



Monday 2 April 2007  
SALA BARBARA  
5° Palazzo Uffici - Eni E&P division  
Via Emilia 1  
SAN DONATO MILANESE

11:00

2006-2007 SPE Distinguished Lectures Series

**CRUDE QUALITY & VALUE ENHANCEMENT:  
AN OPPORTUNITY FOR INNOVATION**

*By Rashid Khan – Saudi Aramco*

➤ **ABSTRACT**

With the global increase in demand for quality crude, there is an increased need to convert lower quality crude into value added products. Historically, crude value enhancement and crude desulfurization are achieved in refineries. In fact, there has been a “brick wall” when discussing crude quality upstream of refining. The value of a crude is generally based on its sulfur content and its density. From refining perspectives, however, integrity of crude is also impacted by the acid content and the presence of various additives, contaminants and metals. Integrity and consistency of crude oil streams are important to all parties from production to transport and refining. Nevertheless, achieving a reduction in sulfur, accomplished by various upgrading processes, can have a most profound impact in terms of crude price. Relatively narrow differences in price between light and heavy crudes historically deterred the growth of appropriate upgrading technology. The sweeter and lighter oil production is declining; therefore, the conversion of high sulfur crude is becoming increasingly more attractive. Technologies for upgrading heavy oils can be broadly divided into hydrogen addition or carbon rejection processes, although many other innovative solutions have been proposed. This presentation provides an overview of crude quality issues and the heavy oil upgrading technologies with the aim to improve crude quality. It will discuss upgrading in terms of technology type and the fundamentals involved. The improvements in the following crude properties can be achieved by an upgrading technology: sulfur, density, nitrogen, metals, acid contents etc. The discussion covers several compelling and innovative options and examples of opportunities, some of which can possibly be applied within E&P, in improving crude quality while addressing the traditional production issues.

➤ **BIOGRAPHY**

*Rashid Khan is a specialist for Saudi Aramco providing leadership to capture, develop and commercialize Intellectual Properties. Highly motivated, innovative and a versatile Intellectual Property Specialist and Energy Technologist, he has experience in both upstream and downstream technology areas. Rashid received Texaco's highest technical award for creativity, while employed with Texaco. Considered as an international expert in hydrocarbon processing, Rashid received American Chemical Society regional Research Award. While employed with the U.S. Dept of Energy, he championed the development and commercialization of an upgrading process. Rashid also served as a technical advisor to the US White House. He served as an adjunct professor for Vassar College, NY. He has 27 patent awards, published over 150 journal papers/presentations and authored/edited three books. He received the Outstanding Achievement CRC Award in Chemistry. He is an editorial board member for “Energy Sources.” He organized various national and international conferences. Rashid received the Outstanding Service Awards from American Chemical Society. He received his PhD and MS in Energy & Fuels Engineering from Pennsylvania State University and received an MS in Environmental Engineering from Oregon State University.*