

# **PROPOSED COALBED METHANE STUDY DESIGN**

*An Investigation to Determine the Risks to Underground Sources of Drinking Water Associated with the Hydraulic Fracturing of Coalbeds for Methane Gas Recovery*

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# **Study Design for Evaluation of Risk to Ground Water from Hydraulic Fracturing of Coalbeds for Methane Production**

The Environmental Protection Agency (EPA) will conduct a study of the environmental risks associated with hydraulic fracturing. The study will focus first on hydraulic fracturing of coalbeds for enhancing methane production. EPA may later study a wider universe of hydraulic fracturing if information collected during this study indicates further investigation is warranted.

EPA is initiating this study because we have received reports from citizens of contamination of their ground water-supplied drinking water wells, and ground water loss which they believe to be the result of nearby hydraulic fracturing of coalbed methane(CBM) gas production wells.

EPA intends to evaluate the potential and actual (as defined by incident rates) risks associated with this type of hydraulic fracturing. EPA will also survey existing State regulations and investigate industry practices to determine if the current regulatory structure (if present) is sufficient to protect against environmental damage that could result from hydraulic fracturing of coalbeds.

## **Background**

Prior to 1997, EPA's understanding of its authority under the SDWA concerning the regulation of hydraulic fracturing was that the Agency believed that such a production well stimulation process did not fall under the UIC program's purview. This understanding was held by EPA during the promulgation of UIC regulations in the early 1980s. But in 1994, the Legal Environmental Assistance Foundation (LEAF) - a Florida based environmental interest organization - challenged that interpretation by petitioning EPA to withdraw Alabama's EPA-approved Section 1425 (SDWA) UIC program. LEAF, prompted by its membership, believed the State should regulate hydraulic fracturing for coalbed methane development as underground injection because they alleged a case of drinking water well contamination in Alabama. This case was investigated and findings from State and Federal agencies determined that nearby CBM production was not at issue. Therefore, EPA denied LEAF's petition a few years later.

However, LEAF litigated and in August 1997, the 11<sup>th</sup> Circuit Court of Appeals ruled that hydraulic fracturing of coalbeds for methane gas recovery in Alabama should be regulated under the SDWA as an underground injection (LEAF v. EPA, 118F. 3d 1467). After appeals by EPA were denied by the Court, the LEAF petition was remanded to EPA and a schedule was established for the Agency to either withdraw the program or require the State to regulate CBM hydraulic fracturing accordingly. The State chose to modify its UIC program, and in December 1999, EPA approved this revision and published a final rule doing so in the Federal Register (January 2000).

But, during the 11<sup>th</sup> Circuit Court's deliberations, EPA received several verbal phone calls and written correspondence from other environmental interest groups, who also alleged that practices associated with methane gas production from coalbeds had resulted in contamination and/or loss of water from underground drinking water well sources. Because of these communications, and because the frequency of coalbed methane development is rapidly escalating, EPA determined it would be in the public interest to evaluate the risks to underground sources of drinking water associated with hydraulic fracturing. Congressional, State, and industry interest in this issue has grown significantly, and public opinion on the practice of coalbed methane gas production has polarized various interest groups. EPA believes that the proper action it must take would first involve an appropriate level of data and information collection regarding this issue, in order to make further decisions concerning the potential regulation of hydraulic fracturing.

## **Study Design**

EPA will conduct the study in three parts: (1) investigation of incidents; (2) evaluation of potential risk based on the geology of the areas likely to be developed for coalbed methane, best available technology for planning and conducting fracturing jobs, and common industry practices; and (3) survey of existing regulations and legislation. A more detailed discussion of these parts of the study follows.

### **(1) Incidents:**

The current study will estimate contamination and water loss incidents associated with hydraulic fracturing through interviews with State and local agencies responsible for drinking water protection, citizens, and industries performing hydraulic fracturing.

- # Survey public health agencies in charge of drinking water quality in States where hydraulic fracturing is practiced frequently. This survey will serve as a follow-up to the Ground Water Protection Council's 1998 survey of State Oil and Gas Boards to determine if public health agencies are aware of incidents of water contamination or loss.
- # Conduct interviews with citizens and/or public health officials. During these interviews, EPA will attempt to collect information which may help link a physical mechanism to an alleged incident.
- # Request list and descriptions of incidents from industry. EPA believes individuals working in the industry are likely to have information on water contamination and/or loss incidents that may have occurred due to hydraulic fracturing, since one line of recourse for resolving problems is to contact the producing company.
- # Secure and review O&G records of reported incidents. EPA will request that State Oil and Gas Boards allow us to review records on any incidents we believe have not been resolved.

EPA intends to rely on field tests performed as part of other studies such as those performed in the San Juan Basin and the Alabama Black Warrior Basin. Depending on the findings from our investigation, EPA may perform field tests to research the association between fracturing and incidents of water contamination and/or loss.

## **(2) Potential Risks:**

EPA will perform a literature review of fracturing technology and geology in areas developed for methane production and conduct site visits to gather information on hydraulic fracturing practices. We will assimilate information to evaluate the potential risks posed by hydraulic fracturing of coalbeds in areas likely to be developed for methane gas production.

- # Literature review of fracturing technology. The literature review will include technical aspects of fracturing theory, modeling, mechanics, fluid composition, and chemical interactions likely to result after fluid leakoff.
- # Literature review of instrumentation technology. The current available technologies for measuring fracture areas and the strengths and limitations of the technologies will be characterized. EPA will review any fracturing records that are offered by industry.
- # Literature review of geology and hydrogeology. The literature review will include the geology and hydrogeology for each region of the country with methane reserves. Specifically, we will identify:
  - the locations within the U.S.
  - underlying geology and hydrogeology
  - current and future water usage
  - underground sources of drinking water (USDW)
  - water quality data
  - coalbed methane well location strategies
  - water well locations
  - population
- # Site visits. EPA will attempt to visit sites during hydraulic fracturing events and interview individuals who are or have been involved in hydraulic fracturing work. These site visits and interviews are intended to characterize field practices for implementing hydraulic fracturing.

### **(3) Regulations and Legislation:**

State and local regulations. EPA will survey States to collect what regulations pertaining to coalbed methane development are in place. EPA will review and summarize the regulations. This current study will identify and characterize the risks underground sources of drinking water associated with hydraulic fracturing of coalbeds for methane production.

## **Report**

EPA will produce a report presenting all the data collected during the study, methods of data analysis, methods of risk characterization and our conclusions regarding the risks associated with hydraulic fracturing of coalbeds for methane production.

This study will evaluate hydraulic fracturing of coalbeds, however, EPA will also consider experiences with hydraulic fracturing associated with other types of production. EPA may later study a wider universe of hydraulic fracturing if information collected during this study indicates further investigation is warranted.

## **Schedule**

EPA's timeline for completing the study is shown below.

<u>Timeframe</u>	<u>Event</u>
August 2000	Stakeholder comments on EPA's study
Fall 2000	Site visits
Fall 2000	Survey to public health agencies responsible for groundwater protection
Fall 2000	Review SDWA documents
Fall 2000 to Winter 2001	Collect and analyze information offered by industry
Winter 2001	Survey State agencies for State and local regulations
Fall 2000 to Spring 2001	Literature reviews
Spring 2001	Review existing studies, characterize risks
Summer 2001	Prepare Report
Fall 2001	Draft report available for comment
Winter 2002	Final report