



Borehole **40-03-06**

Log Event **A**

Borehole Information

Farm : <u>S</u>	Tank : <u>S-103</u>	Site Number : <u>299-W23-152</u>
N-Coord : <u>36,183</u>	W-Coord : <u>75,885</u>	TOC Elevation : <u>663.27</u>
Water Level, ft :	Date Drilled : <u>10/31/1971</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness, in. : <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 October 1971 to a depth of 100 ft. According to the drilling log, a starter casing of unknown diameter was installed to a depth of 20 ft. The borehole was completed to a total depth of 100 ft using 6-in. casing. The drilling report does not indicate if the starter casing or borehole casing was perforated or grouted. The borehole casing thickness is presumed to be 0.280 in., on the basis of published thickness for schedule-40, 6-in. steel tubing. The top of the casing, which is the zero reference for the SGLS, is approximately 2 in. above the tank farm grade.

Equipment Information

Logging System : <u>1</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>04/1996</u>	Calibration Reference : <u>GJPO-HAN-5</u>	Logging Procedure : <u>P-GJPO-1783</u>

Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>06/07/1996</u>	Logging Engineer: <u>Gary Lekvold</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>28.5</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>06/10/1996</u>	Logging Engineer: <u>Kim Benham</u>
Start Depth, ft.:	Counting Time, sec.:	L/R : Shield :
Finish Depth, ft. :	MSA Interval, ft. :	Log Speed, ft/min.: <u>n/a</u>
Log Run Number : <u>3</u>	Log Run Date : <u>06/10/1996</u>	Logging Engineer: <u>Kim Benham</u>
Start Depth, ft.: <u>98.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>27.5</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



Borehole **40-03-06**

Log Event A

Log Run Number :	<u>4</u>	Log Run Date :	<u>06/18/1996</u>	Logging Engineer:	<u>Gary Lekvold</u>
Start Depth, ft.:	<u>98.5</u>	Counting Time, sec.:	<u>100</u>	L/R :	<u>L</u> Shield : <u>N</u>
Finish Depth, ft. :	<u>27.5</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Analysis Information

Analyst :	<u>S.D. Barry</u>		
Data Processing Reference :	<u>P-GJPO-1787</u>	Analysis Date :	<u>03/10/1997</u>

Analysis Notes :

Four log runs were attempted in this borehole; however, data from log runs one and four were the only data used for the SGLS analyses. The data acquired from log runs two and three were compromised because of a failing power supply in the logging tool. After the logging tool was repaired, log run four served as a rerun of log runs two and three. The pre- and post-survey field verification spectra from log runs one and four 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 logs one and four 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 man-made radionuclide Cs-137 was detected in this borehole. The presence of Cs-137 was detected only at the ground surface with a concentration of 4 pCi/g. However, this is not an accurate concentration value because the source-to-detector geometry at the top of the borehole casing differs from source-to-detector geometry used in the calibration.

Increased KUT concentration values are shown on the KUT log plots below about 64 ft.

The change in U-238 concentration values at about 22 ft is associated with the change in log runs. This change is probably caused by radon venting up the borehole. The 609-keV spectral peak that is used to calculate the 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 concentration of the Rn-222 in the borehole does not necessarily remain constant between log runs.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks S-103 and S-106.

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



Spectral Gamma-Ray Borehole
Log Data Report

Borehole **40-03-06**

Log Event A

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.