



Borehole **30-00-10**

Log Event A

**Borehole Information**

|                         |                                  |                                 |
|-------------------------|----------------------------------|---------------------------------|
| Farm : <u>C</u>         | Tank : <u>C</u>                  | Site Number : <u>299-E27-53</u> |
| N-Coord : <u>43,029</u> | W-Coord : <u>48,549</u>          | TOC Elevation : <u>649.17</u>   |
| Water Level, ft :       | Date Drilled : <u>12/31/1944</u> |                                 |

**Casing Record**

|                            |                                |                     |
|----------------------------|--------------------------------|---------------------|
| Type : <u>Steel-welded</u> | Thickness : <u>0.406</u>       | ID, in. : <u>12</u> |
| Top Depth, ft. : <u>0</u>  | Bottom Depth, ft. : <u>50</u>  |                     |
| Type : <u>Steel-welded</u> | Thickness : <u>0.322</u>       | ID, in. : <u>8</u>  |
| Top Depth, ft. : <u>0</u>  | Bottom Depth, ft. : <u>150</u> |                     |

**Borehole Notes:**

This borehole was drilled in December 1944. The borehole was started with a 50-ft length of 12-in. casing and completed at a depth of 150 ft with 8-in.-diameter casing. The 8-in. casing was perforated between depths of 48 and 148 ft with a staggered pattern of five slots per foot. The driller's log makes no mention of grouting; therefore, it is assumed that the casing is not grouted. According to the driller's log, on completion of the perforating work about 15 ft of sand fell into the borehole. This sand was not removed. The driller's log also observes that the casing was out of alignment at a depth of about 48 ft. The borehole may have been damaged at this depth region because it is currently accessible only to a depth of 52 ft.

Although the standard practice at the time was to withdraw the surface (12 in.) casing, this work is not mentioned in the driller's log. The SGLS logs indicate that the 12-in. casing remains in place. Although only a 6-in. casing is visible at the borehole collar, the casing thickness is assumed to be 0.322 in., on the basis of the nominal thickness of schedule-40, 8-in. pipe. The driller's log reports that 8-in. pipe was used as the casing for this borehole. It is assumed that the 6-in. casing that is visible at the surface extends to only a limited depth (less than 2 ft) into the borehole. 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 : <u>2</u>         | Detector Type : <u>HPGe</u>               | Detector Efficiency: <u>35.0 %</u>     |
| Calibration Date : <u>10/1996</u> | Calibration Reference : <u>GJO-HAN-13</u> | Logging Procedure : <u>P-GJPO-1783</u> |

**Log Run Information**

|                                |                                  |                                    |
|--------------------------------|----------------------------------|------------------------------------|
| Log Run Number : <u>1</u>      | Log Run Date : <u>04/08/1997</u> | Logging Engineer: <u>Bob Spatz</u> |
| Start Depth, ft.: <u>52.0</u>  | Counting Time, sec.: <u>100</u>  | L/R : <u>L</u> Shield : <u>N</u>   |
| Finish Depth, ft. : <u>0.0</u> | MSA Interval, ft. : <u>0.5</u>   | Log Speed, ft/min.: <u>n/a</u>     |



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### Analysis Information

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Analyst : H.D. Mac Lean

Data Processing Reference : MAC-VZCP 1.7.9

Analysis Date : 09/08/1997

#### Analysis Notes :

The SGLS log of this borehole was completed in a single logging run. A centralizer was deployed. The pre- and post-survey field verification spectra met the acceptance criteria established for peak shape and system efficiency. The energy and peak-shape calibration that best matched the logging run data were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging run. Some gain drift occurred during the logging runs, making it necessary to alternate use of the pre- and-post survey verification spectra in selecting the channel-to-energy parameters. It was also necessary to adjust the established channel-to-energy parameters slightly for a few logging spectra to maintain proper peak identification.

Casing correction factors for a 0.330-in.-thick casing were applied during the analysis.

Cs-137 was the only man-made radionuclide detected in this borehole log. Cs-137 contamination was detected at the ground surface, continuously to a depth of 2 ft, and at 13 ft. The measured concentration of the Cs-137 occurrences ranged from about 8 pCi/g at the ground surface to about 0.2 pCi/g (just above the MDL). The highest subsurface measured Cs-137 concentration was about 2 pCi/g at a depth of 1 ft.

The logs of the naturally occurring radionuclides show that the K-40 concentrations are abnormally low (about 7 pCi/g) in the interval between the ground surface and a depth of 50 ft, and that the concentrations of all the naturally occurring radionuclides increase by an inordinate amount below about 51 ft. Below a depth of 51 ft, the K-40 concentrations increase from a background of about 7 pCi/g, which is low by about 2 pCi/g for the interval of the borehole that penetrates the backfilled portion of the tank farm, to about 17 pCi/g, which is the normal background concentration for this region of the borehole. The Th-232 and U-238 concentrations also increase significantly below a depth of 51 ft.

Details concerning the interpretation of data for this borehole are presented in the Tank Summary Data Report for tank C-111.

#### 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.