Log Event A

Borehole # 51-09-08

Borehole Information

Farm : TX	**Tank :** TX-109	**Site Number :** 299-W15-140
N-Coord : 41,820	**W-Coord :** 75,784	**TOC Elevation :** 671.85
Water Level, ft :	**Date Drilled :** 10/31/1971	

Casing Record

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

Borehole Notes:
According to the driller's records, this borehole was not perforated or grouted. The casing thickness is presumed to be 0.280 in., on the basis of published thickness for schedule-40, 6-in. steel tubing.

Equipment Information

Logging System : 2	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 11/1995	**Calibration Reference :** GJPO-HAN-3	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number : 1	**Log Run Date :** 03/20/1996	**Logging Engineer:** Kim Benham
Start Depth, ft.: 99.0	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 53.5	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 2	**Log Run Date :** 03/21/1996	**Logging Engineer:** Bob Spatz
Start Depth, ft.: 0.0	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 54.5	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

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Analysis Information

Analyst : S.D. Barry

Data Processing Reference : P-GJPO-1787 Analysis Date : 11/21/1996

Analysis Notes :

This borehole was logged in two 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 only man-made radionuclide detected in this borehole was Cs-137. The presence of Cs-137 contamination was measured almost continuously from the ground surface to about 31 ft and intermittently to the bottom of the borehole. Two regions of interest can be identified from the plot: between the ground surface and 13 ft and between 18 and 31 ft. The maximum Cs-137 concentration is 7.4 pCi/g at the ground surface.

An increase is shown on the K-40 concentration plot at a depth of about 48 ft. The U-238 plot shows different concentrations between log runs. The variability in the U-238 background is not related to changes in the efficiency of the logging system, but more likely to the weather conditions during a particular run. The 609-keV spectral peak used to calculate the U-238 concentration is actually emitted by Bi-214, and the calculated U-238 concentration is only accurate if the Bi-214 and U-238 are in secular equilibrium. Because radon gas is an intermediate member of the U-238 decay chain, the equilibrium condition will be disturbed along with changes in the weather conditions in the vicinity of the borehole. The variations in the calculated U-238 background have no effect on the determination of the man-made gamma-ray-emitting nuclides from the SGLS data set.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank TX-109.

Log Plot Notes:

Separate log plots show the man-made (Cs-137) and the naturally occurring radionuclides (KUT). The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

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 SGLS data.

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.