



Consider water resources

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Unconventional plays bring water considerations into the fold of well construction.

The Marcellus Shale is a hot topic in Western Pennsylvania. The prolific volume of estimated reserves is driving operators to the region and will likely lead to a wealth of drilling activity throughout the next five to ten years. According to McKinsey Rig Projections, in the Marcellus alone near 1,400 horizontal rigs will be operating by 2015. The bridge to this production will include millions of gallons of water used through the completions stage.

Although, according to Richard Broderick, business manager, North America, Schlumberger Water Services, “Our industry is using a very minute percentage of global water supplies.” Speaking at Hart’s Water Management Workshop on November 2, 2010, Broderick explained the problem of perception, “I have not found anywhere in North America where groundwater resources are not stressed. They are not stressed because of our activities. They were stressed when we got there.”

The important point to consider with water management is that the oil and gas industry does not have an immediate impact on global water supplies, but it can affect things locally. Many companies are looking at new ways of offsetting their water use on the front end. The primary goal for a completions team is to provide water of sufficient quantity and quality to the well site.

“When 20% to 30% of water flows back – how is water being managed to its end fate?” Broderick asked. In Texas, produced water traditionally has been placed safely into disposal wells. “That option is not available in the Marcellus,” Broderick said.

Protecting aquifers during the construction phase is also an important goal. Companies such as Range Resources already uses methods to protect environmental quality in Pennsylvania by triple-casing each well and using extra cement on completions to eliminate accidents and water supply contamination.

In areas like the Marcellus, where disposal wells are not an option, re-use is becoming a proven alternative. Cabot Oil & Gas recently completed one of the first Marcellus wells to use 100% recycled frac water. Dave Grottenthaler, General Manager, Kroff Well Services said, “There are many environmental and design issues driving the need to re-use frac water.” Potential surface discharge; surface spills and surface water contamination; and the ongoing protection of underground sources of drinking water are just a few. Through the company’s FSF (flocculation, sedimentation, and filtration) water treatment process Kroff and Superior Wells Services performed the frac job using 100% recycled water. The well ultimately produced at a greater rate

than neighboring wells in a similar geologic setting. “Clean saltwater cracks the rocks better,” Grottenthaler said. The process is daunting, but it will likely find an expanded use when drilling and completing wells in sensitive areas. “We need to end up with a near zero risk operation. We need to try to make as few mistakes as possible,” Grottenthaler added.

Companies are planning ahead to find a best practice for managing the large amounts of water that will be needed for North America’s shale gas development. The real question will be if this process is handled onsite through mobile facilities or through centrally located plants that will require additional transportation. Pipelines are not out of the question; however, most right-of-ways have been reserved strictly for midstream transport. Introducing contaminated water on its way to be processed could introduce more liability than midstream companies want to take on.

“If I get one message through to you, this is it,” Broderick said, “In 2011, we’ll be at 7,000 million barrels of water. If you could recycle 100% of water used, it will still be 5 million bbl/month.” “As long as operations are in effect, you are in a water deficit.”

Looking ahead, operators and service companies will continue to work toward sustainable, manageable water use scenarios. Well construction programs will have to ensure each site has access to ample supply of freshwater; flowback can be processed efficiently and possibly reused; and, that what remains will be disposed of safely and responsibly. While drilling and completions technology have served to open unconventional reserves, water management remains one of the main limitations for further development.