



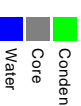
Scale: 5" / 100'  
Measured Depth Log

Well Name	DOLPH 15C-1HZ		
Location	Sec.1 Twp. 2N R66W		
State	COLORADO	County	WELD
Country	UNITED STATES OF AMERICA		
API Number	05123393320000	Rig Number	ENSIGN 145
Region	DJ BASIN	AFE #	2093679 DRL
Spud Date	8/28/2014	Field	WATTENBERG
		Drilling Completed	9/2/2014
Surface Coordinates	597' FNL & '1936 FWL Sec.1 Twp.2N R66W		
Bottom Hole Coordinates	460' FNL & '1638' FWL		
Ground Elevation	5,013'	K.B. Elevation	5,026'
Logged Interval	6,900'	To	12,246'
		Total Depth	12,246'
Formation	SUSSEX, SHARON SPRINGS, NIOBRARA A, NIOBRARA B, NIOBRARA C, FORT HAYS, CODELL		
Type of Drilling Fluid	FWLSND		

Company Anadarko  
Address 1099 18TH ST.  
DENVER, CO. 80202

Name SHARON SADLE, RHE  
Company ANADARKO PETROLE  
Address 1099 18TH ST.  
Denver, CO 80202

SENIOR WELLSITE GEOLOG  
WELLSITE GEOLOG



Zon

Operator

Geologist

AD CANNON  
JM CORPORATION

Other

ST MOHAMMED ALMUBARAK  
ST TOM WRIGHT

Color Coding



Rock Types

UNKNOWN	COAL	MARLSTONE	SHALY SANDSTONE
ANHYDRITE	CONGLOMERATE	METAMORPHIC	SHALY SILTSTONE
BENTONITE	DOLOMITE	NO SAMPLE	SILTY SHALE
BRECCIA	DOLOMITIC LIMESTONE	SALT	SILTSTONE
CHALK	GRANITE	SANDSTONE	TILL
CEMENT	GYPSUM	SALT-PEPPER SAND	TUFF
CHERT	IGNEOUS	SHALE	WELDED TUFF
CLAY CHOKE SAND	SIDERITE or LIMONITE	SHALE COLORED	
CLAYSTONE	LIMESTONE	SHALE GRAY	

Accessories

GASTROPOD	ARGILLITE GRAIN	HEAVY MINERAL	ANHYDRITE STRINGER
INOCERAMUS	B BENTONITE	KAOLIN	BENTONITE STRINGER
OOLITE	BITUMENOUS SUBSTANCE	MARLSTONE	COAL STRINGER
OSTRACOD	BRECCIA FRAGMENTS	MICACEOUS	DOLOMITE STRINGER
PELECYPOD	CALCAREOUS	MINERAL CRYSTALS	GYPSUM STRINGER
PELLET	CARBONACEOUS FLAKES	NODULES	LIMESTONE STRINGER
PISOLITE	CHTDK	PHOSPHATE PELLETS	MARLSTONE (CALC) STRG
PLANT REMAINS	CHTLT	PYRITE	MARLSTONE (DOL) STRG
PLANT SPORES	COAL - THIN BEDS	SALT CAST	SANDSTONE STRINGER
SCAPHOPOD	DOLOMITIC	SANDY	SHALE STRINGER
STROMATOPOROID	FELDSPAR	SILICEOUS	SILTSTONE STRINGER
ECHINOID	FERRUGINOUS PELLETT	SILTY	
FISH	FERRUGINOUS	TUFFACEOUS	
FORAMINIFERA	ANHYDRITIC	GLAUCONITE	
FOSSIL	ARGILLACEOUS	GYPSIFEROUS	

Stringer

Other Symbols

Oil Show

P PINPOINT	DST INTERVAL	WIRELINE TESTED - LEFT	E EARTHY
V VUGGY	FAULT	WIRELINE TESTED - RT	FX FINELYXLN

DEAD

Engineering

FORMATION TOP	DRILL STEM TEST	GS GRANSTONE
GAS SHOW	MINDEPTH MIN DEPTH	L LITHOGRAPHIC
OIL SHOW		MX MICROXLN

EVEN

QUESTIONABLE

BIT

SPOTTED STAINING

CONNECTION (UP)

Rounding

MS MUDSTONE

Prosity

CONNECTION (DOWN)	MINDEPTH	MIN DEPTH (DOWN)	A ANGULAR	PS PACKSTONE
CONNECTION GAS	NORMAL FAULT	R ROUNDED		WIS WACKESTONE
CONNECTION GAS (LEFT)	OVERTURNED STRATA	S SUBANG		
TRIP GAS	REVERSE FAULT	P SUBRND		

Sorting

RACTURE

CASING

M MODERATE

Textures

INTERCRYSTALLINE	DOWN TIME GAS	SIDEWALL CORE (LEFT)	P POOR
INTEROOLITIC	DOWN TIME GAS (LEFT)	SIDEWALL CORE (RIGHT)	BS BOUNDSTONE
MOLDIC	CORE - LOST	SLIDE	C CHALKY
ORGANIC	CORE - RECOVERED	SURVEY	CX CRYPTOXLN

W WELL

Slide/Rotate

ROP  
ROP

ROP

Total Gas & Chromatograph

GAS  
C1  
C2  
C3  
C4

Depth Labels

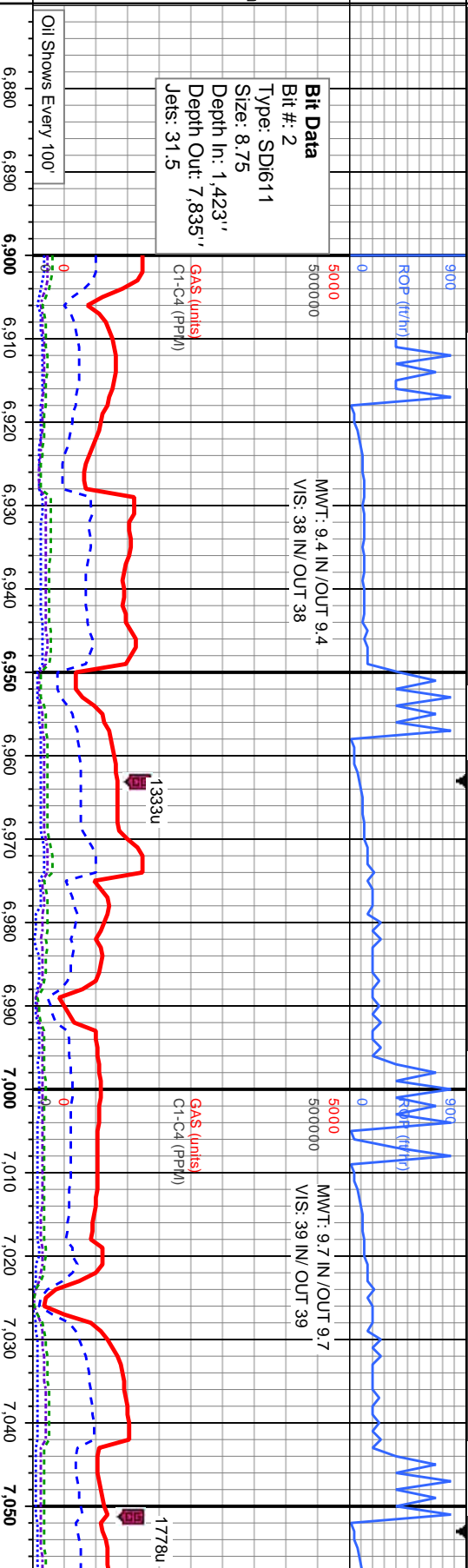
% Lith

Curves  
GAMMA

Well Bore  
TVD

Oil Show

Images



COLUMBINE LOGGING 08/29/14  
2-MAN LOGGING - LATERAL & CURVE  
WITH BLOODHOUND GAS  
CHROMATOGRAPH UNIT #314

MD: 6,914  
TVD: 6,867.68  
Inclination: 6.26  
Azimuth: 167.46  
TVD (ft)  
VS: -488.45

MD: 6,959  
TVD: 6,912.2  
Inclination: 10.43  
Azimuth: 165.83  
VS: -481.97

MD: 7,004  
TVD: 6,956.1  
Inclination: 14.8  
Azimuth: 163.05  
VS: -472.18

MD: 7,049  
TVD: 6,999.09  
Inclination: 19.47  
Azimuth: 160.47  
VS: -458.94

100% SLTY SH: lt - dk  
gy/brn, sb pily - pily,  
sily tex, v f grn, sft -  
mod frm, v sl calc, com  
bent

100% SLTY SH: lt - dk gy/brn, sb pily - pily, sily  
tex, v f grn, sft - mod frm, v sl calc, com bent,  
O SHW: med dull yell/bl wh cut, mky slow stmg,  
tr sin, tr od

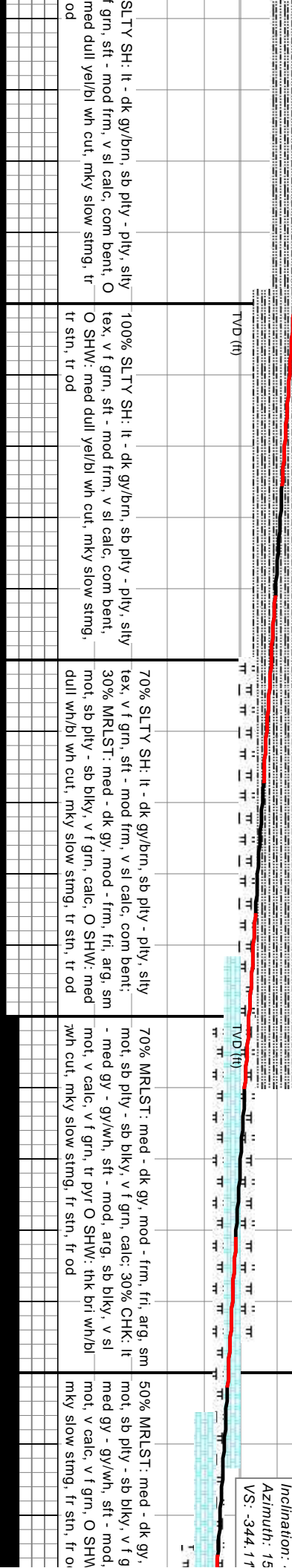
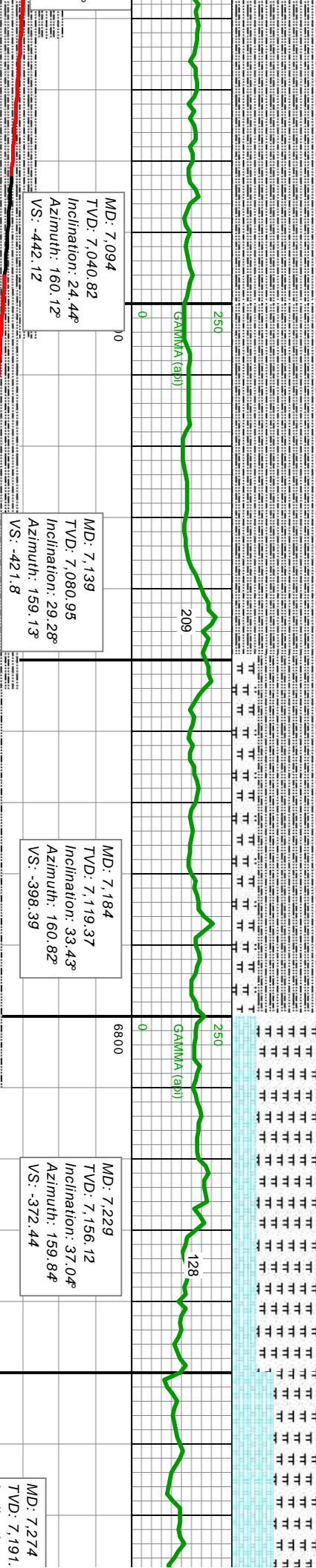
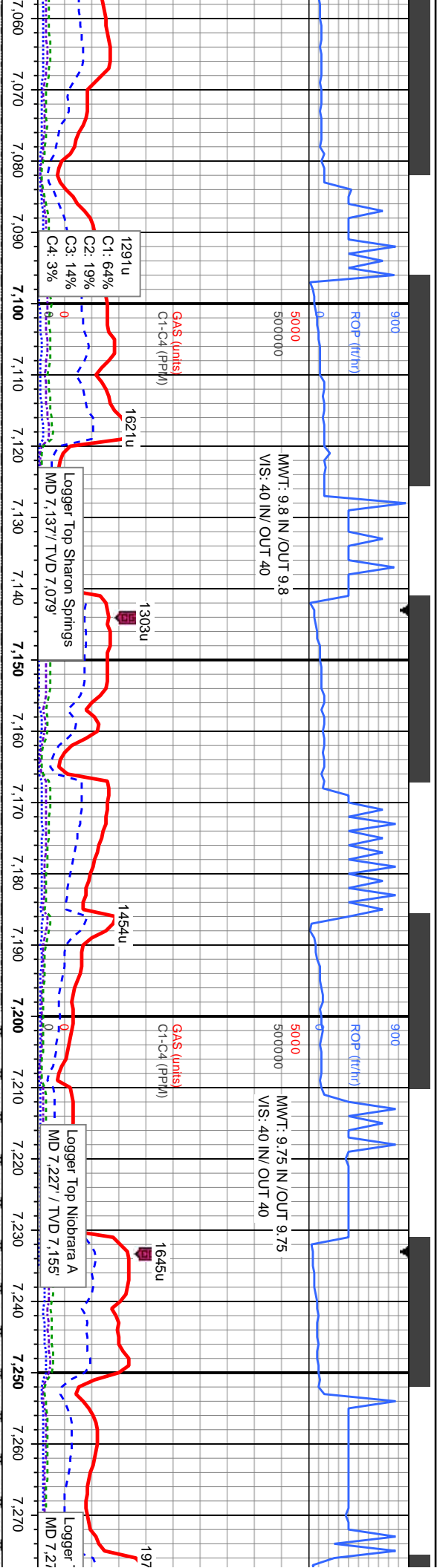
100% SLTY SH: lt - dk gy/brn, sb pily - pily, sily  
tex, v f grn, sft - mod frm, v sl calc, com bent,  
O SHW: med dull yell/bl wh cut, mky slow stmg,  
tr sin, tr od

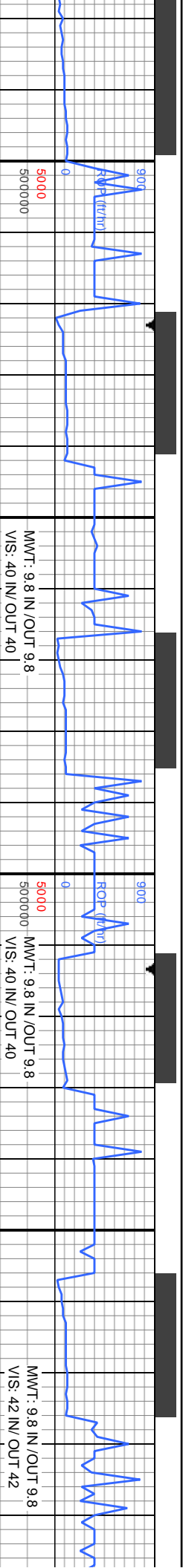
100% SLTY SH: lt - dk gy/brn, sb pily - pily, sily  
tex, v f grn, sft - mod frm, v sl calc, com bent, O  
SHW: med dull yell/bl wh cut, mky slow stmg, tr  
sin, tr od

E  
G  
M  
FR  
TR  
SL









MMWT: 9.8 IN/OUT 9.8  
VIS: 40 IN/OUT 40

MMWT: 9.8 IN/OUT 9.8  
VIS: 40 IN/OUT 40

MMWT: 9.8 IN/OUT 9.8  
VIS: 42 IN/OUT 42

Gas (units)  
C1-C4 (PPM)

1158u

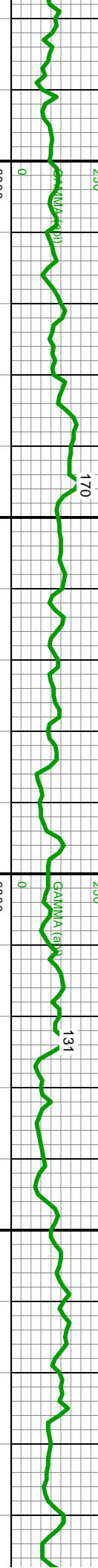
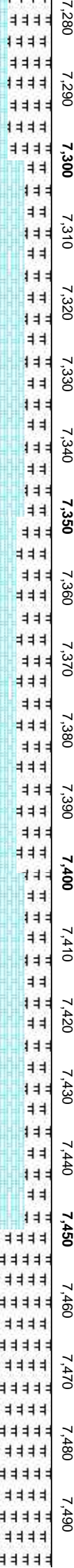
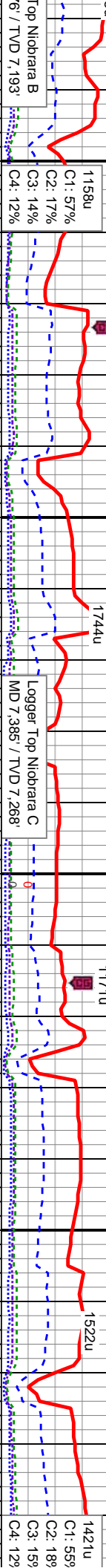
1604u

1744u

Gas (units)  
C1-C4 (PPM)

1171u

1522u



40% MRLST: med - dk gy, mod - frm, fri, arg, sm  
mot, sb ply - sb blk, v f grn, calc: 60% CHK: lt -  
med gy - gy/wh, sft - mod, arg, sb blk, v sl mot,  
v calc, v f grn; O SHW: thk bri wh/bl wh cut, mky  
slow sting, mod str, mod od

30% MRLST: med - dk gy, mod - frm, fri, arg, sm  
mot, sb ply - sb blk, v f grn, calc: 70% CHK: lt -  
med gy - gy/wh, sft - mod, arg, sb blk, v sl  
mot, v calc, v f grn; O SHW: thk bri wh/bl wh cut,  
mky fast sting, mod str, mod od

80% MRLST: med - dk gy, mod - frm, fri, arg,  
sm mot, sb ply - sb blk, v f grn, calc: 20%  
CHK: lt - med gy - gy/wh, sft - mod, arg, sb  
blk, v sl mot, v calc, v f grn; O SHW: thk bri  
wh/bl wh cut, mky fast sting, mod str, mod od

MD: 7,319  
TVD: 7,223.8  
Inclination: 45.65  
Azimuth: 159.06  
VS: -313.25

MD: 7,364  
TVD: 7,254.2  
Inclination: 49.35  
Azimuth: 158.98  
VS: -280.08

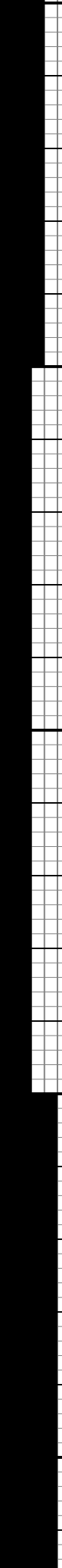
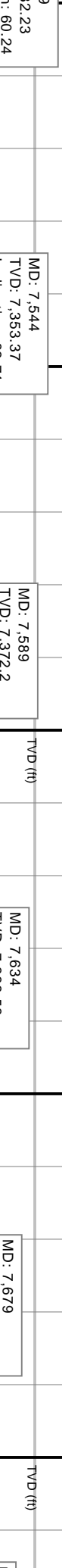
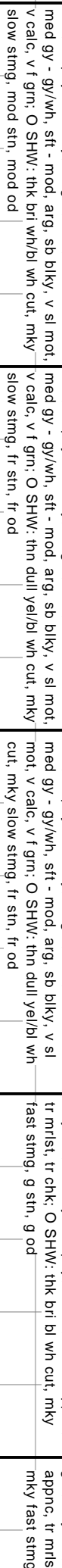
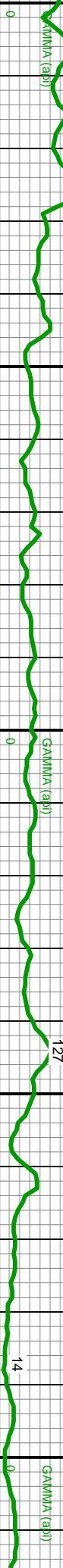
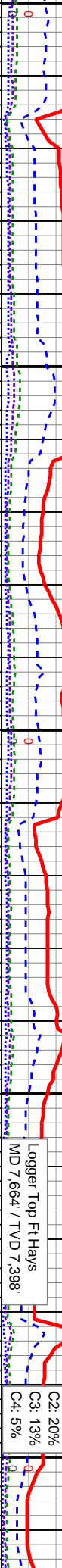
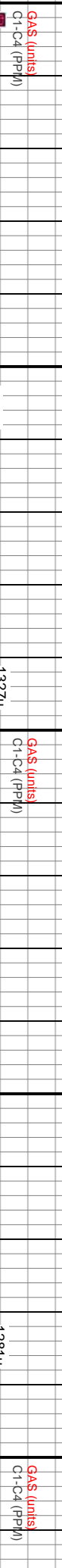
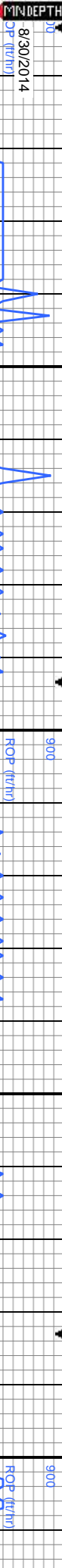
MD: 7,409  
TVD: 7,282.48  
Inclination: 52.78  
Azimuth: 159.58  
VS: -245.08

MD: 7,454  
TVD: 7,308.57  
Inclination: 56.32  
Azimuth: 159.55  
VS: -208.43

MD: 7,4  
TVD: 7,  
Inclinat  
Azimuth  
VS: -17







MD: 7.544  
TVD: 7.353.37  
Inclination: 63.71  
Azimuth: 160.88  
VS: -130.45

MD: 7.589  
TVD: 7.372.2  
Inclination: 66.8  
Azimuth: 161.08  
VS: -89.6

MD: 7.634  
TVD: 7.388.53  
Inclination: 70.64  
Azimuth: 160.76  
VS: -47.69

MD: 7.679  
TVD: 7.402.11  
Inclination: 74.21  
Azimuth: 160.56  
VS: -4.81

70% MRLST: med - dk gy, mod - frm, fri, arg, sm  
mot, sb pily - sb blkly, v f grn, calc: 30% CHK: lt -  
med gy - gy/wh, sft - mod, arg, sb blkly, v sl mot,  
v calc, v f grn; O SHW: thk bri wh/bl wh cut, mky  
slow sting, mod stn, mod od

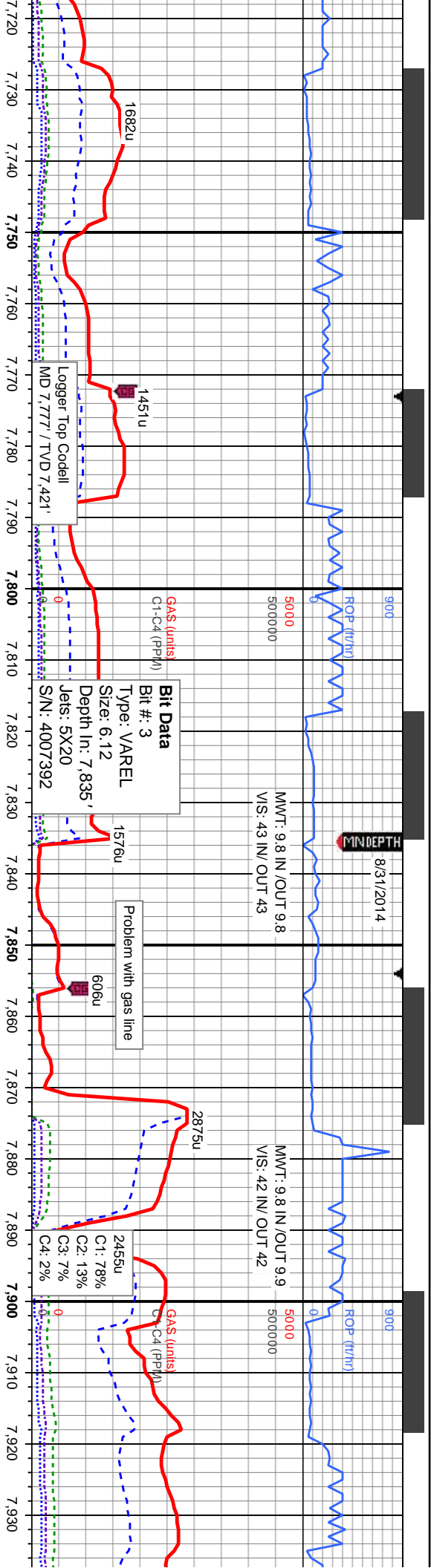
30% MRLST: med - dk gy, mod - frm, fri, arg, sm  
mot, sb pily - sb blkly, v f grn, calc: 70% CHK: lt -  
med gy - gy/wh, sft - mod, arg, sb blkly, v sl mot,  
v calc, v f grn; O SHW: thn dull yel/bl wh cut, mky  
slow sting, tr stn, tr od

20% MRLST: med - dk gy, mod - frm, fri, arg, sm  
mot, sb pily - sb blkly, v f grn, calc: 80% CHK: lt -  
med gy - gy/wh, sft - mod, arg, sb blkly, v sl  
mot, v calc, v f grn; O SHW: thn dull yel/bl wh  
cut, mky slow sting, tr stn, tr od

100% LS: lt crm - wh - brn, sft - mod, fri, v f grn,  
wxy tex, sb blkly - sb pily, v calc, sl mot appnc,  
tr mlst, tr chk; O SHW: thk bri bl wh cut, mky  
fast sting, g stn, g od

100% LS: lt crm  
grn, wxy tex, sb  
appnc, tr mlst,  
mky fast sting, g





- wh - brn, sft - mod, fri, v f  
wxy tex, sb blk - v calc, sl mot  
20% SS: lt - med brn/gy, sb blk - blk, fri, f -  
med grn, p srt, sb rnd, non calc, tr mist; O SHW:  
thk bri bl wh cut, mky fast string, g sin, g od

80% LS: lt crm - wh - brn, sft - mod, fri, v f grn,  
wxy tex, sb blk - v calc, sl mot appnc,  
60% SS: lt - med brn/gy, sb blk - blk, fri, f -  
med grn, p srt, sb rnd, non calc, tr mist; O SHW:  
thk bri bl wh cut, mky fast string, mod sin, mod od

90% SS: med - dk gy/brn, sb blk - blk, fri, f -  
med grn, lith clus, p srt, sb rnd, non calc, 10% LS:  
lt crm - wh - brn, sft - mod, fri, v f grn, wxy tex,  
sb blk - sb blk, v calc, sl mot appnc; O SHW:  
thk bri bl wh cut, mky fast string, mod sin, mod od

690100% SS: med - dk gy/brn, sb blk  
SHW: thk bri bl wh cut, mky fast s

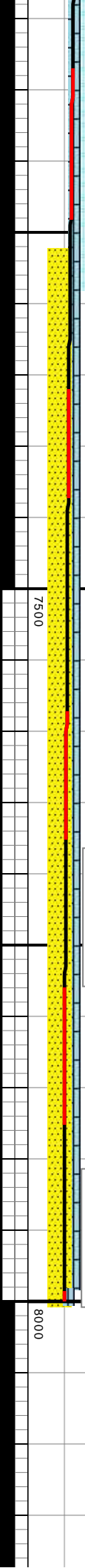
MD: 7.724  
TVD: 7.412.72  
Inclination: 78.51  
Azimuth: 159.5  
VS: 38.91

MD: 7.769  
TVD: 7.419.94  
Inclination: 83.04  
Azimuth: 158.45  
VS: 83.31

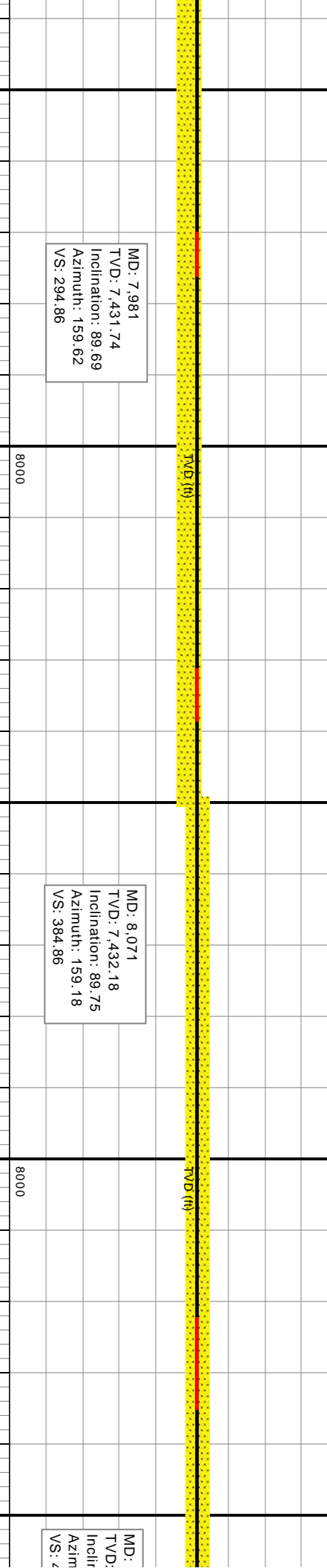
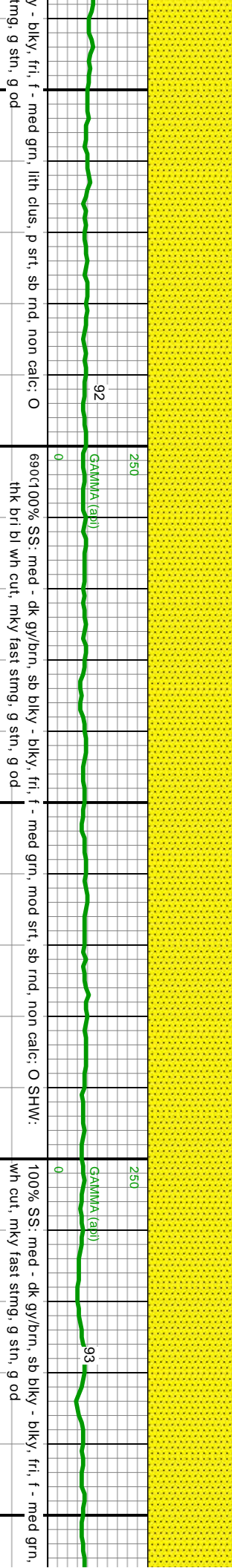
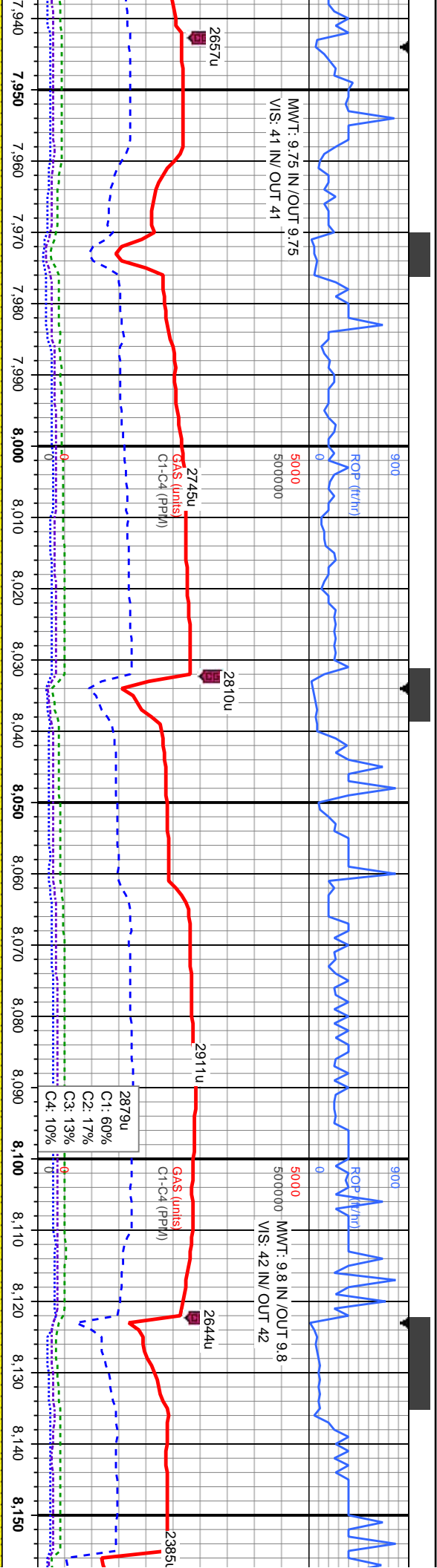
MD: 7.786  
TVD: 7.421.84  
Inclination: 84.13  
Azimuth: 158.31  
VS: 100.2

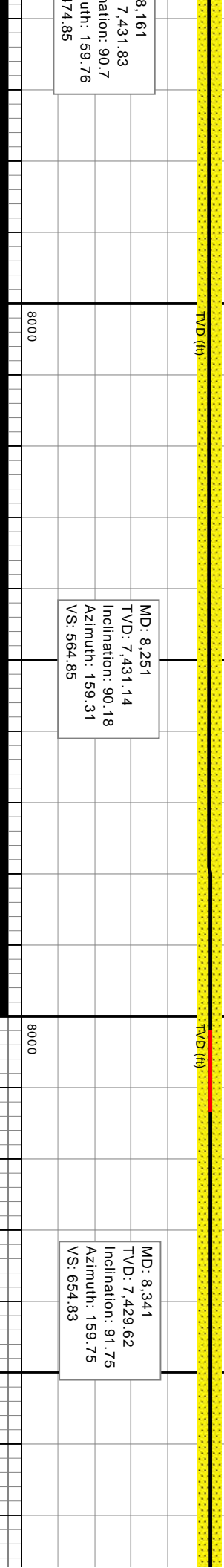
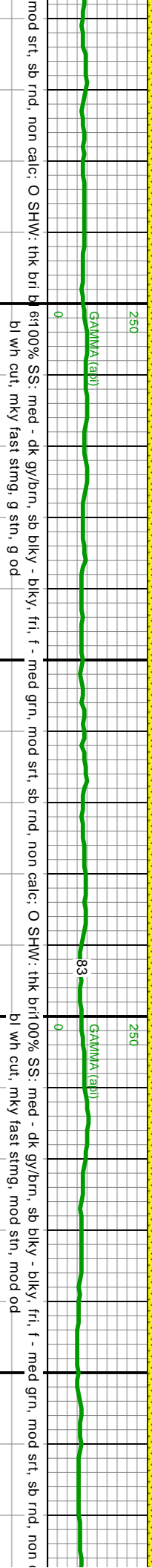
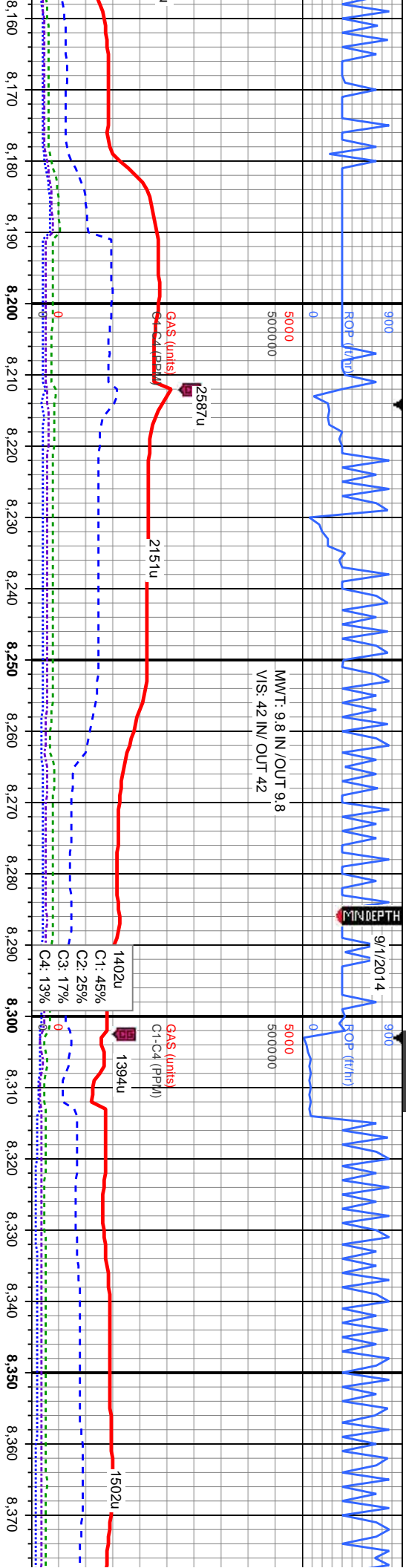
MD: 7.846  
TVD: 7.427.11  
Inclination: 85.78  
Azimuth: 159.56  
VS: 159.96

MD: 7.891  
TVD: 7.429.68  
Inclination: 87.68  
Azimuth: 159.48  
VS: 204.89

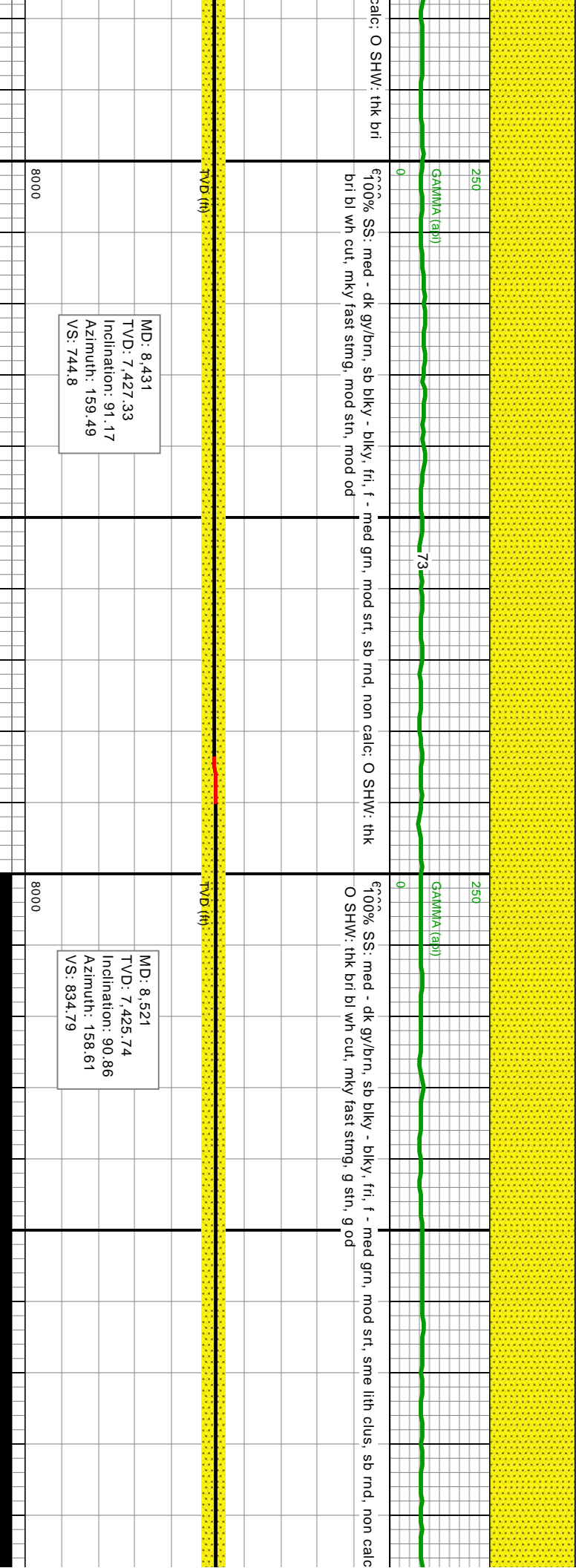
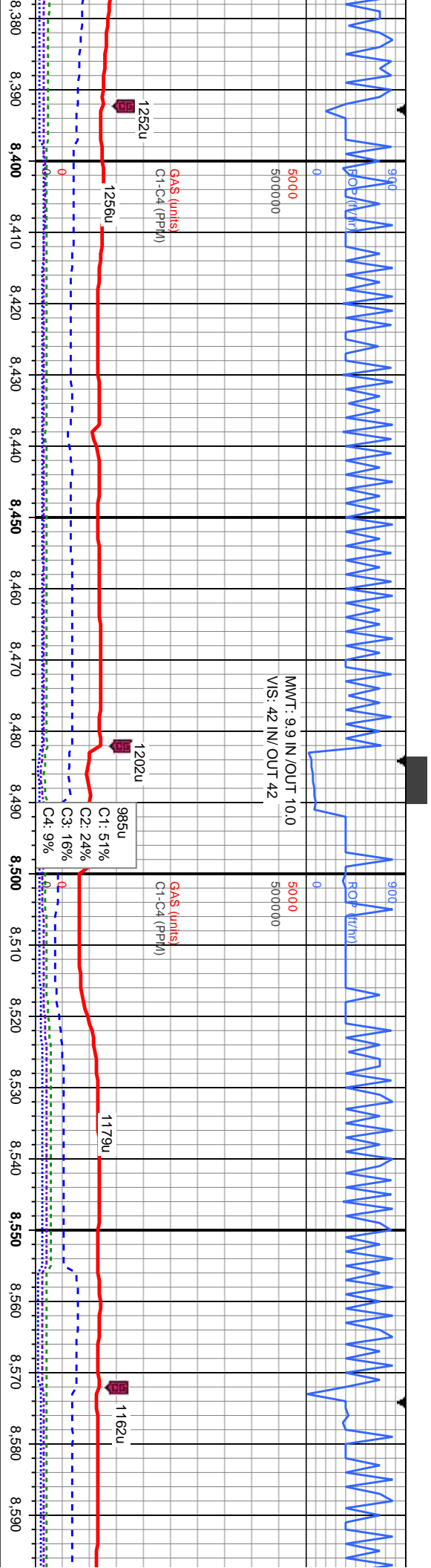




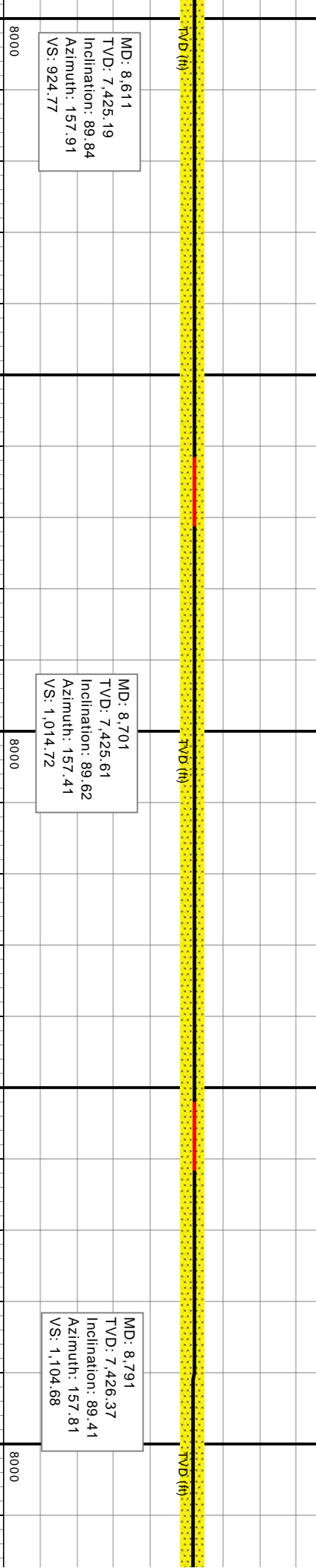
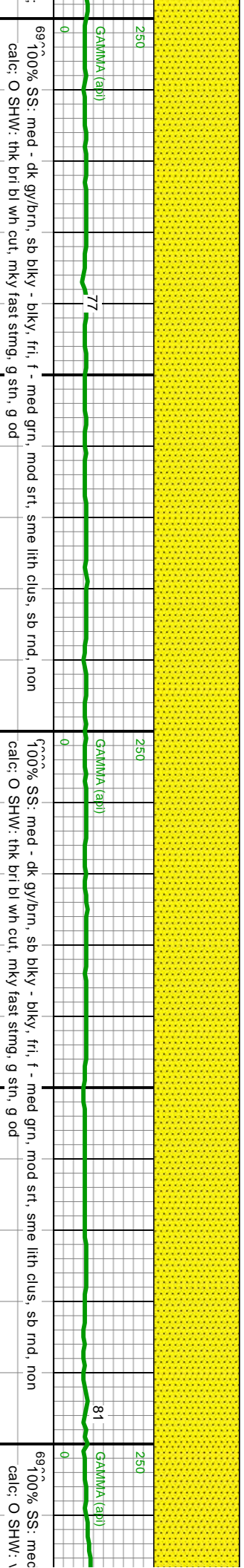
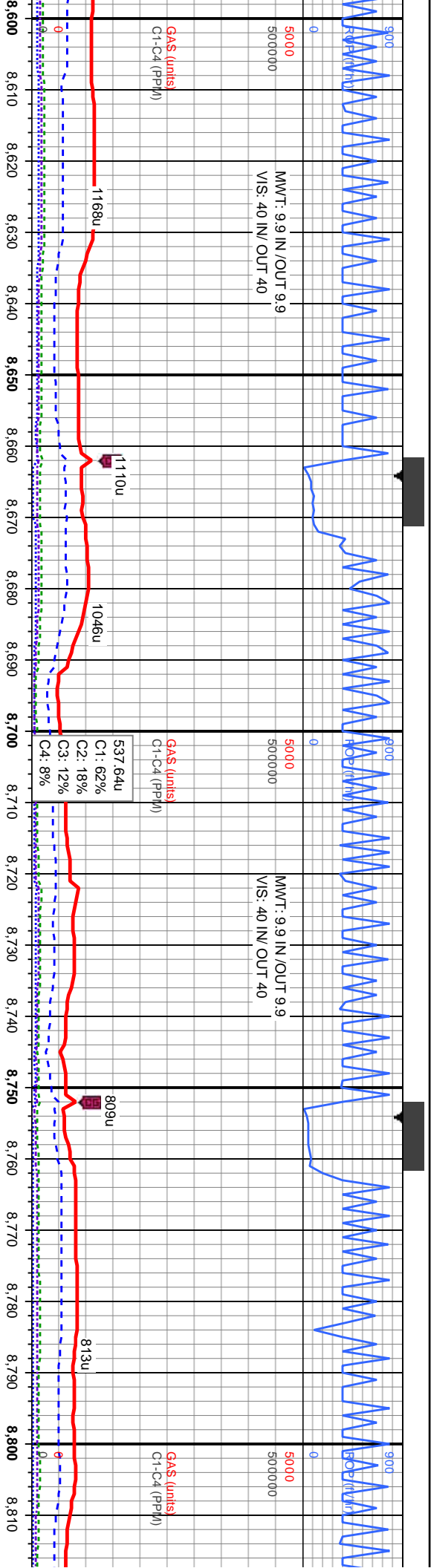












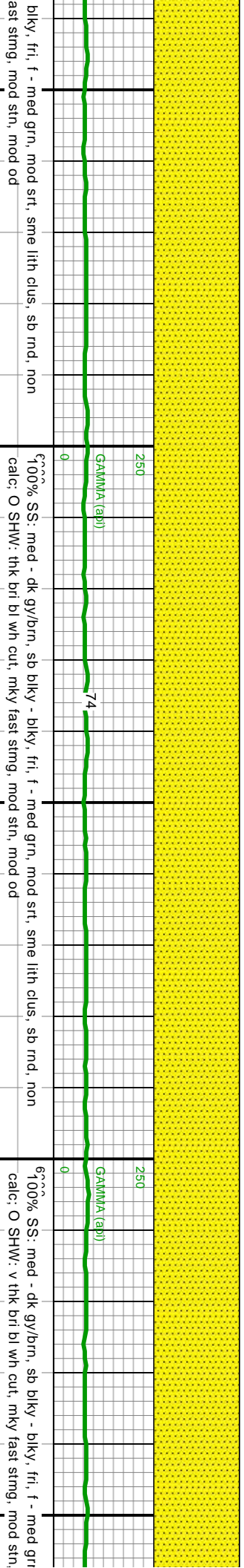
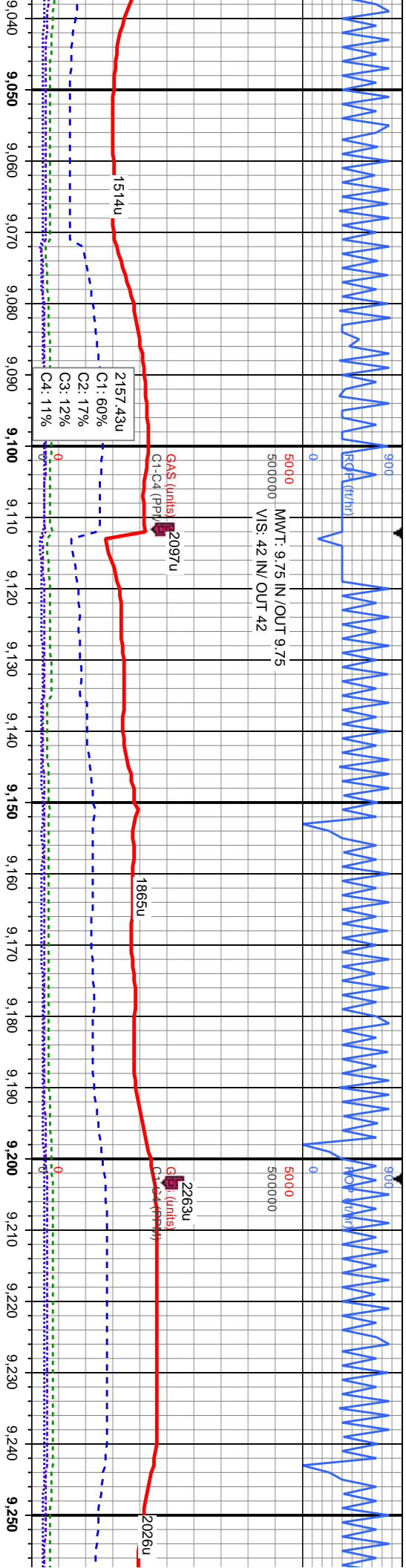
MD: 8.611  
TVD: 7.425.19  
Inclination: 89.84  
Azimuth: 157.91  
VS: 924.77

MD: 8.701  
TVD: 7.425.61  
Inclination: 89.62  
Azimuth: 157.41  
VS: 1,014.72

MD: 8.791  
TVD: 7.426.37  
Inclination: 89.41  
Azimuth: 157.81  
VS: 1,104.68





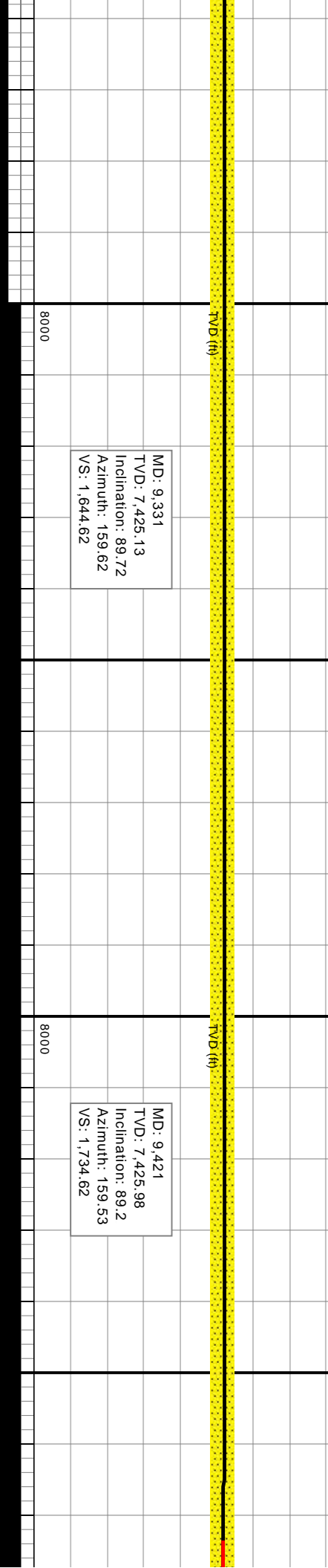
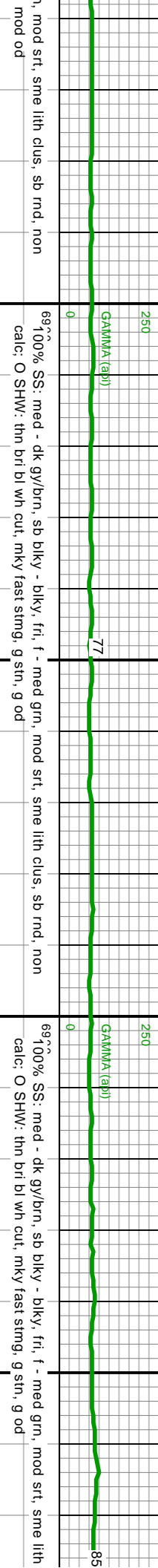
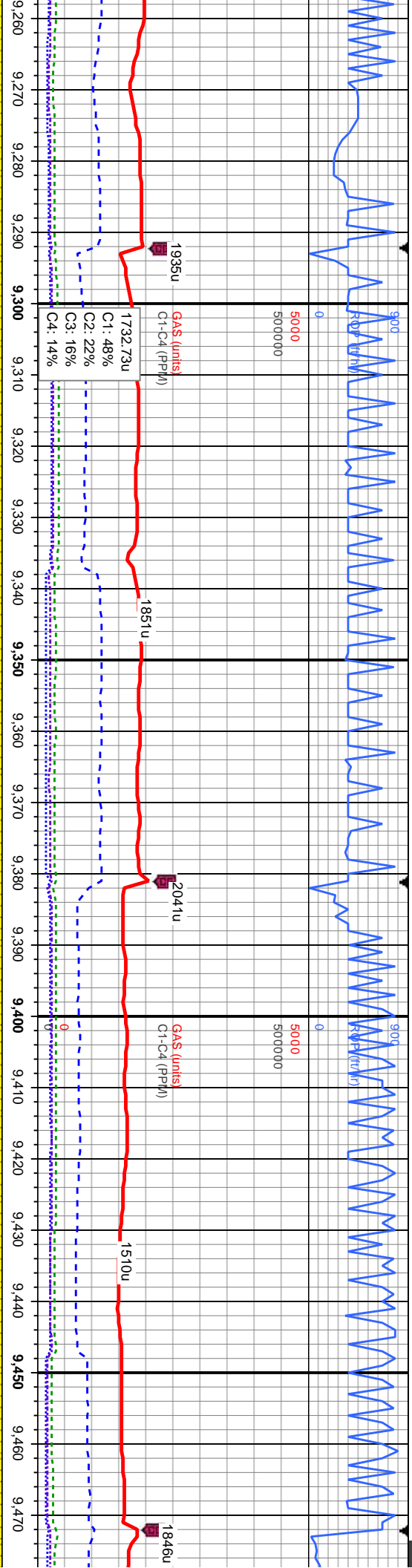


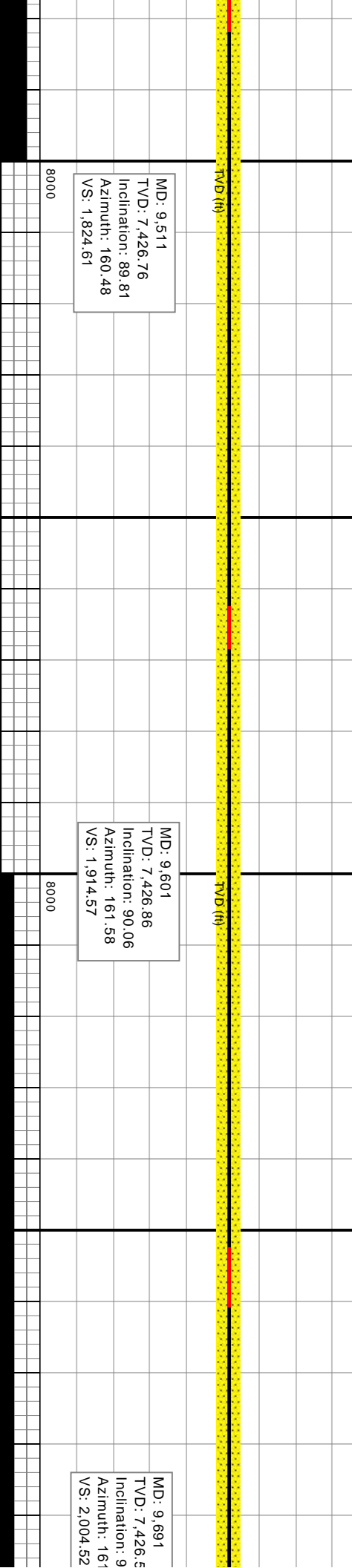
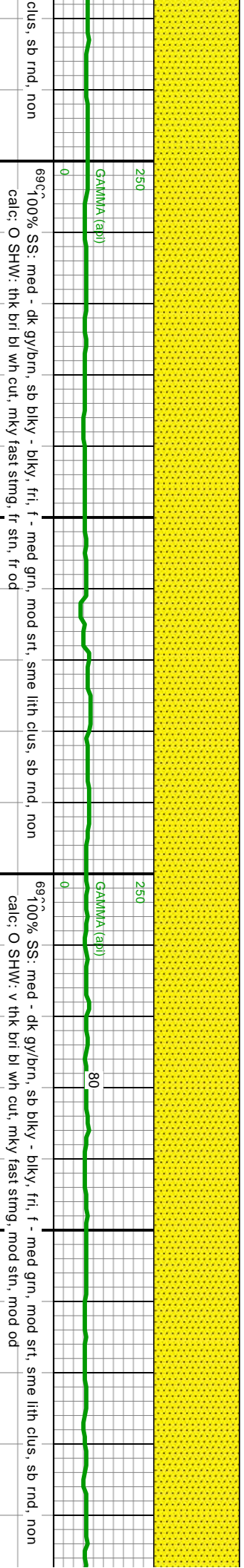
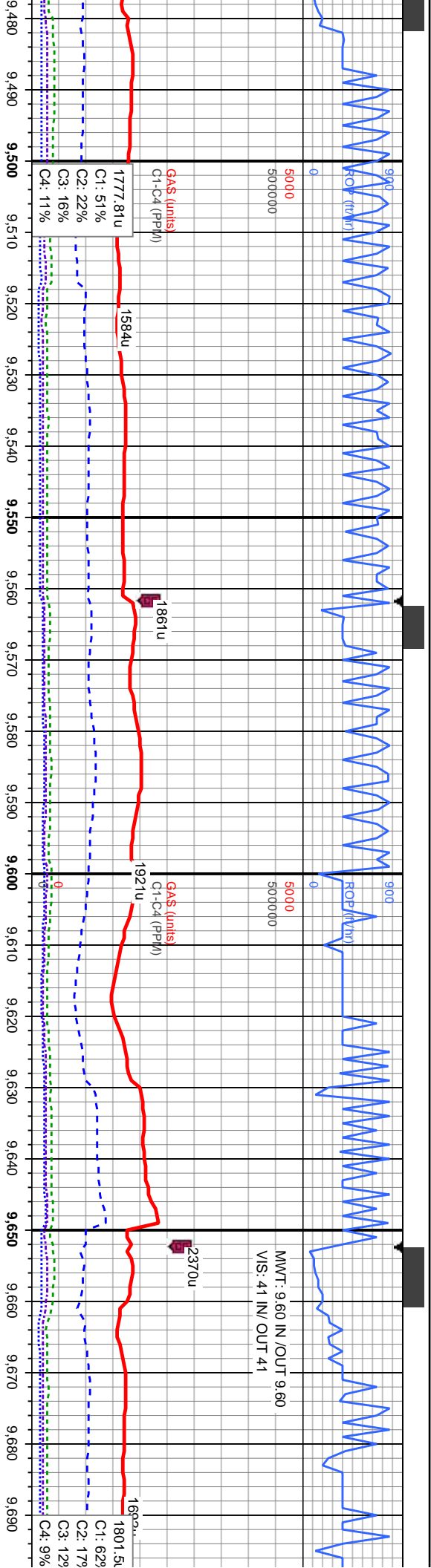
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Inclination: 90.27  
Azimuth: 158.87  
VS: 1,373.63

MD: 9,151  
TVD: 7,425.77  
Inclination: 89.87  
Azimuth: 159.37  
VS: 1,464.63

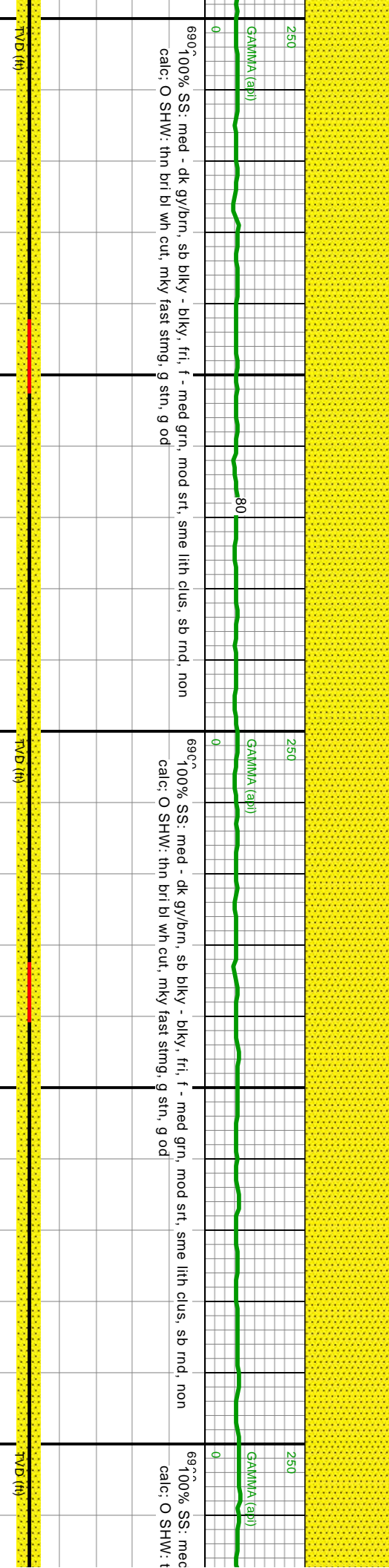
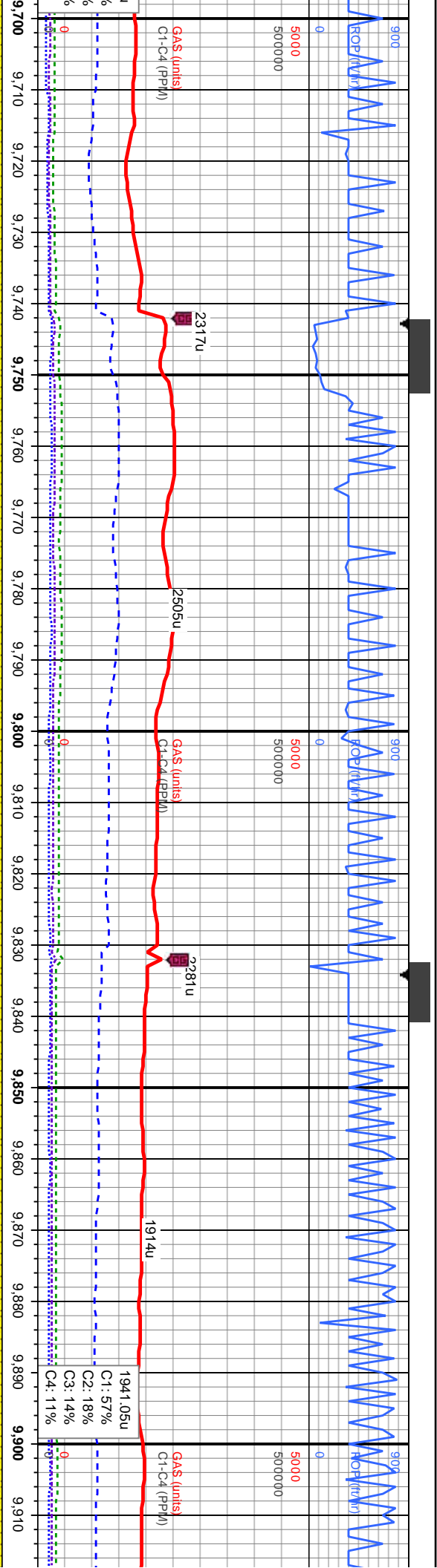
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TVD: 7,425.39  
Inclination: 90.61  
Azimuth: 159.94  
VS: 1,554.62



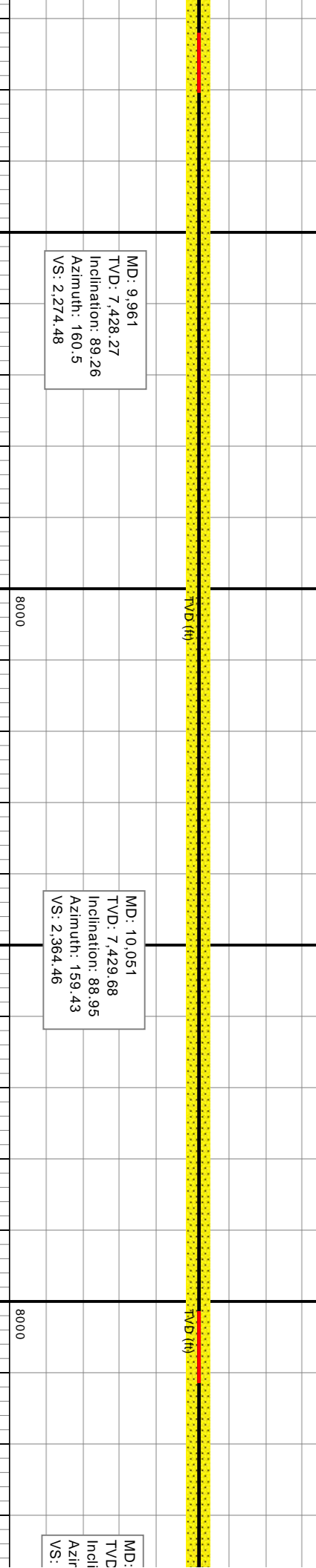
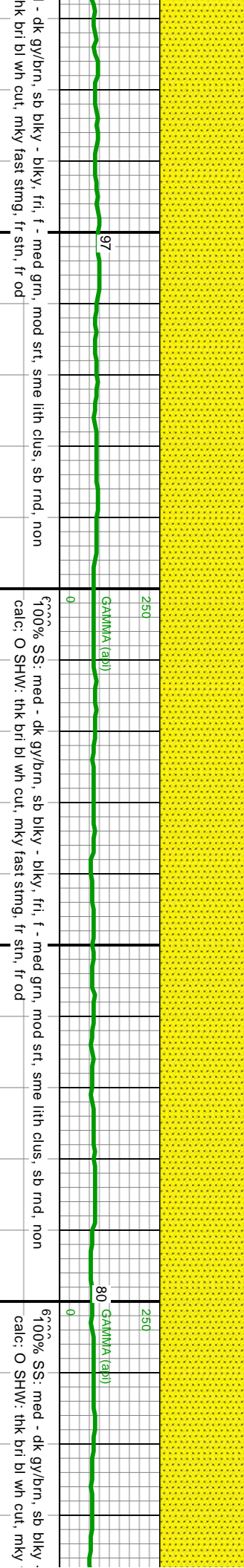
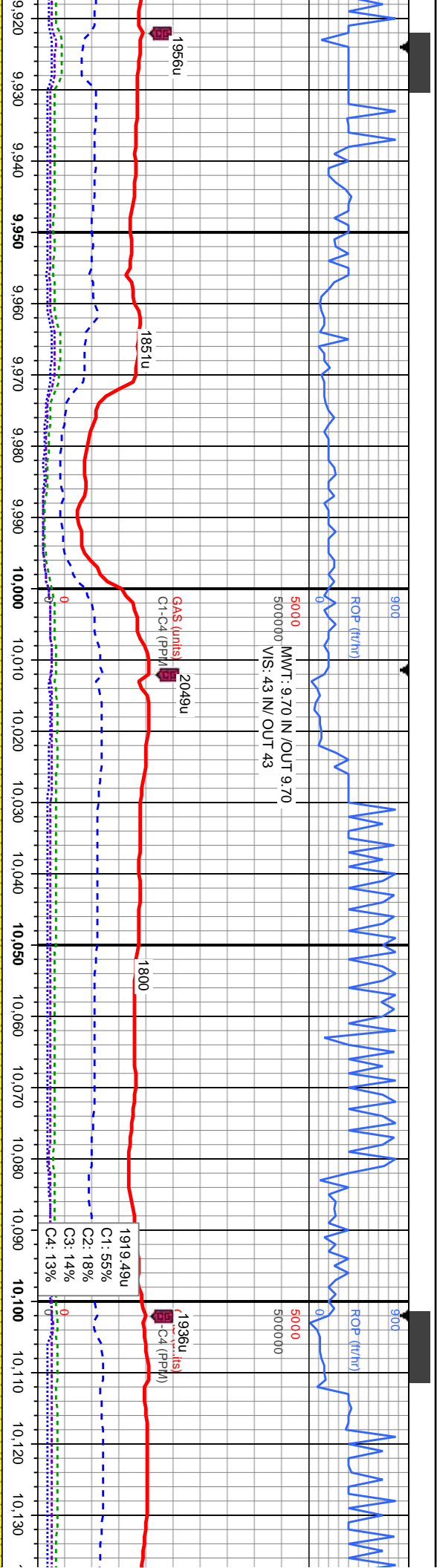


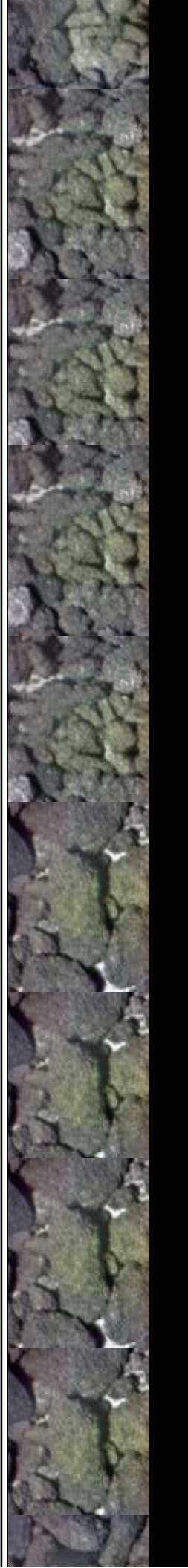
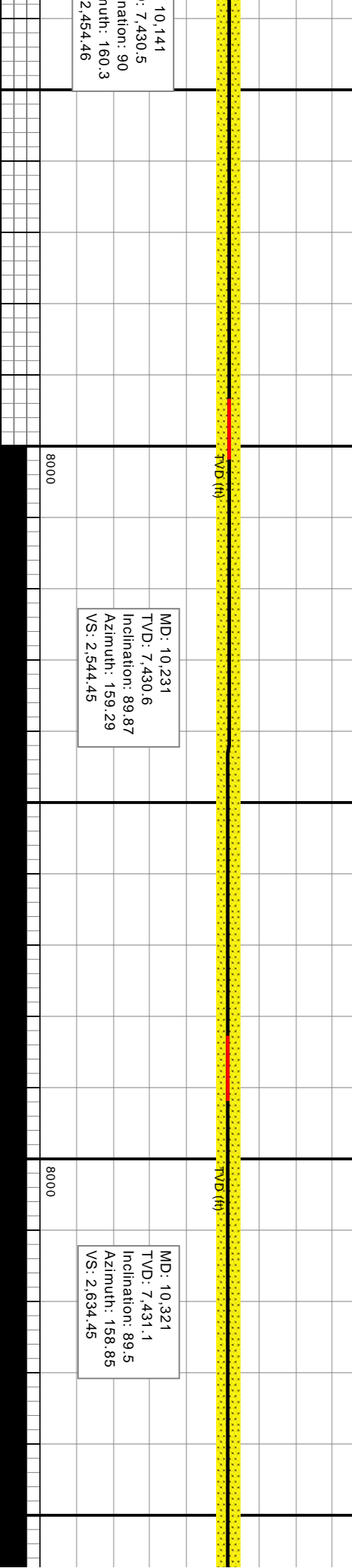
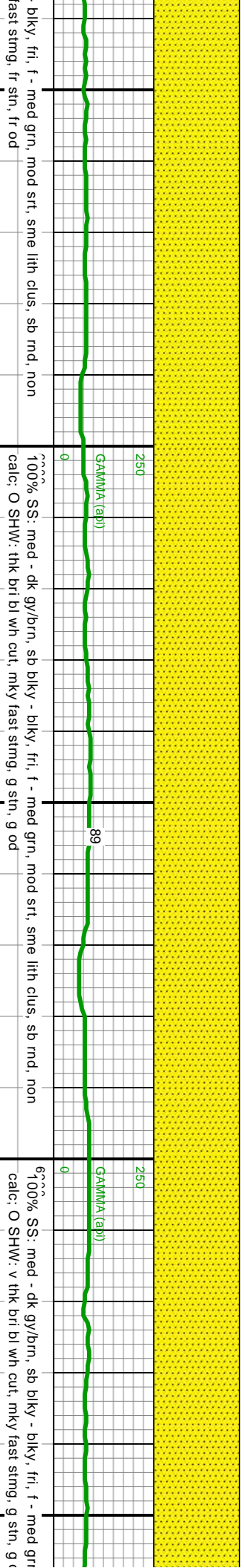
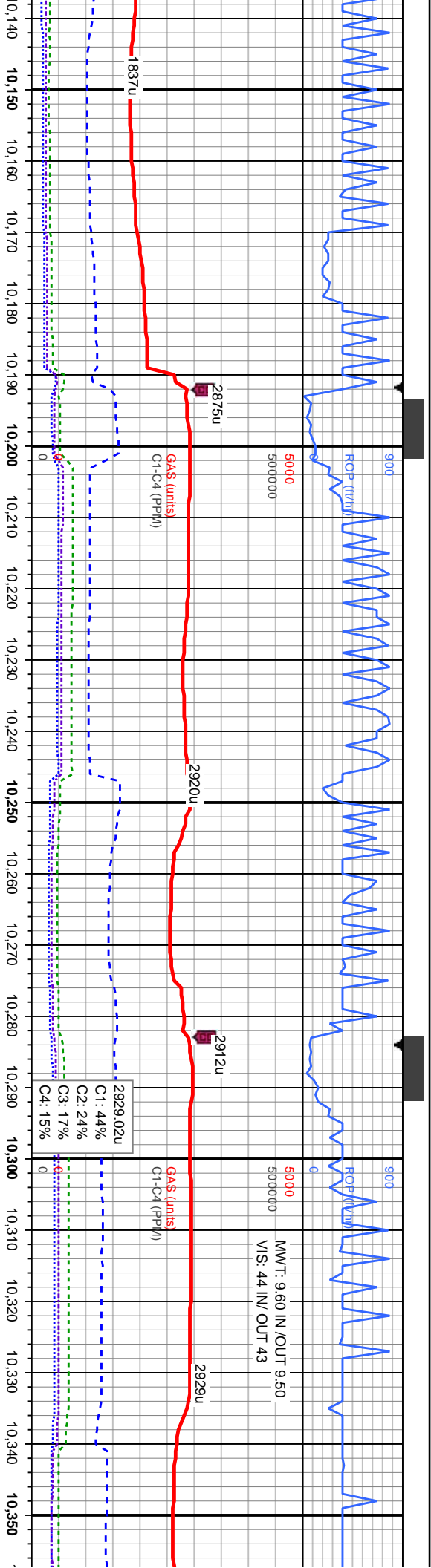




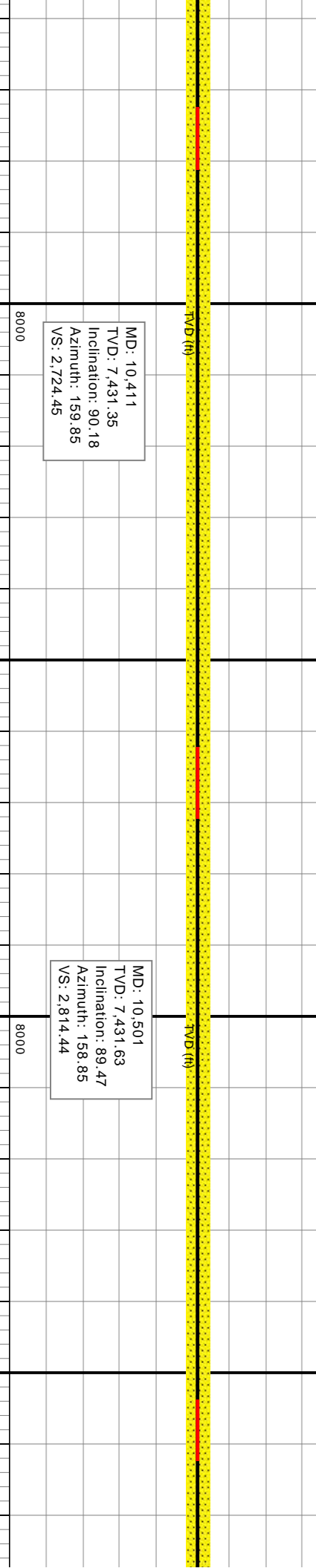
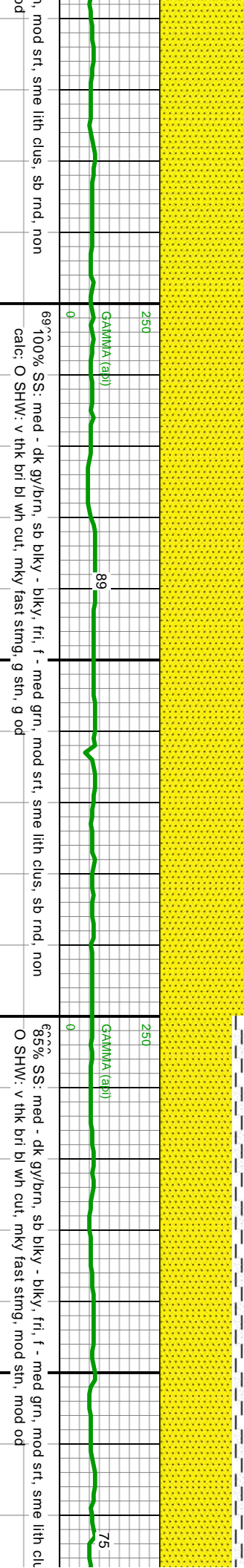
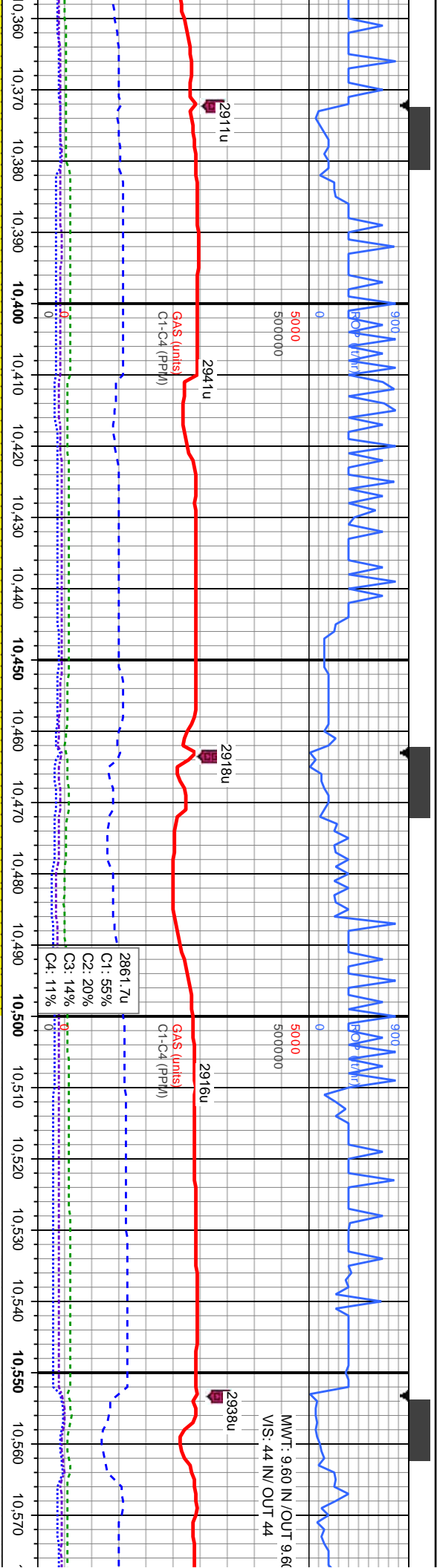




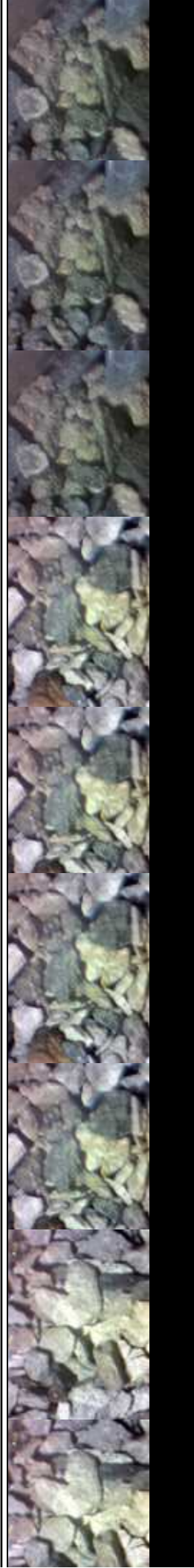
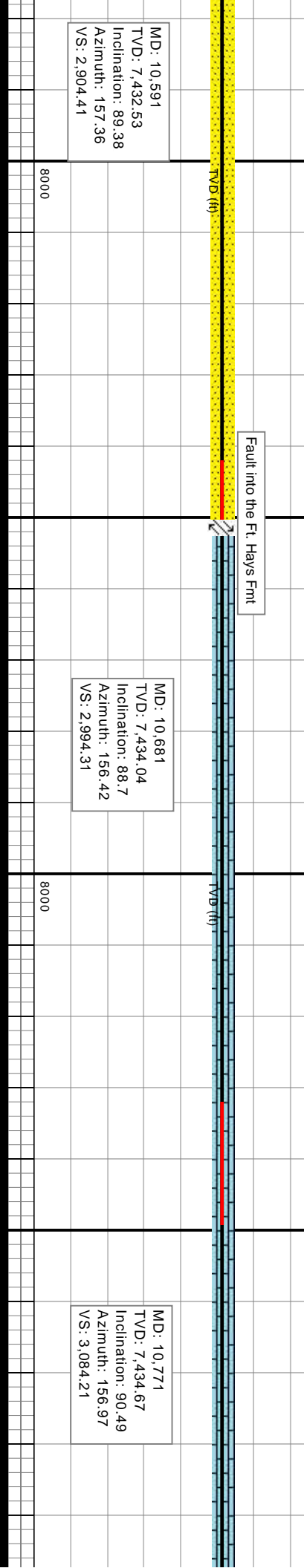
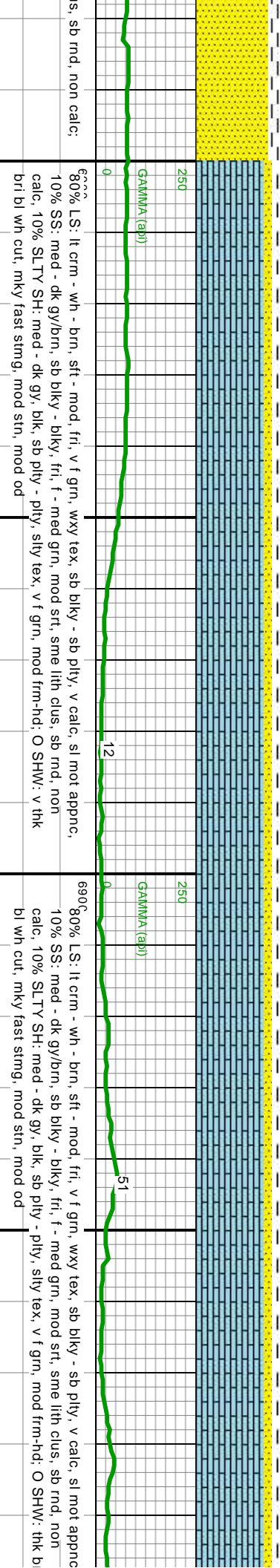
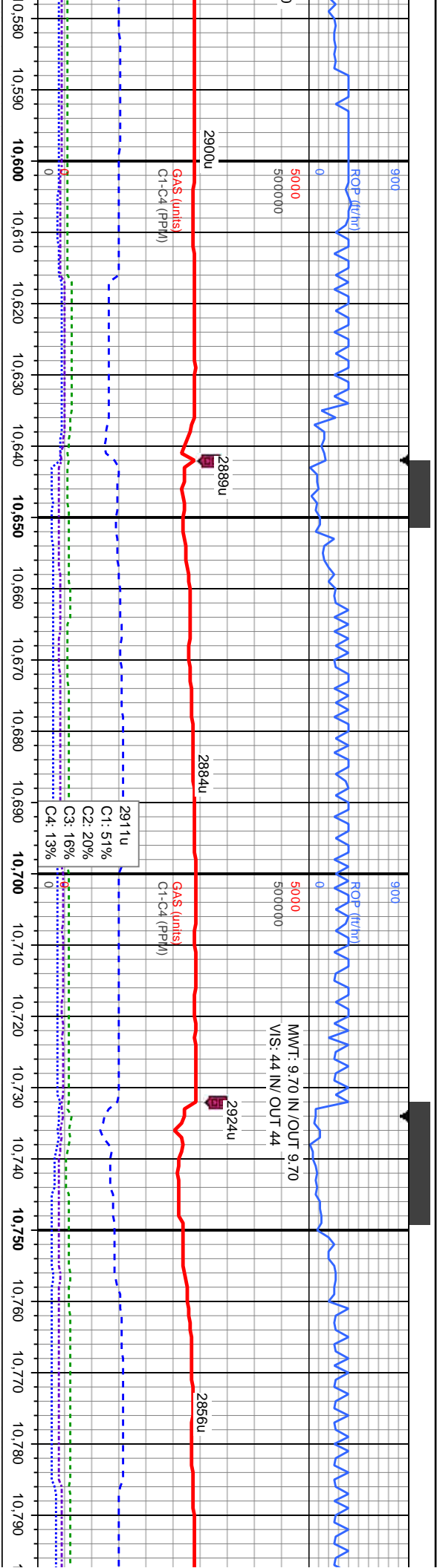






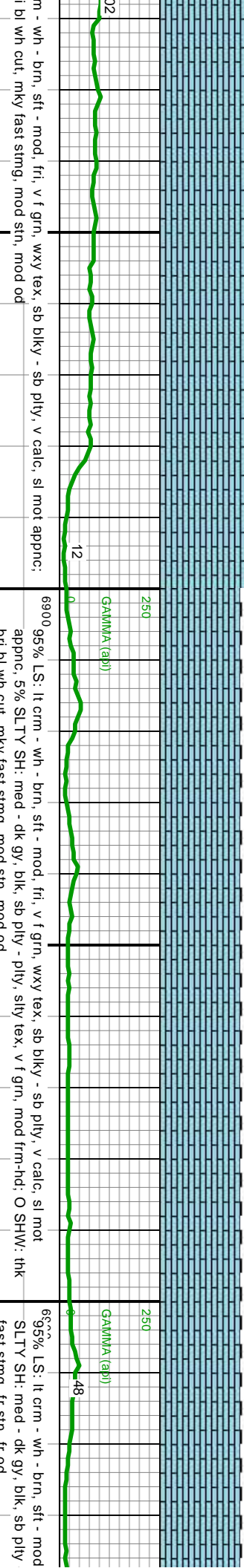
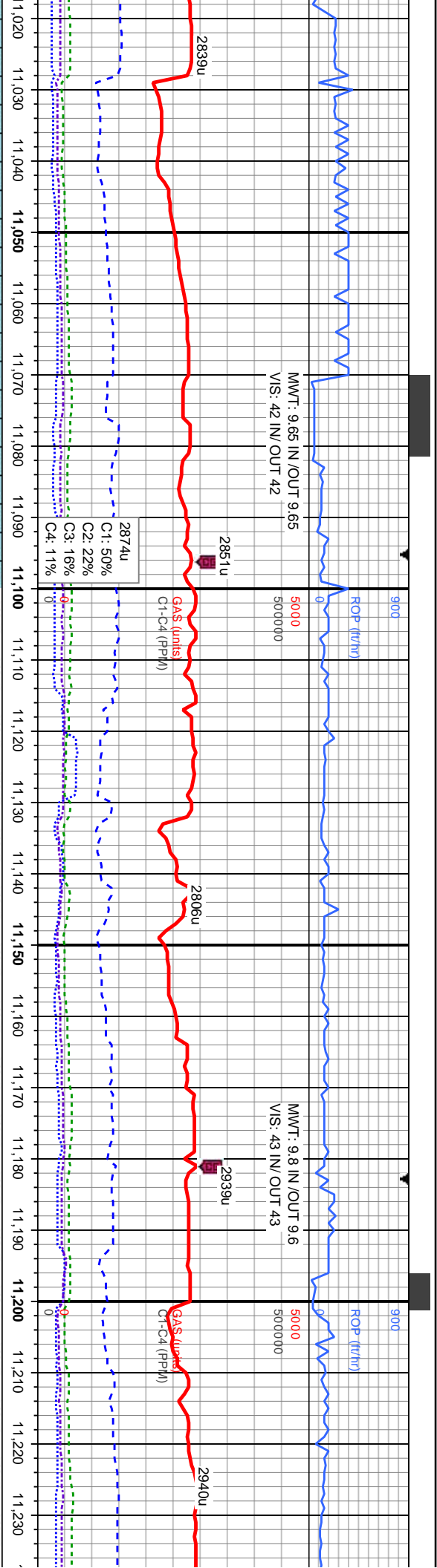










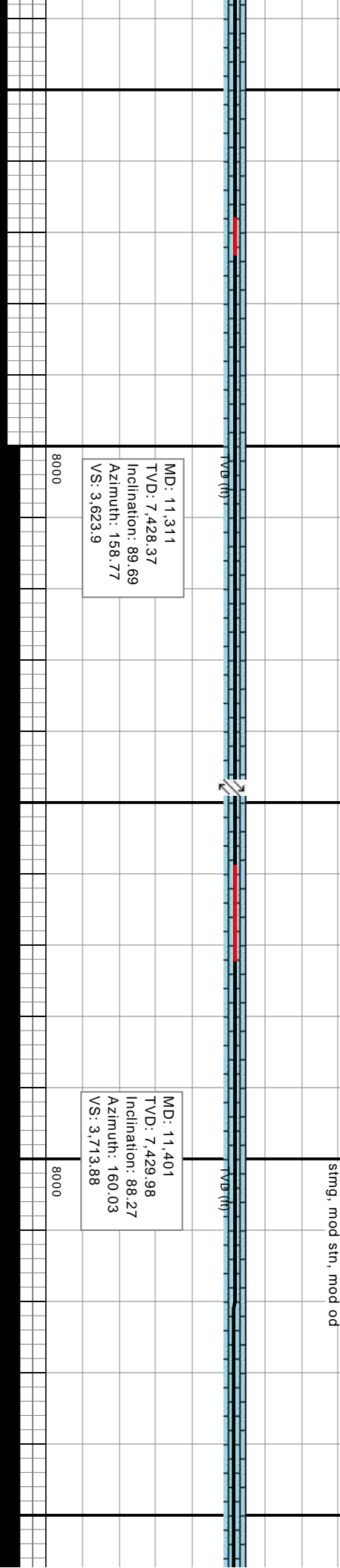
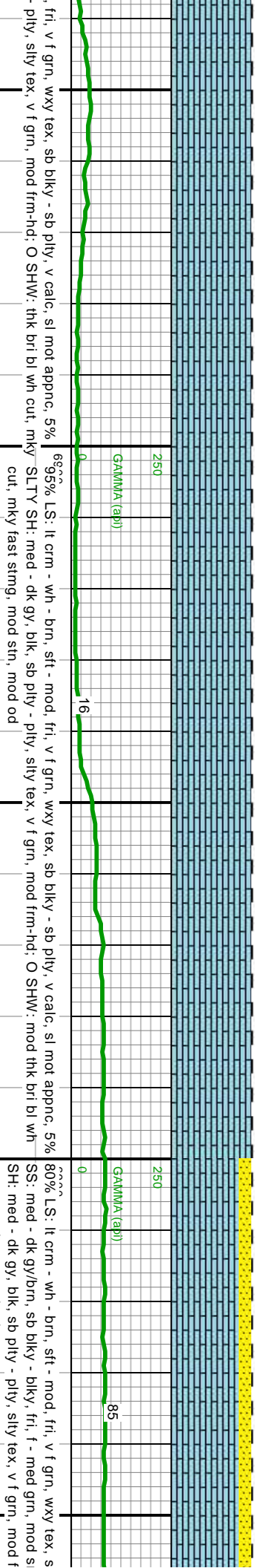
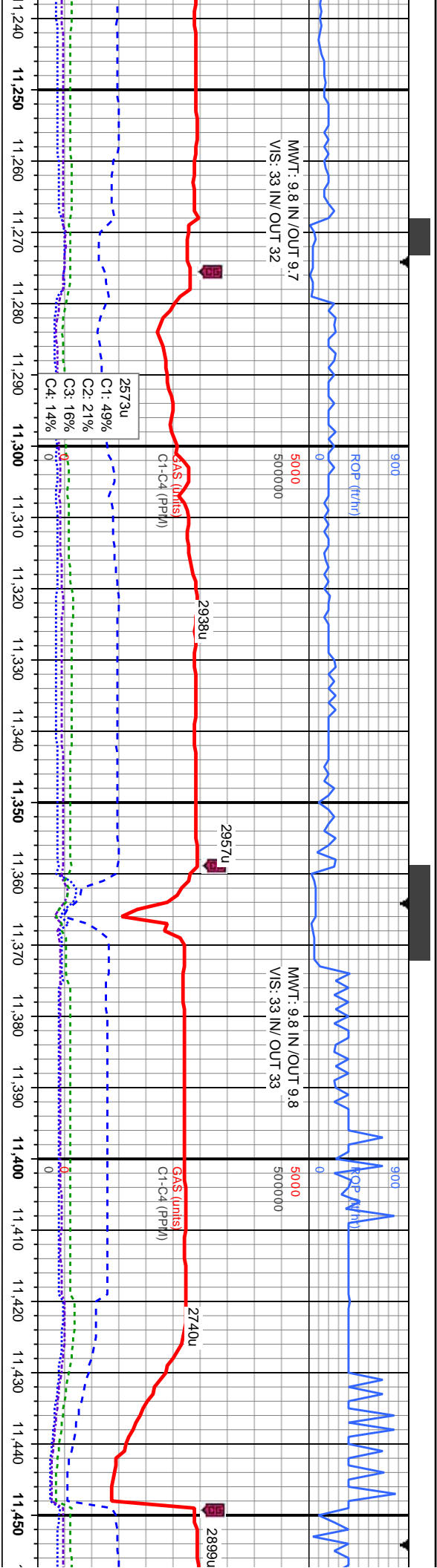


MD: 11,041  
TVD: 7,427.92  
Inclination: 91.11  
Azimuth: 157.18  
VS: 3,353.95

MD: 11,131  
TVD: 7,427.15  
Inclination: 89.87  
Azimuth: 158.97  
VS: 3,443.92

MD: 11,221  
TVD: 7,427.69  
Inclination: 89.44  
Azimuth: 158.31  
VS: 3,533.91







9/2/2014

MINDEPTH

900

ROP (ft/hr)

5000

500000

MMWT: 9.8 IN/OUT 9.8  
VIS: 43 IN/OUT 45

3044u

GAS (units)  
C1-C4 (PPM)

2898u

C1: 47%  
C2: 22%  
C3: 17%  
C4: 14%

11,460

11,470

11,480

11,490

11,500

11,510

11,520

11,530

11,540

11,550

11,560

11,570

11,580

11,590

11,600

11,610

11,620

11,630

11,640

11,650

11,660

11,670

250

GAMMA (api)

0

24

250

GAMMA (api)

0

sb blkly - v calc, sl mot appnc, 15%  
rt, sme lith clus, sb md, non calc, 5% SLTY  
frm-hd; O SHW: thk bri bl wh cut, mky fast

69%  
90% LS: lt crm - wh - brn, sft - mod, fri, v f grn, wxy tex, sb blkly - sb blkly, v calc, sl mot appnc,  
10% SLTY SH: med - dk gy, blk, sb ply - ply, silty tex, v f grn, mod frm-hd; O SHW: v thk bri bl wh  
cut, mky fast strng, mod sin, mod od

69%  
90% LS: lt crm - wh - brn, sft - mod, fri, v f grn, wxy tex, sb blkly - sb blkly, v calc, sl mot appnc,  
10% SLTY SH: med - dk gy, blk, sb ply - ply, silty tex, v f grn, mod frm-hd; O SHW: v thk bri bl wh  
cut, mky fast strng, mod sin, mod od

TVD (ft)

TVD (ft)

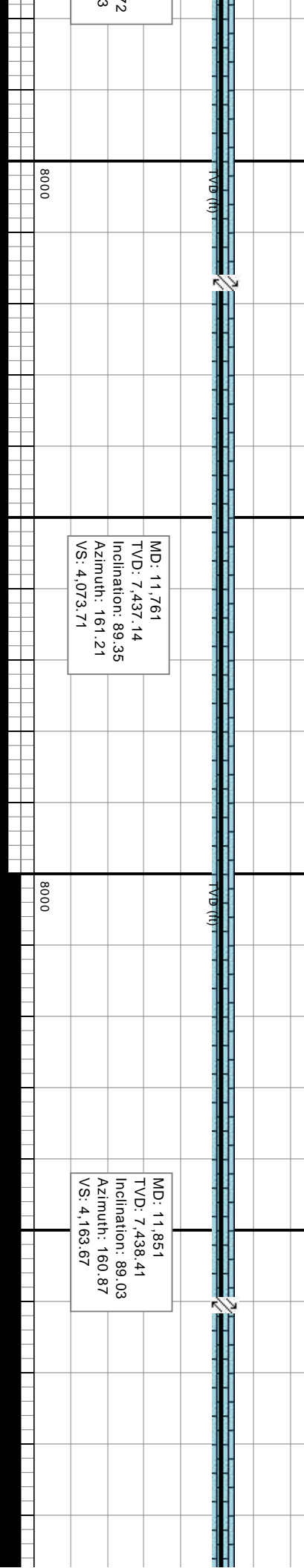
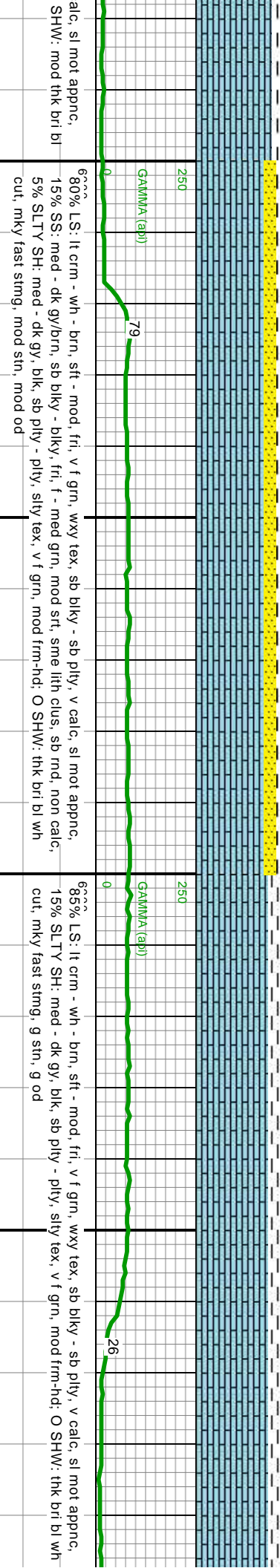
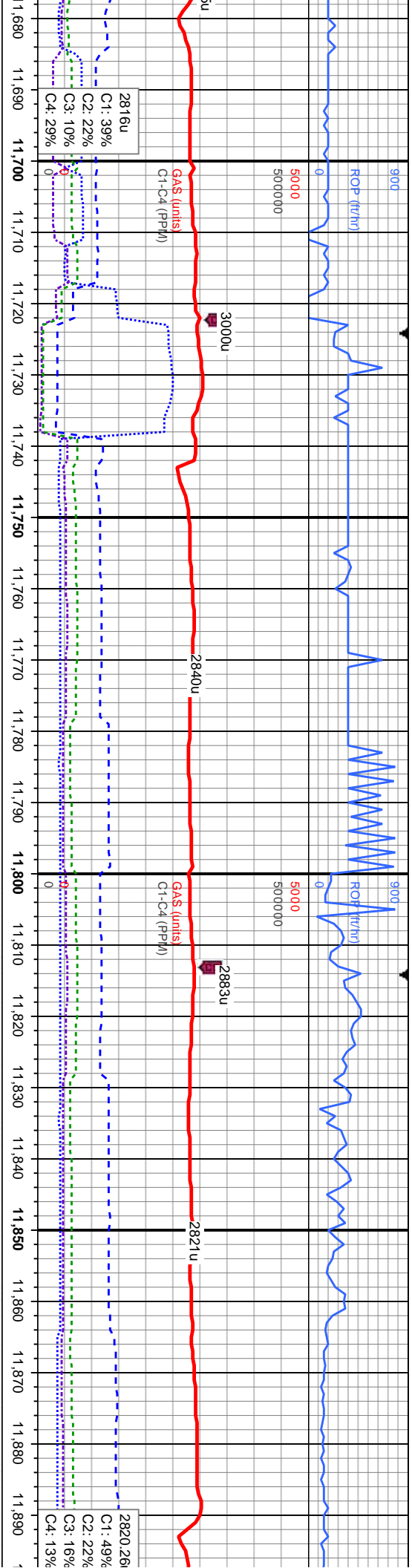
MD: 11,491  
TVD: 7,433.16  
Inclination: 87.68  
Azimuth: 159.66  
VS: 3,803.82

MD: 11,581  
TVD: 7,435.58  
Inclination: 89.23  
Azimuth: 160.44  
VS: 3,893.78

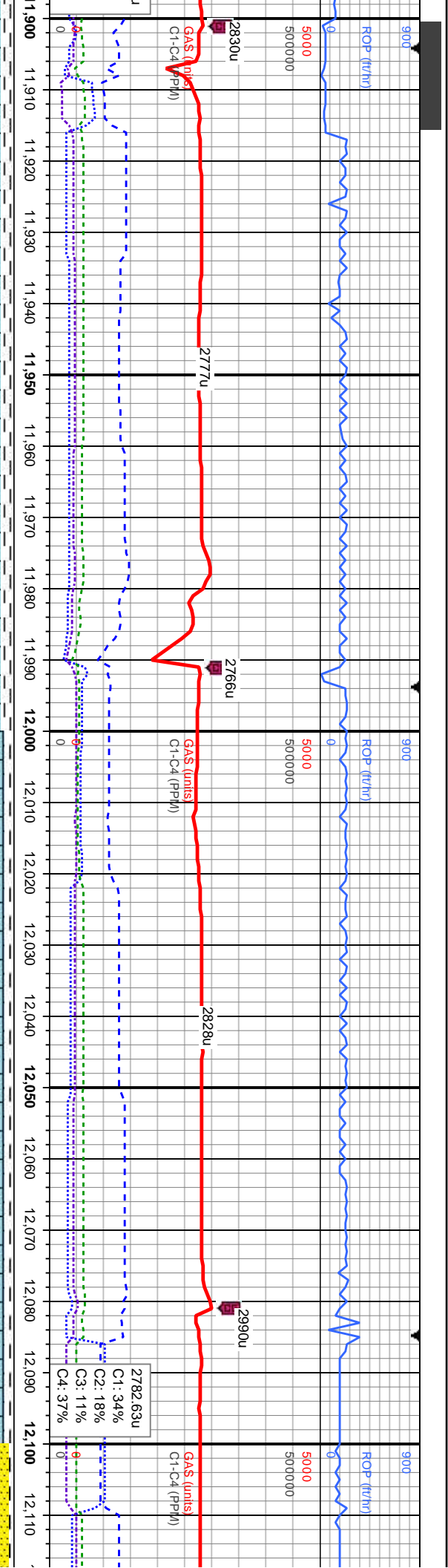
MD: 11,671  
TVD: 7,436.41  
Inclination: 89.7  
Azimuth: 160.8  
VS: 3,983.75

8000

8000







68% LS: lt crm - wh - brn, sft - mod, fri, v f grn, wxy tex, sb blkly - sb ply, v calc, sl mot appnc, 15% SLTY SH: med - dk gy, blk, sb ply - ply, silty tex, v f grn, mod frm-hd; O SHW: mod thk bri bl wh cut, mky fast stmg, mod stn, mod od

69% LS: lt crm - wh - brn, sft - mod, fri, v f grn, wxy tex, sb blkly - sb ply, v calc, sl mot appnc, 10% SLTY SH: med - dk gy, blk, sb ply - ply, silty tex, v f grn, mod frm-hd; O SHW: thk bri bl wh cut, mky fast stmg, g stn, g od

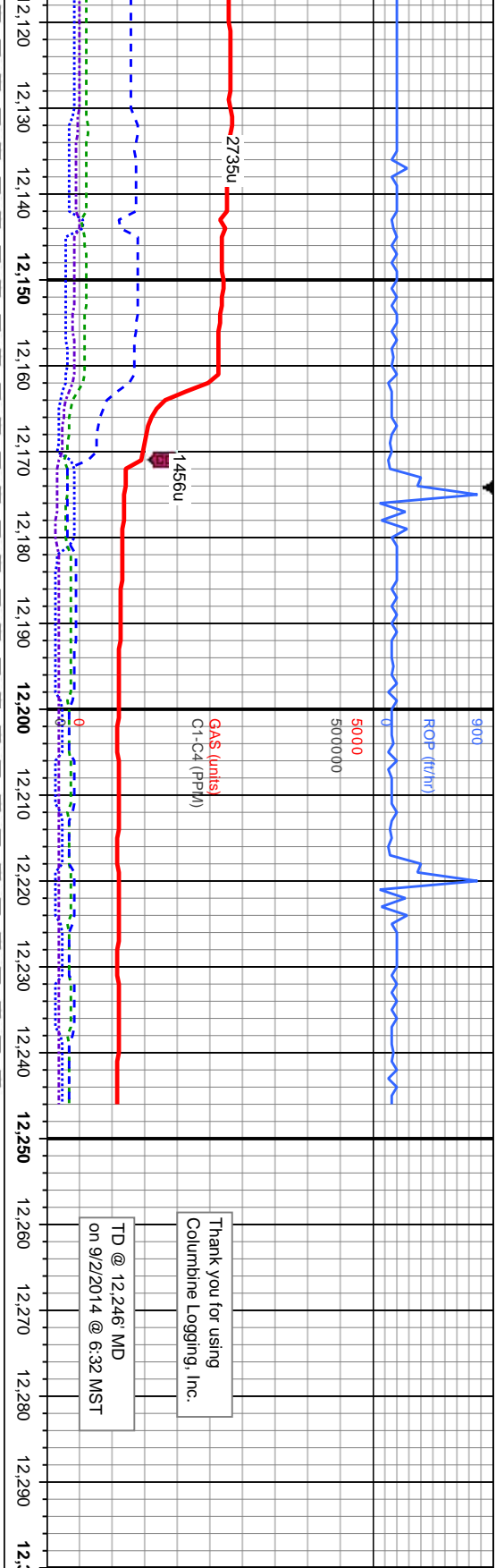
65% LS: lt crm 20% SS: med - 5% SLTY SH: r wh cut, mky v f

MD: 11,942  
TVD: 7,439.16  
Inclination: 90.03  
Azimuth: 159.98  
VS: 4,254.65

MD: 12,032  
TVD: 7,439.96  
Inclination: 88.95  
Azimuth: 159.75  
VS: 4,344.64

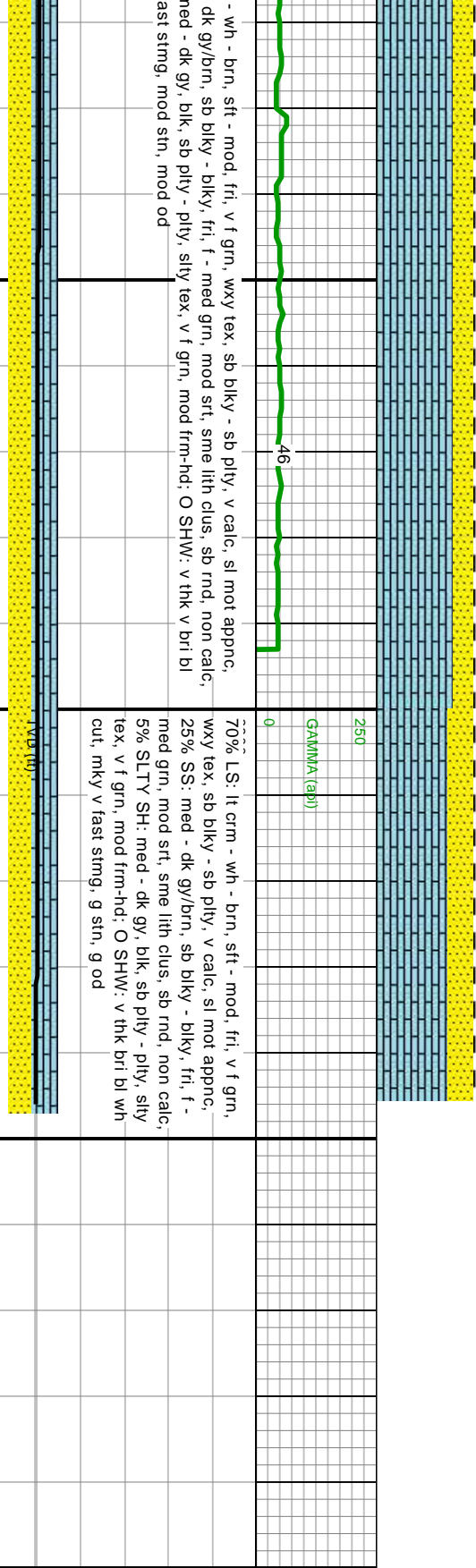
MC  
TV  
Inc  
Az  
VS





Thank you for using  
Columbine Logging, Inc.

TD @ 12,246' MD  
on 9/2/2014 @ 6:32 MST



70% LS: lt crm - wh - brn, sft - mod, fri, v f grn, wxy tex, sb blkly - sb ply, v calc, sl mot appnc, 25% SS: med - dk gy/brn, sb blkly - blkly, fri, f - med grn, mod srt, sme lith clus, sb rrd, non calc, 5% SLTY SH: med - dk gy, blk, sb ply - ply, silty tex, v f grn, mod frm-hd; O SHW: v thk bri bl wh cut, mky v fast sting, g stn, g od

MD: 12,122  
D: 7,442.45  
Inclination: 87.88  
Azimuth: 158.52  
VS: 4,434.6

MD: 12,191  
TVD: 7,445.61  
Inclination: 86.86  
Azimuth: 155.64  
VS: 4,503.46

MD: 12,246  
TVD: 7,448.63  
Inclination: 86.86  
Azimuth: 155.64  
VS: -472.18

