

Drilling Down

Debunking Fracking Health Myths

Baltimore, MD

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PSR

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Contents

- * Myth #1- Fracking has existed for 60 years
- * Myth #2- No studies exist to demonstrate health risks
- * Misconception- fracking = hydraulic fracturing?
- * Lessons from residents in PA

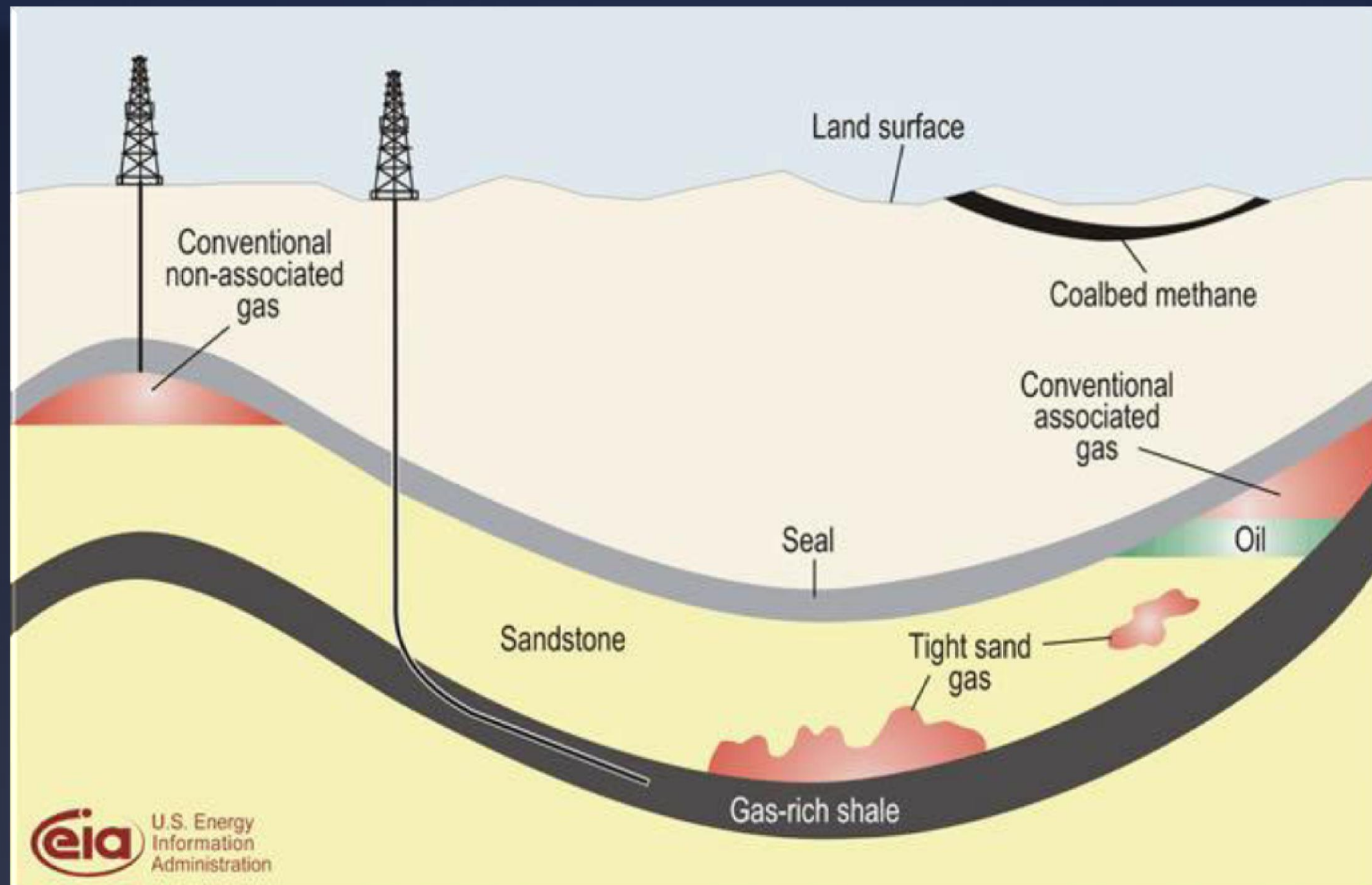
What do we mean by fracking?

* Conventional vs. unconventional

- Directional Drilling (vs. vertical drilling)
- High-fluid volume, high-pressure hydraulic fracturing
- Addition of chemicals (“Slickwater”) to reduce friction and increase efficiency of fracturing fluids
- Multi-well sites

* Historical facts

CONVENTIONAL vs. UNCONVENTIONAL GAS DRILLING



<http://www.youtube.com/watch?v=EHg6Ueb2t-E>

What do we mean by fracking?

- * Life cycle:
 - * Exploration, Extraction, Transportation

Units at Compressor Stations & Gas Metering Stations Releasing Emissions into the Air

- * Compressor Engines
 - * Storage Tanks
 - * Compressor Blow downs
 - * Truck Loading Racks
 - * Condensate Tanks
 - * Glycol Dehydration Units
 - * Amine Units
 - * Separators
 - * Fugitive Emission Sources
- * 90% of individuals reported experiencing odor events from these facilities

From survey conducted by Earthworks

$$\text{Hazard} \quad \times \quad \text{Exposure} = \text{Health Risk}$$

- Slick-water
- Fracking chemicals
- Contaminants in flow back water
 - VOCs and ozone
- CH₄ and hydrocarbons
- Diesel exhaust and PM2.5

x

- Water pollution
 - Migration
 - Aquifers
 - Well water
 - Surface water
- Air pollution
 - Drill head proximity
 - Compressor stations
 - Transportation
- Occupational

Vulnerable populations: children, pregnant women, elderly

Potential Sources of Water Contamination

- Seismic testing
- Initial drilling through aquifer
 - Failures in well casings
- Migration up from fractured rock
- Wastewater storage, transport, or processing
- Impoundment leak or overflow
 - Pipeline leak
 - Inadequate treatment
- Other on-site or transportation spill or accident
- Use of brine for de-icing or dust control
 - Drill cuttings

Susquehanna County, Pennsylvania
source: www.un-naturalgas.org



Health Effects of Exposure to Water Contaminants

- * Type of contaminant

- * Bacterial contamination-
Gastrointestinal
- * Inorganic
- * Organic
- * Radioactive
- * proprietary

- * Organ system

- * Neurological,
respiratory, dermal

- * Acute vs Chronic

- * Dizziness vs kidney
damage

Potential contaminants of Well Water

- * Volatile Organic Chemicals- Benzene, Ethyl Benzene, Toluene, Xylene compounds
- * Semi-volatile Organic Chemicals-Phenol and Pyridine
- * Heavy Metals-Arsenic, Barium, Cadmium, Chromium, Lead, Mercury and Vanadium
- * Sulfur containing
- * NORM-Radioactive Radium 226, Radium 228 and Uranium 238
- * Salt Water Minerals
- * Additives



Potential for Air Pollution- VOC & PM 2.5

- * Ground level ozone exacerbates underlying asthma and COPD and causes lung injury
- * PM2.5 when inhaled lodge in the deep lung (bronchioles and alveoli)
- * PM2.5 carbonaceous core adsorbs PAH, nitro-PAH and heavy metals
- * PM2.5 invoke an inflammatory response and contain probable lung carcinogens (IARC)

Examples of Chemicals Detected in Air

* Xylene

* Propane

* Carbon
Monoxide

* Ethane

* Propylene

* Sulfur Dioxide

* Isobutane

* Nitrogen
Oxide

* Methane

LOSS OF VIEWSHED, FOODSHED AND WATERSHED; SURFACE DISTURBANCE FOR ONE WELL PAD IS 3-5 ACRES



Quality of Life/Stress Issues _

- * High volumes of truck traffic
- * Congestion
- * Accidents
- * Damaged roads
- * Impacts on infrastructure
- * decreased personnel
- * Noise and light pollution
- * Odors
- * Influx of temporary employees
- * Increased enrollment in schools
- * Increased STI's
- * Crime
- * Megan's law
- * Increased rental property prices

Lessons from PA

- * Social issues- Simona Perry similar to Witter
- * Earthworks - Gas Patch Roulette: How Shale Gas Development Risks Public Health in Pennsylvania
- * Health complaints- Saberi
- * Group without health concerns- Saberi

Health Symptoms Temporally Associated with Gas Drilling Activities As of July 2012

*Most common symptoms experienced by individuals evaluated by Dr. Saberi and by SWPA EHP

*N = 44

Skin rash or irritation	19
SOB or other breathing difficulties	12
Sinus problems	5
Headaches	6
Nose bleeds	6
Throat irritation	6
Abdominal pain or cramps	16
Nausea or vomiting	11
Dizziness	6
Sleep disturbance	7
Anxiety	7



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