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HGLP-LDR-201, Rev. 0

699-52-55A (C5861)
Log Data Report

Borehole Information:

Borehole:	699-52-55A (C5861)		Site:	200 BP-5	
Coordinates (WA St Plane)		GWL[1] (ft):	161.4	GWL Date:	01/07/08
North (m)	East (m)	Drill Date	TOC Elevation	Total Depth (ft)	Type
Unknown	Unknown	12/2007; 1/2008	Unknown	183	Cable Tool

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 3/8	11/16	0	70
Threaded Steel	4.15	8 3/4	7 3/4	1/2	-4.15	177

Borehole Notes:

Logger measured casing using a steel tape and rounding to the nearest 1/16-in. Zero reference is the top of the ground surface.

Logging occurred on two separate days. On 12/03/07 the total drill depth was 73 ft., and on 01/07/08, the total drill depth was 183 ft.

Logging Equipment Information:

Logging System:	Gamma 4 L		Type: Serial No.:	SGLS HpGe (60%) 47TP32211A
Effective Calibration Date:	07/09/2007	Calibration Reference:	HGLP-CC-020	
		Logging Procedure:	HGLP-MAN-002, Rev. 0	

Logging System:	Gamma 4 N		Type: Serial No.:	SGLS HpGe (60%) 45TP22010A
Effective Calibration Date:	07/09/2007	Calibration Reference:	HGLP-CC-022	
		Logging Procedure:	HGLP-MAN-002, Rev. 0	

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

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2 Repeat	3	4 Repeat
Date	12/03/07	12/03/07	01/07/08	01/07/08
Logging Engineer	Spatz	Spatz	McClellan	McClellan
Start Depth (ft)	73.0	60.0	72.0	162.0
Finish Depth (ft)	0.0	50.0	176.0	152.0
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
ft/min	N/A	N/A	N/A	N/A
Pre-Verification	DL081CAB	DL081CAB	DN871CAB	DN871CAB

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Log Run	1	2 Repeat	3	4 Repeat
Start File	DL081000	DL081074	DN871000	DN871105
Finish File	DL081073	DL081084	DN871104	DN871115
Post-Verification	DL081CAA	DL081CAA	DN871CAA	DN871CAA
Depth Return Error (in.)	0	High ½	N/A	2 high
Comments	Fine gain adjustment made a bottom of borehole before logging began, and after files 006, 053.	Repeat section.	No gain adjustments, (except before –000).	Repeat section

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	1	2 Repeat	3	4 Repeat
Date	12/03/07	12/03/07	01/07/08	01/07/08
Logging Engineer	Spatz	Spatz	Pearson	Pearson
Start Depth (ft)	73.0	60.0	72.0	146.0
Finish Depth (ft)	0.0	50.0	161.0	156.0
Count Time (sec)	15	15	15	15
Live/Real	R	R	R	R
Shield (Y/N)	N	N	N	N
MSA Interval (ft)	0.25	0.25	0.25	0.25
ft/min	N/A	N/A	N/A	N/A
Pre-Verification	DH882CAB	DH882CAB	DH922CAB	DH922CAB
Start File	DH882000	DH882293	DH922000	DH922357
Finish File	DH882292	DH882333	DH922356	DH922397
Post-Verification	DH882CAA	DH882CAA	DH922CAA	DH922CAA
Depth Return Error (in.)	High 1	0	N/A	2 high
Comments	None.	Repeat section.	None.	Repeat section

Logging Operation Notes:

Data were collected using Gamma 4, HO 68B-3573. SGLS pre- and post-survey verification measurements were acquired in the Amersham KUTh-115 field verifier. Maximum logging depth achieved on 12/03/07 was 73.05 ft before sonde un-weighted. Maximum logging depth achieved on 01/07/08 was 176.87 ft before sonde un-weighted. A centralizer was installed on the sonde. The ground surface has approximately 1-ft. of backfill to stabilize the working area. NMLS pre and post-survey verification measurements were acquired in the standard field verifier.

Analysis Notes:

Analyst:	LEGLER	Date:	3/28/08	Reference:	GJO-HGLP 1.6.3, Rev. 0

The SGLS pre- and post-survey verification spectra met the acceptance criteria for each system, but DL081CAA had measurements below the lower control limit for the 2614 keV energy line. DN871CAA had measurements below the lower control limit for the 1461 keV energy line. DN871CAB and DN871CAA had measurements above the upper control limit for full width half max for 609, 14611, and 2614 keV energy lines.

The NMLS pre- and post- survey verification spectra met the acceptance criteria for the system, but DH922CAA had measurements above the upper control limit for count per second (cps).

A casing correction for 11/16-in. thick casing from 0 to 70 ft., and a correction for 1/2-in. thick casing from 72 ft to 176 ft were applied during analysis.

SGLS spectra were processed in batch mode in APTEC SUPERVISOR to identify individual peaks and count rates. Concentrations were calculated using EXCEL templates identified as G4LJuly07.xls and G4NSept07.xls using efficiency functions and corrections for casing, dead time, and water as determined by annual calibrations for each system.

NMLS spectra were process in batch mode in APTEC SUPERVISOR to identify count rates. NMLS count rates were calculated using an EXCEL template identified as G4Hnov07.xls. NMLS data are presented in cps, because there are no calibration data for 10 3/8-in. and 7 3/4-in. diameter borehole casings.

Results and Interpretations:

The only manmade radionuclide detected was Cs-137, which was detected at several depths near the MDL. Inspection of the individual spectra indicates that these detections are a statistical fluctuation and are not considered valid.

The repeat sections of SGLS and NMLS show good repeatability suggesting that the systems were working properly.

The Total Gamma and Neutron Moisture plots had exclusions at 72 – 73 ft, which are due to the end effect of the borehole where the casing ends and logging continues into the open borehole.

List of Log Plots:

Depth Reference is top of ground surface

Man-made Radionuclides
Natural Gamma Logs
Combination Plot
Total Gamma, Dead Time, & Moisture
Repeat Section of Natural Gamma Logs (50-60 ft)
Repeat Section of Natural Gamma Logs (152-162 ft)
Moisture Repeat Section (146-156 ft)
Moisture Repeat Section (50-60 ft)

[1] GWL – groundwater level

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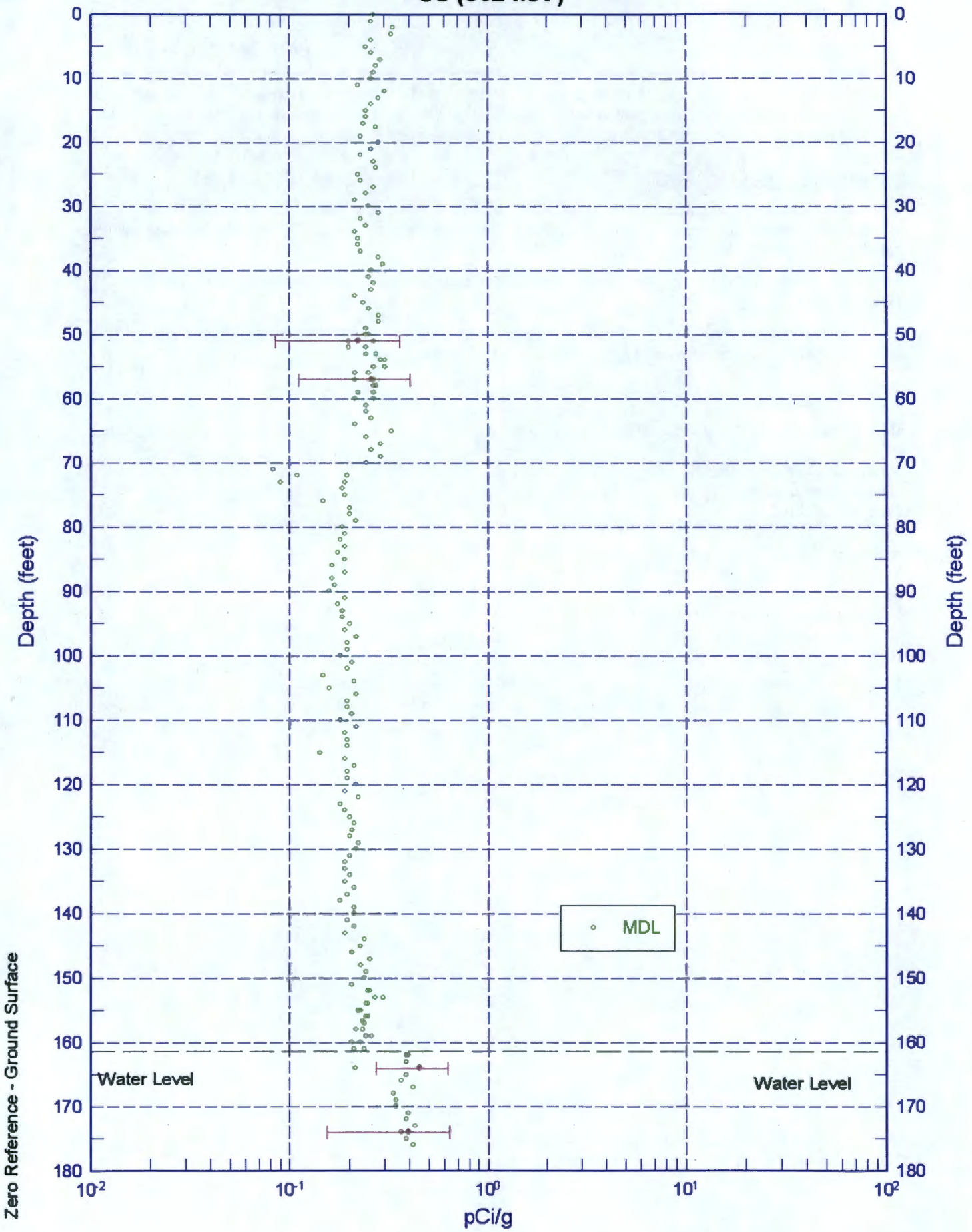
Manmade Radionuclides
^{137}Cs (662 keV)



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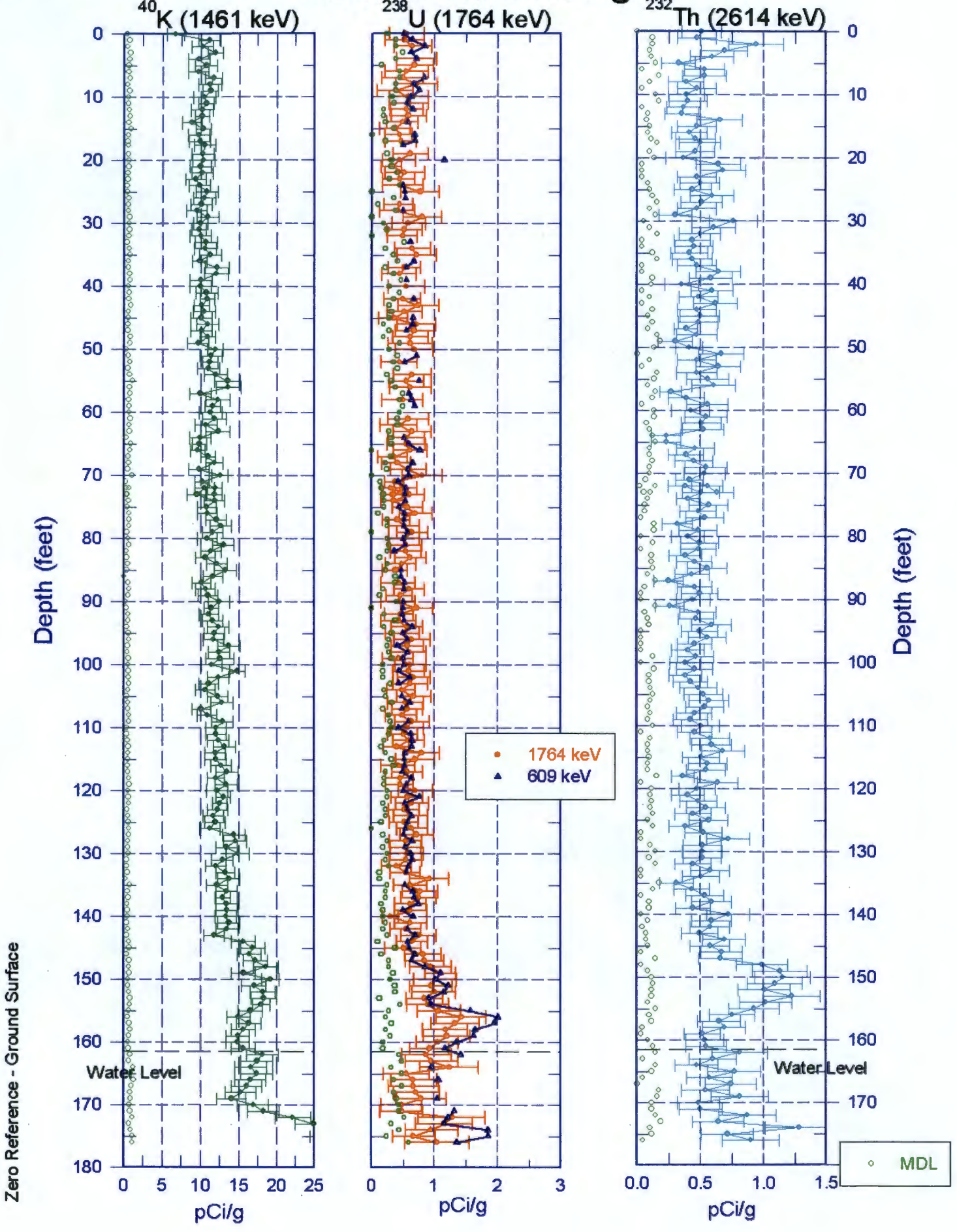
699-52-55A (C5861)
Natural Gamma Logs



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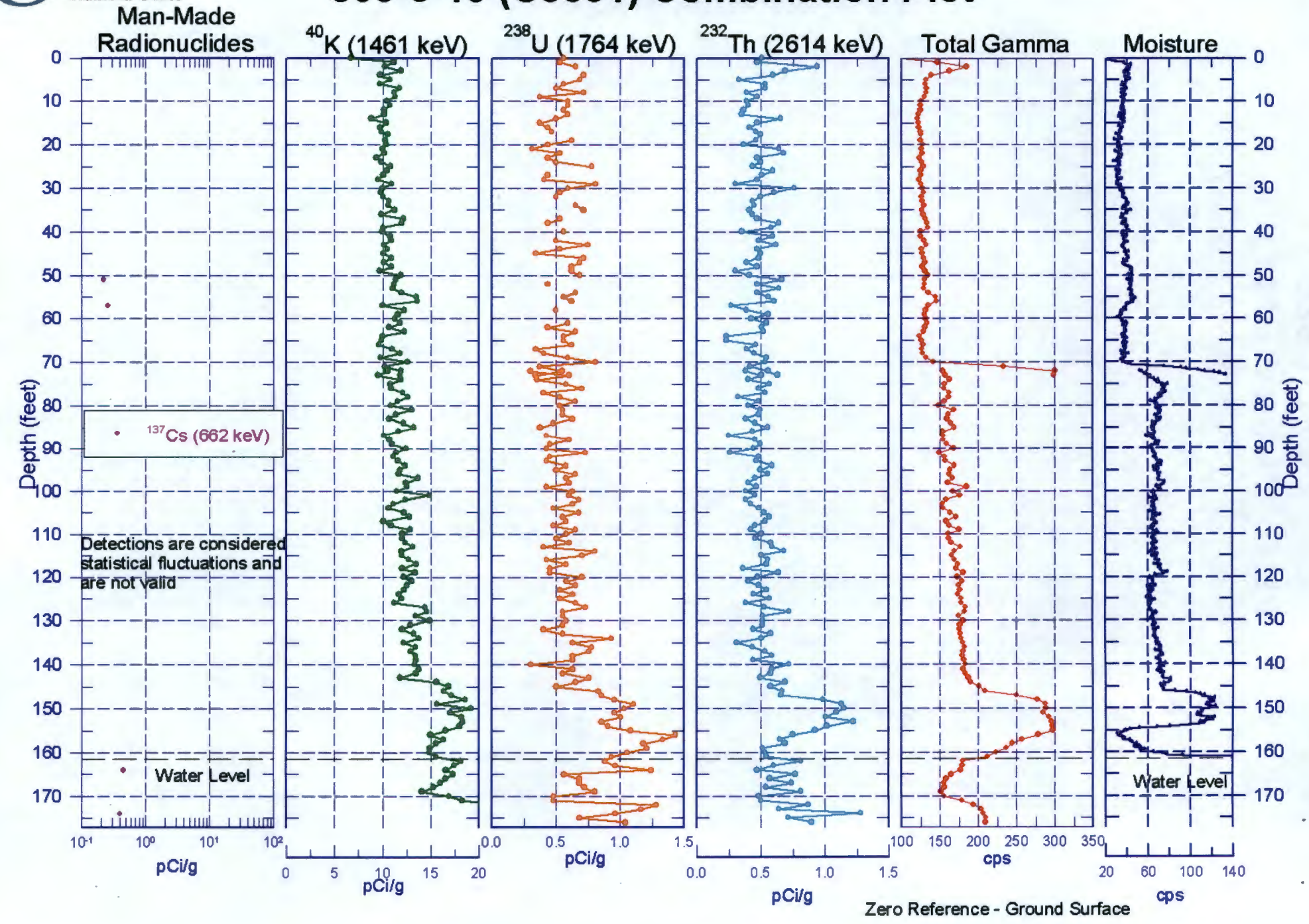
399-3-19 (C5001) Combination Plot



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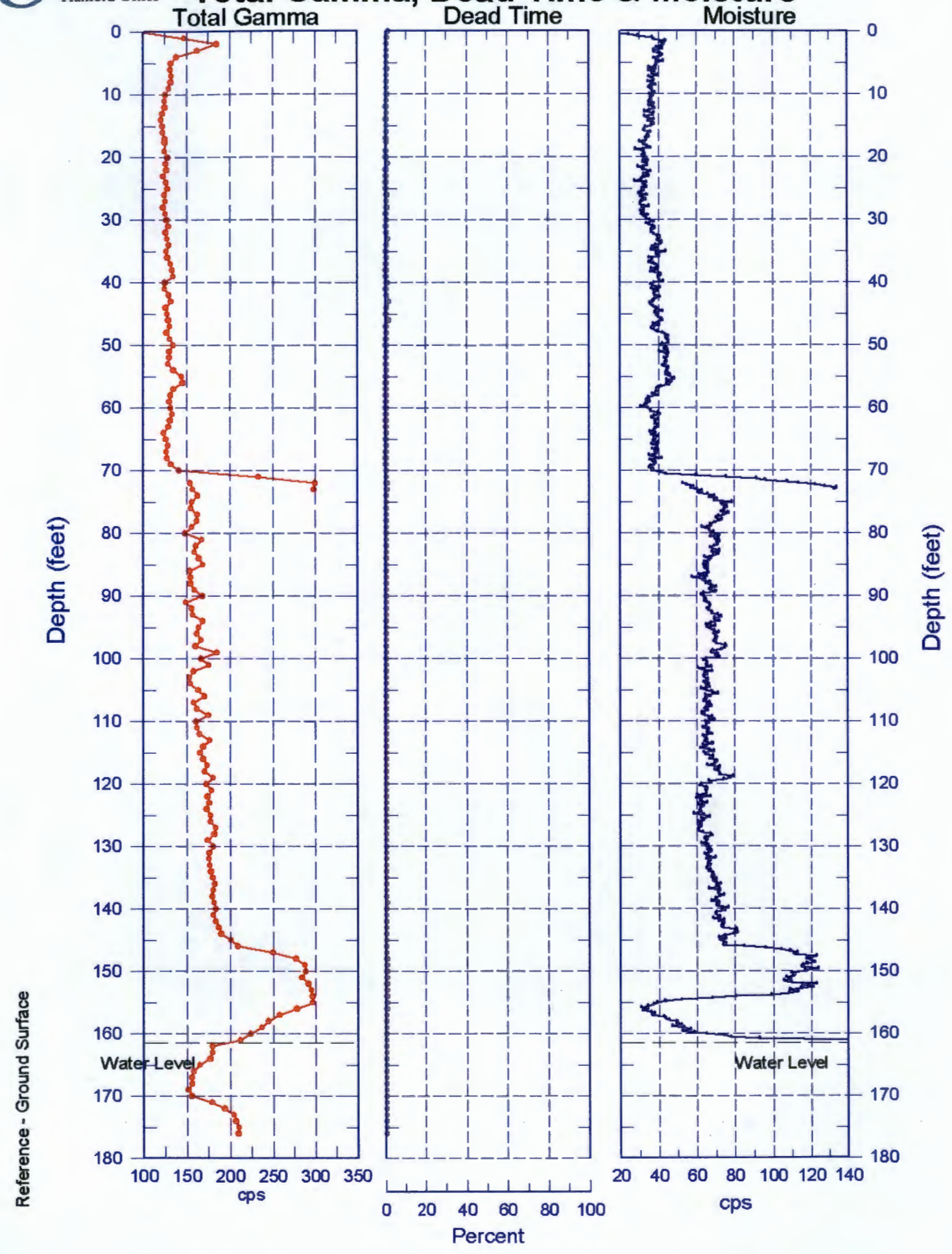
Total Gamma, Dead Time & Moisture



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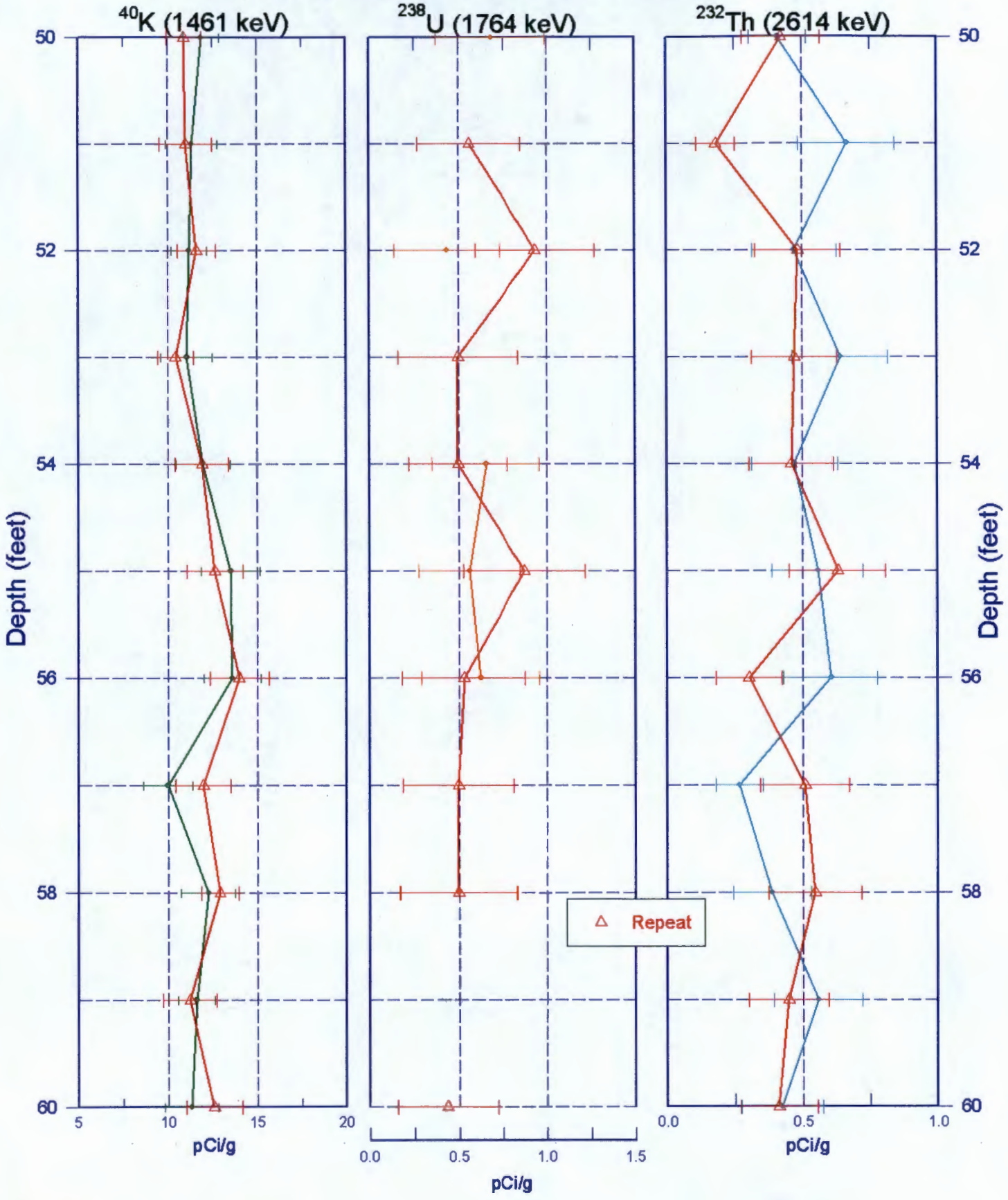
Repeat Section of Natural Gamma Logs



Zero Reference - Ground Surface

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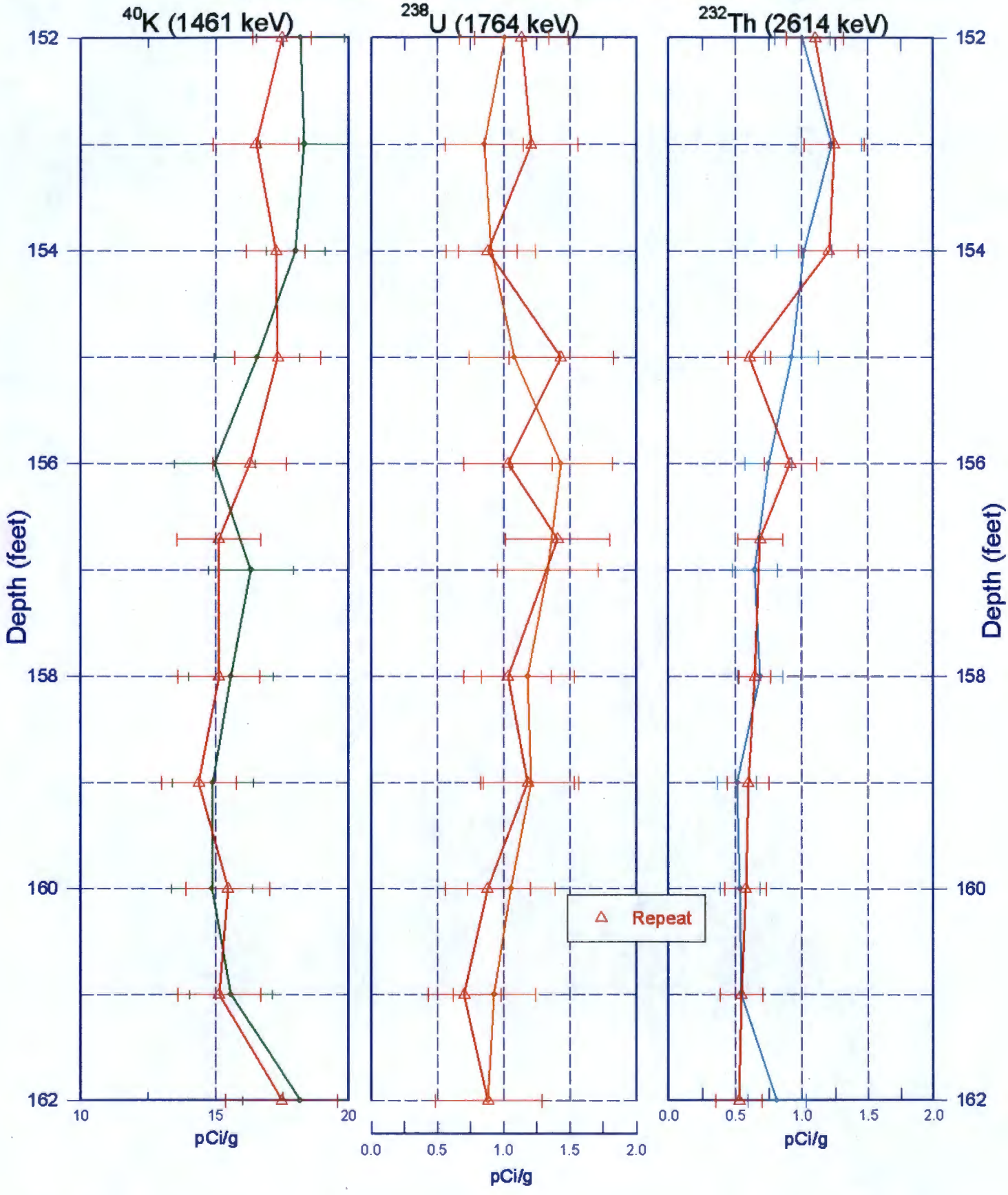
Repeat Section of Natural Gamma Logs



Zero Reference - Ground Surface

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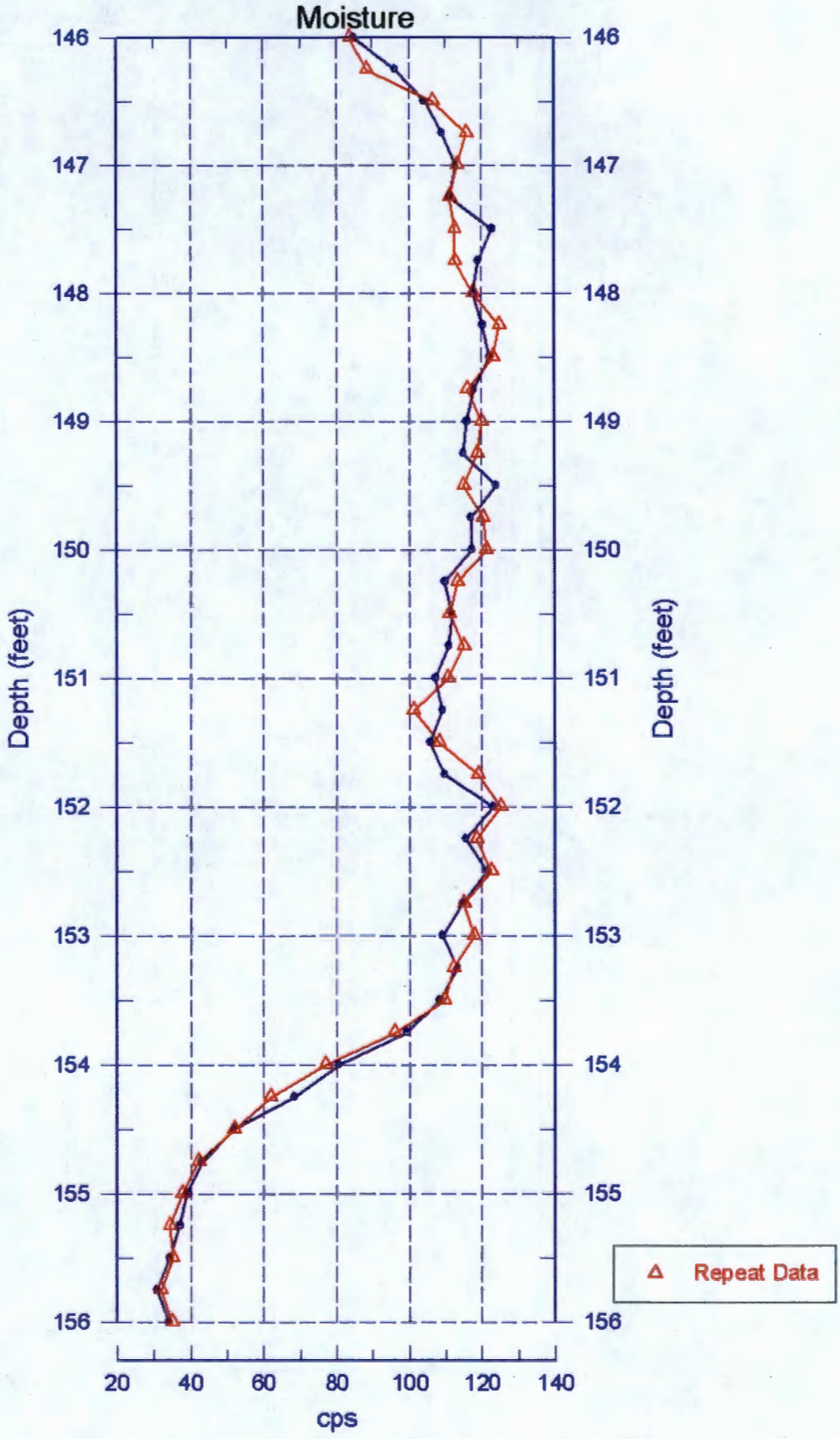
Moisture Repeat Section



Reference - Ground Surface

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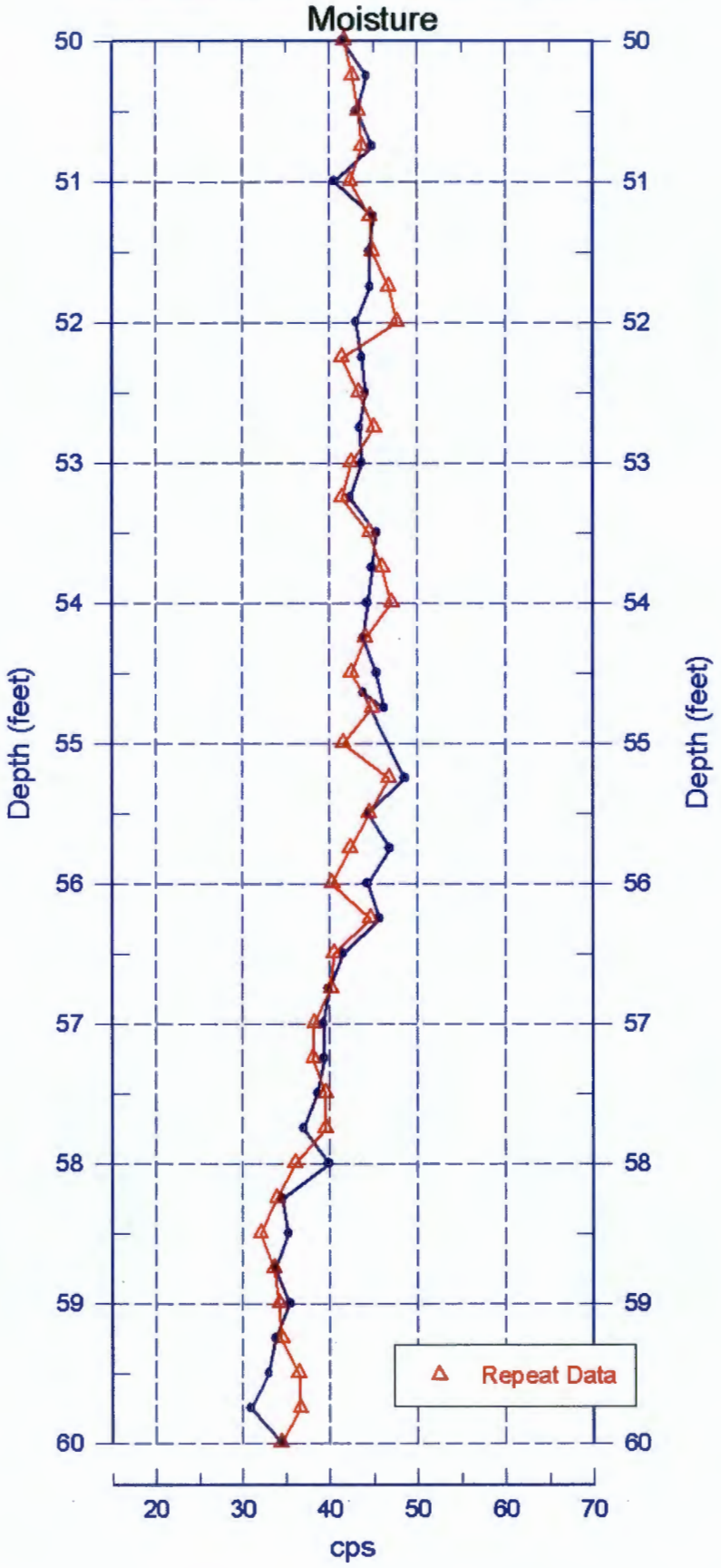
699-52-55A (C5861)
Moisture Repeat Section



Reference - Ground Surface