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299-E33-343 (C5858)
Log Data Report

Borehole Information:

Borehole:	299-E33-343 (C5858)			Site:	E of 299-E33-41 near 241-BX Farm
Coordinates (WA St Plane)		GWL[1] (ft):	249.4	GWL Date:	02/26/08
North (m)	East (m)	Drill Date	TOC Elevation	Total Depth (ft)	Type
Not available	Not available	02/08	Not available	263.8	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Threaded steel	0.3	13 1/2	12 1/4	5/8	0	60
Threaded steel	0.7	11 3/4	10 3/4	1/2	0	235
Threaded steel	4.5	9 11/16	8 5/8	17/32	0	260.9

Borehole Notes:

The logging engineer measured the casing diameters with a caliper and steel tape. The onsite geologist reported the casing depths.

Logging Equipment Information:

Logging System:	Gamma 4N		Type: Serial No.:	SGLS HpGe (60%) 45TP22010A
Effective Calibration Date:	09/20/07	Calibration Reference:	HGLP-CC-022, Rev. 1	
		Logging Procedure:	HGLP-MAN-002, Rev. 0	

Logging System:	Gamma 4L		Type: Serial No.:	SGLS HpGe (60%) 47TP32211A
Effective Calibration Date:	12/31/07	Calibration Reference:	HGLP-CC-027, Rev. 0	
		Logging Procedure:	HGLP-MAN-002, Rev. 0	

Logging System:	Gamma 4H (with AmBe source)		Type: Serial No.:	NMLS H310700352
Effective Calibration Date:	11/06/07	Calibration Reference:	HGLP-CC-021	
		Logging Procedure:	HGLP-MAN-002, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2 Repeat	5	6 Repeat	7 Repeat
Date	01/17/08	01/17/08	02/12/08	02/12/08	02/12/08
Logging Engineer	Spatz	Spatz	Spatz	Spatz	Spatz
Start Depth (ft)	59.0	45.0	59.0	216.0	234.0
Finish Depth (ft)	0.0	35.0	234.0	234.0	234.0
Count Time (sec)	100	100	100	100	1000
Live/Real	R	R	R	R	R
Shield (Y/N)	N	N	N	N	N
MSA Interval (ft)	1.0	1.0	1.0	1.0	None
Pre-Verification	DN921CAB	DN921CAB	DN961CAB	DN961CAB	DN961CAB
Start File	DN921000	DN921060	DN961000	DN961176	DN961195

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Log Run	1	2 Repeat	5	6 Repeat	7 Repeat
Finish File	DN921059	DN921070	DN961175	DN961194	DN961195
Post-Verification	DN921CAA	DN921CAA	DN961CAA	DN961CAA	DN961CAA
Depth Return Error (in.)	- 0.5	0	N/A	N/A	- 3
Comments	Fine gain adjustment after files -023, -049, -059	No fine gain adjustment	Fine gain adjustment after files -056, -069, -112.	No fine gain adjustment	No fine gain adjustment

Log Run	10	11 Repeat			
Date	02/26/08	02/26/08			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	233.0	233.0			
Finish Depth (ft)	263.0	239.0			
Count Time (sec)	100	100			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
Pre-Verification	DL131CAB	DL131CAB			
Start File	DL131000	DL131031			
Finish File	DL131030	DL131037			
Post-Verification	DL131CAA	DL131CAA			
Depth Return Error (in.)	N/A	- 3			
Comments	No fine gain adjustment	No fine gain adjustment			

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	3	4 Repeat	8	9 Repeat	12
Date	01/17/08	01/17/08	02/12/08	02/12/08	02/26/08
Logging Engineer	Spatz	Spatz	Spatz	Spatz	Spatz
Start Depth (ft)	59.5	45.0	59.0	213.0	233.0
Finish Depth (ft)	1.0	35.0	234.25	231.0	249.0
Count Time (sec)	15	15	15	15	15
Live/Real	R	R	R	R	R
Shield (Y/N)	N	N	N	N	N
MSA Interval (ft)	0.25	0.25	0.25	0.25	0.25
Pre-Verification	DHA02CAB	DHA02CAB	DHB02CAB	DHB02CAB	DHB92CAB
Start File	DHA02000	DHA02235	DHB02000	DHB02702	DHB92000
Finish File	DHA02234	DHA02275	DHB02701	DHB02774	DHB92064
Post-Verification	DHA02CAA	DHA02CAA	DHB02CAA	DHB02CAA	DHB92CAA
Depth Return Error (in.)	- 2.0	- 0.5	N/A	- 2	N/A
Comments	None	None	None	None	None

Log Run	13 Repeat				
Date	02/26/08				
Logging Engineer	Spatz				
Start Depth (ft)	234.0				
Finish Depth (ft)	240.0				
Count Time (sec)	15				
Live/Real	R				
Shield (Y/N)	N				
MSA Interval (ft)	0.25				
Pre-Verification	DHB92CAB				
Start File	DHB92065				
Finish File	DHB92089				

Log Run	13 Repeat				
Post-Verification	DHB92CAA				
Depth Return Error (in.)	- 3.0				
Comments	None				

Logging Operation Notes:

Logging was conducted with a centralizer on the sondes. Data were mostly acquired in a single casing. Exceptions include a few depth intervals below the bottom of each casing where the sonde entered an open hole and approximately 2 to 3 ft of overlap where two casings exist. All measurements are referenced to ground surface.

Analysis Notes:

Analyst:	Henwood	Date:	02/27/08	Reference:	GJO-HGLP 1.6.3, Rev. 0

Pre- and post-run verifications for the logging systems were performed before and after each day's data acquisition. The acceptance criteria were met.

Three different sized casings were used in drilling this borehole. A casing correction for a 5/8-in.-thick casing was applied to the SGLS data to 60 ft. For log run 8, from 59 to 60 ft, a combined casing correction of 1.125-in.-thick casing (5/8+1/2 for the 12- and 10-in. casings, respectively), was applied; from 61 to 235 ft, a correction for a single 1/2-in. casing was applied. For log run 12, from 233 to 235 ft, a combined casing correction of 1.03125-in.-thick casing (1/2+17/32 for the 10- and 9-in. casings, respectively), was applied; from 236 to 260 ft, a correction for a single 17/32-in. casing was applied. From 261 to the bottom of the logged interval at 263 ft, no casing correction was applied. Note: The total gamma and neutron moisture data are not corrected for casing so that the count rates do not repeat at depth overlaps where casing changes are made. Data acquired below the 249.4 ft water level were also corrected for water.

The moisture data are reported in counts per second, as there is no valid calibration available for the multiple casings used in this borehole. The data reflect relative moisture content.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated with EXCEL worksheet templates identified as G4LDec07.xls and G4Nsept07.xls for logging systems Gamma4L and Gamma4N, respectively, using efficiency functions and corrections for casing, dead time, and water as determined from annual calibrations.

Results and Interpretations:

Cs-137 was detected near the ground surface (0 to 3 ft) at concentrations less than 2 pCi/g.

Evidence of processed uranium (U-238 and U-235) exists from approximately 225 to 238 ft. U-238 concentrations are determined by the Pa-234m energy peak at 1001 keV. U-235 is directly measured by the 185.72 keV energy peak. As determined from a spectrum (file number DN961195, log run 7) acquired for 1000 seconds, the maximum concentrations for U-238 and U-235 are approximately 107 and 7 pCi/g.

Moisture data indicate relatively high moisture from approximately 214 to 238 ft.

Repeat sections acquired for each logging system indicate good repeatability.

List of Log Plots:

Depth Reference is top of casing

Manmade Radionuclides (2 pages)
Natural Gamma Logs (2 pages)
Combination Plot (3 pages)

Combination Plot (0 to 280 ft)
Total Gamma & Moisture (0 to 280 ft)
Repeat of Manmade Radionuclides
Repeat Section of Natural Gamma Logs (35 to 45 ft)
Repeat Section of Natural Gamma Logs (216 to 234 ft)
Repeat Section of Natural Gamma Logs (233 to 239 ft)
Repeat Section for Total Gamma & Moisture (35 to 45 ft)
Repeat Section for Total Gamma & Moisture (213 to 231 ft)
Repeat Section for Total Gamma & Moisture (234 to 240 ft)

[1] GWL – groundwater level

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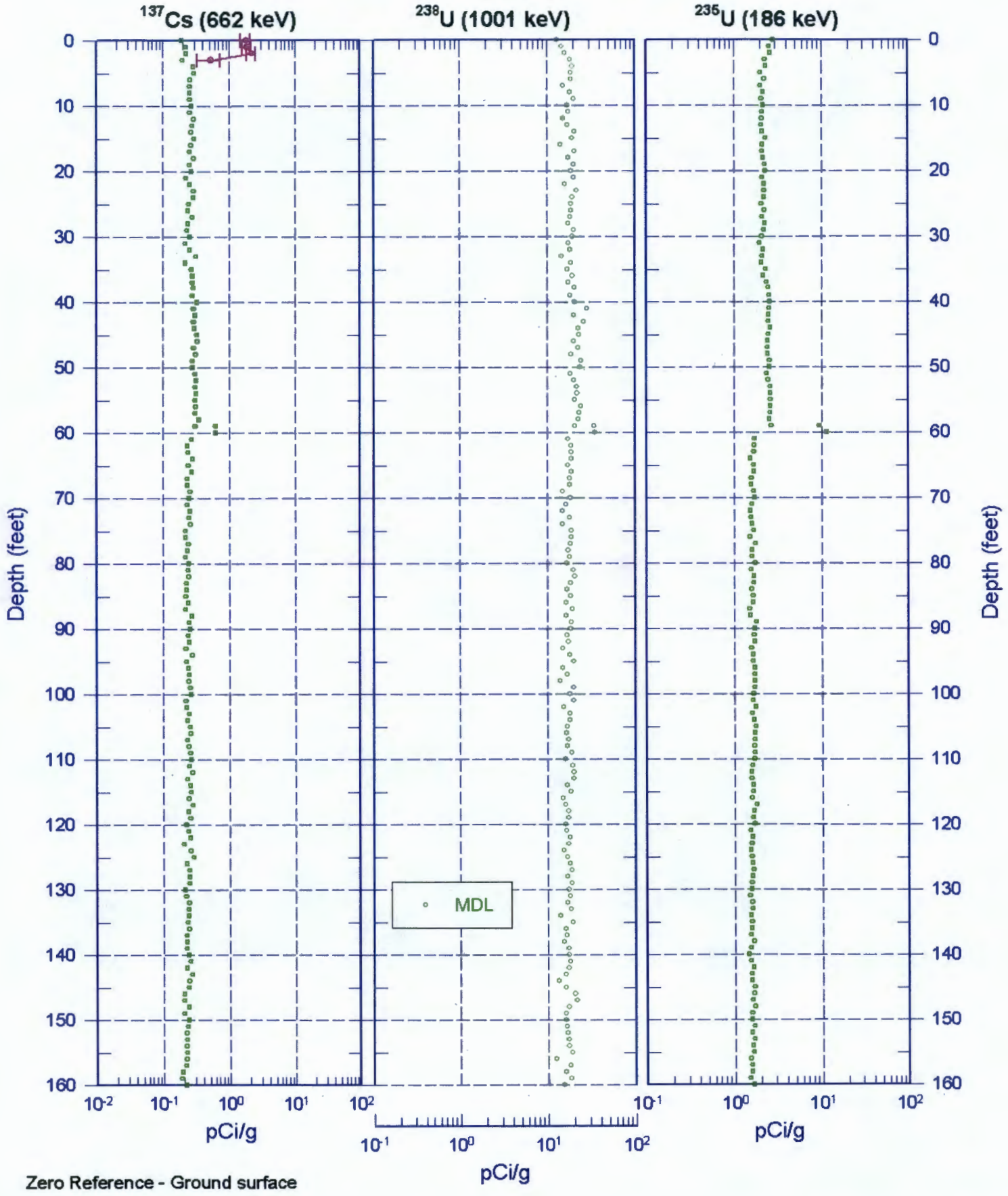
Man-Made Radionuclides



Zero Reference - Ground surface

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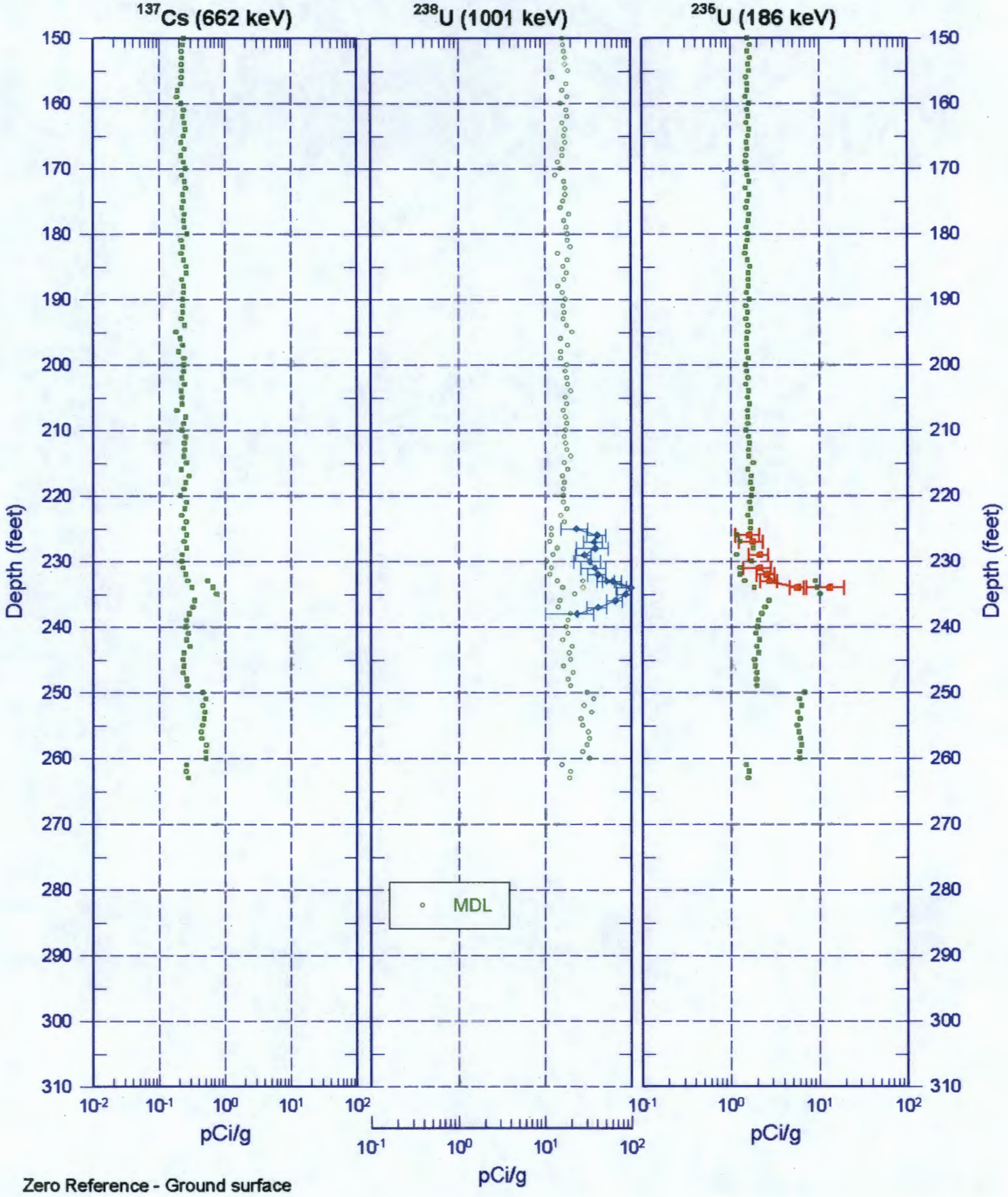
Man-Made Radionuclides



Zero Reference - Ground surface

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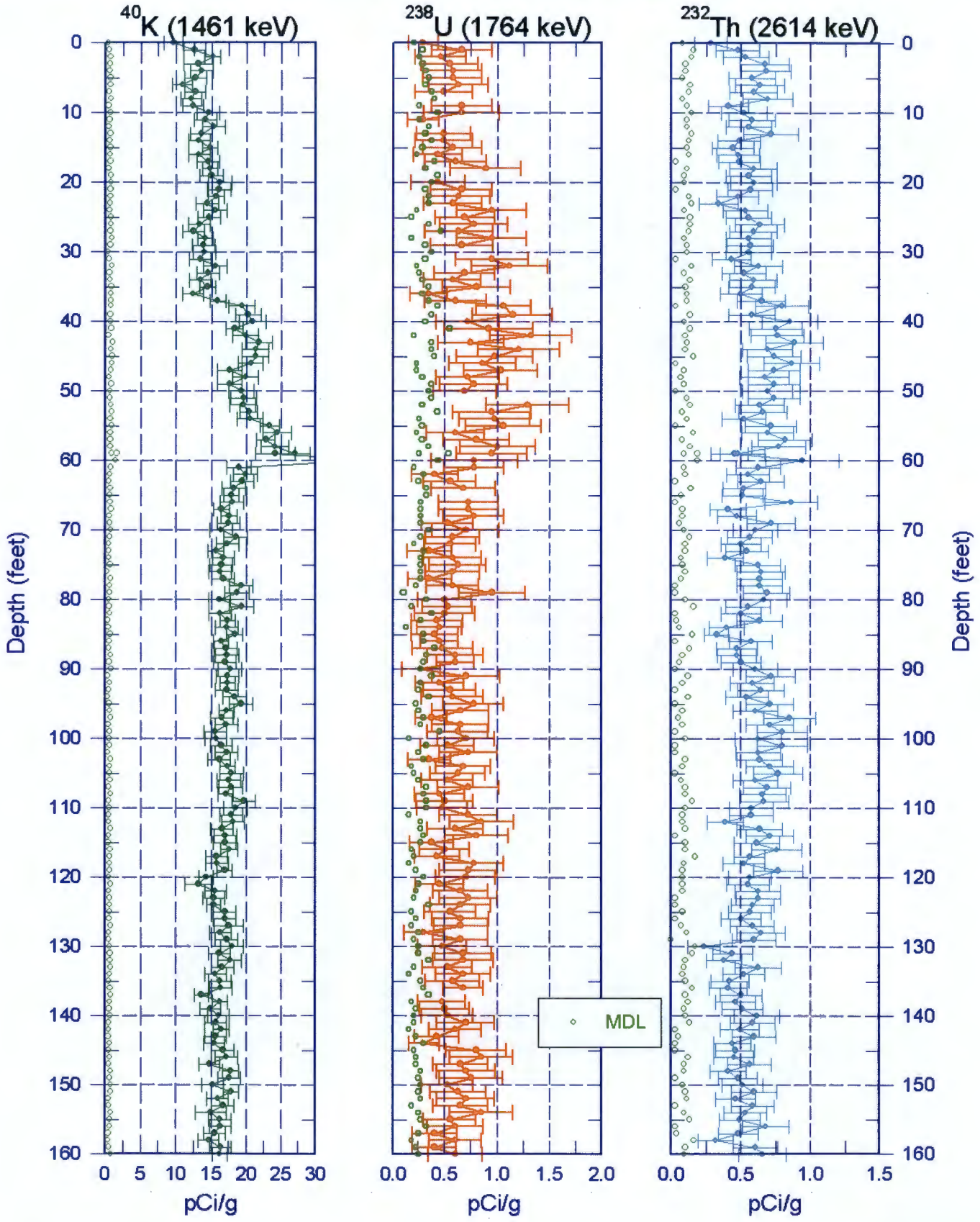
Natural Gamma Logs



Zero Reference - Ground surface

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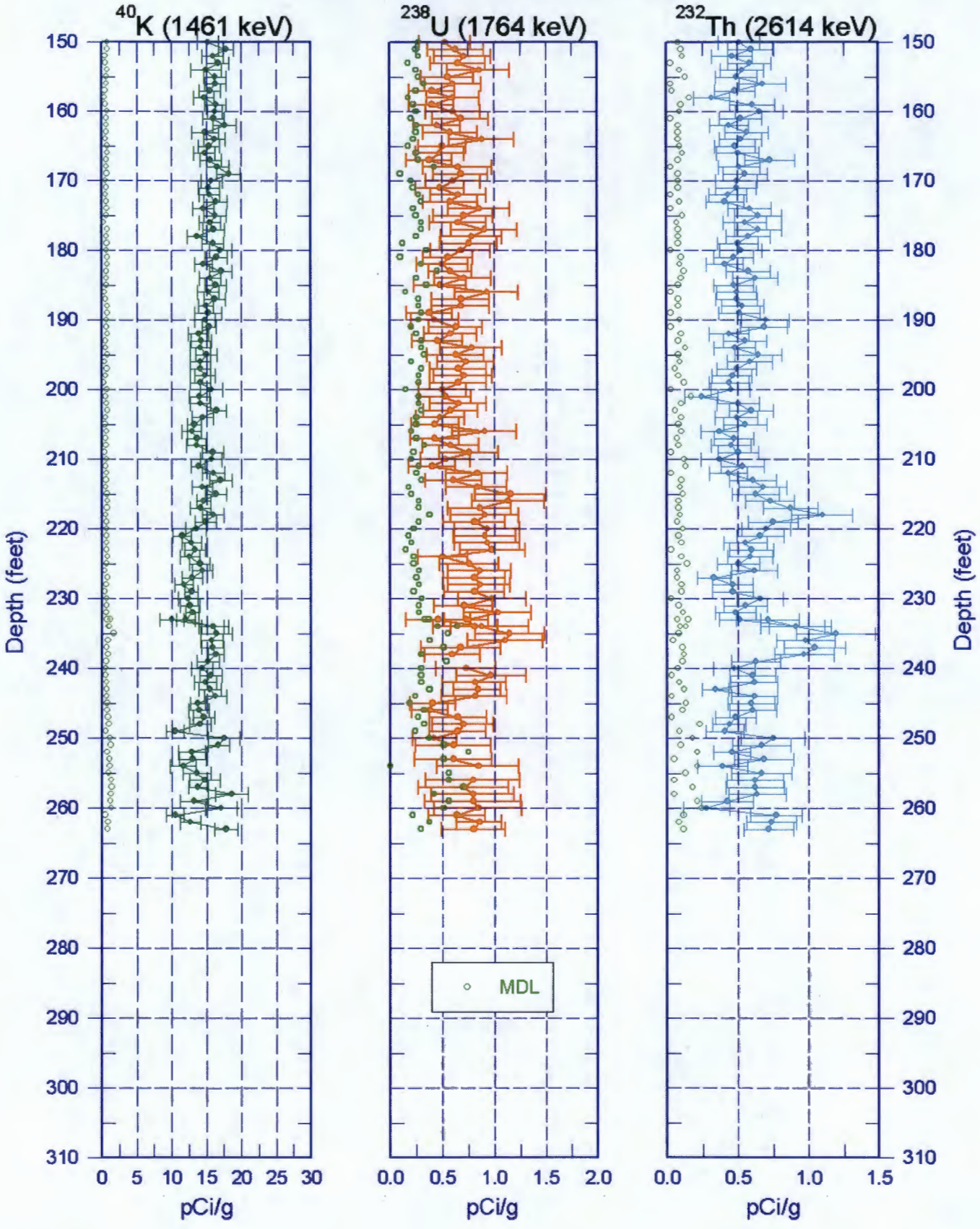
299-E33-343 (C5858)
Natural Gamma Logs



Zero Reference - Ground surface

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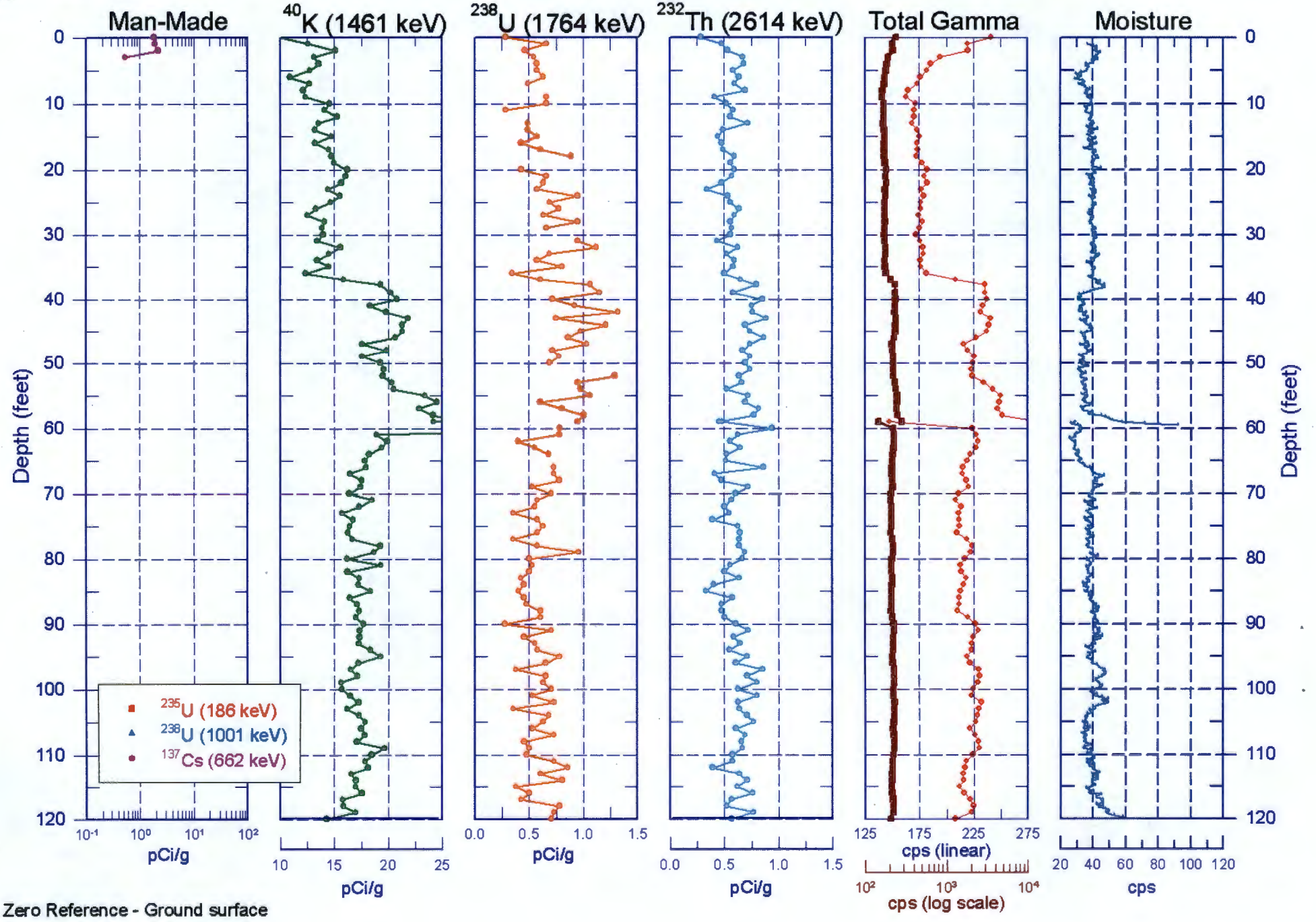
299-E33-343 (C5858) Combination Plot



Zero Reference - Ground surface

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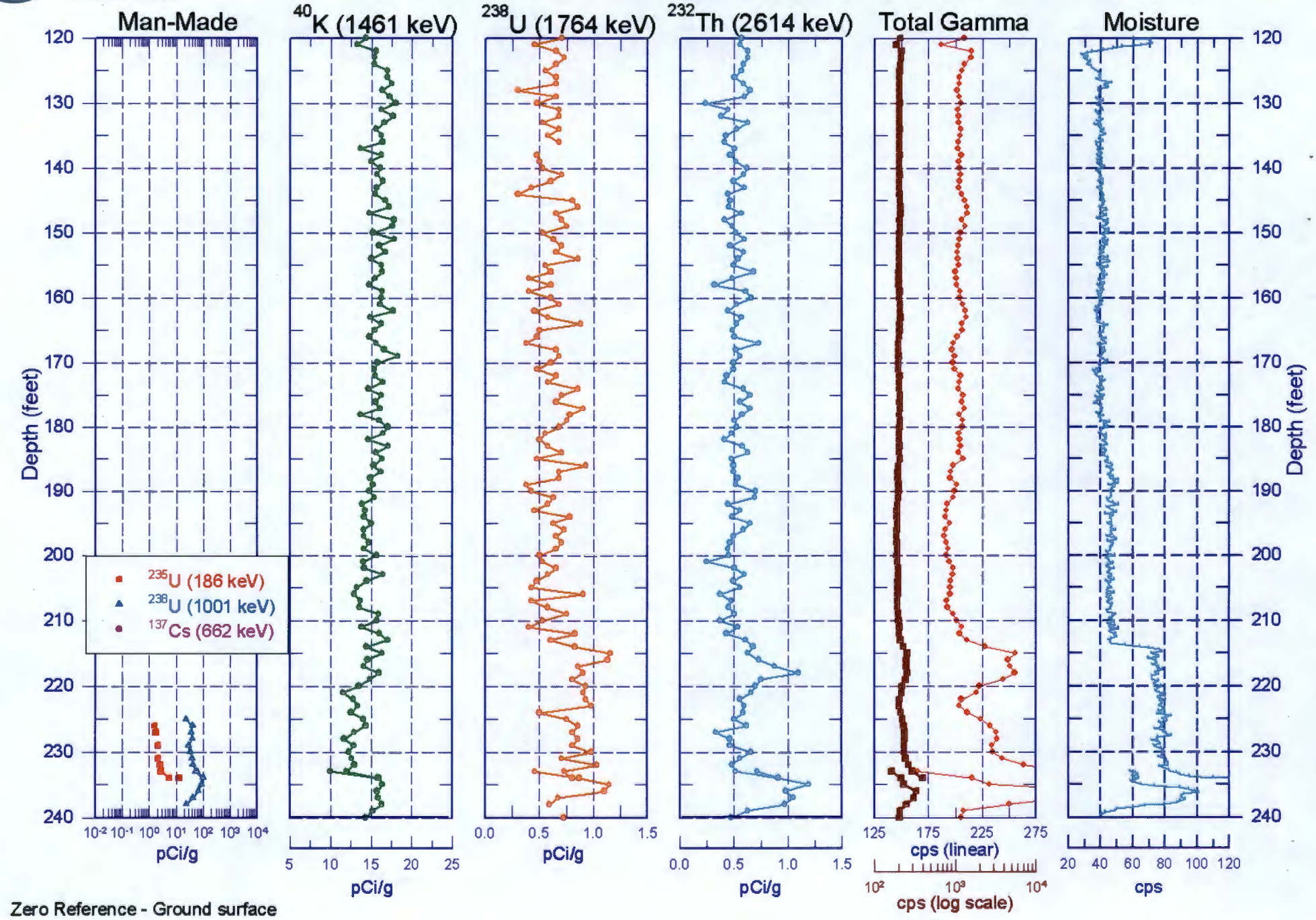
299-E33-343 (C5858) Combination Plot



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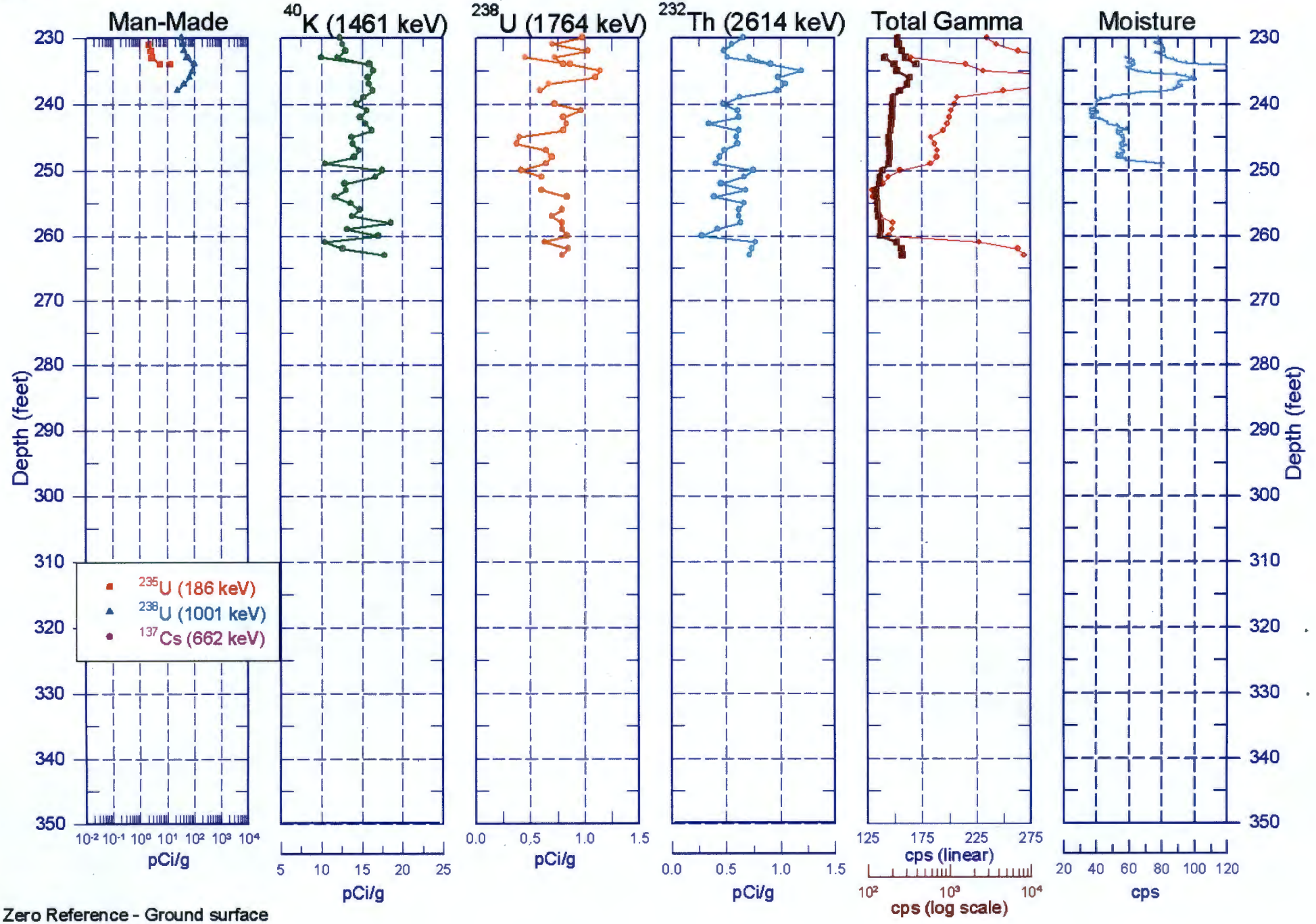
299-E33-343 (C5858) Combination Plot



Zero Reference - Ground surface

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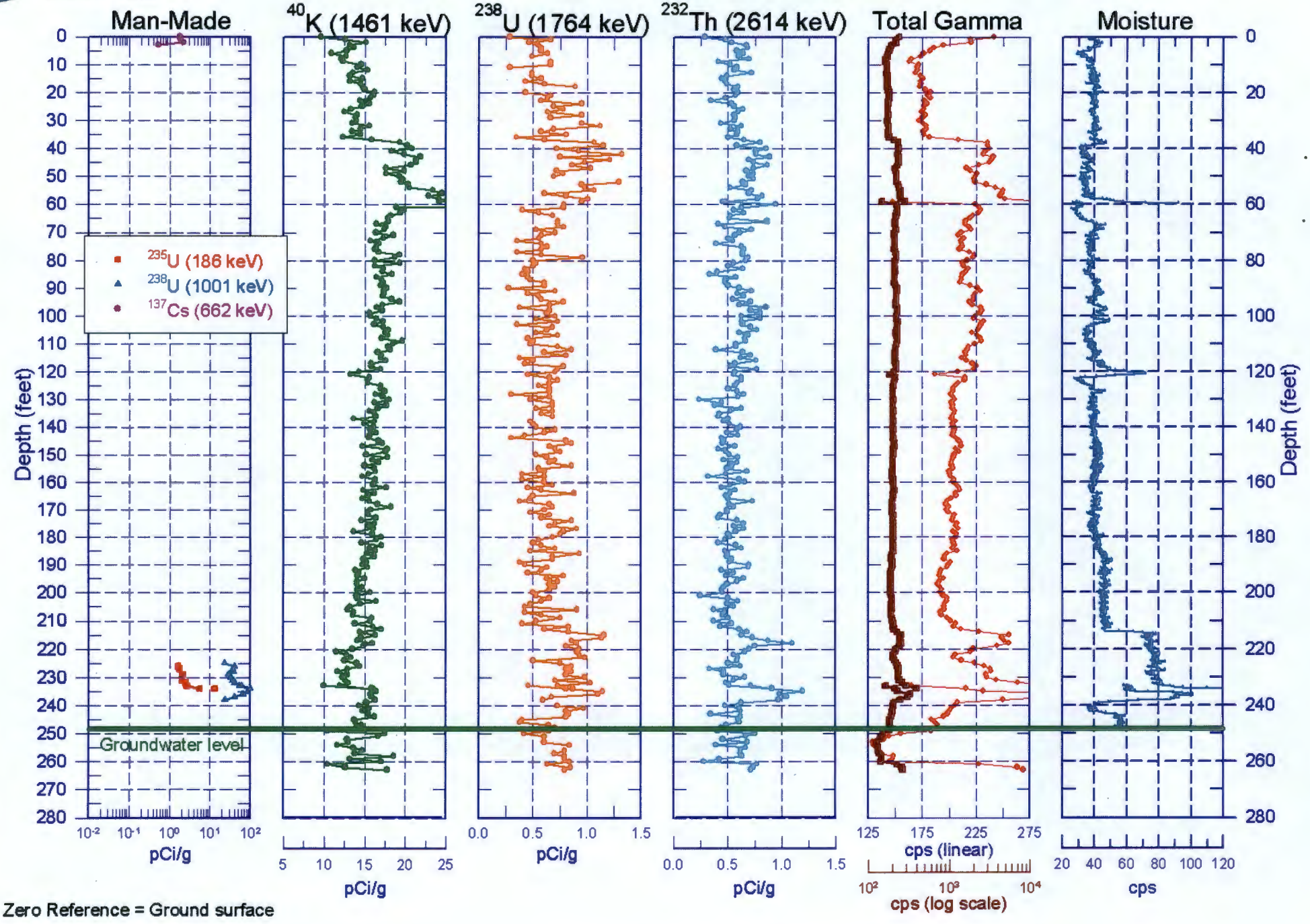
299-E33-343 (C5858) Combination Plot



Zero Reference = Ground surface

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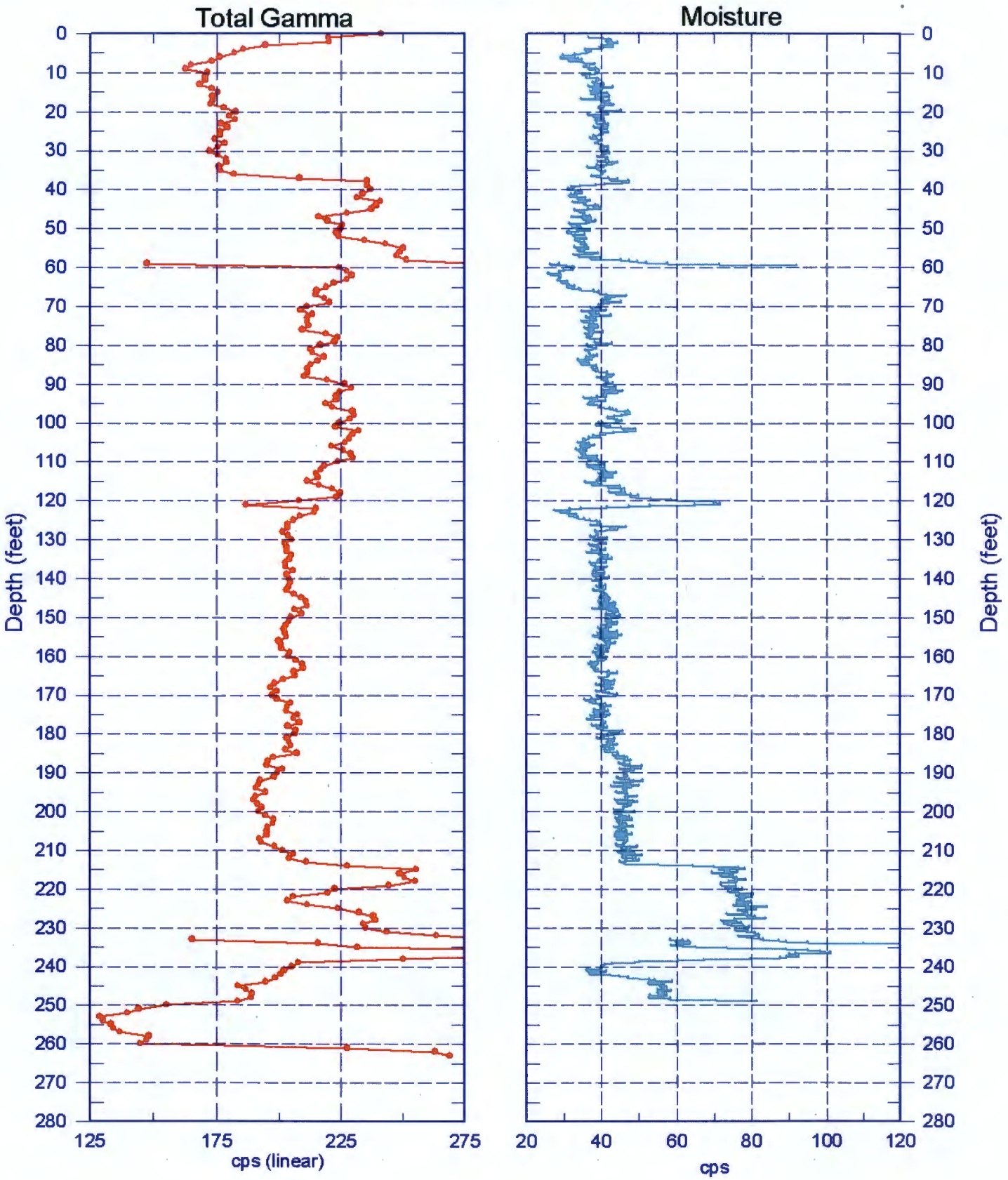
Total Gamma & Moisture



Reference - Ground Surface

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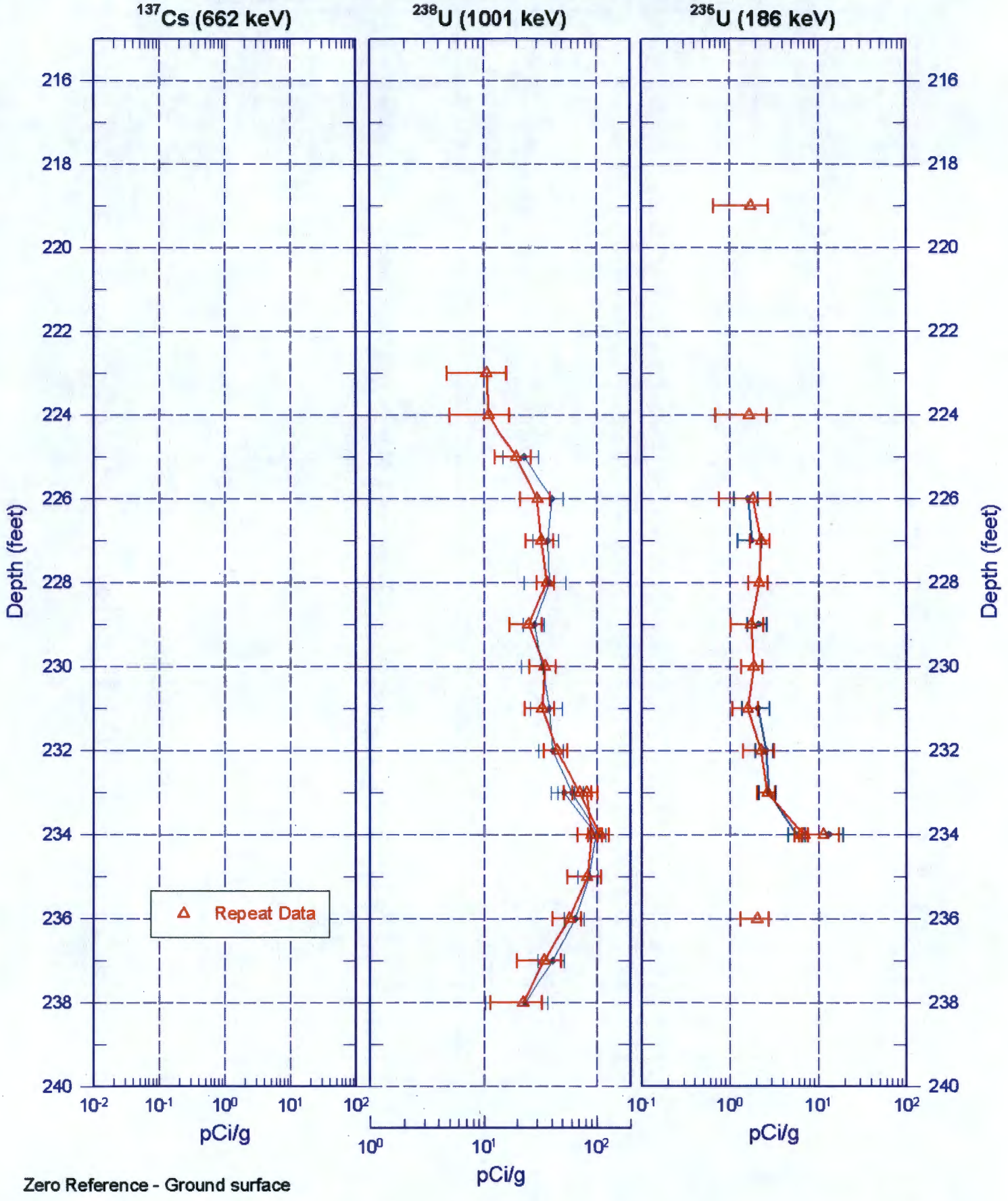
Repeat of Manmade Radionuclides



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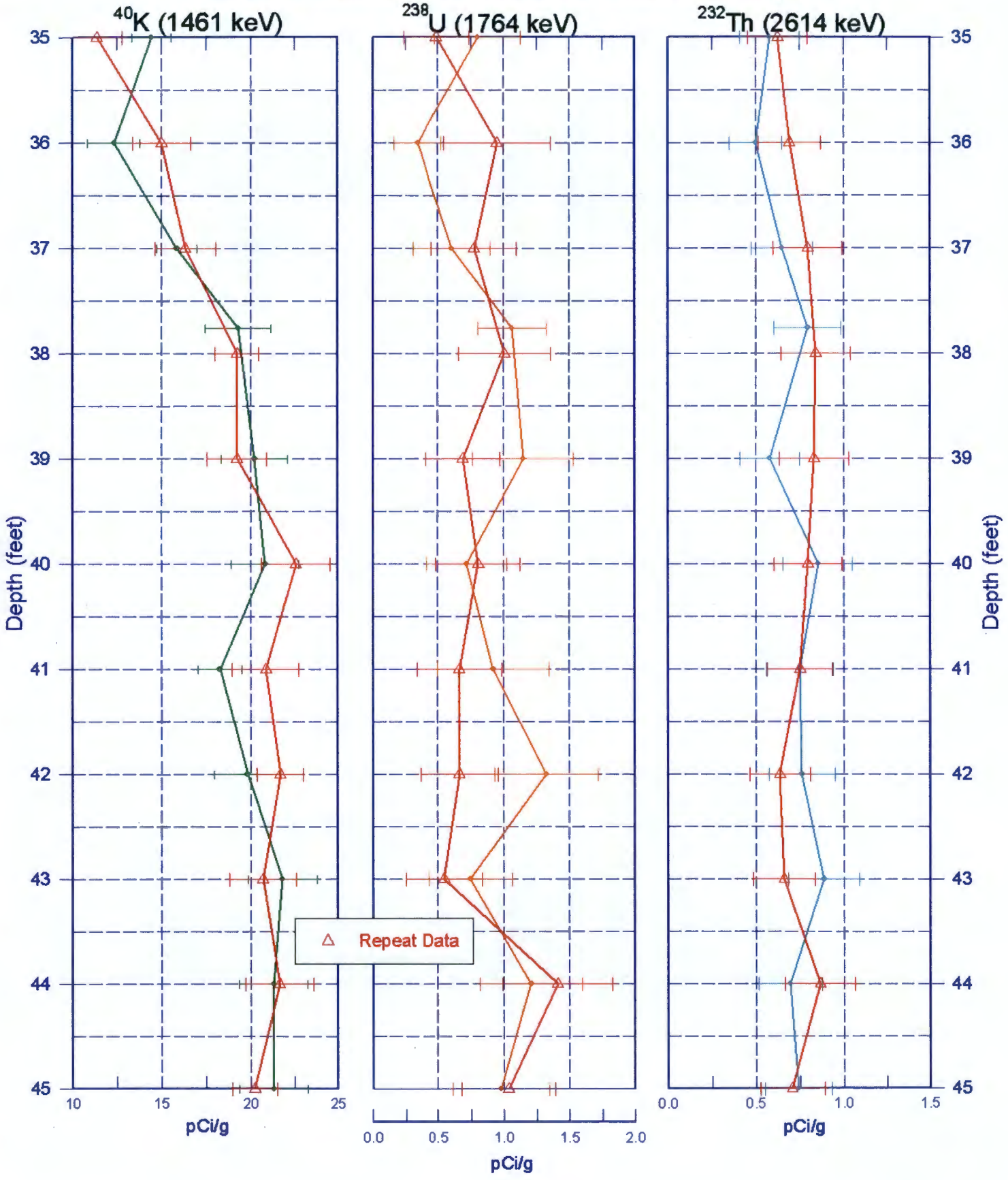
Repeat Section of Natural Gamma Logs



Zero Reference - Ground surface

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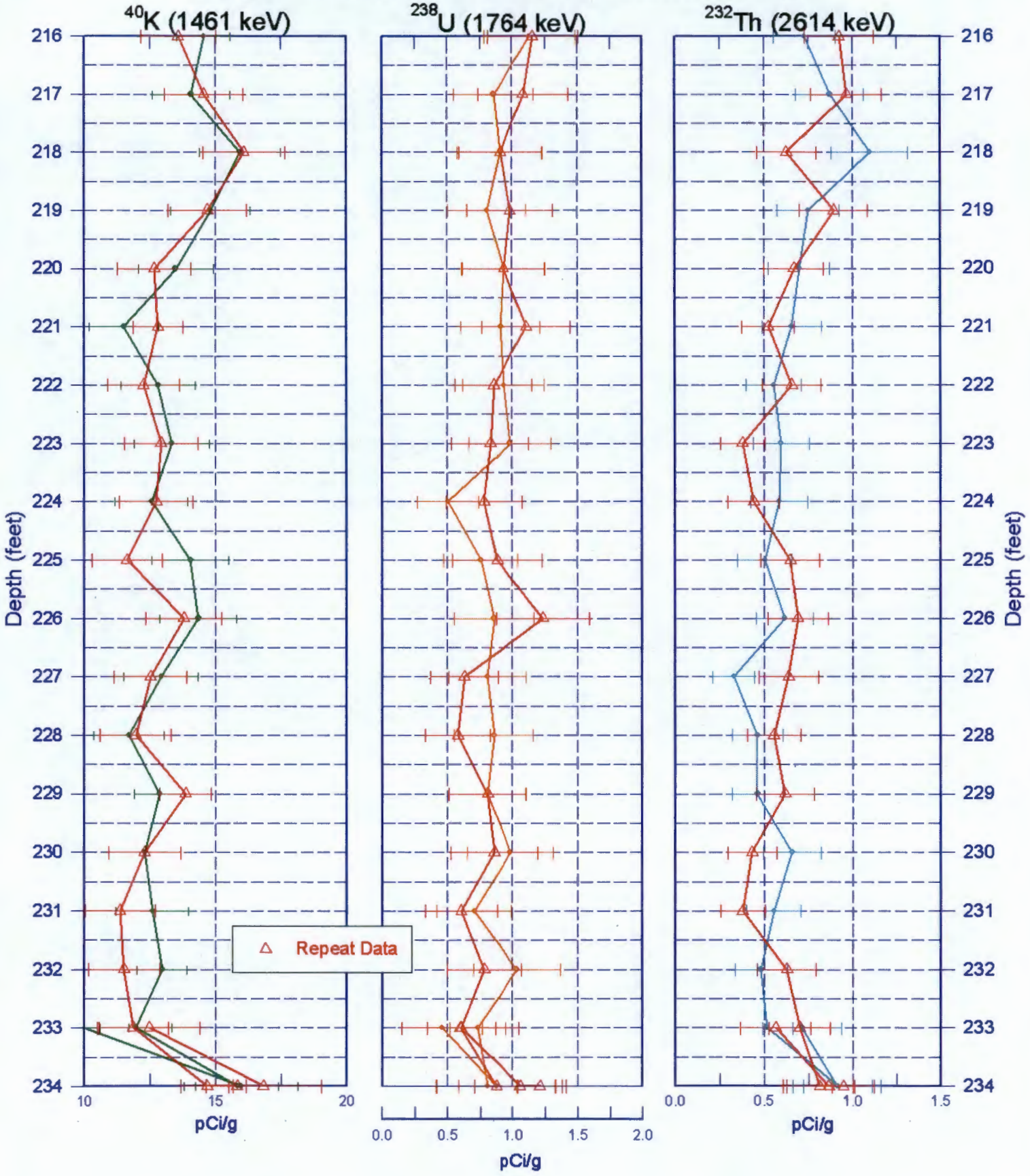
Repeat Section of Natural Gamma Logs



Zero Reference - Ground surface

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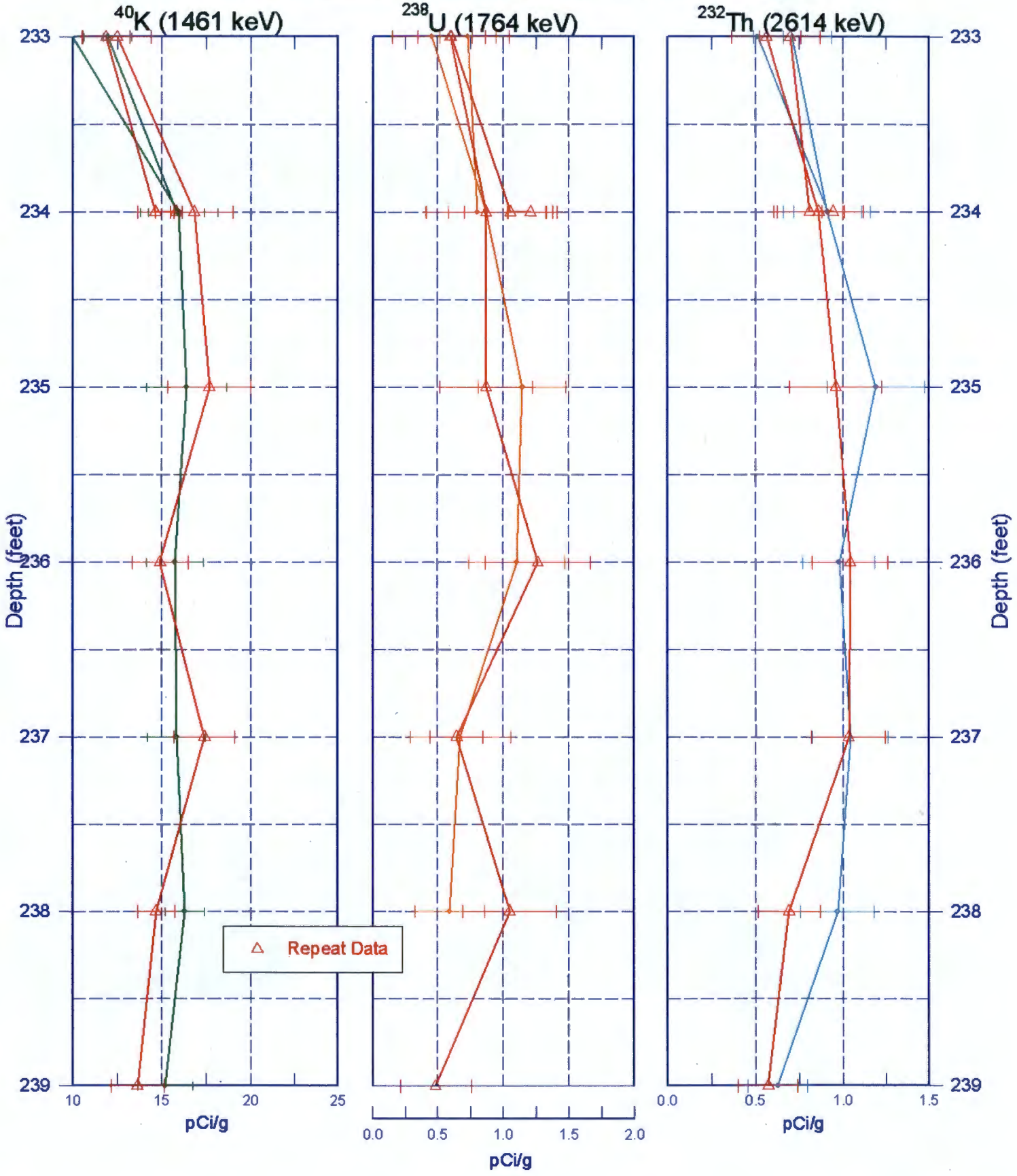
Repeat Section of Natural Gamma Logs



Zero Reference - Ground surface

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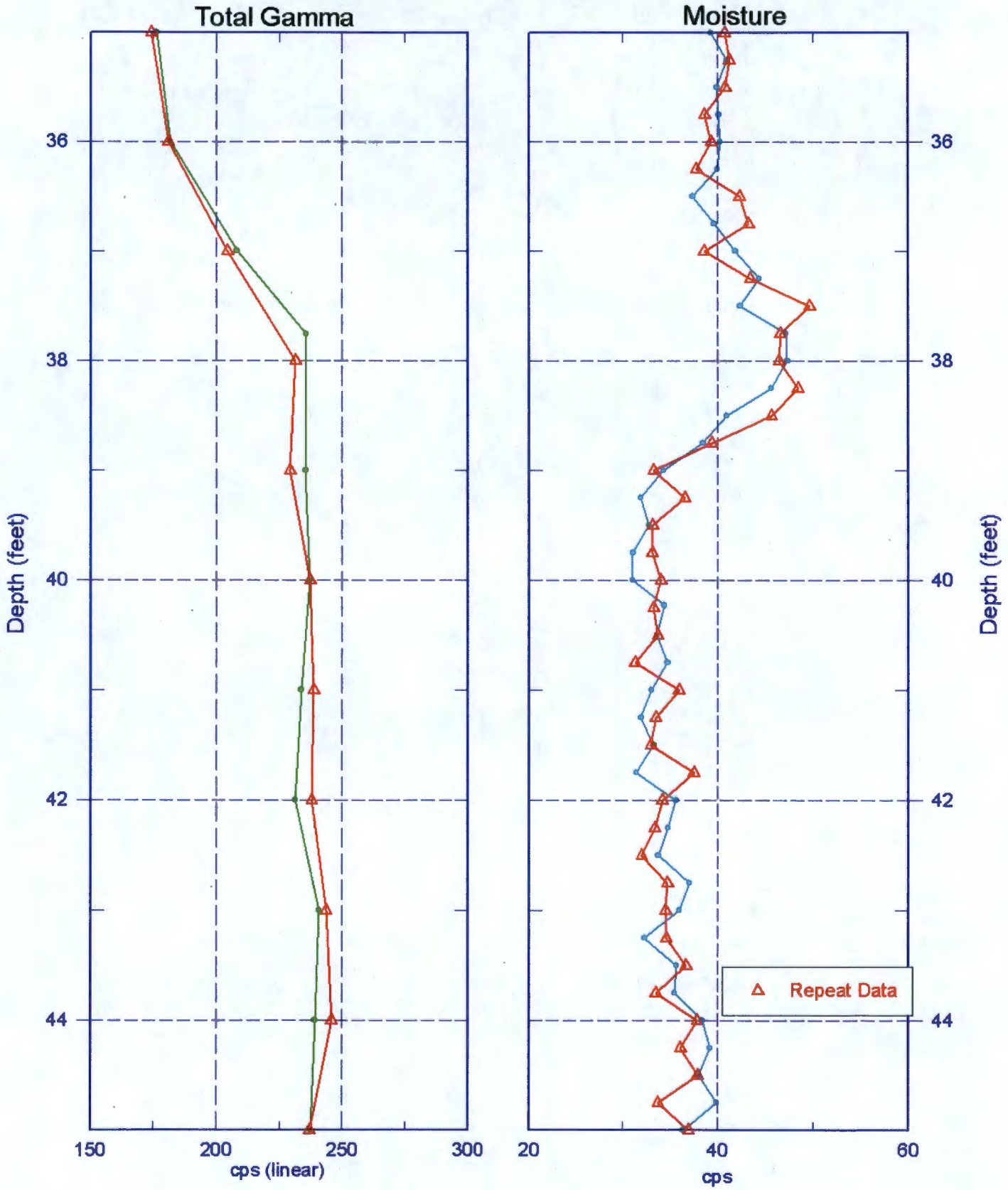
Repeat Section for Total Gamma & Moisture



Reference - Ground surface

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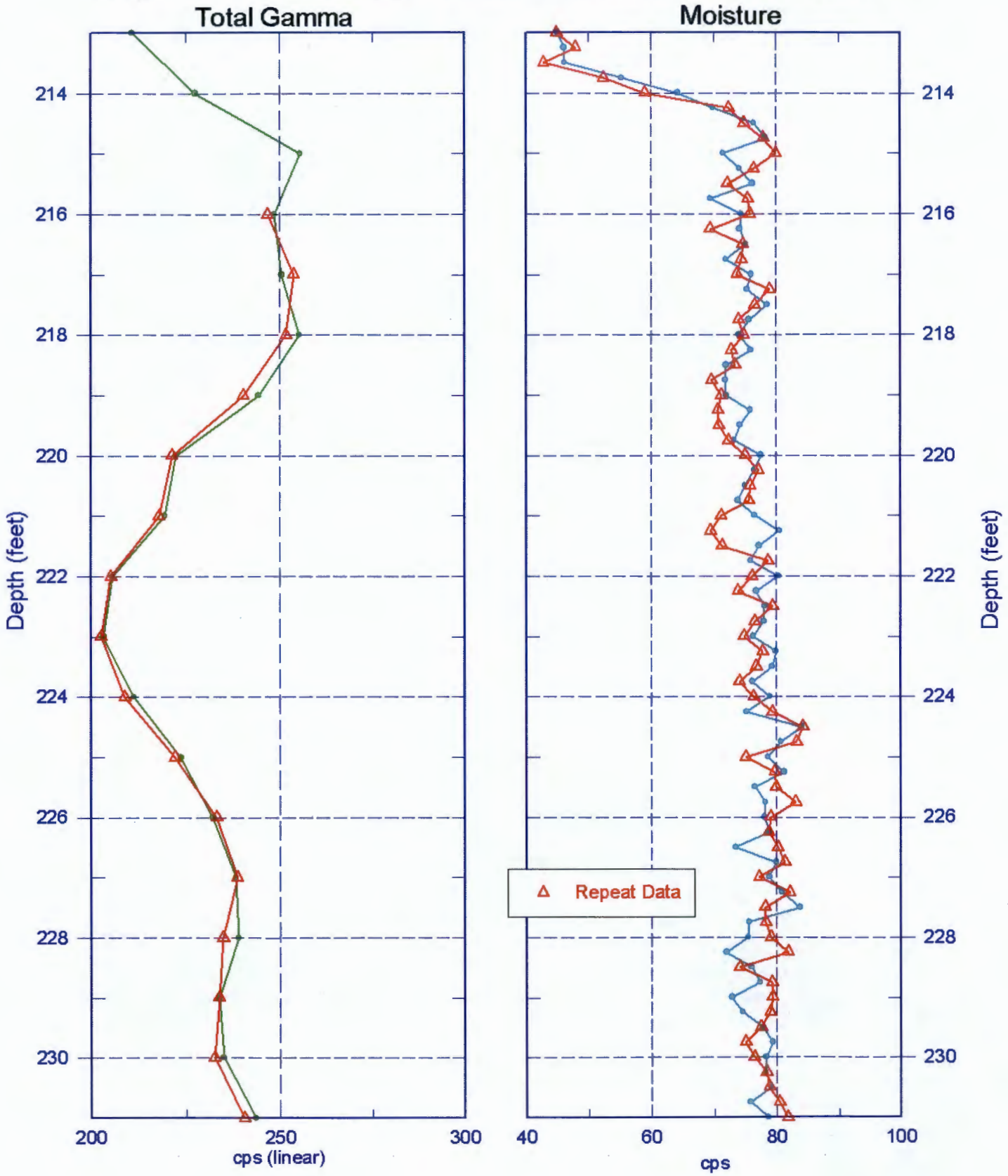
299-E33-343 (C5858)

Repeat Section for Total Gamma & Moisture



Reference - Ground surface

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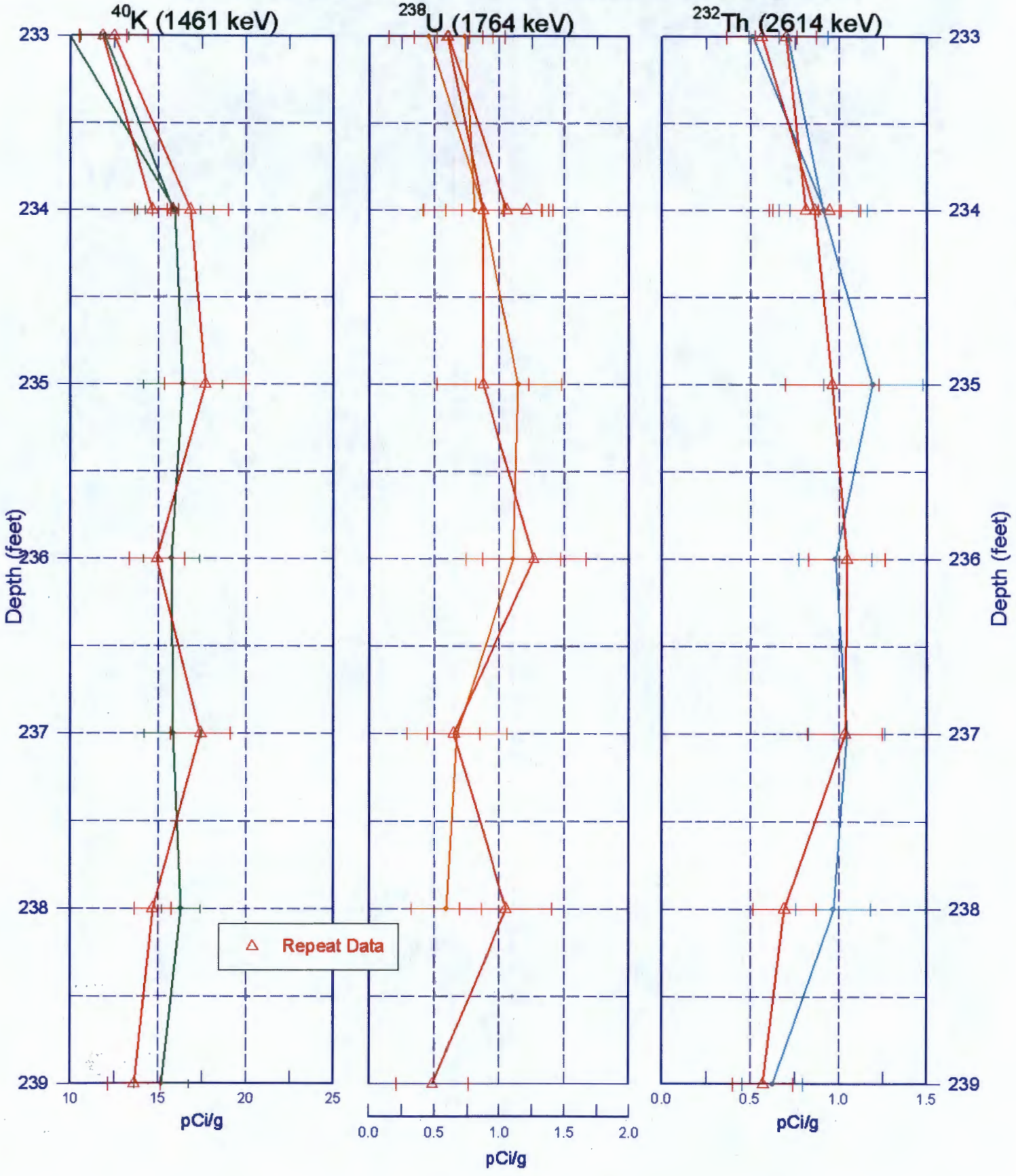
Repeat Section of Natural Gamma Logs



Zero Reference - Ground surface