Using Steam to Produce More Oil

Marc Guzman, Technical Team Supervisor, Chevron

The history of Kern River dates back to 1899 when the field was first discovered. Production started pretty high but ultimately declined all the way through the 1950s. That was using the primary production methods at the time.

One of the challenges with Kern River crude is it’s unconventional—not light oil. It’s very thick. It’s like molasses. Picture a sandbox. Oil exists in that sandbox, in between all those sand grains. If the oil is very, very heavy, it’s not going to flow through those sand grains at all. To address this challenge, we introduced the concept of heating the oil up. That way it would flow easier.

Narrator

Steamflooding is a process used by Chevron to increase recovery from heavy oil reservoirs. In steamflooding, steam is injected near the base of a heavy oil reservoir through an injection well. The injected steam vapor rises toward the top of the reservoir due to buoyancy. Heavy oil is thick and has a very high viscosity, or resistance to flow, which can make it difficult to extract or produce. As the injected steam comes into contact with the oil, it transfers heat to the cold, heavy oil, reducing the viscosity of the oil and making it more mobile.

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Through the 1950s, primary production ultimately recovered only 10 percent of the oil in place. It peaked out at about 19,000 barrels a day, up until when we introduced steamflooding. That technology—the use of information—allowed us to take that production to a peak of 120,000 barrels a day. From one pilot, it grew to over 10,000 producing wells and almost 400 steam injectors.

Chevron has invested the energy required to look at the data of what’s going on in the reservoir and basically been able to create a management process around steam injection, putting in the right amount of heat and producing the optimum number of barrels.

The work that we’re doing here in Kern River has tremendous implications worldwide. There are numerous fields that have the same characteristics of Kern River where we’ll be able to take our steamflooding technology, heat management, put those together and grow production for the future.