ABSTRACT

Conventional emulsified acids composed of a strong mineral acid and an aromatic solvent, such as xylene, are commonly used to stimulate both water injection and production wells. When this system is properly applied, it is effective in dissolving organic and inorganic deposits, and in stripping off layered scales that may be deposited onto the inner surface of the tubing. Until recently, application of this system has been restricted to conventional reservoirs; however, with proper compatibility and corrosion testing, the emulsified acid system can be used to successfully stimulate thermal heavy oil reservoirs. Thermal heavy oil wells often exhibit significant calcite scaling on the long horizontal slotted liner, as well as an emulsion of low API oil dispersed in an aqueous mixture. Previous treatments using 1% HCl acid or 5% Acetic have addressed the issue with scaling. However, the issue with the heavy oil emulsion remained unresolved. By using a high temperature emulsified organic acid, both calcite scale and heavy organic deposits can be removed along the length of the slotted liner. 5% or 10% acetic acid emulsified in a 4:1 ratio with a modified wax and asphaltene solvent blend, in conjunction with a liquid organic acid corrosion inhibitor and an emulsifying surfactant, have proven to be an effective treatment in the remediation of scales and build up of organic deposits. Also, the blend is designed to maintain sufficient corrosion protection despite the high temperature environments that are characteristic of thermal heavy oil wells. This paper details the acid compatibility testing procedure, corrosion testing, and subsequent analysis that were required to formulate this specialized acid blend.

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