Kids' Health in the Gas Patch

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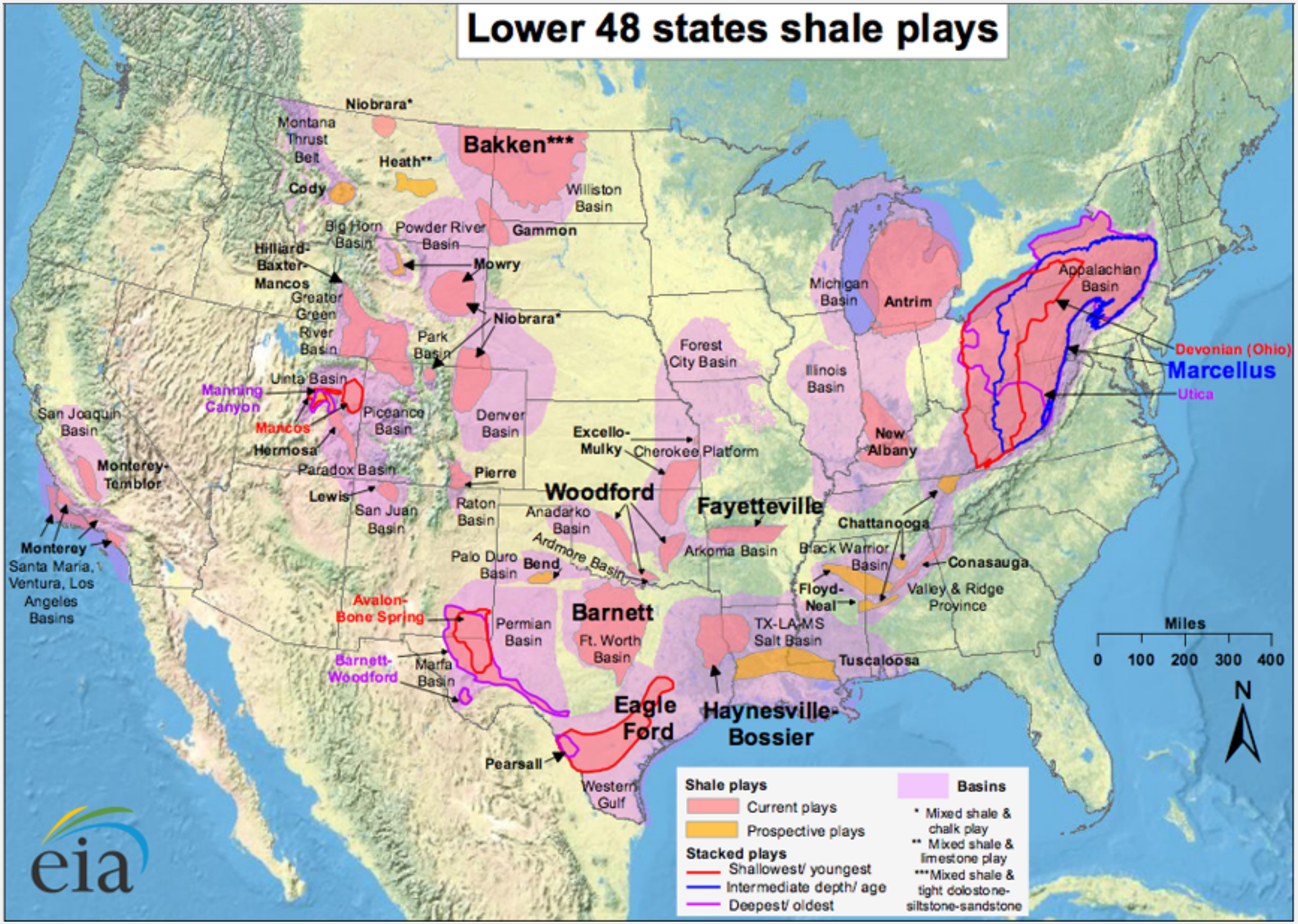
(Southwestern PA - Environmental Health Project)

Marcellus Shale Gas is "Wet" Gas

- Methane
- Liquid fuels: propane, butane, ethane



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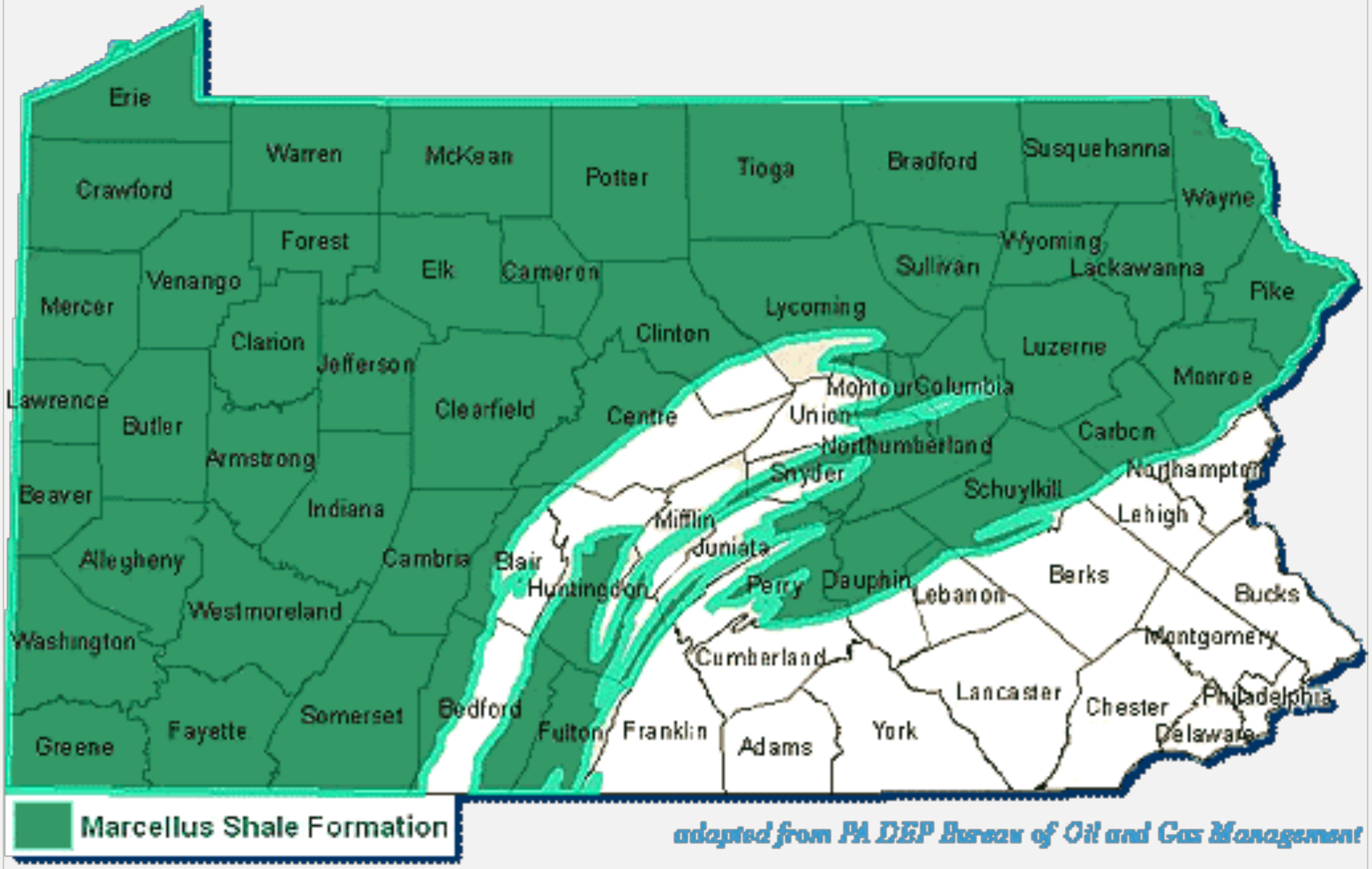
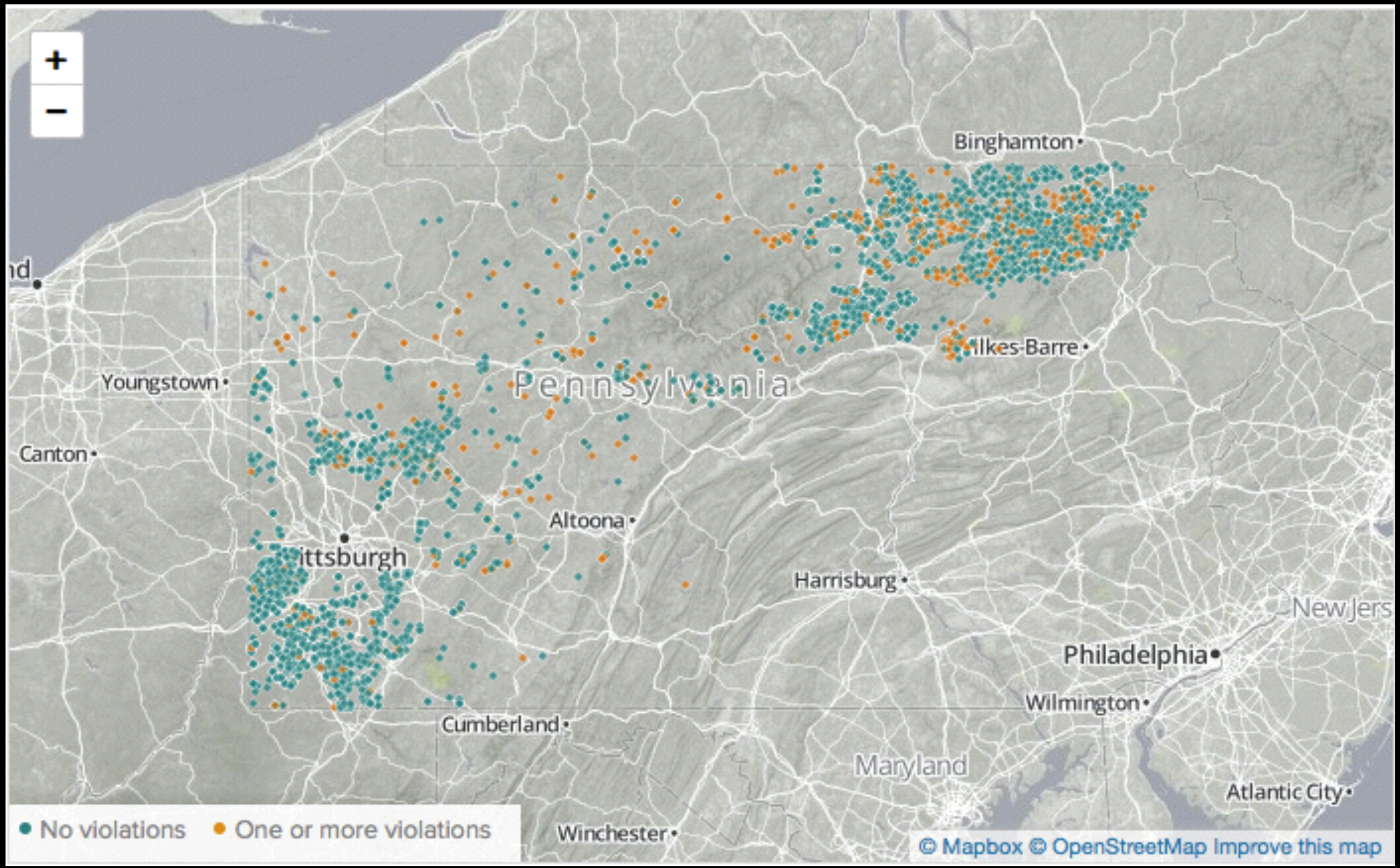


(PA DEP/Google Images)



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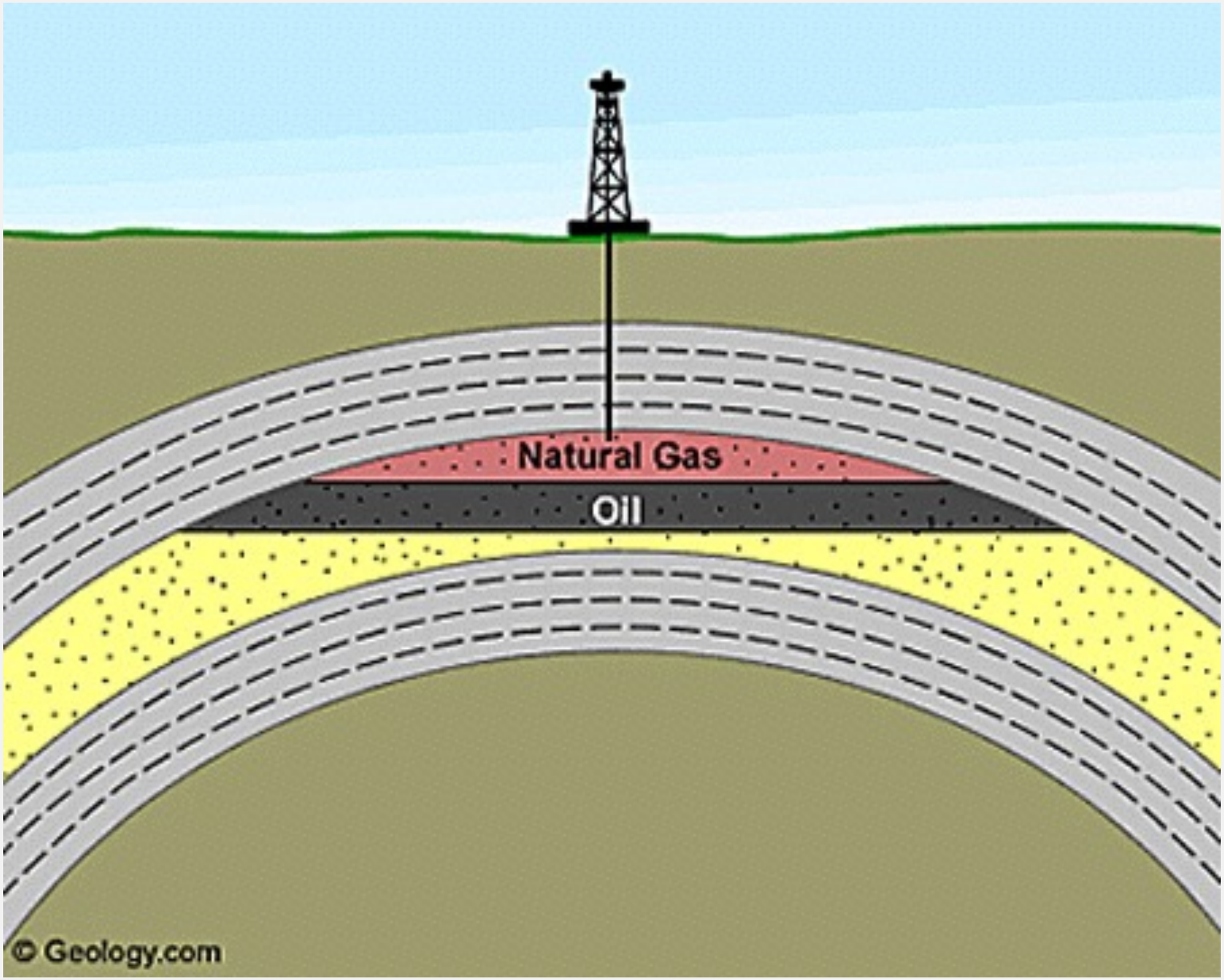

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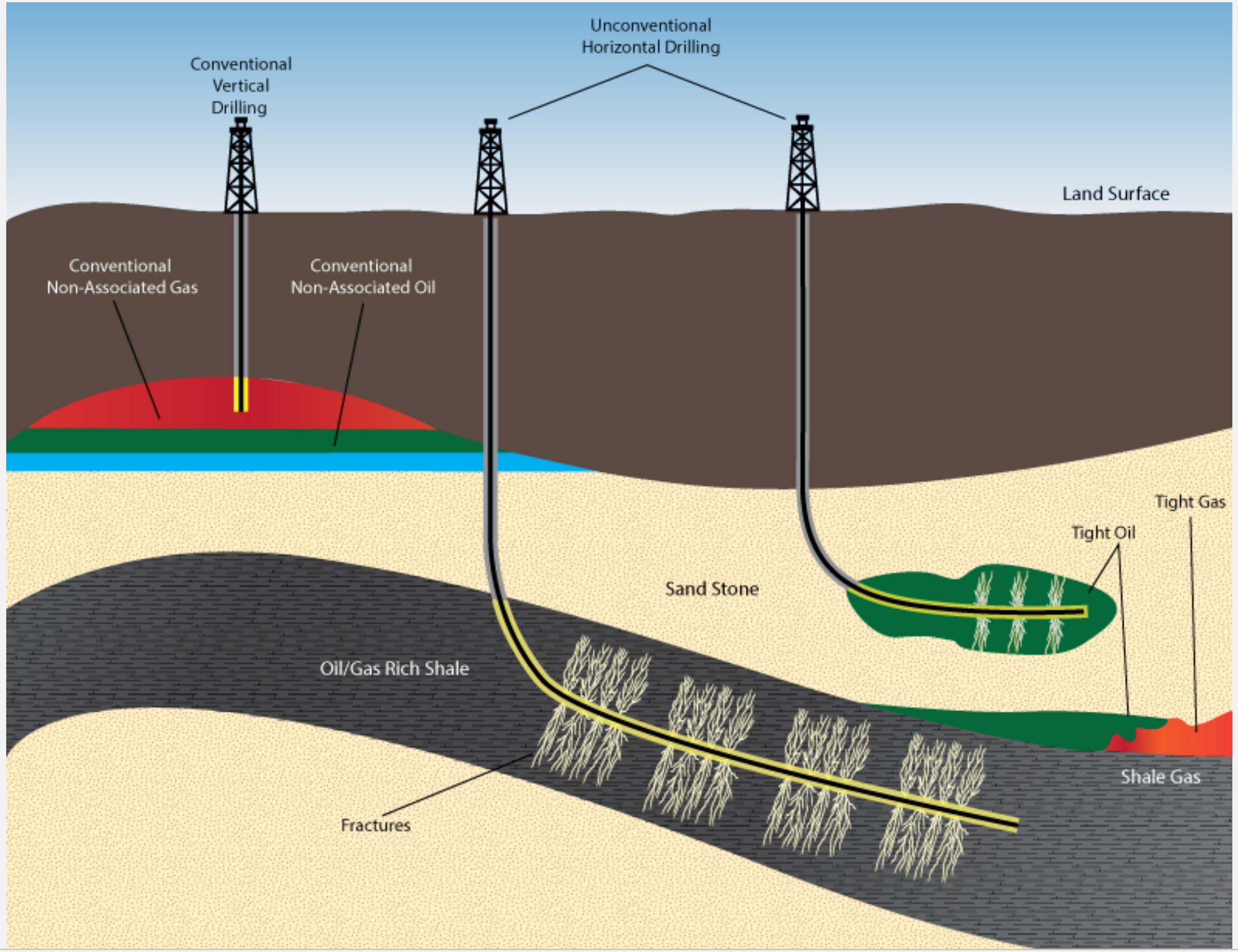
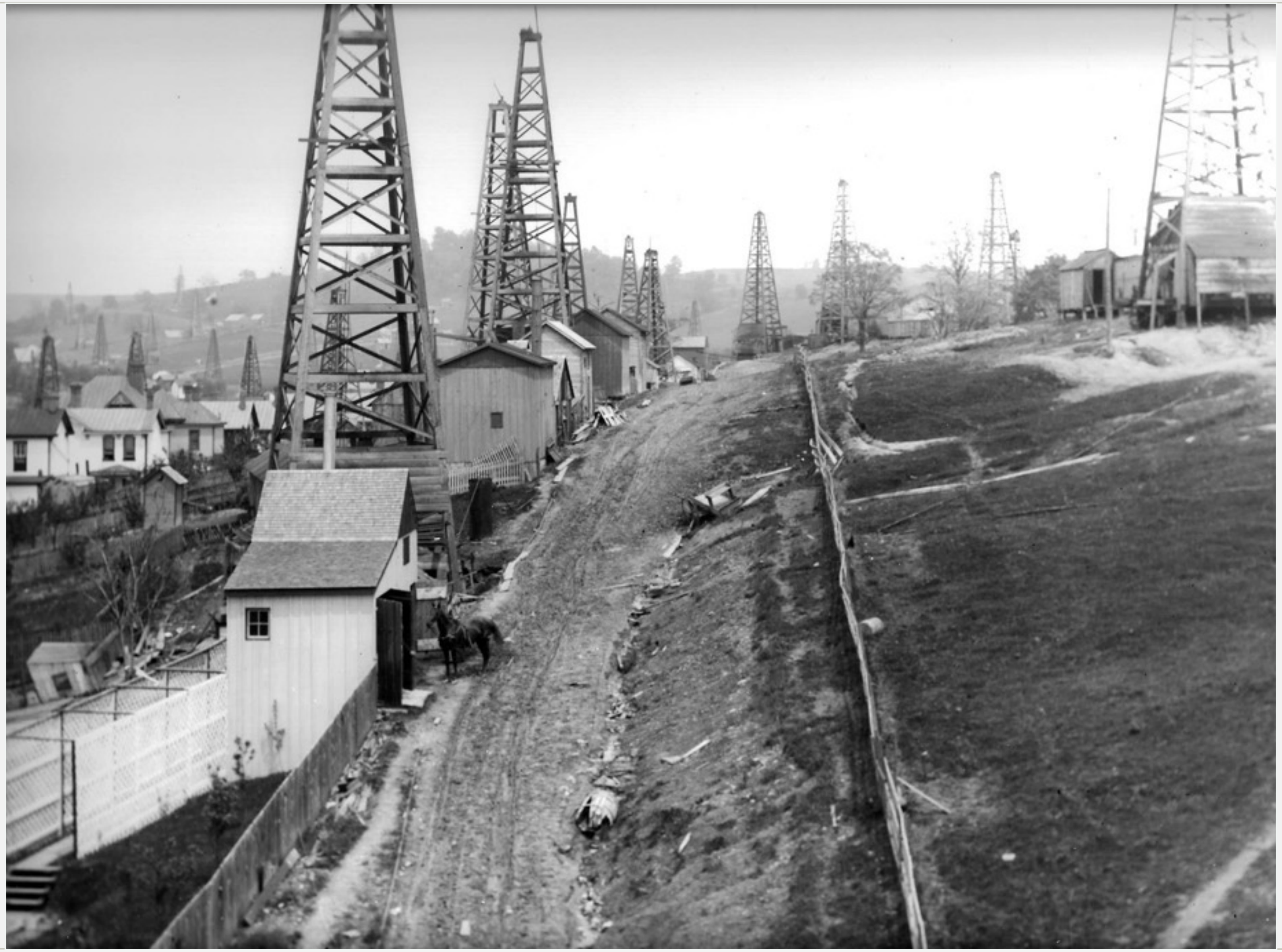


(sanchezenergycorp.com/Google Images)



Washington, PA (c. 1882)

(Robert Donnan Family Archive)

Abandoned oil well

Canton Township, Washington Co.

(Photo: Robert Donnan)

(Robert P. Ruschak/Google Images)

(Marcellus-shale.us)

Important points about UNG development

1. Emissions of toxics occur at every stage of the process.

2. Emissions don't stay in one place.

   > trucks travel

   > winds blow

   > rivers and streams flow

   > what goes up comes down

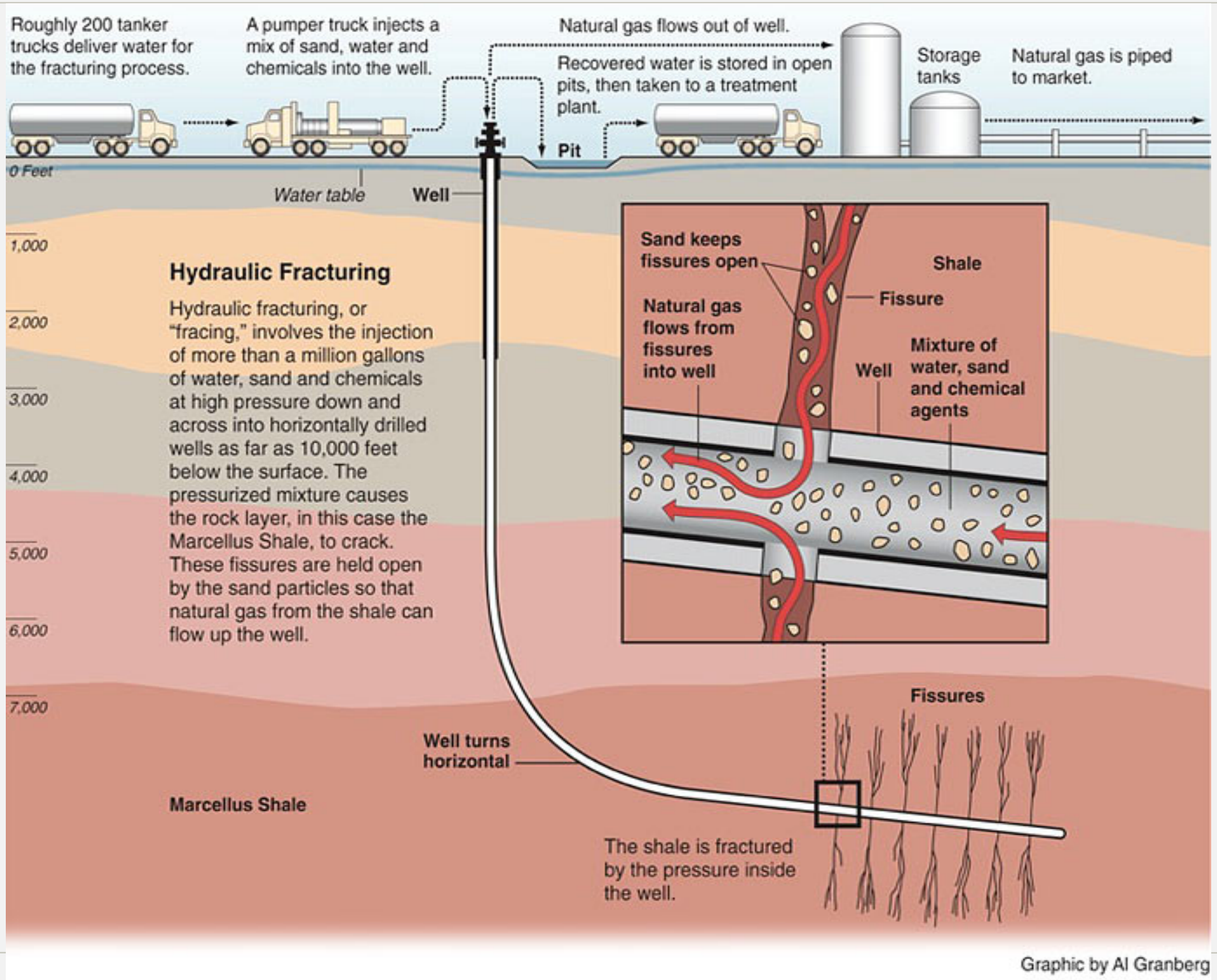
   > climate, weather patterns, topography help determine exposure

3. Liquids leak & spill, on well pads and off well pads.

4. Gases are vented accidentally and **on purpose**.

5. Chemicals that leak, spill, or are aerosolized remain a mystery.

6. Earth is a closed system. What happens here stays here.



Graphic by Al Granberg

Shale Gas Development: What Goes Down?

- Drill Bit
- Steel piping and cement
- Fresh Water
- Sand
- Chemicals (proprietary)

Flowback: What Comes Back Up?

- Drill Cuttings

- Contaminated Water
  - > Fracking chemicals
  - > Salts
  - > Natural elements (lead, arsenic)
  - > Naturally-occurring radioactive materials (NORM's)

- Non-fuel Gases (VOCs, PAHs, hydrogen sulfide, radon)

- Methane

- Liquid Fuels (propane, butane, ethane)

Airborne Emissions – Adverse Health Effects

> Emissions occur at every stage of UNG development.

> Symptoms from exposure are well-known from decades of occupational research.

> Exposure to toxics based on several factors:

- proximity to emissions
- duration of exposure
- individual susceptibility (age, gender, pre-existing conditions)
- use of personal protective equipment

> Exposure may be continuous or sporadic.

> Exposure may involve multiple chemicals at once from one or from multiple sources in the vicinity of the exposed person.

"Drilling is just the beginning." (Range Resources motto)

(Photos: Robert Donnan)

Airborne Emissions — Adverse Health Effects

Acute Exposures

>>> Upper respiratory — congestion, conjunctivitis, nosebleeds, sore throat, cough.

>>> Lower respiratory — cough, wheezing, shortness of breath.

>>> Systemic — rashes, headache, dizziness, nausea, vomiting, mental status changes, seizures, death.

Chronic Exposures

>>> permanent neurologic impairment; liver, renal, myocardial damage; cancer.

Unconventional Natural Gas Development

— Airborne Emissions —

- Fracking Chemicals
- Volatile Organic Compounds (VOC)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Particulate Matter (PM)
- Radioactive Elements (Radon)
- Carbon monoxide (CO)
- Carbon dioxide (CO2)
- Nitrogen dioxide (NO2)
- Sulfur dioxide (SO2)
- Methane

VOCs + NO2 + SUNLIGHT = OZONE

OZONE + PARTICULATE MATTER = SMOG

Well Pad Preparation
(Deforestation)

Truck Transport

(SWPA-Environmental Health Project)

Truck Transport

(marcellus-shale.us)

Truck Transport

(marcellus-shale.us)

Truck Transport

(marcellus-shale.us)

Drilling

(SWPA-Environmental Health Project)

Drilling

(Ecowatch.com/Google Images)

Drilling

(vice.com/Google Images)

Drilling

(Beaver Run Reservoir (Google Images))

Hydraulic Fracturing of Shale (Fracking)

Fracking

(jasonmunster.com/Google Images)

Flowback (Wastewater) Impoundment

(marcellus-shale.us)

Flowback (Wastewater) Impoundment

(SWPA-Environmental Health Project)

Flowback (Wastewater) Impoundment

(marcellus-shale.us)

Flowback (Wastewater) Impoundment

(marcellus-shale.us)

Condensate Tanks

(SWPA-Environmental Health Project)

Venting ("Pig Launcher")

(SWPA-Environmental Health Project)

Flaring

(SWPA-Environmental Health Project)

Pipelines

(SWPA-Environmental Health Project)

Compressor Station

(SWPA-Environmental Health Project)

Metering Station

(SWPA-Environmental Health Project)

Natural Gas Processing Facility

(marcellus-shale.us)

(Southwestern PA - Environmental Health Project)

(Marcellus Air)


MARCELLUS AIR @ www.marcellus-shale.us

Air Pollution in Children

- Increases risk of developing asthma.

- Increases frequency and severity of respiratory symptoms in children with pre-existing asthma and other chronic lung conditions.

- Increases the risk of developing and worsening acute lower respiratory diseases (pneumonia, bronchiolitis).

- Increases the risk of common upper airway illnesses (non-allergic rhinitis and conjunctivitis, nosebleeds, sore throats, sinusitis, acute otitis media).

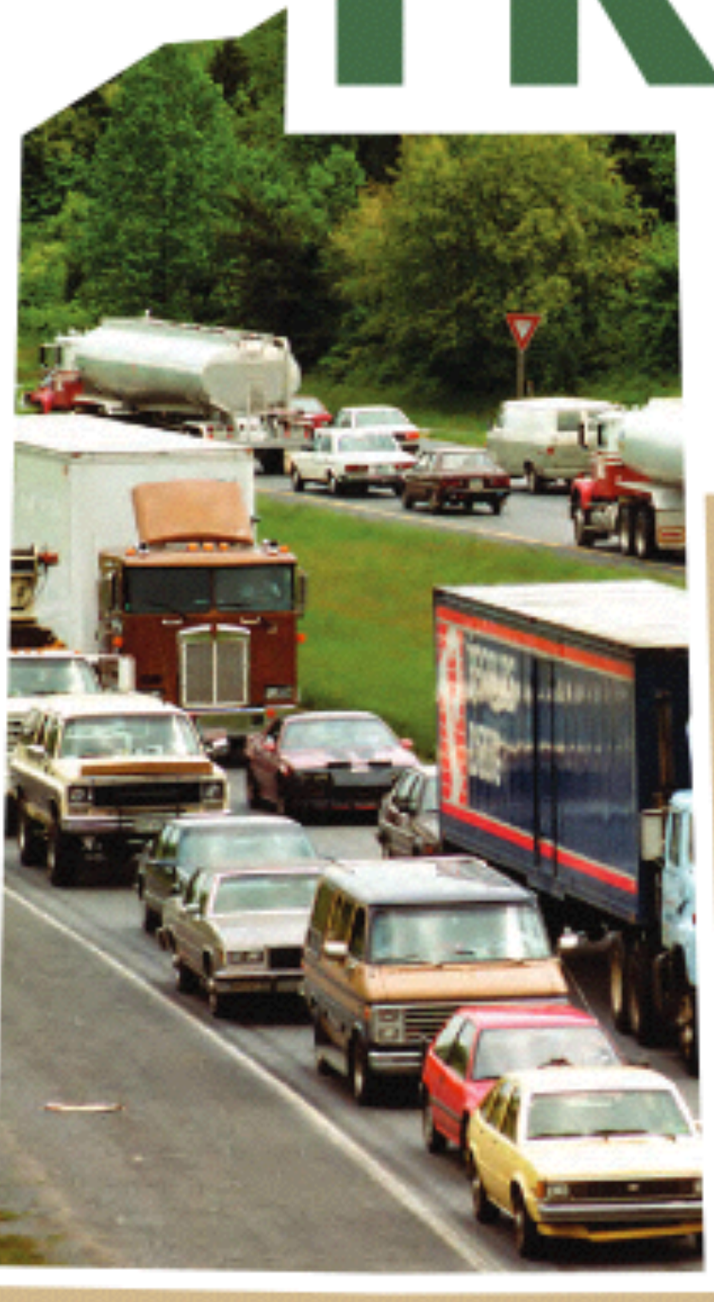
- Increases the risk of other common symptoms: headaches, nausea, abdominal pain, and symptoms associated with stress.

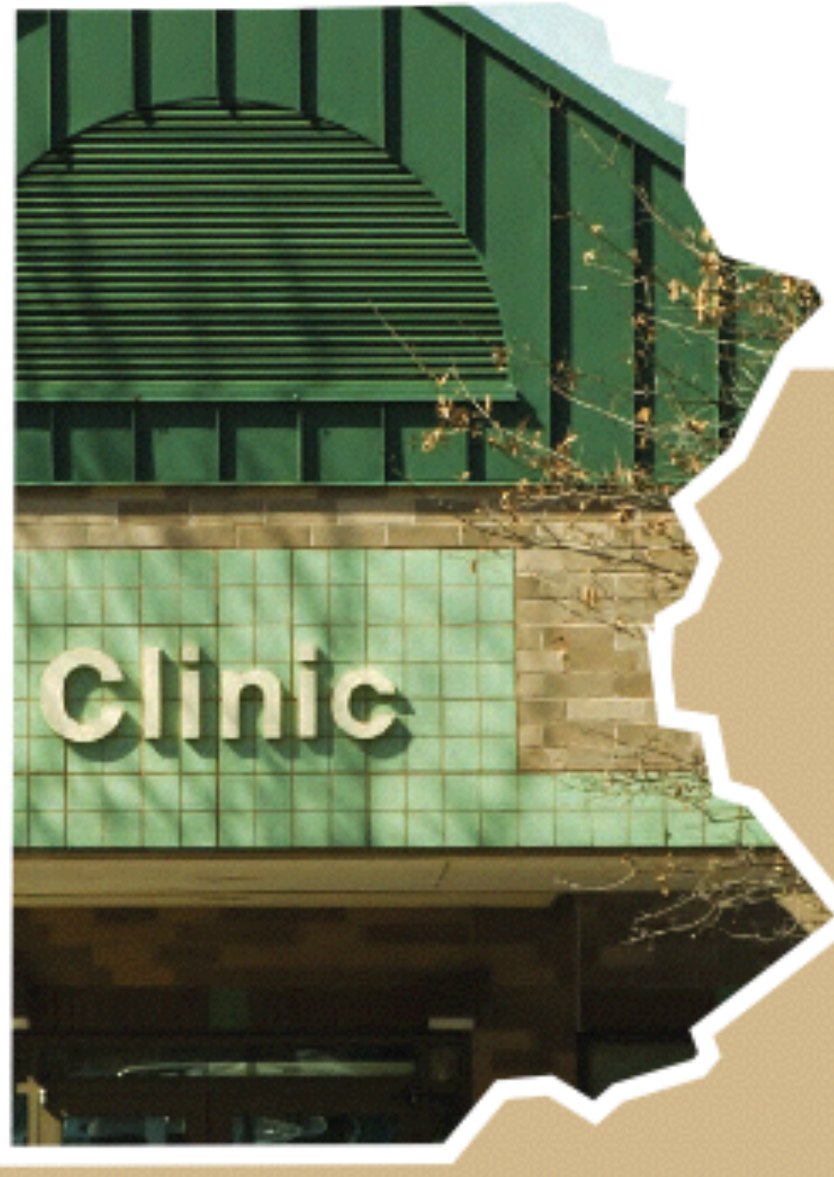
(American Lung Association - State of the Air app/Google Images)

Health Effects of Air Pollution - Cradle to Grave

- Complications of pregnancy
- Infant developmental problems
- Childhood asthma
- Childhood cancer
- Adult lung disease
- Adult heart disease
- Adult cerebral vascular disease
- Cancer
- Premature death

The Social Costs of
FRACKING





A PENNSYLVANIA CASE STUDY

Psychosocial Impacts of UNGD

SOURCES OF STRESS

- Noise (drilling, fracking, flaring, pig-launcher venting, compressor blowdowns, truck traffic)
- Odors (diesel, hydrocarbon emissions, hydrogen sulfide)
- Light (sleep deprivation)
- Traffic (increased truck-related fatalities)
- Crime (violent crime, property crime, drug and alcohol abuse, STD's)

SOUTHWEST PENNSYLVANIA ENVIRONMENTAL HEALTH PROJECT

Health & Shale Gas Development: State of the Science

Friday June 10, 2016 • 8 am – 4 pm
Hyatt Regency • Pittsburgh International Airport, PA

Program Overview

This is a conference for healthcare providers and community members that will discuss unconventional gas development and related health effects. Join us to understand the interdisciplinary and multi-agency/sector roles in environmental health, and how they are critical in protecting public health.

Learning Objectives

At the conclusion of the conference, participants should be able to:

- Describe environmental health risks related to unconventional gas development.
- Identify physical and psychological symptoms related to environmental exposures from unconventional gas extraction and development.
- Characterize unconventional gas development health risks across populations and across the life cycle.
- Identify the role governmental agencies play in protecting the health of communities impacted by unconventional gas development.

Target Audience

This continuing education activity is meant to attract physicians, residents, medical students, nurse practitioners, nurses, physician assistants, social workers and community members interested in learning about the health impacts of gas drilling activities.

Are you worried about your health because you live near gas drilling?

Industrial activities like gas drilling can pollute the air, water, and soil in nearby homes. The suggestions provided here are used in places where people are concerned about the quality of their air, water and other aspects of their environment. We make these suggestions because research shows that these steps can protect people from pollution in their immediate environment – in and around their homes.

Here are 3 **Good Things to Do** if you live near gas drilling.

1 Clear the Air

Take off your shoes when you come inside. Keep contaminated soil out of your home.

Clean your house often. Use a vacuum that can fit a HEPA filter. Don't sweep with a broom.

Clean kids' outdoor toys and the floors where they play often. If possible, wipe down swing sets and other play sets outside.

Wipe off pets' paws and fur before they come inside.

Cover all food containers. Don't leave food uncovered.

Vent the air in places where you use water. Open windows or run an exhaust fan in the bathroom, kitchen, laundry room. If you have a stove fan, always use it while cooking.

Let fresh air in your home when it is breezy outside, usually in the middle of the day. Unhealthy air can collect closer to ground level when the air is still, usually in the morning and evening. Contact us to learn about air filters.

2 Use Clean Water

Don't rely on one-time water tests to tell you if your water is safe to drink and use. Accidents and contamination can happen at any time.

Consider using bottled water for drinking, cooking and making drinks like baby formula, coffee, and juice.

If you must drink or cook with your tap water, leave it *uncovered* in a pitcher or bottle in the refrigerator overnight before using it.

Stop drinking your water if you or someone in your family has stomach pain or discomfort, confusion, nosebleeds, muscle pains or other unusual symptoms.

If your water burns your skin or causes a rash, take showers and baths somewhere else. Go see your doctor or call our office to see our nurse practitioner.

3 Look for Changes

Keep a health diary. Write down changes in your health and changes you notice in your water or air. Share this information with your health care provider.

Remember that children, senior citizens or people with chronic health conditions **are more sensitive**. Pay special attention to changes in their health.

Check your water for total dissolved solids (TDS). This can tell you if your water changes and if there may be a problem with your water supply. Contact us for more information about checking for TDS.

Contact us to learn about ways **to monitor the air** inside your home.

Call us to see our nurse practitioner or ask questions. **Visit our website** for more info.
724.260.5504 • www.environmentalhealthproject.org
info@environmentalhealthproject.org
Southwest PA Environmental Health Project • 4198 Washington Road, Suite 5, McMurray, PA, 15317

None of these steps can assure your safety completely. They may reduce your chance of exposure to harmful substances. If you are sick, get medical attention.

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