

HALLIBURTON

RESERVOIR  
MONITORING TOOL  
ELITE

Company EAST CHEYENNE GAS  
Well ECGS 6-13 WP-D007-2  
Field WEST PEETZ  
County LOGAN State CO

Company EAST CHEYENNE GAS STORAGE, LLC  
Well ECGS 6-13 WP-D007-2  
Field WEST PEETZ  
County LOGAN State CO

API No.: 05-075-09411-00  
Location: SURFACE HOLE LOCATION:  
263' FNL & 2275' FWL

Other Services  
GAUGE RING  
JUNK BASKET  
ACX  
CAST-M  
PRT #2  
PLUG SET

Sec: 6 Twp: 11N Rge: 52W

Permanent Datum  
Log Measured From K.B. , 14 Ft. above perm. datum  
Drilling Measured From K.B.

Date @ Time Logged 19-MAR 2016 @ 12:20  
Run No. ONE  
Depth - Driller 5,265 ft  
Depth - Logger 5,202 ft  
Bottom - Logged Interval 5,196 ft  
Top - Log Interval 200 ft  
Max. Recorded Temp. 158 degF  
CEMENTING DATA  
Date / Time Cemented  
Primary / Squeeze  
Expected  
Compressive Strength  
Cement Volume  
Cement Type / Weight  
Formulation  
Mud Type / Mud Wgt.

Surface  
String

Protection  
String

Production  
String

Liner

Type Fluid in Hole  
Density of Fluid  
Fluid Level  
Cement Top Est. Logged  
Equipment / Location  
Recorded by  
Witnessed by

WBM  
8.5 ppg  
FULL  
LOGGED  
11875120 / FT. LUPTON  
DIMPFL/SCHMIDT/HEID  
G. FRANCIS/G. OHLMAN

Elevation  
K.B. 4,564 ft  
D.F. 4,564 ft  
G.L. 4,550 ft

Borehole Record  
Run Number Bit From To Size Weight From To

Casing & Tubing Record  
Weight From To

<<< Fold Here >>>

HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, FOR ANY LOSS, DAMAGES, OR EXPENSES RESULTING FROM THE USE THEREOF.

Comments  
1. LOG CORRELATED TO J-W WIRELINE CEMENT BOND LOG DATED OCTOBER 9, 2012  
2. RMT-I LOGGED IN CAPTURE MODE  
3. LOGGING INTERVALS PER CUSTOMER REQUEST  
4. RMT-I GENERATOR VOLTAGE: 85V  
5. SPLICE AT 4830'  
  
HALLIBURTON CREW: J. WILKERSON, C. BUCANEK  
\*\*\*THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES, FT. LUPTON, CO\*\*\*

Service Ticket No. 903182642 API No. 05-075-09411-0000 PGM Ver WARRIOR 8

The Well Name, Location, Borehole Description, and / or Cementing Data Furnished by Client

EQUIPMENT DATA

TELEMETRY

RESERVOIR MONITORING TOOL

Run No. ONE

Run No. ONE

Run No.

Run No.

Serial No. 10010734

Serial No. 11917921

Serial No.

Serial No.

Model No. TTTC-U-002

Model No. RMTI-A

Model No.

Model No.

Diameter 1.688"

Diameter 2.125"

Diameter

Diameter

LOGGING DATA

General Data

Pass

Depths

Well Head

Speed

Logging Run Comments

No

From

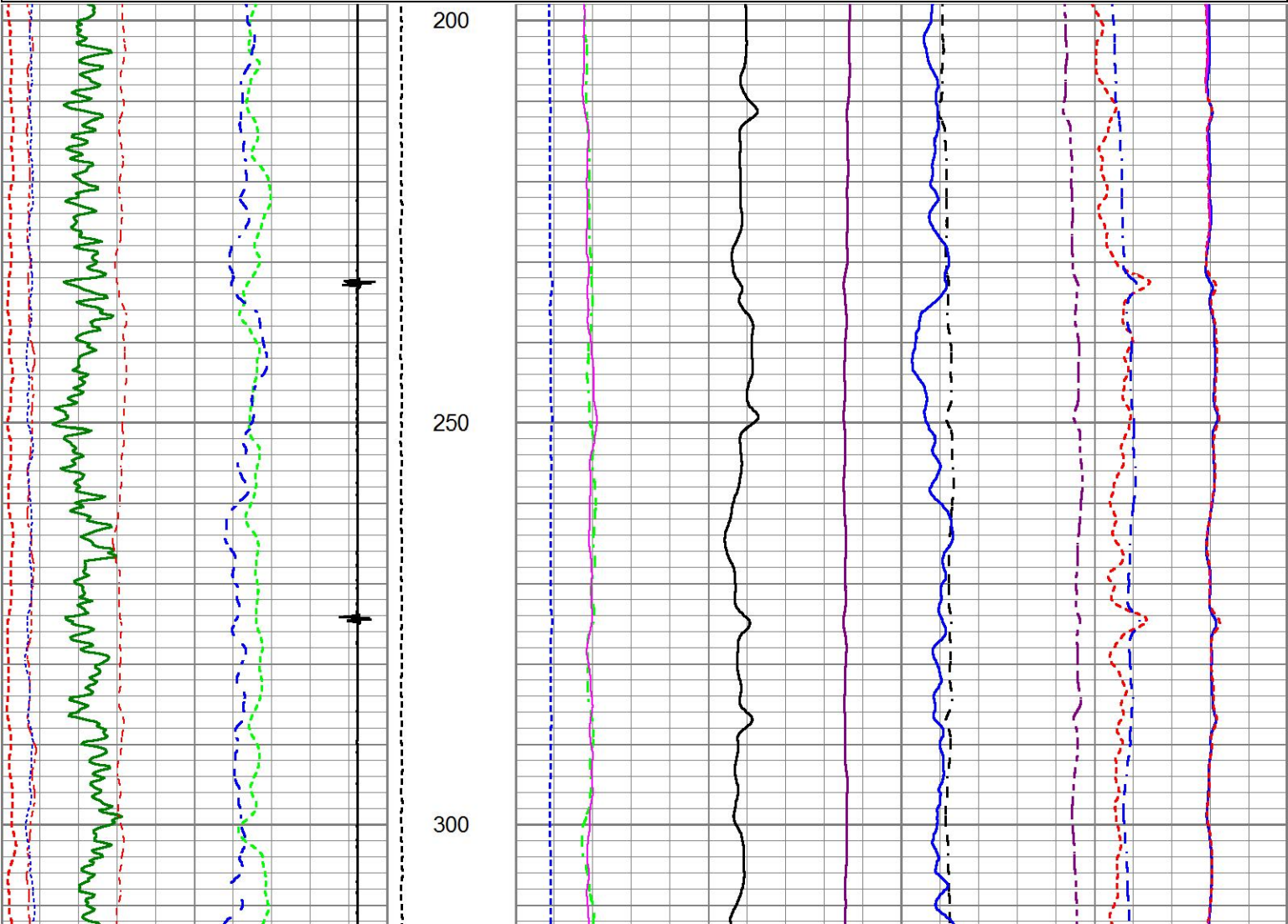
To

Pressure

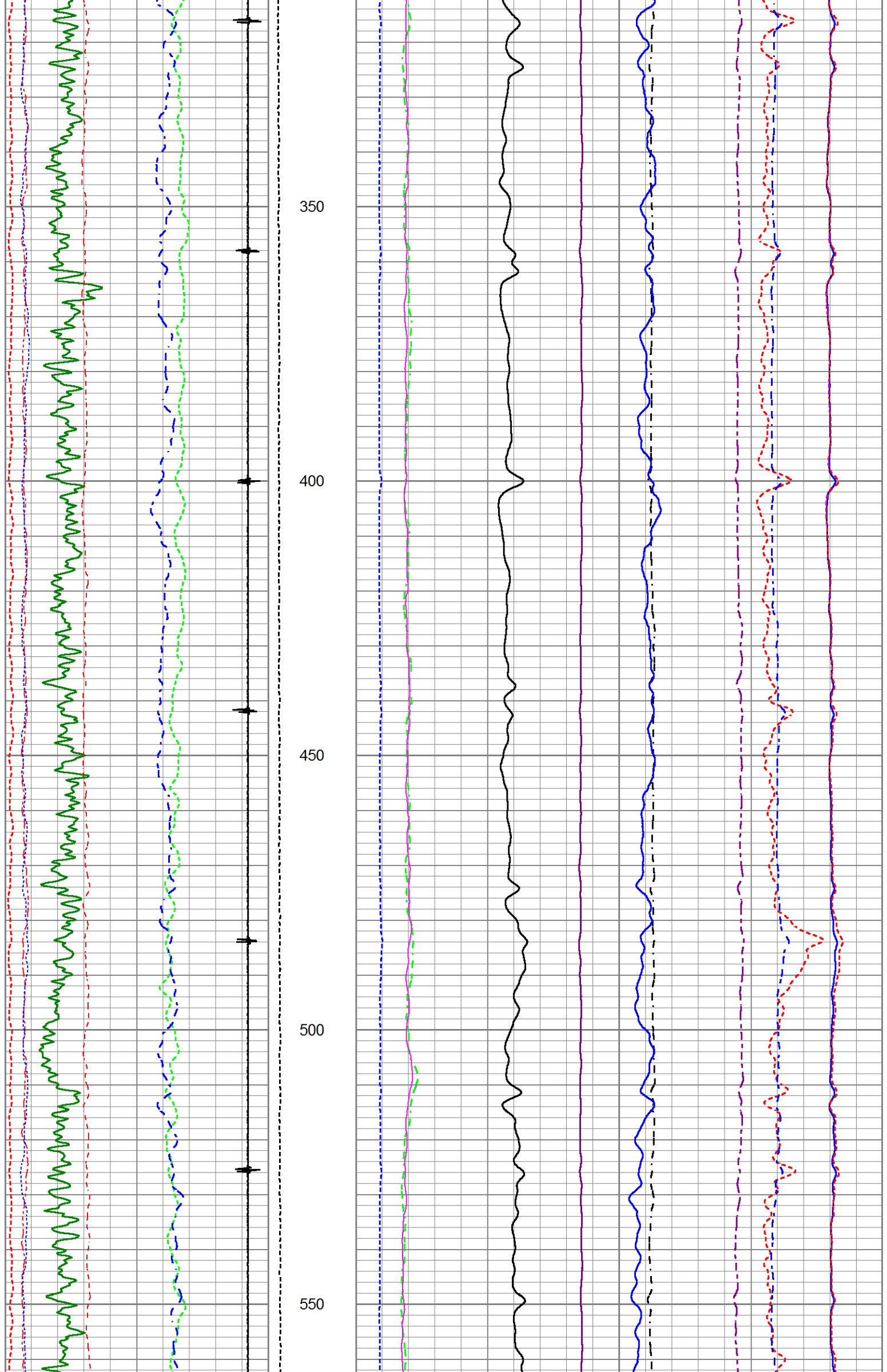
Ft/Min

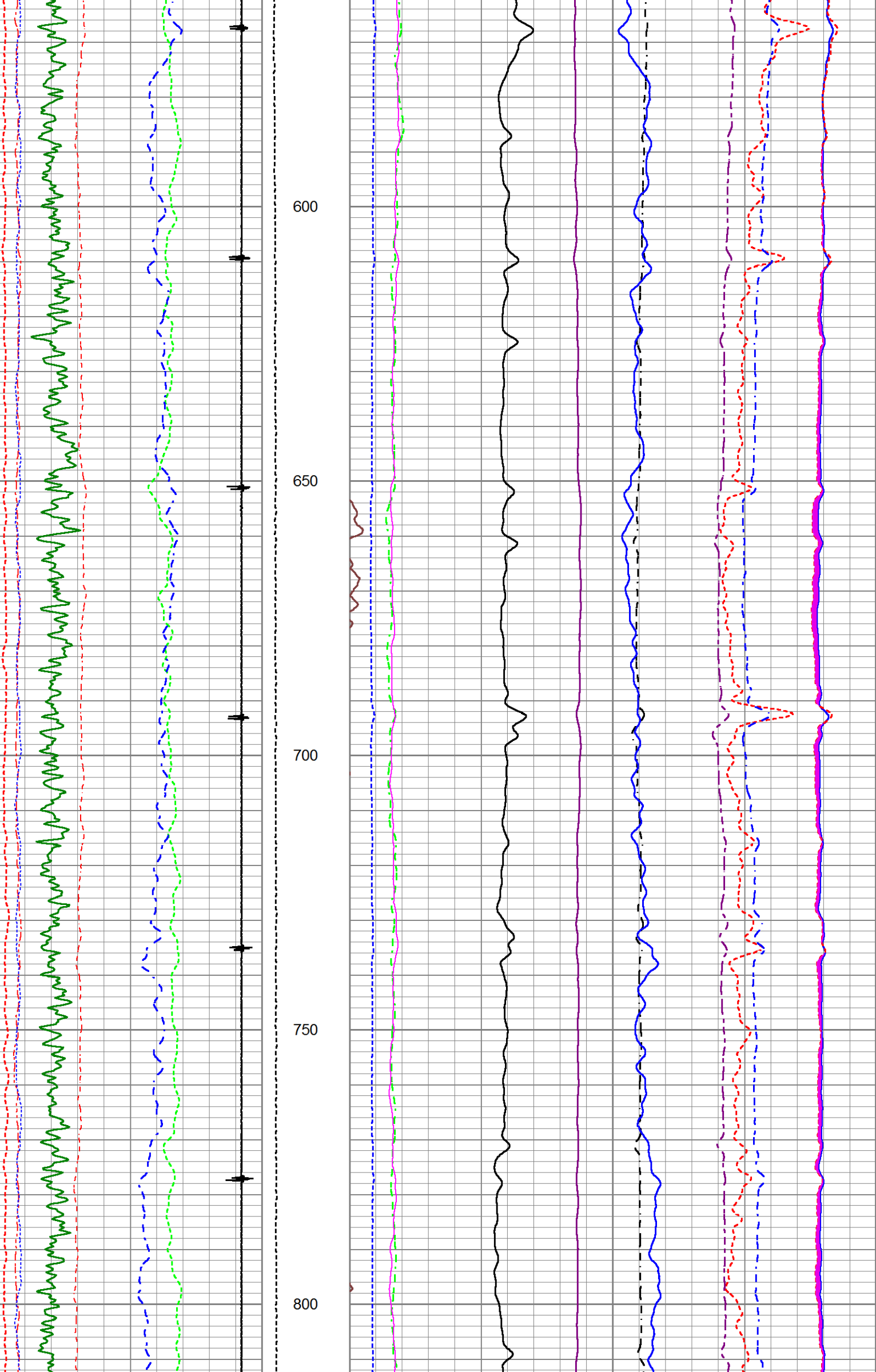
ONE	5202'	200'	1200 PSI	15 FPM	MAIN LOG SECTION			
	GAMMA RAY		NEAR BORE SI (SCBN)		RATIO (RNF)		SGIN	
Pass	Scale		Scale		Scale		Scale	
No.	L	R	L	R	L	R	L	L
	0 API	150 API	200	0	2	0.5	60	0
DIRECTIONAL INFORMATION								
Maximum Deviation			deg. @		KOP			

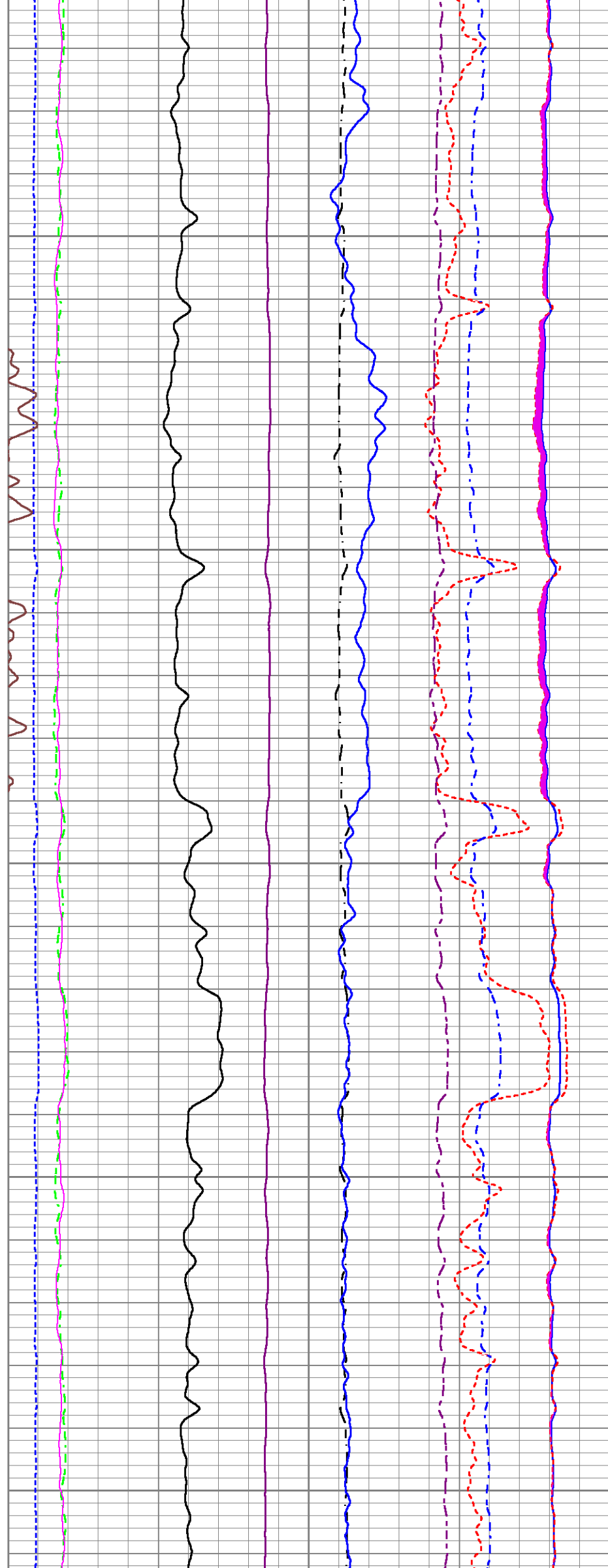
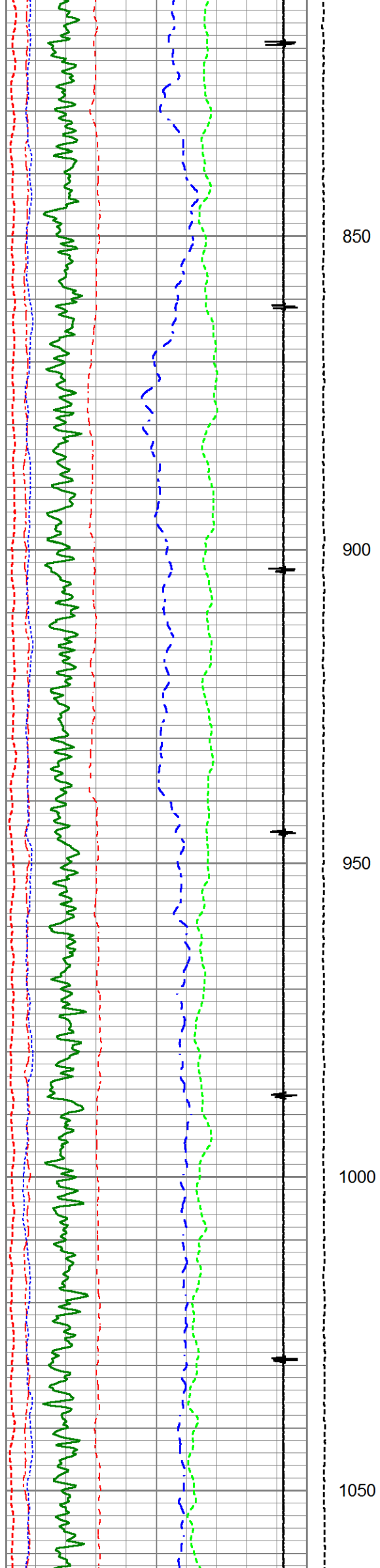
MAIN LOG PASS									
HALLIBURTON									
SCALE: 5" = 100'									
Database File		ecgs_6_13_wp_d007_2_rmt.db							
Dataset Pathname		MAIN_FINAL							
Presentation Format		rmte_main							
Dataset Creation		Mon Mar 21 15:08:35 2016							
Charted by		Depth in Feet scaled 1:240							
200	Near Bore Si (SGBN)	0	TENSION	0	RATIO (RNF)				1.22
0	OAI	100	0 (lb 1750)	60	SGIN				0
10	FAR FIT ERR (SGFF)	40		0	RIN	9	60000	Near Counts (NCAP)	0
0	GR (GAPI)	150		0	RICF	6	60000	Far Counts (FCAP)	0
0	NEAR FIT ERR (SGFN)	100		0	H YIELD (YH2)	1	100000	FAR INTEL CT (FSIN)	0
-2000	CCL	20000		0	H YIELD (YH1)	1	10000	(NEAR INTEL CT (NSIN)	0
0	IN FIT ERR (CFTR1) NEAR	1		0.3	PHIT ( )	-0.1	ET INL NEAR (NNII		
0	IN FIT ERR CFTR2) FAR	1			INOX2		50000	-1000	
					-1500	1500			

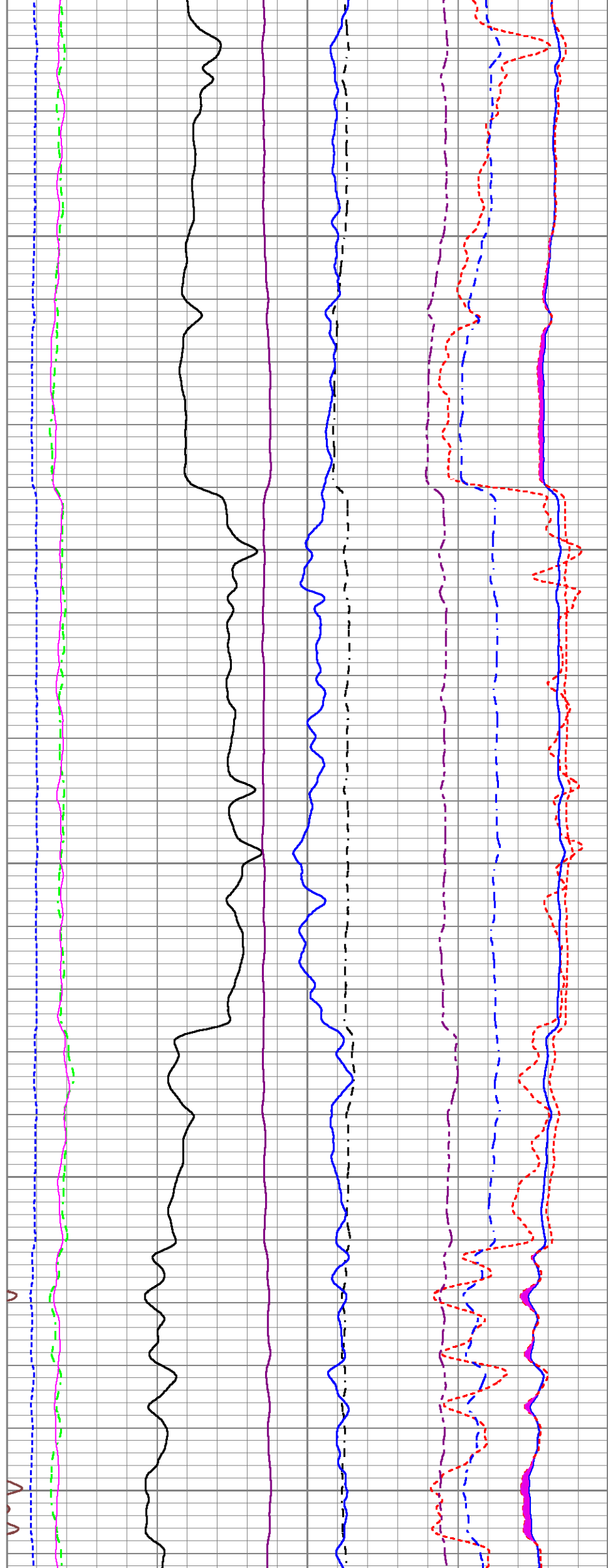
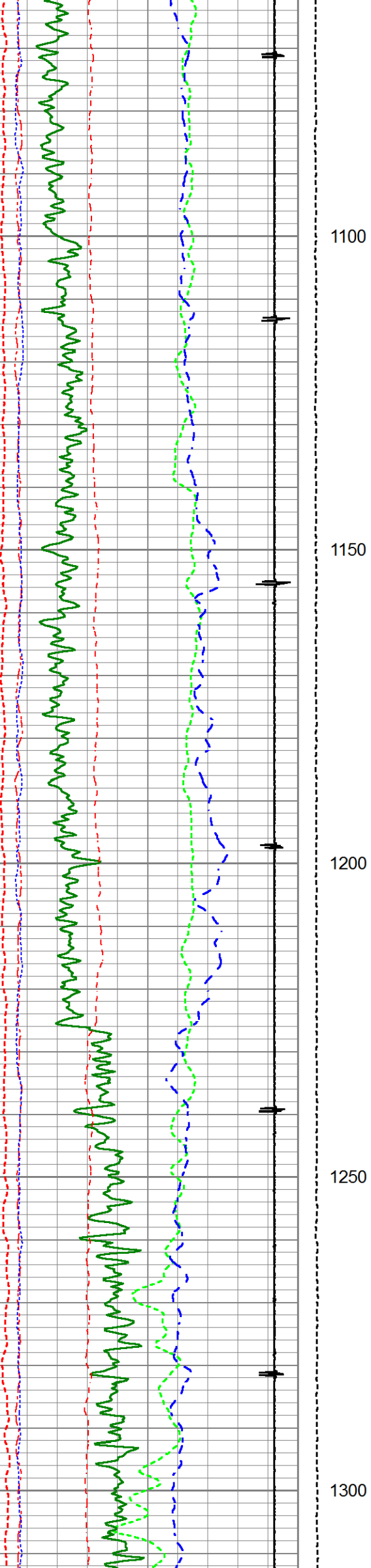


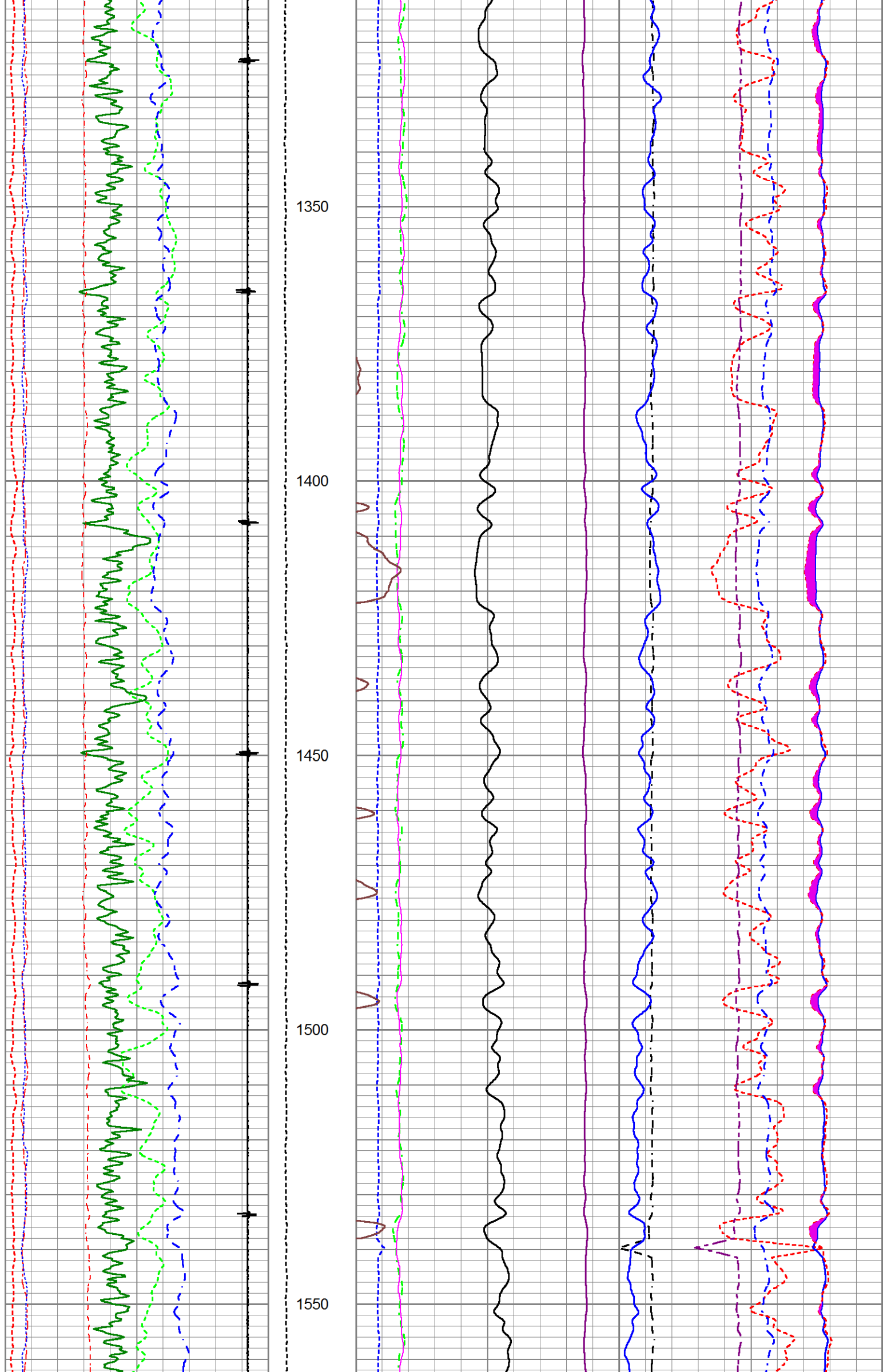


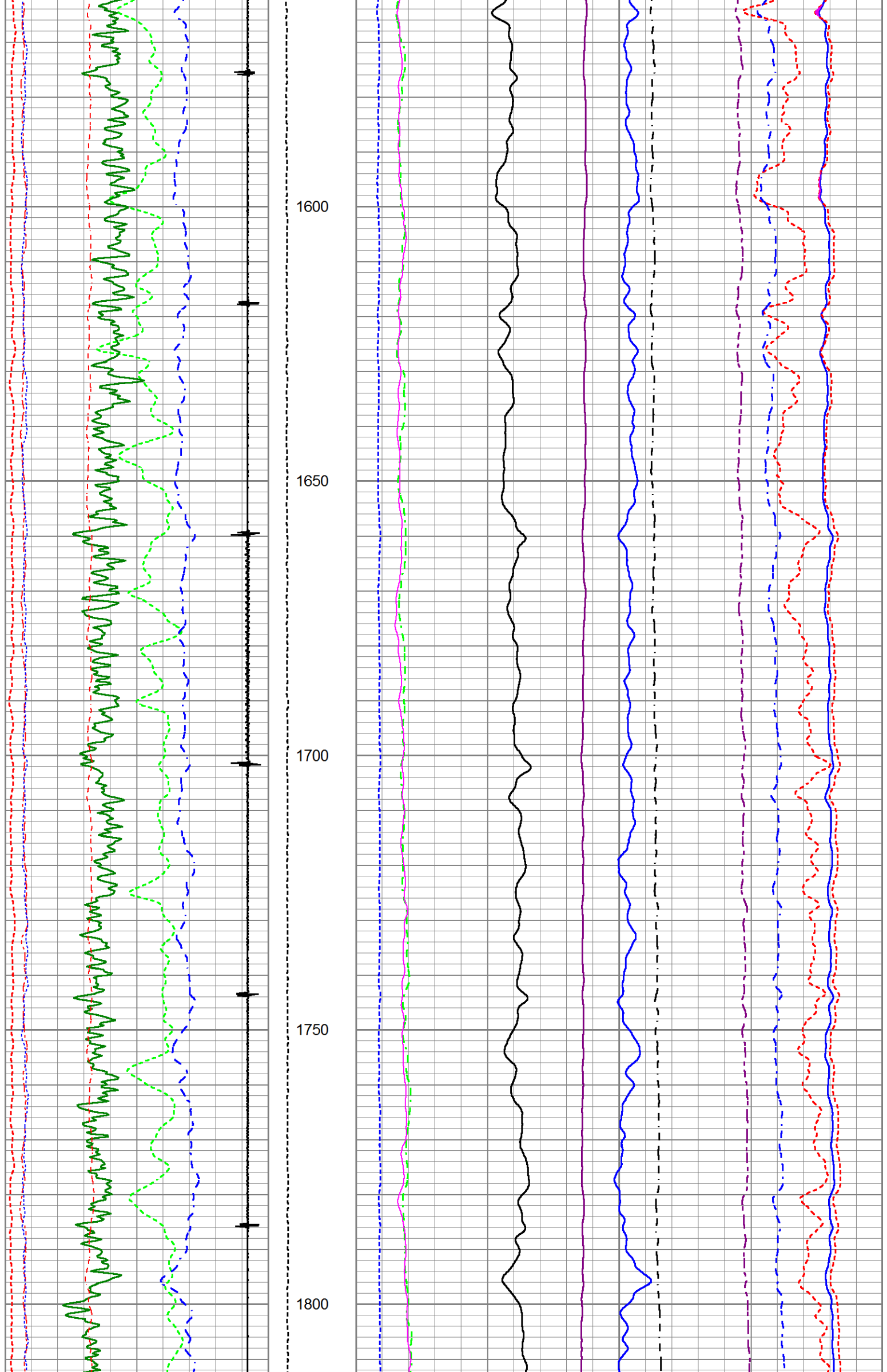




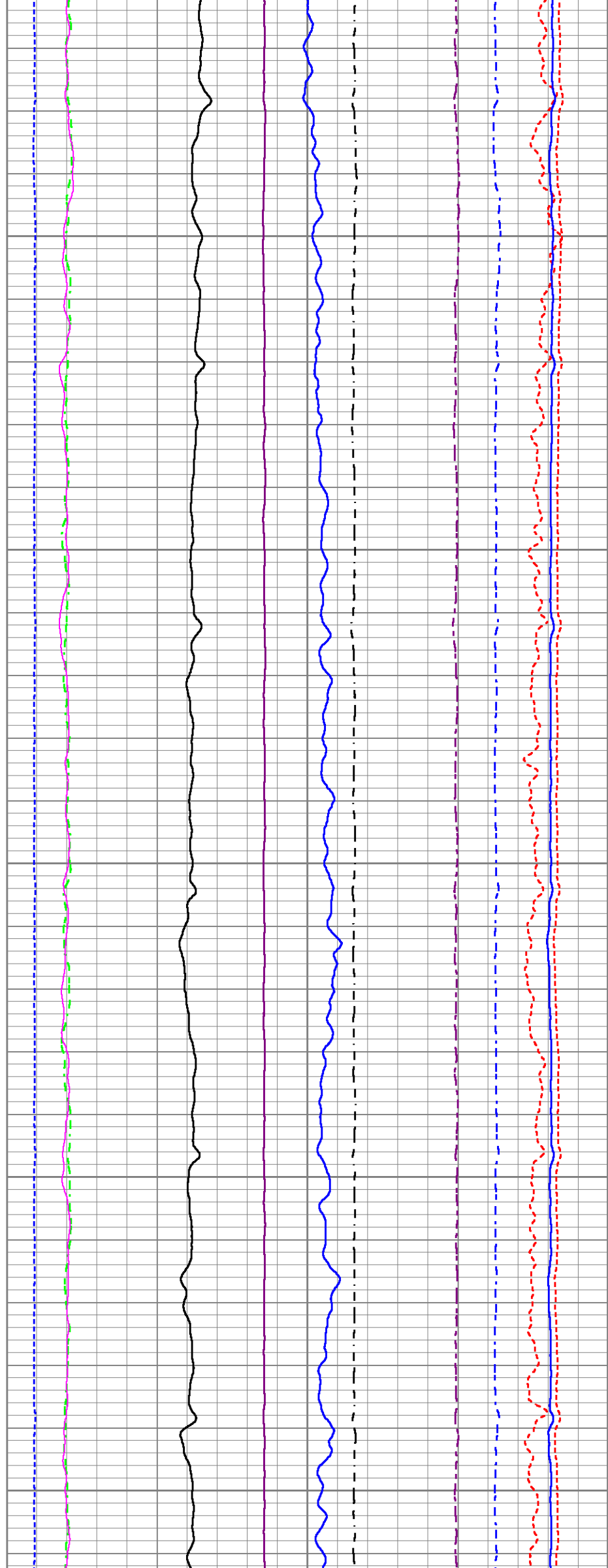
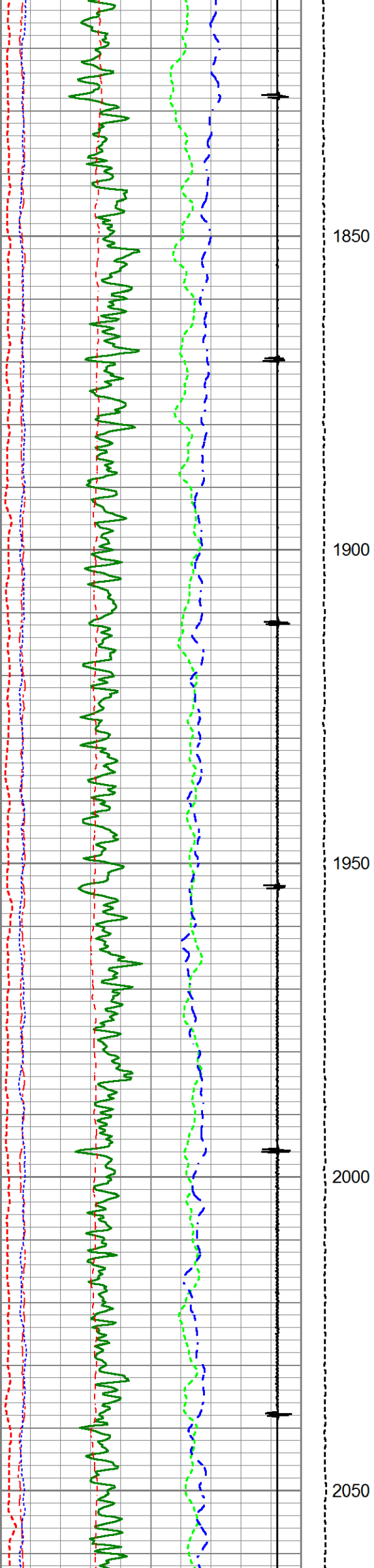


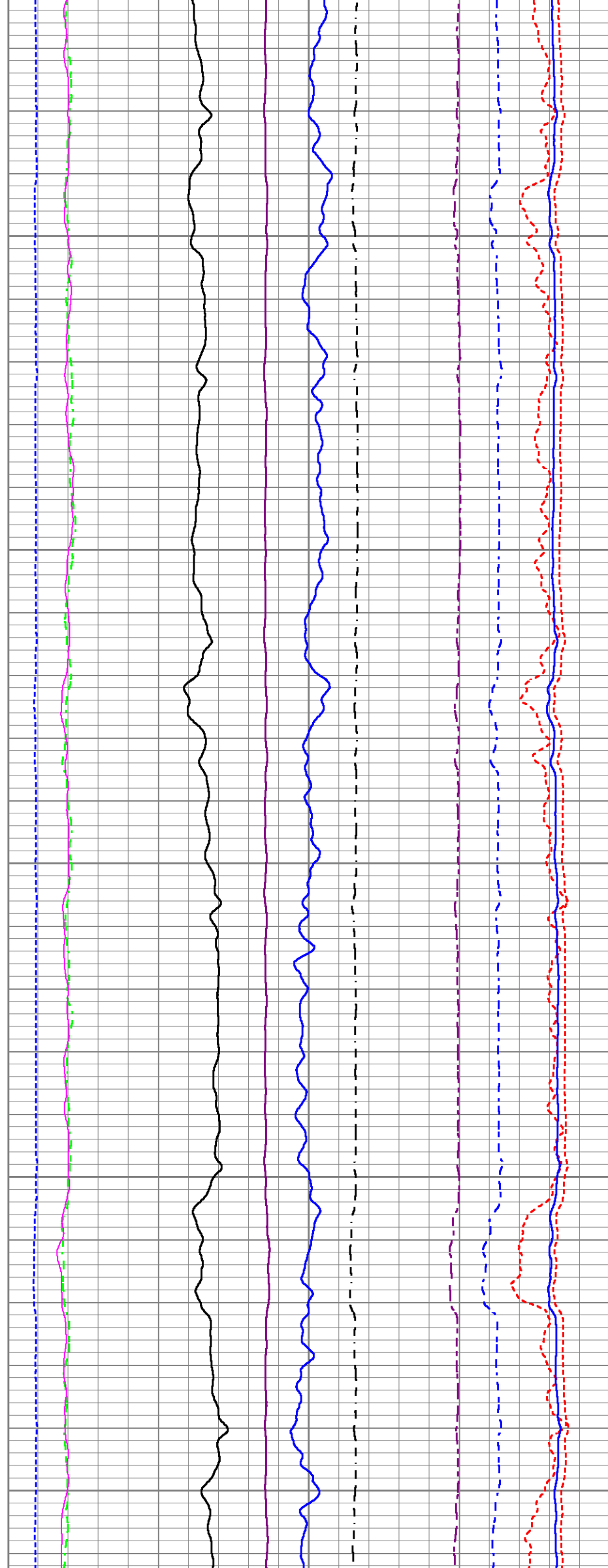
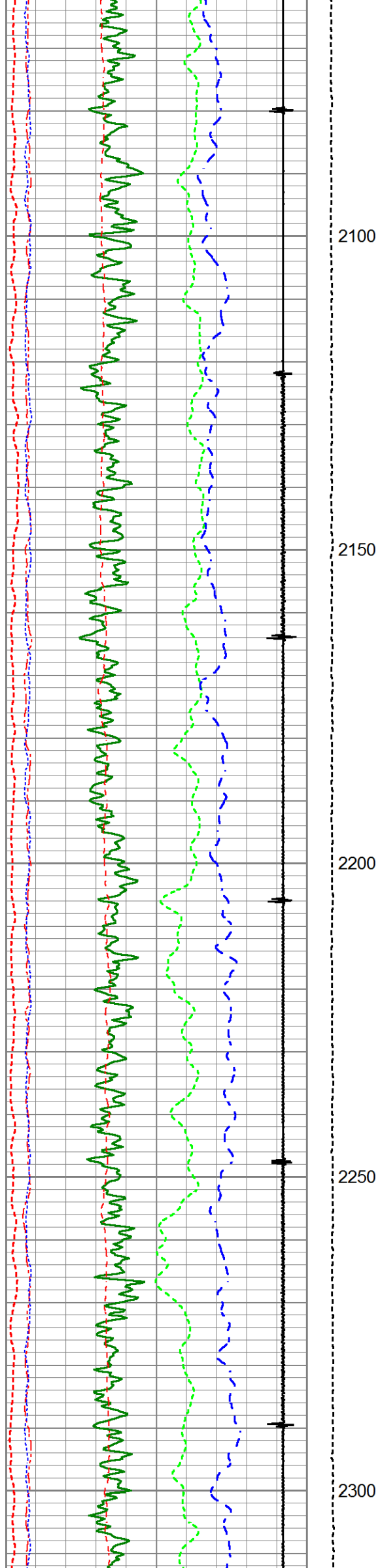


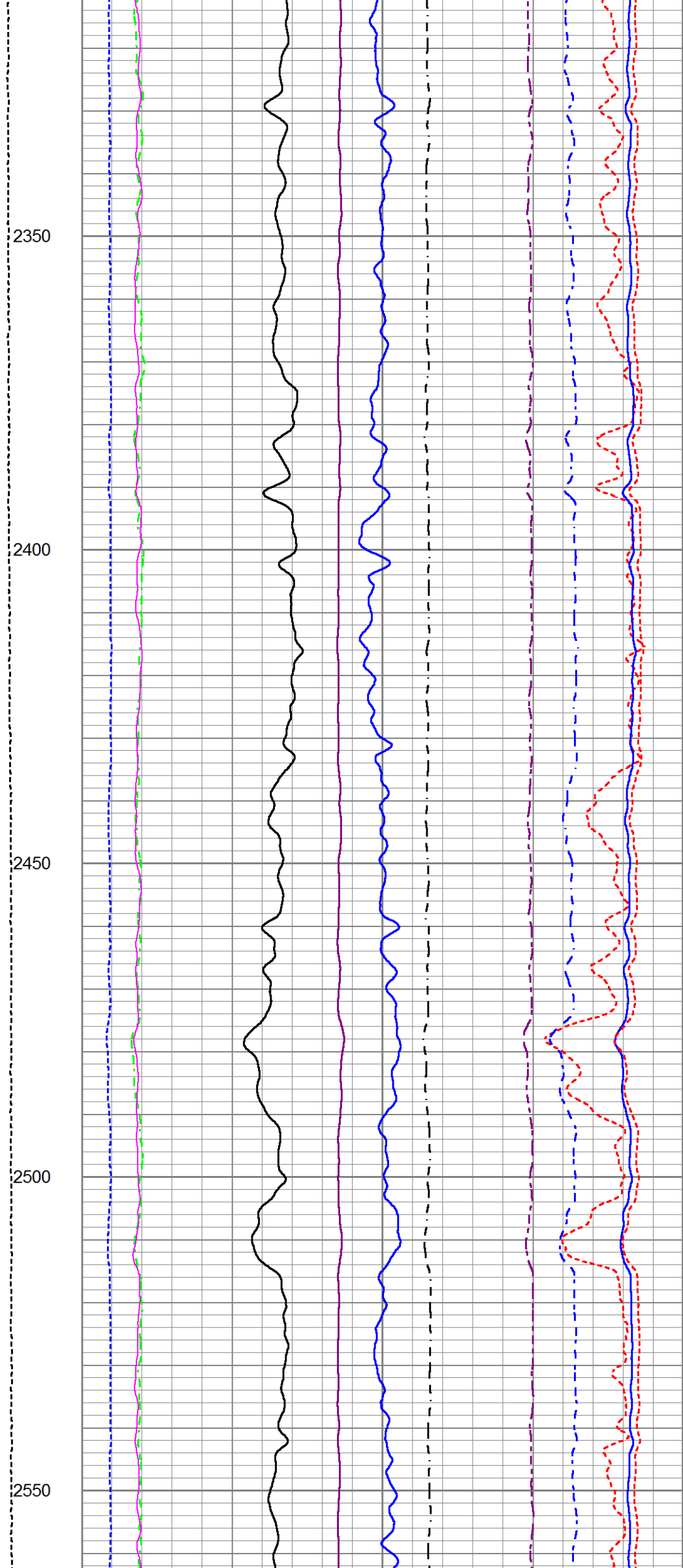
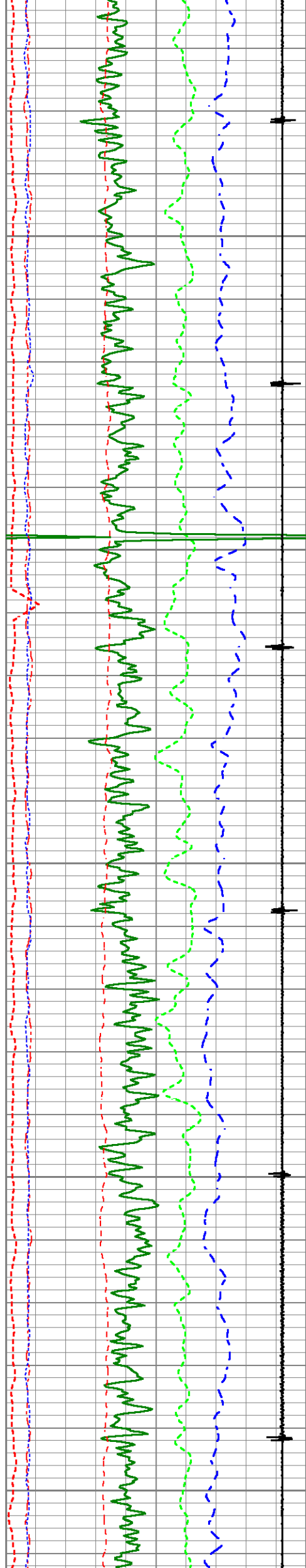


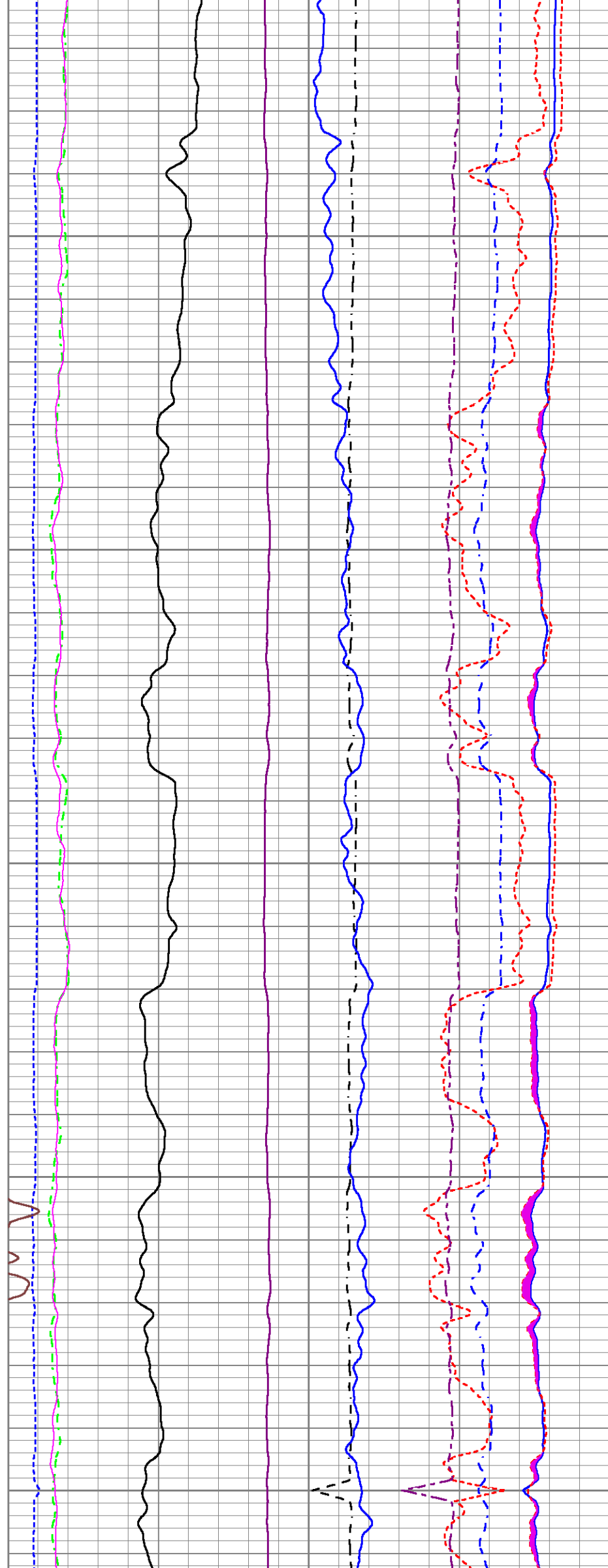
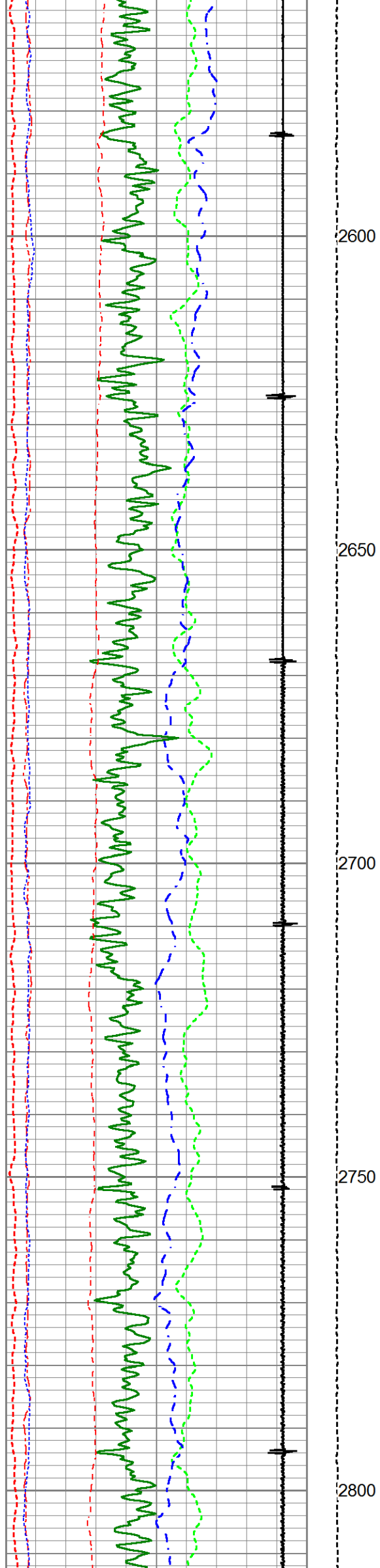




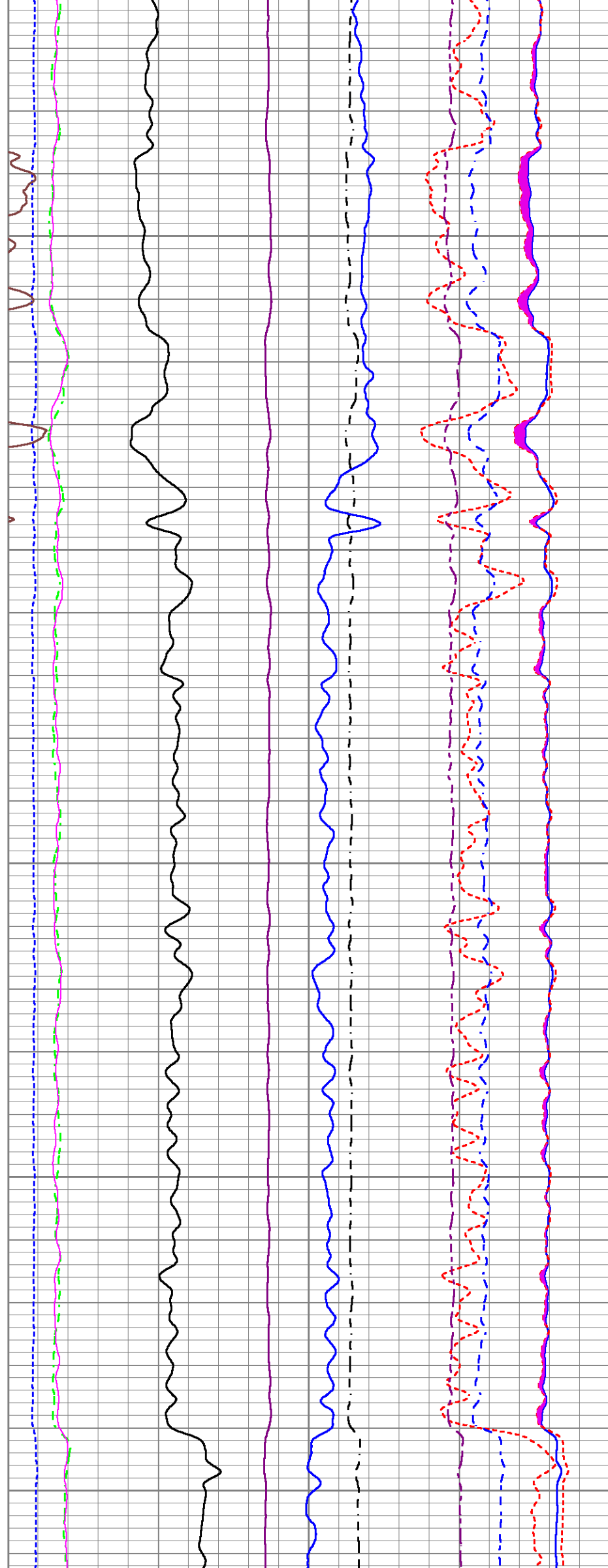
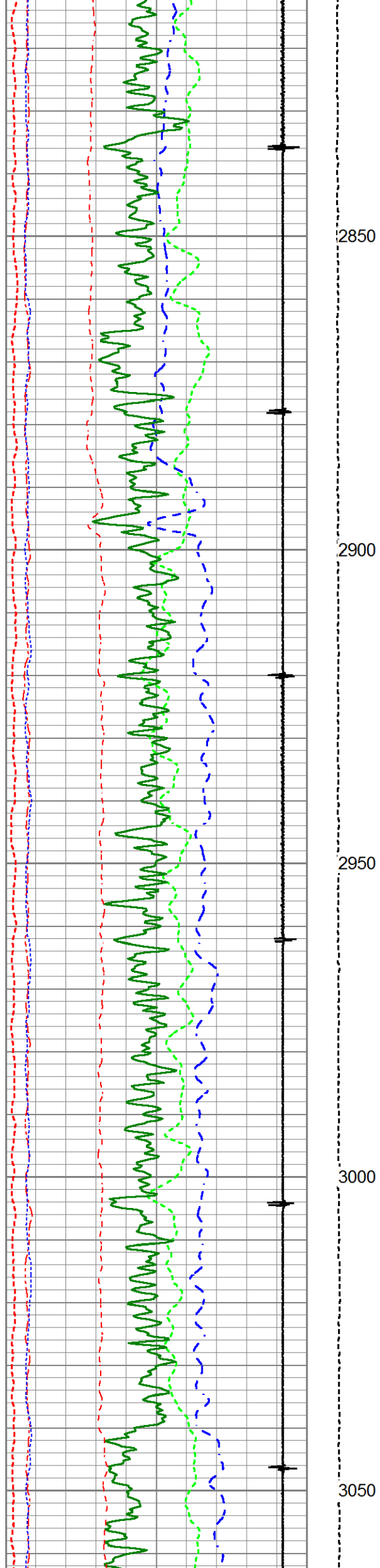


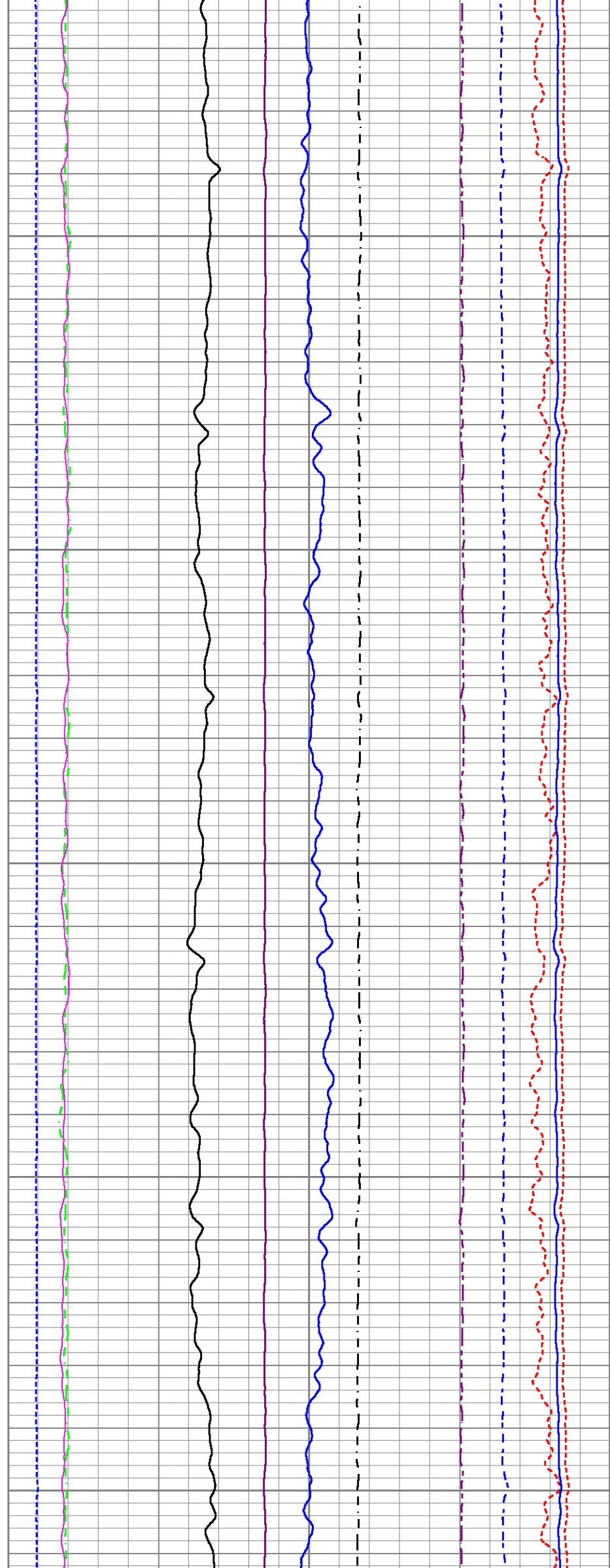
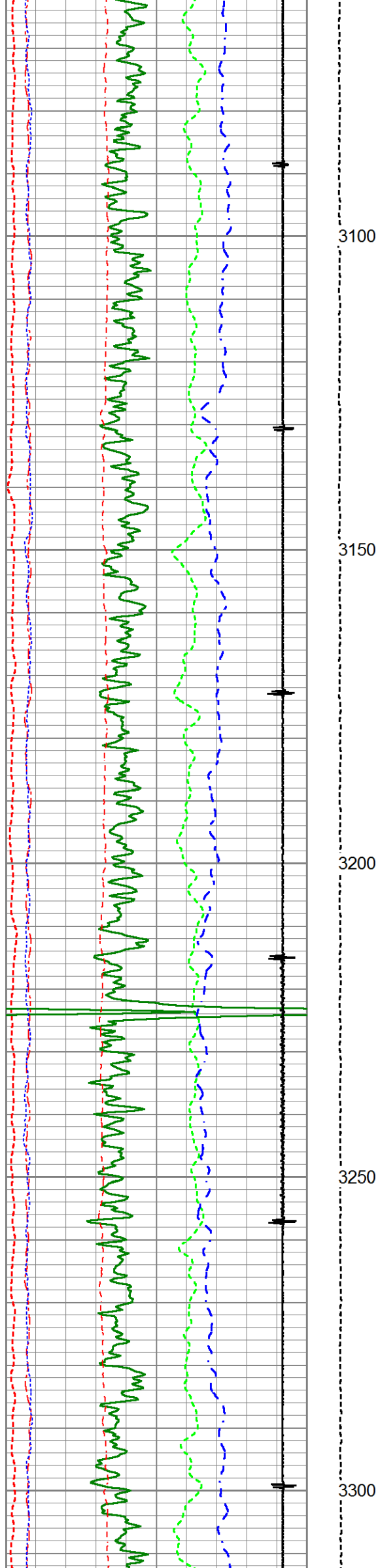


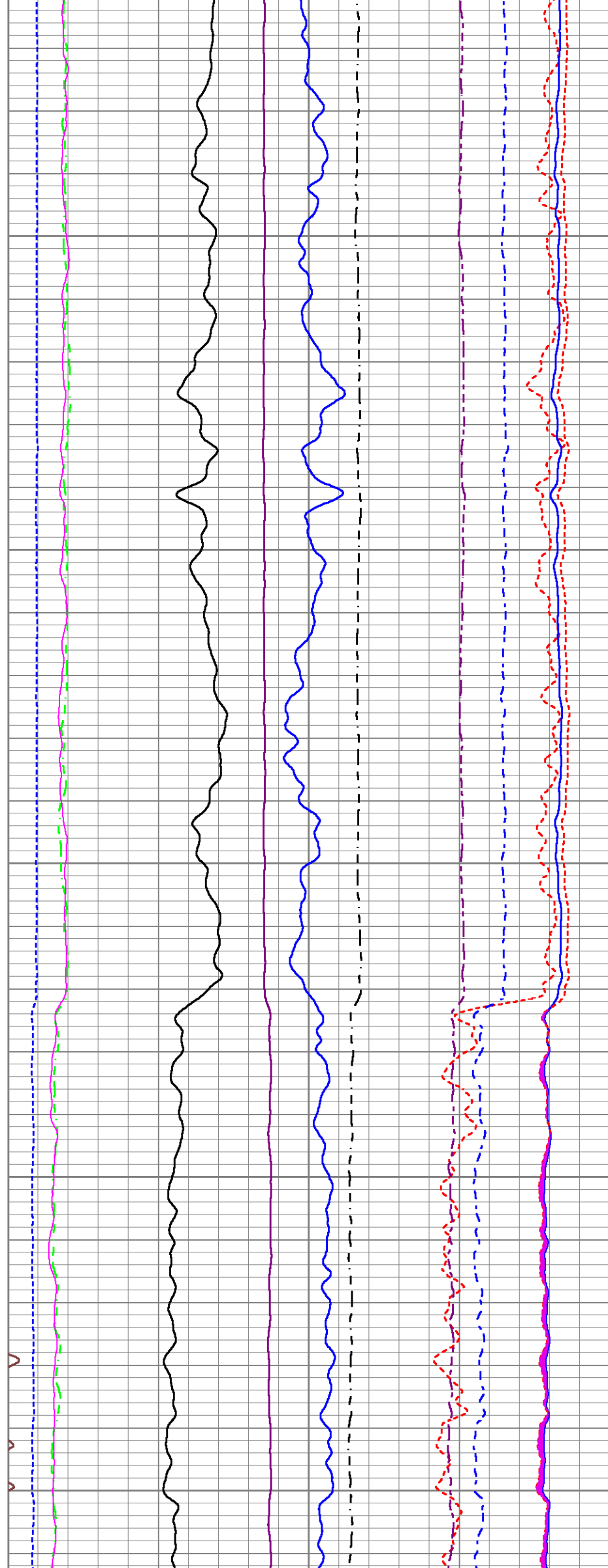
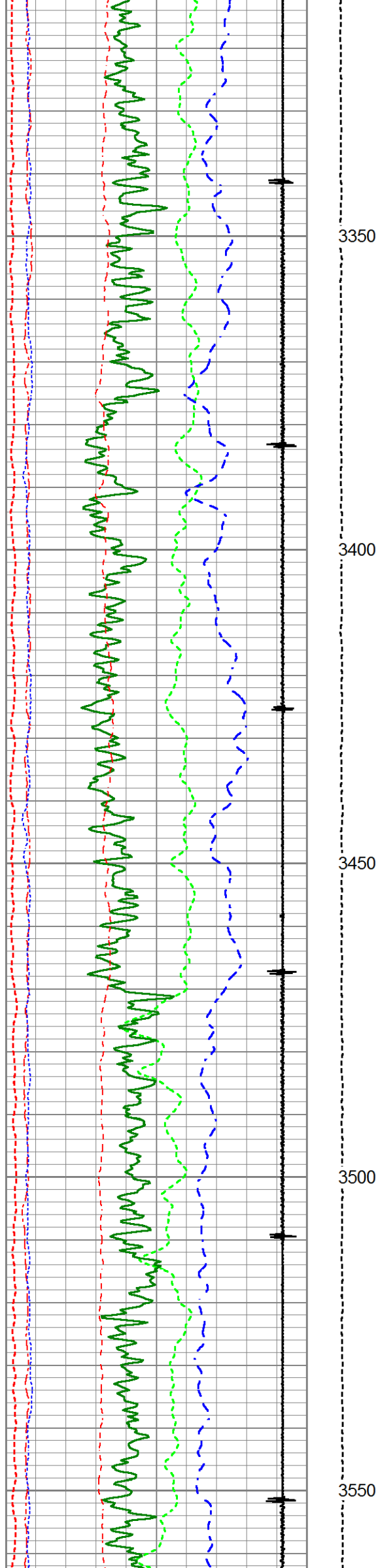


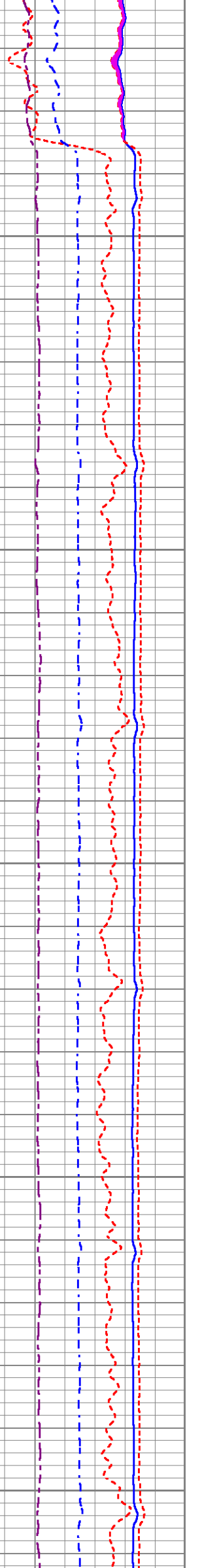
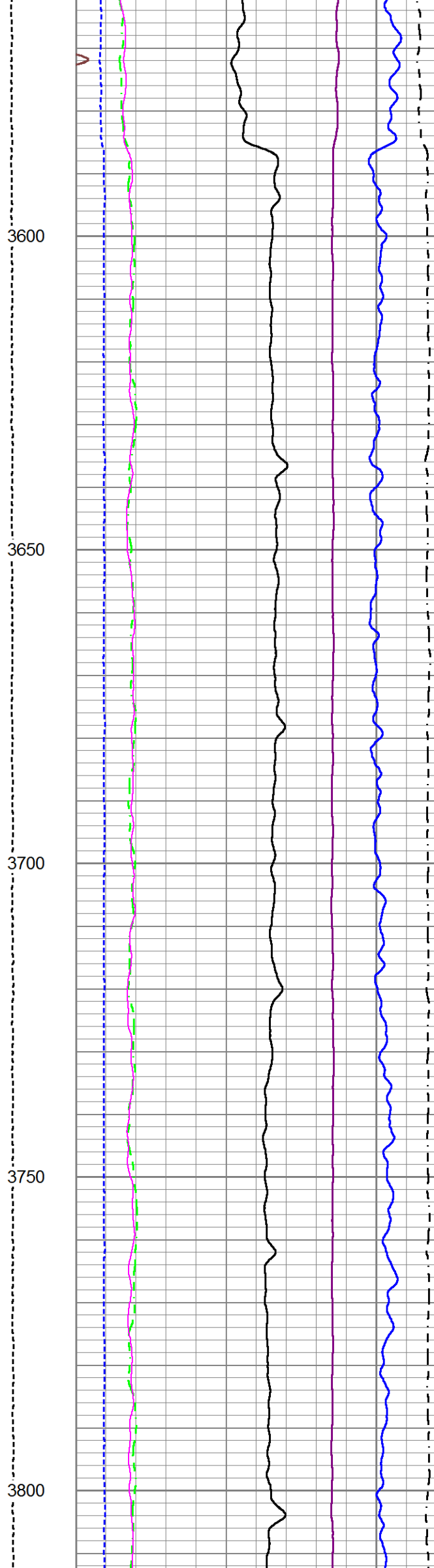
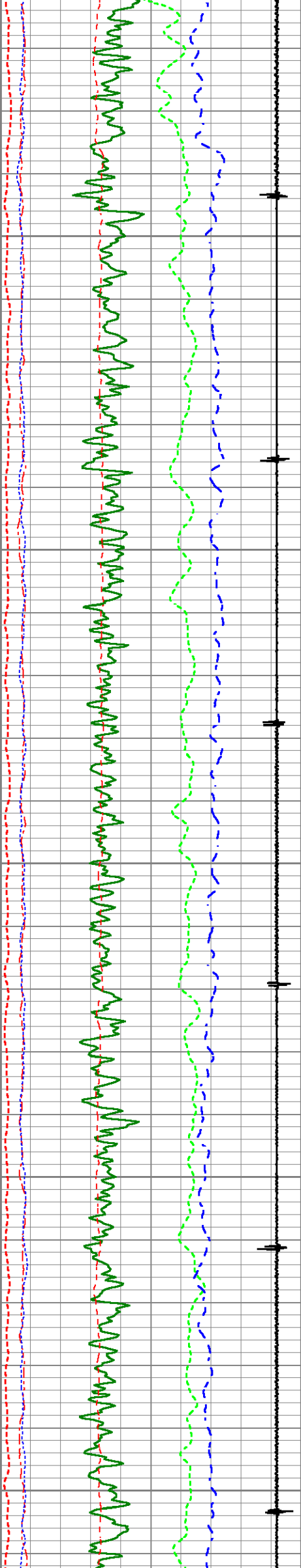




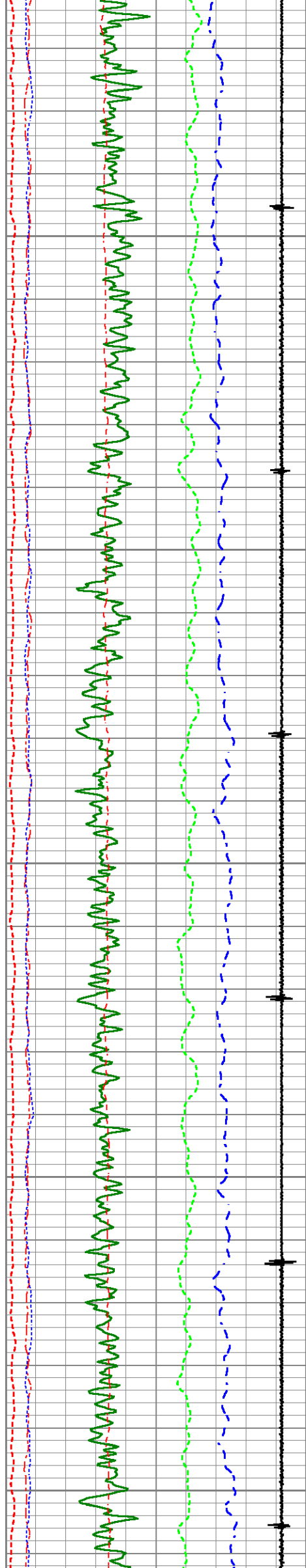












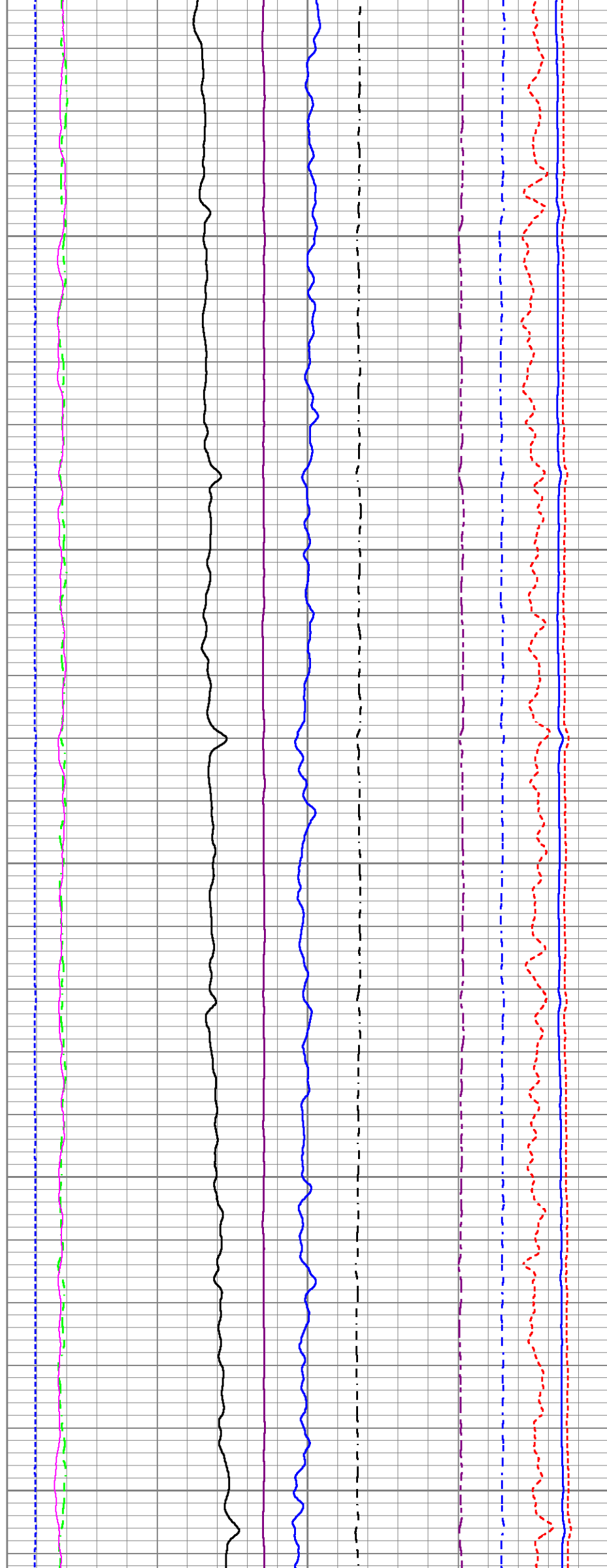
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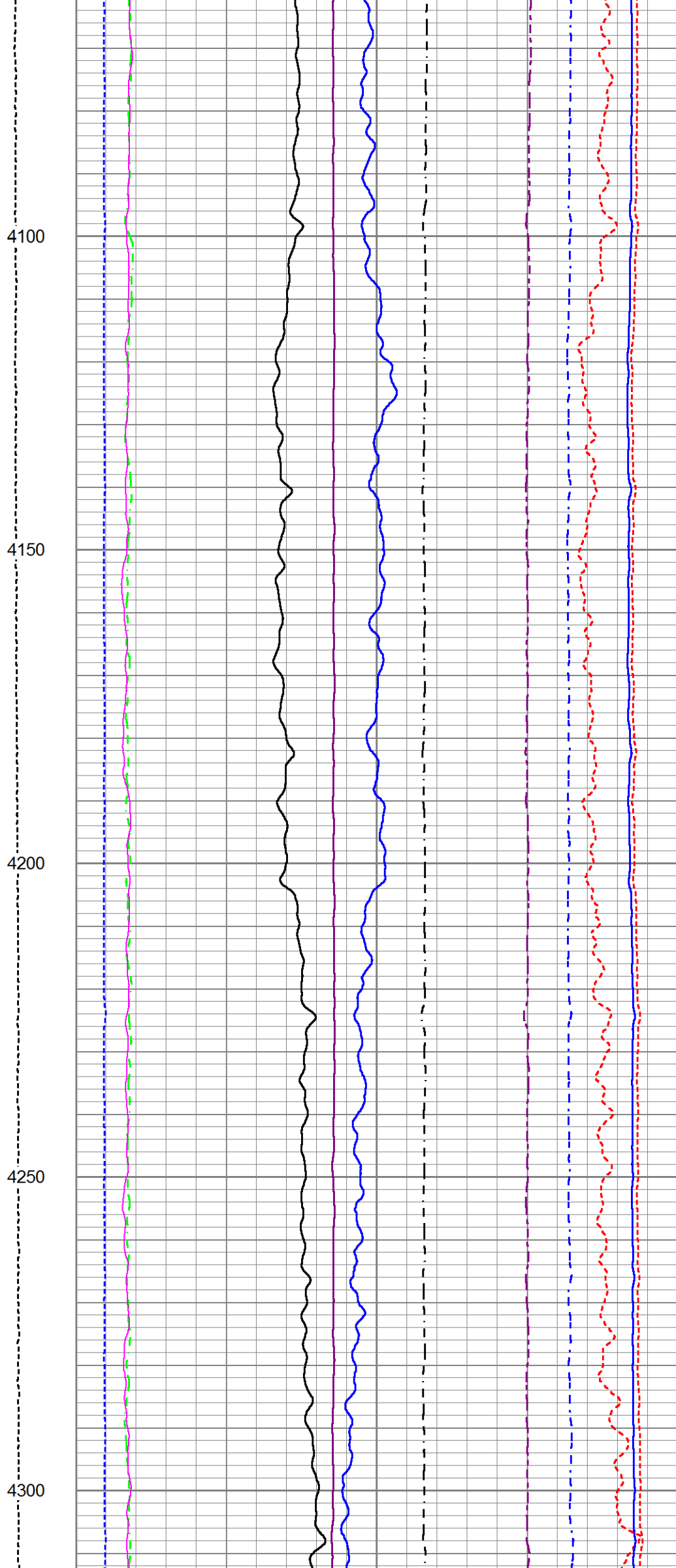
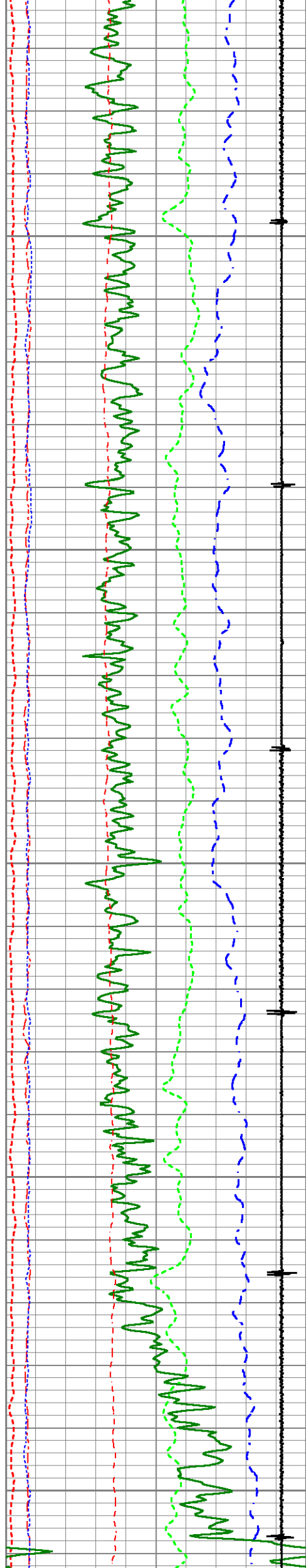
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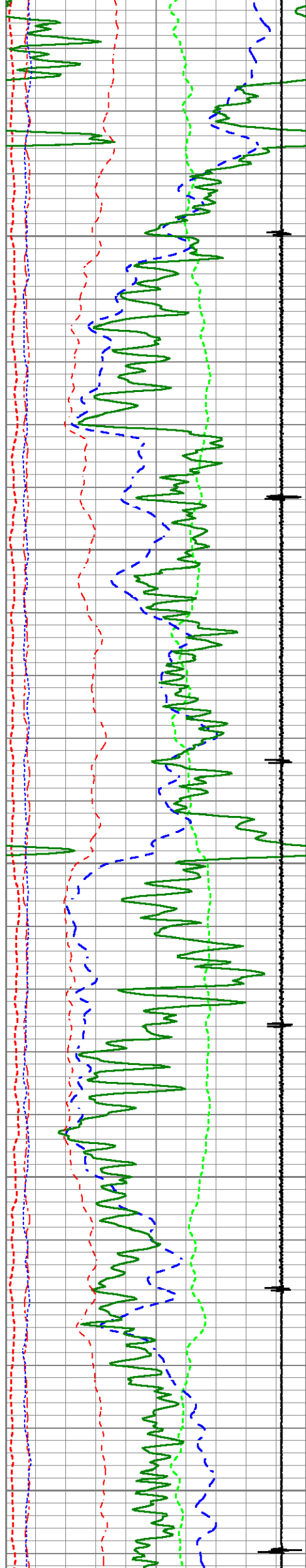
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4000

4050







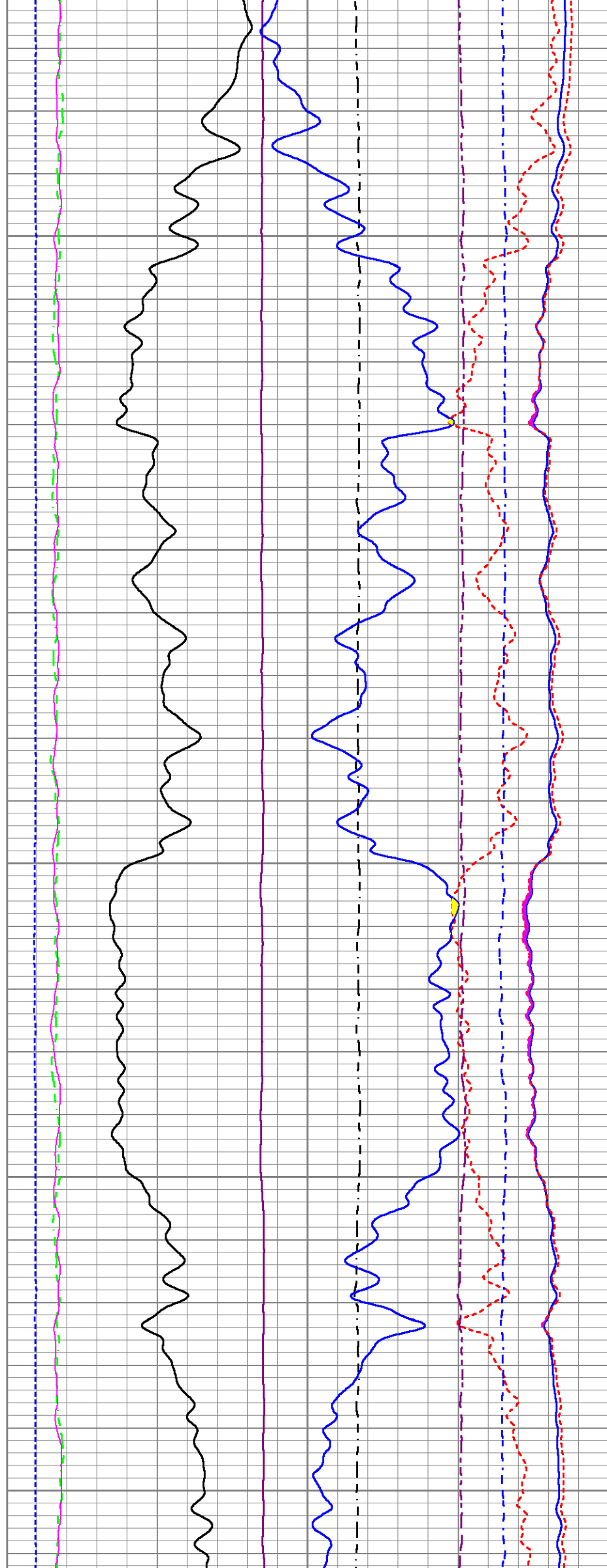
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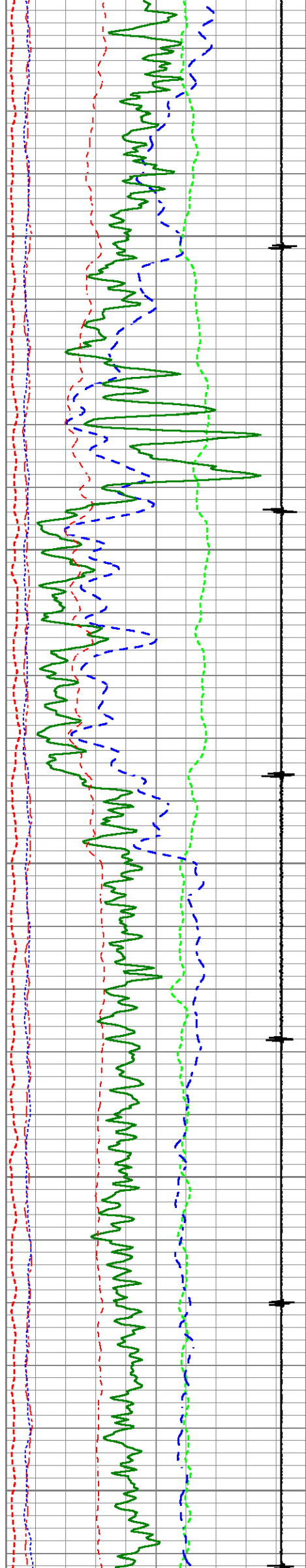
4400

4450

4500

4550





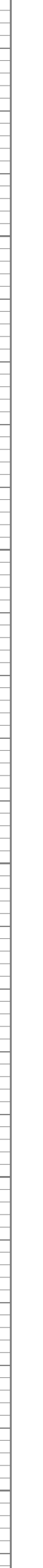
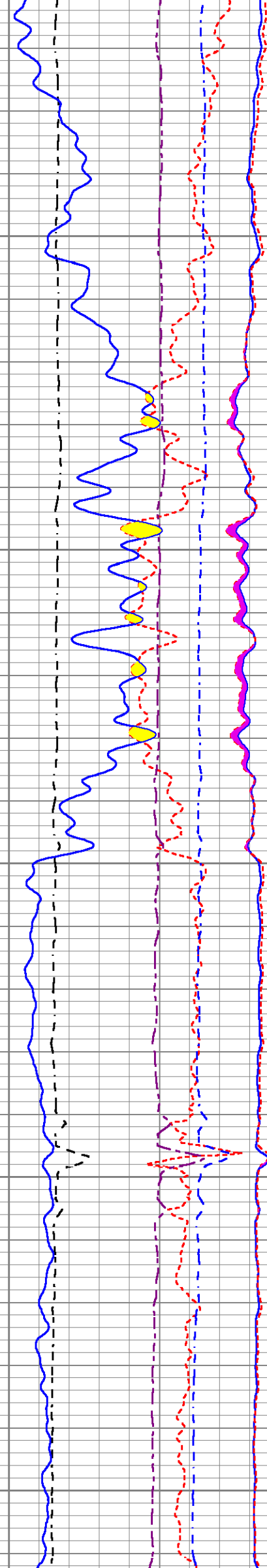
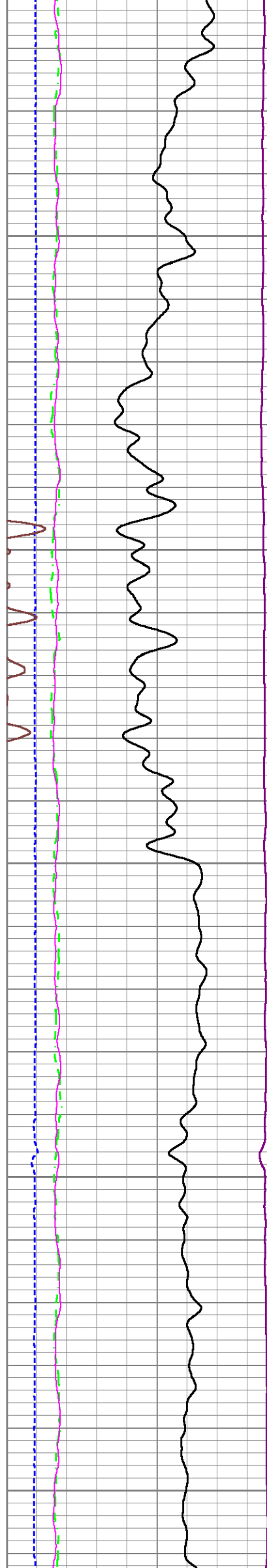
4600

4650

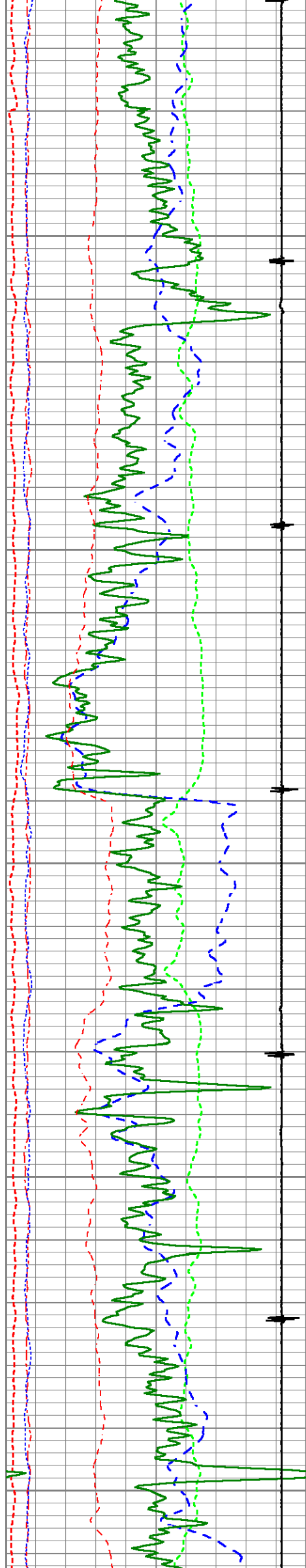
4700

4750

4800







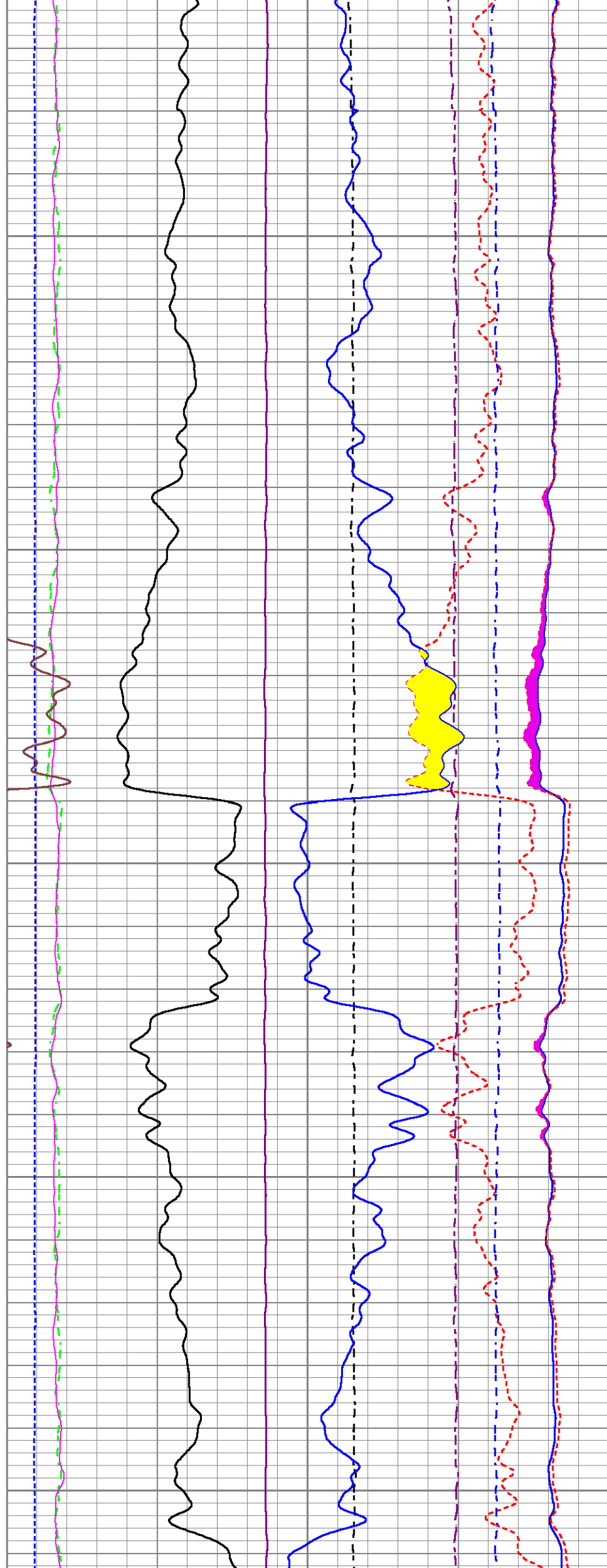
4850

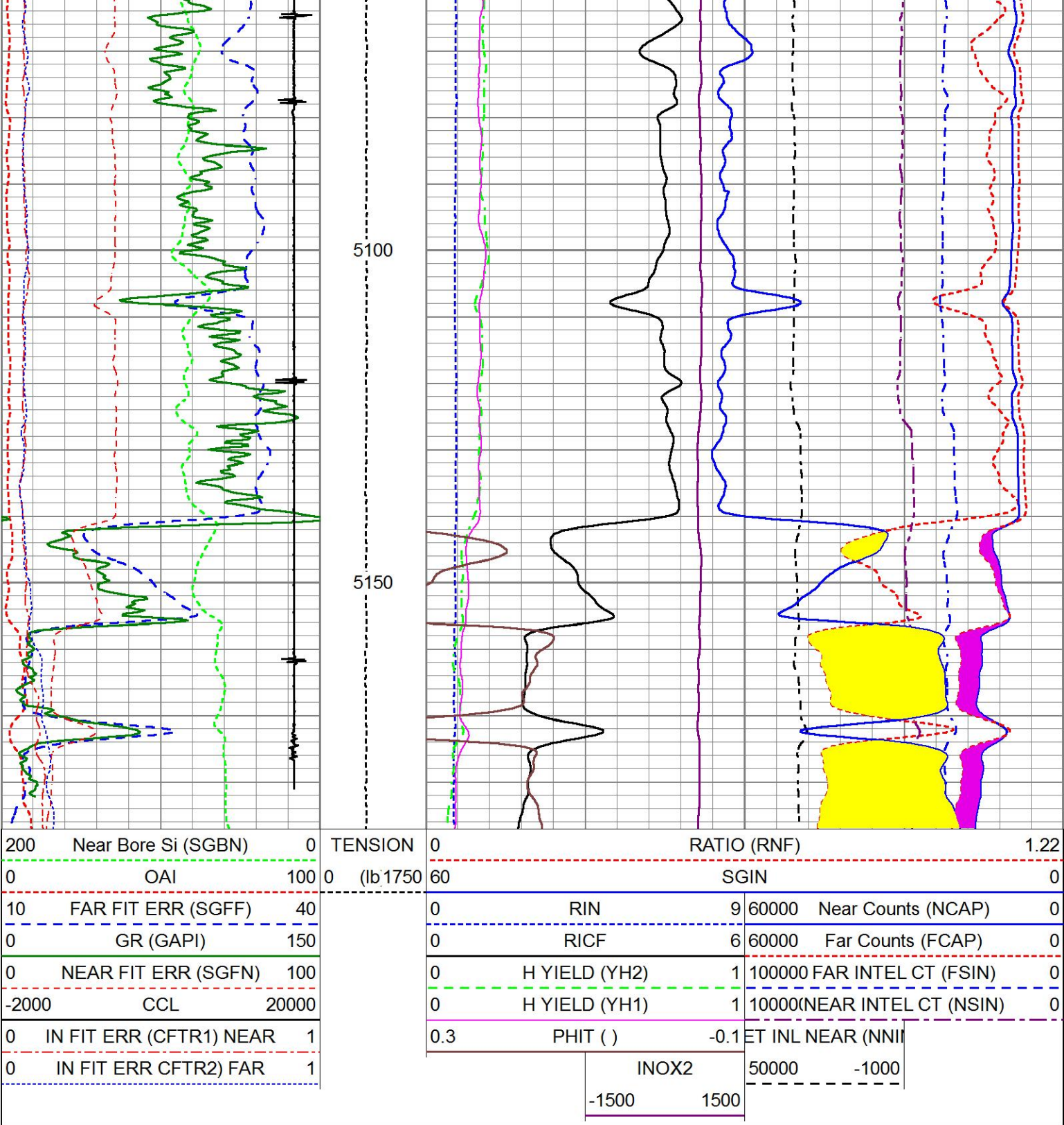
4900

4950

5000

5050





MAIN LOG PASS

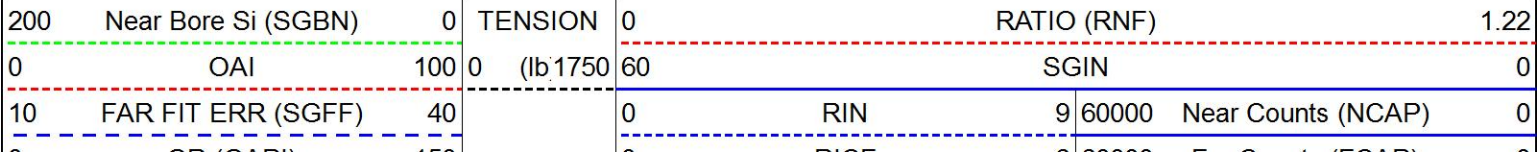
SCALE: 5" = 100'

PASS WITH WATER IN ANNULUS

PER CUSTOMER REQUEST

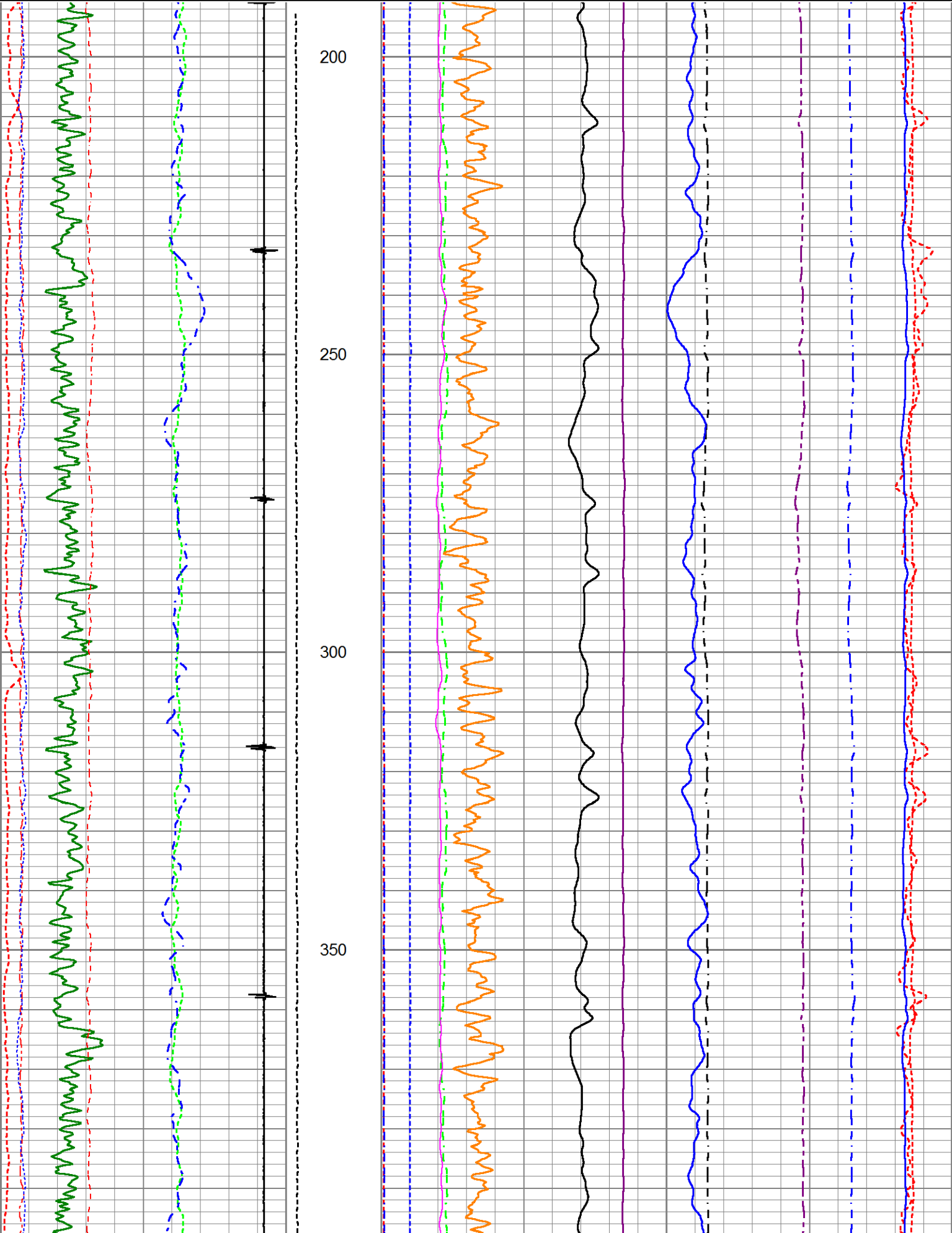
5" = 100'

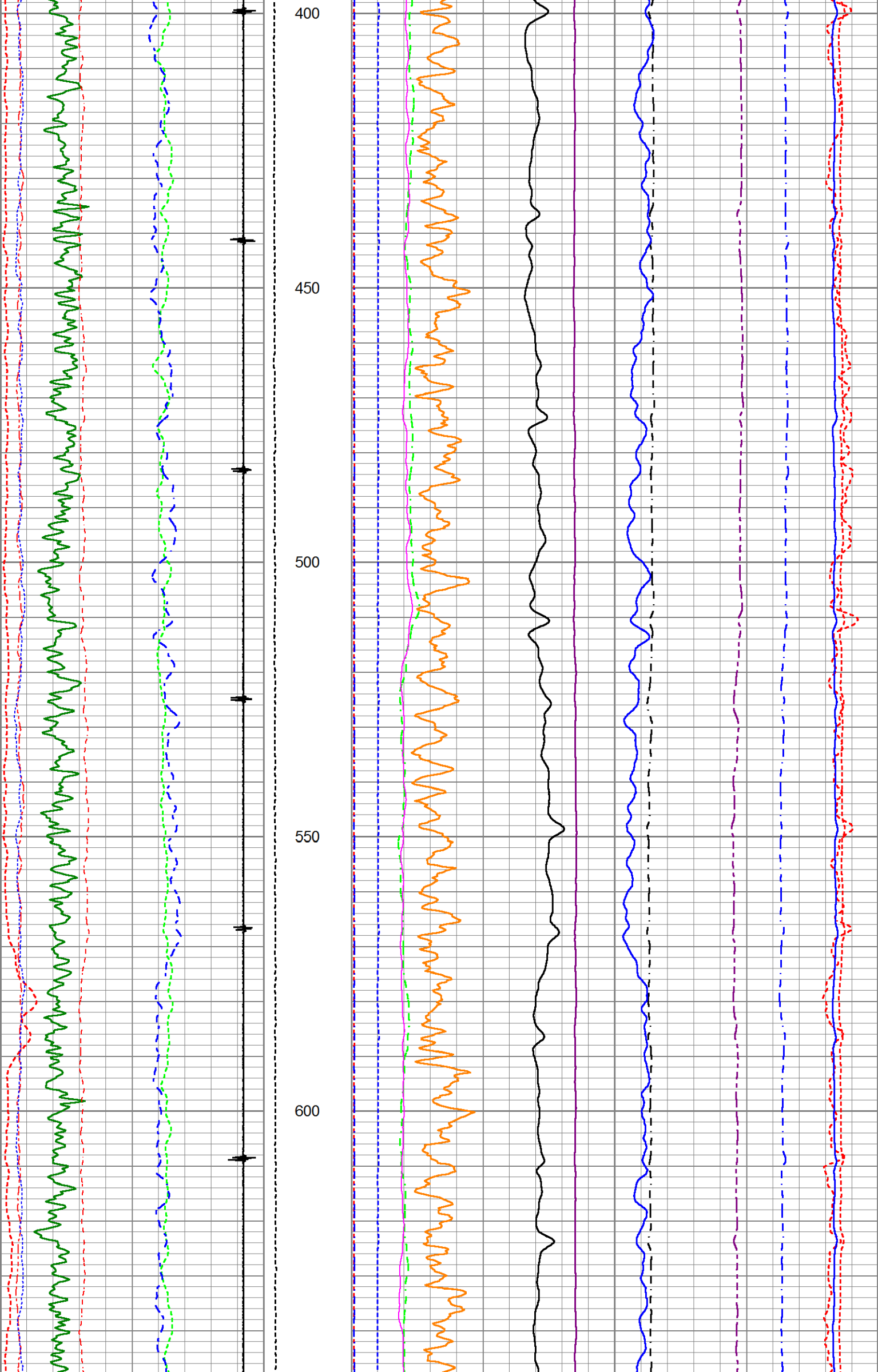
Database File ecgs\_6\_13\_wp\_d007\_2\_rmt.db  
Dataset Pathname MAIN\_FLUID  
Presentation Format 1\_rmt\_main  
Dataset Creation Mon Mar 21 10:30:21 2016  
Charted by Depth in Feet scaled 1:240



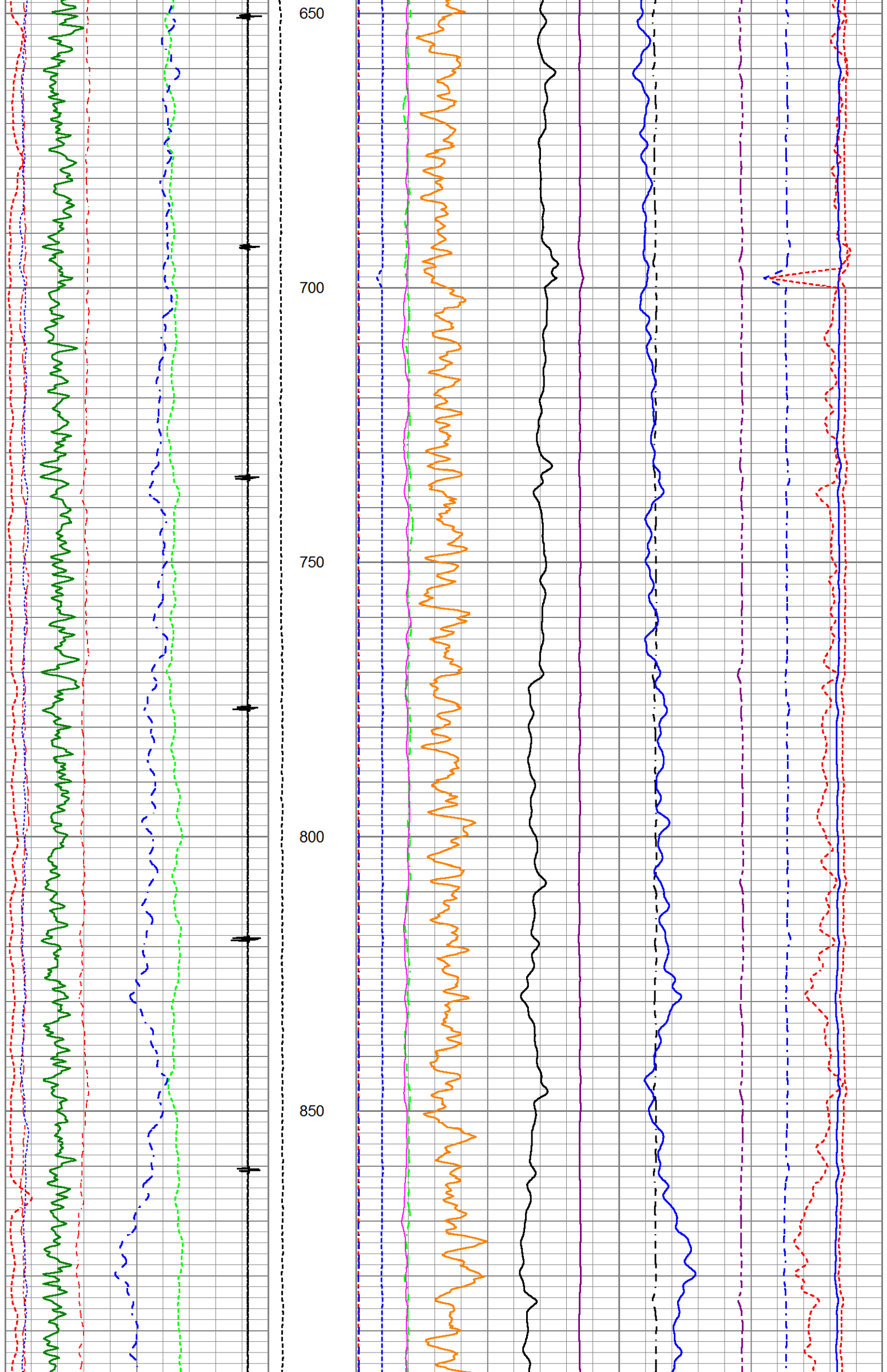
	GR (GAPI)	150
0	NEAR FIT ERR (SGFN)	100
-2000	CCL	20000
0	IN FIT ERR (CFTR1) NEAR	1
0	IN FIT ERR CFTR2) FAR	1

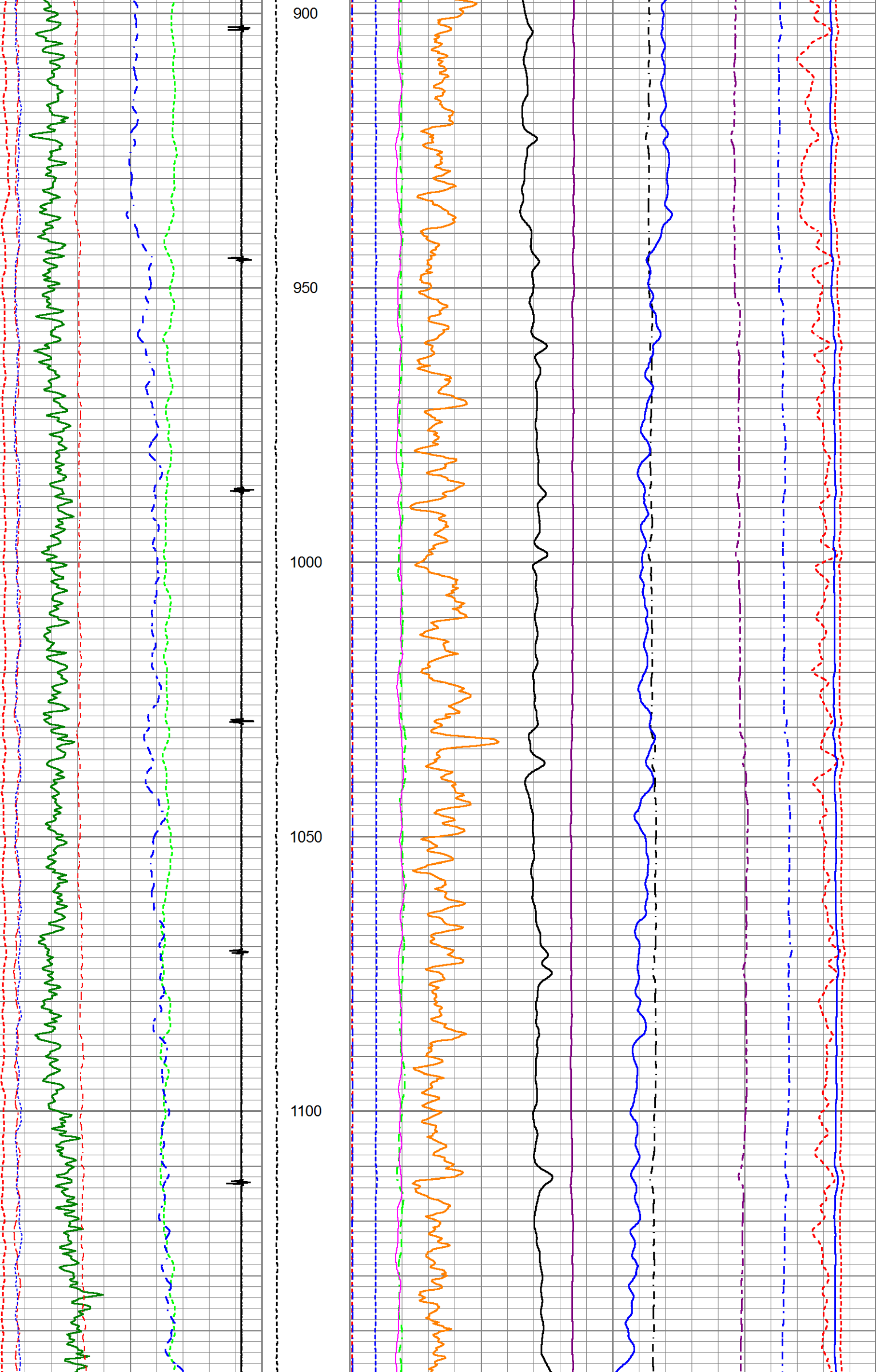
0	RICF	6	60000	Far Counts (FCAP)	0
0	H YIELD (YH2)	1	100000	FAR INTEL CT (FSIN)	0
0	H YIELD (YH1)	1	10000	(NEAR INTEL CT (NSIN)	0
0.3	PHIT ( )	-0.1	ET INL NEAR (NNI		
0	STUN1	1	50000	-1000	
0	STUN2	1			
0	NFTR	5			
	INOX2				
	-1500	1500			

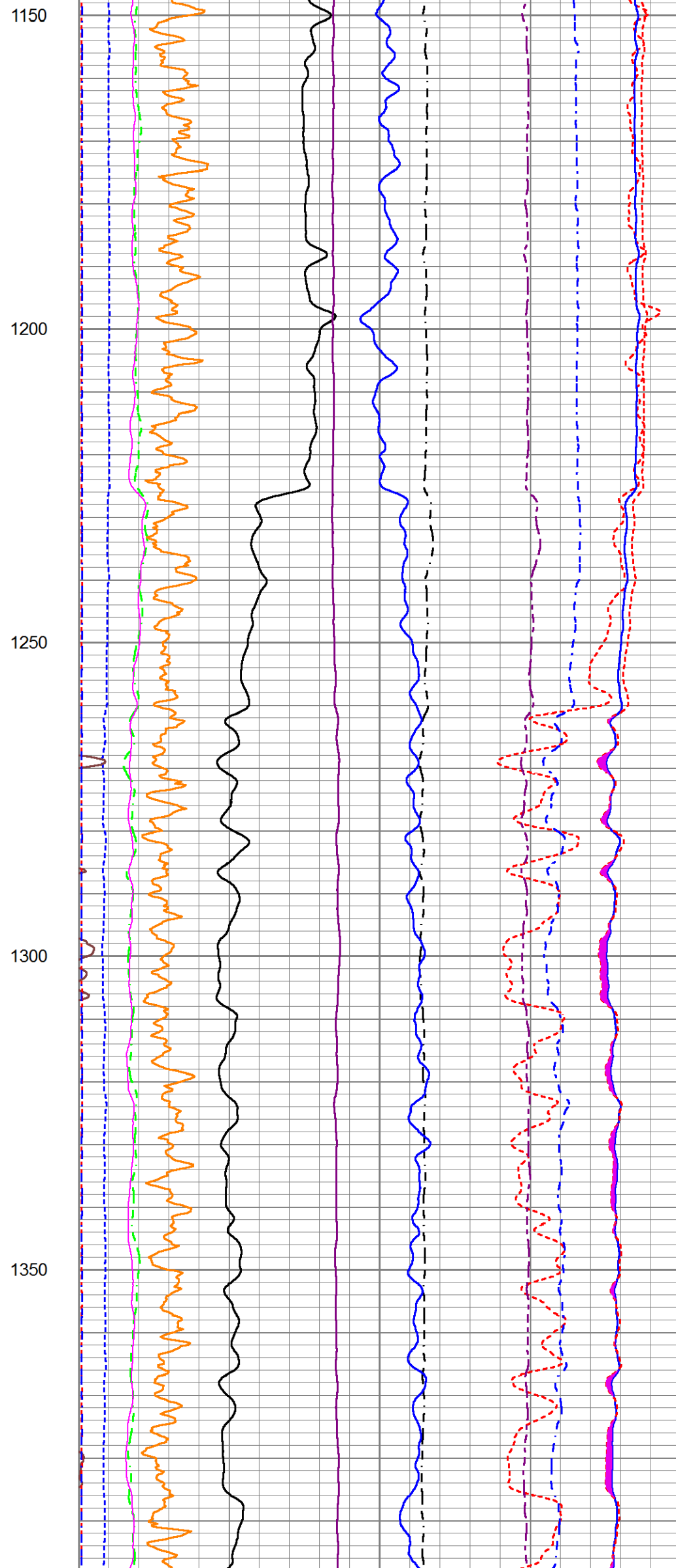
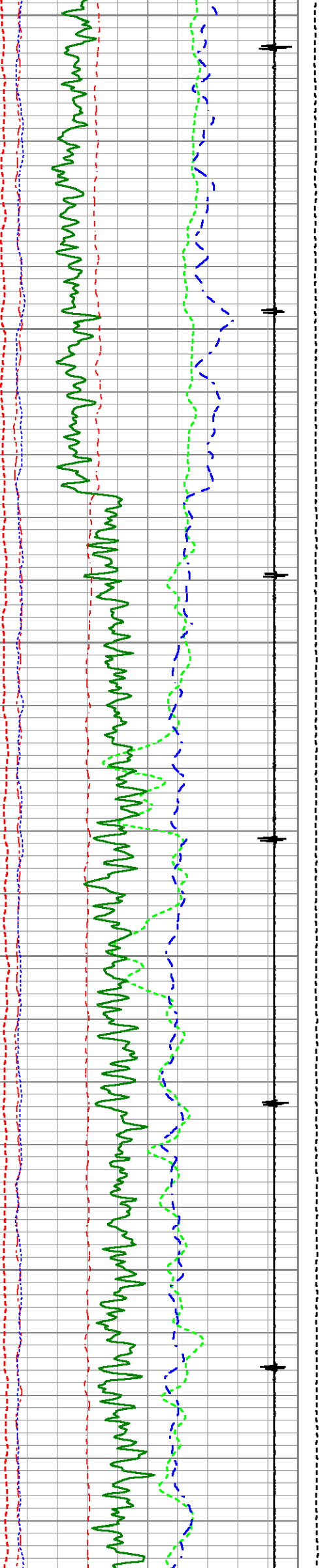


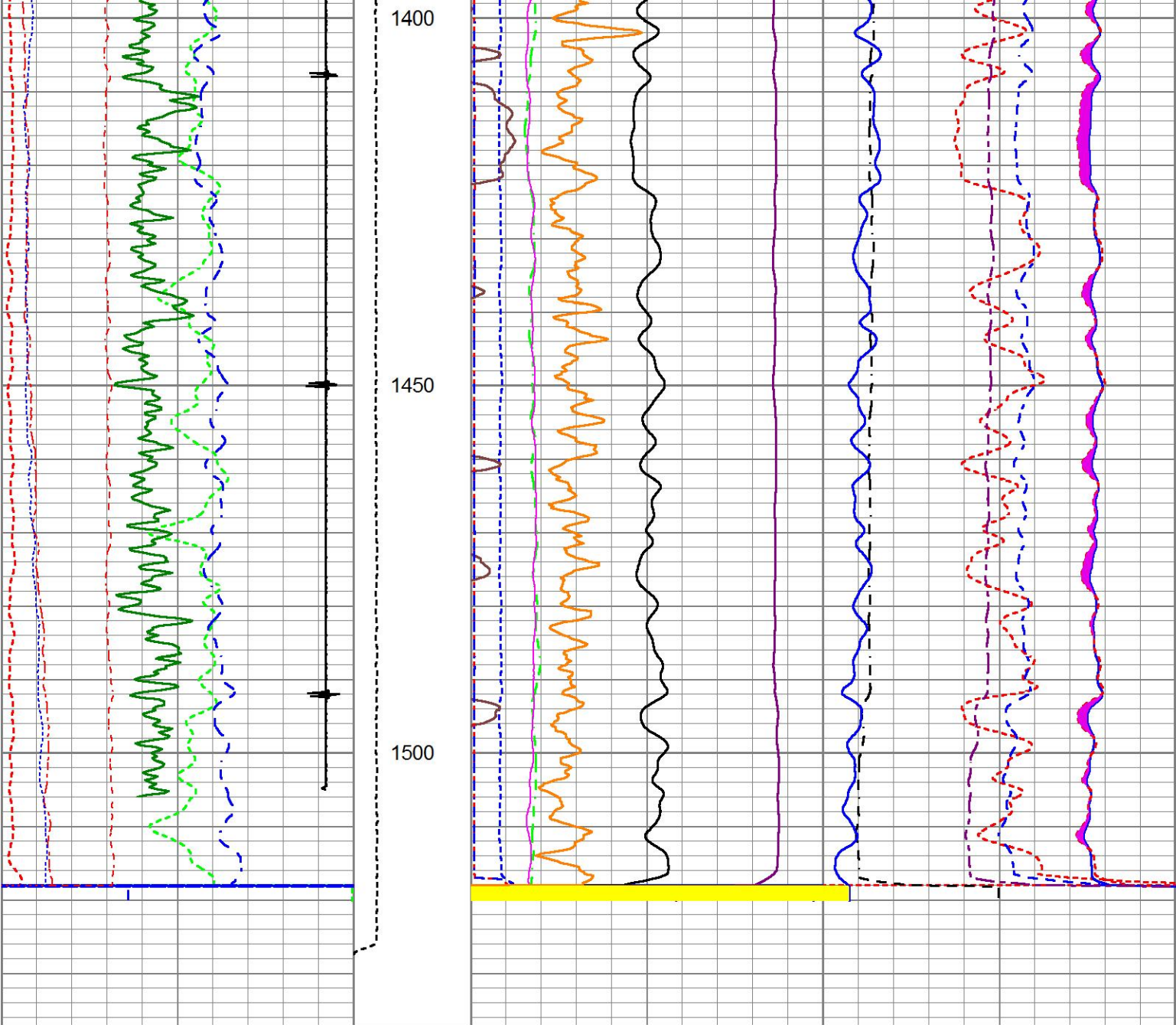












200	Near Bore Si (SGBN)	0	TENSION	0	RATIO (RNF)	1.22
0	OAI	100	0 (lb/1750)	60	SGIN	0
10	FAR FIT ERR (SGFF)	40		0	RIN	9 60000 Near Counts (NCAP)
0	GR (GAPI)	150		0	RICF	6 60000 Far Counts (FCAP)
0	NEAR FIT ERR (SGFN)	100		0	H YIELD (YH2)	1 100000 FAR INTEL CT (FSIN)
-2000	CCL	20000		0	H YIELD (YH1)	1 10000(NEAR INTEL CT (NSIN)
0	IN FIT ERR (CFTR1) NEAR	1		0.3	PHIT ( )	-0.1 ET INL NEAR (NNI)
0	IN FIT ERR (CFTR2) FAR	1		0	STUN1	1 50000 -1000
				0	STUN2	1
				0	NFTR	5
					INOX2	
					-1500	1500

PASS WITH WATER IN ANNULUS

PER CUSTOMER REQUEST

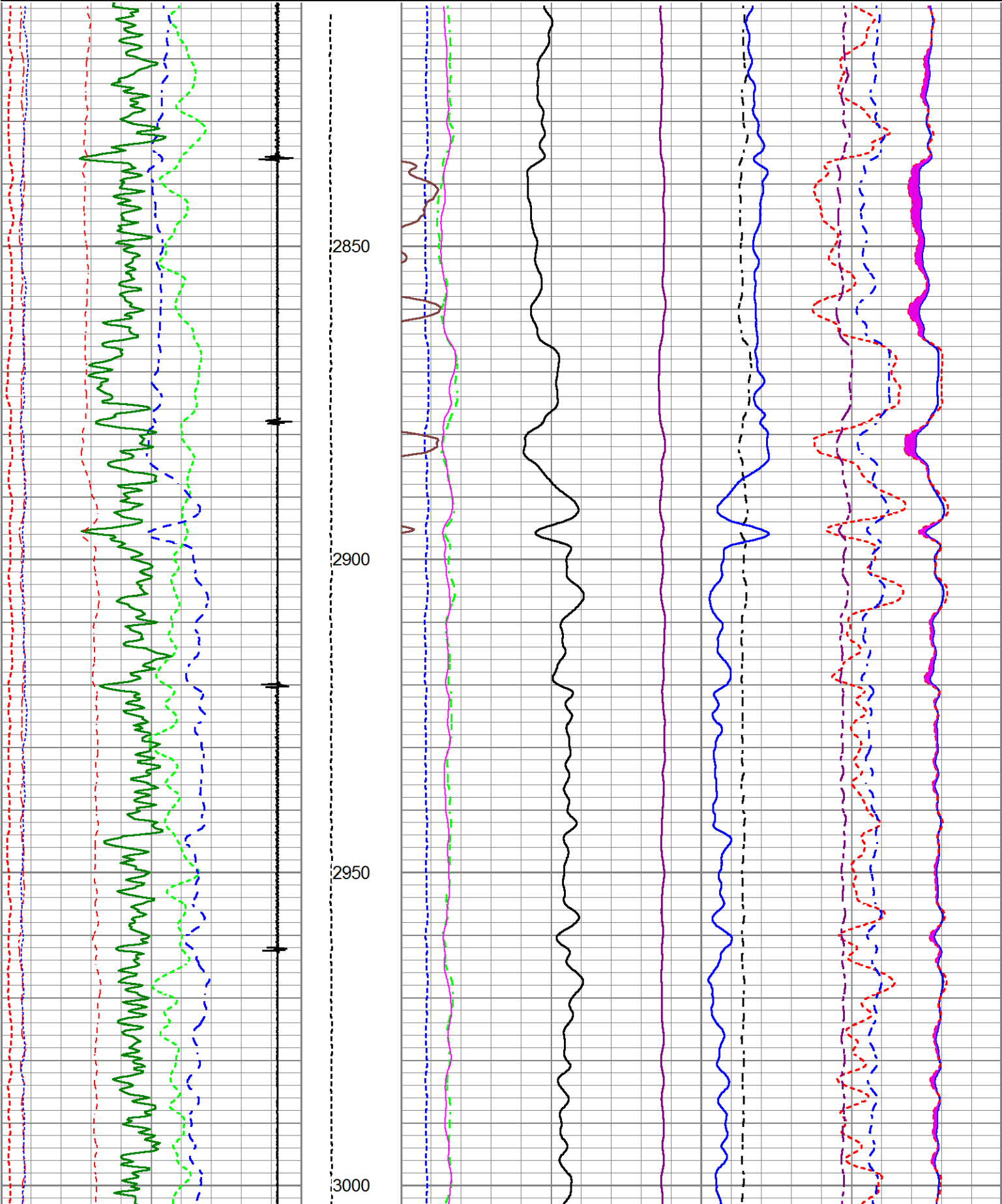
5" = 100'

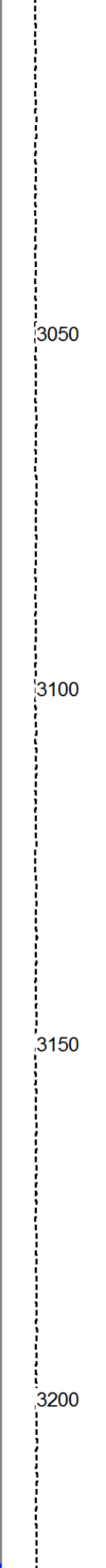
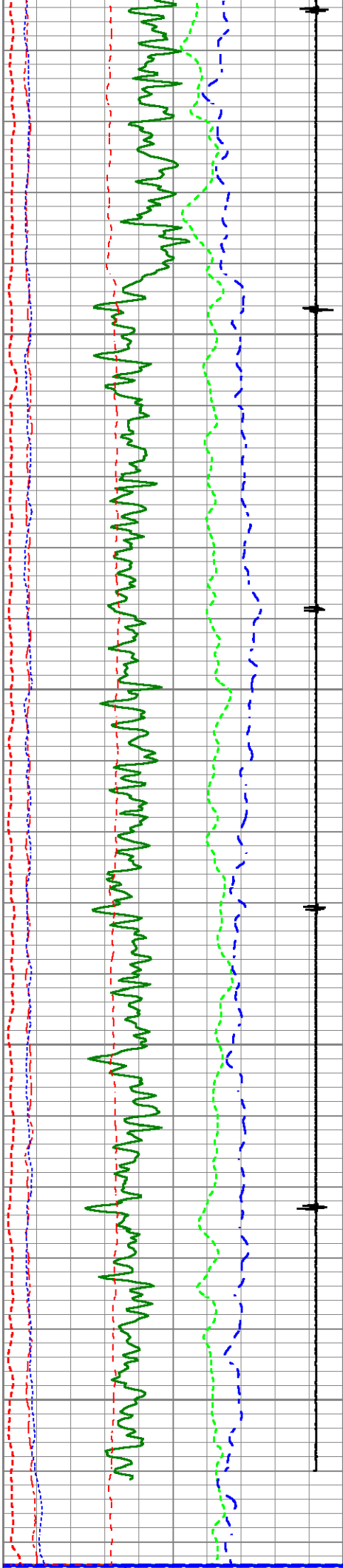
REPEAT PASS

5" = 100'



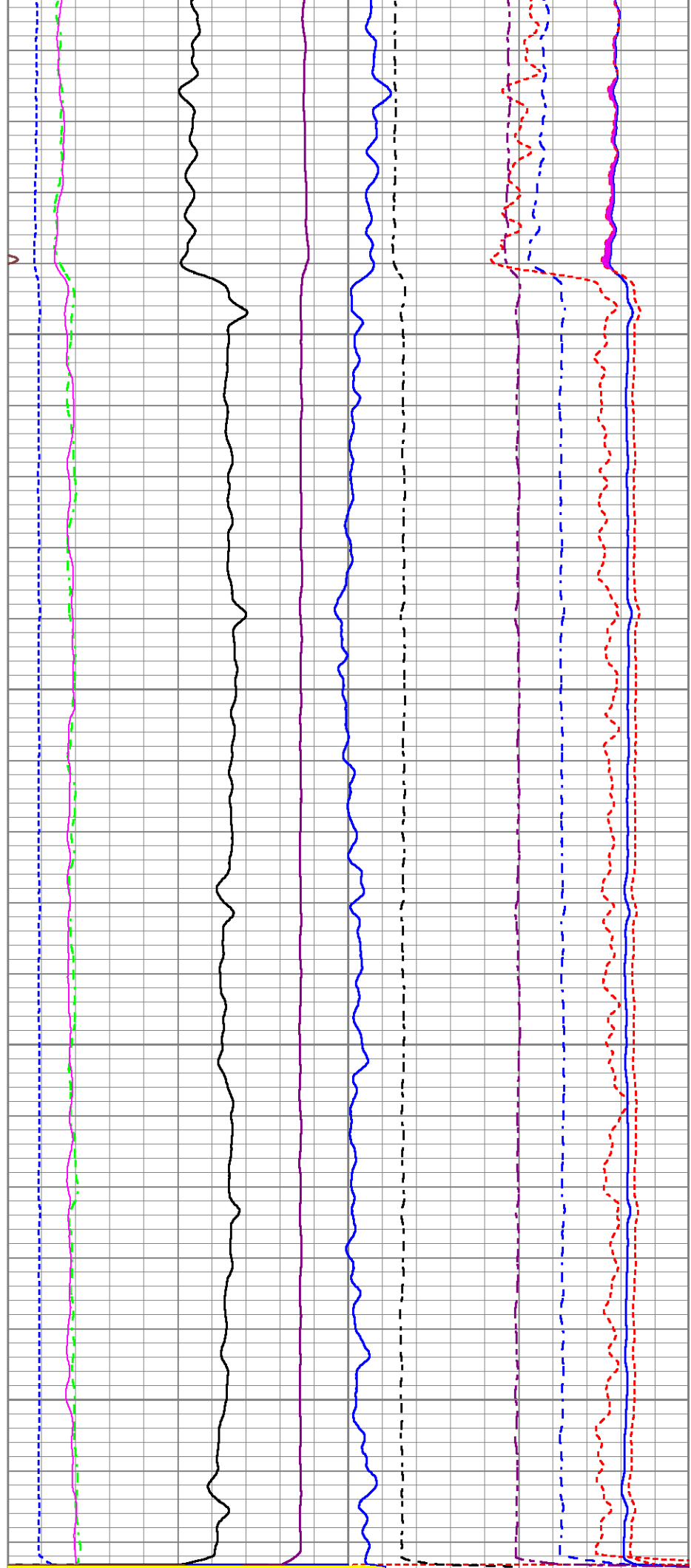
200	Near Bore Si (SGBN)	0	TENSION	0	RATIO (RNF)				1.22
0	OAI	100	0 (lb 1750	60	SGIN				0
10	FAR FIT ERR (SGFF)	40		0	RIN	9	60000	Near Counts (NCAP)	0
0	GR (GAPI)	150		0	RICF	6	60000	Far Counts (FCAP)	0
0	NEAR FIT ERR (SGFN)	100		0	H YIELD (YH2)	1	100000	FAR INTEL CT (FSIN)	0
-2000	CCL	20000		0	H YIELD (YH1)	1	10000	(NEAR INTEL CT (NSIN)	0
0	IN FIT ERR (CFTR1) NEAR	1		0.3	PHIT ( )	-0.1	ET INL NEAR (NNI		
0	IN FIT ERR CFTR2) FAR	1			INOX2		50000	-1000	
					-1500	1500			





200	Near Bore Si (SGBN)	0
0	OAI	100
10	FAR FIT ERR (SGFF)	40
0	GR (GAPI)	150
0	NEAR FIT ERR (SGFN)	100

TENSION	0
(lb1750	60



0	RATIO (RNF)				1.22
60	SGIN				0
0	RIN	9	60000	Near Counts (NCAP)	0
0	RICF	6	60000	Far Counts (FCAP)	0
0	LLYIELD (YU2)	1	100000	FAR INTEL CT (FCIN)	0



NEAR FIT ERR (SGFN) 100			H YIELD (YH2) 1			100000 FAR INTEL CT (FSIN) 0		
-2000 CCL 20000			0 H YIELD (YH1) 1			10000(NEAR INTEL CT (NSIN) 0		
0 IN FIT ERR (CFTR1) NEAR 1			0.3 PHIT ( ) -0.1			ET INL NEAR (NNII		
0 IN FIT ERR CFTR2) FAR 1			INOX2			50000 -1000		
			-1500 1500					

REPEAT PASS

HALLIBURTON

5" = 100'

Log Variables

DatabaseC:\ProgramData\Warrior\Data\ecgs\_6\_13\_wp\_d007\_2\_rmt.db  
Dataset field/well/run1/MAIN\_FINAL/\_vars\_

Top - 198.00 ft

BHSAL1	BHSAL2	BHTEMP_Src	BITSIZE in	BORSAL kppm	BOTTEMP degF	CASED?	CASEOD in
0	0	ITEMPX	0	0	0	No	0
CASETHCK in	CASEWGHT lb/ft	LTH	MudWgt lb/gal	PERFS	POROS1	POROS2	RHO CF
0	0	Limestone	0	0	0	0	0
SO in	SRFTEMP degF	TDEPTH ft	UHSGC				
0	0	0	NONE				

198.00 ft - 4830.00 ft

BHSAL1	BHSAL2	BHTEMP_Src	BITSIZE in	BORSAL kppm	BOTTEMP degF	CASED?	CASEOD in
1	0	ITEMPX	8.75	150	155	Yes	7
CASETHCK in	CASEWGHT lb/ft	LTH	MudWgt lb/gal	PERFS	POROS1	POROS2	RHO CF
0.362	26	Sandstone	8.5	0	1	0	0.25
SO in	SRFTEMP degF	TDEPTH ft	UHSGC				
0	20	5202	NONE				

4830.00 ft - 5187.00 ft

BHSAL1	BHSAL2	BHTEMP_Src	BITSIZE in	BORSAL kppm	BOTTEMP degF	CASED?	CASEOD in
1	0	ITEMPX	8.75	150	155	Yes	7
CASETHCK in	CASEWGHT lb/ft	LTH	MudWgt lb/gal	PERFS	POROS1	POROS2	RHO CF
0.362	7	Sandstone	8.5	0	1	0	0.25
SO in	SRFTEMP degF	TDEPTH ft	UHSGC				
0	30	0	NONE				

5187.00 ft - Bottom


BHSAL1	BHSAL2	BHTEMP_Src	BITSIZE in	BORSAL kppm	BOTTEMP degF	CASED?	CASEOD in
0	0	ITEMPX	0	0	0	No	0
CASETHCK in	CASEWGHT lb/ft	LTH	MudWgt lb/gal	PERFS	POROS1	POROS2	RHO CF
0	0	Limestone	0	0	0	0	0
SO	SRFTEMP	TDEPTH	UHSGC				

in 0	degF 0	ft 0	NONE
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Calibration Report						
Database File	ecgs_6_13_wp_d007_2_rmt.db					
Dataset Pathname	MAIN_FINAL					
Dataset Creation	Mon Mar 21 15:08:35 2016					
Reservoir Monitor Tool I Calibration Report						
Serial-Model:		11917921-A				
Shop Calibration Performed:		Mon Mar 14 16:32:03 2016				
Carbon/Oxygen Mode						
Stabilization						
Result	Logged	Expected Value	Diff.	Tol.	Units	
GENV	83.00	80.00	3.00	+/-15.00	V	
ITCR2	3251	3250	1	+/-250	cps	
Near Detector						
	Channel	Expected Value	Amplitude	FWHM	Tol.	
H	60	60 +/-2	0.0251	5.67	<6.00	
Fe	206	206 +/-2	0.0961	-----	-----	
NGAIN = 0.998	NZOFF = 0.6					
Far Detector						
	Channel	Expected Value	Amplitude	FWHM	Tol.	
H	60	60 +/-2	0.0354	5.78	<6.50	
Fe	210	208 +/-2	0.0905	-----	-----	
FGAIN = 0.989	FZOFF = 0.4					
Flask Temperature	53.2 degF					
Result	Logged	Expected Value	Diff.	Tol.	Units	
COIR2	0.45	0.45	-0.00	+/-0.02		
LIRI2	1.65	1.64	0.01	+/-0.05		
TCCR2	5223	5000	223	+/-1000	cps	
ITCR2	3253	3200	53	+/-250	cps	

Sigma Mode					
Stabilization					
Result	Logged	Expected Value	Diff.	Tol.	Units
GENV	83.00	80.00	3.00	+/-15.00	V
FCAP	10028	10000	28	+/-500	cps
Horizontal Water Tank					
Result	Logged	Expected Value	Diff.	Tol.	Units
N/F Normalizer	0.95	0.95	-0.00		
N/F Inel Norm	0.61	0.61	0.00		
RNF	1.06	1.07	-0.01	+/-0.12	
RINC	1.63	1.64	-0.01	+/-0.18	
SGFN	24.07	24.00	0.07	+/-0.50	cu
SGFF	22.91	22.85	0.06	+/-0.50	cu
FSIN	24153	24000	153	+/-2000	cps
FCAP	10174	10000	174	+/-1000	cps
NFTR	0.83			<5.00	
FFTR	0.91			<5.00	
NPKC	107			<500	cps

NBKG	187			<500	cps
FBKG	101			<500	cps
RTN	0.40	0.40	0.00	+/-0.10	usec
RTF	0.43	0.40	0.03	+/-0.10	usec
Calibration Software Modules					
HRMTI Module	2013.11.14.0				
RMTI Module	2014.8.28.1				
Log Data Acquisition Software Modules					
HRMTI Module	2013.11.14.0				
RMTI Module	2014.8.28.1				
Gamma Ray Calibration Report					
Serial Number:	10010734				
Tool Model:	002				
Performed:	Tue Mar 08 14:57:04 2016				
Calibrator Value:	190.0	GAPI			
Background Reading:	42.0	cps			
Calibrator Reading:	184.4	cps			
Sensitivity:	1.3349	GAPI/cps			

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
CCL	21.46		STNDCH-STND_CH Fishing Neck	1.50	2.00	1.00
			TTTCU-002 (10010734) Through Tubing Telemetry Cartridge - Ultrawire	7.65	1.69	100.00
GR	19.21		XHU-003 (11870311) Crossover Halliburton 1553 to Ultrawire	1.58	1.69	7.00

