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Abstract

Objectives/Scope:
This paper will show how the clever use of thermal recovery, more specifically steamflooding will increase oil recovery to more than 70% in heavy oil reservoirs (clastic and carbonate).

Methods, Procedures, Process:
Kern River Field (Discovered 1899) is an unconsolidated sand heavy oil field located in California. After experiencing declining primary oil production, it became apparent that the addition of heat would substantially improve oil recovery in this field (Downhole heaters, hot water, steam stimulation, and ultimately continuous steam injection). Steamflooding was settled on as the recovery process of choice for this reservoir. In addition, the evolving technologies utilized with steamflooding to maximize recovery will be mapped out.

Results, Observations, Conclusions:
It will be shown that based on production and post steamflood cores that this process resulted in +70% recovery (+2 Billion BO produced) for this 11-13o API oil. An additional success story we have seen in another steamflood will be shared. The promise of high recovery as shown for Kern River has also been realized in other reservoirs (including a carbonate). The high recovery will be shown by pilot production and post flood cores results. This recovery accomplished at the pilot level can be achieved by commercial steamflood expansion. For these fields the high recoveries are the product of the synergistic application of continually evolving technologies.

Novel/Additive Information:
An updated status of these fields will be presented. Examples from our fields of these technologies will be presented. Examples for Kern River will include the role of cogeneration, surveillance, steam injection management, and more recently horizontal wells. Examples for other steamfloods will include optimizing well configuration, controlling corrosion and scaling, acid gas production, surveillance, and managing injected steam.