RUST GEOTECH INC.

Spectral Gamma-Ray Borehole
Log Data Report

Log Event A

Borehole 51-05-05

Borehole Information

Farm : TX	**Tank :** TX-105	**Site Number :** 299-W15-145
N-Coord : 41,717	**W-Coord :** 75,717	**TOC Elevation :** 674.06
Water Level, ft :	**Date Drilled :** 6/30/1971	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 100	

Borehole Notes:
According to the driller's records, this borehole was not perforated or grouted. The top of the casing is approximately 2 ft higher than the rest of the TX Tank Farm. 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 : 2	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 10/1995	**Calibration Reference :** GJPO-HAN-3	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number :	1	**Log Run Date :**	4/8/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	98.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	42.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	2	**Log Run Date :**	4/9/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	0.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	43.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	3	**Log Run Date :**	4/9/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	65.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	50.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Borehole 51-05-05

Log Event A

Analysis Information

Analyst : P.D. Henwood

Data Processing Reference : P-GJPO-1787 Analysis Date : 8/13/1996

Analysis Notes :

This borehole was logged by the SGLS in three logging runs; log run 3 repeated the log of a segment of the borehole for the specific purpose of demonstrating the system repeatability. The field verification spectra recorded immediately before and after the survey operation 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 in processing the spectra acquired during the logging operation.

The SGLS data was processed using a casing-correction factor for 0.280-in.-thick steel casing.

Depth overlaps, where data were collected by separate logging runs over the same depth interval, occurred in this borehole between depths of 42 and 43 ft. In addition, the interval between depths of 50 and 65 ft was relogged to check the quality of the radionuclide concentrations measurements made by the SGLS. The concentrations of the natural radionuclides K-40, U-238, and Th-232, and the concentrations of Sb-125 and the processed uranium (U-235 and metastable Pa-234) were calculated using the separate data sets at the overlapping depths. The measured concentrations of these radionuclides using the separate data sets were within the statistical uncertainty of the measurements, indicating very good repeatability of the radionuclide concentration measurements.

Cs-137, processed U-238, processed U-235, and Sb-125 were the man-made radionuclides identified in this borehole.

The presence of Cs-137 was measured almost continuously from the ground surface to about 25 ft and at the bottom of the borehole. The maximum Cs-137 concentration was about 10 pCi/g, which occurred at ground surface.

Processed U-238 and U-235 were detected in three intervals of the log, (i.e., between 50.5 and 53.5 ft, between 69 and 62 ft, and between 68 and 74.5 ft. Measured concentrations of these nuclides ranged up to about 240 and 11 pCi/g, respectively. Sb-125 was detected at 59.5 ft at a concentration of slightly more than 1 pCi/g, which is just above the MDL of 0.96 pCi/g. An additional peak was identified just below the MDL at 60 ft.

Historical gross gamma logs from 1982 to 1994 were plotted. The historical logs show a count rate at 60 ft that decreased with time at a rate consistent with the 2.77-yr half-life of Sb-125. The suite of logs also shows that the gamma-ray activity of the upper and lower zones has remained relatively stable over the 12-year time span shown.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks TX-101 and TX-105.

Log Plot Notes:

Separate log plots show the man-made (e.g., Cs-137) and the naturally occurring radionuclides (e.g., K-40, U-

Borehole 51-05-05

Log Event A

38, and Th-232). The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

A combination plot includes both the man-made and natural radionuclides, in addition to 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.

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 compilation of Tank Farms gross gamma logs shows relevant changes in gamma-ray activity over time. The representative logs show anomalous gamma-ray activity at depths that correlate approximately with the observed occurrences of processed uranium (i.e., 52, 60, and 70 ft).

Separate plots are included that compare the measured concentrations of the man-made radionuclides, (i.e., Sb-125 and processed U-238 and U-235) and the naturally occurring radionuclides (K-40, U-238, and Th-232) over the repeated log interval. The radionuclide concentrations shown were calculated using the separate data sets provided by the original and rerun logging runs.