

From: Bev Edwards [<mailto:nadesha@msn.com>]
Sent: Wednesday, July 20, 2016 1:38 PM
To: Houde, Patty; Walsh, Cheryl
Subject: Comment on SEC New Rules

Dear Representative McGuire,

Thank you for the opportunity to comment on the SEC's New Rules for high pressure gas pipelines. I am writing in support of the Final Rules which will be presented to the Joint Legislative Committee on Administrative Rules (JLCAR) on July 21.

I have a great appreciation for the SEC's Final Rules which will strengthen and modernize the ability of NH to respond clearly and appropriately to applications for siting high pressure gas pipelines within the state.

NH has the opportunity to lead the way for NE and other states dealing with creating New Rules for this totally new type of gas infrastructure. High pressure, high volume/hydraulic fracture (HV/HF) gas pipelines present many new challenges and entirely different issues never before experienced with the conventional gas industry of the past. For instance:

- <!--[if !supportLists]-->• <!--[endif]-->The health and safety issues which accompany the new high pressure (HV/HF) gas industry and its infrastructure are far more hazardous and problematic. Due to the numerous chemical pollutants used in the process of hydraulic fracturing itself, as well as substances such as Radium 226 and 228 which get drawn in from the matrix of the rock at the Marcellus shale plays, there are extremely harmful pollutants which cling to the methane and get released into the atmosphere surrounding compressor stations and metering stations during intentional blow-downs and fugitive emission events, according to extensive documentation by many toxicologists, chemists, universities and research groups.

- <!--[if !supportLists]-->• <!--[endif]-->The size of the transmission pipelines for the HV/HF gas are usually much larger than the previously installed distribution pipelines for conventional gas—30-36” wide instead of 10-12”. The pipes have to be laid deeper to have sufficient covering soil. Therefore, there are greater risks for water and soil contamination from the amount of drilling and blasting down through NH’s radon and arsenic-laden granite (2 types of arsenic) during construction, potentially resulting in unsafe drinking water from contaminated aquifers and wells.

- <!--[if !supportLists]-->• <!--[endif]-->The increasingly well-documented toxic and carcinogenic emissions from natural gas compressor and metering stations create potential health impacts for citizens living, working, farming or going to school within a 3 mile+ radius surrounding a 12,000 HP compressor station (further out for larger ones). These are public health threats requiring impeccable solutions. (See the attached PowerPt and its references).

- <!--[if !supportLists]-->• <!--[endif]-->And the safety issues are potential nightmares for our rural towns with volunteer FDs, lack of municipal water systems and insufficient hydrants for protecting homes and forests from a volatile pipeline or compressor station gas fire or explosion. When Kinder Morgan’s pipeline was still being proposed they instructed our FDs that they were

not allowed to assist in quelling pipeline fires, but must wait for the company's experienced crews to come (from miles away) to shut down the valves. Our FDs were only allowed to evacuate and rescue residents and deal with burning houses and resulting forest fires.

A brief examination of the safety record of the company NH is most familiar with at this point, Kinder Morgan, shows a very disappointing and abysmal record which adds to communities' concerns. A report from 2015 indicates that KM had "180 incidents of leaks, fires, explosions, injuries and fatalities since 2003". And KM's and Tennessee Gas Co's maintenance records have been the subject of derision and scorn from PHMSA, making it imperative to establish Rules that would require explicit and extraordinary mitigation measures for their construction, operational and maintenance processes as well as information regarding their equipment purchases.

Unfortunately, the high pressure gas pipelines constructed since 2010 have the same dismal accident record as the oldest pipes still in the ground! So the newer equipment is not the answer to our safety concerns.

Causes for the newly constructed failures cover a wide range from lower quality equipment to improper installation and fault welding, from insufficient quality control over construction to lax and inadequate maintenance. Summed up, there are problems resulting from the rush to export natural gas— to get pipelines in the ground and export LNG. For that reason alone, strong and well thought out Rules for their siting are necessary.

With all that in mind, I strongly support the SEC's New Rules for high pressure gas pipelines, particularly:

- <!--[if !supportLists]-->a) <!--[endif]-->The requirement for a Comprehensive Health Impact Assessment (CHIA) to accompany any application to be paid for by the applicant and conducted by strictly independent public health professionals. (See attached White Paper on Need for a CHIA)
- <!--[if !supportLists]-->b) <!--[endif]-->The requirement for the siting of pipelines to be over 1,000 ft. away from electric transmission lines for the safety of the public, the electric lines, and the integrity of the pipeline, itself.
- <!--[if !supportLists]-->c) <!--[endif]-->The requirement for proof of an applicant's bond to secure their ability to pay and their agreement to pay the total costs for the decommissioning of the pipeline and its appurtenances with all debris removed and disposed of according to state and federal regulations and rules.

I would also like to recommend additional New Rules that would require the applicant to fund the following essential precautionary processes:

- <!--[if !supportLists]-->a) <!--[endif]-->pre-construction, baseline ambient air, water and soil testing for residences, schools, farms, aquifers and wells within 1 mile of a pipeline and/or 3 miles from compressor stations and metering stations
- <!--[if !supportLists]-->b) <!--[endif]-->construction phase air and water testing for the same areas
- <!--[if !supportLists]-->c) <!--[endif]-->operational phase testing and monitoring of soil and water quality and quantity

- <!--[if !supportLists]-->d) <!--[endif]-->operational phase seasonal air monitoring and analysis for selected pollutants from an updated version of NH’s Toxic Air Statutes, selected by NH licensed toxicologists and municipal representatives, measuring hourly, daily, monthly and yearly emissions, especially within a 3 mile radius of 12,000 HP compressor stations, further for larger ones
- <!--[if !supportLists]-->e) <!--[endif]-->a baseline pre-construction health survey for citizens living, working, or attending school within a 3 mile radius of a compressor station
- <!--[if !supportLists]-->f) <!--[endif]-->10 years of follow through health assessments for children attending school within a 3 mile radius of a compressor station

Similar to the SEC’s consideration of the “cumulative visual impact” of Northern Pass. I support the SEC’s consideration of the **cumulative health and safety impact** of high pressure gas pipelines.

Factors to consider regarding the issue of “**public interest**”:

- <!--[if !supportLists]-->1. <!--[endif]-->With the amount of inevitable environmental destruction of woodlands, conservation land and private property as well as the contamination of water resources and eco-systems and the numerous other potentially harmful health and safety consequences to communities and NH citizens from siting high pressure natural gas pipelines, the question of “public interest” can be answered fairly easily.
- <!--[if !supportLists]-->2. <!--[endif]-->We’ve come to realize that the reason for electricity rates being set sky-high in the fall of 2015 was simply a response to the reported “energy crisis” of 2014, which we’ve come to understand was not due to an actual lack of available energy, but to the mismanagement of NE’s grid. And that is being corrected by the Winter Reliability program and the modernization of the grid.
- <!--[if !supportLists]-->3. <!--[endif]-->Plus the “crisis” dissolved with the reality that wholesale energy costs plummeted 60% by January, 2015. And, in spite of having an even colder winter, there was no “energy crisis” in 2015, “even though 2 more major power plants had retired and there wasn’t a single new pipeline”, as the president of the NE Power Generators Association, Dan Dolan, publically stated.
- <!--[if !supportLists]-->4. <!--[endif]-->In fact, ISO-NE’s e-news reported that April 2015 had the lowest energy demand in 12 years and the lowest wholesale energy prices in 16 years! Simply no “energy crisis” to be found.
- <!--[if !supportLists]-->5. <!--[endif]-->We’ve also learned that it’s actually NE’s transmission costs that raise our rates higher than many other states...not the cost of our energy. Hopefully, ISO-NE or the PUC will respond with solutions to FERC’s questions about our overly high transmission costs.
- <!--[if !supportLists]-->6. <!--[endif]-->Plus, as you know, Distrigas has signed a 10 year contract to supply all the energy NE might need for winter peaks.

So with NO “energy crisis” to fix and actual energy prices back to a relative normal, there is no “public interest” in the addition of potentially problematic energy infrastructure for NH.

On the other hand, if, for any reason, a high pressure gas pipeline is sited in NH, The New Rules proposed by the SEC will help to guide the siting responsibly and carefully for the benefit of our state and citizens.

I am attaching a White Paper on the Need for Comprehensive Health Impact Assessment for natural gas pipelines along with the list of its co-authors. Also attached is a Power PT on compressor stations with numerous references to support statements in this comment, created by Dennis Gauvin from New Ipswich and John Kieley from Temple.

Thank you, again, for this opportunity to comment on the SEC's Final New Rules for high pressure gas pipelines. Their Rules reflect the SEC's conscientious concern for the health and well being of NH's citizens and communities.

Sincerely,

Beverly Edwards
Co-Chair, Temple Ad Hoc Pipeline Advisory Committee
41 Twillingate Rd.
Temple, NH 03084
603-878-3227
nadesha@msn.com

The Role of Comprehensive Health Impact Assessment in Evaluating Infrastructure for Natural Gas Transport
A White Paper prepared by an *ad hoc* working group
(20 February 2016)

Executive Summary

This white paper provides an overview of four critical issues regarding the role of comprehensive health impact assessment (CHIA) in review of applications for permits and certificates concerning natural gas transport infrastructure proposals. Section I outlines the essential features of CHIA and the value it adds to the review process. Section II documents the increasing need for CHIA given recent developments in the installation, operation, monitoring, and researching of natural gas transportation infrastructure. Section III covers incorporating CHIA into review procedures. Section IV proposes particular approaches to CHIA at various points in the application and review process and in the federal environmental impact assessment process.

I. What is a CHIA

A. Purpose

A comprehensive health impact assessment (“CHIA”) is an in-depth and systematic approach to health impact assessment 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.”¹ A CHIA provides recommendations on minimizing, monitoring, and managing those effects.

CHIAs inform decision-making by identifying and prospectively evaluating potential effects on human health of a development proposal and its alternatives, aiming specifically at predicting how development induces unintended changes in health determinants and resulting changes in health outcomes. After considering multiple factors, a CHIA informs decision-making about whether to proceed with a proposed activity and if so, offers recommendations to address health-related gaps in data, to minimize risks and maximize benefits, and to establish a monitoring framework. A CHIA can be performed at many different levels of policymaking and regulation.

Intimately related to environmental impacts, the objective of a CHIA can, and should, be incorporated into an environmental impact statement (“EIS”) but very often, is not. As a result, the typical EIS:

- Does not consider the human health impacts of the project; and when it does, the analysis is narrow
- Does not encompass human health in the “description of the affected environment.” As a result, there are no baseline rates of potentially impacted health problems, no identification of drivers of those problems, no “consequences of the alternatives” in terms of human health -- direct, indirect, or cumulative health risks are not systematically identified or analyzed
- Does not review pertinent medical research and public health studies
- Rarely involves health experts and officials

¹ North American HIA Practice Standards Working Group, “Minimum Elements and Practice Standards for Health Impact Assessment (Version 3, September 2014),” found at <http://hiasociety.org/wp-content/uploads/2013/11/HIA-Practice-Standards-September-2014.pdf>.

- Rarely proposes the “no action” alternative or mitigation measures to protect and promote health

Further, the typical regulatory agency approach estimates the total short-term and long-term emissions directly sent into air or water by the project under consideration. Estimated total emissions are then compared with Federal or State standards for “acceptable” emissions.² If the estimated levels fall below critical thresholds, the project is assessed as having a non-significant health impact. This approach is inadequate. For example, the following are but three examples of impacts that the typical approach presently does not include:

- Emission spikes. Regulatory agencies measure emissions in terms of averages taken over numerous short (for example, one hour or less) or long-term intervals (for example one or more days). Recent studies have found that these averages do not reveal the occurrence of very high levels of “peak” emissions that may occur at irregular intervals. These peaks may have serious adverse health impacts that are not captured by averaging over longer periods of time. A comprehensive assessment performed according to public health professional standards would capture information on peak emissions and their consequent health implications.
- Dynamic evolution of emissions. Regulatory agencies take a very local and static view of toxic emissions, assessing them in isolation from each other and only at the time and place immediately adjacent to their source. Many if not most standards are based on single chemical emission, while under most circumstances it is a mixture of different chemicals that are emitted. In addition, any single emission can disperse widely, evolve, and combine with other emissions and atmospheric conditions and become reabsorbed into distant water and soil. Only a comprehensive health assessment can properly evaluate the full range of emission impacts.
- Downstream and upstream impacts. Regulatory agencies restrict their assessment of impacts to the operations of the project in question. However, pipeline impacts extend far beyond pipeline operations. Pipelines are a “midstream” structure, placed between the start-point of gas well production sites and the endpoint of commercial or residential consumption. Adding a pipeline has the impact of expanding both production and consumption; and many studies have reported that the endpoint use of pipeline-provided gas in residential stoves has adverse impacts on respiratory function. Only the CHIA component of an environmental impact assessment would, correctly, view this as a pipeline impact.

The above examples are not exhaustive. The issue of vulnerable sub-populations (such as people with pre-existing asthmatic conditions) is not routinely addressed by regulatory agencies, but is a key CHIA element.

As an integral component of an EIS, the CHIA must be completed before any final decisions are made by the regulators, and, must inform such decisions. Unlike the other components of an EIS, which focus on estimating and evaluating the increase in environmental stressors (*e.g.*, air, water and soil contamination; population movement; *etc.*) and then on articulating means and methods to eliminate adverse environmental impacts to the maximum extent practicable, the CHIA component is specifically designed to consider and evaluate potential *human health* impacts by identifying the potential pathways for such stressors to harm human health, quantifying the cumulative risks posed by such stressors, and

² In fact, the Department’s rationale in rejecting recommendations in the Algonquin Incremental Market Project to conduct an independent air emissions baseline assessment and health impact study consistent with the resolutions adopted by many municipalities within the New York portion of the AIM Project reflects precisely this approach: “Neither ... is required in order for the NYSDEC to issue the Title V air permit modifications because the AIM Project complies with all applicable federal and state regulations, which have been established to protect public health and safety.” “New York State Department of Environmental Conservation Response to Public Comments: Algonquin Incremental Market Project, May 2015,” which may be found at: http://www.spectraenergy.com/content/documents/Projects/AIM/NYSDEC_Response_Public_Comments_AIM%20Project_%20May%202015_DEC%20website_7625736_1-c.PDF.

recommending necessary mitigation. The goal of the CHIA component of an EIS, then, is to maximize preservation of the health of individuals and to minimize negative health impacts. The CHIA component therefore focuses specifically on health outcomes linked to potential exposures, including respiratory, cardiovascular, oncologic, dermatologic, reproductive, developmental, neurological, psychiatric, substance abuse, emerging infectious disease and injury/motor vehicle related impacts, with a special emphasis on vulnerable and general populations in the community. The CHIA component gives special attention to vulnerable populations, such as subpopulations of low socioeconomic status, racial and ethnic minorities, infants and youth, pregnant women, the elderly, the infirm, and industrial workers, because such populations must be protected from levels of exposure that might be judged “on average” to be of insignificant adverse impact. The CHIA component is also well-designed to evaluate both cumulative impacts and site-specific factors (such as local geography and meteorological conditions) that may predominate in determining whether human health will be adversely impacted by an action.

B. The Steps in the CHIA Process³

The first two steps determine the tools to be used in the following four.

1. Screening –determines what policy/regulatory requirements would the CHIA inform. Identify lead(s) and partners
2. Scoping – develops the framework for the CHIA component; identifies the important possible health effects, affected populations, and available evidence. Identifies budget. Includes the following steps/tools:
 - Literature search and gathering of opinions from medical and public health experts, scientists, and engineers, as well as economists and sociologists
 - Identify stakeholders and their information needs
 - Identify and prioritize stressors which might lead to health impacts
 - Identify the boundaries of the potential impact
 - Specify budget
 - Use the above information to identify methods and tools for data collection
3. Assessing risks and benefits – analyzes baseline conditions and predicts potential effects
4. Developing recommendations – develops human health-based recommendations and a feasible plan for implementing them
5. Reporting – produces the text to be included in the EIS, disseminates the EIS to decision-makers, the public, and other stakeholders
6. Monitoring and evaluating – determines the extent to which inclusion of CHIA in the EIS added value to it, identifies the obstacles to research, and monitors outcomes of implementing decision

II. The need to include CHIAs into environmental impact assessments of the natural gas transport infrastructure is increasingly significant

Incorporating a CHIA into an environmental assessment of a proposed natural gas transport infrastructure project or a proposed policy relating to natural gas transport infrastructure is essential since the CHIA component informs decision-making by, among other things, identifying potential risks and benefits of the proposal and making recommendations to minimize risks, maximize benefits, address data gaps, and establish a monitoring framework.

A. Increased understanding of releases and their human health effects

³ Derived from Figure S-1 (p. 7) in National Research Council (2011), “Improving Health in the United States: The Role of Health Impact Assessment by Committee on Health Impact Assessment”, found at http://www.nap.edu/download.php?record_id=13229.

Setting aside the known impacts on the natural environment of anthropogenic releases of methane, the primary component of the mix of fuel gases commonly known as “natural gas”⁴ – which alone should give cause to question the desirability of expanding natural gas transport infrastructure⁵ -- gases and condensate⁶ in natural gas transport infrastructure have known human health effects. Recent studies show that those releases occur in quantities greater than had been previously estimated and in patterns that pose risk to human health. The need for incorporation of CHIA into environmental impact assessments of natural gas infrastructure projects thus becomes that much more important.

1. Releases

Recent research documents the prevalence of leaks in each component of the natural gas extraction, processing, and transport infrastructure system. As but a few examples:

- According to USEPA, 92.1 percent of methane emissions in the United States natural gas industry come from fugitive emissions (62.1 percent of the total) and vented emissions (30 percent of the total),⁷ with total United States natural gas industry methane emissions accounting for 19 to 21 percent of anthropogenic methane emissions.⁸ Additionally, “In the largest, most comprehensive study ever conducted on methane emissions from natural gas gathering facilities and processing plants, researchers led by Colorado State University found that 0.47 percent of the methane produced domestically is lost during gathering and processing operations. According to the study, methane emissions from gathering systems are equivalent to 30 percent of overall methane emissions in the current U.S. greenhouse gas inventory. The majority of these methane emissions were attributed to normal operations of gathering facilities.”⁹
- “A Colorado State University-led research team ... completed the most comprehensive field study to date of the amount of methane being emitted at the nation’s natural gas transmission and storage infrastructure. [Based on 2012 data,] researchers detected methane emissions at compressor stations that were both operating and idle. Estimates based on on-site measurements indicate about 30 percent of aggregate emissions were from facilities where all compressors were idle. ... Without the two super emitters, average methane emissions recorded during the study

⁴ “Natural gas is composed primarily of methane, but may also contain ethane, propane and heavier hydrocarbons. Small quantities of nitrogen, oxygen, carbon dioxide, sulfur compounds, and water may also be found in natural gas.” http://www.beg.utexas.edu/energyecon/lng/LNG_introduction_07.php.

⁵ USEPA considers methane to be a major greenhouse gas: “Pound for pound, the comparative impact of CH₄ on climate change is more than 25 times greater than CO₂ over a 100-year period.” <http://www3.epa.gov/climatechange/ghgemissions/gases/ch4.html>. To address the issue of reducing anthropogenic releases of methane into the atmosphere, that agency recently issued a series of regulations and requests for information on emissions occurring at various stages of natural gas extraction, processing, and transportation. See <http://www3.epa.gov/airquality/oilandgas/actions.html>.

⁶ In the context of this White Paper, “condensate” means liquids -- hydrocarbon liquids and water -- that condensed out of the natural gas stream and particulate matter formed during natural gas contact with the materials that coat the inside of the natural gas pipeline.

⁷ USEPA, “Estimate of Methane Emissions from the U.S. Natural Gas Industry,” Table 2, posted September 15, 2015 and found at <http://www3.epa.gov/ttn/chief/ap42/ch14/related/methane.pdf>.

⁸ *Ibid.*, at “5.0: Conclusions.” According to USEPA, methane emissions from oil extraction activities and from natural gas extraction, transportation, and distribution activities account for nearly 30 percent of total United States anthropogenic methane emission sources. USEPA news release dated August 18, 2015, “EPA Proposes New Commonsense Measures to Cut Methane Emissions from the Oil and Gas Sector/Proposal Cuts GHG Emissions, Reduces Smog-Forming Air Pollution and Provides Certainty for Industry,” found at <http://yosemite.epa.gov/opa/admpress.nsf/bd4379a92ceceac8525735900400c27/e5f2425e2e668a2b85257ea5005176fa!opendocument>.

⁹ <http://source.colostate.edu/researchers-measure-methane-lost-in-natural-gas-operations/>. The study itself, A. Marchese et al., “Methane Emissions from United States Natural Gas Gathering and Processing,” *Environ. Sci. Technol.* 2015, 49, 10718–10727, may be found at <http://pubs.acs.org/doi/pdf/10.1021/acs.est.5b02275>.

were higher than the Greenhouse Gas Reporting program, but comparable to or lower than the Environmental Protection Agency's Greenhouse Gas Inventory estimate. When the super emitters are included, then the study-average emission factors could exceed both EPA estimates."¹⁰ A follow-up analysis of the data "found that the total amount of methane emitted into the atmosphere from the transmission and storage sector is not statistically different from the emissions reported in the Environmental Protection Agency's 2012 Greenhouse Gas Inventory¹¹ for the sector[, which] ... estimated emissions between 1,680 to 2,690 Gg/yr (mean of 2,071 Gg/yr). The study estimates that total methane emissions from the transmission and storage sector resulted in the loss of 0.28% to 0.45% (mean of 0.35%) of the methane transported in 2012."¹² This new information, combined with other data acquired from other studies, led USEPA last week to announce its re-evaluation of its inventory.¹³

- A Harvard University study of natural gas leaks from the Boston area's natural gas infrastructure published in January 2015 showed that natural gas is leaking from that infrastructure at rates two to three times higher than previous government estimates, with an overall leak rate of 2.1 percent to 3.3 percent.¹⁴

Additionally, at present, planned releases of large volumes of transported fuel gases into the atmosphere (commonly known as "blowdown events") are an integral component of routine pipeline infrastructure operations.¹⁵

The above, and other, studies and analyses led USEPA last year to propose regulations that tighten requirements intended to reduce methane emissions from the natural gas transport infrastructure system.¹⁶

¹⁰ <http://source.colostate.edu/csuo-study-measures-methane-emissions-natural-gas-transmission-storage-sites/>. The report, R. Subramanian *et al.*, "Methane Emissions from Natural Gas Compressor Stations in the Transmission and Storage Sector: Measurements and Comparisons with the EPA Greenhouse Gas Reporting Program Protocol," *Environ. Sci. Technol.* 2015, 49, 3252–3261, may be found at <http://pubs.acs.org/doi/pdfplus/10.1021/es5060258>.

¹¹ USEPA's Greenhouse Gas Inventory is one of the federal agency's two programs that track methane from the natural gas infrastructure system.

¹² <http://source.colostate.edu/results-of-second-methane-emissions-study-published/>. The study, D. Zimmerle *et al.*, "Methane Emissions from the Natural Gas Transmission and Storage System in the United States," *Environ. Sci. Technol.* 2015, 49, 9374–9383, may be found at <http://pubs.acs.org/doi/pdf/10.1021/acs.est.5b01669>.

¹³ USEPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: Revisions under Consideration for Natural Gas Transmission and Storage Emissions January 2016," posted January 20, 2016, and found at http://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/DRAFT%20Proposed%20Revisions%20to%20NG%20Transmission%20Storage%20Segment%20Emissions_2016-01-20.pdf.

¹⁴ K. McKain *et al.*, "Methane emissions from natural gas infrastructure and use in the urban region of Boston, Massachusetts," *Proceedings of the National Academy of Sciences*, 112: 1941-1946 (February 17, 2015), which may be found at <http://www.pnas.org/content/112/7/1941.full.pdf>.

¹⁵ See Argonne National Laboratory, "Natural Gas Pipeline Technology Overview," (2007), p.45. This report may be found at http://corridoreis.anl.gov/documents/docs/technical/apt_61034_evs_tm_08_5.pdf. See also "Infrastructure" in Concerned Health Professional of New York, "Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking (Unconventional Gas and Oil Extraction), Third Edition (October 2015)", found at <http://concernedhealthny.org/wp-content/uploads/2012/11/PSR-CHPNY-Compendium-3.0.pdf>.

¹⁶ USEPA news release dated August 18, 2015, "EPA Proposes New Commonsense Measures to Cut Methane Emissions from the Oil and Gas Sector/Proposal Cuts GHG Emissions, Reduces Smog-Forming Air Pollution and Provides Certainty for Industry," found at <http://yosemite.epa.gov/opa/advpress.nsf/bd4379a92ceceac8525735900400c27/e5f2425e2e668a2b85257ea5005176fa!opendocument>. See also [Natural Gas STAR Annual Implementation Workshop, Pittsburgh, Pennsylvania, November 18, 2015, "Directed Inspection and Maintenance for Transmission Compressor Station Leak Reduction: Program Focus Supported by Subpart W Data," found at http://www3.epa.gov/gasstar/documents/workshops/2015_AIW/19mccarthyphugh.pdf.

These releases, occurring through spills, leaks, and intended releases, pose threats to the environment and human health ranging from impacts on forests and wetlands to exposure to radiation, gas, and hazardous condensate.

The push to build new natural gas transport infrastructure appears to be having a materially adverse impact on pipeline safety:

- According to a 2015 Pipeline Safety Trust analysis of federal data, new pipelines are failing at a rate on par with gas transmission lines installed before the 1940s. Carl Weimer, director of the Pipeline Safety Trust, told attendees at a National Association of Pipeline Safety Representatives annual meeting in Tempe, Arizona, “The new pipelines are failing even worse than the oldest pipelines.” The Trust looked at the annual average number of incidents per 10,000 miles of onshore transmission lines over 2005-2013 based on when the pipelines were installed, as reported to PHMSA and found a “bathtub curve” with high points on the ends and low points in the middle, indicating that the oldest pipes and the newest pipes had the highest rates of incidents.
- Robert Miller, chairman of the National Association of Pipeline Safety Representatives said in a September 1, 2015 interview that while more emphasis has been placed on construction inspections, “If it's brand new, if it's all new materials, if everybody was doing their job correctly, why would we have an uptick in ... failures?” Miller, who is also the Arizona Corporation Commission's pipeline safety section supervisor, said, “You can only attribute that, in my personal opinion, to poor construction practices or maybe not enough quality control, quality assurance programs out there to catch these problems before those pipelines go into service.”
- Robert Hall, director of the NTSB's Office of Railroad, Pipeline and Hazardous Materials Investigations, noted in a September 1, 2015 interview that the “bathtub curve phenomenon” is well established among industries working through the struggles of new technology, but he agreed that the rapid construction of pipelines in the United States is likely a contributing factor to “people ... out there possibly taking shortcuts or not being as diligent” as they would be if the pace of construction were less fervent.”¹⁷

Pipeline ruptures occur even in newly constructed pipelines. As but one example: a 20 foot by 20 foot rupture occurred in January 2015 in a buried 42 inch pipeline in Missouri that went fully online in November 2009.¹⁸ Reductions in staffing at regulatory agencies make oversight and timely correction of deficiencies more difficult.

2. Human health effects

Experience in other states across the country shows that a decision to allow further expansion of natural gas infrastructure to allow transport of natural gas extracted by means of high volume hydraulic fracture technology (“HVHF”) has the potential to result in significant substantive effects on human health, particularly effects that could be avoidable, involuntary, adverse, and irreversible. Numerous members of the medical community have affirmed this conclusion.¹⁹

¹⁷

<http://www.napsr.org/SiteAssets/mediainfo/SNL%20Sept%209%202015%20BathTub%20Curve%20Construction%20Practices.pdf>. USEPA’s 2015 rulemaking proposals intended to reduce methane emissions from natural gas infrastructure may have the beneficial consequence of providing an enforceable adjunct in New York State to PHMSA’s pipeline safety program in the form of NYSDEC’s Air Resources program.

¹⁸ “Pipeline Ruptures Near Pike 43”, The People’s Tribune, February 3, 2015, found at <http://thepeopletribune.com/?author=2>.

¹⁹ In support of an HIA on HVHF, in October 2011, 250 physicians and medical professionals wrote a letter calling for a comprehensive public health impact assessment on HVHF.

The Medical Society of the State of New York adopted Position Statement 260.904 “Protecting Public Health from Natural Gas Infrastructure” in May, 2015, which states that the Society recognizes the potential impact on human health and environment associated with natural gas infrastructure and supports governmental assessment of the health and environmental risks that are associated with natural gas pipelines. The Position Statement may be

Residents living near shale gas operations have reported health issues ranging from dizziness, sinus disorders, bronchitis, and other respiratory symptoms to depression, nausea, fatigue, headaches, anxiety, difficulty concentrating, and cancer. A Colorado School of Public Health study released in March 2012 found that cancer risks were 66 percent higher for residents living less than half a mile from oil and gas wells than for those living farther away, with benzene being the major contributor to the increased risk. While these studies primarily relate to gas extraction activity consequences, some research has included consideration of pipelines and compressor stations.²⁰ Health impacts may occur in these situations even when conventional means of monitoring air quality do not universally document actionable levels of specific toxins. In essence, the human beings who, and farm and domestic animals

found at http://www.mssny.org/MSSNY/About_MSSNY/Position_Statements/HTML-Position_Statements-2.aspx#260000.

In June 2015, the American Medical Association adopted a similar policy (number: H-135.930): “Protecting Public Health from Natural Gas Infrastructure,” found at <https://searchpf.ama-assn.org/SearchML/searchDetails.action?uri=%2FAMADoc%2Fhod.xml-0-297.xml> which 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.”

²⁰ See, e.g.,

- D. Brown *et al.*, “Understanding exposure from natural gas drilling puts current air standards to the test,” *Reviews in Environmental Health* 2014: 29(4):277-92, the abstract for which may be found at <http://www.ncbi.nlm.nih.gov/pubmed/24690938>.
- Southwest Pennsylvania Environmental Health Project, “Summary of Minisink Monitoring Results” found at <http://www.environmentalhealthproject.org/wp-content/uploads/2015/06/Summary-of-Minisink-Results.Public.pdf> (documented episodic spikes in air pollutants emanating from this compressor station, which became operational in 2013, corresponded with waxing and waning self-reported health symptoms among 35 residents in eight families living within a mile of the compressor. Six of 12 children suffered from nosebleeds); and W Gillingham *et al.*, “Toxic Air Emissions During a Compressor Station Blowdown at Hancock New York” (submitted for publication).
- In comments to the Federal Energy Regulatory Commission, New York’s Madison County Health Department reviewed the literature on compressor station emissions and expressed concerns about associated health impacts, including documented correlations between health problems and residential proximity to compressor stations. It also reviewed health outcomes associated with exposures to chemicals known to be released from compressor stations, including volatile organic compounds, carbonyls and aldehydes, aromatics, and particulate matter. In addition, gas from fracking operations transiting through compressor stations carries gaseous radon. The Health Department noted a troubling lack of information on the intensity, frequency, and duration of emission peaks that occur during the blowdowns and large venting episodes that are a normal part of compressor operations. https://www.madisoncounty.ny.gov/sites/default/files/publicinformation/madison_county_doh_comments_-_docket_no._cp14-497-000.pdf
- A research team led by David O. Carpenter at University at Albany found high levels of formaldehyde near 14 compressor stations in three states. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4216869/>. In Arkansas, Pennsylvania, and Wyoming, formaldehyde levels near compressor stations exceeded health-based risk levels. Other hazardous air pollutants detected near compressor stations in this study were benzene and hexane.
- Southwest Pennsylvania Environmental Health Project’s (2015, February 24) “Summary on compressor stations and health impacts,” found at <http://www.environmentalhealthproject.org/wp-content/uploads/2012/03/Compressor-station-emissions-and-health-impacts-02.24.2015.pdf>, describes impacts that are based upon the researchers’ first-hand experience with health impacts in southwest Pennsylvania. It also describes the results of other studies conducted by the Pennsylvania Department of Environmental Protection, by the Texas Commission on Environmental Quality, consultants for Dish, Texas, and by Earthworks, a not-for-profit organization, and by other organizations, identifying the various pollutants emitted during compressor station operations.

that, are becoming ill are serving as “bioassays,” revealing the presence of toxins or combinations of toxins that are difficult or impractical to measure in other ways. Thus, instead of measuring environmental contaminants as an indicator of or surrogate for human health impacts, in this setting it may be more accurate and more efficient to measure human health indicators directly as the primary “outcome measures” of possible contaminants. Moreover, it must be kept in mind that (a) leaks occur in the infrastructure used to transport gas extracted from HVHF gas wells and (b) standard procedure for planned and unplanned pipeline evacuation events is simply to release into the air the fuel gas contained in the pipeline.

Further, research has also shown that even minute amounts of endocrine disrupting chemicals commonly used in fossil fuel operations may impact humans, particularly children and the unborn, a concern not currently addressed. Such chemicals include many of the additives used in fracking procedures, as well as many of the volatile aromatic compounds (such as “BTEX”: benzene, toluene, ethylene, and xylene) that travel with methane and other components of natural gas.

Other factors that confirm that a CHIA would add value to the decision-making process are the presence of broad stakeholder concerns about the decision’s health effects, the potential for unequally distributed impacts, the potential for the CHIA to recommend and result in timely changes to various proposals, and the likely availability of resources and technical capacity to conduct the CHIA.

A. Precedent for fossil fuel CHIAs

A CHIA covering natural gas transport infrastructure operations should be undertaken in order to assess the risks to human health that the transport infrastructure already poses and the cumulative and site-specific human health risks that additional infrastructure development will be anticipated to bring about. The timing of such an assessment will be discussed later in this paper.

There is established precedent for preparing HIAs to evaluate the impacts of HVHF and other fossil fuel operations. For example:

- In 2007, a health impact assessment was performed for the Bureau of Land Management and Minerals Management Service for oil and gas development proposals on Alaska’s North Slope. This assessment led to new requirements for air quality analysis and monitoring of any oil related contaminants in subsistence foods, along with more worker education. It also identified significant public health impacts not normally examined in the context of an environmental review, including risks from increased traffic accidents, drug trafficking, and infectious diseases.²¹
- In 2010, a draft health impact assessment was completed in Garfield County, Colorado for proposed natural gas development in Battlement Mesa.²² The draft assessment concluded “that [the] health of the Battlement Mesa residents will most likely be affected by chemical exposures, accidents or emergencies resulting from industry operations and stress related community changes.” The researchers went on to recommend a set of mitigation measures to reduce the health threats to local residents. The Battlement Mesa assessment clearly

²¹ See A. Dannenberg *et al.*, “Use of Health Impact Assessment in the U.S.: 27 Case Studies, 1999–2007,” *American Journal of Preventive Medicine*, 2008;34(3):241–256, which may be found at www.cdc.gov/healthyplaces/publications/AJPM_HIAcasesstudies_March2008.pdf. See also R. Bhatia and A. Wernham, “Integrating Human Health into Environmental Impact Assessment: An Unrealized Opportunity for Environmental Health and Justice,” which may be found at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2516559/#b70-ehp0116-000991>.

²² The draft report may be found at <http://www.garfield-county.com/environmental-health/battlement-mesa-health-impact-assessment-draft2.aspx>

- demonstrates the feasibility and utility of health impact assessments for evaluating risks to the health of local residents from HVHF and horizontal drilling operations.
- In September 2014, the City of Hermosa Beach, California released its report covering its health impact assessment of the E&B oil well drilling and production project proposed to be undertaken in the city.²³ While the assessment concluded that when considered by itself, the project under review is expected not to cause more than nuisance health impacts to the general population, it provided monitoring recommendations for the city to consider, including a community liaison committee to address resident's active concerns about project activities; a follow-up community health assessment to identify if some groups are disproportionately impacted by project activities; and a quality of life survey to establish baseline conditions in Hermosa Beach, and to monitor health status changes during the project.
 - On December 17, 2014, the New York State Department of Health (NYSDOH) released its review of the health impacts of HVHF. This 186-page document served as the foundation for NYDEC's determination not to issue permits for high volume hydraulic fracturing.²⁴ While NYSDOH did not employ a formal CHIA to reach its conclusions, it "identified environmental problems associated with fracking that could contribute to adverse public health impacts. Among them: air pollution (particulate matter, ozone, diesel exhaust, and volatile organic compounds) that could affect respiratory health; drinking water contamination from underground migration of methane and/or fracking chemicals associated with faulty well construction or seismic activity; drinking water contamination from inadequate water treatment of fracking waste or from surface spills of fracking chemicals or wastewater; earthquakes and the creation of fissures; increased vehicle traffic; increased noise; increased demand for housing and medical care; and public health problems related to climate change impacts from methane and other greenhouse gas emissions into the atmosphere."²⁵ NYSDOH concluded that "there are significant uncertainties about the kinds of adverse health outcomes that may be associated with [HVHF], the likelihood of the occurrence of adverse health outcomes and the effectiveness of some of the mitigation measures in reducing or preventing environmental impacts which could adversely affect public health."²⁶ The contributions of the NYSDOH's thorough review of the health and science literature were pivotal in NYSDEC's determination under SEQRA that HVHF should not proceed in New York State.

III. Incorporating CHIAs into the environmental impact assessment of a natural gas infrastructure project

1. In enacting the National Environmental Policy Act of 1969, as amended,²⁷ Congress declared a national policy "which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." In order to carry out that policy, the federal government must "use all

²³ The report, entitled, "Health Impact Assessment: E&B Oil Drilling and Production Project," may be found at: <http://www.slideshare.net/StopHermosaBeachOil/final-health-impact-assessment-2014>

²⁴ New York State Department of Health, "A public health review of high volume hydraulic fracturing for shale gas development, December 17, 2014." The report may be found at http://www.health.ny.gov/press/reports/docs/high_volume_hydraulic_fracturing.pdf.

²⁵ Concerned Health Professional of New York, "Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking (Unconventional Gas and Oil Extraction), Third Edition (October 2015)", found at <http://concernedhealthny.org/wp-content/uploads/2012/11/PSR-CHPNY-Compendium-3.0.pdf>, at page 74.

²⁶ New York State Department of Health, "A public health review of high volume hydraulic fracturing for shale gas development, December 17, 2014." The report may be found at http://www.health.ny.gov/press/reports/docs/high_volume_hydraulic_fracturing.pdf.

²⁷ Pub. L. 91-190, 42 U.S.C. 4321 *et seq.*

practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may ... assure for all Americans safe [and] ... healthful ... surroundings; [and to] attain the widest range of beneficial uses of the environment without ... risk to health or safety.”²⁸ The environmental assessment process contained in the Act is a systematic interdisciplinary approach “intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.”²⁹ Specifically, all federal agencies are to prepare detailed statements assessing the environmental impact of and alternatives to major federal actions significantly affecting the environment.

2. “Environment” in the NEPA context encompasses the human environment, which is interpreted comprehensively “to include the natural and physical environment and the relationship of people with that environment. (See the definition of ‘effects’ (Sec. 1508.8[which defines ‘effects’ to include effects on, among others, *health, whether direct, indirect, or cumulative*].) This means that economic or social effects are not intended by themselves to require preparation of an environmental impact statement. When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment.”³⁰

Typically there is no information pertaining to, or discussion of, specific potential health impacts or vulnerable subpopulations in the usual SEQRA- or NEPA-mandated EIS that either the state or federal agencies undertake or require of an applicant. This serious deficiency in the existing process of evaluating the environmental impact of a proposed project results in current environmental assessments covering natural gas transport infrastructure projects containing no references to peer-reviewed literature on health effects near such infrastructure despite there being several determinants of health impacts that should be studied – and would be in the CHIA component of an EIS relating to that infrastructure. Those determinants include:

- Baseline health of population and prevalence of relevant diseases
- Identity and location of vulnerable populations and high-risk groups (*e.g.*, communities with low socioeconomic status, racial and ethnic minorities, women of childbearing age, infants, youth, elderly, and people with pre-existing or latent health conditions) and areas of particular concern (*e.g.*, sites near residences, schools, camps, recreational facilities, nursing homes, hospitals, agricultural regions, areas of sensitive geographical characteristics, such as wetlands and natural wildlife preserves, and sites likely to concentrate contaminants)
- Pathways of exposure: all potential pathways that link the activity to health, direct, indirect and cumulative (*e.g.*, risks of multiple chemical exposures; accident risk, diet/subsistence factors; strain on services; and social changes such as violence and crime)
- Modeling of, for instance, air impacts, local and distant
- Review of scientific information and research on health impacts of compressor stations, metering stations, regulating stations and pigging facilities and other infrastructure associated with transported natural gas, including Colorado research on negative health impacts from HVHF-related air pollution
- Input from local population and county and regional health departments
- Worker health included as part of the community health evaluation
- A literature search and expert opinions from the medical and public health community and from other experts

²⁸ 42 USC 4331(b).

²⁹ 40 CFR 1500.1(c).

³⁰ 40 CFR 1508.14.

The CHIA component also provides recommendations for health-based mitigation. For instance, in the case of air impacts, recommendations could include best control practices near particularly vulnerable communities that may drive enhanced mitigation measures, development of site-specific monitoring and adaptive management based on local meteorological conditions and population vulnerability, and/or alternative siting or avoidance of some areas altogether. With respect to water impacts, health-based mitigation could include identification and monitoring of sensitive receptors and addressing unique pathways such as subsistence consumption.

The failure to evaluate and attempt to mitigate potential health impacts associated with natural gas transport infrastructure can result in a number of negative outcomes for states, including more illness and disability and decreased productivity; increased cost to insurers, business owners and the state for health care; social instability; loss of community support; and particularly adverse effects for those who are poor, already ill, underserved or otherwise vulnerable.

IV Proposal for a CHIA on Natural Gas Transport Infrastructure Development

A. Project Description

The proposed CHIA component of an EIS covering natural gas transport infrastructure will assess the potential health impacts of that infrastructure and will inform decision-making about permitting and development of permit conditions encompassing needed health-based mitigation. (At higher policy levels, a CHIA could inform new legislation or regulations related to energy policy and delivery options, including consideration of the comparative health benefits of most forms of renewable energy, including the positive impact of renewable alternatives on climate stability, with its associated health benefits.) Unlike the non-human health related components of the EIS, the CHIA component will give special attention to how the infrastructure may affect vulnerable populations and to what mitigation is needed to protect such groups. The potential health impacts that should be examined through the systematic approach of a CHIA include, but are not limited to, those potentially resulting from or relating to:

- air pollution
- water contamination
- soil contamination
- exposure to endocrine-disrupting and other chemicals
- waste management
- radiation exposure
- spills, accidents
- road safety
- social concerns such as housing, community character, schools, substance abuse and infectious diseases
- economic issues such as employment, home value, health costs, loss of productivity
- health infrastructure including availability of insurance
- justice concerns such as vulnerable populations and equality
- synergistic and cumulative effects of multiple stressors

The CHIA component will lead to recommendations for health-based mitigation (including the potential denial of permits or imposition of permit limitations), additional or new regulations, education programs, monitoring, and further study and potentially risk assessment(s).

B. Implementing the CHIA in the EIS process

Two major issues arise when considering how to incorporate CHIA into the environmental review of an interstate natural gas transport infrastructure project: (a) what geographical extent does the CHIA cover and (b) at what stage in the permit application review process is the project?

CHIA needs a baseline condition against which a project's particular incremental and cumulative impacts can be assessed; and the area whose information will be used to articulate that condition. For example, should the information be drawn only from the area through which the infrastructure is proposed to pass or from some other portion of the states (such as an area that does not have any pipeline infrastructure)?

Where an applicant is in the project review process drives how CHIA may be addressed. For example,

- Before the EIS process gets underway, there is the opportunity to develop the baseline condition with assistance from other agencies, and to issue guidance that incorporates CHIA into the requirements for an acceptable environmental assessment of a project.
- Respecting applications pending before the FERC as of the date of this White Paper that have not yet been declared "complete" for processing purposes, FERC could inform the applicant that an acceptable environmental assessment for the project would include a CHIA component fulfilling requirements that are provided to the applicant, with the CHIA component encompassing a description of the baseline condition and an assessment of the incremental and cumulative human health impacts that the project is anticipated to generate. In consultation with other impartial agencies, FERC could also identify the qualifications of those who would undertake the CHIA components of the environmental assessment.
- Respecting applications pending before FERC as of the date of this White Paper that have already been declared "complete" for processing purposes, FERC could inform the applicant of the need for it to supplement the environmental assessment by expanding that assessment to encompass a CHIA. The difference between this situation and the situation described immediately above is, in this case, the need to have the supplementation completed before expiration of the time period set forth in federal law for consideration of the application in question in order to have the CHIA's assessment have any impact on agency decision-making on the application.

New Hampshire

Not The Next Minisink!

Although not a KM/TGP project
the story and results here
will be the same!

This story **did** happen
It **continues** to happen
and **will happen here**
unless
we do things differently!

Minisink, NY

- Small, rural town west of Brewster NY
- Compressor station (CS) added to existing Millennium pipeline in 2013...12,260 horse power
- Town fought to site CS outside of town on pipeline owned land...far from homes
- FERC voted 3-2 to site in town rather than the existing alternative. **Dissenters cited air quality would suffer**
- Town took to court and lost

Minisink, NY

- **In the fall of 2014 SWPA-EHP initiated a community health and air pollution project in Minisink, New York. SWPA-EHP was fortunate to have a community willing to participate in this first effort at monitoring impacts from a natural gas compressor station. The residents' cooperation in the air monitoring effort and in the health assessment process was a key factor in the project's success**

Minisink, NY

- Soon after CS operation commences residents report nosebleeds, headaches, asthma, rashes etc.
- SWPA-EHP conducts health and air quality study
- **Volatile Organic Compounds, as expected, are captured** in the air canisters
- **Higher than expected Particulate Matter is present**

Minisink, NY

- Elevated amounts of Particulate Matter **PM 2.5** are found, **17-20 micro grams per cubic meter (mg/cm)**
- **3 TIMES** the national average of 6.3 mg/cm
- Well above the **EPA limit of 12 mg/cm**
- Multiple episodes of **peaks into the hundreds, as high as 426**, were also recorded by Speck monitors
- **One home had a 24-hour average of 64**

Minisink, NY

- **June 2015 Harvard study shows health risks with PM 2.5 levels above 6 include reduced lung function, heart disorders and increased BP**
- **Each 1 microgram per cubic meter increases the mortality rate by 1% for people over 65**
- **Dec 2014 Harvard study shows high PM 2.5 levels in the 3rd trimester of pregnancy DOUBLE the risk of newborn autism**

Minisink, NY

- **No** pre-construction air quality or health assessments were done which nullified request to close Compressor Station

- Emissions now total **61,000 tons annually, before blowdowns**

- Examples of chemicals found in canisters:

Volatile Organic Compounds, Methane, Acetone, Ethylbenzene, Dichlorodifluoromethane, Ethanol, Ethylbenzene, Propene, Toluene, Trichlorofluoromethane, Trichlorotrifluoroethane

Minisink, NY

- Radium 226 and 228 are found in large quantities in Marcellus Shale gas
- Radium scale builds up in pipeline and CS which must be periodically removed and properly disposed of not dispersed into the environment
- Radium is known cause of bone and lung cancer

Minisink, NY

- **Dr. Wilma Subra's presentation on:**
"Potential Environmental and Human Health Impacts Associated with the Minisink Compressor Station" summarizes the dangers posed to the communities of New Ipswich, Temple and Greenville if a station over 3 times as large is built
- (The link can be found in bold print on links pg.)

New Hampshire

- KM newsletter states that hazardous air pollutants have been removed prior to transfer into TGP pipeline system
- What is removed is sulfur...not other toxins, VOC's etc., and benzene is actually **increased**
- KM's brochure for Emergency Responders states, Pipeline Incident Response Tactics - Conduct vapor monitoring for H₂S, LEL and **Benzene, Refer to guidebook 130 Benzene**

Dr. Wilma Subra

- Speaking on the chemicals released from Compressors
- This is not the presentation mentioned on previous slide
- <https://youtu.be/R403JjaxnTs?t=20>

Minisink, NY

- Currently, 7 miles from Minisink, in Wawayanda, NY, a gas fired power plant to produce electricity is under construction by Competitive Power Ventures. Citizens of the area have filed suit to stop construction
- To compensate for emissions exceeding local limits, **CPV bought emission reduction credits** (ERCs) from other companies not using their permitted amounts. Those companies are in Philadelphia, **375 miles away**.
- CPV ERCs include credits for 75 tons of volatile organic compounds (VOC's), which the World Health Organization deems unsafe and carcinogenic in any amount. **So CPV's total VOC emissions annually are actually 140 tons, more than twice the local limit. On an average day, the plant would emit a volume of VOCs that could fill a large barn.**

Dr. David O. Carpenter

- **Director of the Institute for Health and Environment at the University of Albany**
- **He is speaking in Nassau NY which has a proposed compressor station similar to New Ipswich**
- https://youtu.be/RPyXaAwHM_8?list=PL8i7qTPiGAF5VSxuf5kSavHGNxbs-JT6D

New Hampshire

- Now slated to have one CS in New Ipswich with KM already saying they plan to add more CS's along the route...possibly one every 17 miles
- Like Minisink the New Ipswich CS would be close to dozens of homes, the Temple Elementary School, numerous wells and the Greenville reservoir
- Air pollution would easily reach the centers of Temple, New Ipswich and Greenville...and beyond
- **How long before WE get a gas fired power plant?**

New Hampshire

- **At 41,000 HP, the New Ipswich CS would be over three times that in Minisink; at 80,000 HP it would be over six times its size**
- **Amount of toxins released and area of dispersion is proportional to size of CS**
- **Expected total emissions (not VOC's) 200,000-400,000 tons annually**
- **Area of dispersion very dependent on height of stack and wind conditions**

What an 80,000 HP Compressor Station looks like Haven, Kansas

<https://vimeo.com/139932144>

Earth Works

- A non-profit dedicated to protecting residents from the effects of energy production and transportation
- Have worked with SWPA-EHP and Wilma Subra to study Marcellus Shale wells and transportation
- Findings include:
 - **Actual pollutants from Compressor Stations exceed modeling estimates prior to construction**
 - **90% of individuals within a 2-3 mile radius of Compressor Stations experience health impacts**

Are Blowdown Emissions considered in permit applications?

- Blowdowns of raw gas should be counted in “modelling” a CS
- <https://youtu.be/yXLD3e7EoI8?list=PL8i7qTPiGAF5VSxuf5kSavHGNxbs-JT6D>
- Venting in Union County FL
- https://youtu.be/6a_uV6c-Nu0?list=PL8i7qTPiGAF5VSxuf5kSavHGNxbs-JT6D

Dr. David Brown

- To attain permits, pipeline companies use analysts who **manipulate** projected emissions levels to make them acceptable by Environmental Protection Agency standards, Brown says. Those standards are also weakened by industry lawsuits when the EPA tries to tighten them. “They delude themselves about emissions safety,” says Brown.
- By segmenting and averaging emissions over long periods and shortening technology operation periods, emissions levels can be calculated that fall below a level designated “major source.” A project designated “**major source**” necessitates an Environmental Impact Assessment that requires hazards to be more thoroughly investigated.

Dr. Wilma Subra

The rules and regulations have minor and major emitters. The companies always make sure they are just below the concentration that would make them major because when you're major you have to comply with a whole lot more modeling. They all want to be minor sources.

FERC, EPA & DES Will Protect Us?

- **FERC system is broken and is under fire to change. Fact is, the existing rules will be what FERC enforces**
- **The EPA has been weakened in recent years due to budget cuts. In addition when they introduce more stringent regulations, big industry lobbies, sues and ultimately negotiates a lowering of the intended requirements**
- **DES – remains to be seen – if like other states, if FERC approves, so will they.**

Dr. Wilma Subra

- **Wetlands, endangered species, bird migrations etc., even schools, don't matter**
- **The only way you're going to stop this is through your Congressional Delegation**

What Our Governor and Congressional Delegation Must Do For Us

- **Stop the project if there is no proven NET benefit to NH**
- **Insist on electric compressors**
- **Demand air, water, soil and health testing before, during and after construction at KM expense by independent 3rd party**
- **Demand that the Compressor Station be designated a “Minor or Major Source” via independent 3rd party modeling**

Reference Material

Dr. Wilma Subra

- **Has just completed a seven year term as Vice-Chair of the Environmental Protection Agency National Advisory Council for Environmental Policy and Technology (NACEPT)**
- **A five year term on the National Advisory Committee of the U. S. Representative to the Commission for Environmental Cooperation**
- **A six year term on the EPA National Environmental Justice Advisory Council (NEJAC) where she served as a member of the Cumulative Risk and Impacts Working Group of the NEJAC Council, and chaired the NEJAC**
- **Dr. Subra holds degrees in Microbiology/Chemistry from the University of Southwestern Louisiana**
- **She received the MacArthur Fellowship Genius Award from the MacArthur Foundation for helping ordinary citizens understand, cope with and combat environmental issues in their communities and was one of three finalist in the Environmental Category of the 2004 Volvo for Life Award.**

Dr. David Brown

- **Dr. David Brown is the Public Health Toxicologist and Director of Public Health Toxicology for Environment and Human Health, Inc.**
- **He is the past Chief of Environmental Epidemiology and Occupational Health in Connecticut and was previously Associate Professor of Toxicology at Northeastern College of Pharmacy and Allied Health.**
- **He also served as Deputy Director of the Public Health Practice Group of Agency for Toxic Substances and Disease Registry (ATSDR) at the National Centers for Disease Control and Prevention in Atlanta, Georgia**
- **Dr. Brown graduated from Cornell University in Biochemistry, received his MS from the University of California In Environmental Health, and his ScD from Harvard School of Public Health in Toxicology**

Links For Presentation Data

(Right click & select “open hyperlink”)

<http://www.minisinkmatters.org/?p=147#comment-44>

http://www.stopmcs.org/?page_id=383

<http://www.utne.com/environment/gas-compressors-and-nose-bleeds-zm0z15fzsau.aspx>

<http://www.stopmcs.org/?p=1072>

<http://www.environmentalhealthproject.org/wp-content/uploads/2015/06/Summary-of-Minisink-Results.Public.pdf>

<https://www.youtube.com/watch?v=RYdrSe-USxg>

<http://www.environmentalhealthproject.org/wp-content/uploads/2012/03/Compressor-station-emissions-and-health-impacts-02.24.2015.pdf>

Links For Presentation Data

(Right click & select “open hyperlink”)

<http://www.hsph.harvard.edu/news/press-releases/air-pollution-below-epa-standards-linked-with-higher-death-rates/>

<http://www.hsph.harvard.edu/news/press-releases/fine-particulate-air-pollution-linked-with-increased-autism-risk/>

<http://www.utne.com/environment/gas-compressors-and-nose-bleeds-zm0z15fzsau.aspx>

<http://www.catskillcitizens.org/learnmore/subraminisink.pdf>

<http://www.stopmcs.org/?p=1185>

<http://www.minisinkmatters.org/?p=242>

<http://des.nh.gov/organization/commissioner/pip/factsheets/ard/documents/ard-ehp-22.pdf>

Links For Presentation Data

(Right click & select “open hyperlink”)

<http://caselaw.findlaw.com/us-dc-circuit/1675630.html>

<http://www.minisinkmatters.org/?p=263>

<http://www.utne.com/environment/effects-of-air-pollution-zm0z15fzsau.aspx?PageId=3#ArticleContent>

http://www.kindermorgan.com/content/docs/er_brochure.pdf

http://www3.epa.gov/air/ej/conference2007/Wilma_Subra_Bio.pdf

Please feel free to edit this presentation, changing names to the towns affected in your area!

What is missing from this presentation

- ***This Power Point Presentation should be accompanied by a MS Word Doc - Not the Next Minisink! This document is a 3 page narrative version of the Minisink story with links to supporting data embedded as the story progresses.***
- Other medical related links of interest.....
- John Hopkins Study Pregnancy complications
<http://marcellus.com/news/id/130030/new-study-links-active-gas-wells-to-pregnancy-complications-preterm-birth/>
- Physicians for Social Responsibility latest study
<http://concernedhealthny.org/wp-content/uploads/2012/11/PSR-CHPNY-Compendium-3.0.pdf>

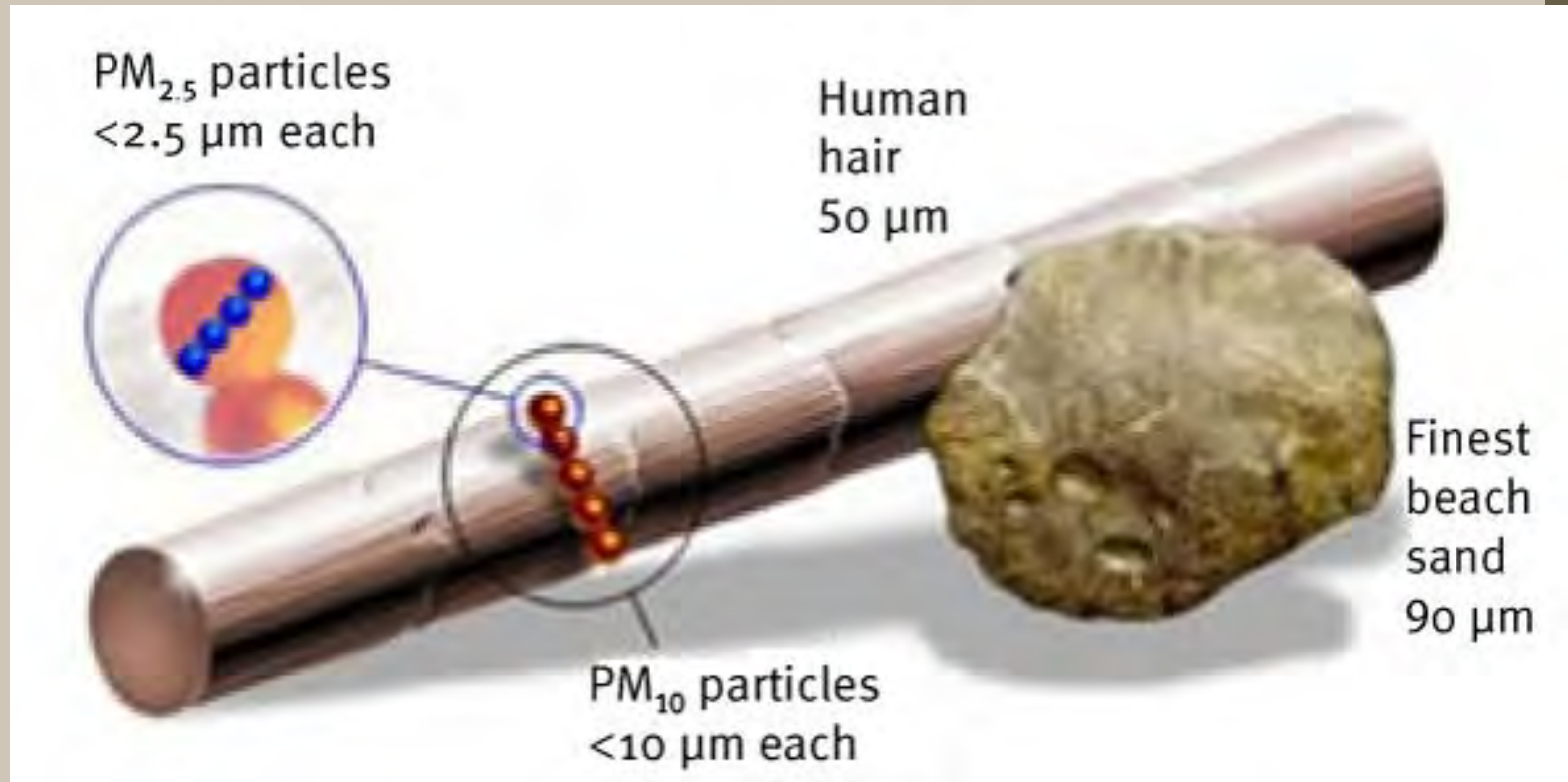
What is missing from this presentation

- Health Professionals open letter to FERC
https://docs.google.com/document/d/1aTx7Xf1ISU8S4zUf-ofTifz5b-_C7ZF3F2O8r6cJqBQ/edit
- Doctors urge Cuomo to put brakes on
<http://www.timesunion.com/business/article/Governor-asked-to-put-brakes-on-natural-gas-6571163.php#>
- 100+ studies on health & safety re. fracking just released
<http://ecowatch.com/2015/10/14/health-risks-fracking/>
- UTNE - the real cost of fracking
<http://www.utne.com/environment/cost-of-fracking-zm0z14fzsau.aspx>
- CS & Toxic Gases <http://nopipelines.org/compressor-stations/>

Next Steps

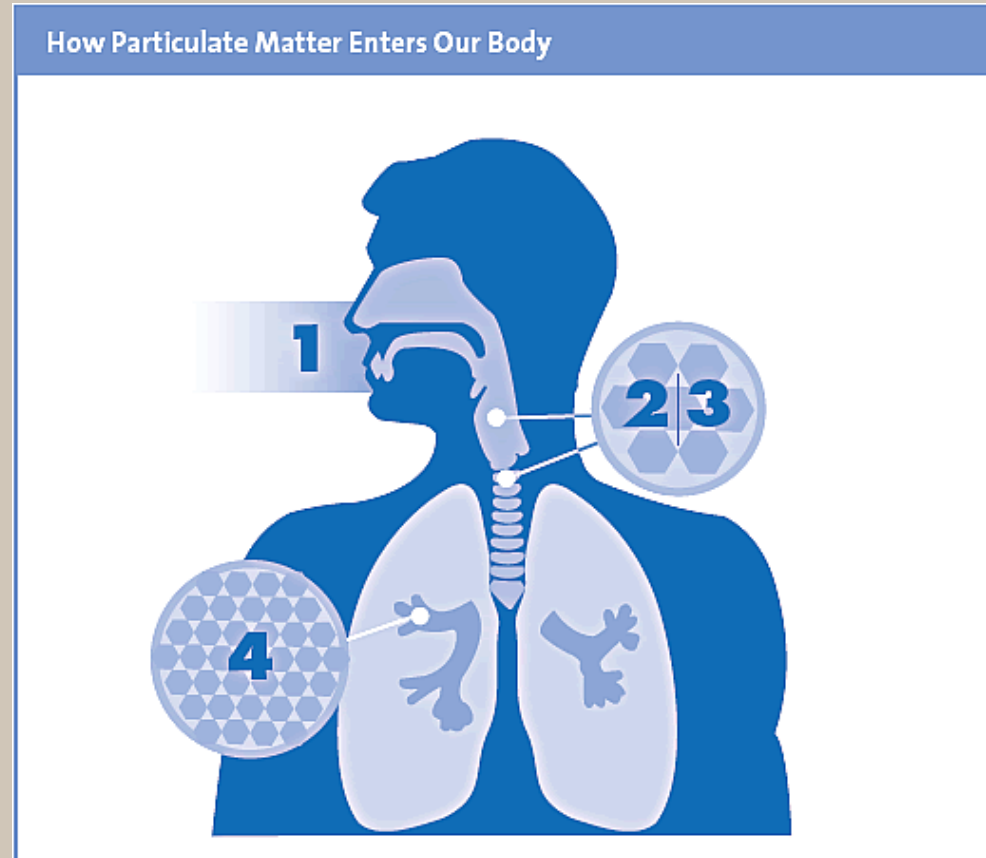
- **Get NH Medical Society to oppose this project...like NYMS**
- **Meet with Congressional Delegation to make this presentation....if you do nothing here's what going to happen to thousands of NH residents...the time to act is now**
- **Hold large informational meetings to inform public**
- **Get this presentation and video out on social media**

Particulate matter



Organic compounds, metals

Particulate matter



2100 premature deaths in one summer*, eastern US cities
Stroke, heart disease, diabetes, stillbirth, low birth weight

* X Hou et al (2015). *Environmental Research*, v137, 475-484

Particulate matter

EPA standards:¹

Annual limit 12 mcg/m³

24hr limit 35 mcg/m³

Increase of 10 mcg/m³ for one day:

Cardiopulmonary mortality up to 5.3% higher ²

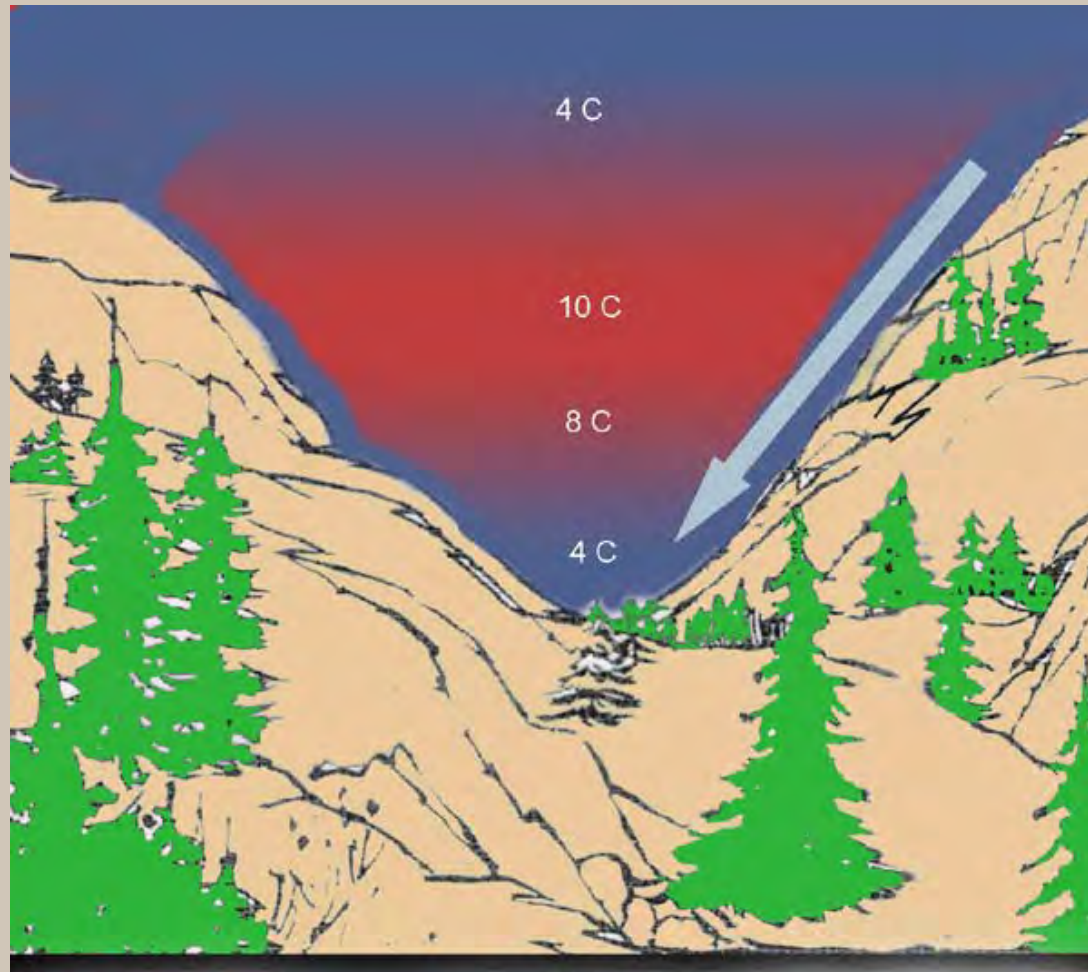
Asthma diagnoses up 10%-12% ³

1) <http://www3.epa.gov/ttn/naaqs/criteria.html>

2) Samoli et al (2014). *Environment International*, v67, 54-61

3) JK Wendt et al (2014). *Environmental Research*, v131, 50-58

Inversions



Zone of warm nighttime temperatures above a valley temperature inversion. (From Schroeder and Buck. 1970)

Inversions



Inversions



Inversions

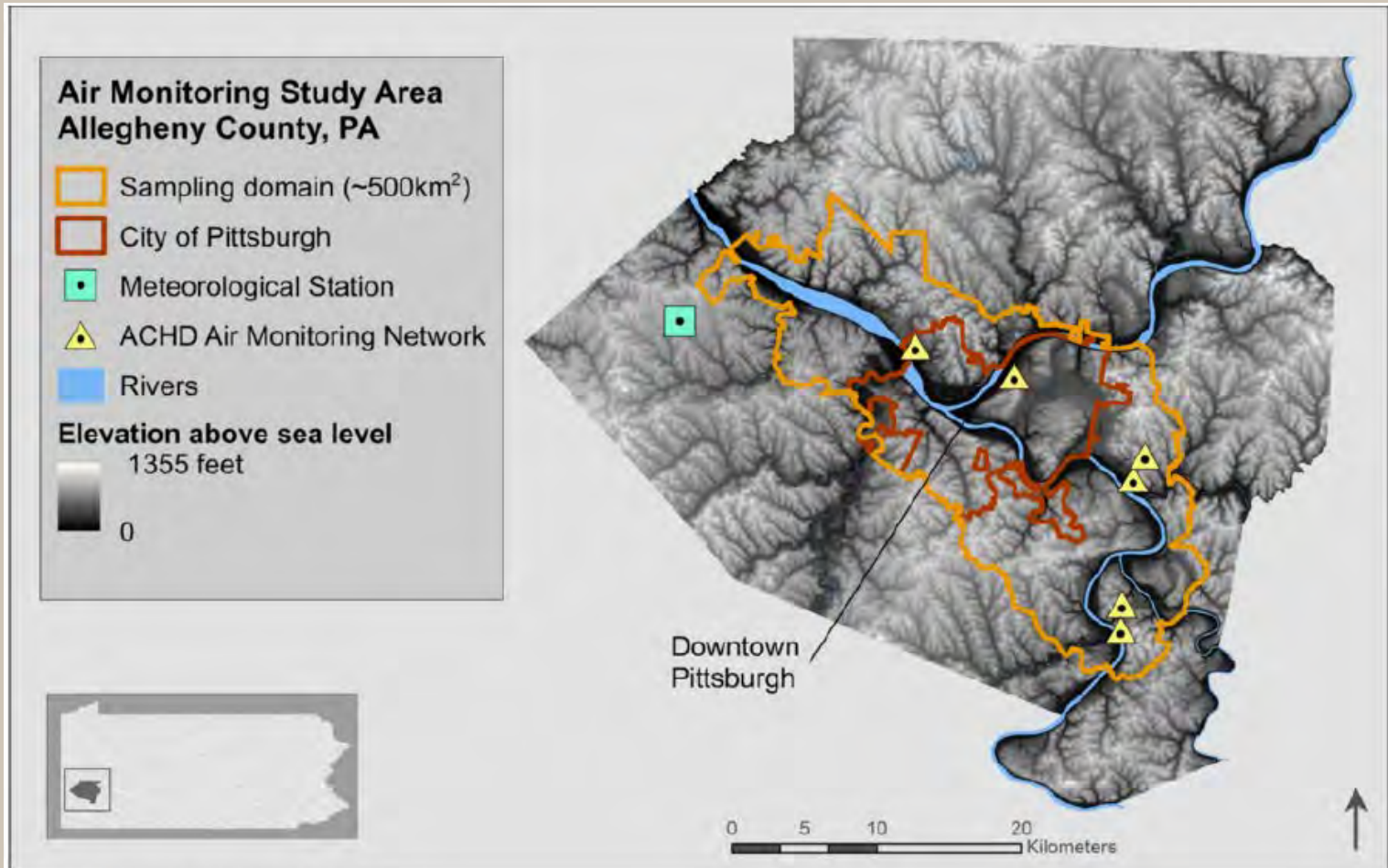


Figure 1 Air monitoring study domain.

Schmool et al (2014). *Environmental Health*, v13, 28-44.

Inversions

Summer:

- No relationship between PM and elevation
- Higher NO₂ levels at lower elevations

Winter:

- Higher PM and NO₂ levels at lower elevations

Dr. Sheila Bushkin-Bedient: a physician who specializes in public health and preventive medicine, with a particular focus on environmental health. She is a cofounder of Concerned Health Professionals of New York. She has been a member of the Medical Society of the State of New York for 17 years, and is the former Vice-chair of the Committee for Preventive Medicine and Family Health. She is a member of the Institute for Health and the Environment at SUNY Albany. Her specific areas of interest involve environmental health issues, chronic diseases, and health concerns of vulnerable populations. She has a particular interest in the continuing education of physicians, as well as public health education and advocacy.

Dr. Larysa Dyrszka: a graduate of Washington University School of Medicine in St. Louis. Following residency and board certification in pediatrics, Dr. Dyrszka practiced general pediatrics and held the position of Director of Pediatrics at Holy Name Hospital in Teaneck, NJ. Her recent work has been focused on children's rights with the Conference of NGOs at the United Nations Committee on Children's Rights. She has been a SUNY (State University of New York) Sullivan Community College Board of Trustees Member since 2009, appointed by Governor Paterson. Dr. Dyrszka is an advocate for health on the issue of natural gas exploration and production. She is a founding member of Sullivan Area Citizens for Responsible Energy Development, vice-chair of the CME curriculum committee for Physicians, Scientists and Engineers for Healthy Energy and on the board of Physicians for Social Responsibility – New York. Together with fellow NY medical colleagues, she founded Concerned Health Professionals of New York.

Ansje Miller: the Eastern States Director for the Center for Environmental Health. In that role, she represents CEH with elected officials and others in New York and Washington. Ms. Miller has led a number of successful legislative and regulatory campaigns that removed the use of toxic chemicals like lead and cadmium from consumer products. Her organizing efforts, research reports, and popular articles have also led to the creation of numerous policies on global warming including California's AB32. Ansje currently serves on the board of the Reproductive Health Technologies Project (RHTP). Prior to her work at CEH, from 2001 to 2006, Ansje founded and directed the Environmental Justice and Climate Change Initiative, a coalition that brought together the nation's leading environmental justice, faith-based, and policy organizations to advocate socially just policies on climate change.

Dr. Kathy Nolan: a pediatrician and bioethicist, with training in epidemiology and research design. She serves as Senior Research Director for Catskill Mountain keeper, where her work has focused on articulating the health impacts of high-volume horizontal fracturing. She is member of the Steering Committee of the New York chapter of Physicians for Social Responsibility, a co-founder of Concerned Health Professionals of New York and co-author of CHPNY's Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of High Volume Horizontal Hydro fracturing.

Charles E Sullivan, Jr., Esq: an attorney who served 27 years in the New York State Department of Environmental Conservation, nine years as its Director of Environmental Enforcement and the last two years as Special Counsel to the General Counsel. His practice mainly focused on solid waste regulation and enforcement and on hazardous substance remediation.

Ellen Webb: Energy Program Associate in the Center for Environmental Health's New York office for initiatives relating to energy and environmental health. She is currently assisting with the development of a research report evaluating various energy sources based on a comparative assessment of their impact on the environment and human health. Ellen has over a decade of experience working at the

intersection of health, science, and policy and has experience working in the private, government and non-profit sectors. Prior to joining CEH, Ellen worked on a range of environmental health initiatives including a study of toxic exposures in hospital environments. She worked with a variety of hospital governance structures in NYC coordinating planning efforts across private, federal and public hospitals for the purpose of improving New YorkCity Hospitals' ability to respond to bio-terrorist attacks as well as other public health emergencies. Her past work includes the development of disaster preparedness guidance documents for hospitals to meet the special needs of New York City's children and improve radiation disaster preparedness. Ellen has her B.A. in Health Sciences from Hampshire College and a M.P.H. in Health Policy & Management from Columbia University.

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