299-E28-58 (A6809)

Log Data Report

Borehole Information:

Borehole:	299-E28-58 (A6809)		Site:	216-B-9 Crib	
Coordinates (WA State Plane)		GWL (ft)[1]:	Not reached	GWL Date:	N/A[2]
North	East	Drill Date	TOC[3] Elevation	Total Depth (ft)	Type
136,877.9 m	573,865.8 m	July 1948	207.7 m	150	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Steel Welded	0.8	8.625	8.0	0.3125	0	148

Borehole Notes:

The logging engineer measured the stickup using a steel tape. A reference point survey "X" is located on top of the casing stickup. Calipers were used to measure the casing wall thickness and the outside diameter; the inside diameter is calculated. Zero reference is the top of casing stickup. Top of casing stickup is cut squarely. HWIS[4] is the source of the TOC elevation and coordinates. Total depth (ground level reference) and casing bottom (TOC reference) are reported from information provided in Chamness and Merz (1993). The borehole was swabbed on 03/12/02, and no contamination was detected.

Logging Equipment Information:

Logging System:	Gamma 2A		Type: SGLS (35%)
Calibration Date:	11/01/01	Calibration Reference:	GJO-2002-286-TAR
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3		
Date	04/05/02	04/08/02	04/08/02		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	148.0	62.0	2.5		
Finish Depth (ft)	61.0	2.5	18.0		
Count Time (sec)	100	100	100		
Live/Real	R	R	R		
Shield (Y/N)	N/A	N/A	N/A		
MSA Interval (ft)	0.5	0.5	0.5		
ft/min	N/A	N/A	N/A		
Pre-Verification	BA122CAB	BA123CAB	BA123CAB		
Start File	BA122000	BA123000	BA123120		
Finish File	BA122174	BA123119	BA123151		
Post-Verification	BA122CAA	BA124CAA	BA124CAA		
Depth Return Error (ft)	+1.4"	0	0		

Log Run	1	2	3		
Comments	Fine-gain adjustment notes below.	No fine-gain adjustment.	Repeat section. No fine-gain adjustment.		

Logging Operation Notes:

Zero reference is the top of casing. Logging was performed with a centralizer installed on the sonde. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT verifier with SN 082.

During SGLS logging, fine-gain adjustments were made to maintain the 1460-keV (^{40}K) photopeak at a pre-described channel. During logging run 1, 04/05/02, fine-gain adjustments were made after files BA122064, BA122065, and BA122142.

Analysis Notes:

Analyst:	Sobczyk	Date:	05/02/02	Reference:	MAC-HGLP 1.6.3, Rev. 0

SGLS pre-run and post-run verification spectra were collected at the beginning and end of each day. The verification spectra were all within the control limits. The recorded peak counts per second (cps) at the 609-keV, 1461-keV, and 2615-keV photopeaks on the post-run verification spectra as compared to the pre-run verification spectra for each day were within 4 percent of one another at each spectrum's energy line. The post-run verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC Supervisor.

Spectra for the SGLS were processed in batch mode using APTEC Supervisor to identify individual energy peaks and determine count rates. Concentrations were calculated in EXCEL (source file: G2ANov1.xls), using parameters determined from analysis of recent calibration data. Zero reference is the top of the casing. The casing configuration was assumed to be one string of 8-in. casing with a thickness of 0.322 in. to a log depth of 148 ft. A casing thickness of 0.322 in. is the published value for ASTM schedule-40 steel pipe (a commonly used casing material at Hanford). This casing thickness is within the range of measurement error associated with the logging engineer's measurements. A water correction was not needed or applied to the SGLS data. Dead time corrections were not needed because dead time did not exceed 10.5 percent.

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.

Results and Interpretations:

^{137}Cs, ^{235}U, and ^{238}U (based on the 1001-keV photopeak) were the man-made radionuclides detected in this borehole. ^{137}Cs was detected near the ground surface (3.5- through 4.5-ft log depth) at activities ranging from 0.3 to 0.9 pCi/g. ^{137}Cs was also detected at 32.5 ft with an activity of about 0.3 pCi/g. At 64 ft, ^{235}U was detected with an activity of about 1.4 pCi/g near its MDL of about 1.1 pCi/g, and ^{238}U (based on the 1001-keV photopeak) was detected with an activity of about 18 pCi/g near its MDL of about 16 pCi/g.

Recognizable changes in the KUT logs occurred in this borehole. A change in apparent ^{40}K activities of about 5 pCi/g occurs at about 22 ft. This increase in ^{40}K activities probably represents the transition from the coarse-grained sediments of the Hanford H1 to the finer grained sediments of the Hanford H2.

The plots of the repeat logs demonstrate good repeatability of the SGLS data for the naturally occurring radionuclides. Man-made radionuclides were not detected in the interval from 2.5 to 18.0 ft during the original and repeat log runs.

Gross gamma profiles from Additon et al. (1978) (attached) indicate that the sediments surrounding this borehole may have contained minor amounts of gamma-emitting contamination. The profile from 5/24/63 indicated possible gamma flux above background in the following intervals: 20 to 30 ft (6 to 9 m), 56 to 95 ft (17 to 29 m), and 131 to 141 ft (40 to 43 m). Elevated gamma flux is not apparent on the 5/4/76 profile. Only chemically separated uranium was detected with the SGLS in these depth intervals, at a depth of 64 ft.

References:

Additon, M.K., K.R. Fecht, T.L. Jones, and G.V. Last, 1978. *Scintillation Probe Profiles From 200 East Area Crib Monitoring Wells*, RHO-LD-28, Rockwell Hanford Operations, Richland, Washington.

Chamness, M.A., and J.K. Merz, 1993. *Hanford Wells*, PNNL-8800, UC-903, Pacific Northwest Laboratory, Richland, Washington.

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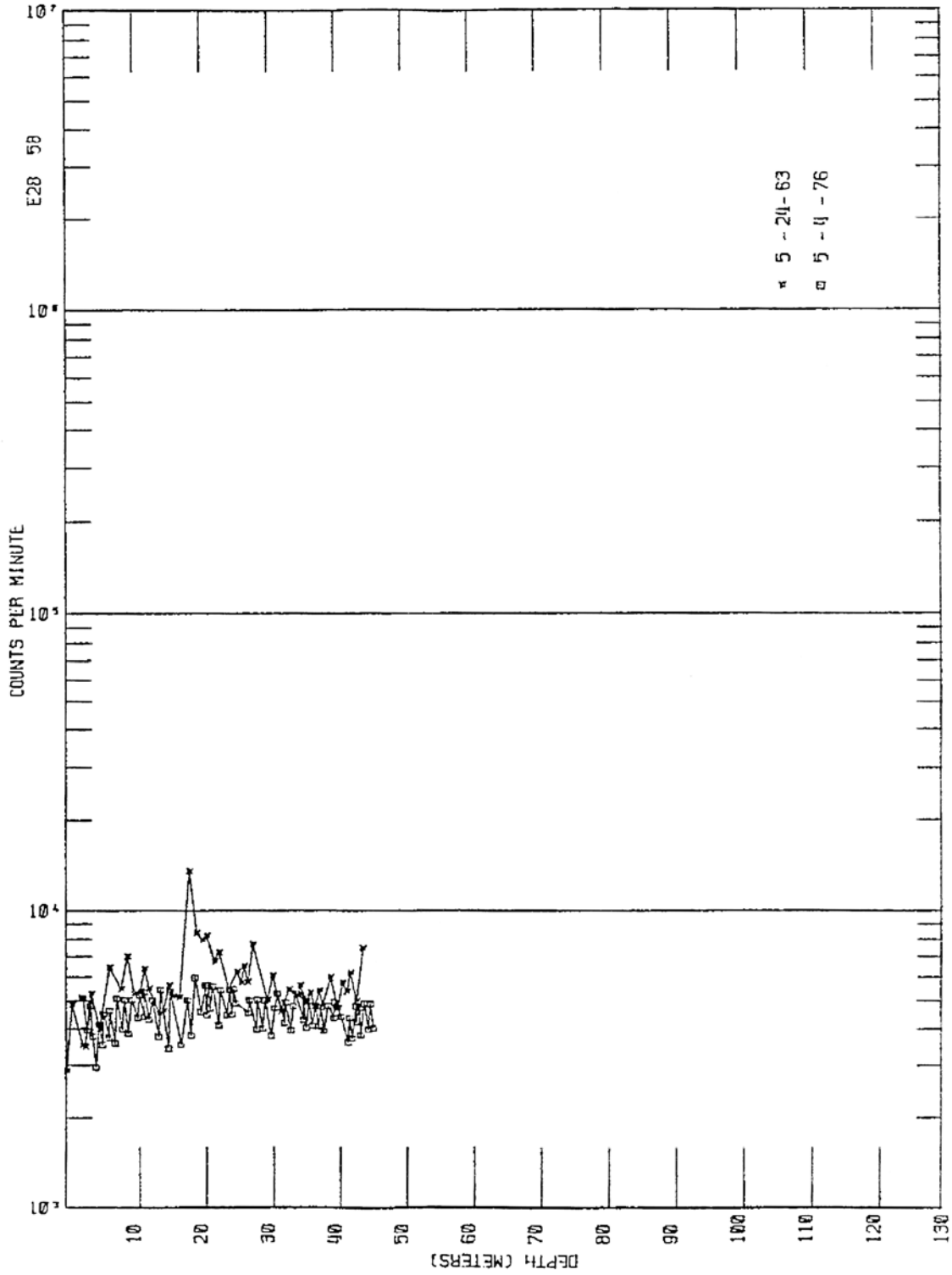
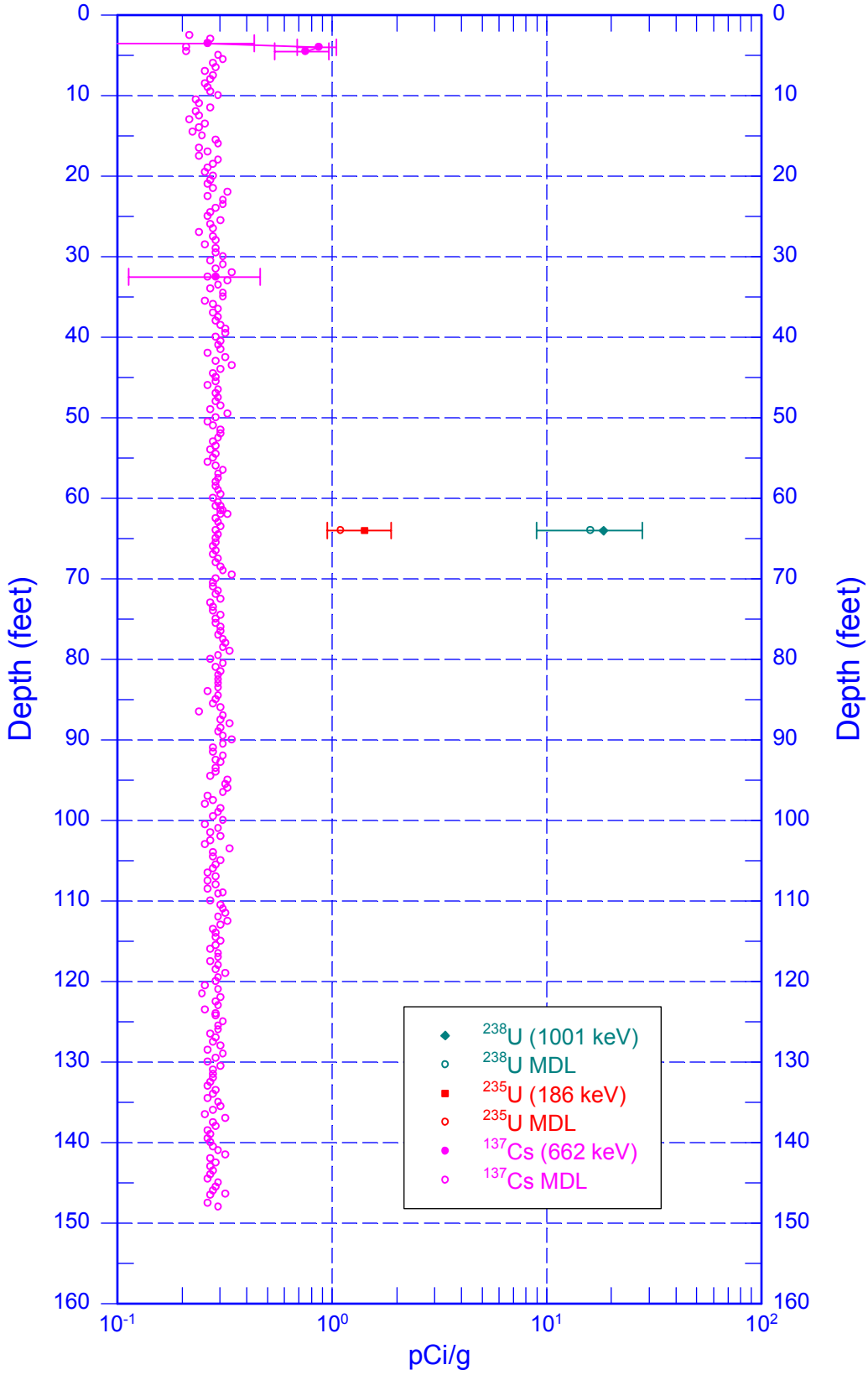
[1] GWL – groundwater level
[2] N/A – not applicable
[3] TOC – top of casing
[4] HWIS – Hanford Well Information System



from Additon et al. (1978)

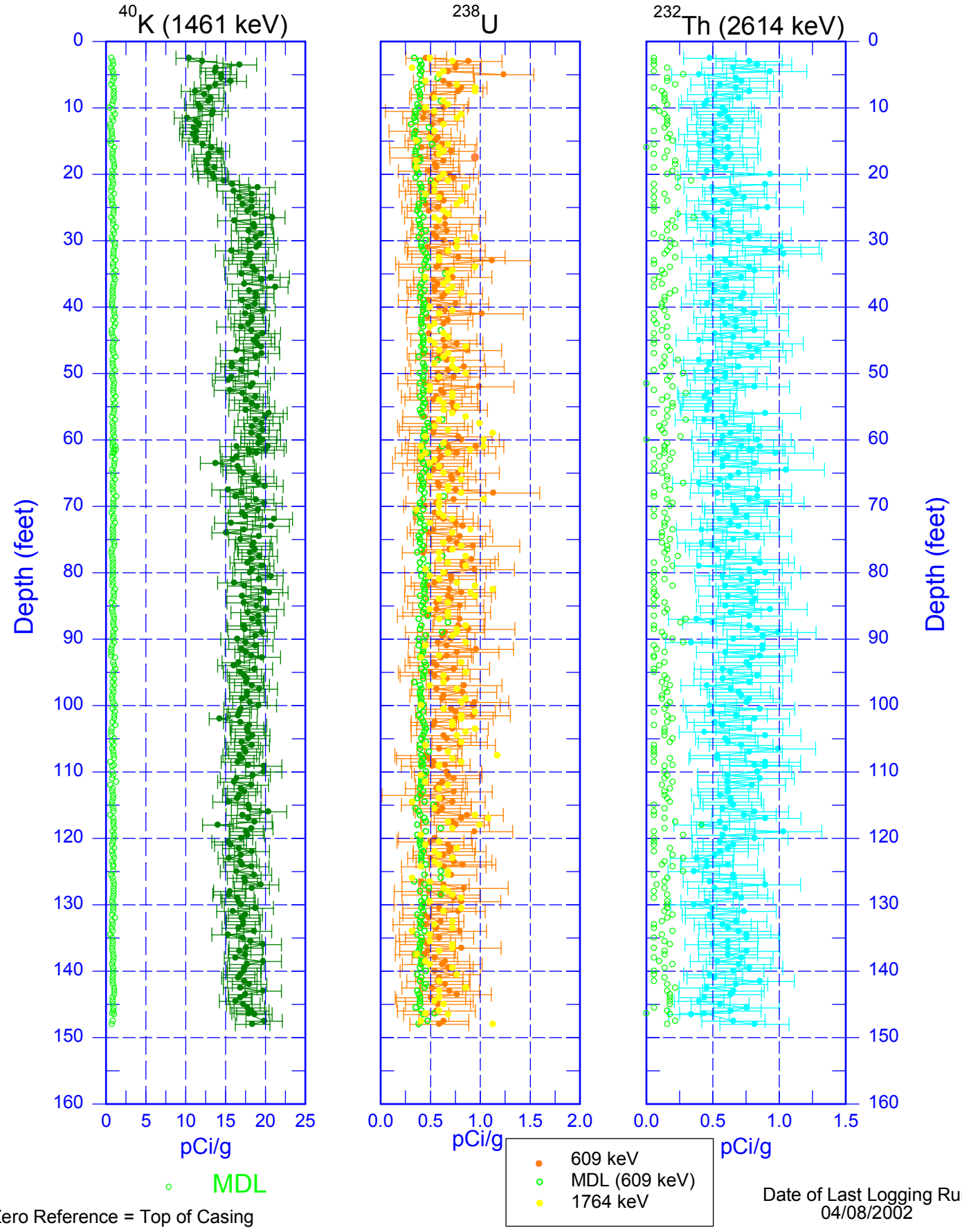
299-E28-58 (A6809)
Man-Made Radionuclides



Zero Reference = Top of Casing

Date of Last Logging Run
04/08/2002

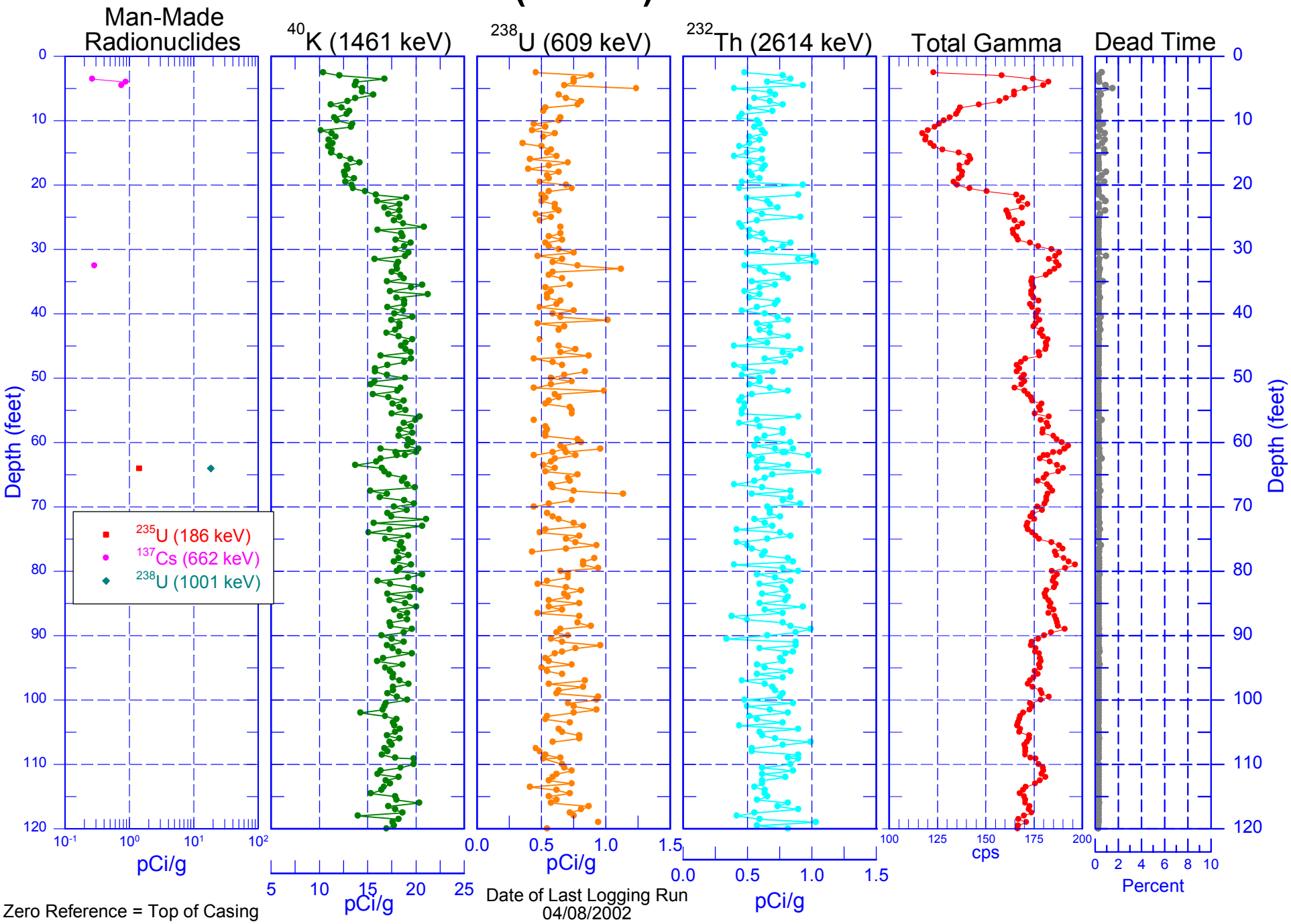
299-E28-58 (A6809)
Natural Gamma Logs



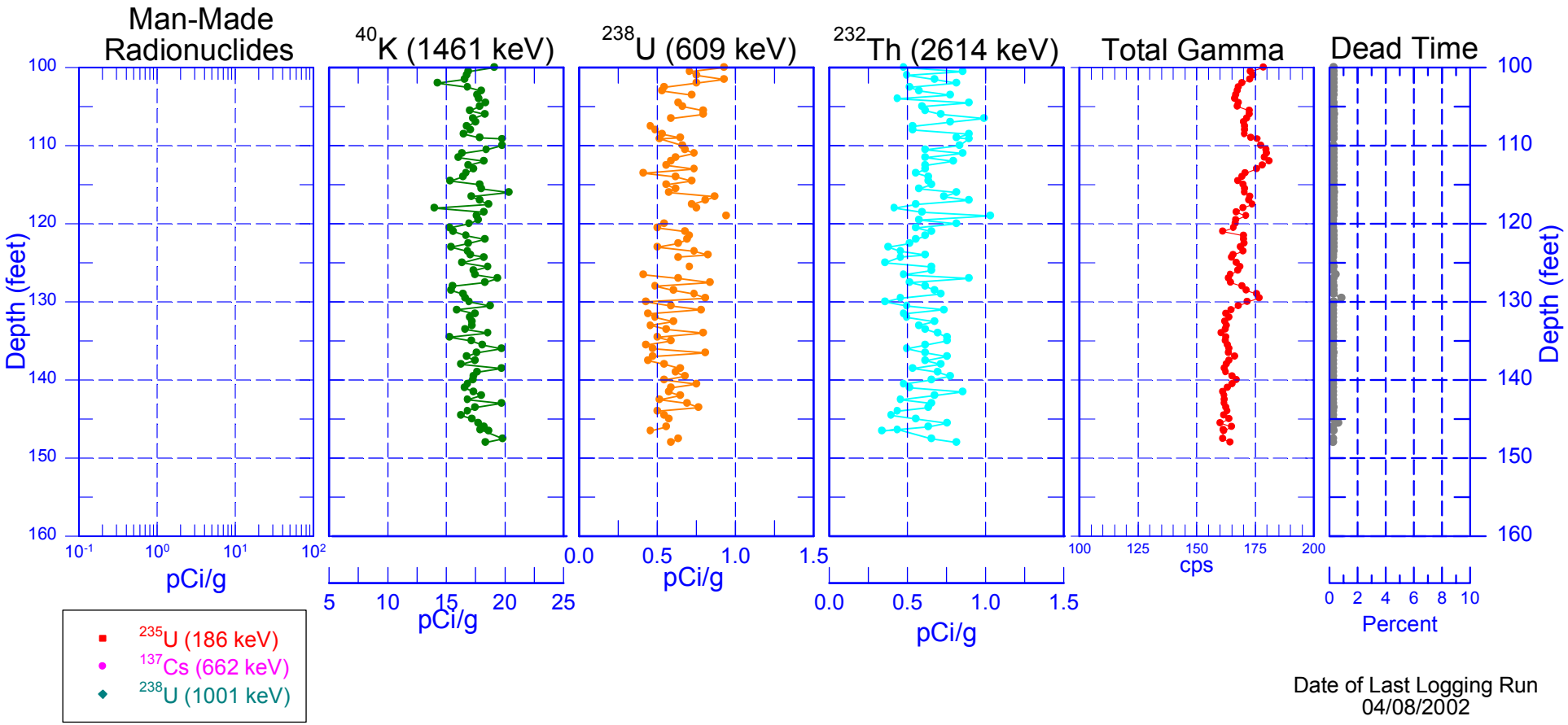
Zero Reference = Top of Casing

Date of Last Logging Run
04/08/2002

299-E28-58 (A6809) Combination Plot



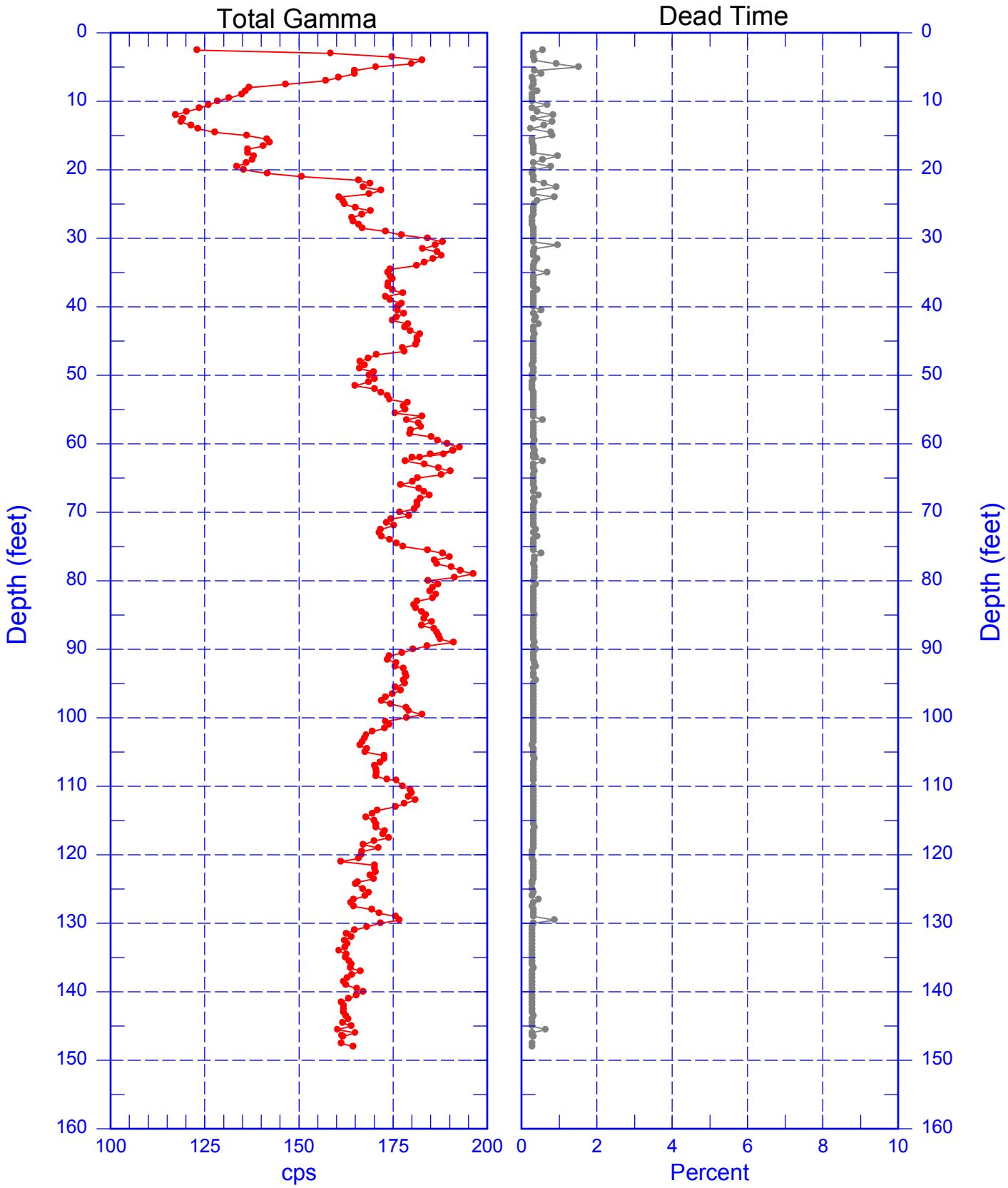
299-E28-58 (A6809) Combination Plot



Date of Last Logging Run
04/08/2002

Zero Reference = Top of Casing

299-E28-58 (A6809)
Total Gamma & Dead Time



Date of Last Logging Run
04/08/2002

Zero Reference = Top of Casing

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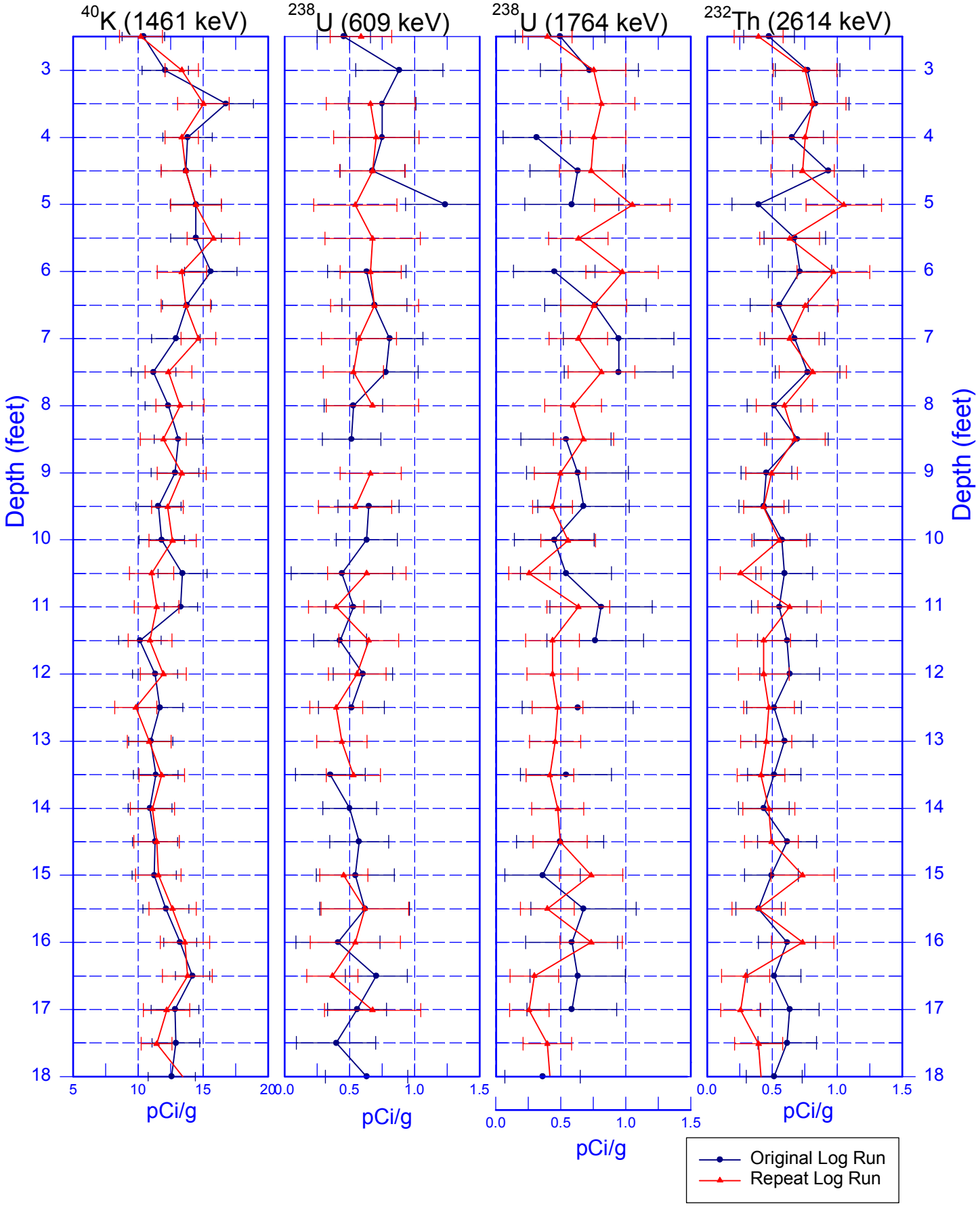
Rerun of Natural Gamma Logs (2.5 to 18.0 ft)



299-E28-58 (A6809)

Rerun of Man-Made Radionuclides (40 to 56.5 ft)