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# **Low-Cost Investigation Strategies for Oilfield Brine Contamination in Ground Water**

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As a conservative contaminant, chlorides move through the hydrologic cycle as a result of physical processes. Objectionable because of undesirable physical effects (taste, odor, corrosion), chlorides survive most processes that remove other ions from naturally occurring waters. Finding the cause of increasing chloride concentrations in a fresh-water aquifer has long been an environmental concern. While chloride

contamination can occur as a result from many sources, natural and man-made, in oilfield areas production brines are often blamed as the sole source of the problem. Existing literature or guidance on the subject of brine source identification usually describes academic or government studies too area-specific and expensive to be useful for the average investigation. This talk will describe some of the success-

ful investigation strategies the authors have used, including a simple brine investigation method developed by the authors and presented at the 1995 SPE/EPA E&P Environmental Conference. The emphasis will be on low-cost approaches and procedures that can be used to differentiate among the many possible chloride contamination sources and oilfield brines.

### **Biographical Sketch**

Jim Grace and Nancy Alyanak are Certified Petroleum Geologists involved in the exploration and production of oil and gas and the environmental methods that affect industry. Jim Grace received a B.S. in Geology and Chemistry from Michigan State University in 1972 and a M.S. in Geology/Hydrogeology from the University of

South Carolina in 1974. He worked as a hydrogeologist for the Michigan Geological Survey before beginning a career in the petroleum industry. Active in both fields, he had been an independent geologist for the past 15 years.

Nancy Alyanak received a B.A. in Geology and Mathematics from Mount Holyoke College in 1971. She earned a M.S. in Geology from Michigan State University in 1973 and was involved

in Ph.D. work at the University of South Carolina before entering the petroleum industry. Since 1974 she has worked for major and independent E&P companies. For the past few years, she has been involved in the implementation of geological and statistical applications in the exploration for oil and gas and in environmental investigations with emphasis on efficient, cost-effective solutions.