

EXPLORER

Setting the record straight

Gas Leaks, Revisited

By Ken Milam

Some surprising findings bubbled up in a recent study of methane geochemistry in the Appalachian Basin.

The findings could complicate the jobs of investigators trying to determine how stray methane gets into water wells.

"Our results should be of value to all O&G companies that operate in the Appalachian Basin as well as any environmental professionals that are involved in characterizing or understanding incidents of stray gas migration," said Fred Baldassare of Echelon Applied Geochemistry Consulting, lead author of the paper published in the February AAPG BULLETIN.

Previous investigators thought that methane occurring naturally in water supplies was biogenic, and if early thermogenic gas turned up, it must be the result of migration from natural gas wells.

Baldassare and his co-authors, Mark A. McCafferty of Weatherford Laboratories and AAPG member John A. Harper of the Pennsylvania Geological Survey, used what they say is the largest published geochemistry database in the Appalachian basin and found otherwise.

"This interpretation that post mature gas in the aquifer system is evidence of gas migration from the Marcellus is flawed," Baldassare said.

"Our dataset (more than 2,200 samples) reveals (that) thermogenic gas that is also post mature thermogenic and genetically similar in origin to gas that occurs in the Marcellus also occurs in formations above the Marcellus," Baldassare said, "including the Hamilton Group, Tully Limestone and Genesee Shale."

Most of the data used for the study that was first revealed in the AAPG BULLETIN was collected during the drilling process for 234 Marcellus gas wells throughout a five-county study area.

The sampling protocol, Baldassare said, "was developed to define the different gas types that occur in the stratigraphy in the vertical section of the well and in the Marcellus Formation."

Mischaracterized Research?

To Baldassare and his co-authors, a stray gas migration incident in 2009 in Dimock, Pa., ostensibly was ground zero for stray gas migration incidents associated with the shale gas industry.

"The incident was often misreported by the media, and further mischaracterized by research that, in my view, was rushed to publication," Baldassare said.

"Since then, the O&G industry has been under the microscope," he added. "It has been reported by a small group of researchers based on a small dataset (less than 160 samples) that gas from the Marcellus (post mature thermogenic in origin) has been found in the aquifer system in some of the areas where stray gas incidents have occurred.

"The implication of an allegation that gas from the Marcellus has contaminated the aquifer system is that the process of hydraulic fracturing is the mechanism responsible for the stray gas migration," he added.

Baldassare said investigations must be site-specific, and that the new findings "should only be used as a general guide.



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"We go to great lengths to advise the reader that proper interpretation of gas geochemistry is fundamentally important to the investigation," he said, "however, other site specific data is necessary to conclude the source(s) of stray gas."

Nonetheless, "Our results should be of value to all O&G companies that operate in the Appalachian Basin as well as any environmental professionals that are involved in characterizing or understanding incidents of stray gas migration," he said.

"They represent a proven approach that should be useful to define pre-existing conditions in basins around the world."

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