

Repurposing acid mine discharge for use in shale at a standstill

BY ANYA LITVAK

It's been at least three years since the promise of using the state's many abandoned mine discharges to frac the Marcellus Shale appeared to be an environmental panacea for two potential problems: The millions of gallons of fresh water shale operators need to get gas out of the earth and the millions of gallons of abandoned coal mine waste that leaches heavy metals into the state's streams.

But fast forward those three years and a combination of economics, legal barriers and chemical unknowns has stagnated the idea in the promise stage.

TECHNICALLY SPEAKING

Left over from the state's 200-year legacy of coal mining, there are now about 2,500 miles of streams in Pennsylvania polluted with AMD and billions more gallons of it in mine pools throughout the state.

Many are in southwestern Pennsylvania, along the footprint of the shale.

Today, AMD is treated mostly by the state, in metaphorical spoonfuls, with an annual budget of about \$19 million for reclamation projects.

The DEP is soliciting comments on a white paper on the topic, with a final version expected to be issued in early 2012.

with them if they can't guarantee results.

Vidic has spent several years testing how AMD would behave if pumped underground at high pressure. His feeling is that it would work beautifully without any additional treatment.

But Vidic has had a hard time convincing companies that the sulfates in AMD won't sour the well by producing hydrogen sulfide, or clog it by combining with the barium native in the shale.

Considering a single Marcellus well can average about \$5 million to complete, experimenting with a new formula is a costly risk.

MONEY AND THE LAW

In December, RAND Corp. hosted a conference on AMD use in frac water at the request of the Marcellus Shale Coalition, which has endorsed the possibility.

"At the end of the day, it was fairly



Katharine Fredriksen of CONSOL Energy Inc.

widely agreed in the room that there was a sufficient resource out there and it was very technically feasible to use the resource (in fracking)," said Aimee Curtright, a physical scientist who attended the conference. "But things standing in the way

still expected to be issued in early spring.

What's at issue is how the AMD can be stored and transported safely for use in fracking.

The agency is proposing three options: Keeping it in water impoundments or in site pits, both of which require the AMD to be treated to drinking water quality; or storing it in a centralized, double-lined impoundment with leak detection and monitoring. That last option means the AMD wouldn't have to be treated at all.

"Not a lot of companies are currently interested," said Rick Palmer, an oil and gas environmental group manager with the DEP. "If they have to adhere to drinking water quality, we probably won't get many takers."

It might be public relations pressure that could move the effort further along, Palmer said, the same way it forced many Pennsylvania shale operators to recycle rather than dispose of their flowback water.

To sweeten the deal, the DEP said last week that applications from drillers to use AMD will be processed within 15 days, a speedy trial.

But one of the major issues yet unresolved is the quality of water Marcellus operators are looking for, Palmer said.

"There's no generally accepted criteria for frac fluid" when it comes to AMD, said Radisav Vidic, a professor at the University of Pittsburgh's department of civil and environmental engineering. "And some people have a much more stringent criteria than the others."

Not to mention that many natural gas companies hire contractors such as Schlumberger and Halliburton to frac their wells. These firms have proprietary frac formulas and may be less willing to tinker

SOLO Energy Inc., said it makes sense to reuse acid mine water in a 'sustainable fashion.'

may be economic."

For example, the location of the AMD and its proximity to a well is a critical cost consideration.

For CONSOL Energy Inc., a coal miner and gas producer obligated to treat its acid mine water, the combination makes sense, according to Katharine Fredriksen, senior vice president for environmental strategy and regulatory affairs.

"In fact, we were the first to receive approval to do so from one of our AMD plants and have also moved forward with arrangements for a third party to use water from another plant," she said.

CONSOL treats more mine water than anyone else in the U.S., Fredriksen said — about 32 billion gallons annually.

"It only makes sense to assess the options to use that water in a sustainable fashion where the nexus of flow, location and need converge," she said.

Range Resources, the most active driller in southwestern Pennsylvania, is convinced that, technically, the concept can work.

"The issue now is liability," said Matt Pitzarella, a spokesman for Range. "If we fix the problem, so to speak, we would own the abandoned mine and all of the potential issues. Until that issue is addressed at the state level, I'm not sure this issue can go much further."

In November, Sen. Richard Kasunic, who represents parts of Fayette, Somerset, Washington and Westmoreland counties, introduced a bill that would specifically free natural gas operators who withdraw AMD from streams for the purpose of fracking from any liability for those discharges.