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## **Techniques for Determining Groundwater Quality from Borehole Geophysical Logs**

In many parts of the world, techniques are needed to accurately assess the quality and quantity of fresh and saline groundwater resources. In determining the water quality of an aquifer there is certainly nothing equal to a laboratory analysis of the water. Unfortunately, however, water samples are frequently not available. This is true for fresh as well as saline water aquifers.

In the absence of a water analysis, water quality can be calculated from borehole geophysical logs. Often, this is the only available method. Plus, logging data are much more abundant and more easily accessible than water analyses. In hydrocarbon-producing areas tens of thousands of borehole geophysical logs are available for aquifers that have only a few water analyses.

Determining water quality from logs has long been a subject of interest to log analysts. However, most of the research has been conducted by the petroleum industry and has centered on very saline and brine waters. Only a few papers have addressed log-derived groundwater quality determination of less saline waters.

In 1987 the Texas Water Development Board funded a six-year study of openhole borehole geophysical techniques for characterizing groundwater resources. This talk summarizes some of the findings of the study, with examples of how the techniques have since been applied.

Techniques for calculating total dissolved solids (TDS) from log-derived water conductivity values for aquifers with less than 50,000 ppm TDS are reviewed. Guidelines for quantifying the relationship between water conductivity and TDS are also presented.