



866-463-5600 ★ Many, LA
www.toledomudlogging.com

5 INCHES PER 100 FT

P. O. Box 1209
 MANY LA, 71449
 (318)-590-9755
 FAX (318)590-9754

COMPANY: Sandridge Energy

WELL: Mutual 0780 4-8H

FIELD: North Park COUNTY: Jackson STATE: Colorado

LOCATION: 37' FNL & 744' FWL of Section 17, T7N, R80W

Interval Logged: 2500 To: _____ G.L.: 8148 K.B.: 8164

Date Logged: 05/16/2016 To: _____ Spud Date: 05/16/2016

Rig: Extreme Unit No.: 20

Loggers: Bruce Bush/Jeff Barber

Api No.: 05057065410000

Filename: mutual_0780_4-8h.mlw

Geologist: Simon Anzaldua

Created By MainLog

<p>Abbreviations:</p> <p>NB...New Bit CO...Circ Out NR...No Returns TG...Trip Gas WOB...Wt on Bit RPM...Rev/Min SG...Survey Gas</p> <p>DST...Drill Stem Test DS...Directional Survey CG...Connection gas LAT...Logged After Trip PP...Pump Pressure SPM...Strokes/Min DTG...Down Time Gas</p> <p>Mud Data</p> <p>WT..Weight PH..Acidity CHL..Chlorides</p> <p>V..Viscosity F..Filtrate SC..Solids Content</p>	<p>Lithology Symbols:</p> <table style="width: 100%; font-size: small;"> <tr> <td> Anhydrite</td> <td> Salt</td> <td> Granite</td> </tr> <tr> <td> Siltstone</td> <td> Chert</td> <td> Sandstone</td> </tr> <tr> <td> Dolomite</td> <td> Conglomerate</td> <td> Limestone</td> </tr> <tr> <td> Coal</td> <td> Shale</td> <td> Bentonite</td> </tr> <tr> <td> Carb Shale</td> <td> Granite Wash</td> <td> Quartz Wash</td> </tr> <tr> <td> Red Sh</td> <td> Org Sh</td> <td> Green Sh</td> </tr> <tr> <td> Cust Sh1</td> <td> Cust Sh2</td> <td> Cust Sh3</td> </tr> <tr> <td> Cust Sh4</td> <td> Cust Sh5</td> <td> Cust Sh6</td> </tr> </table> <p>Accessories</p> <p> Glauconite Pyrite Fossils Oolites</p> <p> Fractures Cement</p>	Anhydrite	Salt	Granite	Siltstone	Chert	Sandstone	Dolomite	Conglomerate	Limestone	Coal	Shale	Bentonite	Carb Shale	Granite Wash	Quartz Wash	Red Sh	Org Sh	Green Sh	Cust Sh1	Cust Sh2	Cust Sh3	Cust Sh4	Cust Sh5	Cust Sh6	<p>Gas Chromatograph Analysis:</p> <p>HW _____</p> <p>C1 _____</p> <p>C2 _____</p> <p>C3 _____</p> <p>IC4 _____</p> <p>NC4 _____</p> <p>IC5 _____</p>
Anhydrite	Salt	Granite																								
Siltstone	Chert	Sandstone																								
Dolomite	Conglomerate	Limestone																								
Coal	Shale	Bentonite																								
Carb Shale	Granite Wash	Quartz Wash																								
Red Sh	Org Sh	Green Sh																								
Cust Sh1	Cust Sh2	Cust Sh3																								
Cust Sh4	Cust Sh5	Cust Sh6																								

Drilling Rate FT/HR	Vis Por	Tr / p f g	Lithology	% Oil Flu	Cut	Descriptions/Remarks	Total Gas/Chromatograph
GAMMA API 150							
GAMMA 150							
BHA#2 Type: HCC AT506X (PDC) Size: 8.75" Jets: 6x16							

Surface Casing
Depth: 0-2390'
Size: 9.625"
Weight: 36.0lb ft

Surface Casing
Depth: 0-2390'
Size: 9.625"
Weight: 36.0lb ft

Mudloggers Logging@2500'

2500

2500'-600' Fair Flour.
No Cut.

WOB 13.6
RPM 36
PP 1879
SPM 155

50

WT IN 10.6
WT OUT 10.6

GAMMA

150

300 150 100 50

c

Fluorescence Possibly
Caused By OBM

CG 154u

40%SLTST lt gry-gry,
sft-sli frm, silc wi arg
mtx, sndy mtx, 30%SS,
f-med grn, clr wh-lt
gry, sl frm-frm sme
uncons grns, sbang-
sbrnd, sme free qtz
grns, 30% SH, gry-brn,
blky-pty, f lam, sft

2600

GAMMA

150

300 150 100 50

2600'-700' Fair Flour.
No Cut.

50 100 150 200 250 300 350

Fluorescence Possibly
Caused By OBM

WT IN 10.6
WT OUT 10.6

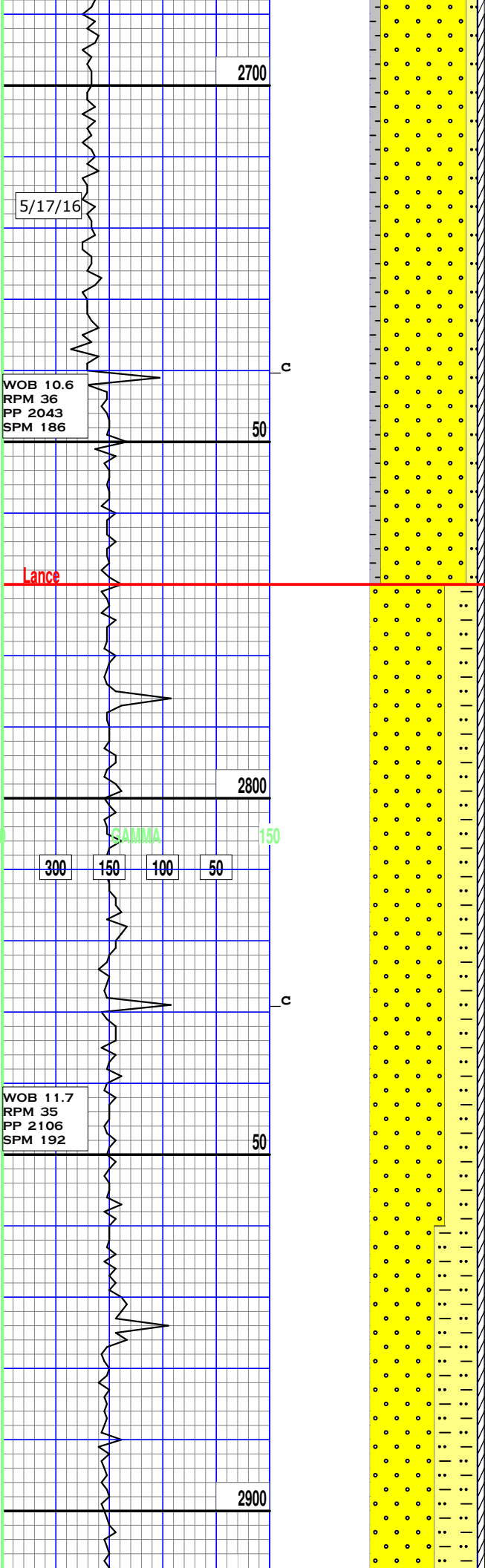
CG 161u

WOB 14.8
RPM 35
PP 21958
SPM 167

50

MB 2654'
TVD 2629.91'
INC 6.83°
AZM 153.07°
VS -3.59'

40%SS, clr wh-lt gry,
f-med grn, sl frm-frm
sme uncons grns, sbang-
sbrnd, sme free qtz
grns, 30% SH, gry-brn,



blk-pty, f lam, sft-mod frm, 30%SLTST lt gry-gry, sft-sli frm, silc wi arg mtx, sndy mtx

OBG 173u

2700

2700'-800' Fair Flour. No Cut.

5/17/16

Fluorescence Possibly Caused By OBM

CG 173u

WOB 10.6
RPM 36
PP 2043
SPM 186

50

WT IN 10.6
WT OUT 10.6

Lance

80%SS, clr-wht-occ lt gy, f-med grn, sbang-sbrnd, sli frm-frm, cons, sme uncons grns, fri, sme free qtz grns, 10%SLTST, lt gry-gry, sli frm, silc wi arg mtx, sndy mtx, 10%SH, brn-dk gy, blk-pty, f lam, sft-sli frm

2800

2800'-900' Fair Flour. No Cut.

SAMMA

300 150 100 50

50 100 150 200 250 300 350

Fluorescence Possibly Caused By OBM

CG 171u

WOB 11.7
RPM 35
PP 2106
SPM 192

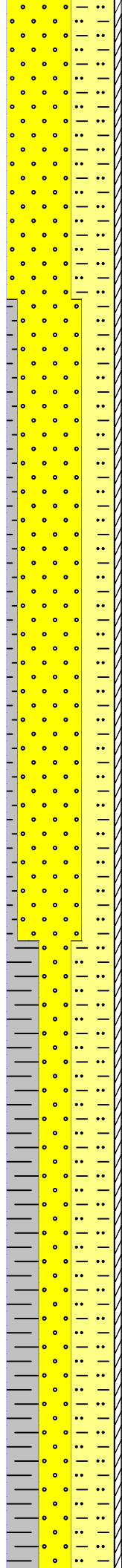
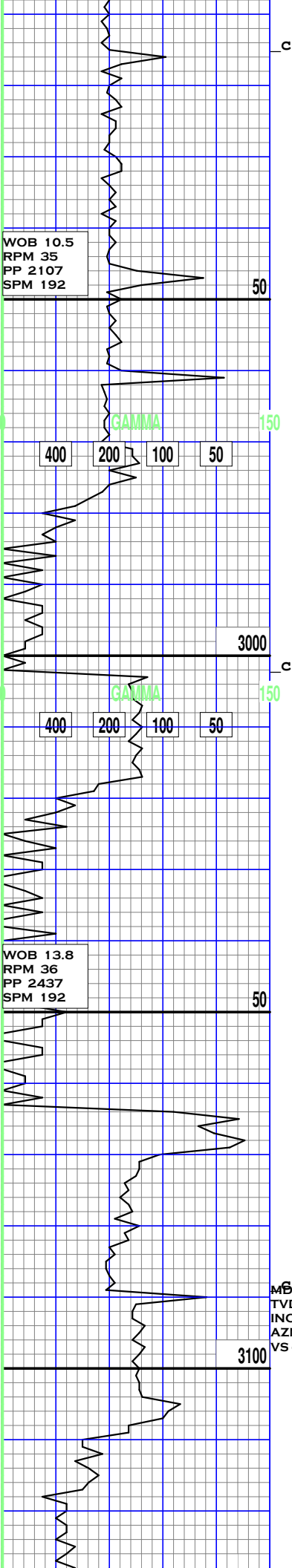
50

WT IN 10.4
WT OUT 10.4

70%SS, clr-wht-occ lt gy, f-med grn, sbang-sbrnd, sli frm-frm, cons, sme uncons grns, fri, sme free qtz grns, 30%SLTST, lt gry-gry, sli frm, silc wi arg mtx, sndy mtx, tr SH

2900

2900'-3000' Fair Flour. No Cut.



Fluorescence Possibly Caused By OBM

60%SS, clr-wht-off wht
lt gy, f-crse grn,
sbang-sbrnd, sli frm-
frm, cons-uncons, fri,
free crse qtz grns,
40%SLTST, lt gry-blu
gry, sli frm-frm, silc
wi arg mtx, sndy mtx, tr
SH

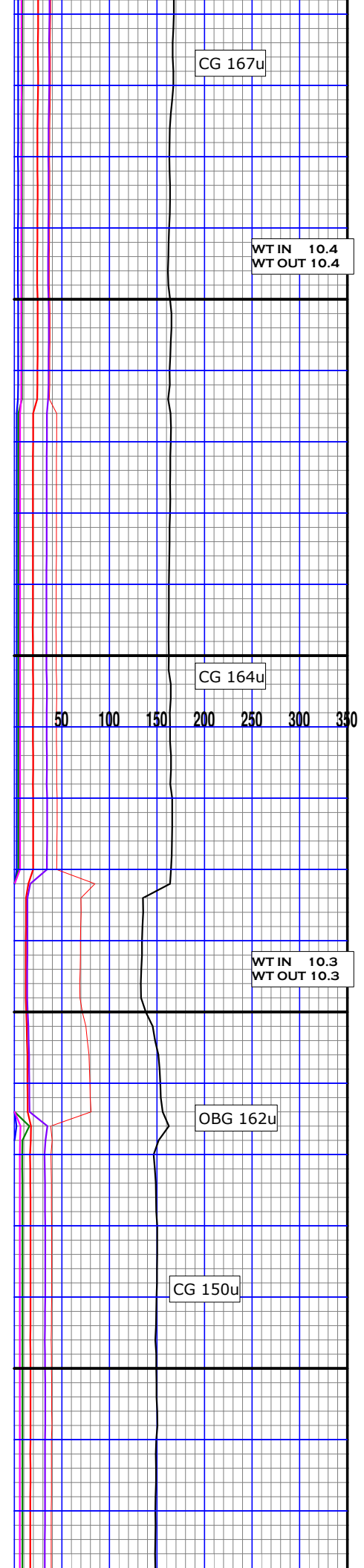
3000'-100' Fair Flour.
No Cut.

Fluorescence Possibly Caused By OBM

60%SS, clr-wht-off wht-
lt gy, f-crse grn,
sbang-sbrnd, sli frm-
frm, cons-uncons, fri,
free crse qtz grns,
30%SLTST, lt gry-blu
gry, sli frm-frm, silc
wi arg mtx, sndy mtx,
10%SH, gy-dk gy-brn,
blky-subblky-plty, sft-
mod frm, silc wi arg mtx

Fluorescence Possibly Caused By OBM

3100-200' Fair Flour.
No Cut



WOB 13.2
RPM 35
PP 1734
SPM 135

50

c

3200

GAMMA

150

400

200

100

50

WOB 23.7
RPM 35
PP 1865
SPM 135

50

MB 3266'
TVD 3222.89'
INC 20.22°
AZM 82.64°
VS 9.95'

3300

WOB 13.5
RPM 62
PP 1866
SPM 135

40%SLTST, lt gry-blu
gry, sli frm-frm, silc
wi arg mtx, sndy mtx,
30%SH, gy-lt gy-occ dk
gy, blk-pty, sft-mod
frm, silc wi arg mtx,
30%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncons, fri, sme
free crse qtz grns

WT IN 10.1
WT OUT 10.1

Fluoresecence Possibly
Caused By OBM

CG 149u

3200-300' Fair Fluor.
No Cut

30%SLTST, lt gry-blu
gry, sli frm-frm, silc
wi arg mtx, sndy mtx,
50%SH, gy-lt gy-occ dk
gy, blk-pty, sft-mod
frm, silc wi arg mtx,
20%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncons, fri, sme
free crse qtz grns

WT IN 10.2
WT OUT 10.2

Fluoresecence Possibly
Caused By OBM

CG 138u

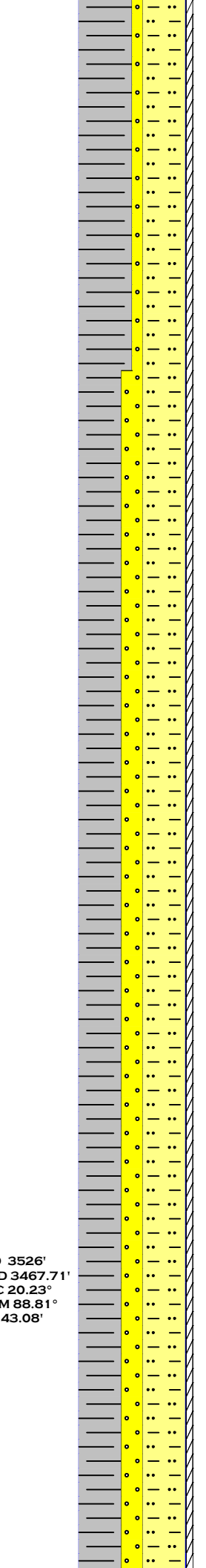
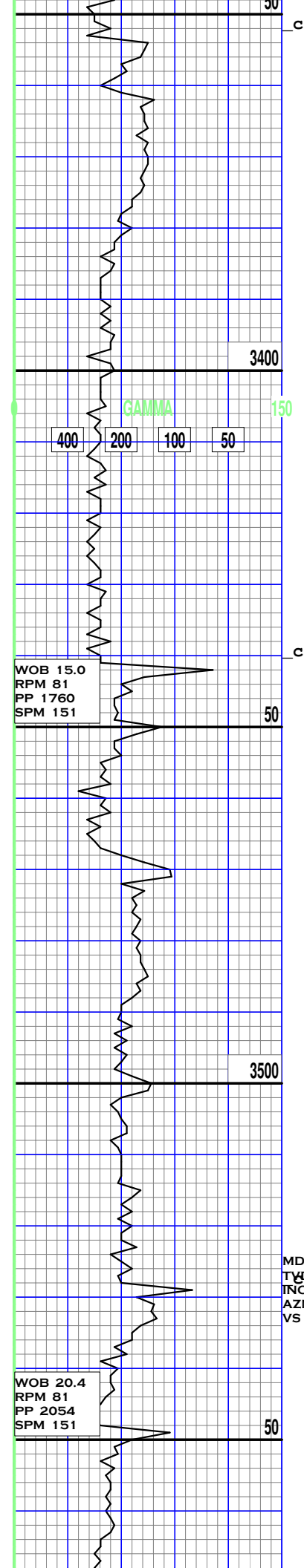
3300-400' Fair Fluor.
No Cut

40%SLTST, lt gry-blu
gry, sli frm-frm, silc
wi arg mtx, sndy mtx,
50%SH, gy-lt gy-occ dk
gy, blk-pty, sft-mod
frm, silc wi arg mtx,
10%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncons, fri, sme
free crse qtz grns

OBG 140u

WT IN 10.2
WT OUT 10.2

50 100 150 200 250 300 350



Fluorescence Possibly Caused By OBM

3400-500' Fair Fluor.
No Cut

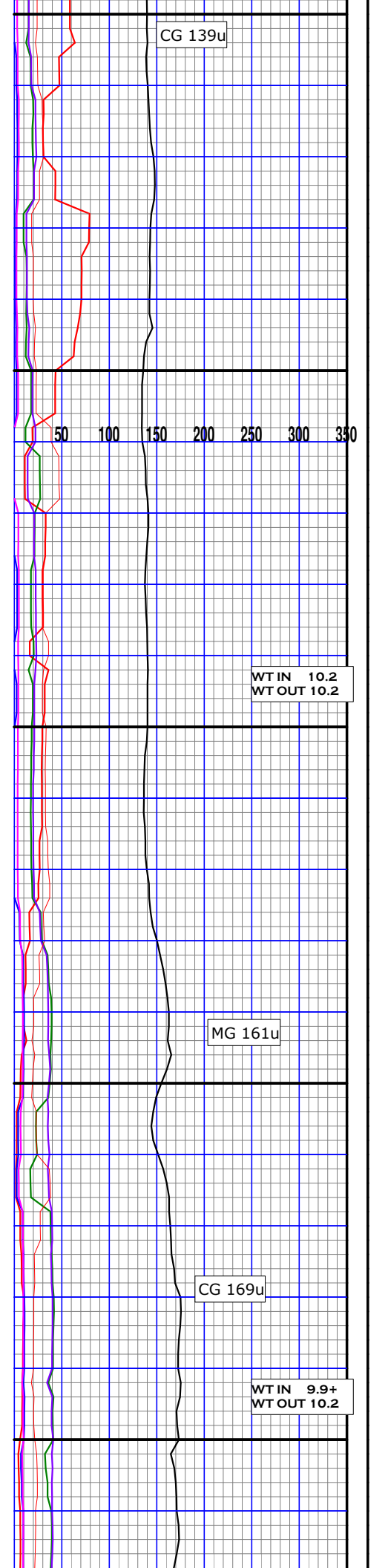
40%SLTST, lt gry-blu gry, sli frm-frm, silc wi arg mtx, sndy mtx, 50%SH, gy-lt gy-occ dk gy, blk-ply, sft-mod frm, silc wi arg mtx, 10%SS, clr-wht-occ lt gry, f-med grn, sbang-sbrnd, sli frm, cons, sme uncons, fri, sme free crse qtz grns

Fluorescence Possibly Caused By OBM

40%SLTST, lt gry-blu gry, sli frm-frm, silc wi arg mtx, sndy mtx, 50%SH, gy-lt gy-occ dk gy, blk-ply, sft-mod frm, silc wi arg mtx, 10%SS, clr-wht-occ lt gry, f-med grn, sbang-sbrnd, sli frm, cons, sme uncons, fri, sme free crse qtz grns

3500-600' Fair Fluor.
No Cut

Fluorescence Possibly Caused By OBM



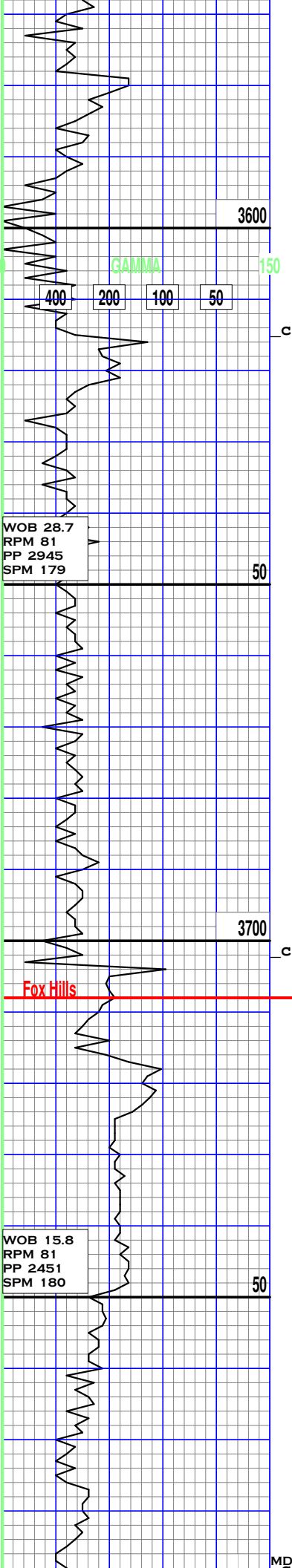
WOB 15.0
RPM 81
PP 1760
SPM 151

WT IN 10.2
WT OUT 10.2

MD 3526'
TYD 3467.71'
INC 20.23°
AZM 88.81°
VS 43.08'

WOB 20.4
RPM 81
PP 2054
SPM 151

WT IN 9.9+
WT OUT 10.2



3600

GAMMA 150

400 200 100 50

c

WOB 28.7
RPM 81
PP 2945
SPM 179

50

3700

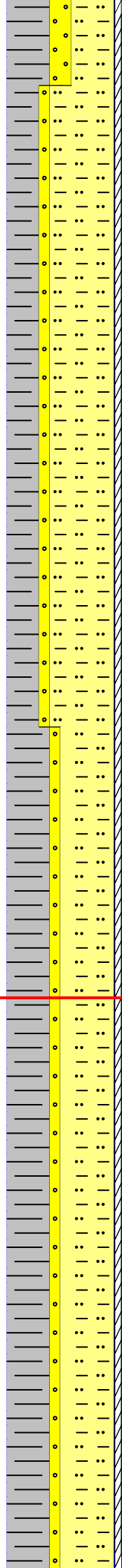
c

Fox Hills

WOB 15.8
RPM 81
PP 2451
SPM 180

50

MD 3788'



40%SLTST, lt gry-blu
gry, sli frm-frm, silc
wi arg mtx, sndy mtx,
40%SH, gy-lt gy-occ dk
gy, blk-pty, sft-mod
frm, silc wi arg mtx,
20%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncon, fri, sme
free crse qtz grns

3600-700' Fair Fluor.
No Cut

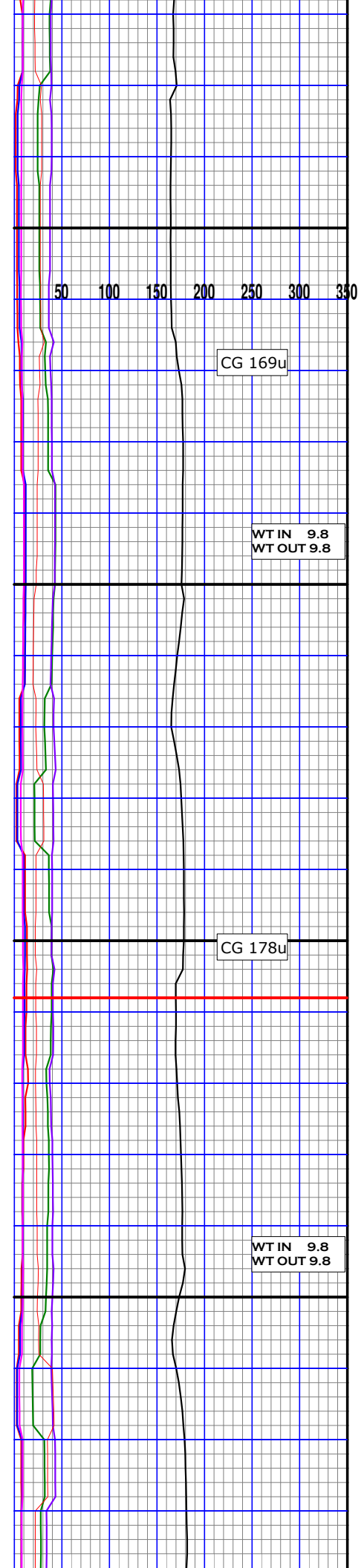
Fluorescence Possibly
Caused By OBM

60%SLTST, lt gry-blu
gry, sli frm-frm, silc
wi arg mtx, sndy mtx,
30%SH, gy-lt gy-occ dk
gy, blk-pty, sft-mod
frm, silc wi arg mtx,
10%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncon, fri, sme
free crse qtz grns, occ
calc

3700-800' Fair Fluor.
No Cut

Fluorescence Possibly
Caused By OBM

50%SLTST, lt gry-gry,
sli frm-frm, silc
wi arg mtx, sndy mtx,
40%SH, gy-dk gy, blk-
pty, sft-mod frm, silc
wi arg mtx, fn slty lam
10%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncon, fri, sme
free crse qtz grns, occ
calc



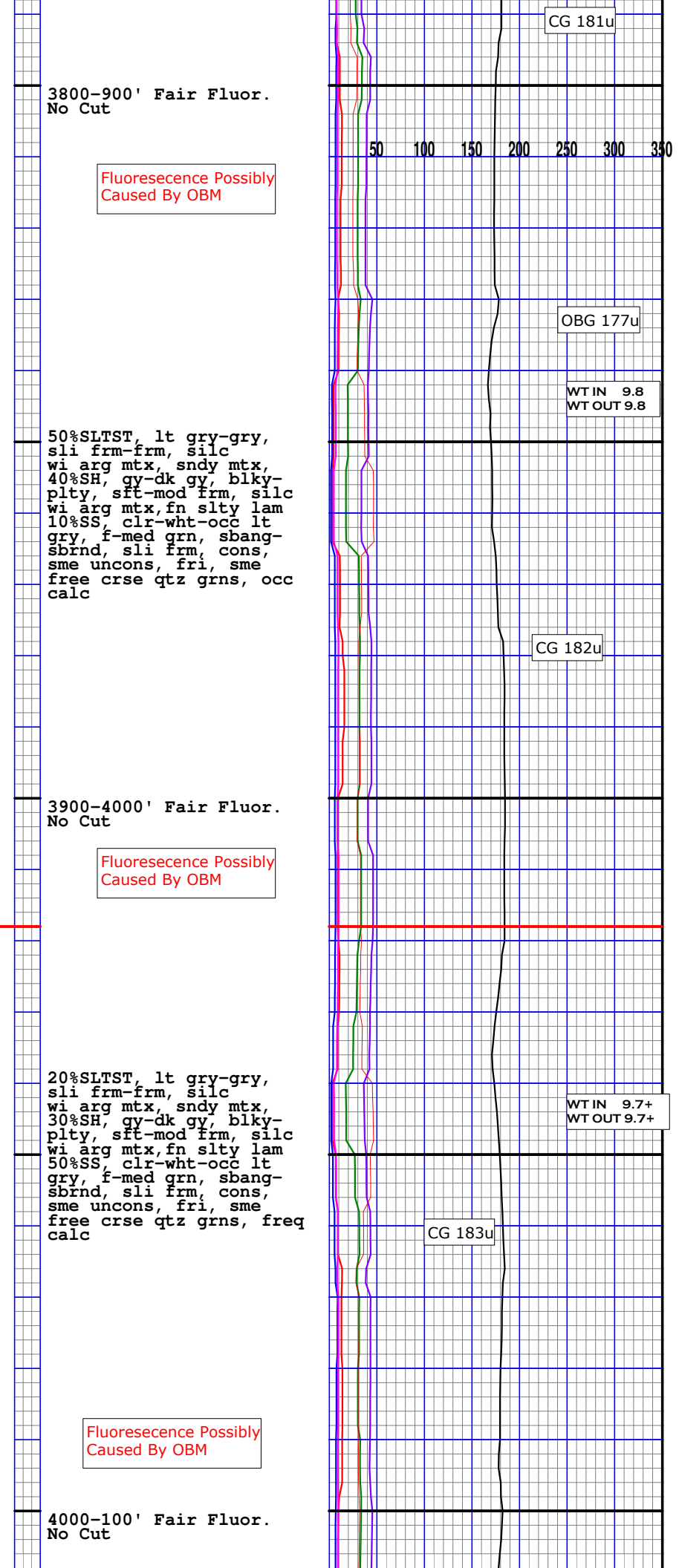
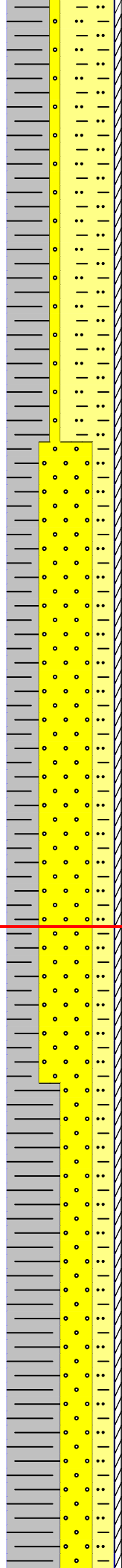
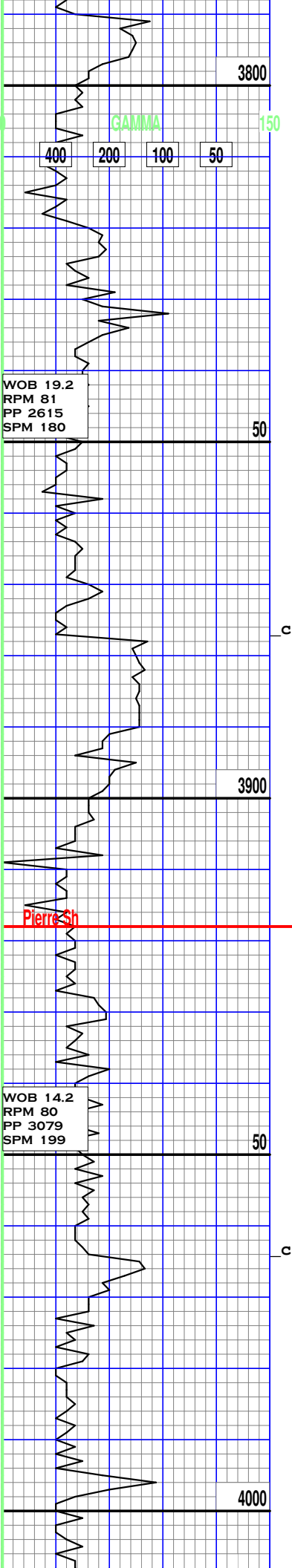
50 100 150 200 250 300 350

CG 169u

WT IN 9.8
WT OUT 9.8

CG 178u

WT IN 9.8
WT OUT 9.8



WOB 25.4
RPM 81
PP 3208
SPM 199

50 C
MD 4050'
TVD 3959.34'
INC 19.71°
AZM 91.50°
VS 98.61'

20%SLTST, lt gry-gry,
sli frm-frm, silc
wi arg mtx, sndy mtx,
50%SH, gy-dk gy, blk-
pty, sft-mod frm, silc
wi arg mtx,fn slty lam
30%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncons, fri, sme
free crse qtz grns, freq
calc

CG 181u

WT IN 9.7+
WT OUT 9.7+

Fluorescence Possibly
Caused By OBM

4100

4100-200' Fair Fluor.
No Cut

20%SLTST, lt gry-gry,
sli frm-frm, silc
wi arg mtx, sndy mtx,
50%SH, gy-dk gy, blk-
pty, sft-mod frm, silc
wi arg mtx,fn slty lam
30%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncons, fri, sme
free crse qtz grns, freq
calc

CG 180u

WT IN 9.7
WT OUT 9.7

Fluorescence Possibly
Caused By OBM

WOB 23.8
RPM 80
PP 2968
SPM 200

50

4200

4200-300' Fair Fluor.
No Cut

20%SLTST, lt gry-gry,
sli frm-frm, silc
wi arg mtx, sndy mtx,
60%SH, gy-dk gy, blk-
pty, sft-mod frm, silc
wi arg mtx,fn slty lam
20%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncons, fri, sme

50 100 150 200 250 300 350

CG 176u

GAMMA 150

400 200 100 50

WOB 29.3
RPM 81
PP 3231
SPM 199

50

WT IN 9.7+
WT OUT 9.7+

Fluorescence Possibly
Caused By OBM

4300

c

30%SLTST, lt gry-gry,
sli frm-frm, silc
wi arg mtx, sndy mtx,
50%SH, gy-dk gy, blk-
pty, sft-mod frm, silc
wi arg mtx,fn slty lam
20%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncons, fri, sme
free crse qtz grns, freq
calc

4300-400' Fair Fluor.
No Cut

CG 174u

WOB 19.8
RPM 81
PP 3061
SPM 199

50

WT IN 9.7+
WT OUT 9.7+

Fluorescence Possibly
Caused By OBM

4400

c

30%SLTST, lt gry-gry,
sli frm-frm, silc
wi arg mtx, sndy mtx,
50%SH, gy-dk gy, blk-
pty, sft-mod frm, silc
wi arg mtx,fn slty lam
20%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncons, fri, sme
free crse qtz grns, freq
calc

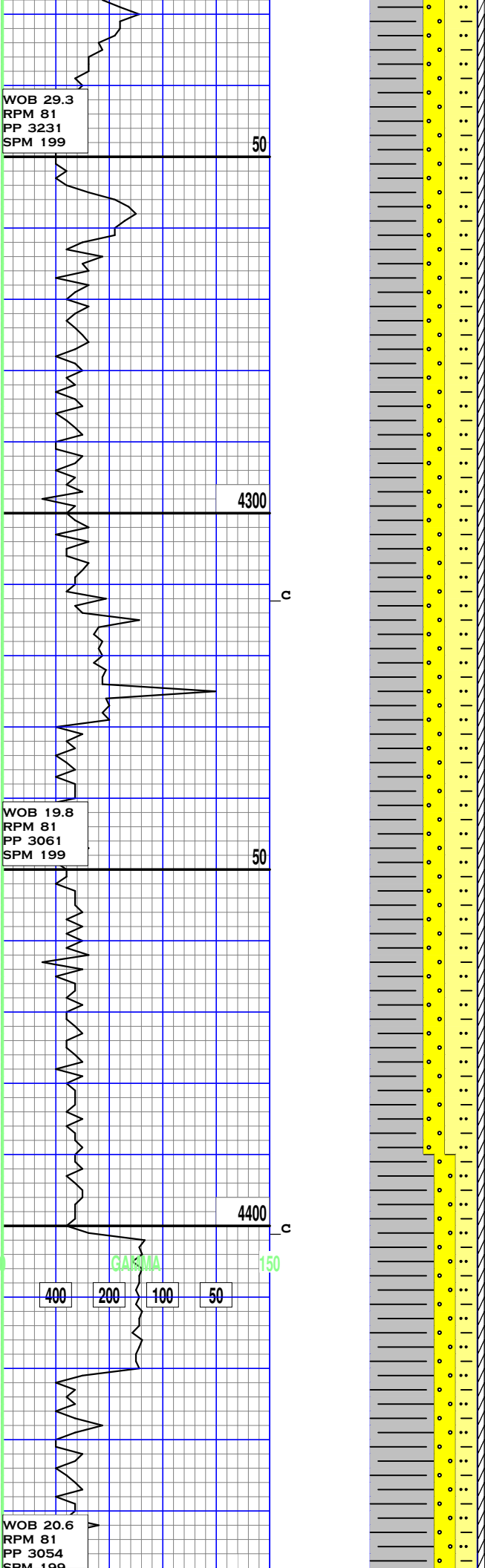
4400-500' Fair Fluor.
No Cut

CG 176u

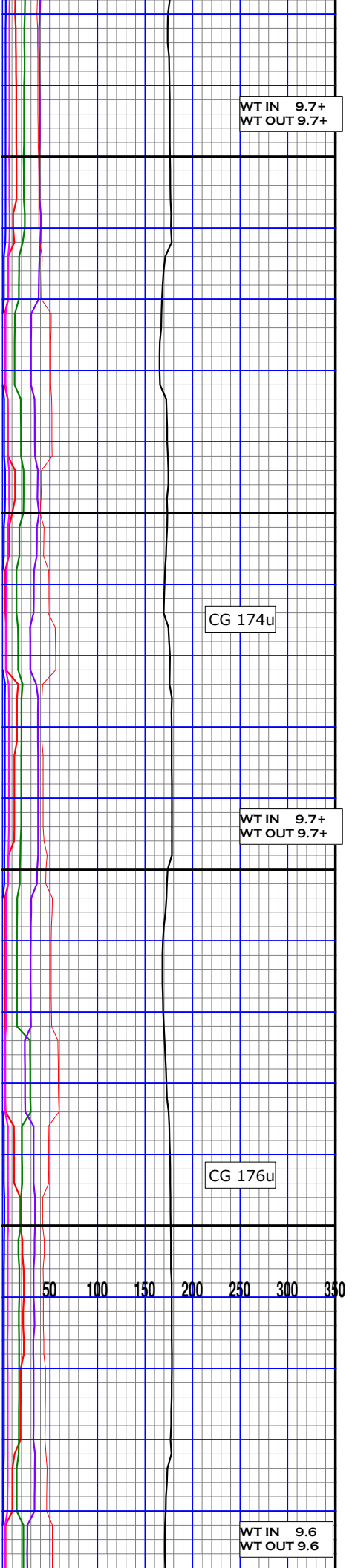
WOB 20.6
RPM 81
PP 3054
SPM 199

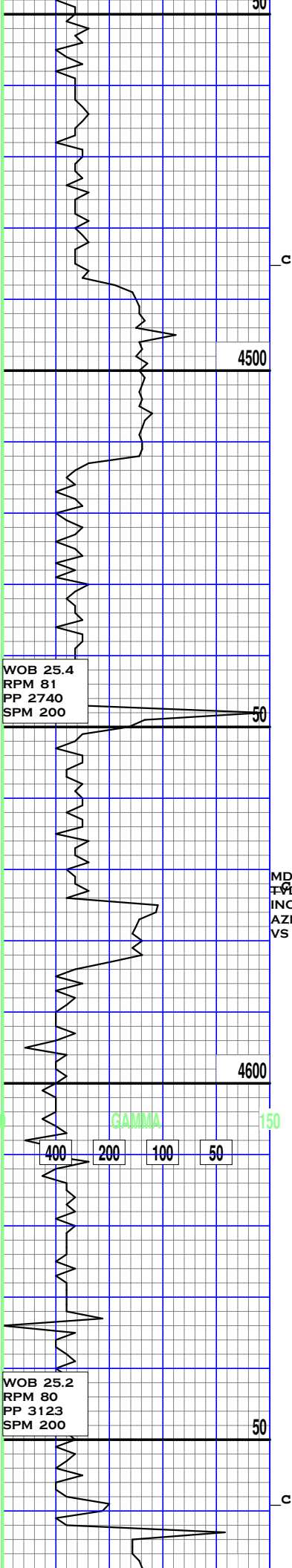
WT IN 9.6
WT OUT 9.6

Fluorescence Possibly
Caused By OBM



free crse qtz grns, freq
calc





WOB 25.4
RPM 81
PP 2740
SPM 200

MD 4572'
TVD 4449.31'
INC 20.25°
AZM 89.71°
VS 147.70'

WOB 25.2
RPM 80
PP 3123
SPM 200

20%SLTST, lt gry-gry,
sli frm-frm, silc
wi arg mtx, sndy mtx,
60%SH, gy-dk gy, blk-
pty, sft-mod frm, silc
wi arg mtx,fn slty lam
20%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncon, fri, sme
free crse qtz grns

4500-600' Fair Fluor.
No Cut

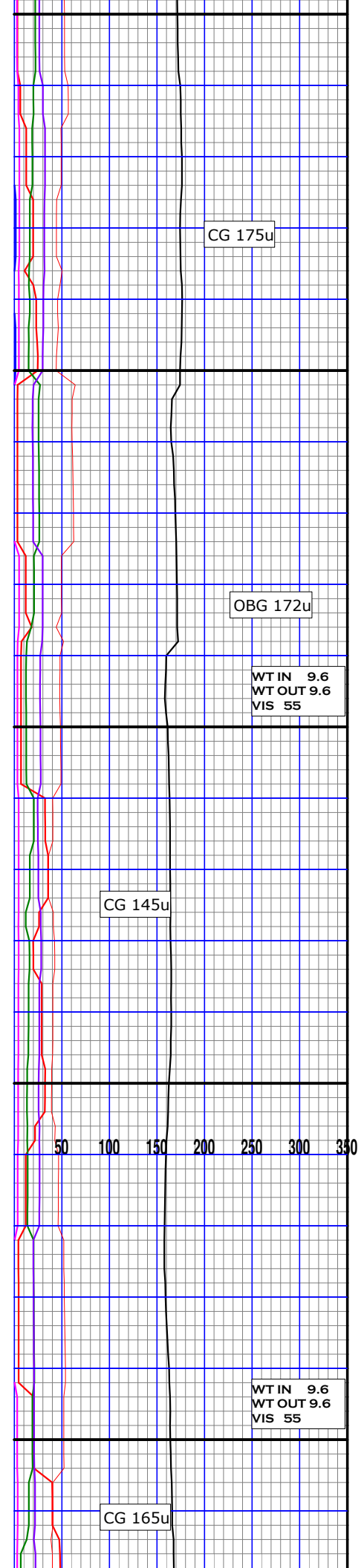
Fluorescence Possibly
Caused By OBM

20%SLTST, lt gry-gry,
sli frm-frm, silc
wi arg mtx, sndy mtx,
60%SH, gy-dk gy, blk-
pty, sft-mod frm, silc
wi arg mtx,fn slty lam
20%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncon, fri, sme
free crse qtz grns

4600-700' Fair Fluor.
No Cut

Fluorescence Possibly
Caused By OBM

20%SLTST, lt gry-gry,
sli frm-frm, silc
wi arg mtx, sndy mtx,
60%SH, gy-dk gy, blk-
pty, sft-mod frm, silc



CG 175u

OBG 172u

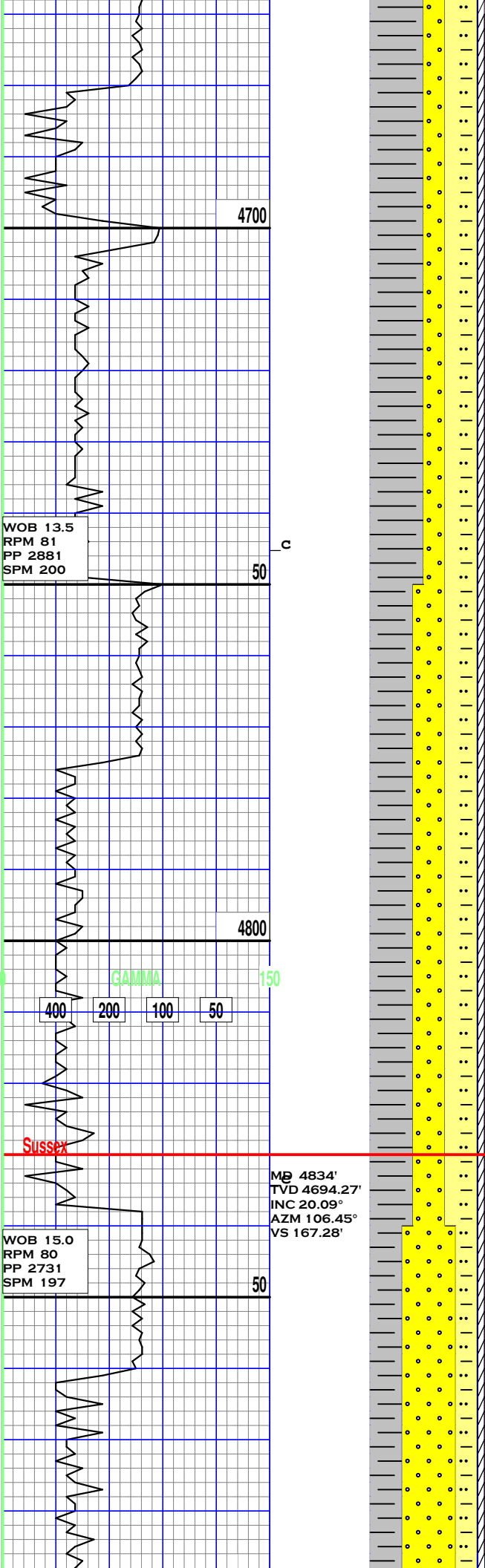
WT IN 9.6
WT OUT 9.6
VIS 55

CG 145u

50 100 150 200 250 300 350

WT IN 9.6
WT OUT 9.6
VIS 55

CG 165u



wi arg mtx, fn slty lam
 20%SS, clr-wht-occ lt
 gry, f-med grn, sbang-
 sbrnd, sli frm, cons,
 sme uncon, fri, sme
 free crse qtz grns

4700-800' Fair Fluor.
 No Cut

Fluorescence Possibly
 Caused By OBM

CG 168u

WT IN 9.6
 WT OUT 9.6
 VIS 55

20%SLTST, lt gry-gry,
 sli frm-frm, silc
 wi arg mtx, sndy mtx,
 60%SH, gy-dk gy, blk-
 pty, sft-mod frm, silc
 wi arg mtx, fn slty lam
 20%SS, clr-wht-occ lt
 gry, f-med grn, sbang-
 sbrnd, sli frm, cons,
 sme uncon, fri, sme
 free crse qtz grns

Fluorescence Possibly
 Caused By OBM

4800-900' Fair Fluor.
 No Cut

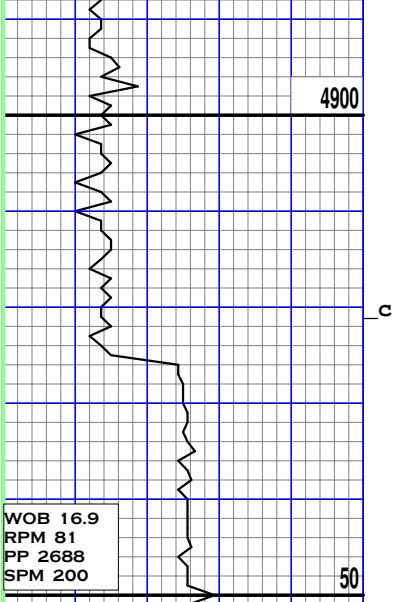
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CG 167u

WT IN 9.6
 WT OUT 9.6
 VIS 55

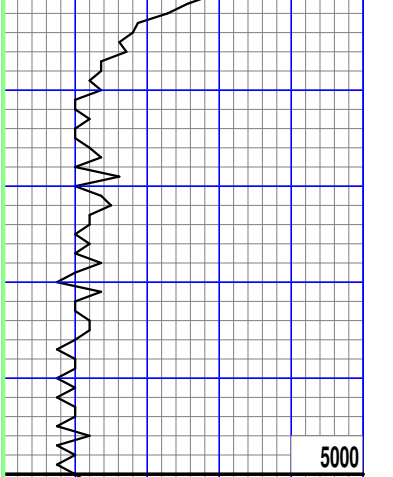
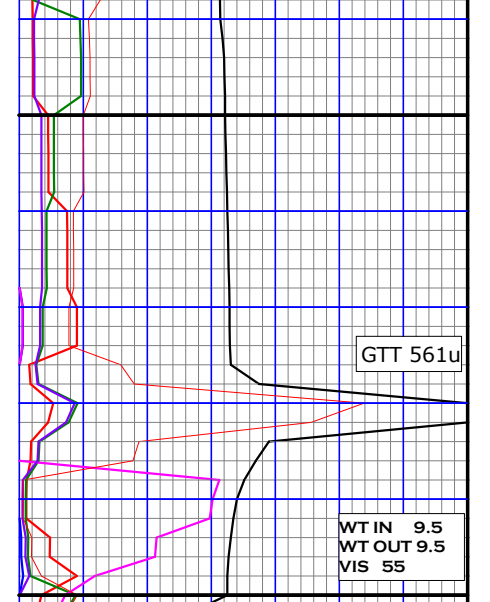
30%SLTST, lt gry-gry,
 sli frm-frm, silc
 wi arg mtx, sndy mtx,
 40%SH, gy-dk gy, blk-
 pty, sft-mod frm, silc
 wi arg mtx, fn slty lam
 30%SS, clr-wht-occ lt
 gry, f-med grn, sbang-
 sbrnd, sli frm, cons,
 sme uncon, fri, sme
 free crse qtz grns

Fluorescence Possibly



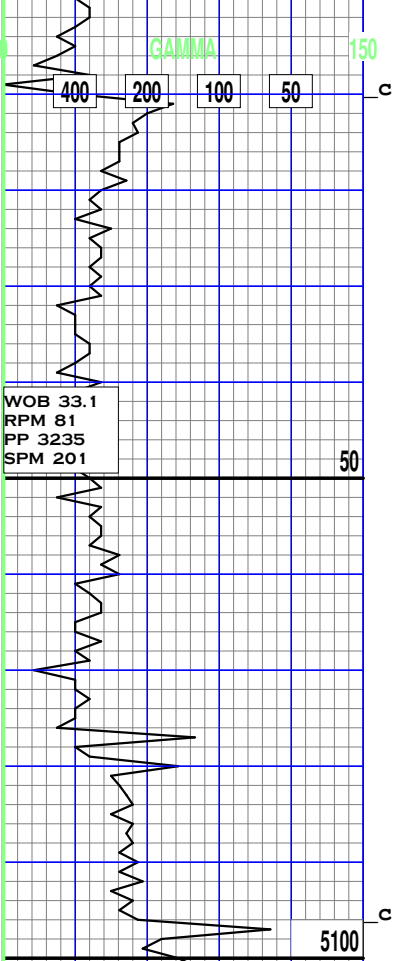
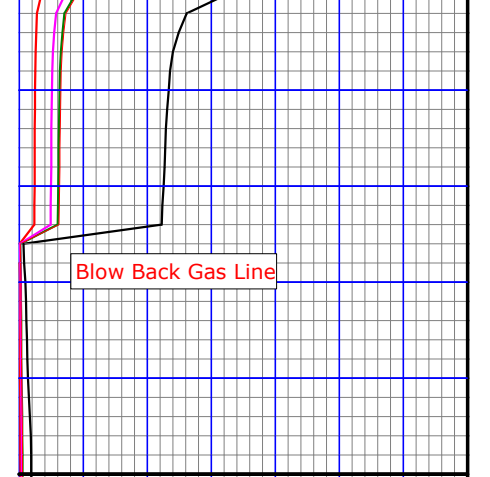
4900-5000' Fair Flour.
No Cut.

20%SLTST, lt gry-gry,
sli frm-frm, silc
wi arg mtx, sndy mtx,
30%SH, gy-dk gy, blk-
ply, sft-mod frm, silc
wi arg mtx,fn slty lam
50%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncons, fri, sme
free crse qtz grns

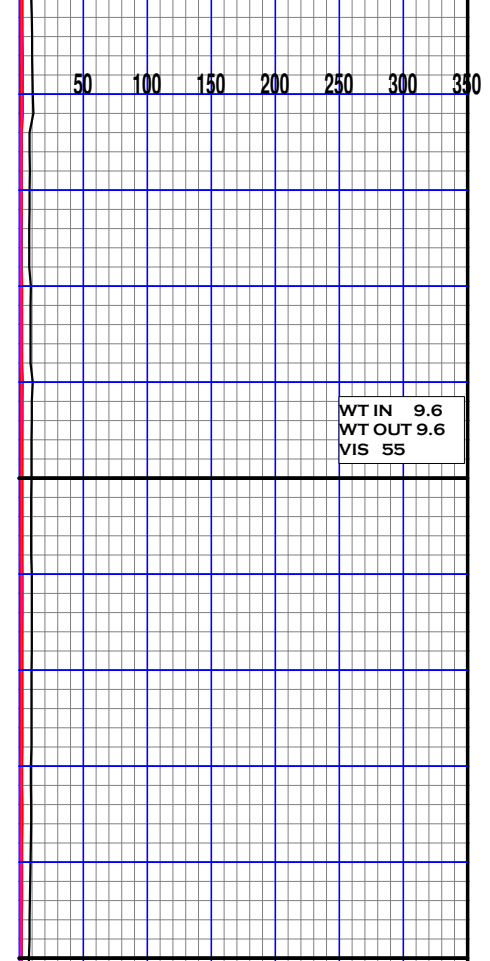


5000'-100' Fair Flour.
No Cut.

50%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm, cons,
sme uncons, fri, sme
free crse qtz grns
20%SLTST, lt gry-gry,
sli frm-frm, silc
wi arg mtx, sndy mtx,
30%SH, gy-dk gy, blk-
ply, sft-mod frm, silc
wi arg mtx,fn slty lam



5100'-200' Fair Flour.
No Cut.



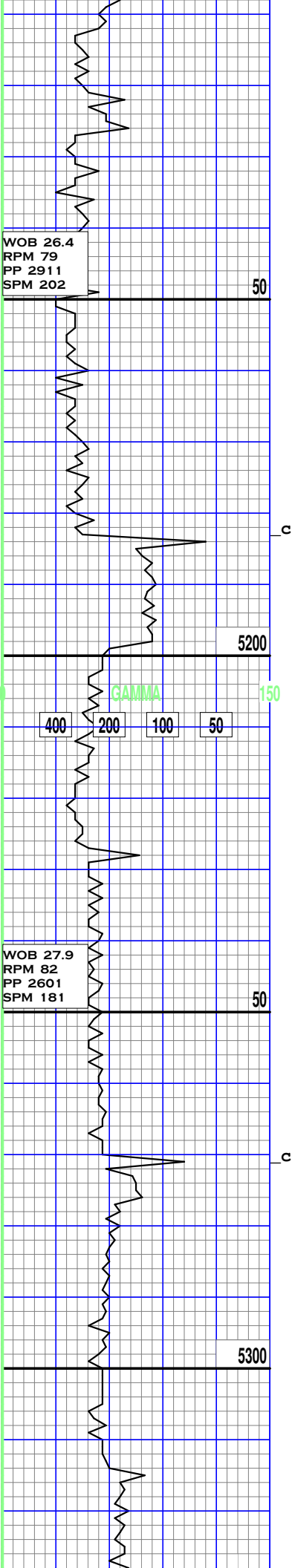
Fluorescence Possibly
Caused By OBM

Fluorescence Possibly
Caused By OBM

GAMMA 150

400 200 100 50

50 100 150 200 250 300 350



WOB 26.4
RPM 79
PP 2911
SPM 202

50

5200

5300

GAMMA

400 200 100 50

WOB 27.9
RPM 82
PP 2601
SPM 181

50

c

60%SS, clr-wht-occ lt gry, f-med grn, sbang-sbrnd, sli frm, cons, sme uncon, fri, sme free crse qtz grns, 20%SLTST, lt gry-gry, sli frm-frm, silc wi arg mtx, sndy mtx, 20%SH, gy-dk gy, blk-plty, sft-mod frm, silc wi arg mtx, fn slty lam

Fluorescence Possibly Caused By OBM

5200'-300' Fair Flour. No Cut.

40%SS, clr-wht-occ lt gry, f-med grn, sbang-sbrnd, sli frm-frm, cons, sme uncon, fri-sli fri, sme free crse qtz grns, 40%SLTST, lt gry-gry, sli frm-frm, silc wi arg mtx, sndy mtx, 20%SH, gy-dk gy, blk-plty-subblk, sft-mod frm, silc wi arg mtx, fn slty lam

Fluorescence Possibly Caused By OBM

40%SS, clr-wht-occ lt gry, f-med grn, sbang-sbrnd, sli frm-frm, cons, sme uncon, fri-sli fri, sme free crse qtz grns, 30%SLTST, lt gry-gry, sli frm-frm, silc wi arg mtx, sndy mtx, 30%SH, gy-dk gy, blk-plty-subblk, sft-mod frm, silc wi arg mtx, fn slty lam

5300'-400' Fair Flour. No Cut.

WT IN 9.6
WT OUT 9.6
VIS 55

50 100 150 200 250 300 350

WT IN 9.6
WT OUT 9.6
VIS 55

CG 45u

WOB 16.8
RPM 80
PP 2574
SPM 181

50

c

5400

GAMMA

150

400 200 100 50

WOB 22.9
RPM 81
PP 2869
SPM 181

50

c

5500

WOB 19.1
RPM 80
PP 2566
SPM 181

MD 5534'
TD 5351.33'
INC 20.29°
AZM 101.66°
VS 192.47'

Fluorescence Possibly
Caused By OBM

Fluorescence Possibly
Caused By OBM

30%SS, clr-wht-occ lt
gry, f-med grn, sbang-
sbrnd, sli frm-frm,
cons, sme uncons, fri-
sli fri, sme free crse
qtz grns, 30%SLTST, lt
gry-gry, sli frm-frm,
silc wi arg mtx, sndy
mtx, 40%SH, gy-dk gy,
blky-pty-subblky, sft-
mod frm, silc wi arg
mtx, fn slty lam

5400'-500' Fair Flour.
No Cut.

Fluorescence Possibly
Caused By OBM

40% SH, gy-lt gy-dk gy,
blky-pty-subblky, sft-
vfrm, rthy txt, f slty
lam 30%SLTST, lt gy-gy,
blky-pty-sft-sl frm,
brtl, silc wi arg mtx,
sndy mtx, 20%SS, f-med
grn, clr-wh-lt gy, cons,
cons, sme uncons grns,
fri, sbang-sbrnd, sme
free qtz grn 10% CLYSTN,
lt gry-gry, v sft, mas,
slty mtx

5500'-600' Fair Flour.
No Cut.

Fluorescence Possibly
Caused By OBM

WT IN 9.55
WT OUT 9.55
VIS 56

CG 50u

50 100 150 200 250 300 350

CG 53u

WT IN 9.6
WT OUT 9.6
VIS 49

CG 53u

WT IN 9.6
WT OUT 9.6
VIS 48

5600

5700

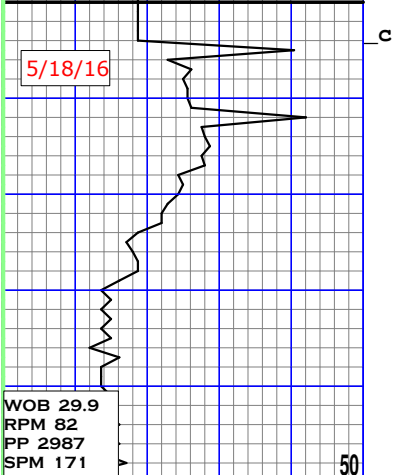
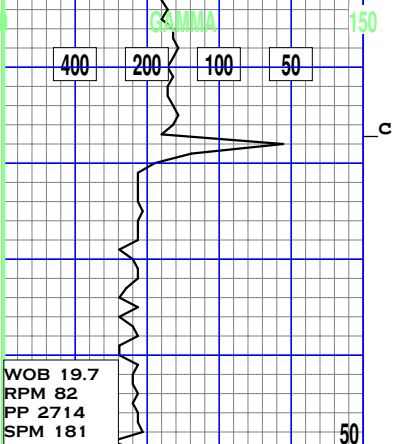
30% SH, gy-lt gy-dk gy, blky-pty-subblky, sft-frm, rthy txt, f slty lam 30%SLTST, lt gy-gy, blky-pty-sft-sl frm, brtl, slic wi arg mtx, sndy mtx, 30%SS, f-med grn, clr-wh-lt gy, cons, sme uncongs grns, fri, sbang-sbrnd, sme free qtz grn, 10% CLYSTN, lt gry-gry, v sft, mas, slty mtx

5600'-700' Fair Flour. No Cut.

50%SS, f-med grn, clr-wh-lt gy, cons, sme uncongs grns, fri, sbang-sbrnd, sme free qtz grn, 30%SLTST, lt gy-gy, blky-pty, sft-sl frm, brtl, slic wi arg mtx, sndy mtx, 20% SH, gy-lt gy-dk gy, blky-pty, sft-frm, rthy txt, f slty lam

5700'-800' Fair Flour. No Cut.

40% SH, gy-lt gy-dk gy, blky-pty, sli frm-mod frm, rthy txt, f slty lam, 40%SLTST, lt gy-gy, blky-pty, sft-sl frm, brtl, slic wi arg mtx, sndy mtx, 20%SS, f-med grn, clr-wh-lt gy, cons, sme uncongs grns, fri, sbang-sbrnd, sme free qtz grn



Fluorescence Possibly Caused By OBM

Fluorescence Possibly Caused By OBM

50 100 150 200 250 300 350

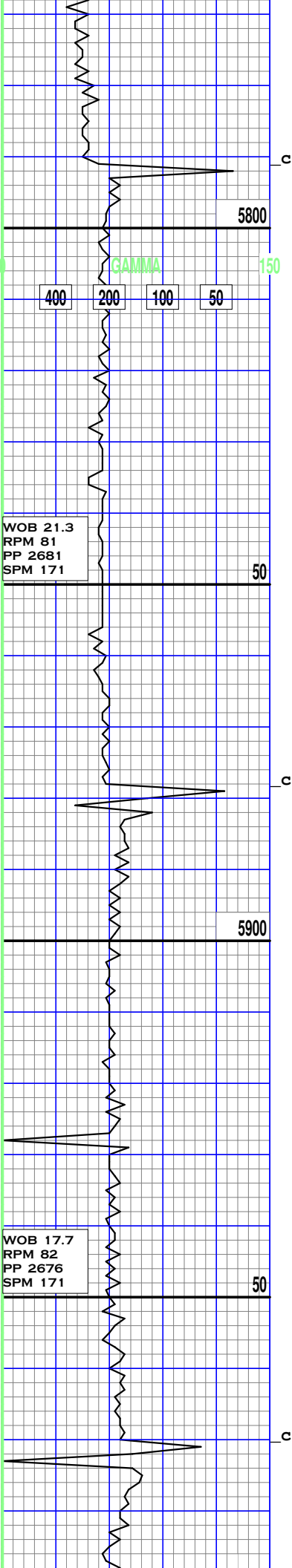
WT IN 9.7
WT OUT 9.7
VIS 49

OBG 55u

CG 55u

WT IN 9.5+
WT OUT 9.5+
VIS 49

MG 80u



WOB 21.3
RPM 81
PP 2681
SPM 171

WOB 17.7
RPM 82
PP 2676
SPM 171

Fluorescence Possibly
Caused By OBM

CG 68u

5800'-900' Fair Flour.
No Cut.

40% SH, gy-lt gy-dk gy,
blky-pty, sli frm-mod
frm, rthy txt, f slty
lam, 40%SLTST, lt gy-gy,
blky-pty, sft-sl frm,
brtl, slic wi arg mtx,
sndy mtx, 20%SS, f-med
grn, clr-wh-lt gy, cons,
sme uncongs grns, fri,
sbang-sbrnd, sme free
qtz grn

WT IN 9.5+
WT OUT 9.5+
VIS 49

Fluorescence Possibly
Caused By OBM

CG 64u

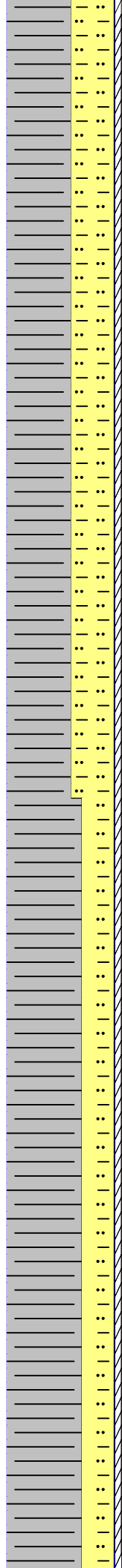
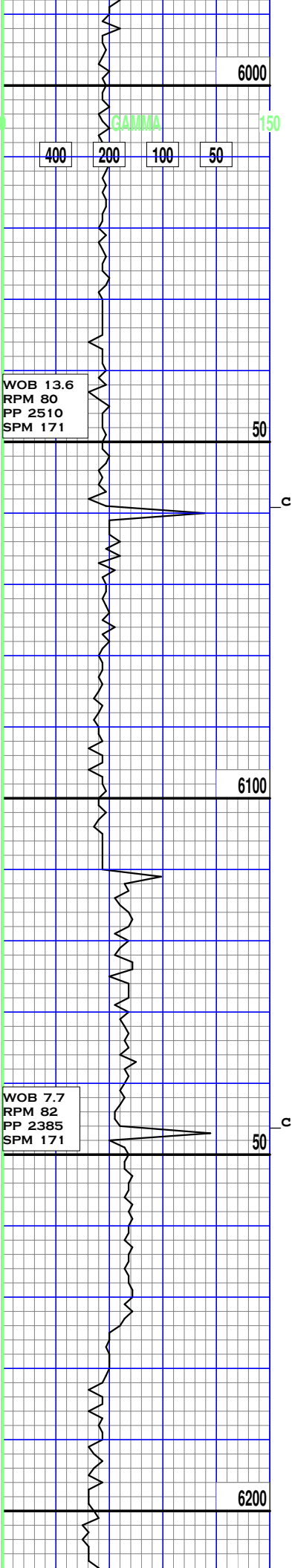
5900-6000' Fair Flour.
No Cut.

60% SH, gy-lt gy-dk gy,
blky-pty, sli frm-mod
frm, rthy txt, f slty
lam, tr free calcite,
30%SLTST, lt gy-gy,
blky-pty, sft-sl frm,
brtl, slic wi arg mtx,
sndy mtx, 10%SS, f-med
grn, clr-wh-lt gy, sme
uncongs grns, fri, sbang
sbrnd, sme free qtz grn

WT IN 9.5
WT OUT 9.5
VIS 48

Fluorescence Possibly
Caused By OBM

CG 70u



6000'-100' Fair Flour.
No Cut.

60% SH, gy-lt gy-dk gy,
blky-pty, sli frm-mod
frm, rthy txt, f slty
lam, tr free calcite,
40%SLTST, lt gy-gy,
blky-pty, sft-sl frm,
brtl, slic wi arg mtx,
sndy mtx, tr SS, tr free
qtz grns

Fluorescence Possibly
Caused By OBM

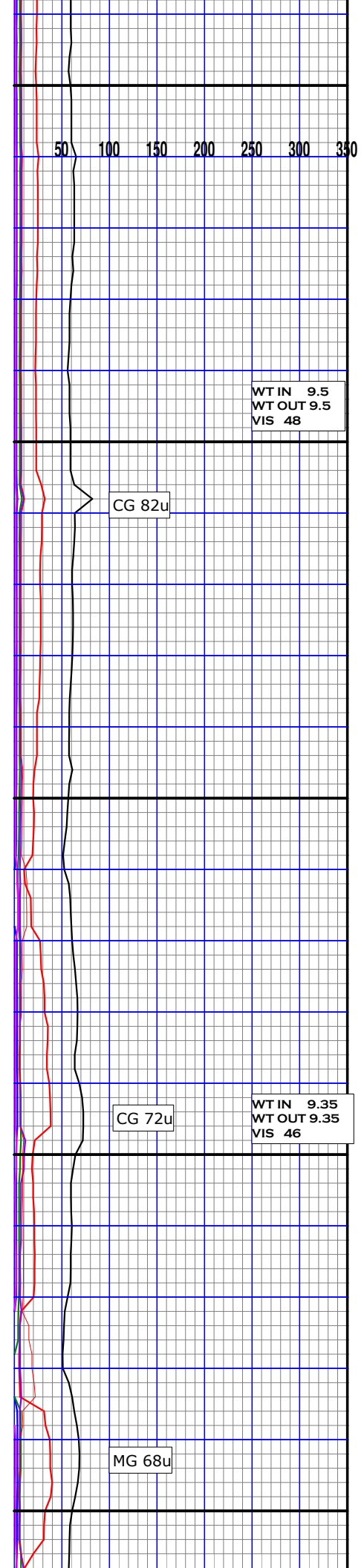
60% SH, gy-dk gy-brn,
blky-pty-subblky, sli
frm-mod frm, rthy txt, f
slty lam, tr free
calcite, 40%SLTST, lt
gy-gy, blky-pty, sft-sl
frm, brtl, slic wi arg
mtx, sndy mtx, tr SS, tr
free qtz grns

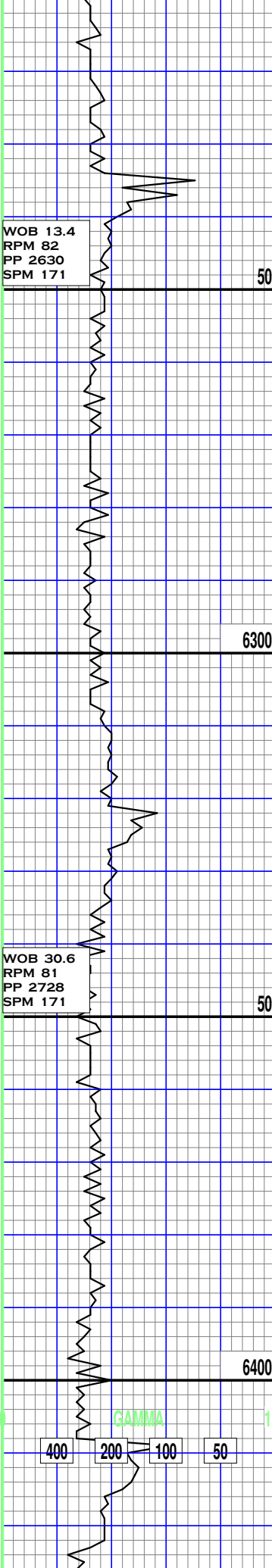
6100-200' Fair Fluor.
No Cut

Fluorescence Possibly
Caused By OBM

60% SH, gy-lt gy-dk gy,
blky-pty-subblky, sft
frm-v frm, rthy txt, f
slty lam, 40%SLTST, lt
gy-gy, blky-pty, sft-sl
frm, brtl, slic wi arg
mtx, sndy mtx, tr SS

6200-300' Fair Fluor.
No Cut





MD 6232'
 TVD 6007.34'
 INC 20.14°
 AZM 90.45°
 VS 238.26'

WOB 13.4
 RPM 82
 PP 2630
 SPM 171

50

6300

c

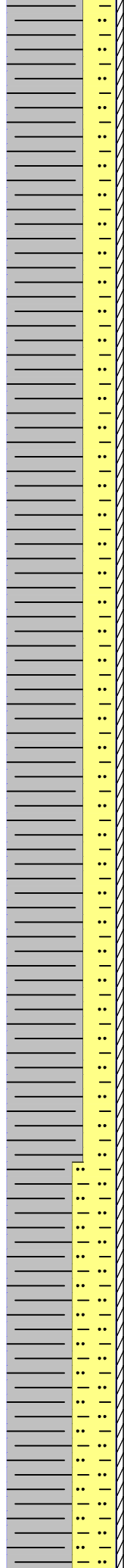
WOB 30.6
 RPM 81
 PP 2728
 SPM 171

50

6400

MD 6410'
 TVD 6173.54'
 INC 19.95°
 AZM 92.39°
 VS 254.82'

400 200 100 50



Fluorescence Possibly
 Caused By OBM

60% SH, gy-lt gy-dk gy
 blk-pty-subblk, sft
 frm-v frm, rthy txt, f
 slty lam, 40%SLTST, lt
 gy-gy, blk-pty, sft-sl
 frm, brtl, slic wi arg
 mtx, sndy mtx, tr SS

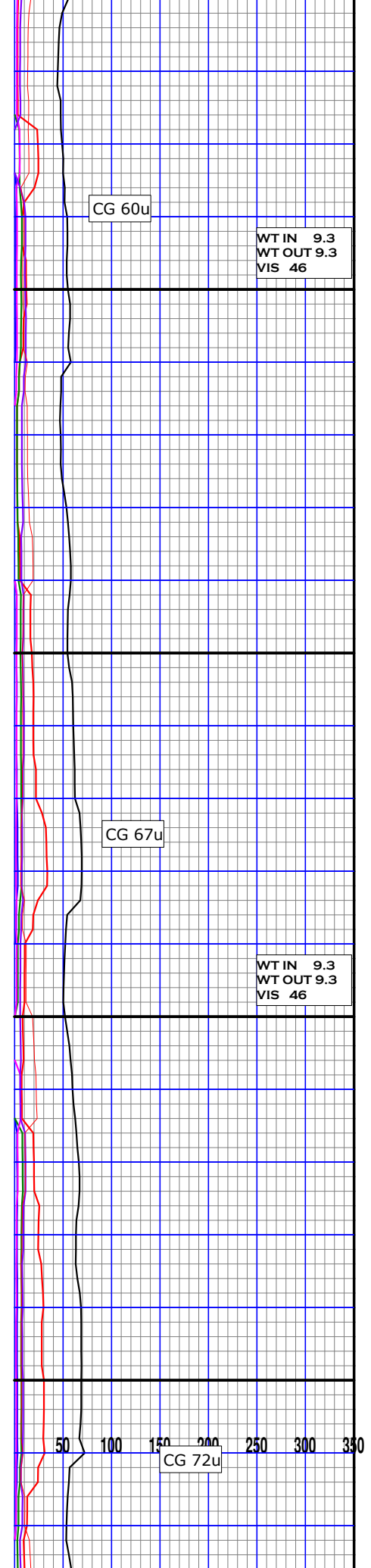
6300-400' Fair Fluor.
 No Cut

Fluorescence Possibly
 Caused By OBM

60% SH, gy-dk gy, blk-
 pty-subblk, sft frm-v
 frm, rthy txt, f slty
 lam, 40%SLTST, lt gy-gy,
 blk-pty, sft-sl frm,
 brtl, slic wi arg mtx,
 sndy mtx, tr SS, tr BE

6400-500' Fair Fluor.
 No Cut

Fluorescence Possibly
 Caused By OBM



CG 60u

WT IN 9.3
 WT OUT 9.3
 VIS 46

CG 67u

WT IN 9.3
 WT OUT 9.3
 VIS 46

CG 72u

50 100 150 200 250 300 350

WOB 23.9
RPM 81
PP 2641
SPM 171

WT IN 9.3
WT OUT 9.3
VIS 46

50

60% SH, gy-dk gy, blk
pty-subblk, sft frm-v
frm, rthy txt, f slty
lam, 40%SLTST, lt gy-gy,
blk-pty, sft-sl frm,
brtl, slic wi arg mtx,
sndy mtx, tr SS, tr BE

6500

CG 69u

6500-600' Fair Fluor.
No Cut

Fluorescence Possibly
Caused By OBM

WOB 19.6
RPM 81
PP 2614
SPM 171

WT IN 9.3
WT OUT 9.3
VIS 46

50

80% SH, gy-dk gy, blk
pty-subblk, sft frm-v
frm, rthy txt, f slty
lam, 20%SLTST, lt gy-gy,
blk-pty, sft-sl frm,
brtl, slic wi arg mtx,
sndy mtx, tr BE

6600

CG 82u

6600-700' Fair Fluor.
No Cut

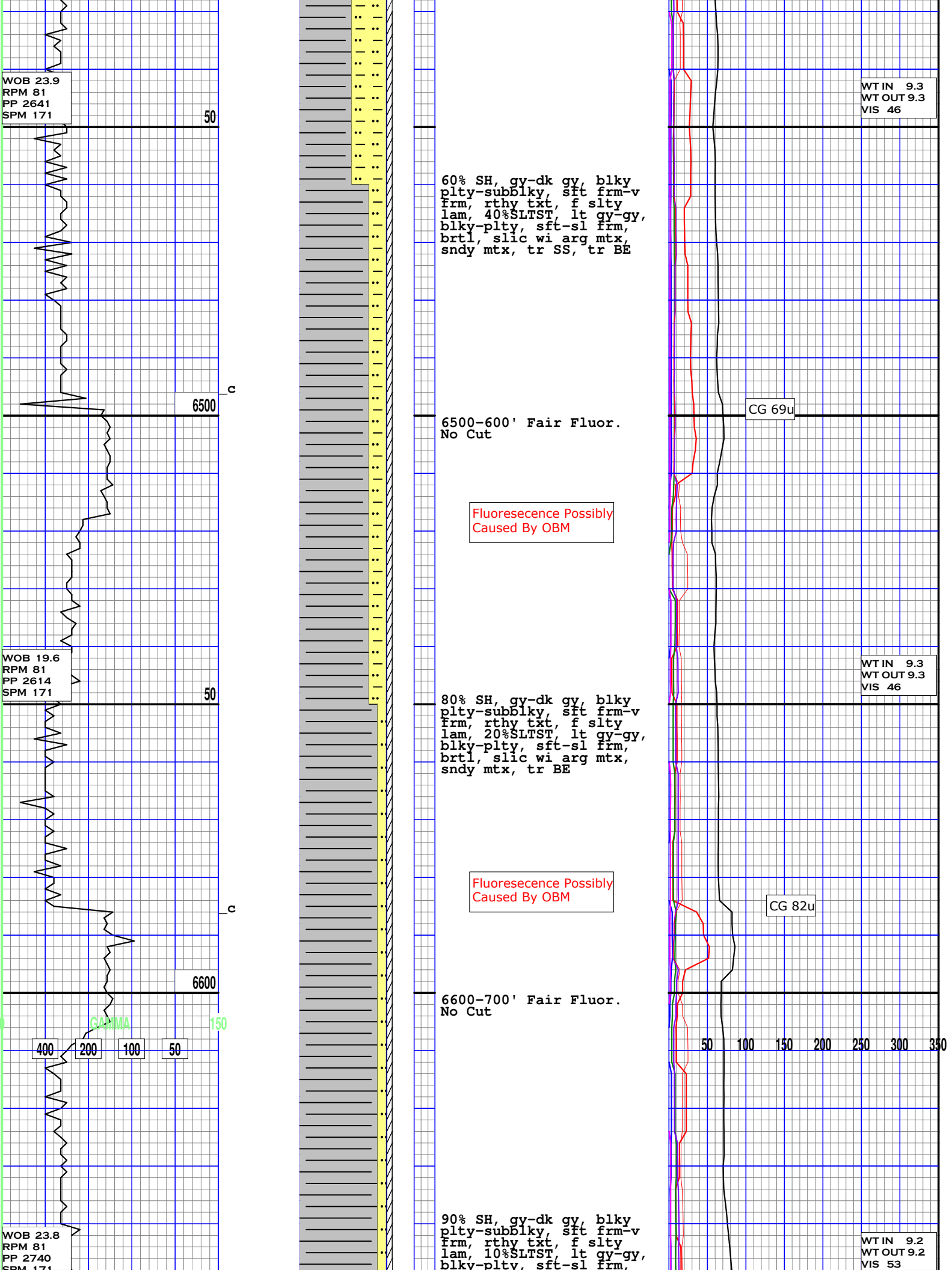
Fluorescence Possibly
Caused By OBM

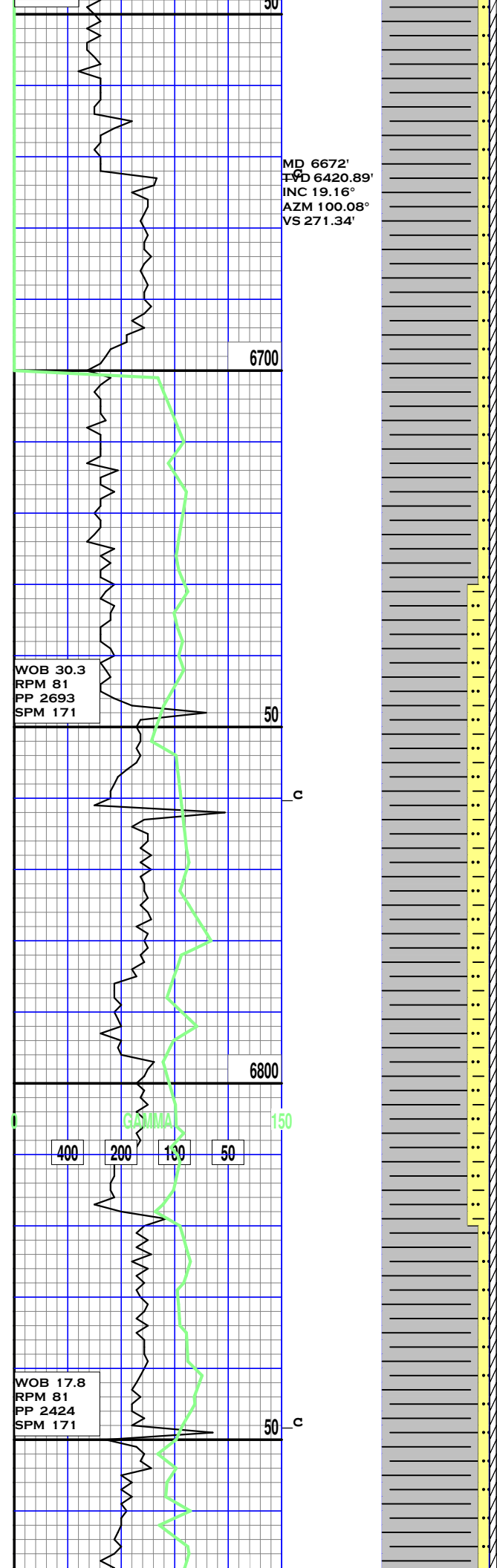
WOB 23.8
RPM 81
PP 2740
SPM 171

WT IN 9.2
WT OUT 9.2
VIS 53

50

90% SH, gy-dk gy, blk
pty-subblk, sft frm-v
frm, rthy txt, f slty
lam, 10%SLTST, lt gy-gy,
blk-pty, sft-sl frm,





MD 6672'
 TVD 6420.89'
 INC 19.16°
 AZM 100.08°
 VS 271.34'

6700

WOB 30.3
 RPM 81
 PP 2693
 SPM 171

50

c

6800

GAMMA

150

400 200 100 50

WOB 17.8
 RPM 81
 PP 2424
 SPM 171

50

c

brtl, slic wi arg mtx,
 sndy mtx, tr BE

Fluorescence Possibly
 Caused By OBM

6700-800' Fair Fluor.
 No Cut

90% SH, gy-dk gy, blk
 plty-subblk, sft frm-v
 frm, rthy txt, f slty
 lam, 10%SLTST, lt gy-gy,
 blk-plty, sft-sl frm,
 brtl, slic wi arg mtx,
 sndy mtx, tr BE

WT IN 9.2
 WT OUT 9.2
 VIS 52

CG 84u

Fluorescence Possibly
 Caused By OBM

6800-900' Fair Fluor.
 No Cut

80% SH, gy-dk gy, blk
 plty-subblk, sft frm-v
 frm, rthy txt, f slty
 lam, 20%SLTST, lt gy-gy,
 blk-plty, sft-sl frm,
 brtl, slic wi arg mtx,
 sndy mtx, tr BE

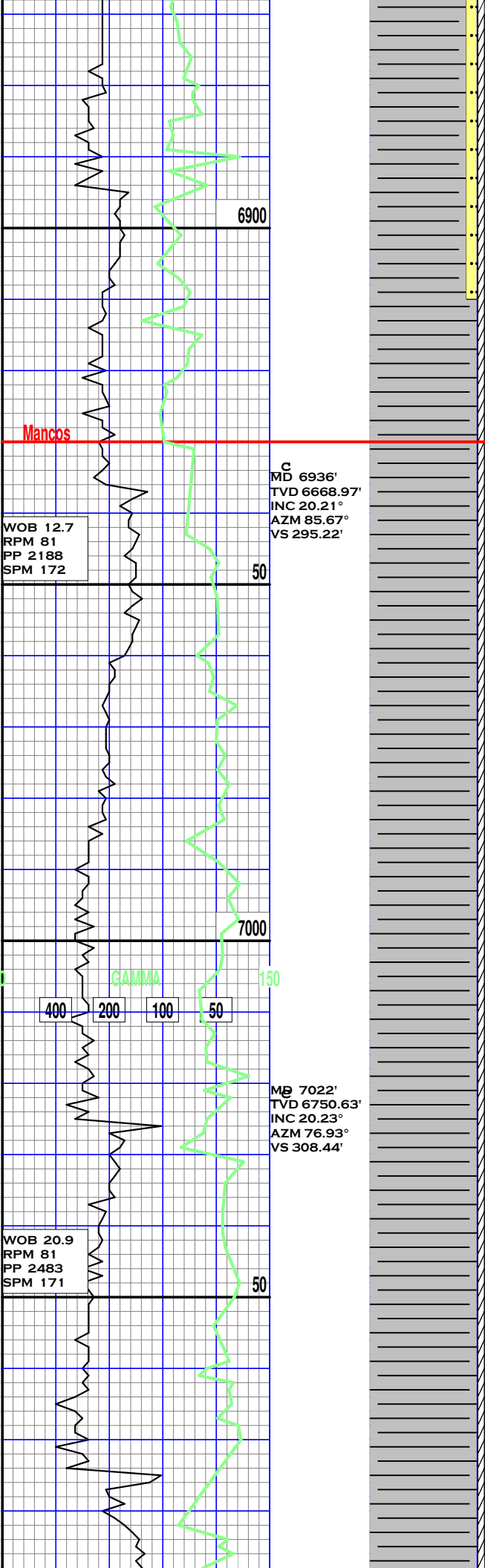
WT IN 9.2
 WT OUT 9.2
 VIS 52

CG 82u

Fluorescence Possibly
 Caused By OBM

CG 80u

50 100 150 200 250 300 350



6900

Mancos

C
MD 6936'
TVD 6668.97'
INC 20.21°
AZM 85.67°
VS 295.22'

WOB 12.7
RPM 81
PP 2188
SPM 172

50

7000

GAMMA

150

400 200 100 50

M 7022'
TVD 6750.63'
INC 20.23°
AZM 76.93°
VS 308.44'

WOB 20.9
RPM 81
PP 2483
SPM 171

50

6900-7000' Fair Fluor.
No Cut

90% SH, gy-dk gy, blk
pty-subblk, sft frm-v
frm, rthy txt, f slty
lam, 10%SLTST, lt gy-gy,
blk-pty, sft-sl frm,
brtl, slic wi arg mtx,
sndy mtx, tr BE

Fluorescence Possibly
Caused By OBM

100% SH, gy-dk gy, blk
pty-subblk, sft frm-v
frm, rthy txt, f slty
lam

7000-100' Fair Fluor.
No Cut

Fluorescence Possibly
Caused By OBM

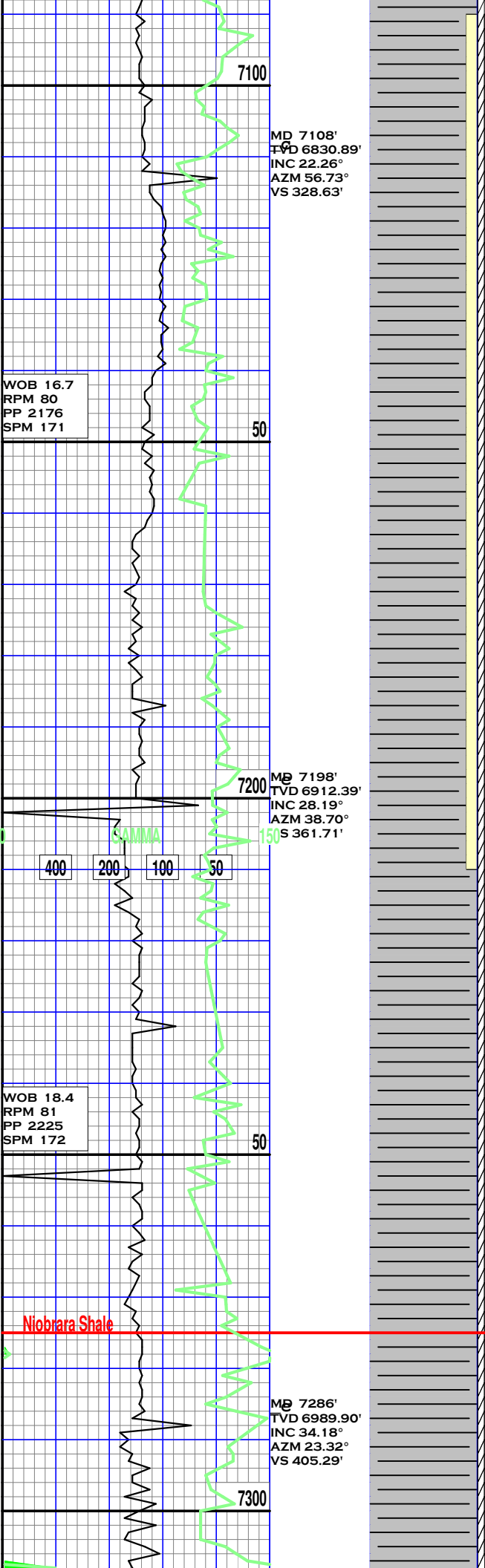
CG 87u

WT IN 9.2
WT OUT 9.2
VIS 52

CG 87u

WT IN 9.2
WT OUT 9.2
VIS 51

50 100 150 200 250 300 350



100% SH, gy-dk gy, blkyply-subblky, sft frm-v frm, rthy txt, f slty lam

7100-200' Fair Fluor. No Cut

Fluoresecence Possibly Caused By OBM

90% SH, gy-dk gy, blkyply-subblky, sft frm-v frm, rthy txt, f slty lam 10% BE, lt gry-blu, pty, frm-sli hrd, arg wi silc mtx

7200-300' Fair Fluor. No Cut

90% SH, gy-dk gy, blkyply-subblky, sft frm-v frm, rthy txt, f slty lam 10% BE, lt gry-blu, pty, frm-sli hrd, arg wi silc mtx

Fluoresecence Possibly Caused By OBM

100% SH, gy-dk gy, blkyply-subblky, sft frm-v frm, rthy txt, f slty lam

7300-400' Fair Fluor. No Cut

CG 88u

WT IN 9.2
WT OUT 9.2
VIS 51

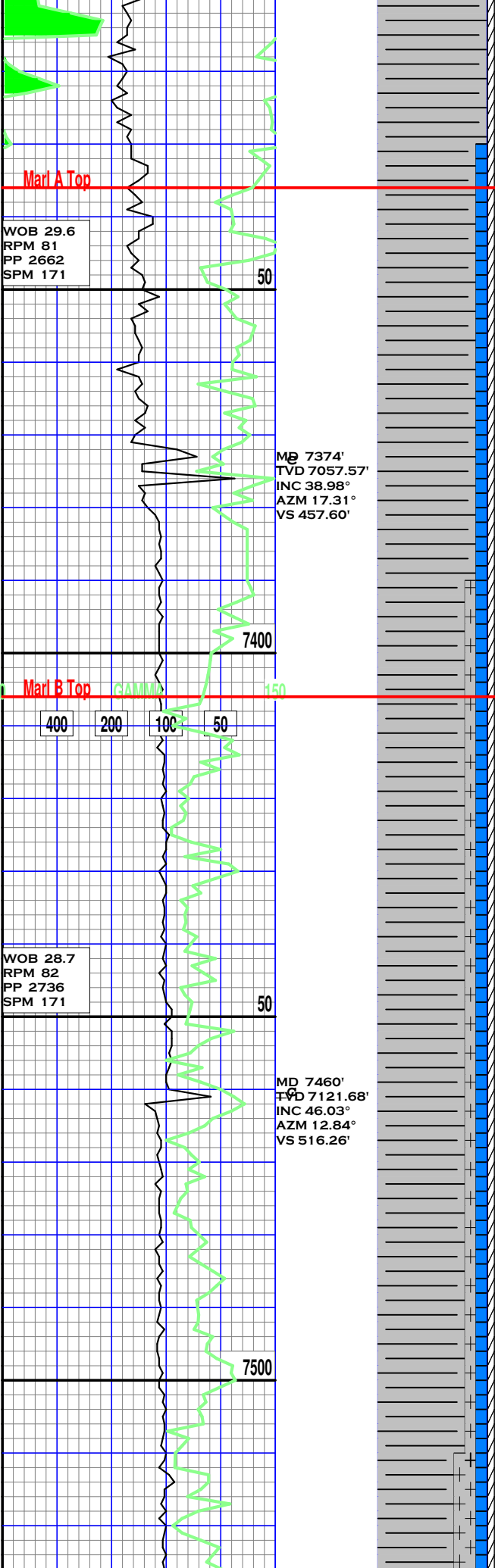
CG 89u

OBG 84u

WT IN 9.2
WT OUT 9.2
VIS 51

CG 99u

Niobrara Shale



100% SH, gy-dk gy, blkyply-subblky, sft frm-v frm, rthy txt, f slty lam

Fluorecence Possibly Caused By OBM

90% SH, gy-dk gy, blkyply-subblky, sft frm-v frm, rthy txt, f slty lam 10% LS, wh-clr, frm-mod frm, sbky-pty, HI-V HI EFF-HCL

7400-510' Fair Fluor. No Cut

80% SH, gy-dk gy, blkyply-subblky, sft frm-v frm, rthy txt, f slty lam 10% MRSTN, lt gry, v sft-sft, mas 10% LS, wh-clr, frm-mod frm, sbky-pty, HI-V HI EFF-HCL

Fluorecence Possibly Caused By OBM

7510'-600' Fair Flour. Weak Cut.

80% SH, gy-dk gy, blkyply-subblky, sft frm-v frm, rthy txt, f slty lam 10% MRSTN, lt gry, v sft-sft, mas 10% LS, wh-clr, frm-mod frm, sbky-pty, HI-V HI EFF-HCL

MG 106u

WT IN 9.6
WT OUT 9.6
VIS 56

CG 95u

50 100 150 200 250 300 350

MG 94u

WT IN 9.7
WT OUT 9.7
VIS 55

CG 86u

OBG 111u

WOB 31.9
RPM 81
PP 2697
SPM 171

MD 7548'
TVD 7177.75'
INC 54.75°
AZM 8.86°
VS 583.50'

WT IN 9.7
WT OUT 9.7
VIS 55

CG 94u

70% SH, gy-dk gy, blky-pty-subblky, sft frm-v frm, rthy txt, f slty lam 20% MRSTN, lt gry, v sft-sft, mas 10% LS, wh-clr, frm-mod frm, sbky-pty, HI-V HI Eff-Hcl

MG 89u

7600'-700' Fair Flour. Weak Cut.

Fluorescence and Cut Possibly Caused By OBM

50 100 150 200 250 300 350

WOB 34.3
RPM 80
PP 2787
SPM 171

MD 7636'
TVD 7224.10'
INC 61.65°
AZM 6.49°
VS 657.14'

WT IN 10.1
WT OUT 10.1
VIS 53

CG 95u

90% SH, gy-dk gy-brn, blky-pty-subblky, sft frm-v frm, rthy txt, sme smth txt, f slty lam, Sli-Mod Eff-Hcl, 10% MRSTN, lt gry, v sft-sft, mas, mott, Hi Eff-Hcl

Marl C Top

80% SH, gy-dk gy-brn, blky-pty-subblky, sft-v frm, rthy txt, sme smth txt, f slty lam, Sli-Mod Eff-Hcl, 10% MRSTN, lt gry, v sft-sft, mas, mott, 10% LS, wh-lt gy, frm-mod frm, sbky-pty, HI-V HI Eff-Hcl

CG 90u

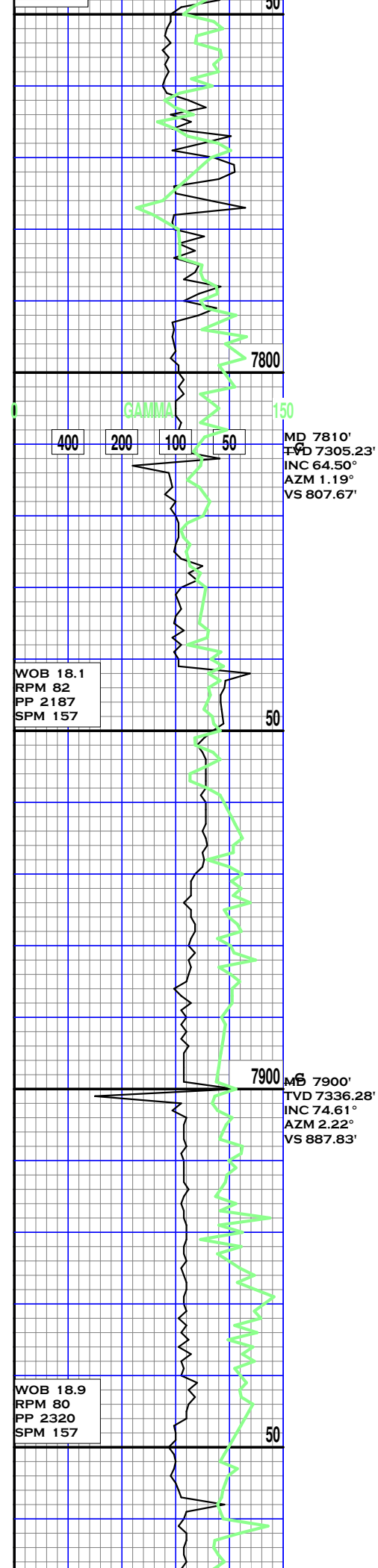
7700'-800' Fair Flour. Weak Cut.

Fluorescence and Cut Possibly Caused By OBM

MD 7724'
TVD 7265.87'
INC 61.69°
AZM 3.57°
VS 732.77'

WT IN 10.1
WT OUT 10.1
VIS 53

WOB 34.6
RPM 81
PP 2621
SPM 171



80% SH, gy-dk gy,
 blk-pty-subblk, mod
 frm-v frm, rthy txt, f
 slty lam, Sli-Mod Eff-
 Hcl, 10% MRSTN, lt gry,
 v sft-sft, mas, mott,
 10% LS, gy-lt gy, frm-
 mod frm, sblky-pty,
 Hi-V Hi Eff-Hcl

7800'-900' Fair Flour.
 Weak Cut.

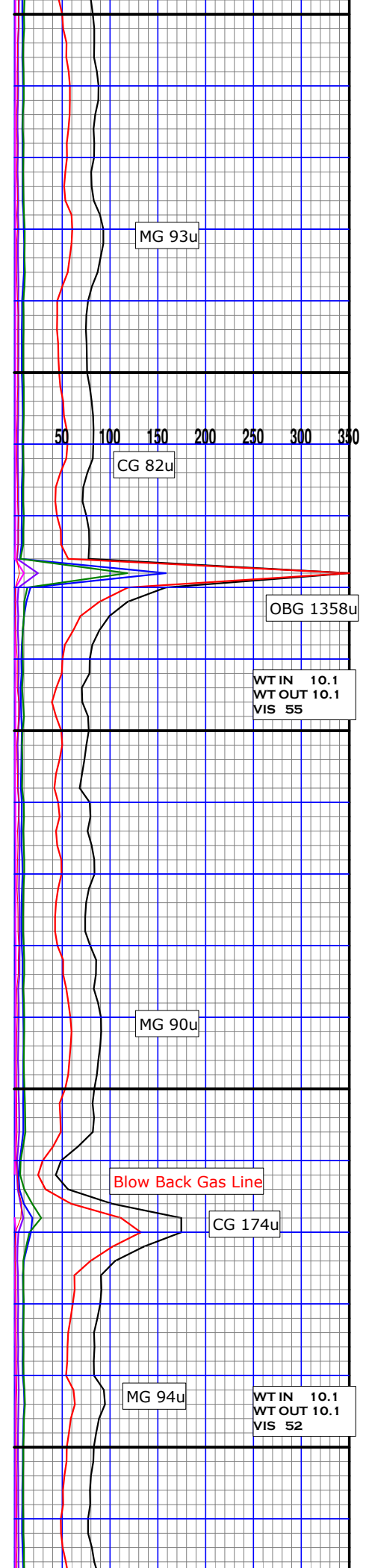
70% SH, gy-dk gy,
 blk-pty-subblk, mod
 frm-v frm, rthy txt, f
 slty lam, sme free
 calcite, Sli-Mod Eff-
 Hcl, 20% MRSTN, lt gry,
 v sft-sft, mas, mott,
 10% LS, gy-lt gy, frm-
 mod frm, sblky-pty,
 Hi-V Hi Eff-Hcl

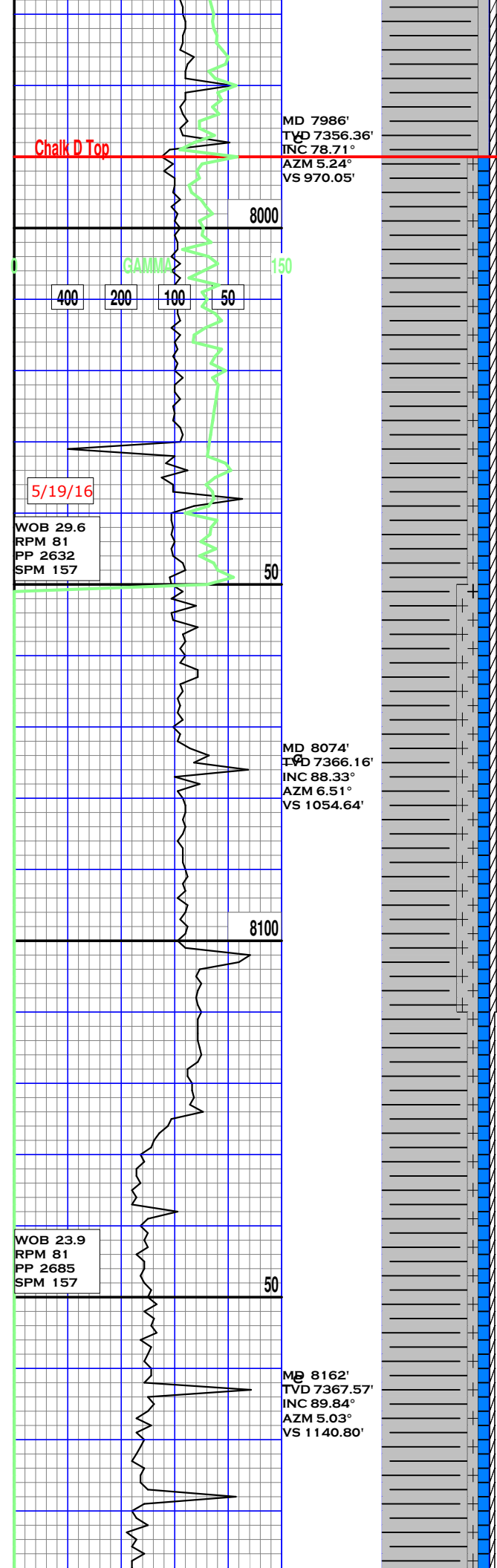
Fluorescence and Cut
 Possibly Caused By OBM

80% SH, gy-dk gy,
 blk-pty, mod frm-v
 frm, rthy txt, f slty
 lam, sme free calcite,
 Sli-Mod Eff-Hcl, 10%
 MRSTN, lt gry, v sft-
 sft, mas, mott, 10% LS,
 gy-lt gy, mod frm,
 sblky-pty, Hi-V Hi
 Eff-Hcl

7900'-7990' Fair Flour.
 Weak Cut.

70% SH, gy-dk gy,
 blk-pty, mod frm-v
 frm, rthy txt, f slty
 lam, sme free calcite,
 Sli-Mod Eff-Hcl, 20%
 MRSTN, lt gry, v sft-
 sft, mas, mott, 10% LS,
 gy-lt gy, mod frm,
 sblky-pty, Hi-V Hi
 Eff-Hcl





Fluorescence and Cut
Possibly Caused By OBM

Note Gas Scale Change 0-1750u

90% SH, gy-dk gy, blk-pty-sblk, mod frm-v frm, rthy txt, f slty lam, sme free calcite, Sli-Mod Eff-Hcl, 10% MRSTN, lt gry, v sft-sft, mas, mott, tr ls, tr free pyr

7990'-8050' Fair Flour. Fair Cut.

OBG 198u

CG 1177u

MG 2800u

8050'-100' Fair Flour. Weak Cut.

WT IN 10.1
WT OUT 10.1
VIS 52

80% SH, gy-dk gy, blk-pty, mod frm-v frm, rthy txt, f slty lam, sme free calcite, Sli-Mod Eff-Hcl, 10% MRSTN, lt gry, v sft-sft, mas, mott, 10% LS, gy-lt gy, mod frm, sblk-pty, Hi-V Hi Eff-Hcl

MG 223u

Fluorescence and Cut
Possibly Caused By OBM

CG 1180u

8100'-200' Fair Flour. Weak Cut.

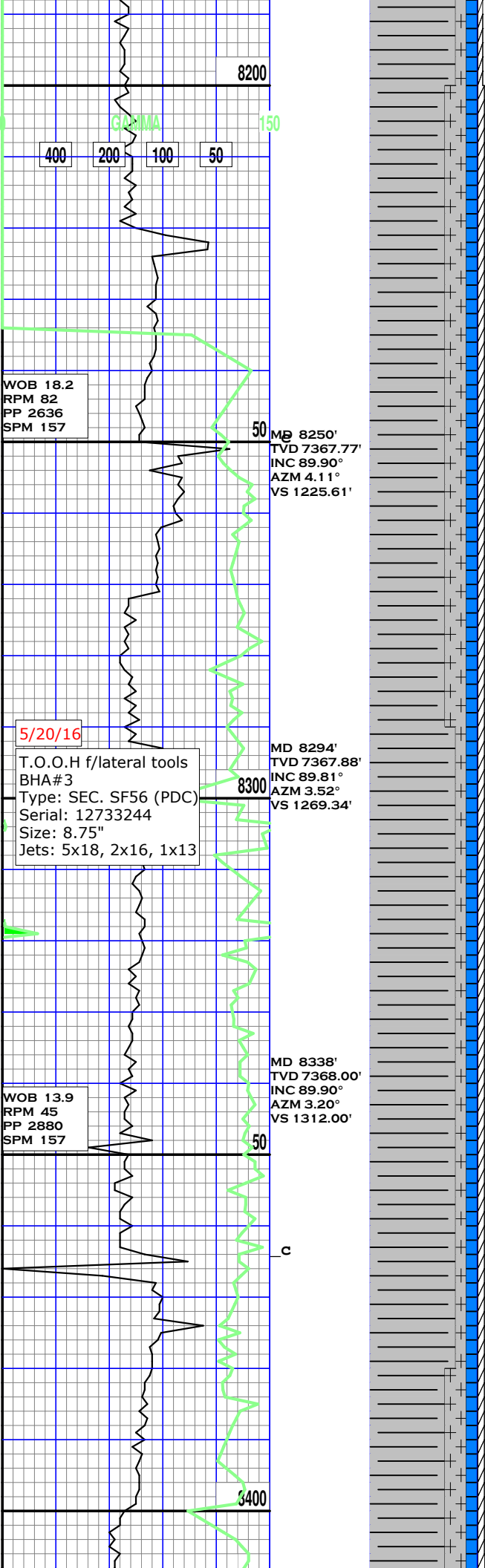
70% SH, gy-dk gy, blk-pty, mod frm-v frm, rthy txt, f slty lam, sme free calcite, Sli-Mod Eff-Hcl, 20% MRSTN, lt gry-gy, v sft-sli frm, mas, mott, 10% LS, gy-lt gy, mod frm-v frm, sblk-pty, Hi-V Hi Eff-Hcl, tr BENT

OBG 695u

WT IN 10.1
WT OUT 10.1
VIS 53

Fluorescence and Cut
Possibly Caused By OBM

CG 1100u



400 200 100 50

WOB 18.2
RPM 82
PP 2636
SPM 157

5/20/16

T.O.O.H f/lateral tools
BHA#3
Type: SEC. SF56 (PDC)
Serial: 12733244
Size: 8.75"
Jets: 5x18, 2x16, 1x13

WOB 13.9
RPM 45
PP 2880
SPM 157

8200

50

8300

50

8400

MD 8250'
TVD 7367.77'
INC 89.90°
AZM 4.11°
VS 1225.61'

MD 8294'
TVD 7367.88'
INC 89.81°
AZM 3.52°
VS 1269.34'

MD 8338'
TVD 7368.00'
INC 89.90°
AZM 3.20°
VS 1312.00'

80% SH, gy-dk gy,
blky-plty, mod frm-v
frm, rthy txt, sme smth
txt, f slty lam, sme
free calcite, Sli-Mod
Eff-Hcl, 10% MRSTN, lt
gry-gy, v sft-sli frm,
mas, mott, 10% LS, gy-lt
gy, mod frm, sblky-plty,
Hi-V Hi Eff-Hcl, tr BENT

8200'-300' Fair Flour.
Weak Cut.

Fluorescence and Cut
Possibly Caused By OBM

70% SH, gy-dk gy,
blky-plty-sblky, sli
frm-v frm, rthy txt, sme
smth txt, f slty lam,
sme free calcite, Sli-
Mod Eff-Hcl, 20% MRSTN,
lt gry-gy, v sft-sli
frm, mas, mott, 10% LS,
gy-lt gy, mod frm-v frm,
sblky-plty, Hi-V Hi
Eff-Hcl

8300'-400' Fair Flour.
Weak Cut.

Fluorescence and Cut
Possibly Caused By OBM

80% SH, gy-dk gy-lt gy,
blky-plty-sblky, sli
frm-v frm, rthy txt, sme
smth txt, f slty lam,
Sli-Mod Eff-Hcl, 10%
MRSTN, lt gry-gy, v
sft-sli frm, mas, mott,
10% LS, gy-lt gy, mod
frm-frm, sblky-plty,
Hi-V Hi Eff-Hcl

8400-500' Fair Flour.
No Cut

250 500 750 1k 1.25k 1.5k 1.75k

WT IN 10.1
WT OUT 10.1
VIS 53

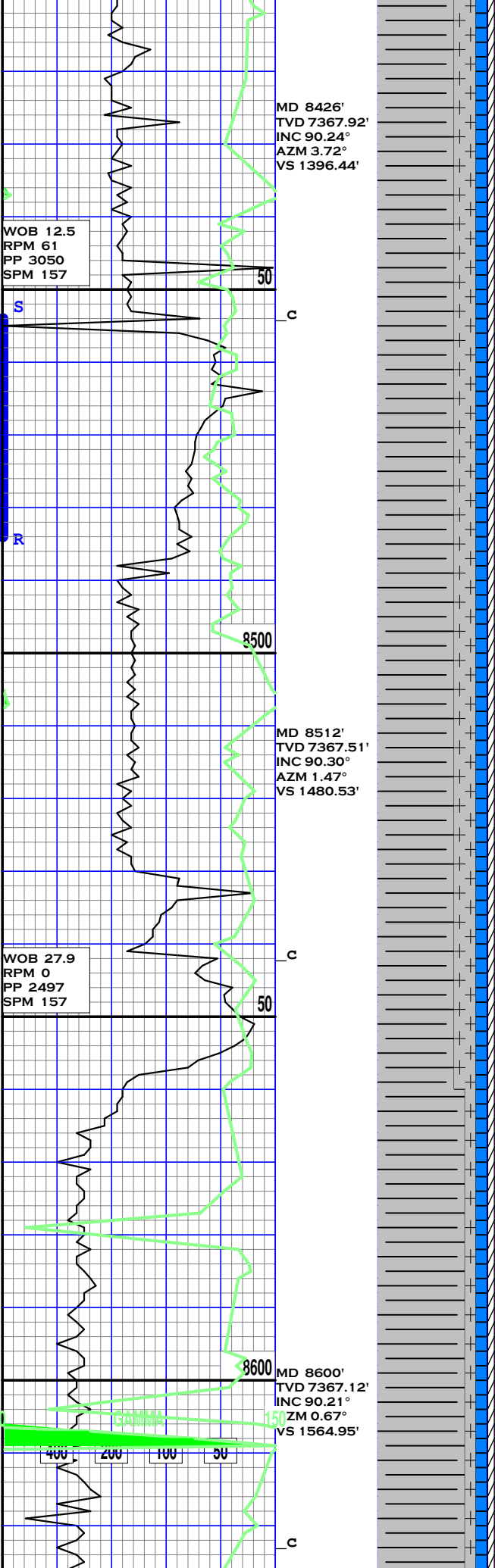
MG 546u

CG 1285u

MG 181u

WT IN 10.1
WT OUT 10.1
VIS 57

CG 440u



MD 8426'
 TVD 7367.92'
 INC 90.24°
 AZM 3.72°
 VS 1396.44'

WOB 12.5
 RPM 61
 PP 3050
 SPM 157

MD 8512'
 TVD 7367.51'
 INC 90.30°
 AZM 1.47°
 VS 1480.53'

WOB 27.9
 RPM 0
 PP 2497
 SPM 157

MD 8600'
 TVD 7367.12'
 INC 90.21°
 AZM 0.67°
 VS 1564.95'

Fluorescence Possibly
 Caused By OBM

70% SH, gy-dk lt gy,
 blk-pty-sblk, sli
 frm-v frm, rthy txt, sme
 smth txt, f slty lam,
 Sli-Mod Eff-Hcl, 20%
 MRSTN, lt gry-gy, v
 sft-sli frm, mas, mott,
 10% LS, gy-lt gy, mod
 frm-frm, sblk-pty,
 Hi-V Hi Eff-Hcl

8500-600' Fair Fluor.
 No Cut

Fluorescence Possibly
 Caused By OBM

70% SH, gy-dk gy-lt gy,
 blk-pty-sblk, sli
 frm-v frm, rthy txt, sme
 smth txt, f slty lam,
 Sli-Mod Eff-Hcl, 20%
 MRSTN, lt gry-gy, v
 sft-sli frm, mas, mott,
 10% LS, gy-lt gy, mod
 frm-frm, sblk-pty,
 Hi-V Hi Eff-Hcl

8600-700' Fair Fluor.
 Weak Cut

Fluorescence & Cut
 Possibly Caused By OBM

WT IN 10.1
 WT OUT 10.1
 OBG 805u/s 56

CG 566u

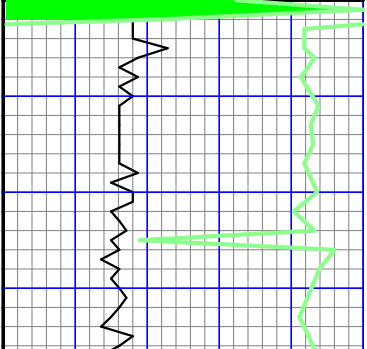
CG 172u

WT IN 10.1
 WT OUT 10.1
 VIS 56

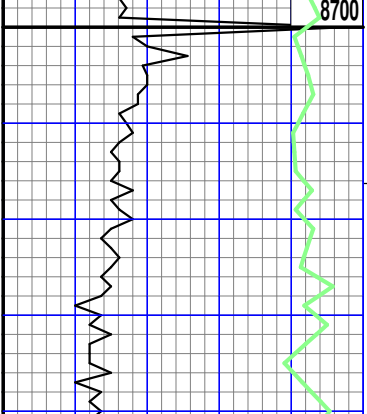
250 500 750 1k 1.25k 1.5k 1.75k

GTT 979u

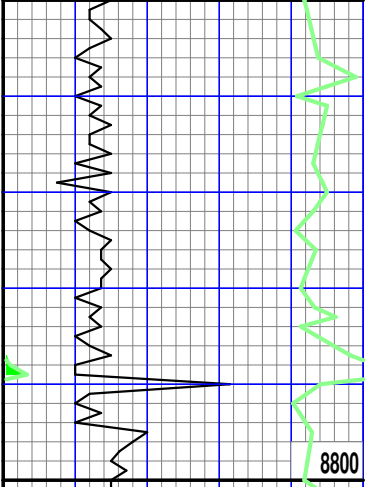
WOB 14.1
RPM 66
PP 3594
SPM 170



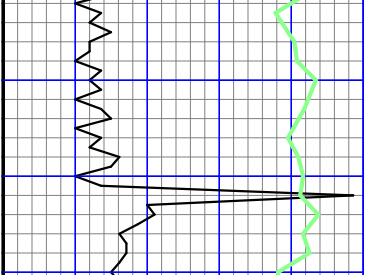
MD 8688'
TVD 7366.87'
INC 90.12°
AZM 359.33°
VS 1647.95'



WOB 19.6
RPM 66
PP 3789
SPM 170



MD 8804'
TVD 7366.38'
INC 90.52°
AZM 357.68°
VS 1731.18'



WOB 21.6
RPM 65
PP 3816
SPM 170

80% SH, gy-dk lt gy,
blky-plty-sblky, sli
frm-v frm, rthy txt, sme
smth txt, f slty lam,
Sli-Mod Eff-Hcl, 10%
MRSTN, lt gry-gy, v
sft-sli frm, mas, mott,
10% LS, gy-lt gy, mod
frm-frm, sblky-plty,
Hi-V Hi Eff-Hcl

Fluoresece Possibly
Caused By OBM

8700-800' Fair Fluor.
No Cut

70% SH, gy-dk lt gy,
blky-plty-sblky, sli
frm-v frm, rthy txt, sme
smth txt, f slty lam,
Sli-Mod Eff-Hcl, 10%
MRSTN, lt gry-gy, v
sft-sli frm, mas, mott,
20% LS, gy-lt gy, mod
frm-frm, sblky-plty,
Hi-V Hi Eff-Hcl

Fluoresece Possibly
Caused By OBM

8800-900' Fair Fluor.
NO Cut

70% SH, gy-dk lt gy,
blky-plty-sblky, sli
frm-v frm, rthy txt, sme
smth txt, f slty lam,
Sli-Mod Eff-Hcl, 10%
MRSTN, lt gry-gy, v
sft-sli frm, mas, mott,
20% LS, gy-lt gy, mod
frm-frm, sblky-plty,
Hi-V Hi Eff-Hcl

WT IN 10.1
WT OUT 10.1
VIS 56

Note: Gas Scale Change

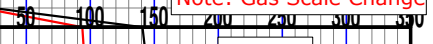
CG 179u

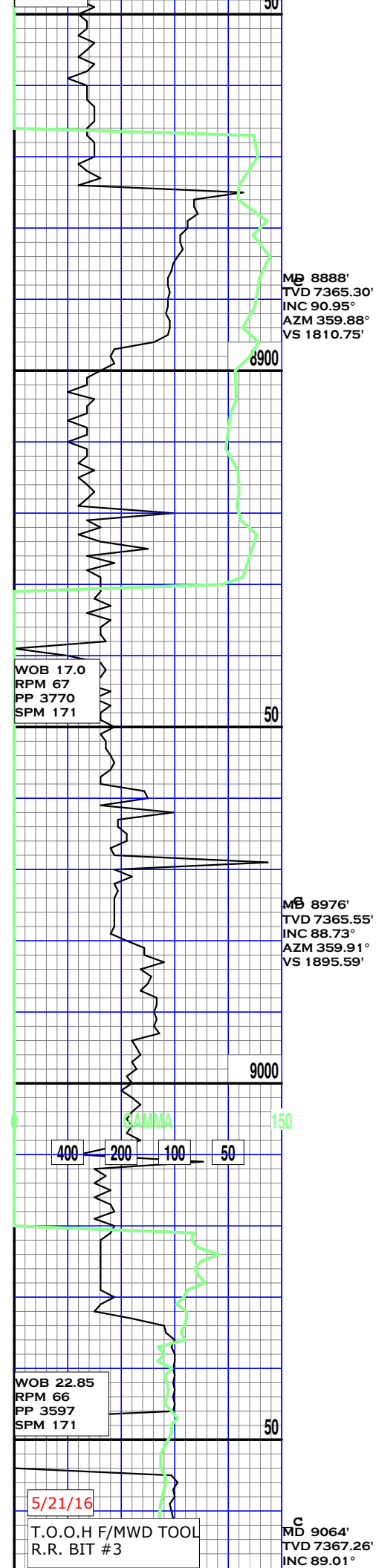
WT IN 10.1
WT OUT 10.1
VIS 56

CG 186u

OBG 202u

WT IN 10.2
WT OUT 10.2
VIS 58





Fluorescence Possibly Caused By OBM

8900-900' Fair Flour. Weak Cut

70% SH, gy-dk lt gy, blk-pty-sbkly, sli frm-v frm, rthy txt, sme smth txt, f slty lam, Sli-Mod Eff-Hcl, 10% MRSTN, lt gry-gy, v sft-sli frm, mas, mott, 20% LS, gy-lt gy, mod frm-frm, sbkly-pty, Hi-V Hi Eff-Hcl

CG 148u

WT IN 10.2
WT OUT 10.2
VIS 58

Fluorescence & Cut Possibly Caused By OBM

9000'-100' Fair Flour. Weak Cut.

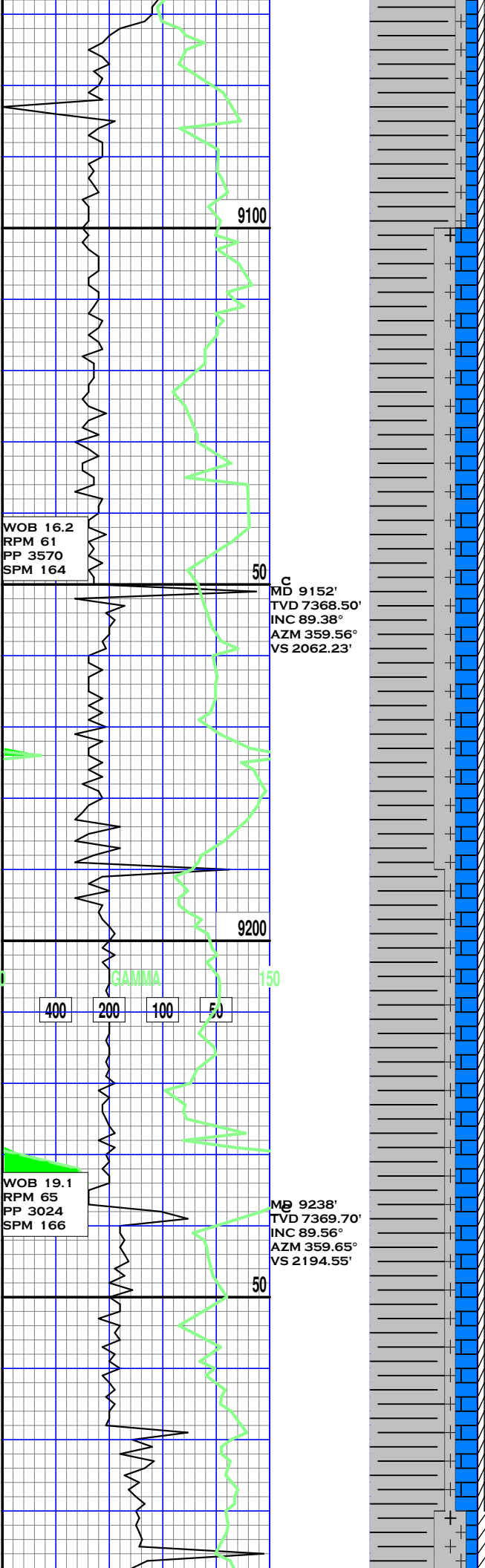
80% SH, gy-dk lt gy, blk-pty-sbkly, sli frm-v frm, rthy txt, sme smth txt, f slty lam, Sli-Mod Eff-Hcl, 10% MRSTN, lt gry-gy, v sft-sli frm, mas, mott, 10% LS, gy-lt gy, mod frm-frm, sbkly-pty, Hi-V Hi Eff-Hcl

CG 188u

WT IN 10.1
WT OUT 10.1
VIS 56

Note Gas Scale Change 0-1750u

Fluorescence & Cut Possibly Caused By OBM



9100'-9190' Fair Flour.
Weak Cut.

80% SH, gy-dk lt gy,
blky-plty-sblky, sli
frm-v frm, rthy txt, sme
smth txt, f slty lam,
Sli-Mod Eff-Hcl, 10%
MRSTN, lt gry-gy, v
sft-sli frm, mas, mott,
10% LS, gy-lt gy, mod
frm-frm, sblky-plty,
Hi-V Hi Eff-Hcl

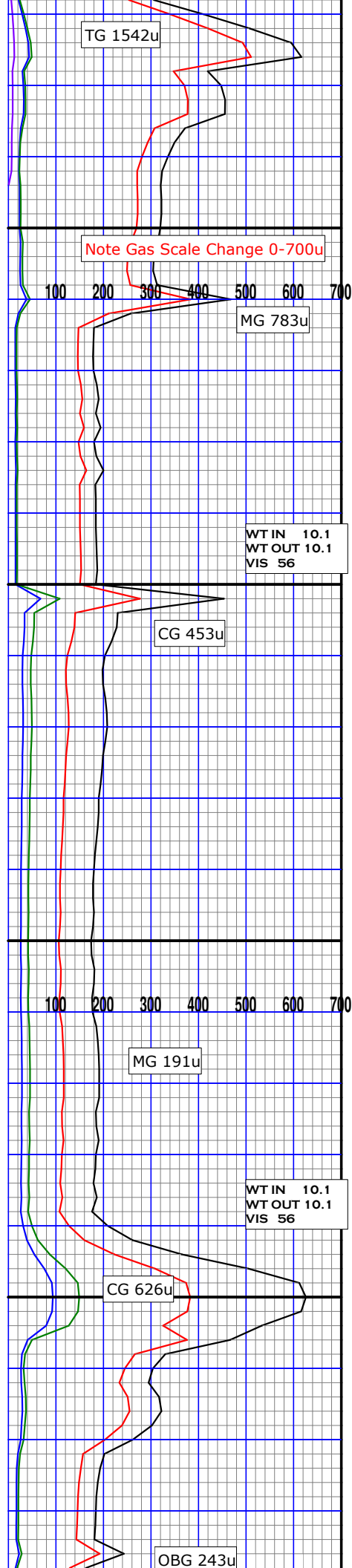
Fluoresecence & Cut
Possibly Caused By OBM

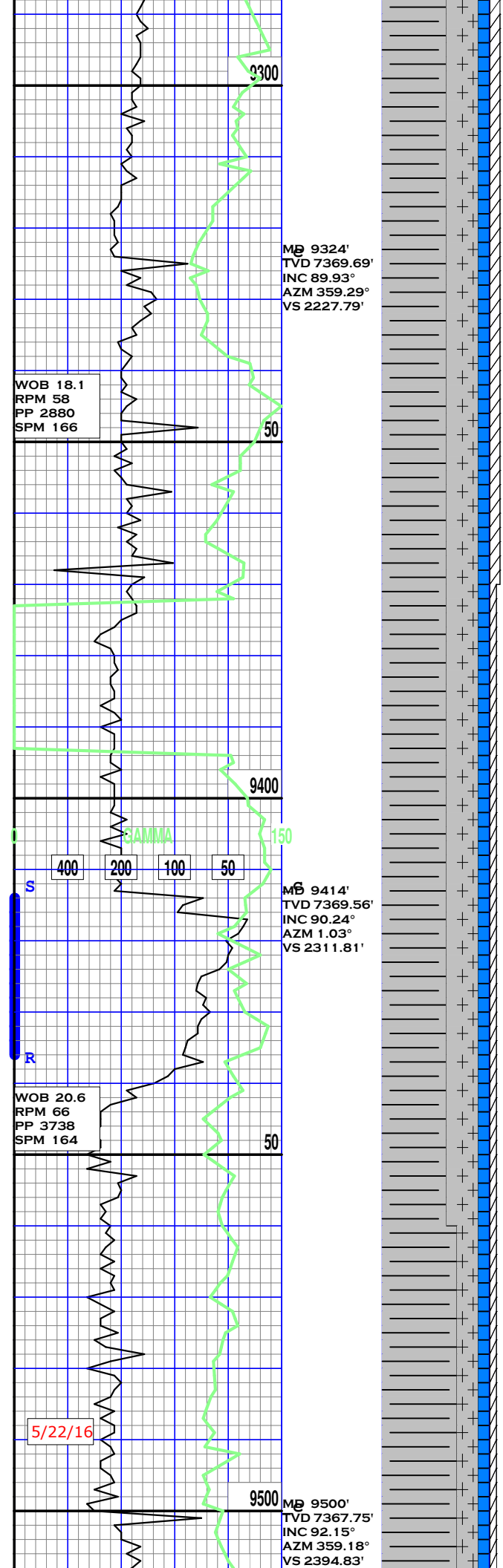
9190'-9280' Fair Flour.
No Cut.

60% SH, gy-dk lt gy,
blky-plty-sblky, sli
frm-frm, rthy txt, sme
smth txt, f slty lam,
Sli-Mod Eff-Hcl, 20%
MRSTN, lt gry-gy, v
sft-sli frm, mas, mott,
20% LS, gy-lt gy, mod
frm-frm, sblky-plty,
Hi-V Hi Eff-Hcl

Fluoresecence & Cut
Possibly Caused By OBM

70% SH, gy-dk lt gy,
blky-plty-sblky, sli
frm-frm, rthy txt, sme
smth txt, f slty lam, tr
free calcite Sli-Mod





Eff-Hcl, 10% MRSTN, lt gry-gy, v sft-sli frm, mas, mott, 20% LS, gy-lt gy, mod frm-frm, sblky-plty, Hi-V Hi Eff-Hcl, tr free pyr

9280'-9370' Fair Flour. Fair Cut.

Fluoresecence & Cut Possibly Caused By OBM

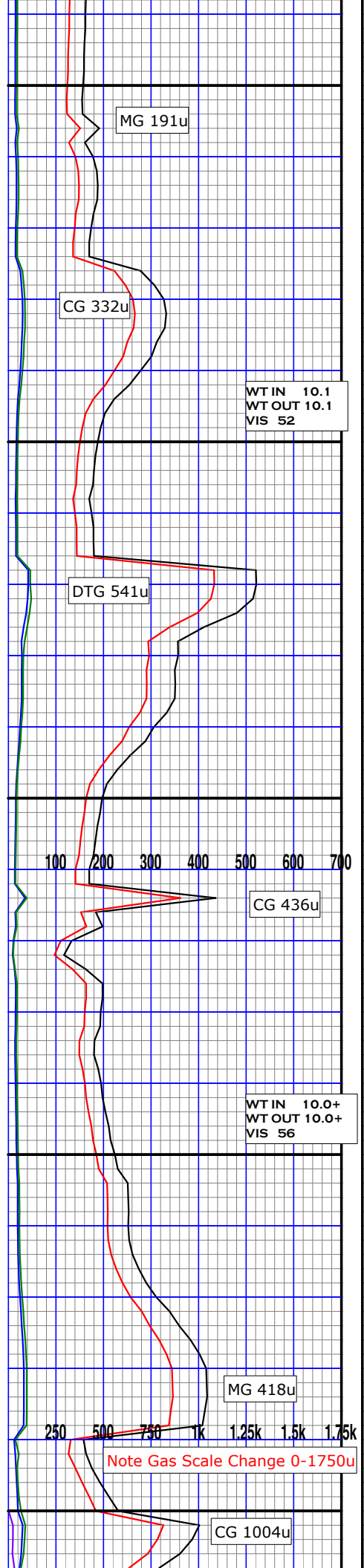
60%SH,gy-lt gy-dk gy blkly-plty-sme sblky, mod frm-v frm, rthy txt, sme smth txt, com fn slty lam, sme silc, tr free calcite, occ embd calcite, Mod-Str Eff Hcl, 30% MRSTN, lt gy-gy, vsft-sli frm, mas mott, 10% LS, plty-sblky, mod frm-frm, rthy txt, arg, Hi-V Hi Eff-Hcl

9370'-9500' Fair Flour. Weak Cut.

Fluoresecence & Cut Possibly Caused By OBM

60% SH, gy-lt gy-dk gy, blkly-plty-sme sblky, mod frm-v frm, rthy txt, sme smth txt, com fn slty lam, sme silc, tr free calcite, Mod-Str Eff Hcl, 30% MRSTN, lt gy-gy, vsft-sli frm, mas mott, 20% LS, plty-sblky, mod frm-frm, rthy txt, arg, Hi-V Hi Eff-Hcl

9500'-550' Fair Flour. Weak Cut.



WOB 22.3
RPM 66
PP 3590
SPM 165

50

Mainlog Shutdown
Depth Correction 10'

MB 9588'
TVD 7363.75'
INC 93.11°
AZM 359.90°
VS 2477.53'

9600

400 200 400 50

WOB 18.3
RPM 63
PP 3610
SPM 166

50

MB 9676'
TVD 7358.50'
INC 93.73°
AZM 359.88°
VS 2561.28'

9700

Fluorescence & Cut
Possibly Caused By OBM

70%SH,gy-lt gy-dk gy
blky-pty, sli frm-sli
hrd, rthy txt, com fn
sly lam, sme silc, tr
free calcite, Mod-Str
Eff Hcl, 20% MRSTN, lt
gy-gy, sft-mod frm, mas
mott, 10% LS, pty-
sblky, mod frm-frm, rthy
txt, arg, Hi-V Hi Eff-
Hcl

9550'-9640 P-Fair Flour.
No Cut.

Fluorescence & Cut
Possibly Caused By OBM

80% SH, gy-lt gy-dk gy,
blky-pty, sli frm-sli
hrd, rthy txt, com fn
sly lam, sme silc, tr
free calcite, Mod-Str
Eff Hcl, 20% MRSTN, lt
gy-gy, sft-mod frm, mas
mott, tr LS

9640'-9700' Fair Flour.
Fair Cut.

Fluorescence & Cut
Possibly Caused By OBM

9700'-800' Fair Flour.
Fair Cut.

WT IN 10.1
WT OUT 10.1
VIS 54

MG 990u

CG 811u

250 500 750 1k 1.25k 1.5k 1.75k

WT IN 10.1
WT OUT 10.1
VIS 53

MG 1017u

CG 1068u

MG 610u

WOB 17.7
RPM 65
PP 3584
SPM 167

50

MD 9762'
TVD 7353.69'
INC 92.61°
AZM 359.62°
VS 2644.03'

WOB 10.3
RPM 65
PP 3536
SPM 167

50

MD 9852'
TVD 7349.25'
INC 93.11°
AZM 359.85°
VS 2728.70'

WOB 17.6
RPM 65
PP 3692
SPM 164

9900

MD 9938'
TVD 7345.79'
INC 91.50°
AZM 359.13°
VS 2810.44'

80% SH, gy-lt gy-dk gy, blk-pty, sli frm-sli hrd, rthy txt, com fn slty lam, sme silc, tr free calcite, Mod-Str Eff Hcl, 10% MRSTN, lt gy-gy, sft-mod frm, mas mott, 10% LS, pty-sblk, mod frm-frm, rthy txt, arg, Hi-V Hi Eff-Hcl

70% SH, gy-lt gy-dk gy, blk-pty, sli frm-sli hrd, rthy txt, com fn slty lam, sme silc, tr free calcite, tr embd calcite, Mod-Str Eff Hcl, 30% MRSTN, lt gy-gy, sft-mod frm, mas mott, tr LS, pty-sblk, mod frm-frm, tr BENT

70% SH, gy-lt gy-dk gy, blk-pty, sli frm-sli hrd, rthy txt, com fn slty lam, sme silc, tr free calcite, Mod-Str Eff Hcl, 20% MRSTN, lt gy-gy, sft-mod frm, mas mott, 10% LS, pty-sblk, mod frm-frm, rthy txt, arg, Hi-V Hi Eff-Hcl, tr BENT

Fluorescence & Cut
Possibly Caused By OBM

9800'-900' Fair Flour.
Fair Cut.

9900-10000' Fair Flour.
Fair Cut

Fluorescence & Cut
Possibly Caused By OBM

MG 599u

MG 599u

WT IN 10.1
WT OUT 10.1
VIS 54

CG 718u

MG 564u

WT IN 10.1
WT OUT 10.1
VIS 53

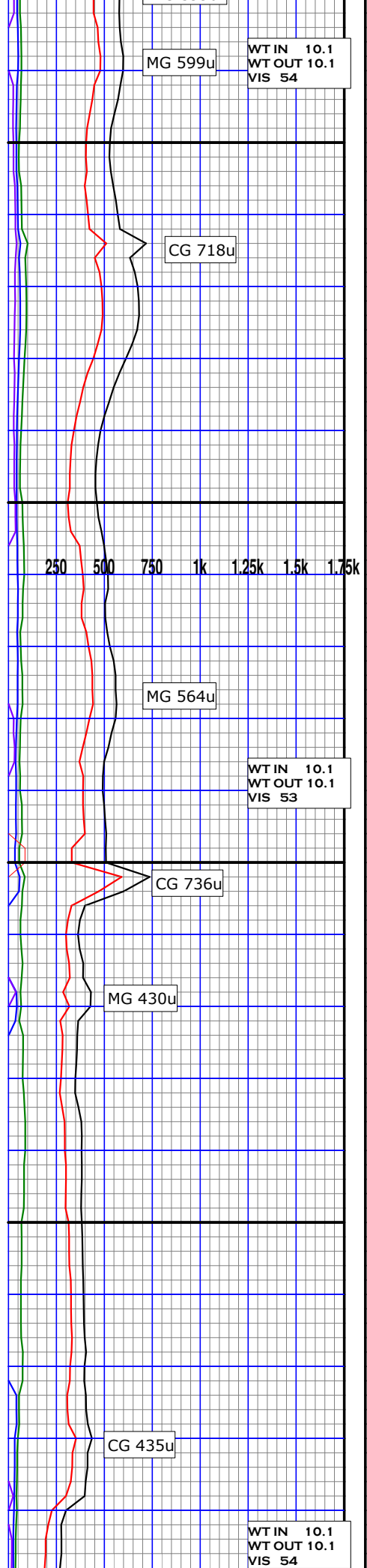
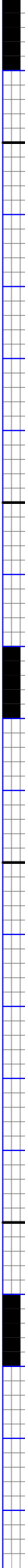
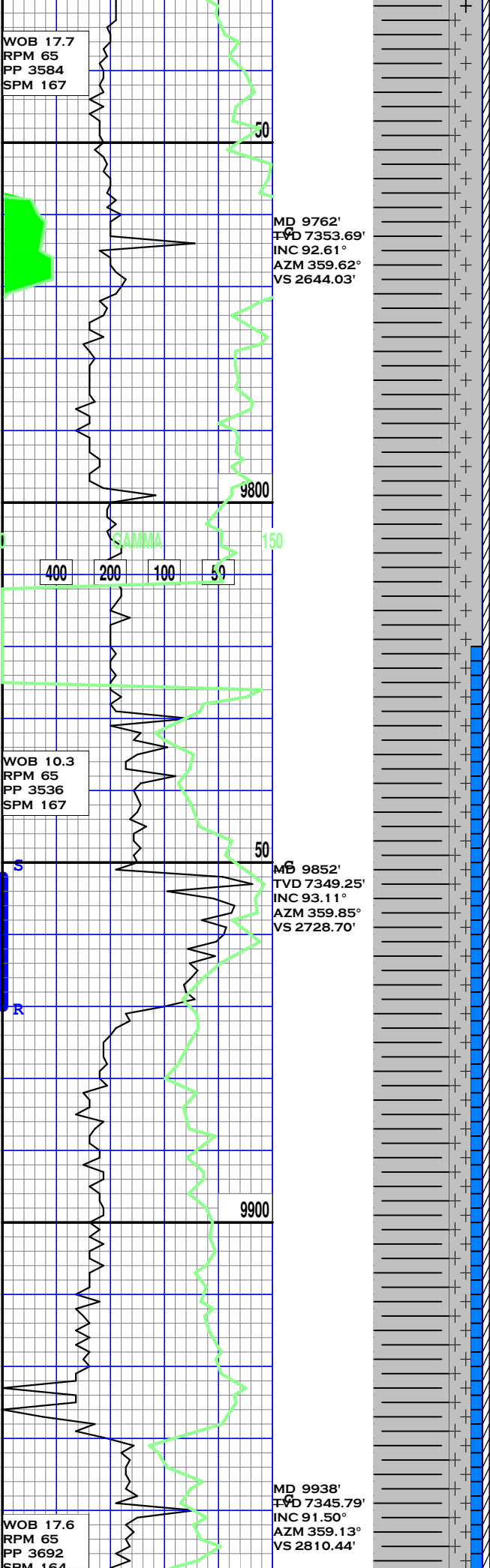
CG 736u

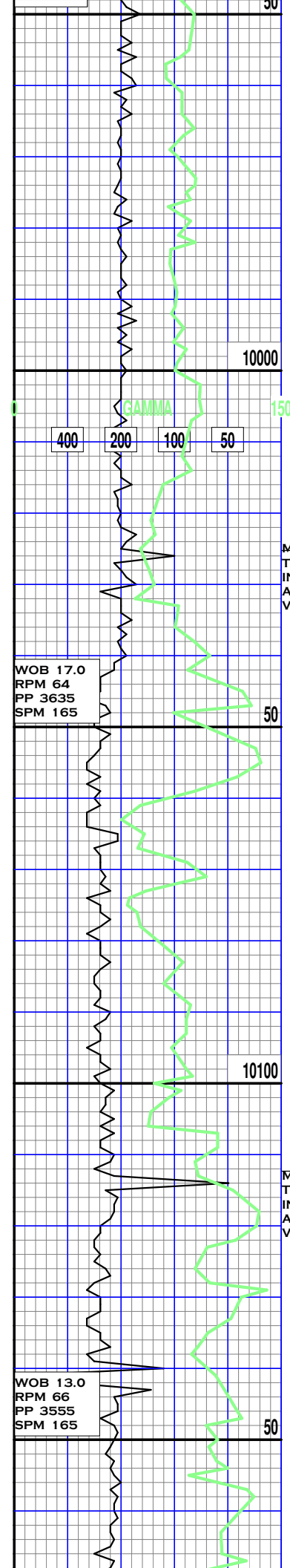
MG 430u

CG 435u

WT IN 10.1
WT OUT 10.1
VIS 54

250 500 750 1k 1.25k 1.5k 1.75k





M 10026'
 TVD 7343.08'
 INC 92.03°
 AZM 359.52°
 VS 2894.04'

WOB 17.0
 RPM 64
 PP 3635
 SPM 165

C 10114'
 TVD 7339.31'
 INC 92.89°
 AZM 359.32°
 VS 2977.64'

WOB 13.0
 RPM 66
 PP 3555
 SPM 165

Fluorescence & Cut
 Possibly Caused By OBM

70% SH, gy-lt gy-dk
 gy, blk-pty, sli frm-
 sli hrd, rthy txt, com
 fn slty lam, sme silc,
 tr free calcite, Mod-Str
 Eff Hcl, 20% MRSTN, lt
 gy-gy, sft-mod frm, mas
 mott, 10% LS, plty-
 sblk, mod frm-frm, rthy
 txt, arg, Hi-V Hi Eff-
 Hcl, tr BENT

10000-100' Fair Fluor.
 Fair Cut

CG 642u

WT IN 10.1
 WT OUT 10.1
 VIS 54

Fluorescence & Cut
 Possibly Caused By OBM

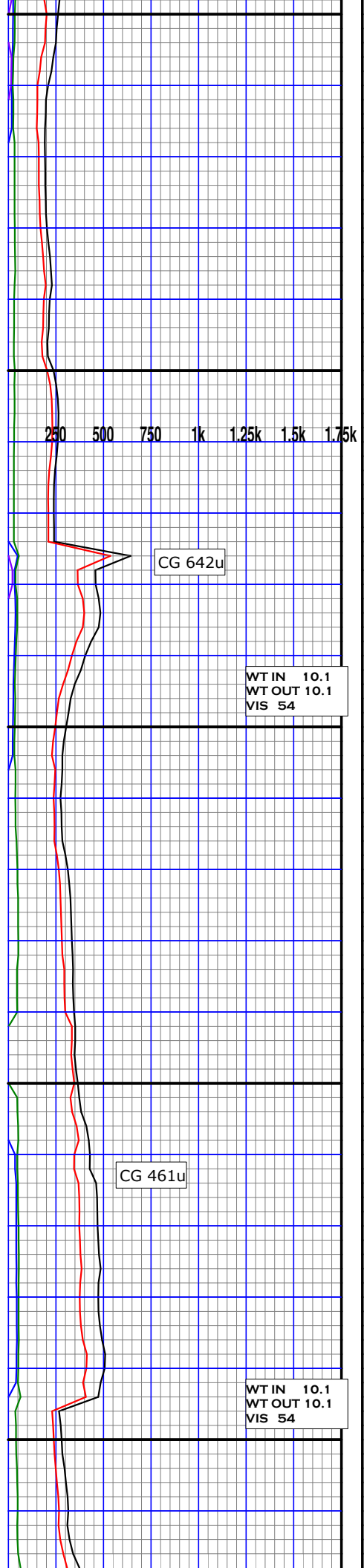
70% SH, gy-lt gy-dk
 gy, blk-pty, sli frm-
 sli hrd, rthy txt, com
 fn slty lam, sme silc,
 tr free calcite, Mod-Str
 Eff Hcl, 20% MRSTN, lt
 gy-gy, sft-mod frm, mas
 mott, 10% LS, plty-
 sblk, mod frm-frm, rthy
 txt, arg, Hi-V Hi Eff-
 Hcl, tr BENT

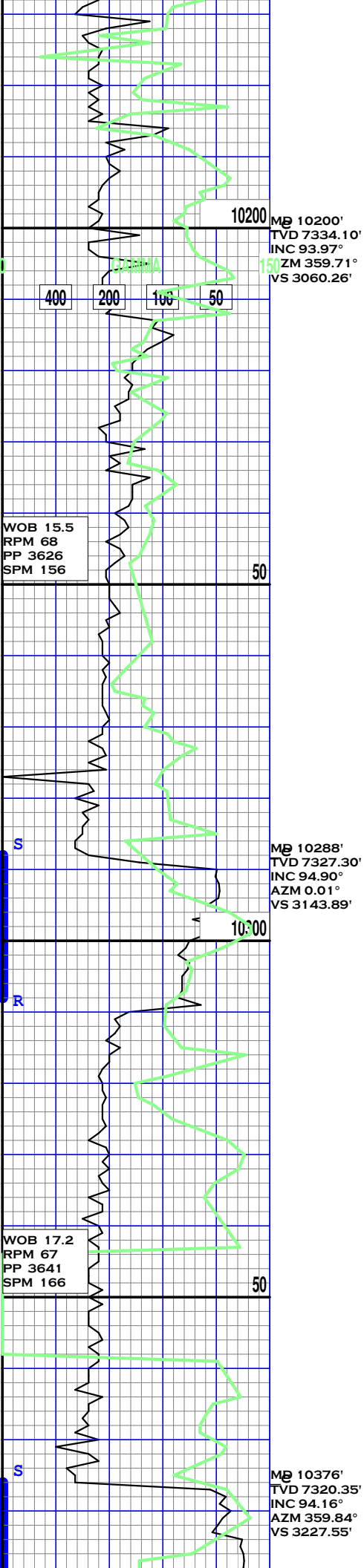
10100-200' Fair Fluor.
 Weak Cut

CG 461u

WT IN 10.1
 WT OUT 10.1
 VIS 54

Fluorescence & Cut
 Possibly Caused By OBM





80% SH, gy-lt gy-dk
 gy, blk-pty, sli frm-
 sli hrd, rthy txt, com
 fn slty lam, sme silc,
 tr free calcite, Mod-Str
 Eff Hcl, 10% MRSTN, lt
 gy-gy, sft-mod frm, mas
 mott, 10% LS, pty-
 sblky, mod frm-frm, rthy
 txt, arg, Hi-V Hi Eff-
 Hcl, tr BENT

10200-300' Fair Fluor.
 Weak Cut

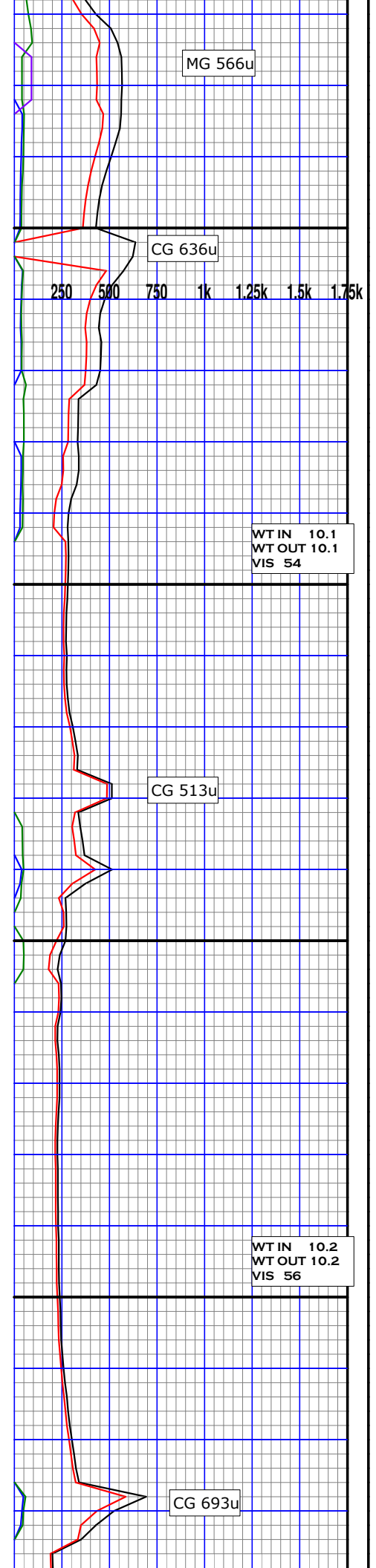
Fluorescence & Cut
 Possibly Caused By OBM

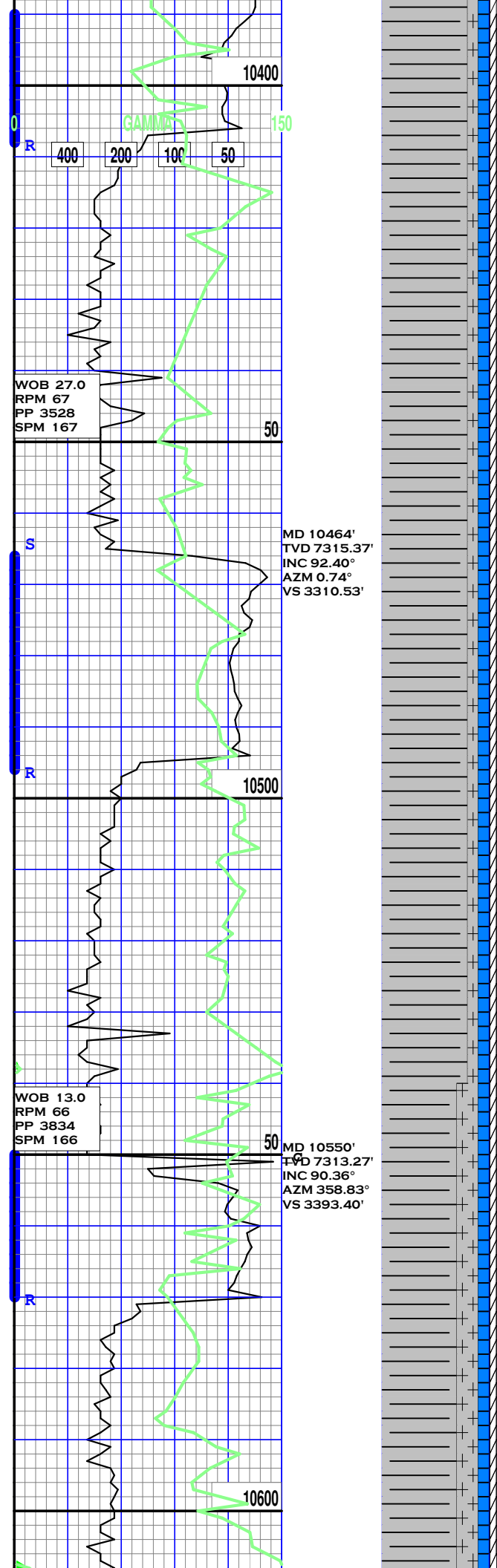
80% SH, gy-lt gy-dk
 gy, blk-pty, sli frm-
 sli hrd, rthy txt, com
 fn slty lam, sme silc,
 tr free calcite, Mod-Str
 Eff Hcl, 10% MRSTN, lt
 gy-gy, sft-mod frm, mas
 mott, 10% LS, pty-
 sblky, mod frm-frm, rthy
 txt, arg, Hi-V Hi Eff-
 Hcl, tr BENT

10300-400' Fair Fluor.
 Weak cut

Fluorescence & Cut
 Possibly Caused By OBM

80% SH, gy-lt gy-dk
 gy, blk-pty, sli frm-
 sli hrd, rthy txt, com
 fn slty lam, sme silc,
 free calcite, Mod-Str
 Eff Hcl, 10% MRSTN, lt
 gy-gy, sft-mod frm, mas
 mott, 10% LS, pty-
 sblky, mod frm-frm, rthy
 txt, arg, Hi-V Hi Eff-
 Hcl, tr BENT





10400-500' Fair Fluor.
Weak Cut

Fluoresecence & Cut
Possibly Caused By OBM

250 500 750 1k 1.25k 1.5k 1.75k

WT IN 10.2
WT OUT 10.2
VIS 56

80% SH, gy-lt gy-dk
gy, blk-pty, sli frm-
sli hrd, rthy txt, com
fn slty lam, sme silc,
free calcite, Mod-Str
Eff Hcl, 10% MRSTN, lt
gy-gy, sft-mod frm, mas
mott, 10% LS, pty-
sblk, mod frm-frm, rthy
txt, arg, Hi-V Hi Eff-
Hcl, tr BENT

CG 408u

Fluoresecence Possibly
Caused By OBM

10500-600' Fair Fluor.
No Cut

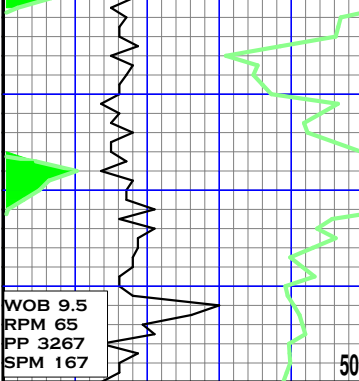
80% SH, gy-lt gy-dk
gy, blk-pty, sli frm-
sli hrd, rthy txt, com
fn slty lam, sme silc, tr
free calcite, Mod-Str
Eff Hcl, 10% MRSTN, lt
gy-gy, sft-mod frm, mas
mott, 10% LS, pty-
sblk, mod frm-frm, rthy
txt, arg, Hi-V Hi Eff-
Hcl, tr BENT

CG 333u

WT IN 10.2
WT OUT 10.2
VIS 56

Fluoresecence Possibly
Caused By OBM

10600-700' Fair Fluor.
No Cut

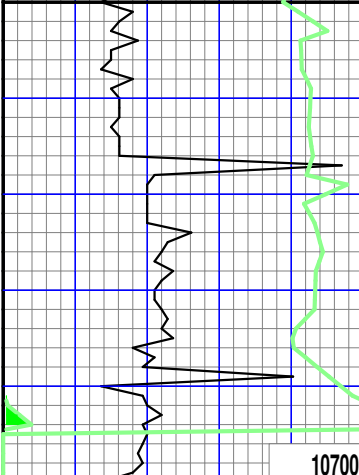


MD 10638'
TVD 7312.93'
INC 90.09°
AZM 358.86°
VS 3475.85'

70% SH, gy-lt gy-dk
gy, blk-pty, sli frm-
sli hrd, rthy txt, com
fn slty lam, sme silc, tr
free calcite, Mod-Str
Eff Hcl, 20% MRSTN, lt
gy-gy, sft-mod frm, mas
mott, 10% LS, plty-
sblky, mod frm-frm, rthy
txt, arg, Hi-V Hi Eff-
Hcl, tr BENT

CG 190u

WT IN 10.1
WT OUT 10.1
VIS 54

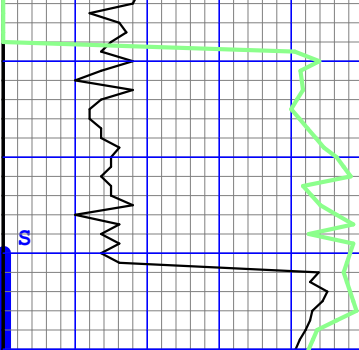


10700

Fluoresecence Possibly
Caused By OBM

OBG 216u

10700-800' Fair Fluor.
No Cut



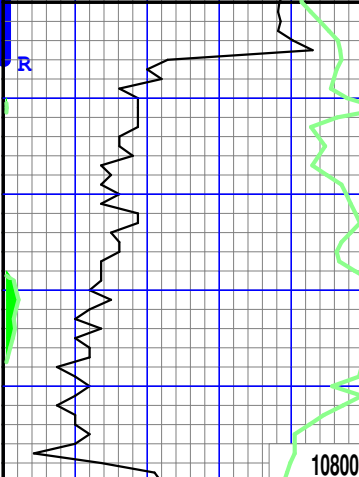
WOB 19.3
RPM 28
PP 2996
SPM 161

MD 10726'
TVD 7312.25'
INC 90.80°
AZM 358.95°
VS 3559.27'

70% SH, gy-lt gy-dk
gy, blk-pty, sli frm-
sli hrd, rthy txt, com
fn slty lam, sme silc, tr
free calcite, Mod-Str
Eff Hcl, 20% MRSTN, lt
gy-gy, sft-mod frm, mas
mott, 10% LS, plty-
sblky, mod frm-frm, rthy
txt, arg, Hi-V Hi Eff-
Hcl, tr BENT

CG 285u

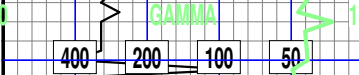
WT IN 10.2
WT OUT 10.2
VIS 55



10800

Fluoresecence Possibly
Caused By OBM

Gas Calibration

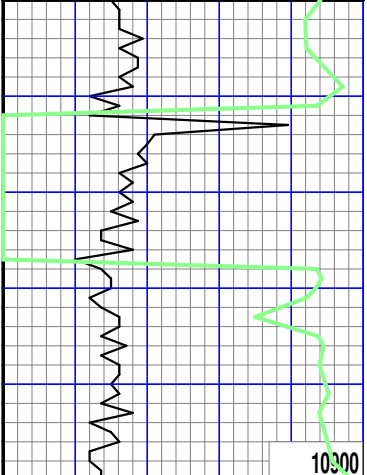


MD 10814'
TVD 7312.77'
INC 88.52°
AZM 359.58°
VS 3642.86'

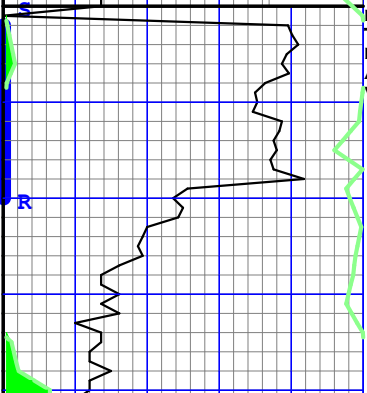
90% SH, gy-lt gy-dk
gy, blk-pty, sli frm-
sli hrd, rthy txt, com
fn slty lam, sme silc, tr
free calcite, Mod-Str
Eff Hcl, 10% LS, plty-
sblky, mod frm-frm, rthy
txt, arg, Hi-V Hi Eff-
Hcl, tr BENT

250 500 750 1k 1.25k 1.5k 1.75k
CG 1280u

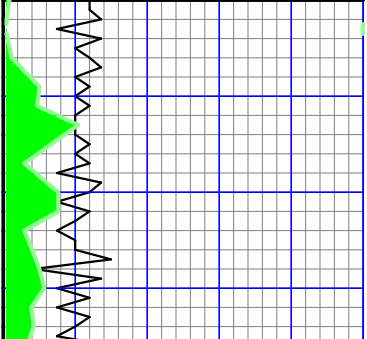
WOB 21.2
RPM 66
PP 3546
SPM 160



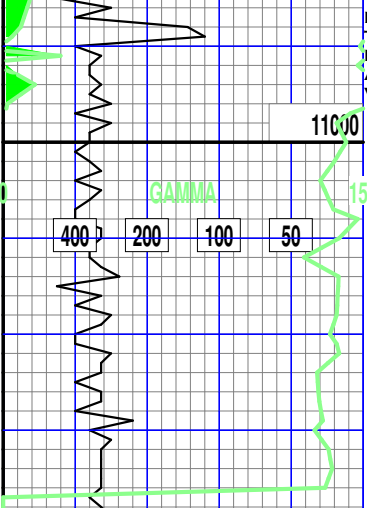
MD 10902'
TVD 7314.88'
INC 88.73°
AZM 359.08°
VS 3726.47'



WOB 19.3
RPM 66
PP 3569
SPM 160



MD 10988'
TVD 7317.97'
INC 87.25°
AZM 0.10°
VS 3810.18'



WOB 12.6
RPM 66
PP 3580
SPM 160

Fluorescence Possibly
Caused By OBM

WT IN 10.2
WT OUT 10.2
VIS 55

OBG 440u

MG 437u

CG 685u

90% SH, gy-lt gy-dk
gy, blk-pty, sli frm-
sli hrd, rthy txt, com
fn slty lam, sme silc, tr
free calcite, Mod-Str
Eff Hcl, 10% LS, plty-
sblky, mod frm-frm, rthy
txt, arg, Hi-V Hi Eff-
Hcl, tr BENT

10900-11000' Fair Flour.
No Cut.

Fluorescence Possibly
Caused By OBM

WT IN 10.2
WT OUT 10.2
VIS 55

CG 995u

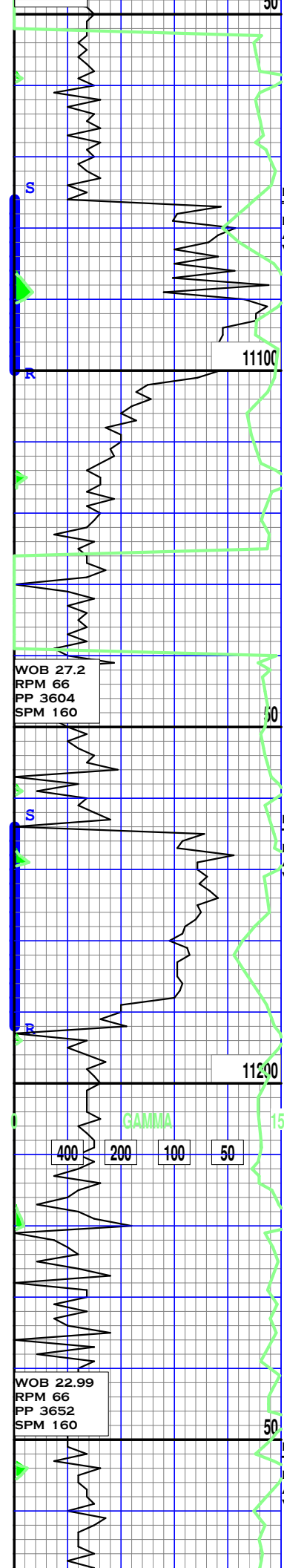
100% SH, gy-lt gy-dk
gy, blk-pty, sli frm-
sli hrd, rthy txt, com
fn slty lam, sme silc,
tr free calcite, Mod-Str
Eff Hcl, tr LS, plty,
mod frm-frm, rthy txt,
Hi-V Hi Eff-Hcl, tr
MRSTN, lt gy-gy, sft,
mas, mott, tr BENT

10990-11080' Fair Flour
No cut.

Fluorescence Possibly
Caused By OBM

WT IN 10.1+
WT OUT 10.1
VIS 52

250 500 750 1k 1.25k 1.5k 1.75k



MP 11076'
 TVD 7321.73'
 INC 87.80°
 AZM 358.79°
 VS 3892.84'

MP 11164'
 TVD 7325.36'
 INC 87.47°
 AZM 358.49°
 VS 3976.07'

MP 11252'
 TVD 7329.93'
 INC 86.51°
 AZM 359.44°
 VS 4058.49'

90% SH, gy-lt gy-dk gy,
 blk-pty, sli frm-
 sli hrd, rthy txt, com
 fn slty lam, sme silc,
 tr free calcite, Mod-Str
 Eff Hcl, 10% LS, plty,
 mod frm-frm, rthy txt,
 Hi-V Hi Eff-Hcl, tr BENT

11080-200' Fair Flour.
 Weak Cut.

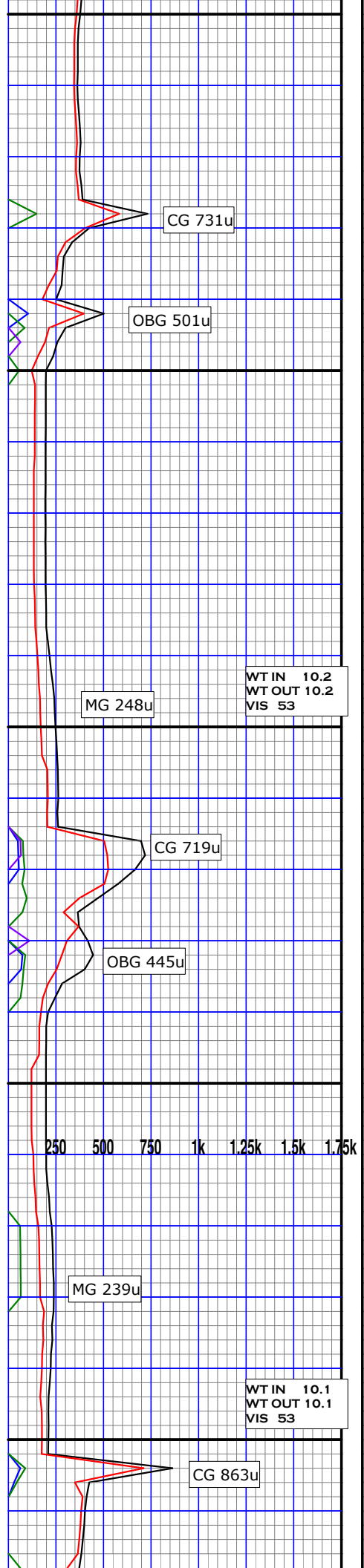
Fluorescence Possibly
 Caused By OBM

80%SH,gy-lt gy-dk gy
 blk-pty, sli frm-sli
 hrd, rthy txt, sme smth
 txt com fn slty lam, sme
 silc, tr free calcite,
 Mod-Str Eff Hcl, 10% LS,
 plty, sli frm-frm, rthy
 txt, Hi-V Hi Eff-Hcl,
 10% MRSTN, lt gy-gy,
 sft, mas, mott, tr BENT

11200'-350' Fair Flour.
 Weak Cut.

Fluorescence Possibly
 Caused By OBM

80% SH, gy-lt gy-dk gy,
 blk-pty, sli frm-sli
 hrd, rthy txt, sme smth
 txt com fn slty lam, sme
 silc, tr free calcite,



CG 731u

OBG 501u

WT IN 10.2
WT OUT 10.2
VIS 53

MG 248u

CG 719u

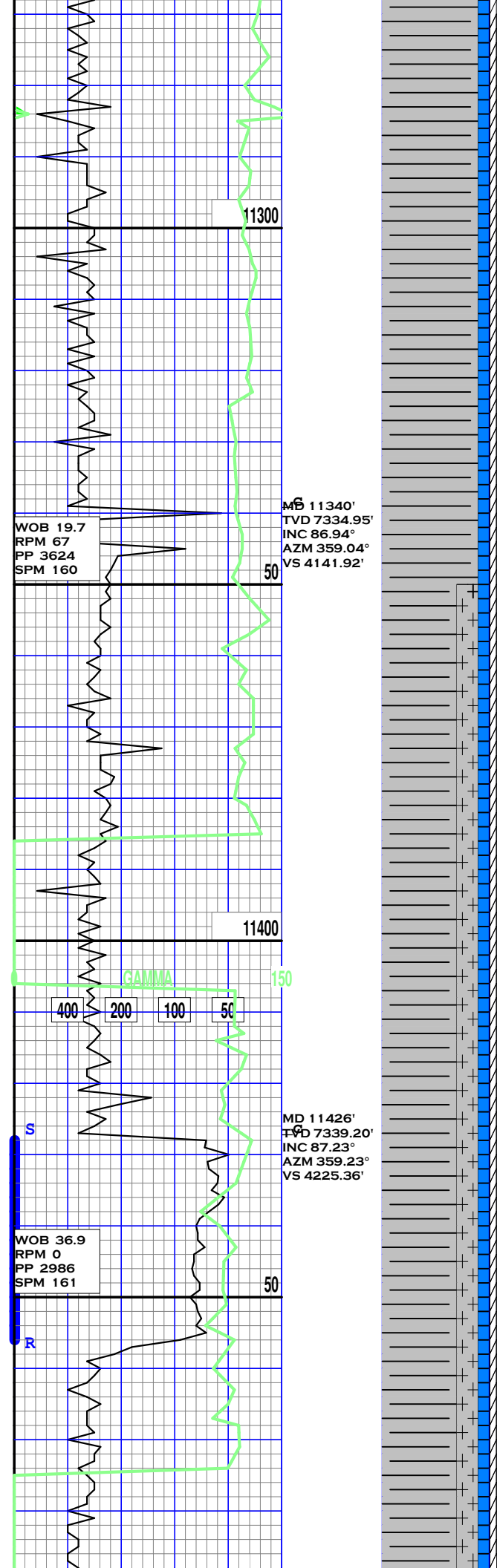
OBG 445u

250 500 750 1k 1.25k 1.5k 1.75k

MG 239u

WT IN 10.1
WT OUT 10.1
VIS 53

CG 863u



Mod-Str Eff Hcl, 10% LS,
 plty, sli frm-frm, rthy
 txt, Hi-V Hi Eff-Hcl,
 10% MRSTN, lt gy-gy,
 sft, mas, mott, tr BENT

Fluoresecence Possibly
 Caused By OBM

90% SH, gy-lt gy-dk gy
 blk-pty, sli frm-sli
 hrd, rthy txt, sme smth
 txt com fn slty lam, sme
 silc, tr free calcite,
 Mod-Str Eff Hcl, 10% LS,
 plty, sli frm-frm, rthy
 txt, Hi-V Hi Eff-Hcl

11350'-500' Fair Flour.
 No Cut.

Fluoresecence Possibly
 Caused By OBM

70% SH, gy-dk gy-sme lt
 gy, blk-pty-sblk,
 frm-sli hrd, rthy txt,
 com fn slty lam, sme
 silc, tr free calcite,
 occ embd calcite Mod-Str
 Eff Hcl, 10% LS, plty,
 sli frm-frm, rthy txt,
 Hi-V Hi Eff-Hcl, 20%
 MRSTN, lt gy-gy, sft,
 mas, mott

11300

MB 11340'
 TVD 7334.95'
 INC 86.94°
 AZM 359.04°
 VS 4141.92'

WOB 19.7
 RPM 67
 PP 3624
 SPM 160

50

11400

GAMMA 150
 400 200 100 50

MD 11426'
 TVD 7339.20'
 INC 87.23°
 AZM 359.23°
 VS 4225.36'

WOB 36.9
 RPM 0
 PP 2986
 SPM 161

50

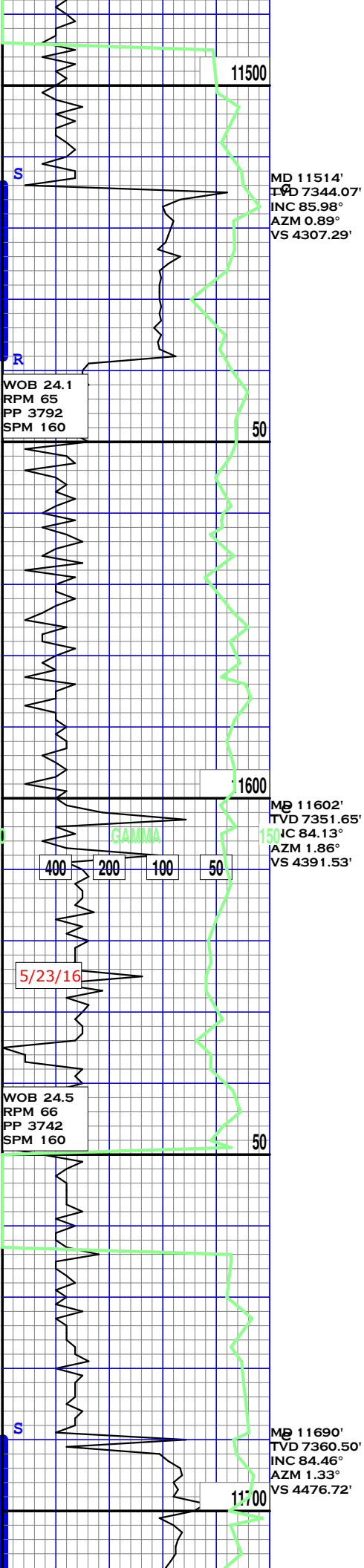
CG 711u

WT IN 10.1
 WT OUT 10.1
 VIS 52

CG 608u

WT IN 10.1
 WT OUT 10.1
 VIS 53

250 500 750 1k 1.25k 1.5k 1.75k



Fluorescence Possibly Caused By OBM

11500'-620' Fair Flour.
No Cut.

70% SH, gy-dk gy-sme
lt gy, blk-pty-sblk,
frm-sli hrd, rthy txt,
com fn slty lam, sme
silc, tr free calcite,
occ embd calcite Mod-Str
Eff Hcl, 10% LS, pty,
sli frm-frm, rthy txt,
Hi-V Hi Eff-Hcl, 20%
MRSTN, lt gy-gy, sft,
mas, mott

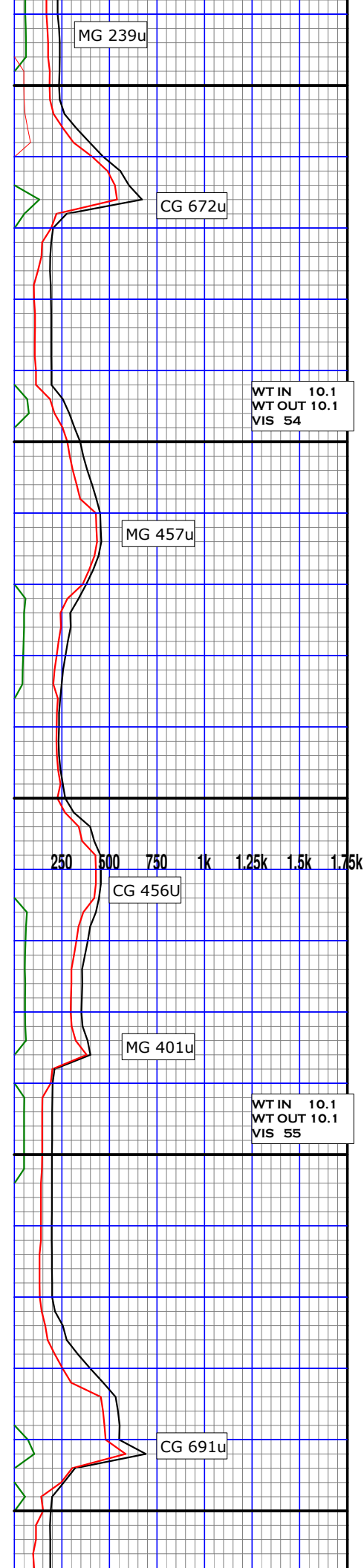
Fluorescence Possibly Caused By OBM

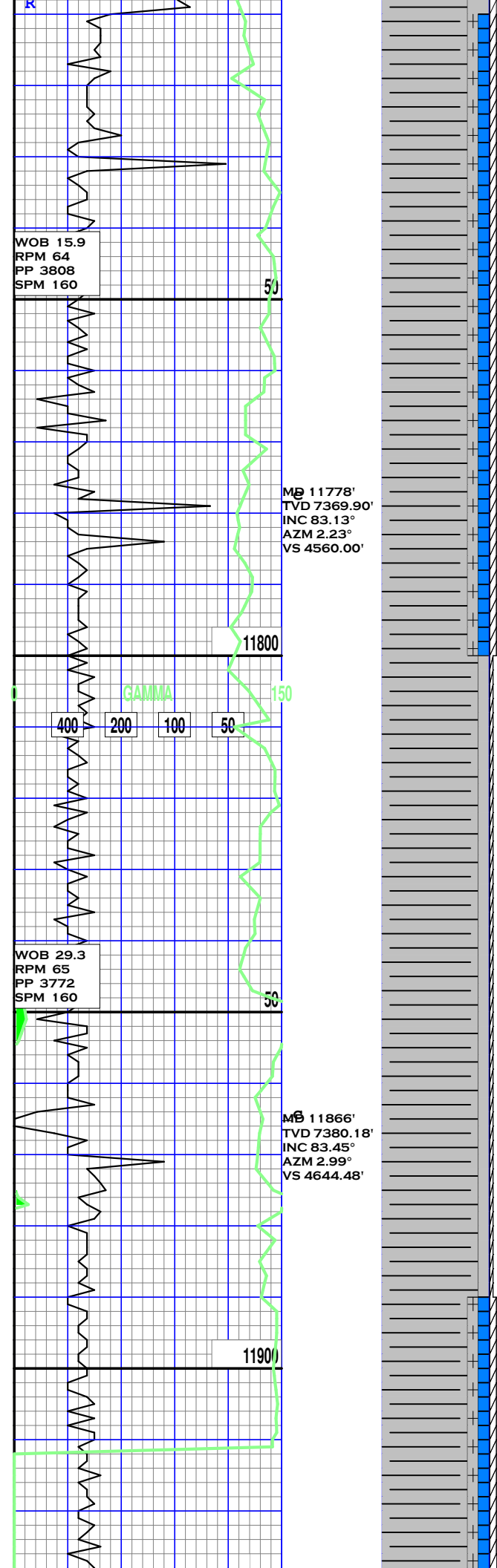
80% SH, gy-dk gy-sme lt
gy, blk-pty-sblk,
frm-sli hrd, rthy txt,
com fn slty lam, sme
silc, tr free calcite,
occ embd calcite Mod-Str
Eff Hcl, 10% LS, pty,
sli frm-frm, rthy txt,
Hi-V Hi Eff-Hcl, 10%
MRSTN, lt gy-gy, sft,
mas, mott

11620'-700' Fair Flour.
Weak Cut.

Fluorescence Possibly Caused By OBM

11700'-800' Fair Flour.
Weak Cut.





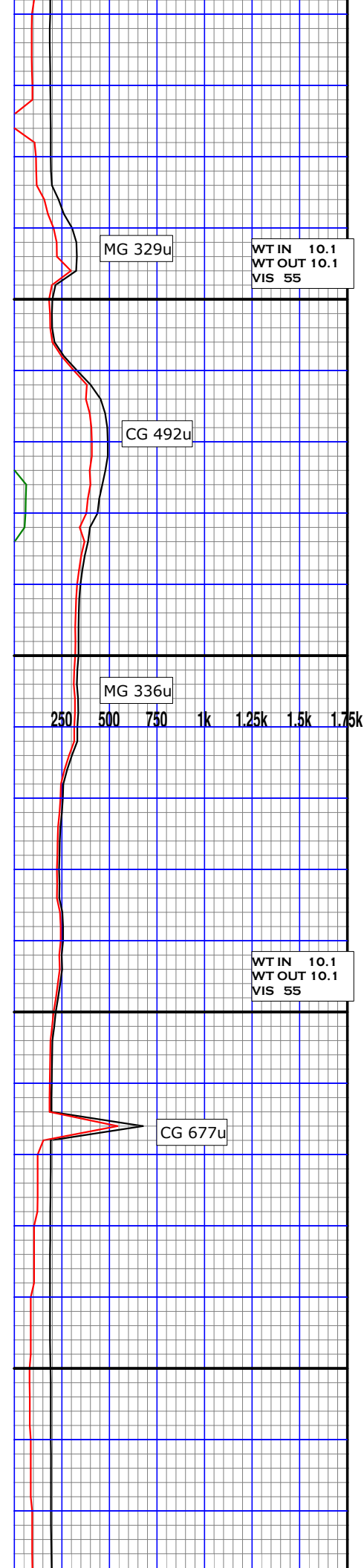
80% SH, gy-dk gy-lt
gy, blk-pty-sblk,
sft-sli hrd, rthy txt,
com fn slty lam, sme
silc, tr free calcite,
Mod-Str Eff Hcl, 20%
MRSTN, lt gy-gy, sft-
sli frm, mas, mott, tr
ls

11800'-900' Fair Flour.
No Cut.

80% SH, gy-dk gy-lt
gy, blk-pty-sblk,
sft-sli hrd, rthy txt,
com fn slty lam, sme
silc, tr free calcite,
Mod-Str Eff Hcl, 10%
MRSTN, lt gy-gy, sft-
sli frm, mas, mott, 10%
LS, pty, sli frm-frm,
rthy txt, Hi-V Hi Eff-
Hcl

90% SH, gy-dk gy-lt
gy, blk-pty, sli frm-
sli hrd, rthy txt, com
fn slty lam, sme silc,
tr free calcite, Mod-Str
Eff Hcl, 10% MRSTN, lt
gy-gy, sft-sli frm, mas,
mott, tr LS

11900-12000 Fair Flour.
No Cut.

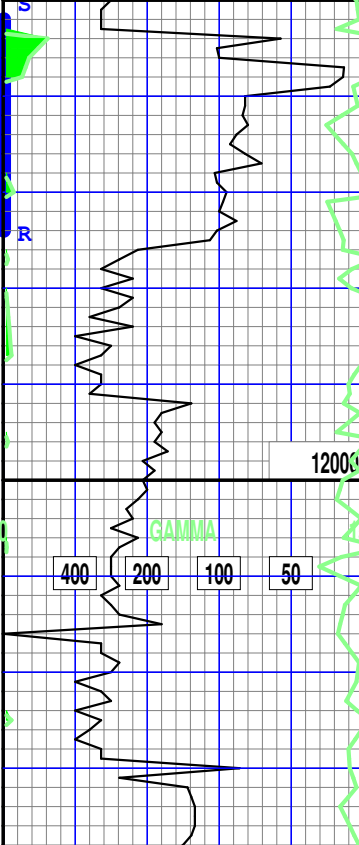


Fluorescence Possibly
Caused By OBM

Fluorescence Possibly
Caused By OBM

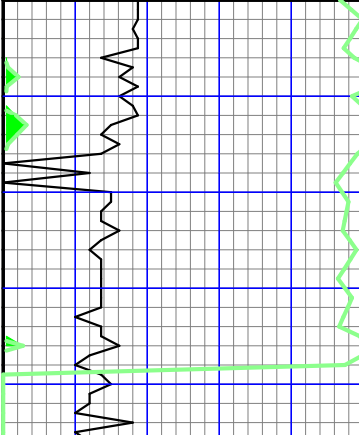
WOB 20.1
RPM 65
PP 3760
SPM 160

MD 11952'
TVD 7389.86'
INC 83.78°
AZM 1.53°
VS 4727.91'



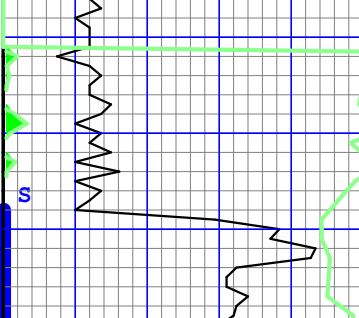
WOB 15.1
RPM 65
PP 3654
SPM 160

MD 12042'
TVD 7400.55'
INC 82.42°
AZM 2.81°
VS 4813.14'



WOB 37.6
RPM 0
PP 3220
SPM 160

MD 12128'
TVD 7411.93'
INC 82.55°
AZM 3.05°
VS 4896.64'



Fluorescence Possibly
Caused By OBM

80% SH, gy-dk gy-lt
gy, blk-pty-sblk,
sft-sli hrd, rthy txt,
com fn slty lam, sme
silc, tr free calcite,
Mod-Str Eff Hcl, 10%
MRSTN, lt gy-gy, sft-
sli frm, mas, mott, 10%
LS, plty, sli frm-frm,
rthy txt, Hi-V Hi Eff-
Hcl

12000'-100' Fair Flour.
No Cut.

Fluorescence Possibly
Caused By OBM

90% SH, gy-dk gy-lt
gy, blk-pty, sli frm-
sli hrd, rthy txt, com
fn slty lam, sme silc,
tr free calcite, Mod-Str
Eff Hcl, 10% MRSTN, lt
gy-gy, sft-sli frm, mas,
mott, tr LS

12100'-200' Fair Flour.
No Cut.

Fluorescence Possibly
Caused By OBM

CG 500u

WT IN 10.1
WT OUT 10.1
VIS 54

MG 183u

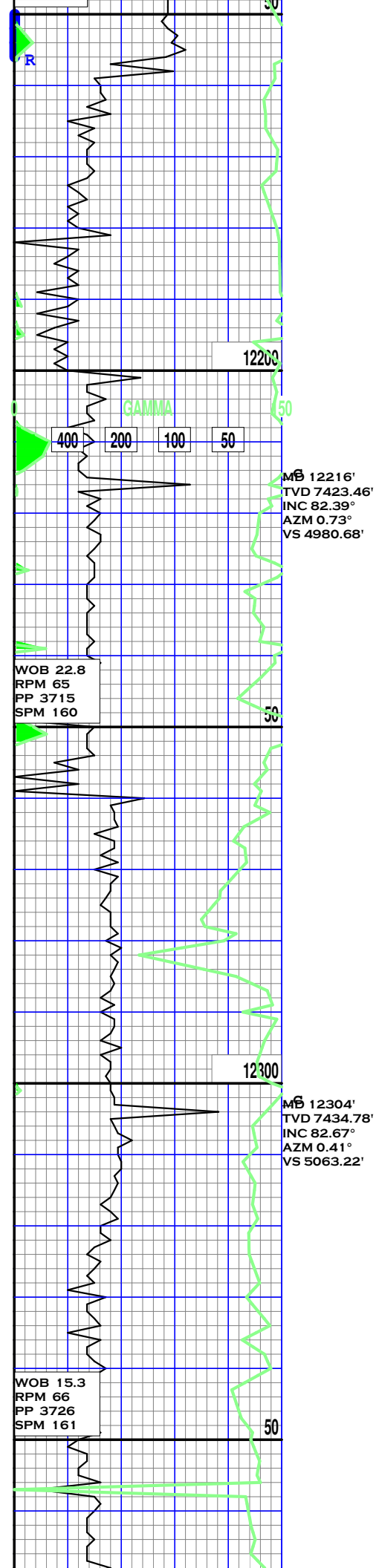
250 500 750 1k 1.25k 1.5k 1.75k

CG 693u

WT IN 10.1+
WT OUT 10.1+
VIS 55

CG 835u

WT IN 10.1
WT OUT 10.1
VIS 55



90% SH, gy-dk gy-lt
gy, blk-pty, sli frm-
sli hrd, rthy txt, com
fn slty lam, sme silc,
tr free calcite, Mod-Str
Eff Hcl, 10% MRSTN, lt
gy-gy, sft-sli frm, mas,
mott, tr LS

Fluoresecence Possibly
Caused By OBM

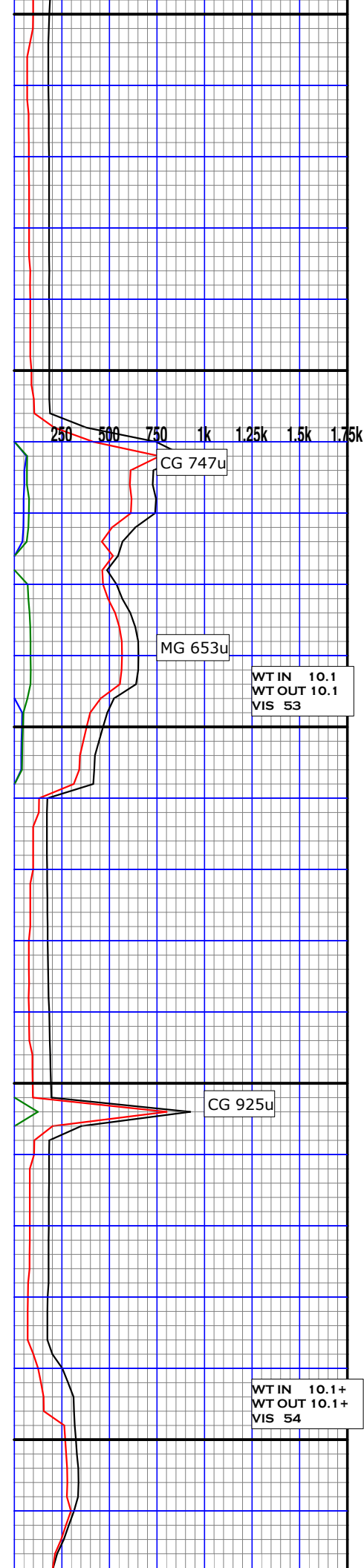
12200-300' Fair Fluor.
No Cut

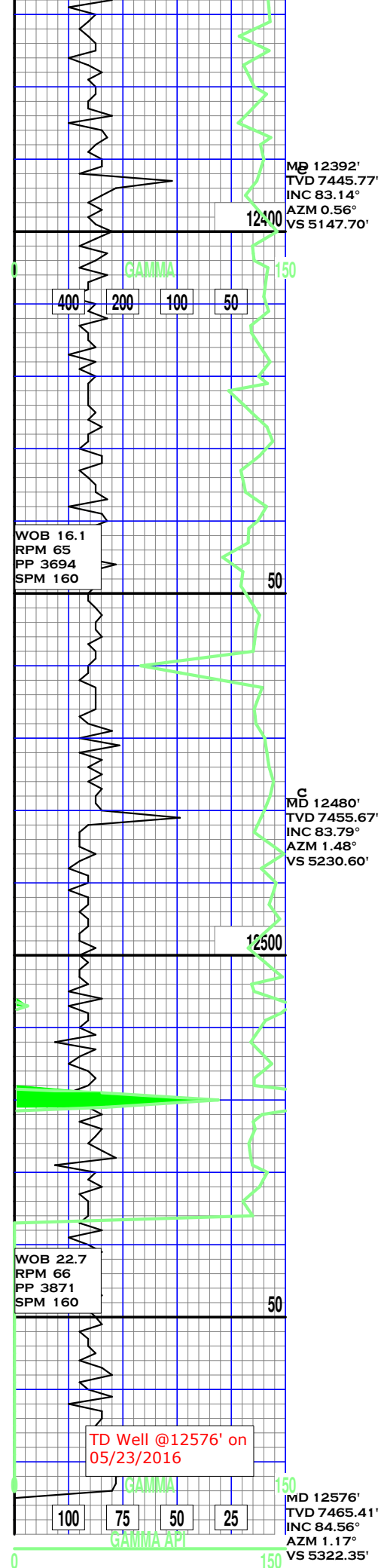
80% SH, gy-dk gy, blk-
pty-sblk, mod frm-sli
hrd, rthy txt, com fn
slty lam, sme silc, tr
free calcite, Mod-Str
Eff Hcl, 10% MRSTN, lt
gy-gy, sft-sli frm, mas,
mott, 10% LS, pty, sli
frm-frm, rthy txt, Hi-V
Hi Eff-Hcl

Fluoresecence Possibly
Caused By OBM

12300-400' Fair Fluor.
No Cut

80% SH, gy-dk gy, blk-
pty-sblk, mod frm-sli
hrd, rthy txt, com fn
slty lam, sme silc, tr
free calcite, Mod-Str
Eff Hcl, 10% LS, pty,
sli frm-frm, rthy txt,
Hi-V Hi Eff-Hcl





Fluoresecence Possibly
Caused By OBM

12400-500' Fair Fluor.
No Cut

90% SH, gy-dk gy,blky-
plty-sblky, mod frm-sli
hrd, rthy txt, com fn
silty lam, sme silc, tr
free calcite, Mod-Str
Eff Hcl, 10% LS, plty,
sli frm-frm, rthy txt,
Hi-V Hi Eff-Hcl

Fluoresecence Possibly
Caused By OBM

12500-576' Fair Fluor.
No Cut

90% SH, gy-dk gy,blky-
plty-sblky, mod frm-sli
hrd, rthy txt, com fn
silty lam, sme silc, tr
free calcite, Mod-Str
Eff Hcl, 10% LS, plty,
sli frm-frm, rthy txt,
Hi-V Hi Eff-Hcl

90% SH, gy-dk gy,blky-
plty-sblky, mod frm-sli
hrd, rthy txt, com fn
silty lam, sme silc, tr
free calcite, Mod-Str
Eff Hcl, 10% LS, plty,
sli frm-frm, rthy txt,

