

Talking Points: Health Risks of Gas Pipeline Infrastructure

Many people know that fracking is causing a lot of health problems due to air and water pollution where the drilling is done. But people often don't realize that in the race to bring this fracked gas to U.S. consumers and to foreign markets like Canada and Europe, thousands of miles of new gas pipelines are being built, along with compressor stations to push it through the pipelines. With this infrastructure comes pollution that has a direct impact on human health and safety. These potential health impacts include:

- Cancer, respiratory and heart problems from **hazardous air pollutants and particulate matter** [1,2]
- Miscarriages, neurologic problems, impaired learning and cancer from **radioactive radon, and heavy metals including lead and mercury** [3-5];
- Psychological distress from **noise pollution** [6]
- Risk of accidents: fires, explosions, contamination of waterways and soil [7]

AIR POLLUTION and CANCER CAUSING CHEMICALS coming from Compressor/Metering and Regulating Stations

- What comes out of compressor and M&R stations? They release methane as well as nitrogen oxides (NO_x), carbon monoxide, volatile organic compounds (VOCs), sulfur dioxide, particulate matter, hazardous air pollutants and heavy metals [8];
- Unsafe emissions can occur up to a mile or more from the stations or other parts of pipeline infrastructure such as metering and regulating stations [10]

There are **serious health impacts** associated with these pollutants [9]:

- **When methane leaks it can transform into formaldehyde, which** irritates the nose, sinuses, respiratory tract, and may worsen asthma; long term exposure can cause cancer [10]
- **NO_x** is associated with respiratory disease. [9]
- **VOCs** are neurotoxins, hepatotoxins, reproductive toxins, fetotoxins, and dermatotoxins. [9]
- **SO₂ (sulfur dioxide)** is associated with respiratory illness. [9]
- **Particulate matter (PM)** refers to tiny soot-like particles that, when breathed in, can contribute to respiratory disease, heart attacks and cancer. It is also linked with premature birth and low birth weight in newborns and is a

significant contributor to human morbidity and mortality, mostly due to its cardiovascular effects, which include heart attacks and death. Particulate matter is a driver of childhood illnesses including allergies and respiratory illness [11]

- **Hazardous Air Pollutants**, or HAPs: The pipeline companies that transport fracked gas know that fracked gas has HAPs in it because they list them in their public resource reports; **they include benzene, toluene, heptane and naphthalene** among many others. [12] HAPs can be toxic (harmful to human health), carcinogenic (cause cancer), or both toxic and carcinogenic. Fracked gas contains both toxic and carcinogenic HAPs. **Health effects** include neurologic, ocular, dermatologic, respiratory and developmental toxicity; benzene is a known carcinogen. [13]

How humans get exposed: inhalation from the following sources: leaking, intentionally released, or burning gas

1. Leaking gas pipelines in our streets and homes
 2. Leaking high-pressure pipelines, mainline valves and fittings
 3. Compressor and metering & regulating station blowdowns
- A blowdown is an intentional or accidental release of gas through the blowdown valve that creates a **30- to 60-meter-high gas plume**
 - May be a scheduled part of routine maintenance, to reduce pressure and empty the system -- or they can be accidental. It is unknown exactly how often these events occur. It is also not known what exactly is emitted in any given blowdown as there is very little data available. We do know that it will include whatever is in the pipeline when the blowdown occurs [7]:
 - Health effects of blowdowns: anecdotally, there are reports of odors and burning eyes, headaches and coughing. An exposure to blowdown concentrations of contaminants may have different health implications than long-term, lower-level exposure to the same contaminants

RADIOACTIVITY

- There is a concern that the gas transiting the pipes and being compressed in compressor stations has radioactivity levels that can put workers and residents living in the area at risk. [14]
- Fracked Gas contains radioactive elements including:
 - Radon
 - Radioactive lead
 - Radioactive polonium

Radon, a gas, has a short half-life (3.8 days) but its progeny include lead and polonium: these are toxic and have relatively long half-lives (22.6 years and 138 days respectively). Radon enters the body primarily through inhalation. The body exhales most of the radon prior to its radioactive decay, but some of the lead and polonium remain in the lungs and may cause cancer. **Radon is the leading cause of lung cancer among non-smokers and the second leading**

cause among smokers. 21,000 lung cancer deaths per year on a nationwide basis are attributed to radon exposure according to the EPA. [15]

HEAVY METALS

- The process of extracting methane by fracking from complex geologic formations introduces toxic metals into fracked gas, including lead, arsenic and mercury. In Massachusetts, M&R stations are listed as **hazardous waste generators**. Why? EPA records show that, in the course of operating Spectra's Algonquin fracked gas pipeline, an M&R station produces heavy metals [17]; environmental testing companies that work with the fracked gas industry acknowledge the presence of heavy metals in fracked gas, including arsenic, barium, lead, and mercury [16]
- These metals are not consumed by combustion – they are simply released. Therefore, heavy metals in fracked gas are released any time fracked gas is released or burned.
- Data is needed to show whether other heavy metals are cleared by the “mercury guard bed” in the pretreatment process; there is no mention of what processes, if any, remove other heavy metals, nor how much mercury remains after treatment
- Lead, mercury and arsenic are notorious neurotoxins, fetotoxins, and cause impaired learning in children, miscarriages, and impair fertility [18]
- Chromium is known to cause DNA damage; hexavalent chromium is a known carcinogen [16].
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NOISE POLLUTION

- The noise emitted from a compressor station has been likened to a large jet engine. It occurs at unpredictable times of day or night; it is loudest during blowdowns, but there is a continuous hum that rattles dishes in nearby houses and creates a constant low frequency noise that is reportedly highly stressful
- Noise pollution has been shown to raise the risk of heart attack and high blood pressure in adults, and cognitive deficits in children; in particular, it can interfere with the ability to learn, as reported by the World Health Organization. [19]
- Persons living in close proximity have reported disruption of sleep and increased anxiety caused by noise from compressor and M&R stations. [20]

ACCIDENTS

- Accidents and fires have occurred at gas compressor stations in Godley, Madison County and Corpus Christi TX; gas leaks and contamination of waterways have occurred across the country

- The possibility of fire or other accidents raises a number of concerns: Will the nearby localities have the resources available to contain a gas fire or explosion? Will first responders and hospitals be able to care for injured workers or other victims? Will evacuation be required, and have evacuation plans been developed and tested?
- Without knowing what precisely is in the pipeline or what else may be housed on the site, it is not possible to estimate emissions from a fire at a compressor station or pipeline. [7]

Health Impacts—summary

We wish we knew more about the health effects of fracking, pipelines, compressors, and other aspects of natural gas use, but small studies suggest:

- Health impacts on respiratory, neurological and cardiovascular body systems.
- Direct health impact correlates with distance from the natural gas infrastructure: bloody noses, headaches, asthma are found in increasing frequency the closer to the M&R or compressor station. Among youngest respondents (1.5-16 years of age), those within 1500 feet experienced higher rates of throat irritation (57% vs. 69%) and severe headaches (52% vs. 69%). It is also notable that the youngest group had the highest occurrence of frequent nosebleeds (perhaps reflective of the more sensitive mucosal membranes in the young), as well as experiencing conditions not typically associated with children, such as severe headaches, joint and lumbar pain, and forgetfulness. [9]
- Because many carcinogens and heavy metals can travel many miles, there may be distant health effects and ones that take longer to develop, such as cancer, that have not been detected in studies that look only at immediate sites adjacent to compressor stations

Conclusions:

- Compressor stations and M&R stations pose a health risk because of the pollutants they elaborate and the illnesses that they can potentially cause: cancer, respiratory illness, cardiac and neurologic disease, birth defects, and miscarriage.
- The toxic and/or carcinogenic pollutants identified here pose an unquantified and unknown degree of risk to the environment and human health.
- Massachusetts Health Care Providers Against Fracked Gas (MHCPAFG), which is comprised of professionals from multiple areas of health care, has issued the **Call for a Moratorium** to bring specific attention to the health-related issues involved with the myriad of gas infrastructure projects being pursued across the state. They join the ranks of other groups, including the

American Medical Association, Physicians for Social Responsibility, Massachusetts Nurses Association and Concerned Health Professionals of New York, calling for a **Health Impact Assessment, a thorough assessment of the impact of these activities on public health and safety.**

References

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Compressor Stations: An unacceptable health risk

Many people know that fracking is causing a lot of health problems due to air and water pollution where the drilling is done. But people often don't realize that in the race to bring this fracked gas to U.S. consumers and to foreign markets like Canada and Europe, thousands of miles of new gas pipelines are being built, along with **compressor stations** to push it through the pipelines. With this infrastructure comes pollution that has a direct impact on human health and safety.

What health conditions are associated with compressor station emissions?

- Particulate matter^{1,2}: Asthma, heart attacks, diabetes
- Benzene³: Leukemia, bone marrow suppression
- Formaldehyde^{4,5}: Asthma, several types of cancer
- Nitrogen dioxide⁶: Produces hazardous ground level ozone, an asthma trigger associated with respiratory tract irritation and infection

Do compressor stations emit dangerous levels of these pollutants?

- Benzene levels have been measured near compressor stations that far exceed cancer-causing thresholds⁷
- Formaldehyde levels can exceed cancer-causing thresholds up to at least a half mile away from compressor stations⁸

Do residents living near compressor stations notice compressor emissions?

- Residents living near compressor stations report severe headaches, bloody noses, sinus problems, and throat irritation more often than residents living further away⁹

Would additional emissions make a difference?

- Significant background emissions increase the likelihood that additional emissions will reach toxic or carcinogenic levels

Why haven't we heard more about compressors and health risks before?

- Many compressor stations are built in rural areas near much smaller populations, where fewer people are exposed to the pollutants

What additional health risks will we accept in our communities so that compressor stations can be built?

- A child with **leukemia**?
- A parent or sibling with a **heart attack**?
- A neighbor in the Emergency Department with an **asthma attack**?

If we value the health of our communities, our families, and our children, then we must acknowledge that increased risks of asthma, heart attacks, and cancer are unacceptable.

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