

# 10-06-07, 299-E25-77 (A6516), 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



**P.O. Box 850**  
**Richland, Washington 99352**

# 10-06-07, 299-E25-77 (A6516), Log Data Report

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Date Published  
September 2015

To be Presented at  
N/A

WRPS  
N/A

N/A

Published in  
N/A

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**APPROVED**  
By Janis Aardal at 10:10 am, Apr 05, 2022

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Date

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**10-06-07**  
**299-E25-77 (A6516)**  
**Log Data Report**

**Borehole Information:**

<b>Log Date:</b>	2015-05-18	<b>Filename:</b>	A6516_HG_2015-05-18	<b>Site:</b>	A Farm
<b>Coordinates (WA St Plane)</b>		<b>DTW<sup>1</sup> (ft) :</b>	Dry	<b>GWL Date:</b>	04/30/15
<b>North (m)</b>	<b>East (m)</b>	<b>Drill Date</b>	<b>TOC<sup>2</sup> Elevation</b>	<b>Total Depth (ft)</b>	<b>Type</b>
N/A	N/A	02/28/1962	N/A	125	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	125

**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<sup>3</sup> 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-106* (DOE 1998). Casing thicknesses are derived from published values for schedule 40-steel pipe.

This borehole was deepened to 130 ft in 1978 and a grout plug emplaced to about 125 ft. Grout may have been emplaced around the 6-in. casing from 0 to 18 ft (DOE 1998).

The zero reference is the TOC.

**Logging Equipment Information:**

<b>Logging System:</b>	Gamma 2	<b>Type:</b>	DHMCA <sup>4</sup> SGLS BR
<b>Effective Calibration Date:</b>	03/17/15	<b>Serial No.:</b>	48-TP50478A
<b>Calibration Reference:</b>	HGLP-CC-117, Rev. 0	<b>Logging Procedure:</b>	HGLP-MAN-002, Rev. 2a

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

**SGLS Log Run Information:**

Log Run	3	4	5	6 Repeat	
HEIS Number	1016266	1016267	1016268	1016269	
Date	05/11/15	05/12/15	05/18/15	05/18/15	

<sup>1</sup> Depth to water inside casing

<sup>2</sup> top of casing

<sup>3</sup> Spectral Gamma Logging System

<sup>4</sup> Down-Hole Multi-Channel Analyzer

<sup>5</sup> Borehole Casing Temperature Logging System



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Log Run	3	4	5	6 Repeat	
Logging Engineer	Spatz/ Felt/McClellan	Spatz/ Felt/McClellan	Spatz/ Felt/McClellan	Spatz/ Felt/McClellan	
Start Depth (ft)	0.0	19.5	81.0	110.0	
Finish Depth (ft)	20.5	82.01	123.5	122.01	
Count Time (sec)	100	100	100	100	
Live/Real	R	R	R	R	
Shield (Y/N)	N	N	N	N	
MSA Interval (ft)	0.5	0.5	0.5	0.5	
Log Speed (ft/min)	N/A	N/A	N/A	N/A	
Pre-Verification	1016264_B_155 11	_B_15512	_B_15518	1016268_B_155 18	
Start File	D_000000	D_001950	D_008100	D_011000	
Finish File	D_002050	D_008201	D_012350	D_012201	
Post-Verification	1016266_A_155 11	_A_15512	1016269_A_155 18	_A_15518	
Depth Return Error (in.)	1.0 low	4.0 low	N/A	3.0 low	
Comments	No fine gain adjustments made	No fine gain adjustments made	No fine gain adjustments made	No fine gain adjustments made	

**Borehole Temperature Information:**

Log Run	1	2			
Date	05/04/15	05/04/15			
Logging Engineer	Spatz/Pope	Spatz/Pope			
Start Depth (ft)	124.0	20.0			
Finish Depth (ft)	0.0	8.0			
MSA Interval (ft)	1.0	1.0			
Comments	Sensor stabilized at bottom for 4 hrs 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:**

<b>Analyst:</b>	P.D. Henwood	<b>Date:</b>	09/24/15	<b>Reference:</b>	HGLP-MAN-003, Rev. 1a
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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 20150317\_BR\_117\_ODT, 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



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results in an isolated “detection” near the MDL<sup>6</sup> 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 May 18, 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 discontinuously from ground surface to approximately 41.5 ft, intermittently from 49.5 to 109.5, and from 112.5 to 123.5 ft. A maximum concentration of approximately 10 pCi/g was measured at 5 ft. Comparisons with the 1996 SGLS data indicate no significant changes.

Although not detected in 1996 or 2015, MDLs for Co-60 and Eu-154 are plotted on the comparison plot of manmade radionuclides.

Temperature measurements are plotted on the Combination Plot and range from approximately 68.2 degrees F at 6 ft to 87.8 degrees F beginning at 73 ft. The temperature remained static from 73 to 83 ft at 87.8 degrees F before falling slightly below 83 ft. 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 10-06-07 is approximately 10.8 ft from the steel liner of tank A-106. The tank currently contains approximately 50,000 gal sludge, 29,000 gal salt cake, and no 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-106 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) (0-130 ft)  
Comparison of Manmade Radionuclides (2015 & 1996) (0-130 ft)  
Manmade Repeat Section (110-122 ft)  
Repeat Section of Natural Gamma Logs (110-122 ft)  
Temperature Repeat Section (8-20 ft)

### **References:**

U.S. Department of Energy (DOE). 1998. *Hanford Tank Farms Vadose Zone, Tank Summary Data Report for Tank A-106*. GJ-HAN-111. 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.

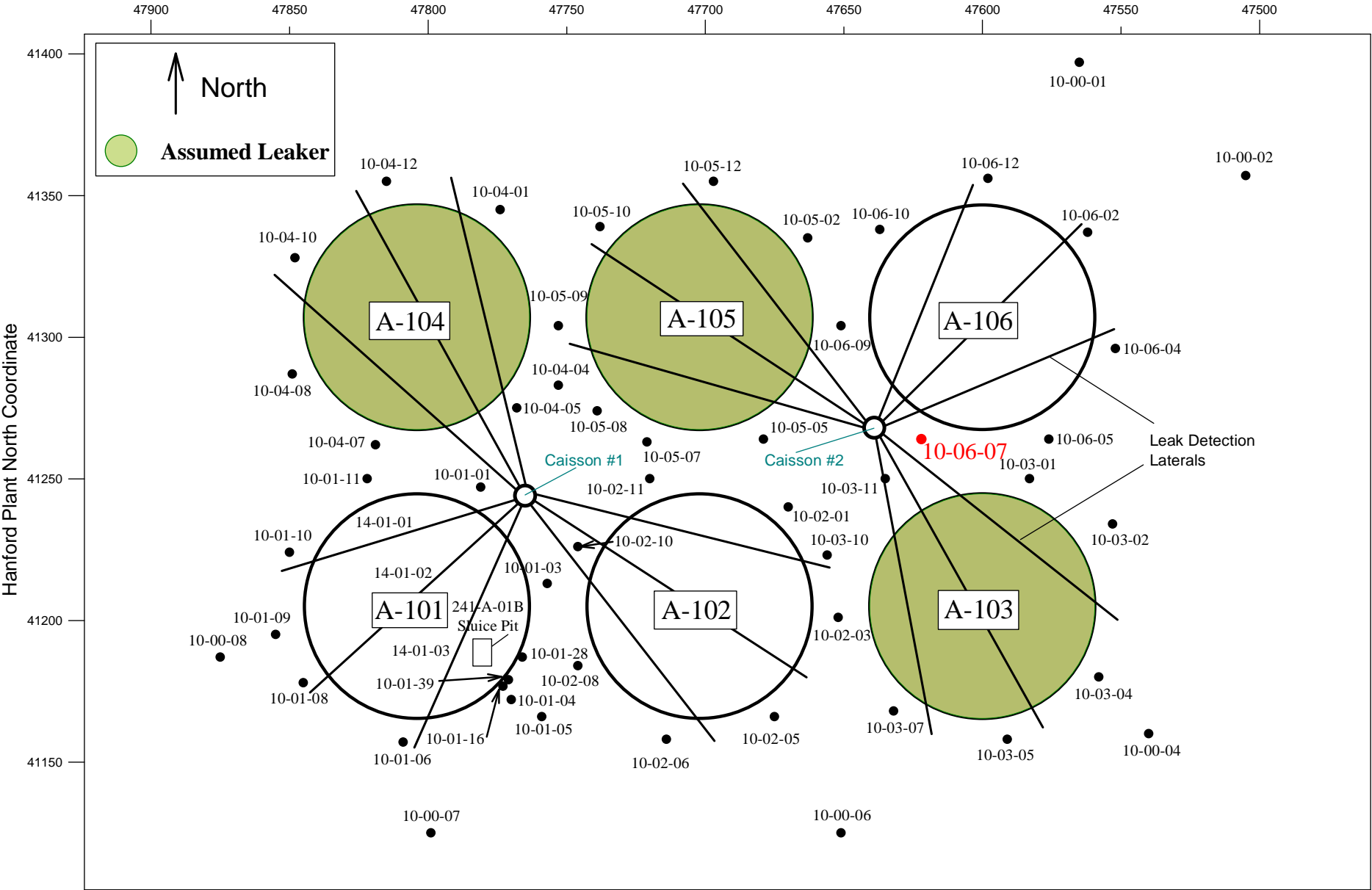
Stoller Newport News Nuclear (SN3). 2015. *Borehole Casing Temperature Logging System Operating Procedure*. HGLP-PRO-009, Revision 0a. Richland, Washington.

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<sup>6</sup> minimum detectable level

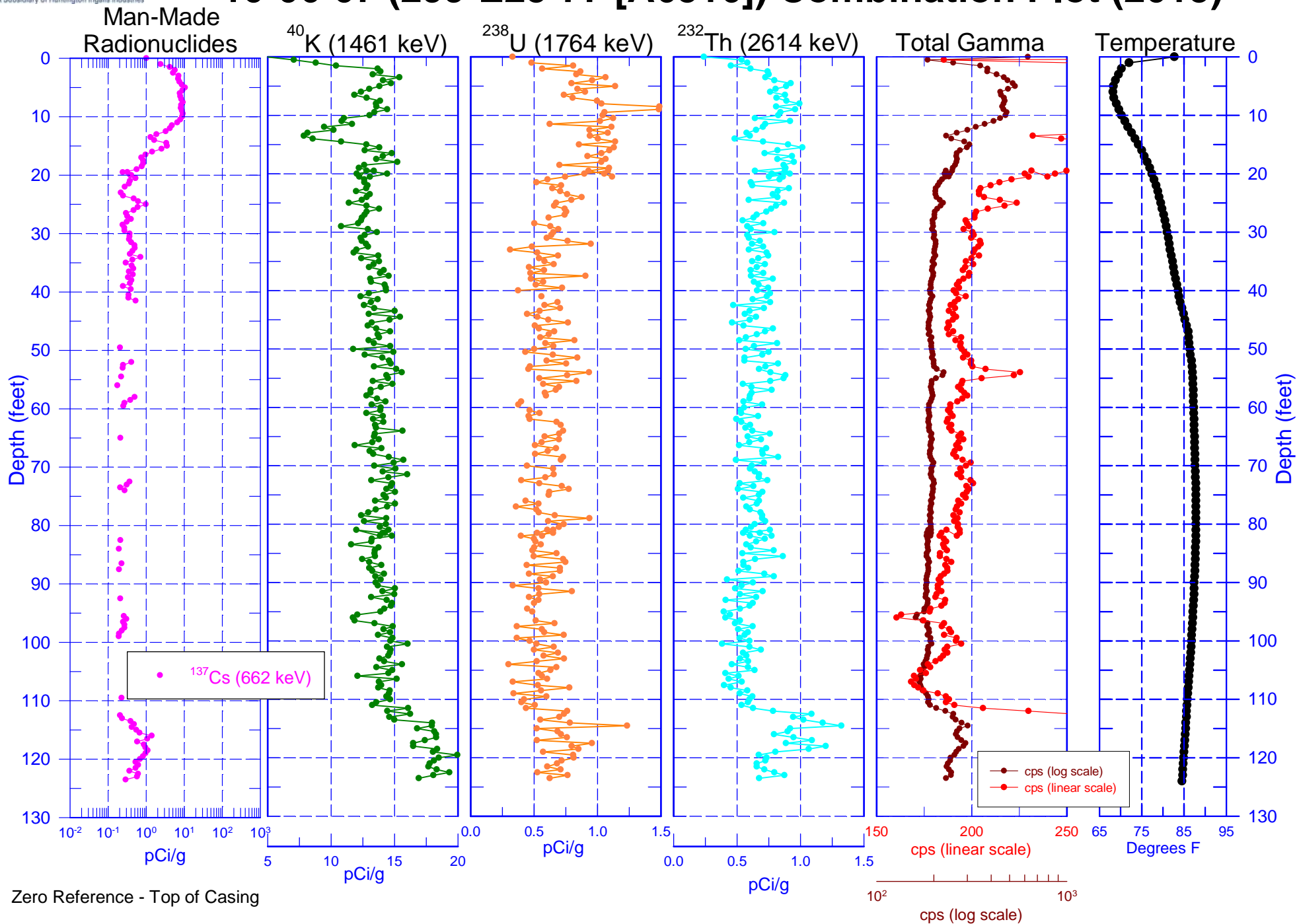
# Borehole Location Map for A Farm

Hanford Plant West Coordinate





# 10-06-07 (299-E25-77 [A6516]) Combination Plot (2015)

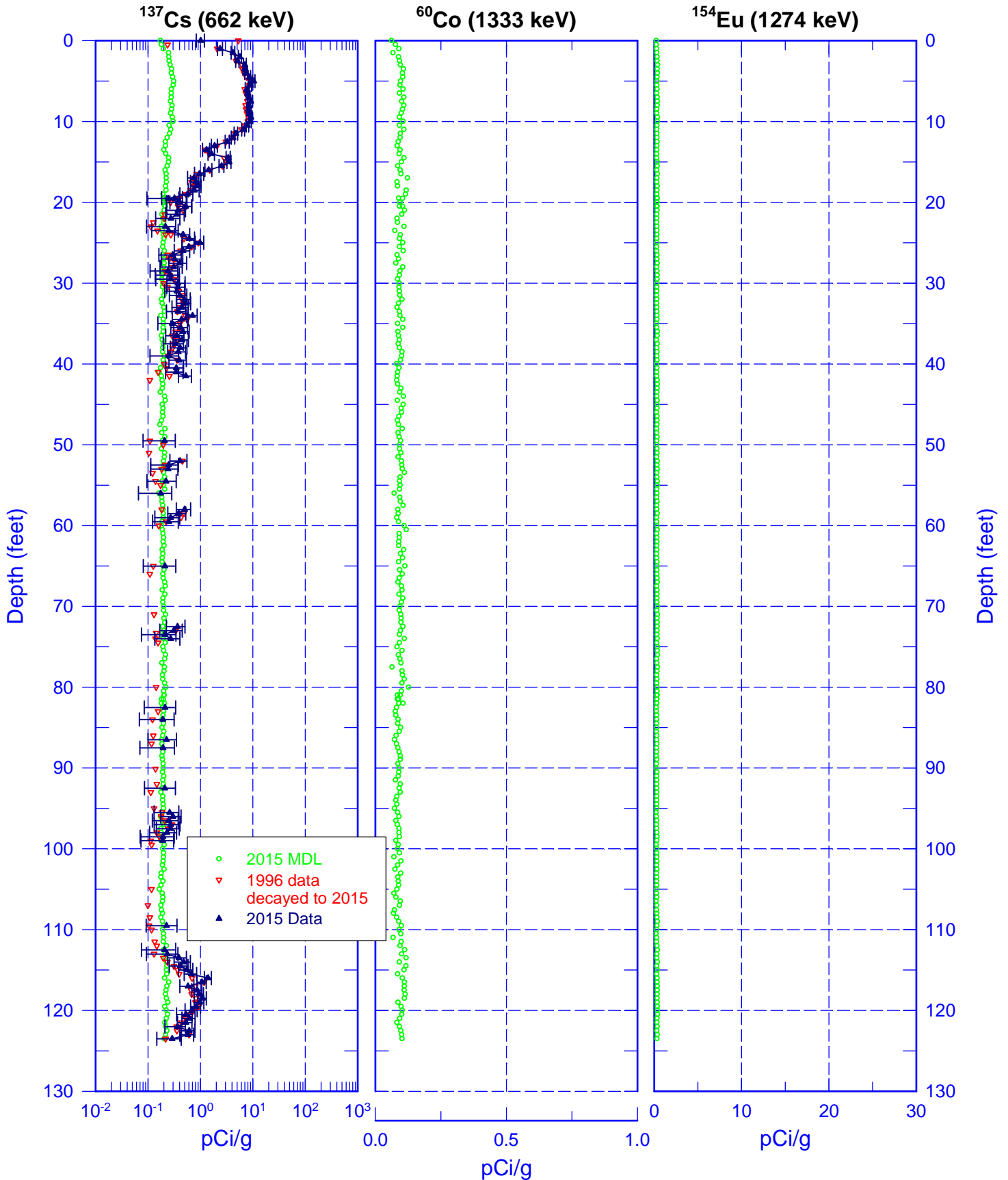






# 10-06-07 (299-E25-77 [A6516])

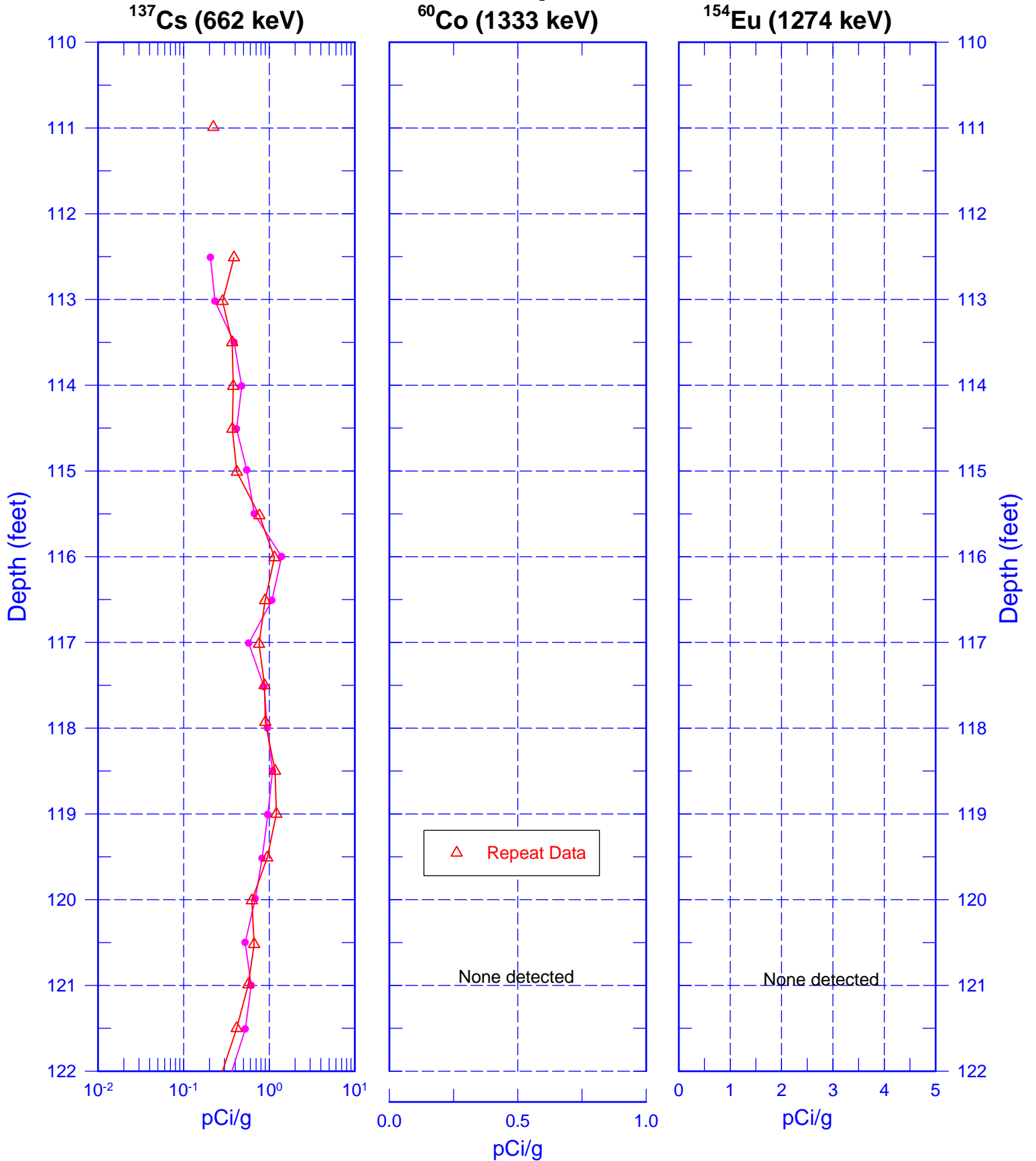
## Comparison of Manmade Radionuclides (2015 & 1996)



Zero Reference - Top of Casing



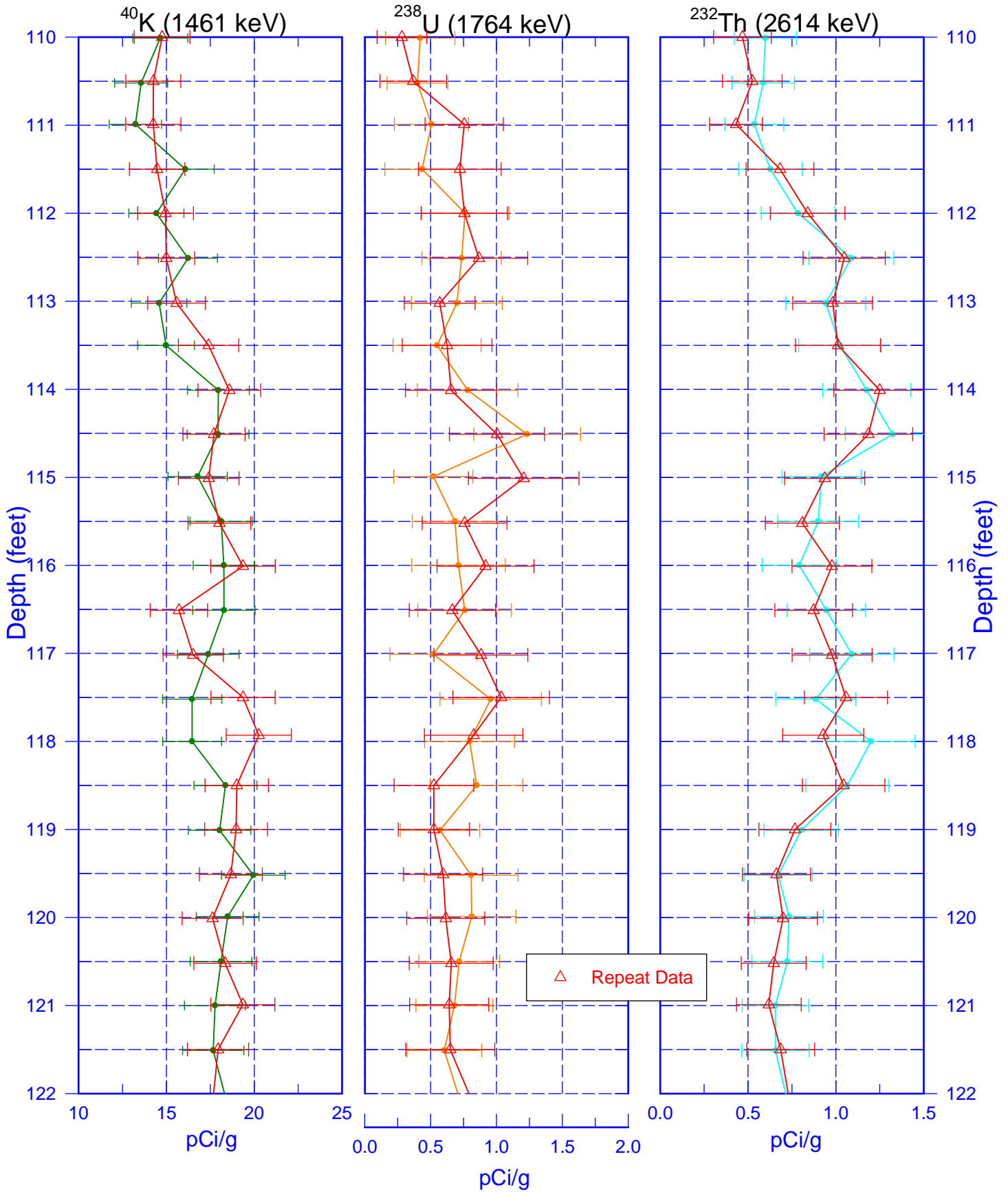
# 10-06-07 (299-E25-77 [A6516]) Manmade Repeat Section



Zero Reference - Top of Casing



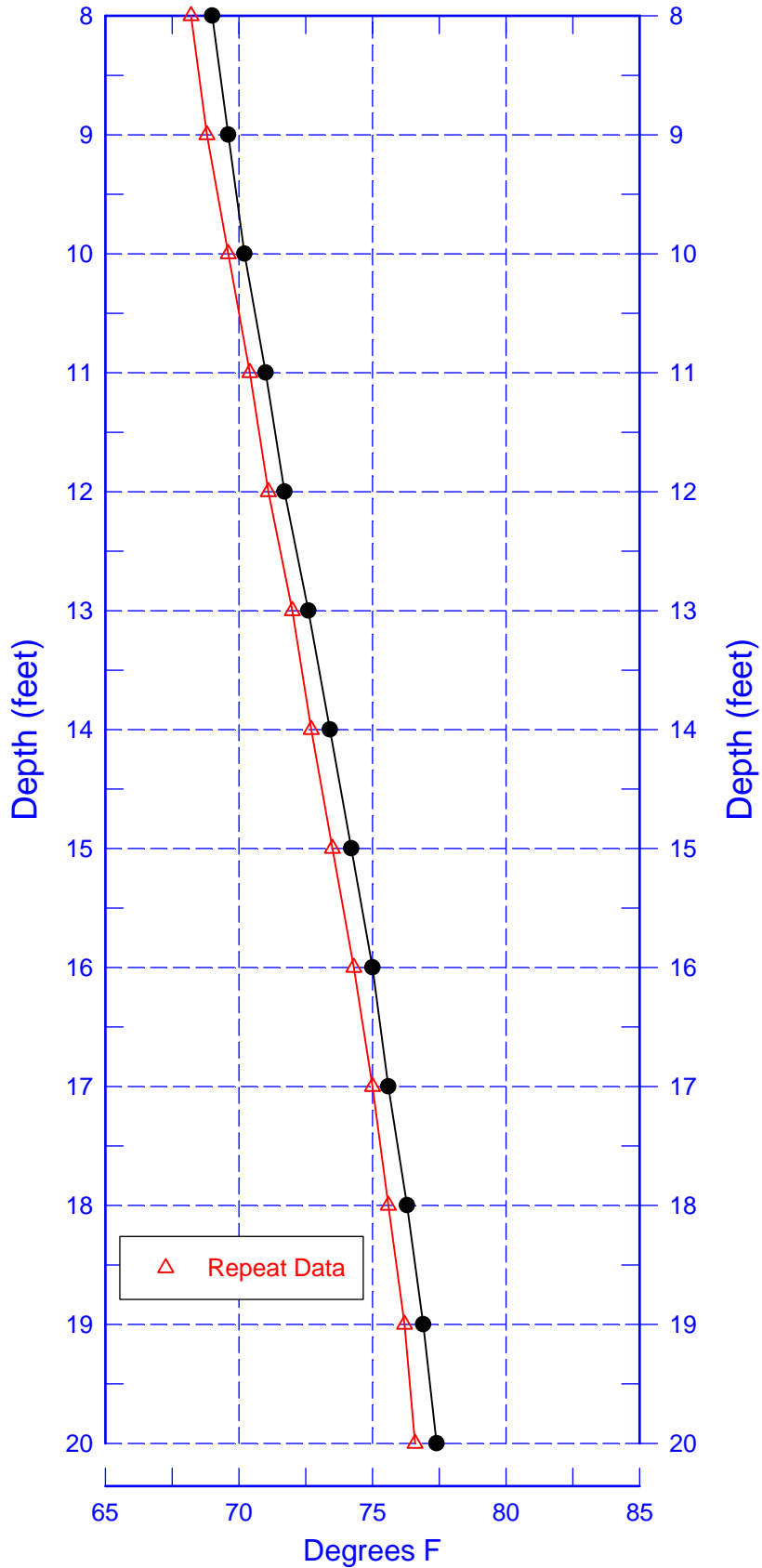
# 10-06-07 (299-E25-77 [A6516]) Repeat Section of Natural Gamma Logs



Zero Reference - Top of Casing



# 10-06-07 (299-E25-77 [A6516]) Temperature Repeat Section



Zero Reference - Top of Casing