

SPECTRAL DENSITY DUAL SPACED NEUTRON

Fold here

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	6517'	1130'	REC	0 API	150 API				30%	-10%	2.68	30%	-10%	SAND
DIRECTIONAL INFORMATION														
Maximum Deviation					@				KOP			@		
Remarks:														
ANNULAR HOLE VOLUME CALCUALTED FOR 7.625-INCH CASING														
BOREHOLE RUGOSITY, TENSION PULLS, AND WASHOUTS MAY AFFECT LOG QUALITY AND REPEATABILITY														
RIG: SST-66														
CREW: D. PIEGER, T. CHASE, M. SKINNER, T. PETERSON														
THANK YOU FOR USING HALLIBURTON: ROCK SPRINGS, WY 307-352-8600														
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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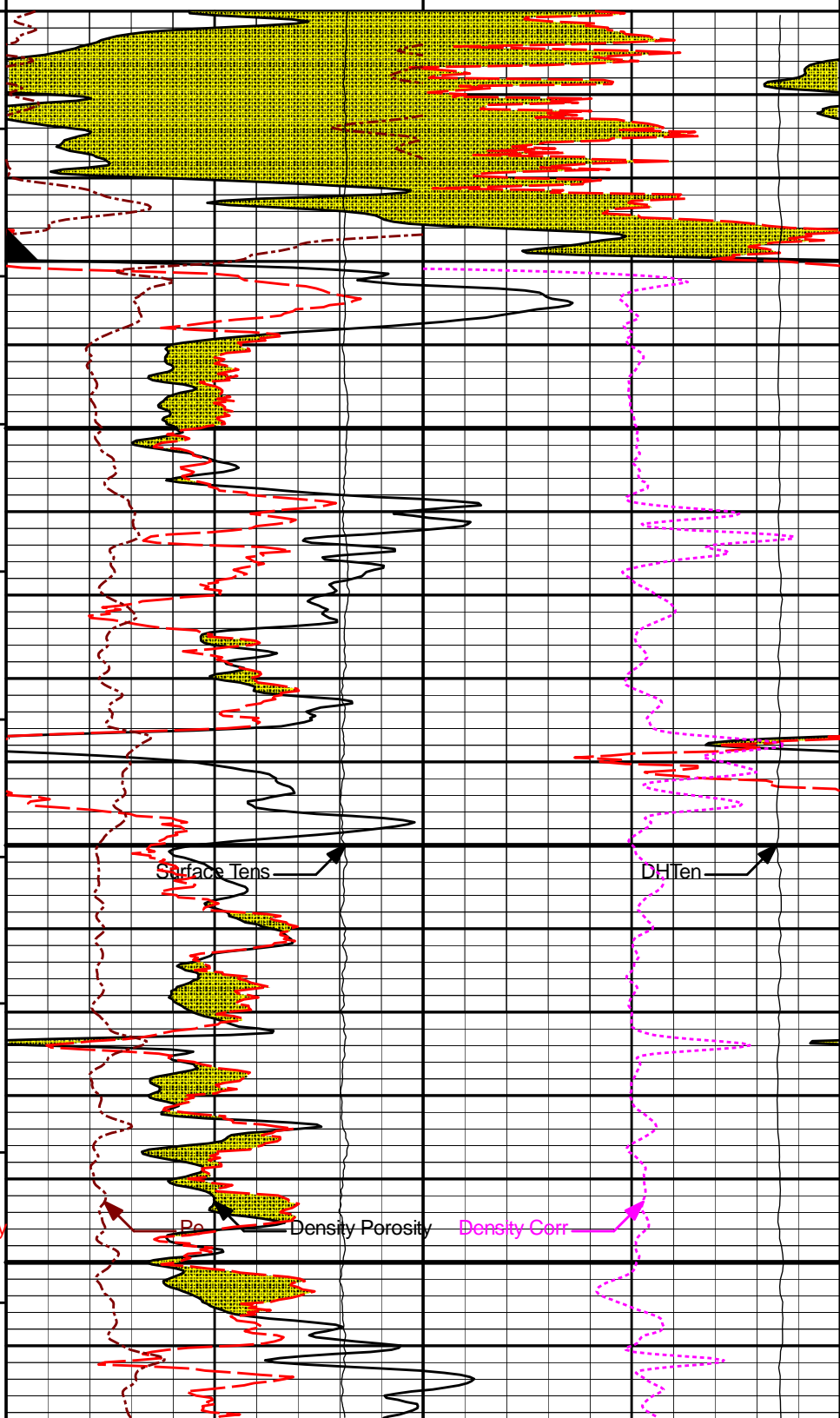
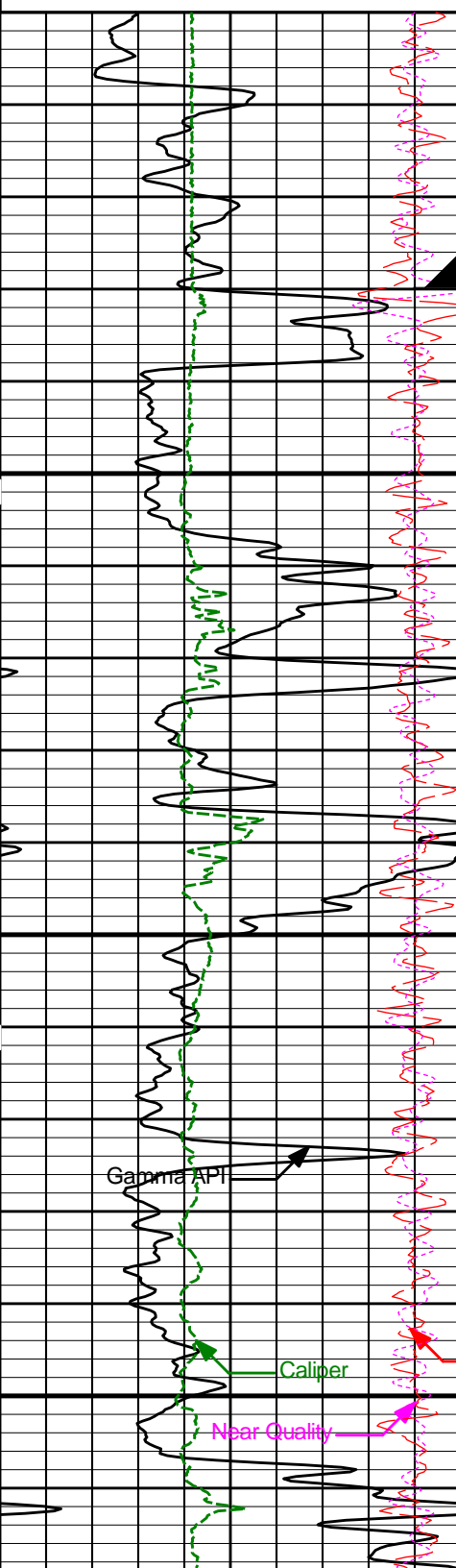
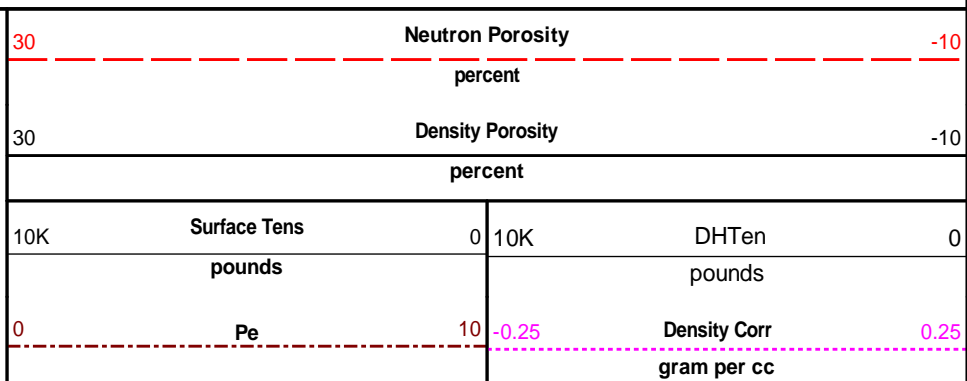
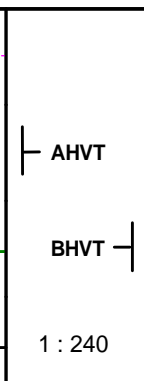
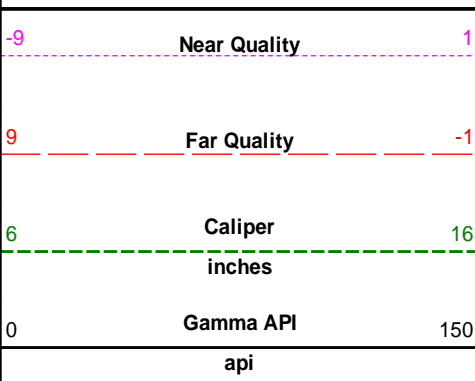
PARAMETERS REPORT

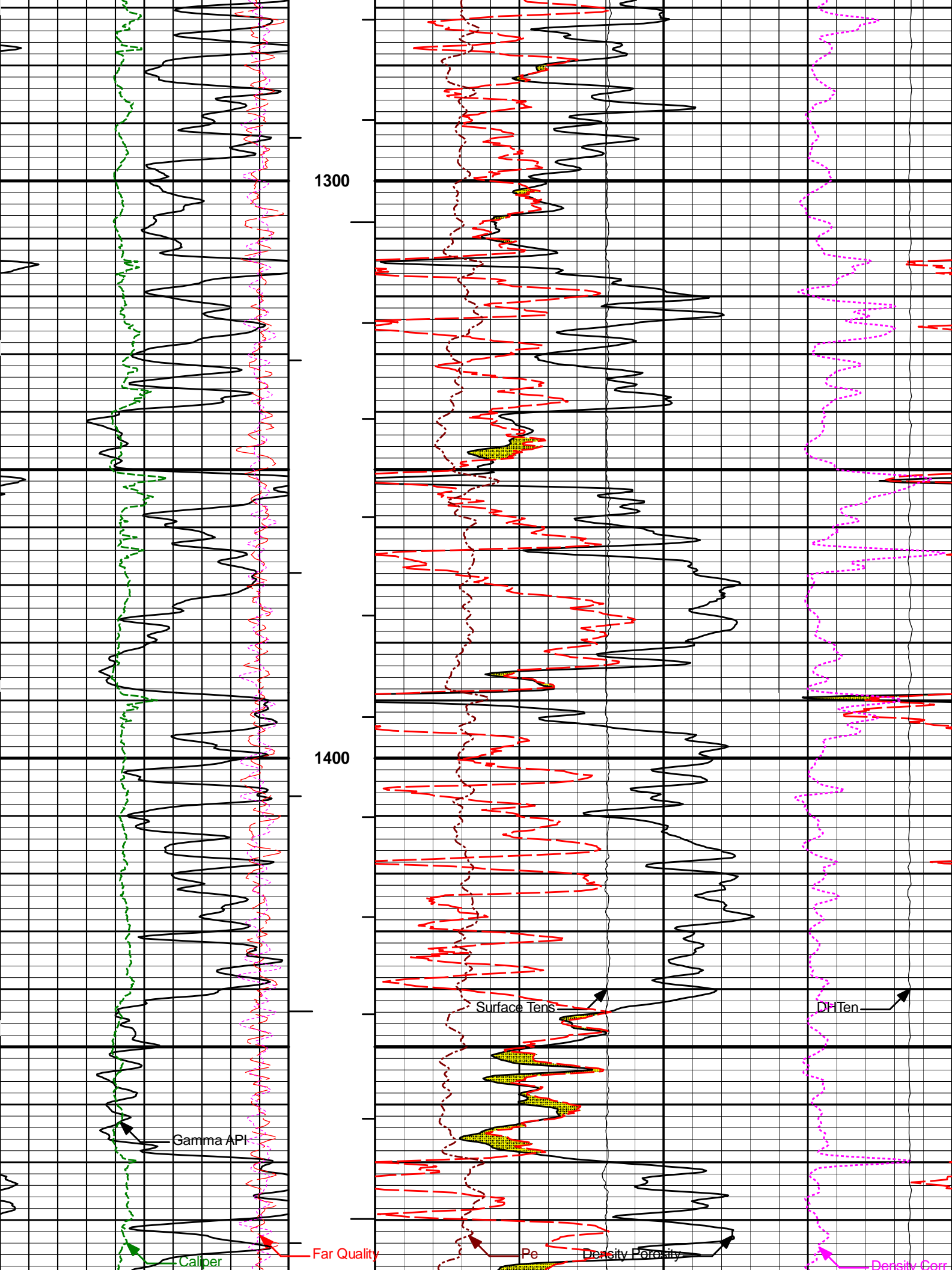
Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	9.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.300	ppg
	SHARED	WAGT	Weighting Agent	Natural	
	SHARED	BSAL	Borehole salinity	0.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	0.514	ohmm
	SHARED	TRM	Temperature of Mud	85.2	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	7.625	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	6550.00	ft
	SHARED	BHT	Bottom Hole Temperature	156.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	Temperature Master Tool	NONE	
	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
	Rwa / CrossPlot	AFAC	Archie A factor	0.6200	

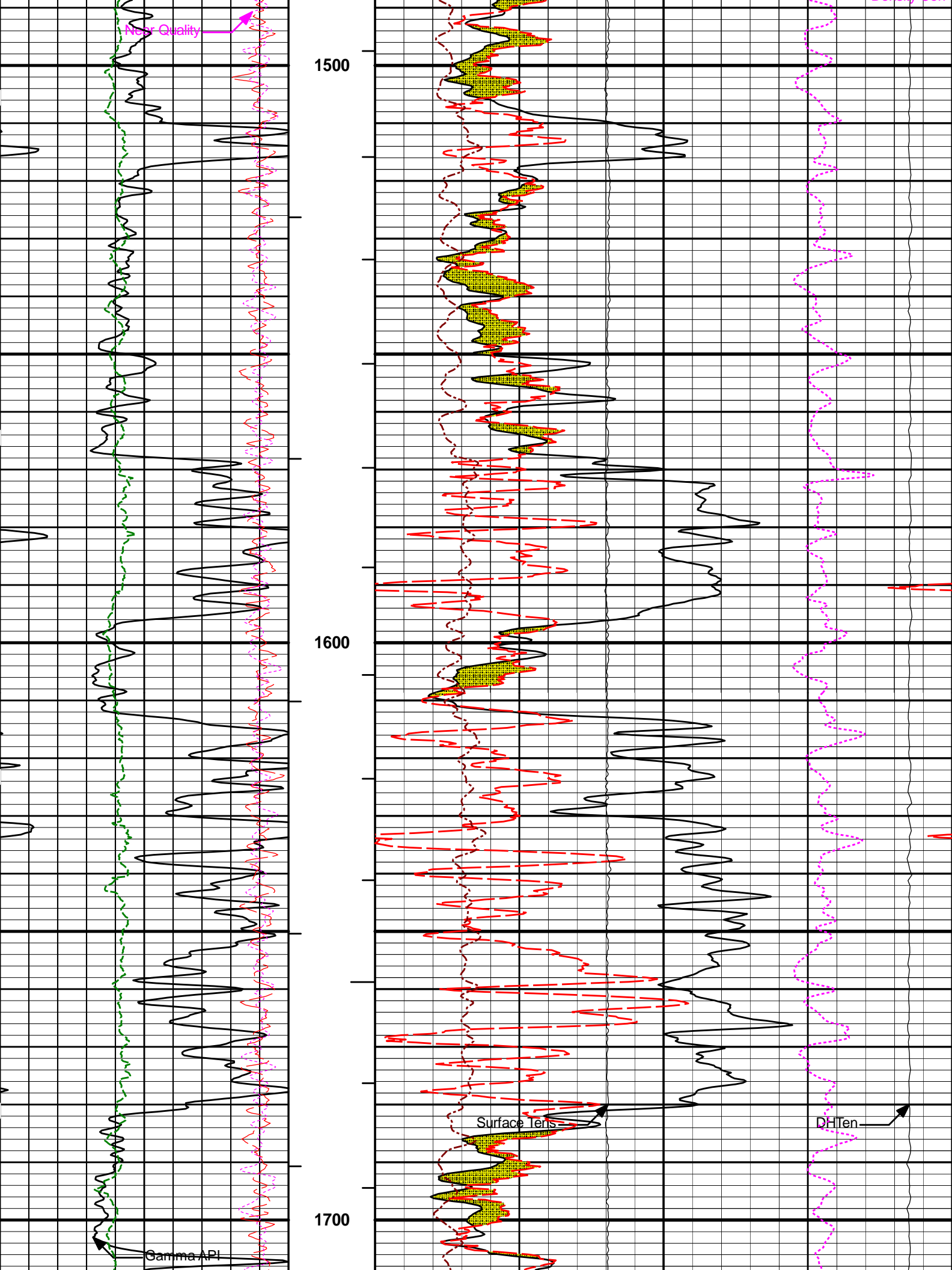
Rwa / CrossPlot	MFAC	Archie M factor	2.1500	
Rwa / CrossPlot	RMFR	Rmf Reference	0.10	ohmm
Rwa / CrossPlot	TMFR	Rmf Ref Temp	75.00	degF
Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
Rwa / CrossPlot	BHSM	Borehole Size Source Tool	SDLT	
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	
GTET	BHSM	Borehole Size Source Tool	SDLT	
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	
DSNT	BHSM	Borehole Size Source Tool	SDLT	
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
SDLT Pad	BHSM	Borehole Size Source Tool	SDLT	
ACRt Sonde	RTOK	Process ACRt?	Yes	
ACRt Sonde	MNSO	Minimum Tool Standoff	1.50	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Up	
ACRt Sonde	TPOS	Tool Position	Free Hanging	
ACRt Sonde	RMOP	Rmud Source	Mud Cell	
ACRt Sonde	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt Sonde	RMIN	Maximum Resistivity for MAP	200.00	ohmm
ACRt Sonde	THQY	Threshold Quality	0.50	
ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm
ACRt Sonde	BHSM	Borehole Size Source Tool	SDLT	
BOTTOM				
Data: BH_HOMER_9-41AH\0001 TRIPLE\004 05-Jul-14 21:58 Up @6553.8f			Date: 05-Jul-14 23:59:54	

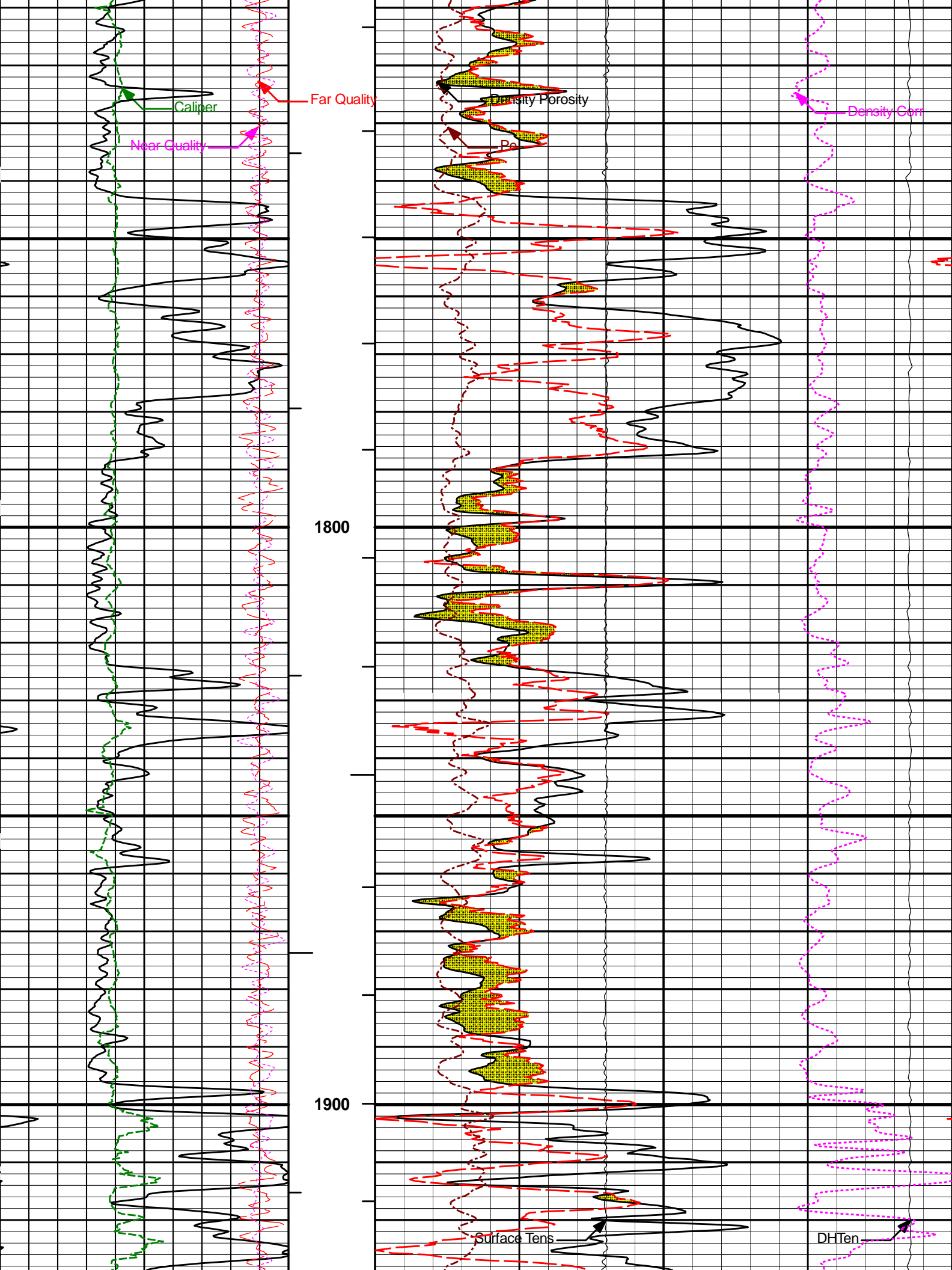
HALLIBURTON	Plot Time: 08-Jul-14 11:49:57 Plot Range: 1100 ft to 6552.17 ft Data: BH_HOMER_9-41AH\Well Based\DAQ-0001-004\ Plot File: \\PORO\BP_5IN_POR
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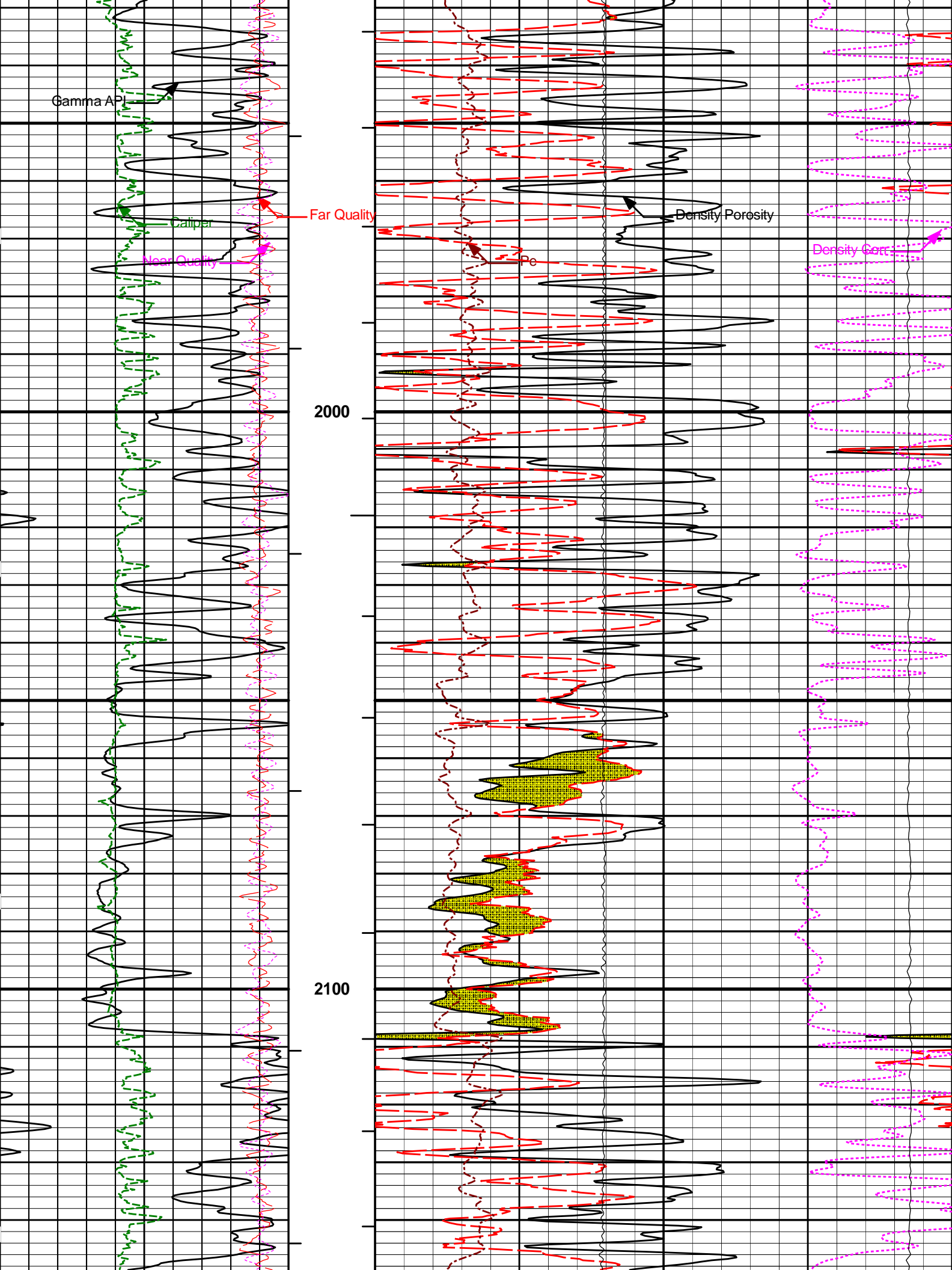
MAIN PASS 5" = 100'

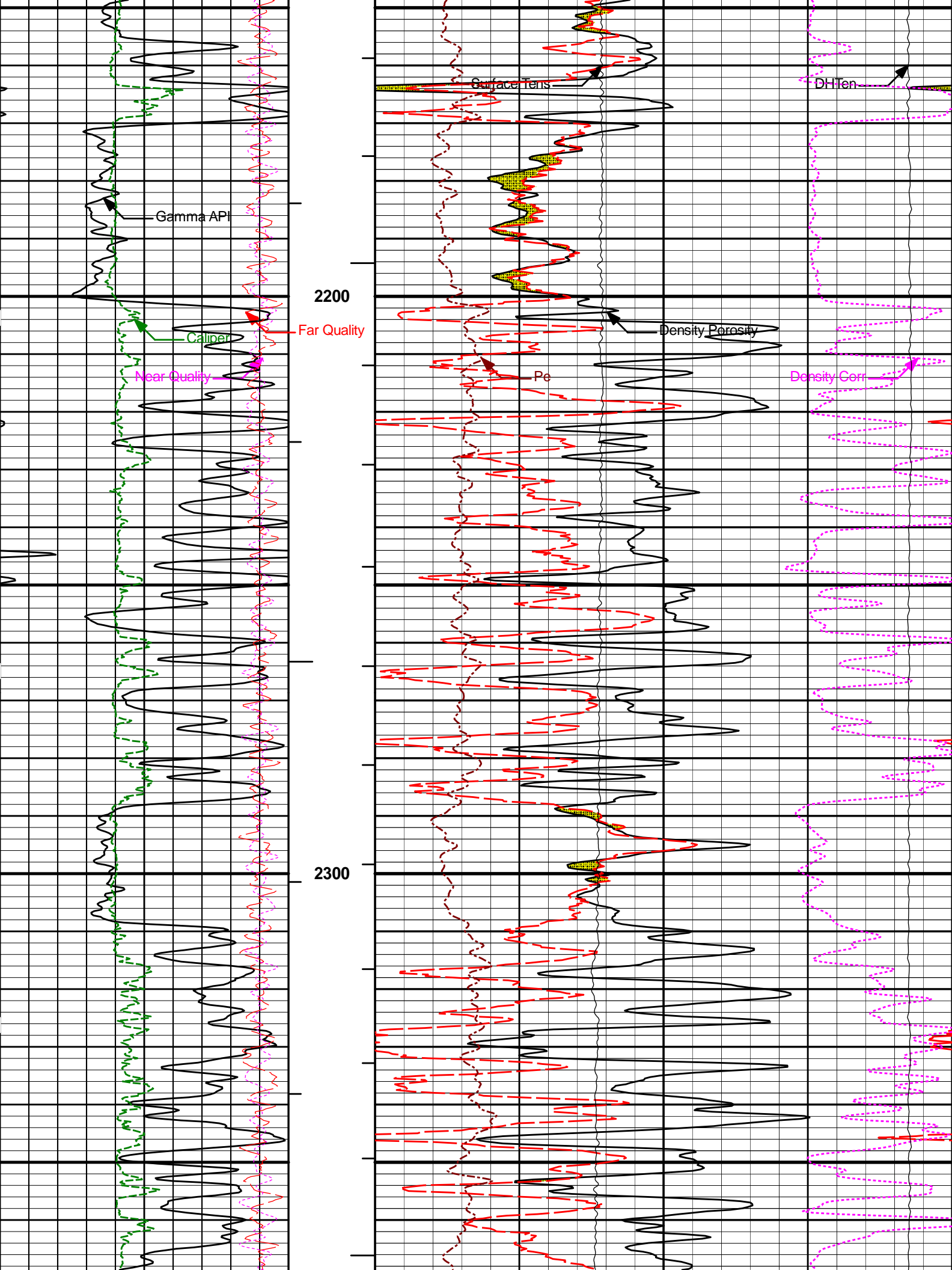


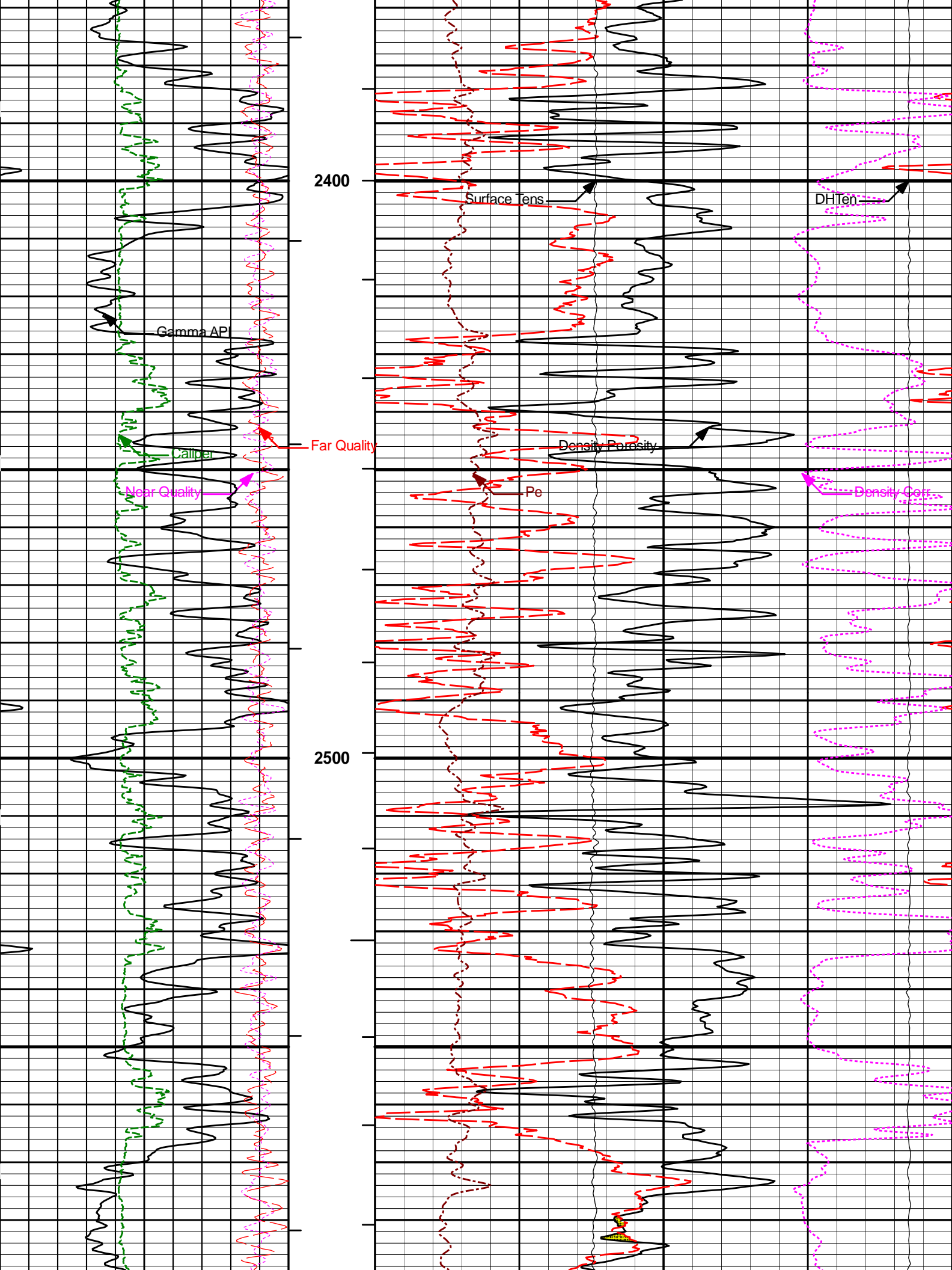


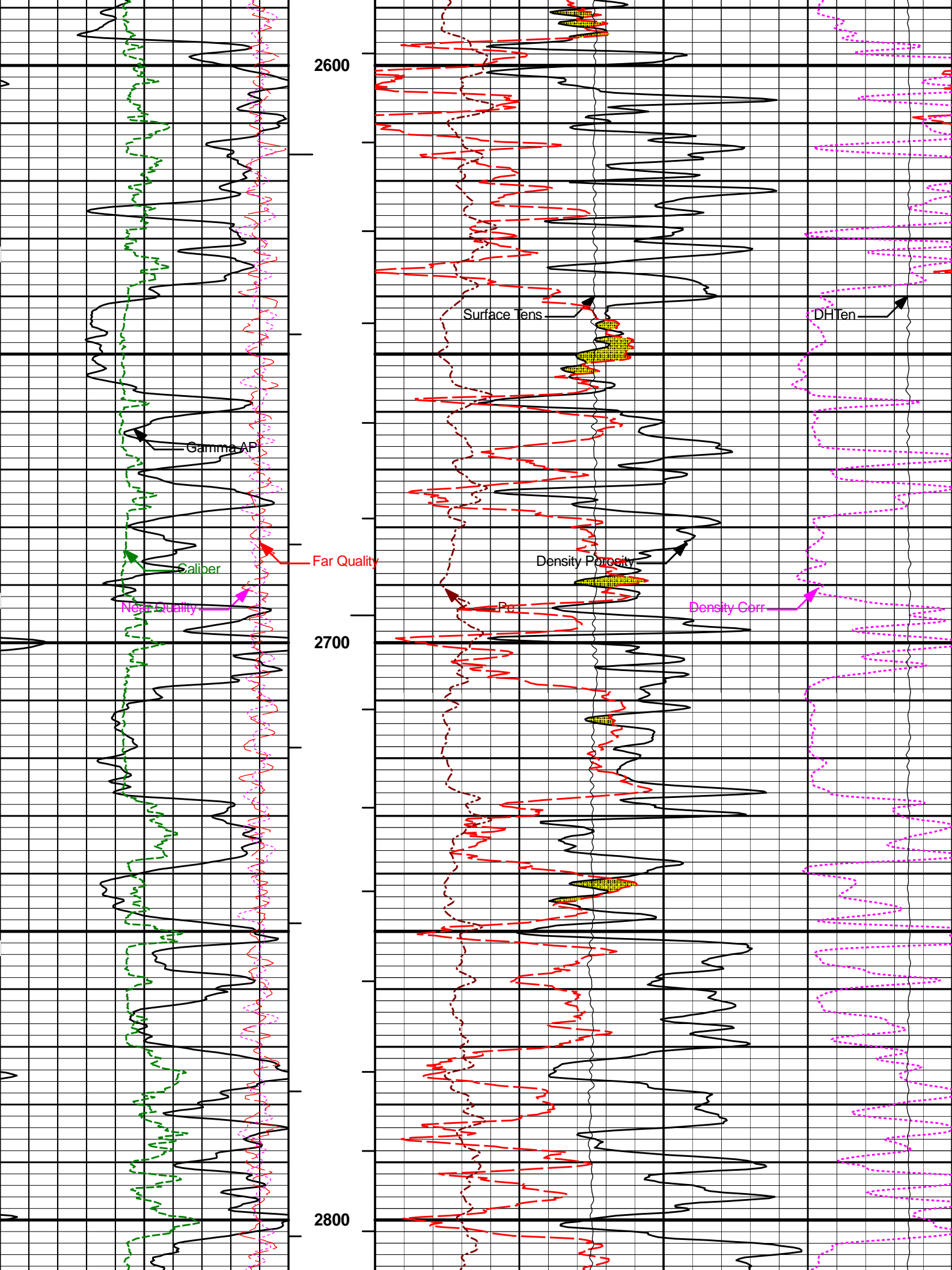


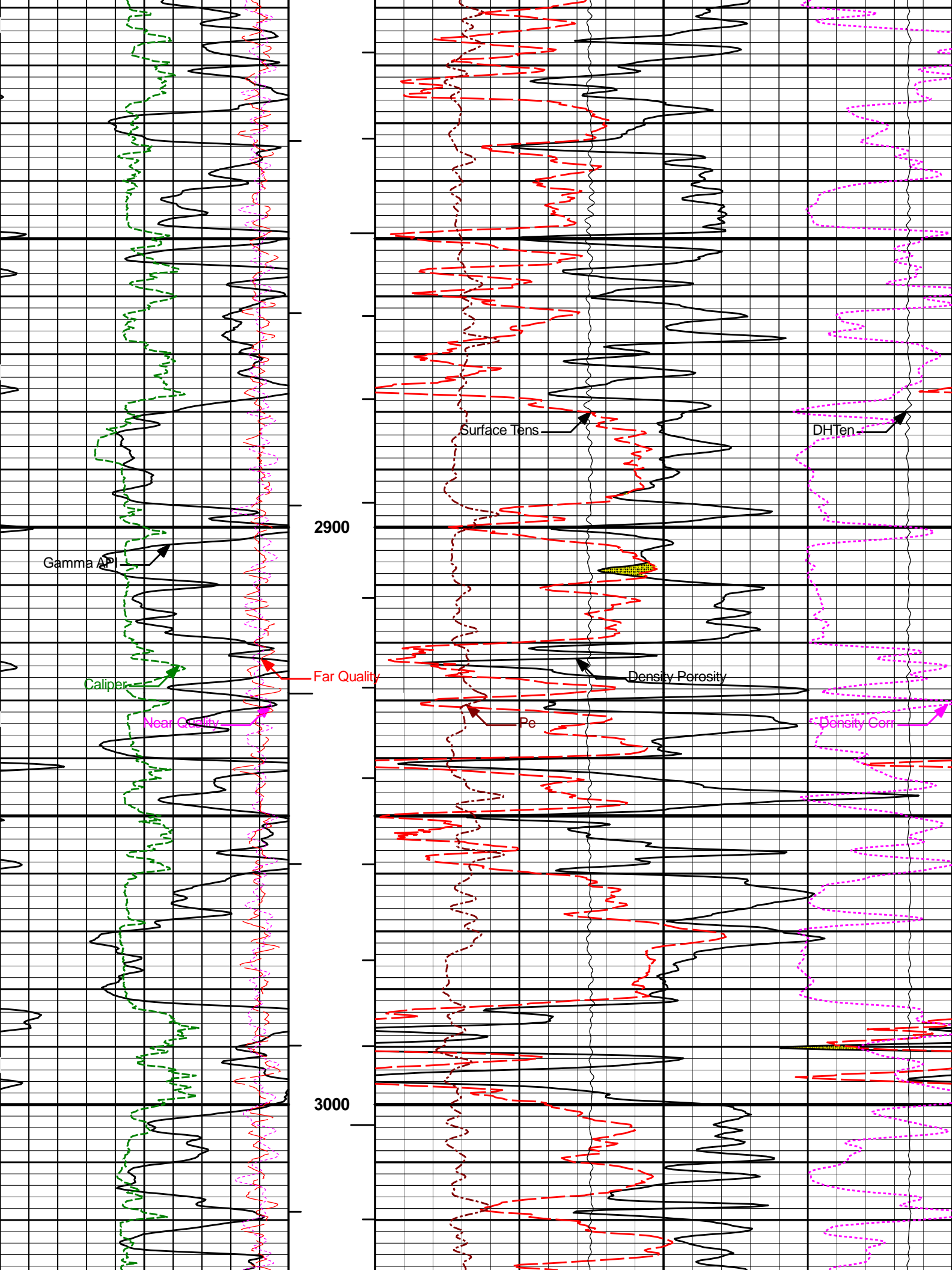


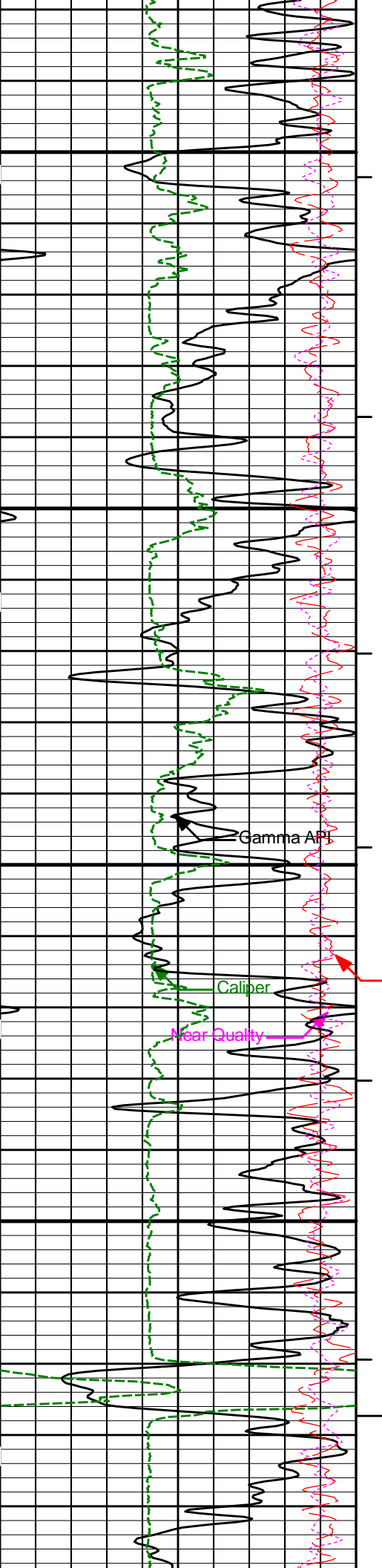






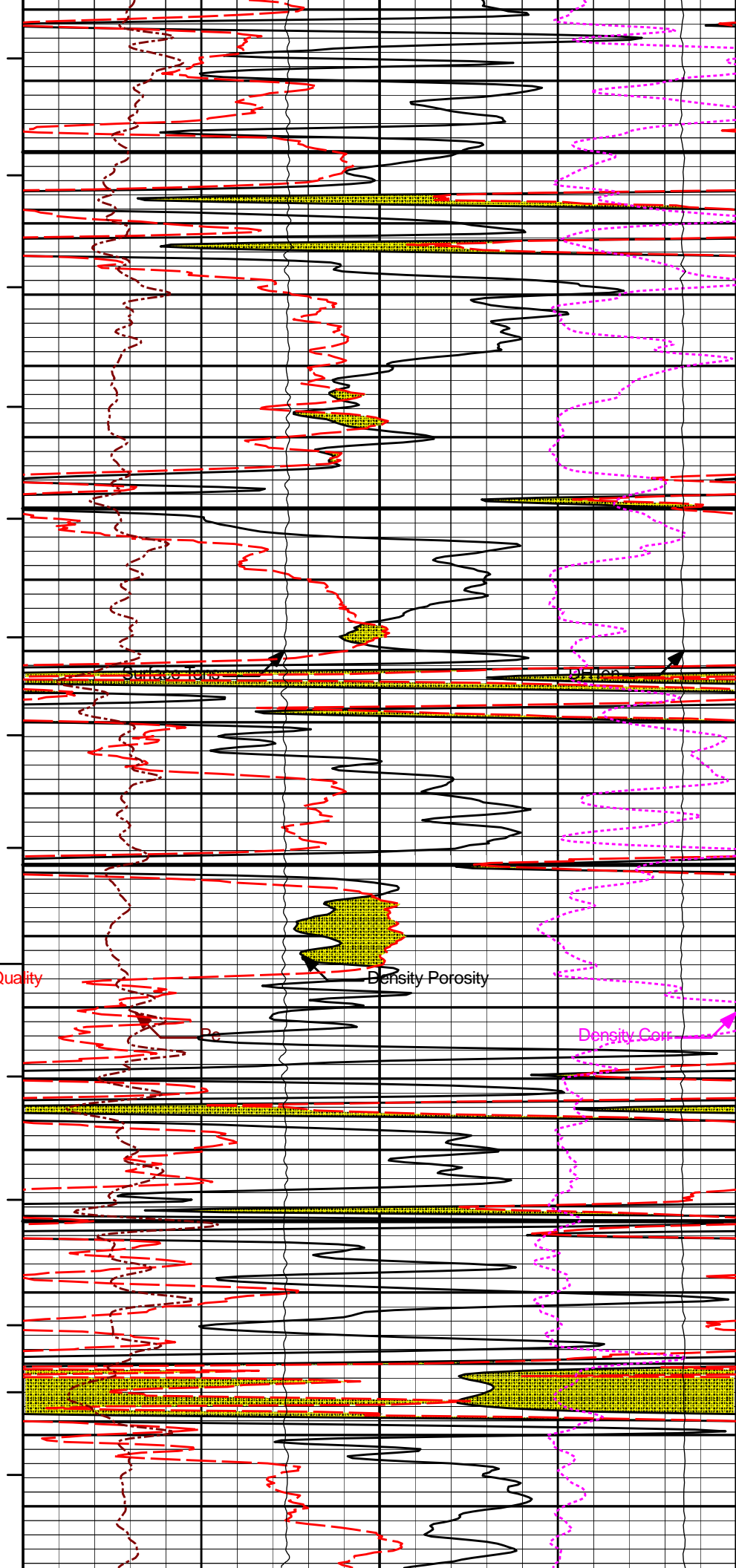


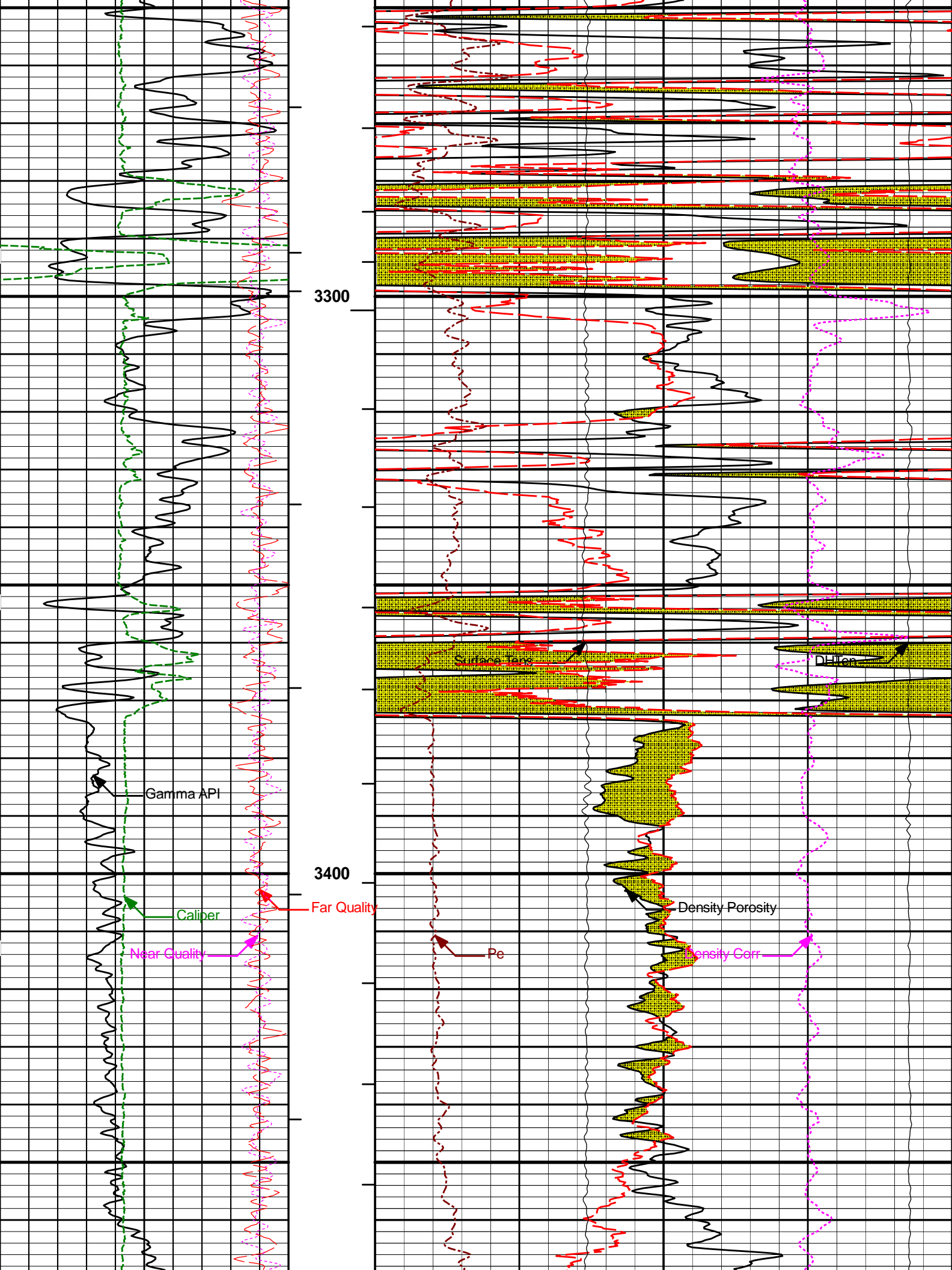


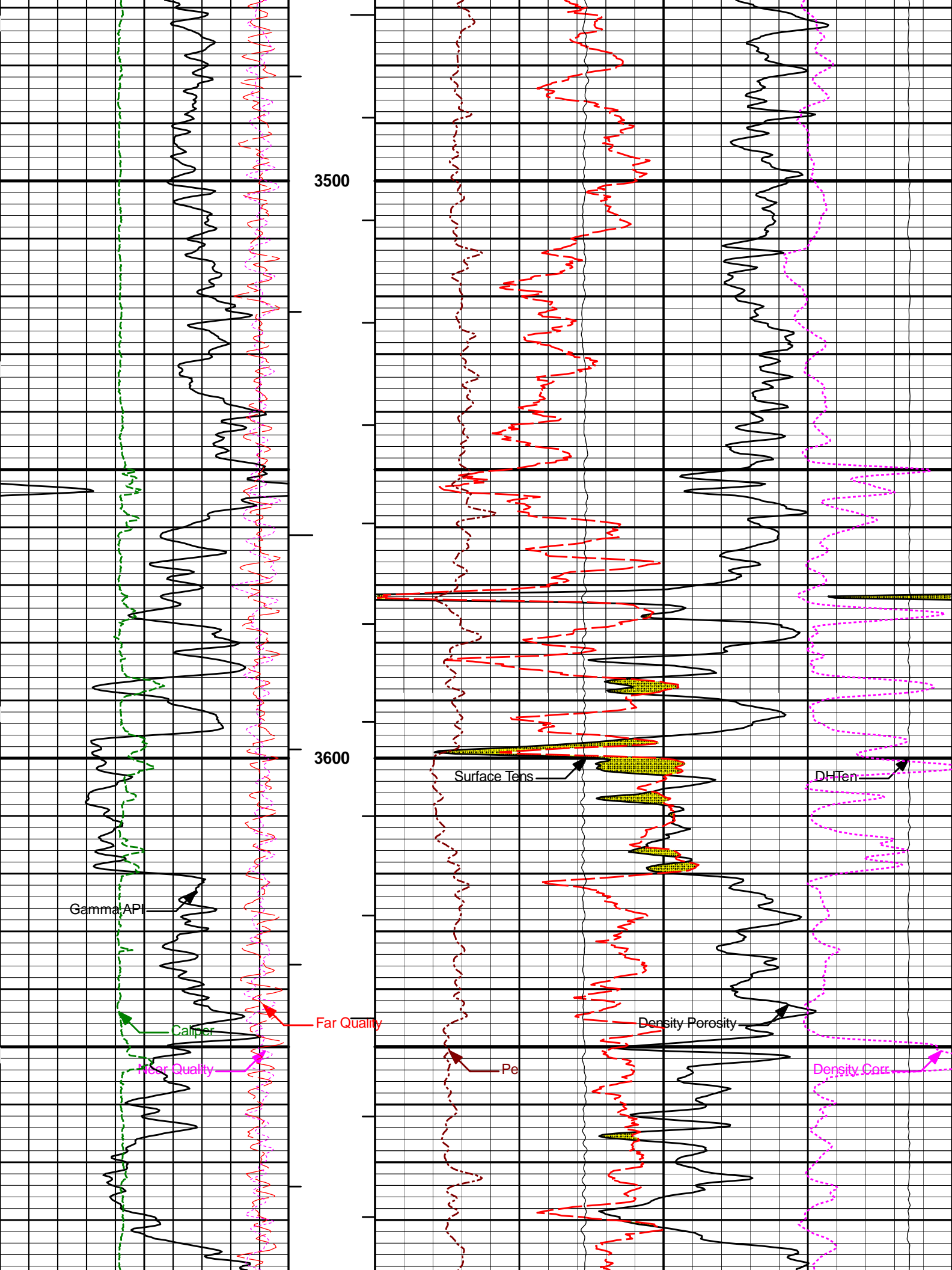


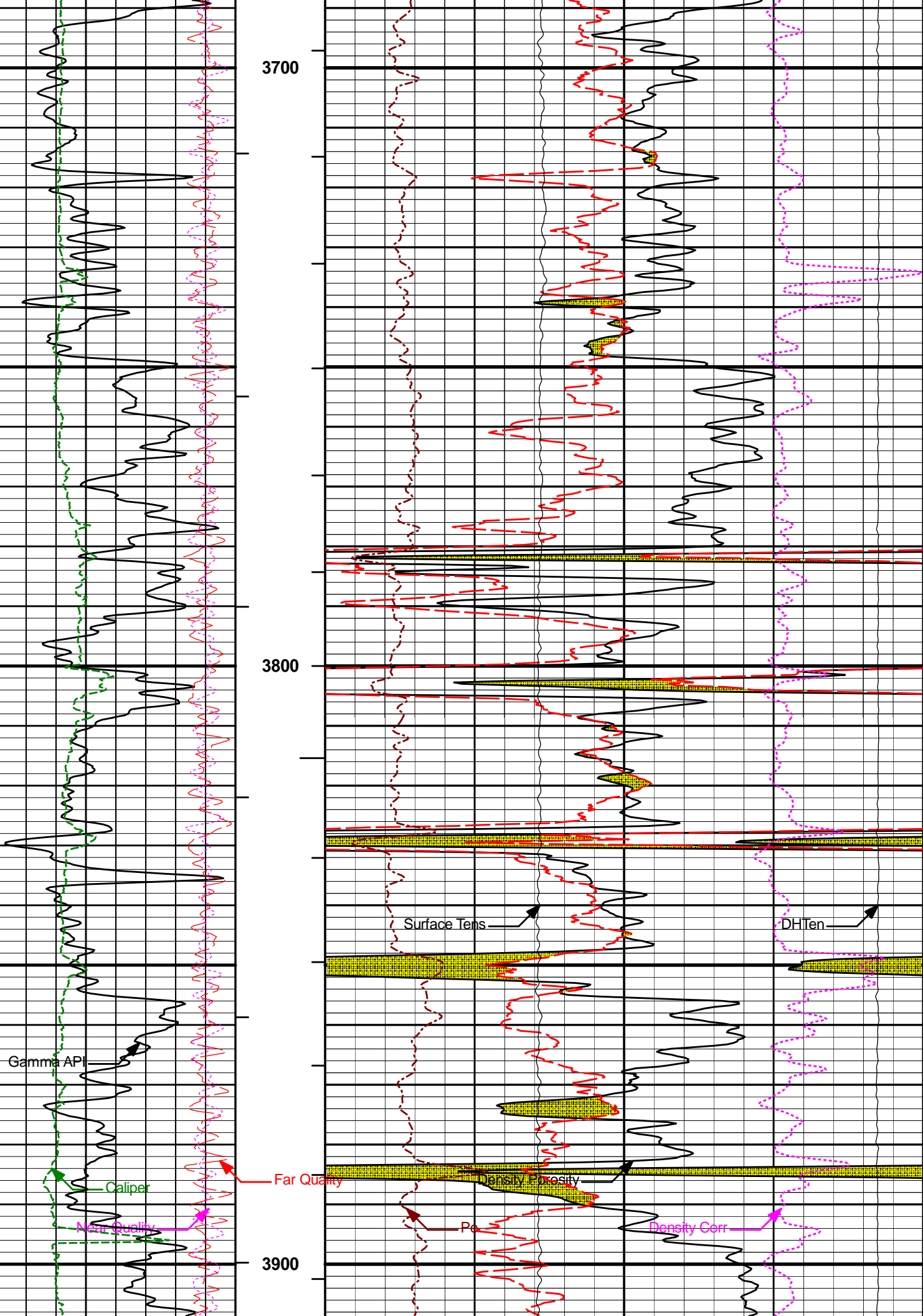
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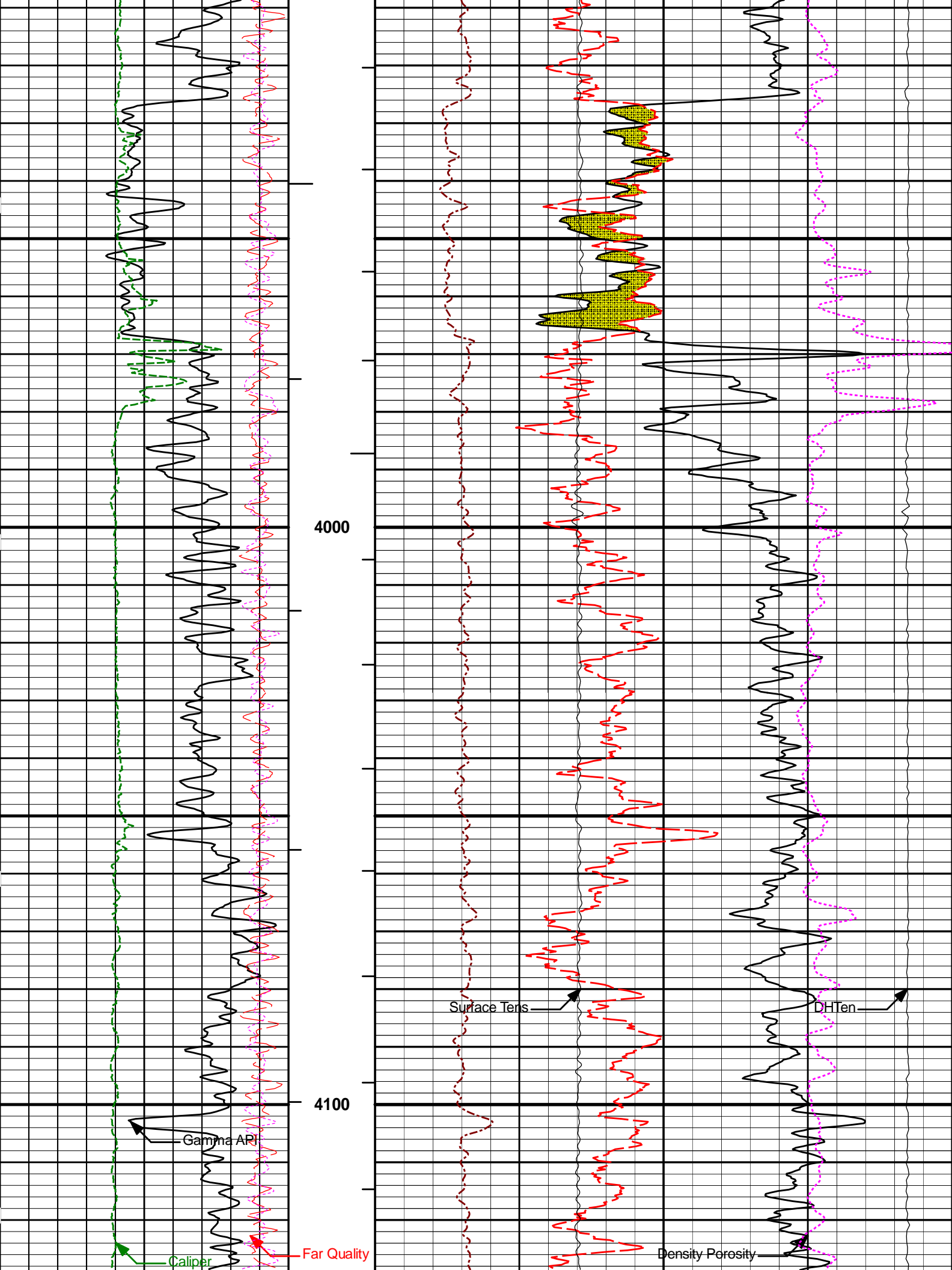
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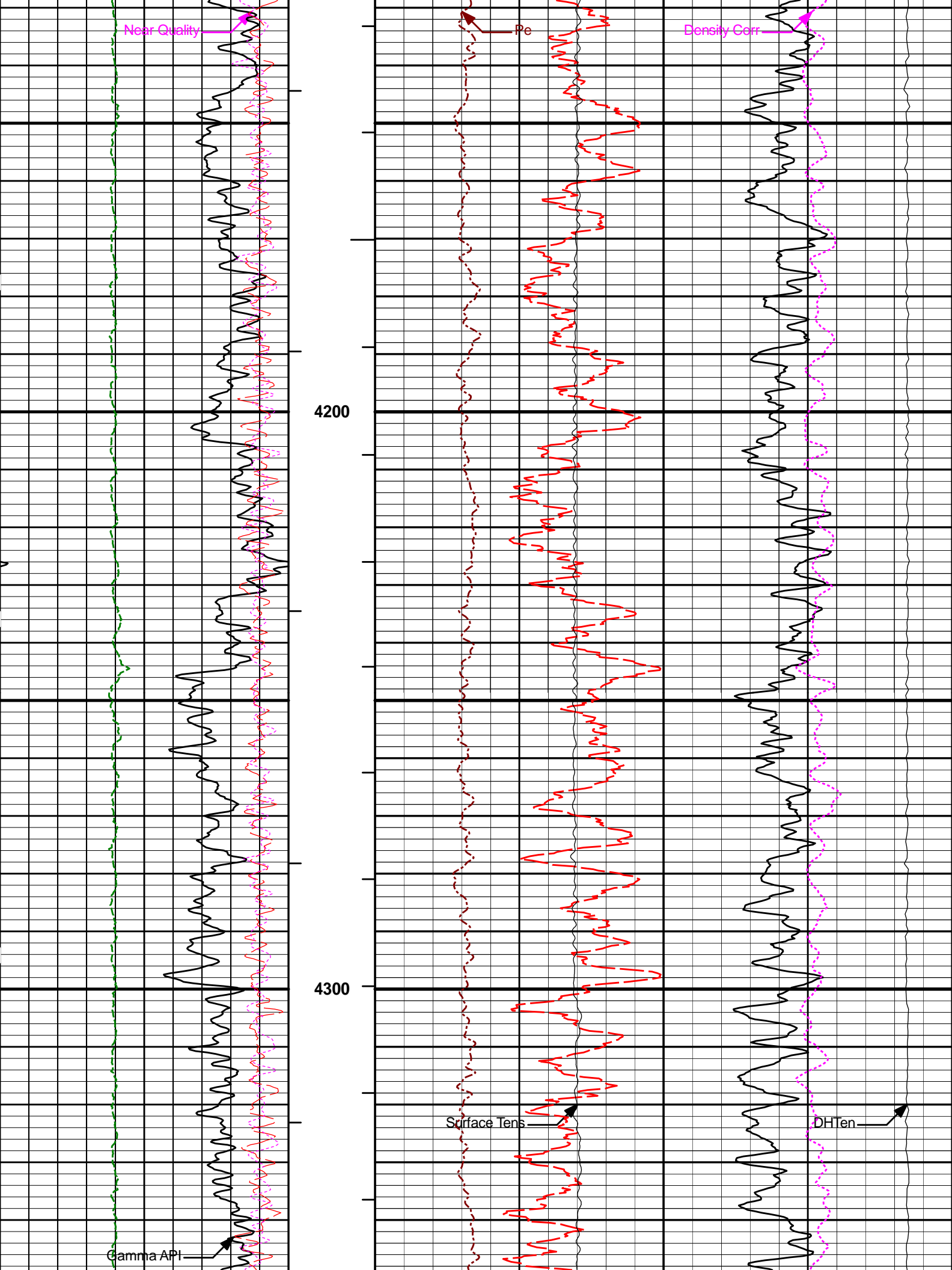


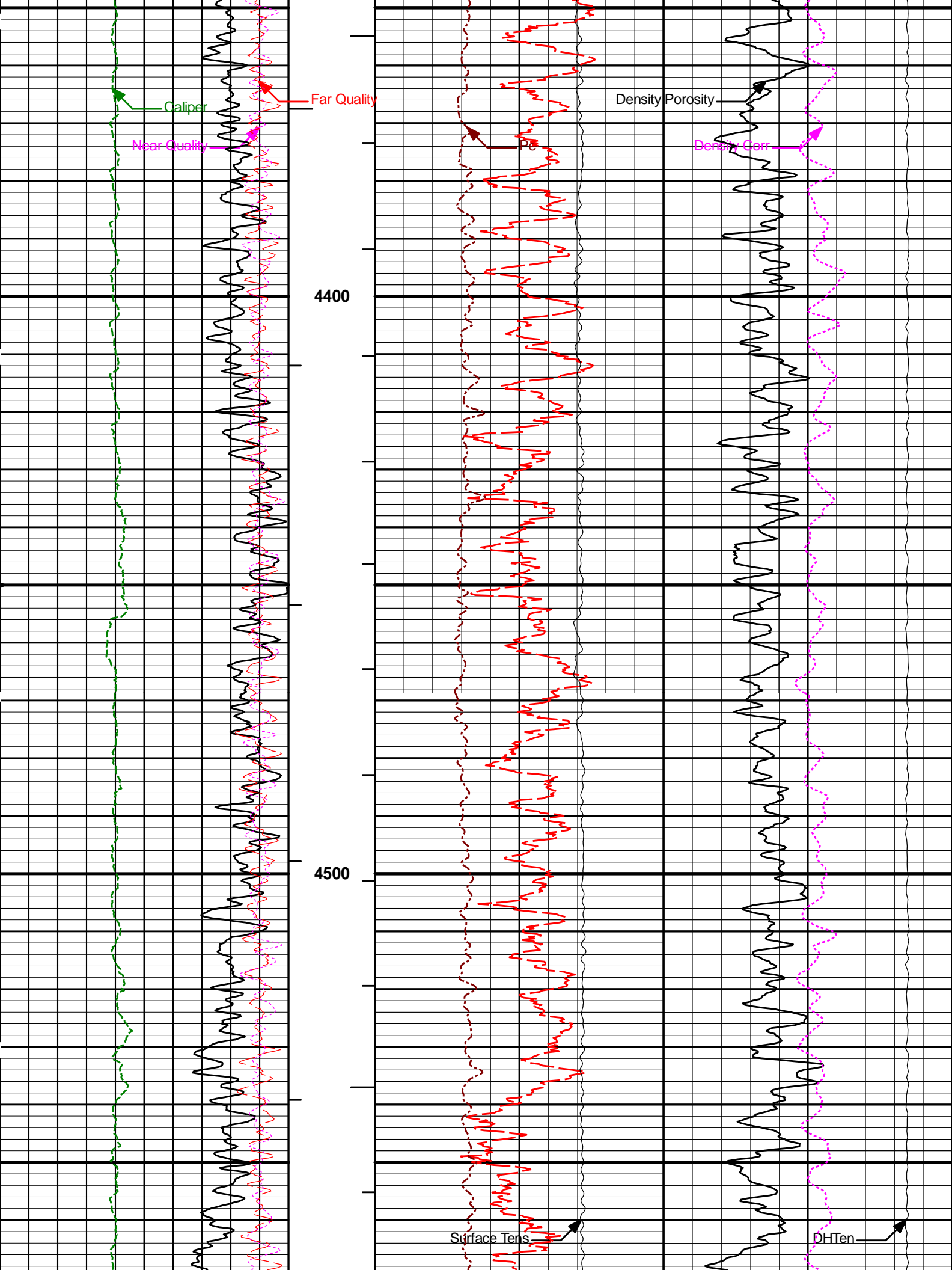












Gamma API

4600

4700

Sliper

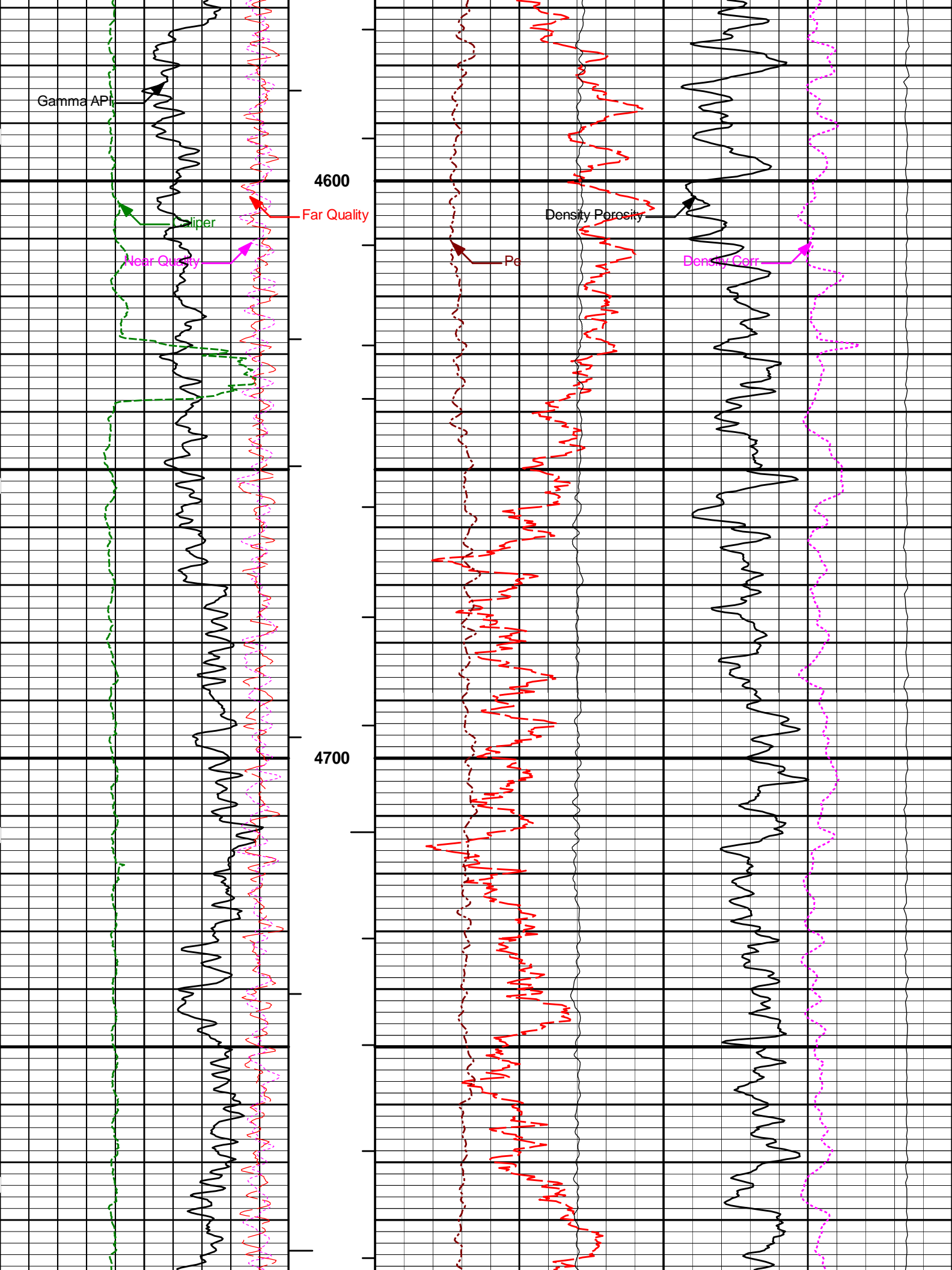
Near Quality

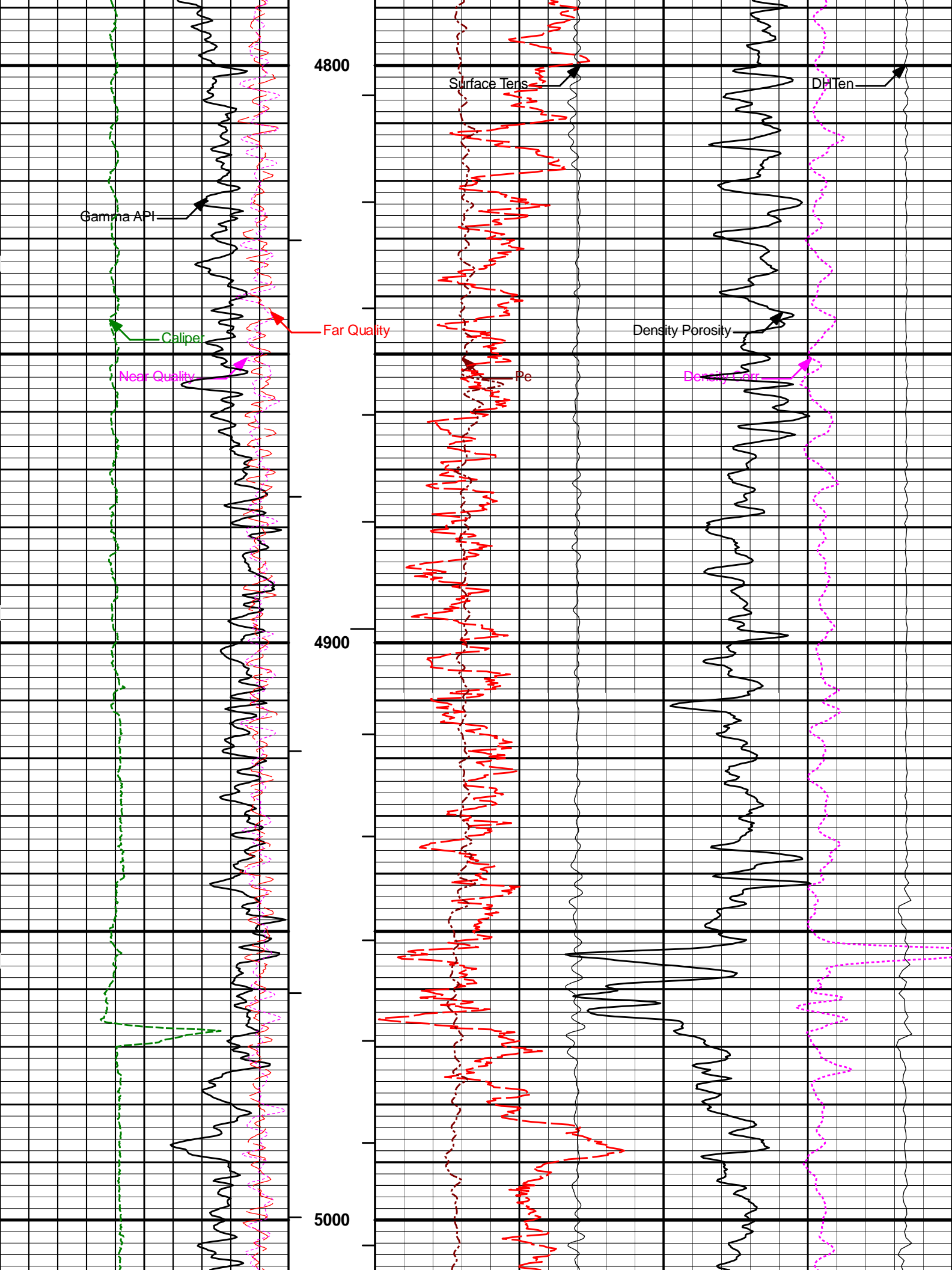
Far Quality

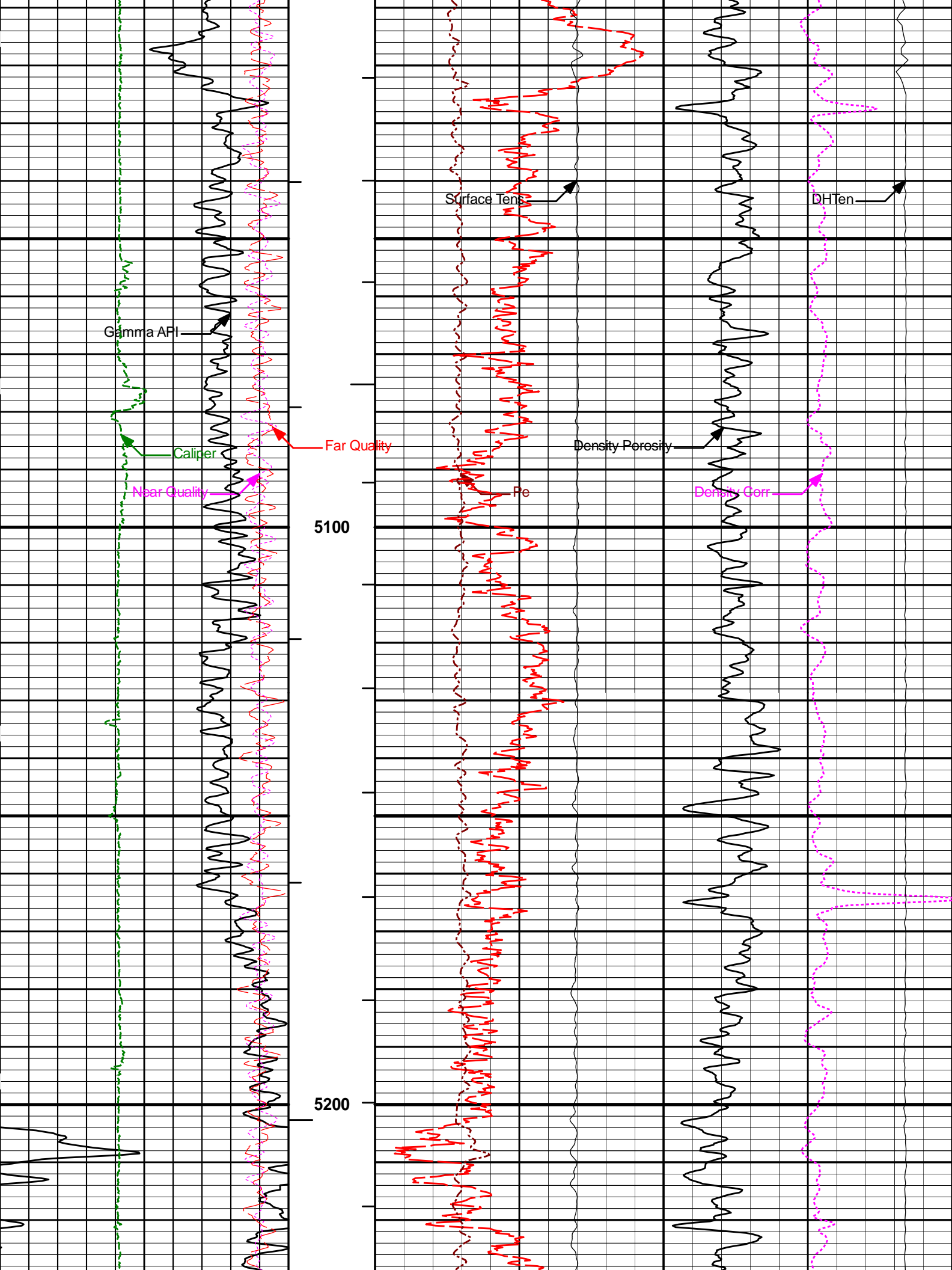
Density Porosity

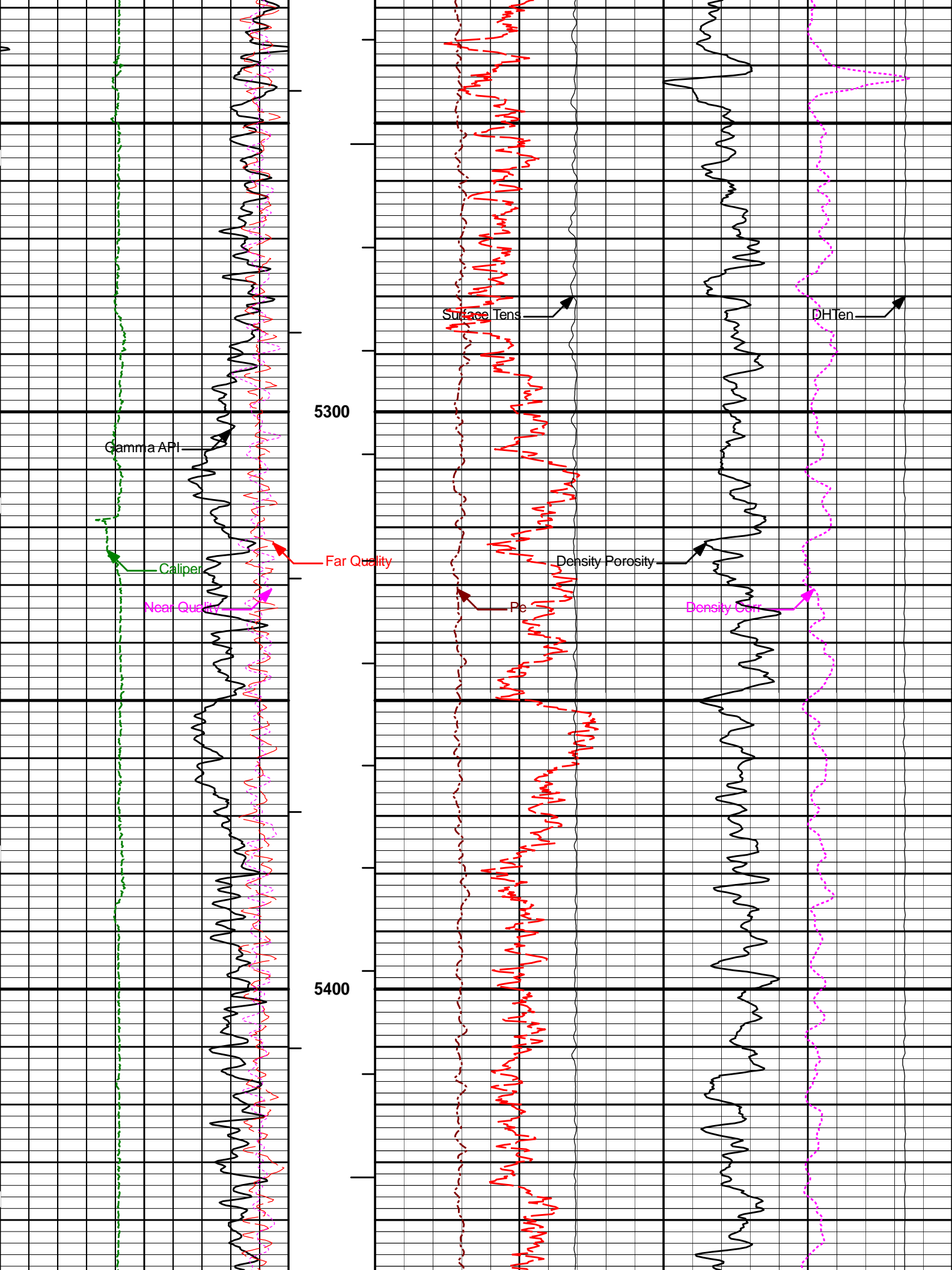
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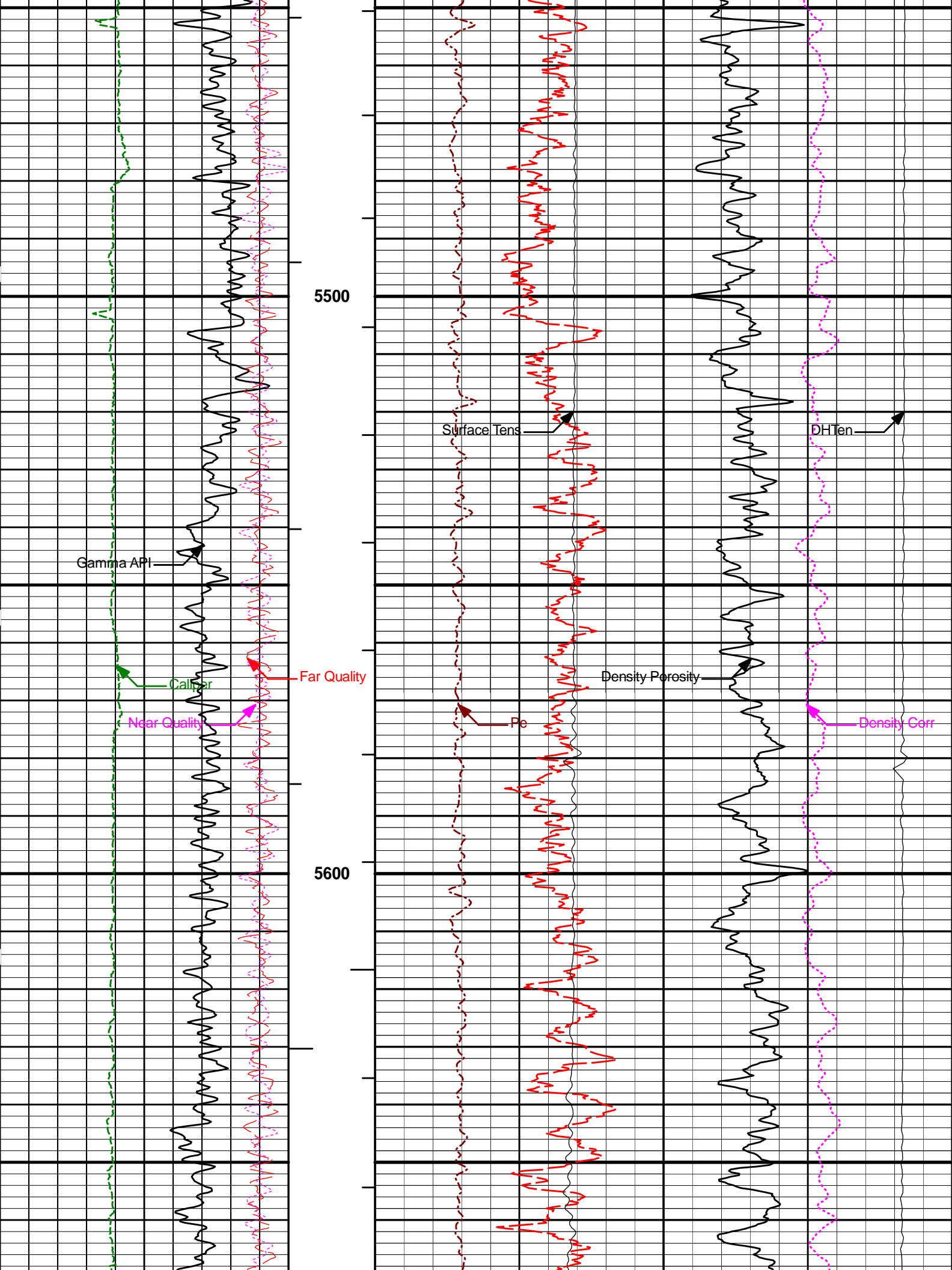
Density Corr

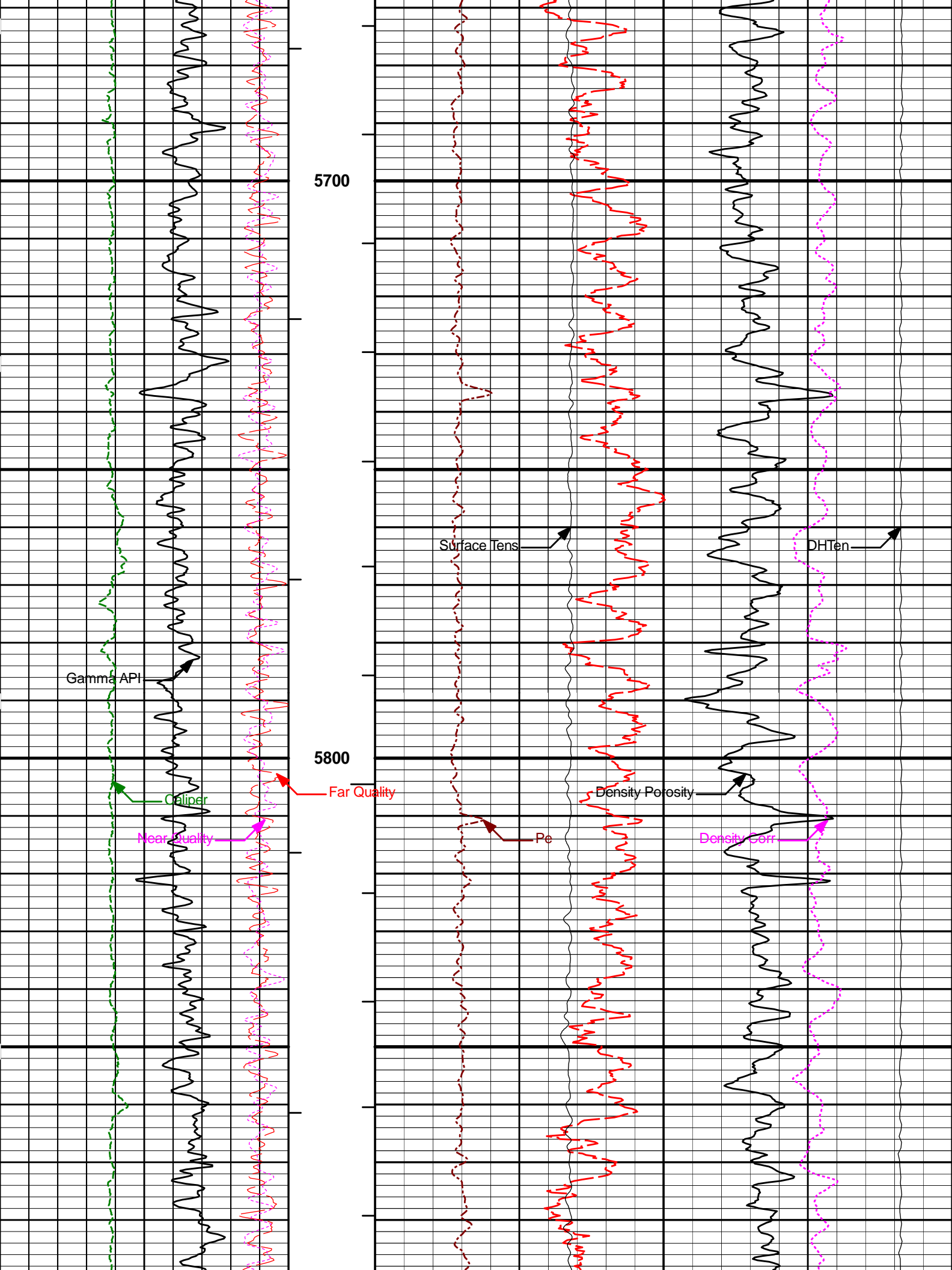


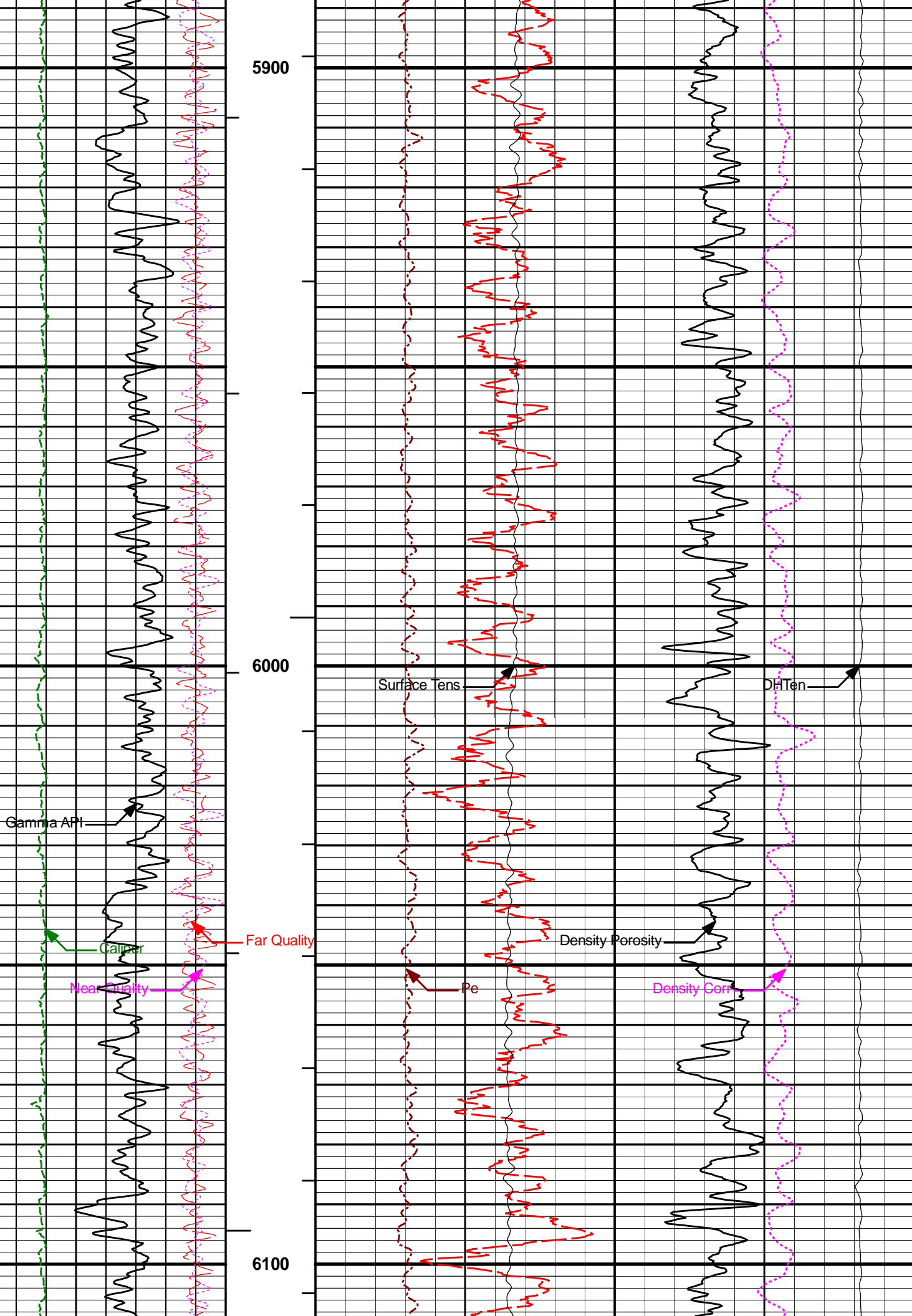


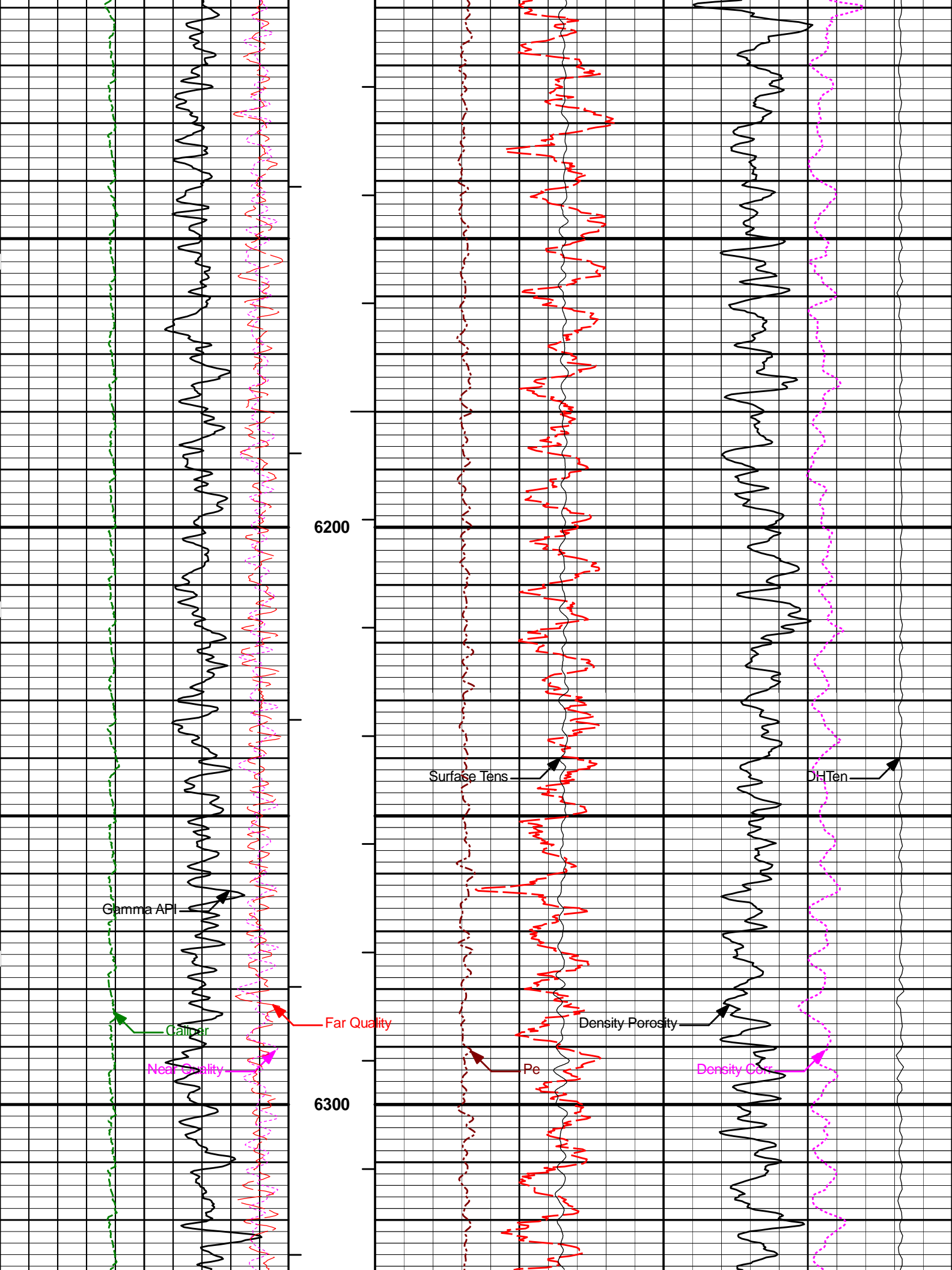


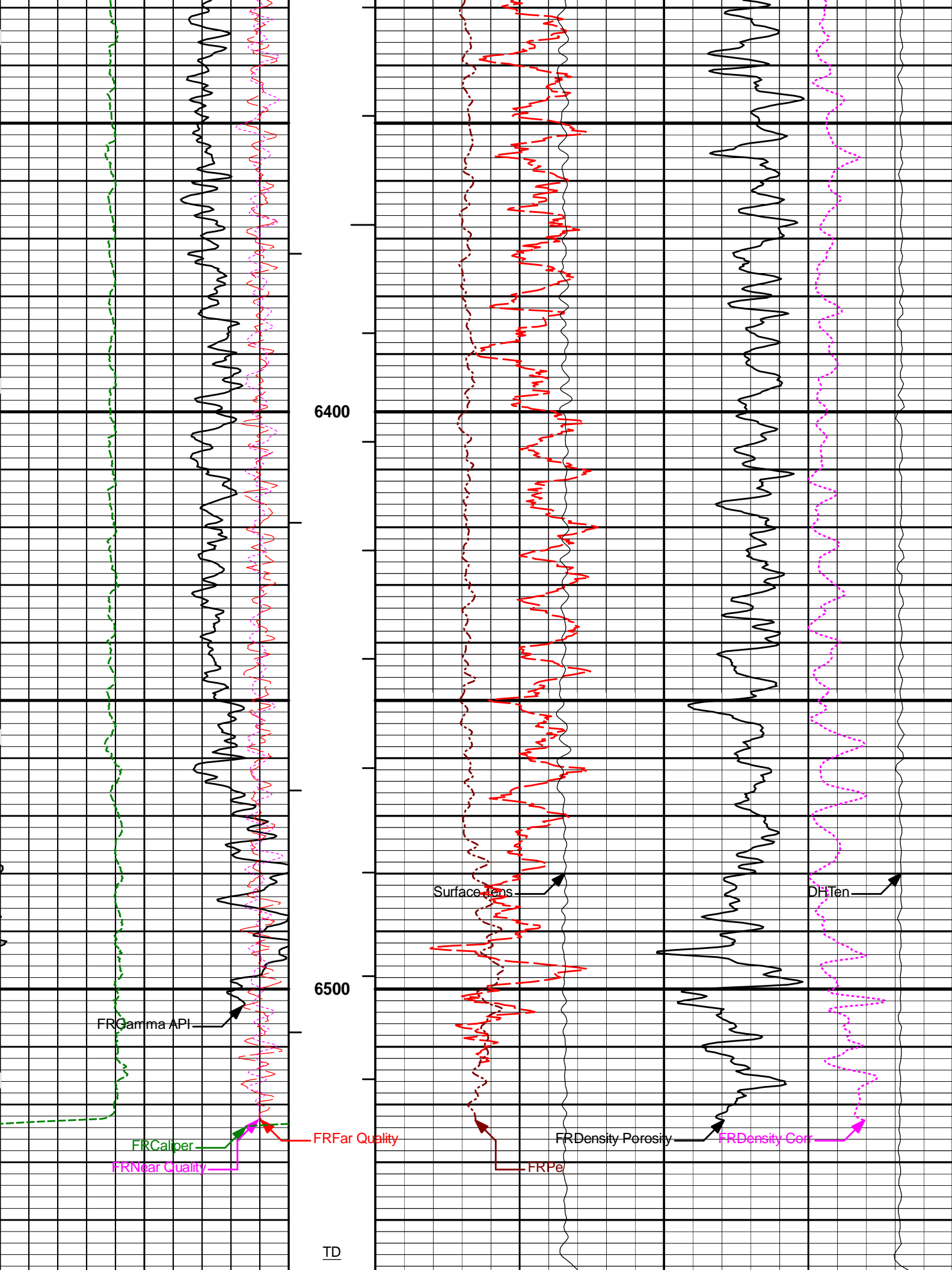


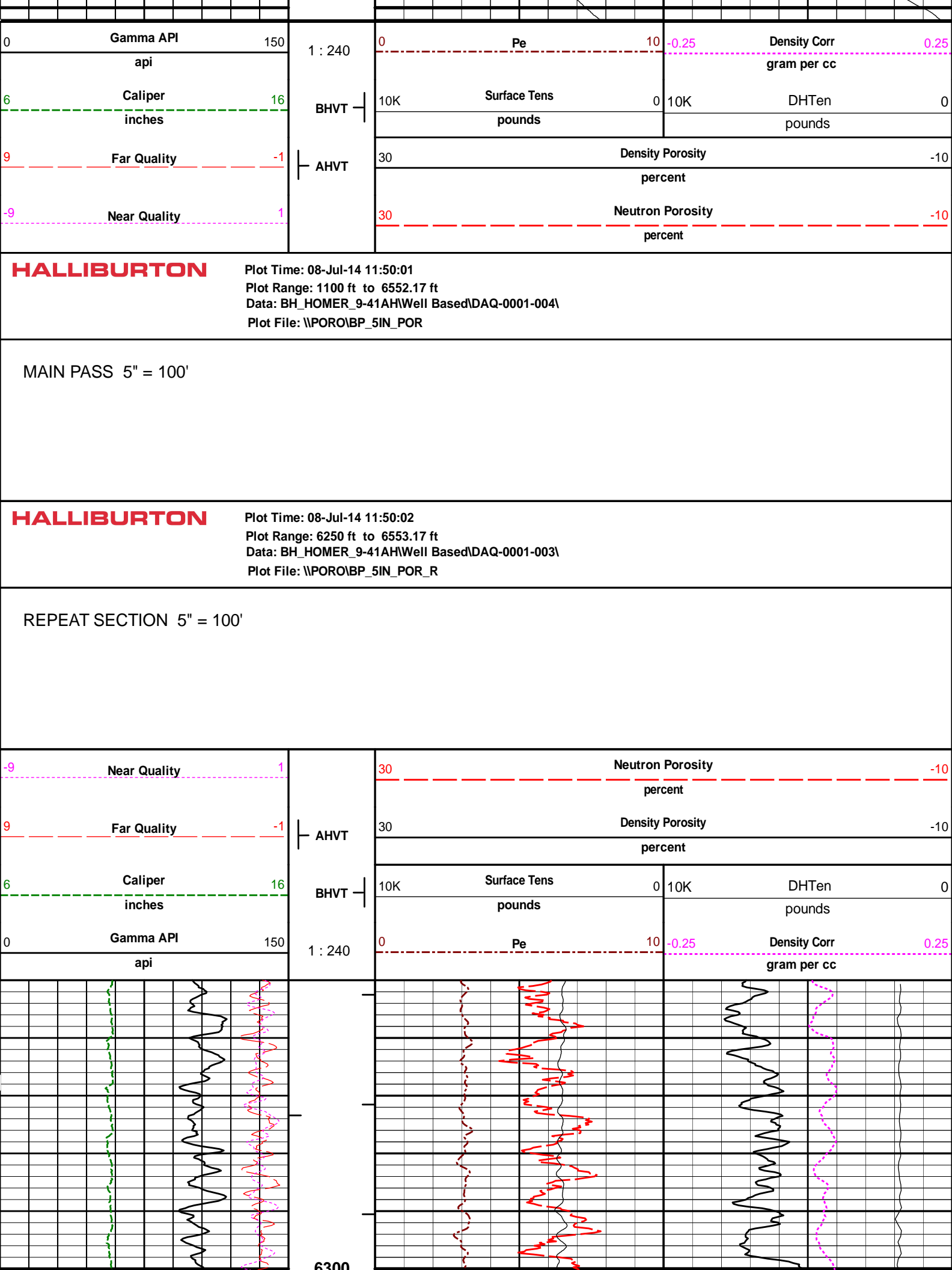


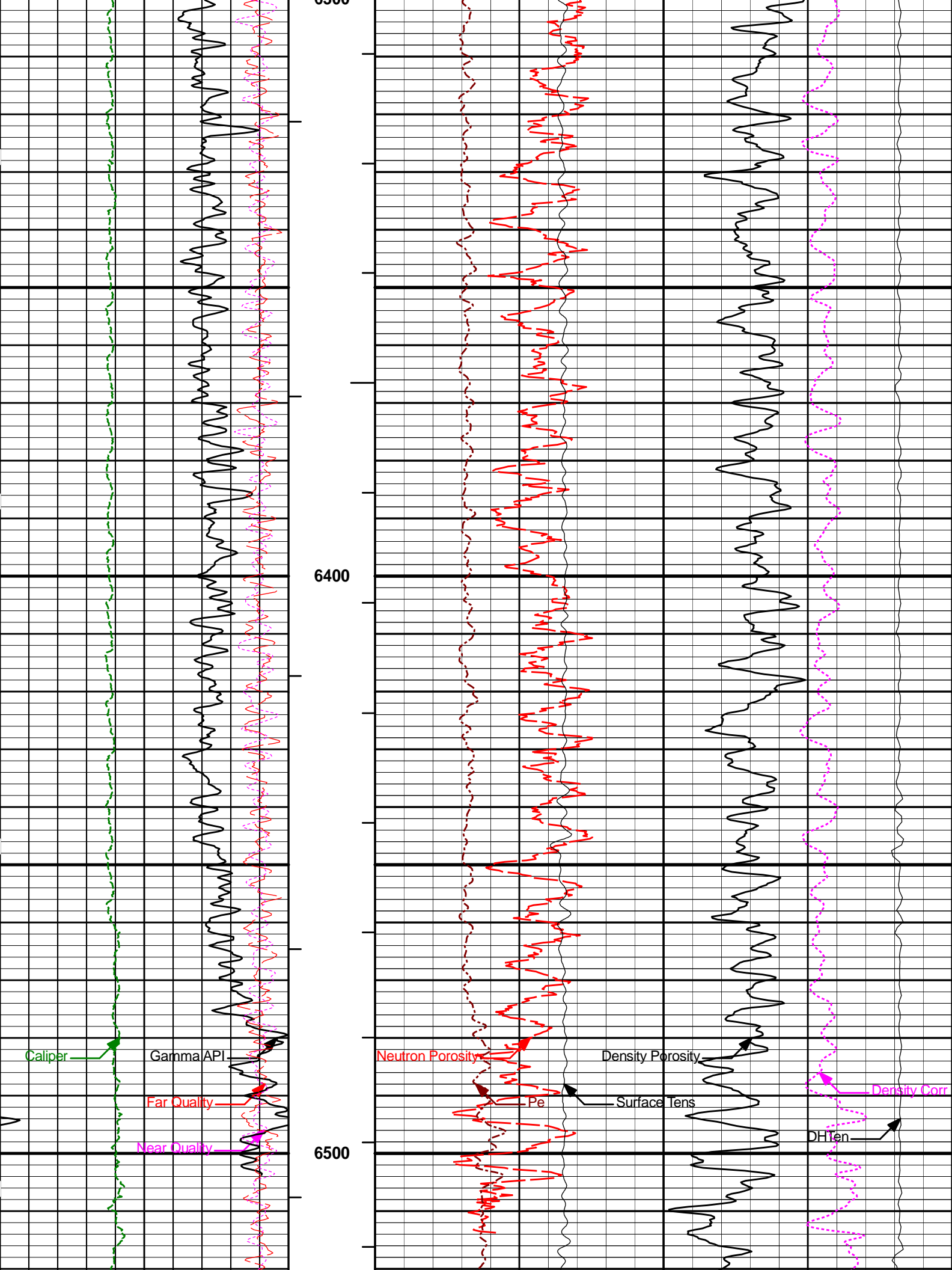


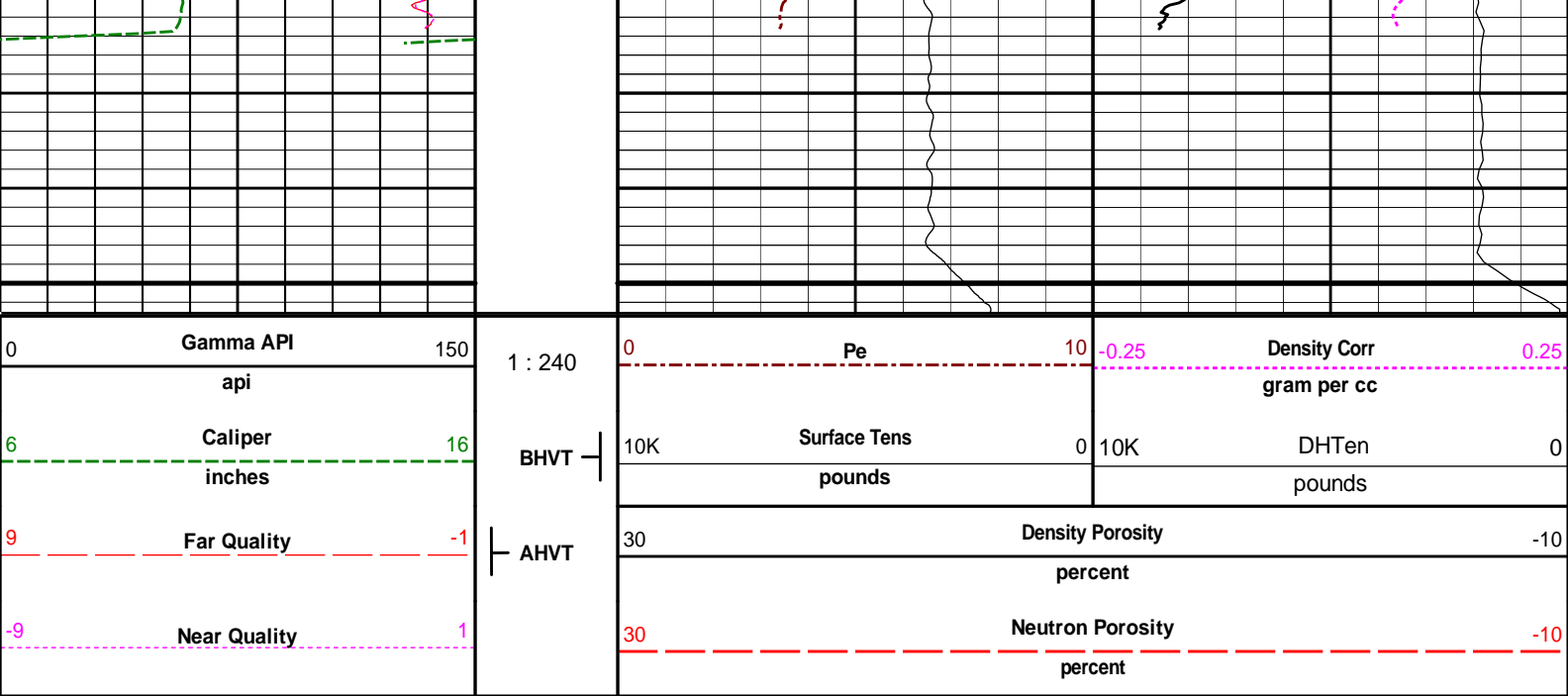












HALLIBURTON

Plot Time: 08-Jul-14 11:50:03
Plot Range: 6250 ft to 6553.17 ft
Data: BH_HOMER_9-41AH\Well Based\DAQ-0001-003\
Plot File: \\PORO\BP_5IN_POR_R

REPEAT SECTION 5" = 100'

HALLIBURTON

CALIBRATION REPORT

SURFACE TENSION SHOP CALIBRATION

Tool Name: Depth Panel - 12345678 Reference Calibration Date: 05-Jul-14 16:31:37
Engineer: B. NEALON Calibration Date: 05-Jul-14 16:32:10
Software Version: WL INSITE R4.2.1 (Build 5) Calibration Version: 1

SURFACE TENSION LOAD CELL				
Measurement	Load Cell Value	Measurement	Calibrated	Units
Low	10694.68	-2.24	0.00	lbs
High	17252.19	7828.09	7830.00	lbs

DOWNHOLE TENSION SHOP CALIBRATION

Tool Name: RWCH - 11830878 Reference Calibration Date: 03-Jul-14 14:12:29
Engineer: B. NEALON Calibration Date: 05-Jul-14 16:34:31
Software Version: WL INSITE R4.2.1 (Build 5) Calibration Version: 1

DOWNHOLE LOAD CELL				
Measurement	Tool Value	Measurement	Calibrated	Units
Low	-911.21	26.35	0.00	lbs
High	3619.83	1468.65	1430.00	lbs

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: CTET - 11204346 Reference Calibration Date: 26-Jun-14 05:42:02

Tool Name:	GTET - 11294346	Reference Calibration Date:	29-Jun-14 04:56:03
Engineer:	B. CRAWFORD	Calibration Date:	29-Jun-14 04:56:03
Software Version:	WL INSITE R4.2.1 (Build 5)	Calibration Version:	1
Calibrator Source S/N: TB-270			
Calibrator API Reference:259.00 api			
Equivalent Calibrator API Reference:263.5 api			
Measurement	Measured	Calibrated	Units
Background	45.0	48.1	api
Background + Calibrator	287.0	307.1	api
Calibrator	262.2	259.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION			
Tool Name:	GTET - 11294346	Reference Calibration Date:	29-Jun-14 04:56:03
Engineer:	B. NEALON	Calibration Date:	04-Jul-14 20:43:00
Software Version:	WL INSITE R4.2.1 (Build 5)	Calibration Version:	1

Calibrator Source S/N: TB-270			
Calibrator API Reference:259.00 api			
Equivalent Calibrator API Reference:263.5 api			
Field Verification	Shop	Field	Units
Background	48.1	47.9	api
Background + Calibrator	307.1	311.0	api
Calibrator	259.0	263.0	api
Shop	Field	Difference	Tolerance
259.0	263.0	-4.0	+/- 9.00

ACCELEROMETER SHOP CALIBRATION			
Tool Name:	GTET - 11294346	Reference Calibration Date:	06-May-14 15:42:50
Engineer:	B. CRAWFORD	Calibration Date:	06-Jun-14 19:46:06
Software Version:	WL INSITE R4.2.1 (Build 5)	Calibration Version:	1

	Horizontal-1 Telemetry	Horizontal-2 Telemetry	Vertical Telemetry	Units
	-250.27	-304.91	-16483.64	cnts

DUAL SPACED NEUTRON SHOP CALIBRATION			
Tool Name:	DSNT - 10846353	Reference Calibration Date:	06-May-14 15:31:32
Engineer:	B. CRAWFORD	Calibration Date:	06-Jun-14 19:36:13
Software Version:	WL INSITE R4.2.1 (Build 5)	Calibration Version:	1

Logging Source S/N: 08-018			
Tank Serial Number: 105039			
Reference value assigned to Tank: 49.230			
Snow Block S/N: 11170614			
Calibration Tank Water Temperature: 71 degF			

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.946	0.944	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):	0.1972	0.1968	0.0005	+/- 0.0020
Calibrated Ratio:	9.26	9.24	0.016	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0738	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 - 10846353	Reference Calibration Date:	06-Jun-14 19:36:13
Engineer:	B. NEALON	Calibration Date:	04-Jul-14 20:49:49
Software Version:	WL INSITE R4.2.1 (Build 5)	Calibration Version:	1

Logging Source S/N: 08-018
Snow Block S/N: 11170614

NEUTRON FIELD-CHECK SUMMARY				
	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0738	0.0743	0.0005	+/- 0.0150

PASS/FAIL SUMMARY	
Block Change Check:	Passed
Snow Block Stat Check:	Passed
Temperature Check:	Passed

DENSITY CALIPER SHOP CALIBRATION			
Tool Name:	SDLT - 10947725	Reference Calibration Date:	01-Jan-70 00:00:00
Engineer:	B. CRAWFORD	Calibration Date:	26-Jun-14 05:42:56
Software Version:	WL INSITE R4.2.1 (Build 5)	Calibration Version:	1
Host Tool Name:	DSNT - 10846353		

CALIBRATION COEFFICIENTS			
Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-3141.15	-3141.15	-7000.00 - -1000.00
Pad Gain	0.0003759	0.0003759	0.000200 - 0.000600
Arm Offset	-4705.64	-4705.64	-5000.00 - 3000.00
Arm Gain	0.0005524	0.0005524	0.000300 - 0.000700
Arm Power	-0.000005103	-0.000005103	-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)	2.00	2.00	0.00	+/- 0.20
Medium Ring (in)	3.75	3.75	0.00	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.50	6.50	0.00	+/- 0.20
Medium Ring (in)	8.25	8.25	0.00	+/- 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

SDLT CALIPER FIELD CALIBRATION			
Tool Name:	SDLT - 10947725	Reference Calibration Date:	26-Jun-14 05:42:56
Engineer:	B. NEALON	Calibration Date:	04-Jul-14 20:45:02
Software Version:	WL INSITE R4.2.1 (Build 5)	Calibration Version:	1

MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.74	-0.01	+/- 0.10
Ring Diameter	8.25	8.26	0.01	+/- 0.15

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

SPECTRAL DENSITY SHOP CALIBRATION			
Tool Name:	SDLT Pad - 10844773	Reference Calibration Date:	26-May-14 09:46:45
Engineer:	B. CRAWFORD	Calibration Date:	24-Jun-14 13:12:18
Software Version:	WL INSITE R4.2.1 (Build 5)	Calibration Version:	1

Logging Source S/N: 5235GW		
Aluminum Block S/N: ROCK SPRINGS	Density: 2.602g/cc	Pe: 3.110
Magnesium Block S/N: ROCK SPRINGS	Density: 1.690g/cc	Pe: 2.610

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0254	1.0164	0.90 - 1.10
Near Dens Gain	1.0150	1.0094	0.90 - 1.10
Near Peak Gain	1.0077	1.0192	0.90 - 1.10
Near Lith Gain	0.9853	0.9923	0.90 - 1.10
Far Bar Gain	1.0129	1.0073	0.90 - 1.10
Far Dens Gain	0.9992	0.9970	0.90 - 1.10
Far Peak Gain	0.9920	0.9921	0.90 - 1.10
Far Lith Gain	0.9676	0.9655	0.90 - 1.10
Near Bar Offset	-0.1166	-0.0416	NONE
Near Dens Offset	-0.0368	0.0063	NONE

Near Peak Offset	0.0264	-0.0786	NONE
Near Lith Offset	0.1826	0.1166	NONE
Far Bar Offset	-0.0911	-0.0467	NONE
Far Dens Offset	0.0235	0.0368	NONE
Far Peak Offset	0.0457	0.0370	NONE
Far Lith Offset	0.1771	0.1869	NONE
Near Bar Background	829.38	828.99	700 - 1450
Near Dens Background	278.70	277.43	230 - 480
Near Peak Background	122.65	122.14	100 - 210
Near Lith Background	150.11	149.00	125 - 260
Far Bar Background	503.52	501.95	450 - 900
Far Dens Background	198.18	195.65	175 - 345
Far Peak Background	78.30	78.69	70 - 140
Far Lith Background	81.52	79.92	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.691	1.690	-0.001	+/- 0.015
Pe	2.563	2.566	0.003	+/- 0.150
ALUMINUM				
Density (g/cc)	2.604	2.602	-0.002	+/- 0.01500
Pe	3.062	3.072	0.010	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0010	+/- 0.0110	-0.0011	+/- 0.0140
Magnesium Block	-0.0000	+/- 0.0110	0.0007	+/- 0.0140
Aluminum Block	0.0005	+/- 0.0110	0.0005	+/- 0.0140
Resolution	8.70	6.00 - 11.50	9.00	6.00 - 11.50
Internal Verifier(B+D+P+L)	1378	1200 - 2700	856	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 - 10844773

Reference Calibration Date: 24-Jun-14 13:12:18

Engineer: B. NEALON

Calibration Date: 04-Jul-14 20:43:54

Software Version: WL INSITE R4.2.1 (Build 5)

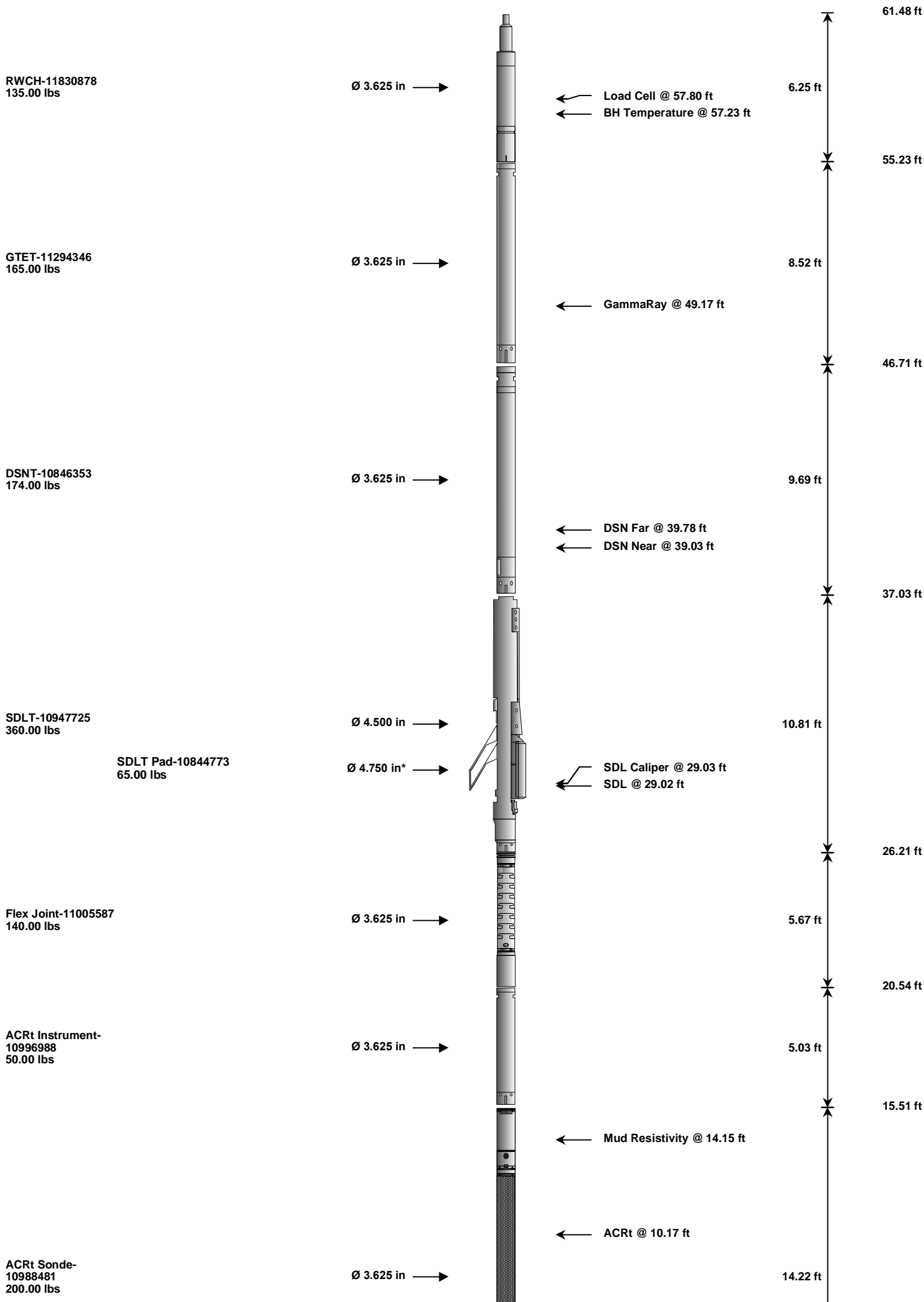
Calibration Version: 1

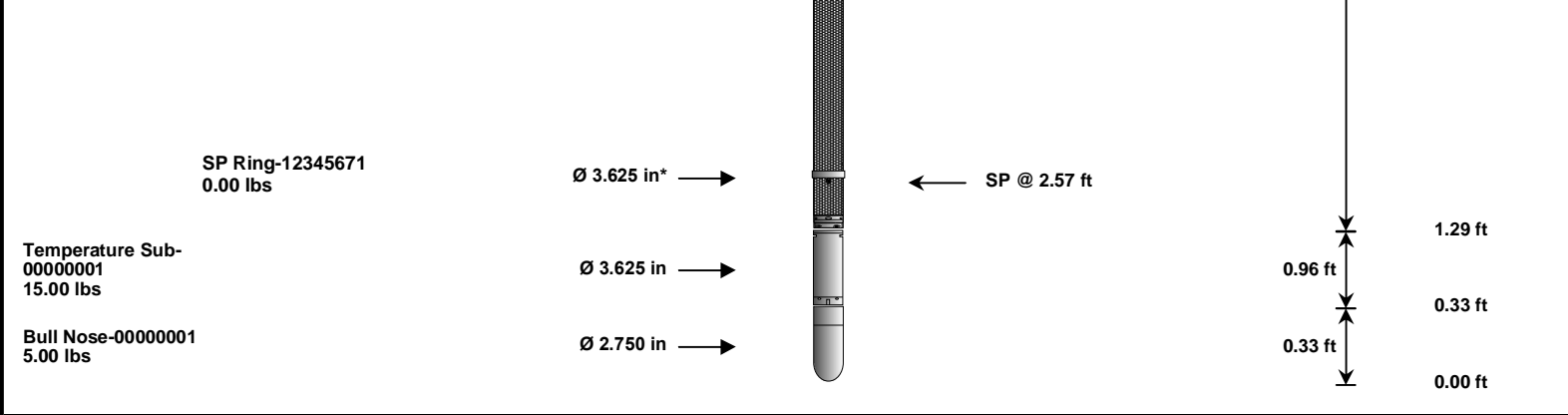
Pad Temperature: 82.3 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1377.551	1378.040	0.489	14.997
Far (B+D+P+L) cps	856.213	863.963	7.750	16.035
Near Resolution	8.70	8.79	0.090	0.50
Far Resolution	9.00	9.05	0.050	1.00
PASS/FAIL SUMMARY				
Bkg Quality Check:			Passed	
Bkg Resolution Check:			Passed	
Bkg Verification Check:			Passed	

CALIBRATION SUMMARY						
Sensor	Shop	Field	Post	Difference	Tolerance	Units
Depth Panel-12345678						
Tension Zero	0.00	-----	-----	0.00	-----	lbs
Tension Cal	7830.00	-----	-----	0.00	-----	lbs
RWCH-11830878						
DH Tension Zero	0.00	-----	-----	0.00	-----	lbs
DH Tension Cal	1430.00	-----	-----	0.00	-----	lbs
GTET-11294346						
Gamma Ray Calibrator	259.0	263.0	-----	-4.0	+/- 9.00	api
DSNT-10846353						
Snow-Block Porosity	0.0738	0.0743	-----	-0.0005	+/- 0.0150	decp
SDLT-10947725						
Pad Extension	3.75	3.74	-----	0.01	+/-0.10	in
Ring Diameter	8.25	8.26	-----	-0.01	+/-0.15	in
SDLT Pad-10844773						
Near(B+D+P+L)	1377.551	1378.040	-----	-0.489	+/-14.997	cps
Far(B+D+P+L)	856.213	863.963	-----	-7.750	+/-16.035	cps

Data: BH_HOMER_9-41AH\0001 TRIPLE\004 05-Jul-14 21:58 Up @6553.8f				Date: 06-Jul-14 00:01:57	
HALLIBURTON					
CUSTOMER EVENT LOG					
Event Type	Time & Date	Depth (ft)	Event Description		
	05-Jul-14 21:09:22	350.00	Logging 001 05-Jul-14 21:09 Up @350.0f		
	05-Jul-14 21:11:58	277.75	Halting 001 05-Jul-14 21:09 Up @350.0f		
	05-Jul-14 21:21:16	726.50	Logging 002 05-Jul-14 21:21 Dn @726.5f		
	05-Jul-14 21:47:59	6536.84	Halting 002 05-Jul-14 21:21 Dn @726.5f		
	05-Jul-14 21:48:22	6554.25	Logging 003 05-Jul-14 21:48 Up @6554.3f		
	05-Jul-14 21:54:17	6212.61	Halting 003 05-Jul-14 21:48 Up @6554.3f		
	05-Jul-14 21:58:11	6553.75	Logging 004 05-Jul-14 21:58 Up @6553.8f		
	05-Jul-14 23:30:23	1080.19	Halting 004 05-Jul-14 21:58 Up @6553.8f		
Data: BH_HOMER_9-41AH\0001 TRIPLE\HW10997				Date: 06-Jul-14 00:00:17	
HALLIBURTON					
TOOL STRING DIAGRAM REPORT					
Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length Accumulated Length





Mnemonic		Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head		11830878	135.00	6.25	55.23	300.00
GTET	Gamma Telemetry Tool		11294346	165.00	8.52	46.71	60.00
DSNT	Dual Spaced Neutron		10846353	174.00	9.69	37.03	60.00
SDLT	Spectral Density Tool		10947725	360.00	10.81	26.21	60.00
SDLP	Density Insite Pad		10844773	65.00	2.55	*	28.42
FLEX	Flex Joint		11005587	140.00	5.67	20.54	300.00
ACRt	Array Compensated True Resistivity Instrument Section		10996988	50.00	5.03	15.51	120.00
ACRt	Array Compensated True Resistivity Sonde Section		10988481	200.00	14.22	1.29	120.00
SP	SP Ring		12345671	0.00	0.25	*	2.57
TMAX	Temperature Sub - 3_625 OD		00000001	15.00	0.96	0.33	300.00
BLNS	Bull Nose		00000001	5.00	0.33	0.00	300.00
Total				1,309.00	61.48		
* Not included in Total Length and Length Accumulation.							
Data: BH_HOMER_9-41AH\0001 TRIPLE\004 05-Jul-14 21:58 Up @6553.8f						Date: 05-Jul-14 23:58:08	

COMPANY	BLACK HILLS EXPLORATION & PRODUCTION		
WELL	HOMER DEEP UNIT 9-41BH		
FIELD	SOUTH SHALE RIDGE		
COUNTY	GARFIELD	STATE	CO
HALLIBURTON		SPECTRAL DENSTY DUAL SPACED NEUTRON	