (API) 160

MD 5458 TVD 5413.69
INC 1.23 AZ 233.41
VS 126.2

MD 5552 TVD 5507.69
INC 1.23 AZ 87.95
VS 125.96

5300'- 5400': SLTST: 60% 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

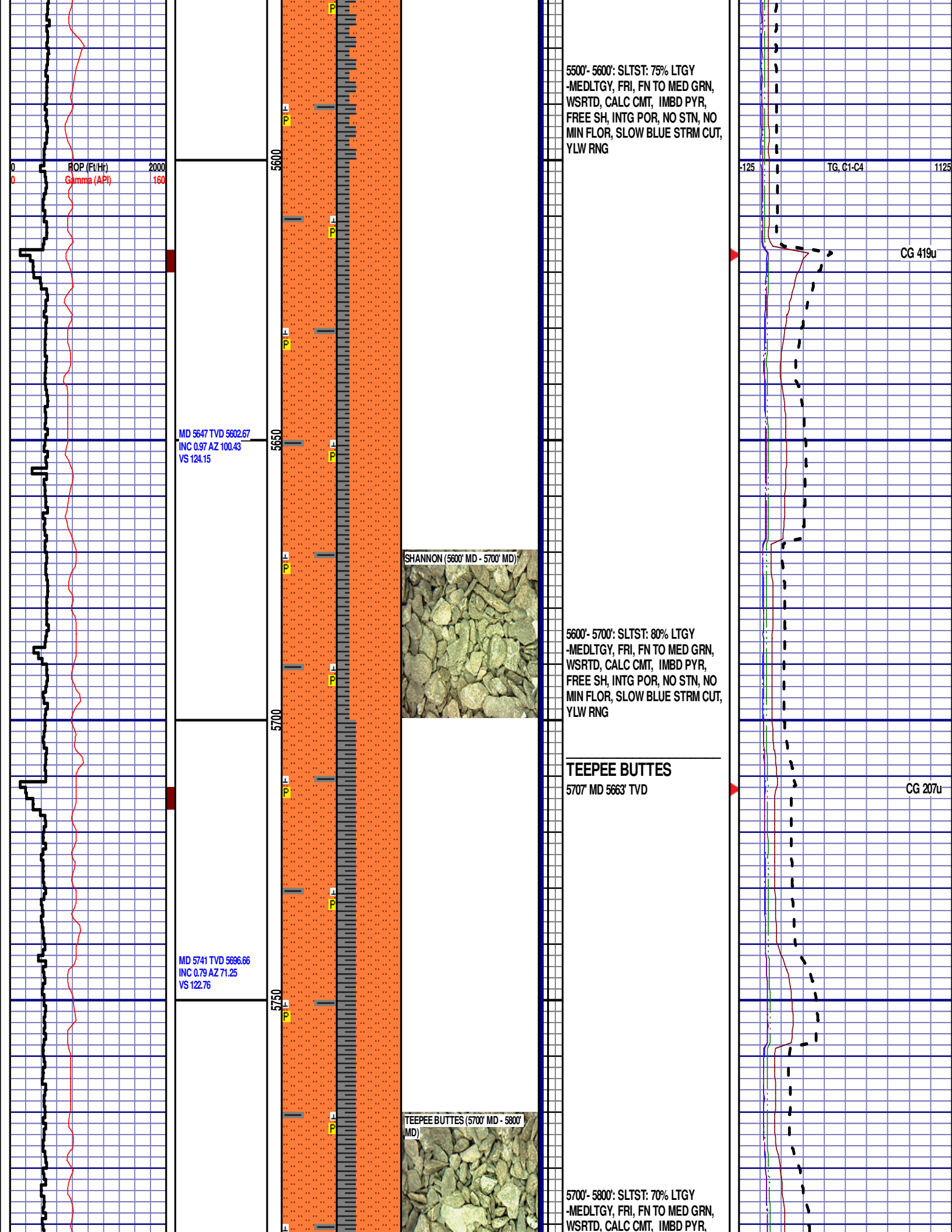


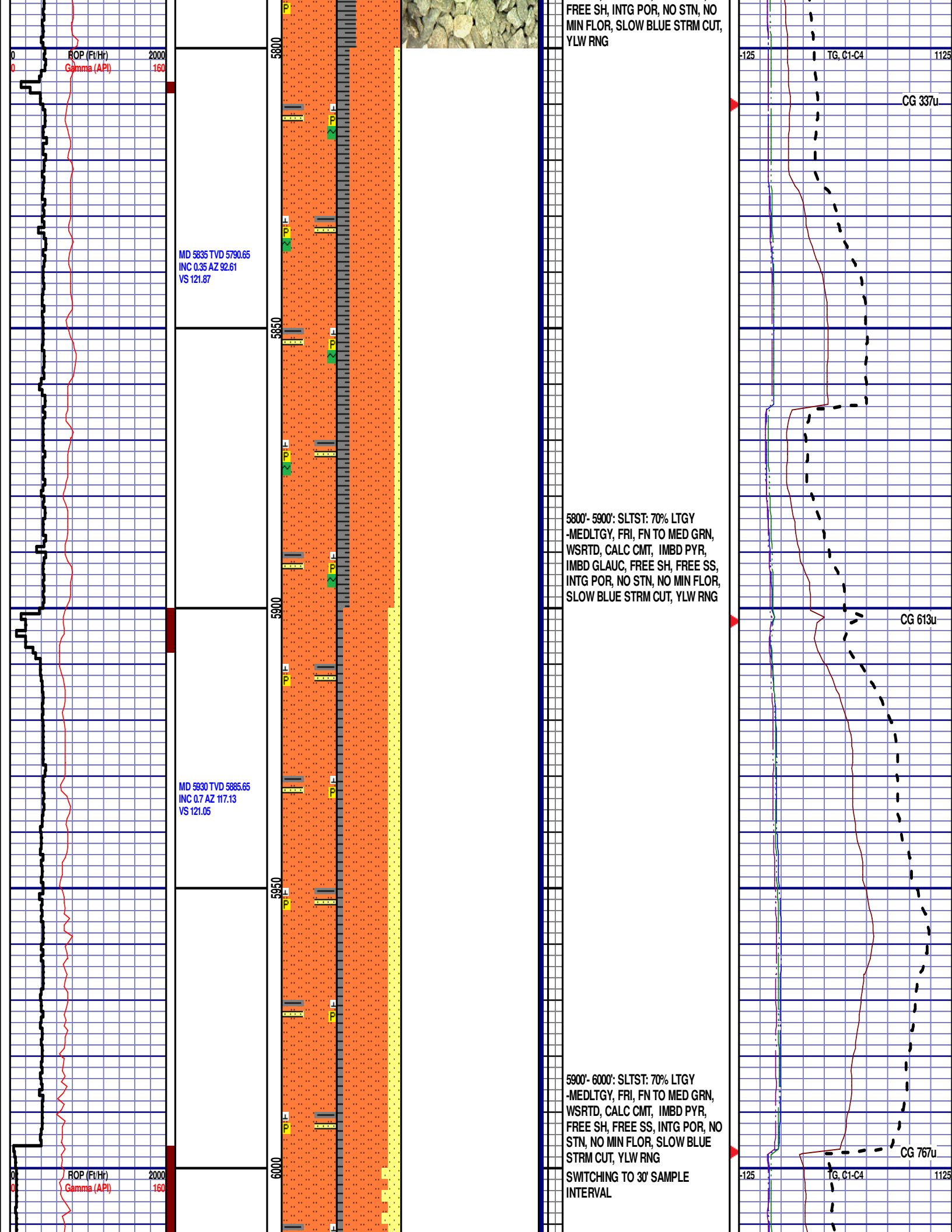
5400'- 5500': SLTST: 70% LTGY
-MEDLTGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,
FREE SH, INTG POR, NO STN, NO
MIN FLOR, SLOW BLUE STRM CUT,
YLW RNG

-125 TG, C1-C4 1125

CG 104u

CG 112u





MD 6214 TVD 6164.72
INC 19.96 AZ 267.95
VS 163.4

6210'- 6240': SLTST: 70% LTGY
-MEDLTGY, FRI, FN TO MED GRN,
WSRTD, CALC CMT, IMBD PYR,

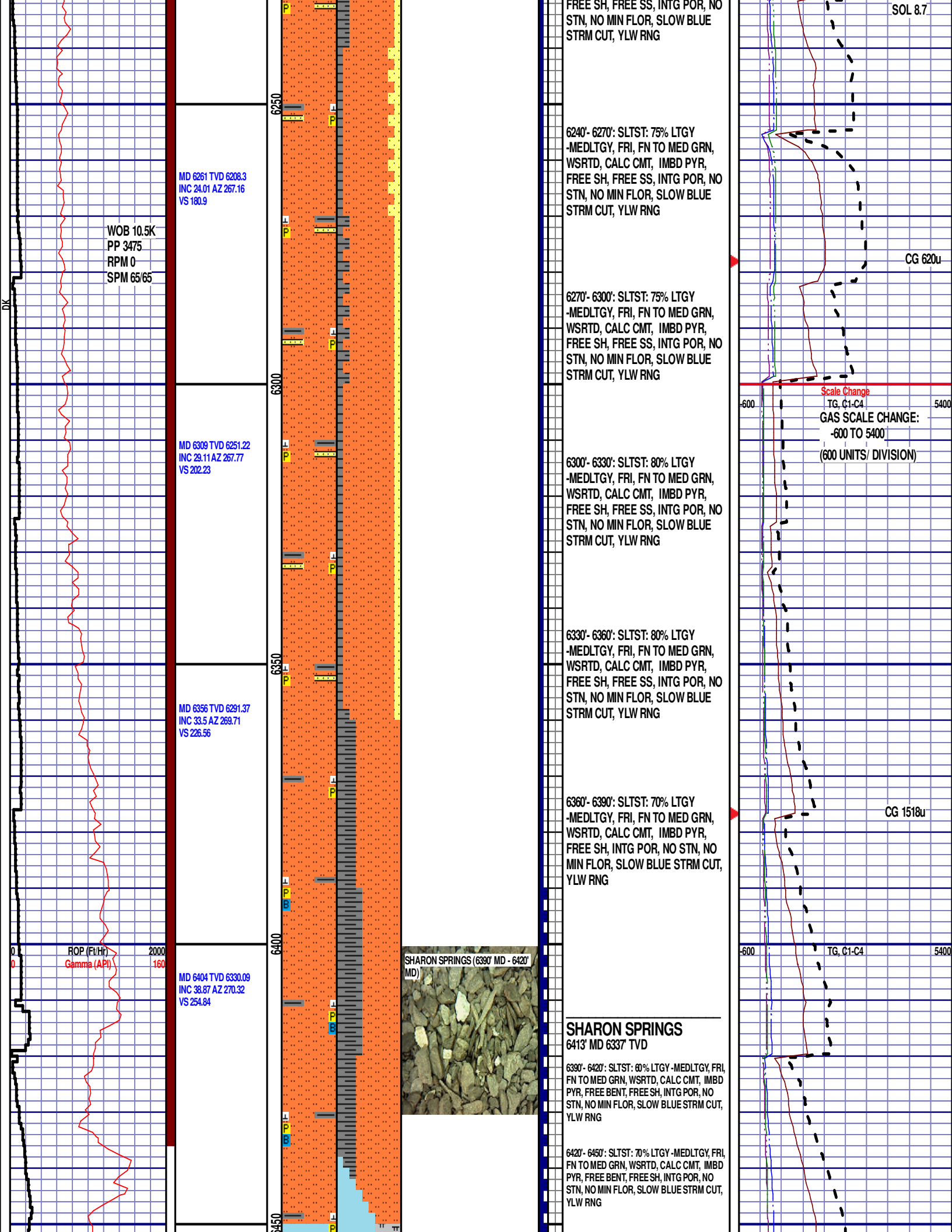
TEEPER BUTTES (6090' MD - 6120' MD)

CG 532u

CG 648u

DEPTH 6192'	
WT 10.10	
VIS 42	
PH 8.4	
FIL 8.2	1125
CL 1750	
CAL 80	
H2O 91.0	
OIL 0.0	
LGS 38.85	
GELS	
5/10/14	
PV 14	
YP 12	
CK 1/0	

ROP (Ft/Hr)
Gamma (API)



MD 6451 TVD 6365.38
INC 43.79 AZ 270.15
VS 285.82

MD 6499 TVD 6398.37
INC 49.33 AZ 269.88
VS 320.59

MD 6546 TVD 6427.85
INC 52.94 AZ 269.27
VS 357.09

MD 6594 TVD 6455.5
INC 56.72 AZ 269.53
VS 396.22

ROR (Ft/Hr)
Gamma (API)

2000
160

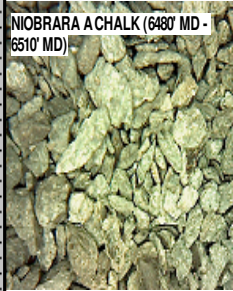
6500

6550

6600

6650

NIOBRARA A CHALK (6480' MD -
6510' MD)



6450'-6480': CHK: 60% (CaCO₃ 65%)
PRED LTGY - MEDGY - TR
GYSHBLK, BLKY TO SUBBLKY,
FXLN TO CHLKY, SFT TO FRM,
IMBD CALC, SCAT FREE PYR, TRC
FREE BENT, 40% FREE MARL, MOD
GYSHBLK STN, 10% MIN FLOR,
IMMED BLUE STRM CUT, YLW RING

NIOBRARA A CHALK

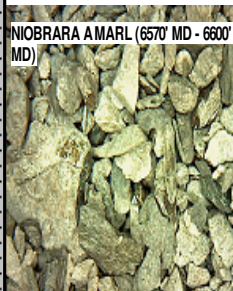
6488' MD 6391' TVD

6480'-6510': CHK: 90% (CaCO₃ 75%) PRED
LTGY - MEDGY - TR GYSHBLK, BLKY TO
SUBBLKY, FXLN TO CHLKY, SFT TO FRM,
IMBD CALC, SCAT FREE PYR, TRC FREE
BENT, 10% FREE MARL, MOD GYSHBLK STN,
10% MIN FLOR, IMMED BLUE STRM CUT,
YLW RING

6510'-6540': CHK: 80% (CaCO₃ 70%) PRED
LTGY - MEDGY - TR GYSHBLK, BLKY TO
SUBBLKY, FXLN TO CHLKY, SFT TO FRM,
IMBD CALC, SCAT FREE PYR, TRC FREE
BENT, 20% FREE MARL, MOD GYSHBLK STN,
10% MIN FLOR, IMMED BLUE STRM CUT,
YLW RING

6540'-6570': CHK: 55% (CaCO₃ 60%)
PRED LTGY - MEDGY - TR
GYSHBLK, BLKY TO SUBBLKY,
FXLN TO CHLKY, SFT TO FRM,
IMBD CALC, SCAT FREE PYR, TRC
FREE BENT, 45% FREE MARL, MOD
GYSHBLK STN, 10% MIN FLOR,
IMMED BLUE STRM CUT, YLW RING

NIOBRARA A MARL (6570' MD - 6600'
MD)



NIOBRARA A MARL

6580' MD 6447' TVD

6570'-6600': MRL: 55% (CaCO₃ 45%)
MEDDRKGY - GYSHBLK, SOFT TO BRITTLE,
FREE CALC, SCAT PYRC LAMN, TRC FREE
BENT, IMBD CALC, 45% FREE CHK, PRED
LTGY - SCAT MEDGY, 10% MIN FLOR, IMMED
BLUE STRM CUT, YLW RING

6600'-6630': MRL: 60% (CaCO₃ 45%)
MEDDRKGY - GYSHBLK, SOFT TO BRITTLE,
FREE CALC, SCAT PYRC LAMN, TRC FREE
BENT, IMBD CALC, 40% FREE CHK, PRED
LTGY - SCAT MEDGY, 10% MIN FLOR, IMMED
BLUE STRM CUT, YLW RING

END OF VERTICAL LOG @ 6630' MD
ON 6/20/2014, CONTINUED ON
HORIZONTAL LOG.

CG 2259u

CG 2778u

TG, C1-C4

5400

