



## 299-E33-70 (A6878)

### Log Data Report

#### Borehole Information:

<b>Borehole:</b> 299-E33-70 (A6878)		<b>Site:</b> 216-B-8 Crib			
<b>Coordinates</b>		<b>GWL (ft) <sup>1</sup>:</b> Not Applicable		<b>GWL Date:</b>	
<b>North</b> 573775	<b>East</b> 137462	<b>Drill Date</b> Dec. 1947	<b>TOC<sup>2</sup> Elevation</b> 637.58ft	<b>Total Depth (ft)</b> 150	<b>Type</b>

#### Casing Information:

<b>Casing Type</b>	<b>Stickup (ft)</b>	<b>Outer Diameter (in.)</b>	<b>Inside Diameter (in.)</b>	<b>Thickness (in.)</b>	<b>Top (ft)</b>	<b>Bottom (ft)</b>
Steel Welded	2.1	8 5/8	8	5/16	2.1	150

#### Borehole Notes:

The borehole was swabbed before collecting data, and no water was detected inside the casing. The logging engineer measured the pipe stickup at the borehole using a steel tape. Calipers were used to measure casing OD and thickness only; the casing ID is calculated. Stickup was measured between survey points marked on the casing. Zero reference is the top of casing.

#### Logging Equipment Information:

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

#### Spectral Gamma Logging System (SGLS) Log Run Information:

<b>Log Run</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Date	09/13/01	09/13/01	09/13/01	09/17/01		
Logging Engineer	Spatz	Spatz	Spatz	Spatz		
Start Depth (ft)	2.5	30.5	60.0	151.0		
Finish Depth (ft)	31.5	61.0	92.5	91.5		
Count Time (sec)	100	30	100	100		
Live/Real	R	R	R	R		
Shield (Y/N)	N/A <sup>3</sup>	N/A	N/A	N/A		
MSA Interval (ft)	0.5	0.5	0.5	0.5		
ft/min	N/A	N/A	N/A	N/A		
Pre-Verification	B0051CAB	B0051CAB	B0051CAB	B0052CAB		
Start File	B0051000	B0051059	B0051121	B0052000		
Finish File	B0051058	B0051120	B0051186	B0052119		
Post-Verification	B0051CAA	B0051CAA	B0051CAA	B0053CAA		
Depth Return Error (ft)	N/A	N/A	0	0		

Log Run	1	2	3	4	5	6
Comments	See fine-gain adjustment statement below.	Logging parameter change, depth interval exceeds 50% dead time.	No fine-gain adjustments made during this log run.	Repeat section. No fine-gain adjustments made during this log run.		

**Logging Operation Notes:**

Fine-gain adjustments were made after 59.0 ft (file B0051053) and 123.0 ft (file B0052056) during log run 1. Zero reference is the top of casing. The pre-calibration files (B0051CAB and B052CAB) passed verification criteria.

**Analysis Notes:**

<b>Analyst:</b>	Sobczyk	<b>Date:</b>	09/19/01	<b>Reference:</b>	MAC-VZCP 1.7.9 Rev. 2
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Pre-run and post-run verification spectra for the SGLS were evaluated. All of the spectra were within the control limits. The post-survey verification (file B0053CAA) was outside of the warning limits. The photopeak counts per second for the 1461-keV peak and the 609-keV peak were below the lower warning limits for this post-run verification spectrum. The photopeak counts per second for the 2615-keV peak was below the lower warning limits for the post-run verification spectrum file B0051CAA. Evaluation of the spectra indicated that the tool is functioning properly, and the spectra are provisionally accepted.

Individual spectra were processed in batch mode using APTEC Supervisor. Concentrations were calculated in EXCEL, using parameters determined from analysis of calibration data collected in August 2000. The casing configuration was assumed to be one string of 8-in. casing with a thickness of 5/16 in. These assumptions are consistent with the logging engineer’s measurements. Zero reference is the top of the casing.

Dead time was greater than 40 percent from 30.5 to 71 ft, and data from this region are considered unreliable. Dead time corrections were required where the tool was not saturated. At dead time greater than 40 percent, peak spreading and pulse pile-up effects may result in underestimation of activities. This effect is not entirely corrected by the dead time correction, and the extent of error increases with increasing dead time.

**Log Plot Notes:**

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides (<sup>40</sup>K, <sup>238</sup>U, and <sup>232</sup>Th), and <sup>137</sup>Cs. 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 activity (MDA) 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 also included to facilitate correlation.

**Results and Interpretations:**

<sup>137</sup>Cs, which is a man-made radionuclide, was detected in this borehole. A zone of <sup>137</sup>Cs contamination was detected near the ground surface (log depth 3.0 through 7.5 ft) with activities ranging from 0.3 to 95.3 pCi/g. <sup>137</sup>Cs occurred between 28 and 120.5 ft. In this interval, activities exceeded 1,000 pCi/g between 31

and 72.5 ft. Above the zone of intense gamma-ray activity, apparent <sup>40</sup>K activities are about 13 pCi/g. Below this zone of intense gamma ray activity, apparent <sup>40</sup>K activities are about 18 pCi/g. The relatively high concentrations of Cs -137 below about 30 ft may correspond with the increase in <sup>40</sup>K activities and the transition from the coarse-grained sediments of the Hanford H1 to the finer grained sediments of the Hanford H2.

Because of the high activities encountered by the SGLS, the interval between 30 and 74 ft should be logged with the High Rate Logging System.

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<sup>1</sup> GWL – groundwater level

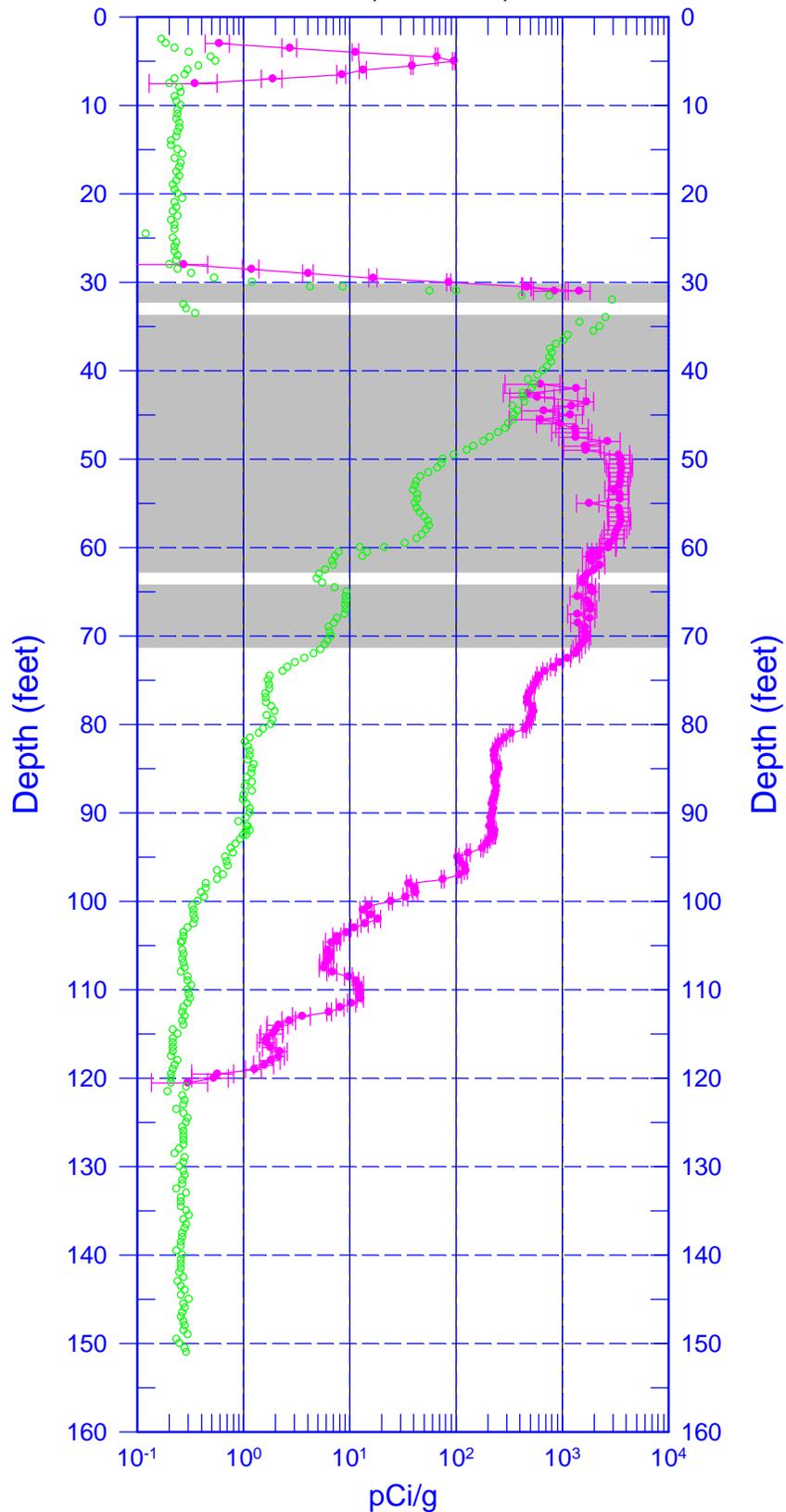
<sup>2</sup> TOC – top of casing

<sup>3</sup> N/A – not applicable

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## Man-Made Radionuclide

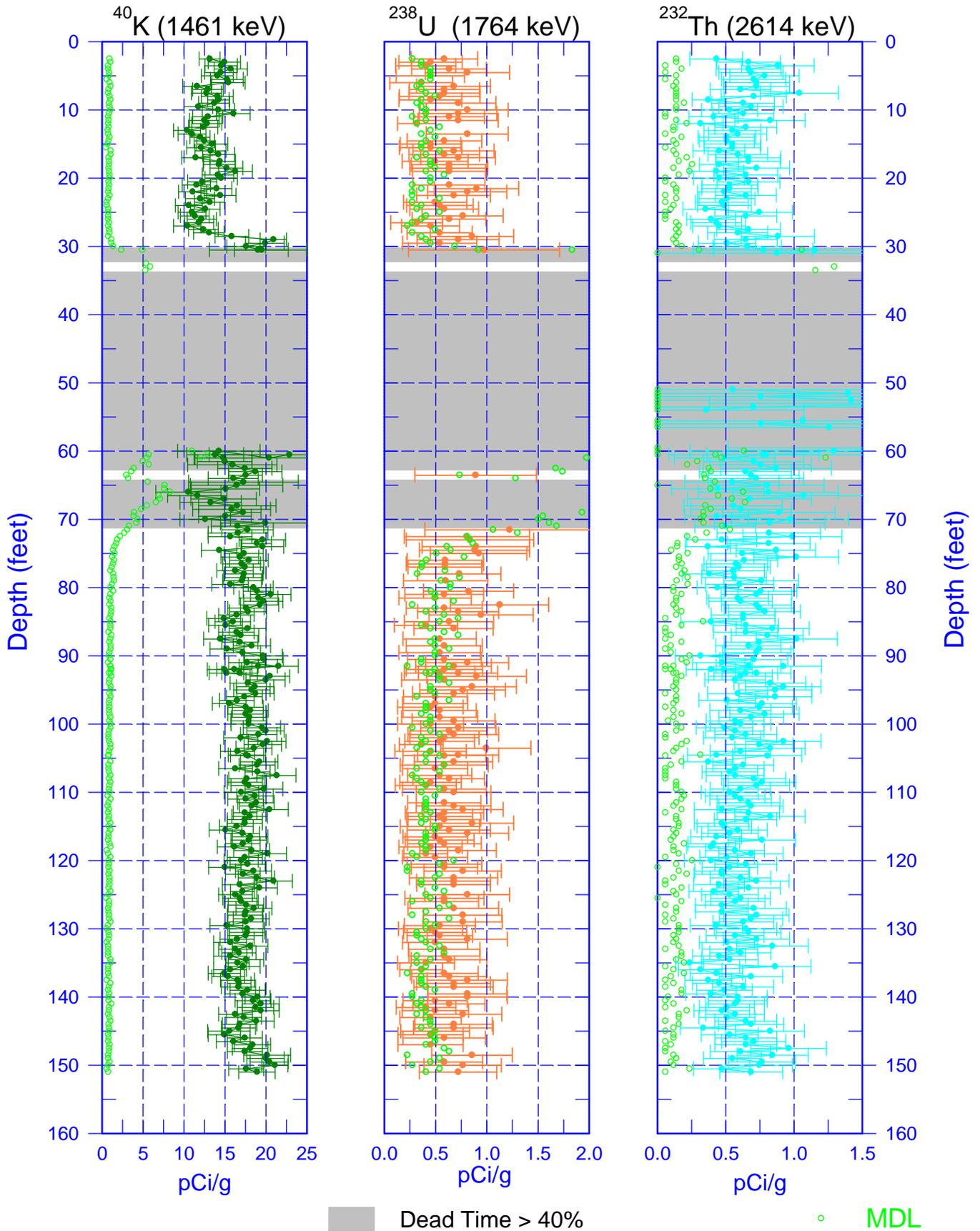
$^{137}\text{Cs}$  (662 keV)



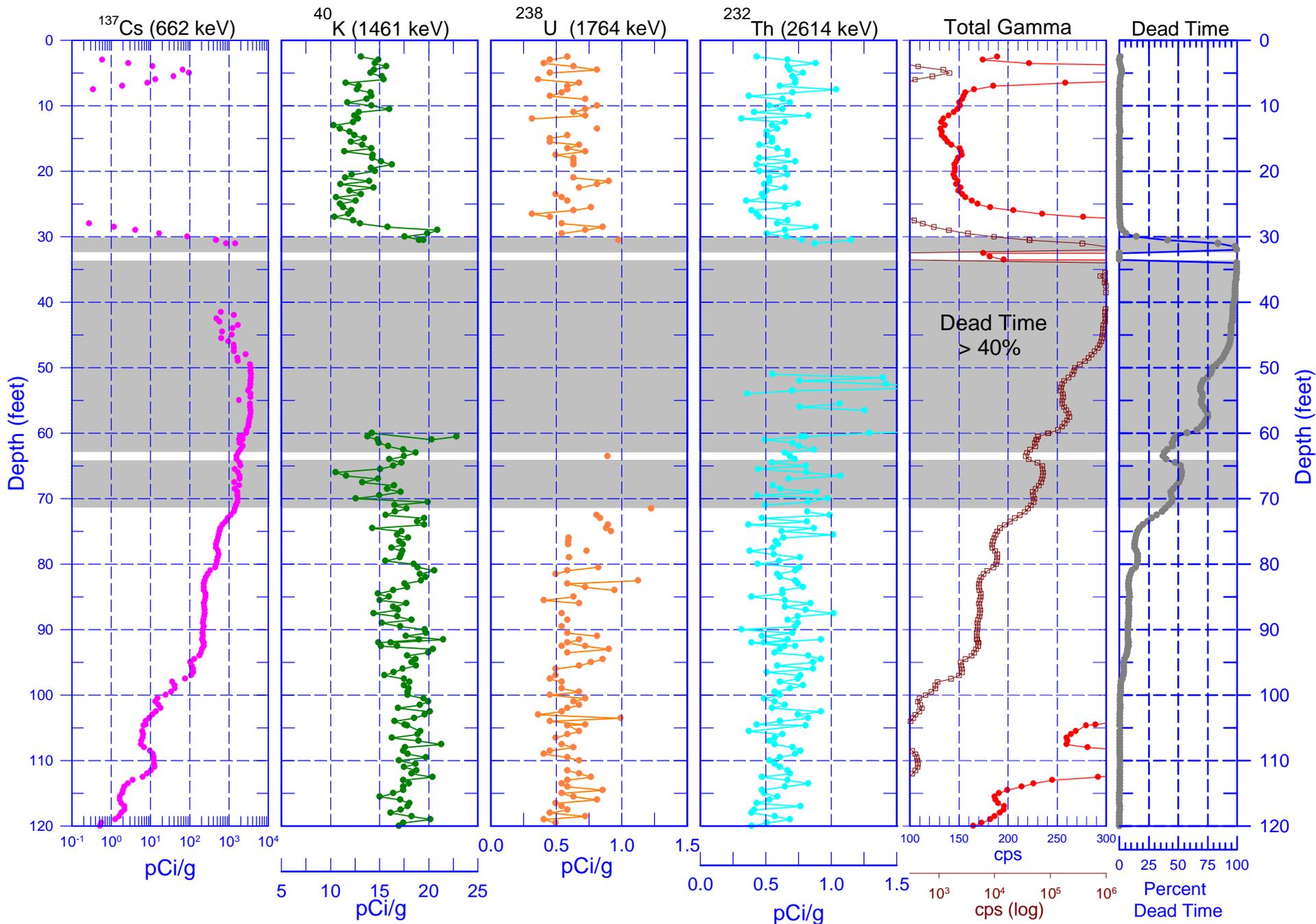
Dead Time > 40%

MDL

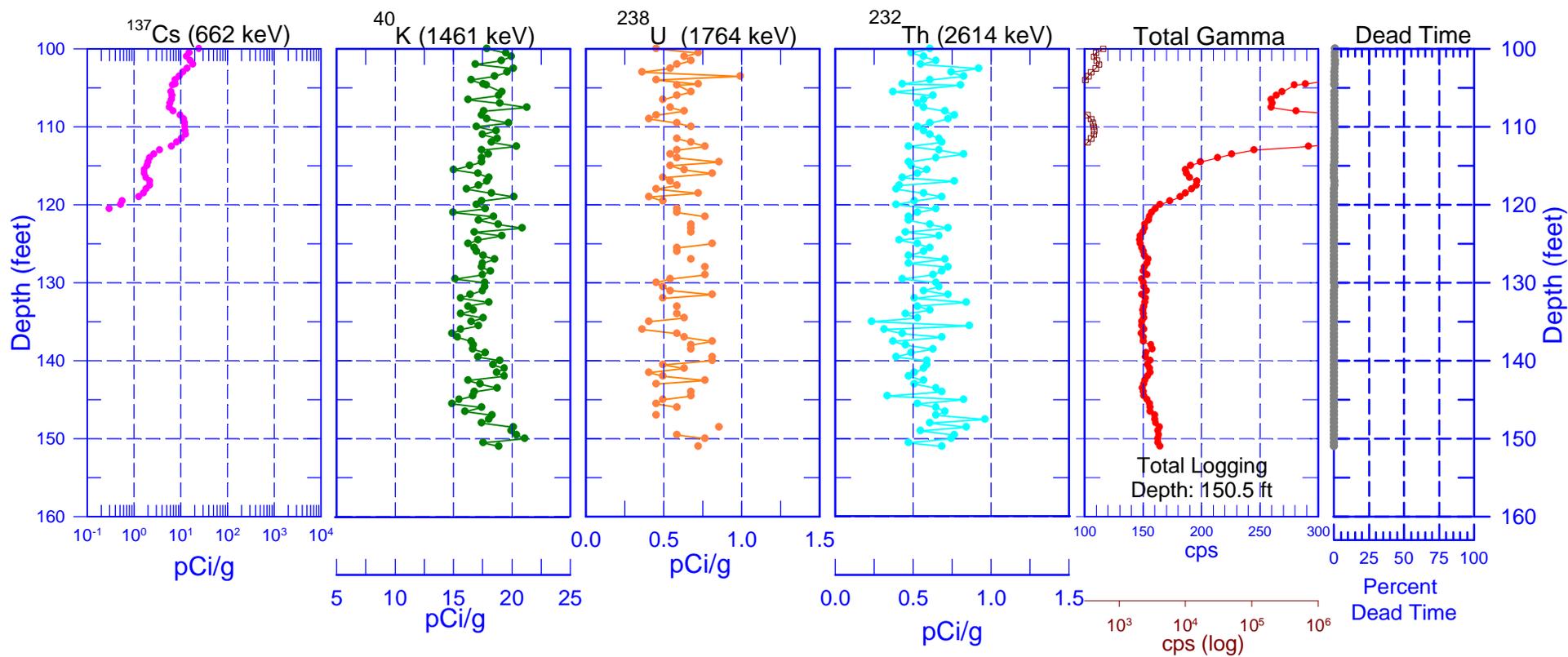
# 299-E33-70 (A6878) Natural Gamma Logs



# 299-E33-70 (A6878) Combination Plot



# 299-E33-70 (A6878) Combination Plot



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## Total Gamma & Dead Time

