HALLIBURTON

SPECTRAL DENSITY DUAL SPACED NEUTRON LOG

COMPANY CHAMA OIL & MINERALS LLC
WELL SORS-1P
FIELD/BLOCK WILDCAT
COUNTY WASHINGTON
STATE CO

COMPANY **CHAMA OIL & MINERALS LLC**

WELL **SORS-1P**

FIELD/BLOCK **WILDCAT**

COUNTY **WASHINGTON** STATE **CO**

API No. 05121110180000

Location LATITUDE: 40.279391°
LONGITUDE: -103.394496°

SHL: 650' FSL & 650' FWL SWSW

Sect. 26 Twp. 4N Rge. 54W

Other Services:
RWCH
DLLT
MSFL
BSAT

Permanent Datum	GL	Elev. 4412.5 ft	Elev.: K.B. 4434.6 ft
Log measured from	KB	, 22.1 ft above perm. Datum	D.F. 4434.6 ft
Drilling measured from	KB		G.L. 4412.5 ft

Date		08-Jan-13					
Run No.		1					
Depth - Driller		6385.00 ft					
Depth - Logger		6366.0 ft					
Bottom - Logged Interval		6284.0 ft					
Top - Logged Interval		547.0 ft					
Casing - Driller		13.375 in @ 550.0 ft		@		@	
Casing - Logger		547.0 ft					
Bit Size		12.250 in		@		@	
Type Fluid in Hole		WATER BASED MUD					
Density	Viscosity	10.5 ppg	47.00 s/qt				
PH	Fluid Loss	10.50 pH	5.8 cptm				
Source of Sample		FLOWLINE					
Rm @ Meas. Temperature		0.069 ohmm @ 36.00 degF		@		@	
Rmf @ Meas. Temperature		0.02 ohmm @ 75.00 degF		@		@	
Rmc @ Meas. Temperature		0.065 ohmm @ 75.00 degF		@		@	
Source Rmf	Rmc	CHART	CHART				
Rm @ BHT		0.02 ohmm @ 179.0 degF		@		@	
Time Since Circulation		10.0 hr					
Time on Bottom		08-Jan-13 05:58					
Max. Rec. Temperature		179.0 degF @ 6366.0 ft		@		@	
Equipment	Location	11072147	BRIGHTON				
Recorded By		J. WALDEN					
Witnessed By		LARRY KEITH					

Fold here

Service Ticket No.:
API Serial No.: 05121110180000
PGM Version: WL INSITE R3.8.0 (Build 2)

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE

Date	Sample No.				
Depth-Driller					
Type Fluid in Hole					
Density	Viscosity				
Ph	Fluid Loss				
Source of Sample					
Rm @ Meas. Temp		@	@	@	@
Rmf @ Meas. Temp.		@	@	@	@
Rmc @ Meas. Temp.		@	@	@	@
Source Rmf	Rmc				
Rm @ BHT		@	@	@	@
Rmf @ BHT		@	@	@	@
Rmc @ BHT		@	@	@	@

RESISTIVITY SCALE CHANGES

	Type Log	Depth	Scale Up Hole	Scale Down Hole

RESISTIVITY EQUIPMENT DATA

	Run No.	Tool Type & No.	Pad Type	Tool Pos.	Other
	@				
	@	ONE	DLLT	N/A	ECCE.	N/A
	@		90277021			
		ONE	MSFL	STAN.	ECCE.	N/A
	@		11976327			
	@					
	@					

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	11958944	Serial No.	11105780	Serial No.	11014271	Serial No.	11219332
Model No.	GTET	Model No.	BSAT	Model No.	SDLT	Model No.	DSNT
Diameter	3.625"	No. of Cent.	2	Diameter	4.5"	Diameter	3.625"
Detector Model No.	GTET	Spacing	2'	Log Type	GAM-GAM	Log Type	NEU-NEU
Type	SCINT			Source Type	CS137	Source Type	AM241BE
Length	8"	LSA [Y/N]	N/A	Serial No.	5256GW	Serial No.	DSN430
Distance to Source	14'	FWDA [Y/N]	N/A	Strength	1.78CI	Strength	15CI

LOGGING DATA

GENERAL				GAMMA		ACOUSTIC			DENSITY			NEUTRON		
Run	Depth		Speed	Scale		Scale		Matrix	Scale		Matrix	Scale		Matrix
No.	From	To	ft/min	L	R	L	R		L	R		L	R	
ONE	6366	CSG	REC	0	200	140	40	55.5	30	-10	2.68	30	10	SAND

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@

Remarks: RWCH-SP-GTET-DSNT-SDLT-BSAT-IDT-ICT-DLLT-MSFL RUN WITH TWO STANDOFFS FOR DLL AND TWO CENTRALIZERS FOR BSAT.
WASHOUTS, BOREHOLE RUGOSITY, AND TIGHT PULLS MAY AFFECT LOG RESPONSE.

YOUR CREW TODAY: A. AXE, M. BURNETT, C. KLEINSASSER.
THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES. BRIGHTON, CO.

HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, FOR ANY LOSS, DAMAGES, OR EXPENSES RESULTING FROM THE USE THEREOF.

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PARAMETERS REPORT

Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	12.250	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	10.500	ppg
	SHARED	WAGT	Weighting Agent	Natural	
	SHARED	BSAL	Borehole salinity	146000.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	0.069	ohmm
	SHARED	TRM	Temperature of Mud	36.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	9.625	in
	SHARED	ST	Surface Temperature	34.0	degF
	SHARED	TD	Total Well Depth	6366.00	ft
	SHARED	BHT	Bottom Hole Temperature	179.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	IDT	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	IDT	
	SHARED	TEMM	Temperature Master Tool	NONE	
	SHARED	BHSM	Borehole Size Master Tool	ICT	
	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
	Rwa /	AFAC	Archie A factor	0.6200	

CrossPlot	APAC	Archie A factor	0.6200	
Rwa / CrossPlot	MFAC	Archie M factor	2.1500	
Rwa / CrossPlot	RMFR	Rmf Reference	0.10	ohmm
Rwa / CrossPlot	TMFR	Rmf Ref Temp	75.00	degF
Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GRSO	Gamma Tool Standoff	0.000	in
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
DSNT	DNOK	Process DSN?	Yes	
DSNT	DEOK	Process DSN EVR?	No	
DSNT	NLIT	Neutron Lithology	Sandstone	
DSNT	DNSO	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in
DSNT	DNTP	Temperature Correction Type	None	
DSNT	DPRS	DSN Pressure Correction Type	None	
DSNT	SHCO	View More Correction Options	No	
DSNT	UTVD	Use TVD for Gradient Corrections?	No	
DSNT	LHWT	Logging Horizontal Water Tank?	No	
SDLT	CLOK	Process Caliper Outputs?	Yes	
SDLT Pad	DNOK	Process Density?	Yes	
SDLT Pad	DNOK	Process Density EVR?	No	
SDLT Pad	CB	Logging Calibration Blocks?	No	
SDLT Pad	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT Pad	DTWN	Disable temperature warning	No	
SDLT Pad	DMA	Formation Density Matrix	2.680	g/cc
SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
BSAT	MBOK	Compute BCAS Results?	Yes	
BSAT	FLLO	Frequency Filter Low Pass Value?	5000	Hz
BSAT	FLHI	Frequency Filter High Pass Value?	27000	Hz
BSAT	DTFL	Delta -T Fluid	189.00	uspf
BSAT	DTMT	Delta -T Matrix Type	Sandstone 55.5	
BSAT	DTSH	Delta -T Shale	100.00	uspf
BSAT	SPEQ	Acoustic Porosity Equation	Wylie	
IDT	WRTI	Survey Writing Interval	30	ft
IDT	SOPT	Smoothing Option	None	
ICT	CLOK	Process Caliper Outputs?	Yes	
ICT	DARM	Disable Caliper Arm	No	
ICT	ATDS	Arm To Disable	0	
ICT	REPM	Method to replace arm?	Caliper Average	
ICT	ARMV	Diameter to use for disabled arm	0.00	in
ICT	DARM	Disable Second Caliper Arm	No	
ICT	ATDS	Second Arm To Disable	0	
ICT	REPM	Method to replace second arm?	Caliper Average	
ICT	ARMV	Diameter to use for second disabled arm	0.00	in
ICT	NAVS	Navigation Source Tool	IDT	
ICT	CL1O	Radius 1 Offset	0.0	in
ICT	CL2O	Radius 2 Offset	0.0	in
ICT	CL3O	Radius 3 Offset	0.0	in
ICT	CL4O	Radius 4 Offset	0.0	in
ICT	CL5O	Radius 5 Offset	0.0	in
ICT	CL6O	Radius 6 Offset	0.0	in
ICT	BHVC	Radius type for borehole volume calcuations	Elliptical	

DLLT	DLOK	Process Dual Laterolog?	Yes
DLLT	DBOK	Process Dual Laterolog Borehole Corrections?	Yes
DLLT	SBHD	Select Borehole Diam Source	Caliper
DLLT	TPOS	Tool Position	Standoff
DLLT	TMPC	Temperature Correction Type	Tool Value
DLLT	DLOK	Calculate Dual Laterolog DI?	Yes
MSFL	DLOK	Process MSFL?	Yes
MSFL	SLPD	Use MSFL Slim Hole Pad?	No
MSFL	CLOK	Process Caliper Outputs?	Yes

BOTTOM

Data: SORS_1P\0002 GTET-DSNT-SDLT-BSAT-DLLT-MSFL\IDLE **Date: 08-Jan-13 07:34:06**

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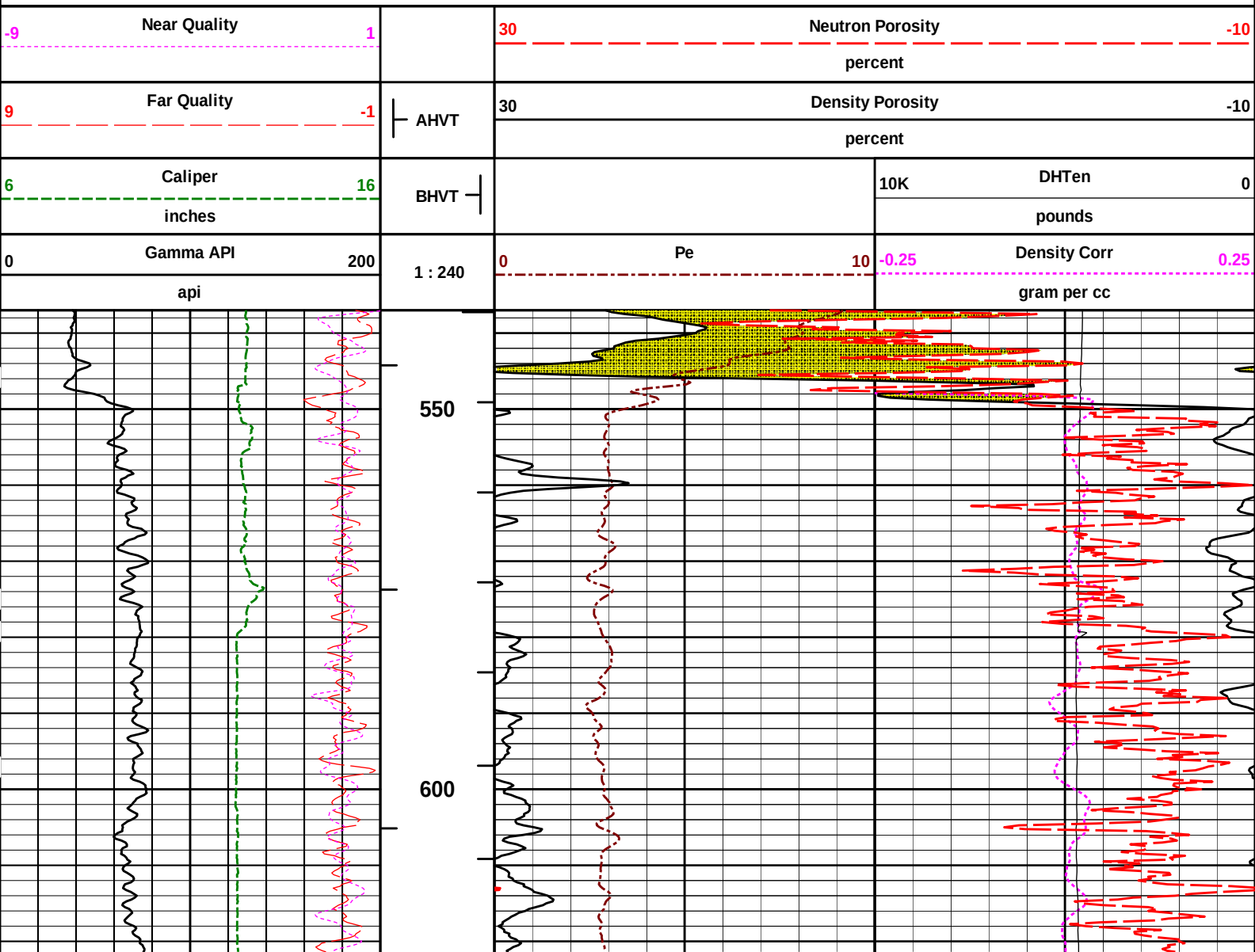
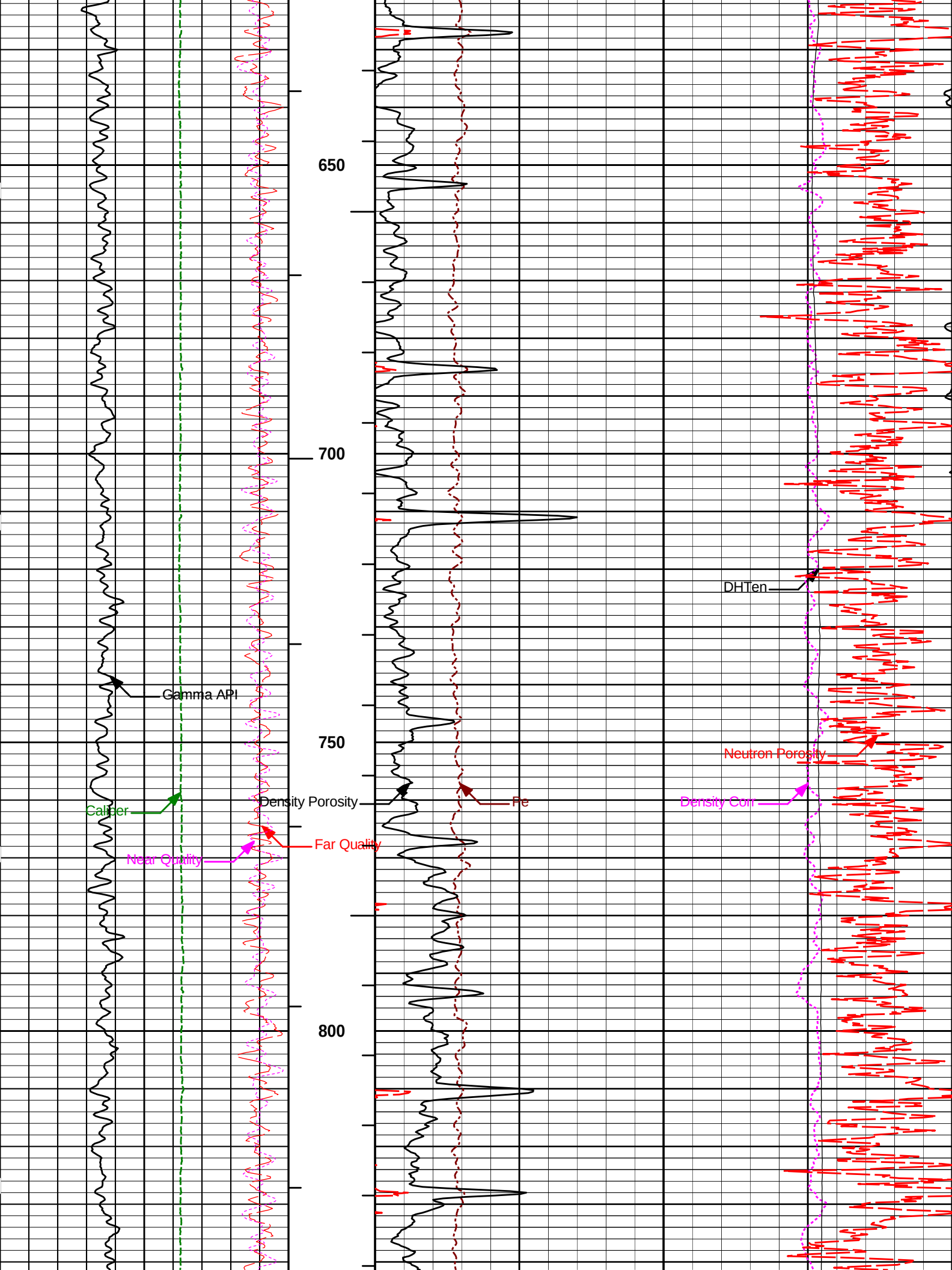
Plot Time: 08-Jan-13 10:00:07
Plot Range: 537 ft to 6370.68 ft
Data: SORS_1P\Well Based\DAQ-0002-002
Plot File: \\PORO\IQ_POROSITY_5IN_RM

MAIN PASS 5" = 100'

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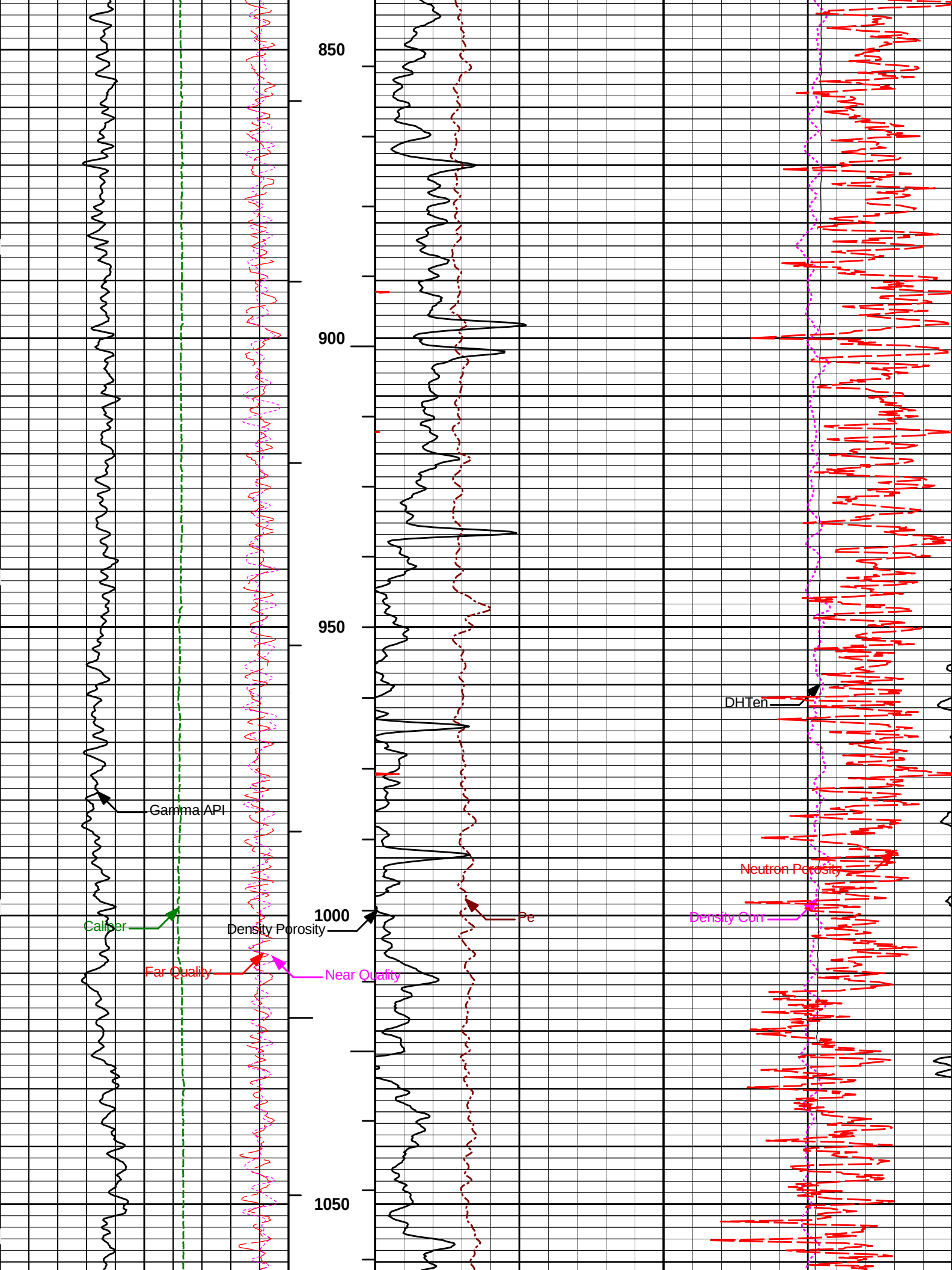
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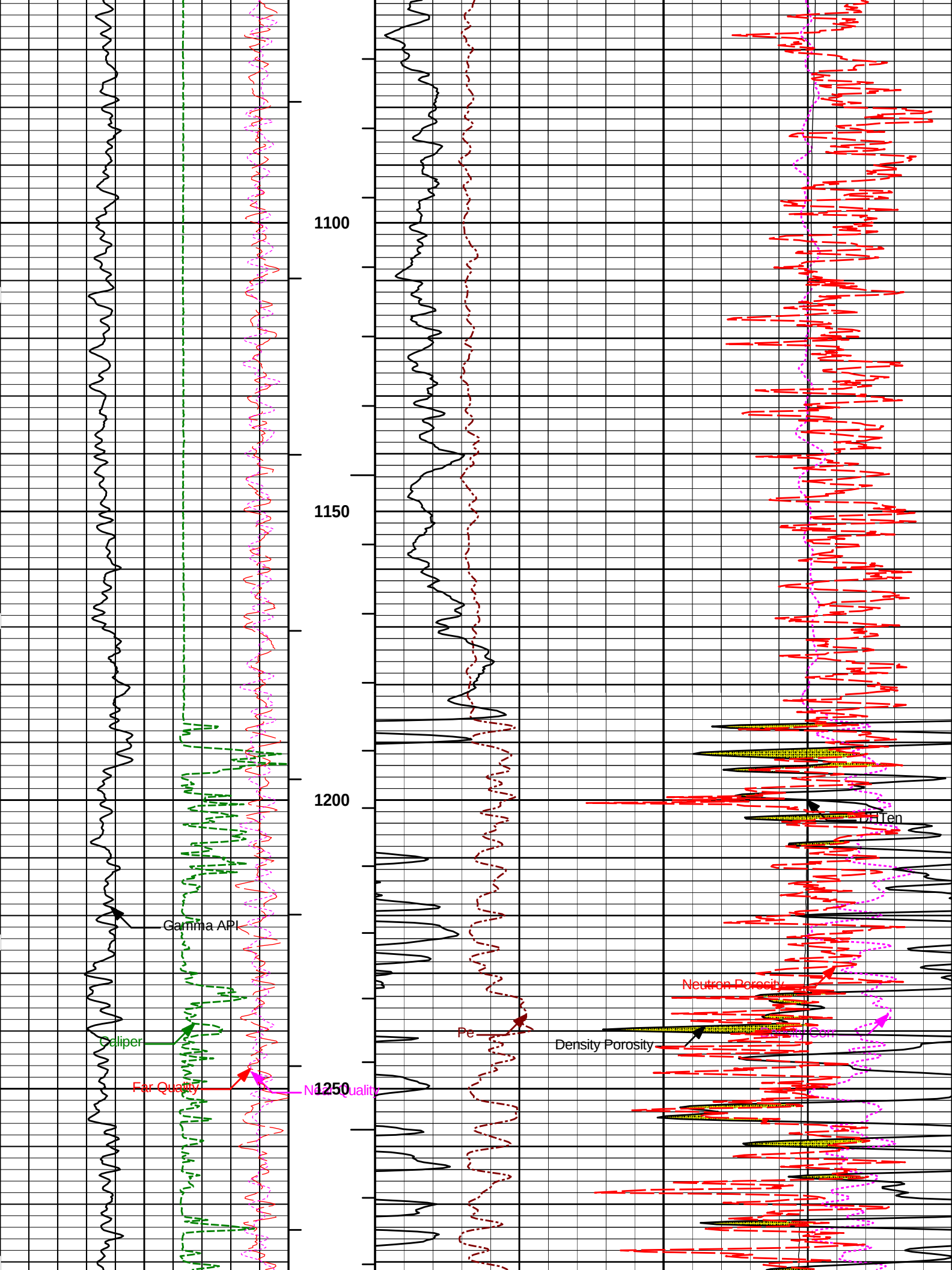
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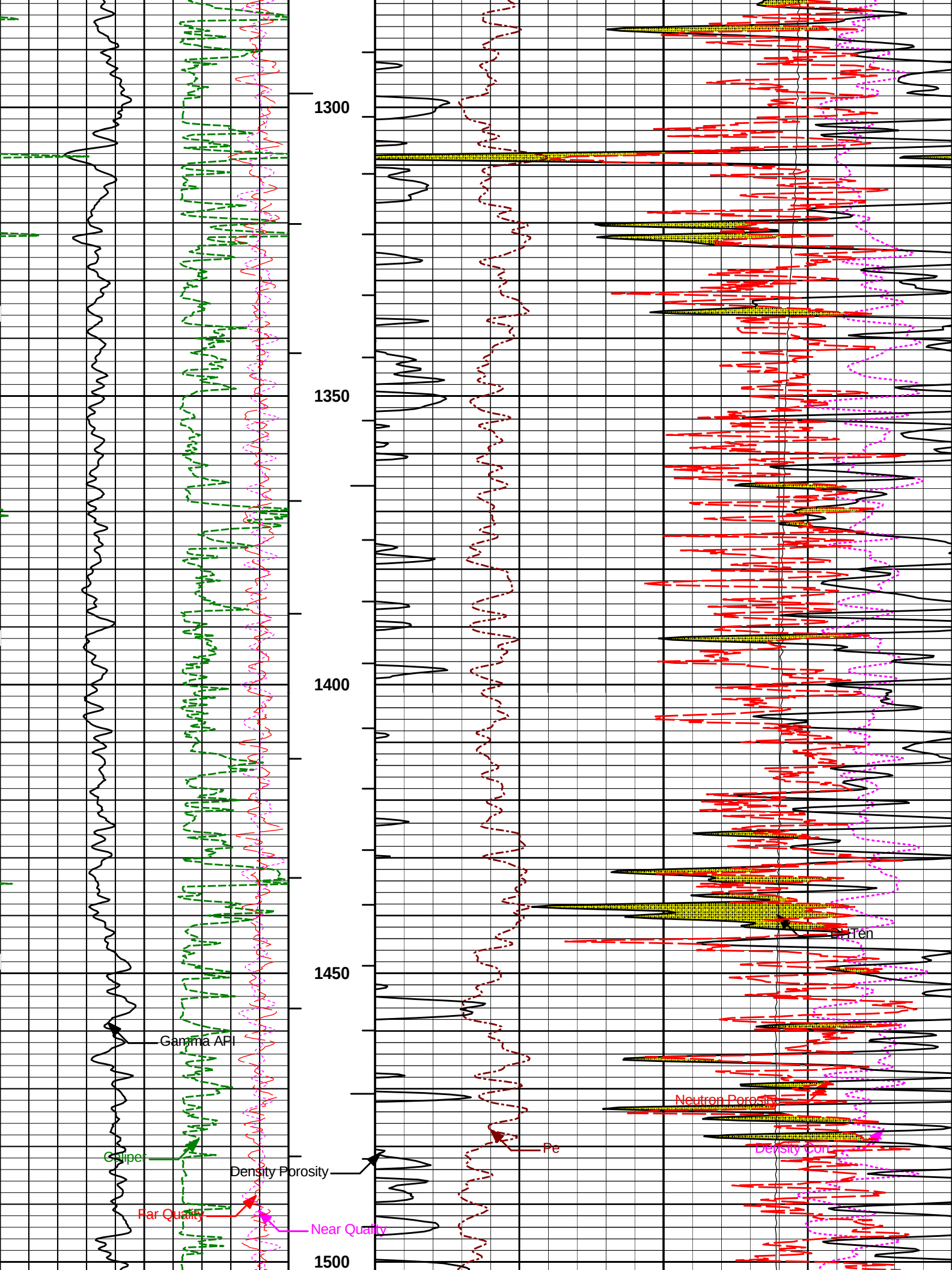
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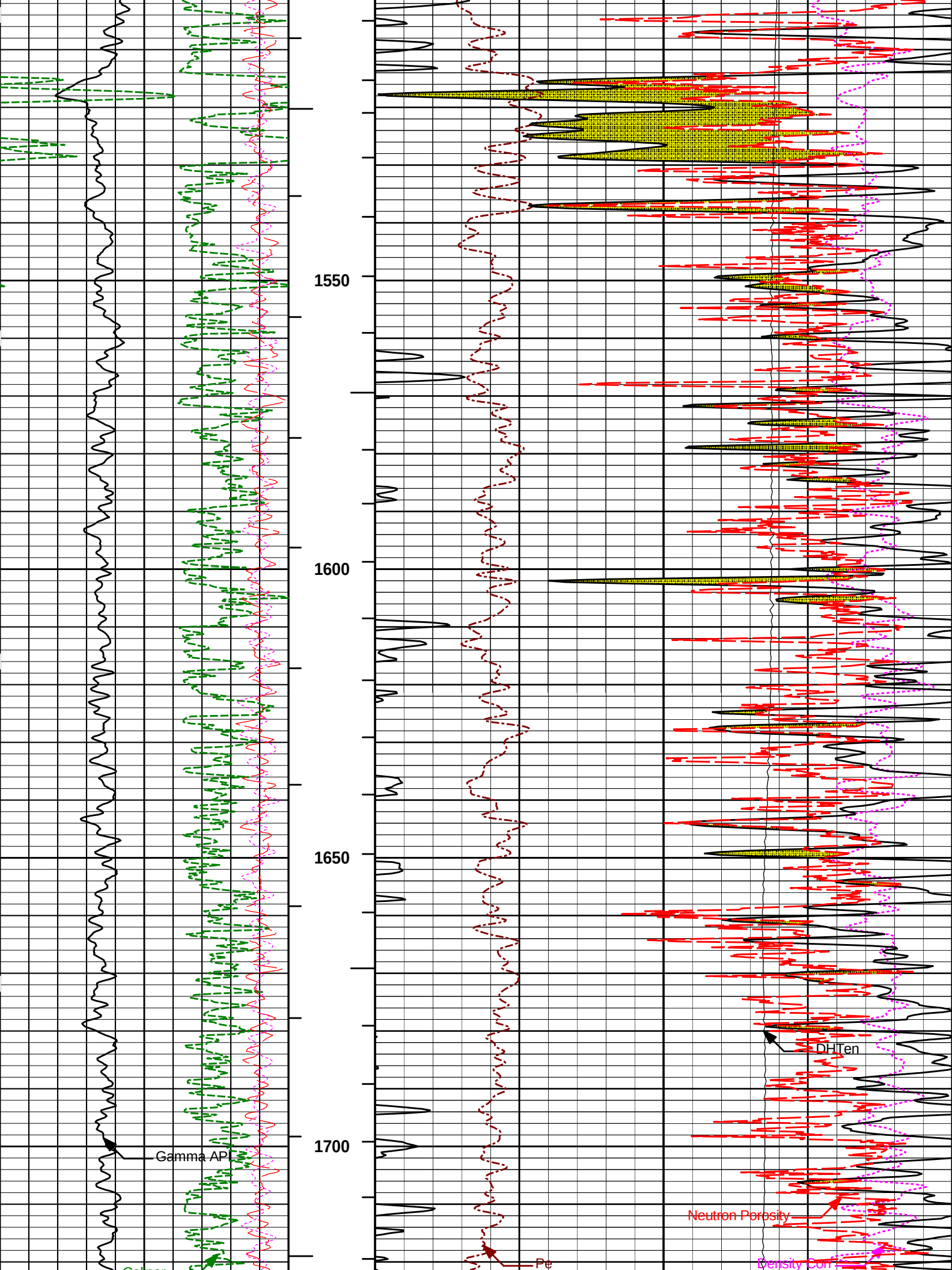
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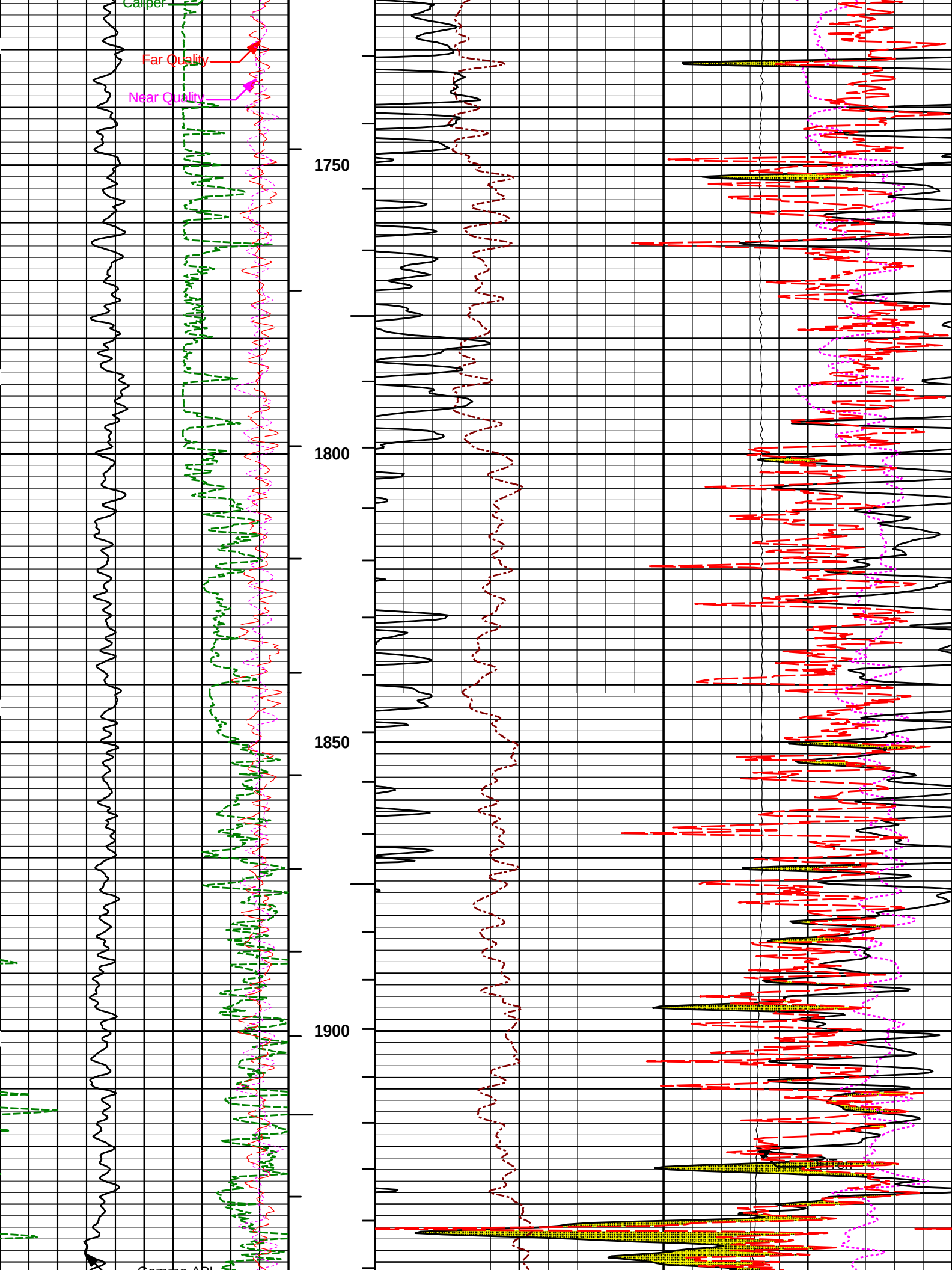
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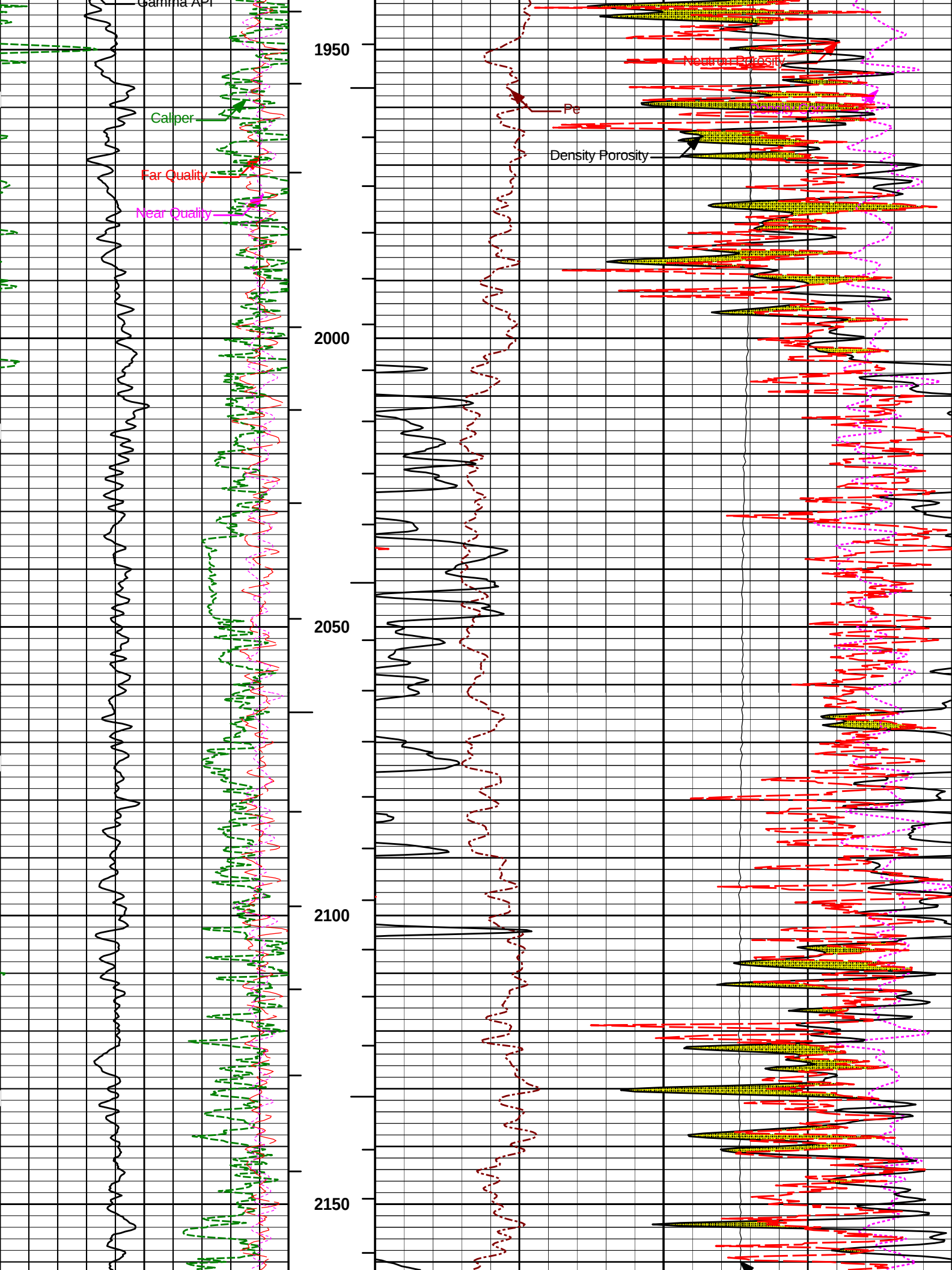
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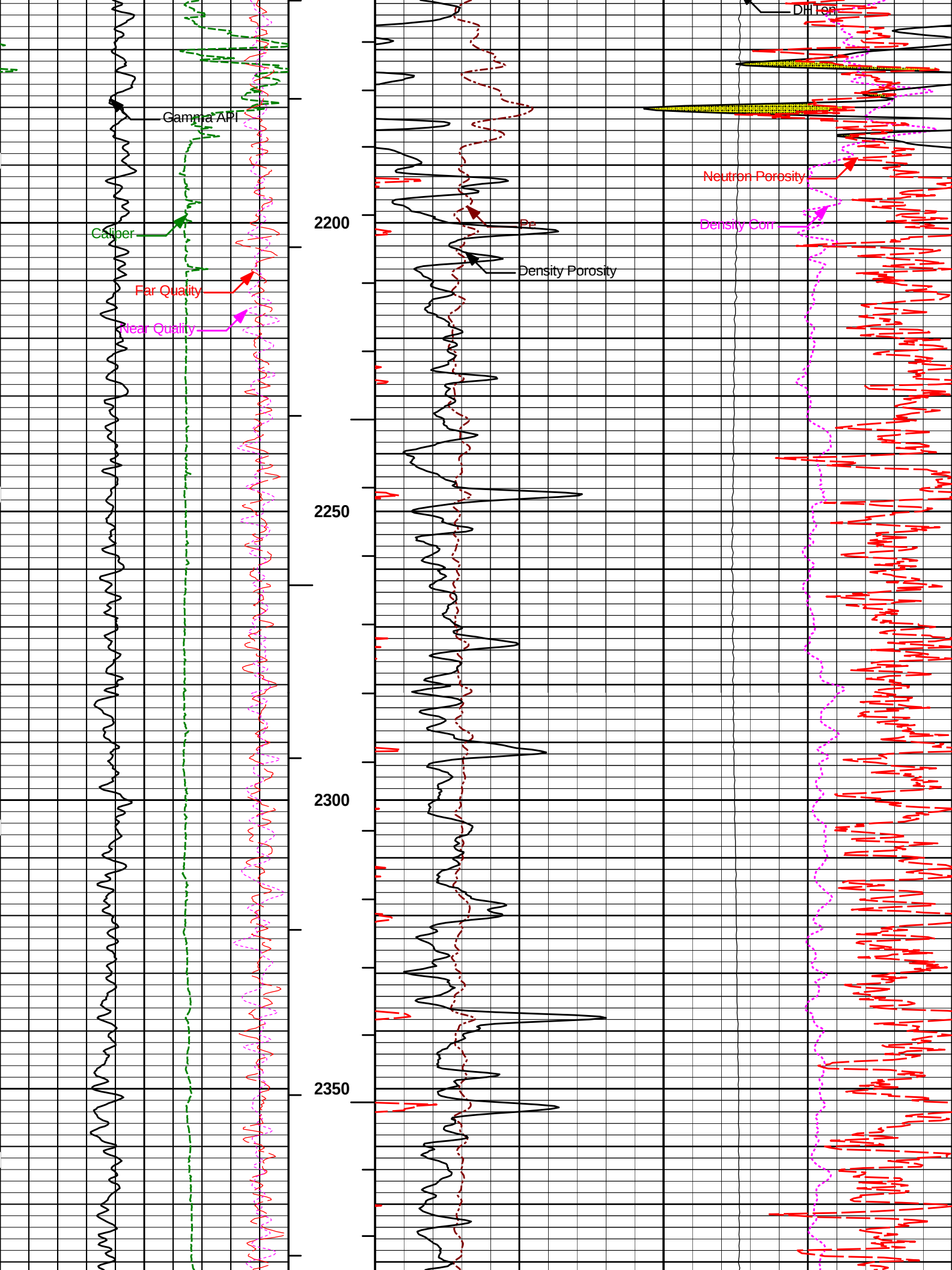
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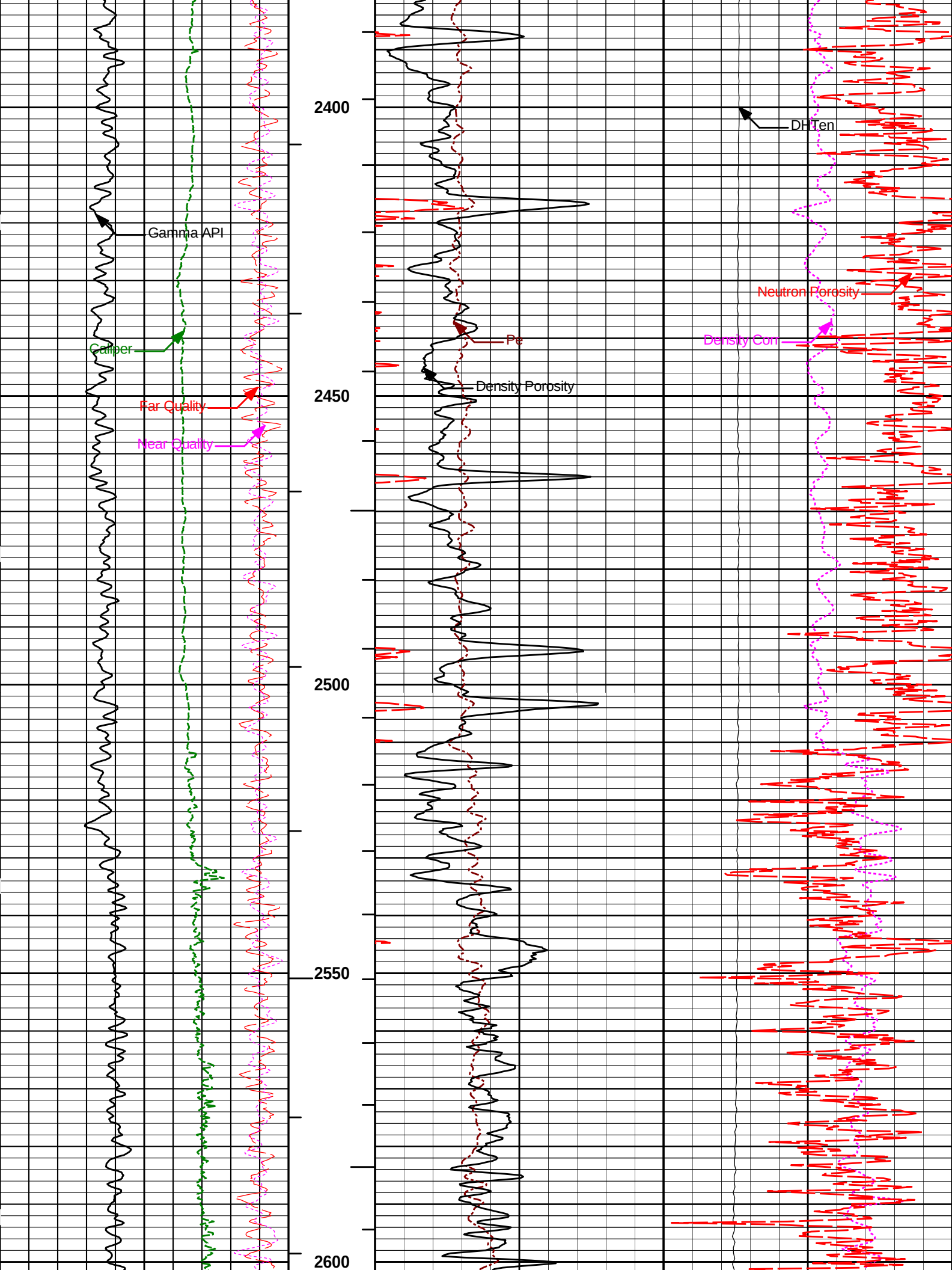
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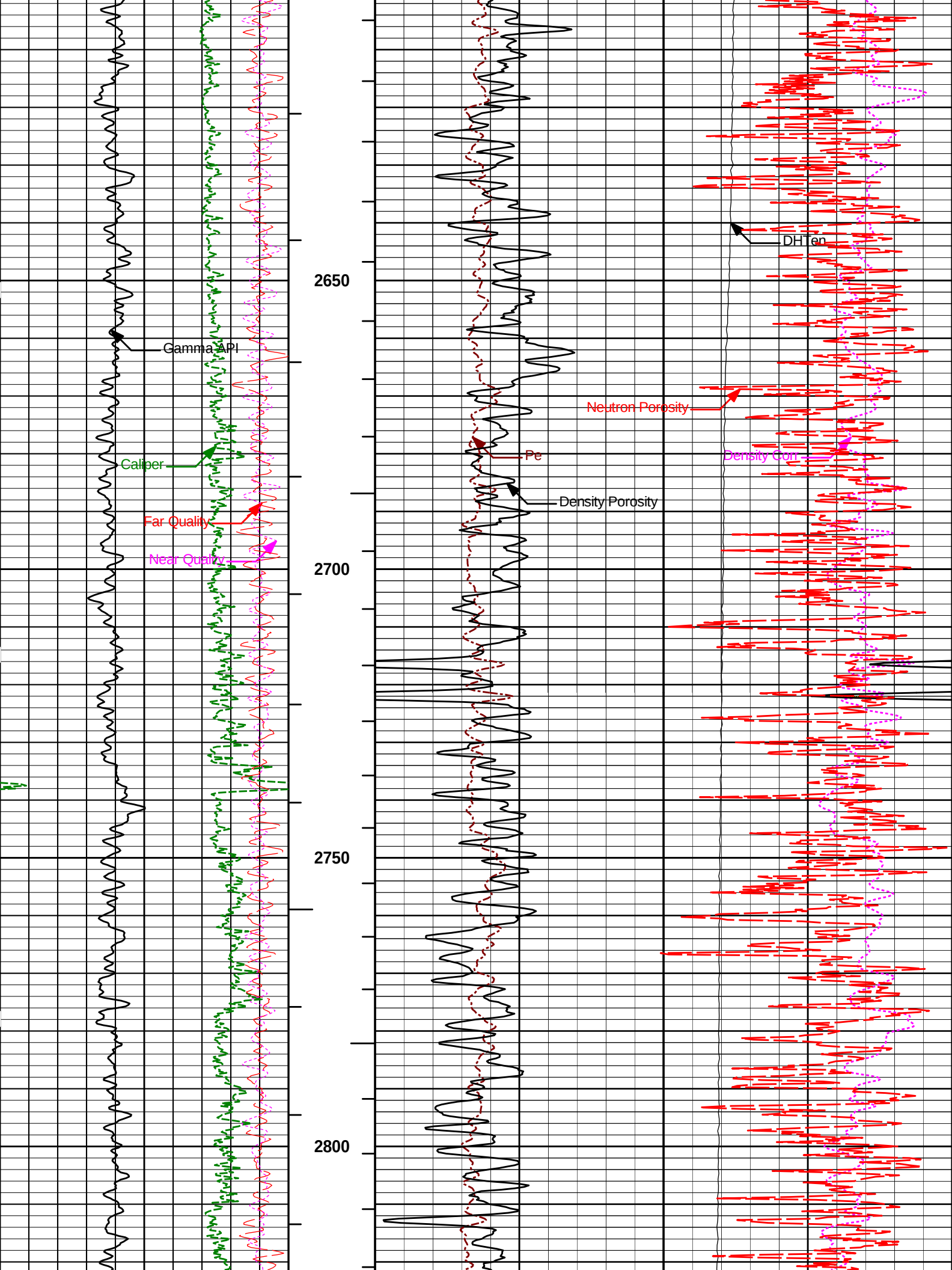
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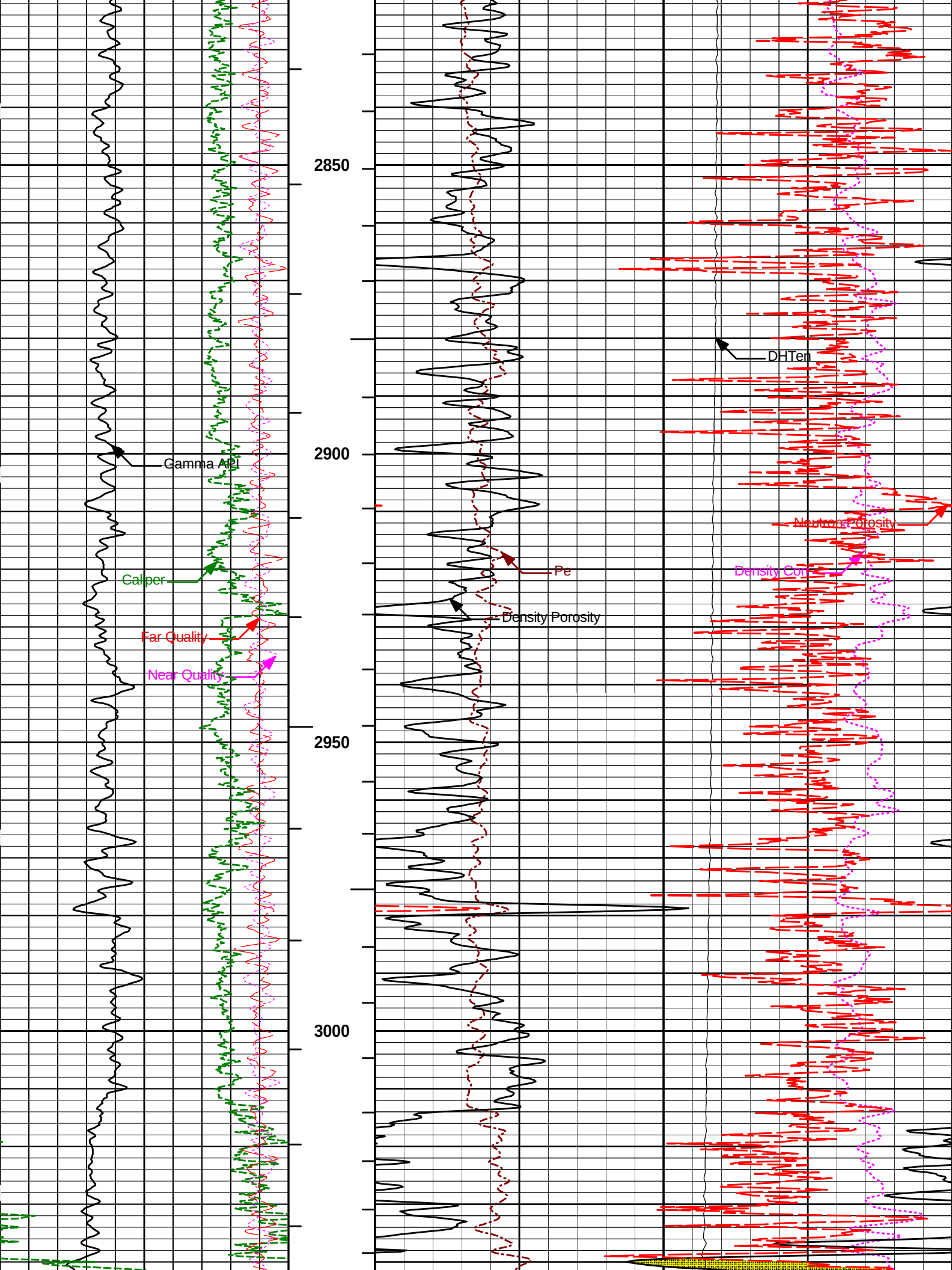
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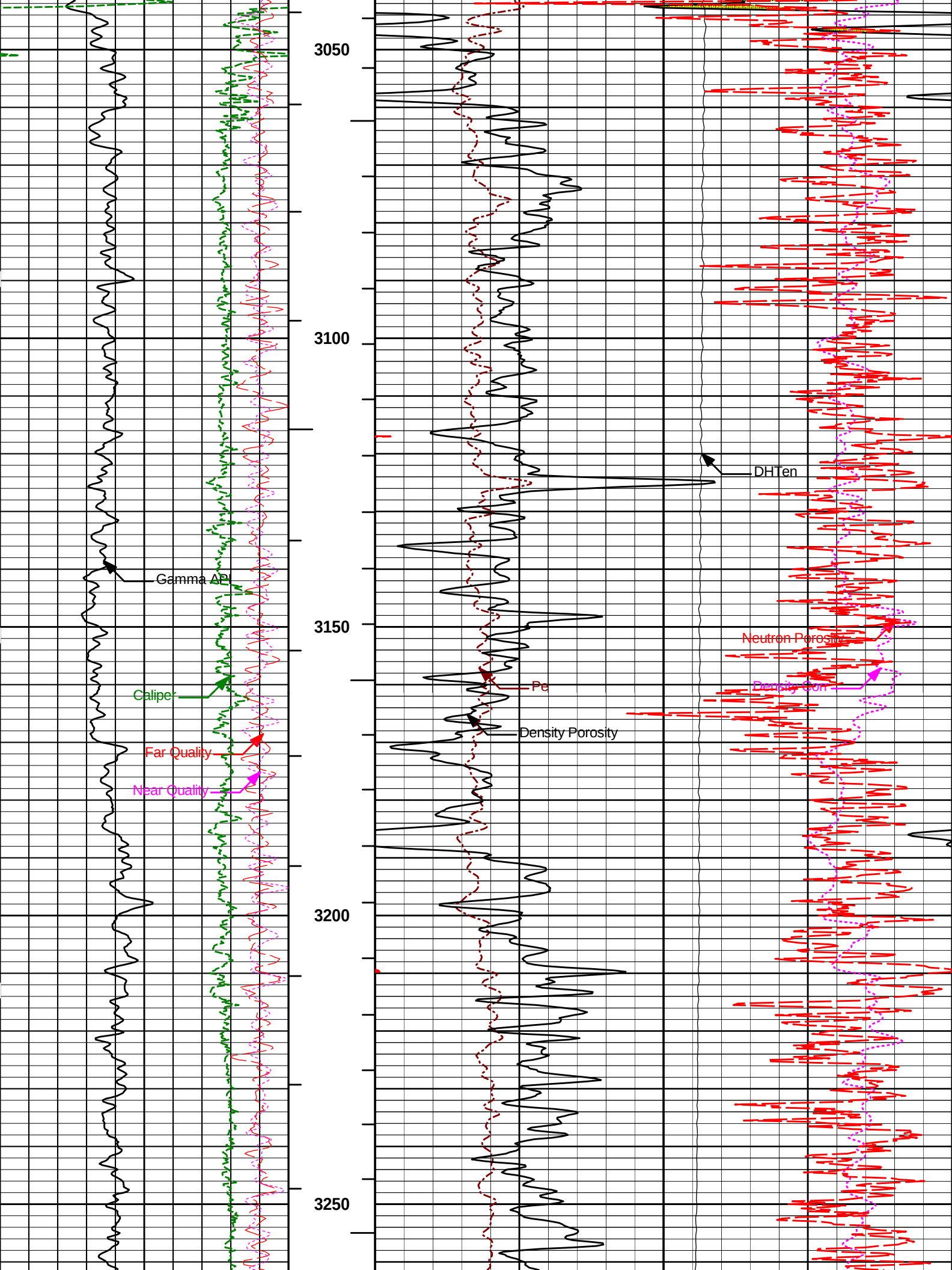
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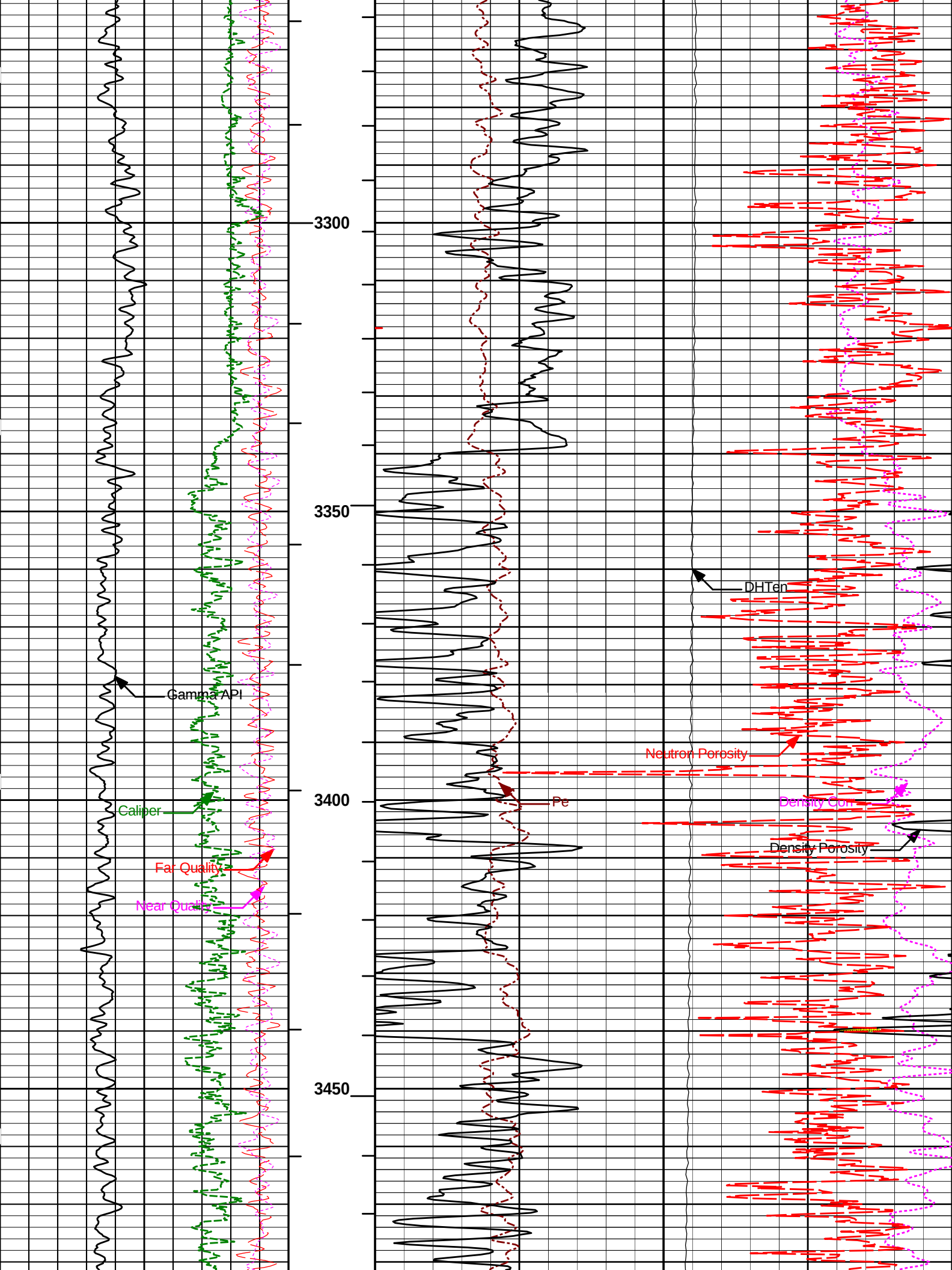
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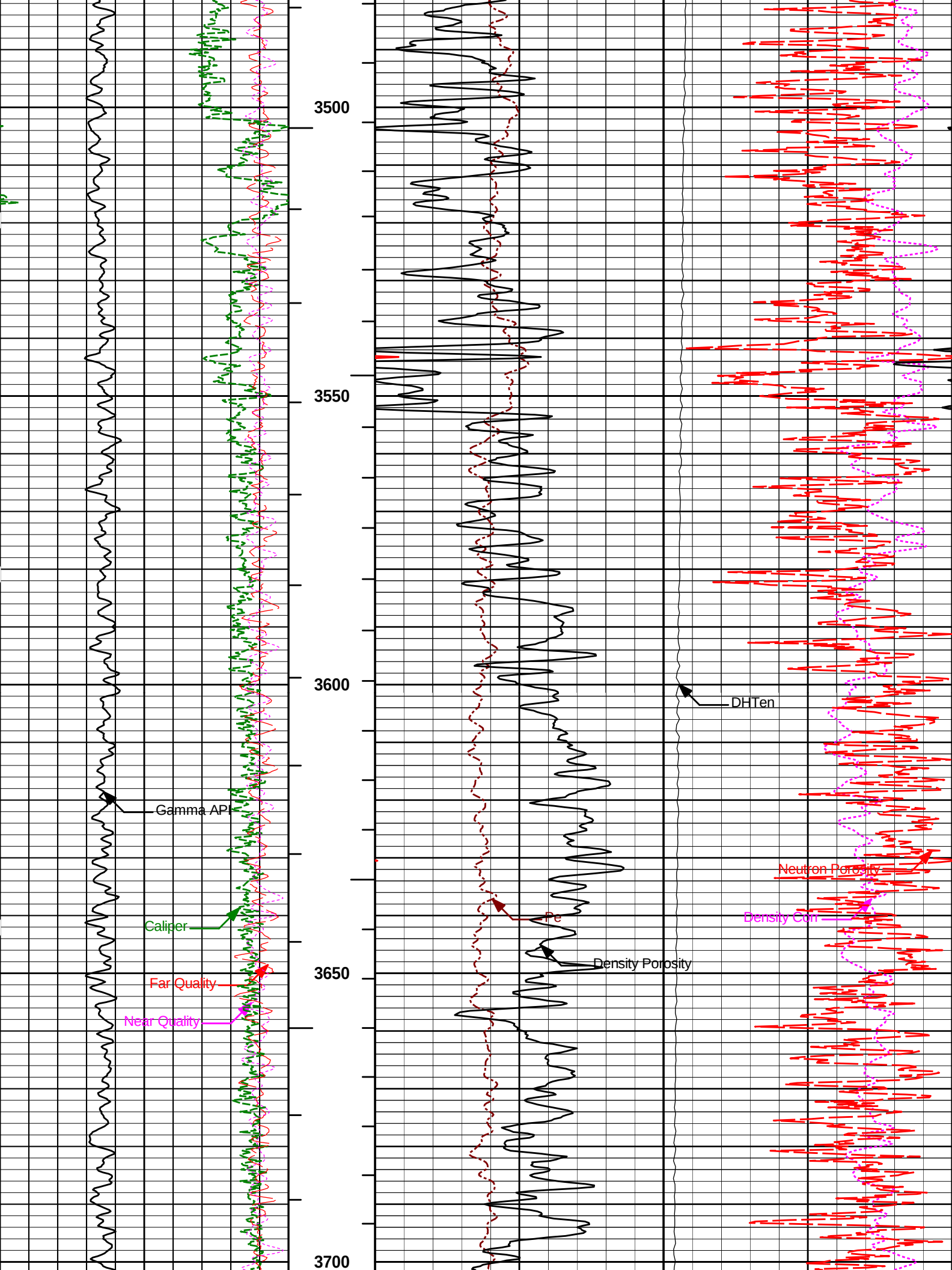
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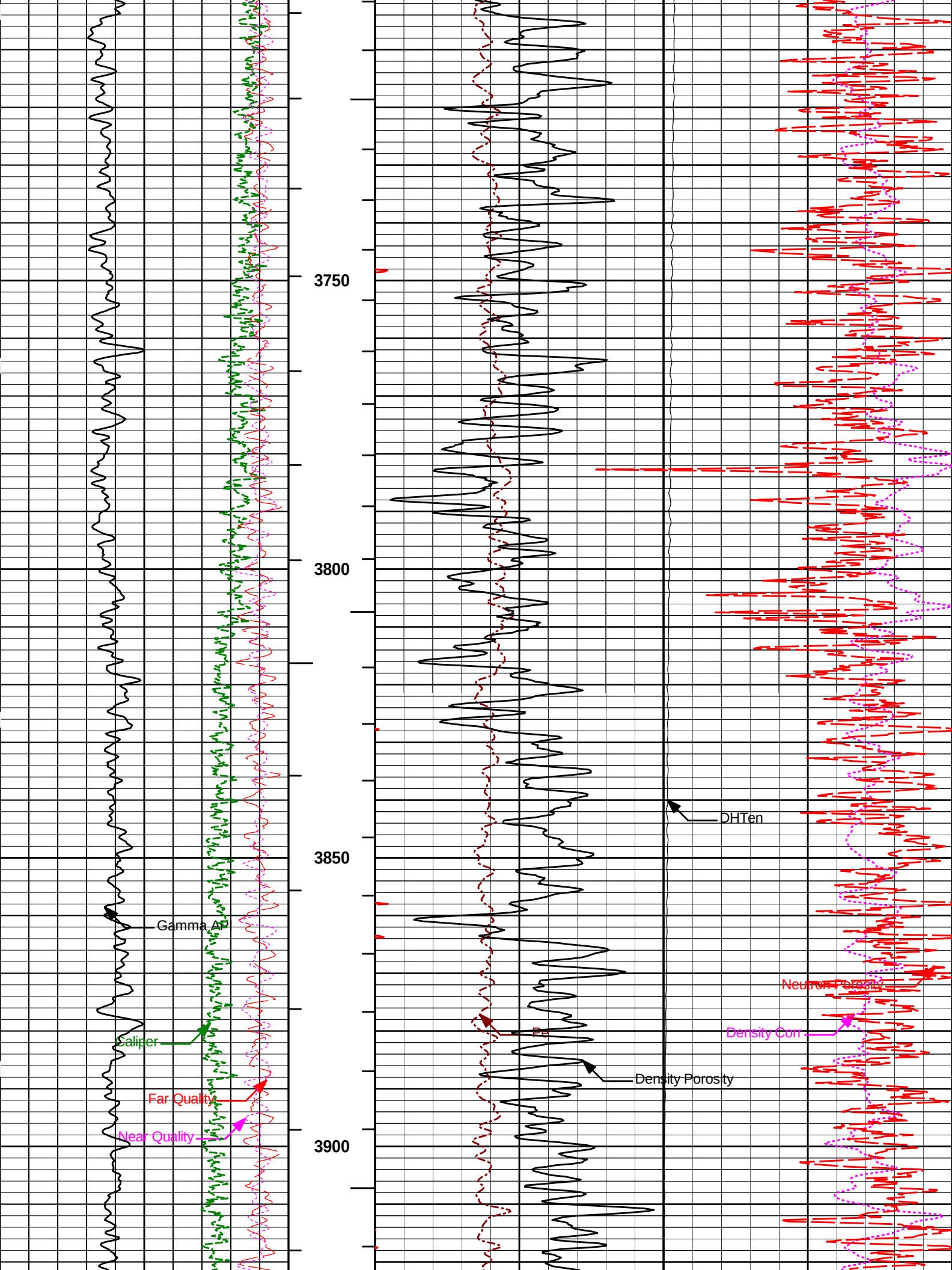
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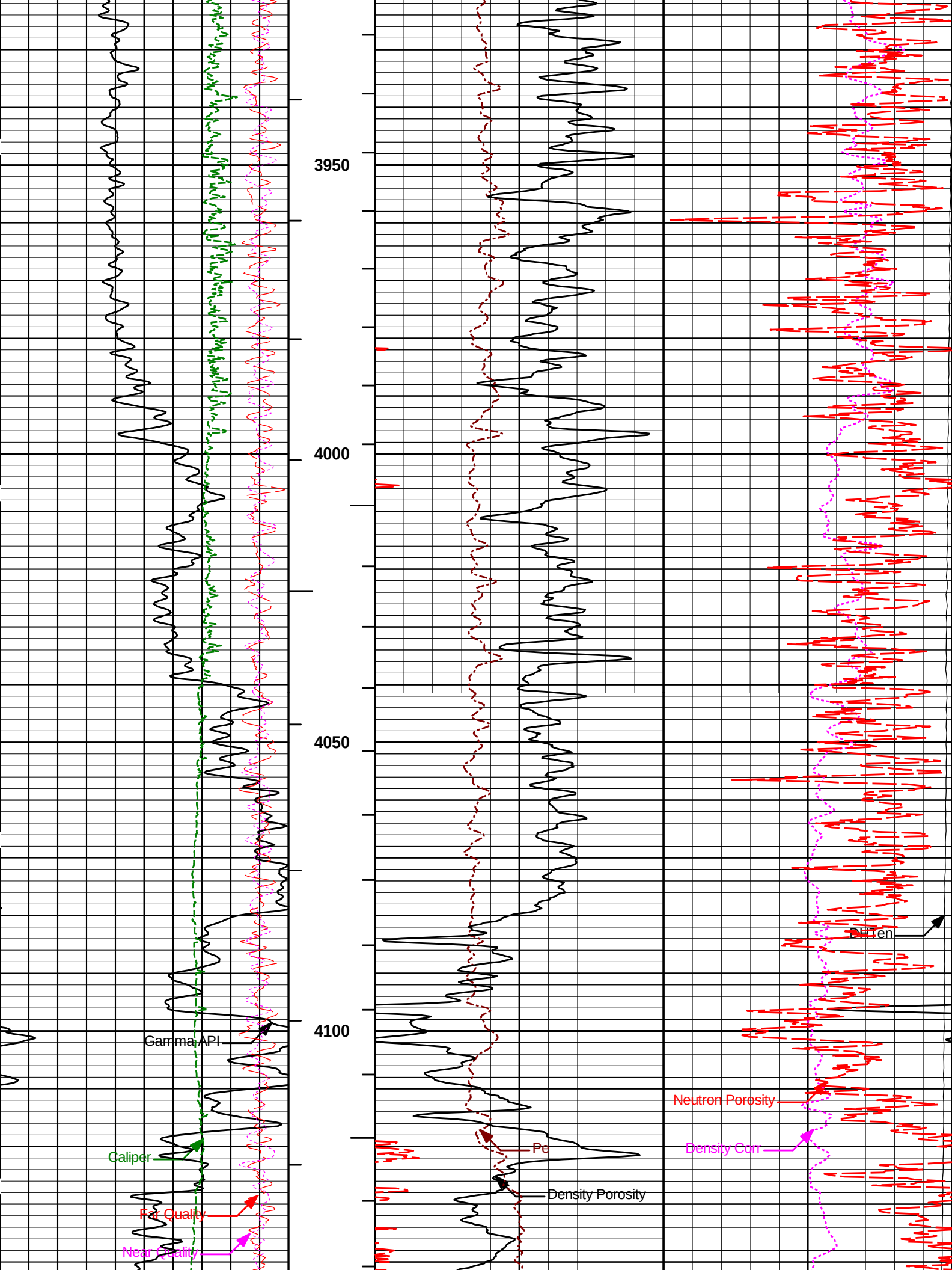
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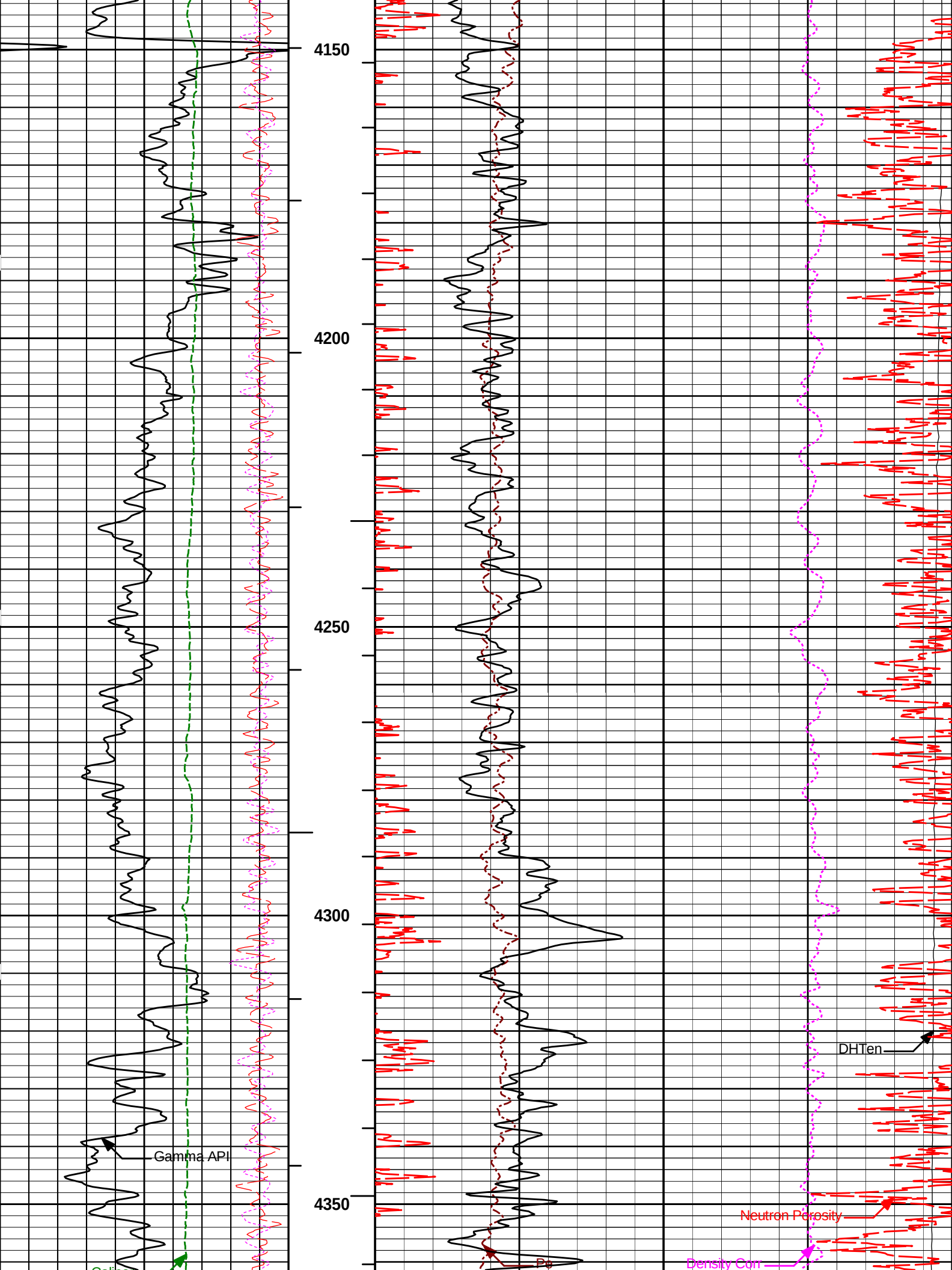
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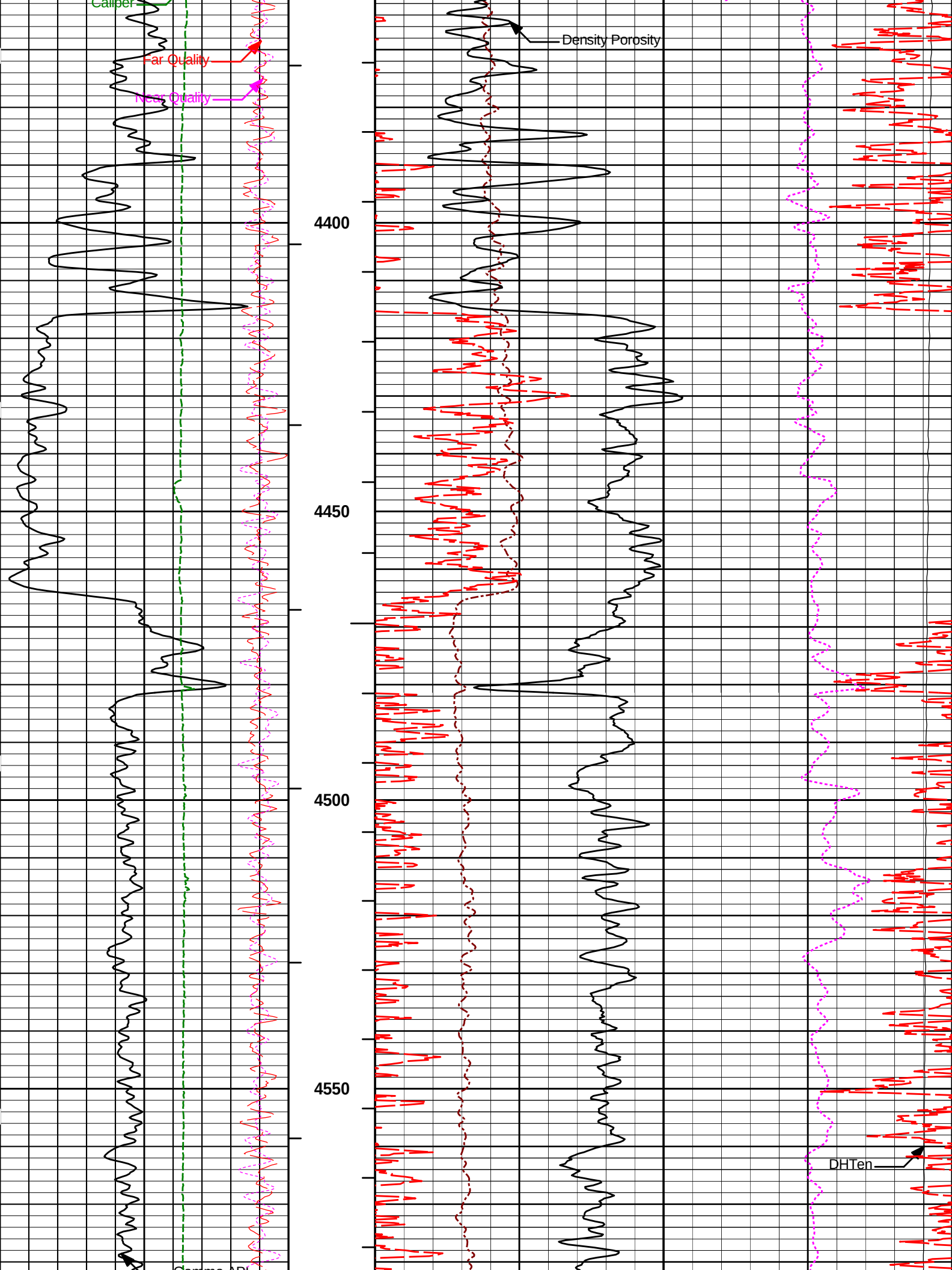
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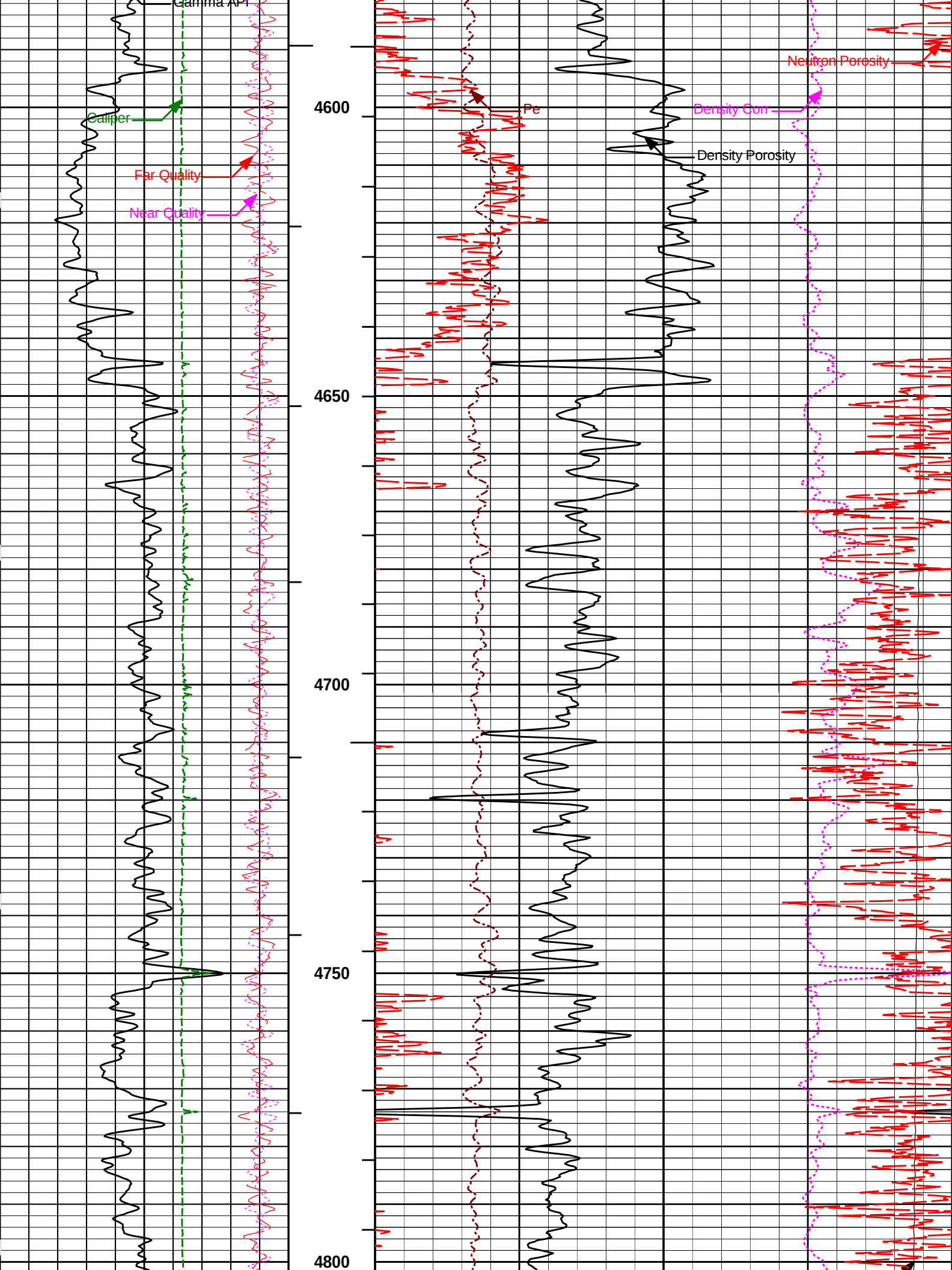
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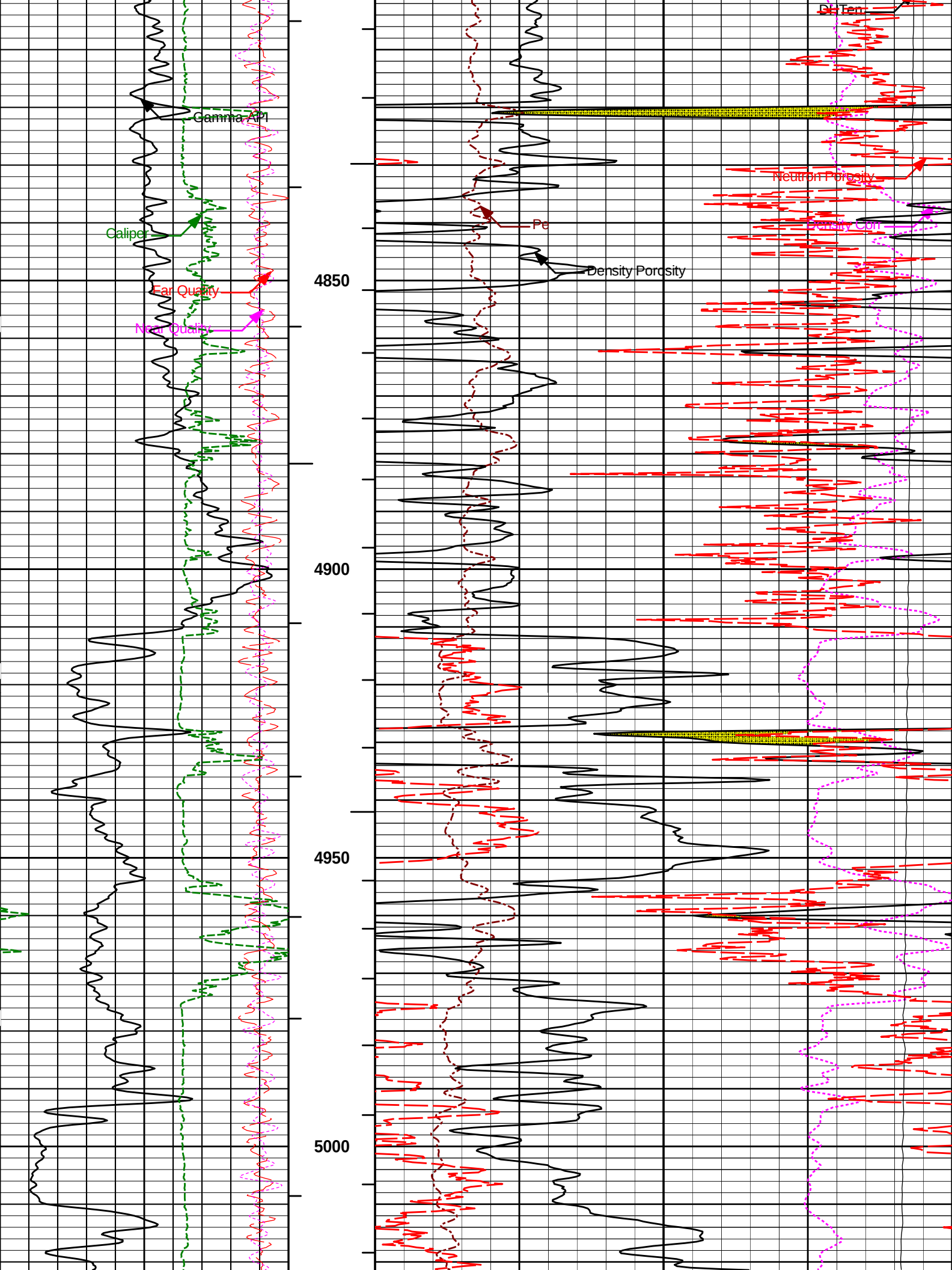
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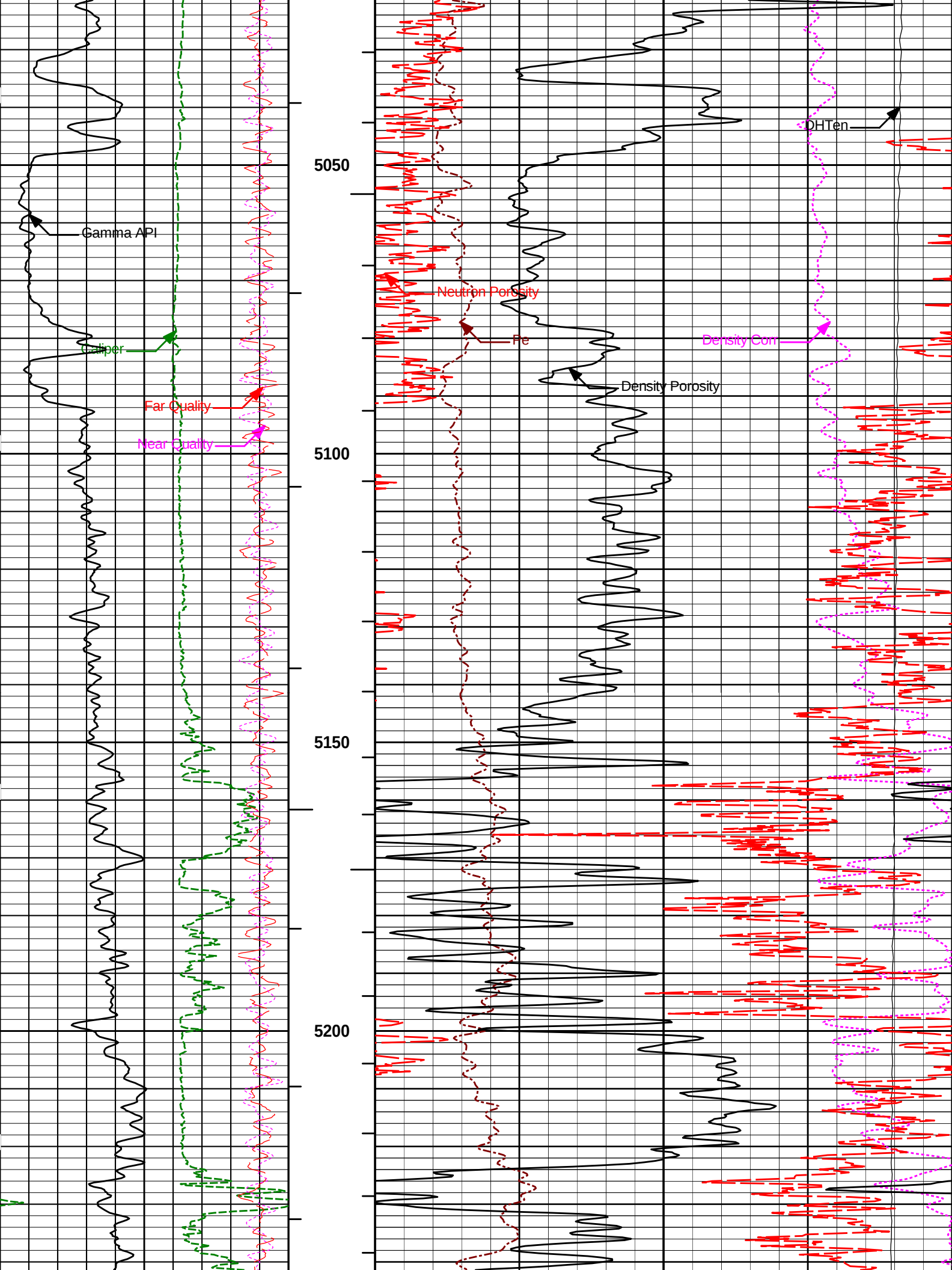
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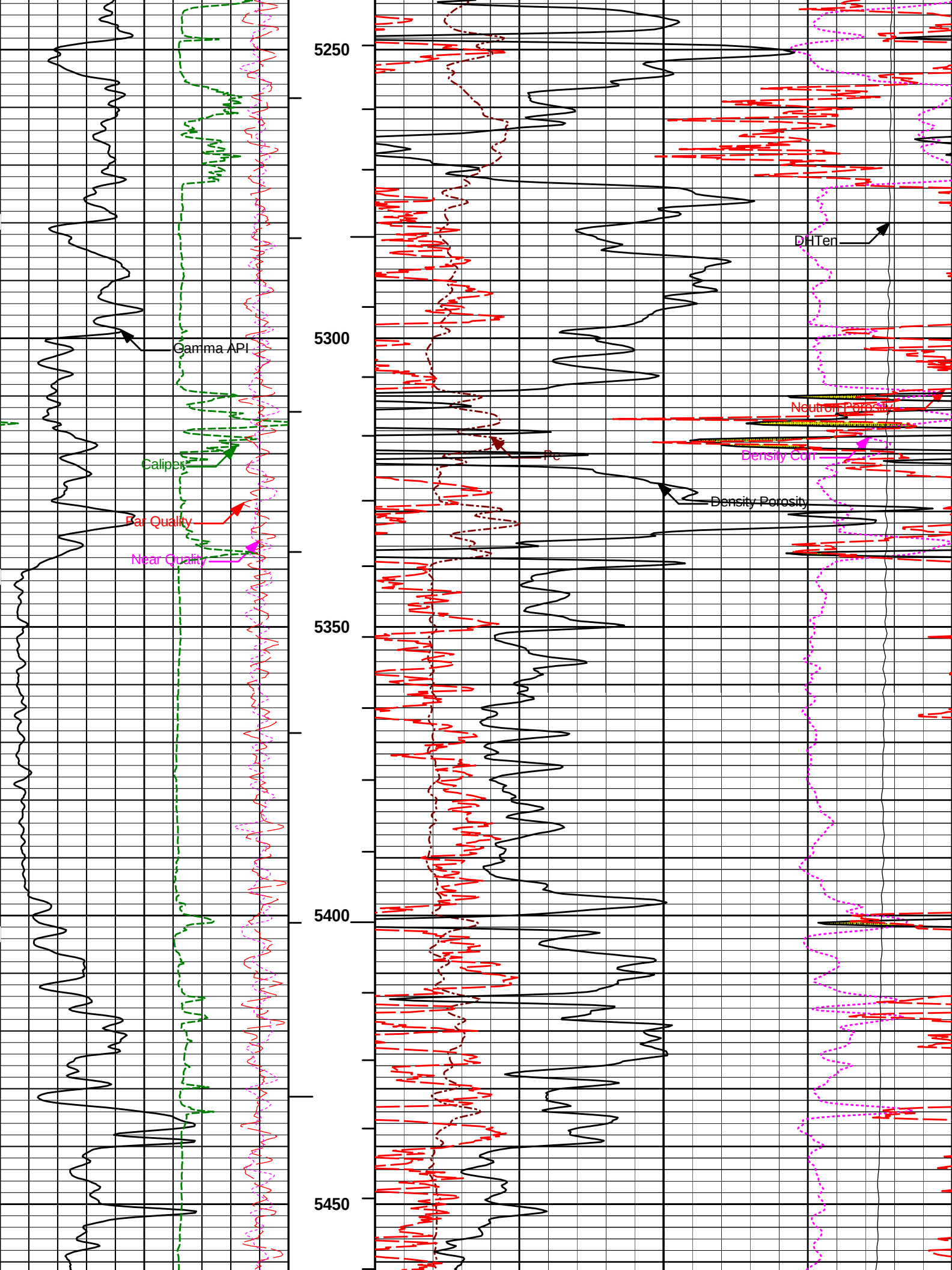
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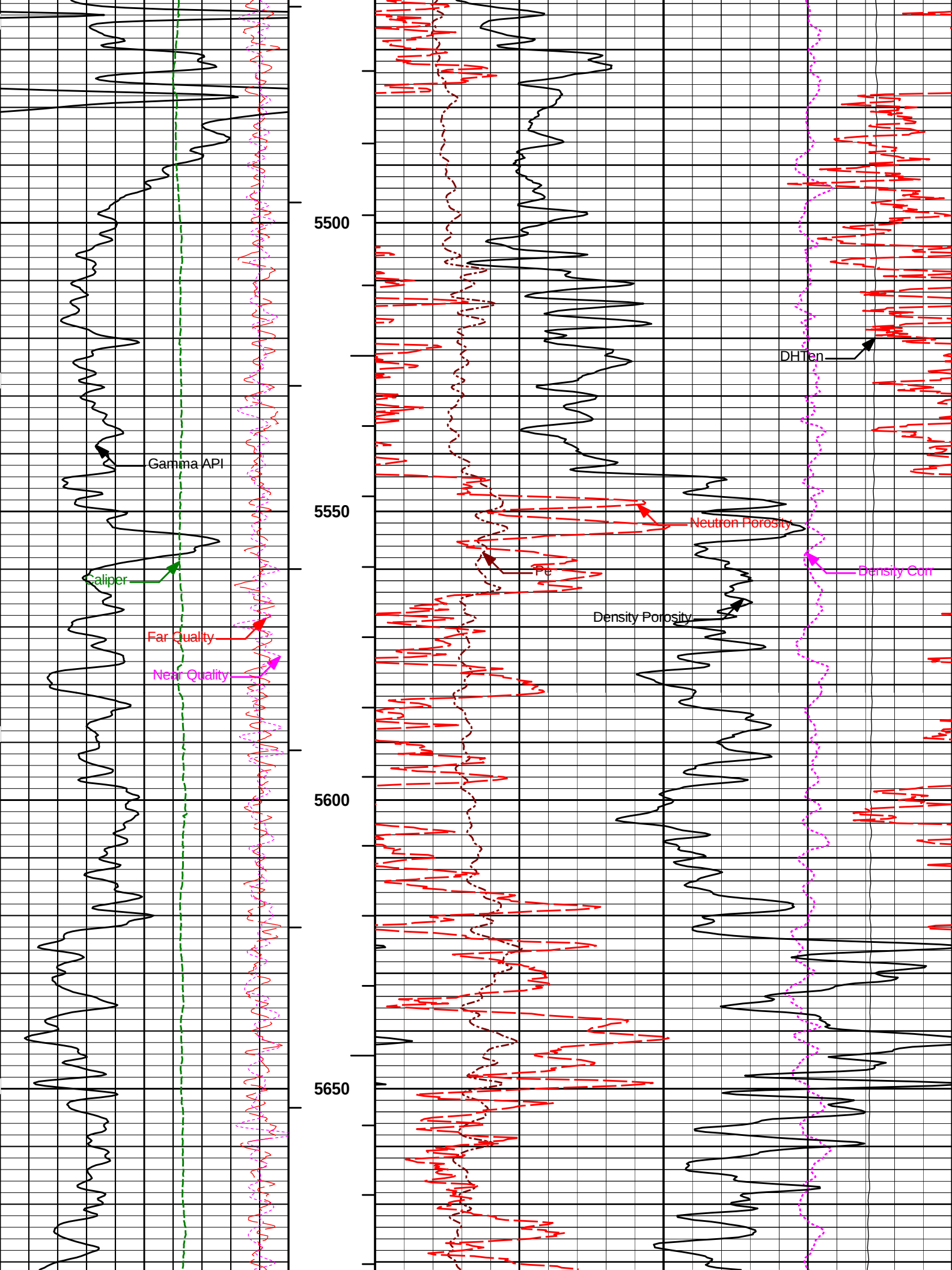
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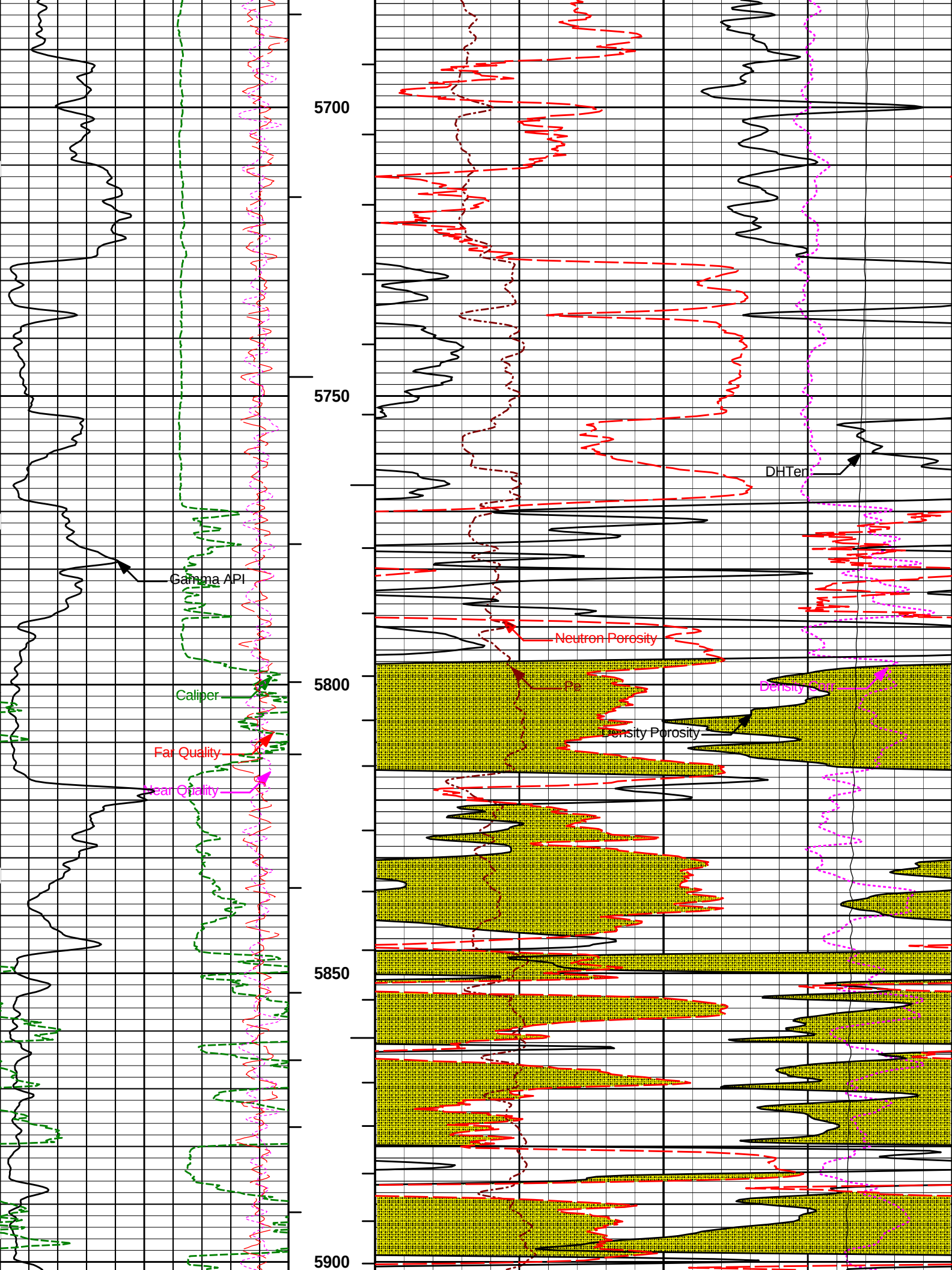
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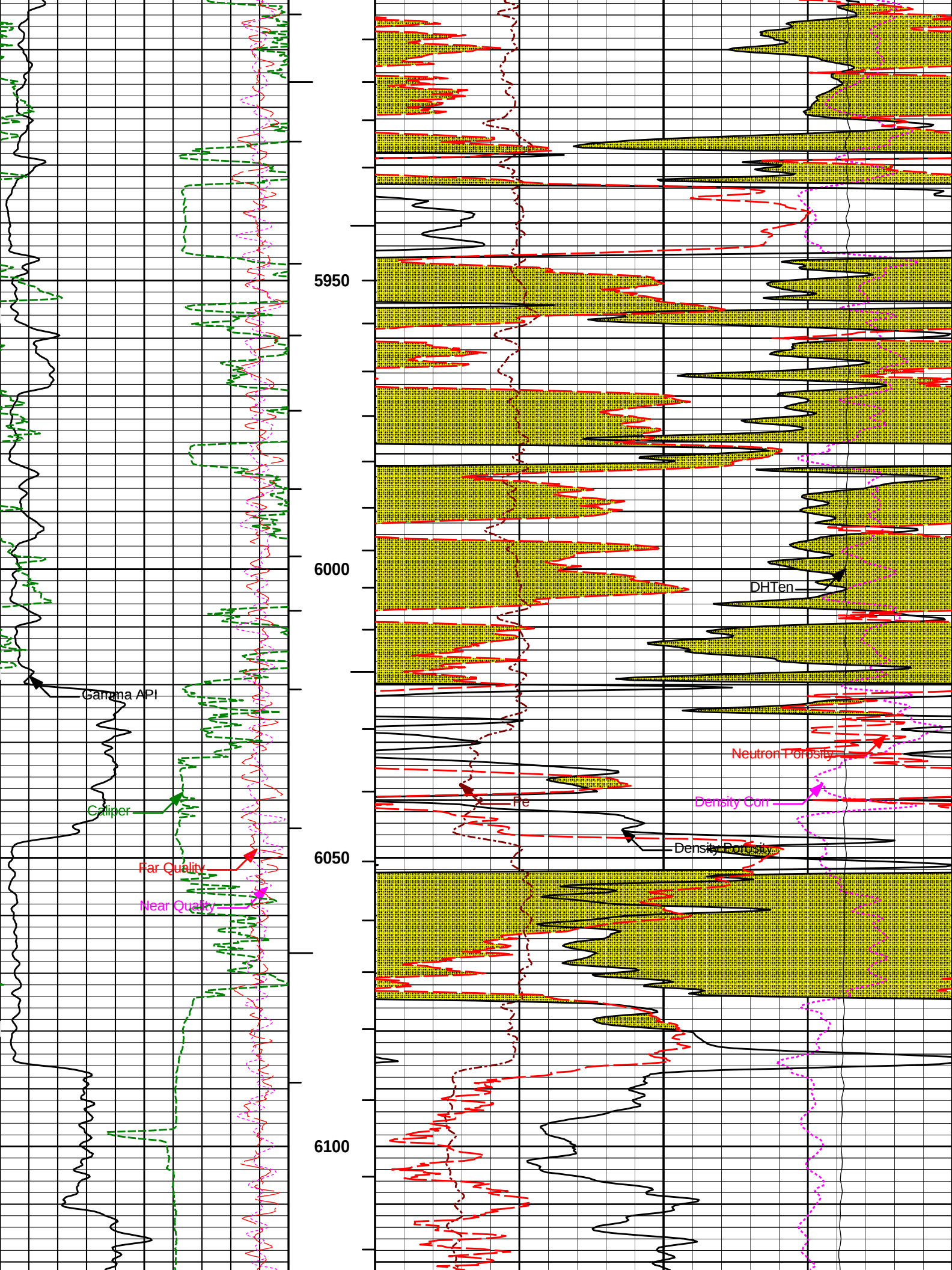
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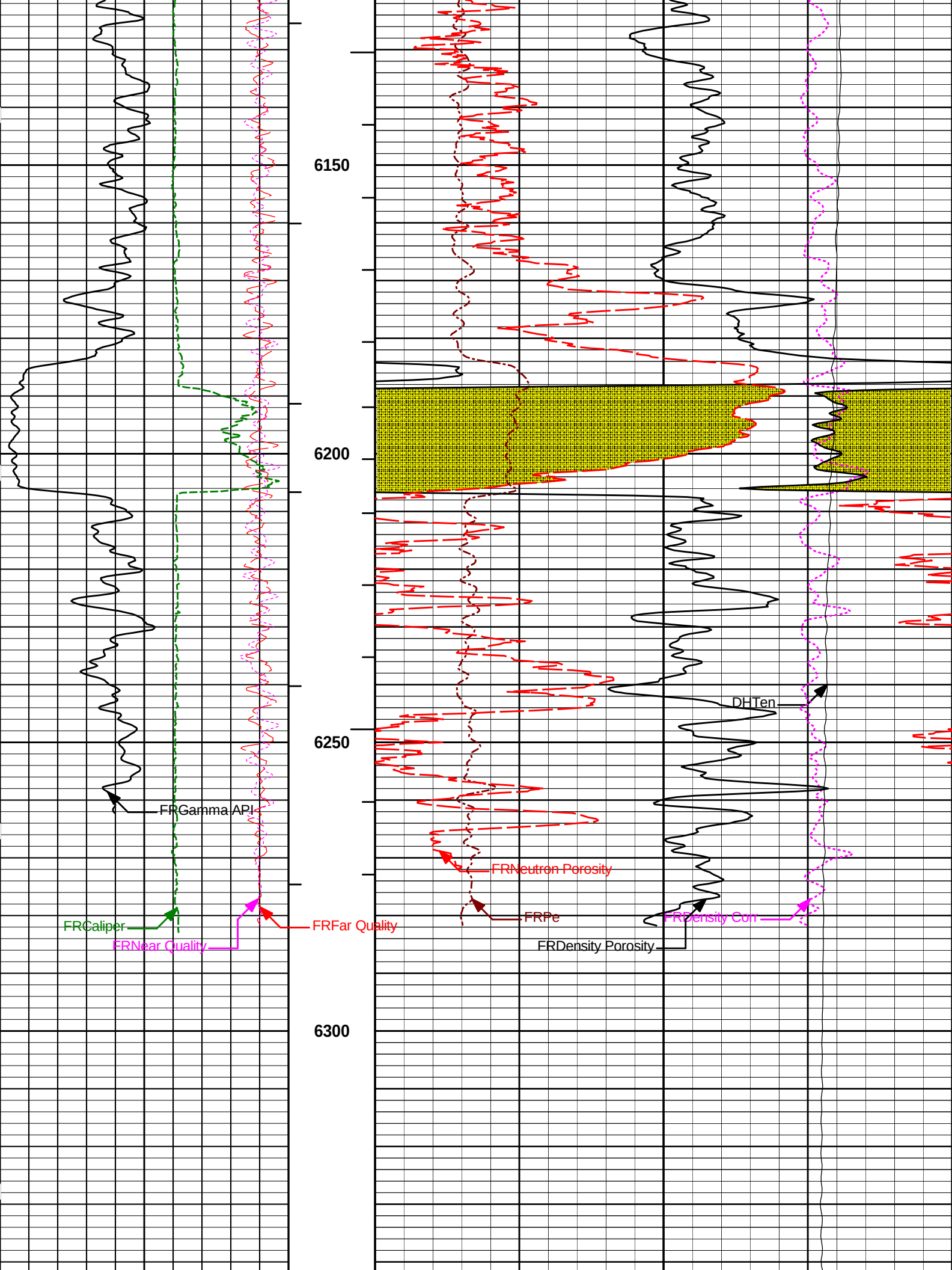
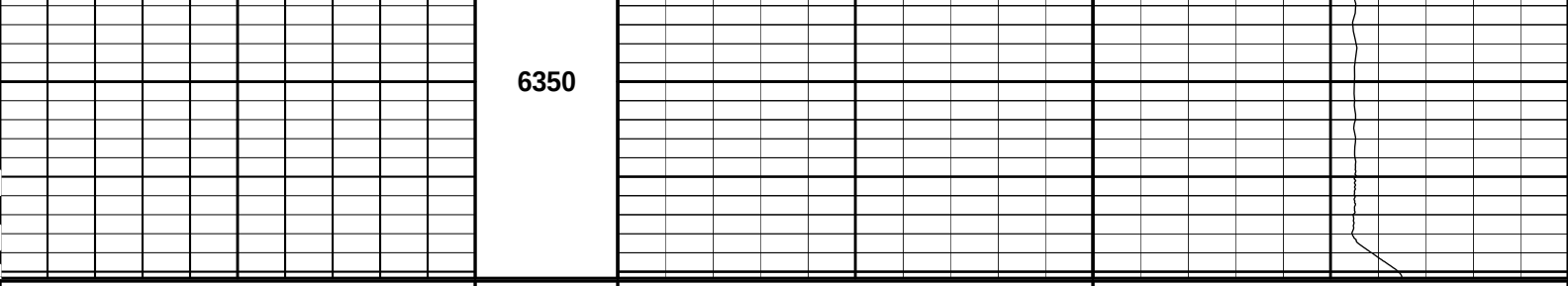
Density Corr
Density Porosity


6150
6200
6250
6300
FRGamma API
FRCaliper
FRNear Quality
FRFar Quality
FRNeutron Porosity
FRPe
FRDensity Porosity
FRDensity Corr
DHTen



0 Gamma API 200 api	1 : 240	0 Pe 10	-0.25 Density Corr 0.25 gram per cc	
6 Caliper 16 inches	BHVT		10K DHTen 0 pounds	
9 Far Quality -1	AHVT	30 Density Porosity -10 percent		
-9 Near Quality 1		30 Neutron Porosity -10 percent		

HALLIBURTON

Plot Time: 08-Jan-13 10:00:13
Plot Range: 537 ft to 6370.68 ft
Data: SORS_1P\Well Based\DAQ-0002-002\
Plot File: \\PORO\IQ_POROSITY_5IN_RM

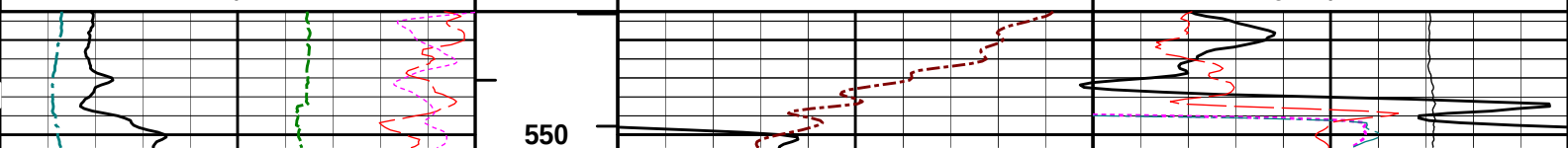
MAIN PASS 5" = 100'

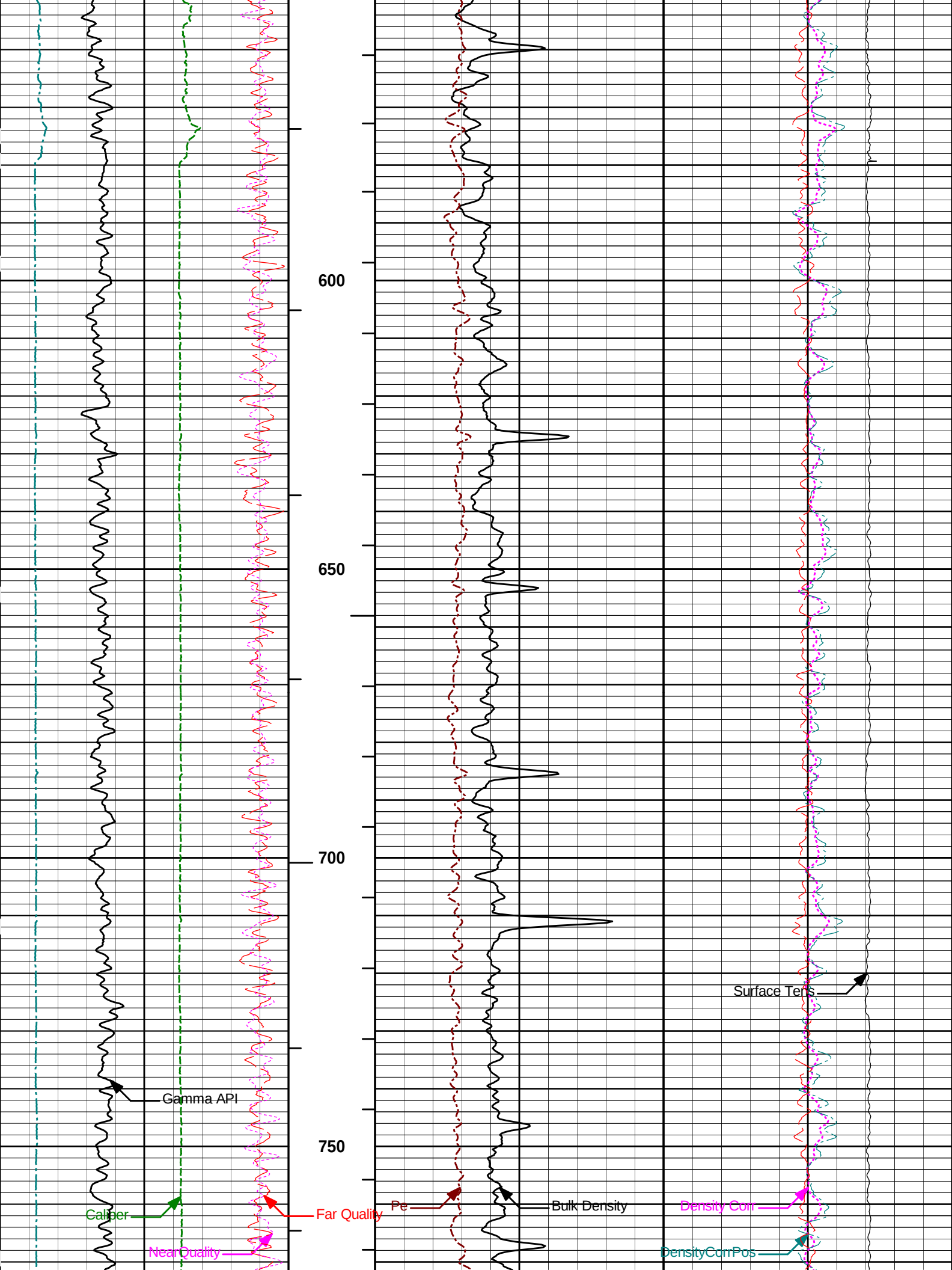
HALLIBURTON

Plot Time: 08-Jan-13 10:00:14
Plot Range: 537 ft to 6370.58 ft
Data: SORS_1P\Well Based\DAQ-0002-002*
Plot File: \\PORO\IQ_RHOB_5IN_RM

MAIN PASS 5" = 100'

-9 NearQuality 1		2 Bulk Density 3 gram per cc		
9 Far Quality -1			10K Surface Tens 0 pounds	
0 Caliper Pad 10 inches	AHVT		-0.25 DensityCorrNeg 0.25 gram per cc	
6 Caliper 16 inches	BHVT		-0.25 DensityCorrPos 0.25 gram per cc	
0 Gamma API 200 api	1 : 240	0 Pe 10	-0.25 Density Corr 0.25 gram per cc	

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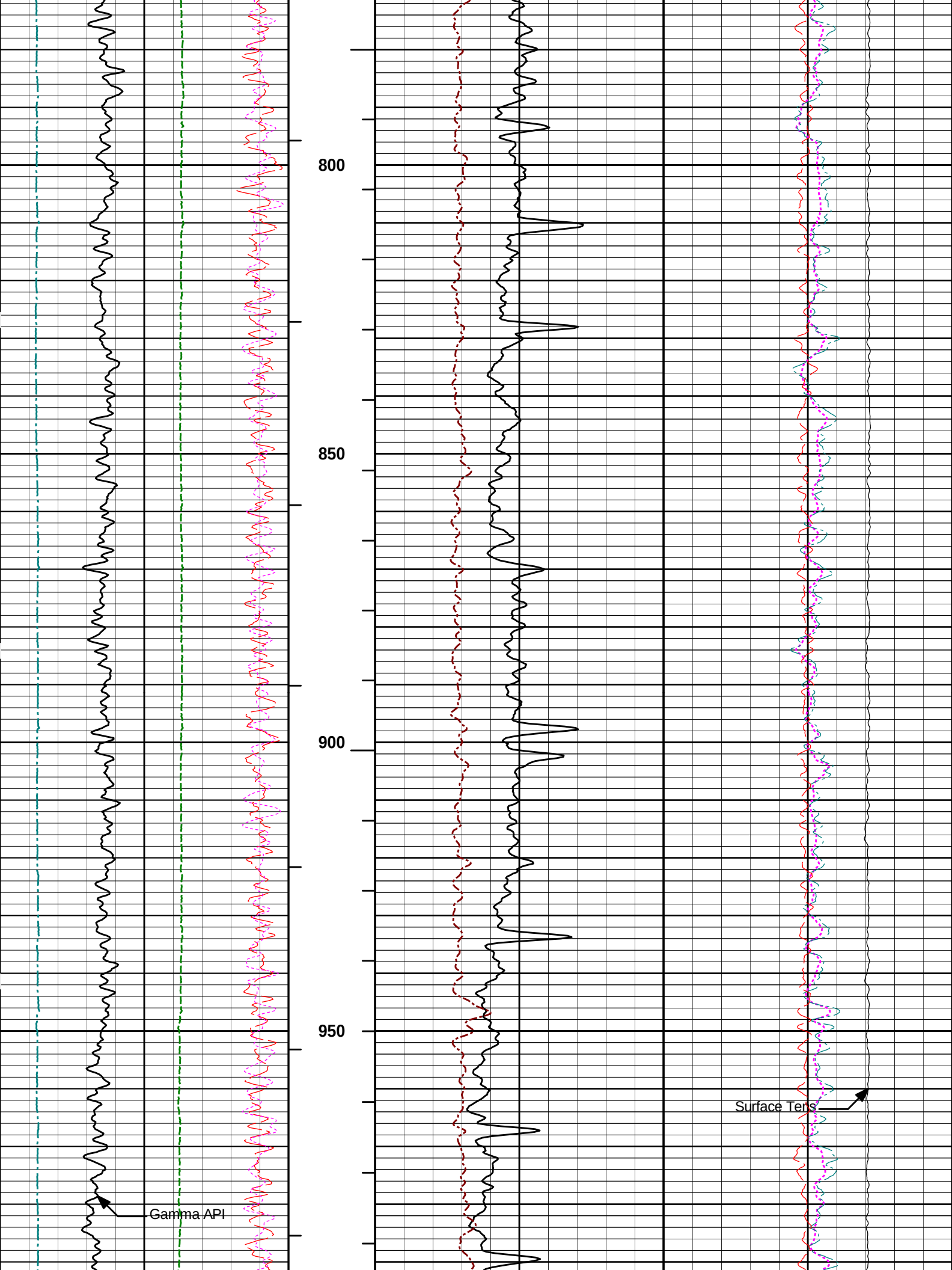
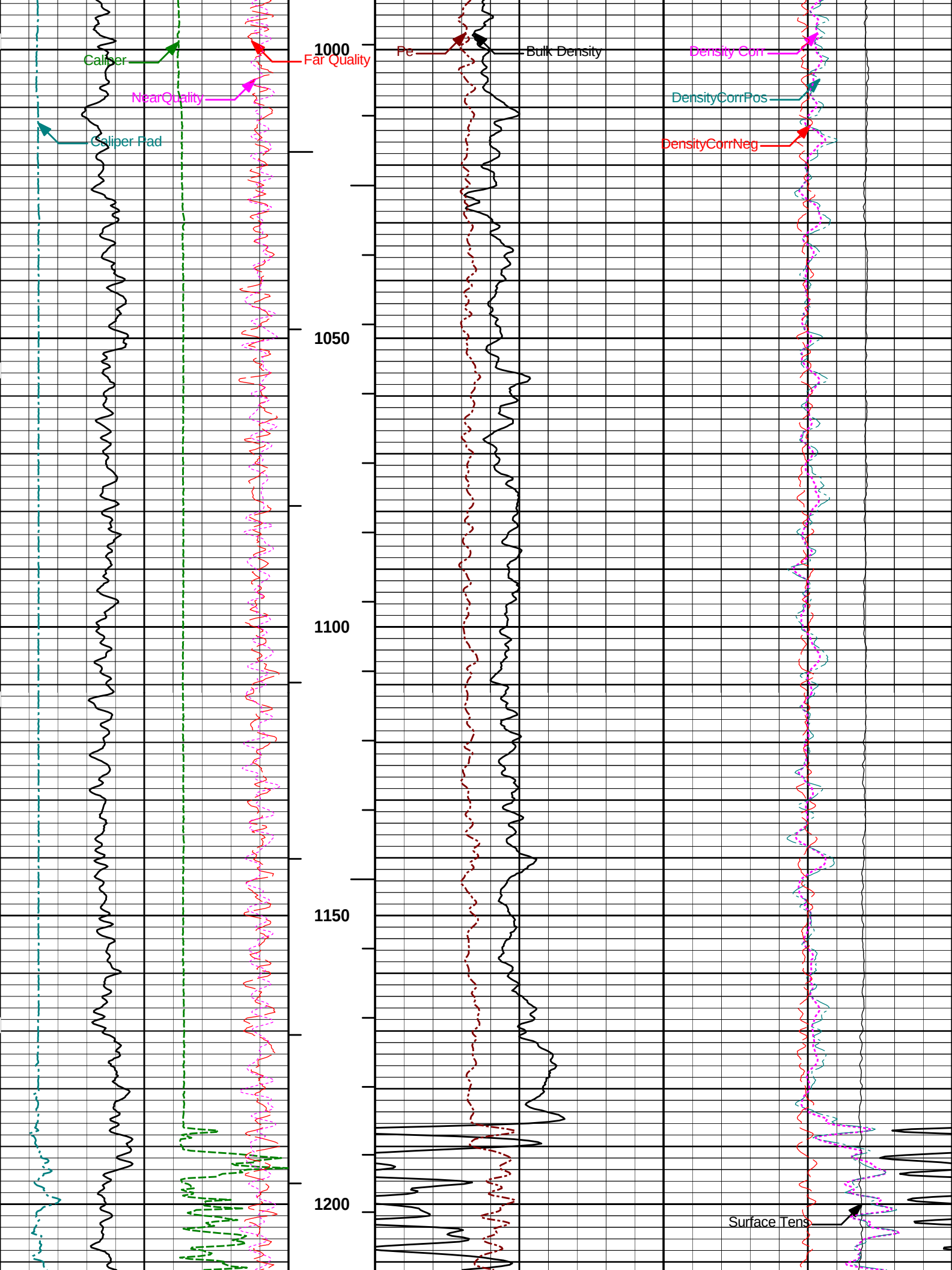
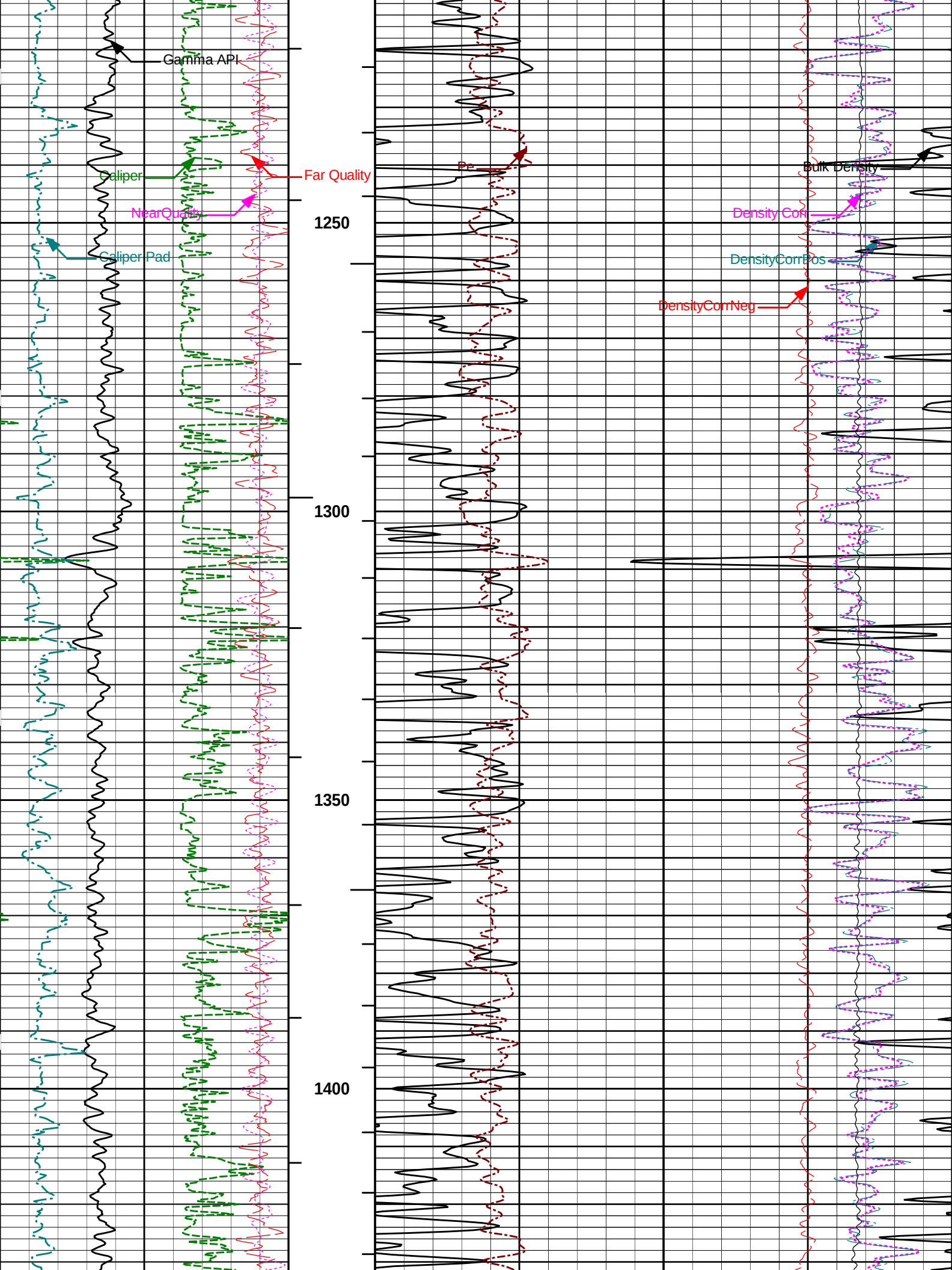
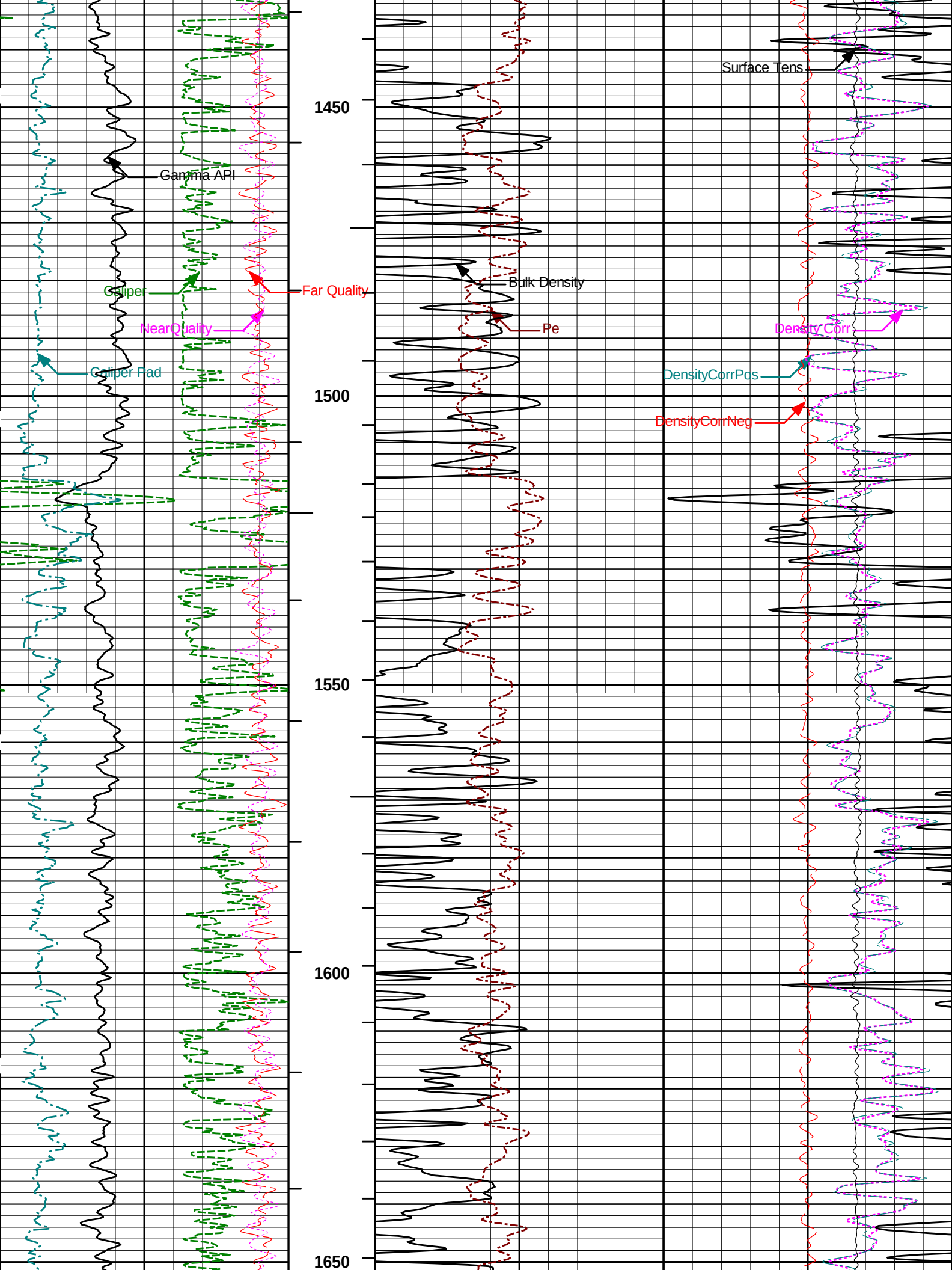
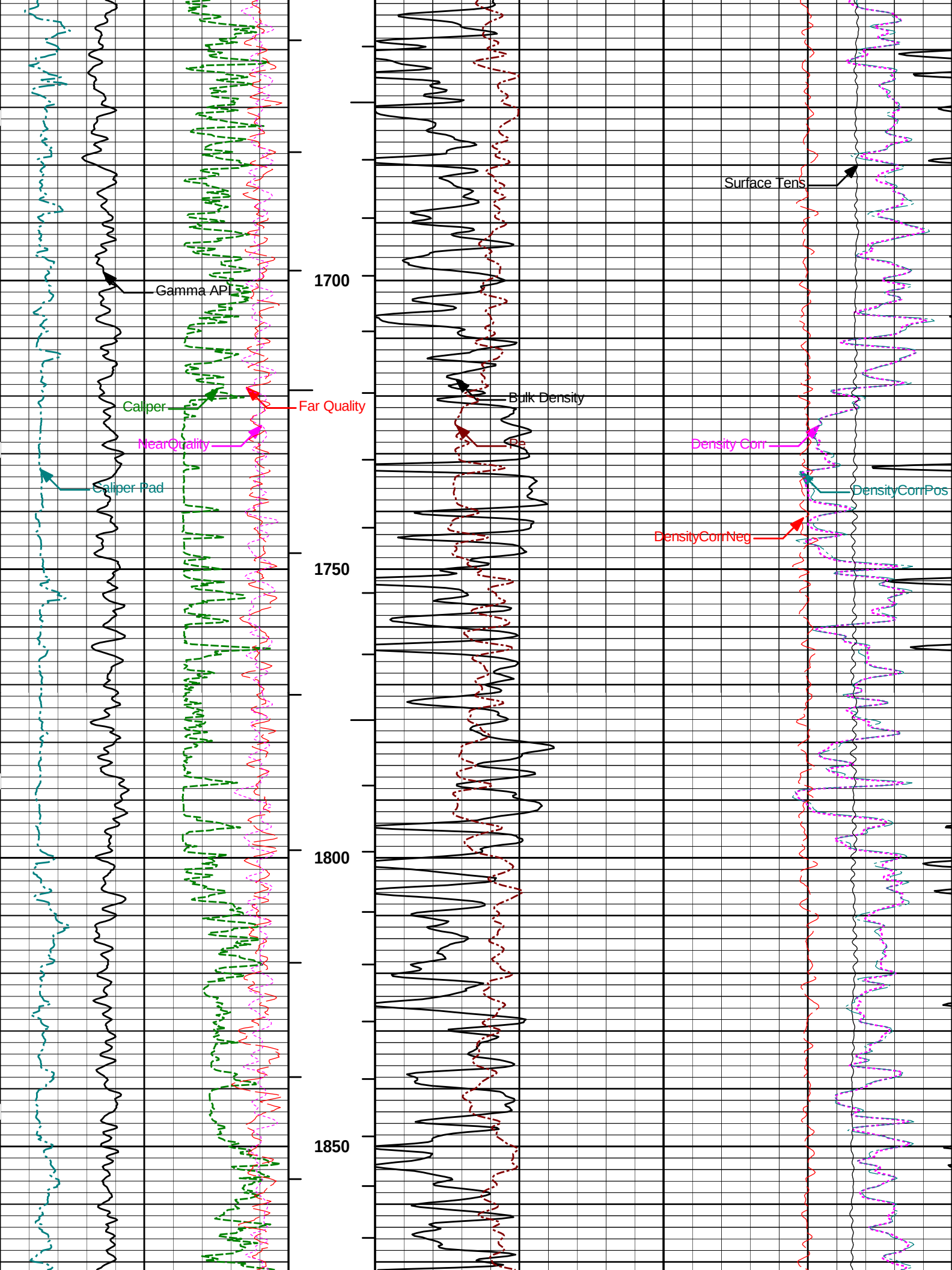
650
700
750
Gamma API
Caliper
NearQuality
Far Quality
Pe
Bulk Density
Density Corr
DensityCorrPos
Surface Tens


800
850
900
950
Gamma API
Surface Tens


Caliper
NearQuality
Far Quality
Caliper Pad
Pe
Bulk Density
Density Corr
DensityCorrPos
DensityCorrNeg
Surface Tens
1000
1050
1100
1150
1200


Gamma API
Caliper
Far Quality
NearQuality
Caliper Pad
Pe
Bulk Density
Density Corr
DensityCorrPos
DensityCorrNeg
1250
1300
1350
1400


Gamma API
Caliper
Caliper Rad
Far Quality
NearQuality
Bulk Density
Pe
Surface Tens
Density Corr
DensityCorrPos
DensityCorrNeg
1450
1500
1550
1600
1650


Gamma API
Caliper
Far Quality
NearQuality
Caliper Pad
Bulk Density
Pe
Surface Tens
Density Corr
DensityCorrPos
DensityCorrNeg
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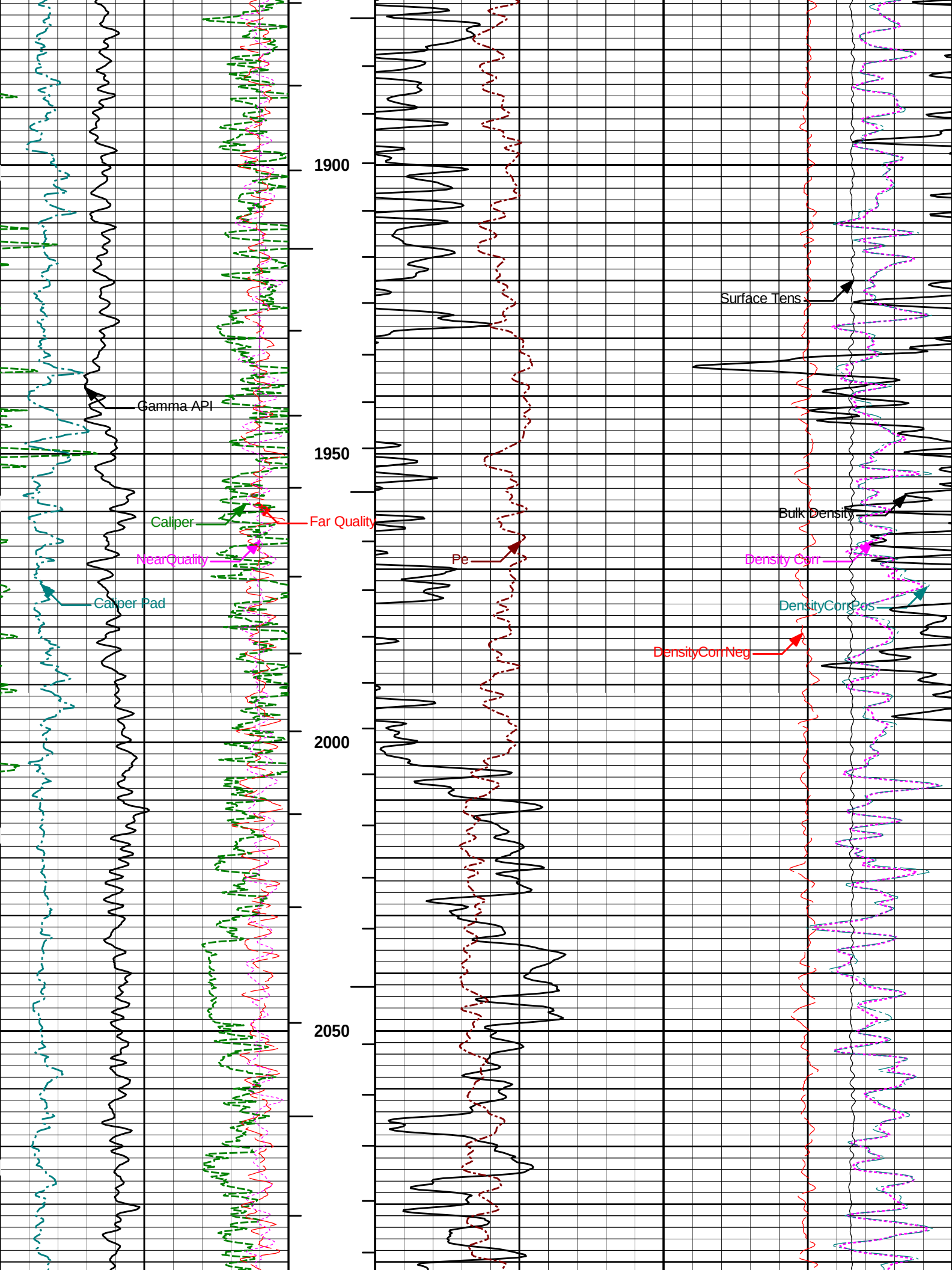
1750
1800
1850


1900
1950
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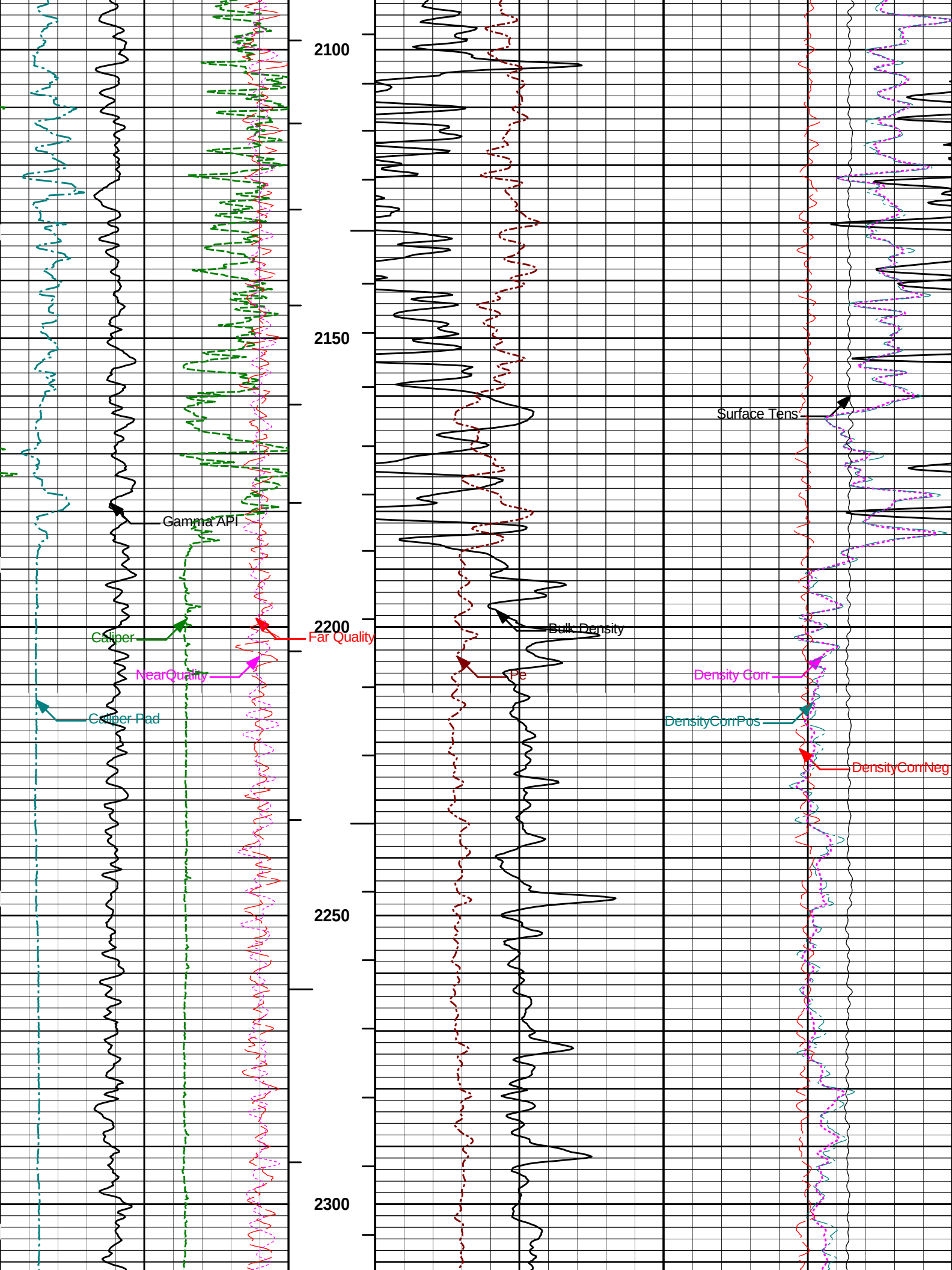
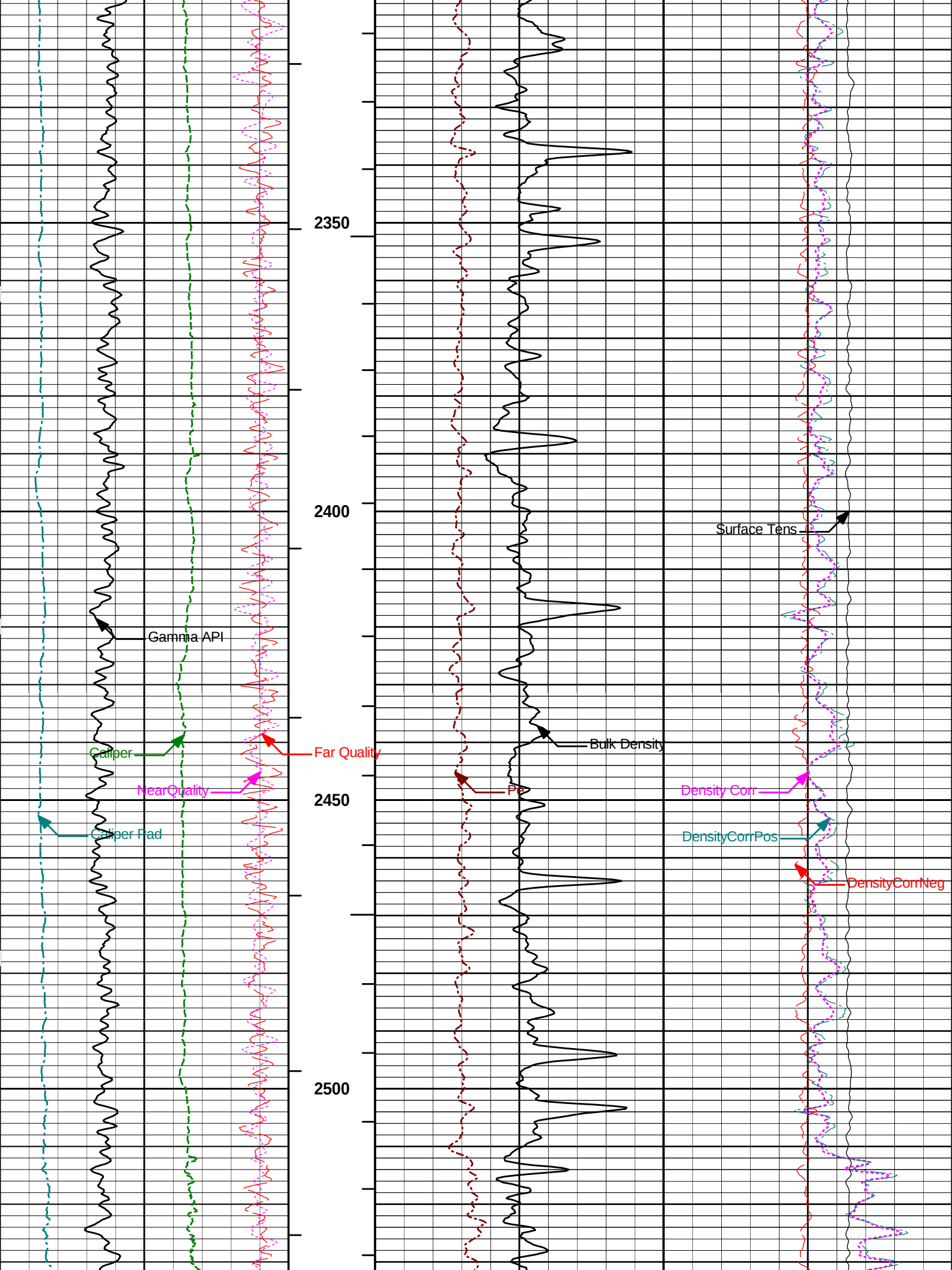
Far Quality
NearQuality
Caliper Pad
Pe
Surface Tens
Bulk Density
Density Corr
DensityCorrPos
DensityCorrNeg


2100
2150
2200
2250
2300
Gamma API
Caliber
Far Quality
NearQuality
Caliber Pad
Bulk Density
Pe
Surface Tens
Density Corr
DensityCorrPos
DensityCorrNeg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2400
2450
2500
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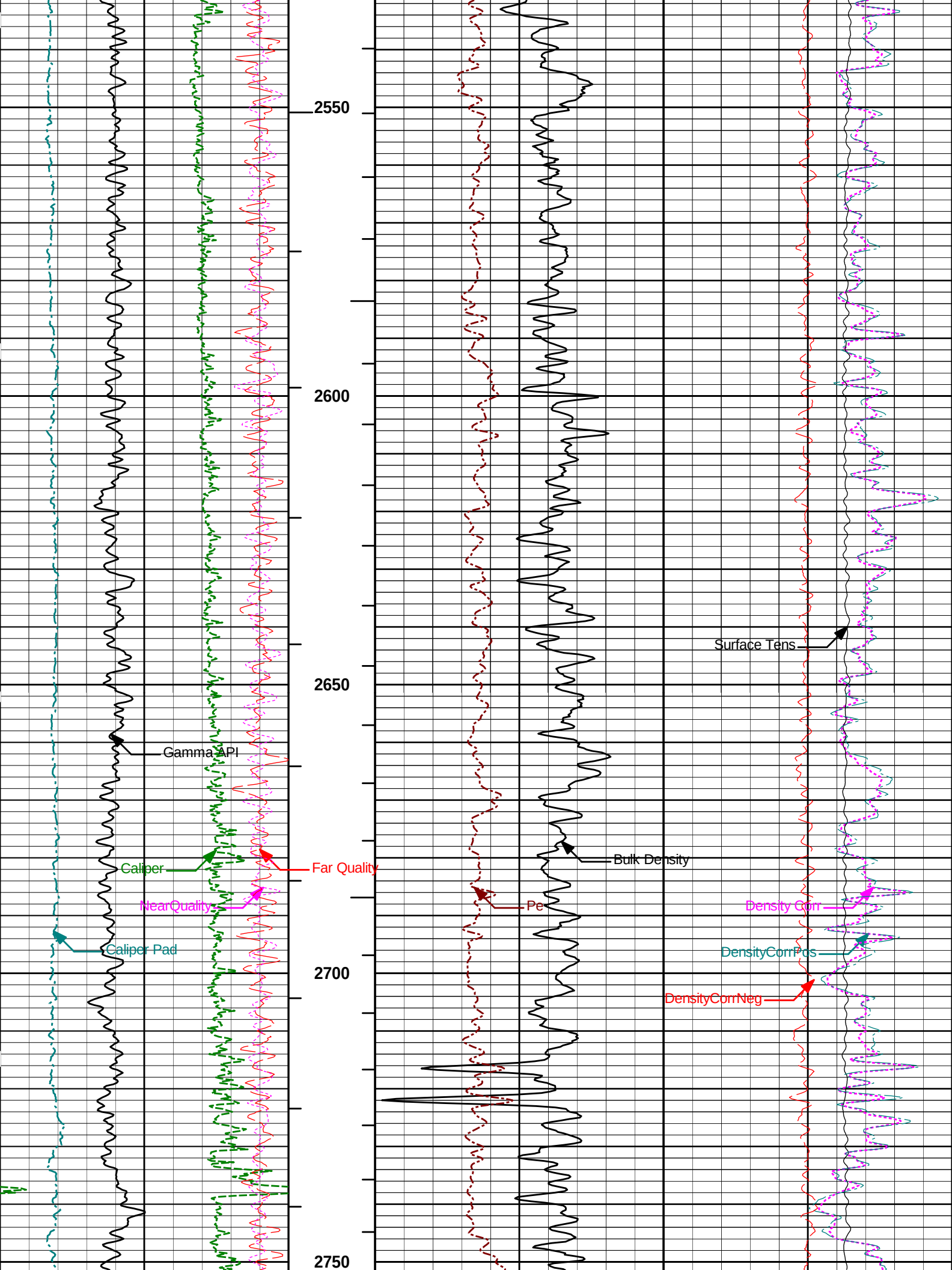
NearQuality
Caliper Pad
Bulk Density
Pe
Surface Tens
Density Corr
DensityCorrPos
DensityCorrNeg


2550
2600
2650
2700
2750
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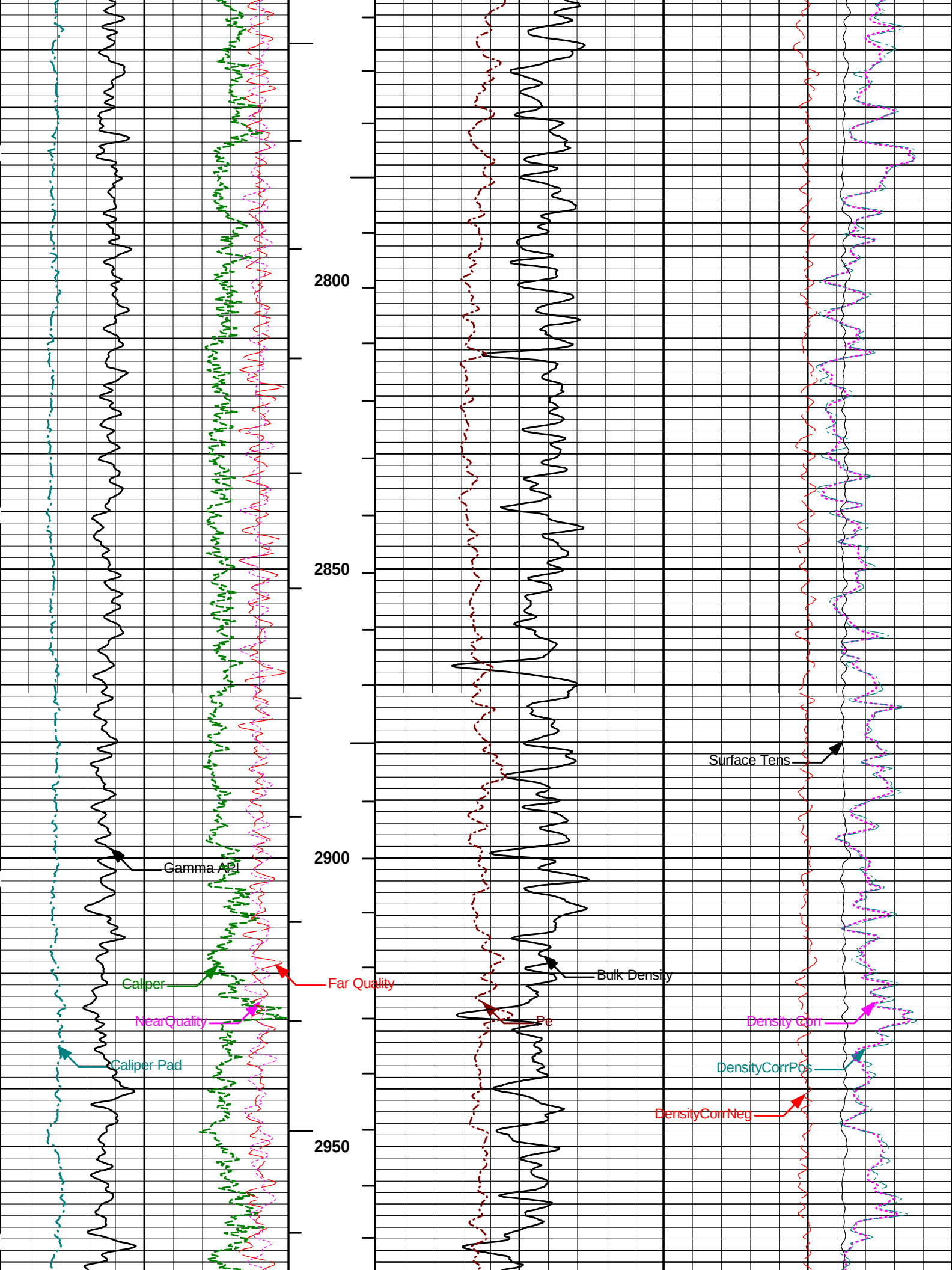
Caliper
Far Quality
NearQuality
Caliper Pad
Bulk Density
Pe
Surface Tens
Density Corr
DensityCorrPos
DensityCorrNeg


2800
2850
2900
2950
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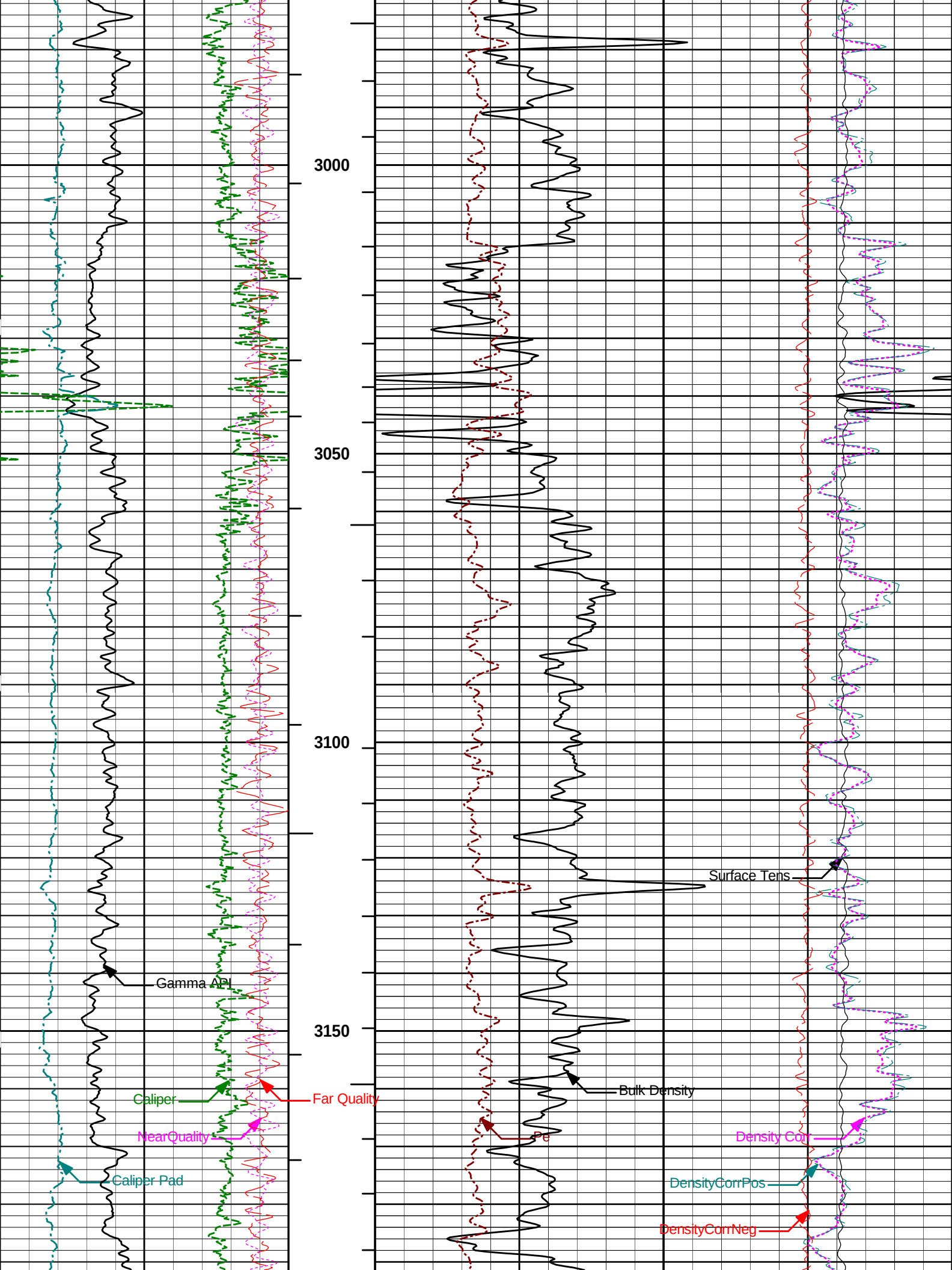
Caliper
Far Quality
NearQuality
Caliper Pad
Bulk Density
Pe
Surface Tens
Density Corr
DensityCorrPos
DensityCorrNeg


3000
3050
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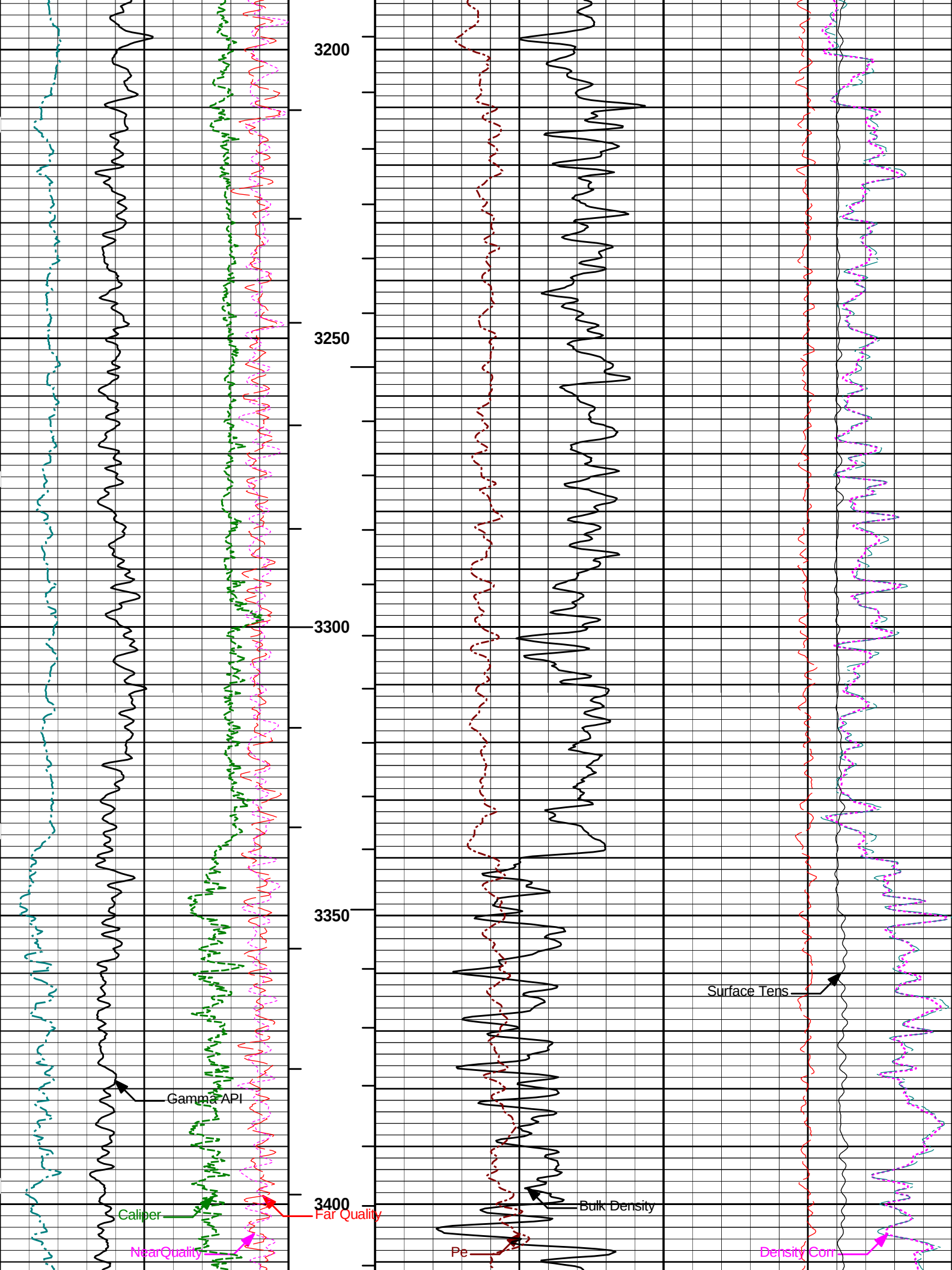
Caliper
Far Quality
NearQuality
Caliper Pad
Bulk Density
Pe
Surface Tens
Density Corr
DensityCorrPos
DensityCorrNeg


3200
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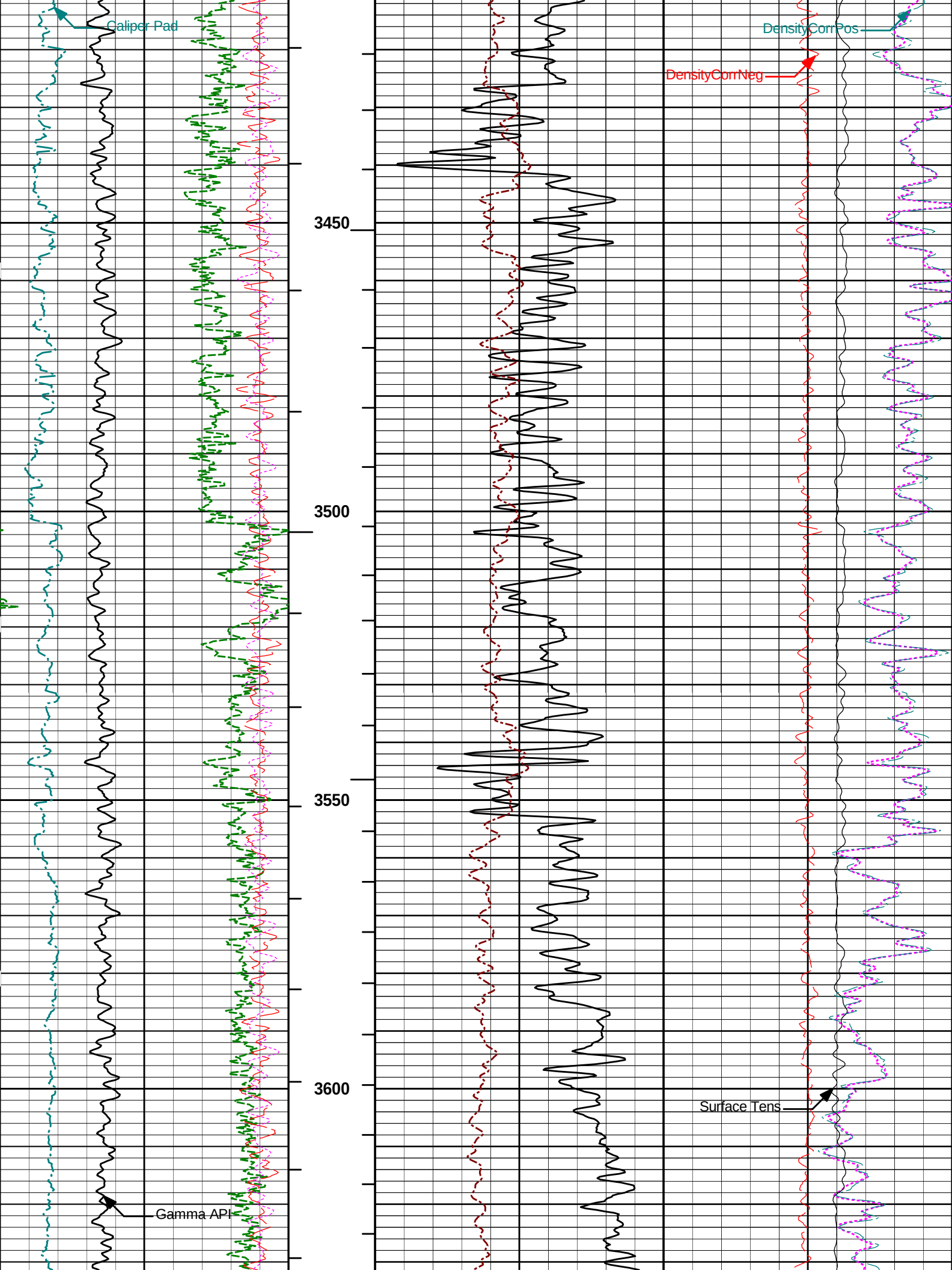
3350
3400
Gamma API
Caliper
Far Quality
NearQuality
Bulk Density
Pe
Surface Tens
Density Corr


Caliper Pad
DensityCorrPos
DensityCorrNeg
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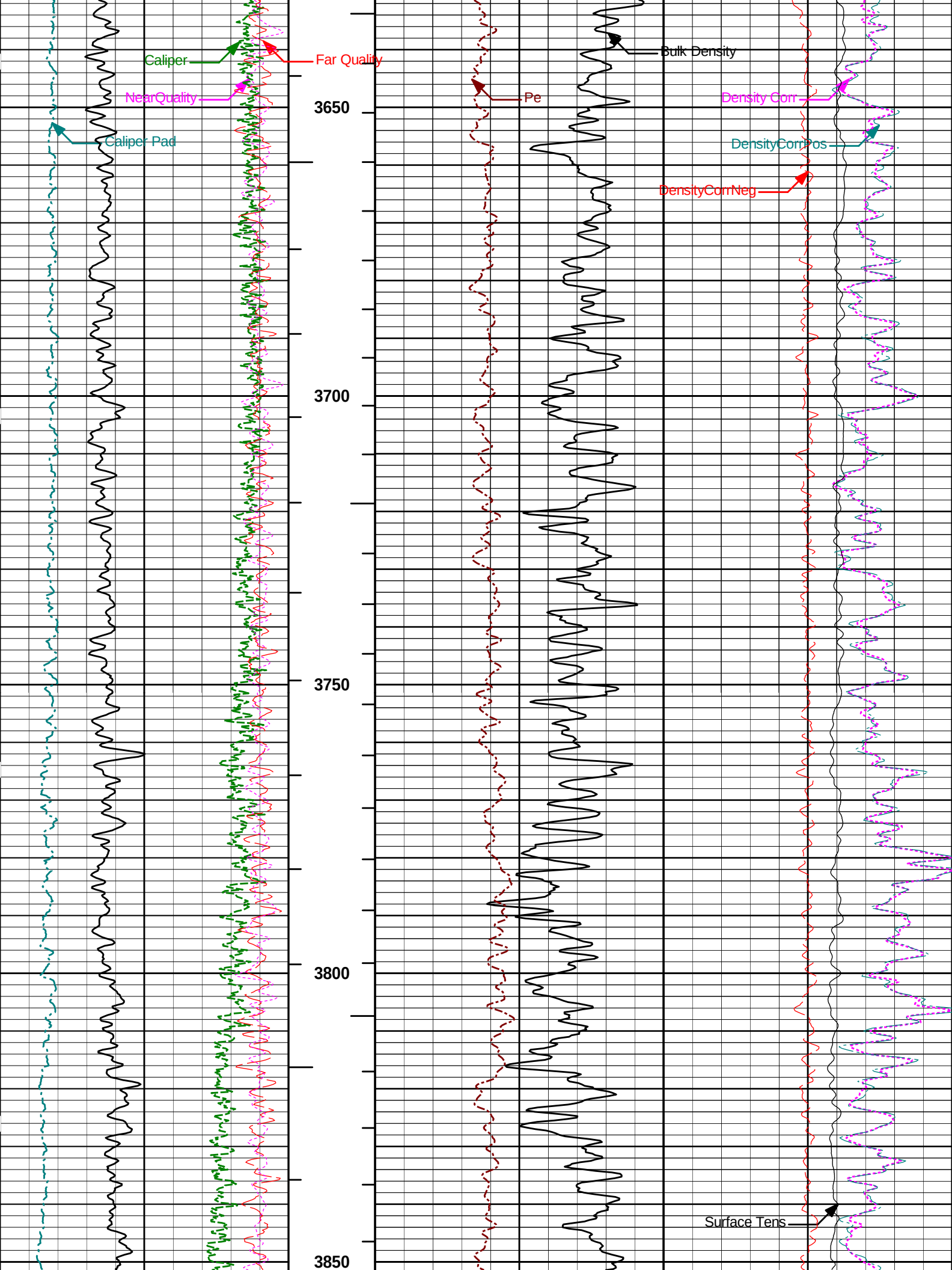
3550
3600
Surface Tens
Gamma API


Caliper
Far Quality
NearQuality
Caliper Pad
Bulk Density
Pe
Density Corr
DensityCorrPos
DensityCorrNeg
Surface Tens
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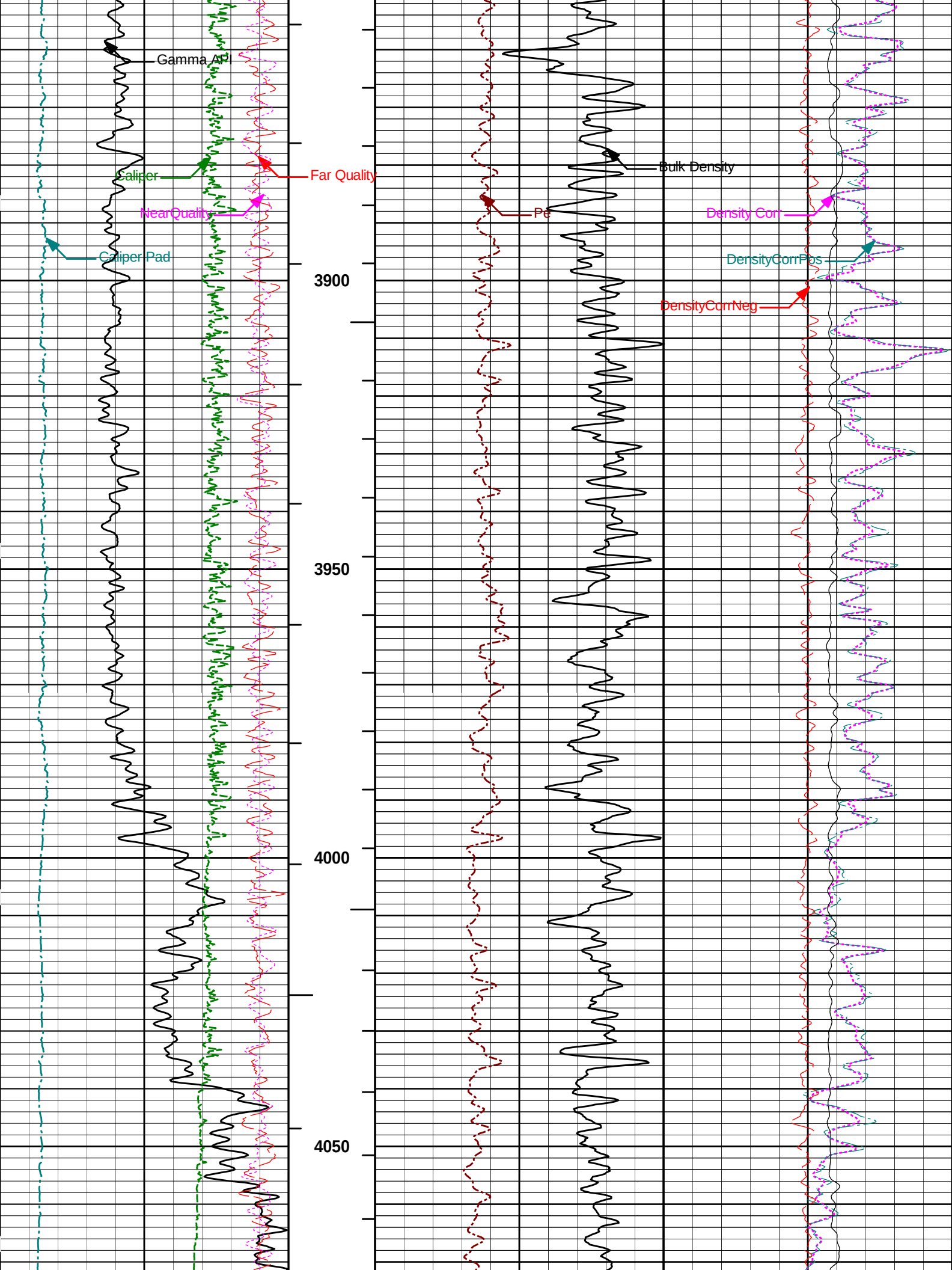
3700
3750
3800
3850


Gamma API
Caliper
Far Quality
NearQuality
Caliper Pad
Pe
Bulk Density
Density Corr
DensityCorrPos
DensityCorrNeg
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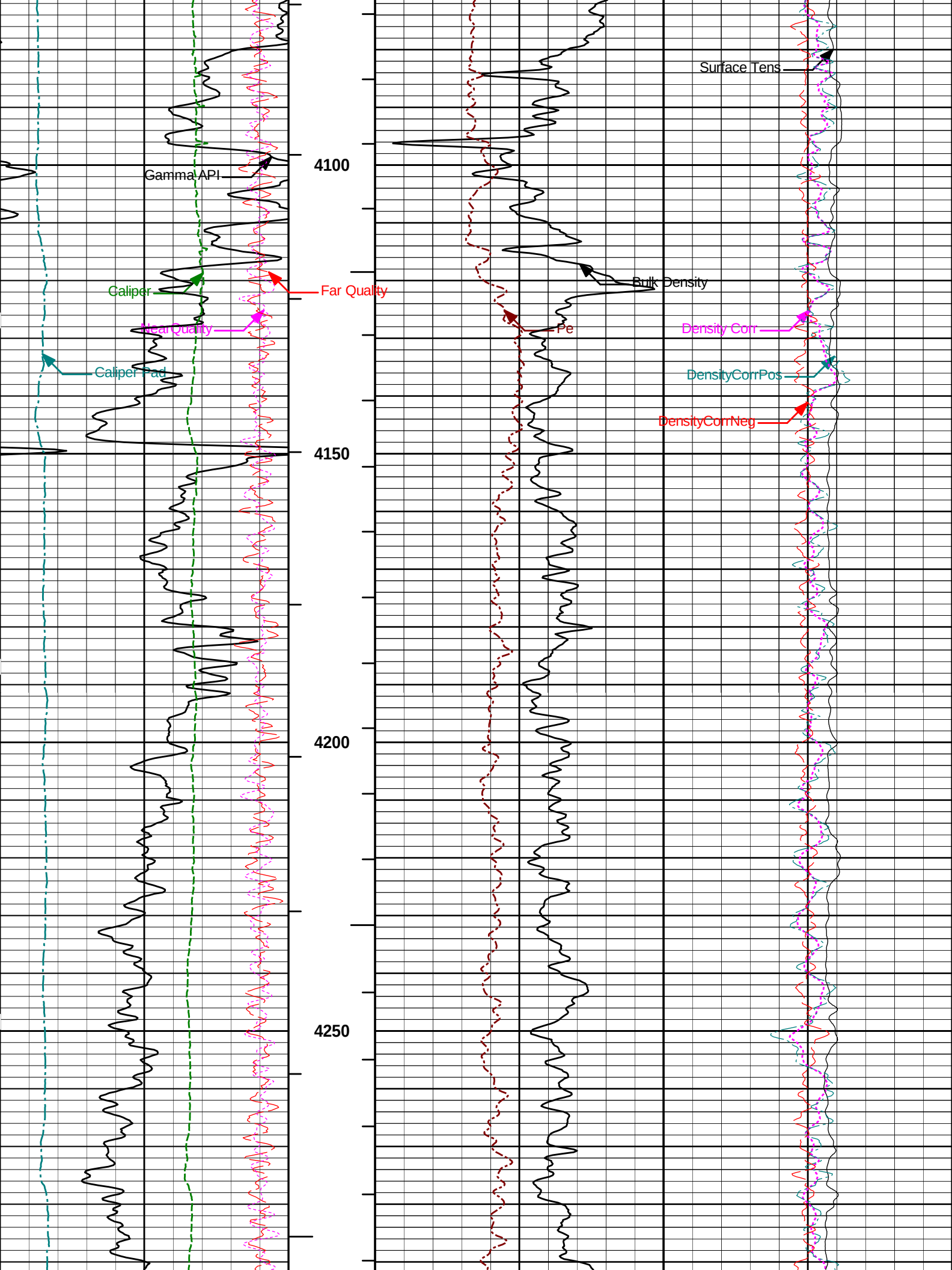
3950
4000
4050


Surface Tens
Gamma API
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Bulk Density
Caliper
Far Quality
Pe
Near Quality
Density Corr
Caliper Pad
DensityCorrPos
DensityCorrNeg
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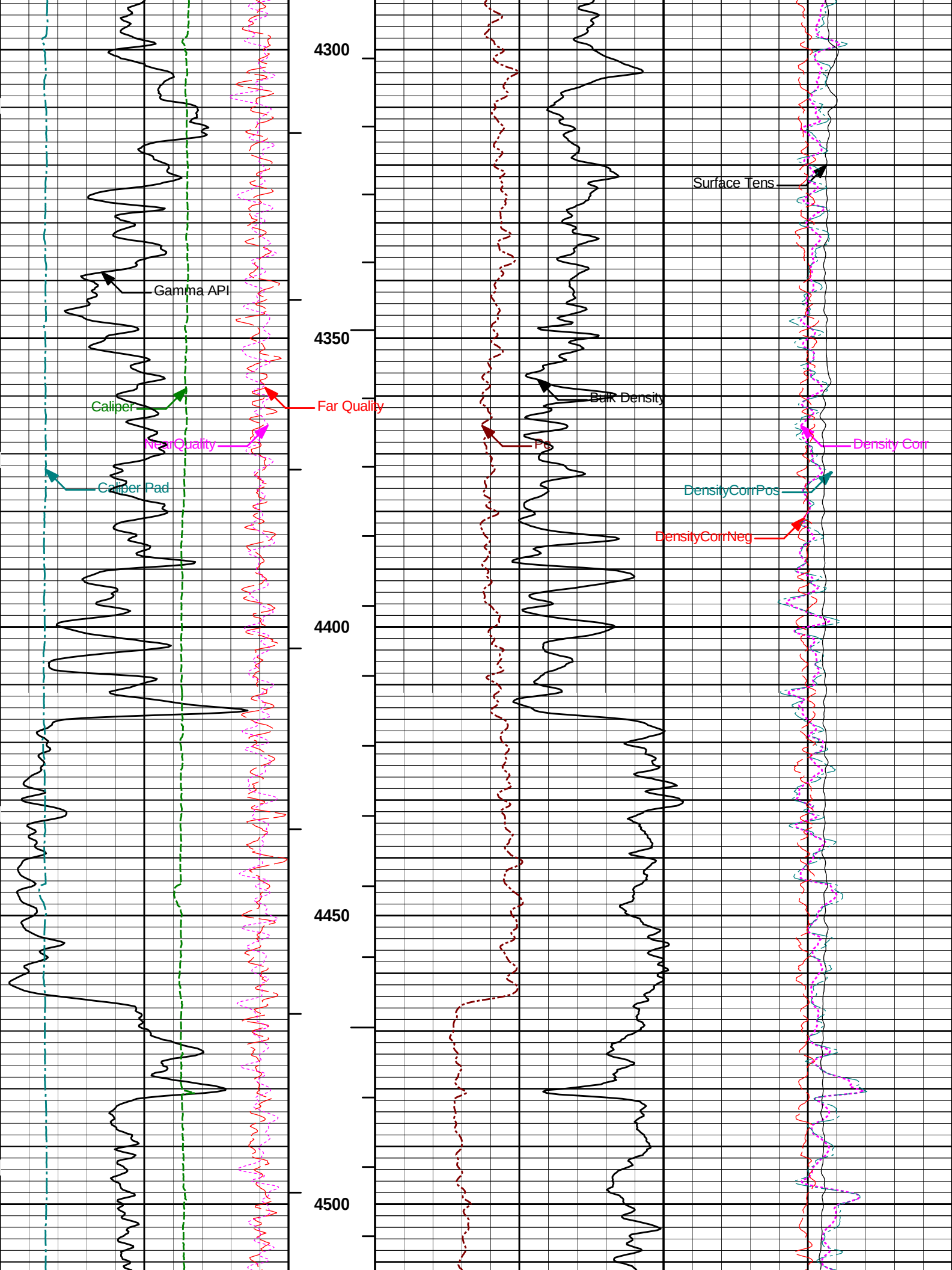
4250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4350
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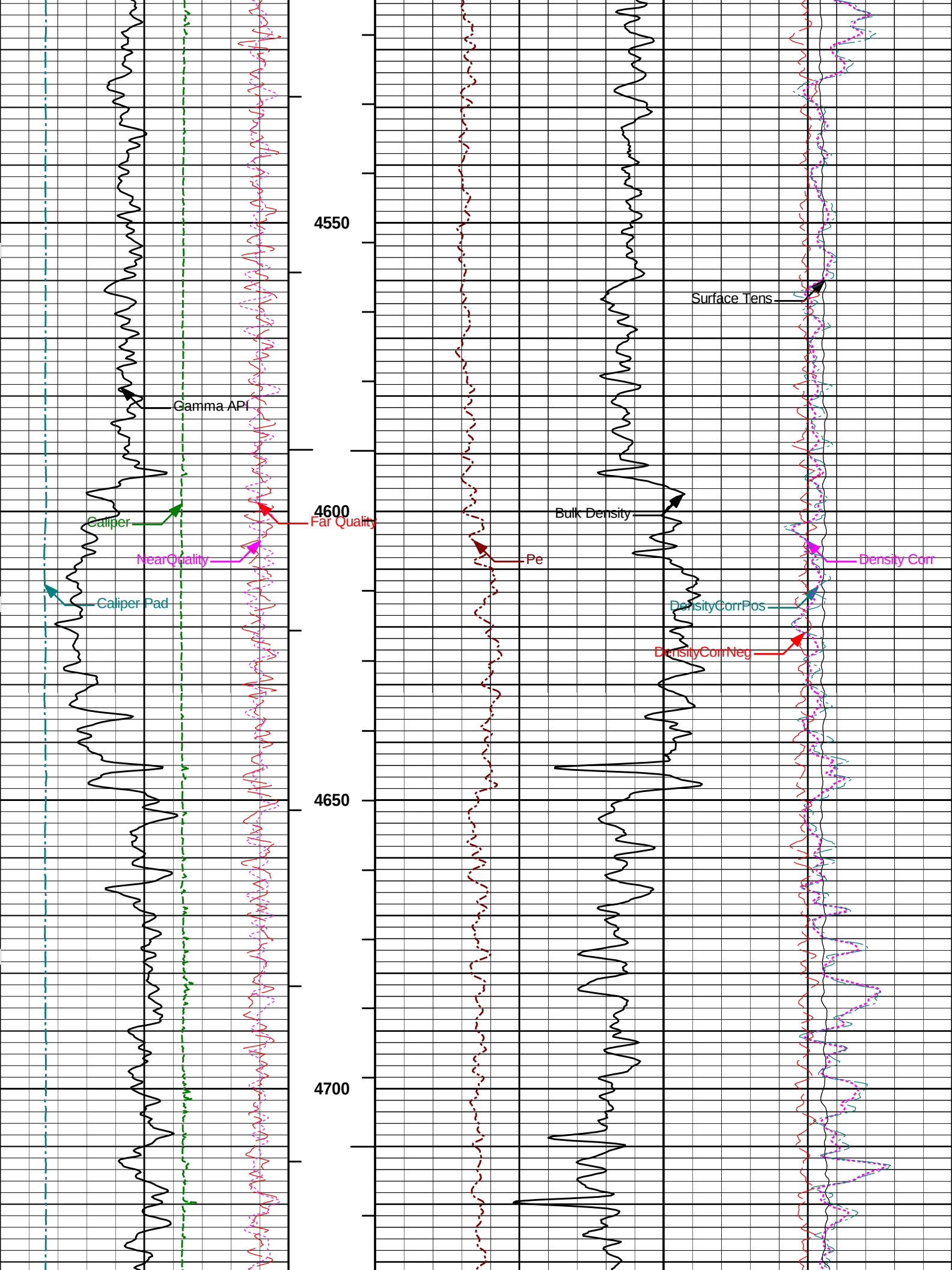
Caliper
Caliper Pad
Far Quality
NearQuality
Bulk Density
Pe
Surface Tens
Density Corr
DensityCorrPos
DensityCorrNeg


4550
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Caliper
Caliper Pad
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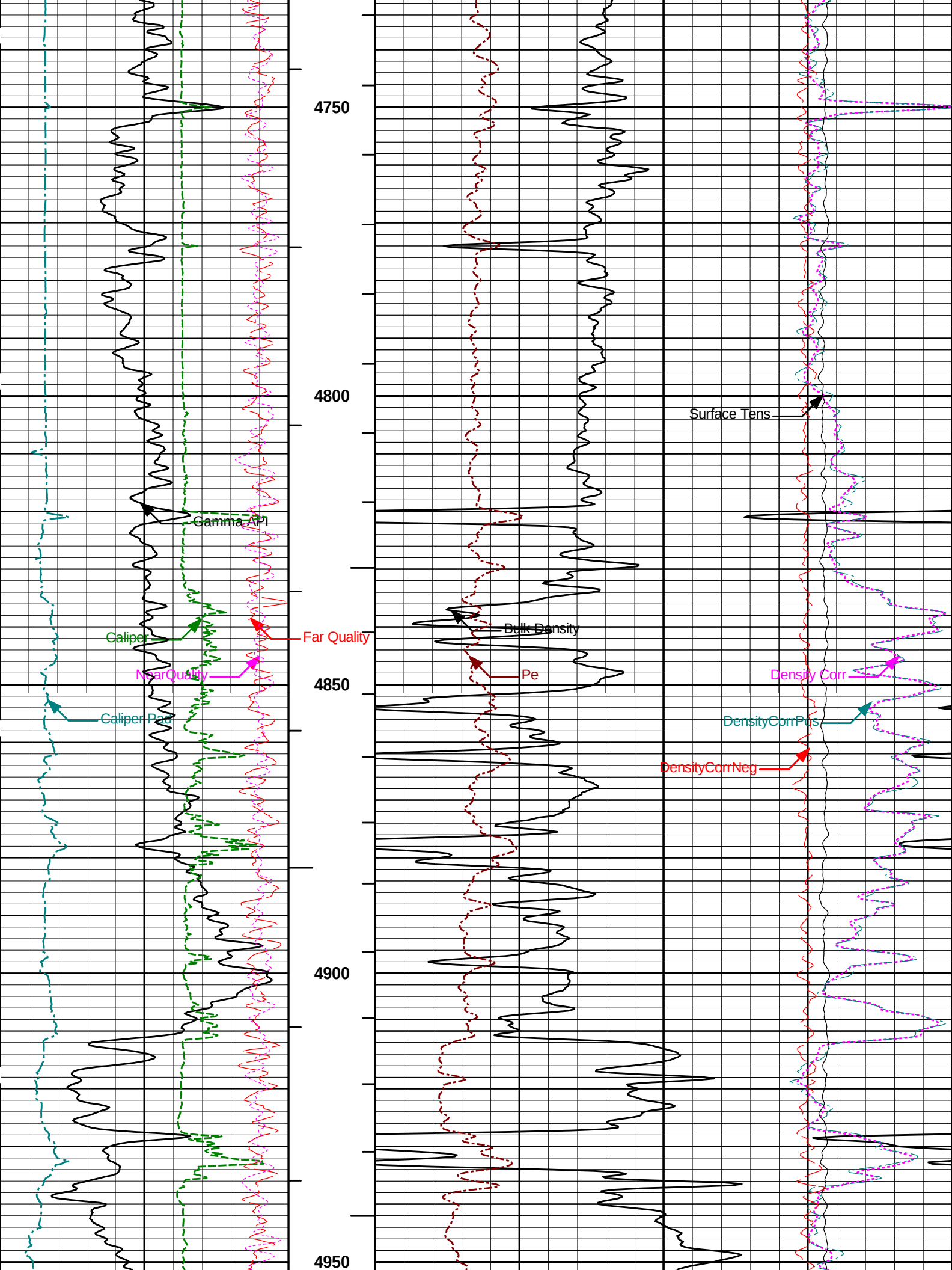
NearQuality
Pe
Bulk Density
Surface Tens
Density Corr
DensityCorrPos
DensityCorrNeg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4800
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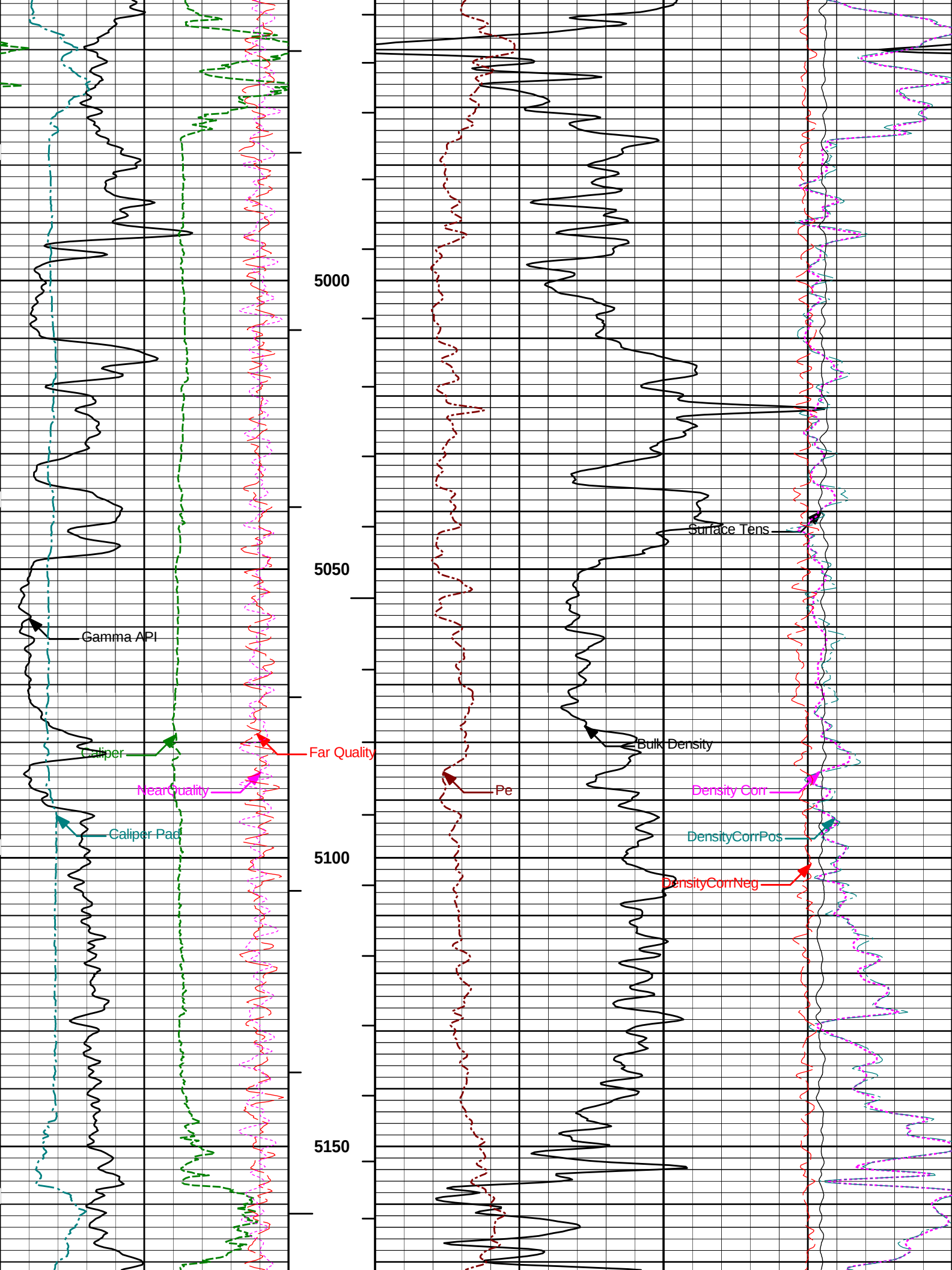
Gamma API
Caliper
Far Quality
NearQuality
Caliper Pad
Bulk Density
Pe
Surface Tens
Density Corr
DensityCorrPos
DensityCorrNeg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Caliper
Caliper Pad
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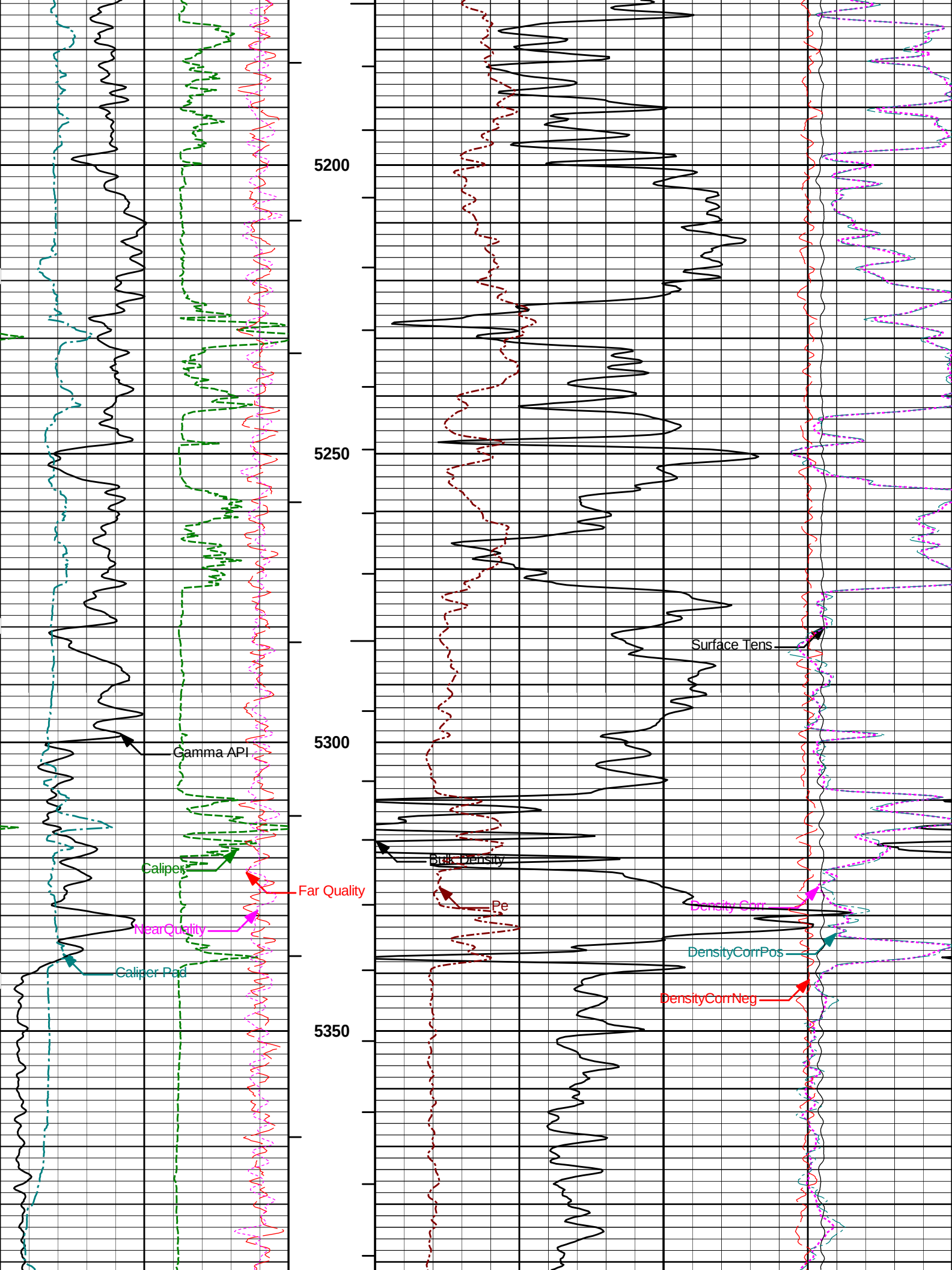
NearQuality
Pe
Surface Tens
Bulk Density
Density Corr
DensityCorrPos
DensityCorrNeg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Gamma API
Caliper
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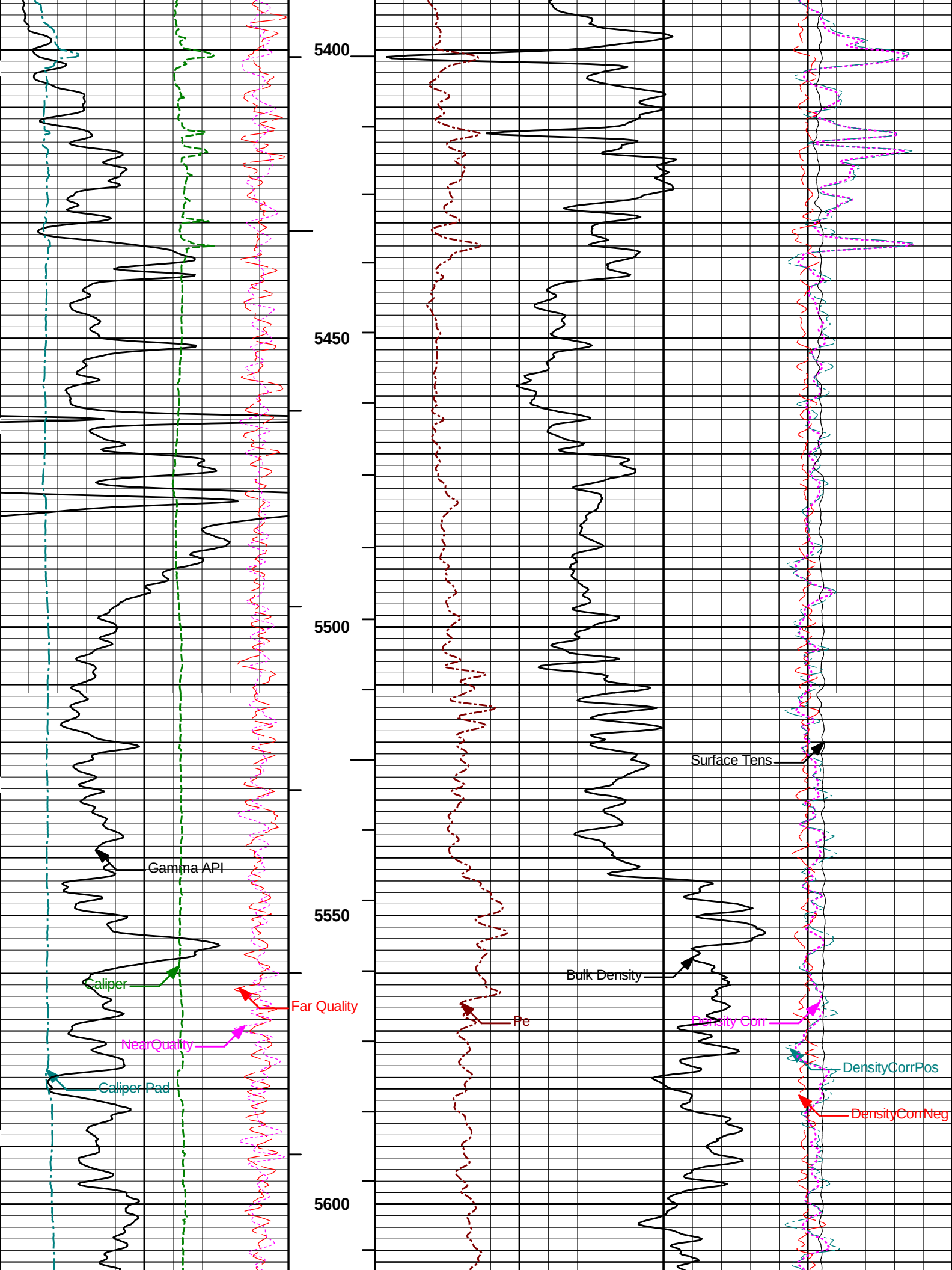
NearQuality
Caliper Pad
Bulk Density
Pe
Surface Tens
Density Corr
DensityCorrPos
DensityCorrNeg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Caliper Pad
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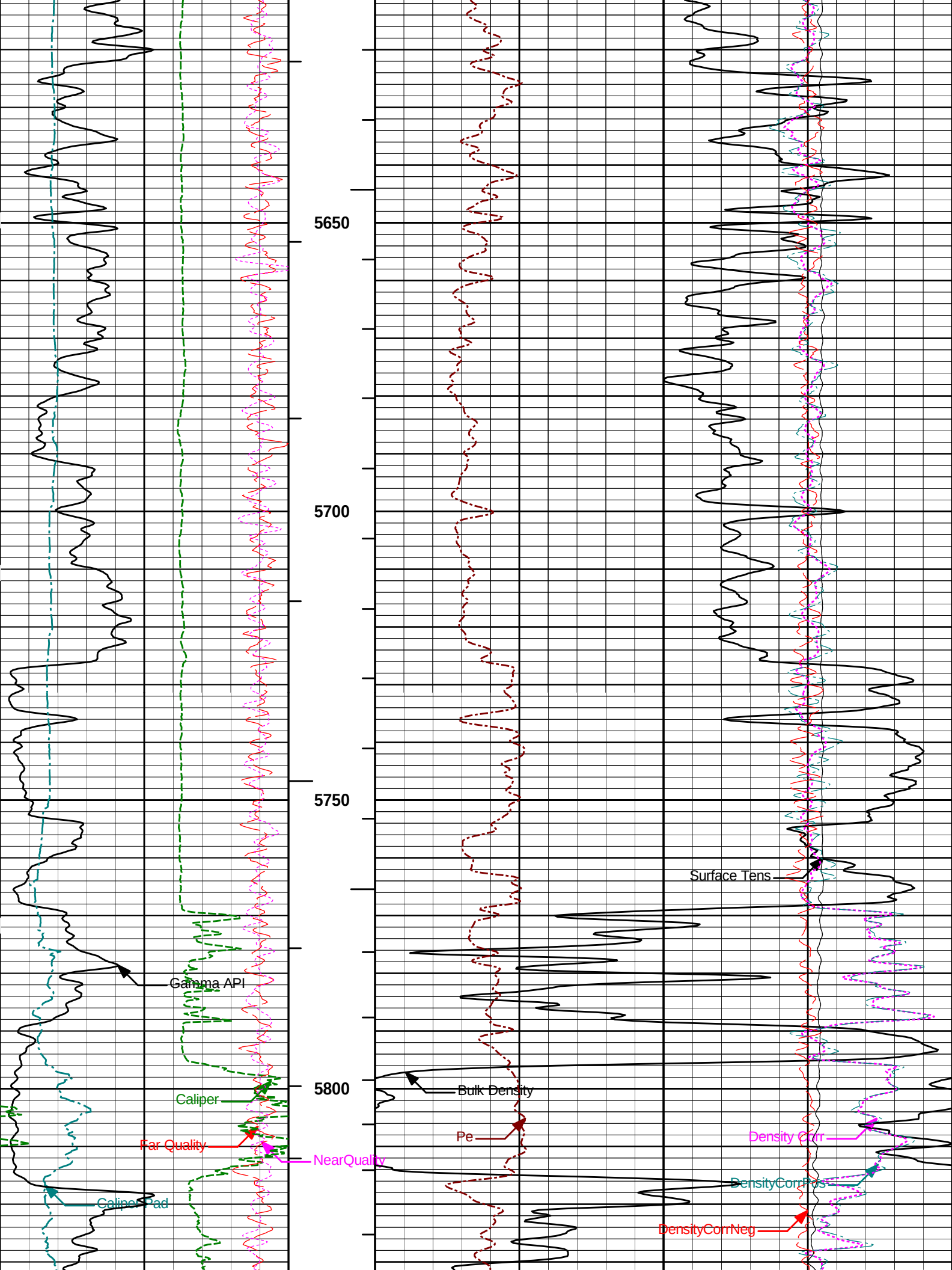
NearQuality
Pe
Bulk Density
Surface Tens
Density Corr
DensityCorrPos
DensityCorrNeg


5650
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Gamma API
Caliper
Far Quality
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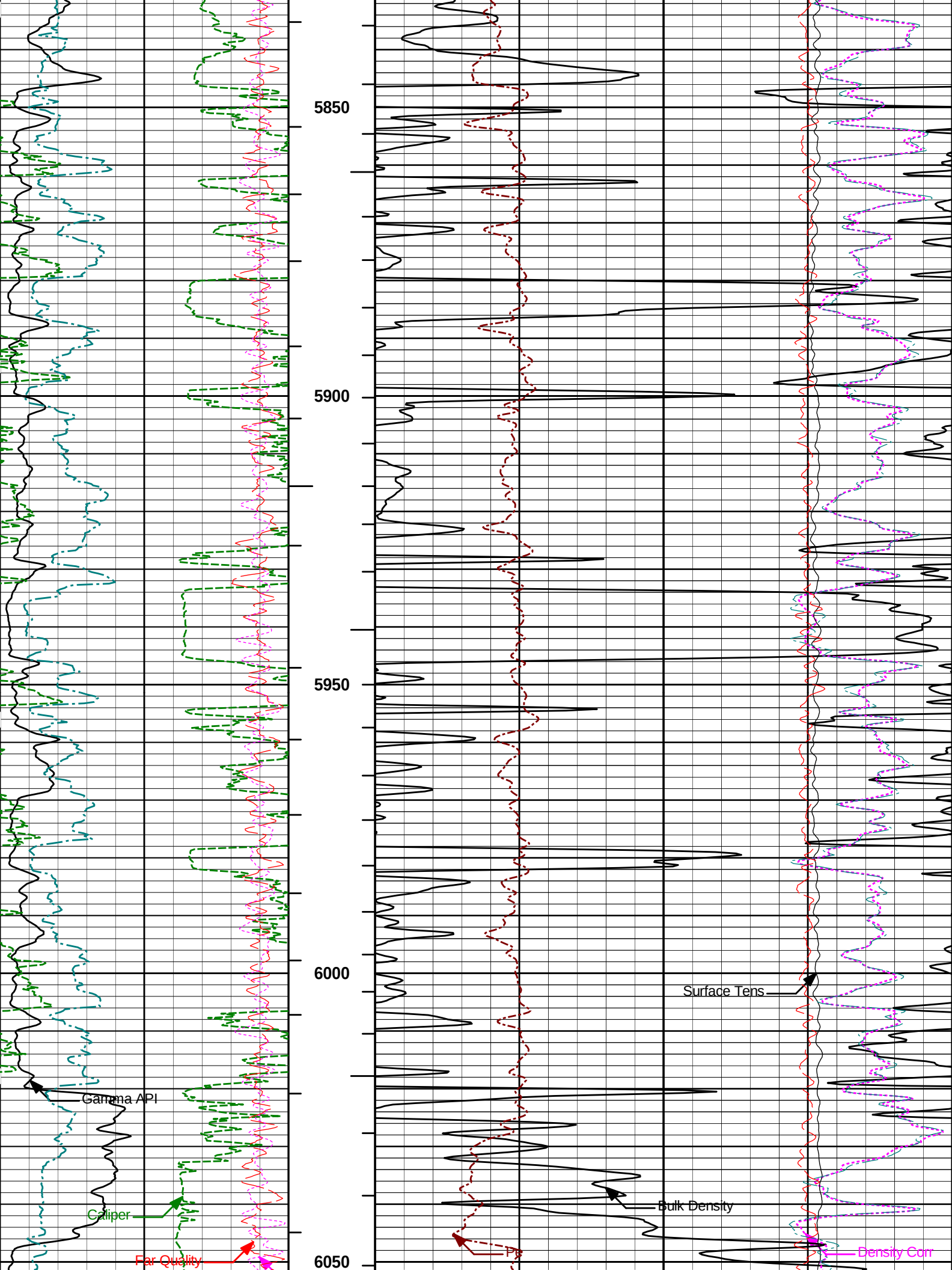
CaliperPad
Bulk Density
Pe
Surface Tens
Density Corr
DensityCorrPos
DensityCorrNeg


5850
5900
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6000
6050
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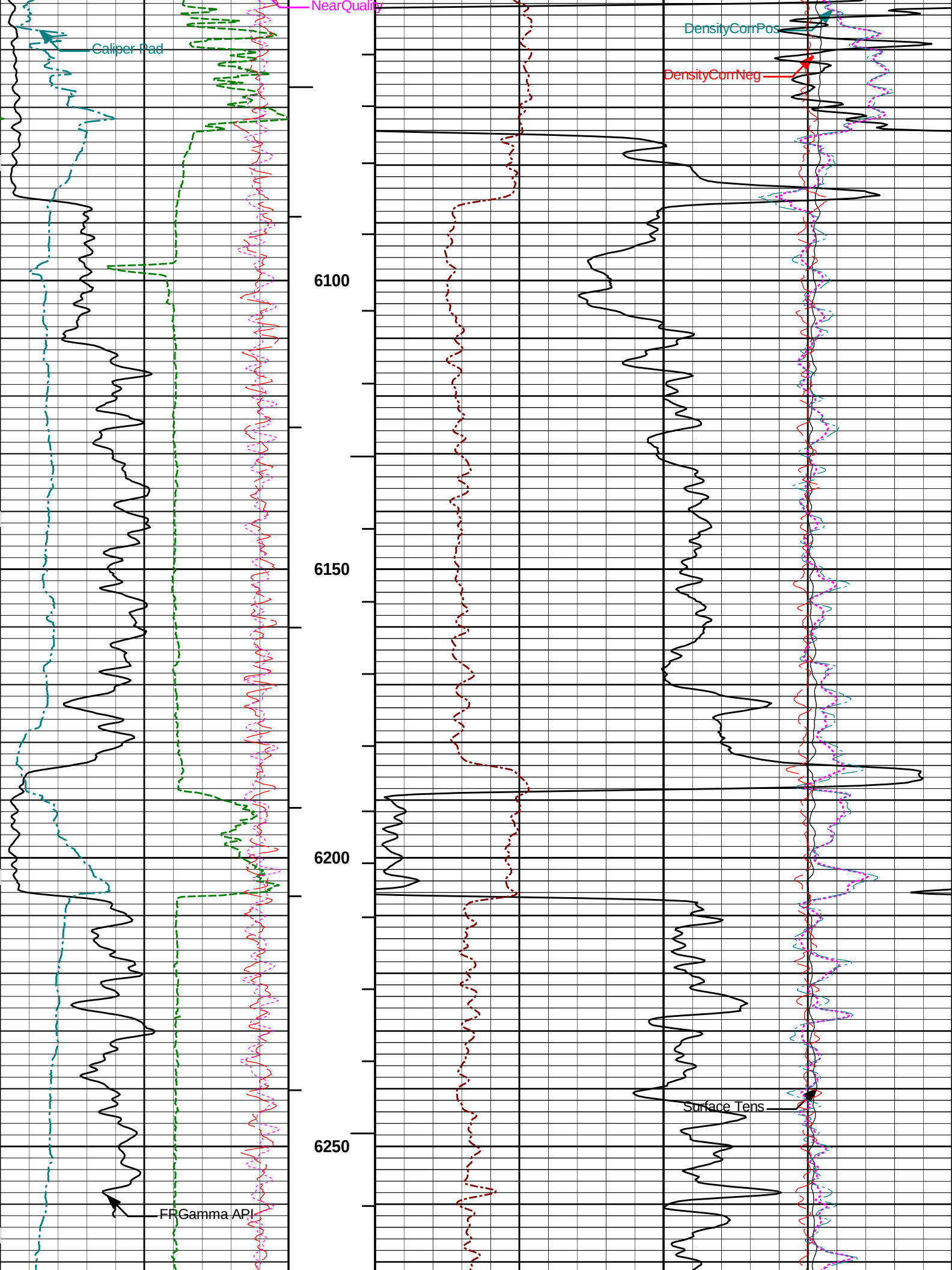
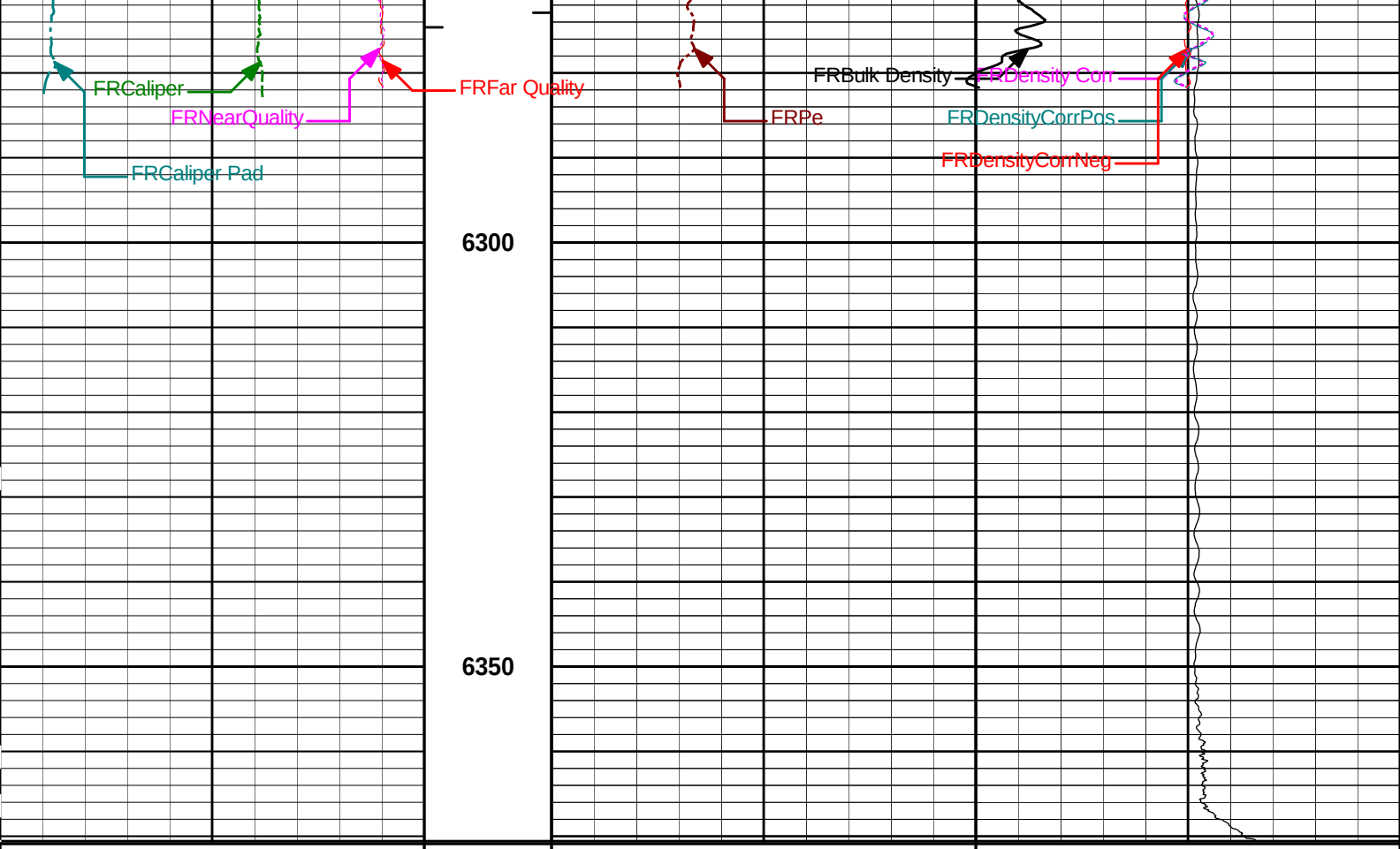
Caliper
Far Quality
Surface Tens
Bulk Density
Pe
Density Corr


NearQuality
Caliper Pad
DensityCorrPos
DensityCorrNeg
6100
6150
6200
6250
Surface Tens
FRGamma API



0 Gamma API 200 api	1 : 240	0 Pe 10
6 Caliper 16 inches	BHVT	
0 Caliper Pad 10 inches	AHVT	
9 Far Quality -1		
-9 NearQuality 1		2 Bulk Density 3 gram per cc

-0.25 Density Corr 0.25 gram per cc
-0.25 DensityCorrPos 0.25 gram per cc
-0.25 DensityCorrNeg 0.25 gram per cc
10K Surface Tens 0 pounds

HALLIBURTON

Plot Time: 08-Jan-13 10:00:20
Plot Range: 537 ft to 6370.58 ft
Data: SORS_1P\Well Based\DAQ-0002-002*
Plot File: \\PORO\IQ_RHOB_5IN_RM

MAIN PASS 5" = 100'

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 11958944 **Reference Calibration Date:** 17-Dec-12 13:37:02

Engineer:	**J. WALDEN**	**Calibration Date:**	**07-Jan-13 10:10:17**
Software Version:	**WL INSITE R3.8.0 (Build 2)**	**Calibration Version:**	**1**

Calibrator Source S/N: TB-290
Calibrator API Reference:230.00 api
Equivalent Calibrator API Reference:234.0 api

Measurement	Measured	Calibrated	Units
Background	77.4	76.1	api
Background + Calibrator	315.1	310.2	api
Calibrator	237.8	234.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name:	**GTET - 11958944**	**Reference Calibration Date:**	**07-Jan-13 10:10:17**
Engineer:	**J. WALDEN**	**Calibration Date:**	**07-Jan-13 10:13:16**
Software Version:	**WL INSITE R3.8.0 (Build 2)**	**Calibration Version:**	**1**

Calibrator Source S/N: TB-290
Calibrator API Reference:230.00 api
Equivalent Calibrator API Reference:234.0 api

Field Verification	Shop	Field	Units
Background	76.1	76.8	api
Background + Calibrator	310.2	311.2	api
Calibrator	234.0	234.4	api

Shop	Field	Difference	Tolerance
234.0	234.4	-0.4	+/- 9.00

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name:	**DSNT - 11219332**	**Reference Calibration Date:**	**13-Nov-12 12:16:23**
Engineer:	**J. SCHMIDT**	**Calibration Date:**	**17-Dec-12 13:59:21**
Software Version:	**WL INSITE R3.8.0 (Build 2)**	**Calibration Version:**	**1**

Logging Source S/N: DSN430
Tank Serial Number: 11068236
Reference value assigned to Tank: 53.720
Snow Block S/N: 37526
Calibration Tank Water Temperature: 50 degF
Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	**Prev. Value**	**New Value**	**Control Limit On New Value**
Gain:	0.977	0.978	0.900 - 1.100

WATER TANK SUMMARY (Horizontal Water Tank)				
Measurement	**Current Reading (Previous Coef.)**	**Calibrated (New Coef.)**	**Change**	**Control Limit On Change**
Porosity (decp):	0.2220	0.2223	0.0004	+/- 0.0020
Calibrated Ratio:	10.10	10.11	0.012	+/- 0.050

VERIFIER		
Measurement	**Value**	**Control Limit**
Snow-Block Porosity (decp):	0.0766	0.02000 - 0.09000

PASS/FAIL SUMMARY

Background Check:	Passed
Gain-Range Check:	Passed
Snow-Block Check:	Passed

DUAL SPACED NEUTRON FIELD CALIBRATION

Tool Name:	**DSNT - 11219332**	**Reference Calibration Date:**	**17-Dec-12 13:59:21**
Engineer:	**J. WALDEN**	**Calibration Date:**	**07-Jan-13 10:21:18**
Software Version:	**WL INSITE R3.8.0 (Build 2)**	**Calibration Version:**	**1**

Logging Source S/N: DSN430

Snow Block S/N: 37526

NEUTRON FIELD-CHECK SUMMARY

	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0766	0.0745	-0.0021	+/- 0.0150

PASS/FAIL SUMMARY

Block Change Check:	Passed
Snow Block Stat Check:	Passed
Temperature Check:	Passed

DENSITY CALIPER SHOP CALIBRATION

Tool Name:	**SDLT - 11014271**	**Reference Calibration Date:**	**17-Dec-12 17:09:10**
Engineer:	**J. SCHMIDT**	**Calibration Date:**	**17-Dec-12 17:13:23**
Software Version:	**WL INSITE R3.8.0 (Build 2)**	**Calibration Version:**	**1**
Host Tool Name:	**DSNT - 11219332**		

CALIBRATION COEFFICIENTS

Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-3261.53	-3152.75	-7000.00 - -1000.00
Pad Gain	0.0003781	0.0003749	0.000200 - 0.000600
Arm Offset	-3871.74	-3981.46	-5000.00 - 3000.00
Arm Gain	0.0005207	0.0005253	0.000300 - 0.000700
Arm Power	-0.000001960	-0.000002330	-0.000010000 - 0.000010000

The ring diameter is computed from: DIAMETER = PAD EXTENSION + ARM EXTENSION + TOOL DIAMETER

Tool Diameter: 4.50 in

CALIBRATION RINGS

Measurement	Current Reading (Previous Coeff.)	Calibrated (New Coeff.)	Change	Control Limit On New Value
PAD EXTENSION:				
Small Ring (in)	1.98	2.00	0.02	+/- 0.20
Medium Ring (in)	3.74	3.75	0.01	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.50	6.50	0.00	+/- 0.20
Medium Ring (in)	8.24	8.25	0.01	+/- 0.20
Large Ring (in)	15.00	15.00	0.00	+/- 0.20

PASS/FAIL SUMMARY

Calibration-Coefficients Range Check:	Passed
Ring-Measurement Check:	Passed

PASS/FAIL SUMMARY

Calibration-Coefficients Range Check:	Passed

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name:	**SDLT Pad - 11816600**	**Reference Calibration Date:**	**17-Dec-12 16:00:17**
Engineer:	**J. SCHMIDT**	**Calibration Date:**	**17-Dec-12 16:37:26**
Software Version:	**WL INSITE R3.8.0 (Build 2)**	**Calibration Version:**	**1**

Logging Source S/N: 5256 GW

Aluminum Block S/N: 63066 Density: 2.602g/cc Pe: 3.100

Magnesium Block S/N: N/A Density: 1.691g/cc Pe: 2.650

DENSITY CALIBRATION SUMMARY

Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0810	1.0859	0.90 - 1.10
Near Dens Gain	1.0417	1.0457	0.90 - 1.10
Near Peak Gain	1.0198	1.0307	0.90 - 1.10
Near Lith Gain	0.9866	0.9715	0.90 - 1.10
Far Bar Gain	1.0120	1.0115	0.90 - 1.10
Far Dens Gain	1.0005	1.0015	0.90 - 1.10
Far Peak Gain	0.9937	0.9951	0.90 - 1.10
Far Lith Gain	0.9743	0.9759	0.90 - 1.10
Near Bar Offset	-0.6695	-0.7187	NONE
Near Dens Offset	-0.2738	-0.3127	NONE
Near Peak Offset	-0.0563	-0.1539	NONE
Near Lith Offset	0.2090	0.3300	NONE
Far Bar Offset	-0.0766	-0.0725	NONE
Far Dens Offset	0.0329	0.0222	NONE
Far Peak Offset	0.0820	0.0687	NONE
Far Lith Offset	0.2248	0.2109	NONE
Near Bar Background	1033.91	1032.22	700 - 1450
Near Dens Background	343.03	343.79	230 - 480
Near Peak Background	150.10	150.01	100 - 210
Near Lith Background	183.01	183.49	125 - 260
Far Bar Background	658.62	661.91	450 - 900
Far Dens Background	257.43	257.27	175 - 345
Far Peak Background	101.42	102.41	70 - 140
Far Lith Background	105.96	106.13	75 - 145

CALIBRATION BLOCK SUMMARY

Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.694	1.691	-0.003	+/- 0.015
Pe	2.567	2.601	0.034	+/- 0.150
ALUMINUM				
Density (g/cc)	2.604	2.602	-0.002	+/- 0.01500
Pe	3.060	3.061	0.001	+/- 0.150

TOOL SUMMARY

Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0004	+/- 0.0110	0.0005	+/- 0.0140
Magnesium Block	0.0009	+/- 0.0110	-0.0006	+/- 0.0140
Aluminum Block	0.0002	+/- 0.0110	-0.0000	+/- 0.0140

Resolution	8.60	6.00 - 11.50	8.70	6.00 - 11.50
Internal Verifier(B+D+P+L)	1710	1200 - 2700	1128	800 - 1700

PASS/FAIL SUMMARY	
Background Quality Check:	Passed
Background Range Check:	Passed
Background Resolution Check:	Passed
Background Verification Check:	Passed
Magnesium Quality Check:	Passed
Aluminum Quality Check:	Passed
Gains Check:	Passed
Changes in Calibration Blocks:	Passed

SPECTRAL DENSITY FIELD CHECK

Tool Name: SDLT Pad - 11816600 **Reference Calibration Date:** 17-Dec-12 16:37:26

Engineer: J. WALDEN **Calibration Date:** 07-Jan-13 09:57:15

Software Version: WL INSITE R3.8.0 (Build 2) **Calibration Version:** 1

Pad Temperature: 57.6 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1709.502	1709.182	-0.320	16.593
Far (B+D+P+L) cps	1127.718	1126.210	-1.508	17.664
Near Resolution	8.60	8.74	0.140	0.50
Far Resolution	8.70	8.95	0.250	1.00

PASS/FAIL SUMMARY	
Bkg Quality Check:	Passed
Bkg Resolution Check:	Passed
Bkg Verification Check:	Passed

SDLT CALIPER FIELD CALIBRATION

Tool Name: SDLT - 11014271 **Reference Calibration Date:** 17-Dec-12 17:13:23

Engineer: J. WALDEN **Calibration Date:** 07-Jan-13 09:59:53

Software Version: WL INSITE R3.8.0 (Build 2) **Calibration Version:** 1

MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.82	0.07	+/- 0.10
Ring Diameter	8.25	8.17	-0.08	+/- 0.15

PASS/FAIL SUMMARY	
Pad Extension Check:	Passed
Diameter Check:	Passed

ACCELEROMETER AND MAGNETOMETER SHOP CALIBRATION

Tool Name: IDT - 11277451 **Reference Calibration Date:** 22-Dec-11 12:25:38

Engineer: R. TWEETEN **Calibration Date:** 12-Dec-12 09:29:09

Software Version: WL INSITE R3.8.0 (Build 2) **Calibration Version:** 1

Reference Gravity Field: 1.0000 g

Reference Magnetic Field: 52800.0000 nT

* QF : value of 0 is shown for bad quality if | data - reference | > (2 * standard deviation) and > (0.5% of reference value)

ACCELEROMETER CALIBRATION RAW DATA VALUE					
Raw Acc X	Raw Acc Y	Raw Acc Z	Quality(Gravity)	Quality Error(%)	QF
0.4269	-0.5884	-0.0061	1.0002	99.9829	1
-0.5599	-0.4780	-0.0063	1.0000	99.9967	1
-0.4375	0.6033	-0.0067	1.0000	99.9953	1
0.5831	0.4446	-0.0061	1.0000	99.9994	1
-0.0172	0.7436	-0.0064	0.9999	99.9936	1
0.6184	0.3018	0.1163	0.9998	99.9824	1
-0.0564	0.7421	-0.0065	1.0001	99.9927	1
0.7216	0.0940	-0.0061	1.0001	99.9879	1
-0.0078	-0.7309	-0.0061	0.9999	99.9889	1
-0.7395	-0.0298	-0.0065	1.0000	99.9995	1
-0.0143	0.0013	0.3591	1.0000	99.9969	1
0.6578	-0.1071	-0.1504	0.9999	99.9929	1

ACCELEROMETER QUALITY SUMMARY		
Average Calculated Gravity Field	1.0000	g
Standard Deviation Calculated Gravity Field	0.0001	g

ACCELEROMETER GAIN AND OFFSET		
	GAIN	OFFSET
ACC X	1.3631752729	0.0093273642
ACC Y	1.3562285900	-0.0086623570
ACC Z	2.7358396053	0.0174727775

* QF : value of 0 is shown for bad quality if | data - reference | > (3 * standard deviation) and > (1% of reference value)

MAGNETOMETER CALIBRATION RAW DATA VALUE					
Raw Mag X	Raw Mag Y	Raw Mag Z	Quality(Magnetic)	Quality Error(%)	QF
-0.1621	1.2632	-0.0843	53389.0742	98.8843	1
1.2405	0.2697	-0.0857	53529.2031	98.6189	1
0.1707	-1.2622	-0.0893	54134.3047	97.4729	1
-1.2427	-0.1685	-0.0880	52686.8008	99.7856	1
-0.0479	-1.0868	0.4088	51367.3828	97.2867	1
-1.0982	-0.5665	-0.3070	53254.3945	99.1394	1
0.2701	-1.0216	-0.6403	52368.3047	99.1824	1
-0.9920	-0.3106	-0.6376	51226.5664	97.0200	1
-0.1738	1.0402	-0.6485	51847.8633	98.1967	1
1.0246	0.2544	-0.6342	51825.9453	98.1552	1
-0.2197	-0.5608	0.9200	52932.6523	99.7488	1
-0.7837	-0.0929	-0.9906	54458.1367	96.8596	1

MAGNETOMETER QUALITY SUMMARY		
Average Calculated Magnetic Field	52751.7188	nT
Standard Deviation Calculated Magnetic Field	1052.5829	nT

MAGNETOMETER GAIN AND OFFSET		
	GAIN	OFFSET
MAG X	42089.3085937500	159.4645385742
MAG Y	42207.0781250000	-351.8444519043
MAG Z	46856.6171875000	3174.7180175781

Noise Level Value: 0.000219 cnts

Noise Level Cal Value: 0.0006 g

ICT SHOP CALIBRATION

Tool Name:	**ICT - 11294351**	**Reference Calibration Date:**	**13-Mar-12 12:13:20**
Engineer:	**R. TWEETEN**	**Calibration Date:**	**20-Nov-12 10:40:08**
Software Version:	**WL INSITE R3.8.0 (Build 2)**	**Calibration Version:**	**1**

CALIPERS AND RINGS

Ring	Measured	Calibrated	Units
CALIPER 1:			
Small Ring	3.69	3.65	in
Medium Ring	8.12	8.00	in
Large Ring	15.16	15.00	in
X-Large Ring	23.50	21.00	in
CALIPER 2:			
Small Ring	3.74	3.65	in
Medium Ring	8.05	8.00	in
Large Ring	15.21	15.00	in
X-Large Ring	21.07	21.00	in
CALIPER 3:			
Small Ring	3.72	3.65	in
Medium Ring	7.94	8.00	in
Large Ring	15.10	15.00	in
X-Large Ring	21.19	21.00	in
CALIPER 4:			
Small Ring	3.76	3.65	in
Medium Ring	7.92	8.00	in
Large Ring	14.91	15.00	in
X-Large Ring	20.89	21.00	in
CALIPER 5:			
Small Ring	3.61	3.65	in
Medium Ring	7.93	8.00	in
Large Ring	14.75	15.00	in
X-Large Ring	25.58	21.00	in
CALIPER 6:			
Small Ring	3.66	3.65	in
Medium Ring	8.04	8.00	in
Large Ring	15.04	15.00	in
X-Large Ring	21.00	21.00	in

DUAL LATEROLOG SHOP CALIBRATION

Tool Name:	**DLLT - 90277021**	**Reference Calibration Date:**	**05-Nov-12 17:37:07**
Engineer:	**Z. TAYLOR**	**Calibration Date:**	**05-Nov-12 17:44:10**
Software Version:	**WL INSITE R3.6.0 (Build 3)**	**Calibration Version:**	**1**

Measurement	Deep Measured	Deep Calibrated	Shallow Measured	Shallow Calibrated	Units
External Cal Point #1	1.06	1.04	1.00	1.00	ohmm
External Cal Point #2	119.57	119.47	99.66	99.63	ohmm
External Cal Point #3	1539.64	1541.79	1020.27	1019.96	ohmm
External Check Point	119.58	119.48	99.66	99.63	ohmm
Internal Reference	16.04	16.01	20.17	20.17	ohmm

DUAL LATEROLOG FIELD CALIBRATION

Tool Name:	**DLLT - 90277021**	**Reference Calibration Date:**	**05-Nov-12 17:44:10**
Engineer:	**J. WALDEN**	**Calibration Date:**	**07-Jan-13 11:08:57**
Software Version:	**WL INSITE R3.8.0 (Build 2)**	**Calibration Version:**	**1**

Measurement	Deep Shop	Deep Field	Shallow Shop	Shallow Field	Units
Internal Reference	16.01	16.02	20.17	20.18	ohmm

PASS/FAIL SUMMARY

Measurement	Difference	Tolerance	Pass/Fail
Internal Deep	0.01	+/- 0.8	Passed
Internal Shallow	0.00	+/- 0.8	Passed

MICRO SPHERICALLY FOCUSED LOG SHOP CALIBRATION

Tool Name: MSFL - 11976327 **Reference Calibration Date:** 05-Nov-12 18:47:05

Engineer: Z. TAYLOR **Calibration Date:** 05-Nov-12 18:49:29

Software Version: WL INSITE R3.6.0 (Build 3) **Calibration Version:** 1

Measurement	Measured	Calibrated	Units
External Cal Point #1	0.20	0.20	ohmm
External Cal Point #2	20.00	20.00	ohmm
External Cal Point #3	2001.49	2000.00	ohmm
Internal Reference	19.98	19.98	ohmm

MICRO SPHERICALLY FOCUSED LOG FIELD CALIBRATION

Tool Name: MSFL - 11976327 **Reference Calibration Date:** 05-Nov-12 18:49:29

Engineer: R. TWEETEN **Calibration Date:** 30-Nov-12 11:39:25

Software Version: WL INSITE R3.8.0 (Build 2) **Calibration Version:** 1

Measurement	Shop	Field	Change	Control Limit On	Units
Internal Reference	19.98	19.99	0.007	0.800	ohmm

PASS/FAIL SUMMARY

Internal Reference:	Passed

CALIPER SHOP CALIBRATION

Tool Name: MSFL - 11976327 **Reference Calibration Date:** 05-Nov-12 18:34:56

Engineer: Z. TAYLOR **Calibration Date:** 05-Nov-12 18:38:11

Software Version: WL INSITE R3.6.0 (Build 3) **Calibration Version:** 1

CALIBRATION RINGS AND INTERNAL

Measurement	Current Reading (Previous Coeff.)	Calibrated (New Coeff.)	Change
RING DIAMETER:			
Ring #1 (in)	8.40	8.25	0.1500
Ring #2 (in)	15.00	15.00	0.0000
Hi/Lo Internal:			
Lo Internal (in)	4.17	4.17	0.0000
Hi Internal (in)	19.10	19.10	0.0000

CALIPER FIELD CALIBRATION

Tool Name: MSFL - 11976327 **Reference Calibration Date:** 05-Nov-12 18:38:11

Engineer: J. WALDEN **Calibration Date:** 07-Jan-13 11:10:09

Software Version: WL INSITE R3.8.0 (Build 2) **Calibration Version:** 1

MEASURED CALIPER VALUES

Measurement	Shop	Field	Change	Control Limit On New Value
Lo Internal (in)	4.17	4.03	0.000	+/- 0.500

Lo Internal (in)	4.17	3.93	0.238	+/- 0.500
Hi Internal (in)	19.10	19.20	-0.099	+/- 0.500

PASS/FAIL SUMMARY	
Lo Internal Check:	Passed
Hi Internal Check:	Passed

CALIBRATION SUMMARY

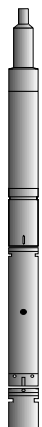
Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11958944						
Gamma Ray Calibrator	234.0	234.4	----------	-0.4	+/- 9.00	api
DSNT-11219332						
Snow-Block Porosity	0.0766	0.0745	----------	0.0021	+/- 0.0150	decp
SDLT-11014271						
Pad Extension	3.75	3.82	----------	-0.07	+/-0.10	in
Ring Diameter	8.25	8.17	----------	0.08	+/-0.15	in
SDLT Pad-11816600						
Near(B+D+P+L)	1709.502	1709.182	----------	0.320	+/-16.593	cps
Far(B+D+P+L)	1127.718	1126.210	----------	1.508	+/-17.664	cps
ICT-11294351						
Caliper 1	8.00	----------	----------	0.00	----------	in
Caliper 2	8.00	----------	----------	0.00	----------	in
Caliper 3	8.00	----------	----------	0.00	----------	in
Caliper 4	8.00	----------	----------	0.00	----------	in
Caliper 5	8.00	----------	----------	0.00	----------	in
Caliper 6	8.00	----------	----------	0.00	----------	in
DLLT-90277021						
Deep Internal Ref.	16.01	16.02	----------	-0.01	+/- 0.8	ohmm
Shallow Internal Ref.	20.17	20.18	----------	-0.01	+/- 0.8	ohmm
MSFL-11976327						
MSFL Internal Ref.	19.98	19.99	----------	-0.01	+/- 0.800	ohmm
Caliper Lo. Internal	4.17	3.93	----------	0.24	+/- 0.500	in
Caliper Hi. Internal	19.10	19.20	----------	-0.10	+/- 0.500	in

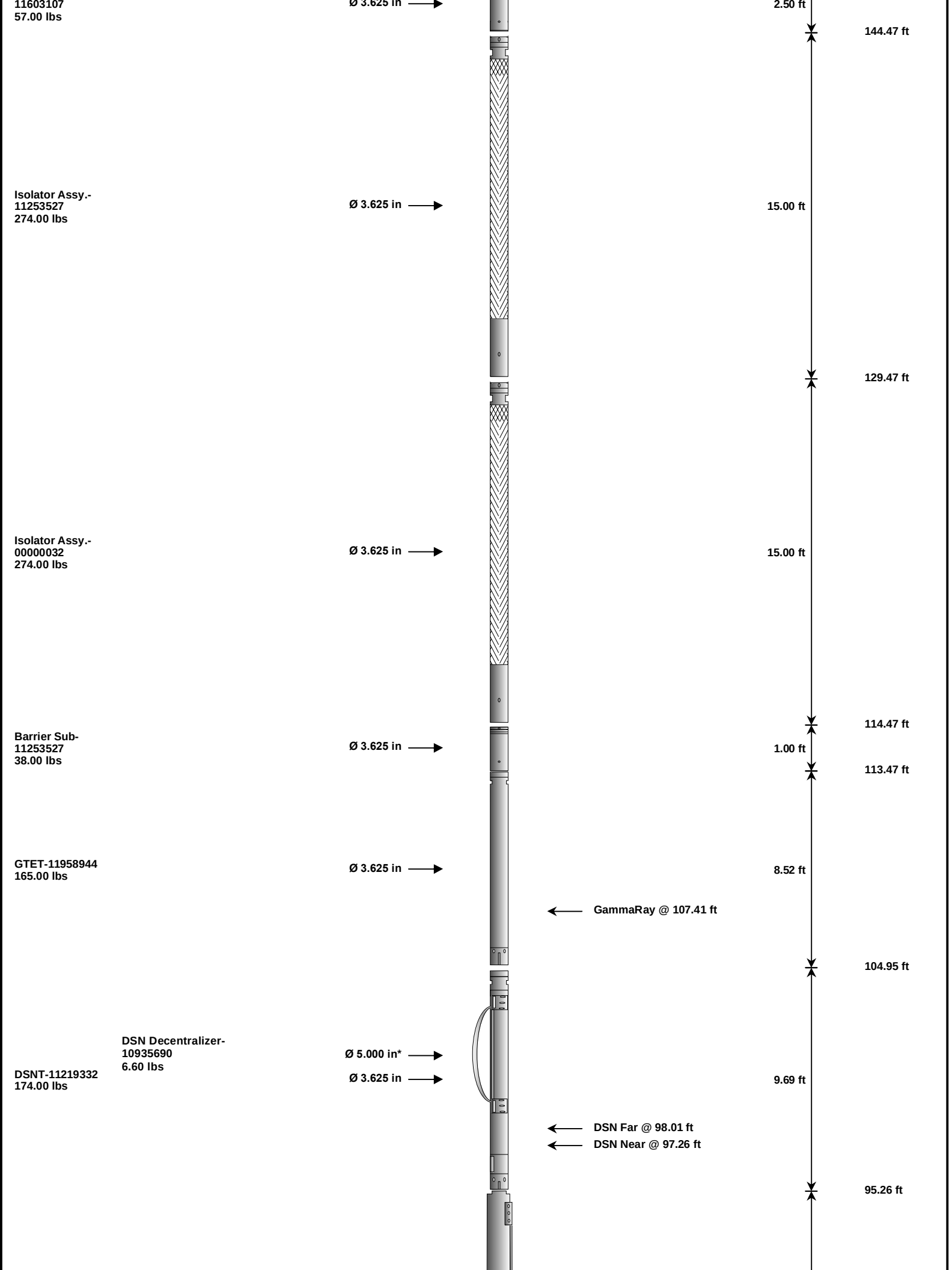
Data: SORS_1P\0001 GTET-DSNT-SDLT-BSAT-DLLT-MSFL\001 08-Jan-13 05:53 Dn @50.0f **Date: 08-Jan-13 06:17:19**

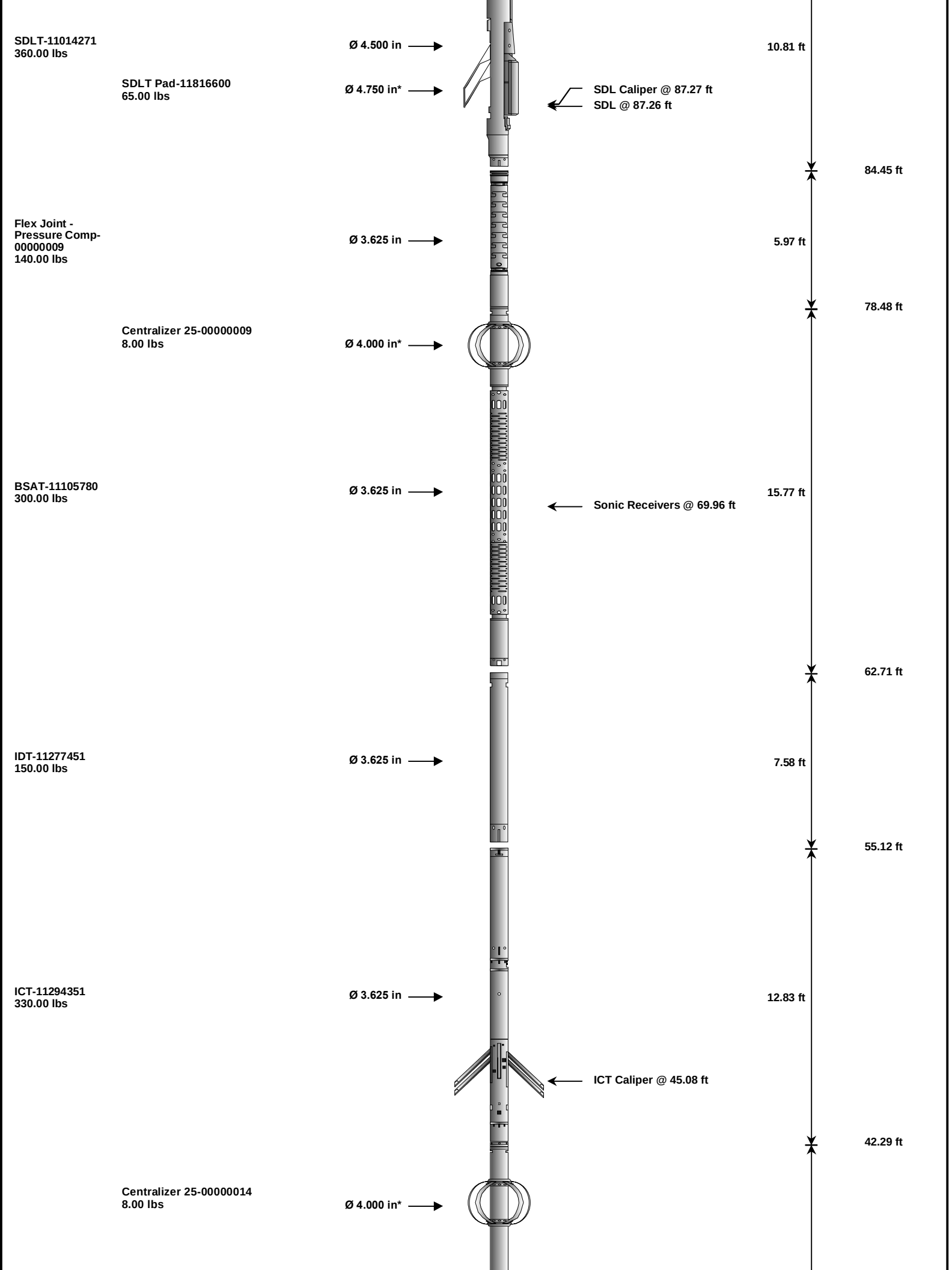
HALLIBURTON

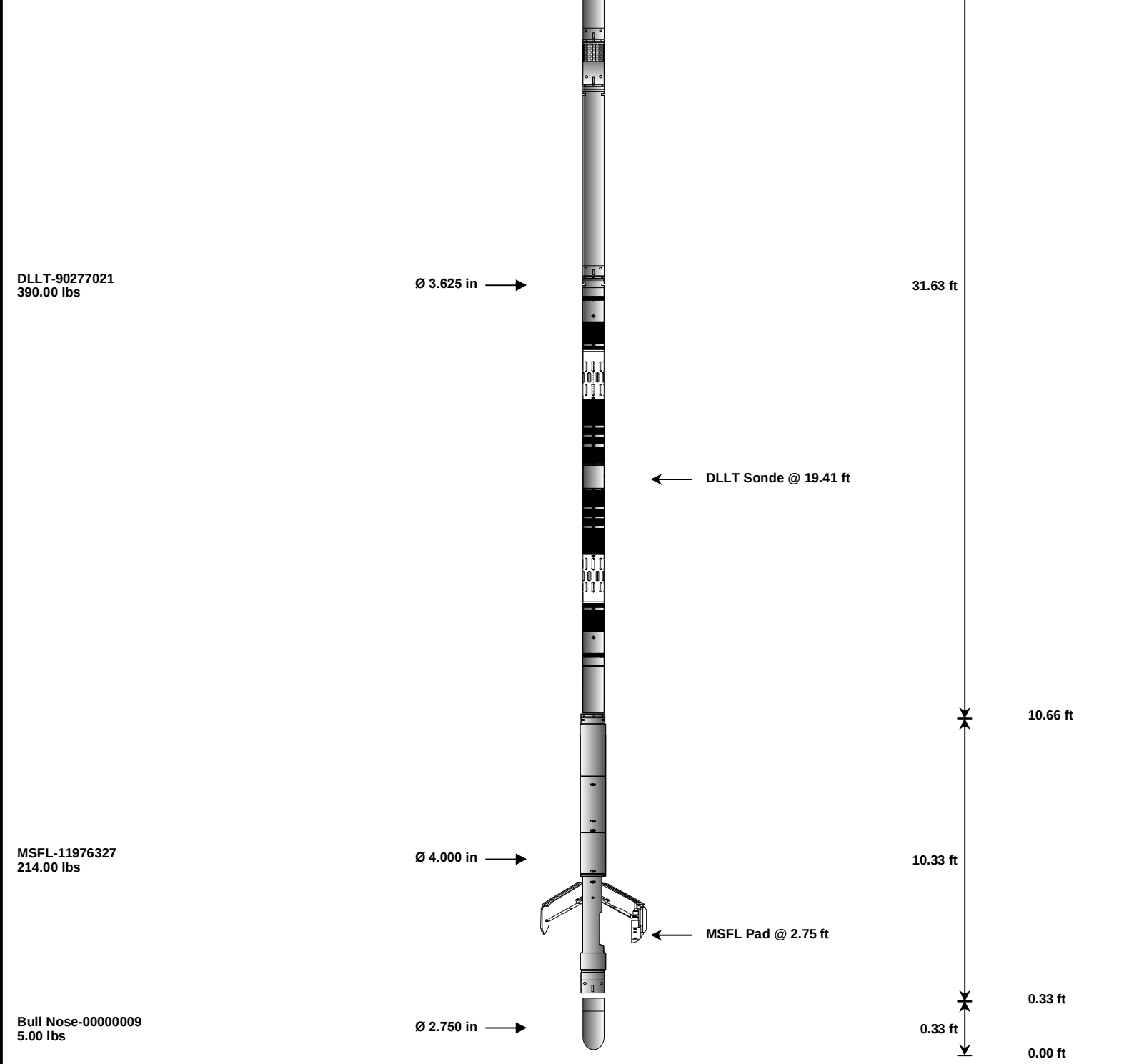
TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
						156.96 ft
RWCH-11732195 135.00 lbs		Ø 3.625 in		Load Cell @ 153.28 ft BH Temperature @ 152.71 ft	6.25 ft	
						150.71 ft
SP Sub-11616670 60.00 lbs		Ø 3.625 in		SP @ 148.93 ft	3.74 ft	
						146.97 ft
Return Electrode-						




11603107
57.00 lbs
Ø 3.625 in
2.50 ft
144.47 ft
Isolator Assy.-
11253527
274.00 lbs
Ø 3.625 in
15.00 ft
129.47 ft
Isolator Assy.-
00000032
274.00 lbs
Ø 3.625 in
15.00 ft
114.47 ft
Barrier Sub-
11253527
38.00 lbs
Ø 3.625 in
1.00 ft
113.47 ft
GTET-11958944
165.00 lbs
Ø 3.625 in
8.52 ft
GammaRay @ 107.41 ft
104.95 ft
DSN Decentralizer-
10935690
6.60 lbs
Ø 5.000 in*
DSNT-11219332
174.00 lbs
Ø 3.625 in
9.69 ft
DSN Far @ 98.01 ft
DSN Near @ 97.26 ft
95.26 ft


SDLT-11014271
360.00 lbs
Ø 4.500 in
10.81 ft
SDLT Pad-11816600
65.00 lbs
Ø 4.750 in*
SDL Caliper @ 87.27 ft
SDL @ 87.26 ft
84.45 ft
Flex Joint -
Pressure Comp-
00000009
140.00 lbs
Ø 3.625 in
5.97 ft
78.48 ft
Centralizer 25-00000009
8.00 lbs
Ø 4.000 in*
BSAT-11105780
300.00 lbs
Ø 3.625 in
15.77 ft
Sonic Receivers @ 69.96 ft
62.71 ft
IDT-11277451
150.00 lbs
Ø 3.625 in
7.58 ft
55.12 ft
ICT-11294351
330.00 lbs
Ø 3.625 in
12.83 ft
ICT Caliper @ 45.08 ft
42.29 ft
Centralizer 25-00000014
8.00 lbs
Ø 4.000 in*



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)		Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	11732195	135.00	6.25		150.71	300.00
SP	SP Sub	11616670	60.00	3.74		146.97	300.00
RE	Return Electrode - Rigid Bridle	11603107	57.00	2.50		144.47	300.00
ISA	Isolator Assembly - Rigid Bridle	11253527	274.00	15.00		129.47	300.00
ISA	Isolator Assembly - Rigid Bridle	00000032	274.00	15.00		114.47	300.00
w	Barrier Sub - Rigid Bridle	11253527	38.00	1.00		113.47	300.00
GTET	Gamma Telemetry Tool	11958944	165.00	8.52		104.95	60.00
DSNT	Dual Spaced Neutron	11219332	174.00	9.69		95.26	60.00
DCNT	DSN Decentralizer	10935690	6.60	5.13	*	98.59	300.00
SDLT	Spectral Density Tool	11014271	360.00	10.81		84.45	60.00
SDLP	Density Insite Pad	11816600	65.00	2.55	*	86.66	60.00
FLEX	Flex Joint - Pressure Compensated	00000009	140.00	5.97		78.48	300.00
BSAT	Borehole Sonic Array Tool	11105780	300.00	15.77		62.71	60.00
OBCEN	Centralizer - 25 in. Overbody	00000009	8.00	2.08	*	75.87	300.00
IDT	Insite Directional Tool	11277451	150.00	7.58		55.12	30.00
ICT	Six Independent Arm Caliper	11294351	330.00	12.83		42.29	30.00
DLLT	Dual Laterolog	90277021	390.00	31.63		10.66	100.00

OBCEN	Centralizer - 25 in. Overbody	00000014	8.00	2.08	*	38.59	300.00
MSFL	Micro Spherically Focused Log	11976327	214.00	10.33		0.33	60.00
BLNS	Bull Nose	00000009	5.00	0.33		0.00	300.00
Total			**3,153.60**	**156.96**			

* Not included in Total Length and Length Accumulation.

Data: SORS_1P\0001 GTET-DSNT-SDLT-BSAT-DLLT-MSFL\IDLE **Date: 08-Jan-13 05:51:00**

COMPANY	**CHAMA OIL & MINERALS LLC**		
WELL	**SORS-1P**		
FIELD	**WILDCAT**		
COUNTY	**WASHINGTON**	STATE	**CO**

HALLIBURTON

SPECTRAL DENSITY DUAL SPACED NEUTRON LOG