

HALLIBURTON

BORE HOLE SONIC ARRAY LOG

COMPANY				OXY USA INC			
WELL				SMU #318			
FIELD				SMU			
COUNTY				FINNEY			
STATE				KANSAS			
Permanent Datum				GL			
Log measured from				KB			
Drilling measured from				KB			
Date				17-Jul-12			
Run No.				ONE			
Depth - Driller				4891.00 ft			
Depth - Logger				4883.0 ft			
Bottom - Logged Interval				4856.0 ft			
Top - Logged Interval				3700.0 ft			
Casing - Driller				8.625 in @ 1823.0 ft			
Casing - Logger				1818.0 ft			
Bit Size				7.875 in @			
Type Fluid in Hole				WATER BASED MUD			
Density				9.6 ppq 50.00 s/qt			
PH				9.60 pH 8.0 cp/m			
Source of Sample				FLOWLINE			
Rm @ Meas. Temperature				0.390 ohmm @ 75.00 degF @			
Rmf @ Meas. Temperature				0.33 ohmm @ 75.00 degF @			
Rmc @ Meas. Temperature				0.460 ohmm @ 75.00 degF @			
Source Rmf				MEASURED MEASURED			
Rm @ BHT				0.24 ohmm @ 125.0 degF @			
Time Since Circulation				6.0 hr			
Time on Bottom				17-Jul-12 19:05			
Max. Rec. Temperature				125.0 degF @ 4883.0 ft @			
Equipment				10782954 LIBERAL			
Recorded By				T. HYDE			
Witnessed By				J. KNEESE			

Fold here

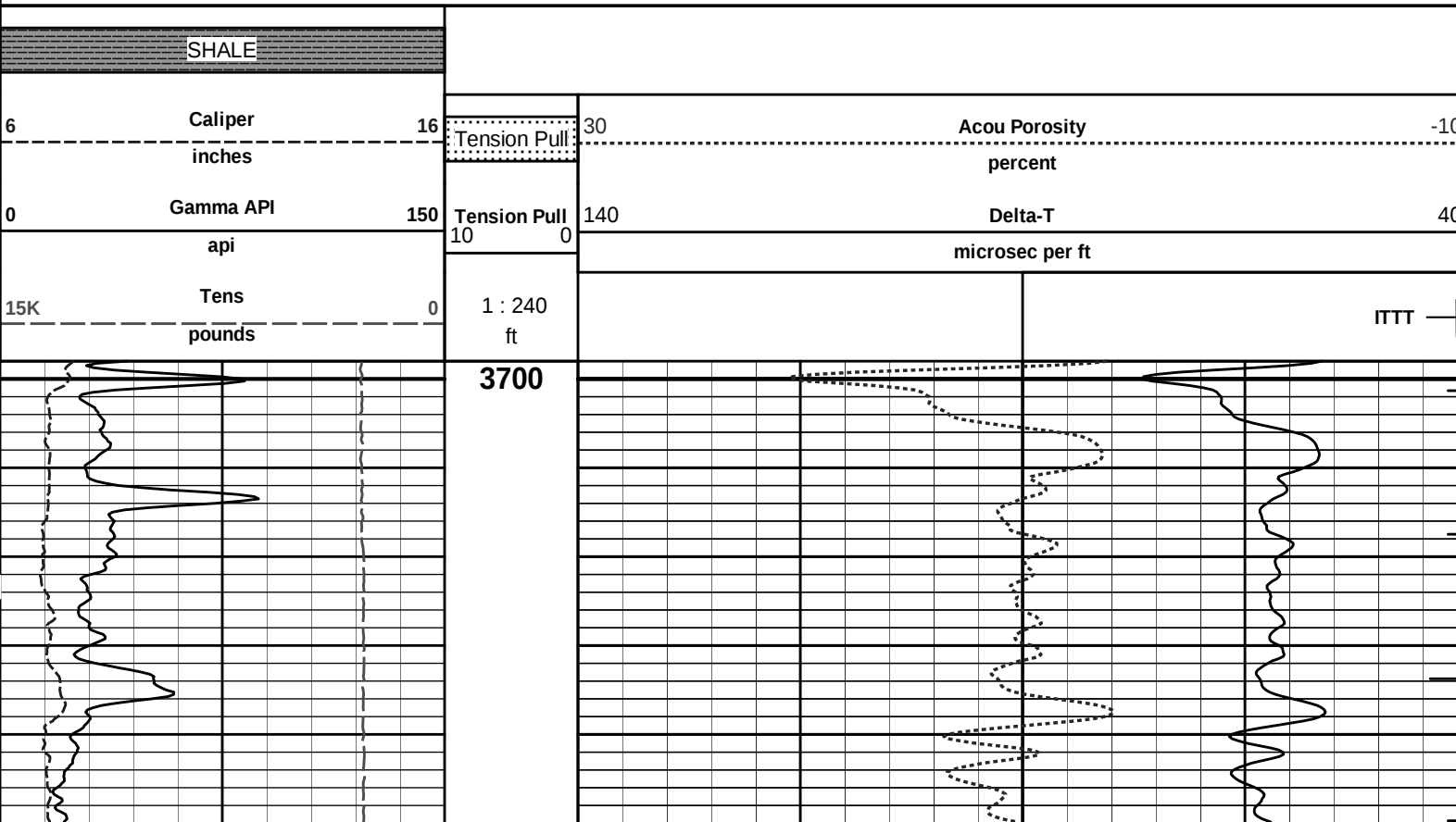
Service Ticket No.: 9670805				API Serial No.: 15-055-22161				PGM Version: WL INSITE R3.6.0 (Build 3)											
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE								RESISTIVITY SCALE CHANGES											
Date		Sample No.						Type Log		Depth		Scale Up Hole		Scale Down Hole					
Depth-Driller																			
Type Fluid in Hole																			
Density		Viscosity																	
Ph		Fluid Loss																	
Source of Sample								RESISTIVITY EQUIPMENT DATA											
Rm @ Meas. Temp		@		@				Run No.		Tool Type & No.		Pad Type		Tool Pos.					
Rmf @ Meas. Temp.		@		@															
Rmc @ Meas. Temp.		@		@															
Source Rmf		Rmc																	
Rm @ BHT		@		@															
Rmf @ BHT		@		@															
Rmc @ BHT		@		@															
EQUIPMENT DATA																			
GAMMA				ACOUSTIC				DENSITY				NEUTRON							
Run No.		ONE		Run No.		ONE		Run No.				Run No.							
Serial No.		10811258		Serial No.		10747683		Serial No.				Serial No.							
Model No.		GTET		Model No.		BSAT		Model No.				Model No.							
Diameter		3.625"		No. of Cent.		2		Diameter				Diameter							
Detector Model No.		T-102		Spacing		.5		Log Type				Log Type							
Type		SCINT						Source Type				Source Type							
Length		8"		LSA [Y/N]		Y		Serial No.				Serial No.							
Distance to Source		10'		FWDA [Y/N]		Y		Strength				Strength							
LOGGING DATA																			
GENERAL				GAMMA				ACOUSTIC				DENSITY				NEUTRON			

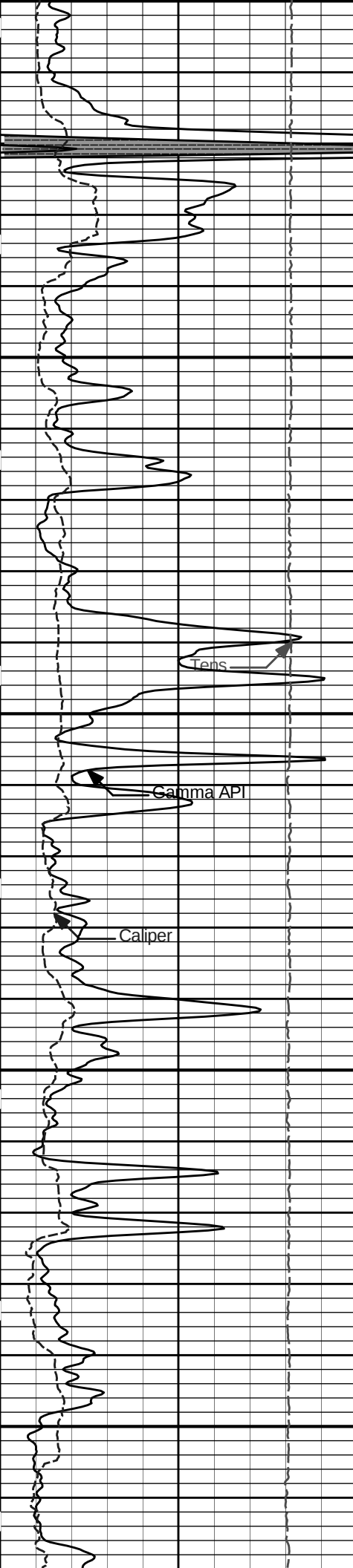
GENERAL			GAMMA	ACOUSTIC		DENSITY		NEUTRON						
Run	Depth		Speed	Scale		Scale		Matrix	Scale		Matrix	Scale		Matrix
No.	From	To	ft/min	L	R	L	R		L	R		L	R	
ONE	4883	3700	REC	0	150	30	-10	47.6						
DIRECTIONAL INFORMATION														
Maximum Deviation @								KOP @						
Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH CASING														
CHLORIDES REPORTED AT 7000 MG/L														
LCM REPORTED AT 2 PPB														
TODAY' CREW A. VAQUERA B. TERRELL														
THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES LIBERAL, KANSAS 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														

HALLIBURTON

Plot Time: 17-Jul-12 20:33:35
Plot Range: 3698 ft to 4886.25 ft
Data: SMU_318\Well Based\DAQ-0001-007
Plot File: \\BSAT\BSAT_5_MAIN_LIB

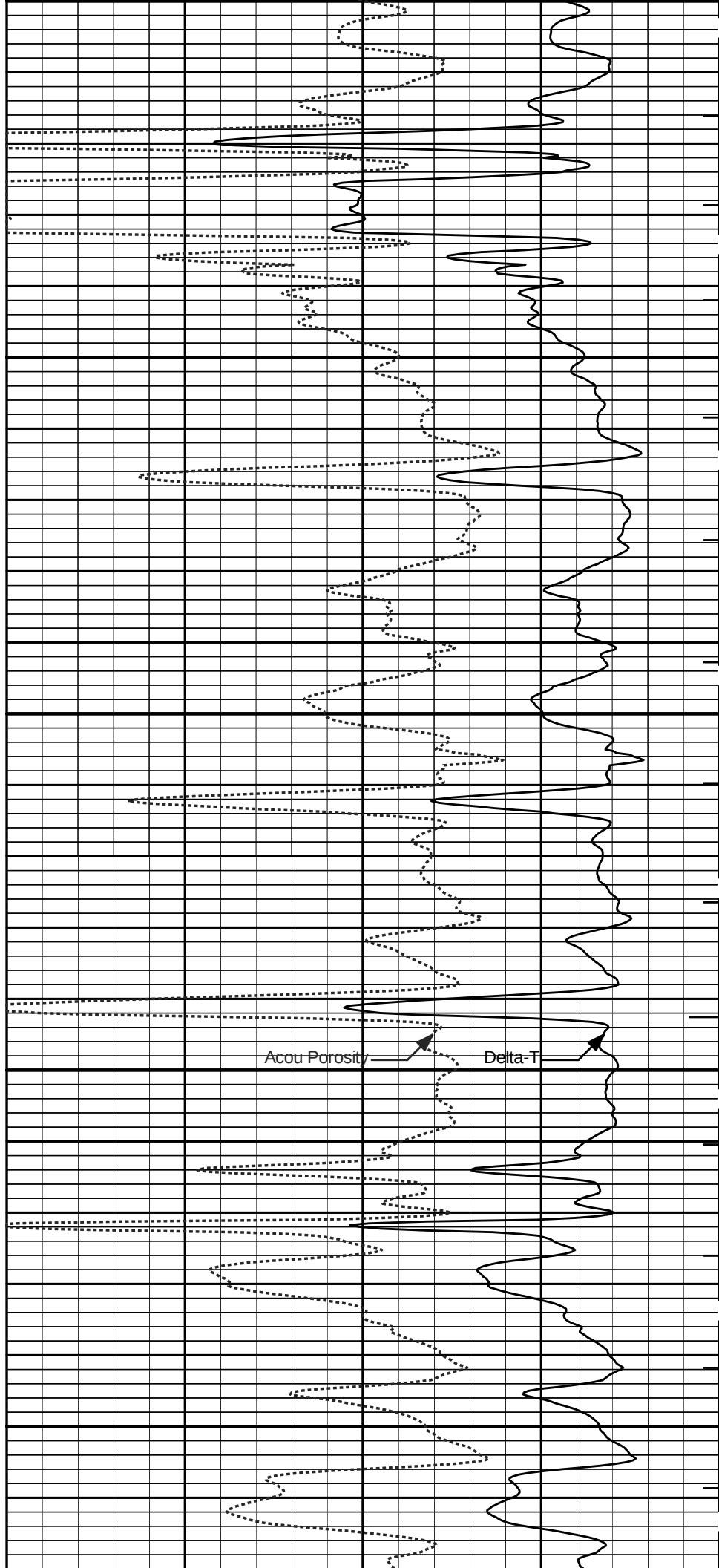
5 INCH MAIN LOG





3800

3900





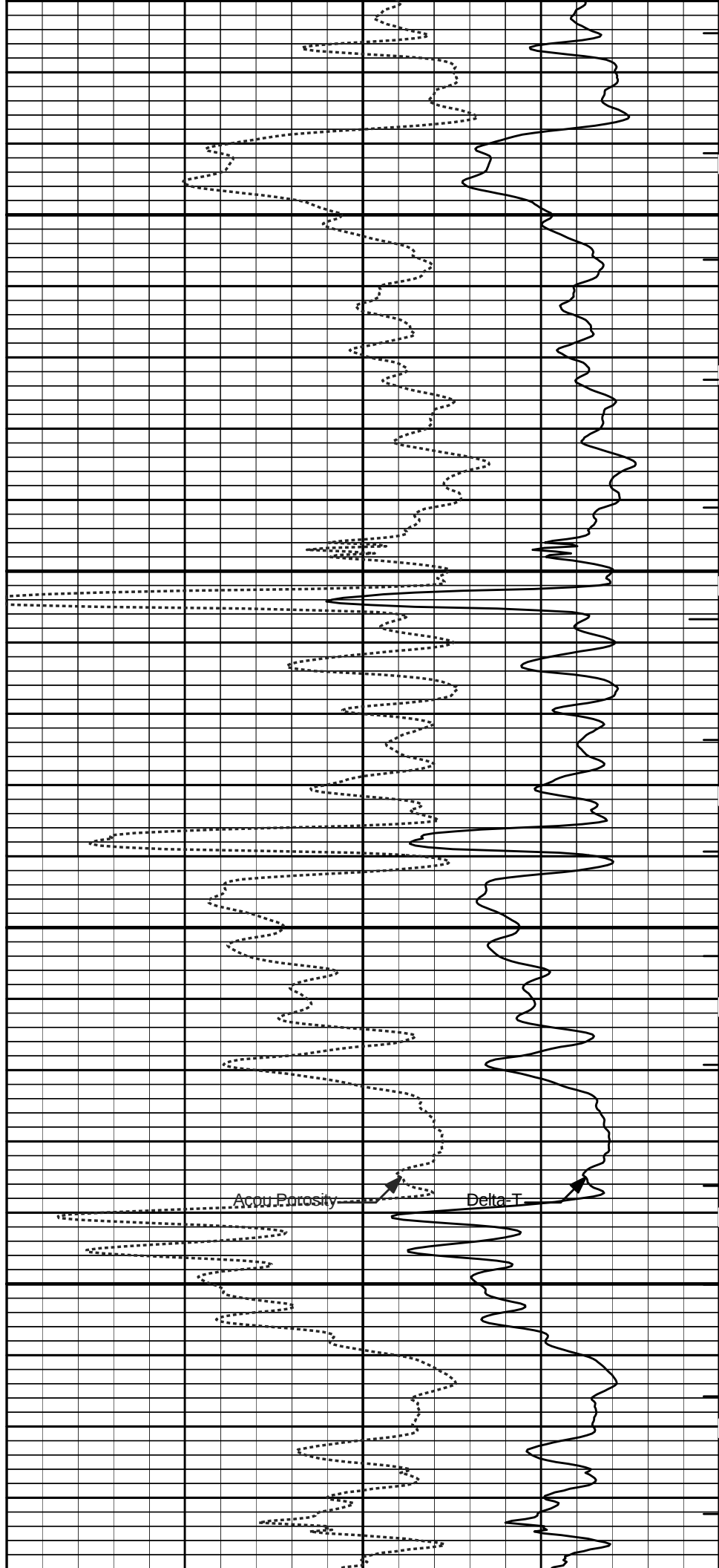
4000

Tens

Gamma API

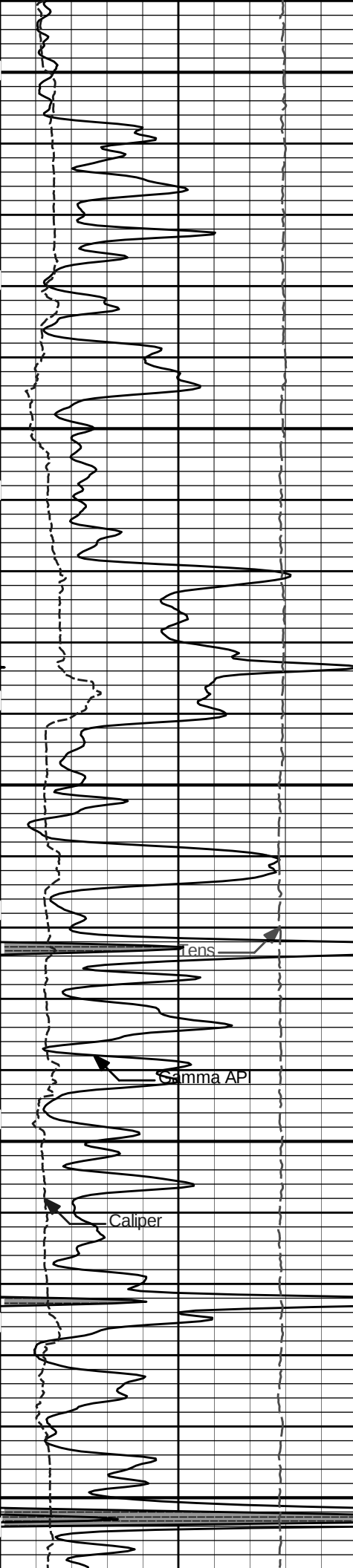
Caliper

4100



Acou Porosity

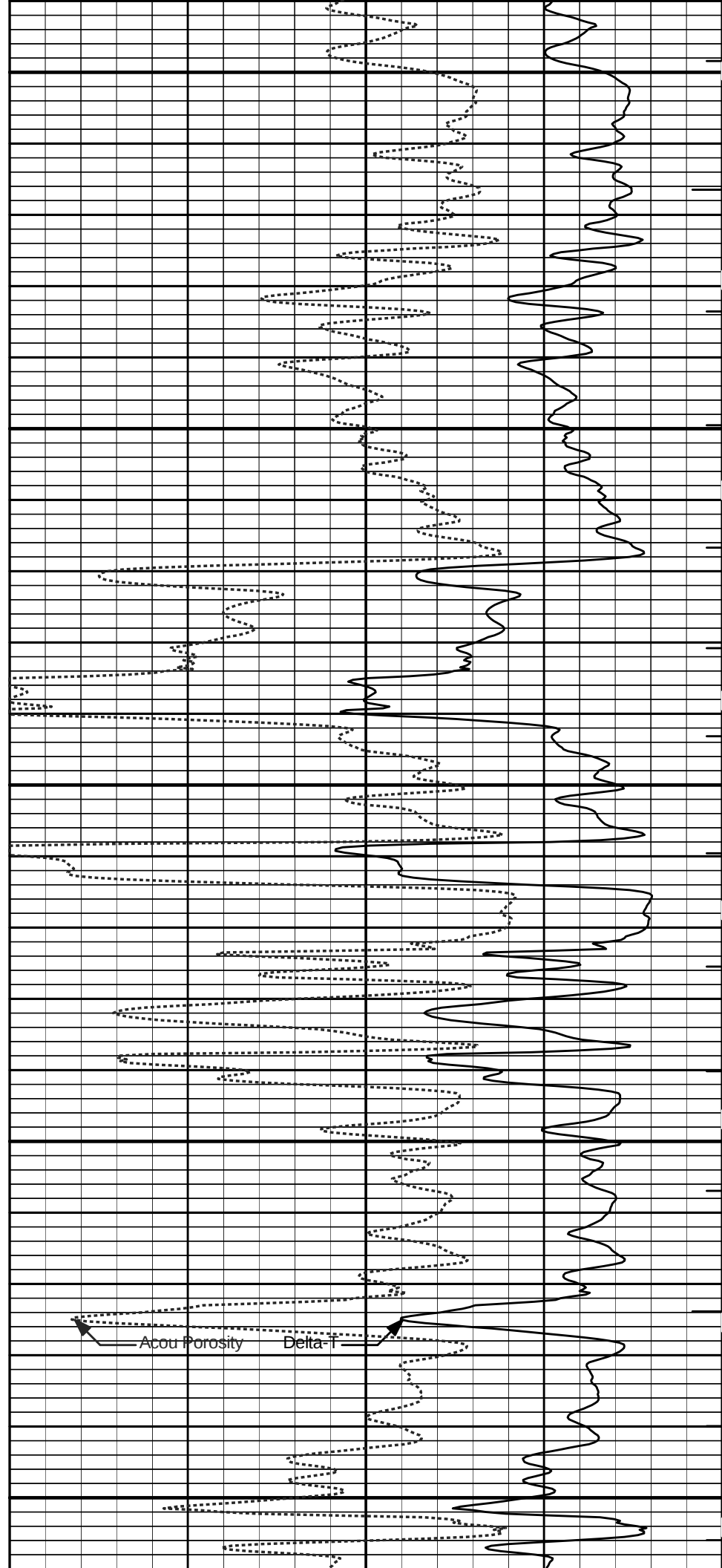
Delta-T



4200

4300

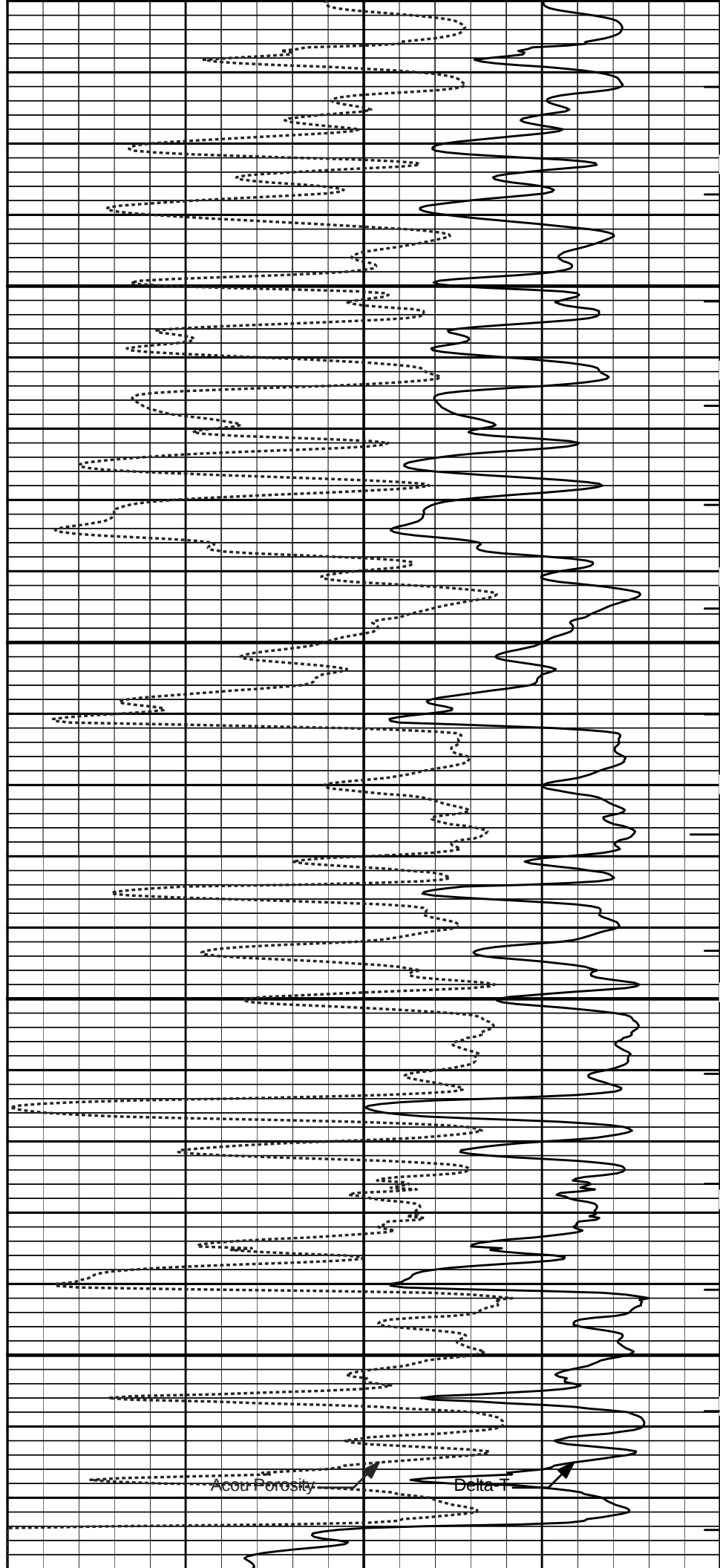
4400

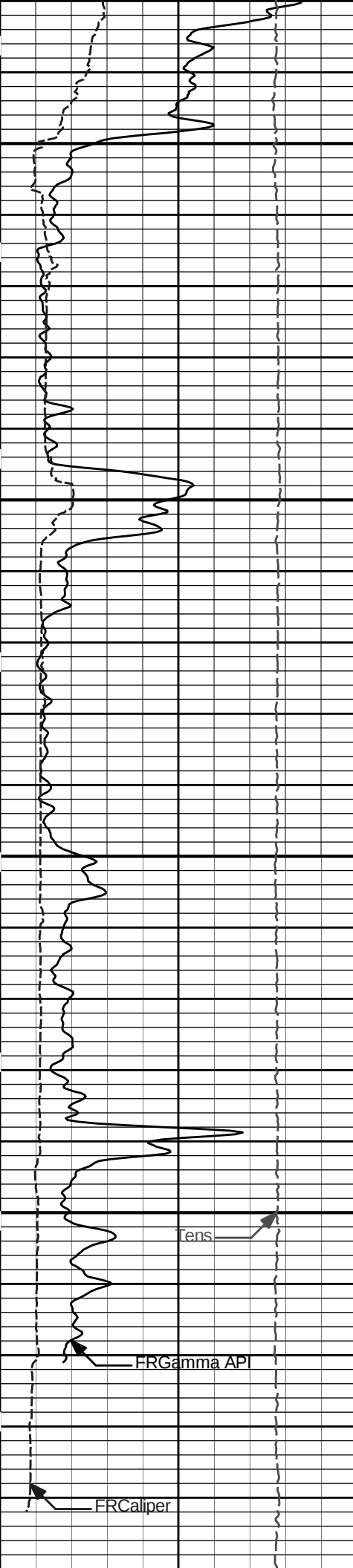




4500

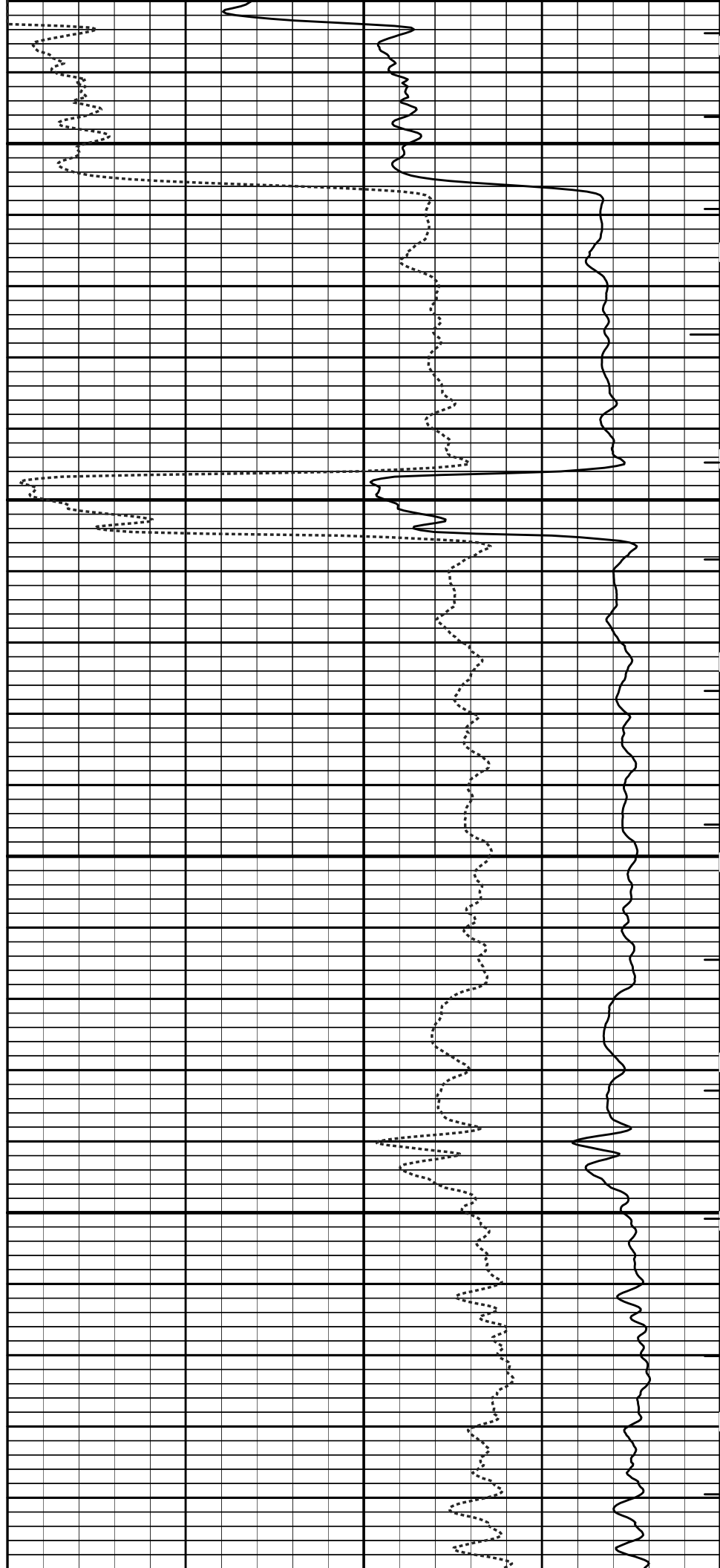
4600

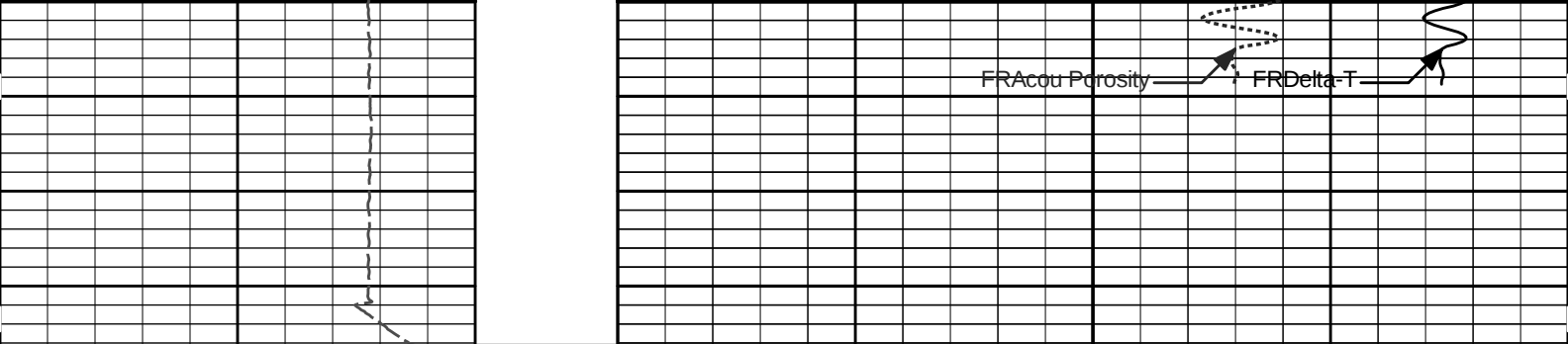




4700

4800





15K	Tens	0	1 : 240		ITTT
	pounds		ft		
0	Gamma API	150	Tension Pull	140	Delta-T
	api		10		microsec per ft
6	Caliper	16	Tension Pull	30	Acou Porosity
	inches				percent
	SHALE				

HALLIBURTON

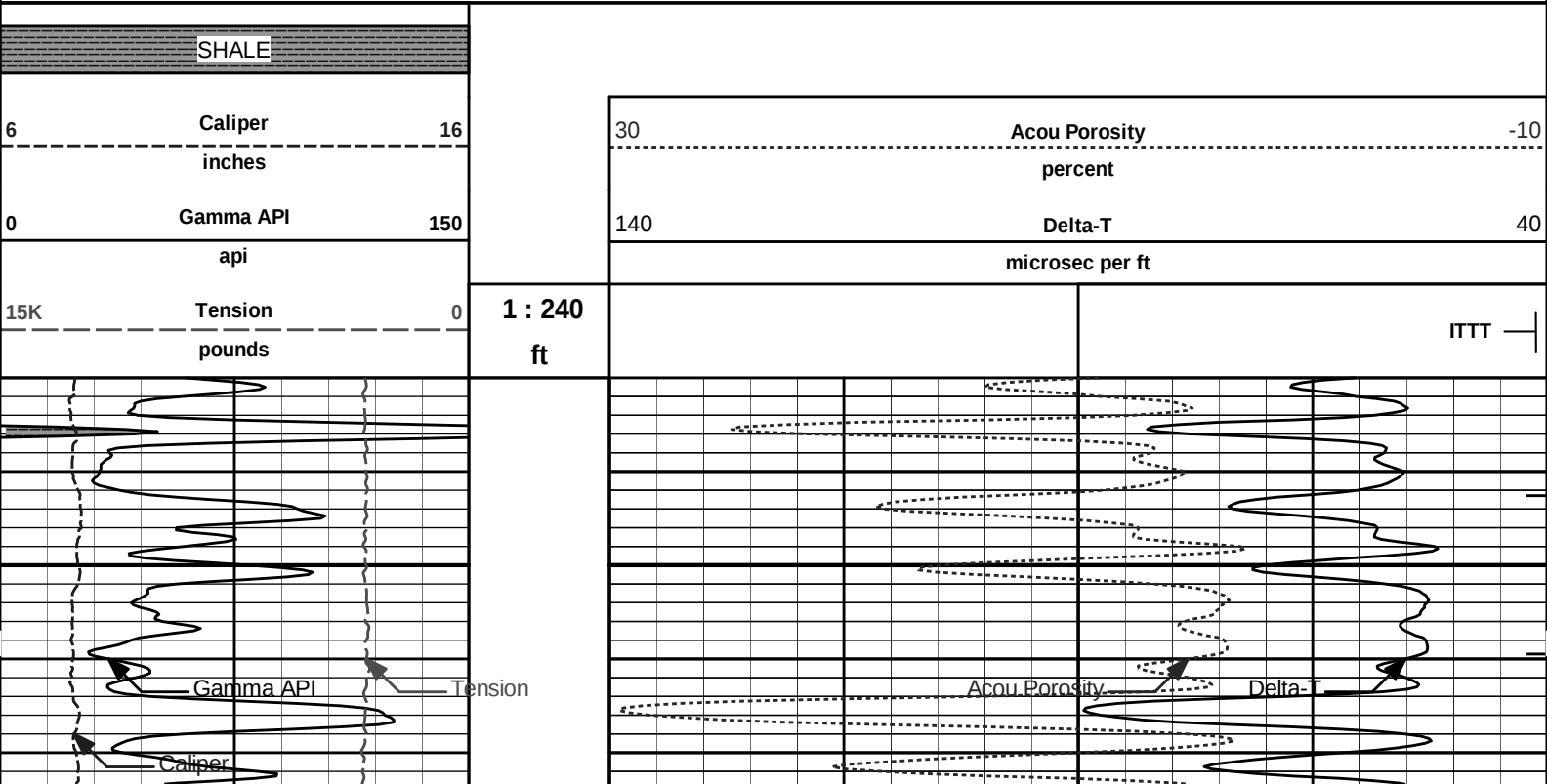
Plot Time: 17-Jul-12 20:33:38
Plot Range: 3698 ft to 4886.25 ft
Data: SMU_318\Well Based\DAQ-0001-0071
Plot File: \\BSAT\BSAT_5_MAIN_LIB

5 INCH MAIN LOG

HALLIBURTON

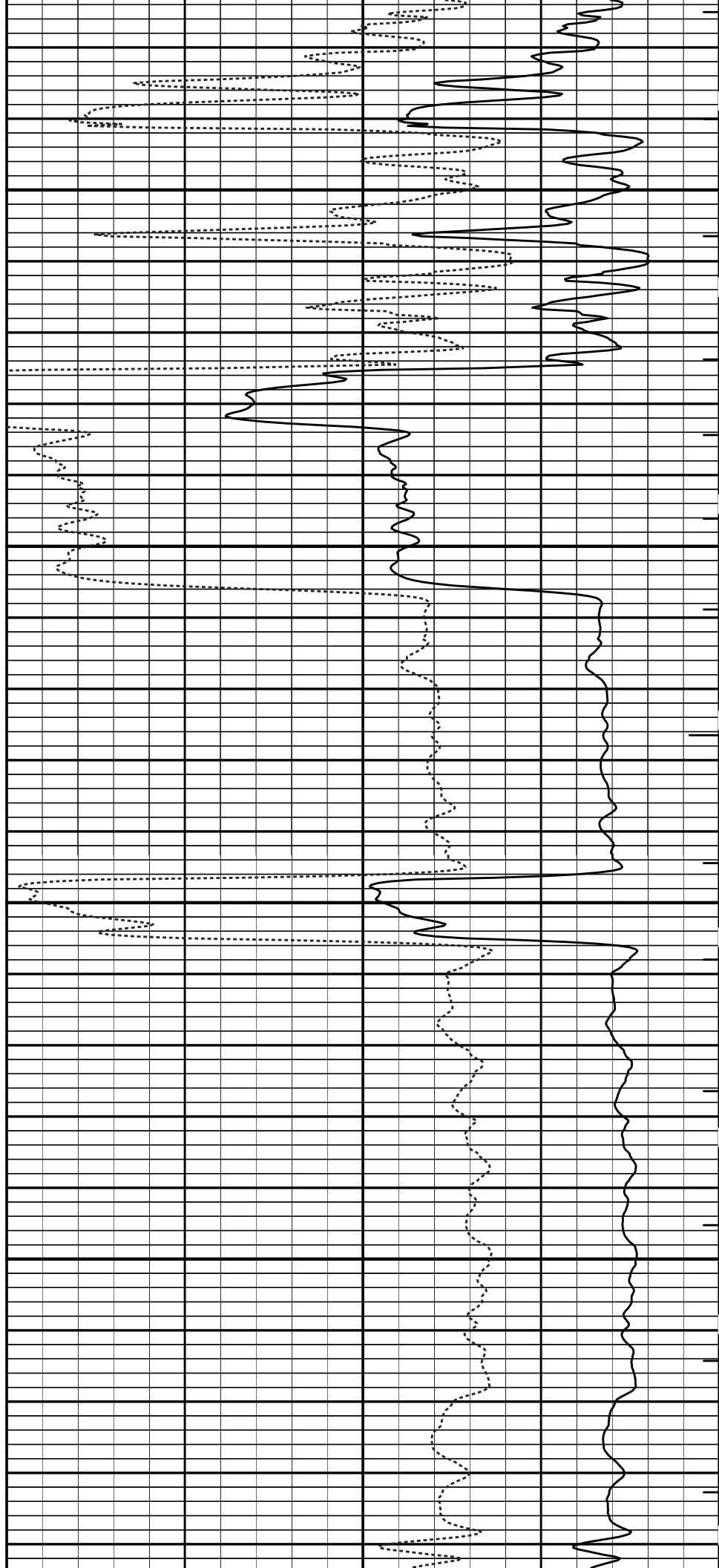
Plot Time: 17-Jul-12 20:33:39
Plot Range: 4530 ft to 4886.25 ft
Data: SMU_318\Well Based\DAQ-0001-0061
Plot File: \\BSAT\BSAT_5_REP_LIB

REPEAT SECTION

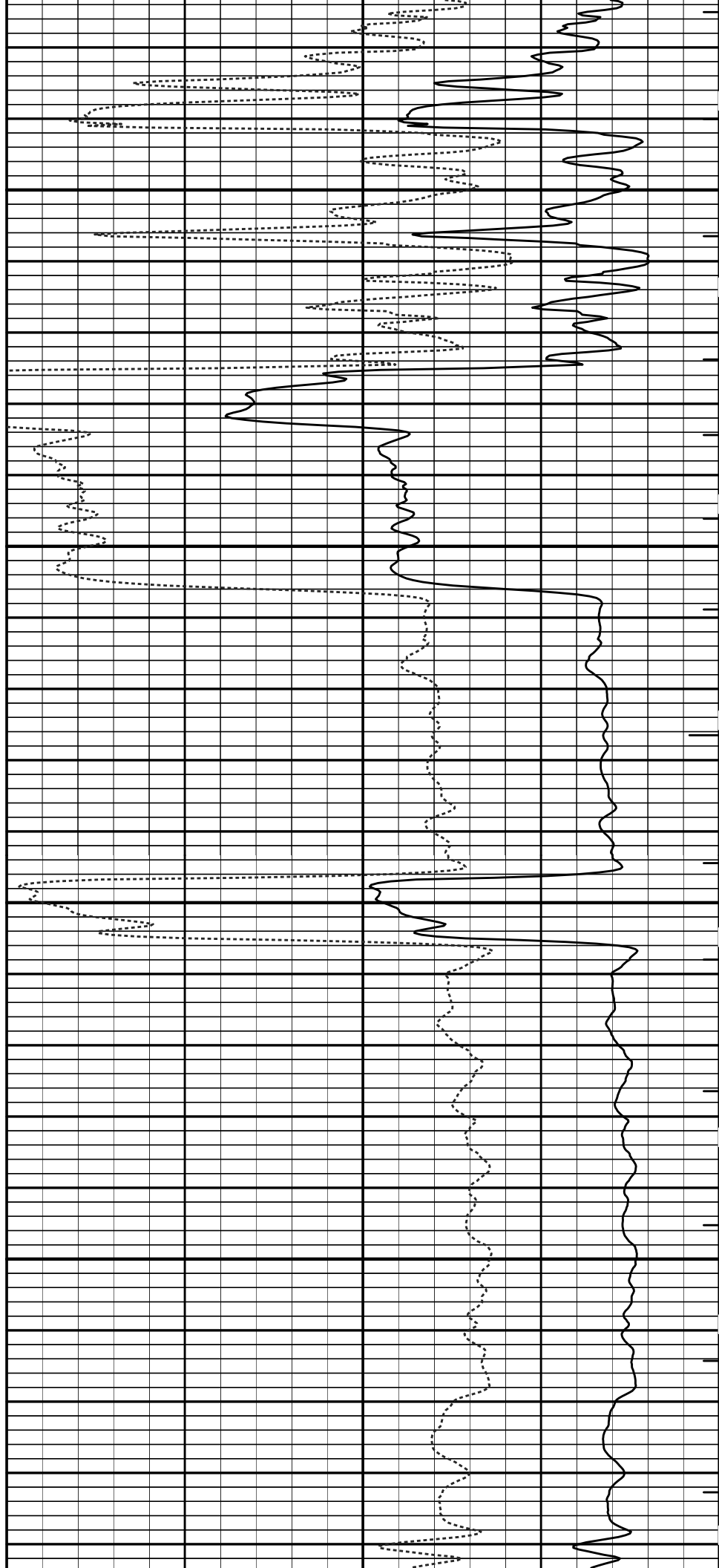


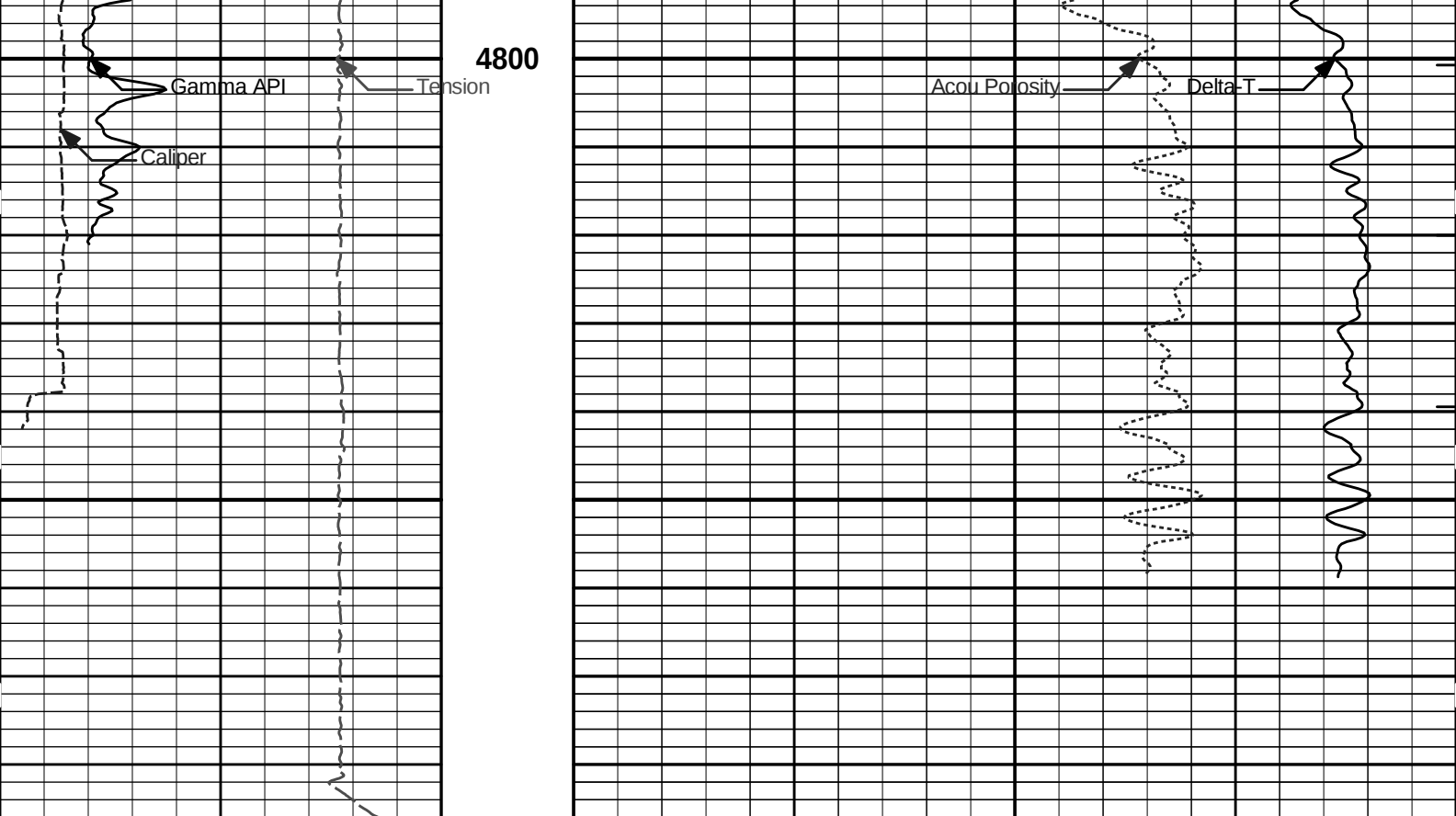


4600



4700





15K	Tension	0	1 : 240		ITTT
	pounds		ft		
0	Gamma API	150		140	Delta-T
	api				microsec per ft
6	Caliper	16		30	Acou Porosity
	inches				percent
SHALE					

HALLIBURTON

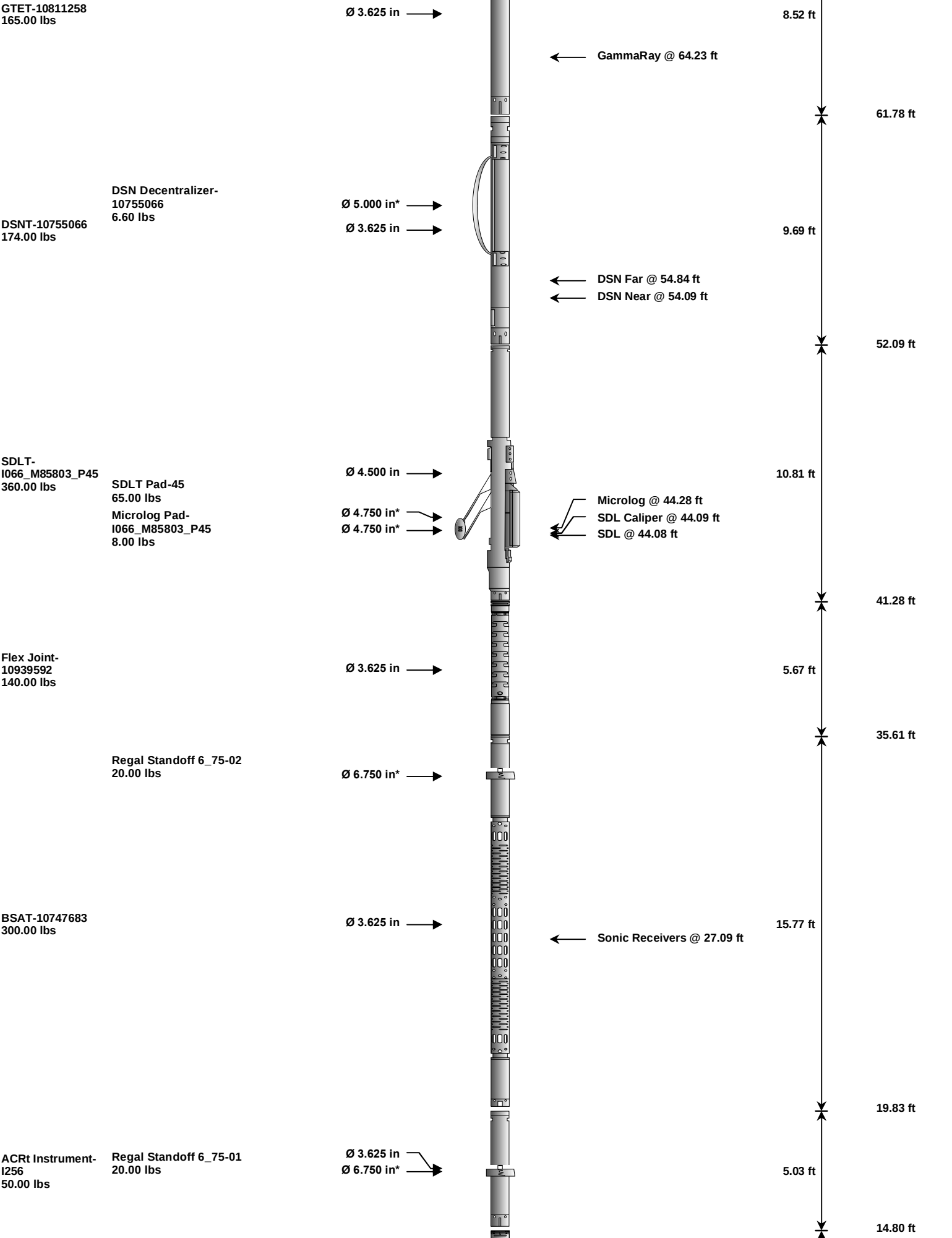
Plot Time: 17-Jul-12 20:33:43
 Plot Range: 4530 ft to 4886.25 ft
 Data: SMU_318\Well Based\DAQ-0001-0061
 Plot File: \\BSAT\BSAT_5_REP_LIB

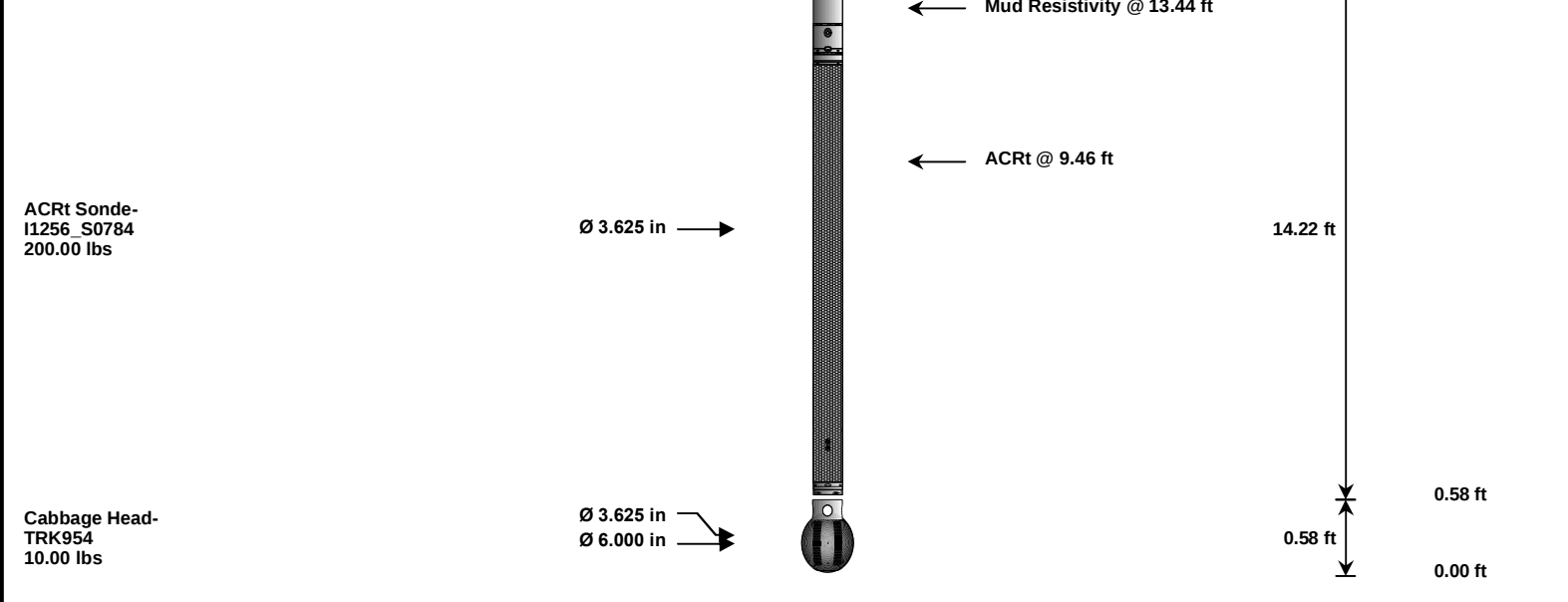
REPEAT SECTION

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
						74.03 ft
SP Sub-11441709 60.00 lbs		Ø 3.625 in →		← SP @ 72.26 ft	3.74 ft	70.30 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		11441709	60.00	3.74	70.30	300.00
GTET	Gamma Telemetry Tool		10811258	165.00	8.52	61.78	60.00
DSNT	Dual Spaced Neutron		10755066	174.00	9.69	52.09	60.00
DCNT	DSN Decentralizer		10755066	6.60	5.13	* 55.42	300.00
SDLT	Spectral Density Tool		I066_M85803_P45	360.00	10.81	41.28	60.00
MICP	Microlog Pad		I066_M85803_P45	8.00	1.00	* 43.78	60.00
SDLP	Density Insite Pad		45	65.00	2.55	* 43.49	60.00
FLEX	Flex Joint		10939592	140.00	5.67	35.61	300.00
BSAT	Borehole Sonic Array Tool		10747683	300.00	15.77	19.83	60.00
RSOF	Regal Standoff 6.75in		02	20.00	0.52	* 33.69	300.00
ACRt	Array Compensated True Resistivity Instrument Section		I256	50.00	5.03	14.80	300.00
RSOF	Regal Standoff 6.75in		01	20.00	0.52	* 17.02	300.00
ACRt	Array Compensated True Resistivity Sonde Section		I1256_S0784	200.00	14.22	0.58	300.00
CBHD	Cabbage Head		TRK954	10.00	0.58	0.00	300.00
Total				1,608.60	75.95		
							* Not included in Total Length and Length Accumulation.
Data: SMU_318\0001 SP-GTET-DSNT-SDLT-BSAT-ACRT-CH\IDLE							Date: 17-Jul-12 17:49:41

HALLIBURTON			
CALIBRATION REPORT			
NATURAL GAMMA RAY TOOL SHOP CALIBRATION			
Tool Name:	GTET - 10811258	Reference Calibration Date:	29-Jun-12 10:45:01
Engineer:	T. HYDE	Calibration Date:	29-Jun-12 10:47:38
Software Version:	WL INSITE R3.6.0 (Build 3)	Calibration Version:	1
Calibrator Source S/N: TB-185			
Calibrator API Reference:228.00 api			
Equivalent Calibrator API Reference:232.0 api			
Measurement	Measured	Calibrated	Units
Background	46.1	47.6	api
Background + Calibrator	270.8	279.6	api
Calibrator	224.7	232.0	api
NATURAL GAMMA RAY TOOL FIELD CALIBRATION			
Tool Name:	GTET - 10811258	Reference Calibration Date:	29-Jun-12 10:47:38

Engineer: T. HYDE		Calibration Date: 17-Jul-12 17:34:29				
Software Version: WL INSITE R3.6.0 (Build 3)		Calibration Version: 1				
Calibrator Source S/N: TB-185						
Calibrator API Reference:228.00 api						
Equivalent Calibrator API Reference:232.0 api						
Field Verification		Shop	Field	Units		
Background		47.6	64.0	api		
Background + Calibrator		279.6	297.2	api		
Calibrator		232.0	233.2	api		
Shop		Field	Difference	Tolerance		
232.0		233.2	-1.2	+/- 9.00		
CALIBRATION SUMMARY						
Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-10811258						
Gamma Ray Calibrator	232.0	233.2	-----	-1.2	+/- 9.00	api
Data: SMU_318\0001 SP-GTET-DSNT-SDLT-BSAT-ACRT-CHIDLE					Date: 17-Jul-12 18:32:41	

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	9.600	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	4891.00	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	
	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
	Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	
	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	Wyllie	
	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_318\0001 SP-GTET-DSNT-SDLT-BSAT-ACRT-CHIDLE				Date: 17-Jul-12 18:33:00	

HALLIBURTON				
INPUTS, DELAYS AND FILTERS TABLE				
Mnemonic	Input Description	Delay (ft)	Filter Type	Filter Length (ft)
Depth Panel				
FEENS	Tool	0.00	None	

TENS	Tension	0.00	NO	
SP Sub				
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
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	
SDLT Pad				
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
EPK	Far Peak	44.26	BLK	0.250

FLI	Far Lithology	44.26	BLK	0.250
PTMP	Pad Temperature	44.09	BLK	0.920
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	
Microlog Pad				
TPUL	Tension Pull	44.28	NO	
MINV	Microlog Lateral	44.28	BLK	0.750
MNOR	Microlog Normal	44.28	BLK	0.750
Data: SMU_318\0001 SP-GTET-DSNT-SDLT-BSAT-ACRT-CH\IDLE				Date: 17-Jul-12 18:33:17

COMPANY	OXY USA INC		
WELL	SMU #318		
FIELD	SMU		
COUNTY	FINNEY	STATE	KANSAS
HALLIBURTON		BORE HOLE SONIC ARRAY LOG	