

Schlumberger

Company:	Noble Energy Inc
Well:	Meis 32-8B
Field:	Schramm
County:	Yuma
	State: Colorado

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Well:	Meis 32-8B
Field:	Schramm
County:	Yuma
	State: Colorado

County: Yuma Field: Schramm Location: Sec. 8, T1N, R46W Well: Meis 32-8B Company: Noble Energy Inc			
<div> <div>Platform Express</div> <div>Triple Combo</div> </div>			
LOCATION			
Sec. 8, T1N, R46W SHL: 1980' FNL X 1750' FEL SWNE		Elev.: K.B. 3972.00 ft G.L. 3966.00 ft D.F. 3971.00 ft	
Permanent Datum: _____ Log Measured From: _____ Drilling Measured From: _____	Ground Level _____ Kelly Bushing _____ Kelly Bushing _____	Elev.: 3730.00 ft 6.00 ft above Perm. Datum	
API Serial No. 05-125-11990-0C	Section 8	Township 1N	Range 46W

[illegible]

Logging Date	28-Sep-2011				
Run Number	1				
Depth Driller	2763 ft				
Schlumberger Depth	2758 ft				
Bottom Log Interval	2750 ft				
Top Log Interval	510 ft				
Casing Driller Size @ Depth	7,000 in @ 510 ft			@	
Casing Schlumberger	510 ft				
Bit Size	6,250 in				
Type Fluid In Hole	Water Based Mud				
Density	Viscosity	8.7 lbm/gal		32 s	
Fluid Loss	PH				
Source Of Sample	AIT Sensor				
RM @ Measured Temperature	0.154 ohm.m @ 88 degF		@		
RMF @ Measured Temperature	0.116 ohm.m @ 88 degF		@		
RMC @ Measured Temperature	0.231 ohm.m @ 88 degF		@		
Source RMF	RMC	Calculated	Calculated		
RM @ MRT	RMF @ MRT	0.120 @ 115	0.090 @ 115	@	@
Maximum Recorded Temperatures	115 degF				
Circulation Stopped	Time	17-Aug-2011	7:00		
Logger On Bottom	Time	28-Sep-2011			
Unit Number	Location	2153	Fort Morgan, CO		
Recorded By	Todd Johnson				
Witnessed By	Tom Hoff				

Logging Date			
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	Viscosity		
Fluid Loss	PH		
Source Of Sample			
RM @ Measured Temperature		@	
RMF @ Measured Temperature		@	
RMC @ Measured Temperature		@	
Source RMF	RMC		
RM @ MRT	RMF @ MRT	@	@
Maximum Recorded Temperatures			
Circulation Stopped	Time		
Logger On Bottom	Time		
Unit Number	Location		
Recorded By			
Witnessed By			

OTHER SERVICES1 OS1: None OS2: OS3: OS4: OS5:	OTHER SERVICES2 OS1: OS2: OS3: OS4: OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
This is the first run in hole.	
Tool run as per tool sketch.	
Data may be affected by hole rugosity.	
Matrix: Limestone 2.71	

Induction
Temperatu
Power Sup

7.9

SP SENSOR
HTEN HMAS
Accelerom HV
Mud Resis
Tension

0.1

0.0

TOOL ZERO

MAXIMUM STRING DIAMETER 4.63 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET

Production String

(in) (ft)
OD ID MD

Well Schematic

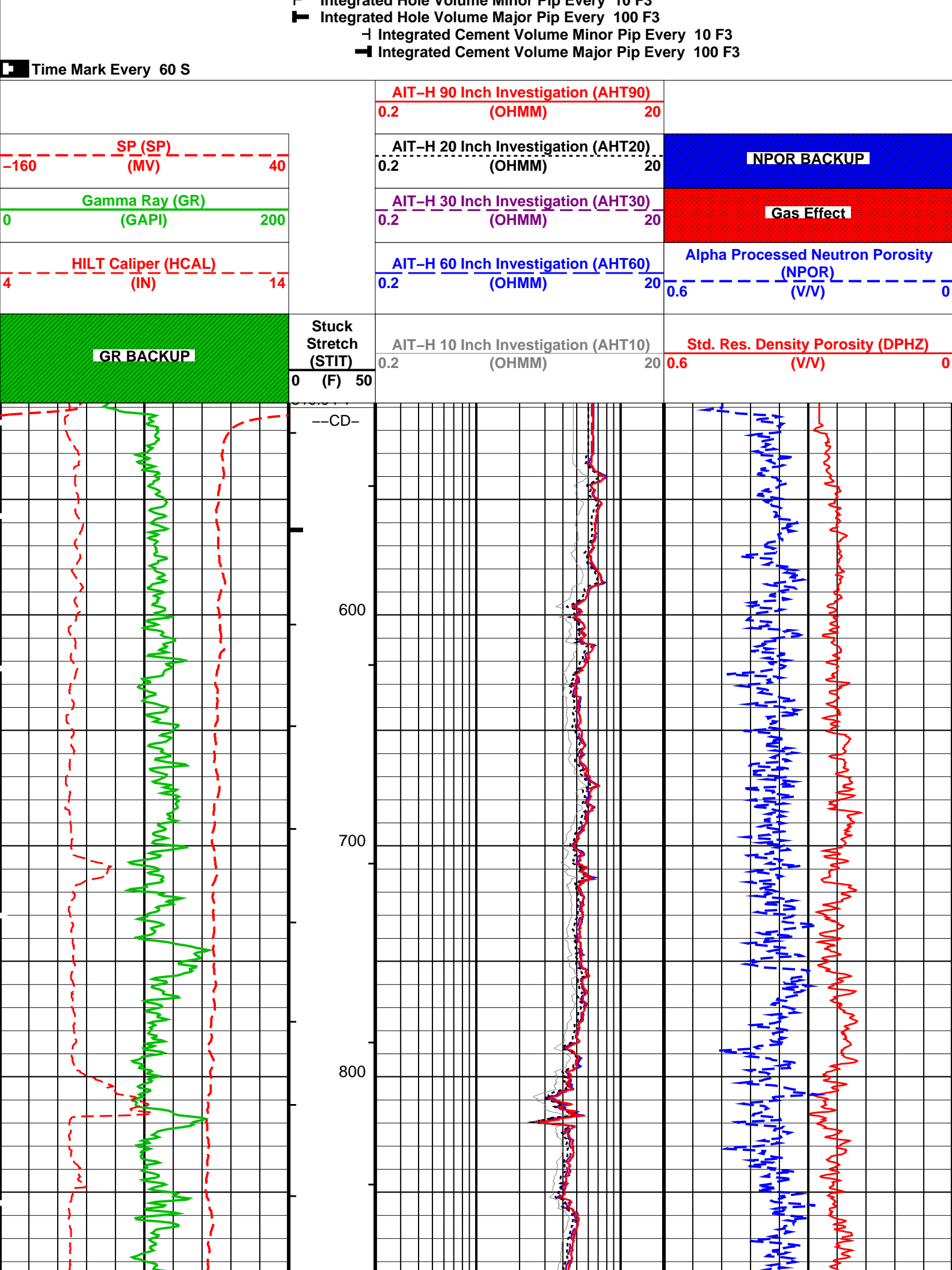
(ft) (in)
MD OD ID

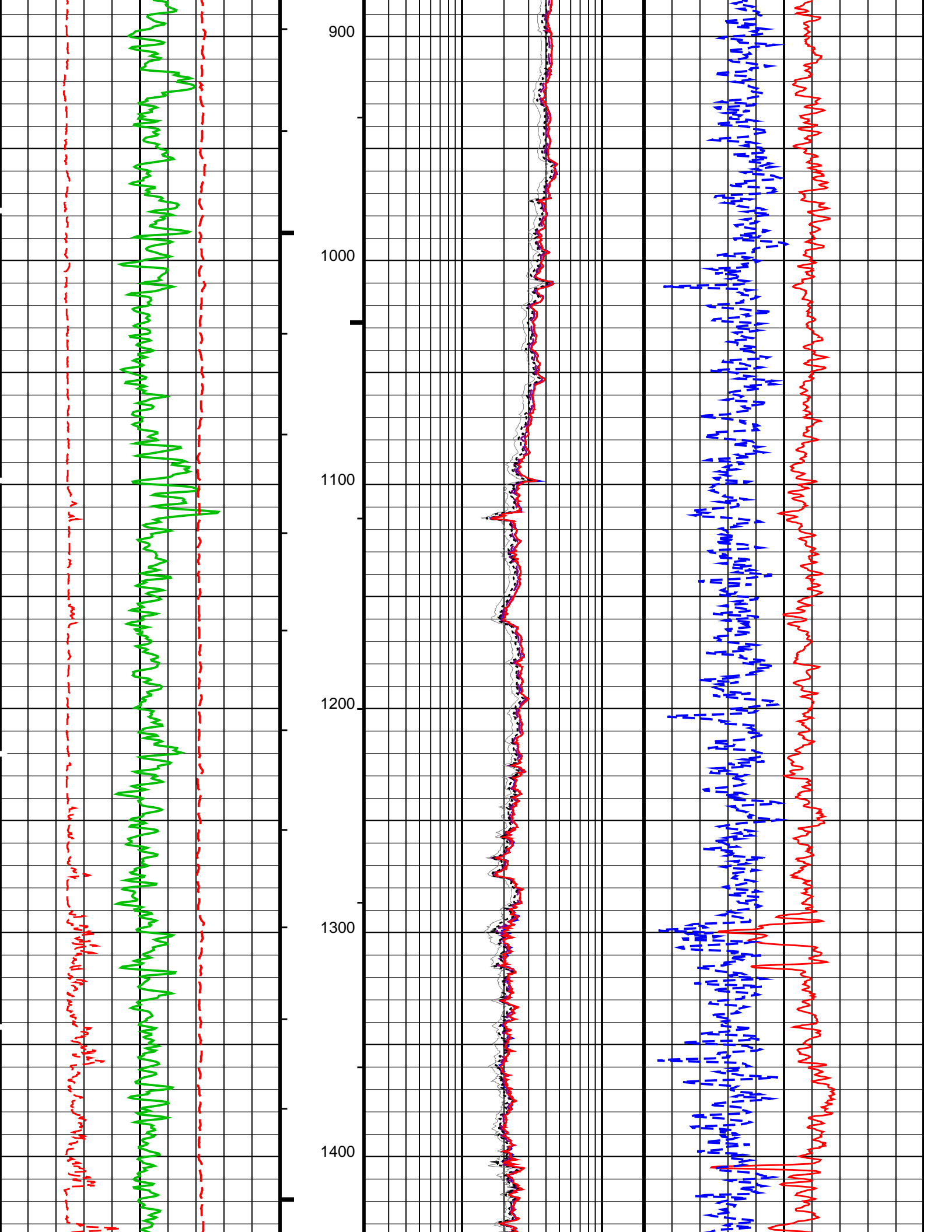
Casing String

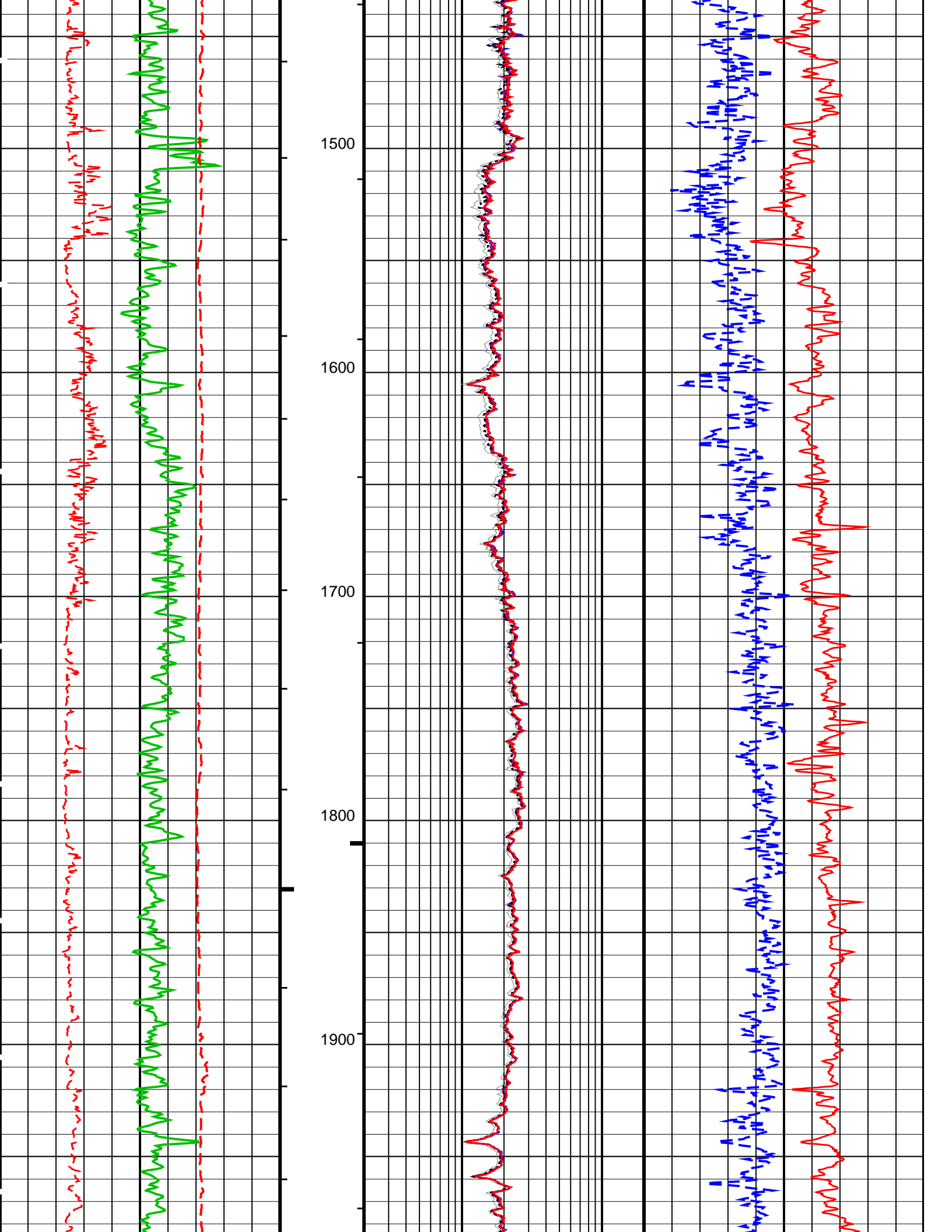
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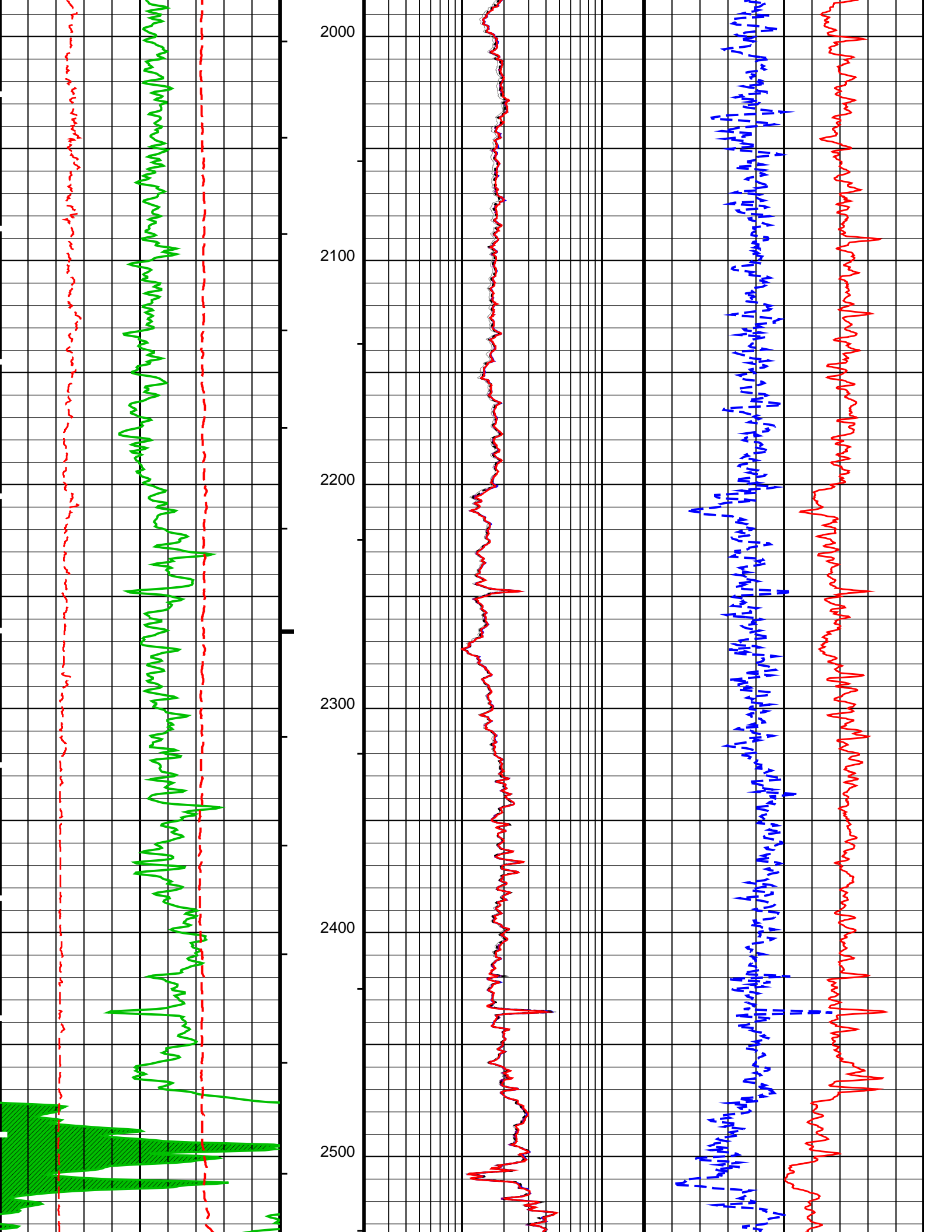
Casing Shoe

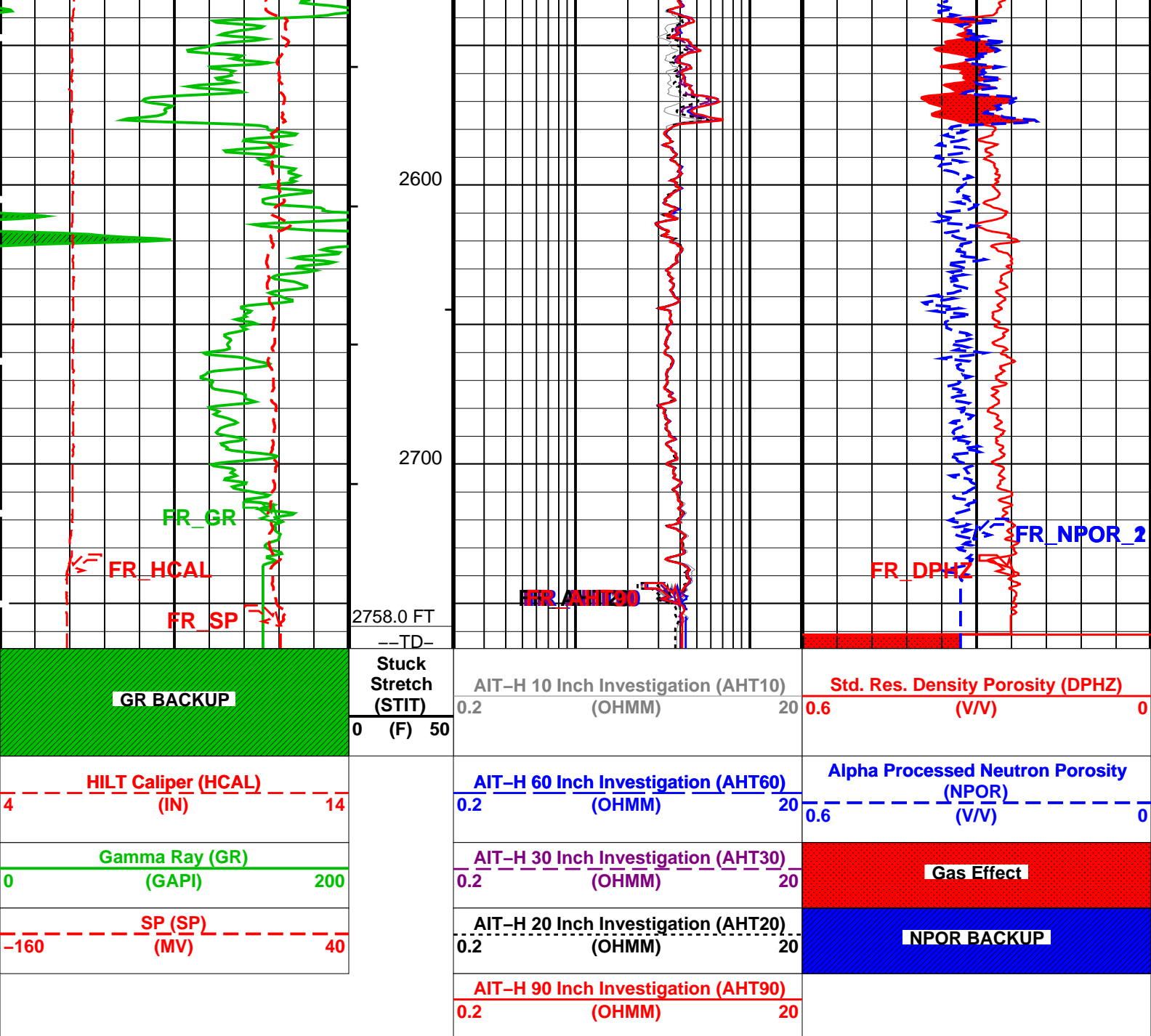
L Integrated Hole Volume Minor Bin Every 10 F3











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

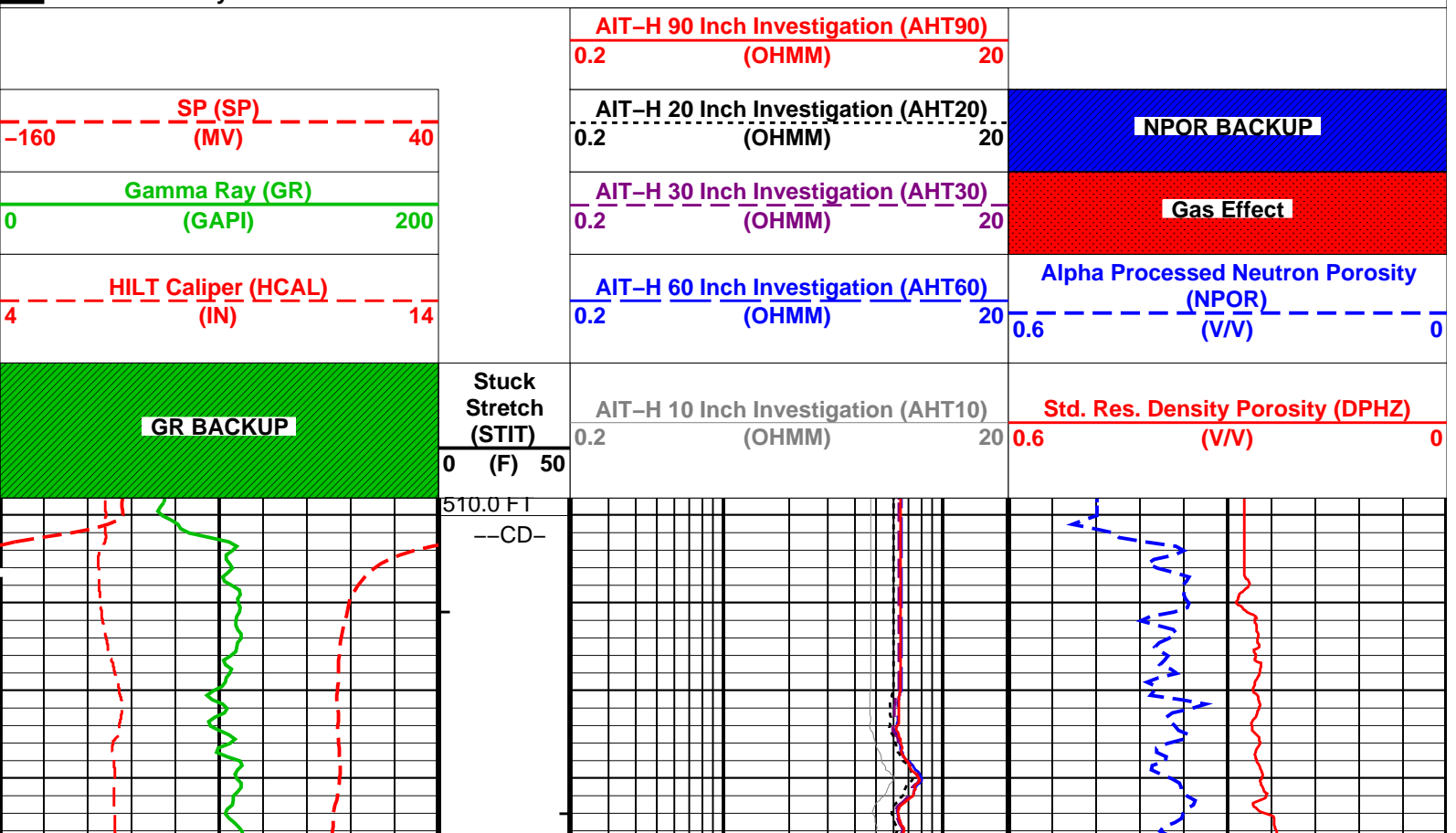
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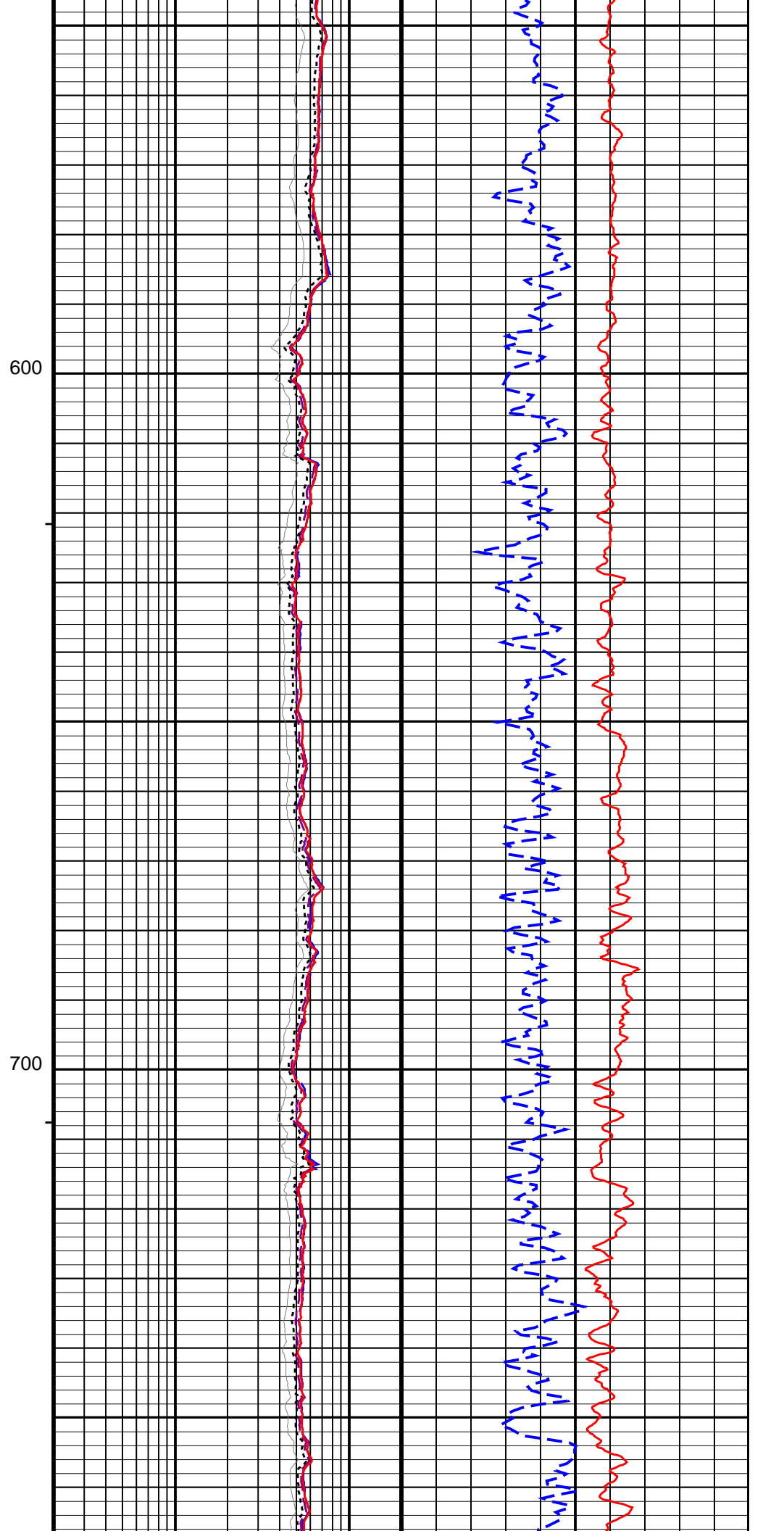
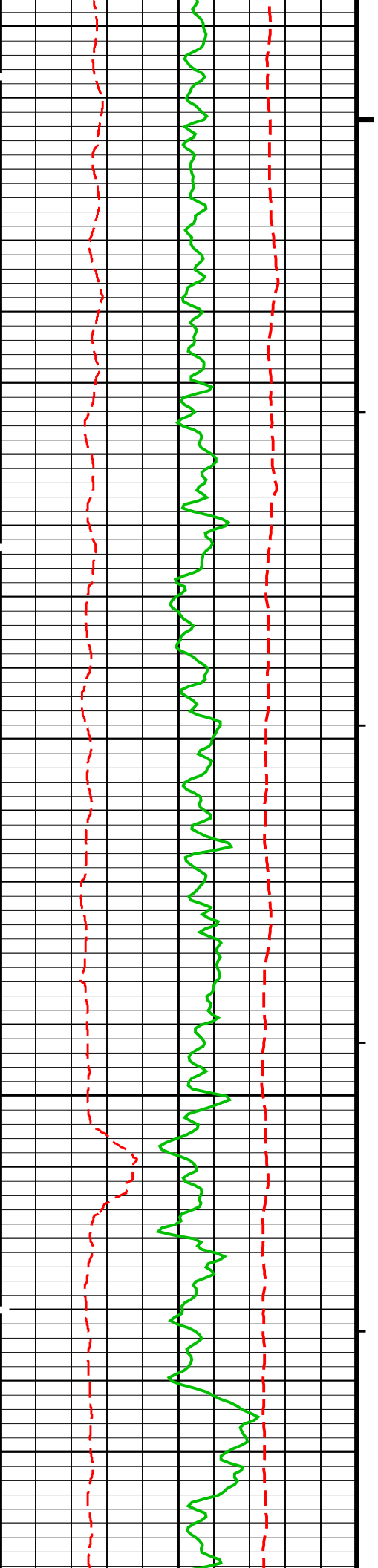
DLIS Name	Description	Value
HILTB-CTS: High resolution Integrated Logging Tool-CTS		
AHBHM	Array Induction Borehole Correction Mode	2_ComputeStandoff
AHBHV	Array Induction Borehole Correction Code Version Number	900
AHBLM	Array Induction Basic Logs Mode	6_One_Two_and_Four
AHBLV	Array Induction Basic 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

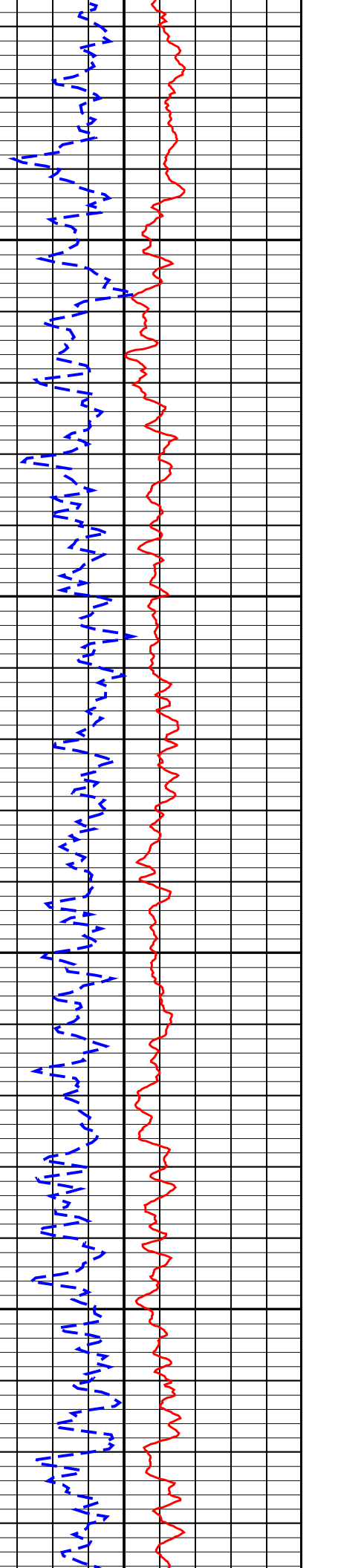
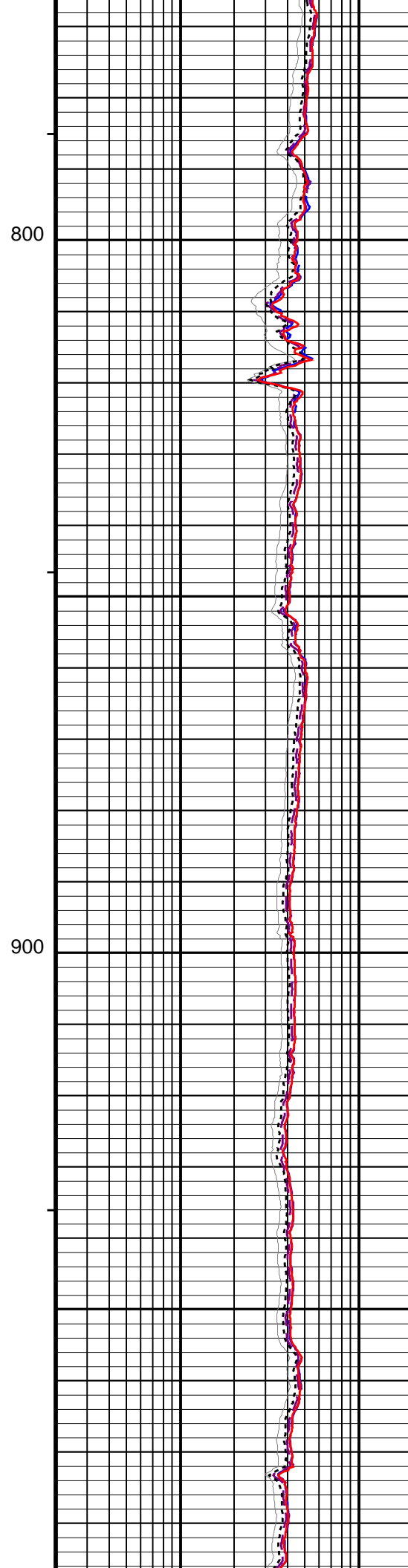
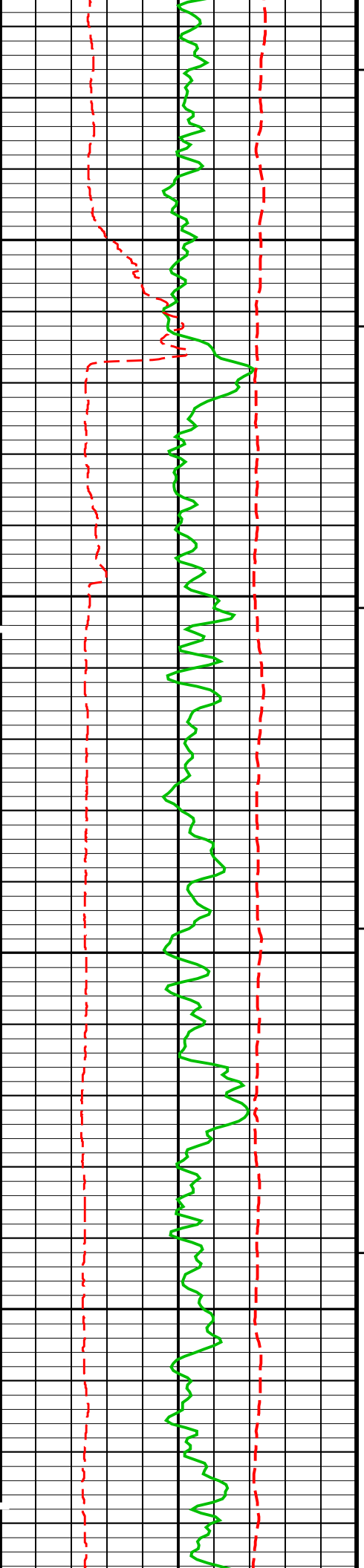
BHFL	Borehole Fluid Type	WATER	
BHFL_TLD	HILT Nuclear Mud Base	OPEN	
BHS	Borehole Status	115	DEGF
BHT	Bottom Hole Temperature (used in calculations)	NO	
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	BS	
DHC	Density Hole Correction	1	G/C3
FD	Fluid Density	2	
FEXP	Form Factor Exponent	1	
FNUM	Form Factor Numerator	-50000	PPM
FSAL	Formation Salinity	NO	
FSCO	Formation Salinity Correction Option	NO	
GCLF	Germany Coal-like Formation Option	HCAL	
GCSE	Generalized Caliper Selection	0	DEG
GDEV	Average Angular Deviation of Borehole from Normal	0.01	DF/F
GGRD	Geothermal Gradient	AITH_RESIST	
GRSE	Generalized Mud Resistivity Selection	HSTS_HTEM	
GTSE	Generalized Temperature Selection	YES	
HSCO	Hole Size Correction Option	LIMESTONE	
MATR	Rock Matrix for Neutron Porosity Corrections	NO	
MCCO	Mud Cake Correction Option	NATU	
MCOR	Mud Correction	2.71	G/C3
MDEN	Matrix Density	NO	
MWCO	Mud Weight Correction Option	OFF	
NAAC	HRDD APS Activation Correction	NOBARITE	
NMT	HILT Nuclear Mud Type	StdRes	
NPRM	HRDD Processing Mode	1	IN
NSAR	HRDD Depth Sampling Rate	NO	
PTCO	Pressure/Temperature Correction Option	SOCN	
SDAT	Standoff Data Source	65	DEGF
SHT	Surface Hole Temperature	0.125	IN
SOCN	Standoff Distance	YES	
SOCO	Standoff Correction Option	0	MV
SPNV	SP Next Value		
FEQL: Formation Evaluation Quick Look			
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
HOLEV: Integrated Hole/Cement Volume			
BHS	Borehole Status	OPEN	
BHT	Bottom Hole Temperature (used in calculations)	115	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	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	65	DEGF
PERT: Preliminary Evaluation – Real Time			
BHS	Borehole Status	OPEN	
BHT	Bottom Hole Temperature (used in calculations)	115	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	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	65	DEGF
STI: Stuck Tool Indicator			
LBFR	Trigger for MAXIS First Reading Label	TDL	
STKT	STI Stuck Threshold	2.5	FT
TDD	Total Depth – Driller	2763.00	FT
TDL	Total Depth – Logger	2758.00	FT
System and Miscellaneous			
BS	Bit Size	6.250	IN
BSAL	Borehole Salinity	-50000.00	PPM
CSIZ	Current Casing Size	7.000	IN
CWEI	Casing Weight	20.00	LB/F
DORL	Depth Offset for Repeat Analysis	0.0	FT
FLEV	Fluid Level	-50000.00	FT
MST	Mud Sample Temperature	87.88	DEGF
RMFS	Resistivity of Mud Filtrate Sample	0.1155	OHMM
TD	Total Depth	2758	FT

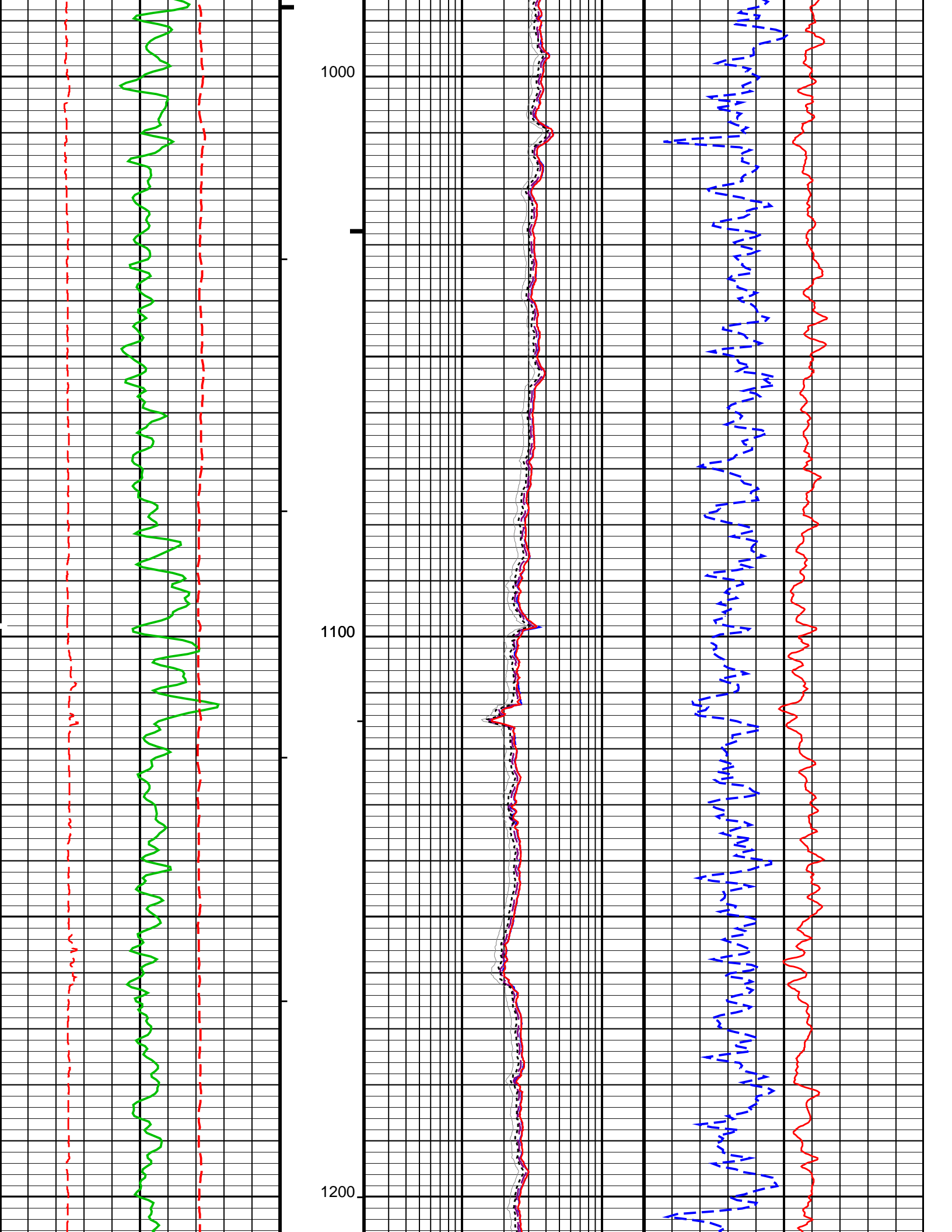
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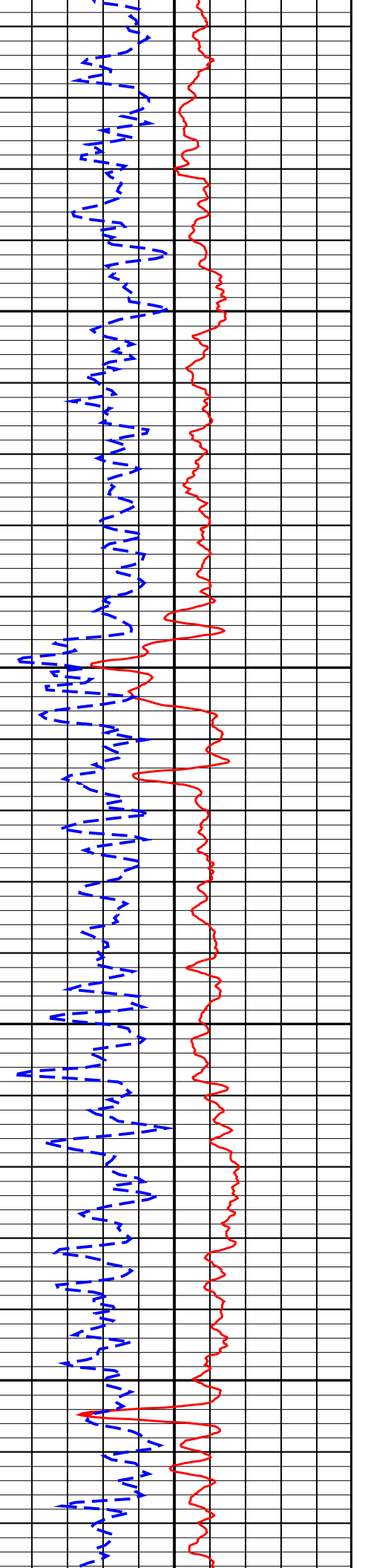
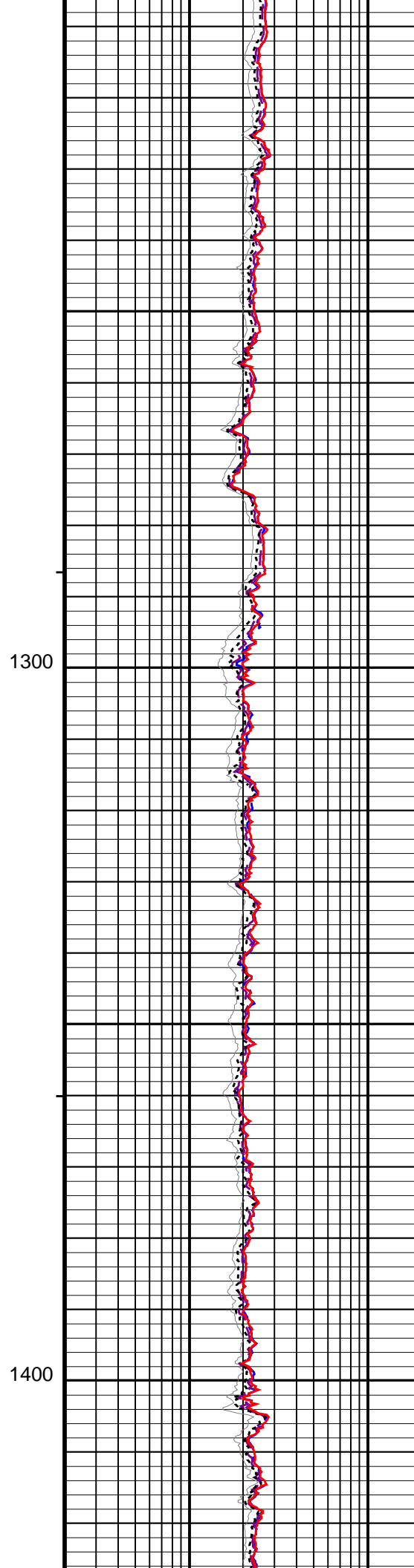
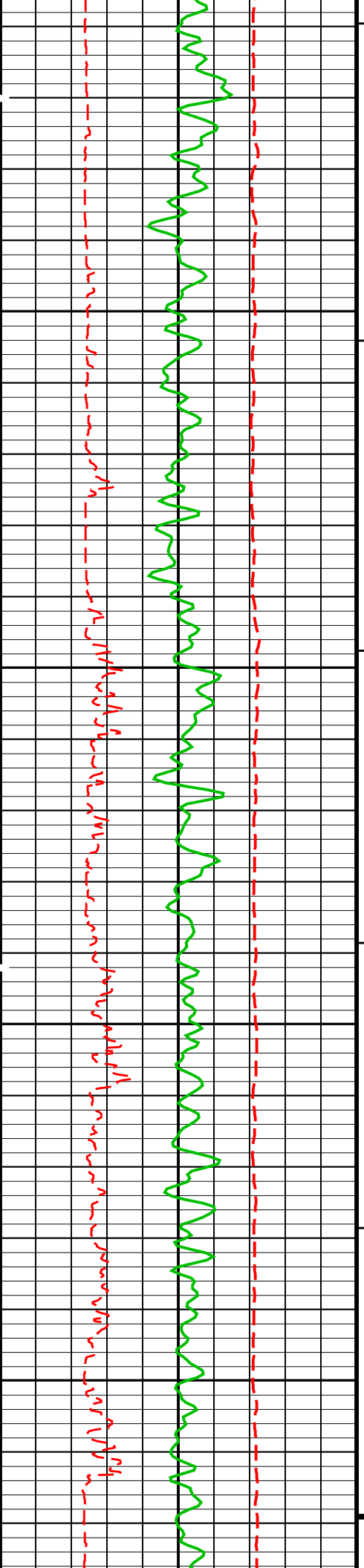
OP System Version: 18C0-147

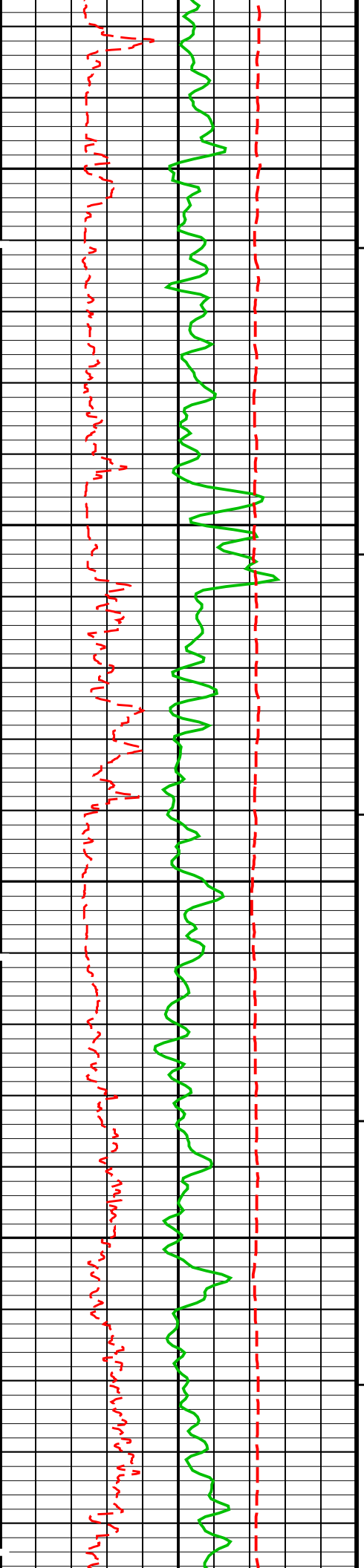






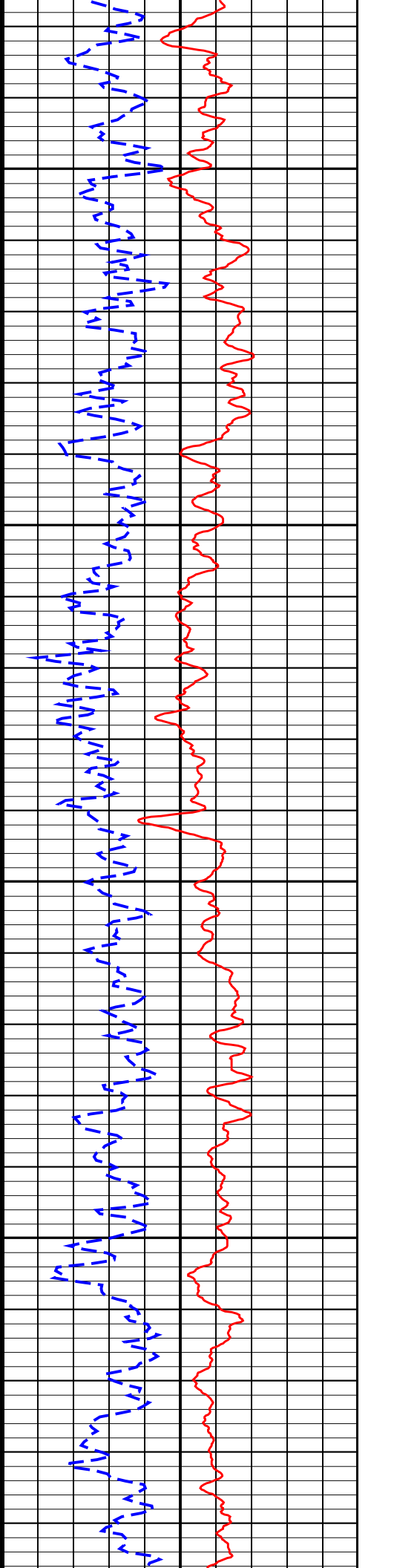
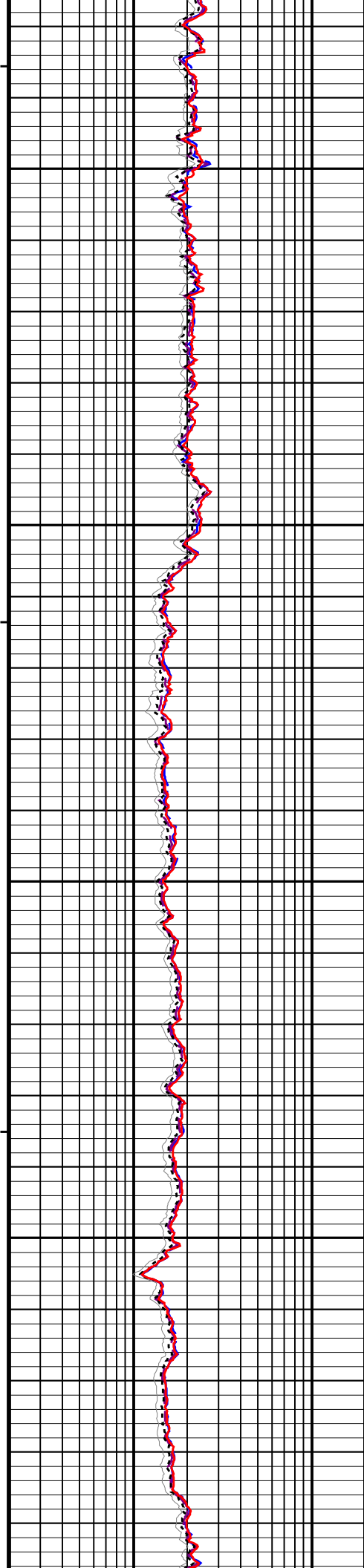


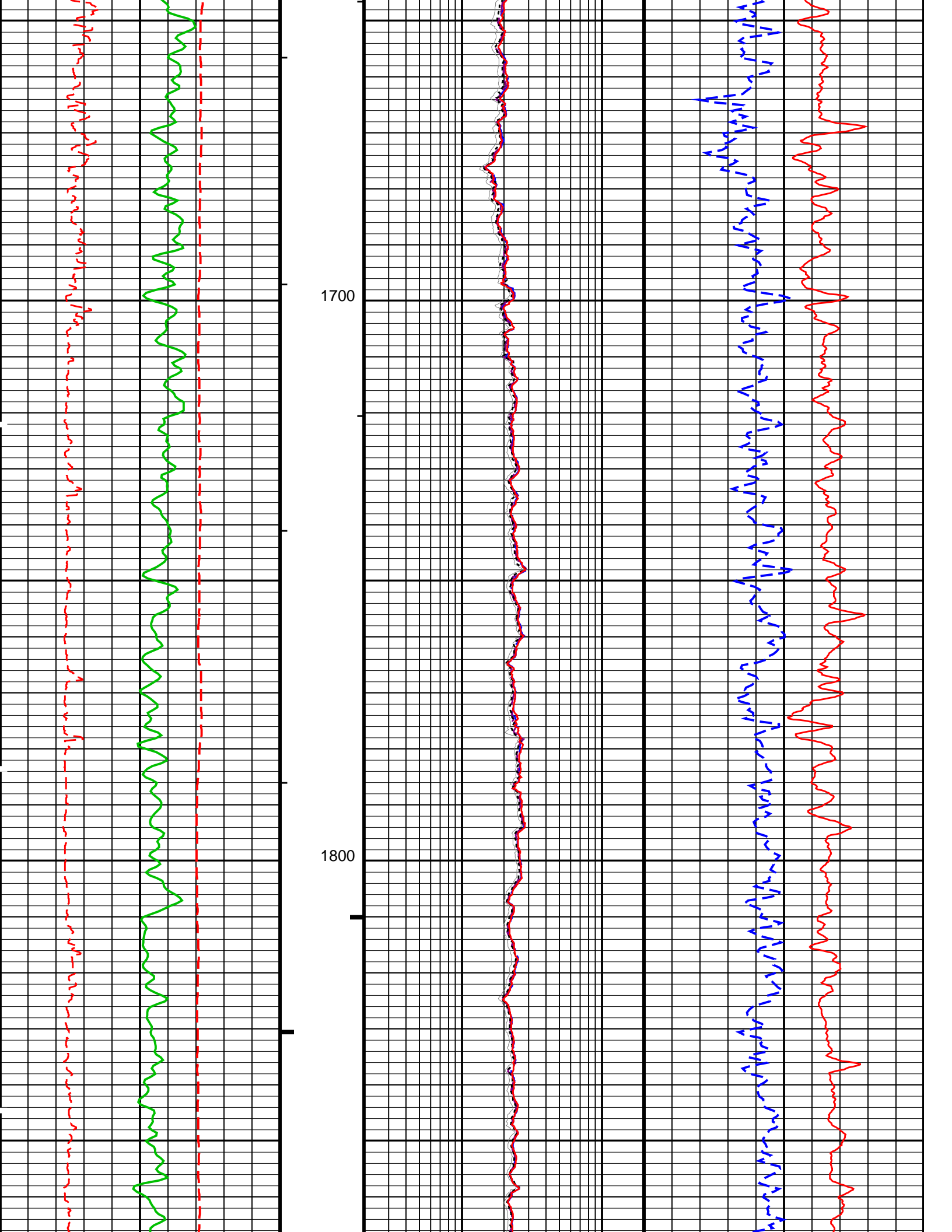


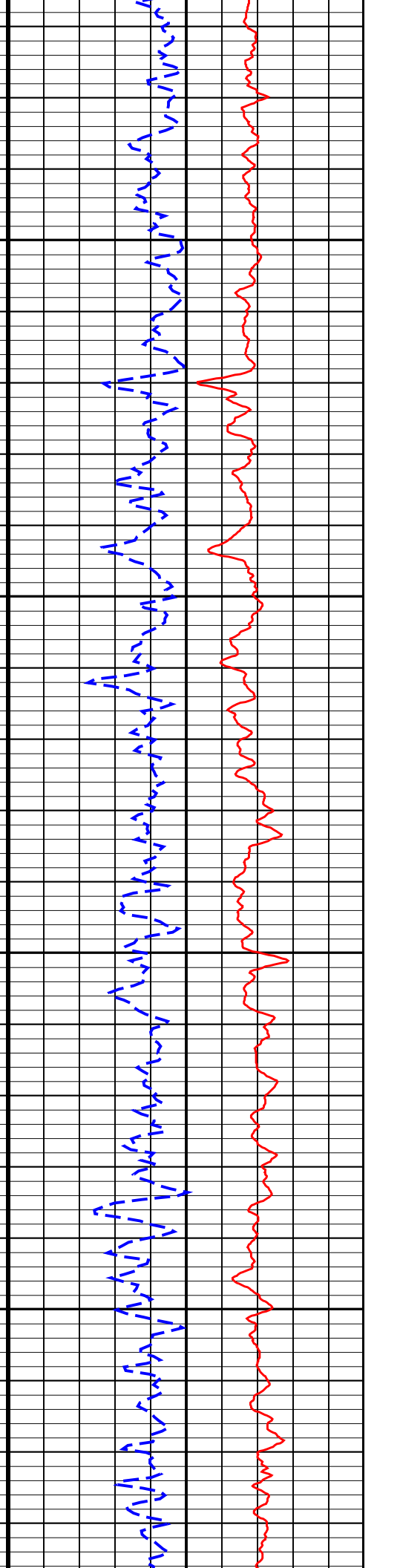
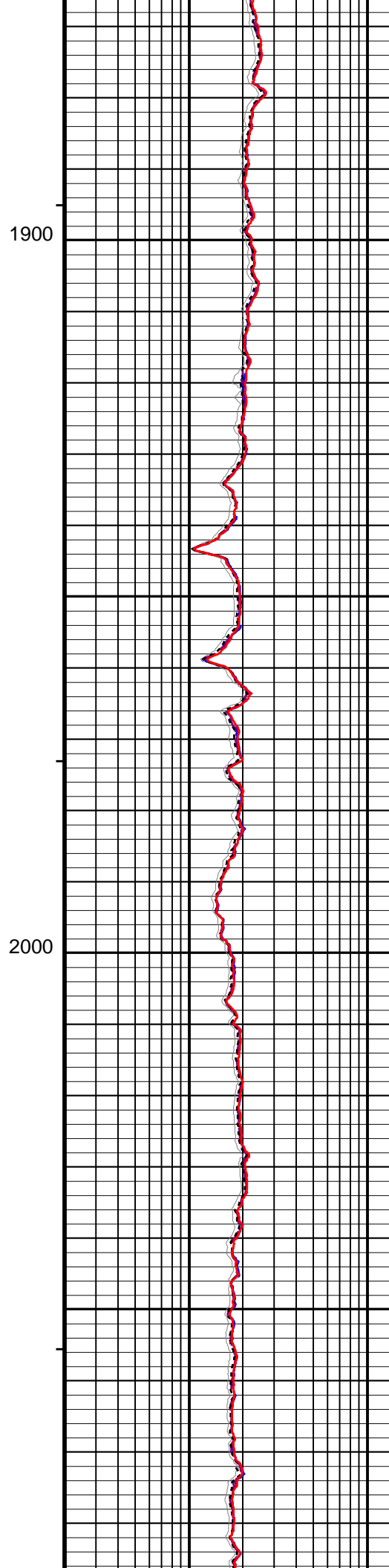
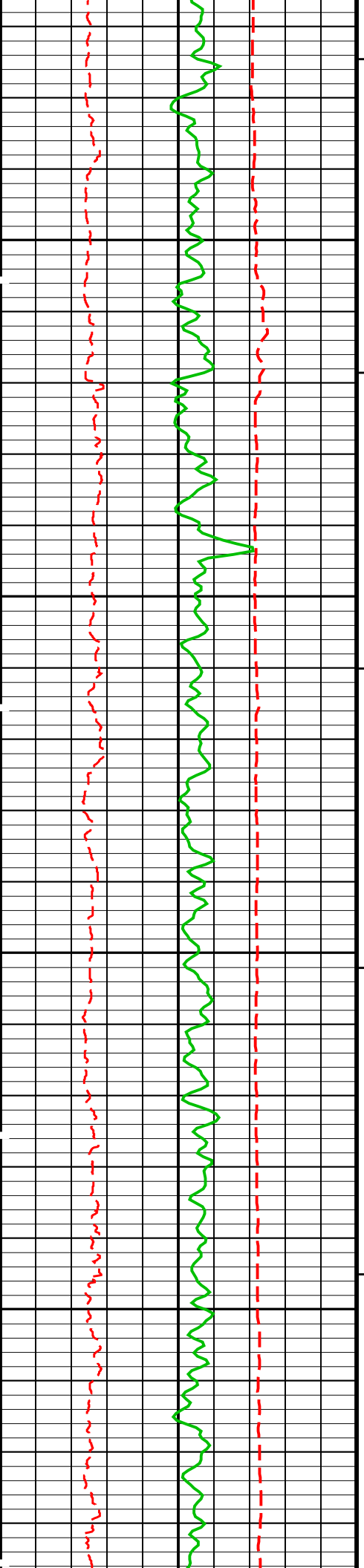


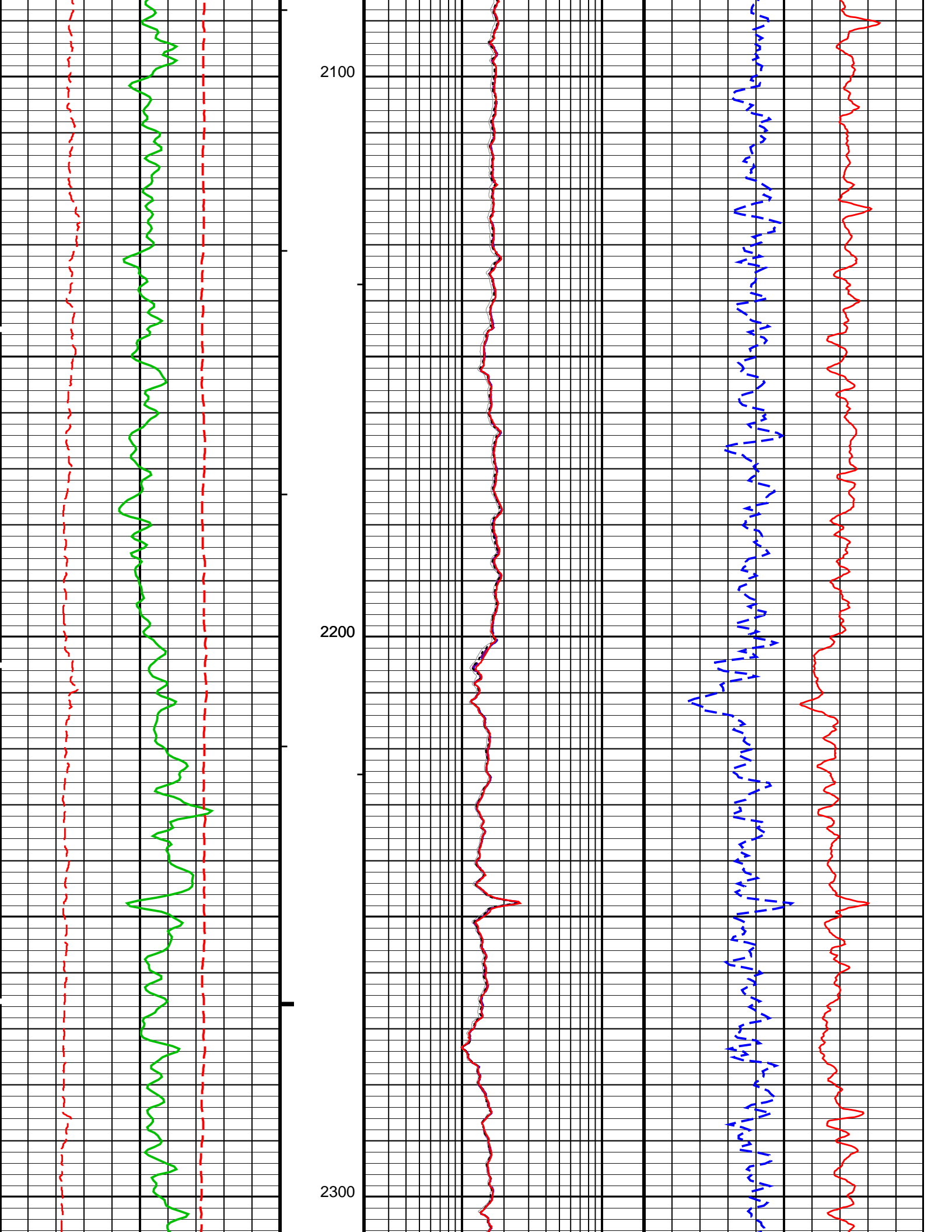
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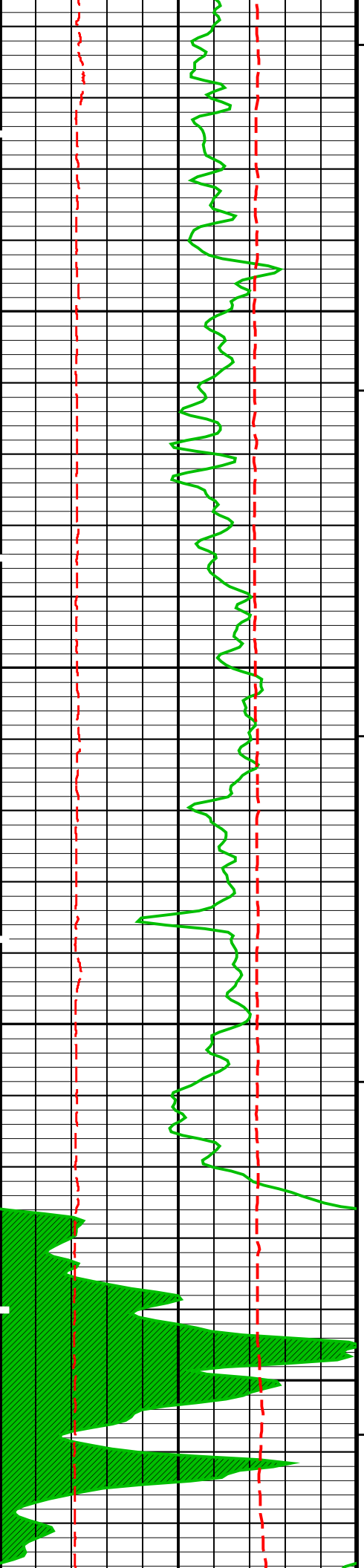
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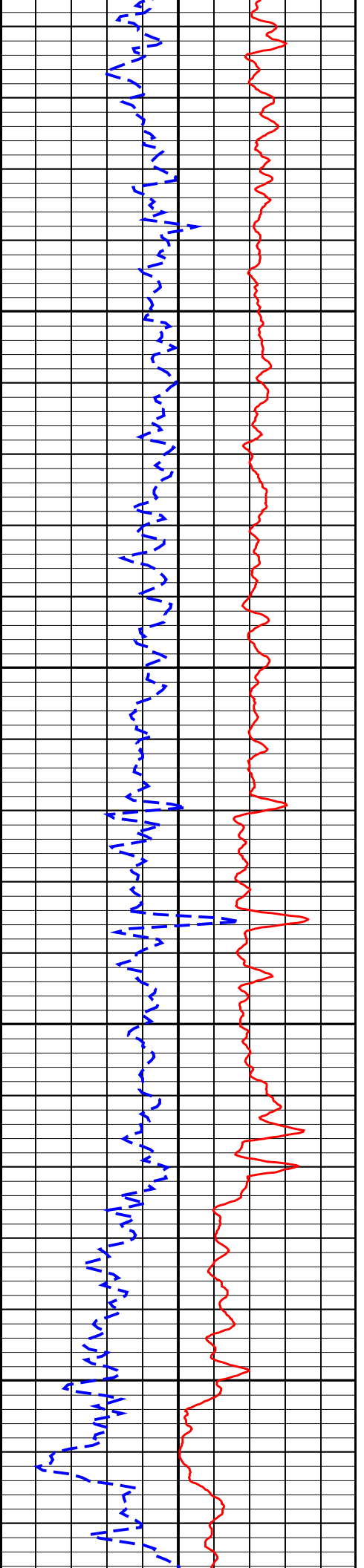
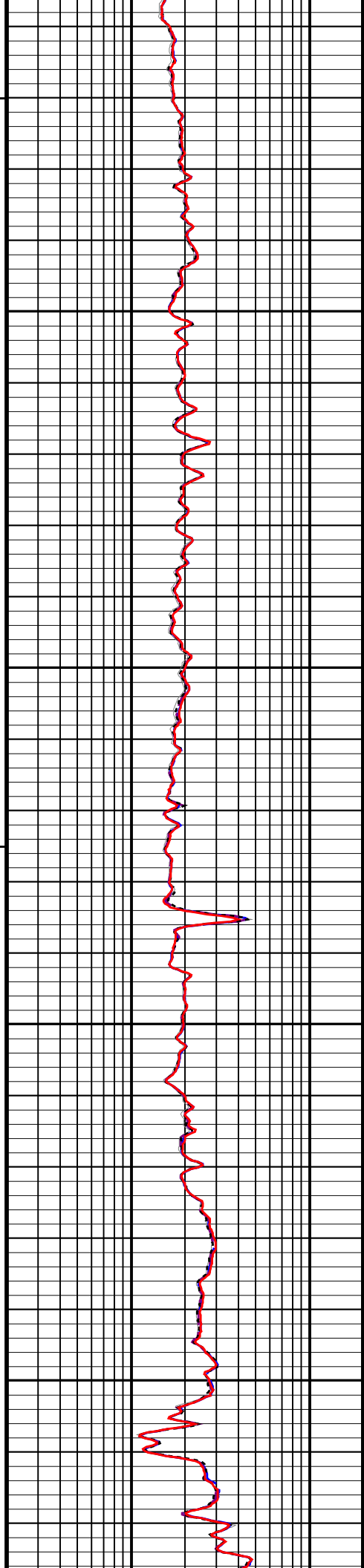


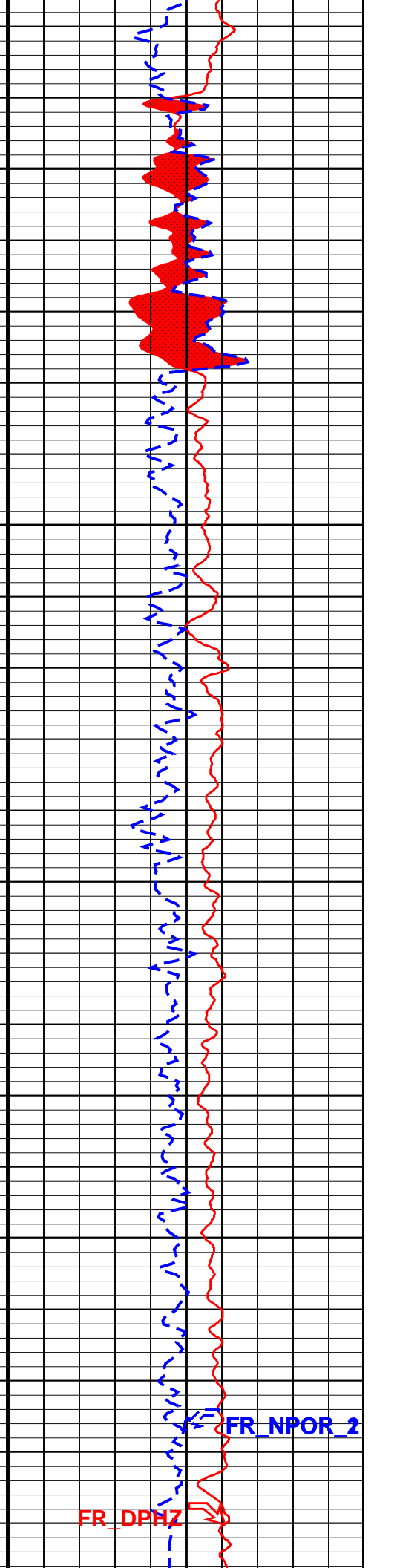
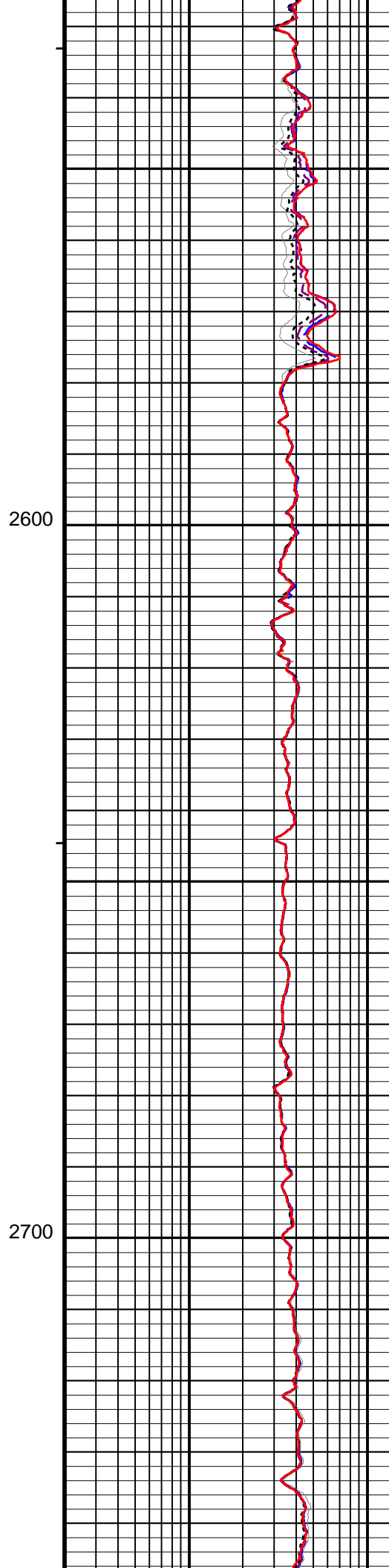
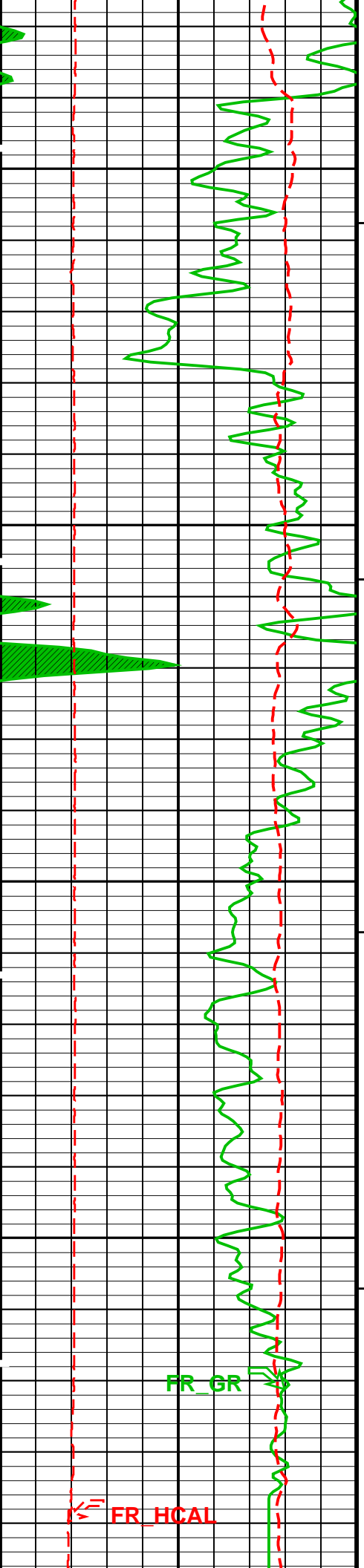


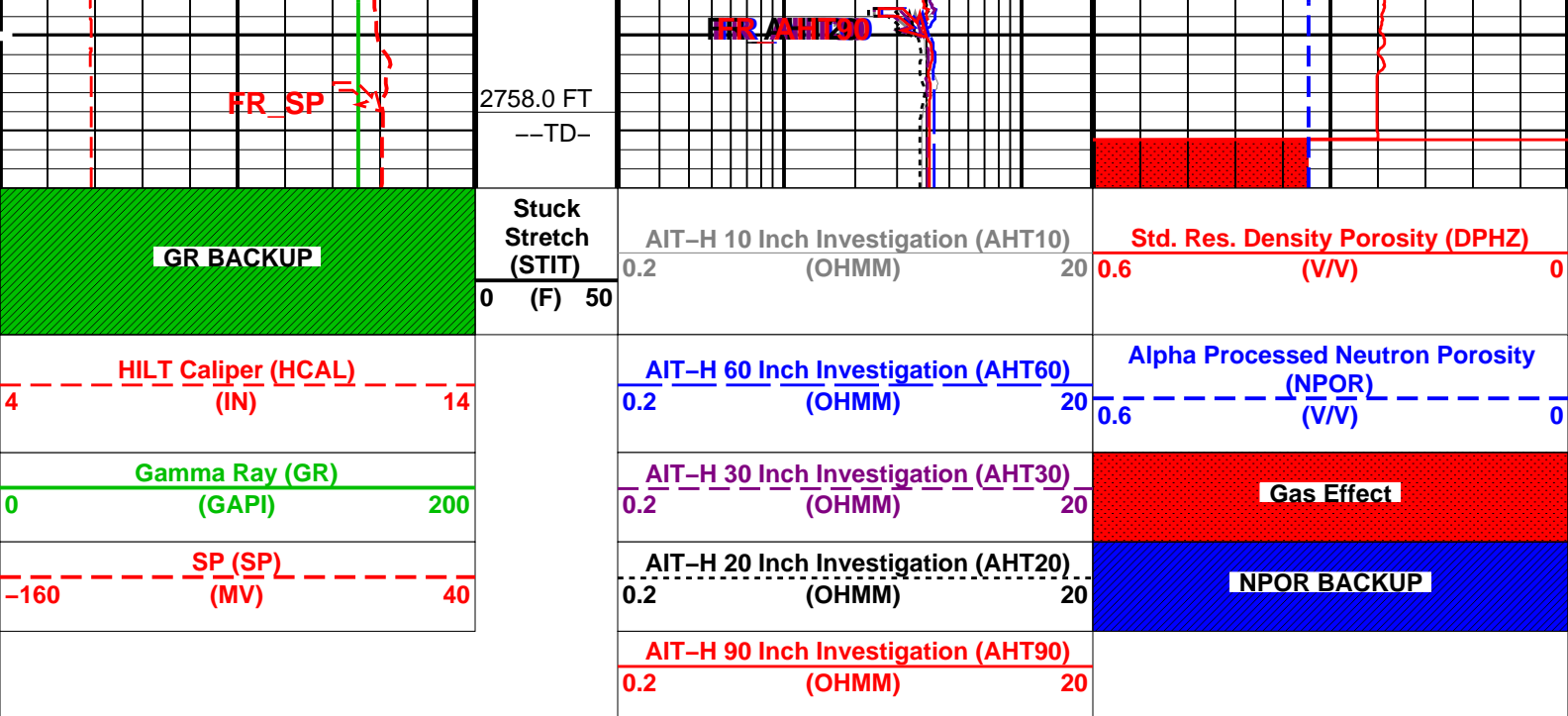


2400

2500







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-CTS: High resolution Integrated Logging Tool-CTS		
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
BHFL	Borehole Fluid Type	WATER
BHFL_TLD	HILT Nuclear Mud Base	WATER
BHS	Borehole Status	OPEN
BHT	Bottom Hole Temperature (used in calculations)	115 DEGF
BSCO	Borehole Salinity Correction Option	NO
CCCO	Casing & Cement Thickness Correction Option	NO
DHC	Density Hole Correction	BS
FD	Fluid Density	1 G/C3
FEXP	Form Factor Exponent	2
FNUM	Form Factor Numerator	1
FSAL	Formation Salinity	-50000 PPM
FSCO	Formation Salinity Correction Option	NO
GCLF	Germany Coal-like Formation Option	NO
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
HSCO	Hole Size Correction Option	YES
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE
MCCO	Mud Cake Correction Option	NO
MCOR	Mud Correction	NATU
MDEN	Matrix Density	2.71 G/C3
MWCO	Mud Weight Correction Option	NO
NAAC	HRDD APS Activation Correction	OFF
NMT	HILT Nuclear Mud Type	NOBARITE
NPRM	HRDD Processing Mode	StdRes
NSAR	HRDD Depth Sampling Rate	1 IN

PTCO	Pressure/Temperature Correction Option	NO	
SDAT	Standoff Data Source	SOCN	
SHT	Surface Hole Temperature	65	DEGF
SOCN	Standoff Distance	0.125	IN
SOCO	Standoff Correction Option	YES	
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			
BHS	Borehole Status	OPEN	
BHT	Bottom Hole Temperature (used in calculations)	115	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	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	65	DEGF
PERT: Preliminary Evaluation – Real Time			
BHS	Borehole Status	OPEN	
BHT	Bottom Hole Temperature (used in calculations)	115	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	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	65	DEGF
STI: Stuck Tool Indicator			
LBFR	Trigger for MAXIS First Reading Label	TDL	
STKT	STI Stuck Threshold	2.5	FT
TDD	Total Depth – Driller	2763.00	FT
TDL	Total Depth – Logger	2758.00	FT
System and Miscellaneous			
BS	Bit Size	6.250	IN
BSAL	Borehole Salinity	-50000.00	PPM
CSIZ	Current Casing Size	7.000	IN
CWEI	Casing Weight	20.00	LB/F
DORL	Depth Offset for Repeat Analysis	0.0	FT
FLEV	Fluid Level	-50000.00	FT
MST	Mud Sample Temperature	87.88	DEGF
RMFS	Resistivity of Mud Filtrate Sample	0.1155	OHMM
TD	Total Depth	2758	FT

Format: COMBO_LOG Vertical Scale: 5" per 100' Graphics File Created: 28-Sep-2011 06:05

OP System Version: 18C0-147

HILTB-CTS 18C0-147

Output DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_008LUP FN:7 PRODUCER 28-Sep-2011 06:05

Schlumberger

BEFORE CALIBRATIONS

MAXIS Field Log

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
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High resolution Integrated Logging Tool–CTS Wellsite Calibration – Electronics Calibration Check – Thru Cal Mag. & Phase

Master: 5–Aug–2011 17:23 Before: 26–Sep–2011 10:46

Thru Cal Magnitude – 0	0	0.6283	0.6311	N/A	N/A	N/A	V
Thru Cal Magnitude – 1	0	1.288	1.293	N/A	N/A	N/A	V
Thru Cal Magnitude – 2	0	0.6387	0.6411	N/A	N/A	N/A	V
Thru Cal Magnitude – 3	0	0.7214	0.7245	N/A	N/A	N/A	V
Thru Cal Magnitude – 4	0	1.358	1.363	N/A	N/A	N/A	V
Thru Cal Magnitude – 5	0	1.968	1.977	N/A	N/A	N/A	V
Thru Cal Magnitude – 6	0	1.968	1.977	N/A	N/A	N/A	V
Thru Cal Magnitude – 7	0	1.404	1.414	N/A	N/A	N/A	V
Phase – 0	0	51.78	52.09	N/A	N/A	N/A	DEG
Phase – 1	0	50.75	51.06	N/A	N/A	N/A	DEG
Phase – 2	0	46.96	47.29	N/A	N/A	N/A	DEG
Phase – 3	0	46.17	46.50	N/A	N/A	N/A	DEG
Phase – 4	0	39.75	40.13	N/A	N/A	N/A	DEG
Phase – 5	0	37.83	38.23	N/A	N/A	N/A	DEG
Phase – 6	0	37.82	38.22	N/A	N/A	N/A	DEG
Phase – 7	0	33.77	34.40	N/A	N/A	N/A	DEG

High resolution Integrated Logging Tool–CTS Wellsite Calibration – Electronics Calibration Check – Auxilliary

Master: 5–Aug–2011 17:23 Before: 26–Sep–2011 10:46

Array Induction SPA Plus	990.5	992.9	993.4	N/A	N/A	N/A	MV
Array Induction SPA Zero	0	–0.02178	–0.04477	N/A	N/A	N/A	MV
Array Induction Temperature PI	0.9150	0.9212	0.9216	N/A	N/A	N/A	V
Array Induction Temperature Ze	0	–0.00002239	–0.00004901	N/A	N/A	N/A	V

High resolution Integrated Logging Tool–CTS Wellsite Calibration – Test Loop Gain Correction

Master: 5–Aug–2011 17:23

Test Loop Gain Magnitude – 0	0	1.033	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude – 1	0	1.008	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	1.015	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude – 4	0	0.9973	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude – 5	0	0.9872	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude – 6	0	0.9883	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude – 7	0	1.002	N/A	N/A	N/A	N/A	V
Phase – 0	0	0.9022	N/A	N/A	N/A	N/A	DEG
Phase – 1	0	0.3754	N/A	N/A	N/A	N/A	DEG
Phase – 2	0	–0.2211	N/A	N/A	N/A	N/A	DEG
Phase – 3	0	0.3984	N/A	N/A	N/A	N/A	DEG
Phase – 4	0	–0.07337	N/A	N/A	N/A	N/A	DEG
Phase – 5	0	–0.4233	N/A	N/A	N/A	N/A	DEG
Phase – 6	0	1.235	N/A	N/A	N/A	N/A	DEG
Phase – 7	0	–0.3843	N/A	N/A	N/A	N/A	DEG

High resolution Integrated Logging Tool–CTS Wellsite Calibration – Sonde Error Correction

Master: 5–Aug–2011 17:23

R Sonde Error Correction – 0	0	–85.34	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 1	0	166.1	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 2	0	115.2	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 3	0	60.68	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 4	0	26.59	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 5	0	13.30	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 6	0	10.27	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 7	0	–1.251	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 0	0	–217.9	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 1	0	–66.15	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 2	0	–216.9	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 3	0	–25.47	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 4	0	–26.74	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 5	0	–17.19	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 6	0	2.002	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 7	0	3.875	N/A	N/A	N/A	N/A	MM/M

High resolution Integrated Logging Tool–CTS Wellsite Calibration – Mud Gain Correction

Master: 5–Aug–2011 17:23

Coarse – Mag, Real, Imag – 0	0	0.8792	N/A	N/A	N/A	N/A	
Coarse – Mag, Real, Imag – 1	0	0.8792	N/A	N/A	N/A	N/A	
Coarse – Mag, Real, Imag – 2	0	0.8792	N/A	N/A	N/A	N/A	
Fine – Mag, Real, Imag – 0	0	0.8785	N/A	N/A	N/A	N/A	
Fine – Mag, Real, Imag – 1	0	0.8785	N/A	N/A	N/A	N/A	
Fine – Mag, Real, Imag – 2	0	0.8785	N/A	N/A	N/A	N/A	

High resolution Integrated Logging Tool–CTS Wellsite Calibration – Stab Measurement Summary

Before: 26–Sep–2011 10:49

BS Window Ratio	0.7333	N/A	0.7334	N/A	N/A	N/A	
BS Window Sum	25300	N/A	25800	N/A	N/A	N/A	CPS
SS Window Ratio	0.4854	N/A	0.4887	N/A	N/A	N/A	
SS Window Sum	11630	N/A	11600	N/A	N/A	N/A	CPS
LS Window Ratio	0.2985	N/A	0.3019	N/A	N/A	N/A	

LS Window Sum	1292	N/A	1280	N/A	N/A	N/A	CPS
High resolution Integrated Logging Tool–CTS Wellsite Calibration – Photo–multiplier High Voltages Calibrations							
Before: 26–Sep–2011 10:49							
BS PM High Voltage (Command)	1637	N/A	1655	N/A	N/A	N/A	V
SS PM High Voltage (Command)	1448	N/A	1448	N/A	N/A	N/A	V
LS PM High Voltage (Command)	1333	N/A	1337	N/A	N/A	N/A	V
High resolution Integrated Logging Tool–CTS Wellsite Calibration – Crystal Quality Resolutions Calibration							
Before: 26–Sep–2011 10:49							
BS Crystal Resolution	11.18	N/A	11.33	N/A	N/A	N/A	%
SS Crystal Resolution	8.818	N/A	8.628	N/A	N/A	N/A	%
LS Crystal Resolution	9.474	N/A	9.348	N/A	N/A	N/A	%
High resolution Integrated Logging Tool–CTS Wellsite Calibration – MCFL Calibration							
Before: 26–Sep–2011 10:50							
Raw B0 Resistivity	3875	N/A	3907	N/A	N/A	N/A	OHMM
Raw B1 Resistivity	3830	N/A	3835	N/A	N/A	N/A	OHMM
Raw B2 Resistivity	3830	N/A	3851	N/A	N/A	N/A	OHMM
High resolution Integrated Logging Tool–CTS Wellsite Calibration – HILT Caliper Calibration							
Before: 26–Sep–2011 10:45							
HILT Caliper Zero Measurement	8.000	N/A	7.817	N/A	N/A	N/A	IN
HILT Caliper Plus Measurement	12.00	N/A	12.04	N/A	N/A	N/A	IN
High resolution Integrated Logging Tool–CTS Wellsite Calibration – Detector Calibration							
Before: 26–Sep–2011 10:45							
Gamma Ray Background	30.00	N/A	90.40	N/A	N/A	N/A	GAPI
Gamma Ray (Jig – Bkgd)	165.0	N/A	178.3	N/A	N/A	15.00	GAPI
High resolution Integrated Logging Tool–CTS Wellsite Calibration – Zero Measurement							
Master: 5–Aug–2011 15:58 Before: 26–Sep–2011 10:47							
CNTC Background	26.52	26.52	26.98	N/A	N/A	3.978	CPS
CFTC Background	28.37	28.37	27.42	N/A	N/A	4.256	CPS
High resolution Integrated Logging Tool–CTS Wellsite Calibration – Ratio Measurement							
Master: 5–Aug–2011 15:58							
Thermal Near Corr. (Tank)	5800	5378	N/A	N/A	N/A	N/A	CPS
Thermal Far Corr. (Tank)	2400	2207	N/A	N/A	N/A	N/A	CPS
CNTC/CFTC (Tank)	2.159	2.437	N/A	N/A	N/A	N/A	
High resolution Integrated Logging Tool–CTS Wellsite Calibration – Accelerometer Calibration							
Before: 28–Sep–2011 5:26							
Z–Axis Acceleration	32.19	N/A	32.24	N/A	N/A	N/A	F/S2
High resolution Integrated Logging Tool–CTS Master Calibration – Inversion results							
Master: 14–Sep–2011 15:34							
Rho Aluminum	2.596	2.601	--	--	--	--	G/C3
Rho Magnesium	1.686	1.685	--	--	--	--	G/C3
Pe Aluminum	2.570	2.558	--	--	--	--	
Pe Magnesium	2.650	2.642	--	--	--	--	
High resolution Integrated Logging Tool–CTS Master Calibration – Deviation Summary							
Master: 14–Sep–2011 15:34							
BS Average Deviation	0	0.1387	--	--	--	--	%
BS Max Deviation	0	0.3402	--	--	--	--	%
SS Average Deviation	0	0.3342	--	--	--	--	%
SS Max Deviation	0	0.8651	--	--	--	--	%
LS Average Deviation	0	0.6500	--	--	--	--	%
LS Max Deviation	0	1.326	--	--	--	--	%
The GLS–VJ source activity is acceptable.							
The HGNS Neutron Master Calibration was done with the following parameters :							
NCT–B Water Temperature	81.3	DEGF.					
Thermal Housing Size	3.373	IN.					
NSR–F serial number	5168						

High resolution Integrated Logging Tool–CTS / Equipment Identification

Primary Equipment:

Array Induction Tool – H

Rm/SP Bottom Nose

AIT – H

AHRM – A

Array Induction Sonde
HILT high-Resolution Mechanical Sonde
HILT Rxo Gamma-ray Device
HILT Micro Cylindrically Focused Log Dev
GR Logging Source
HILT High Res. Control Cartridge

AHIS – BA
HRMS – B
HRGD – B
MCFL –
GLS – VJ
HRCC – B

216

5363

Auxiliary Equipment:

High resolution Integrated Logging Tool-CTS Wellsite Calibration							
Electronics Calibration Check – Thru Cal Mag. & Phase							
Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.6283		0.6050	51.78		71.00
	Before	0.6311			52.09		
1	Master	1.288		1.270	50.75		70.00
	Before	1.293			51.06		
2	Master	0.6387		0.6230	46.96		66.00
	Before	0.6411			47.29		
3	Master	0.7214		0.7040	46.17		65.00
	Before	0.7245			46.50		
4	Master	1.358		1.337	39.75		59.00
	Before	1.363			40.13		
5	Master	1.968		1.955	37.83		57.00
	Before	1.977			38.23		
6	Master	1.968		1.955	37.82		57.00
	Before	1.977			38.22		
7	Master	1.404		1.415	33.77		53.00
	Before	1.414			34.40		
		60.00 % (Minimum)	(Nominal)	140.0 % (Maximum)	Nom -60.00 (Minimum)	(Nominal)	Nom + 60.00 (Maximum)

Master: 5-Aug-2011 17:23











Before: 26-Sep-2011 10:46

















High resolution Integrated Logging Tool-CTS Wellsite Calibration						
Electronics Calibration Check – Auxilliary						
Phase	Array Induction SPA Plus MV	Value	Phase	Array Induction SPA Zero MV	Value	
Master		992.9	Master		-0.02178	
Before		993.4	Before		-0.04477	
	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		0.9212	Master		-2.239E-00	
Before		0.9216	Before		-4.901E-00	
	0.8700 (Minimum)	0.9150 (Nominal)	0.9600 (Maximum)	-0.05000 (Minimum)	0 (Nominal)	0.05000 (Maximum)
Master: 5–Aug–2011 17:23			Before: 26–Sep–2011 10:46			







Master: 5-Aug-2011 17:23




Before: 26-Sep-2011 10:46




High resolution Integrated Logging Tool-CTS Wellsite Calibration					
Test Loop Gain Correction					
Idx	Value	Test Loop Gain Magnitude V	Value	Phase DEG	
0	1.033		0.9022		
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	
1	1.008		0.3754		
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	
2	1.018		-0.2211		
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	

3	1.015		0.3984			
	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
4	0.9973		-0.07337			
	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
5	0.9872		-0.4233			
	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
6	0.9883		1.235			
	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
7	1.002		-0.3843			
	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
Master: 5-Aug-2011 17:23						




High resolution Integrated Logging Tool-CTS Wellsite Calibration							
Sonde Error Correction							
Idx	Value	R Sonde Error Correction MM/M			Value	X Sonde Error Correction MM/M	
0	-85.34				-217.9		
		-231.0 (Minimum)	-56.00 (Nominal)	119.0 (Maximum)		-2250 (Minimum)	0 (Nominal) 2250 (Maximum)
1	166.1				-66.15		
		114.0 (Minimum)	159.0 (Nominal)	204.0 (Maximum)		-625.0 (Minimum)	0 (Nominal) 625.0 (Maximum)
2	115.2				-216.9		
		66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)		-350.0 (Minimum)	0 (Nominal) 350.0 (Maximum)
3	60.68				-25.47		
		39.00 (Minimum)	64.00 (Nominal)	89.00 (Maximum)		-250.0 (Minimum)	0 (Nominal) 250.0 (Maximum)
4	26.59				-26.74		
		15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)		-63.00 (Minimum)	0 (Nominal) 63.00 (Maximum)
5	13.30				-17.19		
		4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)		-50.00 (Minimum)	0 (Nominal) 50.00 (Maximum)
6	10.27				2.002		
		5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)		-30.00 (Minimum)	0 (Nominal) 30.00 (Maximum)
7	-1.251				3.875		
		-5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)		-30.00 (Minimum)	0 (Nominal) 30.00 (Maximum)
Master: 5-Aug-2011 17:23							

High resolution Integrated Logging Tool–CTS Wellsite Calibration								
Mud Gain Correction								
Idx	Value	Coarse – Mag, Real, Imag			Value	Fine – Mag, Real, Imag		
0	0.8792				0.8785			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
1	0.8792				0.8785			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
2	0.8792				0.8785			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
Master: 5–Aug–2011 17:23								




High resolution Integrated Logging Tool-CTS Wellsite Calibration														
Stab Measurement Summary														
Phase	BS Window Ratio			Value	Phase	SS Window Ratio			Value	Phase	LS Window Ratio			Value
Before				0.7334	Before				0.4887	Before				0.3019
	0.6967 (Minimum)	0.7333 (Nominal)	0.7700 (Maximum)			0.4612 (Minimum)	0.4854 (Nominal)	0.5097 (Maximum)			0.2836 (Minimum)	0.2985 (Nominal)	0.3134 (Maximum)	

Phase	BS Window Sum CPS			Value	Phase	SS Window Sum CPS			Value	Phase	LS Window Sum CPS			Value
Before				25800	Before				11600	Before				1280
	24030 (Minimum)	25300 (Nominal)	26560 (Maximum)			11050 (Minimum)	11630 (Nominal)	12210 (Maximum)			1228 (Minimum)	1292 (Nominal)	1357 (Maximum)	




Before: 26-Sep-2011 10:49

High resolution Integrated Logging Tool–CTS 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				1655	Before				1448	Before				1337
	1537 (Minimum)	1637 (Nominal)	1737 (Maximum)			1348 (Minimum)	1448 (Nominal)	1548 (Maximum)			1233 (Minimum)	1333 (Nominal)	1433 (Maximum)	



Before: 26-Sep-2011 10:49

High resolution Integrated Logging Tool–CTS Wellsite Calibration														
Crystal Quality Resolutions Calibration														
Phase	BS Crystal Resolution %			Value	Phase	SS Crystal Resolution %			Value	Phase	LS Crystal Resolution %			Value
Before				11.33	Before				8.628	Before				9.348
	10.18 (Minimum)	11.18 (Nominal)	12.18 (Maximum)			7.818 (Minimum)	8.818 (Nominal)	9.818 (Maximum)			8.474 (Minimum)	9.474 (Nominal)	10.47 (Maximum)	



Before: 26-Sep-2011 10:49

High resolution Integrated Logging Tool–CTS Wellsite Calibration														
MCFL Calibration														
Phase	Raw B0 Resistivity OHMM			Value	Phase	Raw B1 Resistivity OHMM			Value	Phase	Raw B2 Resistivity OHMM			Value
Before				3907	Before				3835	Before				3851
	3565 (Minimum)	3875 (Nominal)	4185 (Maximum)			3524 (Minimum)	3830 (Nominal)	4136 (Maximum)			3524 (Minimum)	3830 (Nominal)	4136 (Maximum)	





Before: 26-Sep-2011 10:50

High resolution Integrated Logging Tool-CTS Wellsite Calibration													
HILT Caliper Calibration													
Phase	HILT Caliper Zero Measurement IN			Value	Phase	HILT Caliper Plus Measurement IN			Value				
Before				7.817	Before				12.04				
	6.000 (Minimum)	8.000 (Nominal)	10.00 (Maximum)			9.000 (Minimum)	12.00 (Nominal)	15.00 (Maximum)					

Before: 26-Sep-2011 10:45



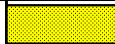
High resolution Integrated Logging Tool-CTS Wellsite Calibration													
Detector Calibration													
Phase	Gamma Ray Background GAPI			Value	Phase	Gamma Ray (Jig - Bkgd) GAPI			Value				
Before				90.40	Before				178.3				
	0 (Minimum)	30.00 (Nominal)	120.0 (Maximum)			157.1 (Minimum)	165.0 (Nominal)	206.3 (Maximum)					

Before: 26-Sep-2011 10:45

High resolution Integrated Logging Tool-CTS Wellsite Calibration													
Zero Measurement													
Phase	CNTC Background CPS			Value	Phase	CFTC Background CPS			Value				
Master				26.52	Master				28.37				
Before				26.98	Before				27.42				
	5.000 (Minimum)	26.52 (Nominal)	40.00 (Maximum)			5.000 (Minimum)	28.37 (Nominal)	40.00 (Maximum)					


Master: 5-Aug-2011 15:58

















Before: 26-Sep-2011 10:47





High resolution Integrated Logging Tool-CTS Wellsite Calibration														
Ratio Measurement														
Phase	Thermal Near Corr. (Tank) CPS			Value	Phase	Thermal Far Corr. (Tank) CPS			Value	Phase	CNTC/CFTC (Tank)			Value
Master				5378	Master				2207	Master				2.437
	4700 (Minimum)	5800 (Nominal)	6900 (Maximum)			1900 (Minimum)	2400 (Nominal)	2900 (Maximum)			2.120 (Minimum)	2.159 (Nominal)	2.540 (Maximum)	

















Master: 5-Aug-2011 15:58

Wellsite Calibration

Accelerometer Calibration			
Phase	Z-Axis Acceleration F/S2		Value
Before			32.24
	31.53 (Minimum)	32.19 (Nominal)	32.84 (Maximum)
Before: 28-Sep-2011 5:26			

High resolution Integrated Logging Tool-CTS Master Calibration							
Electronics Calibration Check - Thru Cal Mag. & Phase							
Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.6283		0.6050	51.78		71.00
1	Master	1.288		1.270	50.75		70.00
2	Master	0.6387		0.6230	46.96		66.00
3	Master	0.7214		0.7040	46.17		65.00
4	Master	1.358		1.337	39.75		59.00
5	Master	1.968		1.955	37.83		57.00
6	Master	1.968		1.955	37.82		57.00
7	Master	1.404		1.415	33.77		53.00
		60.00 % (Minimum)	(Nominal)	140.0 % (Maximum)	Nom -60.00 (Minimum)	(Nominal)	Nom + 60.00 (Maximum)
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High resolution Integrated Logging Tool–CTS Master Calibration							
Electronics Calibration Check – Auxilliary							
Phase	Array Induction SPA Plus MV		Value	Phase	Array Induction SPA Zero MV		Value
Master			992.9	Master			-0.02178
	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			0.9212	Master			-2.239E-00
	0.8700 (Minimum)	0.9150 (Nominal)	0.9600 (Maximum)		-0.05000 (Minimum)	0 (Nominal)	0.05000 (Maximum)
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High resolution Integrated Logging Tool-CTS Master Calibration						
Test Loop Gain Correction						
Idx	Value	Test Loop Gain Magnitude V			Value	Phase DEG
0	1.033				0.9022	
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal) 3.000 (Maximum)
1	1.008				0.3754	
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal) 3.000 (Maximum)
2	1.018				-0.2211	
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal) 3.000 (Maximum)
3	1.015				0.3984	
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal) 3.000 (Maximum)
4	0.9973				-0.07337	
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal) 3.000 (Maximum)
5	0.9872				-0.4233	
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal) 3.000 (Maximum)
6	0.9883				1.235	
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal) 3.000 (Maximum)
7	1.002				-0.3843	
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal) 3.000 (Maximum)

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High resolution Integrated Logging Tool-CTS Master Calibration							
Sonde Error Correction							
Idx	Value	R Sonde Error Correction MM/M			Value	X Sonde Error Correction MM/M	
0	-85.34				-217.9		
		-231.0 (Minimum)	-56.00 (Nominal)	119.0 (Maximum)		-2250 (Minimum)	0 (Nominal) 2250 (Maximum)
1	166.1				-66.15		
		114.0 (Minimum)	159.0 (Nominal)	204.0 (Maximum)		-625.0 (Minimum)	0 (Nominal) 625.0 (Maximum)
2	115.2				-216.9		
		66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)		-350.0 (Minimum)	0 (Nominal) 350.0 (Maximum)
3	60.68				-25.47		
		39.00 (Minimum)	64.00 (Nominal)	89.00 (Maximum)		-250.0 (Minimum)	0 (Nominal) 250.0 (Maximum)
4	26.59				-26.74		
		15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)		-63.00 (Minimum)	0 (Nominal) 63.00 (Maximum)
5	13.30				-17.19		
		4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)		-50.00 (Minimum)	0 (Nominal) 50.00 (Maximum)
6	10.27				2.002		
		5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)		-30.00 (Minimum)	0 (Nominal) 30.00 (Maximum)
7	-1.251				3.875		
		-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-CTS Master Calibration							
Mud Gain Correction							
Idx	Value	Coarse – Mag, Real, Imag			Value	Fine – Mag, Real, Imag	
0	0.8792				0.8785		
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal) 1.200 (Maximum)
1	0.8792				0.8785		
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal) 1.200 (Maximum)
2	0.8792				0.8785		
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal) 1.200 (Maximum)

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High resolution Integrated Logging Tool-CTS Master Calibration									
Inversion results									
Phase	Rho Aluminum G/C3			Value	Phase	Rho Magnesium G/C3			Value
Master				2.601	Master				1.685
	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				2.558	Master				2.642
	2.470 (Minimum)	2.570 (Nominal)	2.670 (Maximum)			2.550 (Minimum)	2.650 (Nominal)	2.750 (Maximum)	
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High resolution Integrated Logging Tool-CTS Master Calibration									
Deviation Summary									
Phase	BS Average Deviation %			Value	Phase	SS Average Deviation %			Value
Master				0.1387	Master				0.3342
	-0.6000 (Minimum)	0 (Nominal)	0.6000 (Maximum)			-1.000 (Minimum)	0 (Nominal)	1.000 (Maximum)	
Phase	LS Average Deviation %			Value	Master				0.6500
	-1.500 (Minimum)	0 (Nominal)	1.500 (Maximum)						
Phase	BS Max Deviation %			Value	Phase	SS Max Deviation %			Value
Master				0.3402	Master				0.8651
	-0.6000 (Minimum)	0 (Nominal)	0.6000 (Maximum)			-1.000 (Minimum)	0 (Nominal)	1.000 (Maximum)	
Phase	LS Max Deviation %			Value	Master				1.326
	-1.500 (Minimum)	0 (Nominal)	1.500 (Maximum)						

-1.600 (Minimum)	0 (Nominal)	1.600 (Maximum)	-2.500 (Minimum)	0 (Nominal)	2.500 (Maximum)	-3.500 (Minimum)	0 (Nominal)	3.500 (Maximum)
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High resolution Integrated Logging Tool-CTS Master Calibration									
Zero Measurement									
Phase	CNTC Background CPS			Value	Phase	CFTC Background CPS			Value
Master				26.52	Master				28.37
	5.000 (Minimum)	26.52 (Nominal)	40.00 (Maximum)			5.000 (Minimum)	28.37 (Nominal)	40.00 (Maximum)	
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High resolution Integrated Logging Tool–CTS Master Calibration														
Tank Measurement														
Phase	Thermal Near Corr. (Tank) CPS			Value	Phase	Thermal Far Corr. (Tank) CPS			Value	Phase	CNTC/CFTC (Tank)			Value
Master				5378	Master				2207	Master				2.437
	4700 (Minimum)	5800 (Nominal)	6900 (Maximum)		1900 (Minimum)	2400 (Nominal)	2900 (Maximum)		2.120 (Minimum)	2.159 (Nominal)	2.540 (Maximum)			
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Company: **Noble Energy Inc**

Schlumberger

Well: **Meis 32-8B**

Field: **Schramm**

County: **Yuma**

State: **Colorado**

Platform Express

Triple Combo