Geophysical Surface and Downhole Measurement to Understand the Subsurface

Speaker: John Macpherson, Baker Hughes Inc.

When drilling a well in the subsurface, measurements of the formation being drilled may be performed with either with tools inside the well or from the surface, being it on the seafloor or from the ground on land. Instruments for measuring inside the wellbore may be connected to the drill string itself, to the cemented casing lining the wellbore, or connected to a wire line, which may be lowered into the well for the specific purpose of geophysical well logging. Sensors for measuring physical properties of rock and the fluid contained in rock pores may be mechanical, electromagnetic or seismic, with subsequent varying depth of investigation.

This tutorial will provide an up to date review of the various types of measurements performed linked to rock properties and present an overview of challenges and limitations in today's sensor technology in the field of wellbore and surface geophysics.

About the speaker: John Macpherson is the Senior Strategic Technology Advisor for Baker Hughes' Drilling and Evaluation division. Baker Hughes is a leading oilfield service company, with significant activities in geothermal drilling operations and research. Mr. Macpherson initially joined Baker Hughes in 1977 and has held various positions in operations, software, research and development, and technology leadership. Most of his research and development work was on early logging while drilling interpretation, and then focused on drilling dynamics and telemetry systems for measurement while drilling. More recent work covered downhole azimuthal bending measurements for geosteering operations, development of 300C systems for drilling wells for Enhanced Geothermal Systems, and research management of automated drilling systems. Mr. Macpherson has authored numerous papers, holds 11 patents, is a

committee member of the SPE Drilling Systems Automation Technical Section (DSATS), and has a BSc (Hons) degree in Geology from the University of Glasgow.