HGLP-LDR-863
Revision 00

10-02-06, 299-E25-86 (A6525), 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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APPROVED
By Lynn M Ayers at 3:47 pm, Apr 05, 2022

Release Approval Date

Stoller Newport News Nuclear

10-02-06
299-E25-86 (A6525)
Log Data Report

Borehole Information:

Log Date:	2015-04-08	Filename:	A6525_HG_2015-04-08	Site:	A Farm
Coordinates (WA St Plane)		DTW[1] (ft) :	86.4	GWL Date:	02/19/15
North (m)	East (m)	Drill Date	TOC[2] Elevation	Total Depth (ft)	Type
N/A	N/A	04/30/1962	N/A	90	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Diameter (in.)		Thickness (in.)	Top (ft)	Bottom (ft)
		Outer	Inside			
Welded Steel	0.0	N/A	6	0.280	0.0	90

Borehole Notes:

A re-baseline of selected boreholes in A Farm was conducted in 2015 for comparison with the initial baseline data acquired in 1996. This Log Data Report includes SGLS[3] data acquired in 1996 and 2015. Temperature data were also collected in 2015.

Borehole information and casing data are as reported in the original log data report contained in the *Tank Summary Data Report for Tank A-102* (DOE 1998). Casing thicknesses are derived from published values for schedule 40-steel pipe.

A drive barrel was lost at 90 ft during deepening of the borehole in 1978. Nine gallons of grout were added to the bottom of the borehole which is probably equivalent to about 3 ft. A small amount of water is inside the casing at 86.4 ft or about 0.6 ft.

The zero reference is the TOC.

Logging Equipment Information:

Logging System:	Gamma 2	Type:	DHMCA[4] SGLS BR
Effective Calibration Date:	03/20/14	Serial No.:	48-TP50478A
Calibration Reference:	HGLP-CC-103, Rev. 1	Logging Procedure:	HGLP-MAN-002, Rev. 2a

Logging System:	BCTLS[5]	Type:	Infrared Temperature
Effective Calibration Date:	N/A	Serial No.:	OS136-1 MV-F
Calibration Reference:	Manufacturer	Logging Procedure:	HGLP-PRO-009 Rev 0a

SGLS Log Run Information:

Log Run	1	2	3 Repeat		
HEIS Number	1016228	1016229	1016230		
Date	02/25/15	02/26/15	02/26/15		

[1] Depth to water inside casing
[2] top of casing
[3] Spectral Gamma Logging System
[4] Down-Hole Multi-Channel Analyzer
[5] Borehole Casing Temperature Logging System

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Log Run	1	2	3 Repeat		
Logging Engineer	Spatz/Pope/Felt/ McClellan	Spatz/Pope/Felt/ McClellan	Spatz/Pope/Felt/ McClellan		
Start Depth (ft)	0.0	50.5	20.0		
Finish Depth (ft)	51.5	86.01	30.0		
Count Time (sec)	100	100	100		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		
MSA Interval (ft)	0.5	0.5	0.5		
Log Speed (ft/min)	N/A	N/A	N/A		
Pre-Verification	_B_15225	_B_15226	1016229_B_152 26		
Start File	D_000000	D_005050	D_002000		
Finish File	D_005150	D_008601	D_003000		
Post-Verification	_A_15225	1016230_A_152 26	A_15226		
Depth Return Error (in.)	2.0 low	N/A	0.0		
Comments	No fine gain adjustments made	No fine gain adjustments made	No fine gain adjustments made		

Borehole Temperature Information:

Log Run	5	6			
Date	04/08/15	04/08/15			
Logging Engineer	Felt	Felt			
Start Depth (ft)	1.0	40.0			
Finish Depth (ft)	86.0	50.0			
MSA Interval (ft)	1.0	1.0			
Comments	Sensor stabilized at 20 ft before logging	None			

Logging Operation Notes:

Data were collected using Gamma 2, HO 68B-3572. Pre- and post-survey verification measurements were acquired in the KUTh-082 field verifier. A centralizer was not installed on the sonde. During logging, the boom was extended over the A Farm perimeter fence boundary using the remote standoff.

Analysis Notes:

Analyst:	P.D. Henwood	Date:	09/18/15	Reference:	HGLP-MAN-003, Rev. 1a

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

A casing correction for 0.280-in. thick casing was applied 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 template identified as 20140320_BR, 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 MDL[6] 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.

To assure comparability, the same casing correction used for the 2015 data was applied to the original 1996 processed files. The efficiency function and dead time correction in place in 1996 was applied during reprocessing. For purposes of comparison with the 2015 data, the Cs-137 concentrations were decayed to a common date of February 26, 2015.

A borehole temperature logging system was deployed that uses an infrared sensor to measure casing temperature. The measurement should be considered qualitative and is described in *Borehole Casing Temperature Logging System Operating Procedure* (HGLP-PRO-009, Rev. 0a). Measurements are made at discrete 1 ft depth intervals. The sensor is factory calibrated such that 10 mV is equivalent to 1 degree Fahrenheit. Readings were recorded with a digital voltmeter.

Results and Interpretations:

Cs-137 was detected from ground surface to approximately 14 ft and at a few intermittent depth locations throughout the borehole. A maximum concentration of approximately 4 pCi/g was measured at 2.5 ft. Comparisons with the 1996 SGLS data indicate no significant changes.

No other radionuclides were detected. MDLs for Co-60 and Eu-154 that are common contaminants in A Farm are plotted with the 1996 data on the "Comparison of Manmade Radionuclides (2015 & 1996)" plot for the entire borehole.

Temperature measurements are plotted on the Combination Plot and range from approximately 43.5 degrees F at 1 ft to 72.2 degrees F beginning at 79 ft. The temperature remained static from 79 to 81 ft at 72.2 degrees F before falling. The temperature log records the temperature of the inside surface of a steel pipe, which is surrounded by soil in which heat may be generated by radioactive decay of contaminants such as Sr-90. It is also possible that the log may be responding to soil heated by waste inside the tanks. Borehole 10-02-06 is approximately 11 ft from the steel liner of tank A-102. The tank currently contains no sludge, 37,000 gal salt cake, and 3,000 gal supernate (*Waste Tank Summary Report for Month Ending June 30, 2015*, HNF-EP-0182, Revision 330). Temperature measurements should be qualitatively compared with other boreholes around tank A-102 and with boreholes associated with other tanks to determine relative differences that may indicate subsurface heat sources.

List of Log Plots:

Depth Reference is top of casing:

Borehole Location Map for A Farm
Combination Plot (2015) (0-100 ft)
Comparison of Manmade Radionuclides (2015 & 1996) (0-100 ft)
Repeat Section of Natural Gamma Logs (20-30 ft)
Temperature Repeat Section (40-50 ft)

References:

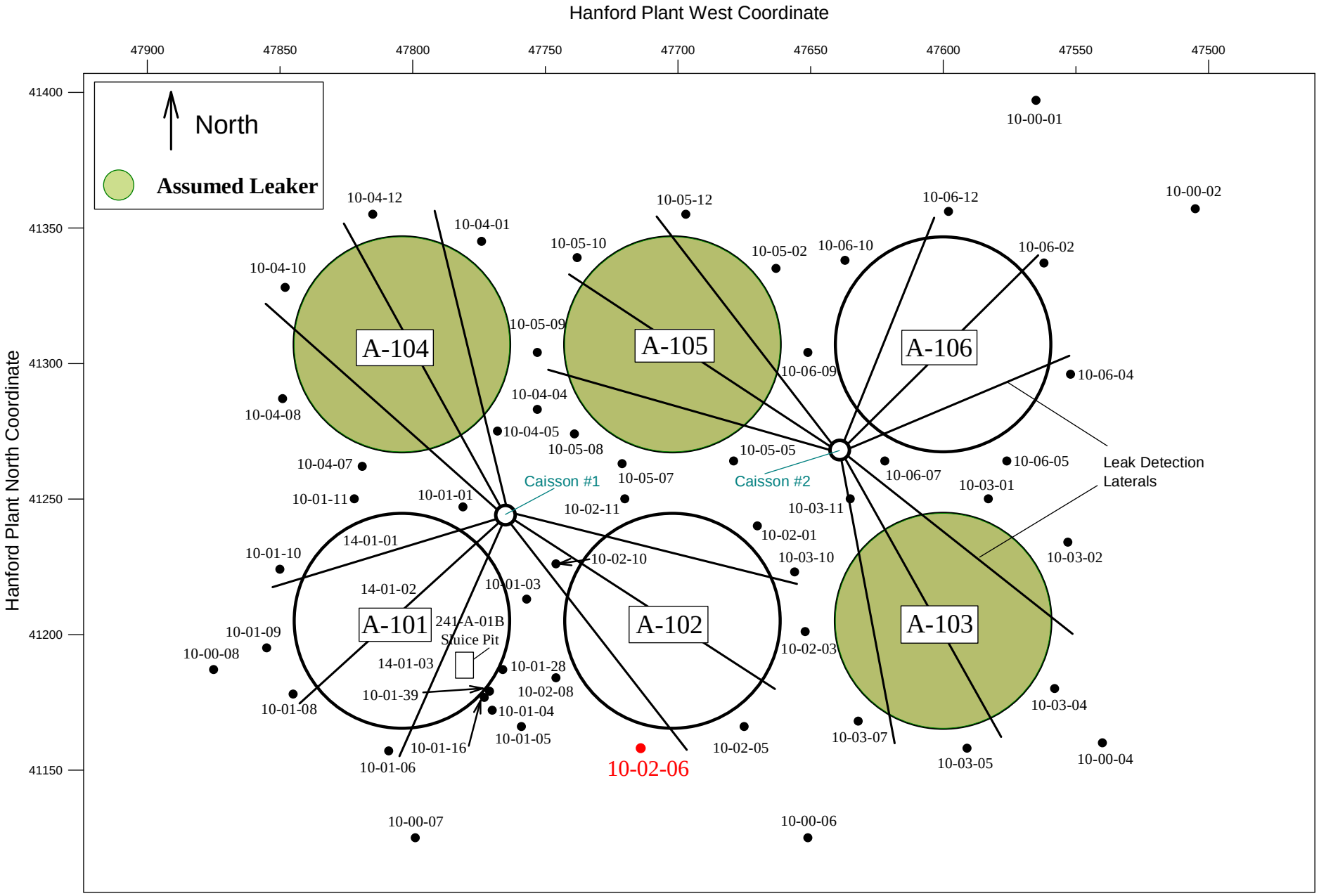
U.S. Department of Energy (DOE). 1998. *Hanford Tank Farms Vadose Zone, Tank Summary Data Report for Tank A-102.* GJ-HAN-107. Prepared by MACTEC-ERS for the Grand Junction Office. Grand Junction, Colorado.

Rogers, M.J. 2015. *Waste Tank Summary Report for Month Ending June 30, 2015*. HNF-EP-0182, Revision 330. Washington River Protection Solutions. Richland, Washington.

Stoller Newport News Nuclear (SN3). 2015. *Borehole Casing Temperature Logging System Operating Procedure*. HGLP-PRO-009, Revision 0a. Richland, Washington.

[6] minimum detectable level

Borehole Location Map for A Farm



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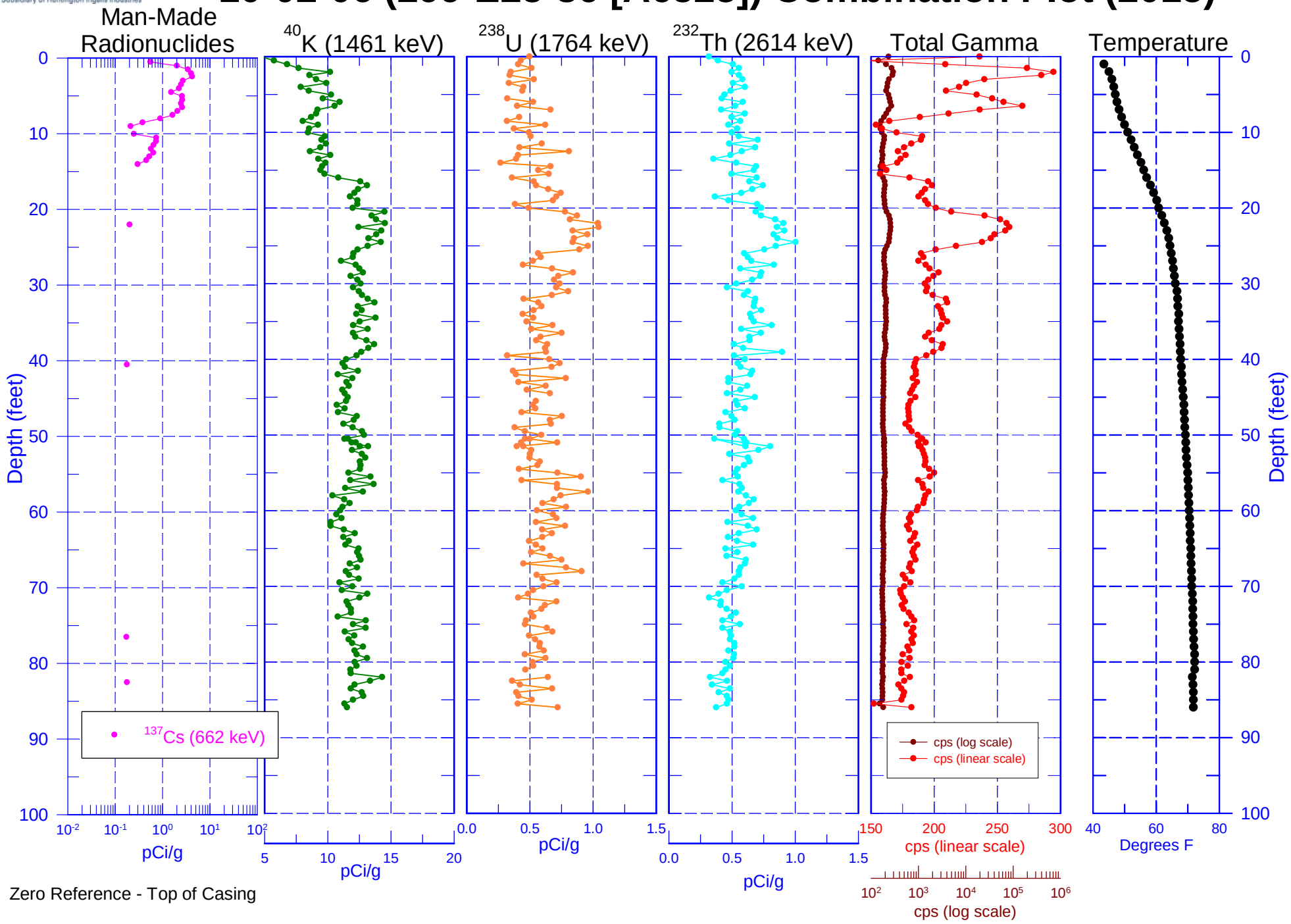
10-02-06 (299-E25-86 [A6525]) Combination Plot (2015)



Zero Reference - Top of Casing

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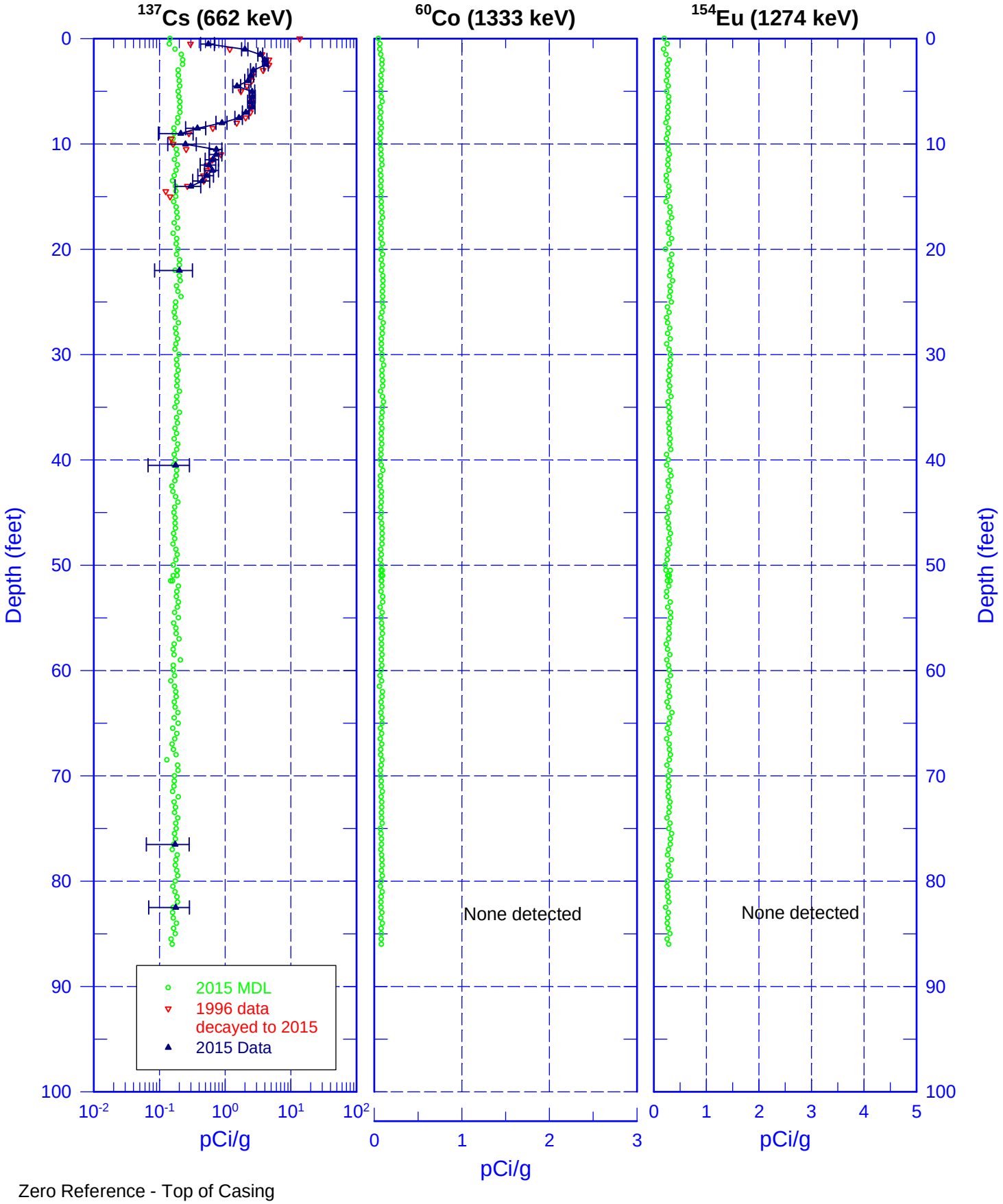
10-02-06 (299-E25-86 [A6525])

Comparison of Manmade Radionuclides (2015 &1996)



Zero Reference - Top of Casing

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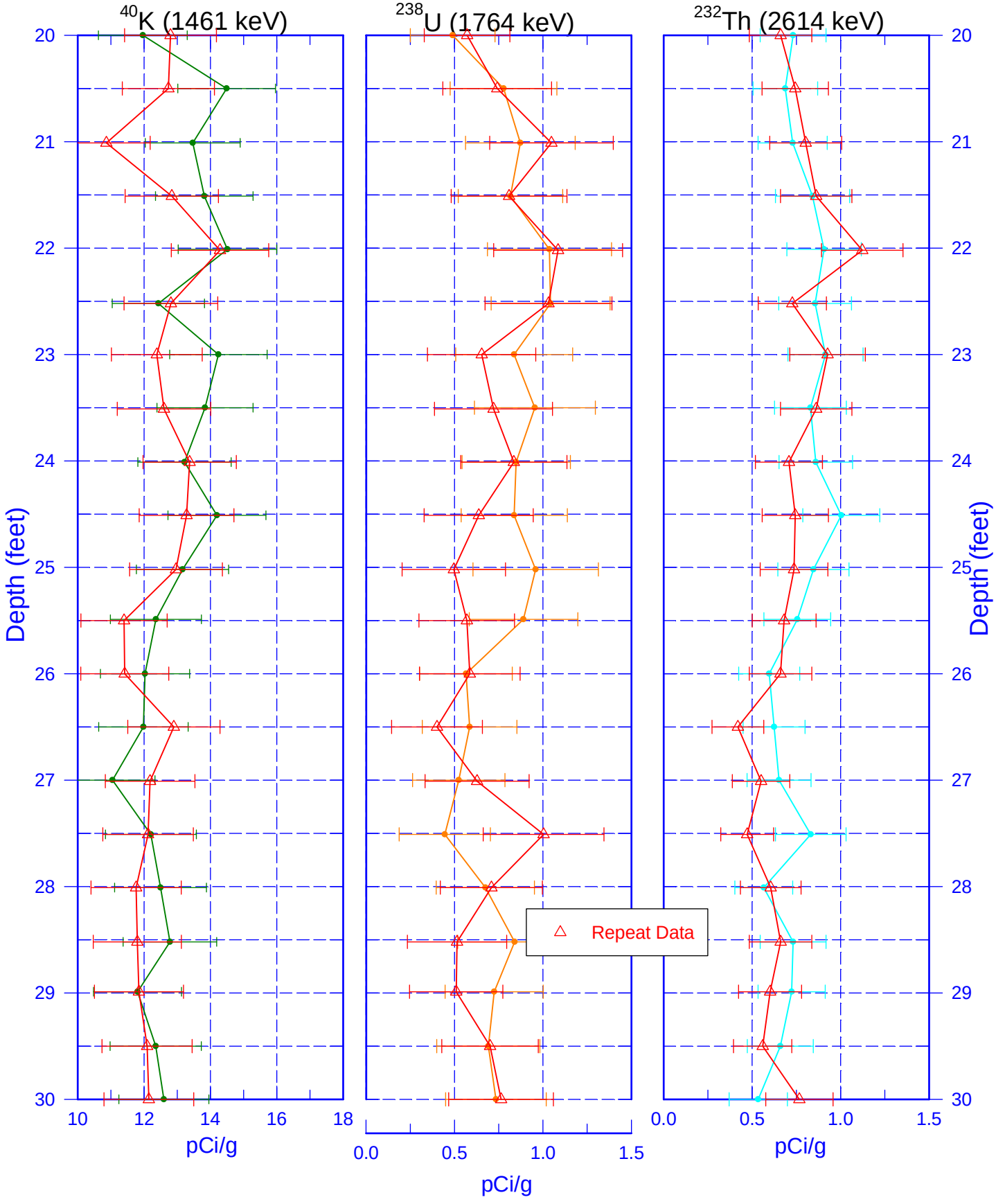
10-02-06 (299-E25-86 [A6525])

Repeat Section of Natural Gamma Logs



Zero Reference - Top of Casing

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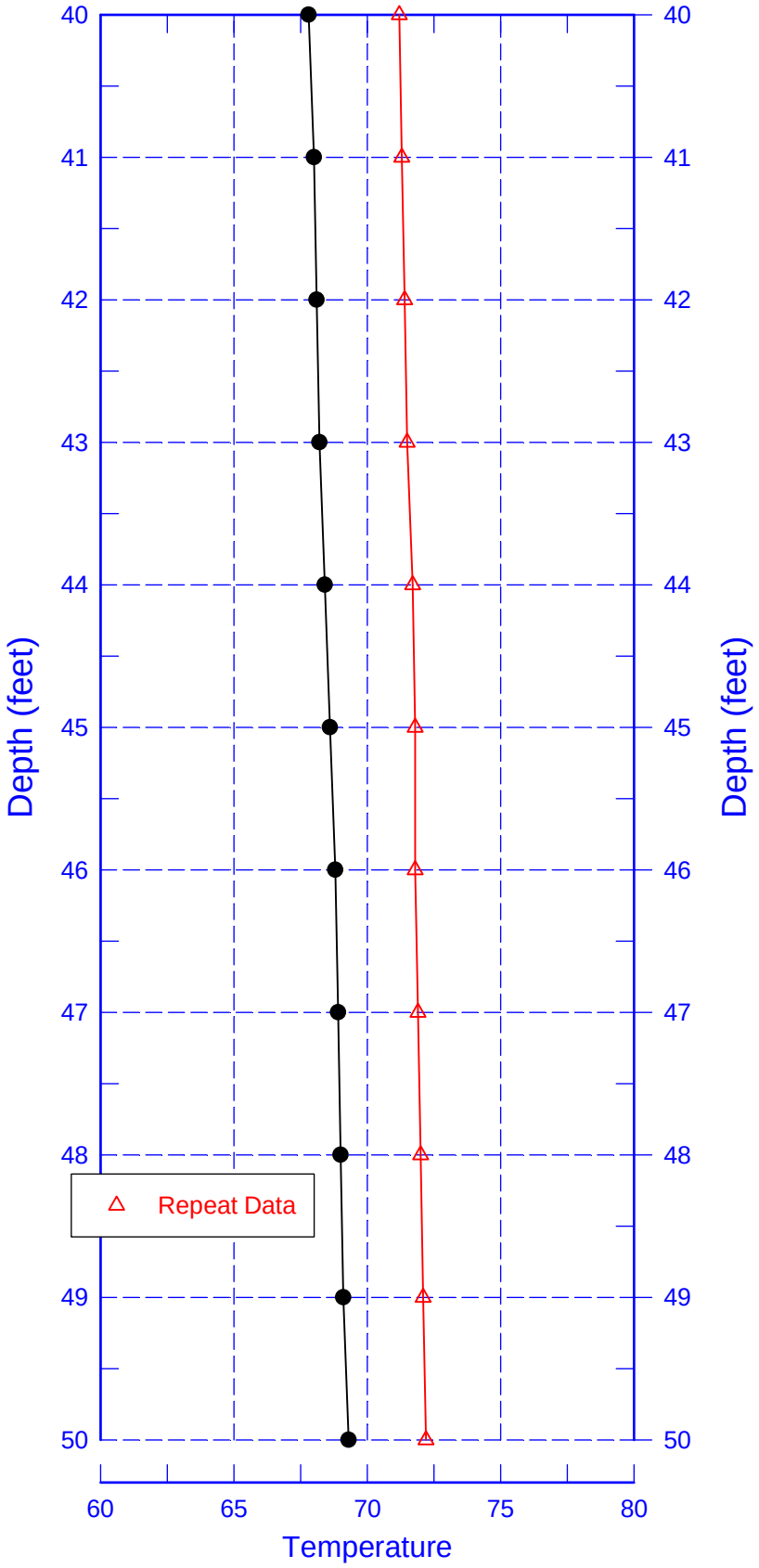
10-02-06 (299-E25-86 [A6525])
Temperature Repeat Section



Zero Reference - Top of Casing