



Borehole 40-12-06

Log Event A

Borehole Information

Farm : <u>S</u>	Tank : <u>S-112</u>	Site Number : <u>299-W23-175</u>
N-Coord : <u>35,874</u>	W-Coord : <u>75,869</u>	TOC Elevation : <u>663.43</u>
Water Level, ft :	Date Drilled : <u>11/30/1971</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>145</u>	

Borehole Notes:

This borehole was initially drilled in November 1971 and completed at a depth of 100 ft with 6-in.-diameter casing. In May 1973, the borehole was deepened to 140 ft. The driller's log contains no mention of perforations or grout; therefore, it is assumed that the casing is not perforated or grouted.

The casing thickness is assumed to be 0.280 in., on the basis of published thickness for schedule-40, 6-in. casing. The top of the casing is the zero reference for the borehole log.

Equipment Information

Logging System : <u>1</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>04/1996</u>	Calibration Reference : <u>GJPO-HAN-5</u>	Logging Procedure : <u>P-GJPO-1783</u>

Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>08/01/1996</u>	Logging Engineer: <u>Kim Benham</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>23.5</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>08/02/1996</u>	Logging Engineer: <u>Kim Benham</u>
Start Depth, ft.: <u>144.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>29.5</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>08/05/1996</u>	Logging Engineer: <u>Kim Benham</u>
Start Depth, ft.: <u>30.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>0.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



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Analysis Information

Analyst : H.D. Mac Lean

Data Processing Reference : P-GJPO-1787

Analysis Date : 05/21/1997

Analysis Notes :

The SGLS log of this borehole was completed in three logging runs. The log of the borehole was completed in two logging runs and the third run repeated a segment of the borehole log as a quality check. A centralizer was used during all the logging runs.

The pre- and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy and peak-shape calibration from the pre- and post-survey field verification spectra that best matched the logging run data were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging runs. There was negligible gain drift during the logging runs. During processing of the log data, it was not necessary to adjust the established channel to energy parameters to maintain proper peak identification.

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

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 contamination was detected at the ground surface, at 1 ft, continuously from 2.5 to 17 ft, at 29 ft, and intermittently from 61 to 63 ft. The measured Cs-137 concentrations within the borehole ranged from about 0.2 pCi/g (just above the MDL) to approximately 2 pCi/g at a depth of 11.5 ft. An apparent concentration of approximately 10 pCi/g was detected at the ground surface.

The logs of the naturally occurring radionuclides show several variations in concentration between depths of 45 and 69 ft. A prominent increase in the K-40 and U-238 concentrations occurs between depths of 60 and 64 ft. The background K-40 concentration increases below a depth of 69 ft.

A log overlap, where a segment of the borehole was logged by the separate logging runs, occurred between depths of 29.5 and 30.5 ft. In addition, the segment of the borehole between the ground surface and a depth of 23.5 ft was repeated as an additional quality check. The measured radionuclide concentrations using the data sets provided by the separate logging runs were within two standard deviations of the measurements (two-sigma or 95-percent confidence level).

Details concerning the interpretation of data for this borehole are presented in the Tank Summary Data Report for tank S-112.

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.



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A combination plot shows the measured concentrations of the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. Uncertainty bars have been omitted from the measured concentration values on this plot. 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 SGLS data.

A separate plot shows the radionuclide concentrations in the interval from the ground surface to a depth of 23.5 ft. This interval was relogged as a quality assurance check and to show the repeatability of the radionuclide concentration measurements. The radionuclide concentrations shown on this plot were calculated using the separate data sets provided by the original and rerun logging runs.