

Using Saline Water for Hydraulic Fracturing: An Overview of Emerging Technology Opportunities

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Abstract

As technical approaches to oil and gas extraction mature and expand, legislation evolves to regulate new practices, and protect the local environment, which in turn spurs further technological development. In heavy oil extraction, for example, government regulations mandated higher water recycling rates, and oil sands projects pioneered technology to increase water recycle rates to between 80-95%, and have shifted make-up water sources toward using 50% or more of saline water as opposed to fresh sources. In the less mature unconventional gas extraction sector, similar provincial or federal regulations may soon mandate saline water use in hydraulic fracturing operations, which could represent major operational and environmental implications. These implications will prompt the development of new technologies and new approaches for hydraulic fracturing and the related water management practices.

Water management in unconventional gas development goes beyond water sourcing, and the use of saline water will present additional operational challenges related to transportation and storage, which represent the major cost components of water infrastructure. Transport and storage also pose a significant environmental risk due to toxicity of saline water spills. The emerging trend towards multi-stage, horizontal, slickwater fracturing in Western Canada has further reinforced these challenges and risks due to the large quantities of water required.

Adapting existing technologies from other industrial sectors will solve short - term issues; however, the market will present strong opportunities for application specific technologies to achieve the required environmental performance and operational goals of each company. By using innovative technologies and approaches that address stakeholder concerns, added benefits can be realized including the increased public perception of a company.

While an across the board mandate of saline water use in hydraulic fracturing operations is unlikely, the increased use of saline water, along with all other water sources, is expected. By examining the implications and opportunities early, companies can decrease their risk by developing operational strategies that can guide successful long-term development.