



Weatherford

SPECTRAL GAMMA RAY

LOG

COMPANY	KINDER MORGAN C02 Co. L.P		
WELL	DOE CANYON #14		
FIELD	DOE CANYON		
PROVINCE/COUNTY	DOLORES		
COUNTRY/STATE	U.S.A. / COLORADO		
LOCATION	987' FSL & 2384' FEL		
SEC 9	TWP 40N	RGE 18W	Other Services
			MPD/MDN
			MDL/MMR
API Number	05-033-06177-01	MIE	
Permanent Datum Gl.	Elevation 7105 feet		Elevations: feet
Log Measured From	KB		KB 7130.00
Drilling Measured From	KB @ 25 FEET		DF 7130.00
			GL 7105.00
Date	17-AUG-2013		
Run Number	ONE		
Service Order	3529584		
Depth Driller	8502.00	feet	
Depth Logger	8502.00	feet	
First Reading	8500.00	feet	
Last Reading	8200.00	feet	
Casing Driller	8368.00	feet	
Casing Logger	8364.00	feet	
Bit Size	6.000	inches	
Hole Fluid Type	H2O		
Density / Viscosity	8.40	g/cc	
PH / Fluid Loss			
Sample Source			
Rm @ Measured Temp	0.92 @ 72.0	ohm-m	
Rmf @ Measured Temp	0.74 @ 72.0	ohm-m	
Rmc @ Measured Temp	1.10 @ 72.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.39 @ 177.0	ohm-m	
Time Since Circulation	8 HOURS		
Max Recorded Temp	177.00	deg F	
Equipment / Base	13173	GJ/CO	
Recorded By	S. LACKEY		P. BATES
Witnessed By	C. SLAUGH		

BOREHOLE RECORD

Last Edited: 01-JAN-2002 00:15

Bit Size inches	Depth From feet	Depth To feet
6.000	8368.00	8503.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
INTERMED	7.000	0.00	8368.00	29.00

REMARKS

WLS VERSION 13.06.9802

TOOLS IN THREE SEPERATE RUNS:

- 1ST RUN: SHA, MBE, MBE, MCG, MUG, MLE AND MMR
- 2ND RUN: SHA, MCG, MISD, MDN AND MPD
- 3RD RUN: SHA, MCG, MIM AND MIE
- 4TH RUN: SHA, MCG, MDM, MRD AND MTD
- 5TH RUM: SHA, MGC, ANS SGS

HARDWARE:

- MUG: 0.5" STANDOFF
- MMR: 0.5" STANDOFF
- MISD: ECCENTRALIZER BOWSPRINGS
- MDN: DUAL BOWSPRINGS
- MPD: 8" PROFILE PLATE
- MIM: NONMAGNETIC BASKET
- MIE: NONMAGNETIC BASKET, 1.0" STANDOFF

2.71 GM/CC DENSITY MATRIX USED TO CALCULATE POROSITY.

ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.

TIGHT PULLS, BOREHOLE SIZE AND RUGOSITY WILL AFFECT DATA QUALITY.

MIE CALIPERS CLOSED BEFORE CASING TO ALLOW FOR SAFE ENTRANCE.

TOTAL HOLE VOLUME = 28 CUBIC FEET.

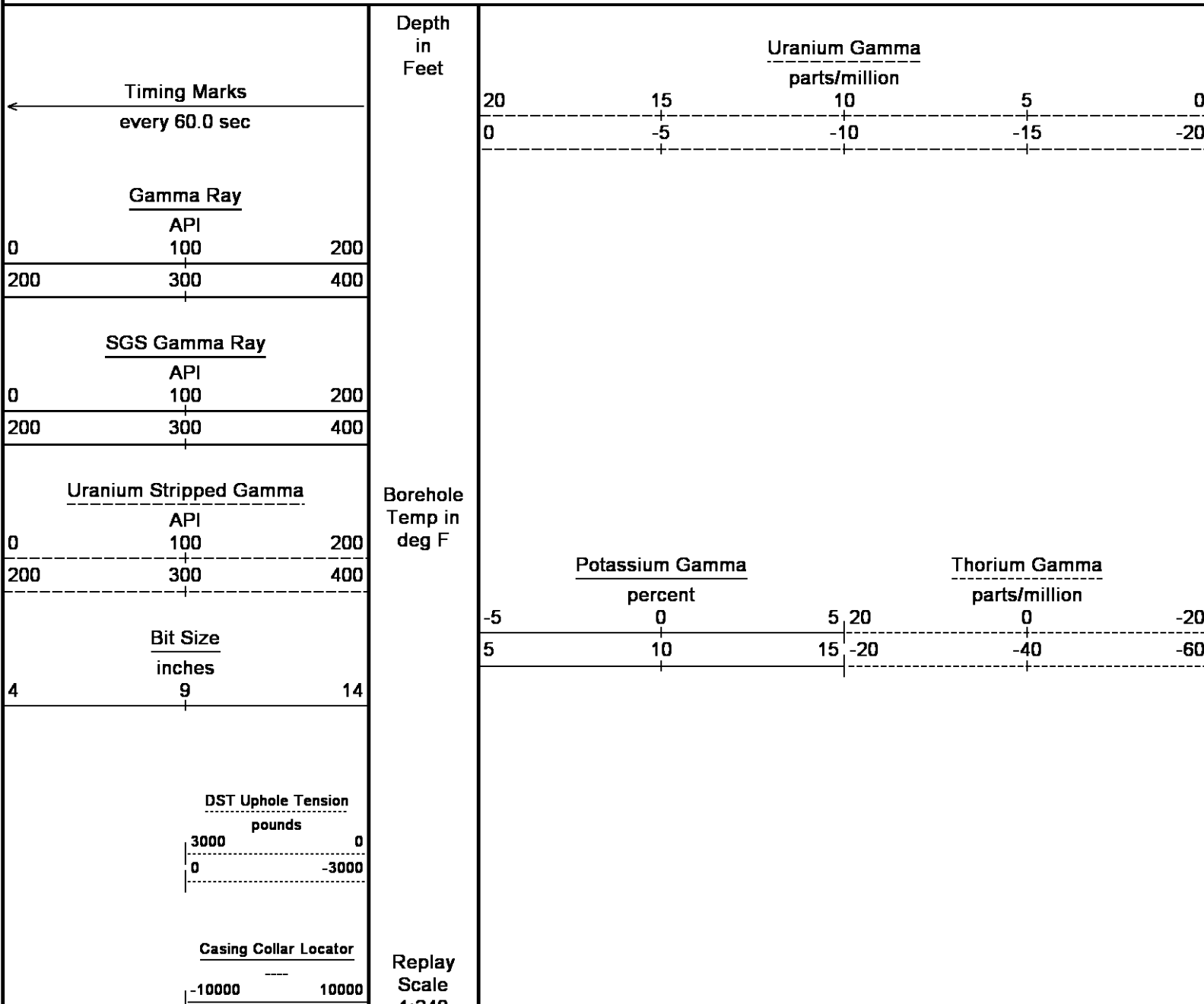
SERVICE ORDER: 3529584

RIG: NABORS 405

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, 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. These interpretations are also subject to our general terms and conditions in our price schedule.

5 INCH MAIN PASS

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 18-AUG-2013 09:28
 Filename: C:\LOGS\KINDER MORGAN\DC 14\SPECTRAL GAMMA.dta Recorded on 18-AUG-2013 08:05
 System Versions: Logged with 13.06.9804 Plotted with 13.06.9804



7464

7500

172°

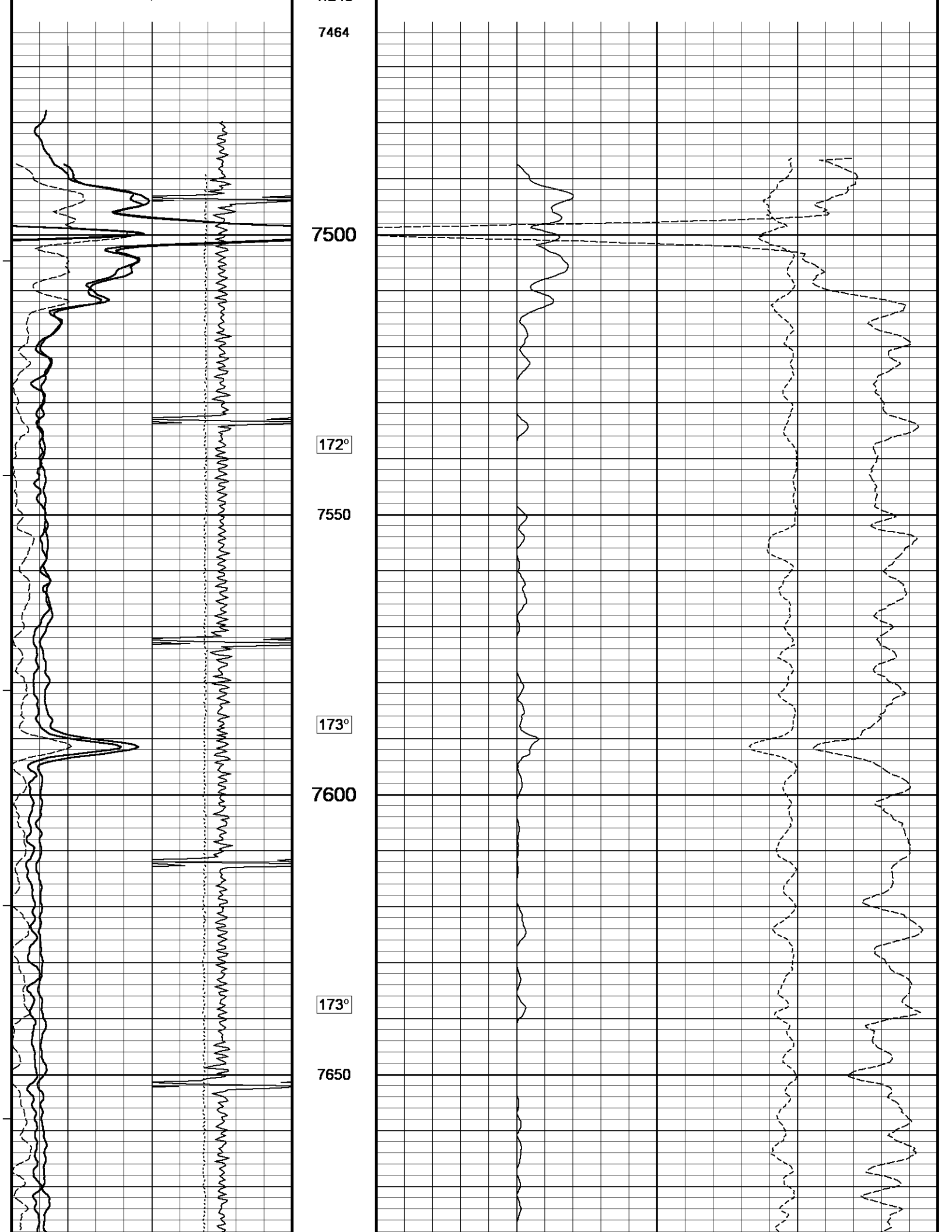
7550

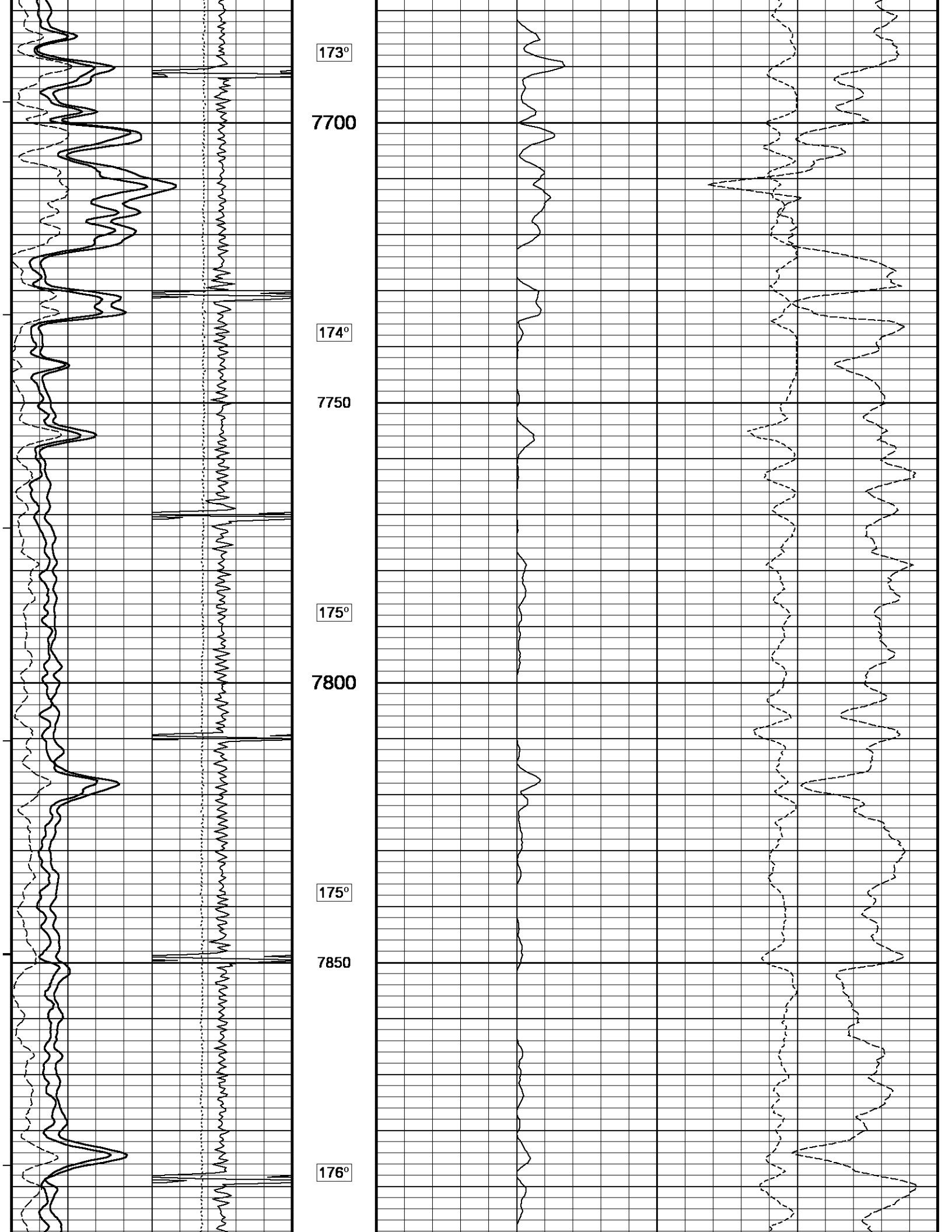
173°

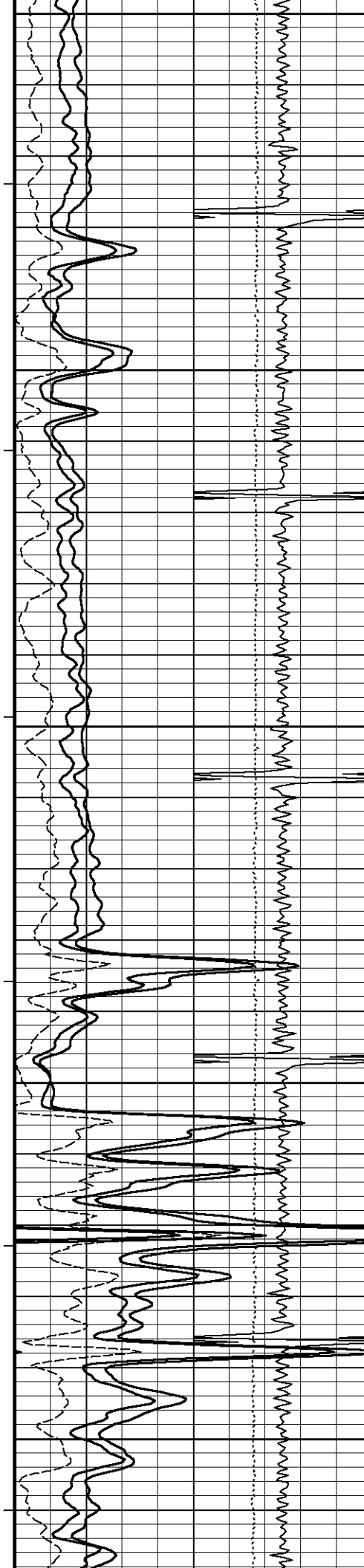
7600

173°

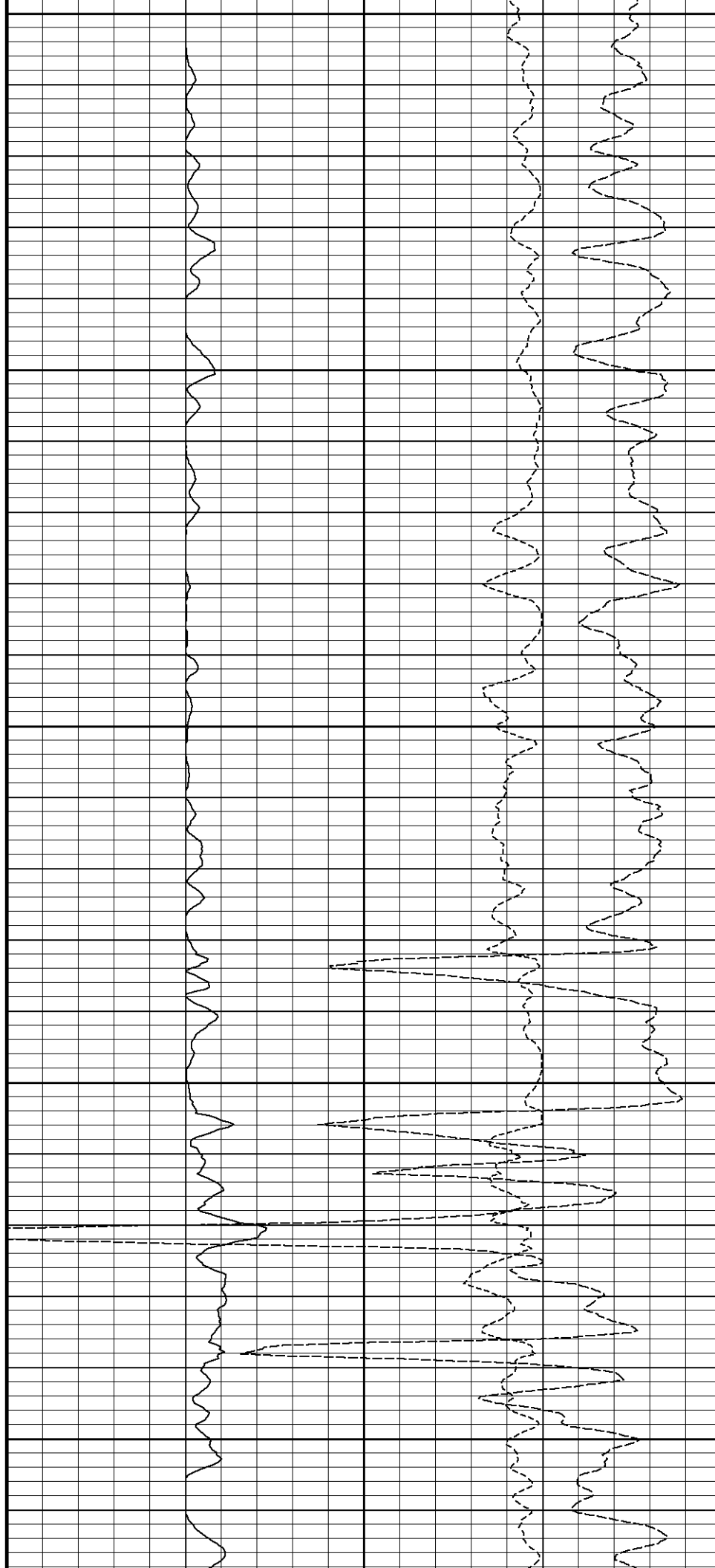
7650

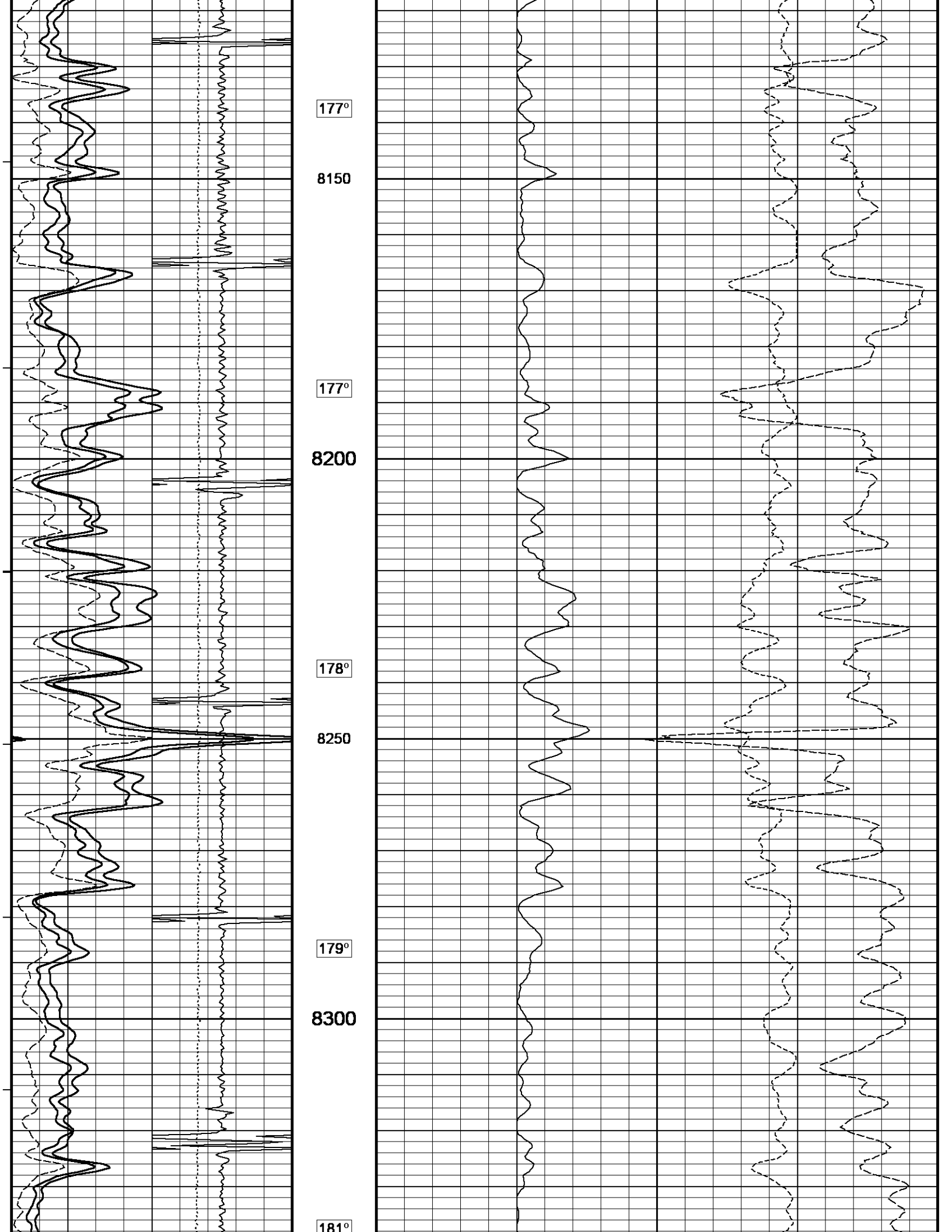


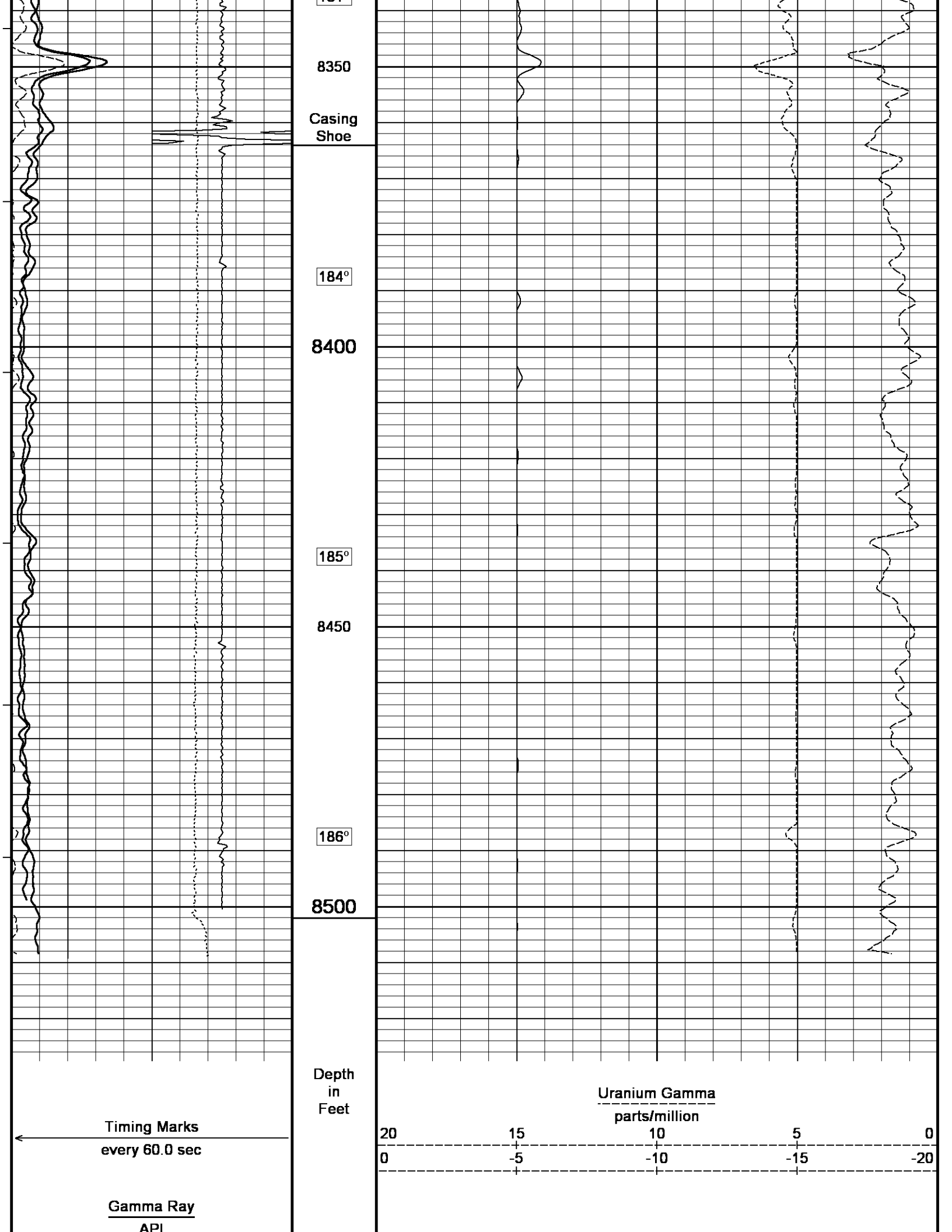




7900
176°
7950
176°
8000
176°
8050
176°
8100







187°

8350

Casing Shoe

184°

8400

185°

8450

186°

8500

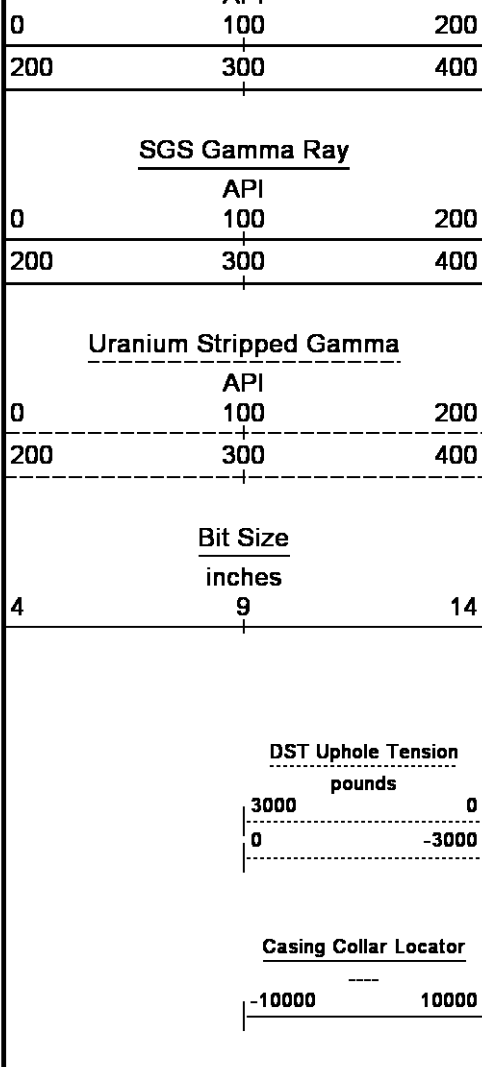
Depth in Feet

Uranium Gamma
parts/million

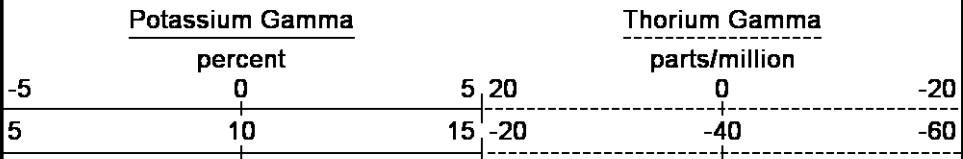
20 15 10 5 0
0 -5 -10 -15 -20

Timing Marks
every 60.0 sec

Gamma Ray
API



Borehole
Temp in
deg F



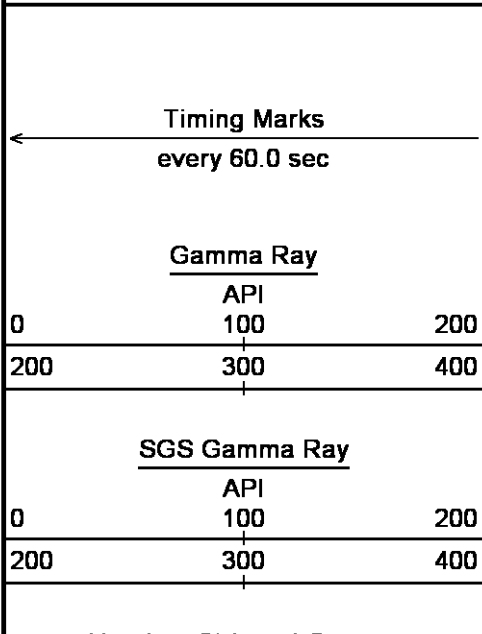
Replay
Scale
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 18-AUG-2013 09:28
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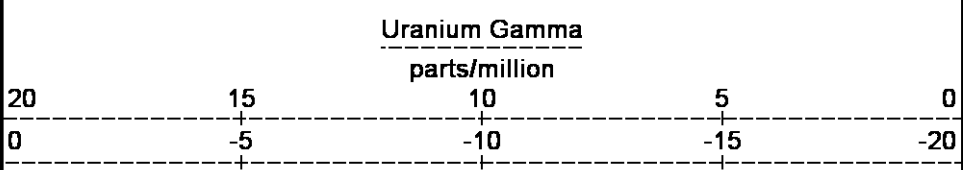
↑ 5 INCH MAIN PASS ↑

↓ REPEAT OVERLAY ↓

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 18-AUG-2013 09:28
 Filename: C:\LOGS\KINDER MORGAN\DC 14\SPECTRAL GAMMA.dta Recorded on 18-AUG-2013 08:05
 Filename: C:\LOGS\KINDER MORGAN\DC 14\SPECTRAL GAMMA REPEAT2.dta Recorded on 18-AUG-2013 08:52
 System Versions: Logged with 13.06.9804 Plotted with 13.06.9804



Depth
in
Feet



Borehole

Gamma Stripped Gamma
 API 100 200
 200 300 400

Borehole
 Temp in
 deg F

Bit Size
 inches 9 14

DST Uphole Tension
 pounds 3000 0
 0 -3000

Casing Collar Locator
 -10000 10000

Replay
 Scale
 1:240

8304

8350

Casing
 Shoe

184°

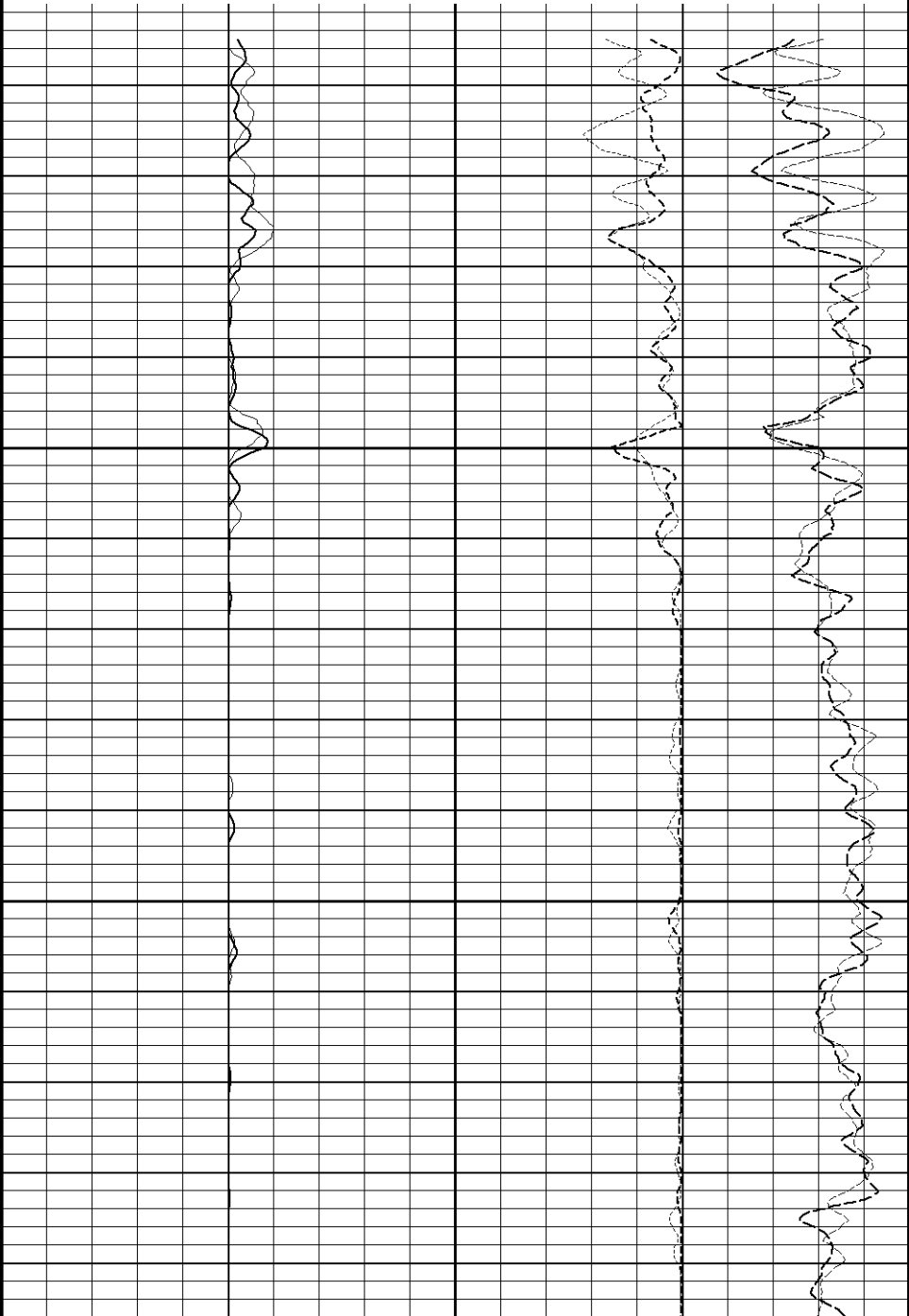
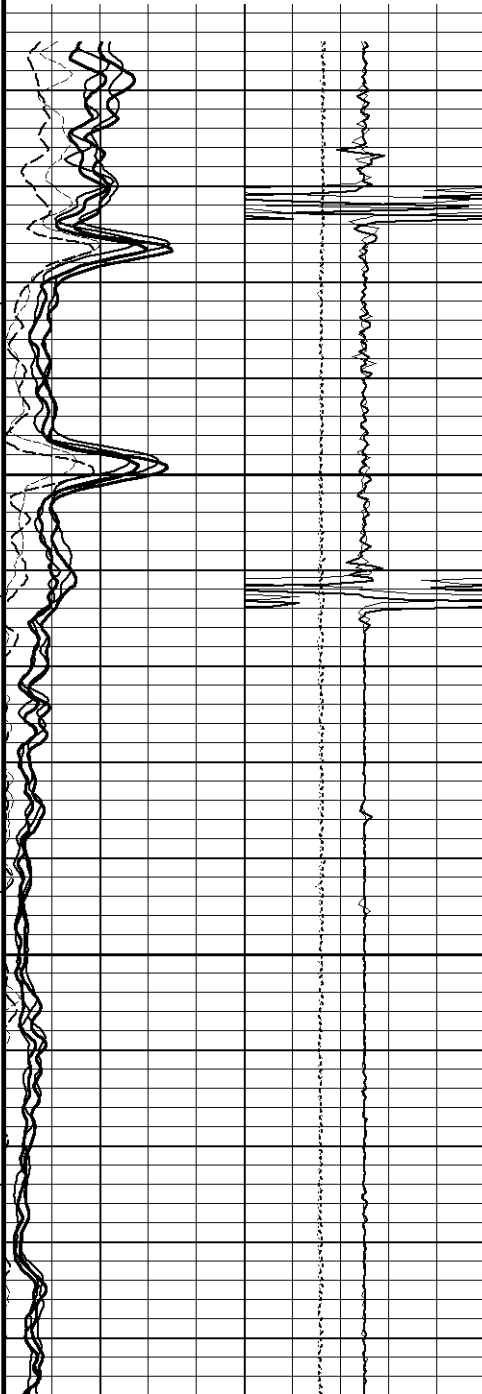
8400

185°

Potassium Gamma
 percent

Thorium Gamma
 parts/million

-5 0 5 20
 5 10 15 -20
 -20 -60



8450

186°

8500

Depth
in
Feet

Timing Marks
every 60.0 sec

Gamma Ray
API
0 100 200
200 300 400

SGS Gamma Ray
API
0 100 200
200 300 400

Uranium Stripped Gamma
API
0 100 200
200 300 400

Bit Size
inches
4 9 14

DST Uphole Tension
pounds
3000 0
0 -3000

Casing Collar Locator
-10000 10000

Borehole
Temp in
deg F

Replay
Scale
1:240

Uranium Gamma
parts/million

20 15 10 5 0
0 -5 -10 -15 -20

Potassium Gamma
percent

Thorium Gamma
parts/million

-5 0 5 20 -20
5 10 15 -20 -40 -60

↑ REPEAT OVERLAY ↑

BEFORE SURVEY CALIBRATION

C:\LOGS\KINDER MORGAN\DC 14\SPECTRAL GAMMA.dta

General Constants All 000 Last Edited on 18-AUG-2013,01:17

General Parameters
 Mud Resistivity 0.920 ohm-metres
 Mud Resistivity Temperature 72.000 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 None
 HVOL Caliper 2 N/A
 Annular Volume Diameter 0.000 inches
 Caliper for Differential Caliper None

Rwa Parameters
 Porosity used N/A
 Resistivity used N/A
 RWA Constant A N/A
 RWA Constant M N/A
 SW/APOR Tool Source

High Resolution Temperature Calibration MCG-D.A 223 Field Calibration on 25-MAR-2013,15:53

	Measured	Calibrated(Deg F)
Lower	1.00	1.00
Upper	2.00	2.00

High Resolution Temperature Constants MCG-D.A 223 Last Edited on 25-MAR-2013,15:53

Pre-filter Length 11

Gamma Calibration MCG-D.A 223 Field Calibration on 01-JAN-2002,00:12

	Measured	Calibrated (API)
Background	98	67
Calibrator (Gross)	1023	693
Calibrator (Net)	924	626

Gamma Constants MCG-D.A 223 Last Edited on 01-JAN-2002,00:12

Gamma Calibrator Number 72
 Mud Density 1.00 gm/cc
 Caliper Source for Processing Bit Size
 Tool Position Centred
 Concentration of KCl kppm
 K Mud Type Chloride
 K Mud Concentration 0.00 %

Spectral Gamma Calibration SGS-E.J 135 Base Calibration on 31-DEC-2001 23:49
Field Calibration on 31-DEC-2001 23:22

Base Calibration
Potassium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	161.9	60.3	7.4	3.1	3.3
Calibrator (Gross)	313.8	163.7	35.2	7.8	3.2
Calibrator (Net)	151.9	103.4	27.8	4.7	-0.2

Concentrations	K %	U ppm	Th ppm
	5.9	0.0	0.0

Uranium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	161.9	60.3	7.4	3.1	3.3
Calibrator (Gross)	616.1	223.2	21.7	14.4	6.7
Calibrator (Net)	454.2	163.0	14.4	11.3	3.4

Concentrations	K % 0.0	U ppm 16.6	Th ppm 0.0
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Thorium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	161.9	60.3	7.4	3.1	3.3
Calibrator (Gross)	482.7	183.9	16.5	10.2	18.8
Calibrator (Net)	320.8	123.6	9.1	7.1	15.4

Concentrations	K % 0.0	U ppm 0.0	Th ppm 44.7
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Mixture Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	161.9	60.3	7.4	3.1	3.3
Calibrator (Gross)	971.0	405.5	54.9	20.8	20.8
Calibrator (Net)	809.1	345.2	47.5	17.7	17.5

Field Calibration

Gamma Ray

	Measured	Calibrated (API)
Background	243	47
Calibrator (Gross)	1480	287
Calibrator (Net)	1237	240

Mixture Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	161.9	60.3	7.4	3.1	3.3
Calibrator (Gross)	971.0	405.5	54.9	20.8	20.8
Calibrator (Net)	809.1	345.2	47.5	17.7	17.5

Spectral Gamma Constants SGS-E.J 135

Last Edited on

Background Calibrator Number	440	
Mixture Calibrator Number	450	
Potassium Calibrator Number	500	
Uranium Calibrator Number	506	
Thorium Calibrator Number	000	
Mud Density	1.00	gm/cc
Caliper Source for Processing	Bit Size	
Tool Position	Centred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

DOWNHOLE EQUIPMENT

C:\LOGS\KINDER MORGAN\DC 14\SPECTRAL GAMMA.dta

3/8" Triple Cone Cable Head (MCB C A)
MCB-C.A 5 LG: 1.58 ft WT: 15.4 lb OD: 2.24 in

SHA-J.A Compact Swivel Head Adaptor
SHA-J.A 214 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

Compact Comms Gamma
MCG-D.A 223 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Spectral Gamma Ray Sub
SGS-E.J 135 LG: 7.78 ft WT: 105.8 lb OD: 3.54 in



9.47 ft GRGC - Gamma Ray
7.29 ft CCLG - Casing Collar Locator
6.56 ft CGXT - MCG External Temperature

0.00 ft GRPC - Potassium Gamma
0.00 ft GRUR - Uranium Gamma
0.00 ft GRTH - Thorium Gamma

Total Length: 20.35 ft Weight: 207.2 lb



0.00 ft GRSG - SGS Gamma Ray
0.00 ft GCGR - Uranium Stripped Gamma
Tool Zero (1.86ft from bottom)
-1.86 ft SMTU - DST Uphole Tension
All measurements relative to tool zero.

COMPANY KINDER MORGAN C02 Co. L.P
WELL DOE CANYON #14
FIELD DOE CANYON
PROVINCE/COUNTY DOLORES
COUNTRY/STATE U.S.A. / COLORADO

Elevation Kelly Bushing	7130.00	feet	First Reading	8500.00	feet
Elevation Drill Floor	7130.00	feet	Depth Driller	8502.00	feet
Elevation Ground Level	7105.00	feet	Depth Logger	8502.00	feet



**SPECTRAL GAMMA RAY
LOG**

Weatherford®