Fracking in California

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Hydraulic Fracturing – An Overview and EPA Region 9 Perspective

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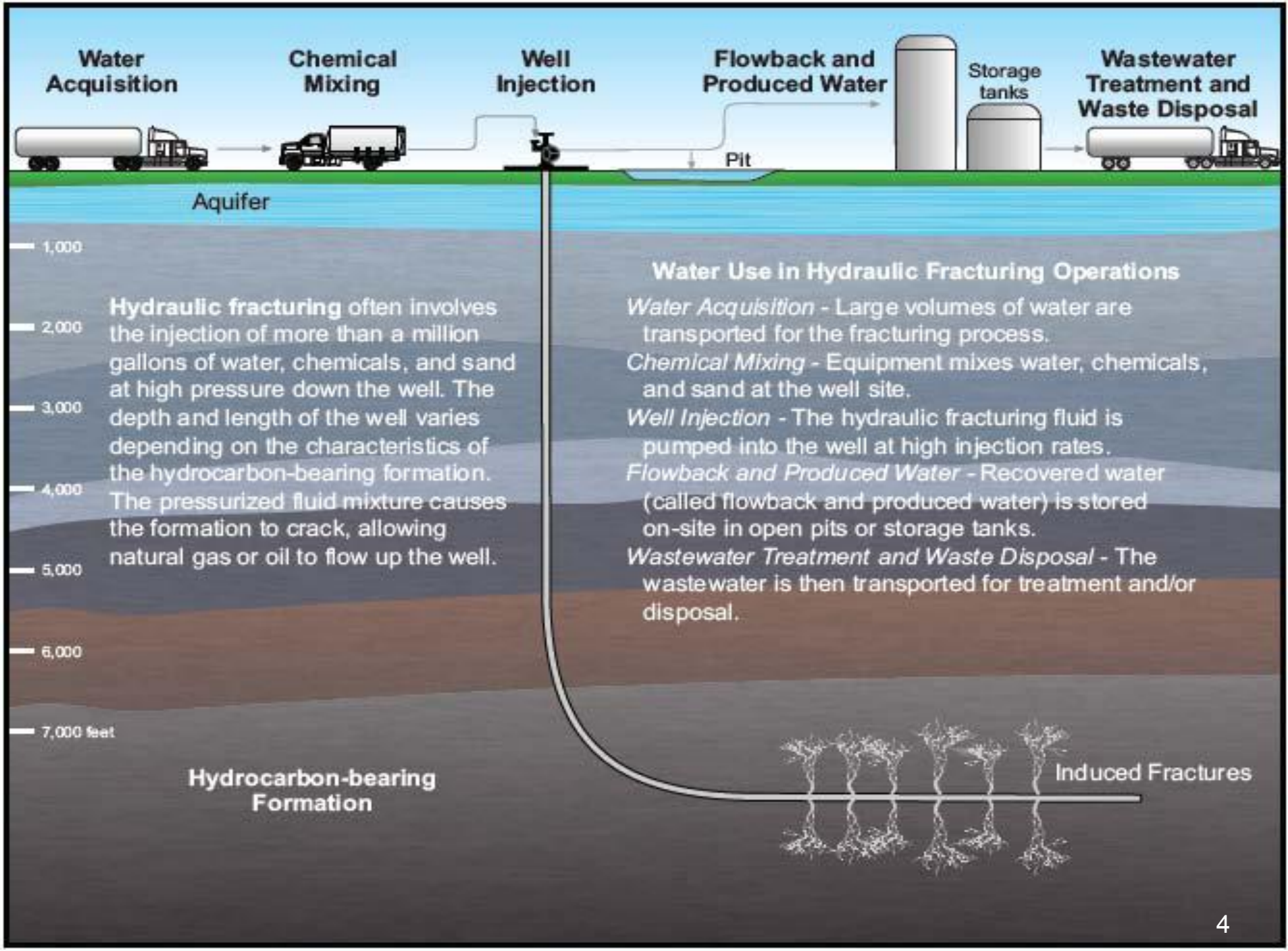
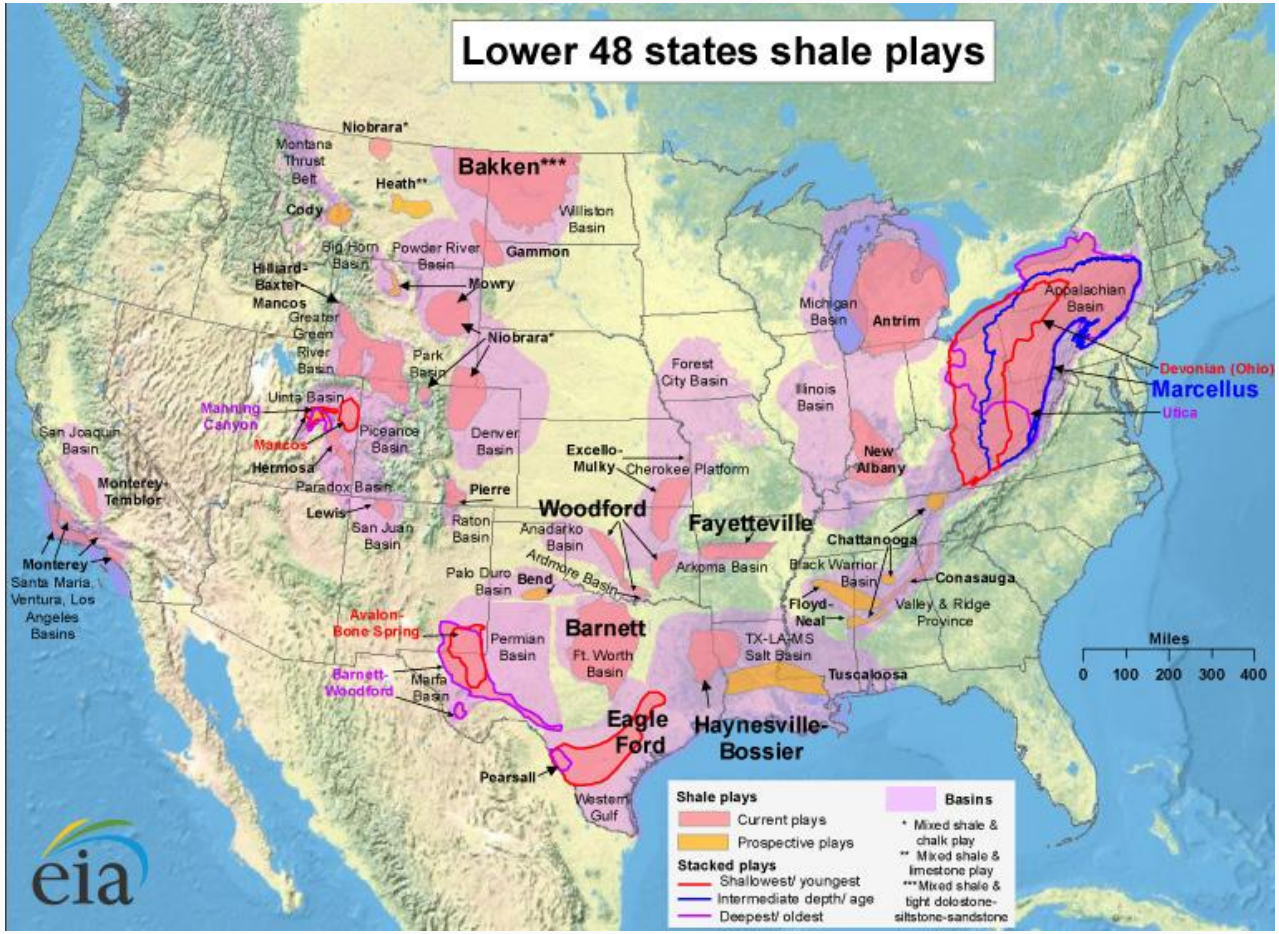
What is Hydraulic Fracturing (HF)

- HF has been used for decades by oil and gas companies
- Production well stimulation technique
- Injection of fluids above fracture pressure to create channels for oil/gas to flow


Water Acquisition
Chemical Mixing
Well Injection
Flowback and Produced Water
Storage tanks
Wastewater Treatment and Waste Disposal
Pit
Aquifer
1,000
2,000
3,000
4,000
5,000
6,000
7,000 feet
Hydraulic fracturing often involves the injection of more than a million gallons of water, chemicals, and sand at high pressure down the well. The depth and length of the well varies depending on the characteristics of the hydrocarbon-bearing formation. The pressurized fluid mixture causes the formation to crack, allowing natural gas or oil to flow up the well.
Water Use in Hydraulic Fracturing Operations
Water Acquisition - Large volumes of water are transported for the fracturing process.
Chemical Mixing - Equipment mixes water, chemicals, and sand at the well site.
Well Injection - The hydraulic fracturing fluid is pumped into the well at high injection rates.
Flowback and Produced Water - Recovered water (called flowback and produced water) is stored on-site in open pits or storage tanks.
Wastewater Treatment and Waste Disposal - The wastewater is then transported for treatment and/or disposal.
Hydrocarbon-bearing Formation
Induced Fractures

We Can Cultivate Energy and Protect Water Resources

- National, Regional, State and Local Opportunities:
  - Enhance domestic energy options
  - Reduce dependence on foreign supplies
  - “Bridge” to renewable energy sources
  - Provide greater certainty about future energy reserves
  - Stabilize energy prices



Is There Hydraulic Fracturing in California?

- Hydraulic fracturing has been utilized by oil and gas operators in CA for decades.

- The hydraulic fracturing that has occurred historically is quite different from the high-volume, multi-staged horizontal drilling/fracturing that is being utilized in many places around the country to produce shale gas/oil.

- The extent to which horizontal drilling (with hydraulic fracturing) is occurring in CA is not well understood, because there are currently no requirements to report these activities.

- The Monterey shale in southern and central CA is an area where a number of companies are using hydraulic fracturing techniques in an attempt to develop the resource.

The Monterey Shale

- The Monterey Shale is a vast oil shale in CA.
- Estimated to hold ~ 2/3 of the oil shale reserves in US (as much as 15.4B barrels).
- Numerous companies are actively exploring and trying to develop this resource.
- To date, the Monterey Shale has not been a significant source of oil production.

Regulatory Development in California

- CA Division of Oil, Gas, and Geothermal Resources (DOGGR) oversees oil and gas production in the State.

- DOGGR recognized the need to develop more specific requirements for HF (e.g., notification/reporting of activities).

- In December 2012, DOGGR issued “pre-draft” regulations; conducted multiple stakeholder workshops around the State.
  - Pre-fracture testing and notice
  - Monitoring during and after fracturing operations
  - Post-fracture disclosure
  - Fracking fluid storage and handling

- DOGGR is scheduled to move forward with formal rulemaking this Summer.

Regulatory Development in California

- In addition to the regulatory efforts at DOGGR, there are numerous bills in the CA Legislature related to HF activities (notification/reporting, further research, ban/moratorium).

- South Coast AQMD actually issued the first new HF rule in the State on April 5, 2013.

- SC Rule 1148.2 is a reporting and notification rule that requires pre-fracturing notice in the South Coast air basin.

What is EPA Doing?

- Improving our Scientific Understanding of Hydraulic Fracturing.

- Providing regulatory clarity and protections against known risks.
  - -Ensuring that HF with diesel fuels is properly permitted
  - -Ensuring the safe disposal of wastewater and stormwater from HF activities
  - -Addressing air quality impacts associated with HF activities

- Assuring compliance.

- Collaboration and outreach.

Improving our Scientific Understanding of Hydraulic Fracturing

- Multi-Agency Collaboration on Unconventional Oil and Gas Research (April 2012 MOA).

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

MOA with EPA, DOE, and DOI on Hydraulic Fracturing Research

- Identify research priorities and collaborate on research to improve our understanding of the impacts of developing unconventional oil and gas resources and ensure the safe and prudent development of these resources.

- Goals of interagency collaboration:
  - Focus each Agency on its area of core competency
  - Collaborate on research topics as appropriate
  - Bring coordination and consistency to the annual budget process

- Interagency Steering Committee
- Formalizing a research plan

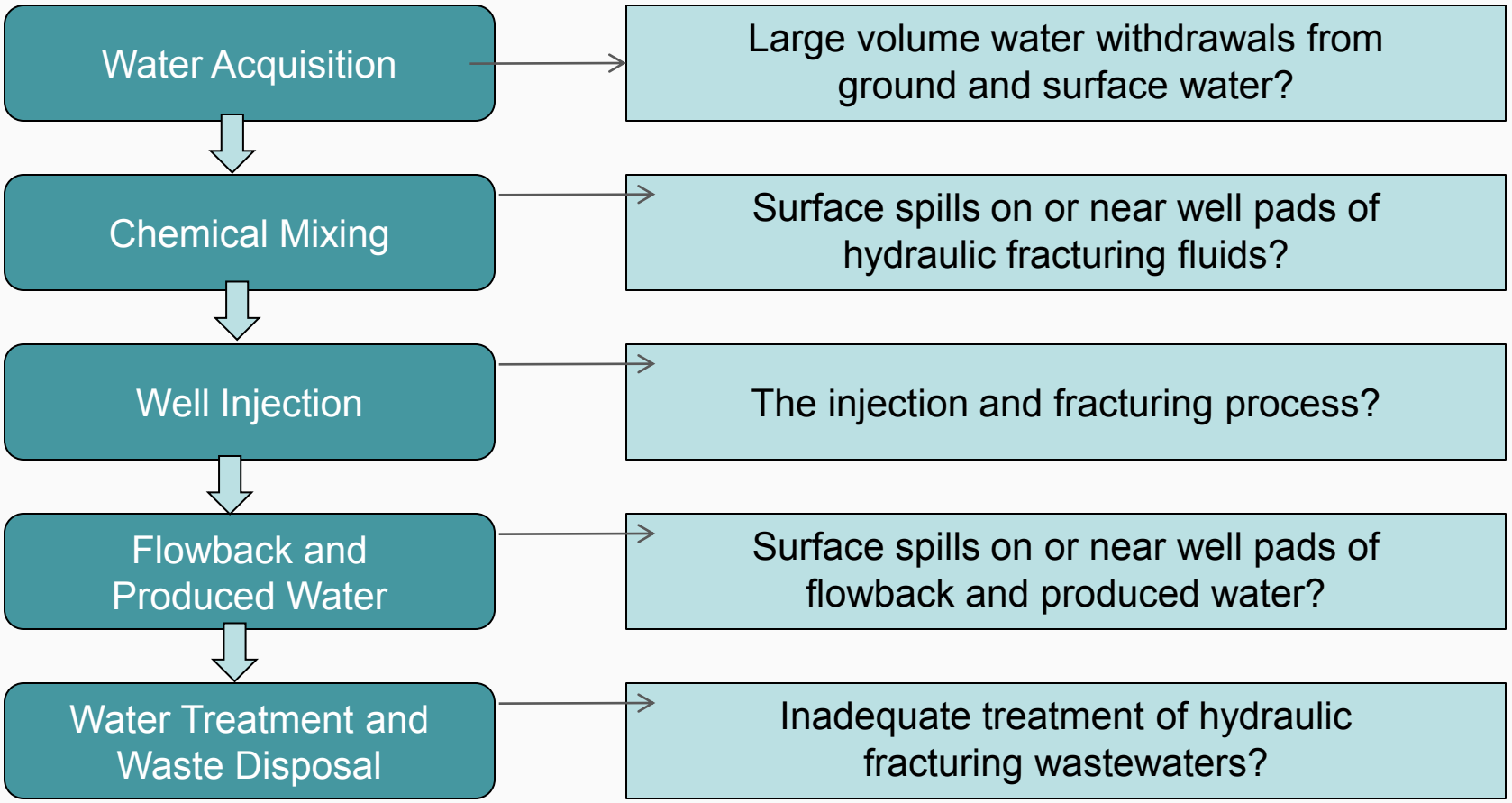
EPA's Study Of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources

- Congress urged EPA in its FY10 appropriations report to conduct a study on the potential impacts of hydraulic fracturing on drinking water resources.

- The 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

Research Questions

What are the potential impacts on drinking water sources of:



Reporting Results

- EPA released an initial progress report in December 2012.
- The progress report outlines work currently underway, including the status of research projects that will inform the final study.
- The progress report does not draw conclusions about the potential impacts of hydraulic fracturing on drinking water resources, which will be made in the final study.
- A draft report is expected to be released for public comment and peer review in 2014.

Federal Roles: Water Authorities Applicable to Hydraulic Fracturing

Clean Water Act

- Water quality criteria and standards
- Effluent Limitations Guidelines and Standards (ELG)
- National Pollutant Discharge Elimination System Permitting

Safe Drinking Water Act

- Underground Injection Control Program regulations
  - 39 states, 3 territories, 2 tribes
  - Produced water/flowback injection
  - Hydraulic fracturing (HF) using diesel fuels
- National Primary Drinking Water Standards
- Emergency Powers

Federal Roles: Management of Produced Water/Flowback

- Shale gas flowback and produced water (brine) is typically disposed by:
  - Deep injection in a SDWA UIC permitted Class II well
  - Treatment and discharge at a CWA NPDES permitted publicly owned treatment works (POTWs), or a centralized waste treatment facility (CWT)

Safe Drinking Water Act

Statutory Authority:

- Definition of "underground injection" (as revised by 2005 Energy Policy Act section 1421(d)(1)(B)) excludes:
  - (i) the underground injection of natural gas for purposes of storage; and
  - (ii) the underground injection of fluids or propping agents **(other than diesel fuels) pursuant to hydraulic fracturing operations related to oil,** gas, or geothermal production activities.

- 1421(b)(1)(A) requires State UIC programs to prohibit underground injection not authorized by a permit issued by a state (or permitted by rule)

- SDWA provides EPA the authority to permit activities using diesel fuels

Federal Roles: SDWA

The SDWA requires EPA to protect underground sources of drinking water (USDWs) from contamination caused by underground injection.

- Protect USDWs from diesel fuels injection related to oil, gas, and geothermal hydraulic fracturing
  - Developed draft guidance (well siting, construction, mechanical integrity testing, etc.) for oil and gas injection using diesel fuels
- Protect USDWs from brine injection (flowback and produced waters) for disposal
- Provide safe drinking water in compliance with the National Primary Drinking Water Regulations (NPDWRs)

Note: States/Tribes with Primacy implement federal laws

Underground Injection Control Guidance (UIC) for Permitting Oil and Natural Gas Hydraulic Fracturing Activities Using Diesel Fuels

-EPA has developed draft Underground Injection Control (UIC) Class II permitting guidance for oil and gas hydraulic fracturing activities using diesel fuels.

-The document describes information useful in permitting oil-and gas-related hydraulic fracturing using diesel fuels where EPA is the permitting authority.

-EPA's goal is to improve compliance with the Safe Drinking Water Act (SDWA) requirements and strengthen environmental protections consistent with existing law.

- EPA issued draft Guidance in June 2012 for public review/comment

Federal Roles: CWA

The CWA establishes the basic structure for regulating discharges of pollutants into surface waters and water quality standards

- Prohibits the discharge of shale gas wastewater into navigable waters except through publicly owned treatment works (POTWs) or private centralized waste treatment facilities (CWTs) .
  - EPA is developing a proposed rule to amend the Effluent Limitations Guidelines (ELGs) for the Oil and Gas Extraction Category; the proposed rule is scheduled for publication in 2014.
  - The proposed rule will focus specifically on wastewater generated from “unconventional” oil and gas extraction
- Stormwater discharges
- Surface impoundments
- Waterwater recycling

Federal Roles: Other

- Clean Air Act provisions
  - Oil and Natural gas Air Pollution Standards
  - New Source Performance Standard
  - Notification of Well Completions
- June 2011 USDA/EPA/Department of Interior memorandum of understanding (MOU)
  - Sets forth expectations and agreements for addressing air quality analyses and mitigation measures through the NEPA process related to federal oil and gas planning, leasing, or field development decisions

Ensuring Energy Extraction Activities Comply with Environmental Laws

- EPA’s enforcement program works with states and other key stakeholders to ensure that unconventional oil and gas extraction does not come at the expense of public health and the environment.

- The Agency's focus and obligations under the law are to provide oversight, guidance, rulemaking and enforcement to achieve the best possible protections for the air, water and land.

Promoting Transparency and Conducting Outreach

- Within the federal government, EPA has played a lead role in conducting stakeholder outreach to individual citizens, communities, tribes, state and federal partners, industry, trade associations and environmental organizations that have a strong interest in the Agency's work and policies related to hydraulic fracturing and shale gas extraction.

- EPA is committed to full transparency and providing opportunities for stakeholder input on all agency actions.

Thank You!

EPA Hydraulic Fracturing Website:

www.epa.gov/hydraulicfracturing