

Analysis of Hydraulic Fracturing Fluid Data from the FracFocus Chemical Disclosure Registry 1.0

Overview of the EPA's *Study of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources*

The EPA is conducting an assessment of the potential impacts of oil and gas hydraulic fracturing activities on the quality and quantity of drinking water resources in the United States. Expected in spring 2015, it will provide much needed information to states, industry, and most importantly our communities, to safeguard our water resources and protect public health.

The EPA's assessment is based upon extensive review of literature, results from EPA research projects, and technical input from state, industry, non-governmental organizations, the public, and other stakeholders. Ultimately, it will help advance the state of our science and provide a new lens to help our states and communities understand the potential impacts on our drinking water resources from hydraulic fracturing. Part of this effort includes analyzing data from the FracFocus Chemical Disclosure Registry 1.0 to better understand the chemicals and water used to hydraulically fracture oil and gas production wells in the United States.

Background

FracFocus is a publicly accessible website (www.fracfocus.org) managed by the Ground Water Protection Council (GWPC) and the Interstate Oil and Gas Compact Commission (IOGCC). Oil and gas production well operators can disclose information at this website about ingredients and water used in hydraulic fracturing fluids at individual wells. The GWPC and IOGCC provided the EPA with over 39,000 PDF disclosures submitted by well operators to FracFocus 1.0 before March 1, 2013. The disclosures identified 20 states with reported well locations that were hydraulically fractured during the study period. Data in the disclosures were extracted from individual PDF files and compiled in a project database, which was used to conduct analyses on chemical and water use for hydraulic fracturing. Analyses were conducted on over 38,000 unique disclosures for wells hydraulically fractured between January 1, 2011, and February 28, 2013. The *Analysis of Hydraulic Fracturing Fluid Data from the FracFocus Chemical Disclosure Registry 1.0* summarizes chemical and water use data and looks at how chemical and water use vary in different locations across the United States.

In addition to the *Analysis of Hydraulic Fracturing Fluid Data from the FracFocus Chemical Disclosure Registry 1.0*, the EPA is releasing the project database developed from FracFocus 1.0 disclosures, Microsoft Excel spreadsheets with the datasets that were used in the analysis, user guides, and state-level summaries for the well locations represented in FracFocus 1.0 for the period of study. The accompanying *Data Management and Quality Assessment Report* describes the structure of the database, data fields, and the quality assessment of the data. The database and the *Data Management and Quality Assessment Report* can be used to better understand the EPA's methods or to perform additional data analyses.

State Summaries

The EPA is releasing state-level summaries of the chemicals and water used for hydraulic fracturing in the 20 states represented during the time of this study. The state-level summaries and a User's Guide that describes the information available in the summaries are available at www2.epa.gov/hfstudy/published-scientific-papers. The information found in the state summaries

reflects data found in the FracFocus 1.0 disclosures and information from publicly available sources. Neither the states nor GWPC verified the data shown in the summaries. The information and figures presented in the state summaries may differ from information held by the states.) The 20 states are:

Alabama	Michigan	Pennsylvania
Alaska	Mississippi	Texas
Arkansas	Montana	Utah
California	New Mexico	Virginia
Colorado	North Dakota	West Virginia
Kansas	Ohio	Wyoming
Louisiana	Oklahoma	

Results

Hydraulic fracturing fluids were generally found to contain 88% (by mass) water, 10% quartz used as proppant, and <1% additive ingredients. 698 unique ingredients (i.e., chemicals) were reported by 428 operators in 20 states. The median number of additive ingredients per disclosure was 14. Hydrochloric acid, methanol, and hydrotreated light petroleum distillates were reported in more than 65% of all disclosures analyzed. Seventy percent of the disclosures analyzed included at least one ingredient that was claimed to be confidential business information (CBI), and 11% of the ingredient records were identified as CBI.

In more than 93% of the disclosures, water was used as the base fluid, with reported volumes ranging from 30,000 to 7.2 million gallons per disclosure. Information related to water sources was reported in 29% of the disclosures. Some of these terms indicate a condition of water quality, such as “fresh,” rather than a specific identification of the source of the water such as ground water or surface water. The most commonly reported source of water used for base fluid was listed as “fresh” (68% of disclosures with water source information).

Study Limitations

Despite the challenge of adapting a dataset originally created for local use and single-PDF viewing to answer broader questions, the project database provided substantial insight into water and chemical use for hydraulic fracturing. All data that met the project’s quality assurance criteria were included in the analyses. The project database represents the data reported to FracFocus 1.0 rather than all hydraulic fracturing that occurred in the United States during the study time period. The project database is an incomplete picture of all hydraulic fracturing due to the voluntary reporting in some states for certain time periods (in the absence of state reporting requirements), the omission of information on CBI ingredients from disclosures, and invalid or erroneous information created during the development of the database or found in the original disclosures. The development of FracFocus 2.0, which became the exclusive reporting mechanism in June 2013, was intended to increase the quality, completeness, and consistency of data submitted by operators by providing dropdown menus, warning and errors messages during submission, and automatic formatting of certain fields. GWPC has announced additional changes and upgrades for FracFocus 3.0 to enhance data searchability, increase system security, provide greater data accuracy, and further increase data transparency.

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

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