



7136 South Yale Avenue, Suite 414

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WWW.HZMUD.COM

**Customer Information**

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

Geologist: Cassidy Miller  
Noble Energy Inc

**Mud Logging Details**

Logger: Andrew Christiano & Ryan Bless

Log Interval: 2500' MD to 7050' MD  
Start Date: September 19, 2012  
Release Date: September 25, 2012

**Well Information**

Well Name: Wells Ranch AE08-69-1HN

Location: 8-6N-62W  
1448' FNL, 274' FWL

County: Weld  
State: Colorado

Drilling Rig: H&P 321  
Total Depth: 11296' MD  
TD Date: September 25, 2012  
Formation: Niobrara  
KB Elevation: 5018'  
GR Elevation: 4988'  
API Number: 05-123-35642

**ROCK TYPES**

Anhy	Dol	Salt	gw	hvycrbsh
Bent	Gyp	Shale	lmywash	NO SMPL
Brec	Igne	Shcol	ogw	nosmpl
Cht	Chk	Shgy	olmywash	Lsdetrit
Clyst	Lmst	Slst	oshly gw	sltst
Coal	Meta	Ss	shly gw	sdy sh
Congl	Mrlst	Till	sdylgw	Cement

Drill Depth v. Time		Survey Data		Lithology		Geological Descriptions		Total Gas, C1-C4	
ROP (Ft/Hr)	Gamma	Depth	Porosity					TG (units)	
								C1 (units)	
								C2 (units)	
								C3 (units)	
								C4 (units)	
0	550	24						-125	1125
0	300								
SLIDE=RED ROTATE=WHITE						NOBLE ENERGY INC WELLS RANCH AE08-69-1HN 8-6N-62W 1448' FNL, 274' FWL WELD CO., CO H&P 321 LOGGERS: ANDREW CHRISTIANO RYAN BLEESS CALLED OUT BY COMPANY MAN ON 9/19/12 COMMENCED LOGGING @ 2500' @		CONNECTIONS MARKED WITH RED TRIANGLES	
ROP SCALE: 0 TO 550								GAS SCALE: -125 TO 1125	

GAMMA SCALE: 0 TO 300

WOB 9.1K  
RPM 55  
SPM 68/67  
PP 2491

ROP (Ft/Hr) 550  
Gamma 300

MD 2586 TVD 2531.58  
Az 349.44° Inc 19.02°  
VS 40.04

MD 2681 TVD 2621.86  
Az 349.51° Inc 17.38°  
VS 42.76

2:30 AM ON 9/20/12 W/BIT #2 8.75"  
SCHLUMBERGER MDI516 IN @ 794'  
MD

DRILLING ON WBM

SILTSTN; 60%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SILTSTN; 60%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SILTSTN; 55%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SS; 50%; OFF WH TO LT GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

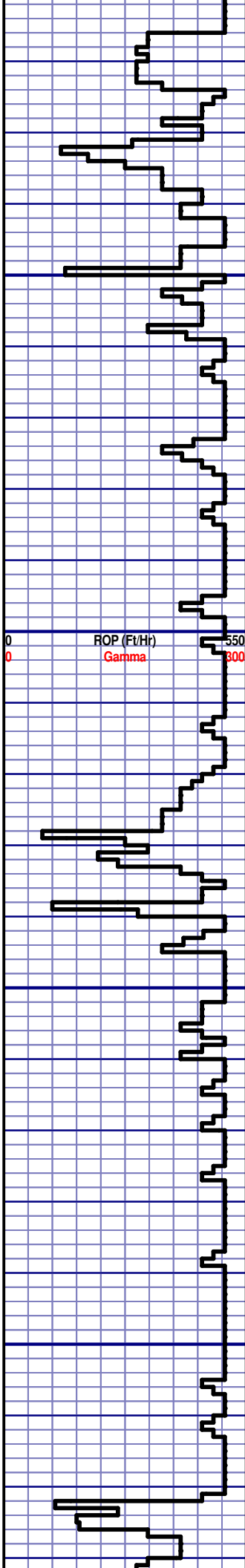
PIERRE  
2700' MD 2638' TVD

CG 248u

MD 2601  
WT 9.0  
VIS 29  
PH 9.4  
FIL 26.8  
CL 2100  
CAL 50  
H2O 96.0  
OIL 0  
SOL 3.6  
GELS N/A  
PV 1  
YP 4

TG, C1-C4

CG 269u



MD 2776 TVD 2712.25  
Az 347.18° Inc 18.33°  
VS 44.85

MD 2871 TVD 2802.41  
Az 347.19° Inc 18.4°  
VS 46.41

2750

2800

2850

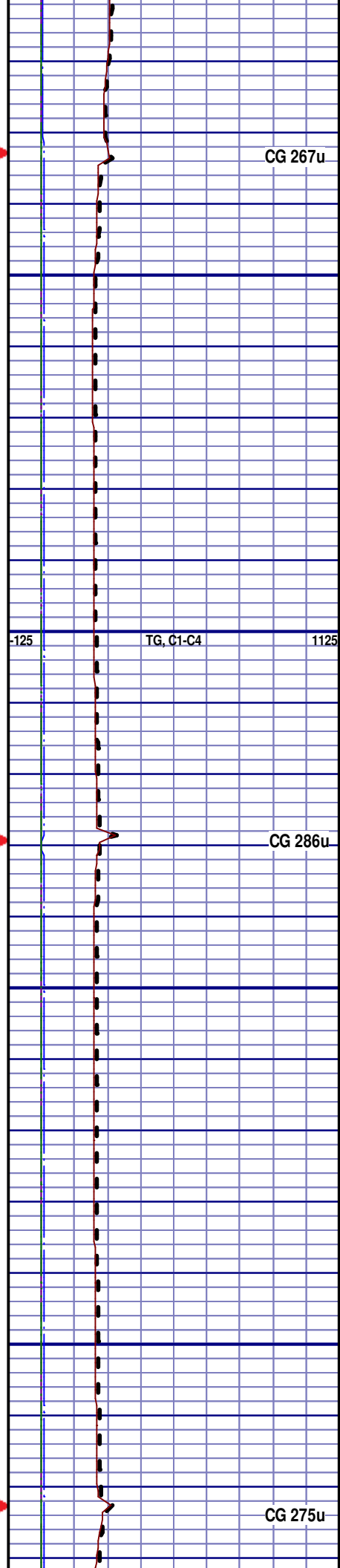
2900

SS; 60%; OFF WH TO LT GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH

SS; 70%; OFF WH TO LT GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH

SS; 70%; OFF WH TO LT GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH

SS; 60%; OFF WH TO LT GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH

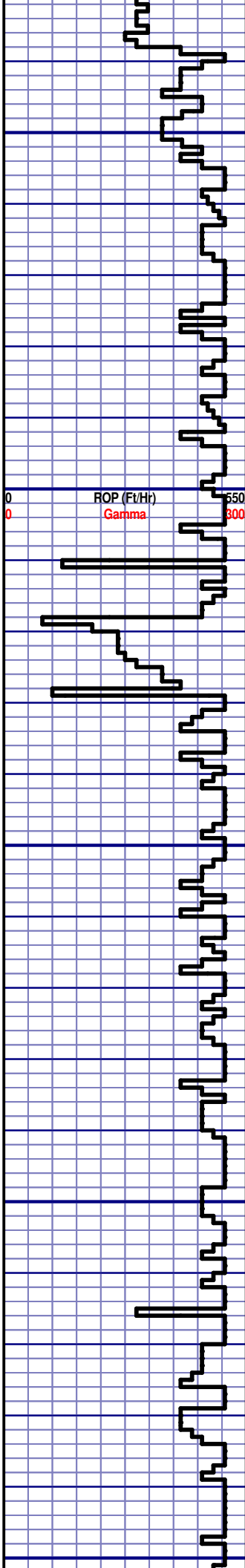


CG 267u

-125 TG, C1-C4 1125

CG 286u

CG 275u



MD 2966 TVD 2892.48  
Az 350.51° Inc 18.68°  
VS 48.86

MD 3061 TVD 2982.48  
Az 353.3° Inc 18.01°  
VS 52.86

2950  
3000  
3050  
3100  
1150

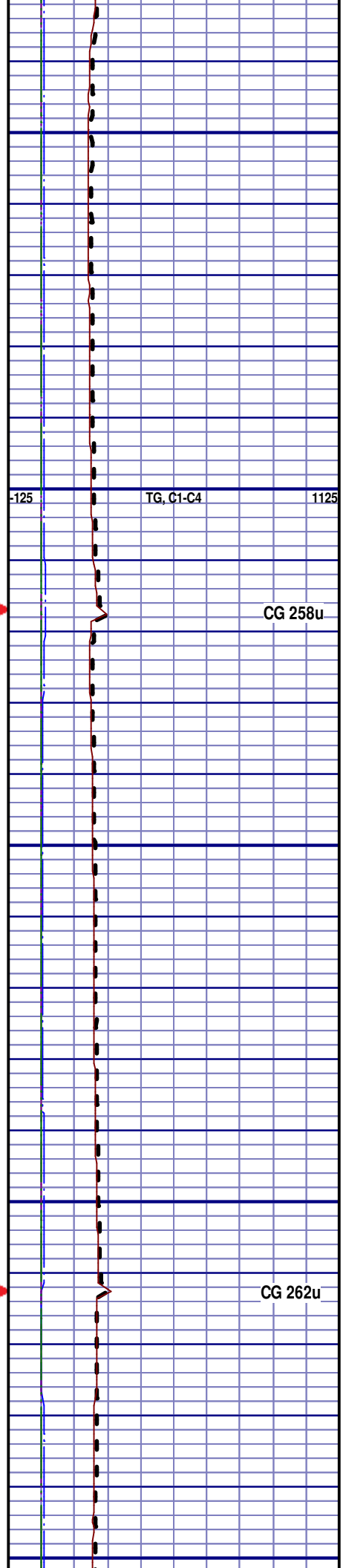
SS; 70%; OFF WH TO LT GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH

SS; 60%; OFF WH TO LT GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH

SS; 60%; OFF WH TO LT GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH

SS; 60%; OFF WH TO LT GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH

SS; 60%; OFF WH TO LT GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH



MD 3156 TVD 3073.2  
Az 353.59° Inc 17.22°  
VS 57.48

MD 3251 TVD 3163.91  
Az 352.81° Inc 17.34°  
VS 61.89

MD 3346 TVD 3254.44  
Az 349.68° Inc 17.95°  
VS 65.41

ROP (Ft/Hr)  
Gamma

550  
300

3200

3250

3300

3350

SS; 75%; OFF WH TO LT GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SS; 85%; OFF WH TO LT GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

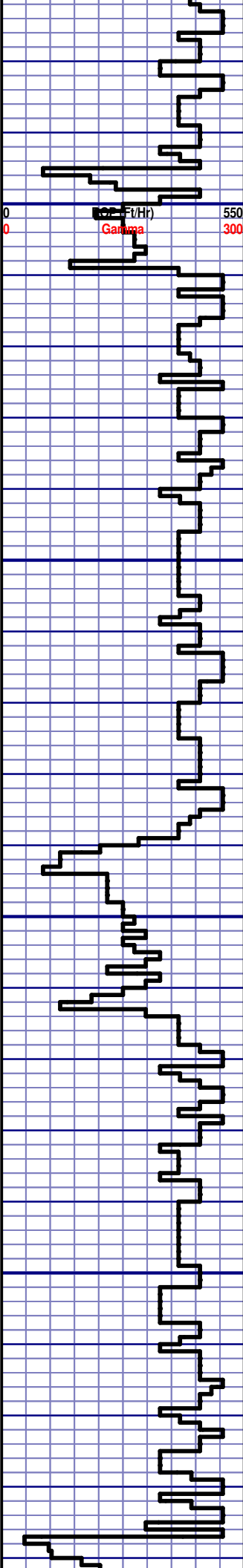
SS; 90%; OFF WH TO LT GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SILTSTN; 80%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

-125 TG, C1-C4 1125

CG 300u

CG 317u



MD 3441 TVD 3345.05  
Az 349.16° Inc 17.03°  
VS 68.02

MD 3535 TVD 3434.8  
Az 349.11° Inc 17.55°  
VS 70.42

3400  
3450  
3500  
3550

SILTSTN; 90%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SILTSTN; 75%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SILTSTN; 75%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

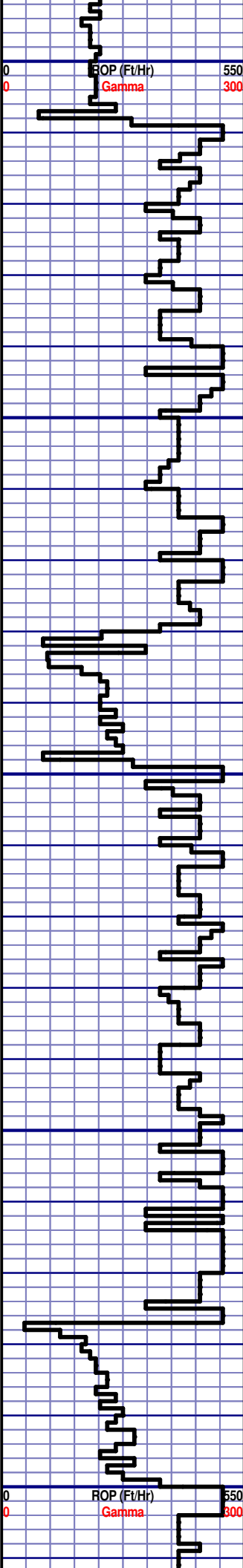
SILTSTN; 90%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SILTSTN; 90%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

CG 324u  
-125 TG, C1-C4 1125

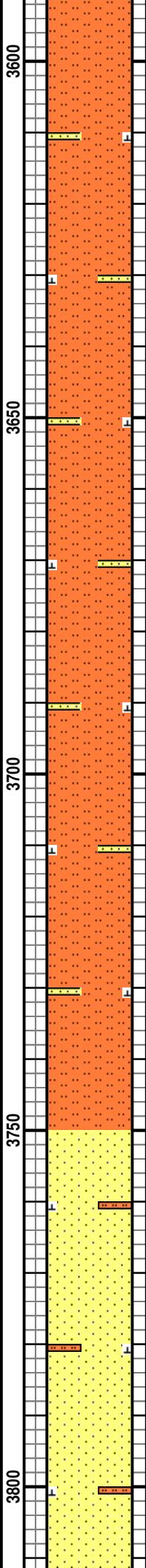
CG 334u

CG 307u



MD 3630 TVD 3525.18  
Az 347.69° Inc 18.34°  
VS 72.55

MD 3725 TVD 3615.54  
Az 348.17° Inc 17.62°  
VS 74.46



P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

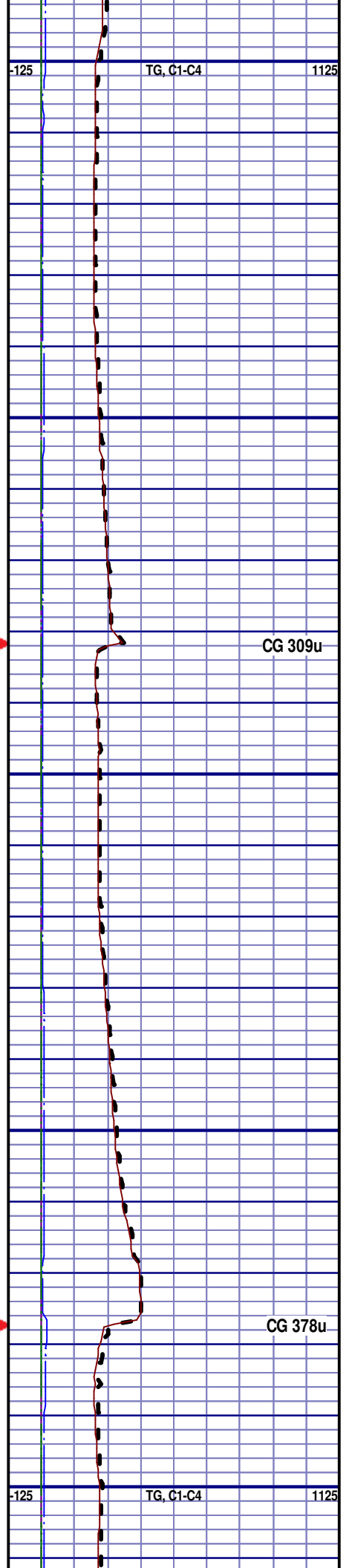
SILTSTN; 80%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SILTSTN; 80%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SILTSTN; 60%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SS; 60%; OFF WH TO LT GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

**PARKMAN**  
3800' MD 3686' TVD



MD 3820 TVD 3705.93  
Az 348.29° Inc 18.23°  
VS 76.51

MD 3915 TVD 3795.82  
Az 348.95° Inc 19.49°  
VS 78.88

MD 4010 TVD 3885.34  
Az 348.57° Inc 19.63°  
VS 81.41

SS; 75%; OFF WH TO LT GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

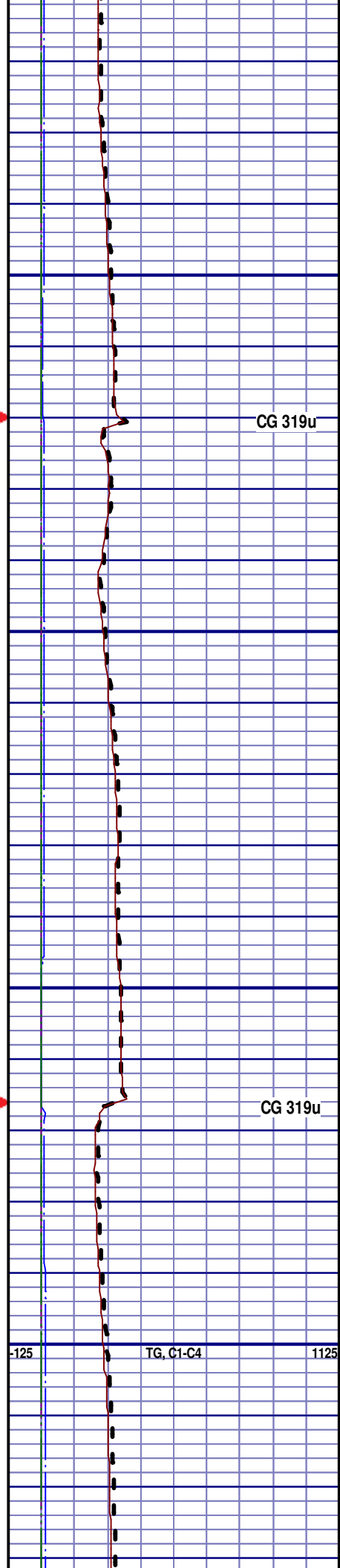
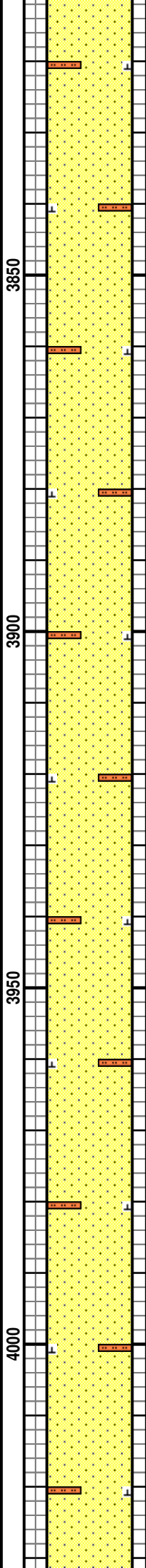
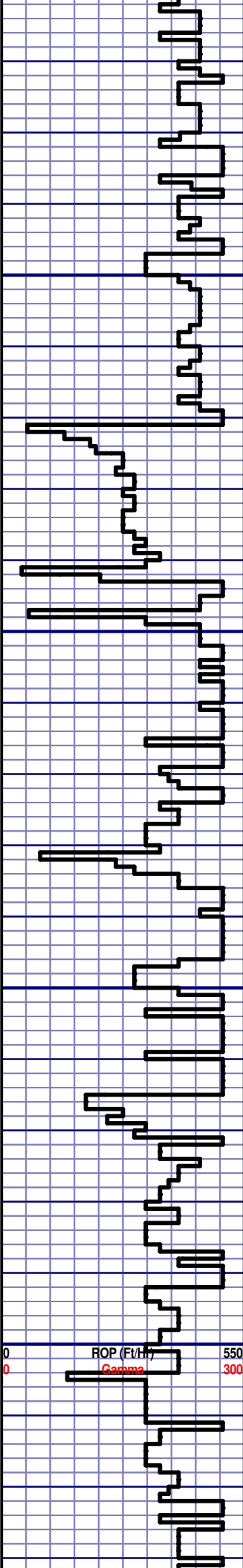
SS; 90%; OFF WH TO LT GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

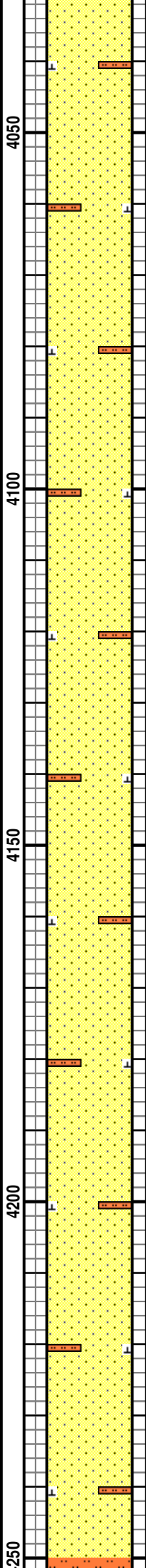
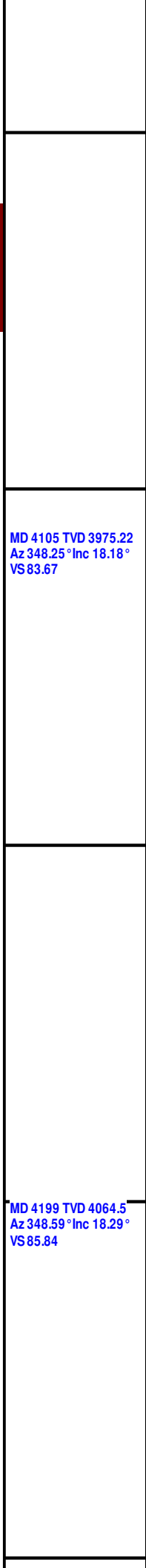
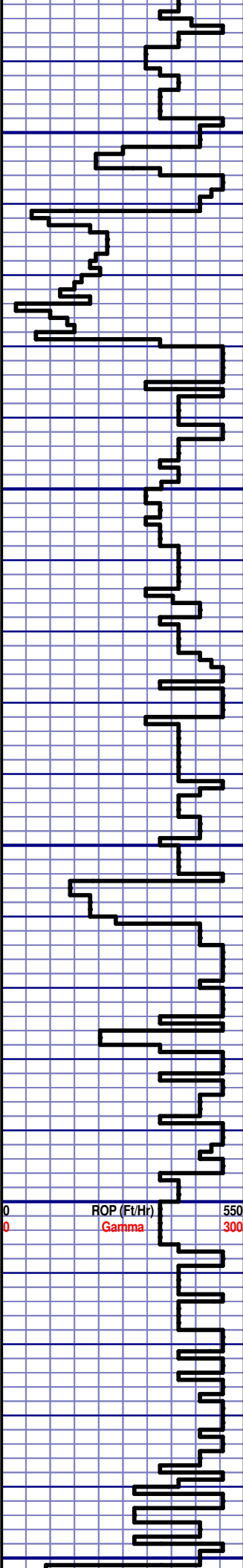
SS; 80%; OFF WH TO LT GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SS; 90%; OFF WH TO LT GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

CG 319u

CG 319u





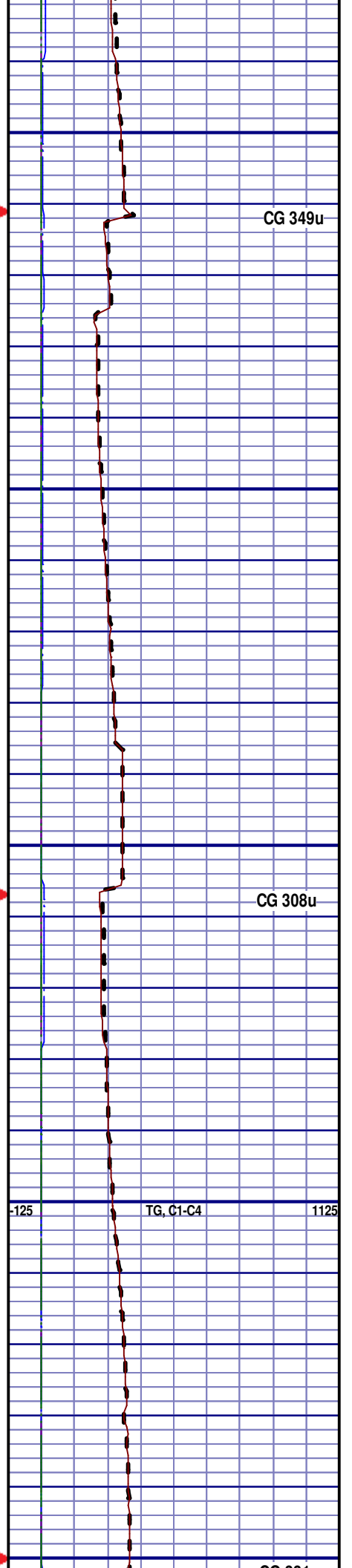
SS; 65%; OFF WH TO LT GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH

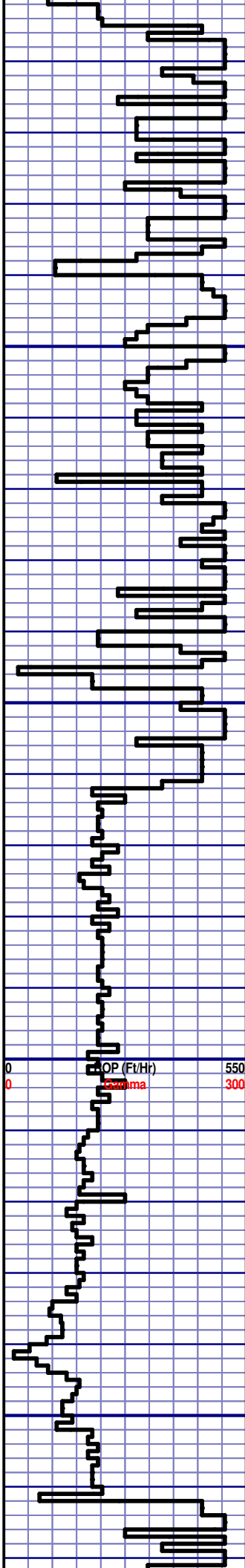
SS; 80%; OFF WH TO LT GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH

SS; 70%; OFF WH TO LT GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH

SS; 60%; OFF WH TO GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH

SS; 55%; OFF WH TO GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH





MD 4294 TVD 4154.89  
Az 348.59° Inc 17.54°  
VS 88.07

4300

SILTSTN; 60%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

4350

SS; 55%; OFF WH TO GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

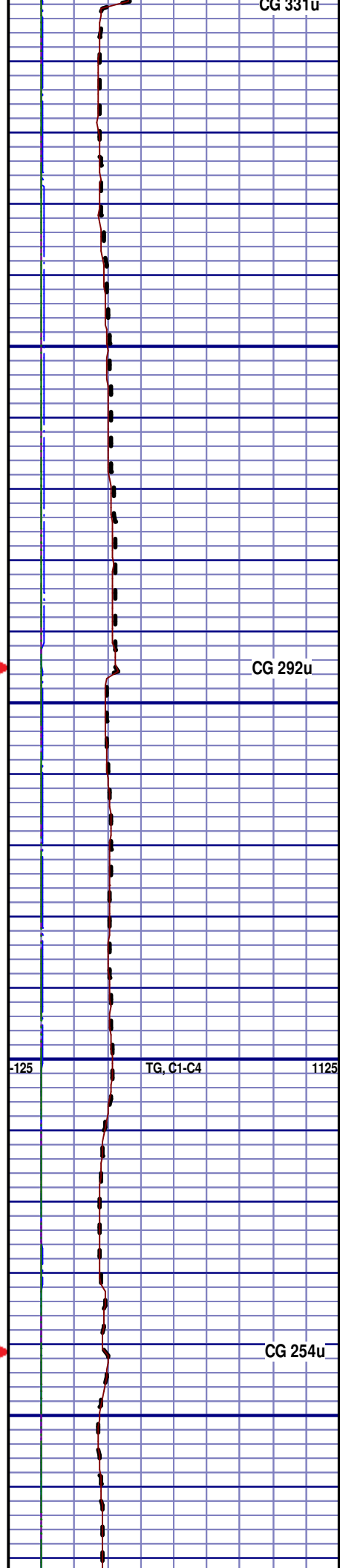
MD 4389 TVD 4245.65  
Az 347.99° Inc 16.83°  
VS 90.08

4400

SILTSTN; 60%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

4450

SILTSTN; 80%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH



CG 292u

CG 254u

MD 4484 TVD 4336.53  
Az 349.21° Inc 17.02°  
VS92.20

SILTSTN; 80%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

4500

SILTSTN; 80%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

4550

MD 4579 TVD 4427.77  
Az 347.58° Inc 15.32°  
VS94.16

SILTSTN; 90%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

4600

ROP (Ft/H)  
Gamma

0  
0

550  
300

-125 TG, C1-C4 1125

SILTSTN; 90%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

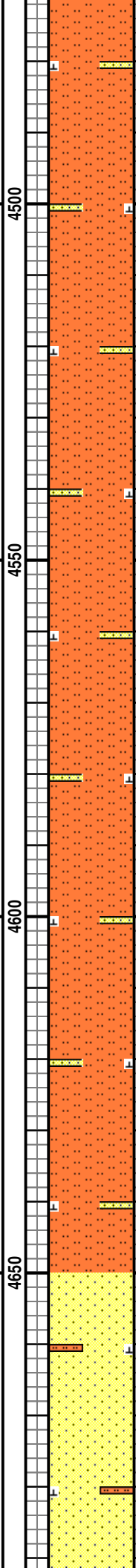
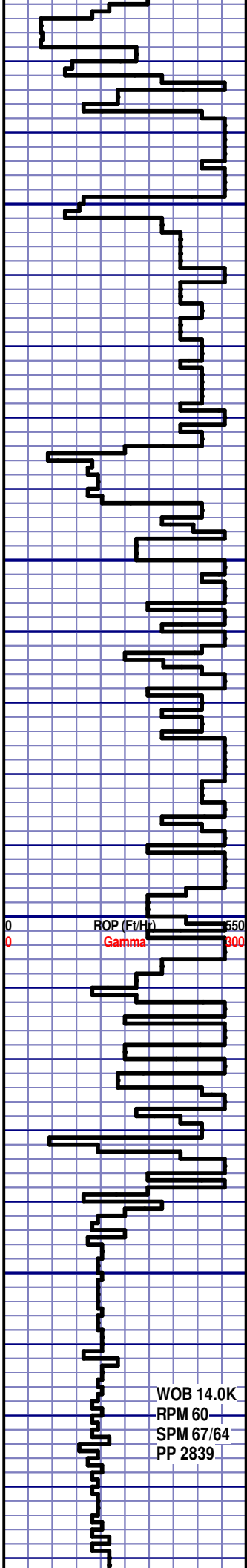
4650

SUSSEX  
4650' MD 4496' TVD

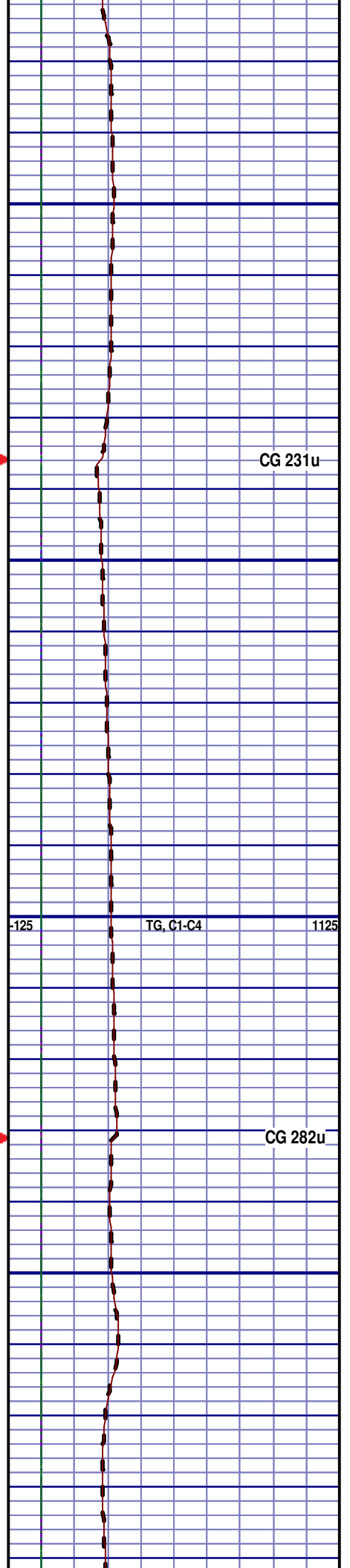
WOB 14.0K  
RPM 60  
SPM 67/64  
PP 2839

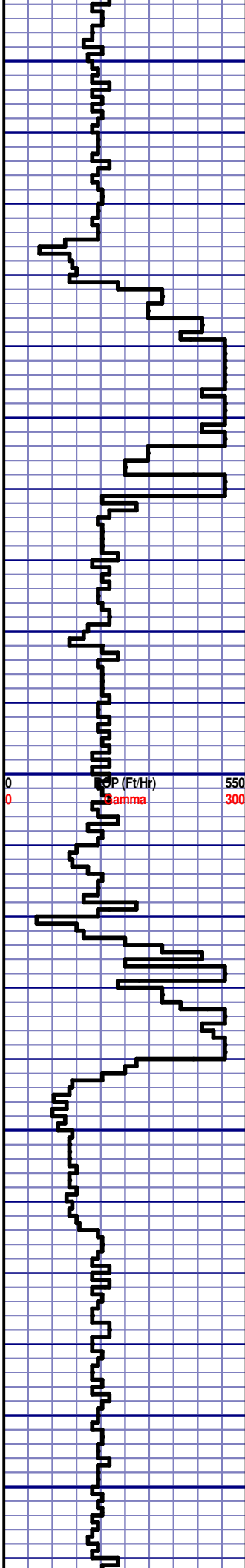
MD 4674 TVD 4519.82  
Az 349.02° Inc 13.31°  
VS95.82

SS; 60%; OFF WH TO GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,



Textual descriptions of lithology and well parameters. Includes descriptions of siltstone and Sussex, and well parameters like MD, TVD, Azimuth, Inclination, and VS. A red arrow points to a specific depth on the right side of the plot.

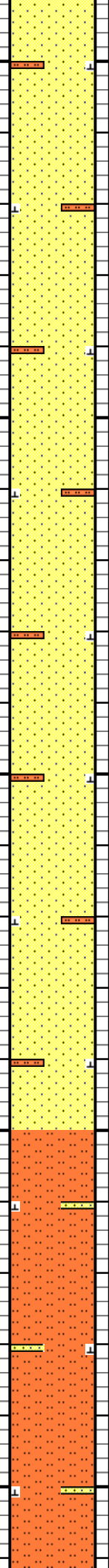




MD 4769 TVD 4612.4  
Az 349.49° Inc 12.6°  
VS 97.69

MD 4864 TVD 4705.29  
Az 350.46° Inc 11.59°  
VS 99.69

4700  
4750  
4800  
4850  
4900



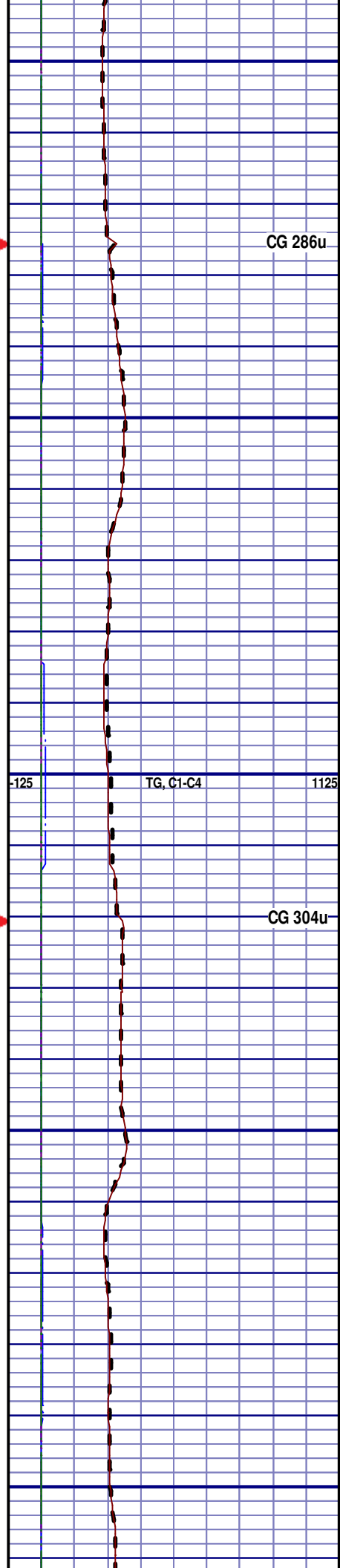
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SS; 60%; OFF WH TO GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SS; 60%; OFF WH TO GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SS; 55%; OFF WH TO GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

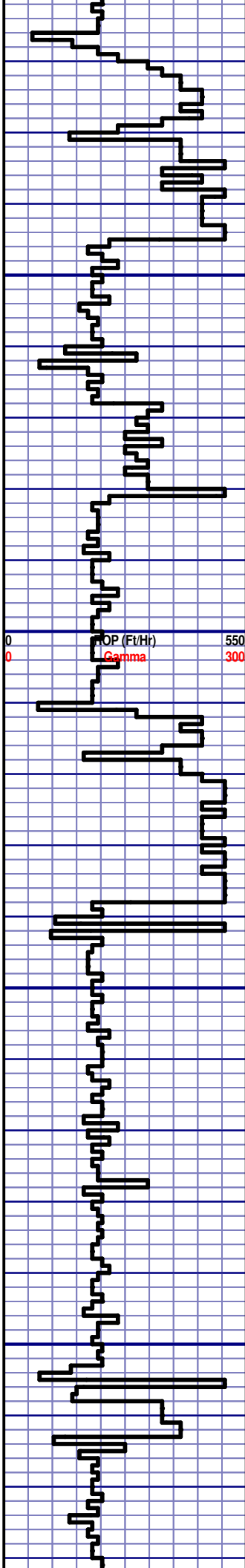
SILTSTN; 90%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH



CG 286u

CG 304u

TG, C1-C4



MD 4958 TVD 4797.62  
Az 354.37° Inc 10.06°  
VS 102.17

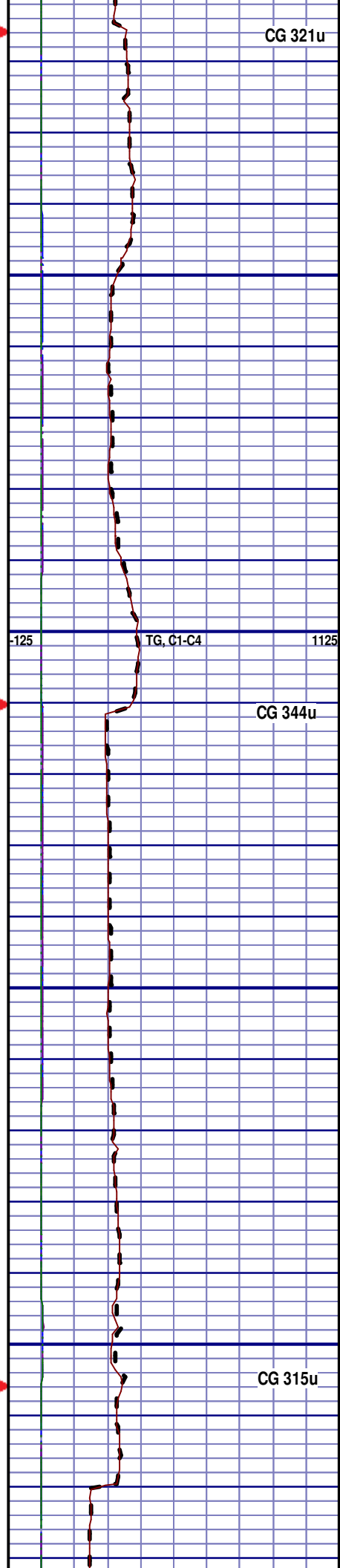
4950  
5000  
5050  
5100

SILTSTN; 90%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SILTSTN; 90%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SILTSTN; 60%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SILTSTN; 60%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

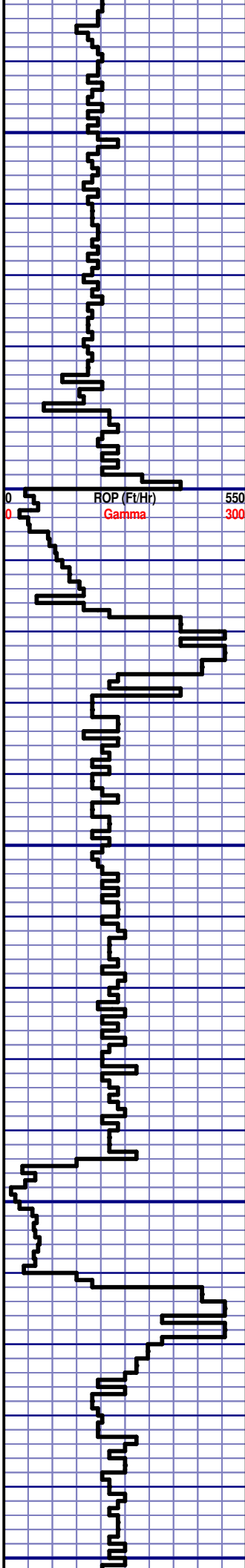


CG 321u

-125 TG, C1-C4 1125

CG 344u

CG 315u



MD 5148 TVD 4985.28  
Az 355.35° Inc 7.88°  
VS 108.14

MD 5243 TVD 5079.54  
Az 344.99° Inc 6.42°  
VS 109.47

MD 5338 TVD 5174.08  
Az 340.4° Inc 4.89°  
VS 109.27

5150  
5200  
5250  
5300  
5350

SILTSTN; 80%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SILTSTN; 70%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SILTSTN; 60%; GRY TO LT GRY,  
VFGR, SUB-ANG, OPA, BRITTLE,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

**SHANNON**  
5250' MD 5086' TVD

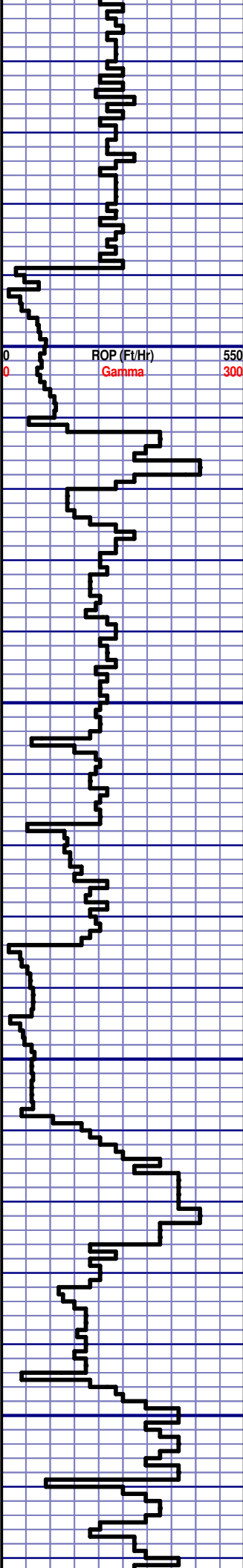
SS; 80%; OFF WH TO GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

SS; 80%; OFF WH TO GRY, VF  
TO FGR, SUB-ANG, FROST, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SILTY, NO FLUOR, NO STRM CUT,  
NO CUT AFTER CRUSH

MD 5191  
WT 9.3  
VIS 30  
PH 9.0  
FIL 27.4  
CL 2200  
CAL 40  
H2O 95.0  
OIL 0  
SOL 4.7  
GELS N/A  
PV 1  
YP 4

-125 TG, C1-C4 CG 389u 1125

CG 337u



0  
0

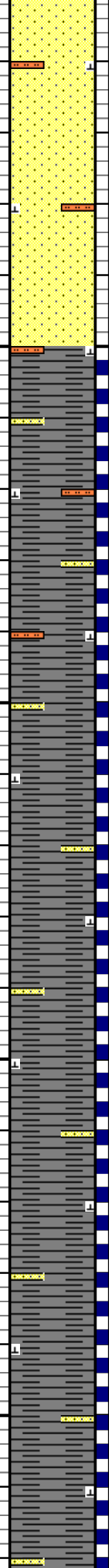
ROP (Ft/Hr)  
Gamma

550  
300

MD 5433 TVD 5268.86  
Az 329.42° Inc 2.82°  
VS 108.41

MD 5528 TVD 5363.81  
Az 284.07° Inc 0.69°  
VS 107.31

5  
5400  
5450  
5500  
5550

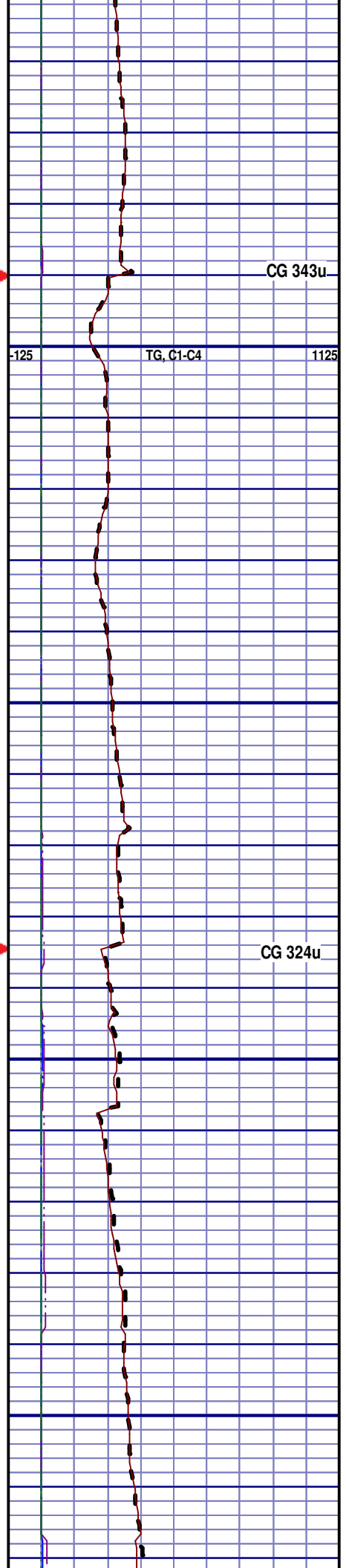


SS; 70%; OFF WH TO GRY, VF TO FGR, SUB-ANG, FROST, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SILTY, NO FLUOR, NO STRM CUT, NO CUT AFTER CRUSH

SH; 60%; BLK TO DK GRY, SMOOTH TXT, SOFT TO FIRM, SANDY, SILTY, NO VIS FRACT, YLW FLUOR, SLOW, BLU STRM CUT, YLW RING CUT, MINOR CALC, BLKY TO PLATY

SH; 70%; BLK TO DK GRY, SMOOTH TXT, SOFT TO FIRM, SANDY, NO VIS FRACT, YLW FLUOR, SLOW, BLU STRM CUT, YLW RING CUT, MINOR CALC, BLKY TO PLATY

SH; 70%; BLK TO DK GRY, SMOOTH TXT, SOFT TO FIRM, SANDY, NO VIS FRACT, YLW FLUOR, SLOW, BLU STRM CUT, YLW RING CUT, MINOR CALC, BLKY TO PLATY



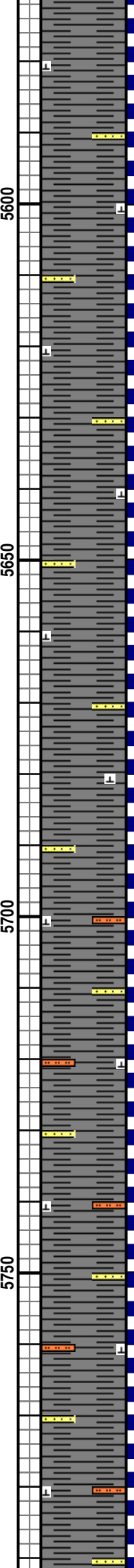
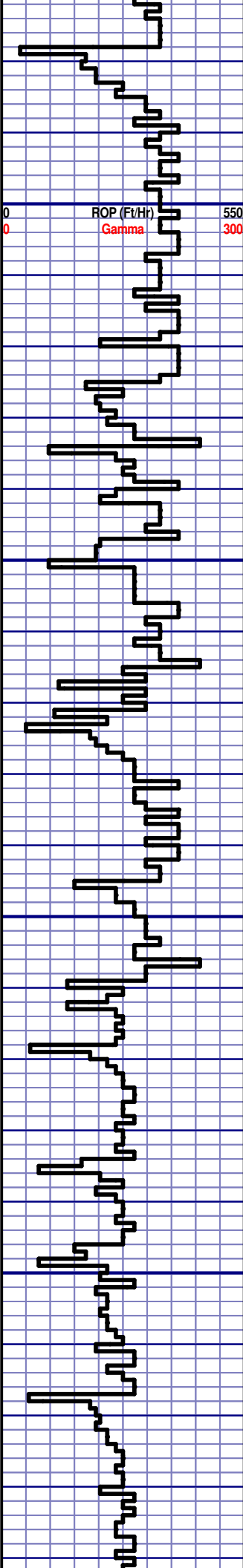
CG 343u

TG, C1-C4

CG 324u

-125

1125



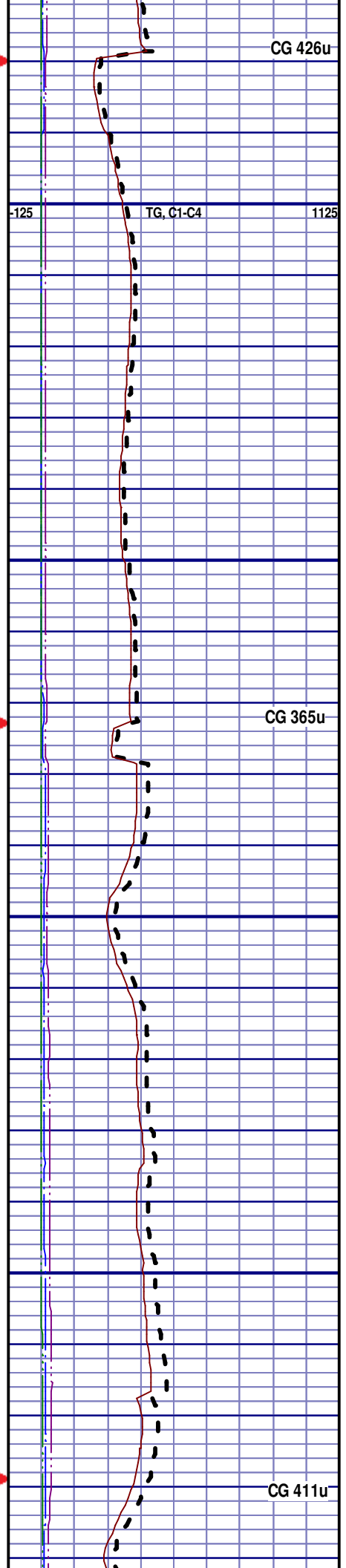
SH; 70%; BLK TO DK GRY, SMOOTH  
TXT, SOFT TO FIRM, SANDY, NO  
VIS FRACT, YLW FLUOR, SLOW,  
BLU STRM CUT, YLW RING CUT,  
MINOR CALC, BLKY TO PLATY

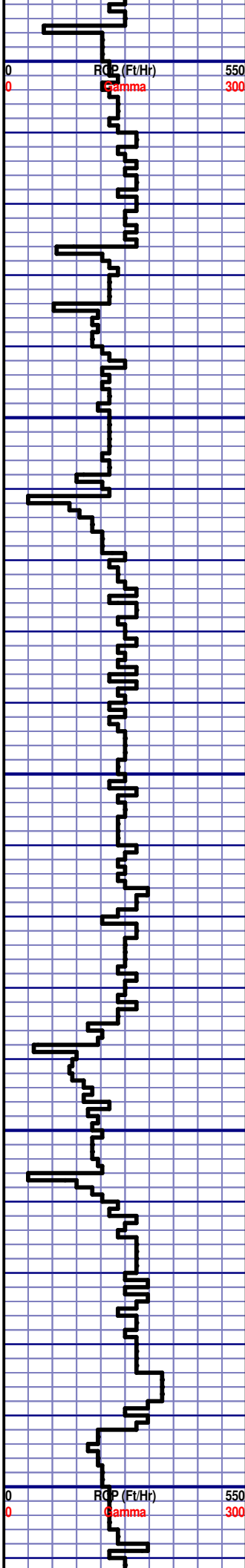
SH; 70%; BLK TO DK GRY, SMOOTH  
TXT, SOFT TO FIRM, SANDY, NO  
VIS FRACT, YLW FLUOR, SLOW,  
BLU STRM CUT, YLW RING CUT,  
MINOR CALC, BLKY TO PLATY

SH; 70%; BLK TO DK GRY, SMOOTH  
TXT, SOFT TO FIRM, SANDY, NO  
VIS FRACT, YLW FLUOR, SLOW,  
BLU STRM CUT, YLW RING CUT,  
MINOR CALC, BLKY TO PLATY

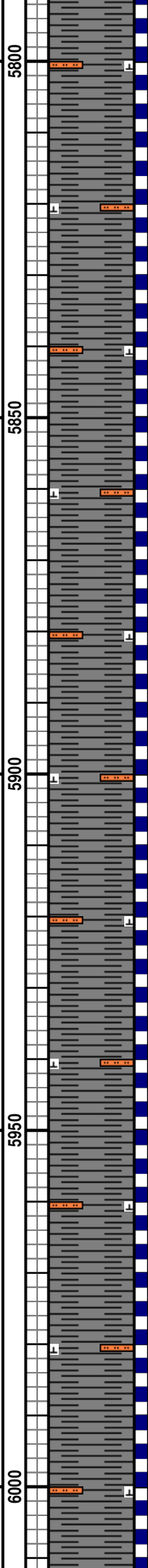
SH; 60%; BLK TO DK GRY, SMOOTH  
TXT, SOFT TO FIRM, SANDY, SILTY,  
NO VIS FRACT, YLW FLUOR,  
SLOW, BLU STRM CUT, YLW RING  
CUT, MINOR CALC, BLKY TO PLATY

SH; 60%; BLK TO DK GRY, SMOOTH  
TXT, SOFT TO FIRM, SANDY, SILTY,  
NO VIS FRACT, YLW FLUOR,  
SLOW, BLU STRM CUT, YLW RING





MD 5812 TVD 5647.8  
 Az 45.62° Inc 0.15°  
 VS106.16



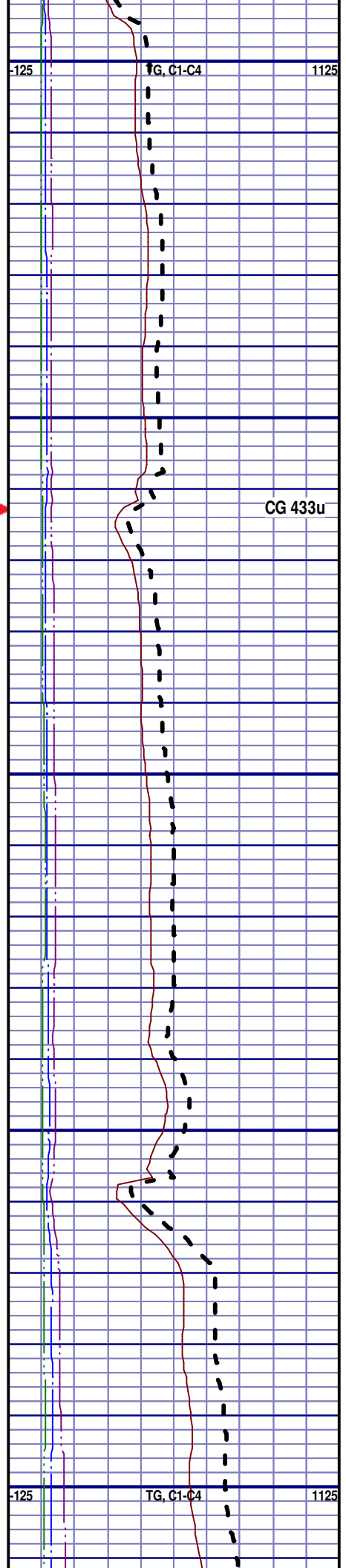
SLOW, BLU STRM CUT, YLW RING CUT, MINOR CALC, BLKY TO PLATY

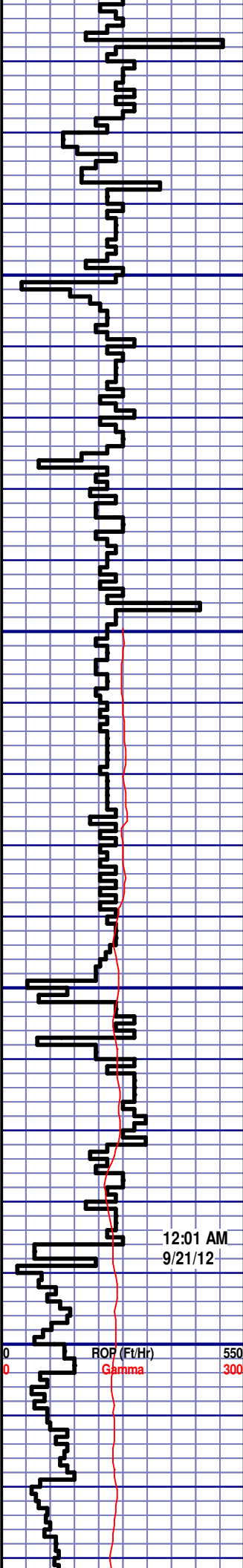
SH; 60%; BLK TO DK GRY, SMOOTH TXT, SOFT TO FIRM, SILTY, NO VIS FRACT, YLW FLUOR, SLOW, BLU STRM CUT, YLW RING CUT, MINOR CALC, BLKY TO PLATY

SH; 60%; BLK TO DK GRY, SMOOTH TXT, SOFT TO FIRM, SILTY, NO VIS FRACT, YLW FLUOR, SLOW, BLU STRM CUT, YLW RING CUT, MINOR CALC, BLKY TO PLATY

SH; 60%; BLK TO DK GRY, SMOOTH TXT, SOFT TO FIRM, SILTY, NO VIS FRACT, YLW FLUOR, SLOW, BLU STRM CUT, YLW RING CUT, MINOR CALC, BLKY TO PLATY

SH; 60%; BLK TO DK GRY, SMOOTH TXT, SOFT TO FIRM, SILTY, NO VIS FRACT, YLW FLUOR, SLOW, BLU STRM CUT, YLW RING CUT, MINOR CALC, BLKY TO PLATY

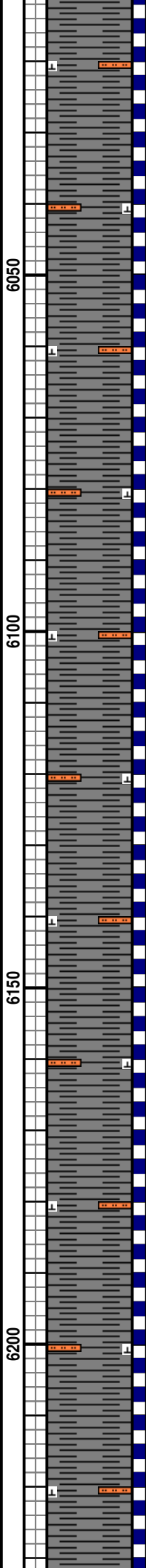




MD 6097 TVD 5932.8  
Az 163.96° Inc 0.66°  
VS 106.50

MD 6135 TVD 5970.79  
Az 171.9° Inc 0.51°  
VS 106.48

MD 6189 TVD 6024.79  
Az 173.3° Inc 1.09°  
VS 106.36



SH; 60%; BLK TO DK GRY, SMOOTH  
TXT, SOFT TO FIRM, SILTY, NO VIS  
FRACT, YLW FLUOR, SLOW, BLU  
STRM CUT, YLW RING CUT, MINOR  
CALC, BLKY TO PLATY

SH; 55%; BLK TO DK GRY, SMOOTH  
TXT, SOFT TO FIRM, SILTY, NO VIS  
FRACT, YLW FLUOR, SLOW, BLU  
STRM CUT, YLW RING CUT, MINOR  
CALC, BLKY TO PLATY

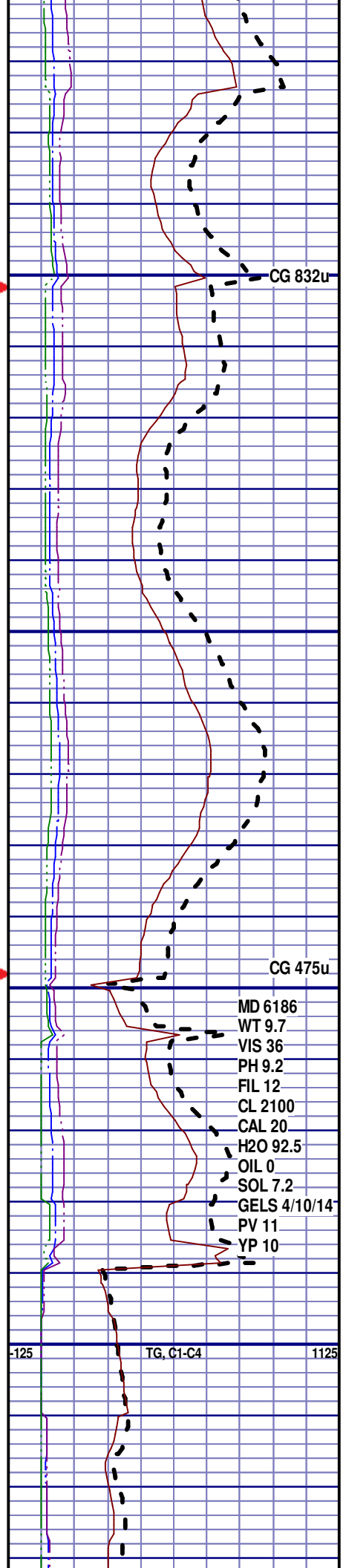
SH; 55%; BLK TO DK GRY, SMOOTH  
TXT, SOFT TO FIRM, SILTY, NO VIS  
FRACT, YLW FLUOR, SLOW, BLU  
STRM CUT, YLW RING CUT, MINOR  
CALC, BLKY TO PLATY

SH; 55%; BLK TO DK GRY, SMOOTH  
TXT, SOFT TO FIRM, SILTY, NO VIS  
FRACT, YLW FLUOR, SLOW, BLU  
STRM CUT, YLW RING CUT, MINOR  
CALC, BLKY TO PLATY

TOOH @ 12:00 AM ON 9/21/2012 @  
6186' MD TO PICK UP NEW TOOLS  
TIH @ 3:30 AM ON 9/21/2012  
RESUMED DRILLING @ 8:30AM ON  
9/21/12 W/ BIT #3 8.75 BAKER  
DP505F IN @ 6188' MD

SH; 55%; BLK TO DK GRY, SMOOTH  
TXT, SOFT TO FIRM, SILTY, NO VIS  
FRACT, YLW FLUOR, SLOW, BLU  
STRM CUT, YLW RING CUT, MINOR  
CALC, BLKY TO PLATY

SH; 55%; BLK TO DK GRY, SMOOTH  
TXT, SOFT TO FIRM, SILTY, NO VIS  
FRACT, YLW FLUOR, SLOW, BLU  
STRM CUT, YLW RING CUT, MINOR  
CALC, BLKY TO PLATY



12:01 AM  
9/21/12

STRM CUT, YLW RING CUT, MINOR CALC, BLKY TO PLATY

SH; 55%; BLK TO DK GRY, SMOOTH TXT, SOFT TO FIRM, SILTY, NO VIS FRACT, YLW FLUOR, SLOW, BLU STRM CUT, YLW RING CUT, MINOR CALC, BLKY TO PLATY

**TEEPEE BUTTES**  
6260' MD 6095' TVD

SILTSTN; 80%; LT GRY TO GRY, VFGR, SUB-ANG, OPA, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SANDY, SH INCLUS, NO FLUOR, SLOW STRM CUT, BLU STRM CUT, NO CUT AFTER CRUSH, YLW RING CUT

SILTSTN; 80%; LT GRY TO GRY, VFGR, SUB-ANG, OPA, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SANDY, SH INCLUS, NO FLUOR, SLOW STRM CUT, BLU STRM CUT, NO CUT AFTER CRUSH, YLW RING CUT

SILTSTN; 80%; LT GRY TO GRY, VFGR, SUB-ANG, OPA, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SANDY, SH INCLUS, NO FLUOR, SLOW STRM CUT, BLU STRM CUT, NO CUT AFTER CRUSH, YLW RING CUT

SILTSTN; 80%; LT GRY TO GRY, VFGR, SUB-ANG, OPA, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SANDY, SH INCLUS, NO FLUOR, SLOW STRM CUT, BLU STRM CUT, NO CUT AFTER CRUSH, YLW RING CUT

SILTSTN; 80%; LT GRY TO GRY, VFGR, SUB-ANG, OPA, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SANDY, SH INCLUS, NO FLUOR, SLOW STRM CUT, BLU STRM CUT, NO CUT AFTER CRUSH, YLW RING CUT

SILTSTN; 80%; LT GRY TO GRY, VFGR, SUB-ANG, OPA, FRIBL, P/CONSOL, P/SORT, CALC CMNT, SANDY, SH INCLUS, NO FLUOR, SLOW STRM CUT, BLU STRM CUT, NO CUT AFTER CRUSH, YLW RING CUT

SILTSTN; 80%; LT GRY TO GRY

CG 317u

CG 259u

CG 367u

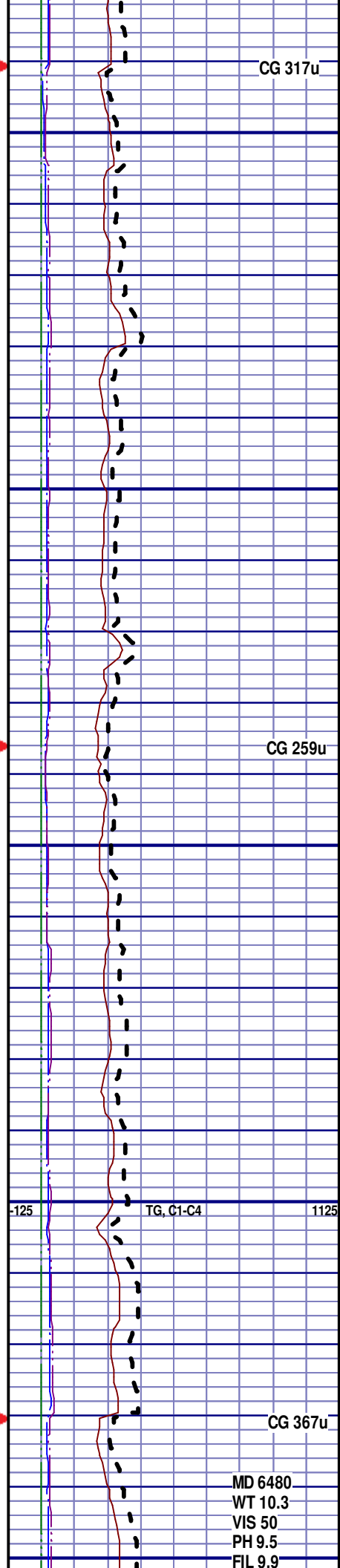
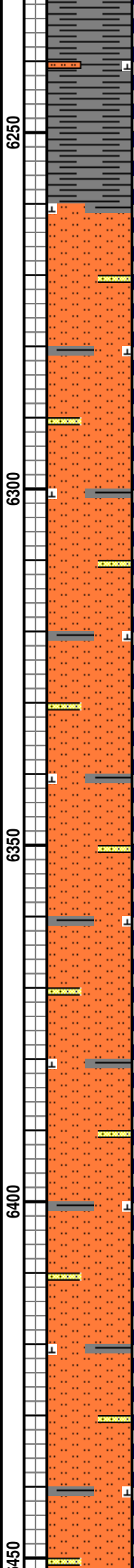
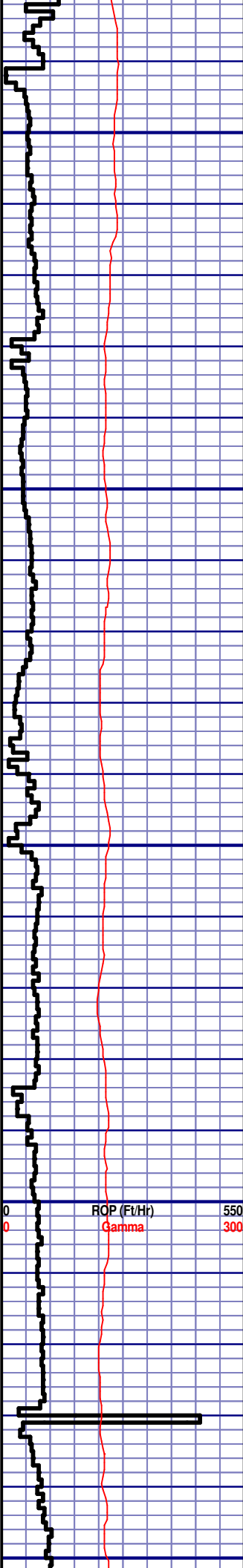
MD 6480  
WT 10.3  
VIS 50  
PH 9.5  
FIL 9.9

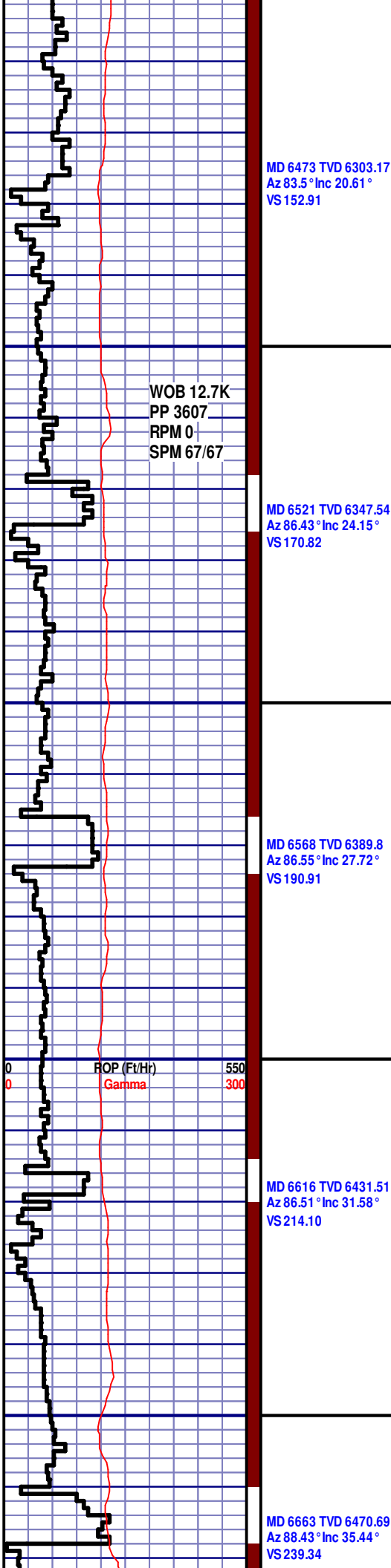
MD 6284 TVD 6119.67  
Az 76.31° Inc 4.94°  
VS 110.31

MD 6332 TVD 6167.29  
Az 72.52° Inc 9.18°  
VS 116.31

MD 6378 TVD 6212.41  
Az 72.07° Inc 13.23°  
VS 125.14

MD 6426 TVD 6258.71  
Az 77.08° Inc 17.26°  
VS 137.75





MD 6473 TVD 6303.17  
Az 83.5° Inc 20.61°  
VS 152.91

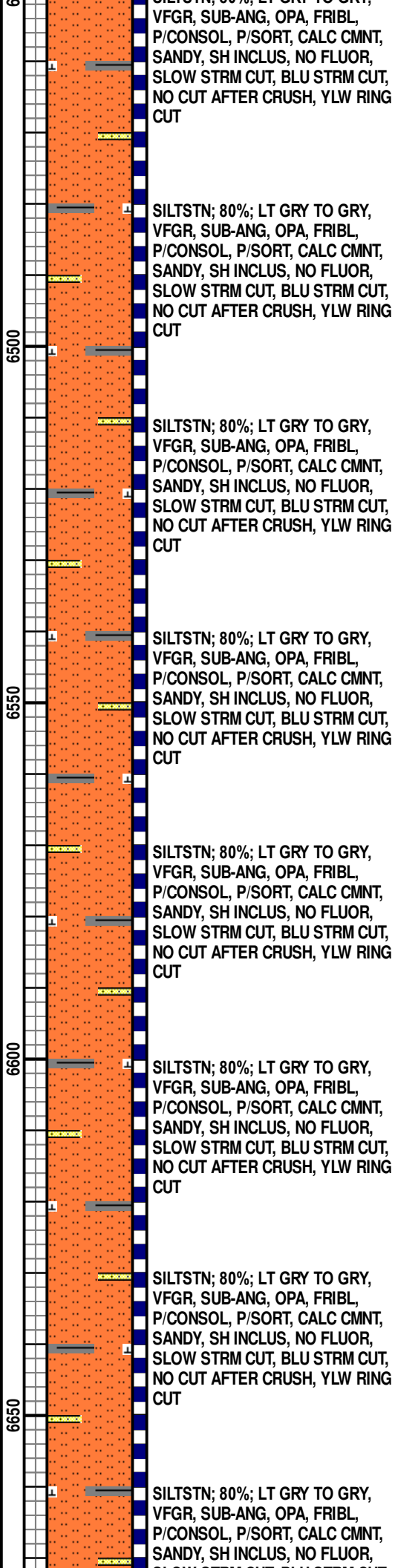
WOB 12.7K  
PP 3607  
RPM 0  
SPM 67/67

MD 6521 TVD 6347.54  
Az 86.43° Inc 24.15°  
VS 170.82

MD 6568 TVD 6389.8  
Az 86.55° Inc 27.72°  
VS 190.91

MD 6616 TVD 6431.51  
Az 86.51° Inc 31.58°  
VS 214.10

MD 6663 TVD 6470.69  
Az 88.43° Inc 35.44°  
VS 239.34



SILTSTN; 80%; LT GRY TO GRY,  
VFGR, SUB-ANG, OPA, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, SH INCLUS, NO FLUOR,  
SLOW STRM CUT, BLU STRM CUT,  
NO CUT AFTER CRUSH, YLW RING  
CUT

SILTSTN; 80%; LT GRY TO GRY,  
VFGR, SUB-ANG, OPA, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, SH INCLUS, NO FLUOR,  
SLOW STRM CUT, BLU STRM CUT,  
NO CUT AFTER CRUSH, YLW RING  
CUT

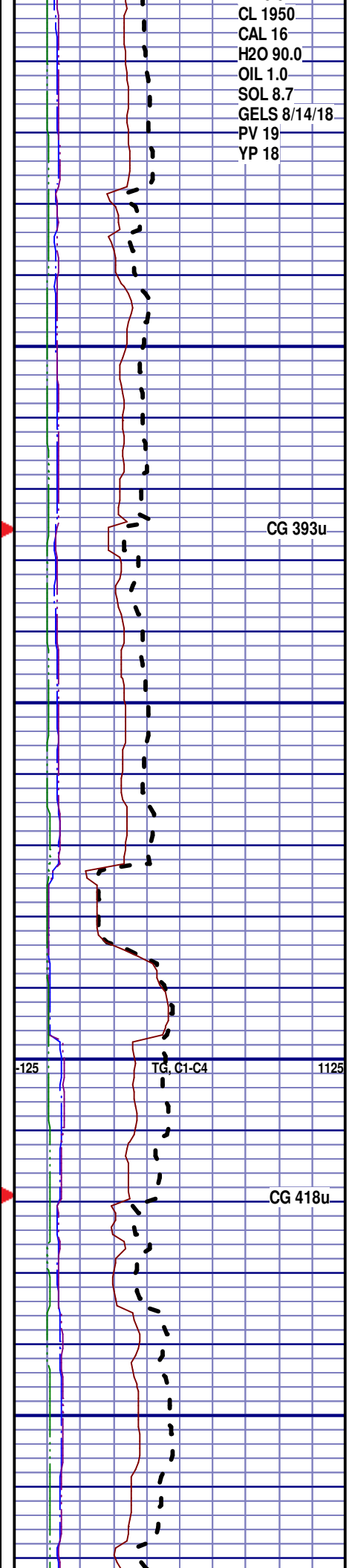
SILTSTN; 80%; LT GRY TO GRY,  
VFGR, SUB-ANG, OPA, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, SH INCLUS, NO FLUOR,  
SLOW STRM CUT, BLU STRM CUT,  
NO CUT AFTER CRUSH, YLW RING  
CUT

SILTSTN; 80%; LT GRY TO GRY,  
VFGR, SUB-ANG, OPA, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, SH INCLUS, NO FLUOR,  
SLOW STRM CUT, BLU STRM CUT,  
NO CUT AFTER CRUSH, YLW RING  
CUT

SILTSTN; 80%; LT GRY TO GRY,  
VFGR, SUB-ANG, OPA, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, SH INCLUS, NO FLUOR,  
SLOW STRM CUT, BLU STRM CUT,  
NO CUT AFTER CRUSH, YLW RING  
CUT

SILTSTN; 80%; LT GRY TO GRY,  
VFGR, SUB-ANG, OPA, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, SH INCLUS, NO FLUOR,  
SLOW STRM CUT, BLU STRM CUT,  
NO CUT AFTER CRUSH, YLW RING  
CUT

SILTSTN; 80%; LT GRY TO GRY,  
VFGR, SUB-ANG, OPA, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, SH INCLUS, NO FLUOR,

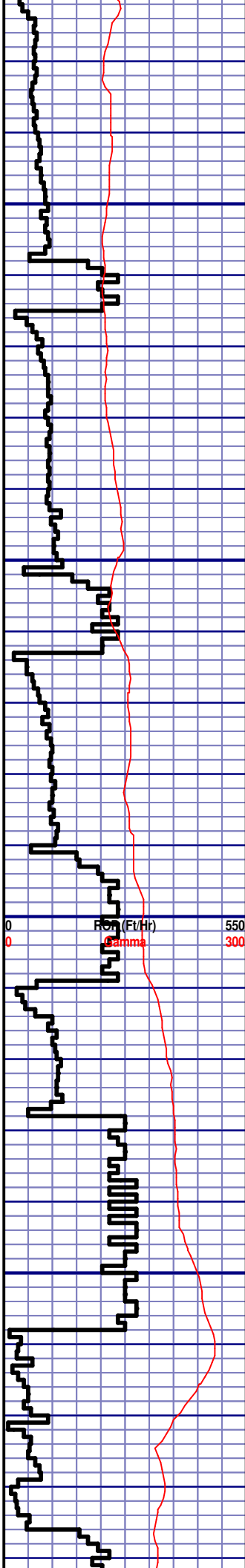


CL 1950  
CAL 16  
H2O 90.0  
OIL 1.0  
SOL 8.7  
GELS 8/14/18  
PV 19  
YP 18

CG 393u

-125 TG, C1-C4 1125

CG 418u



MD 6711 TVD 6508.65  
Az 90.22° Inc 40.01°  
VS 267.67

MD 6758 TVD 6543.42  
Az 90° Inc 44.55°  
VS 298.07

MD 6806 TVD 6576.72  
Az 90.33° Inc 47.58°  
VS 331.30

MD 6853 TVD 6608.02  
Az 90.8° Inc 48.9°  
VS 364.93

6700

6750

6800

6850

SLOW STRM CUT, BLU STRM CUT,  
NO CUT AFTER CRUSH, YLW RING  
CUT

SILTSTN; 80%; LT GRY TO GRY,  
VFGR, SUB-ANG, OPA, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, SH INCLUS, NO FLUOR,  
SLOW STRM CUT, BLU STRM CUT,  
NO CUT AFTER CRUSH, YLW RING  
CUT

SILTSTN; 80%; LT GRY TO GRY,  
VFGR, SUB-ANG, OPA, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, SH INCLUS, NO FLUOR,  
SLOW STRM CUT, BLU STRM CUT,  
NO CUT AFTER CRUSH, YLW RING  
CUT

SILTSTN; 80%; LT GRY TO GRY,  
VFGR, SUB-ANG, OPA, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SANDY, SH INCLUS, NO FLUOR,  
SLOW STRM CUT, BLU STRM CUT,  
NO CUT AFTER CRUSH, YLW RING  
CUT

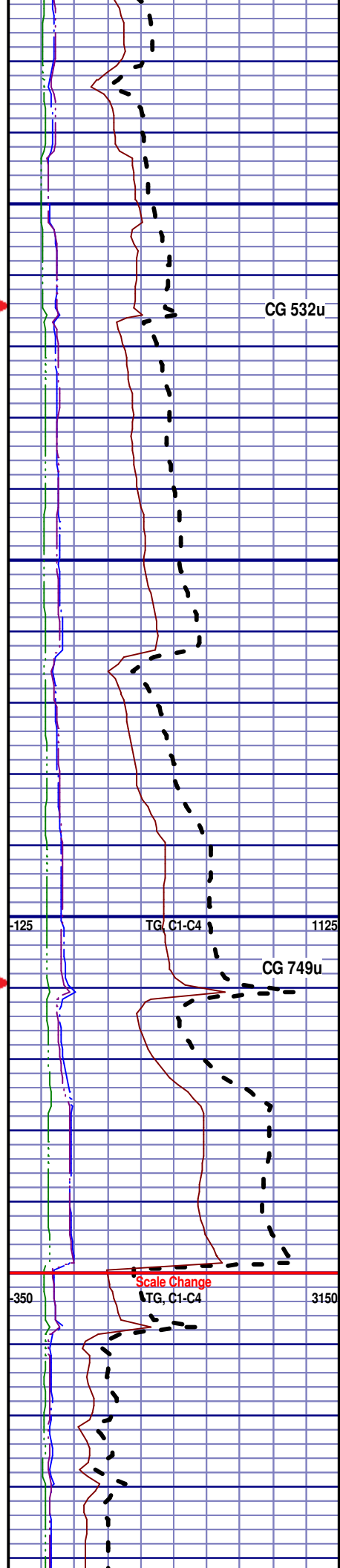
SILTSTN; 60%; LT GRY TO GRY,  
VFGR, SUB-ANG, OPA, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SH INCLUS, NO FLUOR, SLOW  
STRM CUT, BLU STRM CUT, NO CUT  
AFTER CRUSH, YLW RING CUT

SILTSTN; 60%; LT GRY TO GRY,  
VFGR, SUB-ANG, OPA, FRIBL,  
P/CONSOL, P/SORT, CALC CMNT,  
SH INCLUS, NO FLUOR, SLOW  
STRM CUT, BLU STRM CUT, NO CUT  
AFTER CRUSH, YLW RING CUT

**SHARON SPRINGS**  
6830' MD 6592' TVD

SH; 70%; DK GRY TO GRY, FINE  
TXT, SOFT TO FIRM, PYR INCLUS,  
SILTY, PYR NODULES, NO FLUOR,  
SLOW STRM CUT, YLW RING CUT,  
MINOR CALC

SH; 70%; DK GRY TO GRY, FINE  
TXT, SOFT TO FIRM, PYR INCLUS,  
SILTY, PYR NODULES, NO FLUOR,  
SLOW STRM CUT, YLW RING CUT,  
MINOR CALC



CG 532u

CG 749u

-125

TG, C1-C4

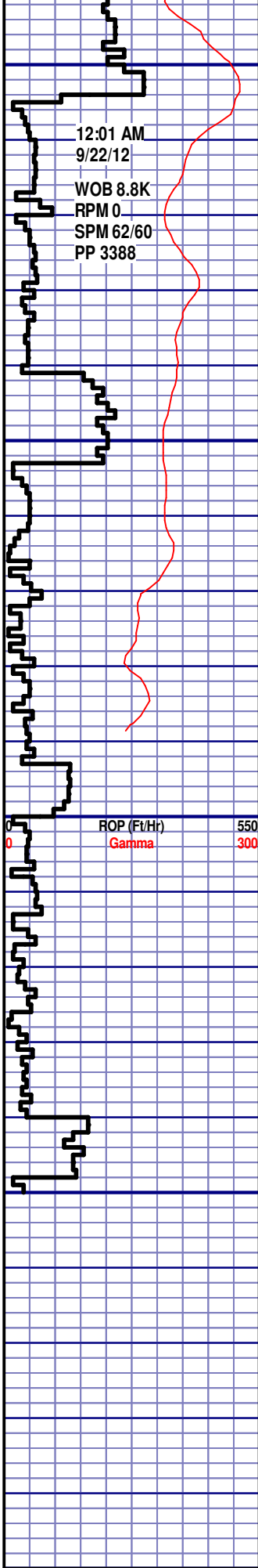
1125

-350

TG, C1-C4

3150

Scale Change



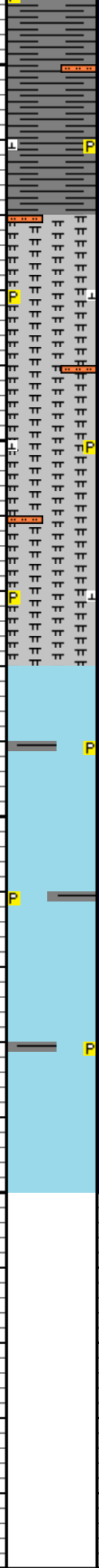
MD 6901 TVD 6638.77  
Az 88.96° Inc 51.42°  
VS 400.42

MD 6948 TVD 6666.85  
Az 86.4° Inc 55.19°  
VS 437.06

MD 6996 TVD 6692.94  
Az 86.66° Inc 58.95°  
VS 476.41

MD 7043 TVD 6715.9  
Az 87.73° Inc 62.56°  
VS 518.36

6900  
6950  
7000  
7050  
00



SH; 70%; DK GRY TO GRY, FINE  
TXT, SOFT TO FIRM, PYR INCLUS,  
SILTY, PYR NODULES, NO FLUOR,  
SLOW STRM CUT, YLW RING CUT,  
MINOR CALC

**NIOBRARA**

6920' MD 6650' TVD

MRL; 35%; GRY TO DK GRY, SOFT  
TO BRITTLE, PYR INCLUS, PYR  
NODULES, NO VIS FRACT, MINOR  
CALC, POOR INTRXLN POR, NO  
FLUOR, IMMED BLU STRM CUT,  
YLW RING CUT, FNT OIL ODOR

MRL; 45%; GRY TO DK GRY, SOFT  
TO BRITTLE, PYR INCLUS, PYR  
NODULES, NO VIS FRACT, MINOR  
CALC, POOR INTRXLN POR, NO  
FLUOR, IMMED BLU STRM CUT,  
YLW RING CUT, FNT OIL ODOR

**NIOBRARA A**

6980' MD 6685' TVD

CHK; 63%; LT GRY TO GRY, SOFT,  
SH INCLUS, PYR NODULES, MINOR  
CALC, NO VIS FRACT, POOR  
INTRXLN POR, NO FLUOR, IMMED  
BLU STRM CUT, YLW RING CUT, NO  
VIS STAIN

CHK; 60%; LT GRY TO GRY, SOFT,  
SH INCLUS, PYR NODULES, MINOR  
CALC, NO VIS FRACT, POOR  
INTRXLN POR, NO FLUOR, IMMED  
BLU STRM CUT, YLW RING CUT, NO  
VIS STAIN

END OF VERTICAL LOG @ 7050'  
MD ON 9/22/12, CONTINUED ON  
HORIZONTAL LOG.

