



Borehole **21-00-07**

Log Event A

Borehole Information

Farm : <u>BX</u>	Tank : <u>BX</u>	Site Number : <u>299-E33-77</u>
N-Coord : <u>45,339</u>	W-Coord : <u>53,550</u>	TOC Elevation : <u>659.73</u>
Water Level, ft :	Date Drilled : <u>2/28/1948</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.313</u>	ID, in. : <u>8</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>150</u>	

Borehole Notes:

Borehole 21-00-07 was drilled in February 1948 to a depth of 152 ft. The borehole was completed at a depth of 150 ft with 8-in. casing. The casing thickness is presumed to be 0.322 in., on the basis of the published thickness for schedule-40, 8-in. steel pipe. However, the type of pipe that was actually used for the casing is unknown. The visible portion of the casing may not represent the original casing since it was probably added after the borehole was completed. Although no information concerning grouting or perforations is provided in the drilling log, Chamness and Merz (1993) report that the casing was perforated between depths of 40 and 100 ft. It is assumed that the borehole was not grouted since this was not a routine practice during the late 1940s drilling campaign. The visible portion of the casing is located on the side of a 4-ft high berm. The top of the casing extends approximately 2 ft above the ground surface. It is possible that a length of pipe was added to the borehole collar some time after the collar elevation was measured. The zero depth reference for the SGLS log is the intercept of the ground surface with the casing. The present depth of the borehole was measured at 87.5 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-14</u>	Logging Procedure : <u>P-GJPO-1783</u>

Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>07/31/1997</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>24.0</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>08/01/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>87.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>23.0</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 : MAC-VZCP 1.7.9

Analysis Date : 01/12/1998

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 pre-survey or post-survey field verification spectra that most closely matched the data acquired during the logging run were used to establish the peak resolution and channel-to-energy parameters used in processing the logging spectra. There was negligible gain drift during logging operations, and it was not necessary to adjust the established channel-to-energy parameters during processing of log data to maintain proper peak identification.

Casing correction factors for a 0.330-in.-thick steel casing were applied during analysis. Correction factors for a 0.320-in. casing were not available. Use of the correction factor for 0.330-in. casing will cause all calculated radionuclide concentrations to be slightly higher than the actual concentrations.

The only man-made radionuclide detected in the log of this borehole was Cs-137. The Cs-137 contaminant was detected continuously from the ground surface to a depth of 4 ft, almost continuously from 39.5 to 44.5 ft, and intermittently from 55 to 71.5 ft. The Cs-137 concentrations in the contaminated zone between the ground surface and 4 ft reached a maximum of about 10 pCi/g at a depth of 2.5 ft. The measured Cs-137 concentrations at all locations below this zone ranged from 0.2 to 0.3 pCi/g.

The plots of the concentrations of the naturally occurring radionuclides show that the K-40 concentrations increase from a background of about 9 pCi/g between the ground surface and 40 ft to about 12 pCi/g below 40 ft. The background K-40 concentrations increase again to about 17 pCi/g below a depth of 54 ft and remain at this level to the bottom of the borehole.

An analysis of the shape factors associated with the spectra from this borehole was not performed. The measured radionuclide concentrations at depths in the general range of the underground tank were insufficient to permit a reliable calculation of the shape factors. Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank BX-110.

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.