Log Event A

Borehole 50-06-11

Borehole Information

Farm : T	**Tank :** T-106	**Site Number :** 299-W10-115
N-Coord : 43,580	**W-Coord :** 75,870	**TOC Elevation :** 671.55
Water Level, ft : 80.2	**Date Drilled :** 7/31/1973	

Casing Record

Type : Steel-welded	Thickness : 0.237	ID, in. : 4
Top Depth, ft. : 0	Bottom Depth, ft. : 87	
Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 87	

Cement Bottom, ft. : 87 **Cement Top, ft. :** 0

Borehole Notes:

Borehole 50-06-11 was drilled in July 1973 to a depth of 87 ft with 6-in. casing. Data from the drilling log and Chamness and Merz (1993) were used to provide borehole construction information. In August 1980, the 6-in. casing was perforated from 0 to 20 ft and 85 to 87 ft. A 4-in. casing liner with a metal cap welded on the bottom was positioned inside the 6-in. casing and the entire annulus between the 4-in. and 6-in. casings was filled with grout. The logging engineer reported that grout was visible between the casings at the ground surface. The thicknesses of the 4-in. and 6-in. casings are presumed to be 0.237 in. and 0.280 in., respectively, on the basis of the published thickness for schedule-40, 4-in. and 6-in. steel tubing.

Equipment Information

Logging System : 2B	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 11/1997	**Calibration Reference :** GJO-HAN-20	**Logging Procedure :** MAC-VZCP 1.7.10-1

Logging Information

Log Run Number :	1	**Log Run Date :**	03/12/1998	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	0.0	**Counting Time, sec.:**	200	**L/R :** L	**Shield :** N
Finish Depth, ft. :	48.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	2	**Log Run Date :**	03/13/1998	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	82.5	**Counting Time, sec.:**	200	**L/R :** L	**Shield :** N
Finish Depth, ft. :	47.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

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Logging Operation Notes:

This borehole was logged by the SGLS in two log runs using a 200-s counting time. The top of the borehole casing, which is the zero reference for the SGLS, is approximately flush with the ground surface. The total logging depth achieved was 82.5 ft.

Analysis Information

Analyst : E. Larsen

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 07/06/1998

Analysis Notes :

The pre-survey and post-survey field verification for each logging run met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from the accepted calibration spectrum that most closely matched the field data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

This borehole was completed with 4-in.- and 6-in.-diameter casings along the entire logged interval. A casing correction factor for a 0.50-in.-thick steel casing was applied to the concentration data because it most closely matched the 0.517-in. total combined thickness of the 4-in. and 6-in. casings. The entire annulus between the 4-in. and 6-in. casings is likely filled with grout, making calculation of accurate radionuclide concentrations impossible. However, man-made and natural radionuclides were identified and apparent concentrations are reported.

Approximately 2 ft of water has collected inside the bottom of this borehole. The appropriate water correction factor was not available, so no compensation was applied to the water-filled interval. This resulted in lower reported man-made and natural radionuclide concentration values between 80.5 and 82.5 ft.

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 estimated 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 1986 is presented with the SGLS log plots. A plot that compares the decay rate of the historical gross gamma data with the calculated decay curves for specific radionuclides is also included.

Results/Interpretations:

The radionuclide concentrations identified in this section are reported as only apparent concentrations and are

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underestimated.

The man-made radionuclides Cs-137 and Co-60 were detected by the SGLS. The Cs-137 contamination was detected at the ground surface, 0.5 ft, and 10.5 ft. Small zones of nearly continuous Co-60 contamination were detected from 36 to 41 ft, 76.5 to 78.5 ft, and from 81 ft to the bottom of the logged interval (82.5 ft).

Variable K-40 concentration values occur from 38 to 50 ft. The K-40 concentrations increase from 47 to 48.5 ft. The K-40 concentrations increase again at 64 ft and remain elevated to the bottom of the logged interval. The U-238 and Th-232 concentrations increase near the bottom of the logged interval at a depth of about 81 ft.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank T-106.