



Weatherford

**SPECTRAL GAMMA RAY
LOG**

COMPANY		KINDER MORGAN C02 Co. L.P	
WELL		DOE CANYON #15	
FIELD		DOE CANYON	
PROVINCE/COUNTY		DOLORES	
COUNTRY/STATE		U.S.A. / COLORADO	
LOCATION		1069' FSL & 1610' FWL	
SEC 11	TWP 40N	RGE 18W	Other Services
		MPD/MDN	
		MDL/MMR	
API Number		05-033-06176	MIE
Permanent Datum GL, Elevation 7227 feet			
Log Measured From KB			
Drilling Measured From KB @ 23 FEET			
Date	24-AUG-2013		
Run Number	ONE		
Service Order	3529587		
Depth Driller	8710.00	feet	Elevations: KB 7250.00
Depth Logger	8705.00	feet	DF 7250.00
First Reading	8705.00	feet	GL 7227.00
Last Reading	7613.00	feet	
Casing Driller	8534.00	feet	
Casing Logger	8525.00	feet	
Bit Size	6.000	inches	
Hole Fluid Type	H2O		
Density / Viscosity	8.40 lb/USg	29.00 CP	
PH / Fluid Loss	7.00		
Sample Source	PIT		
Rm @ Measured Temp	0.95 @ 86.0	ohm-m	
Rmf @ Measured Temp	0.76 @ 86.0	ohm-m	
Rmc @ Measured Temp	1.14 @ 86.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.49 @172.0	ohm-m	
Time Since Circulation	8 HOURS		
Max Recorded Temp	172.00	deg F	
Equipment / Base	13045	GJ/CO	
Recorded By	S.LACKEY		
Witnessed By	D.MOORE		

BOREHOLE RECORD					Last Edited: 24-AUG-2013 21:07
Bit Size inches		Depth From feet		Depth To feet	
6.000		8534.00		8710.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
INTERMED	7.000	0.00	8534.00	29.00	

REMARKS
WLS VERSION 13.06.9804
TOOLS IN THREE SEPERATE RUNS: 1ST RUN: SHA, MBE, MBE, MCG, MUG, MLE AND MMR 2ND RUN: SHA, MCG, MSG, MISD, MDN AND MPD 3RD RUN: SHA, MCG, MIM AND MIE 4TH RUN: SHA, MCG, MDM, MRD AND MTD 5TH RUN: SHA, MCG AND SGS
HARDWARE: MUG: 0.5" STANDOFF MMR: 0.5" STANDOFF 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

LEFT HAND DENSITY MATRIX USED TO CALCULATE GROSS WT.

ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.

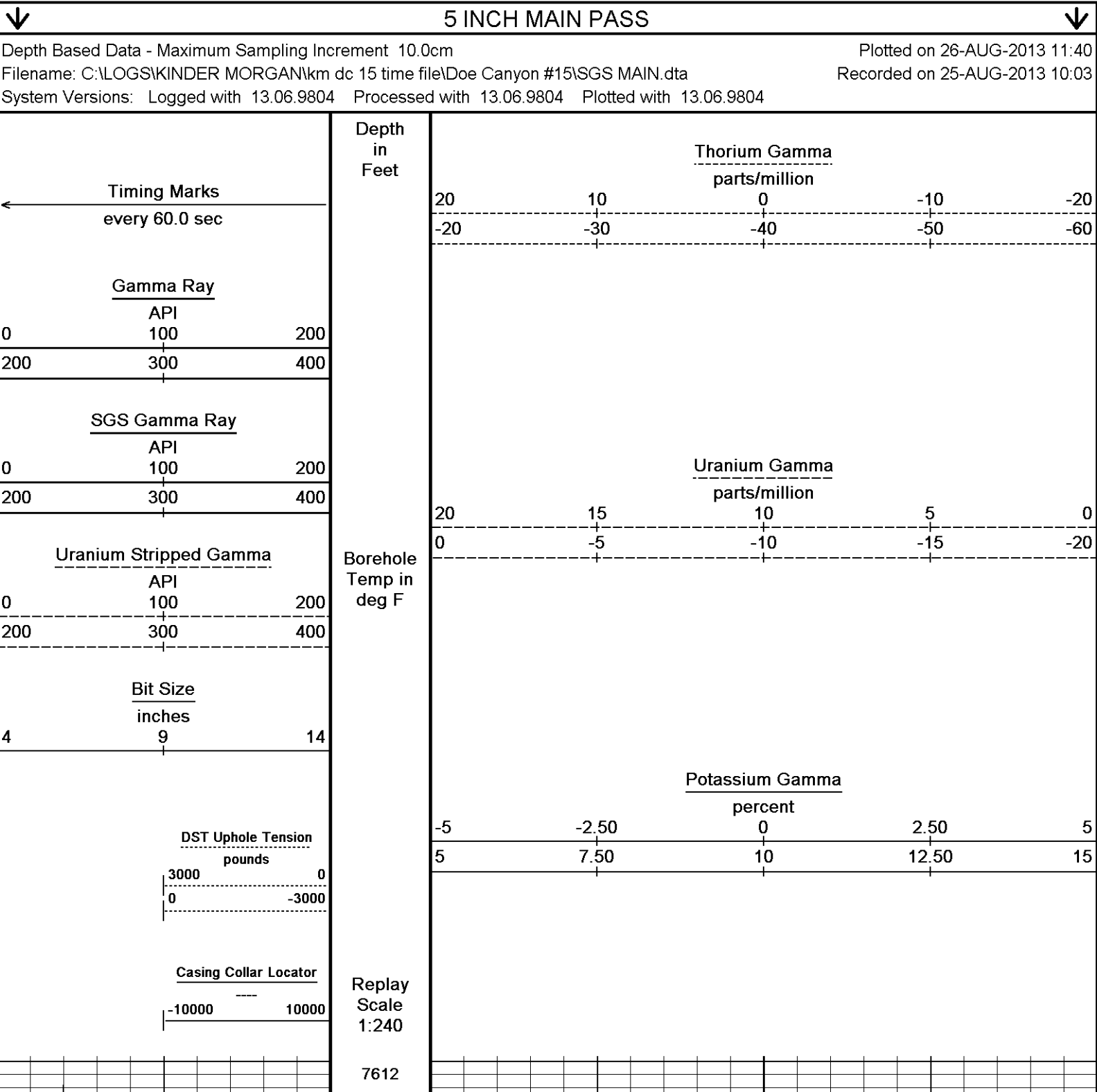
TIGHT PULLS, BOREHOLE SIZE AND RUGOSITY WILL AFFECT DATA QUALITY.

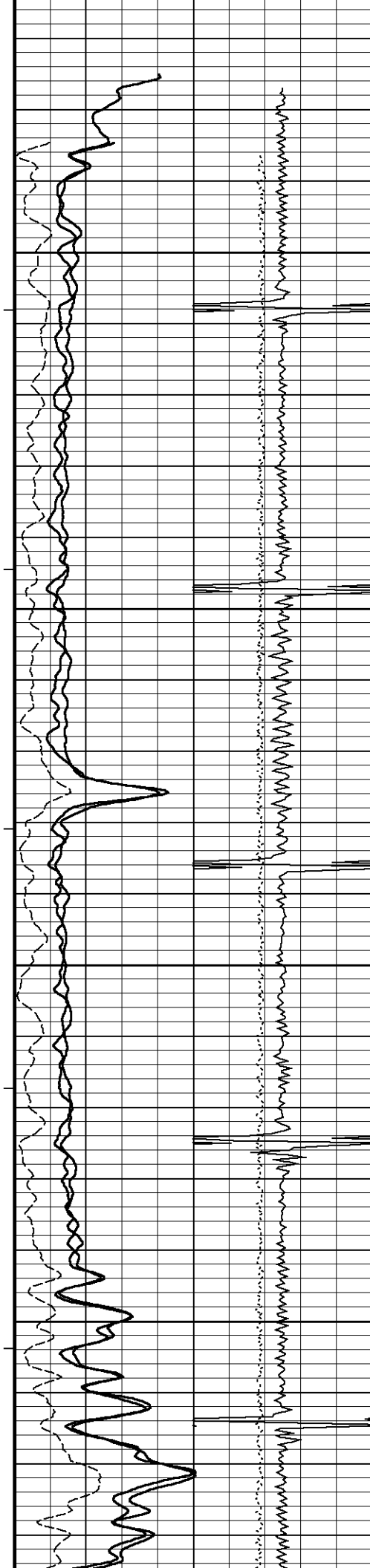
TOTAL HOLE VOLUME = 40 CUBIC FEET.

SERVICE ORDER: 3529587

RIG: NABORS M13

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.





7650

172°

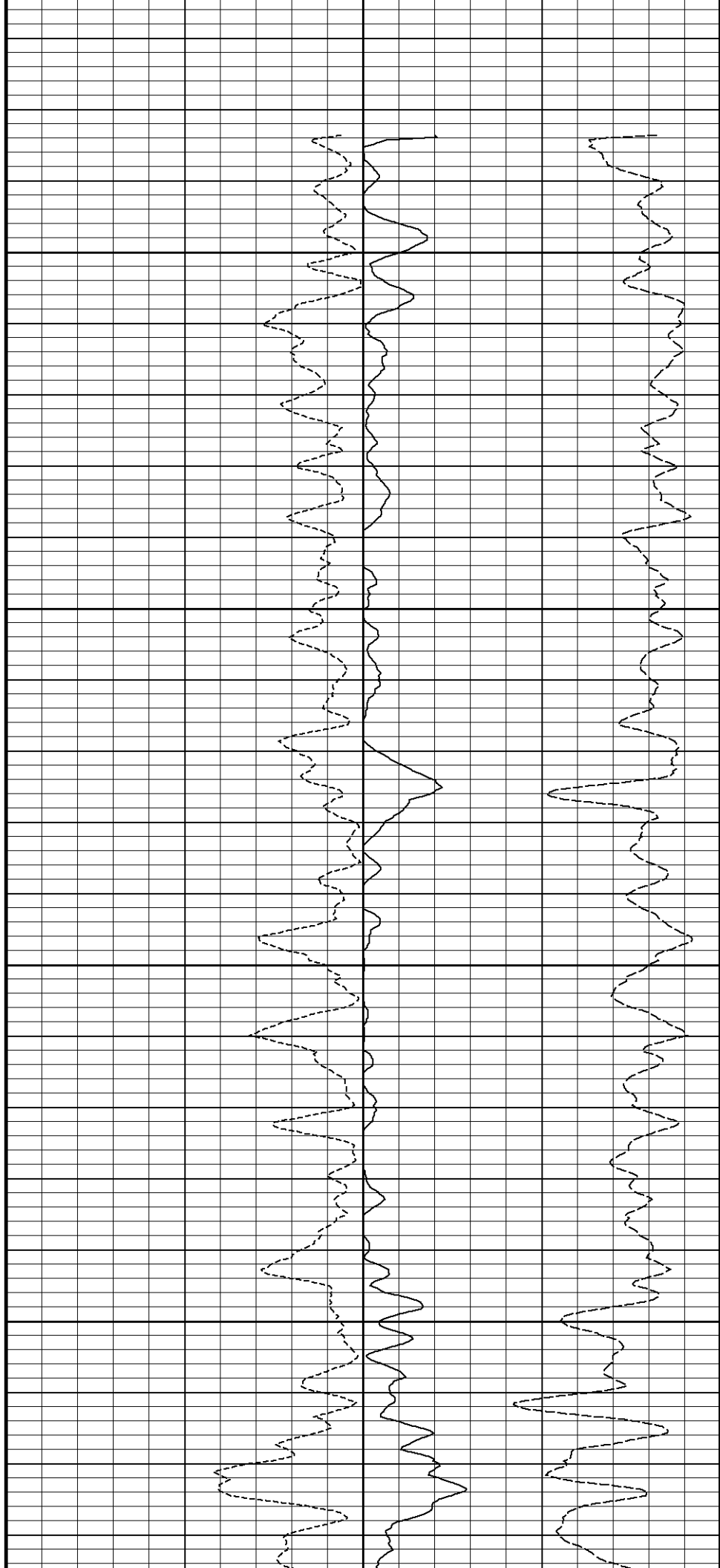
7700

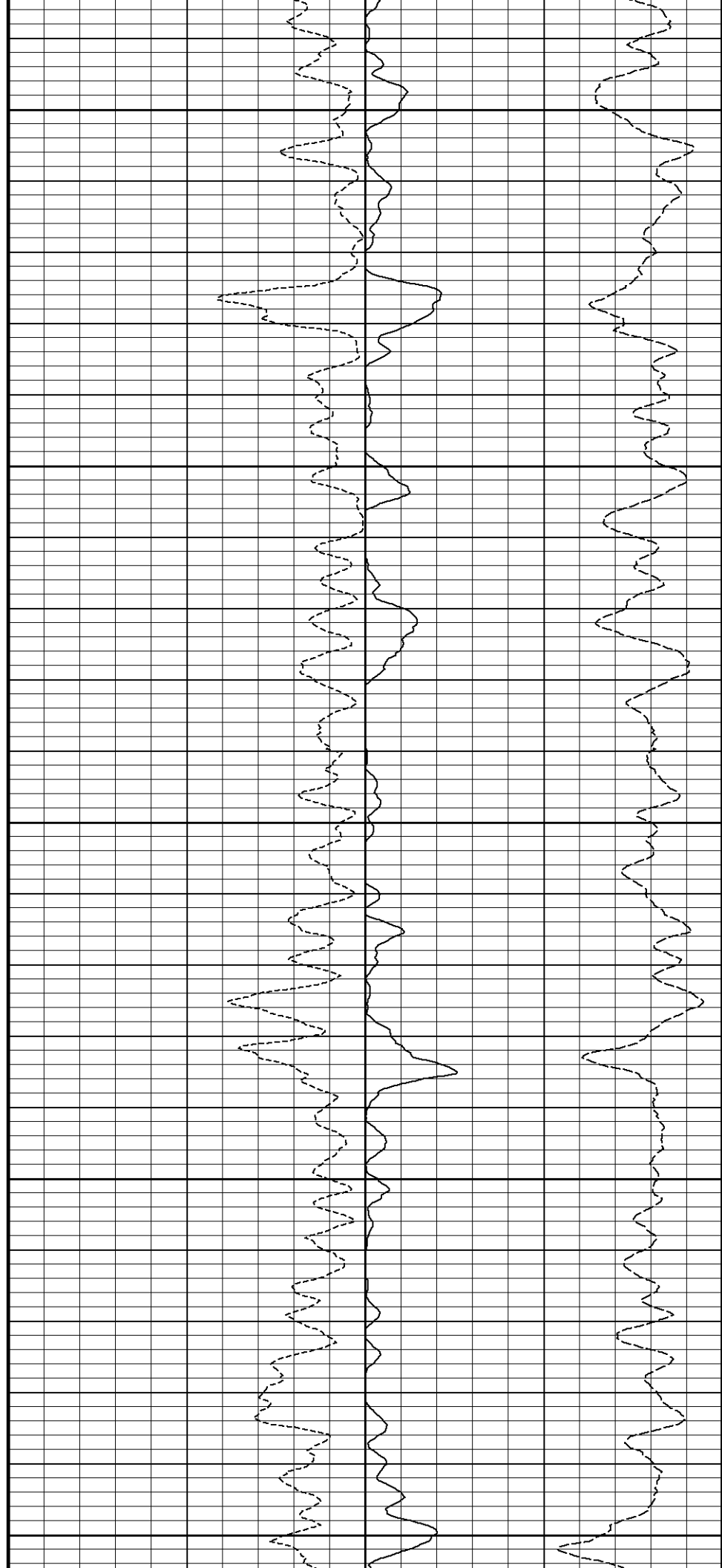
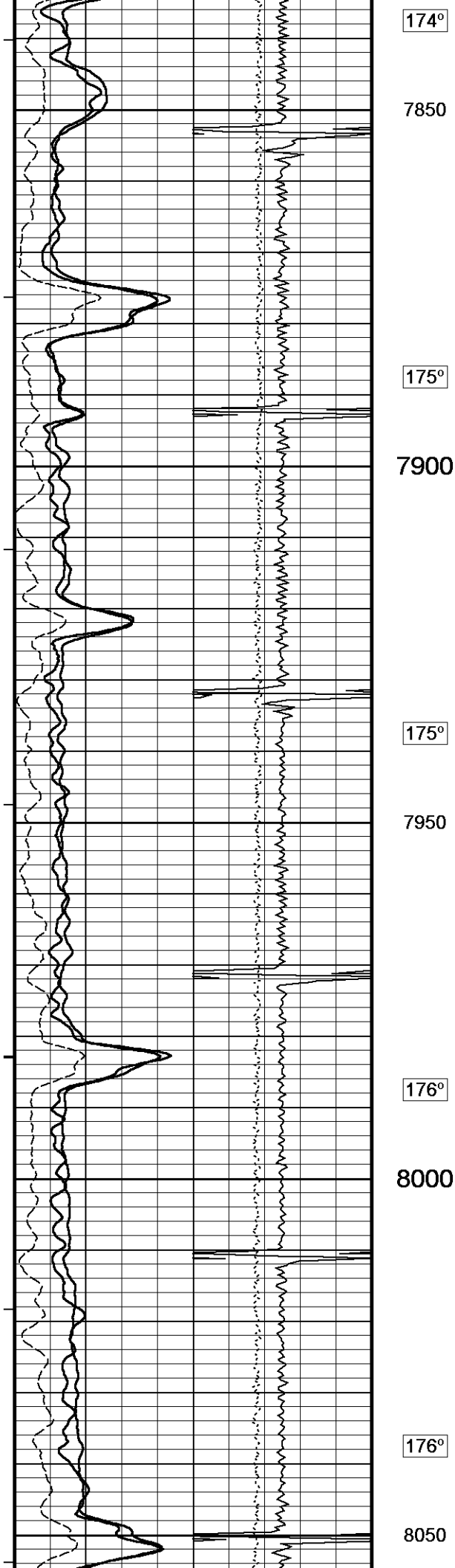
173°

7750

173°

7800







176°

8100

176°

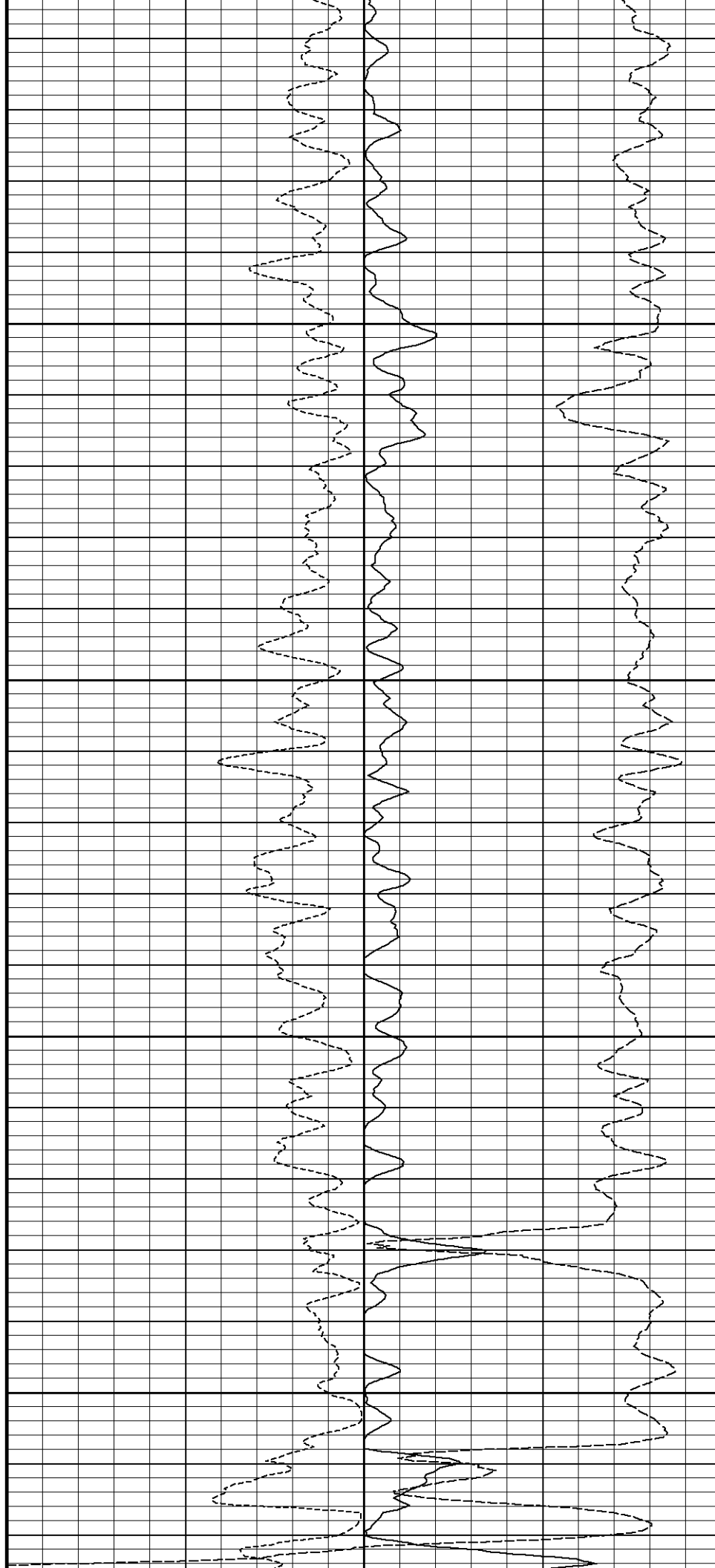
8150

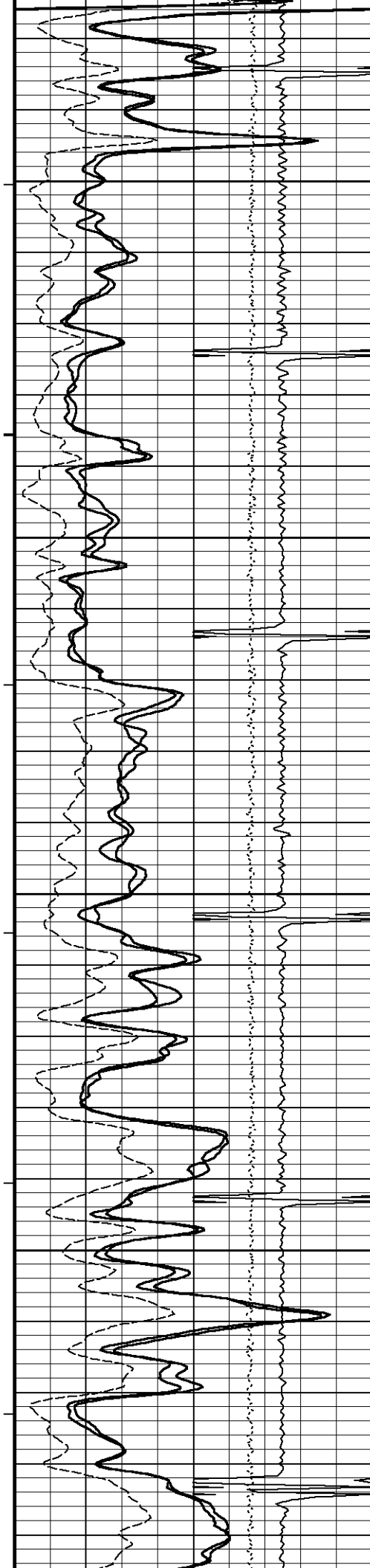
177°

8200

177°

8250





178°

8300

178°

8350

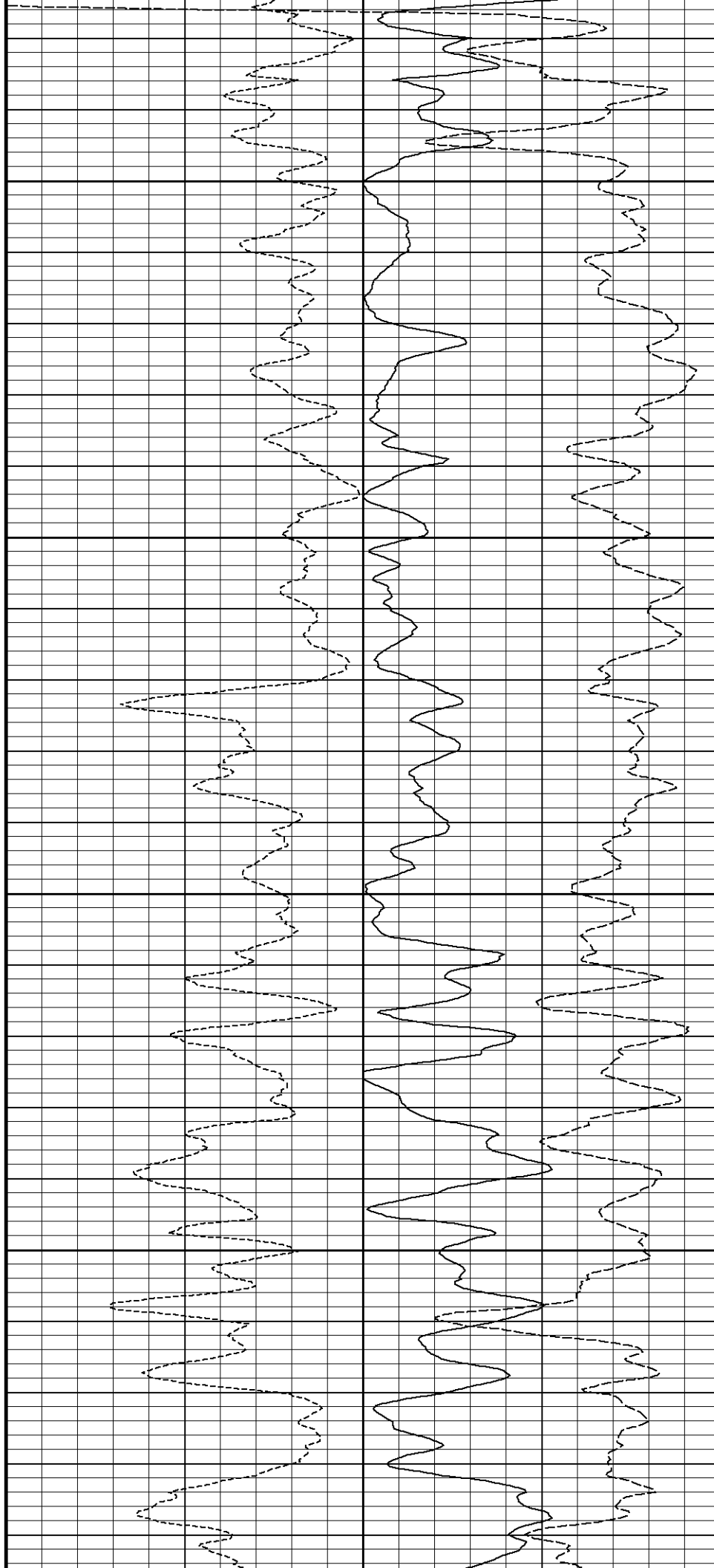
179°

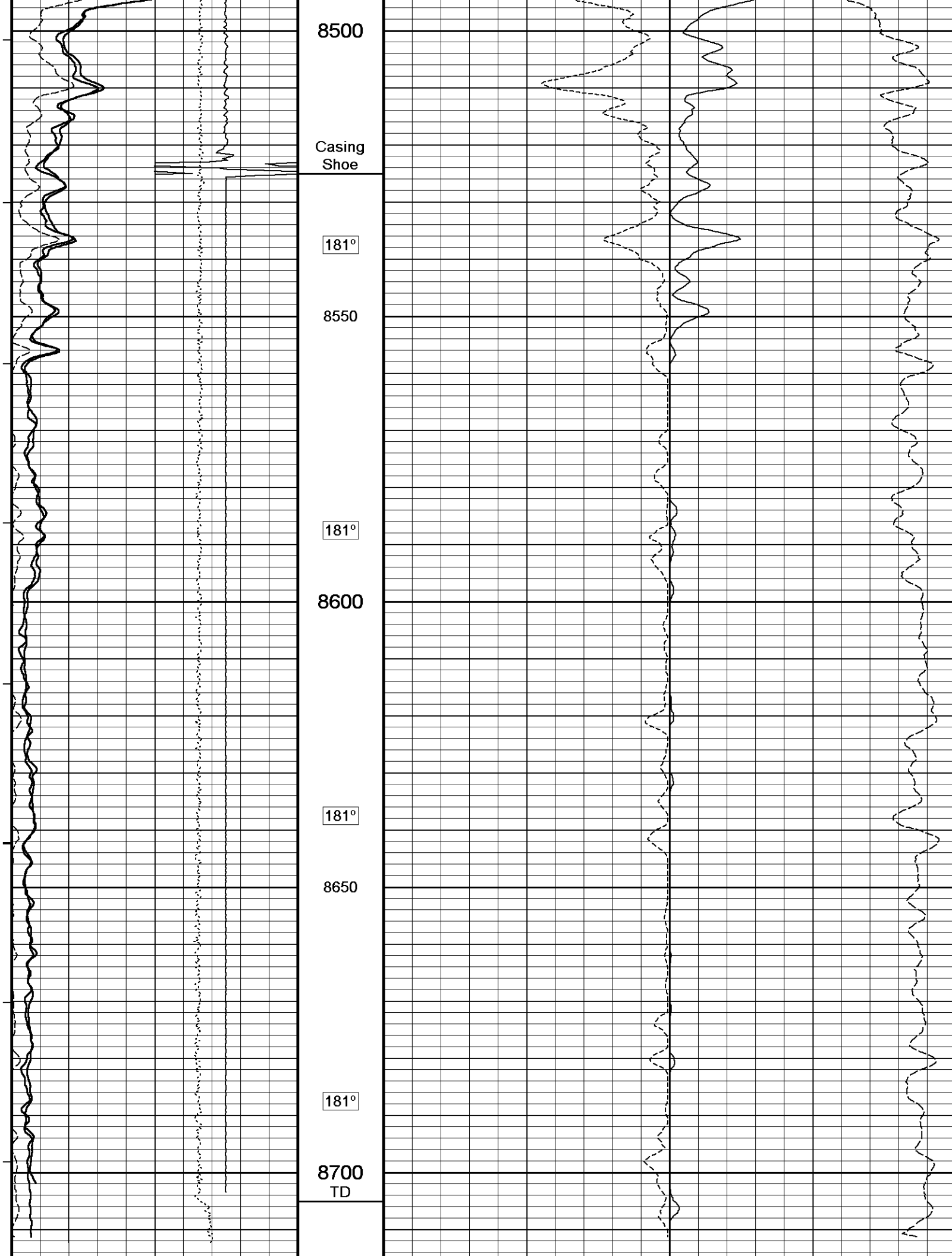
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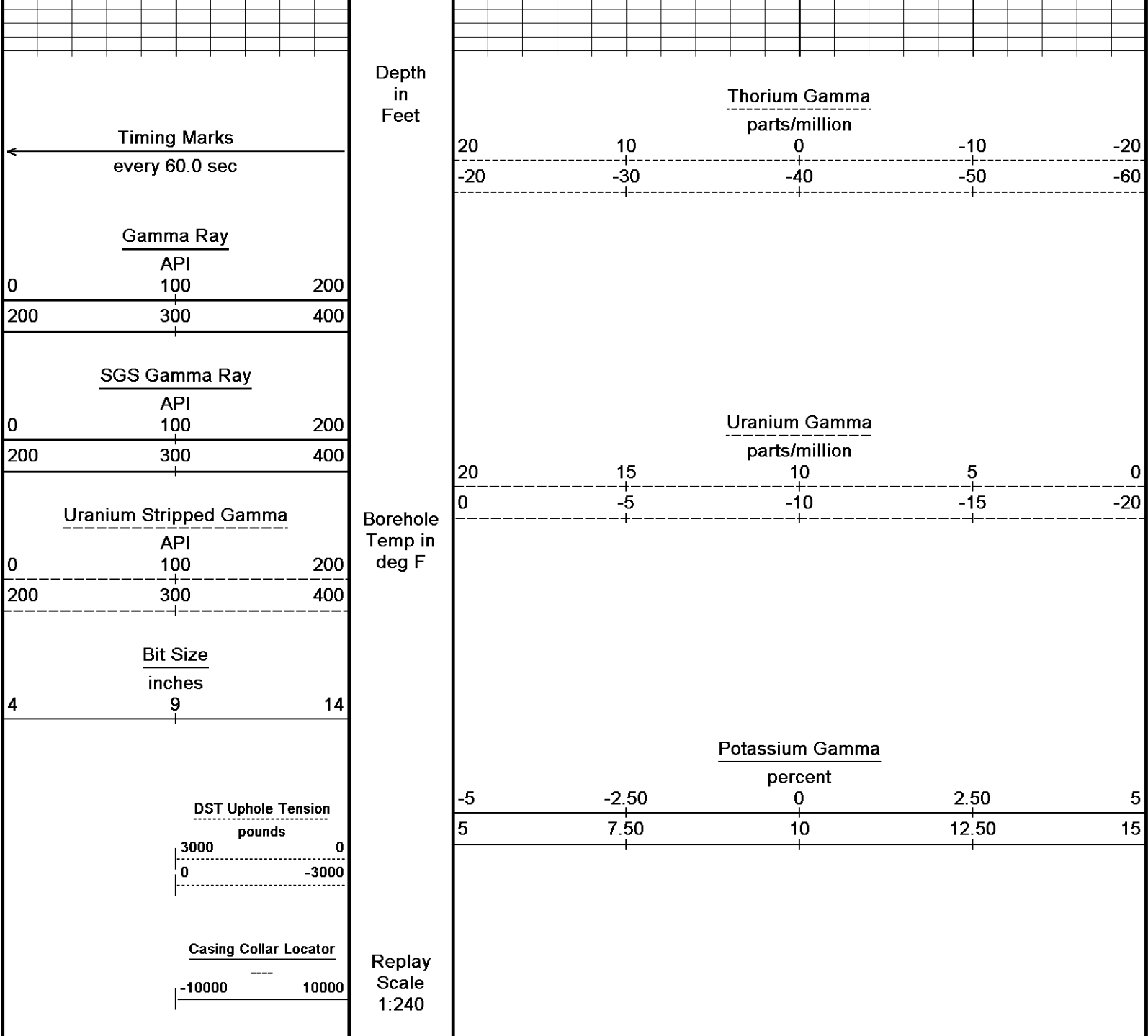
180°

8450

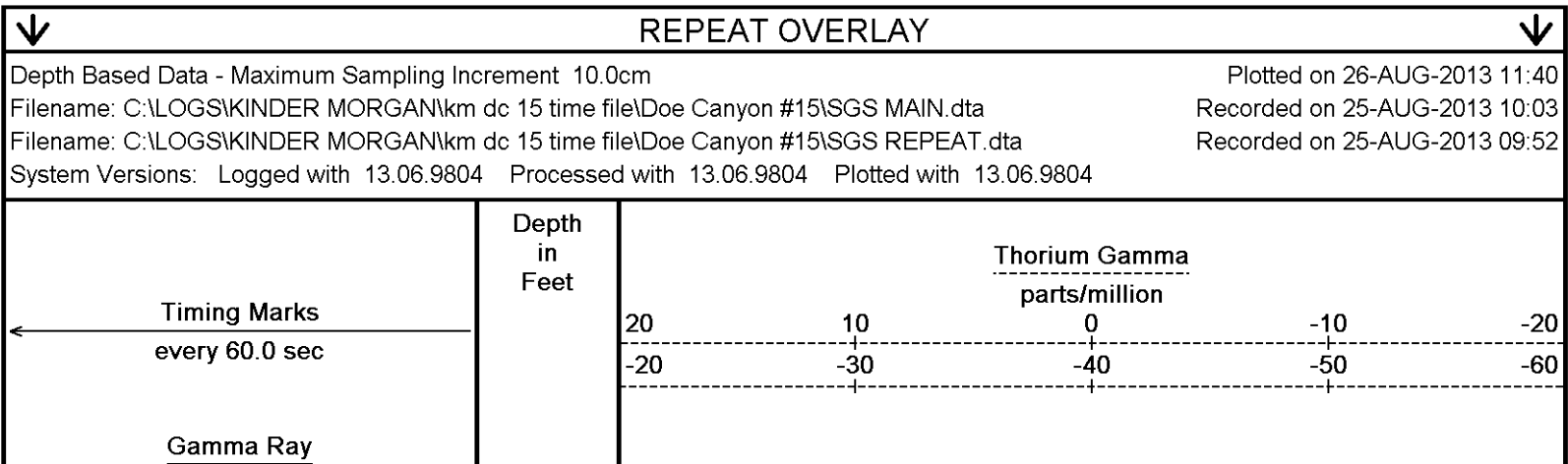
180°







Depth Based Data - Maximum Sampling Increment 10.0cm		Plotted on 26-AUG-2013 11:40
Filename: C:\LOGS\KINDER MORGAN\km dc 15 time file\Doe Canyon #15\SGS MAIN.dta		Recorded on 25-AUG-2013 10:03
System Versions: Logged with 13.06.9804 Processed with 13.06.9804 Plotted with 13.06.9804		
↑	5 INCH MAIN PASS	↑



0	API 100	200
200	300	400

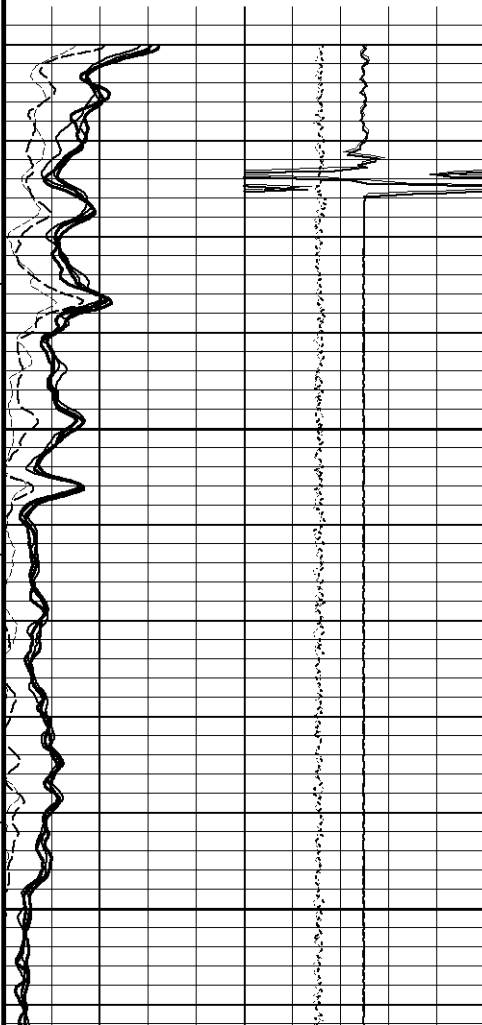
SGS Gamma Ray		
0	API 100	200
200	300	400

Uranium Stripped Gamma		
0	API 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

8508

Casing
Shoe

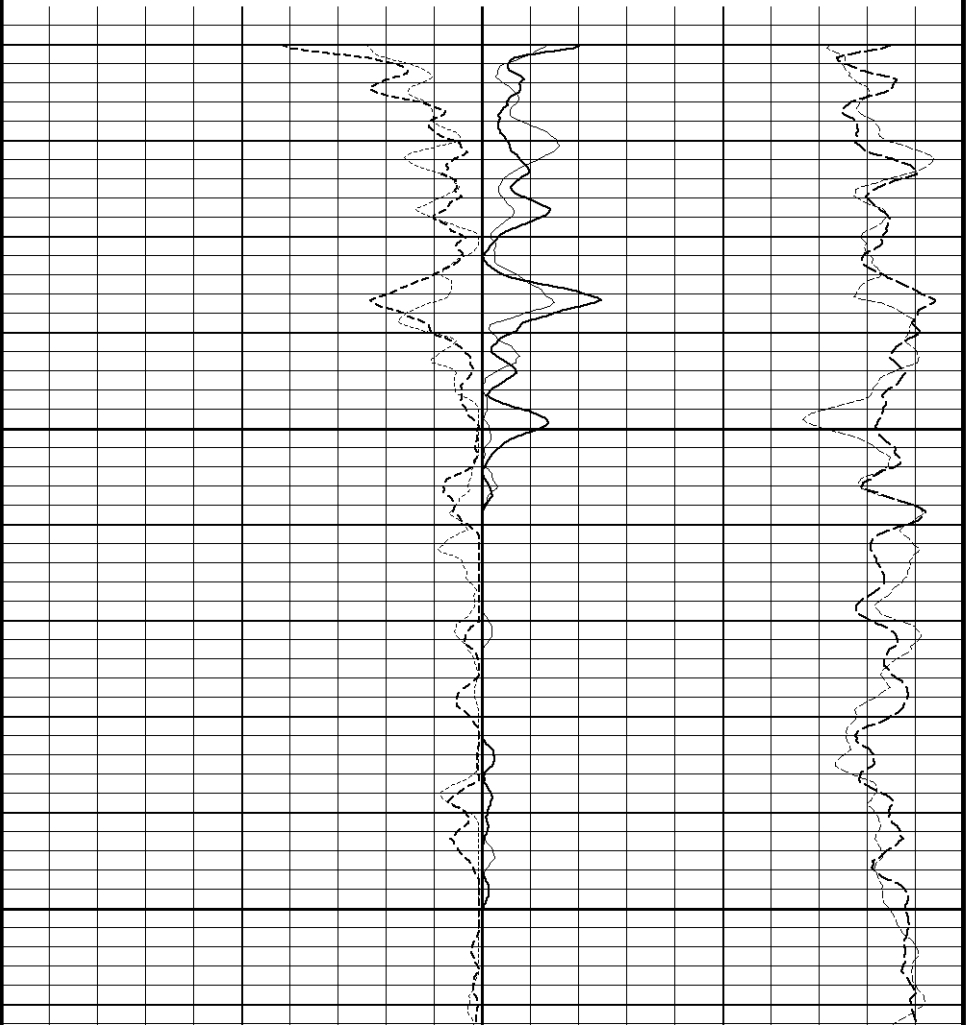
8550

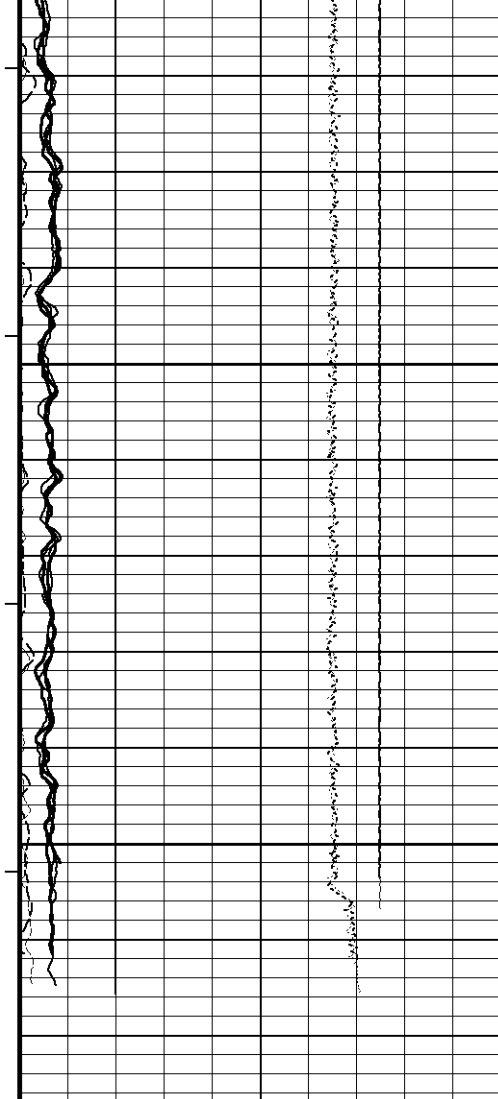
181°

8600

Uranium Gamma parts/million				
20	15	10	5	0
0	-5	-10	-15	-20

Potassium Gamma percent				
-5	-2.50	0	2.50	5
5	7.50	10	12.50	15





181°

8650

181°

8700
TD

Depth
in
Feet

Timing Marks
every 60.0 sec

Gamma Ray

API

100

200

300

400

SGS Gamma Ray

API

100

200

300

400

Uranium Stripped Gamma

API

100

200

300

400

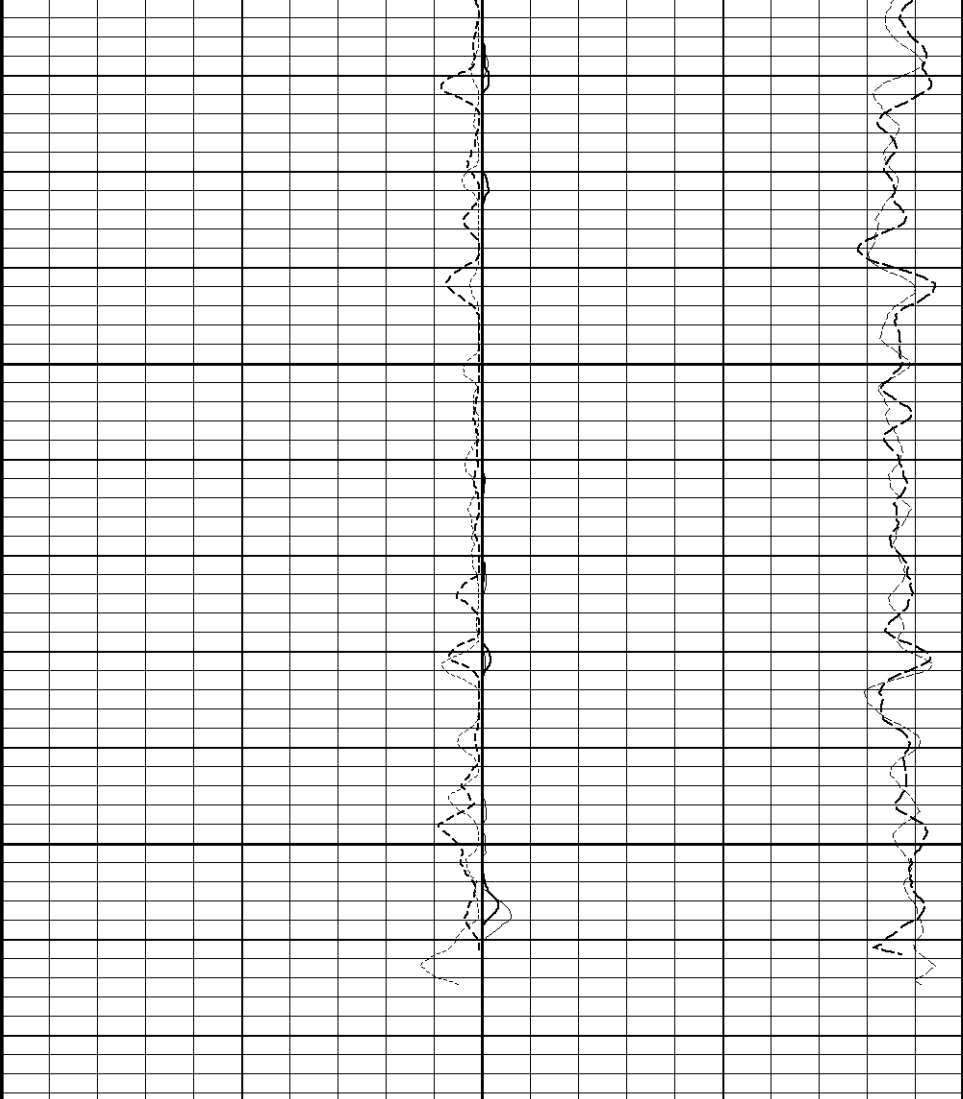
Bit Size

inches

9

14

Borehole
Temp in
deg F



Thorium Gamma
parts/million

20

10

0

-10

-20

-20

-30

-40

-50

-60

Uranium Gamma
parts/million

20

15

10

5

0

0

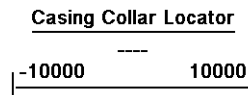
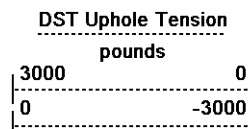
-5

-10

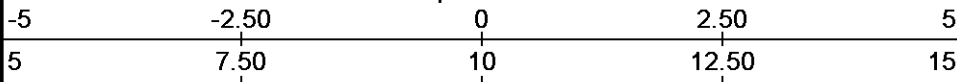
-15

-20

Potassium Gamma
percent



Replay
Scale
1:240



Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 26-AUG-2013 11:40
 Filename: C:\LOGS\KINDER MORGAN\km dc 15 time file\Doe Canyon #15\SGS MAIN.dta Recorded on 25-AUG-2013 10:03
 Filename: C:\LOGS\KINDER MORGAN\km dc 15 time file\Doe Canyon #15\SGS REPEAT.dta Recorded on 25-AUG-2013 09:52
 System Versions: Logged with 13.06.9804 Processed with 13.06.9804 Plotted with 13.06.9804

↑ REPEAT OVERLAY ↑

BEFORE SURVEY CALIBRATION

C:\LOGS\KINDER MORGAN\km dc 15 time file\Doe Canyon #15\SGS MAIN.dta

General Constants All 000

Last Edited on 25-AUG-2013,00:23

General Parameters

Mud Resistivity	0.950	ohm-metres
Mud Resistivity Temperature	86.000	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	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 287

Field Calibration on 12-JUL-2012 04:06

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	200.00	200.00

High Resolution Temperature Constants MCG-D.A 287

Last Edited on 27-FEB-2012 21:44

Pre-filter Length 11

Gamma Calibration MCG-D.A 287

Field Calibration on 24-AUG-2013,20:27

	Measured	Calibrated (API)
Background	130	91
Calibrator (Gross)	1028	717
Calibrator (Net)	898	626

Gamma Constants MCG-D.A 287

Last Edited on 19-AUG-2013,13:39

Gamma Calibrator Number	GRC005	
Mud Density	1.22	gm/cc
Caliper Source for Processing	Bit Size	
Tool Position	Centred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

Base Calibration

Potassium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	151.5	53.0	6.0	1.8	2.9
Calibrator (Gross)	279.2	138.9	30.8	2.1	2.9
Calibrator (Net)	127.7	85.9	24.8	0.3	-0.0

	K %	U ppm	Th ppm
Concentrations	5.9	0.0	0.0

Uranium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	151.5	53.0	6.0	1.8	2.9
Calibrator (Gross)	600.5	213.3	19.3	11.8	6.2
Calibrator (Net)	449.0	160.3	13.3	10.1	3.3

	K %	U ppm	Th ppm
Concentrations	0.0	16.6	0.0

Thorium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	151.5	53.0	6.0	1.8	2.9
Calibrator (Gross)	464.8	171.8	14.6	7.3	18.1
Calibrator (Net)	313.3	118.8	8.6	5.6	15.1

	K %	U ppm	Th ppm
Concentrations	0.0	0.0	44.7

Mixture Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	151.5	53.0	6.0	1.8	2.9
Calibrator (Gross)	944.9	383.6	50.3	15.2	20.6
Calibrator (Net)	793.3	330.6	44.3	13.4	17.7

Field Calibration

Gamma Ray

	Measured	Calibrated (API)
Background	222	44
Calibrator (Gross)	1421	284
Calibrator (Net)	1200	240

Mixture Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	151.5	53.0	6.0	1.8	2.9
Calibrator (Gross)	944.9	383.6	50.3	15.2	20.6
Calibrator (Net)	793.3	330.6	44.3	13.4	17.7

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\km dc 15 time file\Doe Canyon #15\SGS MAIN.dta

3/8" Triple Cone Cable Head (MCB C A)

MCB C A 5' L G: 1.53 ft. WT: 15.4 lb. OD: 0.24 in



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 313 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

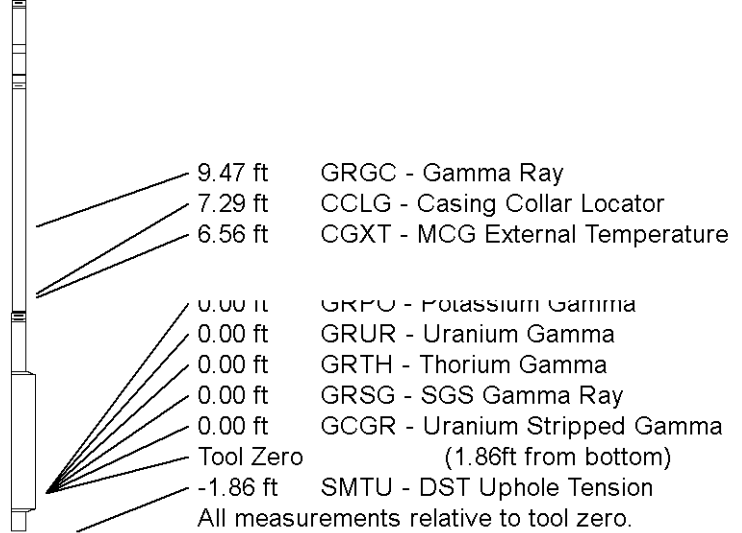
Compact Comms Gamma

MCG-D.A 287 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

Total Length: 20.35 ft Weight: 207.2 lb



COMPANY	KINDER MORGAN C02 Co. L.P
WELL	DOE CANYON #15
FIELD	DOE CANYON
PROVINCE/COUNTY	DOLORES
COUNTRY/STATE	U.S.A. / COLORADO

Elevation Kelly Bushing	7250.00	feet	First Reading	8705.00	feet
Elevation Drill Floor	7250.00	feet	Depth Driller	8710.00	feet
Elevation Ground Level	7227.00	feet	Depth Logger	8705.00	feet



Weatherford®

SPECTRAL GAMMA RAY
LOG