



Borehole 50-05-07

Log Event A

Borehole Information

Farm : <u>T</u>	Tank : <u>T-105</u>	Site Number : <u>299-W10-165</u>
N-Coord : <u>43,510</u>	W-Coord : <u>75,762</u>	TOC Elevation : <u>671.60</u>
Water Level, ft : <u>84.4</u>	Date Drilled : <u>8/31/1975</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.365</u>	ID, in. : <u>10</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>41</u>	
Type : <u>Steel-welded</u>	Thickness, in. : <u>0.322</u>	ID, in. : <u>8</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>87</u>	
Type : <u>Steel-welded</u>	Thickness, in. : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>88</u>	

Borehole Notes:

This borehole was drilled in July and August 1975 to a depth of 120 ft. A 10-in. casing was installed to 40 ft, an 8-in. casing to 87 ft, and a 6-in. casing to 120 ft. In October 1975, the casing was pulled back 32 ft to 88 ft in depth and eight sacks of cement were put into the borehole. No record was found of a 4-in. casing having been installed in this borehole, and only the 6-in. casing is noted in field observations made during logging. However, no record was available regarding removal of the 8-in. and 10-in. casings, and it is assumed that they are still present. The casing wall thicknesses are assumed to be 0.280 in. for the 6-in. casing, 0.322 in. for the 8-in. casing, and 0.365 in. for the 10-in. casing. These thicknesses are based on published values for schedule-40, steel pipe, which was commonly used as casing at Hanford.

During drilling, radiation readings were recorded between 11 and 15 ft and between 65 and 83.5 ft, with maximum readings in each interval of 2,500 cpm at 11 ft in depth and 50,000 cpm at 76 ft in depth.

Equipment Information

Logging System : <u>1B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>10/1997</u>	Calibration Reference : <u>GJO-HAN-14</u>	Logging Procedure : <u>MAC-VZCP 1.7.10-1</u>

Logging Information

Log Run Number : <u>1</u>	Log Run Date : <u>04/21/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>38.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



Borehole **50-05-07**

Log Event **A**

Log Run Number :	<u>2</u>	Log Run Date :	<u>04/22/1998</u>	Logging Engineer:	<u>Alan Pearson</u>
Start Depth, ft.:	<u>87.0</u>	Counting Time, sec.:	<u>200</u>	L/R :	<u>L</u> Shield : <u>N</u>
Finish Depth, ft. :	<u>37.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Logging Operation Notes:

The borehole was logged in two runs on April 21 and 22, 1998. The total depth of the borehole was measured at 87.3 ft. The total logging depth achieved by the SGLS was 87 ft. Spectra were collected at intervals of 0.5 ft. A 200-s counting time was used on all of the log spectra.

The top of the casing, which is the zero reference for the SGLS, is even with grade at an elevation of 671.6 ft. At the time of logging, there was a small amount of water in the borehole. The depth to water inside the casing was measured at 84.5 ft. The source of this water is probably surface runoff that was unable to drain from the borehole because of the grout.

Analysis Information

Analyst :	<u>R.G. McCain</u>	Analysis Date :	<u>08/26/1998</u>
Data Processing Reference :	<u>MAC-VZCP 1.7.9</u>		

Analysis Notes :

The pre-survey and post-survey field verification measurements met acceptance criteria established for peak shape and system efficiency. Energy and resolution calibrations from appropriate verification spectra were used to establish the channel to energy conversion and peak resolution parameters used in processing the spectra acquired during the logging operation.

The casing thickness was assumed to be 0.967 in. from 0 to 40 ft and 0.602 in. from 40 to 87 ft. These values account for the triple casing (6 in., 8 in., and 10 in.) in the upper portion of the borehole and double casing (6 in. and 8 in.) in the lower portion. The computed concentration values should be considered conservative because no allowance was made for attenuation by the grout.

Log Plot Notes:

Separate plots show the man-made and naturally occurring radionuclides. Concentrations are shown as apparent concentrations to reflect the uncertainty associated with the dual casing and annular grout. The headings of the plots identify the specific gamma lines used to calculate concentrations. Uncertainty bars in the plots show statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plot indicate the MDL, which represents the lowest concentration at which positive identification of a gamma ray peak is statistically defensible.

A combination plot includes man-made and natural radionuclides, the total gamma count rate derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma log plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

Results/Interpretations:



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The radionuclide concentrations identified in this borehole are underestimated and reported as only apparent concentrations.

Cs-137 contamination was detected continuously in the upper 20 ft of the borehole. The maximum apparent concentration of 10.9 pCi/g occurred at the ground surface. Cs-137 concentrations were generally in the range of 1 to 2.5 pCi/g. Peaks of 4.6 pCi/g at 7.5 ft and 3.6 pCi/g at 17.5 ft were observed. Cs-137 contamination was also detected sporadically at or near the detection limit between 20 and 60 ft.

Co-60 contamination was detected from 65 to 87 ft. Four distinct peaks are evident on the Co-60 concentration plot: 1.7 pCi/g at 66 ft, 2.8 pCi/g at 71 ft, 2.5 pCi/g at 78.5 ft, and 242.8 pCi/g at 86.5 ft.

K-40 concentrations range between 8 and 10 pCi/g from the ground surface to about 37 ft. At 37.5 ft, there is an increase from 11 to 12 pCi/g that appears to correspond with the contact between the backfill and undisturbed Hanford formation. From 40.5 to 41 ft, there is an abrupt decrease to about 5 pCi/g; this decrease may be related to the transition between casing types at the end of the 10-in. casing. Between 41 and 50 ft, the K-40 concentrations vary between about 8 and 11 pCi/g. From 50.5 to 53 ft, the K-40 concentrations decrease to approximately 3 pCi/g. This interval corresponds to the contact between coarse to fine sand and gravelly sand. From a depth of 53 ft, the K-40 concentrations gradually increase to about 15 pCi/g at a depth of 76 ft. Fluctuations in this interval are probably associated with variations in gravel content. Below 76 ft, the K-40 concentrations fluctuate between 13 and 15 pCi/g.

Both U-238 and Th-232 concentrations are highly variable and show no clear-cut correlation with lithology as reported in the drilling log. U-238 concentrations generally range from 0.5 to 1.2 pCi/g. Th-232 concentrations vary from 0.1 to 0.6 pCi/g.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank T-105.