

045-15178

HAILEY
3517
PRYTON

04-18-2016

HIGH RESOLUTION
INDUCTION

COMPANY ANTERO RESOURCES CORPORATION

WELL NORCROSS A4

MAMM CREEK FIELD TYPE LOG 045-15178

COUNTY GARFIELD

STATE COGCC Document Number 2056192

COMPANY ANTERO RESOURCES CORPORATION
WELL NORCROSS A4
FIELD MAMM CREEK
COUNTY GARFIELD
STATE CO

API No. 050451517800

Location SURFACE HOLE: 1387' FSL & 1384' FWL
BOTTOM HOLE: 1212' FSL & 0720' FWL

Other Services: SDL/DSN

Sect. 13 Twp. 08S Rge. 93W

Permanent Datum GL Elev. 5482.0 ft
Log measured from KB 16.0 ft above perm. Datum
Drilling measured from KB Elev. 5507.0 ft
Date 25-Jan-08 10:00 GL Elev. 5482.0 ft

Run No. ONE

Depth - Driller 8820.0 ft

Depth - Logger 8820.0 ft

Bottom - Logged Interval 8810.0 ft

Top - Logged Interval CSG.

Casing - Driller 8625 in @ 987.0 ft

Casing - Logger 970.0 ft

Bit Size 7.975 in

Type Fluid in Hole LSND

Density 10.2 ppg

PH 10.50

Source of Sample MUD TANK

Rm @ Meas. Temperature 2.63 ohmm @ 57.50 degF

Rmf @ Meas. Temperature 2.11 ohmm @ 57.90 degF

Rmc @ Meas. Temperature 3.15 ohmm @ 58.20 degF

Source Rmf Rmc MEAS. MEAS.
Rm @ BHT 0.75 ohmm @ 218.0 degF
Time Since Circulation 14.0 hr
Time on Bottom 25-Jan-08 12:00
Max. Rec. Temperature 218.0 degF @ 8820.0 ft
Equipment Location 10549593 G.J.
Recorded By C. GUILLETT
Witnessed By J. KENNEDY

RECEIVED

JUN 17 2008

COGCC

KK

Fold here

Service Ticket No.: 5642016 API Serial No.: 050451517800 PGM Version: WL INSITE R2.0 (Build 22)

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.	Other	
Rmf @ Meas. Temp.		ONE	HRID-48S2524	N/A	1.5" S.O.	N/A	
Rmc @ Meas. Temp.							
Source Rmf	Rmc	CALC.	CALC.				
Rm @ BHT		0.75 ohmm @ 218.0 degF					
Rmf @ BHT		0.60 ohmm @ 218.0 degF					
Rmc @ BHT		0.90 ohmm @ 218.0 degF					

EQUIPMENT DATA							
GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.		Run No.	ONE	Run No.	ONE
Serial No.	034	Serial No.		Serial No.	I458M069	Serial No.	108734
Model No.	D4TGX	Model No.		Model No.	SDL_DC	Model No.	DSN_II
Diameter	3.625"	No. of Cent.		Diameter	4.5"	Diameter	3.625"

Detector Model No.	D4TG	Spacing		Log Type	GAMMA-GAMMA	Log Type	THERMAL
Type	SCINT.			Source Type	Cs137	Source Type	Am241Be
Length	8"	LSA [Y/N]		Serial No.	2189GW	Serial No.	DSN-60
Distance to Source	16.3'	FWD A [Y/N]		Strength	1.5 CI	Strength	18.5 CI

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	T.D.	CSG.	REC.	0	200				30%	-10%	2.68	30%	-10%	SAND

MAMM CREEK FIELD TYPE LOG 045-15178

DIRECTIONAL INFORMATION

Maximum Deviation	0.00 deg	@	0.00 ft	KOP	@	0.00 ft
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Remarks:

RWCH-D4TGX-DSN-SDL-HRI WERE RAN IN COMBINATION.
A.H.V. CALCULATED FOR 5.5" CASING.
TENSION PULLS AND HOLE RUGOSITY MAY AFFECT LOG QUALITY.
CHLORIDES REPORTED AT 1600 mg/L.

LATITUDE: 39.52°N // LONGITUDE: 107.72°W.

YOUR CREW TODAY IS: A. LEWIS AND J. WILKERSON.

RIG: FRONTIER #14

THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES - GRAND JUNCTION, CO - (970)-523-3600.

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	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDWT	Borehole Fluid Weight	10.300	ppg
	SHARED	RMUD	Mud Resistivity	2.000	ohmm
	SHARED	TRM	Temperature of Mud	75.0	degF
	SHARED	OEM	Oil Based Mud System?	No	
	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	8820.00	ft
	SHARED	BHT	Bottom Hole Temperature	200.0	degF
	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

CrossPlot				
Rwa / CrossPlot	TMFR	Rmf Ref Temp	75.00	degF
Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
D4TGX	GROK	Process Gamma Ray?	Yes	
D4TGX	GRSO	Gamma Tool Standoff	0.000	in
D4TGX	GEOK	Process Gamma Ray EVR?	No	
DSN_II	DNOK	Process DSN?	Yes	
DSN_II	DEOK	Process DSN EVR?	No	
DSN_II	NLIT	Neutron Lithology	Sandstone	
DSN_II	DNSO	DSN Tool Standoff	0.000	in
DSN_II	DNTP	Temperature Correction Type	None	
DSN_II	DPRS	DSN Pressure Correction Type	None	
DSN_II	SHCO	View More Correction Options	No	
DSN_II	UTVD	Use TVD for Gradient Corrections?	No	
DSN_II		Logging Horizontal Water Tank?	No	
SDL_DC	DNOK	Process Density?	Yes	
SDL_DC	DNOK	Process Density EVR?	No	
SDL_DC	AD	Is Hole Air Drilled?	No	
SDL_DC	CB	Use Calibration Blocks?	No	
SDL_DC	SPVT	SDLT Pad Temperature Valid?	Yes	
SDL_DC	MDTP	Weighted Mud Correction Type?	Barite	
SDL_DC	DMA	Formation Density Matrix	2.680	g/cc
SDL_DC	DFL	Formation Density Fluid	1.000	g/cc
SDL_DC	CLOK	Process Caliper Outputs?	Yes	
HRID-SP	HRE	Do HRI Induction Calculation?	Yes	
HRID-SP	DFLE	Do DFL Calculation?	Yes	
HRID-SP	PYRI	Pyrite Switch	Off	
HRID-SP	CSDP	Casing Depth	950.0	ft
HRID-SP	HDSP	Spike Reduction Filter Type	DELTA	
HRID-SP	HRTC	Temperature Correction Source	None	
HRID-SP	MMRS	Hrmap Minimum Resistivity	0.20	
HRID-SP	MXRS	Hrmap Maximum Resistivity	200.00	

BOTTOM

Data: ANT_NORCROSS_A410001 TRIPLE_DITS1006 25-Jan-08 12:24 Up @9829.87

Date: 25-Jan-08 13:47:08

MAMM CREEK FIELD TYPE LOG 045-15178

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Plot Time: 25-Jan-08 15:31:34

Plot Range: 955 ft to 9830 ft

Data: ANT_NORCROSS_A41Well Based MAIN PASS - CASING1

Plot File: \\LOCAL-ANT_NORCROSS_A410001 TRIPLE_DITS\INDUCTION\HRI_2IN

MAIN PASS 2" = 100'

6	Caliper	16	500	Deep Conductivity	0
	Inches			mmohm	
0	Gamma Ray	200	0	HDRS	100
	api			ohmm	
	SP	1 : 600 ft	0	DFL	100
	-110+	MD		ohmm	10000 Tension
					lbs

Alluvium at Surface
Underlain by Wasatch Formation

CSG

Caliper

1000

SP

Hr Deep Resistivity

Dig Focused Laterolog

Deep Conductivity

MAMM CREEK FIELD TYPE LOG 045-15178

1100

1200

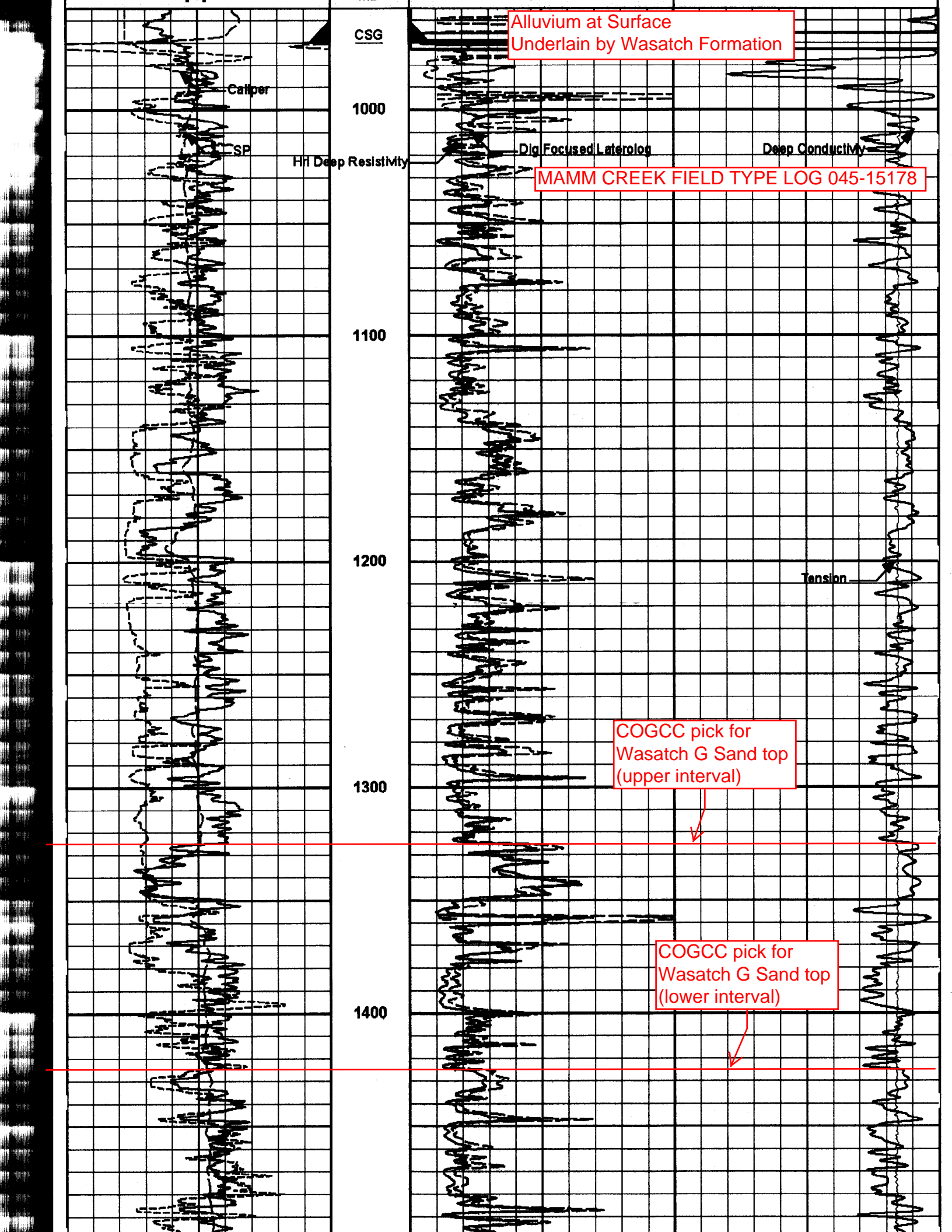
Tension

1300

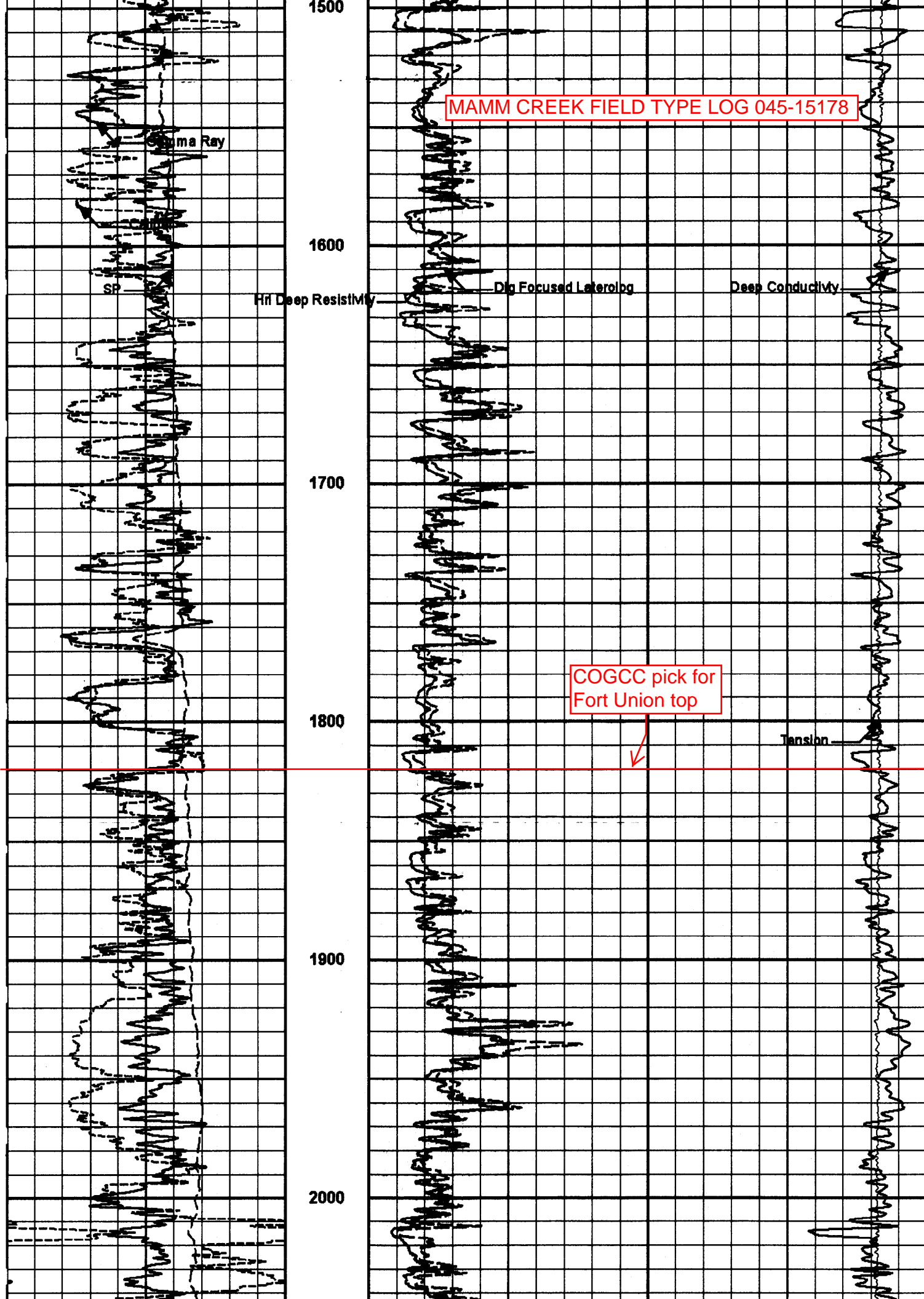
COGCC pick for
Wasatch G Sand top
(upper interval)

1400

COGCC pick for
Wasatch G Sand top
(lower interval)



MAMM CREEK FIELD TYPE LOG 045-15178



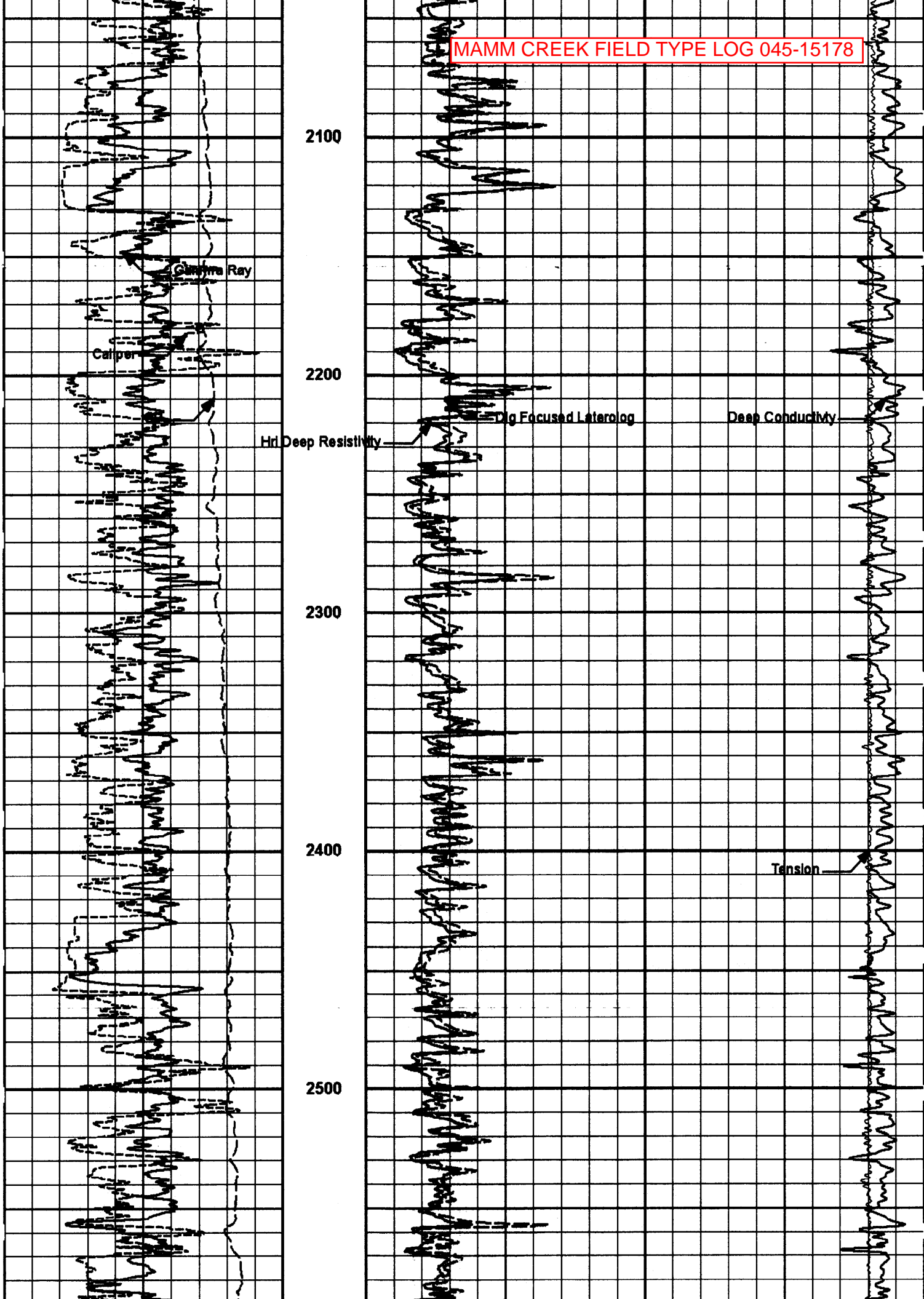
Hi Deep Resistivity

Dip Focused Laterolog

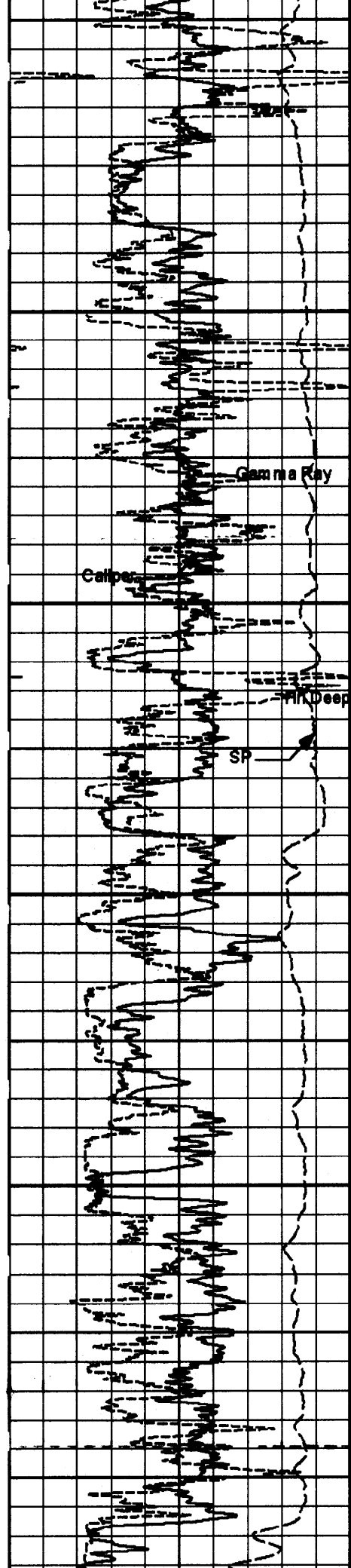
Deep Conductivity

COGCC pick for Fort Union top

Tension

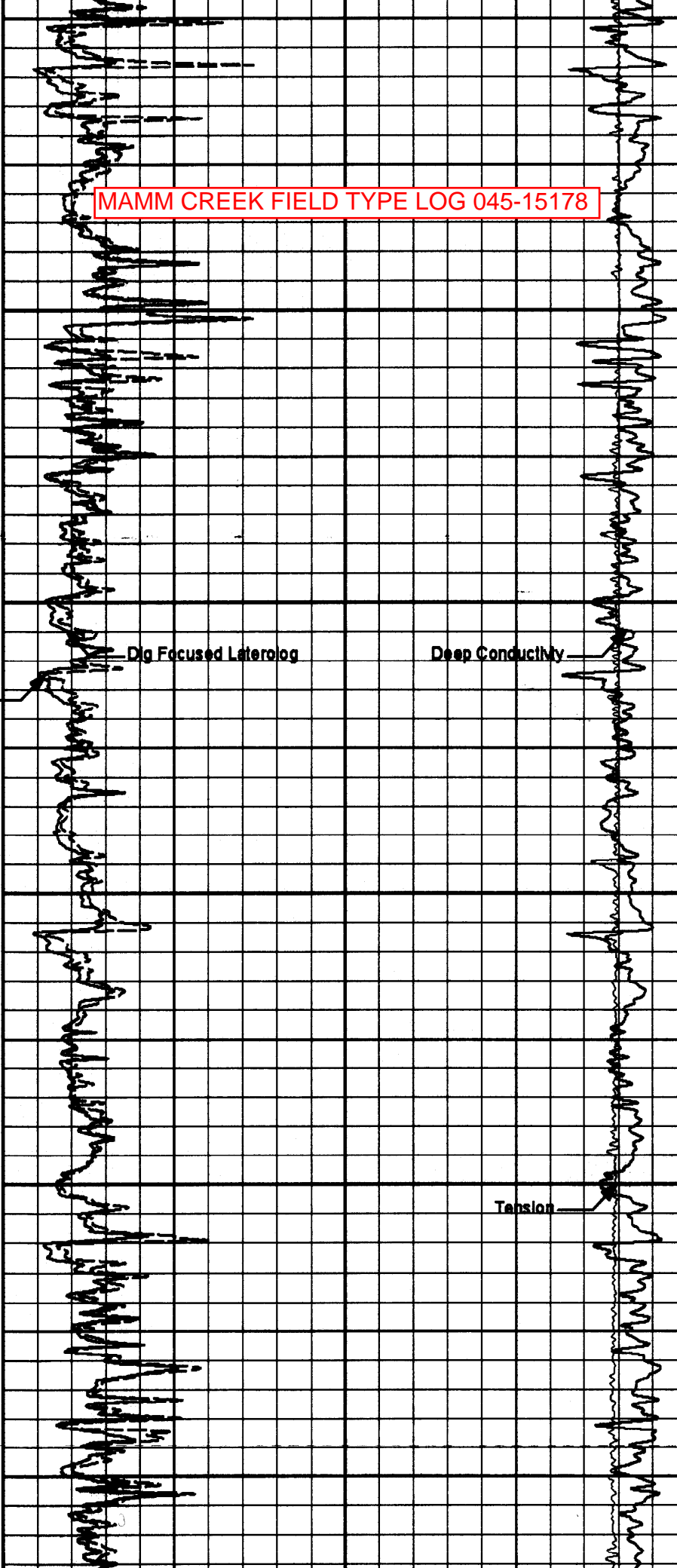


MAMM CREEK FIELD TYPE LOG 045-15178



2600
2700
2800
2900
3000
3100

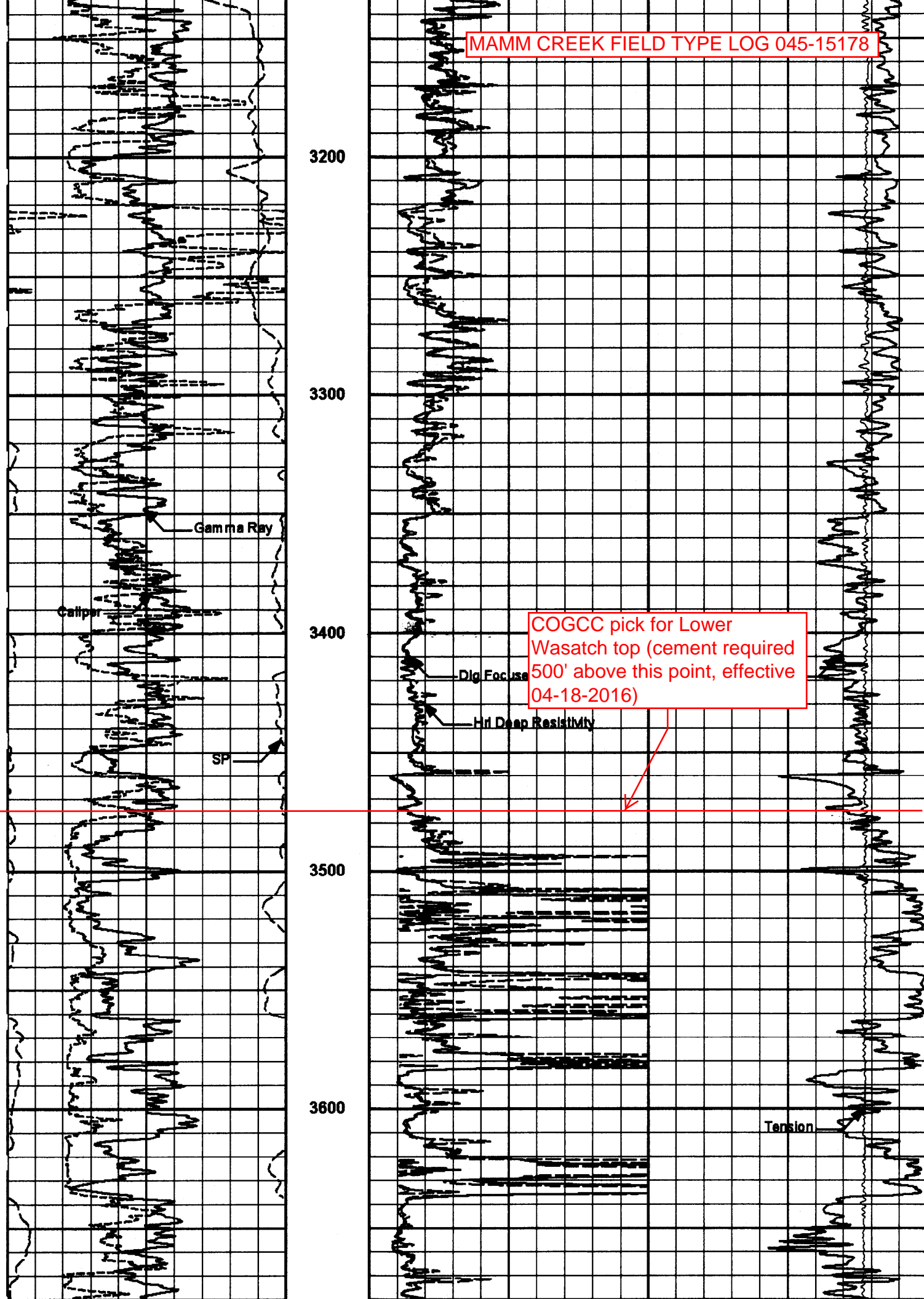
Resistivity



Dig Focused Laterolog

Deep Conductivity

Tension



3200

3300

3400

3500

3600

Gamma Ray

Caliper

SP

Dlg Focus

Hri Deep Resistivity

Tension

COGCC pick for Lower Wasatch top (cement required 500' above this point, effective 04-18-2016)

3700

COGCC pick for Ohio Creek top



MAMM CREEK FIELD TYPE LOG 045-15178

3800

3900

Gamma Ray

Caliper

4000

Dip Focused Lateral

Deep Conductivity

High Conductivity

SP

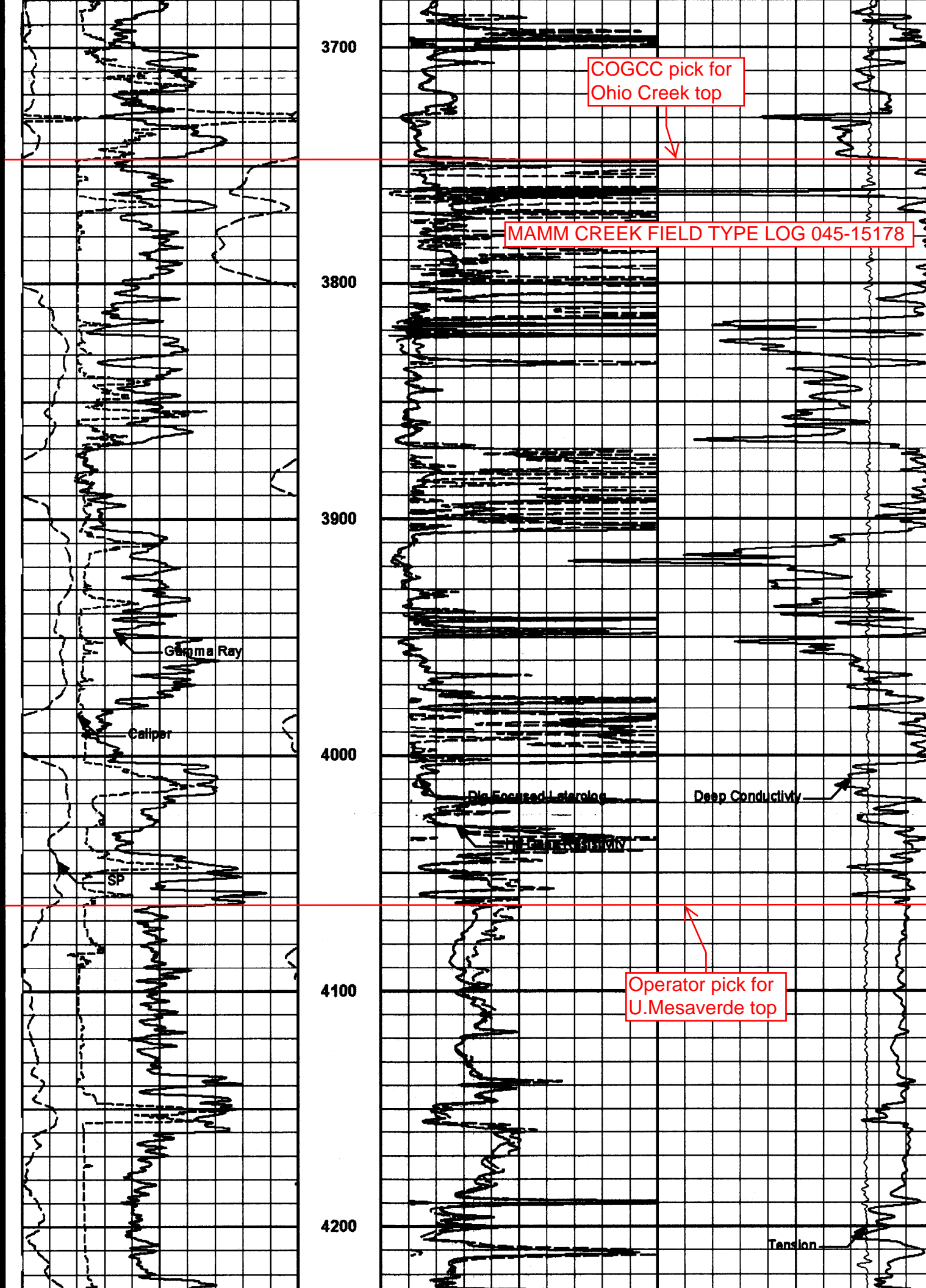
4100

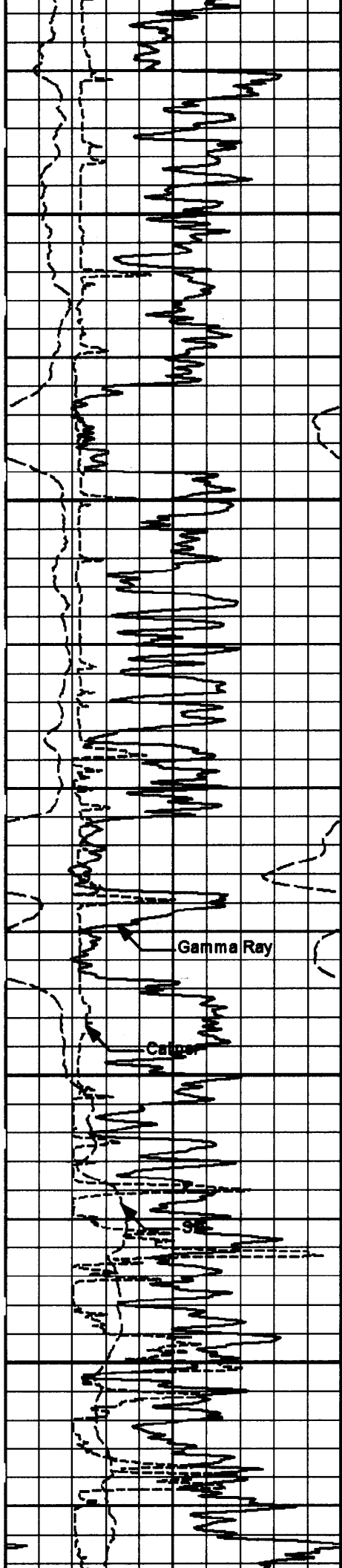
Operator pick for U. Mesaverde top



4200

Tension





4300

4400

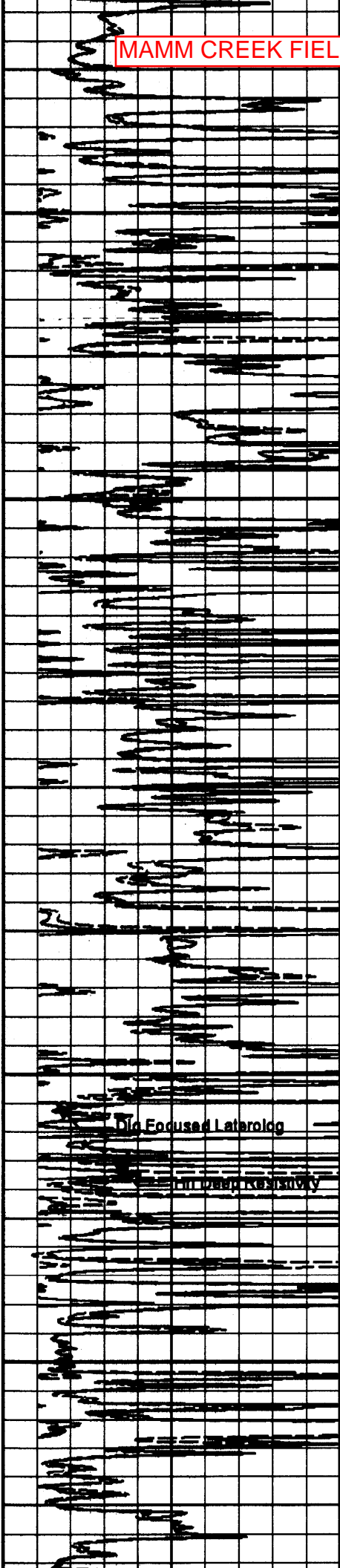
4500

Gamma Ray

Ca

4600

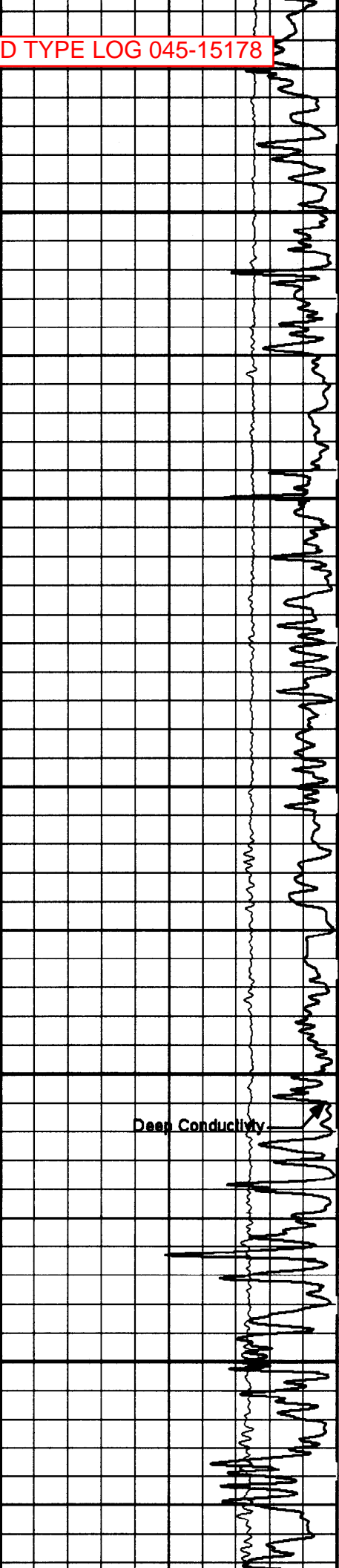
4700



Dip Focused Laterolog

Indirect Resistivity

Deep Conductivity



MAMM CREEK FIELD TYPE LOG 045-15178

Tension

4800

4900

5000

5100

5200

5300

Gamma Ray

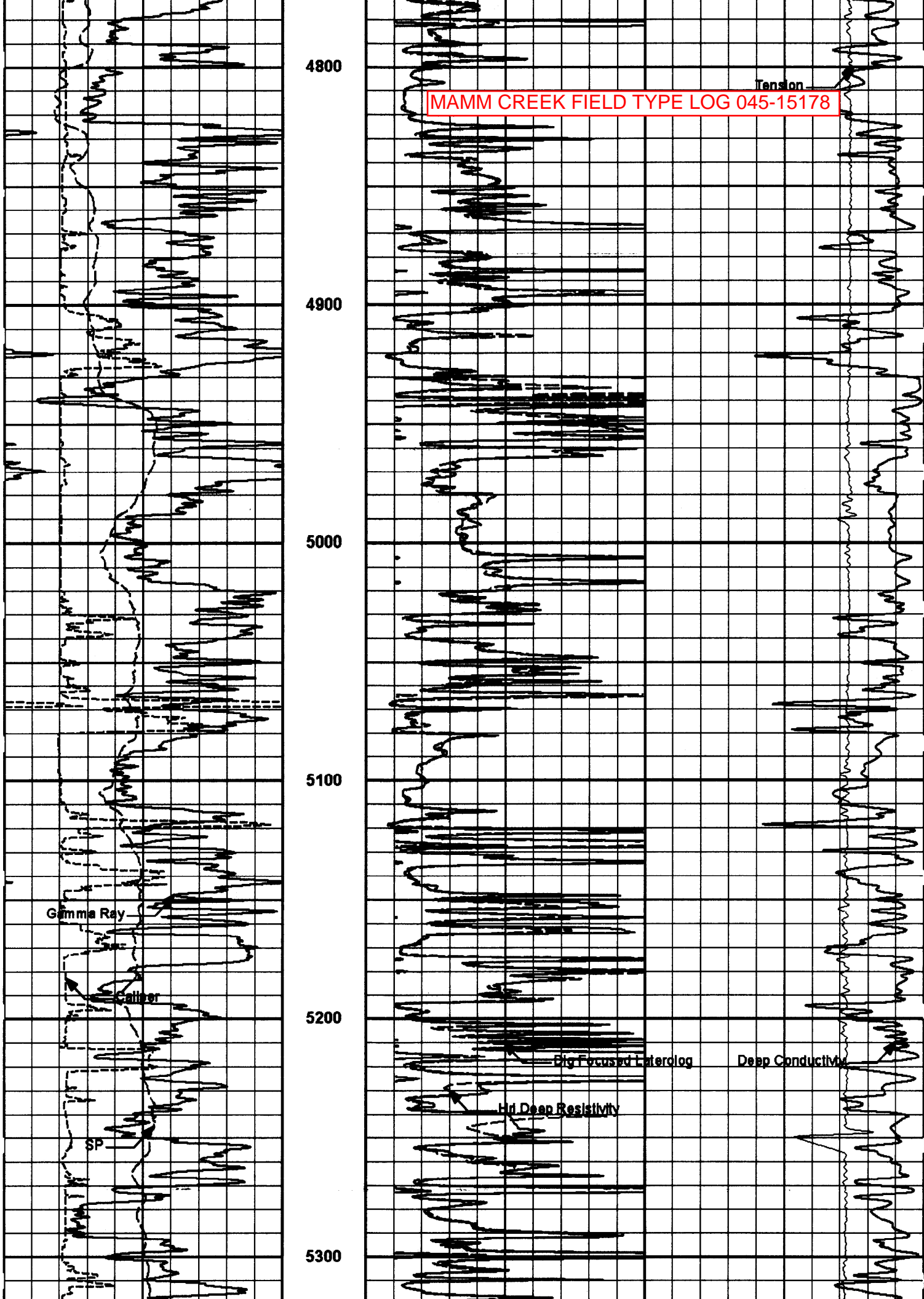
Caliper

SP

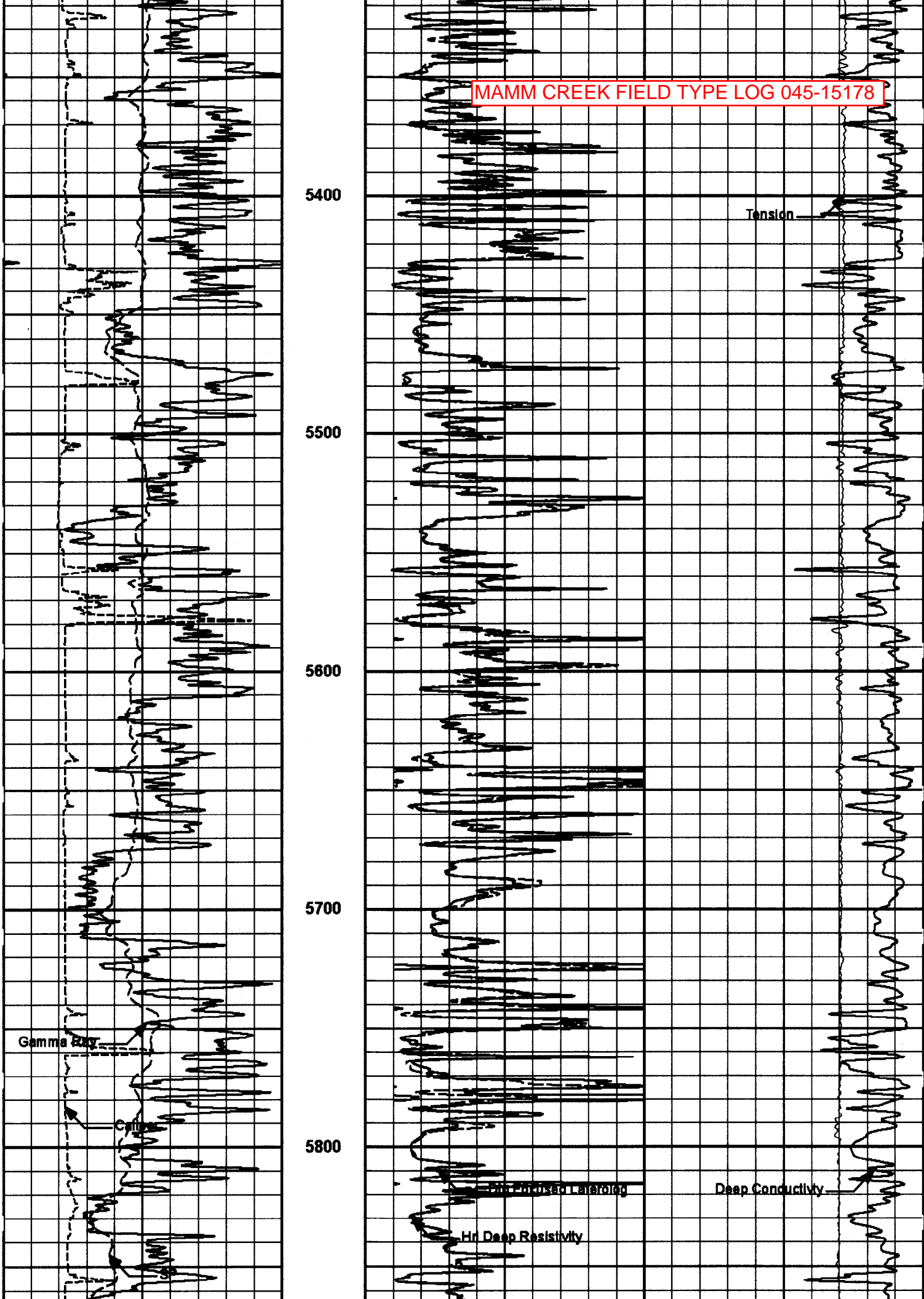
Big Focused Laterolog

Deep Conductivity

Hd Deep Resistivity



MAMM CREEK FIELD TYPE LOG 045-15178



5400

5500

5600

5700

5800

Tension

Gamma Ray

Deep Conductivity

One-Ported Laterolog

Hi-Deep Resistivity

MAMM CREEK FIELD TYPE LOG 045-15178

5900

6000

6100

6200

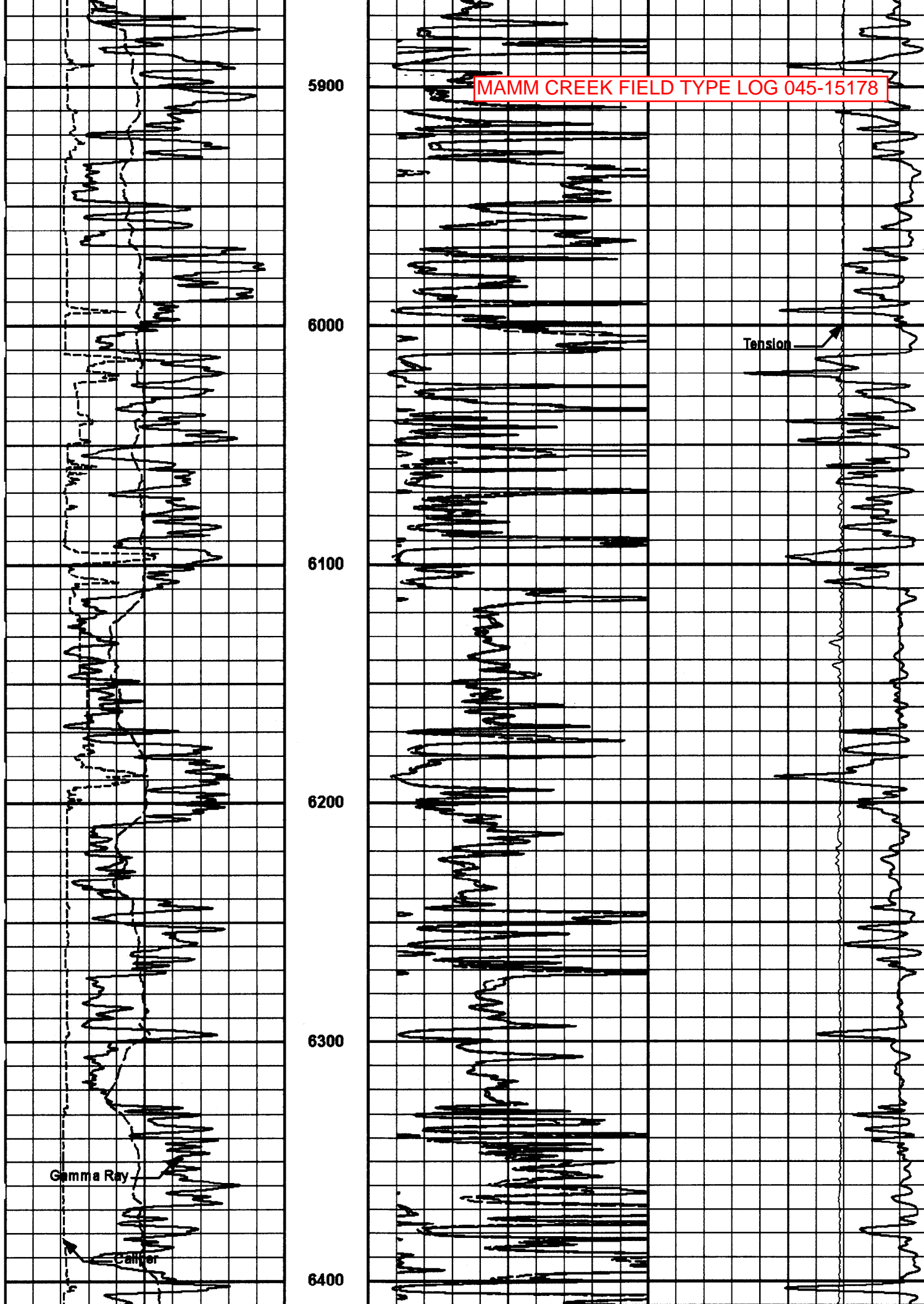
6300

6400

Tension

Gamma Ray

Camper



Directional Log

Deep Conductivity

Hr Depth

MAMM CREEK FIELD TYPE LOG 045-15178

6500

6600

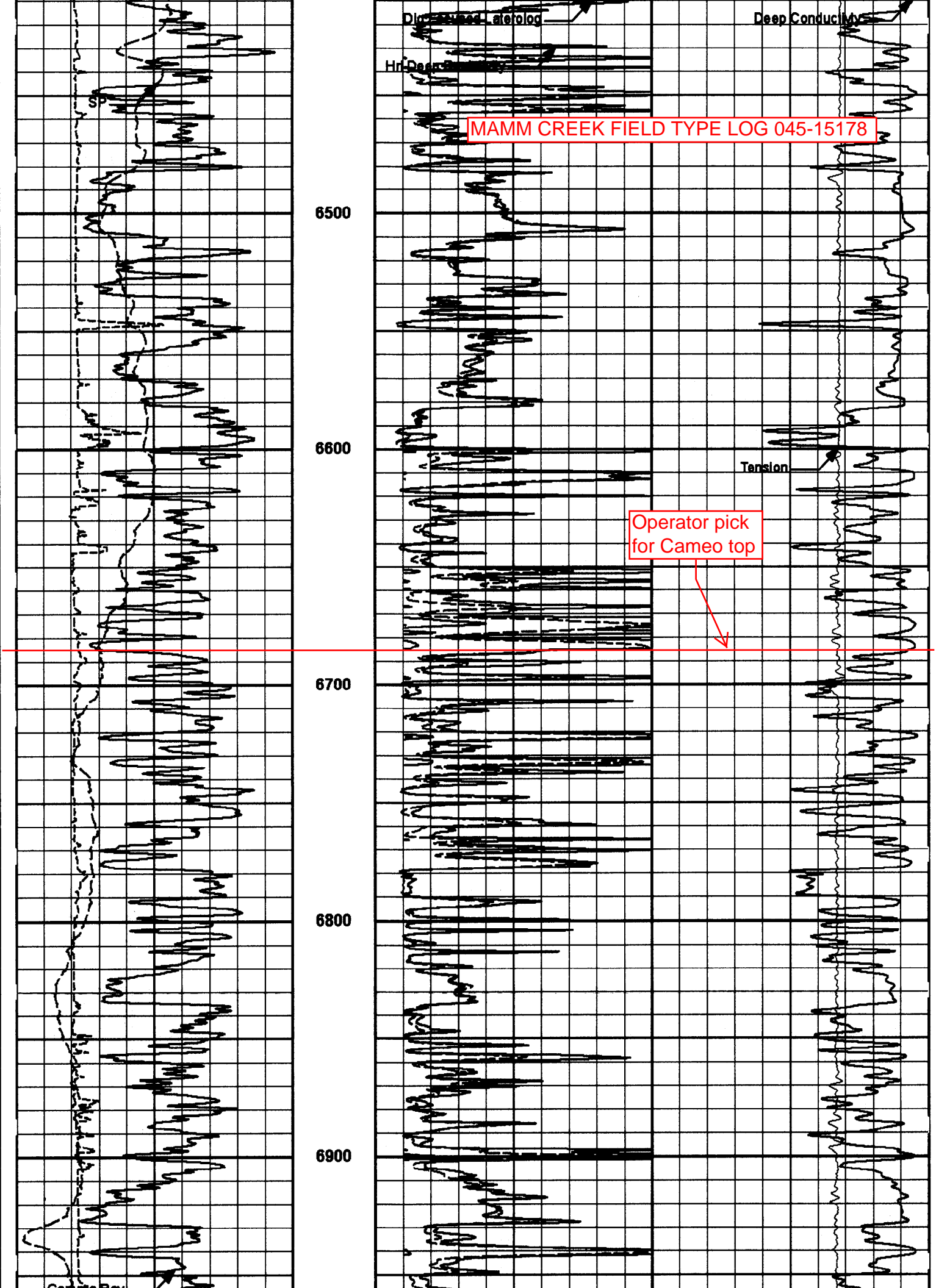
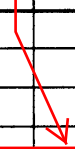
6700

6800

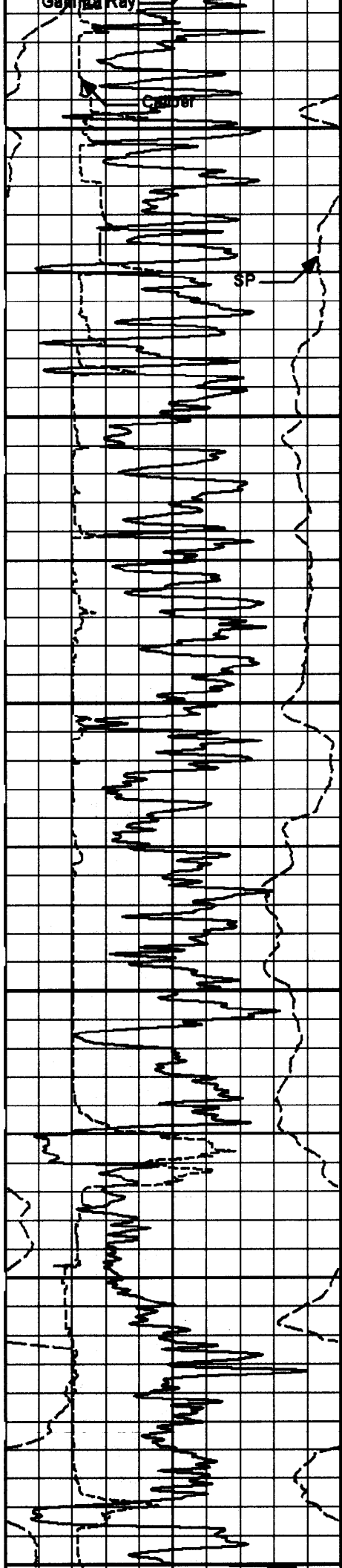
6900

Tension

Operator pick for Cameo top



MAMM CREEK FIELD TYPE LOG 045-15178



7000

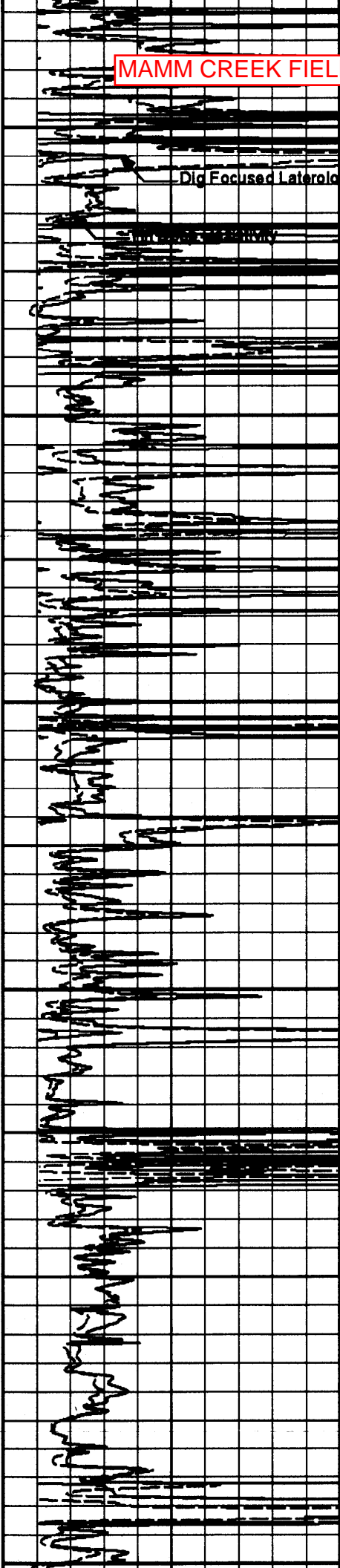
7100

7200

7300

7400

7500

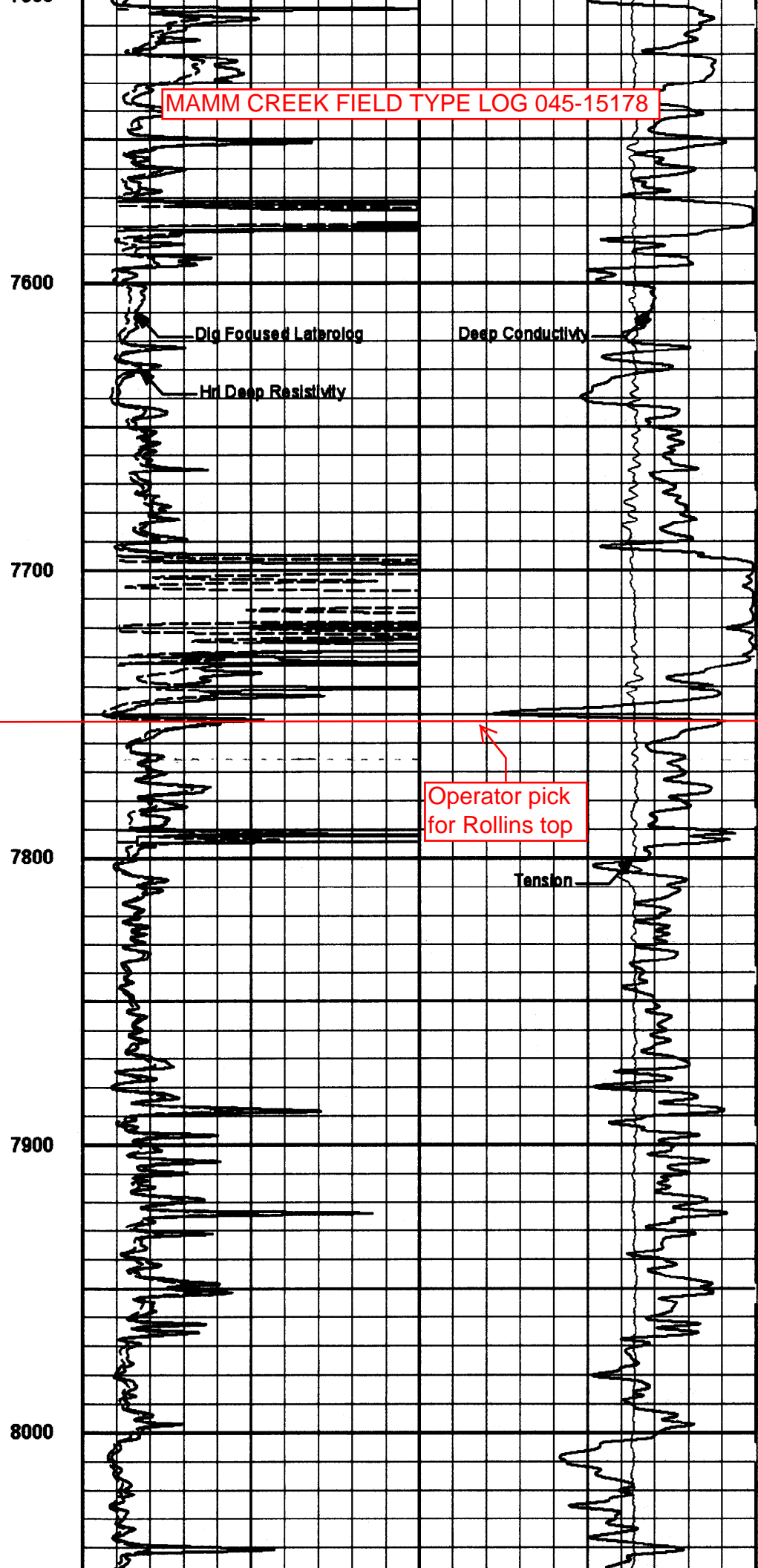
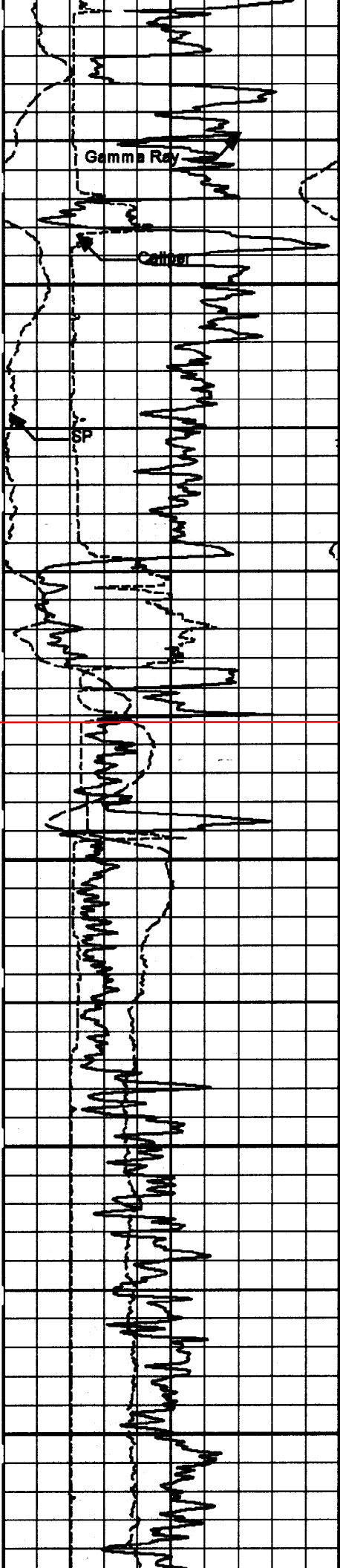


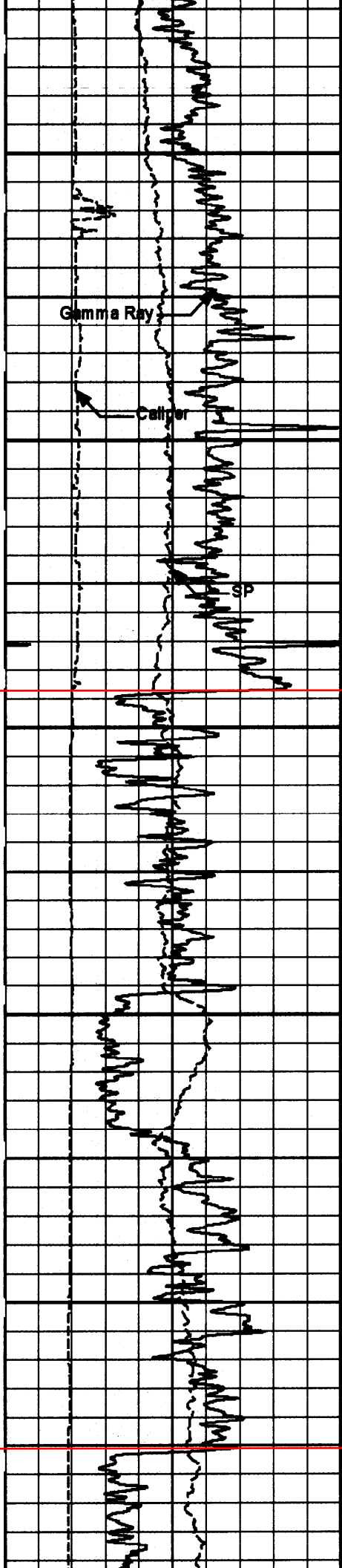
Dig Focused Laterolog

Deep Conductivity

Tension

MAMM CREEK FIELD TYPE LOG 045-15178





8100

Gamma Ray

Caliper

8200

Dip Focused Laterolog

Deep Conductivity

Hri Deep Resistivity

8300

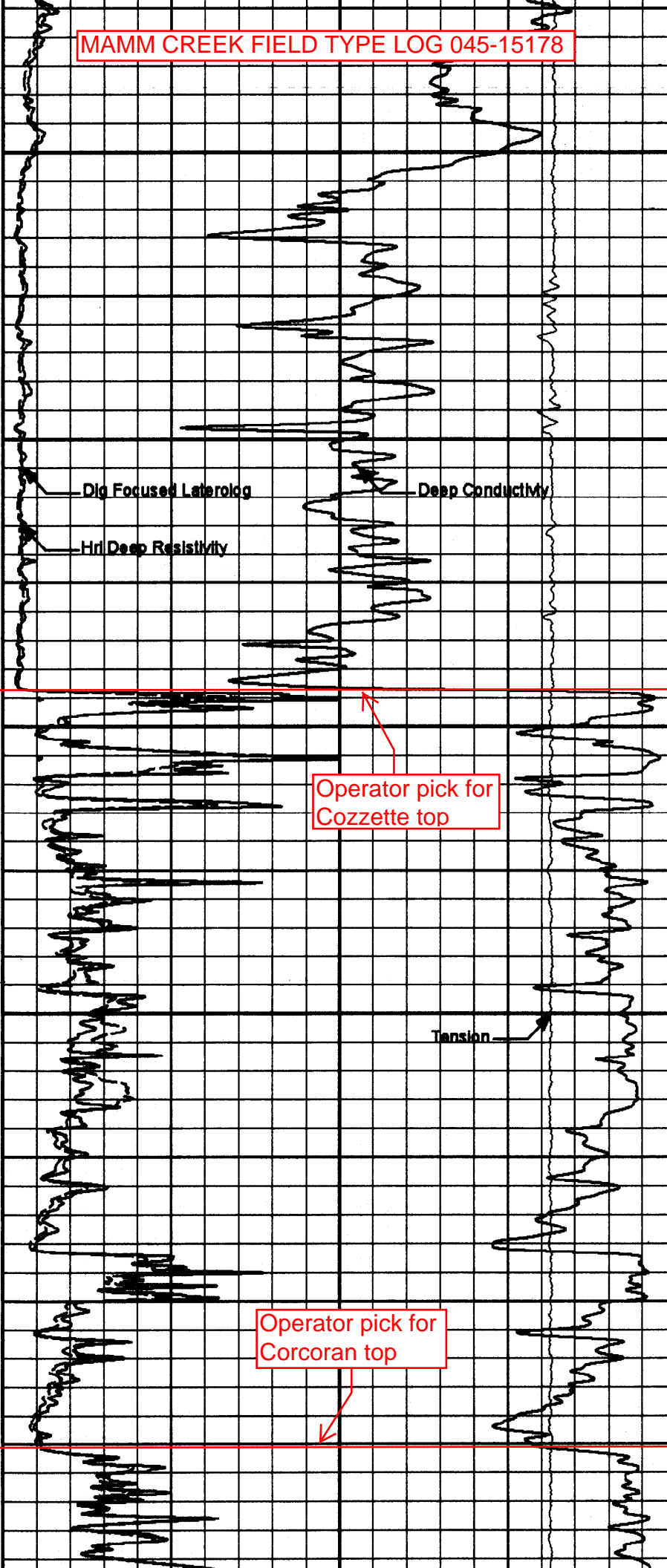
Operator pick for Cozzette top

8400

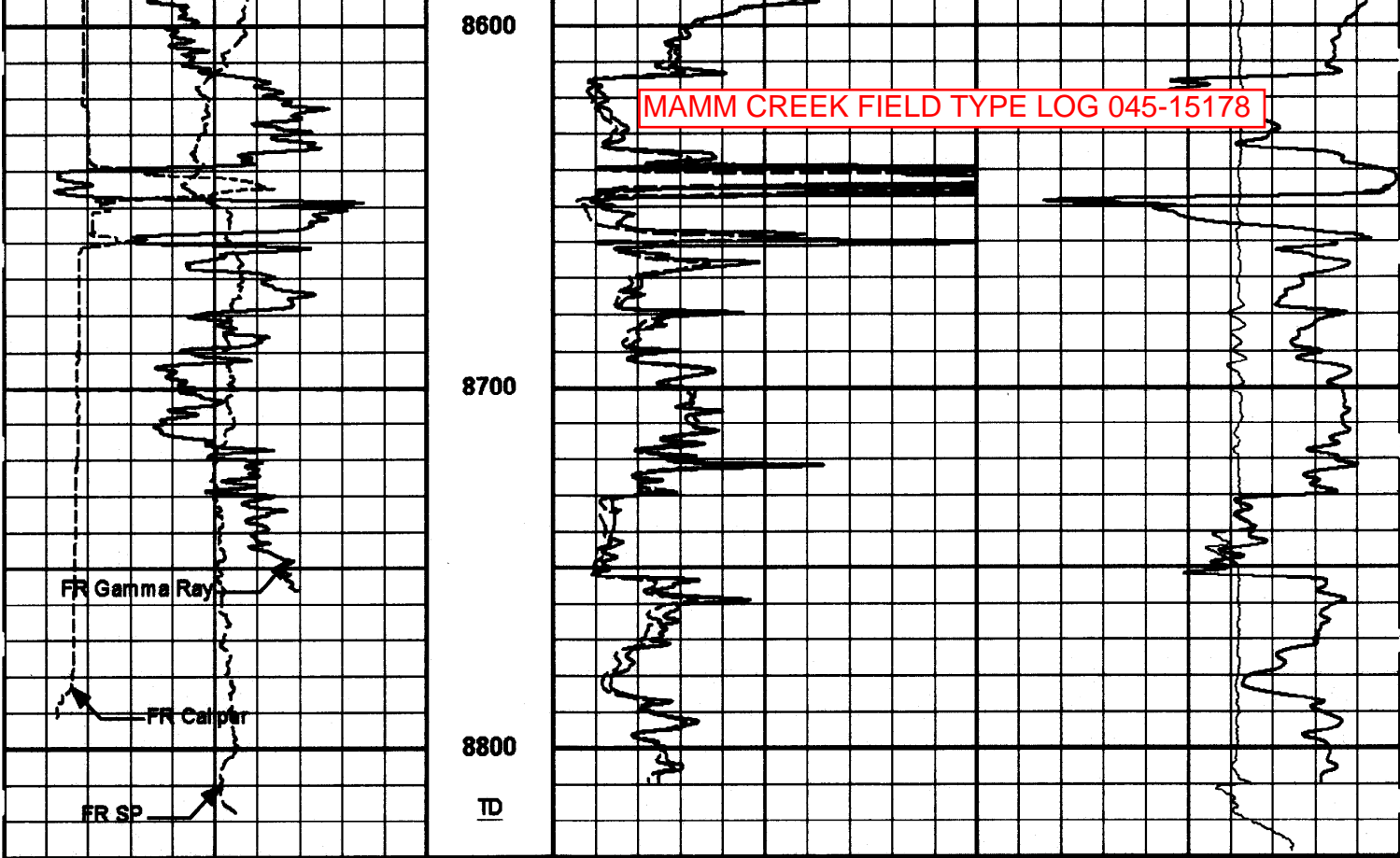
Tension

8500

Operator pick for Corcoran top



MAMM CREEK FIELD TYPE LOG 045-15178



SP	1 : 600 ft	0	DFL	100	10000	Tension	0
-10{+	MD		ohmm			lbs	
0 Gamma Ray 200		0	HRS	100			
spi			ohmm				
6 Caliper 16		500	Deep Conductivity				0
inches			mm/m				

HALLIBURTON

Plot Time: 26-Jan-08 15:31:39
 Plot Range: 966 ft to 9930 ft
 Data: ANT_NORCROSS_A41Well Based MAIN PASS - CASING1
 Plot File: \\LOCAL-ANT_NORCROSS_A410001 TRIPLE_DITS\INDUCTION\HRI_2IN