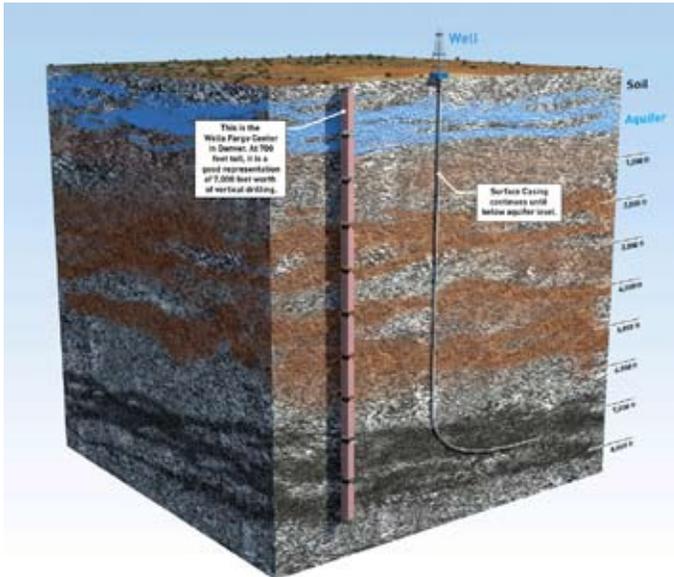




HF Fluids – Exciting Clean and Green Developments



The fluid formulation is the rocket science behind hydraulic fracturing (HF). A subtle difference in formulation can make a huge difference in the effectiveness of the fracturing treatment in releasing oil and gas resources.

The design of each HF process focuses on understanding the reservoir rock and subsurface conditions in order to design HF fluids that can optimize results. Particularly in new areas, such as the emerging shale plays, HF optimization is an exciting area of discovery, imagination, development, and ultimately increasing degrees of success.

What is particularly amazing, is that this subsurface rocket science is all happening in less than 0.5 percent of the total fluids used. 99.5% is sand and water! In addition to water, HF fluids include:

- **Proppant** – This is sand or other hard spherical material used to hold cracks open during well production life.
- **Gelling Agents** – These make the fluids thicker and slicker.
- **Cross Linkers** – These are used to react with the gelling agents to make the fluid even thicker.
- **Breakers** – These are used to thin the fluid after time and temperature to ensure production.
- **Surfactants** – These aid in HF fluid recovery and improve well production.
- **Biocides** – These control the growth of bacteria, which can impact the gelling agents.
- **Additional Additives** – These are used to address other subsurface challenges such as pH, clay control, and scaling.

Increasingly, industry stakeholders are asking operators and service companies to design and provide green fluids. But what makes a fluid green? Is the color in the eye of the beholder?

Most stakeholders will consider a fluid green if its health, safety or environmental impact is reduced compared to what has traditionally been utilized for a similar purpose. Green HF fluids are increasing under development and use in the industry.

For example, Halliburton, an oil field service provider, has developed the CleanStim fluid system which sources its additives from the food industry. A second innovation called CleanStream can eliminate the use of chemical biocides.





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“We are excited about these developments as the next phase in the evolution of HF technology,” said David Adams, vice president, Production Enhancement, Halliburton.

For its part, Pioneer Natural Resources, an exploration and production company, has its own HF laboratory in southern Colorado. Pioneer develops fluids that are formulated with products commonly found in household products.

“We heavily favor products that are environmentally friendly,” says Kevin Tanner, manager at Pioneer Natural Resources. “This is the direction that we, as a company, have decided to go, and we all believe that this choice is the right way to run our business. Our employees live in the areas where we work, and they have a vested interest in ensuring that we do everything possible to protect the environment.”

“The lab,” explains Tanner, “gives us the flexibility to optimize the chemical loadings and evaluate other products without the bias of the chemical companies that are selling to us.”

Looking forward, the use of green chemistry in HF operations is only limited by the technical compatibility of these new processes with the subsurface environment. Companies like Halliburton and Pioneer continue to invest in HF technologies that reduce the environmental footprint while increasing their effectiveness.

We are seeing evidence of this investment in action in the Niobrara play in northeast Colorado. Halliburton’s Brighton camp is one of the first camps to use Advanced Dry Polymer Blender, providing viscous HF fluids without the use of mineral oil – a meaningful environmental improvement. Stay tuned for further HF fluid developments with positive implications for the entire industry.

