



SPE Technical Discussion Group (TDG)

(free to all participants)

Tuesday, 28 November 2017

11:30 AM – 02:00 PM

City Plaza P9 Hall A, Jl. Jend. Gatot Subroto No. 42 Jakarta

“Microbial Huff and Puff Project at Mangunjaya Field Wells:

The First in Indonesia Towards Successful MEOR Implementation”

Presenter: Tutuka Ariadji

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ABSTRACT:

This multidisciplinary paper presents results from a microbial Huff-and-Puff project with objectives: (1) to understand the mechanisms of the microbial injection through relating laboratory work results, field implementation and history-matching with reservoir simulation (2) to seek the reliability of the microbial injection based on improvement of production performance parameters.

After thorough screening work was done, detailed laboratory work on produced fluid samples from selected wells was conducted, implementation programs were designed, and a set of equipment consisting of a cultivation tank, a mobile laboratory, and other supporting facilities was installed at the field. The injection involves three stages: (1) pre-flush, cultivation solution, and post flush (2) injection of cultivation solution and post flush, and (3) injection post flush. Injection was followed by a 6-month monitoring program to measure microbe population and compositional analyses of the produced fluid samples, and production performance analysis of wells production data.

The growth of bacteria increased from 0.002×10^6 to 5×10^6 CFU / mL after 176 days in Well MJ-122. On the other hand, Well MJ-125 can reach much higher up to 500×10^6 CFU/ml after 122 days. Using the GC/MS composition analysis for semi-quantitative analysis with a standard internal reference marker ratio of Pr/Ph shows monthly biodegradation of samples after application up to about 34% at the 3rd month of monitoring. The well MJ-125 Structure Analysis of Bacteria Community resulted from Single Strand Conformation Polymorphism Method indicated that the number of OTU change during the production was relatively stable and this corresponded to their Sorensen Index values. But well MJ-122 indicated an unstable community structure. However, the interaction between microbes which were injected with indigenous microbes was not competitive.

Water-cut versus gross rate profiles show that in the well MJ-122, the water-cut drop occurs at low production rate. Whereas, in the well MJ-125, the water-cut drop occurs drastically both at low and high production rates. In the well MJ-125, the average oil rate gain is about 20%. However, both wells show peculiar production profiles by depicting a cycle of “a valley of low values”. Finally, a history matching process supports understanding of the mechanisms.

Education:

Bachelor of Science in Petroleum Engineering of ITB, Indonesia (October 1988). Master of Science in Petroleum Engineering-Texas A&M Univ., Texas-USA (May 1994). Doctor of Philosophy in Petroleum Engineering-Texas A&M Univ., Texas-USA (Dec. 1996).

Structural Position:

1. Chairman of Society of Indonesian Petroleum Engineers (IATMI) (2016-2019)
2. Vice Dean for Academic Affairs of Faculty of Mining and Petroleum Engineering, ITB (2011-2015)
3. Secretary of Graduate Program Commission of Faculty of Mining and Petroleum Engineering, ITB (2011-2015)
4. Secretary of Graduate Student Program (2009 – 2010)
5. Director of Polytechnic of Balikpapan (2006-2008)
6. Secretary of Graduate Student Program (2005 – 2006)
7. Secretary of Petroleum Engineering Department (2003-2004)
8. Head of Institution of Student Development & Welfare – ITB (2001 – 2003)
9. Assistant of Vice Rector of Academic Affair-ITB (1997 – 2001).

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