

# **Characterization of Flowback of Fracturing Fluids with Upgraded Visualization of Hydraulic Fracturing Treatment & its Implications on Overall Well Performance**

---

*Khush, D., Aminzadeh, F., 2015, University of Southern California. 'Characterization of Flowback of Fracturing Fluids with Upgraded Visualization of Hydraulic Fracturing Treatment and its Implications on Overall Well Performance' accepted for oral presentation at 251st American Chemical Society National Meeting in San Diego, California.*

---

## **Abstract**

We produce only a small fraction of the fracturing fluid we inject. The physics behind the process are not completely understood. The objective of this paper is to identify and evaluate the physical parameters responsible to justify the observations. The problem is approached by visualizing the impact of creation of fractures on the reservoir with application of physics of fluid flow and rock deformation for each event in chronological order.

Fracturing fluid left behind in the reservoir is one of the causes of formation damage which minimizes the production. A calculation of decrease in incremental production due to formation damage associated with unproduced fracturing fluid is performed for a hypothetical reservoir. This calculation highlights the important parameters which determine the performance of the well post treatment. Based on the relative importance of these parameters under dynamic conditions, a methodology for better well performance predictions has been proposed and discussed in the paper.

The proposed methodology is applied to different combinations of reservoirs and fracturing fluids. The results obtained are categorized, compared, discussed and justified. Further, an attempt is made to understand chemical interactions of rock and reservoir fluids with fracturing fluids over extended time periods under reservoir conditions. Recommendations and suggestions are made for narrowing down the formation damage due to partial flowback in a qualitative as well as quantitative manner. This work has profound implications in addressing the challenges faced by the industry regarding accurate quantification of reserves for reliable economic analysis.