

299-E13-52 (A5868) Log Data Report

Borehole Information:

Borehole: 299-E13-52 (A5868)		Site: 216 B 30 Trench	
Coordinates (WA St Plane)		GWL¹ (ft): None	GWL Date: 10/30/2007
North (m)	East (m)	Drill Date	TOC² Elevation
134400.9	227607	12/1965	227.607
		Total Depth (ft)	Type
		94	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded Steel	1.5	6 5/8	6 1/16	9/32	+1.5	94

Borehole Notes:

This borehole was logged for the purpose of updating the radiologic profile and acquiring moisture data prior to decommissioning. This borehole was logged in 1999 by Waste Management Federal Services Northwest with the Radionuclide Logging System (RLS), and in 2003 by Stoller with the Spectral Gamma Logging System (SGLS). This logging is Log Event C, with Log Event A being with the SGLS in 2003, and Log Event B being with the HRLS in 2003. Comparisons of the log data from these three events are provided in this log data report.

Coordinates data and drill date were taken from Log Data Report dated October 22, 2003 (GJO-2003-515-TAC). The logging engineer measured casing using a steel tape and rounded to the nearest 1/16-in. The zero reference is the top of casing.

Logging Equipment Information:

Logging System:	Gamma 4E	Type:	SGLS HPGe (70%)
Effective Calibration Date:	05/17/2007	Serial No.:	34TP40587A
	Calibration Reference:	HGLP-CC-015	
	Logging Procedure:	HGLP-MAN-002, Rev. 0	

Logging System:	Gamma 4H	Type:	NMLS
Effective Calibration Date:	11/22/2006	Serial No.:	H310700352
	Calibration Reference:	HGLP-CC-002	
	Logging Procedure:	HGLP-MAN-002, Rev. 0	

Logging System:	Gamma 1C	Type:	HRLS
Effective Calibration Date:	11/22/2006	Serial No.:	39A314
	Calibration Reference:	HGLP-CC-004	
	Logging Procedure:	HGLP-MAN-002; Rev. 0	

SGLS Log Run Information:

Log Run	1	2	3	4 Repeat
Date	10/31/07	10/31/07	10/31/07	10/31/07
Logging Engineer	Spatz	Spatz	Spatz	Spatz
Start Depth (ft)	94.0	25.0	10.0	69.0
Finish Depth (ft)	23.0	9.0	2.0	59.0
Count Time (sec)	100	20	100	100
Live/Real	R	R	R	R
Shield (Y/N)	N	N	N	N

Log Run	1	2	3	4 Repeat
MSA Interval (ft)	1.0	1.0	1.0	1.0
ft/min	N/A	N/A	N/A	N/A
Pre-Verification	DEH61CAB	DEH61CAB	DEH61CAB	DEH61CAB
Start File	DEH61000	DEH61072	DEH61089	DEH61098
Finish File	DEH61071	DEH61088	DEH61097	DEH61108
Post-Verification	DEH61CAA	DEH61CAA	DEH61CAA	DEH61CAA
Depth Return Error (in.)	N/A	N/A	Low ½	0
Comments	No fine gain adjustment made	Dead time greater than 40%	No fine gain adjustment made	Repeat Section

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	5	6	7 Repeat	
Date	10/30/07	10/31/07	10/31/07	
Logging Engineer	Spatz	Spatz	Spatz	
Start Depth (ft)	94.5	59.0	79.0	
Finish Depth (ft)	58.0	1.5	69.0	
Count Time (sec)	15	15	15	
Live/Real	R	R	R	
Shield (Y/N)	N	N	N	
MSA Interval (ft)	0.25	0.25	0.25	
ft/min	N/A	N/A	N/A	
Pre-Verification	DH782CAB	DH792CAB	DH792CAB	
Start File	DH782000	DH792000	DH792231	
Finish File	DH782145	DH792230	DH792271	
Post-Verification	DH782CAA	DH792CAA	DH792CAA	
Depth Return Error (in.)	0	Low ½	0	
Comments	None	None	Repeat Section	

High Rate Logging System (HRLS) Log Run Information:

Log Run	8	9	10 Repeat	
Date	11/01/07	11/01/07	11/01/07	
Logging Engineer	Spatz	Spatz	Spatz	
Start Depth (ft)	25.0	28.0	14.0	
Finish Depth (ft)	9.0	24.0	11.0	
Count Time (sec)	300	300	300	
Live/Real	R	R	R	
Shield (Y/N)	N	N	N	
MSA Interval (ft)	1.0	1.0	0.5	
ft/min	N/A	N/A	N/A	
Pre-Verification	AC180CAB	AC180CAB	AC180CAB	
Start File	AC180000	AC180017	AC180022	
Finish File	AC180016	AC180021	AC180028	
Post-Verification	AC180CAA	AC180CAA	AC180CAA	
Depth Return Error (in.)	0	0	0	
Comments	None	None	None	

Logging Operation Notes:

Data for SGLS and NMLS were collected using Gamma 4, HO 68B-3573. Pre- and post-survey verification measurements for the SGLS were acquired in the Amersham KUTH-115 field verifier. Maximum logging depth achieved with SGLS was 94.11 ft before sonde un-weighted. Pre- and post-survey verification measurements for

NMLS were acquired in the standard field verifier. Maximum logging depth achieved with NMLS was 94.33 ft before sonde un-weighted.

Data for HRLS were collected using Gamma 1, HO 68B-3574. Pre- and post-survey verification measurements were acquired in the #1013 Cs-137 field verifier. A centralizer was installed on the sonde prior to logging.

Analysis Notes:

Analyst:	M.J. Legler	Date:	4/22/08	Reference:	GJO-HGLP 1.6.3, Rev. 0
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The pre- and post survey verification files met the acceptance criteria for the established systems, but the NMLS verification file DH792CAB had a measurement above the control limit for counts per second.

A casing correction for a 9/32-in. thick casing was applied during analysis.

SGLS and HRLS spectra were processed in batch mode in APTEC SUPERVISOR to identify peaks and count rates. Concentrations were calculated using an EXCEL template identified as G4EMay07.xls for SGLS and G1CNov06.xls for HRLS using an efficiency function and corrections for casing and dead time as determined by annual calibrations.

NMLS spectra were processed in batch mode in APTEC SUPERVISOR to identify count rates. NMLS data are presented in cps, because no calibration data exists for a 6 5/8-in borehole.

Results and Interpretations:

Cs-137 and Co-60 were the only manmade radionuclides detected in this borehole. Cs-137 was detected almost continuously from 5 ft to the bottom of the borehole (94 ft). Co-60 was detected at an interval of 43 to 94 ft.

A zone of greater than 40% dead time from 11 to 24 ft, and 27 ft was encountered with the SGLS. The data from the SGLS in this area is considered unreliable and HRLS data should be used in this zone of high dead time.

The driller’s log indicated that a layer of “white volcanic ash” was present at 20 ft, which is near the bottom of a zone of high dead time and could indicate remnants from processes in the past.

The Log Data Report GJO-2003-515-TAC included comparisons between the RLS and the SGLS. Comparisons between the 2003 data and the current data show agreement between radionuclides identified. Eu-154 detected in 1999 and 2003 at approximately 21 ft was not detected in 2007; it has decayed below the minimum detectable level of the SGLS.

The KUT and manmade plots indicate good repeatability.

List of Log Plots:

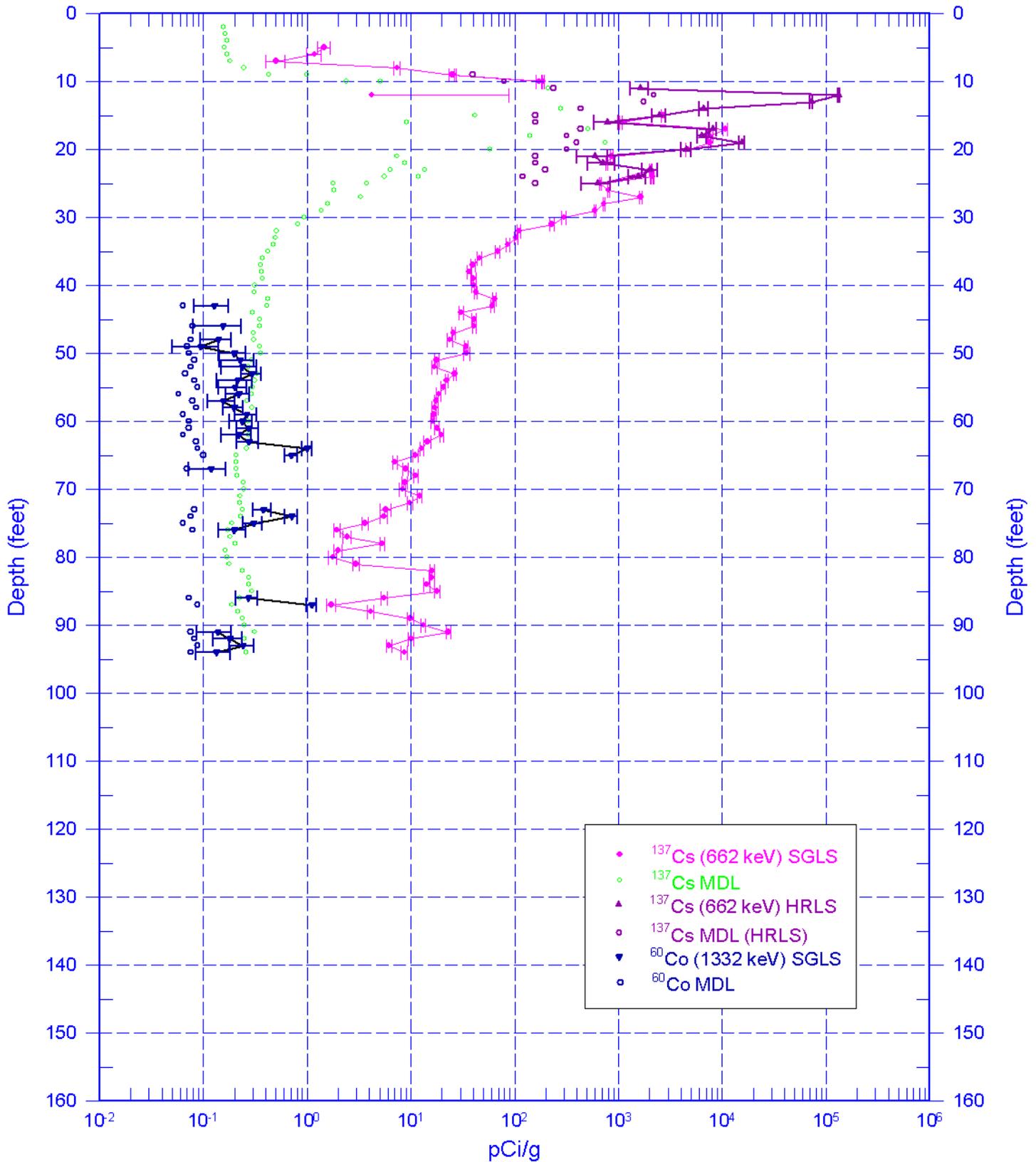
Depth Reference is top of casing

- Manmade Radionuclides
- Natural Gamma Logs
- Combination Plot
- Total Gamma, Moisture, & Dead Time
- Repeat Section of Manmade Radionuclides
- Repeat Section of Natural Gamma Logs
- Repeat Section of Moisture
- Comparison of 2003 to 2007 Cs-137 SGLS
- Comparison of 2003 to 2007 Cs-137 HRLS
- Comparison of 2003 to 2007 Co-60

¹ GWL – groundwater level

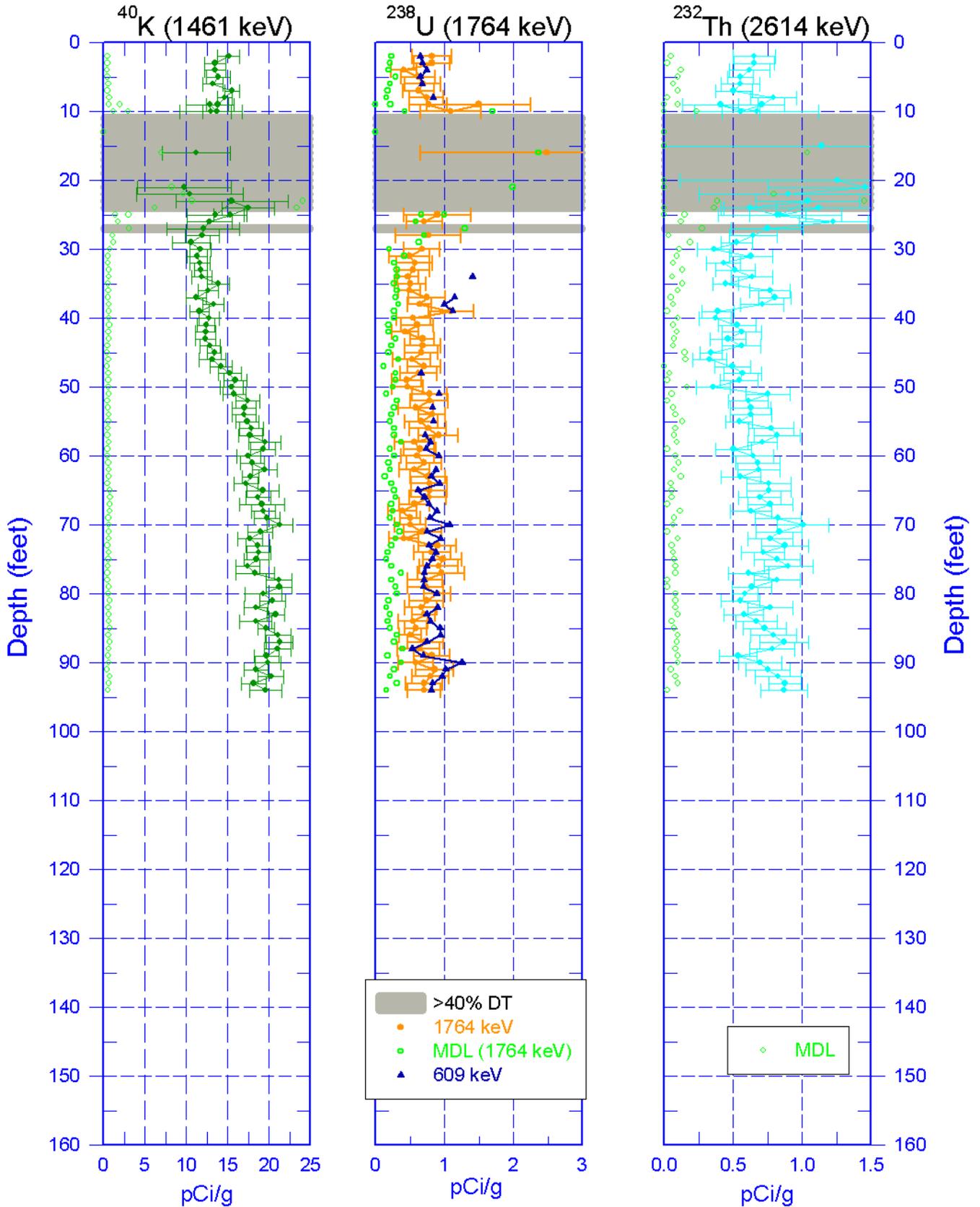
² TOC - top of casing

299-E13-52 (A5868) Manmade Radionuclides



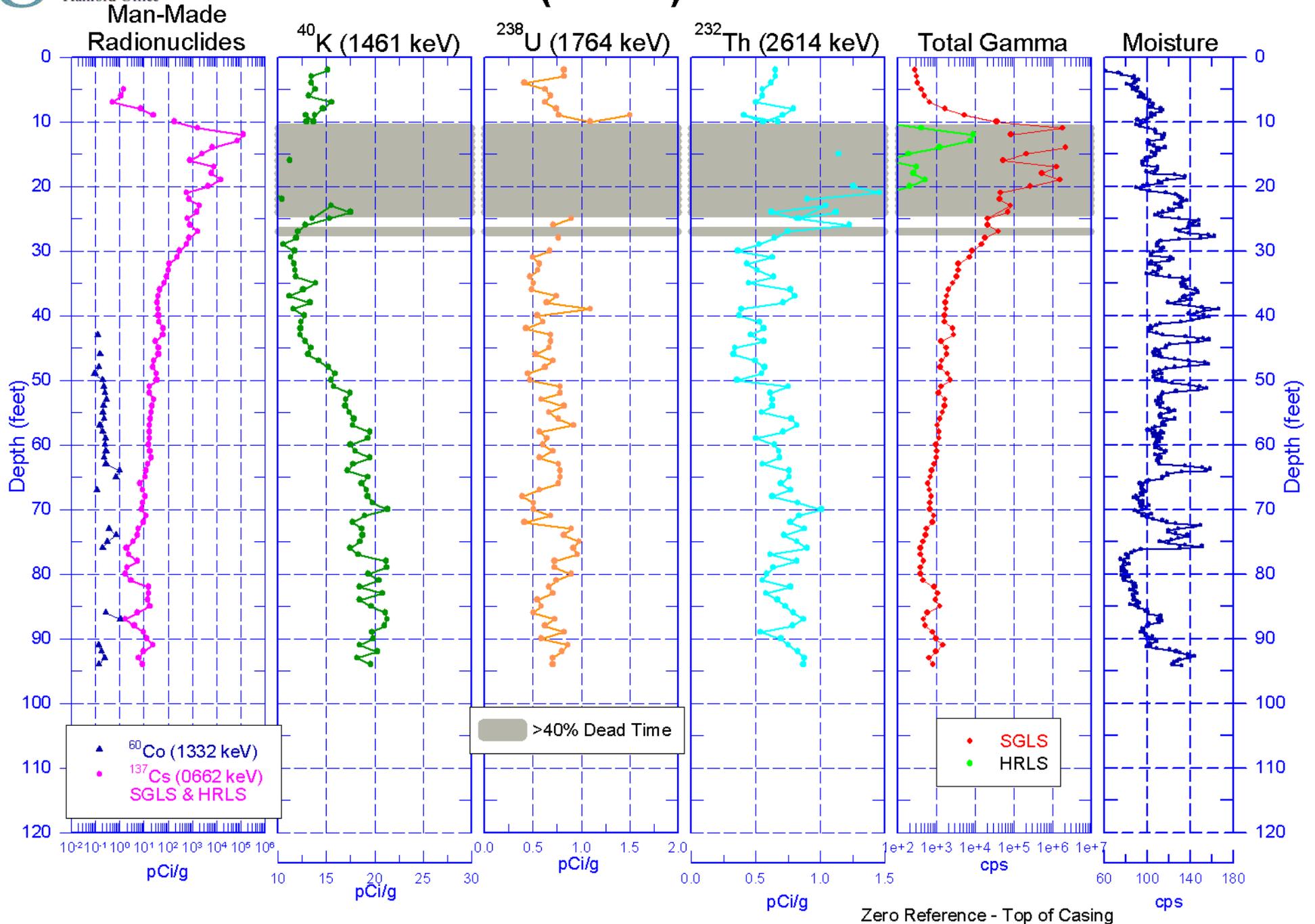
Zero Reference - Top of Casing

299-E13-52 (A5868) Natural Gamma Logs



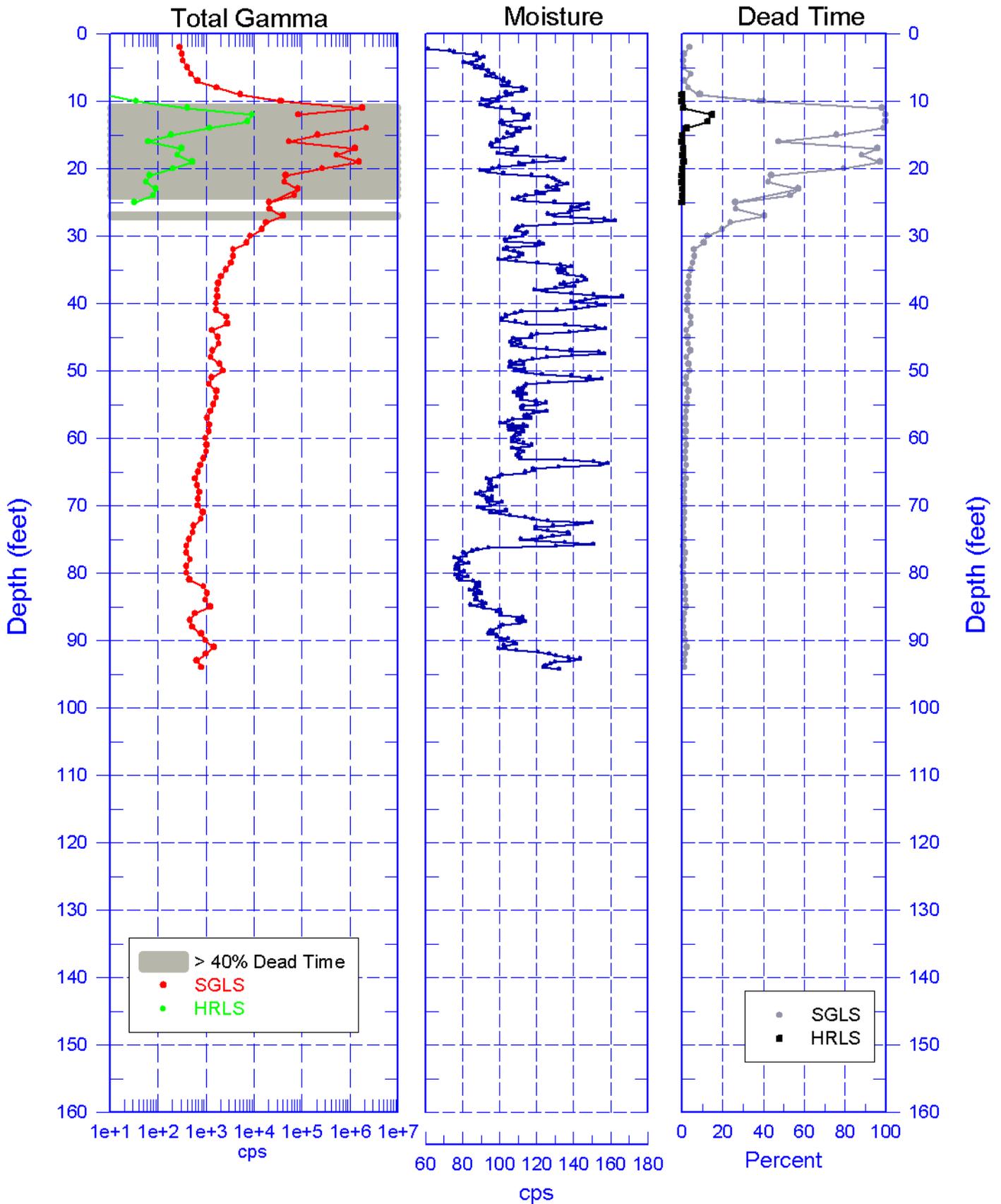
Zero Reference - Top of Casing

299-E13-52 (A5868) Combination Plot

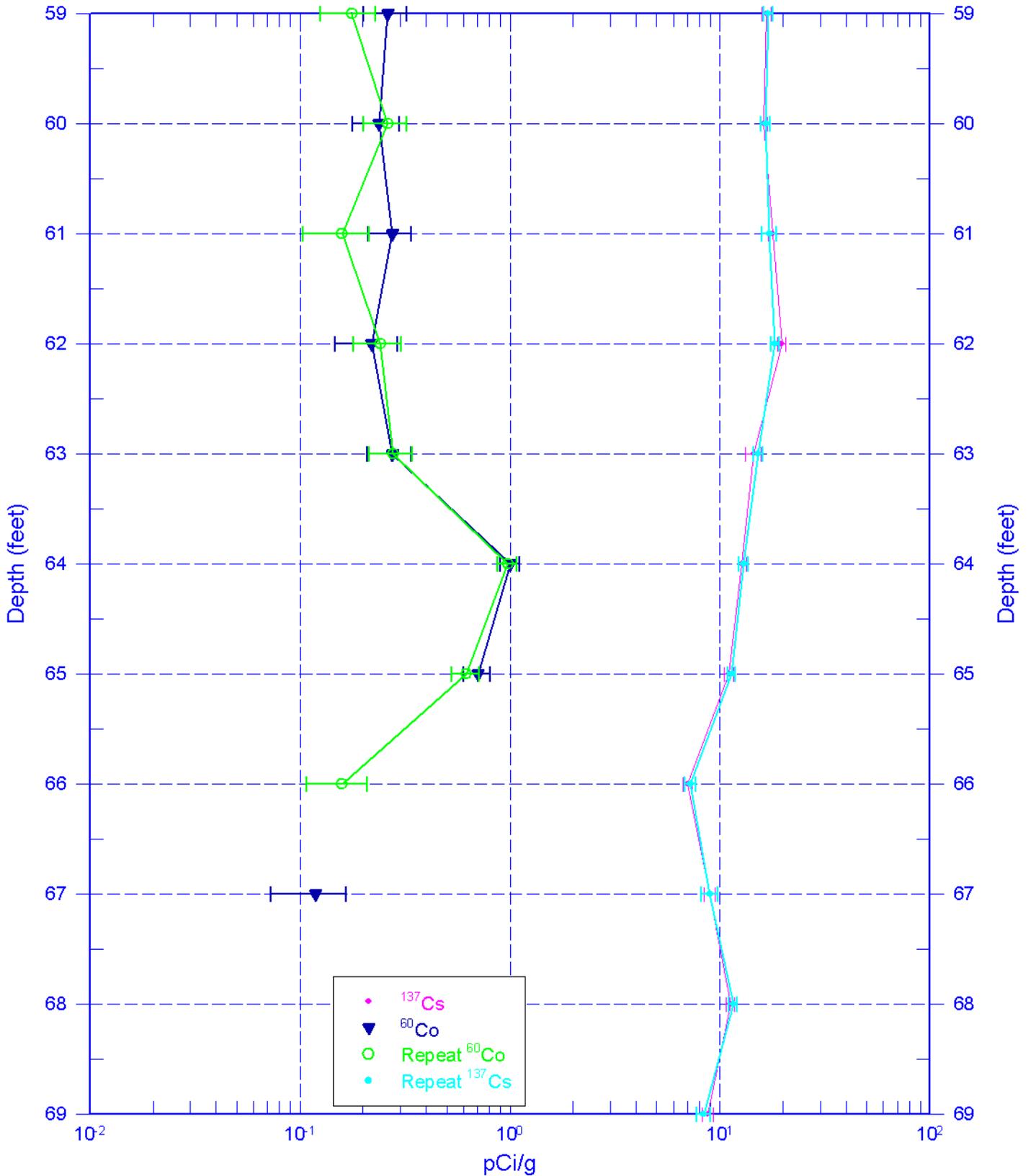


299-E13-52 (A5868)

Total Gamma, Moisture & Dead Time



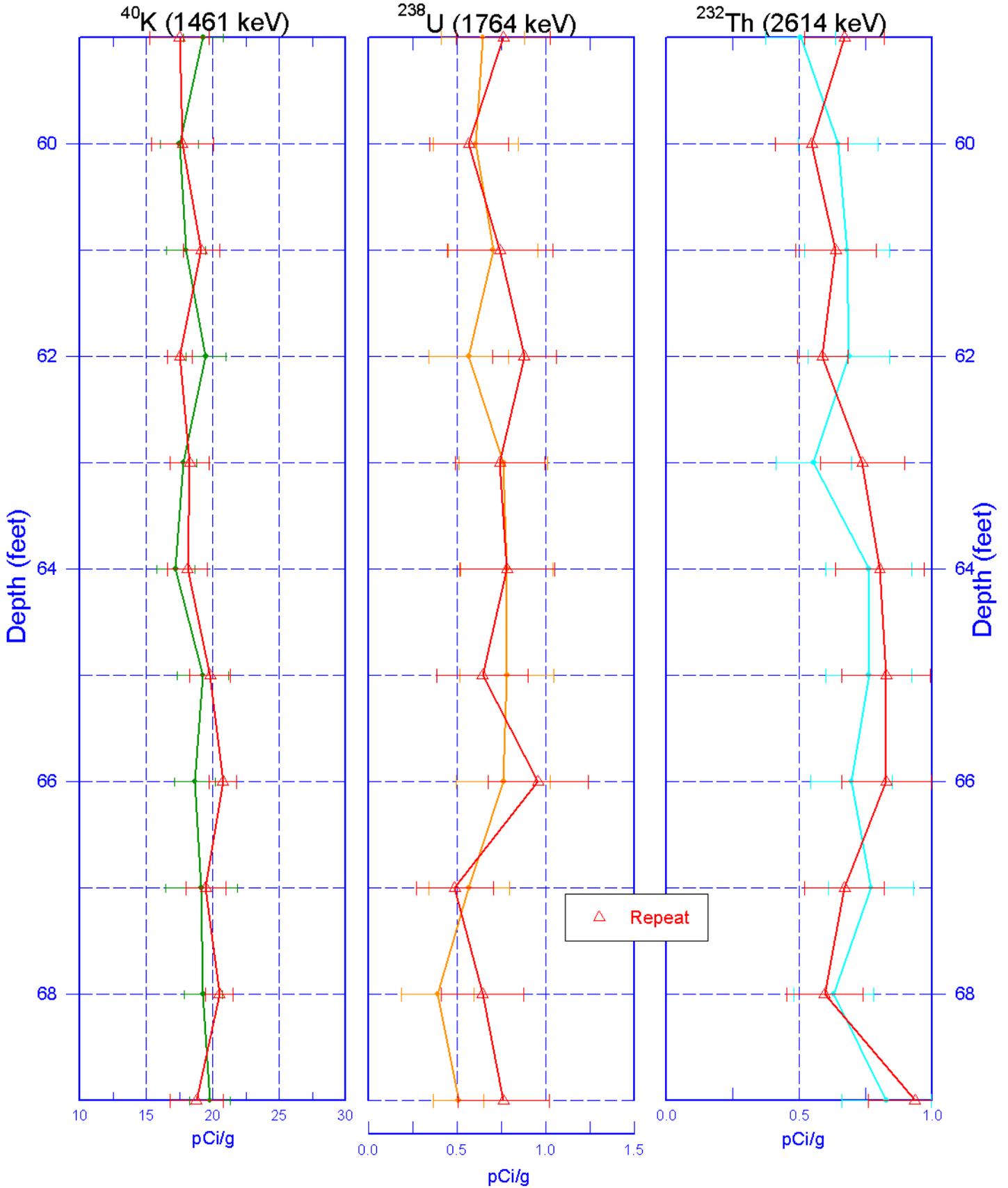
299-E13-52 (A5868) Repeat Section of Manmade Radionuclides



Zero Reference - Top of Casing

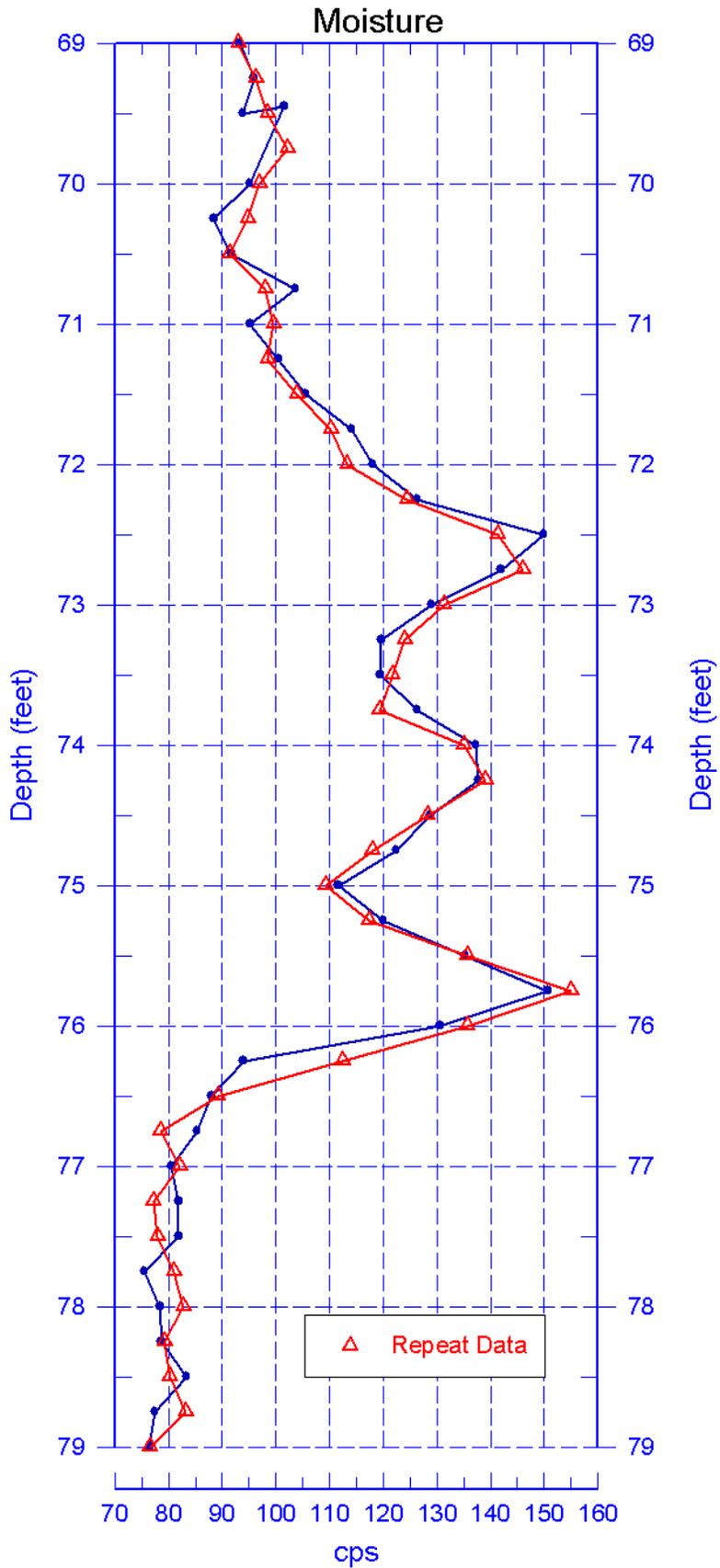
299-E13-52 (A5868)

Repeat Section of Natural Gamma Logs



Zero Reference - Top of Casing

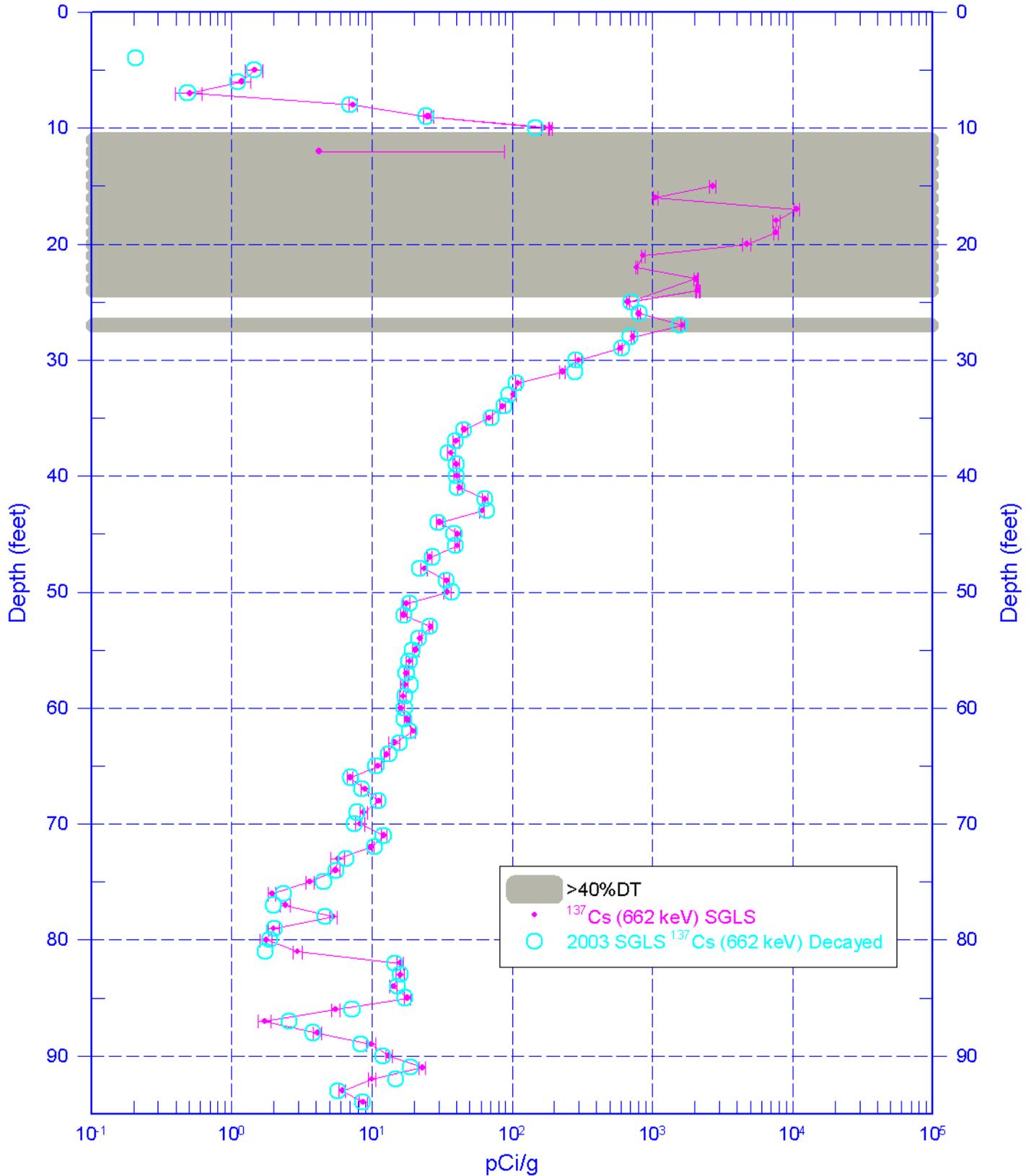
299-E13-52 (A5868) Moisture Repeat Section



299-E13-52 (A5868)

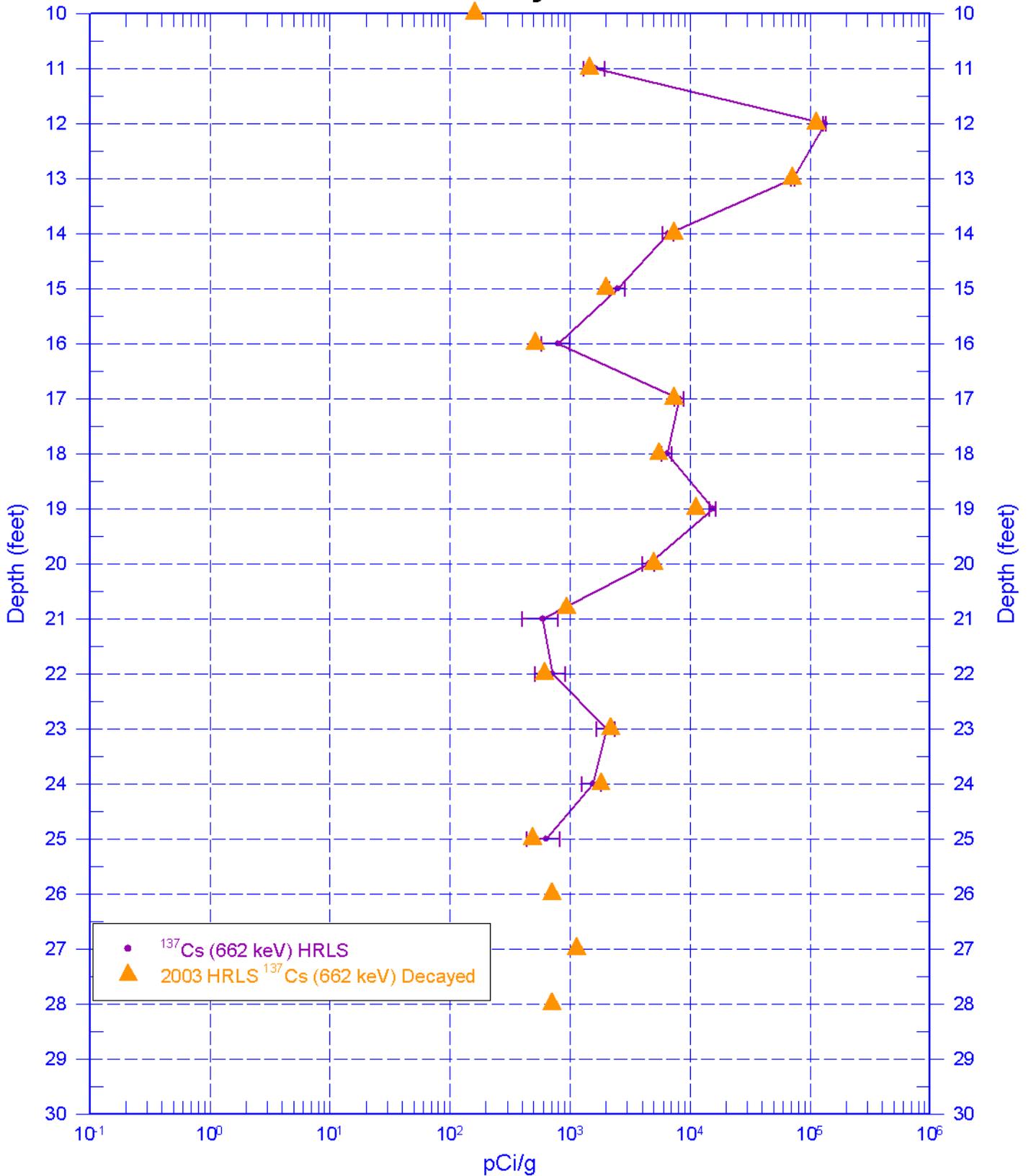
SGLS 2007 ¹³⁷Cs Data Compared to 2003

¹³⁷Cs Data Decayed to 10/30/2007



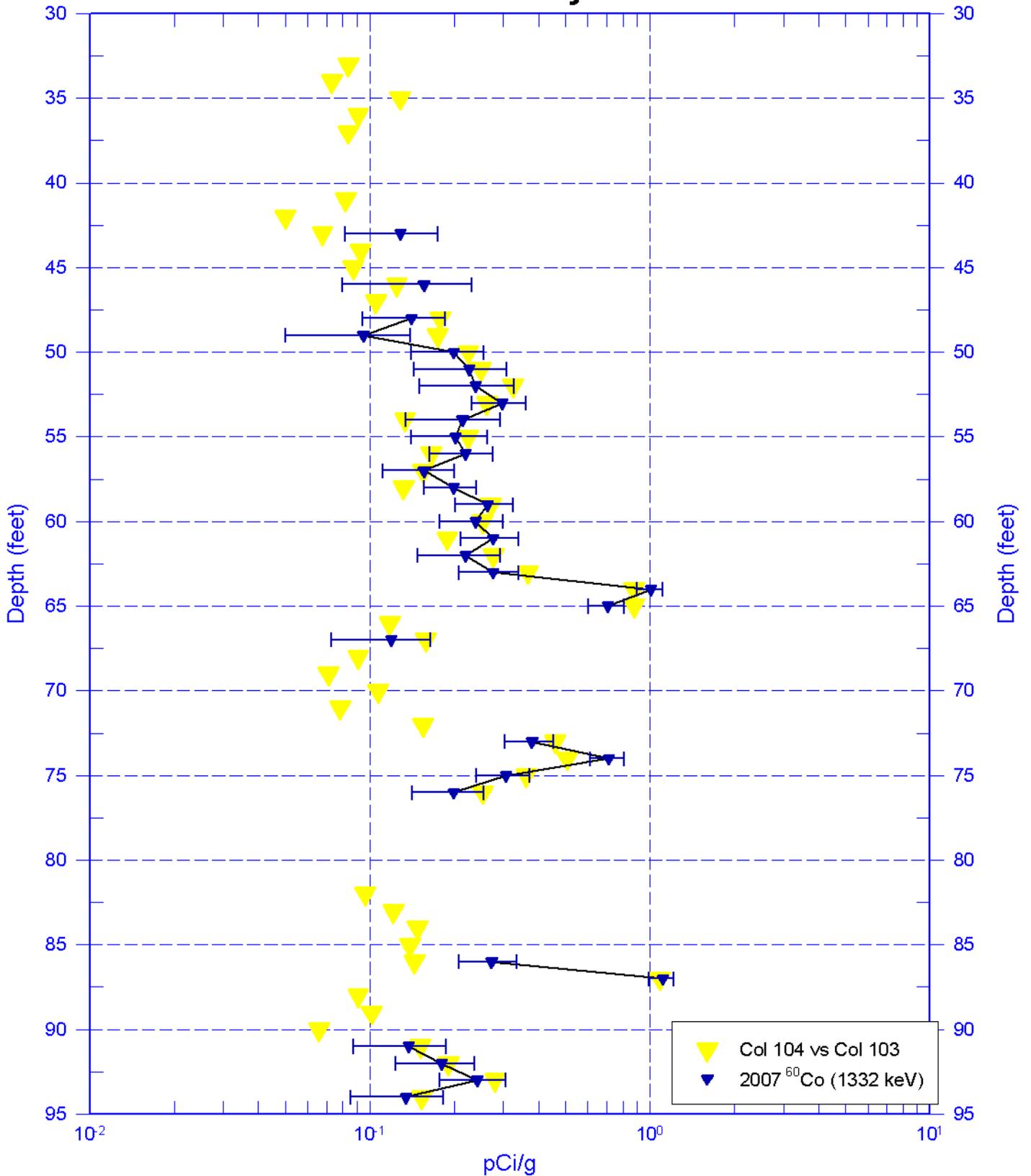
Zero Reference - Top of Casing

299-E13-52 (A5868)
HRLS 2007 ¹³⁷Cs Data Compared to 2003
¹³⁷Cs Data Decayed to 10/30/2007



299-E13-52 (A5868)

2007 ⁶⁰Co SGLS Data Compared to 2003 ⁶⁰Co SGLS Data Decayed to 10/30/2007



Zero Reference - Top of Casing