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BUILDING A SCIENTIFIC FOUNDATION FOR SOUND ENVIRONMENTAL DECISIONS

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

At the request of the U.S. Congress, EPA is conducting a research study on the potential impact of hydraulic fracturing for oil and gas on drinking water resources. Natural gas plays a key role in our nation's clean energy future and the process known as hydraulic fracturing is one way of accessing that vital resource. There are concerns that hydraulic fracturing may impact ground water and surface water quality in ways that threaten human health and the environment. EPA believes a transparent, research-driven approach with significant stakeholder involvement can address concerns about hydraulic fracturing and strengthen our clean energy future.

The Need for a Study

- Recent advances in drilling technologies have made access to vast reserves of natural gas and oil economically possible in the U.S.
- As a result, hydraulic fracturing has increased in some regions and it occurs in a wider variety geologic formations.
- These changes have led to an increased public awareness of the potential for hydraulic fracturing to impact drinking water resources.

Developing a Study Plan (Complete)

EPA developed a study plan on hydraulic fracturing that was reviewed by the agency's Science Advisory Board (SAB) and subject to extensive stakeholder and public comment. The study plan, finalized in November 2011, outlines five fundamental questions associated with the hydraulic fracturing water cycle:

- 1) **Water Acquisition:** What are the possible impacts of large volume water withdrawals from ground and surface waters on drinking water resources?
- 2) **Chemical Mixing:** What are the possible impacts of surface spills on or near well pads of hydraulic fracturing fluids on drinking water resources?
- 3) **Well Injection:** What are the possible impacts of the injection and fracturing process on drinking water resources?
- 4) **Flowback and Produced Water:** What are the possible impacts of surface spills on or near well pads of flowback and produced water on drinking water resources?
- 5) **Wastewater Treatment and Waste Disposal:** What are the possible impacts of inadequate treatment of hydraulic fracturing wastewaters on drinking water resources?

Conducting Cutting-Edge Research (Ongoing)

EPA is using five distinct research approaches for determining whether hydraulic fracturing can impact drinking water resources:

- 1) **Analysis of existing data** on hydraulic fracturing from industry, state and federal agencies, academia and other sources.
- 2) **Laboratory studies** to provide data from experiments conducted in a controlled environment.
- 3) **Scenario evaluations** using sophisticated computer modeling to generate information about realistic hydraulic fracturing scenarios.
- 4) **Toxicological assessments** to summarize existing data on human health effects of chemicals currently known to be used in hydraulic fracturing.
- 5) **Case studies** from real-world sites across the US.

In November 2012, EPA asked stakeholders to submit relevant data and scientific literature to ensure that EPA is up-to-date on evolving industry practices and technologies. The submission period closed in April 2013 and EPA continues to seek and accept additional information to assure that we understand the latest developments in hydraulic fracturing practices.

Peer Review Activities

In March 2013, EPA's Scientific Advisory Board (SAB) formed an ad hoc panel of independent experts who provide periodic advice and review of EPA's hydraulic fracturing research, starting with a review of the progress report and concluding with a review of the draft assessment report.

In addition to the SAB peer review, the study's individual research projects will be peer reviewed as each is completed. Most projects will result in articles submitted to journals and will be subject to the journal's peer review process. The results of some projects will be provided in EPA reports that will undergo contractor-led letter reviews by external technical experts. Papers are posted on the EPA's study website at www.epa.gov/hfstudy as they are published.

Stakeholder Engagement (Ongoing)

EPA is committed to stakeholder engagement and has undertaken an approach that will:

- Increase technical engagement with the stakeholder community to ensure that EPA has ongoing access to a broad range of expertise and data from outside the Agency.
- Improve public understanding of the goals and design of the study.
- Ensure that EPA is current on changes in industry practices and technologies so the assessment report reflects an up-to-date picture of hydraulic fracturing operations.
- Obtain timely and constructive feedback on research projects undertaken as part of the study.
- Subject the draft assessment report and research products supporting the report to meaningful and timely peer review.

Building on an already robust program of stakeholder engagement, EPA has taken several steps to ensure the study has access to as much relevant data as possible while providing continued opportunities for stakeholder engagement:

- Periodic technical workshops and roundtables with invited subject-matter experts.
- Federal Register Notice requesting public input.
- Frequent study updates through the study website, webinars, email listserv, and informal outreach opportunities.
- A public comment period for the study's progress report, published in December 2012, which outlines the progress to date on each research project and preliminary study data.

EPA has Designated the Assessment Report as a Highly Influential Scientific Assessment (HISA)

As a highly influential scientific assessment, the report and its underlying data will receive meaningful and timely peer review in accordance with EPA's peer review handbook.

Draft Assessment Report

In spring 2015, EPA will release the draft assessment report for public comment and peer review. The report will synthesize the Agency's ongoing research activities, a broad literature review, and information submitted by stakeholders. The report will identify and assess the potential for hydraulic fracturing for oil and gas to impact the quality or quantity of drinking water resources, and identify factors that may affect the severity and frequency of potential impacts. The overall purpose of the report is to:

- Contribute to the understanding of potential impacts of hydraulic fracturing on drinking water resources.
- Inform and promote dialogue among federal, tribal, state, and local government entities, industry, non-governmental organizations, and other stakeholders.
- Identify knowledge gaps and information needs.

For more information, please visit: www.epa.gov/hfstudy