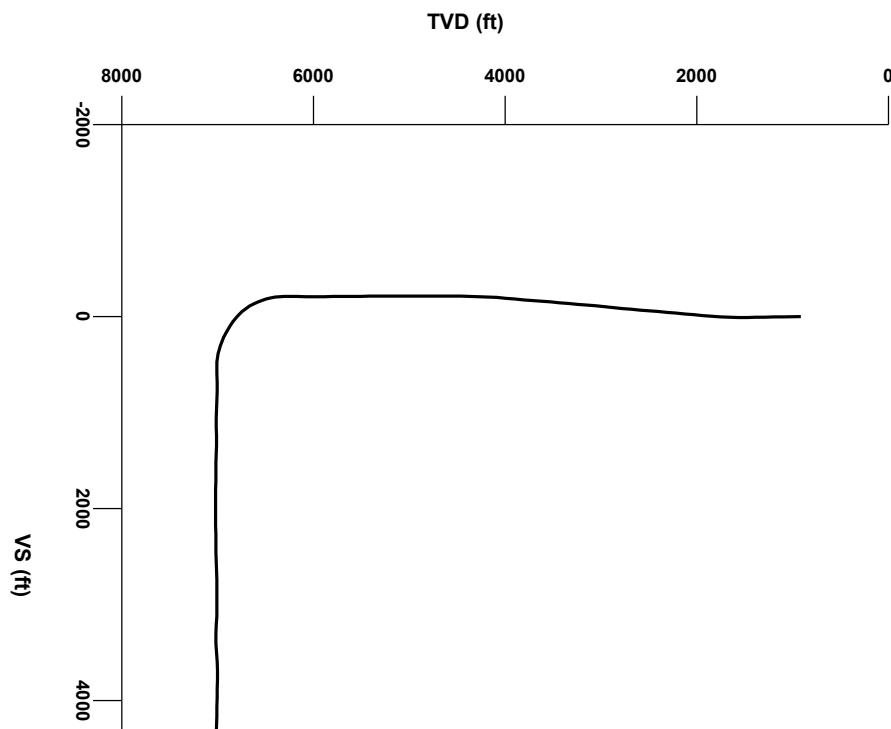




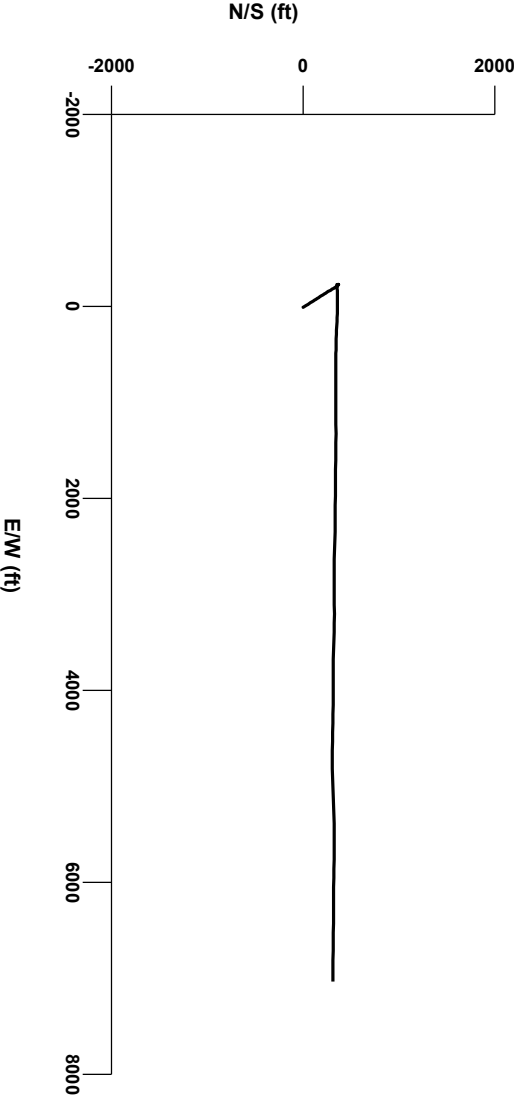
LOG created using L PLOT VH Version 3.0, November 30, 2012, Copyright (C) 1999-2009 Pason Systems Corp.

**OPERATOR:** NOBLE ENERGY INC  
**WELL:** FIVE M E28-69HN  
**LOCATION:** SEC 28, T6N, R65W  
**COUNTY:** WELD  
**STATE:** COLORADO  
**SPOT:** 646' FNL, 284' FWL  
**ELEVATION:** GL 4712', KB 4736'  
**FIELD:** WATTENBERG  
**SPUD DATE:** 11/19/2012  
**TD DATE:** 11/29/2012  
**DATES LOGGED:** 11/21/2012 - 11/29/2012  
**DEPTHS LOGGED:** 1,000' - 14,060'  
**LOGGERS:** BRAD WILSON, JAKOB PAMMER  
**DRILLING FLUID:** WATER, WATER BASED MUD, POLY  
**DRILLING RIG:** HP 322  
**API:** 05123347970000  
**LOG TYPE:** HORIZONTAL  
**SCALE:** 1:240 (5 inches per 100 feet)  
**REMARKS:** WELLSITE GEOLOGICAL SERVICES PROVIDED BY COLUMBINE LOGGING, INC.



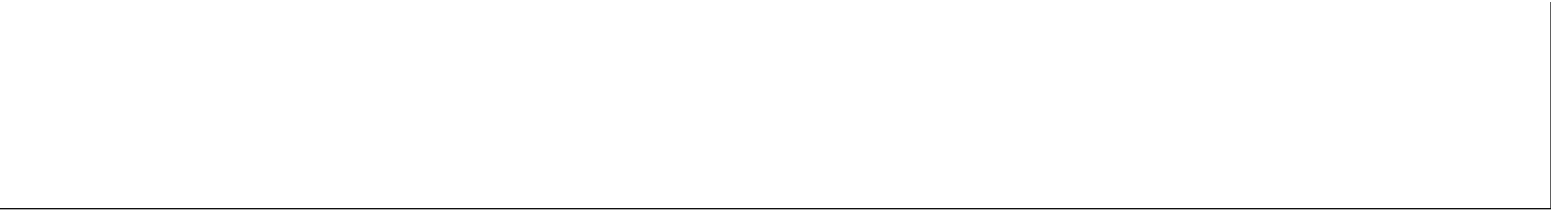
Survey Elevation

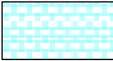
Survey Plan

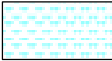


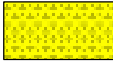
6000

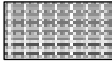
8000



Chalk

Marl

Shaly Sandstone

Silty Shale

Connection

Connection Gas

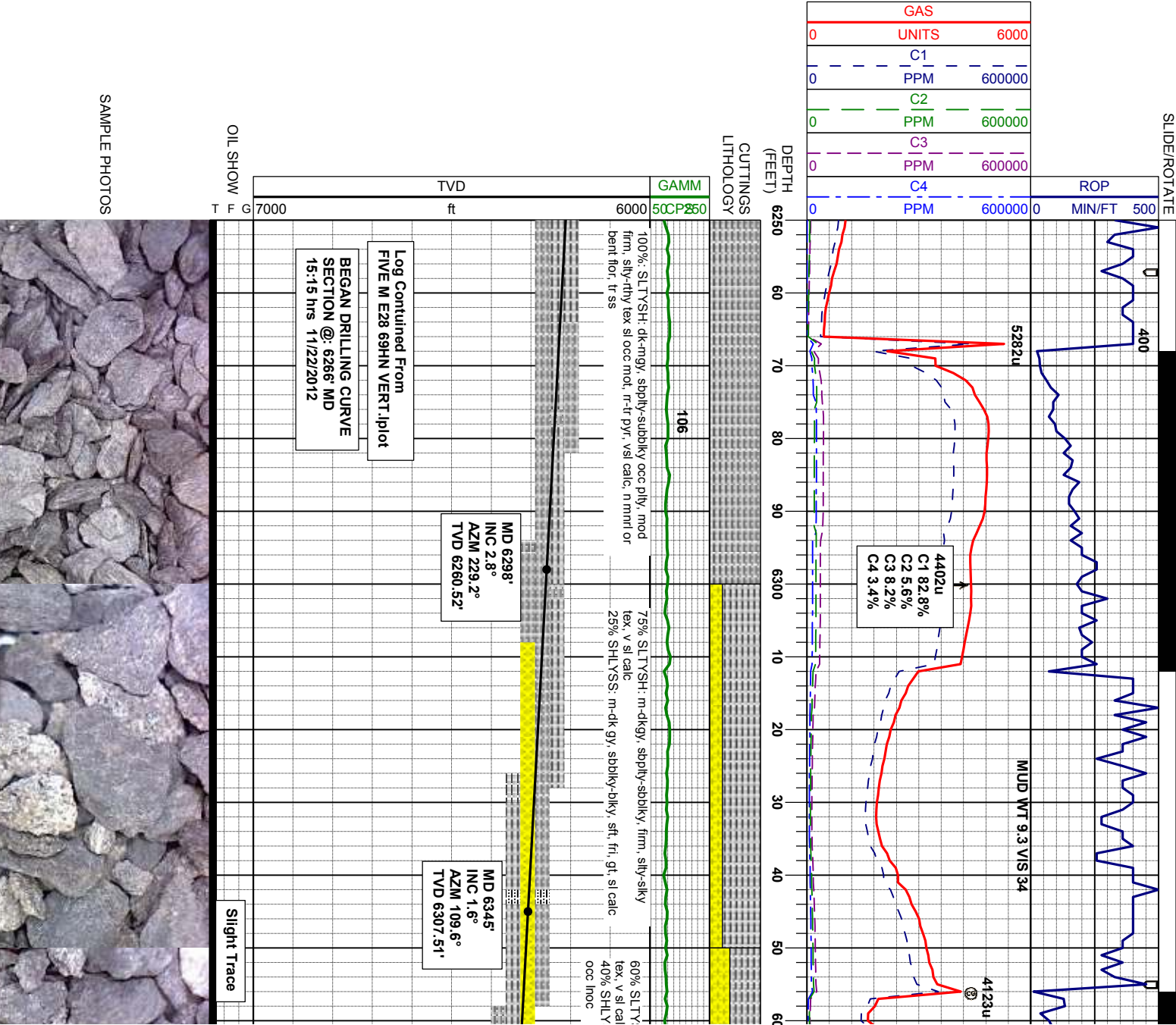
Arrow

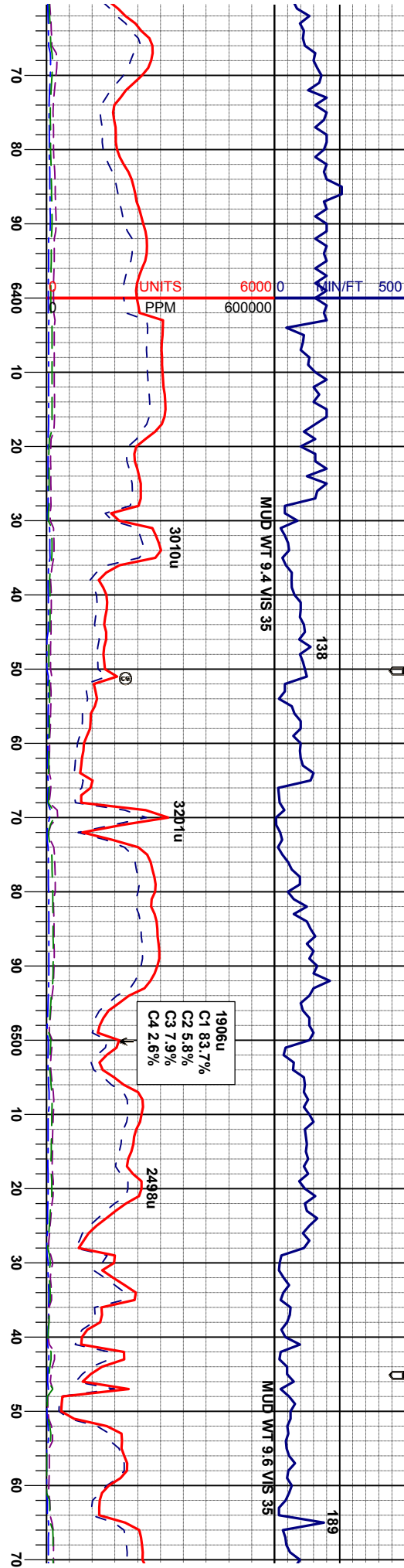
Midnight Depth

Arrow

Trip Gas

ENGINEERING SYMBOLS





Sh: m-dkgy, sbply-sbdky, firm, silty-siky  
SS: m-dk gy, sbdky-blky, sft, fri, gt, sl calc

75% SLTYSH: m-dkgy, sbply-sbdky, firm, silty-siky  
tex, v sl calc  
25% SHLYSS: m-dk gy, sbdky-blky, sft, fri, gt, sl calc

85% SLTYSH: m-dkgy, sbply-sbdky, firm, silty-siky  
tex, v sl calc  
15% SHLYSS: m-dk gy, sbdky-blky, sft, fri, gt, sl calc

90% SLTYSH: m-dkgy, sbply-sbdky, firm, silty-siky  
tex, v sl calc  
10% SHLYSS: m-dk gy, sbdky-blky, sft, fri, gt, sl calc

100% SLTYSH: m-dk  
tex, v sl calc

MD 6393'  
INC 4.9°  
AZM 70.0°  
TVD 6355.43'

MD 6440'  
INC 8.5°  
AZM 82.4°  
TVD 6402.10'

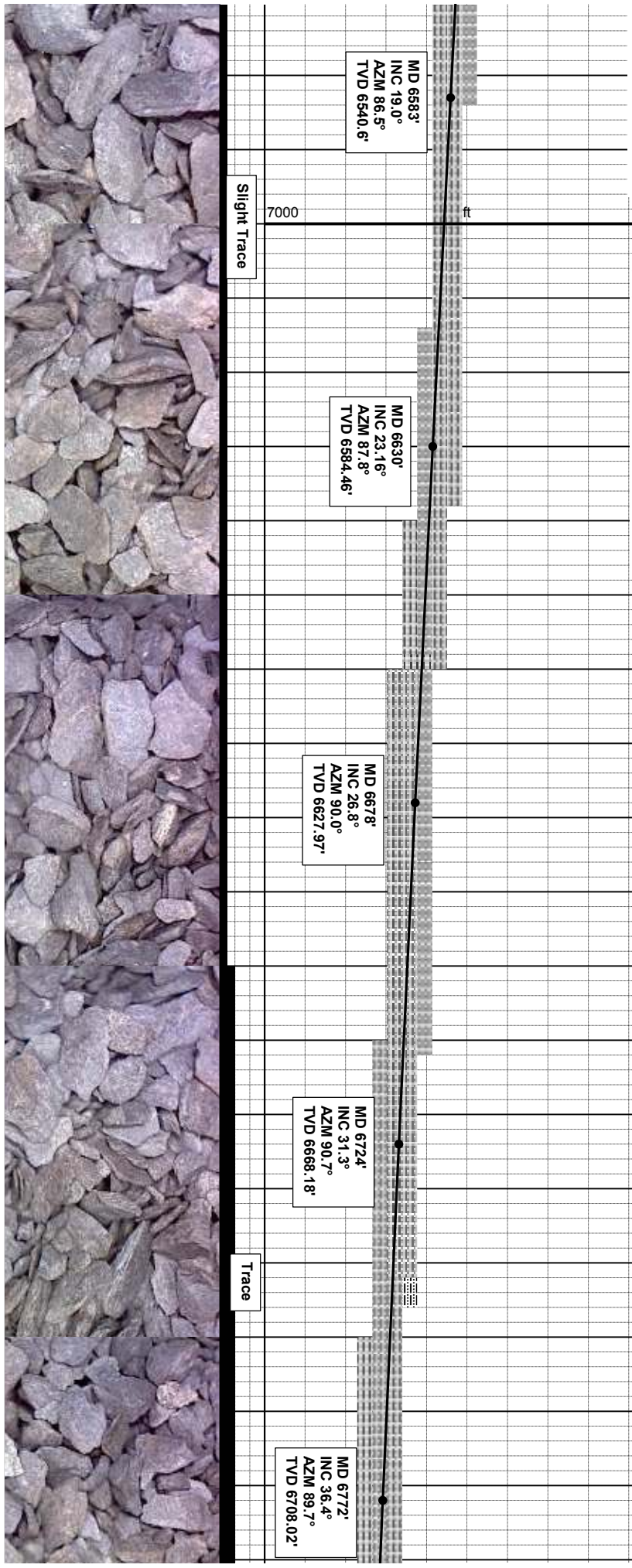
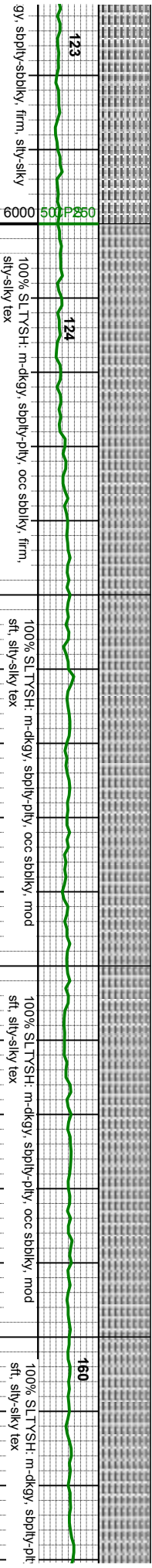
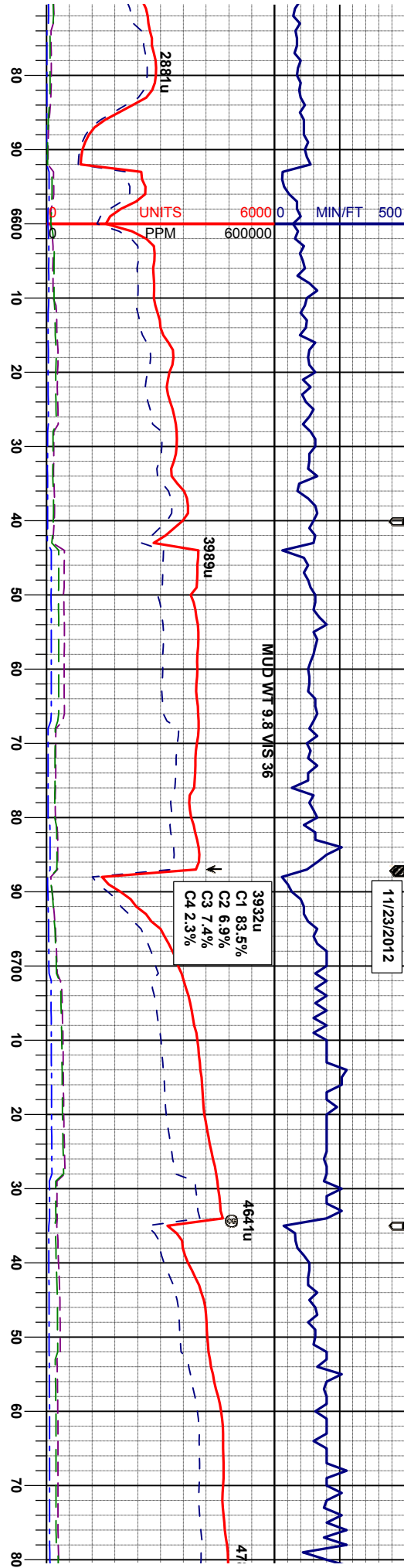
MD 6488'  
INC 12.7°  
AZM 85.1°  
TVD 6449.27'

MD 6535'  
INC 15.8°  
AZM 86.6°  
TVD 6494.8'

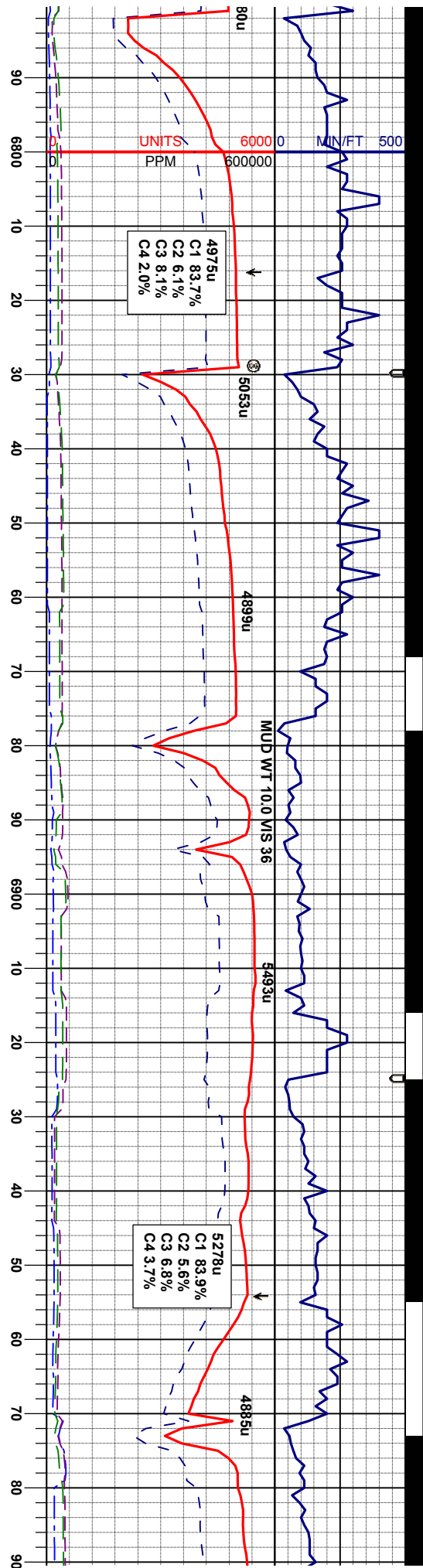




11/23/2012







Tops Picked Using Type Log  
Watson 29-1 and 28-3 Wells  
As Gamma Marker References

Sharon Springs Marker  
Logger: 6763' TVD  
Logger: 6844' MD  
Prog: 6772' TVD

NIOBRARA  
Logger Top: 6773' TVD  
Prog Top: 6783' TVD

Niobrara A Chalk  
Logger Top: 6787' TVD  
Prog Top: 6799' TVD

Niobrara A Marl  
Logger Top: 6810' TVD  
Prog Top: 6819' TVD

MD 6962'  
INC 54.12°  
AZM 89.81°  
TVD 6839.87'

MD 6819'  
INC 41.4°  
AZM 88.7°  
TVD 6744.6'

MD 6867'  
INC 46.1°  
AZM 89.7°  
TVD 6779.25'

SCALE CHANGE  
TVD 6400-7400'

100% SLTYSH: m-dkgy, sbply-pty, occ sbkly, mod  
sft, sly-siky tex, scat bent, v calc

65% SLTYSH: m-dkgy, sbply-pty, occ sbkly, mod  
sft, sly-siky tex, scat bent, v calc  
35% MRL: m-dk gy, sbkly-sbply, sft, rthy, mot, v calc

80% MRL: m-dk gy, sbkly-sbply, sft, rthy, mot, occ  
sft, v calc  
10% SLTYSH: m-dkgy, sbply-pty, occ sbkly, mod  
sft, sly-siky tex, scat bent, v calc

75% CHK: lt gy, v sft- ftr, sbkly, rthy-wxy tex occ mot,  
calc,  
25% MRL: m-dk gy, v sl mot, mod sft-firm, occ fs,  
sbkly-sbply, rthy, tr scat bent, calc,

100% MRL: m-dk gy, mod sft-firm, sbkly-sbply tr fis,  
rthy, sl mot tex, calc ; tr chk ; occ bent hor

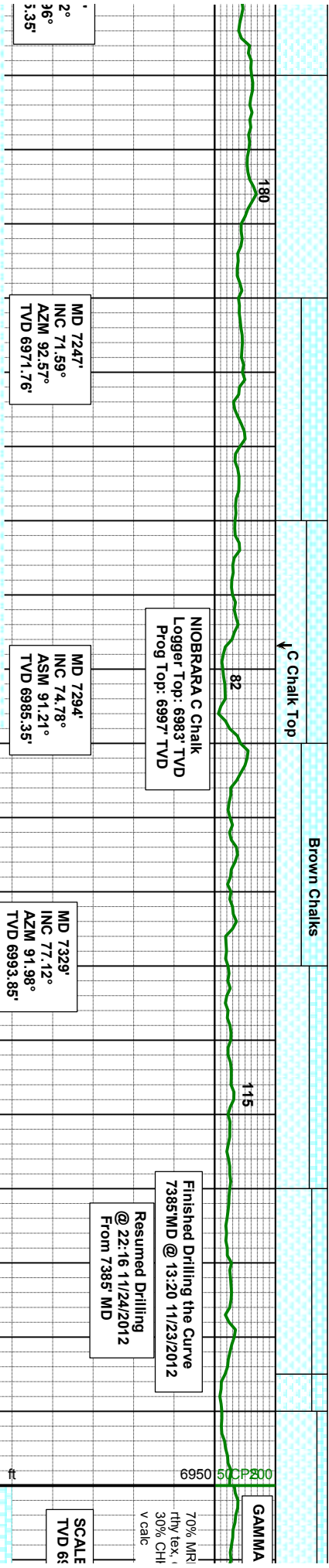
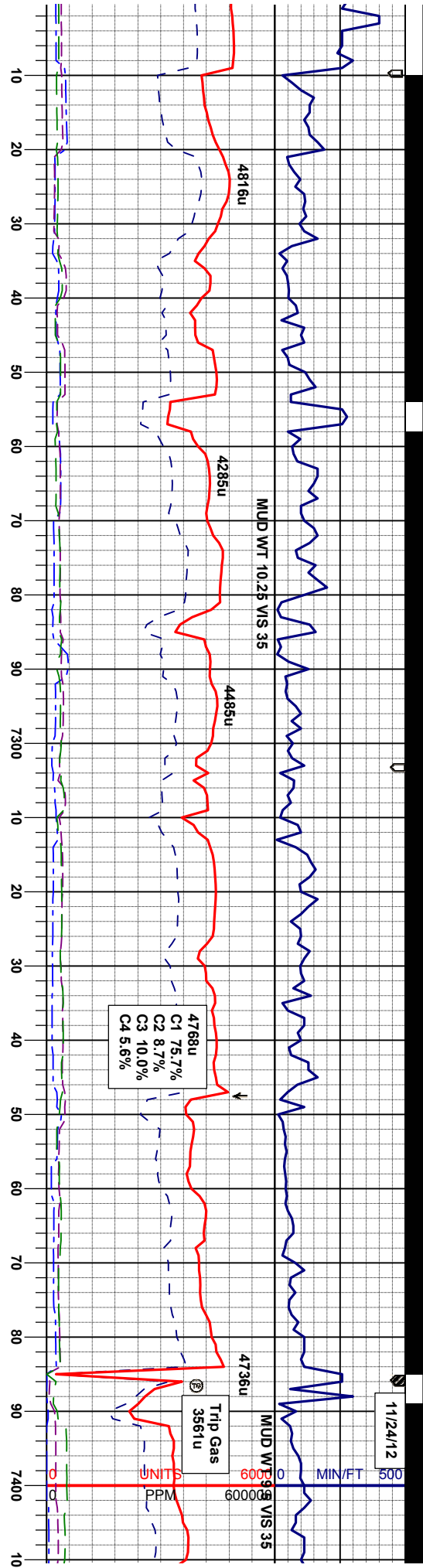
Fair











100% MRL: m-dk gy, firm - mod hd, brt, sbblky-sply, tr fis, rty sl arg tex, v calc, occ fos

50% MRL: m-dkgy dk gy blk, firm, blk - sbblky, sl sily -rty tex, sl arg, v calc, sme fos 50% CHK: lgy - lt gy brn occ m gy, firm - brt, sbblky, sme mod - sl wxy - sl silt, tr bent

60% MRL: m-dkgy dk gy blk, firm, blk - sbblky, sl sily -rty tex, sl arg, v calc, sme fos 40% CHK: lgy - lt gy brn occ m gy, firm - brt, sbblky, sme mod - sl wxy - sl silt, tr bent

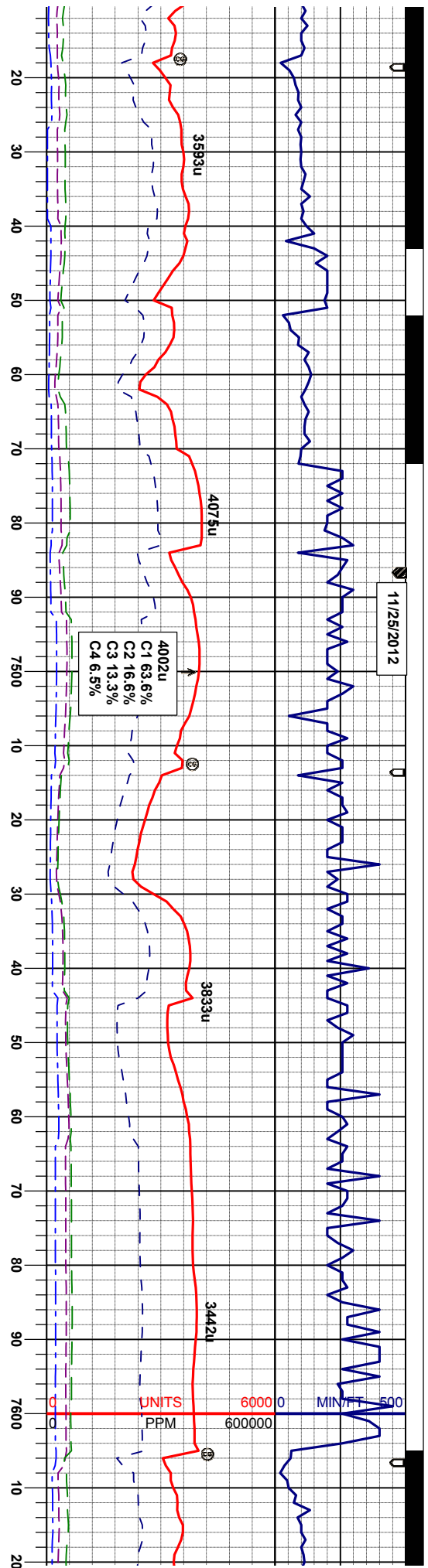
50% CHK: lt -m gy abnt tan- lt -m brn, firm - brt occ sft, sbblky, v mod - sl wxy, occ sily tex 50% MRL: m-dk gy, dk gy blk, firm, blk-sbblky, rty tex, hom, v calc, tr fos w/ assoc pyr

70% MRL: m-dk gy, dk gy blk, firm, blk-sbblky, rty tex, hom, v calc, tr fos w/ assoc pyr 30% CHK: lt -m gy occ tan- lt -m brn, firm - brt occ sft, sbblky, v mod - sl wxy, occ sily tex

m - mod hd, brt, sbblky-sply, blc, occ fos







## SCALE CHANGE

L: m-dkgy, occ blk, mot, mod firm, sbply-pty,  
occ inbd fos, v calc  
<: ltgy, crm, mot, stri, sft, sbply-pty, rthy text,

80% MRL: m-dkgy, occ blk, mot, mod firm, sbply-ply, rthy tex, occ intbd fos, v calc  
20% CHK: ltyg, crm, mot, stri, sft, sbply-ply, rthy text,

75% MRL: m-dkgy, occ blk,mot, mod firm, sbply-ptly  
-rthy tex, occ intbd fos, v calc  
25% CHK: llyg, occ crm, mot, stri, sft, sbply-ptly, rthy  
text v calc

70% MRL: m-dlgy, occ blk, mot, mod firm, sbply-ptly  
rthy tex, occ intbd fos, v calc  
30% CHK: wh-ltgy, occ crm, mot, occ str, sft, sbply-

65% MRL: m-dkgy,  
rthy tex, occ intbd f  
35% CHK: wh-ltgy, c  
nly rthy tex, occ im

: CHANGE  
350'-7050'

MD 7419'  
INC 84.91°  
AZM 90.63°  
TVD 7007.89'

MD 7449'  
INC 87.50°  
AZM 90.42°  
TVD 7009.88'

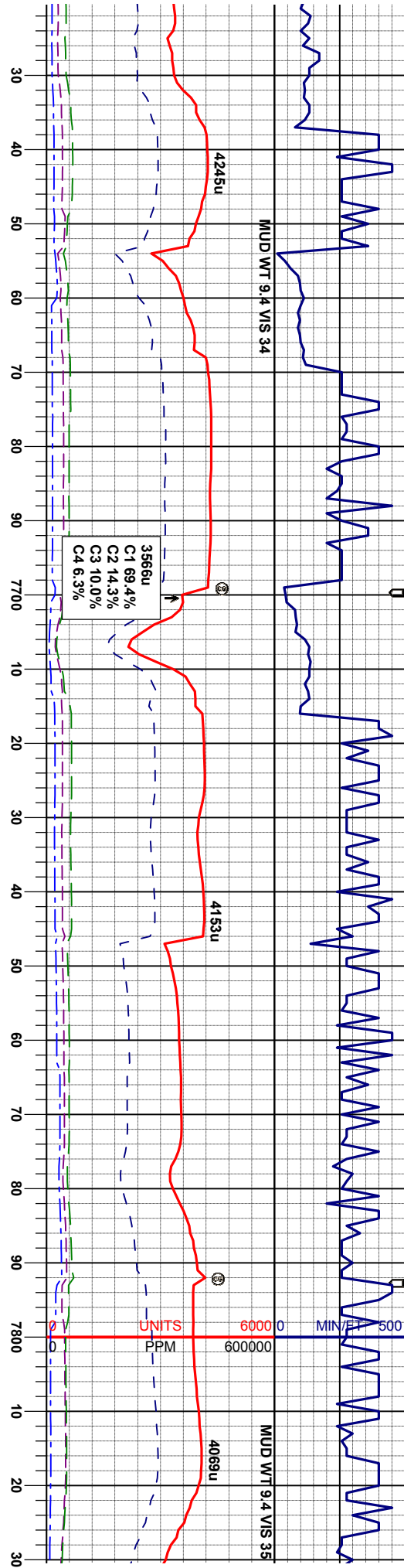
MD 7542'  
INC 93.15°  
AZM 90.76°  
TVD 7009.35'

**Fair**

**Fair**







60% CHK: wh-lgy, occ crm, mot, occ str, sft, sply- ply, rthy tex, occ inbd fos, v calc	
occ blk, mot, mod firm, sply-ply, s, v calc	60% MRL: m-dkgy, occ blk, mot, mod firm, sply-ply, rthy tex, occ fos, v calc
occ crm, mot, occ str, sft, sply- bd fos, v calc	40% CHK: wh-lgy, crm, mot, occ str, sft, sply-ply, rthy tex, occ inbd fos, v calc ; tr inoc
	65% MRL: m gy, occ dk gy-blk, firm, bky-sbiky, rthy tex, hom, v calc
	35% CHK: tan- lt brn -bm gy, mod firm - brt, sbiky, v wax tex, mod hom, v calc ; sme fos, occ lse pry
	85% MRL: m gy, occ dk gy-blk, firm tex, hom, v calc
	15% CHK: tan- lt brn -bm gy, mod f wax tex, mod hom, v calc ; tr fos

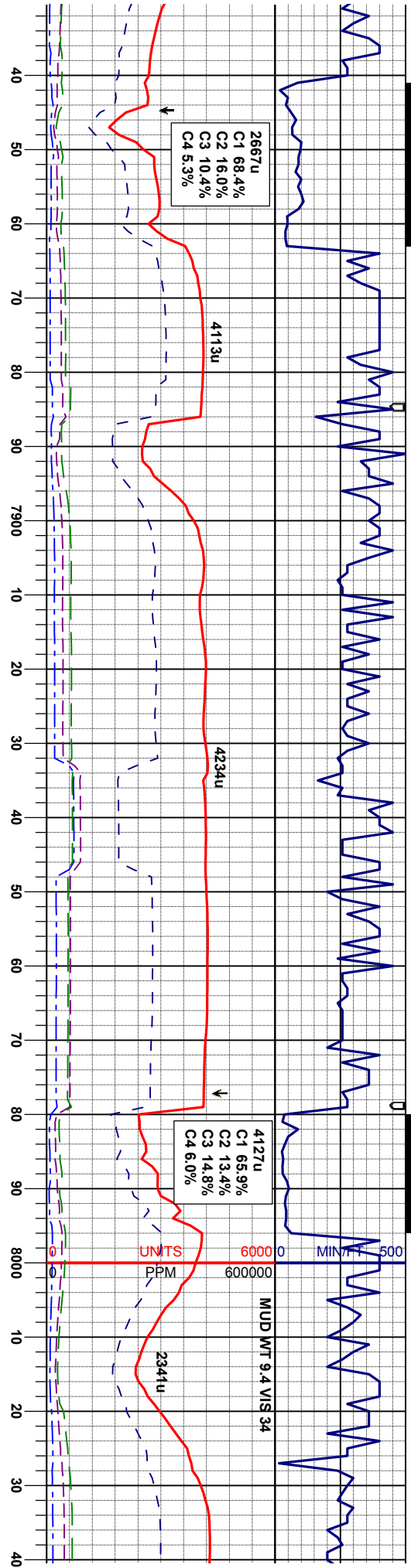
MD 7635'  
INC 92.40°  
AZM 90.77°  
TVD 7004.85'

MD 7728'  
INC 88.33°  
AZM 90.02°  
TVD 7004.25'

MD 7821'  
INC 87.13°  
AZM 89.5°  
TVD 7007.93'







178	197	224	50CP800
biky-sbbiky, rthy	90% MRL: m gy, occ dk gy-blk, firm, biky-sbbiky, rthy tex, hom, v calc 10% CHK: tan- lt brn -brn gy, mod firm - brt, sbbiky, v wax tex, sl mol, v calc, tr fos, occ bent	95% MRL: m gy, occ dk gy-blk, firm, biky-sbbiky, rthy tex, hom, v calc 5% CHK: tan- lt brn -brn gy, mod firm - brt, sbbiky, v wax tex, sl mol, v calc, tr fos, occ bent	95% MRL: m gy, occ dk gy-blk, firm, biky-sbbiky, rthy tex, hom, v calc 5% CHK: tan- lt brn -brn gy, mod firm - brt, sbbiky, v wax tex, sl mol, v calc, tr fos, occ bent
100% MRL: m gy, occ dk gy-blk, firm, biky-sbbiky, rthy mostly hom occ stly tex, v calc, occ fos, abnt			

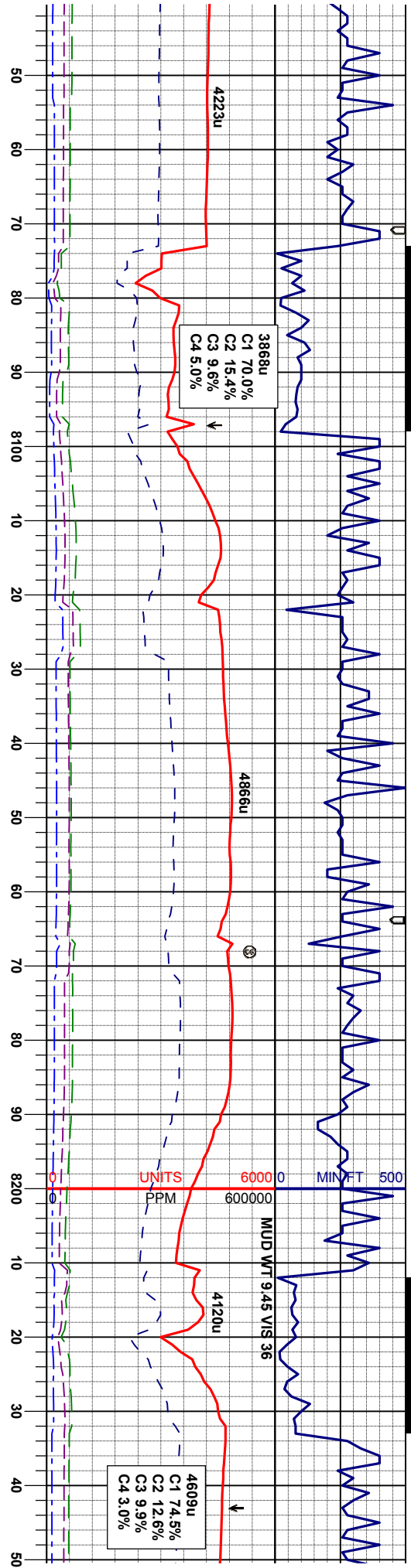
MD 7914'  
INC 88.43°  
AZM 89.47°  
TVD 7011.53'

MD 8007'  
INC 89.01°  
AZM 89.69°  
TVD 7013.6'

Moderate







blky, rthy, bent

80% MRL: m gy, occ dk gy-blk, firm, blky-sbdky, rthy, mostly hom occ sily tex, v calc

20% CHK: tan- lt brn -brn gy, mod firm - brt, sbdky, v wax tex, mod hom, v calc; occ fos, rr ise pry, sme bent

60% CHK: tan- lt brn -brn gy, mod firm - brt, sbdky, v wax tex, mod hom, v calc

40% MRL: m gy, occ dk gy-blk, firm, blky-sbdky, rthy tex, hom, v calc; sme fos, rr ise pry

50% MRL: m gy, occ dk gy-blk, firm, blky-sbdky, rthy tex, hom, v calc

50% CHK: tan- lt brn -brn gy, mod firm - brt, sbdky, v waxy tex, mod hom, v calc; sme fos

50% MRL: m gy, occ dk gy-blk, firm, blky-sbdky, rthy tex, hom, v calc

50% CHK: tan- lt brn -brn gy, mod firm - brt, sbdky, v waxy tex, mod hom, v calc; sme fos

MD 8100'  
INC 90.5°  
AZM 90.07°  
TVD 7013.98'

MD 8193'  
INC 92.16°  
AZM 89.31°  
TVD 7011.8'

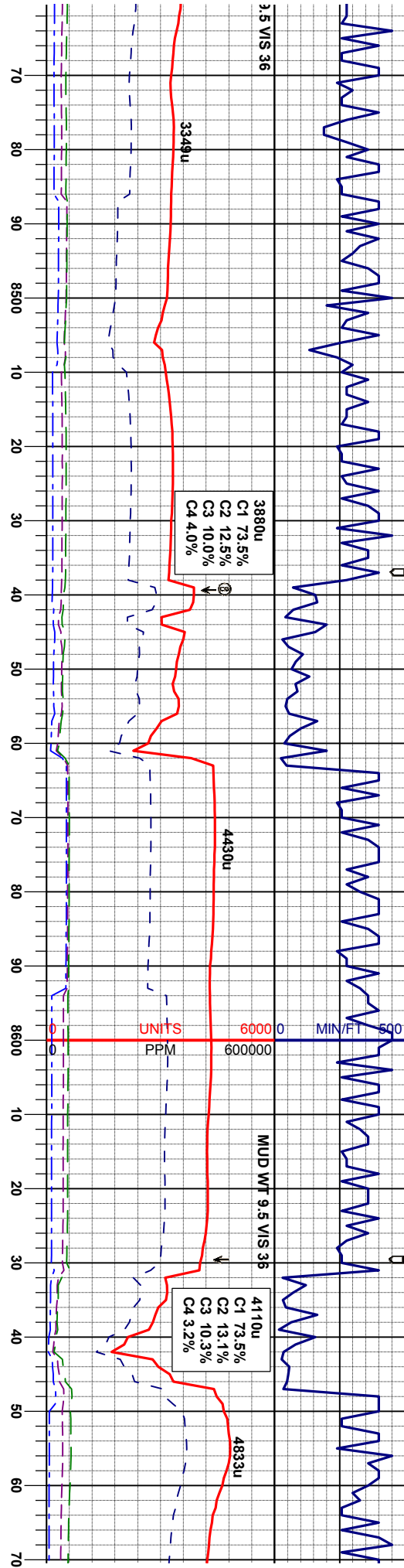
Moderate











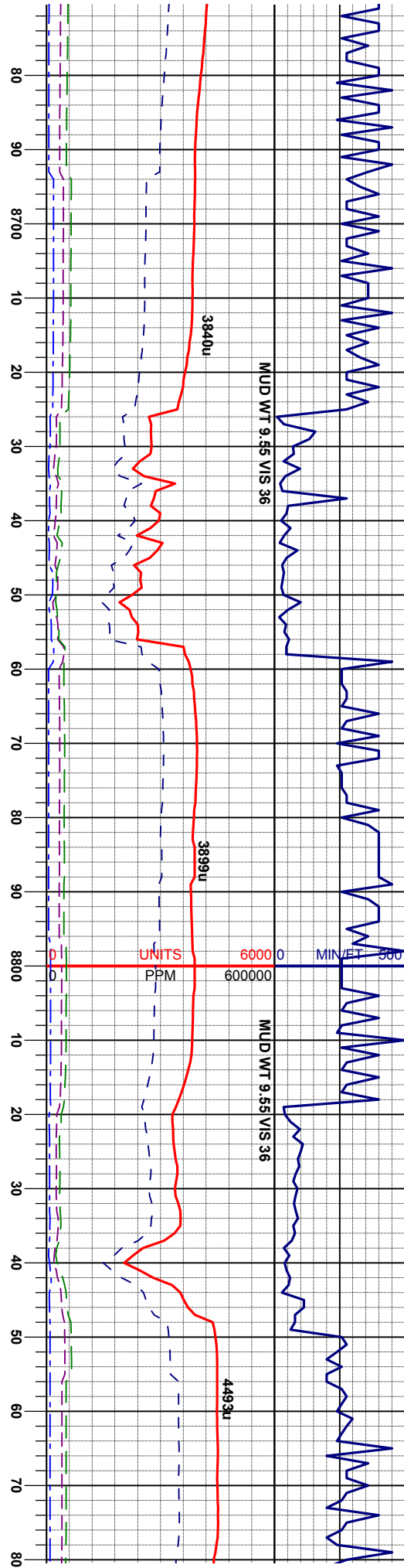
Good Chalk Florescence

tan - lt brn - brn gy occ spec wh, mod firm - y, wxy tex, sl hom, v calc	70% CHK: tan- lt brn -brn gy occ spec wh, mod firm - brit, sbblky, wxy tex, sl hom, v calc 30% MRL: m gy, occ dk gy-blk, firm, blk-y-sbblky, rthy tex, hom, v calc ; tr fos, tr gran bent ; g chk flor	50% CHK: tan- lt brn -brn gy occ spec wh, mod firm - brit, sbblky, wxy tex, sl hom, v calc 50% MRL: m gy, occ dk gy-blk, firm, blk-y-sbblky, rthy tex, hom, v calc ; tr fos, tr gran bent ; g dk yel chk flor	55% CHK: tan- lt brn -brn gy occ spec wh, mod firm - brit, sbblky, wxy tex, sl hom, v calc 45% MRL: m gy, occ dk gy-blk, firm, blk-y-sbblky, rthy tex, hom, v calc ; tr fos, tr gran bent ; sme dk yel chk flor	45% CHK: tan- lt brn - brit, sbblky, wxy tex, s 55% MRL: m gy, occ tex, hom, v calc ; tr to flor
---	---	--	---	--

MD 8473° INC 88.34° AZM 89.62° TVD 7017.97'	MD 8566° INC 90.83° AZM 91.84° TVD 7018.64'	MD 8669° INC 88.67° AZM 90.37° TVD 7019.04'
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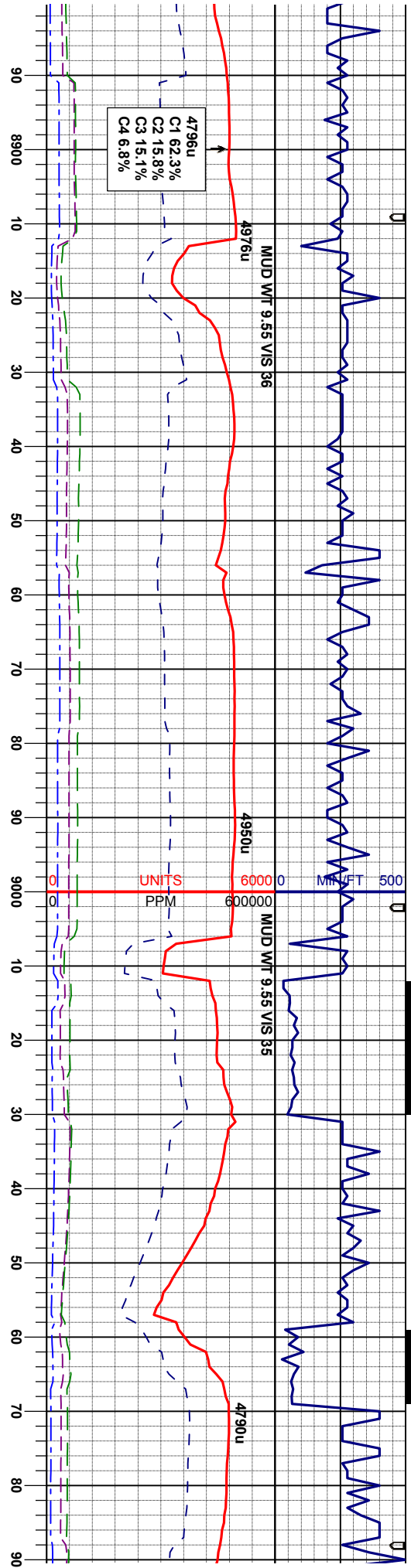


60% MRL: m gy, occ dk gy-blk, firm, bkly-sbdky, rthy tex, hom, v calc : tr fos 35% CHK: tan- lt brn -brn gy occ spec wh, mod firm - bnt, sbdky, wxy tex, sl hom, v calc : sme dk yel chk flor	60% MRL: m gy, occ dk gy-blk, firm, bkly-sbdky, rthy tex, hom, v calc : tr fos 25% CHK: tan- lt brn -brn gy occ spec wh, mod firm - bnt, sbdky, wxy tex, sl hom, v calc : sme dk yel chk flor	60% MRL: dkgy-blk, firm, sbdky-sbply, mot, tr inbtd fos, rthy tex, v calc 40% CHK: ltgy-crm, sft, sbply-ply, mot, occ stn, rthy tex, v calc : tr inoc, tr bent, scat dk yel spl flor	60% CHK: ltgy-crm, sft, sbply-ply tex, v calc 40% MRL: dkgy-blk, firm, sbdky- fos, rthy tex, v calc : tr inoc, tr ber
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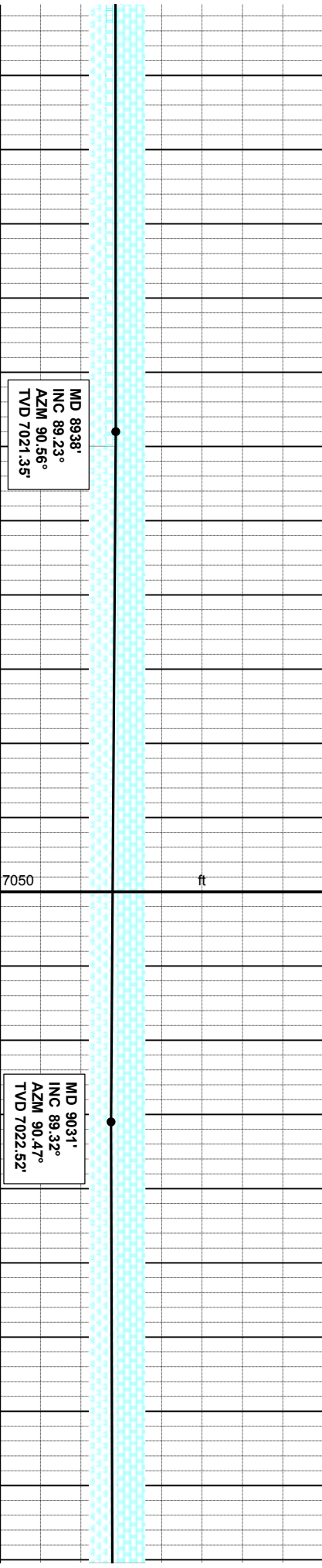
MD 8752' INC 88.67° AZM 89.40° TVD 7021.20'	MD 8845' INC 90.96° AZM 91.99° TVD 7021.50'
--	--



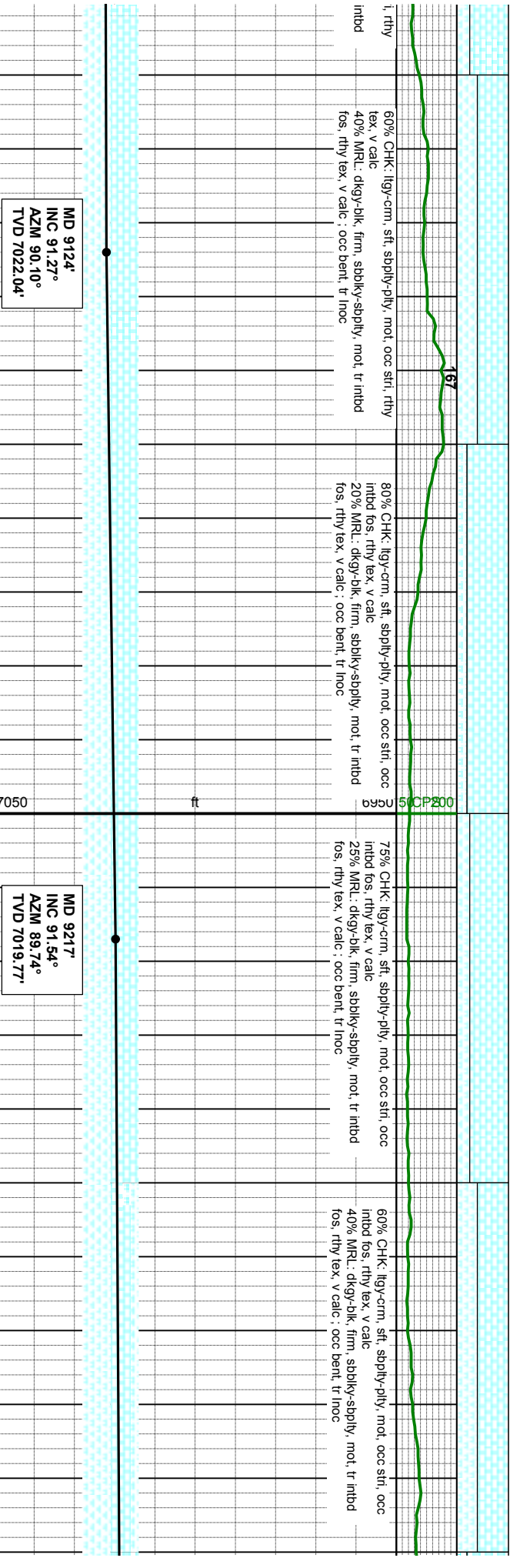
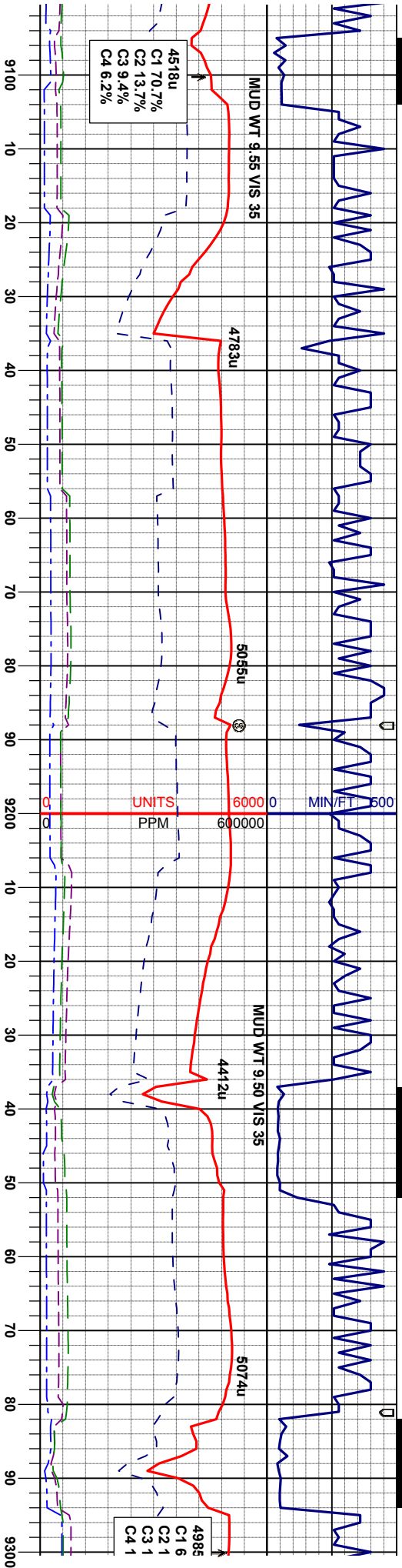




80% CHK: lly-crm, sft, sbply-pty, mot, occ str, rthy tex, v calc 20% MRL: dkgy-blk, firm, sbply-sbply, mot, tr intbd fos, rthy tex, v calc : tr inoc, tr bent, tr dk yel spi flor	80% CHK: lly-crm, sft, sbply-pty, mot, occ str, rthy tex, v calc 10% MRL: dkgy-blk, firm, sbply-sbply, mot, tr intbd fos, rthy tex, v calc : occ bent	80% CHK: lly-crm, sft, sbply-pty, mot, occ str, scat intbd fos, rthy tex, v calc 20% MRL: dkgy-blk, firm, sbply-sbply, mot, tr intbd fos, rthy tex, v calc : occ bent	75% CHK: lly-crm, sft, sbply-pty, mot, occ str tex, v calc 25% MRL: dkgy-blk, firm, sbply-sbply, mot, tr fos, rthy tex, v calc : occ bent
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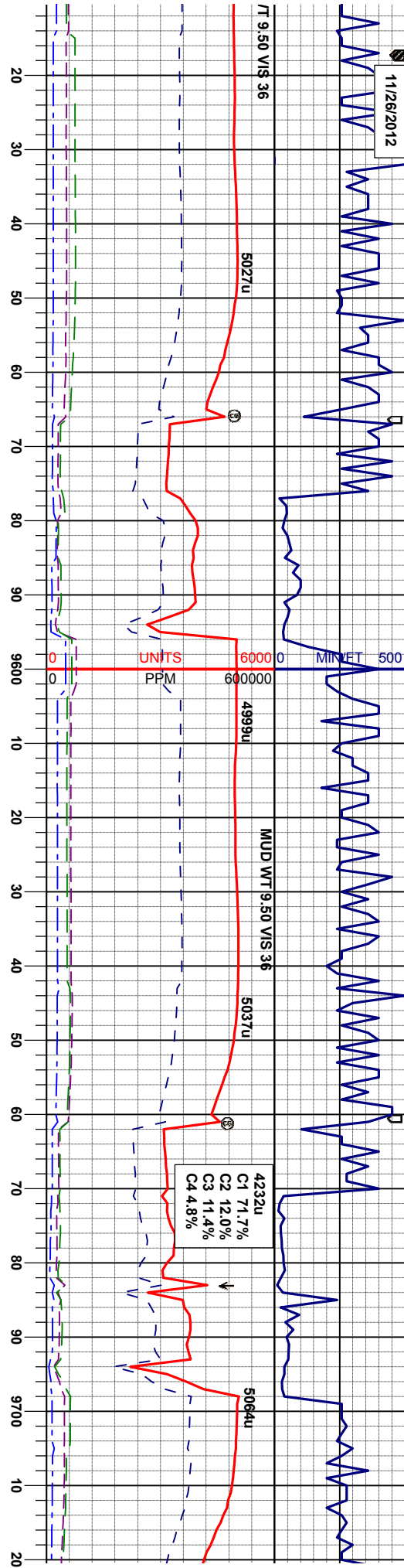








11/26/2012



dkgy-blk, firm, sbbly-sply, mot, tr inbd ex, v calc	60% MRL: dkgy-blk, firm, sbbly-sply, mot, tr inbd fos, rthy tex, v calc	65% CHK: lgy-crm, sft, sply-pty, mot, occ str, tr inbd fos, rthy tex, v calc	60% CHK: lgy-crm, sft, sply-pty, mot, occ str, tr inbd fos, rthy tex, v calc	65% CHK: tan-ll brn-l brtl, sbbly, wvy tex, sl 35% MRL: m gy, occ d tex, nom, v calc; tr fos
lgy-crm, sft, sply-pty, mot, occ str, tr rthy tex, v calc; tr noc, scat bent, scat org	40% CHK: lgy-crm, sft, sply-pty, mot, occ str, tr inbd fos, rthy tex, v calc; tr noc, scat bent, abnt org spl flor	35% MRL: dkgy-blk, firm, sbbly-sply, mot, tr inbd fos, rthy tex, v calc; tr noc, scat bent, abnt org-yel spl flor	40% MRL: dkgy-blk, firm, sbbly-sply, mot, tr inbd fos, rthy tex, v calc; tr noc, scat bent, scat org-yel spl flor	

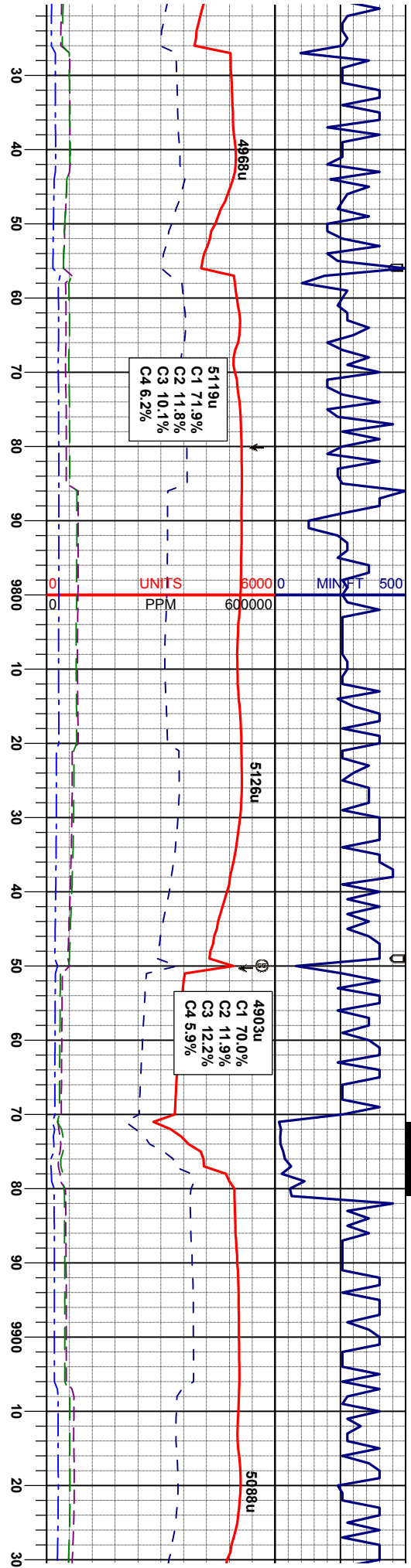
MD 9596'  
INC 91.54°  
AZM 91.02°  
TVD 7011.22'

MD 9691'  
INC 90.06°  
AZM 90.59°  
TVD 7009.88'

Fair







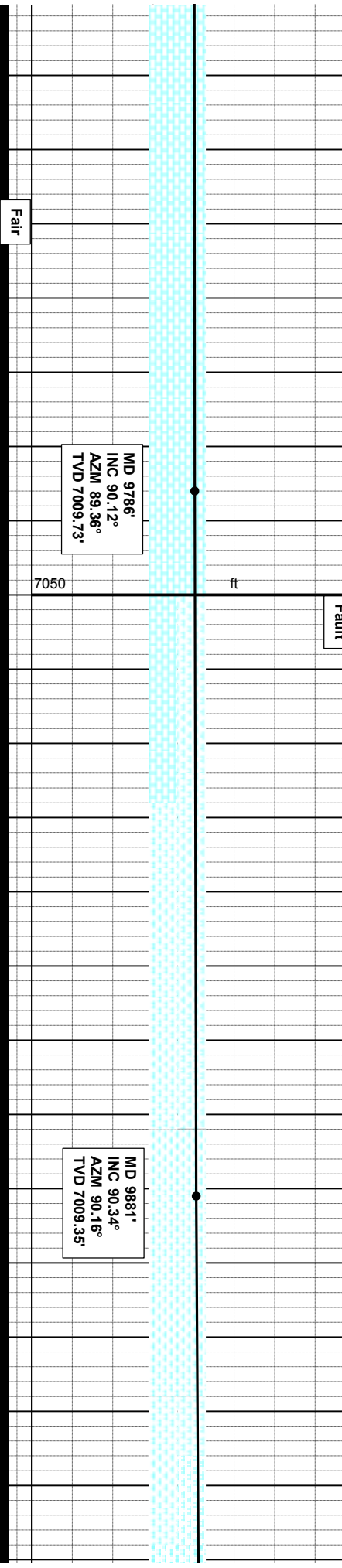
2m gy occ spec wh, mod firm -  
hom, v calc  
k gy-bk, firm, blkly-spbkly, rthy  
, tr bent : g chk flor

70% MRL: m-dk gy -sl silverish, mod firm - hd, sbkly-  
soply tr fis, rthy -sl stly tex, calc : tr chk, tr bent flor  
30% CHK, tan- lt brn -brm gy occ spec wh, mod firm -  
brt, sbkly, wxy tex, sl hom, v calc

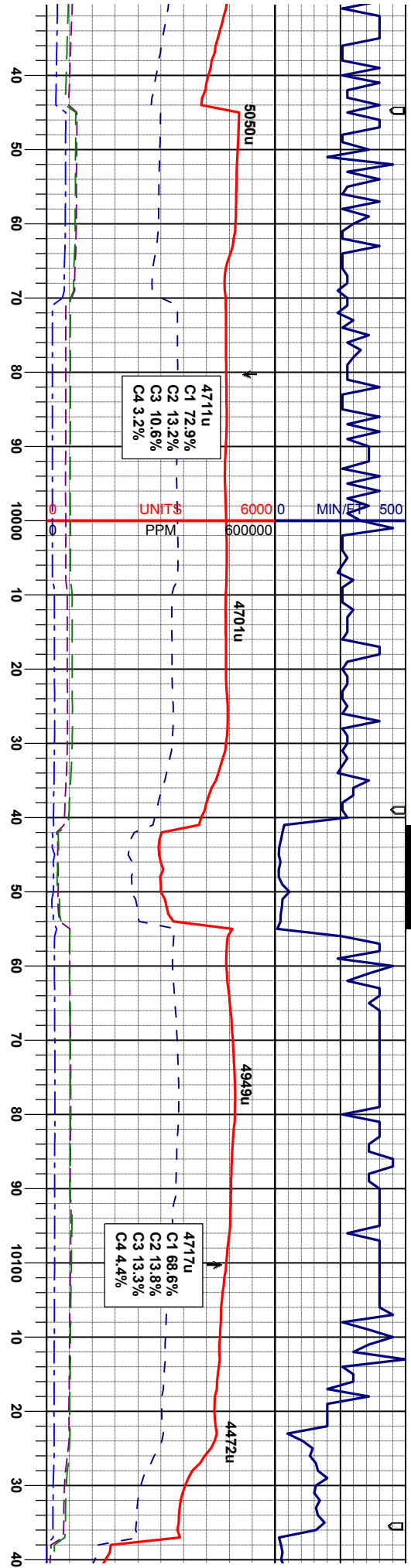
100% MRL: m-dk gy -sl silverish, mod firm - hd, sbkly-  
soply tr fis, rthy -sl stly tex, calc : tr chk, occ bent flor

100% MRL: m-dk gy -sl silverish, mod firm - hd, sbkly  
soply tr fis, rthy -sl stly tex, calc : tr chk, tr bent flor

100% MRL: m-dk gy -sl silverish, mod firm - hd, sbkly  
soply tr fis, rthy -sl stly tex, calc : tr chk, tr bent flor







mod firm - hd sbdky  
t chk, t lse pyr

100% MRL: m-dk gy-silversh, mod firm - hd, sbdky  
-sbdky t rfs, rthy-silv tex, calc, t r chk, t lse pyr

100% MRL: m-dk gy-silversh, mod firm - hd, sbdky  
-sbdky t rfs, rthy-silv tex, calc, t r bent flor

90% MRL: m-dk gy-silversh, mod firm - hd, sbdky  
-sbdky t rfs, rthy-silv tex, calc  
10% CHK: tan-brn-bm gy occ spec wh, mod firm -  
brt, sbdky, wxy tex, sl hom, v calc

85% MRL: m-dk gy-silversh, mod firm - hd, sbt  
-sbdky t rfs, rthy-silv tex, calc  
15% CHK: tan-brn-bm gy occ spec wh, mod firm  
brt, sbdky, wxy tex, sl hom, v calc

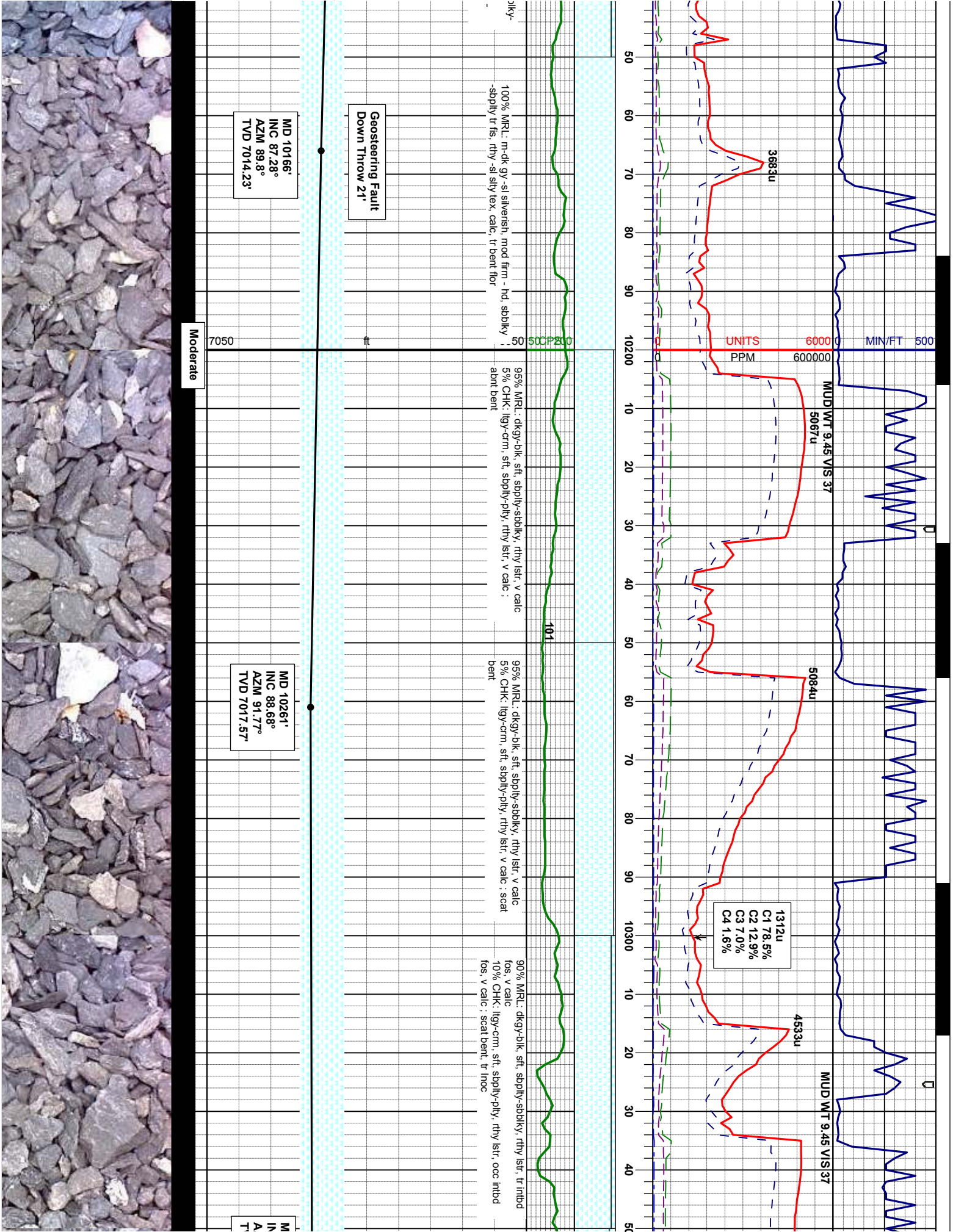
MD 9976'  
INC 90.86°  
AZM 90.37°  
TVD 7008.35°

MD 10071'  
INC 87.38°  
AZM 88.26°  
TVD 7009.8°

Fair





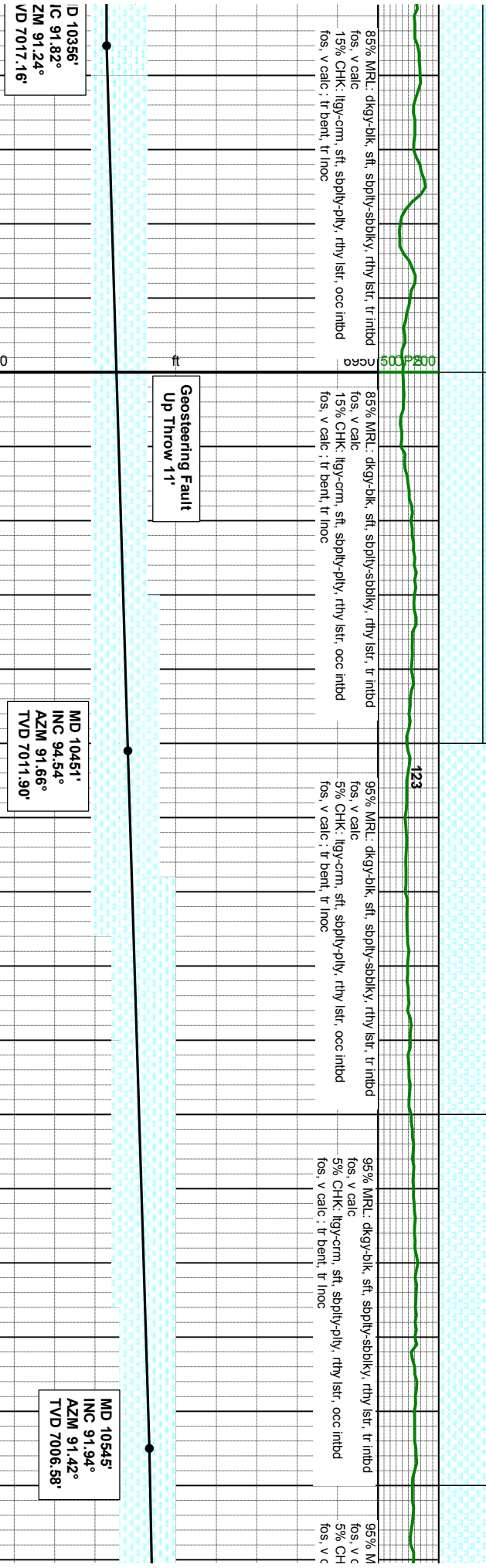
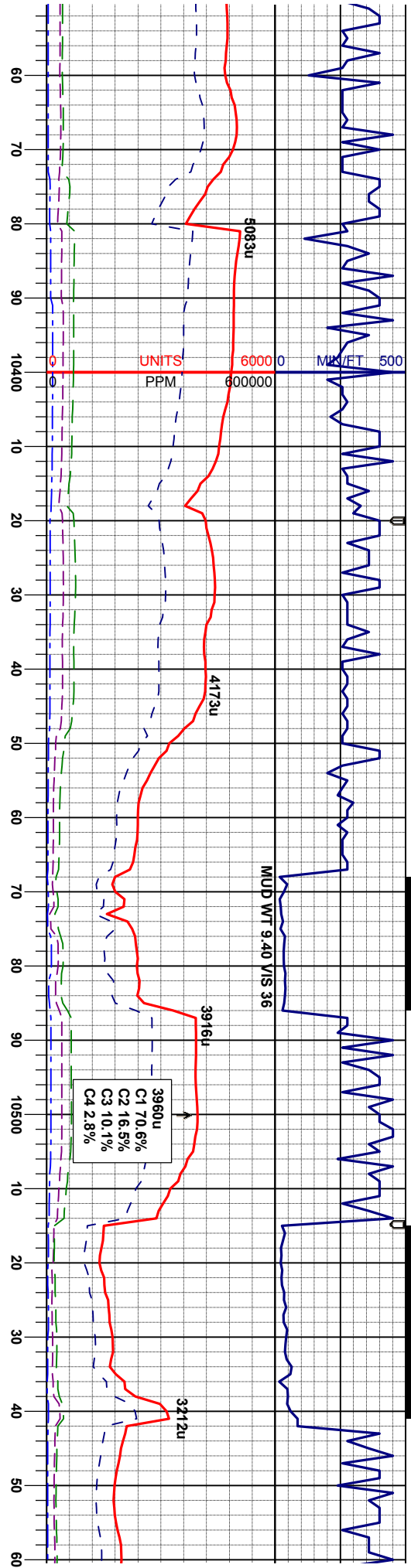


MD 10166'  
INC 87.28°  
AZM 89.8°  
TVD 7014.23'

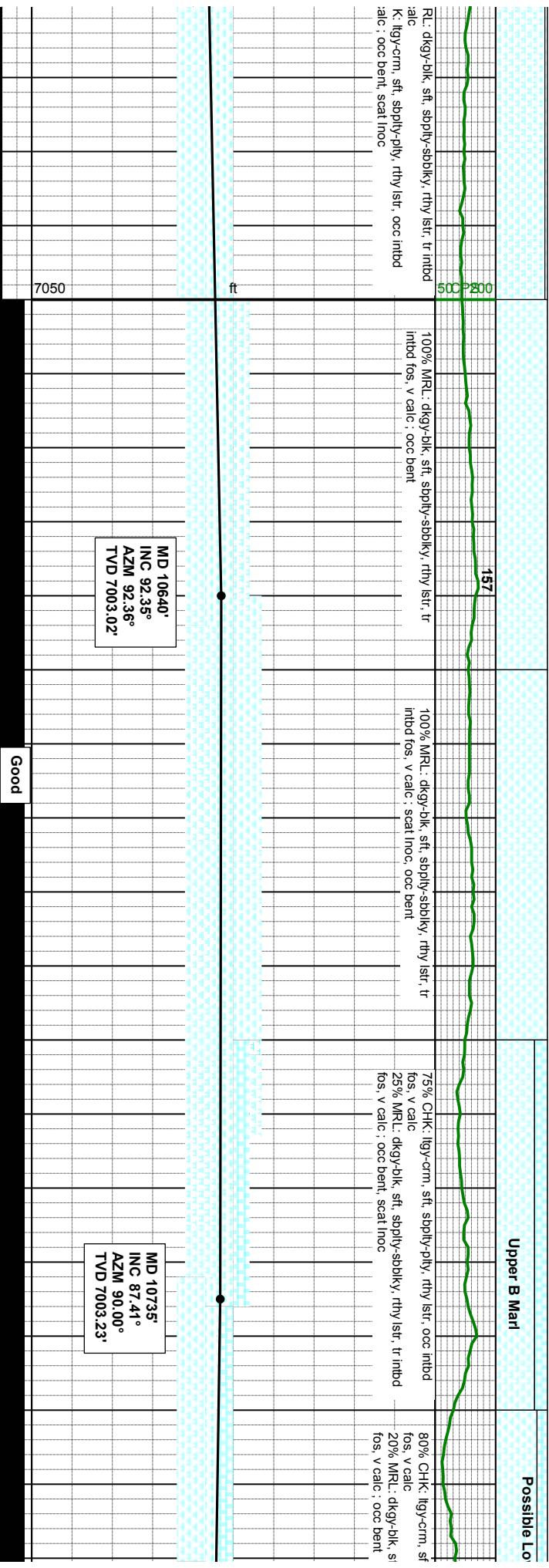
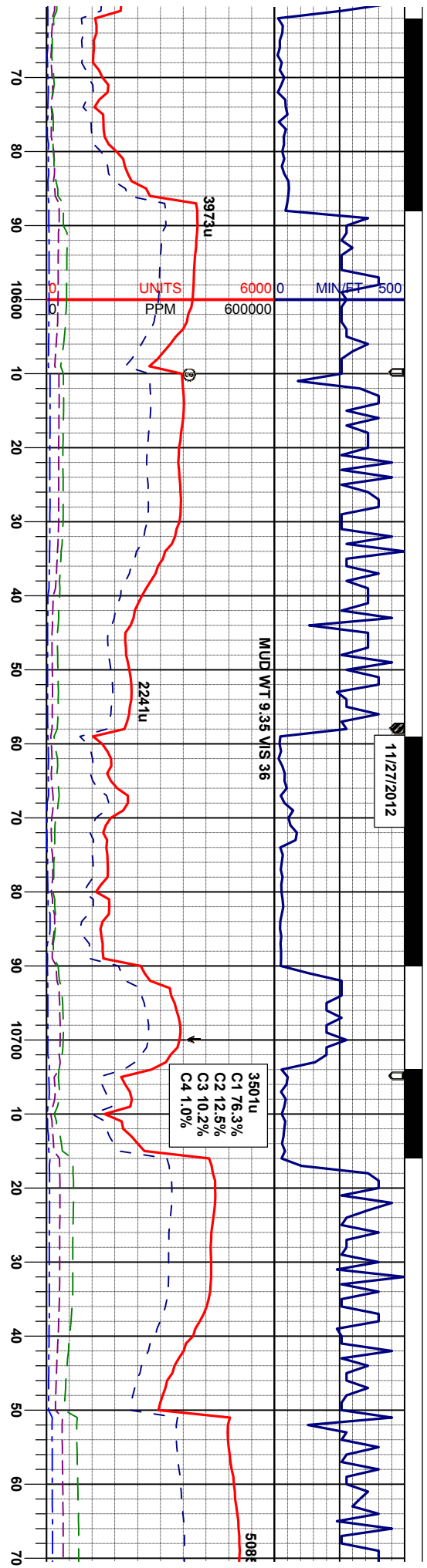
MD 10261'  
INC 88.68°  
AZM 91.77°  
TVD 7017.57'

1312u  
C1 78.5%  
C2 12.9%  
C3 7.0%  
C4 1.6%

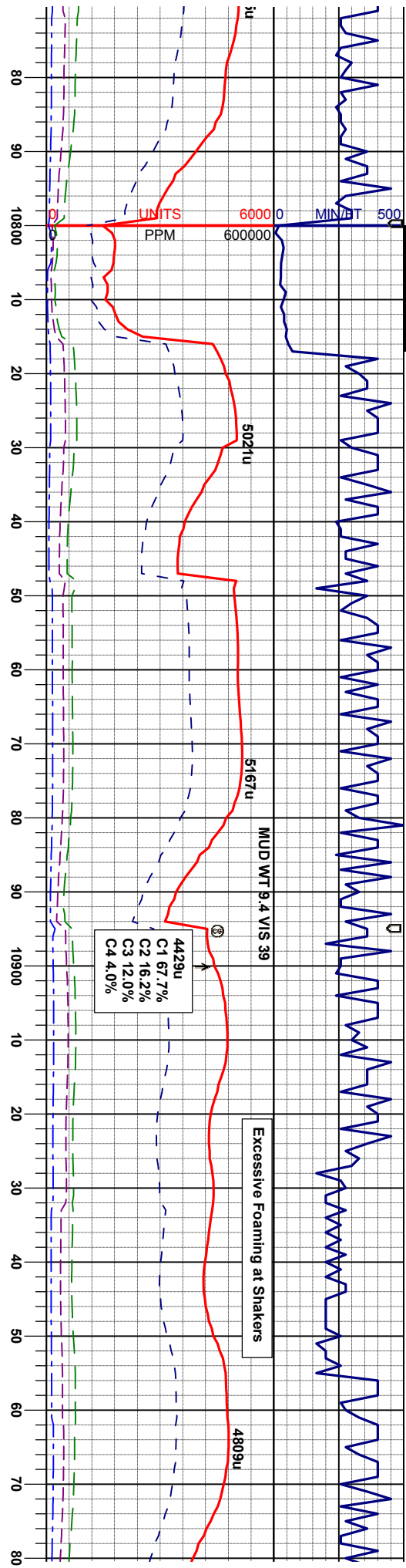












wer B Chalks

Fossils

t, sbbly-pty, rthy lst, occ imbd  
ft, sbbly-sbbly, rthy lst, tr mbd

75% MRL: m-dk gy, firm-mod firm, brlt, sbbly-sbbly,  
fts, rthy, calc, occ imbd fos,  
25% CHK: m-mdk gy occ lgy, sft-firm, sbbly, rthy -  
wxy tex, calc, occ spherical fos

70% MRL: m-dk gy, firm-mod firm, brlt, sbbly-sbbly,  
fts, rthy, calc, occ imbd fos,  
30% CHK: m-mdk gy occ lgy, sft-firm, sbbly, rthy -  
wxy tex, calc, occ spherical fos

75% MRL: m-dk gy, firm-mod firm, brlt, sbbly-sbbly,  
fts, rthy, calc  
25% CHK: m-mdk gy occ lgy, sft-firm, sbbly, rthy -  
wxy tex, calc ; cgl dk brn, v frt, chk mrl llt

75% MRL: m-dk gy, firm-mod firm,  
fts, rthy, calc  
25% CHK: m-mdk gy occ lgy, sft-fir  
wxy tex, calc ; cgl dk brn, v frt, chk r

Questionable Samples

Samples have a light gray sand like  
film on them that is hard to wash away  
From 10,800' - 11,400'

7050

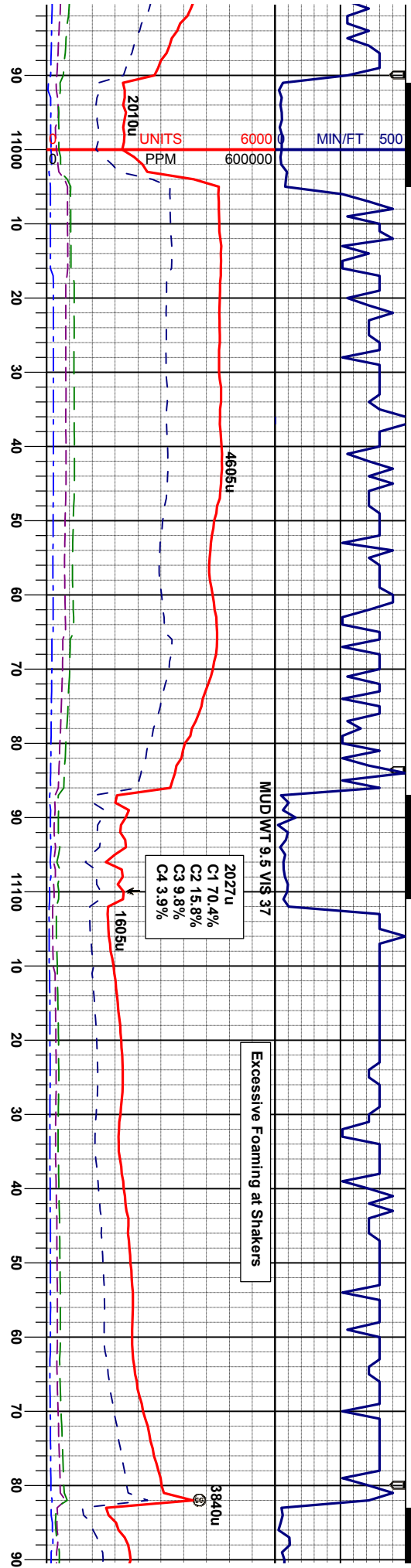
MD 10830'  
INC 89.38°  
AZM 90.18°  
TVD 7005.89'

MD 10925'  
INC 90.18°  
AZM 89.44°  
TVD 7006.25'

Good







brt, sbblky-sply,  
m, sbblky, rthy -  
nt lit

50% CHK: tan-lt brn ooc lly, st-firm ooc fr, sbblky,  
rthy - sl wxy tex, ooc fir brn chk w/ dark lit, v calc  
50% MRL: m-dk gy, firm-mod firm, brt, sbblky-sply,  
rthy, calc, ooc imbd fos,

60% CHK: tan-lt brn ooc lly, st-firm ooc fr, sbblky,  
rthy - sl wxy tex, ooc fir brn chk w/ dark lit, v calc  
40% MRL: m-dk gy, firm-mod firm, brt, sbblky-sply,  
rthy, calc, ooc imbd fos,

65% MRL: m-dk gy, firm-mod firm, brt, sbblky-sply,  
rthy, calc, ooc imbd fos,  
35% CHK: tan-lt brn ooc lly, st-firm ooc fr, sbblky,  
rthy - sl wxy tex, ooc fir brn chk w/ dark lit, v calc

60% MRL: m-dk gy, firm-mod firm, brt, sbblky-s  
rthy, calc, ooc imbd fos,  
40% CHK: tan-lt brn ooc lly, st-firm ooc fr, sb  
rthy - sl wxy tex, ooc fir brn chk w/ dark lit, v calc

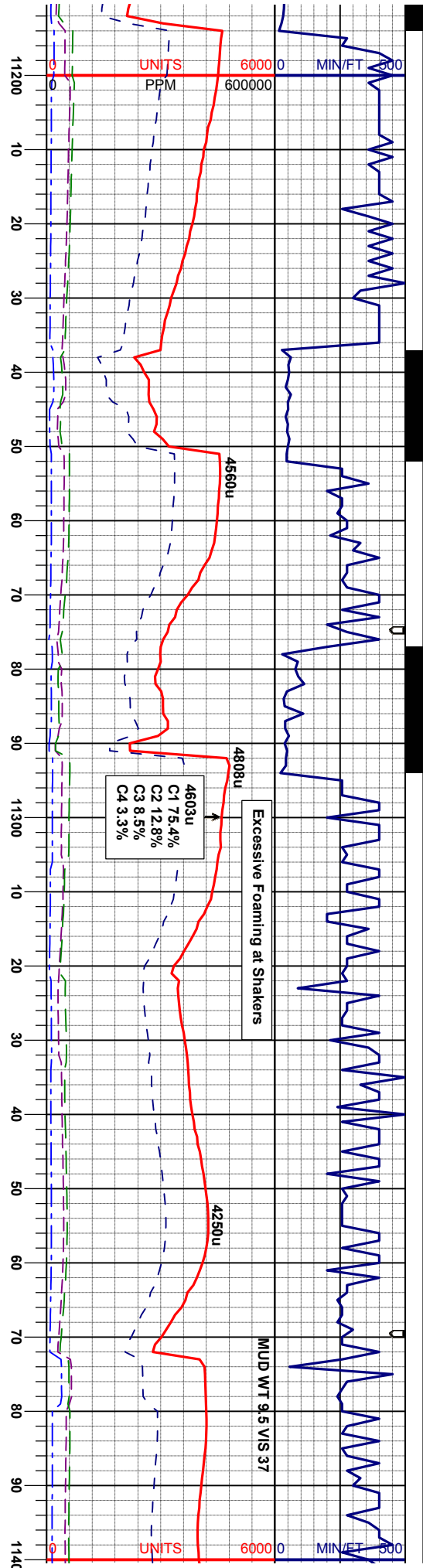
Samples have a light gray sand like  
film on them that is hard to wash away  
From 10,800' - 11,400'

MD 11020'  
INC 88.74°  
AZM 89.77°  
TVD 7007.14'

MD 11116'  
INC 88.24°  
AZM 90.51°  
TVD 7009.67'







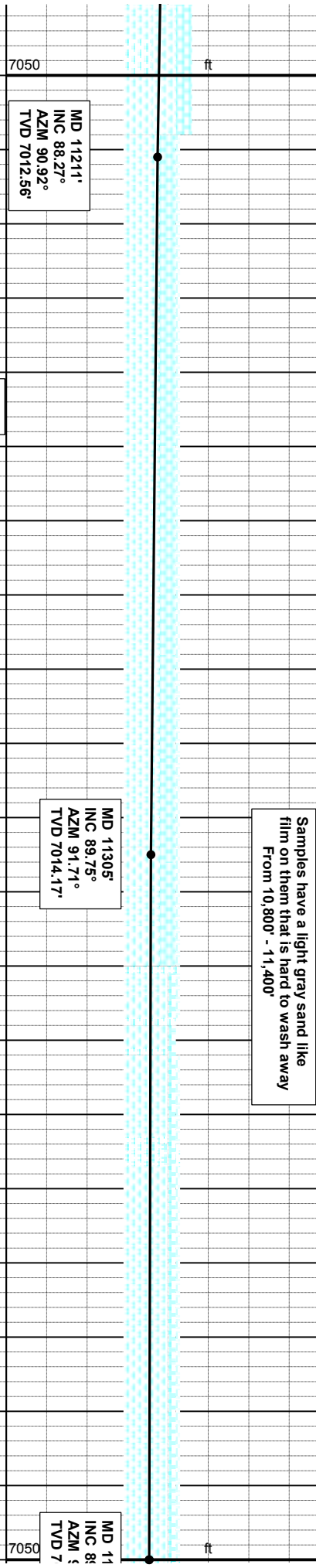
50% MRU: m-dk gy, firm-mod firm, brit, sbblky-spply, rthy, calc, occ imbd fos, 50% CHK: tan-lt brn occ lgy, sft-firm occ fri, sbblky, rthy - sl wvy tex.

50% MRU: m-dk gy, firm-mod firm, brit, sbblky-spply, rthy, calc, occ imbd fos, 50% CHK: tan-lt brn occ lgy, sft-firm occ fri, sbblky, rthy - sl wvy tex.

75% MRU: m-dk gy, firm-mod firm, brit, sbblky-spply, rthy, calc, occ imbd fos, 25% CHK: tan-lt brn occ lgy, sft-firm occ fri, sbblky, rthy - sl wvy tex.

90% MRU: m-dk gy, firm-mod firm, brit, sbblky-spply, rthy, calc, occ imbd fos, 10% CHK: tan-lt brn occ lgy, sft-firm occ fri, sbblky, rthy - sl wvy tex.

Samples have a light gray sand like film on them that is hard to wash away From 10,800' - 11,400'



MD 11211' INC 88.27° AZM 90.92° TVD 7012.56'

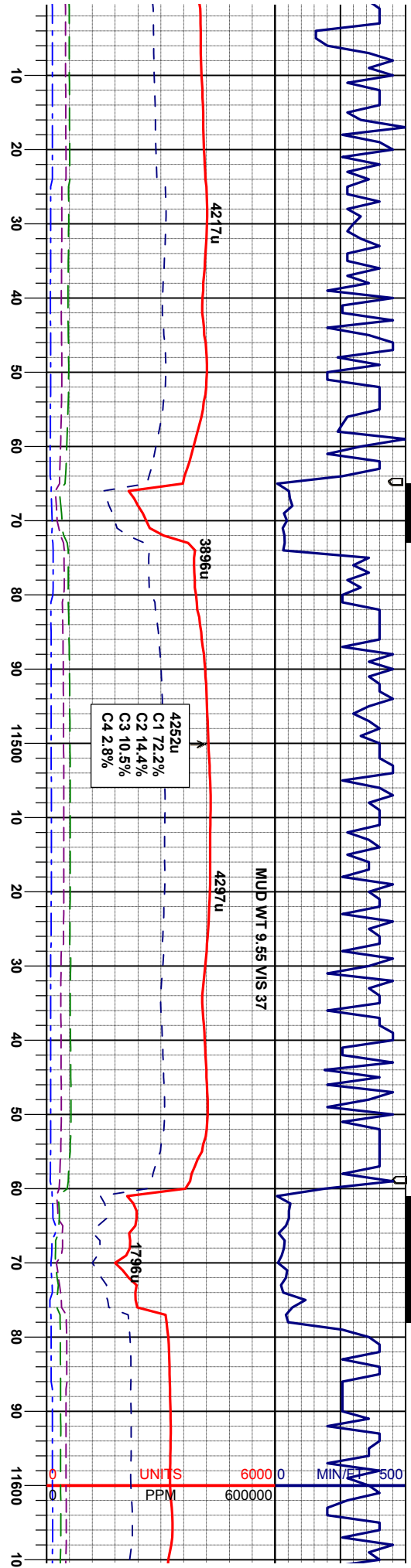
MD 11305' INC 89.75° AZM 91.71° TVD 7014.17'

MD 11305' INC 89.75° AZM 91.71° TVD 7014.17'

Good





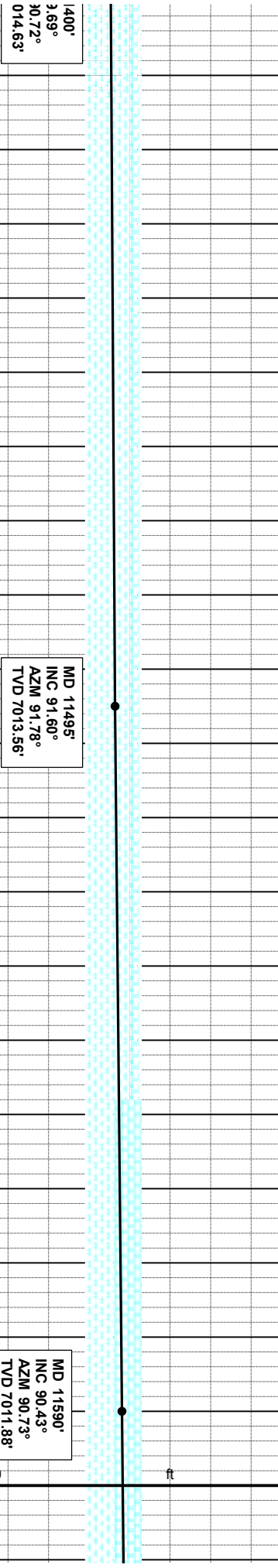


85% MRL: m-dk gy, firm-mod firm, brt, sbbky-sbply,  
rthy, calc, tr imbd fos,  
15% CHK: brn-ilt brn occ gybm, sft-firm occ fti,  
sbbky, rthy tex, occ bent

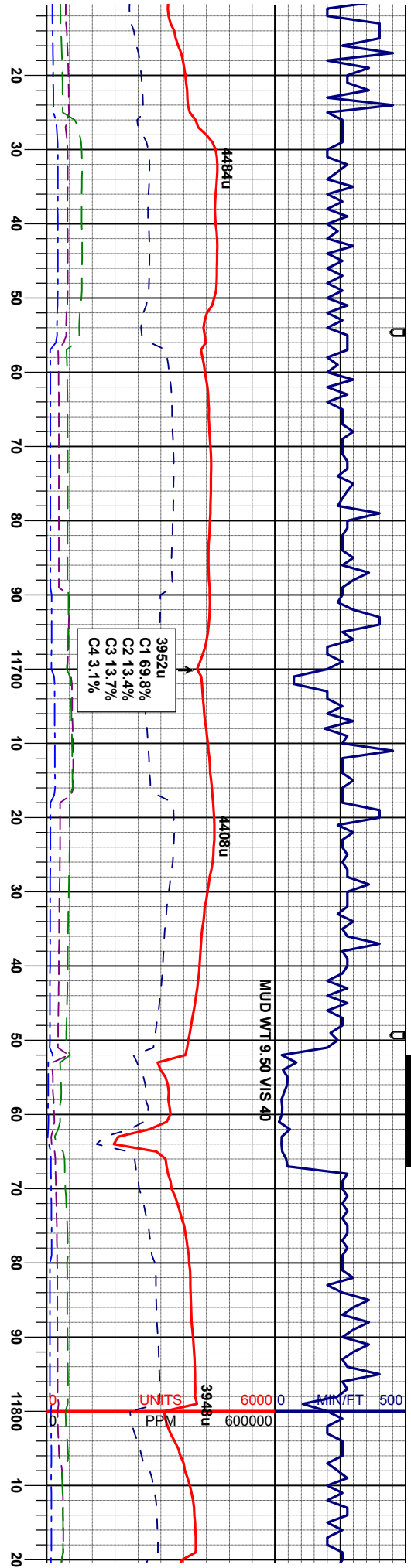
90% MRL: m-dk gy, firm-mod firm, brt, sbbky-sbply,  
rthy, calc, tr imbd fos,  
10% CHK: brn-ilt brn occ gybm, sft-firm occ fti,  
sbbky, rthy tex, occ bent

90% MRL: m-dk gy, firm-mod firm, brt, sbbky-sbply,  
rthy, calc, tr imbd fos,  
10% CHK: brn-ilt brn occ gybm, sft-firm occ fti,  
sbbky, rthy tex, occ bent

60% CHK: tan-brn occ ligybm - gy sft-firm occ fti,  
sbbky, rthy - sl wry tex occ dk ilt v calc,  
40% MRL: m-dk gy, sl silver, firm-mod firm, brt,  
sbbky-sbply, rthy, calc,  
65% CHK  
sbbky, tr  
35% MRL  
sbbky-sb







tan-brn occ lgy-brn - gy, sft-firm occ fri,  
y - sl wxy tex occ dk ill, v calc  
m-dk gy, sl silver, firm-mod firm, brlt,  
ply, rthy, calc.

60% CHK: tan-brn occ lgy-brn - gy, sft-firm occ fri,  
sbbky, rthy - sl wxy tex occ dk ill, v calc  
40% MRL: m-dk gy, sl silver, firm-mod firm, brlt,  
sbbky-sbbly, rthy, calc.

60% CHK: tan-brn occ lgy-brn - gy, sft-firm occ fri,  
sbbky, rthy - sl wxy tex occ dk ill, v calc  
40% MRL: m-dk gy, sl silver, firm-mod firm, brlt,  
sbbky-sbbly, rthy, calc.

80% MRL: dkgy-blk, mot, sft, sbbky-sbbly, rthy tex, v  
calc  
20% CHK: lgy-crm, mot, occ stri, sft, sbbly-ply, rthy  
tex, v calc; tr noc, scat bent

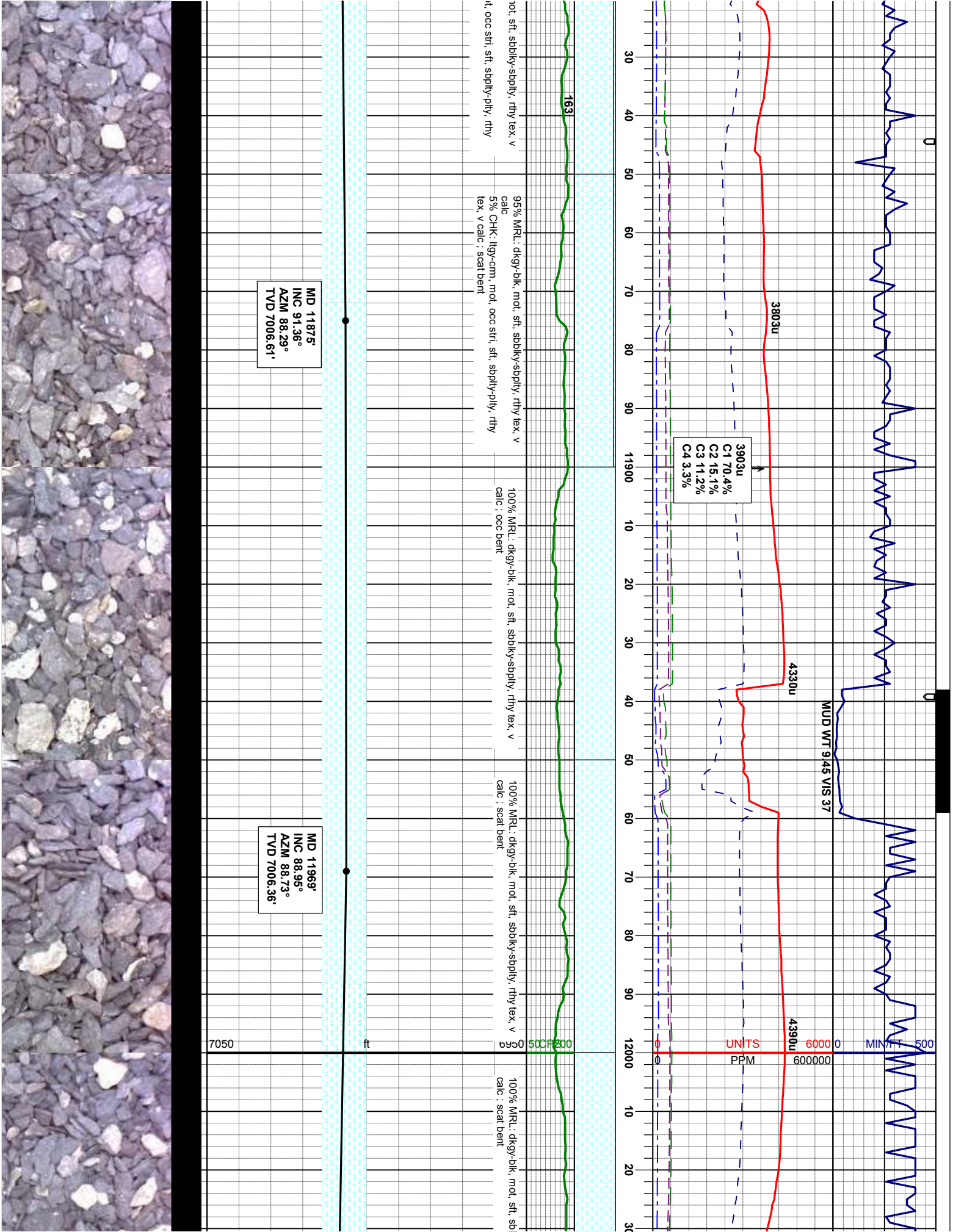
95% MRL: dkgy-blk, n  
calc  
5% CHK: lgy-crm, mc  
tex, v calc; scat bent

MD 11685°  
INC 91.73°  
AZM 88.75°  
TVD 7010.09°

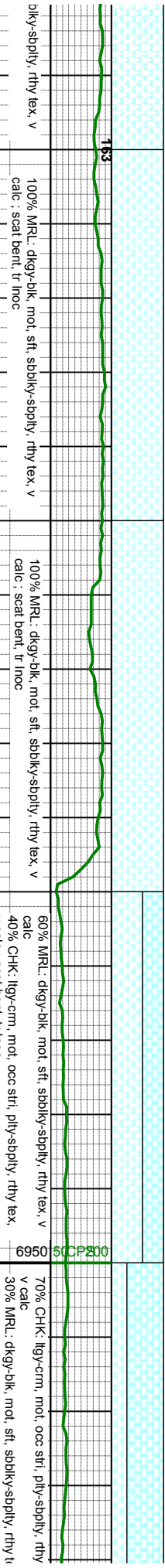
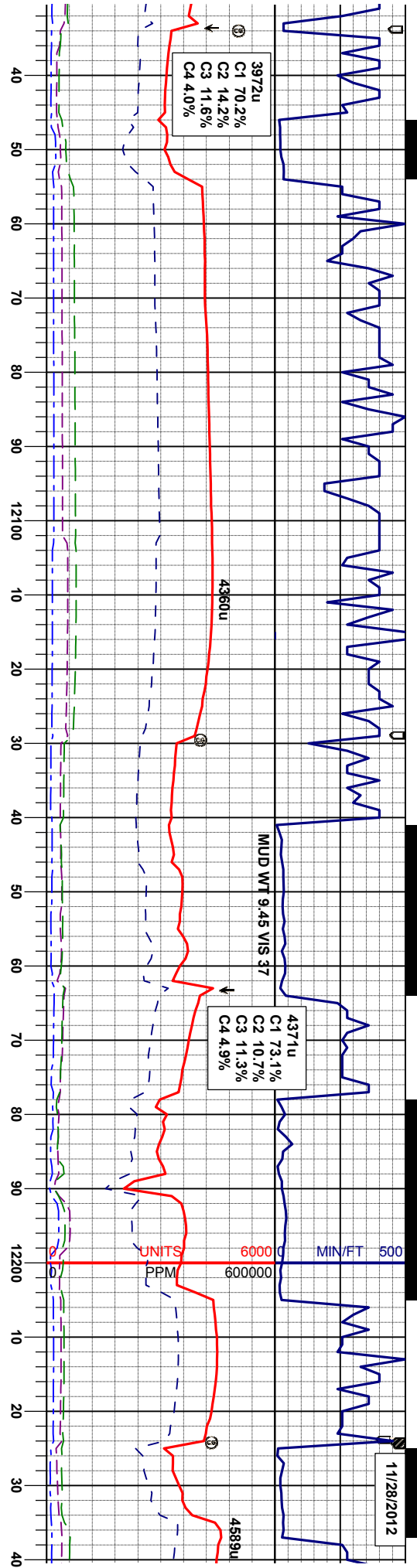
MD 11780°  
INC 90.55°  
AZM 89.58°  
TVD 7008.20°

Good









MD 12065'  
INC 87.23°  
AZM 87.68°  
TVD 7009.56'

MD 12159'  
INC 87.34°  
AZM 86.20°  
TVD 7014.01'

Geosteering Fault  
Down Throw 29'

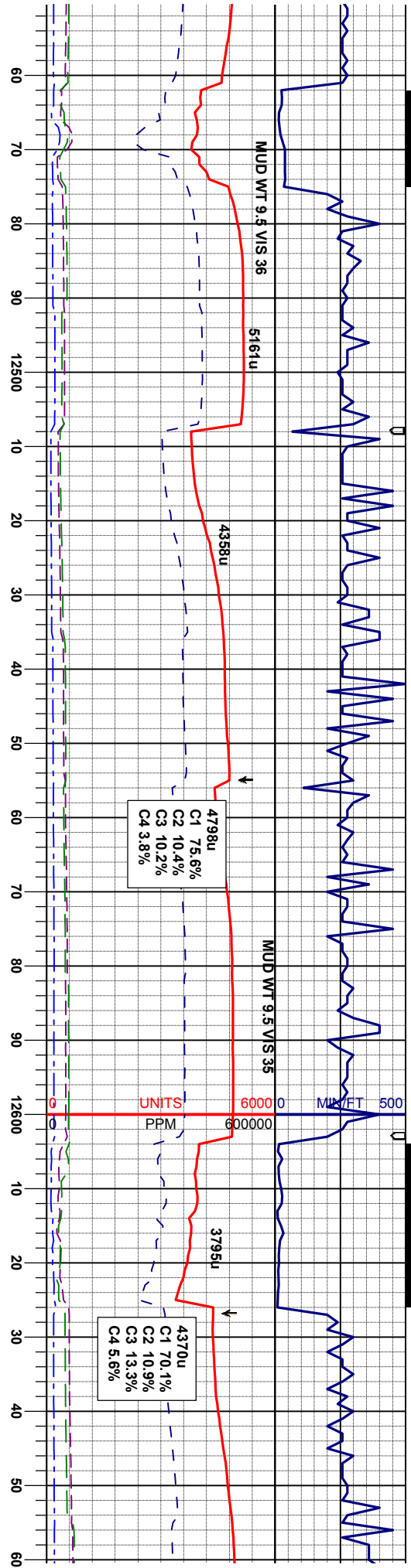
Good











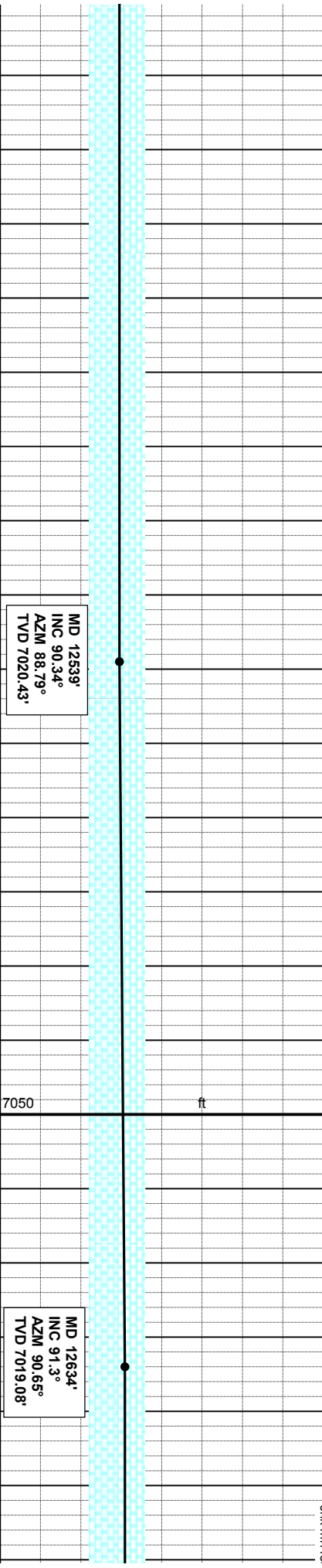
75% CHK: mgy -sl gybrr, firm, sb bly-sbply vs! mot, sl wxy, mostly hom txt, v calc  
25% MRL: dkgy-blk sl silver, firm, sbbly-sbply, rthy tex, v calc; occ bent, tr fos

75% CHK: mgy -sl gybrr, firm, sb bly-sbply vs! mot, sl wxy, mostly hom txt, v calc  
25% MRL: dkgy-blk sl silver, firm, sbbly-sbply, rthy tex, v calc; occ bent, tr fos

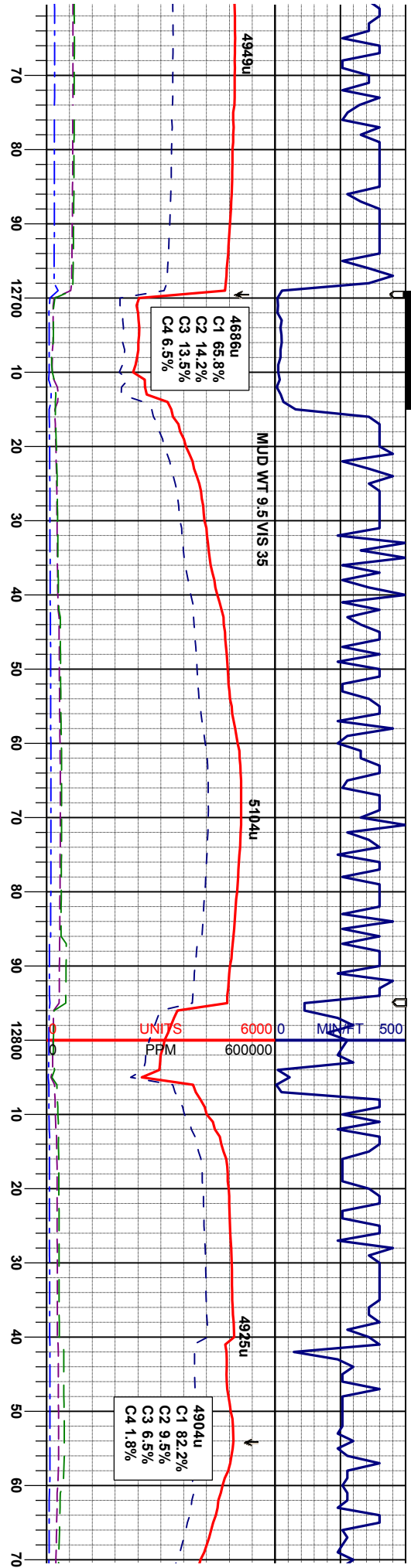
65% CHK: mgy -sl gybrr, firm, sb bly-sbply vs! mot, sl wxy, mostly hom txt, v calc  
35% MRL: dkgy-blk sl silver, firm, sbbly-sbply, rthy tex, v calc; occ bent, tr fos

60% CHK: mgy -sl gybrr, firm, sb bly-sbply vs! mot, sl wxy, mostly hom txt, v calc  
40% MRL: dkgy-blk sl silver, firm, sbbly-sbply, rthy tex, v calc; occ bent, tr fos

60% CHK: mgy -sl gybrr, firm, sb bly-sbply vs! mot, sl wxy, mostly hom txt, v calc  
40% MRL: dkgy-blk sl silver, firm, sbbly-sbply, rthy tex, v calc; occ bent, tr fos







Faulting

Questionable Samples

Bentonite

ngy -sl gybm, firm, sb bky-sbply vsf mot, csily hom txt v calc  
dkgy-bk sl silver, firm, sbply-sbply, rthy  
occ bent, tr fos; abnt dk brn mud mat w/ s incl, pos fit mat

40% CHK: mgy -sl gybm, firm, sb bky-sbply vsf mot, sl wxy, mostly hom txt v calc  
60% MRL: dkgy-bk sl silver, firm, sbply-sbply, rthy tex, v calc; occ bent, tr fos; abnt dk brn mud mat w/ chk mrl fos incl, pos fit mat, v calc

30% CHK: mgy -sl gybm, firm, sb bky-sbply vsf mot, sl wxy, mostly hom txt v calc  
70% MRL: dkgy-bk sl silver, firm, sbply-sbply, rthy tex, v calc; occ bent, tr fos; abnt dk brn mud mat w/ chk mrl fos incl, pos fit mat, v calc

90% MRL: dkgy-bk sl silver, firm, sbply-sbply, rthy tex, v calc  
10% CHK: m-mndk gy occ llygy, sft-firm, sbply, rthy - wxy tex, calc; v abnt bent

100% MRL: dkgy-bk s tex, v calc; v abnt bent

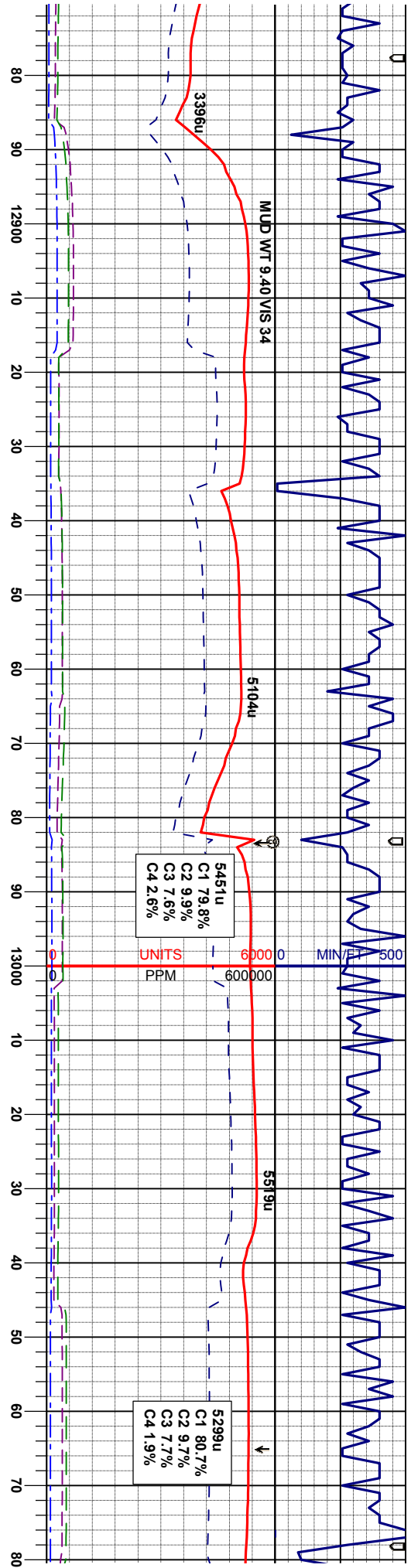
Samples are identical to 10900 -11000 MD



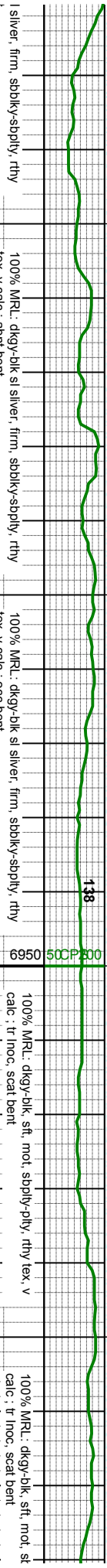
Good



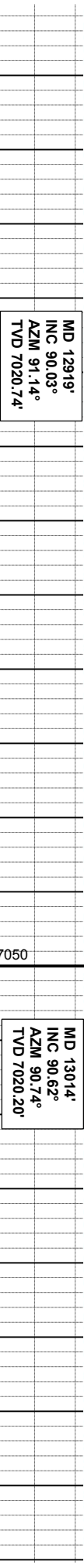




Possible Lower B Marl



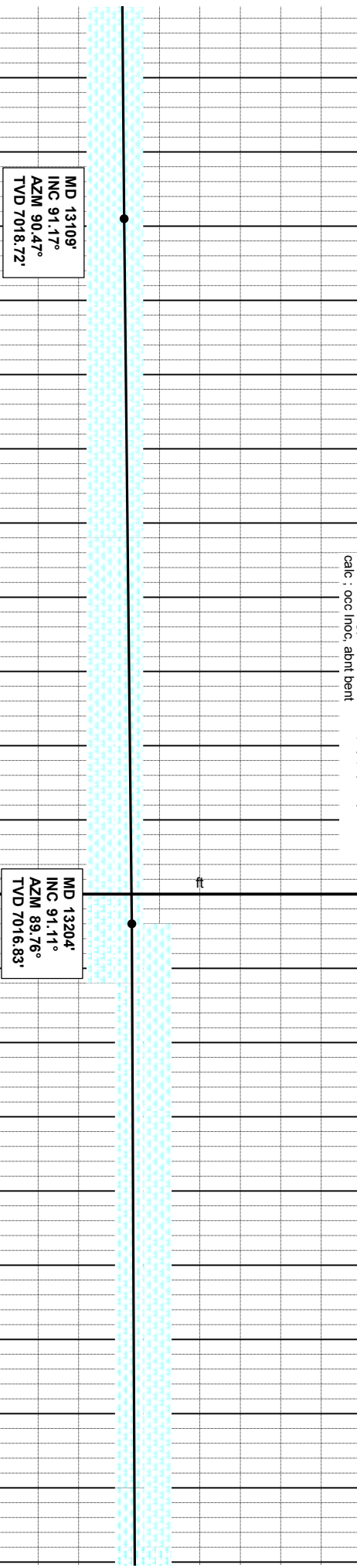
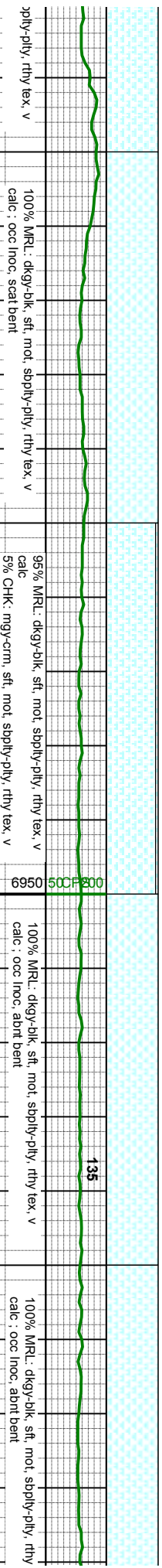
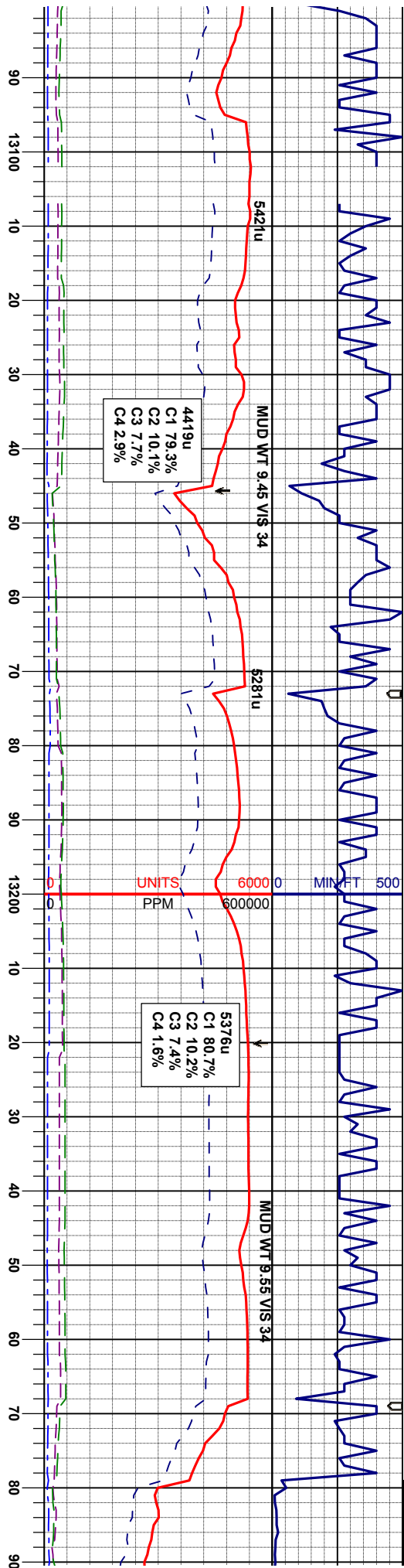
silver, firm, sbbkly-sbply, rthy  
100% MRL: dkgy-blk sl silver, firm, sbbkly-sbply, rthy  
tex, v calc: abnt bent  
100% MRL: dkgy-blk sl silver, firm, sbbkly-sbply, rthy  
tex, v calc: occ bent  
100% MRL: dkgy-blk, sft, mot, sbply-pthy, rthy tex, v  
calc: tr inoc, scat bent  
100% MRL: dkgy-blk, sft, mot, sbply-pthy, rthy tex, v  
calc: tr inoc, scat bent



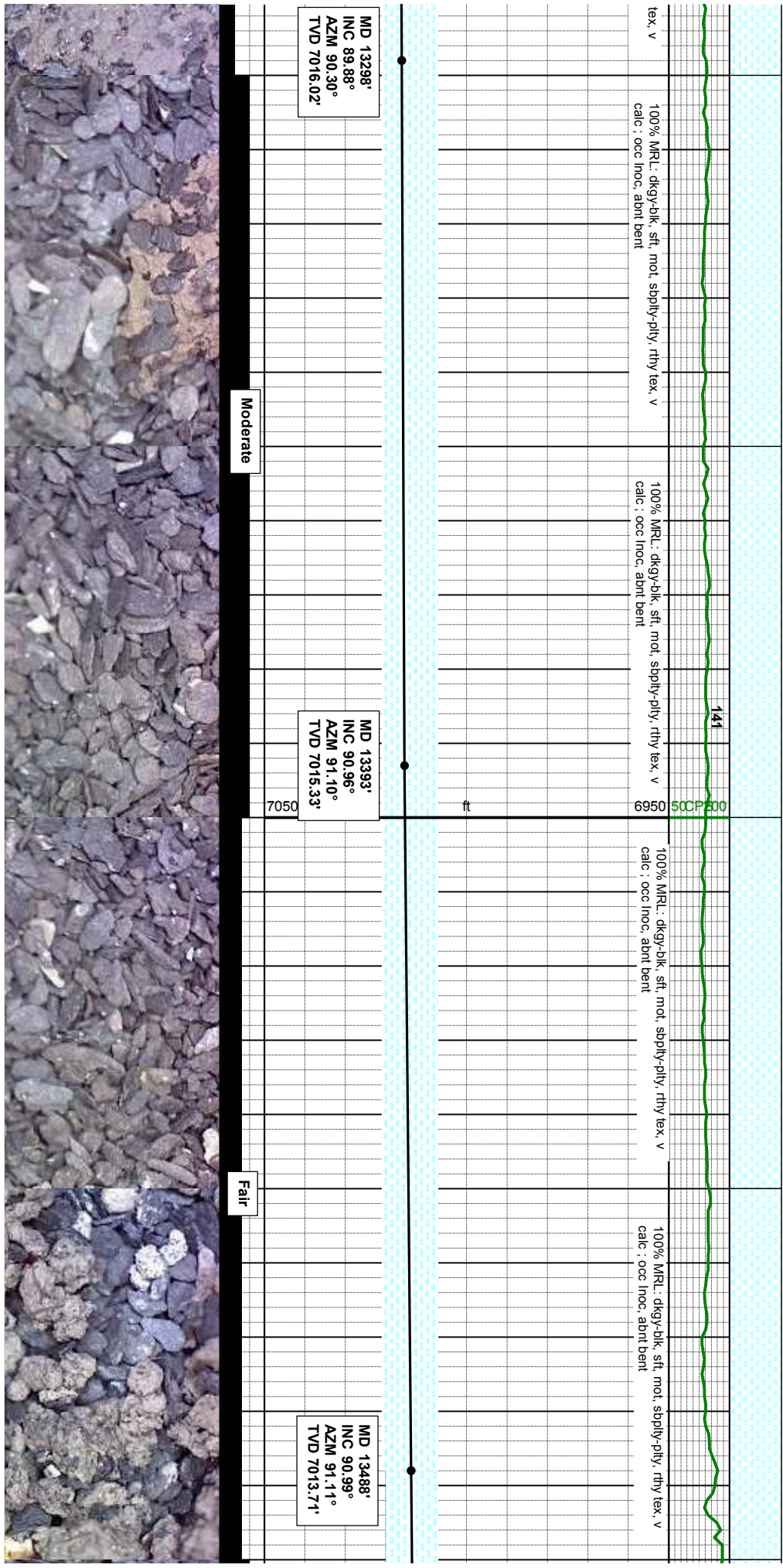
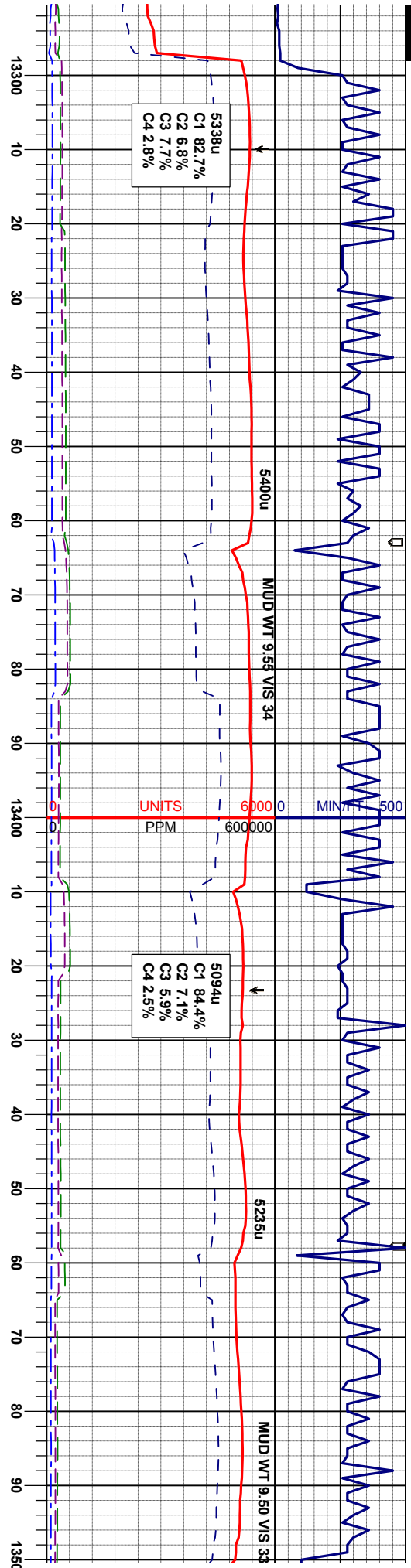
Good





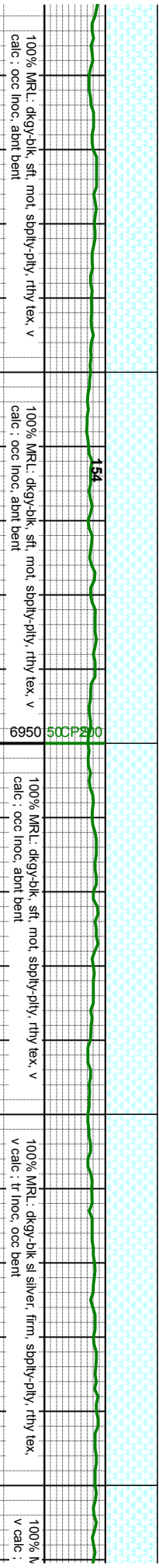
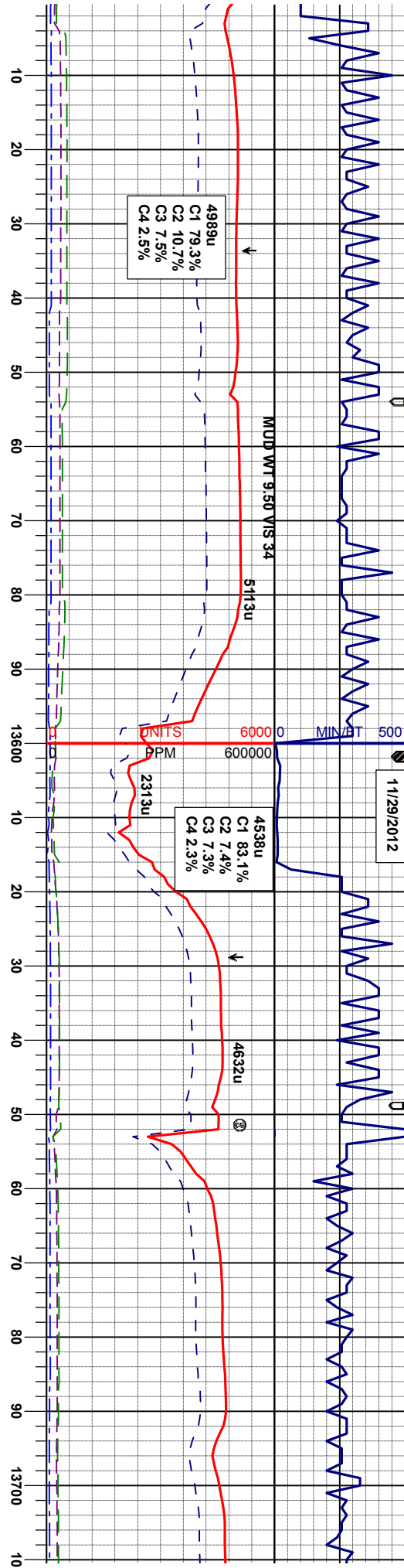








11/29/2012



MD 13583'  
INC 91.05°  
AZM 89.71°  
TVD 7012.03'

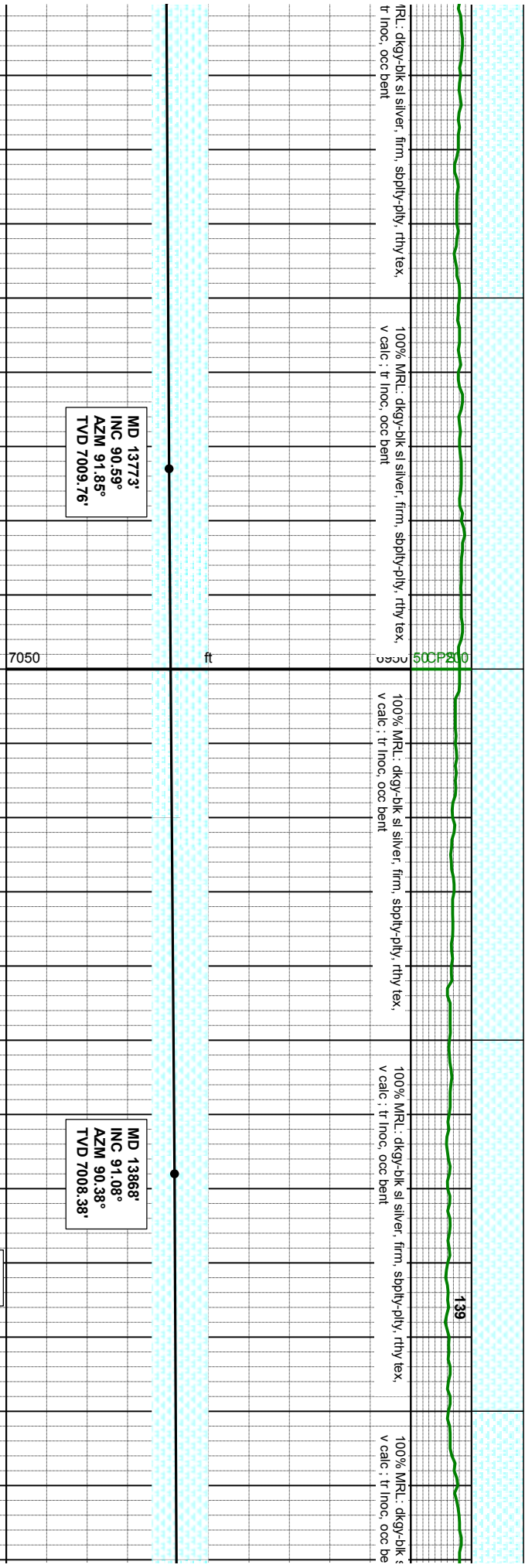
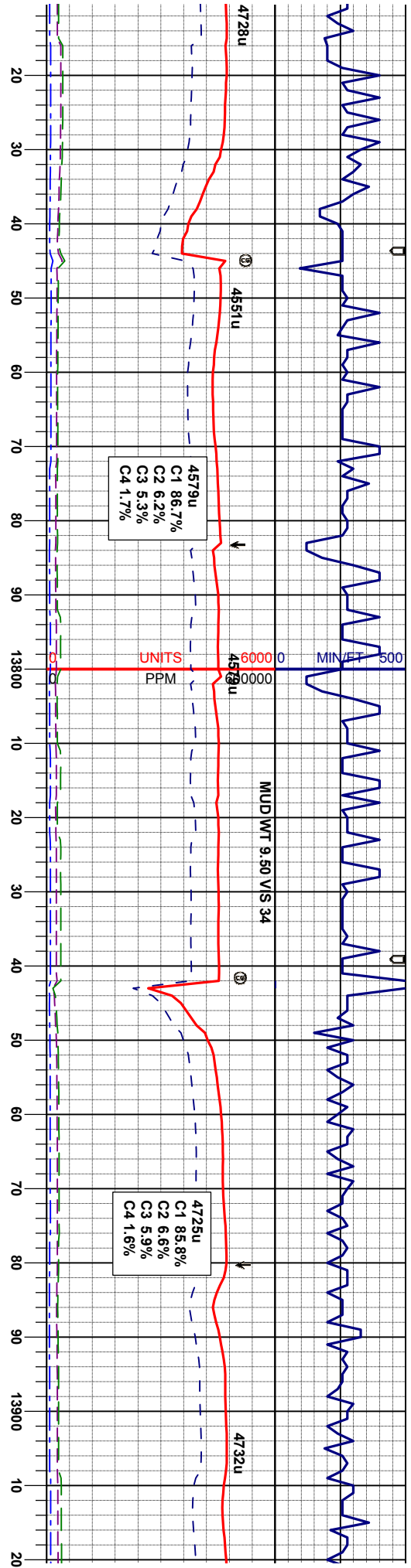
MD 13678'  
INC 90.55°  
AZM 91.65°  
TVD 7010.71'

Moderate

Good







MD 13773'  
INC 90.59°  
AZM 91.85°  
TVD 7009.76'

MD 13868'  
INC 91.08°  
AZM 90.38°  
TVD 7008.38'

Good



