MEETINGS

DINNER MEETING—APRIL 10, 1989

ALF KLAVENESS—Biographical Sketch

Alf Klaveness attended Louisiana State University (1934-1938), receiving a Bachelor degree in Petroleum Engineering with a minor in Geology. He later attended Cornell University for graduate work in Geology/Geophysics (1941), University of Houston Law School (1947) and various Naval Science schools (U.S. Naval Reserve, 1934-1974).

Alf has been active in geophysics, geology and reservoir engineering for more than thirty years. He has worked for two major oil companies and two geophysical contracting companies in various capacities including data acquisition, data processing, data interpretation, project planning/supervision and company management. Principal assignments have been in South America, Europe, Asia, Africa, Canada, the U.S. Gulf Coast, West Coast and Alaska.

He served in the U.S. Navy during World War II as a navigator, sonar officer and destroyer commander in the Pacific and Atlantic areas. Alf holds U.S. and foreign patents in seismic technology, well logging and well drilling operations. He is president and co-founder of Klaveness-Wilkinson Co. He has developed a down-hole seismic energy source, which provides continuous three-dimensional, inverted V.S.P's in wells while drilling.

He is an honorary member and current president of the Geophysical Society of Houston. He is also an active member of SEG, SPE and HGS.

EMERGING TECHNOLOGY IN BOREHOLE GEOPHYSICS

Recent developments in borehole geophysics can reduce the hazards and improve the chances for success when drilling for oil and gas. Seismic Telemetry Logging uses sonic pulses and seismic techniques to scan or "look ahead" of the drill bit to determine the character and the structural conditions of the materials to be drilled. Fracture-prone formations and overpressured gas zones can be detected before they are penetrated, thus permitting mud weights to be altered in sufficient time to prevent lost circulation or dangerous blowouts. Additionally, the degree of compaction, the dipping attitude of the bedding and the position of formations below the borehole are determined so that drilling programs may be optimized and good casing seats established.

The same sonic pulses, which monitor the position of the drill bit, may be used to detect deviations from a true vertical drilling path (crooked holes) and guide directional wells to planned objectives. Precise measurements are made of sonic transit times in materials drilled, thus providing a continuous velocity log, density log and porosity log as the drilling progresses.

Sonic telemetry is used to transmit data to the surface in less than 30 seconds. The results are, therefore, immediately available on the rig floor where they may be used to alter or optimize the drilling program.

Seismic telemetry logging employs conventional seismic instruments with specifically configured surface sensor spreads and a newly developed down hole energy source (pulser) to provide useful borehole data in a timely manner. The energy source is positioned directly above the drill bit and is activated at will without interrupting normal drilling operations. Geologic structures (faults, reefs, sand bodies, salt diapirs, etc.) around and below the borehole can be delineated. The position and magnitude of overpressured gas zones below the drill bit (2000-4000 feet) may also be determined. The position of the drill bit, both vertically and horizontally, can be established through sonic triangulation with acceptable accuracy at each pulsing interval (30 feet). This provides sufficient deflection data for guiding directional wells to prescribed objectives. Sonic triangulation can be of particular value in offshore environments where multiple wells are often drilled directionally from single platforms, and in cases where horizontal drilling is planned.

Much valuable information is obtained from these techniques. In fact, few exploratory wells are now drilled without them. Great progress has been made recently in improving the science of geophysics, both in concept and equipment. It is expected that this new process of scanning or "looking ahead" of the drill bit with sonic pulses will be an important step in improving drilling operations and finding complex "hidden" structural and stratigraphic oil and gas reservoirs. Additionally, it is expected to provide an extra measure of safety for personnel and to help maintain a clean environment by giving early warnings of overpressured gas zones and other hazardous conditions.