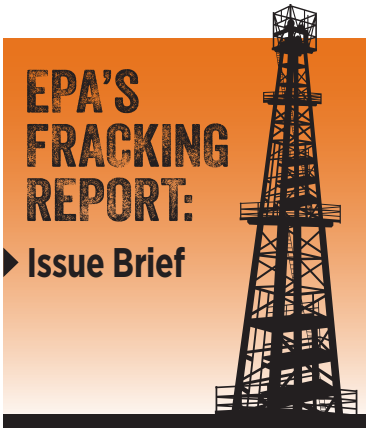
CLEAN WATER ACTION
CLEAN WATER FUND



Issue Brief:

EPA Hydraulic Fracturing and Drinking Water Assessment

What is the Assessment?

Rising concerns over the increase in oil and gas extraction and its impact on public health and the environment compelled Congress to direct EPA, in 2010, to conduct a nationwide study of the impacts of hydraulic fracturing, largely unknown at the time.

The study was to "assess the potential impacts of hydraulic fracturing on drinking water resources and to identify the driving factors that affect the severity and frequency of any impacts."[1]

EPA confined the scope of its research to the hydraulic fracturing water lifecycle. This included the acquisition of water needed to fracture a well, mixing the chemicals, well injection, flowback water, and the management and disposal of the wastewater that returns to the surface.

A water impoundment at a drill pad in the Fayetteville Shale gas play of Arkansas. Photo Credit: Bill Cunningham, USGS.

Over the course of five years, EPA held numerous public meetings, issued a study plan and a progress report and released the more than 900-page draft Assessment in June 2015.

What did the Assessment find?

The draft Assessment is EPA's synthesis of existing research on hydraulic fracturing activities along with limited original research involving retrospective case studies of documented water contamination events.

The draft Assessment reveals that every stage of the hydraulic fracturing water lifecycle is vulnerable to water contamination. These vulnerabilities led to actual impacts in many parts of the study. The potential for future water quality impacts is startling based on the number of people and sources of drinking water near oil and gas development.

- 9.4 million people live within 1 mile of a hydraulically fractured well
- 25,000–30,000 wells were fractured between 2011–2014[2]
- 6,800 sources of drinking water for Public Water Systems were within one mile of a hydraulically fractured well
  - > These sources provide drinking water to 8.6 million people year-round[3]
- 3.6 million people who rely on private water systems live in counties with hydraulically fractured wells[4]

Water Acquisition

The impacts of water withdrawals for hydraulic fracturing can be severe at the local level. Hydraulic fracturing operations typically use more than a million gallons of water per well. In certain counties the water used for hydraulic fracturing was 30% to 50% of *total use.* The impacts are more acute in drier western regions experiencing a large amount of oil and gas activity with low water availability.

Chemical Mixing

EPA identified 1,075 chemicals used in hydraulic fracturing fluids. The Agency also found up to 18,000 pounds of chemicals were injected per fractured well. Despite this volume, information critical to understanding public health impacts from chemical exposure were not available for the majority of chemicals, "representing a significant gap for hazard identification."[5]

Companies claiming chemicals as confidential business information severely hampered EPA's ability to assess potential threats to drinking water. Seventy percent of well data reviewed had at least one chemical claimed as confidential and not reported.[6]

Well Injection

Two years of data from nine service companies revealed at least three percent of hydraulically fractured wells did not have a layer of cement across a critical section of the well meant to protect a source of groundwater. These well design or construction oversights can and have led to impacts to drinking water.

Additionally, not all hydraulic fracturing occurs at depths far below an underground source of drinking water as commonly believed. Twenty percent of wells with corresponding data are at depths deemed shallow. A smaller amount of wells inject fracturing fluids directly into formations that also include drinking water, "which directly affects the quality of that water."[7]

Improperly plugged and abandoned wells pose an even greater threat to drinking water, and many of their locations are unknown. The draft Assessment also confirms there are multiple subsurface pathways in which fluids or gas could migrate into water resources over time.

Flowback, Produced Water & Wastewater Management and Disposal

The wastewater disposal stage of the hydraulic fracturing water lifecycle threatens drinking water quality.

Fracking fluid and other drilling wastes are dumped into an unlined pit located right up against the Petroleum Highway in Kern County, California. Photo Credit: Faces of Fracking, CC BY-NC-ND 2.0.

Over 2 billion gallons of wastewater are created each year as water flows back to the surface after hydraulic fracturing is complete. This water is laced with fracture fluid chemicals, high salt contents, heavy metals and radioactive material from deep underground. The water is generally kept in open pits or impoundments, sent to water treatment plants, injected underground or reused in subsequent fracturing events. Wastewater disposal poses multiple threats to water quality via:

Drill rig at a Marcellus Shale site. Photo Credit: Ken Skipper, USGS

- Storing wastewater in unlined pits or impoundments
- Discharging to surface waters after waste is treated at plants with inadequate treatment technology
- Illegal discharges, accidental leaks and spills from trucks or storage tanks
- Chemicals accumulating in sediments in surface water
- Migrating from poorly constructed, plugged or abandoned underground injection wells
- Improperly disposing of drill cuttings, drilling muds and concentrated treatment residuals

Political Spin in the Executive Summary and Media Reports Misrepresenting Actual Findings

Despite the abundance of vulnerabilities, impacts and significant data gaps described in each chapter, the top line message in the draft Assessment's Executive Summary read:

> *"We did not find evidence that these mechanisms have led to widespread, systemic impacts on drinking water resources in the United States.* Of the potential mechanisms identified in this report, we found specific instances where one or more mechanisms led to impacts on drinking water resources, including contamination of drinking water wells. *The number of identified cases, however, was small compared to the number of hydraulically fractured wells."*[8]

These three sentences led to a flood of misleading media coverage which disregarded the findings of the report. Headlines across the country read:

> "EPA Fracking Study: Drilling Wins" — *Forbes*
>
> "Fracking Doesn't Pollute Drinking Water, EPA says" — *Newsweek*
>
> "EPA: Fracking doesn't harm drinking water" — *Washington Times*
>
> "EPA review clears fracking" — *The Dominion Post*
>
> "The EPA Fracking Miracle" — *Wall Street Journal*

The Executive Summary does not faithfully summarize the results of the study. The statement, "We did not find evidence that these mechanisms have led to widespread, systemic impacts on drinking water resources in the United States" misrepresents the level of certainty with which EPA can identify impacts on drinking water.

This is misleading for anyone who does not read the full findings of the draft Assessment. The report outlines vulnerabilities in every stage of the water lifecycle, but importantly places greater emphasis on EPA's inability to determine with any certainty the frequency of impacts due to a lack of available data. There are dozens of instances in the draft Assessment where EPA reveals a lack of available data, which could lead to undervaluing threats to drinking water.
[See Widespread Uncertainty]

Science Advisory Board Panel Agrees Revisions Needed

The Science Advisory Board Hydraulic Fracturing Research Advisory Panel is a group of 30 interdisciplinary scientists from industry and academia, tasked with reviewing the draft Assessment chapter-by-chapter. The Panel agreed that the messaging in the Executive Summary is not supported by the underlying data of the report. Almost all preliminary comments from the experts agree that EPA's assertion that the impacts to drinking water are not "widespread, systemic" must be changed. *[See In Their Words]*

What's Next?

The Panel is developing an official report to EPA with recommendations for improving the study. If their preliminary comments and public discussion is any indication, the report could recommend EPA revise the Executive Summary to more faithfully convey the findings of the report. This would walk back the conclusions that made national news and were taken out of context by policymakers as fact and used as a way to negate the very real impacts of oil and gas development.

Will EPA listen?

In order to avoid having the Assessment's findings misunderstood or intentionally misconstrued, the high level conclusions must be supported by the underlying data. EPA must revise the Major Findings and Conclusions section of the Executive Summary to make it clear that EPA cannot say with any certainty how widespread or systemic the impacts of hydraulic fracturing are without further analysis, access to more data and defining "widespread" and "systemic."

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1 U.S. EPA. "Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources." November 2015 at IX.
2 U.S. EPA. "EPA's Full Draft Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources." June 4, 2015 at ES-5.
3 *Id.* 3-12.
4 *Id.* 3-12.
5 *Id.* ES-12.
6 *Id.* 5-15.
7 *Id.* ES-14
8 *Id.* ES-6