

# HALLIBURTON

## SPECTRAL DENSITY DUAL SPACED NEUTRON LOG

COMPANY	OXY USA INC
WELL	SMU #320
FIELD	SMU
COUNTY	FINNEY
STATE	KANSAS
COMPANY	OXY USA INC
WELL	SMU #320
FIELD	SMU
COUNTY	FINNEY
STATE	KANSAS
API No.	22-23S-34W
Location	1215' FSL & 2400' FWL
Other Services:	BSAT MICROLOG ACRT
Sect.	22
Twp.	23S
Rge.	34W
Permanent Datum	GL
Log measured from	KB
Drilling measured from	KB
Elev.	2948.0 ft
D.F.	2958.0 ft
G.L.	2948.0 ft

Date	02-Jul-12
Run No.	ONE
Depth - Driller	4920.00 ft
Depth - Logger	4904.0 ft
Bottom - Logged Interval	4860.0 ft
Top - Logged Interval	3700.0 ft
Casing - Driller	8.625 in @ 1811.0 ft
Casing - Logger	1809.0 ft
Bit Size	7.875 in @
Type Fluid in Hole	WATER BASED MUD
Density	9.2 ppg 39.00 sg/qt
PH	8.60 pH 9.2 cp/m
Source of Sample	FLOW LINE
Rm @ Meas. Temperature	0.660 ohmm @ 75.00 degF @
Rmf @ Meas. Temperature	0.50 ohmm @ 75.00 degF @
Rmc @ Meas. Temperature	0.800 ohmm @ 75.00 degF @
Source Rmf	MEAS Rmc MEAS
Rm @ BHT	0.39 ohmm @ 130.0 degF @
Time Since Circulation	8.0 hr
Time on Bottom	02-Jul-12 23:04
Max. Rec. Temperature	130.0 degF @ 4904.0 ft @
Equipment	1054696 LIBERAL
Recorded By	J. BOLLOW
Witnessed By	C. WYLLIE

Fold here

Service Ticket No.: 9625518		API Serial No.: 22-23S-34W		PGM Version: WL INSITE R3.6.0 (Build 3)	
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE				RESISTIVITY SCALE CHANGES	
Date	Sample No.			Type Log	Depth
Depth-Driller					Scale Up Hole
Type Fluid in Hole					Scale Down Hole
Density	Viscosity				
Ph	Fluid Loss				
Source of Sample				RESISTIVITY EQUIPMENT DATA	
Rm @ Meas. Temp	@	@	Run No.	Tool Type & No.	Pad Type
Rmf @ Meas. Temp.	@	@			Tool Pos.
Rmc @ Meas. Temp.	@	@			Other
Source Rmf	Rmc				
Rm @ BHT	@	@			
Rmf @ BHT	@	@			
Rmc @ BHT	@	@			
EQUIPMENT DATA					
GAMMA		ACOUSTIC		DENSITY	
Run No.	ONE	Run No.		Run No.	ONE
Serial No.	11039640	Serial No.		Serial No.	M296_P84
Model No.	GTET	Model No.		Model No.	SDLT-I
Diameter	3.625"	No. of Cent.		Diameter	4.5"
Detector Model No.	GTET	Spacing		Log Type	GAM-GAM
Type	SCINT			Source Type	CS137
Length	8'	LSA [Y/N]		Serial No.	5168GW
Distance to Source	10'	FWDA [Y/N]		Strength	1.5 CI
LOGGING DATA					
GENERAL		GAMMA		ACOUSTIC	
DENSITY		NEUTRON			

Run No.	GENERAL		Speed ft/min	GAMMA		ACOUSTIC		Matrix	DENSITY		NEUTRON			
	Depth			Scale		Scale			Matrix	Scale		Matrix		
	From	To		L	R	L	R			L	R			
ONE	4904	3700	REC	0	150				30	-10	2.71	30	-10	LIME

DIRECTIONAL INFORMATION

Maximum Deviation @ KOP @

Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 5.5-INCH CASING

CHLORIDES REPORTED AT 5700 MG/L

LCM REPORTED AT 3 LB/BBL

GTET-DSNT-SDLT-BSAT-ACRT RUN IN COMBINATION

TODAY'S CREW: P. COBLE & V. JAIME

THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES LIBERAL, KS. 620-624-8123

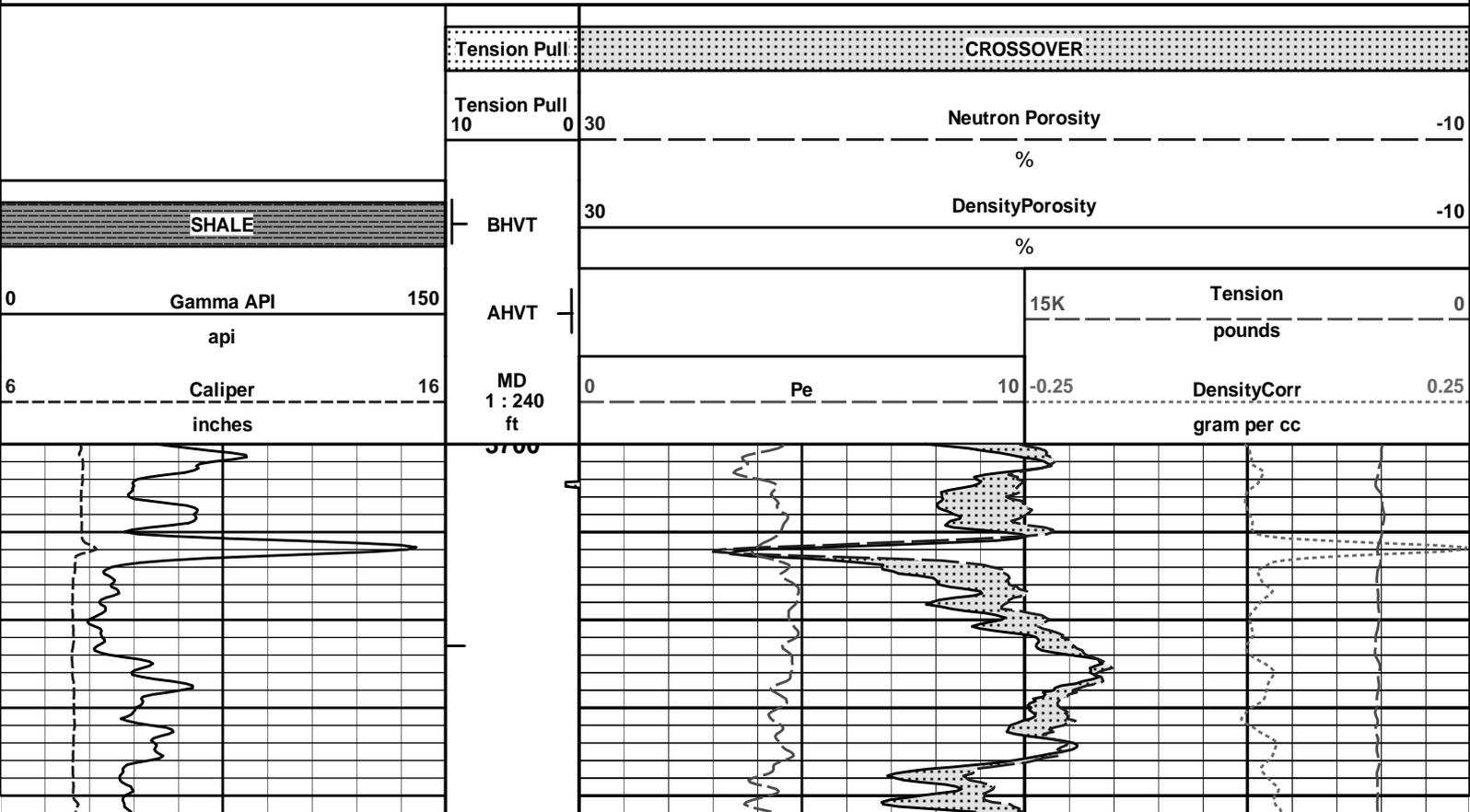
HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR 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.

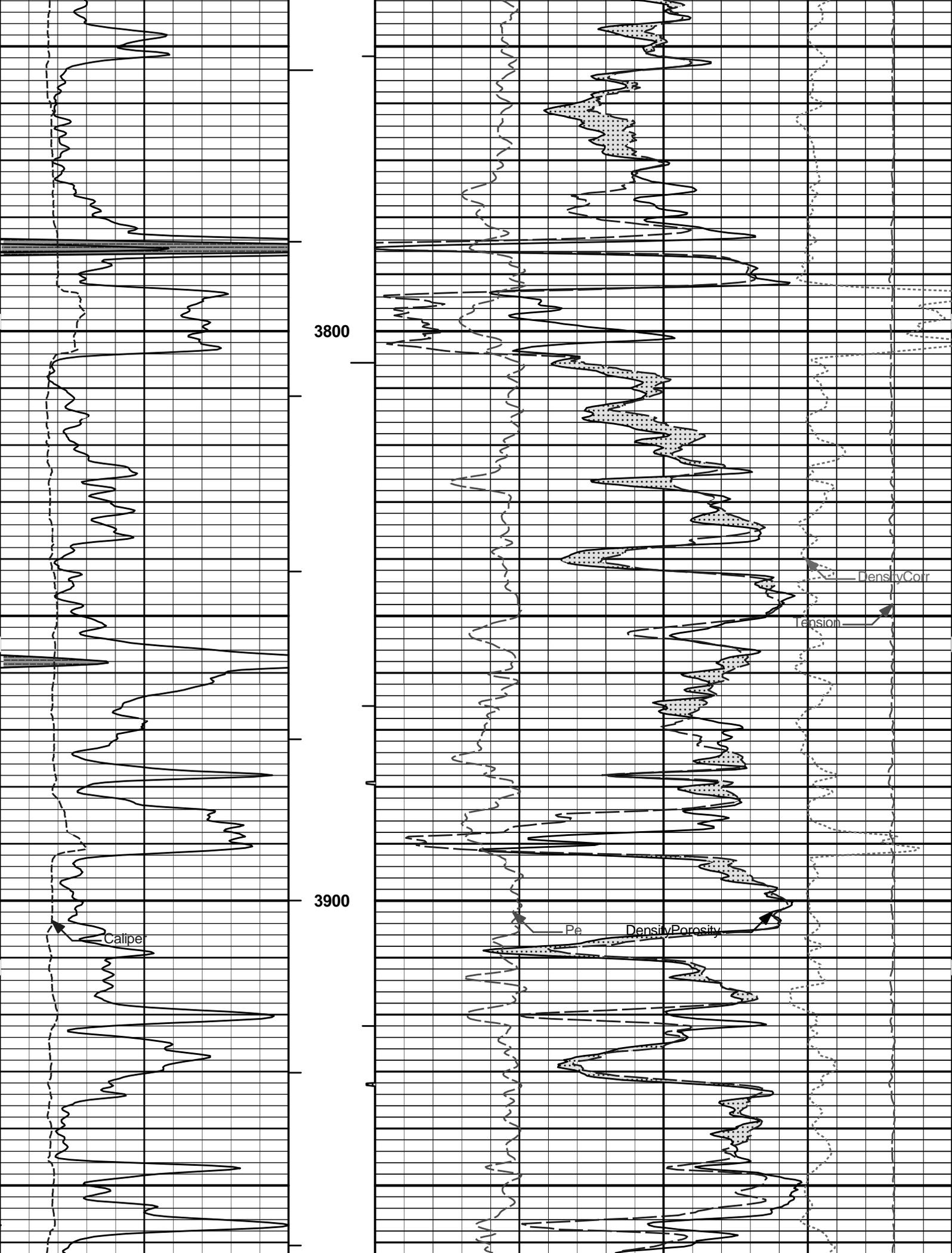
HALLIBURTON

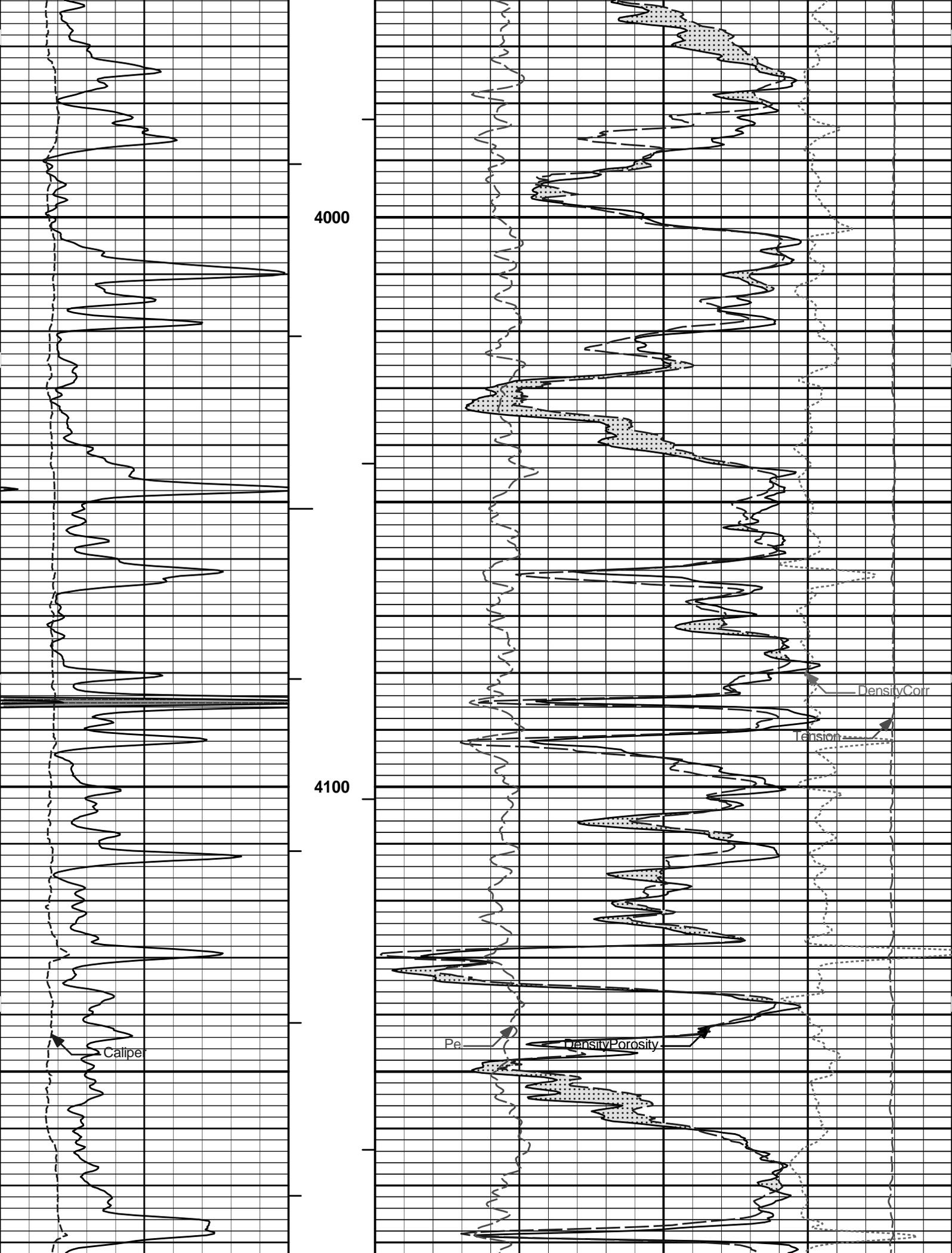


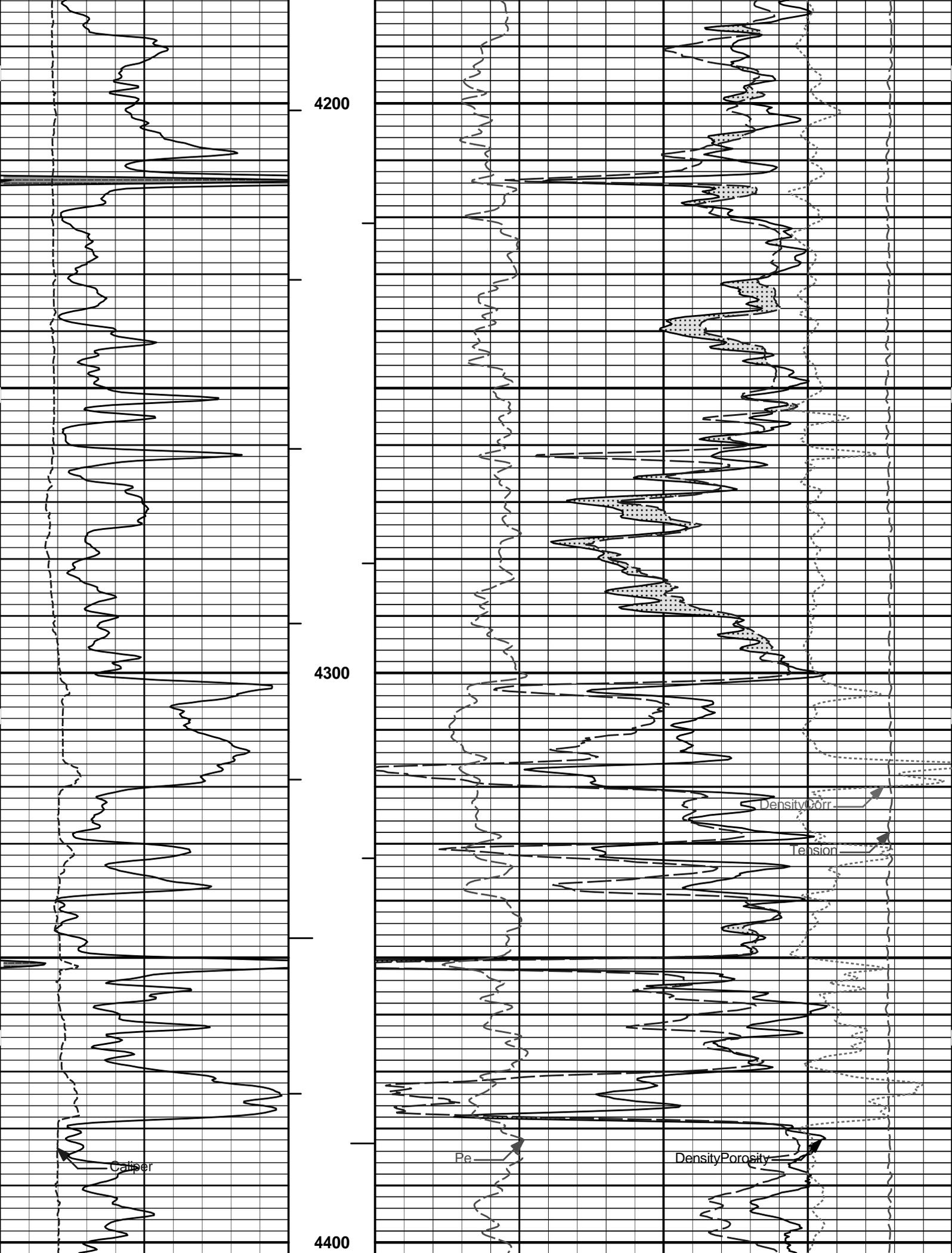
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 Plot Range: 3700 ft to 4907.75 ft  
 Data: SMU\_320\Well Based\DETAIL\  
 Plot File: \\PORO\Poros\_IQ\_5\_MAIN\_LIB

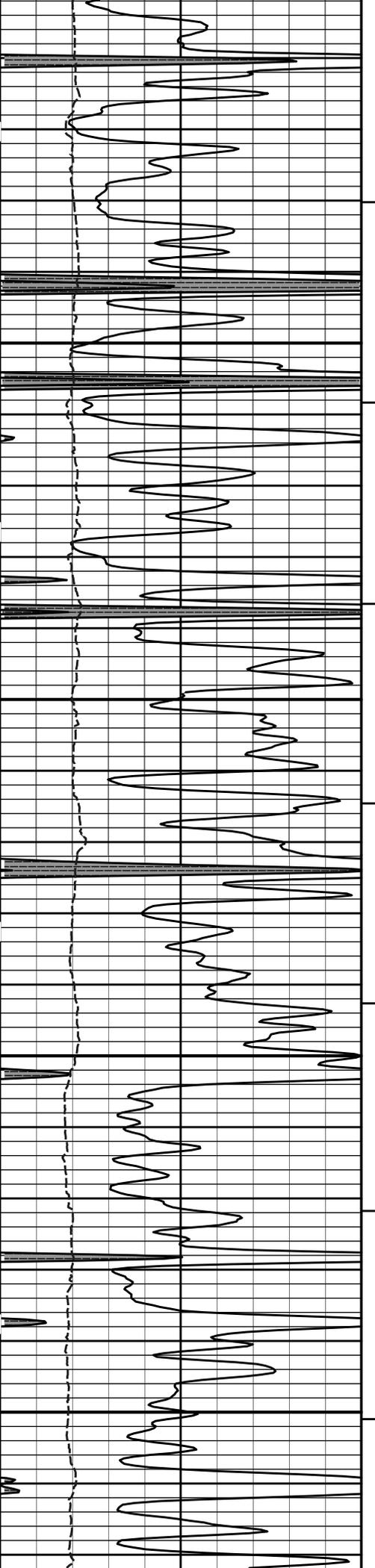
## 5 INCH MAIN LOG





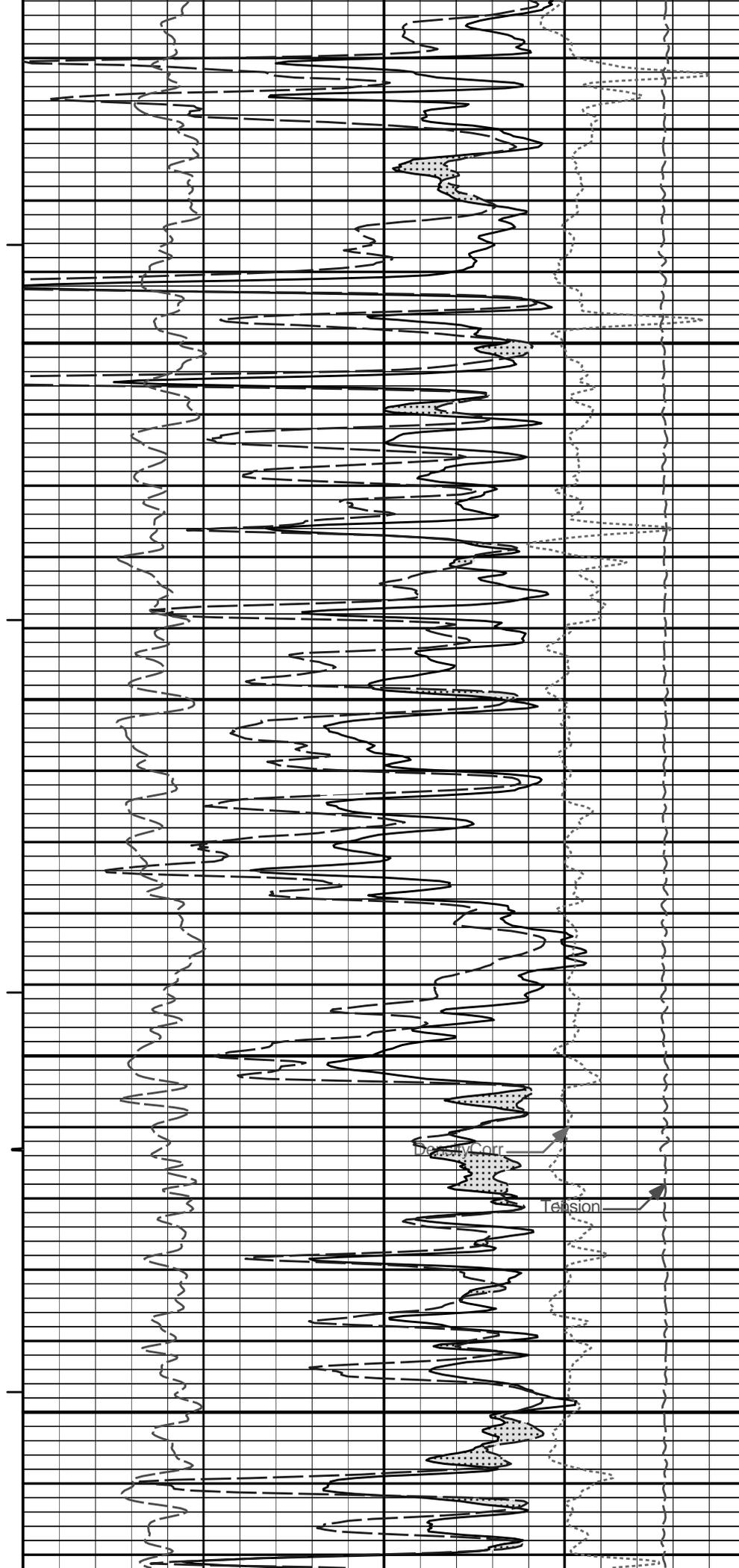






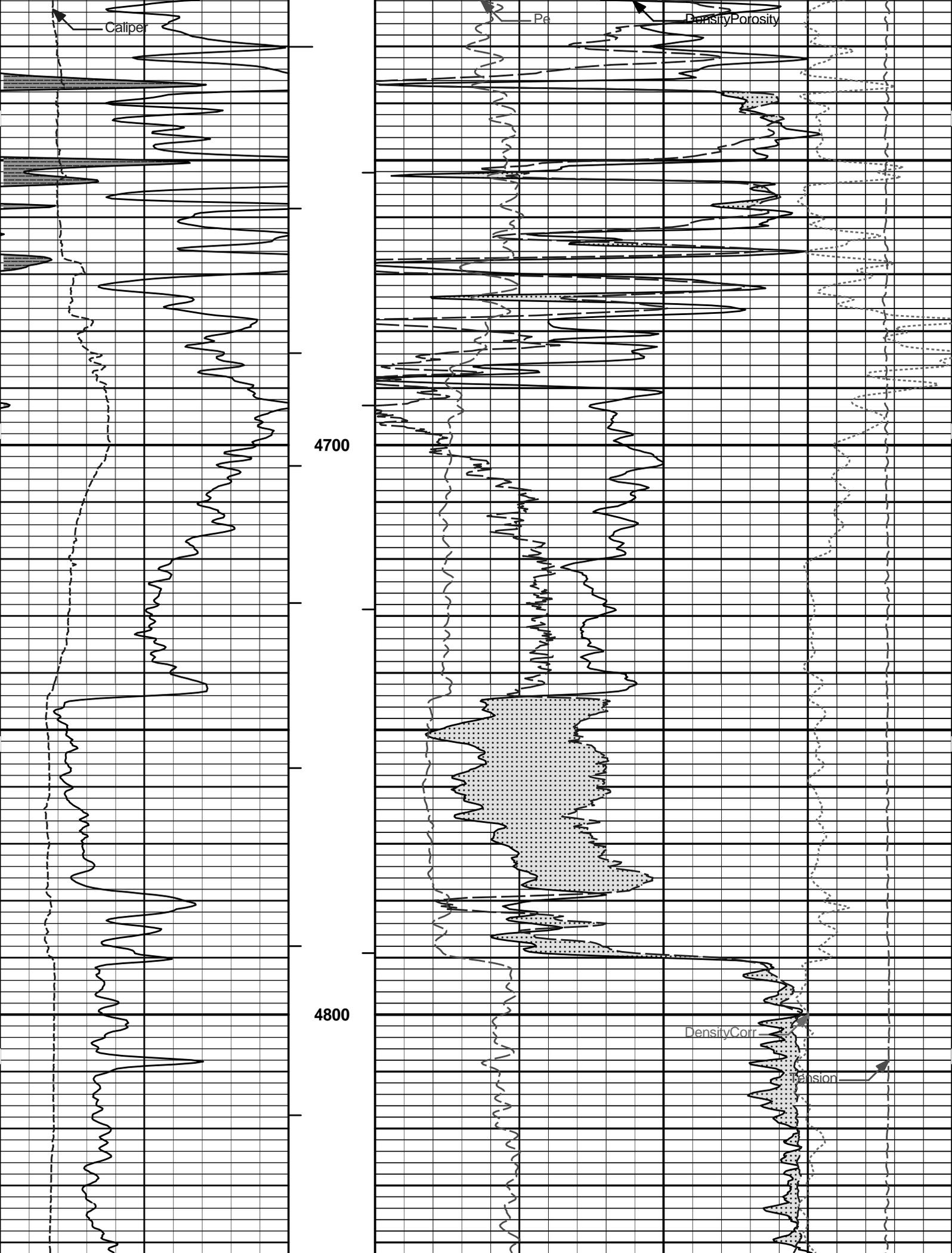
4500

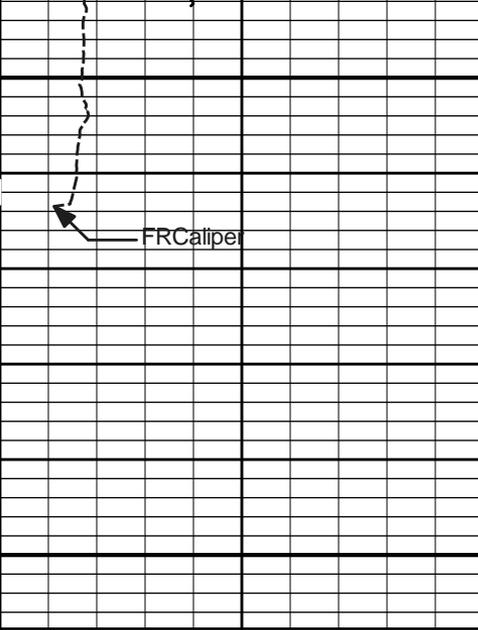
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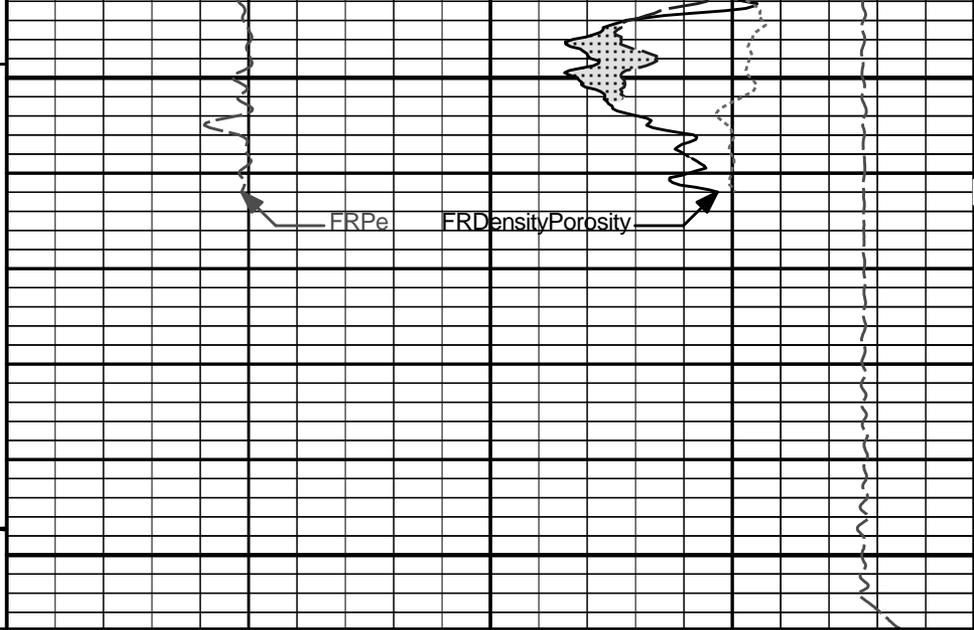
Density Corr

Tension





4900  
TD



6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25
	inches		1 : 240					gram per cc	
0	Gamma API	150	AHVT				15K	Tension	0
	api							pounds	
	SHALE		BHVT	30	DensityPorosity				-10
								%	
			Tension Pull	10	0	30	Neutron Porosity		-10
								%	
			Tension Pull				CROSSOVER		

**HALLIBURTON**

Plot Time: 03-Jul-12 02:20:23  
 Plot Range: 3700 ft to 4907.75 ft  
 Data: SMU\_320\Well Based\DETAIL\  
 Plot File: \\PORO\Poro\_IQ\_5\_MAIN\_LIB

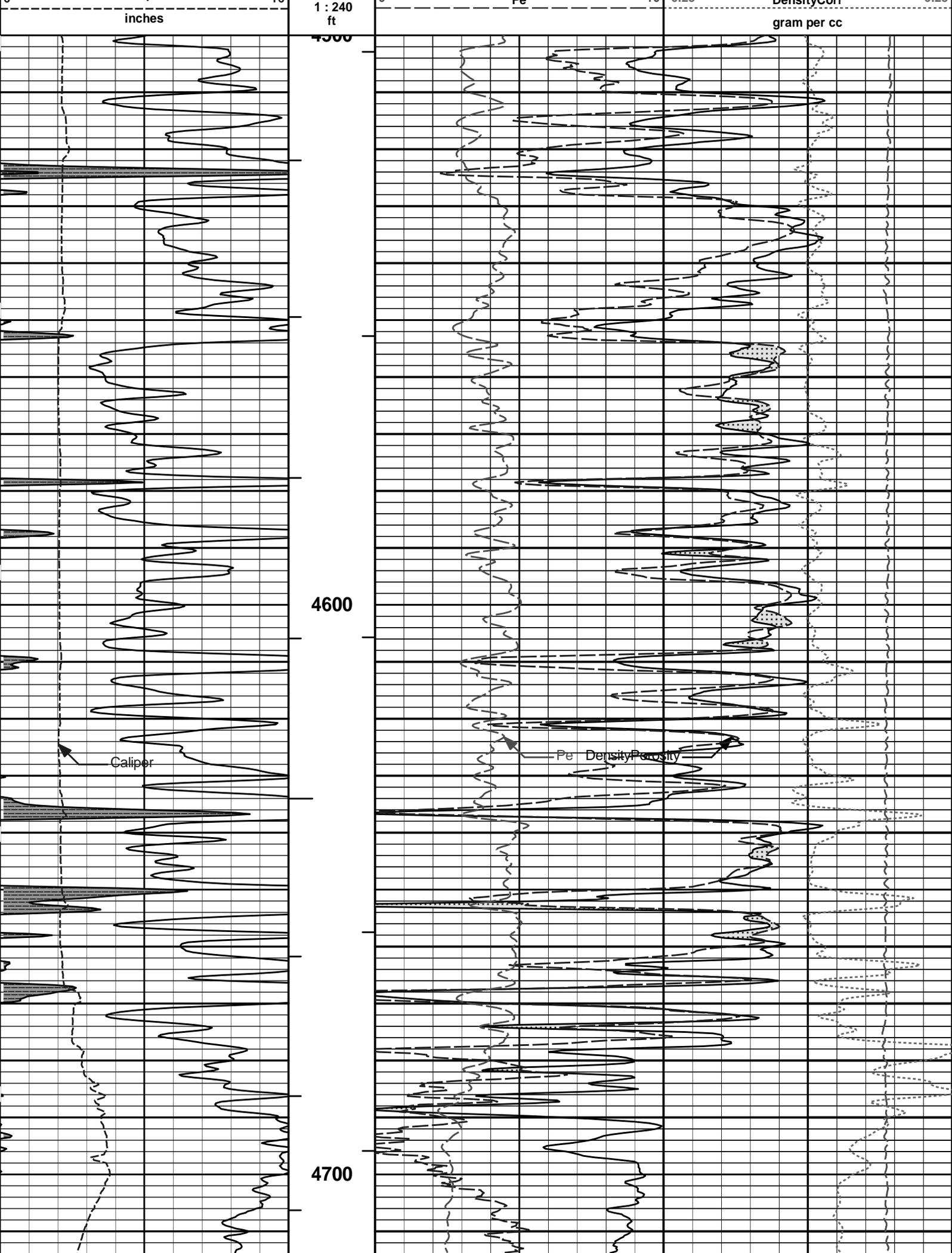
## 5 INCH MAIN LOG

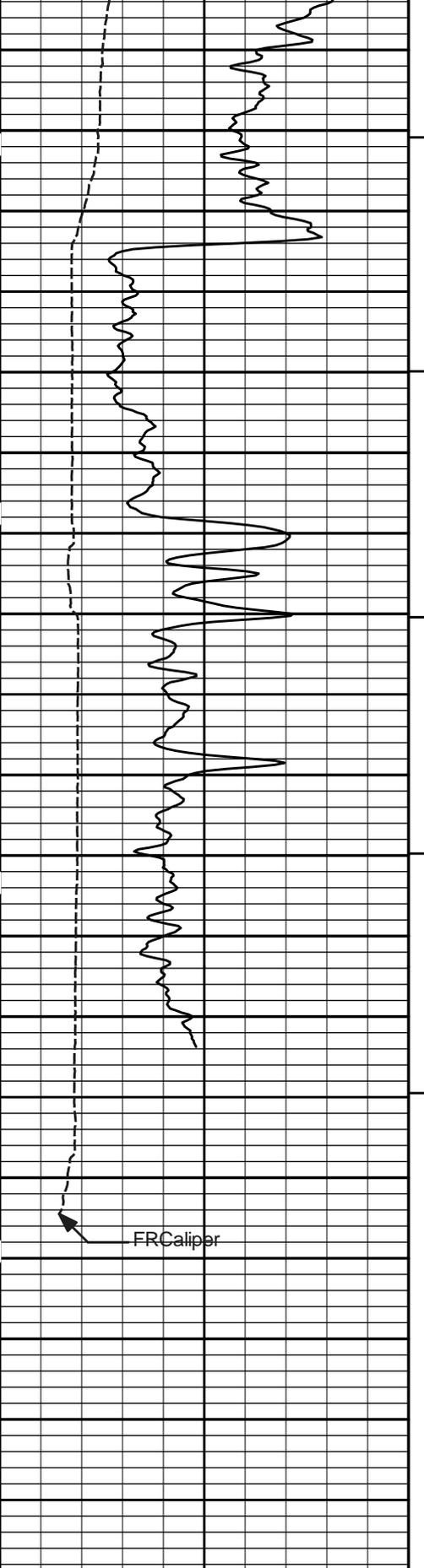
**HALLIBURTON**

Plot Time: 03-Jul-12 02:20:24  
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 Plot File: \\PORO\Poro\_IQ\_5\_REP\_LIB

## REPEAT SECTION

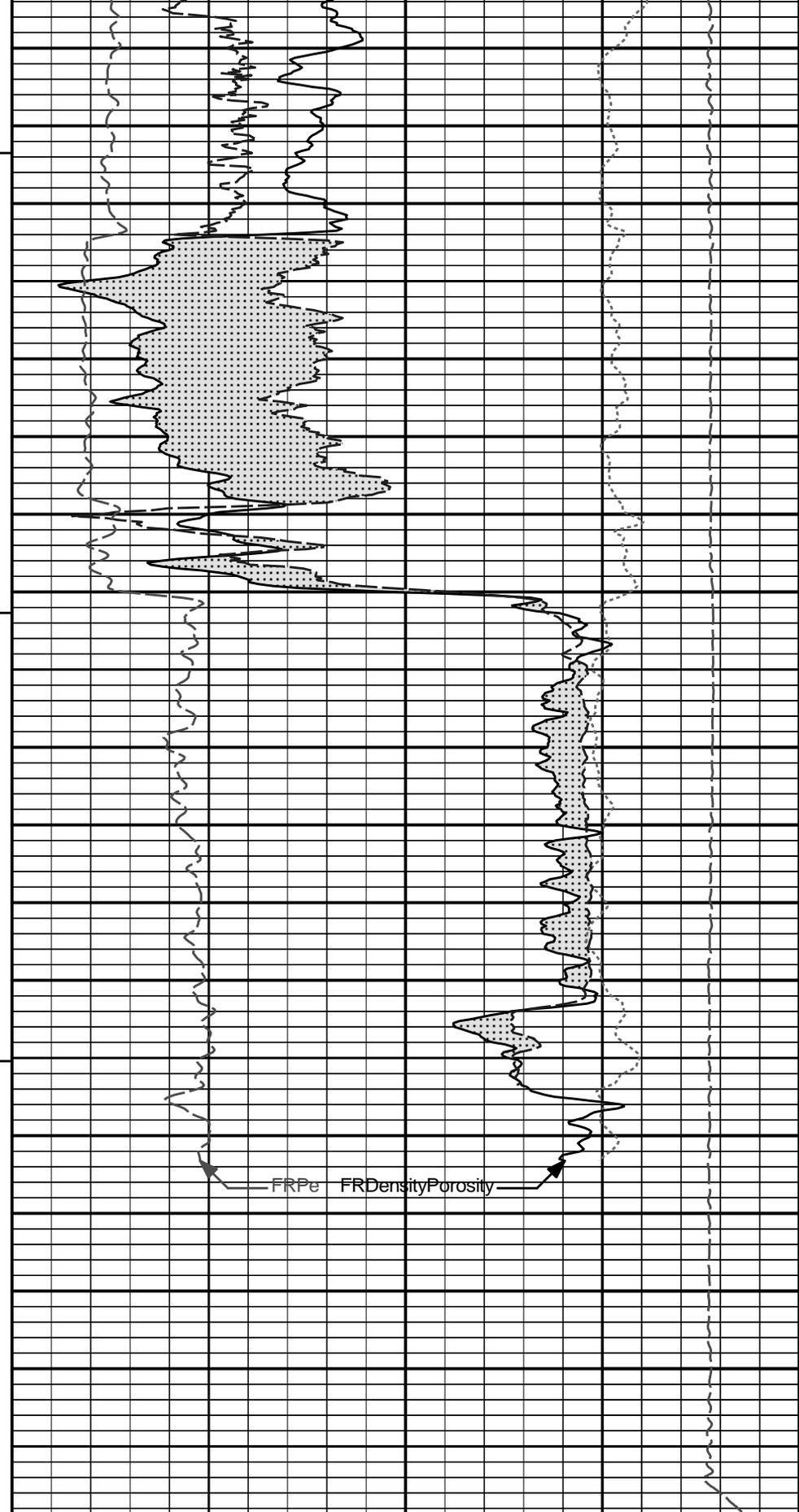
								CROSSOVER	
				30	Neutron Porosity				-10
								%	
				30	DensityPorosity				-10
								%	
0	Gamma API	150	AHVT				15K	Tension	0
	api							pounds	
6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25





4800

4900



6	Caliper	16
	inches	
0	Gamma API	150
	api	
SHALE		

MD  
1 : 240  
ft

AHVT

DHVT

0	Pe	10	-0.25	DensityCorr	0.25
				gram per cc	
			15K	Tension	0
				pounds	
30	DensityPorosity				-10

SHALE

BHV

%

30

Neutron Porosity

-10

%

CROSSOVER

HALLIBURTON

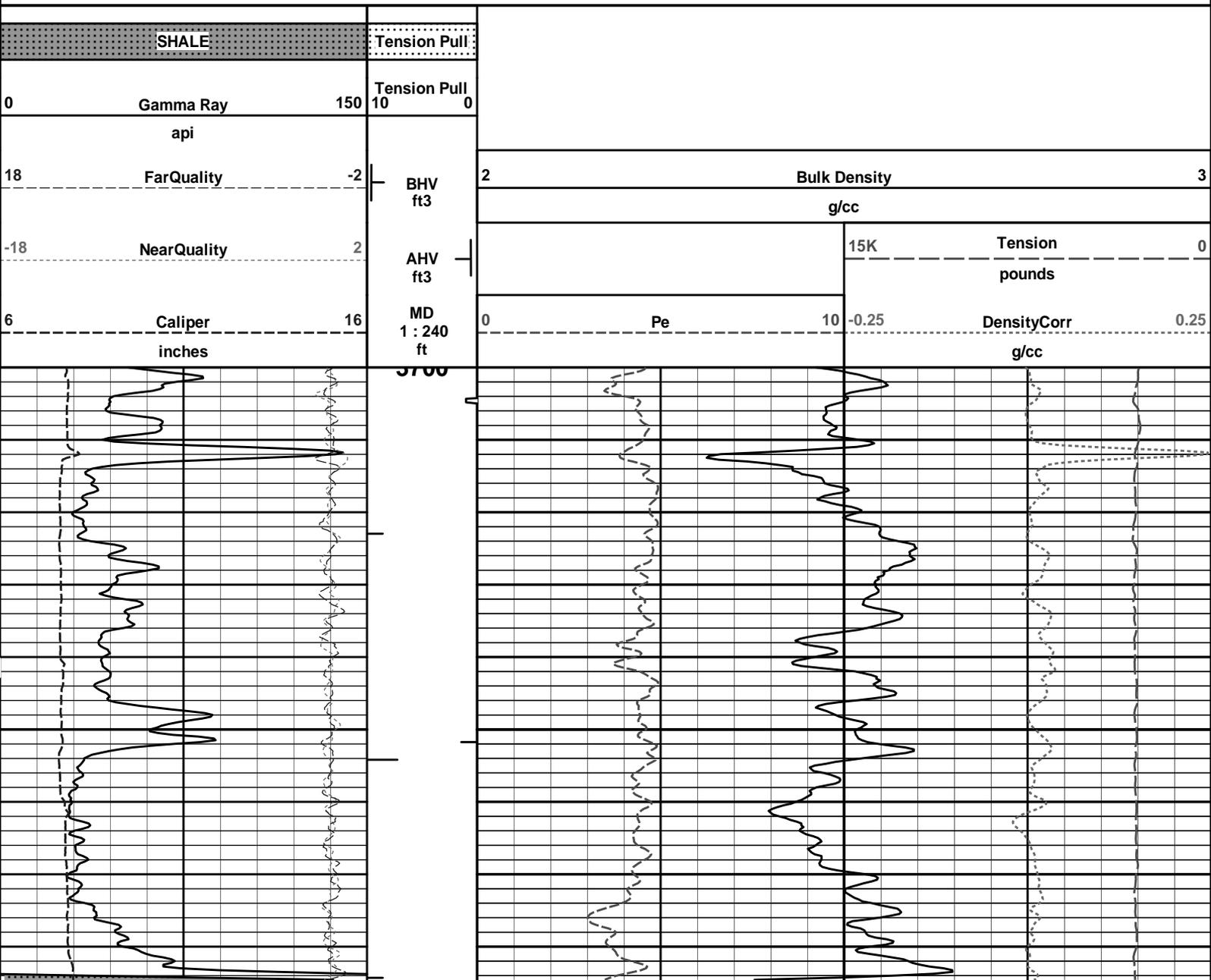
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Plot File: \\PORO\Poro\_IQ\_5\_REP\_LIB

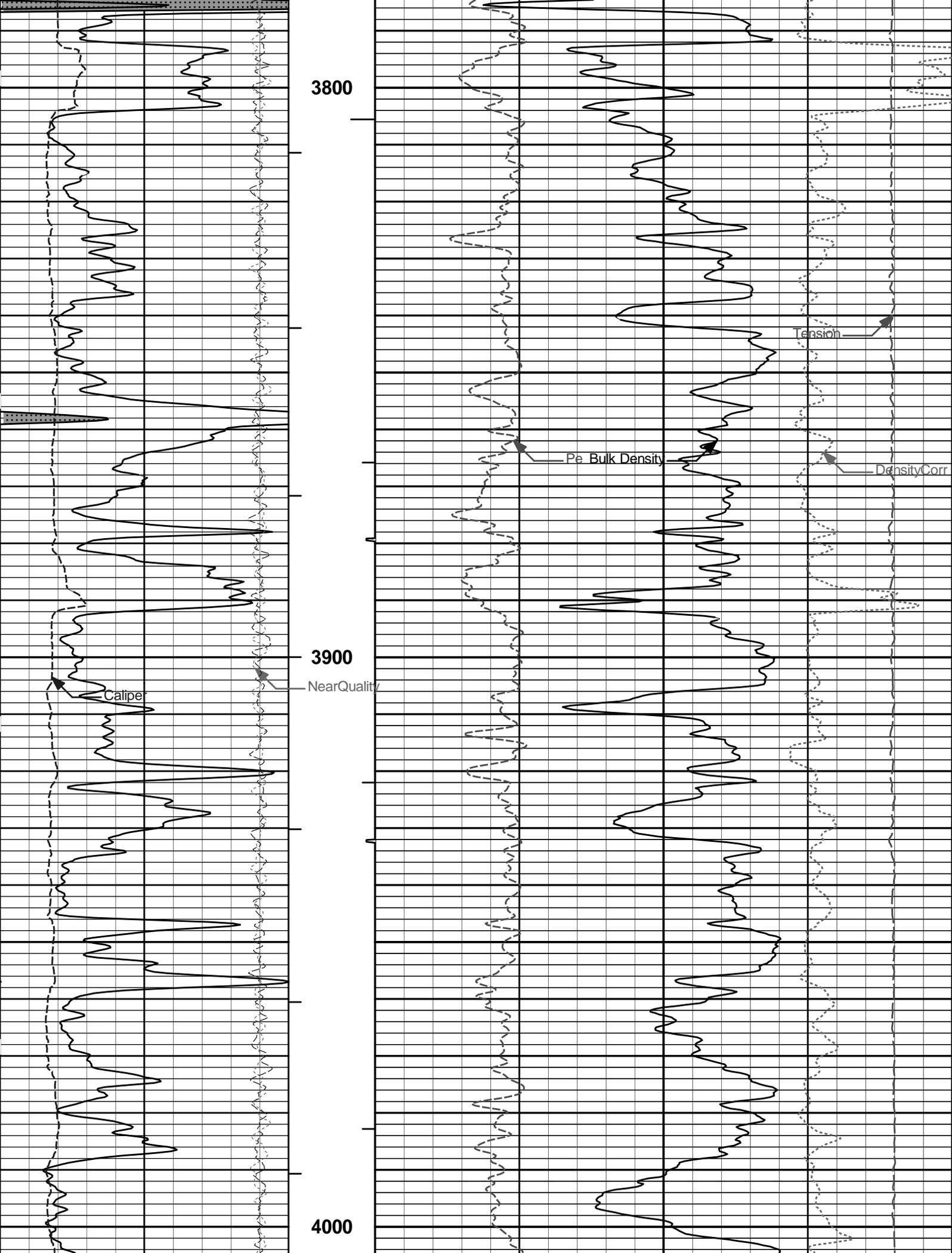
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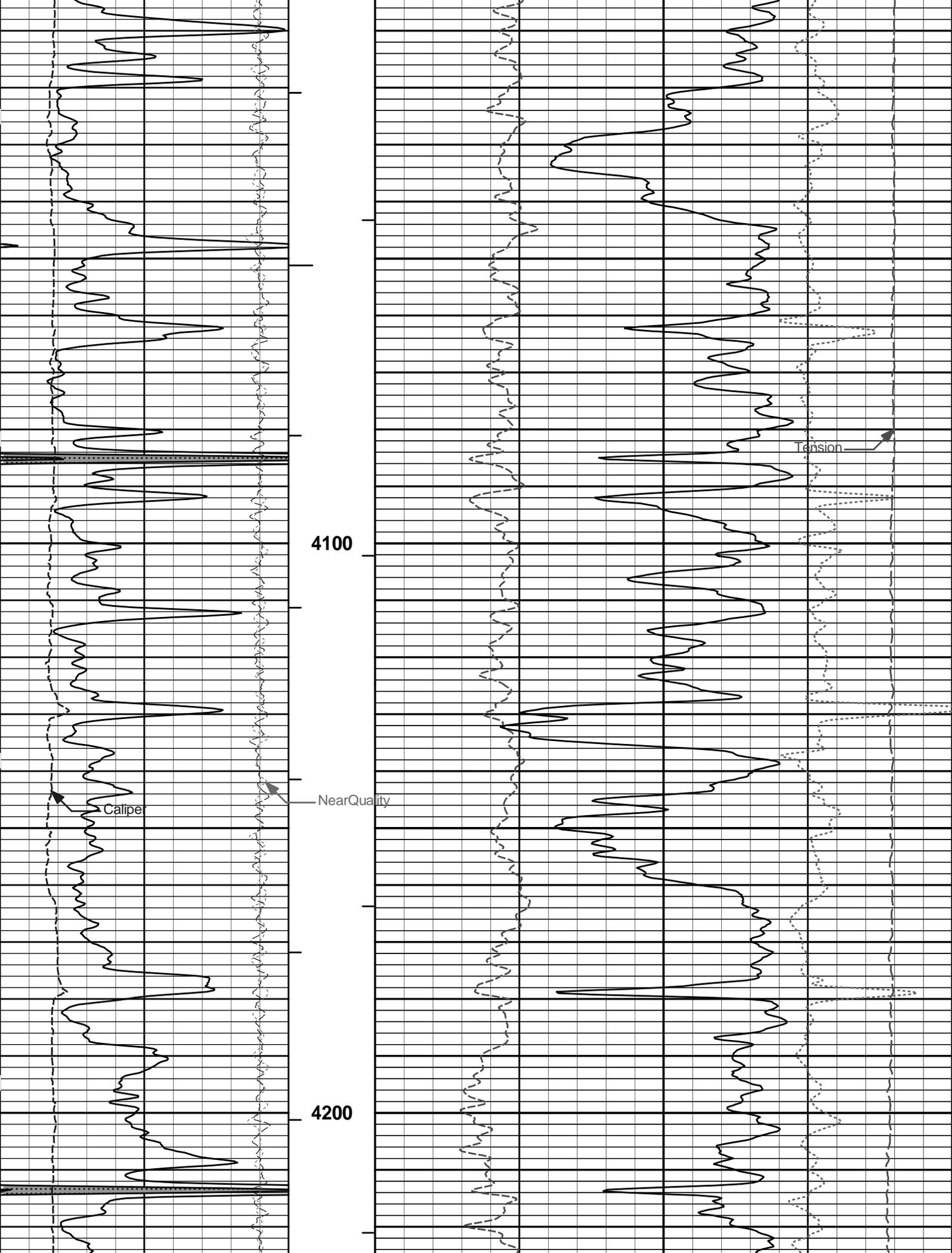
HALLIBURTON

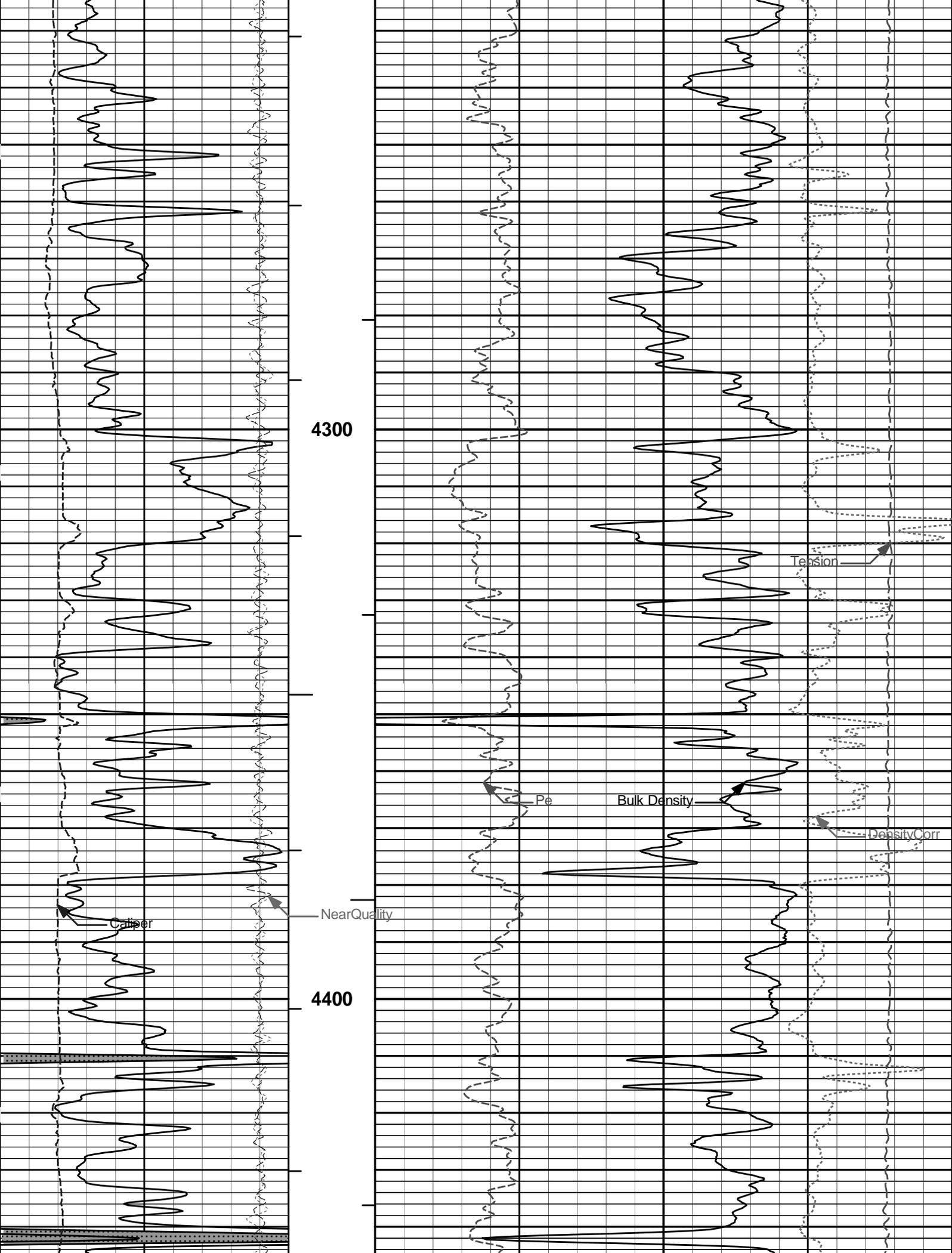
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Data: SMU\_320Well Based\DETAIL\  
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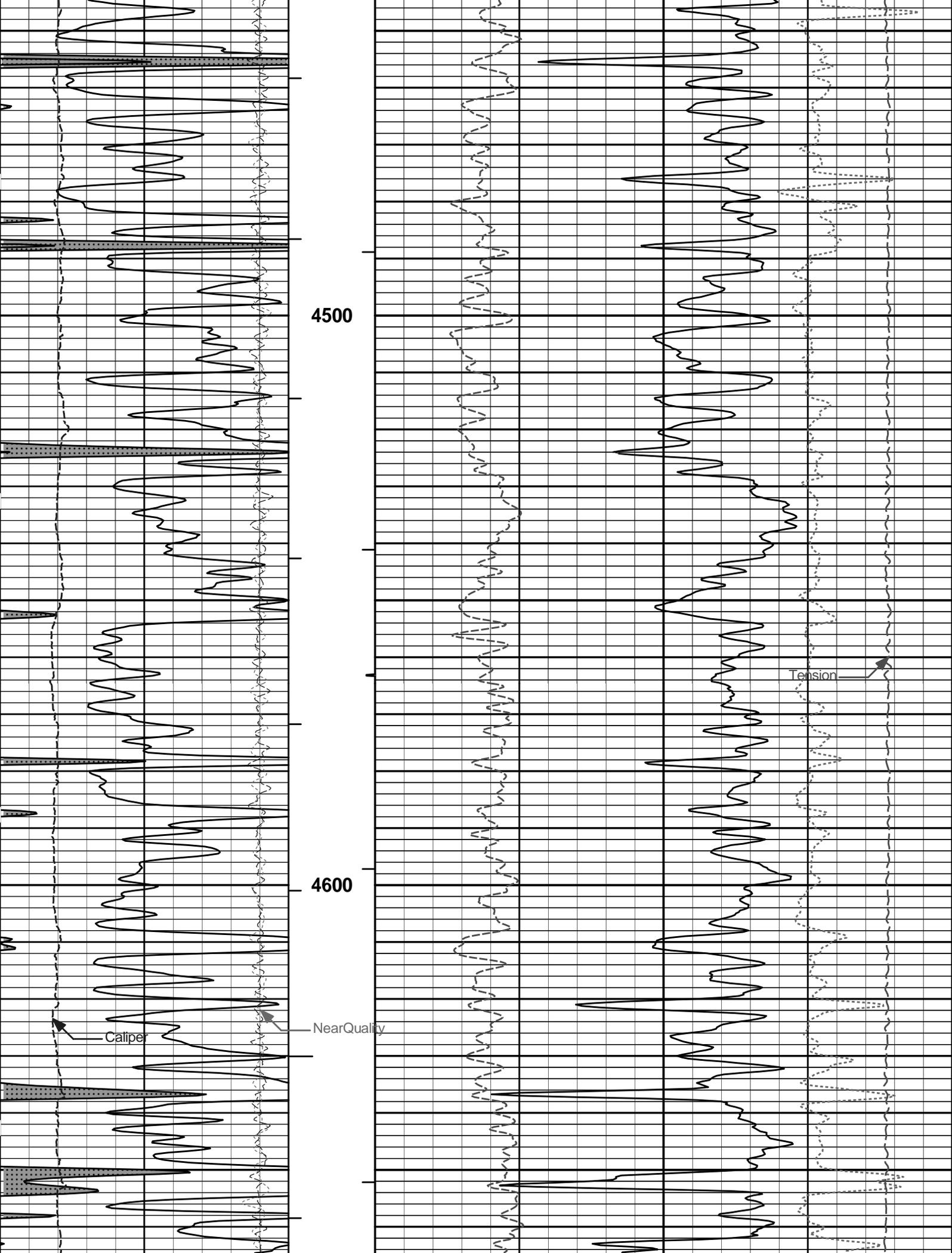
# 5 INCH MAIN LOG

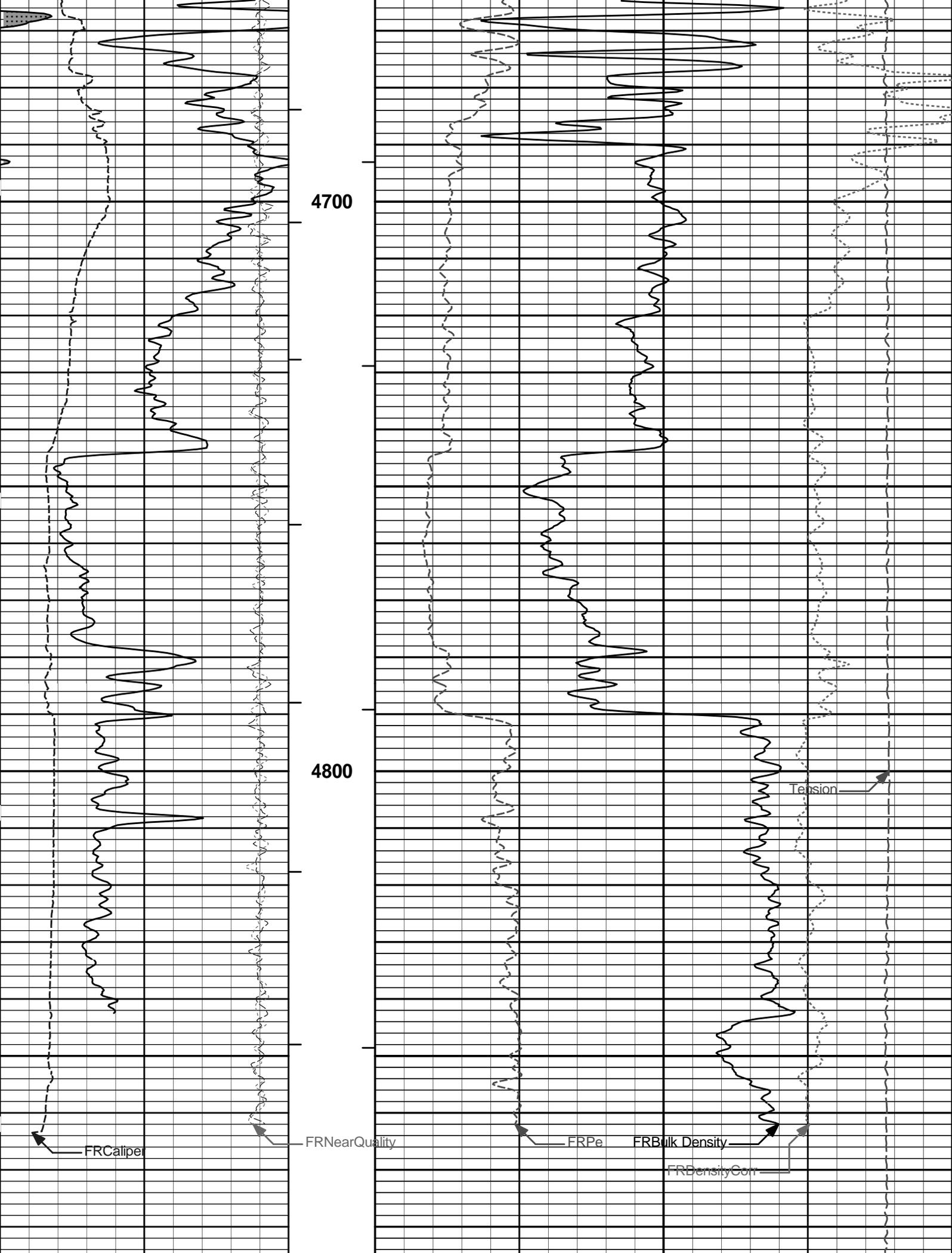












4900  
TD

6	Caliper	16
	inches	
-18	NearQuality	2
18	FarQuality	-2
0	Gamma Ray	150
	api	

MD 1 : 240 ft
AHV ft3
BHV ft3
Tension Pull 10 0

0	Pe	10
2	Bulk Density	
	g/cc	
15K	Tension	0
	pounds	

-0.25	DensityCorr	0.25
	g/cc	
15K	Tension	0
	pounds	

SHALE

Tension Pull

HALLIBURTON

Plot Time: 03-Jul-12 02:20:29  
 Plot Range: 3700 ft to 4907.75 ft  
 Data: SMU\_320\Well Based\DETAIL\  
 Plot File: \\-LOCAL-ISMU\_320\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CHIPOROVBULKD\_5\_MAIN\_LIB

### 5 INCH MAIN LOG

HALLIBURTON

Plot Time: 03-Jul-12 02:20:29  
 Plot Range: 4500 ft to 4908.92 ft  
 Data: SMU\_320\Well Based\REPEAT\  
 Plot File: \\-LOCAL-ISMU\_320\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CHIPOROVBULKD\_5\_REP\_LIB

### REPEAT SECTION

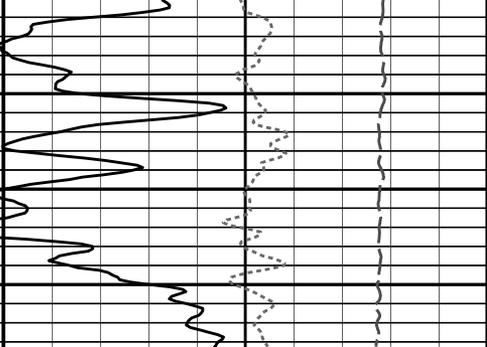
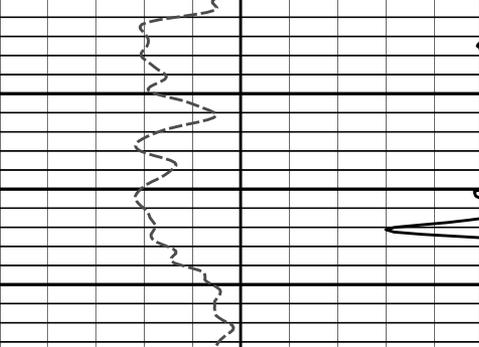
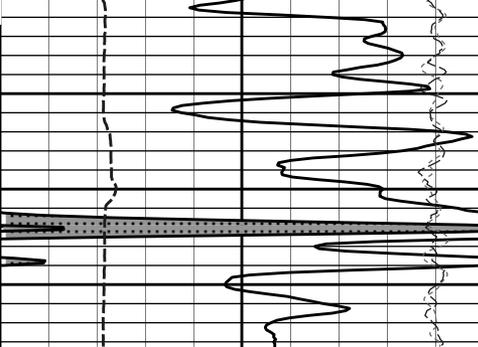
SHALE

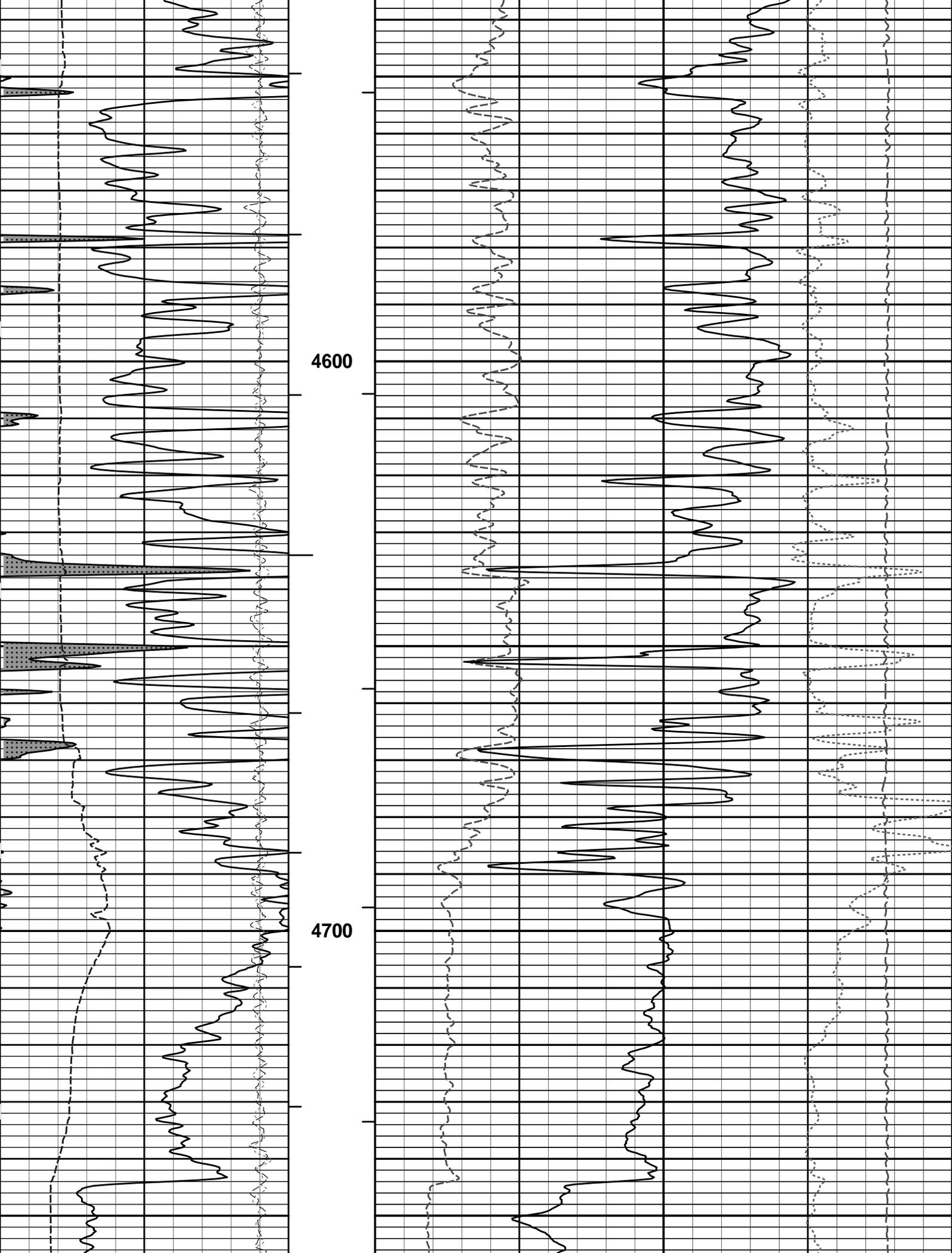
0	Gamma Ray	150
	api	
18	FarQuality	-2
-18	NearQuality	2
6	Caliper	16
	inches	

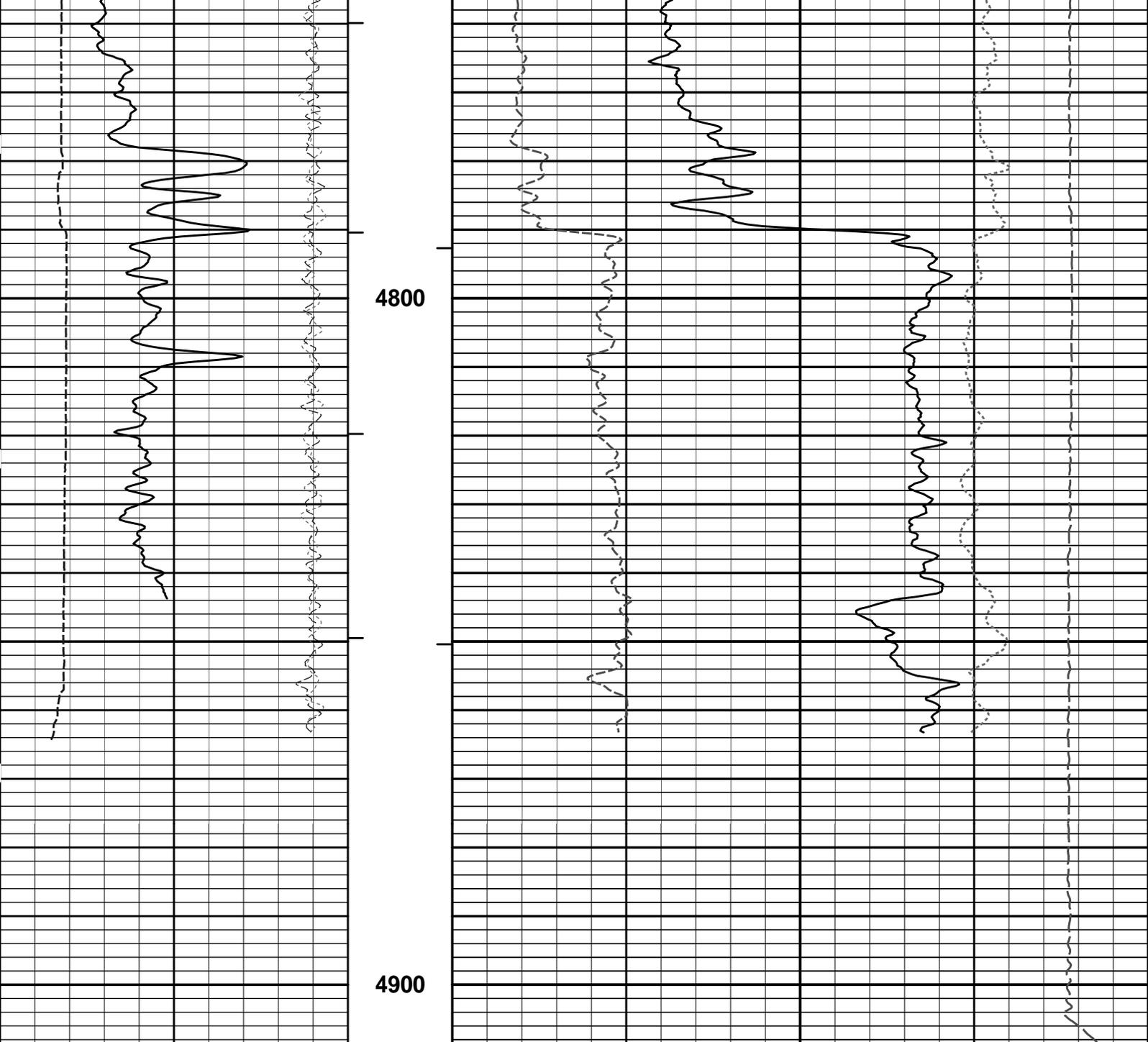
BHV ft3
AHV ft3
MD 1 : 240 ft

2	Bulk Density		3
	g/cc		
15K	Tension	0	
	pounds		
0	Pe	10	
-0.25	DensityCorr	0.25	
	g/cc		

15K	Tension	0
	pounds	
0	Pe	10
-0.25	DensityCorr	0.25
	g/cc	







6	Caliper	16	MD	0	10	-0.25	DensityCorr	0.25
	inches		1 : 240				g/cc	
-18	NearQuality	2	AHV			15K	Tension	0
			ft3				pounds	
18	FarQuality	-2	BHV	2	Bulk Density			3
			ft3		g/cc			
0	Gamma Ray	150						
	api							
	SHALE							

**HALLIBURTON**

Plot Time: 03-Jul-12 02:20:30  
 Plot Range: 4500 ft to 4908.92 ft  
 Data: SMU\_320\Well Based\REPEAT\  
 Plot File: \\-LOCAL-\SMU\_320\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CHIPORO\BULKD\_5\_REP\_LIB

# REPEAT SECTION

**HALLIBURTON**

## TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
Cable Head- PROT01 30.00 lbs		Ø 3.625 in →			1.92 ft	75.95 ft
SP Sub-001 60.00 lbs		Ø 3.625 in →		← SP @ 72.26 ft	3.74 ft	74.03 ft
GTET-11039640 165.00 lbs		Ø 3.625 in →		← GammaRay @ 64.23 ft	8.52 ft	70.30 ft
DSNT-11055304 174.00 lbs	DSN Decentralizer- 11005605 6.60 lbs	Ø 5.000 in* → Ø 3.625 in →		← DSN Far @ 54.84 ft ← DSN Near @ 54.09 ft	9.69 ft	61.78 ft
SDLT-104_M296 360.00 lbs	SDLT Pad-P84 65.00 lbs Microlog Pad-M296 8.00 lbs	Ø 4.500 in → Ø 4.750 in* → Ø 4.750 in* →		Microlog @ 44.28 ft SDL Caliper @ 44.09 ft SDL @ 44.08 ft	10.81 ft	52.09 ft
IQ Flex-696 140.00 lbs		Ø 3.625 in →			5.67 ft	41.28 ft
Centralizer 29-2 12.00 lbs		Ø 4.000 in* →				35.61 ft

BSAT-10747684  
300.00 lbs

Ø 3.625 in →

← Sonic Receivers @ 27.09 ft

15.77 ft

ACRt Instrument-  
I962  
50.00 lbs

Centralizer 25-002  
8.00 lbs

Ø 4.000 in\*  
Ø 3.625 in →

5.03 ft

19.83 ft

Regal Standoff 6\_75-1  
20.00 lbs

Ø 6.750 in\* →

← Mud Resistivity @ 13.44 ft

14.80 ft

ACRt Sonde-  
I962\_S909  
200.00 lbs

Ø 3.625 in →

← ACRt @ 9.46 ft

14.22 ft

Cabbage Head-  
TRK696  
10.00 lbs

Ø 3.625 in  
Ø 6.000 in →

0.58 ft

0.58 ft

0.00 ft



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max. Log. Speed (fpm)
CH	Standard OH Cable Head	PROT01	30.00	1.92	74.03	300.00
SP	SP Sub	001	60.00	3.74	70.30	300.00
GTET	Gamma Telemetry Tool	11039640	165.00	8.52	61.78	60.00
DSNT	Dual Spaced Neutron	11055304	174.00	9.69	52.09	60.00
DCNT	DSN Decentralizer	11005605	6.60	5.13	55.42	300.00
SDLT	Spectral Density Tool	I04_M296	360.00	10.81	41.28	60.00
SDLP	Density Insite Pad	P84	65.00	2.55	43.49	60.00
MICP	Microlog Pad	M296	8.00	1.00	43.78	60.00
IQF	IQ Flex tool	696	140.00	5.67	35.61	300.00
BSAT	Borehole Sonic Array Tool	10747684	300.00	15.77	19.83	60.00
OBCEN	Centralizer - 29 in. Overbody	2	12.00	2.42	32.88	300.00
ACRt	Array Compensated True Resistivity Instrument Section	I962	50.00	5.03	14.80	300.00
OBCEN	Centralizer - 25 in. Overbody	002	8.00	2.08	16.30	300.00
ACRt	Array Compensated True Resistivity Sonde Section	I962_S909	200.00	14.22	0.58	300.00
RSOF	Regal Standoff 6.75in	1	20.00	0.52	13.38	300.00
CBHD	Cabbage Head	TRK696	10.00	0.58	0.00	300.00
<b>Total</b>			<b>1,608.60</b>	<b>75.95</b>		

\* Not included in Total Length and Length Accumulation.

Data: SMU\_320\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CHIDLE

Date: 02-Jul-12 17:50:41

## CALIBRATION REPORT

### NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 11039640

Reference Calibration Date: 17-May-12 09:57:29

Engineer: THOMAS HYDE

Calibration Date: 14-Jun-12 08:57:44

Software Version: WL INSITE R3.4.2 (Build 2)

Calibration Version: 1

Calibrator Source S/N: TB146

Calibrator API Reference:265.00 api

Equivalent Calibrator API Reference:269.6 api

Measurement	Measured	Calibrated	Units
Background	51.3	51.0	api
Background + Calibrator	322.2	320.7	api
Calibrator	270.9	269.6	api

### NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11039640

Reference Calibration Date: 14-Jun-12 08:57:44

Engineer: C. HAVERKAMP

Calibration Date: 02-Jul-12 17:32:38

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

Calibration Version: 1

Calibrator Source S/N: TB146

Calibrator API Reference:265.00 api

Equivalent Calibrator API Reference:269.6 api

Field Verification	Shop	Field	Units
Background	51.0	63.5	api
Background + Calibrator	320.7	328.6	api
Calibrator	269.6	265.1	api

Shop	Field	Difference	Tolerance
269.6	265.1	4.5	+/- 9.00

### DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name: DSNT - 11055304

Reference Calibration Date: 17-May-12 10:28:45

Engineer: THOMAS HYDE

Calibration Date: 14-Jun-12 10:13:23

Software Version: WL INSITE R3.4.2 (Build 2)

Calibration Version: 1

Logging Source S/N: 696

Tank Serial Number: LIBERAL\_NEUTRON

Reference value assigned to Tank: 51.680

Snow Block S/N: 696

Calibration Tank Water Temperature: 74 degF

Min. Tool Housing Outside Diameter: 3.620 in

#### CALIBRATION CONSTANTS

Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.987	0.987	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):	0.2108	0.2107	0.0001	+/- 0.0020
Calibrated Ratio:	9.72	9.72	0.004	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (dec):	0.0602	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 - 11055304	Reference Calibration Date:	14-Jun-12 10:13:23
Engineer:	C. HAVERKAMP	Calibration Date:	02-Jul-12 17:35:11
Software Version:	WL INSITE R3.6.0 (Build 3)	Calibration Version:	1

Logging Source S/N: 696  
Snow Block S/N: 696

NEUTRON FIELD-CHECK SUMMARY				
	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (dec):	0.0602	0.0658	0.0056	+/- 0.0150

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

DENSITY CALIPER SHOP CALIBRATION			
Tool Name:	SDLT - I04_M296	Reference Calibration Date:	14-Jun-12 11:53:43
Engineer:	THOMAS HYDE	Calibration Date:	14-Jun-12 12:01:55
Software Version:	WL INSITE R3.4.2 (Build 2)	Calibration Version:	1
Host Tool Name:	-		

CALIBRATION COEFFICIENTS			
Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-4237.39	-3678.97	-7000.00 - -1000.00
Pad Gain	0.0004001	0.0003838	0.000200 - 0.000600
Arm Offset	-1628.15	-2276.18	-5000.00 - 3000.00
Arm Gain	0.0004327	0.0004611	0.000300 - 0.000700
Arm Power	0.000000558	-0.000002118	-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)	1.86	2.00	0.14	+/- 0.20
Medium Ring (in)	3.69	3.75	0.06	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.46	6.50	0.04	+/- 0.20
Medium Ring (in)	8.17	8.25	0.08	+/- 0.20
Large Ring (in)	15.08	15.00	-0.08	+/- 0.20

PASS/FAIL SUMMARY	
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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 - P84 **Reference Calibration Date:** 14-Jun-12 11:14:39  
**Engineer:** THOMAS HYDE **Calibration Date:** 14-Jun-12 11:33:16  
**Software Version:** WL INSITE R3.4.2 (Build 2) **Calibration Version:** 1

Logging Source S/N: 5168GW  
 Aluminum Block S/N: LIBERAL Density: 2.598g/cc Pe: 3.170  
 Magnesium Block S/N: LIBERAL Density: 1.684g/cc Pe: 2.598

**DENSITY CALIBRATION SUMMARY**

Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0548	1.0675	0.90 - 1.10
Near Dens Gain	1.0190	1.0261	0.90 - 1.10
Near Peak Gain	1.0259	1.0302	0.90 - 1.10
Near Lith Gain	1.0067	0.9948	0.90 - 1.10
Far Bar Gain	1.0175	1.0194	0.90 - 1.10
Far Dens Gain	1.0024	1.0036	0.90 - 1.10
Far Peak Gain	0.9963	0.9959	0.90 - 1.10
Far Lith Gain	0.9722	0.9729	0.90 - 1.10
<hr/>			
Near Bar Offset	-0.3096	-0.4255	NONE
Near Dens Offset	-0.0098	-0.0739	NONE
Near Peak Offset	-0.0807	-0.1183	NONE
Near Lith Offset	0.0380	0.1359	NONE
Far Bar Offset	-0.0246	-0.0390	NONE
Far Dens Offset	0.0812	0.0731	NONE
Far Peak Offset	0.1148	0.1186	NONE
Far Lith Offset	0.2689	0.2654	NONE
<hr/>			
Near Bar Background	843.40	846.63	700 - 1450
Near Dens Background	278.94	280.07	230 - 480
Near Peak Background	122.38	123.01	100 - 210
Near Lith Background	149.50	149.50	125 - 260
Far Bar Background	522.66	522.36	450 - 900
Far Dens Background	203.47	203.34	175 - 345
Far Peak Background	79.74	79.35	70 - 140
Far Lith Background	84.42	83.57	75 - 145

**CALIBRATION BLOCK SUMMARY**

Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
<b>MAGNESIUM</b>				
Density (g/cc)	1.685	1.684	-0.001	+/- 0.015
Pe	2.533	2.563	0.030	+/- 0.150
<b>ALUMINUM</b>				
Density (g/cc)	2.599	2.598	-0.001	+/- 0.01500
Pe	3.134	3.131	-0.003	+/- 0.150

**TOOL SUMMARY**

Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	0.0016	+/- 0.0110	0.0024	+/- 0.0140
Magnesium Block	-0.0001	+/- 0.0110	-0.0001	+/- 0.0140
Aluminum Block	-0.0007	+/- 0.0110	-0.0015	+/- 0.0140
Resolution	9.12	6.00 - 11.50	8.91	6.00 - 11.50
Internal Verifier(B+D+P+L)	1399	1200 - 2700	889	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 - P84	Reference Calibration Date:	14-Jun-12 11:33:16
Engineer:	C. HAVERKAMP	Calibration Date:	02-Jul-12 17:31:51
Software Version:	WL INSITE R3.6.0 (Build 3)	Calibration Version:	1

Pad Temperature: 88.2 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1399.213	1393.140	-6.073	15.107
Far (B+D+P+L) cps	888.615	892.488	3.873	16.242
Near Resolution	9.12	9.24	0.120	0.50
Far Resolution	8.91	9.20	0.290	1.00

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

### SDLT CALIPER FIELD CALIBRATION

Tool Name:	SDLT - I04_M296	Reference Calibration Date:	14-Jun-12 12:01:55
Engineer:	C. HAVERKAMP	Calibration Date:	02-Jul-12 17:43:54
Software Version:	WL INSITE R3.6.0 (Build 3)	Calibration Version:	1

MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.75	0.00	+/- 0.10
Ring Diameter	8.25	8.15	-0.10	+/- 0.15

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

### CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
<b>GTET-11039640</b>						
Gamma Ray Calibrator	269.6	265.1	-----	4.5	+/- 9.00	api
<b>DSNT-11055304</b>						
Snow-Block Porosity	0.0602	0.0658	-----	-0.0056	+/- 0.0150	decp
<b>SDLT-I04_M296</b>						
Pad Extension	3.75	3.75	-----	0.00	+/-0.10	in
Ring Diameter	8.25	8.15	-----	0.10	+/-0.15	in
<b>SDLT Pad-P84</b>						
Near(B+D+P+L)	1399.213	1393.140	-----	6.073	+/-15.107	cps
Far(B+D+P+L)	888.615	892.488	-----	-3.873	+/-16.242	cps

Data: SMU\_320\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CHNDLE Date: 02-Jul-12 17:53:31

# HALLIBURTON

## PARAMETERS REPORT

Depth ((ft))	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.200	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	2.000	ohmm
	SHARED	TRM	Temperature of Mud	75.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	5.500	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	4920.00	ft
	SHARED	BHT	Bottom Hole Temperature	200.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	Temperature Master Tool	NONE	
	SHARED	BHSM	Borehole Size 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	
	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	Limestone	
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	
Microlog Pad	MLOK	Process MicroLog 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	2.710	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	User define	
BSAT	DTMA	Delta -T Matrix	47.60	uspf
BSAT	DTSH	Delta -T Shale	100.00	uspf
BSAT	SPEQ	Acoustic Porosity Equation	Wylie	
ACRt Sonde	RTOK	Process ACRt?	Yes	
ACRt Sonde	MNSO	Minimum Tool Standoff	1.50	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Upr	
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

BOTTOM

Data: SMU\_320\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CHIDLE

Date: 02-Jul-12 23:50:10

## HALLIBURTON

### INPUTS, DELAYS AND FILTERS TABLE

Mnemonic	Input Description	Delay (ft)	Filter Type	Filter Length (ft)
<b>Depth Panel</b>				
TENS	Tension	0.00	NO	
<b>SP Sub</b>				
PLTC	Plot Control Mask	72.25	NO	
SP	Spontaneous Potential	72.25	BLK	1.250
SPR	Raw Spontaneous Potential	72.25	NO	
SPO	Spontaneous Potential Offset	72.25	NO	

**GTET**

TPUL	Tension Pull	64.23	NO	
GR	Natural Gamma Ray API	64.23	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API	64.23	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	64.23	W	1.416 , 0.750
ACCZ	Accelerometer Z	0.00	BLK	0.083
DEVI	Inclination	0.00	NO	

**DSNT**

TPUL	Tension Pull	53.99	NO	
RNDS	Near Detector Telemetry Counts	54.09	BLK	1.417
RFDS	Far Detector Telemetry Counts	54.84	TRI	0.583
DNTT	DSN Tool Temperature	54.09	NO	
DSNS	DSN Tool Status	53.99	NO	
ERND	Near Detector Telemetry Counts EVR	54.09	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	54.84	BLK	0.000
ENTM	DSN Tool Temperature EVR	54.09	NO	

**SDLT**

TPUL	Tension Pull	44.09	NO	
PCAL	Pad Caliper	44.09	TRI	0.250
ACAL	Arm Caliper	44.09	TRI	0.250

**BSAT**

TPUL	Tension Pull	27.09	NO	
STAT	Status	27.09	NO	
DLYT	Delay Time	27.09	NO	
SI	Sample Interval	27.09	NO	
TXRX	Raw Telemetry 10 Receivers	27.09	NO	
FRMC	Tool Frame Count	27.09	NO	
GMOD	Gain processing mode	19.83	NO	

**ACRt Sonde**

TPUL	Tension Pull	2.97	NO	
F1R1	ACRT 12KHz - 80in R value	9.22	BLK	0.000
F1X1	ACRT 12KHz - 80in X value	9.22	BLK	0.000
F1R2	ACRT 12KHz - 50in R value	6.72	BLK	0.000
F1X2	ACRT 12KHz - 50in X value	6.72	BLK	0.000
F1R3	ACRT 12KHz - 29in R value	5.22	BLK	0.000
F1X3	ACRT 12KHz - 29in X value	5.22	BLK	0.000
F1R4	ACRT 12KHz - 17in R value	4.22	BLK	0.000
F1X4	ACRT 12KHz - 17in X value	4.22	BLK	0.000
F1R5	ACRT 12KHz - 10in R value	3.72	BLK	0.000
F1X5	ACRT 12KHz - 10in X value	3.72	BLK	0.000
F1R6	ACRT 12KHz - 6in R value	3.47	BLK	0.000
F1X6	ACRT 12KHz - 6in X value	3.47	BLK	0.000
F2R1	ACRT 36KHz - 80in R value	9.22	BLK	0.000
F2X1	ACRT 36KHz - 80in X value	9.22	BLK	0.000
F2R2	ACRT 36KHz - 50in R value	6.72	BLK	0.000
F2X2	ACRT 36KHz - 50in X value	6.72	BLK	0.000
F2R3	ACRT 36KHz - 29in R value	5.22	BLK	0.000
F2X3	ACRT 36KHz - 29in X value	5.22	BLK	0.000
F2R4	ACRT 36KHz - 17in R value	4.22	BLK	0.000
F2X4	ACRT 36KHz - 17in X value	4.22	BLK	0.000
F2R5	ACRT 36KHz - 10in R value	3.72	BLK	0.000
F2X5	ACRT 36KHz - 10in X value	3.72	BLK	0.000
F2R6	ACRT 36KHz - 6in R value	3.47	BLK	0.000

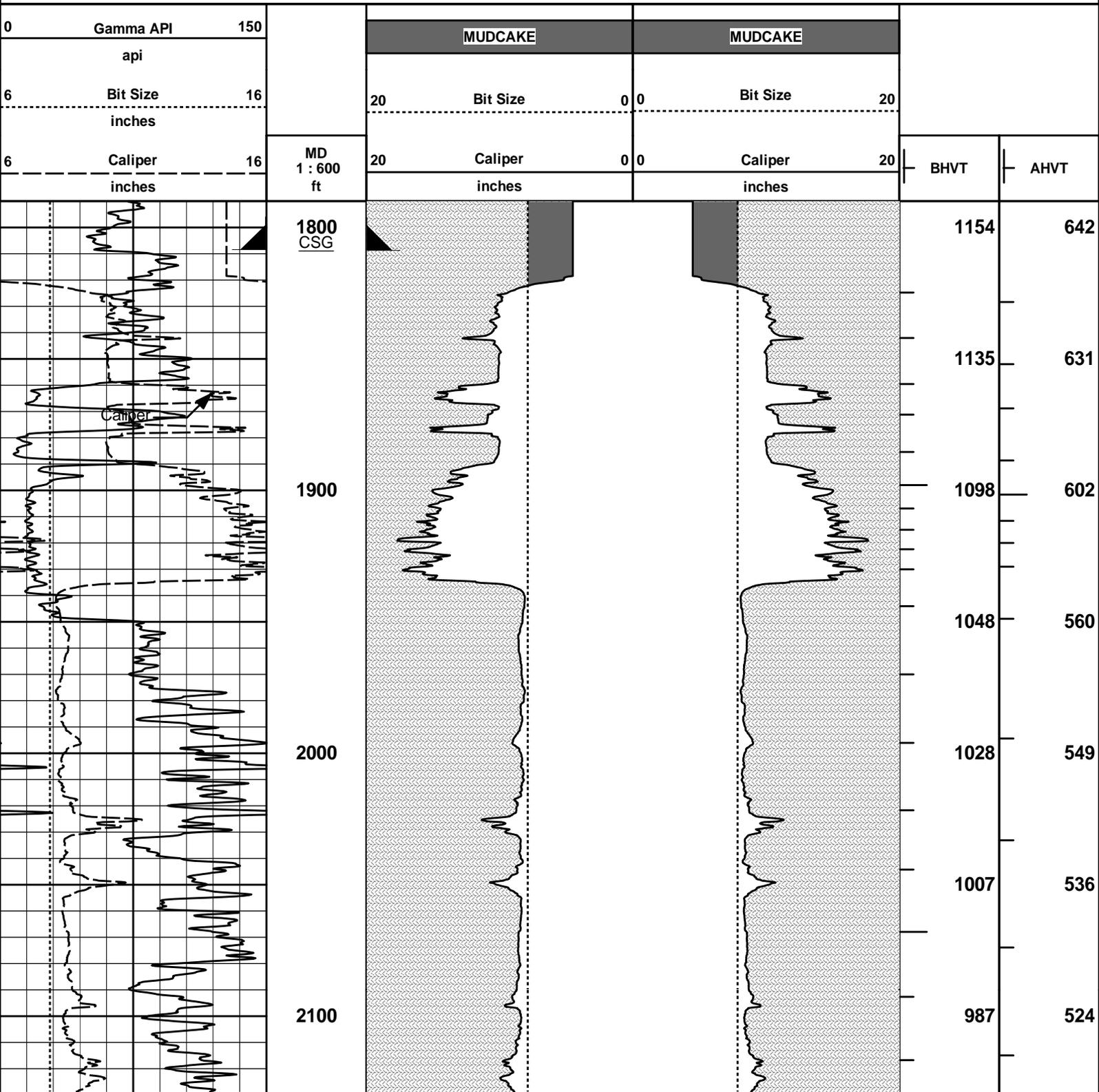
F2R0	ACRT 50KHz - 6in R value	3.47	BLK	0.000
F2X6	ACRT 36KHz - 6in X value	3.47	BLK	0.000
F3R1	ACRT 72KHz - 80in R value	9.22	BLK	0.000
F3X1	ACRT 72KHz - 80in X value	9.22	BLK	0.000
F3R2	ACRT 72KHz - 50in R value	6.72	BLK	0.000
F3X2	ACRT 72KHz - 50in X value	6.72	BLK	0.000
F3R3	ACRT 72KHz - 29in R value	5.22	BLK	0.000
F3X3	ACRT 72KHz - 29in X value	5.22	BLK	0.000
F3R4	ACRT 72KHz - 17in R value	4.22	BLK	0.000
F3X4	ACRT 72KHz - 17in X value	4.22	BLK	0.000
F3R5	ACRT 72KHz - 10in R value	3.72	BLK	0.000
F3X5	ACRT 72KHz - 10in X value	3.72	BLK	0.000
F3R6	ACRT 72KHz - 6in R value	3.47	BLK	0.000
F3X6	ACRT 72KHz - 6in X value	3.47	BLK	0.000
RMUD	Mud Resistivity	12.76	BLK	0.000
F1RT	Transmitter Reference 12 KHz Real Signal	2.97	BLK	0.000
F1XT	Transmitter Reference 12 KHz Imaginary Signal	2.97	BLK	0.000
F2RT	Transmitter Reference 36 KHz Real Signal	2.97	BLK	0.000
F2XT	Transmitter Reference 36 KHz Imaginary Signal	2.97	BLK	0.000
F3RT	Transmitter Reference 72 KHz Real Signal	2.97	BLK	0.000
F3XT	Transmitter Reference 72 KHz Imaginary Signal	2.97	BLK	0.000
TFPU	Upper Feedpipe Temperature Calculated	2.97	BLK	0.000
TFPL	Lower Feedpipe Temperature Calculated	2.97	BLK	0.000
ITMP	Instrument Temperature	2.97	BLK	0.000
TCVA	Temperature Correction Values Loop Off	2.97	NO	
TIDV	Instrument Temperature Derivative	2.97	NO	
TUDV	Upper Temperature Derivative	2.97	NO	
TLDV	Lower Temperature Derivative	2.97	NO	
TRBD	Receiver Board Temperature	2.97	NO	
<b>Microlog Pad</b>				
TPUL	Tension Pull	44.28	NO	
MINV	Microlog Lateral	44.28	BLK	0.750
MNOR	Microlog Normal	44.28	BLK	0.750
<b>SDLT Pad</b>				
TPUL	Tension Pull	44.08	NO	
NAB	Near Above	43.90	BLK	0.920
NHI	Near Cesium High	43.90	BLK	0.920
NLO	Near Cesium Low	43.90	BLK	0.920
NVA	Near Valley	43.90	BLK	0.920
NBA	Near Barite	43.90	BLK	0.920
NDE	Near Density	43.90	BLK	0.920
NPK	Near Peak	43.90	BLK	0.920
NLI	Near Lithology	43.90	BLK	0.920
NBAU	Near Barite Unfiltered	43.90	BLK	0.250
NLIU	Near Lithology Unfiltered	43.90	BLK	0.250
FAB	Far Above	44.26	BLK	0.250
FHI	Far Cesium High	44.26	BLK	0.250
FLO	Far Cesium Low	44.26	BLK	0.250
FVA	Far Valley	44.26	BLK	0.250
FBA	Far Barite	44.26	BLK	0.250
FDE	Far Density	44.26	BLK	0.250
FPK	Far Peak	44.26	BLK	0.250
FLI	Far Lithology	44.26	BLK	0.250
PTMP	Pad Temperature	44.09	BLK	0.920
NLV	Near Detector High Voltage	43.40	NO	

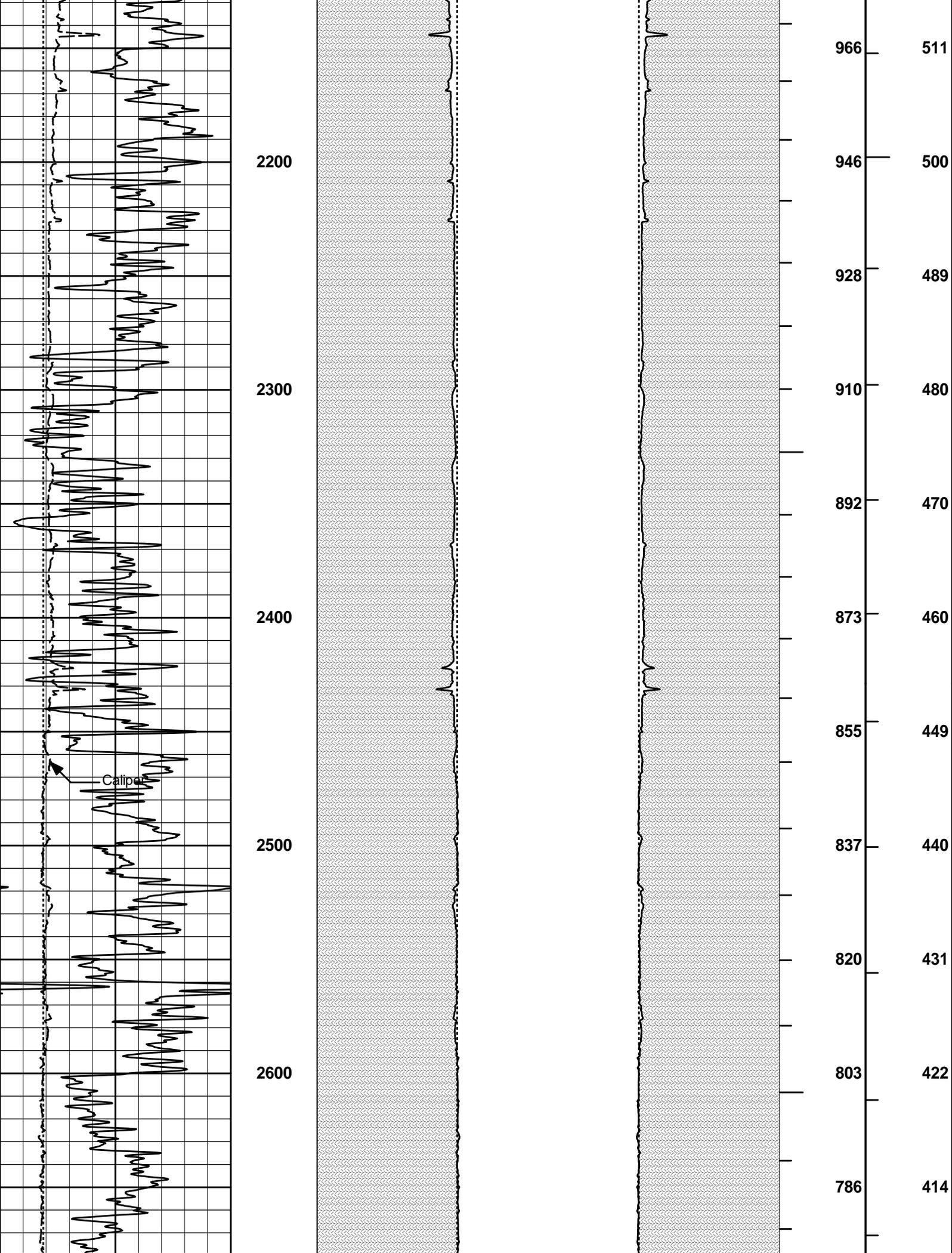
NHV	Near Detector High Voltage	43.49	NO
FHV	Far Detector High Voltage	43.49	NO
ITMP	Instrument Temperature	43.49	NO
DDHV	Detector High Voltage	43.49	NO

Data: SMU\_320\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CHMDLE Date: 03-Jul-12 01:13:50

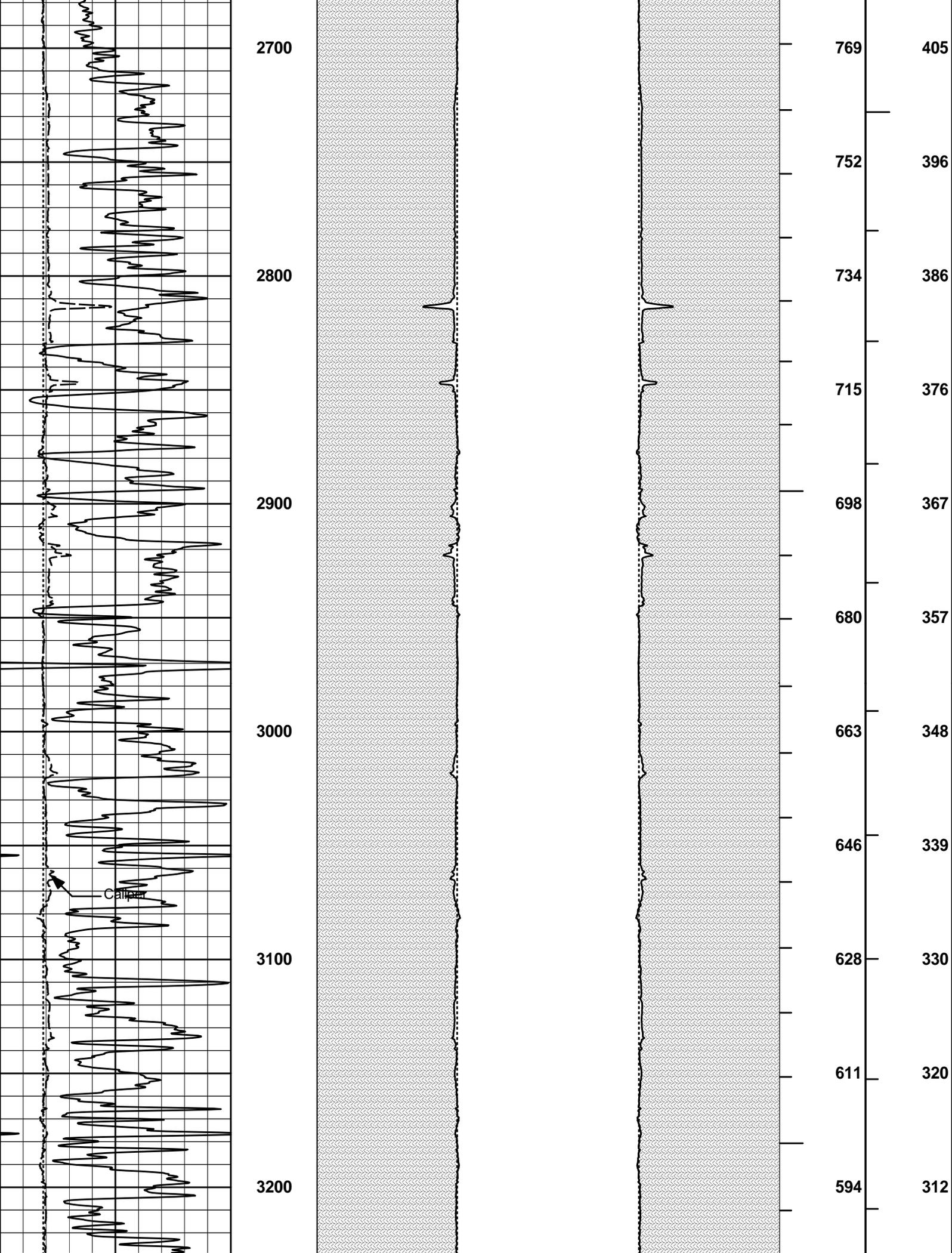
**HALLIBURTON** Plot Time: 03-Jul-12 02:20:31  
Plot Range: 1790 ft to 4907.75 ft  
Data: SMU\_320\Well Based\CASING\  
Plot File: \\-LOCAL-\SMU\_320\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CHIPOROVAHV\_2\_IQ\_LIB

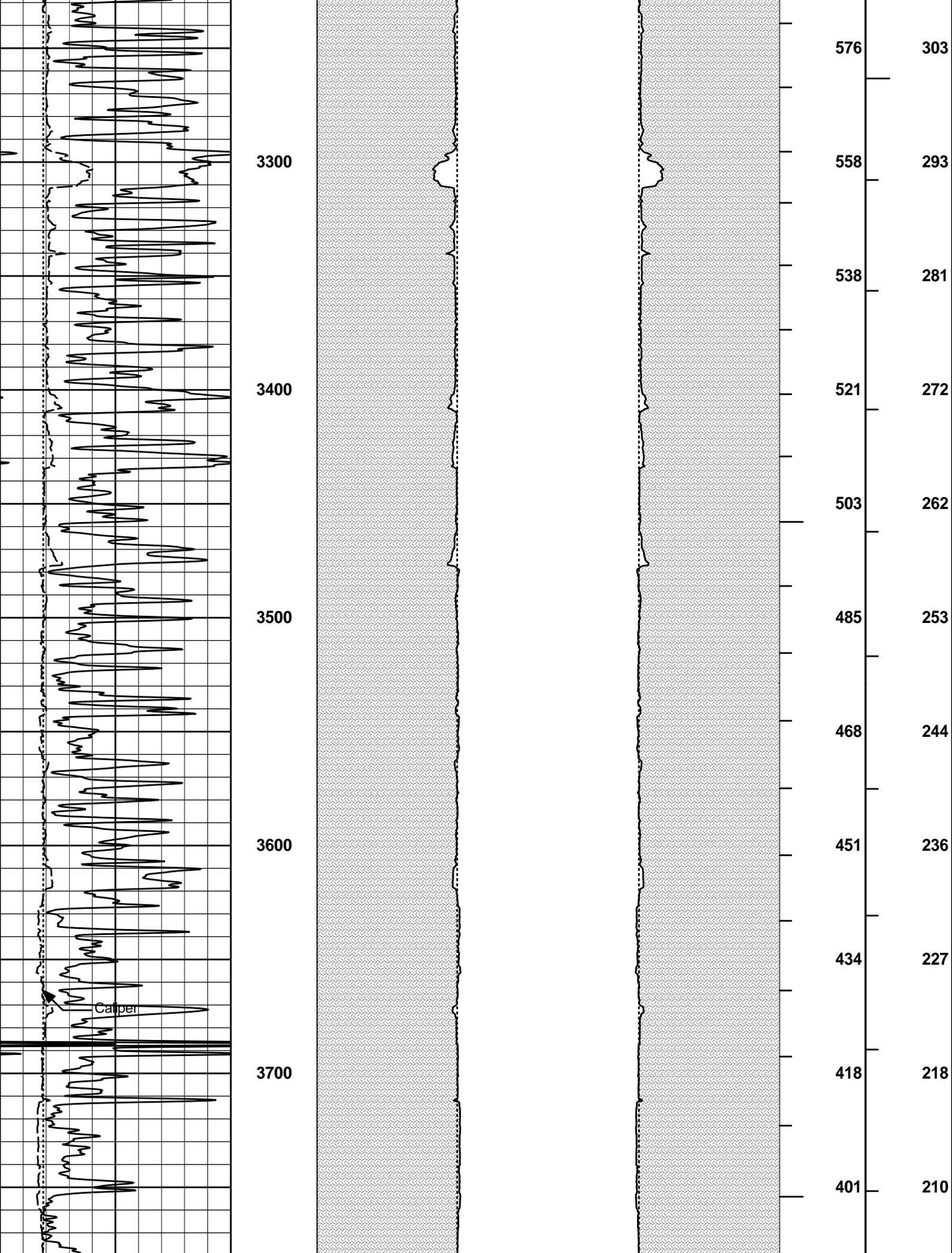
## ANNULAR HOLE VOLUME PLOT

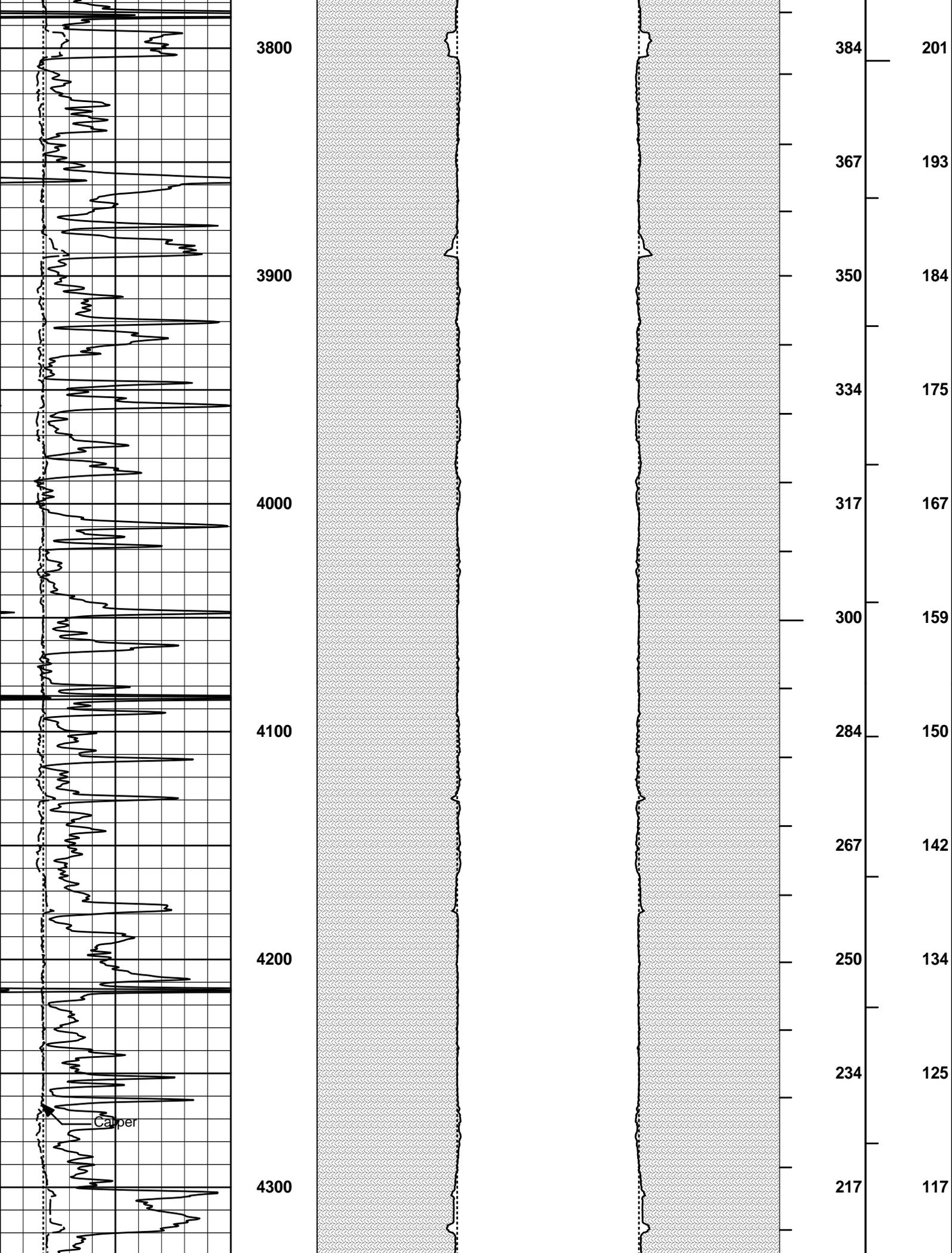


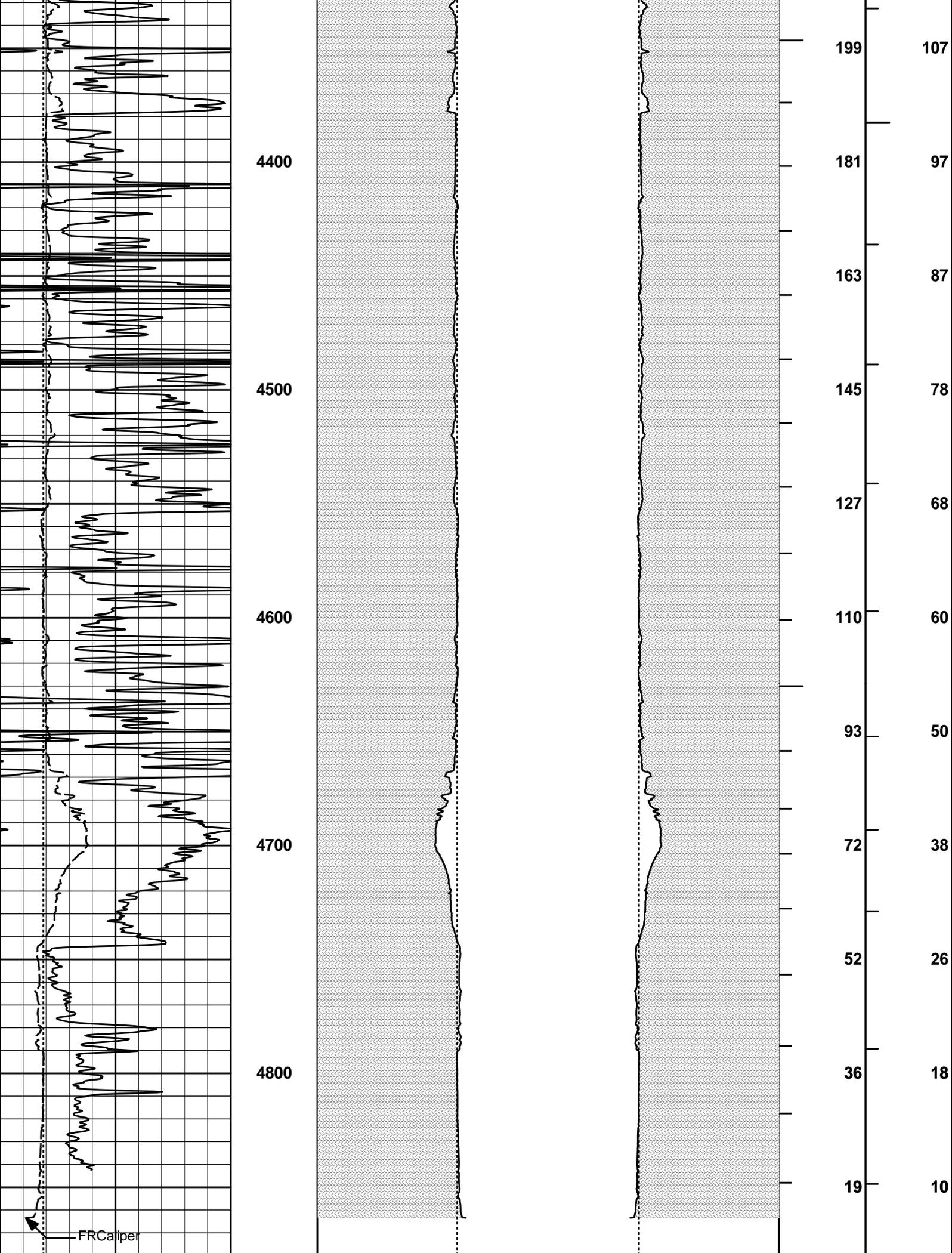


Caliper









		<b>4900</b>								
6	Caliper	16	MD 1 : 600 ft	20	Caliper	0 0	20	BHVT	AHVT	
	inches					inches				
6	Bit Size	16			20	Bit Size	0 0	20		
	inches									
0	Gamma API	150		MUDCAKE		MUDCAKE				
	api									

**HALLIBURTON**

Plot Time: 03-Jul-12 02:20:37  
 Plot Range: 1790 ft to 4907.75 ft  
 Data: SMU\_320\Well Based\CASING\  
 Plot File: \\-LOCAL-\\SMU\_320\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CHIPOROVAHV\_2\_IQ\_LIB

**ANNULAR HOLE VOLUME PLOT**

COMPANY	OXY USA INC		
WELL	SMU #320		
FIELD	SMU		
COUNTY	FINNEY	STATE	KANSAS

**HALLIBURTON**

SPECTRAL DENSITY  
 DUAL SPACED NEUTRON  
 LOG