

Treating and Handling Flowback Responsibly

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Although much has been said — both positive and negative — about the natural gas located in the Marcellus Shale, Pennsylvania's engineers play a vital role in natural gas exploration. With all the controversy surrounding water use and consumption, a sector of the engineering community is venturing outside the lines of providing traditional engineering and consulting services and into the realm of water reuse and treatment. With regard to the environmentally responsible handling, treatment and reuse of water — also known as flowback — used in during drilling operations, the engineer's role is just as critical.

Natural gas from the Marcellus Shale region is extracted using water in a process called hydrofracing, or fracing. The water is mixed with sand (proppant), friction reducers, biocides, recycled water, scale inhibitors, stabilizers, and other reagents. The mixture is then used to fracture the shale, allowing pockets of the fossil fuel to escape the formation and be contained in the well piping. Water coming back out of the well after the fracing operation, which contains fracing material and shale

debris, is called flowback fluid or frac water.

Handling and treating flowback are important components to natural gas drilling operations and, depending on the methods used, can dramatically increase costs and have potential negative impacts to the environment.

One method of handling flowback involves trucking the fluid to a fixed treatment facility for disposal. Trucking the flowback from the well pad site to a fixed treatment facility adds to the overall cost of the treatment operation and can add to the potential negative environmental impacts as well. With a typical fracing operation requiring from one to four million gallons of water, the number of trips needed to truck the flowback to a fixed treatment system can range from 250 to 500, depending on the size of the truck. Those trips wreak havoc on state and local roads and add to the operation's carbon footprint through increased vehicle emissions and fuel consumption.

A second method of handling flowback—a mobile treatment system—involves treating it directly on site at the well head. The system removes the constituents and recycles the treated water at the pad site for use in the next fracing operation. While one might expect



Four jars documenting the stages of flowback treatment, from chemical breaking (far left) to clear water (far right).

a mobile treatment system to be less effective at treating flowback than a fixed treatment system, the results are impressive. Using its mobile treatment system and filtration operations, Rettew Flowback, Inc., or RFI, has treated more than 150,000 bbls, (nearly 6.3 million gallons) of flowback as of January 2011 at a cost 27 percent lower than treating flowback via a fixed treatment facility. Additionally, the mobile treatment system eliminates the need for flowback to be trucked off site, reducing the potential negative environmental impacts by minimizing vehicle emissions, fuel consumption, and the potential for accidents and spills on Pennsylvania's roadways.

While many other methods for

treating flowback become available virtually every day, the above-described methods are the two most effective options for handling flowback. Although both options are effective, a mobile treatment system clearly has its advantages.

As debate between the pros and cons of drilling for natural gas in the Marcellus Shale region will no doubt continue, the majority of natural gas companies are truly mindful of the impacts that drilling for natural gas has on the environment. By using our expertise to handle and treat flowback in a cost-effective, environmentally responsible manner, engineers also play a vital role in harnessing this extraordinary source of domestic energy.

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