



Weatherford

**COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG**

COMPANY GRAND MESA OPERATING COMPANY

WELL BSB 1-22

FIELD WILDCAT

PROVINCE/COUNTY NESS

COUNTRY/STATE U.S.A. / KANSAS

LOCATION 1140' FSL & 110' FEL

PERMIT NUMBER NE NE SE SE

SEC 22 TWP 19S RGE 23W Other Services

Latitude 38.381277 MA/MFE MSS

Longitude -99.843523

API Number 15-135-25820

Permanent Datum GL, Elevation 2269 feet

Log Measured From KB

Drilling Measured From KB @ 11 FEET

Elevations:
KB 2280.00 feet
DF 2278.00
GL 2269.00

Date 05-DEC-2014

Run Number ONE

Service Order 7036-104986928

Depth Driller 4561.00 feet

Depth Logger 4558.00 feet

First Reading 4526.26 feet

Last Reading 3558.00 feet

Casing Driller 221.00 feet

Casing Logger 220.00 feet

Bit Size 7.875 inches

Hole Fluid Type WBM

Density / Viscosity 9.20 lb/USg 51.00 CP

PH / Fluid Loss 9.00 8.80 ml/30Min

Sample Source MUDPIT

Rm @ Measured Temp 0.717 @ 75.0 ohm-m

Rmf @ Measured Temp 0.574 @ 65.0 ohm-m

Rmc @ Measured Temp 0.86 @ 75.0 ohm-m

Source Rmf / Rmc CALC CALC

Rm @ BHT 0.494 @ 111.0 ohm-m

Time Since Circulation 4 HOURS

Max Recorded Temp 112.00 deg F

Equipment / Base 13096 LIB

Recorded By DEREK CARTER

Witnessed By STEVE CARL

JOB # LB14-373

BOREHOLE RECORD

Last Edited: 05-DEC-2014 16:51

Bit Size inches	Depth From feet	Depth To feet
7.875	221.00	4561.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	221.00	24.00

REMARKS

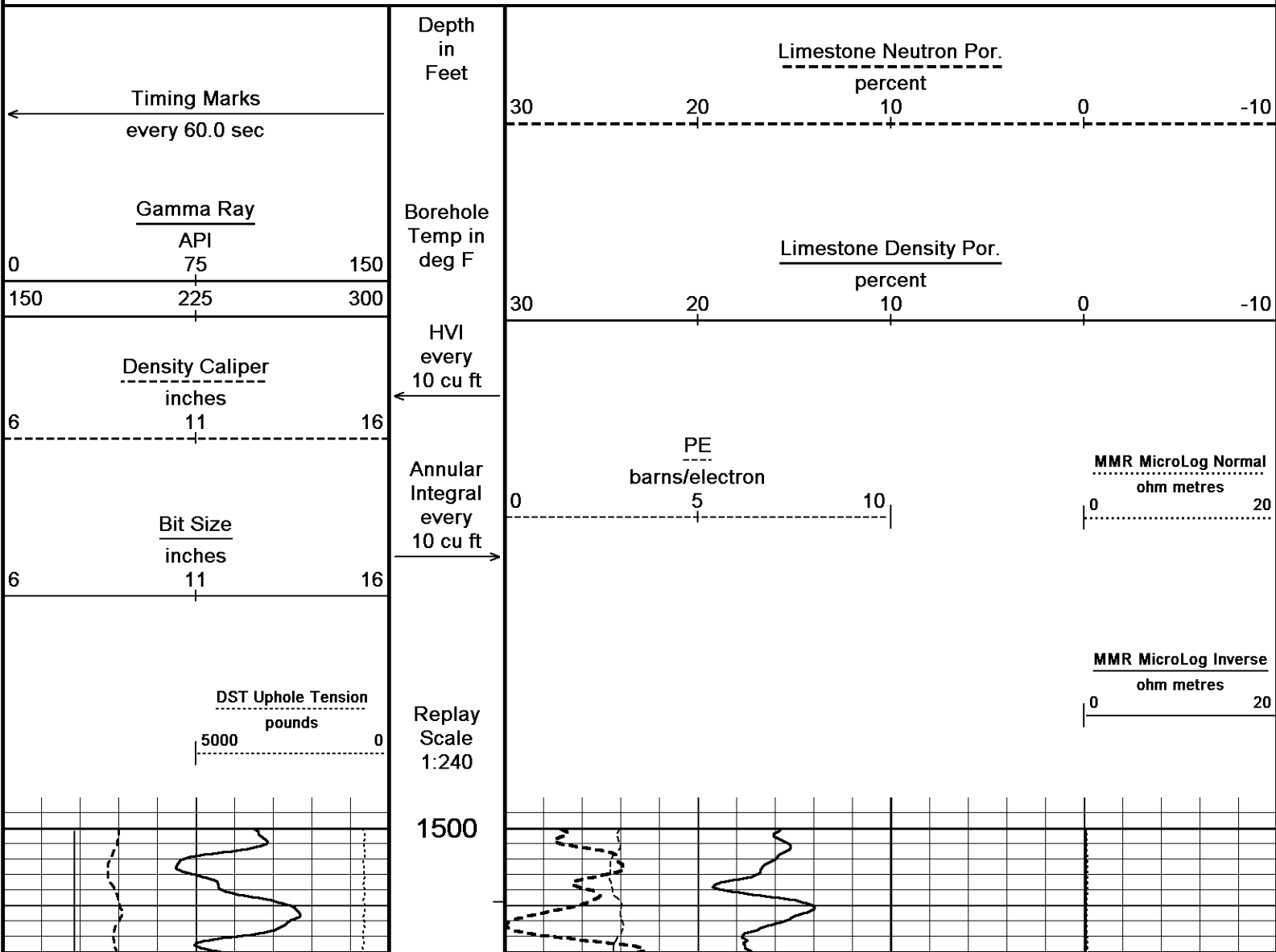
- SOFTWARE ISSUE: WLS 14.05.5280
- TOOL STRING: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION
- HARDWARE:
 - MDN: DUAL BOWSPRING ECCENTRALIZER
 - MFE: 1 X 0.5 INCH STANDOFF
 - MSS: 2 X 0.5 INCH STANDOFF
 - MAI: 2 X 0.5 INCH STANDOFF
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST
- TOTAL HOLE VOLUME FROM TD TO 3558 FT.: 330 CU. FT.

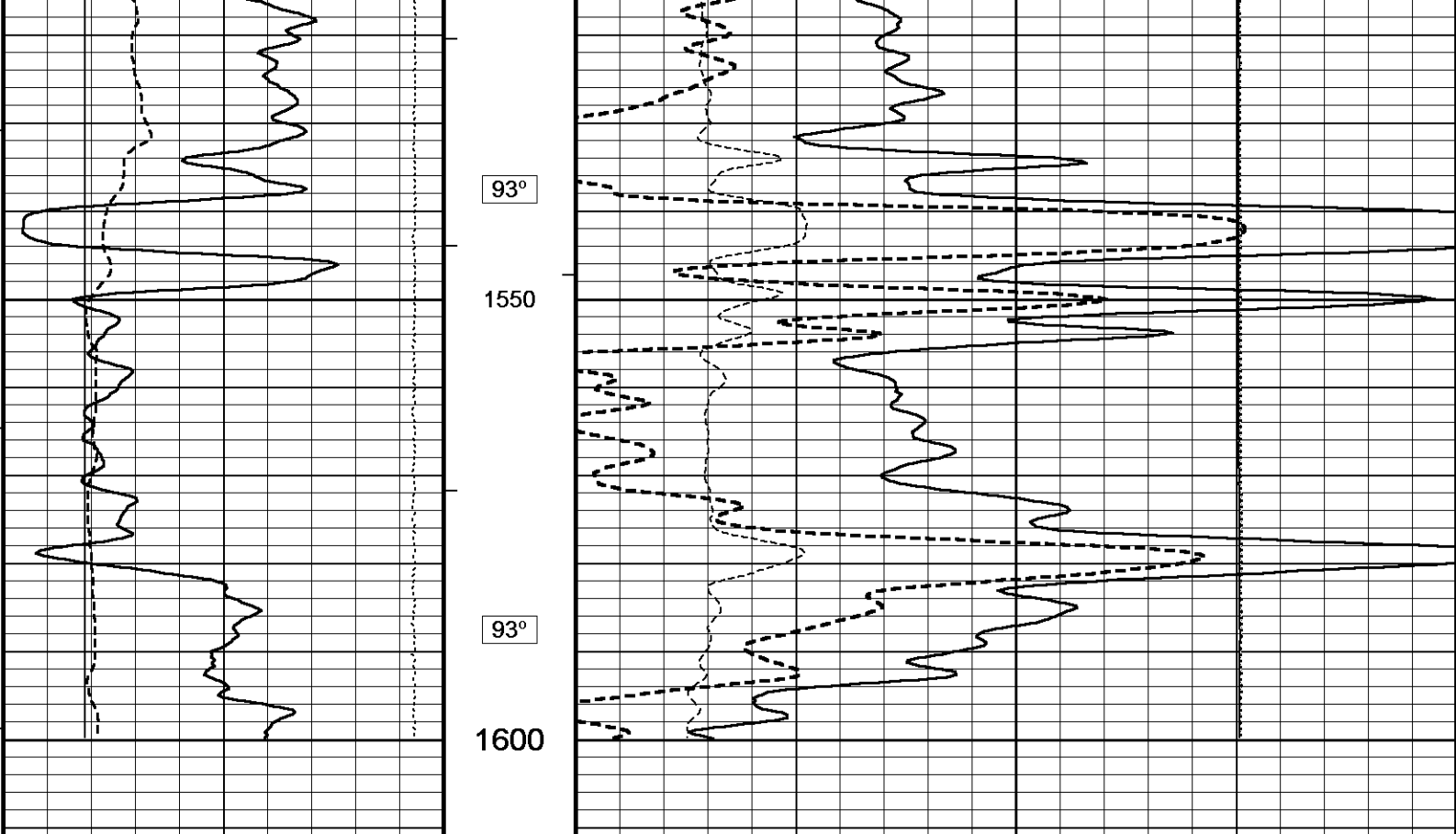
- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO 3558 FT.: 150 CU. FT.
- SERVICE ORDER #7036-104986928
- RIG: DUKE DRILLING #4
- ENGINEER: DEREK CARTER
- OPERATORS: CARLOS RAMIREZ

In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.

5 INCH LIMESTONE MAIN - ANHYDRITE SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 05-DEC-2014 19:47
 Filename: C:\Minimus 14.05\Log Data\Grand Mesa BSB 1-22\Grand Mesa BSB 1-22 Main.dta Recorded on 05-DEC-2014 17:24
 System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280





Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0

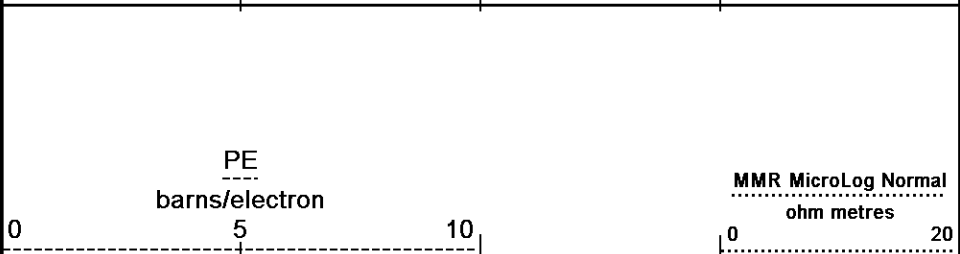
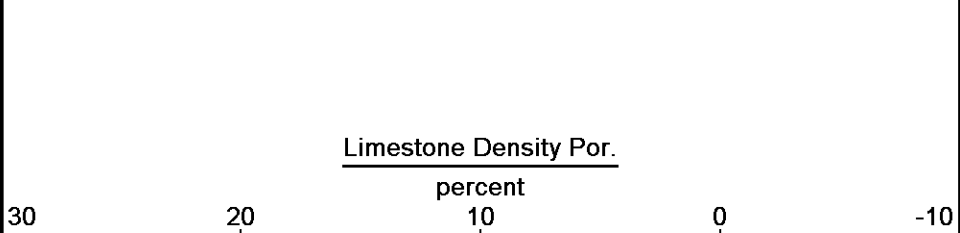
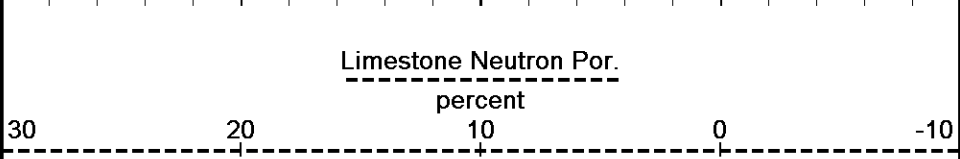
Depth
in
Feet

Borehole
Temp in
deg F

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

Replay
Scale
1:240



Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 05-DEC-2014 19:47
 Filename: C:\Minimus 14.05\Log Data\Grand Mesa BSB 1-22\Grand Mesa BSB 1-22 Main.dta
 Recorded on 05-DEC-2014 17:24
 System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280

5 INCH LIMESTONE MAIN - ANHYDRITE SECTION

5 INCH LIMESTONE MAIN

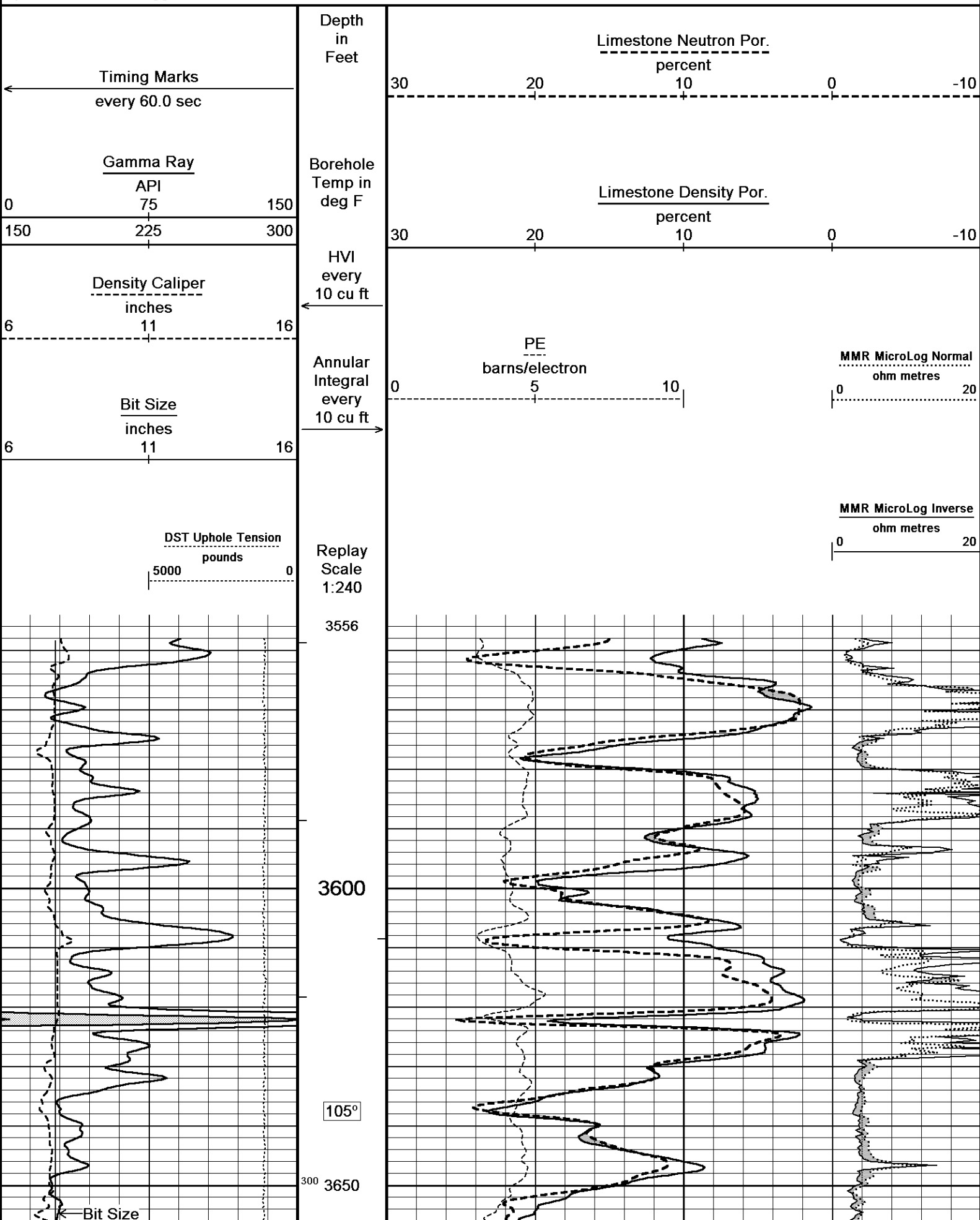
Depth Based Data - Maximum Sampling Increment 10.0cm

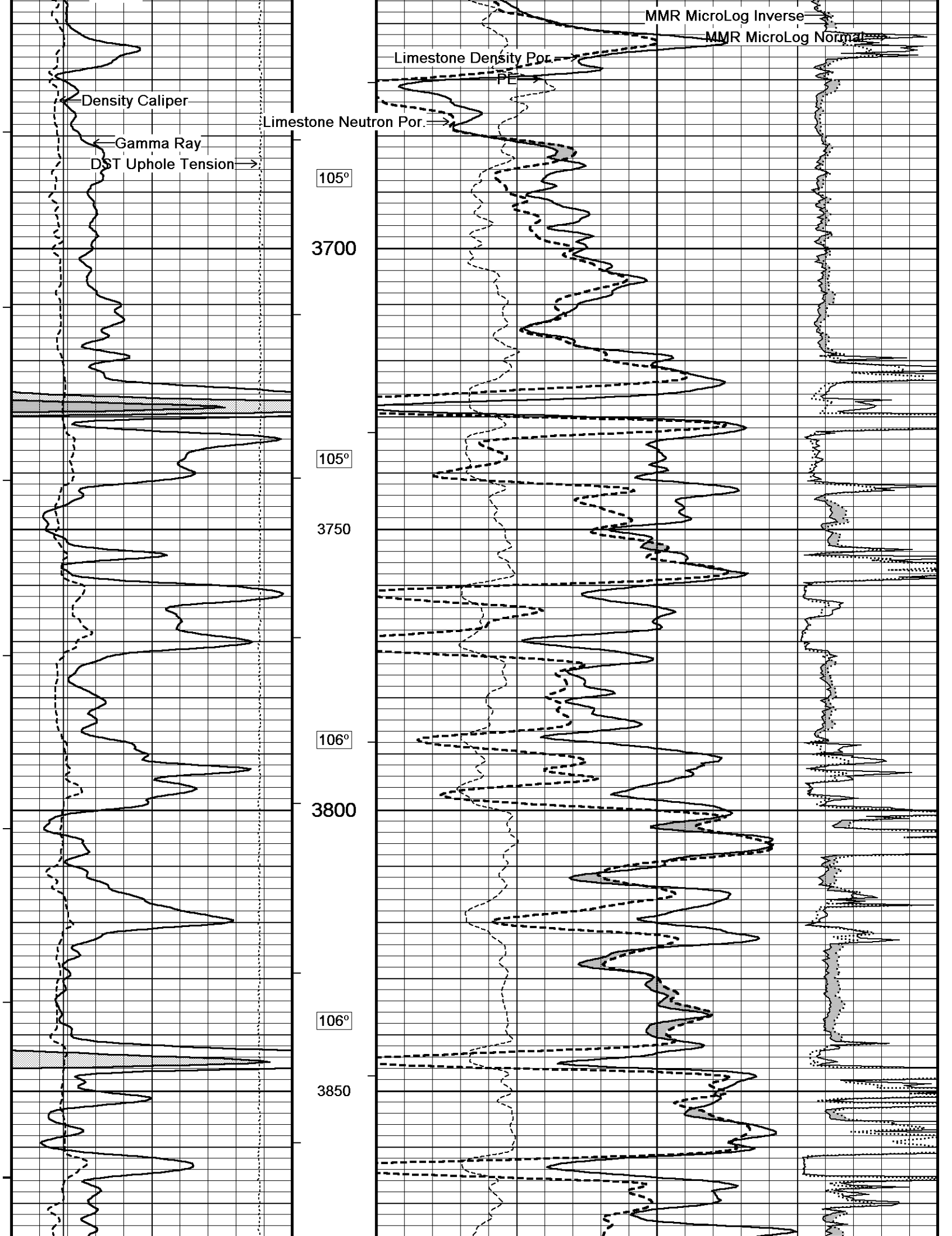
Plotted on 05-DEC-2014 19:47

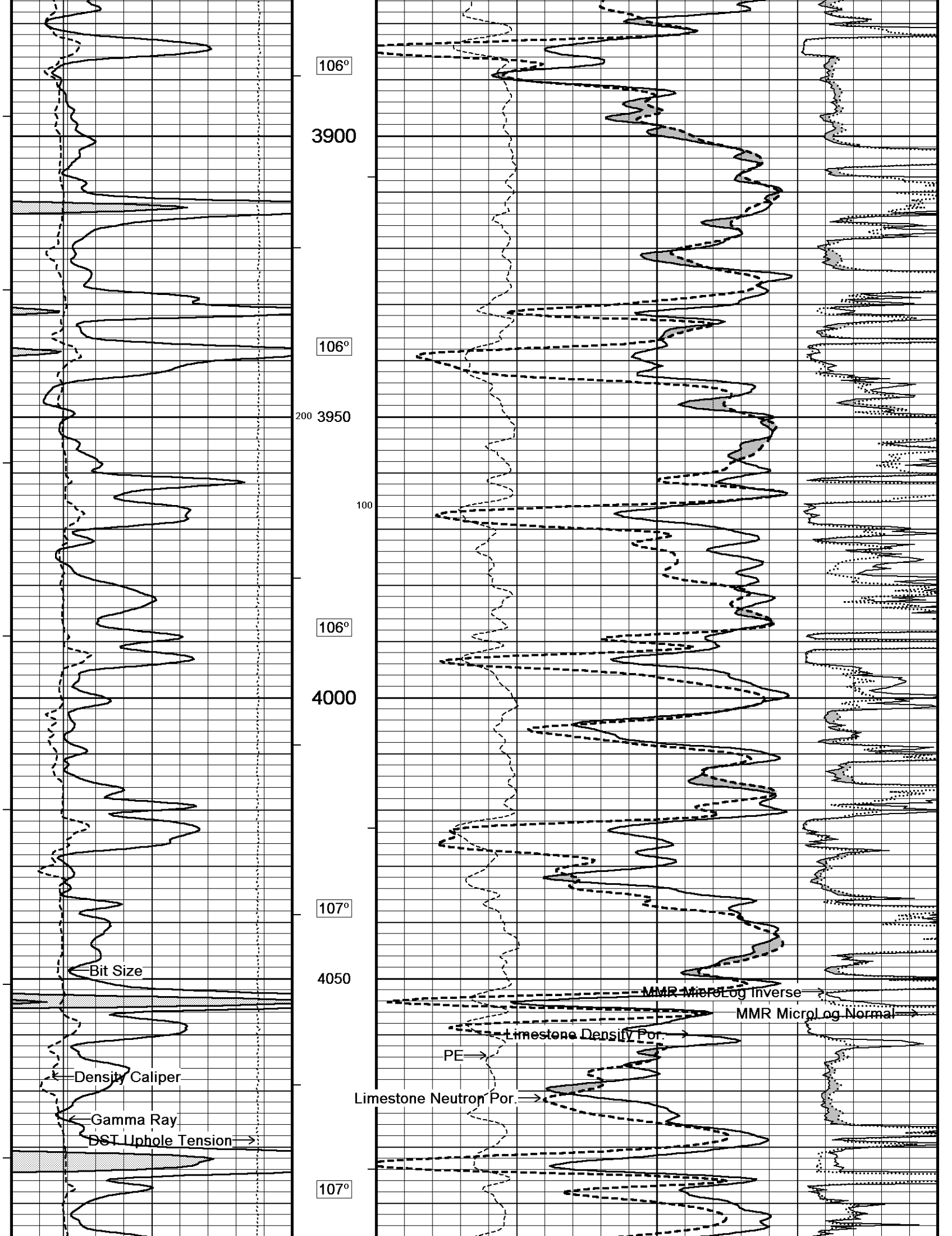
Filename: C:\Minimus 14.05\Log Data\Grand Mesa BSB 1-22\Grand Mesa BSB 1-22 Main.dta

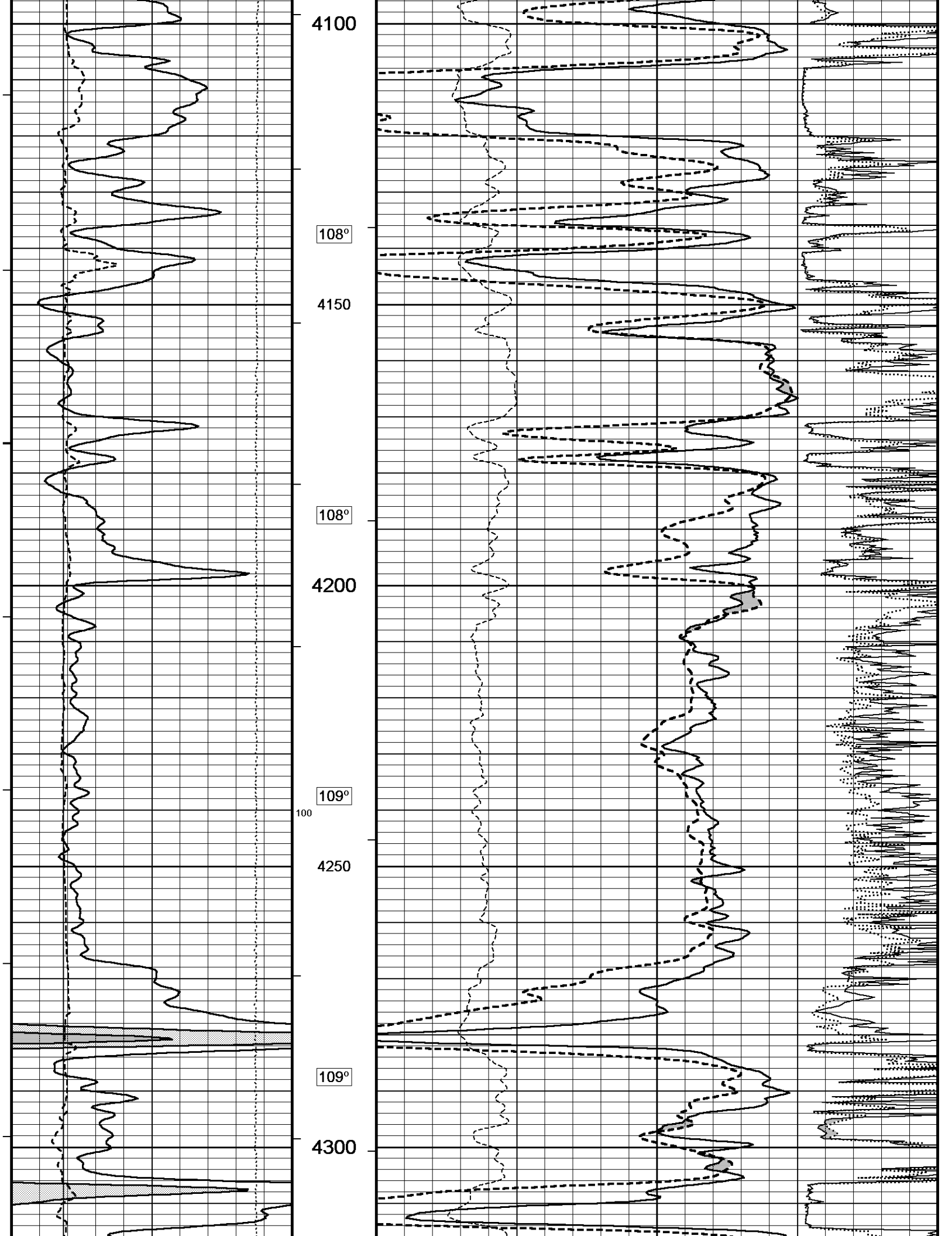
Recorded on 05-DEC-2014 17:24

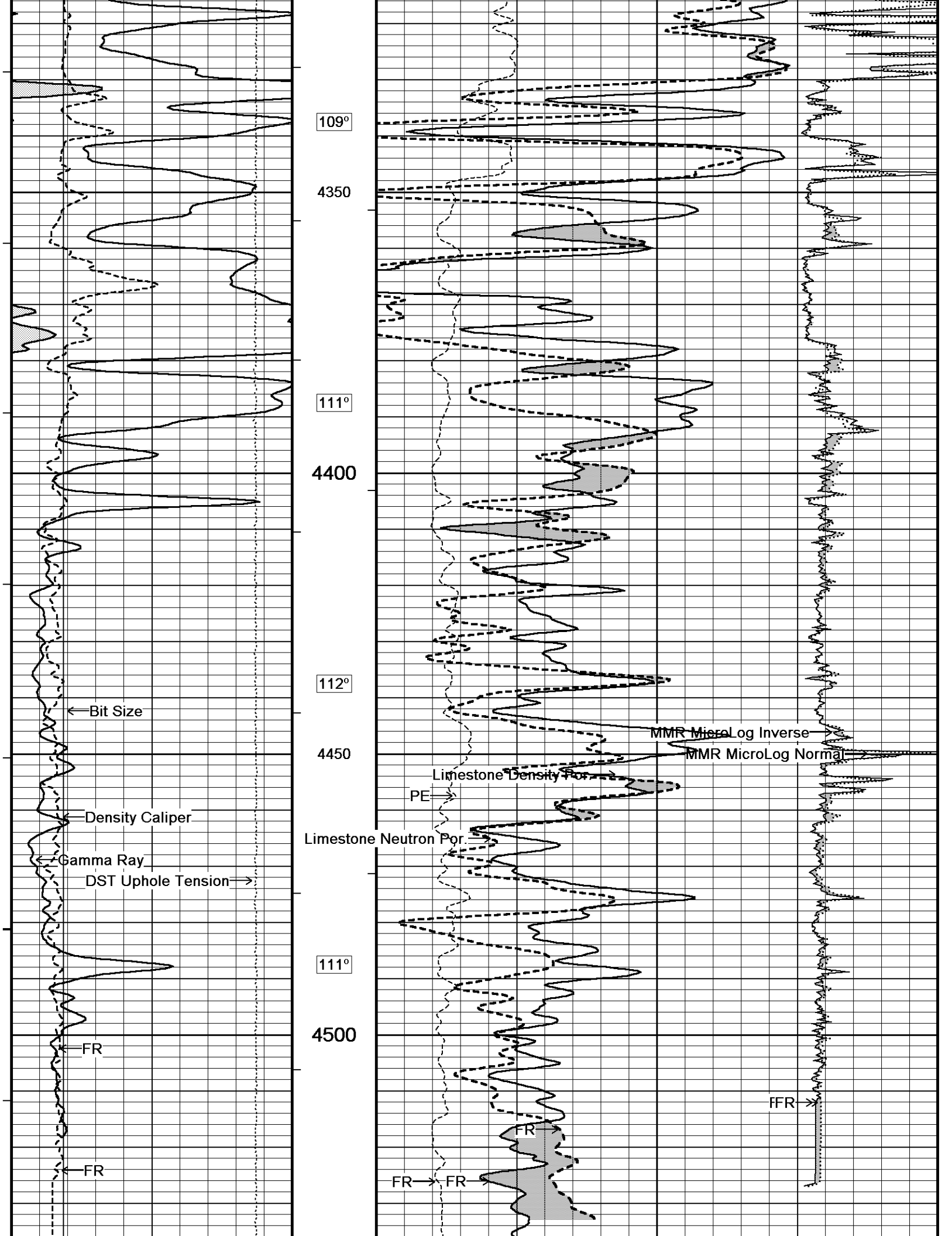
System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280

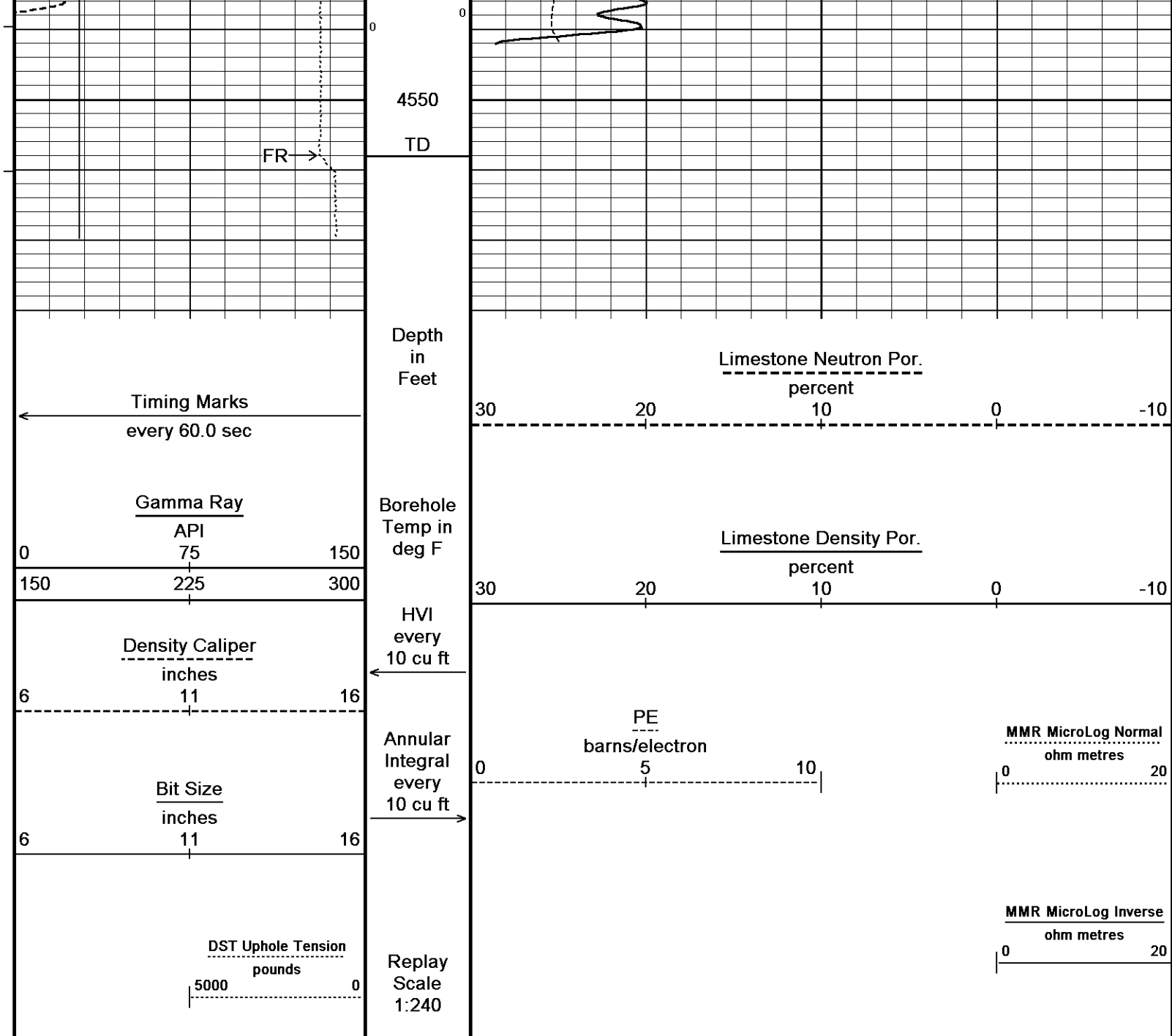










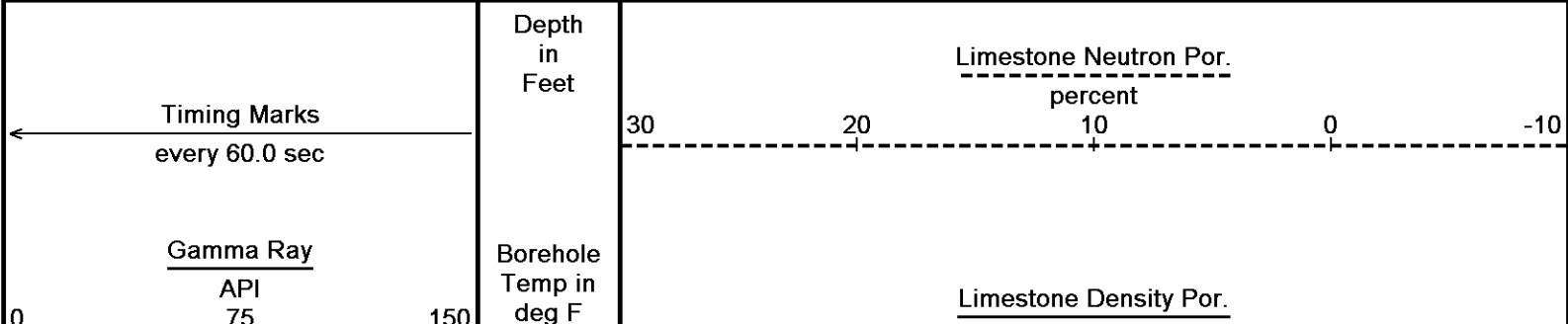


Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 05-DEC-2014 19:47
 Filename: C:\Minimus 14.05\Log Data\Grand Mesa BSB 1-22\Grand Mesa BSB 1-22 Main.dta Recorded on 05-DEC-2014 17:24
 System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280

↑ 5 INCH LIMESTONE MAIN ↑

↓ REPEAT SECTION ↓

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 05-DEC-2014 19:47
 Filename: C:\Minimus 14.05\Log Data\Grand Mesa BSB 1-22\Grand Mesa BSB 1-22 Repeat.dta Recorded on 05-DEC-2014 17:12
 System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280

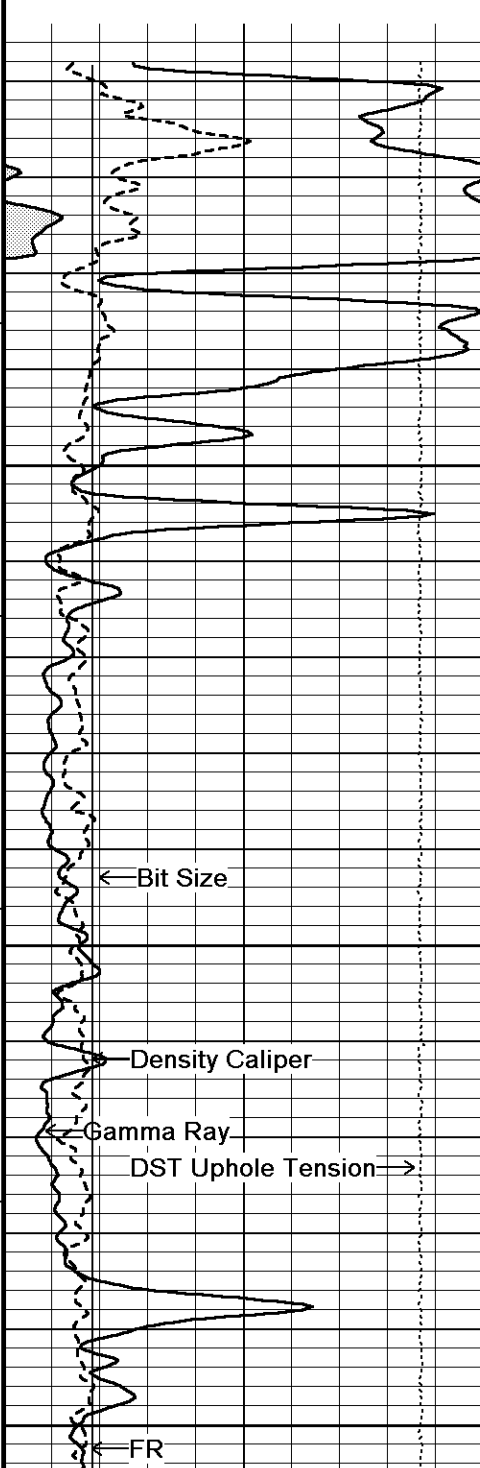


150 225 300

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0



HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

Replay
Scale
1:240

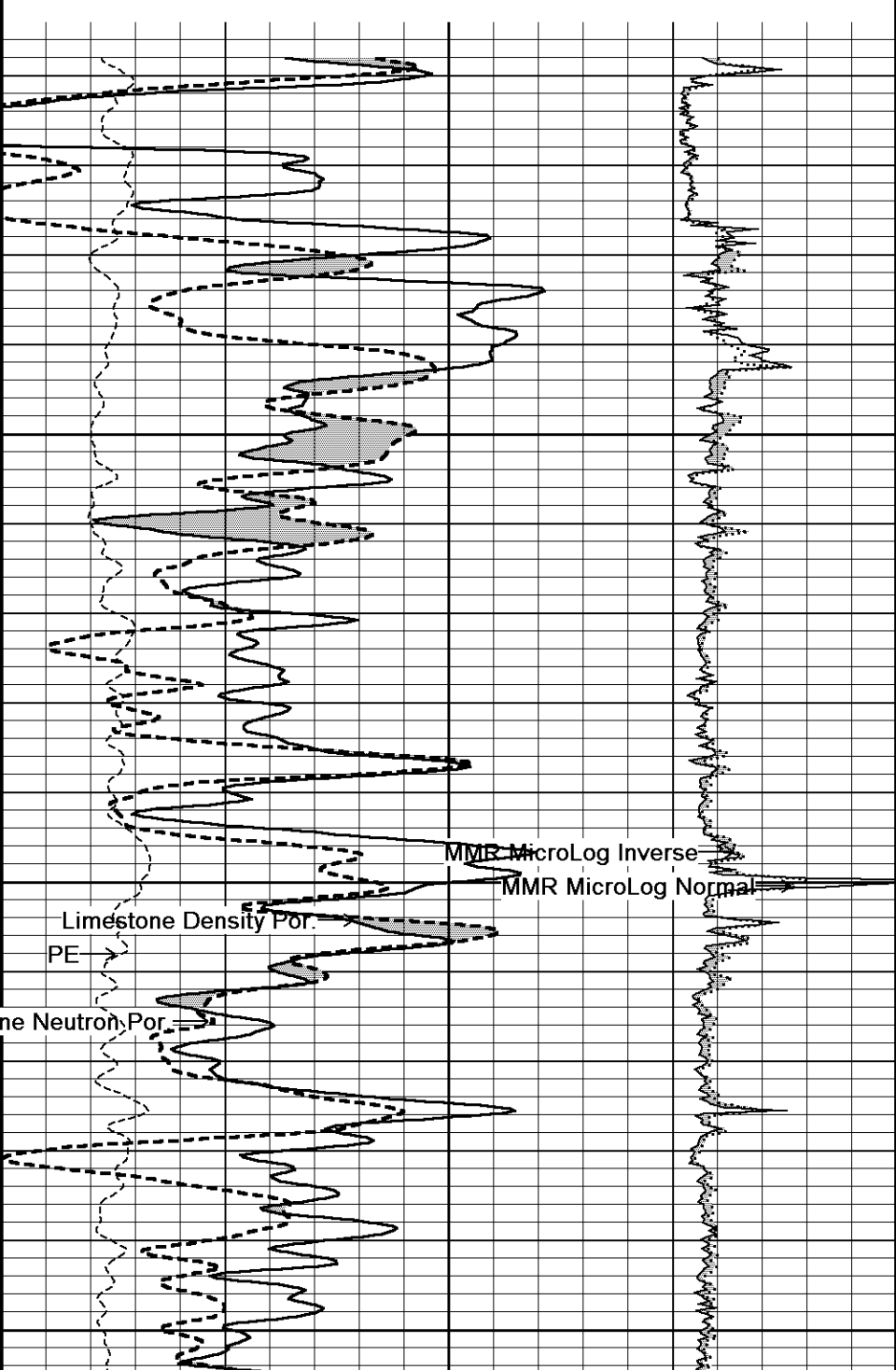


percent
30 20 10 0 -10

PE
barns/electron
0 5 10

MMR MicroLog Normal
ohm metres
0 20

MMR MicroLog Inverse
ohm metres
0 20



4356

4400

111°

4450

111°

4500

← Bit Size

Density Caliper

← Gamma Ray

DST Uphole Tension →

← FR

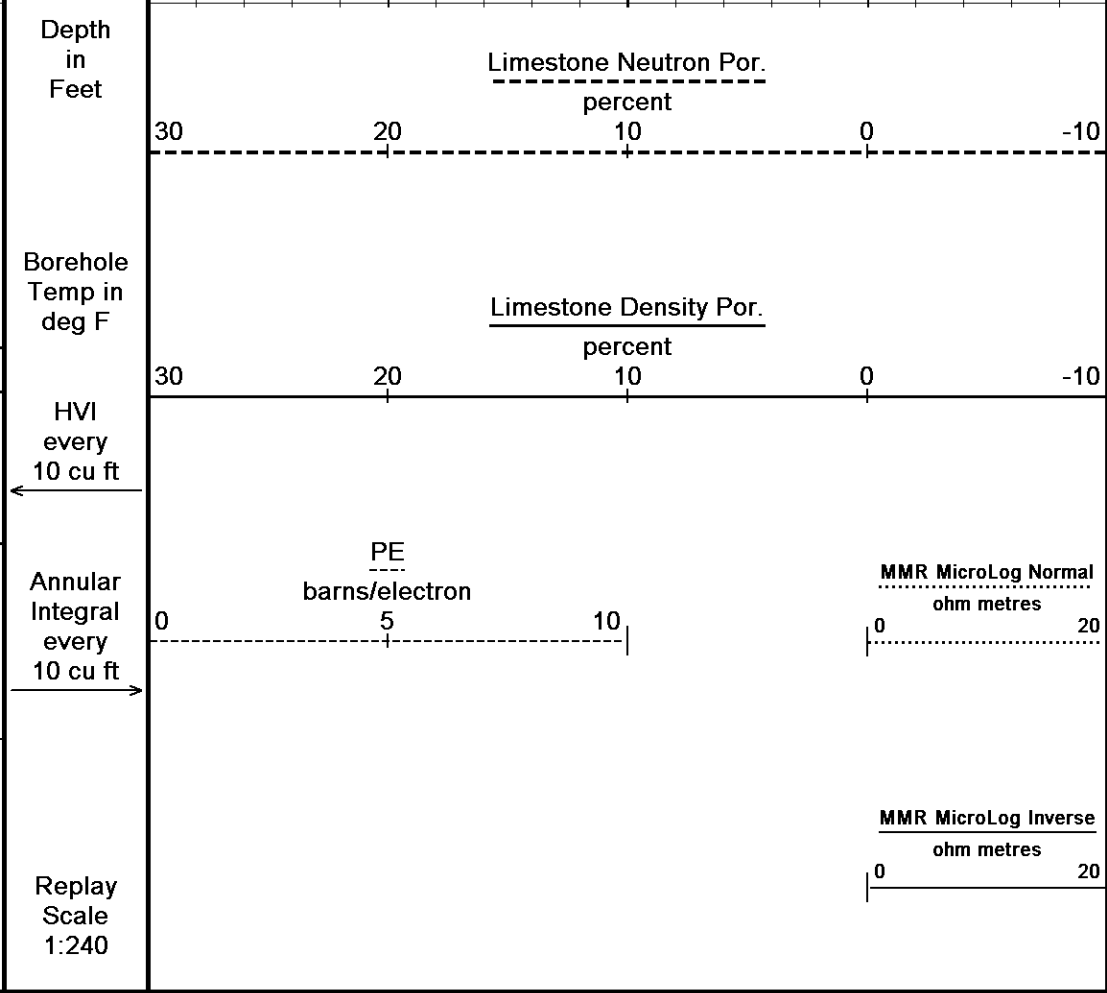
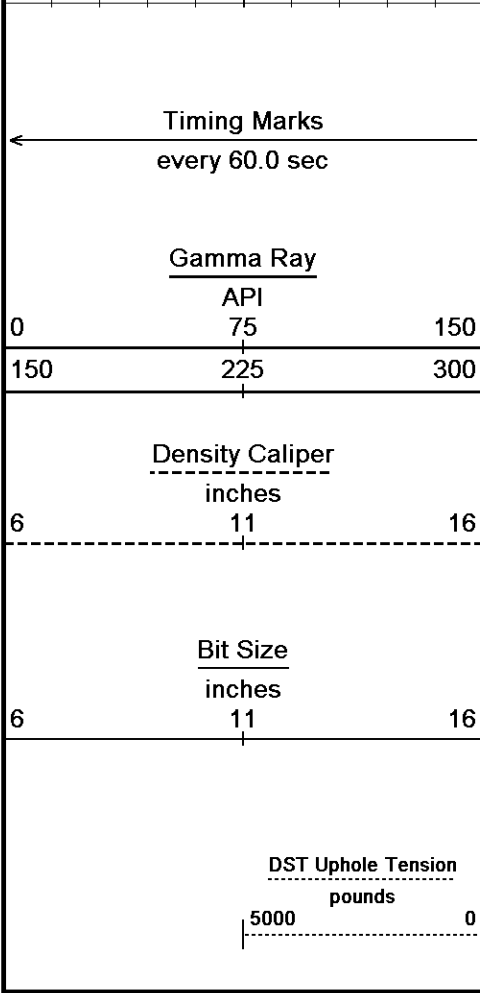
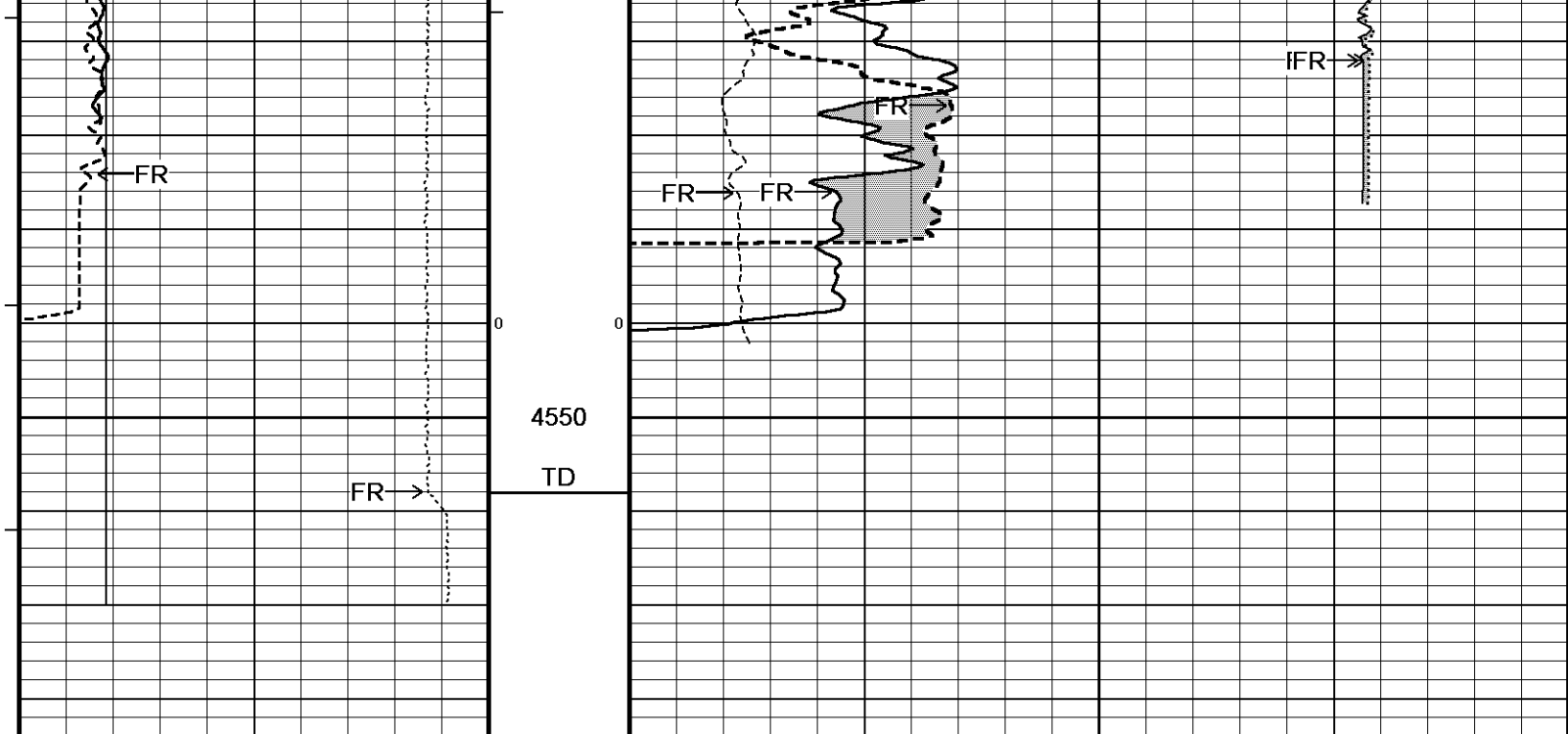
Limestone Density Por.

PE →

Limestone Neutron Por.

MMR MicroLog Inverse

MMR MicroLog Normal

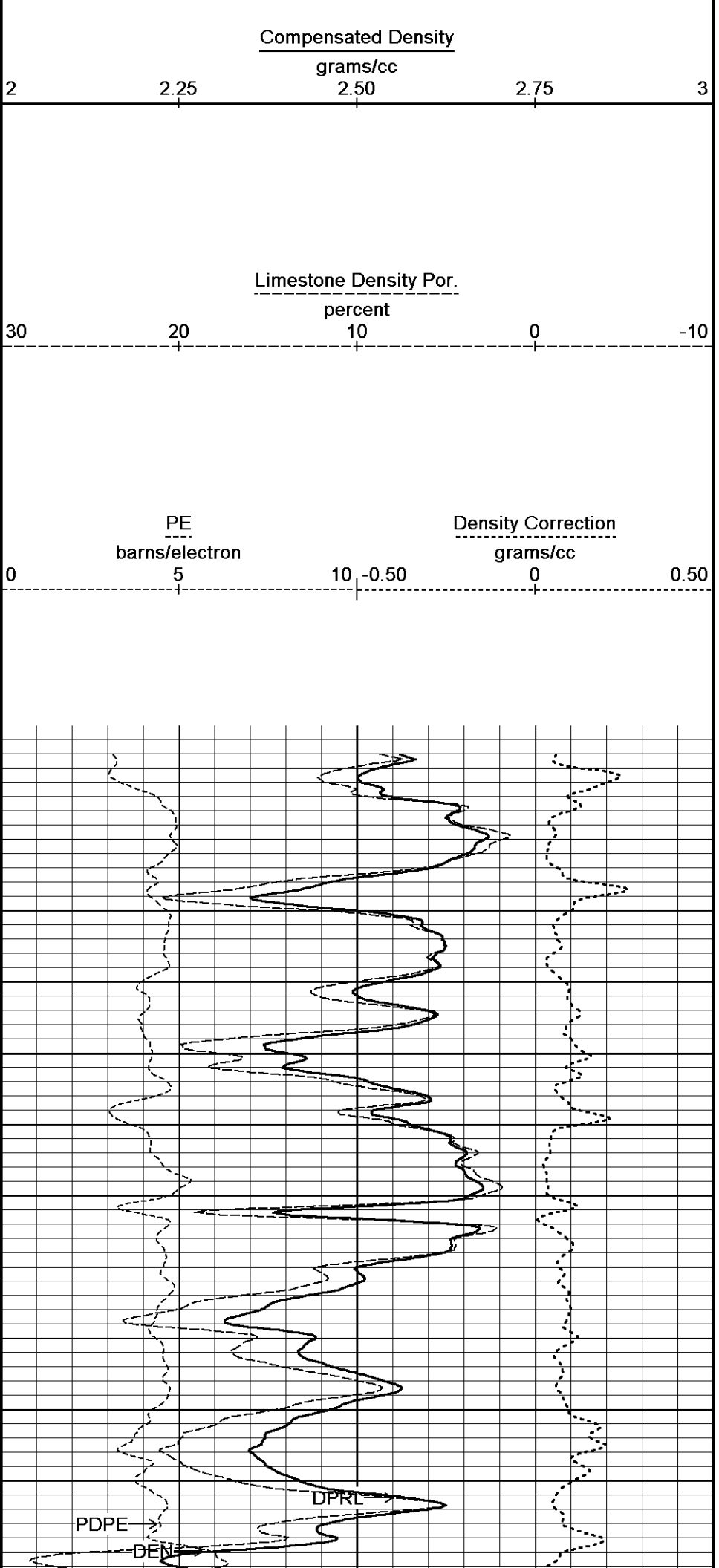
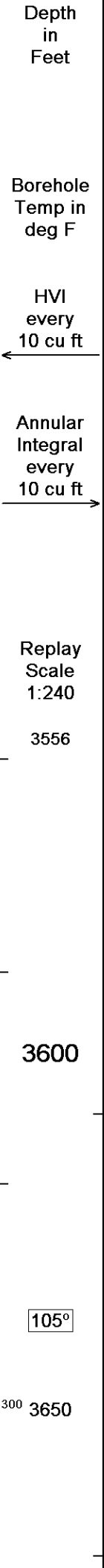
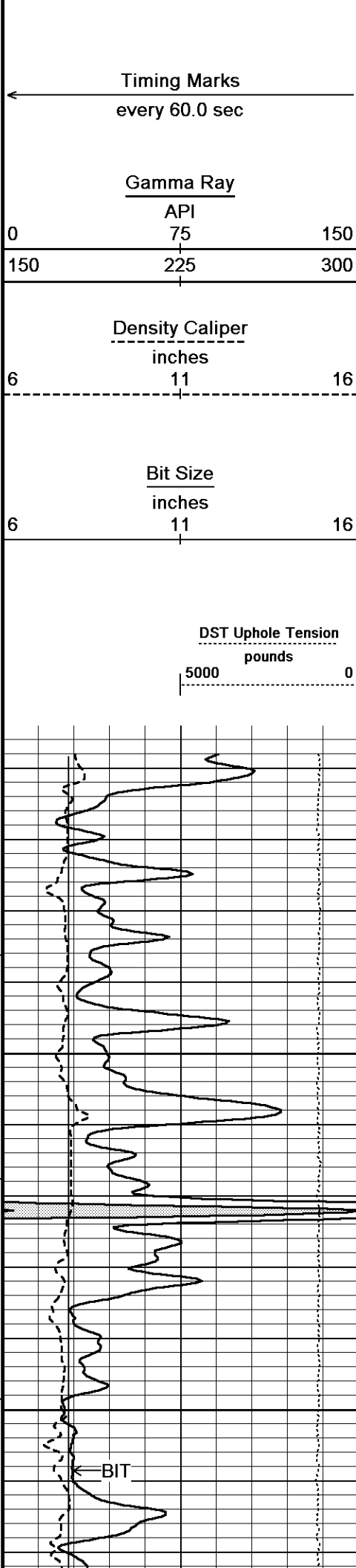


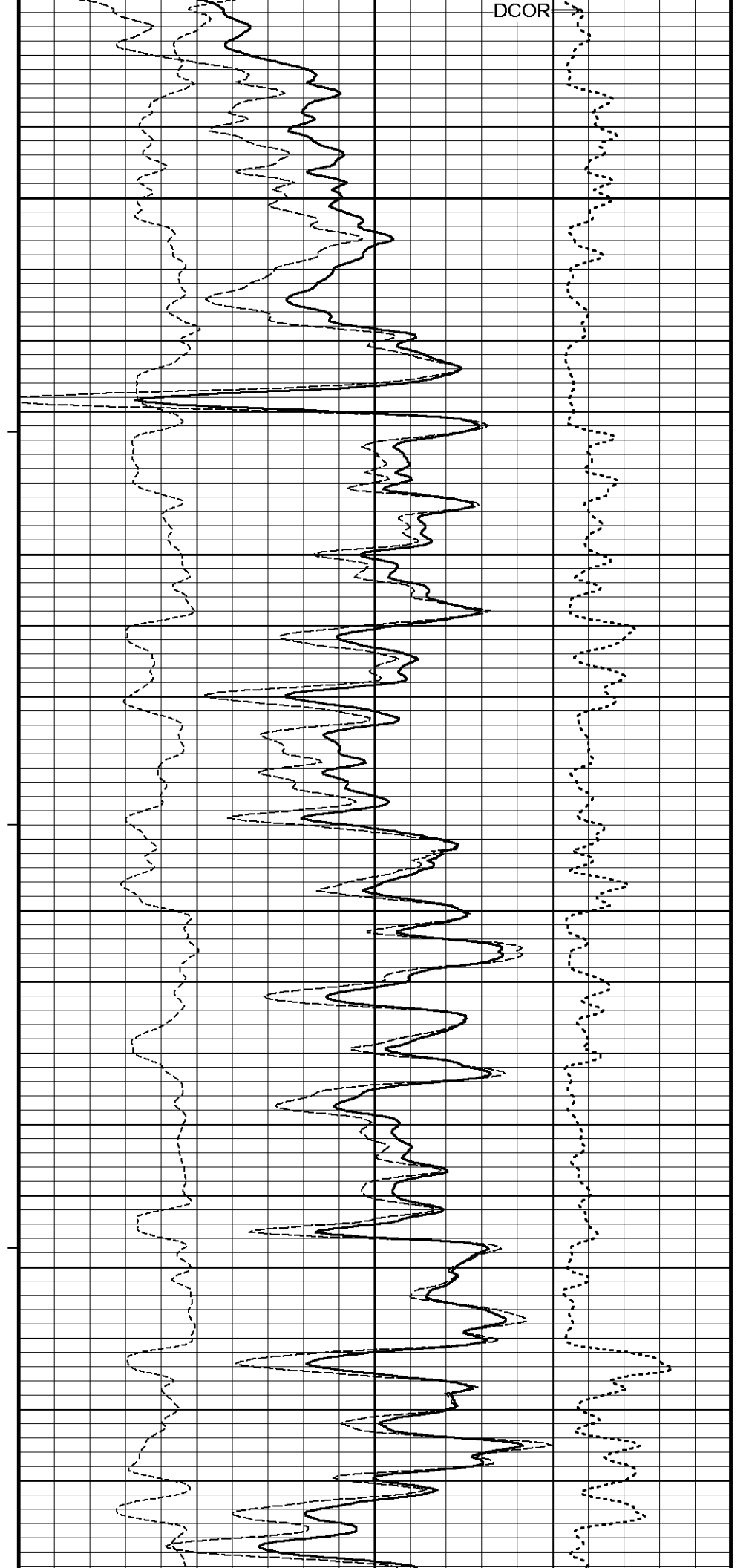
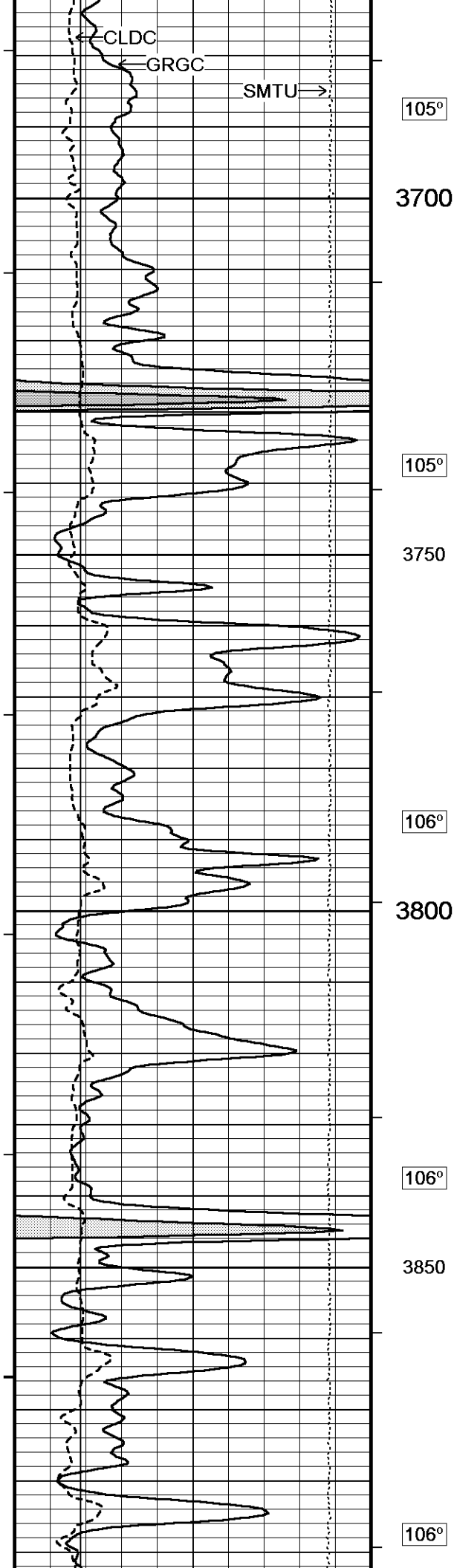
Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 05-DEC-2014 19:47
 Filename: C:\Minimus 14.05\Log Data\Grand Mesa BSB 1-22\Grand Mesa BSB 1-22 Repeat.dta
 Recorded on 05-DEC-2014 17:12
 System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280

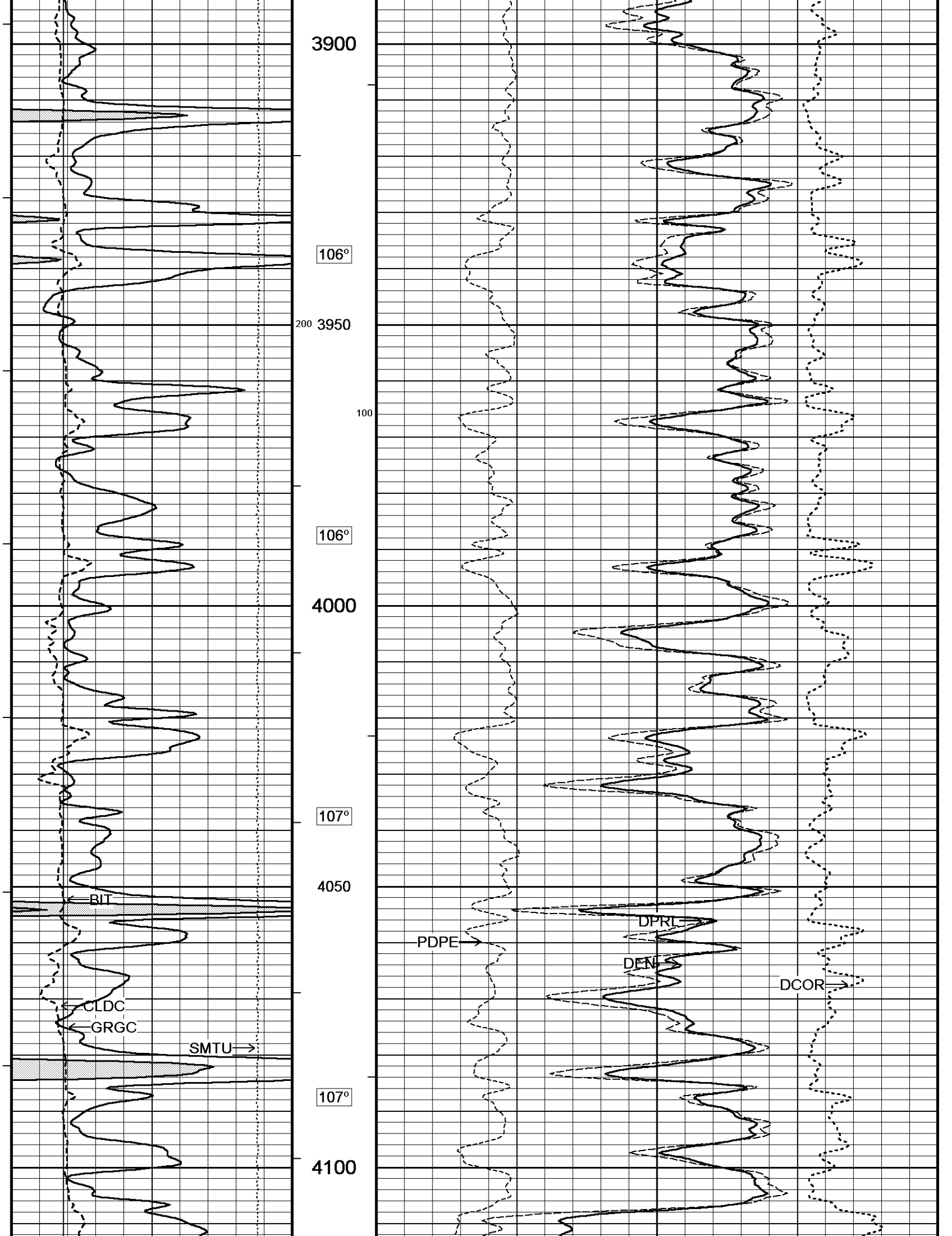
↑ REPEAT SECTION ↑

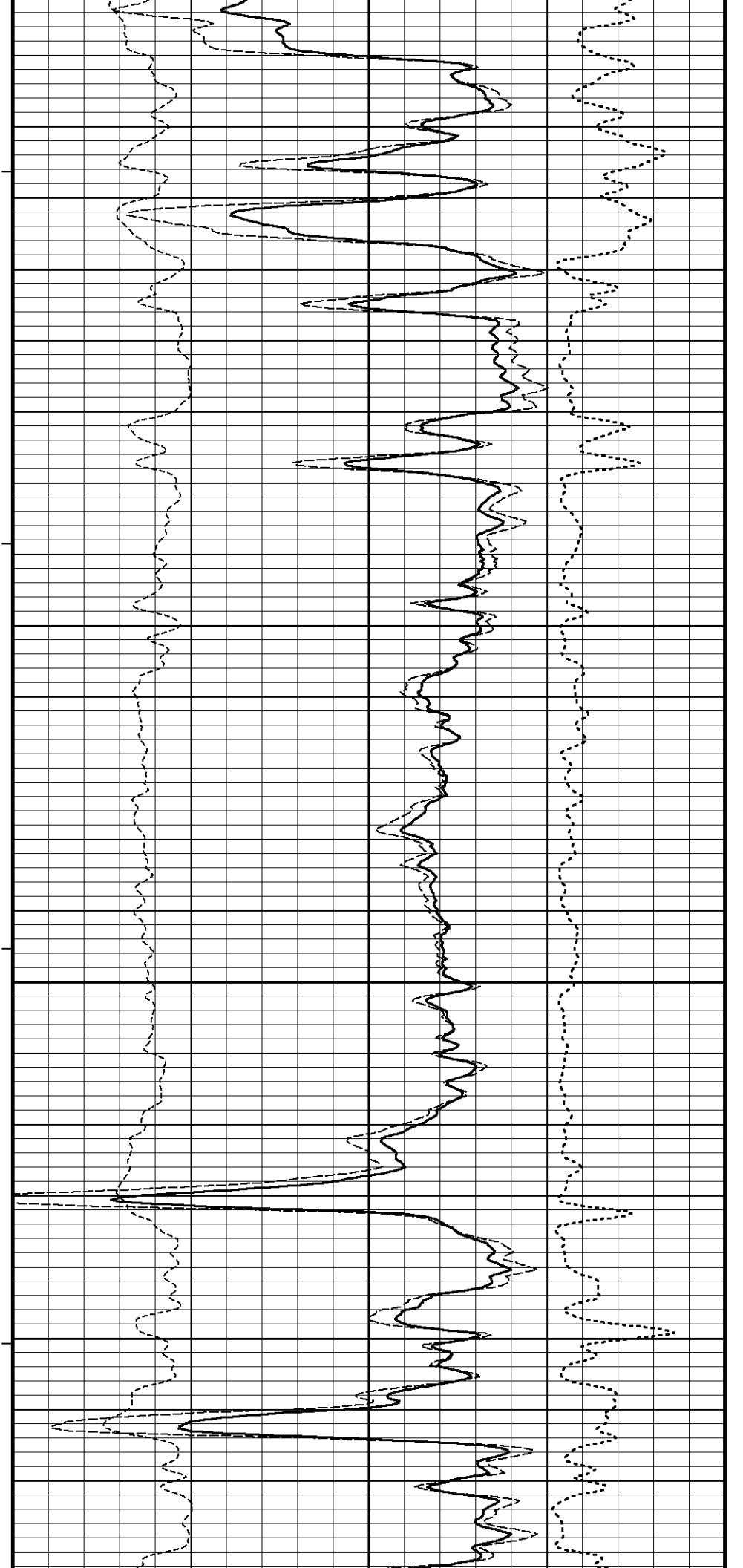
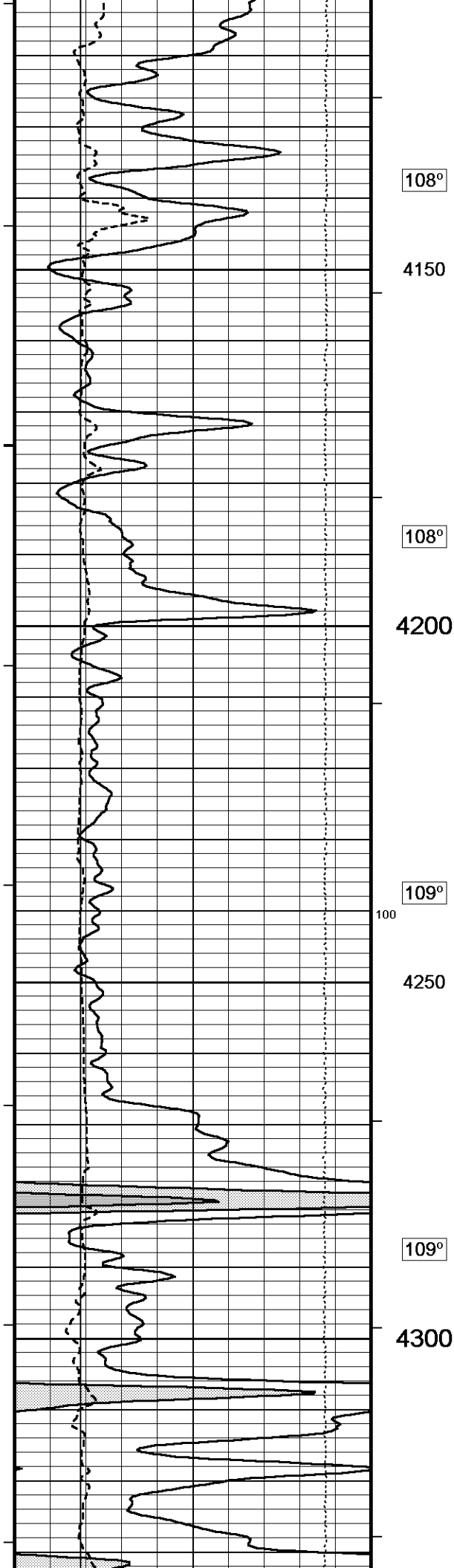
↓ 5 INCH BULK DENSITY MAIN ↓

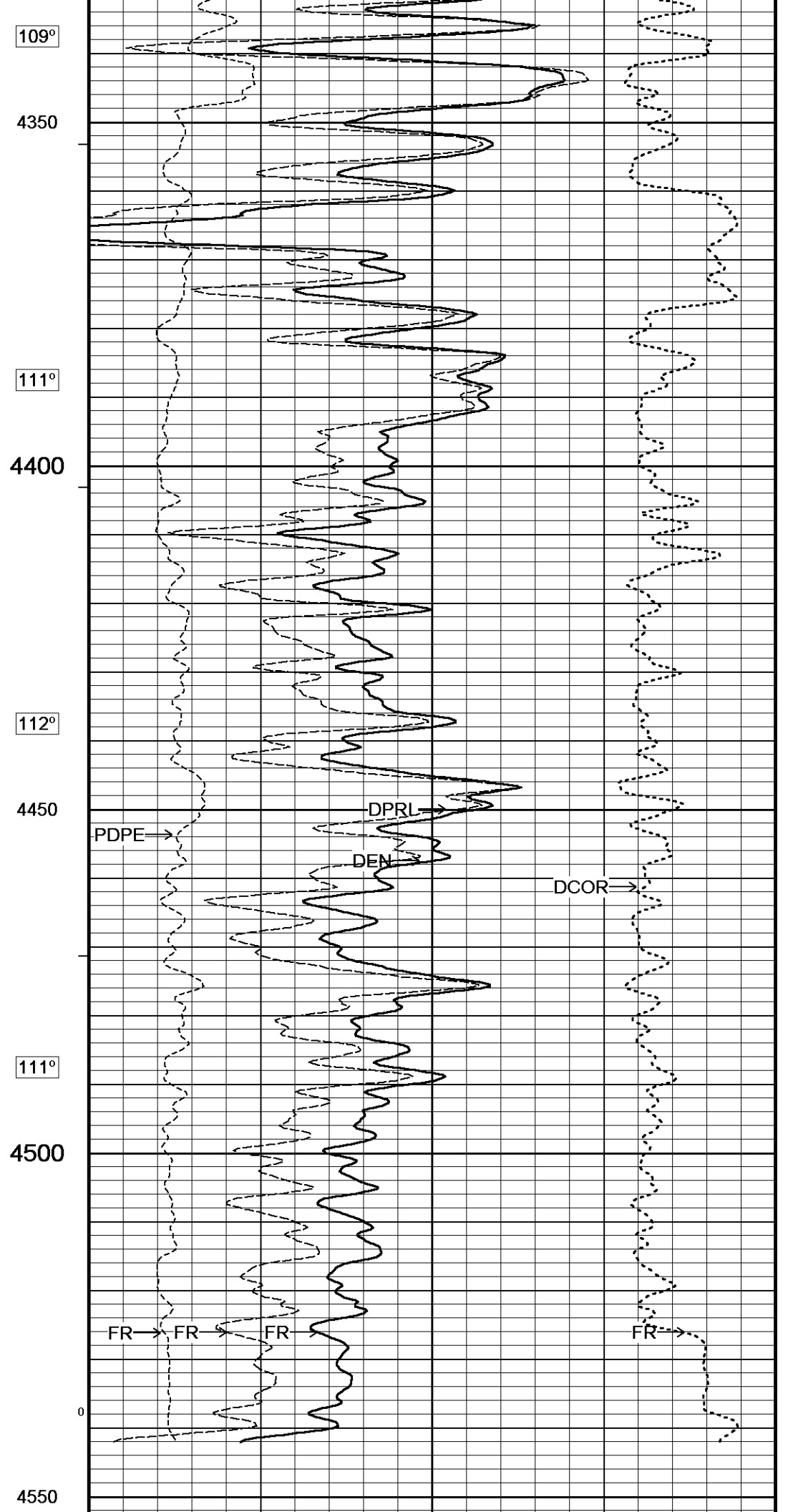
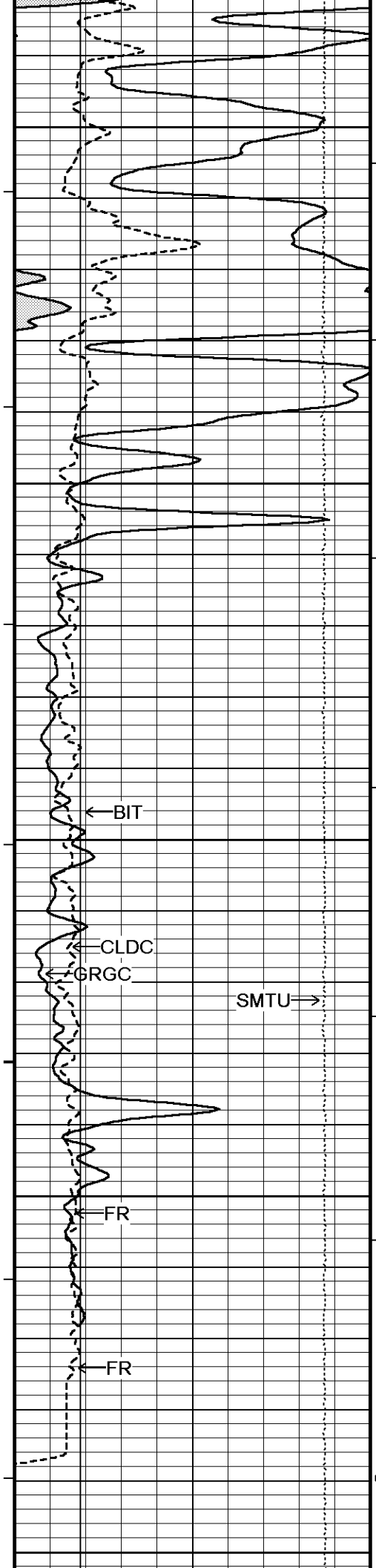
Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 05-DEC-2014 19:47
 Filename: C:\Minimus 14.05\Log Data\Grand Mesa BSB 1-22\Grand Mesa BSB 1-22 Main.dta
 Recorded on 05-DEC-2014 17:24
 System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280

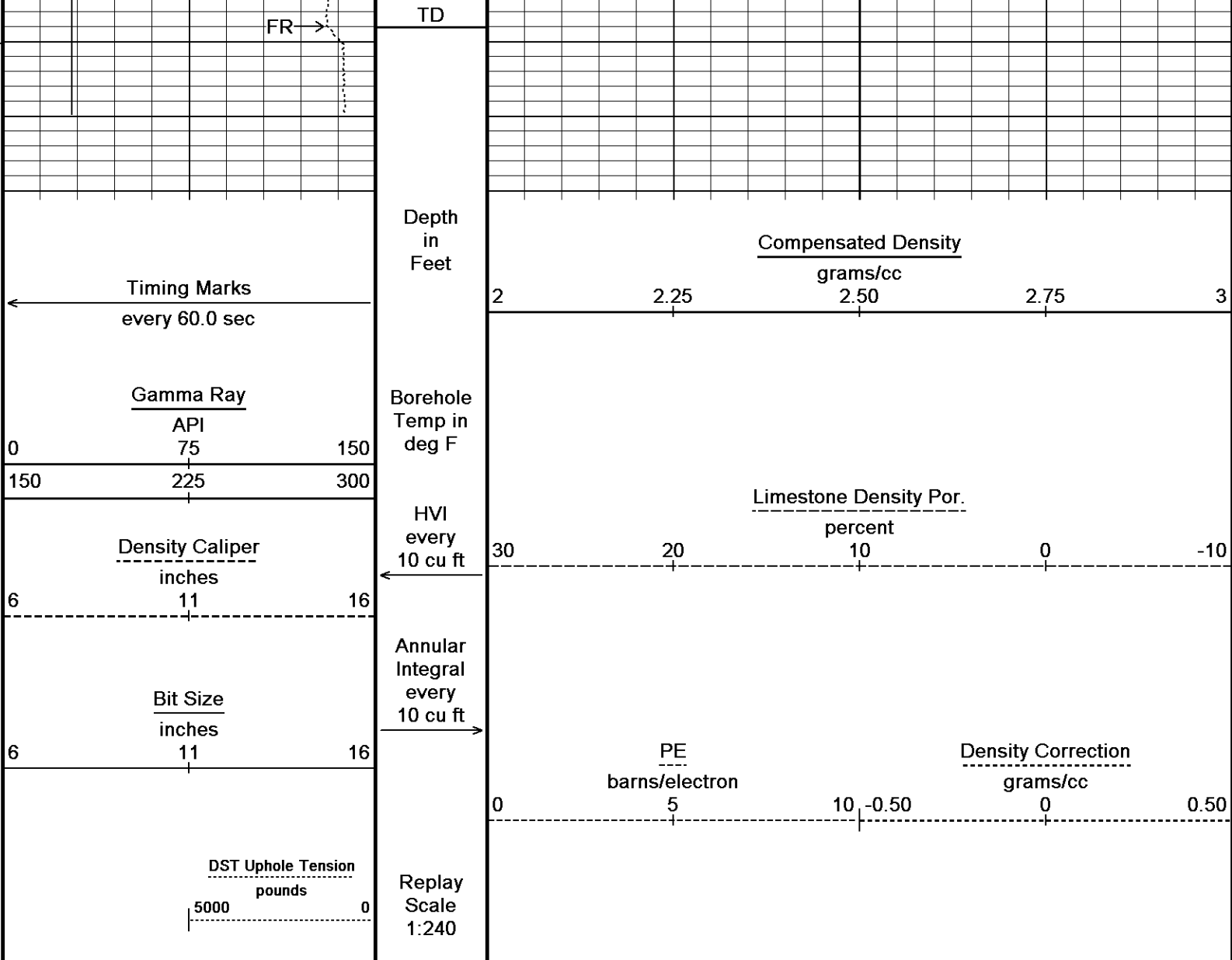










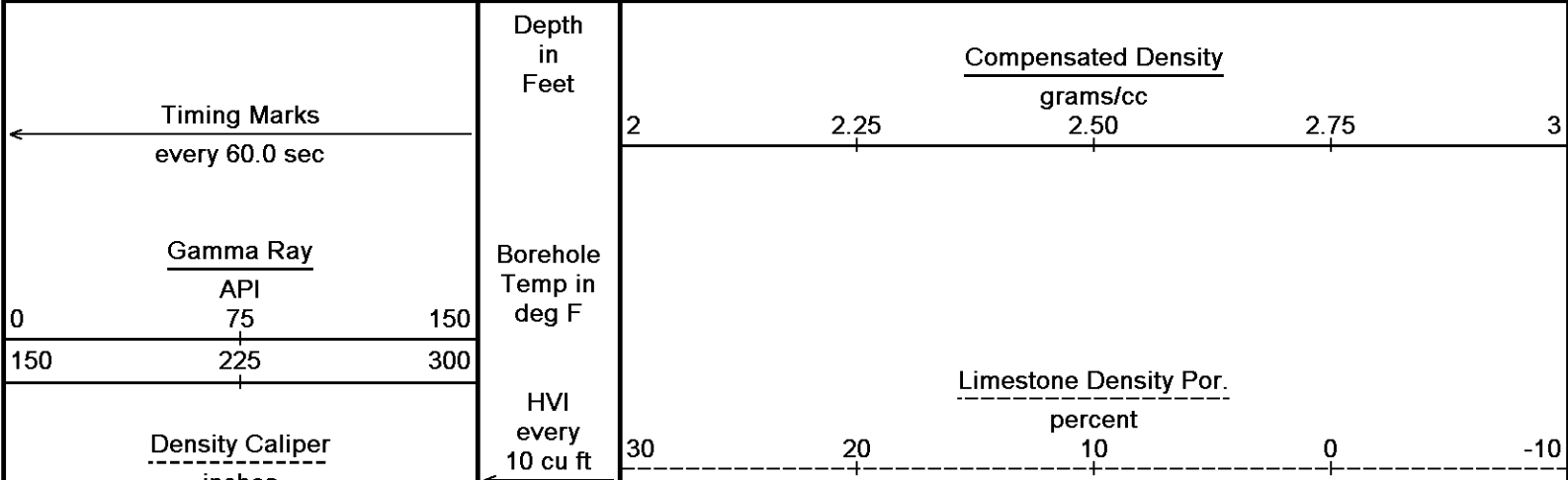


Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 05-DEC-2014 19:47
 Filename: C:\Minimus 14.05\Log Data\Grand Mesa BSB 1-22\Grand Mesa BSB 1-22 Main.dta
 Recorded on 05-DEC-2014 17:24
 System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280

↑ 5 INCH BULK DENSITY MAIN ↑

↓ REPEAT SECTION ↓

Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 05-DEC-2014 19:47
 Filename: C:\Minimus 14.05\Log Data\Grand Mesa BSB 1-22\Grand Mesa BSB 1-22 Repeat.dta
 Recorded on 05-DEC-2014 17:12
 System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280



inches
6 11 16

Bit Size
inches
6 11 16

Annular
Integral
every
10 cu ft

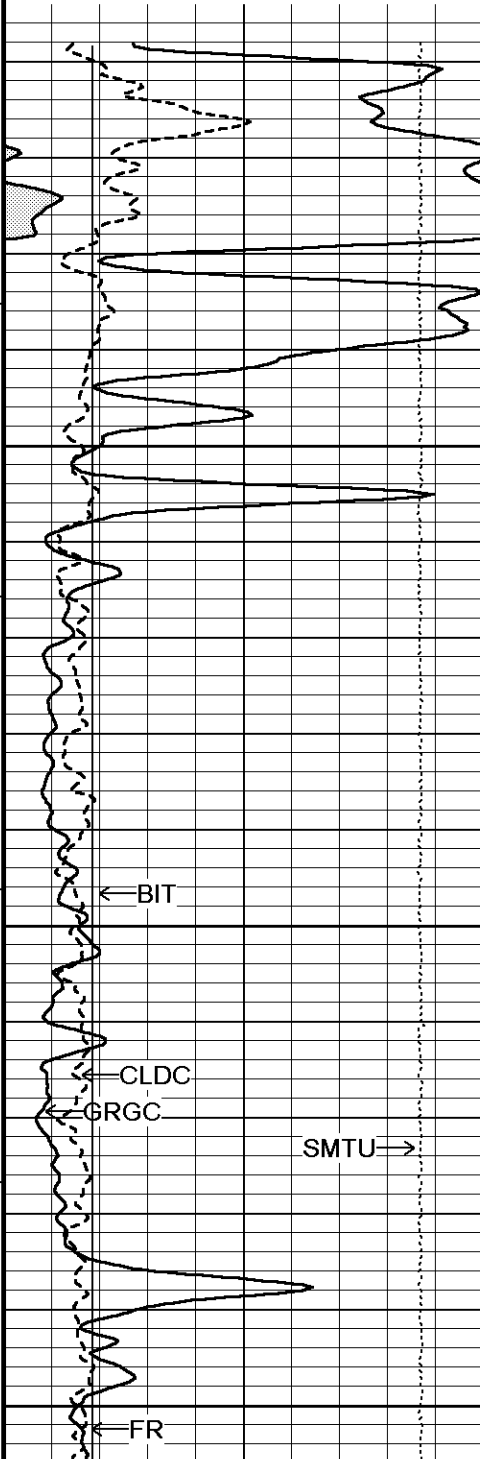
DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240

PE
barns/electron

Density Correction
grams/cc

0 5 10 -0.50 0 0.50



4356

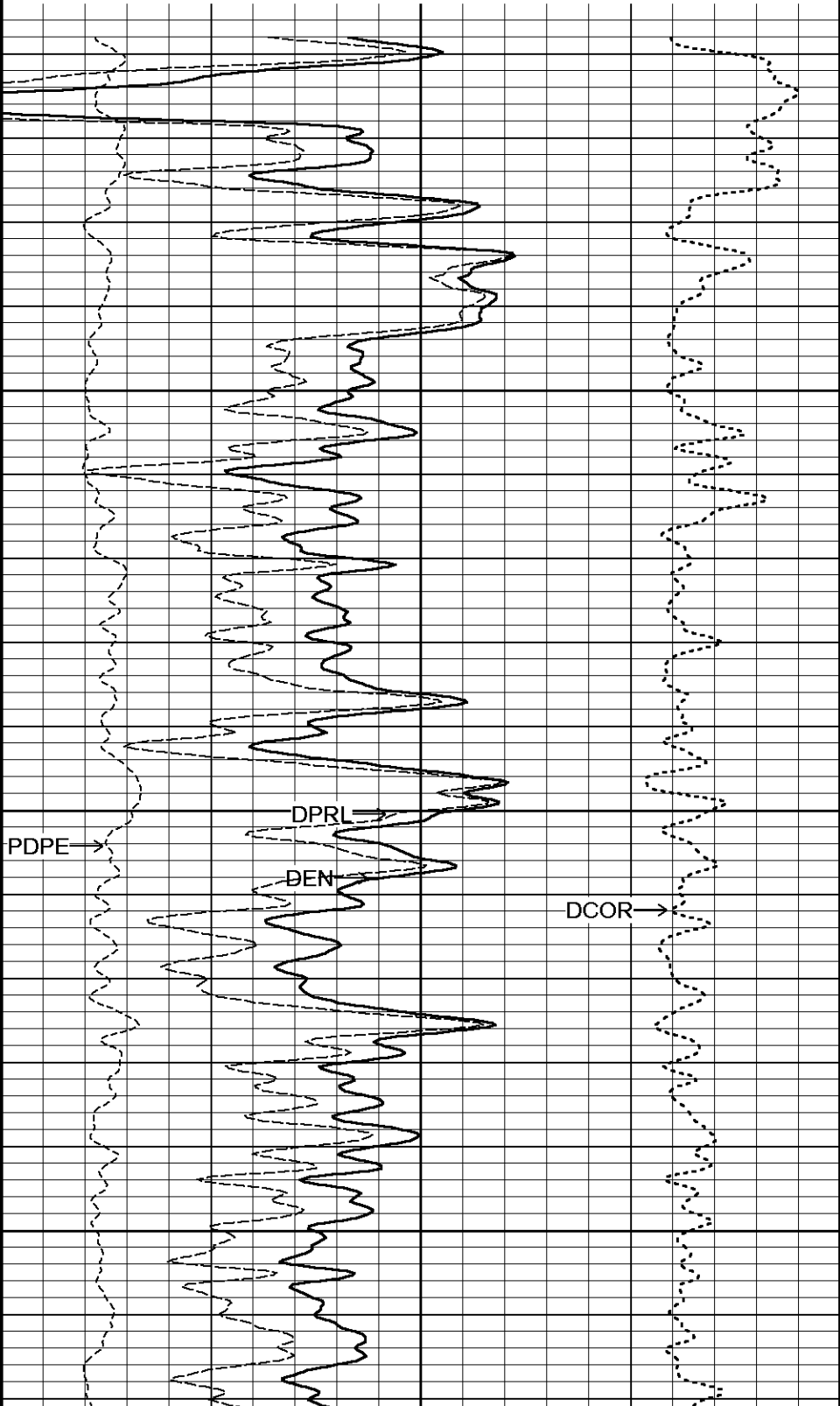
4400

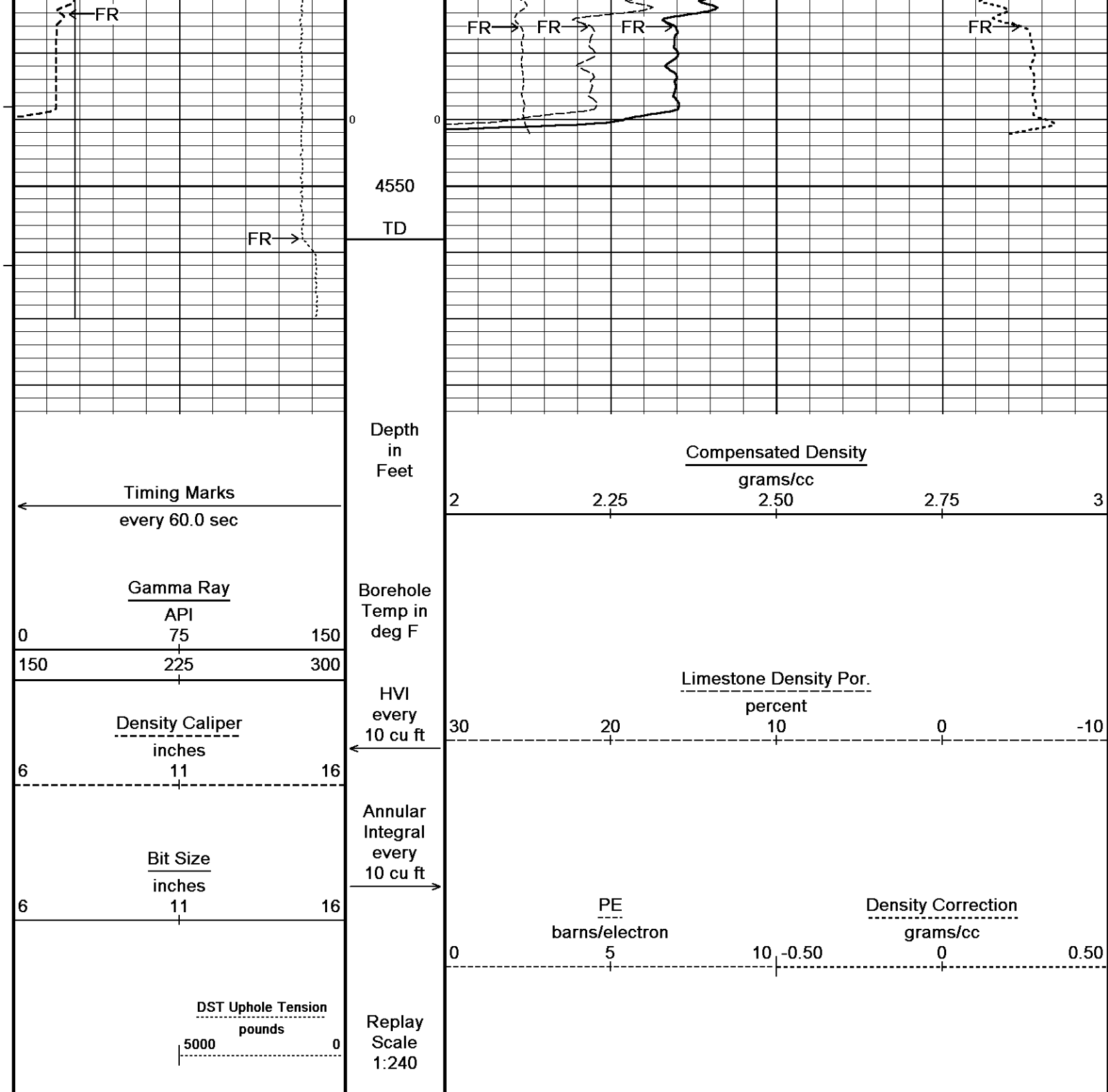
111°

4450

111°

4500





Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 05-DEC-2014 19:47
 Filename: C:\Minimus 14.05\Log Data\Grand Mesa BSB 1-22\Grand Mesa BSB 1-22 Repeat.dta
 Recorded on 05-DEC-2014 17:12
 System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION
 C:\Minimus 14.05\Log Data\Grand Mesa BSB 1-22\Grand Mesa BSB 1-22 Main.dta

General Constants All 000 Last Edited on 05-DEC-2014,16:22

General Parameters
 Mud Resistivity 0.717 ohm-metres
 Mud Resistivity Temperature 75.000 degrees F
 Water Level 0.000 feet
 Borehole Fluid Processing Wet Hole

Hole/Annular Volume and Differential Caliper Parameters
 HVOL Method Single Caliper
 HVOL Caliper 1 Density Caliper
 HVOL Caliper 2 N/A
 Annular Volume Diameter 5.500 inches
 Caliper for Differential Caliper Density Caliper

Rwa Parameters
 Porosity used Crossplot Porosity
 Resistivity used Array Ind. One Res Rt
 RWA Constant A 0.610
 RWA Constant M 2.150
 SW/APOR Tool Source 0.000

High Resolution Temperature Calibration MCG-B 39

Field Calibration on 24-NOV-2014,12:05

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-B 39

Last Edited on 28-AUG-2014,01:02

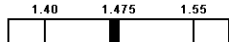
Pre-filter Length 11

Gamma Calibration MCG-B 39

Field Calibration on 05-DEC-2014 12:32

	Measured	Calibrated (API)
Background	72	49
Calibrator (Gross)	1134	774
Calibrator (Net)	1062	725

Gamma Calibration Tolerances MCG-B 39

Ratio 1.465  Counts/API

Gamma Constants MCG-B 39

Last Edited on 05-DEC-2014,17:42

Gamma Calibrator Number GRC038
 GRC-M Calibrator Jig in Use? NO
 Inactive Background Jig in Use? NO
 Mud Density 1.10 gm/cc
 Caliper Source for Processing Density Caliper
 Tool Position Eccentred
 Concentration of KCl kppm
 K Mud Type Chloride
 K Mud Concentration 0.00 %

Caliper Calibration MPD-C.A 216

Base Calibration on 26-NOV-2014 10:38

Field Calibration on 05-DEC-2014 12:16

Base Calibration Reading No	Measured	Calibrator Size (in)
1	19488	3.99
2	29280	5.98
3	38592	7.97
4	48512	9.86
5	59904	11.92
6	N/A	N/A

Field Calibration	Measured Caliper (in)	Actual Caliper (in)
	8.01	7.97

Caliper Calibration Tolerances MPD-C.A 216


Short Arm Field Cal. 8.01  in

Photo Density Calibration MPD-C.A 216

Base Calibration on 26-NOV-2014 11:14

Field Check on 05-DEC-2014 12:14

Density Calibration Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1097	1288		

Reference 1	58999	30564	59556	30836
Reference 2	24761	2718	24941	2541

Field Check at Base
1096.5 1288.3

Field Check
1094.1 1286.1

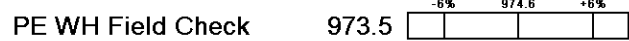
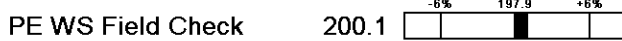
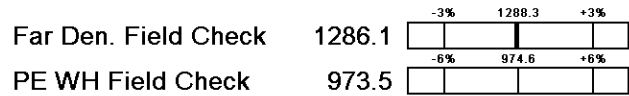
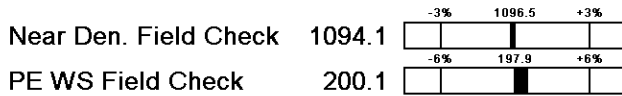
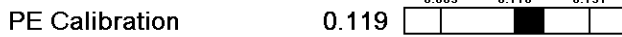
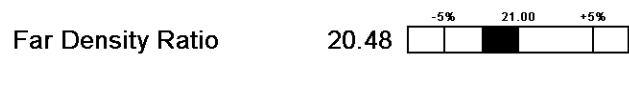
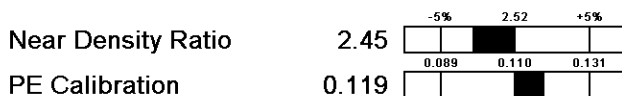
PE Calibration

Base Calibration	WS	Measured WH	Ratio	Calibrated Ratio
Background	198	975		
Reference 1	24121	58805	0.414	0.371
Reference 2	6974	24630	0.286	0.272

Field Check at Base
197.9 974.6

Field Check
200.1 973.5

Photo Density Calibration Tolerances MPD-C.A 216



Density Constants MPD-C.A 216

Last Edited on 05-DEC-2014,17:42

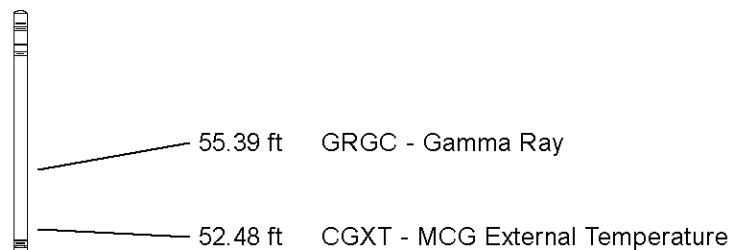
Density Source Id	18235B	
Nylon Calibrator Number	DNCE695	
Aluminium Calibrator Number	DACD698	
Density Shoe Profile	8 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.10	gm/cc
Mud Density Z/A Multiplier	1.11	
Mud Filtrate Density	1.00	gm/cc
Dry Hole Mud Filtrate Density	1.00	gm/cc
DNCT	0.00	gm/cc
CRCT	0.00	gm/cc
Density Z/A Correction	Hybrid	
Matrix Density (gm/cc)	Depth (ft)	
2.71		
0.00	0.00	
0.00	0.00	
0.00	0.00	
0.00	0.00	
0.00	0.00	
0.00	0.00	
0.00	0.00	
0.00	0.00	
0.00	0.00	

DOWNHOLE EQUIPMENT

C:\Minimus 14.05\Log Data\Grand Mesa BSB 1-22\Grand Mesa BSB 1-22 Main.dta

3/8" Triple Cone Cable Head (MCB C A)
MCB-C.A 233 LG: 1.58 ft WT: 15.4 lb OD: 2.240 in

Compact Comms Gamma
MCG-B 39 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in



Compact Micro-log
MML-A.3 LG: 7.97 ft WT: 81.6 lb OD: 2.240 in

Compact Neutron
MDN-A.B 152 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

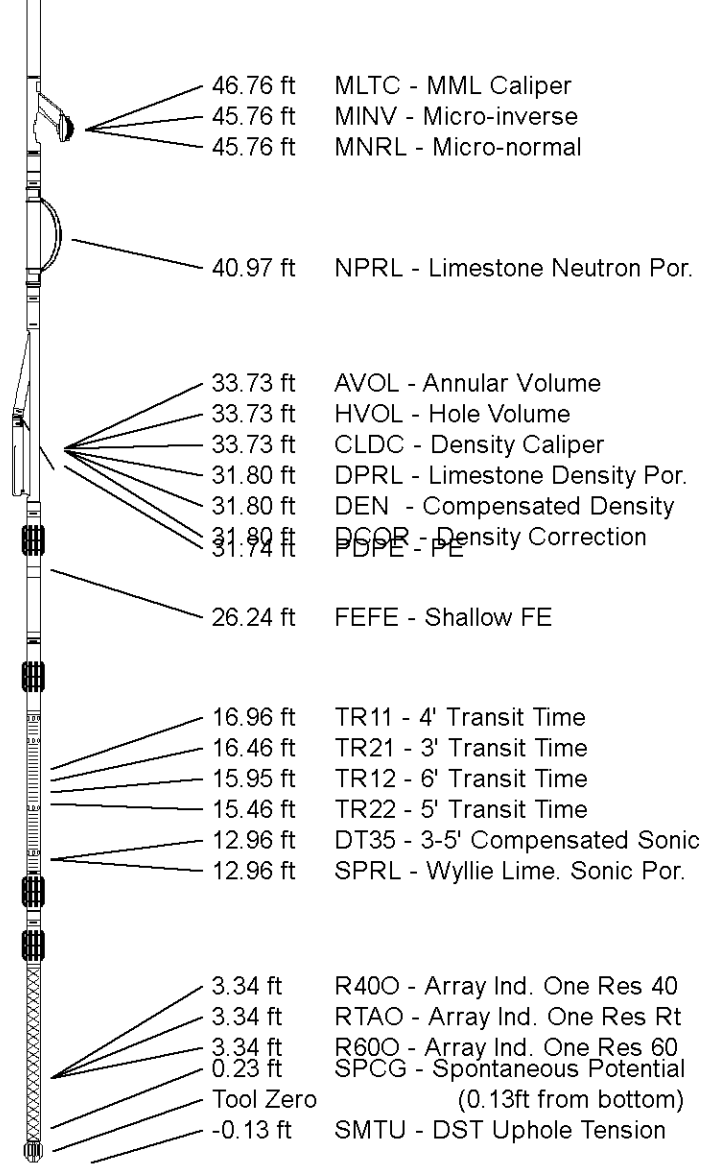
Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric
MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic
MSS-A.A 126 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction
MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 62.25 ft Weight: 471.8 lb



COMPANY	GRAND MESA OPERATING COMPANY
WELL	BSB 1-22
FIELD	WILDCAT
PROVINCE/COUNTY	NESS
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2280.00	feet	First Reading	4526.26	feet
Elevation Drill Floor	2278.00	feet	Depth Driller	4561.00	feet
Elevation Ground Level	2269.00	feet	Depth Logger	4558.00	feet



Weatherford®

COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG