

HGLP-LDR-077

## 399-3-21 (C5575) Log Data Report

### Borehole Information:

<b>Borehole:</b> 399-3-21 (C5575)		<b>Site:</b> East of 307 Trenches (WIDS Site 316-3)			
<b>Coordinates (WA St Plane)</b>		<b>GWL<sup>1</sup> (ft):</b> 46.8	<b>GWL Date:</b> 05/07/07		
<b>North (m)</b>	<b>East (m)</b>	<b>Drill Date</b>	<b>TOC Elevation</b>	<b>Total Depth (ft)</b>	<b>Type</b>
115854.28	594379.75	05/07/07	121.158 m	150	Cable

### Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Threaded Steel	1.2	11 3/4	10 3/4	0.5	1.2	144

### Borehole Notes:

This borehole is located approximately 20 ft northeast of borehole 399-3-20. The logging engineer measured the casing and stickup using a steel tape. Measurements were rounded to the nearest 1/16 in. Depth to groundwater was provided by Fluor-Hanford. Borehole coordinates and elevation were obtained from the Hanford Well Information System.

### Logging Equipment Information:

<b>Logging System:</b> Gamma 1N	<b>Type:</b> SGLS (60%) SN: 45TP22010A
<b>Effective Calibration Date:</b> 02/20/07	<b>Calibration Reference:</b> HGLP-CC-010
	<b>Logging Procedure:</b> HGLP-MAN-002, Rev. 0

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

Log Run	1	2	3 Repeat	
Date	05/07/07	05/08/07	05/08/07	
Logging Engineer	Spatz	Spatz	Spatz	
Start Depth (ft)	0	149.0'	53.0	
Finish Depth (ft)	45.0'	44.0'	38.0'	
Count Time (sec)	100 s	100 s	100 s	
Live/Real	R	R	R	
Shield (Y/N)	NA	NA	NA	
MSA Interval (ft)	0.5 ft	0.5 ft	0.5 ft	
ft/min	NA	NA	NA	
Pre-Verification	AN053CAB	AN054CAB	AN054CAB	
Start File	AN053000	AN054000	AN054211	
Finish File	AN053090	AN054210	AN054241	
Post-Verification	AN053CAA	AN054CAA	AN054CAA	
Depth Return Error (in.)	Low 1"	Low 1"	0	
Comments	Fine gain adjustment made after file 059	No fine gain adjustment made.	Repeat section.	

**HGLP-LDR-077**

**Logging Operation Notes:**

Logging was conducted with a centralizer on the sonde. Logging data acquisition is referenced to ground level. The maximum logging depth achieved was 149.2 ft.

**Analysis Notes:**

<b>Analyst:</b>	McCain	<b>Date:</b>	08/13/07	<b>Reference:</b>	GJO-HGLP 1.6.3, Rev. 0
-----------------	--------	--------------	----------	-------------------	------------------------

Pre-run and post-run verifications for the SGLS (G1N) were acquired in the Amersham verifier, serial number 118. The verification criteria were met.

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 G1NFeb07.xls using efficiency functions and corrections for casing, water, and dead time as determined from annual calibrations. No correction for dead time was necessary. A casing correction for 0.5-in. thick casing was applied to the SGLS log data from 0 to 144 ft. Below 144 ft no casing correction was applied. A correction for water was applied to data acquired below 46.8 ft in depth.

**Results and Interpretations:**

A plot of manmade radionuclides are included for <sup>137</sup>Cs and processed uranium (<sup>235</sup>U and <sup>238</sup>U). The plot indicates all detections based on the routine processing software. All of the detections were at or near the respective MDLs. Inspection of each spectrum where a detection was indicated revealed no full energy peaks. Therefore, the detections are considered to be statistical fluctuations and are not considered valid. No other manmade radionuclides were indicated. The increase in total gamma activity near the bottom of the hole reflects the absence of casing.

There is a strong indication of radon in the groundwater. Comparison of the 1764 keV and 609 keV <sup>214</sup>Bi gamma rays show differing concentrations after corrections for water and casing. The casing and water correction factors decrease with increasing energy. Gamma rays originating inside the casing are not attenuated by the steel casing, and the net effect of applying the correction factors is to amplify results from low-energy gamma rays. The fact that the 609 keV gamma ray results in a higher apparent concentration than the 1764 keV gamma line suggests that radon may be present in the groundwater. Typical formation concentrations of naturally occurring <sup>238</sup>U are between approximately 0.5 and 1.5 pCi/g. The concentrations above the groundwater level are consistent with these values for the assays of both the 609 and 1764 keV peaks. Note that enhanced radon is not related to the existence of manmade uranium.

The repeat section generally indicates good agreement of the naturally occurring KUT.

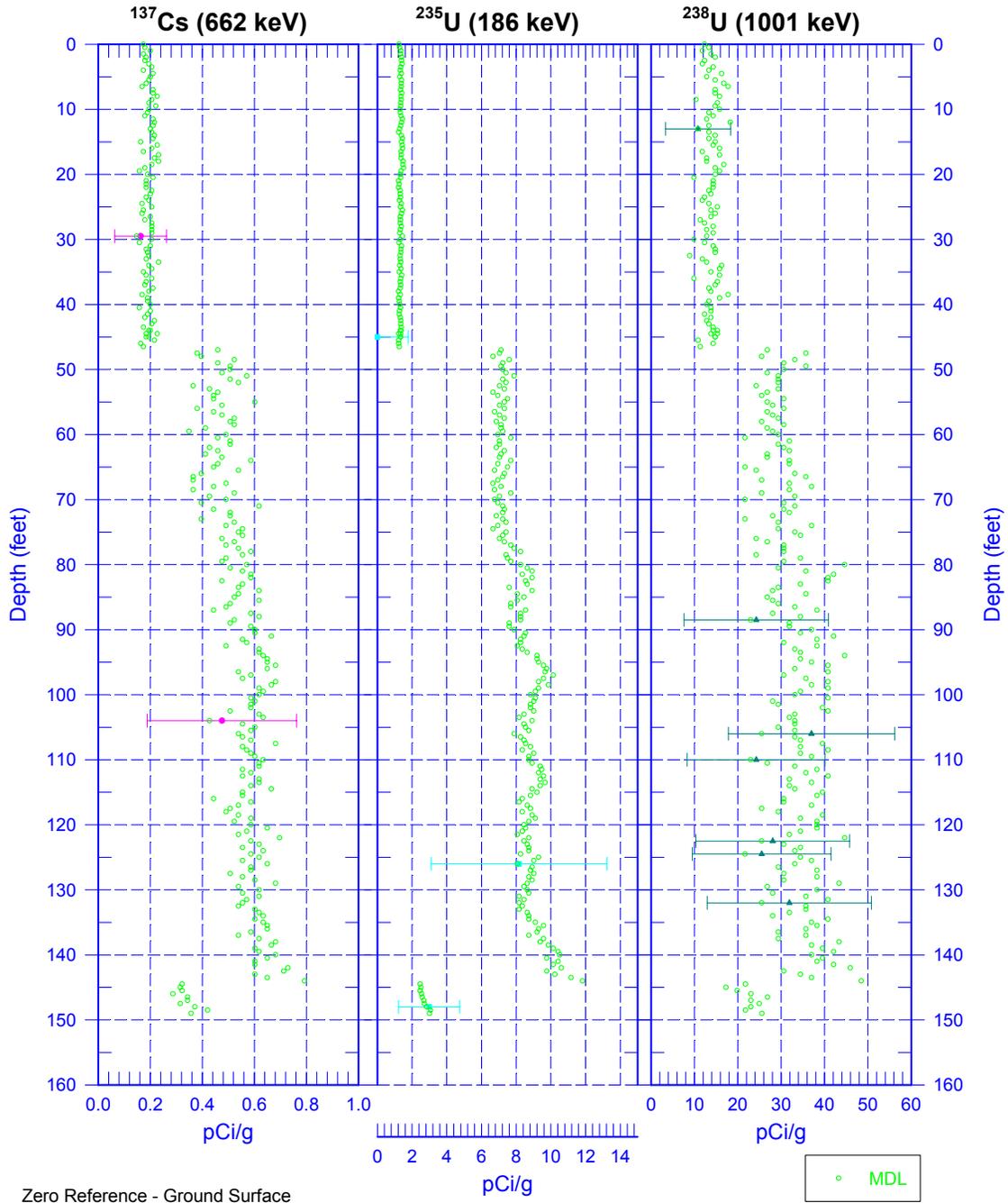
**List of Plots:**

- Manmade Radionuclides
- Natural Gamma Logs
- Combination Plot (0-120 ft)
- Combination Plot (110-230 ft)
- Combination Plot (0-150 ft)
- Total Gamma & Dead Time
- Repeat Section of Natural Gamma Logs

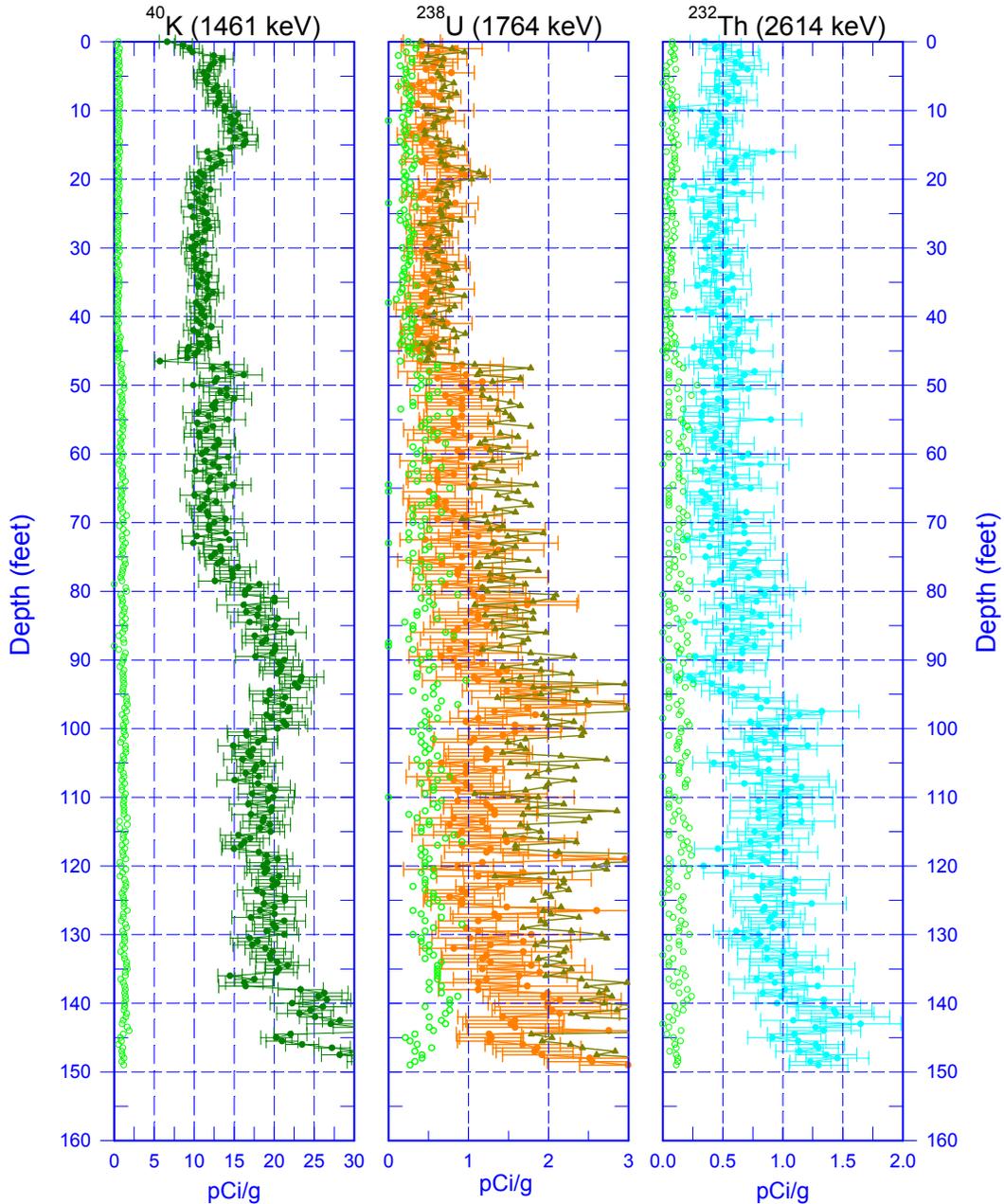
---

<sup>1</sup> GWL – groundwater level

### 399-3-21 (C5575) Manmade Radionuclides



**399-3-21 (C5575)  
Natural Gamma Logs**

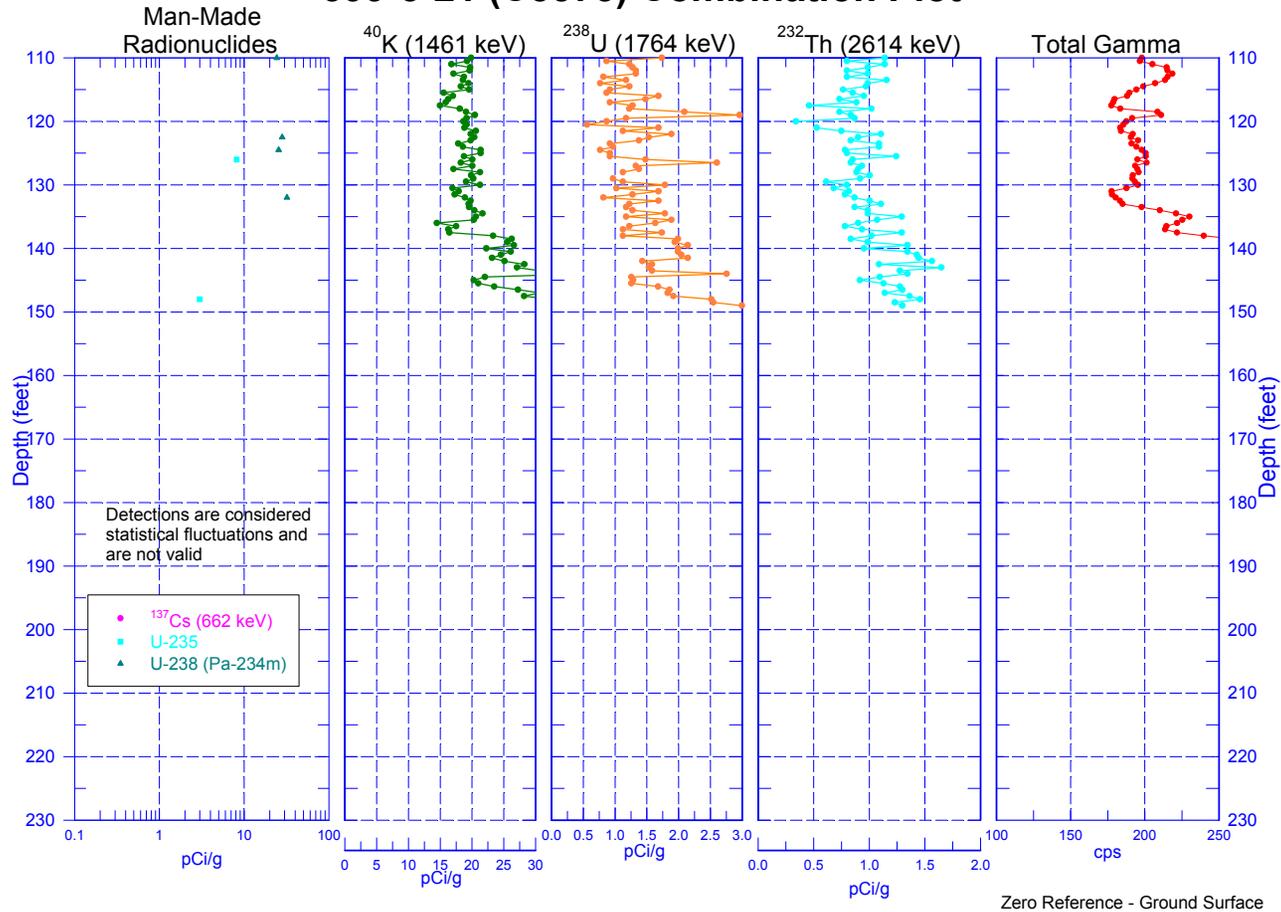


Zero Reference - Ground Surface



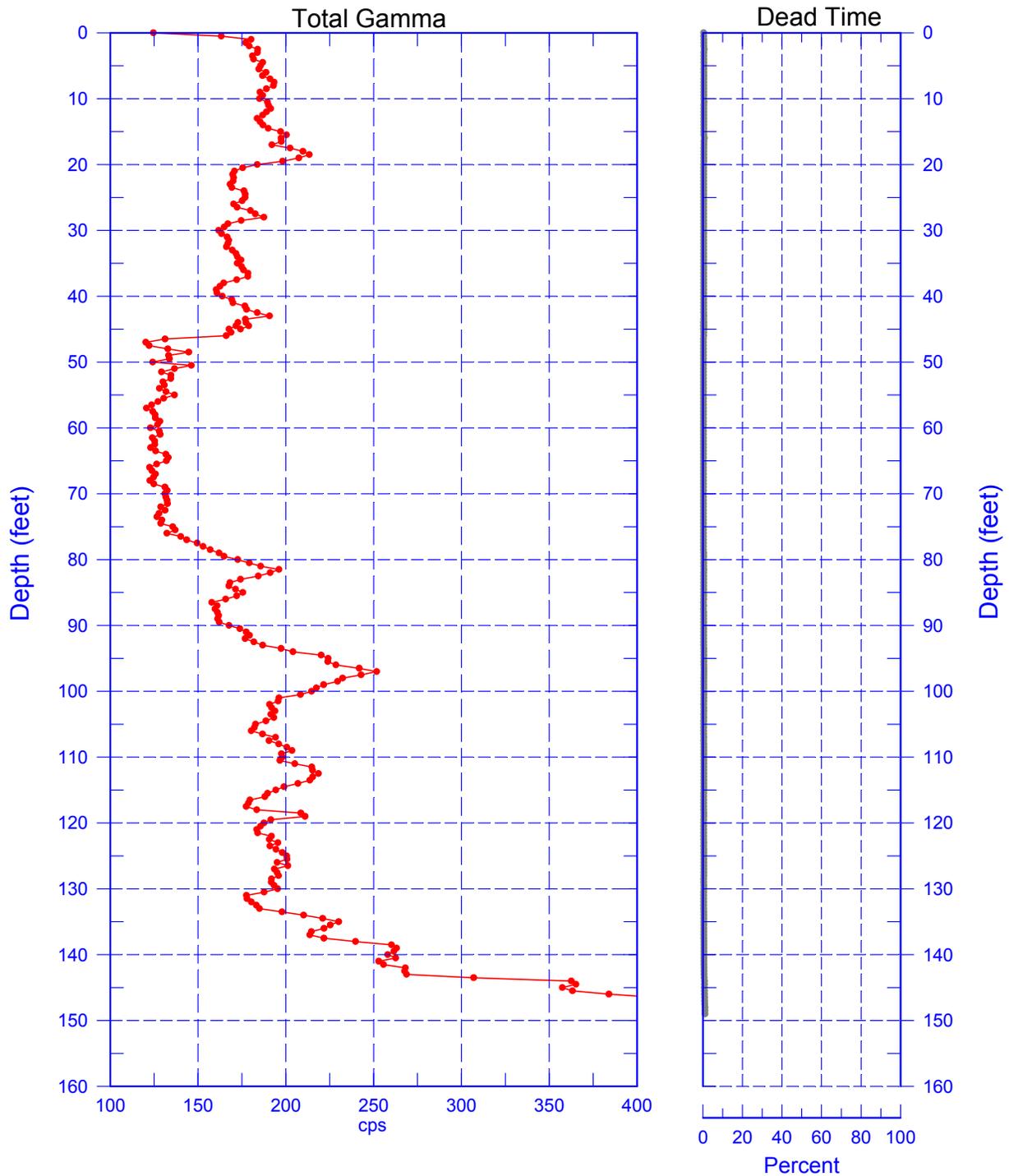


**399-3-21 (C5575) Combination Plot**



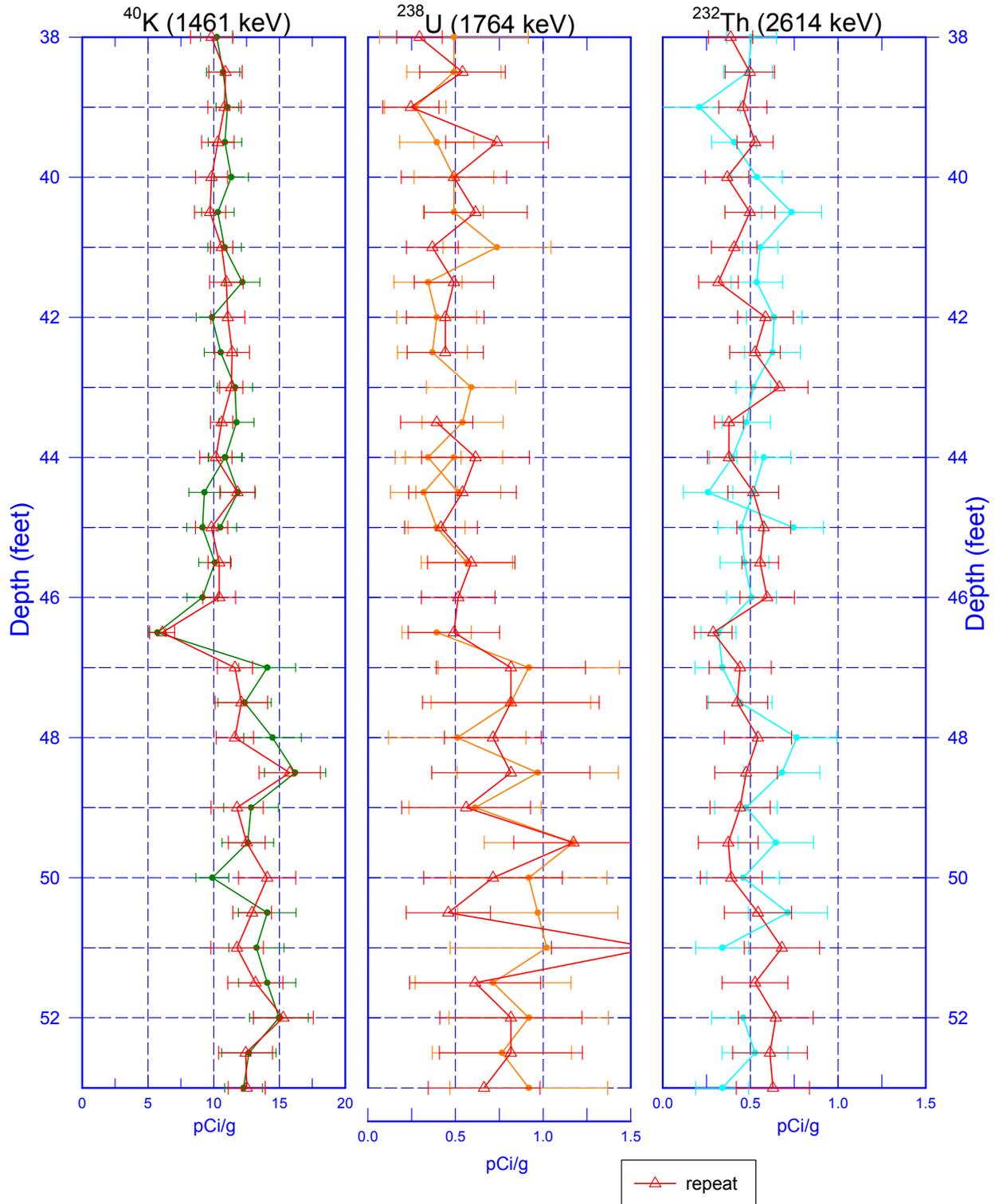


### 399-3-21 (C5575) Total Gamma & Dead Time



Reference - Ground Surface

**399-3-21 (C5575)**  
**Repeat Section of Natural Gamma Logs**



Zero Reference - Ground Surface