

Heavy Oil Production and Transportation as Low-Volume Water-External Emulsions

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Heavy Oil production has become increasingly important in global production as lighter crude reserves are exhausted. The heavy oil reserves of Venezuela and Canada combined currently exceed the reserves of Saudi Arabia.

The high viscosity of heavy crude oils limits production in low temperature reservoirs and restricts flow in surface transportation pipelines. These obstacles have been overcome historically by the use of heat or dilution with low viscosity hydrocarbons to lower the viscosity of the viscous crude oil. The San Joaquin Valley in California is most notable for the use of thermal recovery of heavy oil by steam injection. Large scale projects are starting in Venezuela to transport heavy crude oil with hydrocarbon diluents from remote fields in Venezuela.

This paper presents an alternative means of producing and transporting crude oil as an oil-in-water emulsion. The concept has been considered for over four decades but has rarely been put into practice. Field data will be presented from our 9 years of operating experience in Mexico and Canada. The project economics will be compared to the traditional methods of producing and transporting heavy crude oils. Guidelines for selecting projects that can benefit from this technology will also be presented.

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