Amgen Seminar Series in Chemical Engineering

in

Cherry Auditorium, Kirk Hall, 1 PM

Presents on December 5, 2013

"Improving the Performance of Supercritical CO2 as an Oil Recovery Solvent"

By

Professor Robert M. Enick
Department of Chemical & Petroleum Engineering
University of Pittsburgh

Nearly 5% of the oil produced in the US (about 300,000 barrels of oil each day) is attributable to the injection of supercritical CO2 into subterranean sandstone or carbonate formations. Even though this technology has been used safely and successfully for over 40 years, it is plagued by problems related to the low viscosity of CO2. At reservoir conditions, the viscosity of CO2 is about 0.05 cp, while the viscosity of the crude oil is typically in the 1-10 cp range. As a result, the CO2 tends to "finger" from the injection well, through the formation, toward the production wells rather than uniformly displacing the oil from the pores of the rock. This results in frustratingly high amounts of CO2 production and recycle, and disappointingly low rates of oil recovery and cumulative amounts of oil production. The ability to alter the mobility of high pressure CO2 flowing through the rock, and to re-direct its flow into oil-bearing layers of rock, is a challenge that is ripe for chemical engineering solutions. In this presentation, a review of techniques for increasing the viscosity of CO2, generating CO2-in-brine foams that lower the mobility of CO2, and using gels to plug up highly permeable watered-out layers of rock that "steal" CO2 will be presented.

This series at the University of Rhode Island is made possible through the generosity of Amgen, West Greenwich, R.I.

Refreshments provided by the Joseph Estrin Endowment.