ENVIRONMENTAL/ENGINEERING GEOLOGISTS

HGS ENVIRONMENTAL/ENGINEERING COMMITTEE BUSINESS MEETING JANUARY 9, 1991

Location: Charlies Hamburger Joint
2222 Ella Blvd.
just south of the 610 North Loop

Time: 6:30 - 8:00 p.m.

VICTOR T. JONES, III—Biographical Sketch

Victor T. Jones earned a Ph.D. in Physics (1969) from Texas A&M University. Dr. Jones is currently President of both Leak Search, Inc., and its parent company, Exploration Technologies, Inc.

Dr. Jones has directed over 200 environmental impact evaluations over underground gas storage areas which involved both the detection and location of problem areas.

As Director of Geochemical Application for Gulf Research and Development Co., Dr. Jones has worked with clients, both within Gulf and with other major oil companies, in designing geochemical exploration programs for field operations throughout the world.

His experience in geochemical exploration includes data processing and integration of most disciplines within the major sedimentary basins throughout the world. He has generated over one hundred (100) proprietary geochemical interpretation reports on the geochemistry of both onshore and offshore basins in the United States and many foreign areas, including South America, Africa, and the Far East.

Dr. Jones is a member of American Association of Petroleum Geologists, American Chemical Society, American Institute of Chemists (Fellow), Association of Petroleum Geochemical Explorationists, European Association of Organic Geochemists, Houston Geological Society, National Water Well Association, and Texas Water Well Association.

APPLICATIONS OF SOIL GAS GEOCHEMICAL METHODS IN THE DETECTION OF UNDERGROUND CONTAMINATION

The oil exploration industry has developed soil gas geochemical survey methods which are capable of predicting whether or not an undrilled subsurface prospect is more likely to contain oil or gas. This methodology focuses on the detection of light C1-C4 and C5 plus gasoline range hydrocarbons in the near surface soils, and the fact that the chemical composition of the gases that migrate to the surface from these reservoirs change in direct response to the inherent differences in these oil versus gas reservoirs.

Refined petroleum products also exhibit similar differences in the chemical makeup of their light and gasoline-range hydrocarbons. The volatile gases contained in all types of petroleum products, whether refined or natural, migrate easily from the shallow depths where these products accumulate whenever they escape from their man-made storage containers. Gas chromatography is utilized to characterize and quantify any contamination present in near surface soils and/or groundwater.

Numerous application examples will be shown where these methods have been successfully used to map the unknown extent of subsurface contamination from salt dome storage caverns, mined drifts, underground coal gasification reactors, leaky well casings, pipelines, and underground petroleum storage tanks.

The ability to determine hydrocarbon compositions, in addition to magnitudes, has often led to the identification of additional products not originally thought to be a part of the leakage problem. Major natural gas leaks have been identified, repaired, and separated from leakage associated with other types of subsurface sources. Soil gas methods have been used to define specific leakage products and their migration pathways. Leakage plumes are mapped utilizing the various volatile organic vapor data obtained from laboratory analyses. Although applications to hydrocarbon products are the most common, soil gas methods have and can easily be applied to other volatile organics, such as methylene chloride, Freon acetone, TCE, or any product having adequate vapor pressure.

Plume maps constructed using soil gas data are actually more accurate in defining the horizontal extent of contaminants than are the limited number of boreholes normally deployed. In fact, the soil gas plume maps are invaluable in determining the placement of core borings and monitoring wells which are required to determine the vertical extent of the contamination and the actual concentrations of the contamination at depth. A proper study should use both of these excellent tools employed in concert.