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HGLP-LDR-197, Rev. 0

299-E33-344 (C5859)
Log Data Report

Borehole Information:

Borehole:	299-E33-344 (C5859)			**Site:**	E of 299-E33-18 N of 241-B Farm
Coordinates (WA St Plane)		**GWL[1] (ft):**	None	**GWL Date:**	01/09/08
North (m)	**East (m)**	**Drill Date**	**TOC Elevation**	**Total Depth (ft)**	**Type**
Not available	Not available	01/08	Not available	228.0	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Threaded steel	0.7	13 1/2	12 1/4	5/8	0	100.7
Threaded steel	2.3	11 3/4	10 3/4	1/2	0	227.5

Borehole Notes:

The logging engineer measured the casing diameters with a caliper and steel tape. The onsite geologist reported the casing depths. Water was measured inside the borehole casing at 225.1 ft using an e-tape on January 9. This water apparently subsided by the next day.

Logging Equipment Information:

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

Logging System:	Gamma 4H (with AmBe source)		**Type:**	NMLS
			Serial No.:	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 Repeat	6	7 Repeat
Date	12/21/07	12/21/07	01/09/08	01/09/08	01/09/08
Logging Engineer	Spatz	Spatz	Spatz	Spatz	Spatz
Start Depth (ft)	100.0	11.0	228.0	228.0	225.0
Finish Depth (ft)	0.0	1.0	228.0	98.0	212.0
Count Time (sec)	100	100	1000	100	100
Live/Real	R	R	R	R	R
Shield (Y/N)	N	N	N	N	N
MSA Interval (ft)	1.0	1.0	N/A	1.0	1.0
Pre-Verification	DN861CAB	DN861CAB	DN891CAB	DN891CAB	DN891CAB
Start File	DN861000	DN861101	DN891000	DN891001	DN891130
Finish File	DN861100	DN861111	DN891000	DN891129	DN891143
Post-Verification	DN861CAA	DN861CAA	DN891CAA	DN891CAA	DN891CAA
Depth Return Error (in.)	0.0	0.0	N/A	N/A	- 4.0
Comments	No fine gain adjustment	No fine gain adjustment	No fine gain adjustment	Fine gain adjustment after	No fine gain adjustment

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Log Run	1	2 Repeat	5 Repeat	6	7 Repeat
				file -18.	

Notes: 1000 second count time for long run 5

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	3	4 Repeat	8	9 Repeat	
Date	12/21/07	12/21/07	01/10/08	01/10/08	
Logging Engineer	Spatz	Spatz	Spatz	Spatz	
Start Depth (ft)	0.0	85.0	99.0	212.0	
Finish Depth (ft)	100.25	95.0	224.75	224.0	
Count Time (sec)	15	15	15	15	
Live/Real	R	R	R	R	
Shield (Y/N)	N	N	N	N	
MSA Interval (ft)	0.25	0.25	0.25	0.25	
Pre-Verification	DH912CAB	DH912CAB	DH952CAB	DH952CAB	
Start File	DH912000	DH912402	DH952000	DH952505	
Finish File	DH912401	DH912442	DH952504	DH952553	
Post-Verification	DH912CAA	DH912CAA	DH952CAA	DH952CAA	
Depth Return Error (in.)	N/A	+ 0.5	N/A	- 1.0	
Comments	None	None	None	None	

Logging Operation Notes:

Logging was conducted with a centralizer on the sondes. Data were mostly acquired in a single casing. An exception is approximately 2 ft of overlap where two casings exist at 100 ft. All measurements are referenced to ground surface.

Analysis Notes:

Analyst:	Henwood	Date:	03/06/08	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.

Two 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 99 ft. For log run 6, from 99 to 100 ft, a combined casing correction for 1.129-in.-thick casing (5/8+1/2 for the 12- and 10-in. casings, respectively), was applied. Below 100 ft, a correction for a single 1/2-in. casing 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 225 ft were not corrected for water even though water was indicated at this depth by an e-tape. The water is related to a high moisture zone at this depth and is not representative of groundwater.

The moisture data are reported in counts per second (cps), 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 G4Nsept07.xls using efficiency functions and corrections for casing, dead time, and water as determined from annual calibrations.

Results and Interpretations:

Cs-137 was detected from the ground surface to 10 ft. The maximum concentration was measured at approximately 26 pCi/g at 4 ft.

Because this borehole was drilled 13 ft away from another borehole (299-E33-18) that has exhibited evidence of processed uranium (U-238 and U-235), plots of minimum detection levels for processed uranium are included. 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. No processed uranium was detected. The processed uranium in borehole 299-E33-18 was detected at a log depth of 232 ft, approximately 4 ft deeper than this borehole was drilled.

Moisture data indicate relatively high moisture from approximately 215 to 225 ft. Moisture logging was terminated at approximately 225 ft where water may have been inside the borehole casing.

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 (2 pages)
Combination Plot (0 to 280 ft)
Total Gamma & Moisture (0 to 240 ft)
Repeat of Manmade Radionuclides
Repeat Section of Natural Gamma Logs (1 to 11 ft)
Repeat Section of Natural Gamma Logs (212 to 225 ft)
Repeat Section for Total Gamma & Moisture (212 to 225 ft)

[1] GWL – groundwater level

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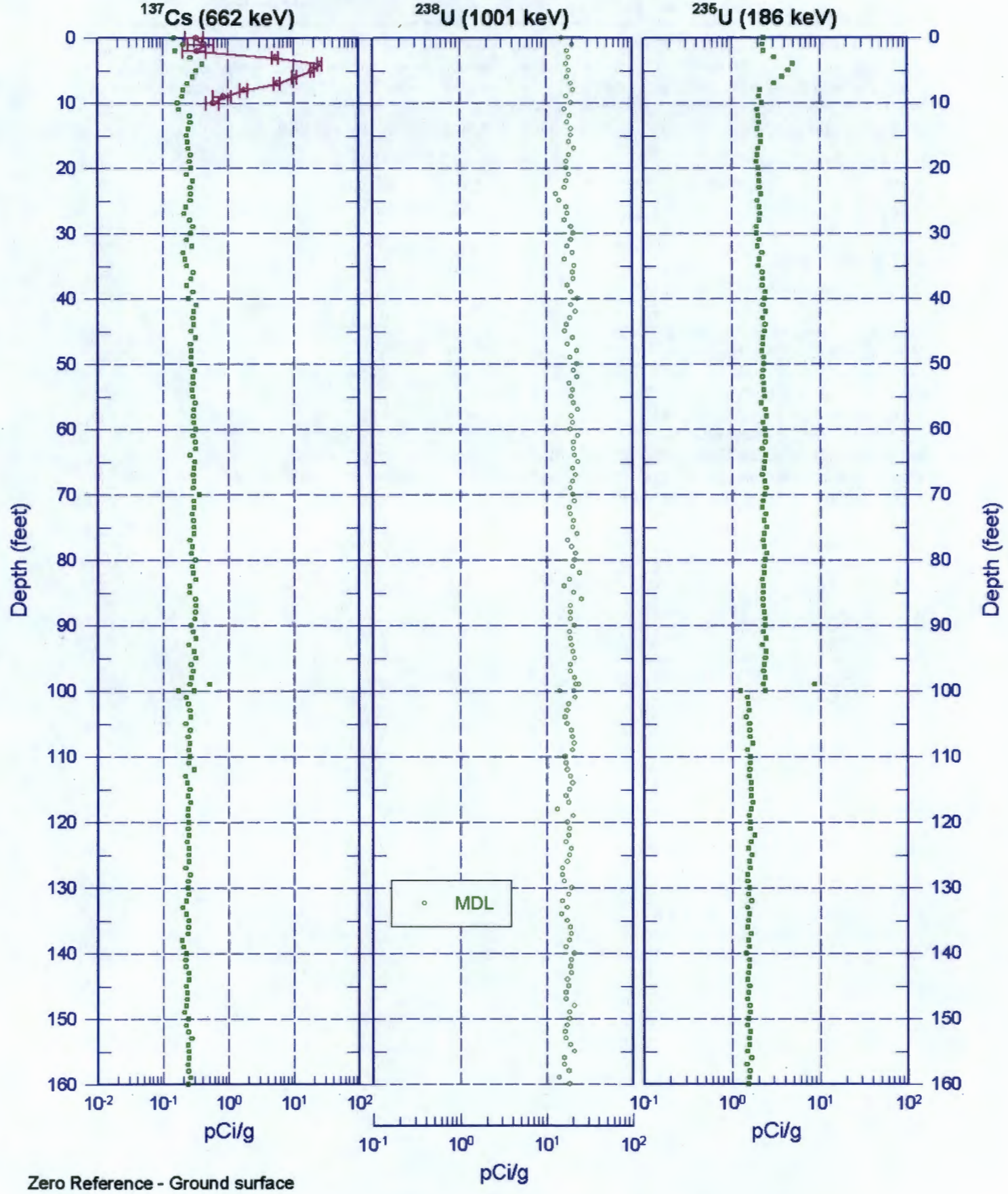
Man-Made Radionuclides



Zero Reference - Ground surface

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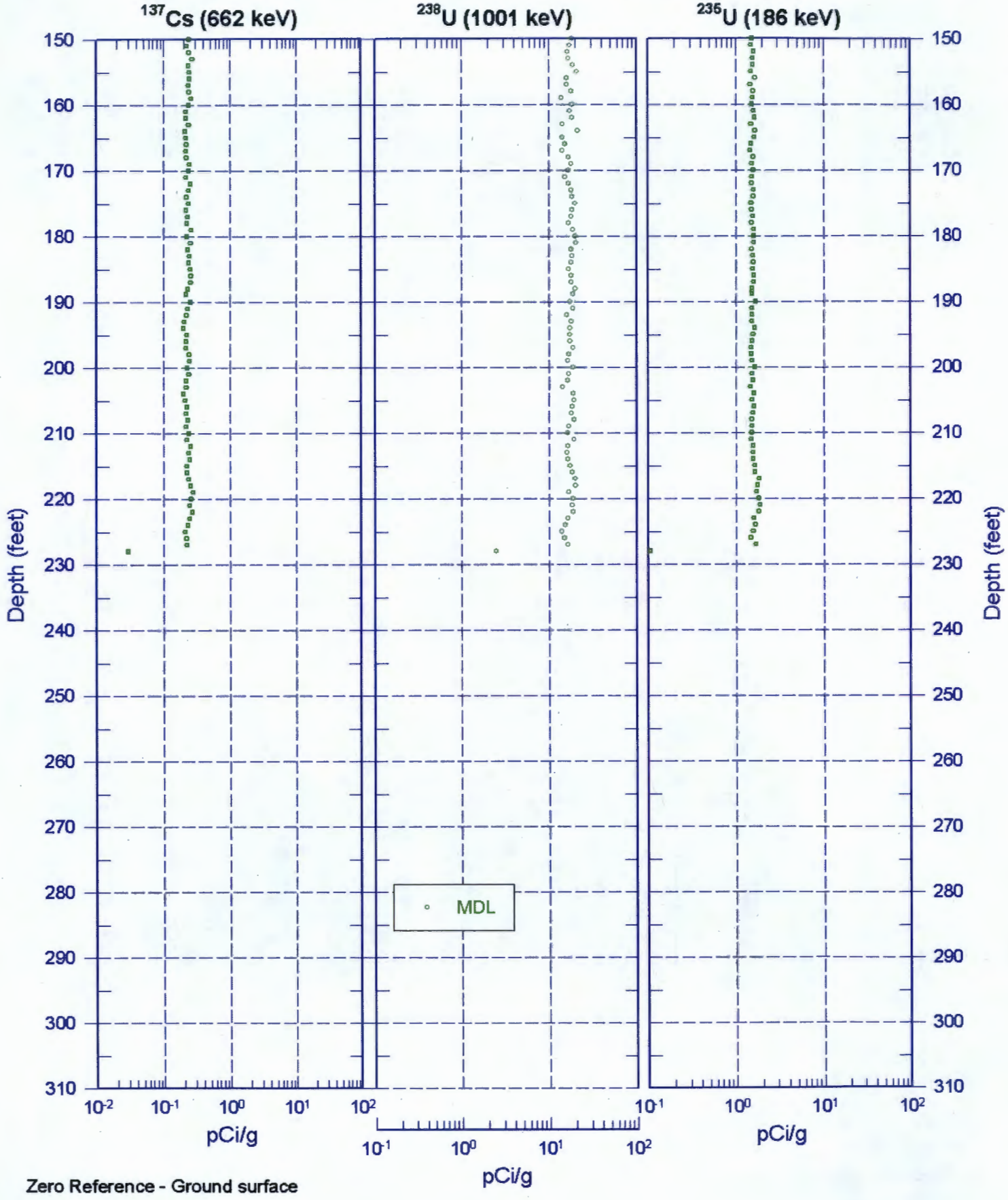
299-E33-344 (C5859)
Man-Made Radionuclides



Zero Reference - Ground surface

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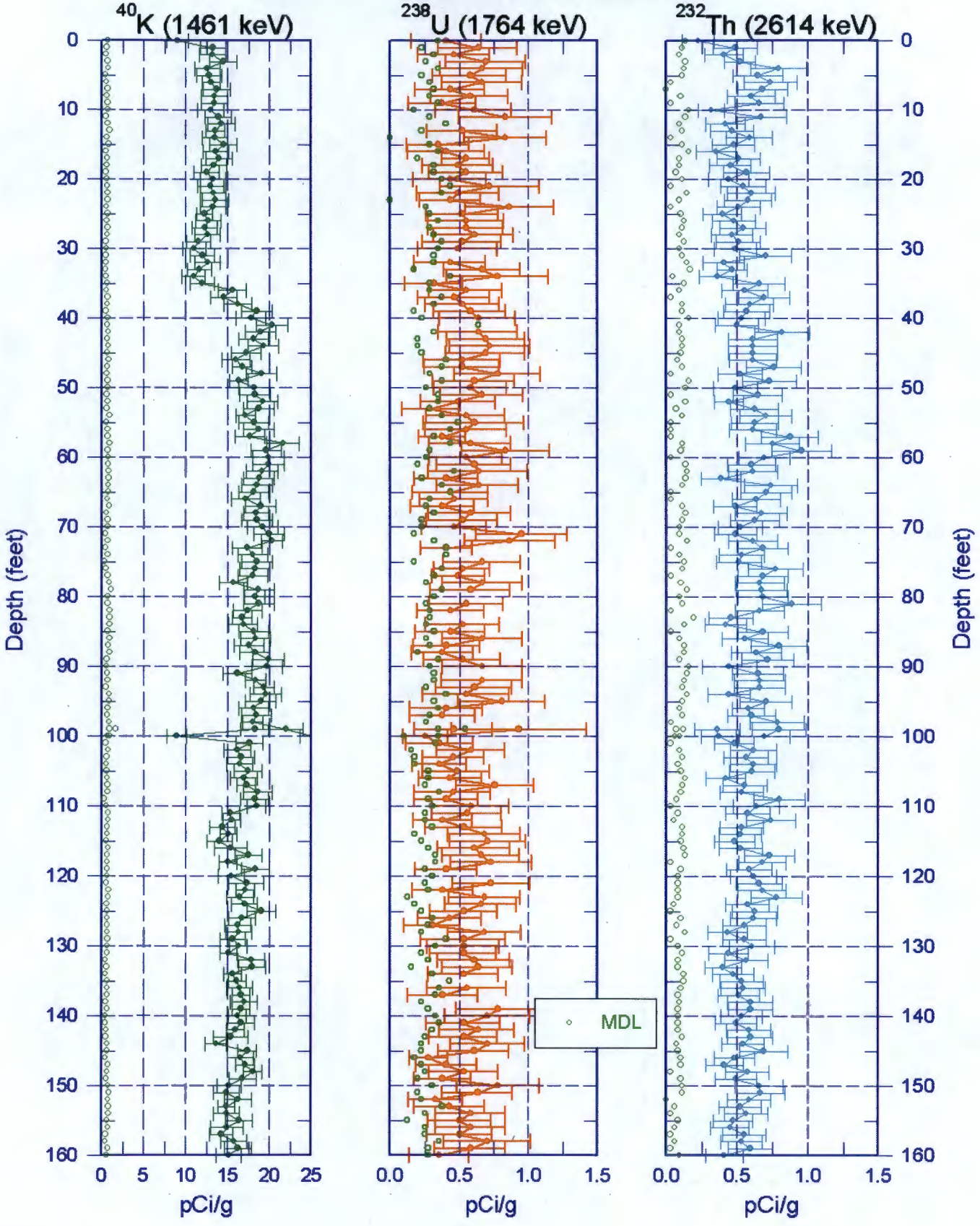
299-E33-344 (C5859)
Natural Gamma Logs



Zero Reference - Ground surface

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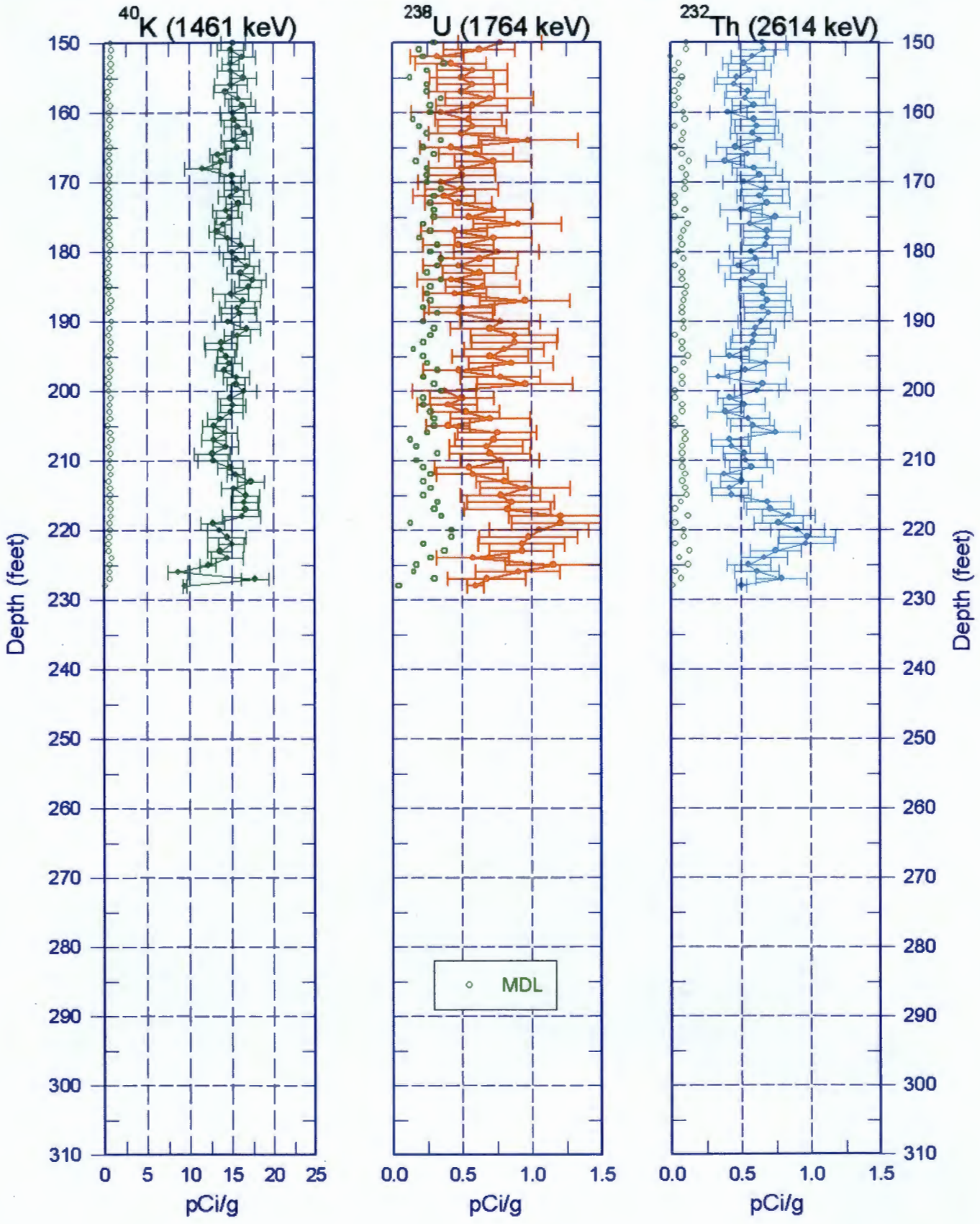
299-E33-344 (C5859)
Natural Gamma Logs



Zero Reference - Ground surface

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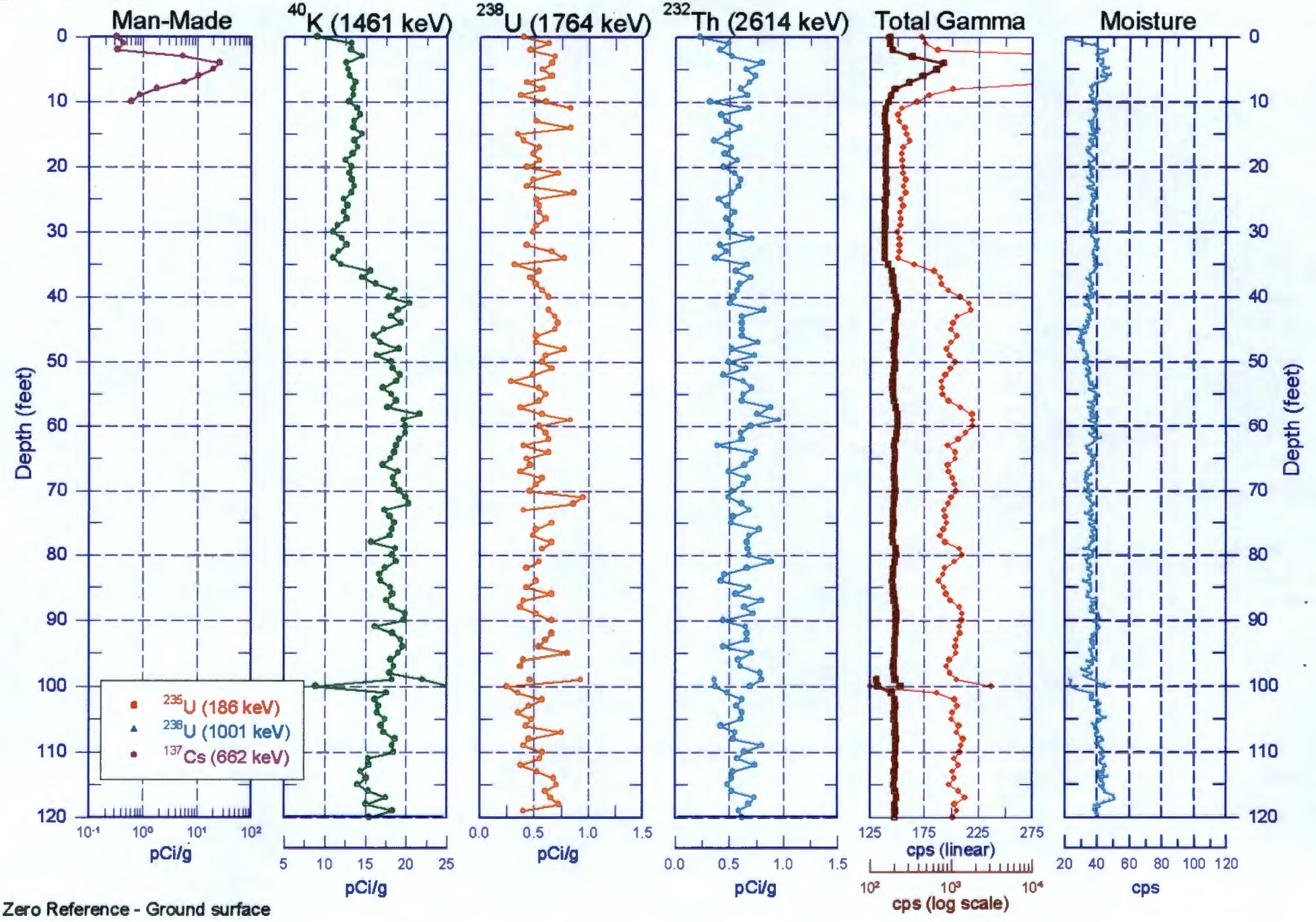
299-E33-344 (C5859) Combination Plot



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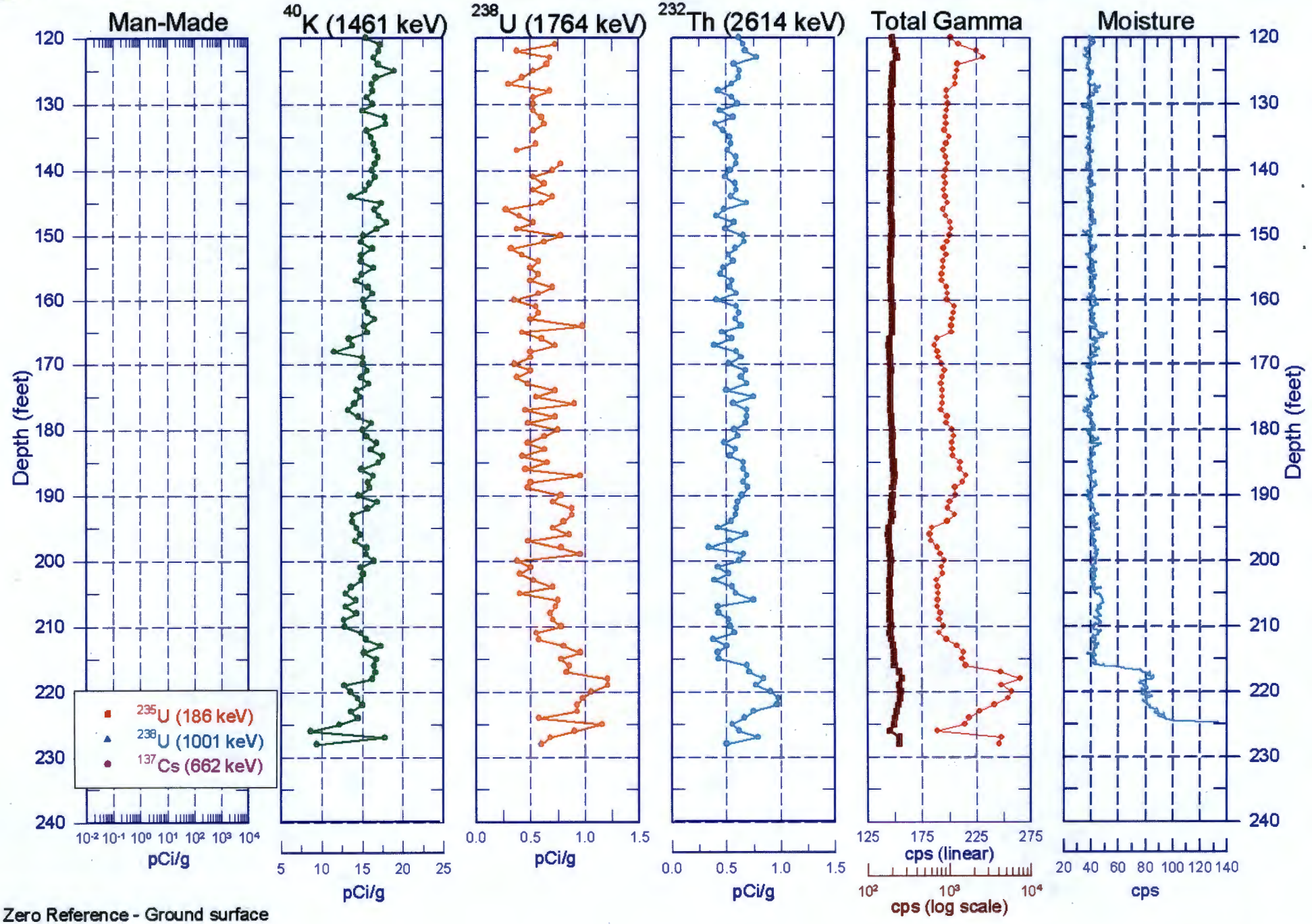
299-E33-344 (C5859) Combination Plot



Zero Reference - Ground surface

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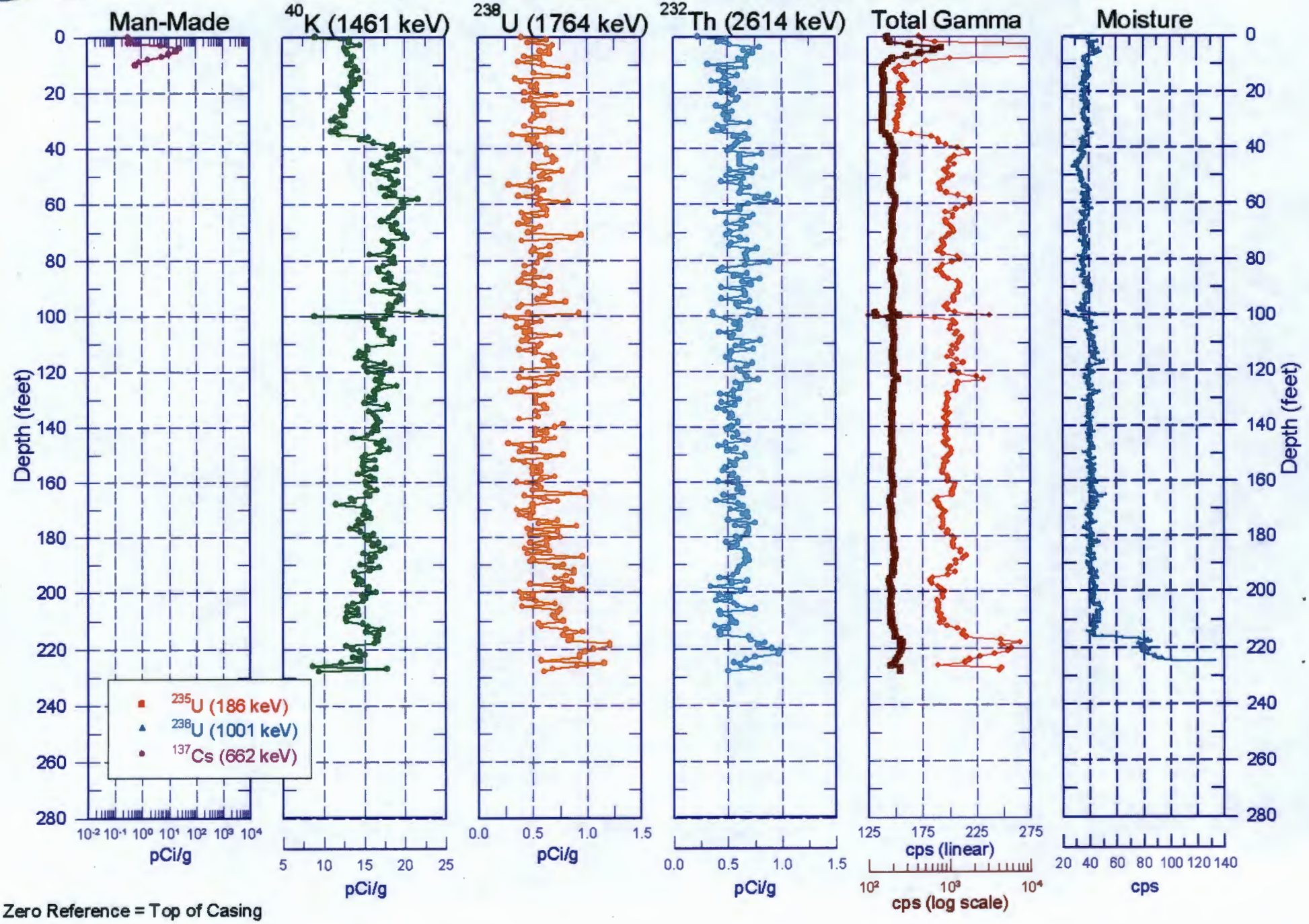
299-E33-344 (C5859) Combination Plot



Zero Reference = Top of Casing

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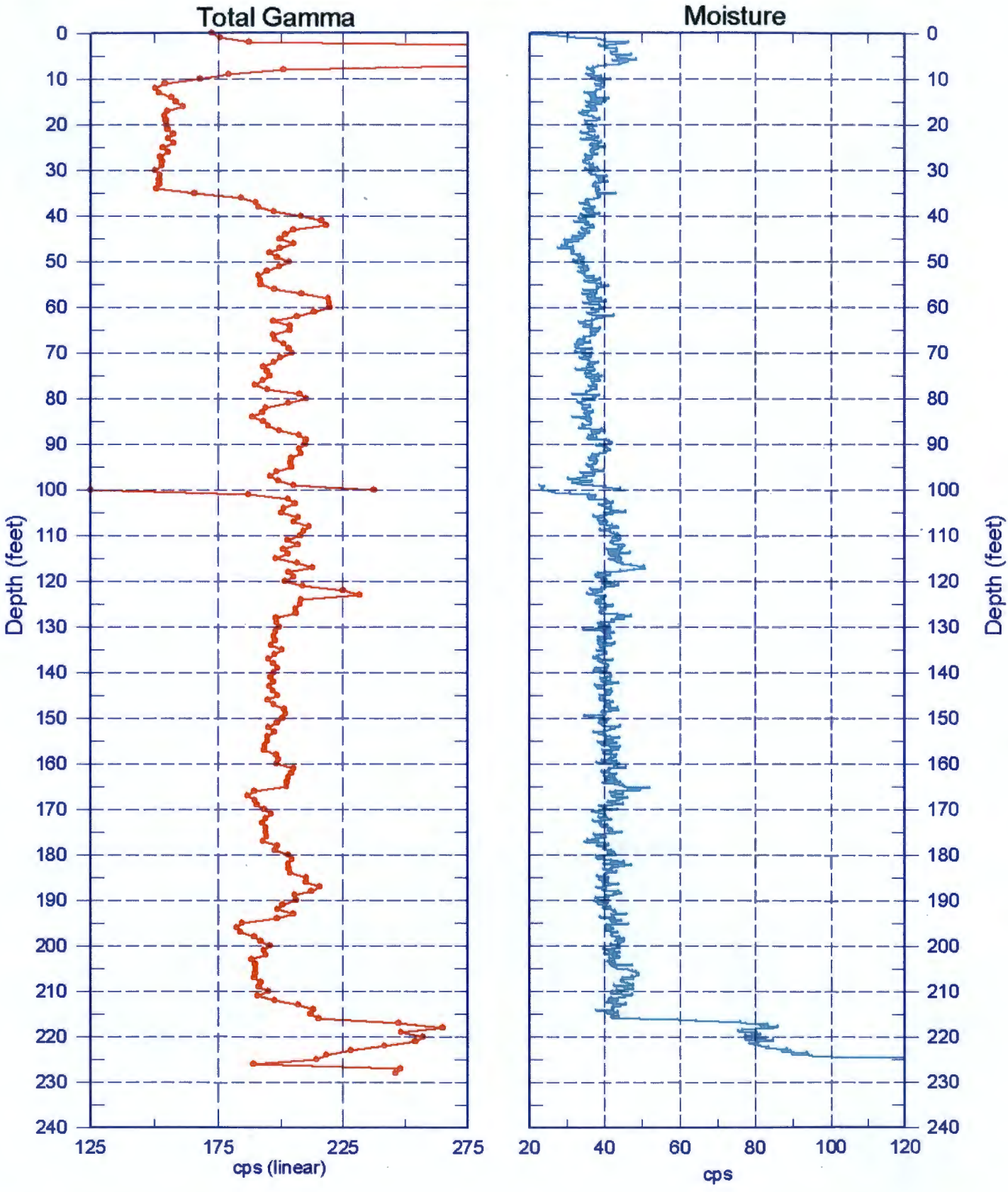
Total Gamma & Moisture



Reference - Ground Surface

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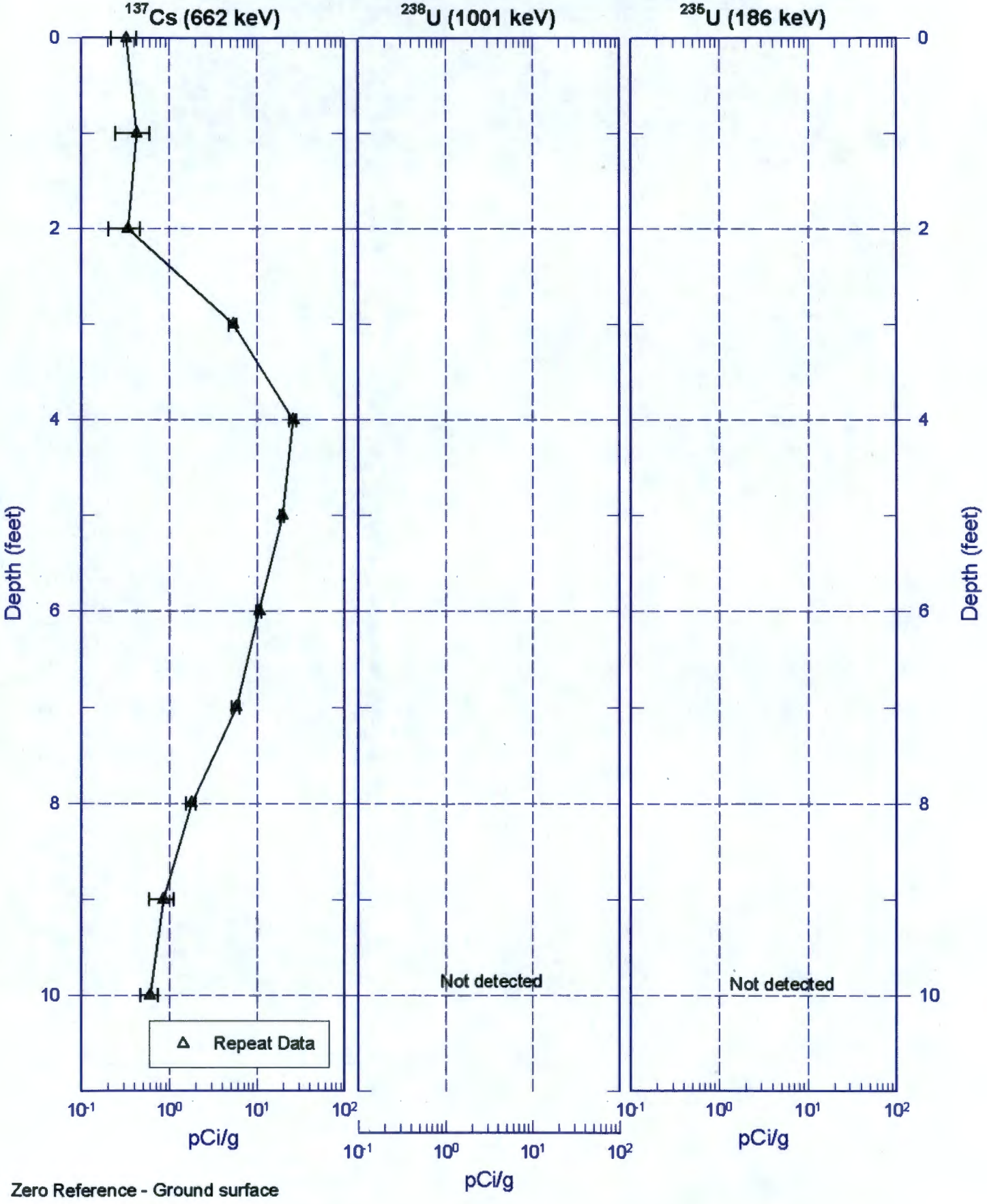
Repeat of Manmade Radionuclides



Zero Reference - Ground surface

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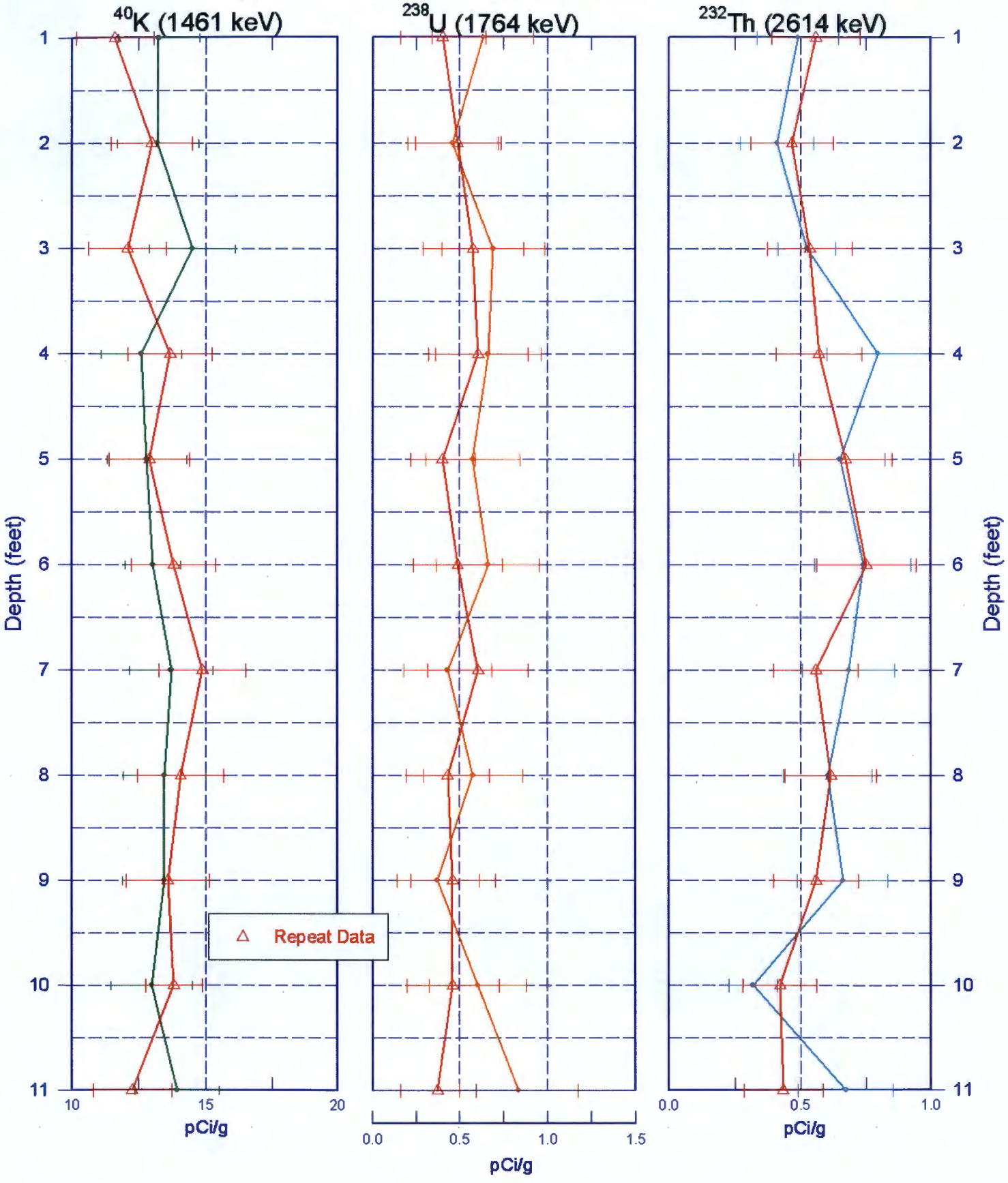
Repeat Section of Natural Gamma Logs



Zero Reference - Ground surface

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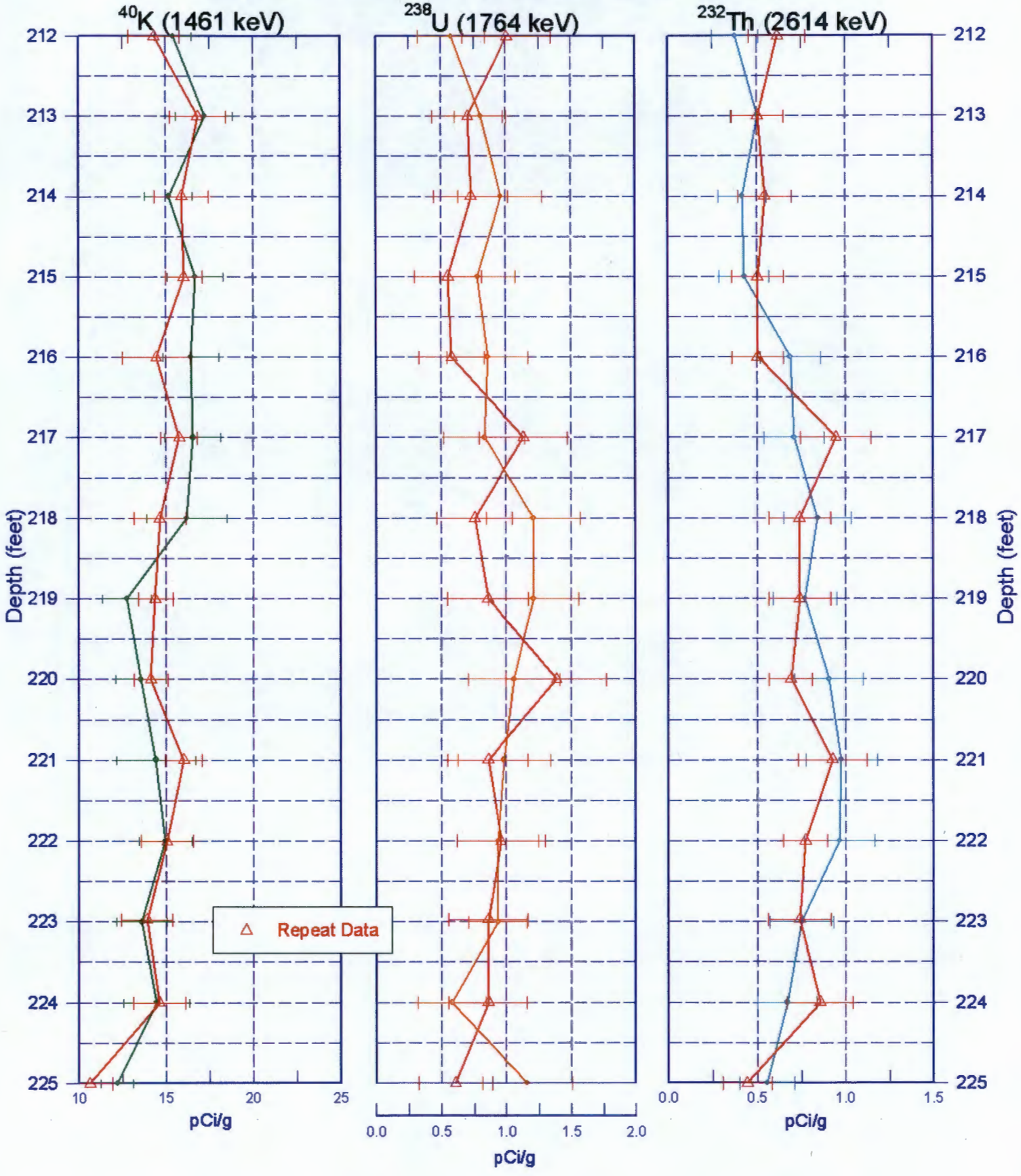
299-E33-344 (C5859)

Repeat Section of Natural Gamma Logs



Zero Reference - Ground surface

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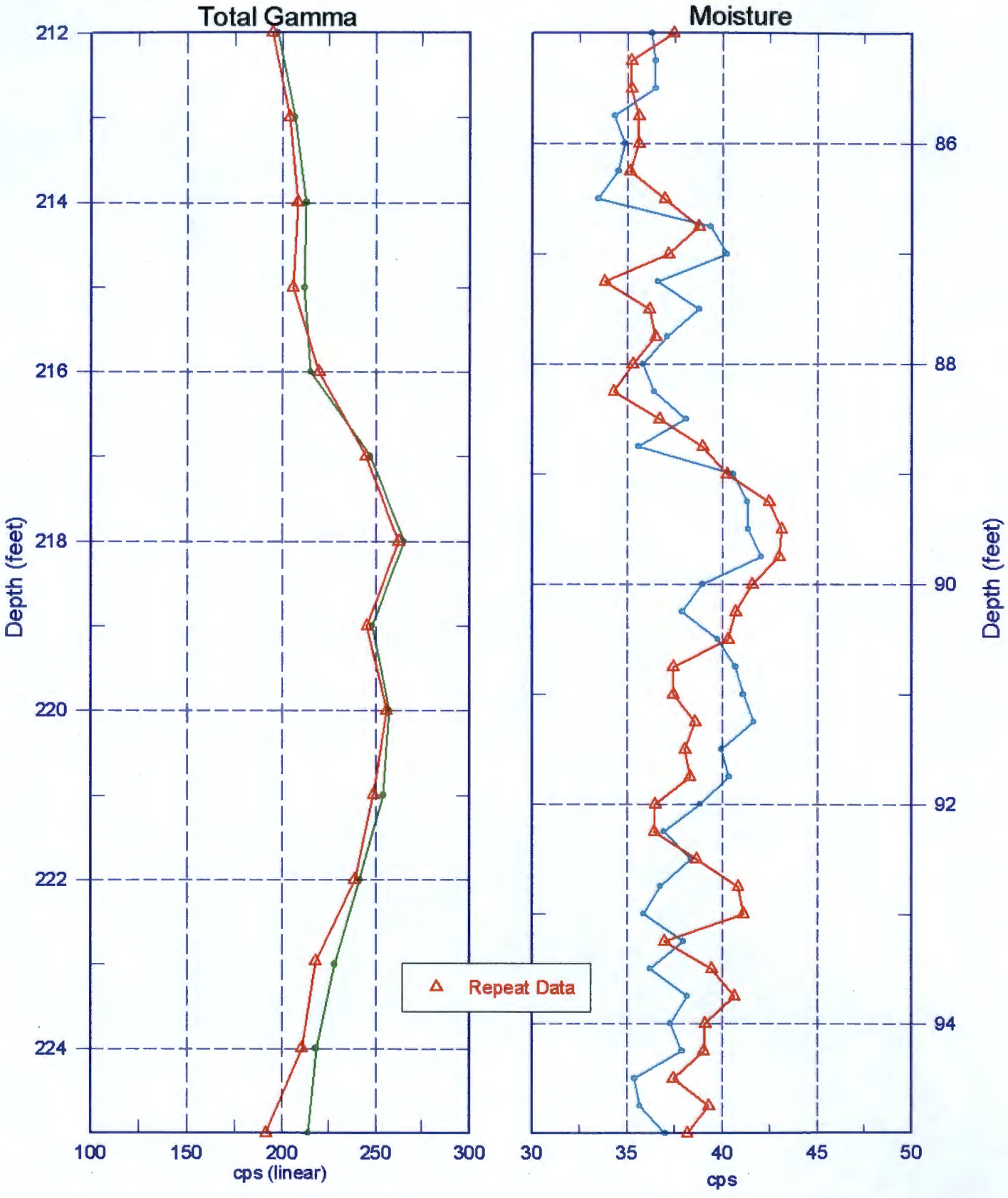
299-E33-344 (C5859)

Repeat Section for Total Gamma & Moisture



Reference - Ground surface