



Borehole **30-06-12**

Log Event **A**

**Borehole Information**

Farm : <u>C</u>	Tank : <u>C-106</u>	Site Number : <u>299-E27-86</u>
N-Coord : <u>42,976</u>	W-Coord : <u>48,260</u>	TOC Elevation : <u>644.74</u>
Water Level, ft :	Date Drilled : <u>8/31/1974</u>	

**Casing Record**

Type : <u>Steel-welded</u>	Thickness : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>100</u>	

**Borehole Notes:**

This borehole was drilled in August 1974 to a depth of 100 ft using 6-in. casing. The drilling report does not indicate if the borehole casing was perforated or grouted. The casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing. The top of the casing, which is the zero reference for the SGLS, is approximately flush with the ground surface.

**Equipment Information**

Logging System : <u>1</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>10/1996</u>	Calibration Reference : <u>GJO-HAN-13</u>	Logging Procedure : <u>P-GJPO-1783</u>

**Log Run Information**

Log Run Number : <u>1</u>	Log Run Date : <u>01/27/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>18.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>
Log Run Number : <u>2</u>	Log Run Date : <u>01/28/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>17.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>66.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>
Log Run Number : <u>3</u>	Log Run Date : <u>01/29/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>99.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>65.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>
Log Run Number : <u>4</u>	Log Run Date : <u>01/29/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>30.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>15.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



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### Analysis Information

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Analyst : E. Larsen

Data Processing Reference : P-GJPO-1787

Analysis Date : 05/16/1997

#### Analysis Notes :

This borehole was logged by the SGLS in four log runs. Three log runs were required to log the length of the borehole. A fourth log run was performed as an additional quality assurance check on a segment of one of the primary log runs.

The pre- and post-survey field verification spectra met the acceptance criteria established for the peak shape and detector efficiency, confirming that the SGLS was operating within specifications. The energy calibration and peak-shape calibration from these spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

The man-made radionuclides Cs-137 and Co-60 were detected in this borehole. Cs-137 contamination was measured continuously from the ground surface to a depth of 31.5 ft, 34 to 35 ft, 43 to 45.5 ft, 48.5 to 65 ft, and 99 to 99.5 ft. Several isolated concentrations of Cs-137 were detected between 66 and 80 ft. The presence of Co-60 was measured continuously from 19.5 to 22.5 ft and intermittently from 90 ft to the bottom of the logged interval. Isolated concentrations of Co-60 were detected at 25.5, 27.5, and 34 ft.

The K-40 concentration values increase at about 38 ft, then become slightly variable from 41 to 80 ft. The K-40 concentrations increase at about 80 ft and generally remain elevated to the bottom of the logged interval. A peak is shown on the U-238 plot at depth of 48.5 ft.

It was not possible to identify any of the 609-keV peaks used to derive the U-238 concentrations between the ground surface and 1 ft. This occurred because high gamma-ray activity associated with the nearby Cs-137 peak (661 keV) created an elevated Compton continuum extending to the 609-keV region, causing the MDL to exceed the measured U-238 concentration.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks C-102 and C-106.

#### Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma 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



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SGLS data.

The interval between 15 and 30 ft was relogged as a quality assurance measure to establish the repeatability of the radionuclide concentration measurements. The radionuclide concentrations shown were calculated using the separate data sets provided by the original and rerun logging runs.

An additional log plot compares spectral gamma data collected with the Radionuclide Logging System (RLS) in 1993 with spectral gamma data collected with the SGLS in 1997. A separate plot was generated from this data that includes the Cs-137, Co-60, and K-40 concentrations detected between 10 and 40 ft plotted on a linear scale to provide a more detailed quantitative comparison of the data. Uncertainty bars and MDLs are not included on either plot.