Stoller
Hanford Office

DOE-EM/GJ755-2004

299-W11-82 (A7324)
Log Data Report

Borehole Information:

Borehole: 299-W11-82 (A7324)			**Site:** 216-T-26 Crib		
Coordinates (WA State Plane)		**GWL (ft)[1]:** Not applicable		**GWL Date:** none	
North	**East**	**Drill Date**	**TOC[2] Elevation**	**Total Depth (ft)**	**Type**
136407.518 m	566933.853 m	01/83	677.68 ft	70	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	2.3	8 5/8	8	5/16	2.3	70

Borehole Notes:

The logging engineer used a steel tape to measure the casing diameter and stickup and measurements were rounded to the nearest 1/16 in.

Hanford Wells (Chamness and Merz 1993) indicated the borehole was drilled in 1983 to a depth of 70 ft. Apparently grout was used around the casing of the borehole but it is not known if the grout was emplaced at selective depth intervals.

Logging Equipment Information:

Logging System:	Gamma 1E		**Type:** SGLS (70%) 34TP40587A
Calibration Date:	01/04	**Calibration Reference:**	GJO-2004-568-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	09/21/04	10/20/04	10/20/04		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	70.5	70.5	25.5		
Finish Depth (ft)	29.5	2.5	17.5		
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	BB175CAB	AE011CAB	AE011CAB		
Start File	BB175000	AE011000	AE011069		
Finish File	BB175041	AE011068	AE011077		

Log Run	1	2	3 Repeat		
Post-Verification	BB175CAA	AE011CAA	AE011CAA		
Depth Return Error (in.)	0	0	0		
Comments	No fine-gain adjustment.	No fine-gain adjustment.			

Logging Operation Notes:

Log run 1 was terminated due to an electronic failure. The borehole was relogged in its entirety October 20. 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.

Analysis Notes:

Analyst:	Henwood	Date:	10/29/04	Reference:	GJO-HGLP 1.6.3, Rev. 0

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 detectors 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 for SGLS spectra were calculated in EXCEL (source file: G1EJan04.xls). A correction for a casing thickness of 0.3125 in. was applied to the data. No dead time or water corrections were required.

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 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.

A comparison plot of the Westinghouse Hanford Company Radionuclide Logging System (RLS) data acquired in 1992 with the current SGLS data is included.

Results and Interpretations:

^{137}Cs, ^{60}Co, and ^{154}Eu were the man-made radionuclides detected in this borehole. ^{137}Cs was detected between 3 and 16 ft, 17 and 24 ft, and 35 and 71 ft. The maximum concentration of approximately 800 pCi/g was detected at 51.5 ft.

^{60}Co was detected at one depth location (69.5 ft) at a concentration of 0.7 pCi/g.

^{154}Eu was detected between 36 and 38 ft at a maximum concentration of 1.3 pCi/g.

A comparison plot of RLS data acquired in 1992 with the current SGLS data is included. The RLS data were decayed to the date of the SGLS log data. The ^{137}Cs concentration profiles of the sets of log data are similar, suggesting stability of contaminants since 1995. ^{60}Co and ^{154}Eu, detected by the RLS at many depth intervals in 1992, were not detected in the current log event. The radionuclides have relatively short half lives (approximately 5.3 and 8.6 years, respectively) and may have decayed below the SGLS MDLs. There is no evidence of ^{125}Sb in the current log data. This radionuclide was apparently detected in 1992; ^{125}Sb also has a relatively short half life (2.8 years).

The ^{40}K and ^{232}Th logs show some variations in concentrations, suggesting lithology changes that may be correlated with adjacent boreholes.

The repeat log sections indicated reasonable repeatability of depth and concentrations.

References:

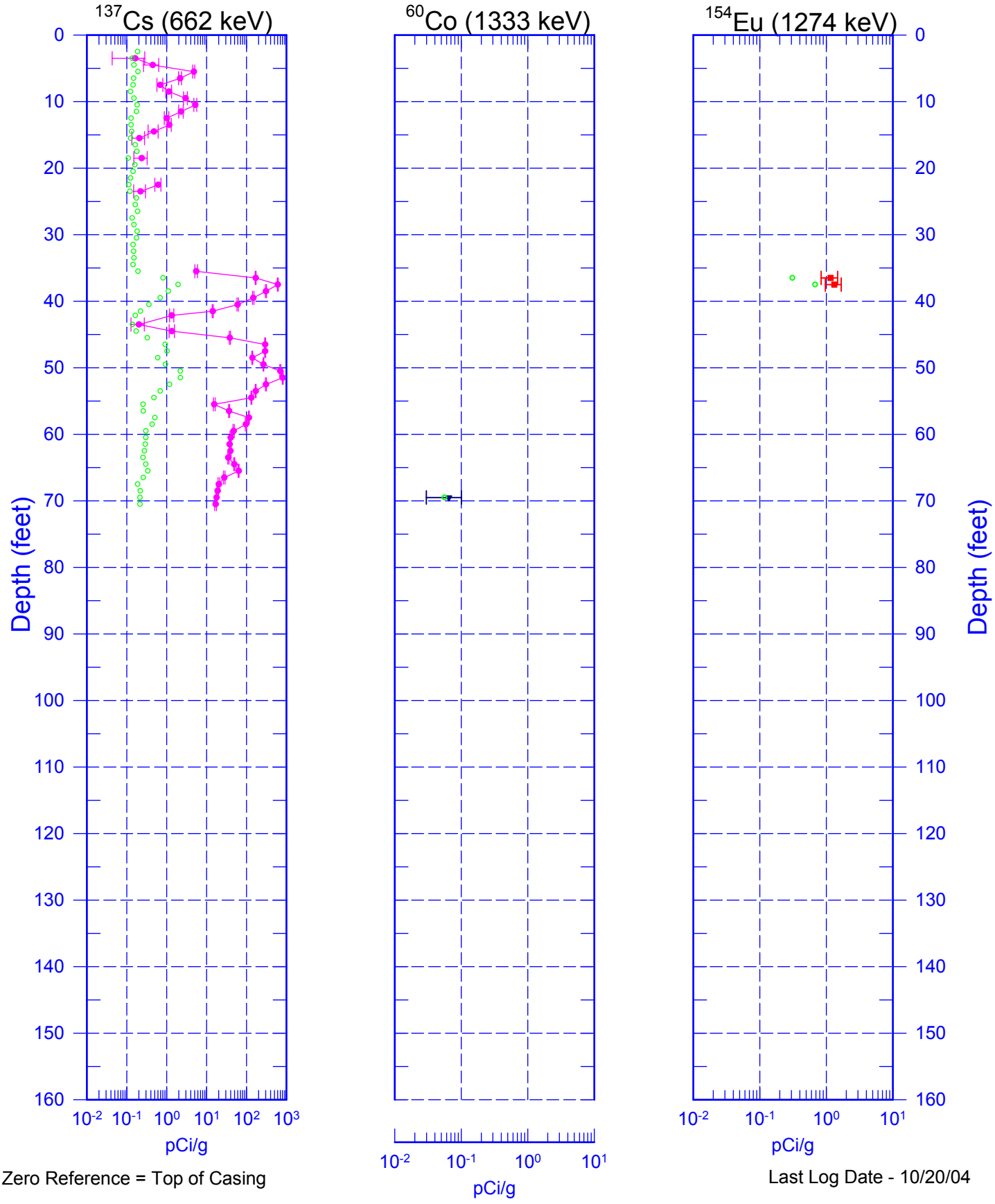
Chamness, M.A., and J.K. Merz, 1993. *Hanford Wells*, PNL-8800, Pacific Northwest Laboratory, Richland, Washington.

Fecht, K.R., G.V. Last, and K.R. Price, 1977. *Evaluation of Scintillation Probe Profiles from 200 Area Crib Monitoring Wells*, ARH-ST-156, Atlantic Richfield Hanford Company, Richland, Washington.

---

[1] GWL – groundwater level
[2] TOC – top of casing
[3] N/A – not applicable

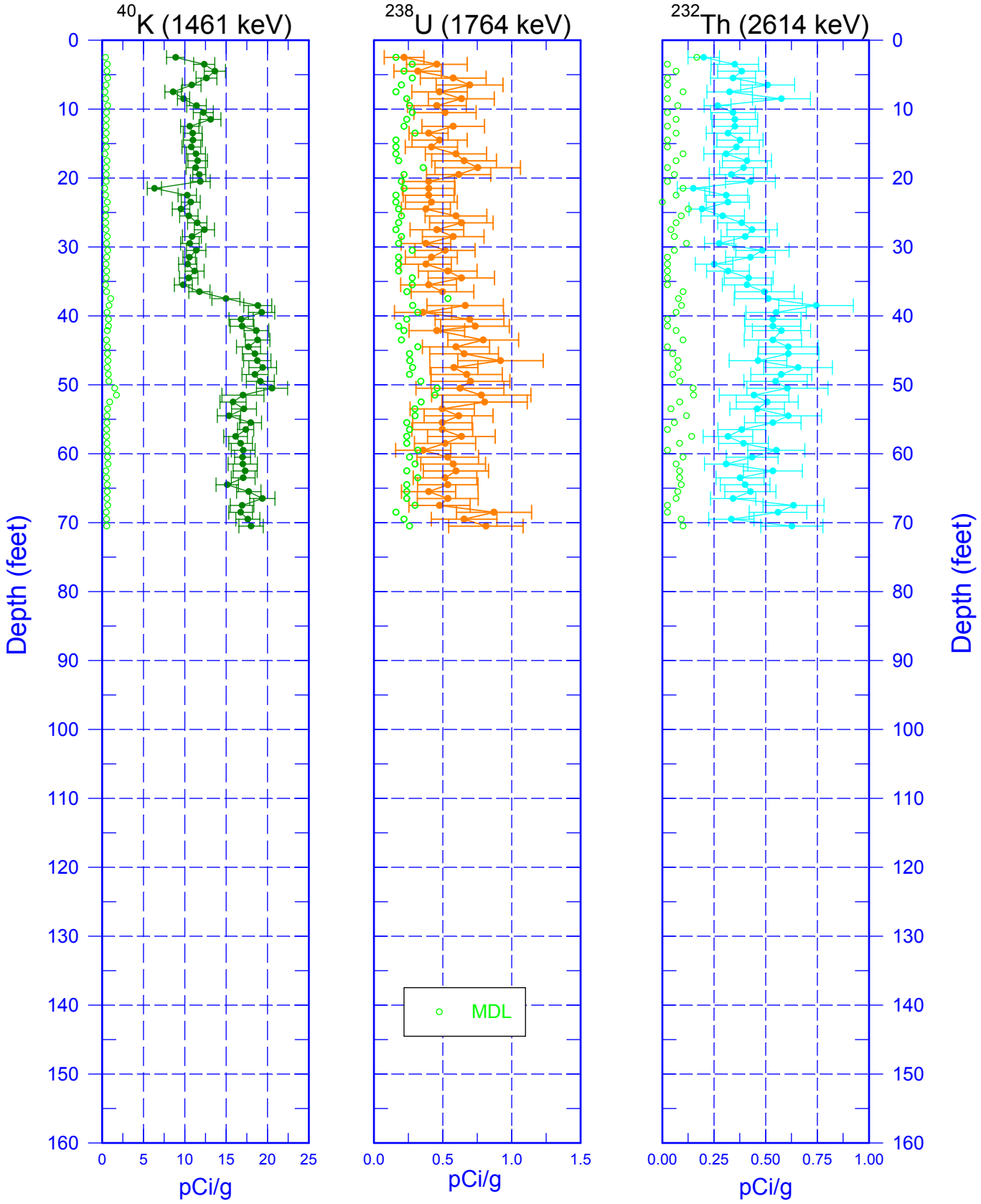
299-W11-82 (A7324)
Man-Made Radionuclides



Zero Reference = Top of Casing

Last Log Date - 10/20/04

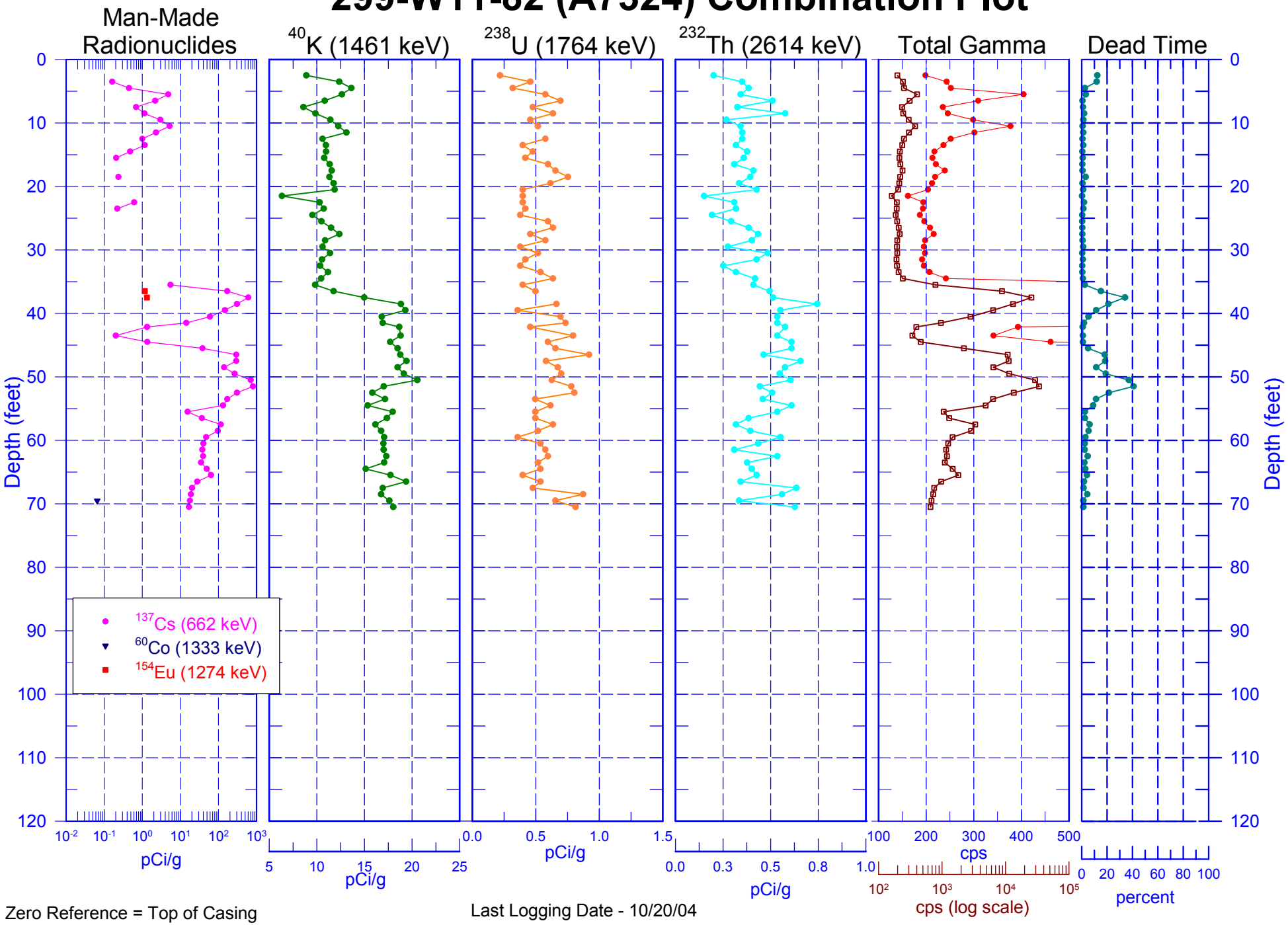
299-W11-82 (A7324)
Natural Gamma Logs



Zero Reference = Top of Casing

Last Log Date - 10/20/04

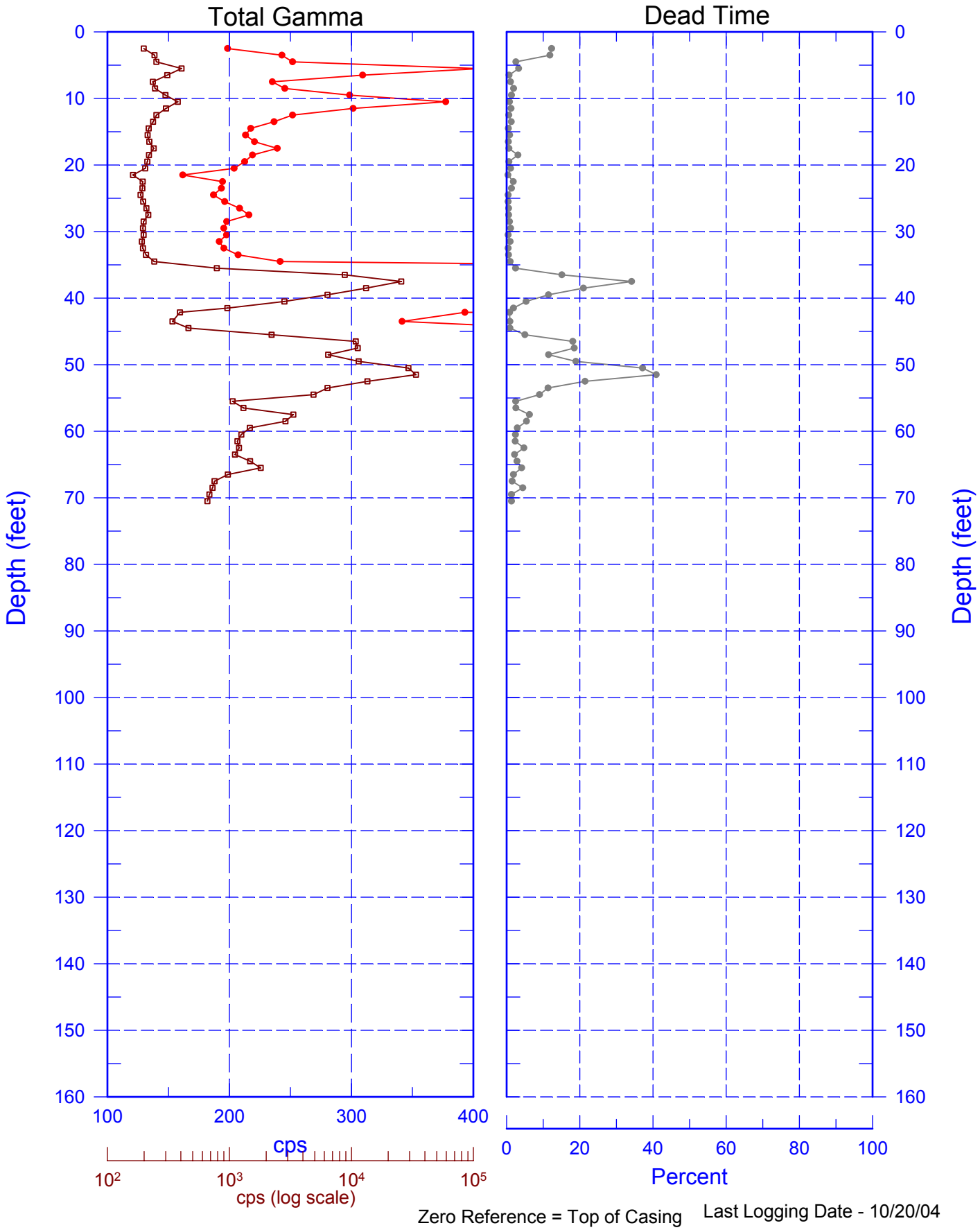
299-W11-82 (A7324) Combination Plot



Zero Reference = Top of Casing

Last Logging Date - 10/20/04

299-W11-82 (A7324)
Total Gamma & Dead Time

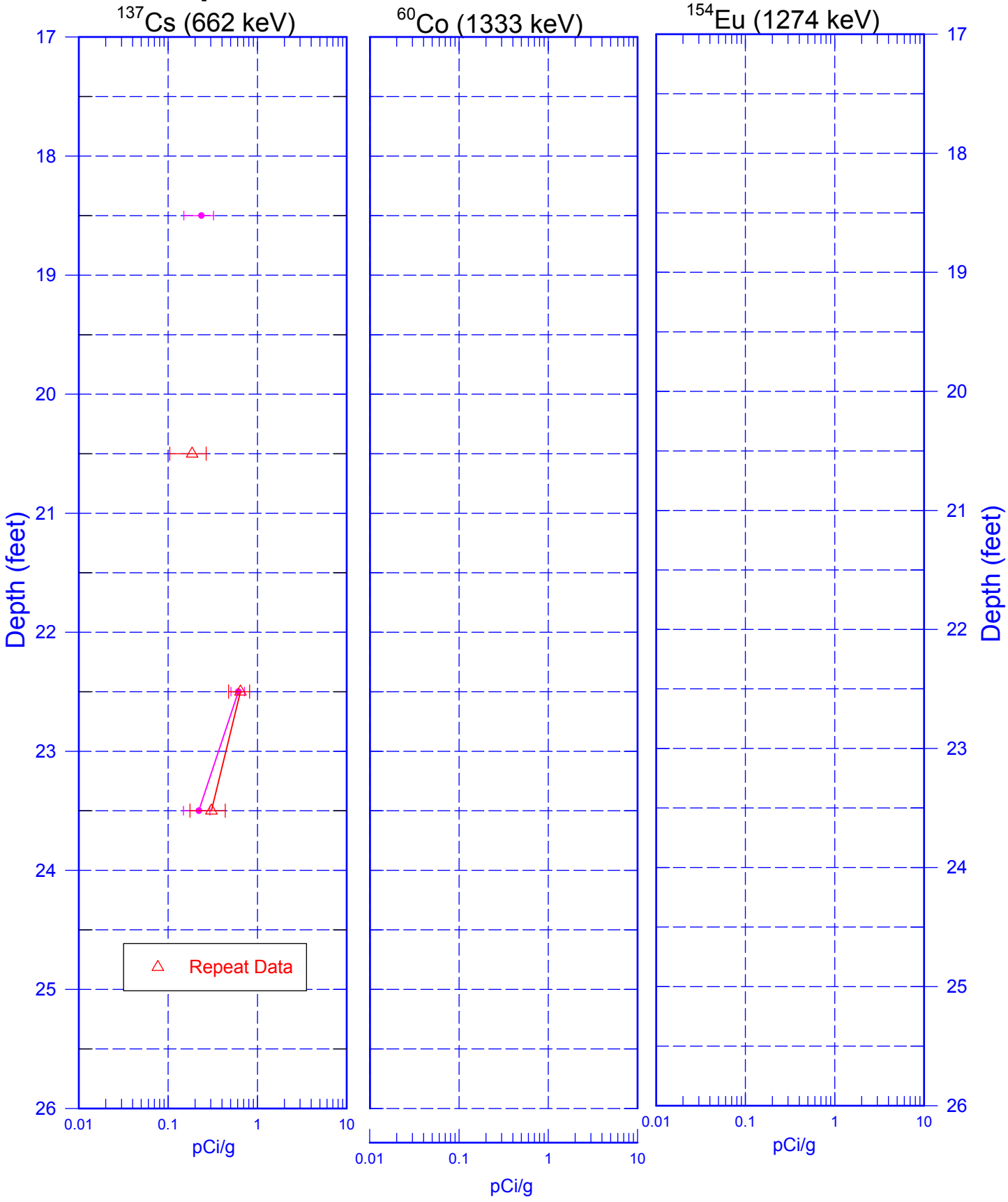


Zero Reference = Top of Casing

Last Logging Date - 10/20/04

299-W11-82 (A7324)

Repeat Section of Man-Made Concentrations

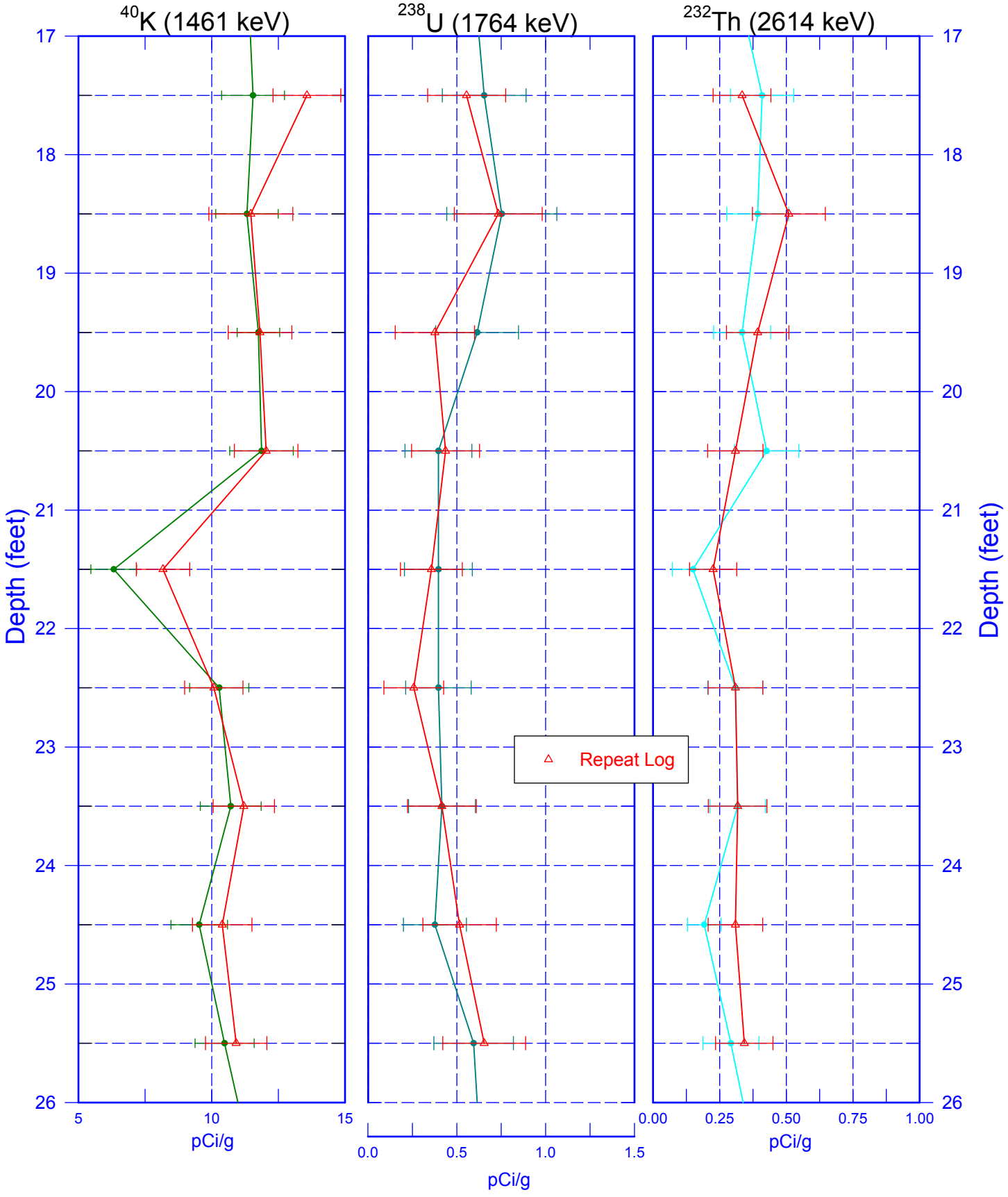


Zero Reference = Top of Casing

Last Log Date - 10/20/04

299-W11-82 (A7324)

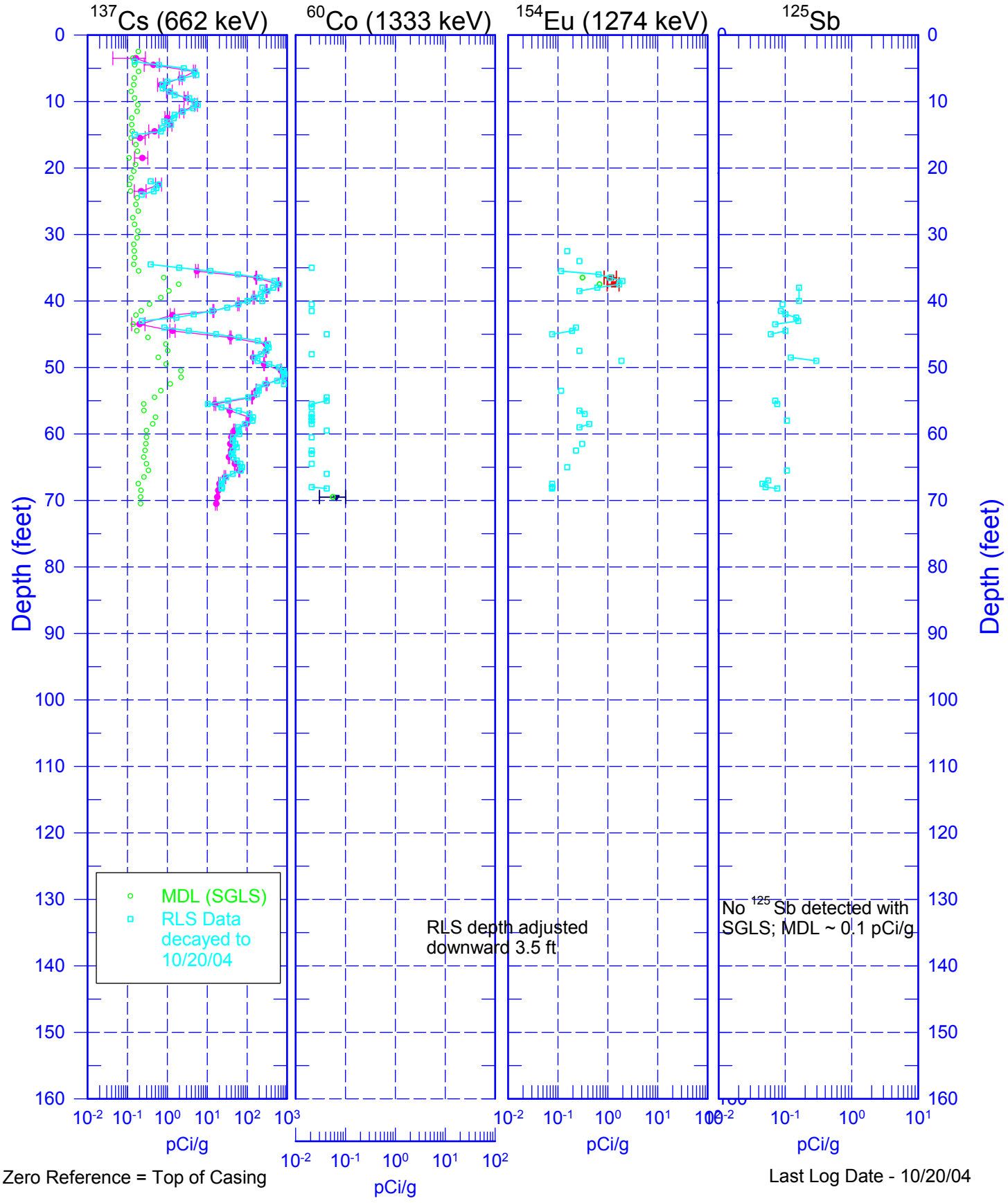
Repeat Section of Natural Gamma Logs



Zero Reference = Top of Casing

Last Log Date - 10/20/04

299-W11-82 (A7324)
Comparison of RLS (12/92) and SGLS (10/04) Data



Zero Reference = Top of Casing

Last Log Date - 10/20/04