HGLP-LDR-769
Revision 0

2014 AX Farm Re-Baseline, 11-01-02, 299-E25-100 (A6535), 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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WRPS

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APPROVED
By Lynn M Ayers at 6:46 am, Apr 25, 2022

Release Approval Date

2014 AX Farm Re-Baseline

11-01-02
299-E25-100 (A6535)
Log Data Report

Borehole Information:

Log Date:	2014-07-08	Filename:	A6535_HG-NM_2014-07-08	Site:	AX Farm
Coordinates (HAN)		DTW[1] (ft) :	Dry	DTW Date:	6/18/14
North	West	Drill Date	TOC[2] Elevation	Total Depth (ft)	Type
N/A	N/A	12/31/1974	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 Repeat	
HEIS Number	1018038	1018039	1018040	1018041	
Date	06/25/14	06/27/14	07/02/14	07/02/14	
Logging Engineer	Pope	Pope	Pope	Pope	
Start Depth (ft)	0.0	22.0	69.0	45.0	
Finish Depth (ft)	23.0	70.0	98.5	49.0	
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	1018038_B_14625	1018039_B_14627	1018040_B_1472	1018040_B_1472	
Start File	D_000000	D_002200	D_006900	D_004500	
Finish File	D_002300	D_007000	D_009851	D_004900	
Post-Verification	1018038_A_14625	1018039_A_14627	None	None	
Depth Error (in.)	0.0	0.0	N/A	0.0	
Comments	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	5	6 Repeat			
HEIS Number	1018422	1018423			
Date	07/08/14	07/08/14			
Logging Engineer	Pope	Pope			
Start Depth (ft)	0.4853	59.235			
Finish Depth (ft)	98.7746	49.9813			
Count Time (sec)	15	15			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	NA	NA			
Log Speed (ft/min)	1.0	1.0			
Pre-Verification	20140708EDCAB	20140708EDCAB			
Start File	ED0464.LAS	ED0465.LAS			
Finish File	ED0464.LAS	ED0465.LAS			
Post-Verification	20140708EDCAA	20140708EDCAA			
Depth Return Error (in.)	N/A	0.0			
Comments	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_0000.chn). SGLS 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 neutron moisture sonde.

The lowest depth achieved was 98.8 ft, where the sonde unweighted.

Pre- and post-survey verification measurements met the acceptance criteria for the established systems. The post-survey verification on 7/2/14 was not acquired because work stoppage occurred as a result of excessive heat.

Analysis Notes:

Analyst:	K. J. Felt/Henwood	**Date:**	07/28/14	**Reference:**	HGLP-MAN-003, Rev. 0

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 2, 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 from ground surface to approximately 5 ft, 9 to 10.5 ft, 18.5 ft, and at 53 ft in depth. The maximum concentration of Cs-137 was measured at 5 pCi/g at a depth of 1.5 ft. A comparison of the 1996 baseline data with the 2014 data indicates no significant changes.

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. Relatively high moisture content is measured in a thin (0.25 to 0.5 ft) depth interval at 55 ft and is probably the result of the compacted excavation surface near the bottom of the tanks.

The KUT and moisture repeat plots indicate that the respective systems were working properly. The moisture repeat section suggests a depth discrepancy of approximately 0.25 ft between the main log and repeat log. This apparent discrepancy results from logging downward in the main log and upward in the repeat log. For example, the data file written for the main log at 55 ft is an average of the count rate from 54.75 to 55 ft. Repeat data at 55 ft represent the interval from 55.25 to 55 ft. After recognizing the cause of the discrepancy, the data are deemed to be repeatable and the data are accepted.

List of Plots:

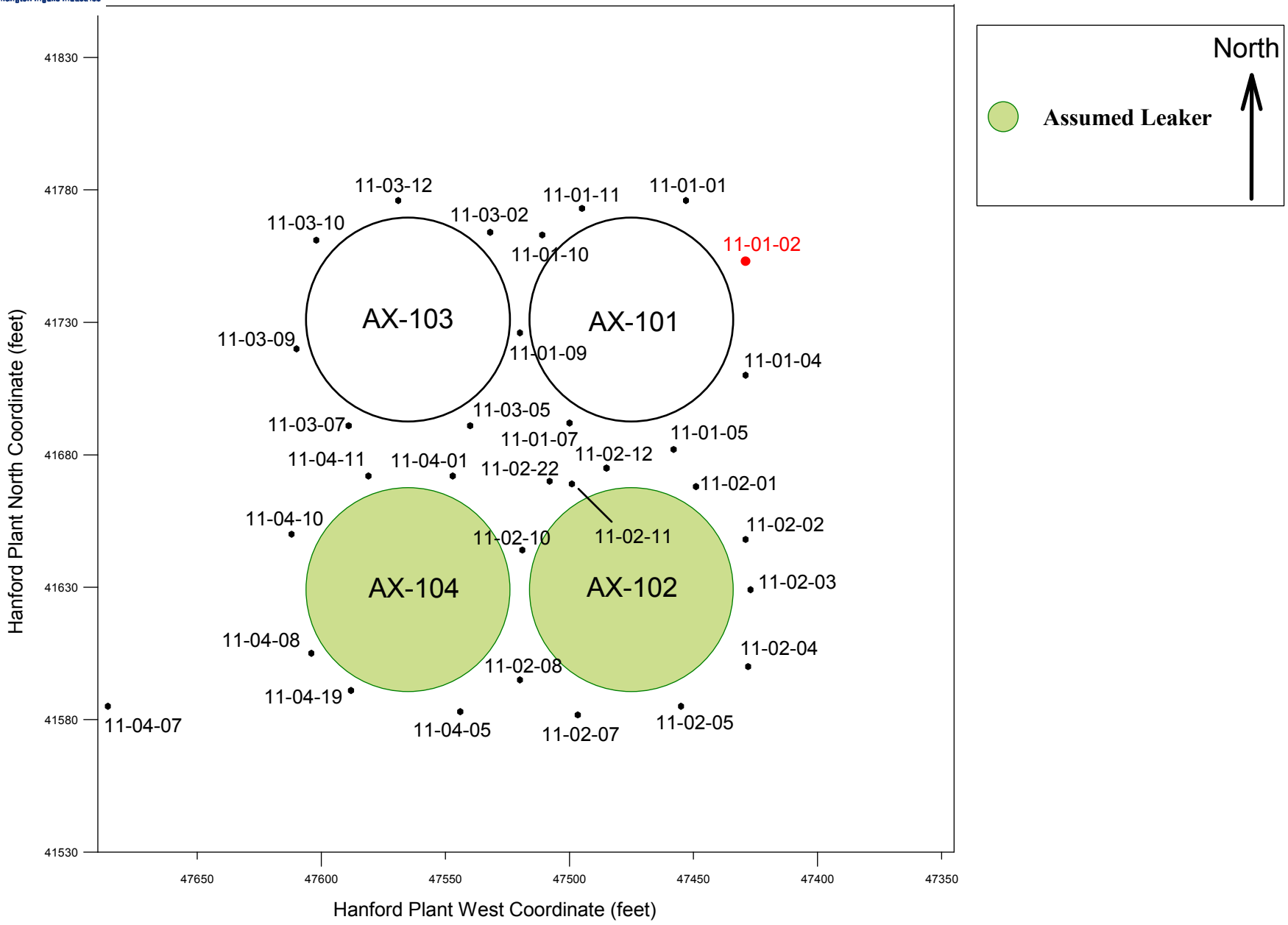
Depth Reference is top of casing.

Borehole 11-01-02 Location in AX Tank Farm
Hanford Single Shell Tank Farms Borehole Geophysics Summary Sheet
Combination Plot-2014 (0-100 ft)
Comparison of Manmade Radionuclides (2014 & 1996) (0-100 ft)
Repeat Section of Natural Gamma Logs (45-49 ft)
Moisture Repeat Section (49-60 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 11-01-02 Location in AX Tank Farm



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Hanford Single Shell Tank Farms
Borehole Geophysics Summary Sheet

Borehole Number (Alias): 11-01-02 (299-E25-100) (A6535)

Borehole Information

Site: AX Farm, Tank AX-101			
Coordinates (HAN Plant):	**North: 41753**	**West: 47429**	**Elevation (ft): 680.00**
Coordinates (WA Plane):	**North: 136210.516**	**East: 575435.934**	**Elevation (m): 208.752**
Drill Date: 12/31/1974	**Type: Cable Tool**	**Depth (ft): 99**	**Depth Datum: TOC**
Depth/Water (ft): Dry	**D/W Date: 6/9/03**	**D/W Reference: Stoller**	
Comments: None.			

Casing Information

Type	Top(ft)	Bottom (ft)	ID (in)	Thick. (in)	Stickup (ft)	Reference
Steel	0	100	6	0.28	0	Stoller

Log Run Information

Log Date	System	Detector	Event	Log int. (ft)	Contractor	Comments
8/22/1996	SGLS	G2A	NA	0-99	MACTEC-ERS	Baseline
6/17/2002	RAS	Large	A	45-85	MACTEC-ERS	No Change
6/11/2003	RAS	Large-New	B	40-85	Stoller	No Change
7/2/2014	DHMCA SGLS	BR	C	0-98.51	Stoller	No Change
7/8/2014	NMLS	ED	A	0.49-98.77	Stoller	--

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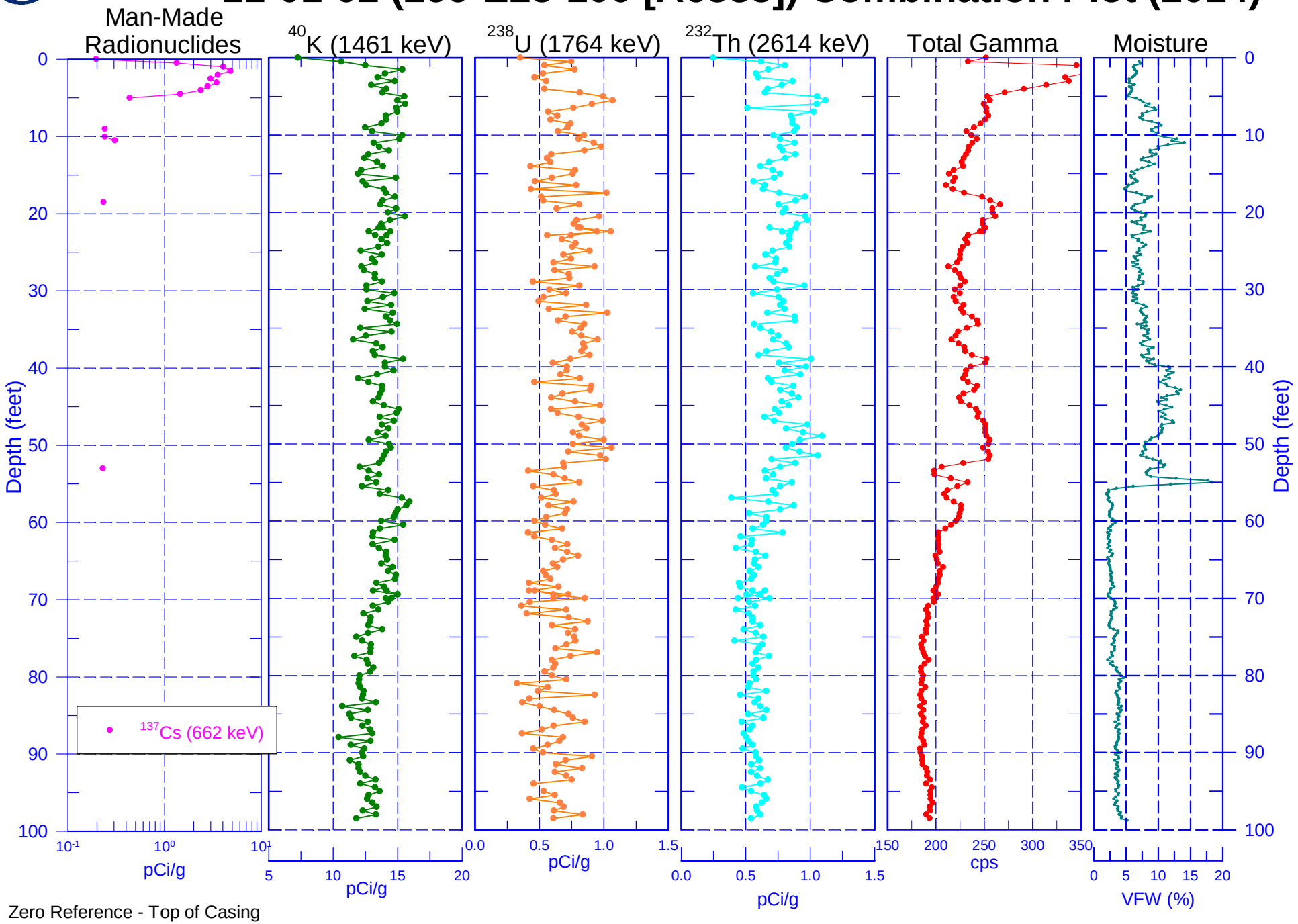
11-01-02 (299-E25-100 [A6535]) Combination Plot (2014)



Zero Reference - Top of Casing

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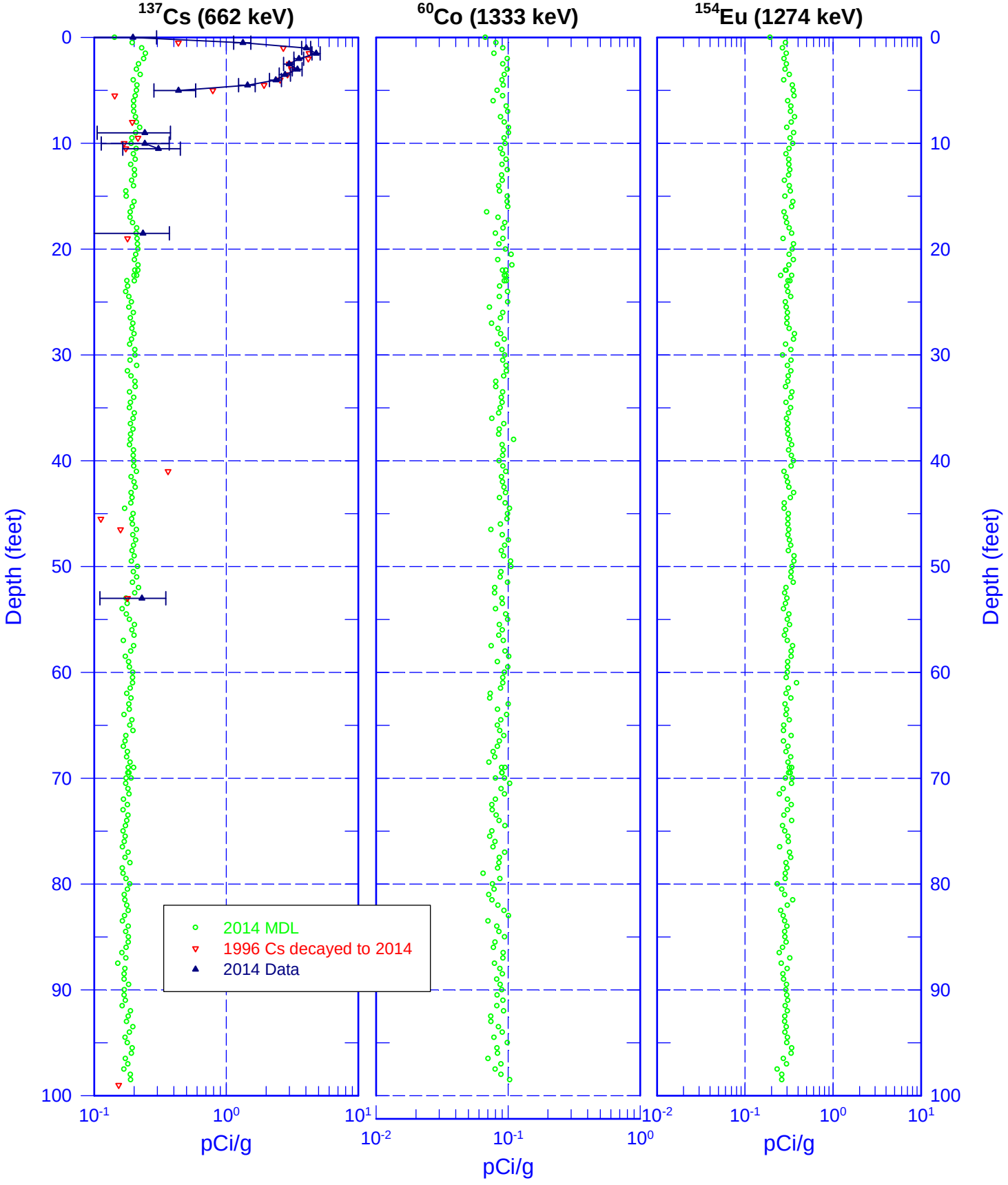
11-01-02 (299-E25-100 [A6535])

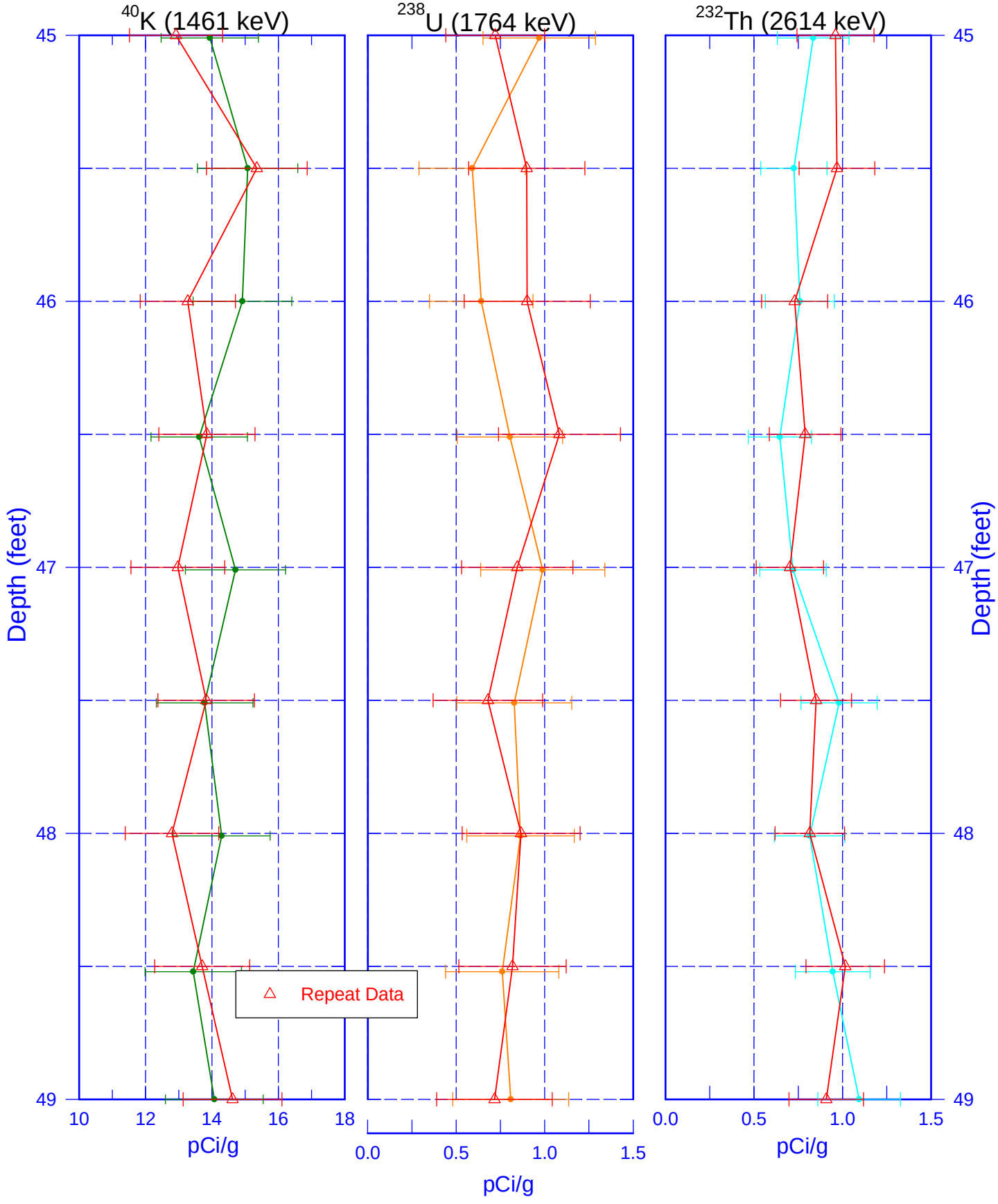
Comparison of Manmade Radionuclides (2014 &1996)



Zero Reference - Top of Casing

11-01-02 (299-E25-100 [A6535])

Repeat Section of Natural Gamma Logs



Zero Reference - Top of Casing

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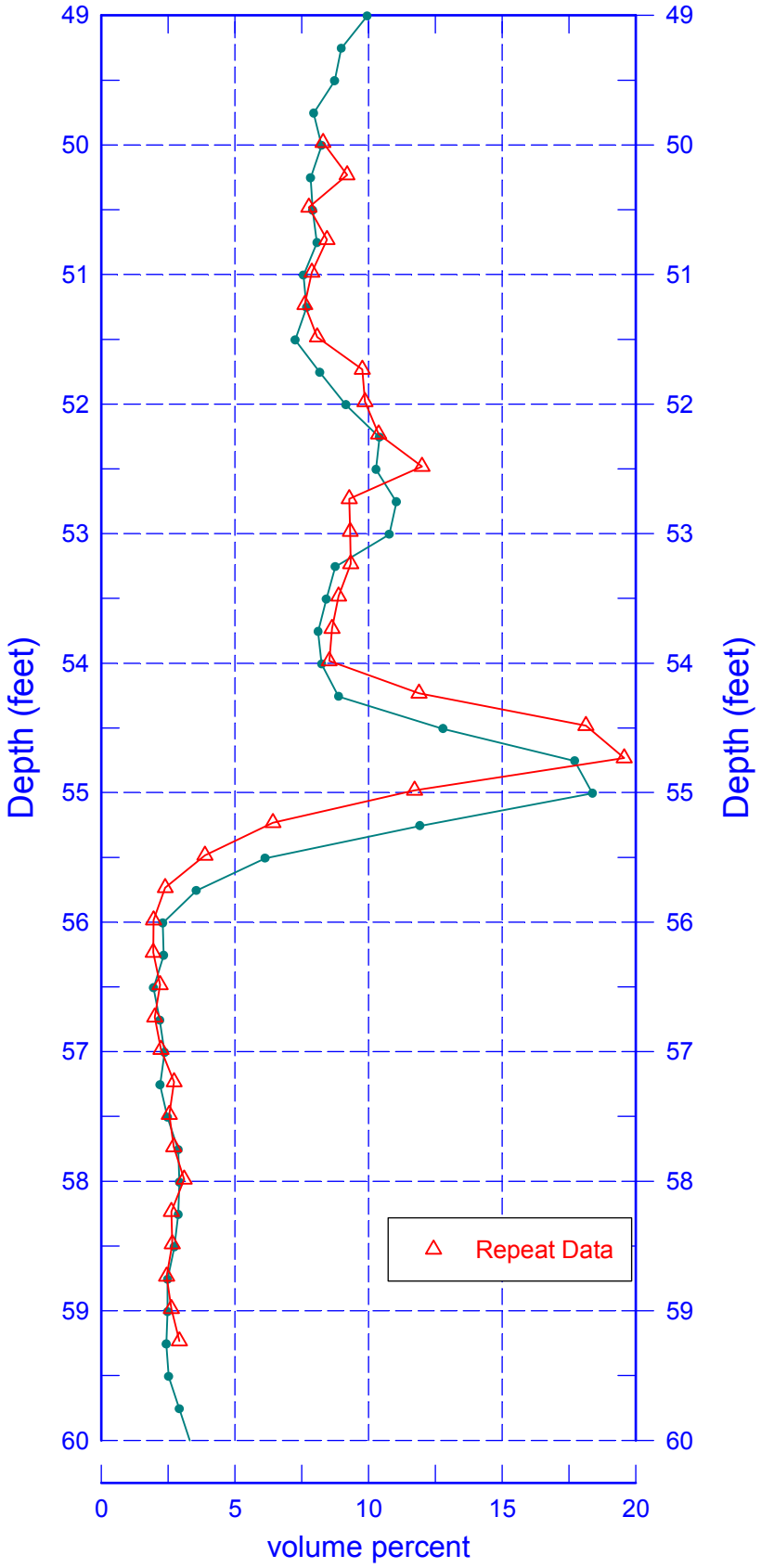
11-01-02 (299-E25-100 [A6535])
Moisture Repeat Section



Zero Reference - Top of Casing