299-E28-30 (C7515)
Log Data Report

Borehole Information:

Borehole:	299-E28-30 (C7515)			Site:	200-BP-5, 216-B-12 Crib OU
Coordinates (WA St Plane)		GWL[1] (ft):	306.0	GWL Date:	02/24/10
North (m)	East (m)	Drill Date	TOC Elevation	Total Depth (ft)	Type
Not available	Not available	02/25/10	Not available	374.7	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in)	Inside Diameter (in)	Thickness (in)	Top (ft)	Bottom (ft)
Threaded steel	-0.8	10 3/4	9 3/8	11/16	-0.8	170
Threaded steel	-2.1	8 11/16	7 9/16	9/16	-2.1	359

Borehole Notes:

The well site geologist reported borehole information. The logging engineer measured casing diameters and rounded to the nearest 1/16-inch.

Logging Equipment Information:

Logging System:	Gamma 1L		Type: Serial No.:	SGLS HPGe (60%) 47TP32211A
Effective Calibration Date:	03/26/09	Calibration Reference:	HGLP-CC-030, Rev. 1	
		Logging Procedure:	HGLP-MAN-002, Rev. 0	

Logging System:	Gamma 1H (with AmBe source)		Type: Serial No.:	NMLS H310700352
Effective Calibration Date:	04/01/09	Calibration Reference:	HGLP-CC-047, Rev. 1	
		Logging Procedure:	HGLP-MAN-002, Rev. 0	

Logging System:	Gamma 1M (with AmBe source)		Type: Serial No.:	NMLS H340207279
Effective Calibration Date:	04/01/09	Calibration Reference:	HGLP-CC-032, Rev. 1	
		Logging Procedure:	HGLP-MAN-002, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2 Repeat	8	9 Repeat
HEIS Number	1014773	1014774	1014775	1014776
Date	01/21/10	01/21/10	02/26/10	02/26/10
Logging Engineer	Legler/McClellan	Legler/McClellan	Pearson	Pearson
Start Depth (ft)	0.0	3.0	363.0	190.0
Finish Depth (ft)	172.0	20.0	171.0	171.0
Count Time (sec)	100	100	100	100
Live/Real	R	R	R	R
Shield (Y/N)	N	N	N	N
MSA Interval (ft)	1.0	1.0	1.0	1.0
Log Speed (ft/min)	N/A	N/A	N/A	N/A
Pre-Verification	AL049CAB	AL049CAB	AL061CAB	AL061CAB

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Log Run	1	2 Repeat	8	9 Repeat
Start File	AL049000	AL049173	AL061000	AL061193
Finish File	AL049172	AL049190	AL061192	AL061212
Post-Verification	AL049CAA	AL049CAA	AL061CAA	AL061CAA
Depth Return Error (in)	N/A	Low 2 1/2	N/A	Low 2
Comments	No fine gain adjustment.	No fine gain adjustment.	Fine gain adjustment made after file 013.	No fine gain adjustment.

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	3	4 Repeat	5	6	7 Repeat
HEIS Number	1014777	1014778	1014779	1014780	1014781
Date	01/22/10	01/22/10	02/25/10	02/25/10	02/25/10
Logging Engineer	McClellan/ Holloway	McClellan/ Holloway	Pearson	Pearson	Pearson
Start Depth (ft)	0.0	3.0	171.0	271.25	270.0
Finish Depth (ft)	172.0	20.0	271.0	306.0	283.0
Count Time (sec)	15	15	15	15	15
Live/Real	R	R	R	R	R
Shield (Y/N)	N	N	N	N	N
MSA Interval (ft)	0.25	0.25	0.25	0.25	0.25
Log Speed (ft/min)	N/A	N/A	N/A	N/A	N/A
Pre-Verification	AH026CAB	AH026CAB	AM068CAB	AM068CAB	AM068CAB
Start File	AH026000	AH026694	AM068000	AM068401	AM068541
Finish File	AH026693	AH026762	AM068400	AM068540	AM068593
Post-Verification	AH026CAA	AH026CAA	AH068CAA	AM068CAA	AM068CAA
Depth Return Error (in)	N/A	½ high	N/A	N/A	2 high
Comments	None	None	None	None	None

Logging Operation Notes:

SGLS data were collected using Gamma 1 HO 68B-3574. Pre- and post-survey verification measurements were acquired in Amersham KUTh-118 field verifier. A centralizer was installed on the sonde. Maximum logging depth was 172 feet, approximately 2 feet below casing 1, and 363 feet, approximately 4 feet below casing 2 before the sonde un-weighted.

NMLS data were collected using Gamma 1 HO 68B-3574. Pre- and post-survey verification measurements were acquired in the AmBe standard field verifier. A centralizer was installed on the sonde. Maximum logging depth was 172.0 feet for casing 1 and 306.0 feet for casing 2, just above ground water.

The zero reference is the ground surface.

Analysis Notes:

Analyst:	L. SPINNER	Date:	03/12/10	Reference:	GJO-HGLP 1.6.3, Rev. 0

Pre- and post-survey verification measurements met the acceptance criteria of the established systems.

Casing corrections were applied for the 11/16-inch thick casing to 170 feet, leaving 2 feet of open borehole uncorrected; and for the 9/16-inch thick casing to 359 feet, with 4 feet of open borehole uncorrected, during analysis.

SGLS spectra were processed in batch mode in APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated in an EXCEL templates identified as AL20090326corr.xls, using an efficiency function and corrections for casing and dead time as determined by annual calibrations.

During routine processing of gamma spectra, regions of interest are forced at specific energy levels associated with natural and manmade radionuclides that can be anticipated to be present. This processing approach sometimes results in an isolated "detection" near the minimum detection level (MDL) resulting in a false positive. Where these detections occur, the individual spectrum is scrutinized and a determination is made regarding the validity of the detection. If the detection is deemed not representative of a full energy peak, or if confirming peaks are not detected, it is removed from the data set. The integrity of the raw data files and the processed files are maintained should questions arise in the future regarding these determinations.

NMLS spectra were processed in batch mode in APTEC SUPERVISOR to identify counts. NMLS count rates were calculated using EXCEL templates identified as AH20090401.xls for casing 1 data and AM20090401.xls for casing 2 data. NMLS data are presented in counts per second (cps) because no calibration exists for a 7 9/16-inch or 9 3/8-inch borehole.

Results and Interpretations:

No man-made contaminants were detected in this borehole, although MDL'S for Cs-137 are plotted.

Radon was observed from approximately 305 to 359 feet in the 2nd casing string, as indicated by the elevated 609 keV energy peak when compared to the 1764 keV energy peak.

The neutron moisture count rates appear to increase as casing diameter decreases from 9 3/8-inch to 7 9/16-inch.

The repeat plots indicate that the respective systems were working properly.

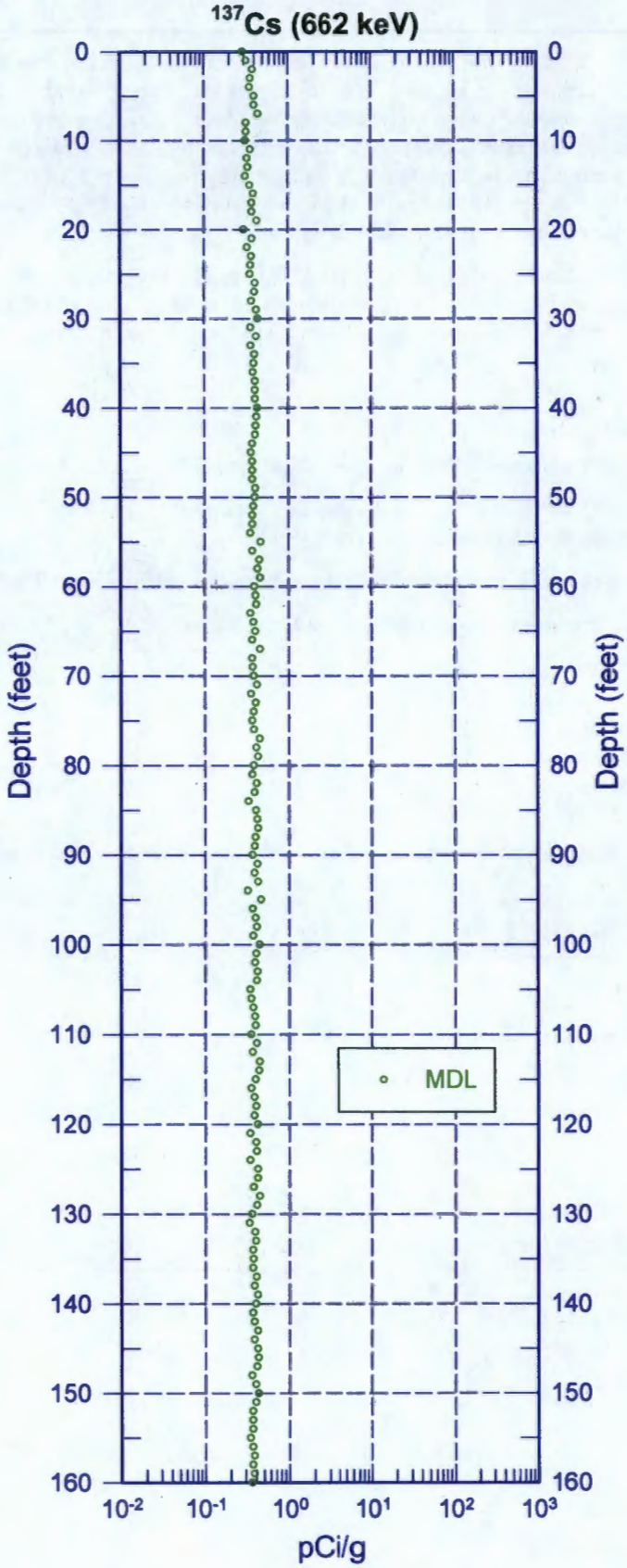
List of Log Plots:

Depth Reference is ground surface.

Manmade Radionuclides (3 pages)
Natural Gamma Logs (3 pages)
Combination Plot (4 pages)
Combination Plot (0 to 380 ft)
Total Gamma & Moisture (0 to 380 ft)
Total Gamma & Dead Time (0 to 380 ft)
Repeat Section of Natural Gamma Logs (3 to 20 ft)
Repeat Section of Natural Gamma Logs (170 to 190 ft)
Repeat Section for Moisture (3 to 20 ft)
Repeat Section for Moisture (270 to 283 ft)

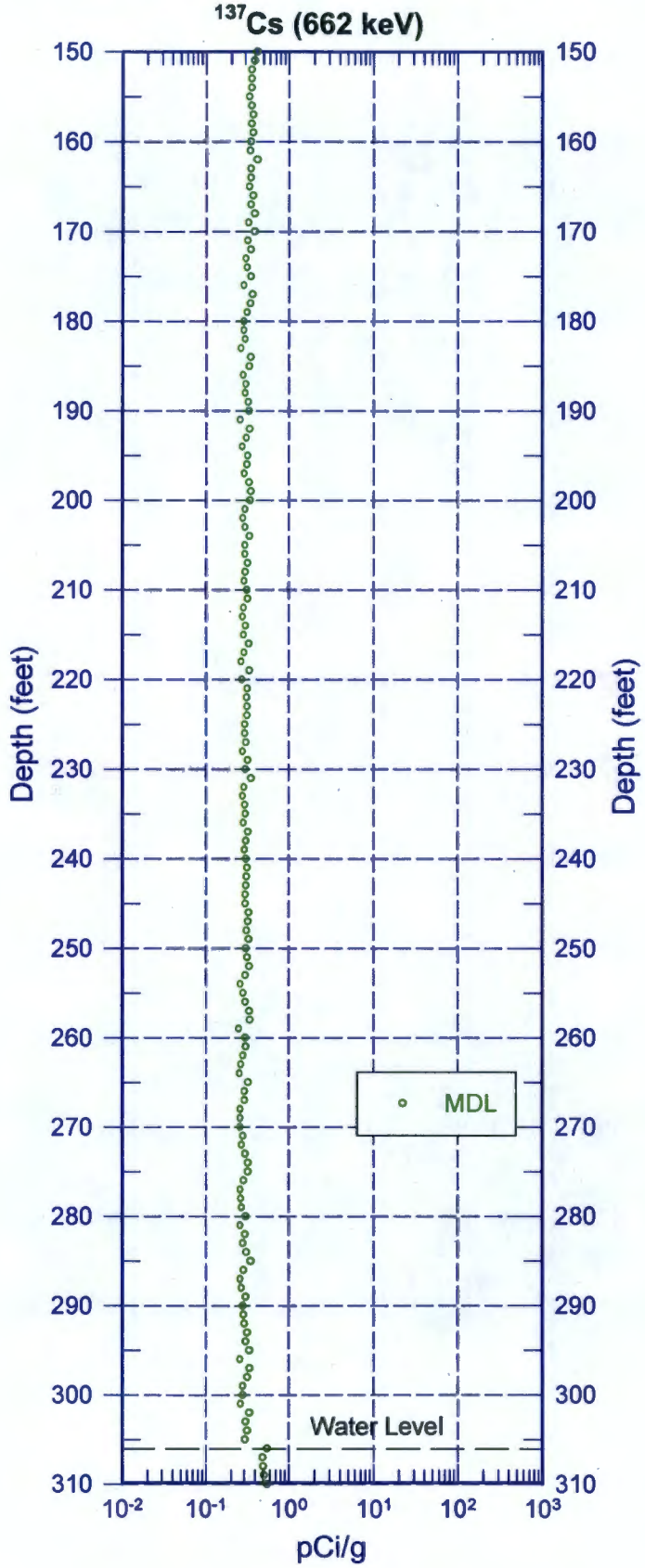
[1] GWL – groundwater level

299-E28-30 (C7515)
Man-Made Radionuclides



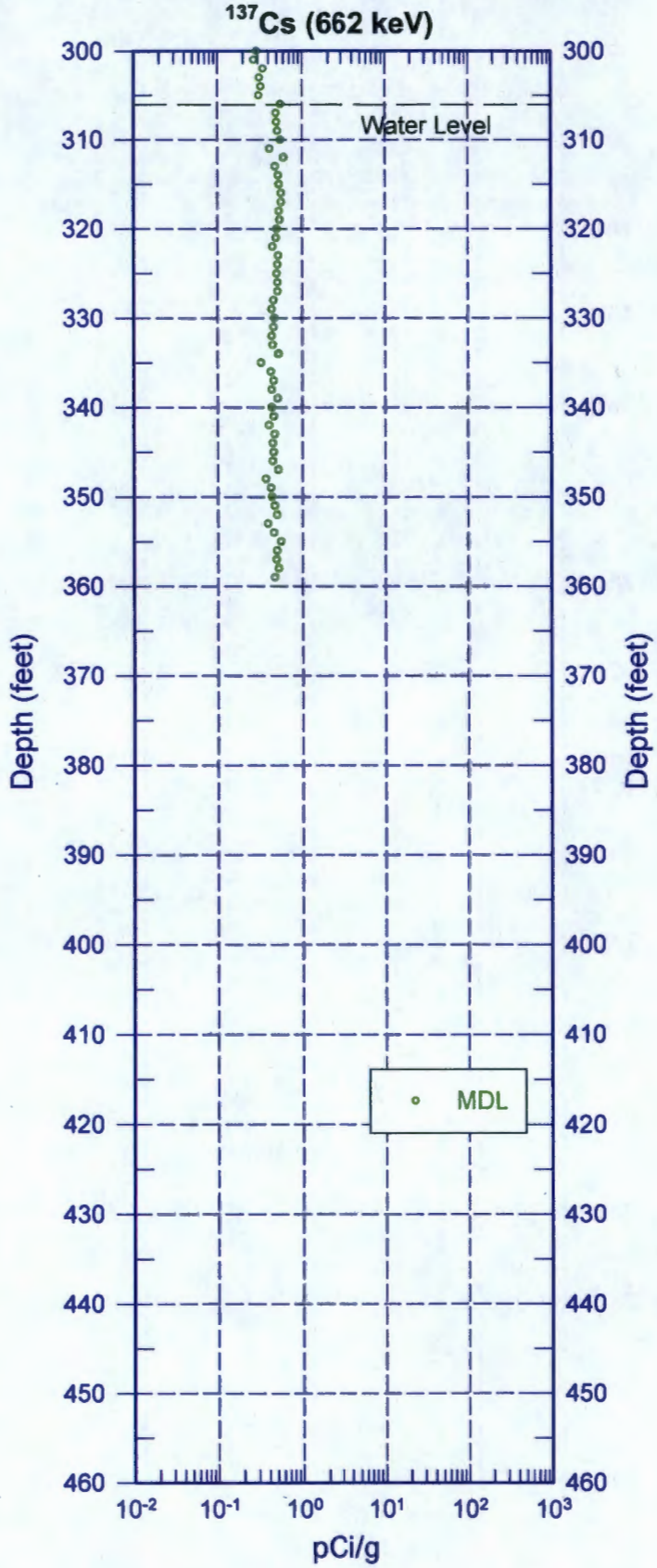
Zero Reference - Ground surface

299-E28-30 (C7515)
Man-Made Radionuclides



Zero Reference - Ground surface

299-E28-30 (C7515)
Man-Made Radionuclides



Zero Reference - Ground surface

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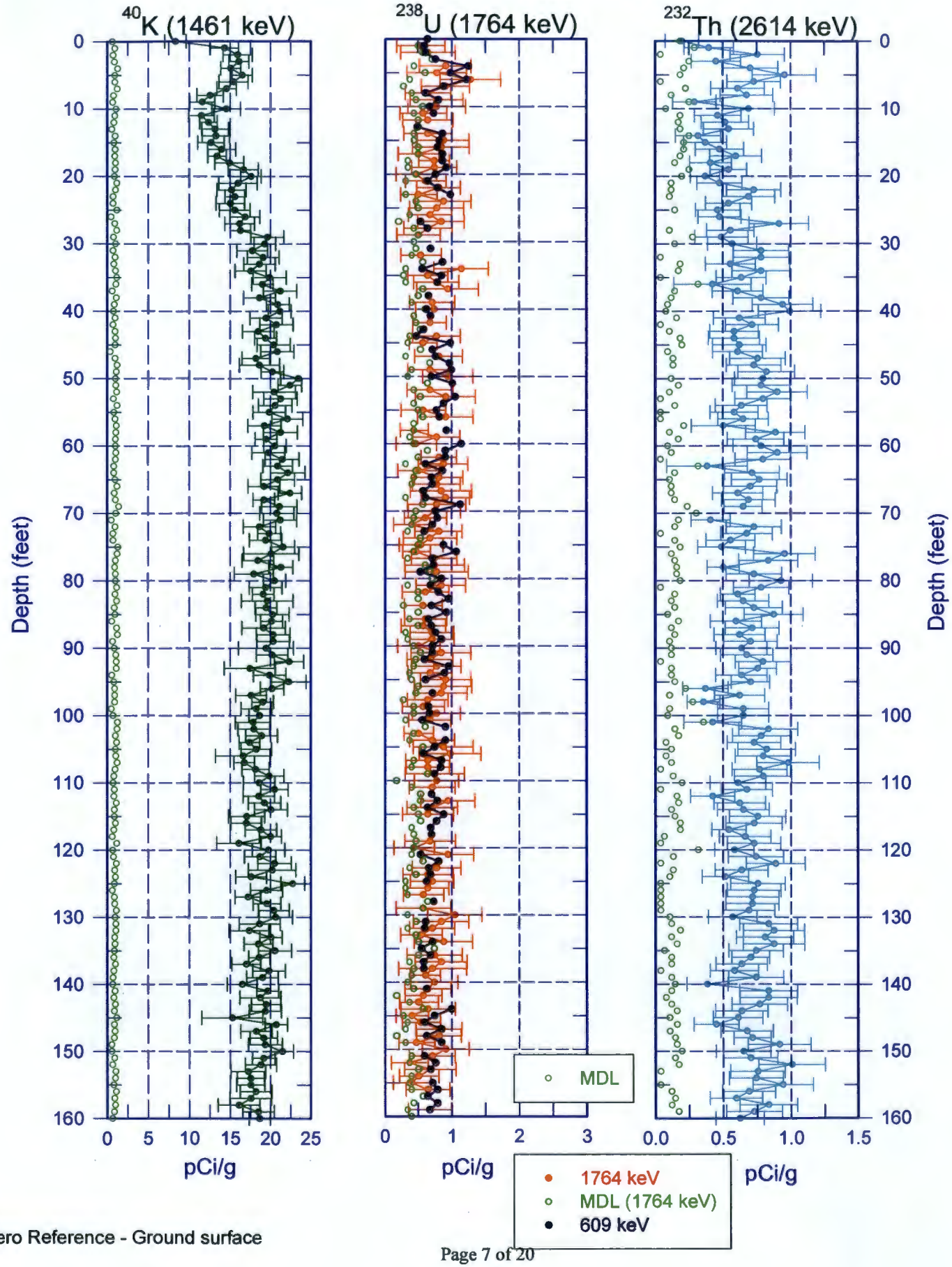
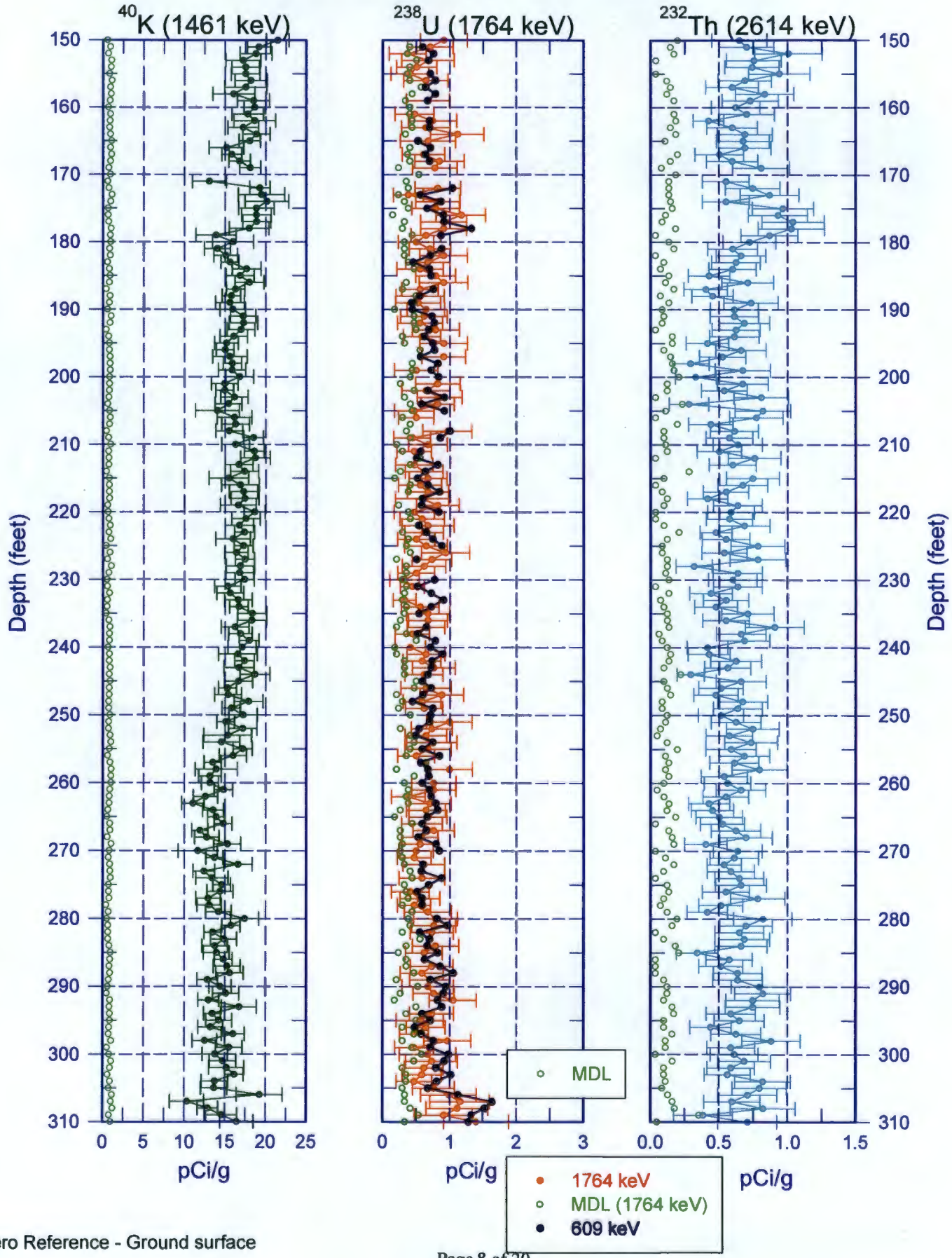
299-E28-30 (C7515)
Natural Gamma Logs



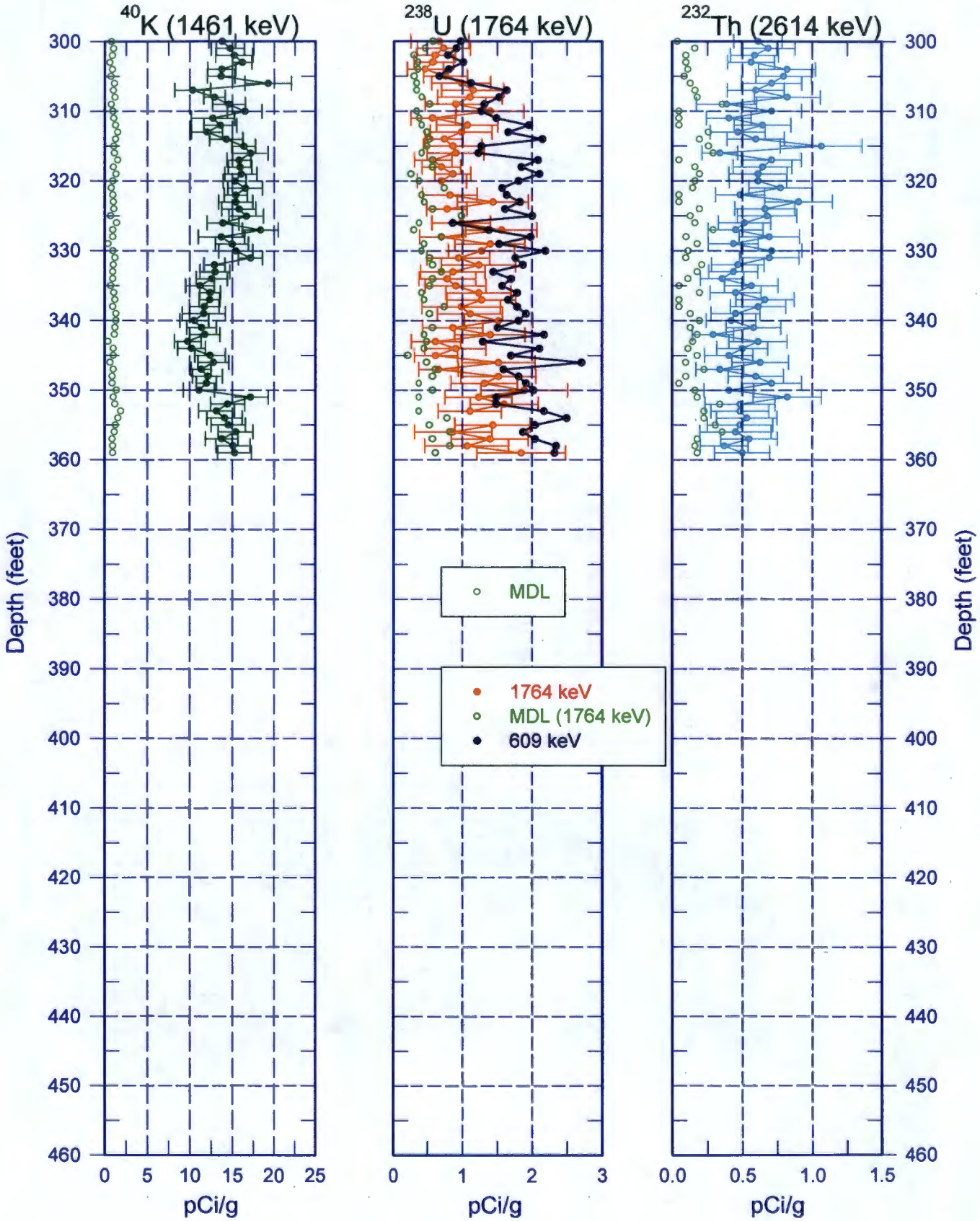
Zero Reference - Ground surface

299-E28-30 (C7515)
Natural Gamma Logs



Zero Reference - Ground surface

299-E28-30 (C7515)
Natural Gamma Logs



Zero Reference - Ground surface

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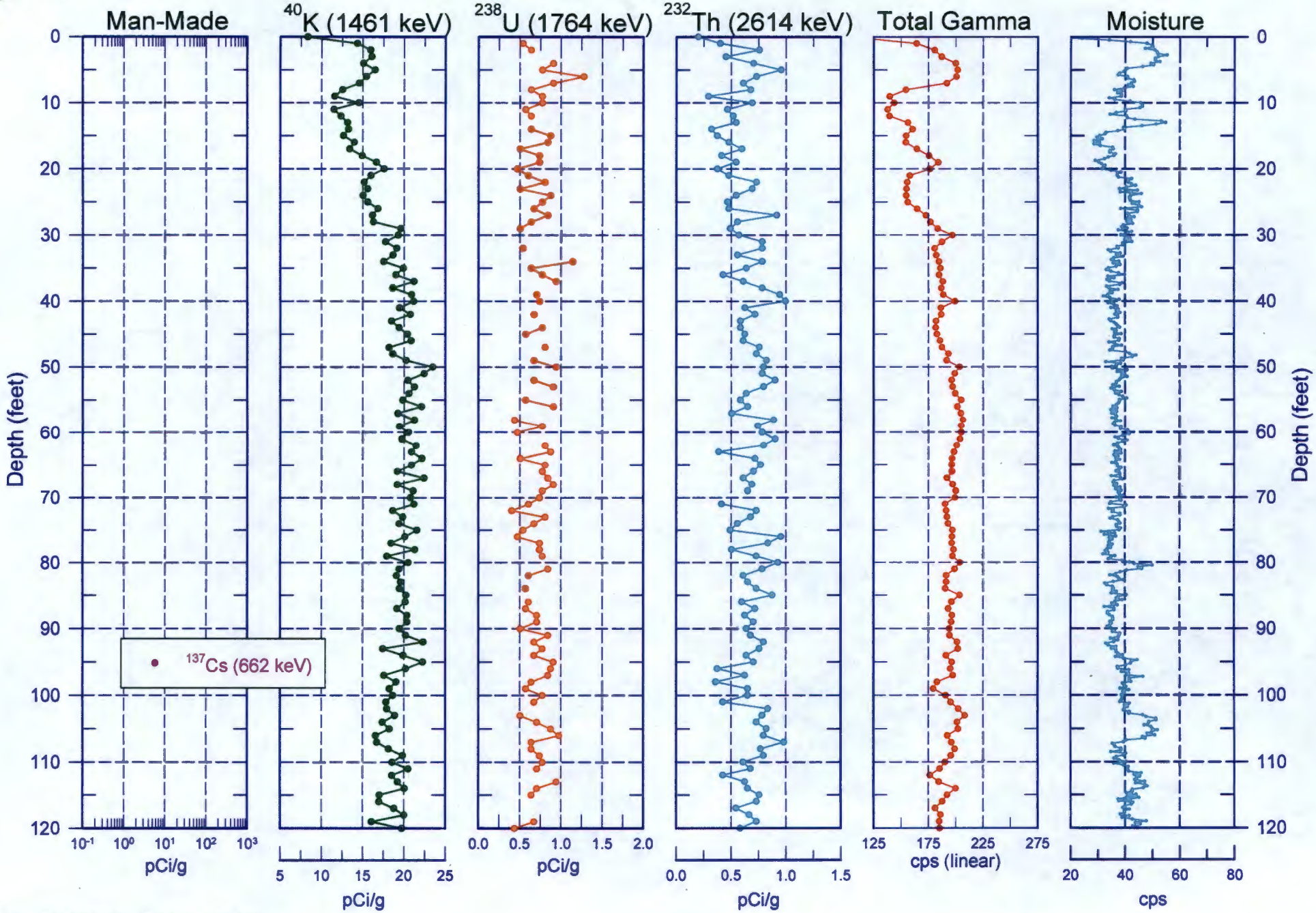
299-E28-30 (C7515) Combination Plot



Zero Reference - Ground surface

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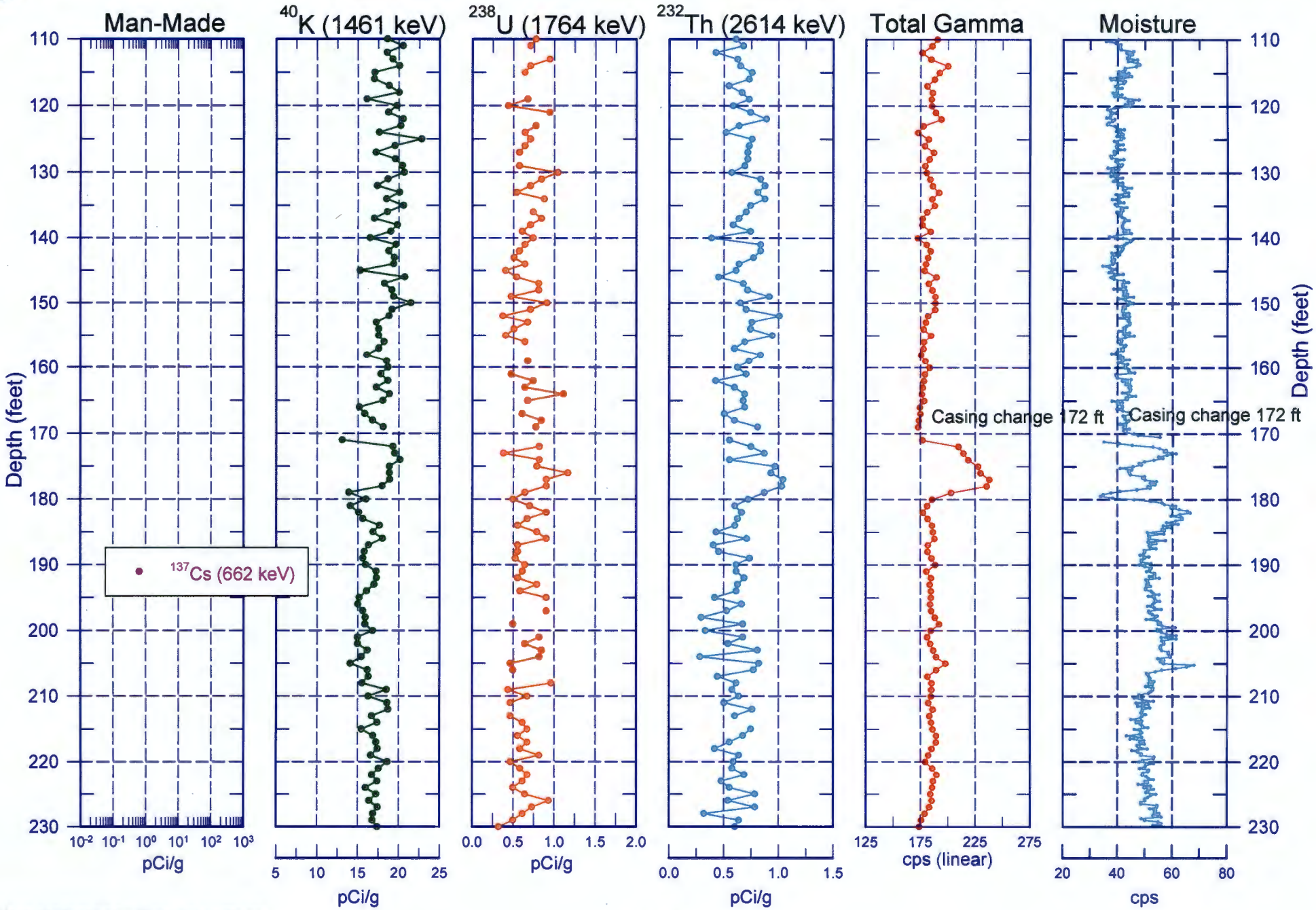
299-E28-30 (C7515) Combination Plot



Zero Reference - Ground surface

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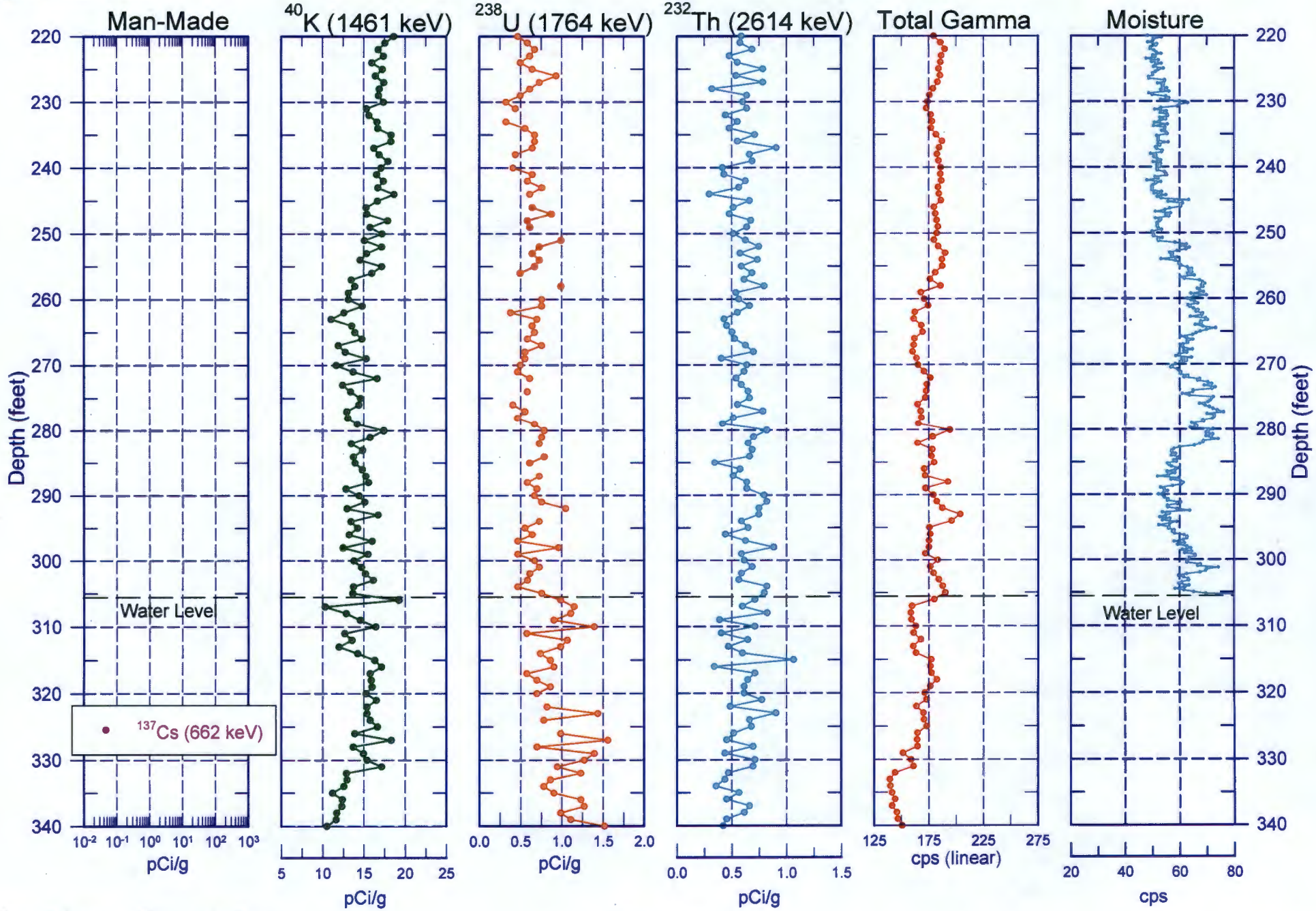

Zero Reference - Ground surface

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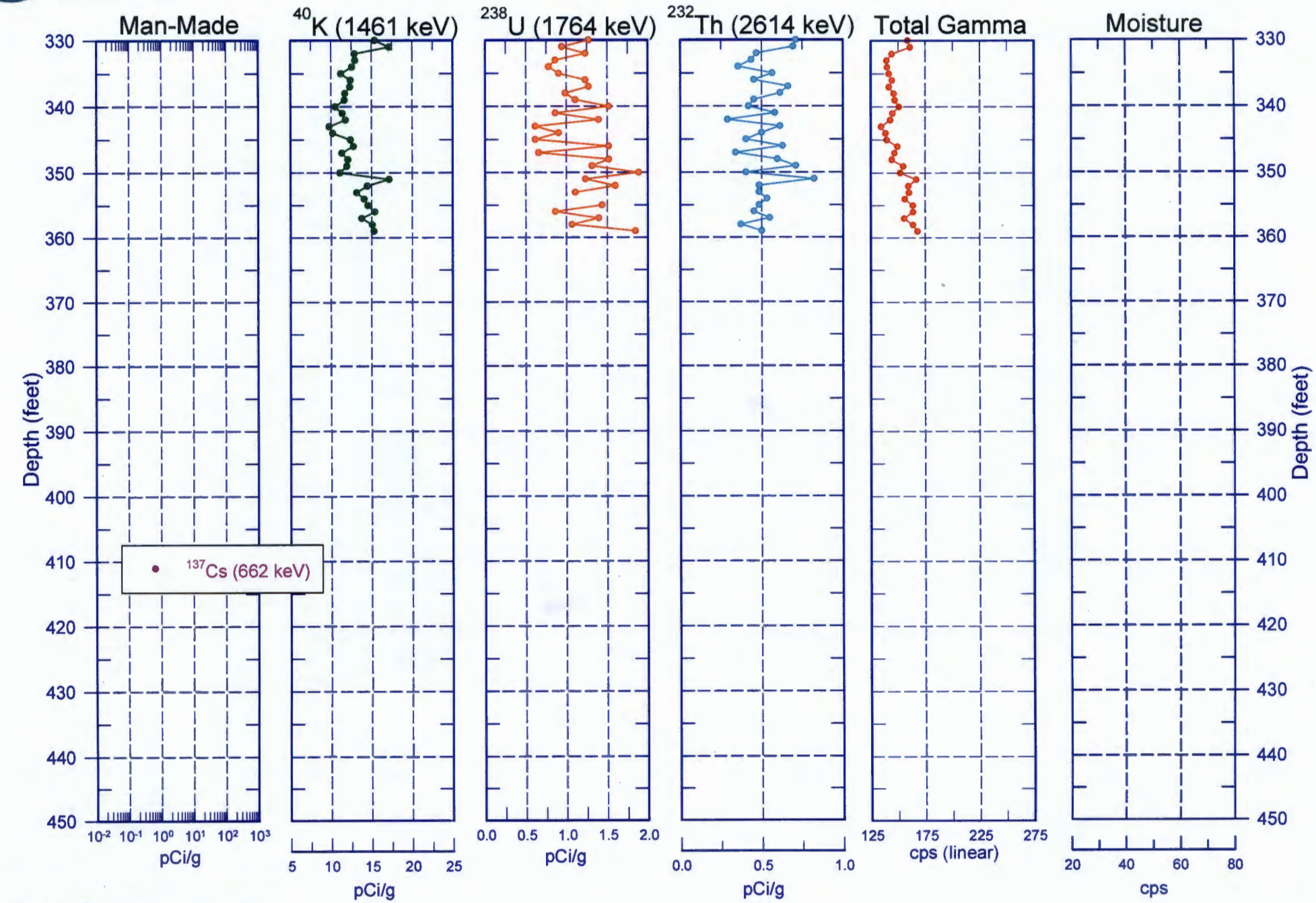
299-E28-30 (C7515) Combination Plot



Zero Reference - Ground surface

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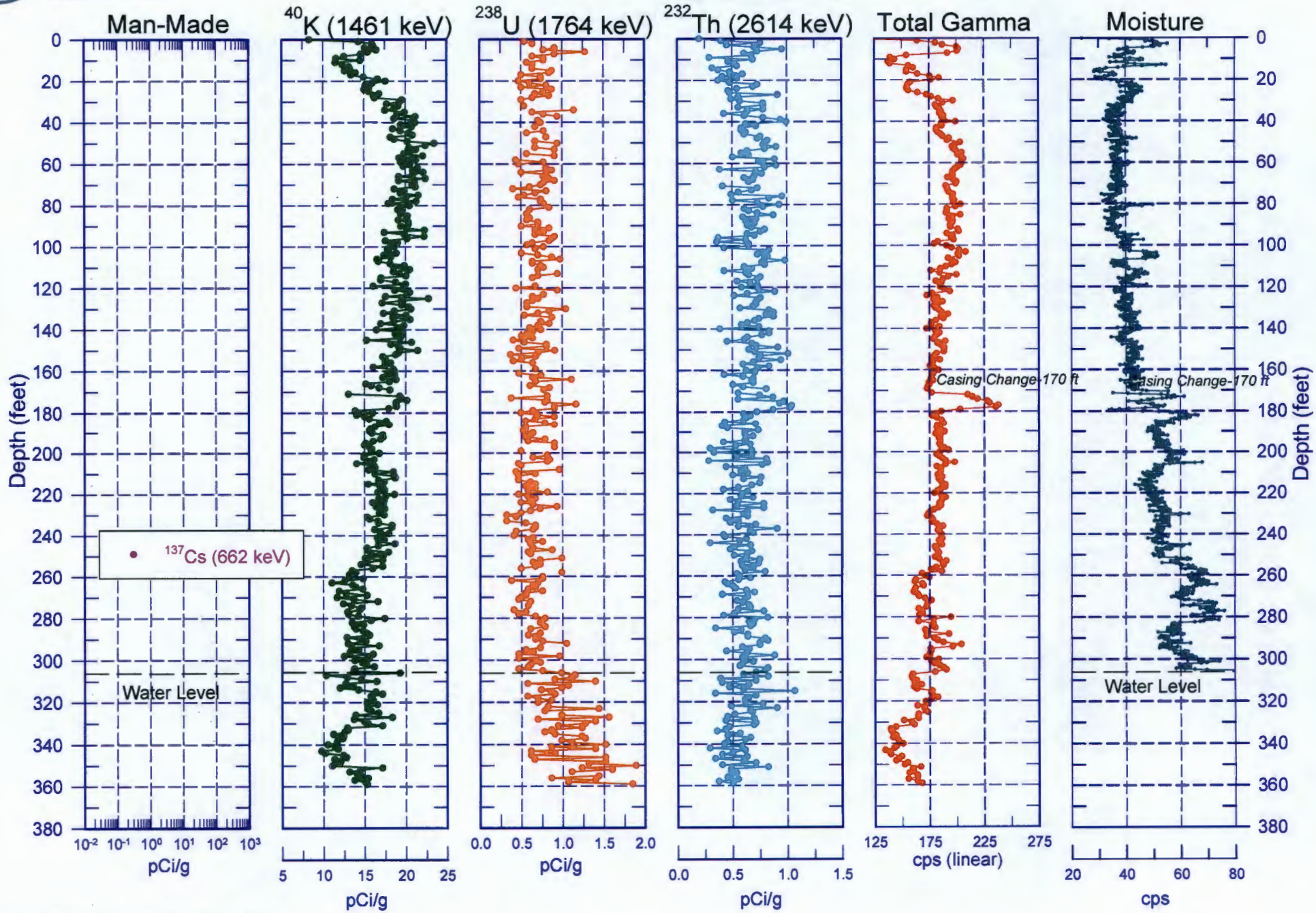
299-E28-30 (C7515) Combination Plot



Zero Reference = Ground Surface

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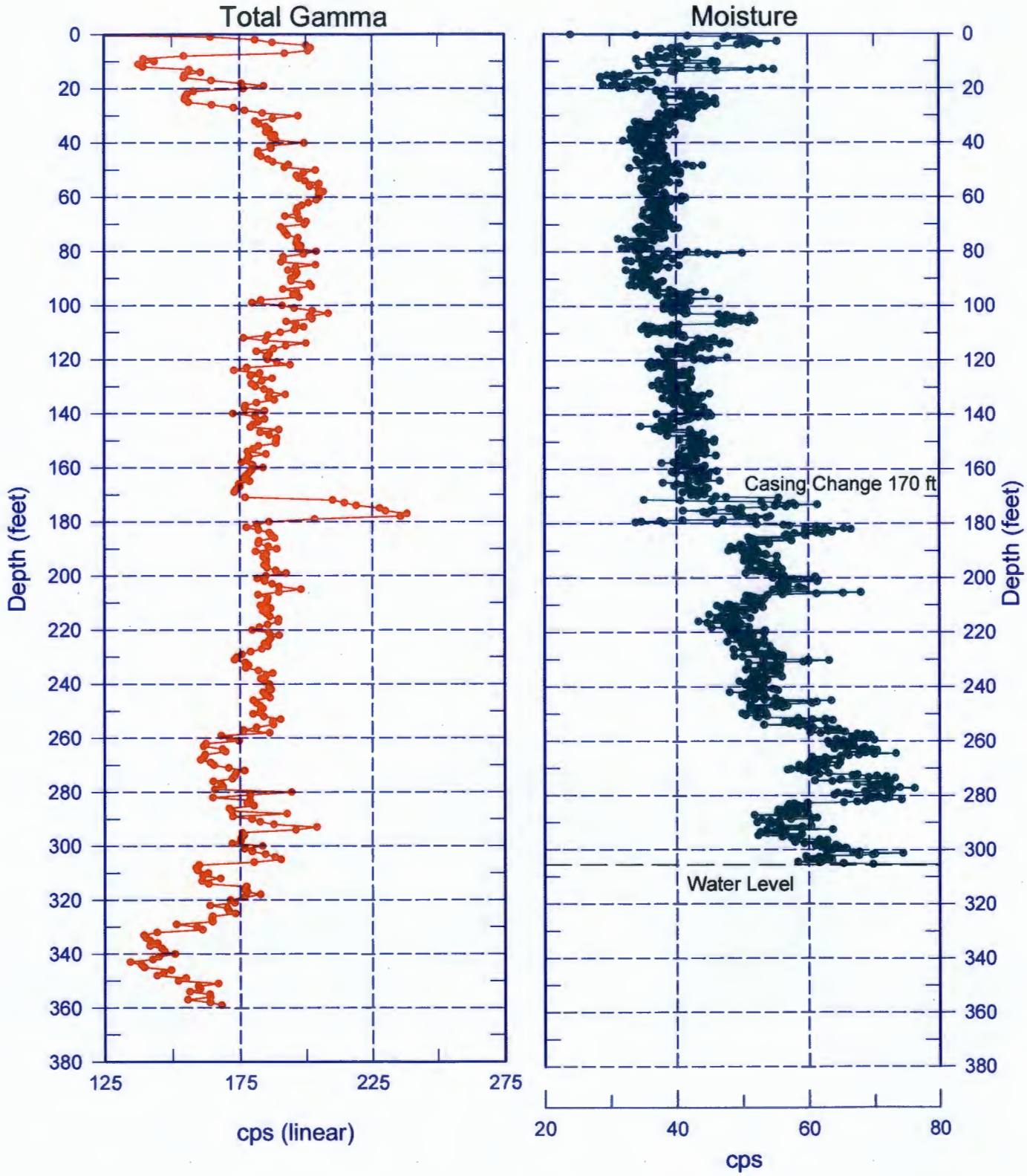
299-E28-30 (C7515)
Total Gamma & Moisture



Zero Reference = Ground Surface

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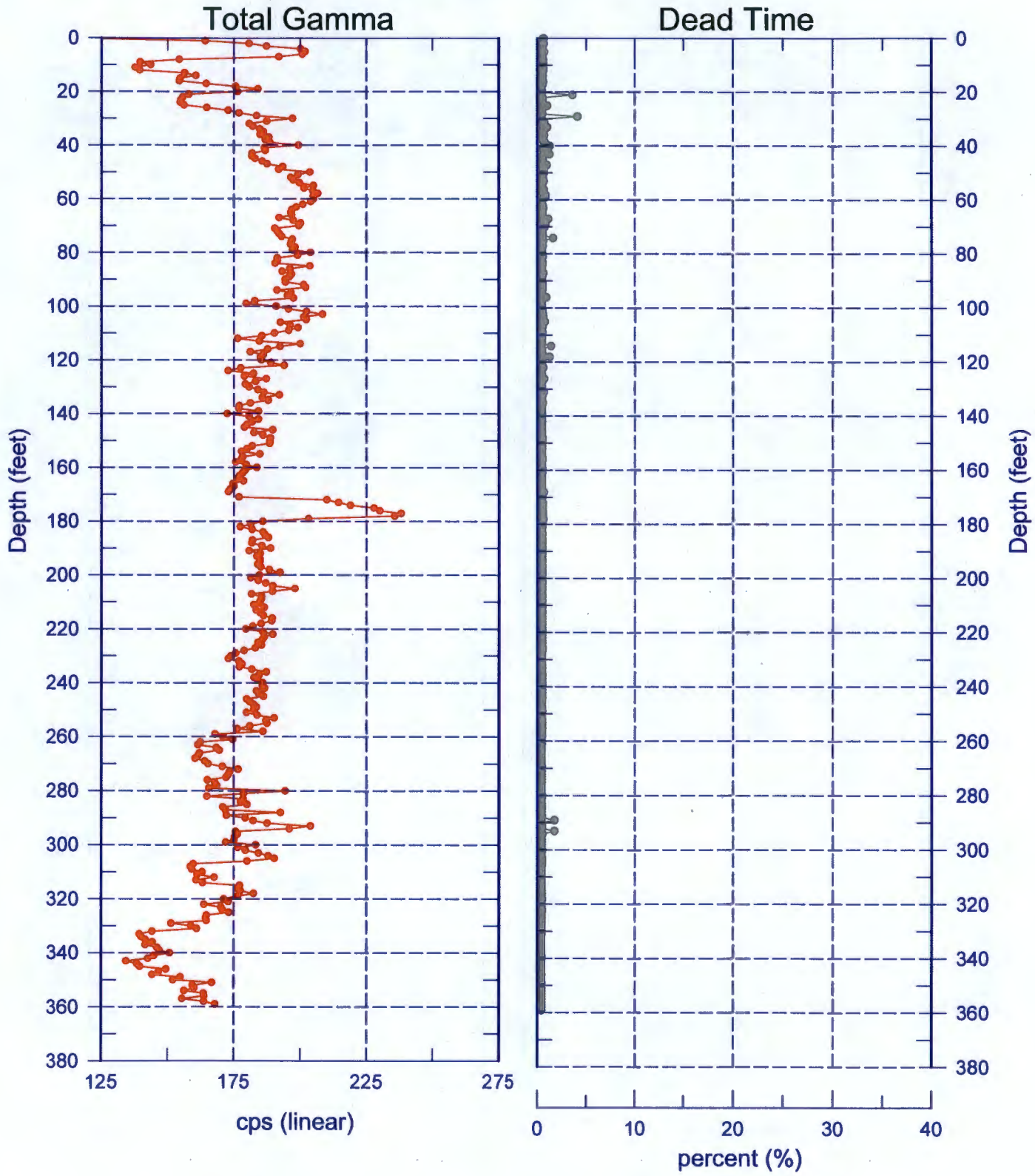
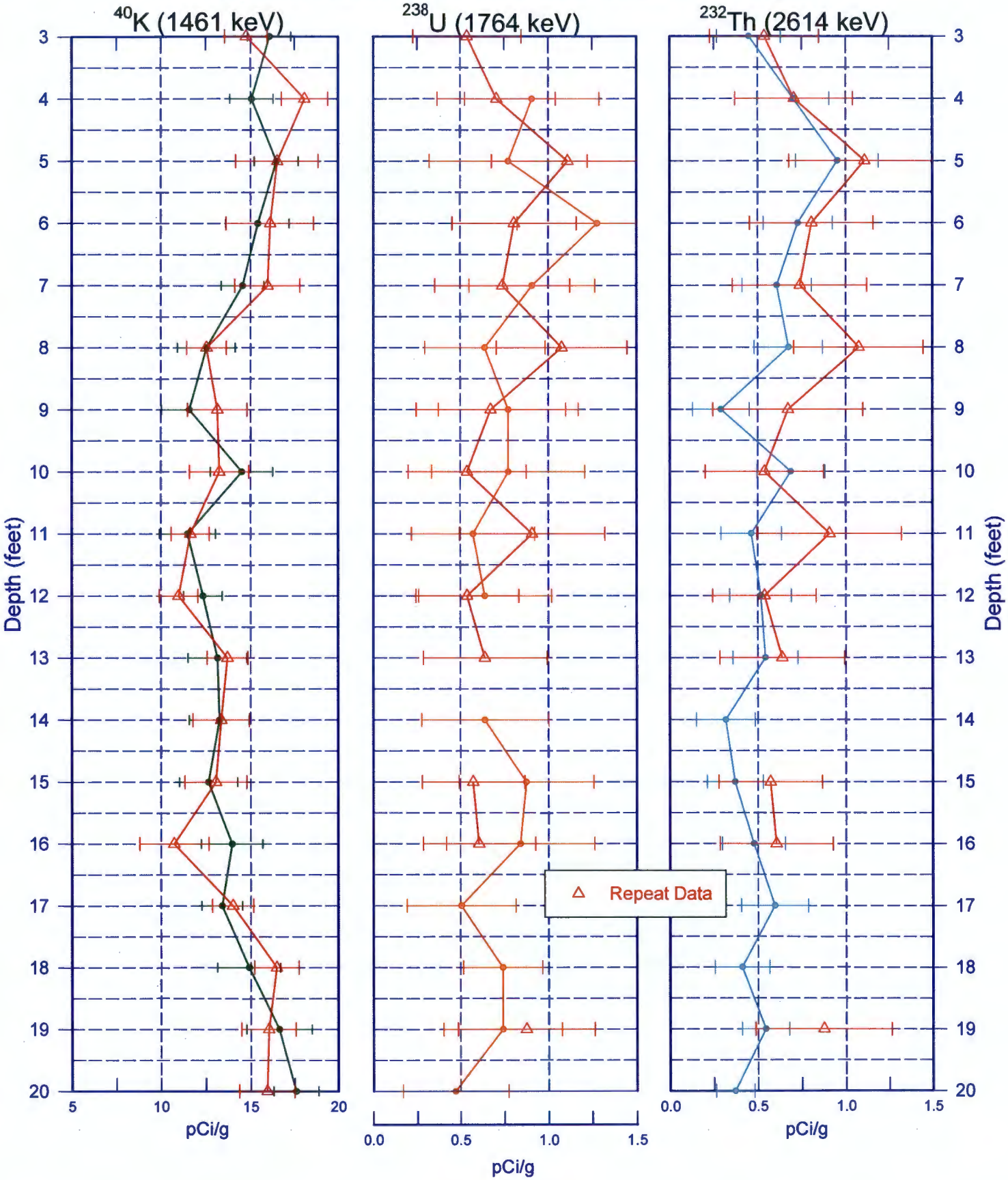
299-E28-30 (C7515)
Total Gamma & Dead Time



Zero Reference = Ground Surface

299-E28-30 (C7515)

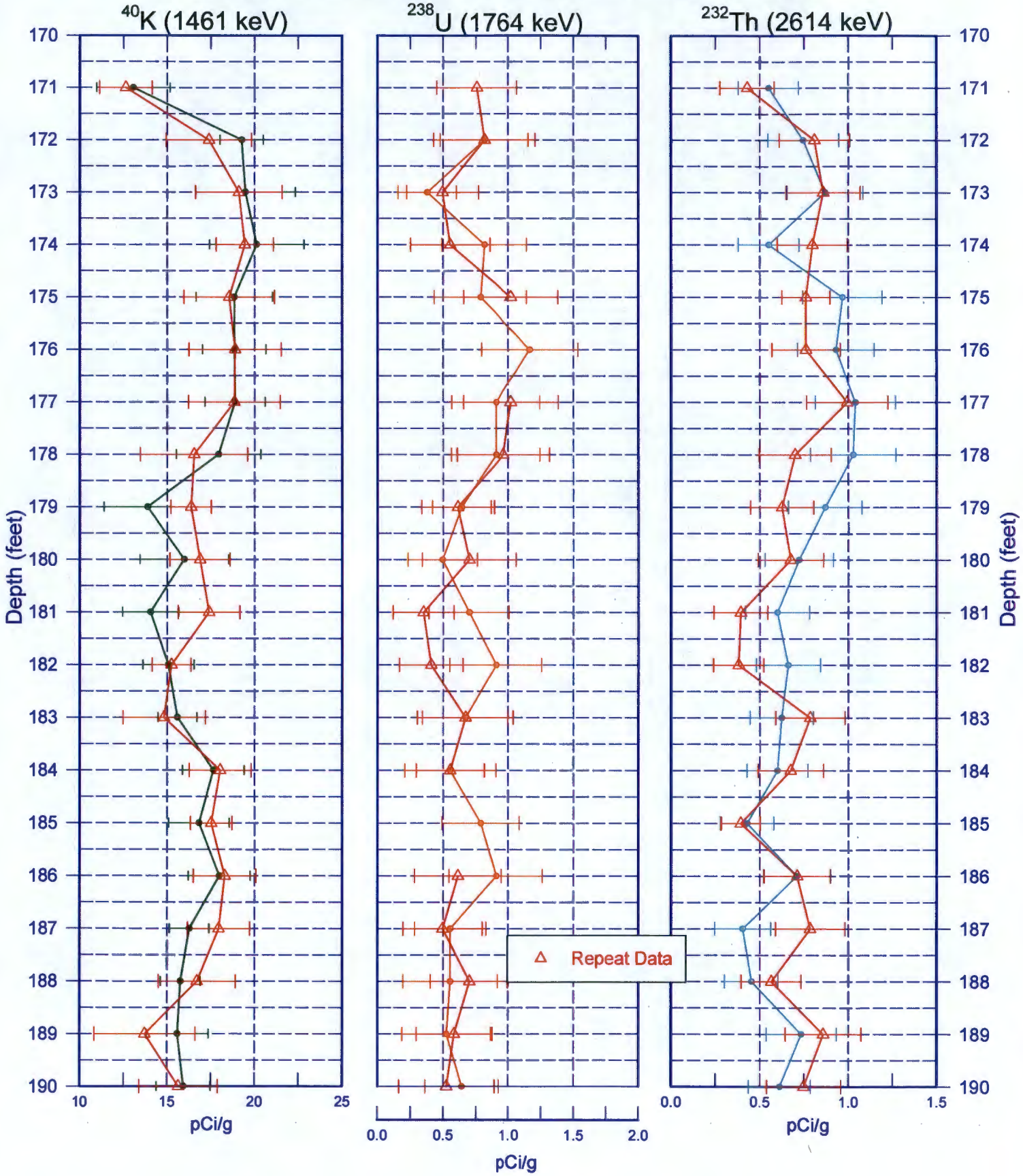
Repeat Section of Natural Gamma Logs



Zero Reference - Ground surface

299-E28-30 (C7515)

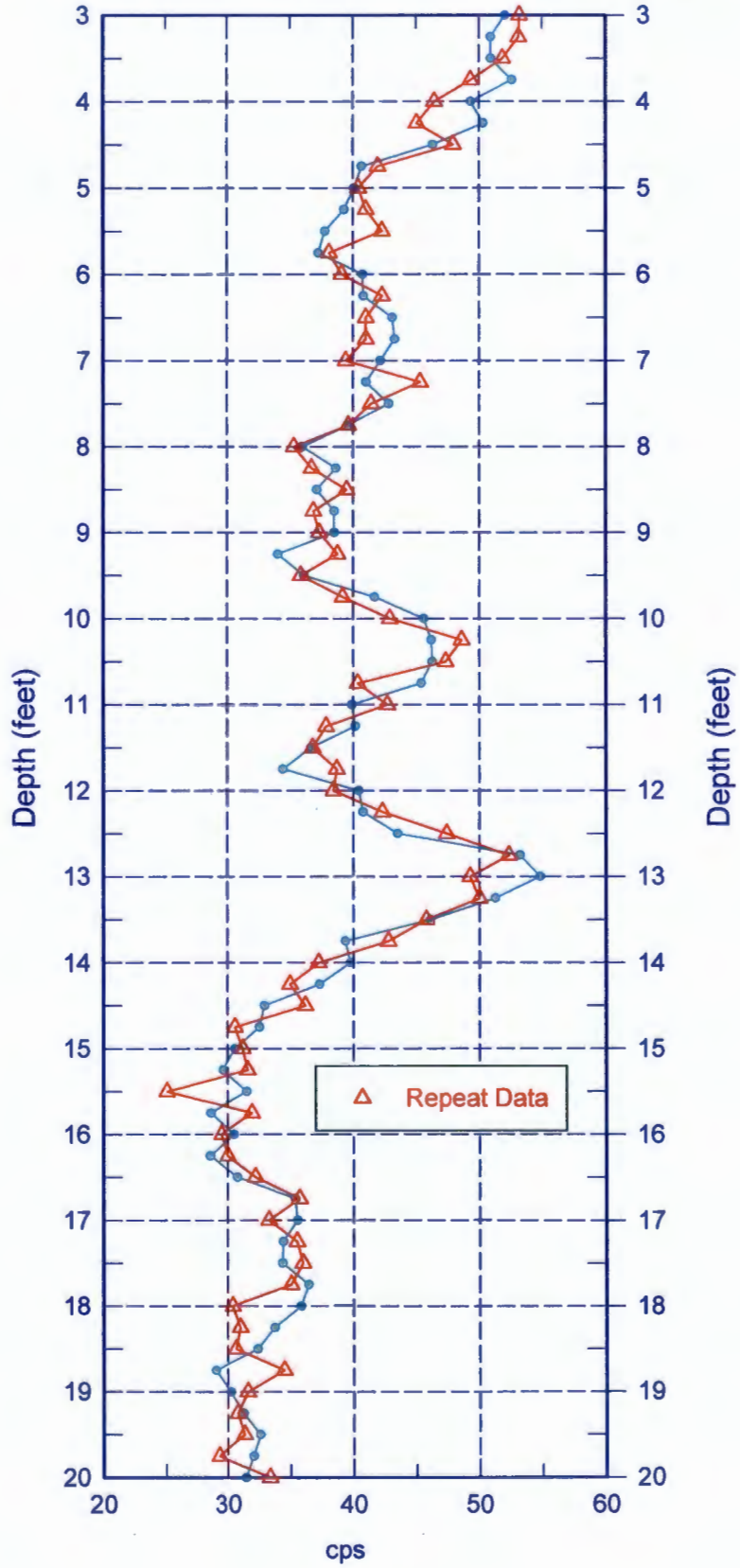
Repeat Section of Natural Gamma Logs



Zero Reference - Ground surface

299-E28-30 (C7515)

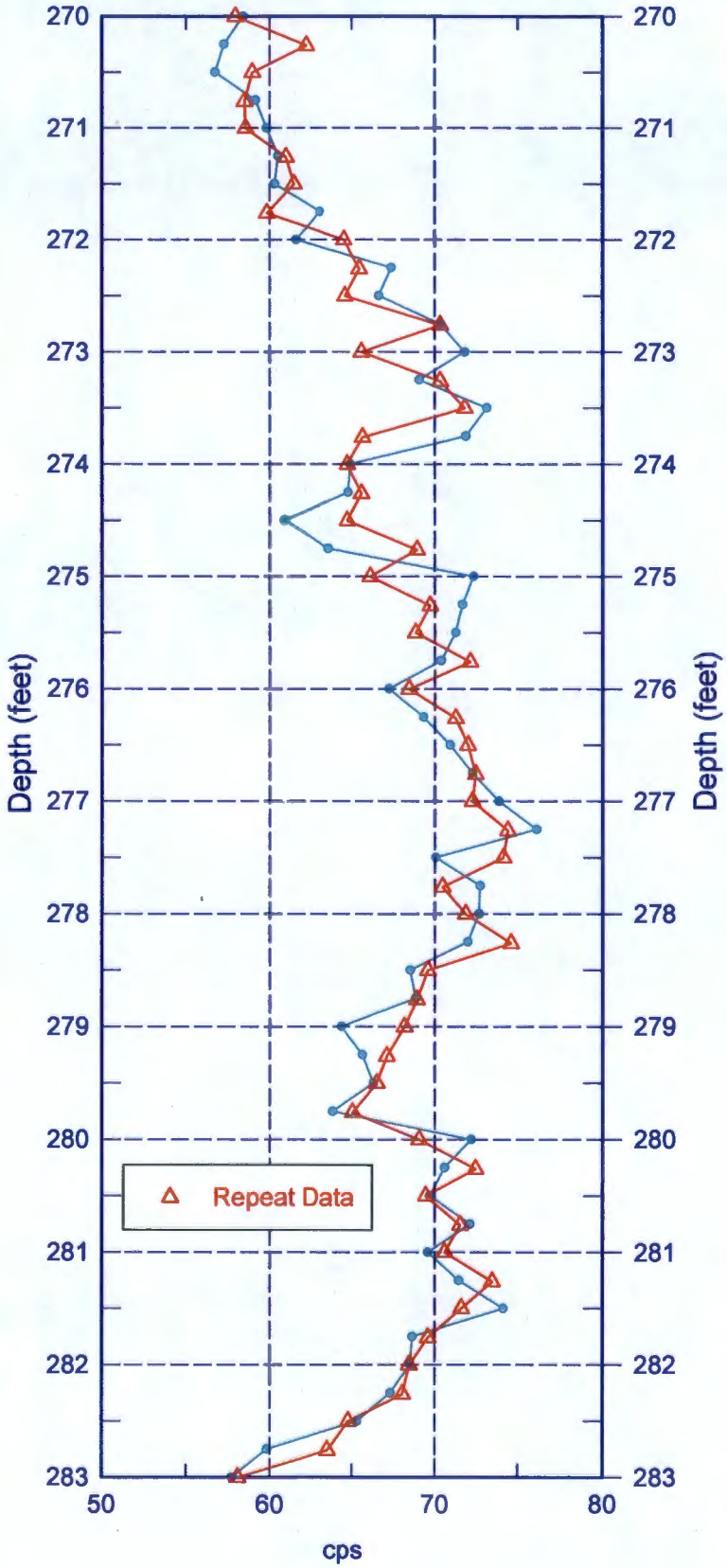
Repeat Section for Moisture (3 - 20 feet)



Reference - Ground surface

299-E28-30 (C7515)

Repeat Section for Moisture (270 - 283 feet)



Reference - Ground surface