County:	Weld
Lorem	
Rutum	
Dei	
Scu	
Bo	
To	
Ca	
Ca	
Bit	
Ty	
MUD	
Dr	
Fl	
Sc	
RM	
RM	
RM	
RM	
Ma	
Cir	
Lo	
Un	
Re	
Wi	

Schlumberger

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

Well: **P Ville Federal 5−7**
Field: **Wattenberg**
County: **Weld** State: **Colorado**

Field: Wattenberg
Location: SENW Sec. 7 , T 3N , R 66W
Well: P Ville Federal 5−7
Company: Kerr McGee Oil and Gas Onshore

Platform Express
Array Induction
with Linear Correlation

LOCATION

SENW Sec. 7 , T 3N , R 66W	Elev.:	K.B.	4805.00 ft
SHL: 1523' FNL / 1352' FWL SENW		G.L.	4790.00 ft
BHL: 2024' FNL / 655' FWL SWNW (Est)		D.F.	4804.00 ft

Permanent Datum:	Ground Level	Elev.:	4790.00 ft
Log Measured From:	Kelly Bushing	15.00 ft	above Perm. Datum
Drilling Measured From:	Kelly Bushing		

API Serial No.	Section	Township	Range
05−123−30764−0000	7	3N	66W

	Run 1	Run 2	Run 3
Logging Date	16−Jan−2010		
Run Number	1		
Depth Driller	8035 ft		
Schlumberger Depth	8013 ft		
Bottom Log Interval	8005 ft		
Top Log Interval	911 ft		
Casing Driller Size @ Depth	8.625 in @ 909 ft	@	
Casing Schlumberger	911 ft		
Bit Size	7.875 in		
Type Fluid In Hole	KCL Polymer		
MUD Density / Viscosity	8.4 lbm/gal / 27 s		
MUD Fluid Loss / PH			
Source Of Sample	Flowline		
RM @ Measured Temperature	0.770 ohm.m @ 81 degF	@	
RMF @ Measured Temperature	0.577 ohm.m @ 81 degF	@	
RMC @ Measured Temperature	1.155 ohm.m @ 79 degF	@	
Source RMF / RMC	Calculated / Calculated		
RM @ MRT / RMF @ MRT	0.303 @ 217 / 0.227 @ 217	@ / @	
Maximum Recorded Temperatures	217 degF		
Circulation Stopped / Time	16−Jan−2010 / 4:00		
Logger On Bottom / Time	16−Jan−2010 / 13:57		
Unit Number / Location	3055 / Fort Morgan, CO		
Recorded By	Jared R. Hoskins		
Witnessed By	Greg Hovivian & M Scanniello		

Run 4

DEPTH SUMMARY LISTING

Date Created: 16−JAN−2010 14:09:07

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:	9−Jan−10	Length:	12560 FT
Calibrator Serial Number:	33	Calibrator Serial Number:	100513	Conveyance Method:	Wireline
Calibration Cable Type:	7−46P	Number of Calibration Points:	0	Rig Type:	LAND
Wheel Correction 1:	−4				
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:	7.50 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 porosity logs.	
4. Tool run with minimum jewelry.	
5. IND data is from the downlog, as the AIT failed upon hitting TD.	

Rig: E 12

Crew: Tim Ludgate & Jay Musgrave

RUN 1			RUN 2		
SERVICE ORDER #:		AXB6−00083	SERVICE ORDER #:		
PROGRAM VERSION:		17C0−154	PROGRAM VERSION:		
FLUID LEVEL:			FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

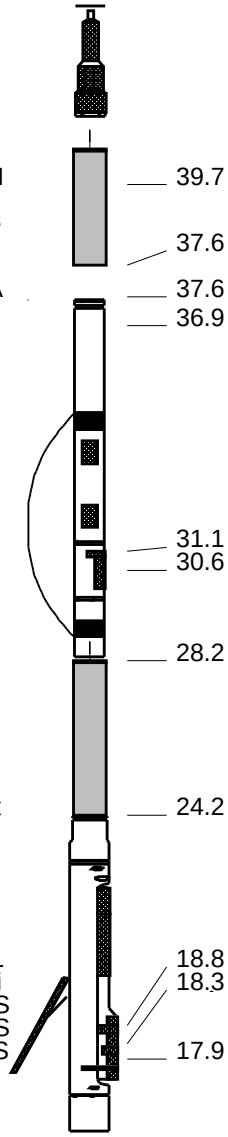
RUN 1 | RUN 2

SURFACE EQUIPMENT

GSR−U/Y
NCT−B
CNB−AB
NCS−VB

WITM (DTS)−A

DOWNHOLE EQUIPMENT

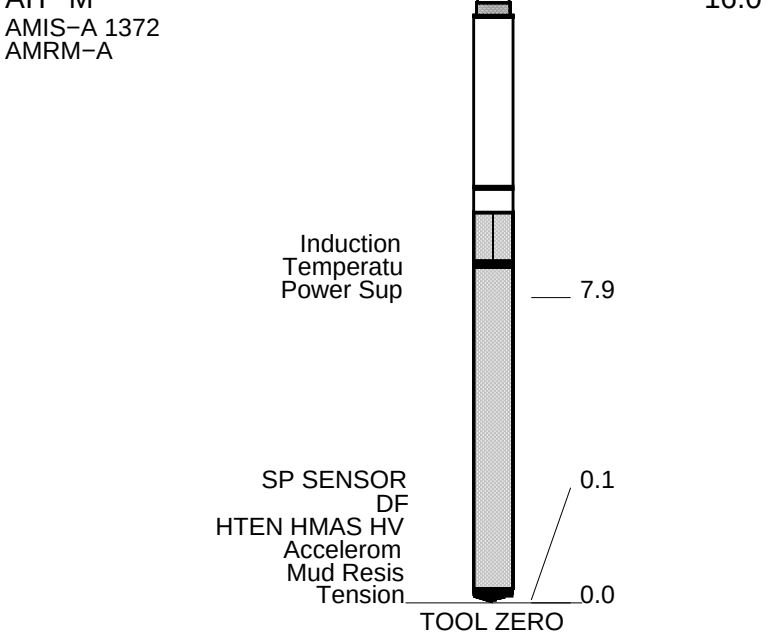


LEH−QT 43.6
LEH−QT

DTC−H 40.6
ECH−KC
DTCH0−A
DTCH1−A

HILTB−FTB 37.6
HGNSD−B
HMCA
HGNH
NLS−KL
NSR−F 5068
HACCZ
HCNT
HGR
HRCC−B
HRMS−B
HRGD−B
GLS−VJ 5416
MCFL Device
HILT Nucl. LS 42767
HILT Nucl. SS 42767
HILT Nucl. BS 42767
BOW−SPR
NPV−N

AIT−M 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
					909.0	8.625		Casing Shoe
					909.0	7.875		Borehole Segment

					8035.0	7.875		Borehole Segment Bottom

All depths are driller's depths

Schlumberger

RESISTIVITY LINEAR 2" = 100'

MAXIS Field Log

Input DLIS Files

DEFAULT	MERGE_AIT_027	FN:1	PRODUCER	16−Jan−2010 15:57	8026.5 FT	615.0 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_028PUP	FN:22	PRODUCER	16−Jan−2010 16:01	8026.5 FT	615.5 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 2559.37 F3

Cement Volume = 1774.92 F3 (assuming 4.50 IN casing O.D.)

Computed from 8013.0 FT to 911.0 FT using data channel(s) HCAL

OP System Version: 17C0−154

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

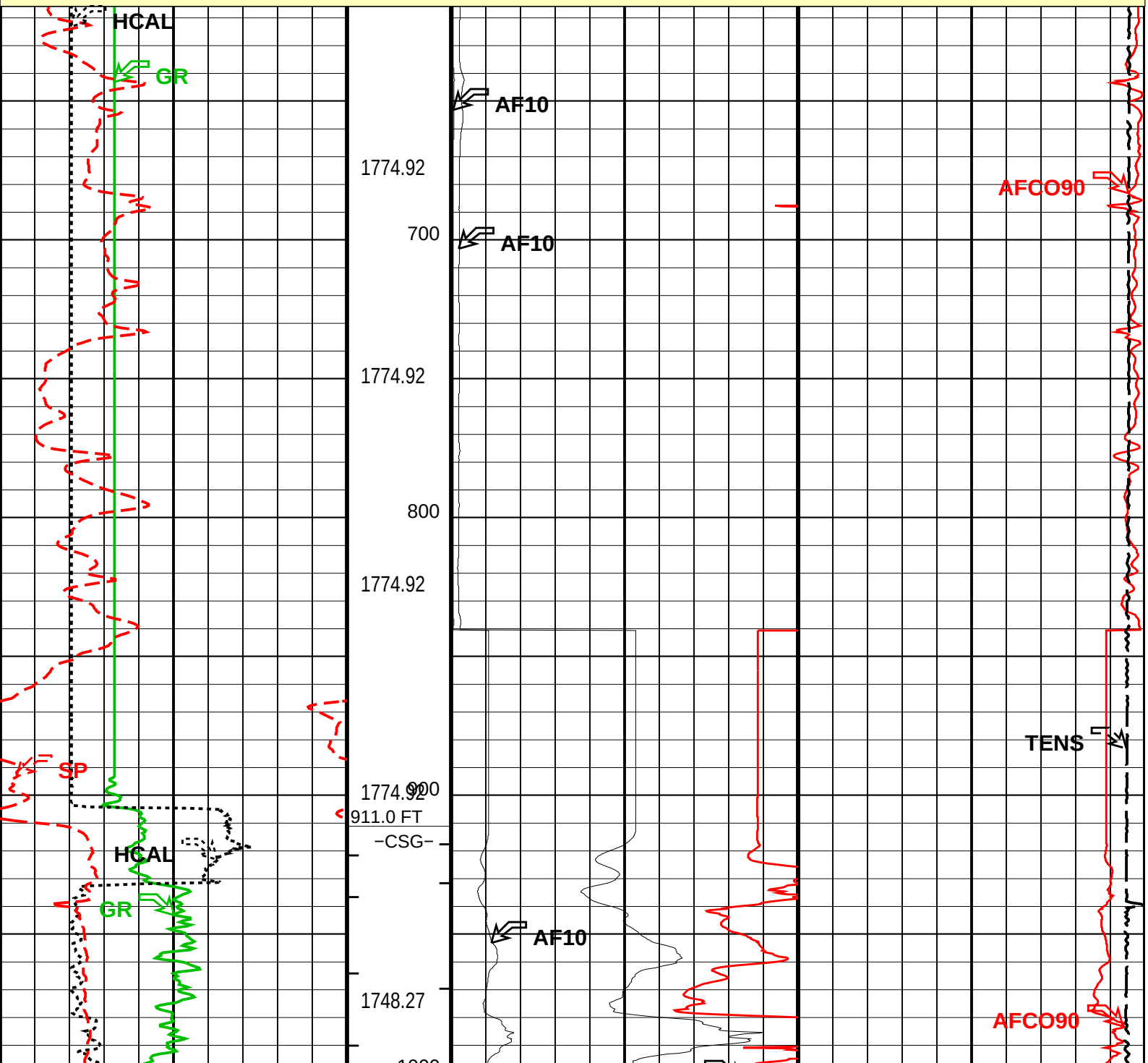
DTC-H 17C0-154

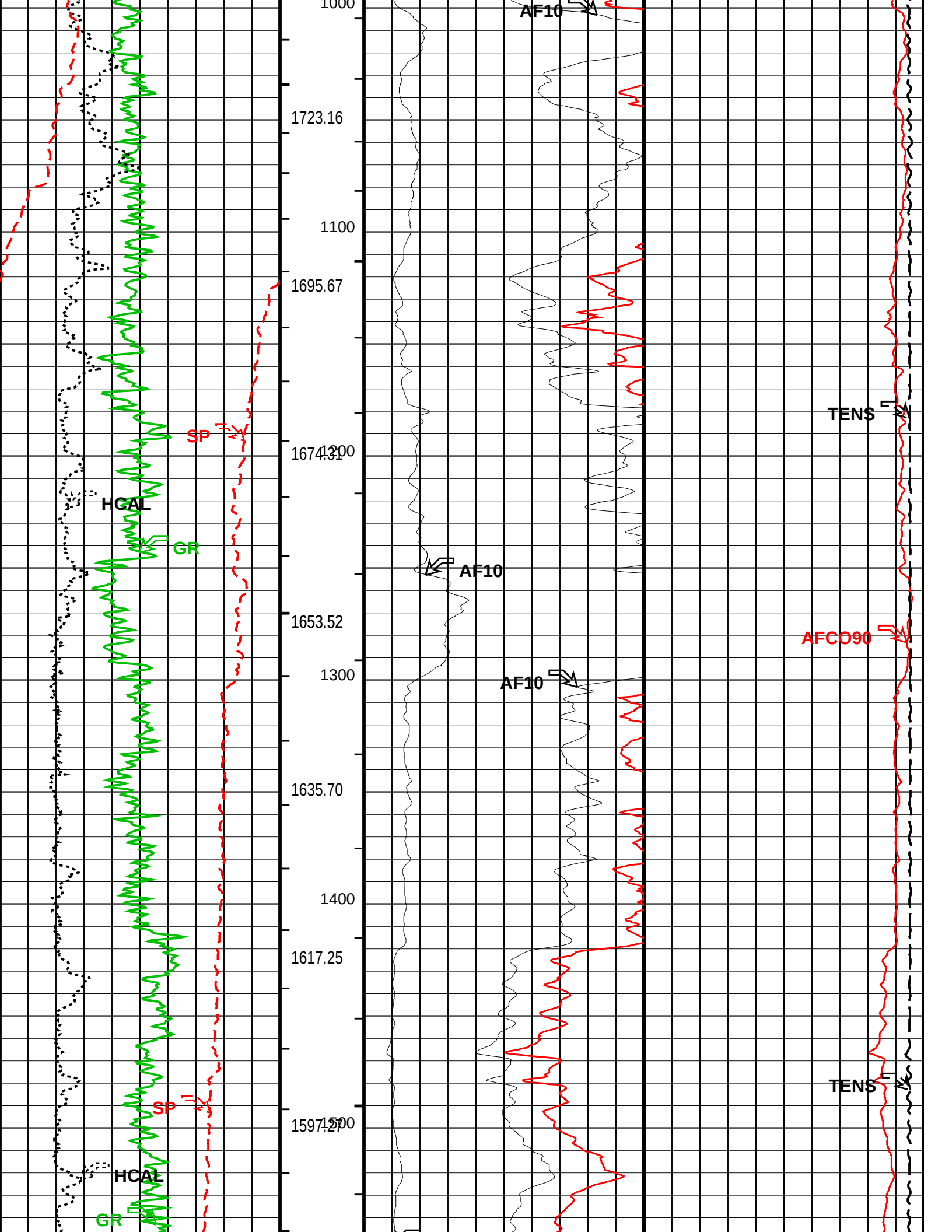
PIP SUMMARY

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) −160 (MV) 40			
Caliper (HCAL) 6 (IN) 16		AIT 10 Inch Investigation (AF10) 0 (OHMM) 50	
Gamma Ray (GR) 0 (GAPI) 200		AIT 90 Inch Investigation (AF90) 0 (OHMM) 10	Tension (TENS) 10000 (LBF) 0
Gamma Ray Backup	Cement Volume (ICV) (F3)	AIT 10 Inch Investigation (AF10) 0 (OHMM) 10	AIT 90 Inch Investigation Conductivity (AFCO90) 1000 (MM/M) 0

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

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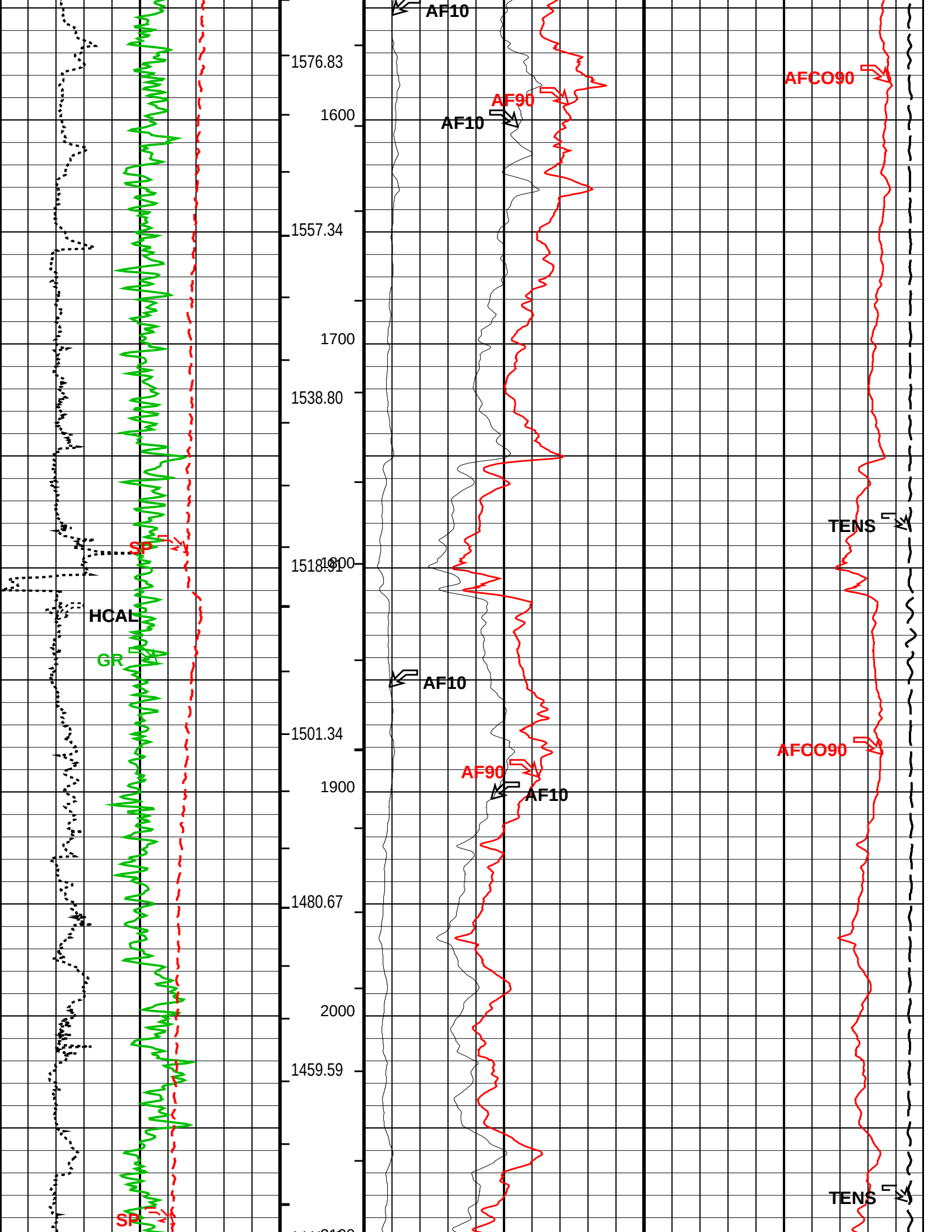
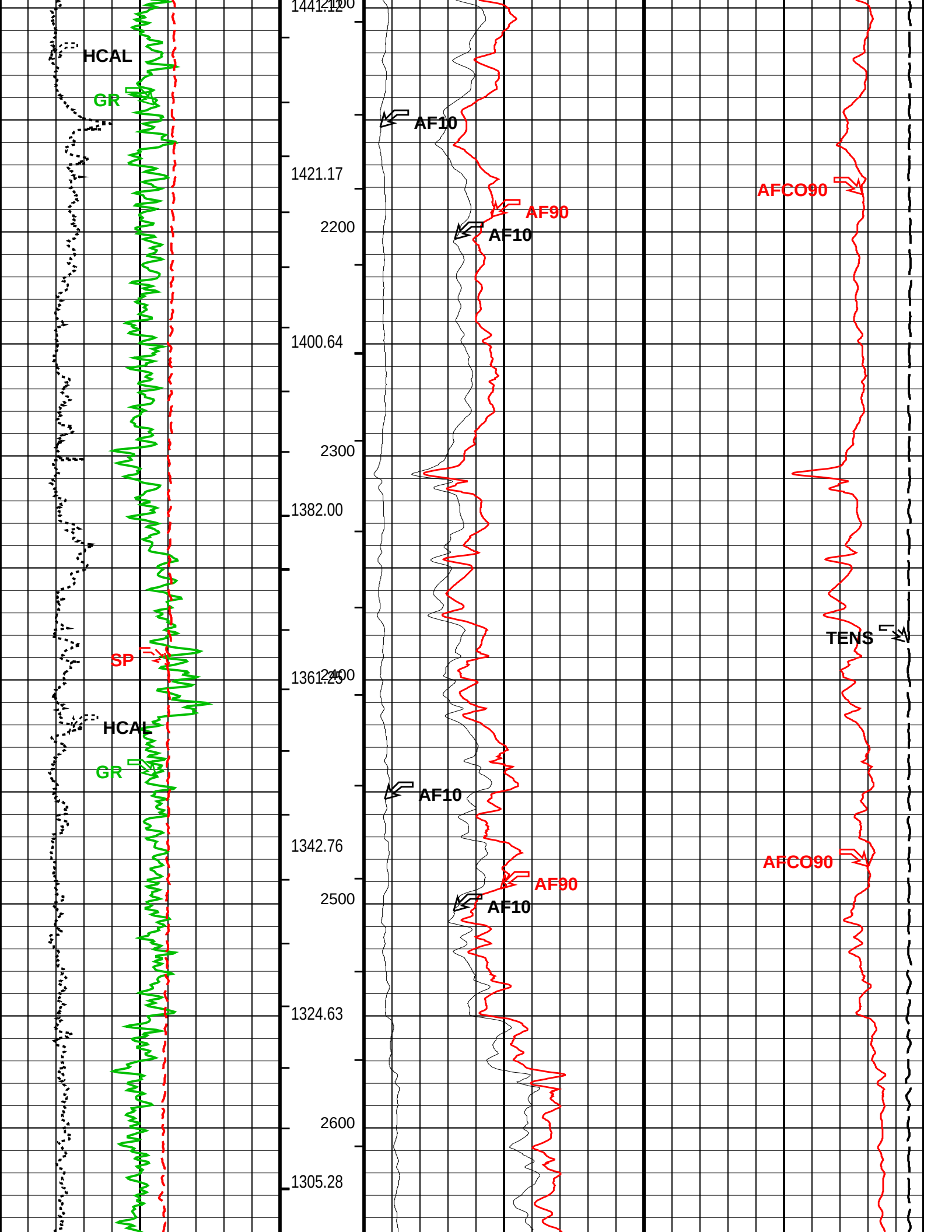
AF10
1723.16
1100
1695.67
TENS
SP
1200
1674.31
HCAL
GR
AF10
1653.52
AFCO90
1300
AF10
1635.70
1400
1617.25
TENS
SP
1500
1597.27
HCAL
GR


AF10
1576.83
AFCO90
AF90
1600
AF10
1557.34
1700
1538.80
TENS
SP
1800
1518.31
HCAL
GR
AF10
1501.34
AFCO90
AF90
1900
AF10
1480.67
2000
1459.59
TENS
SP


HCAL
GR
SP
HCAL
GR
AF10
AF90
AF10
AF10
AF90
AF10
AFCO90
AFCO90
TENS
1441.12
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2400
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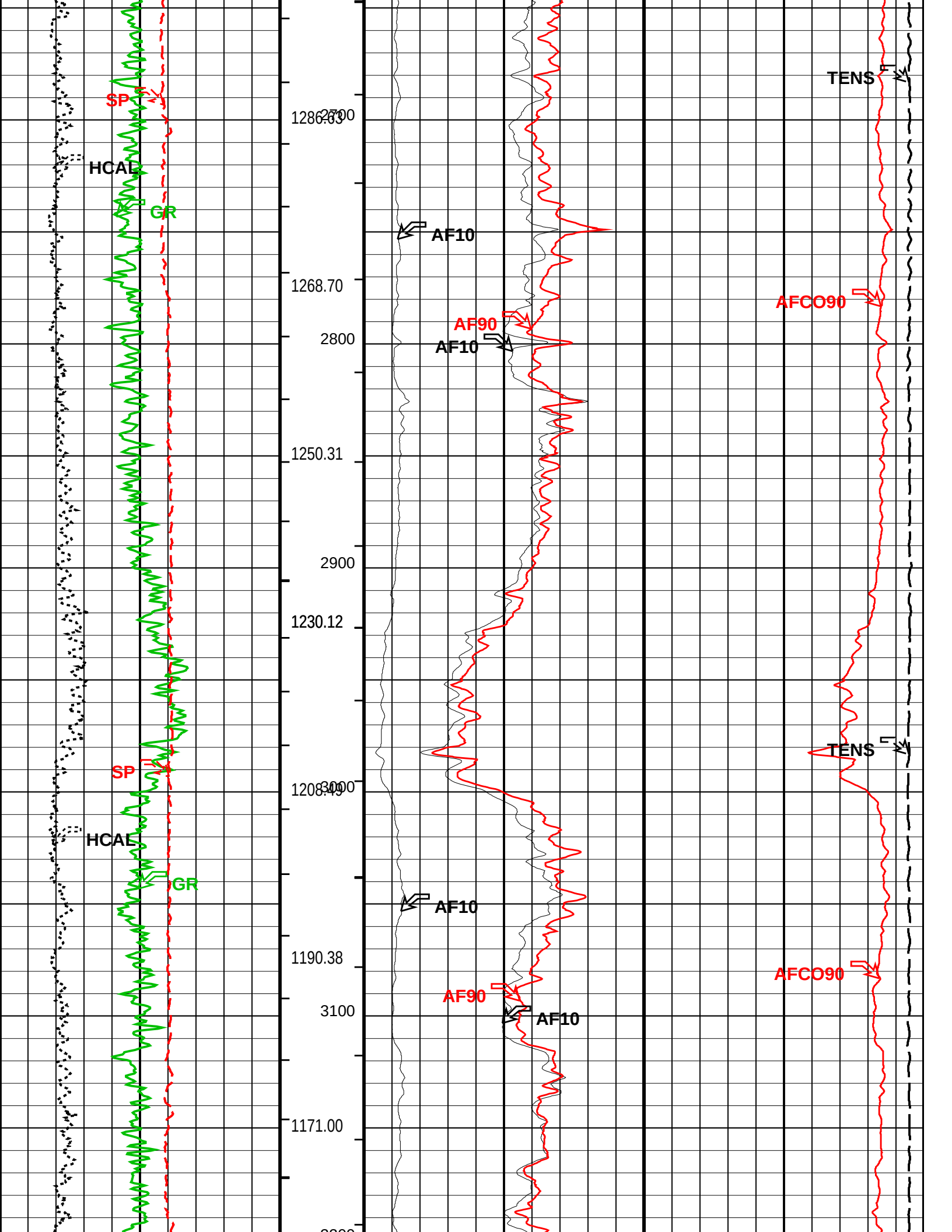
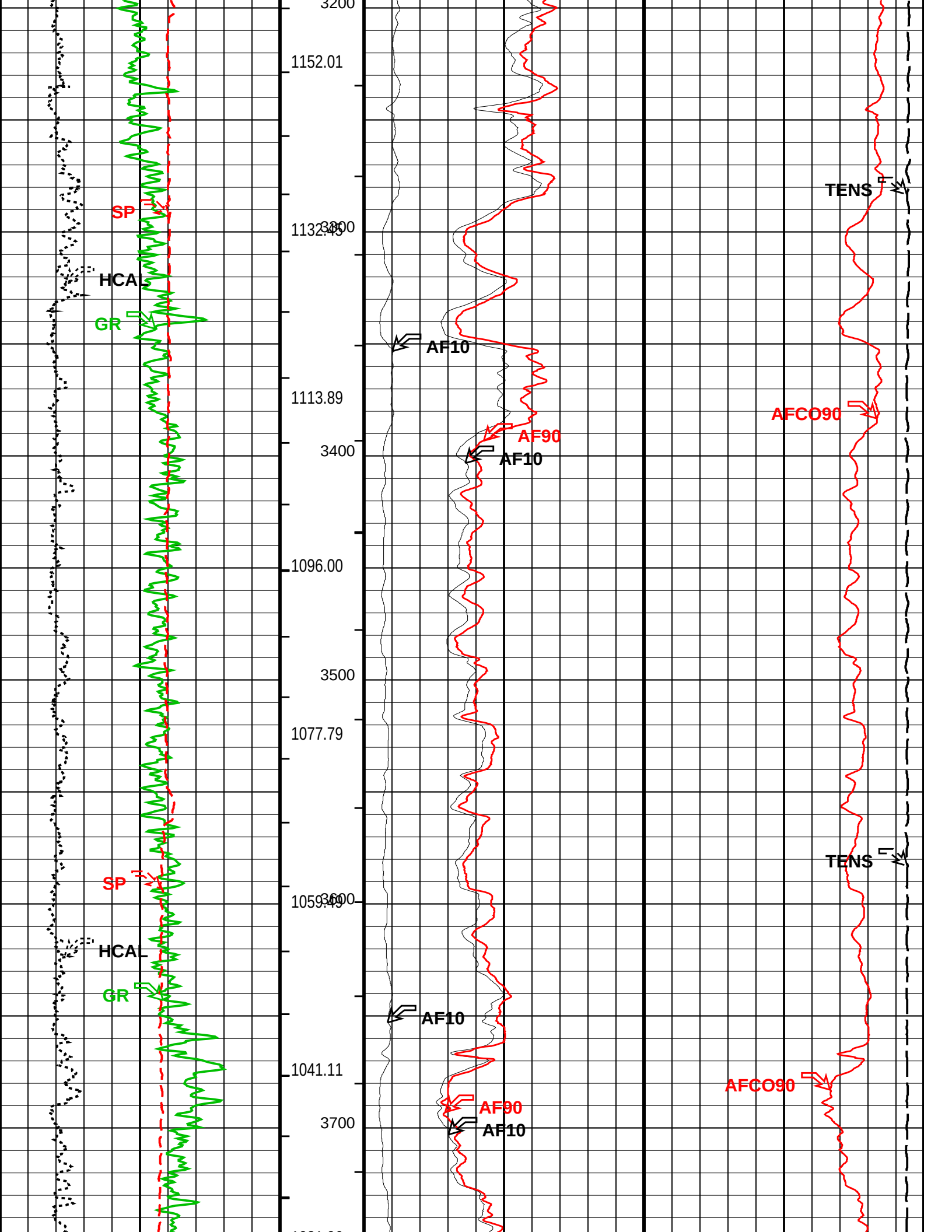
1342.76
2500
1324.63
2600
1305.28


SP
HCAL
GR
1286.63
2700
AF10
1268.70
AF90
2800
AF10
1250.31
2900
1230.12
TENS
AFCO90
SP
1208.49
3000
HCAL
GR
AF10
1190.38
AFCO90
AF90
3100
AF10
1171.00
TENS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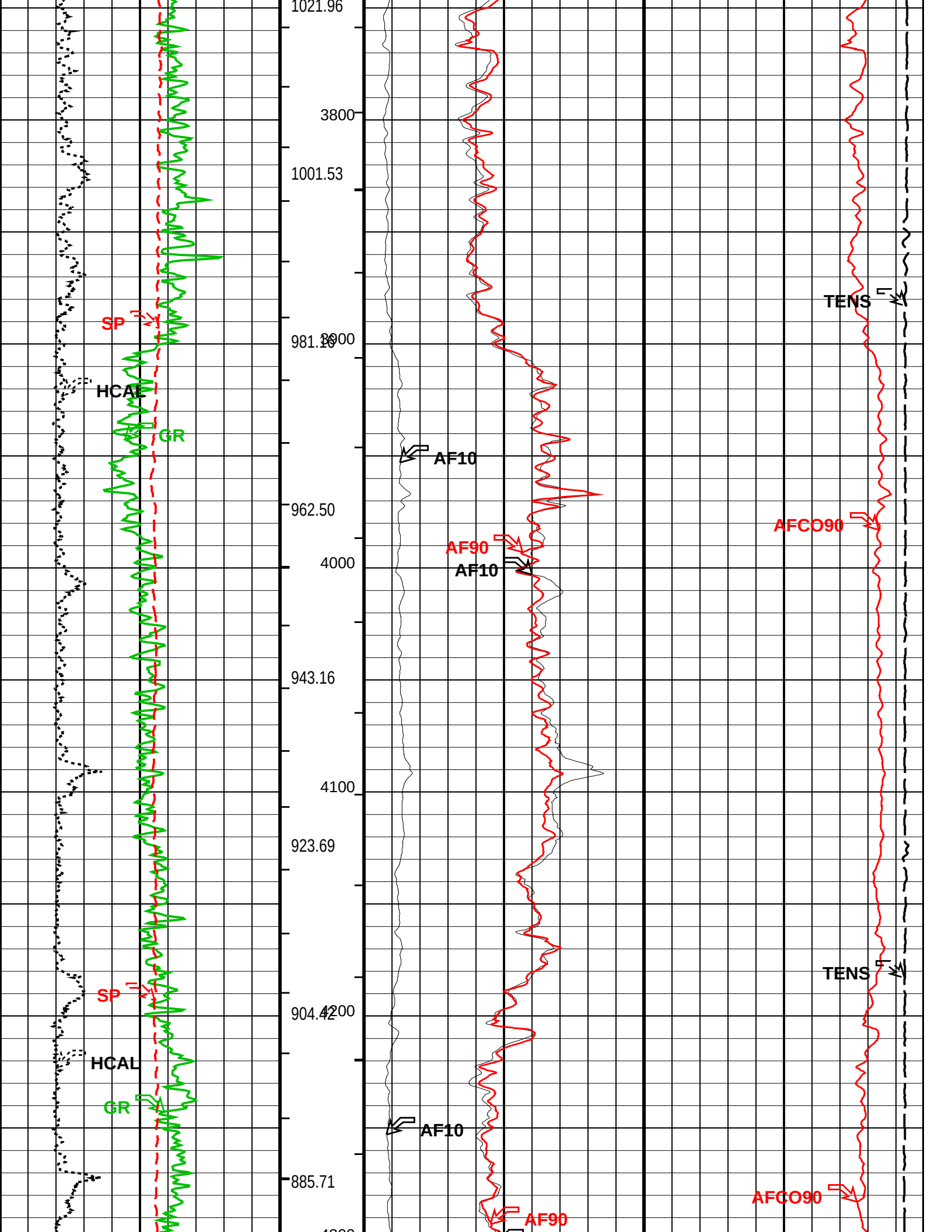
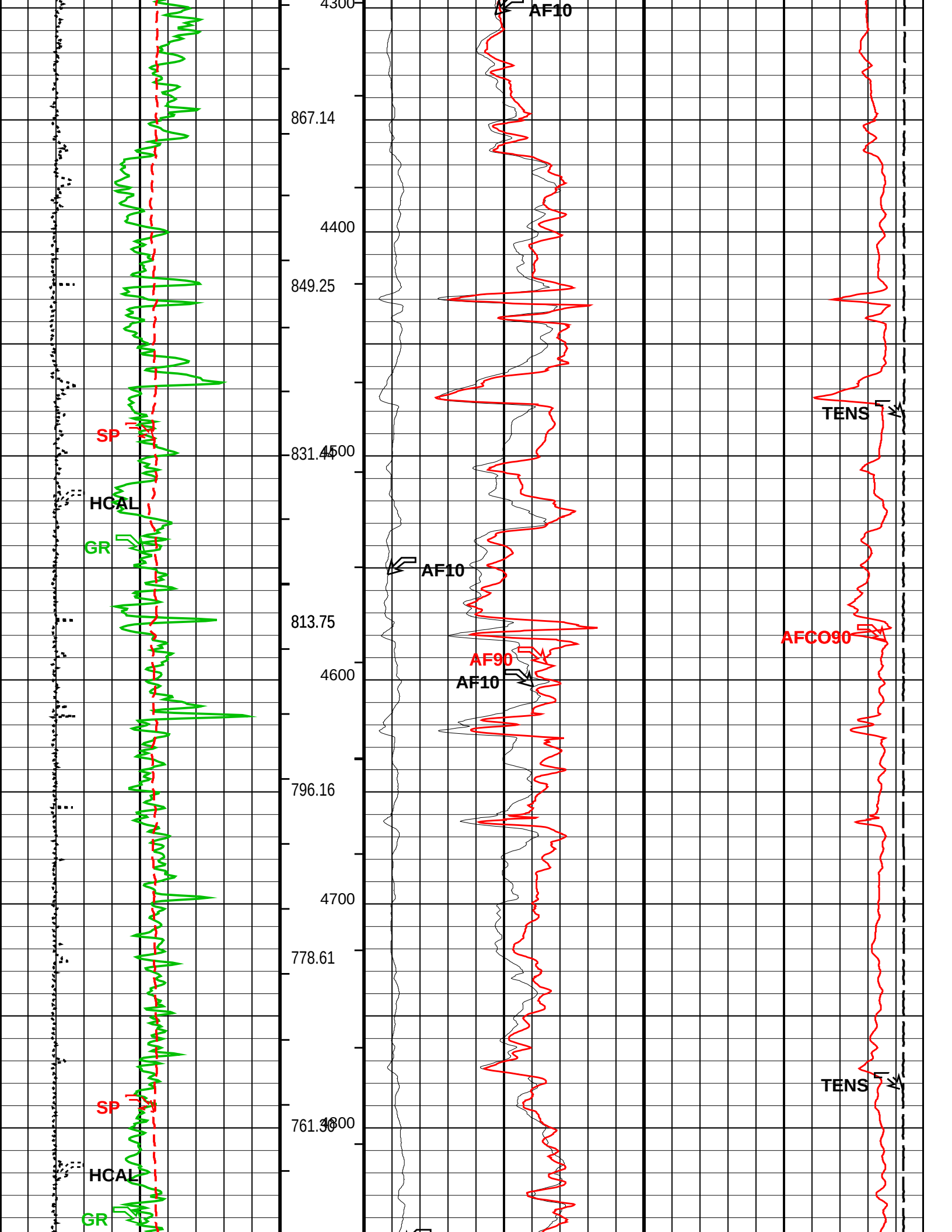
SP
1132.45
3300
HCAL
GR
AF10
1113.89
AFCO90
AF90
3400
AF10
1096.00
3500
1077.79
TENS
SP
1059.49
3600
HCAL
GR
AF10
1041.11
AFCO90
AF90
3700
AF10


1021.96
3800
1001.53
SP
981.16
3900
HCAL
GR
AF10
962.50
AFCO90
AF90
4000
AF10
943.16
4100
923.69
TENS
SP
904.42
4200
HCAL
GR
AF10
885.71
AFCO90
AF90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4400
849.25
TENS
SP
831.44
4500
HCAL
GR
AF10
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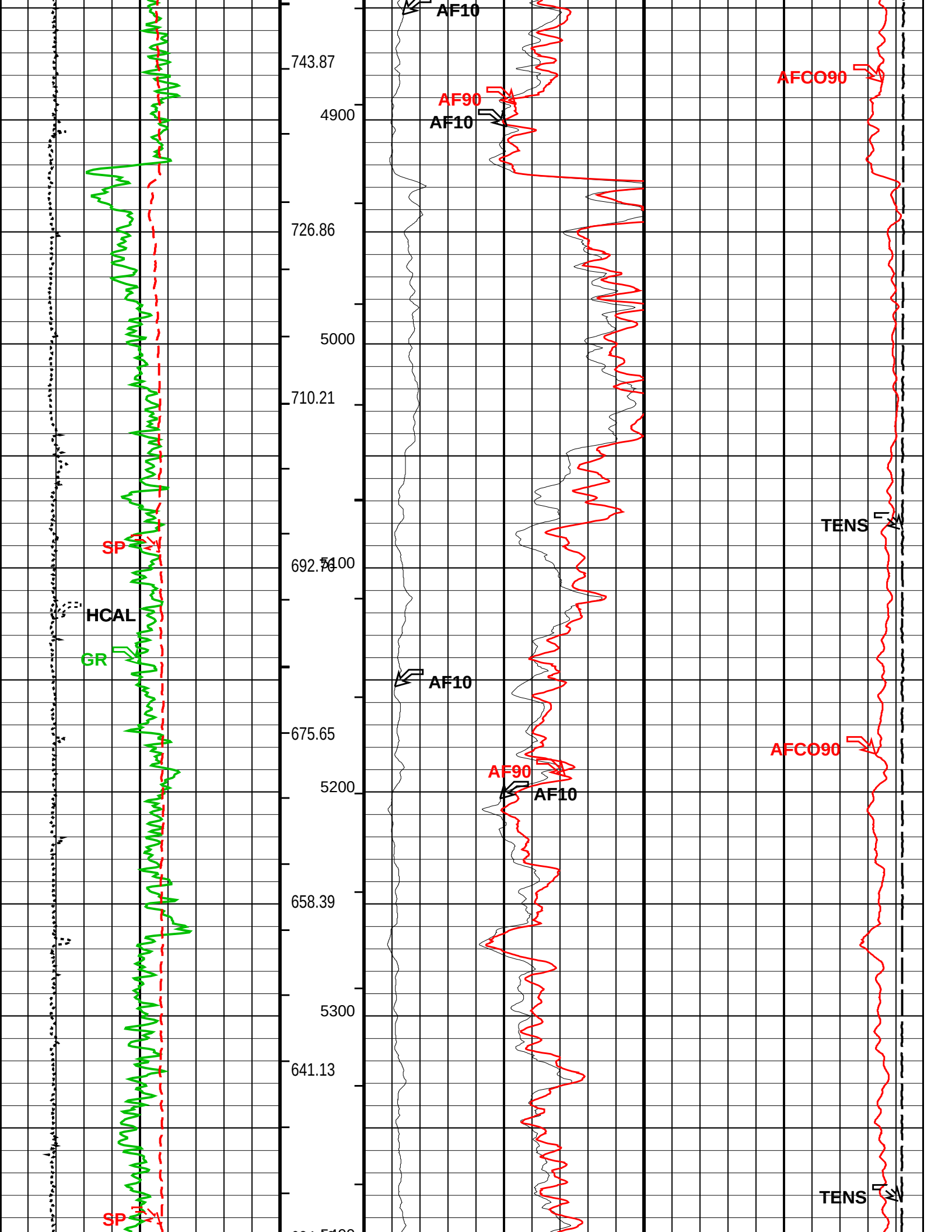
AF90
4600
AF10
796.16
4700
778.61
TENS
SP
761.30
4800
HCAL
GR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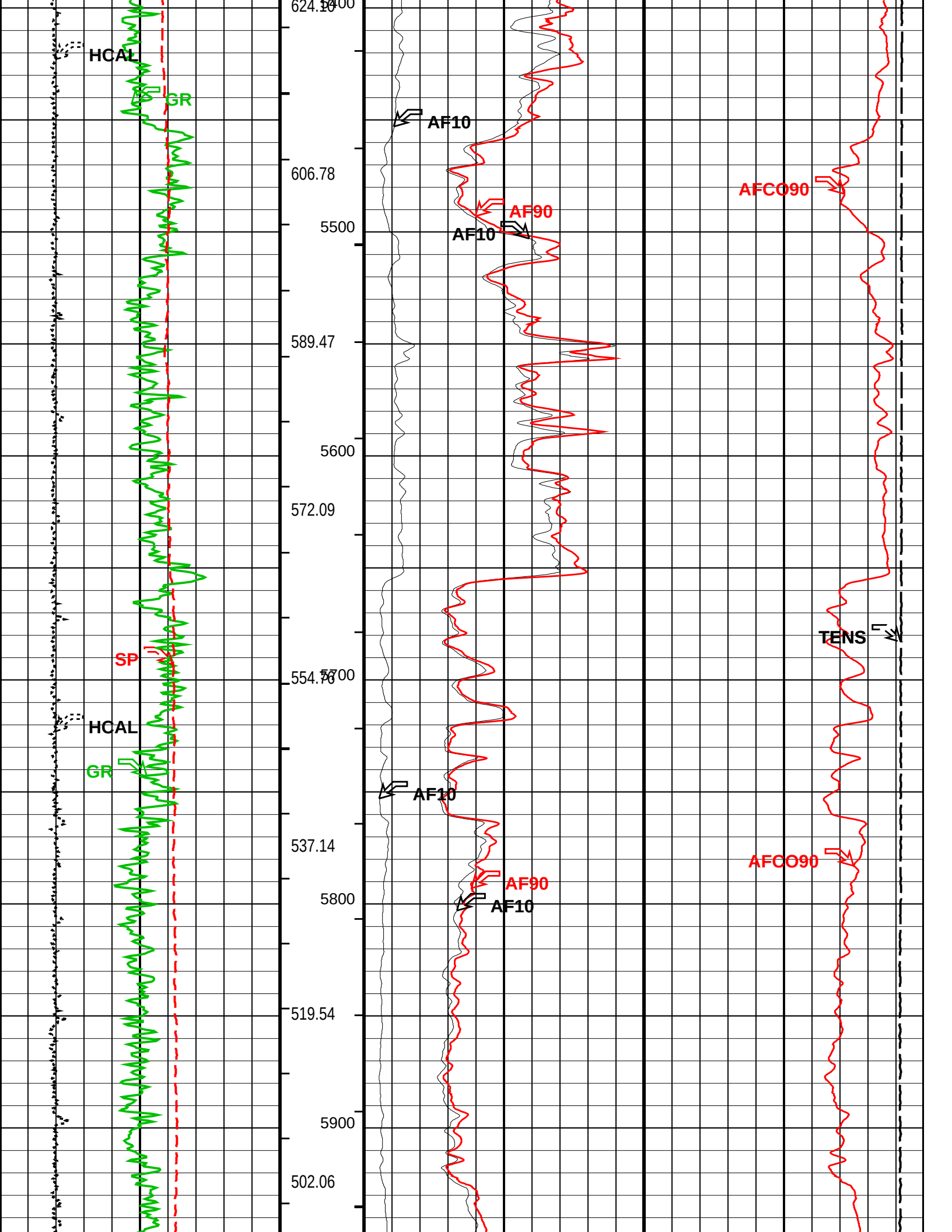
743.87
AFCO90
AF90
4900
AF10
726.86
5000
710.21
TENS
SP
692.76
5100
HCAL
GR
AF10
675.65
AFCO90
AF90
5200
AF10
658.39
5300
641.13
TENS
SP


HCAL
GR
SP
HCAL
GR
AF10
AF90
AF10
AFCO90
TENS
AF10
AF90
AF10
AFCO90
624.10
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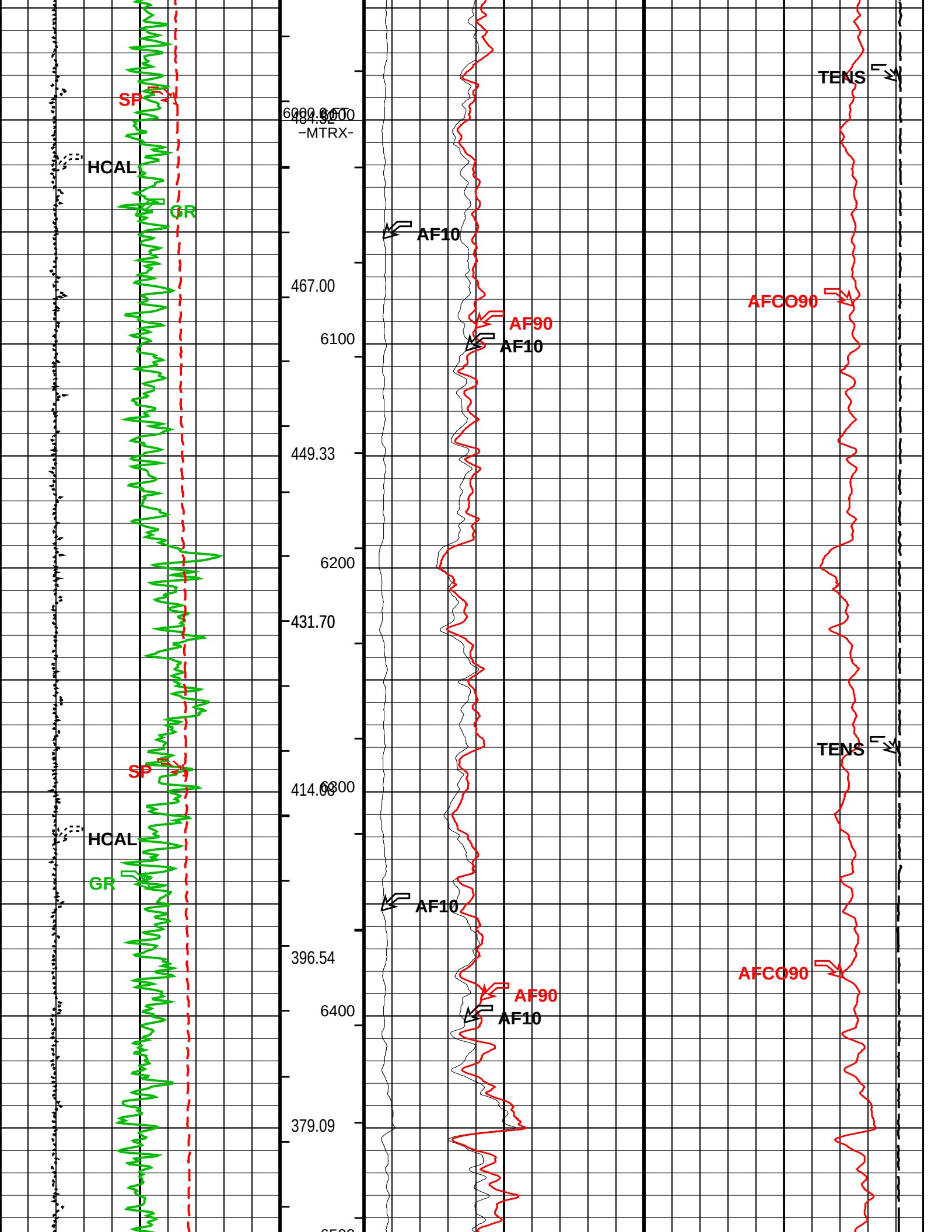
572.09
554.70
537.14
519.54
502.06
5400
5500
5600
5700
5800
5900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484.32
-MTRX-
AF10
467.00
AF90
AFCO90
TENS
6100
449.33
6200
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SP
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GR
AF10
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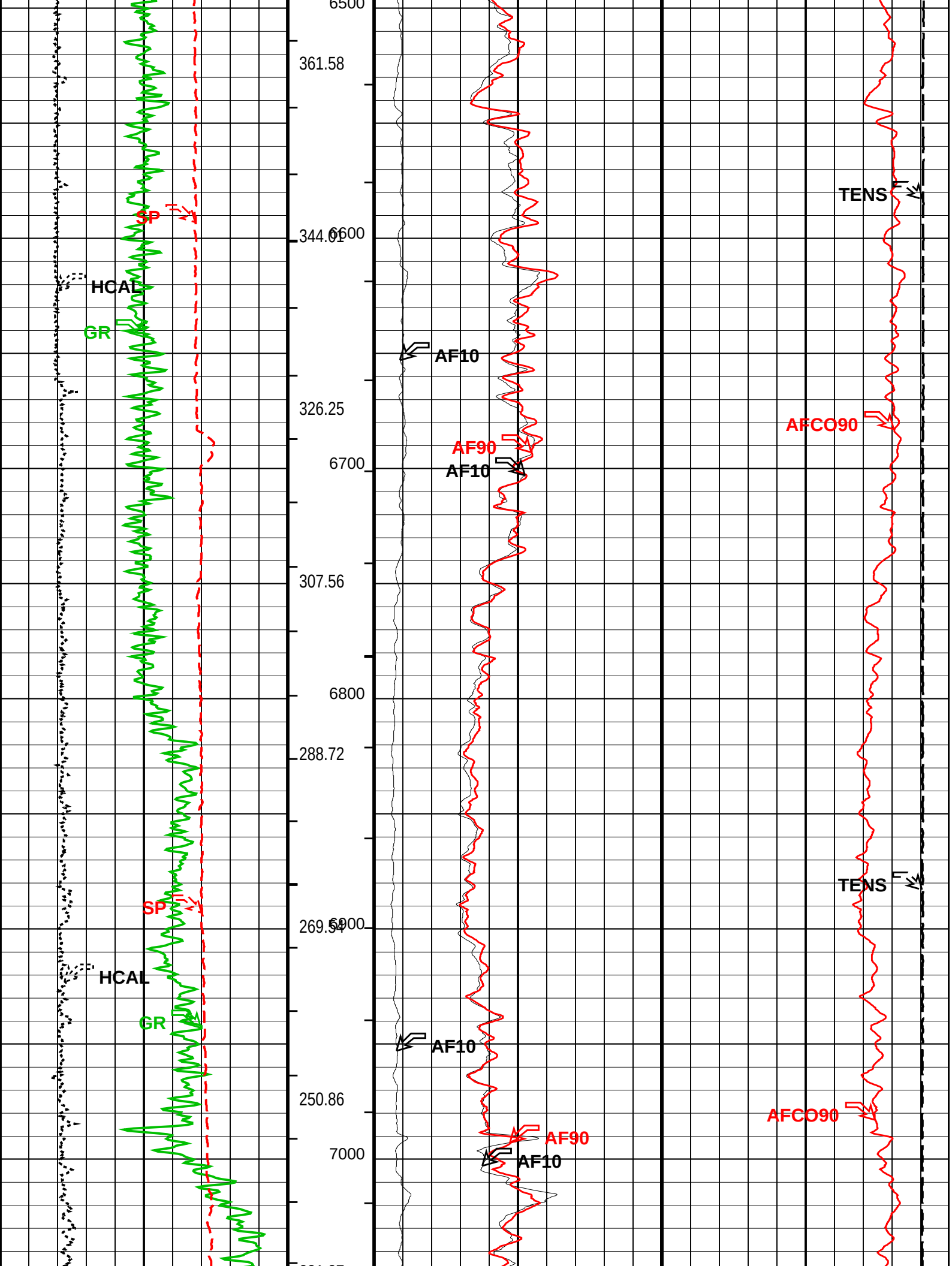
AF90
AFCO90
TENS
6400
AF10
379.09


6500
361.58
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AF10
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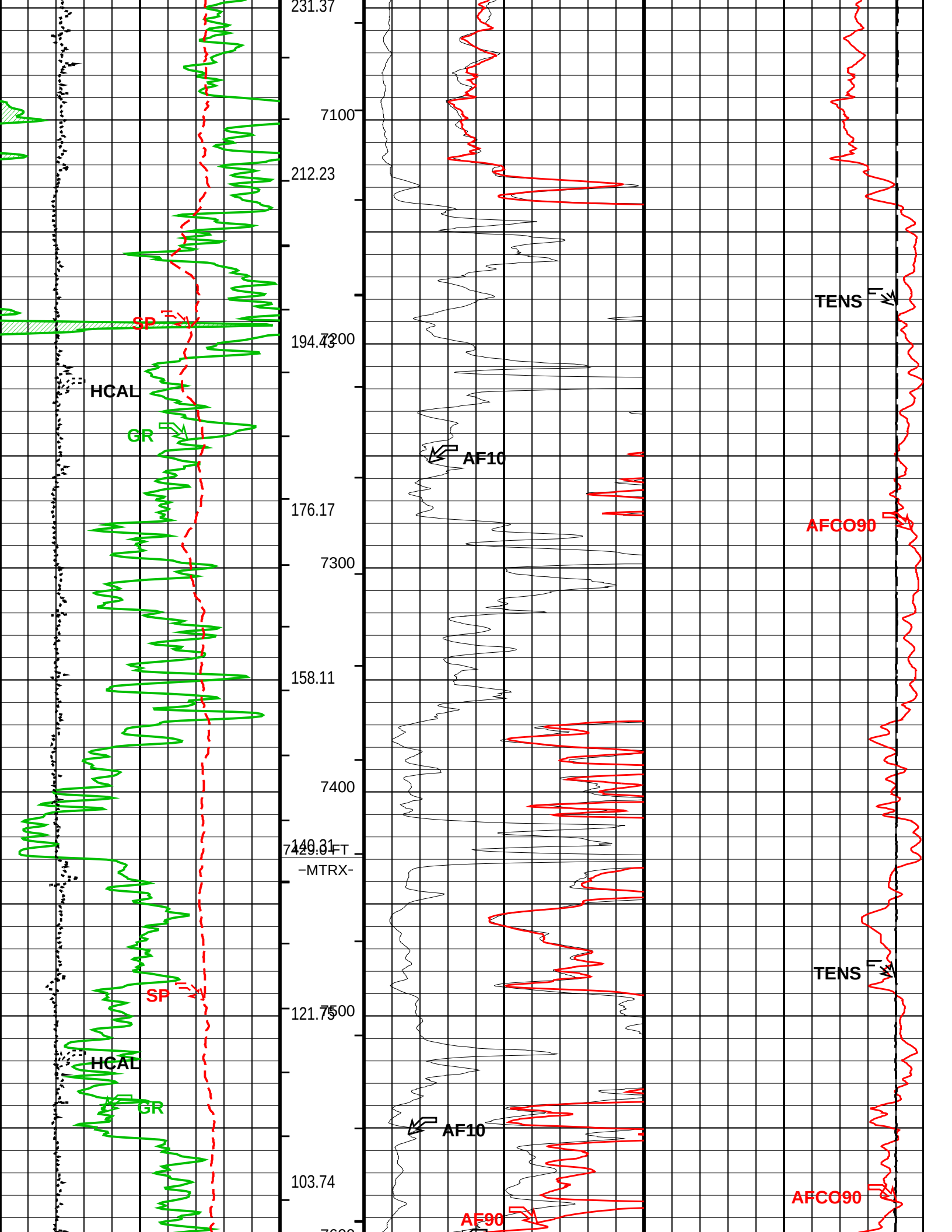
7000
AF10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SP
194.43
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HCAL
GR
AF10
176.17
7300
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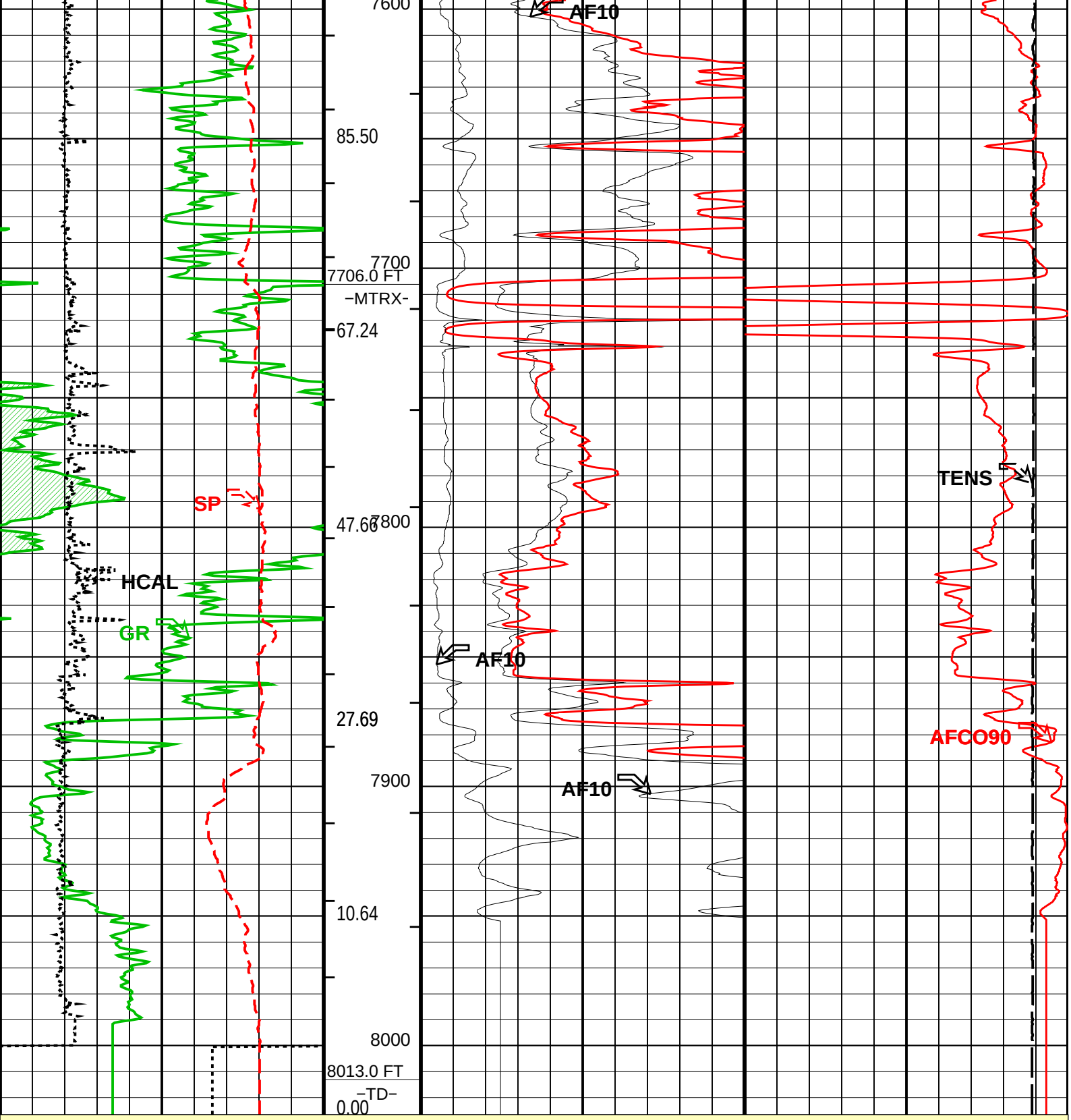
AF90
TENS
AFCO90
TENS
AFCO90



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

Gamma Ray Backup	Cement Volume (ICV) (F3)	AIT 10 Inch Investigation (AF10) 0 (OHMM) 10	AIT 90 Inch Investigation Conductivity (AFCO90) 1000 (MM/M) 0
Gamma Ray (GR) 0 (GAPI) 200		AIT 90 Inch Investigation (AF90) 0 (OHMM) 10	Tension (TENS) 10000 (LBF) 0
Caliper (HCAL) 6 (IN) 16		AIT 10 Inch Investigation (AF10) 0 (OHMM) 50	
SP (SP) −160 (MV) 40			

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	
	AIT−M: Array Induction Tool − M		
ABHM	Array Induction Borehole Correction Mode	2_ComputeStandoff	
ABHV	Array Induction Borehole Correction Code Version Number	900	
ABLM	Array Induction Basic Logs Mode	6_One_Two_and_Four	
ABLV	Array Induction Basic Logs Code Version Number	223	
ACDE	Array Induction Casing Detection Enable	Yes	
ACEN	Array Induction Tool Centering Flag (in Borehole)	Eccentered	
ACSED	Array Induction Casing Shoe Estimated Depth	−50000	FT
AETP	Array Induction Enable Sonde Error Temp&Pres Corr	Yes	
AFRSV	Array Induction Response Set Version for Four ft Resolution	41.70.24.20	
AIGS	Array Induction Select Akima Interpolation Gating	On	
AMRF	Array Induction Mud Resistivity Factor	1	
AORSV	Array Induction Response Set Version for One ft Resolution	41.70.24.20	
ARFV	Array Induction Radial Profiling Code Version Number	701	
ARPV	Array Induction Radial Parametrization Code Version Number	232	
ASTA	Array Induction Tool Standoff	0.25	IN
ATRSV	Array Induction Response Set Version for Two ft Resolution	41.70.24.20	
ATSE	Array Induction Temperature Selection(Sonde Error Correction)	Internal	
AULV	Array Induction User Level Control	Normal	
AZRSV	Array Induction Response Set Version for Z Resolution	00.10.25.00	
BHT	Bottom Hole Temperature (used in calculations)	217	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	AITM_RESIST	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
SHT	Surface Hole Temperature	68	DEGF
SPNV	SP Next Value	0	MV
	HILTB−FTB: High resolution Integrated Logging Tool−DTS		
BHT	Bottom Hole Temperature (used in calculations)	217	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	AITM_RESIST	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
SHT	Surface Hole Temperature	68	DEGF
	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)	217	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	AITM_RESIST	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
SHT	Surface Hole Temperature	68	DEGF
	PERT: Preliminary Evaluation − Real Time		
BHT	Bottom Hole Temperature (used in calculations)	217	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	AITM_RESIST	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
SHT	Surface Hole Temperature	68	DEGF
	System and Miscellaneous		
BS	Bit Size	7.875	IN
DFD	Drilling Fluid Density	8.40	LB/G
DO	Depth Offset for Playback	0.0	FT
FLEV	Fluid Level	−50000.00	FT
MST	Mud Sample Temperature	81.40	DEGF
PP	Playback Processing	NORMAL	
TD	Total Depth	8013	FT

OP System Version: 17C0−154

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

Input DLIS Files

DEFAULT	MERGE_AIT_027	FN:1	PRODUCER	16−Jan−2010 15:57	8026.5 FT	615.0 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_028PUP	FN:22	PRODUCER	16−Jan−2010 16:01

Schlumberger

UPPER RESISTIVITY LOG 5" = 100'

MAXIS Field Log

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_028PUP	FN:22	PRODUCER	16−Jan−2010 16:01	8026.5 FT	615.5 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 987.85 ft3

Cement Volume = 683.52 ft3 (assuming 4.50 in casing O.D.)

Computed from 5099.5 ft to 2344.5 ft

OP System Version: 17C0−154

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

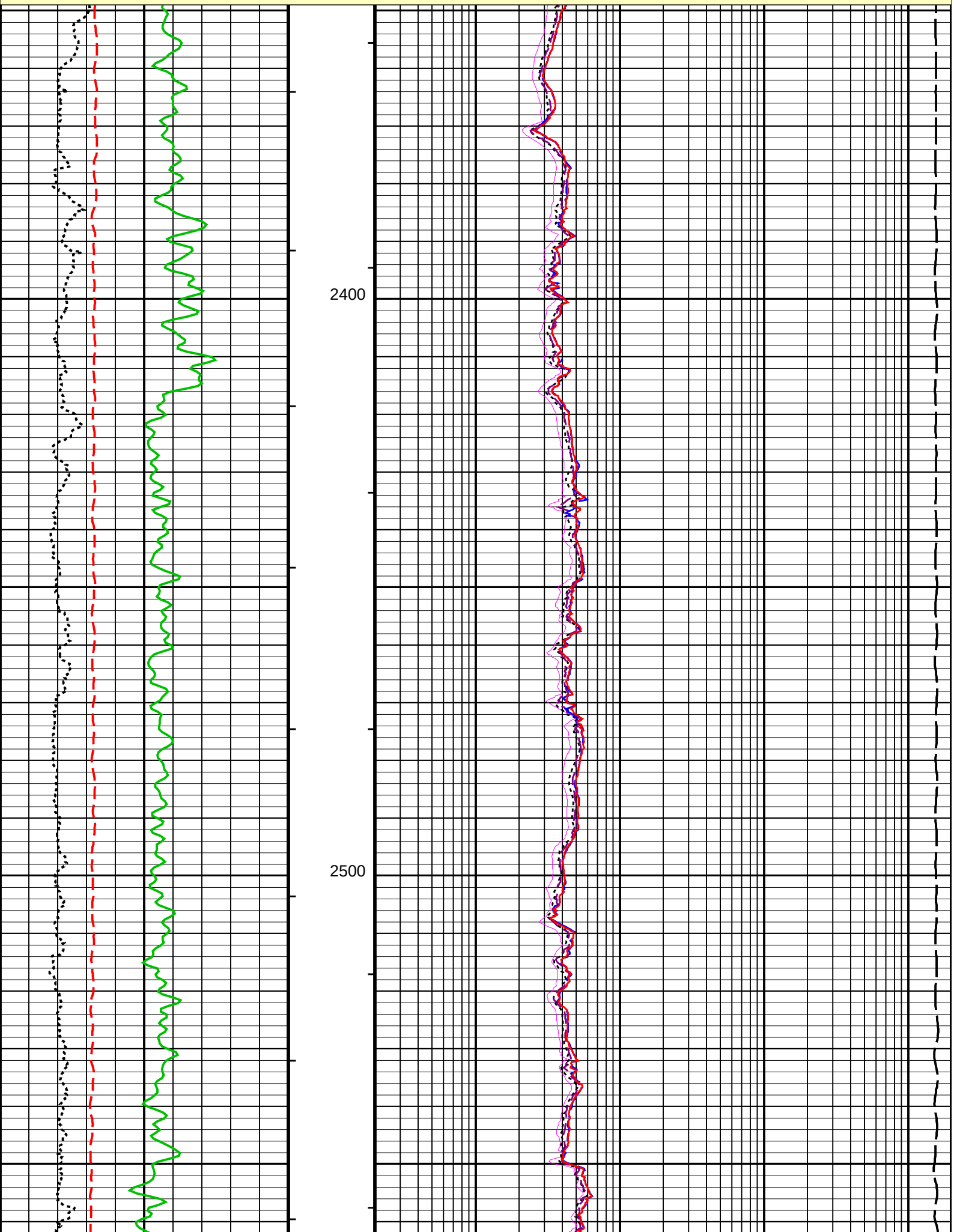
PIP SUMMARY

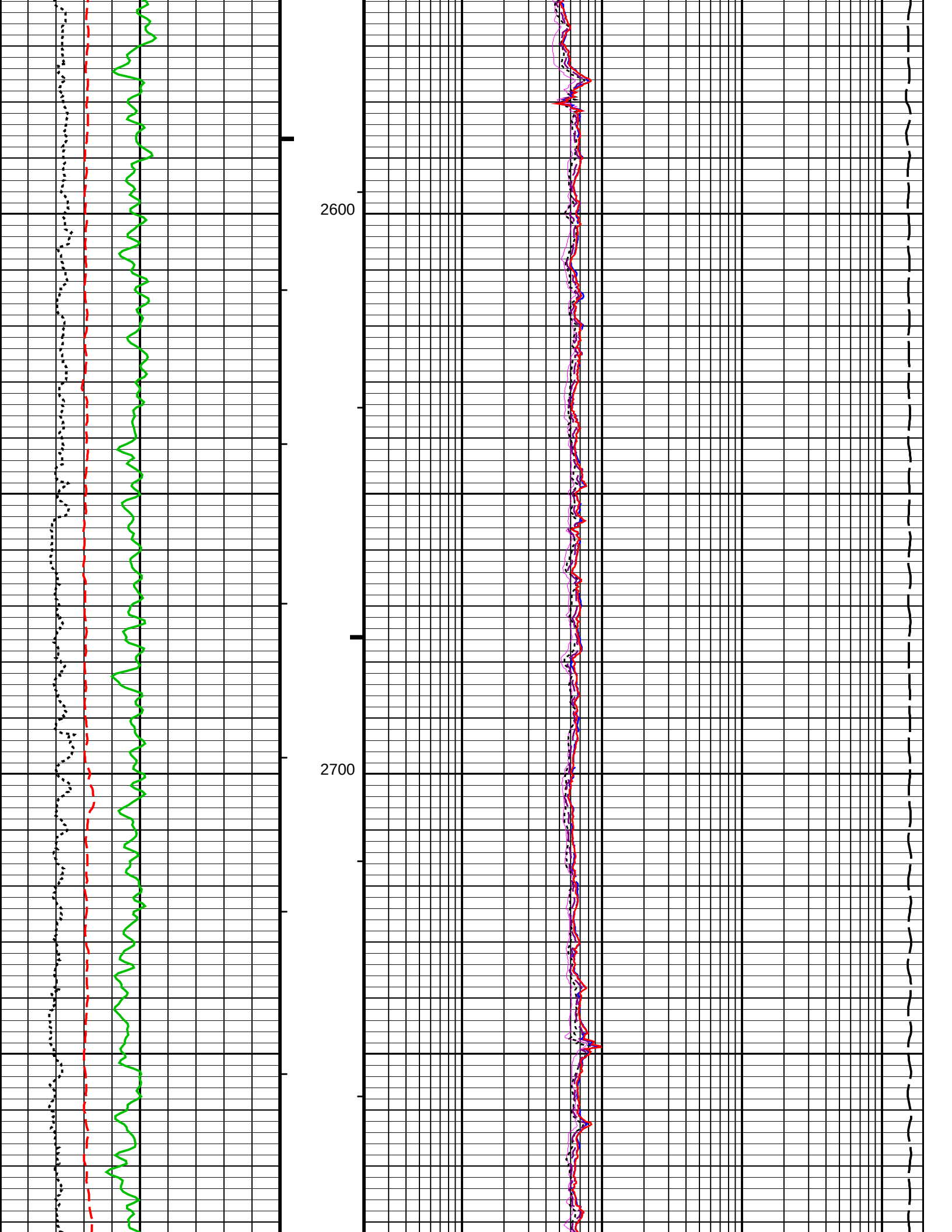
- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

Tension (TENS)	10000 (LBF)	0
AIT 90 Inch Investigation (AT90)	0.2 (OHMM)	2000
SP (SP)	−160 (MV)	40
AIT 60 Inch Investigation (AT60)	0.2 (OHMM)	2000
Caliper (HCAL)	6 (IN)	16
AIT 30 Inch Investigation (AT30)	0.2 (OHMM)	2000
Gamma Ray (GR)	0 (GAPI)	200
AIT 20 Inch Investigation (AT20)	0.2 (OHMM)	2000
Gamma Ray Backup		
AIT 10 Inch Investigation (AT10)	0.2 (OHMM)	2000

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

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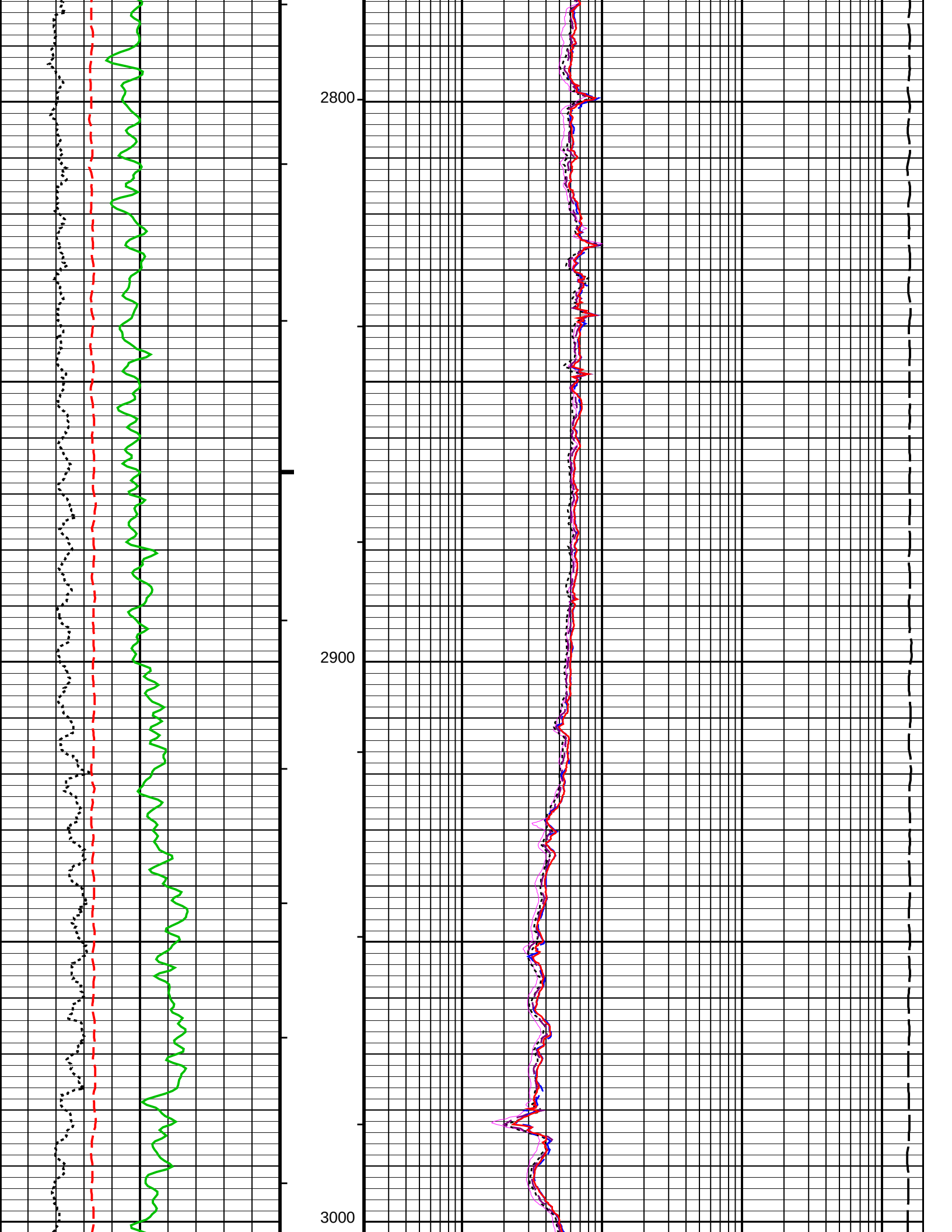
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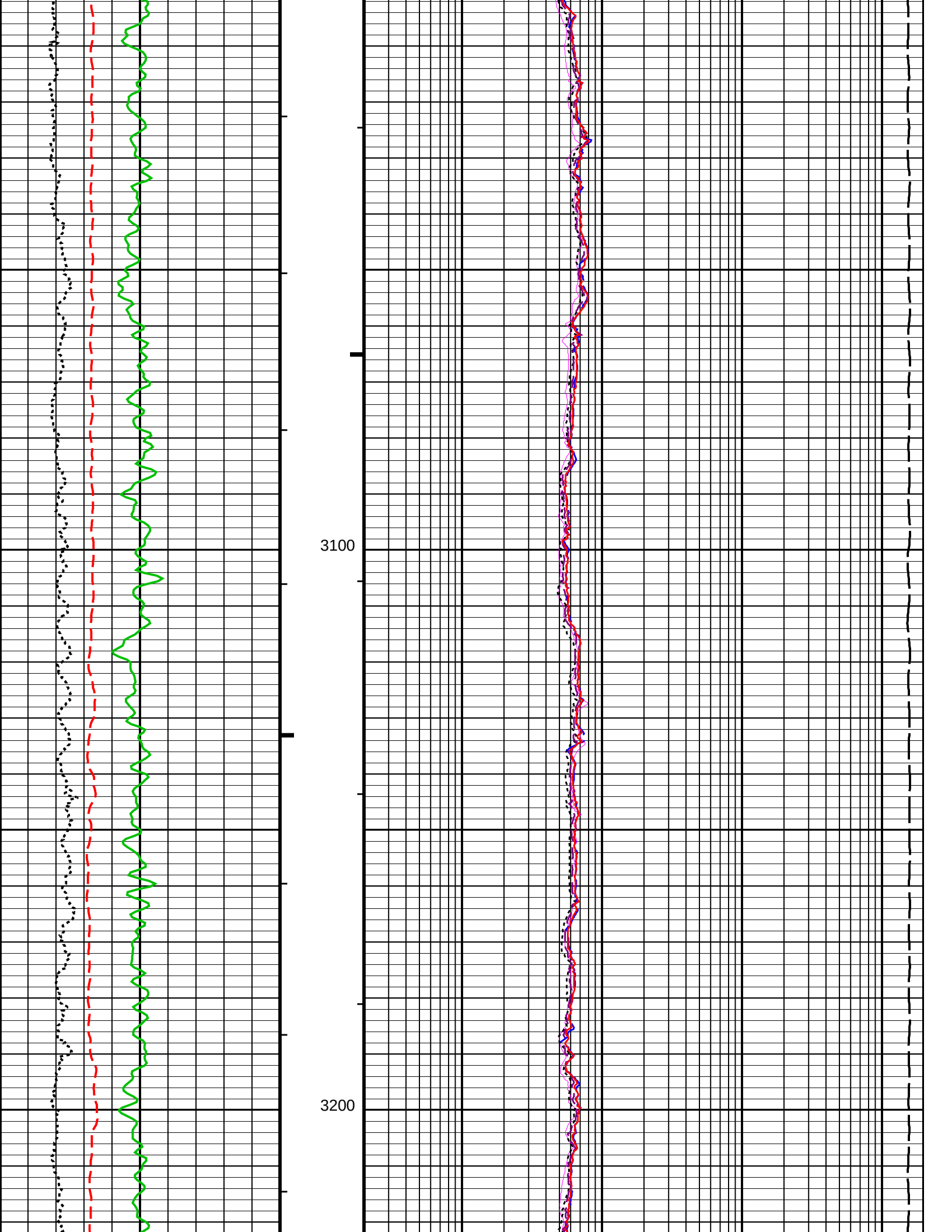
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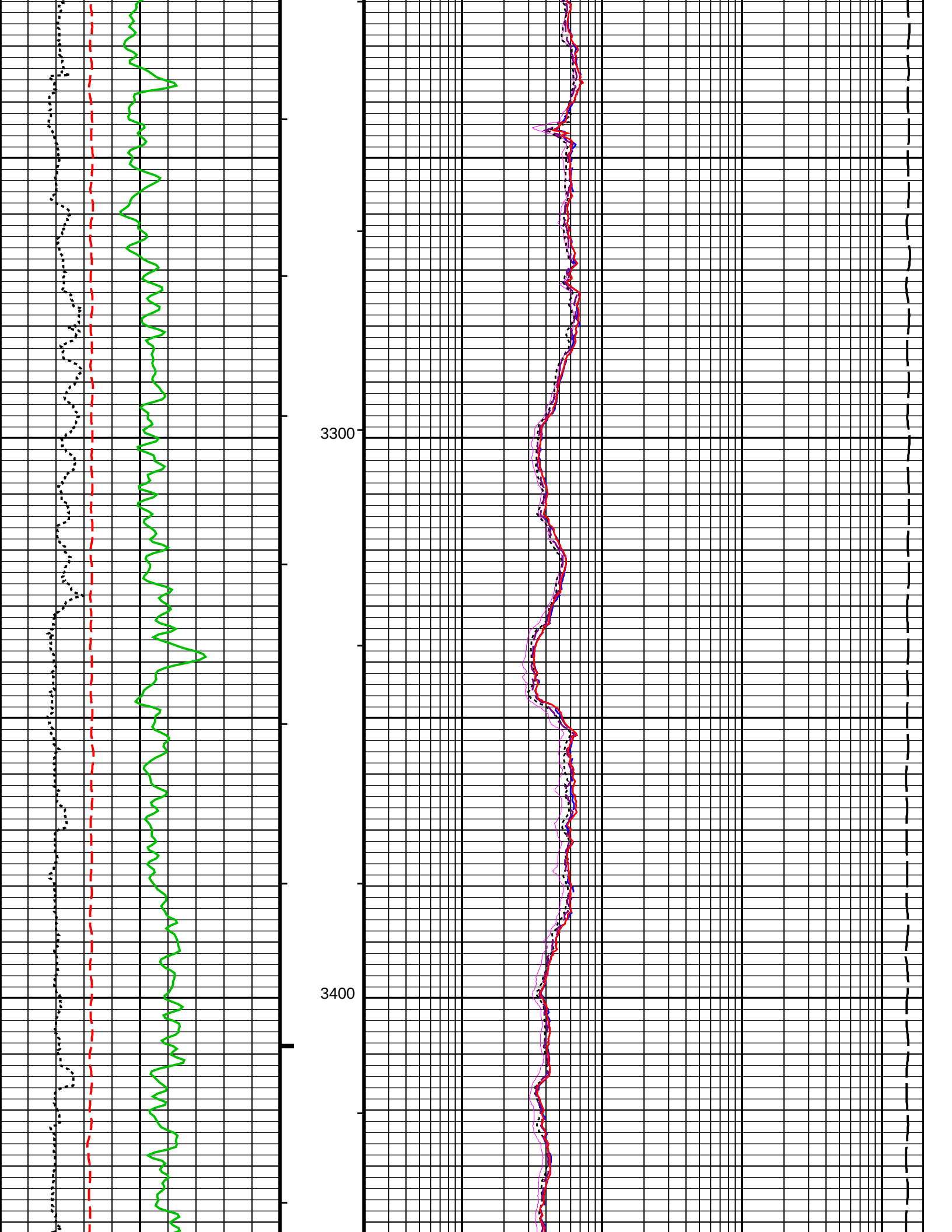
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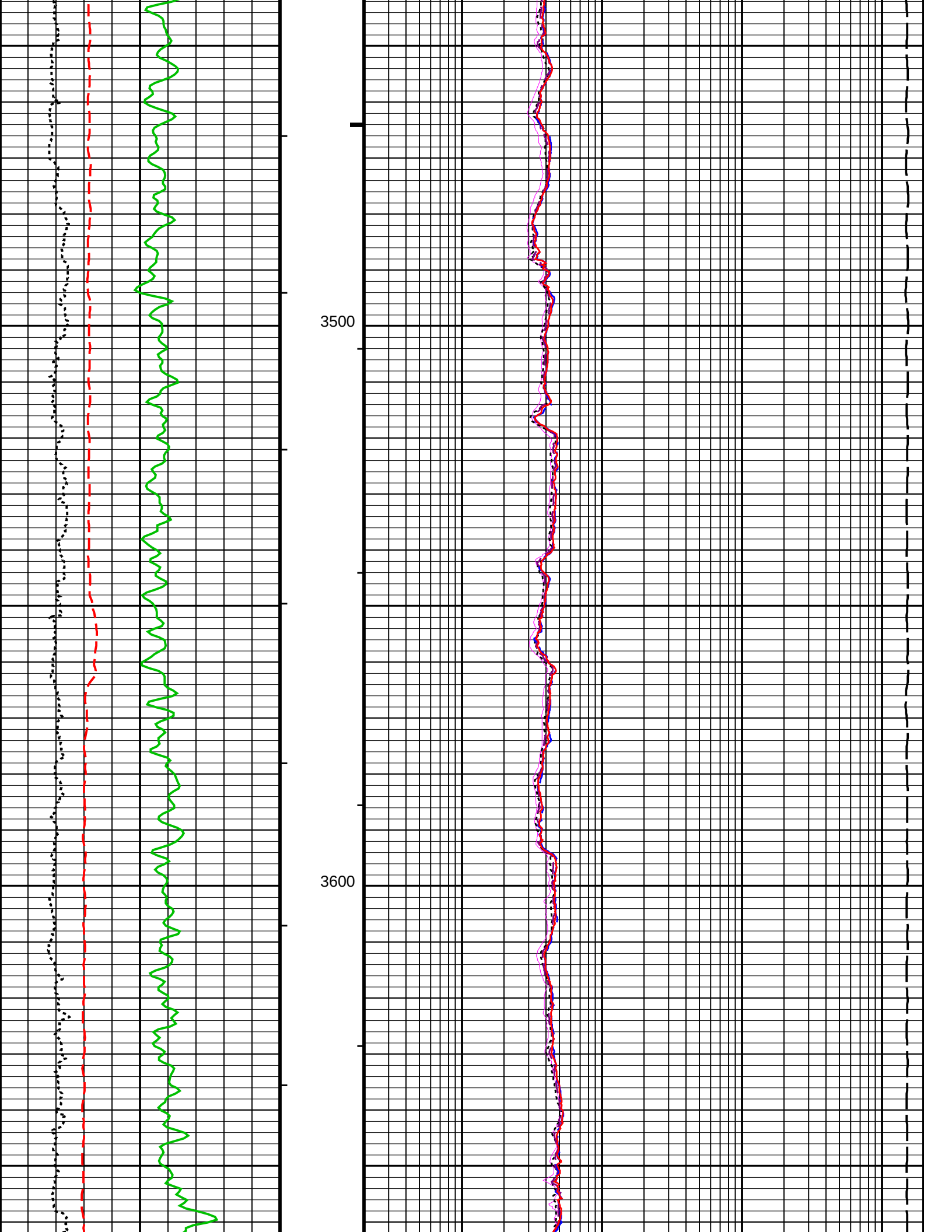
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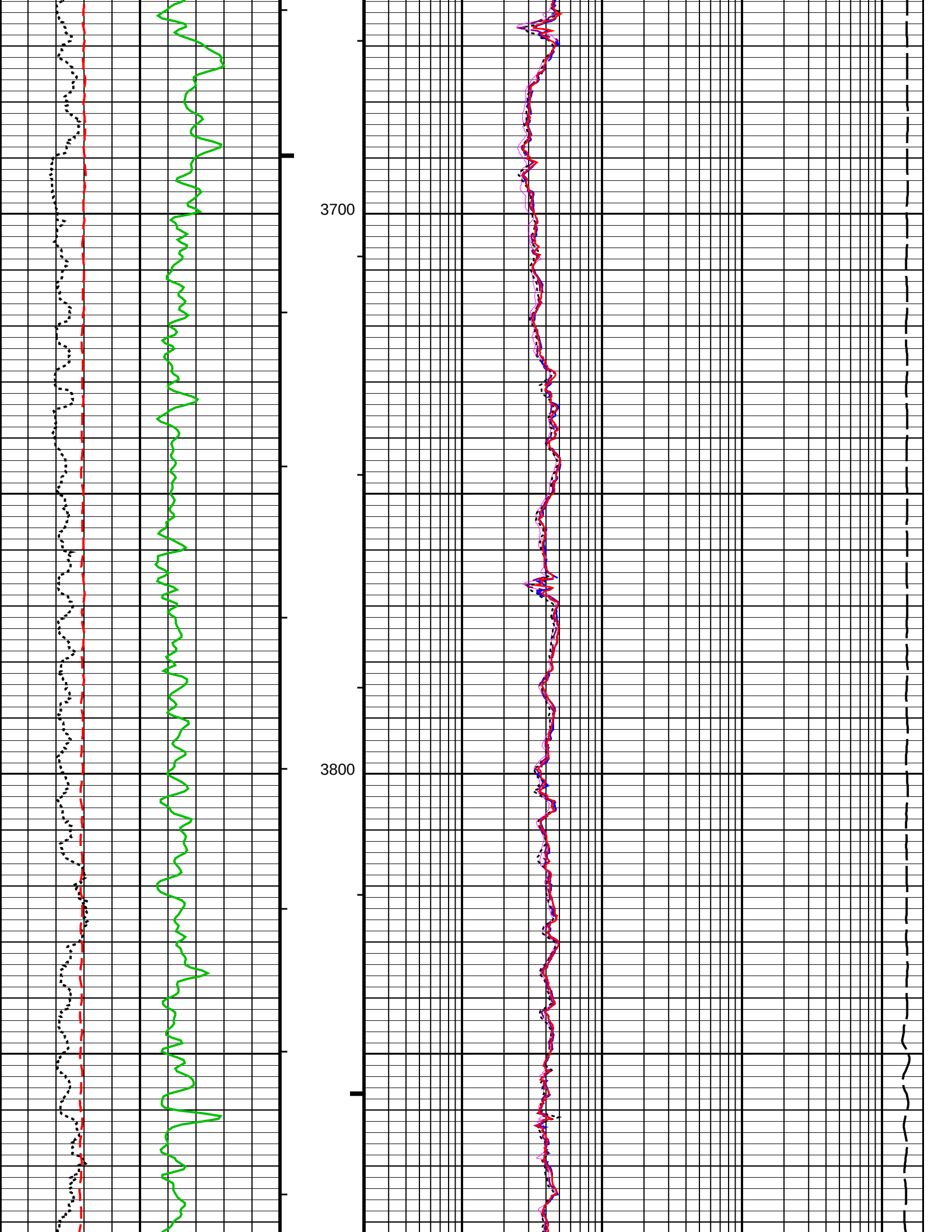
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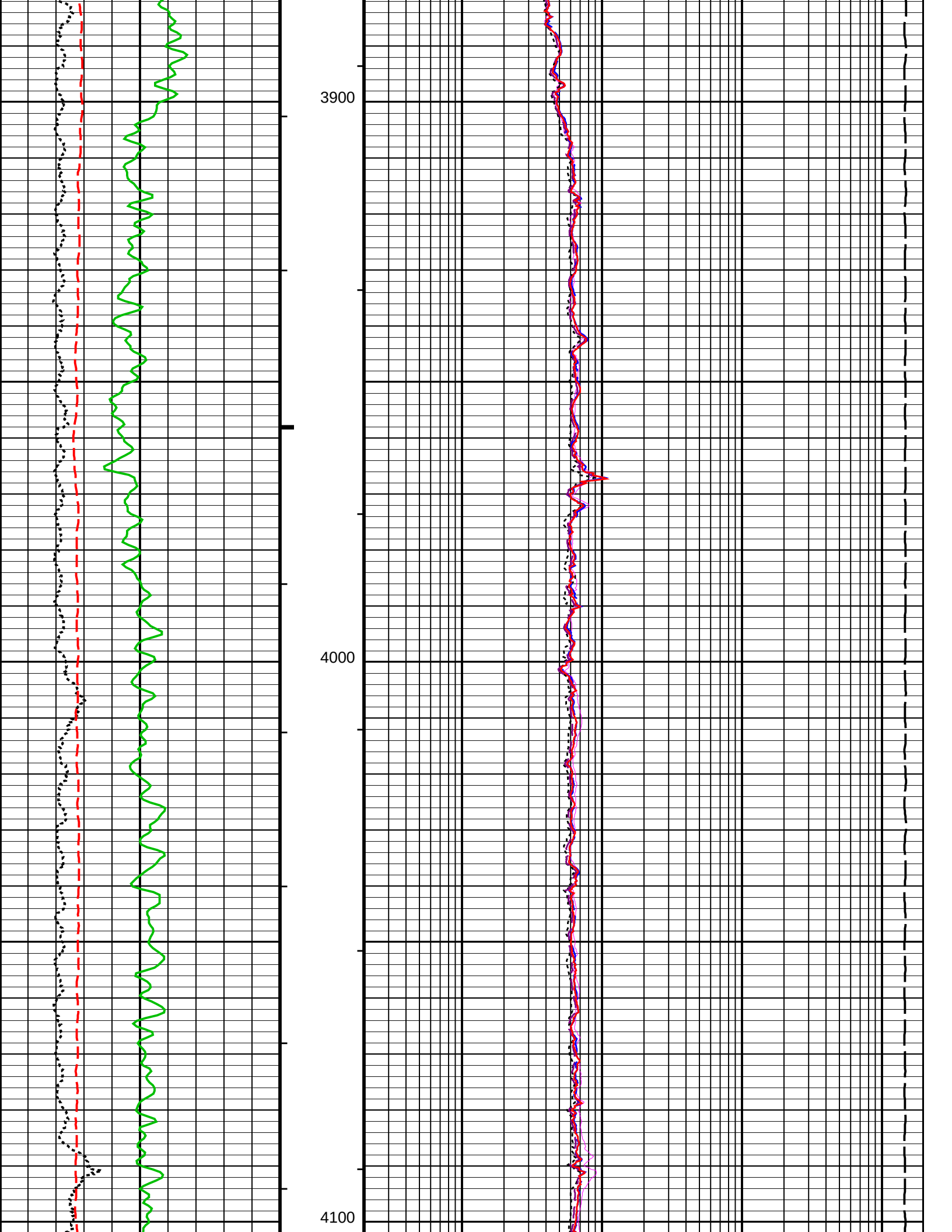
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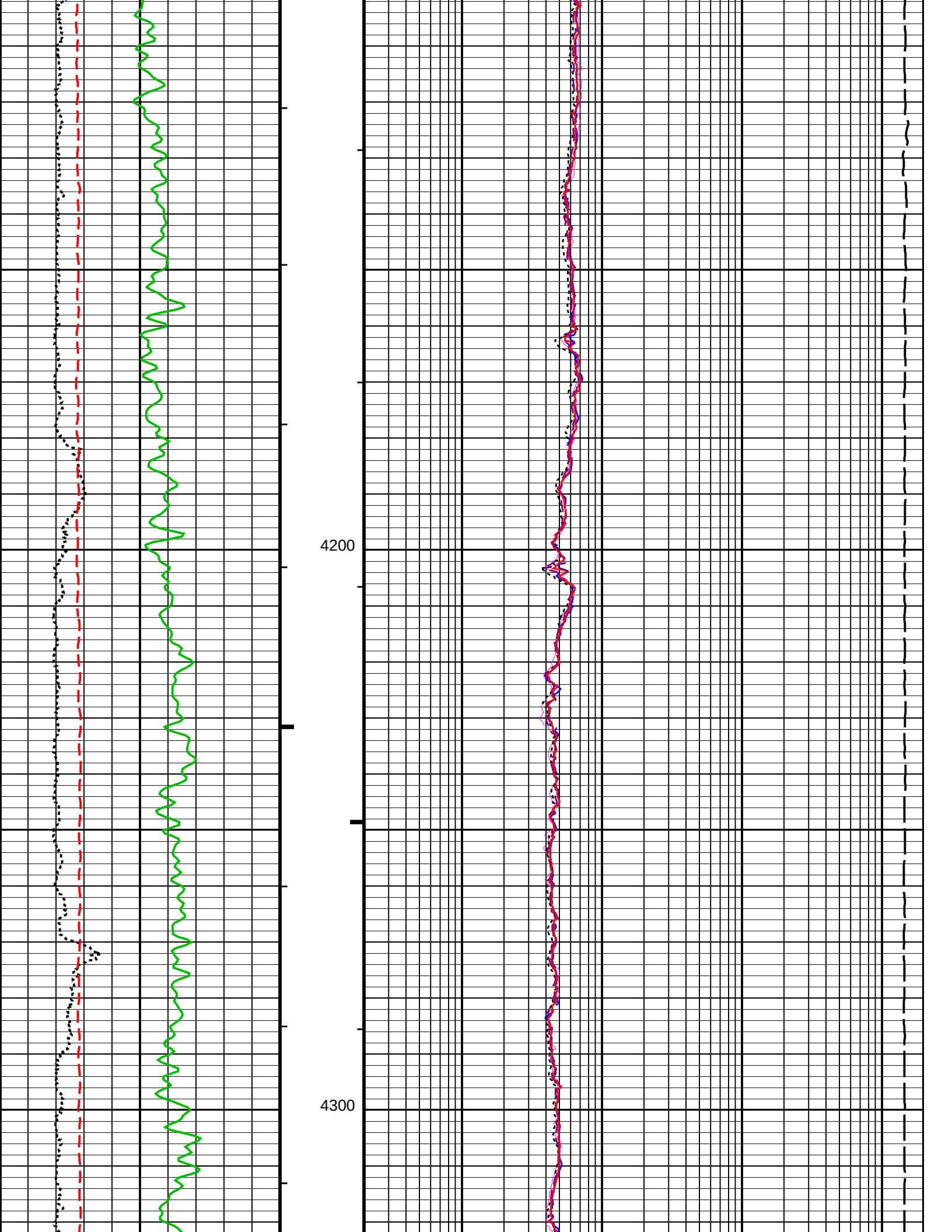
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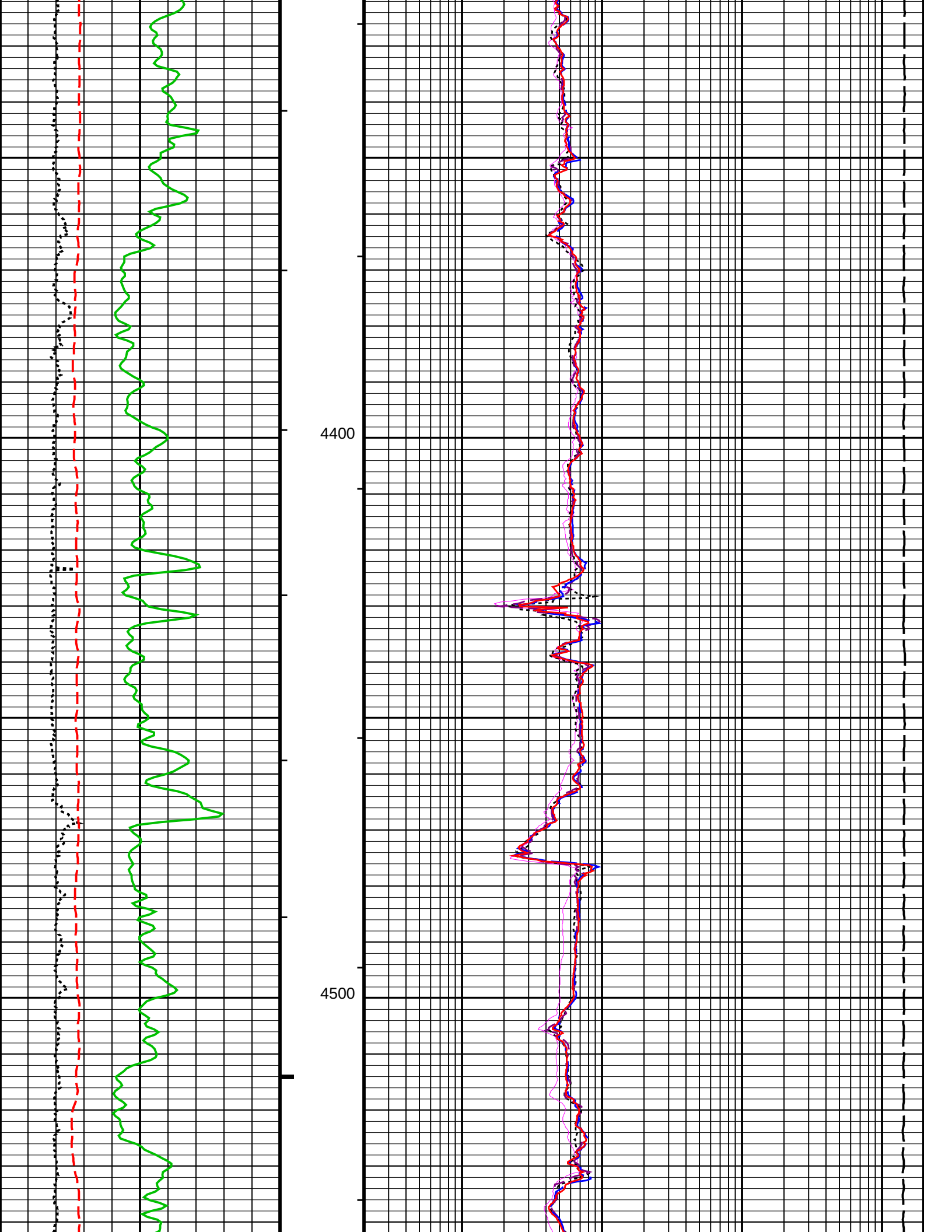
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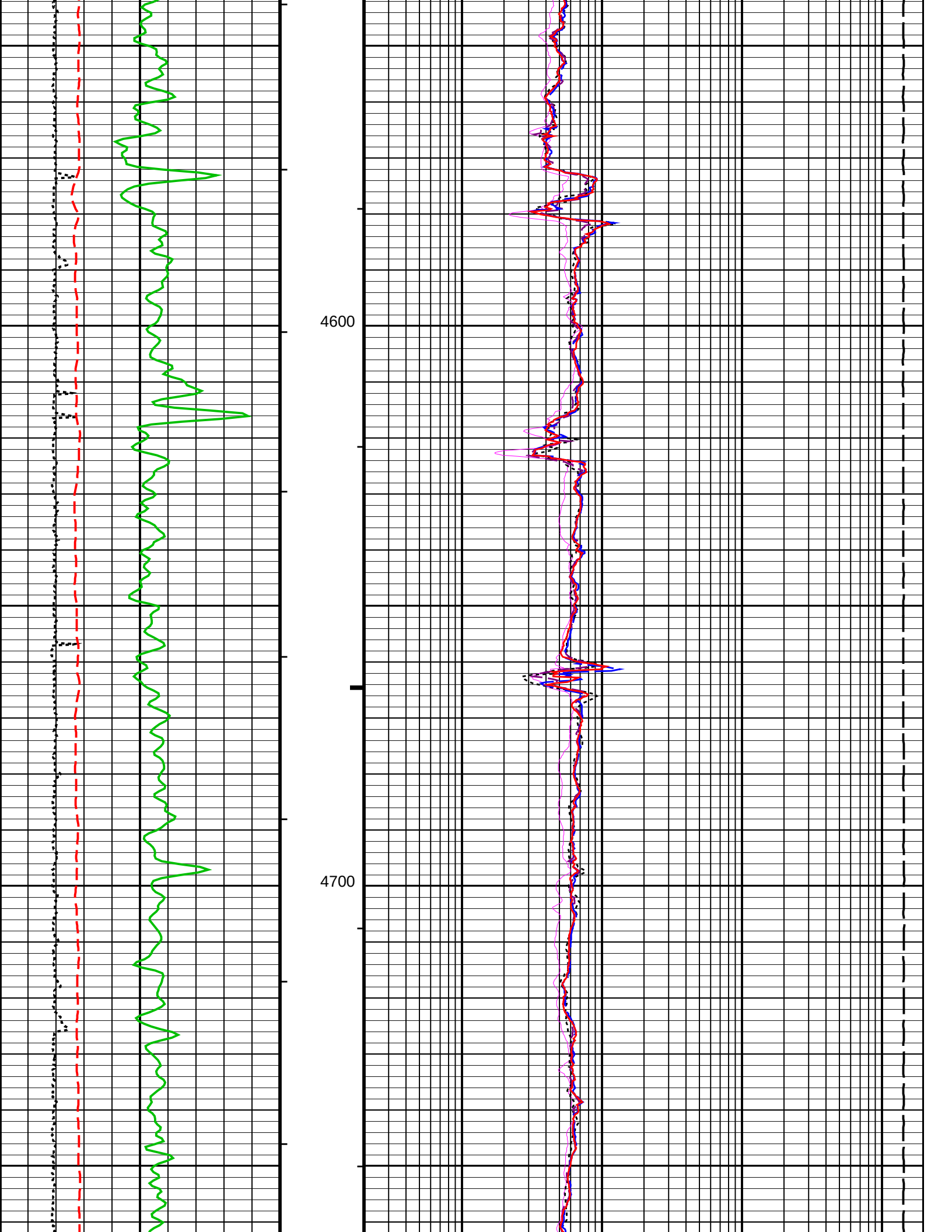
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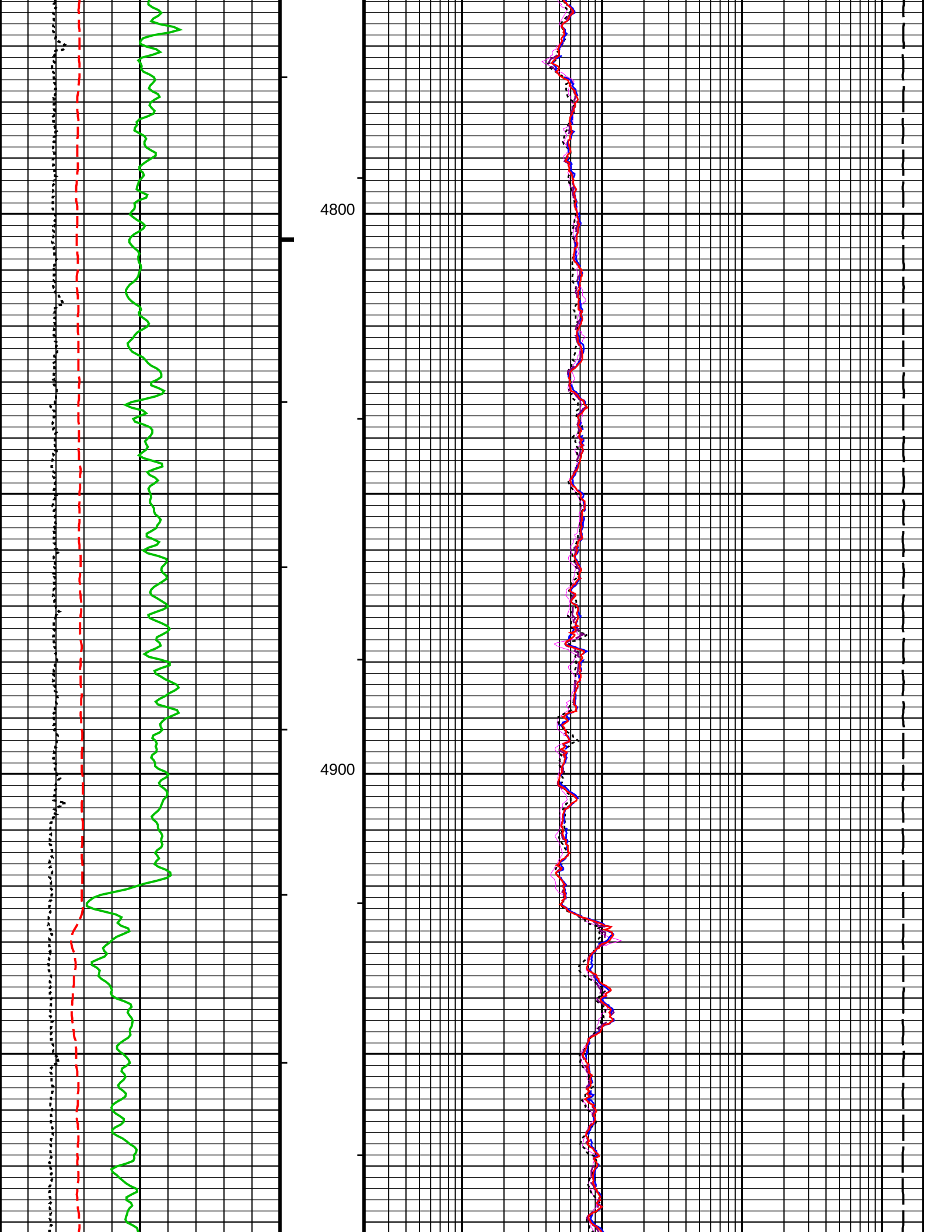
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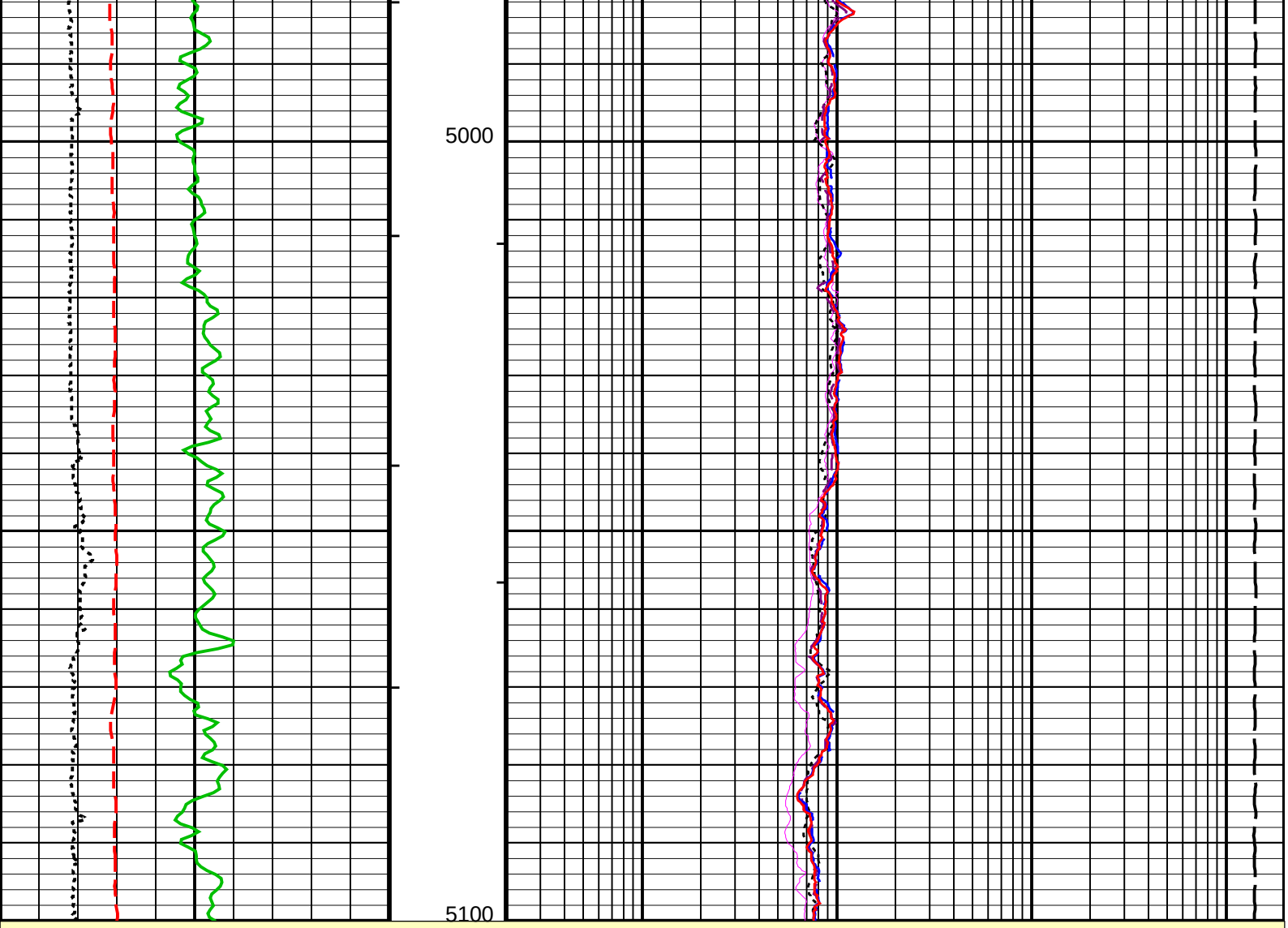

MAIN PASS: *** PLATFORM EXPRESS − ARRAY INDUCTION ***

Gamma Ray Backup		
Gamma Ray (GR)		
0	(GAPI)	200
Caliper (HCAL)		
6	(IN)	16
SP (SP)		
−160	(MV)	40

AIT 10 Inch Investigation (AT10)		
0.2	(OHMM)	2000
AIT 20 Inch Investigation (AT20)		
0.2	(OHMM)	2000
AIT 30 Inch Investigation (AT30)		
0.2	(OHMM)	2000
AIT 60 Inch Investigation (AT60)		
0.2	(OHMM)	2000
AIT 90 Inch Investigation (AT90)		
0.2	(OHMM)	2000
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
	AIT−M: Array Induction Tool − M	
ABHM	Array Induction Borehole Correction Mode	2, COMPUTESTANDOFF

ABHM	Array Induction Borehole Correction Mode	2_COMPUTESTANDOFF	
ABHV	Array Induction Borehole Correction Code Version Number	900	
ABLM	Array Induction Basic Logs Mode	6_ONE_TWO_AND_FOUR	
ABLV	Array Induction Basic Logs Code Version Number	223	
ACDE	Array Induction Casing Detection Enable	YES	
ACEN	Array Induction Tool Centering Flag (in Borehole)	ECCENTERED	
AETP	Array Induction Enable Sonde Error Temp&Pres Corr	YES	
AFRSV	Array Induction Response Set Version for Four ft Resolution	41.70.24.20	
AIGS	Array Induction Select Akima Interpolation Gating	ON	
AMRF	Array Induction Mud Resistivity Factor	1.000	
AORSV	Array Induction Response Set Version for One ft Resolution	41.70.24.20	
ARFV	Array Induction Radial Profiling Code Version Number	701	
ARPV	Array Induction Radial Parametrization Code Version Number	232	
ASAP	Array Induction Suspend Answer Product Processing	0_NOSUSPENSION	
ASPC	Array Induction Sonde Characterization Pressure Coefficients	0.000	
ASTA	Array Induction Tool Standoff	0.250	in
ATRSV	Array Induction Response Set Version for Two ft Resolution	41.70.24.20	
ATSE	Array Induction Temperature Selection(Sonde Error Correction)	INTERNAL	
AULV	Array Induction User Level Control	NORMAL	
AZRSV	Array Induction Response Set Version for Z Resolution	00.10.25.00	
BHT	Bottom Hole Temperature (used in calculations)	217.0	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	AMF_AITM	
GTSE	Generalized Temperature Selection	TEMP	
SHT	Surface Hole Temperature	68.000	degF
SPDR	SP Drift	0.000	mV/ft
SPNV	SP Next Value	0.000	mV
HILTB−FTB: High resolution Integrated Logging Tool−DTS			
BHT	Bottom Hole Temperature (used in calculations)	217.0	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	AMF_AITM	
GTSE	Generalized Temperature Selection	TEMP	
SHT	Surface Hole Temperature	68.000	degF
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)	217.0	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	AMF_AITM	
GTSE	Generalized Temperature Selection	TEMP	
SHT	Surface Hole Temperature	68.000	degF
PERT: Preliminary Evaluation − Real Time			
BHT	Bottom Hole Temperature (used in calculations)	217.0	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	AMF_AITM	
GTSE	Generalized Temperature Selection	TEMP	
SHT	Surface Hole Temperature	68.000	degF
System and Miscellaneous			
ACSED	Array Induction Casing Shoe Estimated Depth		
BS	Bit Size	7.875	in
DFD	Drilling Fluid Density	8.400	lbm/gal
FLEV	Fluid Level		
MST	Mud Sample Temperature	81.400	degF
TD	Total Depth	8013.0	ft

Format: UPPER_GRES Vertical Scale: 5" per 100' Graphics File Created: 16−Jan−2010 16:07

OP System Version: 17C0−154

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

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_028PUP	FN:22	PRODUCER	16−Jan−2010 16:01	8026.5 FT	615.5 FT

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LOWER RESISTIVITY LOG 5" = 100'

MAXIS Field Log

Input DLIS Files

DEFAULT	MERGE_AIT_027	FN:1	PRODUCER	16−Jan−2010 15:57	8026.5 FT	615.0 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_028PUP	FN:22	PRODUCER	16−Jan−2010 16:01

OP System Version: 17C0−154

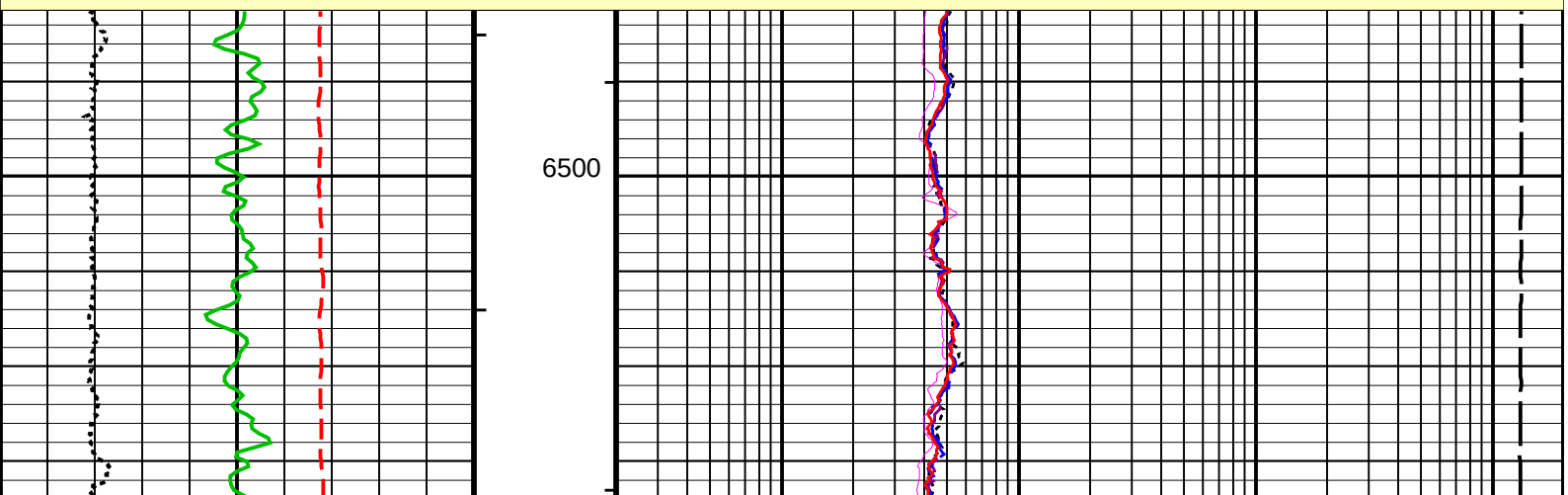
AIT−M	17C0−154	HILTB−FTB	17C0−154
DTC−H	17C0−154		

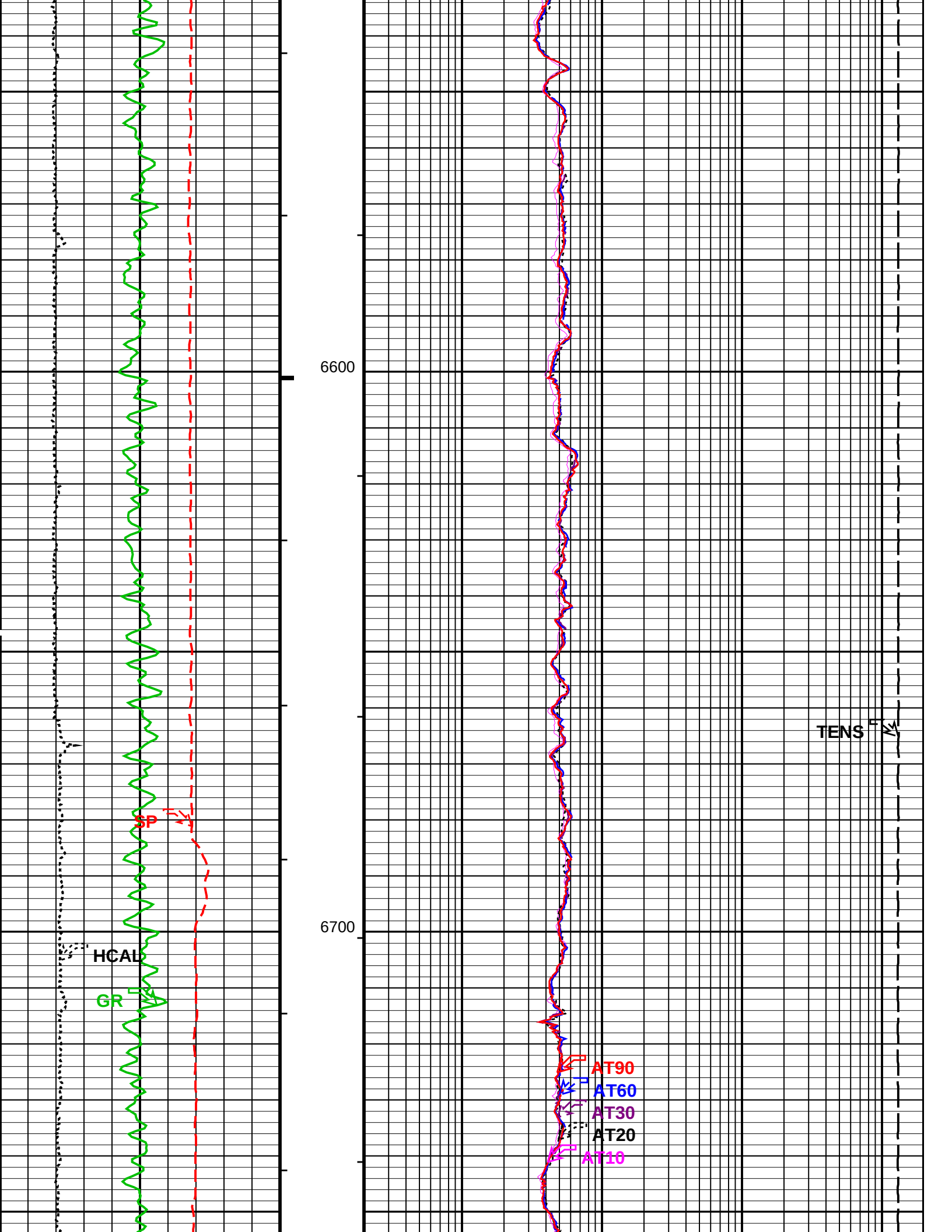
PIP SUMMARY

- 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
AIT 90 Inch Investigation (AT90)		
0.2	(OHMM)	2000
AIT 60 Inch Investigation (AT60)		
0.2	(OHMM)	2000
AIT 30 Inch Investigation (AT30)		
0.2	(OHMM)	2000
AIT 20 Inch Investigation (AT20)		
0.2	(OHMM)	2000
AIT 10 Inch Investigation (AT10)		
0.2	(OHMM)	2000
SP (SP)		
−160	(MV)	40
Caliper (HCAL)		
6	(IN)	16
Gamma Ray (GR)		
0	(GAPI)	200
Gamma Ray Backup		

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

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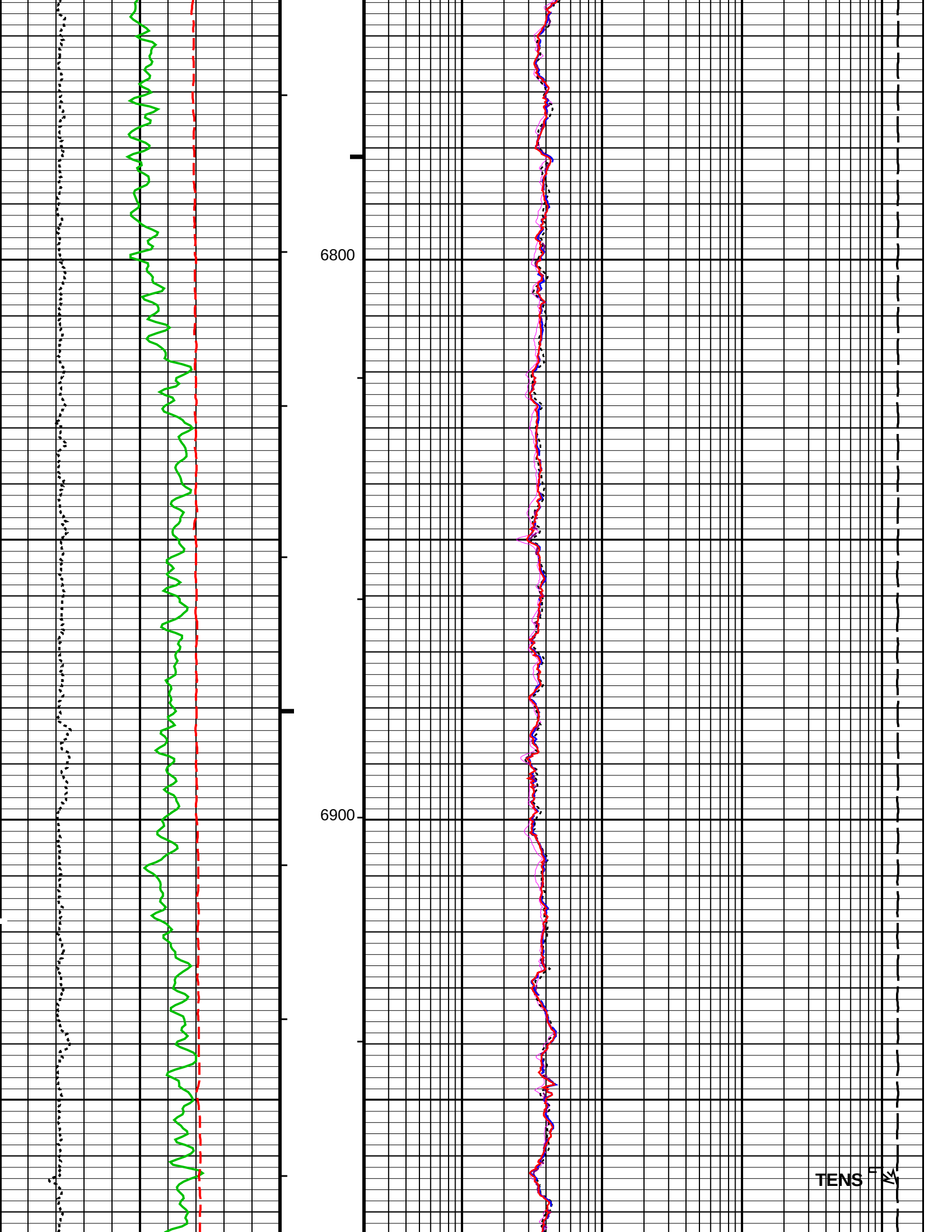
6700
SP
HCAL
GR
TENS
AT90
AT60
AT30
AT20
AT10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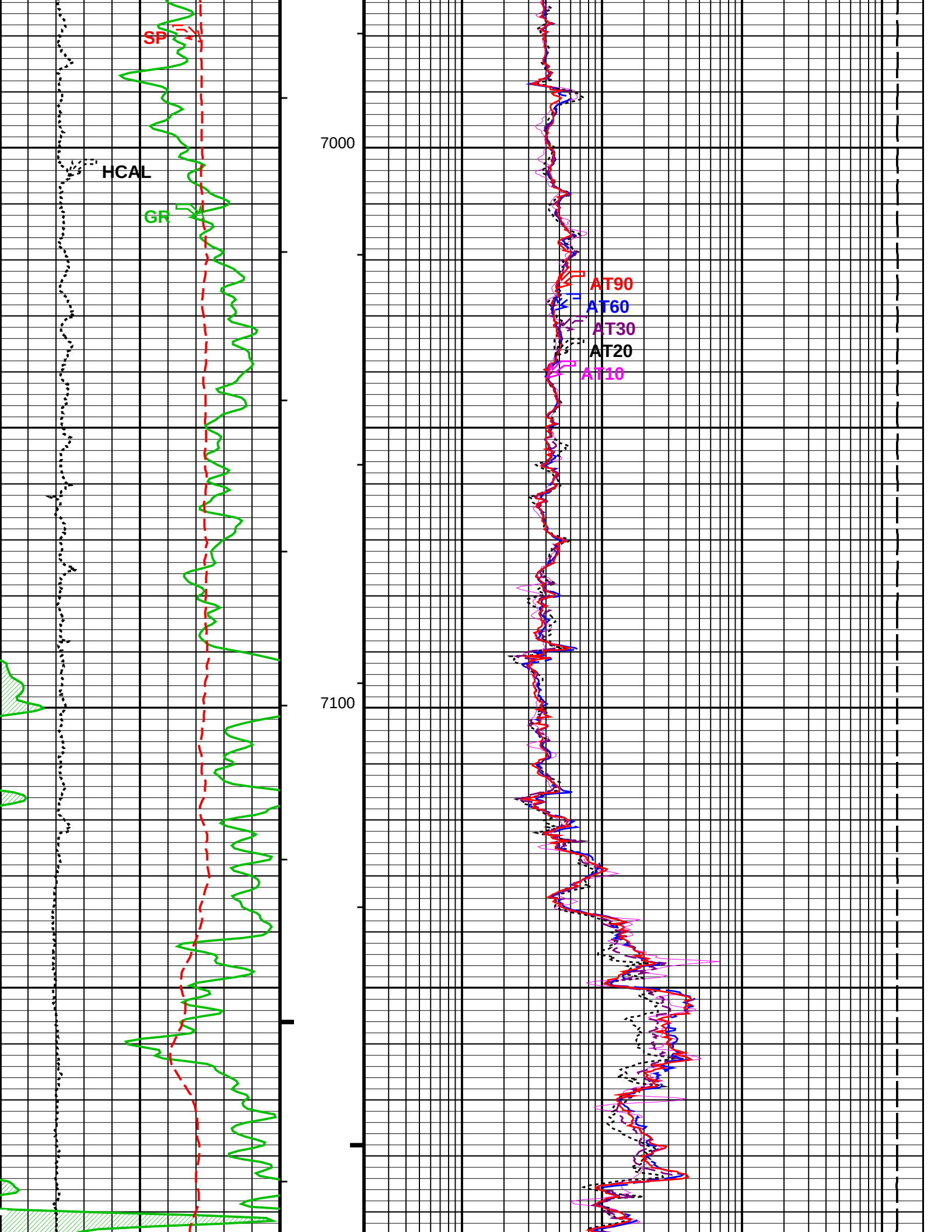
6900
TENS


SP
HCAL
GR
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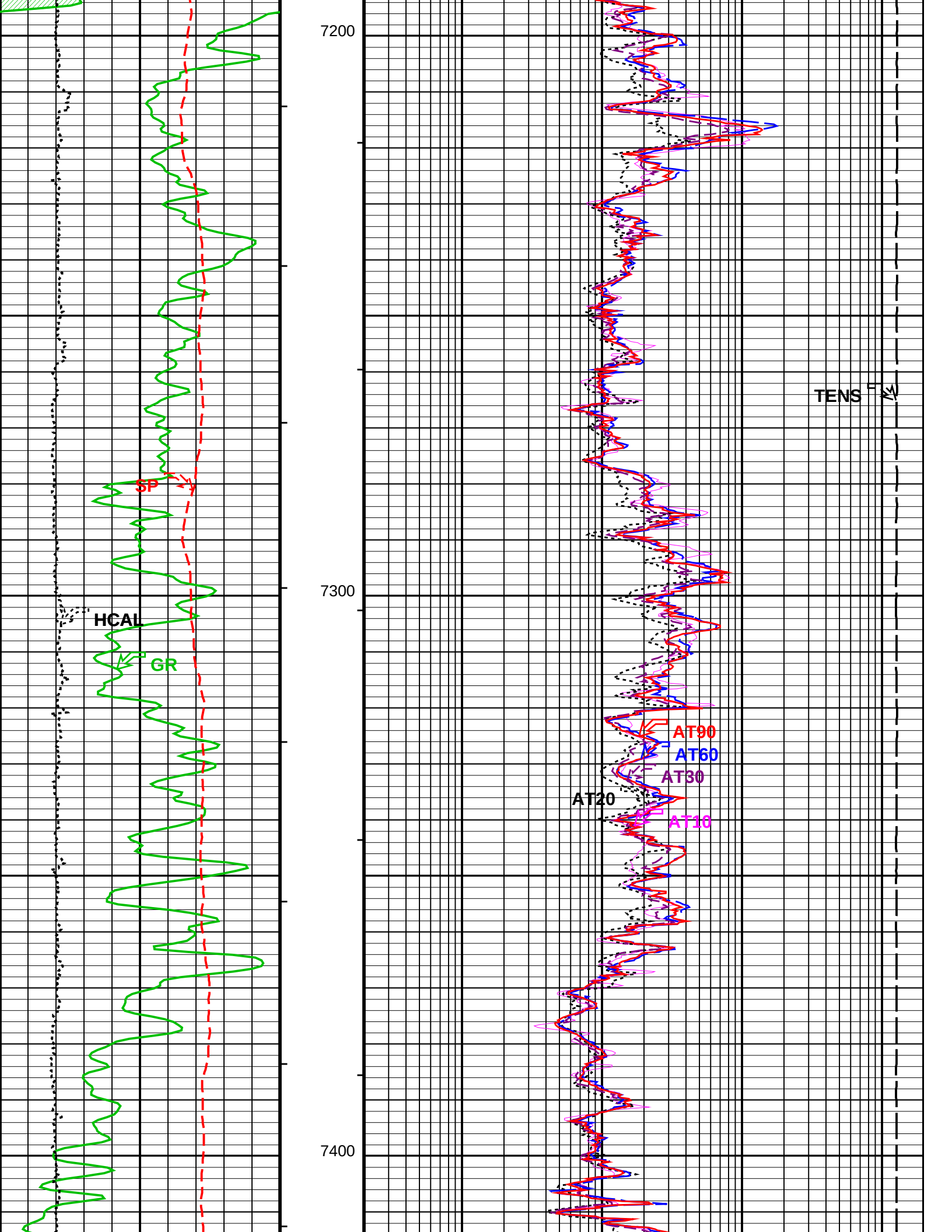
AT90
AT60
AT30
AT20
AT10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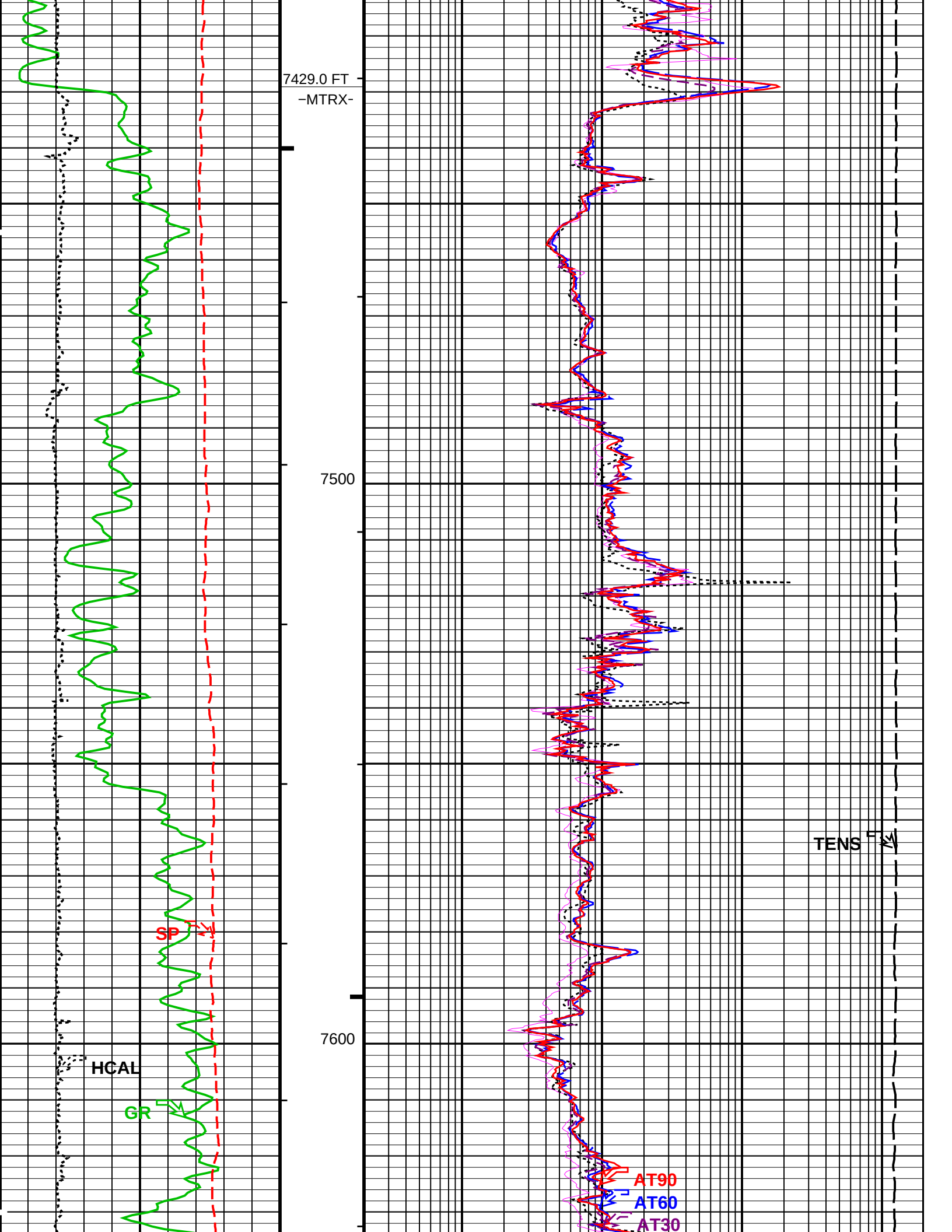
HCAL
GR
TENS
AT90
AT60
AT30
AT20
AT10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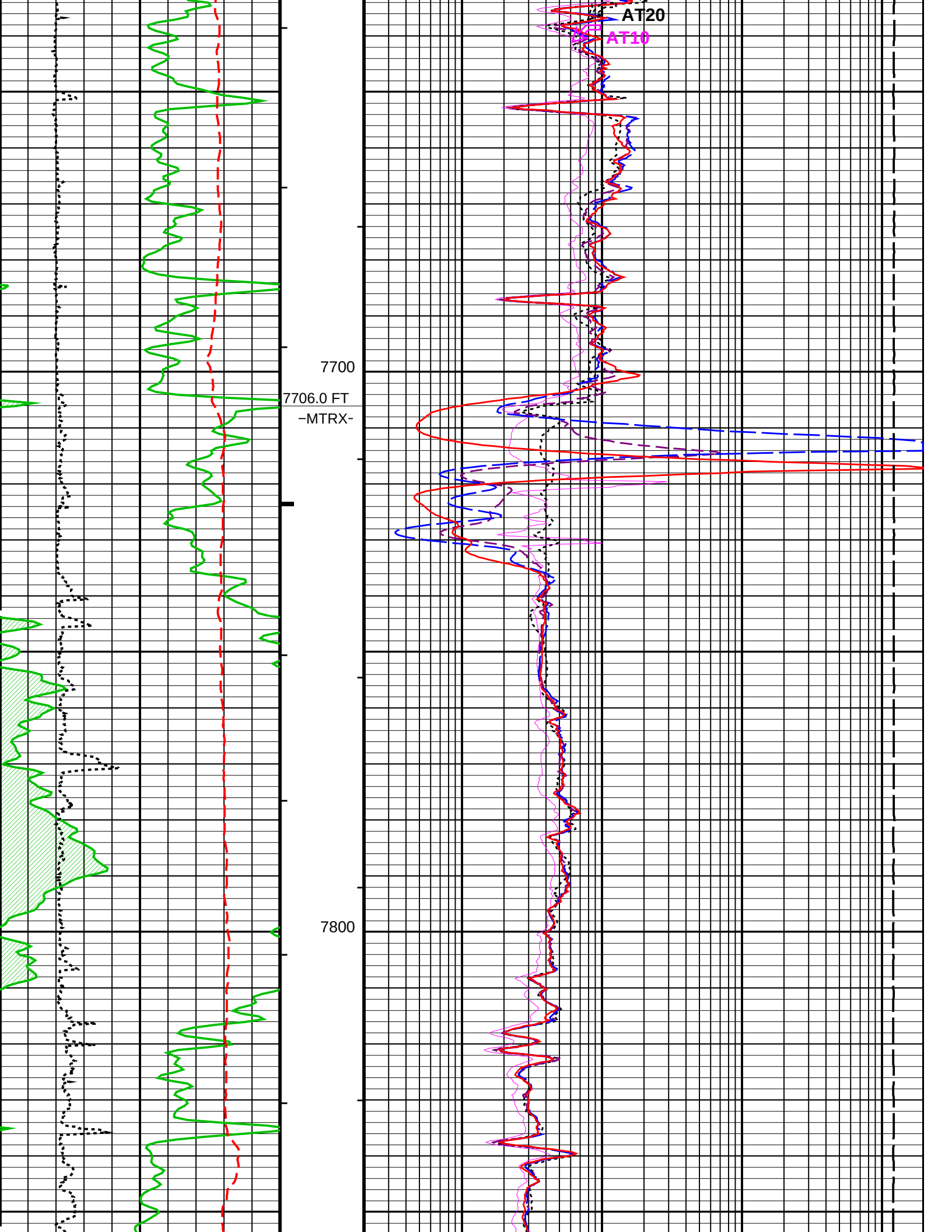
-MTRX-
7500
7600
SP
HCAL
GR
TENS
AT90
AT60
AT30


AT20
AT10
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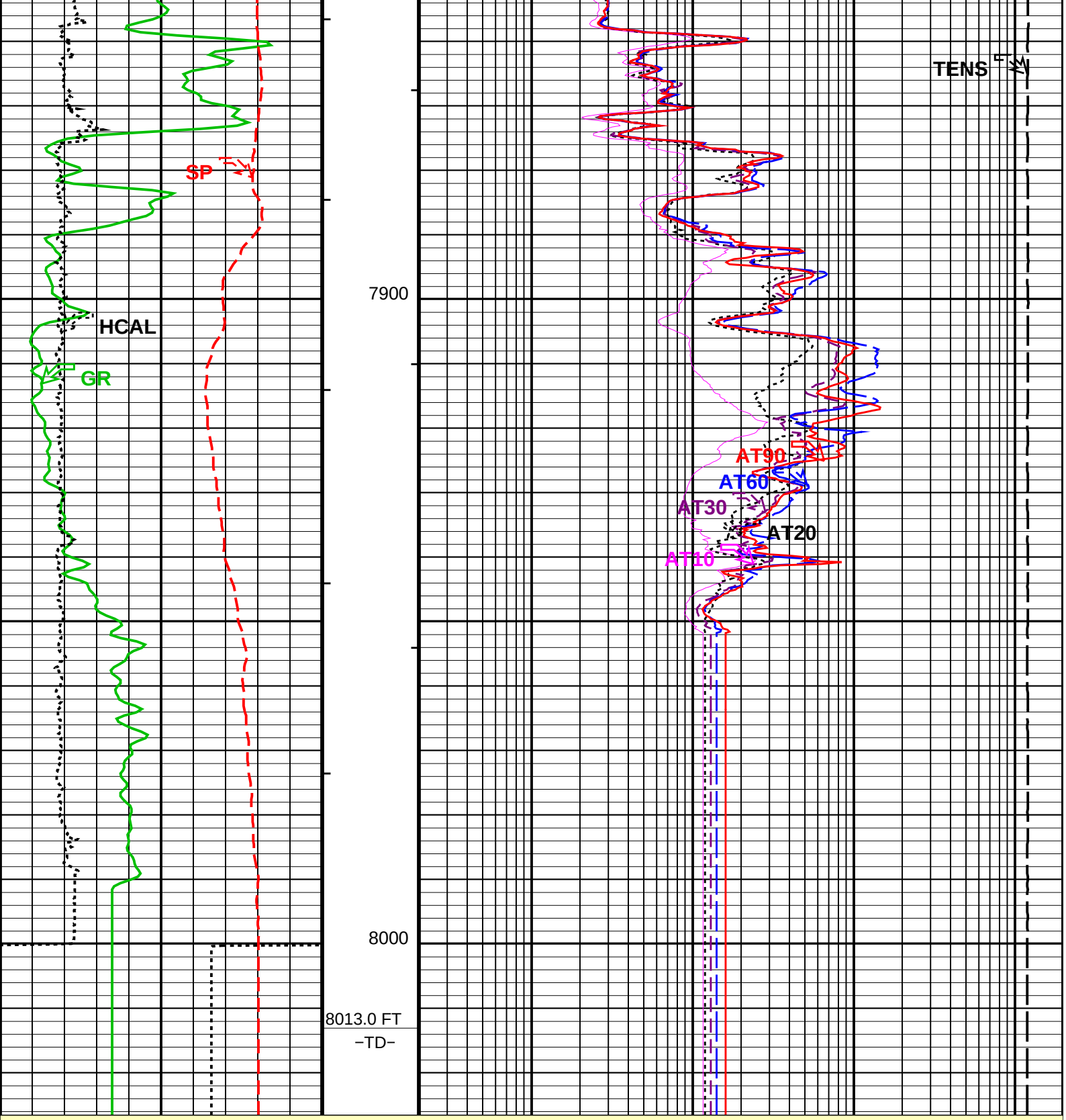

MAIN PASS: * PLATFORM EXPRESS − ARRAY INDUCTION *****

Gamma Ray Backup	AIT 10 Inch Investigation (AT10) 0.2 (OHMM) 2000
Gamma Ray (GR) 0 (GAPI) 200	AIT 20 Inch Investigation (AT20) 0.2 (OHMM) 2000
Caliper (HCAL) 6 (IN) 16	AIT 30 Inch Investigation (AT30) 0.2 (OHMM) 2000
SP (SP) −160 (MV) 40	AIT 60 Inch Investigation (AT60) 0.2 (OHMM) 2000
	AIT 90 Inch Investigation (AT90)

0.2	(OHMM)	2000

10000	Tension (TENS) (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	
	AIT−M: Array Induction Tool − M		
ABHM	Array Induction Borehole Correction Mode	2_ComputeStandoff	
ABHV	Array Induction Borehole Correction Code Version Number	900	
ABLM	Array Induction Basic Logs Mode	6_One_Two_and_Four	
ABLV	Array Induction Basic Logs Code Version Number	223	
ACDE	Array Induction Casing Detection Enable	Yes	
ACEN	Array Induction Tool Centering Flag (in Borehole)	Eccentered	
ACSED	Array Induction Casing Shoe Estimated Depth	−50000	FT
AETP	Array Induction Enable Sonde Error Temp&Pres Corr	Yes	
AFRSV	Array Induction Response Set Version for Four ft Resolution	41.70.24.20	
AIGS	Array Induction Select Akima Interpolation Gating	On	
AMRF	Array Induction Mud Resistivity Factor	1	
AORSV	Array Induction Response Set Version for One ft Resolution	41.70.24.20	
ARFV	Array Induction Radial Profiling Code Version Number	701	
ARPV	Array Induction Radial Parametrization Code Version Number	232	
ASTA	Array Induction Tool Standoff	0.25	IN
ATRSV	Array Induction Response Set Version for Two ft Resolution	41.70.24.20	
ATSE	Array Induction Temperature Selection(Sonde Error Correction)	Internal	
AULV	Array Induction User Level Control	Normal	
AZRSV	Array Induction Response Set Version for Z Resolution	00.10.25.00	
BHT	Bottom Hole Temperature (used in calculations)	217	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	AITM_RESIST	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
SHT	Surface Hole Temperature	68	DEGF
SPNV	SP Next Value	0	MV
	HILTB−FTB: High resolution Integrated Logging Tool−DTS		
BHT	Bottom Hole Temperature (used in calculations)	217	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	AITM_RESIST	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
SHT	Surface Hole Temperature	68	DEGF
	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)	217	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	AITM_RESIST	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
SHT	Surface Hole Temperature	68	DEGF
	PERT: Preliminary Evaluation − Real Time		
BHT	Bottom Hole Temperature (used in calculations)	217	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	AITM_RESIST	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
SHT	Surface Hole Temperature	68	DEGF
	System and Miscellaneous		
BS	Bit Size	7.875	IN

DFD	Drilling Fluid Density	8.40	LB/G
DO	Depth Offset for Playback	0.0	FT
FLEV	Fluid Level	−50000.00	FT
MST	Mud Sample Temperature	81.40	DEGF
PP	Playback Processing	NORMAL	
TD	Total Depth	8013	FT

Format: LOWER_GRES **Vertical Scale: 5" per 100'** **Graphics File Created: 16−Jan−2010 16:01**

OP System Version: 17C0−154

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

Input DLIS Files

DEFAULT	MERGE_AIT_027	FN:1	PRODUCER	16−Jan−2010 15:57	8026.5 FT	615.0 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_028PUP	FN:22	PRODUCER	16−Jan−2010 16:01

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REPEAT ANALYSIS

MAXIS Field Log

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: 13−Jan−2010 12:35 Before: 15−Jan−2010 16:47							
Thru Cal Magnitude − 0	0	0.6204	0.6205	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	0.6316	N/A	N/A	N/A	V
Thru Cal Magnitude − 3	0	0.7131	0.7129	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	1.416	N/A	N/A	N/A	V
Thru Cal Phase − 0	0	180.2	181.6	N/A	N/A	N/A	DEG
Thru Cal Phase − 1	0	179.1	180.6	N/A	N/A	N/A	DEG
Thru Cal Phase − 2	0	175.5	177.0	N/A	N/A	N/A	DEG
Thru Cal Phase − 3	0	174.8	176.3	N/A	N/A	N/A	DEG
Thru Cal Phase − 4	0	168.6	170.1	N/A	N/A	N/A	DEG
Thru Cal Phase − 5	0	166.9	168.4	N/A	N/A	N/A	DEG
Thru Cal Phase − 6	0	167.0	168.4	N/A	N/A	N/A	DEG
Thru Cal Phase − 7	0	166.2	167.6	N/A	N/A	N/A	DEG

Array Induction Tool − M Wellsite Calibration − Electronics Calibration Check − Auxiliary
Master: 13−Jan−2010 12:35 Before: 15−Jan−2010 16:47

Array Induction SPA Plus	991.0	992.7	992.7	N/A	N/A	N/A	MV
Array Induction SPA Zero	0	0.6657	0.6835	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	0.0006534	0.0006749	N/A	N/A	N/A	V

Array Induction Tool − M Wellsite Calibration − Test Loop Gain Correction
Master: 13−Jan−2010 12:35

Test Loop Gain Correctio − 0	0	1.034	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio − 1	0	1.022	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	0.9928	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio − 5	0	0.9883	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio − 6	0	0.9934	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio − 7	0	1.004	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio − 0	0	0.4776	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 1	0	0.7064	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 2	0	0.1915	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 3	0	0.1817	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 4	0	0.1287	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 5	0	−0.03256	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 6	0	0.3307	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio − 7	0	−0.2143	N/A	N/A	N/A	N/A	DEG

Array Induction Tool − M Wellsite Calibration − Sonde Error Correction
Master: 13−Jan−2010 12:35

R Sonde Error Correction − 0	0	−73.77	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 1	0	170.3	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 2	0	115.4	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 3	0	61.79	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 4	0	25.72	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 5	0	11.35	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 6	0	9.275	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 7	0	−1.480	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 0	0	−344.0	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 1	0	133.8	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 2	0	62.75	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 3	0	−33.85	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 4	0	22.34	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 5	0	−14.54	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 6	0	−4.481	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 7	0	−10.82	N/A	N/A	N/A	N/A	MM/M

Array Induction Tool − M Wellsite Calibration − Mud Gain Correction
Master: 13−Jan−2010 12:35

Coarse − Mag, Real, Imag − 0	0	0.8500	N/A	N/A	N/A	N/A	
Coarse − Mag, Real, Imag − 1	0	0.8500	N/A	N/A	N/A	N/A	
Coarse − Mag, Real, Imag − 2	0	0.8500	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 0	0	0.8500	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 1	0	0.8500	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 2	0	0.8500	N/A	N/A	N/A	N/A	

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Stab Measurement Summary
Before: 15−Jan−2010 17:02

BS Window Ratio	0.7094	N/A	0.7116	N/A	N/A	N/A	
BS Window Sum	8629	N/A	8598	N/A	N/A	N/A	CPS
SS Window Ratio	0.4898	N/A	0.4908	N/A	N/A	N/A	
SS Window Sum	9755	N/A	9725	N/A	N/A	N/A	CPS
LS Window Ratio	0.2973	N/A	0.2892	N/A	N/A	N/A	
LS Window Sum	1027	N/A	1009	N/A	N/A	N/A	CPS

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Photo−multiplier High Voltages Calibrations
Before: 15−Jan−2010 17:02

BS PM High Voltage (Command)	1499	N/A	1492	N/A	N/A	N/A	V
SS PM High Voltage (Command)	1689	N/A	1690	N/A	N/A	N/A	V
LS PM High Voltage (Command)	1479	N/A	1478	N/A	N/A	N/A	V

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Crystal Quality Resolutions Calibration
Before: 15−Jan−2010 17:02

BS Crystal Resolution	10.47	N/A	10.54	N/A	N/A	N/A	%
SS Crystal Resolution	9.822	N/A	9.881	N/A	N/A	N/A	%
LS Crystal Resolution	10.15	N/A	10.16	N/A	N/A	N/A	%

High resolution Integrated Logging Tool−DTS Wellsite Calibration − MCFL Calibration
Before: 15−Jan−2010 16:48

Raw B0 Resistivity	3875	N/A	3853	N/A	N/A	N/A	OHMM
Raw B1 Resistivity	3830	N/A	3797	N/A	N/A	N/A	OHMM
Raw B2 Resistivity	3830	N/A	3800	N/A	N/A	N/A	OHMM

High resolution Integrated Logging Tool−DTS Wellsite Calibration − HILT Caliper Calibration
Before: 15−Jan−2010 16:48

HILT Caliper Zero Measurement	8.000	N/A	8.543	N/A	N/A	N/A	IN
HILT Caliper Plus Measurement	12.00	N/A	12.64	N/A	N/A	N/A	IN

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Detector Calibration
Before: 15−Jan−2010 16:47

Gamma Ray Background	30.00	N/A	85.52	N/A	N/A	N/A	GAPI
Gamma Ray (Jig − Bkg)	179.7	N/A	179.7	N/A	N/A	16.33	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: 10−Jan−2010 18:05 Before: 15−Jan−2010 16:48

CNTC Background	26.74	26.74	26.89	N/A	N/A	4.011	CPS
CFTC Background	26.83	26.83	28.58	N/A	N/A	4.025	CPS

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Ratio Measurement
Master: 10−Jan−2010 18:05

Thermal Near Corr. (Tank)	5800	5204	N/A	N/A	N/A	N/A	CPS
Thermal Far Corr. (Tank)	2400	2196	N/A	N/A	N/A	N/A	CPS
CNTC/CFTC (Tank)	2.159	2.370	N/A	N/A	N/A	N/A	

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Accelerometer Calibration
Before: 16−Jan−2010 13:23

Z−Axis Acceleration	32.19	N/A	32.08	N/A	N/A	N/A	F/S2

High resolution Integrated Logging Tool−DTS Master Calibration − Inversion results
Master: 20−Dec−2009 17:11

Rho Aluminum	2.596	2.600	−−	−−	−−	−−	G/C3
Rho Magnesium	1.686	1.689	−−	−−	−−	−−	G/C3
Pe Aluminum	2.570	2.536	−−	−−	−−	−−	
Pe Magnesium	2.650	2.630	−−	−−	−−	−−	

High resolution Integrated Logging Tool−DTS Master Calibration − Deviation Summary
Master: 20−Dec−2009 17:11

BS Average Deviation	0	0.3690	−−	−−	−−	−−	%
BS Max Deviation	0	0.6436	−−	−−	−−	−−	%
SS Average Deviation	0	0.3737	−−	−−	−−	−−	%
SS Max Deviation	0	1.617	−−	−−	−−	−−	%
LS Average Deviation	0	0.5129	−−	−−	−−	−−	%
LS Max Deviation	0	1.805	−−	−−	−−	−−	%

The GLS−VJ source activity is acceptable.

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

NCT−B Water Temperature	57.6	DEGF.
Thermal Housing Size	3.362	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	0.6204		0.6100	180.2		197.0
	Before	0.6205			181.6		
1	Master	1.271		1.270	179.1		196.0
	Before	1.271			180.6		
2	Master	0.6318		0.6200	175.5		192.0
	Before	0.6316			177.0		

3	Master	0.7131	0.7000	174.8	191.0
	Before	0.7129		176.3	
4	Master	1.334	1.340	168.6	185.0
	Before	1.334		170.1	
5	Master	1.953	1.960	166.9	182.0
	Before	1.953		168.4	
6	Master	1.949	1.960	167.0	181.0
	Before	1.949		168.4	
7	Master	1.419	1.410	166.2	175.0
	Before	1.416		167.6	
		60.00 % (Minimum) (Nominal) 140.0 % (Maximum)		Nom −60.00 (Minimum) (Nominal) Nom + 60.00 (Maximum)	

Master: 13−Jan−2010 12:35 Before: 15−Jan−2010 16:47

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		0.6657
Before		0.6835

−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		0.0006534
Before		0.0006749

−0.05000 (Minimum) 0 (Nominal) 0.05000 (Maximum)

Master: 13−Jan−2010 12:35 Before: 15−Jan−2010 16:47

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	1.034	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)	0.4776	−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
1	1.022	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)	0.7064	−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
2	1.015	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)	0.1915	−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
3	1.011	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)	0.1817	−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
4	0.9928	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)	0.1287	−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
5	0.9883	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)	−0.03256	−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
6	0.9934	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)	0.3307	−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
7	1.004	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)	−0.2143	−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)

Master: 13−Jan−2010 12:35

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	−73.77	−231.0 (Minimum)	−56.00 (Nominal)	119.0 (Maximum)	−344.0	−2250 (Minimum)	0 (Nominal)	2250 (Maximum)
1	170.3	114.0 (Minimum)	159.0 (Nominal)	204.0 (Maximum)	133.8	−625.0 (Minimum)	0 (Nominal)	625.0 (Maximum)
2	115.4	66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)	62.75	−350.0 (Minimum)	0 (Nominal)	350.0 (Maximum)
3	61.79	39.00 (Minimum)	64.00 (Nominal)	89.30 (Maximum)	−33.85	−250.0 (Minimum)	0 (Nominal)	250.0 (Maximum)
4	25.72	15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)	22.34	−63.00 (Minimum)	0 (Nominal)	63.00 (Maximum)
5	11.35	4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)	−14.54	−50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)
6	9.275	5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)	−4.481	−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)
7	−1.480	−5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)	−10.82	−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	0.8500	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	0.8500	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
1	0.8500	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	0.8500	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
2	0.8500	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	0.8500	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)

Master: 13−Jan−2010 12:35

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	0.6204				0.6100	180.2				197.0
1	Master	1.271				1.270	179.1				196.0
2	Master	0.6318				0.6200	175.5				192.0
3	Master	0.7131				0.7000	174.8				191.0
4	Master	1.334				1.340	168.6				185.0
5	Master	1.953				1.960	166.9				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)	

Master: 13−Jan−2010 12:35

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				0.6657
	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	0.0006534		
0.8710 (Minimum)	0.9170 (Nominal)	0.9630 (Maximum)		−0.05000 (Minimum)	0 (Nominal)	0.05000 (Maximum)	

Master: 13−Jan−2010 12:35

Array Induction Tool − M Master Calibration

Test Loop Gain Correction

Idx	Value	Test Loop Gain Correction Magnitude V			Value	Test Loop Gain Correction Phase DEG		
0	1.034				0.4776			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
1	1.022				0.7064			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
2	1.015				0.1915			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
3	1.011				0.1817			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
4	0.9928				0.1287			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
5	0.9883				−0.03256			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
6	0.9934				0.3307			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
7	1.004				−0.2143			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)

Master: 13−Jan−2010 12:35

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	−73.77				−344.0			
		−231.0 (Minimum)	−56.00 (Nominal)	119.0 (Maximum)		−2250 (Minimum)	0 (Nominal)	2250 (Maximum)
1	170.3				133.8			
		114.0 (Minimum)	159.0 (Nominal)	204.0 (Maximum)		−625.0 (Minimum)	0 (Nominal)	625.0 (Maximum)
2	115.4				62.75			
		66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)		−350.0 (Minimum)	0 (Nominal)	350.0 (Maximum)
3	61.79				−33.85			
		39.00 (Minimum)	64.00 (Nominal)	89.30 (Maximum)		−250.0 (Minimum)	0 (Nominal)	250.0 (Maximum)
4	25.72				22.34			
		15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)		−63.00 (Minimum)	0 (Nominal)	63.00 (Maximum)
5	11.35				−14.54			
		4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)		−50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)
6	9.275				−4.481			
		5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)		−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)
7	−1.480				−10.82			
		−5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)		−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		

Tax	Value	Source − Mag, Real, Imag	Value	Pile − Mag, Real, Imag
0	0.8500		0.8500	
	0.8000 (Minimum) 1.000 (Nominal) 1.200 (Maximum)		0.8000 (Minimum) 1.000 (Nominal) 1.200 (Maximum)	
1	0.8500		0.8500	
	0.8000 (Minimum) 1.000 (Nominal) 1.200 (Maximum)		0.8000 (Minimum) 1.000 (Nominal) 1.200 (Maximum)	
2	0.8500		0.8500	
	0.8000 (Minimum) 1.000 (Nominal) 1.200 (Maximum)		0.8000 (Minimum) 1.000 (Nominal) 1.200 (Maximum)	

Master: 13−Jan−2010 12:35

High resolution Integrated Logging Tool−DTS / Equipment Identification

Primary Equipment:		
HILT high−Resolution Mechanical Sonde	HRMS − B	
HILT Rxo Gamma−ray Device	HRGD − B	
HILT Micro Cylindrically Focused Log Dev	MCFL −	
GR Logging Source	GLS − VJ	5416
HILT High Res. Control Cartridge	HRCC − B	
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		0.7116	Before		0.4908	Before		0.2892
	0.6740 (Minimum) 0.7094 (Nominal) 0.7449 (Maximum)			0.4653 (Minimum) 0.4898 (Nominal) 0.5143 (Maximum)			0.2825 (Minimum) 0.2973 (Nominal) 0.3122 (Maximum)	
Phase	BS Window Sum CPS	Value	Phase	SS Window Sum CPS	Value	Phase	LS Window Sum CPS	Value
Before		8598	Before		9725	Before		1009
	8197 (Minimum) 8629 (Nominal) 9060 (Maximum)			9268 (Minimum) 9755 (Nominal) 10240 (Maximum)			976.1 (Minimum) 1027 (Nominal) 1079 (Maximum)	

Before: 15−Jan−2010 17:02

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		1492	Before		1690	Before		1478
	1399 (Minimum) 1499 (Nominal) 1599 (Maximum)			1589 (Minimum) 1689 (Nominal) 1789 (Maximum)			1379 (Minimum) 1479 (Nominal) 1579 (Maximum)	

Before: 15−Jan−2010 17:02

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		10.54	Before		9.881	Before		10.16
	9.466 (Minimum) 10.47 (Nominal) 11.47 (Maximum)			8.822 (Minimum) 9.822 (Nominal) 10.82 (Maximum)			9.153 (Minimum) 10.15 (Nominal) 11.15 (Maximum)	

Before: 15−Jan−2010 17:02

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		3853	Before		3797	Before		3800
	3565 (Minimum) 3875 (Nominal) 4185 (Maximum)			3524 (Minimum) 3830 (Nominal) 4136 (Maximum)			3524 (Minimum) 3830 (Nominal) 4136 (Maximum)	

Before: 15−Jan−2010 16:48

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		8.543	Before		12.64
	6.000 (Minimum) / 8.000 (Nominal) / 10.00 (Maximum)			9.000 (Minimum) / 12.00 (Nominal) / 15.00 (Maximum)	

Before: 15−Jan−2010 16:48

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		85.52	Before		179.7	Before		165.0
	0 (Minimum) / 30.00 (Nominal) / 120.0 (Maximum)			163.3 (Minimum) / 179.7 (Nominal) / 196.0 (Maximum)			150.0 (Minimum) / 165.0 (Nominal) / 180.0 (Maximum)	

Before: 15−Jan−2010 16:47

High resolution Integrated Logging Tool−DTS Wellsite Calibration

Zero Measurement

Phase	CNTC Background CPS	Value	Phase	CFTC Background CPS	Value
Master		26.74	Master		26.83
Before		26.89	Before		28.58
	5.000 (Minimum) / 26.74 (Nominal) / 40.00 (Maximum)			5.000 (Minimum) / 26.83 (Nominal) / 40.00 (Maximum)	

Master: 10−Jan−2010 18:05 Before: 15−Jan−2010 16:48

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		5204	Master		2196	Master		2.370
	4700 (Minimum) / 5800 (Nominal) / 6900 (Maximum)			1900 (Minimum) / 2400 (Nominal) / 2900 (Maximum)			2.120 (Minimum) / 2.159 (Nominal) / 2.540 (Maximum)	

Master: 10−Jan−2010 18:05

High resolution Integrated Logging Tool−DTS

Wellsite Calibration

Accelerometer Calibration

Phase	Z−Axis Acceleration F/S2	Value
Before		32.08
	31.53 (Minimum) / 32.19 (Nominal) / 32.84 (Maximum)	

Before: 16−Jan−2010 13:23

High resolution Integrated Logging Tool−DTS Master Calibration

Inversion results

Phase	Rho Aluminum G/C3	Value	Phase	Rho Magnesium G/C3	Value
Master		2.600	Master		1.689
	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		2.536	Master		2.630
	2.470 (Minimum) / 2.570 (Nominal) / 2.670 (Maximum)			2.550 (Minimum) / 2.650 (Nominal) / 2.750 (Maximum)	

Master: 20−Dec−2009 17:11

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		0.3690	Master		0.3737	Master		0.5129
	−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		0.6436	Master		1.617	Master		1.805
	−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: 20−Dec−2009 17:11

High resolution Integrated Logging Tool−DTS Master Calibration

Zero Measurement

Phase	CNTC Background CPS	Value	Phase	CFTC Background CPS	Value
Master		26.74	Master		26.83
5.000 (Minimum)	26.74 (Nominal)	40.00 (Maximum)	5.000 (Minimum)	26.83 (Nominal)	40.00 (Maximum)

Master: 10−Jan−2010 18:05

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		5204	Master		2196	Master		2.370
4700 (Minimum)	5800 (Nominal)	6900 (Maximum)	1900 (Minimum)	2400 (Nominal)	2900 (Maximum)	2.120 (Minimum)	2.159 (Nominal)	2.540 (Maximum)

Master: 10−Jan−2010 18:05

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: **P Ville Federal 5−7**
Field: **Wattenberg**
County: **Weld**
State: **Colorado**

Platform Express
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