

C-4122 Log Data Report

Borehole Information:

Borehole: C-4122		Site: East of A Tank Farm			
Coordinates (WA St Plane)		GWL¹ (ft): 281		GWL Date: 07/02/03	
North (estimated) 136020	East (estimated) 575460	Drill Date 07/03	Ground Level Elevation Not available	Total Depth (ft) 319.5	Type Becker

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Threaded Steel	4.0	9.0	8.0	0.50	+4.0	319.5
Steel Tubing	4.5	6.24	6.0	0.125	+4.5	319.5

Borehole Notes:

The casing dimensions are derived from published values for Becker drill casing. Casing thicknesses at the joints are 0.875-in. and 0.240-in. for the 8-in. and 6-in. casings, respectively. The total depth of the borehole was provided by the driller. Total logging depth was 321 ft, 1.5 ft deeper than reported by the driller. The well site geologist provided the depth to water. Borehole coordinates were provided by Fluor Hanford's person in charge and are estimates. Ground level elevation was not available. Logging data acquisition is referenced to the ground surface.

Logging Equipment Information:

Logging System: Gamma 2E	Type: SGLS (70%) SN: 34TP40587A
Calibration Date: 03/03	Calibration Reference: GJO-2003-430-TAC
	Logging Procedure: MAC-HGLP 1.6.5, Rev. 0

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3 Repeat		
Date	07/07/03	07/07/03	07/07/03		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	0.0	308.0	320.0		
Finish Depth (ft)	309.0	321.0	288.0		
Count Time (sec)	100	100	100		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		
MSA Interval (ft)	1.0	1.0	1.0		
ft/min	N/A ²	N/A	N/A		
Pre-Verification	BE055CAB	BE055CAB	BE055CAB		
Start File	BE055000	BE055310	BE055324		

Log Run	1	2	3 Repeat		
Finish File	BE055309	BE055323	BE055356		
Post-Verification	BE055CAA	BE055CAA	BE055CAA		
Depth Return Error (in.)	-1.5	N/A	0		
Comments	Log run stopped to refill sonde with liquid nitrogen.	Fine-gain adjustment made before resuming logging.	No fine gain adjustment.		

Logging Operation Notes:

Spectral gamma logging was performed in this borehole on July 7, 2003. Logging was conducted with a centralizer on the sonde, and measurements are referenced to ground surface. A repeat section was collected in this borehole to evaluate system performance.

Analysis Notes:

Analyst:	Henwood	Date:	07/11/03	Reference:	GJO-HGLP 1.6.3, Rev. 0
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Pre-run and post-run verifications for the logging system were performed before and after data acquisition. The acceptance criteria were met.

A combined casing correction for 0.625-in.-thick casing was applied throughout the borehole for both casings. The combined thickness at casing joints is 1.115 in. This thickness results in a significant reduction in gamma activity detection as the detector passes by a casing joint. However, it is not practical to correct individual data points for the effect of casing joints. The influence of the thick joints is apparent on the total gamma and ⁴⁰K logs where reduced count rates and concentrations are exhibited at approximately 10-ft depth intervals.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated with an EXCEL worksheet template identified as G2EMar03.xls using efficiency functions and corrections for casing, water, and dead time as determined from annual calibrations. Dead time corrections are applied where dead times exceed 10.5 percent; no dead times in excess of 10.5 percent were encountered. Correction for water was applied to the data below 281 ft.

Log Plot Notes:

Separate log plots are provided for the man-made radionuclide (¹³⁷Cs) detected in the borehole, naturally occurring radionuclides (⁴⁰K, ²³⁸U, ²³²Th [KUT]), a combination of man-made, KUT, and dead time, and total gamma plotted with dead time. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, casing corrections, or water corrections. A repeat log section is also included.

Results and Interpretations:

¹³⁷Cs was the only man-made radionuclide detected in this borehole. ¹³⁷Cs was detected near the ground surface with the maximum concentration of 4.9 pCi/g detected at 0-ft depth. ¹³⁷Cs was also detected at a few sporadic locations throughout the borehole near its MDL of approximately 0.3 pCi/g.

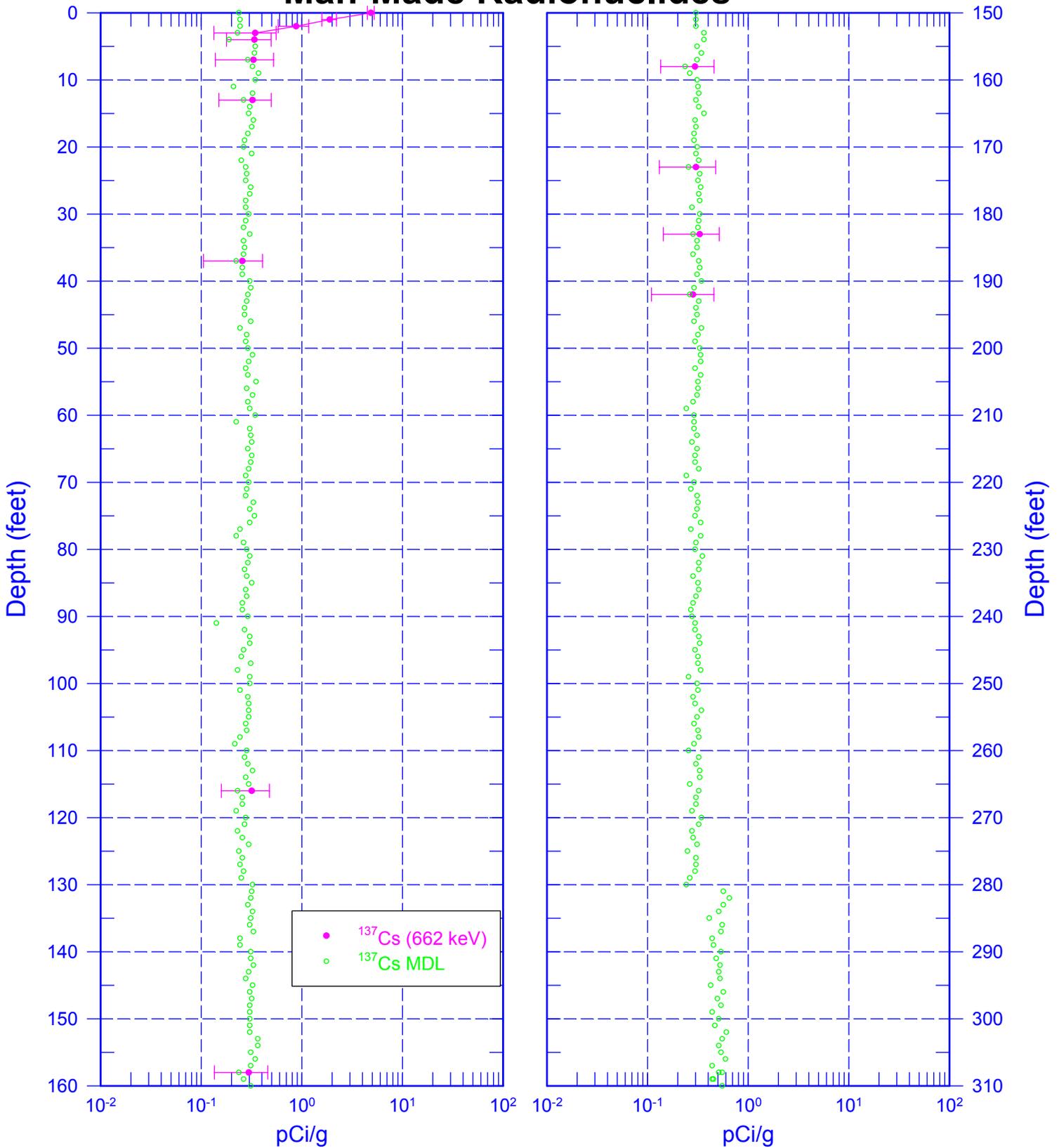
The repeat sections indicated good agreement of the naturally occurring KUT.

¹ GWL – groundwater level

² N/A – not applicable

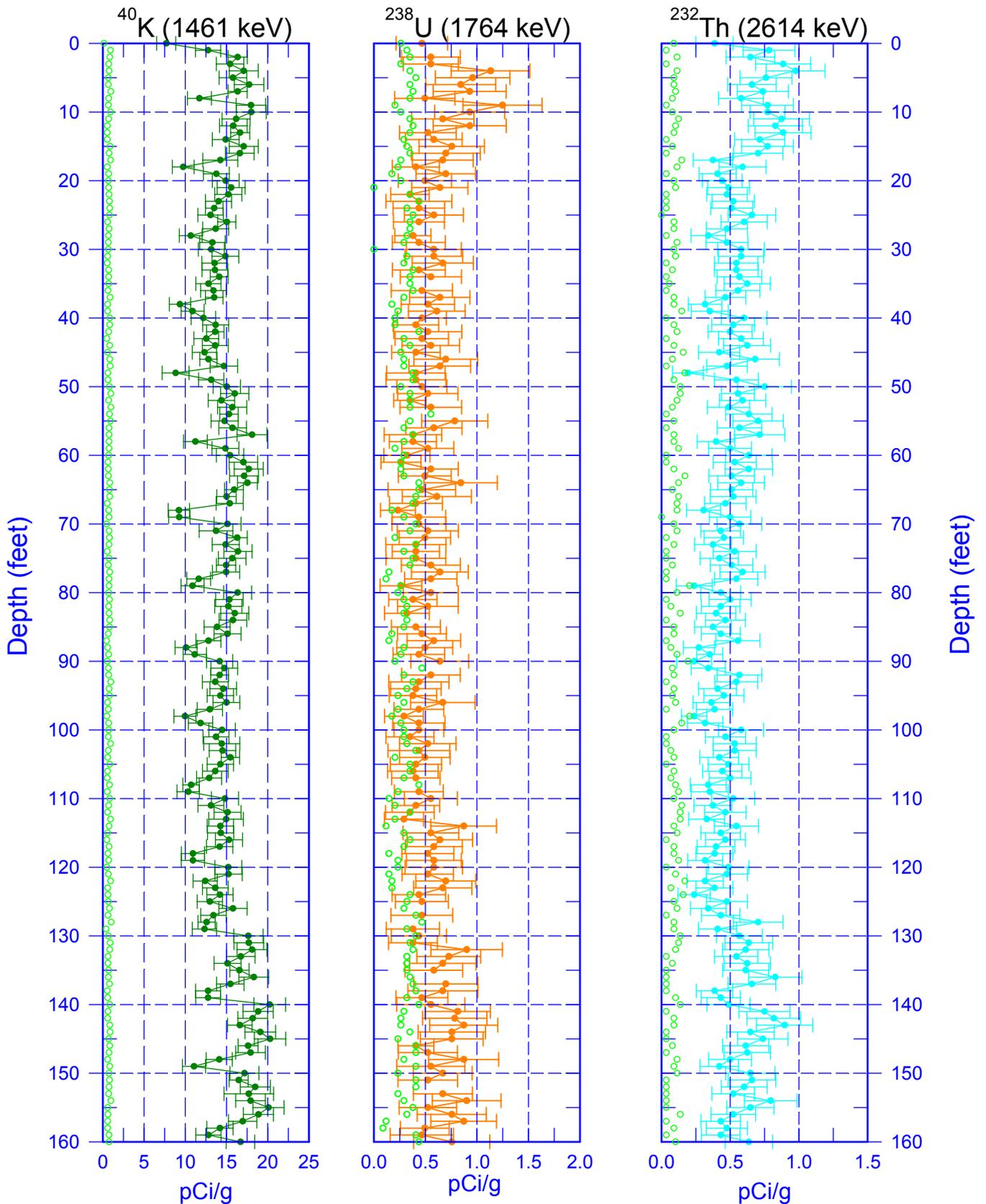
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Man-Made Radionuclides



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Natural Gamma Logs



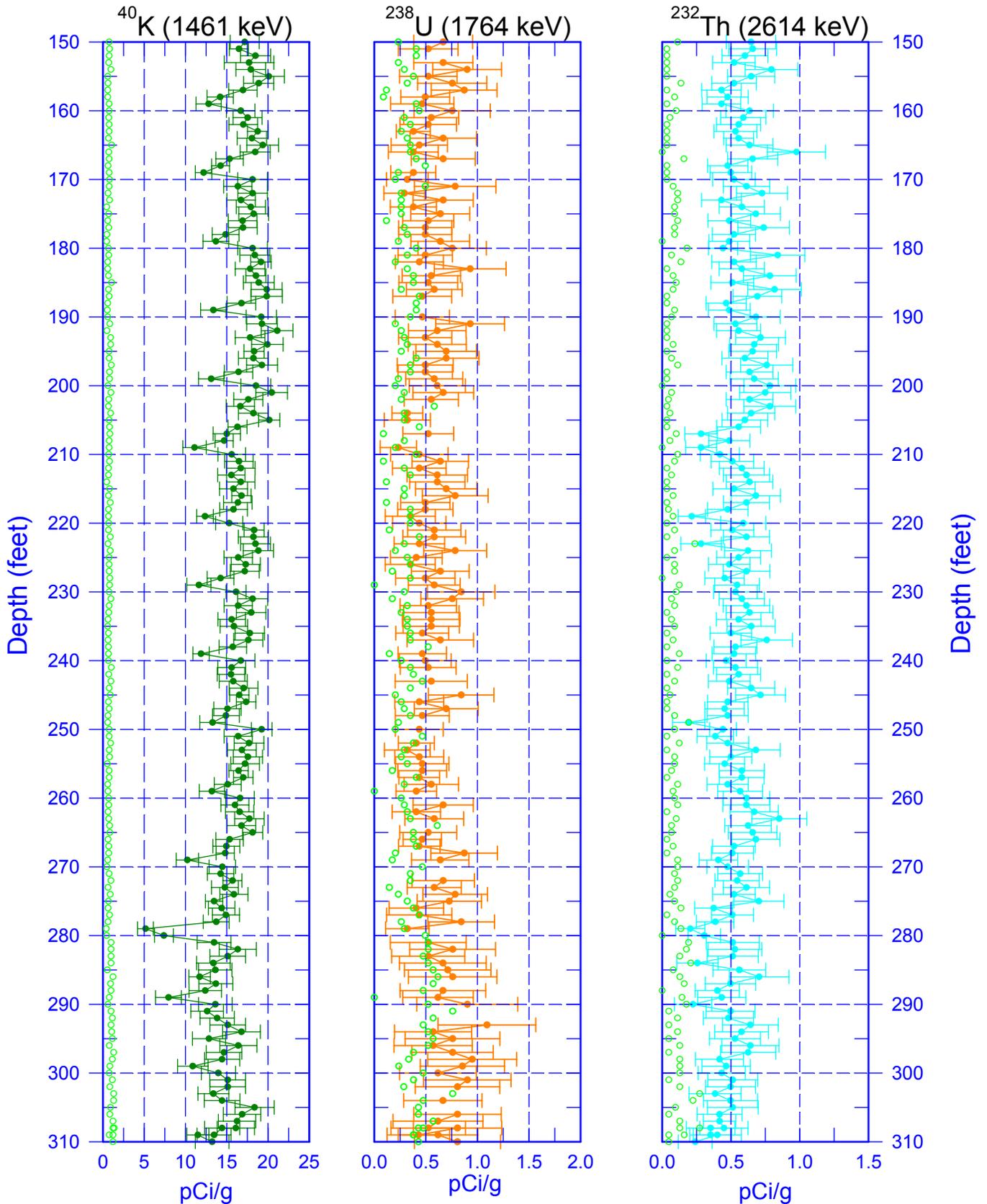
Zero Reference = Ground Surface

○ MDL

Last Log Date - 07/07/03

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Natural Gamma Logs



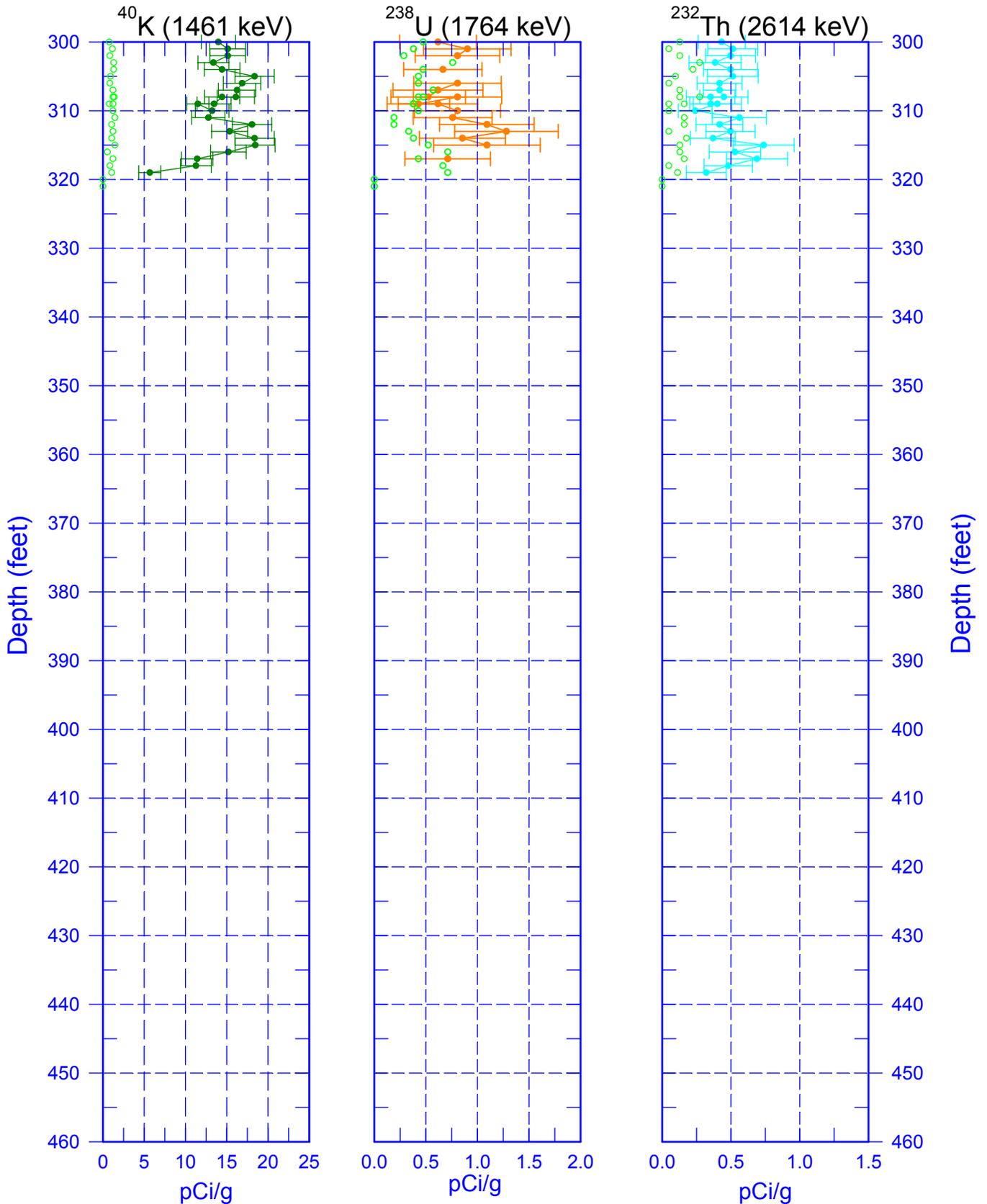
Zero Reference = Ground Surface

○ MDL

Last Log Date - 07/07/03

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Natural Gamma Logs

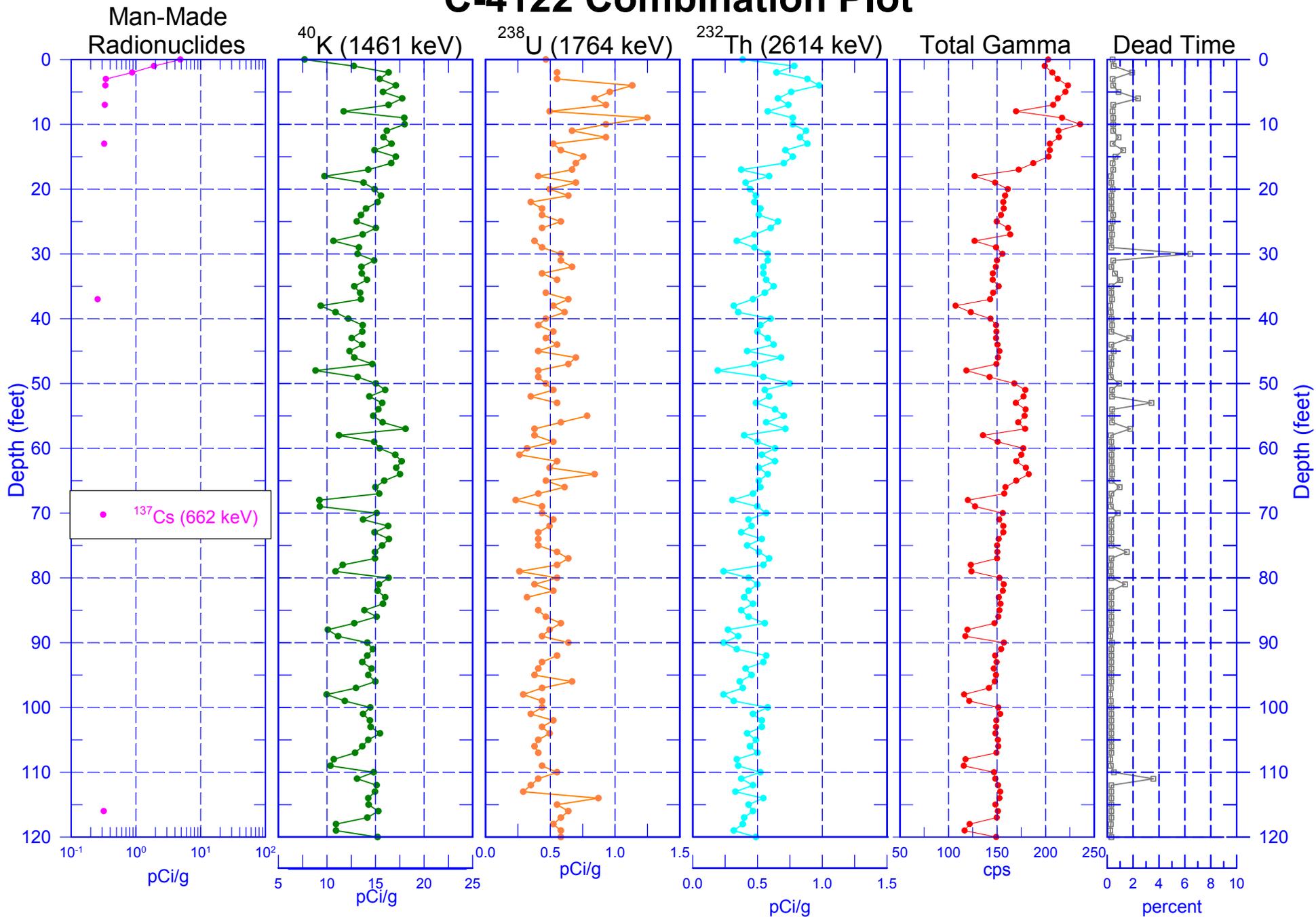


Zero Reference = Ground Surface

○ MDL

Last Log Date - 07/07/03

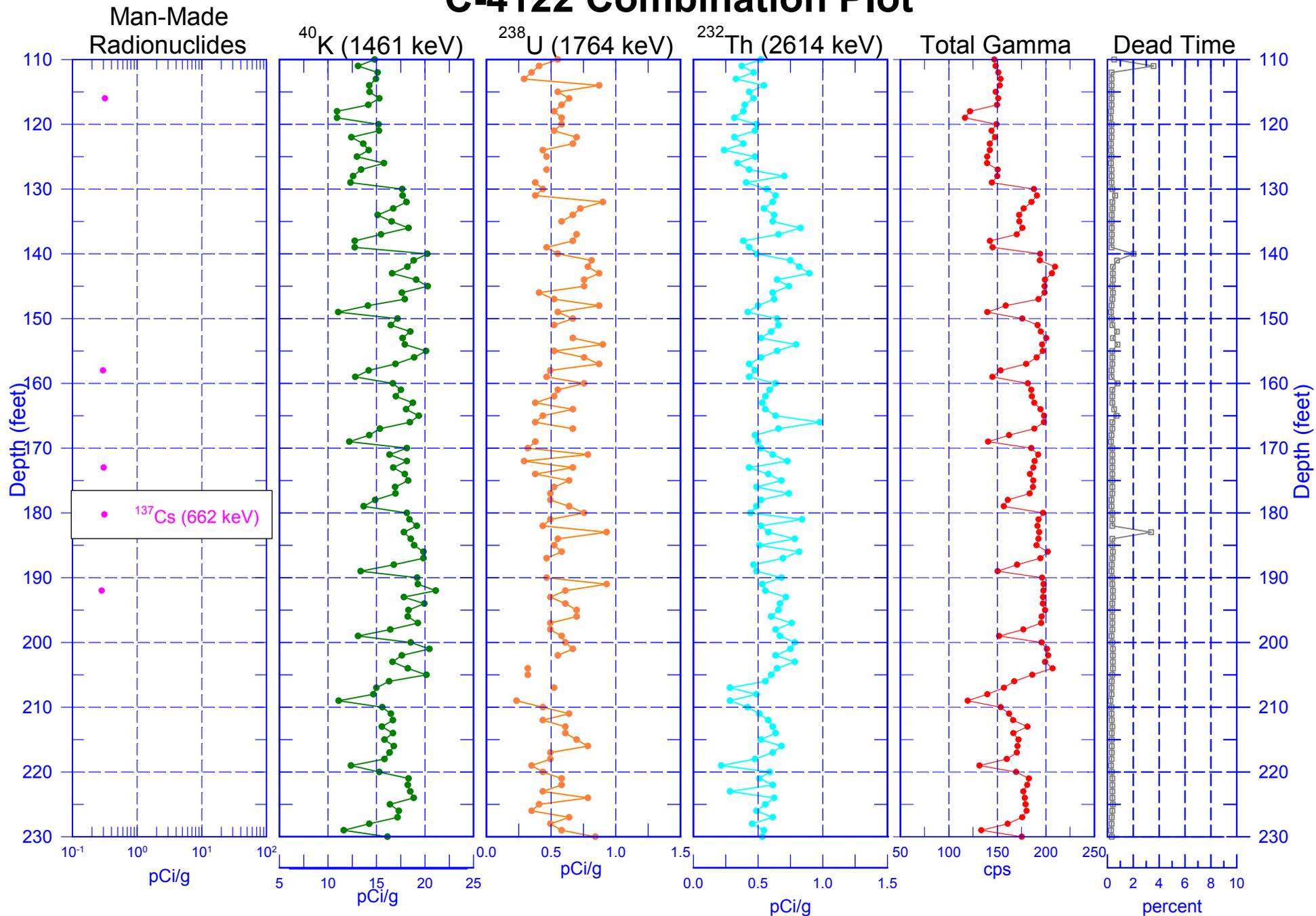
C-4122 Combination Plot



Zero Reference = Ground Surface

Last Logging Date - 07/07/03

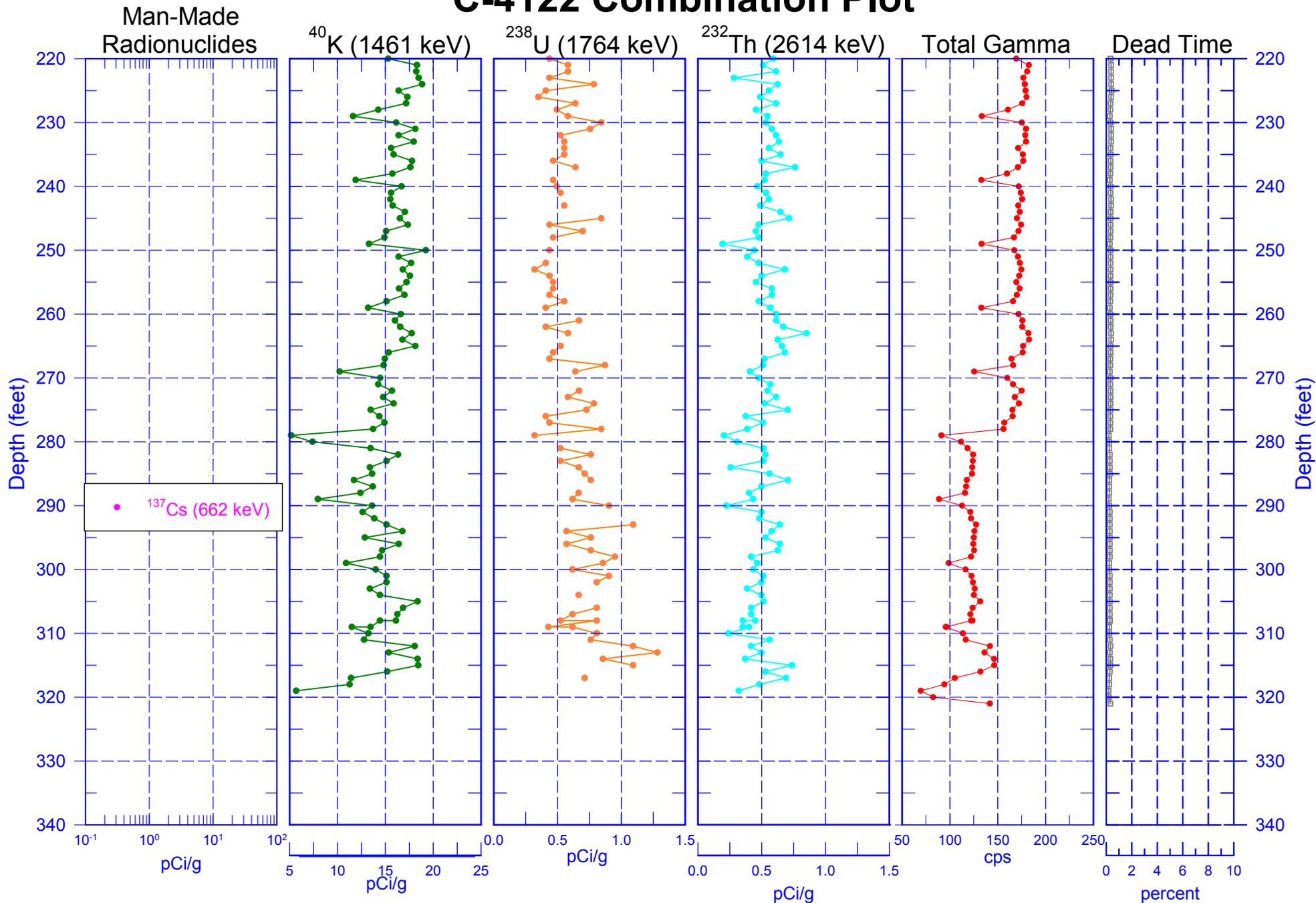
C-4122 Combination Plot



Zero Reference = Ground Surface

Last Logging Date - 07/07/03

C-4122 Combination Plot

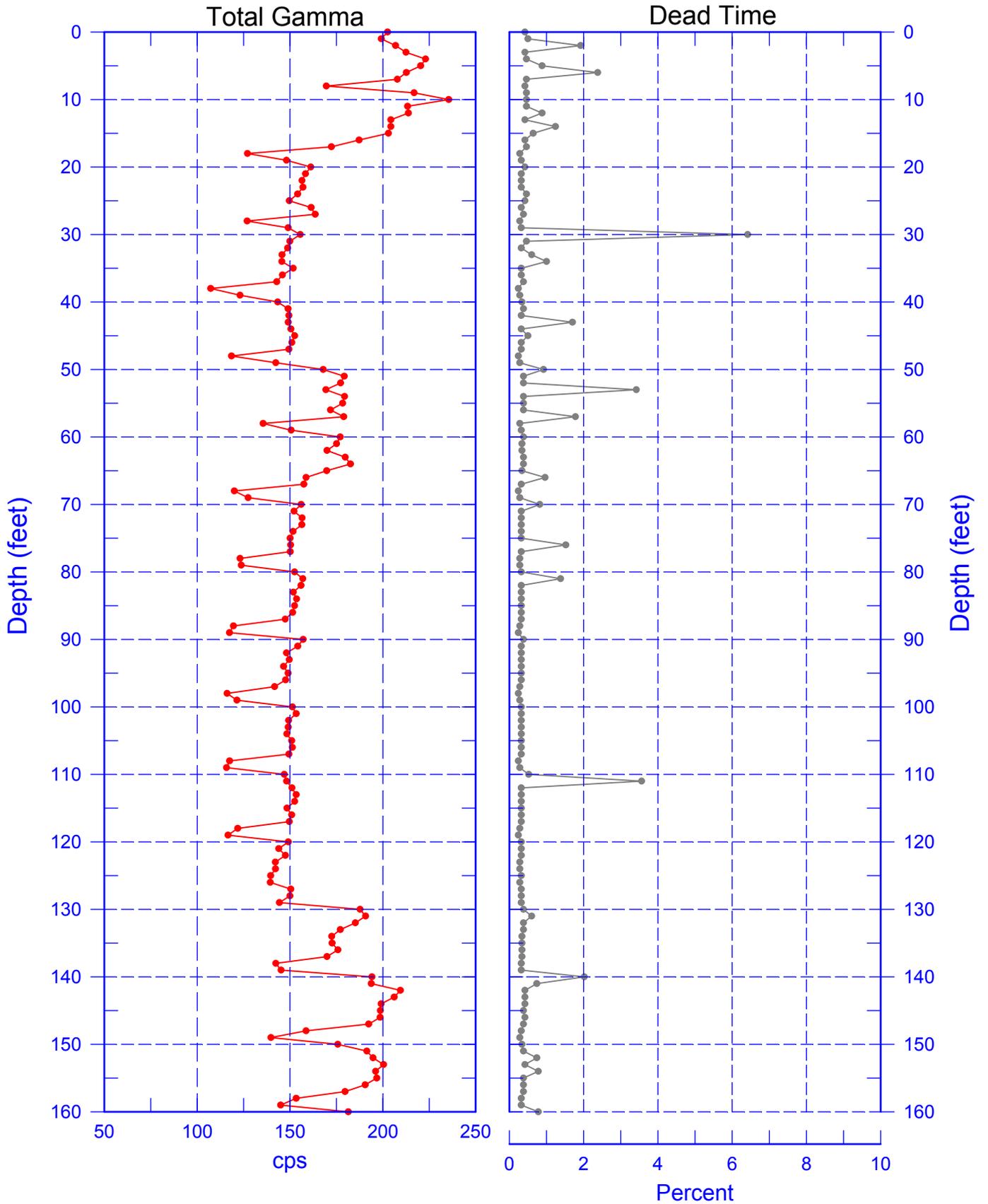


Zero Reference = Ground Surface

Last Logging Date - 07/07/03

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Total Gamma & Dead Time

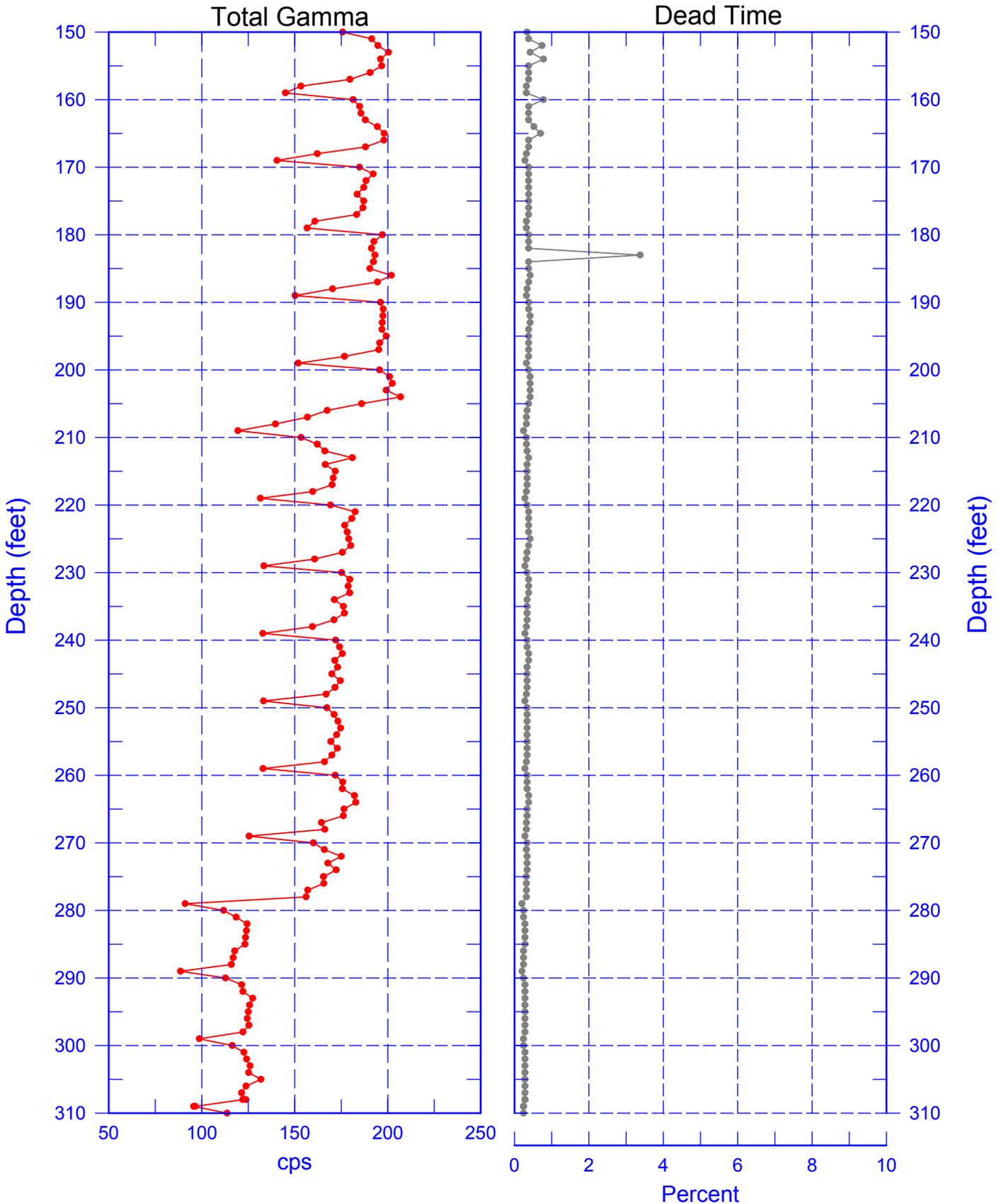


Reference - Ground Surface

Last Log Date - 07/07/03

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Total Gamma & Dead Time

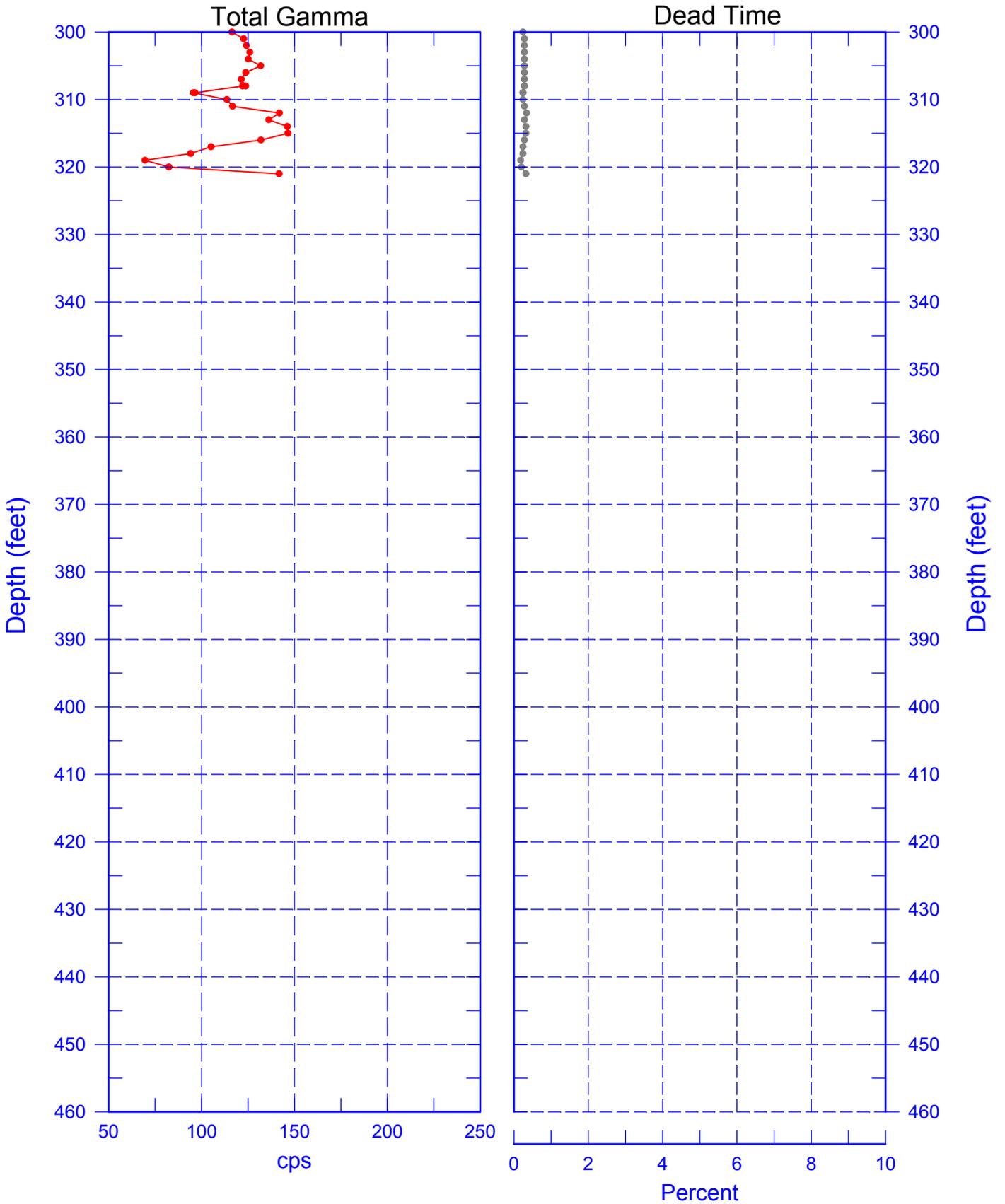


Reference - Ground Surface

Last Log Date - 07/07/03

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Total Gamma & Dead Time

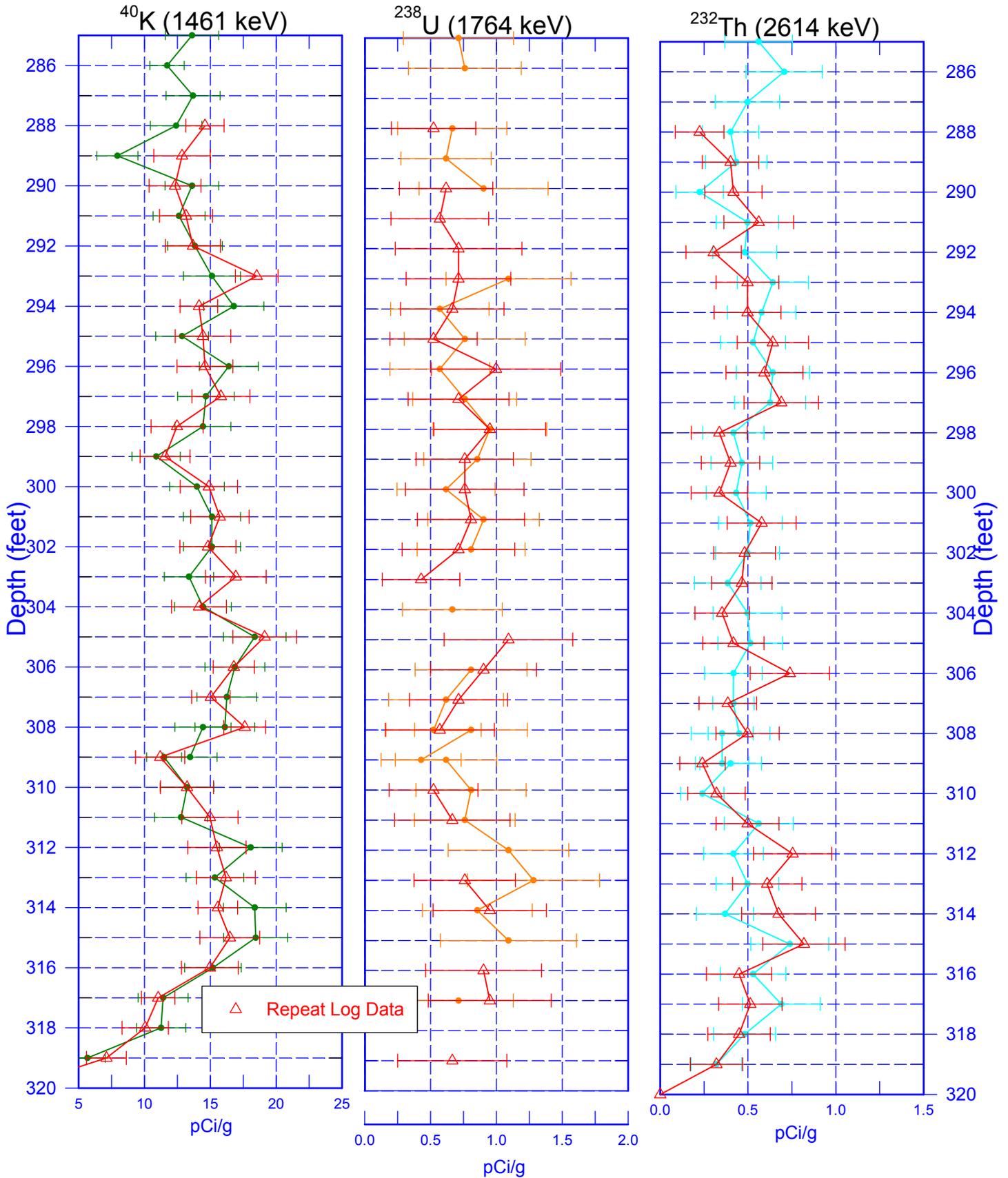


Reference - Ground Surface

Last Log Date - 07/07/03

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Repeat Section of Natural Gamma Logs



Zero Reference = Ground Surface

Last Log Date - 07/07/03