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The Role of Surfactants in Enhanced Oil Recovery

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I. INTRODUCTION

Processes that rely on the injection of surfactants or surfactant-forming materials into a reservoir form a key part of chemical flooding. Micellar-polymer, MP, and alkali-surfactant-polymer, ASP, flooding are two examples in which surfactants serve a specific purpose. In these processes, it is necessary to understand the behavior of a surfactant as it is injected into a reservoir, as it travels through that reservoir over a period of weeks or months, and as it flows out of the reservoir through a producing well. This chapter discusses the basics required for an appreciation of these processes.

The progression from MP to ASP flooding has special significance in this chapter. Micellar-polymer flooding is technically well developed, relatively well understood, and has undergone many technically successful field trials (1). However, this process is inherently expensive because of the large surfactant concentrations that must be injected into the reservoir. Alkali-surfactant-polymer flooding is a much newer technology, is more complex, and is not technically well developed. Many lessons learned from micellar-polymer flooding can be applied to the ASP process. Alkali-surfactant-polymer flooding is inherently much less expensive than the micellar-polymer process, primarily because the surfactant concentration is significantly lower. Field trials are in progress, although many details remain confidential. This technology is at the stage that the micellar-polymer process was in during the early 1970s. As more is learned, this process may come into much more widespread use.

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