MUD

County: Weld

Schlumberger

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

Well: **Bella 19−8**

Field: **Wattenberg**

County: **Weld** State: **Colorado**

Platform Express
Compensated Neutron
Litho Density

Field: Wattenberg
Location: Sec. 8, T3N, R66W
Well: Bella 19−8
Company: Kerr−McGee Oil and Gas Onshor

LOCATION

Sec. 8, T3N, R66W
Surf: 1719' FSL X 1703' FWL NESW
BHL: 1256' FSL X 1430' FWL SESW (est.)

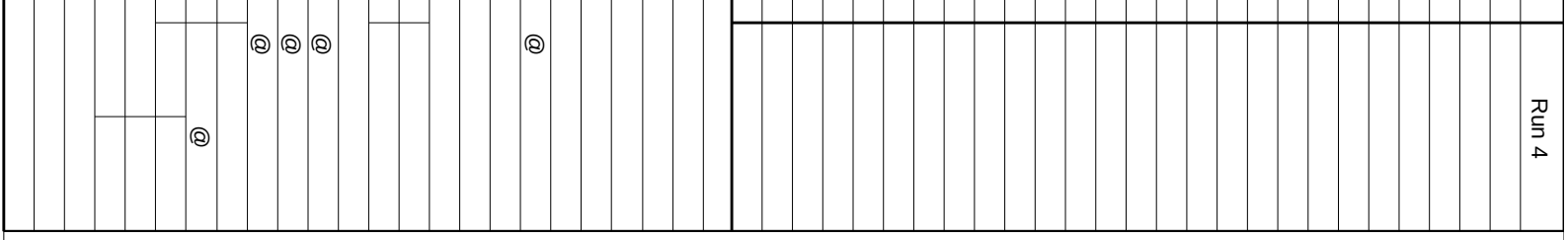
Elev.: K.B. 4877.00 ft
G.L. 4862.00 ft
D.F. 4876.00 ft

Permanent Datum: Ground Level — Elev.: 4862.00 ft
Log Measured From: Kelly Bushing — 15.00 ft above Perm. Datum
Drilling Measured From: Kelly Bushing

API Serial No.	Section	Township	Range
05−123−30696−0000	8	3N	66W

	Run 1	Run 2	Run 3
Logging Date	17−Feb−2010		
Run Number	1		
Depth Driller	8035 ft		
Schlumberger Depth	8027 ft		
Bottom Log Interval	8019 ft		
Top Log Interval	595 ft		
Casing Driller Size @ Depth	8.625 in @ 609 ft	@	
Casing Schlumberger	595 ft		
Bit Size	7.875 in		
Type Fluid In Hole	Water Based Mud		
MUD Density / Viscosity	8.4 lbm/gal / 26 s		
MUD Fluid Loss / PH	/		
MUD Source Of Sample	Mud Pit		
RM @ Measured Temperature	5.850 ohm.m @ 65 degF	@	
RMF @ Measured Temperature	4.387 ohm.m @ 65 degF	@	
RMC @ Measured Temperature	8.775 ohm.m @ 65 degF	@	
Source RMF / RMC	Calculated / Calculated	/	
RM @ MRT / RMF @ MRT	1.814 @ 225 / 1.361 @ 225	@ / @	@ / @
Maximum Recorded Temperatures	225 degF		
Circulation Stopped / Time	17−Feb−2010 / 2:00		
Logger On Bottom / Time	17−Feb−2010 / 8:15		
Unit Number / Location	3021 / Ft. Morgan, CO	/	
Recorded By	Tim Hoffman		
Witnessed By	Greg Hovivian and Tekabe Gedamu		

	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: 17−FEB−2010 8:19:35

Depth System Equipment

Depth Measuring Device		Tension Device		Logging Cable	
Type:	IDW−B	Type:	CMTD−B/A	Type:	7−39P LXS
Serial Number:		Serial Number:		Serial Number:	
Calibration Date:		Calibration Date:		Length:	13115 FT
Calibrator Serial Number:		Calibrator Serial Number:			
Calibration Cable Type:	7−46P	Number of Calibration Points:	0	Conveyance Method:	Wireline
Wheel Correction 1:				Rig Type:	LAND
Wheel Correction 2:					

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:	3.50 FT
Tool Zero Check At Surface:	

Depth Control Remarks

1.
2.
3.
4.
5.
6.

OTHER SERVICES1	OTHER SERVICES2
OS1: None	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
This is the first run in hole.	
Toolstring run as per tool sketch.	
Toolstring run without bowspring or standoffs as per client request on deviated wells.	
Matrix changes are as noted on the porosity print.	

Rig: Xtreme 12

Crew: Mark Hoffman and Shane Walker

RUN 1		RUN 2	
SERVICE ORDER #:	BBE4−00016	SERVICE ORDER #:	
PROGRAM VERSION:	17C0−154	PROGRAM VERSION:	
FLUID LEVEL:	10 ft	FLUID LEVEL:	

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1

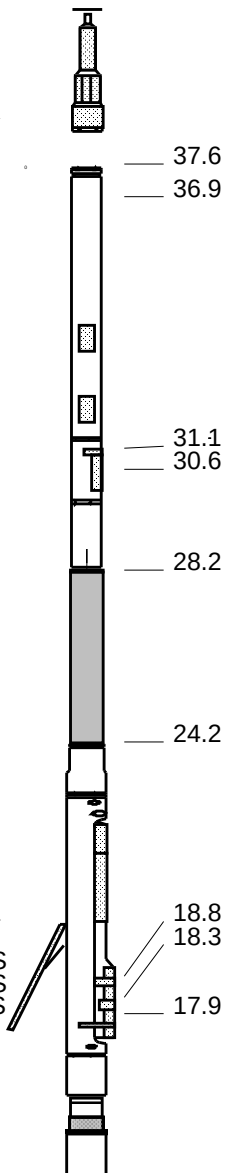
SURFACE EQUIPMENT

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

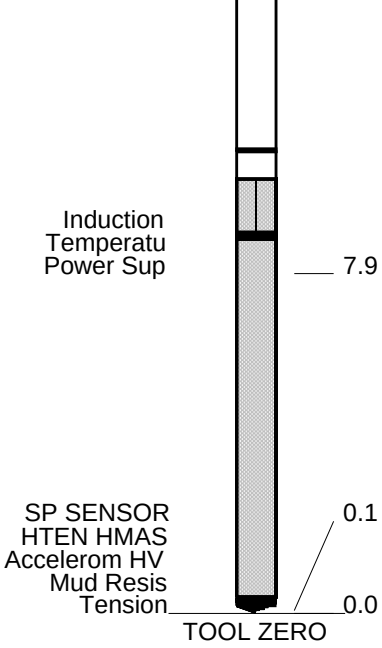
DOWNHOLE EQUIPMENT

LEH−QT 40.6
LEH−QT

HILTB−CTS 37.6
HGNSC−B 940
HMCA
TCC−B
HGNH
NLS−KL
NSR−F 5168
HACCZ 419
HCNT
HGR
HRCC−B
HRMS−B
HRGD−B 898
GLS−VJ 5363
MCFL Device
HILT Nucl. LS 42767
HILT Nucl. SS 42767
HILT Nucl. BS 42767
AIT−H
AHIS−BA 397
AHRM−A
NPV−N

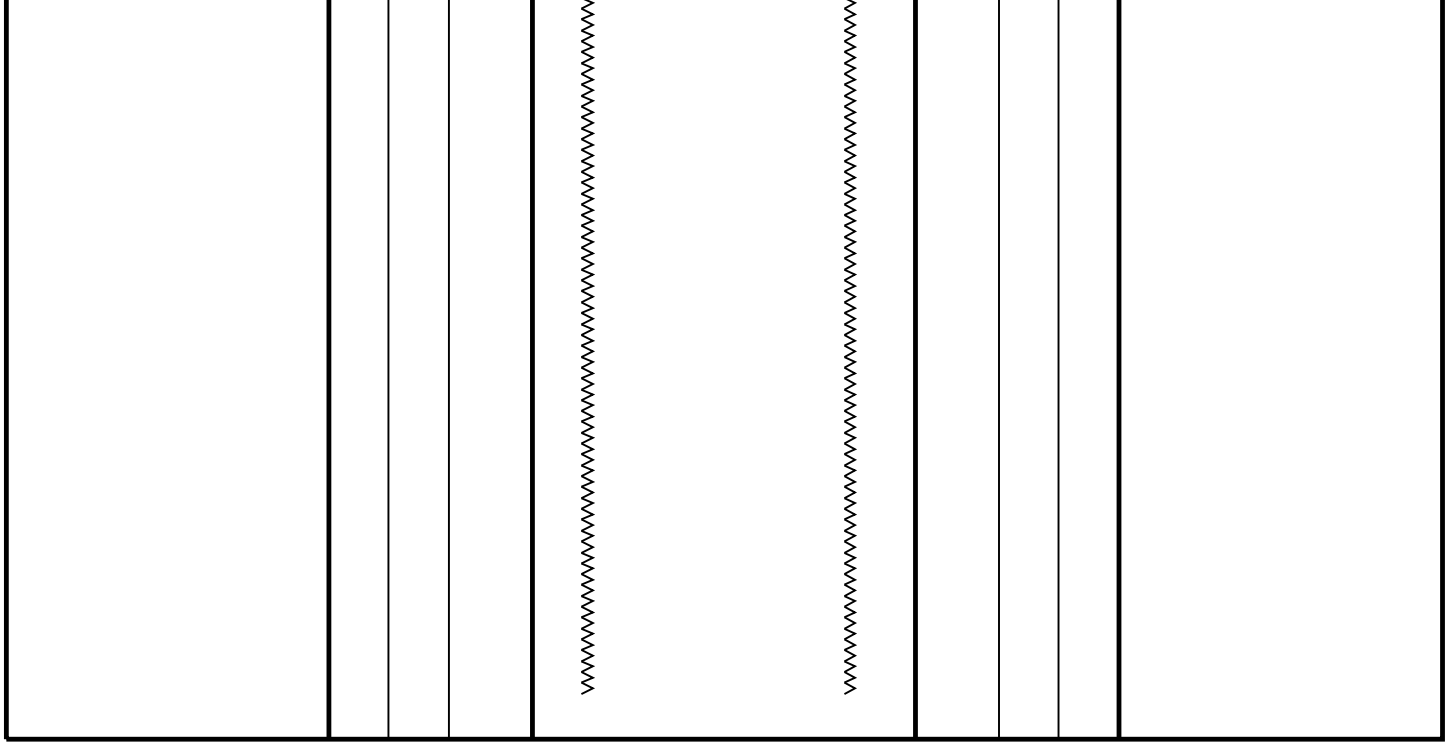


RUN 2



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
					609.0	8.625		Casing Shoe
					609.0	7.875		Borehole Segment



All depths are driller’s depths

Schlumberger

UPPER POROSITY LOG 5" = 100’

MAXIS Field Log

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_006LUP	FN:5	PRODUCER	17−Feb−2010 08:13	8040.0 FT	0.0 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 417.84 ft3

Cement Volume = 284.82 ft3 (assuming 4.50 in casing O.D.)

Computed from 4999.5 ft to 3795.5 ft

OP System Version: 17C0−154

HILTC	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

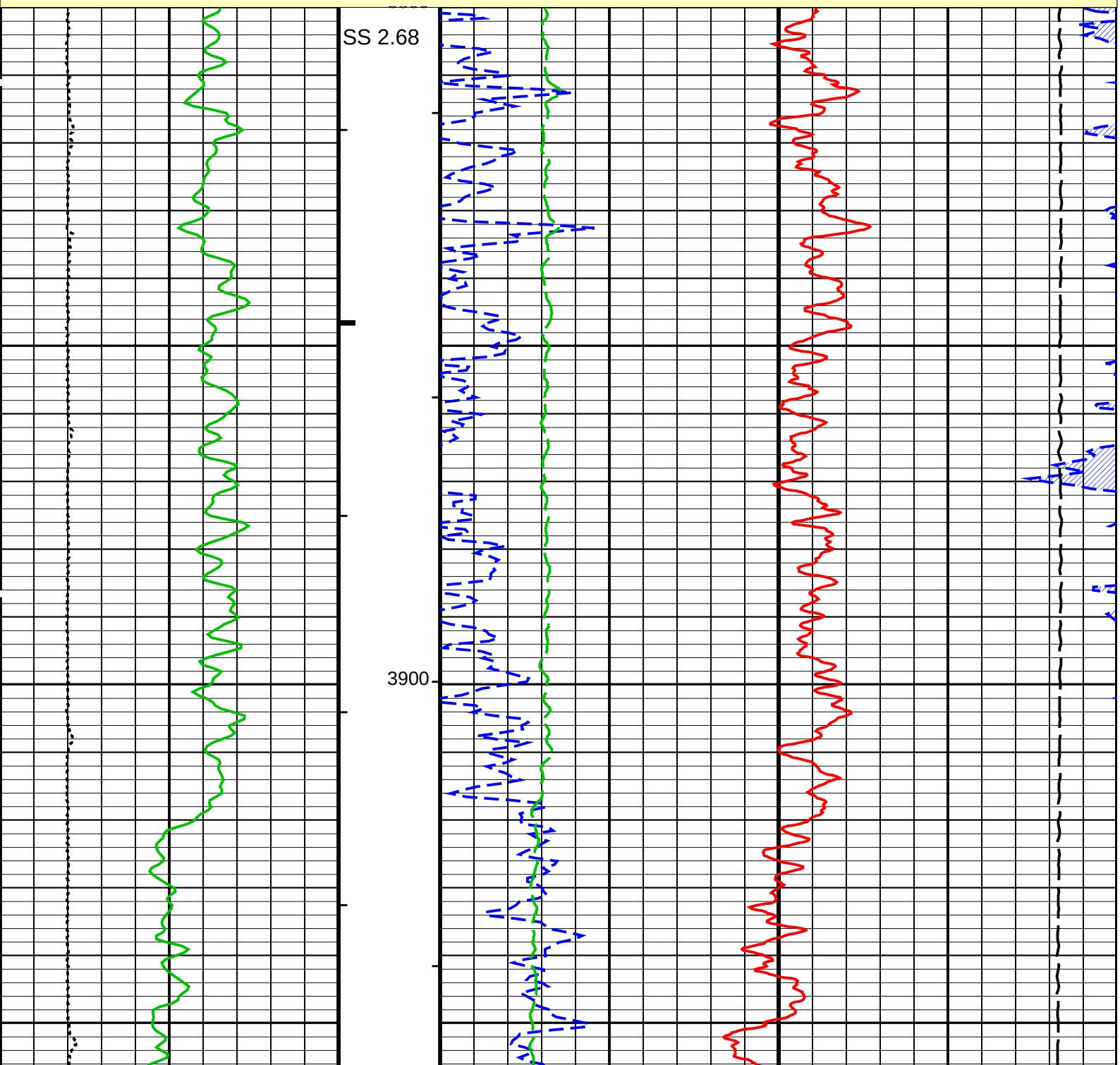
Time Mark Every 60 S

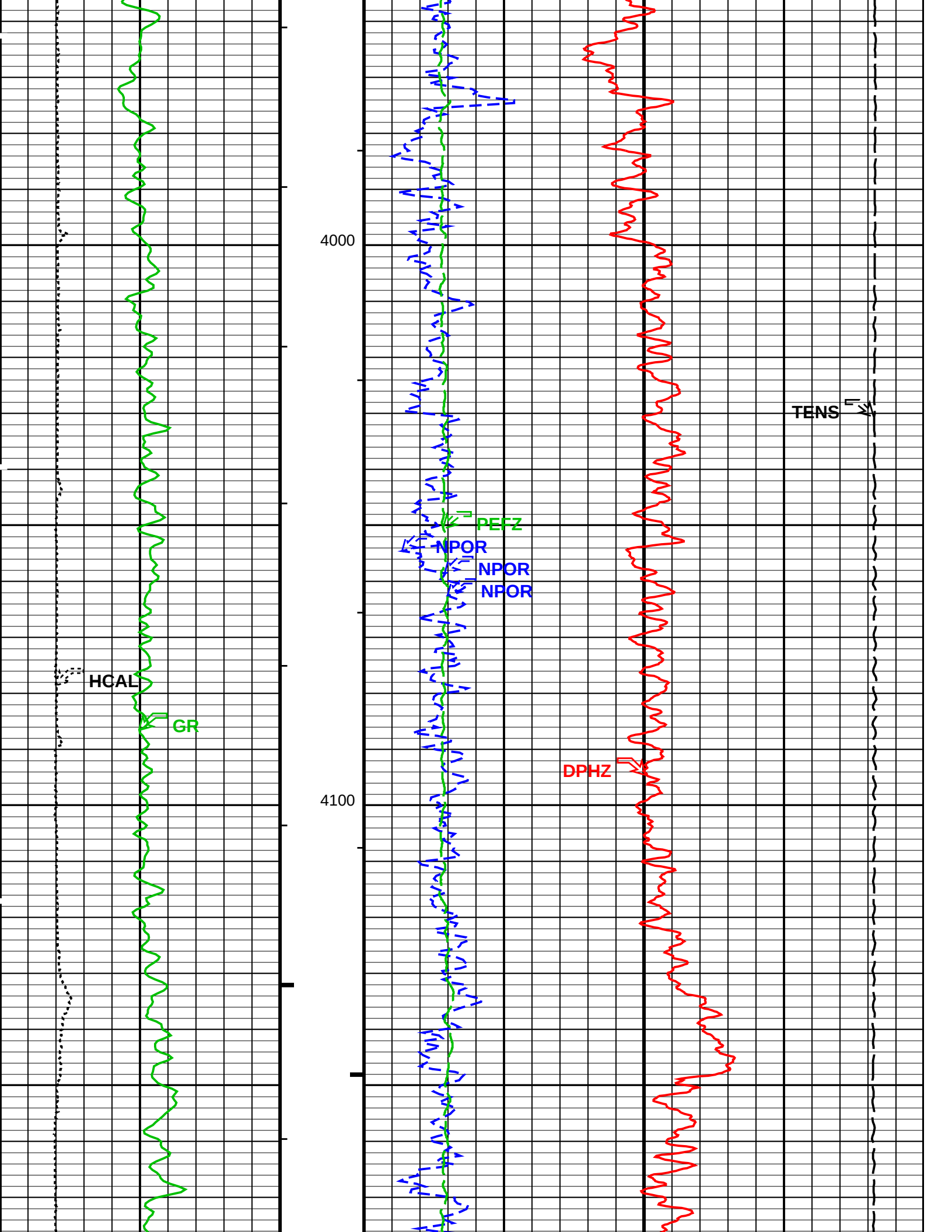
NPOR Backup

Gas Effect

Caliper (HCAL)	Stuck Stretch (STIT)	Std. Res. Formation Pe (PEFZ)	Tension (TENS)
6 (IN) 16	0 (F) 50	0 (---- 10	10000 (LBF) 0
Gamma Ray (GR)	Tool/Tot. Drag	Alpha Processed Neutron Porosity (NPOR)	
0 (GAPI) 200		0.3 (V/V) -0.1	
Gamma Ray Backup	Cable Drag	Std. Res. Density Porosity (DPHZ)	
		0.3 (V/V) -0.1	

MAIN PASS: *** PLATFORM EXPRESS - NUCLEAR POROSITY ***

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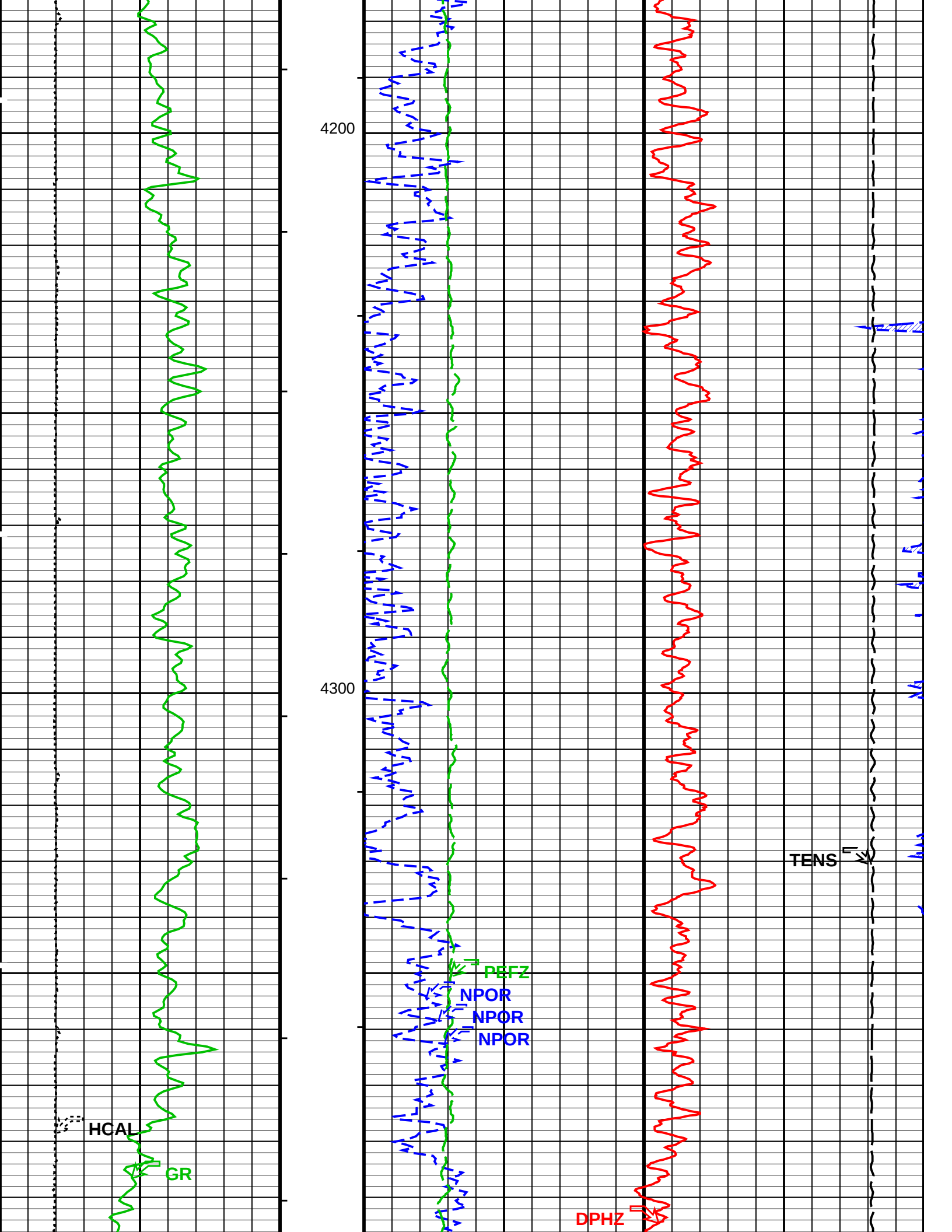
HCAL
GR
PEFZ
NPOR
NPOR
NPOR
DPHZ
TENS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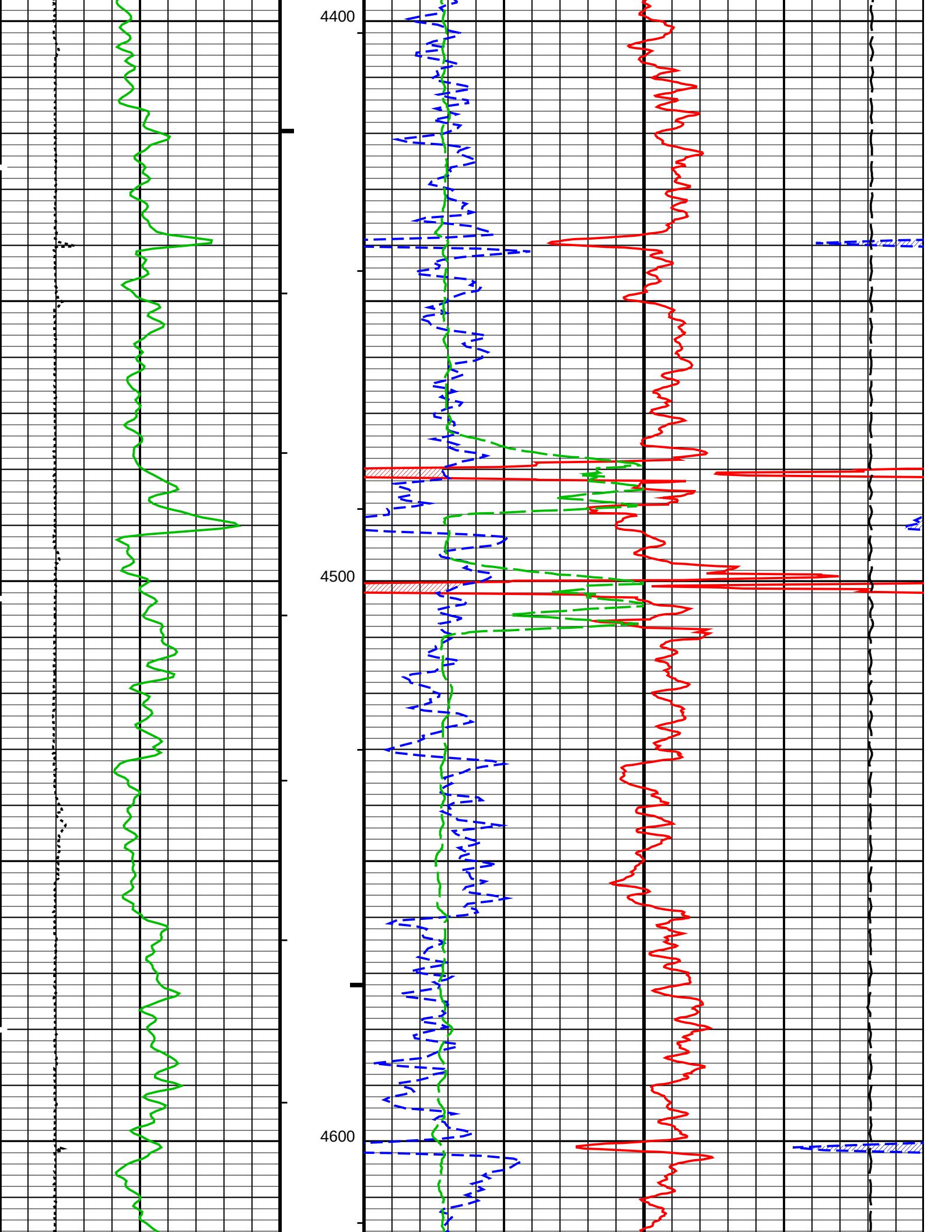
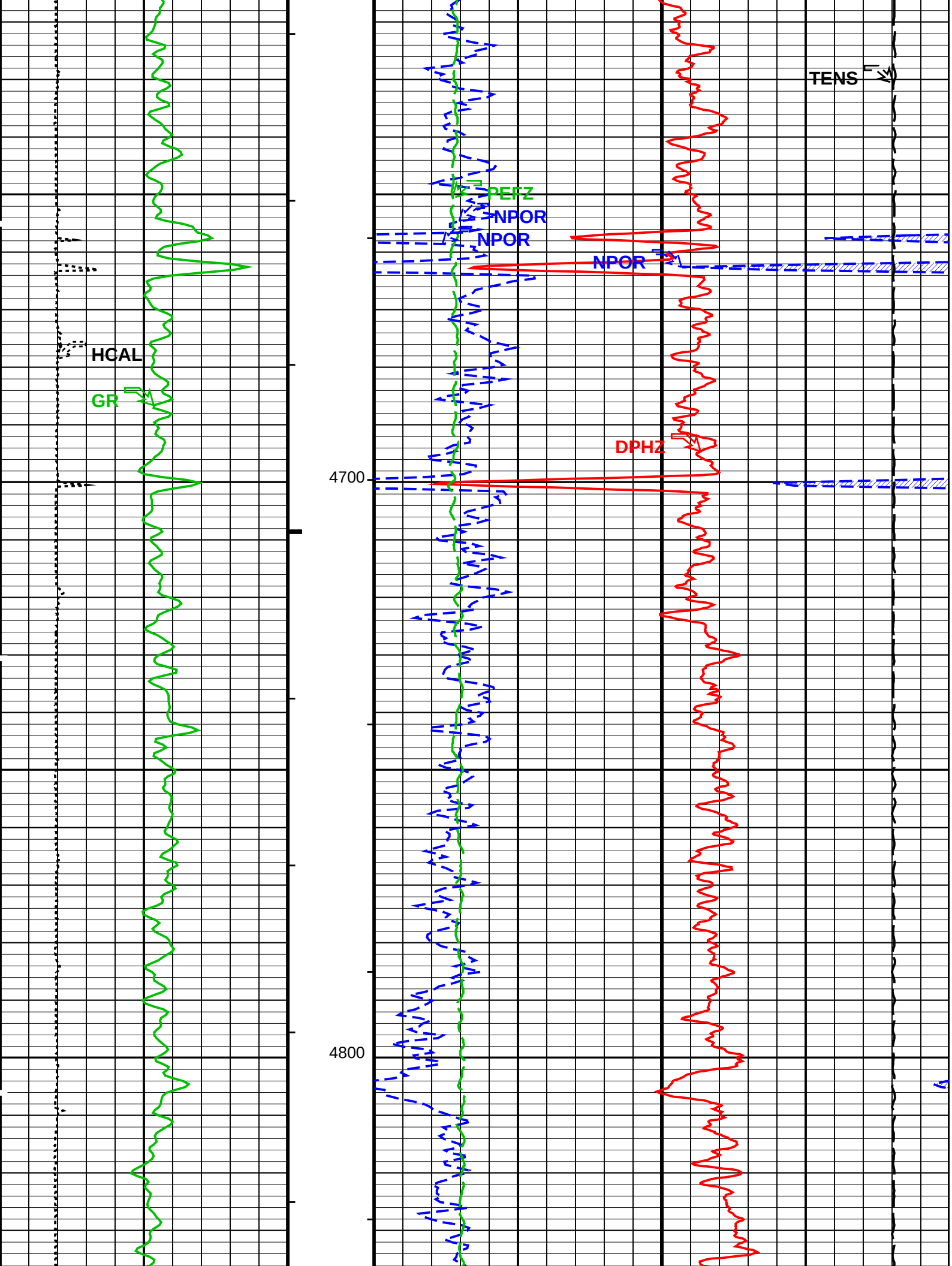
PEFZ
NPOR
NPOR
NPOR
TENS
DPHZ


4400
4500
4600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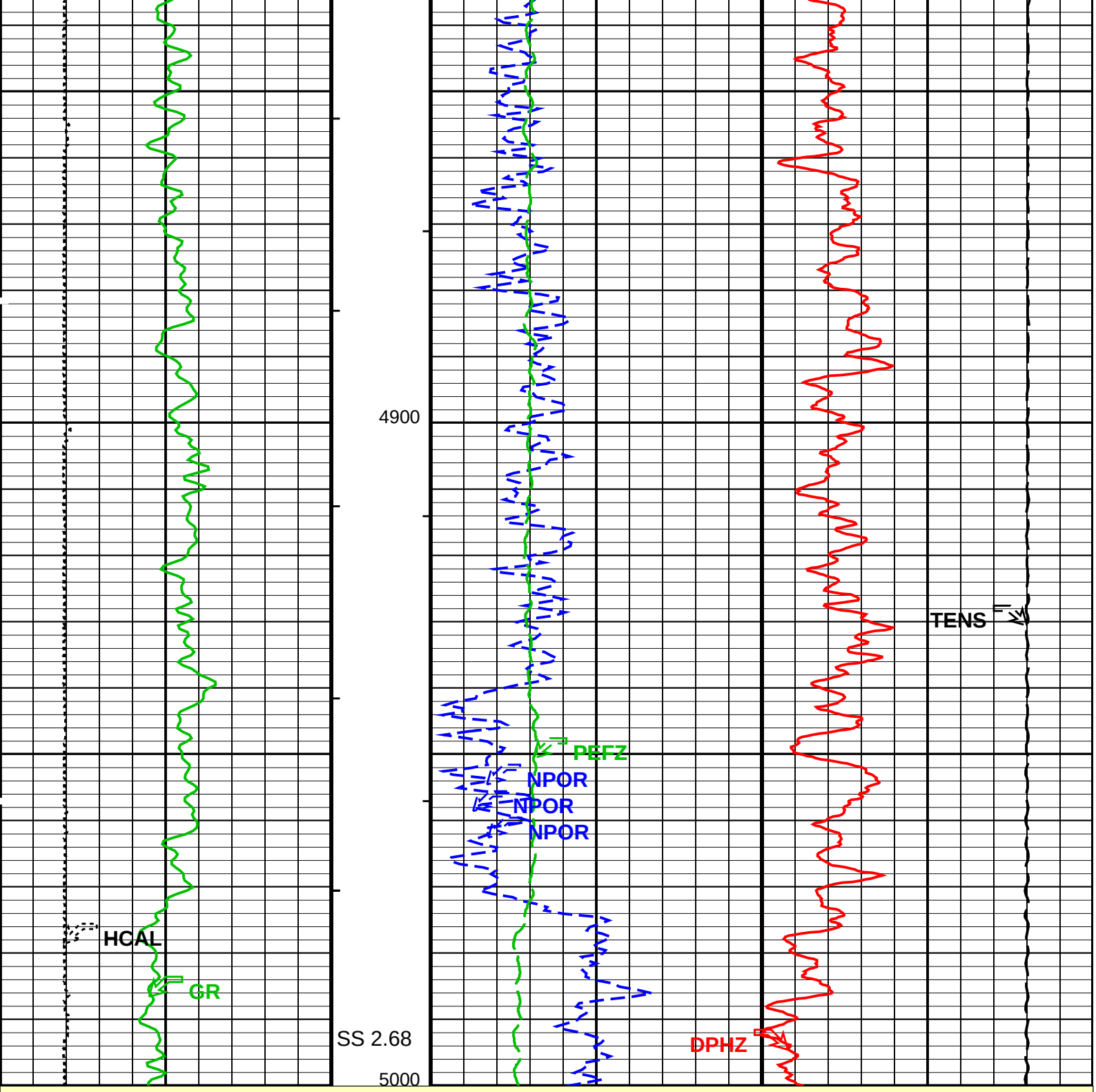
PEFZ
NPOR
NPOR
NPOR
HCAL
GR
DPHZ
4700
4800



MAIN PASS: *** PLATFORM EXPRESS − NUCLEAR POROSITY ***

Gamma Ray Backup	Cable Drag	Std. Res. Density Porosity (DPHZ) 0.3 (V/V) −0.1
Gamma Ray (GR) 0 (GAPI) 200	Tool/Tot. Drag	Alpha Processed Neutron Porosity (NPOR) 0.3 (V/V) −0.1
Caliper (HCAL) 6 (IN) 16	Stuck Stretch (STIT) 0 (F) 50	Std. Res. Formation Pe (PEFZ) 0 (−−−− 10
		Tension (TENS) 10000 (LBF) 0
		Gas Effect
		NPOR Backup

PIP SUMMARY

Integrated Hole Volume Minor Pip Every 10 F3
Integrated Hole Volume Major Pip Every 100 F3
Integrated Cement Volume Minor Pip Every 10 F3
Integrated Cement Volume Major Pip Every 100 F3
Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
	HILTB−CTS: High resolution Integrated Logging Tool−CTS		
BHFL	Borehole Fluid Type	WATER	
BHFL_TLD	HILT Nuclear Mud Base	WATER	
BHS	Borehole Status	OPEN	
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
DHC	Density Hole Correction	BS	
FD	Fluid Density	1.000	g/cm3
FSCO	Formation Salinity Correction Option	NO	
GCLF	Germany Coal−like Formation Option	NO	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix for Neutron Porosity Corrections	SAND	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2.680	g/cm3
MWCO	Mud Weight Correction Option	NO	
NAAC	HRDD APS Activation Correction	OFF	
NMT	HILT Nuclear Mud Type	NOBARITE	
NPRM	HRDD Processing Mode	STDRES	
NSAR	HRDD Depth Sampling Rate	1.000	in
PTCO	Pressure/Temperature Correction Option	NO	
SDAT	Standoff Data Source	SOCN	
SHT	Surface Hole Temperature	68.000	degF
SOCN	Standoff Distance	0.125	in
SOCO	Standoff Correction Option	YES	
	HOLEV: Integrated Hole/Cement Volume		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
MATR	Rock Matrix for Neutron Porosity Corrections	SAND	
SHT	Surface Hole Temperature	68.000	degF
	PERT: Preliminary Evaluation − Real Time		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
MATR	Rock Matrix for Neutron Porosity Corrections	SAND	
SHT	Surface Hole Temperature	68.000	degF
	STI: Stuck Tool Indicator		
STKT	STI Stuck Threshold	2.500	ft
TDD	Total Depth − Driller	8035.0	ft
TDL	Total Depth − Logger	8027.0	ft
	System and Miscellaneous		
BS	Bit Size	7.875	in
BSAL	Borehole Salinity		
CSIZ	Current Casing Size	8.625	in
CWEI	Casing Weight	24.000	lbm/ft
DFD	Drilling Fluid Density	8.400	lbm/gal
FSAL	Formation Salinity		
MST	Mud Sample Temperature	65.100	degF
RMFS	Resistivity of Mud Filtrate Sample	4.387	ohm.m

Format: UPPER_PORO Vertical Scale: 5" per 100' Graphics File Created: 17−Feb−2010 09:02

OP System Version: 17C0−154

HILTC 17C0−154

Input DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_006LUP FN:5 PRODUCER 17−Feb−2010 08:13 8040.0 FT 0.0 FT

Schlumberger

MAIN POROSITY LOG 5" = 100’

MAXIS Field Log

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_006LUP	FN:5	PRODUCER	17−Feb−2010 08:13

OP System Version: 17C0−154

HILTB−CTS	17C0−154

Changed Parameter Summary

DLIS Name	New Value	Previous Value	Depth & Time
MATR	SANDSTONE	SANDSTONE	8040.0 08:15:17
	SANDSTONE	SANDSTONE	7698.0 08:20:02
MDEN	2.65 G/C3	2.68 G/C3	8040.0 08:15:17
	2.68 G/C3	2.65 G/C3	7698.0 08:20:02

PIP SUMMARY

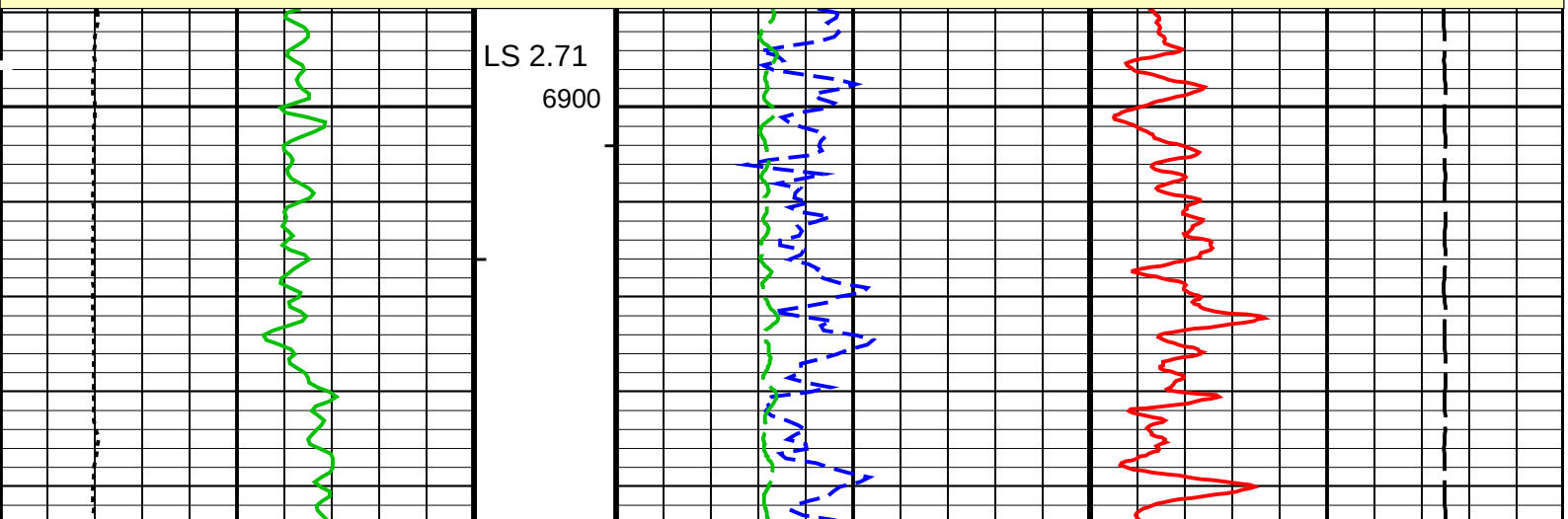
- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3
- Time Mark Every 60 S

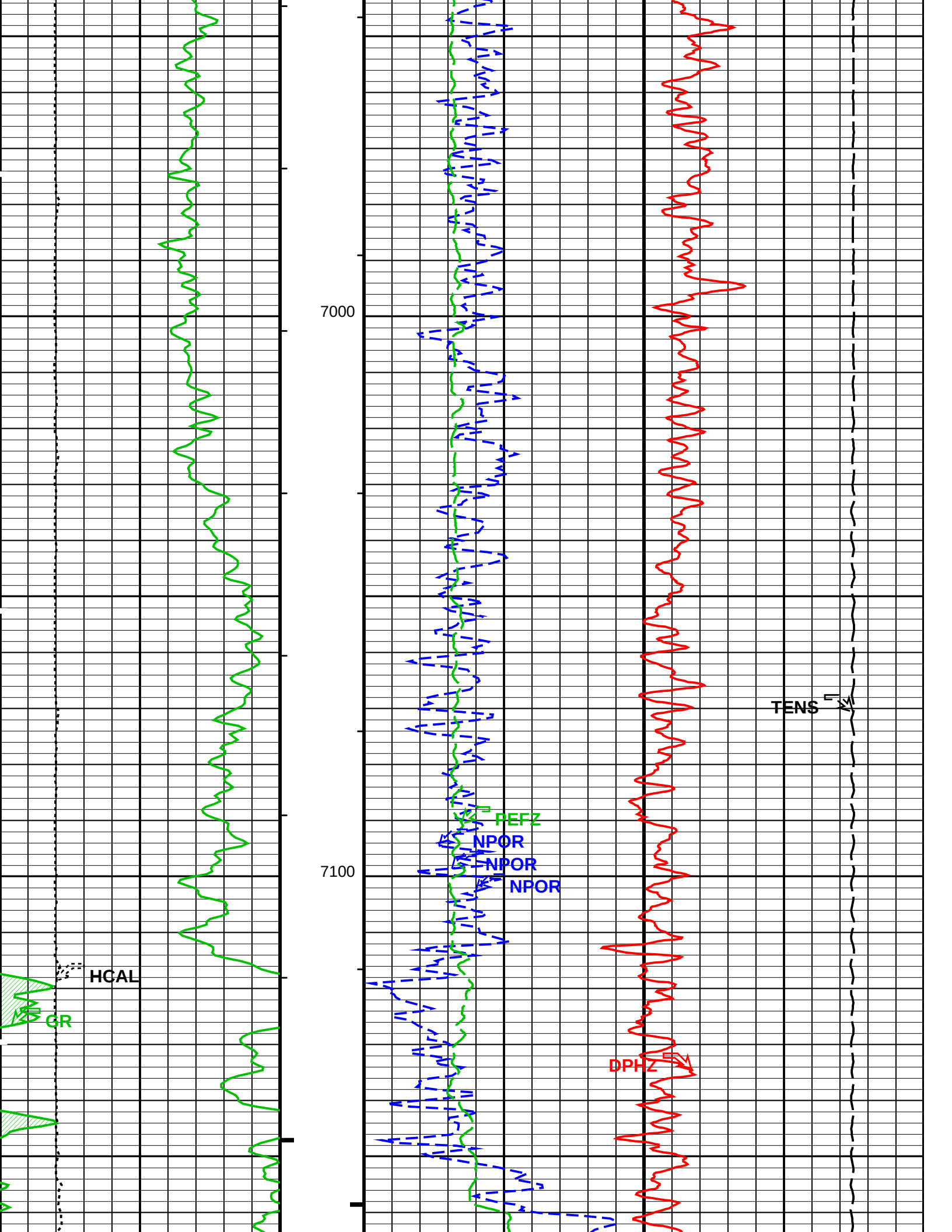
NPOR Backup

Gas Effect

Caliper (HCAL)	Stuck Stretch (STIT)	Std. Res. Formation Pe (PEFZ)	Tension (TENS)
6 (IN) 16	0 (F) 50	0 (−−−− 10	10000 (LBF) 0
Gamma Ray (GR)	Tool/Tot. Drag	Alpha Processed Neutron Porosity (NPOR)	
0 (GAPI) 200		0.3 (V/V) −0.1	
Gamma Ray Backup	Cable Drag	Std. Res. Density Porosity (DPHZ)	
		0.3 (V/V) −0.1	

MAIN PASS: * PLATFORM EXPRESS − NUCLEAR POROSITY ***

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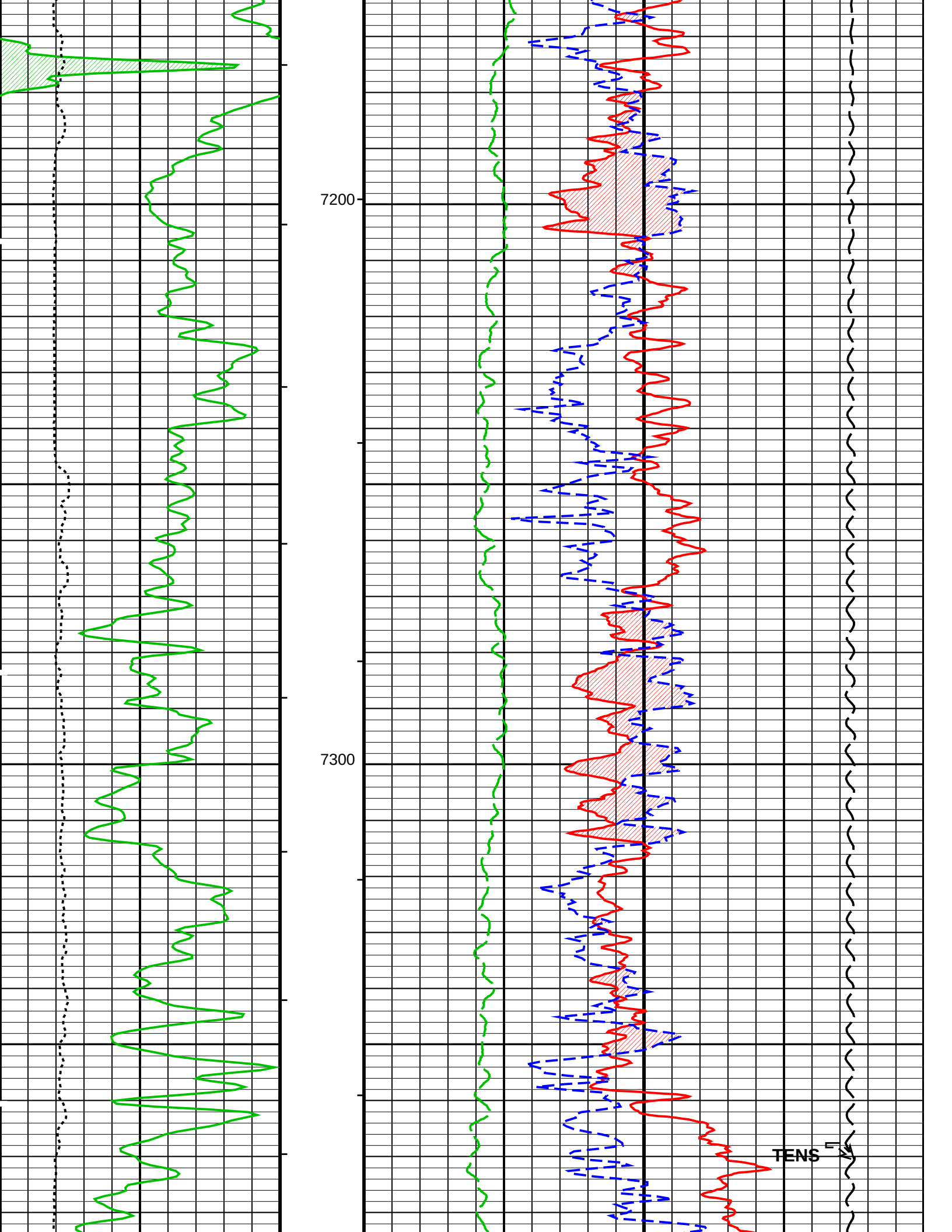
TENS
DPHZ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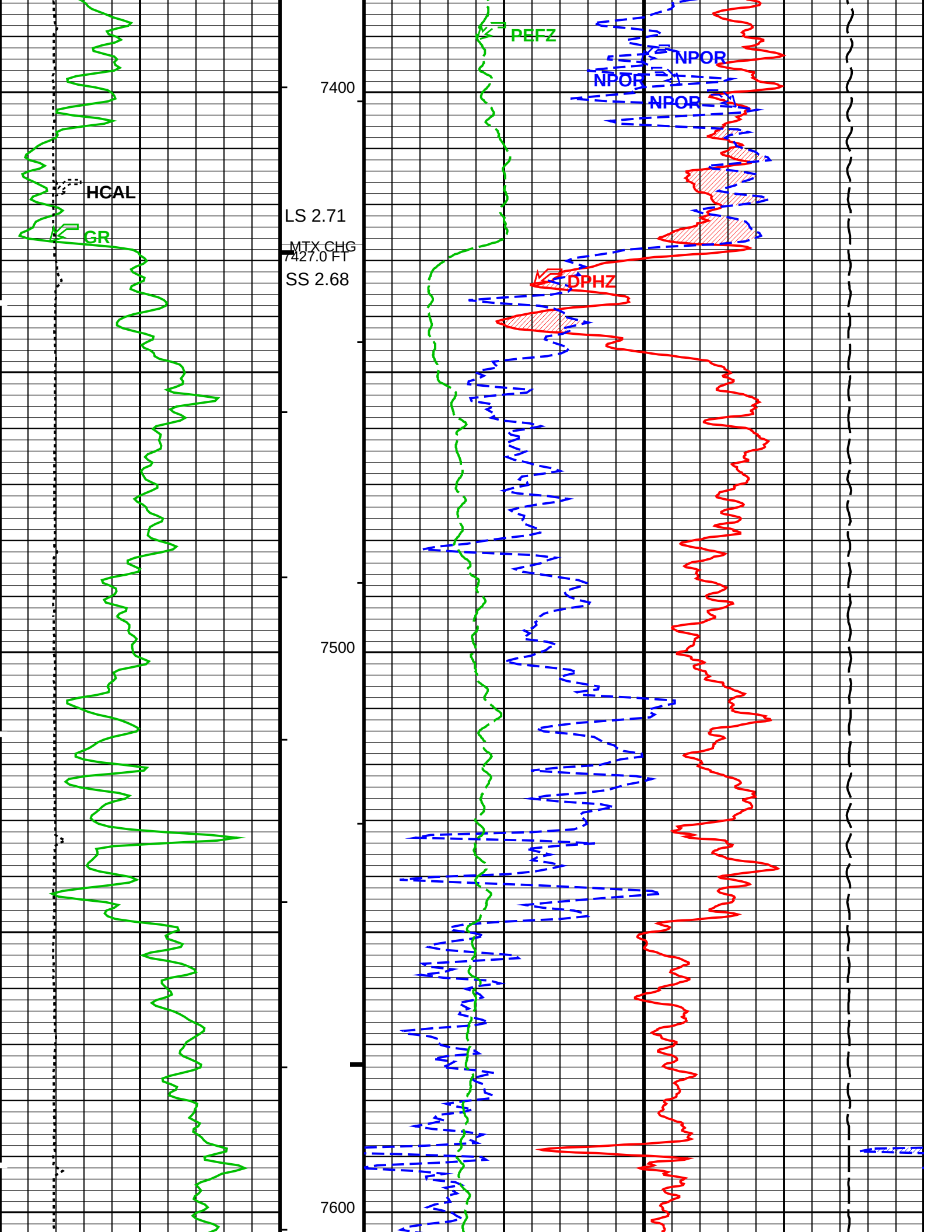
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HCAL
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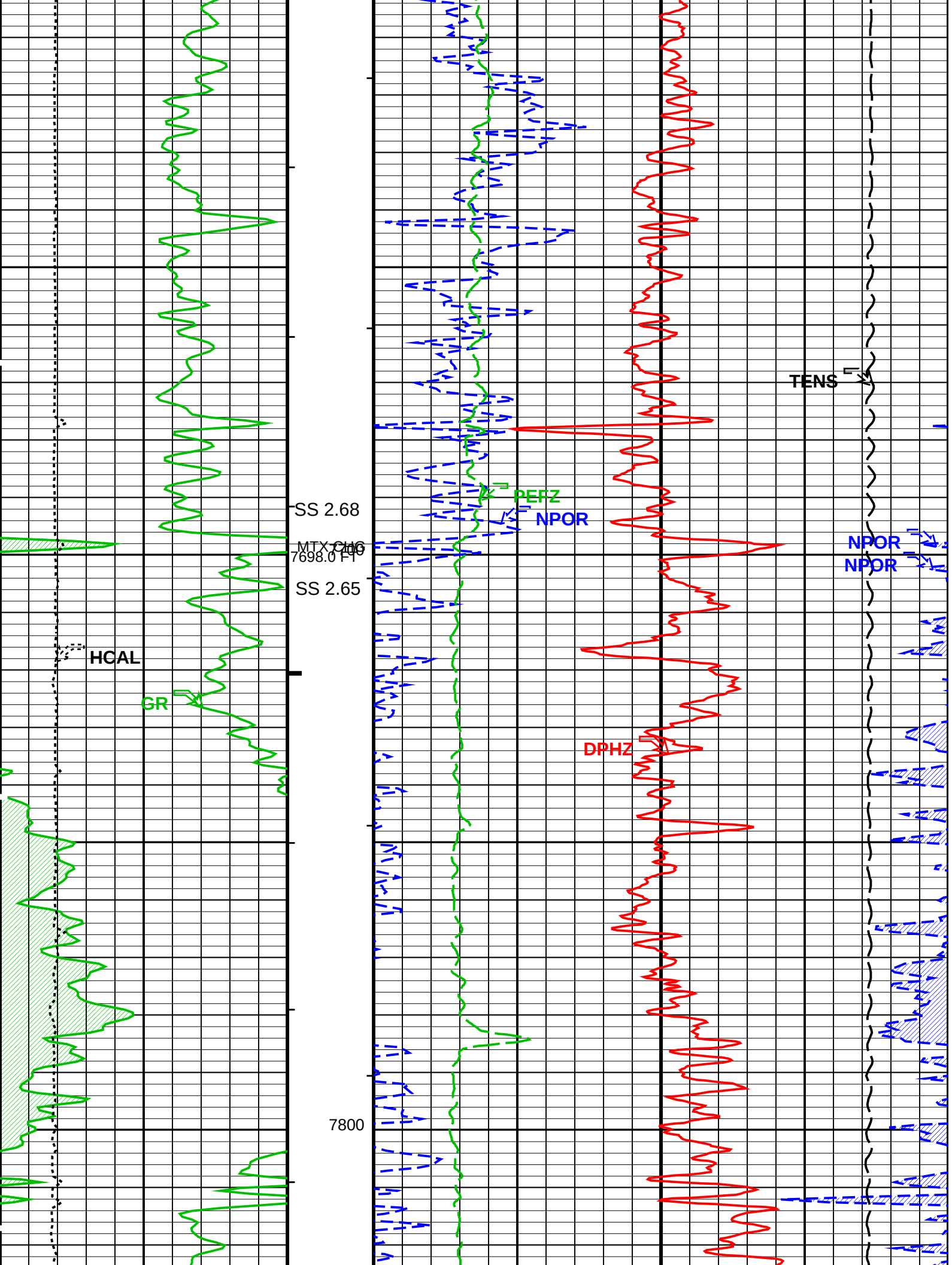
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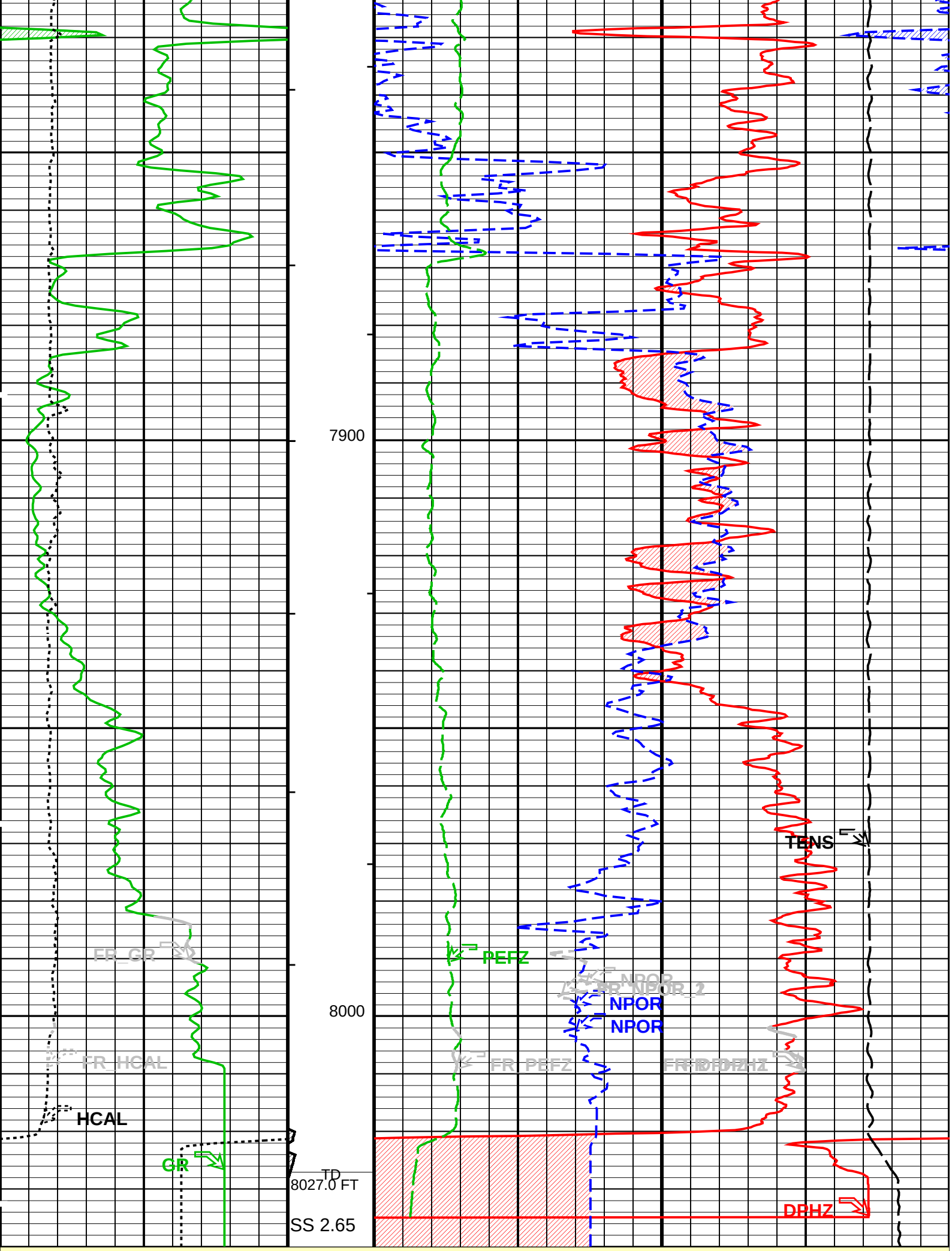
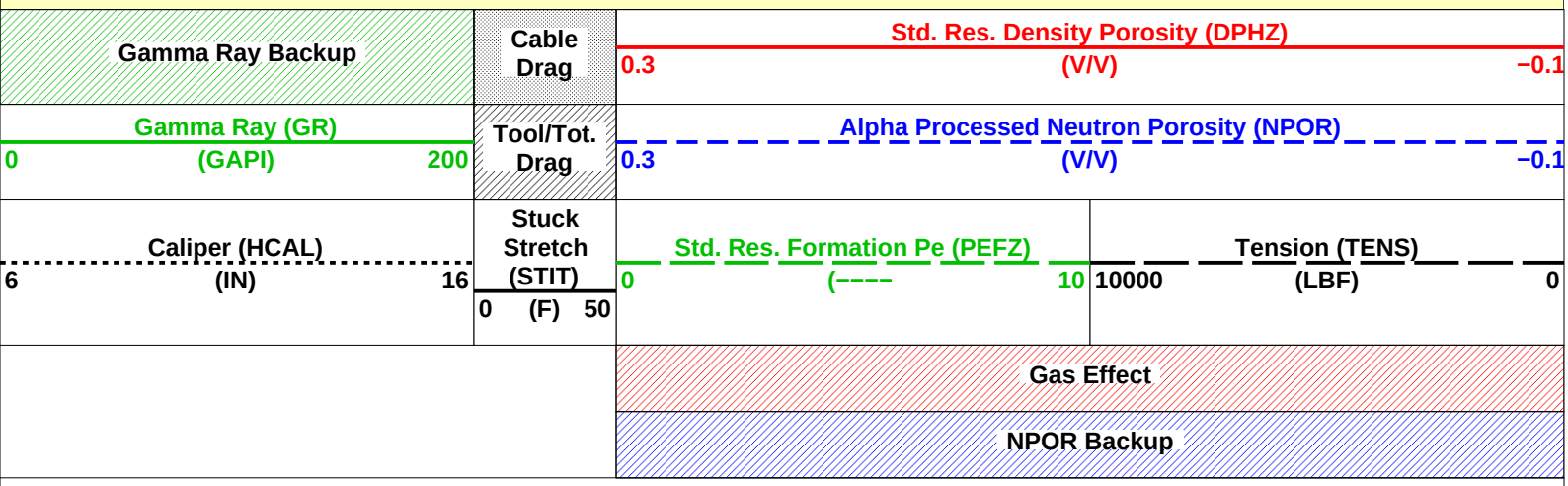


MAIN PASS: *** PLATFORM EXPRESS – NUCLEAR POROSITY ***



PIP SUMMARY

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

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
	HILTB−CTS: High resolution Integrated Logging Tool−CTS		
BHFL	Borehole Fluid Type	WATER	
BHFL_TLD	HILT Nuclear Mud Base	WATER	
BHS	Borehole Status	OPEN	
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
DHC	Density Hole Correction	BS	
FD	Fluid Density	1	G/C3
FSAL	Formation Salinity	−50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCLF	Germany Coal−like Formation Option	NO	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2.68	G/C3
MWCO	Mud Weight Correction Option	NO	
NAAC	HRDD APS Activation Correction	OFF	
NMT	HILT Nuclear Mud Type	NOBARITE	
NPRM	HRDD Processing Mode	StdRes	
NSAR	HRDD Depth Sampling Rate	1	IN
PTCO	Pressure/Temperature Correction Option	NO	
SDAT	Standoff Data Source	SOCN	
SHT	Surface Hole Temperature	68	DEGF
SOCN	Standoff Distance	0.125	IN
SOCO	Standoff Correction Option	YES	
	HOLEV: Integrated Hole/Cement Volume		
BHS	Borehole Status	OPEN	
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
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
SHT	Surface Hole Temperature	68	DEGF
	PERT: Preliminary Evaluation − Real Time		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
SHT	Surface Hole Temperature	68	DEGF
	STI: Stuck Tool Indicator		
LBFR	Trigger for MAXIS First Reading Label	TDL	
STKT	STI Stuck Threshold	2.5	FT
TDD	Total Depth − Driller	8035.00	FT
TDL	Total Depth − Logger	8027.00	FT
	System and Miscellaneous		

BS	Bit Size	7.875	IN
BSAL	Borehole Salinity	−50000.00	PPM
CSIZ	Current Casing Size	8.625	IN
CWEI	Casing Weight	24.00	LB/F
DFD	Drilling Fluid Density	8.40	LB/G
DORL	Depth Offset for Repeat Analysis	0.0	FT
MST	Mud Sample Temperature	65.10	DEGF
RMFS	Resistivity of Mud Filtrate Sample	4.3875	OHMM
TD	Total Depth	8027	FT

Format: LOWER_PORO Vertical Scale: 5" per 100' Graphics File Created: 17−Feb−2010 08:13

OP System Version: 17C0−154

HILTB−CTS 17C0−154

Output DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_006LUP FN:5 PRODUCER 17−Feb−2010 08:13

Schlumberger

REPEAT ANALYSIS

MAXIS Field Log

Input DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_005PUP FN:4 PRODUCER 17−Feb−2010 08:12 8049.0 FT 7607.0 FT

Output DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_006LUP FN:5 PRODUCER 17−Feb−2010 08:13

OP System Version: 17C0−154

HILTB−CTS 17C0−154

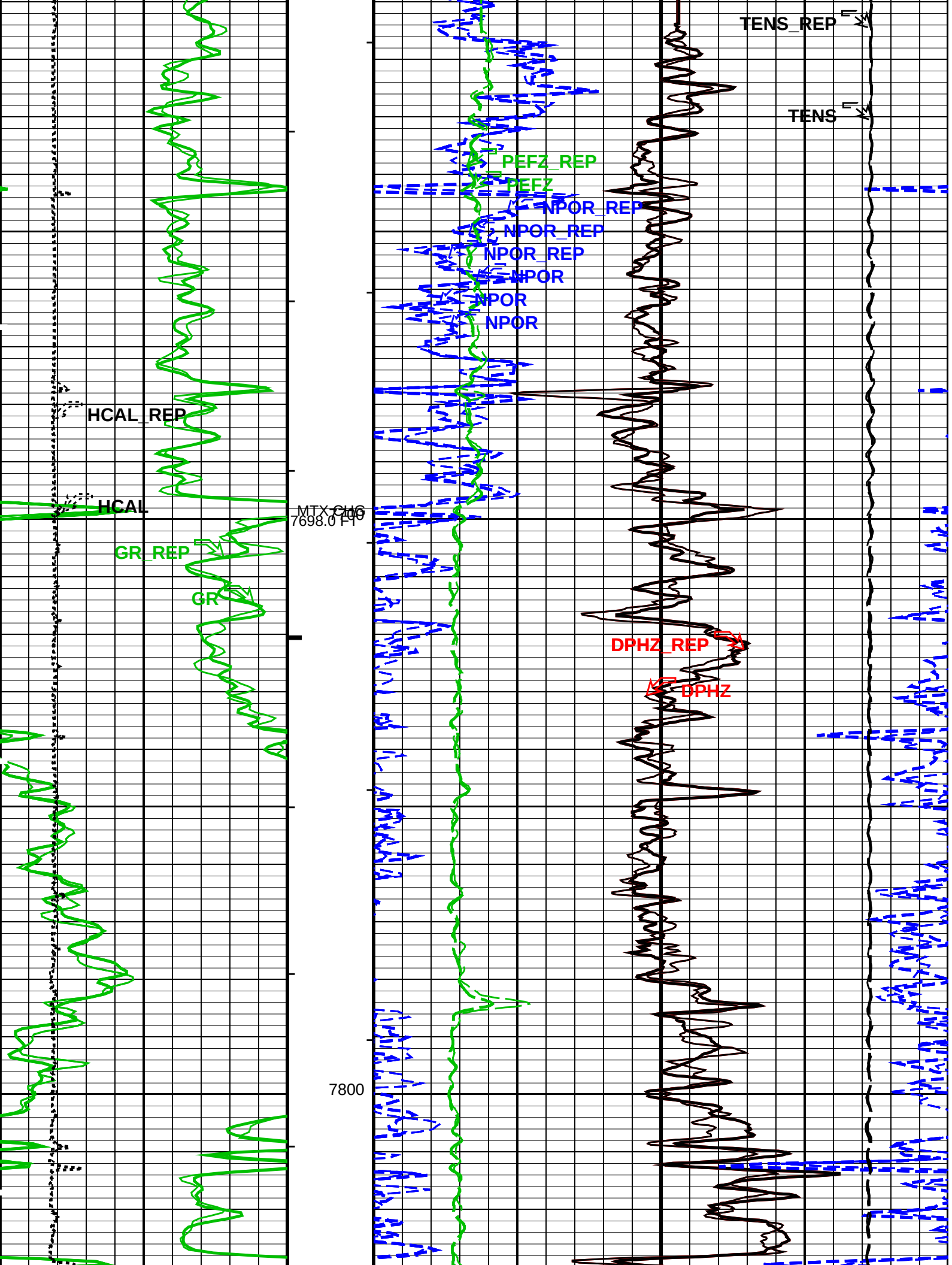
Changed Parameter Summary

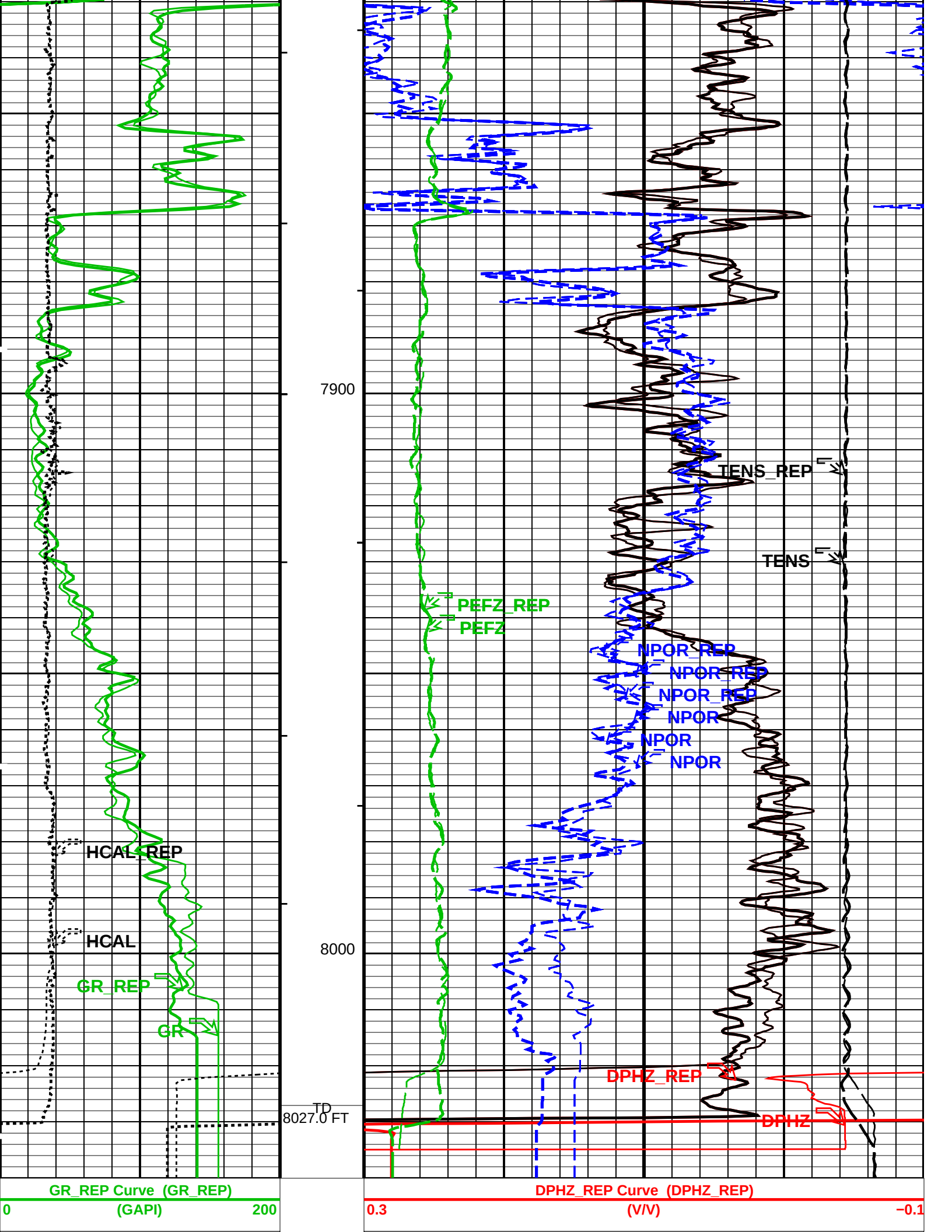
DLIS Name	New Value	Previous Value	Depth & Time
MATR	SANDSTONE	SANDSTONE	8040.0 08:15:17
	SANDSTONE	SANDSTONE	7698.0 08:20:02
MDEN	2.65 G/C3	2.68 G/C3	8040.0 08:15:17
	2.68 G/C3	2.65 G/C3	7698.0 08:20:02

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

PEFZ_REP Curve (PEFZ_REP) 0 (−−−− 10
TENS_REP Curve (TENS_REP) 10000 (LBF) 0
HCAL_REP Curve (HCAL_REP) 6 (IN) 16
NPOR_REP Curve (NPOR_REP) 0.3 (V/V) −0.1
GR_REP Curve (GR_REP) 0 (GAPI) 200
DPHZ_REP Curve (DPHZ_REP) 0.3 (V/V) −0.1


TENS_REP
TENS
PEFZ_REP
PEFZ
NPOR_REP
NPOR_REP
NPOR_REP
NPOR
NPOR
NPOR
HCAL_REP
HCAL
MTX_CHG
7698.0 FT
GR_REP
GR
DPHZ_REP
DPHZ
7800


7900
8000
TD
8027.0 FT
TENS_REP
TENS
PEFZ_REP
PEFZ
NPOR_REP
NPOR_REP
NPOR_REP
NPOR
NPOR
NPOR
HCAL_REP
HCAL
GR_REP
GR
DPHZ_REP
DPHZ
GR_REP Curve (GR_REP)
0
(GAPI)
200
DPHZ_REP Curve (DPHZ_REP)
0.3
(V/V)
−0.1

HCAL_REP Curve (HCAL_REP)		
6	(IN)	16

NPOR_REP Curve (NPOR_REP)		
0.3	(V/V)	−0.1

PEFZ_REP Curve (PEFZ_REP)		
0	(−−−−	10

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

DLIS Name	Description	Value	
	HILTB−CTS: High resolution Integrated Logging Tool−CTS		
BHFL	Borehole Fluid Type	WATER	
BHFL_TLD	HILT Nuclear Mud Base	WATER	
BHS	Borehole Status	OPEN	
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
DHC	Density Hole Correction	BS	
FD	Fluid Density	1	G/C3
FSAL	Formation Salinity	−50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCLF	Germany Coal−like Formation Option	NO	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2.68	G/C3
MWCO	Mud Weight Correction Option	NO	
NAAC	HRDD APS Activation Correction	OFF	
NMT	HILT Nuclear Mud Type	NOBARITE	
NPRM	HRDD Processing Mode	StdRes	
NSAR	HRDD Depth Sampling Rate	1	IN
PTCO	Pressure/Temperature Correction Option	NO	
SDAT	Standoff Data Source	SOCN	
SHT	Surface Hole Temperature	68	DEGF
SOCN	Standoff Distance	0.125	IN
SOCO	Standoff Correction Option	YES	
	HOLEV: Integrated Hole/Cement Volume		
BHS	Borehole Status	OPEN	
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
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
SHT	Surface Hole Temperature	68	DEGF
	PERT: Preliminary Evaluation − Real Time		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
SHT	Surface Hole Temperature	68	DEGF
	STI: Stuck Tool Indicator		
TDL	Total Depth − Logger	8027.00	FT
	System and Miscellaneous		
BS	Bit Size	7.875	IN
BSAL	Borehole Salinity	−50000.00	PPM
CSIZ	Current Casing Size	8.625	IN
CWEI	Casing Weight	24.00	LB/F
DFD	Drilling Fluid Density	8.40	LB/G
DORL	Depth Offset for Repeat Analysis	0.0	FT
MST	Mud Sample Temperature	65.10	DEGF
RMFS	Resistivity of Mud Filtrate Sample	4.3875	OHMM
TD	Total Depth	8027	FT

Format: PORO_REP **Vertical Scale: 5" per 100'** **Graphics File Created: 17−Feb−2010 08:13**

OP System Version: 17C0−154

HILTB−CTS 17C0−154

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_005PUP	FN:4	PRODUCER	17−Feb−2010 08:12	8049.0 FT	7607.0 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_006LUP	FN:5	PRODUCER	17−Feb−2010 08:13		

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UPPER DENSITY LOG 5" = 100’

MAXIS Field Log

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_006LUP	FN:5	PRODUCER	17−Feb−2010 08:13	8040.0 FT	0.0 FT

OP System Version: 17C0−154

HILTC	17C0−154

PIP SUMMARY

Time Mark Every 60 S

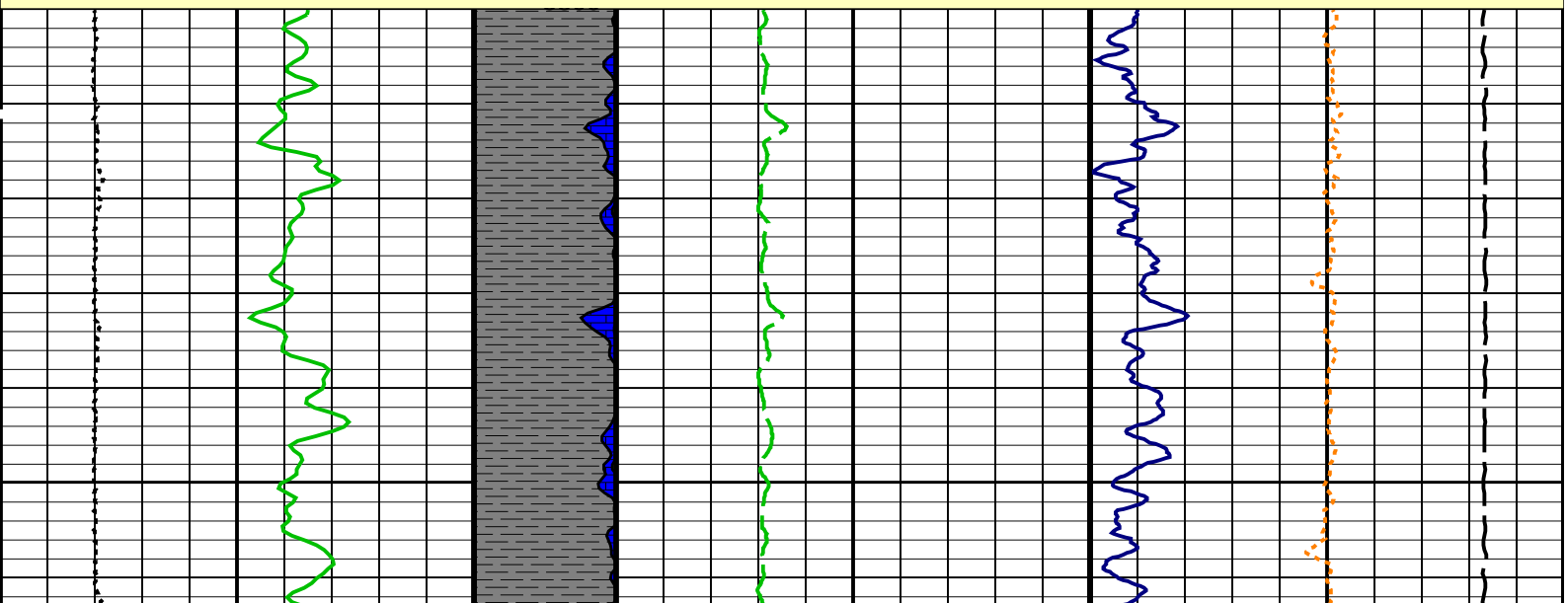
SHALE

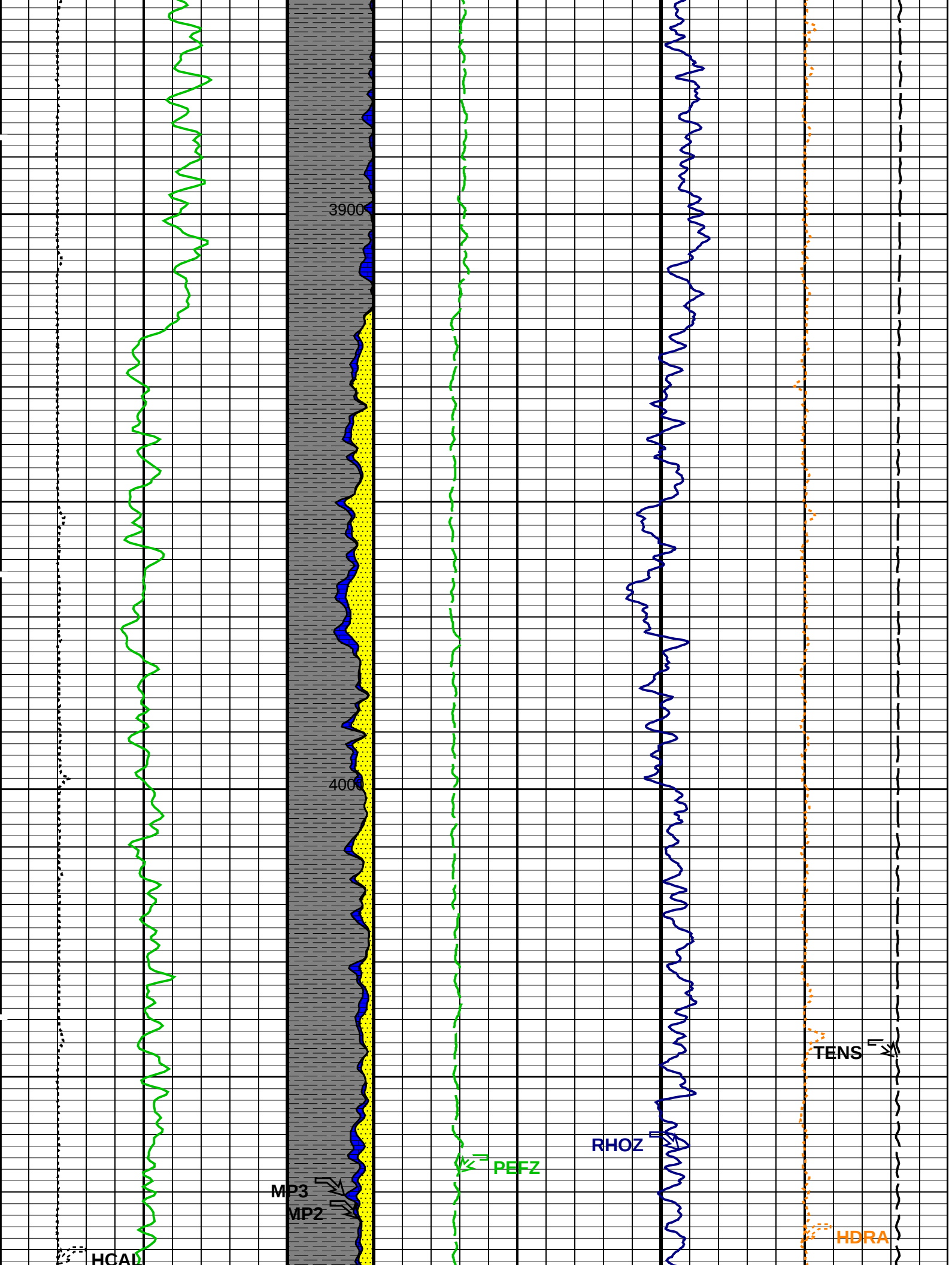
SAND

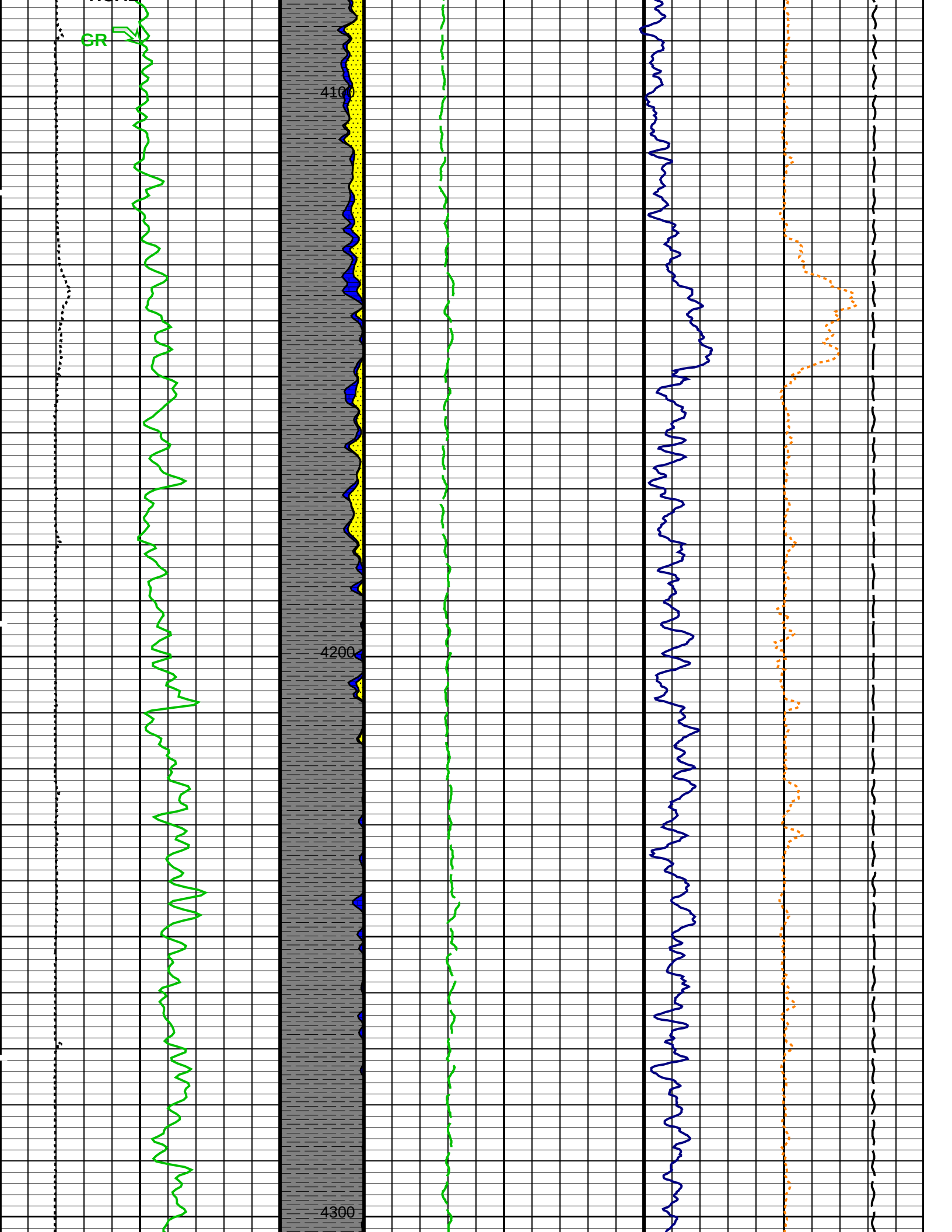
LIME

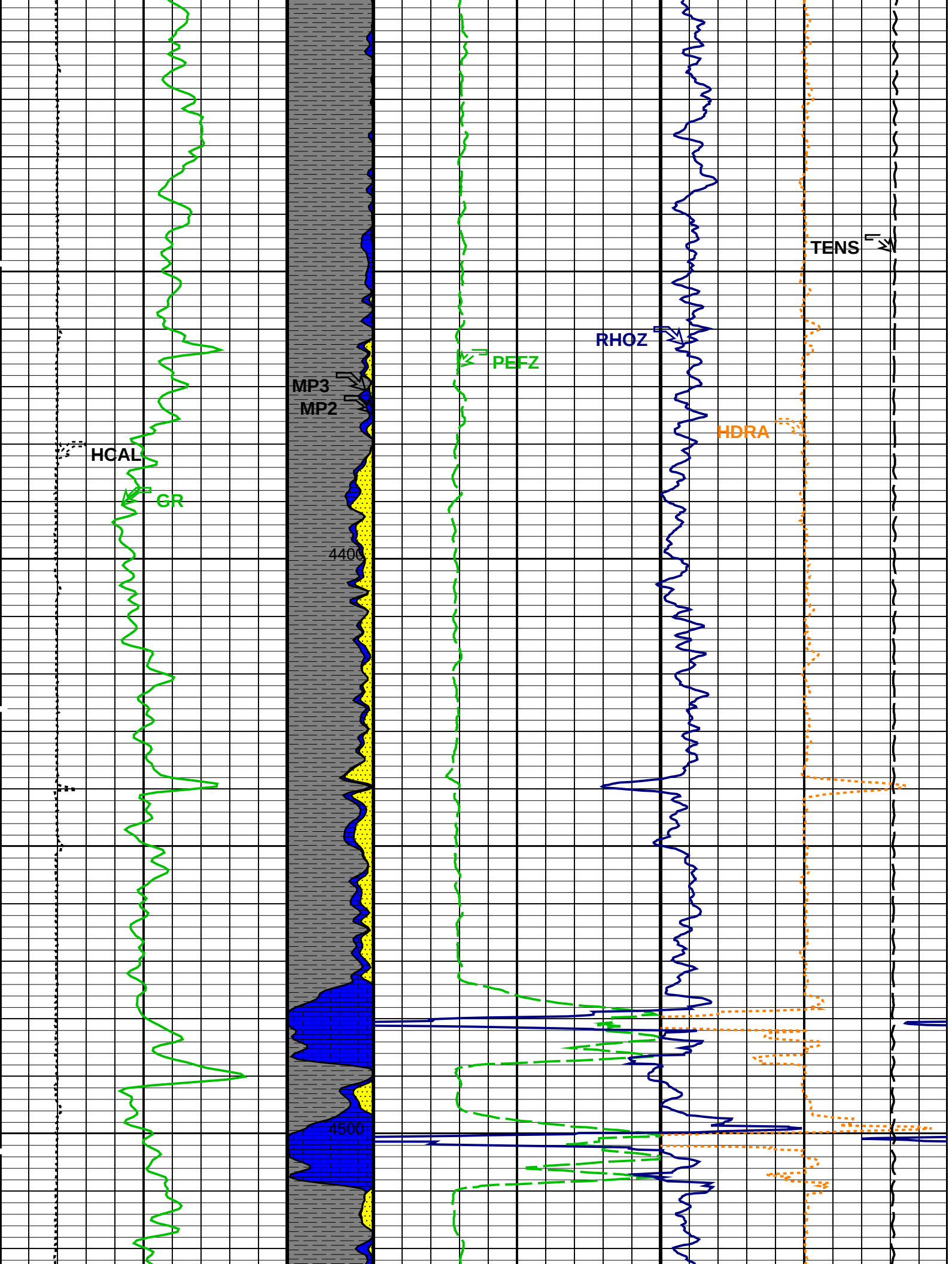
Caliper (HCAL)		Tension (TENS)
6 (IN) 16		10000 (LBF) 0
Gamma Ray (GR)		Std. Res. Formation Density (RHOZ)
0 (GAPI) 200		2 (G/C3) 3
Gamma Ray Backup	Stuck Stretch (STIT) 0 (F) 50	Std. Res. Formation Pe (PEFZ) 0 (−−−− 10
		Density Correction (HDRA) −0.25 (G/C3) 0.25

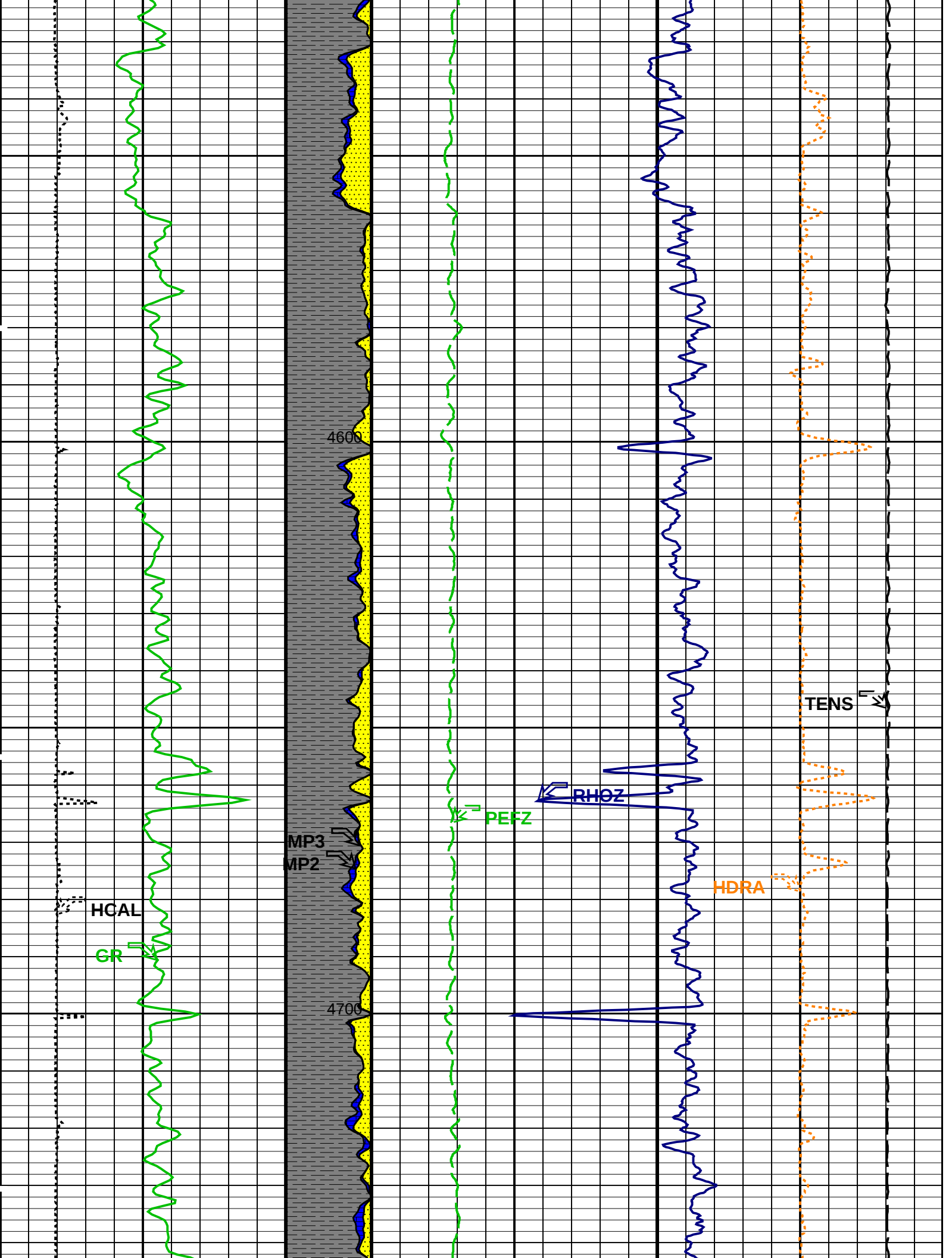
MAIN PASS: * PLATFORM EXPRESS − LITHOLOGY DENSITY ***

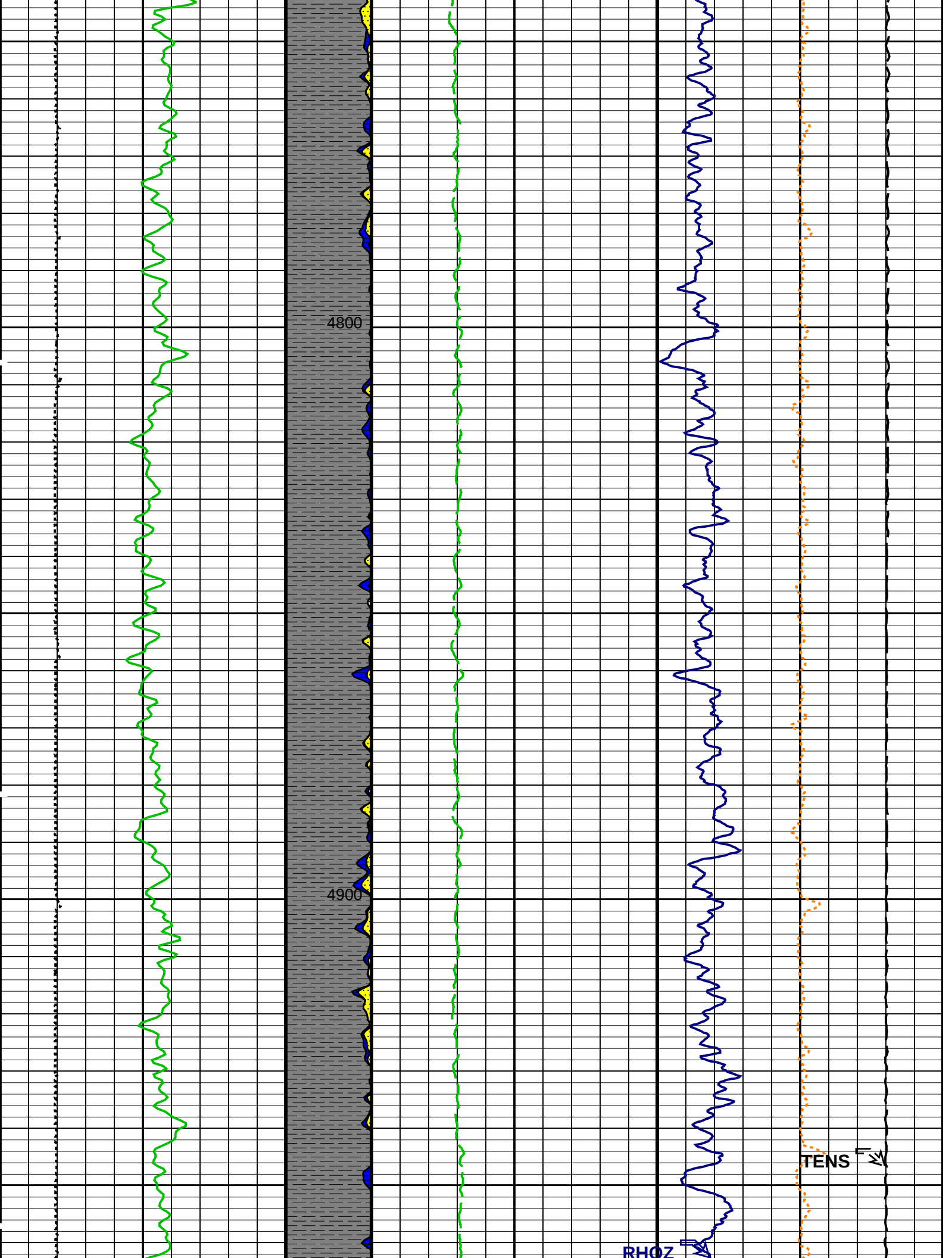


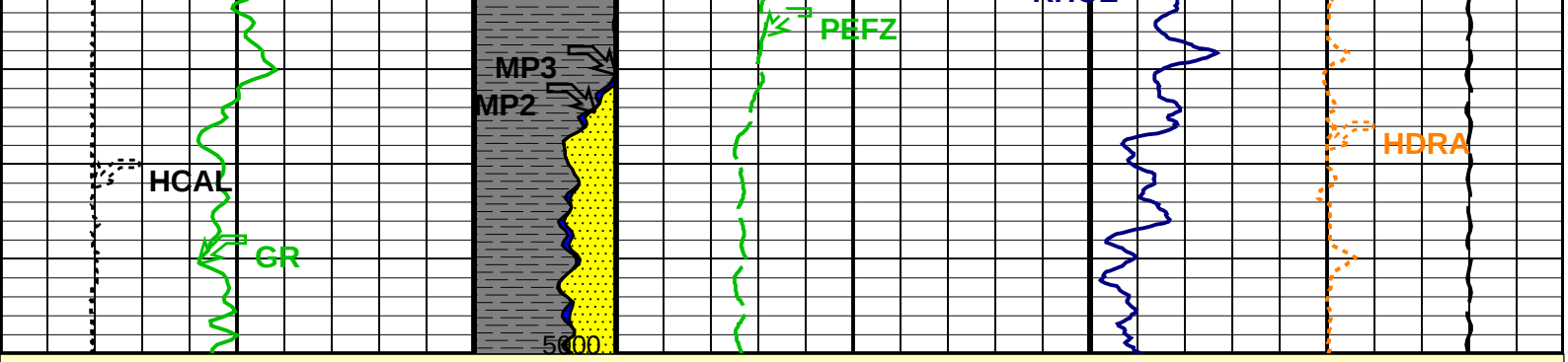

3900
4000
PEFZ
RHOZ
TENS
HDRA
MP3
MP2
HCAL


GR
4100
4200
4300


TENS
RHOZ
PEFZ
MP3
MP2
HDRA
HCAL
GR
4400
4500


4600
4700
HCAL
GR
MP3
MP2
PEFZ
RHOZ
HDRA
TENS


4800
4900
TENS
RHOZ



MAIN PASS: *** PLATFORM EXPRESS − LITHOLOGY DENSITY ***

Gamma Ray Backup	Stuck Stretch (STIT)	Std. Res. Formation Pe (PEFZ)	Density Correction (HDRA)
	0 (F) 50	0 (−−−− 10	−0.25 (G/C3) 0.25
Gamma Ray (GR)		Std. Res. Formation Density (RHOZ)	
0 (GAPI) 200	LIME	2 (G/C3) 3	
Caliper (HCAL)			Tension (TENS)
6 (IN) 16	SAND		10000 (LBF) 0
	SHALE		

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
	HILTB−CTS: High resolution Integrated Logging Tool−CTS		
BHFL_TLD	HILT Nuclear Mud Base	WATER	
DHC	Density Hole Correction	BS	
GCLF	Germany Coal−like Formation Option	NO	
NAAC	HRDD APS Activation Correction	OFF	
NMT	HILT Nuclear Mud Type	NOBARITE	
NPRM	HRDD Processing Mode	STDRES	
NSAR	HRDD Depth Sampling Rate	1.000	in
	STI: Stuck Tool Indicator		
STKT	STI Stuck Threshold	2.500	ft
TDD	Total Depth − Driller	8035.0	ft
TDL	Total Depth − Logger	8027.0	ft
	System and Miscellaneous		
BS	Bit Size	7.875	in
DFD	Drilling Fluid Density	8.400	lbm/gal

Format: UPPER_DENS Vertical Scale: 5" per 100’ Graphics File Created: 17−Feb−2010 09:02

OP System Version: 17C0−154

HILTC	17C0−154

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_006LUP	FN:5	PRODUCER	17−Feb−2010 08:13	8040.0 FT	0.0 FT

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MAIN DENSITY LOG 5" = 100’

Output DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_006LUP FN:5 PRODUCER 17−Feb−2010 08:13

OP System Version: 17C0−154

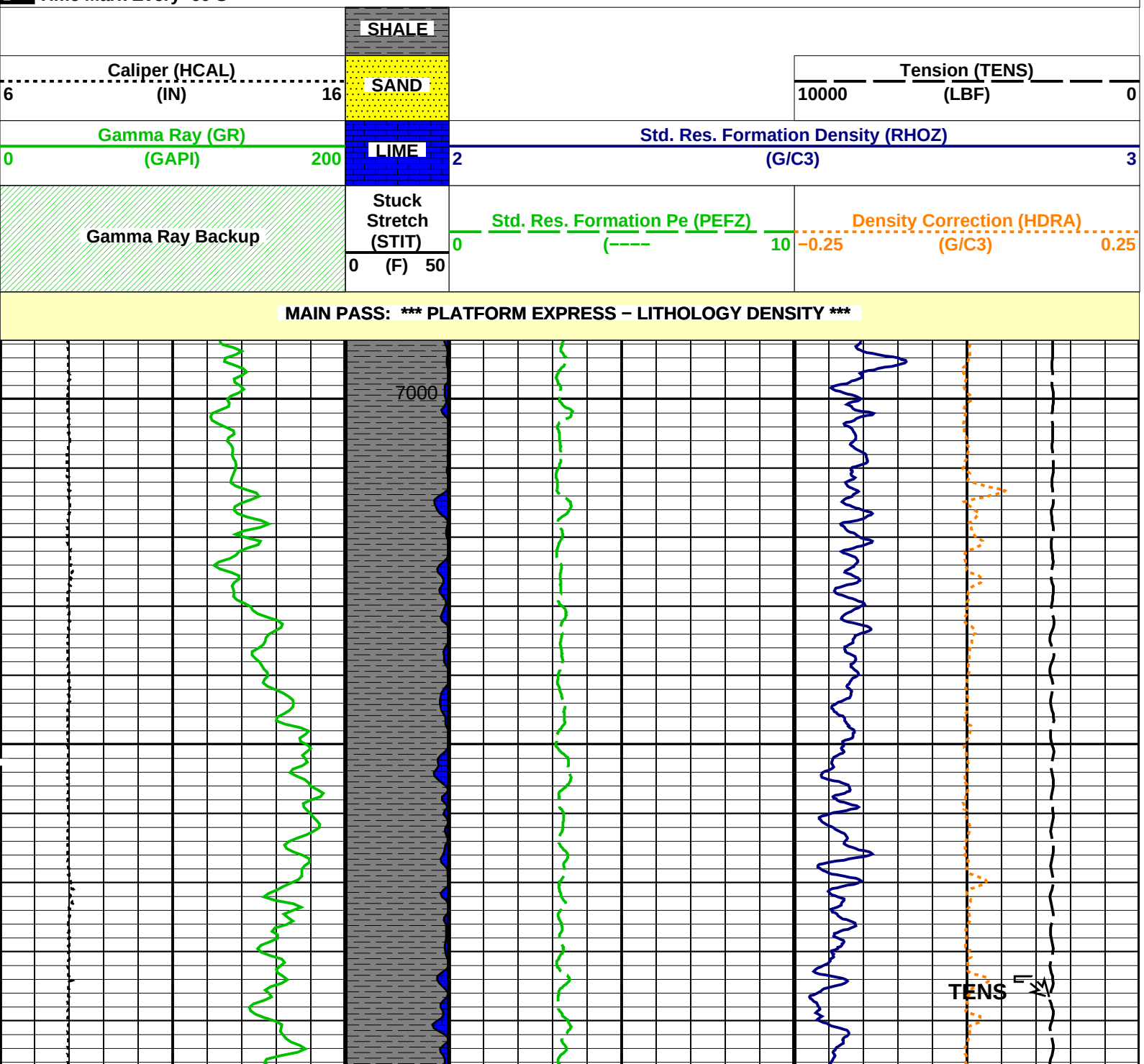
HILTB−CTS 17C0−154

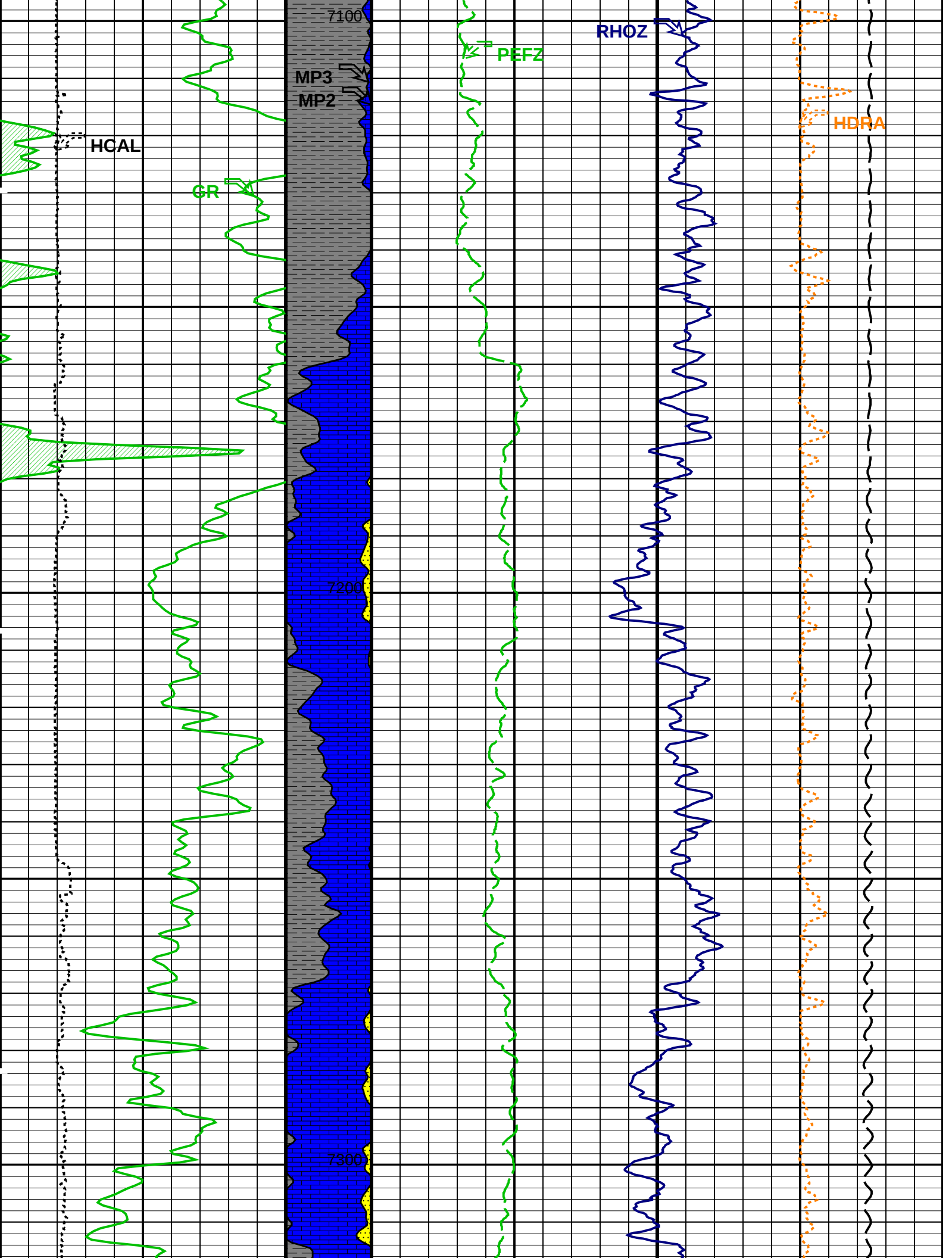
Changed Parameter Summary

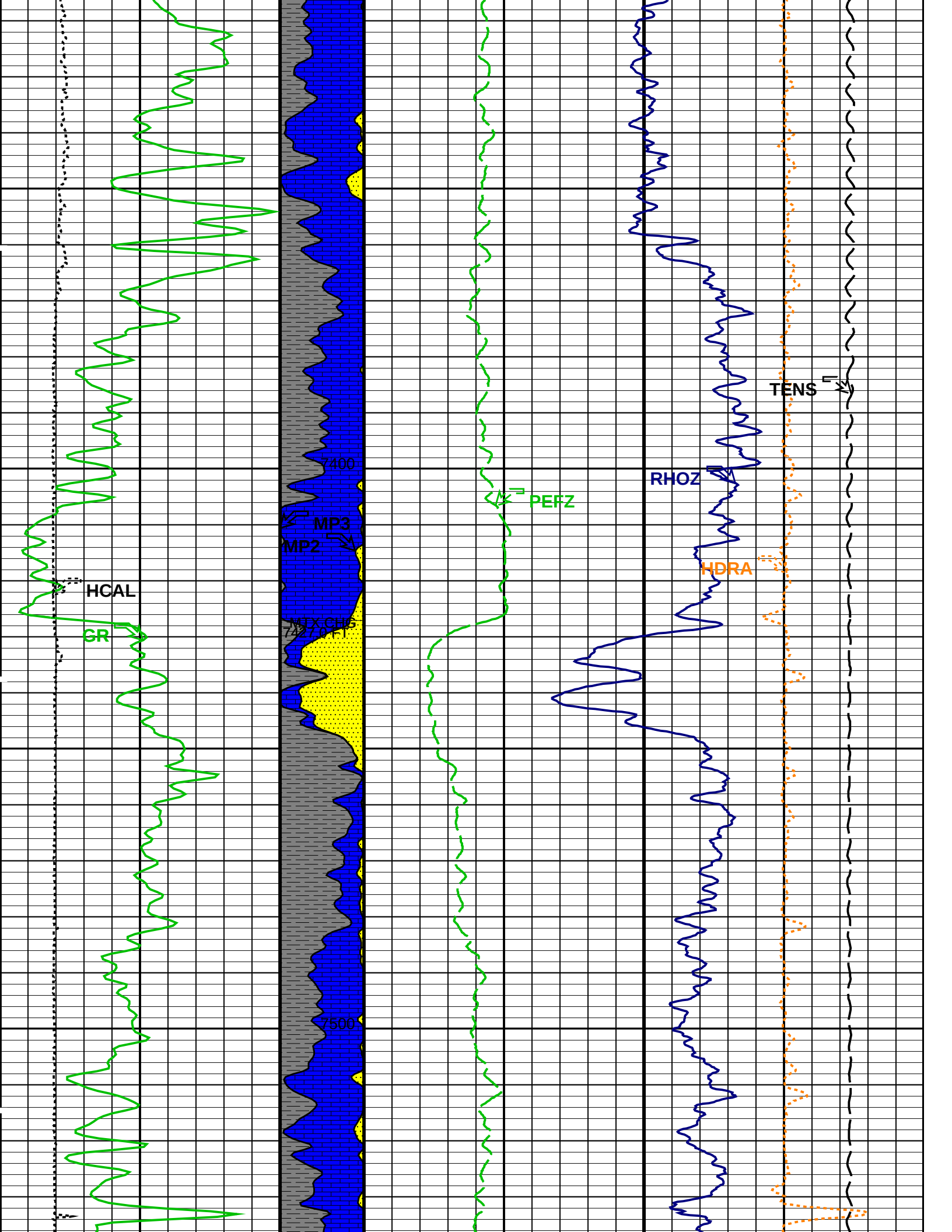
DLIS Name	New Value	Previous Value	Depth & Time
MATR	SANDSTONE	SANDSTONE	8040.0 08:15:17
	SANDSTONE	SANDSTONE	7698.0 08:20:02
POUT	SANDSTONE	SANDSTONE	8040.0 08:15:17
	SANDSTONE	SANDSTONE	7698.0 08:20:02

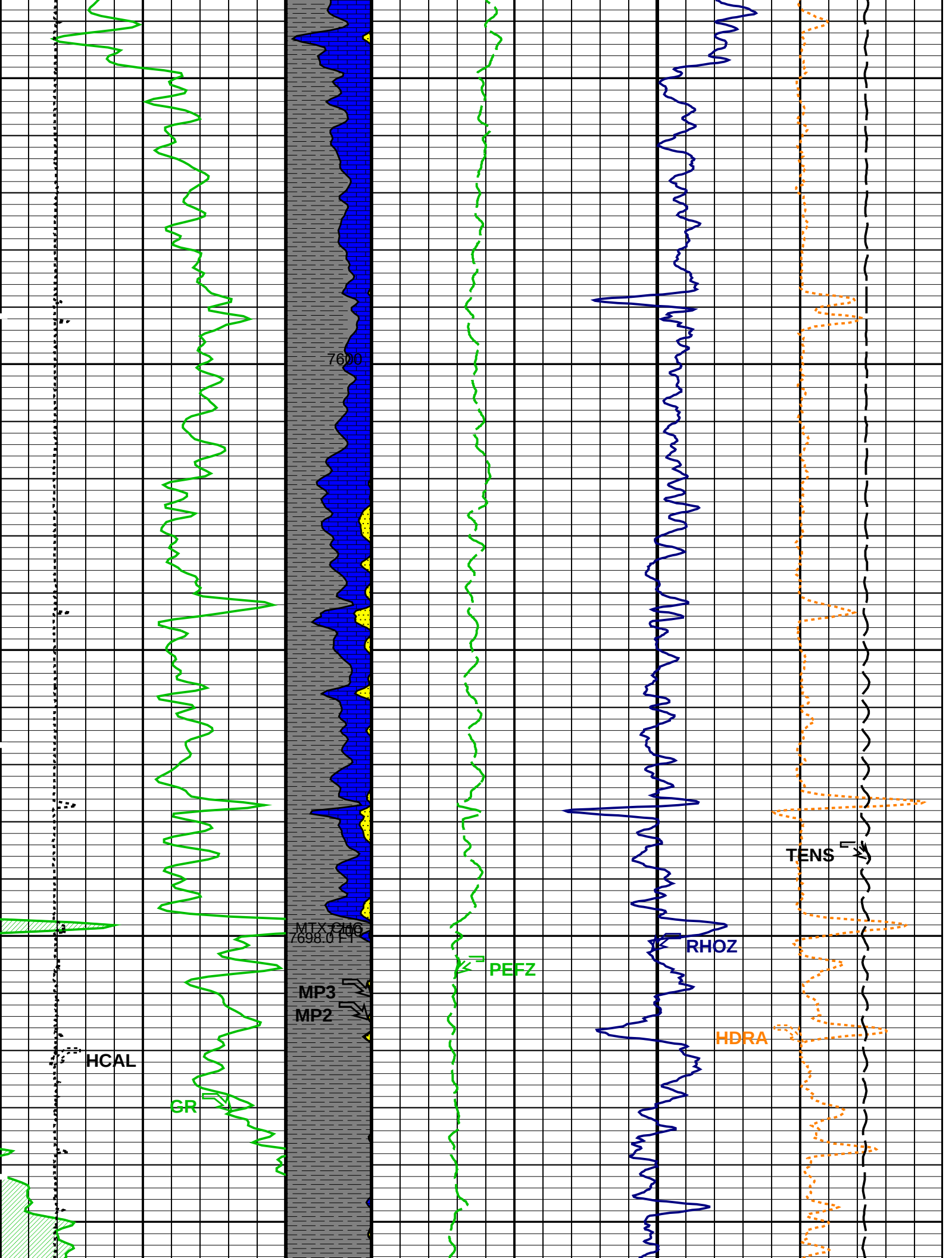
PIP SUMMARY

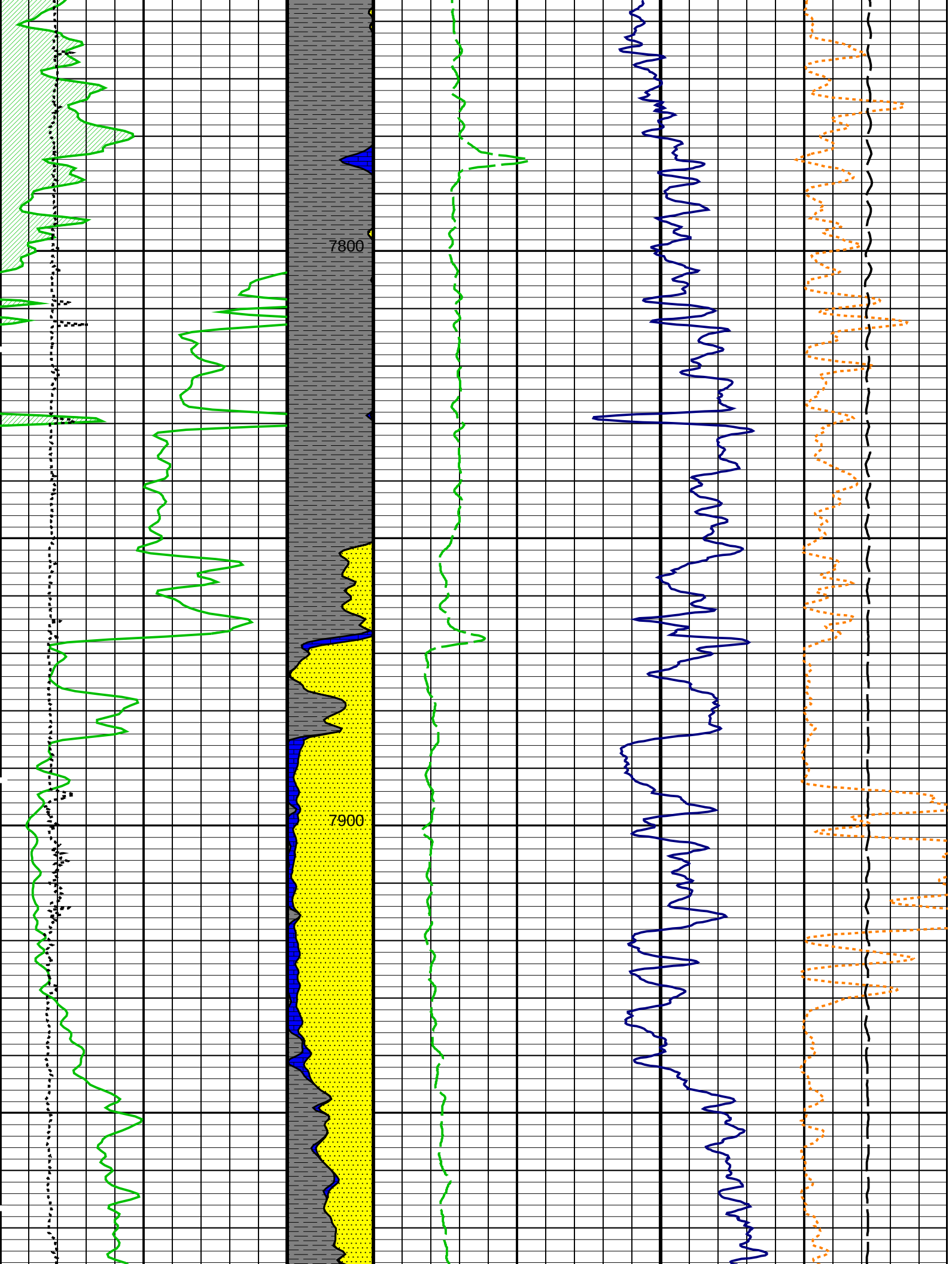
Time Mark Every 60 S

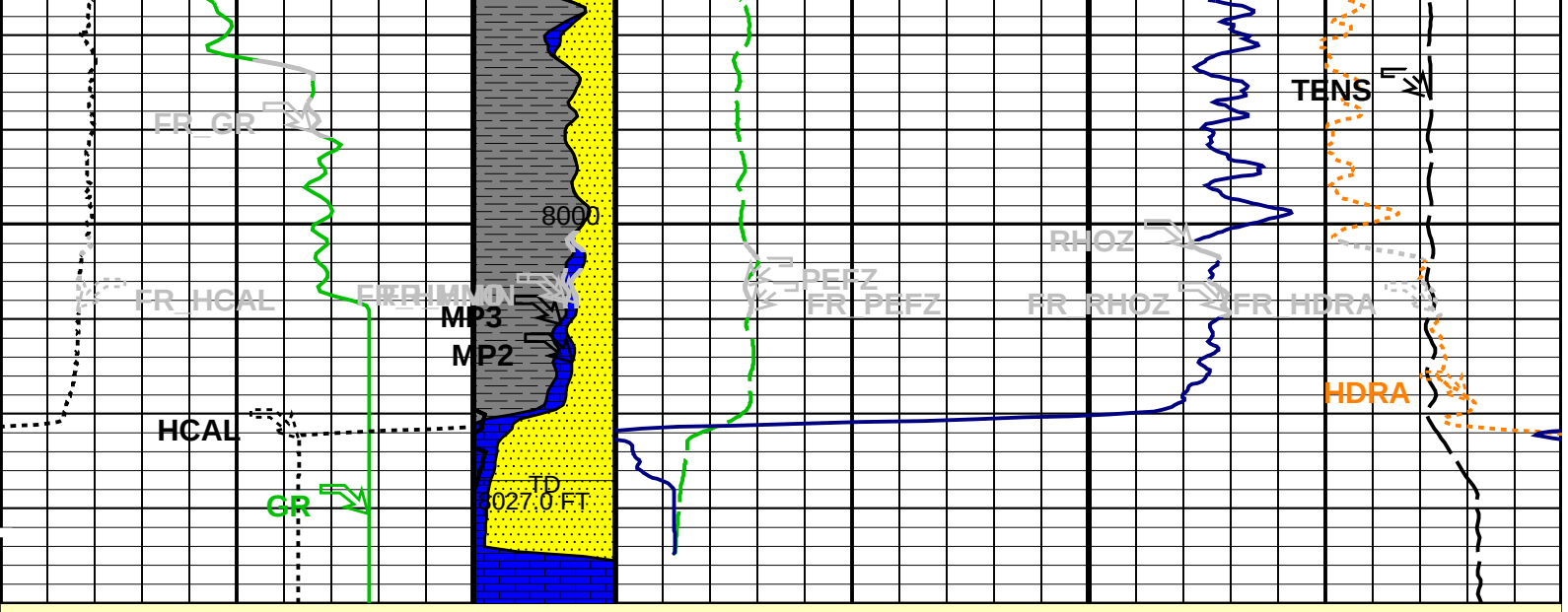



7100
MP3
MP2
HCAL
GR
PEFZ
RHOZ
HDRA
7200
7300


HCAL
GR
7400
MP3
MP2
MTX CH5
7427.0FT
7500
PEFZ
RHOZ
HDRA
TENS


7600
MTX
7698.0 FT
MP3
MP2
HCAL
GR
PEFZ
RHOZ
HDRA
TENS


7800
7900



MAIN PASS: *** PLATFORM EXPRESS − LITHOLOGY DENSITY ***

Gamma Ray Backup	Stuck Stretch (STIT)	Std. Res. Formation Pe (PEFZ)	Density Correction (HDRA)
	0 (F) 50	0 (−−−− 10	−0.25 (G/C3) 0.25
Gamma Ray (GR)		Std. Res. Formation Density (RHOZ)	
0 (GAPI) 200	LIME	2 (G/C3) 3	
Caliper (HCAL)			Tension (TENS)
6 (IN) 16	SAND		10000 (LBF) 0
	SHALE		

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
	HILTB−CTS: High resolution Integrated Logging Tool−CTS		
BHFL_TLD	HILT Nuclear Mud Base	WATER	
BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
DHC	Density Hole Correction	BS	
FD	Fluid Density	1	G/C3
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCLF	Germany Coal−like Formation Option	NO	
GGRD	Geothermal Gradient	0.01	DF/F
GTSE	Generalized Temperature Selection	HSTS_HTEM	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
NAAC	HRDD APS Activation Correction	OFF	
NMT	HILT Nuclear Mud Type	NOBARITE	
NPRM	HRDD Processing Mode	StdRes	
NSAR	HRDD Depth Sampling Rate	1	IN
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)	225	DEGF
GGRD	Geothermal Gradient	0.01	DF/F
GTSE	Generalized Temperature Selection	HSTS_HTEM	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
SHT	Surface Hole Temperature	68	DEGF
	PERT: Preliminary Evaluation − Real Time		
BDPS	Bulk Density Processing Selector	Standard	
BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
CLIM	Caliper Limit for Bad Hole	999	IN
CNPS	Corrected Neutron Porosity Selector	NPHI	
DRUL	DRHO Upper Limit	999	G/C3
FCAL	Caliper Presence Flag	PRESENT	
FCGR	CGR Presence Flag	PRESENT	

FEXP	Form Factor Exponent	2	
FLDT	Bulk Density Presence Flag	PRESENT	
FNUM	Form Factor Numerator	1	
FSON	Sonic Presence Flag	ABSENT	
GGRD	Geothermal Gradient	0.01	DF/F
GTSE	Generalized Temperature Selection	HSTS_HTEM	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
PMAX	PHI Maximum	0.5	CFCF
POUT	Porosity Output Lithology	SANDSTONE	
RG21	RHO Grain (2−Mineral Model, Min−1)	2.71	G/C3
RG22	RHO Grain (2−Mineral Model, Min−2)	2.644	G/C3
RG23	RHO Grain (2−Mineral Model, Min−3)	2.877	G/C3
RG31	RHO Grain (3−Mineral Model, Min−1)	2.71	G/C3
RG32	RHO Grain (3−Mineral Model, Min−2)	2.644	G/C3
RG33	RHO Grain (3−Mineral Model, Min−3)	2.877	G/C3
RTLF	RT Limit Flag	NO_LIMIT	
RWF	Resistivity of Free Water	0.02	OHMM
SHT	Surface Hole Temperature	68	DEGF
UF	U Fluid	0.398	
UM21	U Matrix (2−Mineral Model, Min−1)	13.77	
UM22	U Matrix (2−Mineral Model, Min−2)	4.779	
UM23	U Matrix (2−Mineral Model, Min−3)	8.997	
UM31	U Matrix (3−Mineral Model, Min−1)	13.77	
UM32	U Matrix (3−Mineral Model, Min−2)	4.779	
UM33	U Matrix (3−Mineral Model, Min−3)	8.997	
	STI: Stuck Tool Indicator		
LBFR	Trigger for MAXIS First Reading Label	TDL	
STKT	STI Stuck Threshold	2.5	FT
TDD	Total Depth − Driller	8035.00	FT
TDL	Total Depth − Logger	8027.00	FT
	System and Miscellaneous		
BS	Bit Size	7.875	IN
DFD	Drilling Fluid Density	8.40	LB/G
DORL	Depth Offset for Repeat Analysis	0.0	FT
RMFS	Resistivity of Mud Filtrate Sample	4.3875	OHMM
TD	Total Depth	8027	FT
TWS	Temperature of Connate Water Sample	100.00	DEGF

Format: LOWER_DENS **Vertical Scale: 5" per 100'** **Graphics File Created: 17−Feb−2010 08:13**

OP System Version: 17C0−154

HILTB−CTS **17C0−154**

Output DLIS Files

DEFAULT **AIT_TLD_MCFL_CNL_006LUP** **FN:5** **PRODUCER** **17−Feb−2010 08:13**

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BEFORE CALIBRATIONS

MAXIS Field Log

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
High resolution Integrated Logging Tool−CTS Wellsite Calibration − Electronics Calibration Check − Thru Cal Mag. & Phase							
Master: 30−Nov−2009 14:59 Before: 16−Feb−2010 10:51							
Thru Cal Magnitude − 0	0	0.6193	0.6195	N/A	N/A	N/A	V
Thru Cal Magnitude − 1	0	1.271	1.272	N/A	N/A	N/A	V
Thru Cal Magnitude − 2	0	0.6293	0.6292	N/A	N/A	N/A	V
Thru Cal Magnitude − 3	0	0.7116	0.7120	N/A	N/A	N/A	V
Thru Cal Magnitude − 4	0	1.330	1.331	N/A	N/A	N/A	V
Thru Cal Magnitude − 5	0	1.924	1.926	N/A	N/A	N/A	V
Thru Cal Magnitude − 6	0	1.927	1.929	N/A	N/A	N/A	V

Thru Cal Magnitude − 7	0	1.353	1.357	N/A	N/A	N/A	V
Phase − 0	0	68.36	69.52	N/A	N/A	N/A	DEG
Phase − 1	0	67.36	68.53	N/A	N/A	N/A	DEG
Phase − 2	0	63.29	64.50	N/A	N/A	N/A	DEG
Phase − 3	0	62.43	63.64	N/A	N/A	N/A	DEG
Phase − 4	0	55.68	56.94	N/A	N/A	N/A	DEG
Phase − 5	0	53.53	54.84	N/A	N/A	N/A	DEG
Phase − 6	0	53.50	54.81	N/A	N/A	N/A	DEG
Phase − 7	0	48.00	49.69	N/A	N/A	N/A	DEG

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Electronics Calibration Check − Auxilliary
Master: 30−Nov−2009 14:59 Before: 16−Feb−2010 10:51

Array Induction SPA Plus	990.5	992.6	991.7	N/A	N/A	N/A	MV
Array Induction SPA Zero	0	−0.2184	−0.2105	N/A	N/A	N/A	MV
Array Induction Temperature Pl	0.9150	0.9194	0.9185	N/A	N/A	N/A	V
Array Induction Temperature Ze	0	−0.0002118	−0.0002015	N/A	N/A	N/A	V

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Test Loop Gain Correction
Master: 30−Nov−2009 14:59

Test Loop Gain Magnitude − 0	0	1.013	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 1	0	1.015	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 2	0	1.016	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 3	0	1.012	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 4	0	0.9923	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 5	0	0.9870	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 6	0	0.9920	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 7	0	1.003	N/A	N/A	N/A	N/A	V
Phase − 0	0	−2.469	N/A	N/A	N/A	N/A	DEG
Phase − 1	0	−0.1516	N/A	N/A	N/A	N/A	DEG
Phase − 2	0	0.9347	N/A	N/A	N/A	N/A	DEG
Phase − 3	0	0.1802	N/A	N/A	N/A	N/A	DEG
Phase − 4	0	0.1003	N/A	N/A	N/A	N/A	DEG
Phase − 5	0	−0.09392	N/A	N/A	N/A	N/A	DEG
Phase − 6	0	0.2377	N/A	N/A	N/A	N/A	DEG
Phase − 7	0	−0.1620	N/A	N/A	N/A	N/A	DEG

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Sonde Error Correction
Master: 30−Nov−2009 14:59

R Sonde Error Correction − 0	0	−76.56	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 1	0	170.5	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 2	0	110.7	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 3	0	61.12	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 4	0	24.14	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 5	0	14.16	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 6	0	9.674	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 7	0	−1.714	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 0	0	−228.6	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 1	0	141.0	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 2	0	−31.72	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 3	0	−44.12	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 4	0	2.293	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 5	0	17.99	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 6	0	−4.867	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 7	0	−0.3559	N/A	N/A	N/A	N/A	MM/M

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Mud Gain Correction
Master: 30−Nov−2009 14:59

Coarse − Mag, Real, Imag − 0	0	1.073	N/A	N/A	N/A	N/A	
Coarse − Mag, Real, Imag − 1	0	1.073	N/A	N/A	N/A	N/A	
Coarse − Mag, Real, Imag − 2	0	1.073	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 0	0	1.072	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 1	0	1.072	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 2	0	1.072	N/A	N/A	N/A	N/A	

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Stab Measurement Summary
Before: 16−Feb−2010 15:10

BS Window Ratio	0.7600	N/A	0.7582	N/A	N/A	N/A	
BS Window Sum	10410	N/A	10390	N/A	N/A	N/A	CPS
SS Window Ratio	0.4998	N/A	0.4982	N/A	N/A	N/A	
SS Window Sum	9832	N/A	9831	N/A	N/A	N/A	CPS
LS Window Ratio	0.2927	N/A	0.2906	N/A	N/A	N/A	
LS Window Sum	1029	N/A	1031	N/A	N/A	N/A	CPS

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Photo−multiplier High Voltages Calibrations
Before: 16−Feb−2010 15:10

BS PM High Voltage (Command)	1363	N/A	1408	N/A	N/A	N/A	V
SS PM High Voltage (Command)	1401	N/A	1427	N/A	N/A	N/A	V
LS PM High Voltage (Command)	1517	N/A	1540	N/A	N/A	N/A	V

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Crystal Quality Resolutions Calibration
Before: 16−Feb−2010 15:10

BS Crystal Resolution	10.64	N/A	10.65	N/A	N/A	N/A	%

BS Crystal Resolution	10.64	N/A	10.65	N/A	N/A	N/A	%
SS Crystal Resolution	9.215	N/A	9.156	N/A	N/A	N/A	%
LS Crystal Resolution	10.18	N/A	9.978	N/A	N/A	N/A	%
High resolution Integrated Logging Tool−CTS Wellsite Calibration − MCFL Calibration							
Before: 16−Feb−2010 15:06							
Raw B0 Resistivity	3875	N/A	3876	N/A	N/A	N/A	OHMM
Raw B1 Resistivity	3830	N/A	3823	N/A	N/A	N/A	OHMM
Raw B2 Resistivity	3830	N/A	3825	N/A	N/A	N/A	OHMM
High resolution Integrated Logging Tool−CTS Wellsite Calibration − HILT Caliper Calibration							
Before: 16−Feb−2010 10:49							
HILT Caliper Zero Measurement	8.000	N/A	9.852	N/A	N/A	N/A	IN
HILT Caliper Plus Measurement	12.00	N/A	13.98	N/A	N/A	N/A	IN
High resolution Integrated Logging Tool−CTS Wellsite Calibration − Detector Calibration							
Before: 16−Feb−2010 10:49							
Gamma Ray Background	30.00	N/A	74.73	N/A	N/A	N/A	GAPI
Gamma Ray (Jig − Bkg)	176.8	N/A	176.8	N/A	N/A	16.07	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI
High resolution Integrated Logging Tool−CTS Wellsite Calibration − Zero Measurement							
Master: 10−Jan−2010 18:39 Before: 16−Feb−2010 10:58							
CNTC Background	26.69	26.69	27.56	N/A	N/A	4.004	CPS
CFTC Background	33.46	33.46	29.01	N/A	N/A	5.019	CPS
High resolution Integrated Logging Tool−CTS Wellsite Calibration − Ratio Measurement							
Master: 10−Jan−2010 18:39							
Thermal Near Corr. (Tank)	5800	5102	N/A	N/A	N/A	N/A	CPS
Thermal Far Corr. (Tank)	2400	2170	N/A	N/A	N/A	N/A	CPS
CNTC/CFTC (Tank)	2.159	2.351	N/A	N/A	N/A	N/A	
High resolution Integrated Logging Tool−CTS Wellsite Calibration − Accelerometer Calibration							
Before: 17−Feb−2010 7:29							
Z−Axis Acceleration	32.19	N/A	32.21	N/A	N/A	N/A	F/S2
High resolution Integrated Logging Tool−CTS Master Calibration − Inversion results							
Master: 16−Feb−2010 14:22							
Rho Aluminum	2.596	2.600	−−	−−	−−	−−	G/C3
Rho Magnesium	1.686	1.686	−−	−−	−−	−−	G/C3
Pe Aluminum	2.570	2.554	−−	−−	−−	−−	
Pe Magnesium	2.650	2.639	−−	−−	−−	−−	
High resolution Integrated Logging Tool−CTS Master Calibration − Deviation Summary							
Master: 16−Feb−2010 14:22							
BS Average Deviation	0	0.3068	−−	−−	−−	−−	%
BS Max Deviation	0	0.7997	−−	−−	−−	−−	%
SS Average Deviation	0	0.2497	−−	−−	−−	−−	%
SS Max Deviation	0	1.017	−−	−−	−−	−−	%
LS Average Deviation	0	0.5285	−−	−−	−−	−−	%
LS Max Deviation	0	1.602	−−	−−	−−	−−	%

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 3.357 IN.
NSR−F serial number 5168

High resolution Integrated Logging Tool−CTS / Equipment Identification

Primary Equipment:

Array Induction Tool − H	AIT − H	
Rm/SP Bottom Nose	AHRM − A	
Array Induction Sonde	AHIS − BA	397
HILT high−Resolution Mechanical Sonde	HRMS − B	
HILT Rxo Gamma−ray Device	HRGD − B	898
HILT Micro Cylindrically Focused Log Dev	MCFL −	
GR Logging Source	GLS − VJ	5363
HILT High Res. Control Cartridge	HRCC − B	

Auxiliary Equipment:

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Electronics Calibration Check − Thru Cal Mag. & Phase

Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.6193		0.6050	68.36		71.00
	Before	0.6195			69.52		
1	Master	1.271		1.270	67.36		70.00
	Before	1.272			68.53		
2	Master	0.6293		0.6230	63.29		66.00
	Before	0.6292			64.50		
3	Master	0.7116		0.7040	62.43		65.00
	Before	0.7120			63.64		
4	Master	1.330		1.337	55.68		59.00
	Before	1.331			56.94		
5	Master	1.924		1.955	53.53		57.00
	Before	1.926			54.84		
6	Master	1.927		1.955	53.50		57.00
	Before	1.929			54.81		
7	Master	1.353		1.415	48.00		53.00
	Before	1.357			49.69		
		60.00 % (Minimum)	140.0 % (Maximum)		Nom −60.00 (Minimum)	Nom + 60.00 (Maximum)	

Master: 30−Nov−2009 14:59 Before: 16−Feb−2010 10:51

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Electronics Calibration Check − Auxilliary

Phase	Array Induction SPA Plus MV	Value
Master		992.6
Before		991.7
	941.0 (Minimum) 990.5 (Nominal) 1040 (Maximum)	

Phase	Array Induction SPA Zero MV	Value
Master		−0.2184
Before		−0.2105
	−50.00 (Minimum) 0 (Nominal) 50.00 (Maximum)	

Phase	Array Induction Temperature Plus V	Value
Master		0.9194
Before		0.9185
	0.8700 (Minimum) 0.9150 (Nominal) 0.9600 (Maximum)	

Phase	Array Induction Temperature Zero V	Value
Master		−0.0002118
Before		−0.0002015
	−0.05000 (Minimum) 0 (Nominal) 0.05000 (Maximum)	

Master: 30−Nov−2009 14:59 Before: 16−Feb−2010 10:51

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Test Loop Gain Correction

Idx	Value	Test Loop Gain Magnitude V	Value	Phase DEG
0	1.013		−2.469	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
1	1.015		−0.1516	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
2	1.016		0.9347	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
3	1.012		0.1802	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
4	0.9923		0.1003	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
5	0.9870		−0.09392	

		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
6	0.9920				0.2377			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
7	1.003				−0.1620			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		−3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)

Master: 30−Nov−2009 14:59

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Sonde Error Correction

Idx	Value	R Sonde Error Correction MM/M			Value	X Sonde Error Correction MM/M		
0	−76.56				−228.6			
		−231.0 (Minimum)	−56.00 (Nominal)	119.0 (Maximum)		−2250 (Minimum)	0 (Nominal)	2250 (Maximum)
1	170.5				141.0			
		114.0 (Minimum)	159.0 (Nominal)	204.0 (Maximum)		−625.0 (Minimum)	0 (Nominal)	625.0 (Maximum)
2	110.7				−31.72			
		66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)		−350.0 (Minimum)	0 (Nominal)	350.0 (Maximum)
3	61.12				−44.12			
		39.00 (Minimum)	64.00 (Nominal)	89.00 (Maximum)		−250.0 (Minimum)	0 (Nominal)	250.0 (Maximum)
4	24.14				2.293			
		15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)		−63.00 (Minimum)	0 (Nominal)	63.00 (Maximum)
5	14.16				17.99			
		4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)		−50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)
6	9.674				−4.867			
		5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)		−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)
7	−1.714				−0.3559			
		−5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)		−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)

Master: 30−Nov−2009 14:59

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Mud Gain Correction

Idx	Value	Coarse − Mag, Real, Imag			Value	Fine − Mag, Real, Imag		
0	1.073				1.072			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
1	1.073				1.072			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
2	1.073				1.072			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)

Master: 30−Nov−2009 14:59

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Stab Measurement Summary

Phase	BS Window Ratio			Value	Phase	SS Window Ratio			Value	Phase	LS Window Ratio			Value
Before				0.7582	Before				0.4982	Before				0.2906
	0.7220 (Minimum)	0.7600 (Nominal)	0.7980 (Maximum)			0.4748 (Minimum)	0.4998 (Nominal)	0.5248 (Maximum)			0.2780 (Minimum)	0.2927 (Nominal)	0.3073 (Maximum)	
Phase	BS Window Sum CPS			Value	Phase	SS Window Sum CPS			Value	Phase	LS Window Sum CPS			Value
Before				10390	Before				9831	Before				1031
	9887 (Minimum)	10410 (Nominal)	10930 (Maximum)			9341 (Minimum)	9832 (Nominal)	10320 (Maximum)			977.6 (Minimum)	1029 (Nominal)	1081 (Maximum)	

Before: 16−Feb−2010 15:10

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Photo−multiplier High Voltages Calibrations

Phase	BS PM High Voltage (Command) V	Value
Before		1408
	1263 (Minimum) 1363 (Nominal) 1463 (Maximum)	

Phase	SS PM High Voltage (Command) V	Value
Before		1427
	1301 (Minimum) 1401 (Nominal) 1501 (Maximum)	

Phase	LS PM High Voltage (Command) V	Value
Before		1540
	1417 (Minimum) 1517 (Nominal) 1617 (Maximum)	

Before: 16−Feb−2010 15:10

High resolution Integrated Logging Tool−CTS Wellsite Calibration
Crystal Quality Resolutions Calibration

Phase	BS Crystal Resolution %	Value
Before		10.65
	9.637 (Minimum) 10.64 (Nominal) 11.64 (Maximum)	

Phase	SS Crystal Resolution %	Value
Before		9.156
	8.215 (Minimum) 9.215 (Nominal) 10.21 (Maximum)	

Phase	LS Crystal Resolution %	Value
Before		9.978
	9.176 (Minimum) 10.18 (Nominal) 11.18 (Maximum)	

Before: 16−Feb−2010 15:10

High resolution Integrated Logging Tool−CTS Wellsite Calibration
MCFL Calibration

Phase	Raw B0 Resistivity OHMM	Value
Before		3876
	3565 (Minimum) 3875 (Nominal) 4185 (Maximum)	

Phase	Raw B1 Resistivity OHMM	Value
Before		3823
	3524 (Minimum) 3830 (Nominal) 4136 (Maximum)	

Phase	Raw B2 Resistivity OHMM	Value
Before		3825
	3524 (Minimum) 3830 (Nominal) 4136 (Maximum)	

Before: 16−Feb−2010 15:06

High resolution Integrated Logging Tool−CTS Wellsite Calibration
HILT Caliper Calibration

Phase	HILT Caliper Zero Measurement IN	Value
Before		9.852
	6.000 (Minimum) 8.000 (Nominal) 10.00 (Maximum)	

Phase	HILT Caliper Plus Measurement IN	Value
Before		13.98
	9.000 (Minimum) 12.00 (Nominal) 15.00 (Maximum)	

Before: 16−Feb−2010 10:49

High resolution Integrated Logging Tool−CTS Wellsite Calibration
Detector Calibration

Phase	Gamma Ray Background GAPI	Value
Before		74.73
	0 (Minimum) 30.00 (Nominal) 120.0 (Maximum)	

Phase	Gamma Ray (Jig − Bkg) GAPI	Value
Before		176.8
	160.7 (Minimum) 176.8 (Nominal) 192.8 (Maximum)	

Phase	Gamma Ray (Calibrated) GAPI	Value
Before		165.0
	150.0 (Minimum) 165.0 (Nominal) 180.0 (Maximum)	

Before: 16−Feb−2010 10:49

High resolution Integrated Logging Tool−CTS Wellsite Calibration
Zero Measurement

Phase	CNTC Background CPS	Value
Master		26.69
Before		27.56
	5.000 (Minimum) 26.69 (Nominal) 40.00 (Maximum)	

Phase	CFTC Background CPS	Value
Master		33.46
Before		29.01
	5.000 (Minimum) 33.46 (Nominal) 40.00 (Maximum)	

Master: 10−Jan−2010 18:39 Before: 16−Feb−2010 10:58

High resolution Integrated Logging Tool−CTS Wellsite Calibration
Ratio Measurement

Phase	Thermal Near Corr. (Tank) CPS	Value
Master		5102
	4700 (Minimum) 5800 (Nominal) 6900 (Maximum)	

Phase	Thermal Far Corr. (Tank) CPS	Value
Master		2170
	1900 (Minimum) 2400 (Nominal) 2900 (Maximum)	

Phase	CNTC/CFTC (Tank)	Value
Master		2.351
	2.120 (Minimum) 2.159 (Nominal) 2.540 (Maximum)	

Master: 10−Jan−2010 18:39

High resolution Integrated Logging Tool−CTS Wellsite Calibration
Accelerometer Calibration

Phase	Z−Axis Acceleration F/S2	Value
Before		32.21
	31.53 (Minimum) 32.19 (Nominal) 32.84 (Maximum)	

Before: 17−Feb−2010 7:29

High resolution Integrated Logging Tool−CTS Master Calibration

Electronics Calibration Check − Thru Cal Mag. & Phase

Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.6193		0.6050	68.36		71.00
1	Master	1.271		1.270	67.36		70.00
2	Master	0.6293		0.6230	63.29		66.00
3	Master	0.7116		0.7040	62.43		65.00
4	Master	1.330		1.337	55.68		59.00
5	Master	1.924		1.955	53.53		57.00
6	Master	1.927		1.955	53.50		57.00
7	Master	1.353		1.415	48.00		53.00
		60.00 % (Minimum)	140.0 % (Maximum)		Nom −60.00 (Minimum)	Nom + 60.00 (Maximum)	

Master: 30−Nov−2009 14:59

High resolution Integrated Logging Tool−CTS Master Calibration

Electronics Calibration Check − Auxilliary

Phase	Array Induction SPA Plus MV	Value	Phase	Array Induction SPA Zero MV	Value
Master		992.6	Master		−0.2184
	941.0 (Minimum) 990.5 (Nominal) 1040 (Maximum)			−50.00 (Minimum) 0 (Nominal) 50.00 (Maximum)	

Phase	Array Induction Temperature Plus V	Value	Phase	Array Induction Temperature Zero V	Value
Master		0.9194	Master		−0.0002118
	0.8700 (Minimum) 0.9150 (Nominal) 0.9600 (Maximum)			−0.05000 (Minimum) 0 (Nominal) 0.05000 (Maximum)	

Master: 30−Nov−2009 14:59

High resolution Integrated Logging Tool−CTS Master Calibration

Test Loop Gain Correction

Idx	Value	Test Loop Gain Magnitude V	Value	Phase DEG
0	1.013		−2.469	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
1	1.015		−0.1516	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
2	1.016		0.9347	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
3	1.012		0.1802	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
4	0.9923		0.1003	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
5	0.9870		−0.09392	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
6	0.9920		0.2377	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
7	1.003		−0.1620	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	

Master: 30−Nov−2009 14:59

High resolution Integrated Logging Tool−CTS Master Calibration

Sonde Error Correction

Idx	Value	R Sonde Error Correction MM/M	Value	X Sonde Error Correction MM/M
0	−76.56		−228.6	
	−231.0 (Minimum) −56.00 (Nominal) 119.0 (Maximum)		−2250 (Minimum) 0 (Nominal) 2250 (Maximum)	

1	170.5				141.0			
	114.0 (Minimum)	159.0 (Nominal)	204.0 (Maximum)		−625.0 (Minimum)	0 (Nominal)	625.0 (Maximum)	
2	110.7				−31.72			
	66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)		−350.0 (Minimum)	0 (Nominal)	350.0 (Maximum)	
3	61.12				−44.12			
	39.00 (Minimum)	64.00 (Nominal)	89.00 (Maximum)		−250.0 (Minimum)	0 (Nominal)	250.0 (Maximum)	
4	24.14				2.293			
	15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)		−63.00 (Minimum)	0 (Nominal)	63.00 (Maximum)	
5	14.16				17.99			
	4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)		−50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)	
6	9.674				−4.867			
	5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)		−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)	
7	−1.714				−0.3559			
	−5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)		−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)	

Master: 30−Nov−2009 14:59

High resolution Integrated Logging Tool−CTS Master Calibration

Mud Gain Correction

Idx	Value	Coarse − Mag, Real, Imag			Value	Fine − Mag, Real, Imag		
0	1.073				1.072			
	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	
1	1.073				1.072			
	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	
2	1.073				1.072			
	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	

Master: 30−Nov−2009 14:59

High resolution Integrated Logging Tool−CTS Master Calibration

Inversion results

Phase	Rho Aluminum G/C3			Value	Phase	Rho Magnesium G/C3			Value
Master				2.600	Master				1.686
	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				2.554	Master				2.639
	2.470 (Minimum)	2.570 (Nominal)	2.670 (Maximum)			2.550 (Minimum)	2.650 (Nominal)	2.750 (Maximum)	

Master: 16−Feb−2010 14:22

High resolution Integrated Logging Tool−CTS Master Calibration

Deviation Summary

Phase	BS Average Deviation %			Value	Phase	SS Average Deviation %			Value	Phase	LS Average Deviation %			Value
Master				0.3068	Master				0.2497	Master				0.5285
	−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				0.7997	Master				1.017	Master				1.602
	−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: 16−Feb−2010 14:22

High resolution Integrated Logging Tool−CTS Master Calibration

Zero Measurement

Phase	CNTC Background CPS			Value	Phase	CFTC Background CPS			Value
Master				26.69	Master				33.46

5.000 (Minimum)	26.69 (Nominal)	40.00 (Maximum)		5.000 (Minimum)	33.46 (Nominal)	40.00 (Maximum)		

Master: 10−Jan−2010 18:39

High resolution Integrated Logging Tool−CTS Master Calibration

Tank Measurement

Phase	Thermal Near Corr. (Tank) CPS			Value	Phase	Thermal Far Corr. (Tank) CPS			Value	Phase	CNTC/CFTC (Tank)			Value
Master				5102	Master				2170	Master				2.351
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 18:39

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

Schlumberger

Well: **Bella 19−8**
Field: **Wattenberg**
County: **Weld**
State: **Colorado**

Platform Express
Compensated Neutron
Litho Density