Log Event A

Borehole # 50-04-05

Borehole Information

Farm : T **Tank :** T-104 **Site Number :** 299-W10-129

N-Coord : 43,500 **W-Coord :** 75,620 **TOC Elevation :** 673.73

Water Level, ft : 88.70 **Date Drilled :** 3/31/1974

Casing Record

Type : Steel-welded Thickness : 0.237 ID, in. : 4

Top Depth, ft. : 0 Bottom Depth, ft. : 93

Type : Steel-welded Thickness : 0.280 ID, in. : 6

Top Depth, ft. : 0 Bottom Depth, ft. : 95

Cement Bottom, ft. : 93 **Cement Top, ft. :** 0

Borehole Notes:

Borehole 50-04-05 was drilled in March 1974 to a depth of 95 ft with 6-in. casing. In January 1981, the 6-in. casing was perforated from 0 to 20 ft and 93 to 95 ft. A 4-in. casing liner with a metal cap welded on the bottom was positioned inside the 6-in. casing to a depth of 93 ft. The open borehole below the bottom of the 4-in. casing and the entire annulus between the 4-in. and 6-in. casings were filled with grout. 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 : 1 **Detector Type :** HPGe **Detector Efficiency:** 35.0 %

Calibration Date : 03/1995 **Calibration Reference :** GJPO-HAN-1 **Logging Procedure :** P-GJPO-1783

Logging Information

Log Run Number : 1 **Log Run Date :** 04/14/1995 **Logging Engineer:** Bob Spatz

Start Depth, ft.: 88.0 **Counting Time, sec.:** 200 **L/R :** R **Shield :** N

Finish Depth, ft. : 31.0 **MSA Interval, ft. :** n/a **Log Speed, ft/min.:** 0.3

Log Run Number : 2 **Log Run Date :** 04/17/1995 **Logging Engineer:** Bob Spatz

Start Depth, ft.: 29.0 **Counting Time, sec.:** 200 **L/R :** R **Shield :** N

Finish Depth, ft. : 0.0 **MSA Interval, ft. :** n/a **Log Speed, ft/min.:** 0.3

Borehole 50-04-05

Log Event A

Logging Operation Notes:

This borehole was logged by the SGLS in 1995 at the beginning of the Hanford Tank Farms Vadose Zone project. At that time, the data acquisition parameters were somewhat different than those used in the more recently logged boreholes in the T Tank Farm.

This borehole was logged in two log runs with the SGLS operating in a continuous logging mode using a 200-s counting time while moving a 0.3 ft/min. This method of operation corresponds to a spatial data acquisition interval of 1 ft. The top of the borehole casing, which is the zero reference for the SGLS, is assumed to be flush with the ground surface. The total logging depth achieved was 88.0 ft.

Analysis Information

Analyst : E. Larsen

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 01/06/1999

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 0.650-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. This may result in slightly higher reported man-made and natural radionuclide concentration values. Furthermore, the entire annulus between the 4-in. and 6-in. casings is filled with grout, making it impossible to produce accurate radionuclide assays. However, man-made and natural radionuclides were identified and apparent concentrations are reported.

Approximately 4.3 ft of water has collected inside the bottom of this borehole. The water-filled interval was not logged by the SGLS, so it was not necessary to apply a water correction factor to the data.

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.

Results/Interpretations:

Log Event A

Borehole 50-04-05

The radionuclide concentrations identified in this borehole are underestimated and reported as apparent concentrations only.

The man-made radionuclide Cs-137 was detected by the SGLS. The Cs-137 contamination was detected continuously from the ground surface to 24.5 ft. Several small continuous zones and a few isolated occurrences of Cs-137 were detected between 26.5 and 84.5 ft.

The K-40 concentrations increase sharply from 37.5 to 38.5 ft. The KUT concentrations increase at about 78.5 ft and generally remain elevated to the bottom of the logged interval (88 ft).

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks T-104 and T-107.