Hydraulic Fracturing

Hydraulic fracturing is a technical operation designed to improve oil and gas production. The process involves the use of high pressure and various fluids to create fractures in the source rock and to carry *proppants* – small spheroids of solid material – into these fractures to hold them open during the production operations. Hydraulic fracturing has been used since 1940. In the last 15 years, about 50% of gas wells and 35% of oil wells in the U.S. have used this technique, increasing production by 7 billion barrels of oil and 600 trillion cubic feet of natural gas. Oil and gas reservoirs with a low capacity for the flow of fluids usually require hydraulic fracturing to make them commercially viable.

A number of reservoir variables must be taken into consideration when designing a hydraulic fracturing process, including reservoir pressure, the geologic nature of the reservoir, the rock properties, and the properties of the fluids to be produced. Engineers study these and other variables to avoid fracturing the surrounding formations or creating fractures of inefficient length. The typical hydraulic fracturing fluid is water-based, contains various chemicals to create a gel, is capable of retaining the proppants, and is easily recovered upon the completion of the treatment. Some of the most common additives include bactericides, buffers, stabilizers, fluid loss additives, surfactants, and breakers.

Although hydraulic fracturing operations are customized for each well according to its reservoir properties, some fluid loss inevitably occurs during the process. Oil and gas reservoirs containing an aquifer or near groundwater deposits are usually not fractured in order to avoid water invasion, which will not only complicate the production of the oil or gas, but will introduce environmental concerns as well. On the other hand, hydraulic fracturing is often useful when oil and gas reservoirs lie between layers of shale and aquifers are not present. In the event that fractures propagate to the upper and lower limits of the target reservoir, the hydraulic fracturing operation will not affect shale formations since these are usually harder to break than sandstones.

The risk of fracturing formations with potable water was addressed in the legal case of Legal Environmental Assistance Foundation (LEAF) *v.* the Environmental Protection Agency (EPA), addressing the issue of regulating hydraulic fracturing under the Safe Drinking Water Act. On January 19, 2000, the EPA allowed the State of Alabama to regulate the fracturing program under the Underground Injection Control {UIC} Class II.

Recently, the EPA released a study concluding that the water contamination threat from hydraulic fracturing is low and further study is not needed. However, the Oil and Gas Accountability Project (headquartered in Durango, Colorado) and several Members of Congress have challenged these findings. Hence, the impacts of this widely used technique continue to be debated.

References:

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The Oil and Gas Accountability Project www.ogap.org/hydraulic_fracturing_facts.htm