

**C4559**  
**Log Data Report**

**Borehole Information:**

<b>Borehole:</b> C4559		<b>Site:</b> 216-U-3 Crib			
<b>Coordinates</b> (WA State Plane)		<b>GWL (ft)<sup>1</sup>:</b> Dry		<b>GWL Date:</b> None	
<b>North</b>	<b>East</b>	<b>Drill Date</b>	<b>TOC<sup>2</sup> Elevation</b>	<b>Total Depth (ft)</b>	<b>Type</b>
Not Available	Not Available	Jan. 2005	Not Applicable	120	Cable Tool

**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>
Threaded steel	1.20	10 3/4	9 3/8	11/16	1.20	120

**Borehole Notes:**

Zero reference is the ground surface. Casing diameter was measured by the logging engineer using a steel tape. The driller reports there is an open borehole below 120 ft in depth.

**Logging Equipment Information:**

<b>Logging System:</b> Gamma 4E	<b>Type:</b> SGLS (70%) 34TP40587A
<b>Calibration Date:</b> 05/04	<b>Calibration Reference:</b> DOE-EM/GJ692-2004
<b>Logging Procedure:</b> MAC-HGLP 1.6.5, Rev. 0	

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

<b>Log Run</b>	<b>1</b>	<b>2 Repeat</b>			
Date	12/20/04	12/20/04			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	121.0	30.0			
Finish Depth (ft)	0.0	18.0			
Count Time (sec)	100	100			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
ft/min	N/A <sup>3</sup>	N/A			
Pre-Verification	DE501CAB	DE501CAB			
Start File	DE501000	DE501122			
Finish File	DE501121	DE501134			
Post-Verification	DE501CAA	DE501CAA			
Depth Return Error (in.)	0	0			

Log Run	1	2 Repeat			
Comments	No fine-gain adjustment made.	No fine-gain adjustment made.			

**Logging Operation Notes:**

Zero reference was ground surface. Logging was performed with a centralizer installed on the sonde. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT (<sup>40</sup>K, <sup>238</sup>U, and <sup>232</sup>Th) verifier with serial number 115.

**Analysis Notes:**

<b>Analyst:</b>	Henwood	<b>Date:</b>	03/09/05	<b>Reference:</b>	GJO-HGLP 1.6.3, Rev. 0
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SGLS pre-run and post-run verification spectra were collected at the beginning and end of the day. All of the verification spectra were within the acceptance criteria. Examination of spectra indicates that the detector functioned normally during logging, and the spectra are accepted.

Log spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. The post-run verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC SUPERVISOR. Concentrations were calculated in EXCEL (source file: G4EJul04.xls). The casing configuration was assumed as one string of 6-in. casing with a thickness of 11/16 in. to 120 ft. No correction for casing was made at 121 ft (total logging depth). Dead time and water corrections were not required.

**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 man-made radionuclides. A plot of the repeat log versus the original log is included. 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 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. The <sup>214</sup>Bi peak at 1764 keV was used to determine the naturally occurring <sup>238</sup>U concentrations on the combination plot rather than the <sup>214</sup>Bi peak at 609 keV because it exhibited slightly higher net counts per second.

**Results and Interpretations:**

<sup>137</sup>Cs was detected at one ft at a concentration of approximately 1 pCi/g. No other man-made radionuclides were detected in this borehole.

The plots of the repeat logs demonstrate reasonable repeatability of the SGLS data for the natural radionuclides at energy levels of 1461, 1764, and 2614 keV.

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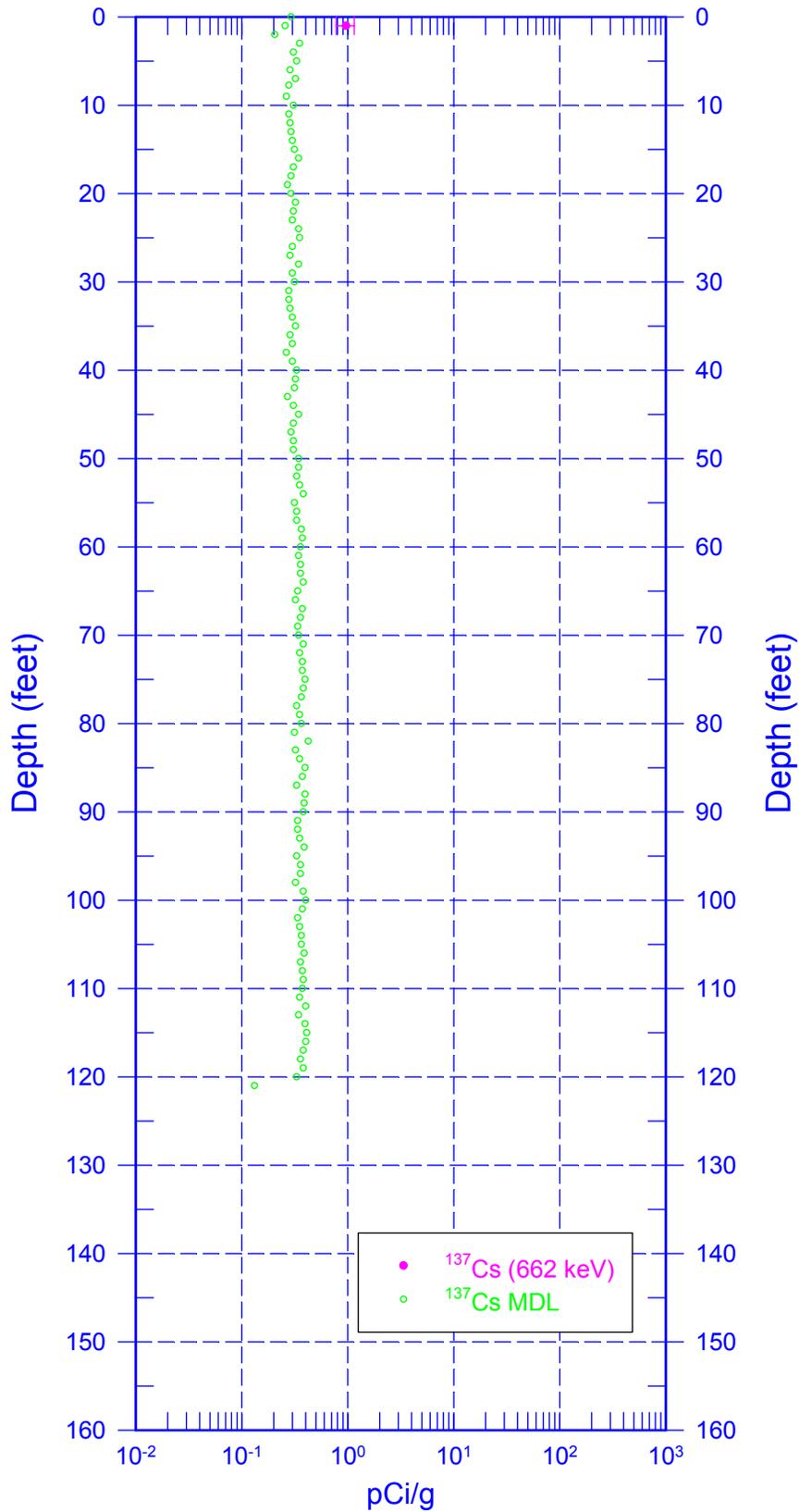
<sup>1</sup> GWL – groundwater level

<sup>2</sup> TOC – top of casing

<sup>3</sup> N/A – not applicable

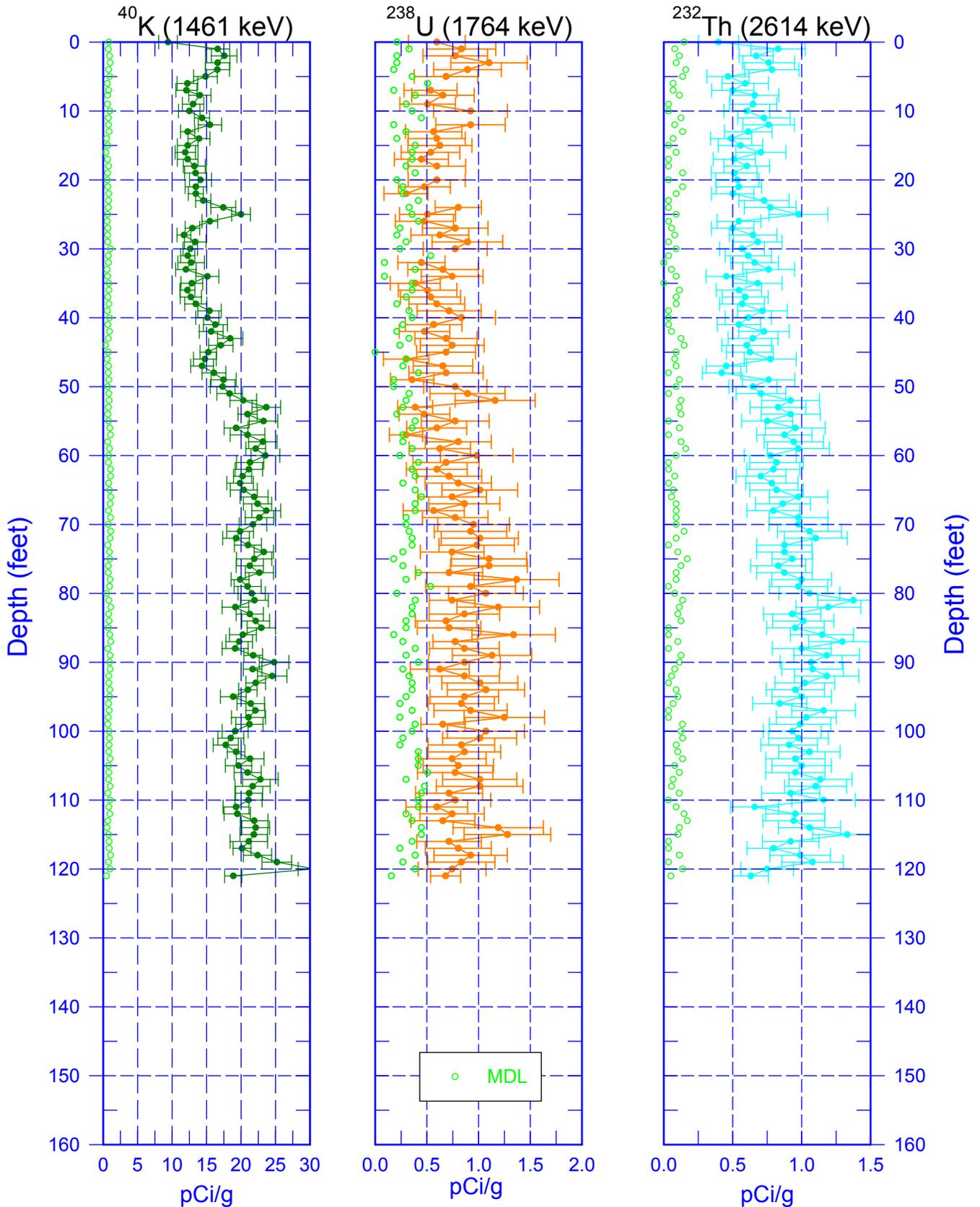
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## Man-Made Radionuclides



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## Natural Gamma Logs

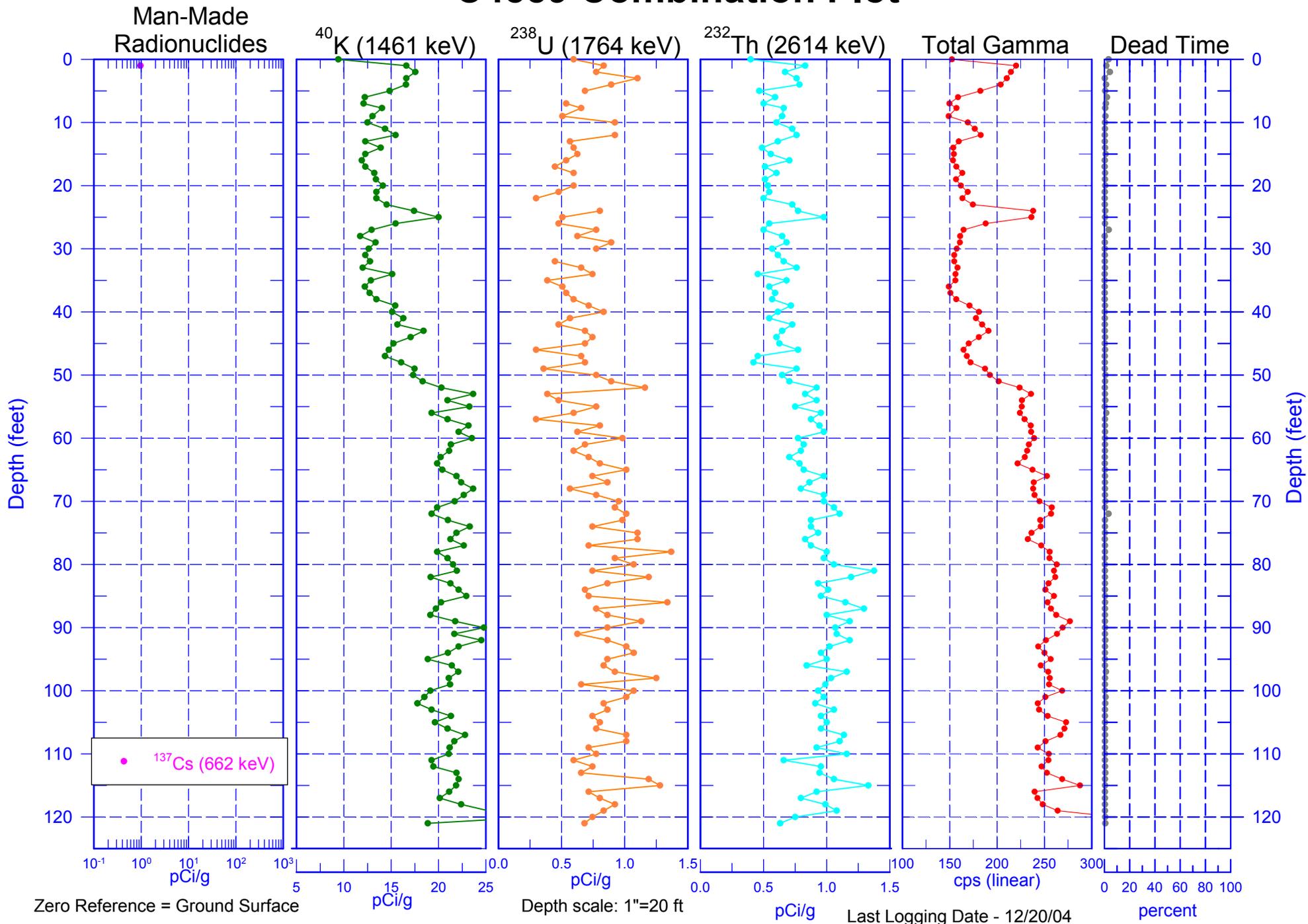


Zero Reference = Ground Surface

Depth Scale = 1" = 20 ft

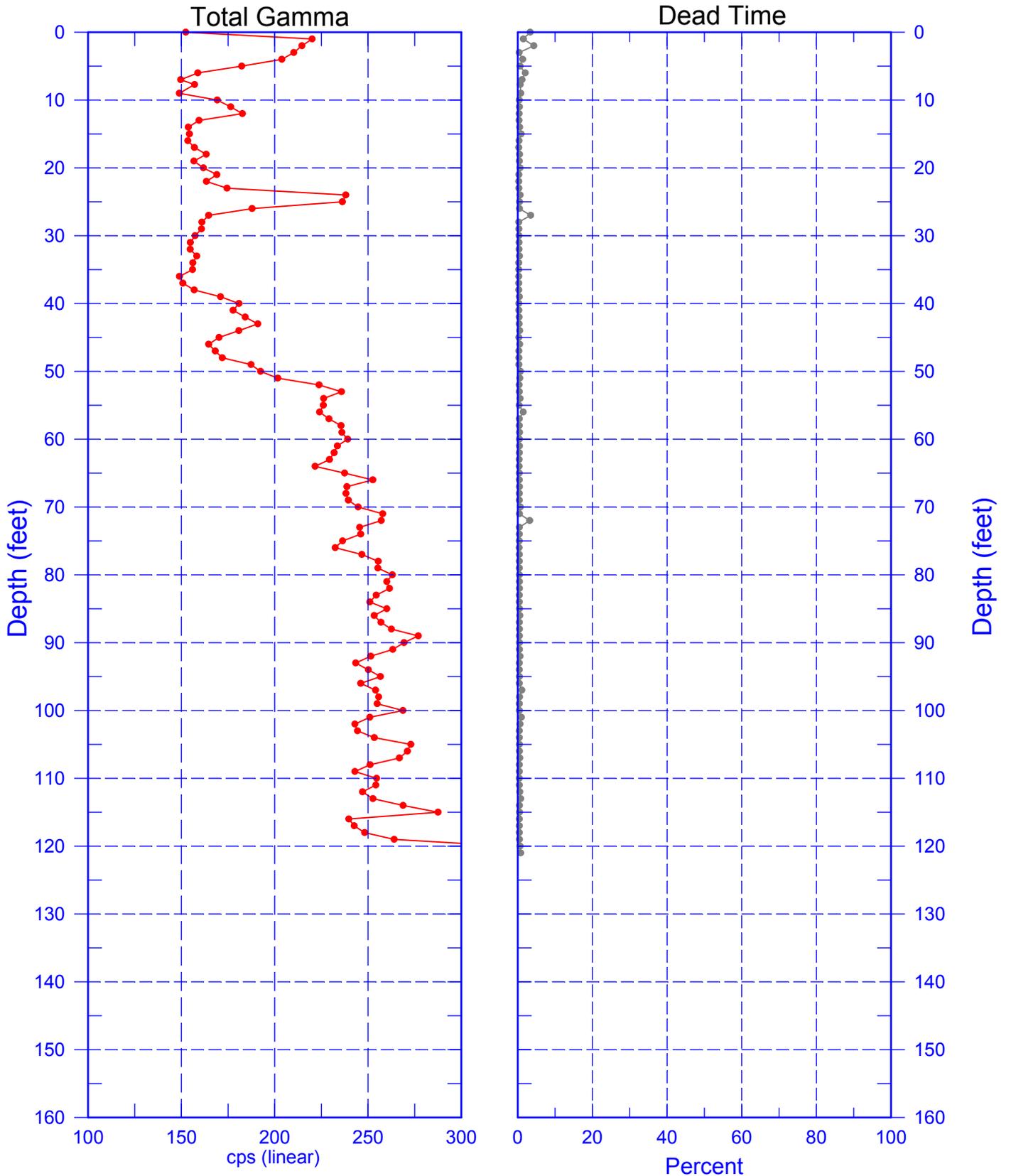
Last Log Date - 12/20/04

# C4559 Combination Plot



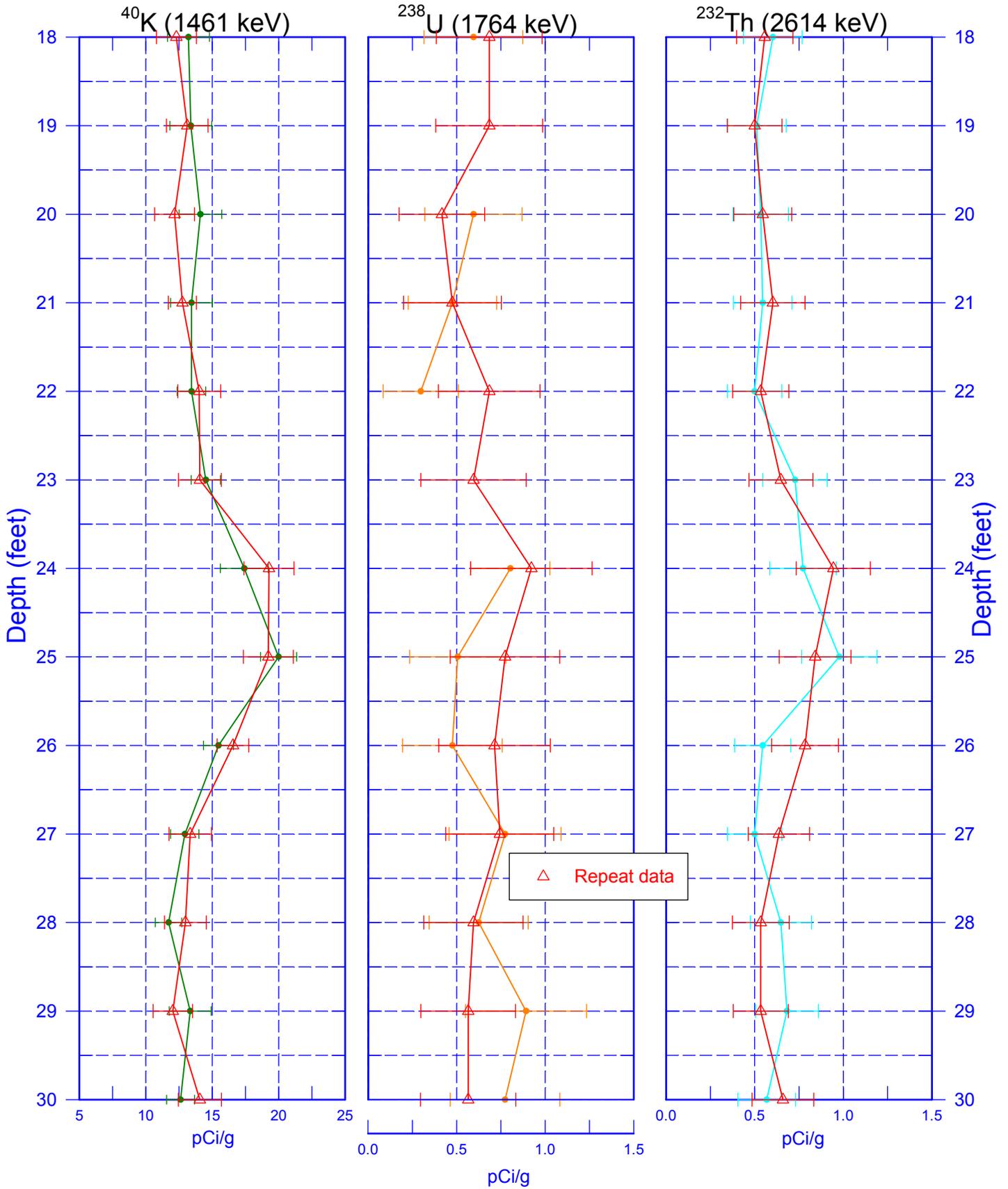
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## Total Gamma & Dead Time



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## Repeat Section of Natural Gamma Logs



Zero Reference = Ground Surface

Last Log Date - 12/20/04