

C3532 Log Data Report

Borehole Information:

Borehole:		C3532		Site:		W of 216-Z1A Crib	
Coordinates (WA St Plane)		GWL¹ (ft):		None		GWL Date:	
North (m)	East (m)	Drill Date	TOC Elevation	Total Depth (ft)	Type		
135444.832	566480.92	Not available	Not available	25	Not available		

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	0.95	10 5/8	10	5/16	0.95	4
Welded steel	0.15	8 5/8	8	5/16	0.15	25

Borehole Notes:

The logging engineer measured the 10-in. casing diameter with a caliper and steel tape. An exact measurement of the 8-in. casing was not possible and the above information is assumed. Using a mirror, the annulus between the 8- and 10-in. casings does not appear to contain grout just below the ground surface. A heavily welded joint is observed approximately 4 ft below the top of the 8-in. casing. Depth reference is the top of the 10-in. casing.

Logging Equipment Information:

Logging System:	Gamma 4N		Type:	SGLS HpGe (60%)
Effective Calibration Date:	09/20/07	Calibration Reference:	Serial No.:	45TP22010A
		Logging Procedure:	HGLP-CC-022, Rev. 1	
			HGLP-MAN-002, Rev. 0	

Logging System:	Gamma 4H (with AmBe source)		Type:	NMLS
Effective Calibration Date:	11/06/07	Calibration Reference:	Serial No.:	H310700352
		Logging Procedure:	HGLP-CC-021	
			HGLP-MAN-002, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2 Repeat			
Date	02/19/08	02/19/08			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	25.0	11.0			
Finish Depth (ft)	0.0	5.0			
Count Time (sec)	100	100			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
Pre-Verification	DN991CAB	DN991CAB			
Start File	DN991000	DN991025			
Finish File	DN991024	DN991031			
Post-Verification	DN991CAA	DN991CAA			
Depth Return Error (in.)	0	0			
Comments	No fine gain adjustment	No fine gain adjustment			

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	3	4			
Date	02/19/08	02/19/08			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	25.25	11.0			
Finish Depth (ft)	1.0	5.0			
Count Time (sec)	15	15			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	0.25	0.25			
Pre-Verification	DHB32CAB	DHB32CAB			
Start File	DHB32000	DHB32098			
Finish File	DHB32097	DHB32122			
Post-Verification	DHB32CAA	DHB32CAA			
Depth Return Error (in.)	0	0			
Comments	None	None			

Logging Operation Notes:

Logging was conducted with a centralizer on the sondes. All measurements are referenced to the top of the 10-in. casing.

Analysis Notes:

Analyst:	Henwood	Date:	03/18/08	Reference:	GJO-HGLP 1.6.3, Rev. 0
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Pre- and post-run verifications for the logging systems were performed before and after each day’s data acquisition. The acceptance criteria were met.

A combined casing correction for a 0.625-in. (0.3125 + 0.3125 for the 10- and 8-in. casings, respectively) thick casing was applied to the SGLS data from 0 to 4 ft. Below 4 ft, a correction for a single 0.3125-in. thick casing was applied.

The moisture data are reported in percent volumetric moisture according to a calibration for an 8-in. borehole.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated with EXCEL worksheet template identified as G4NSept07.xls using efficiency functions and corrections for casing, dead time, and water as determined from annual calibrations.

Results and Interpretations:

No manmade radionuclides were detected in this borehole. Minimum detection limits (MDLs) are plotted for Pu-239, Am-241, and Pa-233, which are common contaminants in the nearby 216-Z-1A crib.

Moisture data indicate some variability.

One of the reasons for logging this borehole was to aid in determining the depth of the 10-in. casing for borehole decommissioning. Interpretation of the log data suggests the 10-in. casing extends to approximately 4 ft. Total gamma activity appears to be attenuated in this interval relative to the remainder of the borehole. Relatively high apparent moisture is also exhibited in this interval, suggesting grout may be emplaced in the annular space between the 10- and 8-in. casings. Moisture data at approximately 5 ft suggests almost no moisture. This depth corresponds with observations made by the logging engineer that a casing joint was “heavily welded” at approximately 4 ft in depth from the top of the 8-in. casing or approximately 5 ft from the top of the 10-in. casing. The significance of

this weld is unknown. Moisture data acquired in the top 5 ft are qualitative only because there is no calibration for two casings.

Repeat sections acquired for each logging system 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

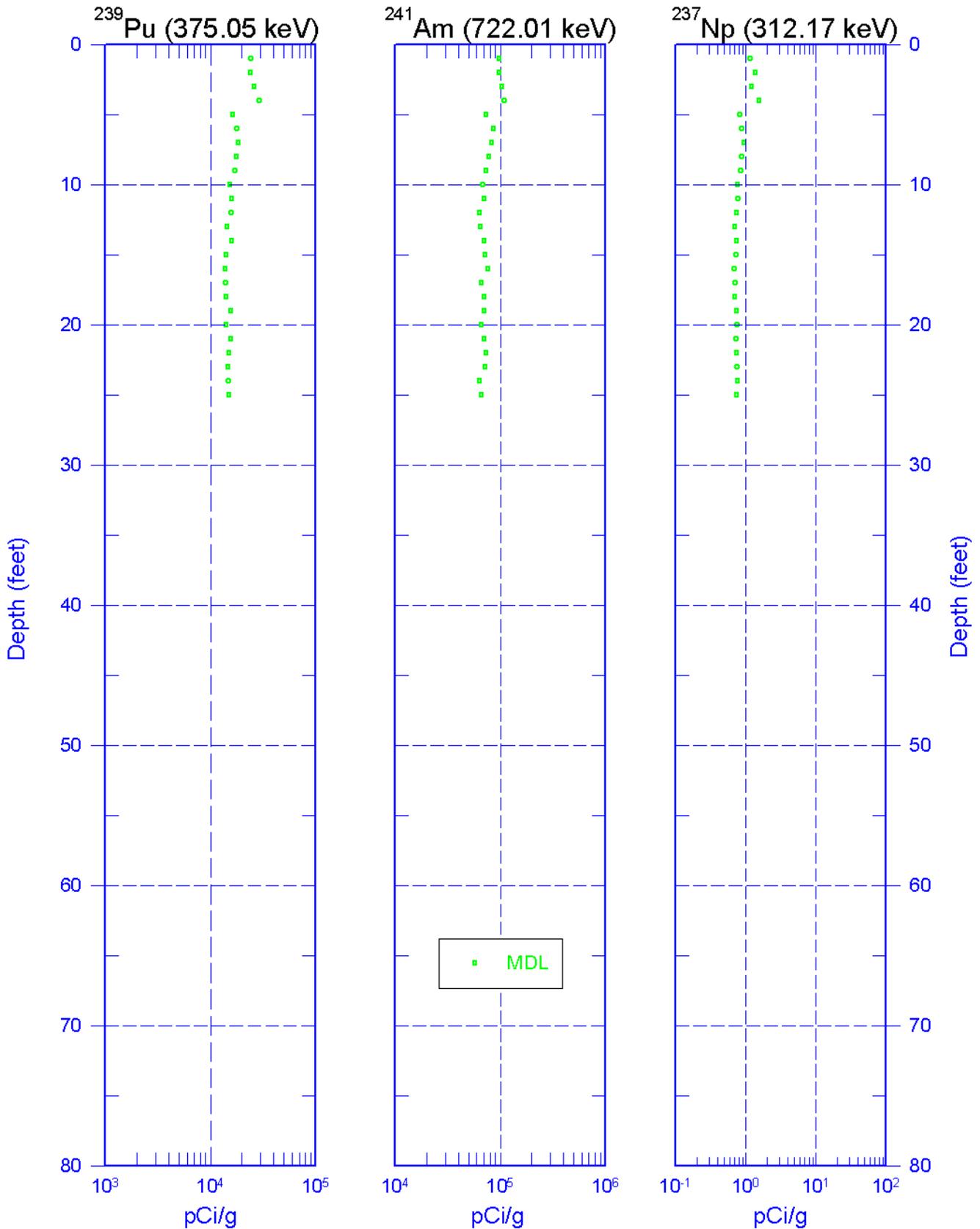
Repeat Section of Natural Gamma Logs

Repeat of Total Gamma, Moisture, & Dead Time

¹ GWL – groundwater level

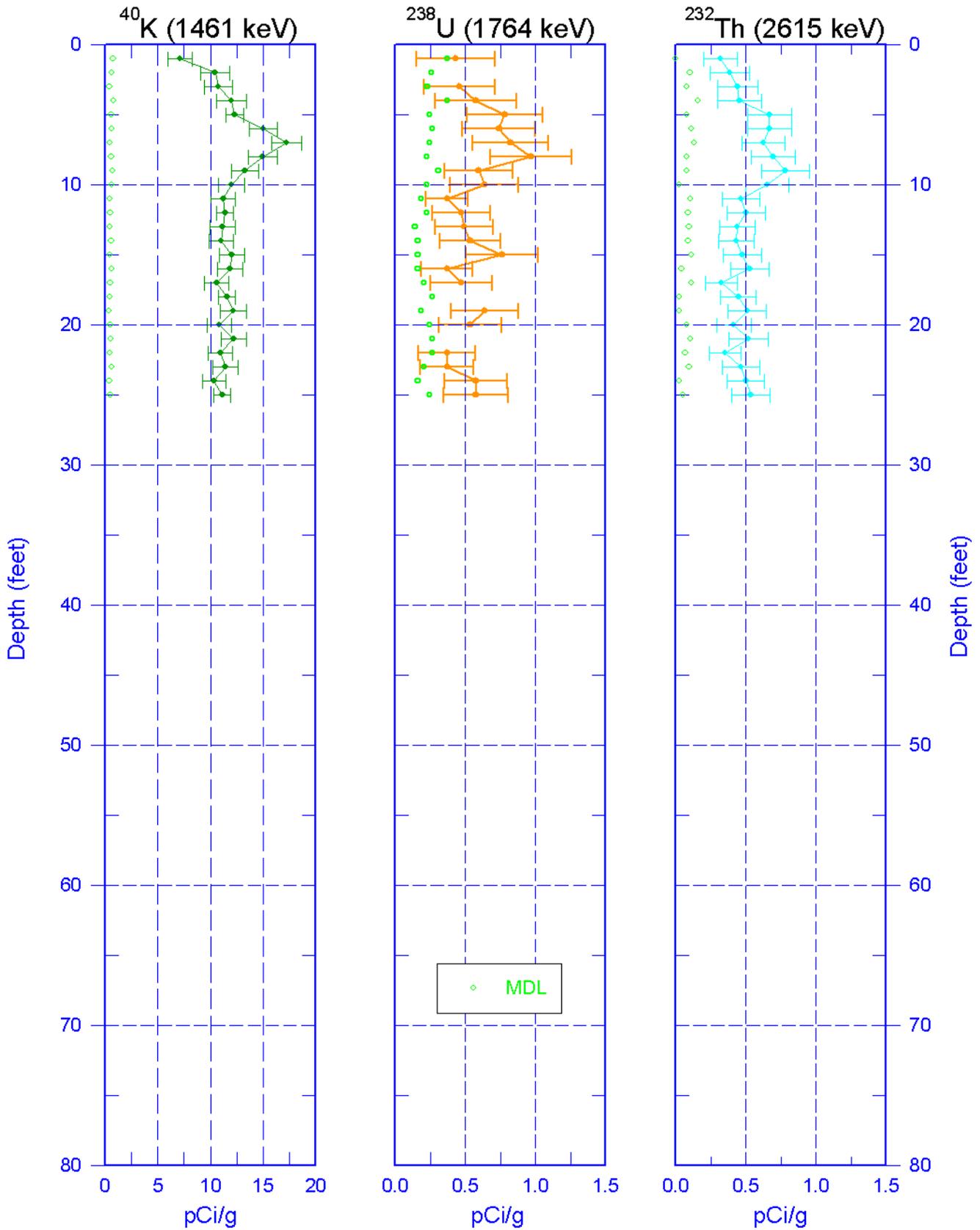
C3532

Manmade Radionuclides



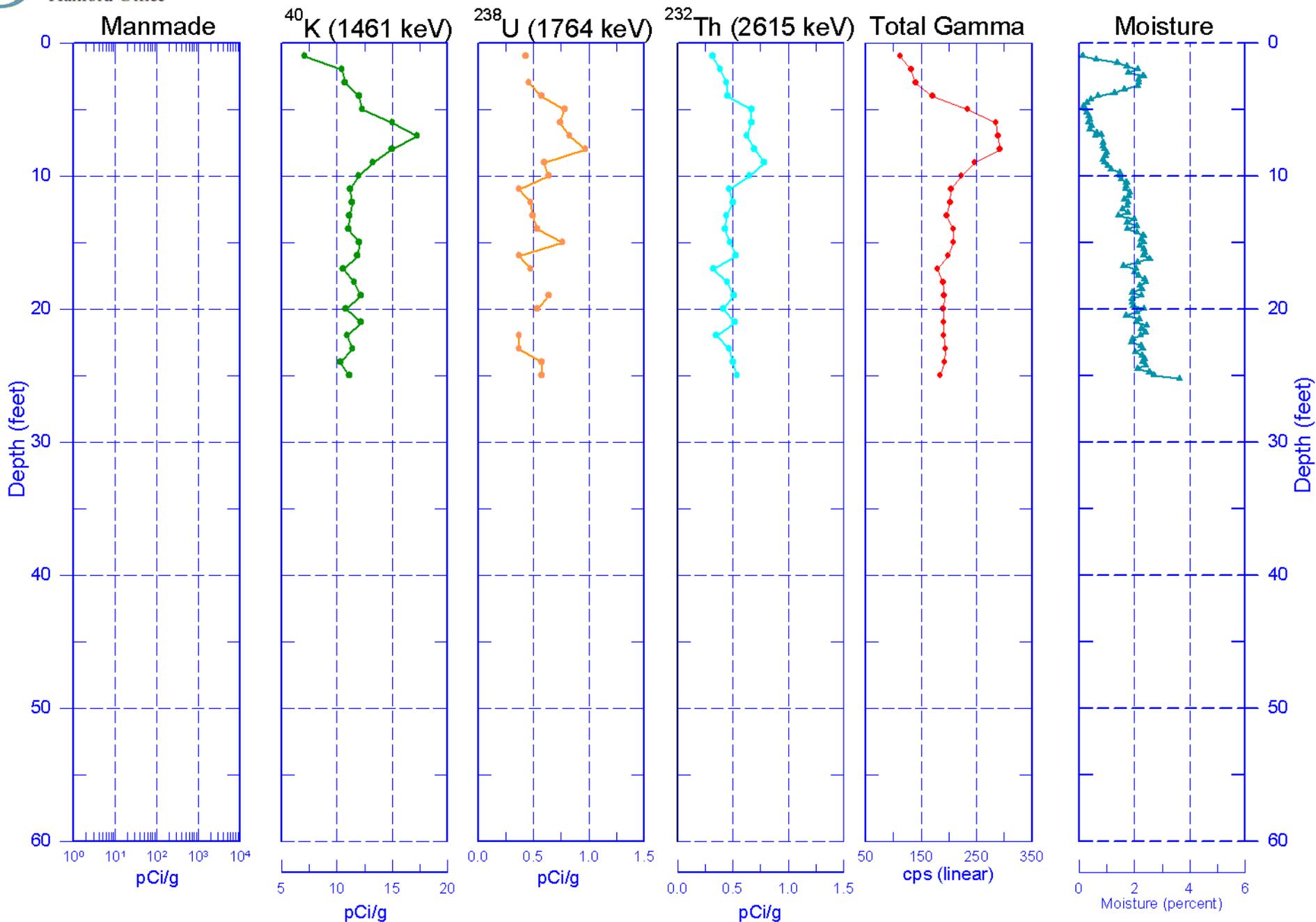
Zero Reference = Top of Casing

C3532 Natural Gamma Logs



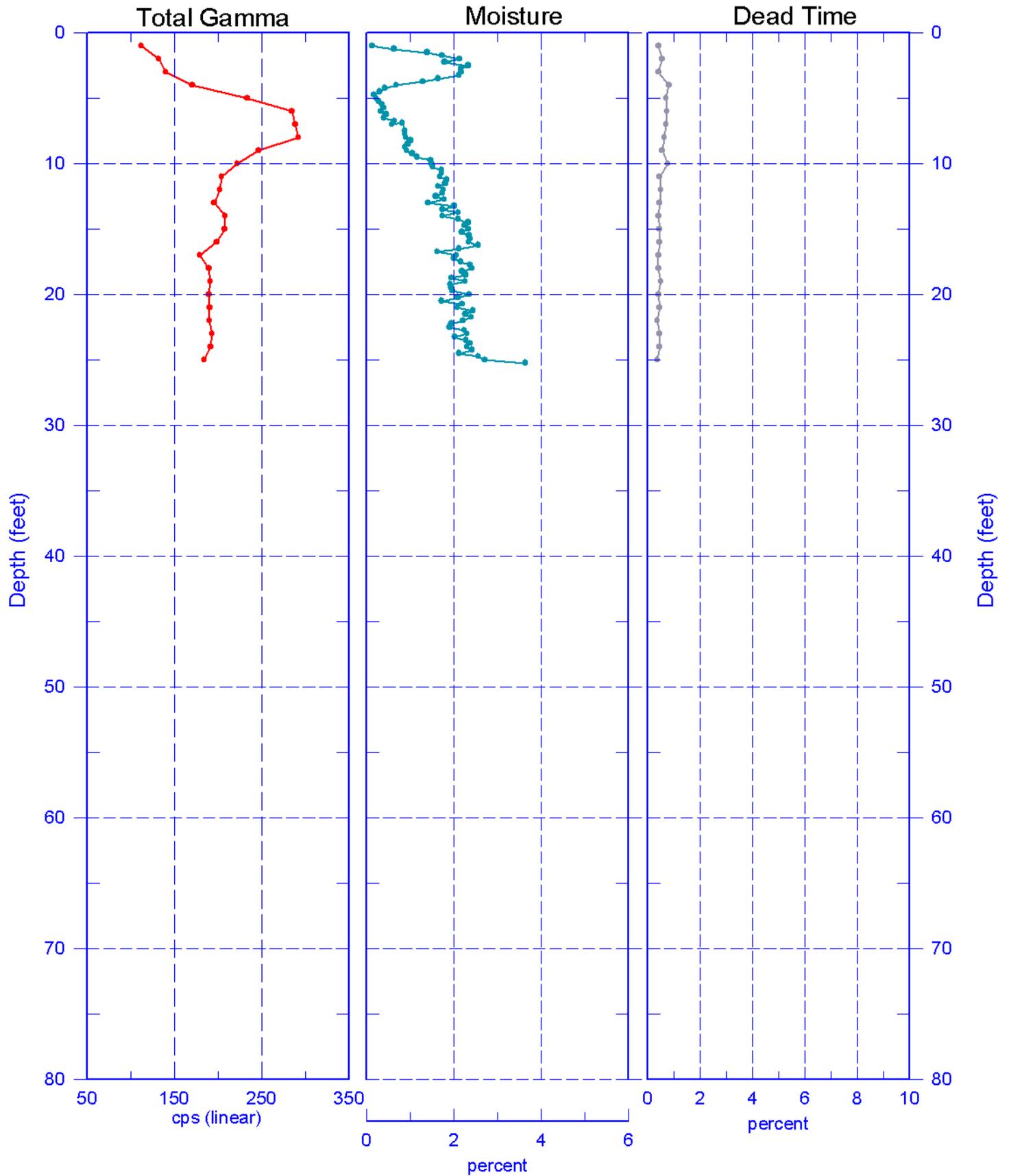
Zero Reference = Top of Casing

C3532 Combination Plot



Zero Reference = Top of Casing

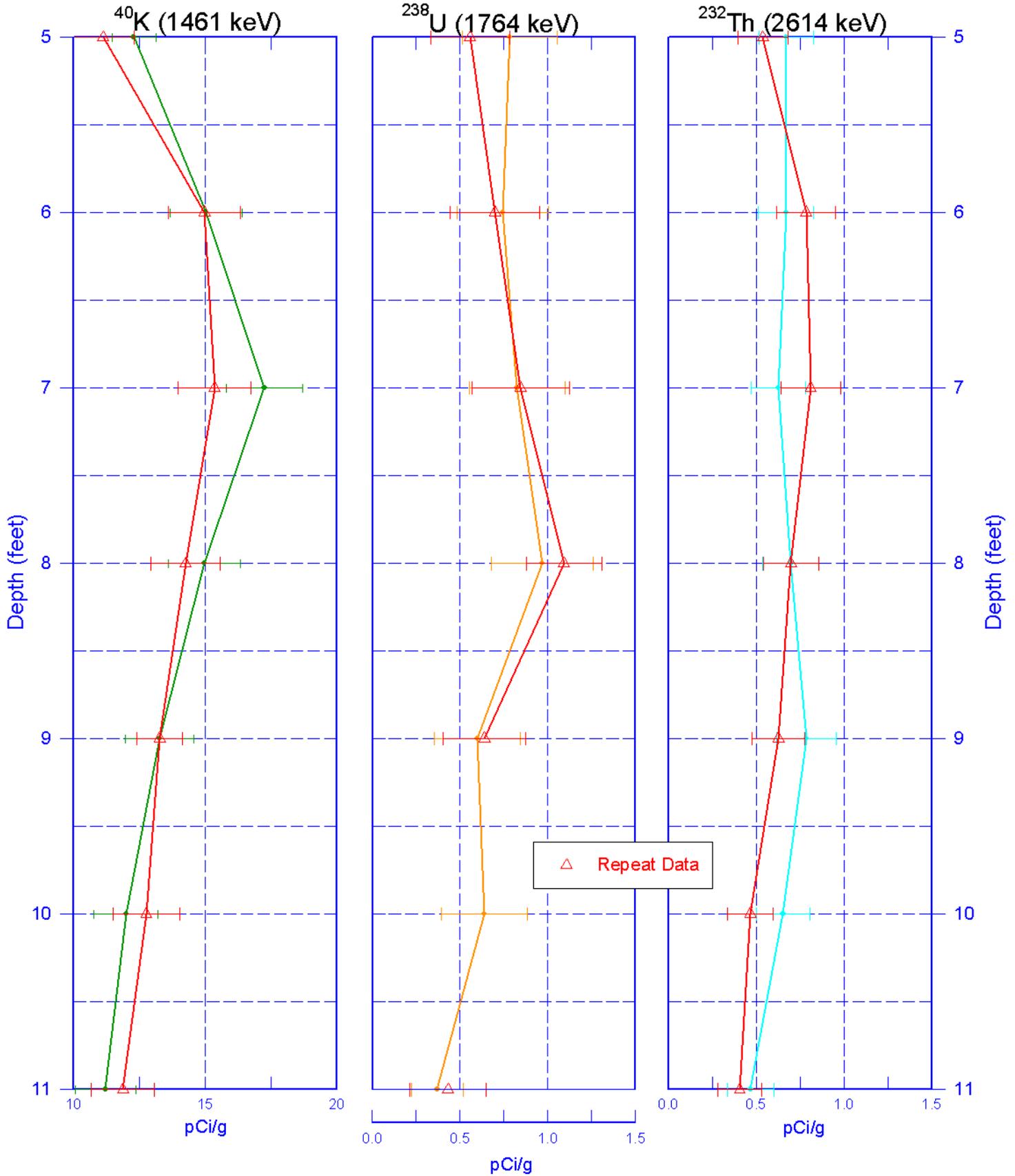
Total Gamma, Moisture, & Dead Time



Reference - Top of Casing

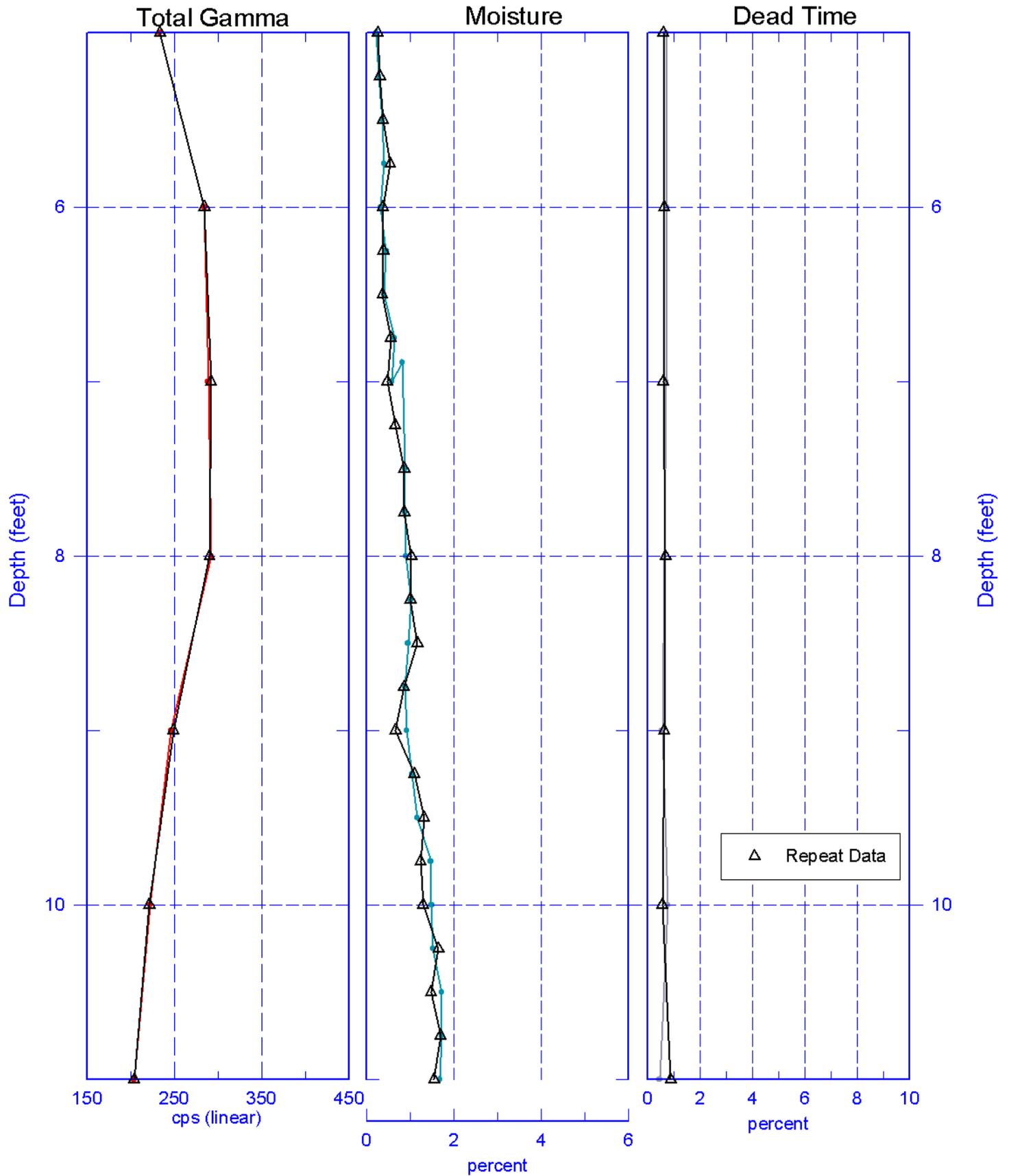
C3532

Repeat Section of Natural Gamma Logs



Zero Reference = Top of Casing

Repeat of Total Gamma, Moisture, & Dead Time



Reference - Top of Casing