



Borehole **51-03-09**

Log Event A

Borehole Information

Farm : <u>TX</u>	Tank : <u>TX-103</u>	Site Number : <u>299-W15-128</u>
N-Coord : <u>41,654</u>	W-Coord : <u>76,002</u>	TOC Elevation : <u>669.34</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>100</u>	

Borehole Notes:

This borehole was drilled in November 1971 to a depth of 100 ft and completed with 6-in. carbon-steel casing. The top of the borehole casing is 0.2 ft above the ground surface. The SGLS was able to reach a depth of 97.5 ft. There is no mention in the drilling log about the casing being perforated or any mention of cement placed in the bottom of the hole. 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 : <u>2</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>10/1995</u>	Calibration Reference : <u>GJPO-HAN-3</u>	Logging Procedure : <u>P-GJPO-1783</u>

Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>1/5/1996</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>97.5</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>



Borehole

51-03-09

Log Event A

Analysis Information

Analyst : E.P. Baumgartner

Data Processing Reference : P-GJPO-1787

Analysis Date : 8/5/1996

Analysis Notes :

The SGLS log of this borehole was completed in one logging run. The pre- and post-survey field verification spectra met the acceptance criteria established for the peak shape and system efficiency, confirming the SGLS system was operating within specifications. The energy calibration and peak-shape calibration from these verification spectra were used to establish the channel-to-energy parameters used to process the spectra acquired during the logging operation.

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

The gamma-ray-emitting radionuclides Cs-137 and Co-60 were detected in separate intervals of this borehole. Cs-137 was detected continuously from the surface to a depth of 14 ft and intermittently between depths of 14 and 29 ft. The highest concentration levels (1 to 12 pCi/g) occur in the upper 11 ft of the borehole. A second lower-intensity zone of Cs-137 activity (maximum concentration about 1 pCi/g) occurs between depths of 19.5 and 23 ft. No Cs-137 was detected below the 29-ft depth.

Co-60 occurs between depths of 60.5 and 97 ft. There are two peaks in the Co-60 concentration within this interval: in the higher zone (between depths of 61 and 65 ft), a maximum concentration of about 10 pCi/g was noted; in the lower zone (between depths of 68 and 75 ft), the maximum Co-60 concentration was about 20 pCi/g. Measured Co-60 concentrations between depths of 75 and 90 ft were between 1 and 2 pCi/g. Below 90 ft, all measured concentrations were less than 1 pCi/g.

Zones of anomalous gamma-ray activity can be identified on the historical gross gamma logs of this borehole at depths of approximately 61 ft and between depths of 69 and 71 ft. The gamma-ray intensity is lowest on the earliest available log (November 2, 1982). The zones of anomalous activity have been generally increasing in intensity and depth extent, and the location of the intensity peak within the zones has been changing over the approximately 11- year time span covered by the historical Tank Farm gross gamma-ray logs.

The K-40 concentration log has a sharp increase at a depth of about 50 ft. There is a noticeable decrease in the Th-234 concentration at a depth of about 95 ft.

The SGLS total count log plot reflects the log plots of the Co-60 concentrations and the contribution from Cs-137 in the upper portion of the borehole. There is a slight decrease in the SGLS total count plot at a depth of about 87 ft.

The concentration of U-238 was not calculated between depths of about 61 to 63 ft and 69 to 74 ft. The absence of these calculated values is caused by the inability of the processing software to identify the weak 609-keV peak in the presence of the high ambient count rate associated with the regions of radionuclide contamination.

Details regarding the interpretation of the data for this borehole are presented in the TSDRs for tanks TX-101 and TX-103.



Borehole **51-03-09**

Log Event A

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 lithologic interpretations. The headings of these plots identify the energy peak for the specific gamma rays used to calculate the concentrations.

A combination plot includes the man-made radionuclides, the naturally occurring radionuclides, the total gamma count derived from the SGLS, and the Tank Farm gross gamma log. The gross gamma plot displays the latest available digital data with no attempt to adjust the depths to coincide with the SGLS data.

Uncertainty bars on the plots show the statistical uncertainty for the calculated concentrations at the 95-percent confidence level. The MDL is shown by open circles on the plots. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A compilation of representative historical gross gamma-ray logs at three-year intervals starting from November 1982, as well as the SGLS total count-rate log acquired early in 1996, is also included.