



C3340

Log Data Report

Borehole Information:

Borehole: C3340		Site: 216-B-38			
Coordinates		GWL¹ (ft): none		GWL Date:	
North N/A ³	East N/A	Drill Date June 2001	TOC² Elevation N/A	Total Depth (ft) 60	Type push

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
steel threaded	0.5	6.625	5.625	0.5	0	60

Borehole Notes:

This is a temporary borehole pushed to a depth of approximately 60 ft. There is a gravel pad approximately 1 ft thick, and the top of casing sticks up approximately 0.5 ft above the gravel surface. The zero reference point for the log data is the ground surface.

Logging Equipment Information:

Logging System: Gamma 2B	Type: SGLS (35%)
Calibration Date: 09/00	Calibration Reference: GJO-2001-245-TAR
Logging Procedure: MAC-HGLP 1.6.5	

Logging System: RLS	Type: NMLS (Moisture)
Calibration Date: 05/01	Calibration Reference: GJO-2001-247-TAR
Logging Procedure: MAC-HGLP 1.6.5	

Logging System: Gamma 1C	Type: HRLS
Calibration Date: 09/00	Calibration Reference: GJO-2001-244-TAR
Logging Procedure: MAC-HGLP 1.6.5	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3	4	
Date	7/11/01	7/11/01	7/12/01	7/12/01	
Logging Engineer	Spatz/Musial	Spatz/Musial	Kos/Musial	Kos/Musial	
Start Depth	0	12.5	22.5	35.0	
Finish Depth	13.5	23.5	34.5	35.0	
Count Time (sec)	180	30	30	180	
Live/Real	L	R	R	L	
Shield (Y/N)	N	N	N	N	
MSA Interval (ft)	0.5	0.5	0.5	0.5	
ft/min	n/a ⁴	n/a	n/a	n/a	
Pre-Verification	B0017CAB	B0017CAB	B0019CAB	B0019CAB	
Start File	B0018000	B0018028	B0019000	B0019024	
Finish File	B0018027	B0018050	B0019023	B0019024	
Post-Verification	B0018CAA	B0018CAA	None	None	

High Rate Logging System (HRLS) Log Run Information:

Log Run	5				
Date	7/20/01				
Logging Engineer	A. Pearson				
Start Depth	13.5				
Finish Depth	36.0				
Count Time (sec)	300				
Live/Real	R				
Shield (Y/N)	N				
MSA Interval (ft)	0.5				
ft/min	n/a				
Pre-Verification	D0000CAB				
Start File	D0000000				
Finish File	D0000045				
Post-Verification	D0002CAA				

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	6	7 (repeat)			
Date	7/23/01	7/23/01			
Logging Engineer	Kos/Spatz	Kos/Spatz			
Start Depth	0.0	40.0			
Finish Depth	59.0	33.25			
Count Time (sec)	n/a	n/a			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	n/a	n/a			
ft/min	1.0	1.0			
Pre-Verification	C0042CAB	C0042CAB			
Start File	C0052000	C0052237			
Finish File	C0052236	C0052264			
Post-Verification	C0062CAA	C0062CAA			

Logging Operation Notes:

Log depths are relative to ground surface. The NMLS and HRLS data are relative to top of casing, which represents an offset of about 0.5 ft. Multiple SGLS log runs were made to adjust count times in response to high dead time intervals. In areas of excessive dead time, the count time was reduced to 30 seconds to provide a log record where spectra were not anticipated to contain reliable full energy peaks. No fine-gain adjustments were made. SGLS log run four was terminated early due to a water-pump failure in the logging truck, and no post-run verification spectrum was recorded. No SGLS logs were recorded below a depth of 35 ft.

Internal contamination (inside the casing) was reported by the HPT on July 11, 2001. A reading of approximately 12,000 dpm was reported. The radionuclide responsible for this contamination was not identified.

Analysis Notes:

Analyst:	McCain	Date:	07/27/01	Reference:	MAC-VZCP 1.7.9, Rev. 2
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Pre-run and post-run verification spectra were evaluated and found to be within acceptance criteria. Individual spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated with EXCEL. Corrections were applied for casing thickness and dead time. Because of high dead time and detector saturation, maximum gross count rates and ^{137}Cs concentrations are not considered reliable, and are probably significantly higher than reported values. Where dead time exceeds about 40 percent, pulse pileup and peak spreading effects may result in underestimation of peak count rates. The ^{214}Bi peak at 1764 keV was used to determine ^{238}U concentrations instead of the ^{214}Bi peak at 609 keV to avoid interference from the ^{137}Cs peak at 662 keV.

The high rate data were processed for the ^{137}Cs count rate at 662 keV using APTEC supervisor. Concentrations were calculated in EXCEL. A casing correction factor of 1.37 was applied to the high rate data to account for the increased attenuation in the 0.5-inch steel casing, relative to 0.28-inch casing.

The neutron moisture log was processed using the calibration relationship developed for a 6-inch diameter borehole with 0.28-inch thick casing. A correction factor of 1.20 was applied to account for the effects of the thicker casing, which is based on an equivalent casing correction for 8-inch diameter developed by Randall.

Log Plot Notes:

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides (^{40}K and associated decay progeny of ^{232}Th and ^{238}U), man-made radionuclides, and moisture content. 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 does not include errors associated with the inverse efficiency function, dead time correction, or casing and water corrections. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation. Intervals where SGLS dead time exceeds 40 percent are shaded.

Results and Interpretations :

¹³⁷Cs was detected. The greatest ¹³⁷Cs concentration occurs between 15 and 32 ft. High dead times and detector saturation occurs between 13 and 36 ft. The maximum measured ¹³⁷Cs concentration is about 180,000 pCi/g, at 23.5 ft.

Detector saturation in the region of high ¹³⁷Cs effectively obscures the natural radionuclides.

¹ GWL – groundwater level

² TOC – top of casing

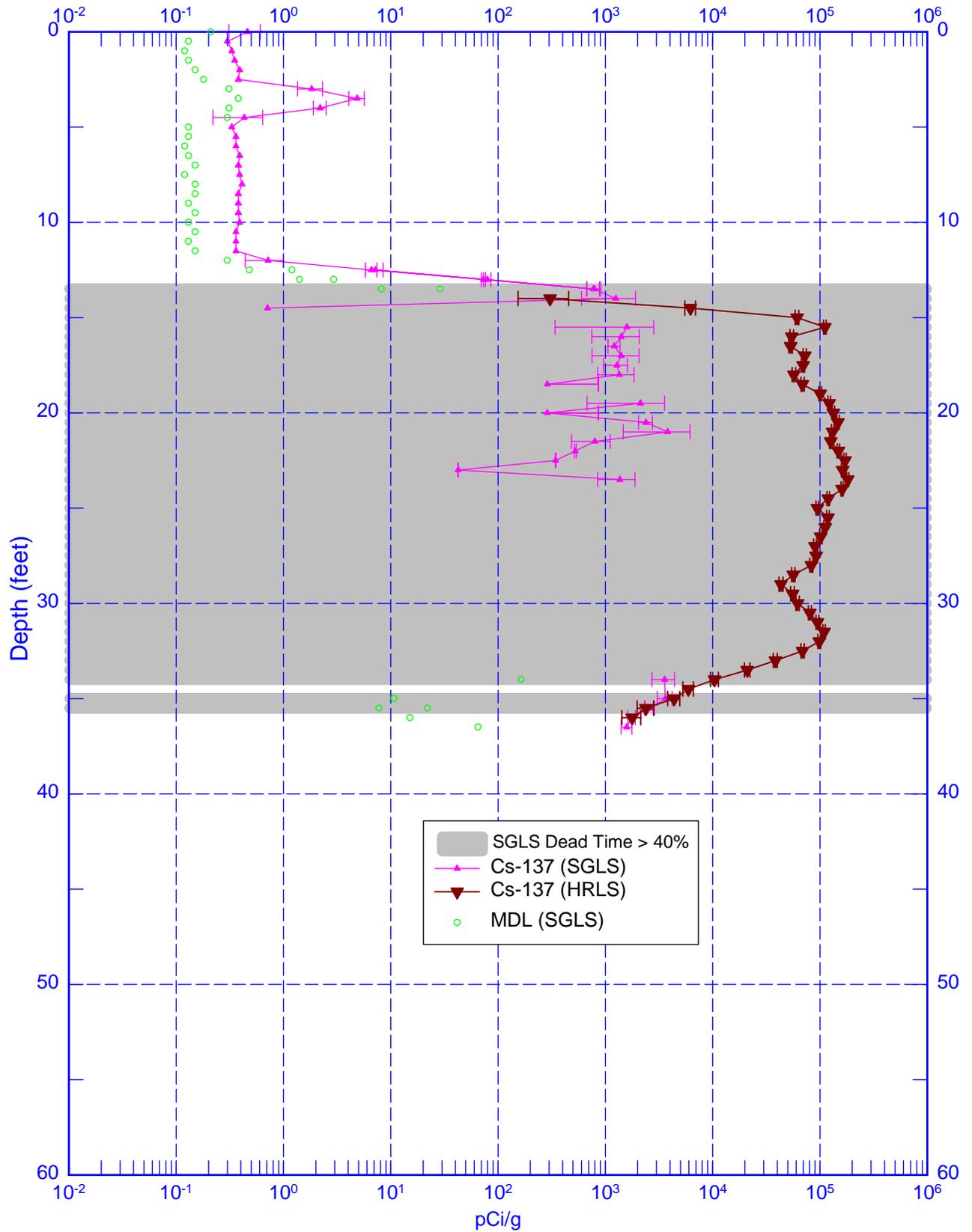
³ N/A – not available

⁴ n/a – not applicable

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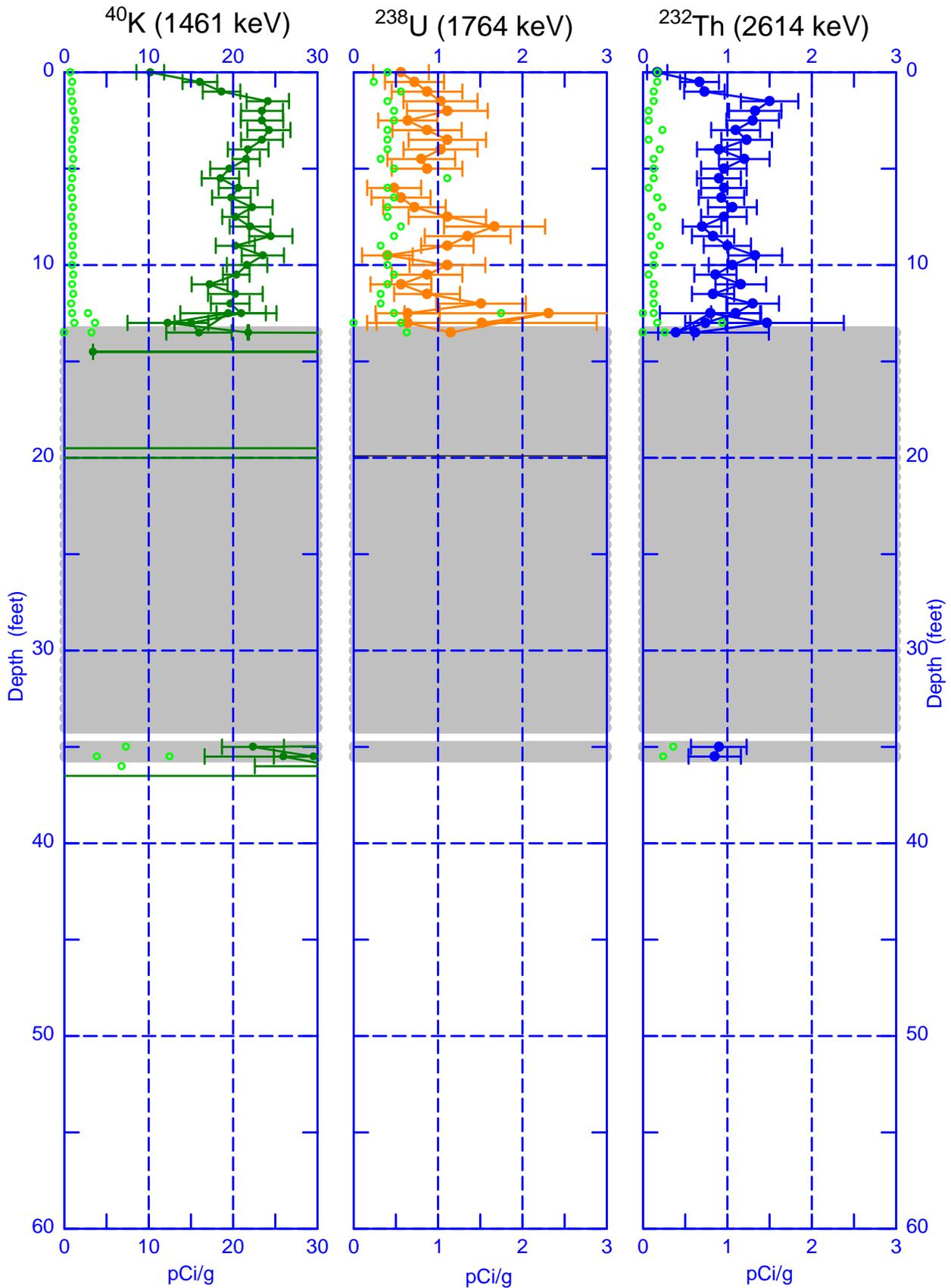
Man-Made Radionuclides

^{137}Cs (662 keV)



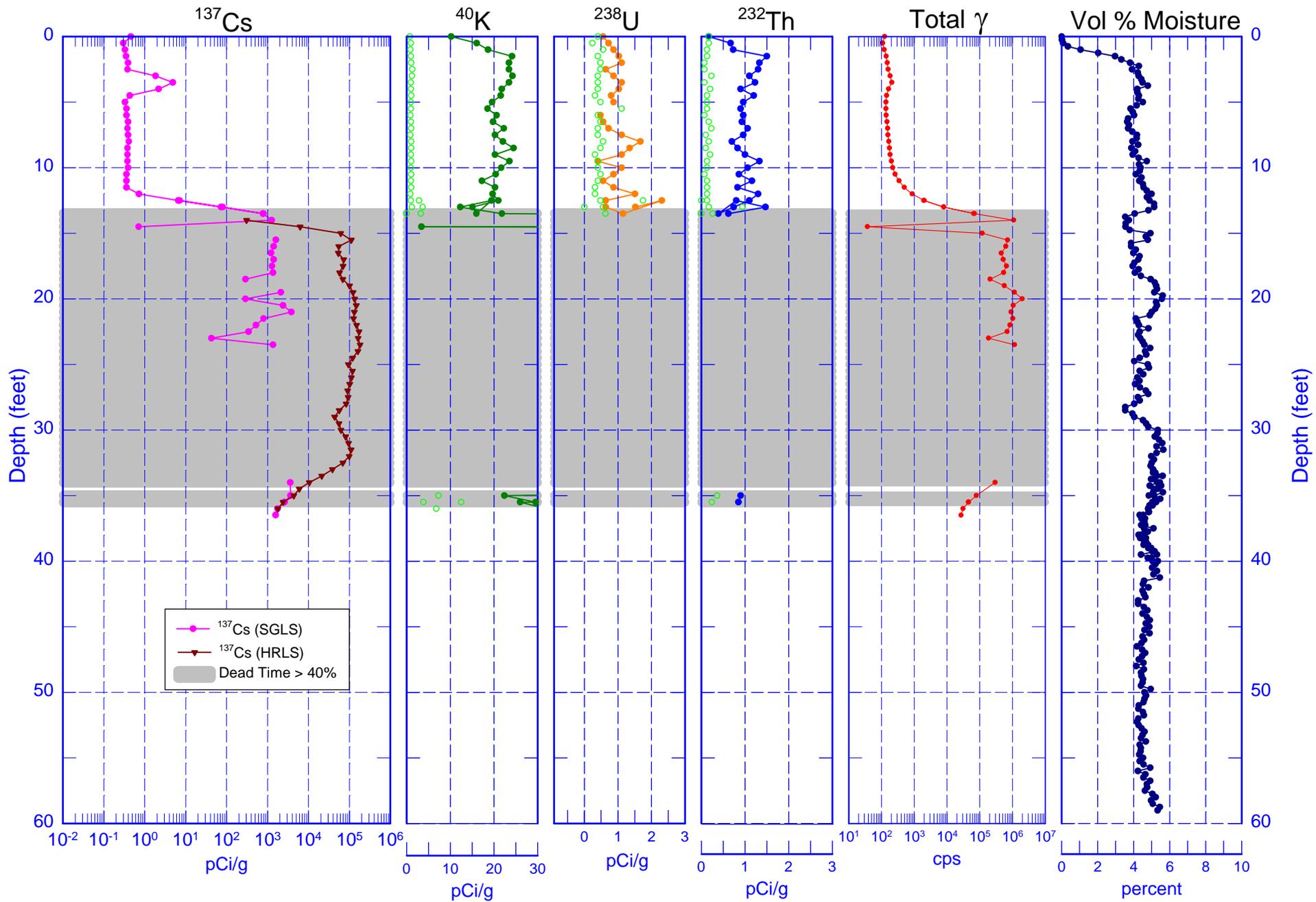
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Natural Gamma (KUT) Logs



○ MDL

C3340 Combination Plot



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Total Gamma & Dead Time

