



**PIONEER**

Pioneer Energy Services

## MICRORESISTIVITY LOG

Company	RENEGADE OIL & GAS
Well	STATE OF COLORADO #3-33
Field	BRAVE
County	ARAPAHOE
State	COLORADO
Location:	API #: 05-005-07364-00 600' FNL & 720' FWL
Permanent Datum	GROUND LEVEL Elevation 6067'
Log Measured From	KELLY BUSHING
Drilling Measured From	KELLY BUSHING
SEC 33 TWP 5S RGE 64W	CNL/CDL DIL
Elevation	K.B. 6077' D.F. N/A G.L. 6067'
Date	10/3/2018
Run Number	ONE
Depth Driller	8650'
Depth Logger	8655'
Bottom Logged Interval	8654'
Top Log Interval	5200'
Casing Driller	8.625" @ 2470'
Casing Logger	2455'
Bit Size	7.875"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	300
Density / Viscosity	9.2 42
pH / Fluid Loss	9.0 9.0
Source of Sample	FLOWLINE
Rm @ Meas. Temp	1.20 @ 62
Rmt @ Meas. Temp	.90 @ 62
Rmc @ Meas. Temp	1.62 @ 62
Source of Rmt / Rmc	CHARTS
Rm @ BHT	.46 @ 163
Operating Rig Time	4 HOURS
Max Rec. Temp. F	163 DEGF
Equipment Number	108
Location	HAYS
Recorded By	J. HENRICKSON
Witnessed By	ED INGVE

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All interpretations are opinions based on inferences from electrical or other measurements and Pioneer Wireline Services, LLC cannot and does not guarantee the accuracy or correctness of any interpretation, and Pioneer Wireline Services, LLC will not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees.

### Comments

N/A DENOTES NOT AVAILABLE OR NON-APPLICABLE.

SO# 657B

Log Measured From: KELLY BUSHING

10 Ft. Above Permanent Datum

THANK YOU FOR USING PIONEER ENERGY SERVICES

[www.pioneerenergy.com](http://www.pioneerenergy.com)

785-625-3858

Your Pioneer Energy Services Crew

Engineer: J. HENRICKSON

Operator:

Operator:

Operator:

This Log Record Was Witnessed By

Primary Witness: ED INGVE

Secondary Witness:

Secondary Witness:











Secondary Witness:

Top - 8072.00 ft

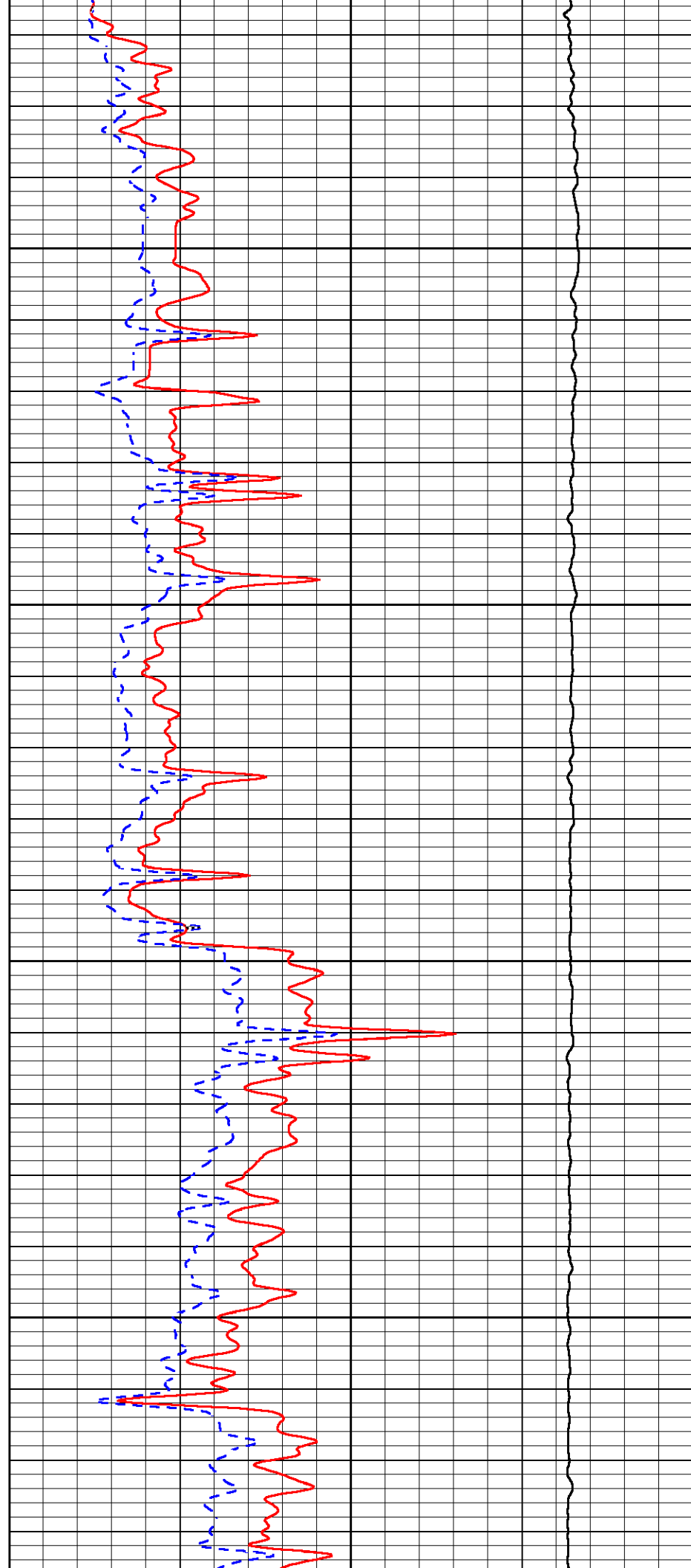
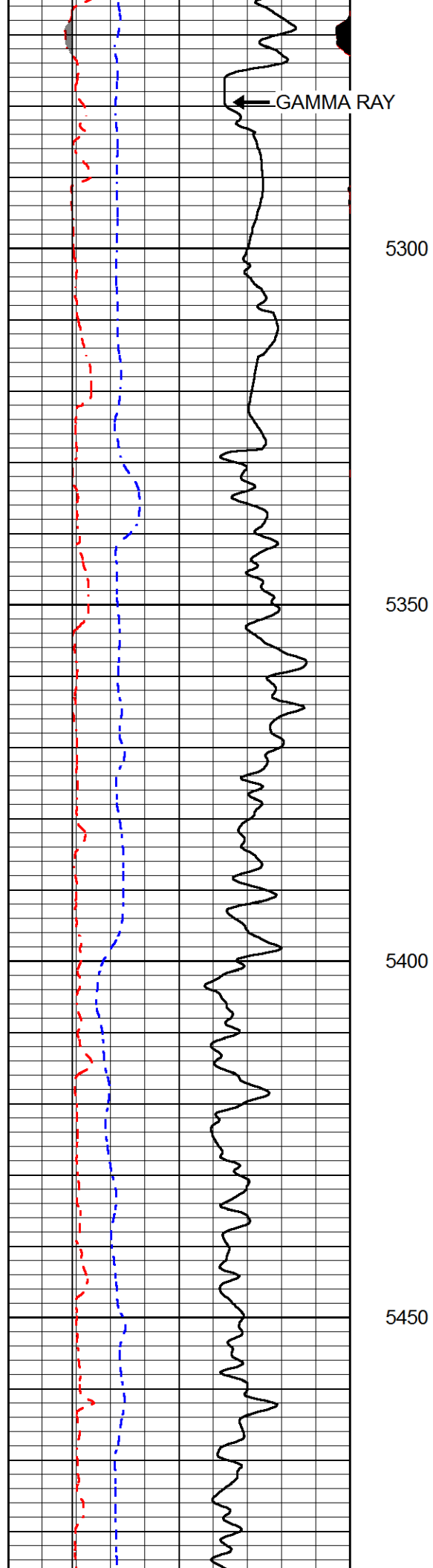
A	BOREID	BOTTEMP	CASEOD	CASETHCK	FLUIDDEN	M	MATRXDEN
1	in	degF	in	in	g/cc		g/cc
	7.875	156	4.5	0	1	2	2.71
NPORSEL	PERFS	SNDERR	SNDERRM	SPSHIFT	SRFTEMP	SZCOR	TDEPTH
Limestone	0	mmho/m	mmho/m	mV	degF	Off	ft
		19	0	-124	0		8655

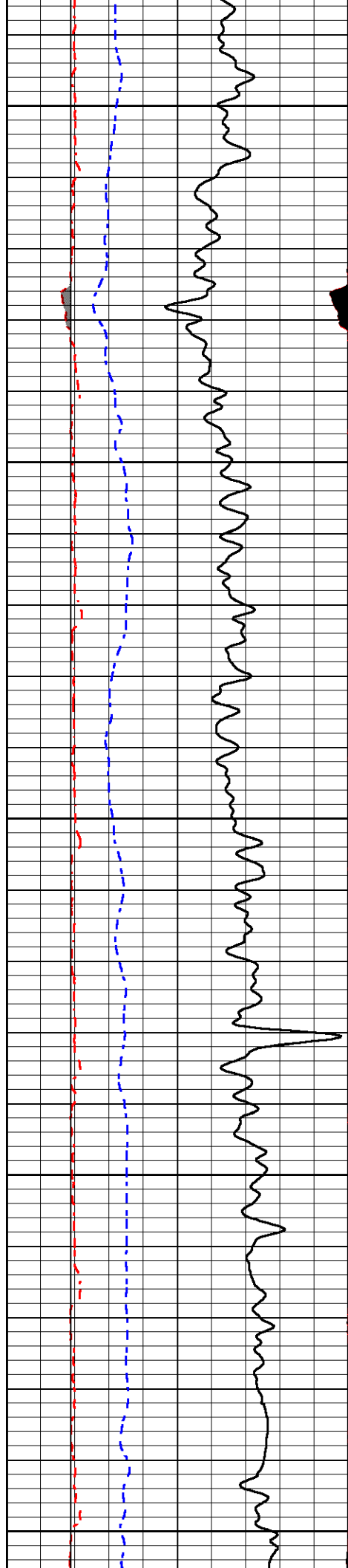
8072.00 ft - Bottom

A	BOREID	BOTTEMP	CASEOD	CASETHCK	FLUIDDEN	M	MATRXDEN
1	in	degF	in	in	g/cc		g/cc
	7.875	156	4.5	0	1	2	2.65
NPORSEL	PERFS	SNDERR	SNDERRM	SPSHIFT	SRFTEMP	SZCOR	TDEPTH
Sandstone	0	mmho/m	mmho/m	mV	degF	Off	ft
		19	0	-124	0		8655

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
GR	40.58		GR-M&W (89-M&W)	3.00	3.50	50.00
CNLSC	37.48		CNT-M&W (tk10-MW)	5.50	3.50	100.00
CNSSC	36.73					
						
			CDL-M&W (934-5002)	8.50	4.00	250.00
LSD	28.43					
DCAL	28.42					
SSD	27.93					
						
			ML-PSI STKBL ML (PSI-02) Stackable Microlog Tools	7.58	4.00	65.00
MCAL	19.83					
MI	19.83					
MN	19.83					
RLL3	15.80					
RLL3F	15.79					







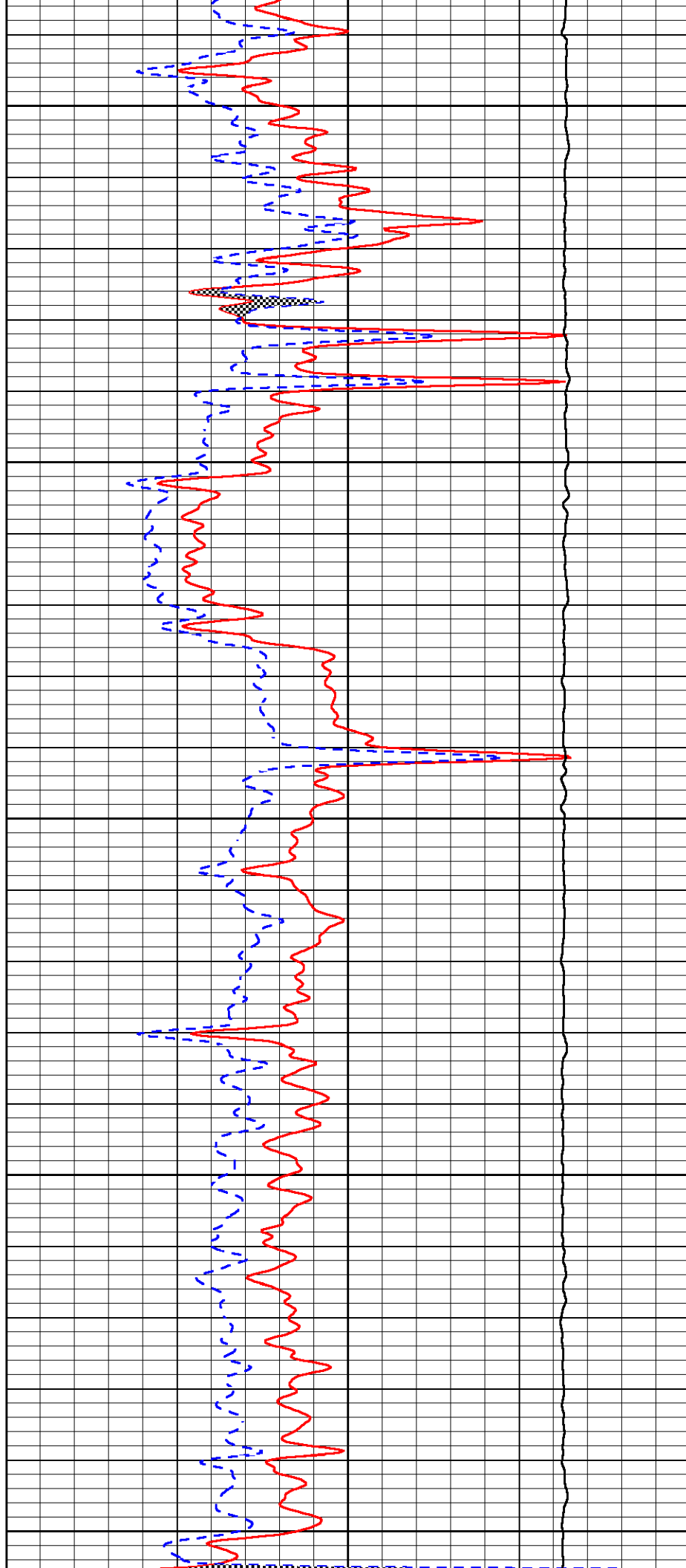
5500

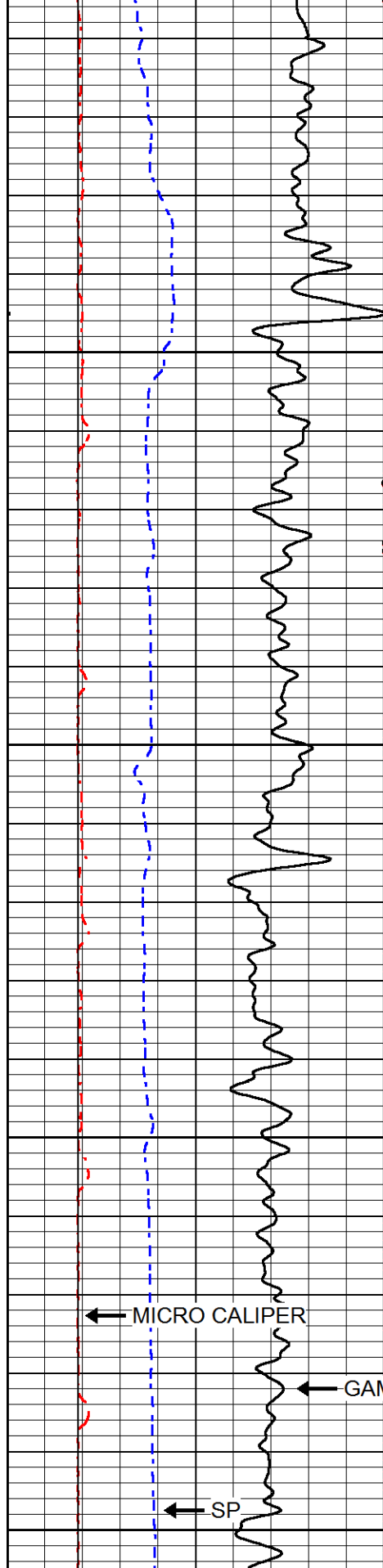
5550

5600

5650

5700





0	GAMMA RAY (GAPI)	150
6	MICRO CALIPER (in)	16
6	BIT SIZE (in)	16
-200	SP (mV)	0

5750

5800

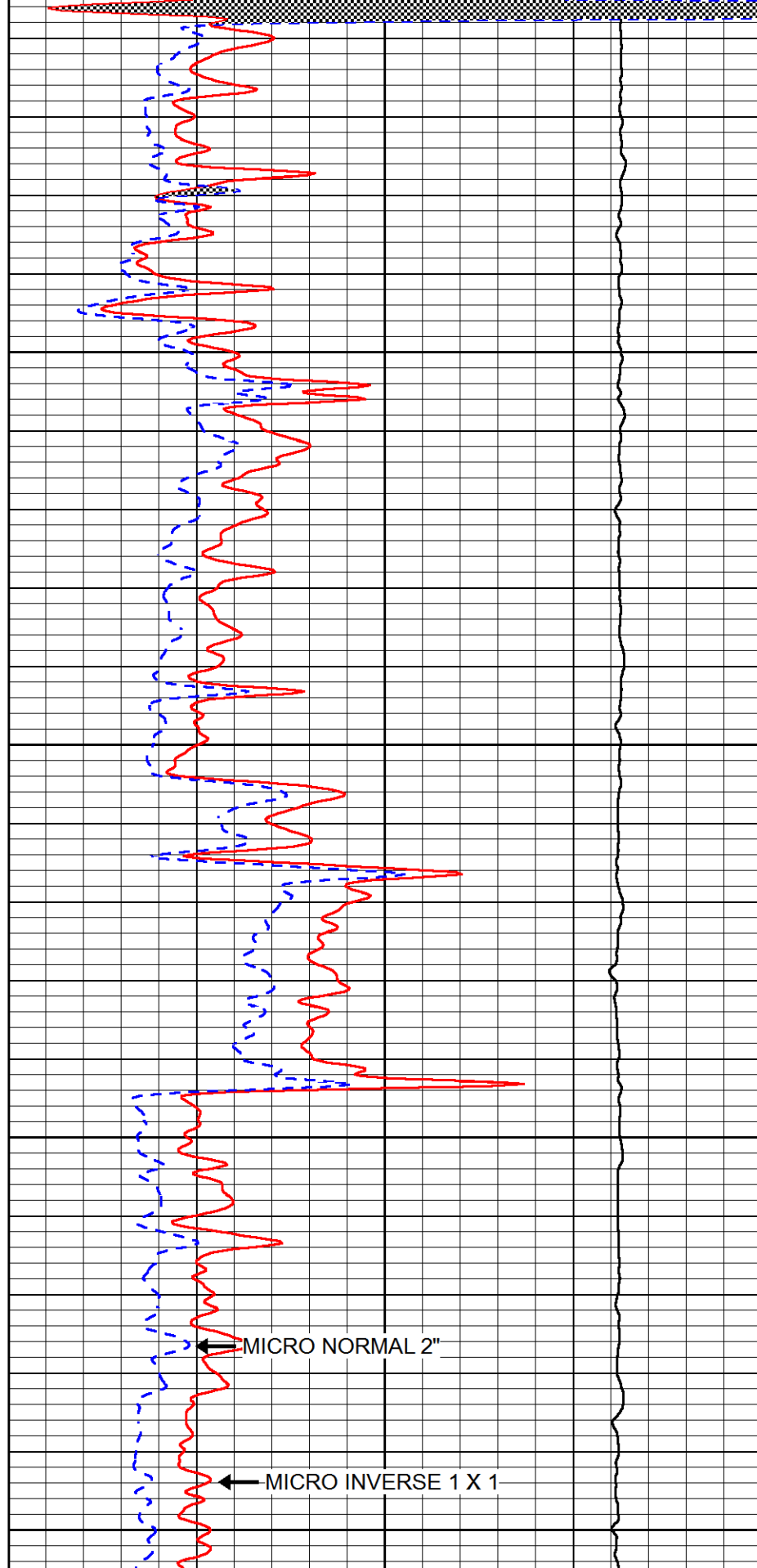
5850

5900

← MICRO CALIPER

← GAMMA RAY

← SP



0	MICRO INVERSE 1 X 1 (Ohm-m)	40
0	MICRO NORMAL 2" (Ohm-m)	40
15000	LINE TENSION (lb)	0

← MICRO NORMAL 2"

← MICRO INVERSE 1 X 1

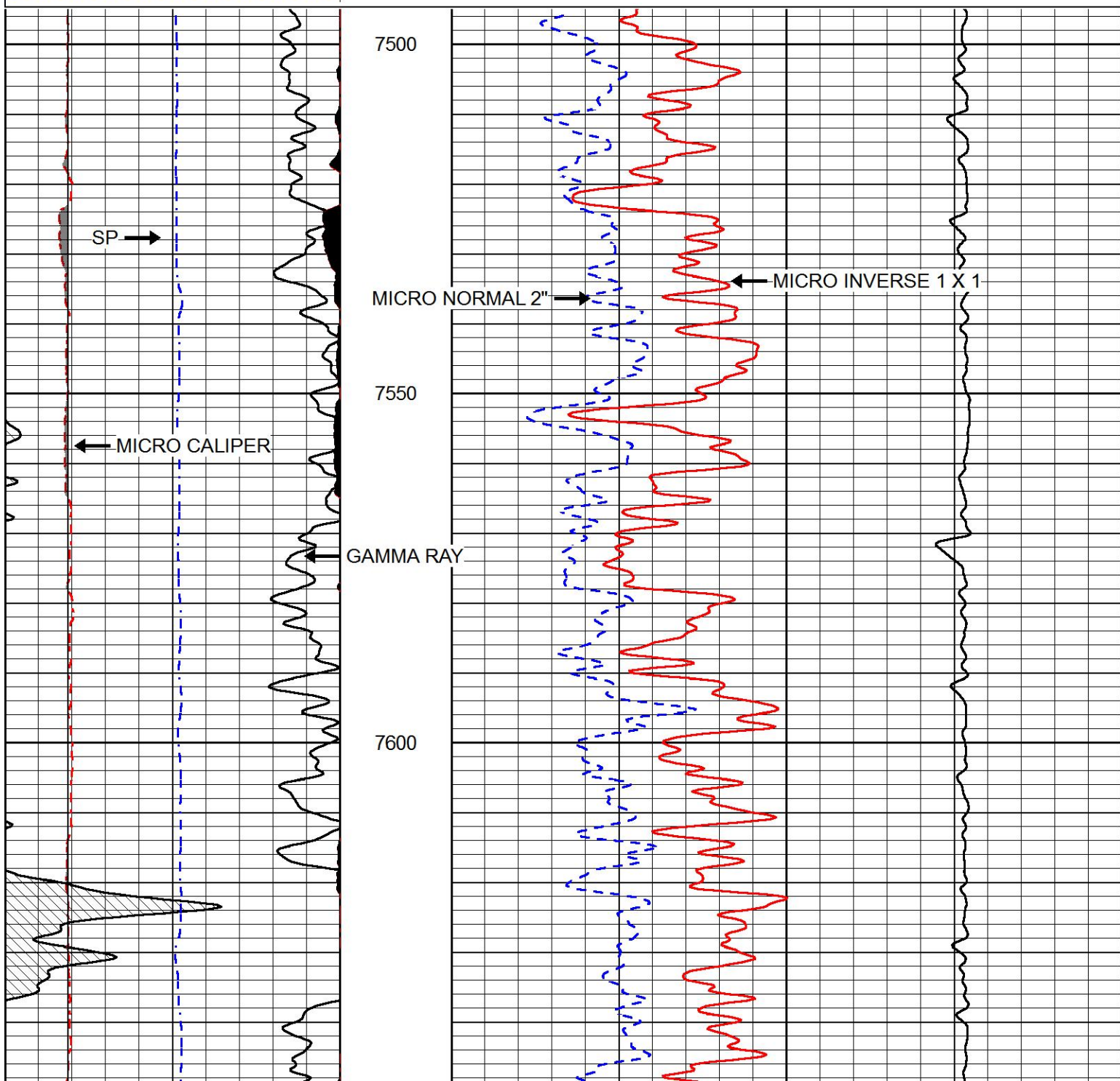


# MAIN PASS

Database File renegade\_state\_3\_33.db  
Dataset Pathname stackml/pass2.1  
Presentation Format micro  
Dataset Creation Wed Oct 03 05:10:29 2018  
Charted by Depth in Feet scaled 1:240

0	GAMMA RAY (GAPI)	150
6	MICRO CALIPER (in)	16
6	BIT SIZE (in)	16
-200	SP (mV)	0

0	MICRO INVERSE 1 X 1 (Ohm-m)	40
0	MICRO NORMAL 2" (Ohm-m)	40
15000	LINE TENSION (lb)	0



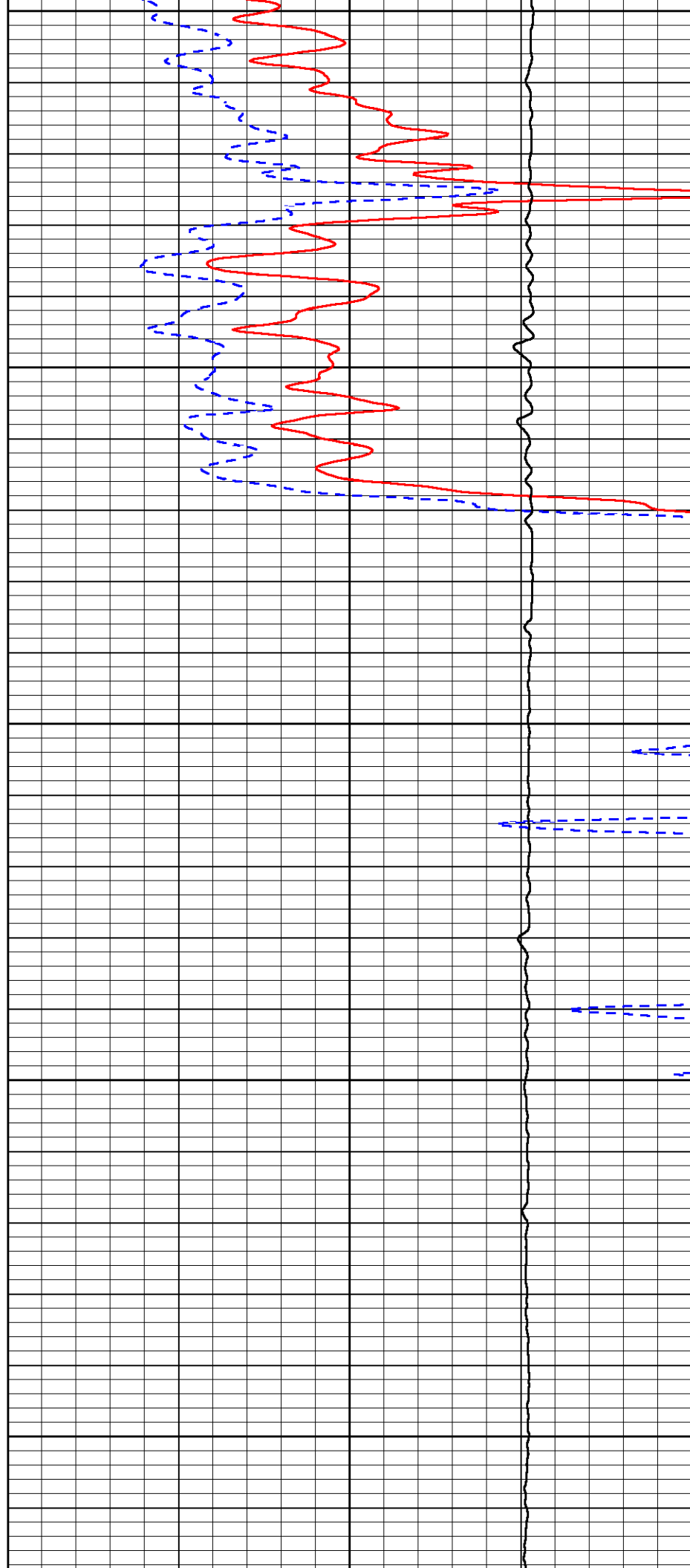
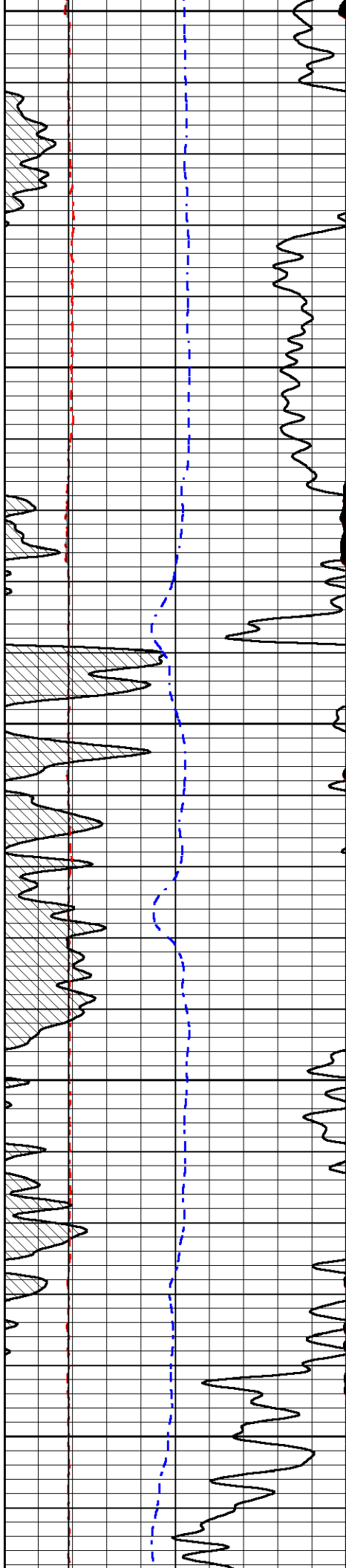
7650

7700

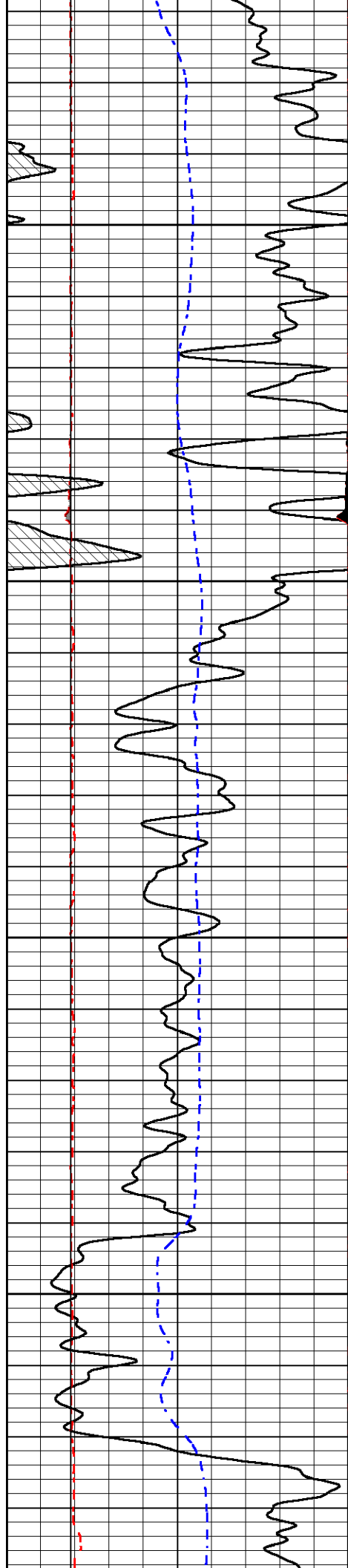
7750

7800

7850





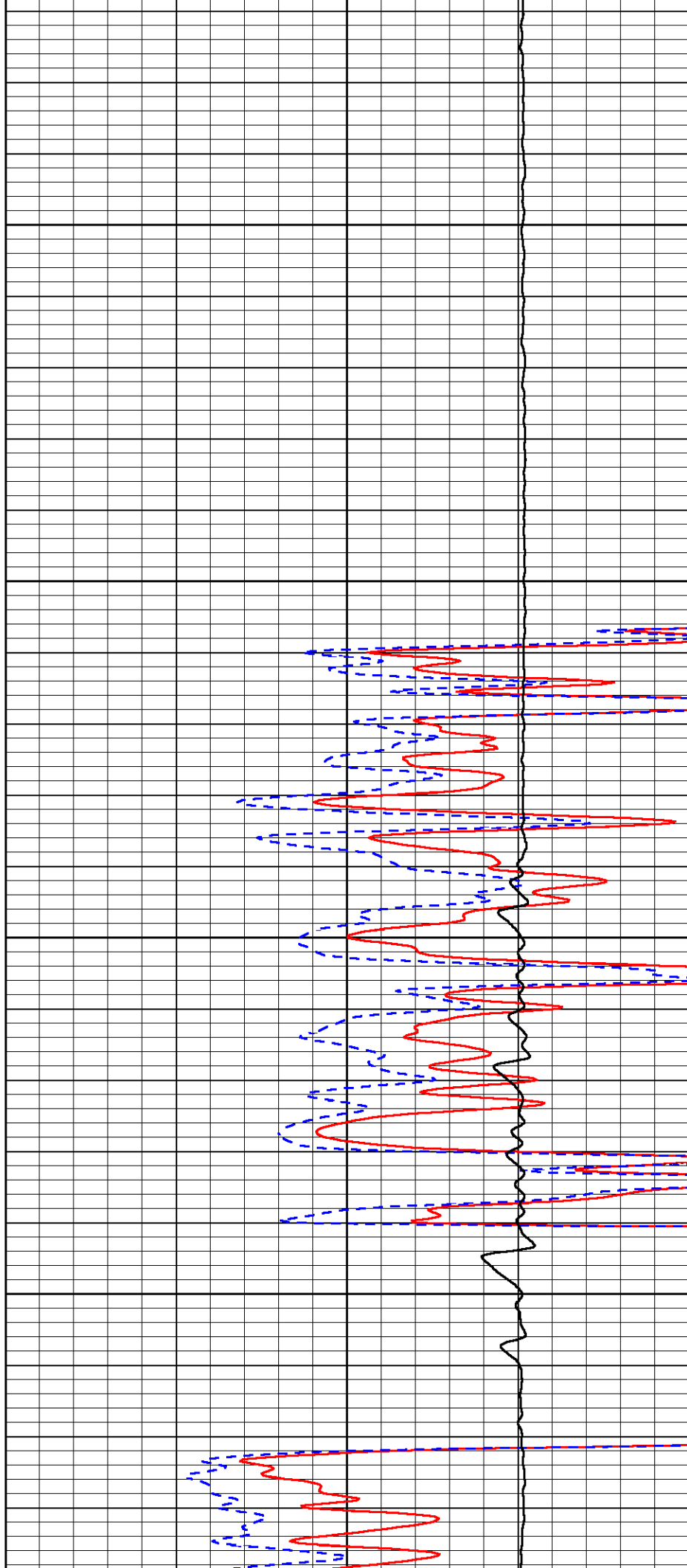


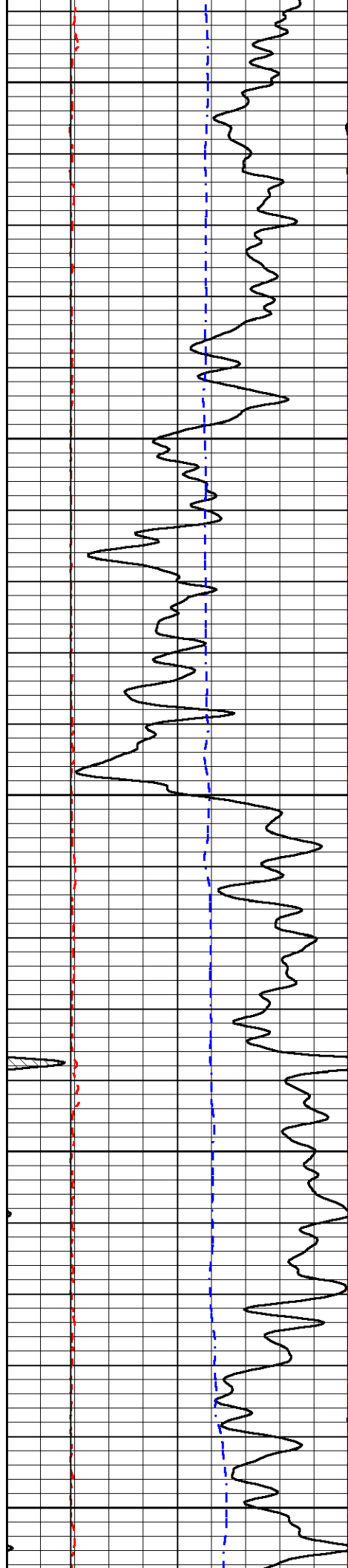
7900

7950

8000

8050





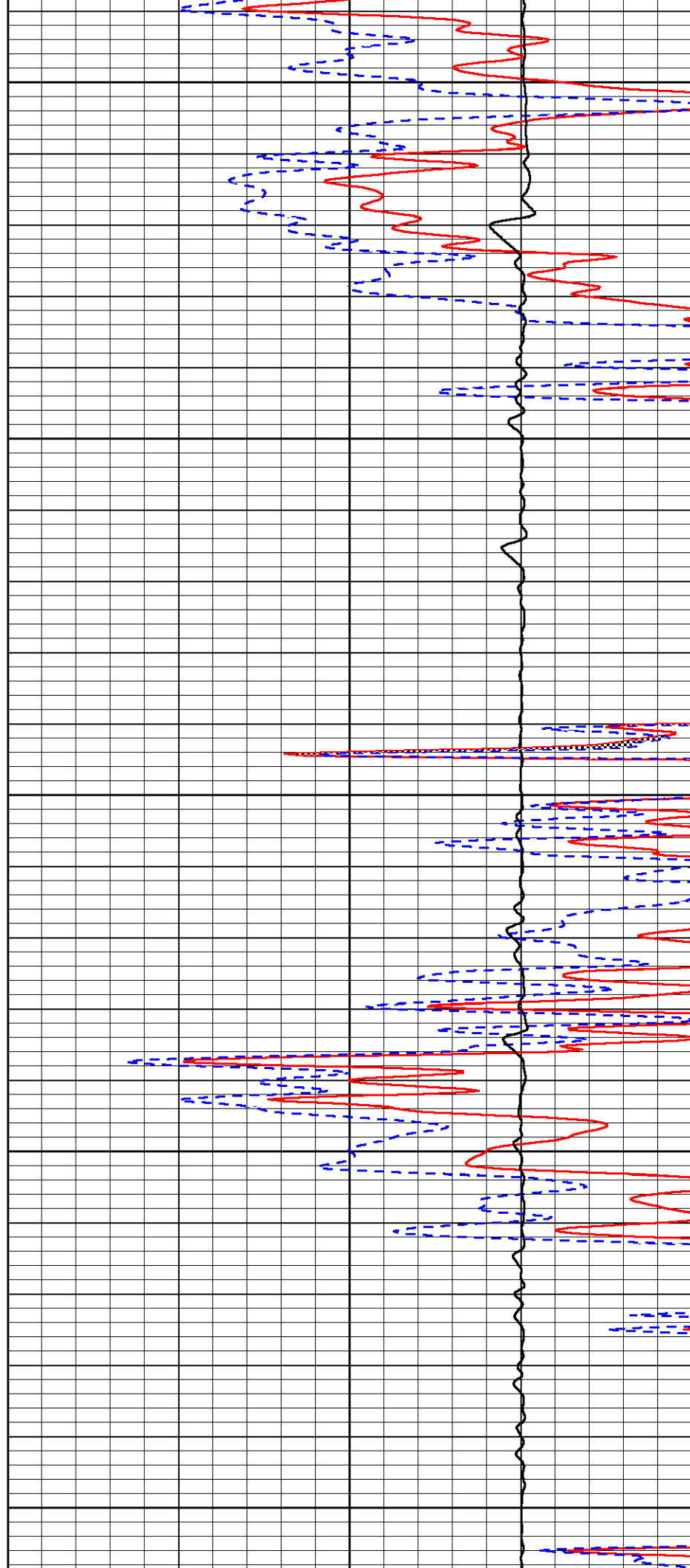
8100

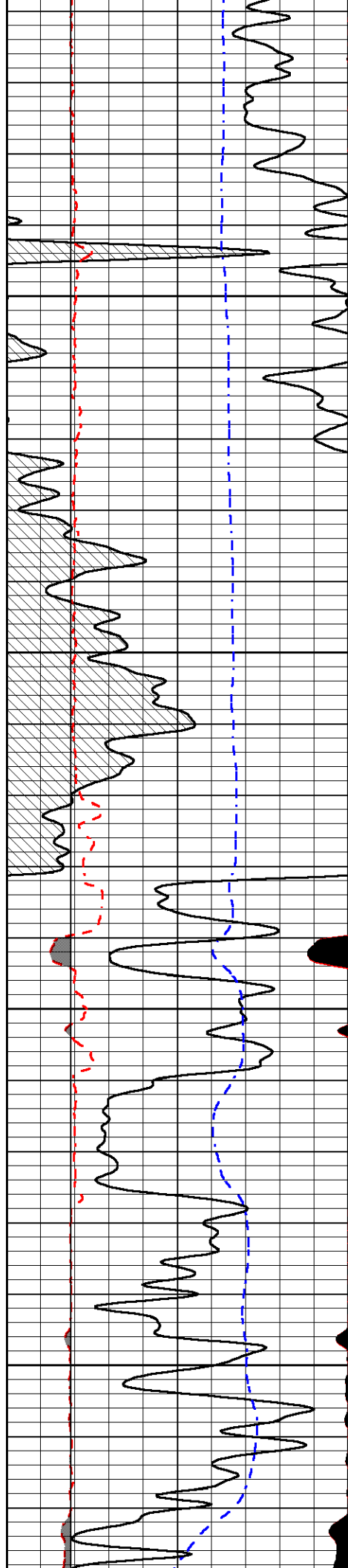
8150

8200

8250

8300



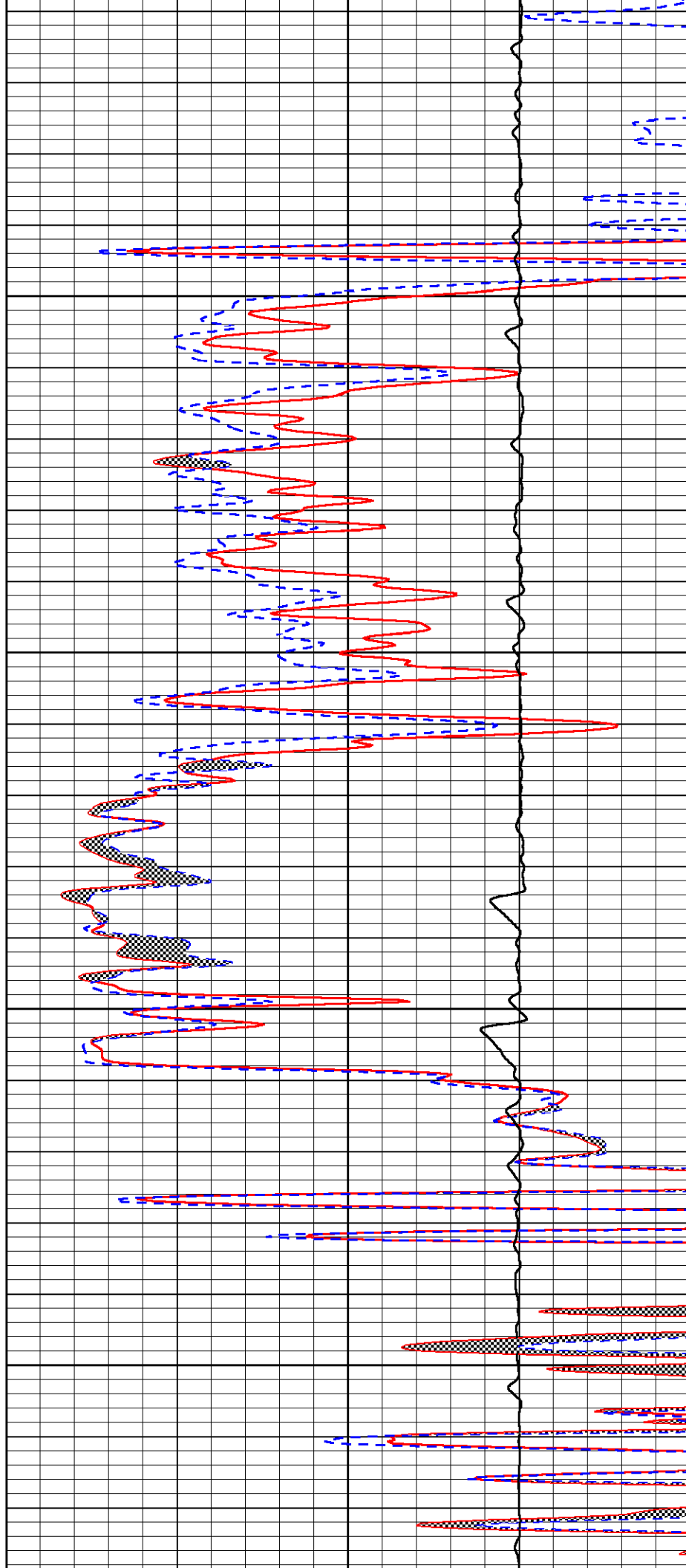


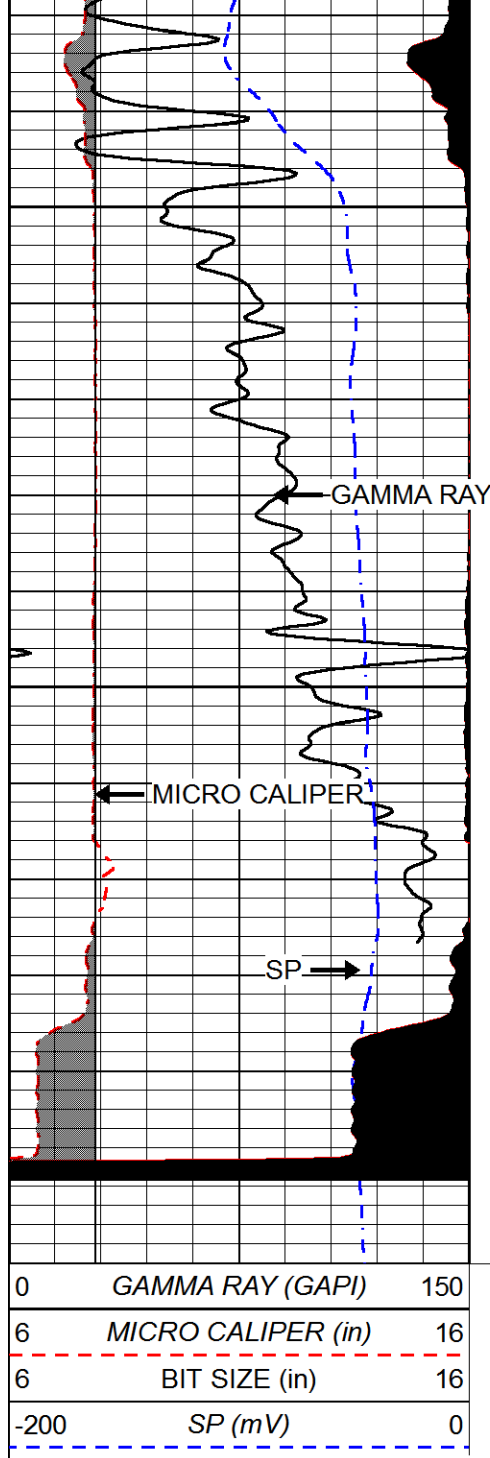
8350

8400

8450

8500

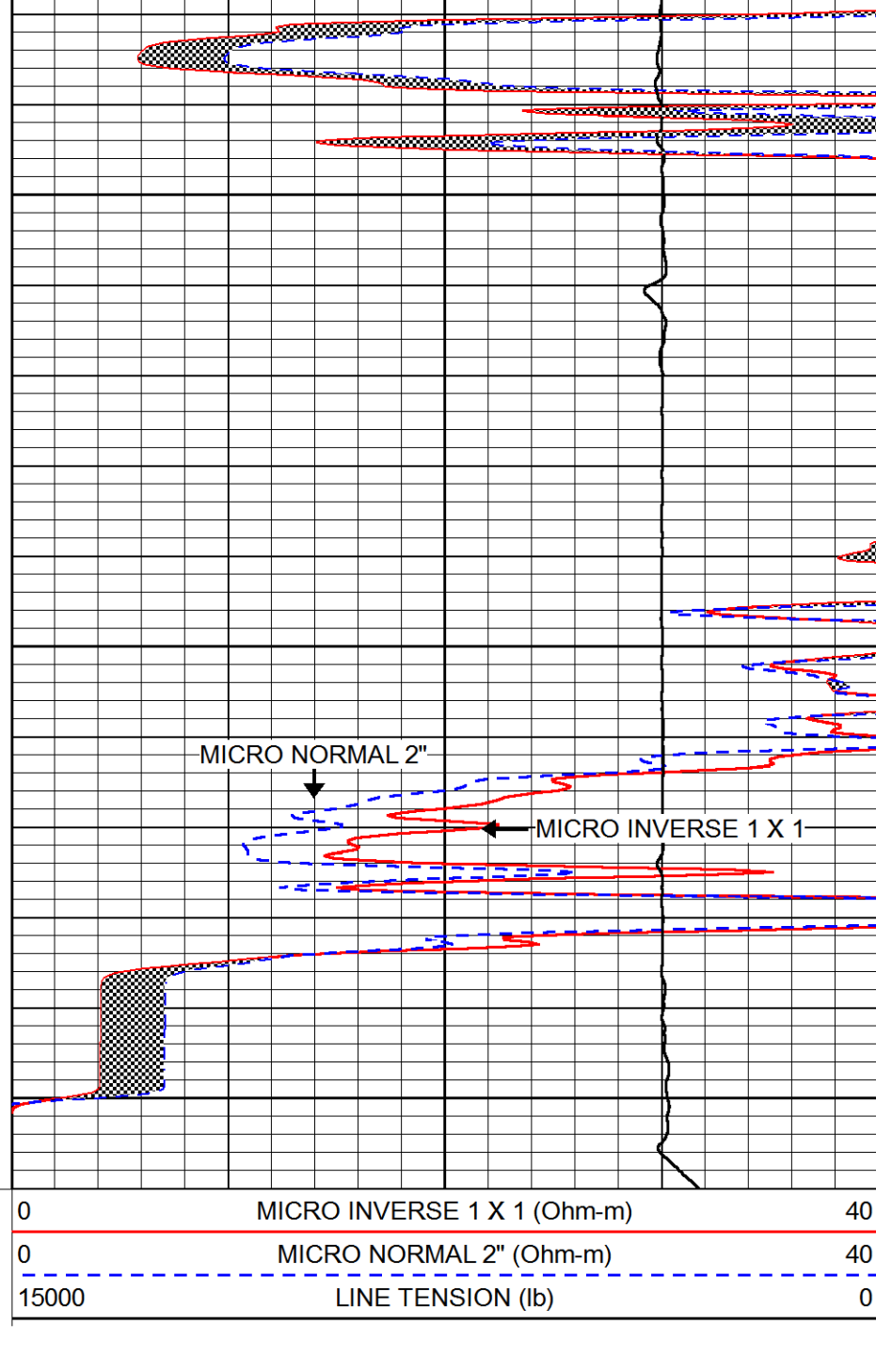




8550

8600

8650



### Calibration Report

Database File renegade\_state\_3\_33.db  
 Dataset Pathname stackml/pass2.1  
 Dataset Creation Wed Oct 03 05:10:29 2018

### Dual Induction Calibration Report

Serial-Model: 1987-M&W  
 Calibration Performed: Thu Aug 09 22:42:18 2018

Loop:	Readings		References		Results	
	Air	Loop	Air	Loop	Gain	Offset
Deep	178.615	710.235	0.000	255.800 mmho/m	0.530	-36.500
Medium	161.982	1441.110	0.000	255.800 mmho/m	0.440	-110.500

## Microlog Calibration Report

Serial-Model:  
Performed:PSI-02-PSI STKBL ML  
Sat Apr 07 12:01:20 2018

	Readings		References			Results	
	Zero	Cal	Zero	Cal		m	b
Normal	0.0031	0.0043	0.0000	10.0000	Ohm-m	34000.0000	-1.0000
Inverse	0.0000	0.0013	0.0000	10.0000	Ohm-m	34000.0000	0.0000
Caliper	1.0020	1.0834	5.5000	16.5000	in	135.1560	-131.5000

## Compensated Density Calibration Report

Serial-Model:

934-5002-M&amp;W

Source / Verifier:

/

Master Calibration Performed:

Wed Aug 29 11:03:55 2018

## Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.755	g/cc	3720.16	2661.79	cps
Aluminum	2.685	g/cc	696.57	1725.83	cps
Spine Angle = 75.50			Density/Spine Ratio = 0.537		
	Size		Reading		
Small Ring	4.00	in	1.16		
Large Ring	16.00	in	1.01		

## Compensated Neutron Calibration Report

Serial Number:

tk10-MW

Tool Model:

M&amp;W

Calibration Performed:

Wed Nov 16 11:21:36 2016

Detector	Readings		Target		Normalization
Short Space	6240.00	cps	1000.00	cps	1.6025
Long Space	460.00	cps	1000.00	cps	1.9500

## Gamma Ray Calibration Report

Serial Number:

89-M&amp;W

Tool Model:

M&amp;W

Calibration Performed:

Tue Apr 11 17:08:01 2017

Calibrator Value:

1000.0

GAPI

Background Reading:

0.0

cps

Calibrator Reading:

6.2

cps

Sensitivity:

0.5200

GAPI/cps



Company

RENEGADE OIL &amp; GAS

Well

STATE OF COLORADO #3-33

Field

BRAVE



***PIONEER***

Pioneer Energy Services

TABLE

County

ARAPAHOE

State

COLORADO