










Scale: 5" / 100'
Measured Depth Log

Name	EVAN HOWELL
Company	Noble Energy Inc
Address	1625 Broadway Denver, CO 80202

	UNKNOWN
	ANHYDRITE
	BENTONITE
	BRECCIA
	CHALK
	CEMENT
	CHERT
	CLAY CHOKO SAND
	CLAYSTONE

Operator

Suite 2200

Suite 2200
202

Geologist

Other






















































AN SULLIVAN
HAEL ROOKS

Rock Types

Symbol	Rock Type	Symbol	Rock Type	Symbol	Rock Type
	CONGLOMERATE		MARLSTONE		SHALY SANDSTONE
	DOLOMITE		METAMORPHIC		SHALY SILTSTONE
	DOLOMITIC LIMESTONE		NO SAMPLE		SILTY SHALE
	GRANITE		SANDSTONE		SILTSTONE
	GYPSUM		SALT-PEPPER SAND		TILL
	IGNEOUS		SHALE		TUFF
	SIDERITE or LIMONITE		SHALE COLORED		WELDED TUFF
	LIMESTONE		SHALE GRAY		

Accessories

Fossils

	GASTROPOD		ARGILLITE GRAIN		HEAVY MINERAL		ANHYDRITE STRINGER
	INOCERAMUS		B BENTONITE		KAOLIN		BENTONITE STRINGER
	ALGAE		BITUMENOUS SUBSTANCE		MARLSTONE		COAL STRINGER
	AMPHIPORA		MICACEOUS		DOLOMITE STRINGER		GYPSUM STRINGER
	BELEMNITE		1 CALCAREOUS FRAGMENTS		MINERAL CRYSTALS		LIMESTONE STRINGER
	BIOCLASTIC		2 CARBONACEOUS FLAKES		NODULES		MARLSTONE (CALC) STRG
	BRACHIOPOD		CHERT		PHOSPHATE PELLETS		MARLSTONE (DOL) STRG
	BRYOZOA		CHTL		P PYRITE		SANDSTONE STRINGER
	CEPHALOPOD		1 COAL - THIN BEDS		S SALT CAST		SHALE STRINGER
	CORAL		2 DOLOMITIC		S SANDY		SILTSTONE STRINGER
	CRINOID		1 FELDSPAR		S SILTY		
	ECHINOID		● FERRUGINOUS PELLET				
	FISH		2 FERRUGINOUS		TUFACEOUS		
	FORAMINIFERA		2 GLAUCONITE				
	F FOSSIL		2 ARGILLACEOUS		2 GYPSIFEROUS		

Other Symbols

Oil Show

Oil Show	P PINPOINT	E EARTH
	V VUGGY	FX FINELYXLN
Engineering	FORMATION TOP	GS GRAINSTONE
DEAD	FAULT	L LITHOGRAPHIC
EVEN	GAS SHOW	MX MICROXLN
QUESTIONABLE	OIL SHOW	
SPOTTED STAINING	MN DEPTH UP	MS MUDSTONE
CONNECTION (UP)		
BIT		
Rounding	DRILL STEM TEST	
	WIRELINE TESTED - RT	
	WIRELINE TESTED - LEFT	
	DST INTERVAL	
	FORMATION TOP	
	GAS SHOW	
	OIL SHOW	
	MN DEPTH UP	
	CONNECTION (UP)	
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	QUESTIONABLE	
	EVEN	
	DEAD	
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	CONNECTION (UP)	
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	BIT	
	QUESTIONABLE	
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	DST INTERVAL	
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	DRILL STEM TEST	
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	GAS SHOW	
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	GAS SHOW	
	OIL SHOW	
	MN DEPTH UP	
	CONNECTION (UP)	
	BIT	
	QUESTIONABLE	
	EVEN	
	DEAD	
	Oil Show	
	FORMATION TOP	
	FAULT	
	<	

Porosity

[illegible]

Textures

✕ INTERCRYSTALLINE	DOWN TIME GAS	▼ SIDEWALL CORE (LEFT)	♂ POOR
⬇️ DTG	DOWN TIME GAS (LEFT)	▲ SIDEWALL CORE (RIGHT)	♂ WELL
⬇️ DTG	DOWN TIME GAS (LEFT)	▨ SLIDE	
⬇️ DTG	DOWN TIME GAS (LEFT)	♂ SURVEY	
⬇️ DTG	DOWN TIME GAS (LEFT)	♂ CRYPTOLIN	
⬇️ DTG	DOWN TIME GAS (LEFT)	♂ CHALKY	
⬇️ DTG	DOWN TIME GAS (LEFT)	♂ CORE - RECOVERED	
⬇️ DTG	DOWN TIME GAS (LEFT)	♂ CORE - LOST	
⬇️ DTG	DOWN TIME GAS (LEFT)	♂ MOLDIC	
⬇️ DTG	DOWN TIME GAS (LEFT)	♂ INTERCOLLITIC	
⬇️ DTG	DOWN TIME GAS (LEFT)	♂ ORGANIC	

Slide/Rotate

ROP
ROF
GAMMA

Total Gas & Chromatograph
GAS
C1
C2
C3
C4

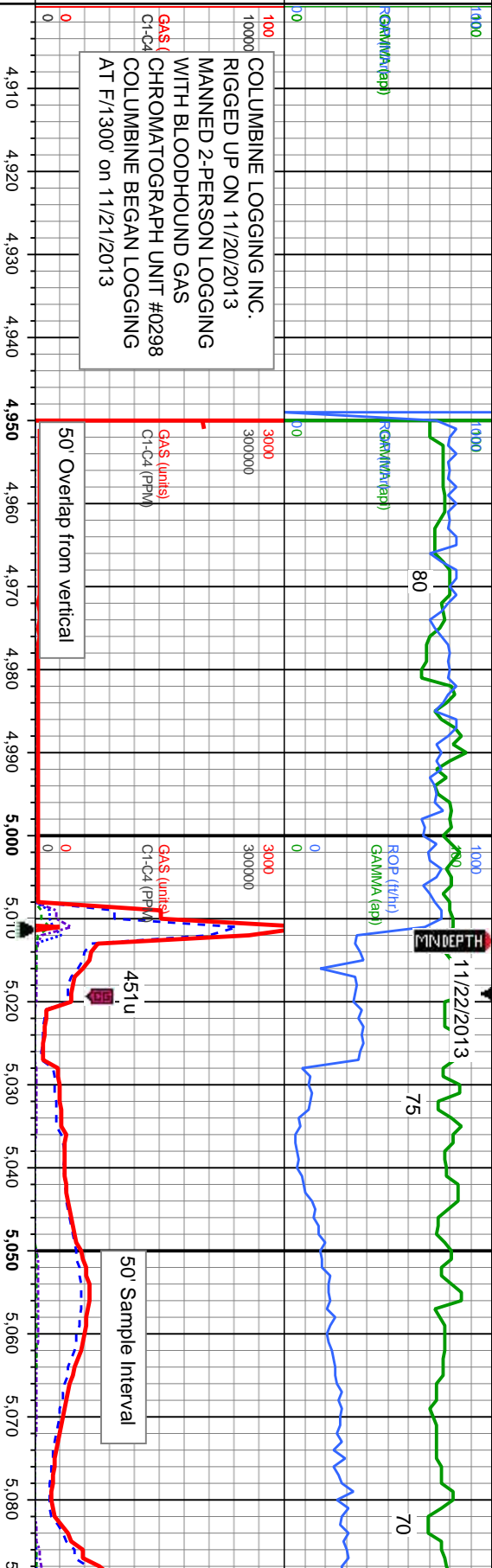
Depth Labels

% Lith

Well Bore
TVD

Oil Show

Images



Bit Data

MD: 4,962'
TVD: 4,952.54'
Inclination: 0.2°
Azimuth: 99.1°
VS: -44.82'

Bit #: 2
Type: PDC
Size: 8.75
Depth In: 5,011'
Depth Out: 6,090'
Jets: 5x14
S/N: 1217568

Resume Drilling @ 5011' MD
11/22/2013 @ 07:00 hrs

MD: 5,057'
TVD: 5,047.52'
Inclination: 2.2°
Azimuth: 276°
VS: -43.19'

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 judgment of brilliance, color and longevity of the cut.

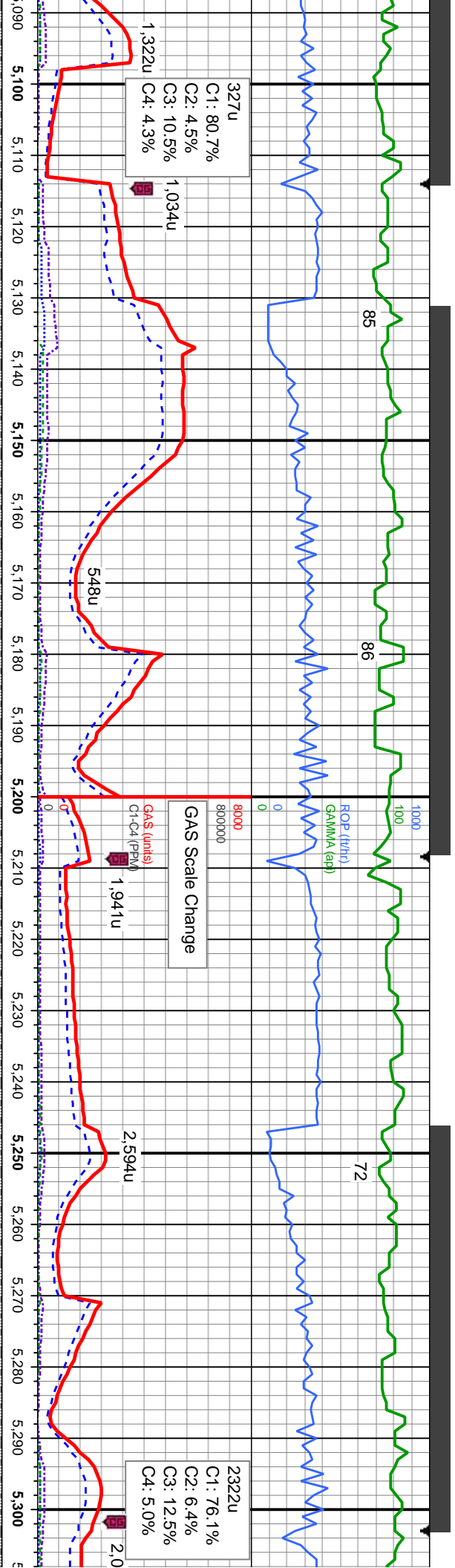
Acetone was used as the cutting agent with the dimple filled to the rim.

SLTY SH: med to dk gy, mod sft - mod frm, brit - sm, fri ip, vf gr, sb ang - sb ply, arg cnt; SHY SLTST: lt - med gy, occ blk, sft - mod frm, vf gr, sb blk - sb ply, tr ply, arg cnt

SHY SLTST: lt - med gy, sme dk gy, mod sft - mod frm, vf gr, sb blk - sb ply, tr ply, arg cnt; SLTY SH: med to dk gy, mod sft - mod frm, brit, vf gr, sb ang - sb ply, arg cnt; v sl calc ip

SHY SLTST: lt - med gy, sme dk gy, mod sft - mod frm, vf gr, sb blk - sb ply, tr ply, arg cnt; SLTY SH: med to dk gy, mod frm, brit, vf gr, sb ang - sb ply, arg calc ip

E G M F T ST



327u
C1: 80.7%
C2: 4.5%
C3: 10.5%
C4: 4.3%

ROP (ft/hr)
GAMMA (api)
GAS (units)
C1-C4 (ppm)

GAS Scale Change

2322u
C1: 76.1%
C2: 6.4%
C3: 12.5%
C4: 5.0%

MD: 5,151'
TVD: 5,140.58'
Inclination: 12.8°
Azimuth: 273°
VS: -31.02'

MD: 5,246'
TVD: 5,231.81'
Inclination: 19.4°
Azimuth: 278.8°
VS: -5.11'

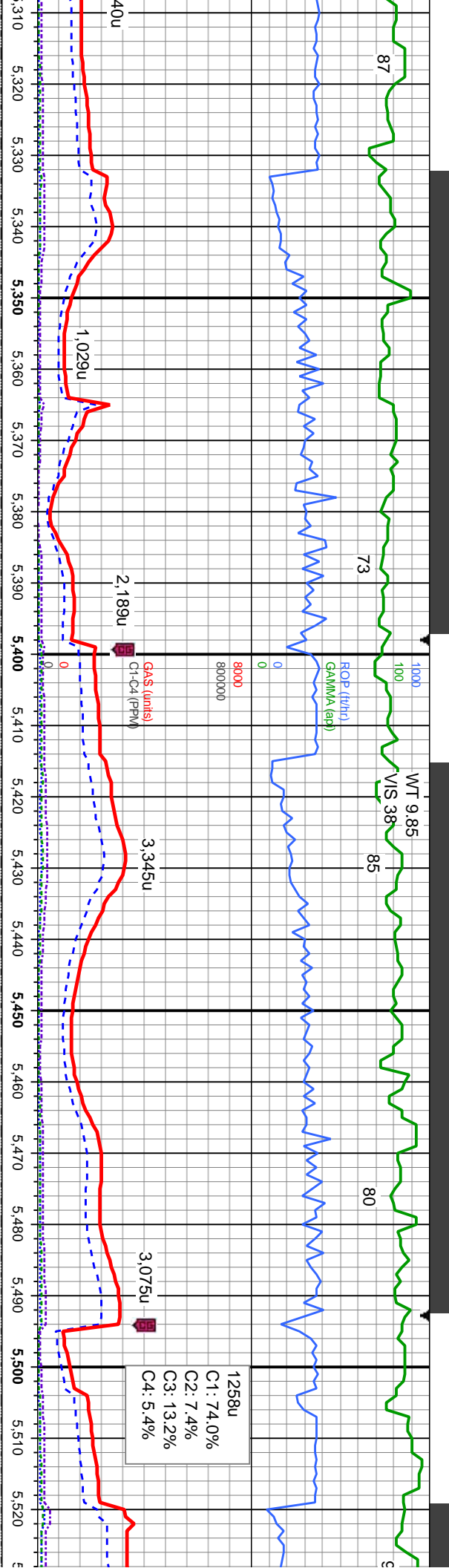
SHY SLTST: lt - med gy, sme dk gy, mod frm, vf gr, sb blkly - sb plty, tr plty, arg cnt; SLTY SH: med to dk gy, mod frm, brit, vf gr, sb ang - sb plty, arg cnt; sme v fnly intbd shy ss, sl calc ip

SHY SLTST: lt - med gy, sme dk gy, mod frm - frm, vf gr, sb blkly - sb plty, tr plty, arg cnt; SLTY SH: med to dk gy, frm, brit, vf gr, sb ang - sb plty, arg cnt; tr v fnly intbd shy ss, sl calc ip

SHY SLTST: lt - med gy, mod frm - frm, vf gr, sb blkly - sb plty, tr plty, arg cnt; SLTY SH: med to dk gy, frm, brit, vf gr, sb ang - sb plty, tr plty, arg cnt; sl calc ip

SHY SLTST: lt - med gy, mod frm - frm, vf gr, sb blkly - sb plty, tr plty, arg cnt; SLTY SH: med to dk gy, frm, brit, vf gr, sb ang - sb plty, tr plty, arg cnt; sl calc ip





MD: 5,340'
TVD: 5,318.56'
Inclination: 25.8 °
Azimuth: 274 °
VS: 30.48'

MD: 5,435'
TVD: 5,400.7'
Inclination: 34.5 °
Azimuth: 262.4 °
VS: 77.95'

1258u
C1: 74.0%
C2: 7.4%
C3: 13.2%
C4: 5.4%

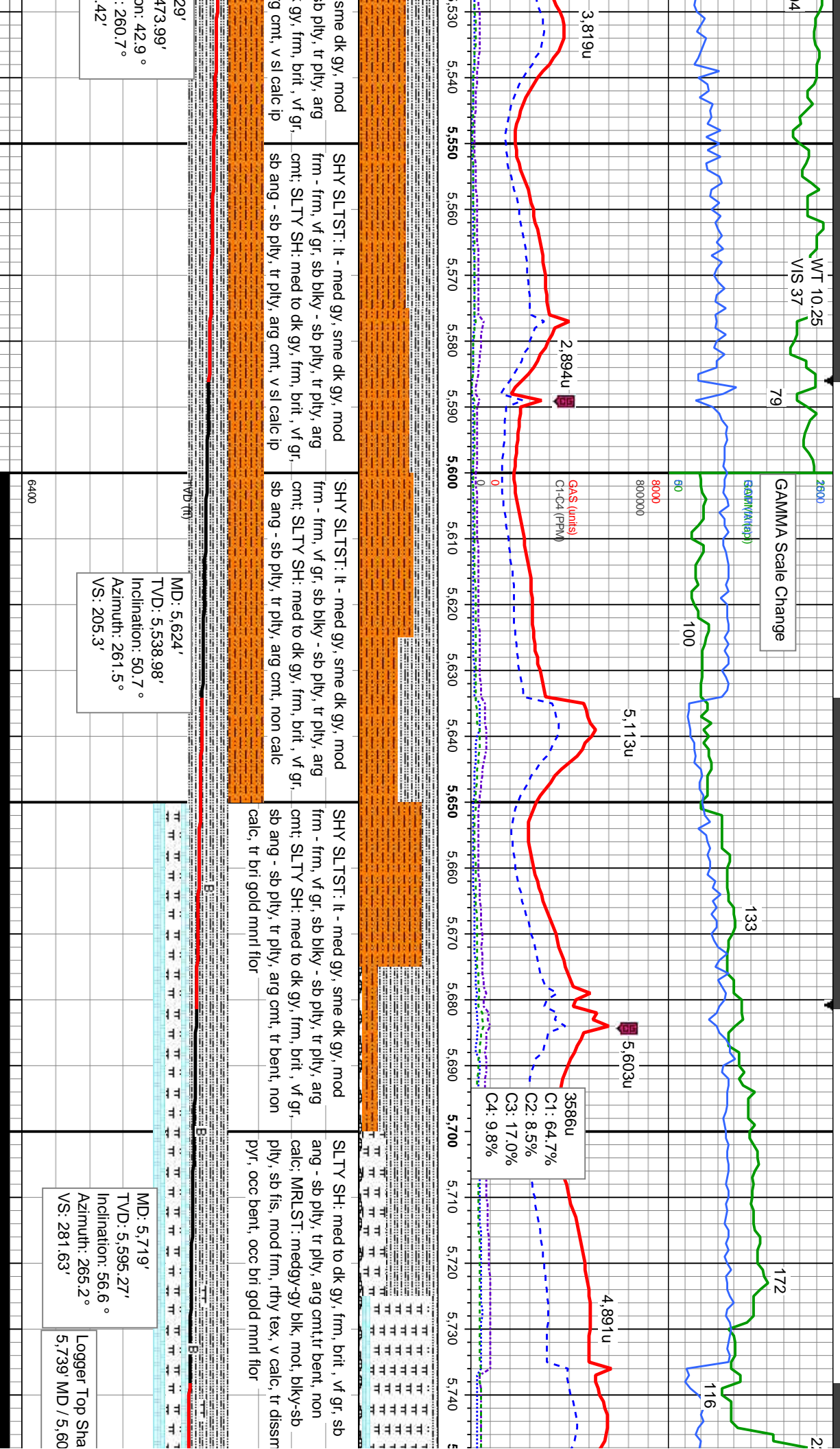
SLTST: lt - med gy, mod frm, vf gr, sb
sb ply, tr ply, arg cnt; SHY SS: lt gy -
frm, brit, vf gr, sb ang - sb blkly, v w
g cnt; occ silty sh, sl calc ip

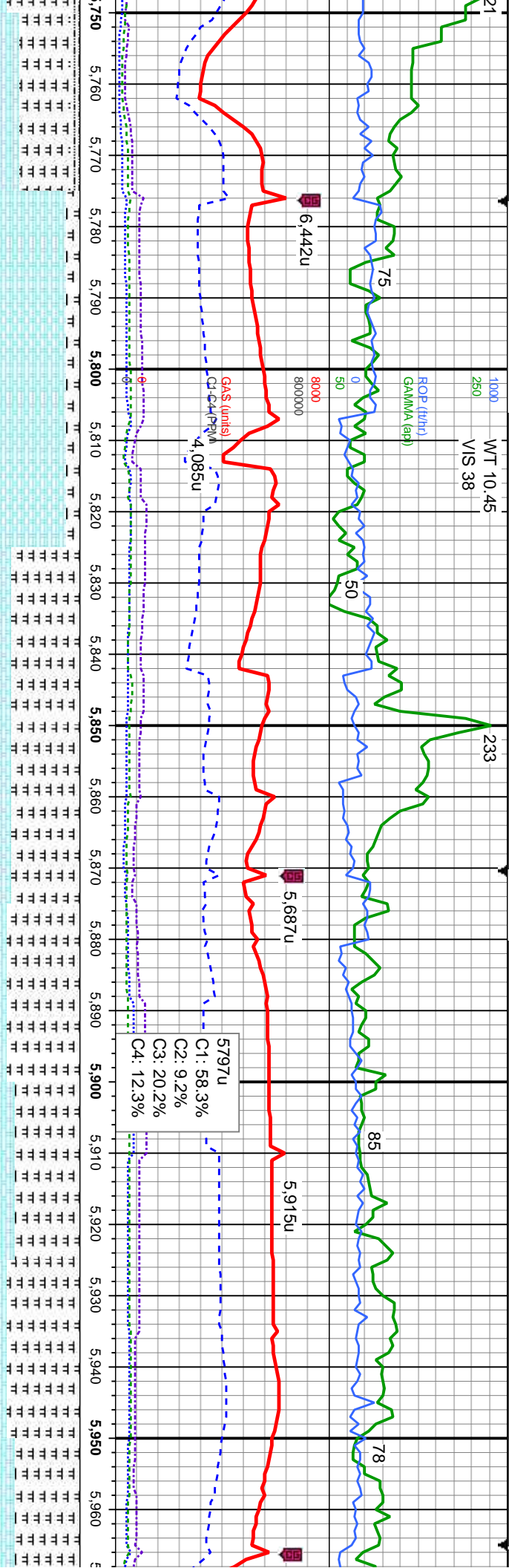
SHY SLTST: lt - med gy, mod frm, vf gr, sb
blkly - sb ply, tr ply, arg cnt; SLTY SH: med
to dk gy, frm, brit, vf gr, sb ang - sb ply, tr
ply, arg cnt; SHY SS: lt gy - off wh, frm, brit,
vf gr, sb ang - sb blkly, v w srt, arg cnt; sl
calc ip

SHY SLTST: lt - med gy, dk gy, mod frm -
frm, vf gr, sb blkly - sb ply, tr ply, arg cnt;
SLTY SH: med to dk gy, frm, brit, vf gr, sb
ang - sb ply, tr ply, arg cnt; tr v fhly intbd
shy ss, sl calc ip

MD: 5,5
TVD: 5,
Inclinati
Azimuth
VS: 136







MRLST: medgy-gy blk, mot, blk-sb pily, sb fis, mod frm, rthy tex, v calc, tr dissim pyr; CHK: pred off wh crm - bf, tr bf - gy brn, frm, brit, sb pily-sb blk, smwt rthy - mot tex, v calc; occ silty sh, occ bent, occ bri gold mnrl flor, abnt dul gn mnrl flor

CHK: pred off wh crm - bf, tr bf - gy brn, mot ip, frm, brit, sb pily-sb blk, sb wxy - sb rthy tex, v calc; MRLST: medgy-gy blk, blk-sb pily, sme sb fis, mod frm, rthy tex, v calc, tr dissim pyr; tr bent, abnt dul gn mnrl flor, tr bri gold mnrl flor

MRLST: medgy - mot dk gy, blk - sb pily, sme sb fis, frm, rthy - sl sb wxy tex, v calc, tr dissim pyr; CHK: pred gy brn - bf, sl mot, frm, brit, sb pily-sb blk, sb wxy - sb rthy tex, v calc; tr dul gn mnrl flor

MRLST: medgy - mot dk gy, blk - sb pily, sme sb fis, frm, rthy - sl sb wxy tex, v calc, tr dissim pyr; CHK: pred gy brn - bf, sl mot, frm, brit, sb pily-sb blk, sb wxy - sb rthy tex, v calc; occ dul gn mnrl flor

MRLST: dk gy - fis, frm, rthy - sl pyr; CHK: pred off wh crm - bf, tr bf - gy brn, frm, brit, sb pily-sb blk, smwt rthy - mot tex, v calc; occ silty sh, occ bent, occ bri gold mnrl flor, abnt dul gn mnrl flor

MD: 5,813'
TVD: 5,645.92'
Inclination: 58.2°
Azimuth: 268.4°
VS: 360.8'

MD: 5,908'
TVD: 5,689.45'
Inclination: 67.2°
Azimuth: 269.6°
VS: 445.06'

Ion Springs @ 5,762 MD / 5,618' TVD Logger Top Niobrara A Chalk @ 5,784 MD / 5,630' TVD Logger Top Niobrara A Marl @ 5,832' MD / 5,654' TVD



WT 10.50
VIS 41

1800
GAMMA Scale Change

WT 10.05
VIS 34

11/23-24/2013

WT 10.10
VIS 40

51

46

112

74

6,442u
80000

6,219u

5,991u

5,630u

5,783u

5740u
C1: 87.2%
C2: 3.8%
C3: 7.3%
C4: 1.7%

1,223u

GAS (units)
CF-C4 (PPM)

5,970 5,980 5,990 6,000 6,010 6,020 6,030 6,040 6,050 6,060 6,070 6,080 6,090 6,100 6,110 6,120 6,130 6,140 6,150 6,160 6,170 6,180

blk, blkly - sb pily, sme sb
wxy tex, v calc, tr diss
brn - bf, sl mot, frm, brit,
wxy - sb rthy tex, v calc;

CHK: pred gy brn - bf, sl mot, frm, brit, sb
pily-sb blkly, sb wxy - sb rthy tex, v calc; occ
dul gn mnrl flr; MRLST: medgy - mot dk gy,
blkly - sb pily, sme sb fis, frm, rthy - sl sb wxy
tex, v calc, tr diss pyr

CHK: pred off wh - crm, sme bf, sl mot, frm,
brit, sb pily-sb blkly, sb wxy - sb rthy tex, v
calc; MRLST: dk gy - gy blk, blkly - sb pily,
sme sb fis, frm, rthy - sl sb wxy tex, v calc, tr
dissm pyr, abnt dul gn mnrl flr

CHK: pred off wh - crm, sme bf, sl mot, frm,
brit, sb pily-sb blkly, sb wxy - sb rthy tex, v
calc; MRLST: dk gy - gy blk, blkly - sb pily,
sme sb fis, frm, rthy - sl sb wxy tex, v calc, tr
dissm pyr, abnt dul gn mnrl flr

CHK: pred off wh - crm, sme bf, sl r
brit, sb pily-sb blkly, sb wxy - sb rthy
calc; MRLST: dk gy - gy blk, blkly -
sme sb fis, frm, rthy - sl sb wxy tex,
dissm pyr, abnt dul gn mnrl flr

a B Chalk @
VD

MD: 6,003'
TVD: 5,716.46'
Inclination: 79.7°
Azimuth: 271.7°
VS: 535.72'

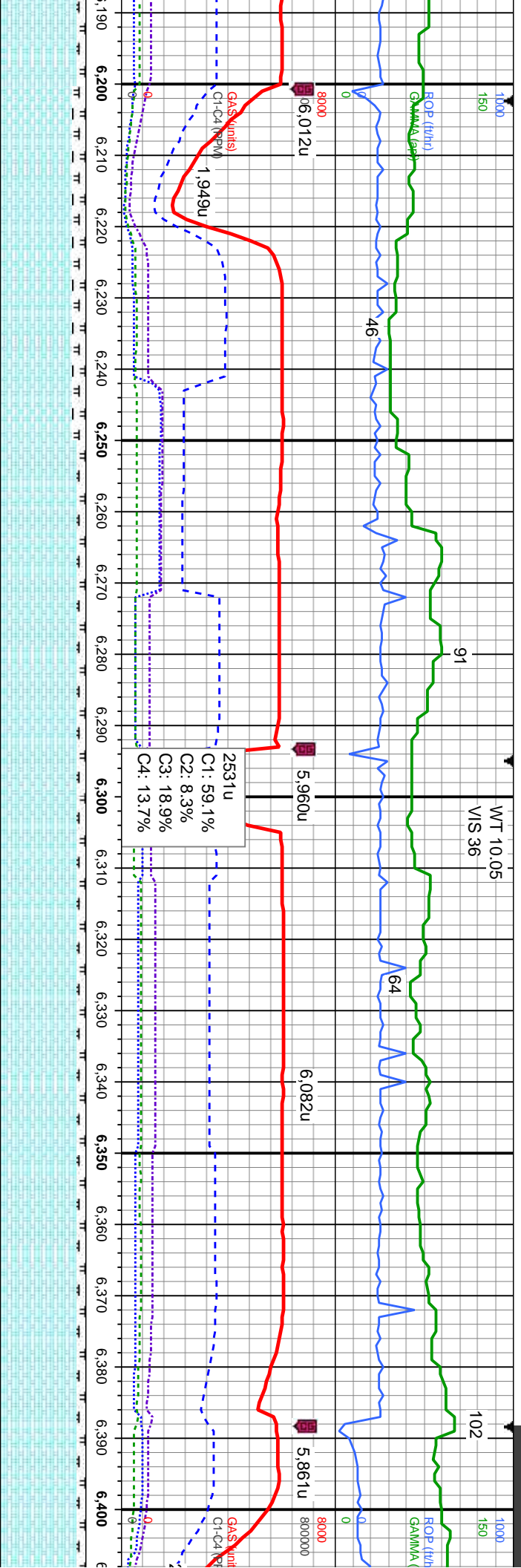
MD: 6,033'
TVD: 5,720.48'
Inclination: 84.9°
Azimuth: 272.3°
VS: 565.31'

TD Curve - 6090' MD
Intermediate Casing
@ 15:53 hrs 11/22/2013
Drilled out of 7" Casing @
03:15 hrs 11/24/2013

Bit Data
Bit #: 3
Type: PDC
Size: 6.12
Depth In: 6,090'
Depth Out: 9,790'
Jets: 5x11
S/N: JH4405

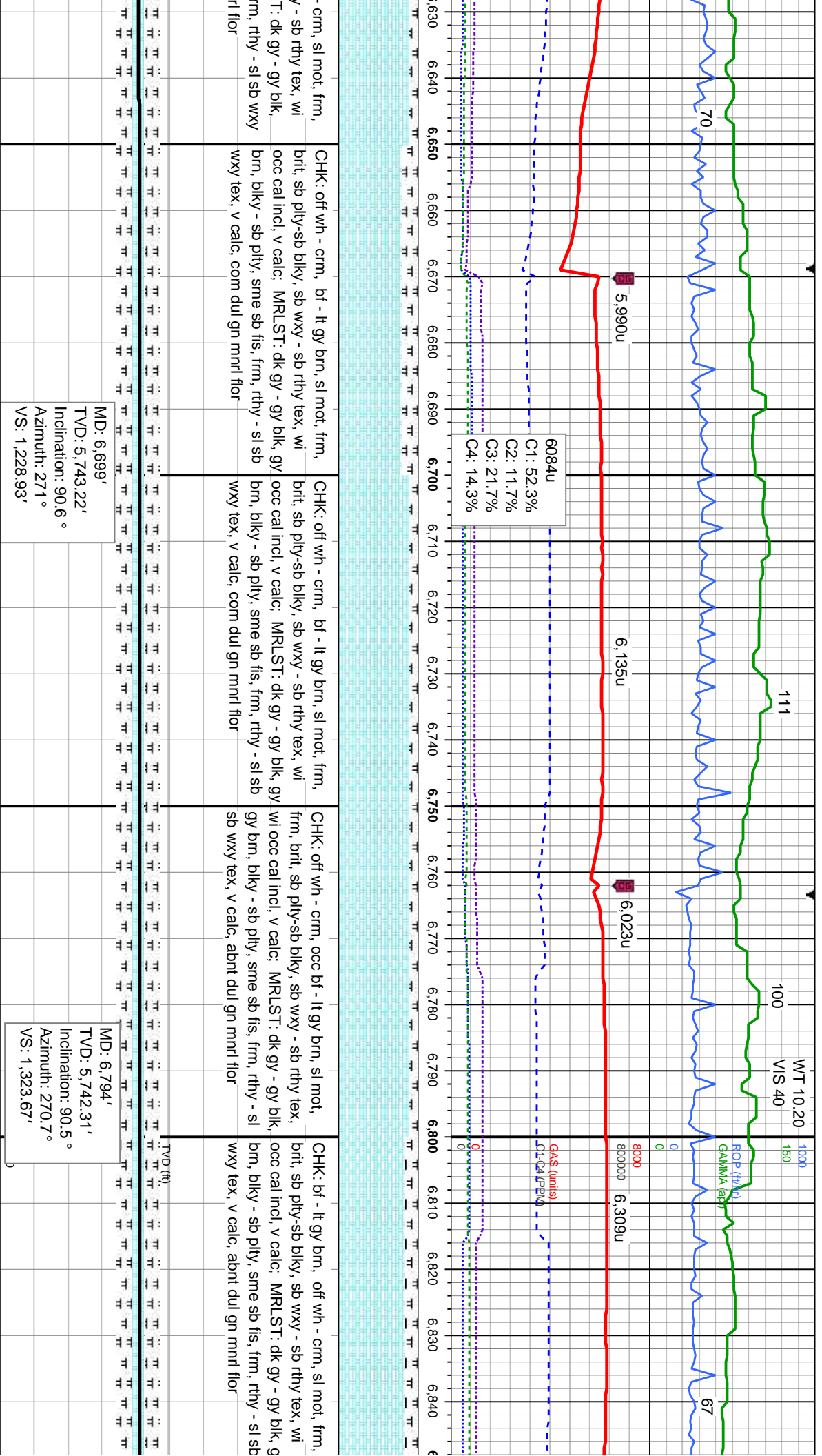
MD: 6,138'
TVD: 5,727.16'
Inclination: 87.8°
Azimuth: 271.7°
VS: 669.63'





mot, frm, tex, v sb ply, v calc, tr	CHK: pred off wh - crm, sme bf - gy brn, sl mot, frm, brit, sb ply-sb blk, sb wxy - sb rthy tex, v calc; MRLST: dk gy - gy blk, blk - sb ply, sme sb fis, frm, rthy - sl sb wxy tex, v calc, tr dissim pyr, abnt dul gn mnrl flr	CHK: pred off wh - crm, sme bf - gy brn, sl mot, frm, brit, sb ply-sb blk, sb wxy - sb rthy tex, v calc; MRLST: dk gy - gy blk, blk - sb ply, sme sb fis, frm, rthy - sl sb wxy tex, v calc, tr dissim pyr, abnt dul gn mnrl flr	CHK: pred off wh - crm, sme bf - gy brn, sl mot, frm, brit, sb ply-sb blk, sb wxy - sb rthy tex, v calc; MRLST: dk gy - gy blk, blk - sb ply, sme sb fis, frm, rthy - sl sb wxy tex, v calc, tr dissim pyr, abnt dul gn mnrl flr	CHK: pred off wh - crm, sme bf - lt gy brn, sl mot, frm, brit, sb ply-sb blk, sb wxy - sb rthy tex, v calc; MRLST: dk gy - gy blk, blk - sb ply, sme sb fis, frm, rthy - sl sb wxy tex, v calc, tr dissim pyr, abnt dul gn mnrl flr	CHK: f, r mot, frm, tex, wi blk, blk wxy tex,
TVD (ft)	TVD (ft)	TVD (ft)	TVD (ft)	TVD (ft)	TVD (ft)
6400	MD: 6,230' TVD: 5,730.7' Inclination: 87.8° Azimuth: 269.3° VS: 761.35'	6400	MD: 6,324' TVD: 5,734.39' Inclination: 87.7° Azimuth: 268.6° VS: 855.2'	6400	6400





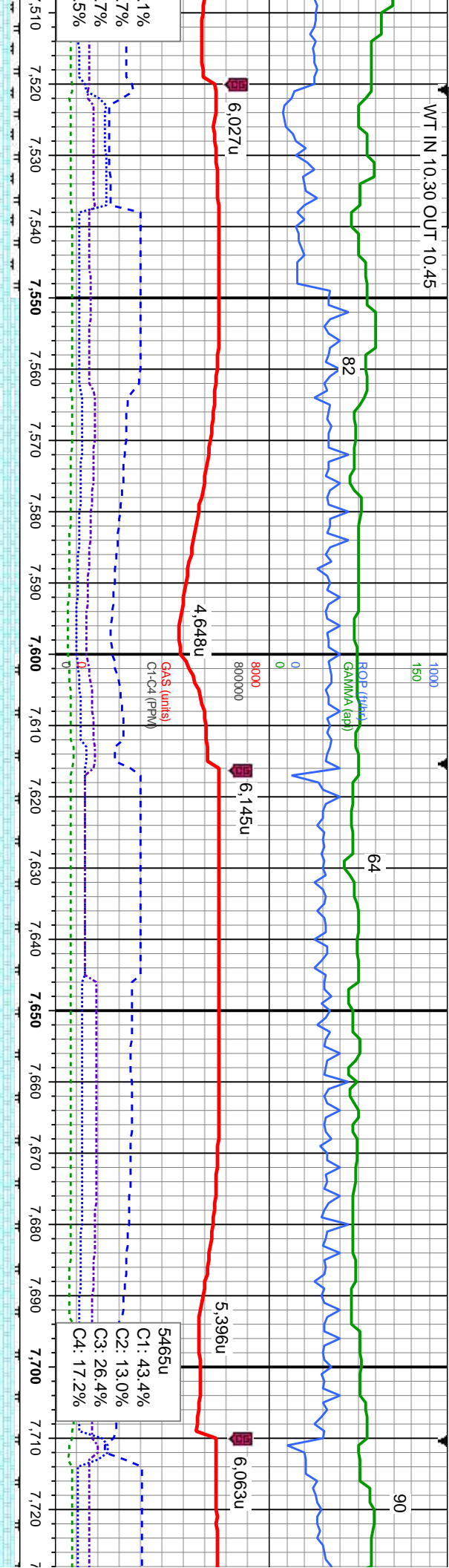
crm, sl mot, frm, v - sb rthy tex, wi	CHK: off wh - crm, bf - lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi	CHK: off wh - crm, bf - lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi	CHK: off wh - crm, occ bf - lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi occ cal incl, v calc; MRLST: dk gy - gy blk, gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc, abt dul gn mnrl flr	CHK: bf - lt gy brn, off wh - crm, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi occ cal incl, v calc; MRLST: dk gy - gy blk, g brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc, abt dul gn mnrl flr
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MD: 6,699'
TVD: 5,743.22'
Inclination: 90.6°
Azimuth: 271°
VS: 1,228.93'

MD: 6,794'
TVD: 5,742.31'
Inclination: 90.5°
Azimuth: 270.7°
VS: 1,323.67'



WT IN 10.30 OUT 10.45



ff wh crm - lt gy brn, sl mot, frm, brit,
sb blk, sb wxy - sb rthy tex, wi tr cal
calc; MRLST: dk gy - gy blk, sme gy
y - sb pty, sme sb fis, frm, rthy - sl sb
f, v calc; occ fos frag, abnt dul gn mnrl
over shaker

CHK: pred off wh crm - bf, tr lt gy brn, sl mot,
frm, brit, sb pty-sb blk, sb wxy - sb rthy tex,
wi tr cal incl, v calc; tr dk gy blk mlst, tr fos
frag, abnt dul gn mnrl flr, oil over shaker

CHK: pred off wh crm - bf, tr lt gy brn, sl mot,
frm, brit, sb pty-sb blk, sb wxy - sb rthy tex,
wi tr cal incl, v calc; tr dk gy blk mlst, abnt
dul gn mnrl flr, oil over shaker

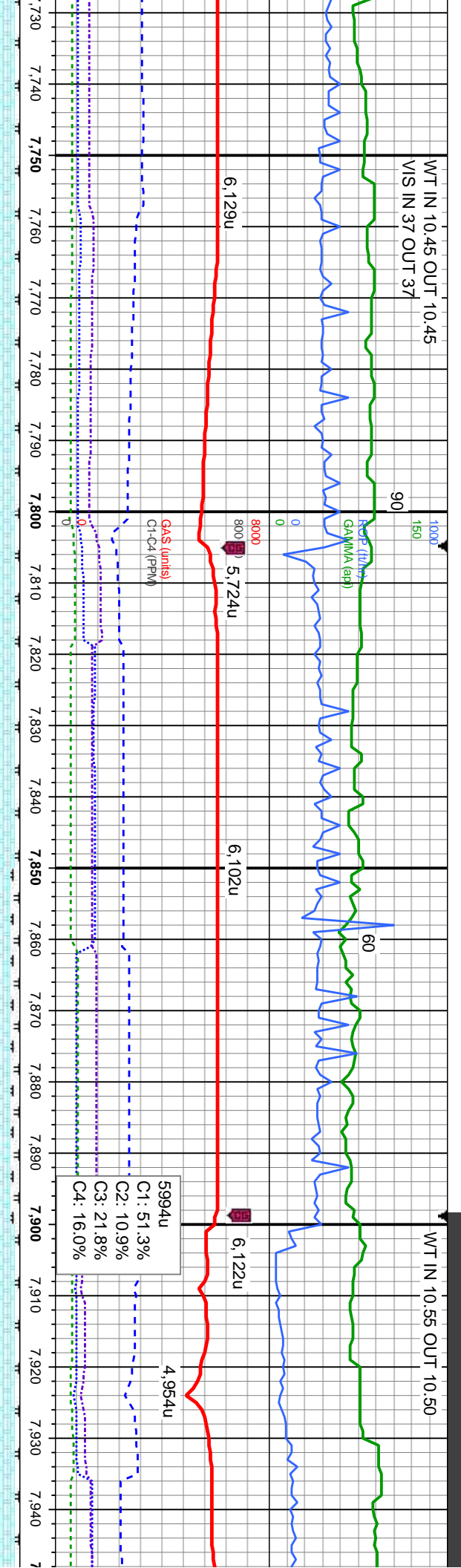
CHK: pred off wh crm - bf, tr lt gy brn, sl mot,
frm, brit, sb pty-sb blk, sb wxy - sb rthy tex,
wi tr cal incl, v calc; tr dk gy blk mlst, abnt
dul gn mnrl flr, oil over shaker

CHK: pred off wh crm - b
mot, frm, brit, sb pty-sb l
rthy tex, wi tr cal incl, v c
mlst, abnt dul gn mnrl flr

MD: 7,551'
TVD: 5,752.05'
Inclination: 89.1°
Azimuth: 269.6°
VS: 2,079.62'

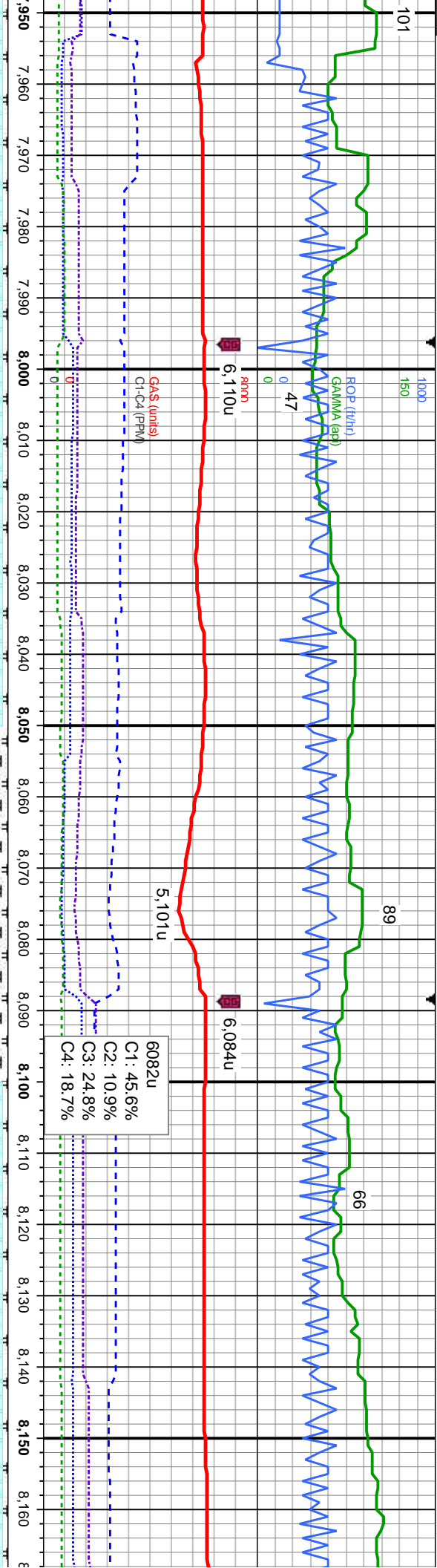
MD: 7,645'
TVD: 5,753.36'
Inclination: 89.3°
Azimuth: 268.4°
VS: 2,173.53'





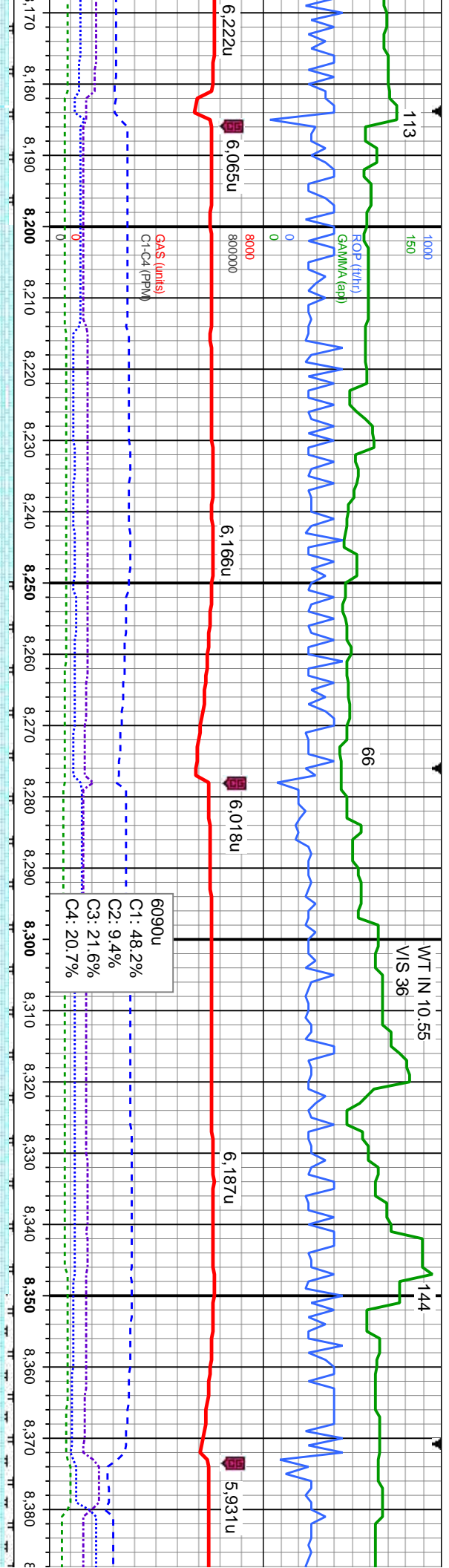
alky, sb wxy - sb calc: tr dk gy blk or, oil over shaker	CHK: pred off wh crm - bf, tr lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: tr mlst dk gy blk mlst, abt dul gn mnrl flor, oil over shaker	CHK: pred off wh crm - bf, tr lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: tr mlst dk gy blk mlst, tr fos frag, abnt dul gn mnrl flor, oil over shaker	CHK: pred off wh crm - bf, tr lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abnt dul gn mnrl flor	CHK: pred off wh crm - bf, tr lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abnt du gn mnrl flor
MD: 7,740' TVD: 5,754.61' Inclination: 89.2 ° Azimuth: 267.7 ° VS: 2,268.5'	TVD (ft)	MD: 7,834' TVD: 5,757.39' Inclination: 87.4 ° Azimuth: 265.6 ° VS: 2,362.45'	MD: 7,929' TVD: 5,760.79' Inclination: 88.5 ° Azimuth: 267 ° VS: 2,457.38'	





CHK: pred off wh crm - bf, tr lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc; MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc; tr fos frag, abnt dul gn mnrl flr	CHK: pred off wh crm - bf, tr lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc; MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc; tr fos frag, abnt dul gn mnrl flr	CHK: pred off wh crm - bf, tr lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc; MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc; tr fos frag, abnt dul gn mnrl flr	CHK: pred off wh crm - bf, tr lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc; MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc; tr fos frag, abnt dul gn mnrl flr	CHK: pred off wh crm - bf, tr lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc; MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc; tr fos frag, abnt dul gn mnrl flr
MD: 8.023' TVD: 5,762.02' Inclination: 90 ° Azimuth: 269.6° VS: 2.551.32'	MD: 8.118' TVD: 5,761.61' Inclination: 90.5 ° Azimuth: 269.8° VS: 2.646.19'			





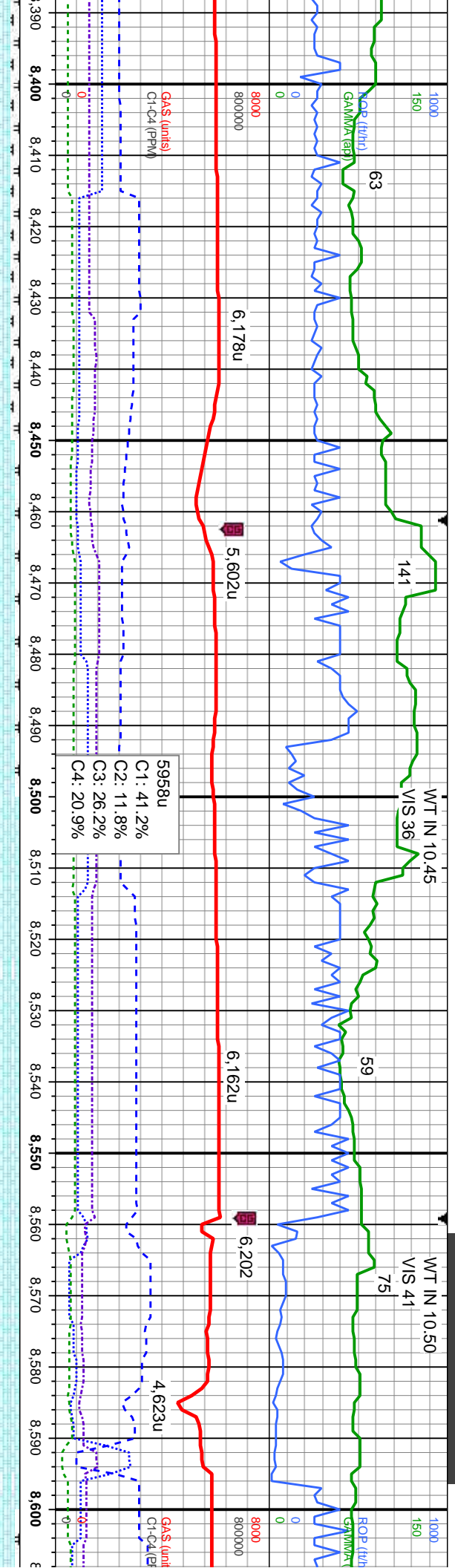
crn - bf, tr lt gy brn, sl mot, sb blk, sb wxy - sb rthy tex, calc: MRLST: dk gy - gy blk, - sb pily, sme sb fis, frm, tex, v calc: tr fos frag, abnt dul	CHK: pred off wh crm - bf, tr lt gy brn, sl mot, frm, brit, sb pily-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: tr MRLST: dk gy - gy blk, sme gy brn, tr fos frag, abnt dul gn mnrl flr	CHK: pred off wh crm - bf, tr lt gy brn, sl mot, frm, brit, sb pily-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pily, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abnt dul gn mnrl flr	CHK: pred lt gy brn, occ off wh crm - bf, sl mot, frm, brit, sb pily-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pily, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abnt dul gn mnrl flr	CHK: pred lt gy brn, occ off wh crm mot, frm, brit, sb pily-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pily, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abnt dul gn mnrl flr
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TVD (ft)

MD: 8,213'
TVD: 5,760.95'
Inclination: 90.3°
Azimuth: 269.5°
VS: 2,741.06'

MD: 8,308'
TVD: 5,760.28'
Inclination: 90.5°
Azimuth: 269.5°
VS: 2,835.94'

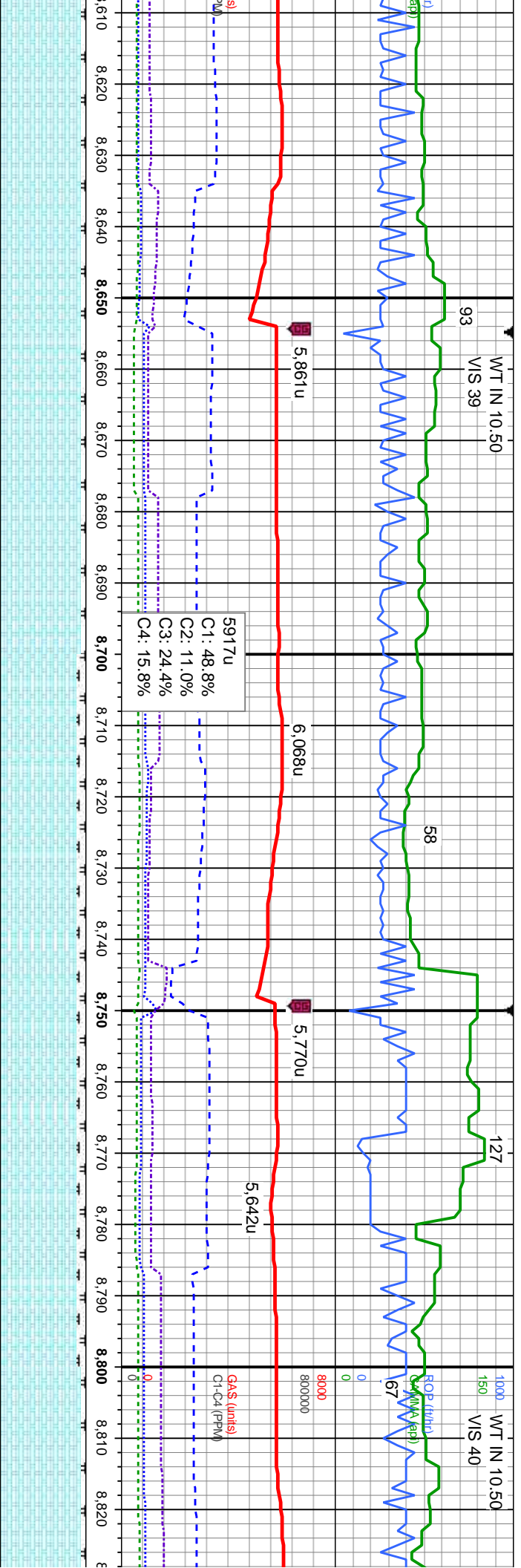




- bf, sl	CHK: pred lt gy brn, occ off wh crm - bf, sl	CHK: pred lt gy brn, occ off wh crm - bf, sl	CHK: pred off wh crm - bf, lt gy brn, sl mot,	CHK: pred off wh crm - bf, lt gy brn, sl mot,	CHK: f
gy - sb rthy	mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy	mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy	frm, brit, sb pty-sb blk, sb wxy - sb rthy tex,	frm, brit, sb pty-sb blk, sb wxy - sb rthy tex,	frm, brit
gy - gy	tex, wi tr cal incl, v calc: MRLST: dk gy - gy	tex, wi tr cal incl, v calc: MRLST: dk gy - gy	wi tr cal incl, v calc: tr MRLST: dk gy - gy blk,	wi tr cal incl, v calc: tr MRLST: dk gy - gy blk,	wi tr ce
sb fis,	blk, sme gy brn, blk, - sb pty, sme sb fis,	blk, sme gy brn, blk, - sb pty, sme sb fis,	sme gy brn, tr fos frag, abt dul gn mnrl flr	sme gy brn, tr fos frag, abt dul gn mnrl flr	sme gy
frag,	frm, rthy - sl sb wxy tex, v calc: tr fos frag,	frm, rthy - sl sb wxy tex, v calc: tr fos frag,			rthy - s
	abt dul gn mnrl flr	abt dul gn mnrl flr			gn mnrl

MD: 8,402'	MD: 8,497'	MD: 8,591'
TVD: 5,759.05'	TVD: 5,756.81'	TVD: 5,755.83'
Inclination: 91 °	Inclination: 91.7 °	Inclination: 89.5 °
Azimuth: 269.1 °	Azimuth: 268.9 °	Azimuth: 269.6 °
VS: 2,929.83'	VS: 3,024.73'	VS: 3,118.62'





pred off wh crm - bf, lt gy brn, sl mot, it, sb pty-sb blk, sb wxy - sb rthy tex, al incl, v calc: MRLST: dk gy - gy blk, brn, blk - sb pty, sme sb fis, frm, l sb wxy tex, v calc; tr fos frag, abnt dul	CHK: pred off wh crm - bf, lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc; tr nod pyr, abnt dul	CHK: pred off wh crm - bf, lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc; tr fos frag, abnt dul	CHK: pred off wh crm - bf, lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc; tr fos frag, abnt dul	CHK: pred off wh crm - bf, lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc; tr fos frag, abnt dul
gn mnrl flr	gn mnrl flr	gn mnrl flr	gn mnrl flr	gn mnrl flr

MD: 8,686'

TVD: 5,756.74'

Inclination: 89.4°

Azimuth: 268.8°

VS: 3,213.52'

MD: 8,780'

TVD: 5,767.07'

Inclination: 90.2°

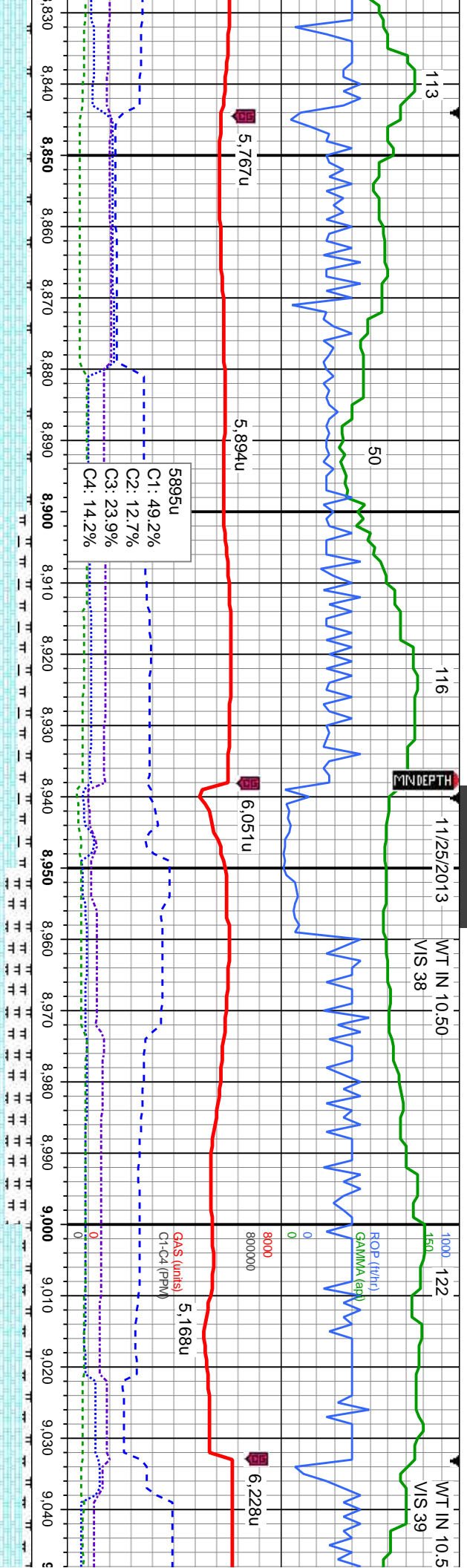
Azimuth: 269.5°

VS: 3,307.43'

TVD (ft)

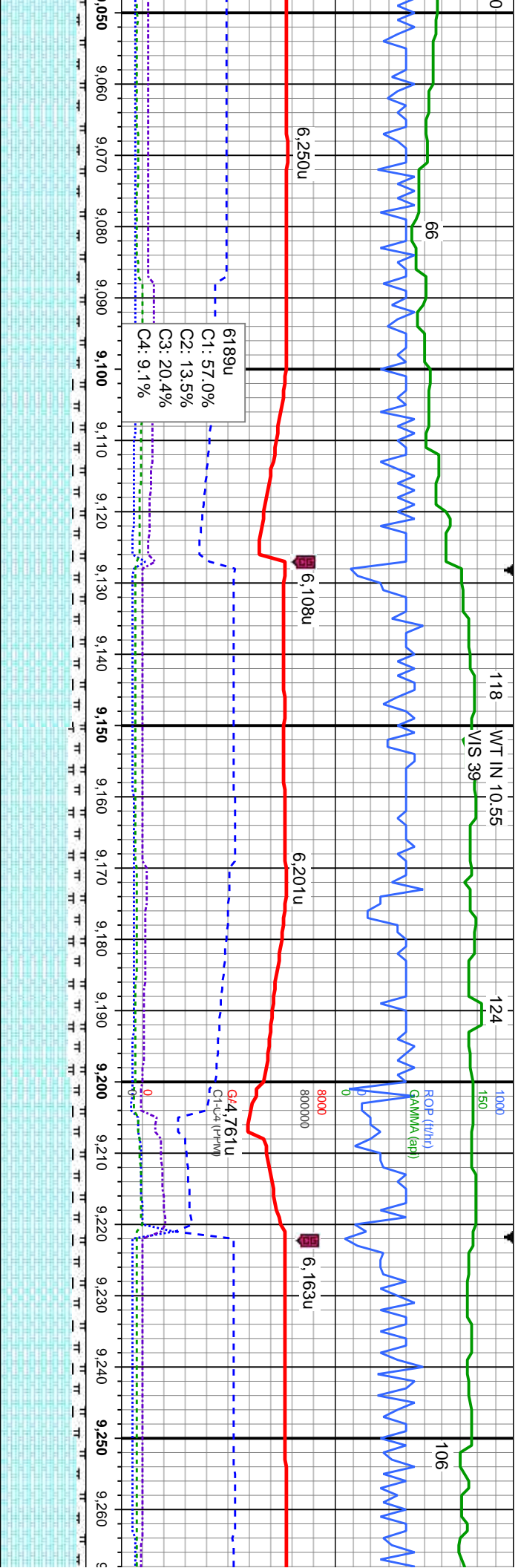
6400





lt gy brn, sl mot, b wxy - sb rthy tex, T: dk gy - gy blk, sme sb fis, frm, rthy - sl sb wxy frag, abt dul	CHK: pred off wh crm - bf, lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abt dul gn mnrl flr	CHK: pred off wh crm - bf, lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abt dul gn mnrl flr	CHK: pred off wh crm - bf, lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abt dul gn mnrl flr	CHK: pred off wh crm - bf, lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abt dul gn mnrl flr
MD: 8,874'				
TVD: 5,756.25'				
Inclination: 90.8°				
Azimuth: 269.1°				
VS: 3,401.33'				
MD: 8,969'				
TVD: 5,756.33'				
Inclination: 89.1°				
Azimuth: 269.6°				
VS: 3,496.22'				
6400				

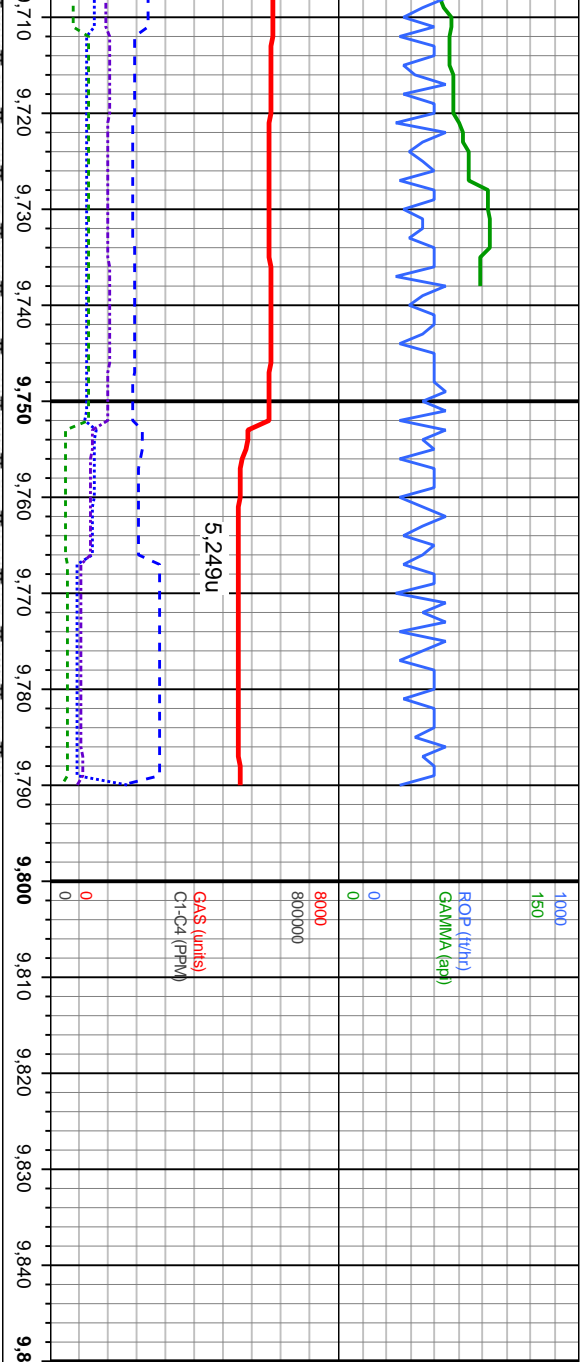




CHK: pred off wh crm - bf, lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abnt dul gn mnrl flr	CHK: pred off wh crm - bf, lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abnt dul gn mnrl flr	CHK: pred off wh crm - bf, lt gy brn, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abnt dul gn mnrl flr	CHK: pred lt gy brn, occ off wh crm - bf, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abnt dul gn mnrl flr	CHK: pred lt gy brn, occ off wh crm - bf, sl mot, frm, brit, sb pty-sb blk, sb wxy - sb rthy tex, wi tr cal incl, v calc: MRLST: dk gy - gy blk, sme gy brn, blk - sb pty, sme sb fis, frm, rthy - sl sb wxy tex, v calc: tr fos frag, abnt dul gn mnrl flr
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MD: 9,064' TVD: 5,757.66' Inclination: 89.3° Azimuth: 269.5° VS: 3,591.09'	MD: 9,158' TVD: 5,758.31' Inclination: 89.9° Azimuth: 270.5° VS: 3,684.93'	MD: 9,253' TVD: 5,758.98' Inclination: 89.3° Azimuth: 269.5° VS: 3,779.77'
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pred off wh crm - lt gy brn, sl mot, frm,
pty-sb blk, sb wxy - sb rthy tex, v
MRLST: dk gy - gy blk, sme gy brn, blk
y, sme sb fis, frm, rthy - sl sb wxy tex,
abt dull gn mnrl flr, oil over shaker

CHK: pred off wh crm - lt gy brn, sl mot, frm,
brit, sb pty-sb blk, sb wxy - sb rthy tex, v
calc; MRLST: dk gy - gy blk, sme gy brn, blk
- sb pty, sme sb fis, frm, rthy - sl sb wxy tex,
v calc, abnt dull gn mnrl flr, oil over shaker

4800

NOBLE ENERGY INC
TIMBRO STATE LD 16-66HN
TD @ 9,790' MD
11/25/2013 @ 06:53 hrs

Thank you for choosing
Columbine Logging Inc.

TVD (ft)

PTB

MD: 9,726'
TVD: 5,765.17'
Inclination: 88.2°
Azimuth: 269.6°
VS: 4,251.78'

MD: 9,790'
TVD: 5,767.18'
Inclination: 88.2°
Azimuth: 269.6°
VS: 4,315.67'

6400

