



Borehole **21-00-11**

Log Event **A**

**Borehole Information**

Farm : <u>BX</u>	Tank : <u>BX</u>	Site Number : <u>299-E33-65</u>
N-Coord : <u>45,670</u>	W-Coord : <u>53,512</u>	TOC Elevation : <u>655.07</u>
Water Level, ft :	Date Drilled : <u>11/30/1947</u>	

**Casing Record**

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.320</u>	ID, in. : <u>8</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>150</u>	

**Borehole Notes:**

Borehole 21-00-11 was drilled in November 1947 to a depth of 150 ft with 8-in. casing. Data from the drilling log and Chamness and Merz (1993) were used to provide construction information. The drilling log reports that the borehole casing was perforated from 46 to 100 ft in March 1948, but does not indicate if the borehole was grouted. The top of the casing, which is the zero reference for the SGLS, is about 0.5 ft below the ground surface.

The current total depth of the borehole was measured at 132.8 ft below the top of the casing using a weighted tape, although this borehole was drilled to a total depth of 150 ft in 1947. The total depths from the historical gross gamma log runs have become progressively shallower over time, indicating that the casing perforations have allowed loose sand to infiltrate into and slowly fill the borehole, or sand and silt has entered the borehole from the ground surface.

**Equipment Information**

Logging System : <u>1B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>02/1997</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>07/07/1997</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>26.5</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>07/08/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>132.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>44.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



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Log Run Number :	<u>3</u>	Log Run Date :	<u>07/09/1997</u>	Logging Engineer:	<u>Alan Pearson</u>
Start Depth, ft.:	<u>45.0</u>	Counting Time, sec.:	<u>100</u>	L/R :	<u>L</u> Shield : <u>N</u>
Finish Depth, ft. :	<u>25.5</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 :	<u>E. Larsen</u>		
Data Processing Reference :	<u>MAC-VZCP 1.7.9</u>	Analysis Date :	<u>01/07/1998</u>

#### Analysis Notes :

This borehole was logged by the SGLS in three log runs. The pre-survey and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

A casing correction factor for a 0.330-in.-thick steel casing was applied during analysis because a correction factor for 0.320-in. casing was not available; the casing correction factor for 0.330-in. casing most closely matches.

The man-made radionuclide Cs-137 was detected in this borehole. The Cs-137 contamination was detected continuously from the ground surface to 6.5 ft. Isolated occurrences of Cs-137 were detected at 39 ft, 50.5 ft, and from 74.5 to 75 ft. Several zones of continuous Cs-137 contamination were detected between 45 and 66.5 ft.

An analysis of the shape factors associated with applicable segments of the spectra was performed. The shape factors provide insights into the distribution of the Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

The K-40 concentration values increase sharply from 29 to 31.5 ft and remain elevated to a depth of 53.5 ft. The K-40 concentrations increase again from 55 to 57 ft, and although somewhat variable, generally remain elevated to the bottom of the logged interval.

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

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



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digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A plot of the spectrum shape factors is included. The plot is used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.