FACT SHEET ON HYDRAULIC FRACTURING

Water Resource IMPACTS for Localities to Consider

High volume hydraulic fracturing is a drilling technique where large volumes of water, sand and chemicals are forced under high pressures underground to break up rock and release captured oil or gas.



Water Consumption

Modern fracking consumes significant quantities of freshwater. In the Marcellus Shale region in Pennsylvania, an average well uses 4.3 million gallons of water each time it is fracked. Wells are fracked repeatedly.

The Potomac Aquifer

The Potomac Aquifer is the only available deep water source for hundreds of thousands of Virginians in the eastern third of the state—running from Hampton Roads up to Northern Virginia. It is an aquifer under stress and the Department of Environmental Quality states that **the aquifer is currently shrinking by two feet per year**.

Private Water Wells

The EPA released a comprehensive report in December 2016 proving that fracking activities can lead to water contamination, sometimes rendering drinking water sources totally unusable—this can occur through multiple pathways. Pennsylvania found that in 2014 oil and gas operations contaminated private drinking wells in 243 cases.

Fracking Fluids

A mixture of chemicals and sand is used to force open holes in rock under extreme pressure during the process of fracking. These mixtures typically contain chemicals like aromatic hydrocarbons (such as benzene) which are known to have adverse effects on the central nervous system, liver and kidneys.

These chemicals either remain somewhere under the surface after fracking has occurred or are expelled from the ground as "flowback." In documented cases in multiple states, these chemicals have come in contact with surface and ground waters, **causing significant contamination of drinking water sources**.

Wastewater Pits & Waste Disposal

Modern fracking generates significant amounts of waste byproduct that must be handled safely. This includes fracking fluids, mud cuttings, flowback water and production brine. Much of this waste is held in open pits until it can be trucked offsite. Local wastewater treatment plants are ill equipped to handle this type of waste. These waste pits represent significant risk to the local environment from pit failures and overflows. Leakage from waste pits in Colorado contaminated nearby springs with benzene. Floods in Texas caused chemicals to flush into nearby rivers. And in Southwest Virginia, a citizen complaint revealed that a driller's waste pit failed, allowing fluids and cuttings to contaminate drinking water from a local spring.

Leaks, Spills and Accidents

- In 2015, Pennsylvania reported 640 oil and gas spills, which affected groundwater or surface waters.
- In 2015, the oil and gas industry in Colorado reported 615 oil and chemical spills—90 of those contaminated ground water and 189 were within 1,000 feet of surface water.
- In January 2014, Cabot Oil & Gas Corporation of Pittsburgh was responsible for a storage tank explosion in Jessup Township that injured an employee and spilled 2,835 gallons of production fluid.

These leaks, spills and accidents result in threats to the environment and the human health and safety of local communities.

Erosion and Sedimentation

Erosion from industrial fracking development is likely to occur from the clearing of land, construction of drill pads at each fracking site, and miles of pipeline trenches that will crisscross the region. This erosion increases sedimentation and phosphorus loading in local streams. And it will set back Virginia's hard work to restore the Chesapeake Bay. To compensate, farmers, homeowners and localities may need to further reduce their pollution impacts on the Bay.



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Community IMPACTS for Localities to Consider

High volume hydraulic fracturing is a drilling technique where large volumes of water, sand and chemicals are forced under high pressures underground to break up rock and release captured oil or gas.



Size and Scale

Modern fracking is an industrial activity. The Wall Street Journal provides this description of a frack well pad:

"...a 10-story rig is assembled to drill a hole up to 10,000 feet deep. After that, the well is fracked, creating thousands of tiny cracks in the rock to free the oil or gas. That entails heavy equipment: truck-sized containers of water and sand, mixers, stadium lighting, pumps, chemical storage and injection vans and recreational-vehicle command centers to orchestrate the operation. The process can last three weeks to three months. Once drilling and fracking ends, the gear moves to the next well..."

The footprint for a single well typically includes 15 acres of land clearing—4 acres for the well pad and the remainder for roads, pipelines and supporting infrastructure.

Additionally, each well pad is connected to gathering gas pipelines that transport the gas to compressor stations and then out of the region.

Community Health Impacts

- "Leaks, poor wastewater management, and air emissions have released harmful chemicals into the air and water around fracking sites nationwide," states a peer-reviewed journal published by the National Institutes for Health.
- A Yale University report in September 2014 found that people living close to natural gas wells are more likely to experience health impacts including skin conditions and upper respiratory symptoms.
- A 2016 report by the Clean Air Task Force found elevated cancer risks in 200 counties in 21 states from oil and gas production emission.

Truck Traffic/Impact on Roads

Construction equipment, pipelines and fracking materials (including water, chemicals and sand) all must be delivered to each gas well. It takes approximately 4 million pounds of sand and millions of gallons of water for each frack—meaning thousands of truck trips per well. A single heavy truck causes the same amount of road damage as 9,000 cars. Localities are responsible for the upkeep of local roads.

Noise and Light

Modern fracking operations occur 24 hours a day, seven days a week. Noise comes from trucks, generators, pumps and other machinery and has been recorded to reach 102 decibels at a distance of 500 feet. The noise generated by the continuous operation of compressor stations is often equated to jet engines.

Light disturbances come from industrial lighting rigs as well as gas flaring. Nighttime light pollution can disrupt sleep patterns for both humans and animals.

Local Emergency Services

Rural Pennsylvania communities affected by the modern fracking boom have experienced an increase in traffic accidents, civic disturbances and public health problems. Similar increases in crime and emergency services have been seen in North Dakota and other fracking states.

These specific service needs can place significant strains on local government staff and resources. Additionally, local emergency service personnel should be prepared to respond to chemical spills or accidents associated with oil and gas production.

Property Values

Duke University researchers found in Washington County, Pennsylvania that **property values dropped on average 22%** for homes with private drinking wells and were within 1 kilometer of a gas site. Real estate studies in Colorado and Texas have found similar results: properties with or near gas and oil drilling sites sell for less than comparable properties further away.



FACT SHEET ON HYDRAULIC FRACTURING

From a Lease to an Industrial Gas Drilling Site

STEPS

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An industrial gas drilling site may be developed in Tidewater Virginia through the following eight steps as outlined in § 45.1-361.29, et al.

Gas Company Leases Land

A landowner signs a lease with a gas development company allowing the company the right to drill on the owner's property. This is a private contract negotiated between the two private parties.

2 Pre-application Meeting *

DMME will convene a meeting with DEQ and the applicant in the locality where drilling is to be proposed. This meeting is open to the public.

Company Applies for a Permit from Virginia's Department of Mines, Minerals and Energy

Applications for permits must include:

- Application Fee: \$130 or \$260 (depending on the type of permit)
- Bonding to plug the well and restore the site: \$10,000 per well or with approval from the DMME Director a blanket bond of \$25,000 for up to 15 wells
- Orphaned Well Fund Fee: \$200 per permit, excluding exploratory well permits
- List of ingredients used for hydraulic fracturing operations*
- Groundwater Baseline Sampling Plan*
- Plat
- Operations Plan
- Spill Prevention Control and Countermeasures Plan*
- Emergency Response Plan*
- Environmental Impact Assessment commissioned by the gas company

4 Pub

Public Notice Is Given

- Within one day of filing the application, the company must notify all surface owners where the land is to be disturbed as well as all mineral owners within 500 feet of the proposed well.
- Within seven days of filing the application, the company must notify the local government of its intent to drill as well as notify the general public via a newspaper advertisement.

DMME Hearing (Optional)

An informal fact-finding hearing may occur if a property owner with standing files a qualified objection to a permit within 15 days of receiving notice. Virginia law specifies that the "only objections...that may be raised by surface owners" be limited to five narrow categories.

Review of Environmental Impact Assessment

Within 90 days of receiving the Environmental Impact Assessment (EIA), the Department of Environmental Quality (DEQ) will coordinate a review of the EIA including a public comment period and consultation with appropriate state agencies. DMME must collaborate with DEQ before granting a permit.

7 Oil Discharge Contingency Plan

The company must file and have approved by the State Water Control Board an oil discharge contingency plan and proof of financial responsibility to implement the plan.

3 Permit Decision

DMME will decide to grant or deny a gas drilling permit.

*Added to Virginia's Oil and Gas Regulations as of December 28, 2016.

For additional information see § 45.1-361.1 et seq., related regulations 4VAC25-150 and §62.1-195.1.