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Fracking Forensics – Why Getting the Science Right Can Dictate the Verdict

Roger G. Hanshaw, Associate
Bowles Rice LLP

Roger Hanshaw is an attorney in the Charleston, West Virginia office of Bowes Rice and focuses his practice in environmental law, energy law and commercial law.

Mr. Hanshaw is a certified professional parliamentarian. He regularly counsels government bodies and nonprofit organizations throughout the state and nation on meeting procedures, parliamentary law, bylaws construction and convention management. He also is a certified magistrate court mediator and a member of the West Virginia Farm Bureau's board of directors.

Prior to joining Bowles Rice, Mr. Hanshaw worked as director of research at West Virginia University Extension Services and as special assistant to the commissioner for scientific affairs and acting director of laboratory services for the West Virginia Department of Agriculture.

Mr. Hanshaw earned his bachelor of science degree in biochemistry from West Virginia University in 2002, where he was a recipient of the Dennis O'Brien Award, annually awarded to the top graduate of the WVU Honors Program. Mr. Hanshaw received his PhD in chemistry from the University of Notre Dame in 2006.

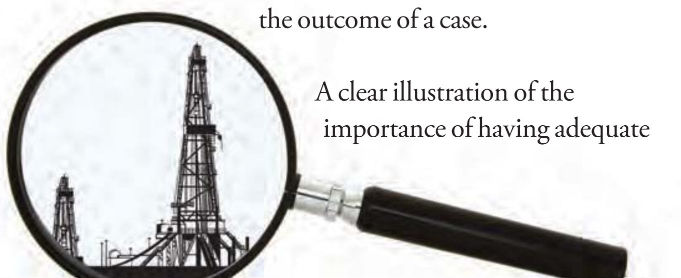
He earned his law degree from the West Virginia University College of Law in 2012.

Given the volume of drilling and hydraulic fracturing throughout Appalachia to recover oil and gas from the Marcellus and Utica shales, it is not surprising that allegations of environmental contamination are beginning to surface with increasing frequency.

Environmental cases present interesting and challenging problems when they make it to a courtroom. Too often, lawyers, energy companies and others involved in the oil and gas industry wait until an allegation of groundwater contamination occurs before consulting those with the proper expertise in using scientific information in the face of a potential claim. An understanding of contemporary environmental forensic techniques and a small upfront investment in proper data collection, before drilling or fracking operations begin, can translate to huge savings later, if an allegation of contamination arises.

Allegations of groundwater contamination are different from most other environmental claims. Unlike an alleged discharge into a creek or stream, an alleged groundwater contamination event may occur thousands of feet below the surface. There will be no photos of leaking trucks or faulty casings, and there can be no testimony from witnesses who saw what happened. Proving or defending a claim for groundwater contamination by drilling and fracking requires data – and having the right data can determine the outcome of a case.

A clear illustration of the importance of having adequate data comes from a Pennsylvania statute, which creates a rebuttable presumption that any contamination of a water supply within 1,000 feet of a newly drilled oil or gas well is attributed to the drilling and completion process. Such statutes are arising in oil and gas producing states across the country, and where the statutes have been adopted, they force operators to be diligent in documenting baseline water quality prior to commencing activity. The key to properly rebutting an alleged contamination, however, is making sure that the baseline water quality survey, performed prior to drilling and completion, contains the proper parameters and is more than a simple perfunctory homeowner-type analysis.



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What makes the allegations of water contamination by drilling and fracking activities particularly problematic is that the alleged contaminant is usually something found both naturally in and around aquifers, and in fracking fluids. Brine and other salts are typical examples. If an operator wanted to protect itself from allegations that its drilling or fracking fluid contaminated a water supply, the baseline water quality testing must do more than just report concentrations of the various ions present pre-drilling. The baseline data must allow an operator to establish that the salts (or other alleged contaminants) originated

from a source other than the operator's drilling or fracking fluids. That can be a near-impossible feat unless the proper analyses are done prior to the drilling and fracking activity.

A typical water analysis provides data on a fairly standard battery of tests, including nitrates, turbidity, pH, hardness, conductivity, and fecal coliform colony forming units, to name a few. The problem with such a standard battery of tests is that none of these data create a true chemical fingerprint for the sampled water prior to drilling or fracking.

One analysis that can add the additional definition needed to create a true chemical fingerprint is an isotopic ratio profile for salts (or more correctly, ions) that occur in each of the materials that can potentially become co-mingled in a drilling and fracking operation, the water source, the drilling or fracking fluids, and the salts and substances found in the target formations. For example, the metal element strontium has two common isotopes in nature, Sr-86 and Sr-87. The ratio of these two isotopes to each other, however, varies depending on where in nature a sample is taken. A groundwater source that provides potable water would be expected to have a different 86Sr/87Sr ratio than produced water from a Marcellus or Utica well.

By determining a true chemical fingerprint for a water formation prior to drilling or fracking activities and the chemical fingerprint of the same element in a target formation and the drilling and fracking fluids, an operator has scientific, mathematical evidence to suggest the extent, if any, to which drilling or fracking fluids contributed to an alleged impact on a water source. There are many kinds of chemical fingerprints, and operators should seek appropriate guidance before choosing a specific target for fingerprinting in a particular formation.

With new technology comes new challenges, and the developments in oil and gas recovery from shale formations are no different. Operators and professional service providers serving the oil and natural gas industry must be prepared to properly defend themselves against the challenges that will accompany these new activities, and that preparation involves becoming familiar with new techniques to prove or disprove allegations. Chemical forensics must not be overlooked as we seek to bring visibility to processes that take place thousands of feet below the surface. V