MUD

County: Weld

Schlumberger

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

Well: **Commons 6−19**
Field: **Wattenberg**
County: **Weld** State: **Colorado**

Company: Kerr McGee Oil and Gas Onshore
Well: Commons 6−19
Location: NENW Sec. 19 , T 1N , R 68W
Field: Wattenberg

Platform Express
Micro Log

LOCATION

NENW Sec. 19 , T 1N , R 68W
SHL: 1259' FNL / 1331' FWL NENW
BHL: 1900' FNL / 1995' FWL SENW (est)

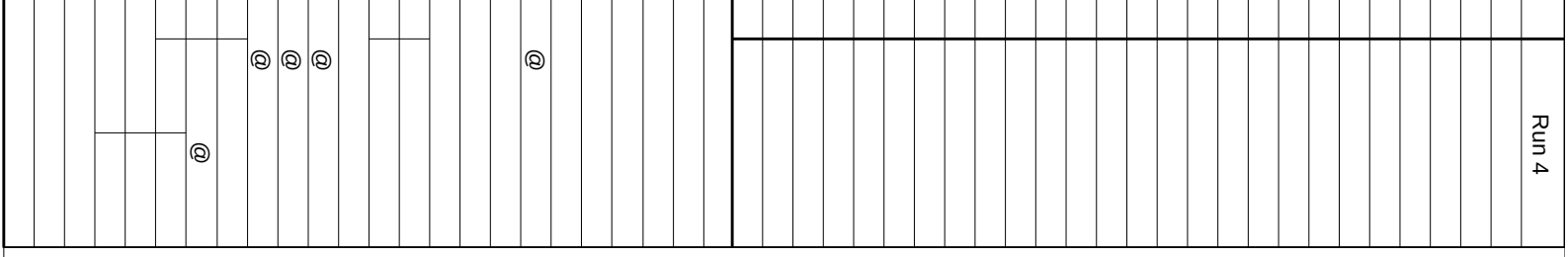
Elev.: K.B. 5056.00 ft
G.L. 5041.00 ft
D.F. 5055.00 ft

Permanent Datum: Ground Level Elev.: 5041.00 ft
Log Measured From: Kelly Bushing 15.00 ft above Perm. Datum
Drilling Measured From: Kelly Bushing

API Serial No.	Section	Township	Range
05−123−29922−0000	19	1N	68W

	Run 1	Run 2	Run 3
Logging Date	12−Nov−2009		
Run Number	1		
Depth Driller	8512 ft		
Schlumberger Depth	8439 ft		
Bottom Log Interval	8431 ft		
Top Log Interval	913 ft		
Casing Driller Size @ Depth	8.625 in @ 912 ft	@	
Casing Schlumberger	913 ft		
Bit Size	7.875 in		
Type Fluid In Hole	Fresh Water		
MUD Density / Viscosity	9.3 lbm/gal / 47 s		
MUD Fluid Loss / PH	/		
MUD Source Of Sample	Flowline		
RM @ Measured Temperature	2.250 ohm.m @ 75 degF	@	
RMF @ Measured Temperature	1.650 ohm.m @ 75 degF	@	
RMC @ Measured Temperature	2.350 ohm.m @ 76 degF	@	
Source RMF / RMC	Press / Press		
RM @ MRT / RMF @ MRT	0.869 @ 205 / 0.639 @ 205	@	@
Maximum Recorded Temperatures	205 degF		
Circulation Stopped Time	12−Nov−2009 16:30		
Logger On Bottom Time	12−Nov−2009 21:35		
Unit Number / Location	3055 / Fort Morgan, CO		
Recorded By	Jared R. Hoskins		
Witnessed By	Rick Masters & Mark Scanniello		

	Run 1	Run 2	Run 3
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			
MUD Density / Viscosity	/		
MUD Fluid Loss / PH	/		
MUD 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			



DEPTH SUMMARY LISTING

Date Created: 12−NOV−2009 21:40:41

Depth System Equipment

Depth Measuring Device		Tension Device		Logging Cable	
Type:	IDW−B	Type:	CMTD−B/A	Type:	7−39P LXS
Serial Number:	799	Serial Number:	1223	Serial Number:	708273
Calibration Date:	1−Oct−2009	Calibration Date:	1−Oct−2009	Length:	15060 FT
Calibrator Serial Number:	33	Calibrator Serial Number:	100513		
Calibration Cable Type:	7−39P LXS	Number of Calibration Points:	0	Conveyance Method:	Wireline
Wheel Correction 1:	−4			Rig Type:	LAND
Wheel Correction 2:	−5				

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:	9.00 FT
Tool Zero Check At Surface:	0.00 FT

Depth Control Remarks

1. All Schlumberger depth policy procedures applied
2. This is the primary depth reference
3.
4.
5.
6.

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	OTHER SERVICES2
OS1: None	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
1. This is the first run in hole.	
2. Tool run as per tool sketch.	
3. Matrix changes are as noted on the porosity scale.	

Rig: Xtreme 11

Crew: Tim Ludgate

RUN 1		RUN 2	
SERVICE ORDER #:	AXB6−00071	SERVICE ORDER #:	
PROGRAM VERSION:	17C0−154	PROGRAM VERSION:	
FLUID LEVEL:		FLUID LEVEL:	

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1 RUN 2

SURFACE EQUIPMENT

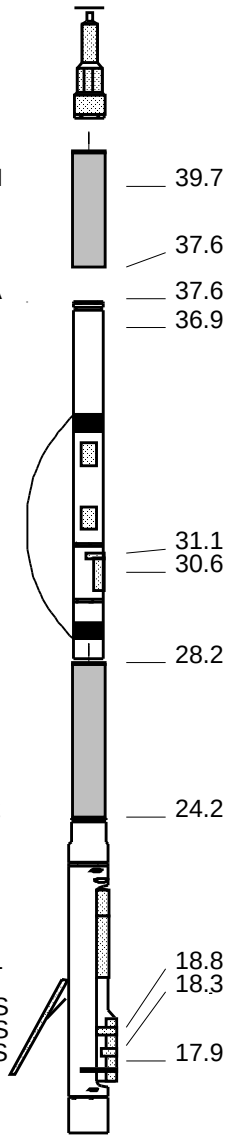
GSR−U/Y
NCT−B
CNB−AB
NCS−VB
WITM (DTS)−A

DOWNHOLE EQUIPMENT

LEH−QT
LEH−QT 2552

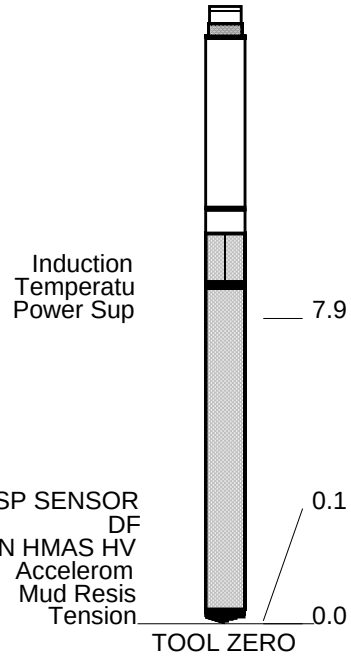
DTC−H
ECH−KC
DTCH0−A
DTCH1−A

HILTB−FTB
HGNSD−B
HMCA
HGNH
NLS−KL
NSR−F 5068
HACCZ 749
HCNT
HGR
HRCC−B 1813
HRMS−B 821
HRGD−B 1748
GLS−VJ 5416
MCFL Device
HILT Nucl. LS 42767
HILT Nucl. SS 42767
HILT Nucl. BS 42767
BOW−SPR
NPV−N



AIT−M
AMIS−A 1372
AMRM−A

16.0



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

Production String	(in) OD	(in) ID	(ft) MD	Well Schematic	(ft) MD	(in) OD	(in) ID	Casing String
					0.0	8.625		Casing String
					912.0	8.625		Casing Shoe
					912.0	7.875		Borehole Segment

						8512.0	7.875	Borehole Segment Bottom

All depths are driller's depths

Schlumberger

UPPER MICROLOG 5" = 100'

MAXIS Field Log

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_008LUP	FN:7	PRODUCER	12−Nov−2009 21:44 8461.5 FT	0.0 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 501.22 ft3

Cement Volume = 335.03 ft3 (assuming 4.50 in casing O.D.)

Computed from 5299.5 ft to 3795.5 ft

OP System Version: 17C0−154

AITM	17C0−154	HILTD	17C0−154
DTCH	17C0−154		

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

Tension (TENS)
10000 (LBF) 0

Caliper (HCAL)
6 (IN) 16

PERM

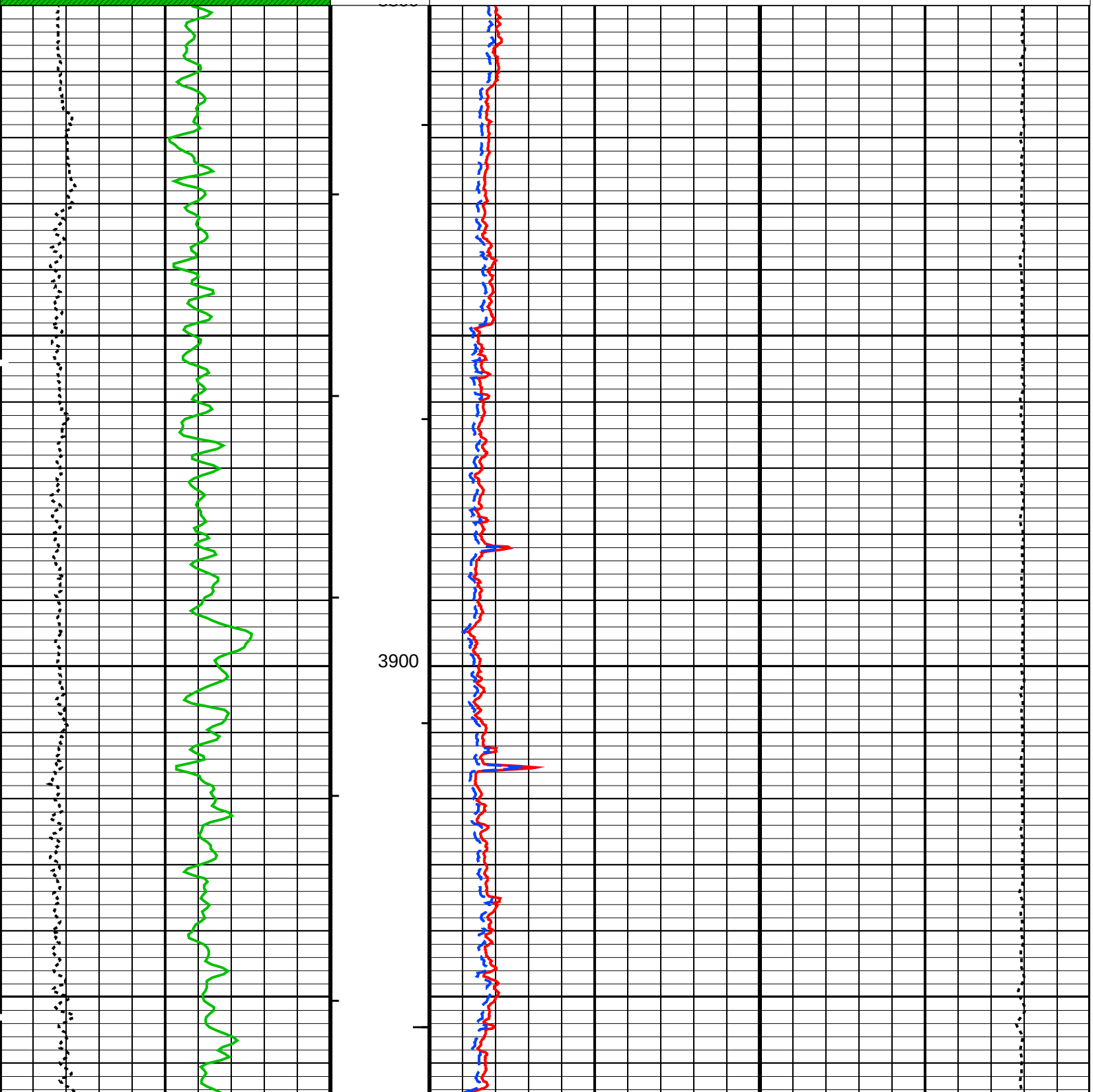
Gamma Ray (GR)
0 (GAPI) 200

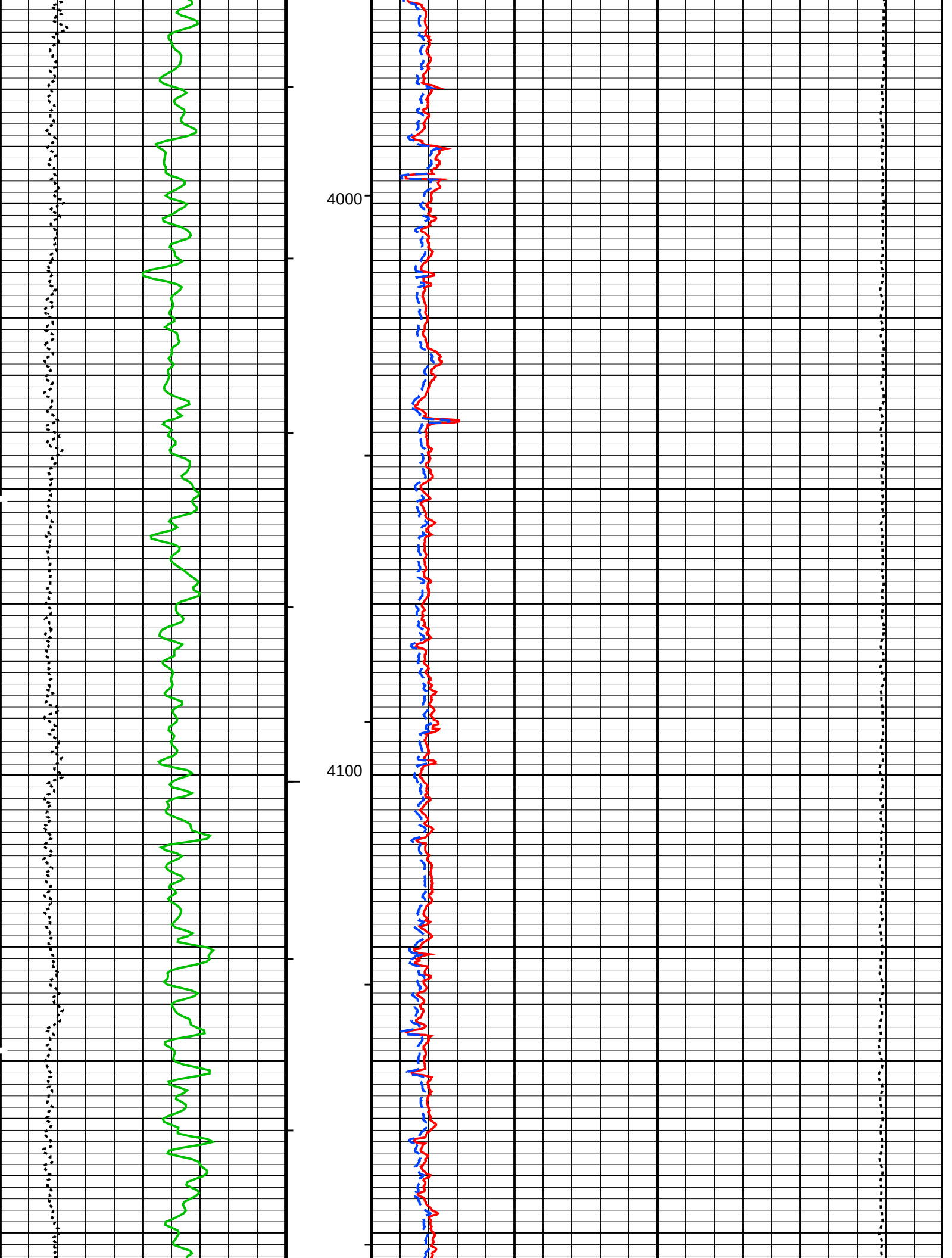
Computed Micro Normal (HMNO)
0 (OHMM) 40

GR BACKUP

Stuck Stretch (STIT)
0 (F) 50

Computed Micro Inverse (HMIN)
0 (OHMM) 40

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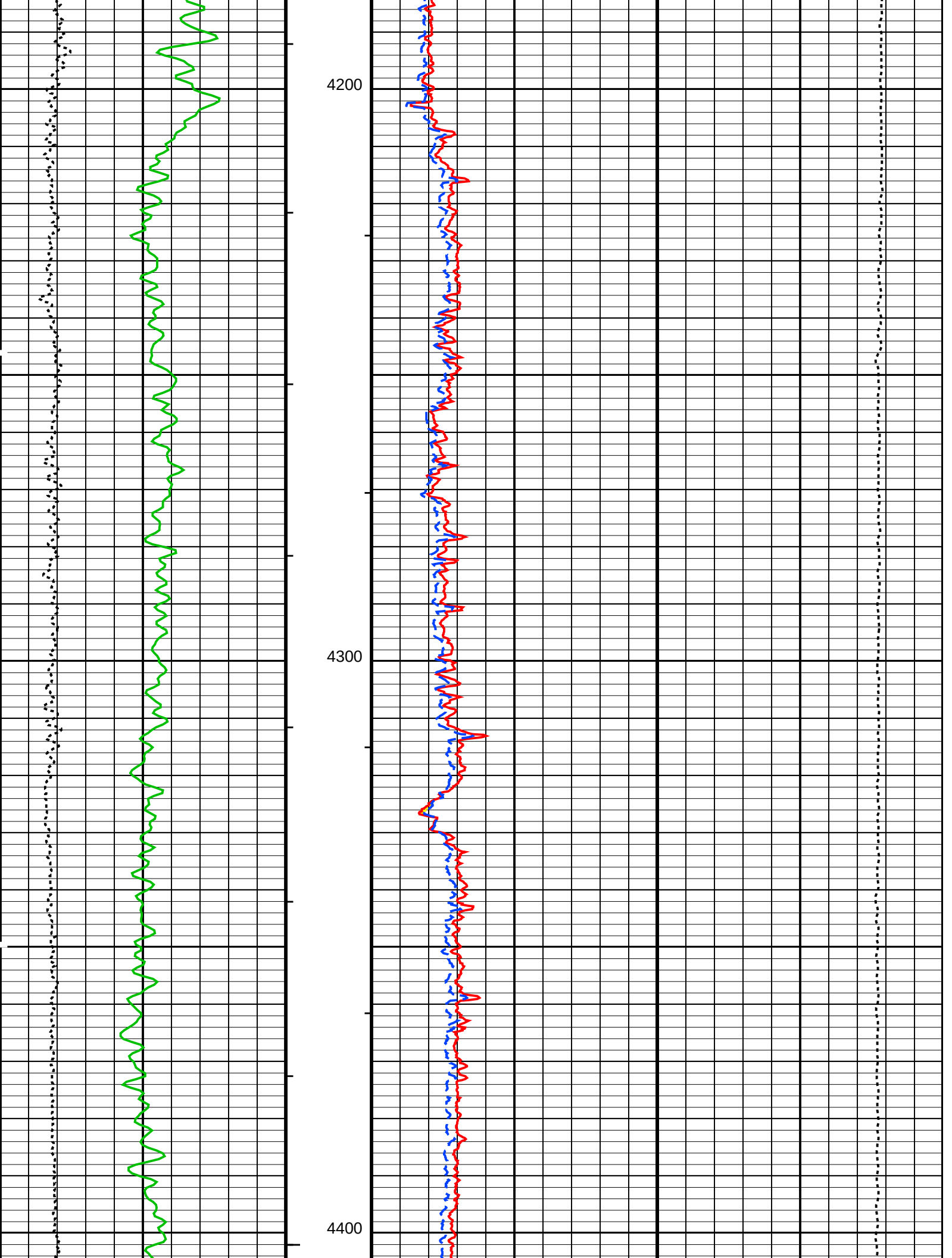
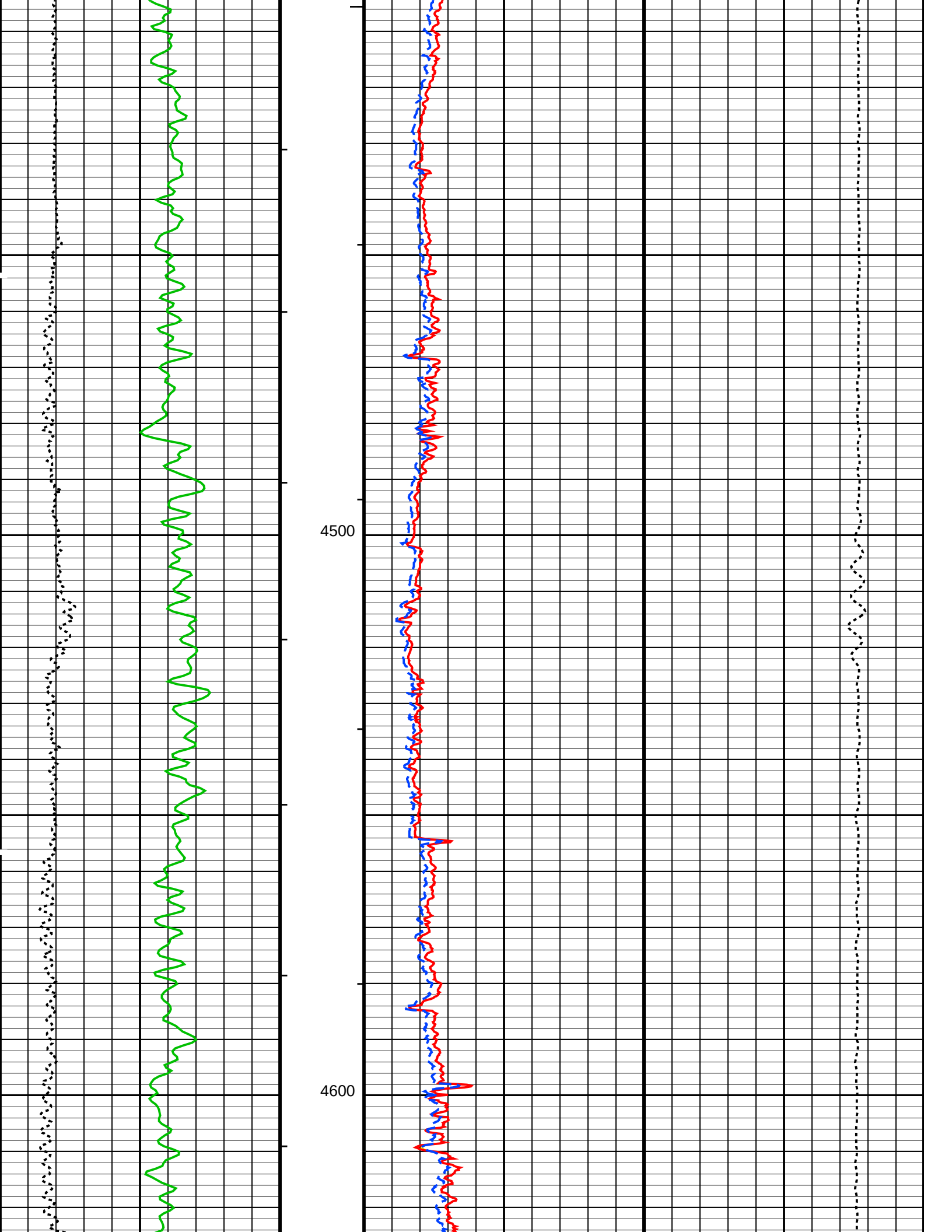

4200
4300
4400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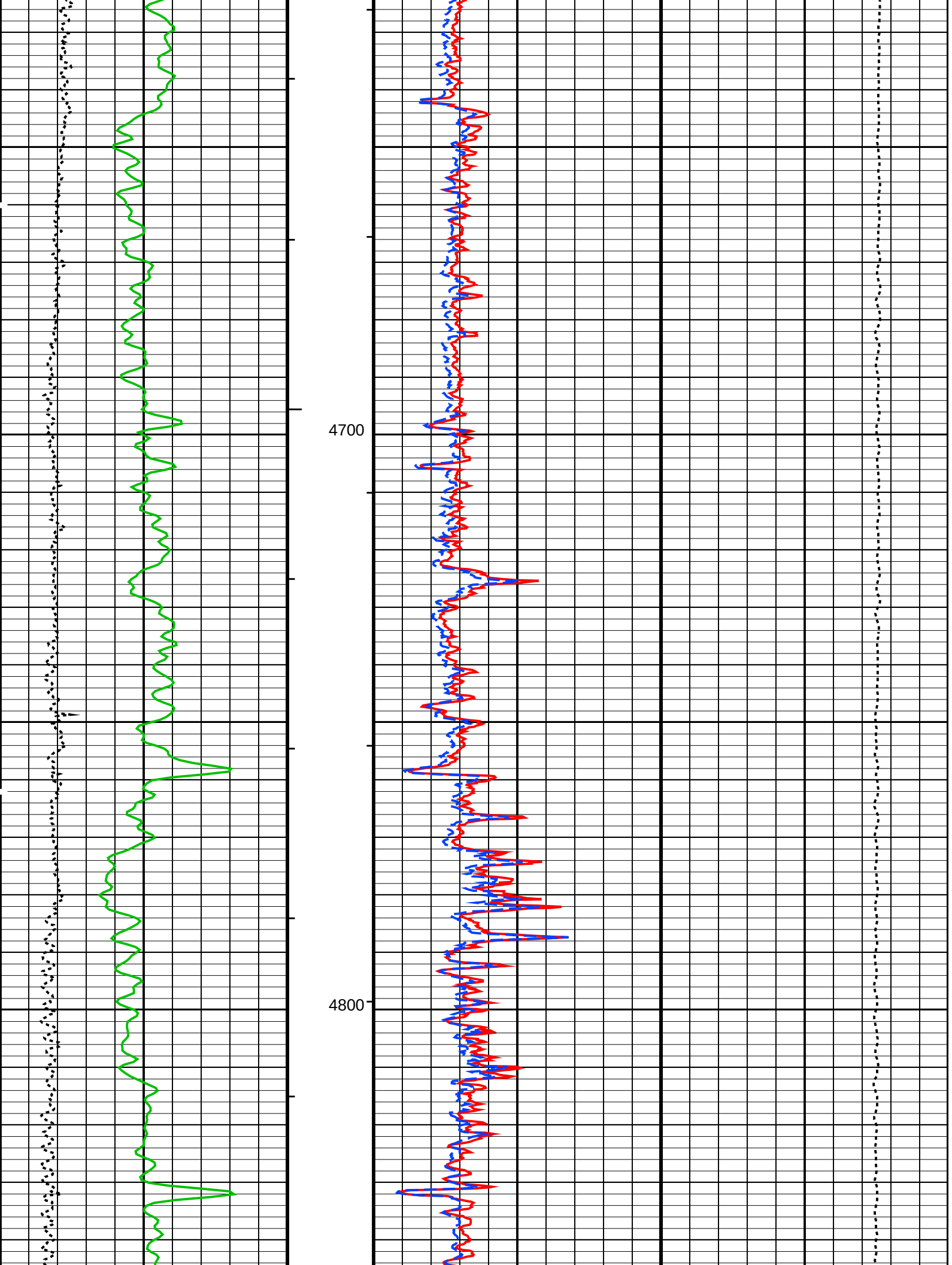
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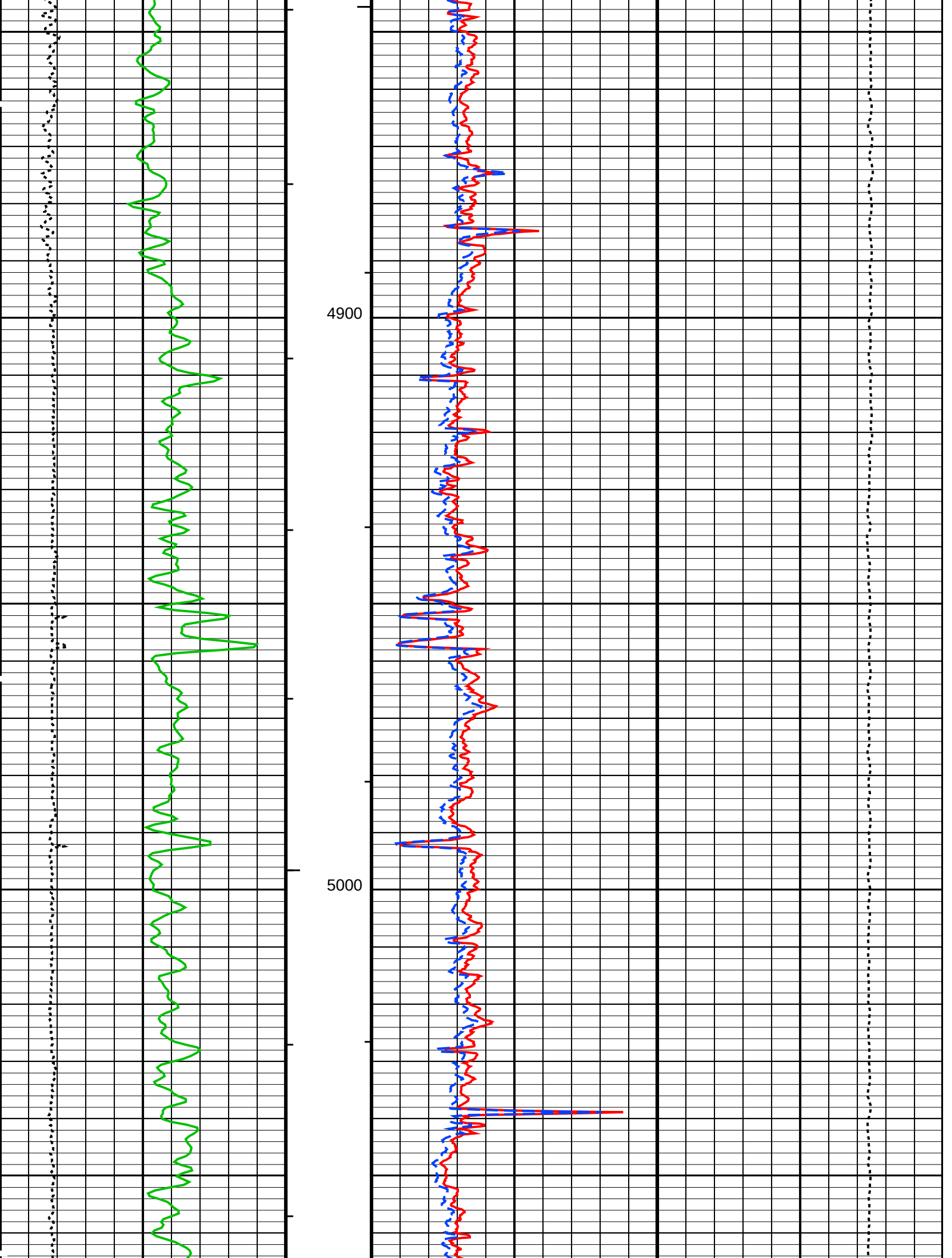
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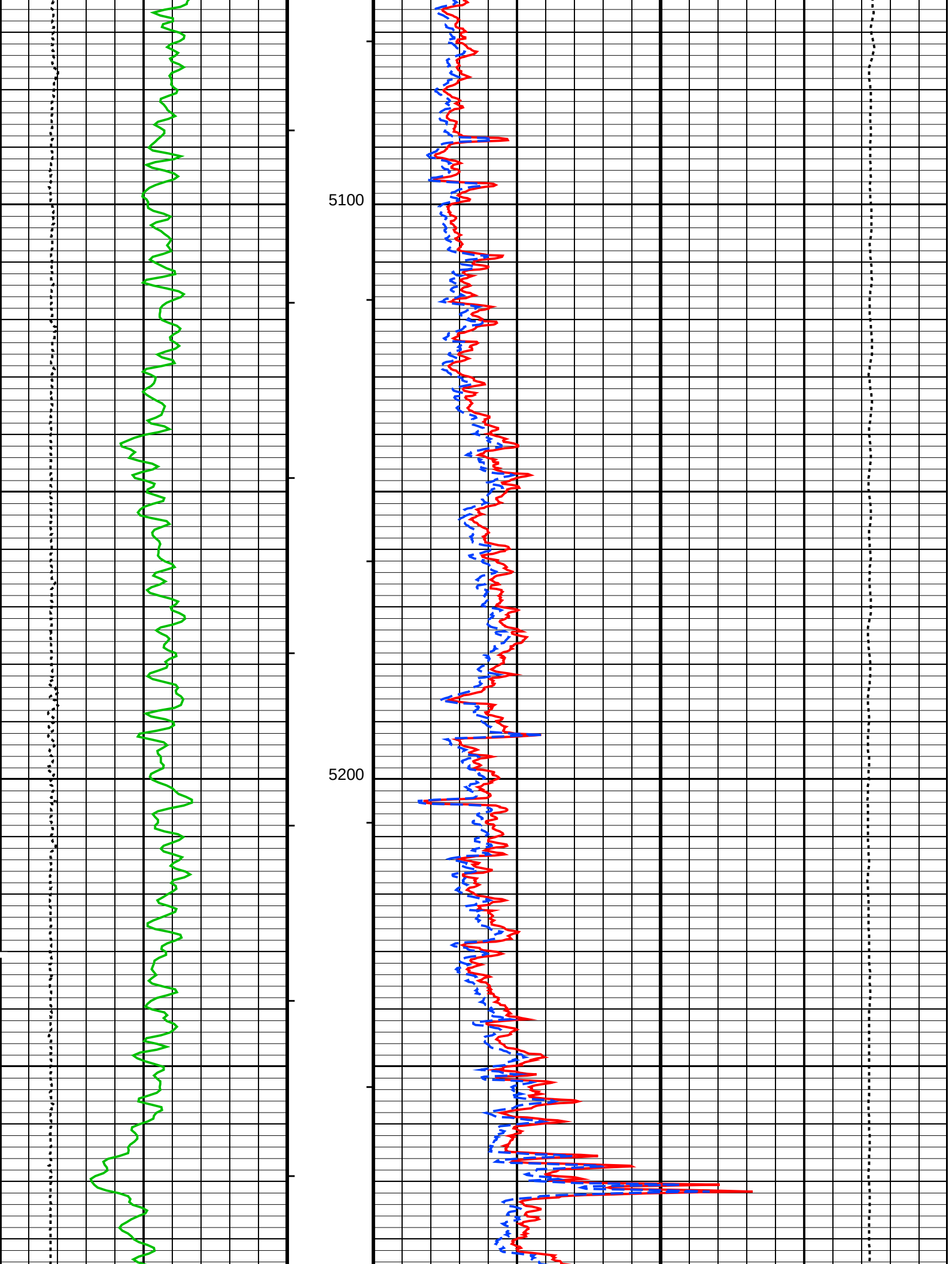
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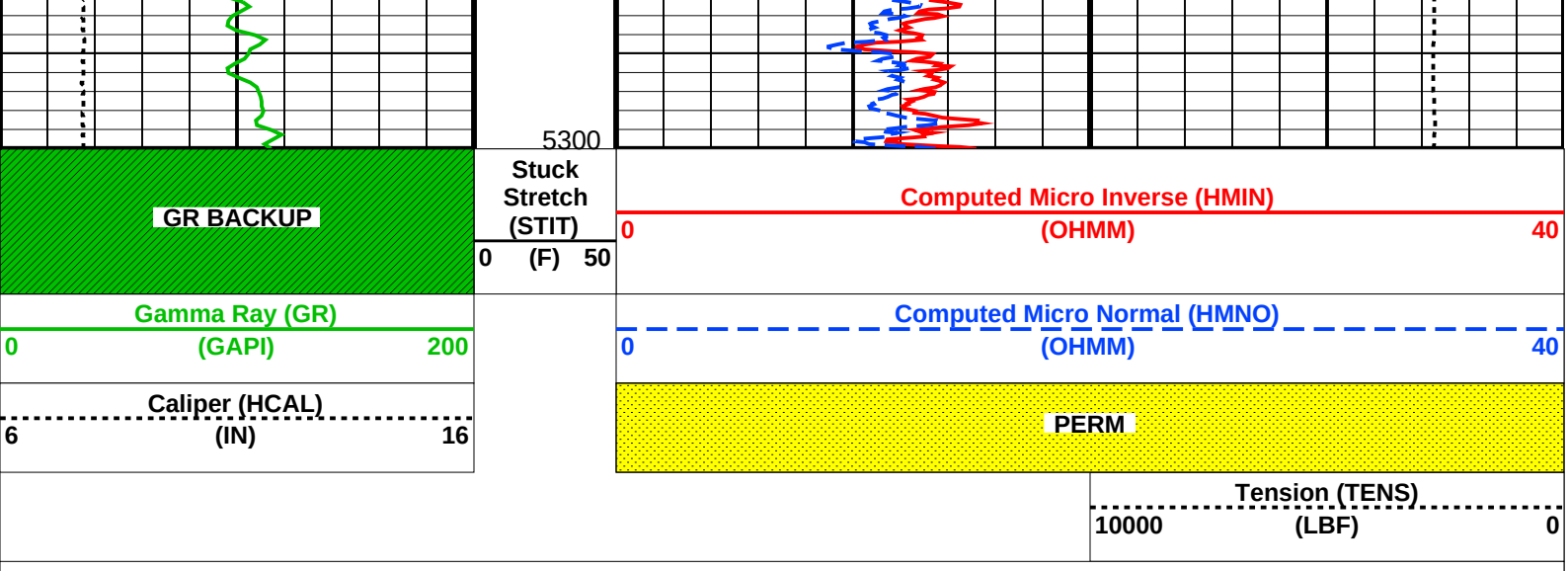
5200



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		
MPOF	MCFL Processing Operation Mode	ON	
	STI: Stuck Tool Indicator		
STKT	STI Stuck Threshold	2.500	ft
TDD	Total Depth − Driller	8512.0	ft
TDL	Total Depth − Logger	8512.0	ft
	System and Miscellaneous		
BS	Bit Size	7.875	in

Format: UPPER_MLT Vertical Scale: 5" per 100’ Graphics File Created: 12−Nov−2009 22:15

OP System Version: 17C0−154

AITM	17C0−154	HILTD	17C0−154
DTCH	17C0−154		

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_008LUP	FN:7	PRODUCER	12−Nov−2009 21:44	8461.5 FT	0.0 FT

Schlumberger

MAIN MICROLOG 5" = 100’

MAXIS Field Log

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_008LUP	FN:7	PRODUCER	12−Nov−2009 21:44

OP System Version: 17C0−154

AIT−M	17C0−154	HILTB−FTB	17C0−154
DTC−H	17C0−154		

Changed Parameter Summary

DLIS Name	New Value	Previous Value	Depth & Time
TD	8439 FT	8512 FT	8079.8 21:51:15
TDL	8439.00 FT	8512.00 FT	8079.8 21:51:15

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

Tension (TENS)
10000 (LBF) 0

Caliper (HCAL)
6 (IN) 16

PERM

Gamma Ray (GR)
0 (GAPI) 200

Computed Micro Normal (HMNO)
0 (OHMM) 40

GR BACKUP

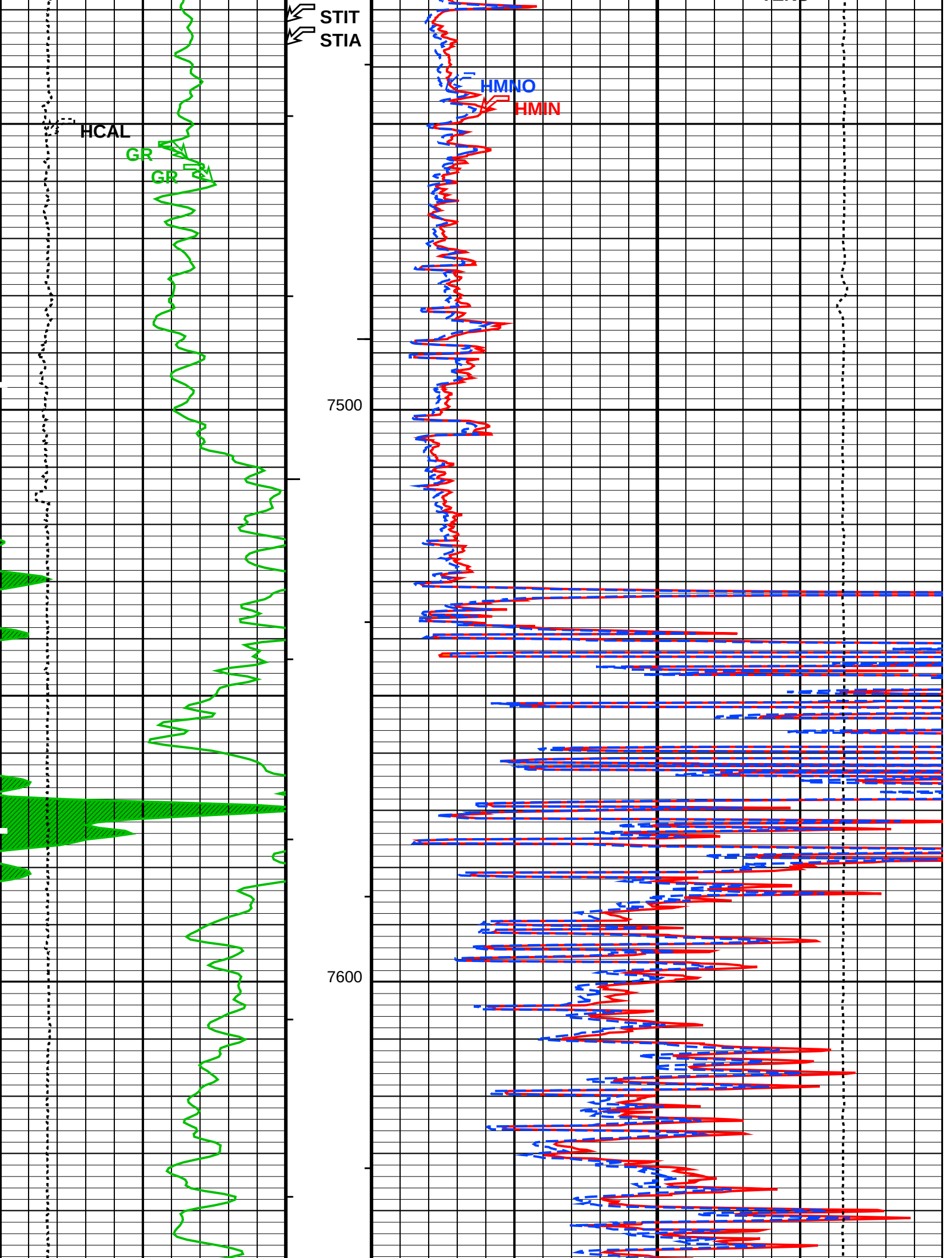
Stuck Stretch (STIT)
0 (F) 50

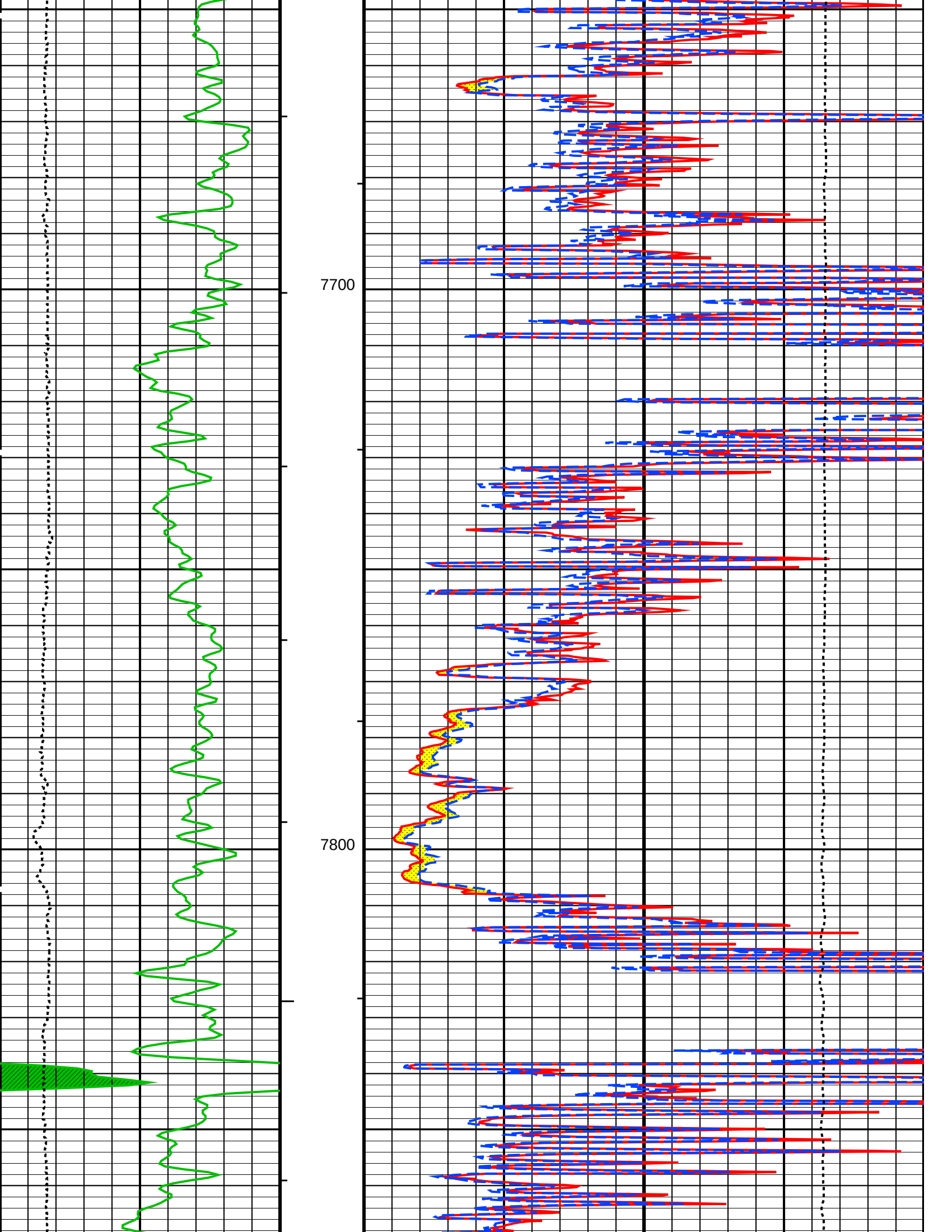
Computed Micro Inverse (HMIN)
0 (OHMM) 40

7300

7400

TENS


STIT
STIA
HMNO
HMIN
HCAL
GR
GR
7500
7600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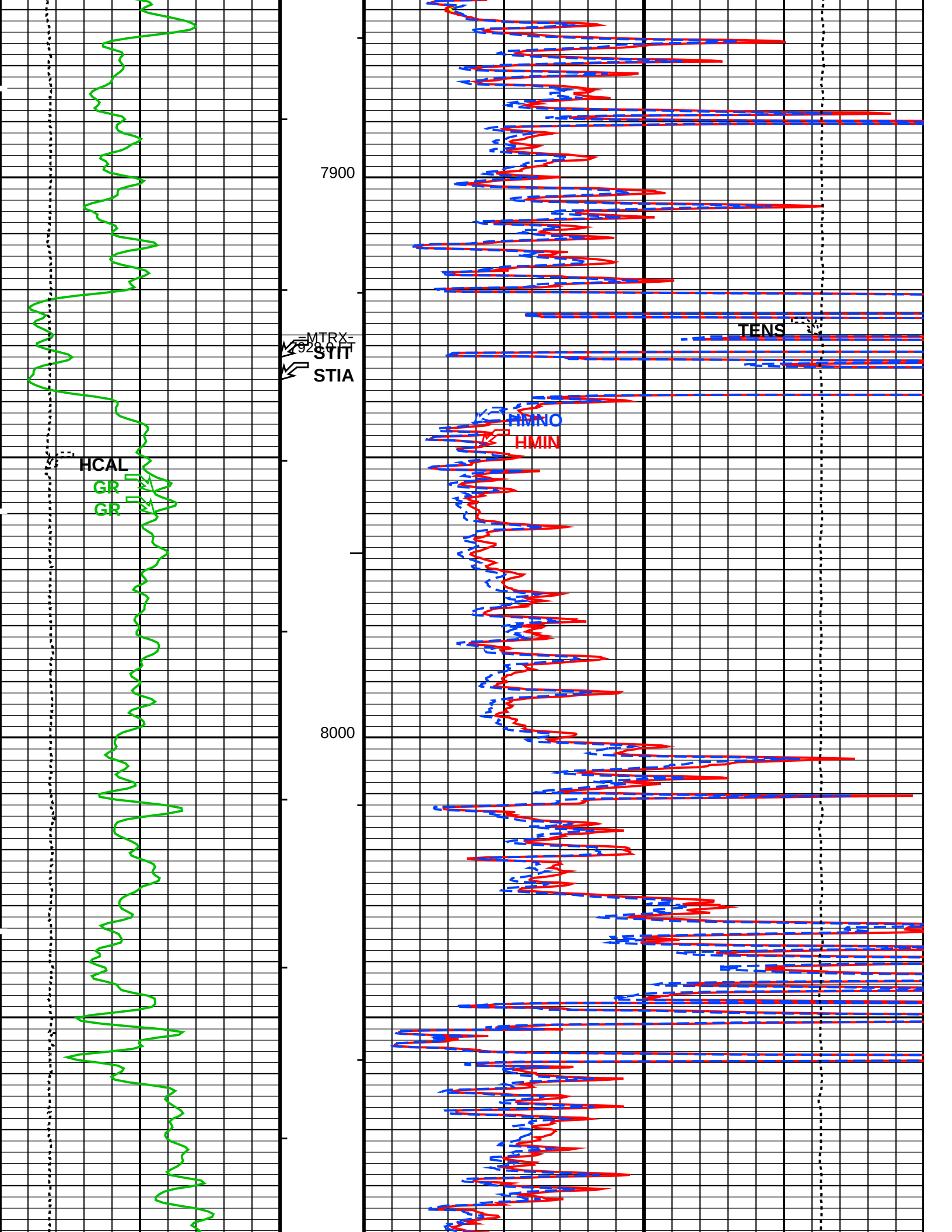
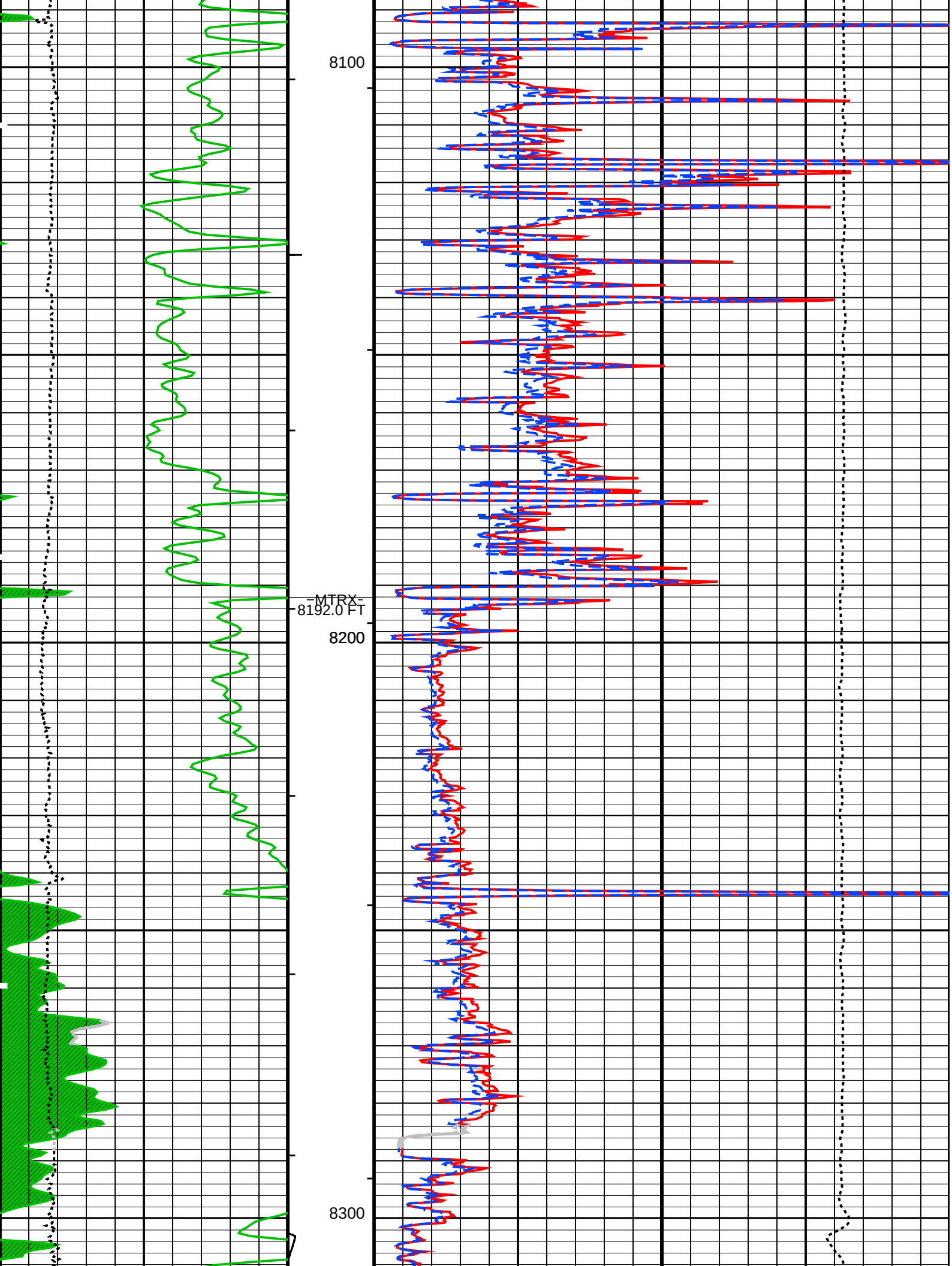
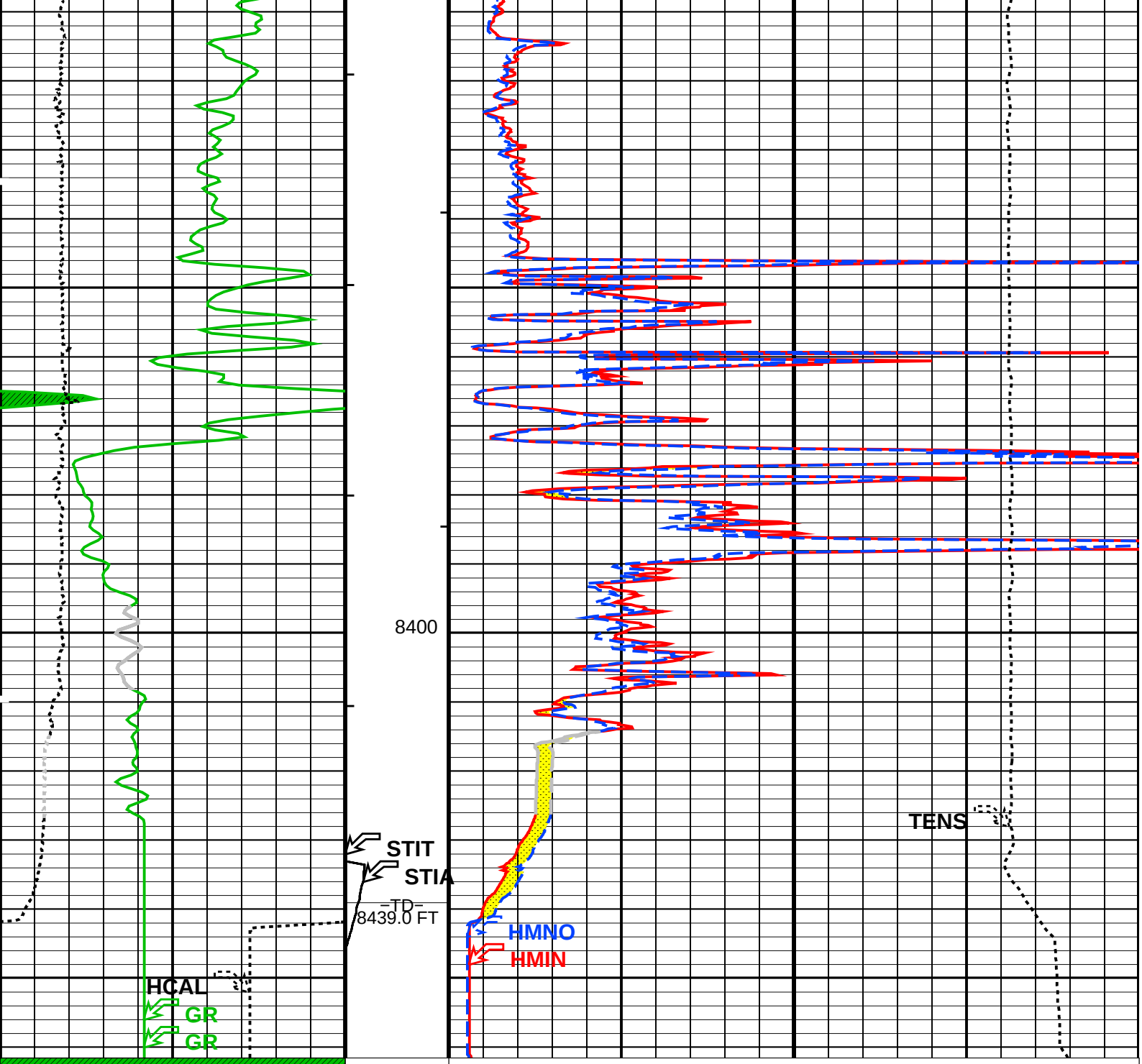
7800


7900
8000
-MTRX-
7928.000
STIT
STIA
TENS
HMNO
HMIN
HCAL
GR
GR


8100
-MTRX-
8192.0 FT
8200
8300



GR BACKUP

Stuck Stretch (STIT)
0 (F) 50

Computed Micro Inverse (HMIN)
0 (OHMM) 40

Gamma Ray (GR)
0 (GAPI) 200

Computed Micro Normal (HMNO)
0 (OHMM) 40

Caliper (HCAL)
6 (IN) 16

PERM

Tension (TENS)
10000 (LBF) 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		
MPOF	MCFL Processing Operation Mode	ON	
	HOLEV: Integrated Hole/Cement Volume		
FCD	Future Casing (Outer) Diameter	4.5	IN
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
	STI: Stuck Tool Indicator		
LBFR	Trigger for MAXIS First Reading Label	TDL	
STKT	STI Stuck Threshold	2.5	FT
TDD	Total Depth − Driller	8512.00	FT
TDL	Total Depth − Logger	8512.00	FT
	System and Miscellaneous		
BS	Bit Size	7.875	IN
DORL	Depth Offset for Repeat Analysis	0.0	FT
TD	Total Depth	8512	FT

Format: LOWER_MLT Vertical Scale: 5" per 100' Graphics File Created: 12−Nov−2009 21:44

OP System Version: 17C0−154

AIT−M	17C0−154	HILTB−FTB	17C0−154
DTC−H	17C0−154		

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_008LUP	FN:7	PRODUCER	12−Nov−2009 21:44	

Schlumberger

REPEAT ANALYSIS

MAXIS Field Log

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_007PUP	FN:6	PRODUCER	12−Nov−2009 21:43	8469.0 FT	7874.5 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_008LUP	FN:7	PRODUCER	12−Nov−2009 21:44

OP System Version: 17C0−154

AIT−M	17C0−154	HILTB−FTB	17C0−154
DTC−H	17C0−154		

Changed Parameter Summary

DLIS Name	New Value	Previous Value	Depth & Time
TD	8439 FT	8512 FT	8079.8 21:51:15

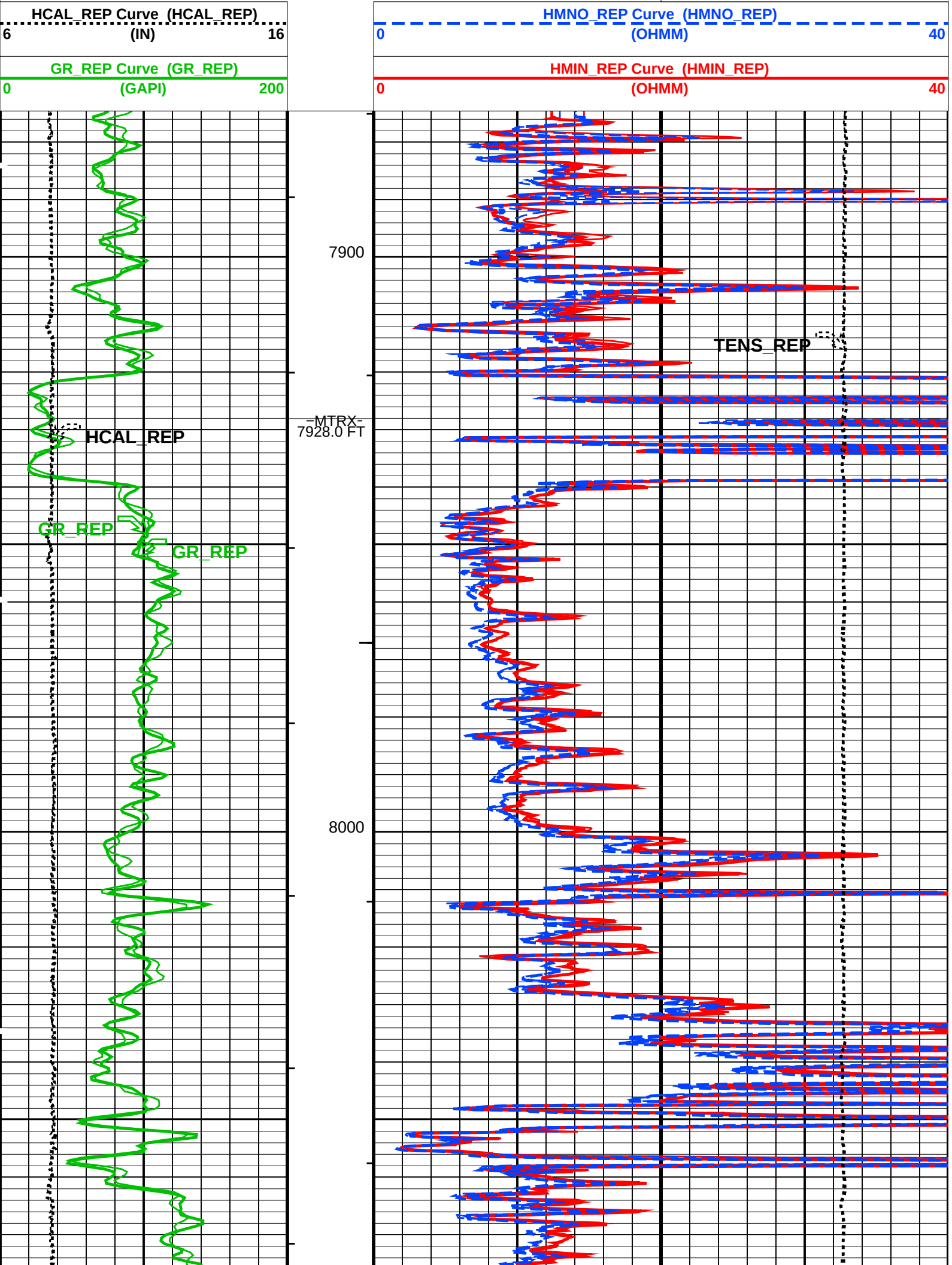
PIP SUMMARY

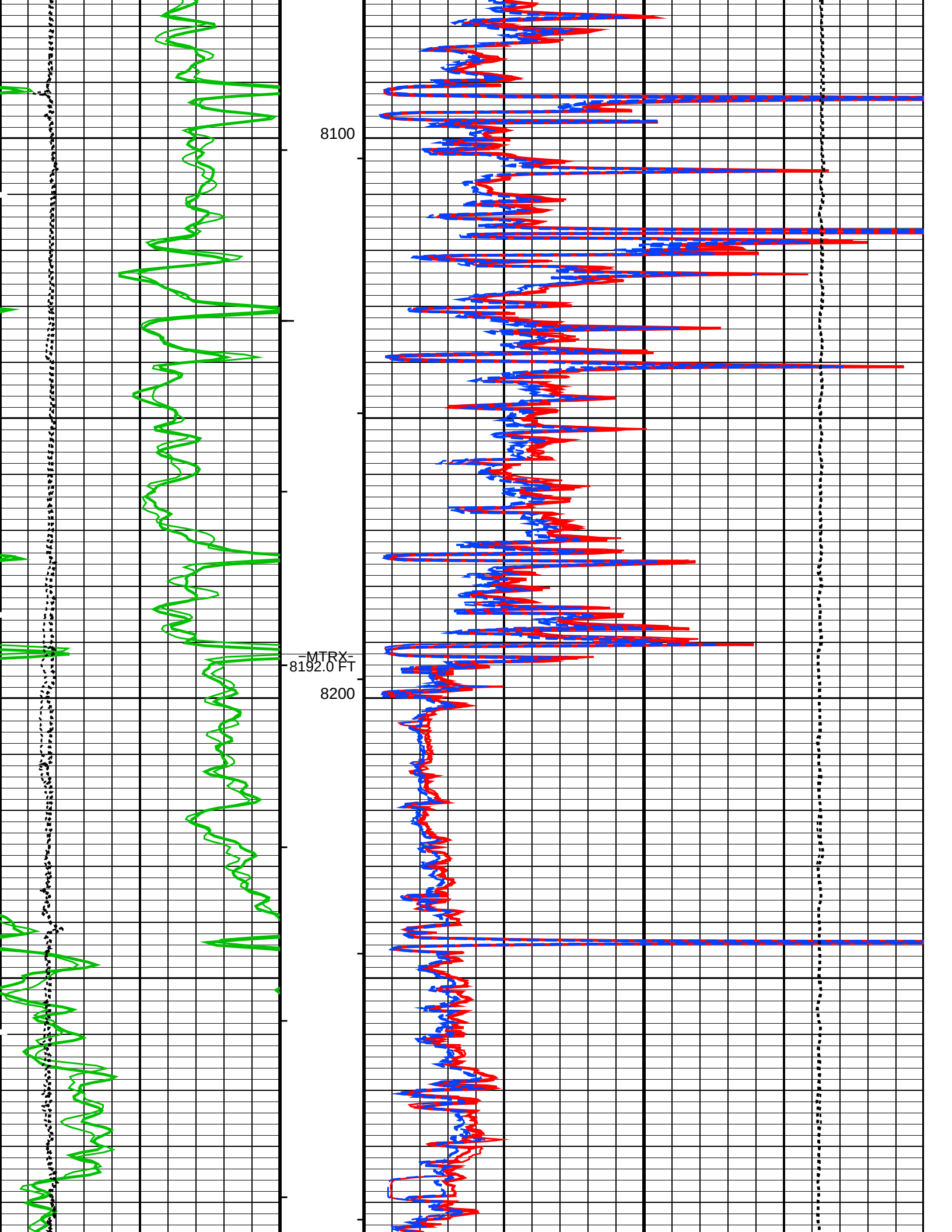
- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

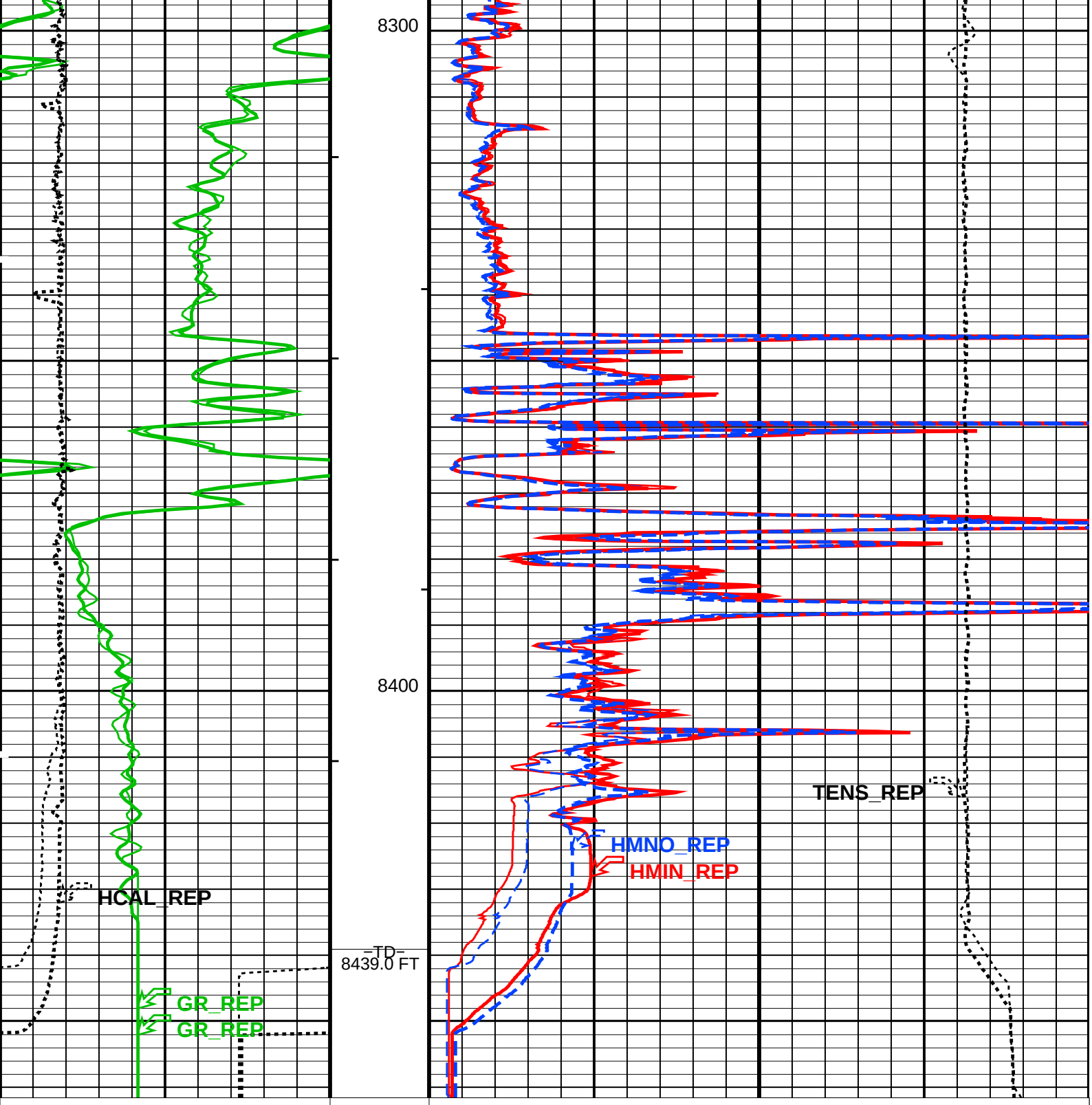
Time Mark Every 60 S

TENS_REP Curve (TENS_REP)

10000 (LBF) 0


HCAL_REP Curve (HCAL_REP)
6
(IN)
16
GR_REP Curve (GR_REP)
0
(GAPI)
200
HMNO_REP Curve (HMNO_REP)
0
(OHMM)
40
HMIN_REP Curve (HMIN_REP)
0
(OHMM)
40
7900
8000
-MTRX-
7928.0 FT
TENS_REP
HCAL_REP
GR_REP
GR_REP


8100
-MTRX-
8192.0 FT
8200



GR_REP Curve (GR_REP)
0 (GAPI) 200

HCAL_REP Curve (HCAL_REP)
6 (IN) 16

HMIN_REP Curve (HMIN_REP)
0 (OHMM) 40

HMNO_REP Curve (HMNO_REP)
0 (OHMM) 40

TENS_REP Curve (TENS_REP)
10000 (LBF) 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

Parameters

DLIS Name	Description	Value	
	HILTB−FTB: High resolution Integrated Logging Tool−DTS		
MPOF	MCFL Processing Operation Mode	ON	
	HOLEV: Integrated Hole/Cement Volume		
FCD	Future Casing (Outer) Diameter	4.5	IN
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
	System and Miscellaneous		
BS	Bit Size	7.875	IN
DORL	Depth Offset for Repeat Analysis	0.0	FT
TD	Total Depth	8512	FT

Format: MLT_REP **Vertical Scale: 5" per 100'** **Graphics File Created: 12−Nov−2009 21:44**

OP System Version: 17C0−154

AIT−M	17C0−154	HILTB−FTB	17C0−154
DTC−H	17C0−154		

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_007PUP	FN:6	PRODUCER	12−Nov−2009 21:43	8469.0 FT	7874.5 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_008LUP	FN:7	PRODUCER	12−Nov−2009 21:44

Schlumberger

BEFORE CALIBRATIONS

MAXIS Field Log

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Array Induction Tool − M Wellsite Calibration − Electronics Calibration Check − Thru Cal Mag. & Phase							
Master: 14−Oct−2009 17:03 Before: 12−Nov−2009 9:30							
Thru Cal Magnitude − 0	0	0.6205	0.6204	N/A	N/A	N/A	V
Thru Cal Magnitude − 1	0	1.271	1.271	N/A	N/A	N/A	V
Thru Cal Magnitude − 2	0	0.6318	0.6317	N/A	N/A	N/A	V
Thru Cal Magnitude − 3	0	0.7131	0.7130	N/A	N/A	N/A	V
Thru Cal Magnitude − 4	0	1.334	1.334	N/A	N/A	N/A	V
Thru Cal Magnitude − 5	0	1.953	1.953	N/A	N/A	N/A	V
Thru Cal Magnitude − 6	0	1.949	1.949	N/A	N/A	N/A	V
Thru Cal Magnitude − 7	0	1.419	1.419	N/A	N/A	N/A	V
Thru Cal Phase − 0	0	180.2	180.2	N/A	N/A	N/A	DEG
Thru Cal Phase − 1	0	179.2	179.1	N/A	N/A	N/A	DEG
Thru Cal Phase − 2	0	175.6	175.6	N/A	N/A	N/A	DEG
Thru Cal Phase − 3	0	174.9	174.8	N/A	N/A	N/A	DEG
Thru Cal Phase − 4	0	168.7	168.7	N/A	N/A	N/A	DEG
Thru Cal Phase − 5	0	167.0	167.0	N/A	N/A	N/A	DEG
Thru Cal Phase − 6	0	167.0	167.0	N/A	N/A	N/A	DEG
Thru Cal Phase − 7	0	166.2	166.2	N/A	N/A	N/A	DEG
Array Induction Tool − M Wellsite Calibration − Electronics Calibration Check − Auxiliary							
Master: 14−Oct−2009 17:03 Before: 12−Nov−2009 9:30							
Array Induction SPA Plus	991.0	992.7	992.7	N/A	N/A	N/A	MV
Array Induction SPA Zero	0	0.6638	0.6669	N/A	N/A	N/A	MV
Array Induction Temperature Pl	0.9170	0.9196	0.9196	N/A	N/A	N/A	V
Array Induction Temperature Ze	0	0.0006632	0.0006657	N/A	N/A	N/A	V
Array Induction Tool − M Wellsite Calibration − Test Loop Gain Correction							

Array Induction Tool − M Wellsite Calibration − Test Loop Gain Correction
Master: 14−Oct−2009 17:03

Test Loop Gain Correctio − 0	0	1.017	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio − 1	0	1.014	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio − 2	0	1.015	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio − 3	0	1.011	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio − 4	0	0.9935	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio − 5	0	0.9888	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio − 6	0	0.9937	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio − 7	0	1.007	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio − 0	0	0.7201	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 1	0	0.7620	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 2	0	0.2948	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 3	0	0.2209	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 4	0	0.1146	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 5	0	−0.009143	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 6	0	0.2984	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 7	0	−0.05307	N/A	N/A	N/A	N/A	DEG

Array Induction Tool − M Wellsite Calibration − Sonde Error Correction
Master: 14−Oct−2009 17:03

R Sonde Error Correction − 0	0	−69.04	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 1	0	172.8	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 2	0	116.8	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 3	0	64.65	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 4	0	26.78	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 5	0	12.75	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 6	0	11.98	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 7	0	−2.480	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 0	0	−259.4	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 1	0	103.1	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 2	0	63.05	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 3	0	−22.90	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 4	0	21.47	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 5	0	−15.50	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 6	0	−4.060	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 7	0	−4.950	N/A	N/A	N/A	N/A	MM/M

Array Induction Tool − M Wellsite Calibration − Mud Gain Correction
Master: 14−Oct−2009 17:03

Coarse − Mag, Real, Imag − 0	0	0.8551	N/A	N/A	N/A	N/A	
Coarse − Mag, Real, Imag − 1	0	0.8551	N/A	N/A	N/A	N/A	
Coarse − Mag, Real, Imag − 2	0	0.8551	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 0	0	0.8573	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 1	0	0.8573	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 2	0	0.8573	N/A	N/A	N/A	N/A	

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Stab Measurement Summary
Before: 12−Nov−2009 9:38

BS Window Ratio	0.7301	N/A	0.7291	N/A	N/A	N/A	
BS Window Sum	9938	N/A	9932	N/A	N/A	N/A	CPS
SS Window Ratio	0.4794	N/A	0.4790	N/A	N/A	N/A	
SS Window Sum	9818	N/A	9810	N/A	N/A	N/A	CPS
LS Window Ratio	0.2953	N/A	0.2948	N/A	N/A	N/A	
LS Window Sum	1055	N/A	1050	N/A	N/A	N/A	CPS

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Photo−multiplier High Voltages Calibrations
Before: 12−Nov−2009 9:38

BS PM High Voltage (Command)	1641	N/A	1636	N/A	N/A	N/A	V
SS PM High Voltage (Command)	1395	N/A	1393	N/A	N/A	N/A	V
LS PM High Voltage (Command)	1245	N/A	1241	N/A	N/A	N/A	V

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Crystal Quality Resolutions Calibration
Before: 12−Nov−2009 9:38

BS Crystal Resolution	11.32	N/A	11.32	N/A	N/A	N/A	%
SS Crystal Resolution	10.13	N/A	10.08	N/A	N/A	N/A	%
LS Crystal Resolution	8.695	N/A	9.015	N/A	N/A	N/A	%

High resolution Integrated Logging Tool−DTS Wellsite Calibration − MCFL Calibration
Before: 12−Nov−2009 9:30

Raw B0 Resistivity	3875	N/A	3844	N/A	N/A	N/A	OHMM
Raw B1 Resistivity	3830	N/A	3807	N/A	N/A	N/A	OHMM
Raw B2 Resistivity	3830	N/A	3816	N/A	N/A	N/A	OHMM

High resolution Integrated Logging Tool−DTS Wellsite Calibration − HILT Caliper Calibration
Before: 12−Nov−2009 9:28

HILT Caliper Zero Measurement	8.000	N/A	7.789	N/A	N/A	N/A	IN
HILT Caliper Plus Measurement	12.00	N/A	11.81	N/A	N/A	N/A	IN

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Detector Calibration
Before: 12−Nov−2009 9:28

Gamma Ray Background	30.00	N/A	75.73	N/A	N/A	N/A	GAPI

Gamma Ray (Jig − Bkg)	180.9	N/A	180.9	N/A	N/A	16.44	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Zero Measurement
Master: 8−Oct−2009 13:16 Before: 12−Nov−2009 9:29

CNTC Background	26.34	26.34	26.27	N/A	N/A	3.951	CPS
CFTC Background	27.85	27.85	27.85	N/A	N/A	4.178	CPS

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Ratio Measurement
Master: 8−Oct−2009 13:16

Thermal Near Corr. (Tank)	5800	5423	N/A	N/A	N/A	N/A	CPS
Thermal Far Corr. (Tank)	2400	2272	N/A	N/A	N/A	N/A	CPS
CNTC/CFTC (Tank)	2.159	2.387	N/A	N/A	N/A	N/A	

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Accelerometer Calibration
Before: 12−Nov−2009 21:04

Z−Axis Acceleration	32.19	N/A	32.07	N/A	N/A	N/A	F/S2

High resolution Integrated Logging Tool−DTS Master Calibration − Inversion results
Master: 26−Oct−2009 12:49

Rho Aluminum	2.596	2.603	−−	−−	−−	−−	G/C3
Rho Magnesium	1.686	1.687	−−	−−	−−	−−	G/C3
Pe Aluminum	2.570	2.544	−−	−−	−−	−−	
Pe Magnesium	2.650	2.619	−−	−−	−−	−−	

High resolution Integrated Logging Tool−DTS Master Calibration − Deviation Summary
Master: 26−Oct−2009 12:49

BS Average Deviation	0	0.3805	−−	−−	−−	−−	%
BS Max Deviation	0	0.6569	−−	−−	−−	−−	%
SS Average Deviation	0	0.4353	−−	−−	−−	−−	%
SS Max Deviation	0	1.873	−−	−−	−−	−−	%
LS Average Deviation	0	0.8605	−−	−−	−−	−−	%
LS Max Deviation	0	2.157	−−	−−	−−	−−	%

The GLS−VJ source activity is acceptable.

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

NCT−B Water Temperature 57.0 DEGF.
Thermal Housing Size 3.365 IN.
NSR−F serial number 5068

Array Induction Tool − M / Equipment Identification

Primary Equipment:

Rm/SP Bottom Nose	AMRM − A	
Array Induction Sonde	AMIS − A	1372

Auxiliary Equipment:

Array Induction Tool − M Wellsite Calibration
Electronics Calibration Check − Thru Cal Mag. & Phase

Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Thru Cal Phase DEG	Nominal
0	Master	0.6205		0.6100	180.2		197.0
	Before	0.6204			180.2		
1	Master	1.271		1.270	179.2		196.0
	Before	1.271			179.1		
2	Master	0.6318		0.6200	175.6		192.0
	Before	0.6317			175.6		
3	Master	0.7131		0.7000	174.9		191.0
	Before	0.7130			174.8		
4	Master	1.334		1.340	168.7		185.0
	Before	1.334			168.7		

5	Master	1.953	1.960	167.0	182.0
	Before	1.953		167.0	
6	Master	1.949	1.960	167.0	181.0
	Before	1.949		167.0	
7	Master	1.419	1.410	166.2	175.0
	Before	1.419		166.2	
		60.00 % (Minimum)	140.0 % (Maximum)	Nom −60.00 (Minimum)	Nom + 60.00 (Maximum)

(Nominal)

Master: 14−Oct−2009 17:03 Before: 12−Nov−2009 9:30

Array Induction Tool − M Wellsite Calibration

Electronics Calibration Check − Auxiliary

Phase	Array Induction SPA Plus MV	Value
Master		992.7
Before		992.7
	941.0 (Minimum) 991.0 (Nominal) 1040 (Maximum)	

Phase	Array Induction SPA Zero MV	Value
Master		0.6638
Before		0.6669
	−50.00 (Minimum) 0 (Nominal) 50.00 (Maximum)	

Phase	Array Induction Temperature Plus V	Value
Master		0.9196
Before		0.9196
	0.8710 (Minimum) 0.9170 (Nominal) 0.9630 (Maximum)	

Phase	Array Induction Temperature Zero V	Value
Master		0.0006632
Before		0.0006657
	−0.05000 (Minimum) 0 (Nominal) 0.05000 (Maximum)	

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Array Induction Tool − M Wellsite Calibration

Test Loop Gain Correction

Idx	Value	Test Loop Gain Correction Magnitude V	Value	Test Loop Gain Correction Phase DEG
0	1.017		0.7201	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
1	1.014		0.7620	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
2	1.015		0.2948	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
3	1.011		0.2209	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
4	0.9935		0.1146	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
5	0.9888		−0.009143	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
6	0.9937		0.2984	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
7	1.007		−0.05307	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)

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Array Induction Tool − M Wellsite Calibration

Sonde Error Correction

Idx	Value	R Sonde Error Correction MM/M	Value	X Sonde Error Correction MM/M
0	−69.04		−259.4	
		−231.0 (Minimum) −56.00 (Nominal) 119.0 (Maximum)		−2250 (Minimum) 0 (Nominal) 2250 (Maximum)
1	172.8		103.1	
		114.0 (Minimum) 159.0 (Nominal) 204.0 (Maximum)		−625.0 (Minimum) 0 (Nominal) 625.0 (Maximum)

2	116.8				63.05			
	66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)		−350.0 (Minimum)	0 (Nominal)	350.0 (Maximum)	
3	64.65				−22.90			
	39.00 (Minimum)	64.00 (Nominal)	89.30 (Maximum)		−250.0 (Minimum)	0 (Nominal)	250.0 (Maximum)	
4	26.78				21.47			
	15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)		−63.00 (Minimum)	0 (Nominal)	63.00 (Maximum)	
5	12.75				−15.50			
	4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)		−50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)	
6	11.98				−4.060			
	5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)		−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)	
7	−2.480				−4.950			
	−5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)		−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)	

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Array Induction Tool − M Wellsite Calibration

Mud Gain Correction

Idx	Value	Coarse − Mag, Real, Imag			Value	Fine − Mag, Real, Imag		
0	0.8551				0.8573			
	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	
1	0.8551				0.8573			
	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	
2	0.8551				0.8573			
	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	

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Array Induction Tool − M Master Calibration

Electronics Calibration Check − Thru Cal Mag. & Phase

Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Thru Cal Phase DEG	Nominal
0	Master	0.6205		0.6100	180.2		197.0
1	Master	1.271		1.270	179.2		196.0
2	Master	0.6318		0.6200	175.6		192.0
3	Master	0.7131		0.7000	174.9		191.0
4	Master	1.334		1.340	168.7		185.0
5	Master	1.953		1.960	167.0		182.0
6	Master	1.949		1.960	167.0		181.0
7	Master	1.419		1.410	166.2		175.0
		60.00 % (Minimum)	(Nominal)	140.0 % (Maximum)		Nom −60.00 (Minimum) (Nominal)	Nom + 60.00 (Maximum)	

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Array Induction Tool − M Master Calibration

Electronics Calibration Check − Auxiliary

Phase	Array Induction SPA Plus MV	Value	Phase	Array Induction SPA Zero MV	Value
Master		992.7	Master		0.6638
	941.0 (Minimum) 991.0 (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		0.9196	Master		0.0006632
	0.8710 (Minimum) 0.9170 (Nominal) 0.9630 (Maximum)			−0.05000 (Minimum) 0 (Nominal) 0.05000 (Maximum)	

Master: 14−Oct−2009 17:03

Array Induction Tool − M Master Calibration

Test Loop Gain Correction

Test Loop Gain Correction

Idx	Value	Test Loop Gain Correction Magnitude V			Value	Test Loop Gain Correction Phase DEG		
0	1.017	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	0.7201	−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
1	1.014	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	0.7620	−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
2	1.015	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	0.2948	−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
3	1.011	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	0.2209	−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
4	0.9935	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	0.1146	−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
5	0.9888	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	−0.009143	−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
6	0.9937	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	0.2984	−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
7	1.007	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	−0.05307	−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)

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Array Induction Tool − M Master Calibration

Sonde Error Correction

Idx	Value	R Sonde Error Correction MM/M			Value	X Sonde Error Correction MM/M		
0	−69.04	−231.0 (Minimum)	−56.00 (Nominal)	119.0 (Maximum)	−259.4	−2250 (Minimum)	0 (Nominal)	2250 (Maximum)
1	172.8	114.0 (Minimum)	159.0 (Nominal)	204.0 (Maximum)	103.1	−625.0 (Minimum)	0 (Nominal)	625.0 (Maximum)
2	116.8	66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)	63.05	−350.0 (Minimum)	0 (Nominal)	350.0 (Maximum)
3	64.65	39.00 (Minimum)	64.00 (Nominal)	89.30 (Maximum)	−22.90	−250.0 (Minimum)	0 (Nominal)	250.0 (Maximum)
4	26.78	15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)	21.47	−63.00 (Minimum)	0 (Nominal)	63.00 (Maximum)
5	12.75	4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)	−15.50	−50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)
6	11.98	5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)	−4.060	−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)
7	−2.480	−5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)	−4.950	−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)

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Array Induction Tool − M Master Calibration

Mud Gain Correction

Idx	Value	Coarse − Mag, Real, Imag			Value	Fine − Mag, Real, Imag		
0	0.8551	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	0.8573	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
1	0.8551	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	0.8573	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)

2	0.8551					0.8573					
	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−DTS / Equipment Identification

Primary Equipment:		
HILT high−Resolution Mechanical Sonde	HRMS − B	821
HILT Rxo Gamma−ray Device	HRGD − B	1748
HILT Micro Cylindrically Focused Log Dev	MCFL −	
GR Logging Source	GLS − VJ	5416
HILT High Res. Control Cartridge	HRCC − B	1813
HILT Gamma−Ray Neutron Sonde−DTS	HGNS − B	
HGNS Gamma−Ray Device	HGR −	
HGNS Neutron Detector with Alpha Source	HCNT −	
Auxiliary Equipment:		
Neutron Calibration Tank	NCT − B	
Gamma Source Radioactive	GSR − U/Y	
HGNS Housing	HGNH −	

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		0.7291	Before		0.4790	Before		0.2948
	0.6936 (Minimum) 0.7301 (Nominal) 0.7666 (Maximum)			0.4555 (Minimum) 0.4794 (Nominal) 0.5034 (Maximum)			0.2805 (Minimum) 0.2953 (Nominal) 0.3101 (Maximum)	
Phase	BS Window Sum CPS	Value	Phase	SS Window Sum CPS	Value	Phase	LS Window Sum CPS	Value
Before		9932	Before		9810	Before		1050
	9441 (Minimum) 9938 (Nominal) 10430 (Maximum)			9327 (Minimum) 9818 (Nominal) 10310 (Maximum)			1002 (Minimum) 1055 (Nominal) 1108 (Maximum)	

Before: 12−Nov−2009 9:38

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		1636	Before		1393	Before		1241
	1541 (Minimum) 1641 (Nominal) 1741 (Maximum)			1295 (Minimum) 1395 (Nominal) 1495 (Maximum)			1145 (Minimum) 1245 (Nominal) 1345 (Maximum)	

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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		11.32	Before		10.08	Before		9.015
	10.32 (Minimum) 11.32 (Nominal) 12.32 (Maximum)			9.133 (Minimum) 10.13 (Nominal) 11.13 (Maximum)			7.695 (Minimum) 8.695 (Nominal) 9.695 (Maximum)	

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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		3844	Before		3807	Before		3816
	3565 (Minimum) 3875 (Nominal) 4185 (Maximum)			3524 (Minimum) 3830 (Nominal) 4136 (Maximum)			3524 (Minimum) 3830 (Nominal) 4136 (Maximum)	

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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		7.789	Before		11.81
	6.000 (Minimum) 8.000 (Nominal) 10.00 (Maximum)			9.000 (Minimum) 12.00 (Nominal) 15.00 (Maximum)	

Before: 12−Nov−2009 9:28

High resolution Integrated Logging Tool−DTS Wellsite Calibration

Detector Calibration

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig − Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before		75.73	Before		180.9	Before		165.0
	0 (Minimum) 30.00 (Nominal) 120.0 (Maximum)			164.4 (Minimum) 180.9 (Nominal) 197.3 (Maximum)			150.0 (Minimum) 165.0 (Nominal) 180.0 (Maximum)	

Before: 12−Nov−2009 9:28

High resolution Integrated Logging Tool−DTS Wellsite Calibration

Zero Measurement

Phase	CNTC Background CPS	Value	Phase	CFTC Background CPS	Value
Master		26.34	Master		27.85
Before		26.27	Before		27.85
	5.000 (Minimum) 26.34 (Nominal) 40.00 (Maximum)			5.000 (Minimum) 27.85 (Nominal) 40.00 (Maximum)	

Master: 8−Oct−2009 13:16 Before: 12−Nov−2009 9:29

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		5423	Master		2272	Master		2.387
	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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High resolution Integrated Logging Tool−DTS
Wellsite Calibration

Accelerometer Calibration

Phase	Z−Axis Acceleration F/S2	Value
Before		32.07
	31.53 (Minimum) 32.19 (Nominal) 32.84 (Maximum)	

Before: 12−Nov−2009 21:04

High resolution Integrated Logging Tool−DTS Master Calibration

Inversion results

Phase	Rho Aluminum G/C3	Value	Phase	Rho Magnesium G/C3	Value
Master		2.603	Master		1.687
	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		2.544	Master		2.619
	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−DTS Master Calibration

Deviation Summary

Phase	BS Average Deviation %	Value	Phase	SS Average Deviation %	Value	Phase	LS Average Deviation %	Value
Master		0.3805	Master		0.4353	Master		0.8605
	−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		0.6569	Master		1.873	Master		2.157
	−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−DTS Master Calibration

Zero Measurement

Phase	CNTC Background CPS	Value	Phase	CFTC Background CPS	Value
Master		26.34	Master		27.85
	5.000 (Minimum) 26.34 (Nominal) 40.00 (Maximum)			5.000 (Minimum) 27.85 (Nominal) 40.00 (Maximum)	

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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		5423	Master		2272	Master		2.387
	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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DTS Telemetry Tool / Equipment Identification

Primary Equipment:

DTC−H Auxiliary Cartridge	DTCH − A
DTC−H Telemetry Cartridge	DTCH − A

Auxiliary Equipment:

DTCH Telemetry Cartridge Housing	ECH − KC

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

Schlumberger

Well: **Commons 6−19**
Field: **Wattenberg**
County: **Weld**
State: **Colorado**

Platform Express
Micro Log