

# Natural soil bacteria pump new life into exhausted oil wells

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Technology that enlists natural soil bacteria as 21st century roughnecks now is commercially available and poised to recover precious oil remaining in thousands of exhausted oil wells, according to a scientist who spoke here today. His report on a process termed microbially enhanced oil recovery (MEOR) was part of the 245th National Meeting & Exposition of the American Chemical Society.

"The idea of using microbes to bring spent [oil](#) wells back to life dates to the early 1900s," said Brian Clement, Ph.D. "That was the era of 'easy-to-recover' oil, and when a well played out, you just moved on and drilled another—knowing that 60-70 percent of the oil in that first reservoir remained untouched. We're in a different era now. Oil is scarcer, and it makes sense to use MEOR. It can put about 10 percent of the oil in exhausted wells into barrels with low capital investment, low operating costs and little environmental impact."

Clement is a senior scientist at [Glori Energy](#), which is deploying its MEOR technology known as AERO, for Activated Environment for Recovery of Oil. Other companies that have moved the technology to market include DuPont, which offers its MATRx MEOR technology and Titan Oil Recovery, Inc., which offers its Titan Process. Clement's talk was part of the symposium titled "The Interconnected World of Energy, Food and Water."

Conventional oil production techniques rely on pressure that exists naturally in an underground reservoir to push oil to the surface, much

like the pressure in a bottle of carbonated beverage. Clement explained that the pressure in a reservoir declines over time, and eventually it is too low to force oil to the surface. At that point, as much as 60 to 70 percent of the reservoir's oil often remains in the ground.

MEOR can retrieve that oil by fostering various changes in the reservoir. Clement explained that the AERO System, for instance, piggybacks on waterflooding, a widely used process in which water is injected into the reservoir to force oil out of the well and to the surface. The system adds a customized formula of nutrients to the injection water to optimize its quality and stimulate the growth of native reservoir bacteria.

With the AERO System, microbes thrive and grow to increase oil production using two main mechanisms. First, they break down and metabolize oil at the oil-water interface, allowing the oil to flow more freely. Second, the microbes block existing water channels within the reservoir's soil, forcing the water into new channels and driving more oil to the surface.

With the AERO System's MEOR technology, oil field owners and operators can increase production from declining wells without having to invest in expensive, new infrastructure. Clement described tests in which the technology helped produce an additional 9-12 percent of the total oil remaining in reservoirs. The number may sound small, but translates into an additional \$10 billion of oil from wells in the United States and more than \$165 billion worldwide.

### **More information: Abstract**

A reliable and predictable energy supply is a requirement for the continued development of our society. Current infrastructure is based on energy supplied from extracted hydrocarbons, and there is no indication of this changing significantly within the foreseeable future. Therefore,

the extraction and consumption of available hydrocarbon resources is extremely important to establishing a secure energy supply.

Traditional production of crude oil typically leaves 60-70% of discovered oil behind, making mature oil fields a prime target for the application of novel technologies aiming to improve oil recovery.

This presentation will review technologies for enhanced oil recovery with a focus on a biotechnology-based approach targeting reservoir microbiology. When successfully implemented, this technology offers a viable option to recover trapped oil with minimal new footprint or investment.

Provided by American Chemical Society

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