



EMPIRICA

The Surface Logging Company

Scale: 5" / 100'

Measured Depth Log

Well Name Pavistma SW #5_HZ

Location 1611' FSL, 161' FWL NWSW, 32-6N-67W

State Colorado

Country USA

API Number #05-123-34959

Region DJ Basin

County Weld

Rig Number Frontier #10

Field Wattenburg

Spud Date 8-24-13(curve) / 10-06-13(Lateral)

Drilling Completed 8-29-13(Curve) / 10-08-13(Lateral)

Surface Coordinates Lat: 40.440390

Long: -104.924920

Ground Elevation 4,954'

K.B. Elevation 4,976'

Logged Interval 5,000'

To 12,176'

Total Depth 12,176'

Formation Niobrara A

Type of Drilling Fluid Fresh Water

Company Tektion Windsor LLC

Address 640 Plaza Drive #290
Highlands Ranch, CO

Name Dominic Pitre / Dan S

Company Empirica

Address 6741 Satsuma Dr.
Houston, TX 77041
(713)-466-7400

Equipment

ML-056

Comments

2 Man L
Start Da
Release

Operator

80129

Geologist

Scott

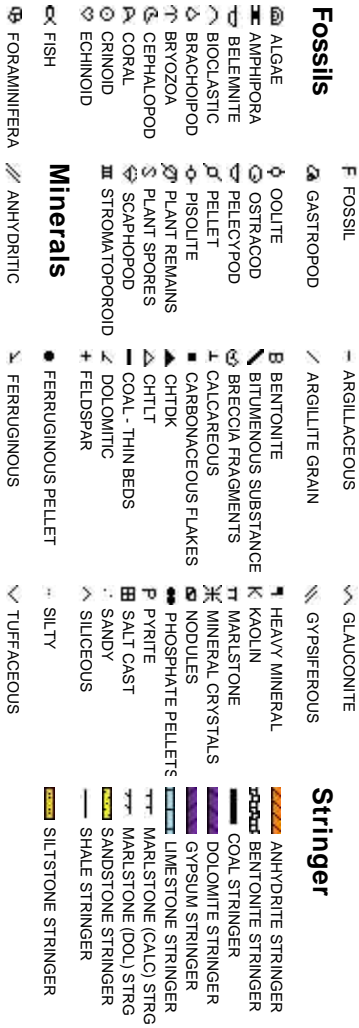
Other

Logging Service
Date: 8-26-13
Date: 10-08-13

Rock Types



Accessories

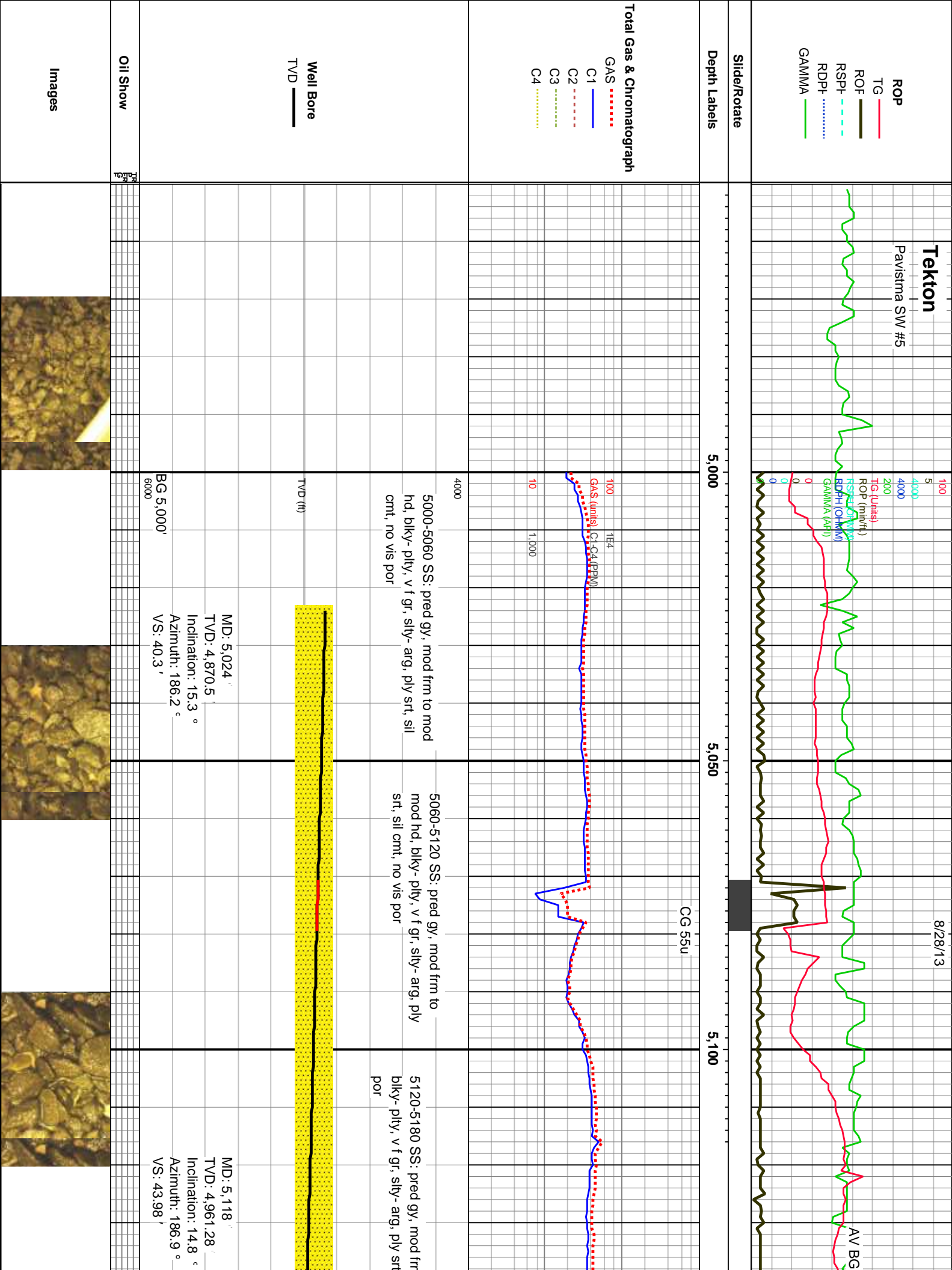


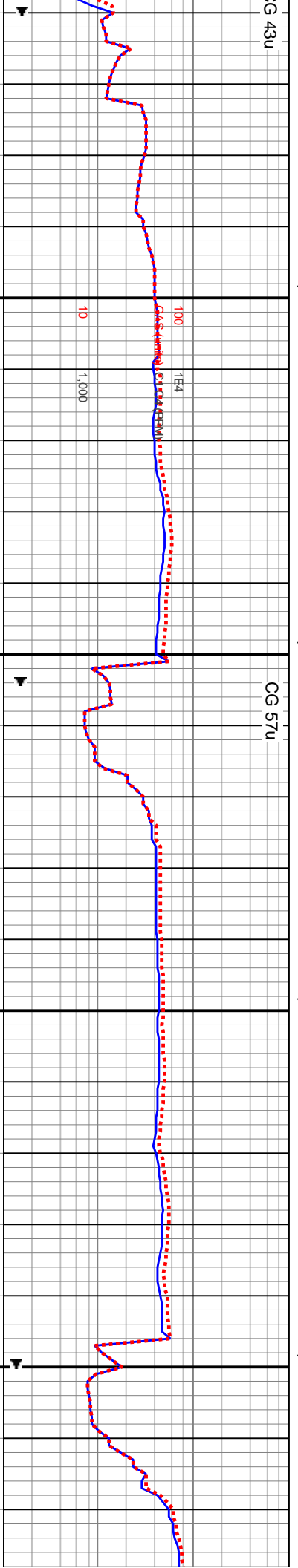
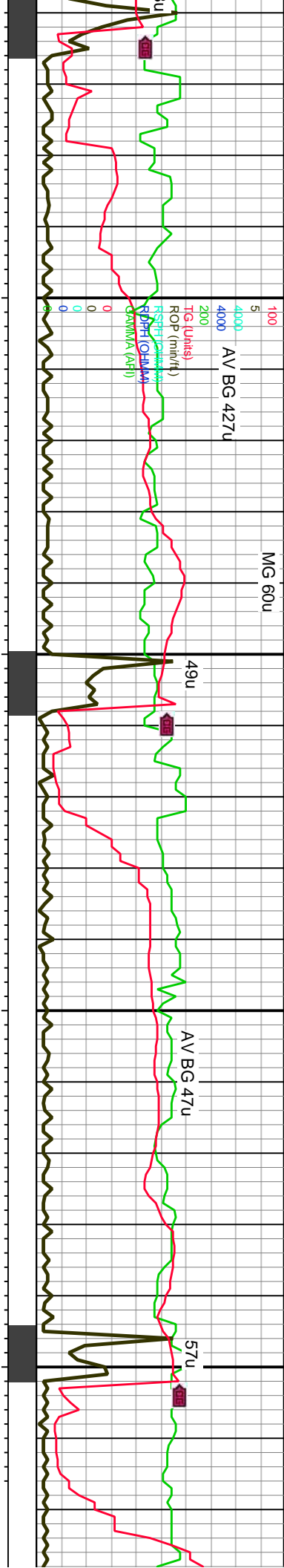
Oil Sha

- DEAD
- EVEN
- QUESTIC
- SPOTTE
- Porosi
- E EARTHY
- F FENESTR
- F FRACTUR
- X INTERCR
- INTEROC

Other Symbols

W	MOLDIC	FAULT	WIRELINE TESTED - LEFT	E EARTHY
O ORGANIC	FORMATION TOP	WIRELINE TESTED - RT	FX FINELYXLN	
P PINPOINT	GAS SHOW		GS GRAINSTONE	
V VUGGY	MNDEPTH MN DEPTH	Rounding	L LITHOGRAPHIC	
ENGINEERING	NORMAL FAULT	A ANGULAR	MS MICROXLN	
O STAINING	OIL SHOW	R ROUNDED	MS MUDSTONE	
BIT	OVERTURNED STRATA	B SUBANG	PS PACKSTONE	
CONNECTION (LEFT)	REVERSE FAULT	F SUBRND	WS WACKSTONE	
CONNECTION (RIGHT)	SIDEWALL CORE (LEFT)			
CONNECTION GAS	SIDEWALL CORE (RIGHT)	Textures		
CORE - LOST	SLIDE	B3 BOUNDSTONE	M MODERATE	
CORE - RECOVERED	SURVEY	C CHALKY	P POOR	
DST INTERVAL	TRIP GAS	CX CRYPTOXLN	W WELL	
Sorting				





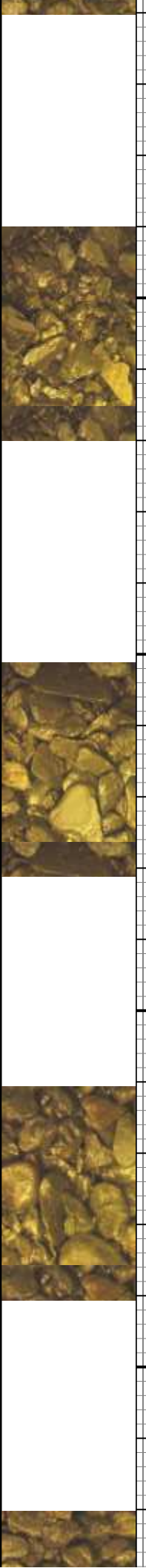
5420-5480 SS: pred gy, ip lt gy, rr off wh, mod
to mod hd, blk- ply, v f gr, rr med gr, silty-
srt, pred sil cnt, occ sl calc, occ lith frags, no vis
por

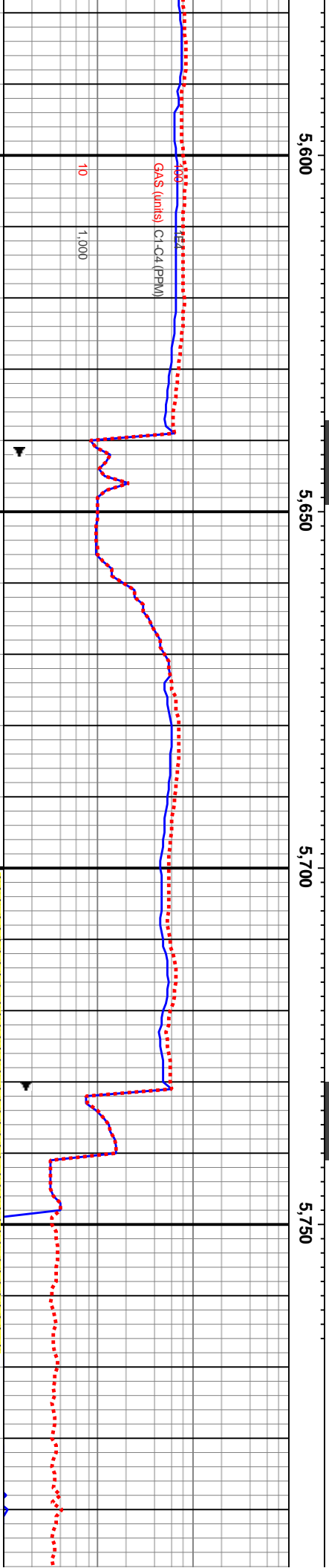
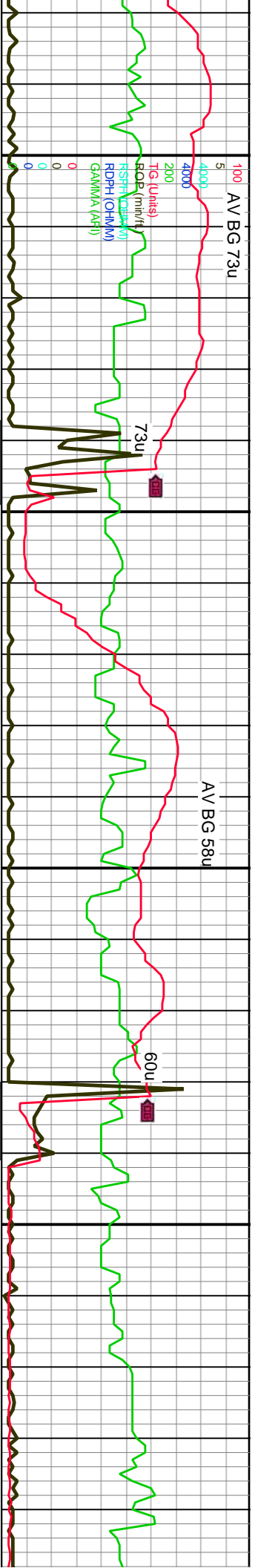
5480-5540 SS: pred gy, lt gy, med gy brn, mod
frm to mod hd, blk, v f gr, silty- arg, mod srt, w
cntd, silc cnt, no vis por

5540-5600 SS: pred gy, lt gy, med gy
brn, mod frm to mod hd, blk, v f gr, silty-
arg, mod srt, w cntd, silc cnt, no vis
por

MD: 5,403
TVD: 5,236.71
Inclination: 14.9 °
Azimuth: 187.4 °
VS: 55.08'

MD: 5,497
TVD: 5,328.05
Inclination: 12.4 °
Azimuth: 189.2 °
VS: 57.78'





5600-5660 SS: pred gy, lt gy, med gy brn,mod
frm to mod hd, blkly, v f gr, silty- arg, mod srt, w
cmt'd, silic cmt, no vis por

5660-5720 SS: pred gy, lt gy, med gy brn,mod
frm to mod hd, blkly, v f gr, silty- arg, mod srt, w
cmt'd, silic cmt, no vis por

5720-5780 SS: pred gy, lt gy, med gy
brn,mod frm to mod hd, blkly, v f gr, v silty- arg,
mod srt, w cmt'd, silic cmt, no vis por

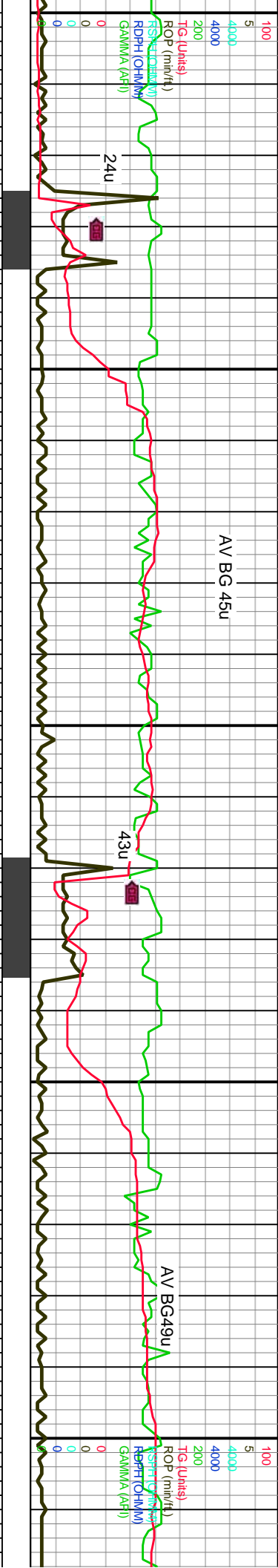
5780-5840 SS: pred gy, l
brn,mod frm to mod hd, l
arg, mod srt, w cmt'd, silic

MD: 5,591
TVD: 5,420
Inclination: 11.6 °
Azimuth: 195.7 °
VS: 58.76'

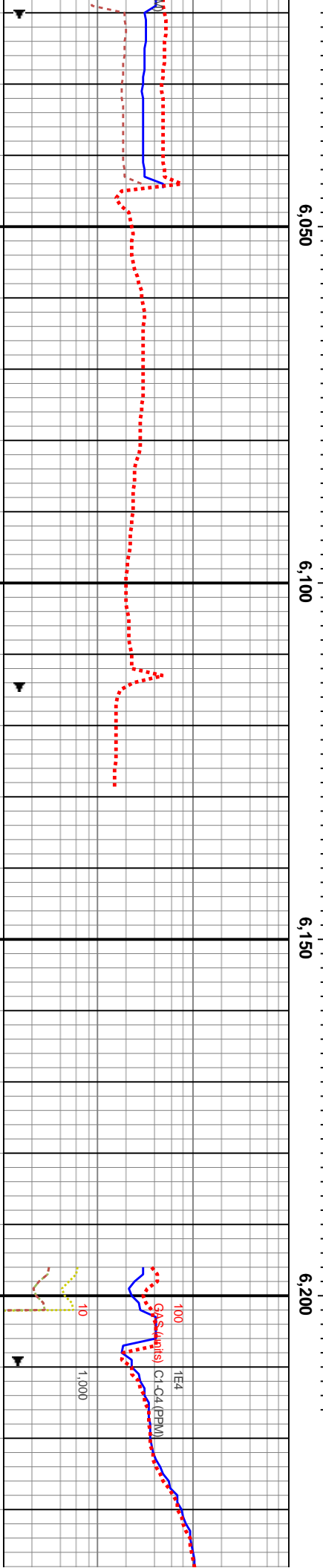
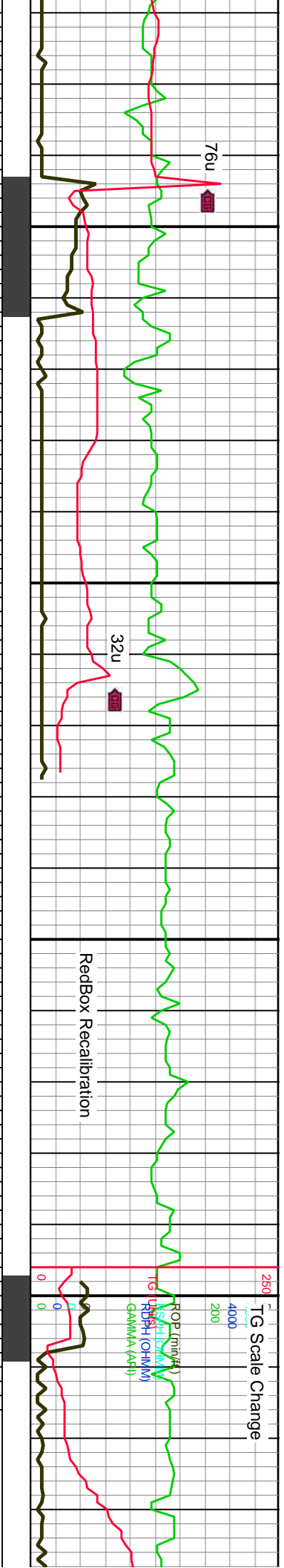
MD: 5,686
TVD: 5,513.13
Inclination: 11.2 °
Azimuth: 203.8 °
VS: 57.3'

MD: 5,779
TVD: 5,604.47
Inclination: 10.5 °
Azimuth: 198.3 °
VS: 55.49'





5,800		5,850		5,900		5,950		6,000	
5840-5900 SS: pred gy, lt gy, med gy brn,mod frm to mod hd, blkgy, v f gr, silty- arg, mod srt, w cntd, silc cnt, no vis por, ip silty sh		5900-5960 SS: pred gy, lt gy, med gy brn,mod frm to mod hd, blkgy, v f gr, silty- arg, mod srt, w cntd, silc cnt, no vis por, ip silty sh		5960-6020 SS: pred gy, lt gy, med gy brn,mod frm to mod hd, blkgy, v f gr, silty- arg, mod srt, w cntd, silc cnt, no vis por, ip silty sh		TVD (ft) 6020-6080 brn,mod fr mod srt, w sh			
MD: 5,874 ' TVD: 5,698.08 ' Inclination: 9.1 ° Azimuth: 194.3 ° VS: 55.15 '		MD: 5,967 ' TVD: 5,790.17 ' Inclination: 6.9 ° Azimuth: 192.7 ° VS: 55.51 '							
DP @ 5,900' Catching 30' / Describing 60'									
ROP (min/ft)		ROP (min/ft)		ROP (min/ft)		ROP (min/ft)		ROP (min/ft)	
TG (lbs)		TG (lbs)		TG (lbs)		TG (lbs)		TG (lbs)	
GAMA (API)		GAMA (API)		GAMA (API)		GAMA (API)		GAMA (API)	
C1-C4 (PPM)		C1-C4 (PPM)		C1-C4 (PPM)		C1-C4 (PPM)		C1-C4 (PPM)	
5500		5500		5500		5500		5500	
6500		6500		6500		6500		6500	



6080-6140 SS: pred gy, lt gy, med gy
brn,mod frm to mod hd, blkly, v f gr, silty-
arg, mod srt, w cntd, silic cnt, no vis por,
ip sit sh

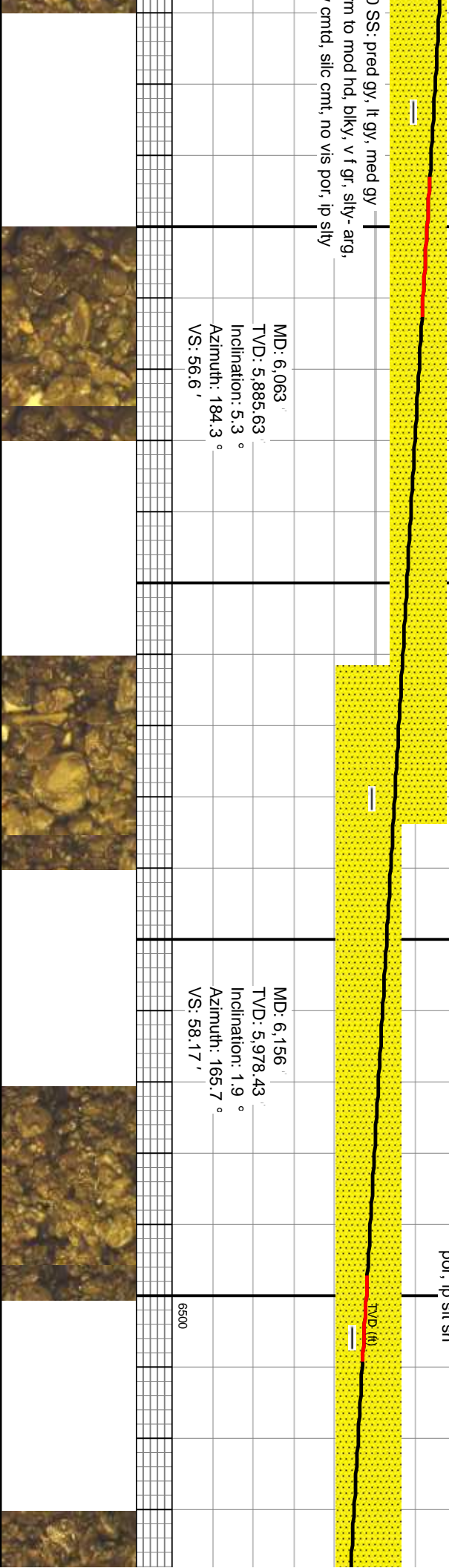
6140-6200 SS: pred gy, lt
gy, med gy brn,mod frm to
mod hd, blkly, v f gr, silty-
arg, mod srt, w cntd, silic
cnt, no vis por, ip sit sh

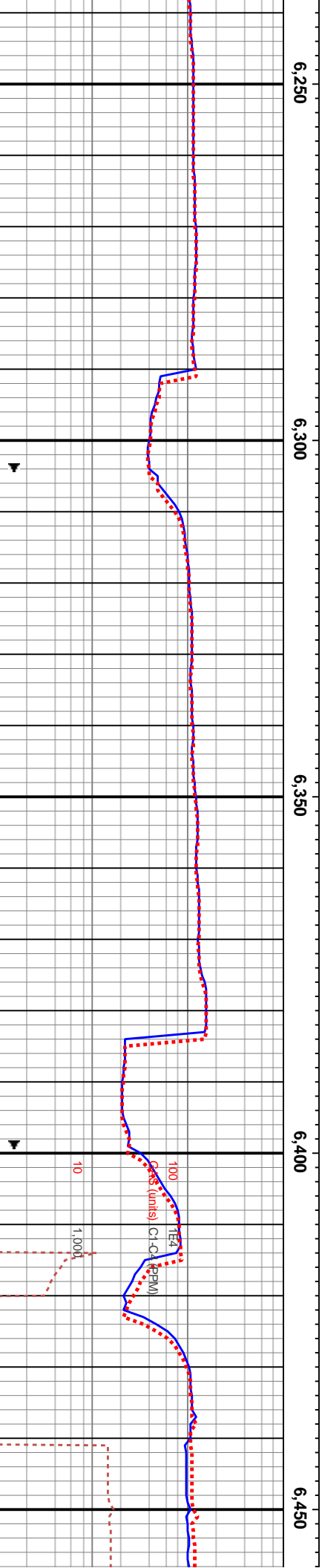
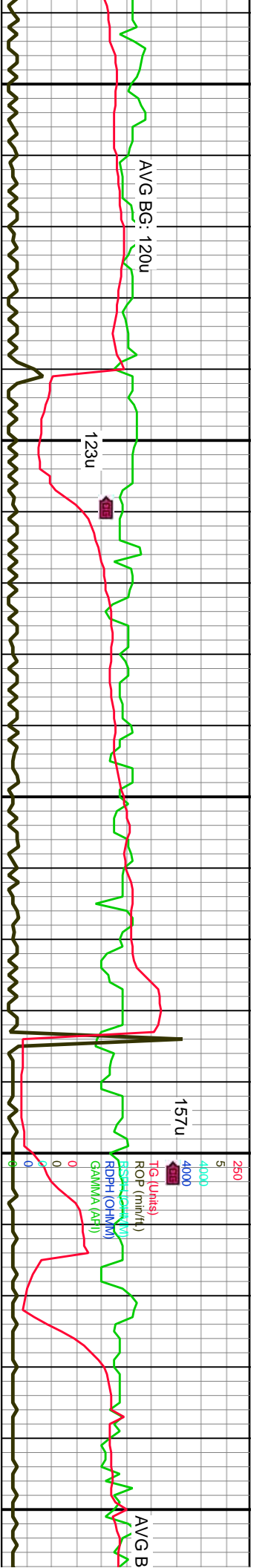
6200-6260 SS: pred gy, lt gy, med gy
brn,mod frm to mod hd, blkly, v f gr, silty-
arg, mod srt, w cntd, silic cnt, no vis
por, ip sit sh

MD: 6,063 '
TVD: 5,885.63 '
Inclination: 5.3 °
Azimuth: 184.3 °
VS: 56.6 '

MD: 6,156 '
TVD: 5,978.43 '
Inclination: 1.9 °
Azimuth: 165.7 °
VS: 58.17 '

6500





6260-6320 SS: pred gy, lt gy, med gy
brn, mod frm to mod hd, blkly, v f gr, sily-
aig, mod srl, w cmdt, silic cnt, no vis por,
ip silt sh

6320-6380 SS: pred gy, It
gy, med gy brn,mod frm to
mod hd, blkly, v f gr, slty-
arg, mod srt, w cmd, silc
cmt, no vis por, ip slt sh

6380-6440 SS: pred gy, lt gy, med gy
brn,mod frm to mod hd, blkly, v f gr,
sily-arg, mod srt, w cmtd, silc cmt, no
vis por, ip silt sh

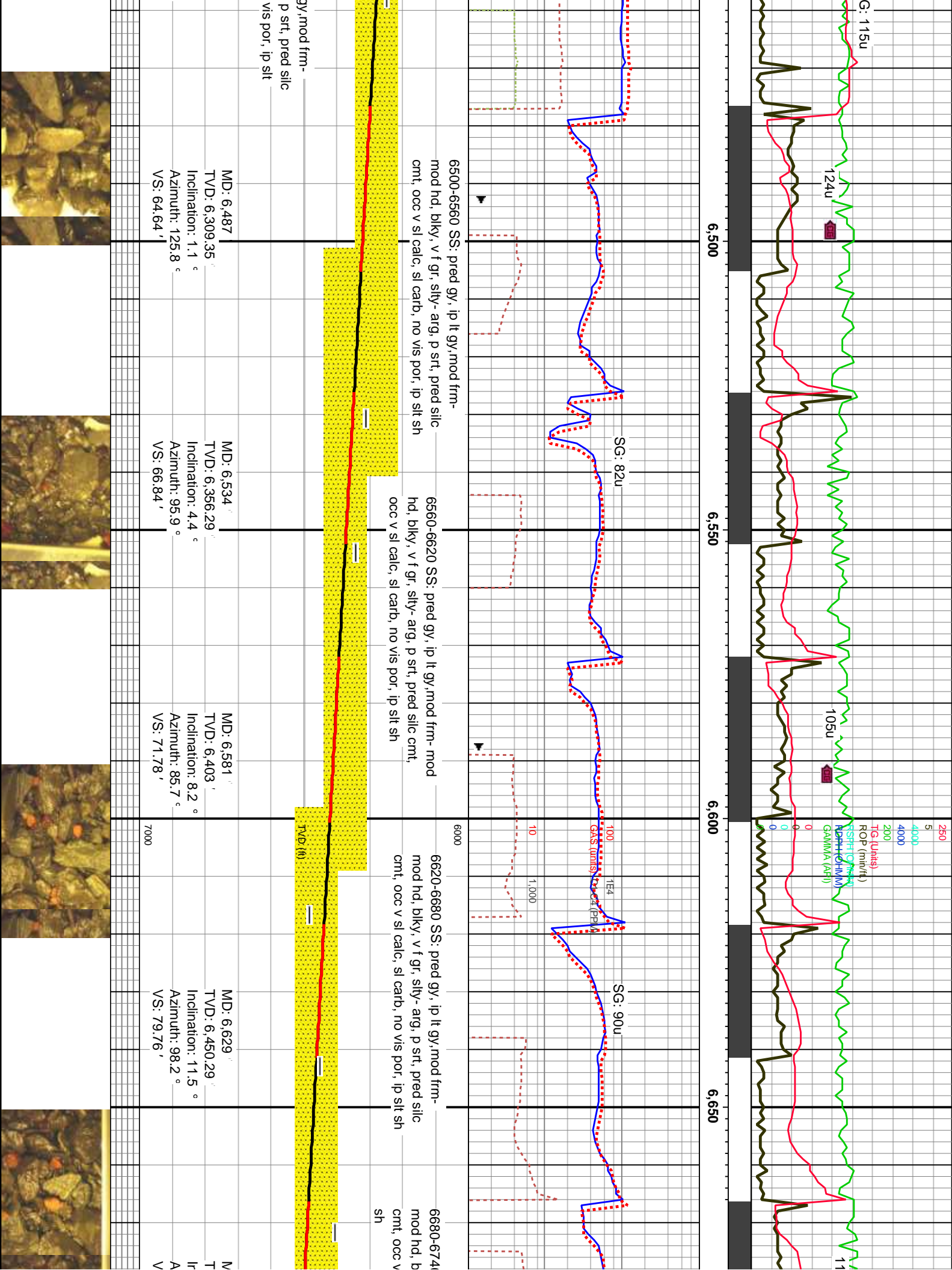
6440-6500 SS: pred gy, ip it
mod hd, bly, v fgr, slty-arg,
cmt, occ v sl calc, sl carb, no
sh

MD: 6,251
TVD: 6,073.4
Inclination: 1.6 °
Azimuth: 109.9 °
VS: 60.27 '

MD: 6,346
TVD: 6,168.37
Inclination: 1.1 °
Azimuth: 109.9 °
VS: 62.5'

MD: 6,440 '
TVD: 6,262.36 '
Inclination: 0.7 °
Azimuth: 123.5 °
VS: 63.95 '





MW IO: 8.4/9.1, VIS IO: 28

TG Scale
Change

660u

AV BG 87u

AV BG 186u

ROF (ppm)
ASAP (ppm)
RDP (ppm)
GAMMA (ppm)

145u

6,700

6,750

6,800

6,850

SG: 139u

SG: 826u

(ppm)
GAS (lights)
CI-1-C4 (PPM)

10
1,000

6000

0 SS: pred gy, ip lt gy, mod frm-
bly, v f gr, silty- arg, p srt, pred silic
sl calc, sl carb, no vis por, ip silt

6740-6800 SS: pred gy, ip lt gy, mod frm- mod
hd, bly, v f gr, silty- arg, p srt, pred silic cm,
occ v sl calc, sl carb, no vis por, ip silt sh

6800-6860 SS: pred gy, ip lt gy, mod frm-
mod hd, bly, v f gr, silty- arg, p srt, pred silic
cm, occ v sl calc, sl carb, no vis por, ip silt

6860-6920 SS: pred gy, ip lt gy, mod frm-
mod hd, bly, v f gr, silty- arg, p srt, pred silic
cm, occ v sl calc, sl carb, no vis por, ip silt sh

TV.D (ft)

MD: 6,676'

VD: 6,496.06'

Inclination: 14.8°

azimuth: 99.4°

S: 90.39'

MD: 6,722'

TV.D: 6,540.19'

Inclination: 17.9°

Azimuth: 96.7°

VS: 103.23'

MD: 6,769'

TV.D: 6,584.53'

Inclination: 20.8°

Azimuth: 95.7°

VS: 118.6'

MD: 6,816'

TV.D: 6,628.06'

Inclination: 23.5°

Azimuth: 92.4°

VS: 135.98'

MD: 6,863'

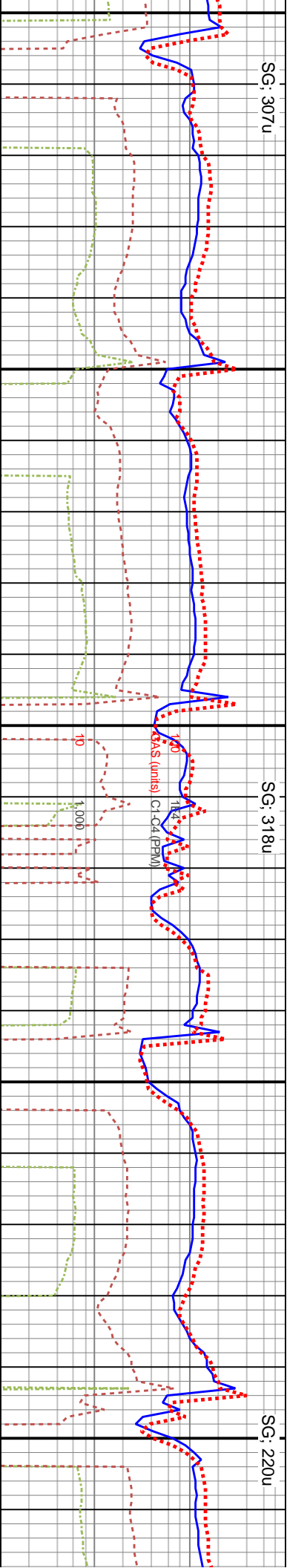
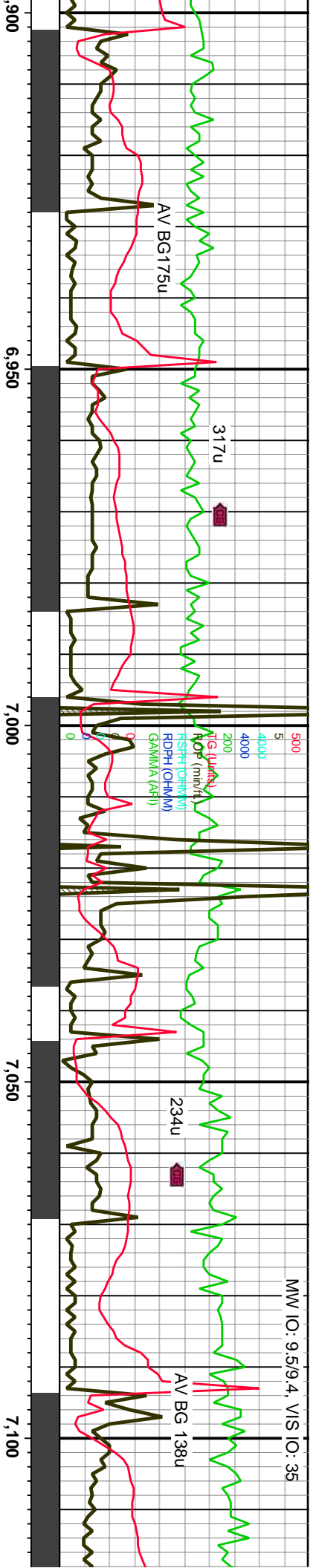
TV.D: 6,670.86'

Inclination: 25.3°

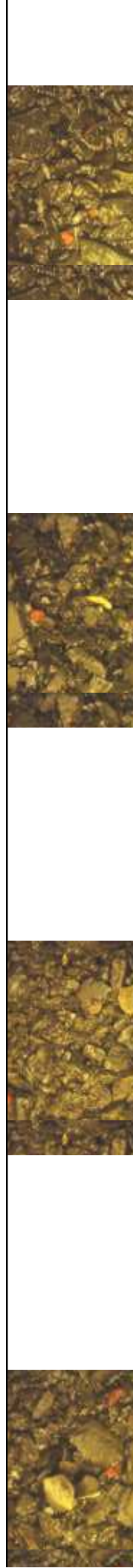
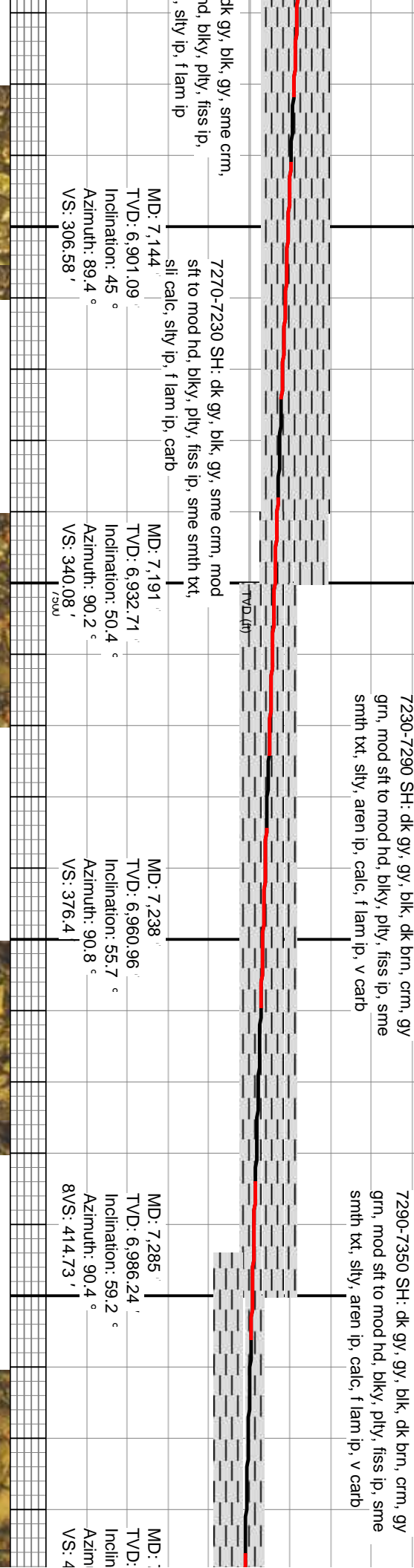
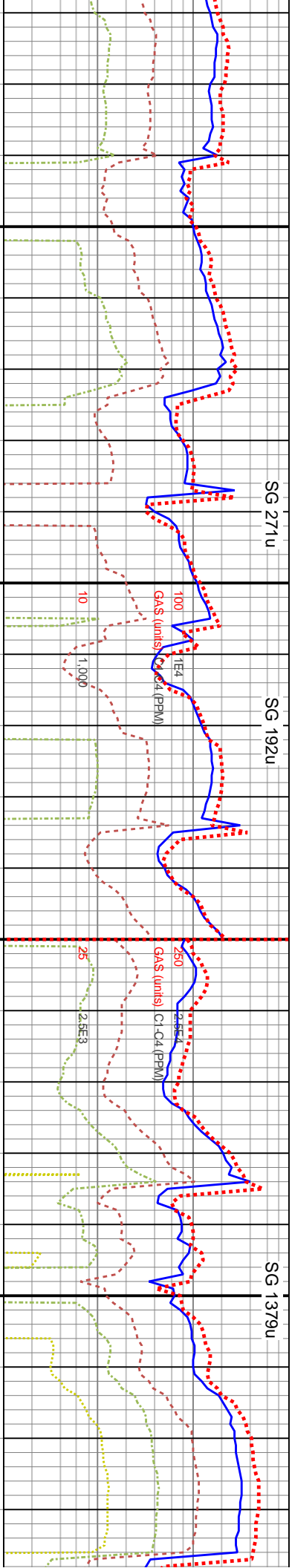
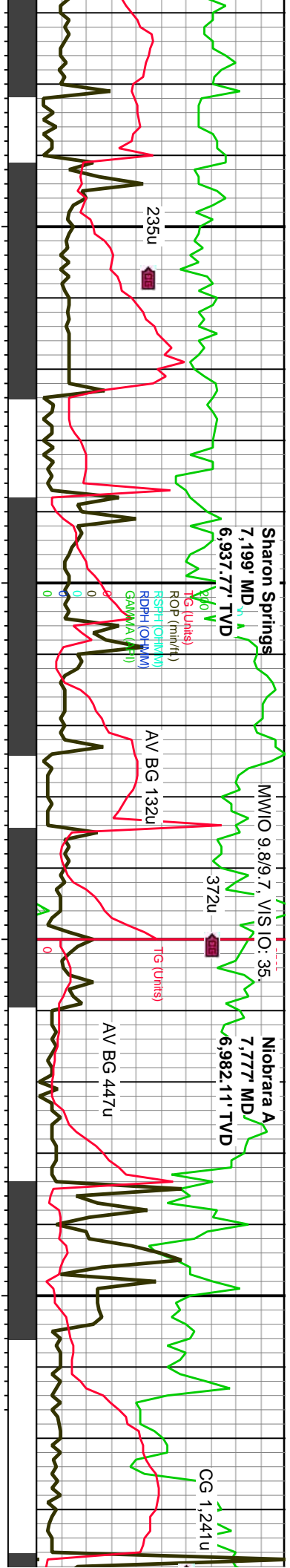
Azimuth: 89.5°

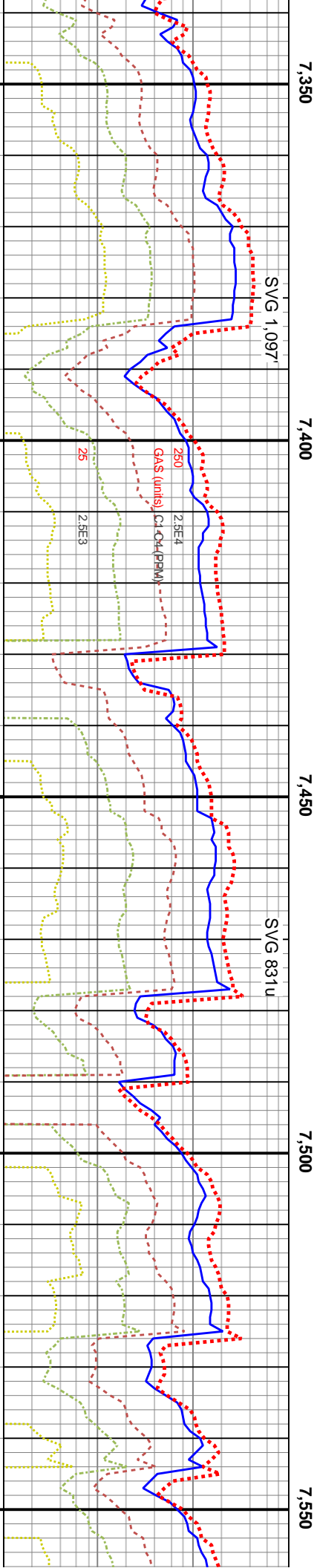
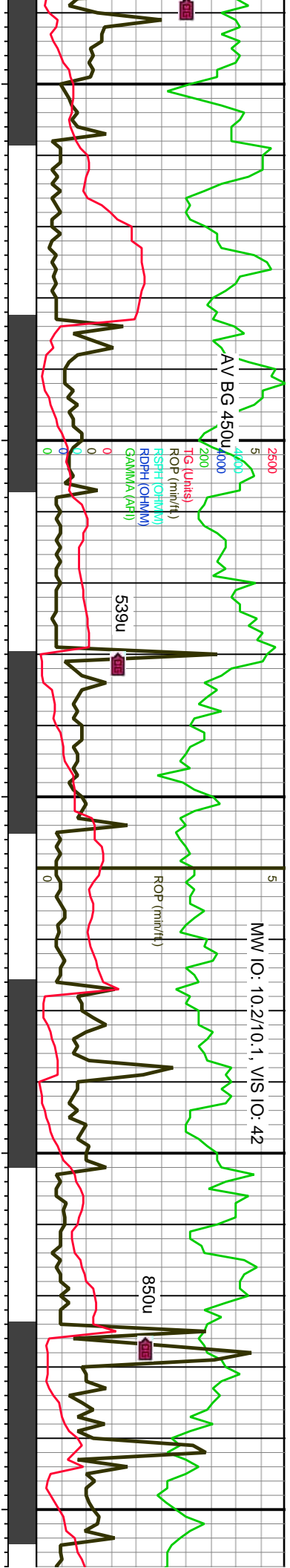
VS: 154.78'





6500	6930-6990 SH: dk gy, gy, sme lt gy, frm to mod hd, blkly, ply, sme smth txt, sil, silty, sil, f lam ip, sme v/ SSS	6500	6990-7050 SH: dk gy, gy, sme lt gy, frm to mod hd, blkly, ply, sme smth txt, sil, silty, sil, f lam ip	6500	7050-7110SH:dk gy, gy, lt gy, frm to hd, blkly, ply, sme smth txt, sil, silty ip, f lam ip	7500	7110-7170 SH: mod sft to mod h sme smth txt, sil
TVD (ft)		TVD (ft)		TVD (ft)		TVD (ft)	
MD: 6,910		MD: 6,957		MD: 7,003		MD: 7,050	
TVD: 6,712.99		TVD: 6,753.97		TVD: 6,792.28		TVD: 6,829.96	
Inclination: 27.3 °		Inclination: 31.3 °		Inclination: 35.9 °		Inclination: 37.5 °	
Azimuth: 89 °		Azimuth: 88.7 °		Azimuth: 88.3 °		Azimuth: 86.9 °	
VS: 174.8 '		VS: 196.87 5 @ 6,970'		VS: 221.24 '		VS: 248.01 '	
7500		7500		7500		7500	



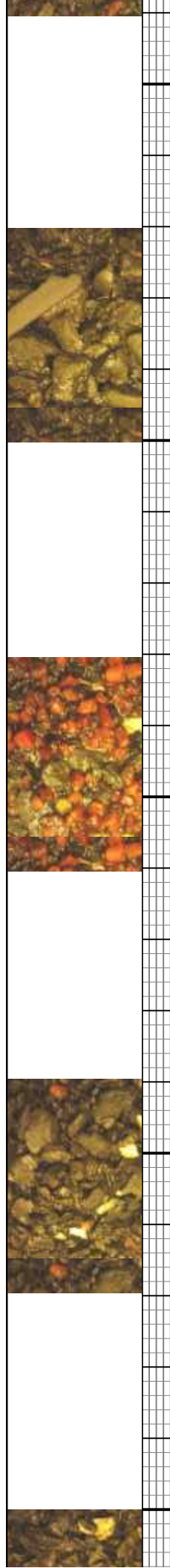
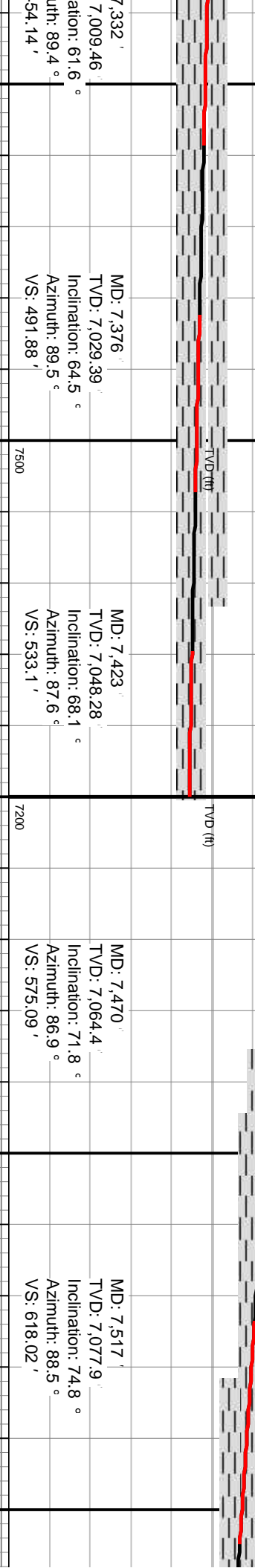


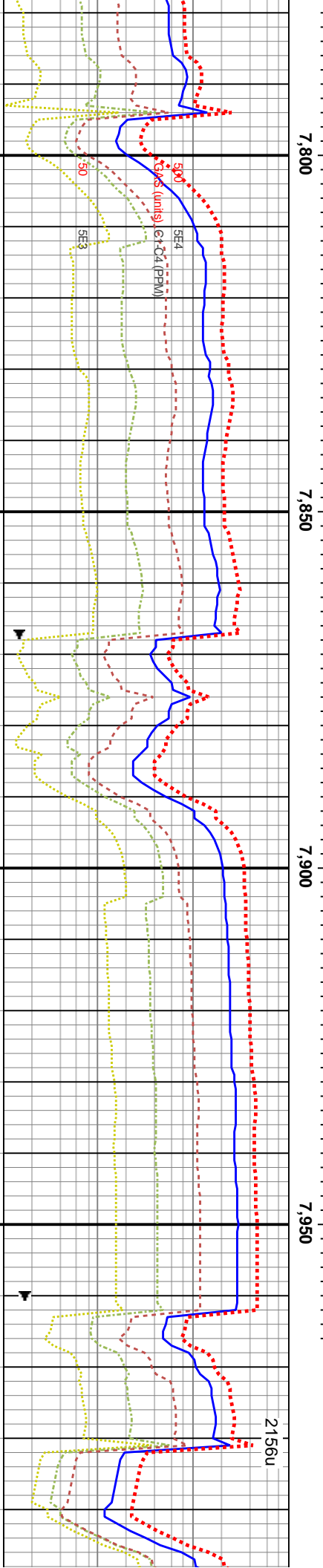
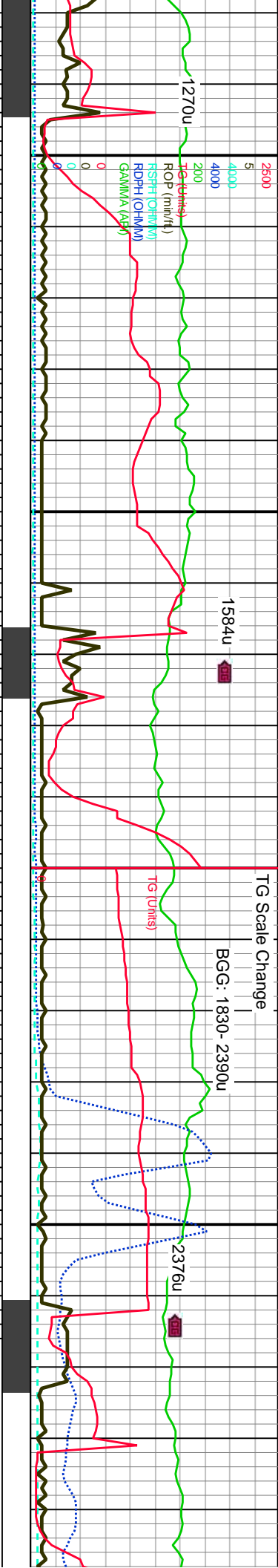
7350-7410 SH: dk gy, gy, blk, dk brn, lt brn, crm, gy grn, mod sft to mod hd, blk, ply, flss ip, sme smth txt, slty, aren ip, calc, f lam ip, v carb; Chalk: lt gy, sft, blk, ruf txt, calc, w/sh inclus

7410-7470 SH: dk gy, gy, blk, dk brn, lt brn, crm, gy grn, mod sft to mod hd, blk, ply, flss ip, sme smth txt, slty, aren ip, calc, f lam ip, v carb; Chalk: lt gy, sft, blk, ruf txt, calc

7470-7530 SH: dk gy, gy, blk, dk brn, lt brn, crm, gy grn, mod sft to mod hd, blk, ply, flss ip, sme smth txt, slty, aren ip, calc, f lam ip, v carb, calc

7560-7620 SH: dk gy, gy, blk, mod sft to mod hd, blk, ply, aren ip, calc, f lam ip, v carb buff, mott, grain str, mod fm





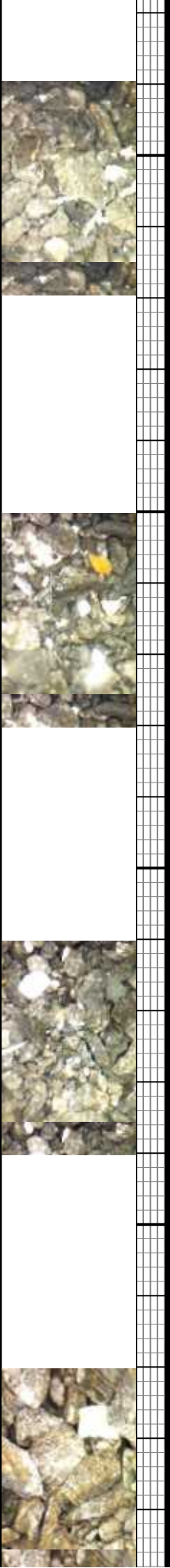
7790-7850 SH: dk gy, gy, blk, mod sft to mod hd, blkly, pfty, flss ip, sme smth txt, mrly ip, occ chk incl, slty, aren ip, calc, f lam ip, v carb, calc, sme lt gn flor, tr ltn gn cut

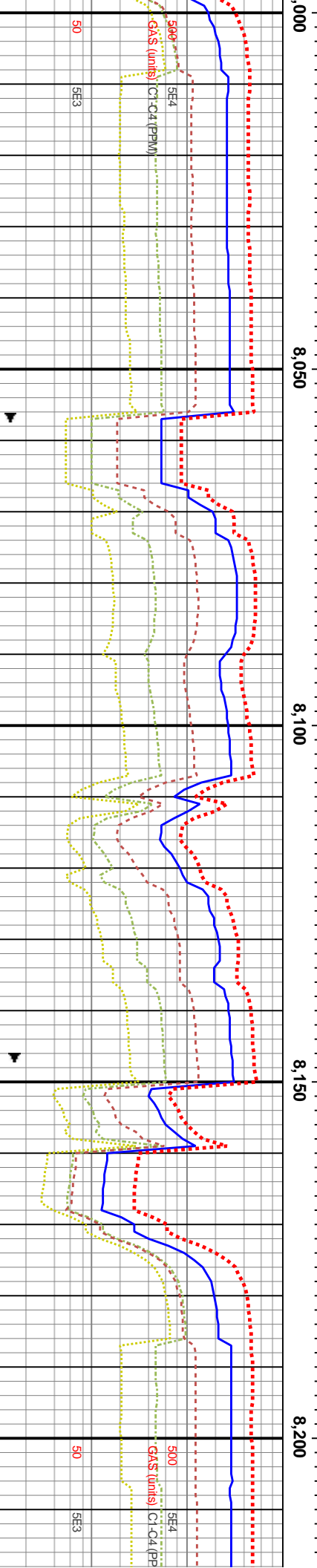
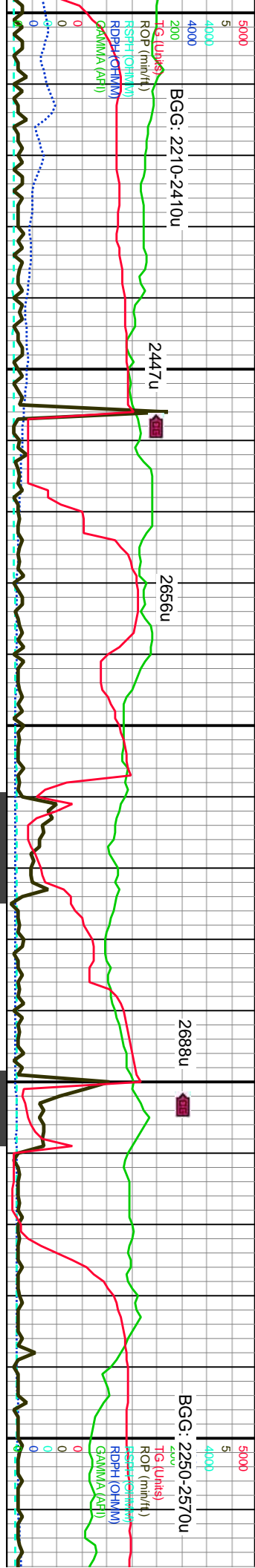
7850-7910 SH: dk gy, gy, blk, mod sft to mod hd, blkly, pfty, flss ip, sme smth txt, mrly ip, abnt chk incl, sme wh chk, slty, aren ip, calc, v carb, calc, sme lt gn flor, tr ltn gn cut

7910-7970 SH: dk gy, gy, blk, mod sft to mod hd, blkly, pfty, flss ip, sme smth txt, mrly ip, abnt chk incl, sme wh chk, slty, aren ip, calc, v carb, calc, sme lt gn flor, tr ltn gn cut

7970-8030 SH: lt gy- gy, mod sft to mod hd, blkly, pfty, flss ip, sme smth txt, mrly ip, abnt chk incl, sme wh chk, slty, aren ip, calc, v carb, calc, sme lt gn flor, tr ltn gn cut

MD: 7,788' TVD: 7,100.8' Inclination: 89.08° Azimuth: 91.45° VS: 879.31'	WOB: 12 kLbs Rotary: 62 RPM/ Strokes: 63 SPM/ Pump Rate: 310 GPM	MD: 7,882' TVD: 7,101.88' Inclination: 89.6° Azimuth: 88.82° VS: 970.06'	MD: 7,977' TVD: 7,102.55' Inclination: 89.6° Azimuth: 89.34° VS: 1,061.32'
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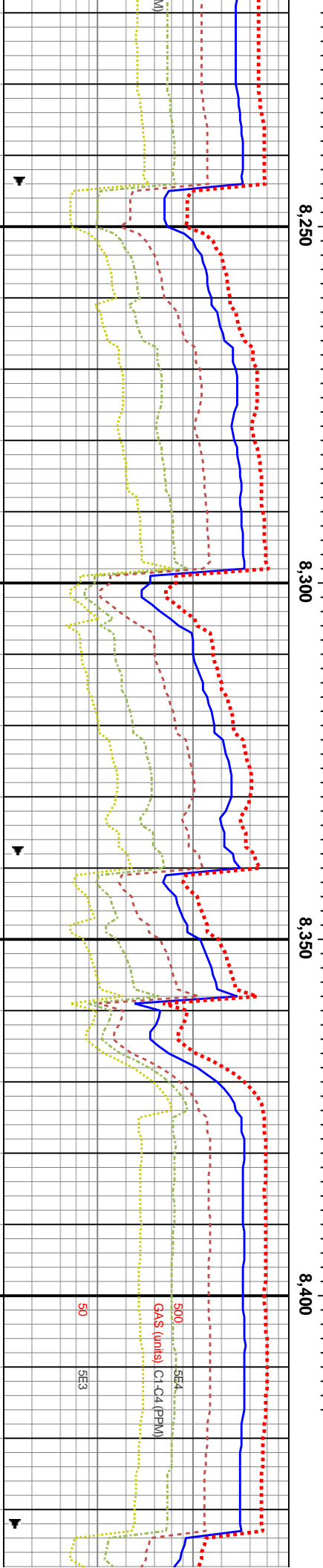
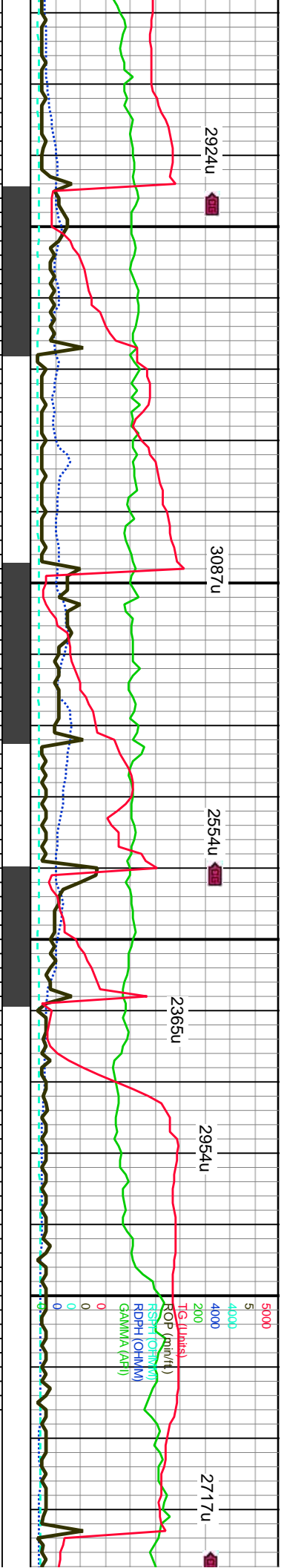




Depth (ft)	Depth (m)	Description
8030-8090 SH	It gy- gy, mod sft to mod	hd, blk, pty, sme smth txt, pred mot, mly ip, ip mltst, sme chk incl, sme wh chk, sly, aren ip, calc, v carb, calc, sme lt gn flr, tr ltn gn cut
8090-8150 SH	It gy- gy, mod sft to mod	hd, blk, pty, sme smth txt, pred mot, mly ip, ip mltst, sme chk incl, sme wh chk, sly, aren ip, calc, r pyr, v carb, calc, sme lt gn flr, tr ltn gn cut
8150-8210 SH	It gy- gy, mod sft to mod	hd, blk, pty, sme smth txt, pred mot, mly ip, ip mltst, sme chk incl, sme wh chk, sly, aren ip, calc, r pyr, v carb, calc, sme lt gn flr, tr ltn gn cut
8210-8270 SH	sft to mod hd, t	ip, ip mltst, abn sly, calc, r pyr flr, tr ltn gn cu

WOB: 14.5 kLbs	MD: 8,071	WOB: 16 kLbs
Rotary: 62 RPM	TVD: 7,101.97'	Rotary: 58 RPM
Strokes: 65 SPM	Inclination: 91.1°	Strokes: 63 SPM
Pump Rate: 320 GPM	Azimuth: 89.26°	Pump Rate: 311 GPM
	VS: 1,151.71'	





It gy- gy, sme dk gy, mod 8270-8330 SH: It gy- gy, sme dk gy, mod sft to
biky- pty, pred mot, mry mod hd, biky- pty, pred mot, mry ip, ip mist, abnt
t chk incl, sme wh chk, silty, calc, rr pyr, carb, calc, chk incl, sme wh chk, silty, calc, rr pyr, carb, calc, sme lt gn flor, tr lln gn cut
v carb, calc, sme lt gn

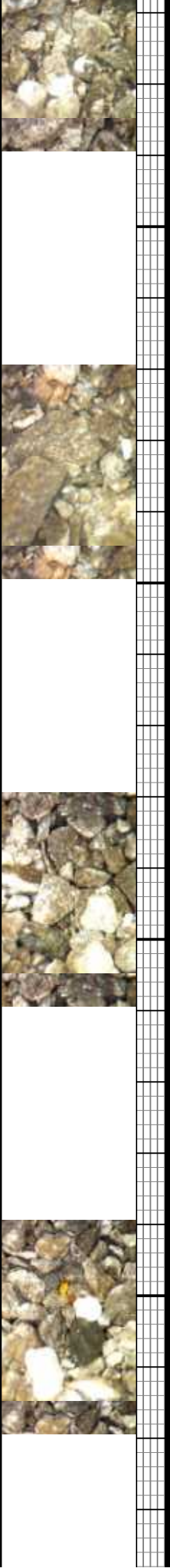
8330-8390 SH: It gy- gy, sme dk gy, mod sft to mod hd, biky- pty, pred mot, mry ip, ip mist, abnt chk incl, sme wh chk, silty, calc, rr pyr, carb, calc, sme lt gn flor, tr lln gn cut

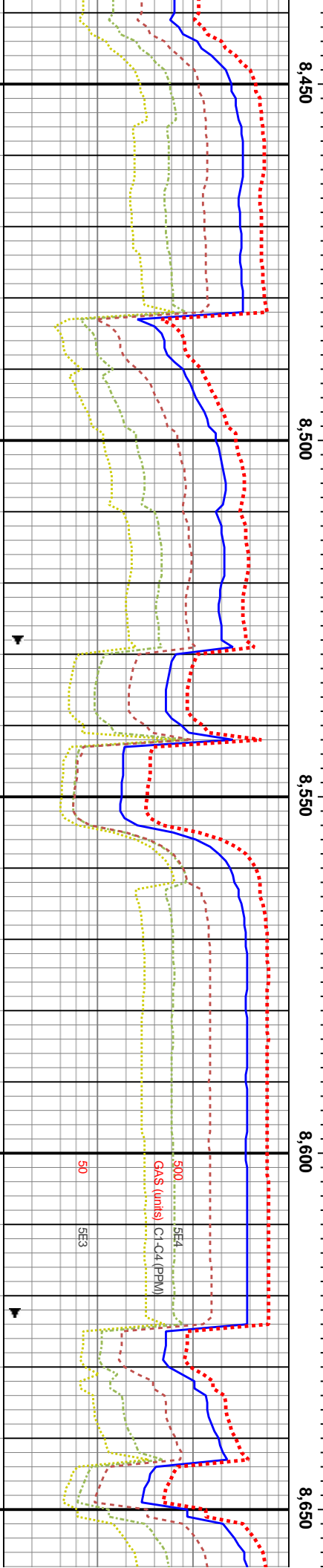
8390-8450 SH: It gy- gy, sme dk gy, mod sft to mod hd, biky- pty, pred mot, mry, sme mist, sme chk incl, occ wh chk, silty, calc, rr pyr, carb, calc, sme lt gn flor, tr lln gn cut

MD: 8,260' TVD: 7,099.88' Inclination: 90.48° Azimuth: 89.26° VS: 1,333.5'

MD: 8,354' TVD: 7,100.75' Inclination: 88.46° Azimuth: 89.43° VS: 1,423.91'

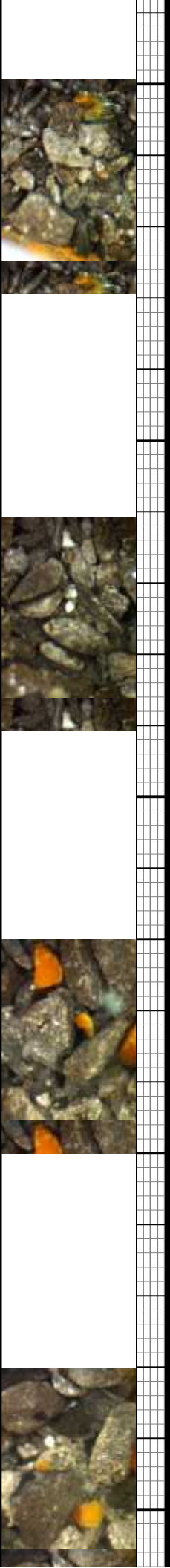
WOB: 14.5 kLbs Rotary: 63 RPM Strokes: 64 SPM Pump Rate: 316 GPM

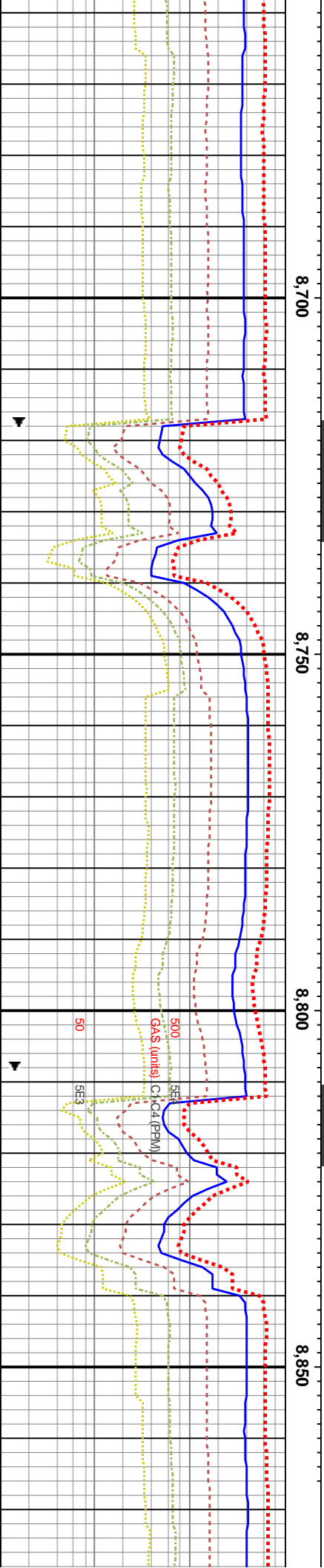




850-8510 SH: lt gy- gy, sme dk gy, mod sft	8510-8570 SH: lt gy- gy, sme dk gy, mod sft to	8570-8630 SH: lt gy- gy, sme dk	8630-8690 SH: lt gy- gy, sme dk gy, tr blk, mod sft- mod hd, blk- ply, pred mot, pred mrlly, sme mrlst, sme chk incl, occ wh chk, silty, calc, tr pyr, carb, calc, sme lt gn flor, tr ltn gn
mod hd, blk- ply, pred mot, pred mrlly, sme mrlst, sme chk incl, occ wh chk, silty, calc, tr pyr, carb, calc, sme lt gn flor, tr ltn gn	mod hd, blk- ply, pred mot, pred mrlly, sme mrlst, sme chk incl, occ wh chk, silty, calc, tr pyr, carb, calc, sme lt gn flor, tr ltn gn cut	gy, tr blk, mod sft- mod hd, blk- ply, pred mot, pred mrlly, sme mrlst, sme chk incl, occ wh chk, silty, calc, carb, calc, sme lt gn flor, tr ltn gn cut	mod hd, blk- ply, pred mot, pred mrlly, sme mrlst, sme chk incl, occ wh chk, silty, calc, carb, calc, sme lt gn flor, tr ltn gn cut

MD: 8,449' TVD: 7,102.14' Inclination: 89.87° Azimuth: 89.26° VS: 1,515.28'	MD: 8,543' TVD: 7,102.93' Inclination: 89.16° Azimuth: 89.43° VS: 1,605.7'	WOB: 17.2 Klbs Rotary: 62 RPM Strokes: 62 SPW/ Pump Rate: 306 GPM	MD: 8,638' TVD: 7,103.88' Inclination: 89.69° Azimuth: 90.4° VS: 1,697.33'





8690-8750 SH: lt gy- gy, sme dk gy, tr blk, mod sft-
mod hd, blk- ply, pred mot, pred mly, sme mrlst,
sme chk incl, occ wh chk, silty, calc, carb, calc, sme lt
gn flor, tr ltn gn cut

8750-8810 SH: lt gy- gy, sme dk gy, tr blk,
mod sft- mod hd, blk- ply, pred mot, pred
mly, mrlst, abnt chk incl, occ wh chk, silty,
calc, carb, calc, sme lt gn flor, tr ltn gn cut

8810-8870 SH: lt gy- gy, tr dk gy, mod sft-
mod hd, blk- ply, pred mot, pred mly,
mrlst, abnt chk incl, occ wh chk, silty, calc,
carb, calc, sme lt gn flor, tr ltn gn cut

8870-8930 SH: lt gy- gy, tr dk
blk- ply, pred mot, pred mrlst,
occ wh chk, silty, calc, carb, c
ltn gn cut

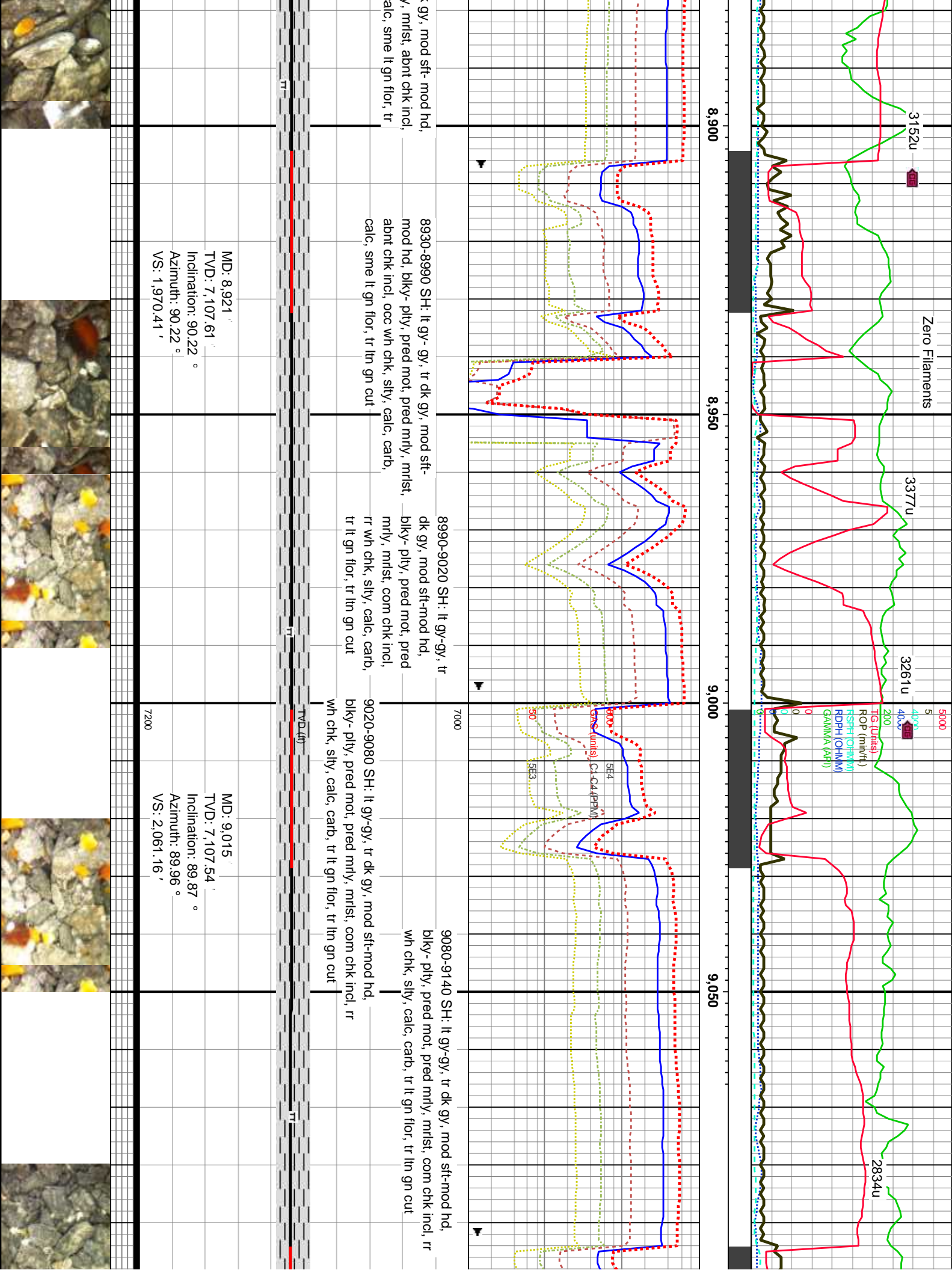
MD: 8,732'
TVD: 7,105.25'
Inclination: 88.64°
Azimuth: 89.87°
VS: 1,788.08'

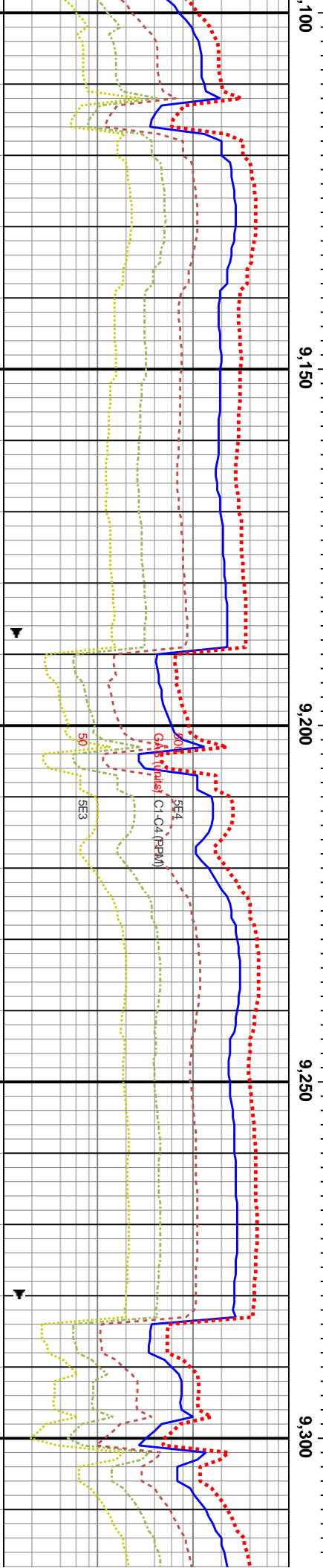
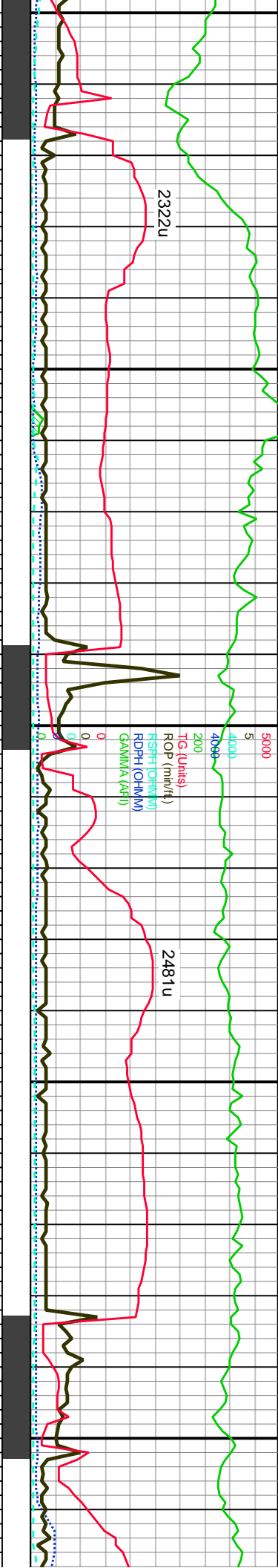
WOB: 18.4 kLbs
Rotary: 67 RPM
Strokes: 62 SPM
Pump Rate: 311 GPM

7200

MD: 8,826'
TVD: 7,107.54'
Inclination: 89.69°
Azimuth: 89.7°
VS: 1,878.76'

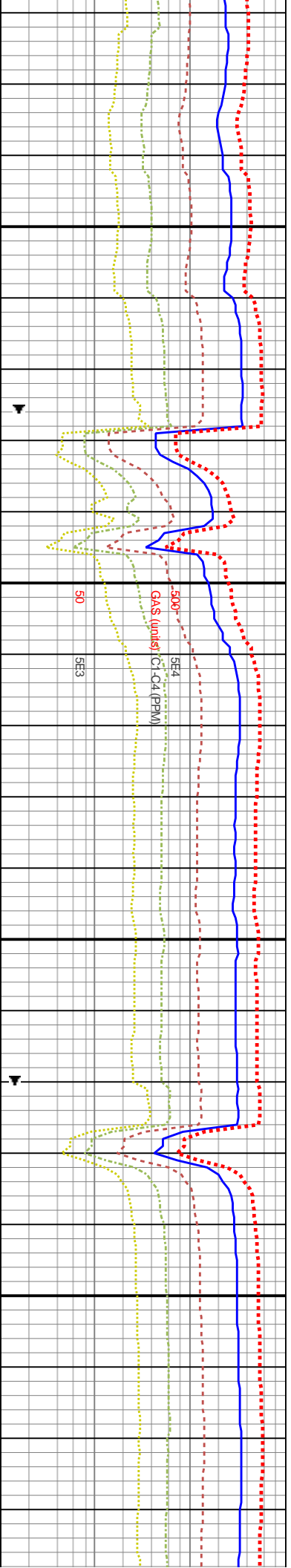
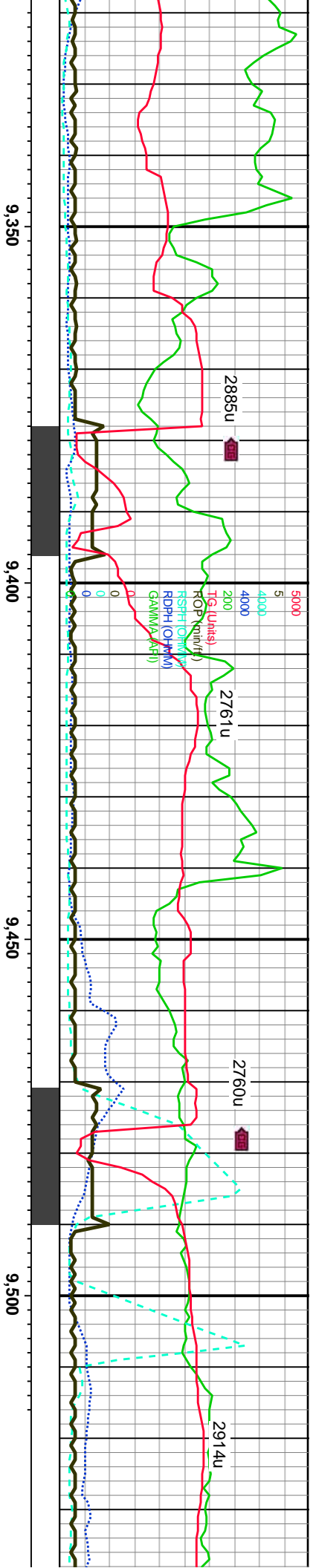


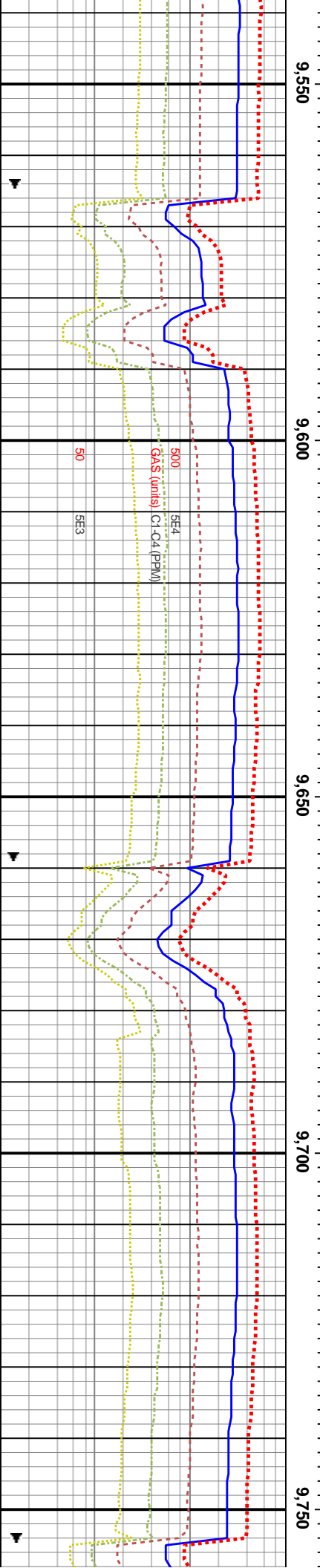
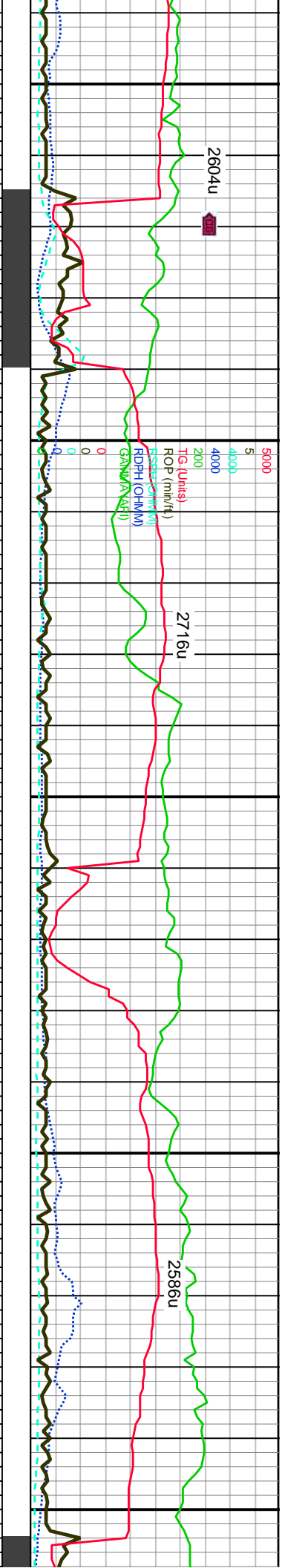




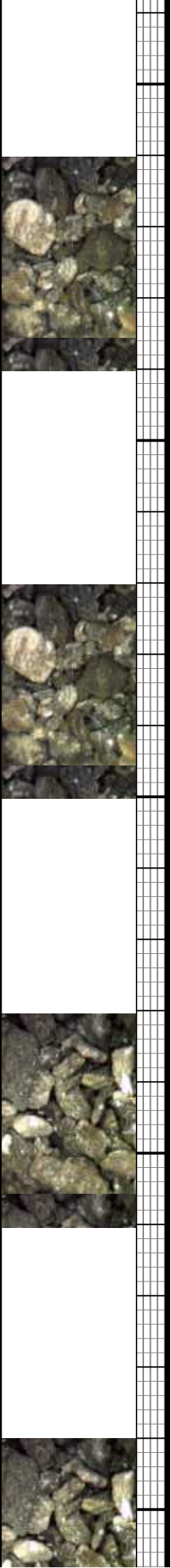
9140-9200 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blk- pty, pred mot, pred mrlst, com chk incl, rr wh chk, silty, calc, carb, tr lt gn flor, tr ltn gn cut	9200-9260 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blk- pty, pred mot, pred mrlst, com chk incl, rr wh chk, silty, calc, carb, tr lt gn flor, tr ltn gn cut	9260-9320 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blk- pty, pred mot, pred mrlst, com chk incl, rr wh chk, silty, calc, carb, tr lt gn flor, tr ltn gn cut	9320-9380 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blk- pty, pred mot, pred mrlst, com chk incl, rr wh chk, silty, calc, carb, tr lt gn flor, tr ltn gn cut
MD: 9,110' TVD: 7,108.85' Inclination: 88.55° Azimuth: 88.99° VS: 2,152.58'	MD: 9,204' TVD: 7,111.16' Inclination: 88.64° Azimuth: 88.73° VS: 2,242.76'	MD: 9,299' TVD: 7,112.61' Inclination: 89.6° Azimuth: 89.78° VS: 2,334.08'	

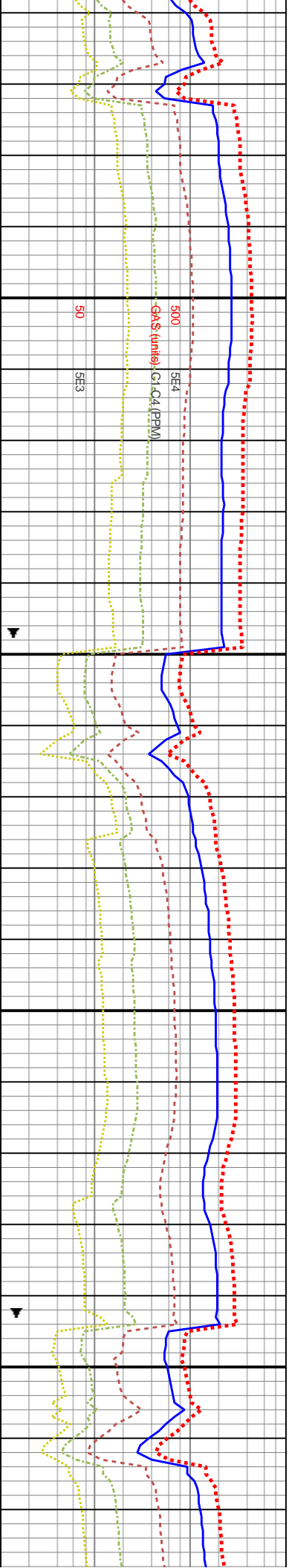
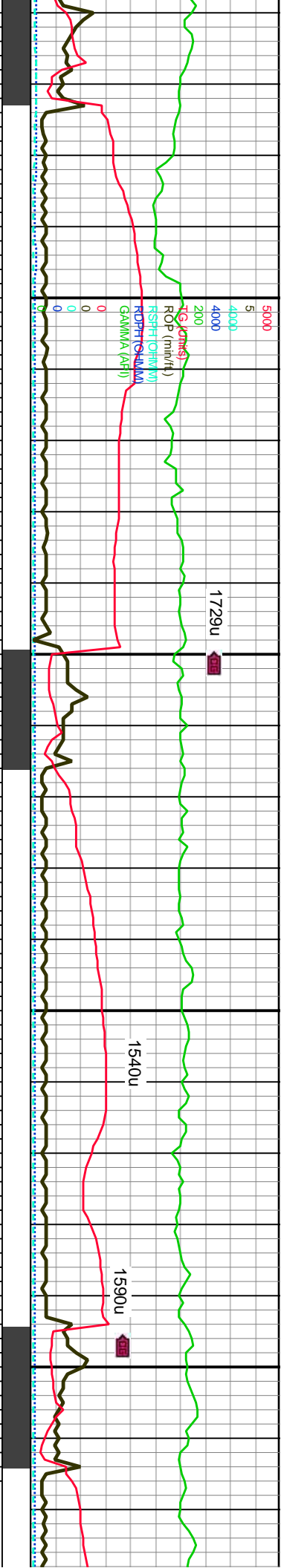


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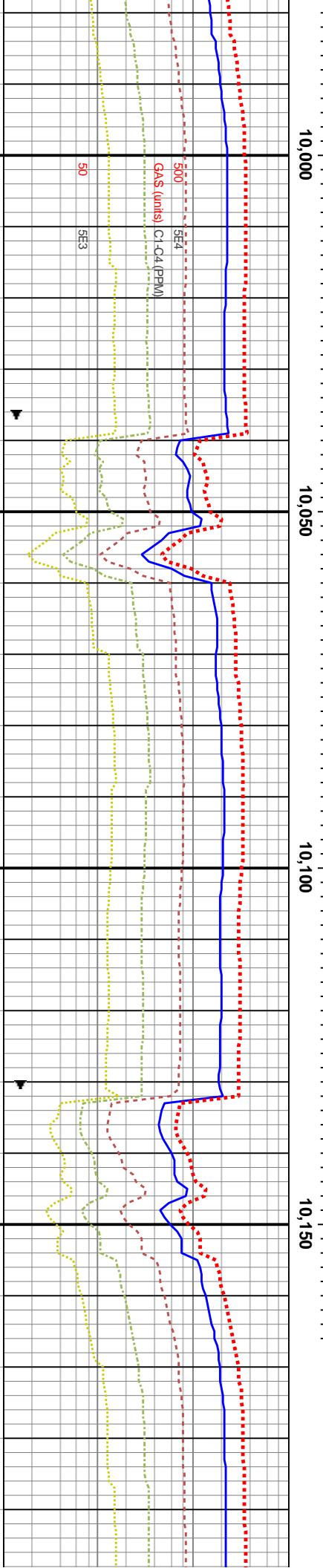
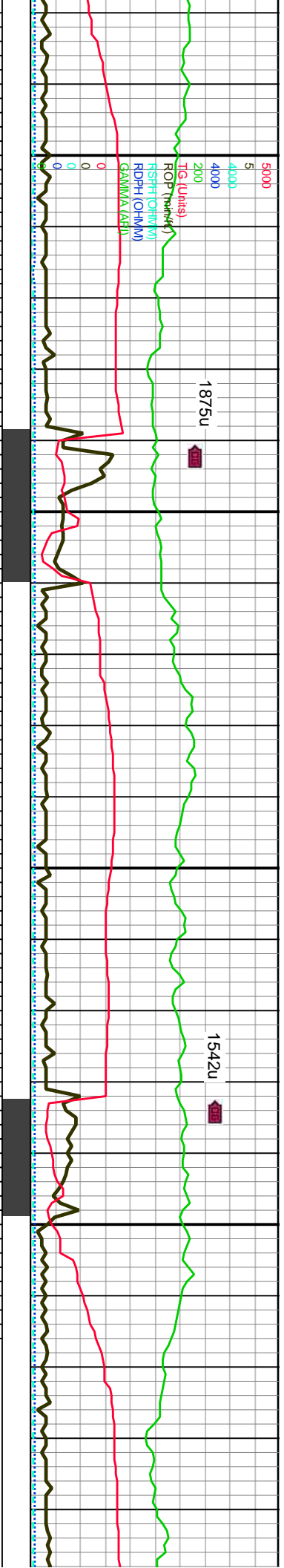
9620-9680 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blkly- ply, pred mot, pred mrlly, mrlst, abnt chk incl, com wh chk, slty, calc, carb, tr lt gn & bri yel flor, tr ltn gn cut	9680-9740 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blkly- ply, pred mot, pred mrlly, mrlst, abnt chk incl, com wh chk, slty, calc, carb, tr lt gn & bri yel flor, tr ltn gn cut	9740-9800 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blkly- ply, pred mot, pred mrlly, mrlst, abnt chk incl, com wh chk, slty, calc, carb, tr lt gn & bri yel flor, tr ltn gn cut
MD: 9,582' TVD: 7,111.89' Inclination: 89.69° Azimuth: 91.72° VS: 2,608.5'	MD: 9,677' TVD: 7,112.04' Inclination: 90.13° Azimuth: 90.66° VS: 2,700.67'	



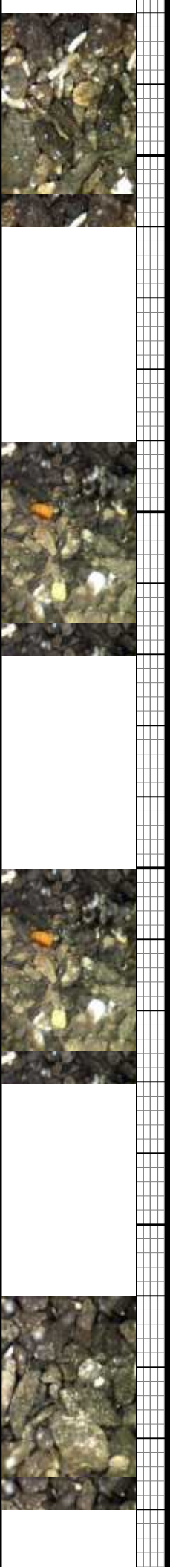


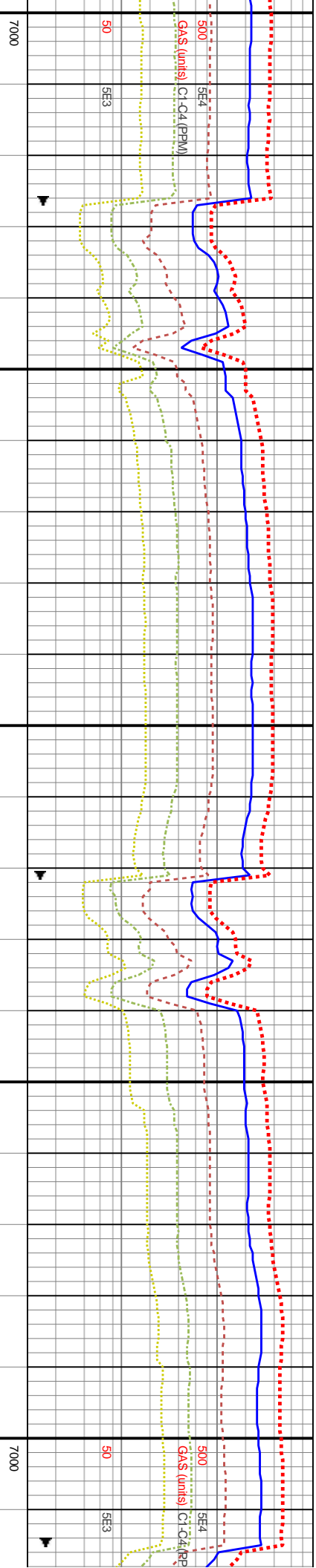
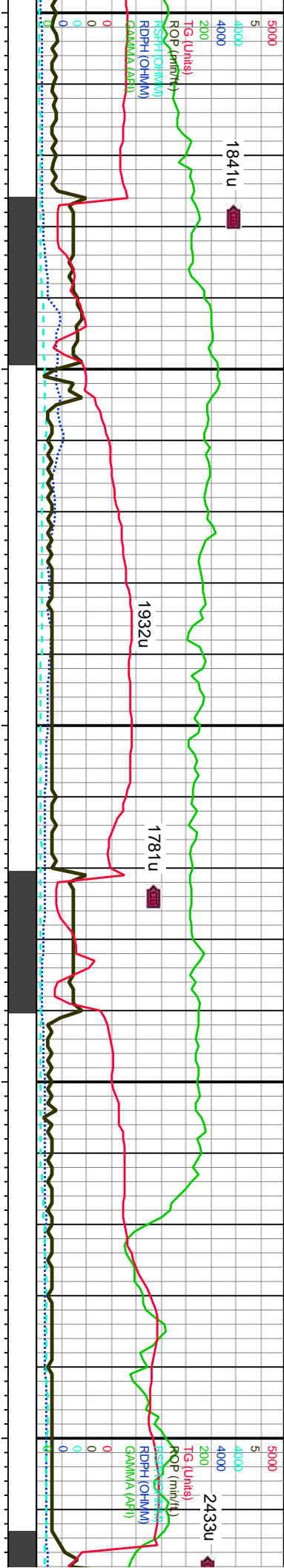
9800-9860 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blk-y- ply, pred mot, pred mrly, mlst, abnt chk incl, com wh chk, slty, calc, carb, tr lt gn & bri yel flor, tr ltn gn cut	9860-9920 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blk-y- ply, pred mot, pred mrly, mlst, abnt chk incl, com wh chk, slty, calc, carb, tr lt gn & bri yel flor, tr ltn gn cut	9920-9980 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blk-y- ply, pred mot, pred mrly, mlst, abnt chk incl, com wh chk, slty, calc, carb, tr lt gn & bri yel flor, tr ltn gn cut	9980-10040 SH: lt gy-gy, blk-y- ply, pred mot, pred com wh chk, slty, calc, ce
MD: 9,771' TVD: 7,112.48' Inclination: 89.34 ° Azimuth: 89.87 ° VS: 2,791.48'	MD: 9,866' TVD: 7,113.21' Inclination: 89.78 ° Azimuth: 92.42 ° VS: 2,883.63'	MD: 9,960' TVD: 7,113.5' Inclination: 89.87 ° Azimuth: 92.77 ° VS: 2,975.36'	
WOB: 17 klbs Rotary: 62 RPM Strokes: 62 SPW Pump Rate: 306 GPM			





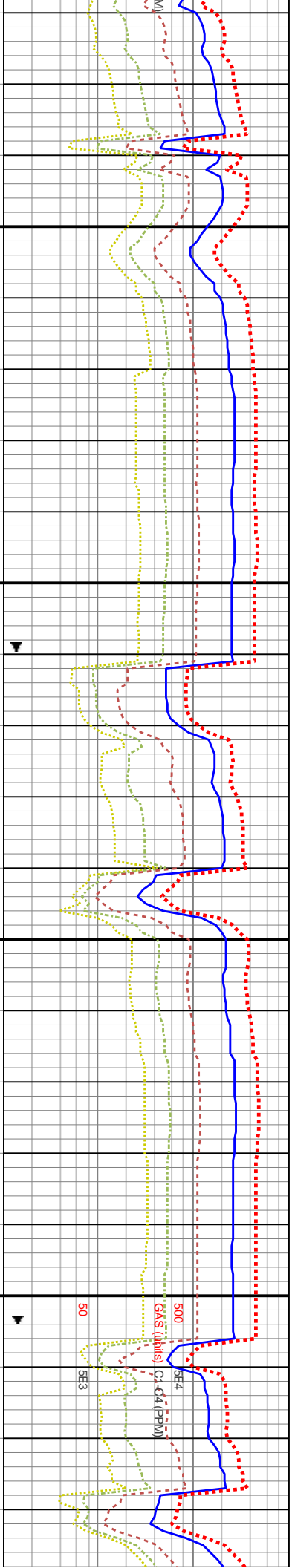
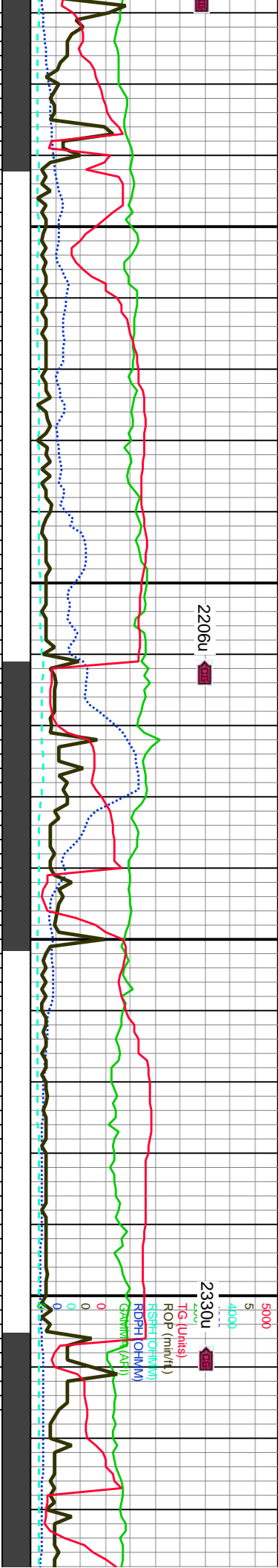
7000	10040-10100 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blk- pty, pred mot, pred mrly, mlst, abnt chk incl, com wh chk, slty, calc, carb, tr lt gn & bri yel flor, tr ltn gn cut	10100-10160 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blk- pty, pred mot, pred mrly, mlst, abnt chk incl, com wh chk, slty, calc, carb, tr lt gn & bri yel flor, tr ltn gn cut	10160-10220 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blk- pty, pred mot, pred mrly, mlst, abnt chk incl, com wh chk, slty, calc, carb, tr lt gn & bri yel flor, tr ltn gn cut	10220
TVD (ft)				
7200				
MD: 10,054' TVD: 7,114.07' Inclination: 89.43 ° Azimuth: 89.52 ° VS: 3,066.52'				
MD: 10,149' TVD: 7,113.48' Inclination: 91.28 ° Azimuth: 88.2 ° VS: 3,157.67'				





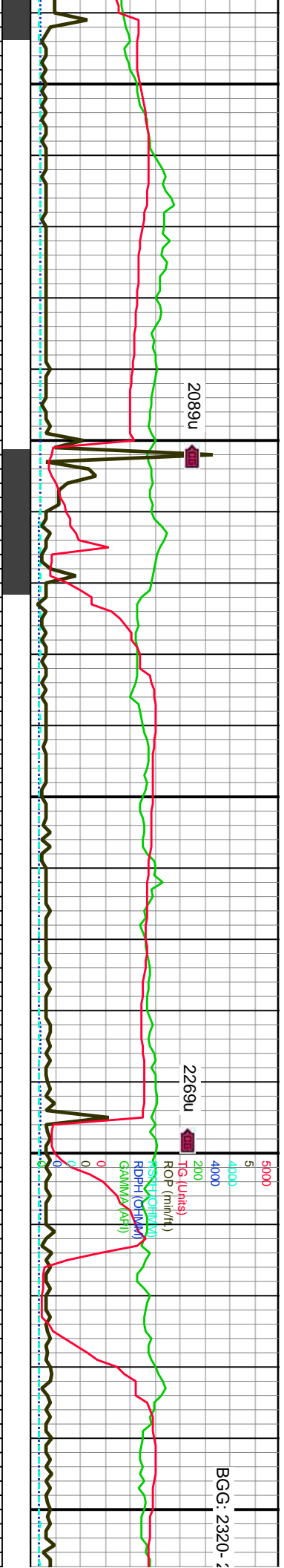
10280 SH: lt gy-gy, tr dk gy, mod sft-mod hd, sily, pred mot, pred mrlly, mist, abnt chk incl, h chk, sily, calc, carb, tr lt gn & bri yel flr, tr ltn		10280-10340 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blk- ply, pred mot, pred mrlly, mist, sme chk incl, com wh chk, sily, calc, carb, tr lt gn & bri yel flr, tr ltn gn cut		10340-10400 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blk- ply, pred mot, pred mrlly, mist, sme chk incl, com wh chk, sily, calc, carb, tr lt gn & bri yel flr, tr ltn gn cut		10400-10460 SH: lt gy-gy, tr dk gy, mod sft-mod hd, blk- ply, pred mot, pred mrlly, mist, sme chk incl, com wh chk, sily, calc, carb, tr lt gn & bri yel flr, tr ltn gn cut	
MD: 10,243'		MD: 10,338'		MD: 10,338'		MD: 10,338'	
TVD: 7,111.68'		TVD: 7,111.31'		TVD: 7,111.31'		TVD: 7,111.31'	
Inclination: 90.92°		Inclination: 89.52°		Inclination: 89.52°		Inclination: 89.52°	
Azimuth: 86.71°		Azimuth: 85.3°		Azimuth: 85.3°		Azimuth: 85.3°	
VS: 3,247.18'		VS: 3,336.89'		VS: 3,336.89'		VS: 3,336.89'	
WOB: 19 kLbs		WOB: 19 kLbs		WOB: 19 kLbs		WOB: 19 kLbs	
Rotary: 63 RPM		Rotary: 63 RPM		Rotary: 63 RPM		Rotary: 63 RPM	
Strokes: 64 SPM		Strokes: 64 SPM		Strokes: 64 SPM		Strokes: 64 SPM	
Pump Rate: 317 GPM		Pump Rate: 317 GPM		Pump Rate: 317 GPM		Pump Rate: 317 GPM	





10460-10520 SH: lt gy-gy, tr dk gy, occ lt brn, mod sft-mod hd, blk-y- ply, pred mot, pred mrly, mlst, sme chk incl, com wh chk, slty, calc, carb, tr lt gn & bri yel flr, tr ltn gn cut	10520-10580 SH: lt gy-gy, tr dk gy, occ lt brn, mod sft-mod hd, blk-y- ply, pred mot, pred mrly, mlst, sme chk incl, com wh chk, slty, calc, carb, tr lt gn & bri yel flr, tr ltn gn cut	10580-10640 SH: pred lt gy-gy, occ dk gy- lt brn, mod sft- sl hd, blk-y- ply, pred mot, pred mrly, mlst, abnt chk incl, sme wh chk, slty- arg, calc, carb, tr lt gn & bri yel flr, tr ltn gn cut	10640-10700 SH: brn, mod sft- sl hd, blk-y- ply, pred mot, pred mrly, mlst, abnt chk incl, sme wh chk, slty- arg, calc, carb, tr lt gn & bri yel flr, tr ltn gn cut
MD: 10,432' TVD: 7,111.67' Inclination: 90.04° Azimuth: 86° VS: 3,425.46'	MD: 10,527' TVD: 7,111.24' Inclination: 90.48° Azimuth: 87.41° VS: 3,515.54'	MD: 10,621' TVD: 7,110.81' Inclination: 90.04° Azimuth: 91.01° VS: 3,605.89'	MD: 10,621' TVD: 7,110.81' Inclination: 90.04° Azimuth: 91.01° VS: 3,605.89'





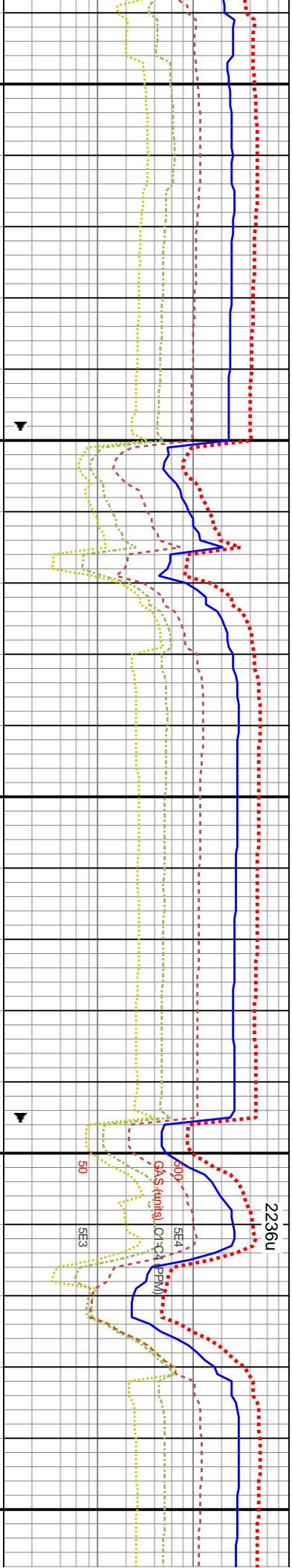
10,650

10,700

10,750

10,800

10,850



7000

10700-10760 SH: pred lt gy-gy, occ dk gy- lt
brn, mod sft- sl hd, blk- ply, pred mot, pred
mrlly, mrlst, sme chk incl, sme wh chk, silty-
arg, calc, carb, tr lt gn & bri yel flr, tr ltn gn cut

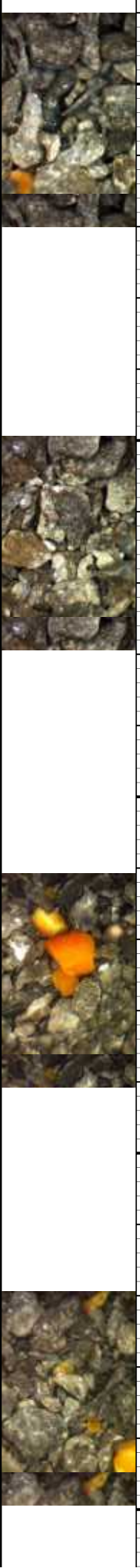
10760-10820 SH: pred lt gy-gy, occ dk gy- lt
brn, mod sft- sl hd, blk- ply, pred mot, pred
mrlly, mrlst, sme chk incl, sme wh chk, silty-
arg, calc, carb, tr lt gn & bri yel flr, tr ltn gn cut

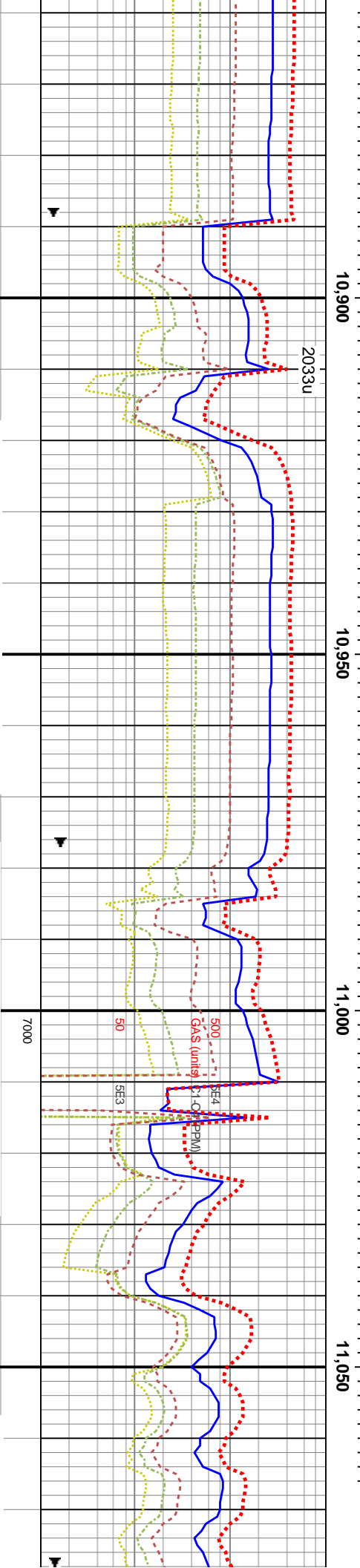
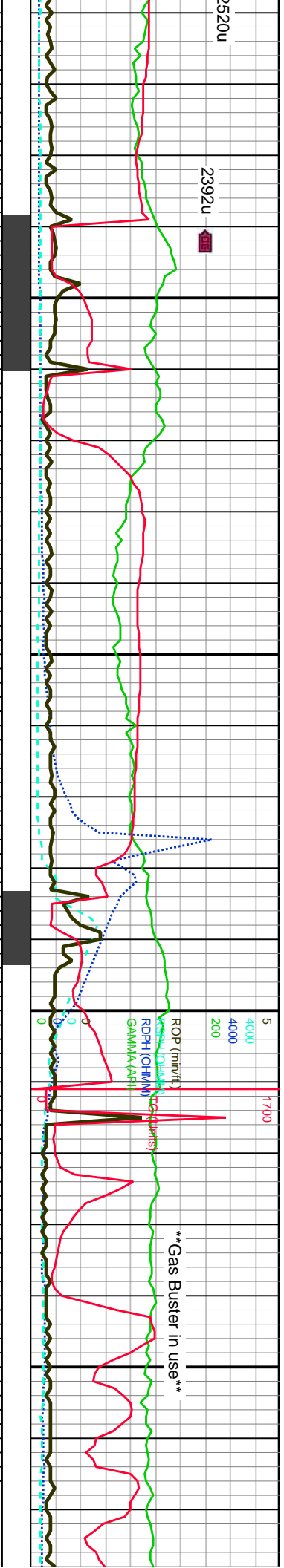
10820-10880 SH: pred lt gy-gy, occ dk gy- lt
brn, mod sft- sl hd, blk- ply, pred mot, pred
mrlly, mrlst, sme chk incl, sme wh chk, silty-
arg, calc, carb, tr lt gn & bri yel flr, tr ltn gn cut

TVD (ft)

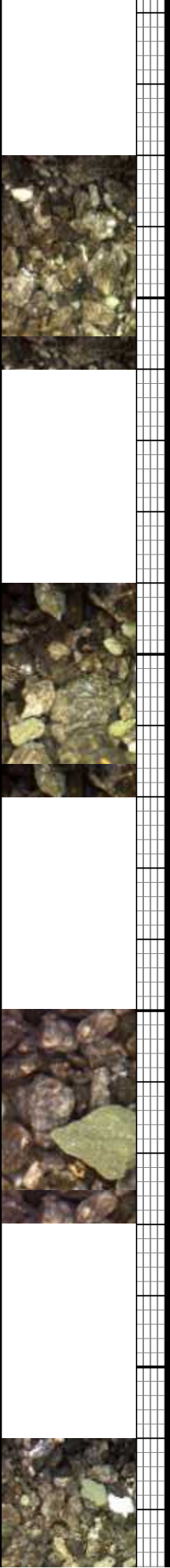
MD: 10,716 '
TVD: 7,111.4 '
Inclination: 89.25 °
Azimuth: 91.98 °
VS: 3,698.17 '

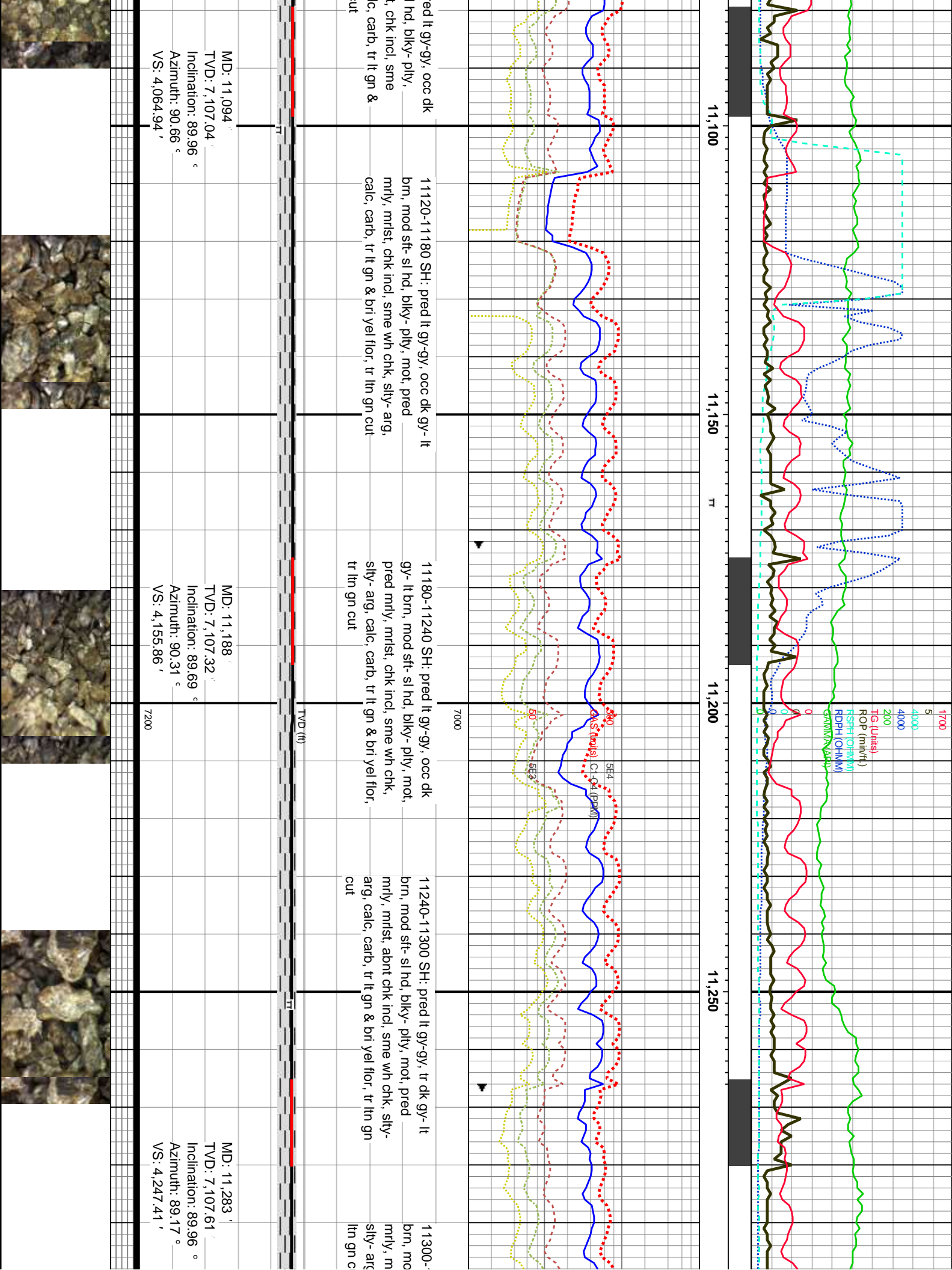
MD: 10,810 '
TVD: 7,111.33 '
Inclination: 90.84 °
Azimuth: 91.98 °
VS: 3,789.68 '
7200

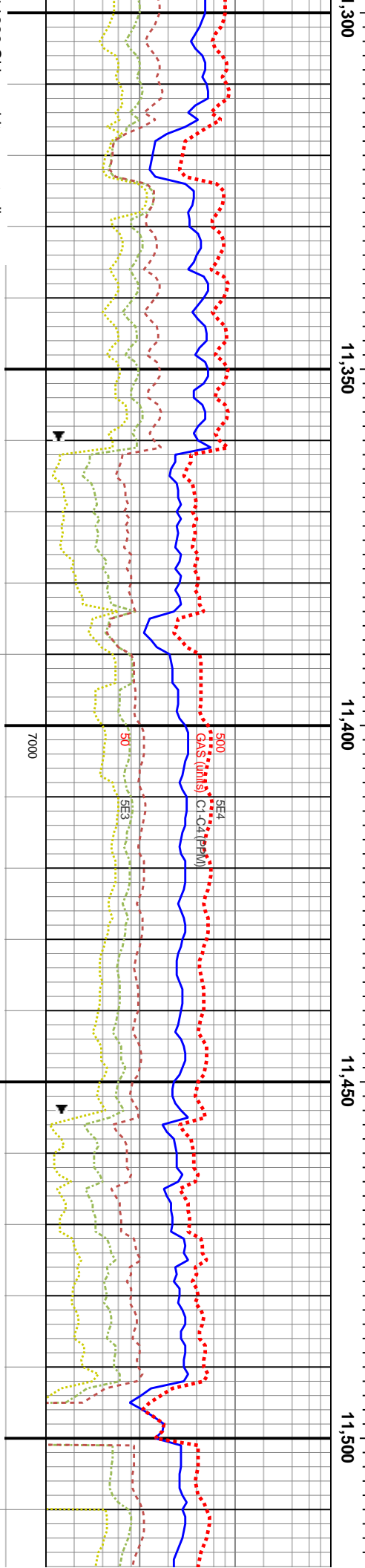
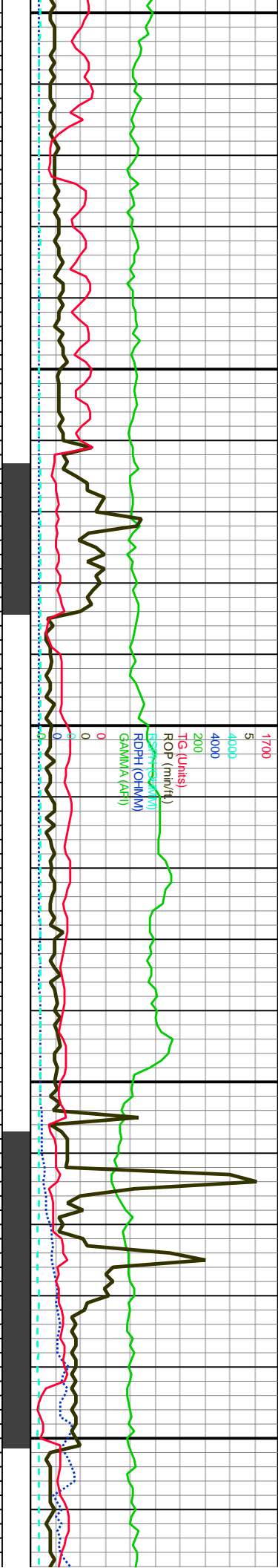




0880-10940 SH: pred lt gy-gy, occ dk gy- lt brn, mod sft- sl hd, blk- ply, pred mot, pred mly, mst, sme chk incl, sme wh chk, sly- arg, calc, carb, occ non calc lt brn sh, tr lt gn & bri yel flr, tr ln gn cut	10940-11000 SH: pred lt gy-gy, occ dk gy- lt brn, mod sft- sl hd, blk- ply, pred mot, pred mly, mst, sme chk incl, sme wh chk, sly- arg, calc, carb, occ non calc lt brn sh, tr lt gn & bri yel flr, tr ln gn cut	11000-11060 SH: pred lt gy-gy, occ dk gy- lt brn, mod sft- sl hd, blk- ply, pred mot, pred mly, mst, sme chk incl, sme wh chk, sly- arg, calc, carb, occ non calc lt brn sh, tr lt gn & bri yel flr, tr ln gn cut	11060-11120 SH: pred lt gy-gy, occ dk gy- lt brn, mod sft- sl hd, blk- ply, pred mot, pred mly, mst, sme chk incl, sme wh chk, sly- arg, calc, carb, occ non calc lt brn sh, tr lt gn & bri yel flr, tr ln gn cut
MD: 10,905' TVD: 7,109.43' Inclination: 91.45° Azimuth: 90.93° VS: 3,881.93'	MD: 10,999' TVD: 7,107.63' Inclination: 90.75° Azimuth: 90.75° VS: 3,972.97'	MD: 10,999' TVD: 7,107.63' Inclination: 90.75° Azimuth: 90.75° VS: 3,972.97'	MD: 10,999' TVD: 7,107.63' Inclination: 90.75° Azimuth: 90.75° VS: 3,972.97'

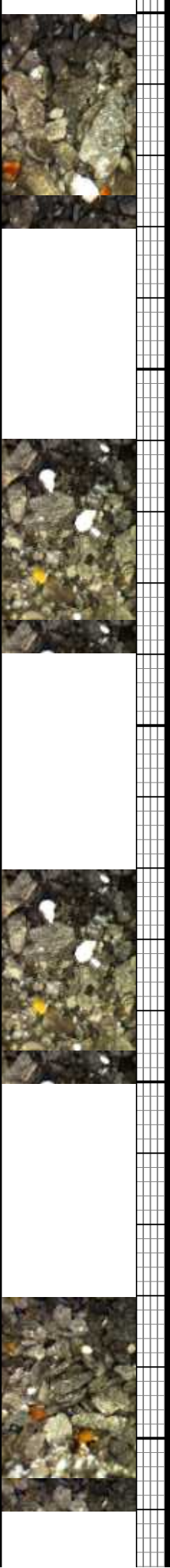


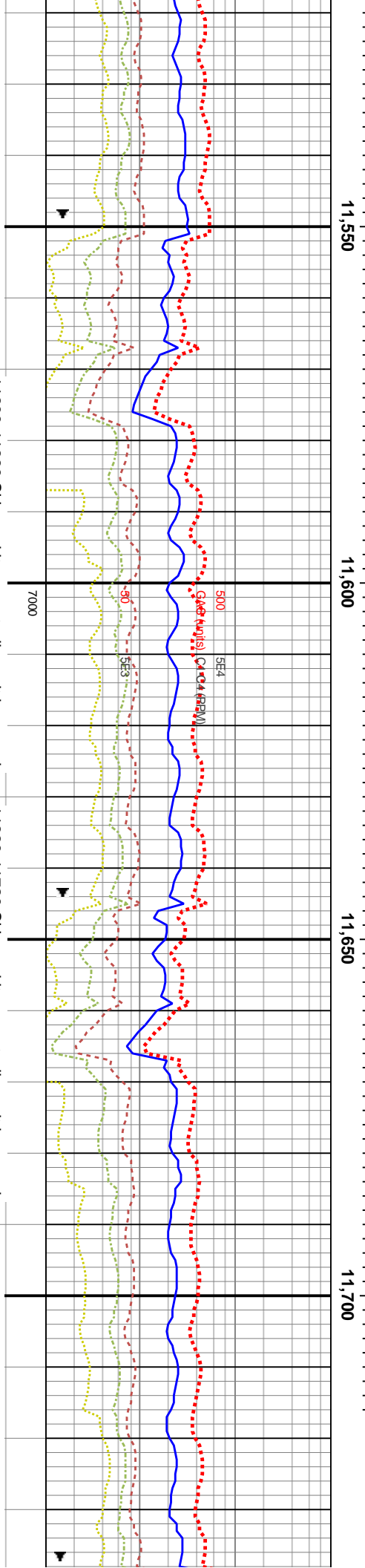
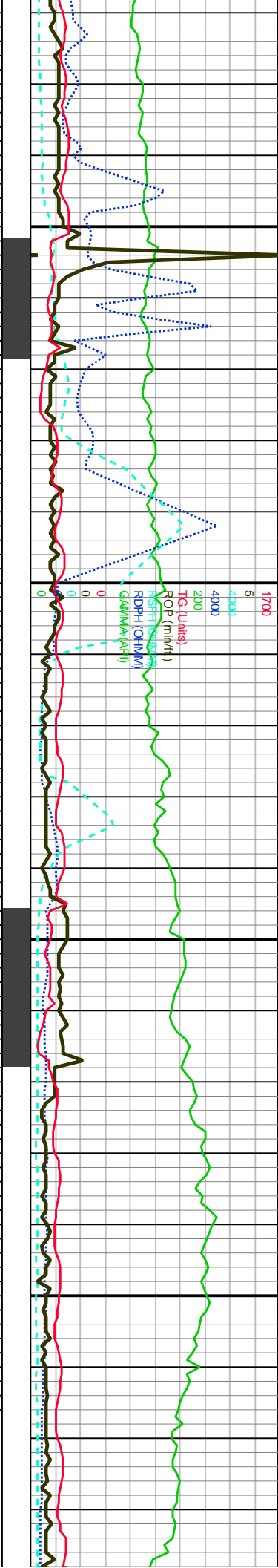




11360 SH: pred lt gy-gy, tr dk g11360-11420 SH: pred lt gy-gy, tr dk gy-lt brn, mod	11420-11480 SH: pred lt gy-gy, tr dk gy-lt brn, mod	11480-11540 SH: pred lt gy-gy, tr dk gy-lt brn, mod	11540-
d sft- sl hd, blk- ply, mot, presft- sl hd, blk- ply, mot, pred mrly, mltst, abnt chk	sft- sl hd, blk- ply, mot, pred mrly, mltst, abnt chk	sft- sl hd, blk- ply, mot, pred mrly, mltst, abnt chk	sft- sl l
ist, abnt chk incl, sme wh chk, incl, occ wh chk, sily- arg, calc, carb, tr lt gn & bri yel	incl, occ wh chk, sily- arg, calc, carb, tr lt gn & bri yel	incl, occ wh chk, sily, calc, carb, tr lt gn & bri yel flr, tr	incl, occ
ut	flor, tr ltn gn cut	lt gn cut	lt gn cl

MD: 11,377'		MD: 11,471'	
TVD: 7,106.38'		TVD: 7,103.21'	
Inclination: 91.54 °		Inclination: 92.33 °	
Azimuth: 87.41 °		Azimuth: 87.5 °	
VS: 4.337.33'		VS: 4.426.8'	
DS @ 11,455'			

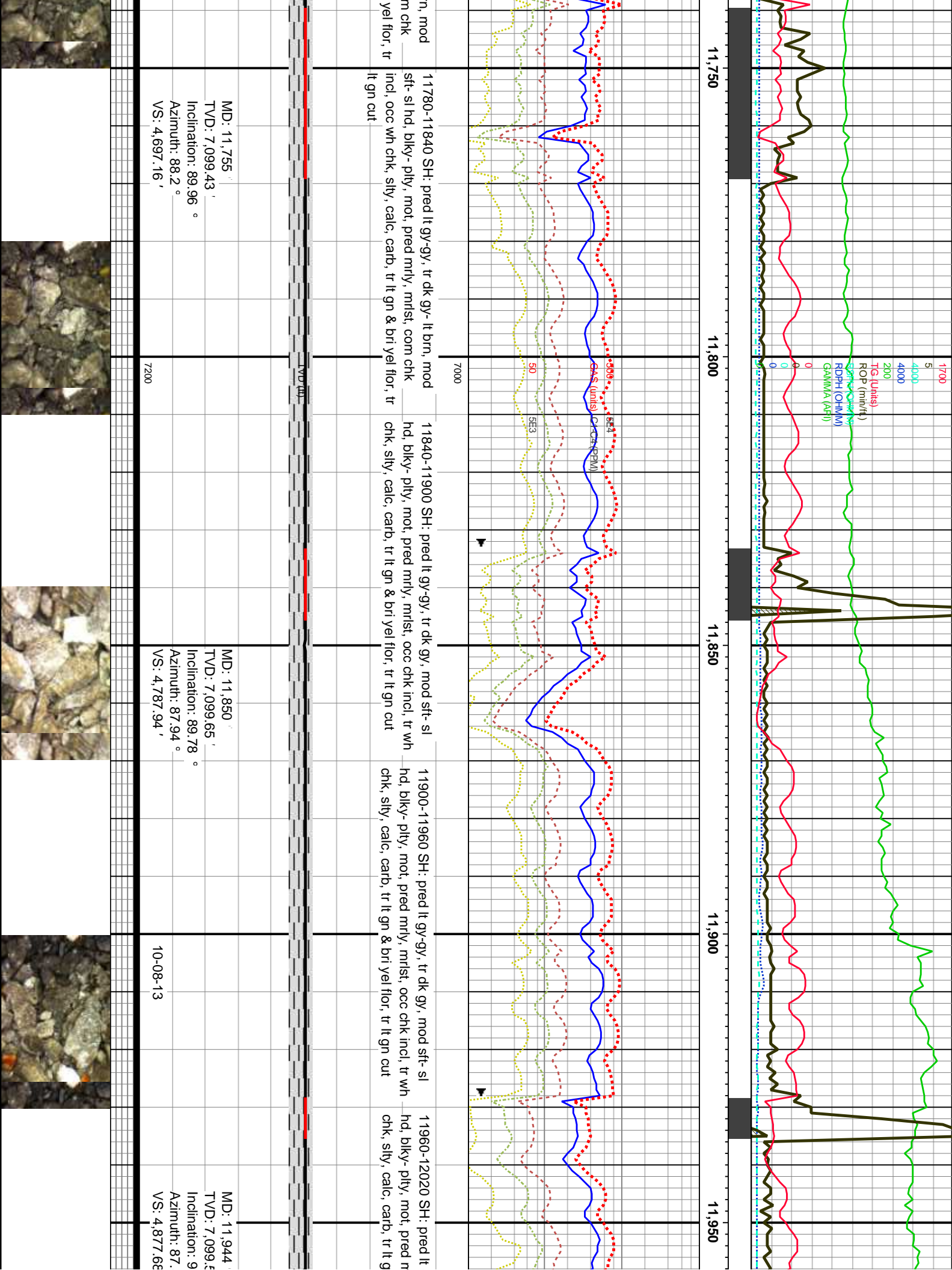


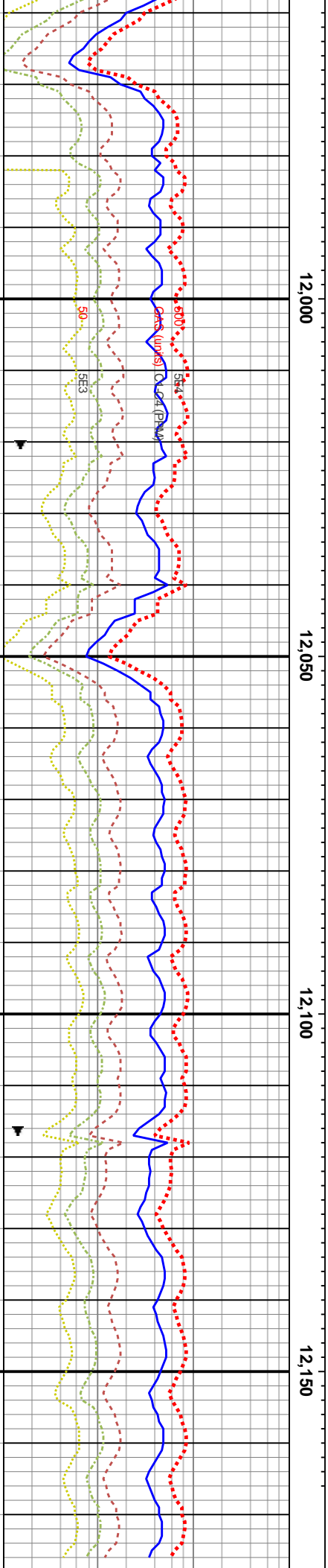
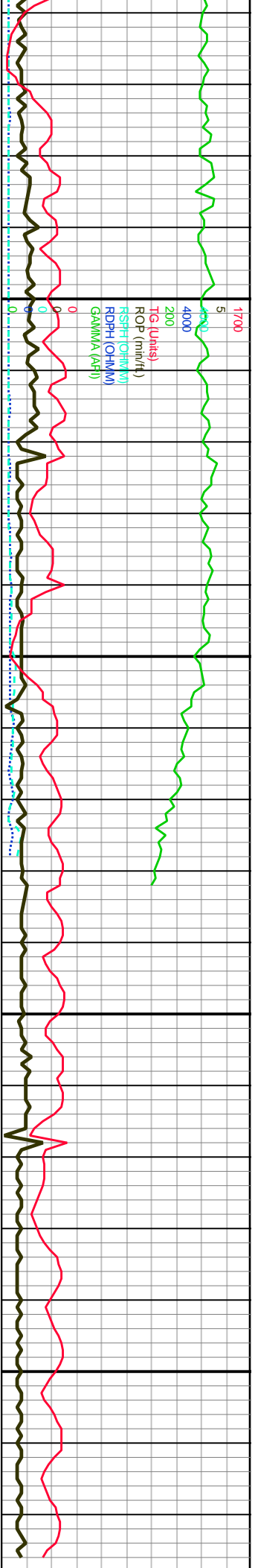


11600 SH: pred lt gy-gy, tr dk gy- lt brn, mod	11600-11660 SH: pred lt gy-gy, tr dk gy- lt brn, mod	11660-11720 SH: pred lt gy-gy, tr dk gy- lt brn, mod	11720-11780 SH: pred lt gy-gy, tr dk gy- lt brn, mod
sft- sl hd, blk- ply, mot, pred mrly, mst, abnt chk	sft- sl hd, blk- ply, mot, pred mrly, mst, abnt chk	sft- sl hd, blk- ply, mot, pred mrly, mst, abnt chk	sft- sl hd, blk- ply, mot, pred mrly, mst, abnt chk
incl, occ wh chk, slty, calc, carb, tr lt gn & bri yel flr, tr	incl, occ wh chk, slty, calc, carb, tr lt gn & bri yel flr, tr	incl, occ wh chk, slty, calc, carb, tr lt gn & bri yel flr, tr	incl, occ wh chk, slty, calc, carb, tr lt gn & bri
lt gn cut	lt gn cut	lt gn cut	lt gn cut

MD: 11,566
TVD: 7,100.73
Inclination: 90.66 °
Azimuth: 87.23 °
VS: 4,517.19 '

MD: 11,660
TVD: 7,099.8
Inclination: 90.48 °
Azimuth: 87.15 °
VS: 4,606.58 '



[illegible]