

What Are the Risks? Who pays the price?

Communities under seige

IN THE ERA OF FRACKING
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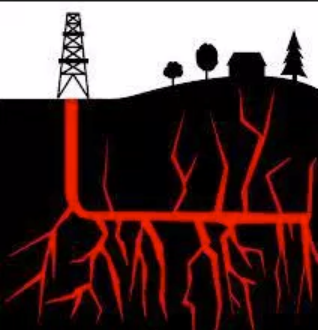
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**MINISINK SAYS
NO
COMPRESSOR
STATION**

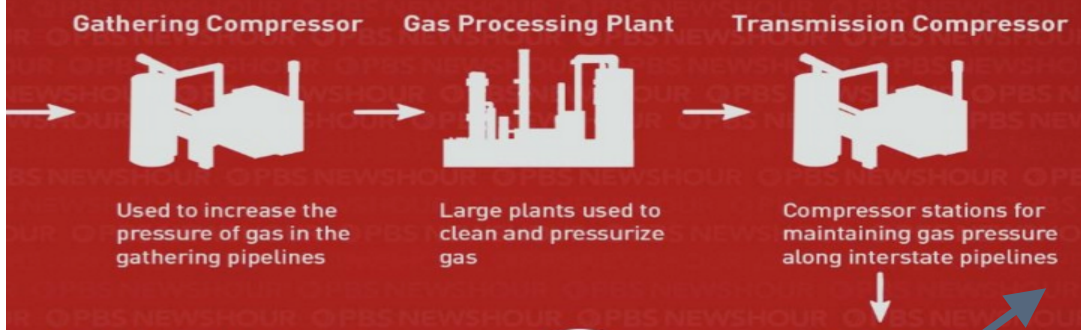
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Public Health
Climate Change



DIMOCK, PA



Used to increase the pressure of gas in the gathering pipelines

Large plants used to clean and pressurize gas

Compressor stations for maintaining gas pressure along interstate pipelines

MINISINK
needed every
40-100 miles

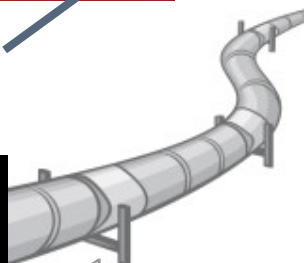
Leaking
Risks of explosion
water contamination
air pollution
at every stage of development
METERING stations

ORANGE COUNTY

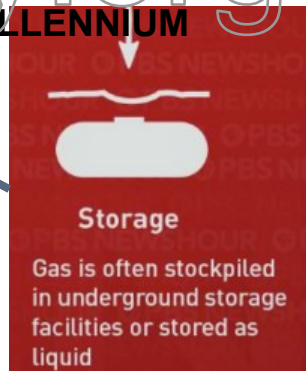


GAS POWER PLANT

ANCHOR PROJECT

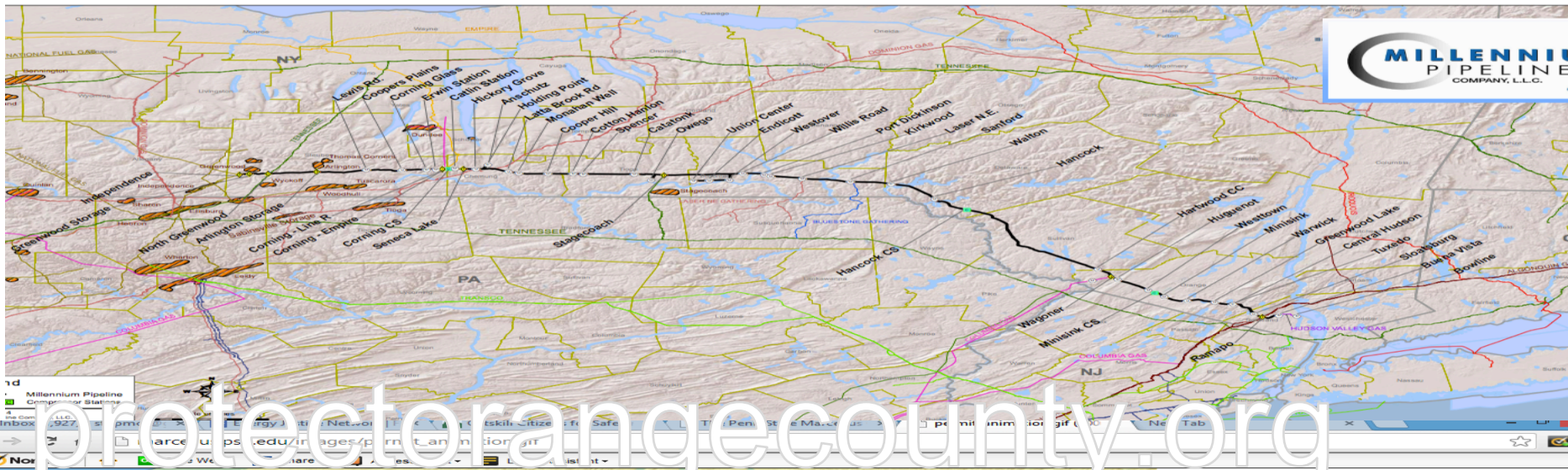


Hundreds of miles of pipeline
MILLENNIUM

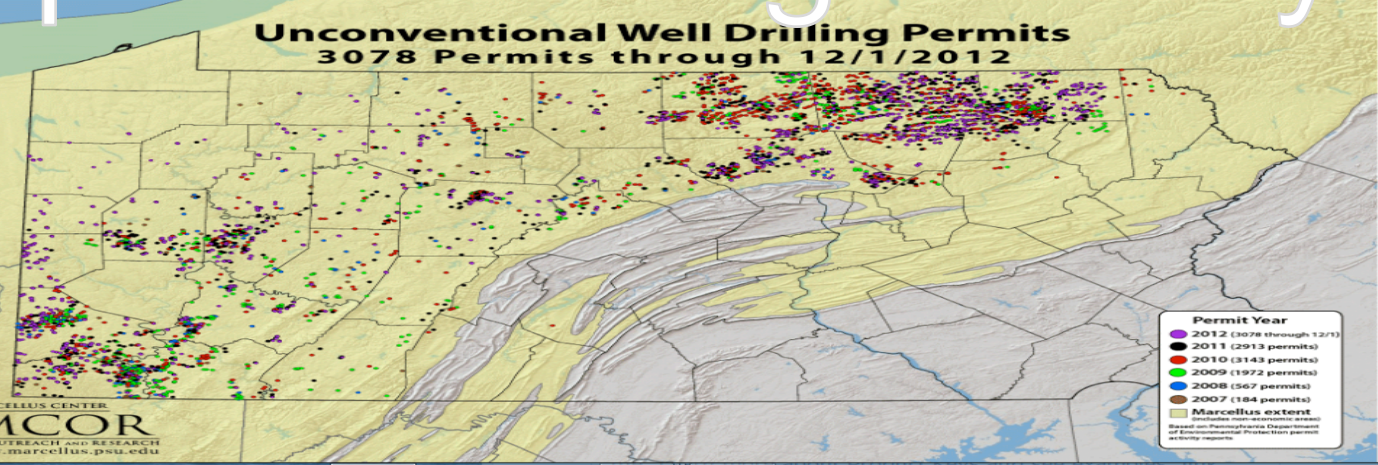


Storage

Gas is often stockpiled in underground storage facilities or stored as liquid



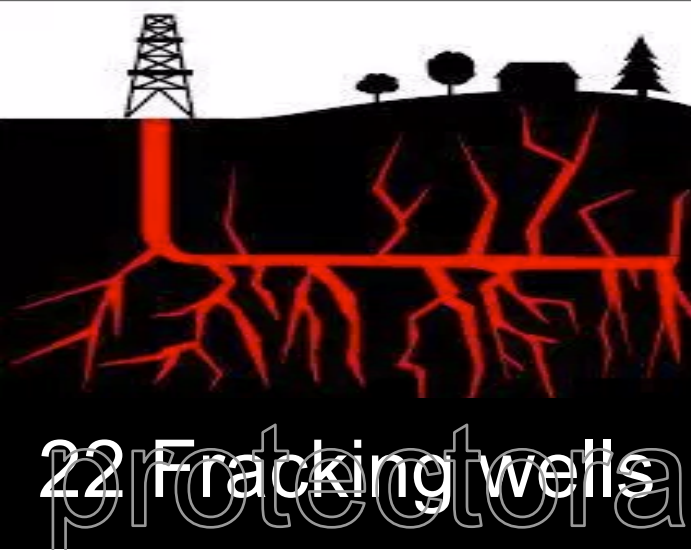
Unconventional Well Drilling Permits 3078 Permits through 12/1/2012



Compressor stations need every 40-100 miles along pipeline to push gas through

Emit VOCs and NOx that interact with sunlight to form ground level ozone

Formaldehyde dangerous



22 Fracking wells

CPV VALLEY
POWER PLANT.



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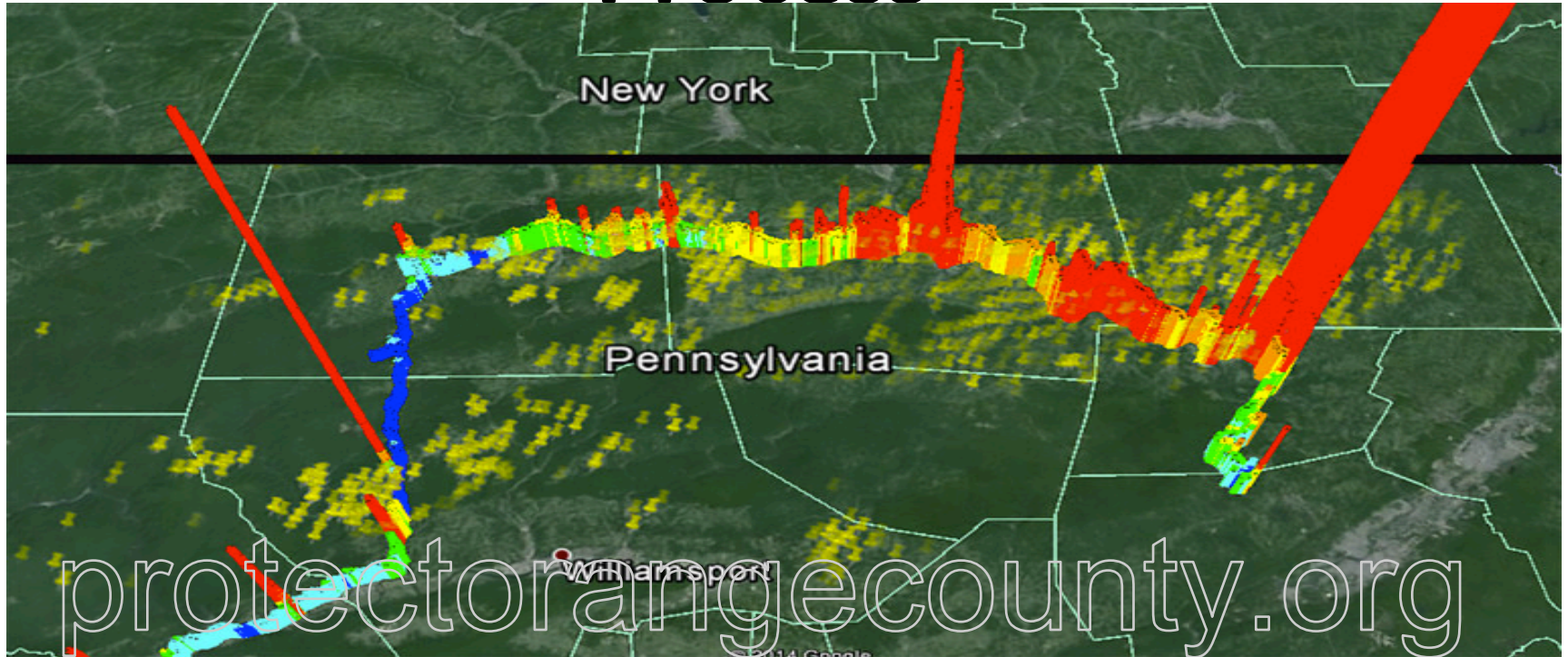
“Fracking is an extreme form of oil and gas extraction that leads to water contamination, air pollution, earthquakes, illness, exacerbates climate change and turns communities upside down.”

— Mark Ruffalo

I've seen it firsthand in the state of **Pennsylvania**, where hundreds and of families have had their water turn brown and toxic. Nosebleeds are common. So are persistent rashes, trouble breathing, headaches, vomiting, hair loss and much more.

*WAIT A
MINUTE
DIDN'T
WE BAN
FRACKING?*

Methane Leaks During Entire Process



Emissions from Compressor Stations

- Compressor stations along pipelines are used to push the natural gas through the pipeline.
- The compressors release combustion products, nitrogen oxide and volatile organic hydrocarbons into the air and degrade the air quality.
- The combustion products combine with the volatile organic compounds released by the compressors and heat and sunlight to produce ground level ozone.
- Ground level ozone impacts the respiratory system, lung function and cardiovascular system.



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COMPRESSOR
STATION**

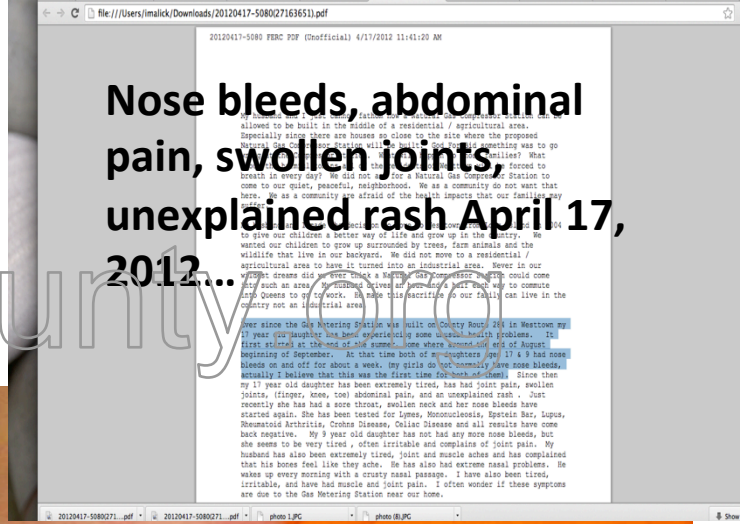


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Metering stations also toxic required every 10 miles



Nose bleeds, abdominal pain, swollen joints, unexplained rash April 17, 2012...



Child living near metering station. photos taken before the compressor station was built. Family moved away after project received approval.

October 2012 Venting



Ramapo NY.... in an email the mother wrote
"On Oct 11 the smell of gas in our house was
so bad I had to call 911, on Oct 13 my son
broke out in this rash."

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Minisink NY

Wilma Subra Chemist, MacArthur “Genius” Grant Recipient

Chemicals Released into the Air from Compressor Facilities

- ▶ Benzene
- ▶ Toluene
- ▶ Ethylbenzene
- ▶ Xylenes
- ▶ 1,3-Butadiene
- ▶ n-Butyl Alcohol
- ▶ Carbon Disulfide
- ▶ Carbonyl Sulfide
- ▶ Chlorobenzene
- ▶ Chloromethane
- ▶ 1, 2-Dichloroethane
- ▶ Diethyl Benzene
- ▶ Dimethyl Disulfide
- ▶ Formaldehyde
- ▶ Methyl Ethyl Disulfide
- ▶ Naphthalene
- ▶ 1,1,1, 2-Tetrachloroethane
- ▶ Trichloroethylene
- ▶ Trimethyl Benzene
- ▶ 1,2,4-Trimethyl Benzene
- ▶ Styrene
- ▶ Methane
- ▶ Ethane
- ▶ Butane
- ▶ Propane
- ▶ Nitrogen Oxide

protektorang@county.org

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- Trichloroethylene
- Trimethyl Benzene
- 1,2,4-Trimethyl Benzene
- Styrene
- Methane
- Ethane
- Butane
- Propane

- Health Symptoms Associated With Chemicals Detected in the Air
 - Allergies
 - Persistent Cough
 - Shortness of Breath
 - Frequent Nose Bleeds
 - Sleep Disturbances
 - Joint Pain
 - Difficulty in Concentrating
 - Nervous System Impacts
 - Forgetfulness
 - Sores and Ulcers in Mouth
 - Thyroid Problems

Health Impacts Associated With Living near Compressor Stations and Gas Metering Stations Along Gas Transmission Pipelines

- Nasal Irritation
- Throat Irritation
- Eyes Burning
- Frequent Nausea
- Sinus Problems
- Bronchitis
- Increased Fatigue
- Muscle Aches and Pains
- Severe Headaches
- Dizziness
- Weakness and Tired
- Decreased Motor Skills
- Depression
- Frequent Irritation
- Severe Anxiety

61% of Health Impacts are associated with chemicals present in the air in excess of Short and Long Term Health Screening Levels

Chronic Health Impacts Experienced by Individuals Living and Working near Compressor Stations

- ▶ Damage to Liver and Kidneys
- ▶ Damage to Lungs
- ▶ Damage to Cardiovascular System
- ▶ Damage to Developing Fetus
- ▶ Reproductive Damage
- ▶ Mutagenic Impacts
- ▶ Developmental Malformations
- ▶ Damage to Nervous System
- ▶ Brain Impacts
- ▶ Leukemia
- ▶ Aplastic Anemia
- ▶ Changes in Blood Cells
- ▶ Impacts to Blood Clotting Ability

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Air Emissions from Infrastructure

- **Found elevated rates of Formaldehyde:** Yes, the same chemical used for embalming
- **And Benzene:** Increases risk of cancer and organ illness

State	Nearest Infrastructure	Chemical	Concentration ($\mu\text{g}/\text{m}^3$)	% of ATSDR risk level	% of EPA cancer risk level
PA	compressor	formaldehyde	8.3	n/a	1,038%
PA	compressor	formaldehyde	7.6	n/a	950%
PA	PIG launch	benzene	5.7	n/a	127%
PA	compressor	formaldehyde	61	124% of acute level	7,625%
PA	compressor	formaldehyde	59	120% of acute level	7,375%
PA	compressor	formaldehyde	32	325% of chronic level	4,000%
PA	compressor	formaldehyde	34	347% of chronic level	4,250%

Sources: 2014. Global Community Monitor, Coming Clean. *Warning Signs*



UTNE READER

Cure Ignorance

Gas Compressors and Nose Bleeds

A new study connects health issues with rural gas compressor pollution.

By Jessica Cohen, special to Utne Reader
Fall 2015



Minisink Health Study Photo

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**Dr. David Brown, Toxicologist,
Environment and Human Health, Inc.,CT**



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Dr. Brown

- **“ government failed to heed citizens cries for help. Level of moral responsibility – we seem to have decided that we need energy so badly ...that we have identified individuals and areas to sacrifice.**

Utne Reader, Fall 2015, cont'd

“To attain permits, pipeline companies use analysts who manipulate projected emissions levels to make them acceptable by Environmental Protection Agency standards.”

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Gas Compressors & Nose Bleeds, by Jessica Cohen Utne Reader, Fall 2015

- In rural Minisink, NY, air **contaminants** from the Millennium Pipeline gas compressor now **exceed what would be found even in a big city**, like New York, and they're different contaminants environmental health consultant, David Brown.
- **Asthma, nosebleeds, headaches, and rashes** were **common** among the 35 participants in eight families **living within one mile of the compressor**. Those symptoms are also frequently reported around gas fracking sites, said Brown.

Investigators report high pollution near gas compressor

By Jessica Cohen
For the Gazette

Families living near the Millennium Pipeline gas compressor in rural Minisink are exposed to air pollution exceeding what would be found in a big city, according to an environmental health consultant.

David Brown and his colleagues at the Southwest Pennsylvania Environmental Health Project, a nonprofit group of public health experts based in McMurray, Pennsylvania, carried out a two-month study of air contaminants and

symptoms near the gas compressor station. Dozens of Minisink residents had complained they were beset by ailments immediately after the compressor station was built in 2013.

The Southwest Pennsylvania Environmental Health Project has been investigating similar symptoms near gas drilling sites in Pennsylvania and elsewhere. Gas compressors are built near gas drilling wells and at 50- to 100-mile intervals along pipelines to stimulate gas flow.

The consultants recently released the results of their

Minisink study reporting that had nosebleeds, which Brown said. The study interviewed 35 residents, who were interviewed by Brown said. Asthma, nosebleeds, headaches, and rashes are common among the 35 participants in eight families within 1.5 kilometers of the compressor, Brown said. Those symptoms are also frequently reported around gas fracking sites, he said.

Six of the 12 children studied had nosebleeds, which Brown attributed to elevated blood pressure or irritation of mucous membranes caused by formaldehyde, a carcinogen found in excess around gas compressors in a recent SUNY Albany study.

The predominant health impacts reported among the 35 residents in the study were:

• Respiratory problems (22, including six experiencing nosebleeds)

• Neurological problems (12, all of whom reported headaches)

• Dermatological problems (10, skin rashes)

The Southwest Pennsylvania

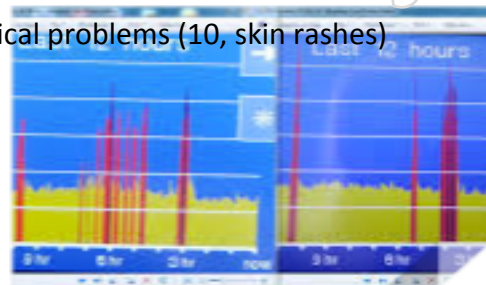
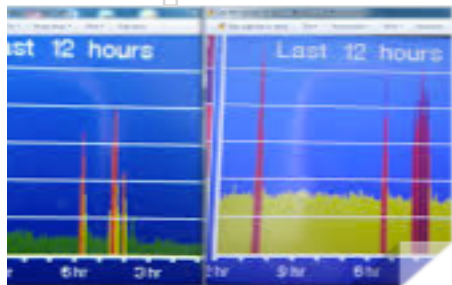
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Attachments



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Compressor Station VS Home Owner's Property Values



Loss of Property Value

- **House-Abandoned-Because-Compressor-Station-Family-Walks-Away-From \$250,000**
- By JESSICA COHEN, November 24, 2015 —MINISINK, NY
- ... no offers on their house ...others in the neighborhood negotiated with "lowball offers" to sell their houses
- The Baum family of #Minisink, New York abandoned their home after emissions from a nearby 12,600 horsepower compressor started hurting their health and well-being.

A photograph of a two-story house with a brown roof and white siding, situated in a green field under a cloudy sky. The text is overlaid on the image in a white, distressed, stencil-like font.

**HOME
SICK
FROM
TOXIC
EMISSIONS**

"Would I be taking one of my children for chemotherapy in 15 years because we'd stayed too long?" -Leanne Baum

#StopCPV #FrackedinNY



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Possible Health Impacts Associated with the Emissions to be Released by the Valley Energy Center Power Plant

- ▶ The same classes of chemicals will be released by the Valley Energy Center Power Plant as are being released by the Minisink compressor facility, except in much higher/larger concentrations.
- ▶ Thus the same exposure and health impacts could be experienced by individuals in the area of the power plant.
- ▶ To reduce the health impacts, individuals must reduce their exposure by increasing their distance from the source of pollution from the Valley Energy Center Power Plant.

Emissions from CPV Valley Energy Center Power Plant Greater than Emissions from Minisink Compressor Facility

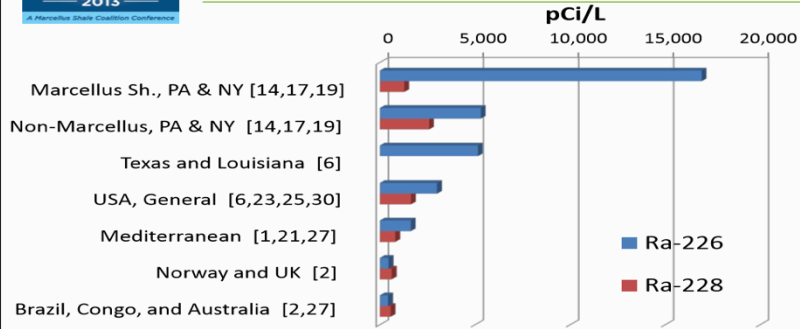
Volatile Organic Compounds 43 times greater
Nitrogen Oxide 14 times greater
Carbon Monoxide 12 times greater
PM 2.5 9 times greater
Sulfur Dioxide 6 times greater

2.1 million tons CO₂e annually

In a 20 year timeframe the GWP of this plant will be 4 times this amount (at 5% leakage rate)

Emissions Reductions Credits are financial scheme the

MAXIMUM RADIUM ACTIVITIES MEASURED IN BRINES AND PRODUCED WATERS



12

SUMMARY

- Radium isotopes precipitate in pipes (scale) and adsorb to sediments and sludges, causing activities to be elevated in those waste byproducts.
- Radium decays to radon, causing some concern of radon at the wellhead and in the pipeline gas during production.

19

SUMMARY

- Because of their elevated organic carbon and clay contents, marine black shales have propensity to contain elevated uranium, thorium, and daughter isotopes.
- Radionuclides, particularly radium, can dissolve and be mobile in groundwaters and more so in brines.
- Radium brought to ground surface in the produced waters.

TENORM Study

Future Work:

- Continued Well Pad Sampling
- Third Round of WWTP Sampling
- Continued Landfill Leachate Collection
- Beneficial Use Sites
- Pipe Disposal/Refurbishing Facilities
- Gas Fired Power Plants, Compressor Stations, and Processing Facilities

Wednesday, September 09, 2015 12:20 PM ET Exclusive

As US rushes to build gas lines, failure rate of new pipes has spiked

Article

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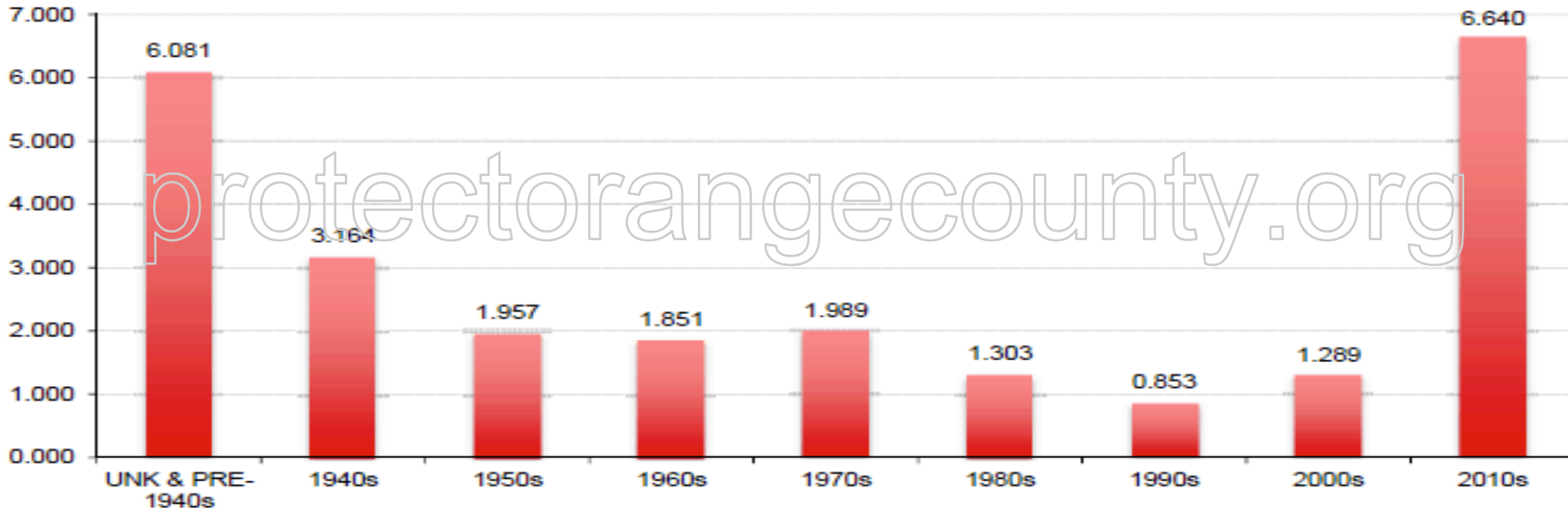
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By Sarah Smith

The push to build new pipelines to transport abundant shale supplies appears to be having a materially adverse impact on pipeline safety.

Tools
 A+ A-    

Average number of annual incidents over 2005-2013 per 10,000 miles of onshore gas transmission pipe by decade of pipe installation



As of March 2015.

Sources: U.S. Pipeline and Hazardous Materials Safety Administration, Pipeline Safety Trust

SAN BRUNO PIPELINE EXPLOSION 8 PEOPLE KILLED



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A California Gas Leak Is the Biggest Environmental Disaster Since the BP Oil Spill

Allissa Walker
12/28/15 6:20pm · Filed to: PORTER RANCH GAS LEAK

264.8K 596 53



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ALISO CANYON

2500 People Forced to Evacuate:
Reports of nosebleeds, headaches,
breathing problems

“devastating on planetary scale” say
experts

Released **2.1 million tons** of Co2e

CPV VALLEY

Would release **2.1 million tons** of
CO2e annually

CPV



Los Angeles Times

SUNDAY FEB. 21, 2016

MOST POPULAR LOCAL SPORTS ENTERTAINMENT POLITICS EDUCATION OPINION PLACE AN AD

60°

Los Angeles Times
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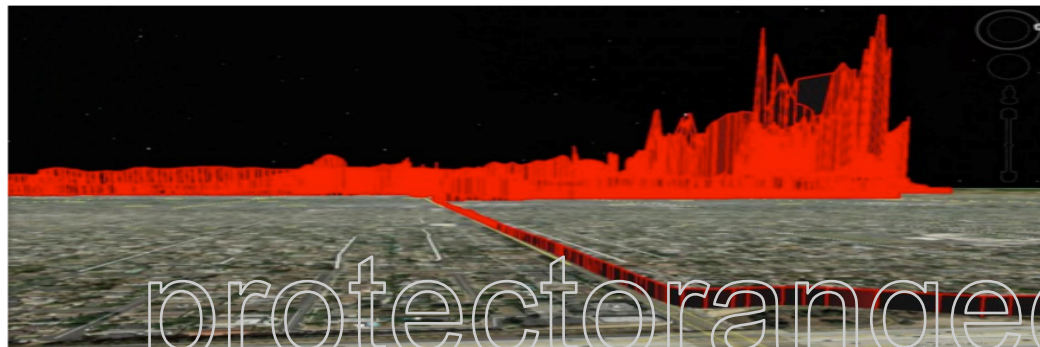
Aliso Canyon gas leak exposes infrastructure vulnerabilities across country

Leaking Methane Plume Spreading Across L.A.'s San Fernando Valley

The findings by independent researchers raise potential health concerns for people living outside the immediate vicinity of the Aliso Canyon gas leak.

BY PHIL MCKENNA, INSIDECLIMATE NEWS

JAN 14, 2016



"Whatever else may be in the gas—benzene, toluene, xylene—that is what people may be breathing," said Nathan Phillips, an earth and environment professor at Boston University. "Even though we're not measuring things other than methane, there is a legitimate concern that there is that other nasty stuff in there."

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Supreme Court Halts Clean Power Plan, with Implications Far Beyond the U.S.

BY JOHN H. CUSHMAN JR.



Oil Industry Group's Own Report Shows Early Knowledge of Climate Impacts

Greenhouse gas emissions

Guardian Environment Network

US 'likely culprit' of global spike in methane emissions over last decade

Harvard study shows 30% rise across the country since 2002 with peaks coinciding with shale oil and gas boom, reports [Climate Central](#)

Bobby Magill for Climate Central, part of the Guardian Environment Network

Wednesday 17 February 2016 08.35 EST



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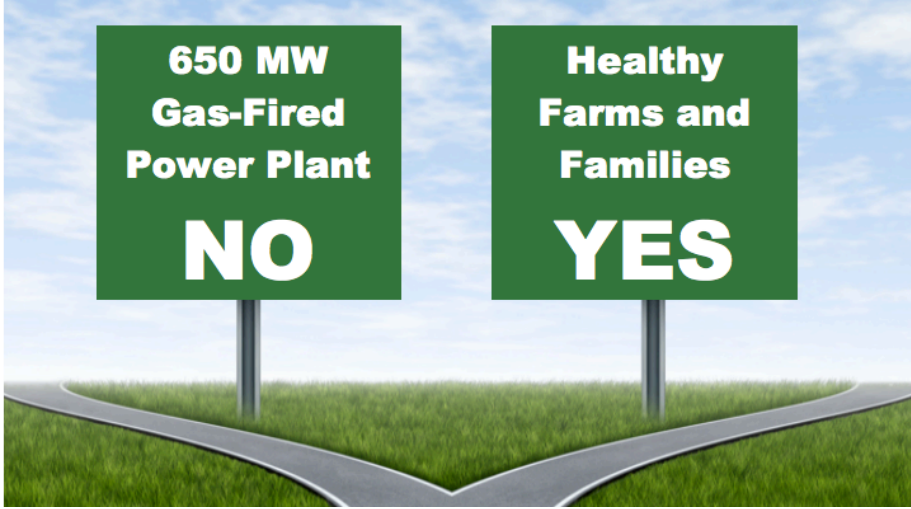
Methane gas flares up at a fracking site in Texas. Photograph: Les Stone/Corbis

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SCIENTISTS SAY THAT AT A 1.22% LEAKAGE RATE BENEFITS OF SWITCHING FROM COAL TO GAS ARE LOST (Afsah Salcito 2013)

CRADLE TO GRAVE (FULL LIFE CYCLE) OF METHANE LEAKAGE AVERAGES 12% (Howarth; Cornell 2015) others have calculated it as high as 25%

NEW HARVARD STUDY FINDS 30% INCREASE IN ATMOSPHERIC METHANE SINCE 2002 with PEAKS COINCIDING WITH SHALE BOOM (FRACKING)



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