Log Event A

Borehole 20-01-01

Borehole Information

Farm : B	**Tank :** B-101	**Site Number :** 299-E33-261
N-Coord : 45,270	**W-Coord :** 52,520	**TOC Elevation :** 654.50
Water Level, ft :	**Date Drilled :** 6/30/1974	

Casing Record

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

Borehole Notes:

A driller's log was not available for this borehole. Chamness and Merz (1993) show this borehole was drilled in June 1974 to a depth of 100 ft and was completed with a 6-in. casing. Chamness and Merz (1993) do not indicate the borehole was perforated or grouted.

The casing thickness for the 6-in. borehole is assumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. casing.

The top of the casing is the zero reference for the log. The casing lip is approximately even with the ground surface.

Equipment Information

Logging System : 2	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 04/1997	**Calibration Reference :** GJO-HAN-14	**Logging Procedure :** P-GJPO-1783

Logging Information

Log Run Number :	1	**Log Run Date :**	08/19/1997	**Logging Engineer:**	Bob Spatz
Start Depth, ft.:	98.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	29.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	2	**Log Run Date :**	08/20/1997	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	0.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	30.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

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Logging Operation Notes:

This borehole was logged in two log runs. The total logging depth achieved by the SGLS was 98 ft.

Analysis Information

Analyst : S.D. Barry

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 04/09/1998

Analysis Notes :

The pre- 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.

Casing correction factors for a 0.280-in.-thick steel casing (based on a 6-in., schedule-40 pipe) were applied to the entire logged interval during the analysis process.

Shape factor analysis was applied to the SGLS data and provided insights into the distribution of Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

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 time-sequence plot of the historical gross gamma log data from 1975 to 1990 is presented with the SGLS log plots. Plots of the observed decay of gamma activity at 51 ft is also included.

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

Results/Interpretations:

The man-made radionuclides detected around this borehole were Cs-137 and Co-60. A broad zone of nearly continuous Cs-137 contamination was detected at generally low concentrations from 4 to 25.5 ft. A small zone of low to moderate Cs-137 contamination was detected continuously from 38.5 to 45 ft. Isolated occurrences of Cs-137 were detected at concentrations slightly above the MDL near the ground surface and at 29, 30.5, and 31.5 ft. The Co-60 contamination was measured continuously at low concentrations from 41.5 to 43.5 ft and 54

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to 66.5 ft.

Historical gross gamma logs indicate anomalous gamma-ray activity was present at depths of 40 and 53 ft as early as January 1975. The activity at 40 ft has remained stable, but the activity at 53 ft has decayed to levels that could not be detected in 1994 with the gross gamma logging system.

The K-40 concentrations increase at approximately 39 ft. The K-40 and Th-232 concentrations increase at about 47 ft. Slightly decreased KUT concentration values occur from 70 to 80 ft. The KUT concentrations increase at about 80 ft and remain elevated to the bottom of the logged interval (98 ft).

An analysis of the shape factors associated with applicable segments of the spectra was performed. Interpretations of the shape factor CsSF1 are contained in the Tank Summary Data Report for tank B-101.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank B-101.