

MICROBIAL ENHANCED OIL RECOVERY FIELD PILOT AT PLAWOWICE, POLAND VALIDATION OF MEOR FOR SMALLER SCALE PROJECTS THROUGH PROPER DESIGN, DEVELOPMENT, IMPLEMENTATION AND MONITORING

MEOR is typically approached by one of three methods after a candidate field is selected: 1) screen production fluids, identify beneficial microorganisms, periodically inject nutrients and/or bio-catalysts formulated to promote *in situ* metabolic activity and growth, 2) screen production fluids, identify beneficial microorganisms, grow up and inject high concentrations of selected microorganisms in one or more slugs, periodically inject nutrients and/or bio-catalysts formulated to promote *in situ* metabolic activity and growth, and 3) produce, inject and support a microbial system comprised of microorganisms with proven beneficial performance characteristics.

The Plawowice microbial enhanced water flood project demonstrates a practical application of approach number (3) at small scale in a 1-injector, 2-oil well system. This project used specific mixed cultures to scavenge oxygen while producing bio-surfactants, and establish conditions beneficial for anaerobic activity. Laboratory data established the design, development and implementation parameters and protocols. Laboratory and monitoring data suggested means to improve recovery efficiency.

Results: cumulative production has increased 42% in 18 months. Assessments show increased production rates of 60.5% and 24% in the two project wells, PI-52 and PI-159 respectively. A total of 84.5 tons of nutrient was injected during the project at a cost of \$180/ton. This is equivalent to \$2.50 per bbl of incremental oil. Moreover, calculations show a total MEOR production cost of \$11 per bbl with no problems reported. Production at Plawowice continues to increase. The project has been extended 12 months.

This MEOR approach easily lends itself to scale-up of treatment materials and staged additions of more injection / production well systems. Risk is limited by built-in go / no-go decision points at key phases of the project. Economies of scale predict that larger-scale projects will produce a greater ROI at an accelerated rate. Evidence based results from Plawowice indicate this MEOR approach can prolong the productive life of mature fields thus increasing their economic viability.

Field Work Start Date: 26 September 2011

Report Date: 31 March 2013

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