



## OPERATIONS GEOLOGY TECHNICAL DIVISION TALK

### Competition between Engineering and Geology in SAGD Caprock Integrity: How to convert geology into numbers

Presenter: Mazda Irani, Ashaw Energy

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1 CPD (Continuing Professional Development) credit will be awarded for this event

#### ABSTRACT

In most thermal recovery processes, injection of high-pressure, high-temperature steam causes significant stress changes at the edge of the heated zone or steam chamber. These stress changes include shear dilation which can both enhance the absolute permeability and result in horizontal and vertical formation displacements. The importance of considering geomechanical effects in thermal recovery processes has been extensively discussed in the literature, but the prediction and surveillance of the resulting effects, such as the impact on production enhancement and reservoir displacement, have in many cases been neglected. Furthermore, converting geology data into numbers were also the biggest challenge. The questions such as scale effect? Fracture intensity? Plasticity?

This presentation will focus on identification of main findings from an extensive monitoring program conducted on the original Steam Assisted Gravity Drainage (SAGD) pilot project conducted at the Underground Test Facility (UTF) in the late 1980s and a seismic program conducted over the last several years by a SAGD operator at a commercial thermal recovery project. The framework to convert the geology information into numbers and make numbers meaningful for G&G. Geology is more important as we deal with more difficult scenarios. In the current geomechanical modelling in SAGD projects the impact of fractures intensity and clay consolidation is neglected and fracture growth and shearing modeling into the caprock is totally independent of G&G inputs. Ashaw Energy is currently developing a module on Caprock Integrity and Hydraulic-Fracturing in shale oil application, that is capable to include the G&G and engineering team to import their data and convert it into a model that is meaningful for both teams. While the discussion on the geomechanical effects in thermal recovery processes will no doubt continue, this presentation will provide field-supported results to illustrate both beneficial and potentially challenging impacts which the correct modelling would have in a thermal recovery project.

#### BIOGRAPHY



Dr. Mazda Irani is CTO of Ashaw Energy. He has 16 years of experience in oil and gas industry mostly in SAGD thermal operation in both reservoir and production design and optimization. Mazda has been involved in the design and development of new in-situ oil sands recovery processes, including the Nsolv solvent-based and Enhanced Solvent Extraction Incorporating Electromagnetic Heating (ESEIEH) electrical-heating based recovery processes. Mazda holds two PhD in Petroleum and Geomechanics and three MSc degrees in different aspect of engineering, including petroleum engineering. Dr. Irani has published and presented more than 70 technical

papers and is named as the inventor on over seven patents on different aspects related to SAGD operation and teaches an SPE short-course on the fundamental reservoir and production aspects related to the SAGD recovery process.