

C5930 Log Data Report

Borehole Information:

Borehole: C5930		Site: 216-B-55	
Coordinates (WA St Plane)		GWL¹ (ft): None	GWL Date: 01/14/08
North (m)	East (m)	Drill Date	TOC Elevation
Not available	Not available	01/08	Not available
		Total Depth (ft)	Type
		50	Push

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Threaded steel	1.2	7	5 3/4	5/8	1.2	50

Borehole Notes:

The logging engineer measured the casing diameter with a caliper and steel tape. One casing length is 5 ft. All measurements are referenced to ground surface. The RCT reported finding contamination on the drill bit and casing. However, measurements from a swab indicated no detectable contamination. A plastic sleeve was placed over each logging sonde to prevent contamination of equipment.

Logging Equipment Information:

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

Logging System:	Gamma 1C	Type:	HRLS planar HpGe
Effective Calibration Date:	11/22/07	Serial No.:	39A314
		Calibration Reference:	HGLP-CC-024
		Logging Procedure:	HGLP-MAN-002, Rev. 0

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

Logging System:	Gamma 4H (without AmBe source)	Type:	PMLS
Effective Calibration Date:	Not required	Serial No.:	H310700352
		Calibration Reference:	None required
		Logging Procedure:	HGLP-MAN-002, Rev. 0

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2 Repeat			
Date	01/14/08	01/14/08			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	0.0	20.0			
Finish Depth (ft)	49.0	25.0			
Count Time (sec)	100	100			
Live/Real	R	R			

Log Run	1	2 Repeat			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
Pre-Verification	DN901CAB	DN901CAB			
Start File	DN901000	DN901050			
Finish File	DN901049	DN901055			
Post-Verification	DN901CAA	DN901CAA			
Depth Return Error (in.)	N/A	0			
Comments	No fine gain adjustment	No fine gain adjustment			

High Rate Logging System (HRLS) Log Run Information:

Log Run	7	8 Repeat			
Date	01/18/08	01/18/08			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	10.0	13.0			
Finish Depth (ft)	18.0	14.0			
Count Time (sec)	300	300			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	0.5	0.5			
Pre-Verification	AC186CAB	AC186CAB			
Start File	AC187000	AC187017			
Finish File	AC187016	AC187019			
Post-Verification	AC187CAA	AC187CAA			
Depth Return Error (in.)	N/A	0			
Comments	No fine gain adjustment	No fine gain adjustment			

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	3	4 Repeat			
Date	01/14/08	01/14/08			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	0.0	10.0			
Finish Depth (ft)	49.75	16.0			
Count Time (sec)	15	15			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	0.25	0.25			
Pre-Verification	DH962CAB	DH962CAB			
Start File	DH962000	DH962200			
Finish File	DH962199	DH962224			
Post-Verification	DH962CAA	DH962CAA			
Depth Return Error (in.)	N/A	0			
Comments	None	None			

Passive Neutron Logging System (PNLS) Log Run Information:

Log Run	5	6 Repeat			
Date	01/15/08	01/15/08			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	0.0	10.0			
Finish Depth (ft)	49.0	16.0			

Log Run	5	6 Repeat			
Count Time (sec)	60	60			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
Pre-Verification	DH972CAB	DH972CAB			
Start File	DH972000	DH972050			
Finish File	DH972049	DH972056			
Post-Verification	DH972CAA	DH972CAA			
Depth Return Error (in.)	N/A	0			
Comments	None	None			

Logging Operation Notes:

Logging was conducted with no centralizer on the sondes. All measurements are referenced to ground surface.

Analysis Notes:

Analyst:	Henwood	Date:	01/23/08	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 casing correction for a 5/8-in. thick casing was applied to the SGLS and HRLS data.

The moisture data are reported in counts per second, as calibrations are limited to 6- and 8-in. boreholes.

Passive neutron data are used qualitatively and no calibration is required. Passive neutron logging detects neutron activity originating from the sediments. The most likely sources are (alpha, neutron) reactions that occur when alpha particles interact with light elements (such as oxygen, nitrogen or fluoride compounds) in the soil matrix, or to a lesser extent, spontaneous fission from radionuclides such as Pu-240. In either case, passive neutron activity is considered a qualitative indicator of the presence of transuranic (TRU) radionuclides, even where no characteristic gamma emissions are detected. However, the absence of passive neutron activity cannot be taken as definitive proof that TRU radionuclides are not present. Below the nanocurie range, TRU radionuclides may not exist in sufficient concentrations that a neutron flux would be evident.

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 and G1cNov07.xls for the SGLS and HRLS, respectively, using efficiency functions and corrections for casing and dead time as determined from annual calibrations. HRLS data are substituted for SGLS data where dead time exceeds approximately 40 percent.

Results and Interpretations:

Cs-137 was detected almost throughout the borehole. The maximum concentration was measured at approximately 37,635 pCi/g at 13.5 ft. It appears some Cs-137 contamination may have adhered to the inside of the casing when the contaminated bit and inner drill pipe was removed from the borehole. Experience suggests this type of contamination may indicate apparent concentrations of less than 10 pCi/g. The elevated concentrations (8 to 124 pCi/g) at the bottom of the borehole between 46 and 49 ft may have been caused by contaminated sediment falling to the bottom. Contamination that was measured after logging on the plastic sleeve at the end of the sonde would be consistent with this hypothesis.

Moisture data indicate some variability.

The passive neutron data indicate no neutron flux that could be attributed to TRU radionuclides.

Repeat sections acquired for each logging system indicate good repeatability.

List of Log Plots:

Depth Reference is ground surface

Manmade Radionuclides

Natural Gamma Logs

Combination Plot

Total Gamma, Passive Neutron, & Moisture

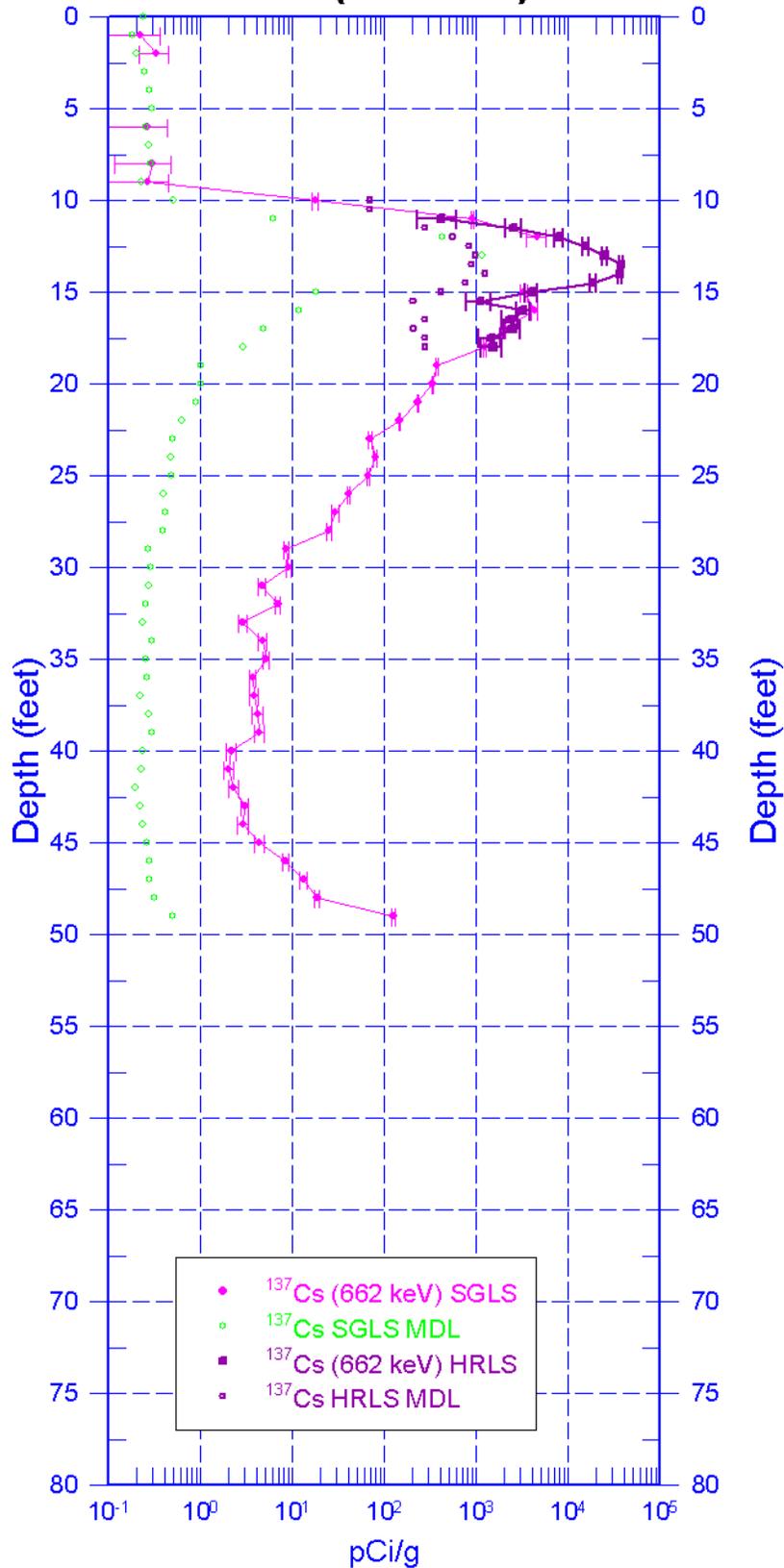
Repeat of Manmade Radionuclides

Repeat Section of Natural Gamma Logs

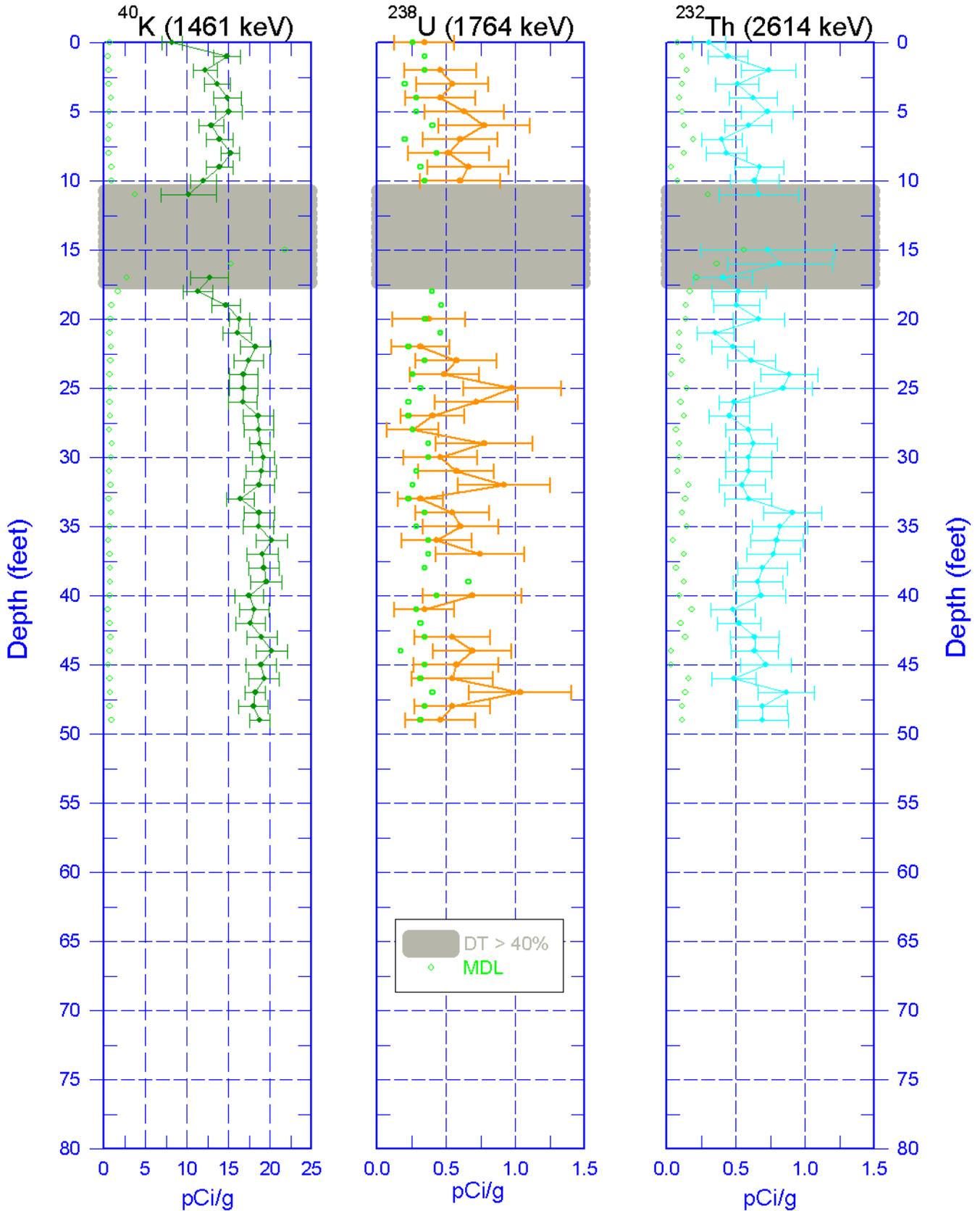
Repeat of Passive Neutron & Moisture

¹ GWL – groundwater level

C5930 Manmade Radionuclides ¹³⁷Cs (662 keV)

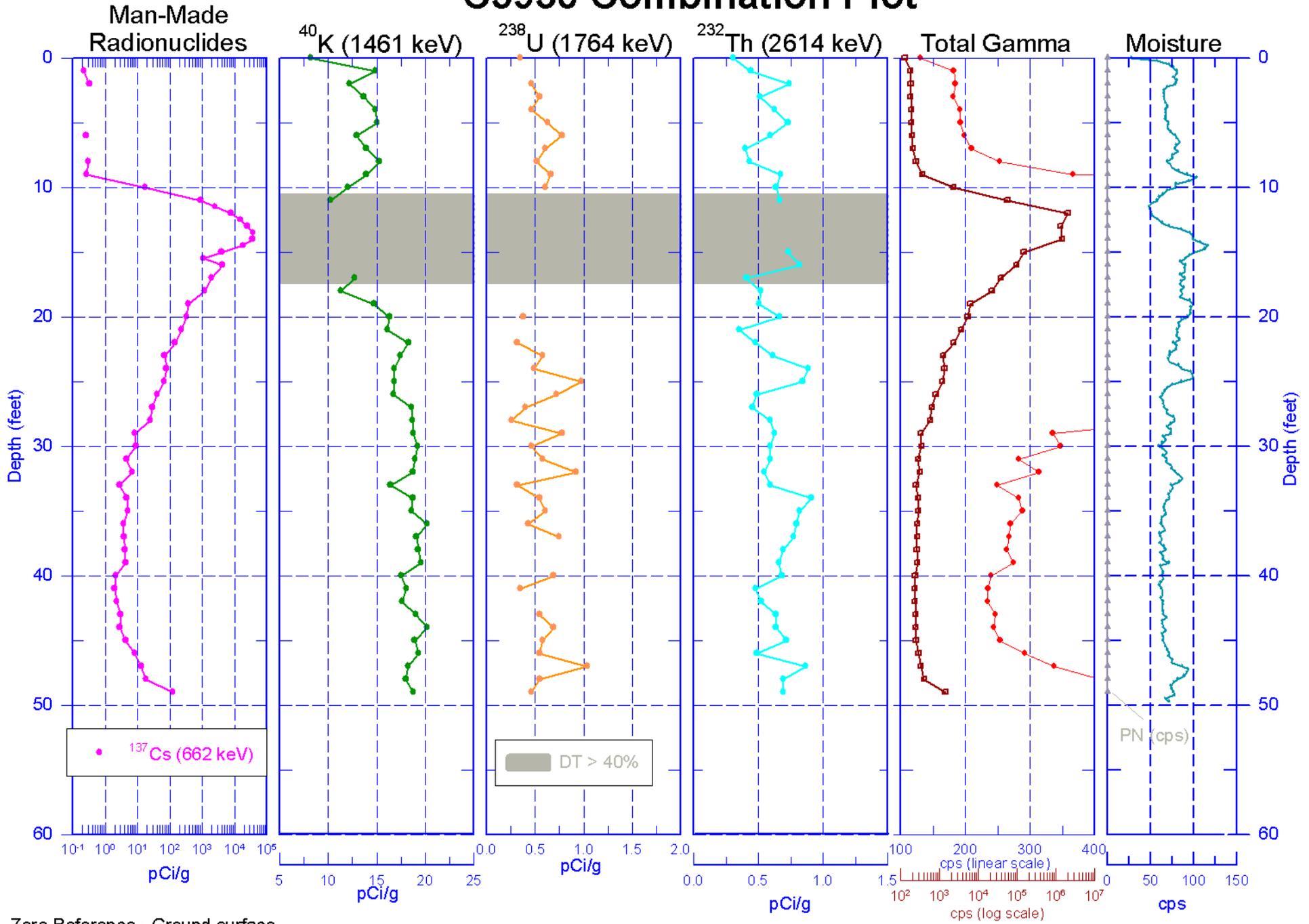


C5930 Natural Gamma Logs



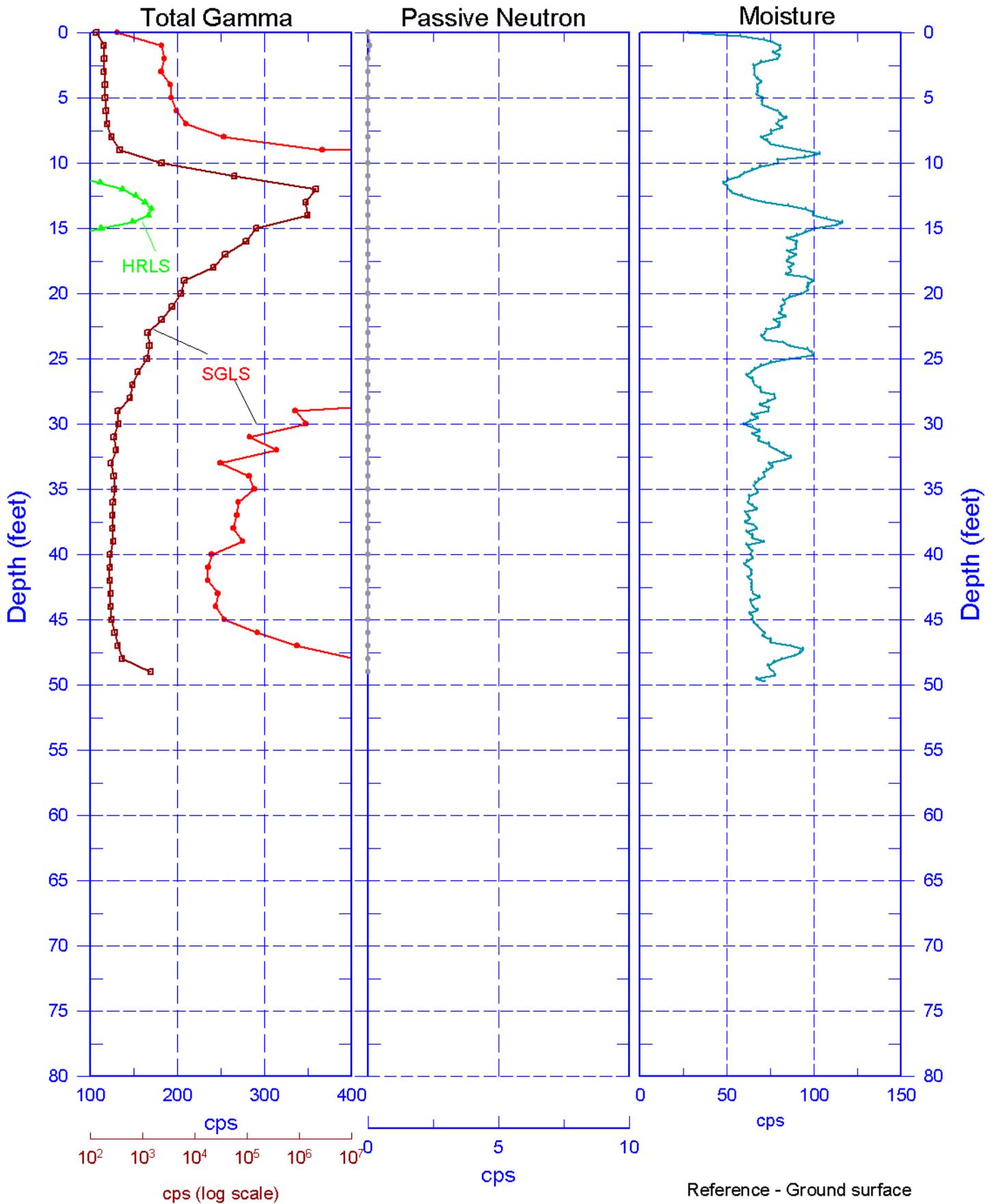
Zero Reference = Ground surface

C5930 Combination Plot



C5930

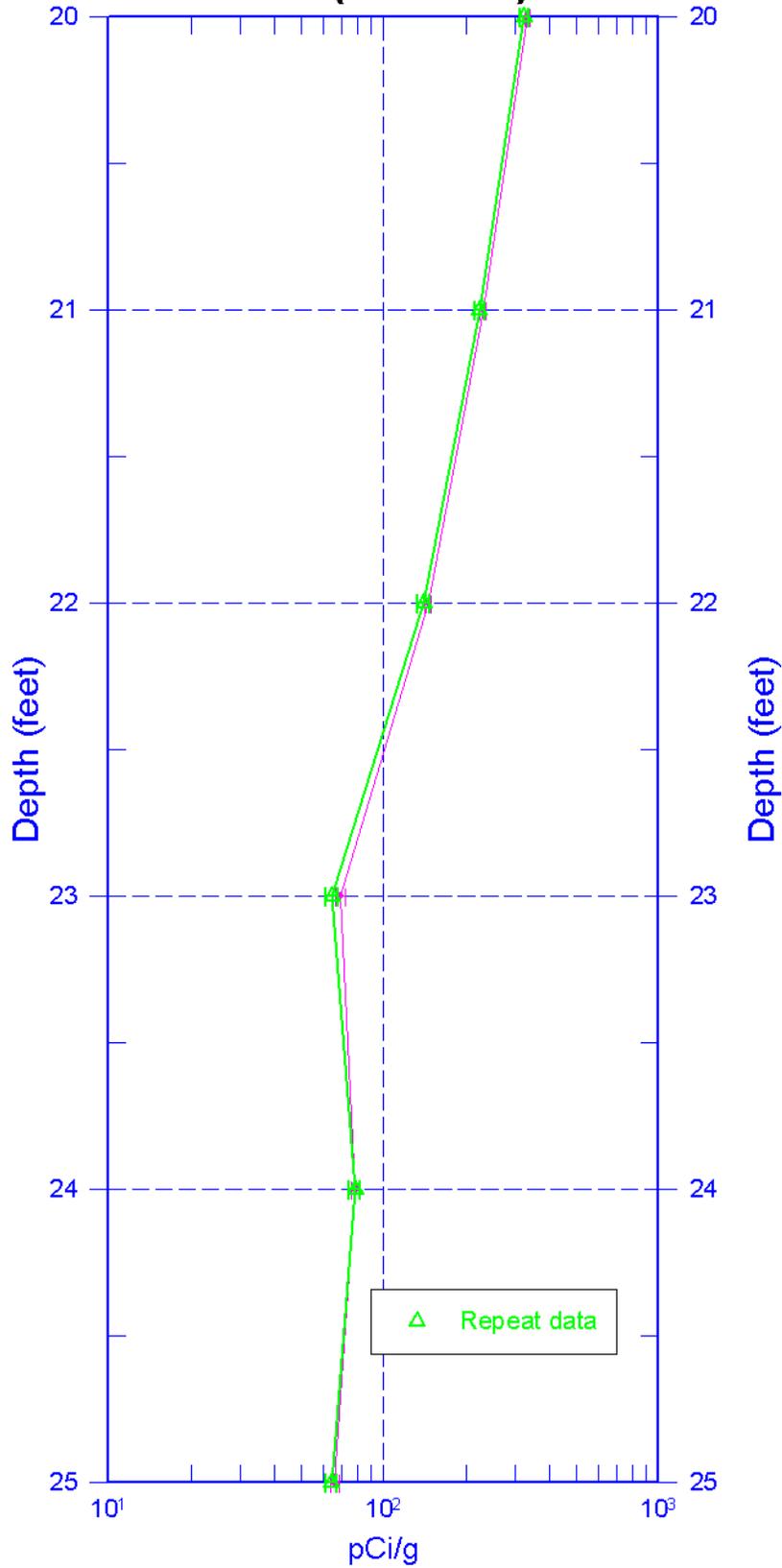
Total Gamma, Passive Neutron & Moisture



C5930

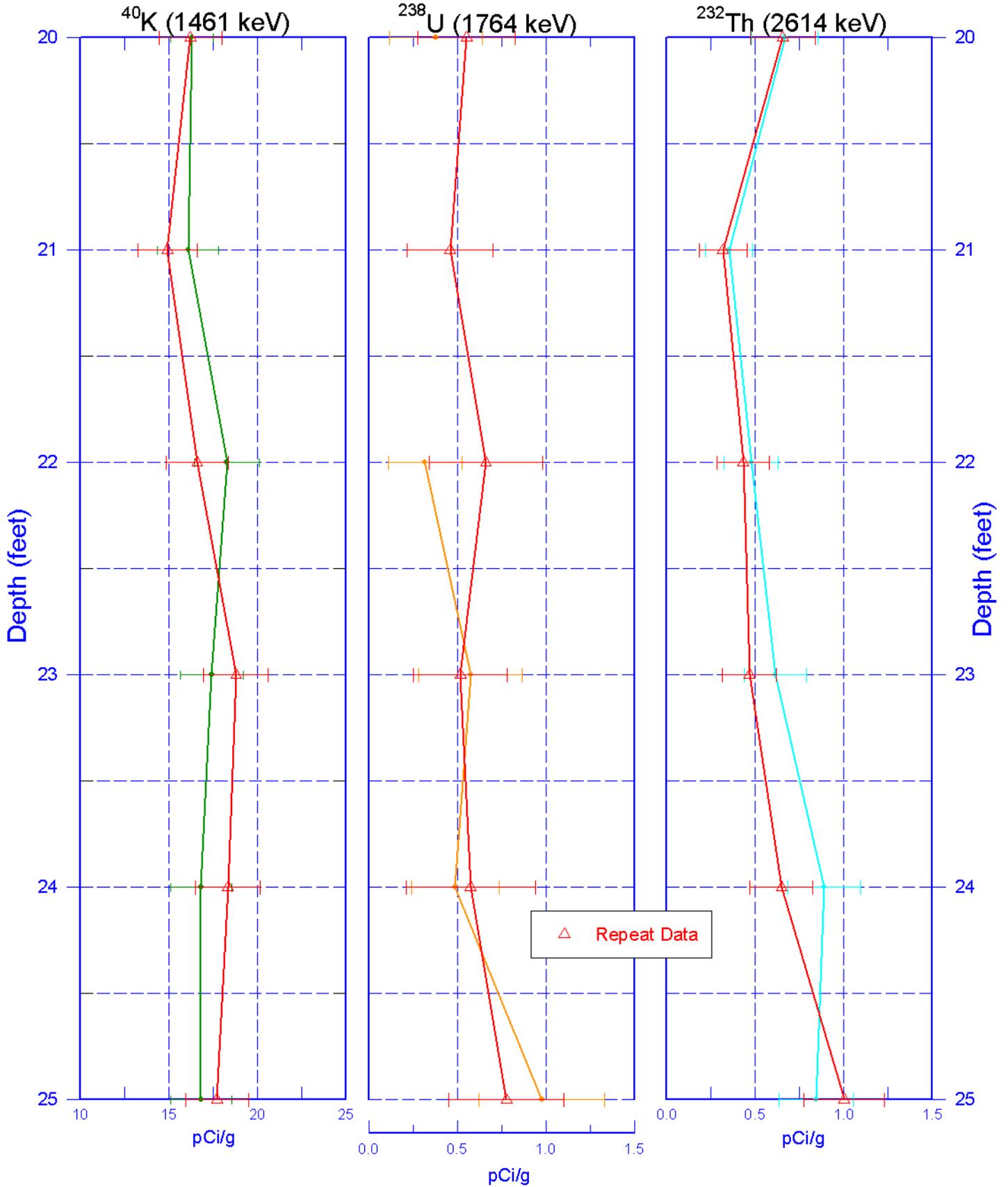
Repeat of Manmade Radionuclides

^{137}Cs (662 keV)



C5930

Repeat Section of Natural Gamma Logs



Zero Reference - Ground surface

Repeat of Passive Neutron & Moisture

