



299-E33-47 (C4259) Log Data Report

Borehole Information:

Borehole: 299-E33-47 (C4259)		Site: East of B Tank Farm			
Coordinates (WA State Plane)		GWL (ft)¹: 249.9		GWL Date: 07/26/04	
North Not Available	East Not Available	Drill Date 07/23/04	TOC² Elevation Not Available	Total Depth (ft) 285	Type Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Threaded steel	2.0	10 3/4	9 3/8	11/16	2.0	285

Borehole Notes:

The logging engineer measured casing diameters and stickup using a steel tape and rounding the measurements to the nearest 1/16 in. Logging measurements are referenced to the ground surface. Groundwater level was measured from TOC at 249.9 ft; the level referenced to the ground surface is 247.9 ft.

Logging Equipment Information:

Logging System: Gamma 4E	Type: SGLS (70%) 34TP40587A
Calibration Date: 05/2004	Calibration Reference: DOE-EM/GJ692-2004
Logging Procedure: MAC-HGLP 1.6.5, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3 Repeat		
Date	07/26/04	07/27/04	07/27/04		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	150.0	271.0	148.0		
Finish Depth (ft)	0.0	149.0	120.0		
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 ³	N/A	N/A		
Pre-Verification	DE131CAB	DE141CAB	DE141CAB		
Start File	DE131000	DE141000	DE141123		
Finish File	DE131150	DE141122	DE141151		
Post-Verification	DE131CAA	DE141CAA	DE141CAA		

Log Run	1	2	3 Repeat		
Depth Return Error (in.)	0	N/A	-2		
Comments	No fine-gain adjustment.	No fine-gain adjustment.	No fine-gain adjustment.		

Logging Operation Notes:

Logging was performed with a centralizer installed on the sonde. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT (^{40}K , ^{238}U , and ^{232}Th) verifier with serial number 118. Zero reference is the ground surface.

Analysis Notes:

Analyst:	Henwood	Date:	09/20/04	Reference:	GJO-HGLP 1.6.3, Rev. 0
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SGLS pre-run and post-run verification spectra were collected at the beginning and end of the day. All of the verification spectra were within the acceptance criteria. Examinations of spectra indicate that the detector functioned normally during logging, and the spectra are accepted.

Log spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC SUPERVISOR. Concentrations were calculated in EXCEL (source file: G4EJul04.xls). The casing configuration was assumed as one string of 10-in. casing with a thickness of 11/16 in. to 285 ft. No dead time corrections were required. A correction for water in the 11-in. borehole was applied to the data below 250 ft.

Log Plot Notes:

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides (^{40}K , ^{238}U , and ^{232}Th), and man-made radionuclides. Plots of the repeat logs versus the original logs are included. 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, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation. The ^{214}Bi peak at 1764 keV was used to determine the naturally occurring ^{238}U concentrations on the combination plot rather than the ^{214}Bi peak at 609 keV because it exhibited slightly higher net counts per second.

Results and Interpretations:

^{137}Cs was the man-made radionuclide detected in this borehole. ^{137}Cs was detected near the ground surface at a maximum concentration of 1.5 pCi/g and at a few sporadic depth intervals throughout the borehole near its MDL of approximately 0.2 pCi/g.

The KUT logs showed variations that may be used for correlation among boreholes in the area. Increases in the KUT at 50 ft and an interval between 211 and 222 ft are notable.

The plots of the repeat logs demonstrate reasonable repeatability of the SGLS data for the natural radionuclides. Naturally occurring ^{238}U as measured at the 1764-keV energy level indicates enhanced radon in the borehole during log runs 2 and 3 relative to the measurements acquired in log run 1.

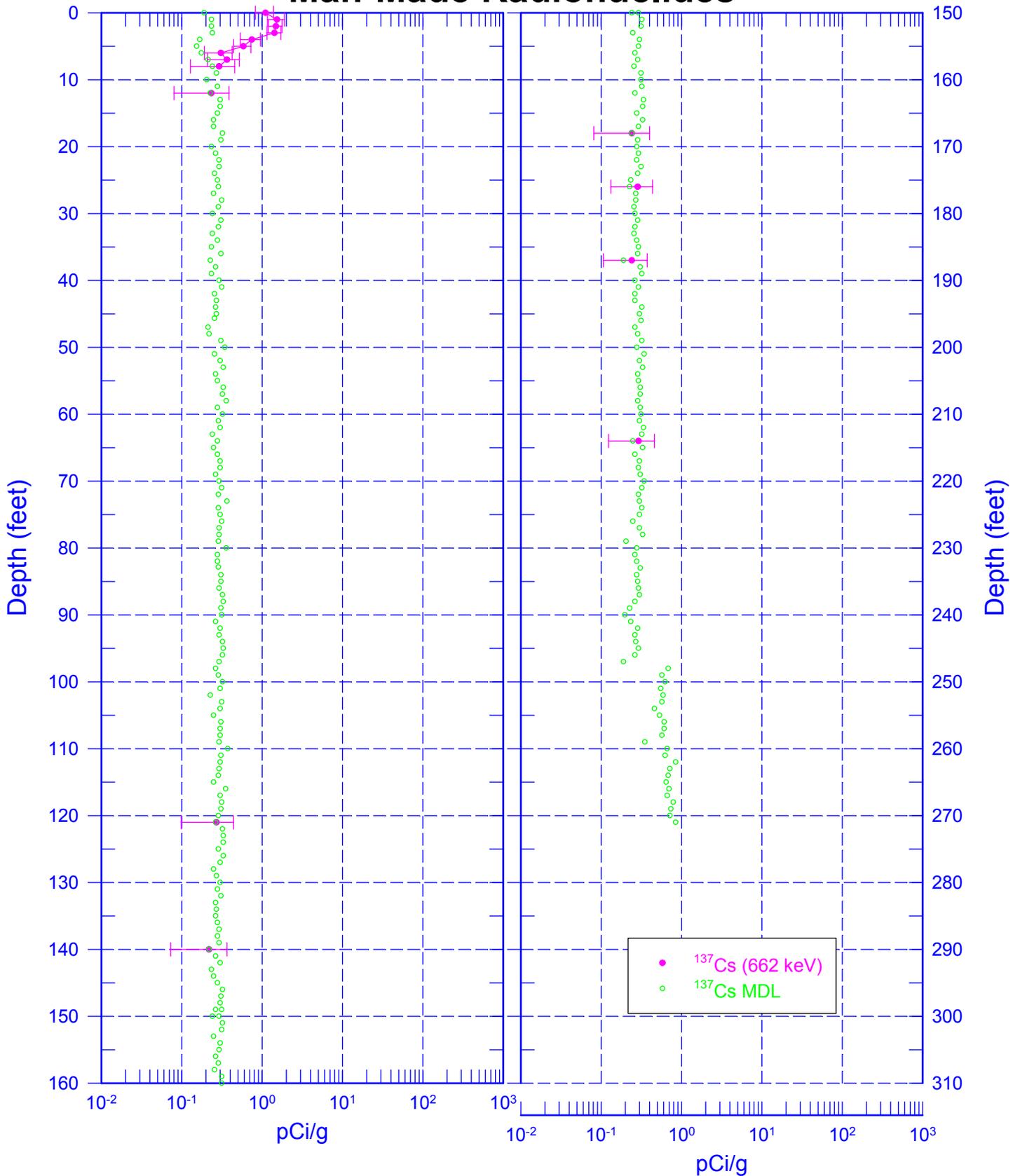
¹ GWL – groundwater level

² TOC – top of casing

³ N/A – not applicable

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Man-Made Radionuclides

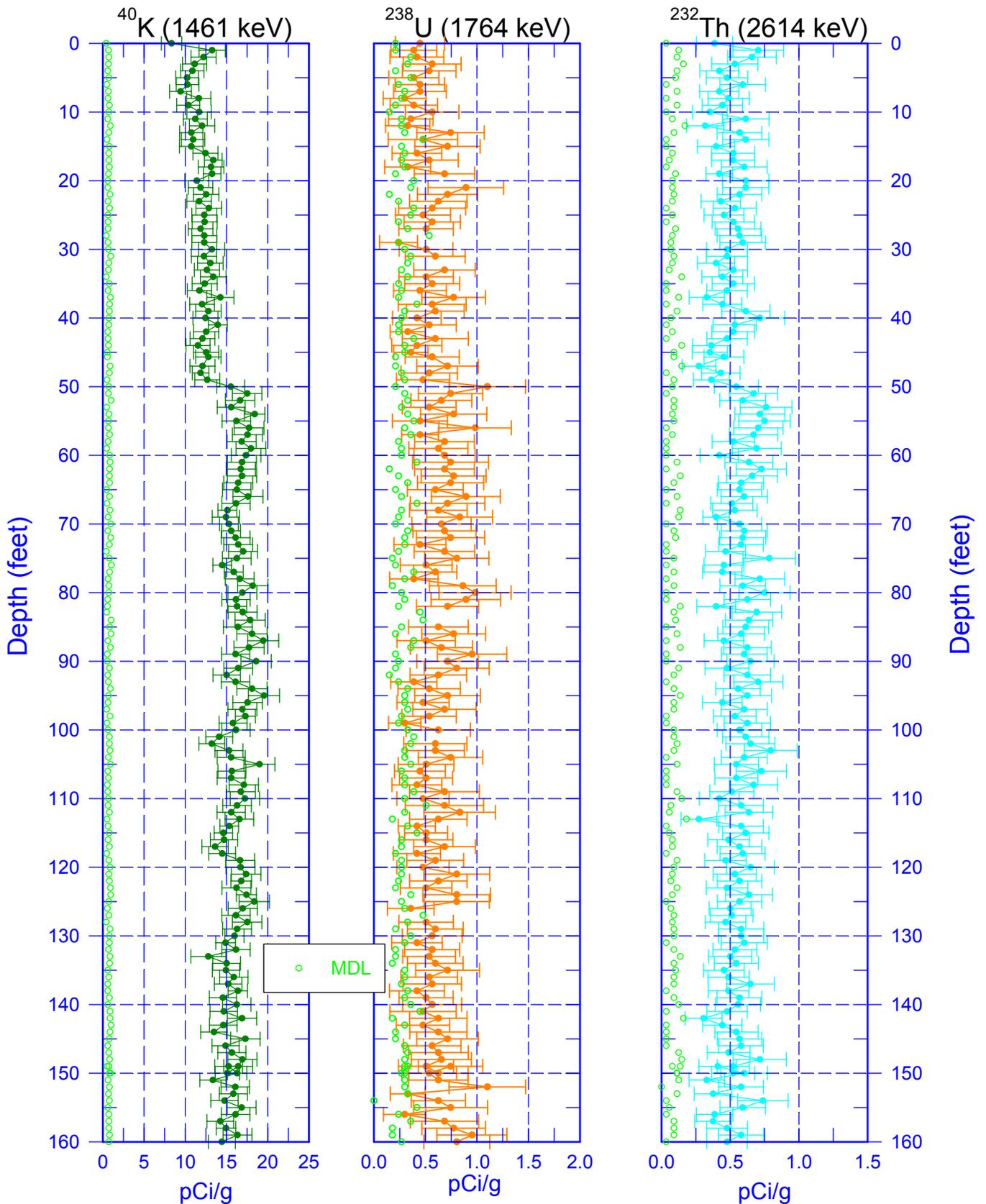


Zero Reference - Ground Surface

Depth scale: 1" = 20 ft

Last Log Date - 07/27/04

299-E33-47 (C4259) Natural Gamma Logs

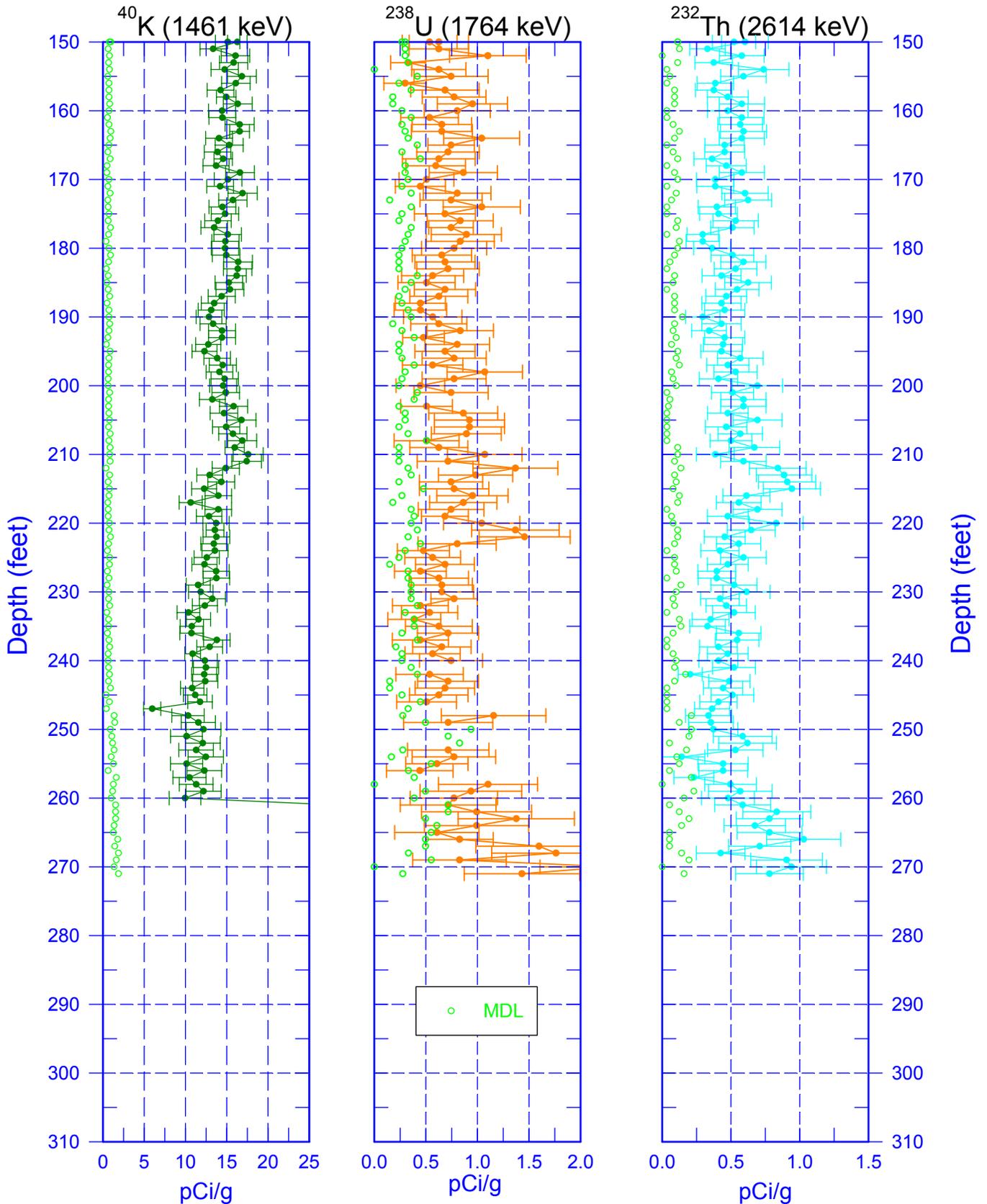


Zero Reference = Ground Surface

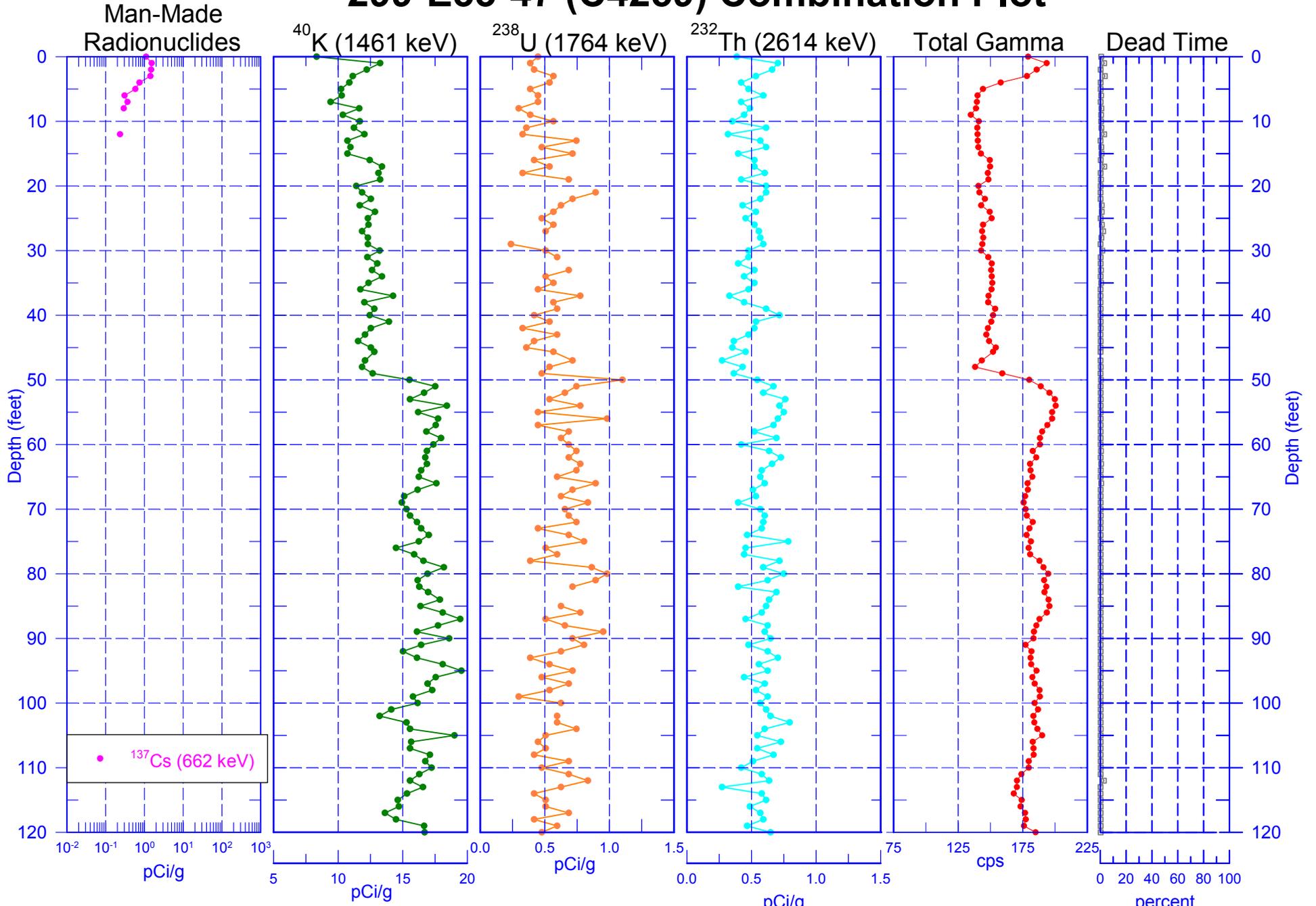
Depth scale: 1" = 20 ft

Last Log Date - 07/27/04

299-E33-47 (C4259) Natural Gamma Logs



299-E33-47 (C4259) Combination Plot

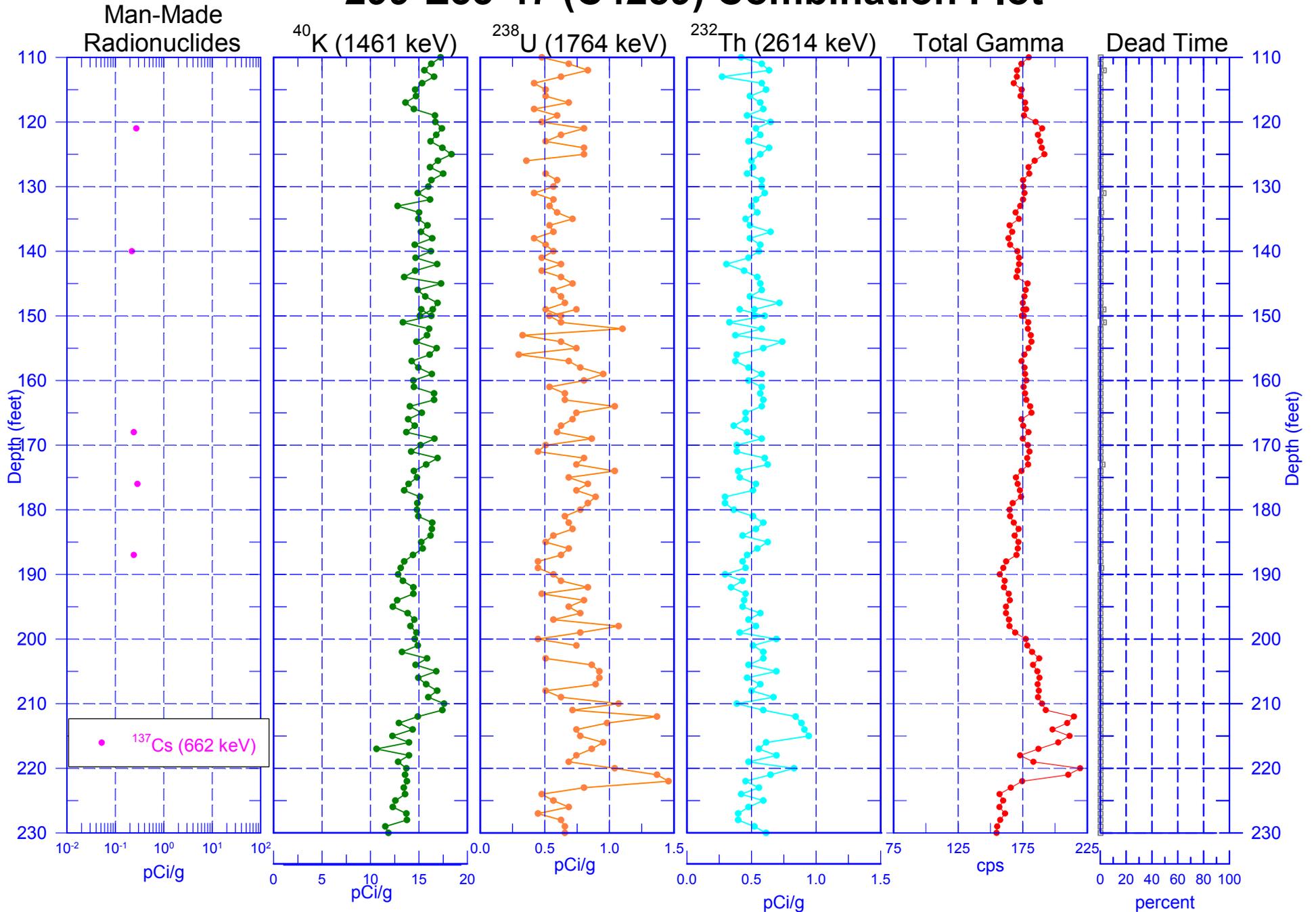


Zero Reference - Ground Surface

Depth scale: 1" = 20 ft

Last Logging Date - 07/27/04

299-E33-47 (C4259) Combination Plot

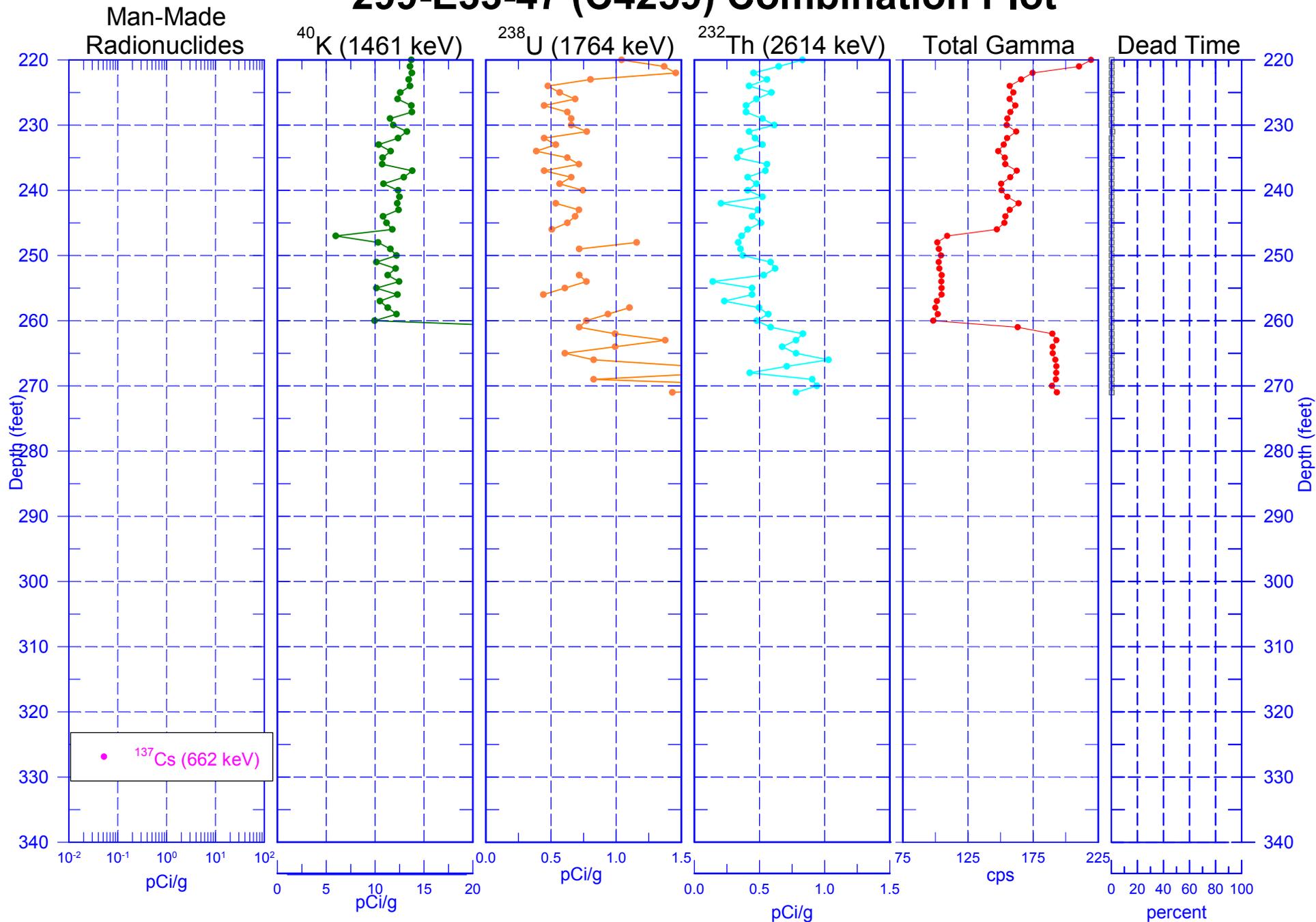


Zero Reference - Ground Surface

Depth scale: 1" = 20 ft

Last Logging Date - 07/27/04

299-E33-47 (C4259) Combination Plot



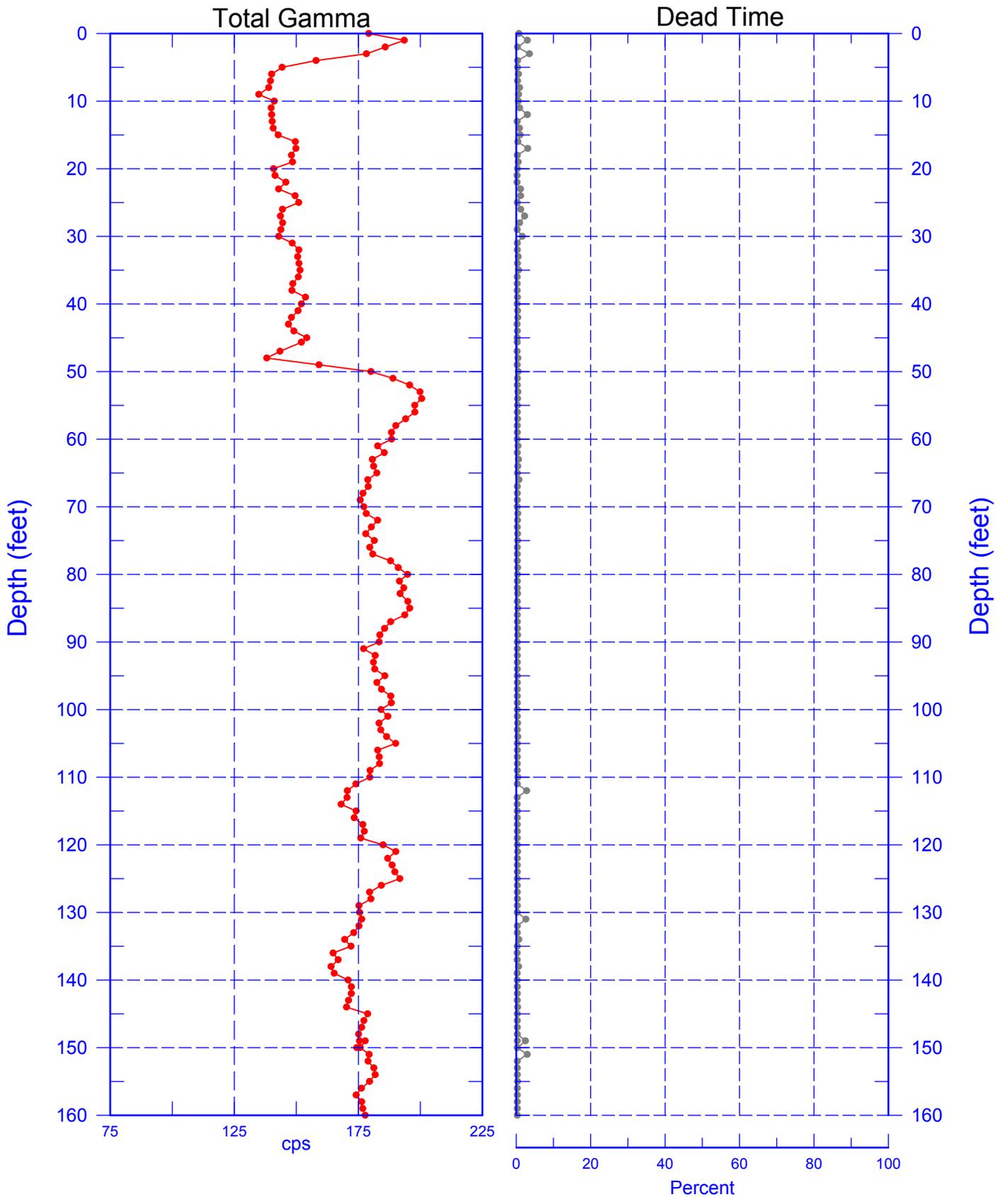
Zero Reference - Ground Surface

Depth scale: 1" = 20 ft

Last Logging Date - 07/27/04

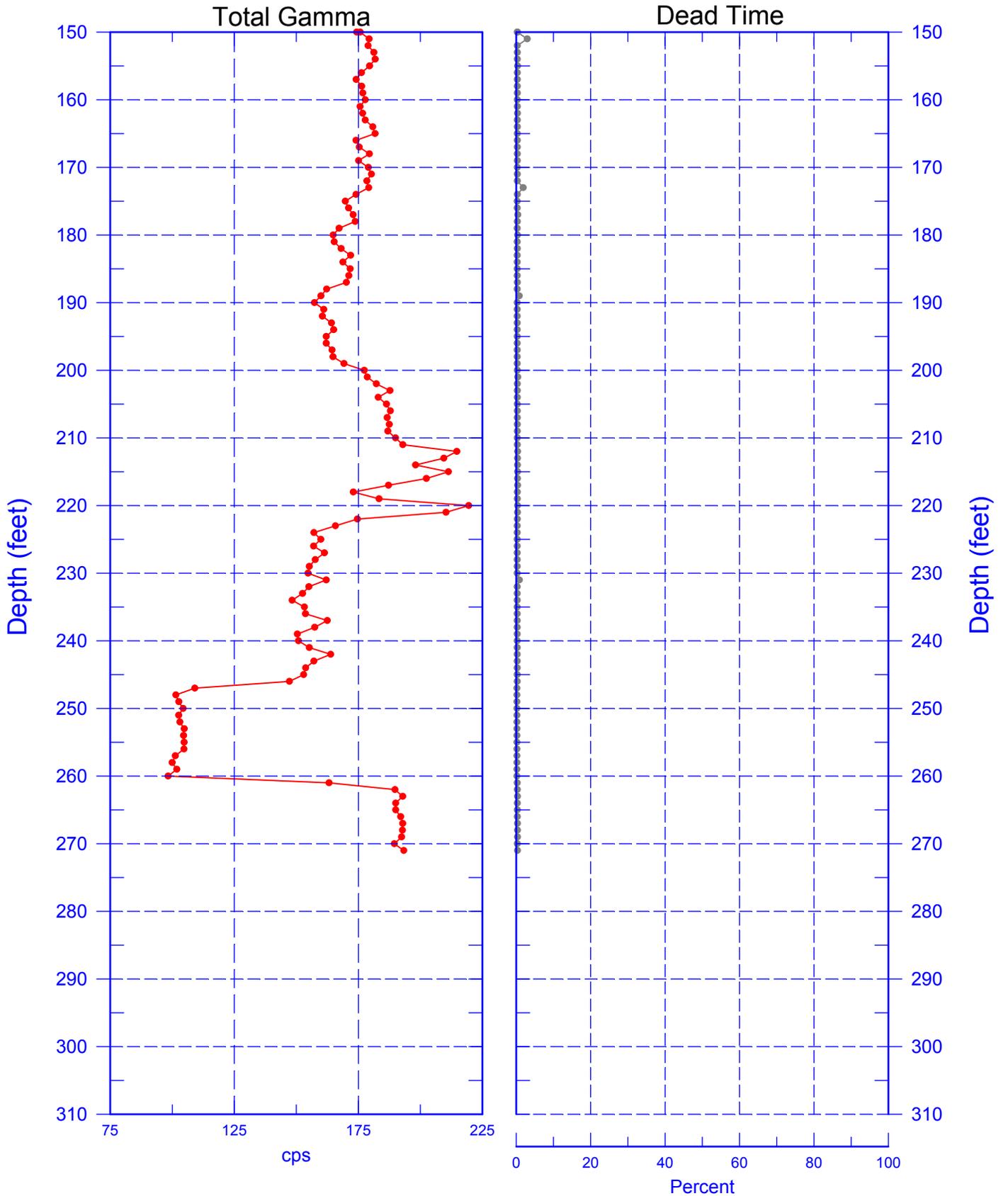
299-E33-47 (C4259)

Total Gamma & Dead Time



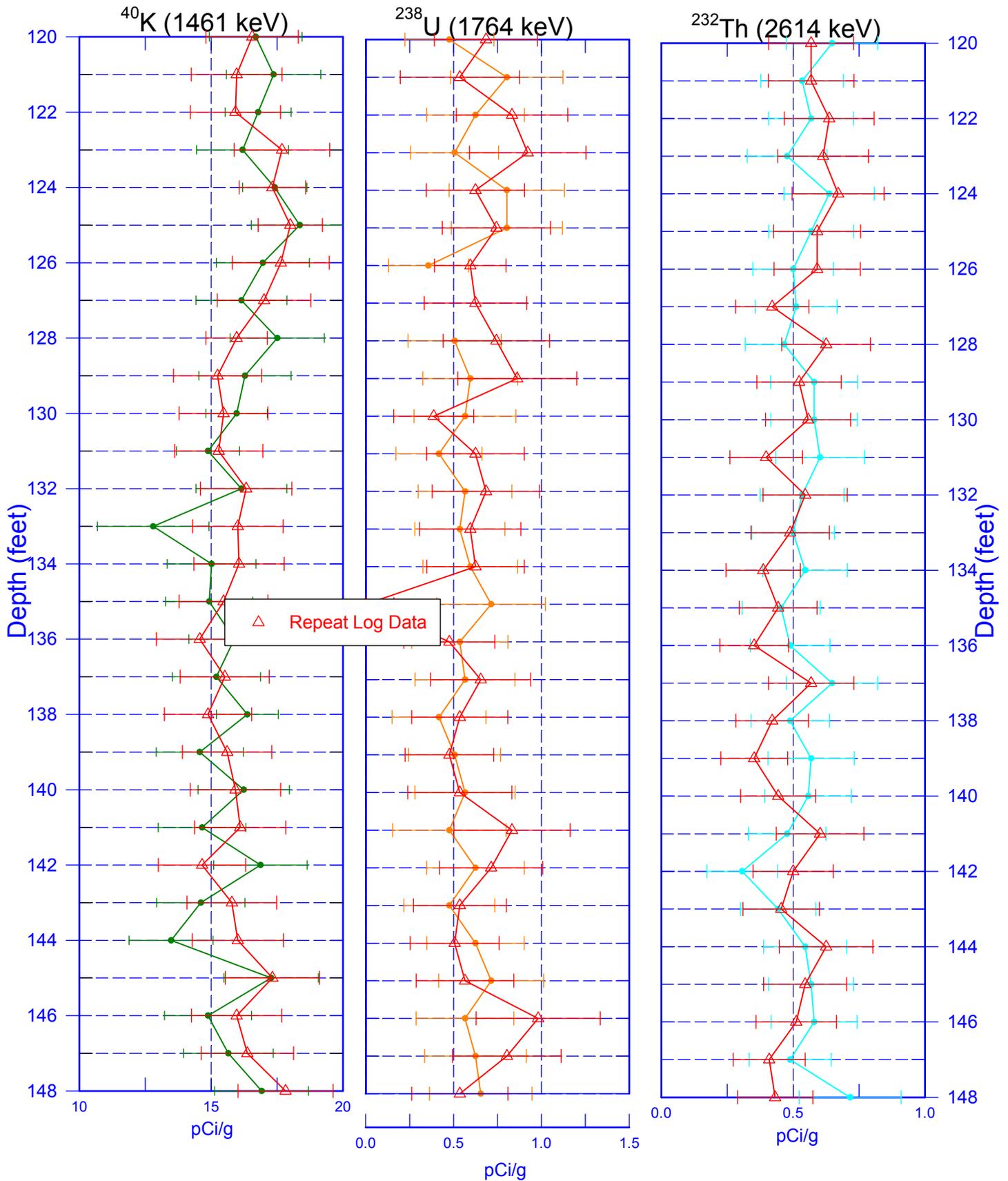
299-E33-47 (C4259)

Total Gamma & Dead Time



299-E33-47 (C4259)

Repeat Section of Natural Gamma Logs



Zero Reference - Ground Surface

Last Log Date - 07/27/04