

Schlumberger

Company: **Kerr McGee Oil and Gas Onshore, LP**

Well: **Howard 37-29**

Field: **Wattenberg**

County: **Weld**

State: **Colorado**

Platform Express Array Induction with Linear Correlation

County: Weld
Field: Wattenberg
Location: SESE Sec. 29 , T 1N , R 67W
Well: Howard 37-29
Company: Kerr McGee Oil and Gas Onshore

LOCATION		Elev.:	K.B.	5038.00 ft
SESE Sec. 29 , T 1N , R 67W			G.L.	5023.00 ft
SHL: 1081' FSL / 1278' FEL SESE			D.F.	5037.00 ft
BHL: 64' FSL / 1340' FEL SWSE				
Permanent Datum:	Ground Level	Elev.:	5023.00 ft	
Log Measured From:	Kelly Bushing	15.00 ft	above Perm. Datum	
Drilling Measured From:	Kelly Bushing			
API Serial No.	Section	Township	Range	
05-123-33735-0000	29	1N	67W	

Logging Date	Run 1	Run 2	Run
Run Number			
Depth Driller			
Schlumberger Depth			
Bottom Log Interval			
Top Log Interval			
Casing Driller Size @ Depth			
Casing Schlumberger			
Bit Size			
Type Fluid In Hole			
Density			
Fluid Loss			
Source Of Sample			
RM @ Measured Temperature			
RMF @ Measured Temperature			
RMC @ Measured Temperature			
Source RMF			
RM @ MRT			
Maximum Recorded Temperatures			
Circulation Stopped			
Logger On Bottom			
Unit Number			
Recorded By			
Witnessed By			

Logging Date	16-Sep-2011		
Run Number	1		
Depth Driller	8471 ft		
Schlumberger Depth	8451 ft		
Bottom Log Interval	8450 ft		
Top Log Interval	1195 ft		
Casing Driller Size @ Depth	8.625 in	@	1207 ft
Casing Schlumberger	1195 ft		
Bit Size	7.875 in		
Type Fluid In Hole	Water		
Density	8.4 lbm/gal	27 s	
Fluid Loss	PH		
Source Of Sample	Flowline		
RM @ Measured Temperature	2.330 ohm.m	@	58 degF
RMF @ Measured Temperature	1.747 ohm.m	@	58 degF
RMC @ Measured Temperature	3.495 ohm.m	@	58 degF
Source RMF	Calculated	Calculated	
RM @ MRT	0.687 @ 213	0.515 @ 213	
Maximum Recorded Temperatures	213 degF		
Circulation Stopped	15-Sep-2011	21:00	
Logger On Bottom	16-Sep-2011	7:00	
Unit Number	3021	Fort Morgan, CO	
Recorded By	Jared R. Hoskins		
Witnessed By	Keith & Tekabe Gedamu		

DEPTH SUMMARY LISTING

Date Created: 16-SEP-2011 7:07:47

Depth System Equipment

Depth Measuring Device	Tension Device	Logging Cable
Type: IDW-B Serial Number: 6380 Calibration Date: 9-17-2011 Calibrator Serial Number: 33 Calibration Cable Type: 7-46P Wheel Correction 1: -9 Wheel Correction 2: -8	Type: CMTD-B/A Serial Number: 1433 Calibration Date: 26-Aug-2011 Calibrator Serial Number: 100513 Number of Calibration Points: 10 Calibration RMS: 33 Calibration Peak Error: 68	Type: 7-46A XS Serial Number: 2153 Length: 16429 FT <hr/> Conveyance Method: Wireline Rig Type: LAND

Depth Control Parameters

Log Sequence: First Log In the Well
Rig Up Length At Surface: 0.00 FT
Rig Up Length At Bottom: 0.00 FT
Rig Up Length Correction: 0.00 FT
Stretch Correction: 5.00 FT
Tool Zero Check At Surface: 0.00 FT

Depth Control Remarks

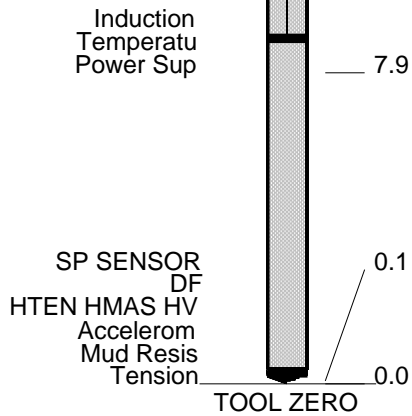
<ol style="list-style-type: none"> 1. This is the primary depth reference 2. All Schlumberger depth policy procedures applied 3. Rig-up lengths not performed due to open-hole conditions 4. 5. 6.
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DISCLAIMER

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE OF AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

OTHER SERVICES1 OS1: None OS2: OS3: OS4: OS5:	OTHER SERVICES2 OS1: OS2: OS3: OS4: OS5:
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REMARKS: RUN NUMBER 1 <ol style="list-style-type: none"> 1. This is the first run in hole. 2. Tool run as per tool sketch. 3. Limestone matrix 2.71 g/cc. 4. Rmf and Rmc calculated using GEN-7 	REMARKS: RUN NUMBER 2
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MAXIMUM STRING DIAMETER 4.63 IN
 MEASUREMENTS RELATIVE TO TOOL ZERO
 ALL LENGTHS IN FEET



MAIN RESISTIVITY LOG 2" = 100'

MAXIS Field Log

Output DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_011LUP FN:10 PRODUCER 16-Sep-2011 07:05 8454.0 FT 1138.5 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 2476.77 F3
 Cement Volume = 1675.10 F3 (assuming 4.50 IN casing O.D.)
 Computed from 8454.0 FT to 1195.0 FT using data channel(s) HCAL

OP System Version: 18C0-147

HILTB-FTB 18C0-147 DTC-H 18C0-147

PIP SUMMARY

- └ Integrated Cement Volume Major Pip Every 100 F3
- └ Integrated Cement Volume Minor Pip Every 10 F3
- └ Integrated Hole Volume Major Pip Every 100 F3
- └ Integrated Hole Volume Minor Pip Every 10 F3

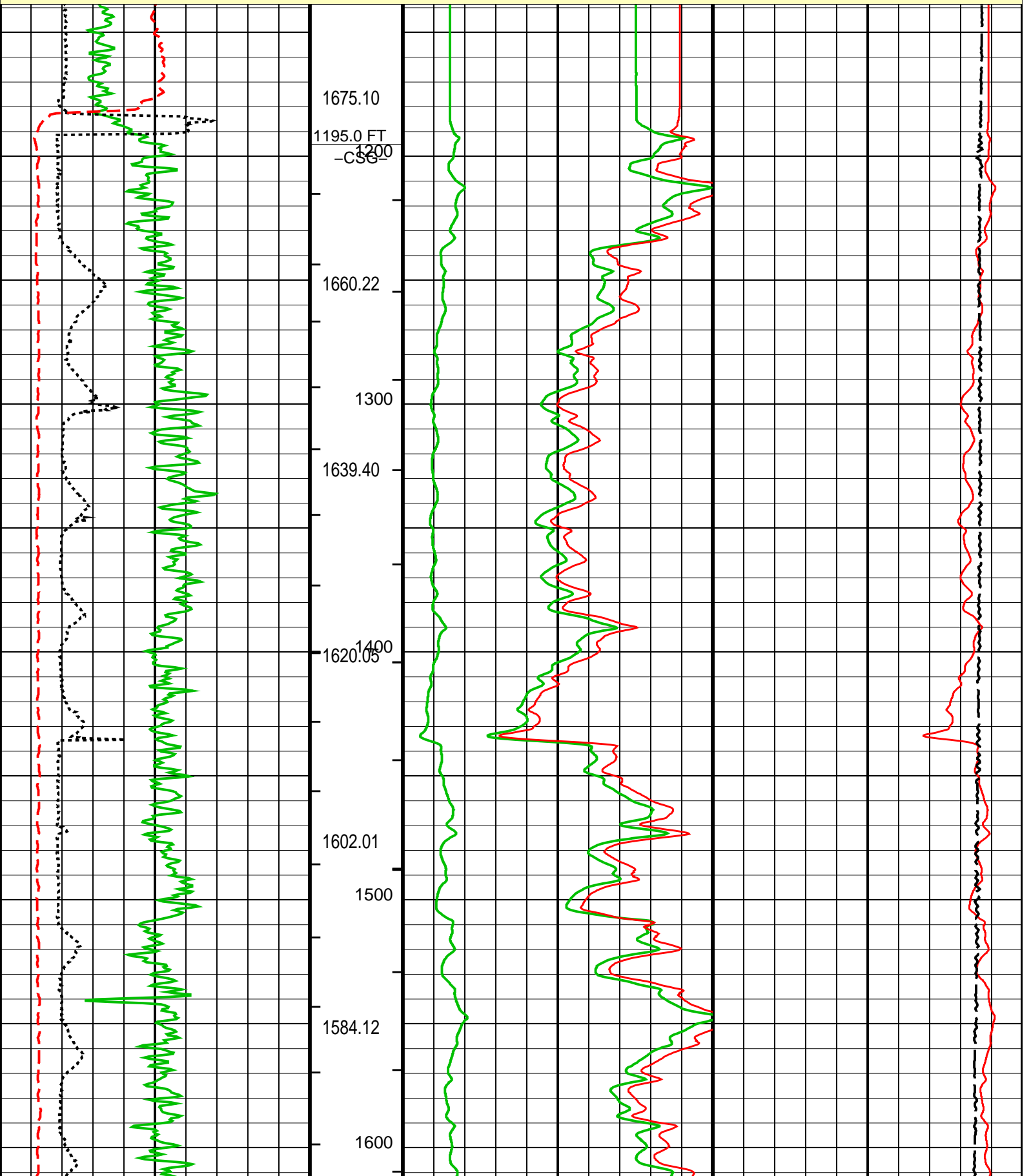
SP (SP) (MV) -160 40

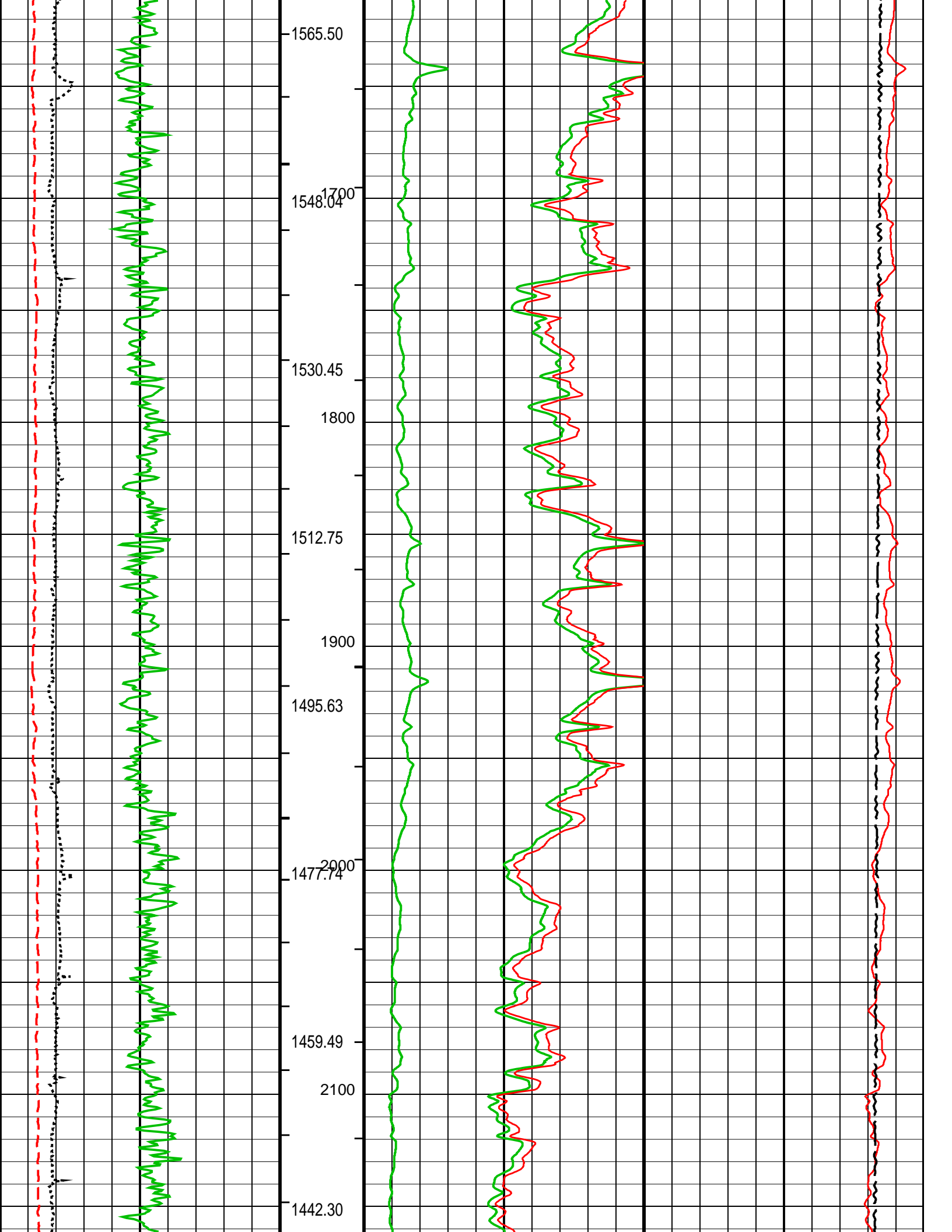
Caliper (HCAL) (IN) 6 16

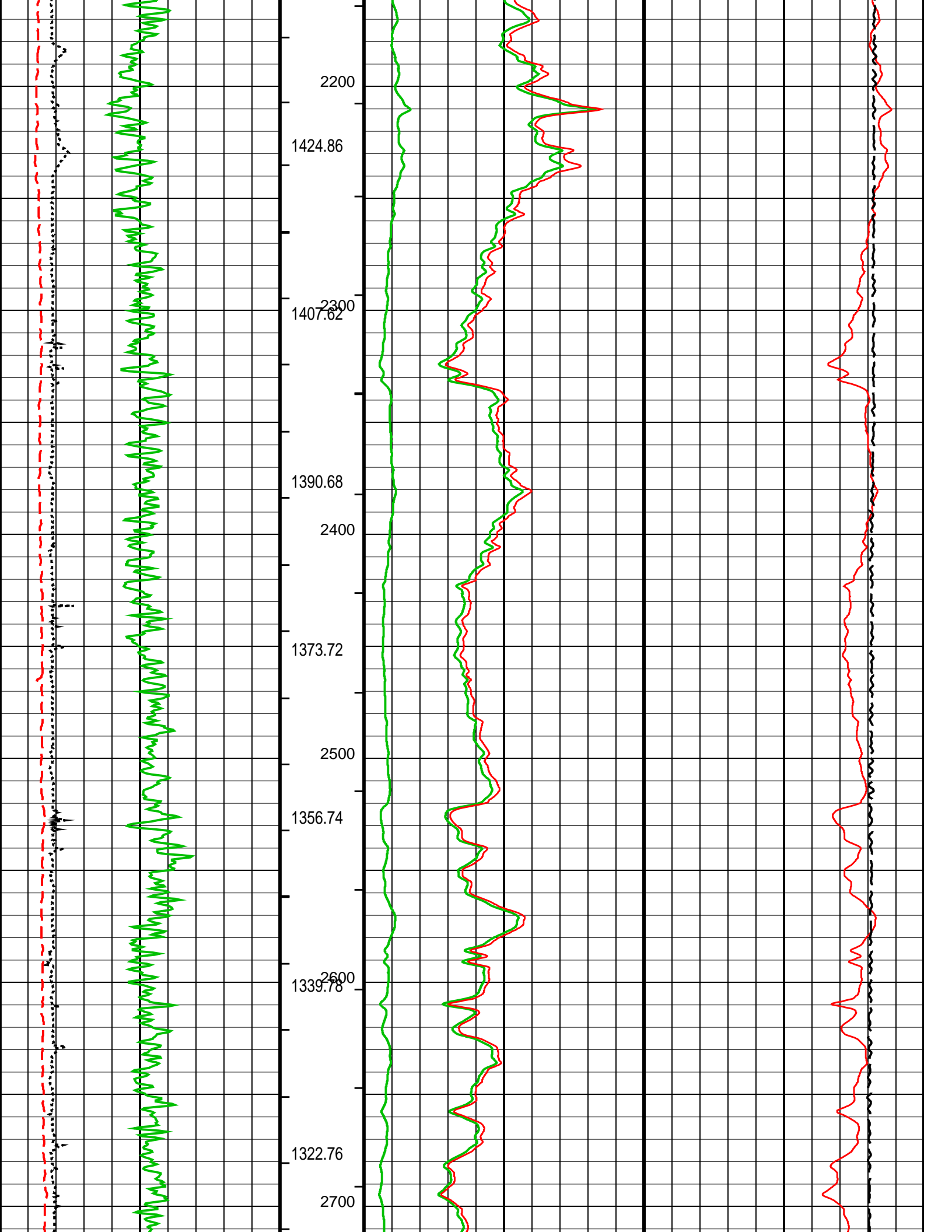
AIT-H 90 Inch Investigation (AHF90) (OHMM) 0 10

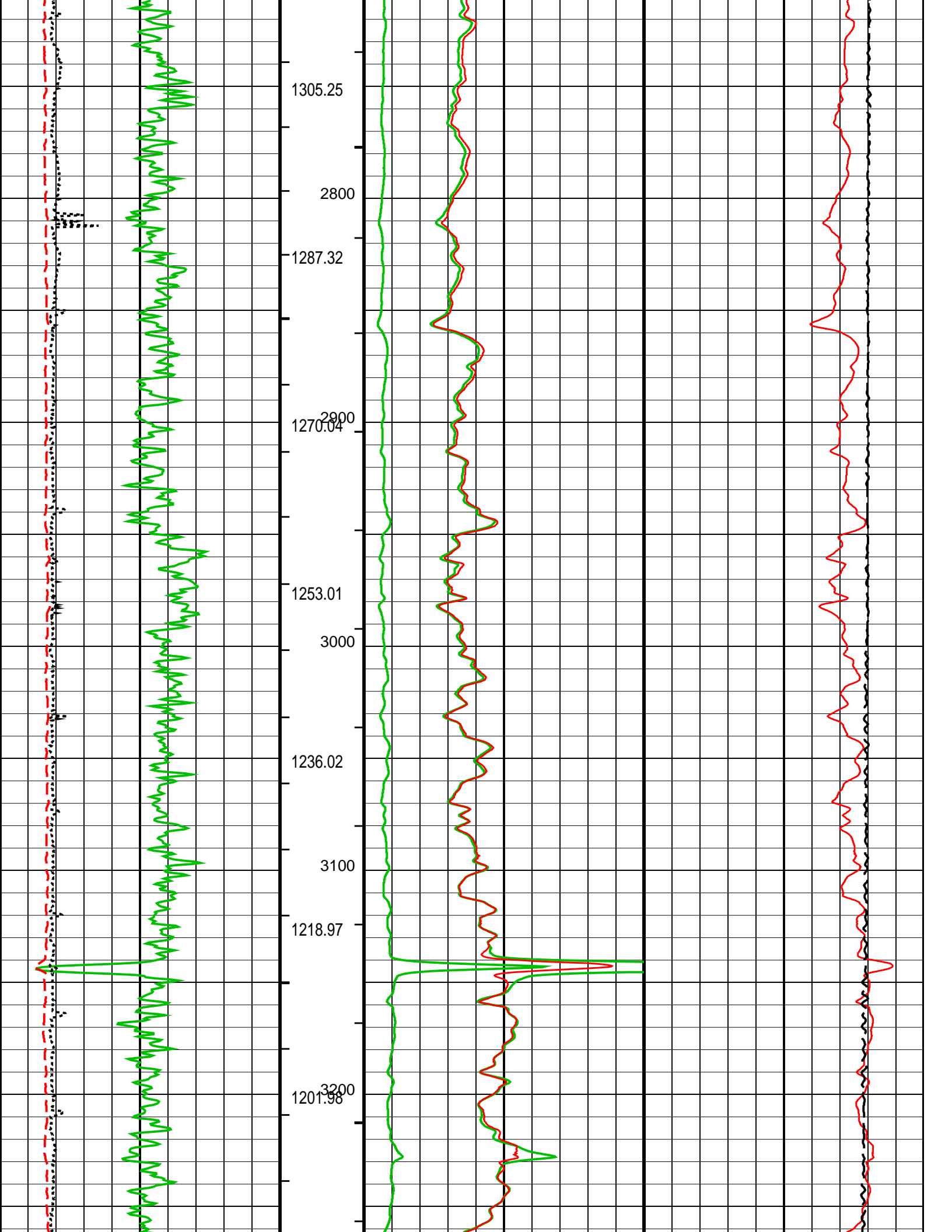
Gamma Ray (GR) (GAPI) 0 200		AIT-H 10 Inch Investigation (AHF10) (OHMM) 0 10		Tension (TENS) (LBF) 10000 0	
Gamma Ray Backup		AIT-H 10 Inch Investigation (AHF10) (OHMM) 0 50		AIT-H 90 Inch Investigation Conductivity (AHFCO90) (MM/M) 1000 0	
		Cement Volume (ICV) (F3)			

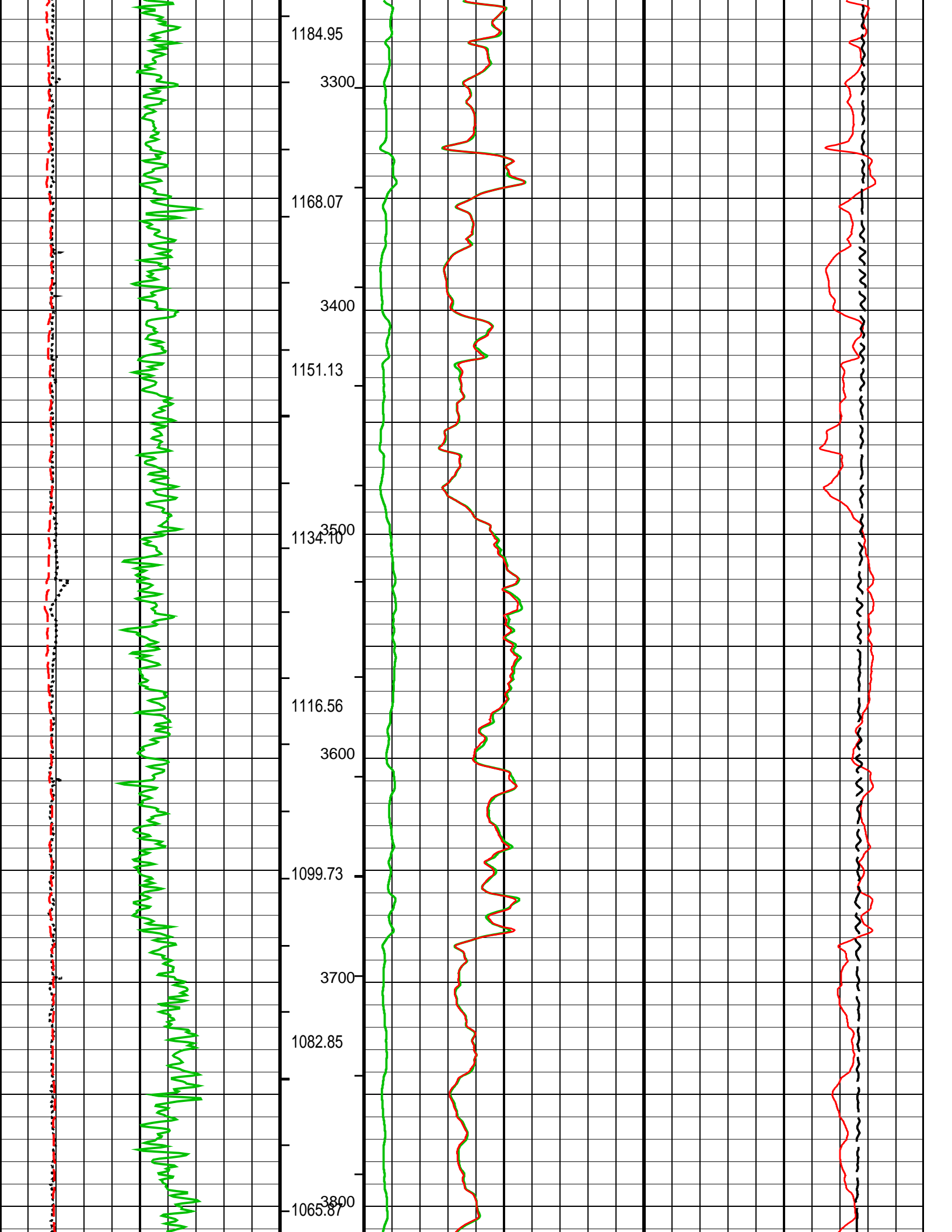
MAIN PASS: *** PLATFORM EXPRESS - ARRAY INDUCTION ***

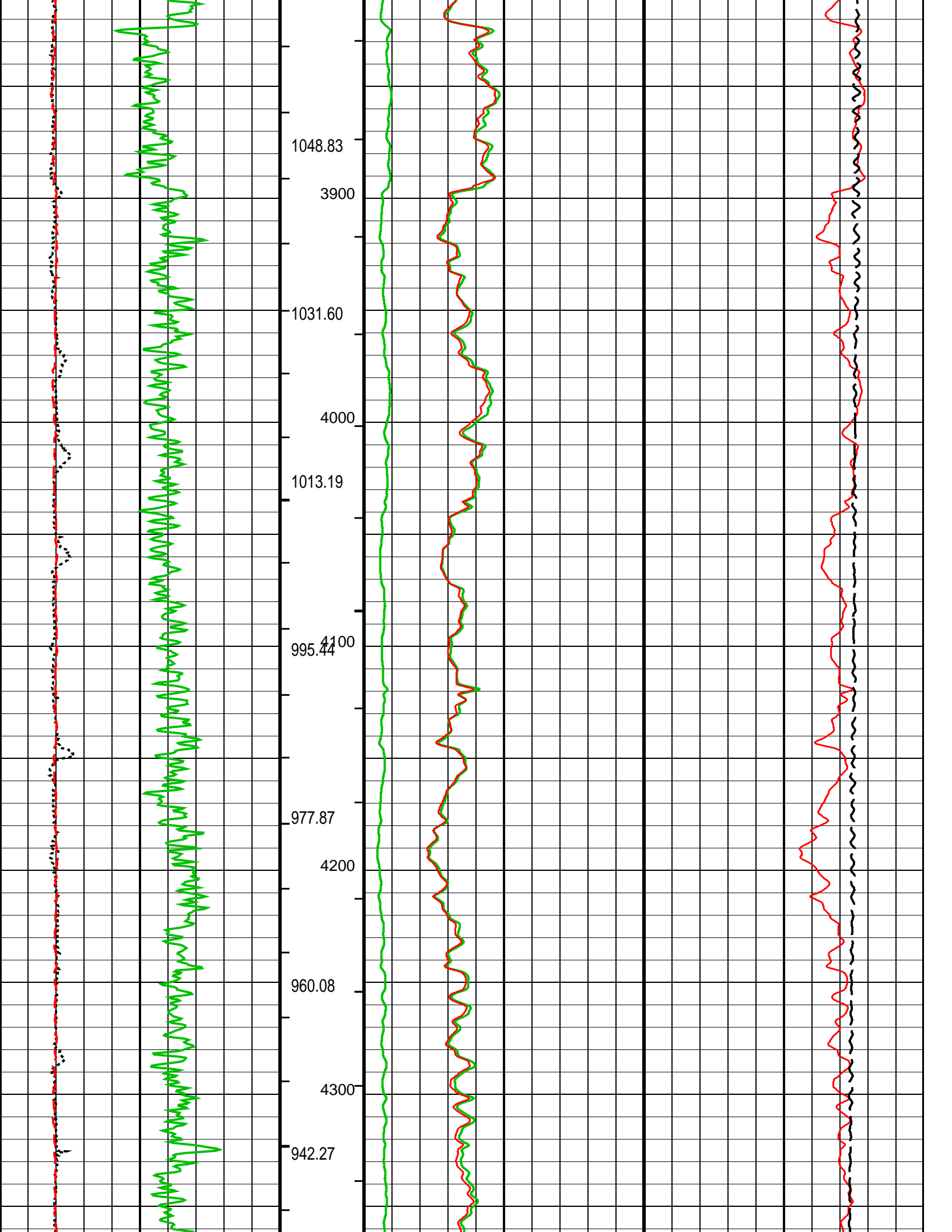


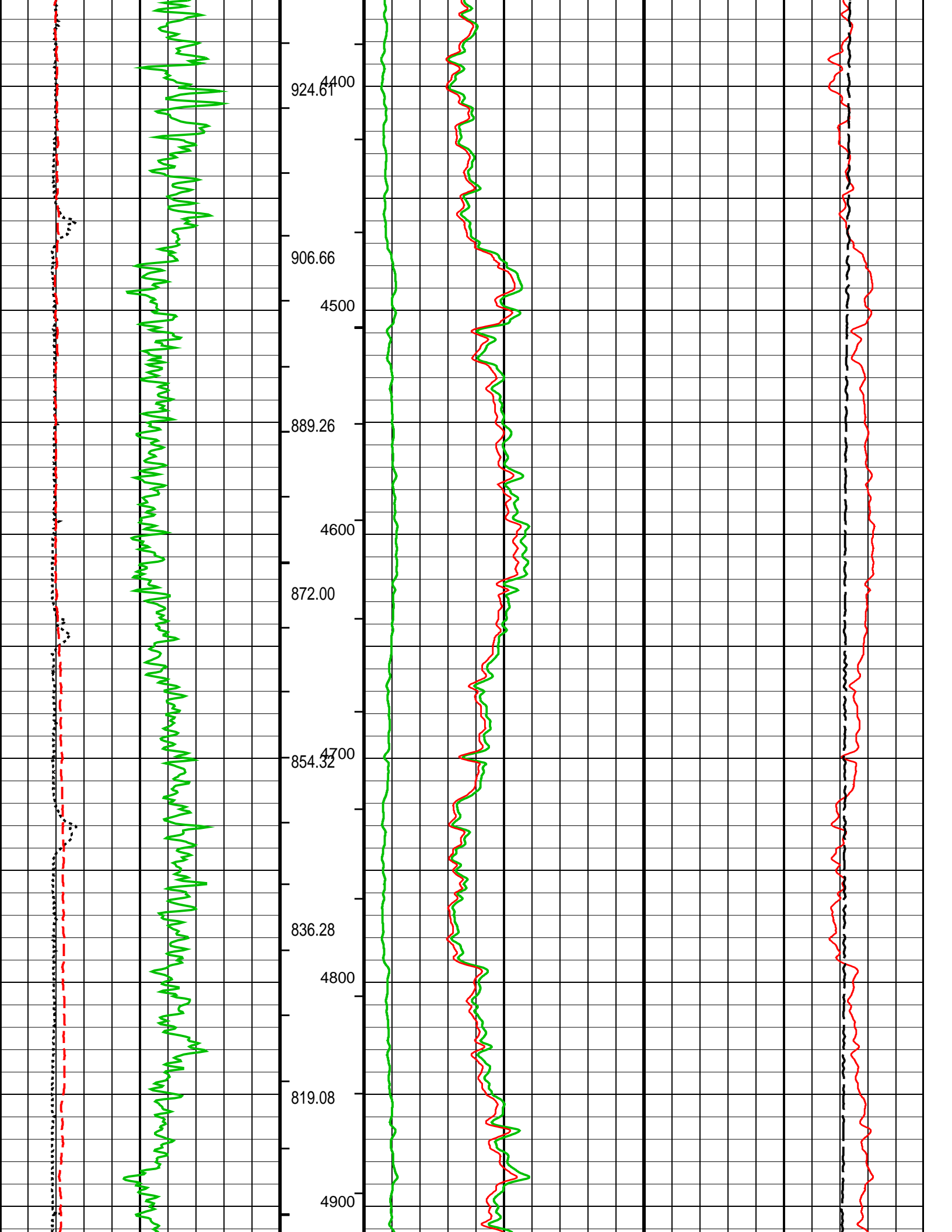


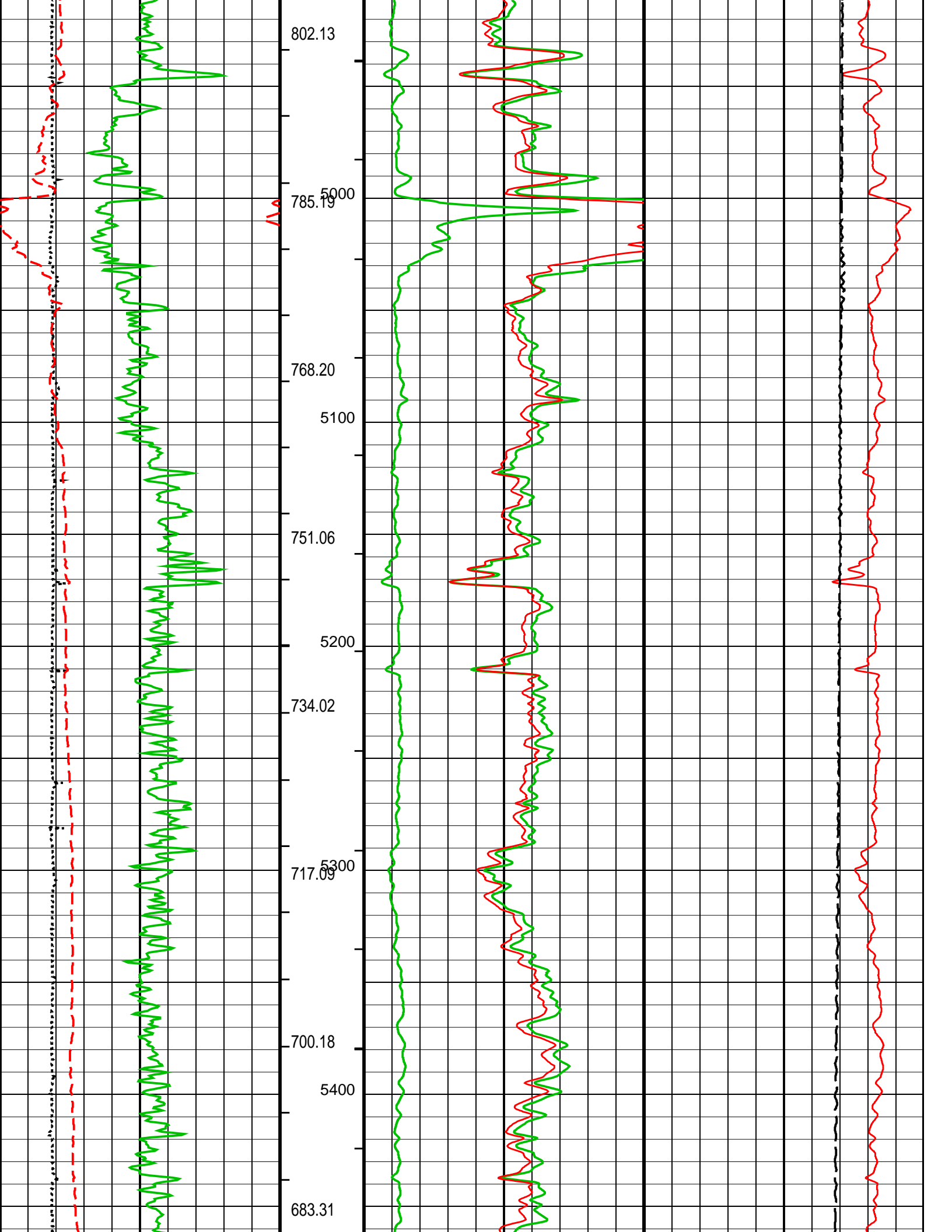


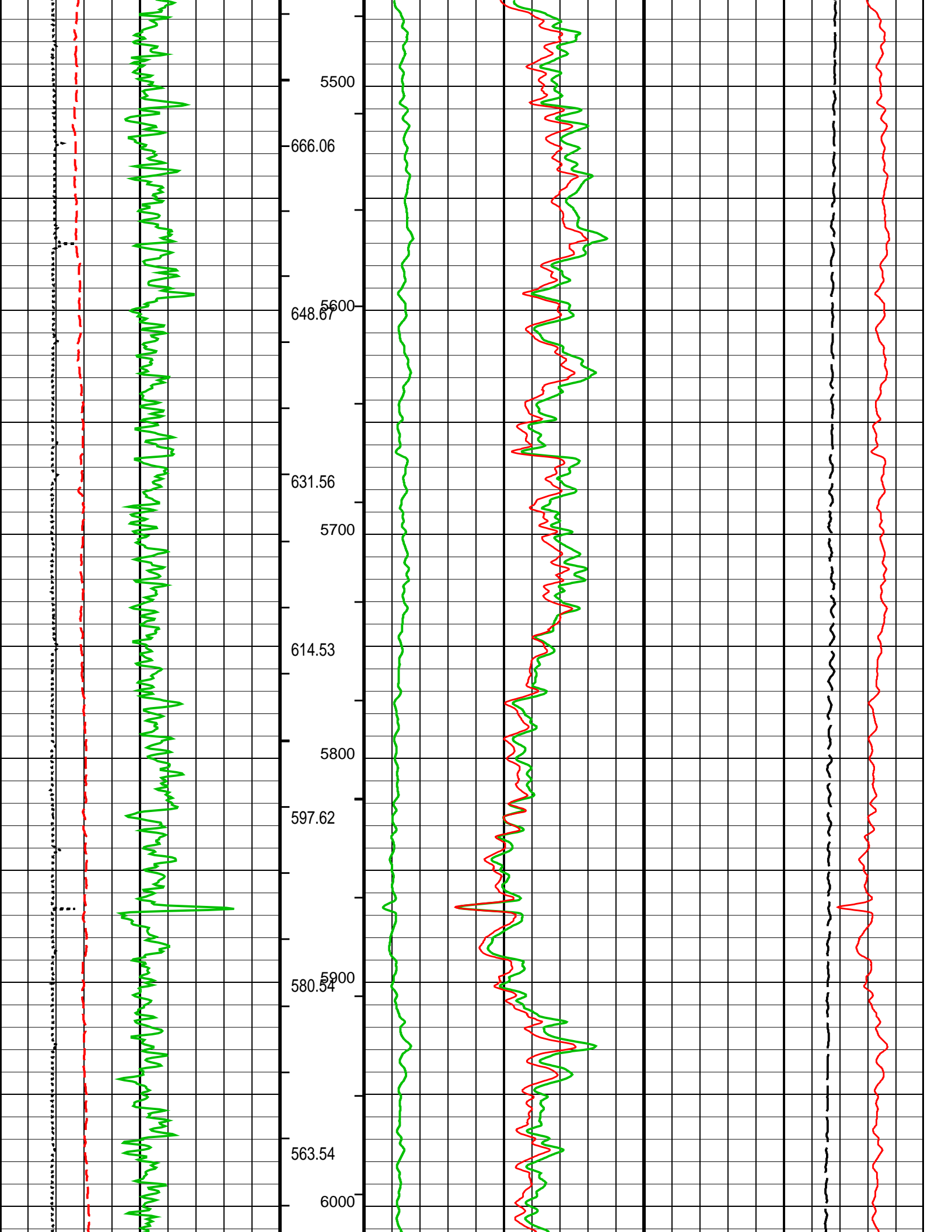


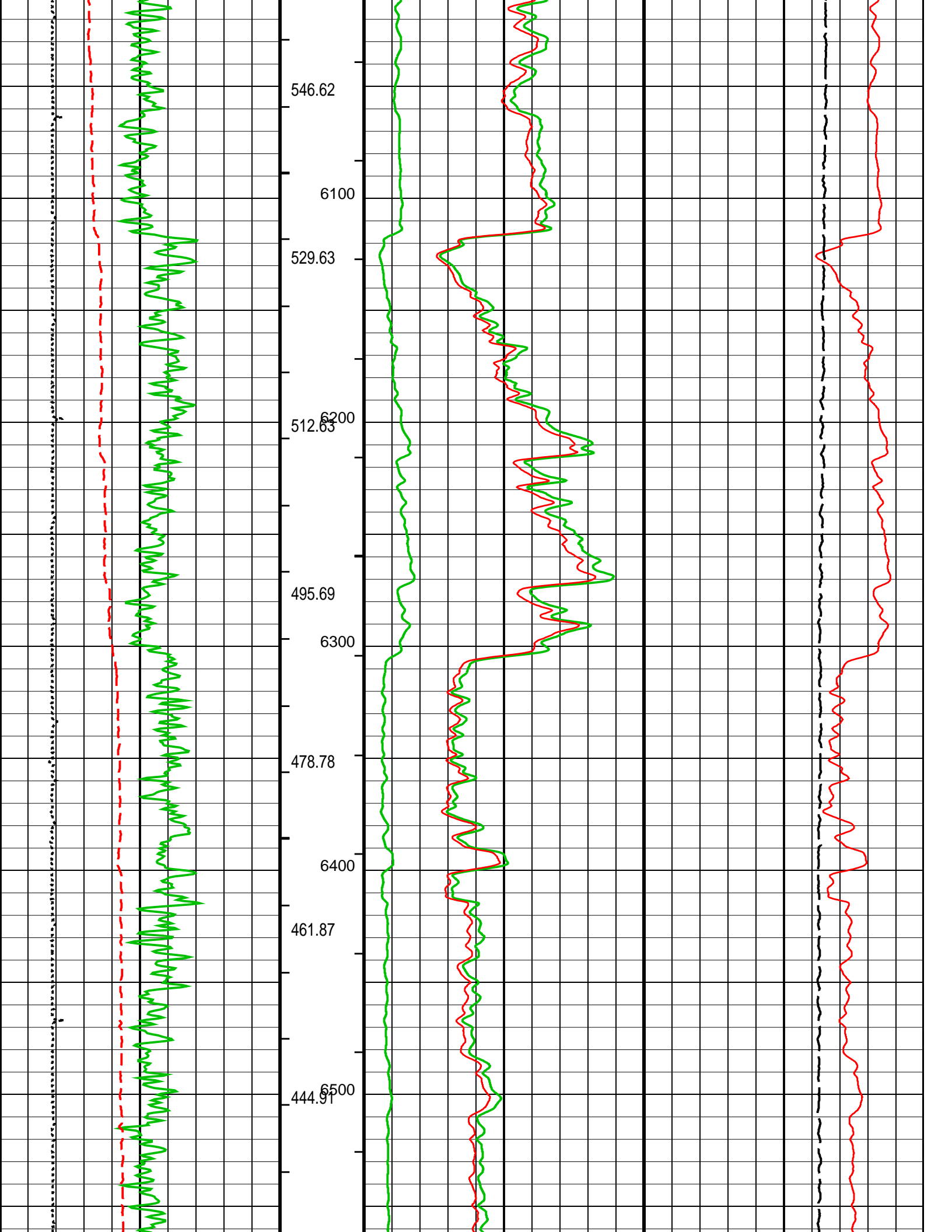


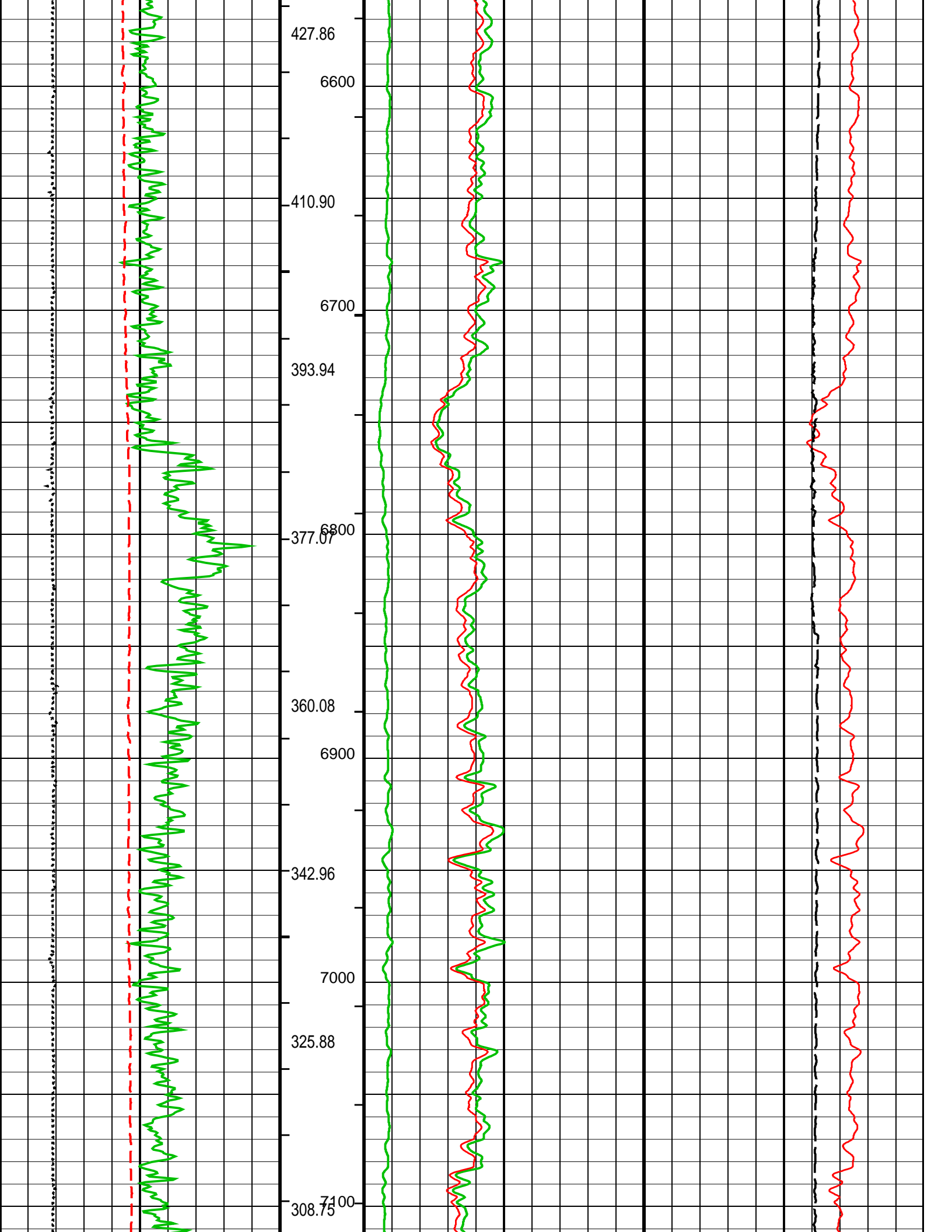


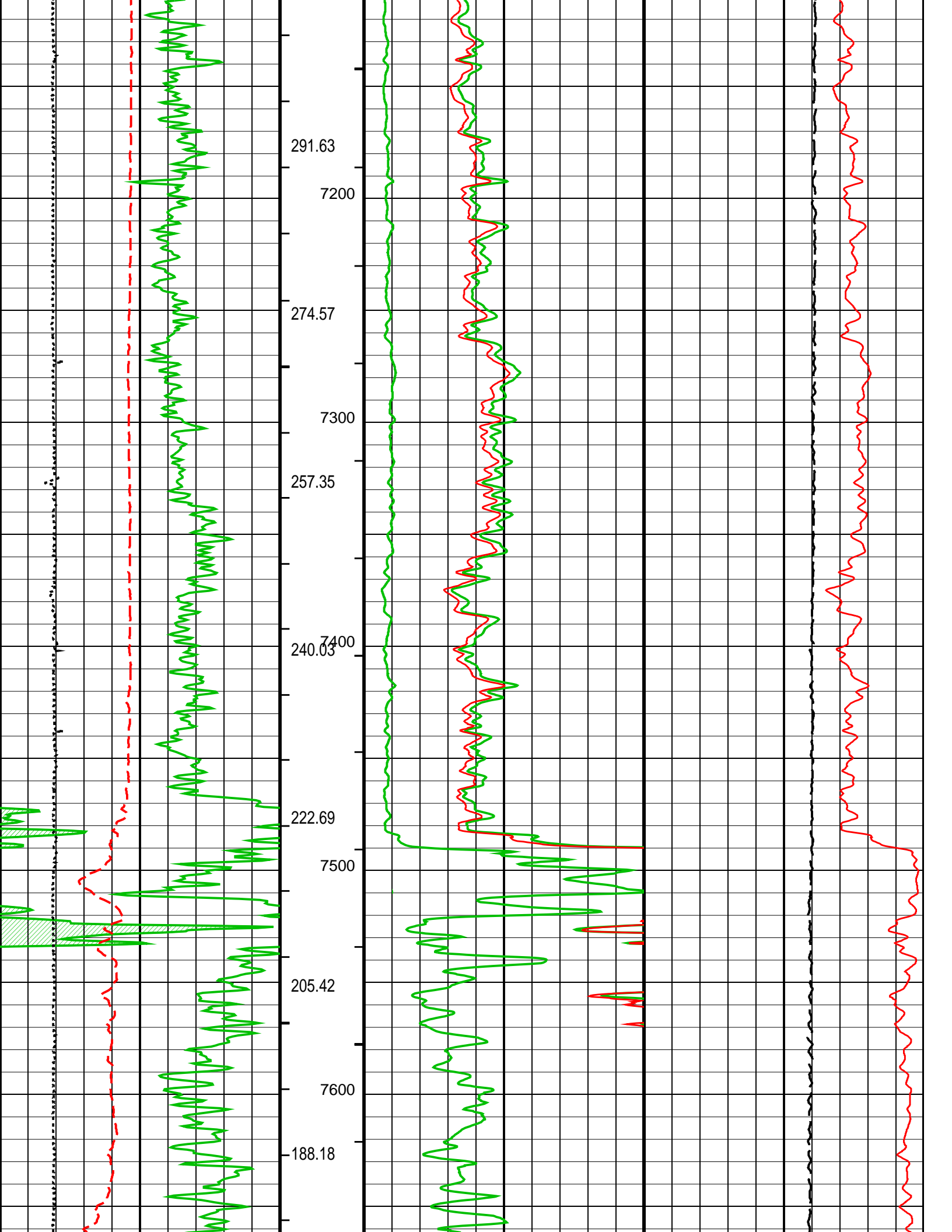


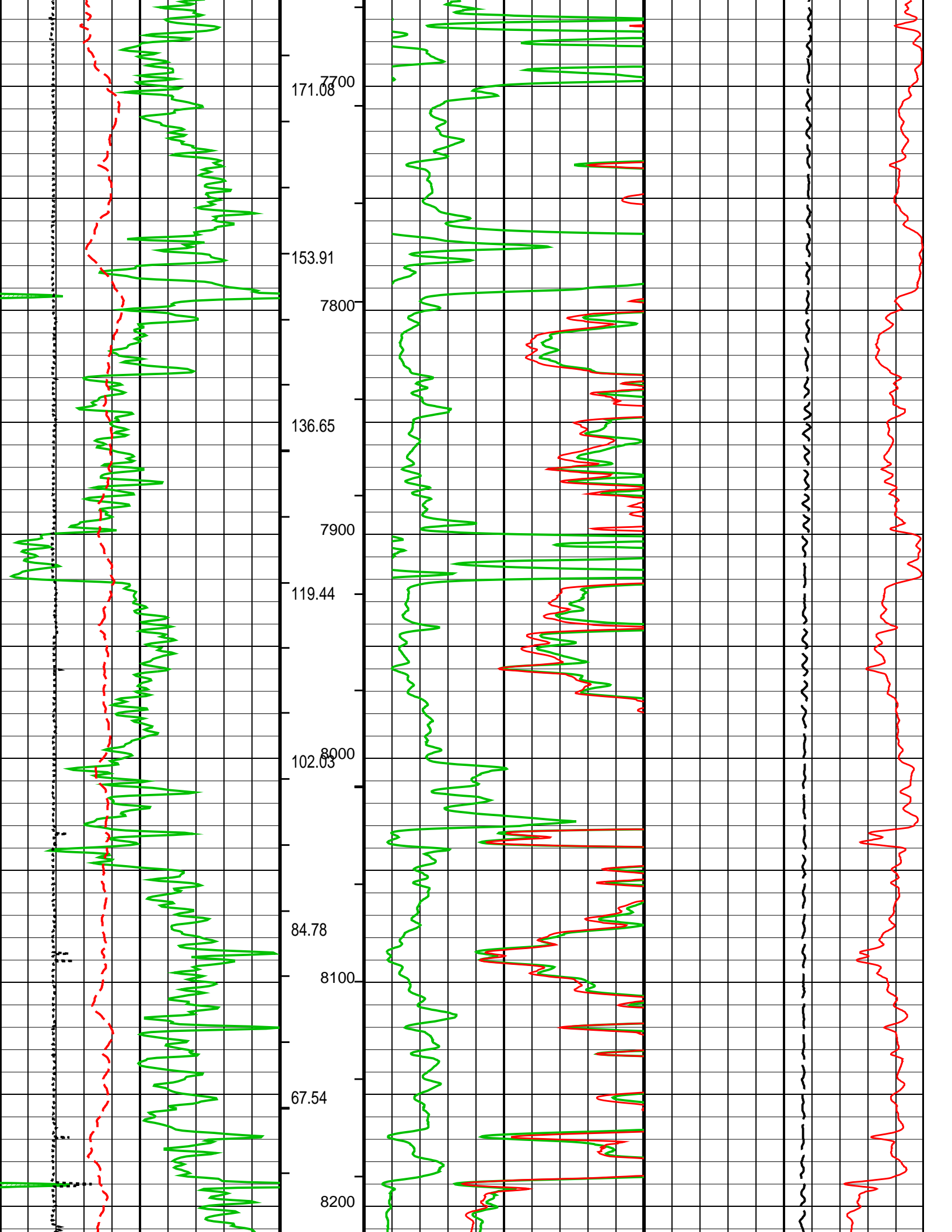


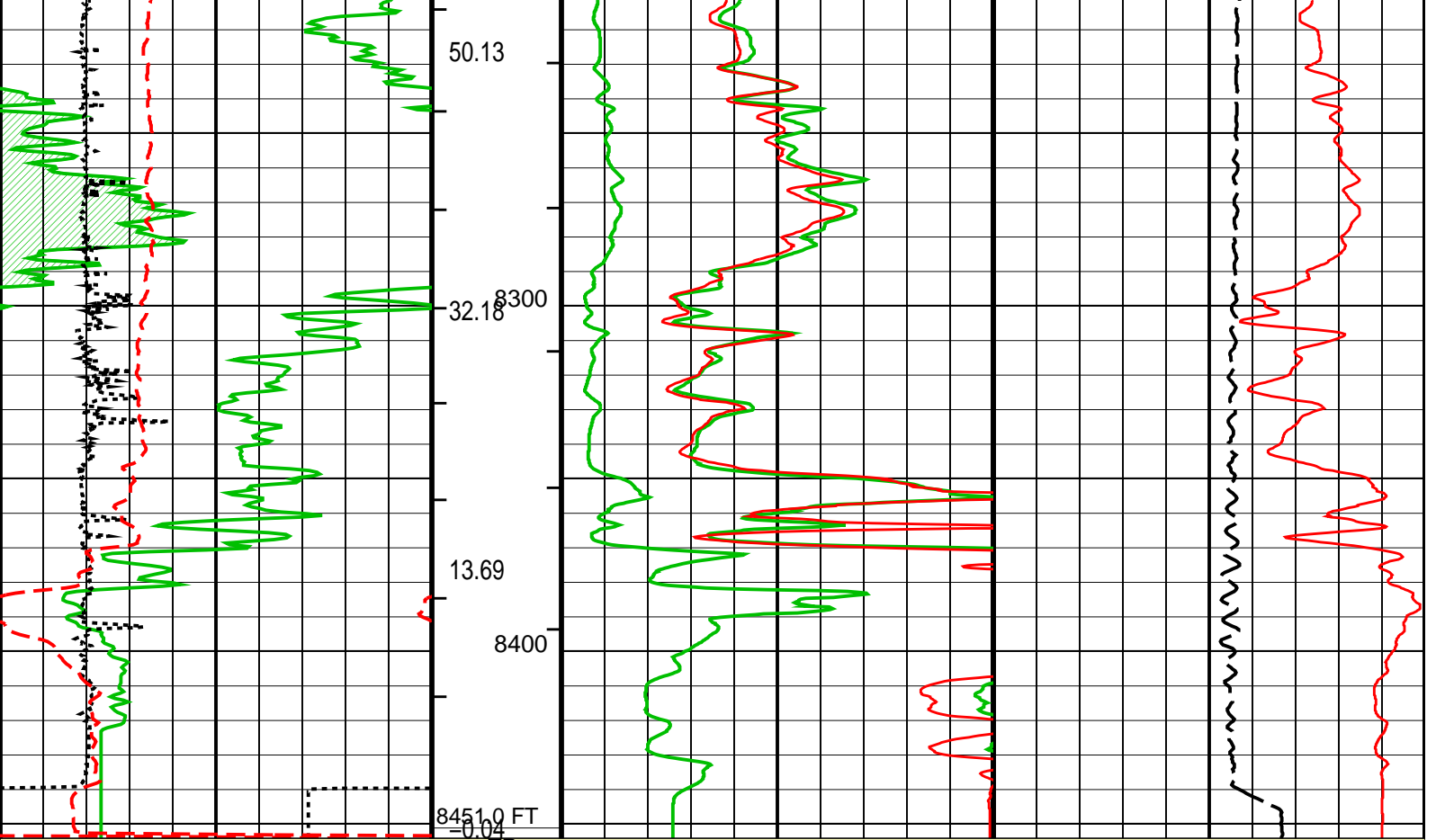












MAIN PASS: *** PLATFORM EXPRESS - ARRAY INDUCTION ***

Gamma Ray Backup	Cement Volume (ICV) (F3)	AIT-H 10 Inch Investigation (AHF10) (OHMM)		AIT-H 90 Inch Investigation Conductivity (AHFCO90) (MM/M)	
Gamma Ray (GR) (GAPI)		0	50	1000	0
Caliper (HCAL) (IN)		AIT-H 10 Inch Investigation (AHF10) (OHMM)		Tension (TENS) (LBF)	
SP (SP) (MV)		0	10	10000	0
		AIT-H 90 Inch Investigation (AHF90) (OHMM)			
		0	10		

PIP SUMMARY

- └ Integrated Cement Volume Major Pip Every 100 F3
- └ Integrated Cement Volume Minor Pip Every 10 F3
- └ Integrated Hole Volume Major Pip Every 100 F3
- └ Integrated Hole Volume Minor Pip Every 10 F3

Parameters

DLIS Name	Description	Value
HILTB-FTB: High resolution Integrated Logging Tool-DTS		
AHBHM	Array Induction Borehole Correction Mode	2_ComputeStandoff
AHBHV	Array Induction Borehole Correction Code Version Number	900
AHBLM	Array Induction Basic Logs Code	6_One_Two_and_Four
AHBLV	Array Induction Basic Logs Code Version Number	223
AHCDE	Array Induction Casing Detection Enable	Yes
AHCEN	Array Induction Tool Centering Flag (in Borehole)	Eccentered
AHFRSV	Array Induction Response Set Version for Four ft Resolution	41.70.24.20
AHMRF	Array Induction Mud Resistivity Factor	1
AHORSV	Array Induction Response Set Version for One ft Resolution	41.70.24.20
AHRFV	Array Induction Radial Profiling Code Version Number	701
AHRPV	Array Induction Radial Parametrization Code Version Number	232
AHSTA	Array Induction Tool Standoff	0.125 IN
AHTRSV	Array Induction Response Set Version for Two ft Resolution	41.70.24.20
BHT	Bottom Hole Temperature (used in calculations)	212 DEGF
FEXP	Form Factor Exponent	2
FNUM	Form Factor Numerator	4

FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68	DEGF
SPNV	SP Next Value	0	MV
FEQL: Formation Evaluation Quick Look			
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
HOLEV: Integrated Hole/Cement Volume			
BHT	Bottom Hole Temperature (used in calculations)	212	DEGF
FCD	Future Casing (Outer) Diameter	4.5	IN
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
HVCS	Integrated Hole Volume Caliper Selection	AUTOMATIC	
SHT	Surface Hole Temperature	68	DEGF
PERT: Preliminary Evaluation - Real Time			
BHT	Bottom Hole Temperature (used in calculations)	212	DEGF
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68	DEGF
System and Miscellaneous			
BS	Bit Size	7.875	IN
DFD	Drilling Fluid Density	8.40	LB/G
DORL	Depth Offset for Repeat Analysis	0.0	FT
FLEV	Fluid Level	-50000.00	FT
MST	Mud Sample Temperature	58.00	DEGF
TD	Total Depth	-50000	FT

Format: ERES_S2 Vertical Scale: 2" per 100' Graphics File Created: 16-Sep-2011 07:05

OP System Version: 18C0-147

HILTB-FTB	18C0-147	DTC-H	18C0-147
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Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_011LUP	FN:10	PRODUCER	16-Sep-2011 07:05
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UPPER RESISTIVITY LOG 5" = 100'

MAXIS Field Log

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_011LUP	FN:10	PRODUCER	16-Sep-2011 07:05	8454.0 FT	0.0 FT
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OP System Version: 18C0-147

HILTD	18C0-147	DTCH	18C0-147
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- PIP SUMMARY**
- ┌ Integrated Hole Volume Minor Pip Every 10 F3
 - └ Integrated Hole Volume Major Pip Every 100 F3
 - ┌ Integrated Cement Volume Minor Pip Every 10 F3

Time Mark Every 60 S

		Tension (TENS)	
		10000	0
		(LBF)	
		AIT-H 90 Inch Investigation (AHT90)	
		0.2	2000
		(OHMM)	
		AIT-H 60 Inch Investigation (AHT60)	
		0.2	2000
		(OHMM)	
		AIT-H 30 Inch Investigation (AHT30)	
		0.2	2000
		(OHMM)	
		AIT-H 20 Inch Investigation (AHT20)	
		0.2	2000
		(OHMM)	
		AIT-H 10 Inch Investigation (AHT10)	
		0.2	2000
		(OHMM)	

SP (SP)
(MV) -160 40

Caliper (HCAL)
(IN) 6 16

Gamma Ray (GR)
(GAPI) 0 200

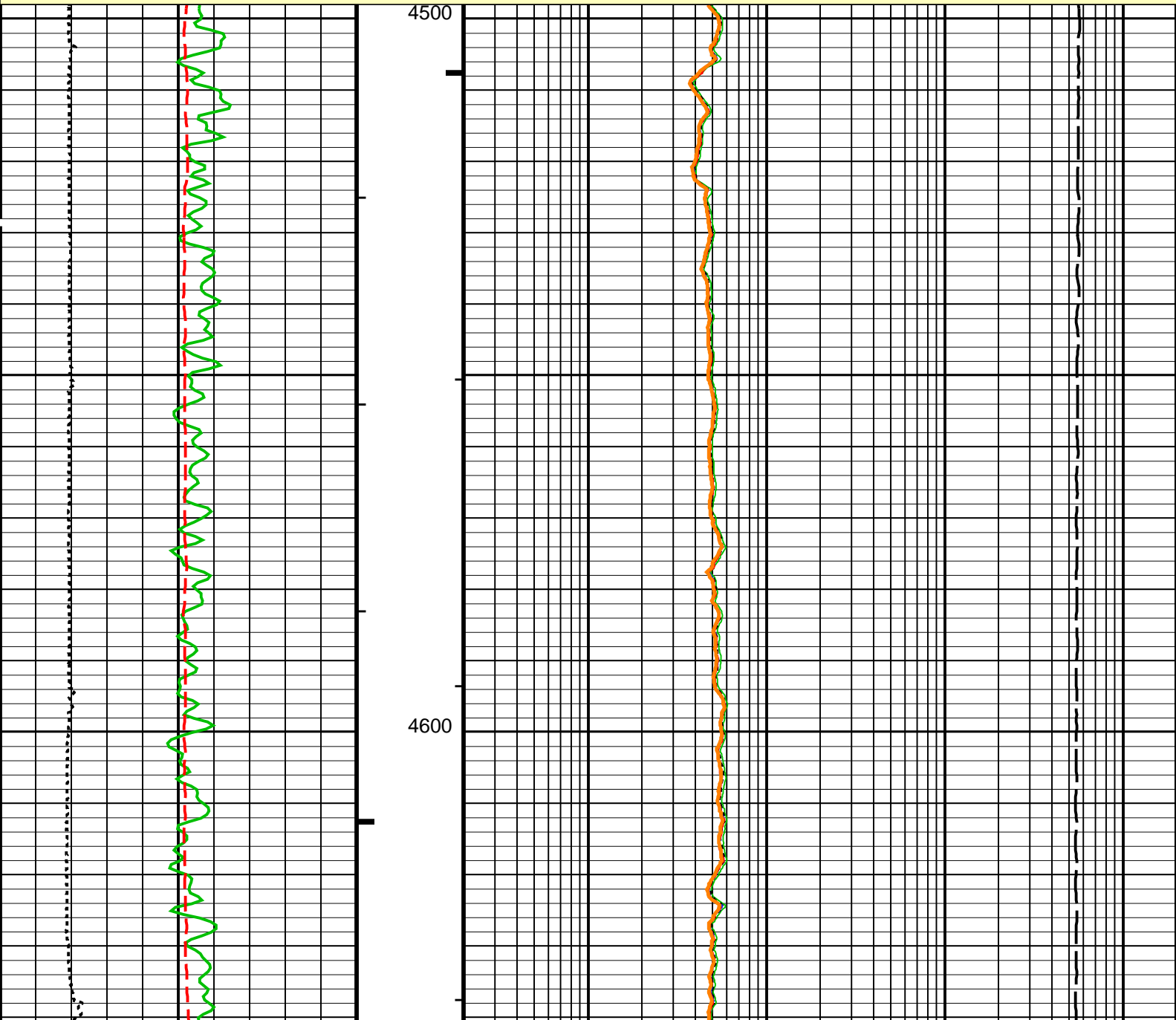
Gamma Ray Backup

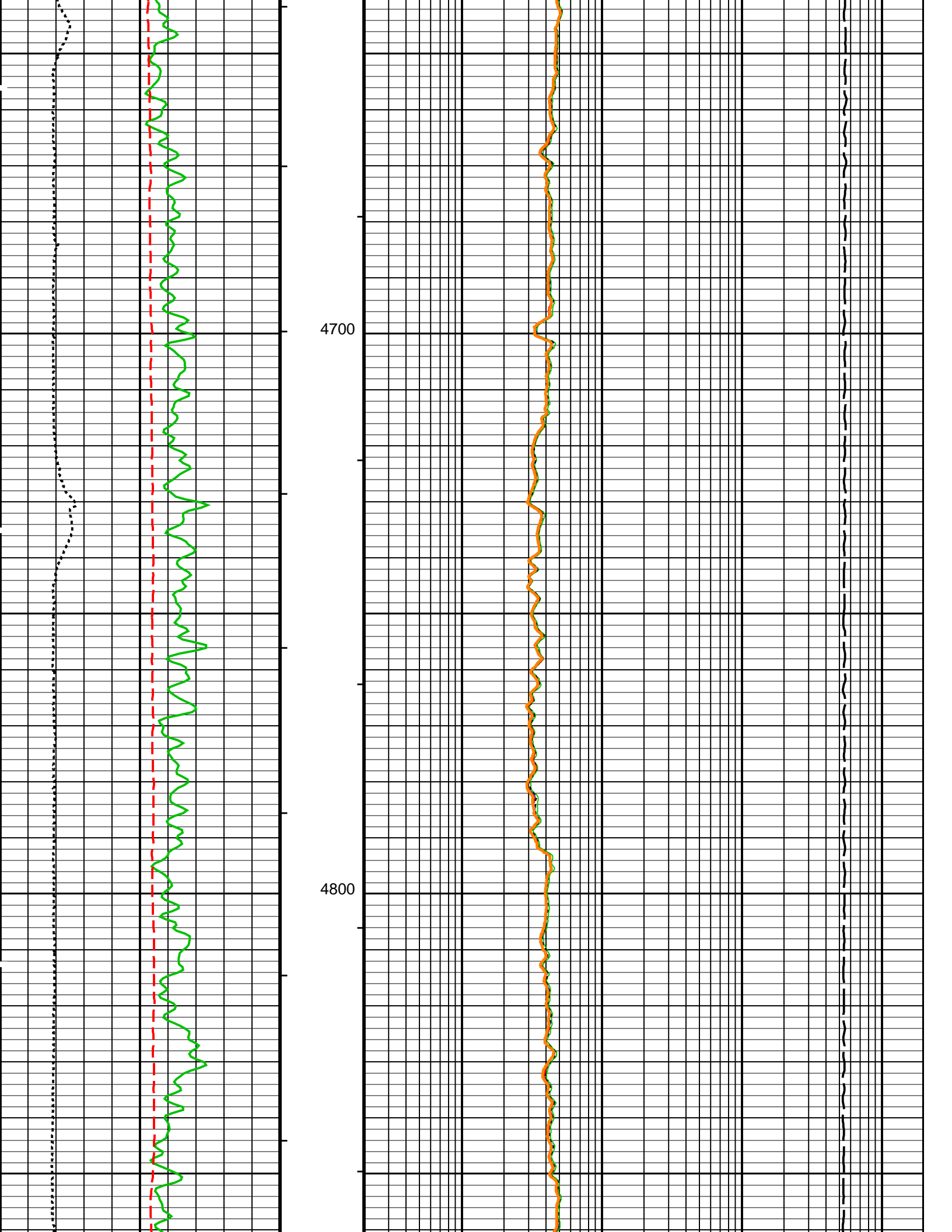
Stuck
Stretch
(STIT)
0 (F) 50

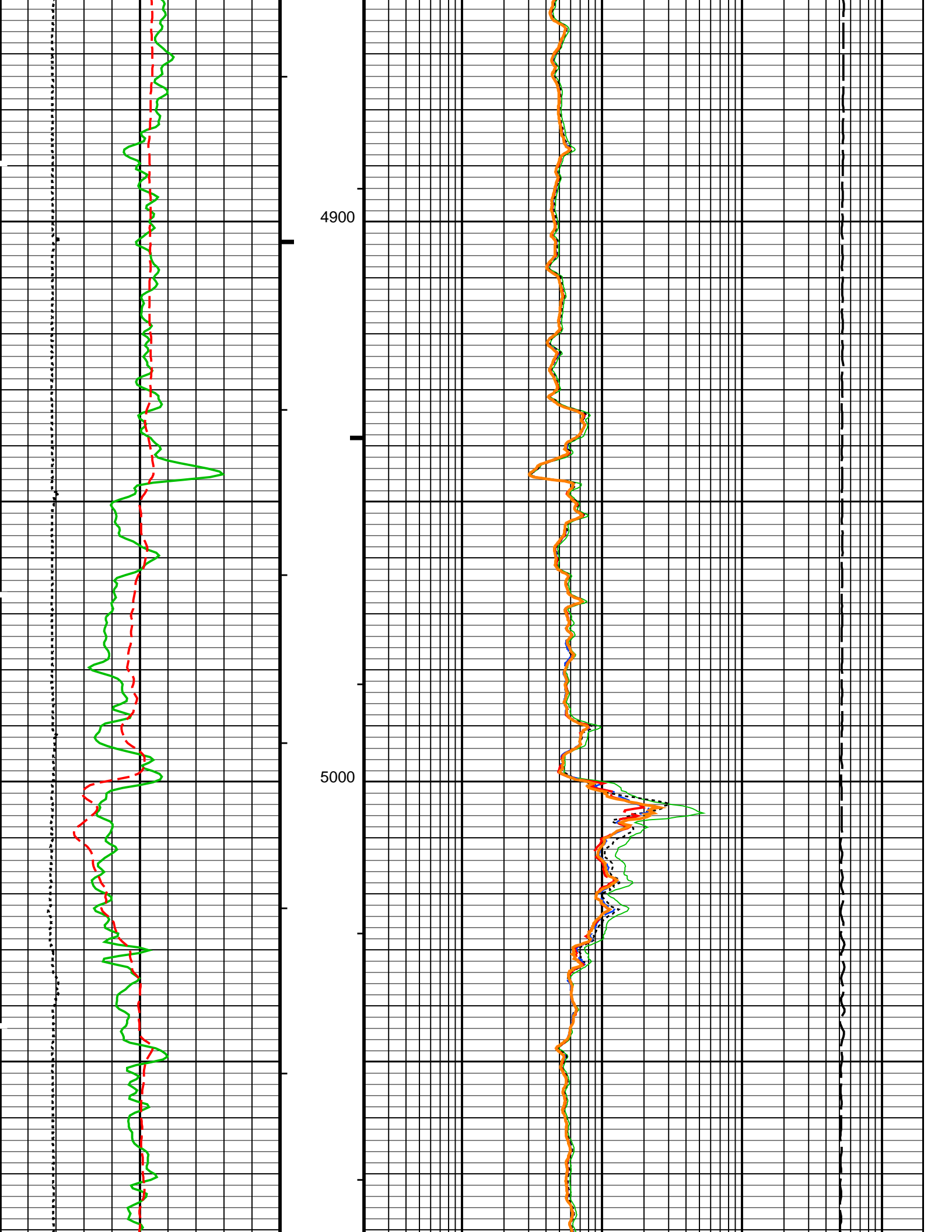
Tool/Tot.
Drag

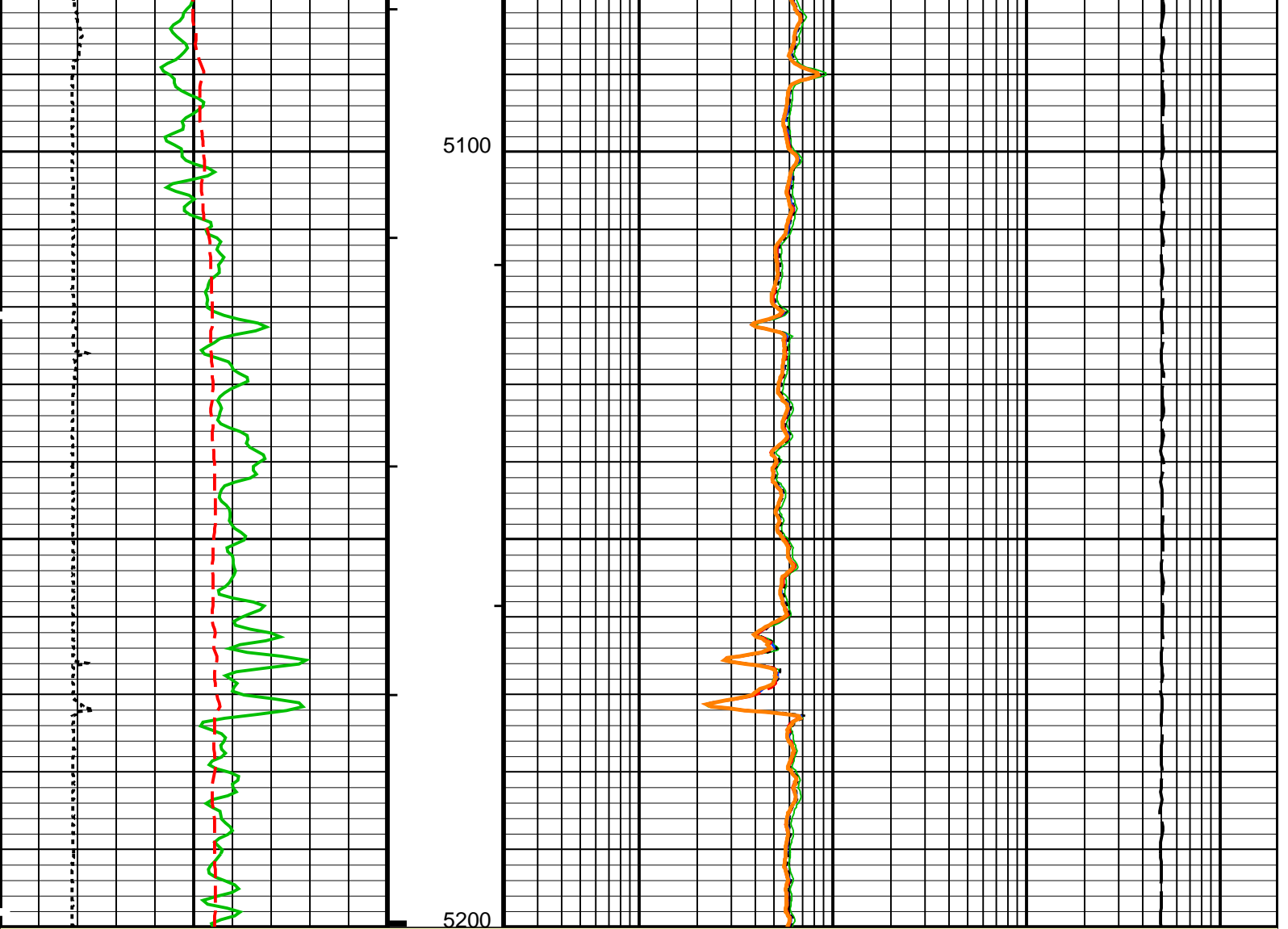
Cable
Drag

MAIN PASS: *** PLATFORM EXPRESS - ARRAY INDUCTION ***









MAIN PASS: *** PLATFORM EXPRESS – ARRAY INDUCTION ***

Gamma Ray Backup	Cable Drag	0.2	AIT-H 10 Inch Investigation (AHT10) (OHMM)	2000
Gamma Ray (GR) (GAPI) 200	Tool/Tot. Drag	0.2	AIT-H 20 Inch Investigation (AHT20) (OHMM)	2000
Caliper (HCAL) (IN) 6 16	Stuck Stretch (STIT) (F) 0 50	0.2	AIT-H 30 Inch Investigation (AHT30) (OHMM)	2000
SP (SP) (MV) -160 40		0.2	AIT-H 60 Inch Investigation (AHT60) (OHMM)	2000
		0.2	AIT-H 90 Inch Investigation (AHT90) (OHMM)	2000
			Tension (TENS) (LBF)	10000 0

PIP SUMMARY

- ┆ Integrated Hole Volume Minor Pip Every 10 F3
- ┆ Integrated Hole Volume Major Pip Every 100 F3
- ┆ Integrated Cement Volume Minor Pip Every 10 F3
- ┆ Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
HILTB-FTB: High resolution Integrated Logging Tool-DTS			
AHBHM	Array Induction Borehole Correction Mode	2_COMPUTESTANDOFF	
AHBHV	Array Induction Borehole Correction Code Version Number	900	
AHBLM	Array Induction Basic Logs Mode	6_ONE_TWO_AND_FOUR	
AHBLV	Array Induction Basic Logs Code Version Number	223	
AHCDE	Array Induction Casing Detection Enable	YES	
AHCEN	Array Induction Tool Centering Flag (in Borehole)	ECCENTERED	
AHFRSV	Array Induction Response Set Version for Four ft Resolution	41.70.24.20	
AHMRF	Array Induction Mud Resistivity Factor	1.000	
AHORSV	Array Induction Response Set Version for One ft Resolution	41.70.24.20	
AHRFV	Array Induction Radial Profiling Code Version Number	701	
AHRPV	Array Induction Radial Parametrization Code Version Number	232	
AHSAP	Array Induction Suspend Answer Product Processing	0_NOSUSPENSION	
AHSTA	Array Induction Tool Standoff	0.125	in
AHTRSV	Array Induction Response Set Version for Two ft Resolution	41.70.24.20	
BHT	Bottom Hole Temperature (used in calculations)	212.0	degF
FEXP	Form Factor Exponent	2.000	
FNUM	Form Factor Numerator	1.000	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
GRSE	Generalized Mud Resistivity Selection	AHMF	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68.000	degF
SPDR	SP Drift	0.000	mV/ft
SPNV	SP Next Value	0.000	mV
FEQL: Formation Evaluation Quick Look			
FEXP	Form Factor Exponent	2.000	
FNUM	Form Factor Numerator	1.000	
HOLEV: Integrated Hole/Cement Volume			
BHT	Bottom Hole Temperature (used in calculations)	212.0	degF
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
GRSE	Generalized Mud Resistivity Selection	AHMF	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68.000	degF
PERT: Preliminary Evaluation - Real Time			
BHT	Bottom Hole Temperature (used in calculations)	212.0	degF
FEXP	Form Factor Exponent	2.000	
FNUM	Form Factor Numerator	1.000	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
GRSE	Generalized Mud Resistivity Selection	AHMF	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68.000	degF
STI: Stuck Tool Indicator			
STKT	STI Stuck Threshold	2.500	ft
TDD	Total Depth - Driller	8471.0	ft
TDL	Total Depth - Logger	8471.0	ft
System and Miscellaneous			
BS	Bit Size	7.875	in
DFD	Drilling Fluid Density	8.400	lbm/gal
FLEV	Fluid Level		
MST	Mud Sample Temperature	58.000	degF
TD	Total Depth		

Format: LOWER_GRES Vertical Scale: 5" per 100' Graphics File Created: 16-Sep-2011 07:40

OP System Version: 18C0-147

HILTD 18C0-147 DTCH 18C0-147

Input DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_011LUP FN:10 PRODUCER 16-Sep-2011 07:05 8454.0 FT 0.0 FT



MAIN RESISTIVITY LOG 5" = 100'

Output DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_011LUP FN:10 PRODUCER 16-Sep-2011 07:05

OP System Version: 18C0-147

HILTB-FTB 18C0-147 DTC-H 18C0-147

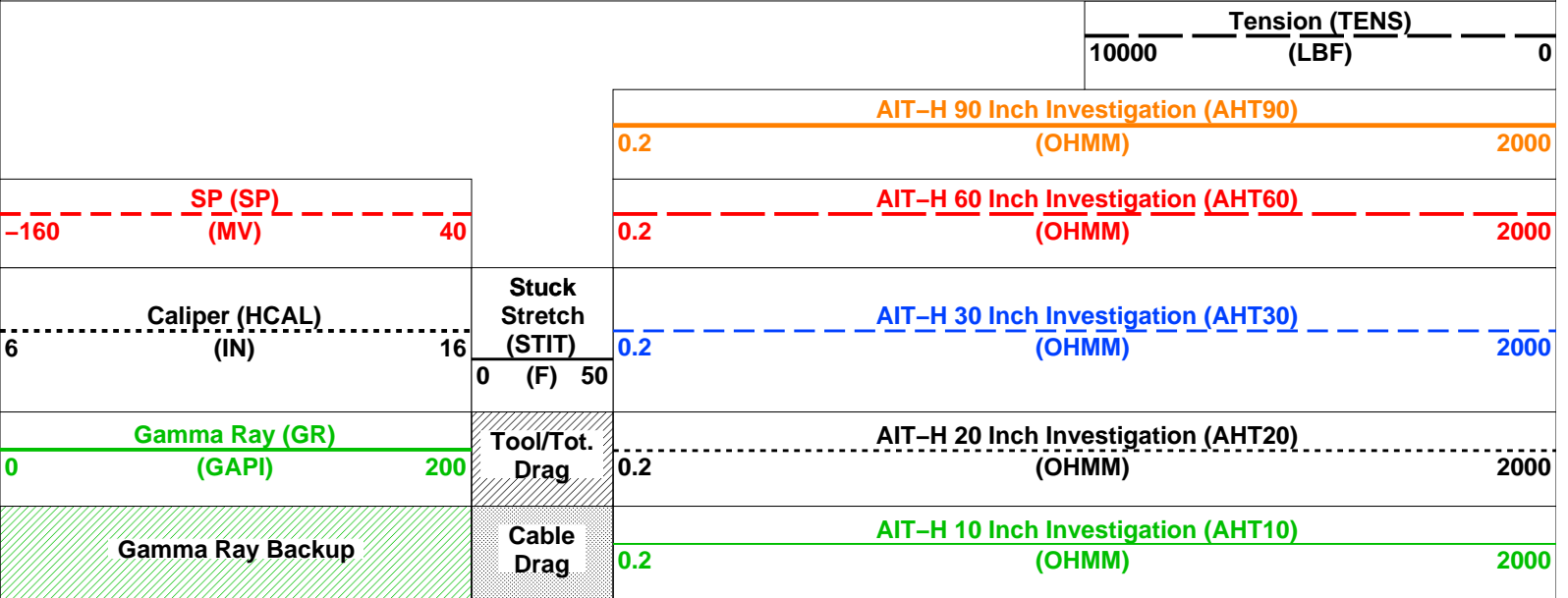
Changed Parameter Summary

DLIS Name	New Value	Previous Value	Depth & Time
TDL	8451.00 FT	8471.00 FT	8392.3 07:05:49

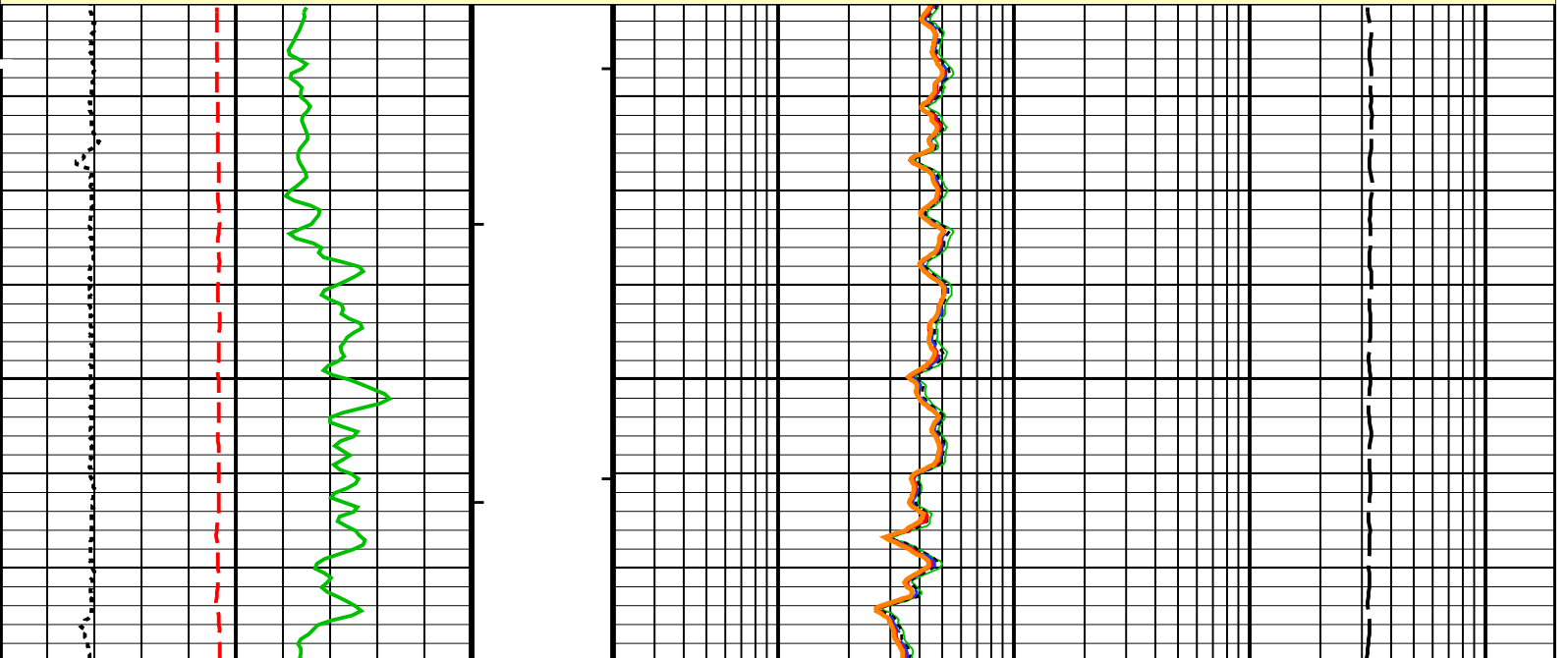
PIP SUMMARY

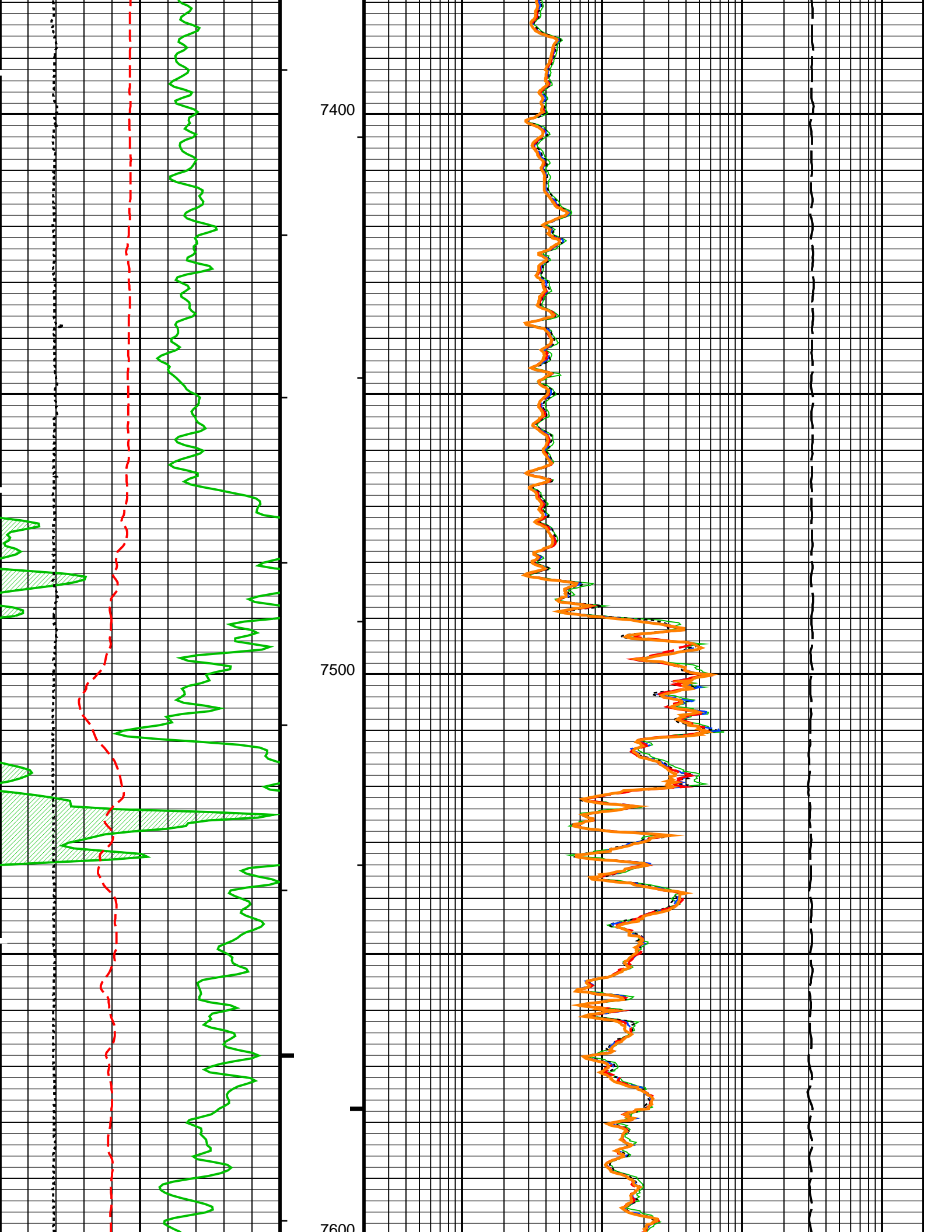
- ┆ Integrated Hole Volume Minor Pip Every 10 F3
- ┆ Integrated Hole Volume Major Pip Every 100 F3
 - ┆ Integrated Cement Volume Minor Pip Every 10 F3
 - ┆ Integrated Cement Volume Major Pip Every 100 F3

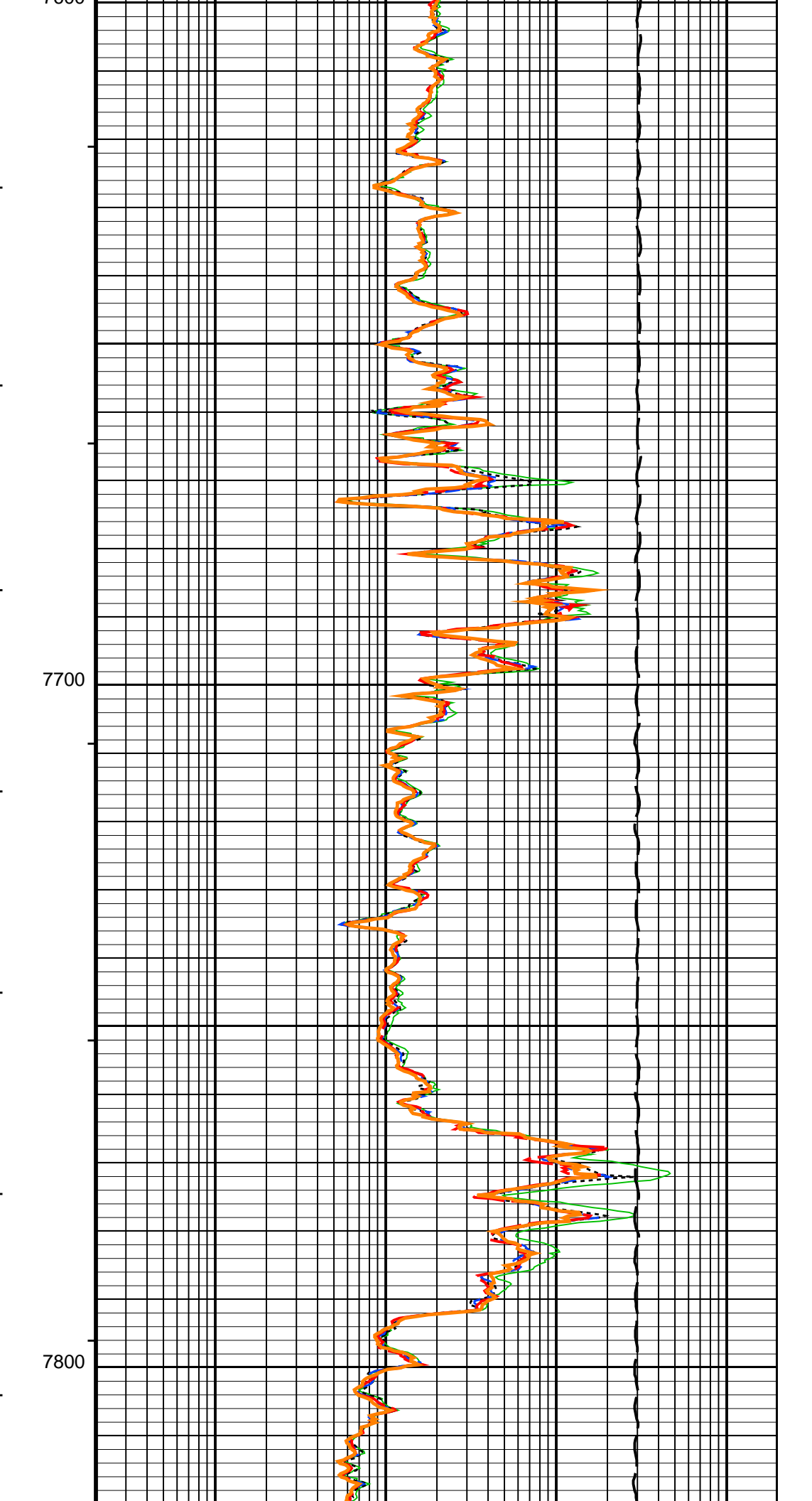
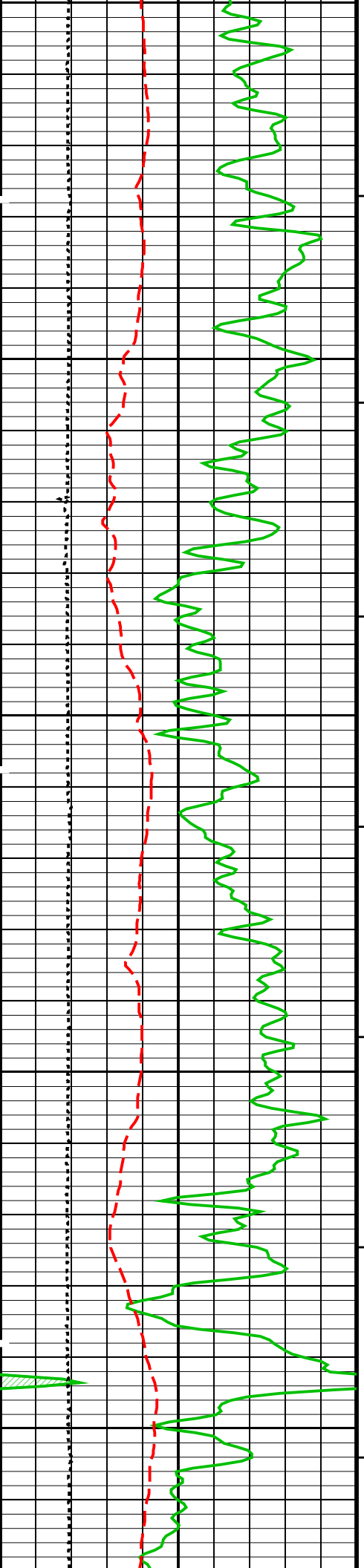
Time Mark Every 60 S

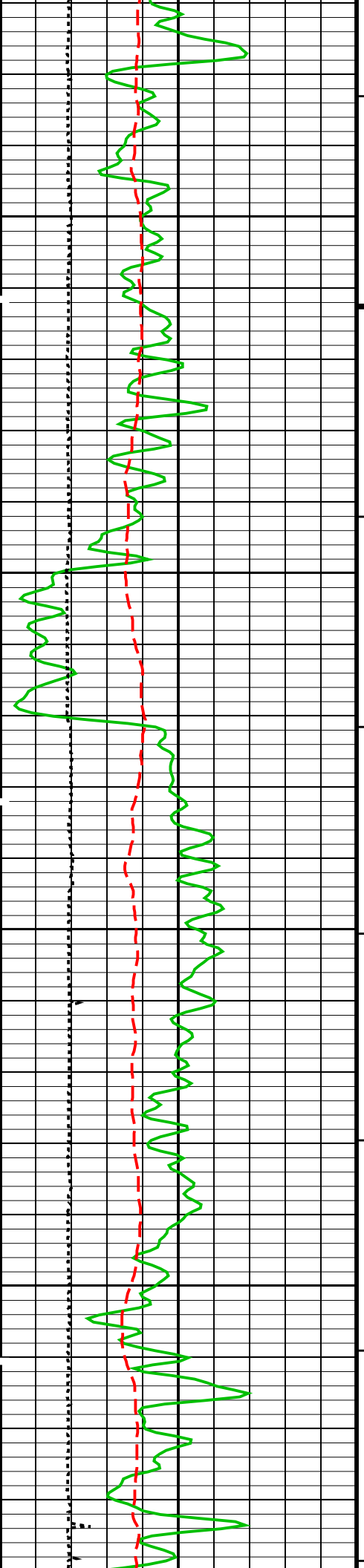


MAIN PASS: *** PLATFORM EXPRESS - ARRAY INDUCTION ***



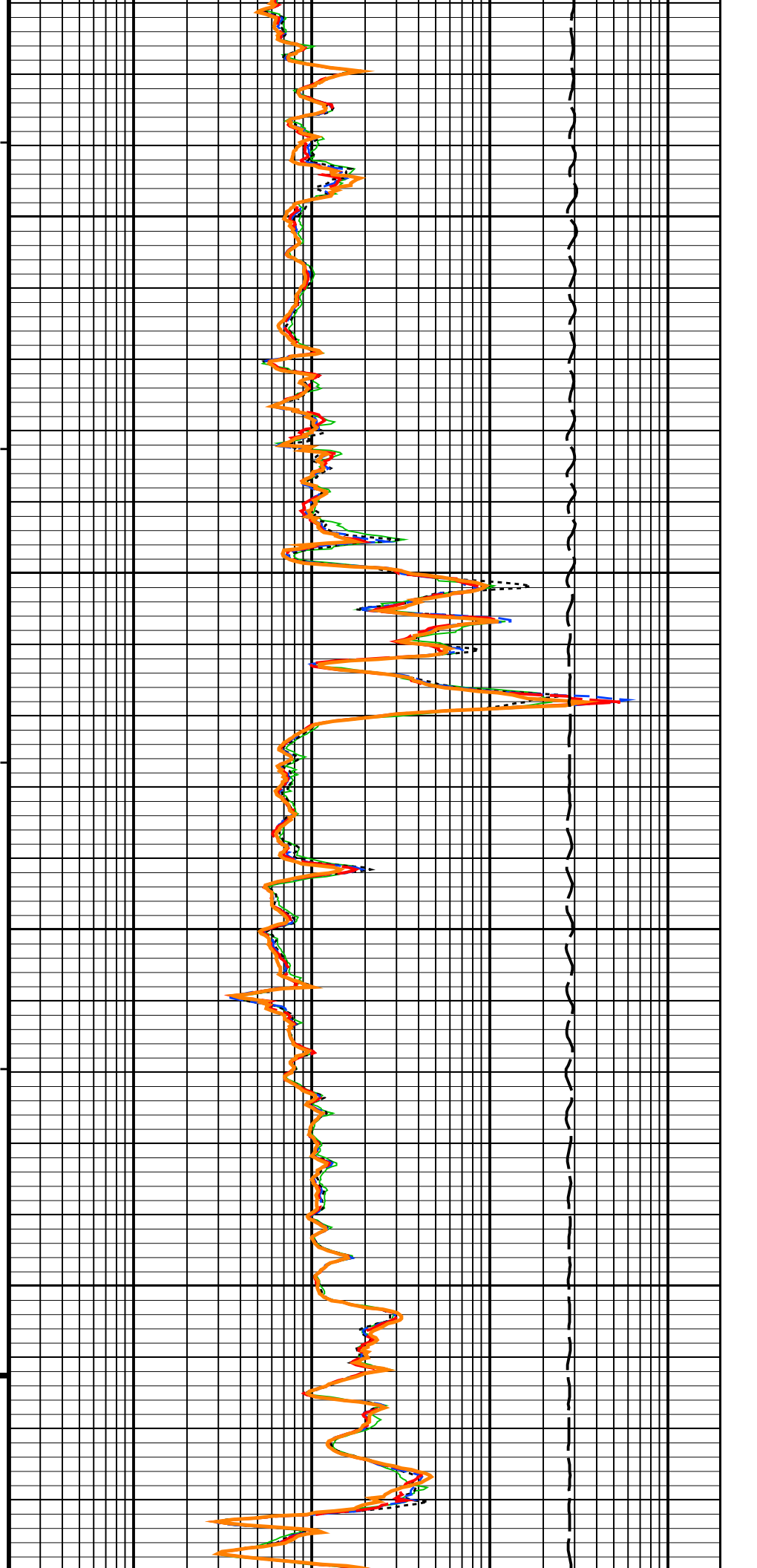


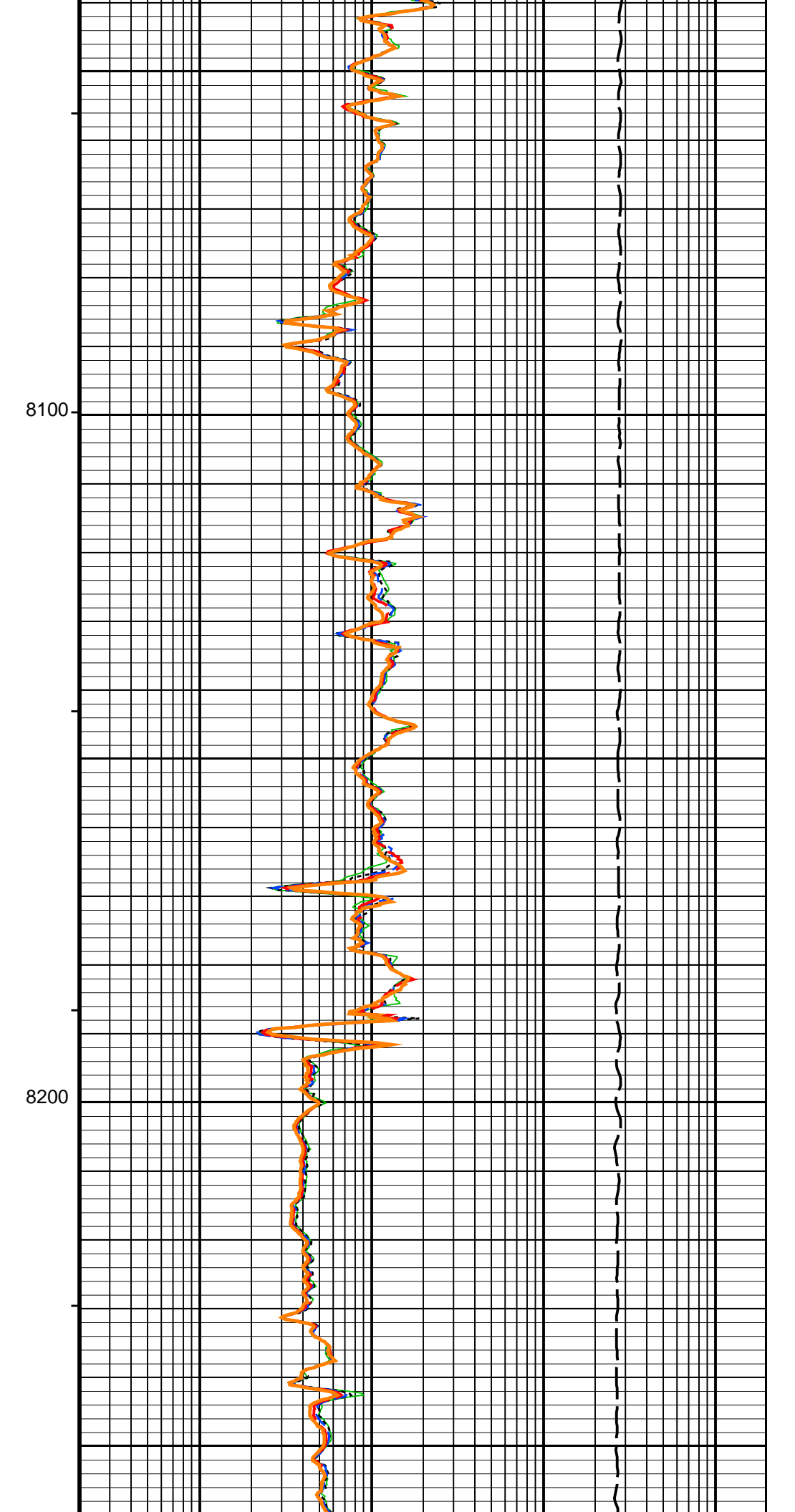
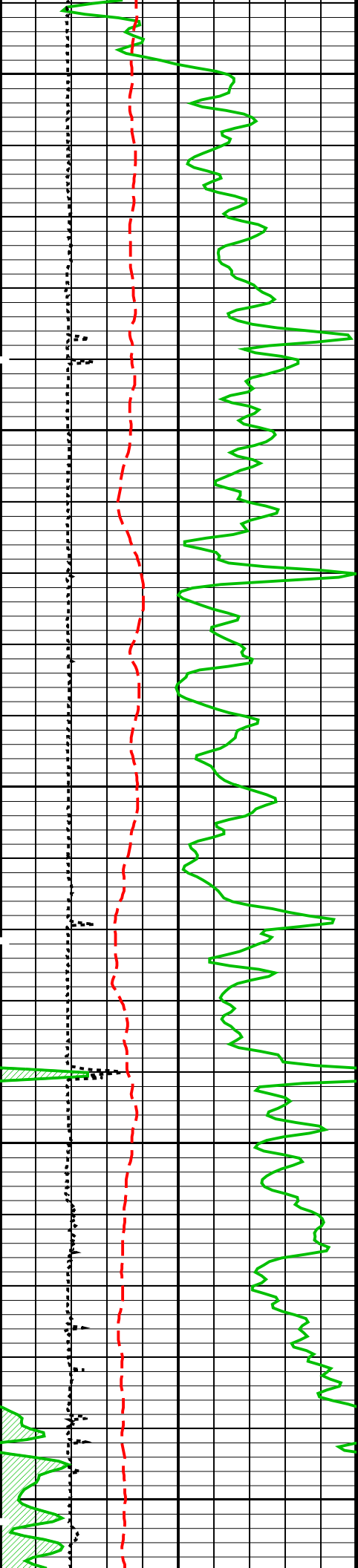


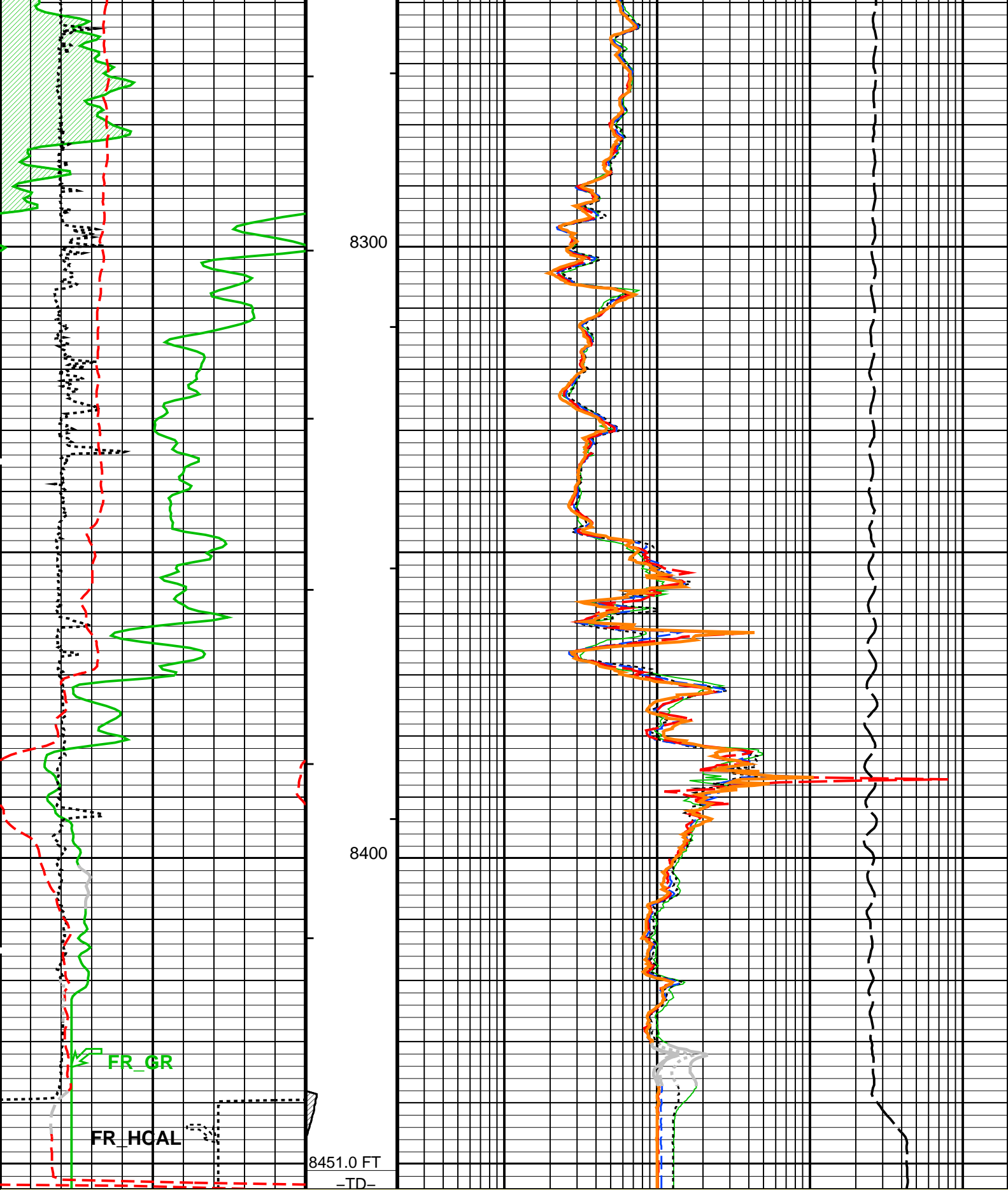


7900

8000







MAIN PASS: *** PLATFORM EXPRESS - ARRAY INDUCTION ***

Gamma Ray Backup	Cable Drag	0.2	AIT-H 10 Inch Investigation (AHT10) (OHMM)	2000
Gamma Ray (GR) (GAPI)	Tool/Tot. Drag	0.2	AIT-H 20 Inch Investigation (AHT20) (OHMM)	2000
0				
200				

6	Caliper (HCAL) (IN)	16	0.2	AIT-H 30 Inch Investigation (AHT30) (OHMM)	2000
		0 (F) 50			
-160	SP (SP) (MV)	40	0.2	AIT-H 60 Inch Investigation (AHT60) (OHMM)	2000
			0.2	AIT-H 90 Inch Investigation (AHT90) (OHMM)	2000
				Tension (TENS) (LBF)	10000 0

PIP SUMMARY

- ┆ Integrated Hole Volume Minor Pip Every 10 F3
- ┆ Integrated Hole Volume Major Pip Every 100 F3
- ┆ Integrated Cement Volume Minor Pip Every 10 F3
- ┆ Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

AIT-H Answer Product Processing Summary. Data taken with Tool # 392 (AHTNO)

...Acquired data from HILT/HAIT

**** Borehole Correction ****

Effective Tool Standoff computed. Borehole diameter and mud res. taken as input (see GCSE and GRSE parameters)

Tool is run in ECCENTERED mode with a tool stand-off of 0.13 IN. Bit Size is 7.88 IN.

**** Input Selections to AIT-H Answer Product Processing ****

Caliper (GCSE): HCAL Mud Resistivity (GRSE): AHMF Temperature (GTSE): HTEM Porosity (FPHI): DPHZ

**** Other Parameters used by AIT-H Answer Product Processing ****

Form Factor Exponent (FEXP) 2.000 Form Factor Numerator (FNUM) 1.000
Mud Filtrate Sample Resistivity (RMFS) 1.747 OHMM Mud Filtrate Sample Temperature (MFST) 58.000 DEG F
Resitivity Connate Water (RW) 1.000 OHMM

**** AIT-H Answer Product Processing Control Parameters ****

(AHAPL): 3_BholeCorr_BasicLogs_Radial_Processing

(AHBHM): 2_ComputeStandoff (AHBLM): 6_One_Two_and_Four (AHRPM): 6_One_Two_and_Four

Parameters

DLIS Name	Description	Value
HILTB-FTB: High resolution Integrated Logging Tool-DTS		
AHBHM	Array Induction Borehole Correction Mode	2_ComputeStandoff
AHBHV	Array Induction Borehole Correction Code Version Number	900
AHBLM	Array Induction Basic Logs Mode	6_One_Two_and_Four
AHBLV	Array Induction Basic Logs Code Version Number	223
AHCDE	Array Induction Casing Detection Enable	Yes
AHCEN	Array Induction Tool Centering Flag (in Borehole)	Eccentered
AHFRSV	Array Induction Response Set Version for Four ft Resolution	41.70.24.20
AHMRF	Array Induction Mud Resistivity Factor	1
AHORSV	Array Induction Response Set Version for One ft Resolution	41.70.24.20
AHRFV	Array Induction Radial Profiling Code Version Number	701
AHRPV	Array Induction Radial Parametrization Code Version Number	232
AHSTA	Array Induction Tool Standoff	0.125 IN
AHTRSV	Array Induction Response Set Version for Two ft Resolution	41.70.24.20
BHT	Bottom Hole Temperature (used in calculations)	212 DEG F
FEXP	Form Factor Exponent	2
FNUM	Form Factor Numerator	1
GCSE	Generalized Caliper Selection	HCAL
GDEV	Average Angular Deviation of Borehole from Normal	0 DEG
GGRD	Geothermal Gradient	0.01 DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST
GTSE	Generalized Temperature Selection	HSTS_HTEM
SHT	Surface Hole Temperature	68 DEG F
SPNV	SP Next Value	0 MV
FEQL: Formation Evaluation Quick Look		
FEXP	Form Factor Exponent	2
FNUM	Form Factor Numerator	1
HOLEV: Integrated Hole/Cement Volume		
BHT	Bottom Hole Temperature (used in calculations)	212 DEG F
FCD	Future Casing (Outer) Diameter	4.5 IN
GCSE	Generalized Caliper Selection	HCAL

GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
HVCS	Integrated Hole Volume Caliper Selection	AUTOMATIC	
SHT	Surface Hole Temperature	68	DEGF
PERT: Preliminary Evaluation – Real Time			
BHT	Bottom Hole Temperature (used in calculations)	212	DEGF
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68	DEGF
STI: Stuck Tool Indicator			
LBFR	Trigger for MAXIS First Reading Label	TDL	
STKT	STI Stuck Threshold	2.5	FT
TDD	Total Depth – Driller	8471.00	FT
TDL	Total Depth – Logger	8471.00	FT
System and Miscellaneous			
BS	Bit Size	7.875	IN
DFD	Drilling Fluid Density	8.40	LB/G
DORL	Depth Offset for Repeat Analysis	0.0	FT
FLEV	Fluid Level	-50000.00	FT
MST	Mud Sample Temperature	58.00	DEGF
TD	Total Depth	-50000	FT

Format: LOWER_GRES Vertical Scale: 5" per 100' Graphics File Created: 16-Sep-2011 07:05

OP System Version: 18C0-147

HILTB-FTB 18C0-147 DTC-H 18C0-147

Output DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_011LUP FN:10 PRODUCER 16-Sep-2011 07:05



REPEAT ANALYSIS

MAXIS Field Log

Input DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_010PUP FN:9 PRODUCER 16-Sep-2011 07:03 8494.5 FT 8070.5 FT

Output DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_011LUP FN:10 PRODUCER 16-Sep-2011 07:05

OP System Version: 18C0-147

HILTB-FTB 18C0-147 DTC-H 18C0-147

PIP SUMMARY

- ┆ Integrated Hole Volume Minor Pip Every 10 F3
- ┆ Integrated Hole Volume Major Pip Every 100 F3
- ┆ Integrated Cement Volume Minor Pip Every 10 F3
- ┆ Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

TENS_REP Curve (TENS_REP)

SP_REP Curve (SP_REP)
(MV) -160 40

HCAL_REP Curve (HCAL_REP)
(IN) 6 16

GR1_REP Curve (GR_REP)
(GAPI) 200 400

GR_REP Curve (GR_REP)
(GAPI) 0 200

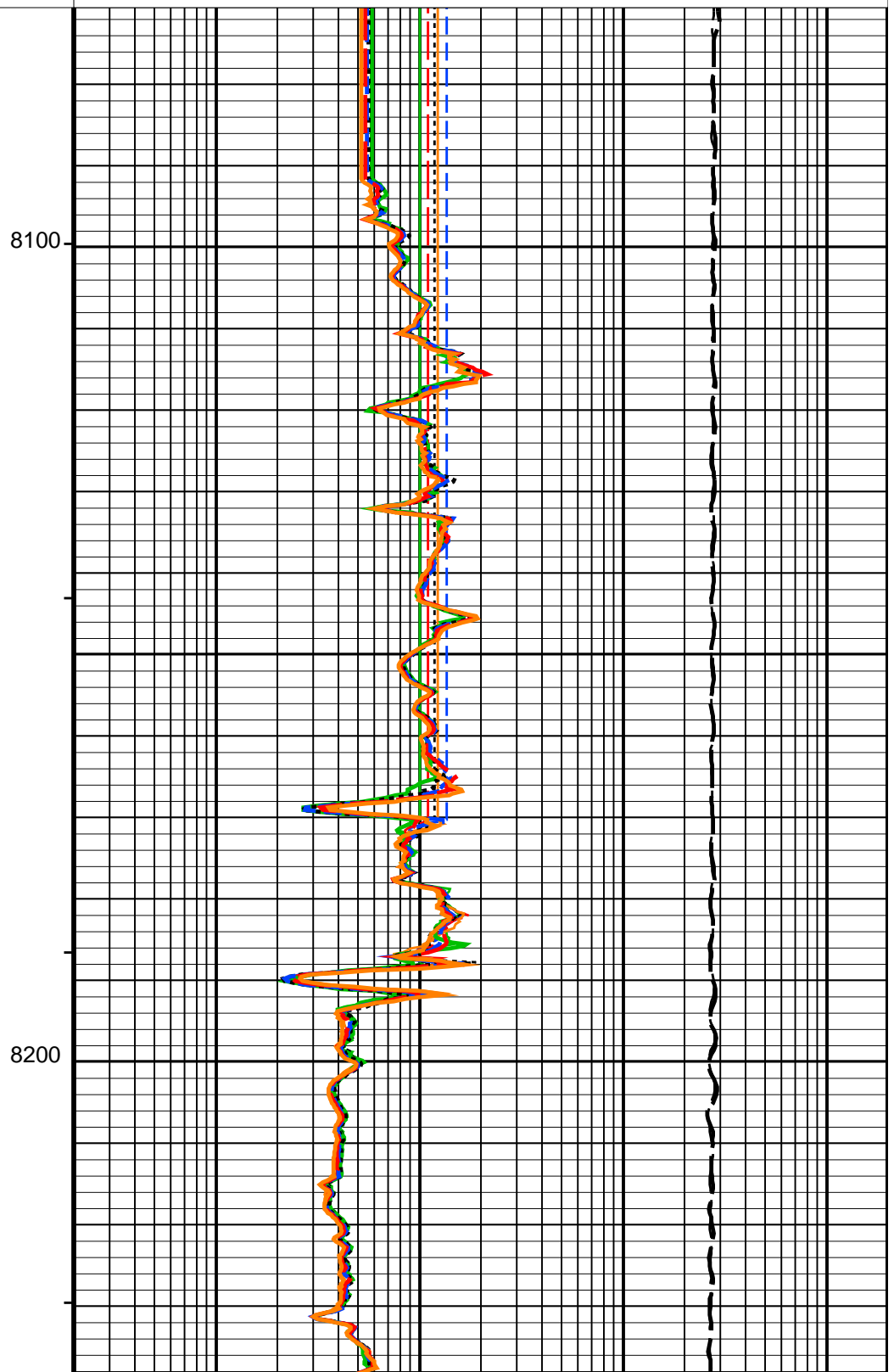
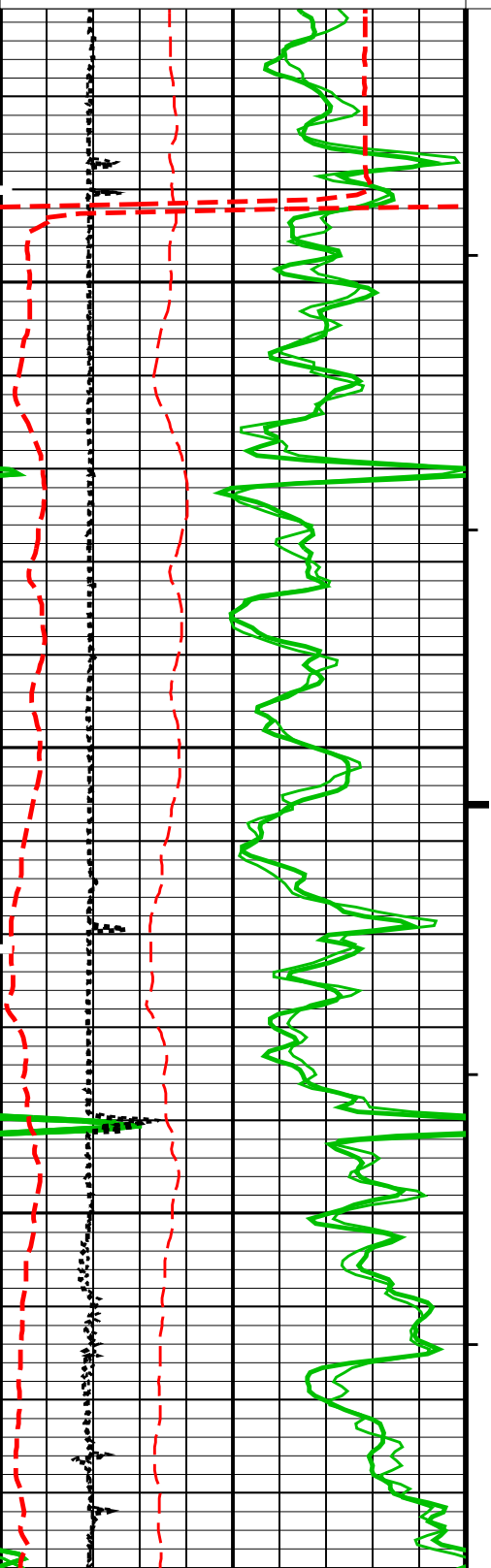
AHT90_REP Curve (AHT90_REP)
(OHMM) 0.2 2000

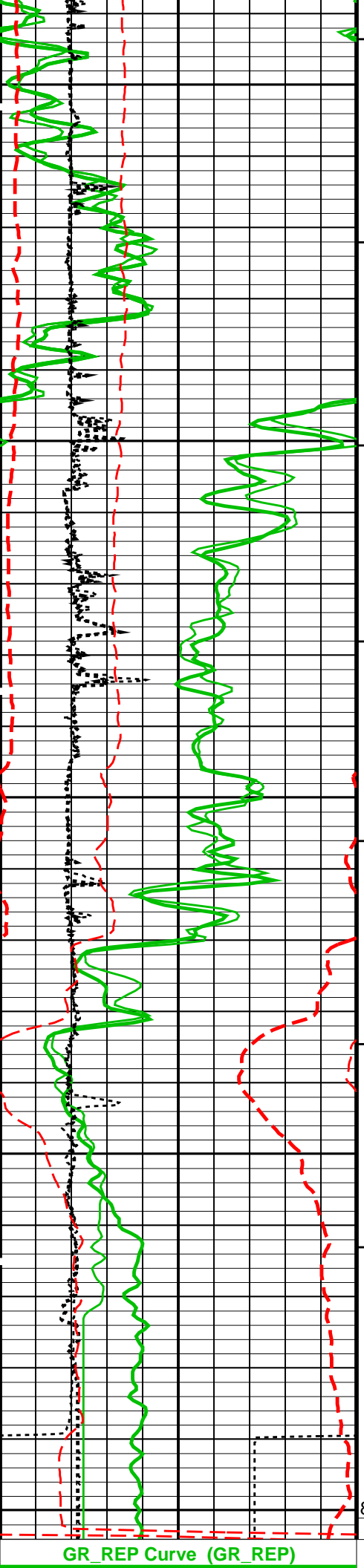
AHT60_REP Curve (AHT60_REP)
(OHMM) 0.2 2000

AHT30_REP Curve (AHT30_REP)
(OHMM) 0.2 2000

AHT20_REP Curve (AHT20_REP)
(OHMM) 0.2 2000

AHT10_REP Curve (AHT10_REP)
(OHMM) 0.2 2000



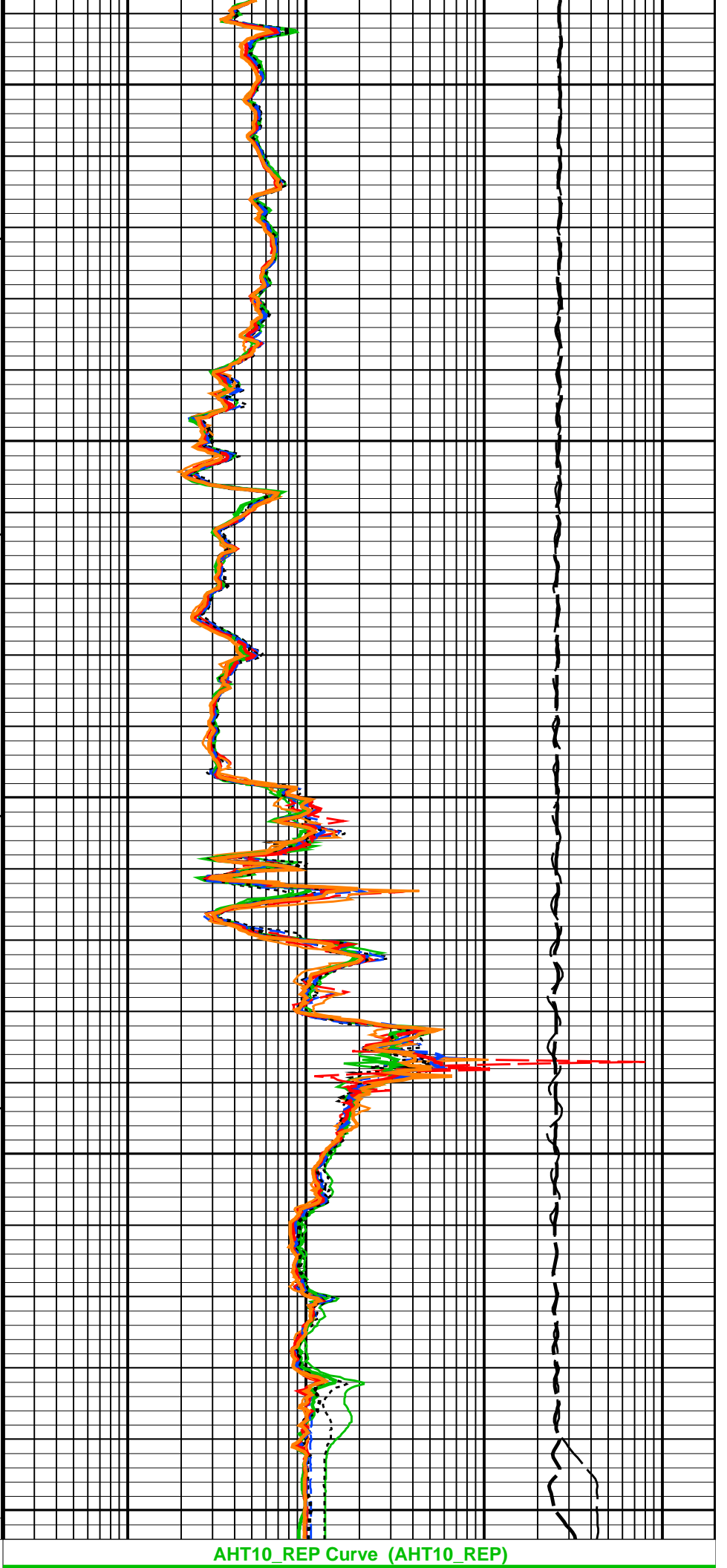


8300

8400

8451.0 FT
-TD-

GR_REP Curve (GR_REP)



AHT10_REP Curve (AHT10_REP)

0	(GAPI)	200
GR1_REP Curve (GR_REP)		
200	(GAPI)	400
HCAL_REP Curve (HCAL_REP)		
6	(IN)	16
SP_REP Curve (SP_REP)		
-160	(MV)	40

0.2	(OHMM)	2000
AHT20_REP Curve (AHT20_REP)		
0.2	(OHMM)	2000
AHT30_REP Curve (AHT30_REP)		
0.2	(OHMM)	2000
AHT60_REP Curve (AHT60_REP)		
0.2	(OHMM)	2000
AHT90_REP Curve (AHT90_REP)		
0.2	(OHMM)	2000
TENS_REP Curve (TENS_REP)		0
10000	(LBF)	

PIP SUMMARY

- ┆ Integrated Hole Volume Minor Pip Every 10 F3
- ┆ Integrated Hole Volume Major Pip Every 100 F3
- ┆ Integrated Cement Volume Minor Pip Every 10 F3
- ┆ Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

AIT-H Answer Product Processing Summary. Data taken with Tool # 392 (AHTNO)

...Acquired data from HILT/HAIT

***** Borehole Correction *****

Effective Tool Standoff computed. Borehole diameter and mud res. taken as input (see GCSE and GRSE parameters)

Tool is run in ECCENTERED mode with a tool stand-off of 0.13 IN. Bit Size is 7.88 IN.

***** Input Selections to AIT-H Answer Product Processing *****

Caliper (GCSE): HCAL Mud Resistivity (GRSE): AHMF Temperature (GTSE): HTEM Porosity (FPHI): DPHZ

***** Other Parameters used by AIT-H Answer Product Processing *****

Form Factor Exponent (FEXP) 2.000 Form Factor Numerator (FNUM) 1.000
Mud Filtrate Sample Resistivity (RMFS) 1.747 OHMM Mud Filtrate Sample Temperature (MFST) 58.000 DEGF
Resitivity Connate Water (RW) 1.000 OHMM

***** AIT-H Answer Product Processing Control Parameters *****

Playback Mode: NORMAL

Parameters

DLIS Name	Description	Value
HILTB-FTB: High resolution Integrated Logging Tool-DTS		
AHBHM	Array Induction Borehole Correction Mode	2_ComputeStandoff
AHBHV	Array Induction Borehole Correction Code Version Number	900
AHBLM	Array Induction Basic Logs Mode	6_One_Two_and_Four
AHBLV	Array Induction Basic Logs Code Version Number	223
AHCDE	Array Induction Casing Detection Enable	Yes
AHCEN	Array Induction Tool Centering Flag (in Borehole)	Eccentered
AHFRSV	Array Induction Response Set Version for Four ft Resolution	41.70.24.20
AHMRF	Array Induction Mud Resistivity Factor	1
AHORSV	Array Induction Response Set Version for One ft Resolution	41.70.24.20
AHRFV	Array Induction Radial Profiling Code Version Number	701
AHRPV	Array Induction Radial Parametrization Code Version Number	232
AHSTA	Array Induction Tool Standoff	0.125 IN
AHTRSV	Array Induction Response Set Version for Two ft Resolution	41.70.24.20
BHT	Bottom Hole Temperature (used in calculations)	212 DEGF
FEXP	Form Factor Exponent	2
FNUM	Form Factor Numerator	1
GCSE	Generalized Caliper Selection	HCAL
GDEV	Average Angular Deviation of Borehole from Normal	0 DEG
GGRD	Geothermal Gradient	0.01 DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST
GTSE	Generalized Temperature Selection	HSTS_HTEM
SHT	Surface Hole Temperature	68 DEGF
SPNV	SP Next Value	0 MV
FEQL: Formation Evaluation Quick Look		
FEXP	Form Factor Exponent	2
FNUM	Form Factor Numerator	1
HOLEV: Integrated Hole/Cement Volume		

BHT	Bottom Hole Temperature (used in calculations)	212	DEGF
FCD	Future Casing (Outer) Diameter	4.5	IN
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
HVCS	Integrated Hole Volume Caliper Selection	AUTOMATIC	
SHT	Surface Hole Temperature	68	DEGF
PERT: Preliminary Evaluation – Real Time			
BHT	Bottom Hole Temperature (used in calculations)	212	DEGF
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68	DEGF
System and Miscellaneous			
BS	Bit Size	7.875	IN
DFD	Drilling Fluid Density	8.40	LB/G
DORL	Depth Offset for Repeat Analysis	0.0	FT
FLEV	Fluid Level	-50000.00	FT
MST	Mud Sample Temperature	58.00	DEGF
TD	Total Depth	-50000	FT

Format: GRES_REP Vertical Scale: 5" per 100' Graphics File Created: 16-Sep-2011 07:05

OP System Version: 18C0-147

HILTB-FTB 18C0-147 DTC-H 18C0-147

Input DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_010PUP FN:9 PRODUCER 16-Sep-2011 07:03 8494.5 FT 8070.5 FT

Output DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_011LUP FN:10 PRODUCER 16-Sep-2011 07:05

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
High resolution Integrated Logging Tool-DTS Wellsite Calibration – Electronics Calibration Check – Thru Cal Mag. & Phase							
Master: 19-Jul-2011 10:13 Before: 16-Sep-2011 2:02							
Thru Cal Magnitude – 0	0	0.6160	0.6163	N/A	N/A	N/A	V
Thru Cal Magnitude – 1	0	1.259	1.260	N/A	N/A	N/A	V
Thru Cal Magnitude – 2	0	0.6284	0.6286	N/A	N/A	N/A	V
Thru Cal Magnitude – 3	0	0.7102	0.7108	N/A	N/A	N/A	V
Thru Cal Magnitude – 4	0	1.323	1.324	N/A	N/A	N/A	V
Thru Cal Magnitude – 5	0	1.928	1.929	N/A	N/A	N/A	V
Thru Cal Magnitude – 6	0	1.926	1.928	N/A	N/A	N/A	V
Thru Cal Magnitude – 7	0	1.373	1.378	N/A	N/A	N/A	V
Phase – 0	0	72.92	72.93	N/A	N/A	N/A	DEG
Phase – 1	0	71.80	71.83	N/A	N/A	N/A	DEG
Phase – 2	0	68.05	68.10	N/A	N/A	N/A	DEG
Phase – 3	0	67.26	67.31	N/A	N/A	N/A	DEG
Phase – 4	0	60.95	61.05	N/A	N/A	N/A	DEG
Phase – 5	0	59.03	59.16	N/A	N/A	N/A	DEG
Phase – 6	0	59.04	59.17	N/A	N/A	N/A	DEG
Phase – 7	0	55.31	55.73	N/A	N/A	N/A	DEG
High resolution Integrated Logging Tool-DTS Wellsite Calibration – Electronics Calibration Check – Auxilliary							
Master: 19-Jul-2011 10:13 Before: 16-Sep-2011 2:02							
Array Induction SPA Plus	990.5	992.9	993.8	N/A	N/A	N/A	MV
Array Induction SPA Zero	0	0.06050	0.05687	N/A	N/A	N/A	MV
Array Induction Temperature PI	0.9150	0.9197	0.9205	N/A	N/A	N/A	V
Array Induction Temperature Ze	0	0.00007260	0.00005022	N/A	N/A	N/A	V
High resolution Integrated Logging Tool-DTS Wellsite Calibration – Test Loop Gain Correction							
Master: 19-Jul-2011 10:13							
Test Loop Gain Magnitude – 0	0	1.016	N/A	N/A	N/A	N/A	V

Test Loop Gain Magnitude - 1	0	1.017	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 2	0	1.018	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 3	0	1.012	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 4	0	0.9978	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 5	0	0.9906	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 6	0	0.9977	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 7	0	0.9981	N/A	N/A	N/A	N/A	V
Phase - 0	0	0.7501	N/A	N/A	N/A	N/A	DEG
Phase - 1	0	0.07848	N/A	N/A	N/A	N/A	DEG
Phase - 2	0	-0.1335	N/A	N/A	N/A	N/A	DEG
Phase - 3	0	0.03423	N/A	N/A	N/A	N/A	DEG
Phase - 4	0	-0.02399	N/A	N/A	N/A	N/A	DEG
Phase - 5	0	-0.2467	N/A	N/A	N/A	N/A	DEG
Phase - 6	0	0.1205	N/A	N/A	N/A	N/A	DEG
Phase - 7	0	-0.4226	N/A	N/A	N/A	N/A	DEG

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Sonde Error Correction
Master: 19-Jul-2011 10:13

R Sonde Error Correction - 0	0	-72.68	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 1	0	191.9	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 2	0	108.4	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 3	0	66.62	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 4	0	25.79	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 5	0	14.04	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 6	0	9.981	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 7	0	-0.1971	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 0	0	-592.4	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 1	0	-69.72	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 2	0	-129.5	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 3	0	118.6	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 4	0	-36.24	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 5	0	6.216	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 6	0	-9.419	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 7	0	-5.815	N/A	N/A	N/A	N/A	MM/M

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Mud Gain Correction
Master: 19-Jul-2011 10:13

Coarse - Mag, Real, Imag - 0	0	1.088	N/A	N/A	N/A	N/A	
Coarse - Mag, Real, Imag - 1	0	1.088	N/A	N/A	N/A	N/A	
Coarse - Mag, Real, Imag - 2	0	1.088	N/A	N/A	N/A	N/A	
Fine - Mag, Real, Imag - 0	0	1.087	N/A	N/A	N/A	N/A	
Fine - Mag, Real, Imag - 1	0	1.087	N/A	N/A	N/A	N/A	
Fine - Mag, Real, Imag - 2	0	1.087	N/A	N/A	N/A	N/A	

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Stab Measurement Summary
Before: 16-Sep-2011 2:13

BS Window Ratio	0.7411	N/A	0.7422	N/A	N/A	N/A	
BS Window Sum	9918	N/A	9908	N/A	N/A	N/A	CPS
SS Window Ratio	0.4778	N/A	0.4776	N/A	N/A	N/A	
SS Window Sum	10120	N/A	10100	N/A	N/A	N/A	CPS
LS Window Ratio	0.2971	N/A	0.2936	N/A	N/A	N/A	
LS Window Sum	1086	N/A	1082	N/A	N/A	N/A	CPS

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Photo-multiplier High Voltages Calibrations
Before: 16-Sep-2011 2:13

BS PM High Voltage (Command)	1540	N/A	1536	N/A	N/A	N/A	V
SS PM High Voltage (Command)	1668	N/A	1676	N/A	N/A	N/A	V
LS PM High Voltage (Command)	1552	N/A	1562	N/A	N/A	N/A	V

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Crystal Quality Resolutions Calibration
Before: 16-Sep-2011 2:13

BS Crystal Resolution	11.44	N/A	11.46	N/A	N/A	N/A	%
SS Crystal Resolution	10.34	N/A	10.55	N/A	N/A	N/A	%
LS Crystal Resolution	9.608	N/A	9.388	N/A	N/A	N/A	%

High resolution Integrated Logging Tool-DTS Wellsite Calibration - MCFL Calibration
Before: 16-Sep-2011 2:03

Raw B0 Resistivity	3875	N/A	3833	N/A	N/A	N/A	OHMM
Raw B1 Resistivity	3830	N/A	3792	N/A	N/A	N/A	OHMM
Raw B2 Resistivity	3830	N/A	3798	N/A	N/A	N/A	OHMM

High resolution Integrated Logging Tool-DTS Wellsite Calibration - HILT Caliper Calibration
Before: 16-Sep-2011 2:01

HILT Caliper Zero Measurement	8.000	N/A	8.056	N/A	N/A	N/A	IN
HILT Caliper Plus Measurement	12.00	N/A	12.20	N/A	N/A	N/A	IN

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Detector Calibration
Before: 16-Sep-2011 2:01

Gamma Ray Background	30.00	N/A	82.29	N/A	N/A	N/A	GAPI
Gamma Ray (Jig - Bkgd)	165.0	N/A	173.9	N/A	N/A	15.00	GAPI

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Zero Measurement

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Zero Measurement								
Master: 10-Aug-2011 15:32 Before: 16-Sep-2011 2:02								
CNTC Background	28.58	28.58	28.61	N/A	N/A	4.287	CPS	
CFTC Background	30.22	30.22	31.63	N/A	N/A	4.533	CPS	
High resolution Integrated Logging Tool-DTS Wellsite Calibration - Ratio Measurement								
Master: 10-Aug-2011 15:32								
Thermal Near Corr. (Tank)	5800	5577	N/A	N/A	N/A	N/A	CPS	
Thermal Far Corr. (Tank)	2400	2408	N/A	N/A	N/A	N/A	CPS	
CNTC/CFTC (Tank)	2.159	2.316	N/A	N/A	N/A	N/A		
High resolution Integrated Logging Tool-DTS Wellsite Calibration - Accelerometer Calibration								
Before: 16-Sep-2011 6:30								
Z-Axis Acceleration	32.19	N/A	31.79	N/A	N/A	N/A	F/S2	
High resolution Integrated Logging Tool-DTS Master Calibration - Inversion results								
Master: 8-Sep-2011 17:55								
Rho Aluminum	2.596	2.594	--	--	--	--	G/C3	
Rho Magnesium	1.686	1.688	--	--	--	--	G/C3	
Pe Aluminum	2.570	2.574	--	--	--	--		
Pe Magnesium	2.650	2.609	--	--	--	--		
High resolution Integrated Logging Tool-DTS Master Calibration - Deviation Summary								
Master: 8-Sep-2011 17:55								
BS Average Deviation	0	0.3621	--	--	--	--	%	
BS Max Deviation	0	0.9377	--	--	--	--	%	
SS Average Deviation	0	0.3858	--	--	--	--	%	
SS Max Deviation	0	1.229	--	--	--	--	%	
LS Average Deviation	0	0.9041	--	--	--	--	%	
LS Max Deviation	0	1.990	--	--	--	--	%	

The GLS-VJ source activity is acceptable.

The HGNS Neutron Master Calibration was done with the following parameters :

NCT-B Water Temperature 77.3 DEGF.
 Thermal Housing Size 3.371 IN.
 NSR-F serial number 5068

High resolution Integrated Logging Tool-DTS / Equipment Identification			
Primary Equipment:			
Array Induction Tool - H	AIT - H	392	
Rm/SP Bottom Nose	AHRM - A		
Array Induction Sonde	AHIS - BA	392	
HILT high-Resolution Mechanical Sonde	HRMS - B		
HILT Rxo Gamma-ray Device	HRGD - B	1879	
HILT Micro Cylindrically Focused Log Dev	MCFL -		
GR Logging Source	GLS - VJ	1827	
HILT High Res. Control Cartridge	HRCC - B		
Auxiliary Equipment:			

High resolution Integrated Logging Tool-DTS Wellsite Calibration							
Electronics Calibration Check - Thru Cal Mag. & Phase							
Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.6160		0.6050	72.92		71.00
	Before	0.6163			72.93		
1	Master	1.259		1.270	71.80		70.00
	Before	1.260			71.83		
2	Master	0.6284		0.6230	68.05		66.00
	Before	0.6286			68.10		
3	Master	0.7102		0.7040	67.26		65.00
	Before	0.7108			67.31		
	Master	1.323			60.95		

	Before	1.324		1.337	61.05		59.00
5	Master	1.928		1.955	59.03		57.00
	Before	1.929			59.16		
6	Master	1.926		1.955	59.04		57.00
	Before	1.928			59.17		
7	Master	1.373		1.415	55.31		53.00
	Before	1.378			55.73		
		60.00 % (Minimum)	(Nominal)	140.0 % (Maximum)	Nom -60.00 (Minimum)	(Nominal)	Nom + 60.00 (Maximum)
Master: 19-Jul-2011 10:13				Before: 16-Sep-2011 2:02			

High resolution Integrated Logging Tool-DTS Wellsite Calibration						
Electronics Calibration Check - Auxilliary						
Phase	Array Induction SPA Plus MV	Value	Phase	Array Induction SPA Zero MV	Value	
Master		992.9	Master		0.06050	
Before		993.8	Before		0.05687	
		941.0 (Minimum)	990.5 (Nominal)	1040 (Maximum)		
				-50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)
Phase	Array Induction Temperature Plus V	Value	Phase	Array Induction Temperature Zero V	Value	
Master		0.9197	Master		7.260E-00	
Before		0.9205	Before		5.022E-00	
		0.8700 (Minimum)	0.9150 (Nominal)	0.9600 (Maximum)		
				-0.05000 (Minimum)	0 (Nominal)	0.05000 (Maximum)
Master: 19-Jul-2011 10:13			Before: 16-Sep-2011 2:02			

High resolution Integrated Logging Tool-DTS Wellsite Calibration						
Test Loop Gain Correction						
Idx	Value	Test Loop Gain Magnitude V	Value	Phase DEG		
0	1.016		0.7501			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		
				-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
1	1.017		0.07848			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		
				-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
2	1.018		-0.1335			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		
				-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
3	1.012		0.03423			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		
				-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
4	0.9978		-0.02399			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		
				-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
5	0.9906		-0.2467			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		
				-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
6	0.9977		0.1205			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		
				-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
7	0.9981		-0.4226			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		
				-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
Master: 19-Jul-2011 10:13						

High resolution Integrated Logging Tool-DTS Wellsite Calibration						
Sonde Error Correction						
Idx	Value	R Sonde Error Correction MM/M	Value	X Sonde Error Correction MM/M		
0	-72.68		-592.4			
		-231.0 (Minimum)	-56.00 (Nominal)	119.0 (Maximum)		
				-2250 (Minimum)	0 (Nominal)	2250 (Maximum)
1	191.9		-69.72			

	114.0 (Minimum)	159.0 (Nominal)	204.0 (Maximum)	-625.0 (Minimum)	0 (Nominal)	625.0 (Maximum)
2	108.4			-129.5		
	66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)	-350.0 (Minimum)	0 (Nominal)	350.0 (Maximum)
3	66.62			118.6		
	39.00 (Minimum)	64.00 (Nominal)	89.00 (Maximum)	-250.0 (Minimum)	0 (Nominal)	250.0 (Maximum)
4	25.79			-36.24		
	15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)	-63.00 (Minimum)	0 (Nominal)	63.00 (Maximum)
5	14.04			6.216		
	4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)	-50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)
6	9.981			-9.419		
	5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)	-30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)
7	-0.1971			-5.815		
	-5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)	-30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)

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High resolution Integrated Logging Tool-DTS Wellsite Calibration								
Mud Gain Correction								
Idx	Value	Coarse - Mag, Real, Imag			Value	Fine - Mag, Real, Imag		
0	1.088				1.087			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
1	1.088				1.087			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
2	1.088				1.087			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)

Master: 19-Jul-2011 10:13

High resolution Integrated Logging Tool-DTS Wellsite Calibration														
Stab Measurement Summary														
Phase	BS Window Ratio			Value	Phase	SS Window Ratio			Value	Phase	LS Window Ratio			Value
Before				0.7422	Before				0.4776	Before				0.2936
	0.7040 (Minimum)	0.7411 (Nominal)	0.7781 (Maximum)			0.4539 (Minimum)	0.4778 (Nominal)	0.5017 (Maximum)			0.2822 (Minimum)	0.2971 (Nominal)	0.3119 (Maximum)	
Phase	BS Window Sum CPS			Value	Phase	SS Window Sum CPS			Value	Phase	LS Window Sum CPS			Value
Before				9908	Before				10100	Before				1082
	9422 (Minimum)	9918 (Nominal)	10410 (Maximum)			9613 (Minimum)	10120 (Nominal)	10630 (Maximum)			1032 (Minimum)	1086 (Nominal)	1140 (Maximum)	

Before: 16-Sep-2011 2:13

High resolution Integrated Logging Tool-DTS Wellsite Calibration														
Photo-multiplier High Voltages Calibrations														
Phase	BS PM High Voltage (Command) V			Value	Phase	SS PM High Voltage (Command) V			Value	Phase	LS PM High Voltage (Command) V			Value
Before				1536	Before				1676	Before				1562
	1440 (Minimum)	1540 (Nominal)	1640 (Maximum)			1568 (Minimum)	1668 (Nominal)	1768 (Maximum)			1452 (Minimum)	1552 (Nominal)	1652 (Maximum)	

Before: 16-Sep-2011 2:13

High resolution Integrated Logging Tool-DTS Wellsite Calibration														
Crystal Quality Resolutions Calibration														
Phase	BS Crystal Resolution %			Value	Phase	SS Crystal Resolution %			Value	Phase	LS Crystal Resolution %			Value
Before				11.46	Before				10.55	Before				9.388
	10.44 (Minimum)	11.44 (Nominal)	12.44 (Maximum)			9.336 (Minimum)	10.34 (Nominal)	11.34 (Maximum)			8.608 (Minimum)	9.608 (Nominal)	10.61 (Maximum)	

Before: 16-Sep-2011 2:13

High resolution Integrated Logging Tool-DTS Wellsite Calibration									
MCFL Calibration									

Phase	Raw B0 Resistivity OHMM	Value	Phase	Raw B1 Resistivity OHMM	Value	Phase	Raw B2 Resistivity OHMM	Value	
Before		3833	Before		3792	Before		3798	
	3565 (Minimum)	3875 (Nominal)	4185 (Maximum)	3524 (Minimum)	3830 (Nominal)	4136 (Maximum)	3524 (Minimum)	3830 (Nominal)	4136 (Maximum)

Before: 16-Sep-2011 2:03

High resolution Integrated Logging Tool-DTS Wellsite Calibration						
HILT Caliper Calibration						
Phase	HILT Caliper Zero Measurement IN	Value	Phase	HILT Caliper Plus Measurement IN	Value	
Before		8.056	Before		12.20	
	6.000 (Minimum)	8.000 (Nominal)	10.00 (Maximum)	9.000 (Minimum)	12.00 (Nominal)	15.00 (Maximum)

Before: 16-Sep-2011 2:01

High resolution Integrated Logging Tool-DTS Wellsite Calibration						
Detector Calibration						
Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig - Bkgd) GAPI	Value	
Before		82.29	Before		173.9	
	0 (Minimum)	30.00 (Nominal)	120.0 (Maximum)	157.1 (Minimum)	165.0 (Nominal)	206.3 (Maximum)

Before: 16-Sep-2011 2:01

High resolution Integrated Logging Tool-DTS Wellsite Calibration						
Zero Measurement						
Phase	CNTC Background CPS	Value	Phase	CFTC Background CPS	Value	
Master		28.58	Master		30.22	
Before		28.61	Before		31.63	
	5.000 (Minimum)	28.58 (Nominal)	40.00 (Maximum)	5.000 (Minimum)	30.22 (Nominal)	40.00 (Maximum)

Master: 10-Aug-2011 15:32 Before: 16-Sep-2011 2:02

High resolution Integrated Logging Tool-DTS Wellsite Calibration									
Ratio Measurement									
Phase	Thermal Near Corr. (Tank) CPS	Value	Phase	Thermal Far Corr. (Tank) CPS	Value	Phase	CNTC/CFTC (Tank)	Value	
Master		5577	Master		2408	Master		2.316	
	4700 (Minimum)	5800 (Nominal)	6900 (Maximum)	1900 (Minimum)	2400 (Nominal)	2900 (Maximum)	2.120 (Minimum)	2.159 (Nominal)	2.540 (Maximum)

Master: 10-Aug-2011 15:32

High resolution Integrated Logging Tool-DTS Wellsite Calibration			
Accelerometer Calibration			
Phase	Z-Axis Acceleration F/S2	Value	
Before		31.79	
	31.53 (Minimum)	32.19 (Nominal)	32.84 (Maximum)

Before: 16-Sep-2011 6:30

High resolution Integrated Logging Tool-DTS Master Calibration							
Electronics Calibration Check - Thru Cal Mag. & Phase							
Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.6160		0.6050	72.92		71.00
1	Master	1.259		1.270	71.80		70.00
2	Master	0.6284		0.6230	68.05		66.00
3	Master	0.7102		0.7040	67.26		65.00
4	Master	1.323		1.337	60.95		59.00
5	Master	1.928		1.955	59.03		57.00
6	Master	1.926		1.955	59.04		57.00
7	Master	1.373		1.415	55.31		53.00
		60.00 % (Minimum)	(Nominal)	140.0 % (Maximum)	Nom -60.00 (Minimum)	(Nominal)	Nom + 60.00 (Maximum)

High resolution Integrated Logging Tool-DTS Master Calibration							
Electronics Calibration Check - Auxilliary							
Phase	Array Induction SPA Plus MV		Value	Phase	Array Induction SPA Zero MV		
Master			992.9	Master			
	941.0 (Minimum)	990.5 (Nominal)	1040 (Maximum)		-50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)
Phase	Array Induction Temperature Plus V		Value	Phase	Array Induction Temperature Zero V		
Master			0.9197	Master			
	0.8700 (Minimum)	0.9150 (Nominal)	0.9600 (Maximum)		-0.05000 (Minimum)	0 (Nominal)	0.05000 (Maximum)

Master: 19-Jul-2011 10:13

High resolution Integrated Logging Tool-DTS Master Calibration								
Test Loop Gain Correction								
Idx	Value	Test Loop Gain Magnitude V		Value	Phase DEG			
0	1.016			0.7501				
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
1	1.017			0.07848				
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
2	1.018			-0.1335				
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
3	1.012			0.03423				
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
4	0.9978			-0.02399				
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
5	0.9906			-0.2467				
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
6	0.9977			0.1205				
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
7	0.9981			-0.4226				
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)

Master: 19-Jul-2011 10:13

High resolution Integrated Logging Tool-DTS Master Calibration								
Sonde Error Correction								
Idx	Value	R Sonde Error Correction MM/M		Value	X Sonde Error Correction MM/M			
0	-72.68			-592.4				
		-231.0 (Minimum)	-56.00 (Nominal)	119.0 (Maximum)		-2250 (Minimum)	0 (Nominal)	2250 (Maximum)
1	191.9			-69.72				
		114.0 (Minimum)	159.0 (Nominal)	204.0 (Maximum)		-625.0 (Minimum)	0 (Nominal)	625.0 (Maximum)
2	108.4			-129.5				
		66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)		-350.0 (Minimum)	0 (Nominal)	350.0 (Maximum)
3	66.62			118.6				
		39.00 (Minimum)	64.00 (Nominal)	89.00 (Maximum)		-250.0 (Minimum)	0 (Nominal)	250.0 (Maximum)
4	25.79			-36.24				
		15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)		-63.00 (Minimum)	0 (Nominal)	63.00 (Maximum)
5	14.04			6.216				
		4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)		-50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)
6	9.981			-9.419				
		4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)		-50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)

	5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)	-30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)
7	-0.1971			-5.815		
	-5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)	-30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)

Master: 19-Jul-2011 10:13

High resolution Integrated Logging Tool-DTS Master Calibration								
Mud Gain Correction								
Idx	Value	Coarse - Mag, Real, Imag			Value	Fine - Mag, Real, Imag		
0	1.088				1.087			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	
1	1.088				1.087			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	
2	1.088				1.087			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	

Master: 19-Jul-2011 10:13

High resolution Integrated Logging Tool-DTS Master Calibration							
Inversion results							
Phase	Rho Aluminum G/C3		Value	Phase	Rho Magnesium G/C3		Value
Master			2.594	Master			1.688
	2.586 (Minimum)	2.596 (Nominal)	2.606 (Maximum)		1.676 (Minimum)	1.686 (Nominal)	1.696 (Maximum)
Phase	Pe Aluminum		Value	Phase	Pe Magnesium		Value
Master			2.574	Master			2.609
	2.470 (Minimum)	2.570 (Nominal)	2.670 (Maximum)		2.550 (Minimum)	2.650 (Nominal)	2.750 (Maximum)

Master: 8-Sep-2011 17:55

High resolution Integrated Logging Tool-DTS Master Calibration											
Deviation Summary											
Phase	BS Average Deviation %		Value	Phase	SS Average Deviation %		Value	Phase	LS Average Deviation %		Value
Master			0.3621	Master			0.3858	Master			0.9041
	-0.6000 (Minimum)	0 (Nominal)	0.6000 (Maximum)		-1.000 (Minimum)	0 (Nominal)	1.000 (Maximum)		-1.500 (Minimum)	0 (Nominal)	1.500 (Maximum)
Phase	BS Max Deviation %		Value	Phase	SS Max Deviation %		Value	Phase	LS Max Deviation %		Value
Master			0.9377	Master			1.229	Master			1.990
	-1.600 (Minimum)	0 (Nominal)	1.600 (Maximum)		-2.500 (Minimum)	0 (Nominal)	2.500 (Maximum)		-3.500 (Minimum)	0 (Nominal)	3.500 (Maximum)

Master: 8-Sep-2011 17:55

High resolution Integrated Logging Tool-DTS Master Calibration							
Zero Measurement							
Phase	CNTC Background CPS		Value	Phase	CFTC Background CPS		Value
Master			28.58	Master			30.22
	5.000 (Minimum)	28.58 (Nominal)	40.00 (Maximum)		5.000 (Minimum)	30.22 (Nominal)	40.00 (Maximum)

Master: 10-Aug-2011 15:32

High resolution Integrated Logging Tool-DTS Master Calibration											
Tank Measurement											
Phase	Thermal Near Corr. (Tank) CPS		Value	Phase	Thermal Far Corr. (Tank) CPS		Value	Phase	CNTC/CFTC (Tank)		Value
Master			5577	Master			2408	Master			2.316
	4700 (Minimum)	5800 (Nominal)	6900 (Maximum)		1900 (Minimum)	2400 (Nominal)	2900 (Maximum)		2.120 (Minimum)	2.159 (Nominal)	2.540 (Maximum)

Master: 10-Aug-2011 15:32

DTS Telemetry Tool / Equipment Identification

Primary Equipment:
DTC-H Auxiliary Cartridge

DTCH - A

Company: Kerr McGee Oil and Gas Onshore, LP

Schlumberger

Well: Howard 37-29

Field: Wattenberg

County: Weld

State: Colorado

Platform Express
Array Induction
with Linear Correlation