

Accepted Manuscript



Organic geochemistry and toxicology of a stream impacted by unconventional oil and gas wastewater disposal operations

William Orem, Matthew Varonka, Lynn Crosby, Karl Haase, Keith Loftin, Michelle Hladik, Denise M. Akob, Calin Tatu, Adam Mumford, Jeanne Jaeschke, Anne Bates, Tiffani Schell, Isabelle Cozzarelli

PII: S0883-2927(16)30344-4

DOI: [10.1016/j.apgeochem.2017.02.016](https://doi.org/10.1016/j.apgeochem.2017.02.016)

Reference: AG 3833

To appear in: *Applied Geochemistry*

Received Date: 27 September 2016

Revised Date: 26 February 2017

Accepted Date: 27 February 2017

Please cite this article as: Orem, W., Varonka, M., Crosby, L., Haase, K., Loftin, K., Hladik, M., Akob, D.M., Tatu, C., Mumford, A., Jaeschke, J., Bates, A., Schell, T., Cozzarelli, I., Organic geochemistry and toxicology of a stream impacted by unconventional oil and gas wastewater disposal operations, *Applied Geochemistry* (2017), doi: 10.1016/j.apgeochem.2017.02.016.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Organic Geochemistry and Toxicology of a Stream Impacted by Unconventional Oil and Gas Wastewater Disposal Operations

William Orem^{1*}, Matthew Varonka¹, Lynn Crosby^{1,5†}, Karl Haase¹, Keith Loftin², Michelle Hladik³, Denise M. Akob¹, Calin Tatu⁴, Adam Mumford¹, Jeanne Jaeschke¹, Anne Bates¹, Tiffani Schell¹, and Isabelle Cozzarelli¹

¹U.S. Geological Survey, Reston, VA

²U.S. Geological Survey, Lawrence, KS

³U.S. Geological Survey, Sacramento, CA

⁴University of Pharmacy and Medicine Victor Babes, Timisoara, Romania

⁵Current Address: Food and Drug Administration, White Oak, MD

*Corresponding Author: Dr. William H. Orem, U.S. Geological Survey, 12201 Sunrise Valley Drive, MS956, Reston, VA 20192, USA, borem@usgs.gov, 703-648-6273

Keywords: unconventional oil and gas production; Marcellus Shale; hydraulic fracturing; produced water; wastewater disposal; class II injection well; organic substances; toxicology

†Although this author is a FDA/CTP employee, this work was not done as part her official duties. This publication/presentation reflects the views of the author and should not be construed to reflect the FDA/CTP's views or policies.

Abstract

The large volume of wastewater produced during unconventional oil and gas (UOG) extraction is a significant challenge for the energy industry and of environmental concern, as the risks due to leaks, spills, and migration of these fluids into natural waters are unknown. UOG wastewater is often hypersaline, and contains myriad organic and inorganic substances added for production purposes and derived from the source rock or formation water. In this study, we examined the organic composition and toxicology of water and sediments in a stream adjacent to an underground injection disposal facility that handles UOG wastewaters. We sampled water and streambed sediments from an unnamed tributary of Wolf Creek upstream from the disposal facility, near the injection well, and downstream. Two sites downstream from the disposal facility contained organic compounds in both water and sediments that were consistent with a source from UOG wastewater. These compounds included: 2-(2-butoxyethoxy)-ethanol, tris(1-chloro-2-propyl)phosphate, α , α -dimethyl-benzenemethanol, 3-ethyl-4-methyl-1H-pyrrole-

Download English Version:

<https://daneshyari.com/en/article/5752589>

Download Persian Version:

<https://daneshyari.com/article/5752589>

[Daneshyari.com](https://daneshyari.com)