Stoller
Hanford Office

DOE-EM/GJ1252-2006

299-E28-89 (A6840)
Log Data Report

Borehole Information:

Borehole:	299-E28-89 (A6840)		Site:	216-B-62 Crib	
Coordinates (WA St Plane)		GWL[1] (ft) :	None	GWL Date:	12/15/05
North	East	Drill Date	Elevation (ft) (TOC)	Total Depth (ft)	Type
136802.68	573083.657	06/83	680.1	29	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	2.35	6 5/8	6	5/16	2.35	29

Borehole Notes:

Casing diameter and stickup measurements were acquired using a caliper and steel tape. Logging data acquisition is referenced to the top of casing (TOC).

Spectral Gamma Logging System (SGLS) Equipment Information:

Logging System:	Gamma 1N		Type:	SGLS (60%) SN: 45-TP22010A
Effective Calibration Date:	11/29/05	Calibration Reference:	DOE/EM-GJ1053-2005	
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

High Rate Logging System (HRLS) Equipment Information:

Logging System:	Gamma 1C	Type:	HRLS SN: 39-A314
Effective Calibration Date:	10/06/05	Calibration Reference:	DOE/EM-GJ1019-2005
	Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3 Repeat		
Date	12/19/05	12/19/05	12/19/05		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	28.5	21.5	12.5		
Finish Depth (ft)	20.5	2.5	4.5		
Count Time (sec)	20	100	100		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		

Log Run	1	2	3 Repeat		
MSA Interval (ft)	1.0	1.0	1.0		
ft/min	N/A[2]	N/A	N/A		
Pre-Verification	AN003CAB	AN003CAB	AN003CAB		
Start File	AN004000	AN004009	AN003029		
Finish File	AN004008	AN004028	AN003037		
Post-Verification	AN004CAA	AN004CAA	AN004CAA		
Depth Return Error (in.)	N/A	-1.0	0.0		
Comments	High-rate interval.	No fine-gain adjustment.	Repeat section.		

High Rate Logging System (HRLS) Log Run Information:

Log Run	4	5 Repeat			
Date	12/27/05	12/27/05			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	28.5	36.0			
Finish Depth (ft)	21.5	33.0			
Count Time (sec)	300	300			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
ft/min	NA	NA			
Pre-Verification	AC155CAB	AC155CAB			
Start File	AC155000	AC155008			
Finish File	AC155007	AC155011			
Post-Verification	AC156CAA	AC156CAA			
Depth Return Error (in.)	N/A	0.0			
Comments	No fine-gain adjustment made.	Repeat section.			

Logging Operation Notes:

Logging was conducted with a centralizer on the sonde for both SGLS and HRLS logging. Repeat sections were collected to evaluate the logging systems' performances.

Analysis Notes:

Analyst:	Pope	Date:	06/14/06	Reference:	GJO-HGLP 1.6.3, Rev. 0

Pre-run and post-run verifications for the logging systems were performed before and after the day's data acquisition. Acceptance criteria were met, with the exception of the resolution of the 609 keV (^{214}Bi) energy peak for the SGLS pre-survey verification spectrum, which was 0.02 above the upper control limit. The resolution control limits are occasionally exceeded due to, among other things, differences in local environments in which verification spectra are acquired. Log spectra and the post-survey verification spectrum both exhibit good resolution, and therefore the pre-survey verification spectrum is provisionally accepted.

SGLS and HRLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated using the EXCEL worksheet templates identified as G1NNov05.xls and G1COct05.xls. A casing correction for 0.3125-in. thick casing was applied to the SGLS and HRLS data.

Results and Interpretations:

A continuous zone of ^{137}Cs was detected from 14.5 ft to the bottom of the borehole (28.5 ft). A zone of high ^{137}Cs concentrations exists from approximately 21.5 to 28.5 ft. The maximum concentration is approximately 3,300 pCi/g at 25.5 ft. A second zone of ^{137}Cs exists between 2.5 and 7.5 ft, with a maximum concentration of approximately 8 pCi/g at 4.5 ft.

Westinghouse Hanford Company logged this borehole in 1994 with the Radionuclide Logging System (RLS). The ^{137}Cs concentrations determined by the RLS, and decayed to 2005, show good agreement with the current SGLS measurements, with the exception of low concentrations (about 0.2 pCi/g) between 14.5 and 16.5 ft that were undetected by the RLS. Comparison of gross gamma plots from 1994 and 2005 also indicate no changes in the gamma profile of this borehole since at least 1994.

The repeat sections for the SGLS and HRLS indicate good agreement for the naturally occurring and man-made radionuclides, with few exceptions.

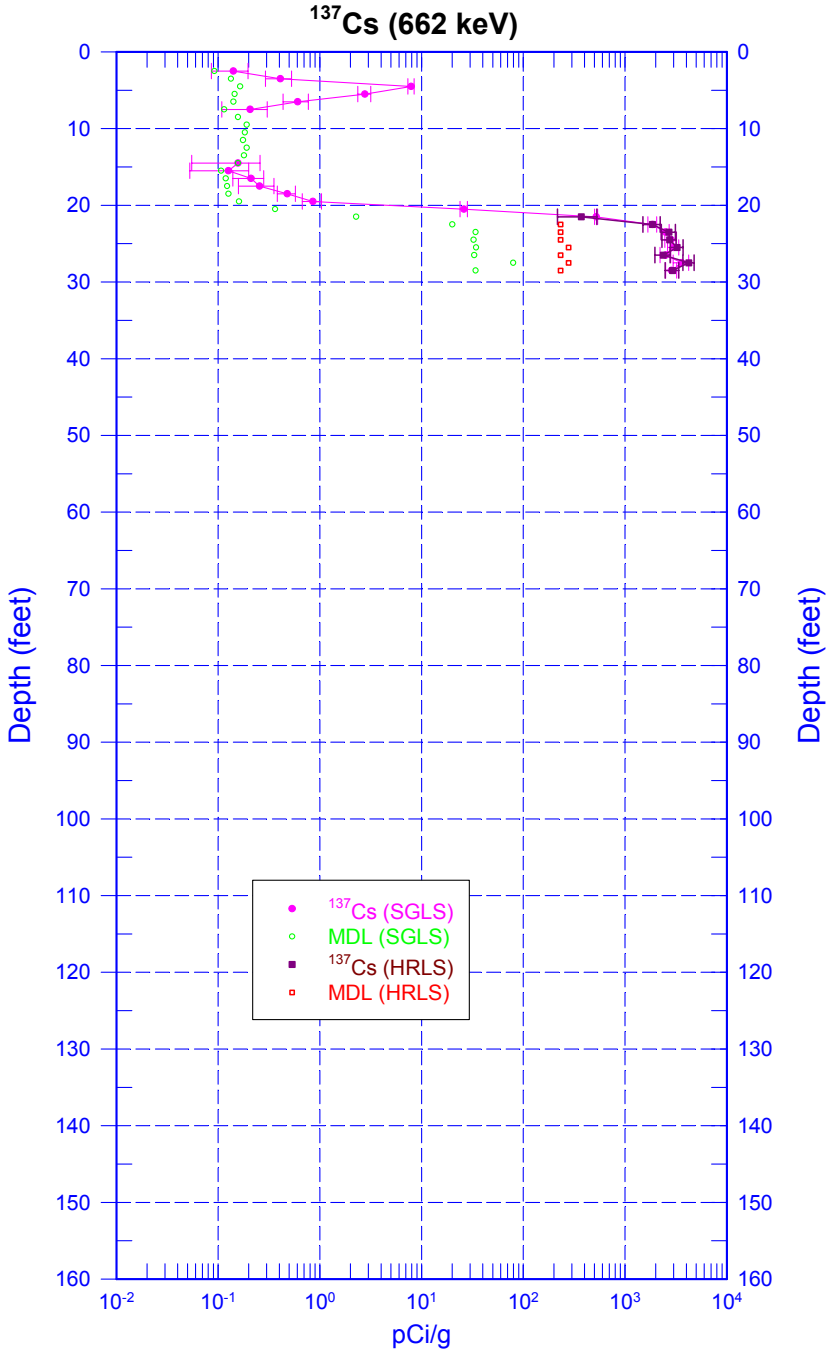
List of Plots:

Man-Made Radionuclides
Natural Gamma Logs
Combination Plot
Total Gamma and Dead Time
SGLS/RLS Man-made Comparison
SGLS/RLS Gross Gamma Comparison
Repeat Section for Man-Made Radionuclides
Repeat Section of Natural Gamma Logs
HRLS Repeat Section

---

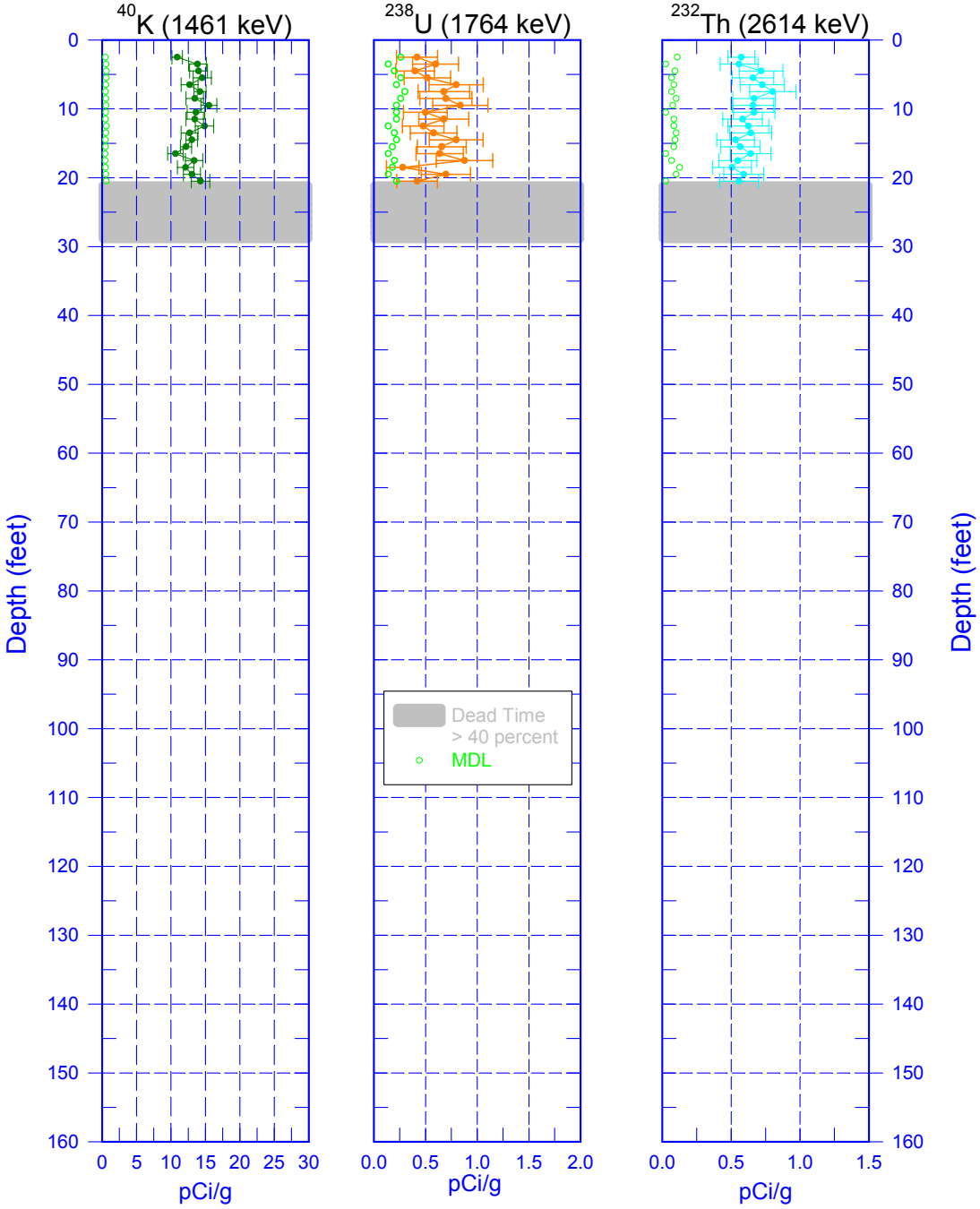
[1] GWL – groundwater level
[2] N/A – not applicable

299-E28-89 (A6840)
Man-Made Radionuclides



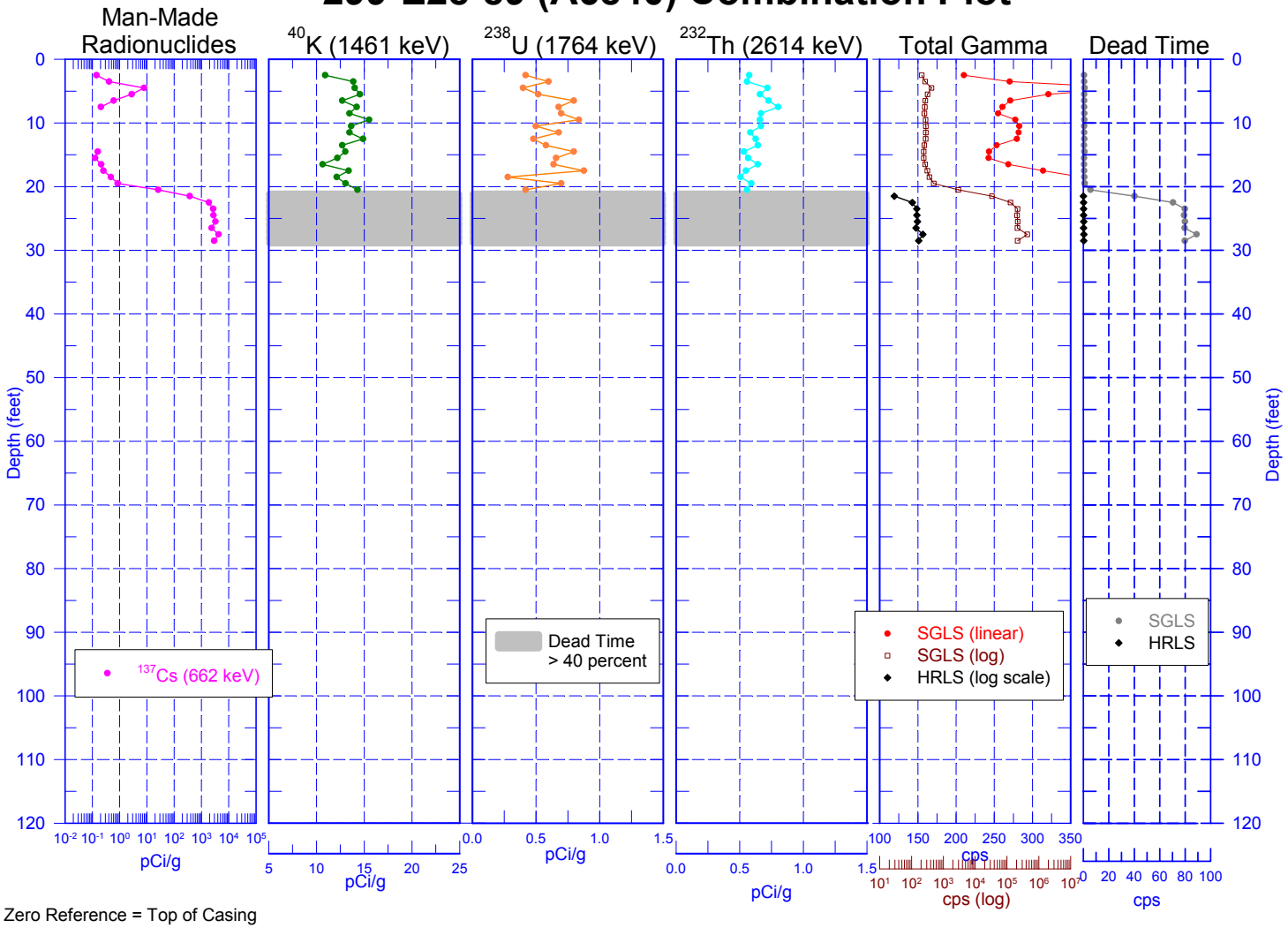
Zero Reference = Top of Casing

299-E28-89 (A6840)
Natural Gamma Logs



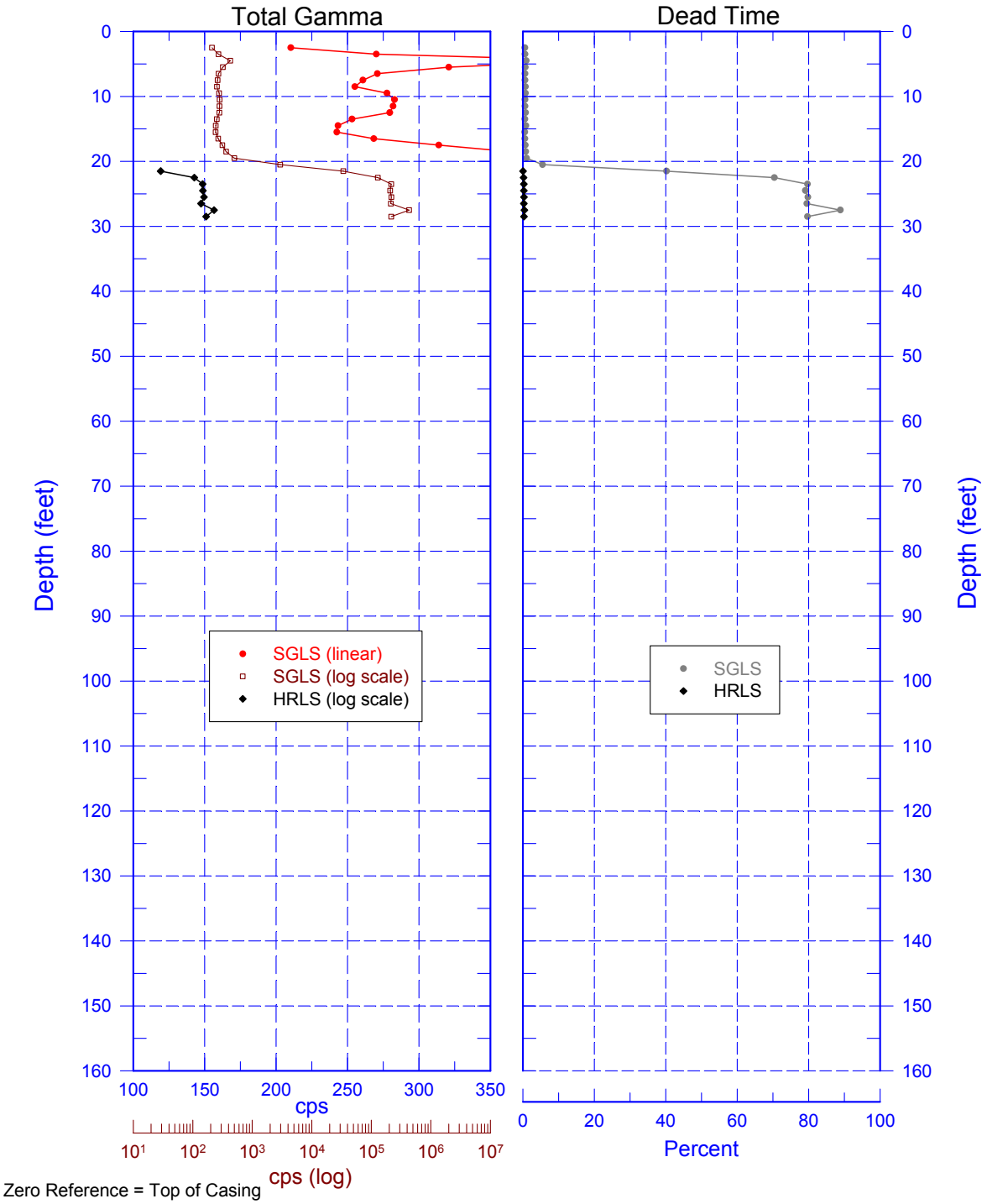
Zero Reference = Top of Casing

299-E28-89 (A6840) Combination Plot



Zero Reference = Top of Casing

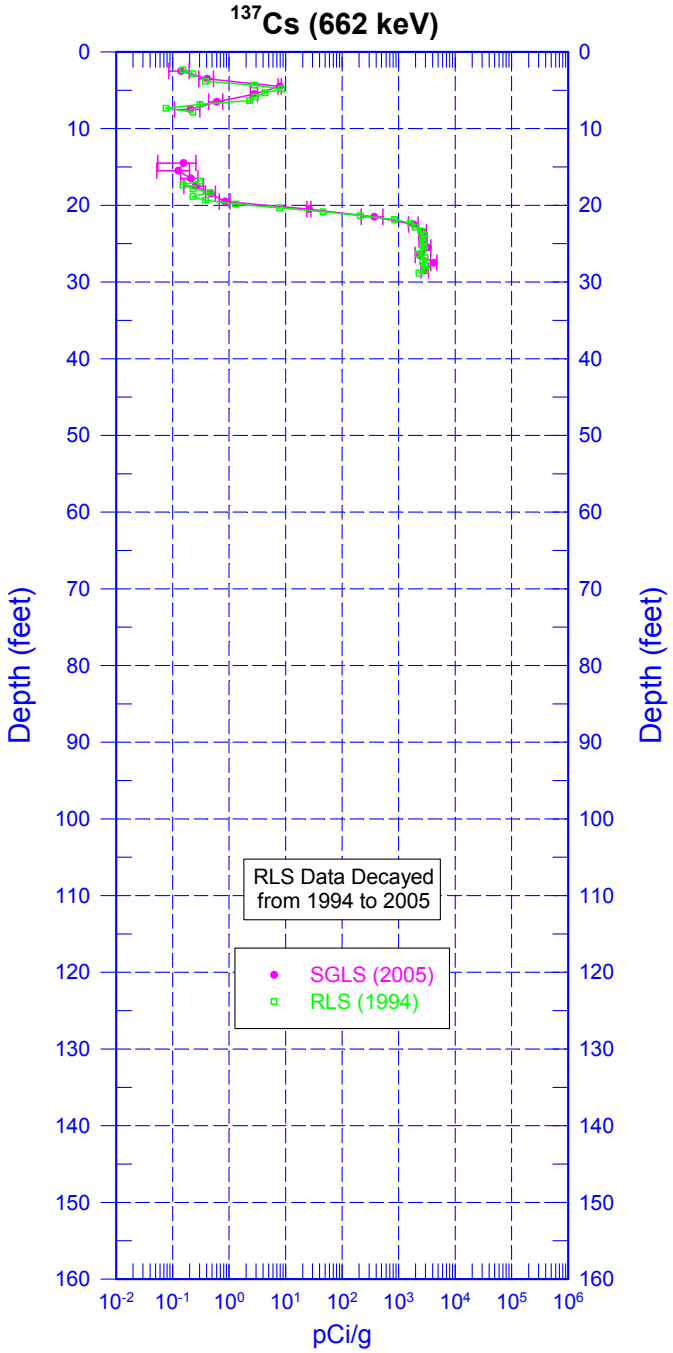
299-E28-89 (A6840)
Total Gamma & Dead Time



Zero Reference = Top of Casing

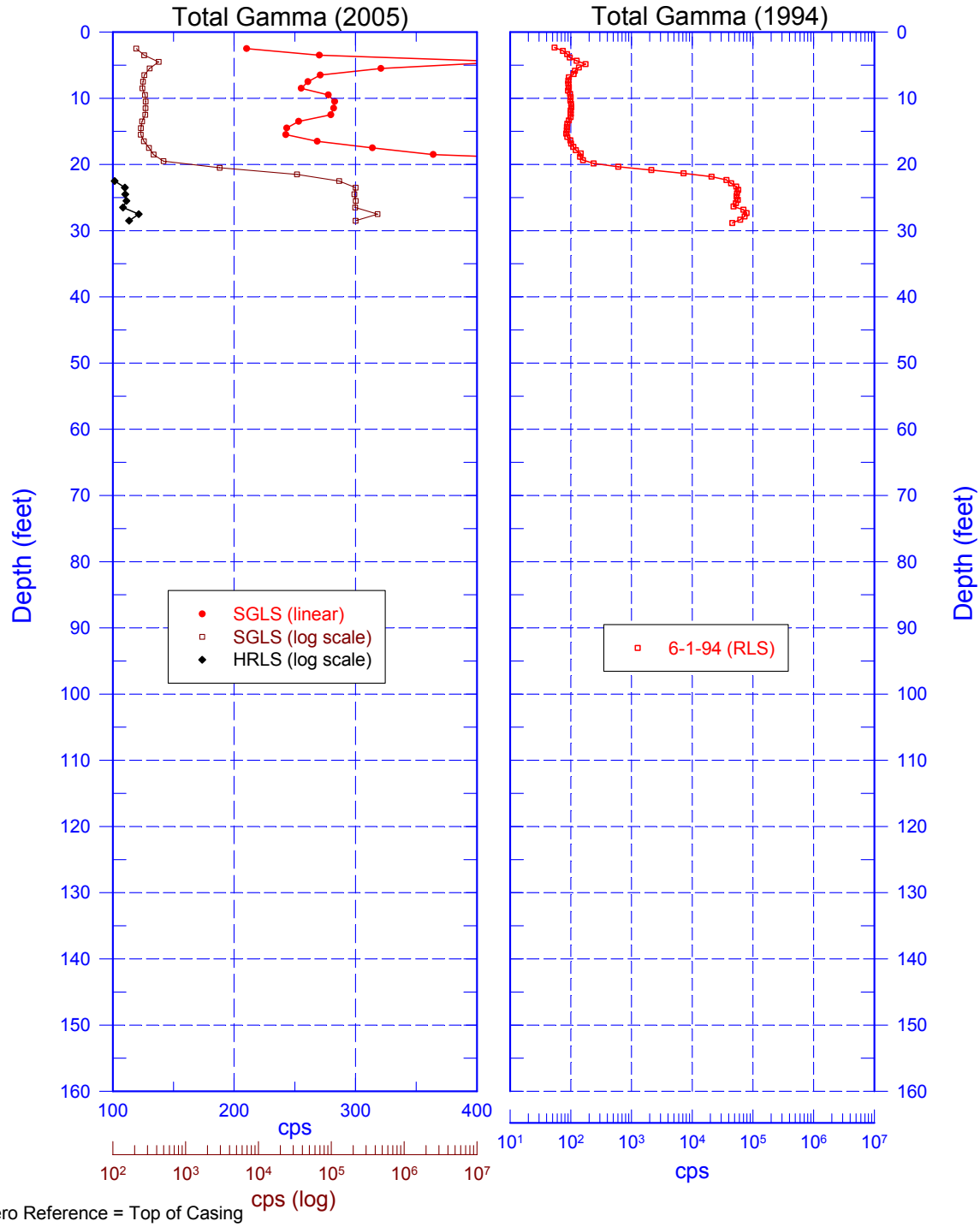
299-E28-89 (A6840)

SGLS & RLS Man-Made Radionuclide Comparison

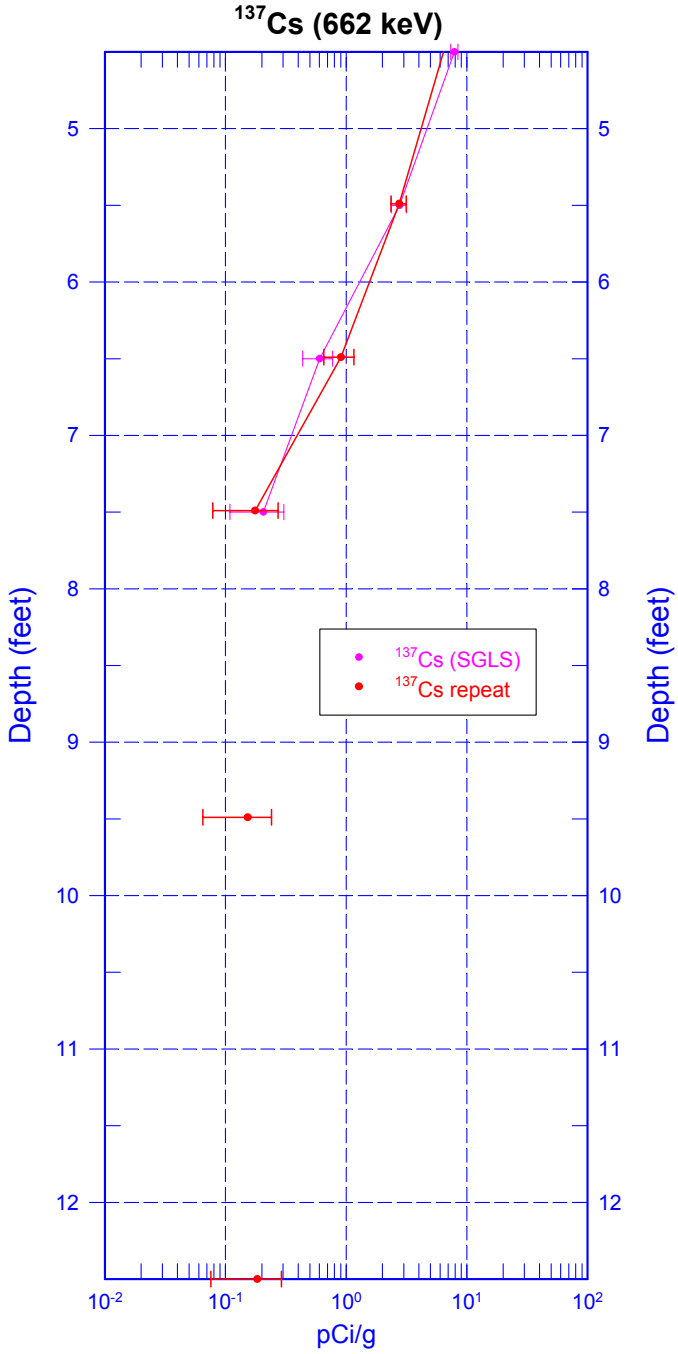


Zero Reference = Top of Casing

299-E28-89 (A6840)
Total Gamma Logs



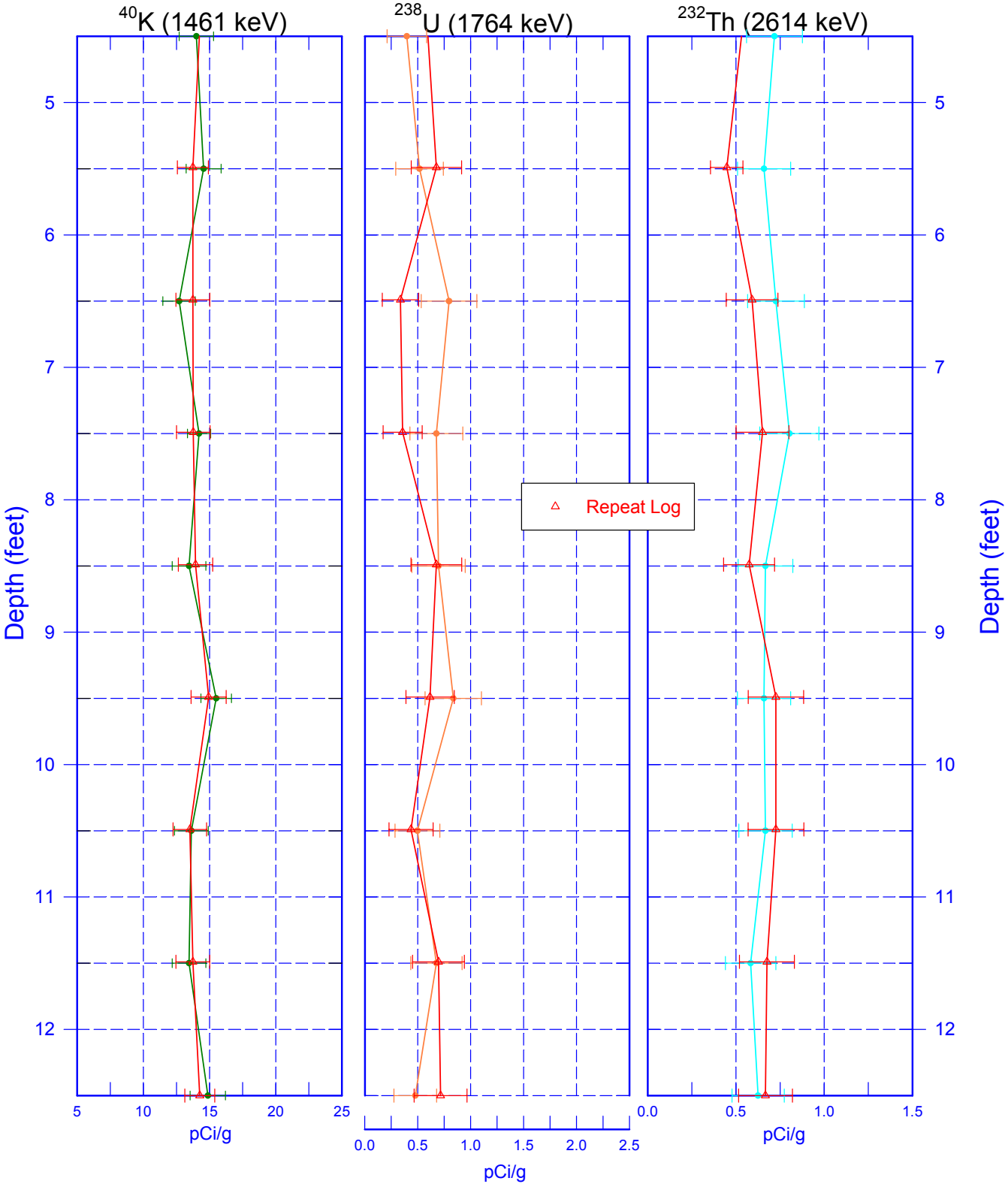
299-E28-89 (A6840)
Repeat Section of Man-Made Radionuclides



Zero Reference = Top of Casing

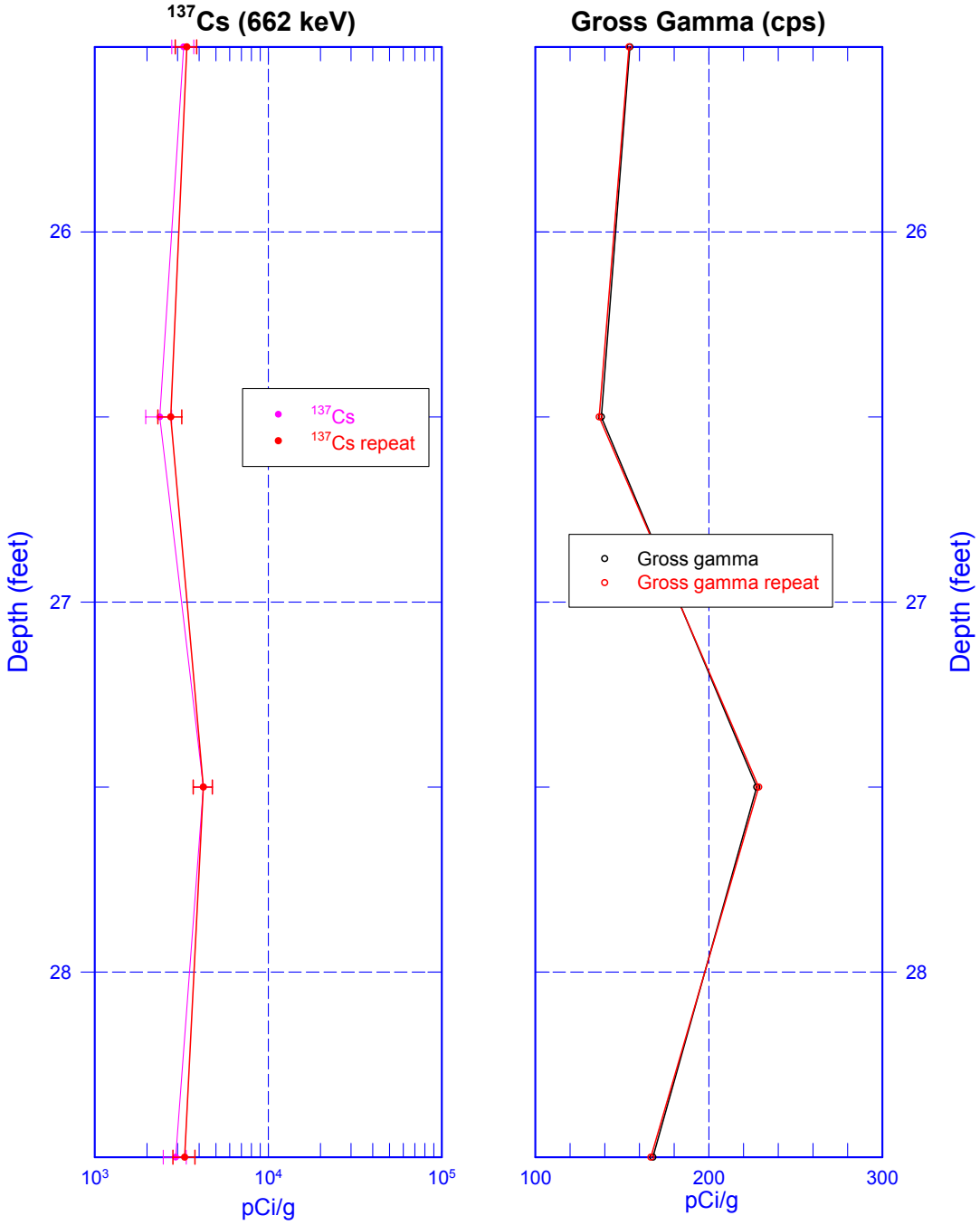
299-E28-89 (A6840)

Repeat Section of Natural Gamma Logs



Zero Reference = Top of Casing

299-E28-89 (A6840)
HRLS Repeat Section



Zero Reference = Top of Casing