

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name HIGHWAY 160 37N-2HZ

Location NW/NE SEC. 2, T1N, R66W

State COLORADO

Country USA

API Number 05-123-38025

Region DJ BASIN

Spud Date 11/30/2013

Surface Coordinates 666' FNL & 1532' FEL
40.085531 -104.74031

Bottom Hole Coordinates 1' FSL & 1340' FEL
40.073158 -104.7396

Ground Elevation 5102'

Logged Interval 6908' To 12480'

Formation NIBRARA C

Type of Drilling Fluid FSNL

County WELD

Rig Number ENSIGN 132

AFE # 2085778

Field WATTENBERG

Drilling Completed 12/7/2013

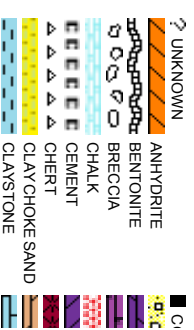
K.B. Elevation 5115'

Total Depth 5572'

Company ANADARKO PE
Address 1099 18th St, S
Denver, CO 80

Name JAKE STUART
Company ANADARKO PE
Address 1099 18th St, S
Denver, CO 80

SHANA S



Operator

ETROLEUM INC.

uite 1800
202

Geologist

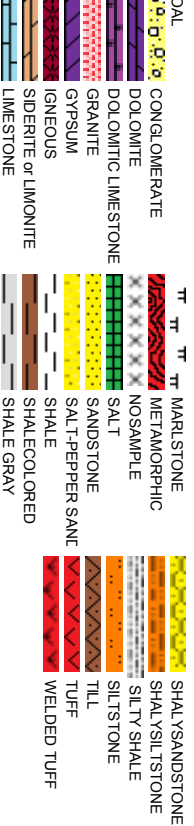
ETROLEUM INC.

uite 1800
202

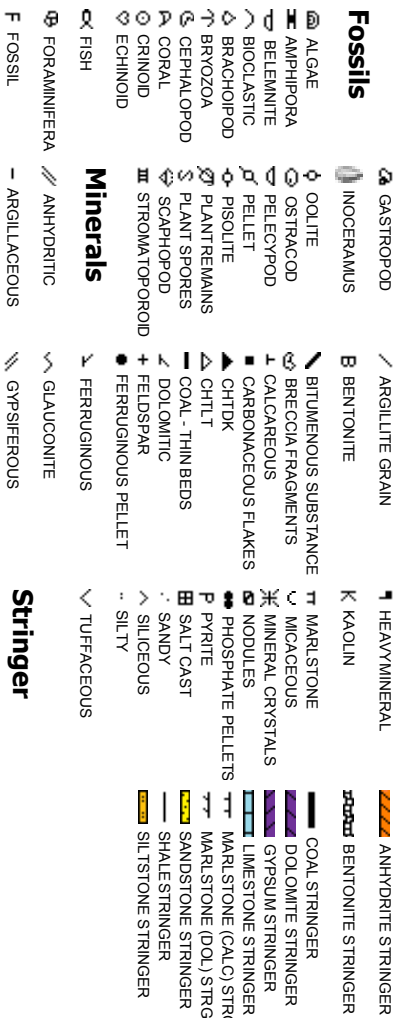
Other

WIRN, THOMAS WRIGHT

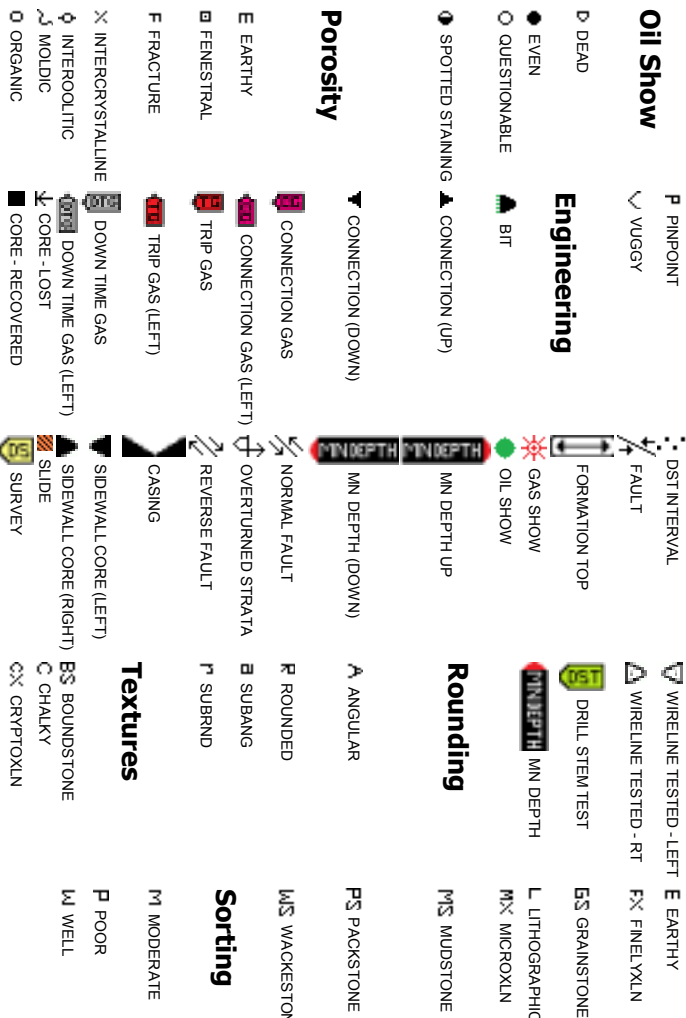
Rock Types



Accessories



Other Symbols



Slide/Rotate

Columbine Logging Two Person
Rigged Up 1340hrs 12/01/2013
With Bloodhound Unit # 0313

ROP
ROF
GAMMA

Logging Started @
1910hrs 12/02/2013
at 6908' MD

Total Gas & Chromatograph

GAS
C1
C2
C3
C4

Bit Data
Bit #: 02
Type: SMITH SDI611MPX
Size: 8.75
Depth In: 1,246'
Depth Out: 7,823'
Jets: 6x18
S/N: JH4404

Depth Labels

% Lith

Begin in Sussex Formation

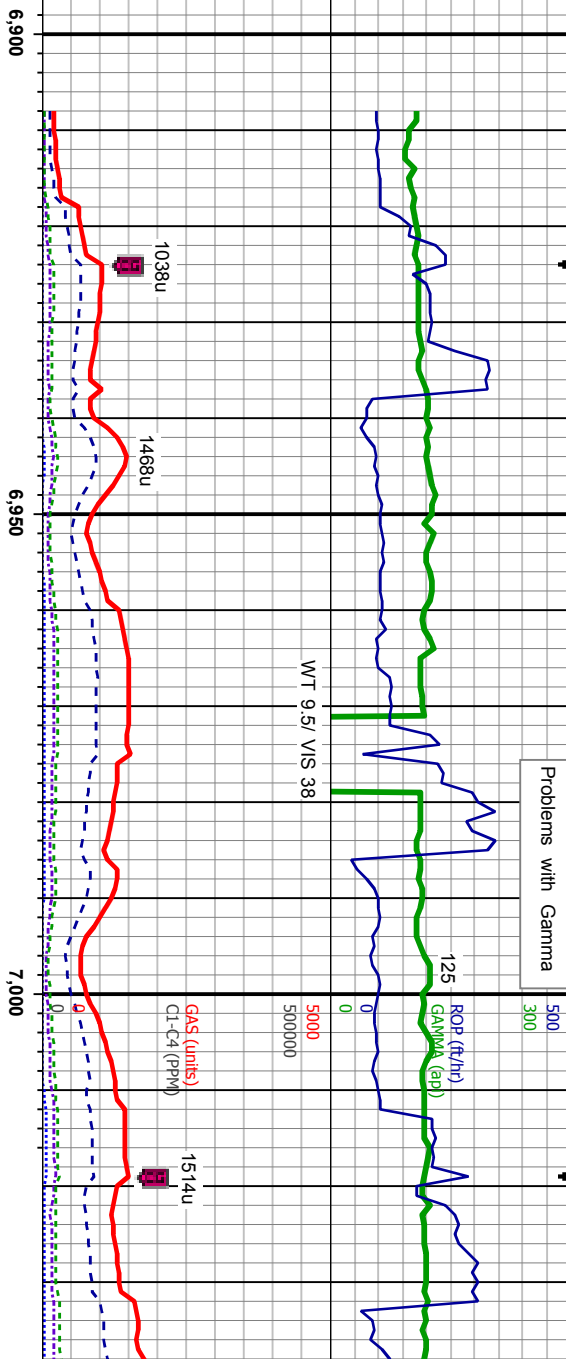
Well Bore
TVD

Acetone was used as the cutting agent with the dimple filled to the rim
The ratings are based on 7 descriptors:
None, Slight trace, Trace, Fair, Moderate, Good, and Excellent. The descriptor used is based on the loggers observations and best judgement of brilliance, color and longevity of the cut.

Oil Show

Images

Problems with Gamma



MD: 6,928'
TVD: 6,841.7'
Inclination: 5.8°
Azimuth: 189.2°
VS: -746.17'

MD: 6,975'
TVD: 6,886.1'
Inclination: 12.14°
Azimuth: 188.16°
VS: -738.93'

MD: 7,023'
TVD: 6,934.53'
Inclination: 17.18°
Azimuth: 187.18°
VS: -726.9'

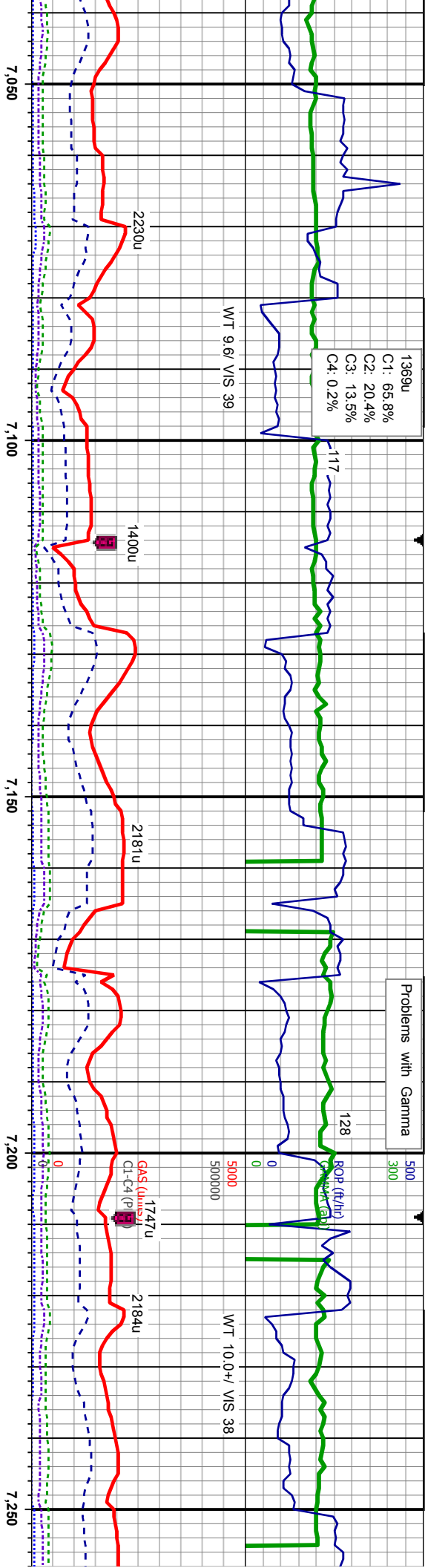
SLTY SH: lt-med gy, sb
ply-sb blk, mod sft-fr, w
srt, sb md-sb ang, mod fri,
stng bl cut, dull yel ring

SLTY SH: lt-med gy, sb
ply-sb blk, mod sft-fr, w
srt, sb md-sb ang, mod fri,
stng bl cut, dull yel ring

SLTY SH: lt-med gy, sb
ply-sb blk, mod sft-fr, w
srt, sb md-sb ang, mod fri,
stng bl cut, dull yel ring

ST
FM
CE





MD: 7,070'
TVD: 6,979.07'
Inclination: 19.98
Azimuth: 186.27
VS: 712.03'

MD: 7,118'
TVD: 7,023.73'
Inclination: 22.98
Azimuth: 183.96
VS: 694.54'

MD: 7,165'
TVD: 7,066.44'
Inclination: 26.39
Azimuth: 177.96
VS: 674.94'

MD: 7,213'
TVD: 7,108.75'
Inclination: 29.98
Azimuth: 174.08
VS: 652.34'

SLTY SH: lt-med gy, sb
ply-sb blkly, mod sft-frn, w
srt, sb md-sb ang, mod fri,
stng bl cut, dull yel ring

SLTY SH: lt-med gy, sb
ply-sb blkly, mod sft-frn, w
srt, sb md-sb ang, mod fri,
stng bl cut, dull yel ring

SLTY SH: lt-med gy, sb
ply-sb blkly, mod sft-frn, w
srt, sb md-sb ang, mod fri,
stng bl cut, dull yel ring

SLTY SH: lt-med gy, sb
ply-sb blkly, mod sft-frn, w
srt, sb md-sb ang, mod fri,
stng bl cut, dull yel ring

MD: 7,213'
TVD: 7,108.75'
Inclination: 29.98
Azimuth: 174.08
VS: 652.34'

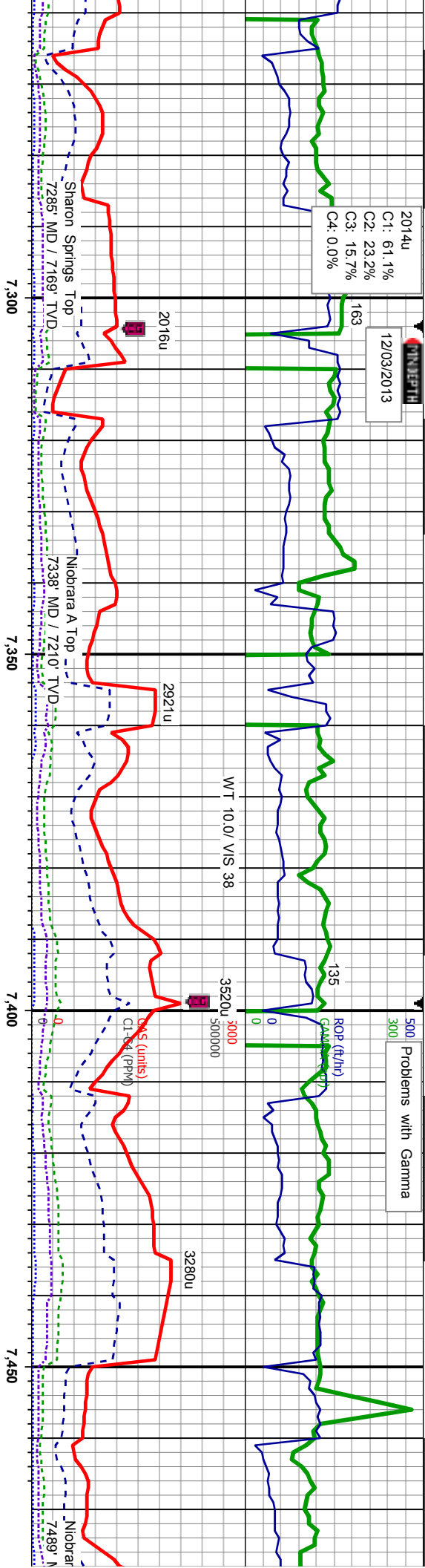


2014u

C1: 61.1%
C2: 23.2%
C3: 15.7%
C4: 0.0%

12/03/2013

Problems with Gamma



Sharon Springs Top
7285' MD / 7169' TVD

Niobrara A Top
7338' MD / 7210' TVD

6550

Niobrara
7489' MD

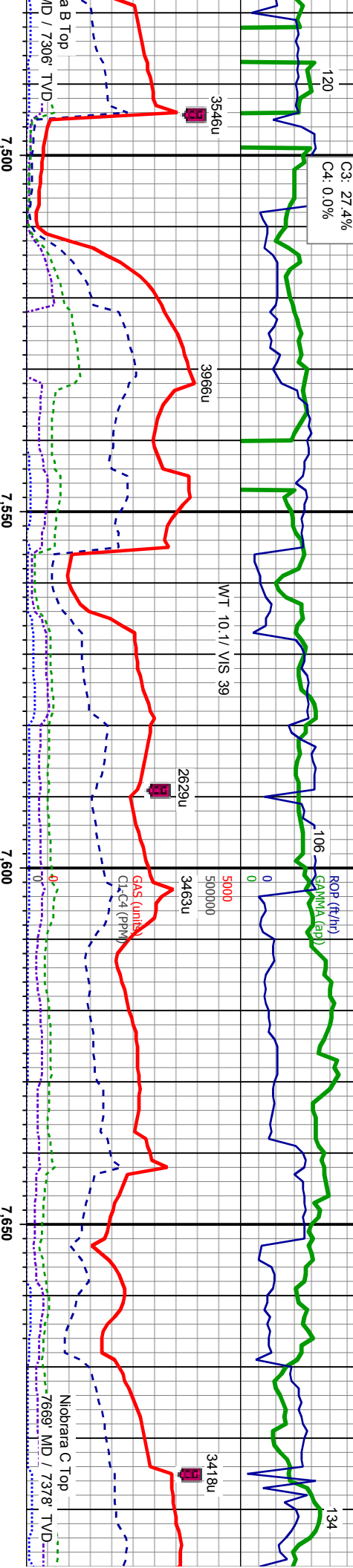
SLTY SH: lt-med gy, sb ply-sb blkly, mod sft-frm, w srt, sb md-sb ang, mod fri, abt bent, sting bl cut, dull yel ring	CHK: lt gy-bm, blkly-sb pily, sft-frm, sb rd-sb ang, mod fri, SLTY SH: med-dk gy, sb ply-sb blkly, mod sft-frm, w srt, sb md-sb ang, mod fri, occ bent, sting bl cut, bri bl ring	CHK: lt gy-bm, blkly-sb pily, sft-frm, sb rd-sb ang, mod fri, SLTY SH: med-dk gy, sb ply-sb blkly, mod sft-frm, w srt, sb md-sb ang, mod fri, tr bent, sting bl cut, bri bl ring	CHK: lt-med gy-bm, blkly-sb pily, sft-frm, sb rd-sb ang, mod fri, MRLST: med-dk gy-bm, blkly-sb pily, sft-frm, sb rd-sb ang, mod fri, tr silty sh, sting bl cut, bri bl ring	CHK: lt-med gy- pily, sft-frm, sb mod fri, MRLST gy-bm, blkly-sb p sb rd-sb ang, r bl cut, bri bl ring
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MD: 7,308' TVD: 7,186.89' Inclination: 38.44° Azimuth: 181.74° VS: 598.52'	MD: 7,355' TVD: 7,222.43' Inclination: 43.27° Azimuth: 181.24° VS: 567.79'	MD: 7,403' TVD: 7,255.48' Inclination: 49.63° Azimuth: 179.77° VS: 533.03'	MD: 7,450' TVD: 7,284.48' Inclination: 54.18° Azimuth: 179.67° VS: 496.05'
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500 Problems with Gamma

C1: 42.8%
C2: 29.7%
C3: 27.4%
C4: 0.0%



bdm, blk-y-sb	CHK: lt-med gy-bm, blk-y-sb	CHK: med-dk gy-bm, blk-y-sb ply, sft-frm, sb	CHK: med-dk gy-bm, blk-y-sb ply, sft-frm, sb	CHK: lt-med gy-bm, blk-y-sb
dd-sb ang,	ply, sft-frm, sb rd-sb ang,	blk-y-sb ply, sft-frm, sb	blk-y-sb ply, sft-frm, sb	ply, sft-frm, sb rd-sb ang,
: med-dk	mod fri, MRLST: med-dk	rd-sb ang, mod fri, MRLST:	rd-sb ang, mod fri, MRLST:	mod fri, MRLST: med-dk
bdly, sft-frm,	gy-brn, blk-y-sb ply, sft-frm,	dk gy-brn, blk-y-sb ply,	dk gy-brn, blk-y-sb ply,	bdly, sft-frm,
mod fri, sting	sb rd-sb ang, mod fri, sting	sft-frm, sb rd-sb ang, mod	sft-frm, sb rd-sb ang, mod	mod fri, sting
	bl cut, bri bl ring	fri, tr cal incl, sting bl cut, bri	fri, occ cal incl, sting bl cut,	

MD: 7,498'
TVD: 7,311.03'
Inclination: 58.65°
Azimuth: 179.43°
VS: -456.08'

MD: 7,546'
TVD: 7,334.08'
Inclination: 63.92°
Azimuth: 179.81°
VS: -414'

MD: 7,594'
TVD: 7,354.18'
Inclination: 66.58°
Azimuth: 180.16°
VS: -370.41'

MD: 7,641'
TVD: 7,370.42'
Inclination: 73.05°
Azimuth: 181.44°
VS: -326.4'

MD: 7,689'
TVD: 7,382.71'
Inclination: 77.28°
Azimuth: 181.55°
VS: -280.03'

7600

3303u
C1: 63.7%
C2: 21.2%
C3: 13.9%
C4: 1.2%

Problems with Gamma

ROP SCALE
CHANGE
12/04/2013
12/05/2013

FINISH

2646u
C1: 64.0%
C2: 22.1%
C3: 13.7%
C4: 0.2%

WT 10.1/ VIS 38

3451u

3556u

500b WT 10.1/ VIS 39
5000000
@ 0935fms on 12/03/2013

TD Curve @ 7823'
@ 0935fms on 12/03/2013

Bit Data
Bit #: 03
Type: Veral VS513D
Size: 6.05
Depth In: 7,823'
Depth Out: 12,480'
Jets: 5X16
S/N: 4006249

Started drilling the Lateral
@ 1800fms on 12/05/2013

2349u

224

7,700

7,750

7,800

7,850

7,900

CHK: lt-med gy-brn, blk-y-sb
ply, sft-firm, sb rd-sb ang,
mod fri, MRLST: dk gy-brn,
blk-y-sb ply, sft-firm, sb
rd-sb ang, mod fri, sting bl
cut, bri bl ring

MD: 7,736'
TVD: 7,390.85'
Inclination: 82.8°
Azimuth: 183.03°
VS: 233.81'

CHK: lt-dk gy-brn, blk-y-sb
ply, sft-firm, sb rd-sb ang,
mod fri, MRLST: dk gy-brn,
blk-y-sb ply, sft-firm, sb
rd-sb ang, mod fri, abnt cal
incl, sting bl cut, bri bl ring

MD: 7,776'
TVD: 7,394.84'
Inclination: 85.77°
Azimuth: 183.55°
VS: 194.09'

CHK: lt-dk gy-brn, blk-y-sb
ply, sft-firm, sb rd-sb ang,
mod fri, MRLST: dk gy-brn,
blk-y-sb ply, sft-firm, sb
rd-sb ang, mod fri, abnt cal
incl, sting bl cut, dull bl ring

MD: 7,823'
TVD: 7,396.64'
Inclination: 89.84°
Azimuth: 183.55°
VS: 147.23'

CHK: lt-dk gy-brn, blk-y-sb
ply, sft-firm, sb rd-sb ang,
mod fri, MRLST: dk gy-brn,
blk-y-sb ply, sft-firm, sb
rd-sb ang, mod fri, abnt cal
incl, sting bl cut, dull bl ring

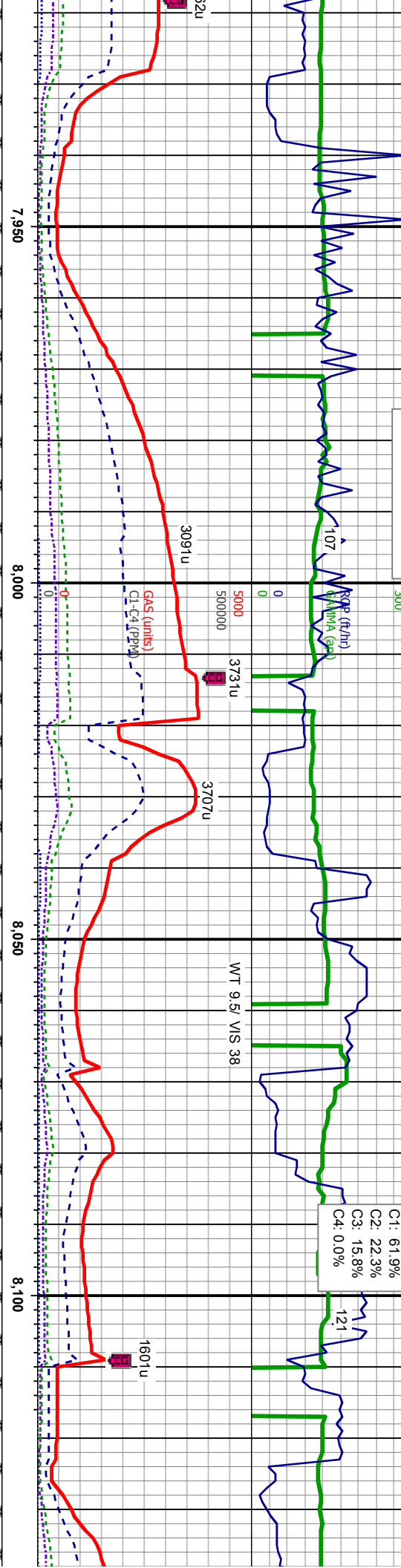
MD: 7,873'
TVD: 7,396.52'
Inclination: 89.82°
Azimuth: 184.17°
VS: 97.42'

TVD SCALE
CHANGE

7600



Problems with Gamma



CHK: lt-dk gy-brn, blk-y-sb
ply, sft-frm, sb rd-sb ang,
mod fri, MRLST: dk gy-brn,
blk-y-sb ply, sft-frm, sb
rd-sb ang, mod fri, abnt cal
incl, sting bl cut, dull bl ring

MD: 7.968'
TVD: 7,395.47'
Inclination: 91.45°
Azimuth: 183.2°
VS: -2.65'

CHK: lt-dk gy-brn, blk-y-sb
ply, sft-frm, sb rd-sb ang,
mod fri, MRLST: dk gy-brn,
blk-y-sb ply, sft-frm, sb
rd-sb ang, mod fri, abnt cal
incl, sting bl cut, dull bl ring

MD: 8.063'
TVD: 7,392.78'
Inclination: 91.79°
Azimuth: 180.65°
VS: 392.23'



Problems with Gamma

575u

C1: 62.5%
C2: 22.4%
C3: 15.1%
C4: 0.0%

WT 9.5/ VIS 38

RSP (ft/hr)
GAMMA (g/g)
5000
5000000

PROBLEMS WITH EQUIPMENT

8,150

8,200

8,250

8,300

8,350

1622u

1376u (15)
1376u (15)

871u

650u

479u

CHK: lt-dk gy-brn, blk-y-sb
y, sft-frn, sb rd-sb ang,
mod fri, MRLST: dk gy-brn,
gy-sb ply, sft-frn, sb
rd-sb ang, mod fri, occ cal
incl, stmg bl cut, dull bl ring

7100

CHK: lt-med gy-brn, blk-y-sb
ply, sft-frn, sb rd-sb ang,
mod fri, MRLST: dk gy-brn,
blk-y-sb ply, sft-frn, sb
rd-sb ang, mod fri, occ cal
incl, stmg bl cut, dull bl ring

7100

CHK: lt-med gy-brn, blk-y-sb
ply, sft-frn, sb rd-sb ang,
mod fri, MRLST: dk gy-brn,
blk-y-sb ply, sft-frn, sb
rd-sb ang, mod fri, at
incl, stmg bl cut, dull bl ring

MD: 8.158'
TVD: 7,391.48'
Inclination: 89.78°
Azimuth: 177.76°
VS: 187.2'

7600

MD: 8.253'
TVD: 7,390.64'
Inclination: 91.23°
Azimuth: 178.17°
VS: 282.15'

MD: 8.348'
TVD: 7,389.32'
Inclination: 90.37°
Azimuth: 176.63°
VS: 377.06'



Problems with Gamma

12/06/2013

720u
C1: 63.8%
C2: 21.8%
C3: 14.5%
C4: 0.0%

ROP (ft/hr)
GAMMA (cpm)
WT 9.5/ VIS 39

Problems with Equipment

GAS (units)
CI-C4 (ppm)

8,400

8,450

8,500

8,550

338u

422u

602u

WT 9.5/ VIS 39

WT 9.5/ VIS

blky-sb
ang,
-brn,
b
nt cal
l ring

CHK: lt-med gy-brn, blky-sb
ply, sft-firm, sb rd-sb ang,
mod fri, MRLST: dk gy-brn,
blky-sb ply, sft-firm, sb
rd-sb ang, mod fri, abnt cal
incl, sting bl cut, dull bl ring

CHK: lt-med gy-brn, blky-sb
ply, sft-firm, sb rd-sb ang,
mod fri, MRLST: dk gy-brn,
blky-sb ply, sft-firm, sb
rd-sb ang, mod fri, abnt cal
incl, sting bl cut, dull bl ring

7600

MD: 8.443°
TVD: 7,389.39°
Inclination: 89.54°
Azimuth: 176.9°
VS: 471.92°

MD: 8.538°
TVD: 7,388.31°
Inclination: 91.78°
Azimuth: 177.13°
VS: 566.8°



600 Problems with Gamma
300

925u
C1: 52.0%
C2: 22.3%
C3: 18.7%
C4: 7.0%

121 ROP (ft/hr)
GAMMA (cp)

118

87

37 4268u
5000
500000

WT 9.5/ VIS 39

2882u

PROBLEMS WITH EQUIPMENT

GLS (units)
CLC4 (PPM)

1874u

2535u

8,600

8,650

8,700

8,750

7100

CHK: med-dk gy-brn,
biky-sb pily, sft-frm, sb
rd-sb ang, mod fri, MRLST:
dk gy-brn, biky-sb pily,
sft-frm, sb rd-sb ang, mod
fri, occ cal incl, sting bl cut,
dull bl ring

CHK: med-dk gy-brn,
biky-sb pily, sft-frm, sb
rd-sb ang, mod fri, MRLST:
dk gy-brn, biky-sb pily,
sft-frm, sb rd-sb ang, mod
fri, occ cal incl, sting bl cut,
dull bl ring

7600

MD: 8.634'
TVD7: 389.04'
Inclination: 87.38
Azimuth: 176.56
VS662.65'

MD: 8.729'
TVD7: 392.05'
Inclination: 86.98
Azimuth: 177.27
VS757.48'



Problems with Gamma

13.12u

Problems with

600
300
0

ROP (ft/hr)
GAMMA (cp)

ROP (ft/hr)
GAMMA (cp)

5000
500000

5000
500000

WT 9.5/ V/S 40

3147u

3099u

GAS (units)
CL-C4 (PPM)

GAS (units)
CL-C4 (PPM)

PROBLEMS WITH EQUIPMENT

8,800

8,850

8,900

8,950

9,000

8,800

8,850

8,900

8,950

9,000

7100

7100

CHK: med-dk gy-brn,
blky-sb pily, sft-fm, sb
rd-sb ang, mod fri, MRLST:
dk gy-brn, blky-sb pily,
sft-fm, sb rd-sb ang, mod
fri, occ cal incl, sting bl cut,
dull bl ring

CHK: lt-dk gy-brn, blky-sb
pily, sft-fm, sb rd-sb ang,
mod fri, MRLST: dk gy-brn,
blky-sb pily, sft-fm, sb
rd-sb ang, mod fri, occ cal
incl, sting bl cut, dull bl ring

MD: 8.824'
TVD: 7.393'
Inclination: 89.88'
Azimuth: 177.05'
VS852.37'

7600

7600

MD: 8.919'
TVD: 7.393.48'
Inclination: 89.54'
Azimuth: 178.33'
VS947.3'

MD: 9.014'
TVD: 7.394.12'
Inclination: 89
Azimuth: 178.5
VS1,042.28'



Gamma

2040u
C1: 57.5%
C2: 21.2%
C3: 15.8%
C4: 5.6%

Problems with Gamma
600
300

ROP (ft/hr)
GAMMA (cp)
GAS (units)
CL-C4 (ppm)

WT 9.5/ VIS 40

5000
500000

CL-C4 (ppm)

9,050 9,100 9,150 9,200

2638u

1400u

2016u

1588u

1173u

CHK: lt-dk gy-bm, blk-y-sb
ply, sft-frn, sb rd-sb ang,
mod fri, MRLST: dk gy-bm,
blk-y-sb ply, sft-frn, sb
rd-sb ang, mod fri, occ cal
incl, sting bl cut, bri bl ring

CHK: lt-dk gy-brn, blk-y-sb
ply, sft-frn, sb rd-sb ang,
mod fri, MRLST: dk gy-brn,
blk-y-sb ply, sft-frn, sb
rd-sb ang, mod fri, occ cal
incl, sting bl cut, bri bl ring

MD: 9,109'
TVD: 3,944.71'
Inclination: 89.6°
Azimuth: 179.84°
VS: 1,137.27'

MD: 9,205'
TVD: 7,396.27'
Inclination: 89.72°
Azimuth: 180.12°
VS: 1,233.27'



Problems with Gamma

1023u
C1: 59.7%
C2: 21.0%
C3: 15.1%
C4: 4.2%

ROP (ft/hr)
GAMMA (cp)

WT 9.5/ VIS 40

0
5000
500000

GAS (units)
CL-C4 (PPM)

9,250

9,300

9,350

9,400

9,450

1433u

1618u

1790u

1806u

1619u

CHK: med-dk gy-brn, blk-y-sb pty, sft-frn, sb

rd-sb ang, mod fri, MRLST: dk gy-brn, blk-y-sb pty, sft-frn, sb rd-sb ang, mod fri, tr cal incl, sting bl cut, bri bl ring

CHK: lt-dk gy-brn, blk-y-sb pty, sft-frn, sb rd-sb ang, mod fri, MRLST: dk gy-brn, blk-y-sb pty, sft-frn, rd-sb ang, mod fri, c incl, sting bl cut, bri bl ring

MD: 9,300' TVD: 9,395.38' Inclination: 90.15° Azimuth: 180.97° VS: 1,328.26'

MD: 9,396' TVD: 9,395.49' Inclination: 89.72° Azimuth: 181.95° VS: 1,423.22'

TVD (ft)

7100



2988u

C1: 67.8%
C2: 20.8%
C3: 11.4%
C4: 0.0%

143

Problems with Gamma

600
300

ROP (ft/h)
GAMMA (cpm)

11

5000
500000

3122u

3342u

GAS (units)
CL-C4 (PPM)

9,700

9,750

9,800

9,850

3175u

2100u

3193u

CHK: med-dk gy-brn,
blky-sb ply, sft-frm, sb

rd-sb ang, mod fri, MRLST:
dk gy-brn, blky-sb ply,

sft-frm, sb rd-sb ang, mod
fri, tr cal incl, sting bl cut, bri

bl ring

CHK: lt-med gy-brn, blky-sb
ply, sft-frm, sb rd-sb ang,

mod fri, MRLST: dk gy-brn,
blky-sb ply, sft-frm, sb

rd-sb ang, mod fri, tr cal
incl, sting bl cut, bri bl ring

681'
,395.22'
ation: 90.22°
uth: 179.33°
709.19'

MD: 9.776'
TVD: 7,393.79'
Inclination: 91.5°
Azimuth: 179.33°
VS: 1,804.17'

7600

MD: 9.871'
TVD: 7,391.9'
Inclination: 90.77°
Azimuth: 178.97°
VS: 1,899.15'

Problems with Gamma

2101u

C1: 62.4%

C2: 22.4%

C3: 15.2%

C4: 0.0%

2671u

C1: 65.4%

C2: 21.2%

C3: 13.3%

C4: 0.0%

ROP (ft/hr)

GAMMA (cp)

WT 9.5+ / VIS 40

5000

500000

2774u

3502u

2611u

1631u

3202u

126

73

0

0

0

0

0

0

0

0

0

0

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0

0

0

0

2101u

C1: 62.4%

C2: 22.4%

C3: 15.2%

C4: 0.0%

2671u

C1: 65.4%

C2: 21.2%

C3: 13.3%

C4: 0.0%

ROP (ft/hr)

GAMMA (cp)

WT 9.5+ / VIS 40

5000

500000

2774u

3502u

2611u

1631u

3202u

126

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2101u

C1: 62.4%

C2: 22.4%

C3: 15.2%

C4: 0.0%

2671u

C1: 65.4%

C2: 21.2%

C3: 13.3%

C4: 0.0%

ROP (ft/hr)

GAMMA (cp)

WT 9.5+ / VIS 40

5000

500000

2774u

3502u

2611u

1631u

3202u

126

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2101u

C1: 62.4%

C2: 22.4%

C3: 15.2%

C4: 0.0%

2671u

C1: 65.4%

C2: 21.2%

C3: 13.3%

C4: 0.0%

ROP (ft/hr)

GAMMA (cp)

WT 9.5+ / VIS 40

5000

500000

2774u

3502u

2611u

1631u

3202u

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2101u

C1: 62.4%

C2: 22.4%

C3: 15.2%

C4: 0.0%

2671u

C1: 65.4%

C2: 21.2%

C3: 13.3%

C4: 0.0%

ROP (ft/hr)

GAMMA (cp)

WT 9.5+ / VIS 40

5000

500000

2774u

3502u

2611u

1631u

3202u

126

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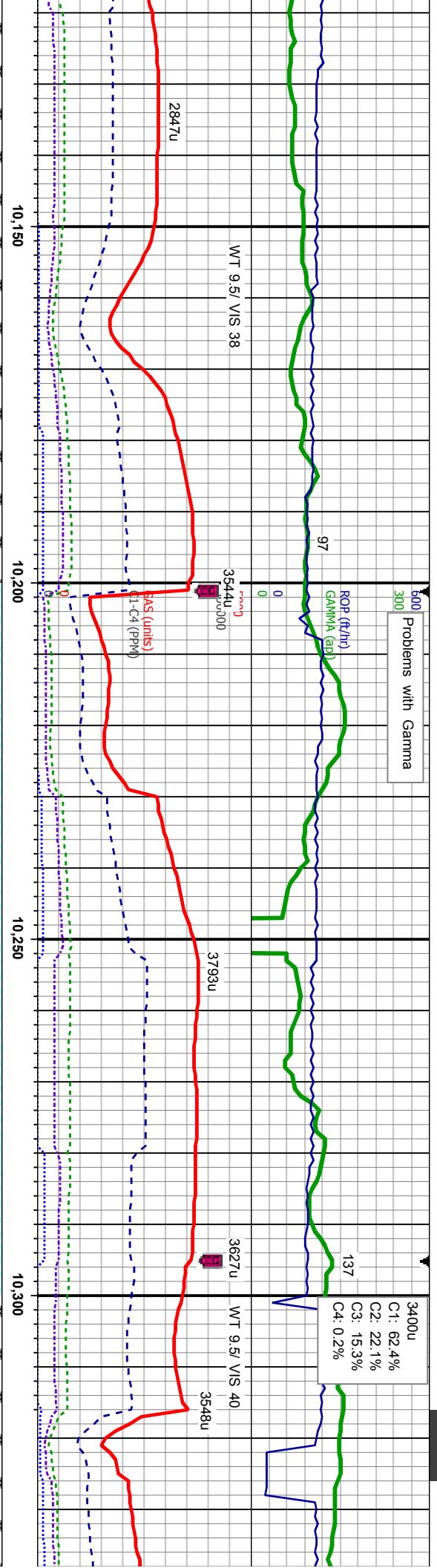
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2101u

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CHK: lt-med gy-bm, blk-y-sb
ply, sft-fm, sb rd-sb ang,
mod fri, MRLST: dk gy-bm,
blk-y-sb ply, sft-fm, sb
rd-sb ang, mod fri, tr cal
incl, sting bl cut, bri bl ring

MD:10,156'
TVD:393.12'
Inclination: 89.9°
Azimuth: 179.0°
VS2,184.12'

CHK: lt gy-bm, blk-y-sb ply,
sft-fm, sb rd-sb ang, mod
fri, tr MRLST: dk gy-bm,
blk-y-sb ply, sft-fm, sb
rd-sb ang, mod fri, tr cal
incl, sting bl cut, bri bl ring

MD:10,261'
TVD:392.49'
Inclination: 90.8°
Azimuth: 178.4°
VS2,279.1'



Problems with Gamma

430u
C1: 67.8%
C2: 19.6%
C3: 11.9%
C4: 0.7%

WT 9.5/ VIS 41

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ROF (ft/hr)

GAMMA (cp)

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600
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ROF (ft/hr)

GAMMA (cp)

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600
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ROF (ft/hr)

GAMMA (cp)

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600
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ROF (ft/hr)

GAMMA (cp)

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ROF (ft/hr)

GAMMA (cp)

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ROF (ft/hr)

GAMMA (cp)

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600
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ROF (ft/hr)

GAMMA (cp)

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ROF (ft/hr)

GAMMA (cp)

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600
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ROF (ft/hr)

GAMMA (cp)

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ROF (ft/hr)

GAMMA (cp)

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600
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ROF (ft/hr)

GAMMA (cp)

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Problems with Gamma

834u

C1: 69.1%
C2: 20.1%
C3: 10.7%
C4: 0.0%

ROP (ft/hr)
GAMMA (cp)

129

WT 9.5/ VIS 40

WT 9.5/ VIS 40

2583u

2296u
C1-C4 (ppm)

2183u

1842u

1582u

10,600

10,650

10,700

10,750

7100

CHK: med-dk gy-brn,
bkly-sb pty, sft-fm, sb
rd-sb ang, mod fri, MRLST:
dk gy-brn, bkly-sb pty,
sft-fm, sb rd-sb ang, mod
fri, tr cal incl, sting bl cut, bri
bl ring

CHK: med-dk gy-brn,
bkly-sb pty, sft-fm, sb
rd-sb ang, mod fri, MRLST:
dk gy-brn, bkly-sb pty,
sft-fm, sb rd-sb ang, mod
fri, tr cal incl, sting bl cut, bri
bl ring

TVD (ft)

7600

MD: 10,632'
TVD: 7,398.49'
Inclination: 90.7°
Azimuth: 180.48°
VS: 2,659.86'

MD: 10,727'
TVD: 7,398.02'
Inclination: 89.85°
Azimuth: 181.22°
VS: 7,548.4'



Problems with Gamma

C1: 62.8%
C2: 21.6%
C3: 14.9%
C4: 0.6%

ROP (ft/h)

3228u

4012u

3586u

3254u

5000

3228u

4012u

3586u

3254u

GAS (units)
CL-C4 (PPM)

2707u

10,800

10,850

10,900

10,950

7100

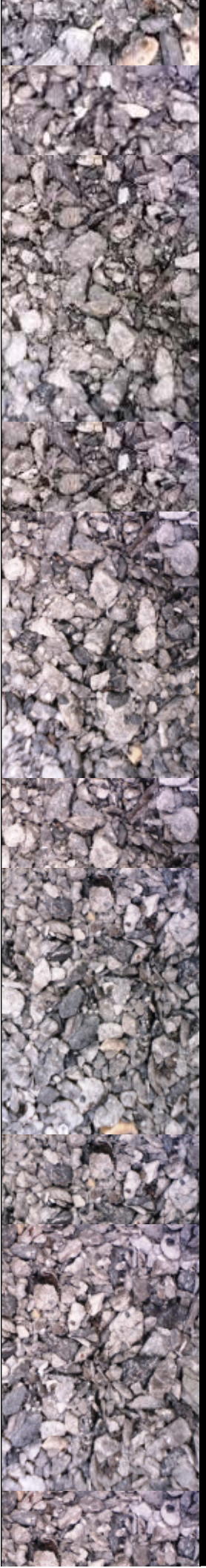
CHK: lt gy-brn, blk-y-sb pily,
sft-fm, sb rd-sb ang, mod
fri, MRLST: dk gy-brn,
blk-y-sb pily, sft-fm, sb
rd-sb ang, mod fri, tr cal
incl, sting bl cut, bri bl ring

CHK: lt gy-brn, blk-y-sb pily,
sft-fm, sb rd-sb ang, mod
fri, tr MRLST: dk gy-brn,
blk-y-sb pily, sft-fm, sb
rd-sb ang, mod fri, tr cal
incl, sting bl cut, bri bl ring

MD:10.822'
TVD:7,398.71'
Inclination: 89.32
Azimuth: 180.89
VS 2,849.82'

MD:10.918'
TVD:7,400.08'
Inclination: 89.04
Azimuth: 180.19
VS 2,945.8'

7600

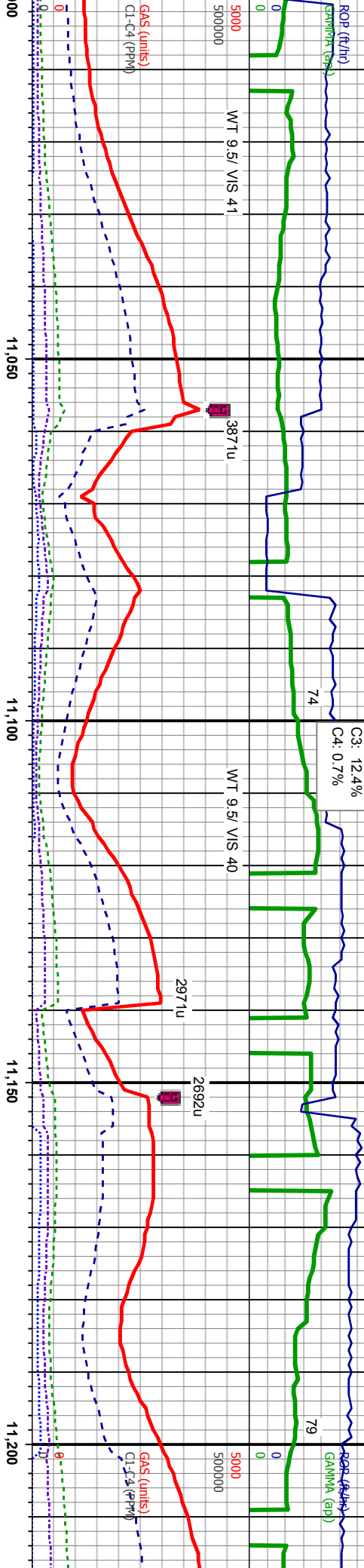


Problems with Gamma

12/07/2013

1293u

Problems with



C1: 66.9%
C2: 20.0%
C3: 12.4%
C4: 0.7%

CHK: lt gy-brn, blk-y-sb pily,
sft-fm, sb rd-sb ang, mod
fri, tr MRLST: dk gy-brn,
blk-y-sb pily, sft-fm, sb
rd-sb ang, mod fri, sting bl
cut, bri bl ring

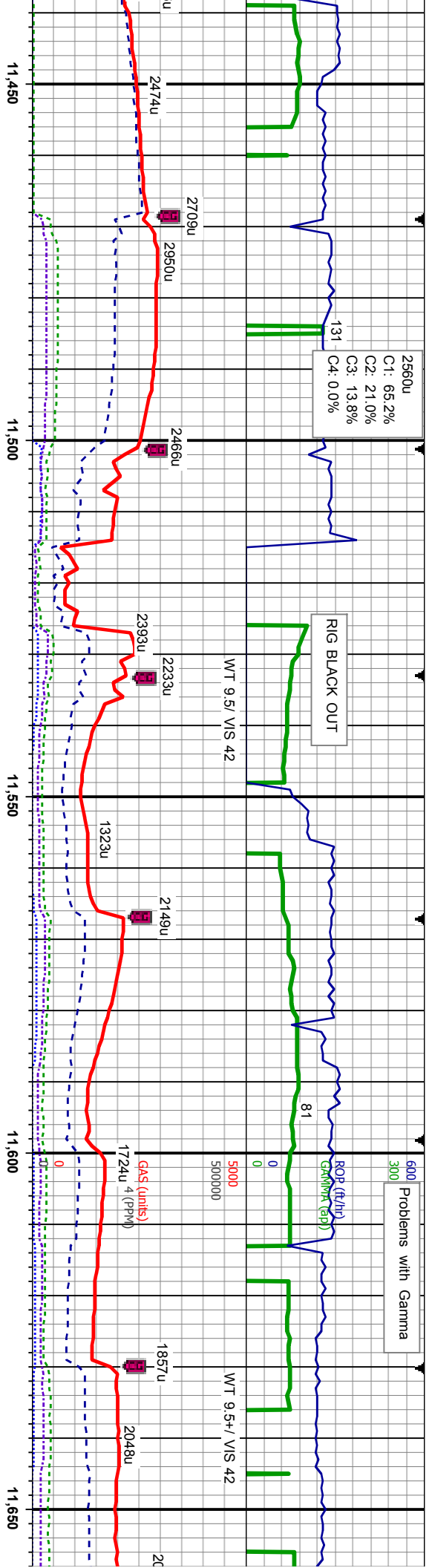
CHK: lt gy-brn, blk-y-sb pily,
sft-fm, sb rd-sb ang, mod
fri, tr MRLST: dk gy-brn,
blk-y-sb pily, sft-fm, sb
rd-sb ang, mod fri, sting bl
cut, bri bl ring

MD-11.013'
TYD7.401.14'
Inclination: 89.69°
Azimuth: 181.8°
VS3.040.77'

MD-11.108'
TYD7.403.02'
Inclination: 88.04°
Azimuth: 182.68°
VS3.135.66'

MD-11.203'
TYD7.403.96'
Inclination: 90.83°
Azimuth: 182.47°
VS3.230.53'

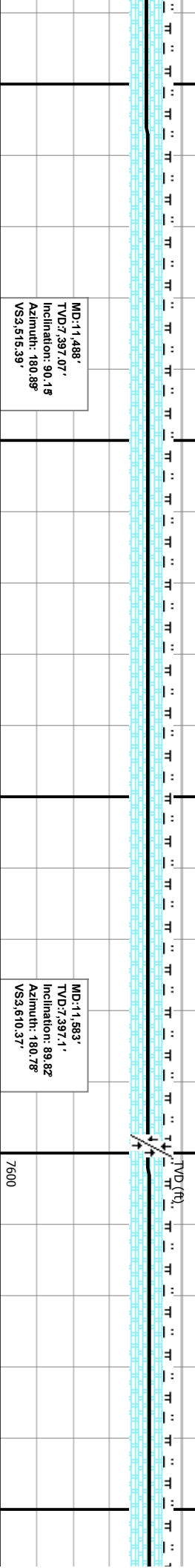


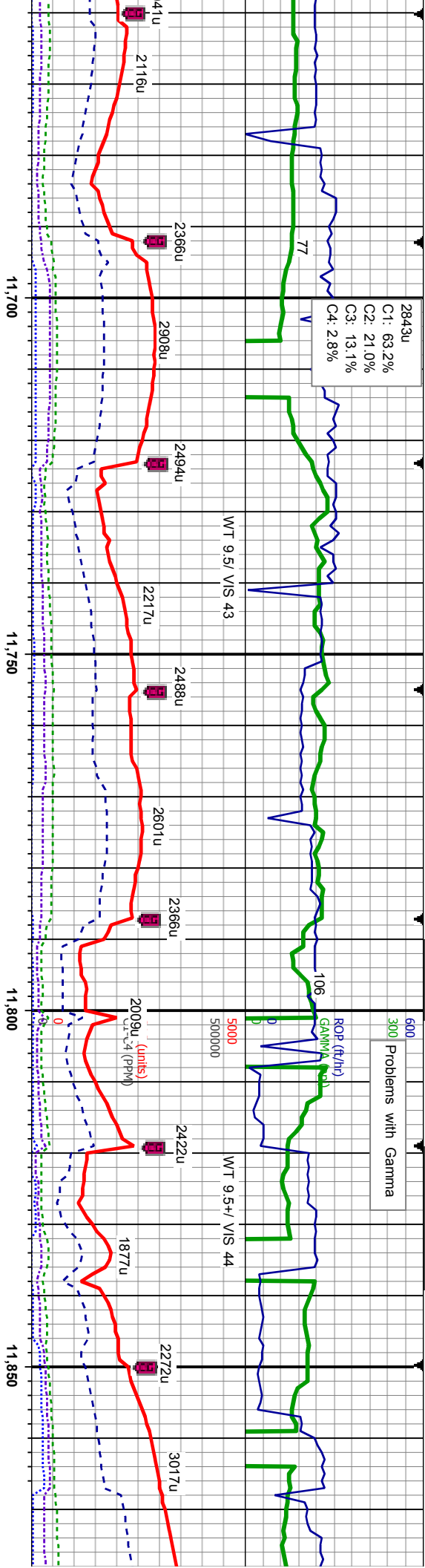


-HK: It gy-brn, blky-sb plty,
-frfm, sb rd-sb ang, mod
-tr MRLST: dk gy-brn, _____
ky-sb plty, sft-frfm, sb
sb ang, mod fti, stng bl
-t, bri bl ring

CHK: It gy-brn, blk-y-sb pty,
sft-firm, sb rd-sb ang, mod
fri, tr MRLST: dk gy-brn,
blk-y-sb pty, sft-firm, sb
rd-sb ang, mod fri, stmg bl
cut, bri bl ring

CHK: lt gy-brn, blkly-s
sft-firm, sb rd-sb ang
fri, tr MRLST: dk gy-b
blkly-sb pty, sft-firm, i
rd-sb ang, mod fri, s
cut, bri bl ring.





b pily, mod, m, string bl

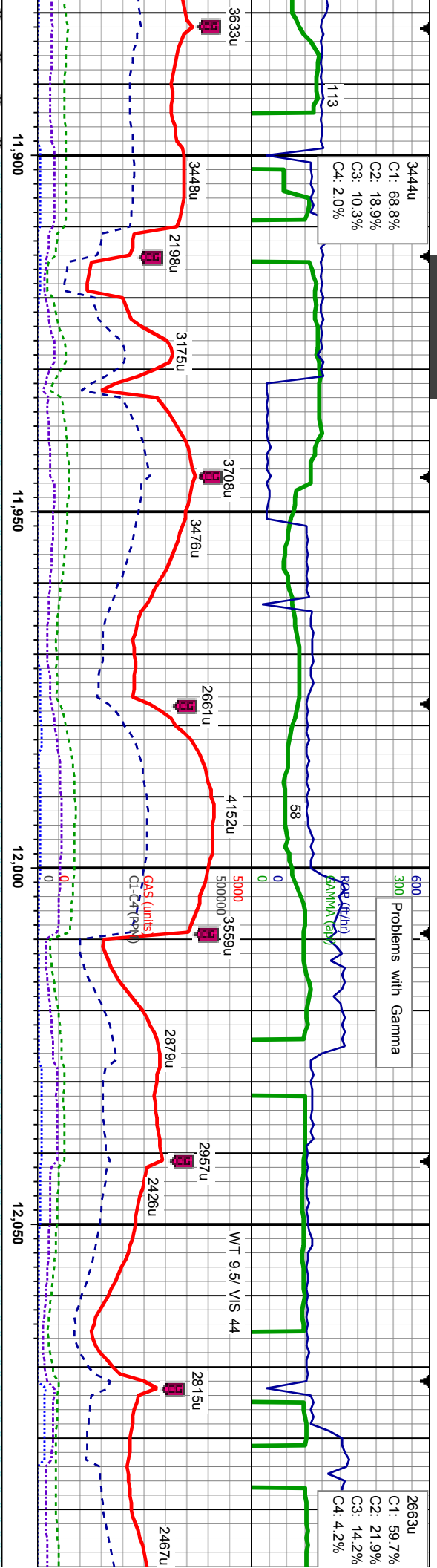
CHK: It gy-brn, blk-y-sb pily, sft-frm, sb rd-sb ang, mod fri, MRLST: dk gy-brn, blk-y-sb pily, sft-frm, sb rd-sb ang, mod fri, string bl cut, bri bl ring

MD-11,679' TVD: 7,395.99' Inclination: 91.57° Azimuth: 180.83° VS: 3,706.35'

MD-11,774' TVD: 7,392.46' Inclination: 92.74° Azimuth: 180.03° VS: 3,801.27'

MD-11,869' TVD: 7,389.17' Inclination: 91.23° Azimuth: 180.58° VS: 3,896.21'





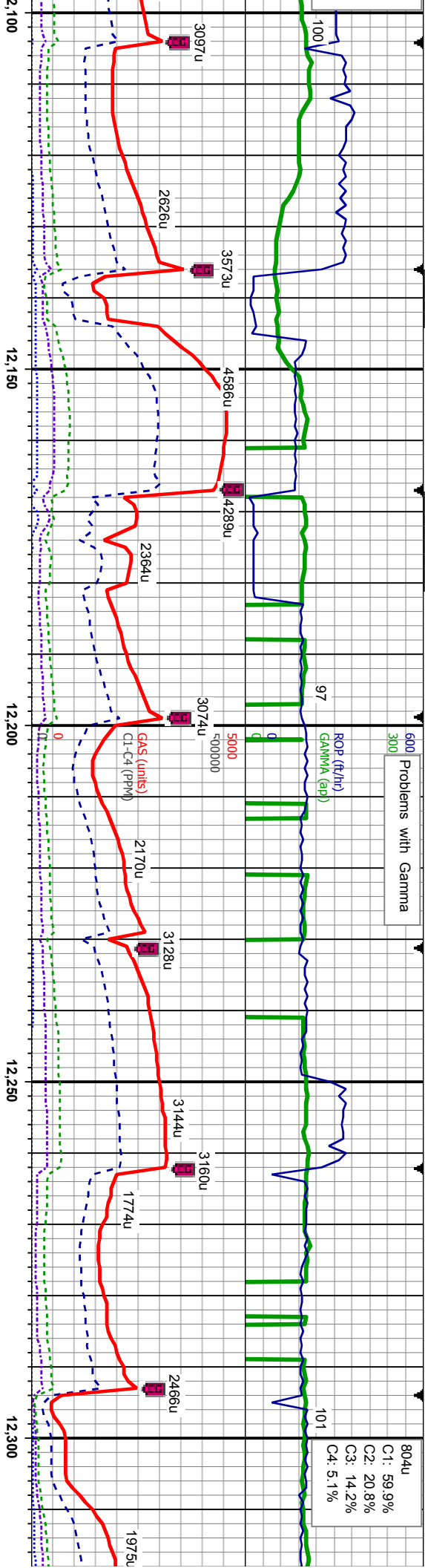
CHK: lt gy-brn, blk-y-sb pty,
sft-firm, sb rd-sb ang, mod
fri, tr MRLST: dk gy-brn,
blk-y-sb pty, sft-firm, sb
rd-sb ang, mod fri, string bl
cut, bri bl ring

CHK: lt gy-brn, blk-y-sb pty,
sft-firm, sb rd-sb ang, mod
fri, tr MRLST: dk gy-brn,
blk-y-sb pty, sft-firm, sb
rd-sb ang, mod fri, string bl
cut, bri bl ring

MD:11.964'
TVD:7.388.97'
Inclination: 89.07
Azimuth: 178.69
VS3.991.2'

MD:12.091'
TVD:7.389.9'
Inclination: 90.18
Azimuth: 177.88
VS4.118.15'





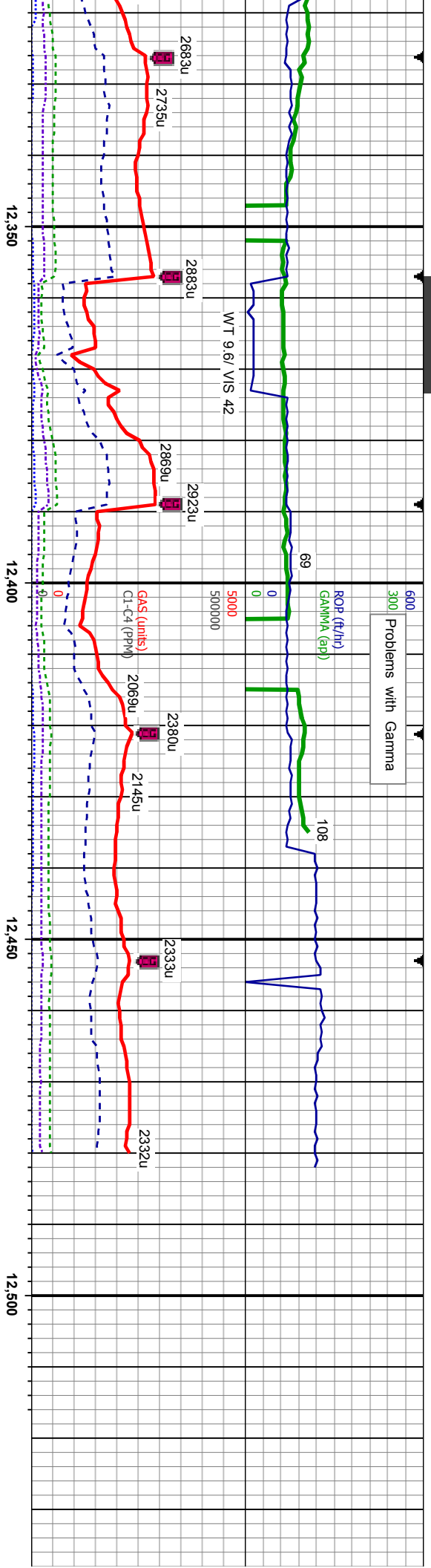
CHK: lt gy-brn, blk-y-sb pily,
sft-fm, sb rd-sb ang, mod
fri, tr MRLST: dk gy-brn,
blk-y-sb pily, sft-fm, sb
rd-sb ang, mod fri, sting bl
cut, bri bl ring

CHK: lt gy-brn, blk-y-sb pily,
sft-fm, sb rd-sb ang, mod
fri, tr MRLST: dk gy-brn,
blk-y-sb pily, sft-fm, sb
rd-sb ang, mod fri, sting bl
cut, bri bl ring

MD:12,154'
TVD:7,389.38'
Inclination: 90.8°
Azimuth: 178.58°
VS4:181.13°

MD:12,249'
TVD:7,389.18'
Inclination: 89.44°
Azimuth: 179.2°
VS4:276.12°





CHK: lt gy-brn, blk-y-sb pily,
sft-firm, sb rd-sb ang, mod
fri, tr MRLST: dk gy-brn,
blk-y-sb pily, sft-firm, sb
rd-sb ang, mod fri, sting bl
cut, bri bl ring

MD-12,344'
TVD: 389.19'
Inclination: 80.58
Azimuth: 179.78
VS#4,371.11'

CHK: lt gy-brn, blk-y-sb pily,
sft-firm, sb rd-sb ang, mod
fri, tr MRLST: dk gy-brn,
blk-y-sb pily, sft-firm, sb
rd-sb ang, mod fri, sting bl
cut, bri bl ring

MD-12,435'
TVD: 7,389'
Inclination: 89.69
Azimuth: 180.15
VS#4,462.11'

MD-12,480'
TVD: 7,389.26'
Inclination: 89.66
Azimuth: 180.15
VS#4,507.11'

ANADARKO
HIGHWAY 160 37N-24Z
WELL TD @ 12480' MD
ON 12/07/2013 @ 1830 HRS

THANK YOU FOR USING
COLUMBINE LOGGING INC.



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