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EPA's Study of Potential Impacts of Hydraulic Fracturing on Drinking Water Resources:

Wastewater Source Apportionment Project

In 2010, the US Congress recognized growing public concern about drinking water in areas with hydraulic fracturing (HF) activity. In response to these concerns, Congress requested that EPA conduct a study examining the potential relationship between HF and drinking water resources.

EPA's *Study of Potential Impacts of Hydraulic Fracturing on Drinking Water Resources* will provide new information and help to answer questions for decision makers at local, state, tribal and federal levels.

What is the research?

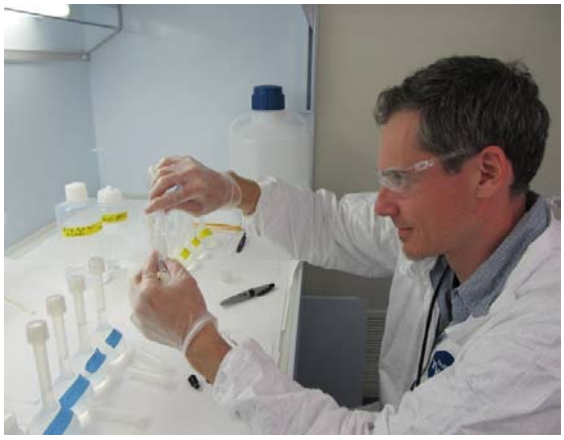
The HF Wastewater Source Apportionment Project is a component of EPA's study of the potential impact of HF on drinking water resources. The goal of the project is to evaluate the relationship, if any, between disposal of treated HF wastewater and river pollution. More specifically, the study has been designed to assess the potential impacts of HF on river systems that serve as sources for public drinking water systems.

The HF process uses large amounts of water mixed with chemical additives to enhance the production of oil and gas from underground reservoirs. After fracturing, the fluid that returns to the surface can be referred to as either "flowback" or "produced water," and may contain both HF fluid and natural formation water. For this study, EPA considers "flowback" to be the fluid returned to the surface after HF has occurred, but before the well is placed into production. The flowback and produced water are collectively referred to as "HF wastewaters" in this study. In addition to the chemicals used during fracturing, these wastewaters may contain salts, crustal elements and radioactivity. The wastewaters are typically stored on-site in tanks or pits before being transported for treatment, disposal, land application, and/or discharge. In some cases, flowback and produced waters are treated to enable the recycling of these fluids for reuse in other HF operations.

Concerns have been raised that the discharge of treated HF wastewater to rivers may be contributing to increased levels of pollutants, including salts or brines, in rivers. However, there are other potential sources of these materials, including acid mine drainage, storm water runoff from road de-icing materials, and discharges from power plants, among others. This research aims to characterize the relative impacts of HF wastewater river discharges and other possible sources of pollutants observed at downstream public drinking water plants.

How will the research be conducted?

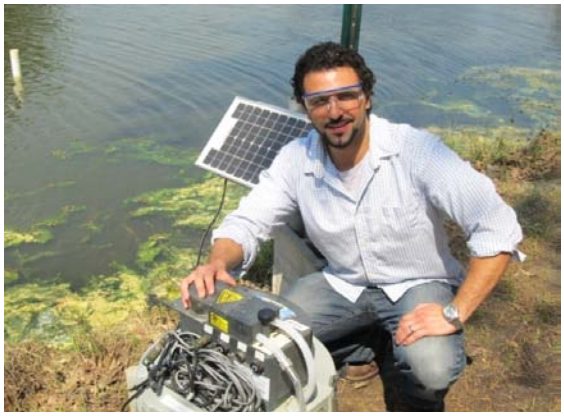
In the spring, summer and fall of 2012, EPA scientists, in collaboration with Pennsylvania's Department of Environmental Protection, will collect wastewater samples in two river systems in Pennsylvania. Samples will be collected from wastewater treatment plant outlets where they discharge into rivers, and from downstream river locations where public drinking water plants draw in water. Samples will also be collected from the major sources of wastewaters discharged into the EPA study areas.



Daily water samples will be drawn from up to ten locations using automated collection systems.

The photograph below illustrates the Isco automated sampling system, which will be used in this project.

The samples will be analyzed for major ions, trace elements, and trace metal isotopes by scientists from EPA and the U.S. Geological Survey.



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Researchers will use mathematical models to compare "fingerprints" of the chemicals with the river data they collect in order to quantify which sources contribute to increased contaminant levels.

This project is designed to help answer critical scientific questions, including:

- Which sources are contributing to elevated levels of constituents in rivers at intakes to drinking water treatment plants?
- What is the relative amount of material associated with HF wastewater found at intakes to drinking water treatment plants?
- What is the seasonal and daily variability of levels of constituents from HF wastewaters?

How will the research benefit the community?

Study results will help decision makers, including federal, state, and local governments, industry, non-governmental organizations and the public, better understand whether there are any potential impacts from HF on drinking water resources, such as rivers used for drinking water supplies.

Results from this work will be published in a final draft report expected to be released for public comment and peer review in 2014. For more information about EPA's hydraulic fracturing research, see www.epa.gov/hfstudy.

REFERENCES:

http://www.epa.gov/hfstudy/

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