

SWC Project Update

June, 2009

Validation of Incremental Oil Productions via Single Well and Reservoir Field Trials Involving *in situ* Stimulation of Indigenous Microorganisms

Microbial enhanced oil recovery (Microbial EOR) is the focus of Ram Biochemicals' 2008 SWC project. Whether you know it or not, if you produce oil, you may already be engaged in microbial oil recovery. This is because microbes exist in virtually every oil-bearing formation world-wide. But their activity can either help or hinder oil production. The questions are; do these microbes work efficiently in your behalf, can their beneficial work be enhanced, or if they are not helpful, can their bad behavior be suppressed?

This project combines a specially prepared nutrient medium with a unique delivery mechanism intended to keep the nutrients from dissipating too rapidly in the formation. With the proper type and amount of readily available nutrients to nourish them the microbes already present in the oil-bearing formation will, in turn, produce bio-chemicals and gases that help release trapped oil.

Three Kansas oil producers are using two different methods to move treatment fluids into the formation; 1) a fluid squeeze for single wells, and 2) injection with co-produced lease water for enhanced water flooding. An initial slug of 25 to 50 gallons will be used for single wells. An initial 250 gallon slug will be used for enhanced waterflooding of two 3-well systems. The object here is to contact as much of the oil bearing formation as possible with treatment fluid at the oil/water/rock interface. This is where the preponderance of microbial activity is believed to take place.

In addition to being a readily available microbial nutrient, the treating fluid exhibits several chemical properties similar to tradition EOR chemicals. In concentrated form it is mild yet hard to buffer organic acid with moderate reducing, chelating, and solvent properties. As such it is being evaluated as a near well bore clean-up fluid to mitigate damage due to scale, bio-film and mild paraffin build-up. Near wellbore treatments involve; 1) pumping the well off, 2) injecting a small slug of fluid into well annulus, 3) a flush with lease water and off road diesel or lease oil, 4) a brief shut-in period with circulation, followed by 5) a 24 to 96 hour soak before turning the well back into production.

Control Treatments

The participating oil producers have been asked to conduct small number of control treatments that use the recommended treatment methodology, but without using treatment fluid. This will help determine the effect of the treatment method alone. Schlobohm Oil has begun well treatments.

Ram was granted a project extension through December, 2009. This will enable the existing field trials to run a full six months. It affords time for participation by oil

producers in other states, and Ram is actively looking to expand its field projects.

To track project progress in near real time, please visit:

http://www.rambiochemicalsinc.com/current_field_trials.htm

Use of Live Microorganisms

Another microbial EOR approach which is not part of this project is to grow up selected beneficial micro-organisms top-side and then inject and nourish them with the proper nutrient regimen. This approach has been used successfully for a number of years, typically in larger field-wide projects where in situ surfactant/polymer production enable reservoir conformance control.

Project Updates – Manufacturing

Pilot plant operations began in November, 2008 following a successful four month R&D effort. This effort resulted in Ram's ability to scale up operations and successfully convert a co-mingled blend of non-hazardous beverage industry wastes into a general purpose oil recovery fluid. Product was shipped to the field on July 1st of this year.

News of Note

Legislation introduced in the 111th Congress caught our attention. Of particular note for marginal producers are H.R. 611 (Rep. Dan Boren, OK) and the Senate versions S.286 (Sen. James Inhofe, OK) – the “**Marginal Well Production Preservation and Enhancement Act.**” These bills seek to afforded marginal well producers tax relief and other advantages not now available under current codes.

The FRAC ACT H.R. 2766/ S.1215 -- **Fracturing Responsibility and Awareness of Chemicals (FRAC) Act** would close a loophole created in the Energy Policy Act of 2005 that exempted hydraulic fracturing from the Safe Drinking Water Act. The FRAC Act would also require the oil and gas industry to disclose the chemicals and proppants used in their hydraulic fracturing processes. Currently, the oil and gas industry is the only industry granted a compliance exemption from Safe Drinking Water Act.

http://www.house.gov/list/press/ny22_hinchey/morenews/060909NaturalGasFrackingBillIntro.html

Track legislative activity related to oil and gas production at: <http://www.thomas.gov>

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