



Borehole **21-03-07**

Log Event **A**

Borehole Information

Farm : <u>BX</u>	Tank : <u>BX-103</u>	Site Number : <u>299-E33-282</u>
N-Coord : <u>45,559</u>	W-Coord : <u>53,276</u>	TOC Elevation : <u>653.90</u>
Water Level, ft : <u>93.20</u>	Date Drilled : <u>1/7/1976</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:

Borehole 21-03-07 was drilled to a depth of 105 ft in December 1975 and January 1976 and was completed to a depth of 100 ft with 6-in. casing. The driller's log notes that an 8-in. surface casing was installed to a depth of about 20 ft and was withdrawn after the borehole was completed. The driller's log does not indicate that the annular space around the 6-in. casing was grouted, but does indicate that the bottom of the borehole was grouted from 105 to 99.5 ft.

The driller's log does not indicate that the borehole casing was perforated, so it is assumed that it was not perforated. The 6-in. 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 about 0.5 ft below the ground surface. The borehole was water filled below a depth of 93.2 ft, and the total logging depth achieved by the SGLS was 96 ft.

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>06/05/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>96.0</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>
Log Run Number : <u>2</u>	Log Run Date : <u>06/06/1997</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>45.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



Borehole

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Analysis Information

Analyst : D.L. Parker

Data Processing Reference : MAC-VZCP 1.7.9

Analysis Date : 11/12/1997

Analysis Notes :

This borehole was logged by the SGLS 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 the spectra that best matched the data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation. No fine gain adjustments were necessary during logging of this borehole. Water was encountered at a depth of 93.5 ft in this borehole.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis. A water-correction factor was added to data collected from depths below the water level.

The man-made radionuclides Cs-137, Eu-154, and processed uranium were detected in this borehole. Cs-137 contamination was detected continuously from the ground surface to 8 ft with two well-defined peaks. The upper peak is located from 1 to 4 ft, and the lower peak is located from about 4.5 to 7.5 ft. The maximum Cs-137 concentration was 16.38 pCi/g at a depth of 6.5 ft. A single detection of Eu-154 occurs at a depth of 6.5 ft at a concentration of 0.35 pCi/g. U-235 contamination was detected from the ground surface to a depth of 0.5 ft; U-238 contamination was detected at a depth of 76.5 ft at a concentration of 13.16 pCi/g.

The K-40 concentrations increase from 1 to 1.5 ft and remain at about 12 pCi/g from 1.5 to 3.5 ft. K-40 concentrations decrease gradually below 4 ft, reaching a concentration of about 6 pCi/g at 9 ft. K-40 concentrations increase at about 14 ft and decrease gradually to about 3.5 pCi/g at a depth of 22.5 ft. K-40 concentrations increase to a background of about 12 pCi/g at about 23 ft and increase again to a background of about 18 pCi/g at about 41 ft.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank BX-103.

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 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.