

2014 AX Farm Re-Baseline, 11-01-05, 299-E25-102 (A6538), Log Data Report

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
Office of River Protection under Contract DE-AC27-08RV14800



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Date

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2014 AX Farm Re-Baseline

11-01-05 299-E25-102 (A6538) Log Data Report

Borehole Information:

Log Date:	2014-07-16	Filename:	A6538_HG-NM_2014-07-16	Site:	AX Farm
Coordinates (HAN)		DTW¹ (ft) :	Dry	DTW Date:	07/09/14
North	West	Drill Date	TOC² Elevation	Total Depth (ft)	Type
N/A	N/A	11/30/1974	N/A	100	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Diameter (in.)		Thickness (in.)	Top (ft)	Bottom (ft)
		Outer	Inside			
Welded steel	0.0	--	6	0.280	0.0	100

Borehole Notes:

The purpose of this logging event is to update the 1996 baseline prior to retrieval activities in AX Farm. No moisture data were acquired during initial logging in 1996 but were acquired during the 2014 logging event. A comparison of manmade radionuclide concentrations from the 1996 and 2014 data is provided. The location of the borehole is indicated on the attached Location Map for AX Farm. A summary of other logging data acquired since 1996 is included in the figure entitled "Hanford Single Shell Tank Farms Borehole Geophysics Summary Sheet."

Borehole information and casing data are as reported in the original log data report contained in the *Tank Summary Data Report for Tank AX-101* (DOE 1997). Casing thickness is derived from published values for schedule 40 steel pipe.

Zero reference is top of casing that is approximately at ground surface.

Logging Equipment Information:

Logging System:	Gamma 2R (BR)	Type:	DHMCA ³ SGLS BR 55% HPGe SGLS
Effective Calibration Date:	03/20/14	Serial No.:	45-TP22010A
Calibration Reference:	HGLP-CC-103, Rev. 1	Logging Procedure:	HGLP-MAN-002, Rev. 1

Logging System:	ED	Type:	NMLS ⁴
Effective Calibration Date:	05/15/14	Serial No.:	H370603792
Calibration Reference:	HGLP-CC-104, Rev. 0	Logging Procedure:	HGLP-MAN-002, Rev. 1

¹ depth to water inside casing

² top of casing

³ Down-hole Multi-Channel Analyzer

⁴ Neutron Moisture Logging System

SGLS Log Run Information:

Log Run	1	2	3	4	5 Repeat
HEIS Number	1018046	1018047	1018048	1018049	1018050
Date	07/10/14	07/11/14	07/14/14	07/15/14	07/15/14
Logging Engineer	Spatz	Spatz	Spatz	Spatz	Spatz
Start Depth (ft)	0.0	11.0	50.0	87.0	5.0
Finish Depth (ft)	12.0	51.0	88.0	100.0	15.0
Count Time (sec)	100	100	100	100	100
Live/Real	R	R	R	R	R
Shield (Y/N)	N	N	N	N	N
MSA Interval (ft)	0.5	0.5	0.5	0.5	0.5
Log Speed (ft/min)	N/A	N/A	N/A	N/A	N/A
Pre-Verification	1018045_B_14710	1018047_B_14711	1018048_B_14714	1018049_B_14715	1018049_B_14715
Start File	D_000000	D_001100	D_005000	D_008700	D_000500
Finish File	D_001200	D_005100	D_008800	D_010000	D_001500
Post-Verification	1018046_A_14710	1018047_A_14711	1018048_A_14714	1015051_A_14715	1018051_A_14715
Depth Error (in.)	0.0	0.0	0.0	0.0	0.0
Comments	No fine gain adjustments made.	No fine gain adjustments made.	No fine gain adjustments made.	No fine gain adjustments made.	No fine gain adjustments made.

NMLS Log Run Information:

Log Run	6	7	8 Repeat		
HEIS Number	1018424	1018425	1018426		
Date	07/15/14	07/16/14	07/16/14		
Logging Engineer	Pope	Pope	Pope		
Start Depth (ft)	0.2377	35.2329	45.4872		
Finish Depth (ft)	35.7519	100.509	54.991		
Count Time (sec)	15	15	15		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		
MSA Interval (ft)	NA	NA	NA		
Log Speed (ft/min)	1.0	1.0	1.0		
Pre-Verification	20140715EDCAB	20140716EDCAB	20140716EDCAB		
Start File	ED0472.LAS	ED0473.LAS	ED0474.LAS		
Finish File	ED0472.LAS	ED0473.LAS	ED0474.LAS		
Post-Verification	20140715EDCAA	20140716EDCAA	20140716EDCAA		
Depth Return Error (in.)	1 low	N/A	1 high		
Comments	None	None	None		

Logging Operation Notes:

File names assigned to DHMCA spectra include the borehole ID, the logging system used, the HEIS number, and the depth (BoreholeID_LoggingSystem_HEISNumber_D_000000.chn). SGSL file names above have been shortened to show depth for simplicity (for example, "D_001500" represents the file at 15 ft).

A centralizer was installed on the SGLS sonde; no centralizer is used for the moisture measurements.

The lowest depth achieved was 100.75 ft, where the sonde unweighted.

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

Analysis Notes:

Analyst:	K. J. Felt/Henwood	Date:	07/25/14	Reference:	HGLP-MAN-003, Rev. 0
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A casing correction for a 0.280-in. thick casing was applied to the log data.

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 template identified as 20140320_BR_HiDT.xls using an efficiency function and corrections for casing and dead time as determined by annual calibration.

To assure comparability, 1996 data were reprocessed using the same casing correction as the 2014 data. The efficiency function and dead time correction in place in 1996 were applied during reprocessing. For purposes of comparison with the 2014 data, the 1996 baseline data has been decayed to a common date of July 15, 2014.

Since the original baseline data were acquired in 1996, an improved detection system has been deployed. Detector efficiency is increased and spectral energy peaks used for assay are better defined with improved resolution. These improvements can result in occasional additional detections of manmade radionuclides at concentrations near the MDL that were not evident in the baseline data. These additional detections are therefore not necessarily evidence of contaminant migration.

NMLS data are represented in percent volumetric moisture content.

Results and Interpretations:

Cs-137 was detected continuously from ground surface to 14 ft, 77.5 ft and at the bottom of the borehole. The maximum concentration of Cs-137 was measured at 63 pCi/g at a depth of 0.5 ft. A comparison of the 1996 baseline data with the 2014 data indicates no significant changes.

Though not detected, the MDLs for commonly detected Eu-154 and Co-60 are plotted on the manmade radionuclides plot.

The neutron moisture log primarily responds to moisture present in the surrounding formation. In general, an increase in count rate reflects an increase in moisture content. Moisture content may increase in sediments of relatively high silt or clay content.

The manmade, KUT, and moisture repeat plots indicate that the respective systems were working properly.

List of Plots:

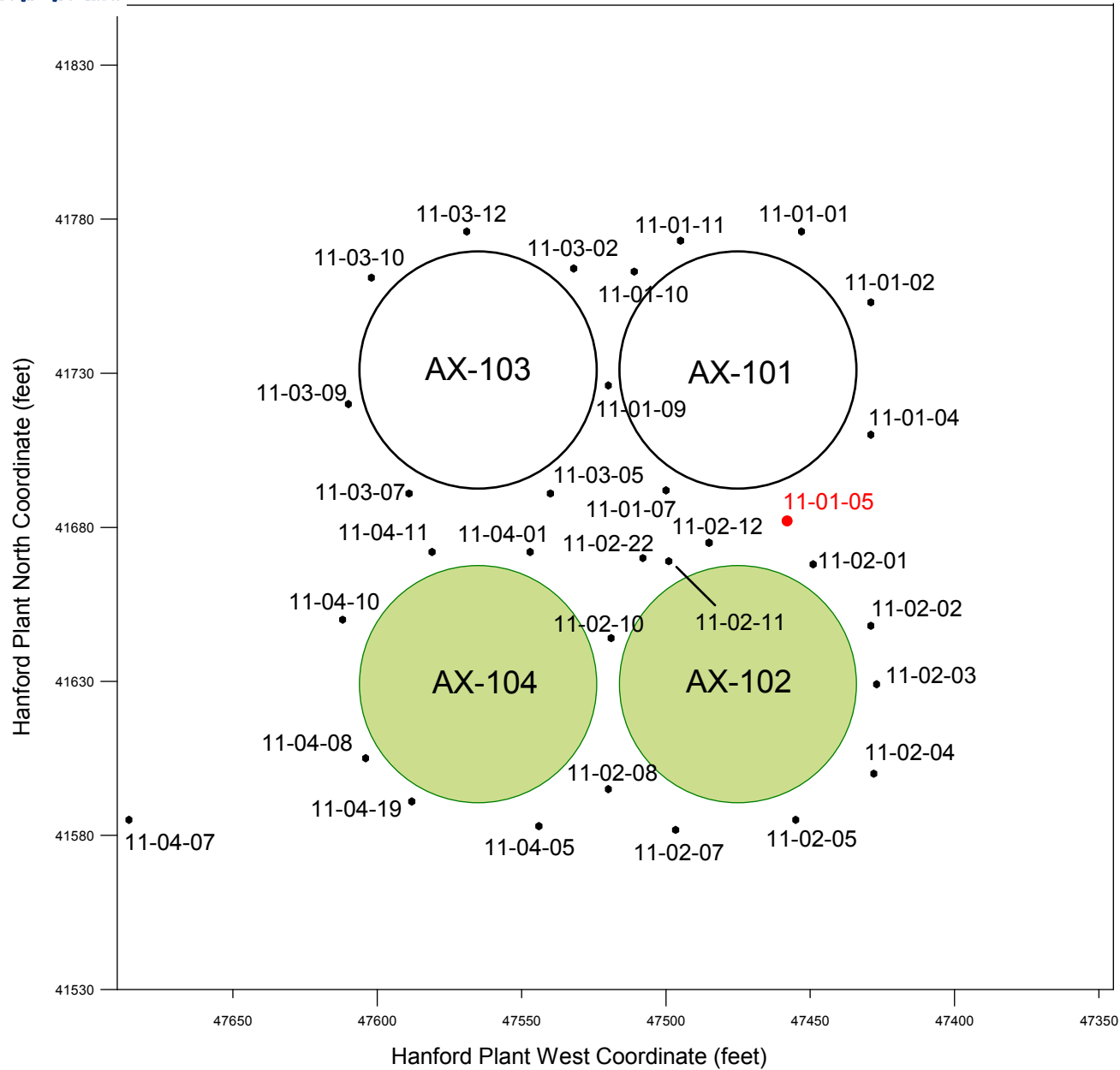
Depth Reference is top of casing.

- Borehole 11-01-05 Location in AX Tank Farm
- Hanford Single Shell Tank Farms Borehole Geophysics Summary Sheet
- Combination Plot-2014 (0-110 ft)
- Comparison of Manmade Radionuclides (2014 & 1996) (0-110 ft)
- Manmade Repeat Plot (5-15 ft)
- Repeat Section of Natural Gamma Logs (5-15 ft)
- Moisture Repeat Section (45-55 ft)

References:

U.S. Department of Energy (DOE). 1997. *Hanford Tank Farms Vadose Zone, Tank Summary Data Report for Tank AX-101*. GJ-HAN-49. Prepared by MACTEC-ERS for the U.S Department of Energy Albuquerque Operations Office, Grand Junction Office. Grand Junction, Colorado.

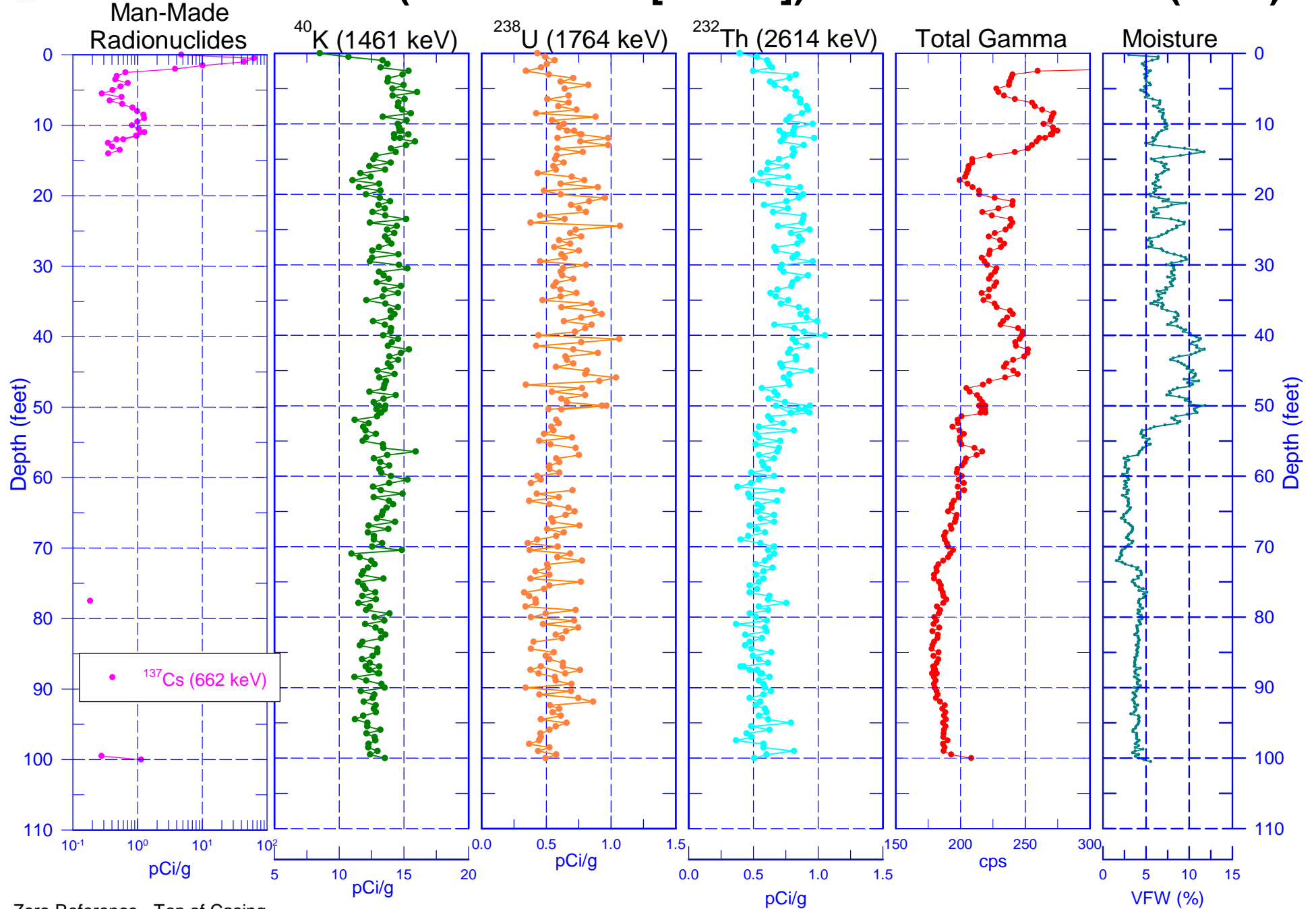
Borehole 11-01-05 Location in AX Tank Farm



North

Assumed Leaker

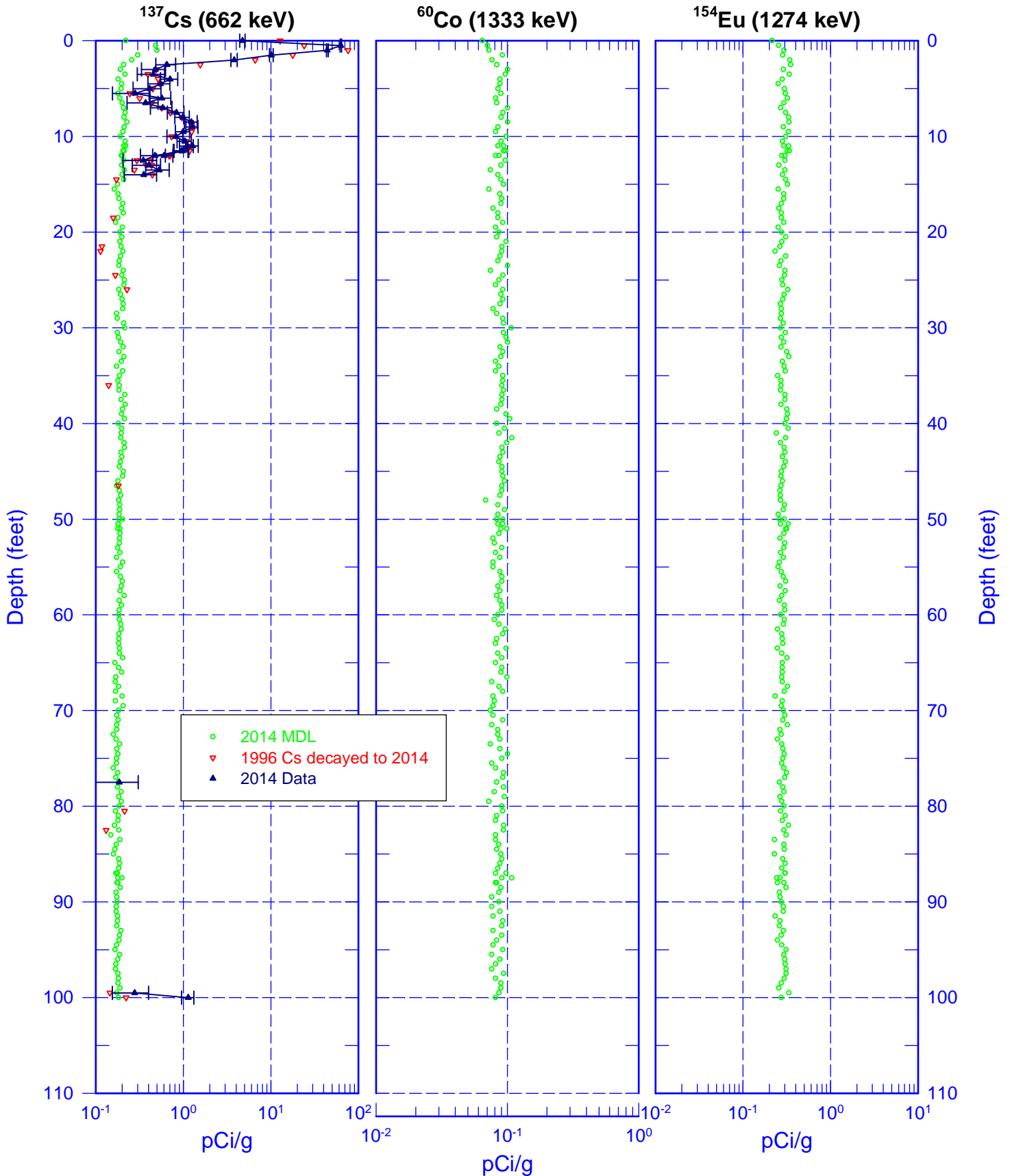
11-01-05 (299-E25-102 [A6538]) Combination Plot (2014)



Zero Reference - Top of Casing

11-01-05 (299-E25-102 [A6538])

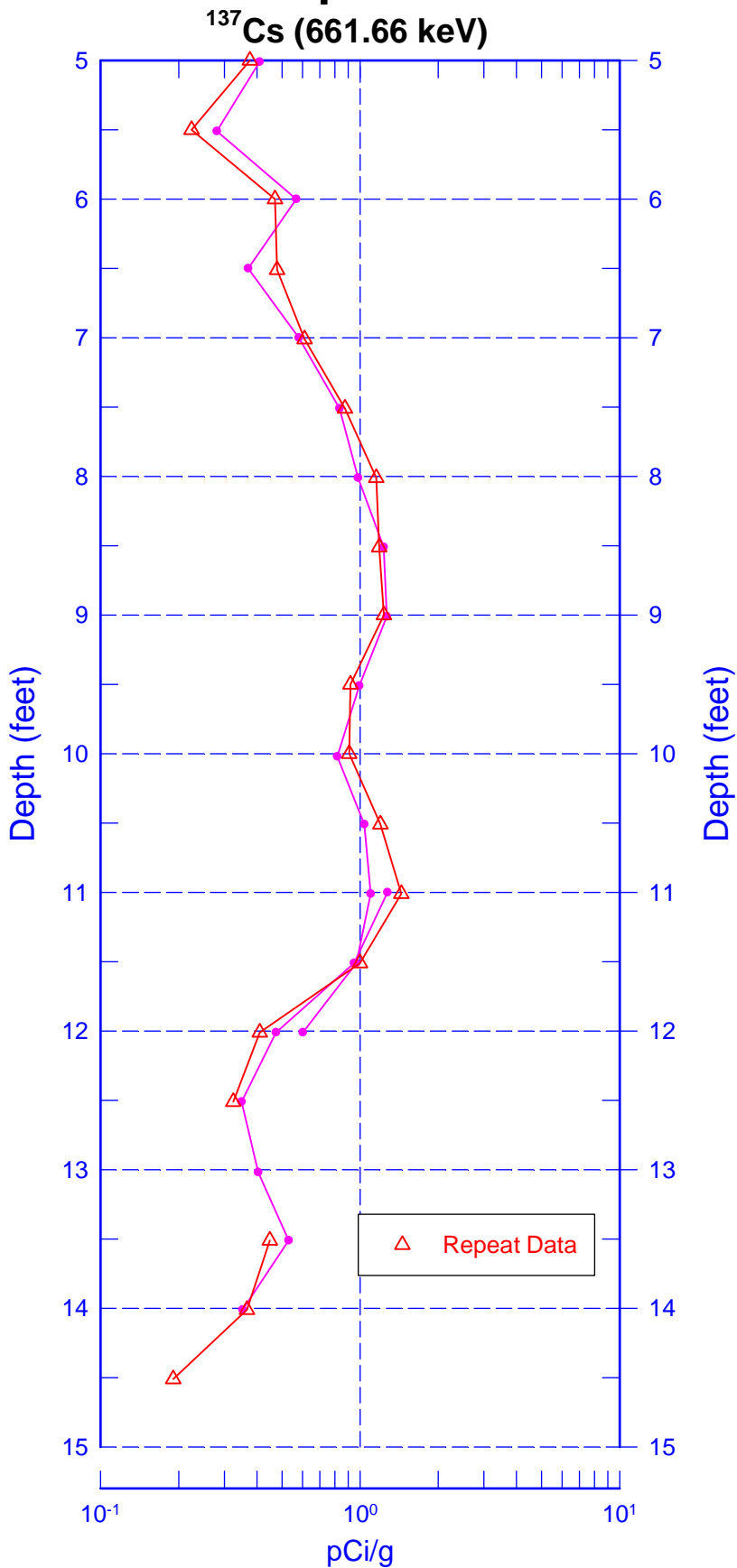
Comparison of Manmade Radionuclides (2014 & 1996)



Zero Reference - Top of Casing

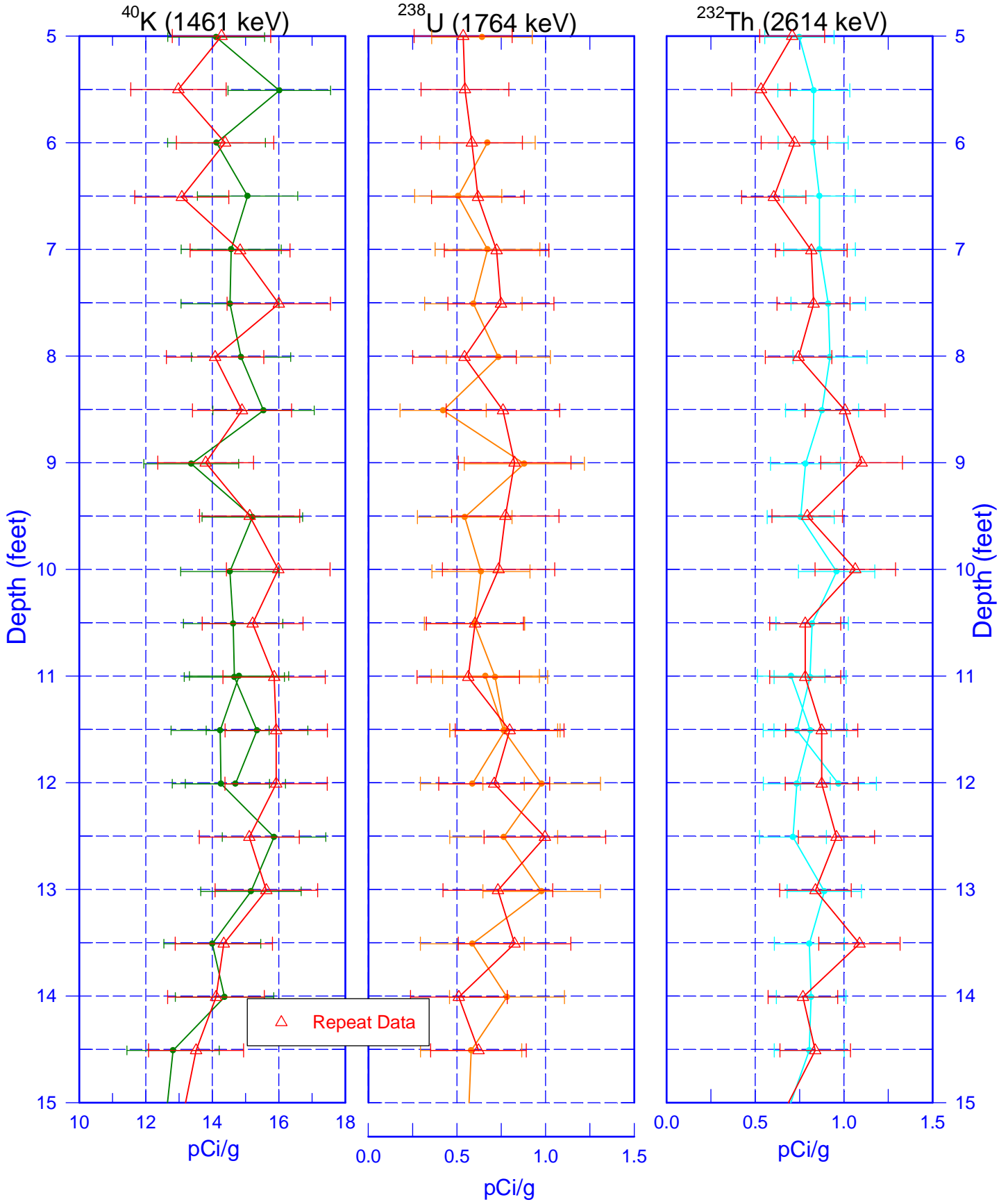


11-01-05 (299-E25-102 [A6538]) Manmade Repeat Section



11-01-05 (299-E25-102 [A6538])

Repeat Section of Natural Gamma Logs





11-01-05 (299-E25-102 [A6538]) Moisture Repeat Section

