

HEALTH IMPACTS OF GAS INFRASTRUCTURE: COMPRESSOR STATIONS

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Health Impacts of Gas Infrastructure

- **scope, focus on NY**

INFRASTRUCTURE INCLUDES:

**SILICA SAND MINING AND TRANSPORT / WATER WITHDRAWAL /
GAS STORAGE / WASTE DISPOSAL /
PROCESSING AND FOSSIL FUEL PLANTS /
PIPELINES AND COMPRESSORS / OIL TRAINS / EXPORT TERMINALS**

- **potential impacts and health concerns, focus on compressors**

INFRASTRUCTURE

- ~ **SILICA SAND** / WATER WITHDRAWAL / STORAGE / WASTE DISPOSAL
- ~ PROCESSING AND FOSSIL FUEL PLANTS
- ~ PIPELINE TRANSPORT / OIL TRAINS / EXPORT TERMINALS

[http://www.osha.gov/dts/hazardalerts/hydraulic frac hazard alert.htm](http://www.osha.gov/dts/hazardalerts/hydraulic%20frac%20hazard%20alert.htm)



http://www.clevelandclinimed.com/medicalpubs/diseasemanagement/pulmonary/occupational_lung_disease/Images/Occupationalfig4_thumb.jpg



© Jim Tittle 2012

<http://www.iatp.org/documents/the-economic-benefits-and-costs-of-frac-sand-mining-in-west-central-wisconsin>

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PAINTED POST, NY

<http://www.nycourts.gov/courts/ad4/clerk/decisions/2015/12-31-15/PDF/0202.pdf>

https://gdacc.files.wordpress.com/2013/05/export_gw_ny_pasierra_club.pdf



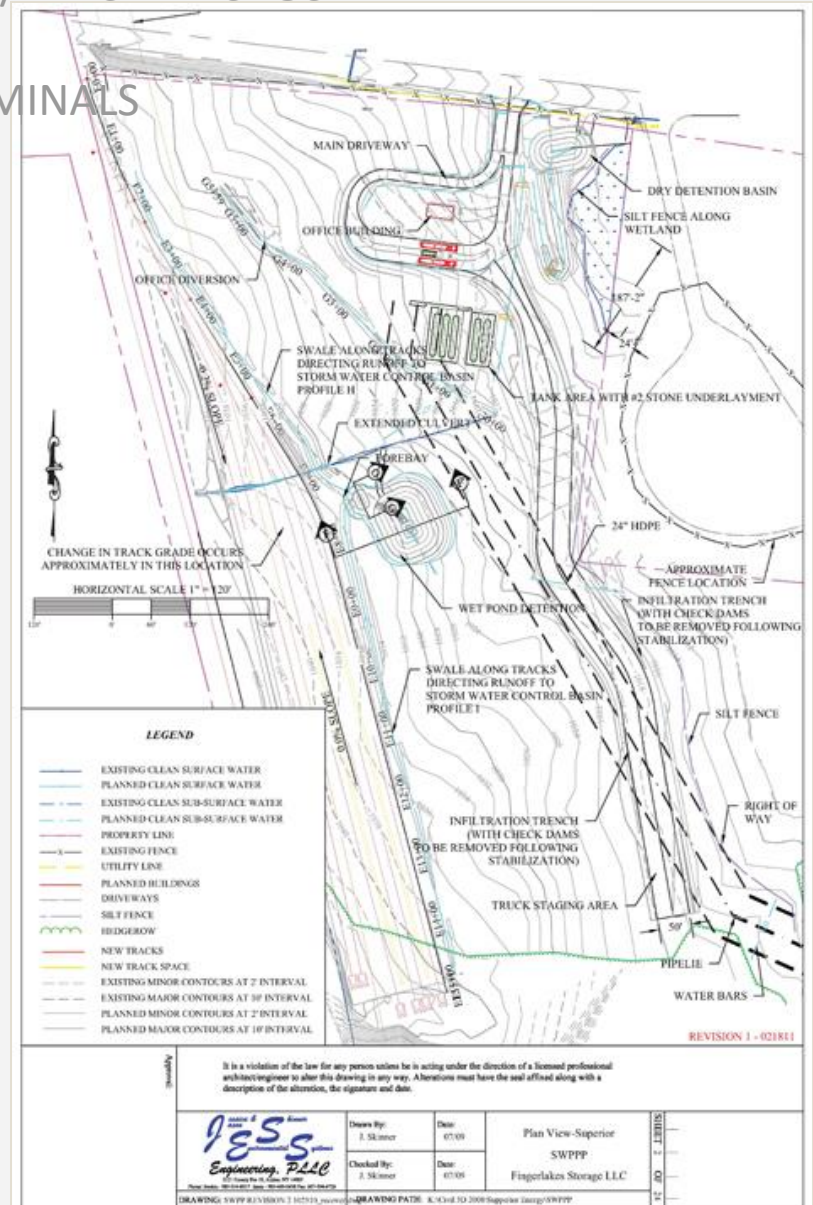
<http://www.the-leader.com/article/2015-10-10/NEWS/1510149995>

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<http://www.dcbureau.org/dcb2/wp-content/uploads/2012/06/InergySaltPlantpic1.jpg>

<http://www.dcbureau.org/201301078183/natural-resources-news-service/inergy-seeks-approval-for-gas-storage-in-once-deemed-unusable-salt-caverns.html#more-8183>

<http://www.newyorker.com/news/news-desk/video-is-gas-storage-the-future-of-seneca-lake>


https://www.eia.gov/dnav/ng/ng_stor_sum_dcu_NUS_m.htm

<http://www.dcbureau.org/dcb2/wp-content/uploads/2012/06/Inergy-Storage-Facility.jpg>

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- **Permitted oil and gas operations in NY, including brine spread on roads and disposal at landfills**
<https://www.fractracker.org/map/us/new-york/> 
- **Pennsylvania gas drilling waste in NY** http://communityscience.org/wp-content/uploads/2014/12/ithaca_mar2015.pdf
- **hazardous with current disposal methods** <http://www.nrdc.org/energy/fracking-wastewater.asp#sec-update> and http://www.shalegas.energy.gov/resources/060211_earthworks_petroleumexemptions.pdf and <http://www.dcbureau.org/201308148881/natural-resources-news-service/new-york-imports-pennsylvanias-radioactive-fracking-waste-despite-falsified-water-tests.html#more-8881>
- **waste contains radioactive elements, brine and gases** <http://www.grassrootsinfo.org/pdf/radioactivewaste.pdf> and <http://www.grassrootsinfo.org/pdf/whitereport.pdf> and http://communityscience.org/wp-content/uploads/2014/12/ithaca_mar2015.pdf
- **exempt from federal oversight** <http://www.epa.gov/osw/nonhaz/industrial/special/oil/oil-gas.pdf>
- **Radioactive Waste Dumped by Oil Companies Is Seeping out of the Ground in North Dakota,**
<http://www.globalpossibilities.org/radioactive-waste-dumped-by-oil-companies-is-seeping-out-of-the-ground-in-north-dakota/>
- **Duke study, 2013** *Elevated levels of radioactivity, salts and metals have been found in river water and sediments at a site where treated water from oil and gas operations is discharged into a western Pennsylvania creek.* Environmental Science & Technology. <http://www.nicholas.duke.edu/news/radioactive-shale-gas-contaminants-found-at-wastewater-discharge-site>
- **Brown VJ. 2014. Radionuclides in fracking wastewater: managing a toxic blend. Environ Health Perspect** 122:A50–A55; <http://dx.doi.org/10.1289/ehp.122-A50>

INFRASTRUCTURE

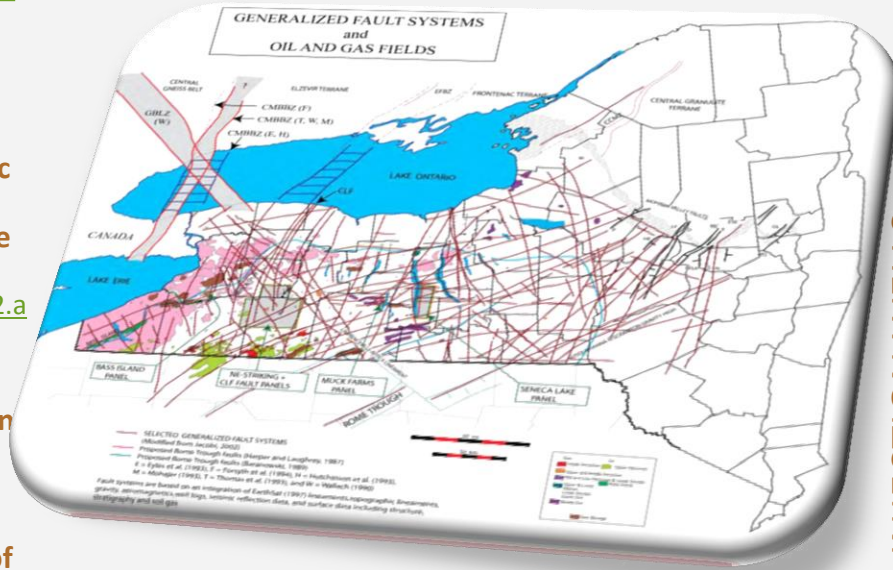
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- ~ PROCESSING AND FOSSIL FUEL PLANTS
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- **Disposal in underground injection wells can, and has caused earthquakes.**
<http://geology.gsapubs.org/content/early/2013/03/26/G34045.1.abstract> and <http://www.ldeo.columbia.edu/news-events/wastewater-injection-spurred-biggest-earthquake-yet-says-study> and <http://stateimpact.npr.org/texas/tag/earthquake/>

EARTHQUAKES

- **“The petroleum industry needs clear requirements for operation, regulators must have a solid scientific basis for those requirements, and the public needs assurance that the regulations are sufficient and are being followed.”]**
<http://www.sciencemag.org/content/341/6142/1225942.abstract?sid=a09d332a-699d-452a-b828-a7b28e7466a6>

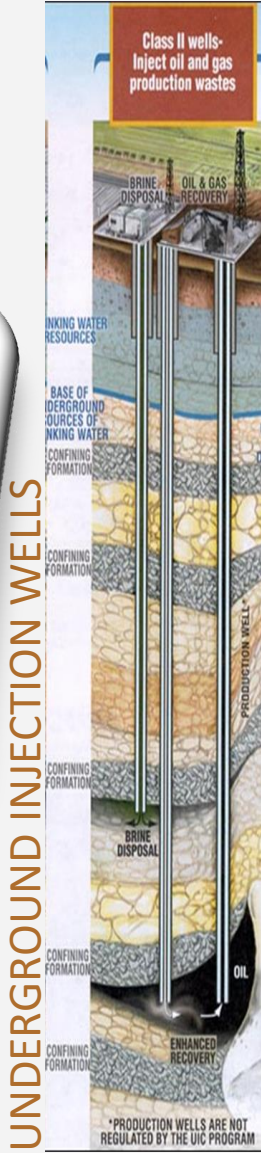
- **“The fluids (in wastewater injection wells) are driving the faults to their tipping point...Areas with suspected anthropogenic earthquakes are more susceptible to earthquake-triggering from natural transient stresses generated by the seismic waves of large remote earthquakes.”**
<http://www.sciencemag.org/content/341/6142/164.abstract?sid=a09d332a-699d-452a-b828-a7b28e7466a6>



- **Waste from fracking is extremely high in TDS and barium.**
<http://www.sciencedirect.com/science/article/pii/S088329271530069X>

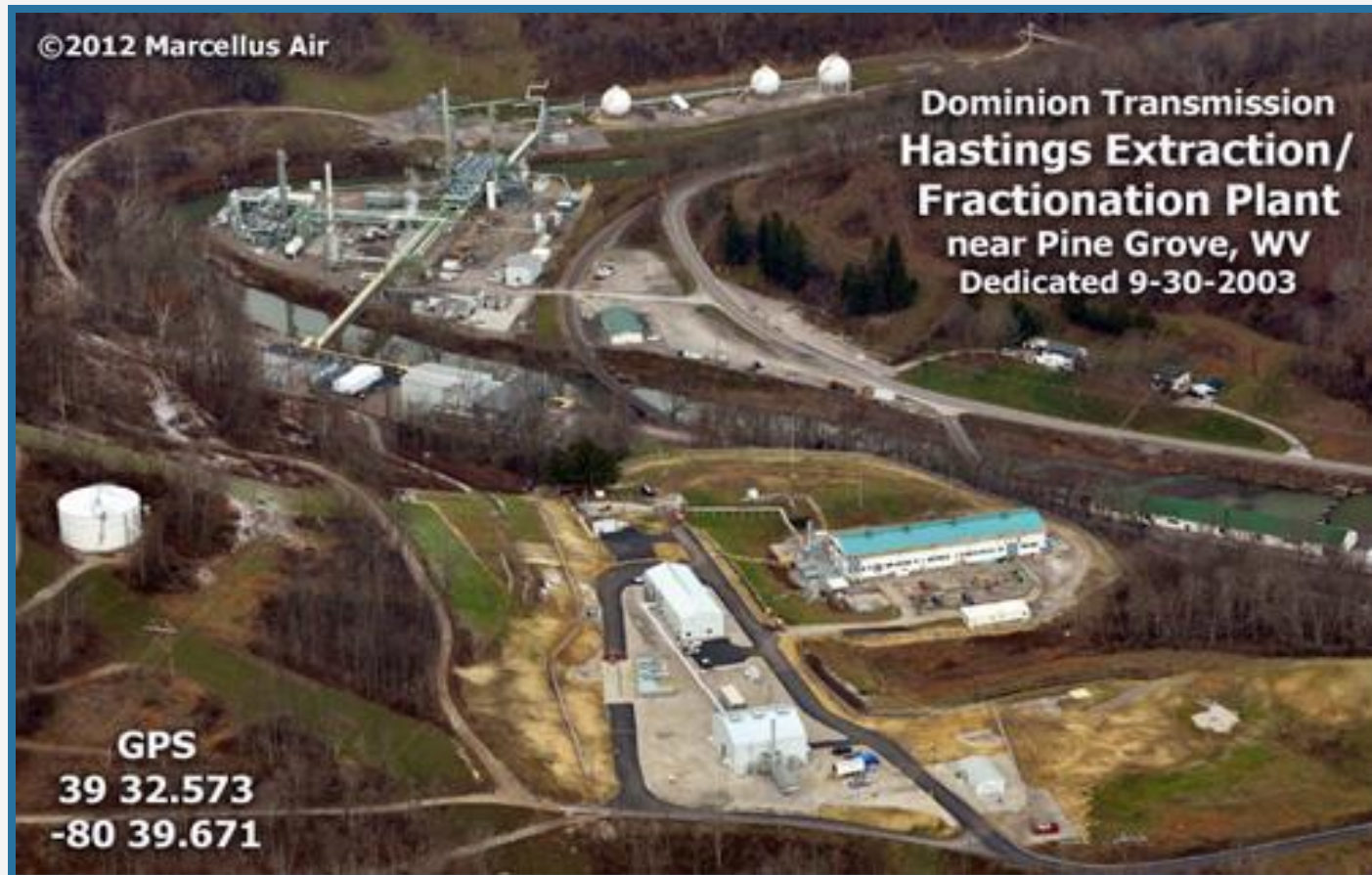
FAULTS and FRACTURES

- <http://www.hydrorelief.org/frackdata/references/NYS%2520-%2520JacobiTectonics.pdf>
- <http://www.pttc.org/aapg/marcellusutica.pdf>



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SAFETY

Accidents

<http://projects.propublica.org/pipelines/>

Spills

<http://earthjustice.org/features/campaigns/fracking-across-the-united-states>

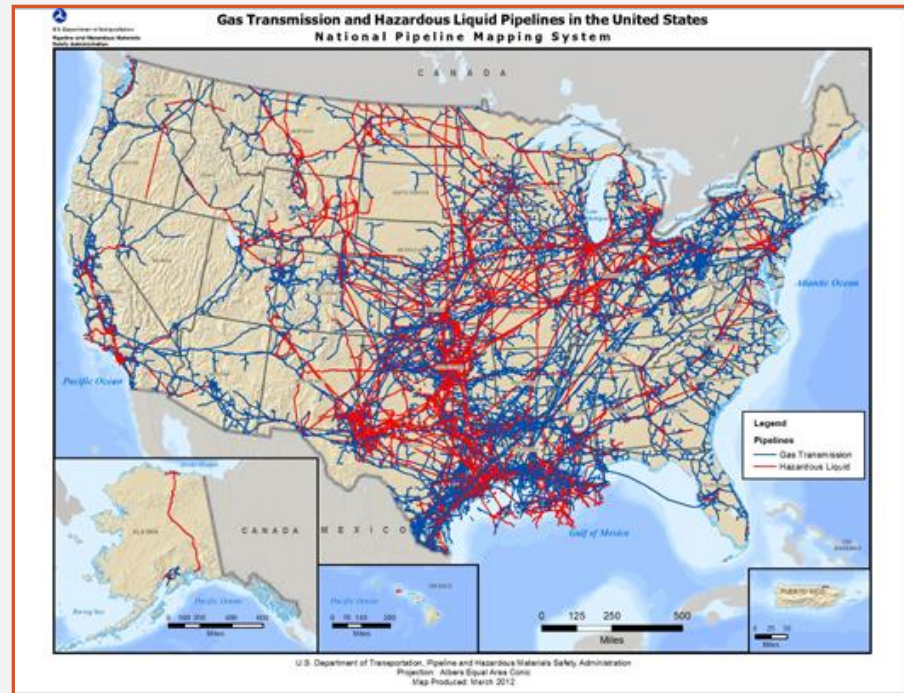
Pipeline and Hazardous Materials Safety Administration

<http://primis.phmsa.dot.gov/comm/reports/safety/psi.html>

HEALTH

<http://www.iom.edu/~media/Files/Activity%20Files/Environment/EnvironmentalHealthRT/2012-04-30/Robinson.pdf> and
http://sape2016.files.wordpress.com/2013/10/air_quality_and_climate_impacts_of_shale_gas_operations.pdf and
<http://www.post-gazette.com/news/state/2013/10/06/Marcellus-gas-facilities-near-to-one-another-or-even-linked-are-evaluated-individually-for-pollution/stories/201310060050> and
<http://www.cleanair.org/program/outdoor-air-pollution/shale-gas-infrastructure/milford-compressor-station-air-impacts-commun> and
<http://www.environmentalhealthproject.org/wp-content/uploads/2015/06/Summary-of-Minisink-Results.Public.pdf> and
<http://www.environmentalhealthproject.org/wp-content/uploads/2012/03/Compressor-station-emissions-and-health-impacts-02.24.2015.pdf> and
<https://www.madisoncounty.ny.gov/sites/default/files/publicinformation/madison-county-doh-comments-docket-no.-cp14-497-000.pdf>

PIPELINES IN THE US



INFRASTRUCTURE

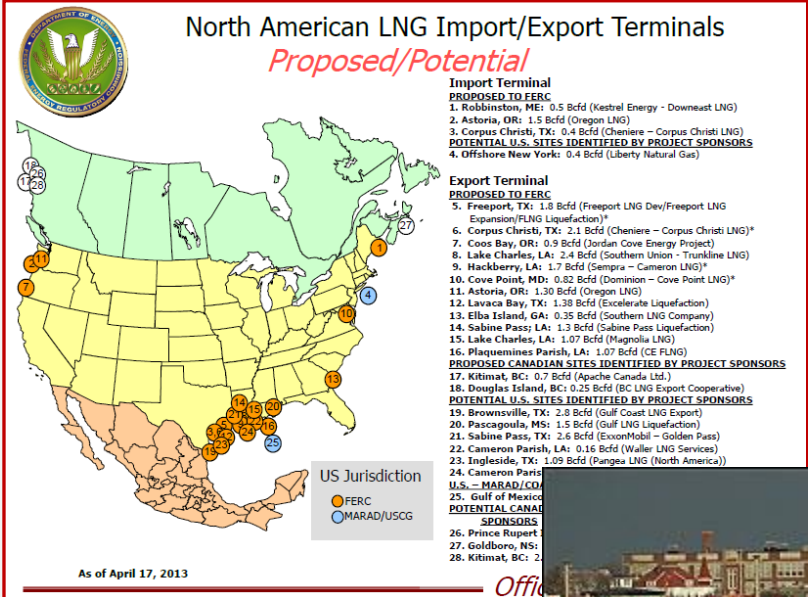
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- Since 2009, the amount of crude oil transported on North America's rail network has grown from almost nothing to around one million barrels per day (bpd) in early 2014, most coming from the Bakken formation.
- The deadly incident at Lac-Mégantic was indicative of a disturbing aspect of the ongoing North American oil boom...there were 117 crude-by-rail spills in the US in 2013, a near tenfold rise from 2008.
- In the short term, better safety standards for pipelines and train cars are needed to protect communities, but in the long term there is a need to transition to clean energy solutions that don't explode.
- Most importantly, there is a need for an immediate moratorium on oil train shipments.

<http://priceofoil.org/rail/>

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<http://ferc.gov/industries/gas/indus-act/lng/lng-proposed-potential.pdf>

and

<http://concernedhealthny.org/wp-content/uploads/2013/10/Factsheet-Health-and-Security-Risks-of-LNG.pdf>



http://timrileylaw.com/LNG_TANKERS.htm

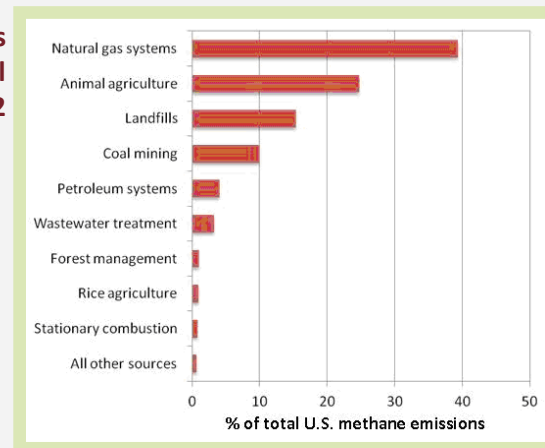
Human-controlled sources of atmospheric methane from the United States for 2009, based on emission estimates from the U.S. Environmental Protection Agency in 2011; graph from Howarth (2012)

CLIMATE CHANGE

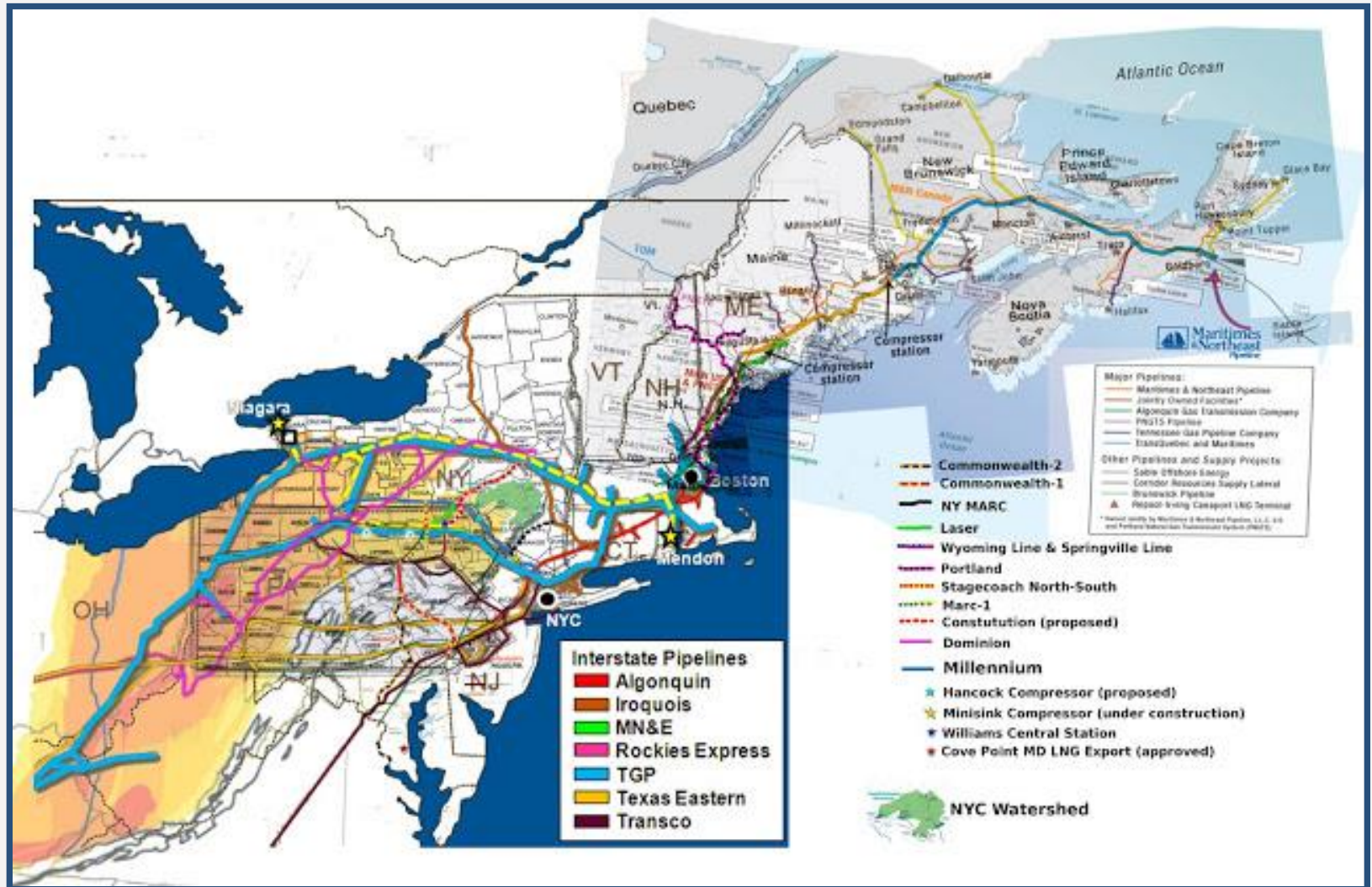
Methane is the second largest contributor to human-caused climate change, after carbon dioxide. Natural gas systems are the single largest source of anthropogenic methane emissions in the U.S., representing almost 40% of total emissions (EPA 2011 data)

http://www.psehealthyenergy.org/data/PSE_ClimateImpactsSummary_ALLCitations_01Feb2013.pdf

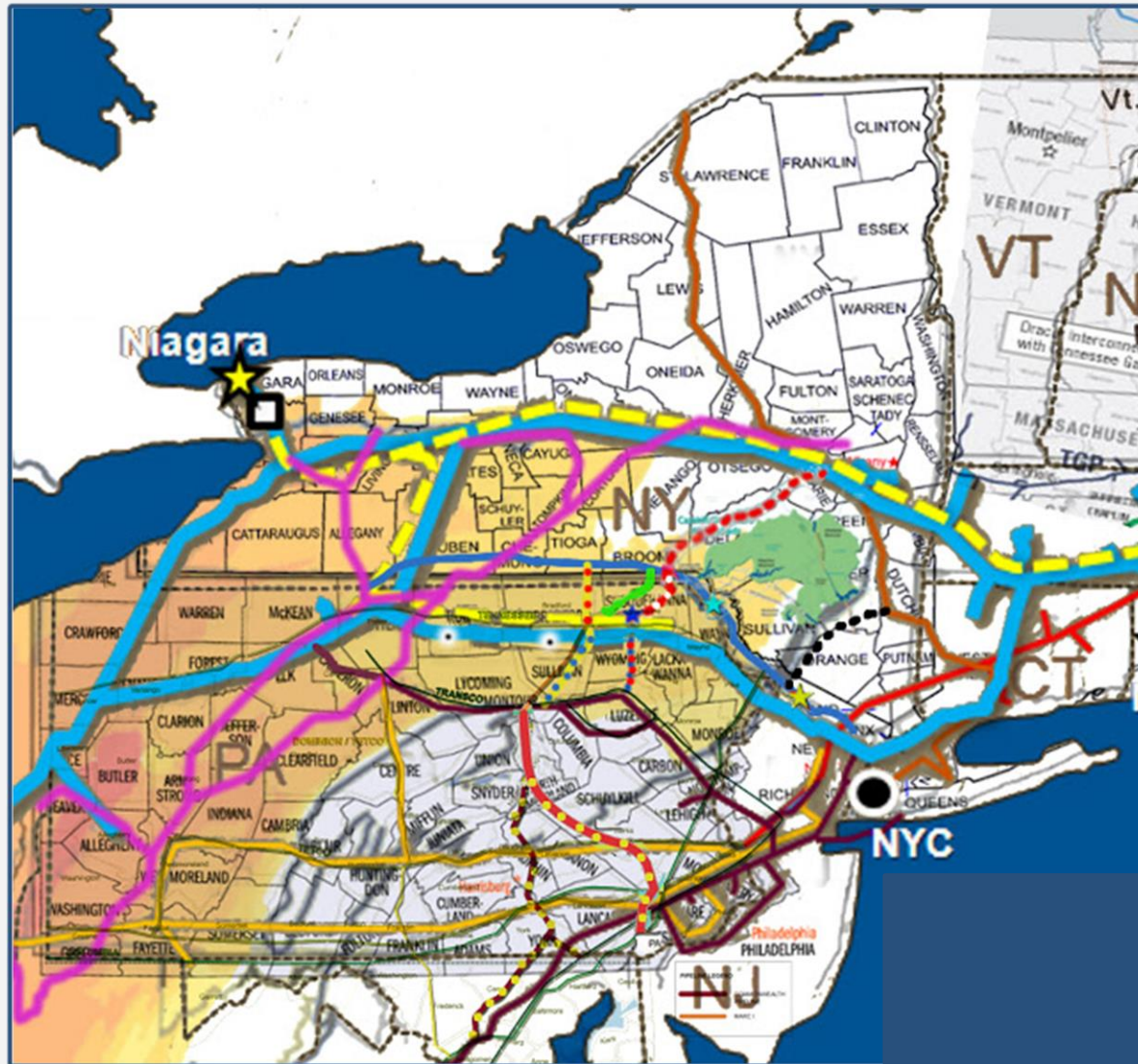
- 2009 Sheffield and Landrigan. Global climate change costs significant healthcare dollars “Global Climate Change and Children’s Health: Threats and Strategies for Prevention”
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3059989/>
- 2009 Shindell. Methane is a potent greenhouse gas, 33 times more efficient at trapping heat than carbon dioxide over 100 years, and about 100 times more potent than carbon dioxide over 20 years. Shindell et al, Improved attribution of climate forcing to emissions, Science.
- 2011 Howarth, Santoro and Ingraffea. “The footprint for shale gas is greater than that for conventional gas or oil when viewed on any time horizon, but particularly so over 20 years.”
<http://link.springer.com/article/10.1007%2Fs10584-011-0061-5>
- 2012 Tollefson. In an area known as the Denver-Julesburg Basin, where gas drilling is the prominent industry, they are losing about 4% of their gas to the atmosphere — not including additional losses in the pipeline and distribution system.
http://www.nature.com/polopoly_fs/1.9982!/menu/main/topColumns/topLeftColumn/pdf/482139a.pdf



- 2012 Howarth. While methane is only causing about 1/5 of the century-scale warming due to US emissions, it is responsible for nearly half the warming impact of current US emissions over the next 20 years.
http://www.eeb.cornell.edu/howarth/publications/Howarth_et_al_2012_National_Climate_Assessment.pdf
- 2012 Myhrvold, N. P. and K Caldeira. The carbon dioxide emitted from burning natural gas contributes significantly to greenhouse gas emissions driving global climate change.
http://iopscience.iop.org/1748-9326/7/1/014019/pdf/1748-9326_7_1_014019.pdf
- 2013 NOAA and CIRES. An emission rate corresponding to 6.2-11.7% of average hourly natural gas production in Uintah County was measured in the month of February.
<http://onlinelibrary.wiley.com/doi/10.1002/grl.50811/abstract>
- 2015 EDF. Environmental Defense Fund researchers involved in a group of 11 studies on methane emissions in Texas’ Barnett Shale demonstrated that methane emissions from oil and gas operations in the Barnett Shale region exceeded the emissions expected from the EPA’s greenhouse gas inventory. Harriss et al. Environmental Science & Technology;
<http://pubs.acs.org/doi/abs/10.1021/acs.est.5b02305>

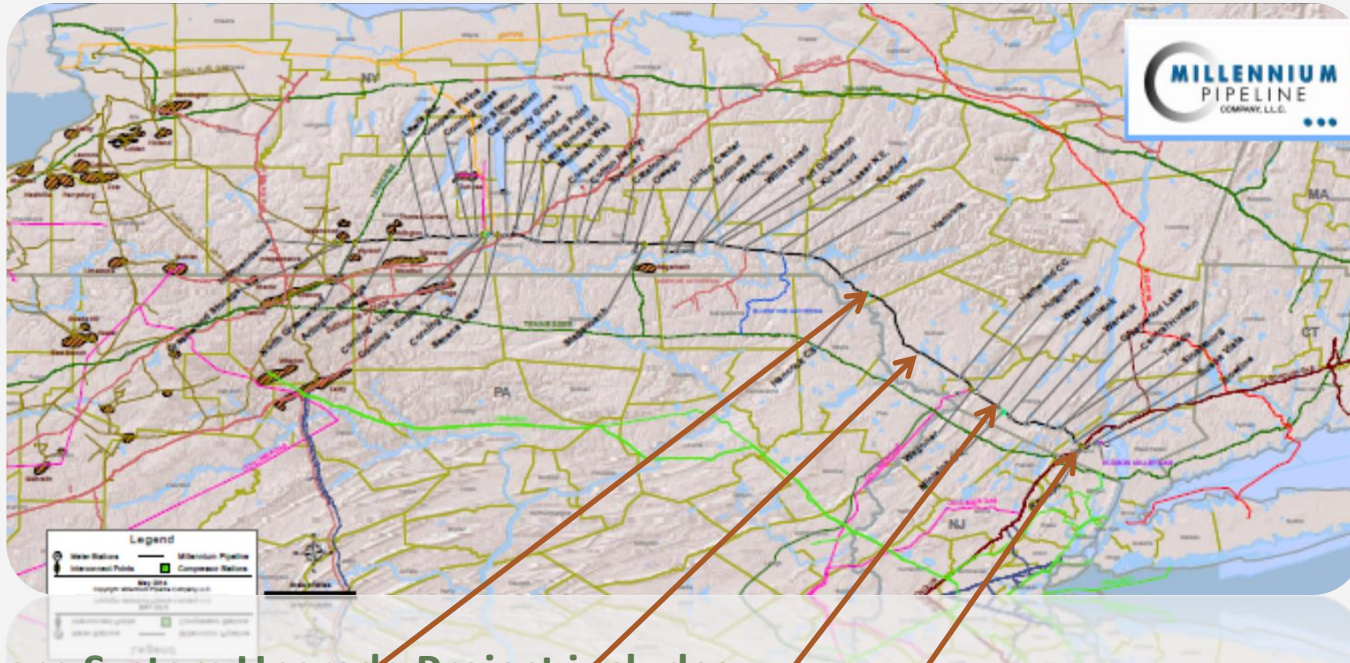


<http://williamahuston.blogspot.com/p/various-pipeline-maps.html>



<http://williamahuston.blogspot.com/p/various-pipeline-maps.html>

MILLENNIUM'S PROPOSED EASTERN SYSTEM UPGRADE PROJECT



- **Eastern System Upgrade Project includes**

- the addition of a new 22,400 hp compressor unit at Millennium's existing Hancock Compressor Station;
- the construction of a 22,400 hp new compressor station in Sullivan County, NY;
- the installation of approximately 7.3-miles of pipeline between Millennium's existing Huguenot and Westtown meter stations;
- the addition of facilities at Millennium's existing Ramapo meter station.

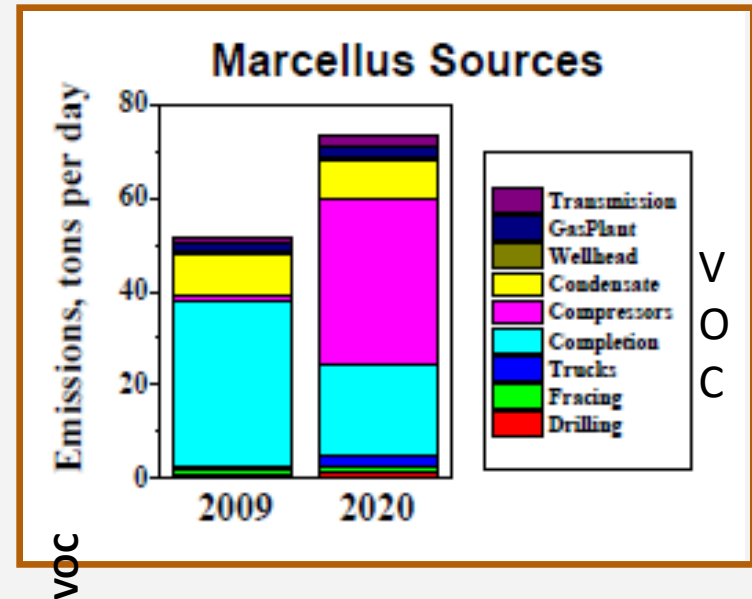
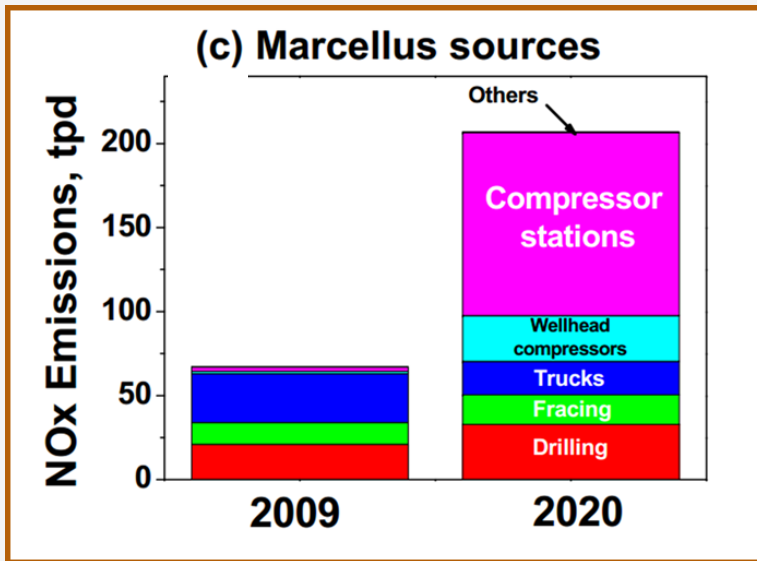
The Project will permit Millennium to transport an incremental volume of approximately 200,000 dekatherms per day

- **FERC pre-filing number PF16-3** <http://www.ferc.gov>
http://elibrary.ferc.gov/idmws/file_list.asp?document_id=14420742

COMPRESSOR LOCATION

Pollutant	Sheds (tons/year)	Horseheads (tons/year)	Minisink (tons/year)	Brookman Corners (tons/year)	Town of Highland (tons/year)
Formaldehyde	0.1	0.1		2.2	?
VOC	1.2	1.2	3.43	16.3	?
CO	6.6	6.6	29.6	33.4	?
NOx	24.4	24.4	28.8	66.3	?
PM10	6.4	6.4	11.04	13.1	?
PM2.5	6.4	6.4	11.04	13.1	?
SO2	0.7	0.7	7.20	1.1	?
GHG	54,351	53,949	61,000	96,683	?
Total pollutants (tons/year)	54,397	54,397	61,751	96,775	~125,000
Horsepower (HP)	11,000HP	11,000HP	12,200HP	18,643HP	22,400HP

Emissions from compressor stations are significant; 60–75 % of the estimated damages (mostly health problems) from all natural gas activities result from compressor station activities. From the 2013 RAND study of air-quality damages in Pennsylvania <http://iopscience.iop.org/1748-9326/8/1/014017>



Graphs adapted from presentation of Dr Allen Robinson

<http://www.iom.edu/~media/Files/Activity%20Files/Environment/EnvironmentalHealthRT/2012-04-30/Robinson.pdf> and video <http://www.iom.edu/Activities/Environment/EnvironmentalHealthRT/2012-APR-30/Day-1/Session-5/1-Robinson.aspx>

see also Clean Air Council's Walker & Koplinka-Loehr presentation

[http://www.cleanair.org/program/outdoor air pollution/shale gas infrastructure/milford compressor station air impacts commun](http://www.cleanair.org/program/outdoor%20air%20pollution/shale%20gas%20infrastructure/milford%20compressor%20station%20air%20impacts%20commun)

POLLUTANTS

- Methane (CH₄)
- Light and heavy alkanes
- BTEX - Benzene, toluene, ethylbenzene, and xylene
- Hydrogen and carbonyl sulfides
- Sulfur Dioxide (SO₂)
- Formaldehyde
- Particulate matter (tiny soot-like particles)
- Carbon monoxide (CO)
- VOCs
- Radon, polonium and lead
- Polychlorinated Biphenyls (PCBs)



SOURCES

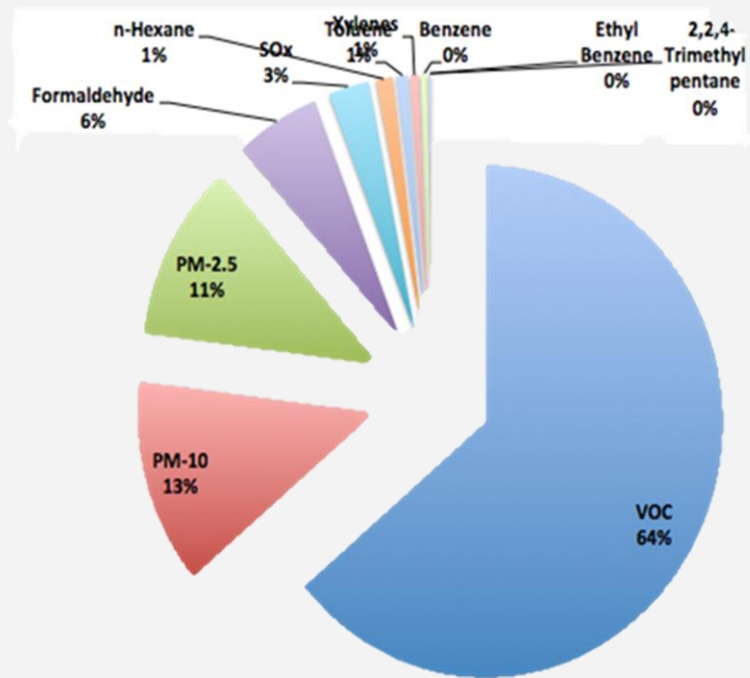
- Emissions and waste from transport vehicles, combustion at compressor stations, storage and condensate tanks, metering stations, processing plants, pipelines
- Flaring , venting, blowdowns and leaks

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

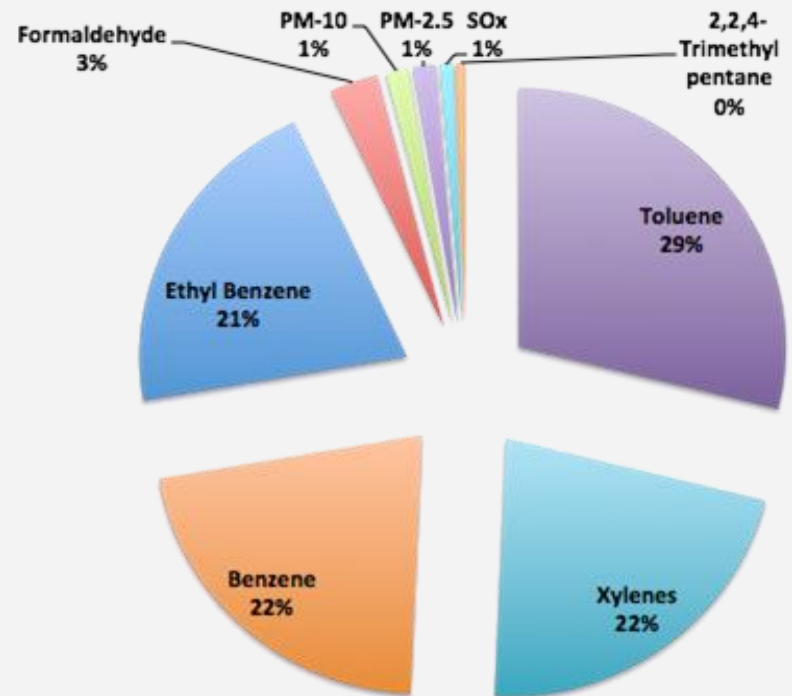
UNITS AT COMPRESSORS RELEASING EMISSIONS

Subra Earthworks

DEP Summary of the Inventory Data Reported Emissions



Compressor Blowdowns



COMMON COMPLAINTS NEAR COMPRESSORS



Air emissions as seen with infrared camera

Most common COMPLAINTS of residents living near compressors:

- Skin rash or irritation
- Eye irritation
- Gastrointestinal problems such as pain, nausea, vomiting
- Respiratory problems such as difficulty breathing or cough
- Upper respiratory problems such as congestion, sore throat and nosebleeds
- Neurological problems such as headaches, movement disorders, dizziness
- Psychological problems such as anxiety, depression, stress, irritability

Possible long-term consequences:

- Cardiovascular such as heart attack and high blood pressure
- Respiratory such as exacerbation of asthma, COPD
- Neurological such as stroke and cognitive deficits in children
- Birth defects
- Cancer
- Premature mortality



Health Impacts reported by community members living near compressor stations and gas metering stations along gas transmission pipelines

http://www.earthworksaction.org/files/publications/SUBRA_3_Shale_Gas_PlaysHealth_Impacts_sm.pdf

***61% of health impacts associated with chemicals present in excess of short and long term health screening levels in the air**

- Nasal Irritation*
- Throat Irritation*
- Eyes Burning*
- Frequent Nausea*
- Allergies
- Sinus Problems*
- Bronchitis*
- Persistent Cough
- Chronic Eye Irritation*
- Shortness of Breath
- Increased Fatigue*
- Muscle Aches & Pains*
- Severe Headaches*
- Frequent Nose Bleeds
- Sleep Disturbances
- Joint Pain
- Difficulty in Concentrating
- Nervous System Impacts
- Irregular/Rapid Heart Beat*
- Strokes
- Dizziness*
- Forgetfulness/Amnesia
- Easy Bruising
- Weakness* & Tired*
- Ringing in Ears
- Sores & Ulcers in Mouth
- Urinary Infections
- Depression*
- Decreased Motor Skills*
- Falling, Staggering*
- Frequent Irritation*
- Brain disorders*
- Severe Anxiety*
- Excessive Sweating
- Abnormal EEG*
- Lump in Breast
- Spleen
- Pre-Cancerous Lesions*
- Abnormal Mammogram
- Thyroid Problems
- Endometriosis

Most prevalent conditions in individuals living close to compressors

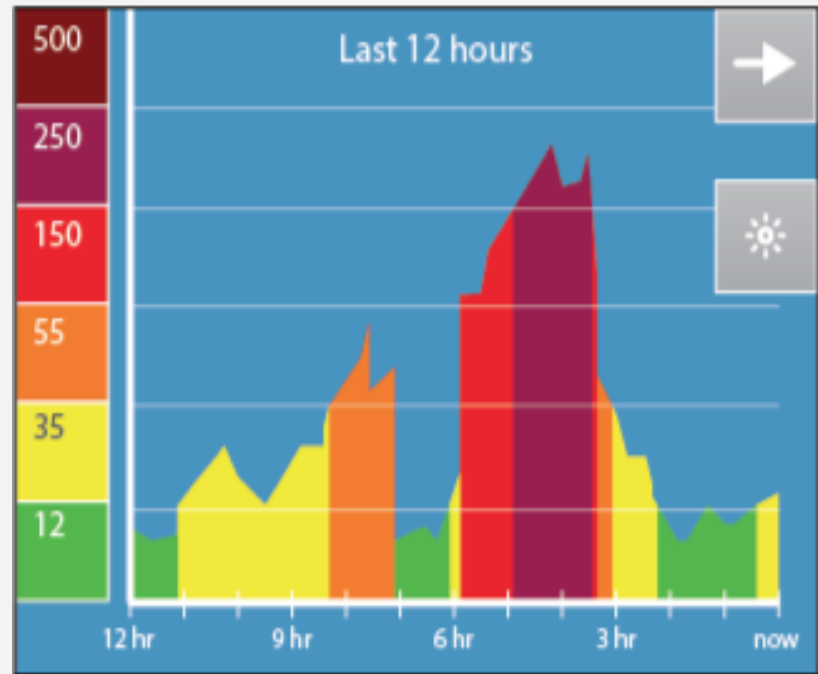
90% of individuals living and working within 2-3 miles of compressor stations report experiencing odor events and health impacts

Medical Conditions and % of Individuals Surveyed

Respiratory Impacts 71%
Sinus Problems 58%
Throat Irritation 55%
Allergies 55%
Weakness and Fatigue 55%
Eye Irritation 52%
Nasal Irritation 48%
Joint Pain 45%
Muscle Aches & Pains 42%
Breathing Difficulties 42%
Vision Impairment 42%
Severe Headaches 39%
Sleep Disturbances 39%
Swollen & Painful Joints 39%

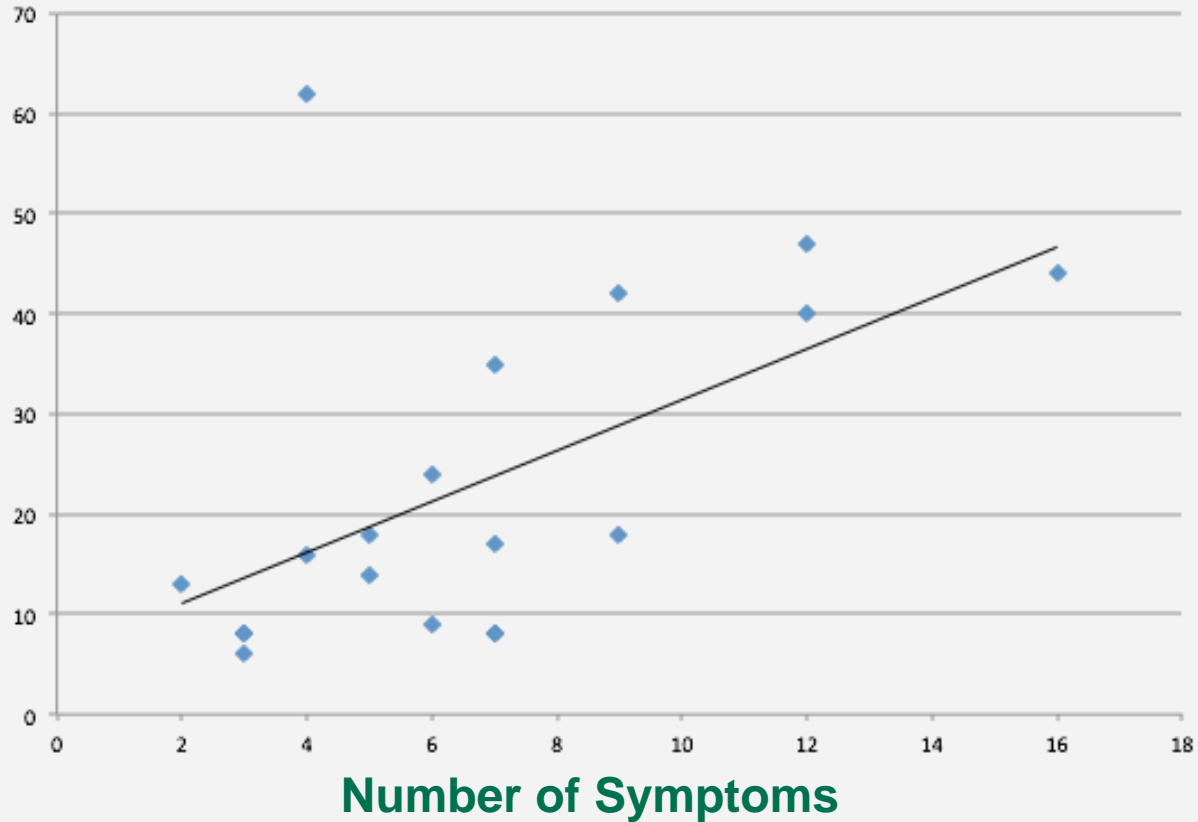
Review of reported symptoms

Symptoms might be persistent, transient, or intermittent. These variations in symptom presentation are consistent with the changing and episodic nature of exposures.



PM 2.5 Peaks vs. Number of symptoms (N=17)

PM Peaks



Health findings and government air monitoring reports are in conflict

Health Findings

Reports of acute onset
sequale in humans:

- Respiratory
- Neurologic
- Dermal
- Vascular bleeding
- Abdominal pain
- Nausea, and vomiting



Monitoring Reports

Assurances from air monitoring data
that untoward exposures are not
occurring.

- Barnett Shale Texas (Bunch et al-
2013)
- Marcellus Shale Ambient Air
sampling (Pennsylvania DEP 2010)
- City of Fort Worth Air Quality Study
(ERG 2011)

Minisink: Pilot Project

Summary of air monitoring and health assessment at 8 residences
data compiled by Celia Lewis PhD

- **Community coordinator**
- **Health assessments of 8 families**
- **PM_{2.5} monitoring with Speck monitors**
- **VOC sampling with summa canisters**



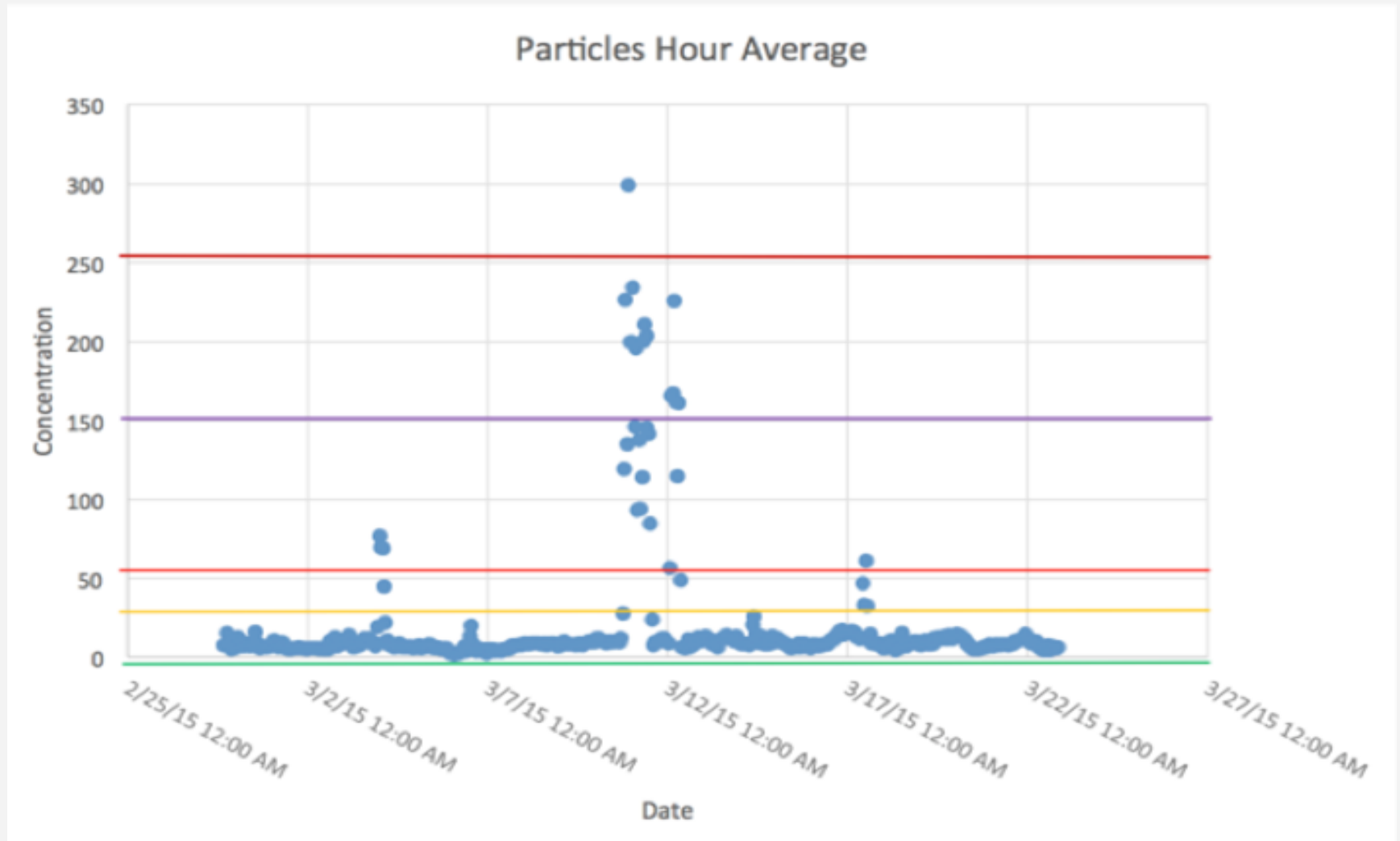
in Minisink:

The predominant health impacts reported were:

- Respiratory problems
- Neurological problems
- Dermatological problems

- Overall “quality of life” levels were below normal for half of the respondents when compared to a national standard (SF36).

Example of Speck results (ug/m³)



Episodic high levels of PM_{2.5} outside multiple homes occurred within similar time frames seven times over 59 days. Results are based on hourly averages of ug/m³ values.

Date of Peak event	# of monitors showing a peak out of # in use	Recorded peak levels	Daily <u>AQI</u> average
10/30	3/4	31, 90, 426	5.0
11/5	2/5	33, 57	5.5
11/7	3/5	36.5, 114, 133	5.3
11/12	4/5	53.7, 131, 269, 325	9.0
12/3	3/5	40, 235, 399	5.0
12/6	2/5	76, 160	10.8
12/17	3/5	99, 162, 229	9.9



New York State Health Assessment Project: Assessing Gas Compressor Station Health Impacts

partners:

- **EHP**
- **Madison County, NY DOH**
- **IHE University at Albany**

Assessment Goals & Objectives

- **Assess health status of residents** before the compressor station is built, during construction, and during operations and blow down events within 1 mile of the site.
- **Monitor and measure environmental factors** before the compressor station is built, during construction, and during operations and blow down events.
- **Evaluate/analyze results to determine possible health effects.**

Assessment Parameters

Environmental

- Air Quality
 - PM
 - VOCs, Formaldehyde
 - Radon*
- Home Env. Assess.
- Water Quality*
 - Surface & Well*
 - *EPA Drinking Water Standards
- Noise*
- Traffic counts*

Health

- Residents
 - Health Questionnaires
 - Health Diary
 - Lung Function Test*
- Community Health* Assessment
 - Target health data (cancer, respiratory, cardio, birth)
 - School nurse reports
 - EMS/Police/ER logs
- DOH Complaint log*

***Madison County only**

Monitoring Events/Timeline

Residents within 1 mile of station participate in baseline monitoring and follow-up assessments for a period of 2 years.

4 main monitoring events

- **Baseline – Pre-Construction - MOST IMPORTANT**
- **Construction***
- **Post Construction**
 - **1 year**
 - **2 years**

***Madison County only**

Basic Community monitoring and health assessment model

PRE- and POST-CONSTRUCTION Monitoring

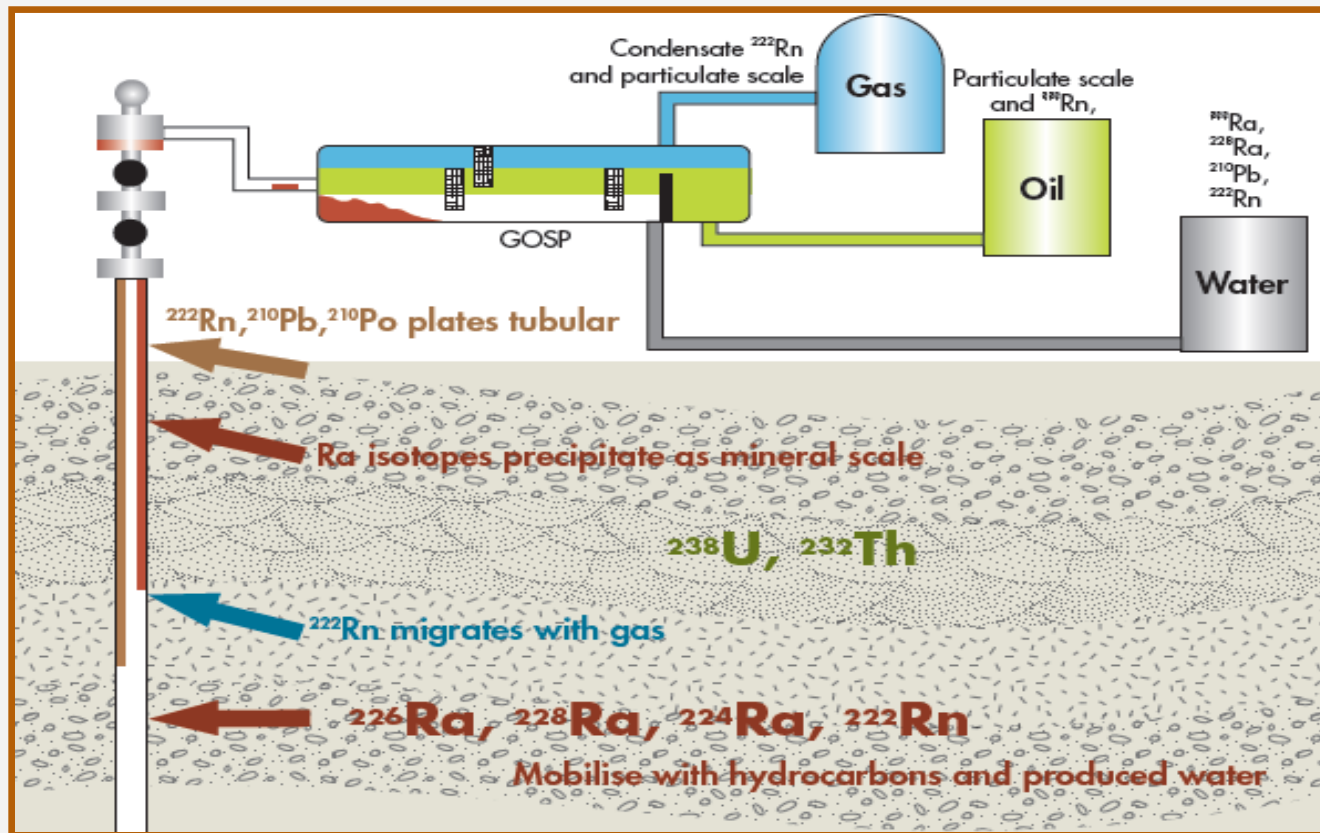
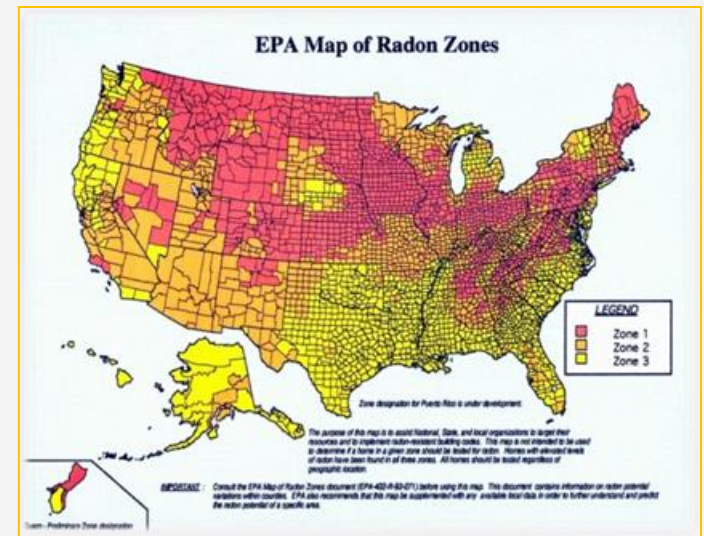
- 4 residences within about ½ mile for placement of continuous air monitors - one inside, one outside
- VOC and formaldehyde sampling at closest residences (1 or more 12-hour sample under appropriate weather conditions)

PRE- and POST-CONSTRUCTION Health assessments

- Individual health assessment, SF36 and home environment assessment surveys on as many residents as possible within 1 mile
- Medically trained personnel review health assessments with residents

RADIOACTIVITY

- Recommendations from the International Atomic Energy Agency (IAEA) http://www-pub.iaea.org/MTCD/publications/PDF/TCS-40_web.pdf
- Federal exemption <http://www.epa.gov/osw/nonhaz/industrial/special/oil/oil-gas.pdf>
- Radionuclides such as Lead-210 and Polonium-210 can be found in pipelines scrapings as well as sludge accumulating in tank bottoms, gas/oil separators, dehydration vessels, liquid natural gas (LNG) storage tanks and in waste pits. International Association of Oil & Gas Producers, *Guidelines for the management of Naturally Occurring Radioactive Material (NORM) in the oil & gas industry*, September 2008 <http://www.oip.org.uk/pubs/412.pdf>



PIGS

Pipeline Inspection or Intervention Gauge/Gizmo/Gadget
and

WASTE



<http://www.post-gazette.com/business/businessnews/2010/03/14/Neighbors-take-a-stand-on-noise-odor-of-gas-drilling/stories/201003140263>



COMMUNITY IMPACTS

- air and water impacts
- community tension
- traffic and road safety
- abandonment by officials
- worker safety
- housing, community character, schools
- economic issues such as value of homes
- cumulative effects of multiple stressors
- noise
- loss of viewshed, foodshed and watershed
- SOLASTALGIA



ARE THERE ADEQUATE HEALTH PROTECTIONS IN PLACE?

- Most of the literature on health impacts has been published in the last 2-3 years, and usually not in the mainstream general medical literature, and the results have not been considered in the regulatory process
- Federal exemptions limit information at the national level
<http://www.earthworksaction.org/pubs/PetroleumExemptions1c.pdf>
http://www.citizenscampaign.org/PDFs/cce_hvhf_wp_final.pdf
- Doctors are not adequately trained to recognize, nor do they have time to investigate, environmental exposures
- Vulnerable populations, especially children, have not been adequately studied
- Community and environmental impacts need attention
- Inadequate measures for worker safety
- Non-disclosure agreements prevent access to health information
- Comprehensive studies which include the infrastructure have not been done

There is a process which brings public health to the table and which can inform land use decisions and should be used prior to the development of regulations and before permitting. It is particularly important in the case of gas exploration and production.

HEALTH IMPACT ASSESSMENT

“HIA IS A SYSTEMATIC PROCESS THAT USES AN ARRAY OF DATA SOURCES AND ANALYTIC METHODS AND CONSIDERS INPUT FROM STAKEHOLDERS TO DETERMINE THE POTENTIAL EFFECTS OF A PROPOSED POLICY, PLAN, PROGRAM, OR PROJECT ON THE HEALTH OF A POPULATION AND THE DISTRIBUTION OF THOSE EFFECTS WITHIN THE POPULATION. HIA PROVIDES RECOMMENDATIONS ON MONITORING AND MANAGING THOSE EFFECTS.”

“IMPROVING HEALTH IN THE UNITED STATES: THE ROLE OF HEALTH IMPACT ASSESSMENT”

[HTTP://WWW.NAP.EDU/CATALOG.PHP?RECORD_ID=13229](http://www.nap.edu/catalog.php?record_id=13229)



MEDICAL SOCIETY OF THE STATE OF NEW YORK

May 2, 2015 – The Medical Society of the State of New York adopted a resolution, “Protecting Public Health from Natural Gas Infrastructure,” that recognizes the potential impact to human health and the environment of natural gas pipelines and calls for a governmental assessment of these risks.



AMERICAN MEDICAL ASSOCIATION

June 9, 2015 -- The American Medical Association (AMA) adopted a resolution, “Protecting Public Health from Natural Gas Infrastructure,” that states, “Our AMA recognizes the potential impact on human health associated with natural gas infrastructure and supports legislation that would require a comprehensive Health Impact Assessment regarding the health risks that may be associated with natural gas pipelines.”

Conclusions

- People are exposed to toxics through air, water and soil.
- The exposures are periodic and intense for several hours.
- Regulatory air and water screening will not detect the hazard.
- Most likely acute physical symptoms include headache, wheezing, ear/nose/throat problems (including nosebleeds), skin rash and fatigue.
- Biomonitoring methods need to be developed.
- Interventions and support at the patient level help coping.
- Individuals must monitor their health and exposure status.
- Sense of community trust and social capital is destroyed.
- Federal, State and Local public health and environmental agencies are not able to effectively respond.
The Public Health Process has become rule bound, restricted to standard environmental tests of air and water and research health protocols.
- Regulatory agencies do not have the flexibility to monitor health and environment appropriately.

AT A MINIMUM:

- **Hearings (DEC and FERC)**
- **Cumulative environmental impact study with a comprehensive health assessment, including pre- during and post-construction health monitoring**
- **Baseline measurements of air emissions, methane, radon and water quality, and continuous monitoring if compressor is approved**
- **Cumulative emissions to include condensate tank emissions and fugitive methane**
- **Best technologies, and for compressors, electric power source**
- **Hazardous Materials Management Plan including plan for disposal of waste from condensate tanks and pipelines, and a NORM Monitoring Plan**

COMPREHENSIVE SOURCES OF HEALTH INFORMATION



- **PSE for Healthy Energy PSE STUDY CITATION DATABASE on Shale Gas & Tight Oil Development** <http://www.psehealthyenergy.org/site/view/1180#sthash.CHp8vErJ.dpuf>
- **Concerned Health Professionals of NY Compendium** www.concernedhealthny.org
- **Southwest Pennsylvania Environmental Health Project** www.environmentalhealthproject.org
724.260.5504 info@environmentalhealthproject.org
- **Physicians for Social Responsibility** www.psr.org

QUESTIONS?



Thank you

Source: <http://passalenevents.wordpress.com/>

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