Stoller
Grand Junction Office established 1959

299-E25-18 (A4764)
Log Data Report

Borehole Information:

Borehole:	299-E25-18 (A4764)		Site:	216-A-37-1 Crib	
Coordinates (WA State Plane)		GWL (ft)[1]:	281.15	GWL Date:	3/11/2003
North	East	Drill Date	TOC[2] Elevation	Total Depth (ft)	Type
135,699.3 m	575,817.38 m	August 1976	208.06 m	300	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	0	unknown	8	unknown		151.85
Welded steel	1.85	6 5/8	6	5/16	0	301.85

The logging engineer measured the 6-in. casing stick up using a steel tape. A caliper was used to determine the outside casing diameter. The caliper and inside casing diameter were measured using a steel tape. Measurements were rounded to the nearest 1/16 in. The 6-in. casing thickness was calculated. There was no evidence of 8-in. casing at the ground surface as reported in Ledgerwood (1993). A 2-ft-diameter concrete pad is present at the surface.

Borehole Notes:

Borehole coordinates, elevation, and well construction information are from measurements by Stoller field personnel, HWIS[3], and Ledgerwood (1993). Duratek well services removed the groundwater pump and tubing before logging began. The 6-in. casing is perforated from 269 to 294 ft, and the 8-in. casing is perforated from 94 to 149 ft (Ledgerwood 1993). The annulus between the 6-in. and 8-in. casings was grouted with bentonite mud. A 10-in. casing (0-20 ft) was removed while the annulus between the 10-in. and 8-in. casing was grouted with cement (Ledgerwood 1993). There is no reference point survey "X" located at the top of the casing stickup.

Logging Equipment Information:

Logging System:	Gamma 2E		Type:	70% HPGe
Calibration Date:	03/2003	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	4	
Date	3/25/03	3/26/03	3/26/03	3/26/03	
Logging Engineer	Pearson	Pearson	Pearson	Pearson	
Start Depth (ft)	2.0	294.0	200.0	151.0	
Finish Depth (ft)	117.0	149.0	170.0	116.0	
Count Time (sec)	100	50	50	100	

Log Run	1	2	3/Repeat	4	
Live/Real	R	R	R	R	
Shield (Y/N)	N/A[4]	N/A	N/A	N/A	
MSA Interval (ft)	1.0	1.0	1.0	1.0	
ft/min	N/A	N/A	N/A	N/A	
Pre-Verification	BE006CAB	BE008CAB	BE008CAB	BE008CAB	
Start File	BE006000	BE008000	BE008146	BE008177	
Finish File	BE006115	BE008145	BE008176	BE008212	
Post-Verification	BE006CAA	BE008CAA	BE008CAA	BE008CAA	
Depth Return Error (in.)	1/2 low	N/A	N/A	1 high	
Comments	Fine-gain adjustment after files BE006039 and -081.	Fine-gain adjustment after file BE008032.	No fine-gain adjustments.	No fine-gain adjustments.	

Logging Operation Notes:

Zero reference was top of the 6-in. casing. Logging was performed with the centralizer on the sonde. A count time of 100 s was used in the double cased portion of the borehole. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT (^{40}K, ^{238}U, and ^{232}Th) verifier with serial number 082.

Analysis Notes:

Analyst:	Sobczyk	Date:	03/31/03	Reference:	GJO-HGLP 1.6.3, Rev. 0

SGLS pre-run and post-run verification spectra were collected at the beginning and end of each day and compared to control limits. The verification spectra were all within the control limits. The 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 between 4 percent lower and 1 percent higher at the end of the day.

Log spectra for the SGLS were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Post-run 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: G2EMar03.xls). Zero reference was the top of the 6-in. casing. On the basis of Ledgerwood (1993), the casing configuration was assumed to be one string of 6-in. casing to total log depth (294 ft) and one string of 8-in. casing to 151.85 ft. Casing correction factors were calculated assuming a total casing thickness of 0.635 in. from 0 to 151.85 ft and 0.3125 in. from 151.85 to 294 ft. The casing correction factor was calculated assuming a 6-in. casing thickness of 0.3125 in. and an 8-in. casing thickness of 0.322 in. The 6-in. casing thickness is based upon the field measurement, and the 8-in. casing thickness of 0.322 in. is the published values for ASTM schedule-40 steel pipe (commonly used casing material at Hanford). Where more than one casing exists at a depth, the casing correction is additive (e.g., 0.322 in. + 0.3125 in. = 0.635 in. would be the combined thickness for the 6-in. and 8-in. casings). A water correction was applied to the data below 281.15 ft. Dead time corrections were not applied because dead time was not greater than 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. 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 only man-made radionuclide detected in this borehole. ^{137}Cs was detected at log depths of 5, 6, 154, 207, 218, 247.8, 264, and 279 ft with concentrations near the MDL (0.2 pCi/g). After examination of the spectra, it was determined that there is no evidence of a photopeak at 662 keV. The reported peaks are probably the result of statistical fluctuation.

Recognizable changes in the KUT logs occurred in this borehole. However, the changes above 152 ft are probably more indicative of the well completion materials than the surrounding formation. The 8-in. casing was perforated between 94 and 149 ft, and the annulus was grouted with bentonite drilling mud and cement. The decreases in total gamma and ^{40}K concentration (5-pCi/g decrease) at 223 ft corresponds with the transition from sand to gravelly sand reported in Ledgerwood (1993).

The plots of the repeat logs demonstrate reasonable repeatability of the SGLS data for the natural radionuclides (609, 1461, 1764, and 2614 keV).

The gross gamma log from Additon et al. (1977) (attached) indicates that the sediments surrounding this borehole contained only background amounts of natural gamma radiation in 1976.

References:

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

Ledgerwood, R.K., 1993. *Summaries of Well Construction Data and Field Observations for Existing 200-East Resource Protection Wells*, WHC-SD-ER-TI-007, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

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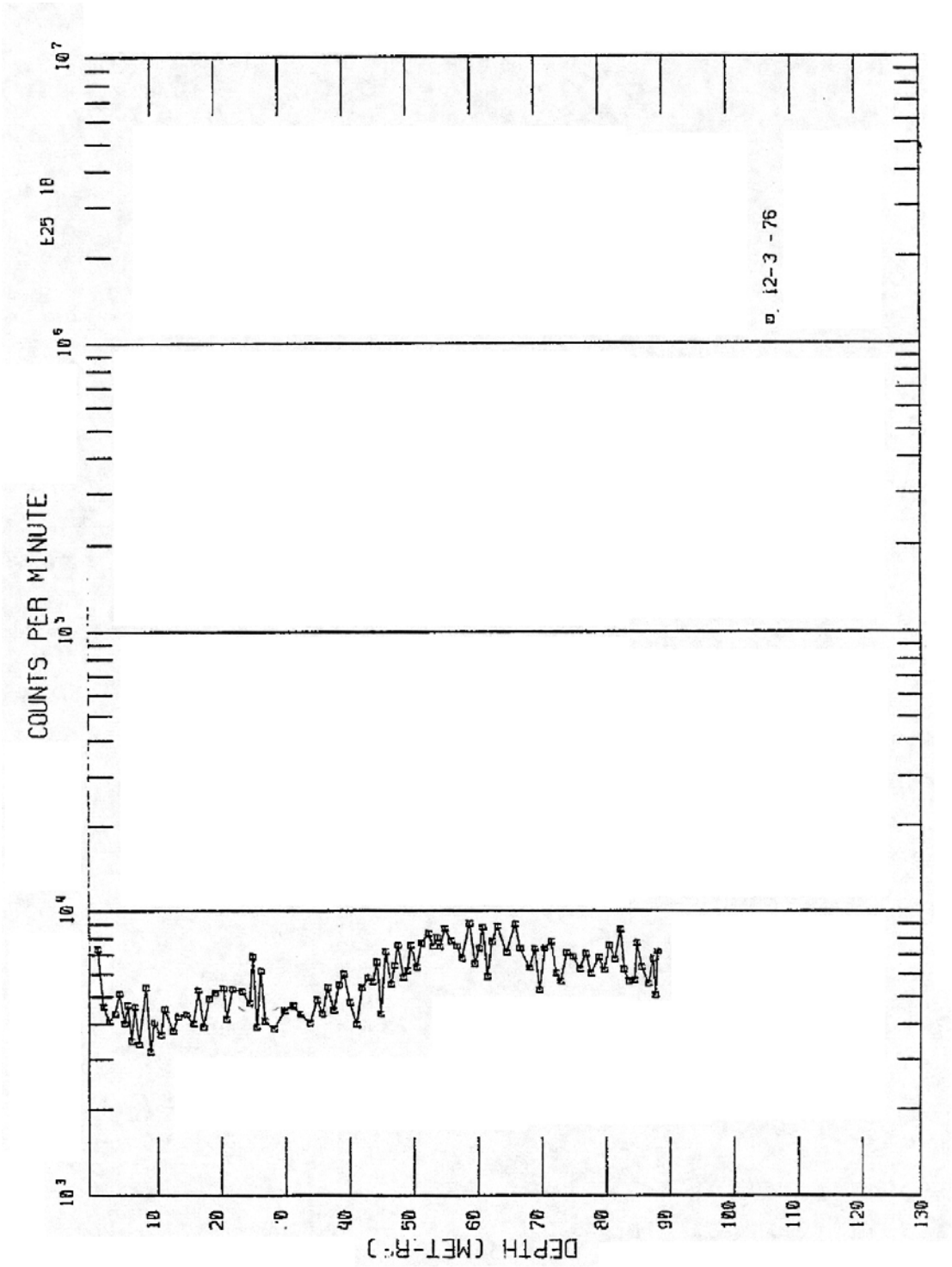
[1] GWL – groundwater level
[2] TOC – top of casing
[3] HWIS – Hanford Well Information System
[4] N/A – not applicable

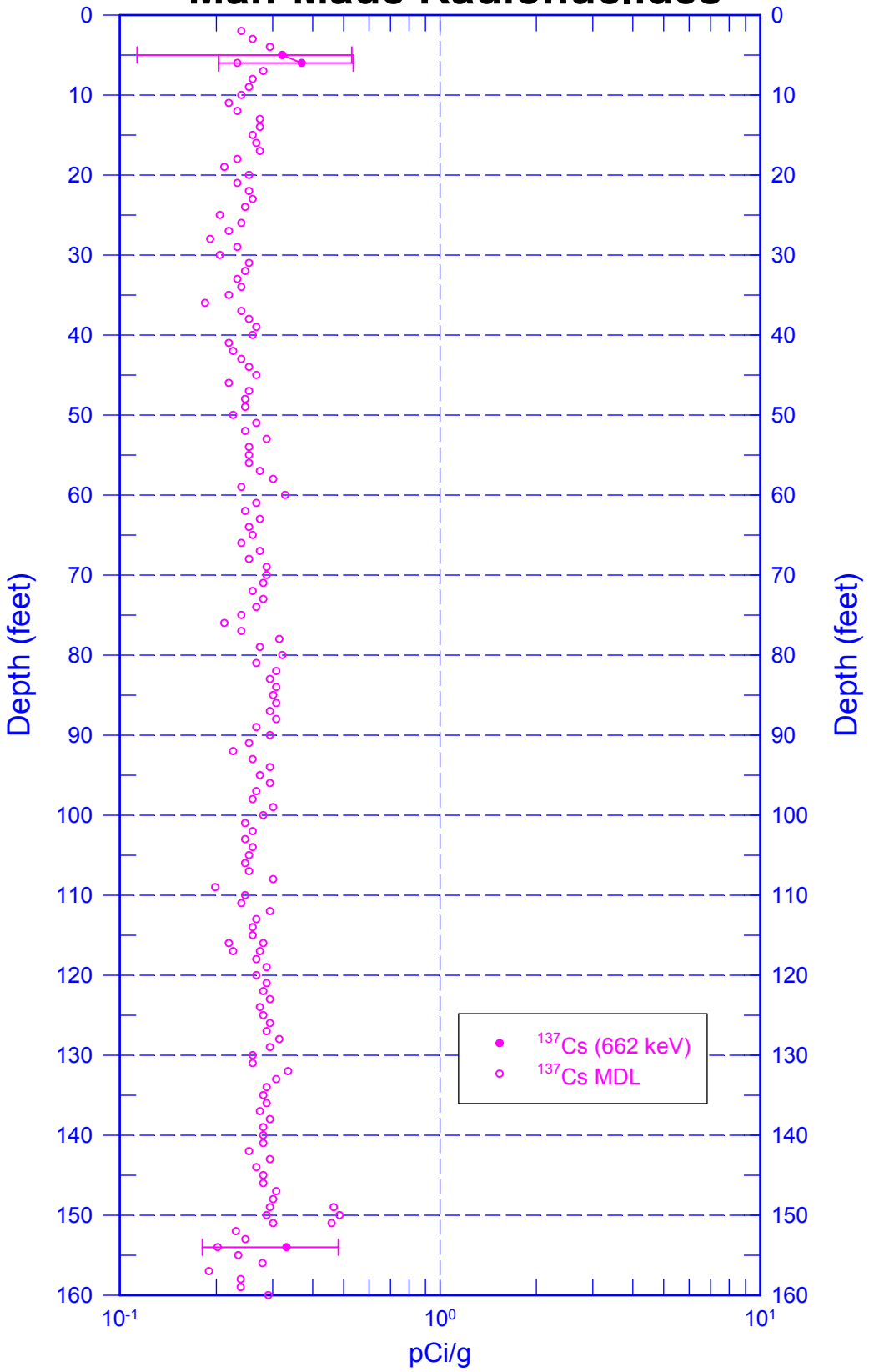


from Additon et al. (1978)

Scintillation Probe Profile for Borehole 299-E25-18, Logged on 12/3/76

299-E25-18 (A4764)

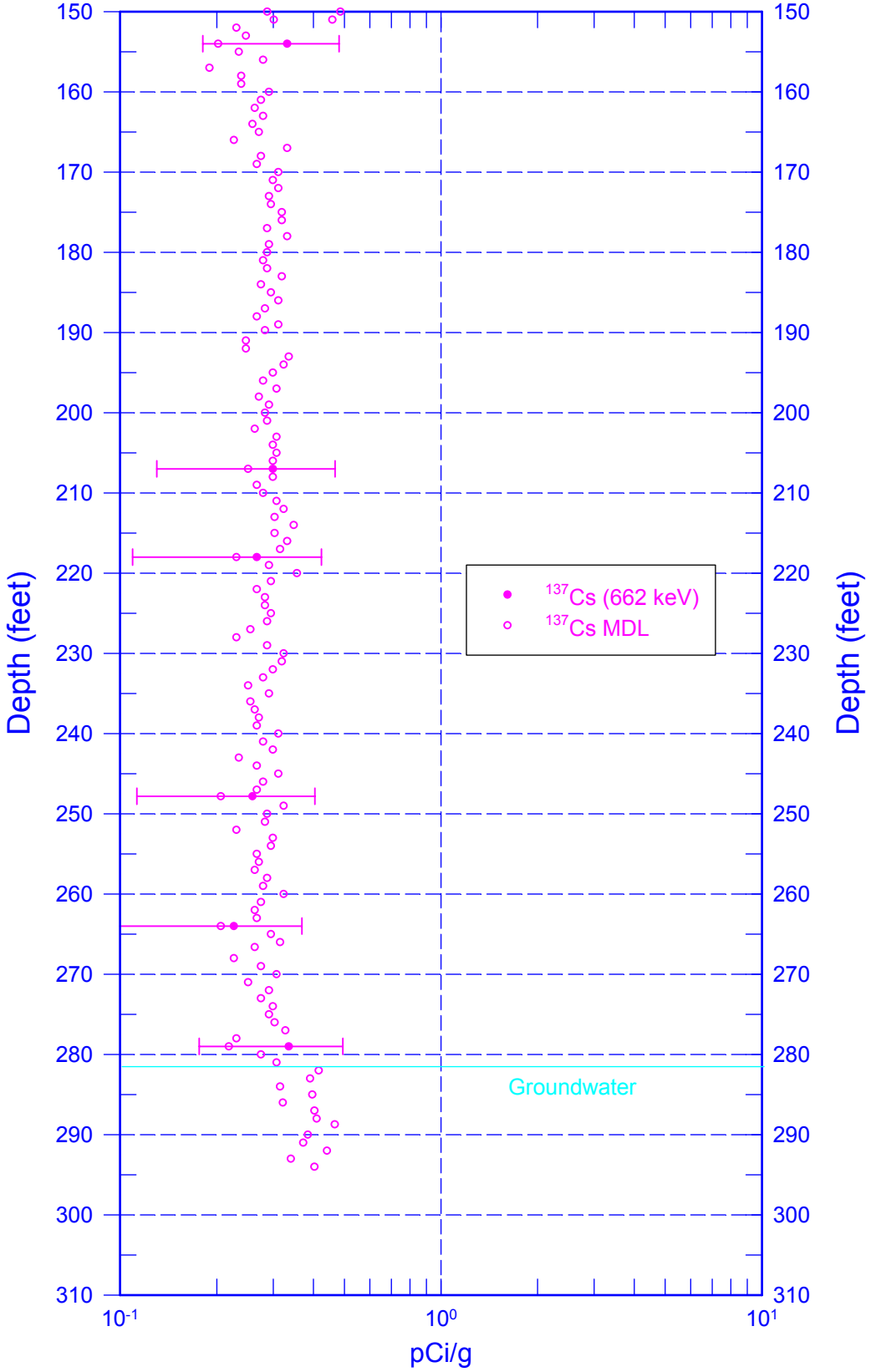
Man-Made Radionuclides



Zero Reference = Top of Casing

Date of Last Logging Run
3/26/2003

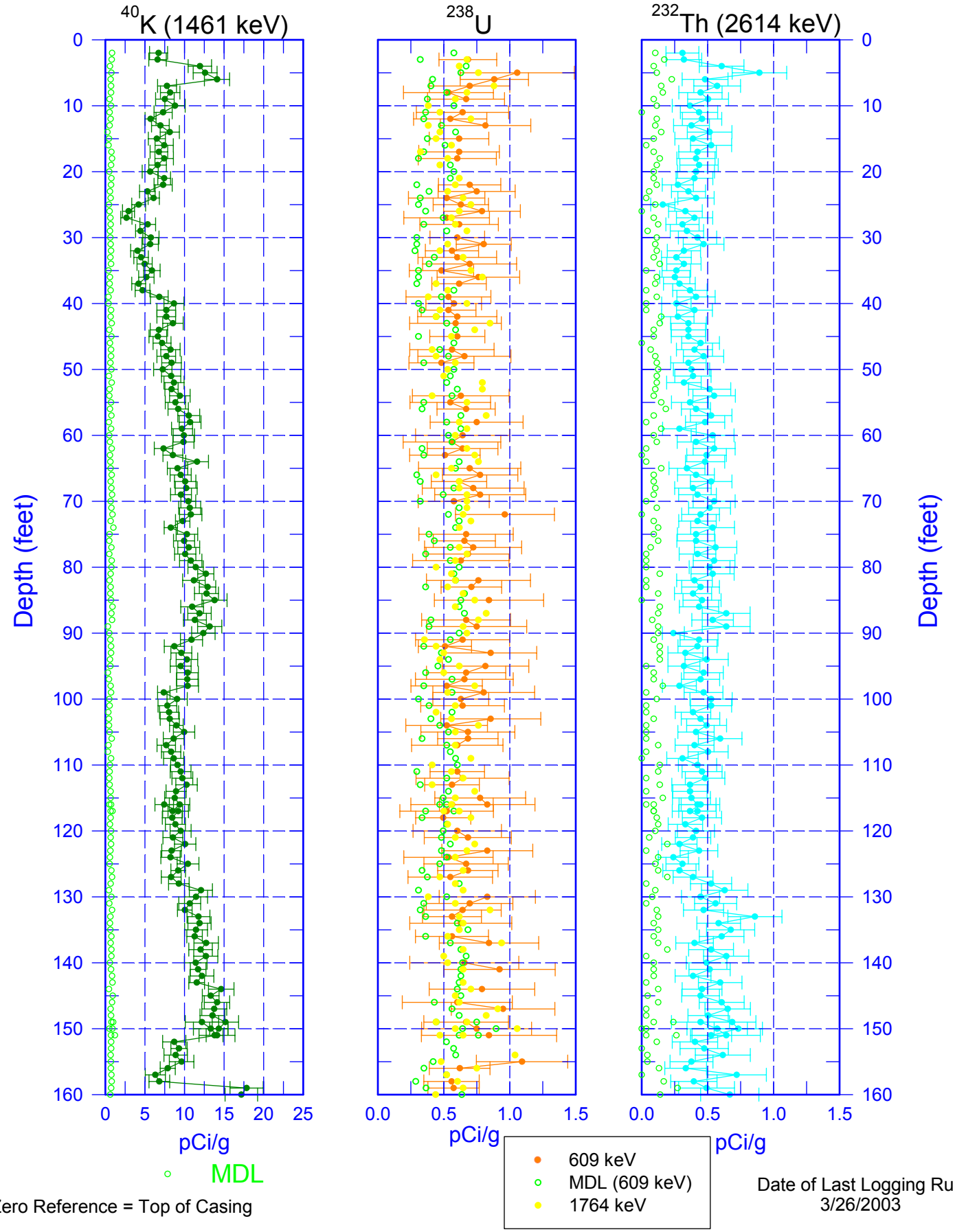
299-E25-18 (A4764)
Man-Made Radionuclides



Zero Reference = Top of Casing

Date of Last Logging Run
3/26/2003

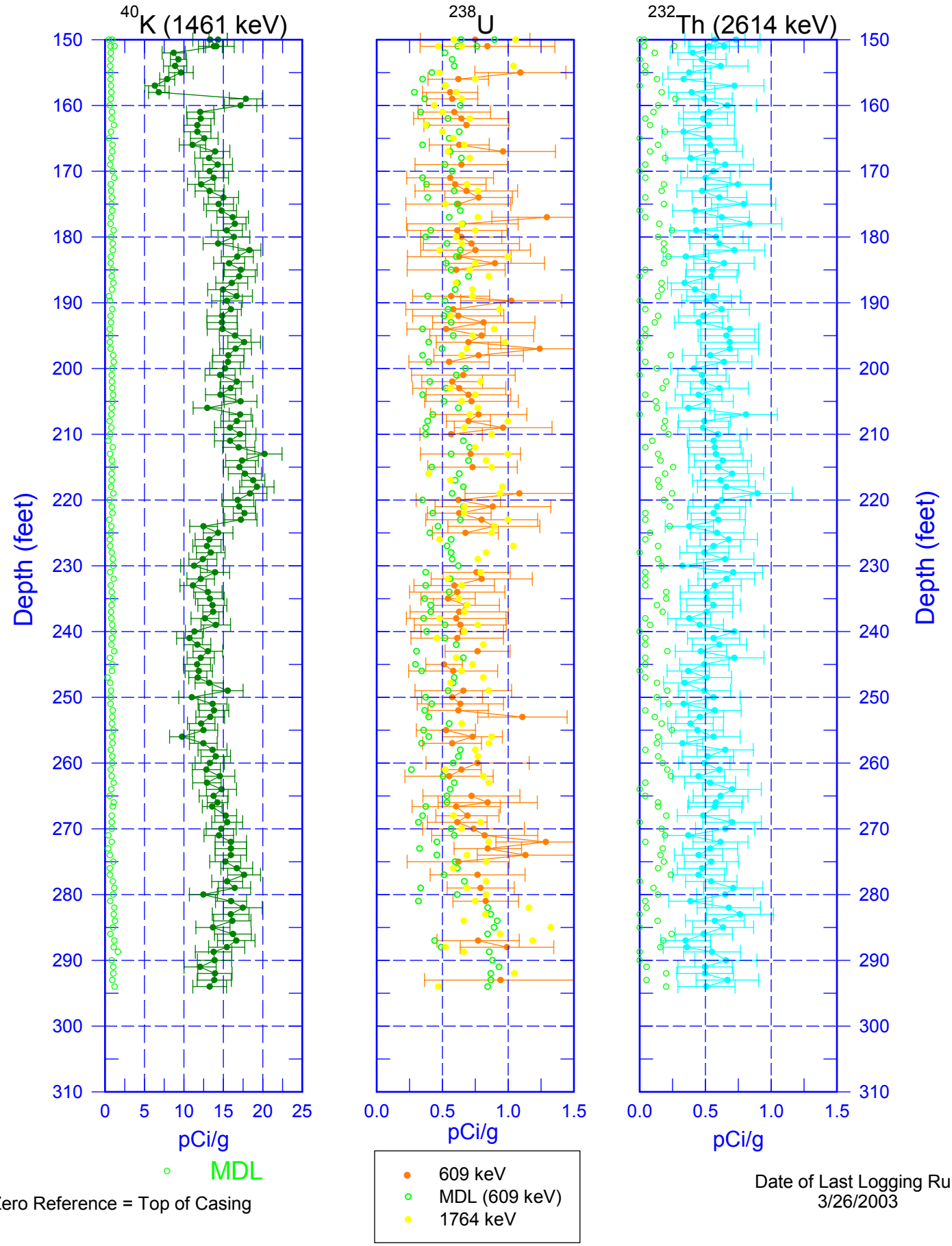
299-E25-18 (A4764)
Natural Gamma Logs



Zero Reference = Top of Casing

Date of Last Logging Run
3/26/2003

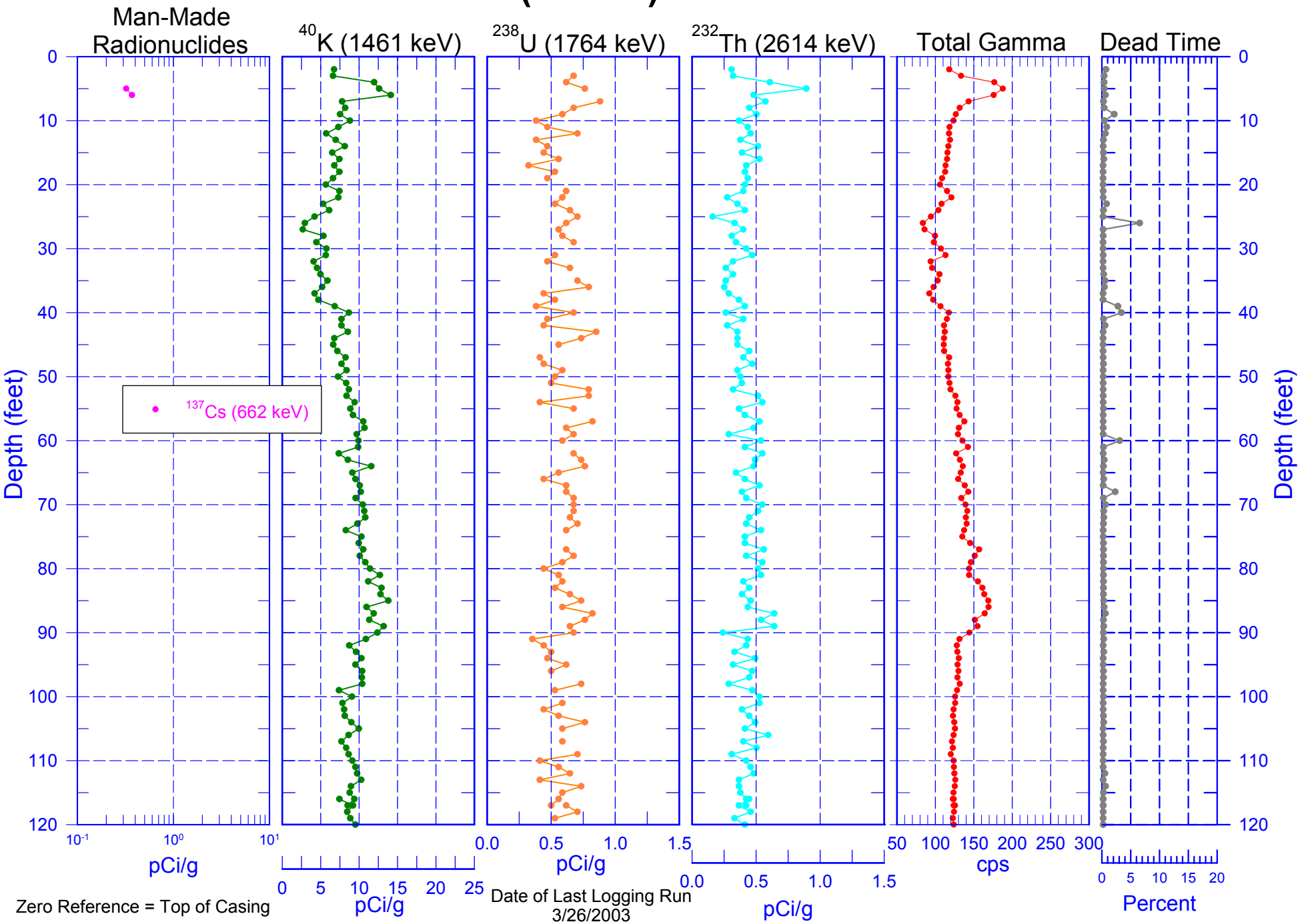
299-E25-18 (A4764)
Natural Gamma Logs



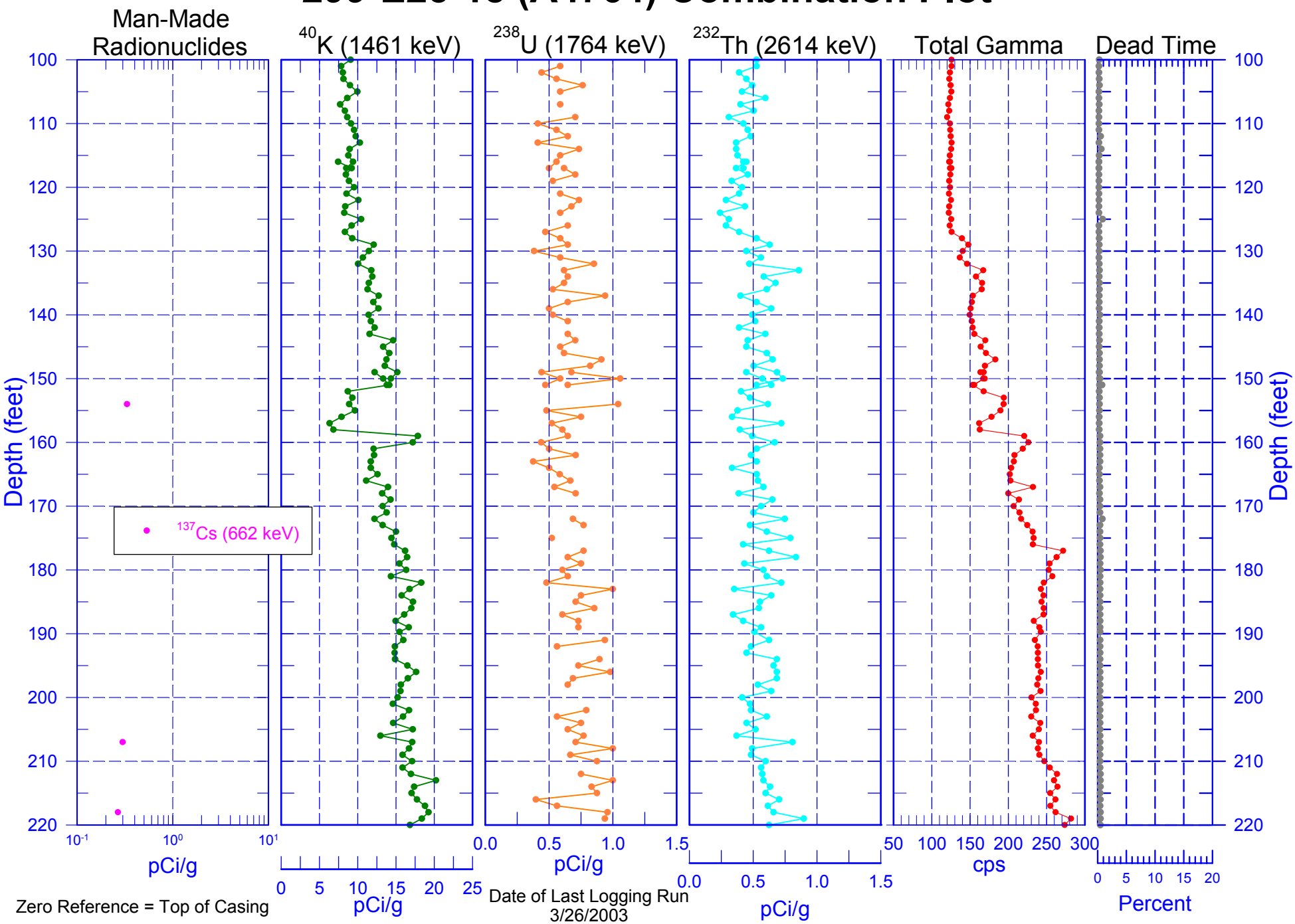
Zero Reference = Top of Casing

Date of Last Logging Run
3/26/2003

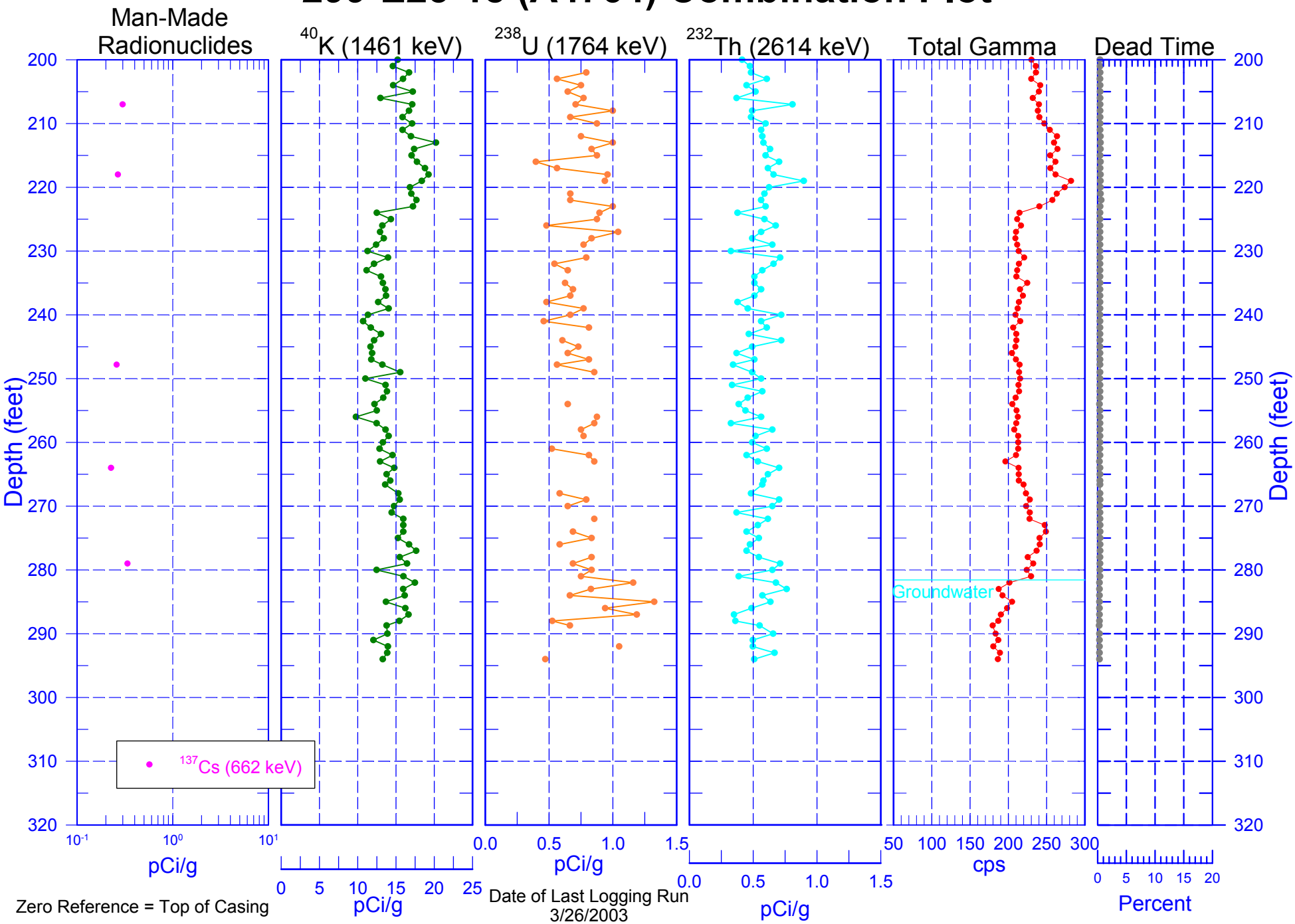
299-E25-18 (A4764) Combination Plot



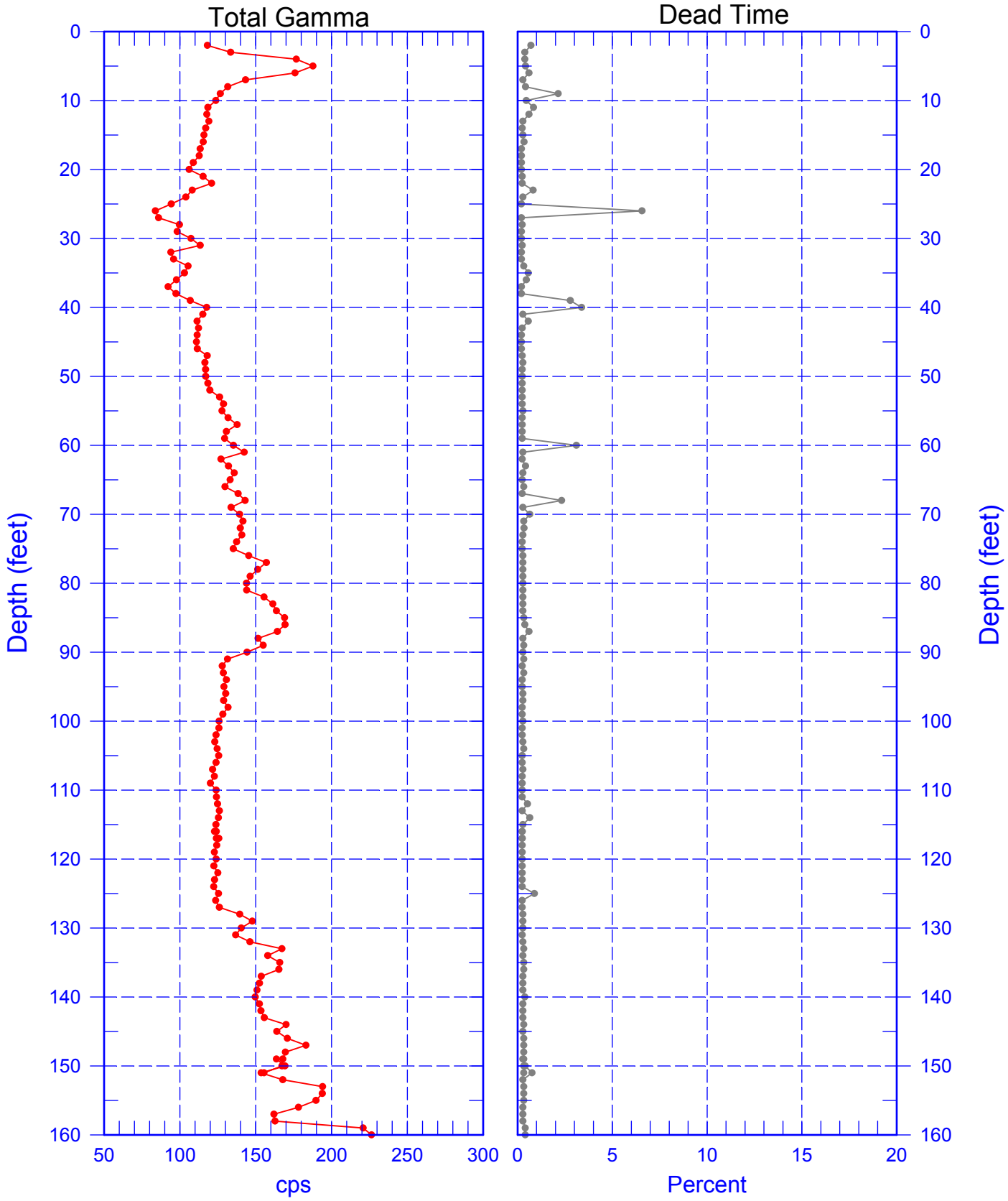
299-E25-18 (A4764) Combination Plot



299-E25-18 (A4764) Combination Plot



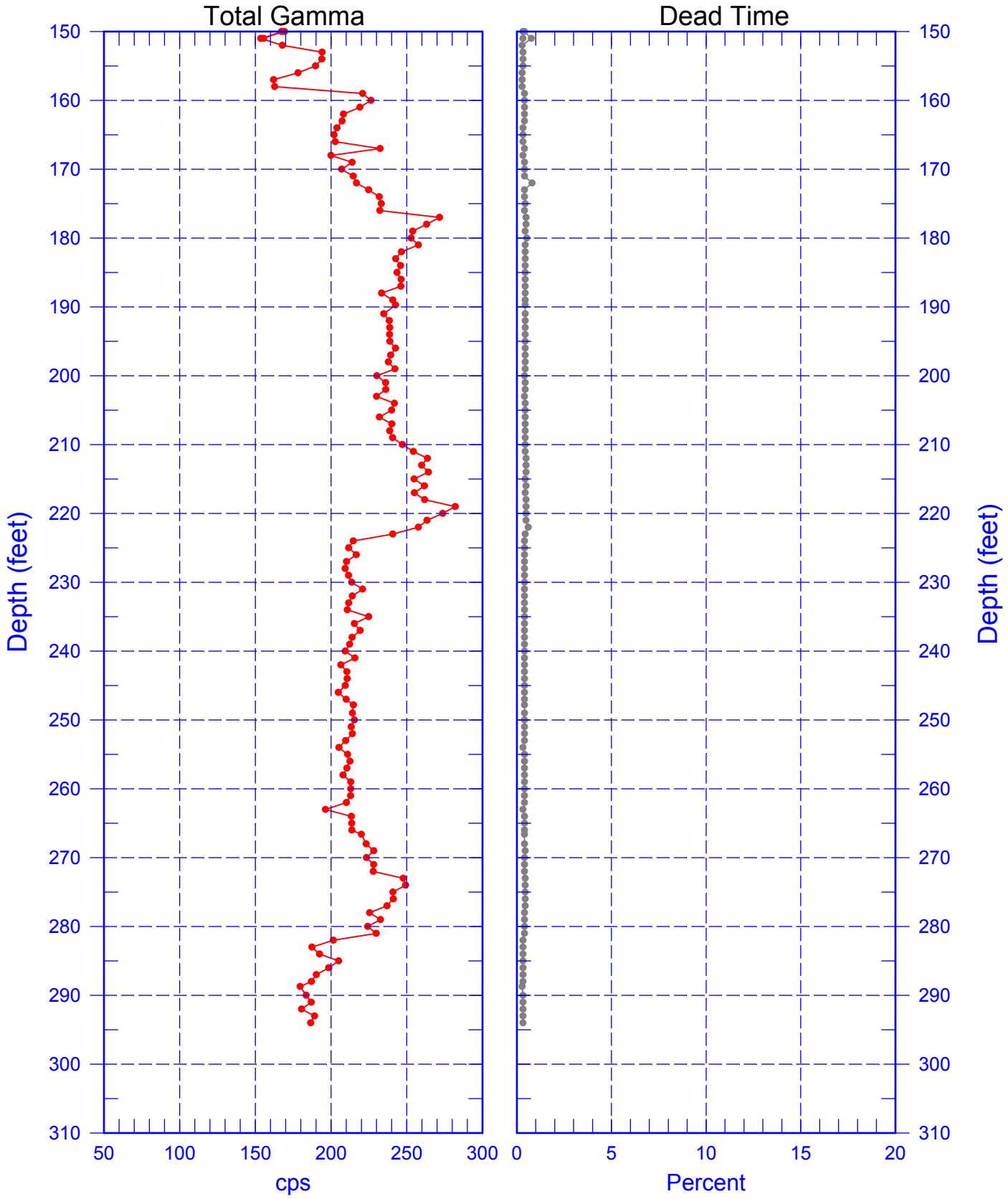
299-E25-18 (A4764)
Total Gamma & Dead Time



Zero Reference = Top of Casing

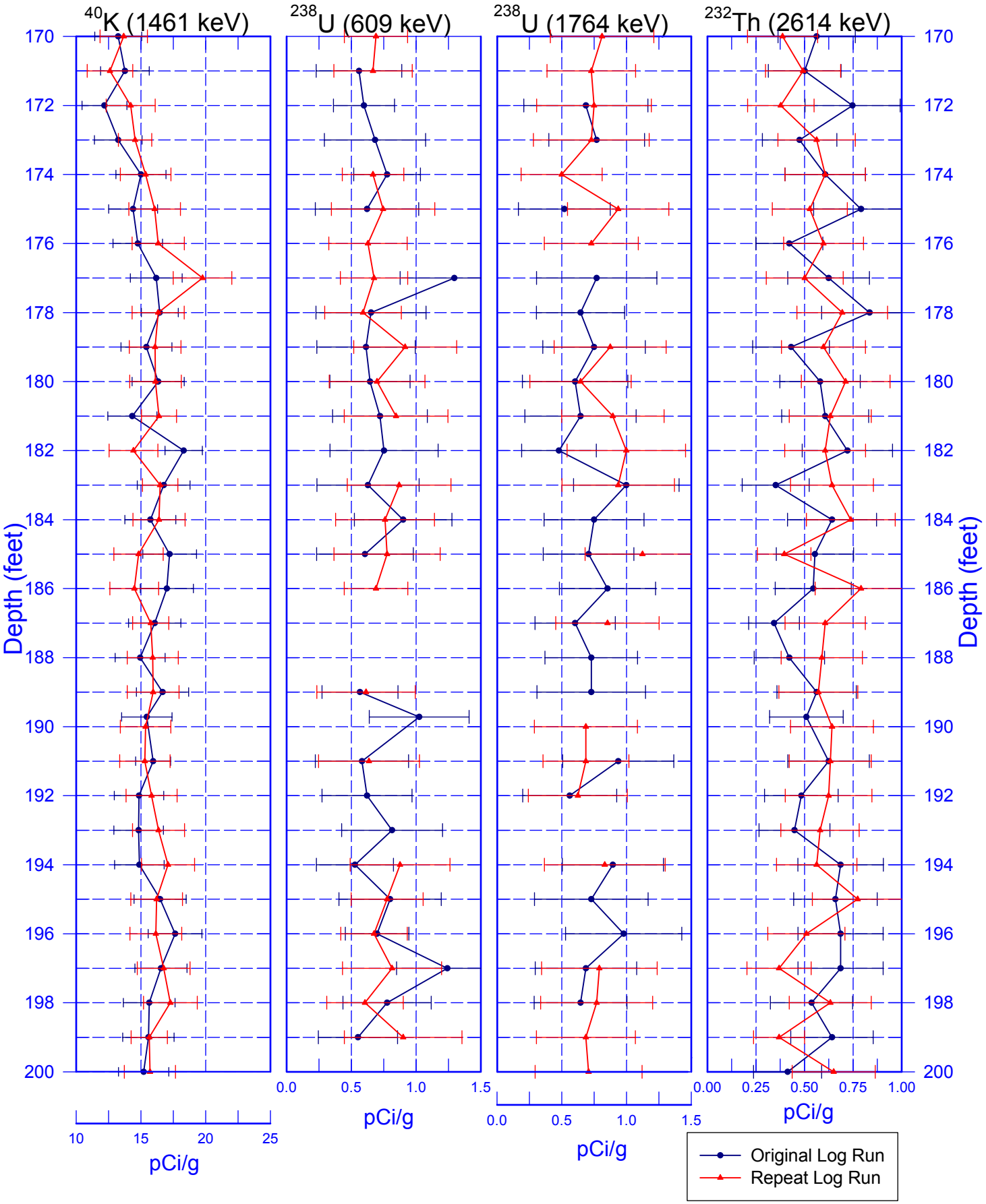
Date of Last Logging Run
3/26/2003

299-E25-18 (A4764)
Total Gamma & Dead Time



Zero Reference = Top of Casing

Date of Last Logging Run
3/26/2003

299-E25-18 (A4764)

Rerun of Natural Gamma Logs (200.0 to 170.0 ft)