



## Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs; National Study Final Report

### Summary

EPA has published a final report summarizing a study to evaluate the potential threat to underground sources of drinking water (USDWs) from the injection of hydraulic fracturing fluids into coalbed methane (CBM) production wells. As in its August 2002 draft report, EPA has concluded that additional or further study is not warranted at this time. In making this decision, EPA reviewed more than 200 peer-reviewed publications, other research, and public comments. The Agency has concluded that the injection of hydraulic fracturing fluids into CBM wells poses minimal threat to USDWs.

In its review of incidents of drinking water well contamination believed to be associated with hydraulic fracturing, EPA found no confirmed cases that are linked to fracturing fluid injection into CBM wells or subsequent underground movement of fracturing fluids. Further, although thousands of CBM wells are fractured annually, EPA did not find confirmed evidence that drinking water wells have been contaminated by hydraulic fracturing fluid injection into CBM wells. Where fluids are injected, EPA believes that groundwater production, combined with mitigating effects of dilution and dispersion, adsorption, and biodegradation, minimize the possibility that chemicals included in fracturing fluids would adversely affect USDWs.

In the course of conducting the study, EPA found that diesel fuel, which may pose some environmental concerns, was sometimes used in fluids for hydraulic fracturing within USDWs. To address any environmental concerns, EPA worked with the three service companies that perform 95% of the hydraulic fracturing projects in the U.S. to voluntarily remove diesel fuel from CBM fracturing fluids injected into USDWs. The three companies agreed and signed a Memorandum of Agreement (MOA) to that effect in December 2003.

### Background

Coalbed methane is a gas contained in varying quantities within all coal. Hydraulic fracturing of production wells is technology that has been used for more than 50 years in conventional oil and gas production to enhance recovery by enlarging fractures through which oil and gas, including CBM, can be drawn to a well and pumped to the surface. Water-based fluids have become the predominant type of CBM fracturing fluids; although fluids can also be based on oil, methanol, or a combination of water and methanol. After fluids are injected to expand fractures within a coal seam, large quantities of ground water and some of the injecting fracturing fluids are pumped out of the well to facilitate the production of CBM. Additional technical information on the practice of hydraulic fracturing can be found in the final report.

In 1997, in *LEAF v. EPA*, the Eleventh Circuit Court ruled that, because hydraulic fracturing of coalbeds to produce methane gas is a form of underground injection, Alabama's EPA-approved underground injection control (UIC) program must effectively regulate this practice. In response to the Eleventh Circuit's decision, citizen complaints, and Congressional interest, EPA made the determination to investigate the potential for hydraulic fracturing of CBM wells to contaminate USDWs.

In addition to reviewing more than 200 peer-reviewed publications, EPA also interviewed 50 employees from state or local government agencies and communicated with approximately 40 citizens who were concerned that CBM production impacted their drinking water wells. EPA made a draft of the report available for a 60-day public comment period in August 2002. Comments received from more than 100 commentors, including private citizens, environmental and citizen groups, government agencies, oil and gas companies, and trade associations, have been summarized in a Response to Comments document that is available on the EPA website.

### **For More Information**

The final report and a Response to Comments document can be found on the EPA website at <http://www.epa.gov/safewater/uic/cbmstudy.html>. The Memorandum of Agreement to remove diesel fuel from hydraulic fracturing fluids and general information about the UIC program are available at <http://www.epa.gov/safewater/uic.html>.

### **Environmental and Public Health Benefits**

This notice does not impose any new regulations, information collection, or record-keeping burden on the public or other entities. The publication of the final report will not change the environmental or public health benefits of the UIC program.