APGE LOOKS AT SEISMIC EXPRESSION OF SEEPS

Rice University, April 15, 1991

The April meeting of the Houston chapter of the Association of Petroleum Geochemical Explorationists (APGE) will be highlighted by a presentation by Gregory J. Nash entitled "Expression of Seeps and Seep-Related Features on High-Resolution Seismic and Other Imaging Systems." A variety of examples of anomalous acoustic responses on high-resolution marine seismic profiles will be presented and discussed. Such high-resolution geophysical data are natural complements to geochemical exploration programs when they are used to identify locations having the highest potential for sampling success.

Greg Nash is a senior geologist/geophysicist with Fugro-McClelland's Marine Geoscience Group in Houston. He is currently responsible for planning high-resolution geophysical surveys for various geochemical, geophysical, and engineering programs. His presentation will be given on Monday, April 15 at 4:00 PM in Room 106 of Rice University's Geology Building. Attendance is free and open to all interested persons. For additional information, call Deet Schumacher at 546-4028.

EXPRESSION OF SEEPS AND SEEP-RELATED FEATURES ON HIGH-RESOLUTION SEISMIC AND OTHER IMAGING SYSTEMS

Most high-resolution geophysical survey systems were developed by the petroleum industry and by the military as remote-sensing techniques for measuring seafloor morphologic and shallow geologic conditions in the marine environment. These systems have evolved over the past 20 years and now provide a wide range of capabilities and potential applications. However, they are primarily being used to provide detailed geologic information for offshore drilling-hazards surveys and production facility-siting studies.

High-resolution geophysical data will augment geochemical exploration programs when they are used to target locations with the highest potential for sampling success. In addition, they will fill the "gap in resolution" between conventional seismic data and surface geochemical data. The collection of high-resolution geophysical data is completely field-compatible with geochemical exploration programs and very beneficial to overall program success.

Several examples of anomalous acoustic responses on high-resolution marine seismic profiles are presented here. Many of these anomalies correlate the presence of gaseous hydrocarbons in the shallow sediments and in the water column. It is also very common to falsely associate some "anomalies" with the presence of gas. A complete understanding of the geological environment is critical to proper interpretation.

Simultaneous operation of up to five different high-resolution systems is now possible. This process allows some qualification of the subtle variations in each system's response to shallow acoustic anomalies. It also confirms their relative capacity to resolve various geologic features.

When data are properly collected and interpreted, high-resolution systems can be used to delineate relatively small concentrations of gas and zones of gassy sediments in the shallow geologic section. These systems can also be used to locate and identify surface features such as seep mounds, gas craters, carbonate build-ups, water-column anomalies, and seafloor fractures. All of these features, associated with hydrocarbon migration to the seafloor, provide ideal targets for successful geochemical exploration programs.