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Low salinity water alternate surfactant in low permeability carbonate reservoirs

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Low-salinity water injected into carbonate cores, which have undergone sea-water injection, can produce additional oil more economically if a low-concentration non-ionic surfactant is added to the low-salinity water and injected as chase fluid. One major reason for the additional oil recovery is that low-concentration surfactant effectiveness favors the low-salinity environment. Several core flooding, contact angle and IFT experiments were performed to assess the proposed process. The core flooding sequence includes seawater, low-salinity water and low-concentration non-ionic surfactant. However, for field application, we proposed low-salinity water-alternate-surfactant injection. The surfactant concentration in low-salinity water was 1,000 and 5,000 ppm. The core permeability is 0.5 to 1.5 md and porosity ranges from 0.18 to 0.25. Cores were aged for eight weeks at reservoir pressure and temperature. The pendant drop oil-brine IFT and captive oil-droplet contact angle measurements were performed at variable brine salinity in the presence of surfactant. Seawater and low-salinity water flooding core floods yielded ultimate oil recoveries of up to 57 percent. Up to 6 percent additional oil recoveries was obtained from low-concentration non-ionic surfactant in low-salinity water flood. With decreasing salinity, in presence of 1,000-ppm surfactant, favorable wettability alteration from intermediate-wet to water-wet was observed by contact angle measurements. Moreover, addition of small concentration of surfactant decreased the IFT and altered the wettability of several one-inch diameter, crude-aged, discs to water wet.

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Valuing a European energy firm

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We study the case of a large Dutch firm, having conventional and non-conventional energy business, with also some presence in Europe and even beyond. Valuing energy firms does in principle not differ from valuing firms in general, although multi-level regulation issues and energy market developments blur the picture. Key value drivers include growth of revenues (prices×volumes), earnings before interest and depreciation and amortization margins to net sales ("EBITDA margins"), capital expenditures ("CAPEX") and costs of capital. The actual valuation requires processing an array of data on regulation, market and firm specifics and much economically relevant as well as precise calculation work. We show with a checklist a vast number of relevant inputs to be taken into account for a transaction valuation. While our case valuation has decreasing practical relevance in the present energy markets, our methodology is still largely valid under the current technology driven circumstances.

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