



**Monday 4 September 2006**

**SALA BARBARA**

**5° Palazzo Uffici - Eni Divisione E&P**

**Via Emilia , 1**

**SAN DONATO MILANESE**

**11:00**

**2006-2007 SPE Distinguished Lectures Series**

## **HEAVY OIL RECOVERY – RECENT DEVELOPMENTS AND CHALLENGES**

***By Mridul Kumar – Chevron Energy Technology Co.***

### ➤ **ABSTRACT**

Heavy oil and extra heavy oil production (currently at about 2.8 MM barrels/day) has been increasing in recent years and is expected to grow even further in the future because of expected supply shortfall in conventional oil and an abundance of relatively large and known deposits of heavy oil. Heavy oil is commercially produced by primary recovery (solution gas drive and cold production), improved recovery (water injection), and enhanced recovery (thermal methods). A large majority of the recent primary production is in the Orinoco belt of Venezuela. Long horizontal wells (with initial production rates/well over 1000 BOPD) and upgrading have made these projects possible. Waterflood has been conducted successfully in a few high viscosity reservoirs in the past, and several projects are currently ongoing and planned around the world. Incremental recovery of ~2% to 20% OOIP have been reported. Steam injection is the most widely applied EOR method. A majority of the steam injection projects are in California, Canada, Indonesia and Venezuela. Recovery can approach 20% for cyclic steaming and over 50% for continuous steam injection. Novel methods such as solvent injection and hybrid methods are being tested for heavy oil recovery, where steam may not be the best option. However, these are in the experimental stage and their commerciality is currently being demonstrated. This presentation highlights recent developments and advances in heavy oil recovery and challenges in each of the heavy oil recovery methods.

### ➤ **BIOGRAPHY**

*Mridul Kumar is a Team Leader of the Heavy Oil and Unconventional Reservoirs team at Chevron Energy Technology Co. in Houston, Texas. He also leads Chevron's Heavy Oil Network. Kumar has contributed to Chevron's heavy oil projects worldwide and has led development and deployment of technologies for heavy oil recovery and IOR processes. He has co-authored 44 papers and holds four patents. Kumar holds a B.Tech. (with distinction) from the Indian Institute of Technology at Kanpur, and M.S. and Ph.D. from The Pennsylvania State University, all in mechanical engineering. He is a member of the SPE Editorial Review Committee and ATC Reservoir Engineering subcommittee. He is on the program committees of SPE 2005 ATW on Heavy Oil Development and 2006 IOR Symposium. He was the Chairperson of the SPE Golden Gate Section (2001-02) and General Co-chairman of 1997 SPE International Thermal Operations and Heavy Oil Symposium. Kumar is a recipient of 2002 SPE Western Region Technical Achievement Award.*