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POLYMER TREATMENT APPLICATIONS IN WATER CONTROL

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ABSTRACT

Unwanted water production in oil and gas wells is becoming an increasingly important limiting factor in controlling both the production and economic life of wells. The disposal of produced water is a significant operating cost in compliance with environmental standards and new governmental regulations.

Water problems are classified as either near-well bore or reservoir related, and may be caused by several potential sources. Several types of these are identified as: 1) bottom water, 2) bottom water coning, 3) casing and/or tubular leaks, 4) channel behind pipe, 5) highly permeable lithology streaks, 6) fluid injection out of zone, 7) interwell communication and 8) stimulation into water.

Many different techniques have been used to identify the sources of water problems and to evaluate the success of the Polymer treatment. Some methods utilized include well logs, production logs, well testing, down hole video, reservoir monitoring, production test performance, radioactive tracer surveys and field-wide reservoir simulation.

Proprietary computer programs are available to perform the large number of calculations for selecting the most appropriate conformance technique in individual fields. From these routines, the parameters are determined for polymer treatment fluid design and placement techniques.

Polymer fluids are available from a variety of water-based and hydrocarbon-based as well as ultrafine Portland cement slurry systems. These are utilized in applications for controlling water entry into the well bore.

Several types of water-based polymer systems include: 1) monomer/polymer treatments, 2) metal complexed polyacrylamides, 3) organically crosslinked polyacrylamides, 4) polymers that reduce water to oil ratios, 5) externally catalyzed silicate systems, 6) internally catalyzed silicate systems and, 7) water or hydrocarbon-based enhanced polymers in cement slurries. All of these polymer treatment systems have proved successful in oil and gas fields throughout Indonesia including onshore operations in west Irian Jaya, South and Central Sumatra and offshore applications in the Java Sea and East Kalimantan.

Polymer treatment performance has been supported by modern field service units designed to support all the required conformance technology services. Equipment utilized include computerized mixing and high pressure pumping units, process monitoring and control systems, treatment fluid filtration units and coiled tubing service units.

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