

Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources: Overview for Roundtable Meetings

U.S. Environmental Protection Agency Office of Research and Development November 2012







Webinar Outline

- Context for roundtable meetings
- Logistics and what to expect at the roundtable meetings
- Background and organization of EPA study
- Questions?

Technical Stakeholder Engagement for EPA's Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources

Technical Roundtables November 14

> Water Acquisition

Chemical Mixing

November 15

Well Injection

Flowback & Produced Water

November 16

Wastewater
Treatment &
Waste
Disposal

Report out on Technical Roundtables 2012 Webinar: Week of December 17, Release of 2012 Progress Report

Technical Workshops

Discuss specific technical topics identified by Roundtables.
Each Roundtable may identify 1-2 technical topics for further

eb. 6* Workshop #1 Follow-up webinar

Feb. 27* Workshop #2 Follow-up webinar

Apr. 3* Workshop #3 Follow-up webinar

Apr. 24* Workshop #4 Follow-up webin

Continue as needed..

SAB Meeting

Public face-toface meeting of the SAB Hydraulic Fracturing Advisory Panel. They will conduct a review of the 2012 Progress Report.

March 2013

Technical Roundtables

Reconvene in Summer/Fall of 2013. This provides continuity of stakeholder input.

Report of Results

Present and discuss EPA's scientific research approach and progress.

* Estimated dates subject to change.

Peer Review Ongoing



EVENT	DATE	PURPOSE
Webinar	10/31	Introduce roundtable participants to the HF study and the roundtable meetings
Five Roundtables: each focusing on a stage of the water cycle	11/14 - 11/16	EPA to present information regarding the work underway on the HF water study. Seek a broad and balanced range of expertise and data from stakeholders Nominate topics for technical workshops
Technical Workshops	TBD	Technical experts from a cross-section of stakeholder groups discuss topics stemming from the roundtable discussions



Roundtable Logistics

Roundtable	Date and Time
Water Acquisition	Wednesday, November 14 8:00 am – 12:00 pm
Chemical Mixing	Wednesday, November 14 1:30 pm – 5:30 pm
Well Injection	Thursday, November 15 8:00 am – 12:00 pm
Flowback and Produced Water	Thursday, November 15 1:30 pm – 5:30 pm
Wastewater Treatment	Friday, November 16 8:00 am - 1:00 pm



Roundtable Meetings

- EPA will present more detailed information regarding the work underway
- Discussion will help to ensure that EPA has access to a broad and balanced range of expertise and data
- Participants may nominate specific topics for technical workshops



Roundtable Agenda

8:00 am or 1:30 pm Welcome and Purpose of Meeting

Robert Sussman, Senior Policy Counsel

8:10 am or 1:40pm Introductions (all participants led by facilitator)

» Name and Affiliation

» Ground Rules

8:25 am or 1:55 pm EPA's Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources

Ramona Trovato, Associate Assistant Administrator, Office of Research and

Development

8:35 am or 2:05 pm ORD Presentation on EPA's Research Related to Water Cycle Stage

9:20 am or 2:50 pm Break

9:30 am or 3:00 pm Discussion and Identification of Specific Technical Topics for Possible Follow-on Workshop

(Roundtable participants and EPA, facilitated)

Questions to stimulate discussion

11:50 am or 5:20 pm Closing

Glenn Paulson, Science Advisor

12:00 pm or 5:30 pm Adjourn



During the Meeting

- Meeting is not a FACA
 - Primary purpose is exchange of information/facts
 - Seeking individual opinions, not consensus advice
 - No voting or recommendations from the group as a whole
- In-person meeting
- No substitutes



After the Meeting

- EPA will host a webinar for the public to inform them of the content and results of the roundtable meeting
- Materials shared at the meeting will be posted on EPA's website
- EPA will identify and set up workshops on key topics



Schedule

2012

- Stakeholder Roundtable Meeting
- Federal Register notice to solicit data and published papers
- Progress Report
- Stakeholder Webinars

2013

- Technical Workshops
- SAB review of Progress Report
- Follow up Stakeholder Roundtable meeting

2014

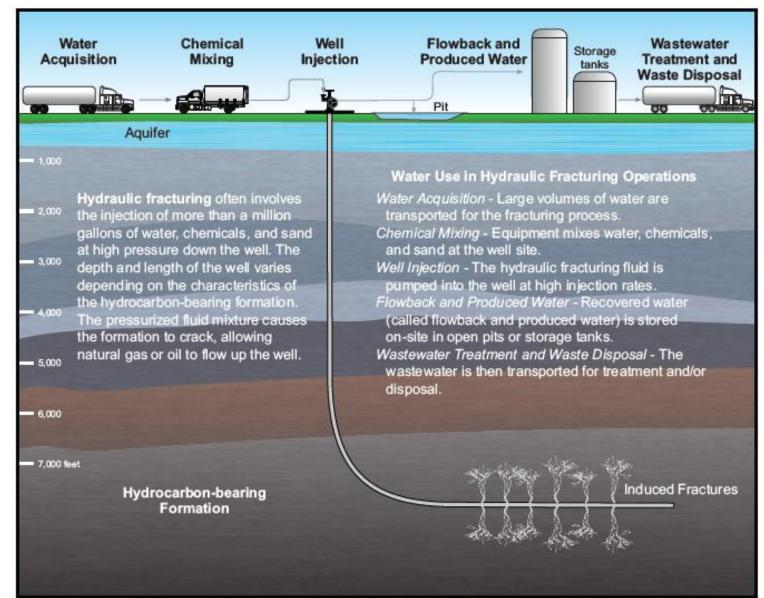
Draft Report of Results



Information in Preparation for Roundtable Meetings



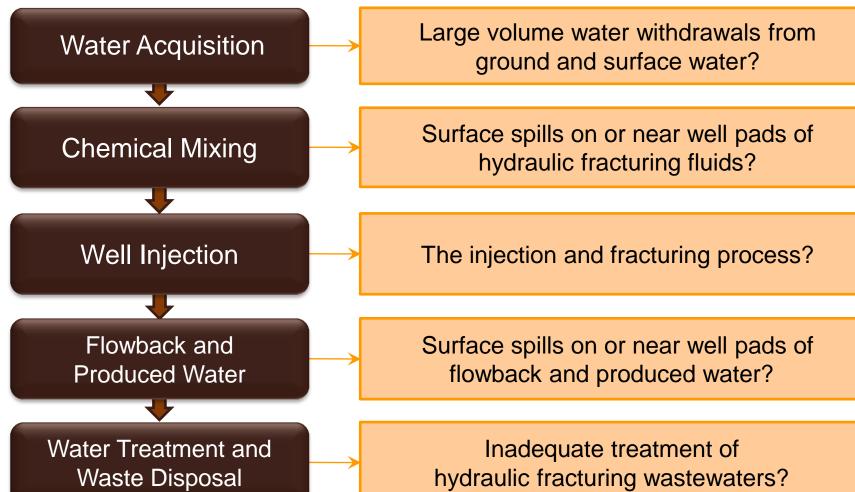
Water Cycle





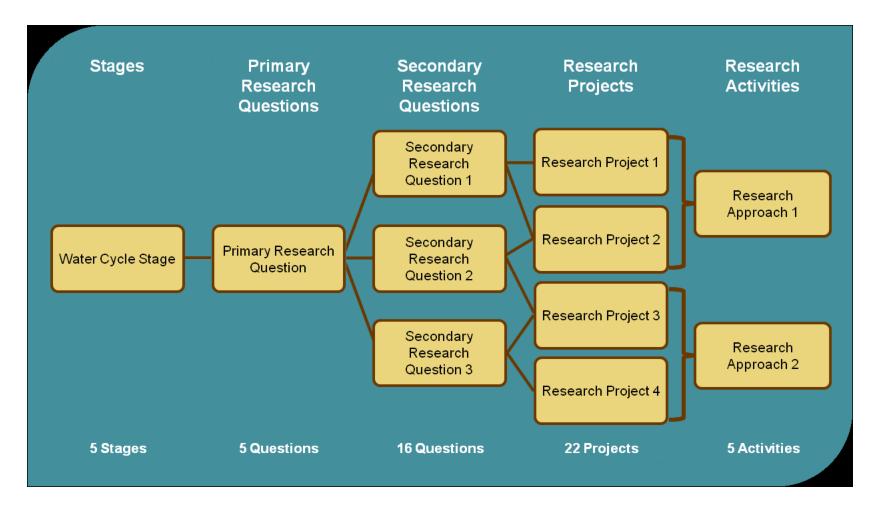
Research Questions

What are the potential impacts on drinking water resources of:



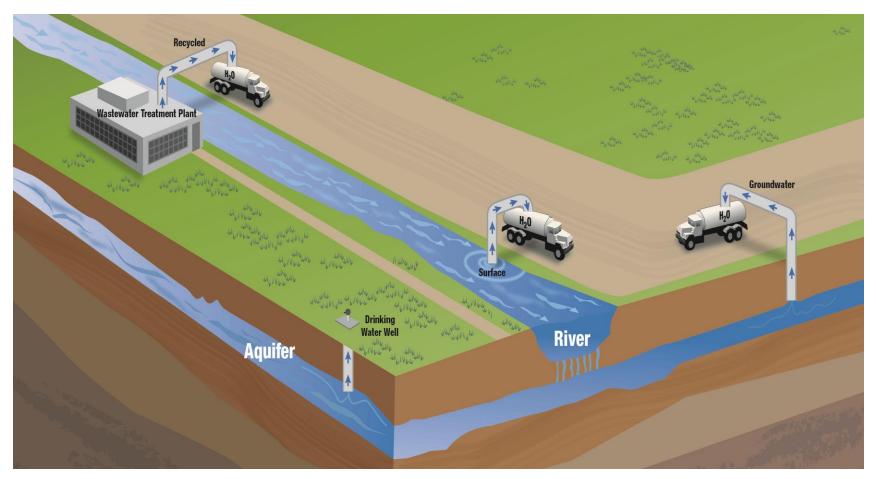


Roundtable Meetings





Water Acquisition



What are the potential impacts of large volume water withdrawals from ground and surface waters on drinking water resources?



Water Acquisition

What are the possible impacts of surface spills on or near well pads of hydraulic fracturing fluids on drinking water resources?

SECONDARY RESEARCH QUESTIONS

RESEARCH PROJECTS

How much water is used in hydraulic fracturing operations, and what are the sources of this water?

How might water withdrawals affect shortand long-term water availability in an area with hydraulic fracturing activity?

What are the possible impacts of water withdrawals for hydraulic fracturing operations on local water quality?

Analysis of Existing Data

Literature Review

Service Company Analysis

Well File Review

FracFocus Analysis

Water Availability Modeling



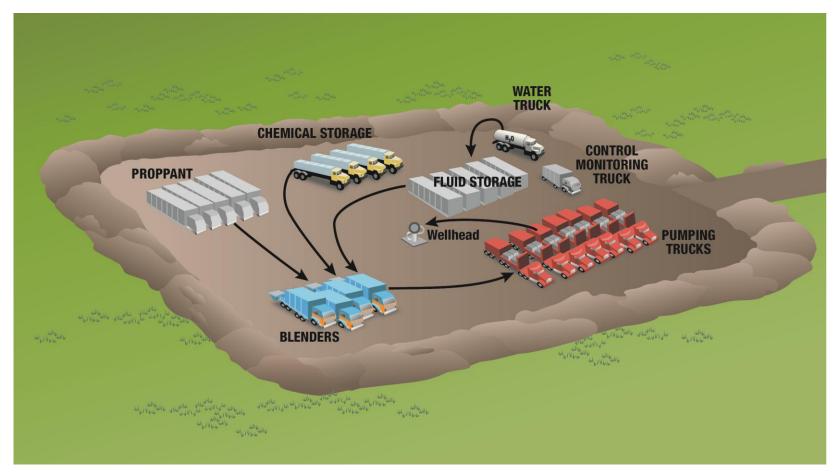


Toxicity Assessment





Chemical Mixing



What are the possible impacts of surface spills on or near well pads of hydraulic fracturing fluids on drinking water resources?



Chemical Mixing

What are the possible impacts of surface spills on or near well pads of hydraulic fracturing fluids on drinking water resources?

SECONDARY RESEARCH QUESTIONS

What is currently known about the frequency, severity, and causes of spills of hydraulic fracturing fluids and additives?

What are the identities and volumes of chemicals used in hydraulic fracturing fluids, and how might this composition vary at a given site and across the country?

What are the chemical, physical, and toxicological properties of hydraulic fracturing chemical additives?

If spills occur, how might hydraulic fracturing chemical additives contaminate drinking water resources?

RESEARCH PROJECTS

Literature Review

Spills Database Analysis

Service Company Analysis

Well File Review

FracFocus Analysis

Analytical Method Development

Toxicity Assessment

Retrospective Case Studies

Analysis of Existing Data





Toxicity Assessment

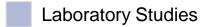




Chemical Mixing

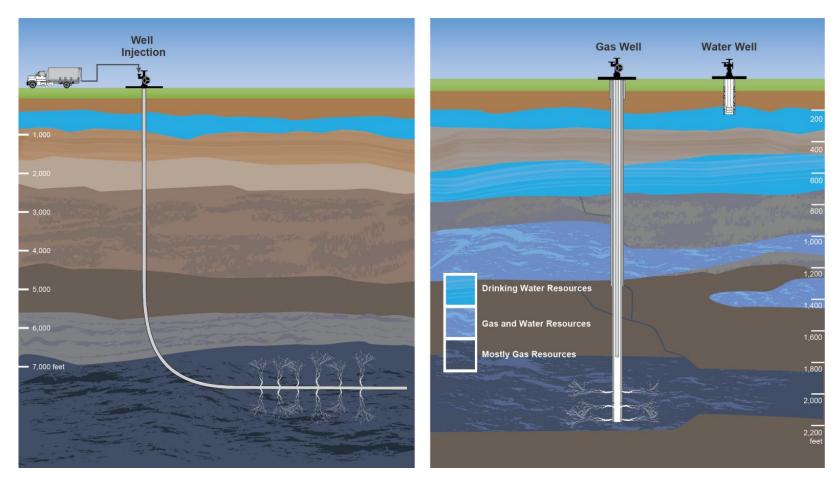
What are the possible impacts of surface spills on or near well pads of hydraulic fracturing fluids and wastewater on drinking water resources?

SECONDARY RESEARCH QUESTIONS RESEARCH PROJECTS Literature Review Service Company Analysis What is the composition of hydraulic Well File Review fracturing fluids and wastewater? FracFocus Analysis What are the chemical, physical, and **Analytical Method** toxicological properties of these chemicals? Development **Toxicity Assessment**





Well Injection



What are the possible impacts of the injection and fracturing process on drinking water resources?



Well Injection

What are the possible impacts of surface spills on or near well pads of hydraulic fracturing fluids on drinking water resources?

SECONDARY RESEARCH QUESTIONS

RESEARCH PROJECTS

What is currently known about the frequency, severity, and causes of spills of hydraulic fracturing fluids and additives?

What are the identities and volumes of chemicals used in hydraulic fracturing fluids, and how might this composition vary at a given site and across the country?

Analysis of Existing Data

Literature Review

Service Company Analysis

Well File Review

Subsurface Migration Modeling

Retrospective Case Studies



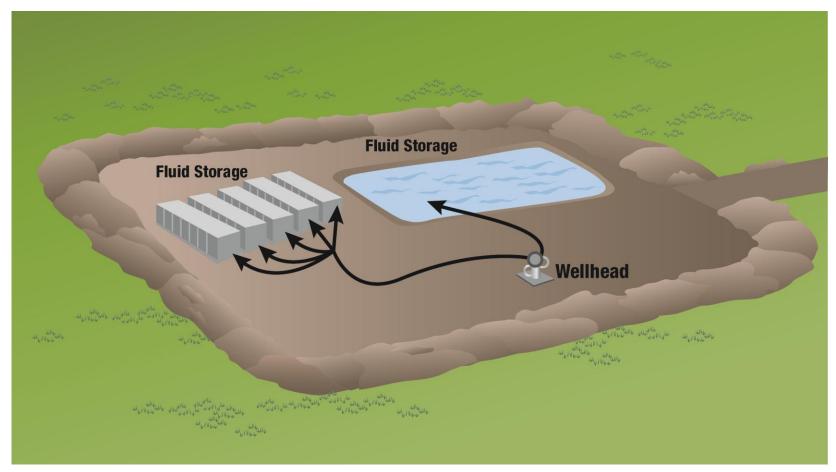


Toxicity Assessment





Flowback & Produced Water



What are the possible impacts of surface spills on or near well pads of flowback and produced water on drinking water resources?



Flowback & Produced Water

What are the possible impacts of surface spills on or near well pads of hydraulic fracturing fluids on drinking water resources?

SECONDARY RESEARCH QUESTIONS

RESEARCH PROJECTS

What is currently known about the frequency, severity, and causes of spills of flowback and produced water?

What is the composition of hydraulic fracturing wastewaters, and what factors might influence this composition?

What are the chemical, physical, and toxicological properties of hydraulic fracturing wastewater constituents?

If spills occur, how might hydraulic fracturing wastewaters contaminate drinking water resources?

Literature Review

Spills Database Analysis

Service Company Analysis

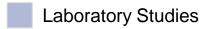
Well File Review

Analytical Method Development

Toxicity Assessment

Retrospective Case Studies

Analysis of Existing Data





Toxicity Assessment







Flowback & Produced Water

What are the possible impacts of surface spills on or near well pads of hydraulic fracturing fluids and wastewater on drinking water resources?

SECONDARY RESEARCH QUESTIONS

RESEARCH PROJECTS

What is currently known about the frequency, severity, and causes of spills of hydraulic fracturing fluids and wastewater?

Spills Database Analysis

Service Company Analysis

If spills occur, how might hydraulic fracturing fluids and wastewater contaminate drinking water resources?

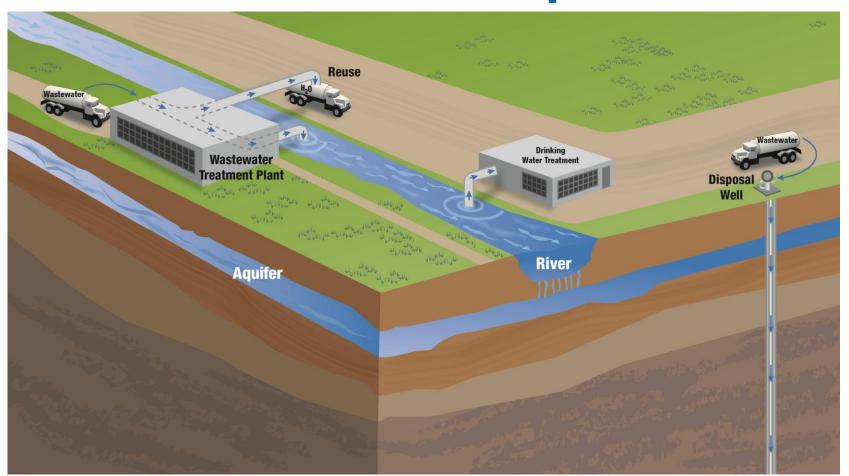
Well File Review

Retrospective Case Studies



United States Environmental Protection Agency

Wastewater Treatment and Waste Disposal



What are the possible impacts of inadequate treatment of hydraulic fracturing wastewaters on drinking water resources?

United States Environmental Protection Agency

Wastewater Treatment and Waste Disposal

What are the possible impacts of surface spills on or near well pads of hydraulic fracturing fluids on drinking water resources?

SECONDARY RESEARCH QUESTIONS

RESEARCH PROJECTS

What are the common treatment and disposal methods for hydraulic fracturing wastewaters, and where are these methods practice?

How effective are conventional POTWs and commercial treatment systems in removing organic and inorganic contaminants of concern in hydraulic fracturing wastewaters?

What are the potential impacts from surface water disposal of treated hydraulic fracturing wastewater on drinking water treatment facilities?

Literature Review

Well File Review

FracFocus Analysis

Surface Water Modeling

Wastewater Treatability
Studies

Source Apportionment Studies

Br-DBP Precursor Studies







Toxicity Assessment







Questions?



For More Information

www.epa.gov/hfstudy

Contact Lisa Matthews

Matthews.lisa@epa.gov



Background Information



Purpose of EPA's Study

 To assess whether hydraulic fracturing can impact drinking water resources

 To identify driving factors that affect the severity and frequency of any impacts

EPA's study plan focuses on the water cycle in hydraulic fracturing.



EPA is committed to using:

- ✓ Best available science
- ✓ Transparent, peer-reviewed process
- ✓ Quality assurance principles
- ✓ Independent sources of information
- ✓ Consultation with others



Science Advisory Board Peer Review

- SAB found study plan to be "appropriate and comprehensive"
- Response to SAB recommendations:
 - Core research questions and general approach are unchanged
 - More focused research questions
 - More detail about how questions will be addressed



Overview of Research Projects

- Analysis of Existing Data
- Scenario Evaluations
- Laboratory Studies
- Toxicity Assessments
- Case Studies



Analysis of Existing Data

Project	Description
Literature Review	Review and assessment of existing papers and reports, focusing on peer-reviewed literature
Spills Database Analysis	Analysis of selected federal and state databases for information on spills of hydraulic fracturing fluids and wastewaters
Service Company Analysis	Analysis of data and information provided by nine hydraulic fracturing service companies in response to a September 2010 information request on hydraulic fracturing operations
Well File Review	Analysis of data and information provided by nine oil and gas operators in response to an August 2011 information request for 350 well files
FracFocus Analysis	Analysis of data compiled from FracFocus



Scenario Evaluations

Project	Description
Subsurface Migration Modeling	Numerical modeling of five subsurface fluid migration scenarios that explore the potential for fluids to move from the fractured zone to drinking water aquifers
Surface Water Modeling	Modeling of concentrations of selected chemicals at public water supplies located downstream from wastewater treatment facilities discharging treated hydraulic fracturing wastewater to surface waters
Water Availability Modeling	Assessment and modeling of current and future scenarios exploring the impact of water usage for hydraulic fracturing on drinking water availability in the Upper Colorado River Basin and the Susquehanna River Basin



Laboratory Studies

Project	Description
Source Apportionment Studies	Identification and quantification of the source of high bromide and chloride concentrations at public water supply intakes downstream from wastewater treatment facilities
Wastewater Treatability Studies	Assessment of the efficacy of common wastewater treatment processes on removing selected chemicals found in hydraulic fracturing wastewater
Br-DBP Precursor Studies	Assessment of the ability of bromide and brominated compounds present in hydraulic fracturing wastewater to form brominated disinfection byproducts (Br-DBPs) during drinking water treatment processes
Analytical Method Development	Development of analytical methods for selected analytes found in hydraulic fracturing fluids or wastewater



Toxicity Assessments

Project	Description
Toxicity Assessment	Toxicity assessment of chemicals used in hydraulic fracturing fluids or found in hydraulic fracturing wastewater



Case Studies

Project	Description
Prospective Studies	Investigation of potential impacts of hydraulic fracturing through collection of samples from a site before, during and after well pad construction and hydraulic fracturing
Retrospective Studies	Investigations of whether reported drinking water impacts may be associated with or caused by hydraulic fracturing activities