



7136 South Yale Avenue, Suite 414

Tulsa, Oklahoma 74136-6378

phone 918.925.9739

fax 866.534.4559

WWW.HZMUD.COM/25

## Customer Information

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

Geologist: Holly Duncan  
Noble Energy Inc.

## Mud Logging Details

Logger: Scott Haney &  
Mark Dennis

Log Interval: 2500' MD to 5770' MD

Start Date: December 21, 2014

Release Date: December 25, 2014

## Well Information

Well Name: Davis State LD02-73HN

Location: 2-T9N-R58W  
450' FSL, 446' FEL

County: Weld  
State: Colorado

Drilling Rig: H&P 343

Total Depth: 10182' MD

TD Date: December 25, 2014

Formation: Niobrara B Chalk

KB Elevation: 4686'

GR Elevation: 4662'

API Number: 05-123-39806-0000

## ROCK TYPES

shale  
Anhy  
Bent  
Brec  
Cht  
Clyst  
Coal

Congl  
Dol  
Gyp  
Igne  
Lmst  
Meta  
Mrlist

Salt  
Shale  
Shcol  
Shgy  
Sltst  
Ss  
Till

gw  
lmywash  
ogw  
olmywash  
oshly gw  
shly gw  
sdygw

hvyrcbsh  
nosmpl  
Lsdetrst  
sltst  
sdy sh

ROP (Ft/Hr) Gamma (API)	Drill Depth v. Time	Survey Data	Depth	Lithology	Lithology Percentages	Sample Photographs	Geological Description	TG (1-8) C1 (units) C2 (units) C3 (units) C4 (units)	Total Gas, C1-C4
12:01 AM 12/22/2014	ROP (Ft/Hr) Gamma (API)		24				NOBLE ENERGY INC. DAVIS STATE LD02-73HN 2-T9N-R58W 450' FSL, 446' FEL WELD CO., CO	75	675
SLIDE=RED ROTATE=WHITE ROP SCALE: 0 TO 2000 GAMMA SCALE: 0 TO 250 ORIGINAL DATA AS RECEIVED							H&P 343 LOGGERS: SCOTT HANEY DENNIS CALLED OUT BY COMPANY MAN @ 6:00 AM ON 12/21/2014 COMMENCED LOGGING @ 2500' MD	CONNECTIONS ARE MARKED WITH RED TRIANGLES GAS SCALE: -75u TO 675u (75 UNITS/DIVISION) DRILLING ON WATER BASED MUD	

12/22/2014  
DAY 02  
0 FT/24HRS

WOB 0.0K  
PP 2961  
RPM 61  
SPM 85/84

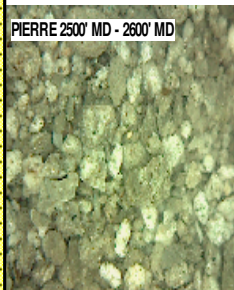
ROP (ft/hr)  
Gamma (API)

MD 2589 TVD 2567.37  
INC 13.49 AZ 254.47  
VS -18.95

MD 2684 TVD 2659.83  
INC 13.05 AZ 254.15  
VS -19.84

2500  
2550  
2600  
2650  
2700

PIERRE 2500' MD - 2600' MD



@ 5:40 AM ON 12/22/2014 W/BIT # 2,  
8.75", SMITH, SDI519 (S/N) JJ8001 IN  
@ 1227 MD

## PIERRE

BEFORE LOGGING DEPTH

2500' MD-2600' MD: SLTST: 60% LTGY  
- MEDLTGY, FRI, FN TO MED GRN,  
W SRTD, CALC CMT, SANDY, IMBD  
PYR, INTGR POR, NO STN, NO  
FLOR, NO O FLOR, NO CUT, NO  
RNG

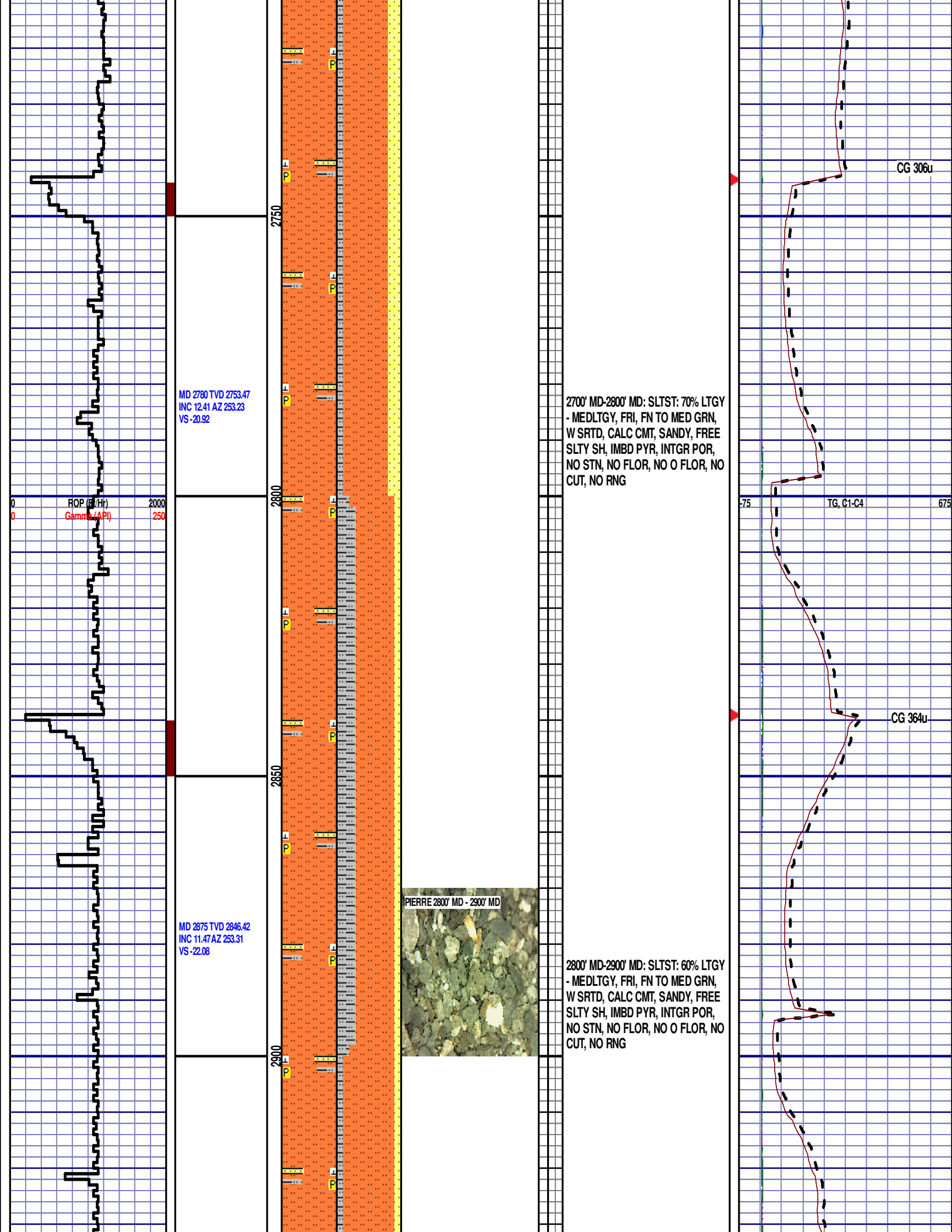
2600' MD-2700' MD: SLTST: 70% LTGY  
- MEDLTGY, FRI, FN TO MED GRN,  
W SRTD, CALC CMT, SANDY, IMBD  
PYR, INTGR POR, NO STN, NO  
FLOR, NO O FLOR, NO CUT, NO  
RNG

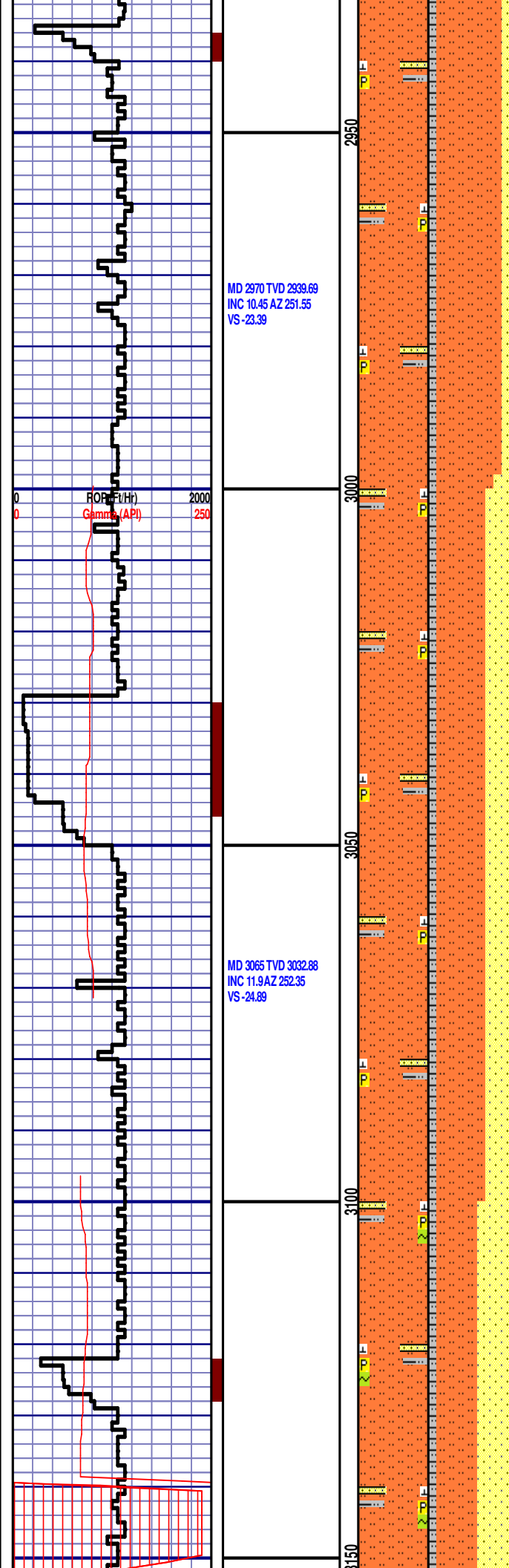
DEPTH 1993'  
WT 8.55  
VIS 27  
PH 11.1  
FIL 37.1  
CL 1700  
CAL 60  
H2O 98.2  
OIL 0.0  
LGS 12.9  
GEL 2/3/3  
PV 3  
YP 4  
CK 3/0  
SOL 1.5

CG 344u

TG, C1-C4

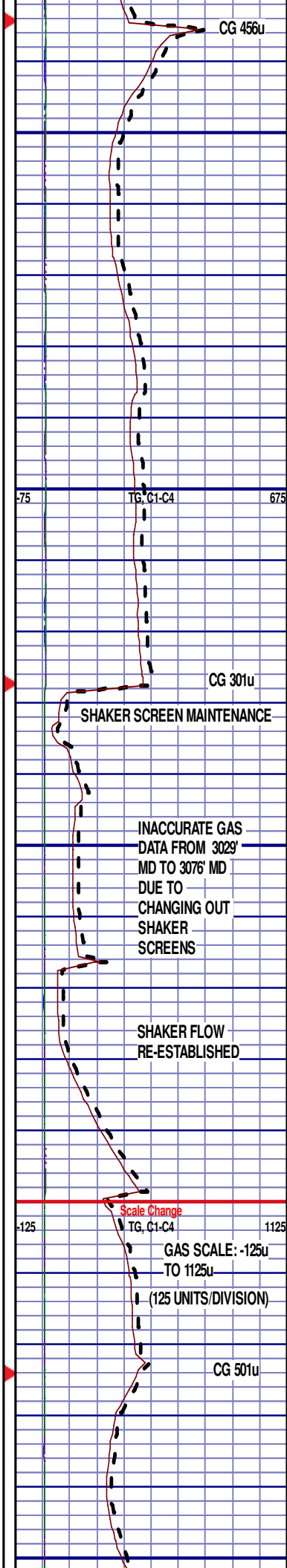
CG 319u





2900' MD-3000' MD: SLTST: 80% LTGY  
- MEDLTGY, FRI, FN TO MED GRN,  
W SRTD, CALC CMT, SANDY, FREE  
SLTY SH, IMBD PYR, INTGR POR,  
NO STN, NO FLOR, NO O FLOR, NO  
CUT, NO RNG

3000' MD-3100' MD: SLTST: 60% LTGY  
- MEDLTGY, FRI, FN TO MED GRN,  
W SRTD, CALC CMT, SANDY, FREE  
SLTY SH, IMBD PYR, INTGR POR,  
NO STN, NO FLOR, NO O FLOR, NO  
CUT, NO RNG

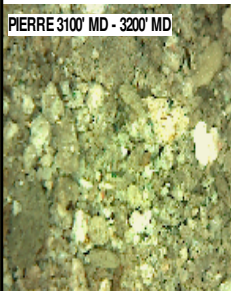


MD 3160 TVD 3125.84  
INC 11.9 AZ 251.07  
VS -26.57

ROP (FRI)  
Gamma (API)

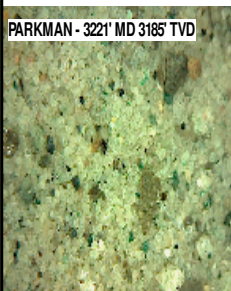
2000  
250

PIERRE 3100' MD - 3200' MD



3100' MD-3200' MD: SLTST: 50% LTGY  
- MEDLTGY, FRI, FN TO MED GRN,  
W SRTD, CALC CMT, SANDY, FREE  
SLTY SH, IMBD PYR, IMBD GLAUC,  
INTGR POR, NO STN, NO FLOR, NO  
O FLOR, NO CUT, NO RNG

PARKMAN - 3221' MD 3185' TVD



**PARKMAN**  
3221' MD 3185' TVD

MD 3255 TVD 3218.75  
INC 12.22 AZ 249.99  
VS -28.69

3200

3250

3300

3350

3200'- 3300': SS: 80% PRED WHT -  
LTGY - OPQ, FRI, FN GRN, WSRTD,  
CALC CMT, FREE SLTST, IMBD PYR,  
IMBD GLAUC, INTGR POR, NO STN,  
NO MIN FLOR, NO O FLOR, NO CUT,  
NO RNG

-125

TG, C1-C4

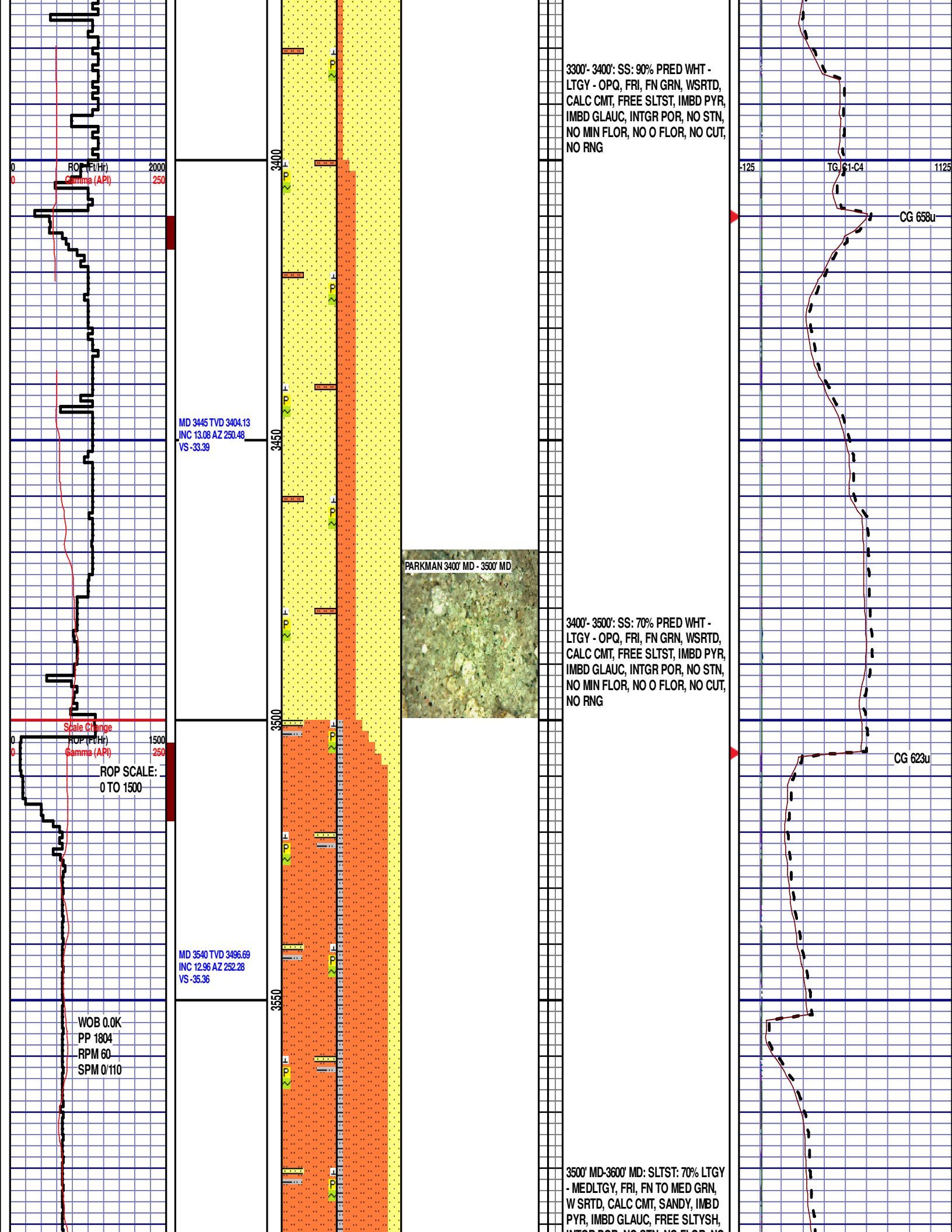
1125

CG 463u

CG 853u

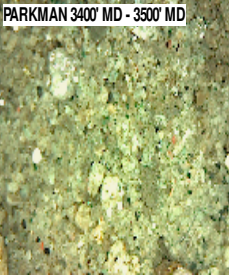
MD 3350 TVD 3311.52  
INC 12.65 AZ 250.04  
VS -31.04



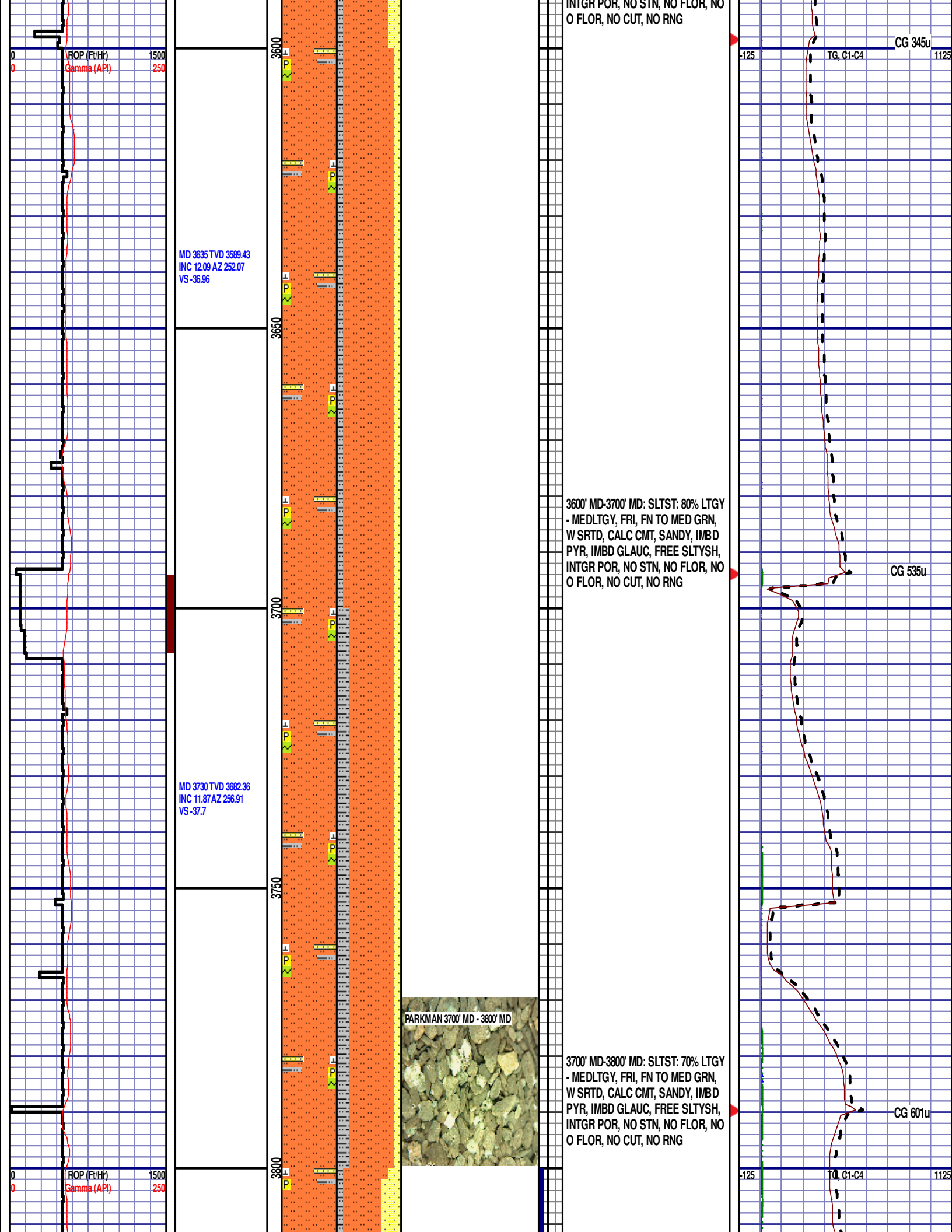


3300'- 3400': SS: 90% PRED WHT -  
LTGY - OPQ, FRI, FN GRN, WSRTD,  
CALC CMT, FREE SLTST, IMBD PYR,  
IMBD GLAUC, INTGR POR, NO STN,  
NO MIN FLOR, NO O FLOR, NO CUT,  
NO RNG

3400'- 3500': SS: 70% PRED WHT -  
LTGY - OPQ, FRI, FN GRN, WSRTD,  
CALC CMT, FREE SLTST, IMBD PYR,  
IMBD GLAUC, INTGR POR, NO STN,  
NO MIN FLOR, NO O FLOR, NO CUT,  
NO RNG



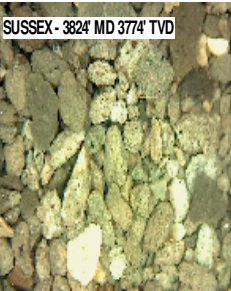
3500' MD-3600' MD: SLTST: 70% LTGY  
- MEDLTGY, FRI, FN TO MED GRN,  
WSRTD, CALC CMT, SANDY, IMBD  
PYR, IMBD GLAUC, FREE SLTYSH,  
INTGR POR, NO STN, NO FLOR, NO



MD 3825 TVD 3775.48  
INC 10.99 AZ 256.62  
VS -37.66

SUSSEX - 3824' MD 3774' TVD

SUSSEX  
3824' MD 3774' TVD



3800' MD-3900' MD: SLTST: 60% LTGY  
- MEDLTGY, FRI, FN TO MED GRN,  
W SRTD, CALC CMT, SANDY, IMBD  
PYR, FREE SLTYSH, INTGR POR,  
NO STN, NO FLOR, NO O FLOR,  
SLOW LZY CUT, DIM YLW RNG

CG 785u

MD 3921 TVD 3869.8  
INC 10.47 AZ 256.05  
VS -37.75

3850

3900

3950

4000

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

CG 461u

ABOP (Ft/Hr)  
Gamma (API)

1500  
250

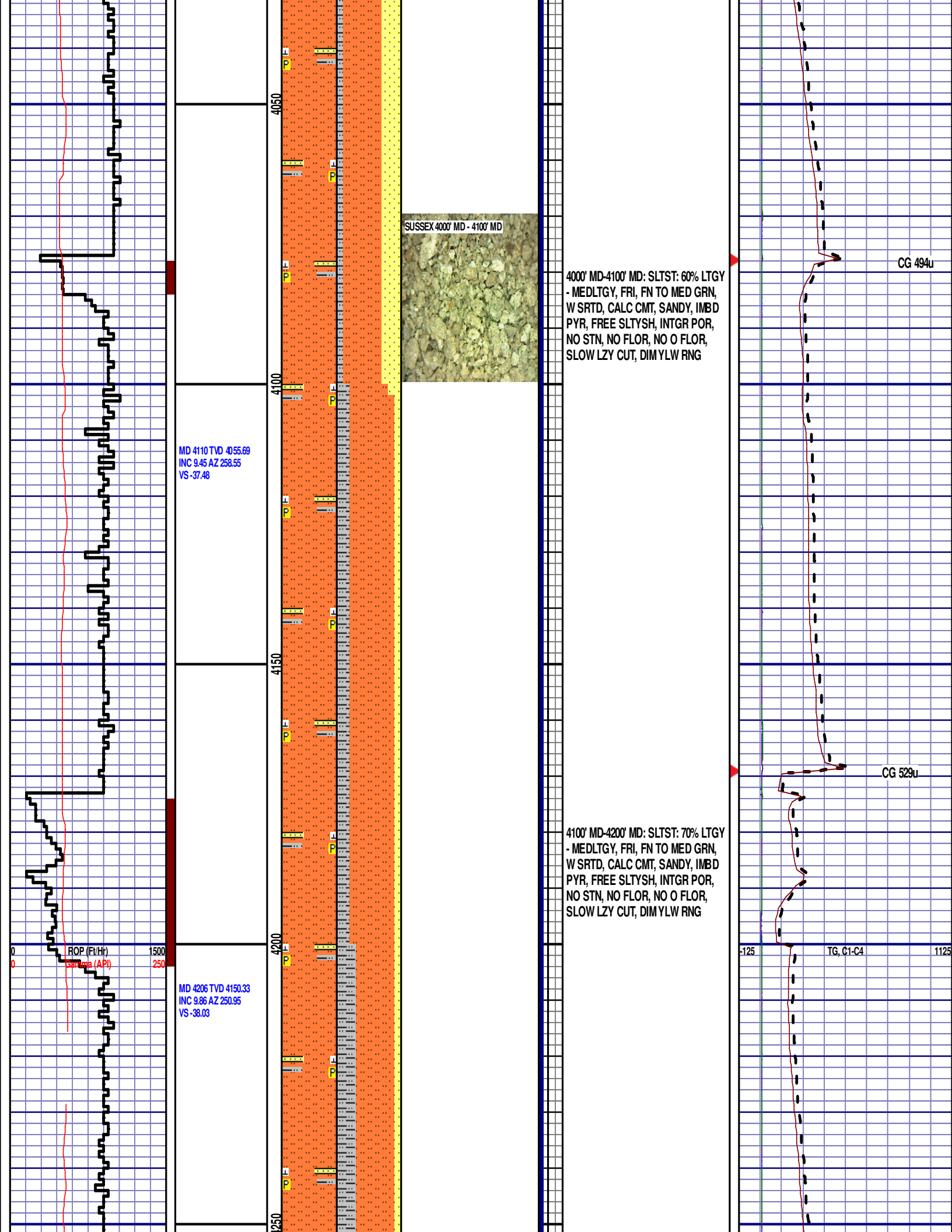
MD 4015 TVD 3962.18  
INC 10.85 AZ 256.98  
VS -37.79

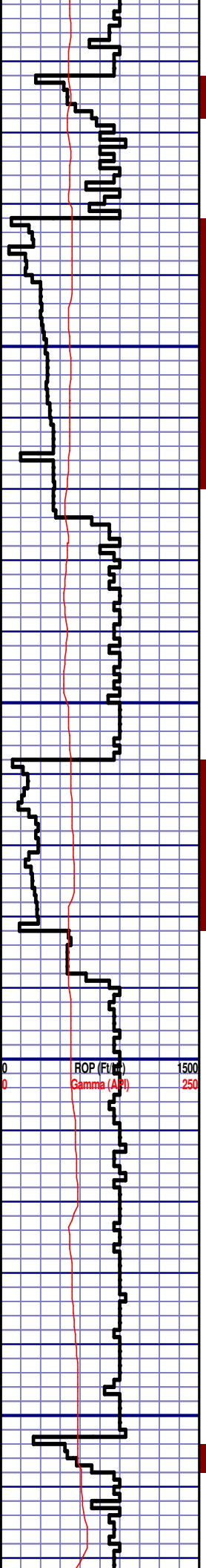
-125

TG, C1-C4

1125

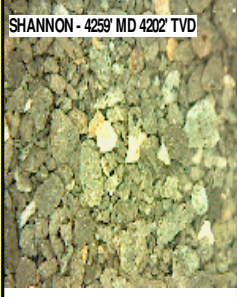
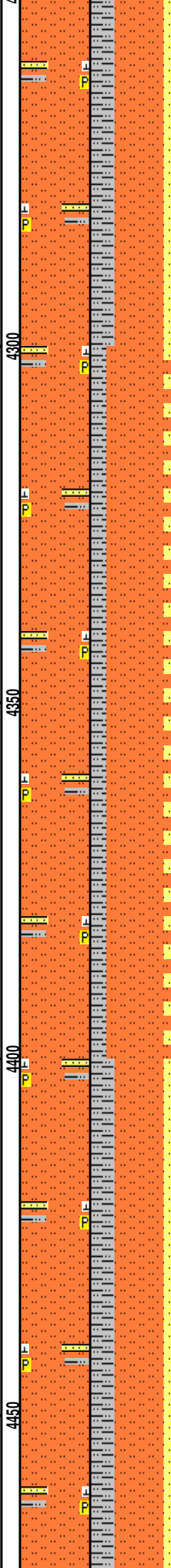






MD 4301 TVD 4243.76  
INC 11.01 AZ 251.38  
VS -39.67

MD 4396 TVD 4336.68  
INC 12.98 AZ 256.66  
VS -40.5

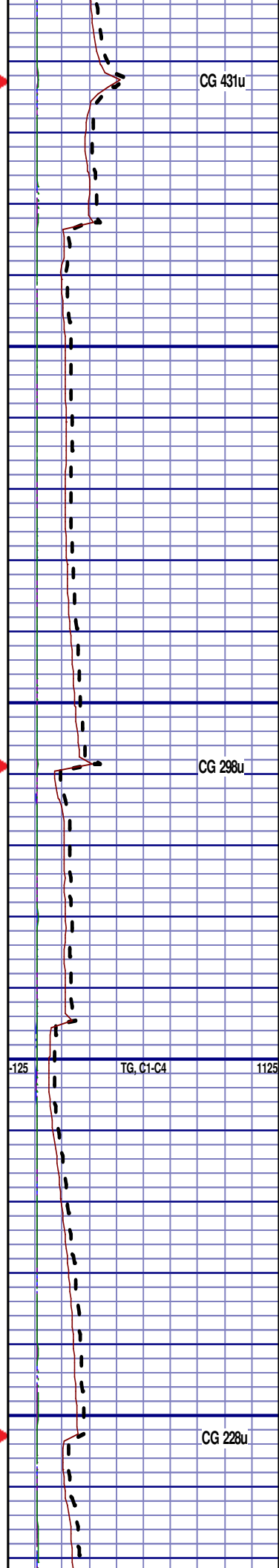


# SHANNON

4259' MD 4202' TVD

4200' MD-4300' MD: SLTST: 60% LTGY  
- MEDLTGY, FRI, FN TO MED GRN,  
W SRTD, CALC CMT, SANDY, IMBD  
PYR, FREE SLTYSH, INTGR POR,  
NO STN, NO FLOR, NO O FLOR,  
SLOW LZY CUT, DIM YLW RNG

4300' MD-4400' MD: SLTST: 75% LTGY  
- MEDLTGY, FRI, FN TO MED GRN,  
W SRTD, CALC CMT, SANDY, IMBD  
PYR, FREE SLTYSH, INTGR POR,  
NO STN, NO FLOR, NO O FLOR,  
SLOW LZY CUT, DIM YLW RNG



CG 431u

CG 298u

TG, C1-C4

CG 228u

MD 4491 TVD 4429.65  
INC 10.77 AZ 257.61  
VS -40.34

MD 4586 TVD 4523.12  
INC 9.81 AZ 253.35  
VS -40.66

MD 4681 TVD 4616.33  
INC 12.38 AZ 256.46  
VS -41.16

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

### TEEPEE BUTTES

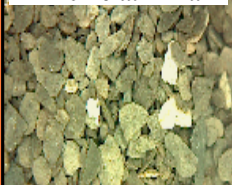
4580' MD 4517 TVD

4500' MD-4600' MD: SLTST: 60% LTGY  
- MEDLTGY, FRI, FN TO MED GRN,  
W SRTD, CALC CMT, IMBD PYR,  
FREE SLTYSH, INTGR POR, NO  
STN, NO FLOR, NO O FLOR, SLOW  
LZY CUT, DIM YLW RNG

TEEPEE BUTTES - 4580' MD 4517 TVD



TEEPEE BUTTES 4600' MD - 4700' MD

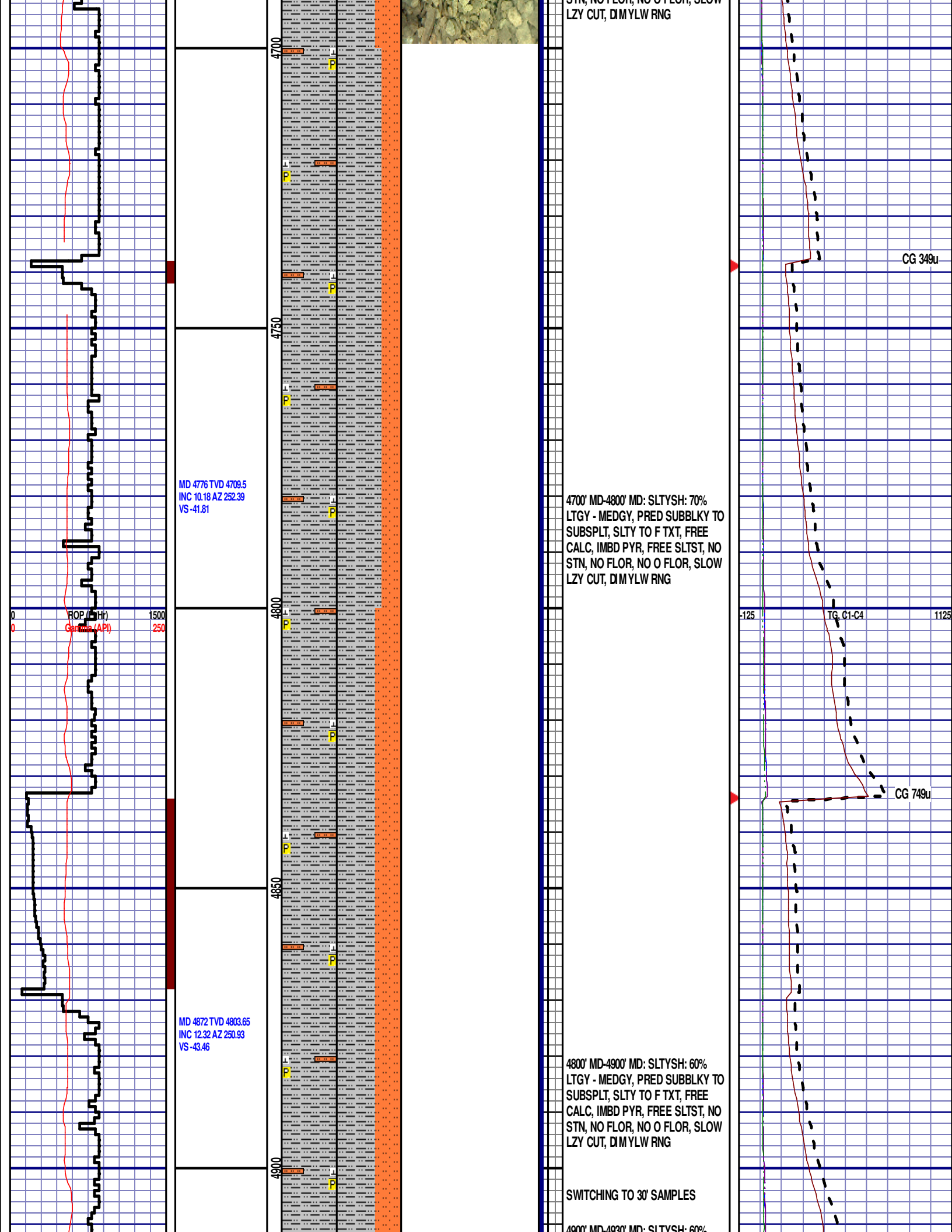


4600' MD-4700' MD: SLTYSH: 60%  
LTGY - MEDGY, PRED SUBBLKY TO  
SUBSPLT, SLTY TO F TXT, FREE  
CALC, IMBD PYR, FREE SLTST, NO  
STN, NO FLOR, NO O FLOR, SLOW

CG 487u

TG, C1-C4

CG 399u



MD 4776 TVD 4709.5  
INC 10.18 AZ 252.39  
VS -41.81

ROP (ft/Hr)  
Gamma (API)

1500  
250

MD 4872 TVD 4803.65  
INC 12.32 AZ 250.93  
VS -43.46

4700  
4750  
4800  
4850  
4900

4700' MD-4800' MD: SLTYSH: 70%  
LTGY - MEDGY, PRED SUBBLKY TO  
SUBSPLT, SLTY TO F TXT, FREE  
CALC, IMBD PYR, FREE SLTST, NO  
STN, NO FLOR, NO O FLOR, SLOW  
LZY CUT, DIM YLW RNG

4800' MD-4900' MD: SLTYSH: 60%  
LTGY - MEDGY, PRED SUBBLKY TO  
SUBSPLT, SLTY TO F TXT, FREE  
CALC, IMBD PYR, FREE SLTST, NO  
STN, NO FLOR, NO O FLOR, SLOW  
LZY CUT, DIM YLW RNG

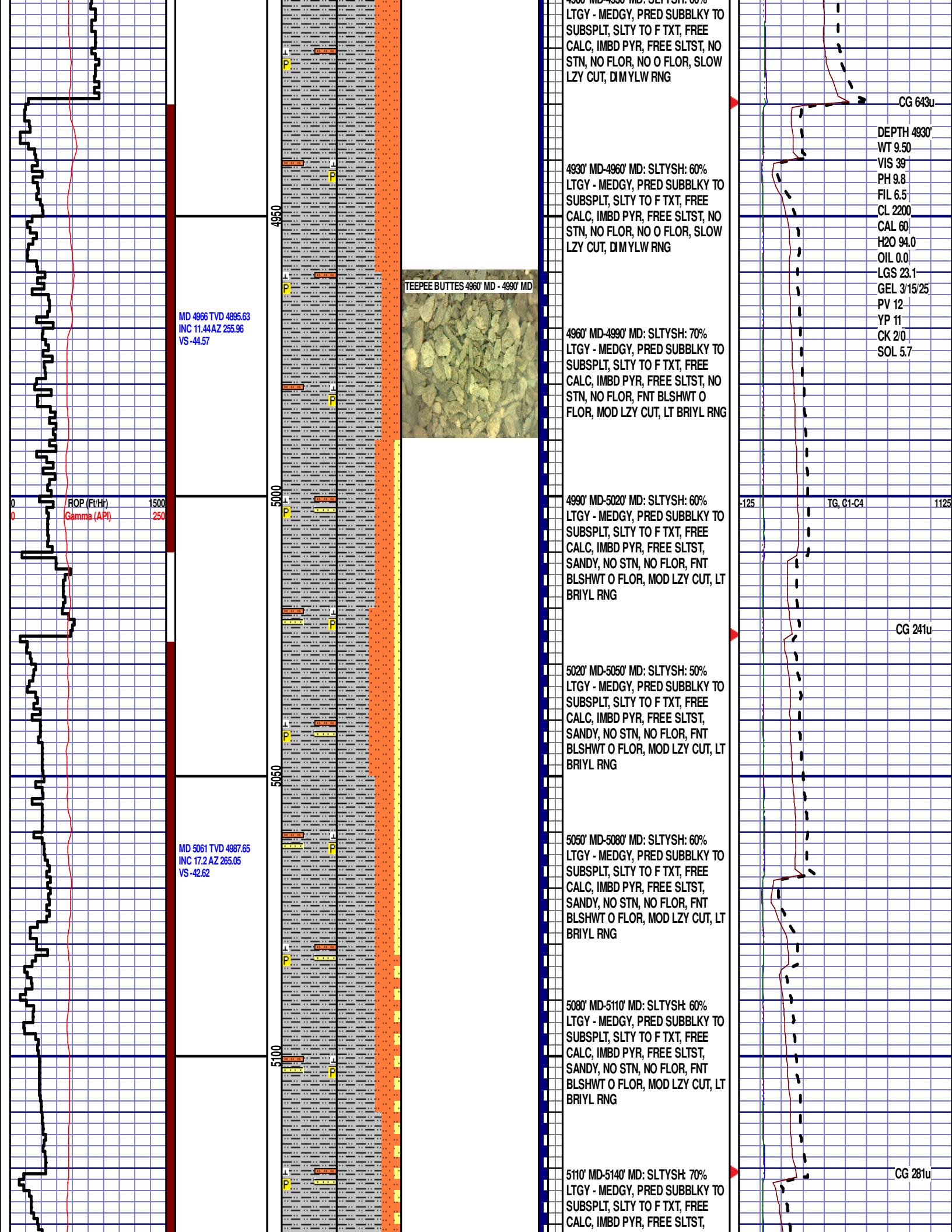
SWITCHING TO 30' SAMPLES

4900' MD-4930' MD: SLTYSH: 60%

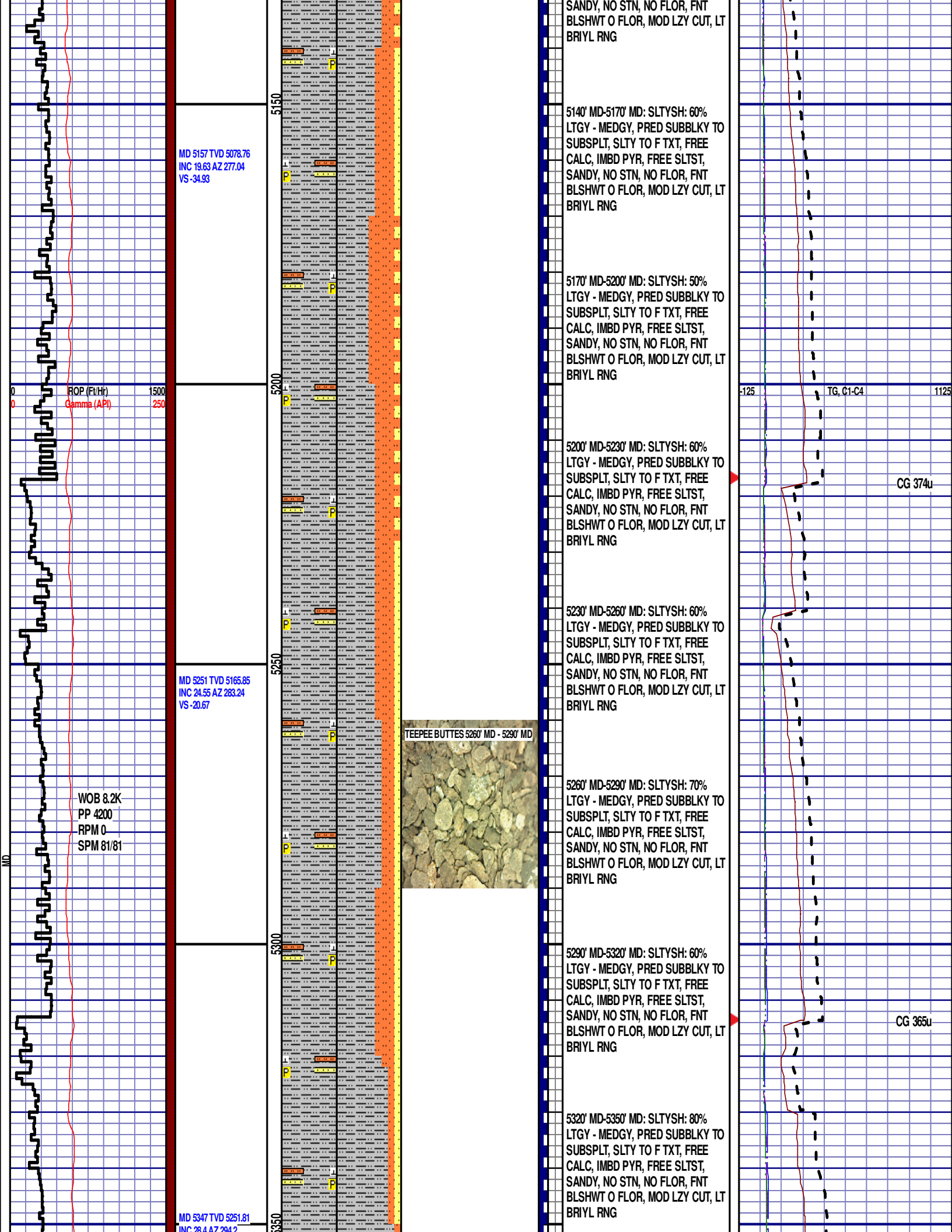
CG 349u

TG, C1-C4

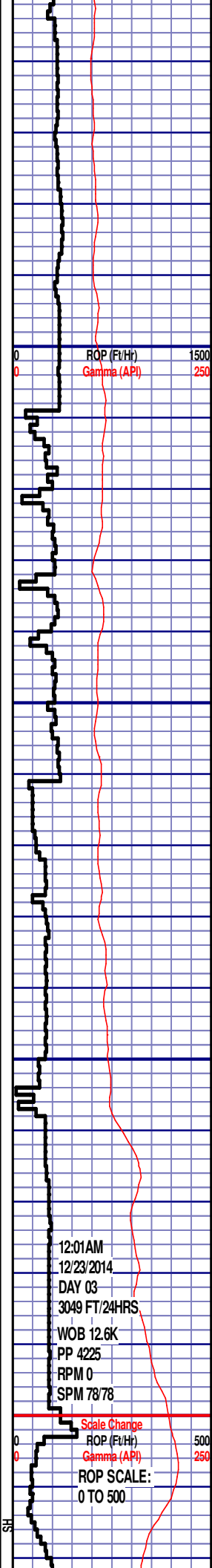
CG 749u







VS 2.2

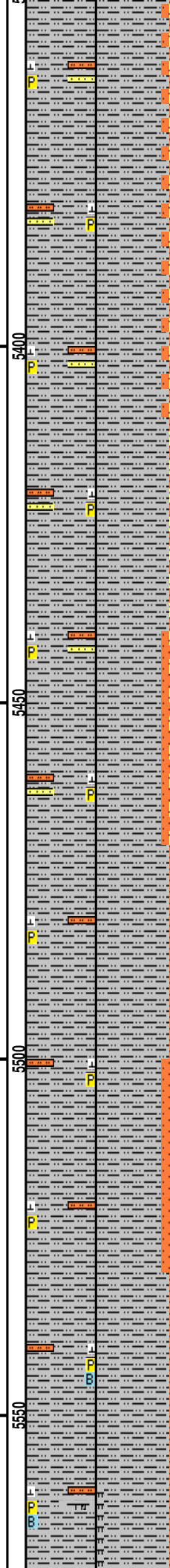


MD 5395 TVD 5293.26  
INC 32.22 AZ 302.21  
VS 18.31

MD 5441 TVD 5331.85  
INC 33.8 AZ 308.77  
VS 37.18

MD 5489 TVD 5371.16  
INC 36.27 AZ 313.86  
VS 59.66

MD 5536 TVD 5408.45  
INC 38.74 AZ 319.15  
VS 84.4



5350' MD-5380' MD: SLTYSH: 85%  
LTGY - MEDGY, PRED SUBBLKY TO  
SUBSPLT, SLTY TO F TXT, FREE  
CALC, IMBD PYR, FREE SLTST,  
SANDY, NO STN, NO FLOR, FNT  
BLSHWT O FLOR, MOD LZY CUT, LT  
BRIYL RNG

5380' MD-5410' MD: SLTYSH: 85%  
LTGY - MEDGY, PRED SUBBLKY TO  
SUBSPLT, SLTY TO F TXT, FREE  
CALC, IMBD PYR, FREE SLTST,  
SANDY, NO STN, NO FLOR, FNT  
BLSHWT O FLOR, MOD LZY CUT, LT  
BRIYL RNG

5410' MD-5440' MD: SLTYSH: 90%  
LTGY - MEDGY, PRED SUBBLKY TO  
SUBSPLT, SLTY TO F TXT, FREE  
CALC, IMBD PYR, FREE SLTST,  
SANDY, NO STN, NO FLOR, FNT  
BLSHWT O FLOR, MOD LZY CUT, LT  
BRIYL RNG

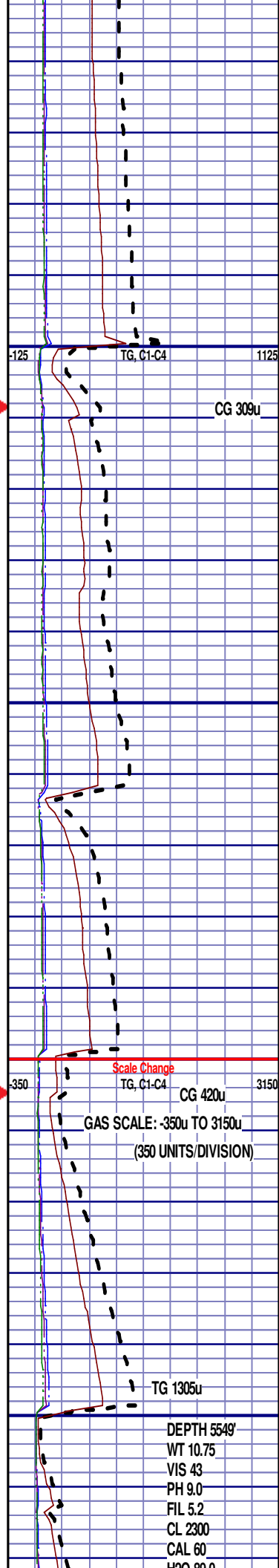
5440' MD-5470' MD: SLTYSH: 80%  
LTGY - MEDGY, PRED SUBBLKY TO  
SUBSPLT, SLTY TO F TXT, FREE  
CALC, IMBD PYR, FREE SLTST,  
SANDY, NO STN, NO FLOR, FNT  
BLSHWT O FLOR, MOD LZY CUT, LT  
BRIYL RNG

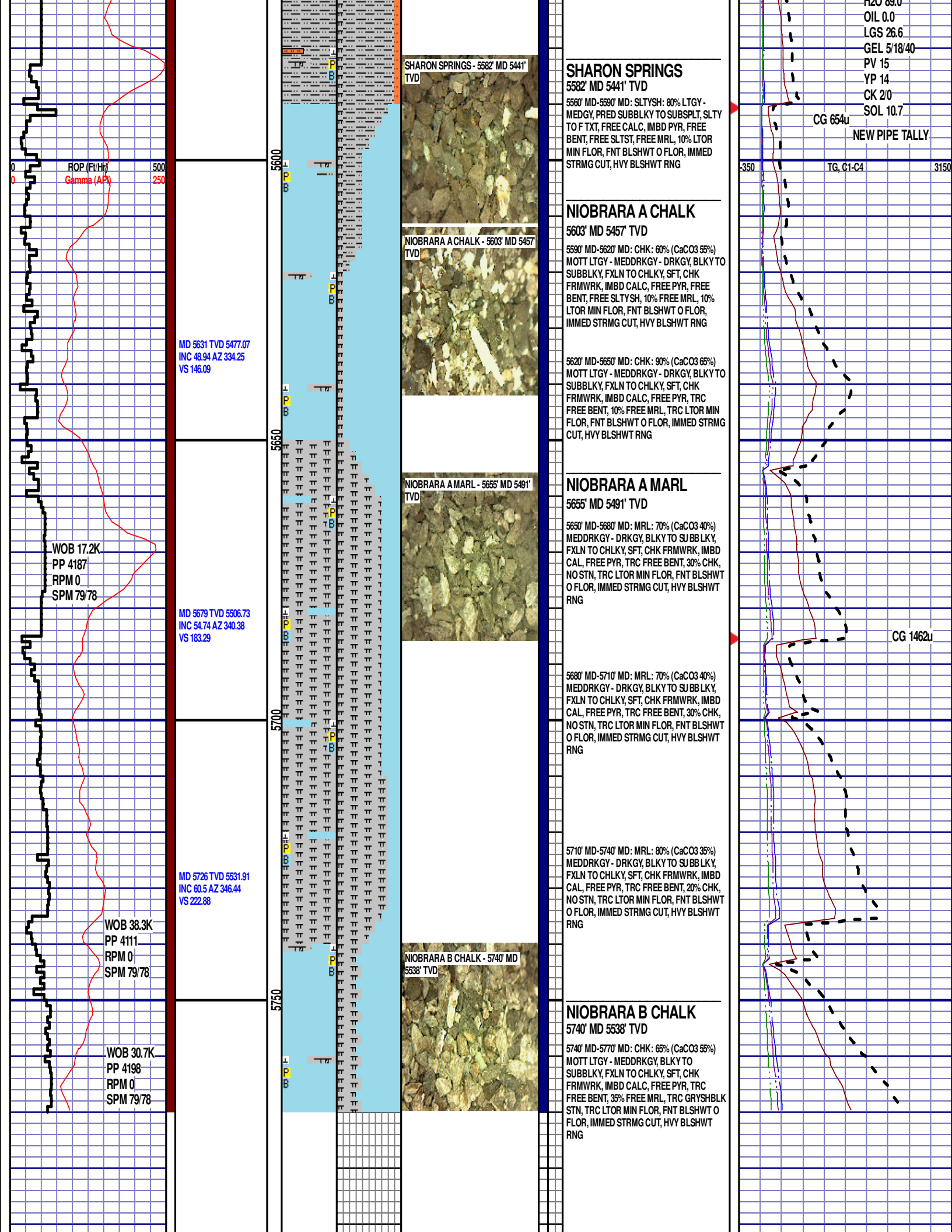
5470' MD-5500' MD: SLTYSH: 90%  
LTGY - MEDGY, PRED SUBBLKY TO  
SUBSPLT, SLTY TO F TXT, FREE  
CALC, IMBD PYR, FREE SLTST, NO  
STN, NO FLOR, FNT BLSHWT O  
FLOR, MOD LZY CUT, LT BRIYL RNG

5500' MD-5530' MD: SLTYSH: 80%  
LTGY - MEDGY, PRED SUBBLKY TO  
SUBSPLT, SLTY TO F TXT, FREE  
CALC, IMBD PYR, FREE SLTST, NO  
STN, NO FLOR, FNT BLSHWT O  
FLOR, MOD LZY CUT, LT BRIYL RNG

TOOH @ 7:45 PM ON 12/22/14 @ 5549' MD FOR  
MUD MOTOR.  
TIH @ 12:20 AM ON 12/23/2014  
RESUMED DRILLING @ 5:07 AM ON 12/23/2014  
W/ BIT #3, 8.75", SECURITY MMD55, SN  
12512408 @ 5549' MD.

5530' MD-5560' MD: SLTYSH: 90% LTGY -  
MEDGY, PRED SUBBLKY TO SUBSPLT, SLTY  
TO F TXT, FREE CALC, IMBD PYR, TRC FREE  
BENT, FREE SLTST, TRC LTOR MIN FLOR,  
FNT BLSHWT O FLOR, IMMED STRMG CUT,  
HVY BLSHWT RNG





[illegible]