Health Effects Associated with Stack Chemical Emissions from NYS Natural Gas Compressor Stations: 2008-2014

A Technical Report Prepared for the Southwest Pennsylvania Environmental Health Project underwritten by the Park Foundation

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From Raina Rippel, Environmental Health Project Director

Health Effects Associated with Chemical Emissions from NYS Natural Gas Compressor stations: 2008-2014 is a report on the chemical and particulate emissions of eighteen compressor stations in New York State (NYS), based on what companies are required to report to NY Department of Environmental Conservation (DEC) and National Emissions Inventory (NEI) of the U.S. Environmental Protection Agency (EPA). In addition, it presents the potential health effects of the 70 chemicals catalogued. The Report is aimed primarily at New York state and local governmental officials and administrators in order to raise their awareness of the size and scope of the air emissions generated by unconventional natural gas compressor stations. Many public officials are in positions to make decisions about siting compressor stations so that people who live nearby are relatively safe. EHP and IHE believe that the data provided in this Report should play a central role in that decision-making.

Secondarily, the Report is intended to inform communities, NGOs, and health care professionals about emissions from the eighteen compressor stations in NYS. It is not, however, designed to help quantify the risk of any particular community. Here's the reason why:

> The presence of a chemical with disease-causing properties does not necessarily result in disease in any one individual. For instance, some chemicals are only harmful beyond a certain level of exposure (often referred to as a "dose"). Some are more likely to be harmful if exposure is repeated before the body has had the opportunity to clear the preceding exposure. Others are more likely to cause disease or symptoms in vulnerable populations. That said, some of the chemicals reported by the companies will likely produce health effects in individuals living, working or going to school near the compressor stations. (David Brown, ScD, EHP Toxicologist and Public Health Scientist)

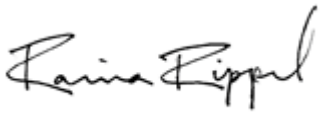
There are important reasons, however, for communities, NGOs and health care professionals to make use of this report. These 18 compressor stations are the seventh largest "Point source" of air pollution in New York State, and emit a large array of chemicals, in conjunction with fine and ultrafine particles. Some communities will experience intense exposures and these exposures will be to multiple contaminants simultaneously. Researchers do not know the combined effects of the possible mix of chemicals, but it is an important feature of the UNGD process (Unconventional Natural Gas Development). Health care professionals can use the Report, and specifically Chapter 3, to identify the actual health conditions produced by the reported chemicals.

By volume, the largest emissions are NO2, CO, VOCs, Formaldehyde, and Particulate Matter. Exposure to these chemicals can cause respiratory and cardiovascular diseases, neurological and developmental diseases and cancer. The New York State Bureau of Vital Statistics reports that, as of 2012, the leading causes of death were heart disease and cancer, followed by chronic lower respiratory disease. What we know from our work and that of researchers across the country is that symptoms associated with UNGD exposure and reported by residents include respiratory, cardiovascular and neurological health effects. Thus, exposure to emissions from these compressor stations may contribute to these prevalent diseases.

What does this data mean for impacted residents and communities?
A question often asked of us by residents living near UNGD sites is "how will these emissions affect my health or my community?" This report shows that every compressor station routinely releases large volumes of chemicals associated a variety of diseases and disorders. The level of risk to any individual or community from a compressor station can be estimated by applying specific statistical analyses. The analysis should include modeling the reported chemical emissions from the compressor station based on local weather patterns. The exposure levels at varying distances from the site, and the duration of extreme exposures can then be estimated. The largest emissions by volume are likely to produce the greatest exposures and consequent health impacts.

EHP expects that this compilation of readily available information will be helpful in assuring the health of residents near compressor stations. We welcome feedback, questions and comments on the use of this report.

In good health,



Raina Rippel, Director

Southwest Pennsylvania Environmental Health Project

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Purpose of the Report

Is it Safe?

People living in communities where natural gas compressor stations are sited or are proposed, have repeatedly asked: "Is it safe?" This study represents an attempt to answer that crucial question.

Industry's answer

Each of the compressor stations operating in New York State (NYS) have been approved by the state's Department of Environmental Conservation (DEC) based on the conclusion that they comply with all federal and state air quality requirements.

When members of the public or local officials question the potential health effects of compressor station pollution, invariably the response from industry, EPA, DEC and DOH is that "all legal requirements have been met" -- the clear ***implication*** being that if these "legal requirements" have been met, there is no reason to be concerned about adverse health effects.

For example, in a public statement issued by Dominion Transmission concerning its New Market Project, it states: "The FERC approved New Market on April 28, 2016 after 23 months of evaluating all environmental, health and safety concerns associated with the project." Dominion poses the question, "What will be the environmental and public health concerns?" And answers:

> Any emissions from the compressor station will comply with all air quality requirements, which are established to protect the public health, safety and welfare. We would not operate the compressor station if we could not operate it according to stringent air quality regulations.
>
> Ensuring compliance with environmental requirements falls either to the Environmental Protection Agency (EPA) or state environmental agencies (states by delegation), depending on the specific permit and rule. (Dominion 2016)

At best, such fact free statements are ill-informed.

In this connection, the three most essential points are these:

First, federal and state environmental laws and regulations are at best designed to protect the general health of regional populations and often fail to protect any single group of locally exposed persons. The "stringent air quality regulations" that Dominion refers to are those established by EPA for the purpose of controlling regional levels of pollution.

Second, "controlling regional levels of air pollution" is not equivalent to ensuring that the air in a region is free of pollutants that cause illness and early death. The air quality in any given region of the state may fully meet all federal and state air standards even though it is saturated with hundreds of dangerous chemicals and tens of thousands of pounds more are added each and every day.

Third, industry's assurances are hollow. They provide neither the empirical information nor the theoretical framework necessary for the public and local and state officials need to begin to understand the potential adverse health effects of existing and proposed compressor stations.

Our answer

Our answer to the question, “Is it safe?” is fundamentally different from that of industry and federal and state government.

In our opinion, the routine emissions surrounding the operation of natural gas compressor stations in New York State (NYS) increase the risk for most major categories of human disease in the state but especially in the communities where they are sited.

This conclusion is based on (1) an empirical assessment of the volume and content of contaminants released by 18 compressor stations operating under Title V of Clean Air Act in NYS (2) a comprehensive review of peer-reviewed scholarship associating the chemical constituents of those emissions with known and suspected human diseases.

What this study shows

The air in NY contains chemicals that are linked to 19 of 20 major categories of human disease.

There are 56 operational natural gas compressor stations in New York. Based on data collected by the natural gas industry and reported by EPA, we show that in ***a 7-year period 18 of these sites released an estimated 40.2 million toxic pollutants made up of 70 different chemicals.*** These 70 chemicals are also linked to 19 of 20 major categories of human disease.

Adding 40.2 million pounds of 70 contaminants to air already contaminated makes the air we breathe ***more contaminated*** and, by extension, increases the potential for human disease. It is, we think, as simple as that.

A few specific examples:

Cancer and air pollution: The International Agency for Research on Cancer, a division of the World Health Organization, is the most authoritative source of information on the effects of chemical and radiologic contamination on human health. In 2016, the Agency released what is perhaps its most important finding: “Outdoor air pollution is carcinogenic to humans.” After reviewing the extensive peer-reviewed literature IARC concluded that (1) in industrialized countries simply breathing the air increases the risk of cancer compared to breathing the uncontaminated air or relatively uncontaminated air and (2) the responsible pollutants are largely the result of human activity, that occur in both rural and urban areas from many difference sources.

> Although there are hundreds of sources of outdoor air pollution, the source categories that are the largest contributors to most air pollutants in many locations are: vehicle emissions; stationary power generation; other industrial and agricultural emissions; residential heating and cooking; re-emission from terrestrial and aquatic surfaces; the manufacturing, distribution, and use of chemicals; and natural processes. (IARC 2016)

Cancer is the second leading cause of death in the United States and the second leading cause of death in NYS, and in the near future it is very likely to surpass cardiovascular disease, currently the leading cause of death. The 40.2 million pounds of chemicals released by the state’s compressor stations from 2008 to 2014 includes 9.5 million pounds associated with cancer. Of this amount, 7.9 million pounds (83%) is made up of 20 chemicals classified as “known human carcinogens” by one or more authoritative governmental authorities. These cancers are known to cause cancers of the digestive tract (biliary tract, hepatocellular and liver), respiratory tract (lung, nasal cavity and paranasal sinuses), male genital organs (prostate), urinary tract (bladder and kidney), and hemolymphatic organs (acute myeloid leukemia/acute non-lymphocytic leukemia). Adding 5.7 million pounds of carcinogens to the state’s air each year can only increase the risk of cancer.

Birth defects: Fifty-seven of the 70 chemicals releases are associated with congenital malformation and deformations, including nervous system, deformations: eye, ear, face and neck, and circulatory system malformations and deformations.

Reproductive disorders: Thirty-seven chemicals are associated with diseases of the pelvis, genitals and breasts that affect reproduction. For males, this includes: epididymis, low hormone levels, male impotence, reduced fertility, semen (chemical contamination of semen, low amount of semen and low number of swimming semen), seminal vesicle injury, sperm (abnormalities, irregular shape and low number), and sterility. In women these chemicals are associated with diseases of female pelvic organs as well as noninflammatory disorders of female genital tract--both primary infertility (infertility without any previous pregnancy) and secondary infertility (fertility problems occurring in a couple that has conceived on their own and had a child in the past), as well as cervical erosion, effects on the ovaries (damage, weight changes and unspecified effects), menstrual problems including dysmenorrhea, endometrial stromal polyps, and vagina effects.

Circulatory system disease: Cardiovascular disease is the leading cause of death in the United States. In a 7-year period New York's compressor stations released 16 million pounds of cardiovascular toxicants. Compressor station pollutants are linked to hypertensive disease, chronic rheumatic heart diseases, cardiac arrhythmia, heart weight change, increased cardiovascular mortality, acute pulmonary edema, diseases of arteries, arterioles and capillaries (blood vessel changes and regional, general arteriolar or venous dilation).

This information has not previously been reported.

Without hesitation, we can say not only that the volume and known health effects of these pollutants increase the ***risk of disease***, but that they will result ***in actual illness***. However, given the limited scope of this study, we cannot quantify the nature or extent of potential increased risk.

The public's right-to-know

In our opinion, the public has a right-to-know the basic facts surrounding the operation of a compressor station, including the number and volume of pollutants and their known or suspected health effects. But beyond this basic information, the public also has the right to expect the opportunity to review a scientifically sound study of the potential health impacts of a compressor station ***before*** it is built.

In the State of New York

Neither industry nor government has provided the public with basic data about the extent of compressor station pollution or its likely health effects. In communities where new compressor stations have been planned, the public has asked the industry and state agencies to provide them with "health impact statements," "risk assessments" or "cost-benefit analysis." To public these terms are essentially synonymous, but they represent very different types of studies to the public health community.

In this connection, we would make three points. First and foremost, "health impact statements," "risk assessments" or "cost-benefit analysis" as conducted by federal and state agencies or industry and its paid consultants (a) rarely predict the likely qualitative impact of pollution, as any number of investigators have noted, (b) seldom present relevant information to the public in coherent fashion, or (c) never present a morally persuasive argument why some populations should be subjected against their will to greater levels of pollution with its attendant risk than other (usually more affluent) populations. Generally, the definition of "acceptable risk" adopted by industry and government is one death per 1 million people who are exposed, though various industries have

sought (in some cases successfully) to lower the accepted standard to one death per 100,000 exposed—a tenfold increase.

Second, notwithstanding our skepticism of the value or "health impact statements" and "risk assessments" broadly defined, it is worth noting that we could not find a single existing or proposed compressor station in NYS that has been the subject of such reviews by industry, NYS's DEC or Department of Health (DOH). Such analyses by the natural gas industry are not those of disinterested investigators. Much the same could be said of FERC, which is widely viewed as a "captive agency," i.e., an agency effectively controlled by the industry it is responsible for regulating. It is not the responsibility of DEC to perform health-based analyses, nor does EPA routinely require health impact statements. This only leaves the DOH which, unfortunately, is missing in action.

And finally, the lack of information about the potential adverse health effects of compressor stations on local communities has played no role in preventing their construction or expansion.

This study's rationale

All industrial development involves tradeoffs between short- and long-term economic benefits (real and perceived) and potential harm to human health and the environment.

To date, the criticisms of the expansion of the natural gas industry in the U.S. have focused primarily on four concerns.

Natural gas versus coal: First: exaggerated claims for the advantages of using natural gas compared to coal in terms of global warming. As a rule, burning natural gas to produce electricity produces half as much carbon monoxide as coal. While natural gas combustion produces fewer greenhouse gases than coal at the point of combustion, when the chemicals released in the production, transportation and distribution of natural gas are taken into account, the comparative advantage of natural gas are far less clear cut (Dove 2016, Grossman 2015. Moskowitz 2015, UCS, Zielinski S. 2014). Fugitive emissions of methane, roughly 30 times more potent as a heat-trapping gas than carbon dioxide, are of particular concern.

Climate change: Second: the more profound and most important argument that whatever natural gas's relative advantage compared to coal, the planet cannot sustain continued reliance on fossil fuels. In this connection, perhaps most startling is a recent study showing that climate sensitivity is nonlinear. Based on past, current and probable future greenhouse gas emissions, the Earth could heat up as much as 6°C (almost 11°F) in a single lifetime. (Friedrich 2016). Scientists estimate the range of sea rise from 1 to 6 meters (1.3 to 20 feet). The Australian Earth and paleoclimate scientist, Andrew Gliskon, describes the likely future: "The consequences of open ended rise in atmospheric CO_2 are manifest in the geological record. . . At 460 ppm CO_2-equivalent, the climate is tracking close to the upper stability limit of the Antarctic ice sheet, defined at approximately 500 ppm. Once transcended, mitigation measures would hardly be able to re-form the cryosphere. According to Joachim Schellnhuber, Director of the Potsdam Climate Impacts Institute and advisor to the German government: 'We're simply talking about the very life support system of this planet.'. . . Humans cannot argue with the physics and chemistry of the atmosphere. What is needed are urgent measures including: Deep cuts in carbon emissions; Parallel Fast track transformation to non-polluting energy utilities – solar, solar-thermal, wind, tide, geothermal, hot rocks; Global reforestation and re-vegetation campaigns, including application of biochar. The alternative does not bear contemplation." (Glikson 2010) Twenty-two scientists writing in *Nature* depict the situation with equal starkness: "[T]he next few decades offer a brief window of opportunity to minimize [but not prevent] large-scale and potentially catastrophic climate change that will extend longer than the entire history of human civilization thus far. " (Clark et al. 2016).

In a recent paper reviewing 40 years of climate data and conclusions drawn from that data, researchers found that scientists have underestimated the likelihood of dangerous to catastrophic climate changes.

> The historic Paris Agreement calls for limiting global temperature rise to "well below 2 °C." Because of uncertainties in emission scenarios, climate, and carbon cycle feedback, we interpret the Paris Agreement in terms of three climate risk categories and bring in considerations of low-probability (5%) high-impact (LPHI) warming in addition to the central (∼50% probability) value. The current risk category of dangerous warming is extended to more categories, which are defined by us here as follows: >1.5 °C as dangerous; >3 °C as catastrophic; and >5 °C as unknown, implying beyond catastrophic, including existential threats. With unchecked emissions, the central warming can reach the dangerous level within three decades, with the LPHI warming becoming catastrophic by 2050. (Xu and Ramanathan 2017)

Damage to local environments: Third: the damage fracking does to local environments in the form of air, water and soil contamination. In February 2014, there were an estimated 1.1 million active oil and gas wells in the U.S. In August 2015, the number of active and dry holes was estimated to be 1.7 million (Kelso 2015). To frack a single well requires up to 5 million gallons of water, and wells can be fracked multiple times—18 times or more. If we assume that each of the 1.1 million active wells were fracked once and used 5 million gallons of water, it means ~12 trillion gallons of water has been contaminated with hundreds of toxic chemicals. This waste water is either collected in surface ponds (many of which are unlined) where it inevitably contaminates surface and groundwater and the air when it vaporizes, or else it is injected underground where it contaminates groundwater and the environment for decades if not centuries.

Health impacts of fracking: Fourth: the health impacts of fracking on local communities. A study by the Wall Street Journal examining fracking operations in 11 of the biggest energy producing states found that, "At least 15.3 million Americans live within a mile of a well that has been drilled since 2000. That is more people than live in Michigan or New York City." (WSJ)

Health impacts of transportation of natural gas: To these concerns, we would add a fifth: the health and environmental damage caused by the transportation of natural gas. To our knowledge, this subject has not been previously addressed.

Much of the environmental damage caused by the natural gas industry is largely unseen. The physical damage to local environments where fracking occurs is in part obvious to anyone who cares to look. Roads are cut through forests and hillsides, large bodies of wastewater are collected in ponds and lagoons, dust from diesel trucks and construction equipment is constant as is the noise they make in what were once relatively quiet rural places. But the chemical pollution associated with the extraction, refinement, transportation, storage and combustion of natural gas for energy and heat is largely invisible. Industry advertisements tout natural gas as the "clean alternative" to coal--and in some ways, it is, though it's comparative advantages are wildly exaggerated. But part of what makes natural gas "clean" is that the public can't see the pollution it causes. One reason most people are unaware and unconcerned by pollution associated with unconventional gas development (UGD) is because most don't live in areas where fracking takes place or compressor stations are sited. But more fundamentally we're unconcerned by the UGD pollution because for the most part it's invisible as are its impacts on the public's health--realities which are denied both by the industry and its supporters in and out of government.

The task we set for ourselves here, is to show what the eye can't see: the volume of pollution associated with the transportation of natural gas in New York and its potential to harm human health. The potential health impacts of the large volumes of pollutants generated by natural gas compressor

stations have not been addressed, let alone answered, by those arguing for their construction and expansion.

This report has been prepared to provide the data necessary to understand and evaluate the potential immediate and long-term health outcomes connected with the pollution generated by the routine operations of natural gas compressor stations in New York State (NYS) by examining the actual volume of airborne releases generated by 18 plants and the diseases associated with the chemical pollutants they contain. It is directed at 4 primary audiences:

- Communities with existing compressor stations (to help them recognize the potential adverse health outcomes associated with their continued operation).
- Communities where compressor stations are proposed (to help them understand the potential health threats their construction and operation will introduce).
- Physicians and health practitioners in affected communities.
- Public officials responsible for protecting the safety and health of the public.

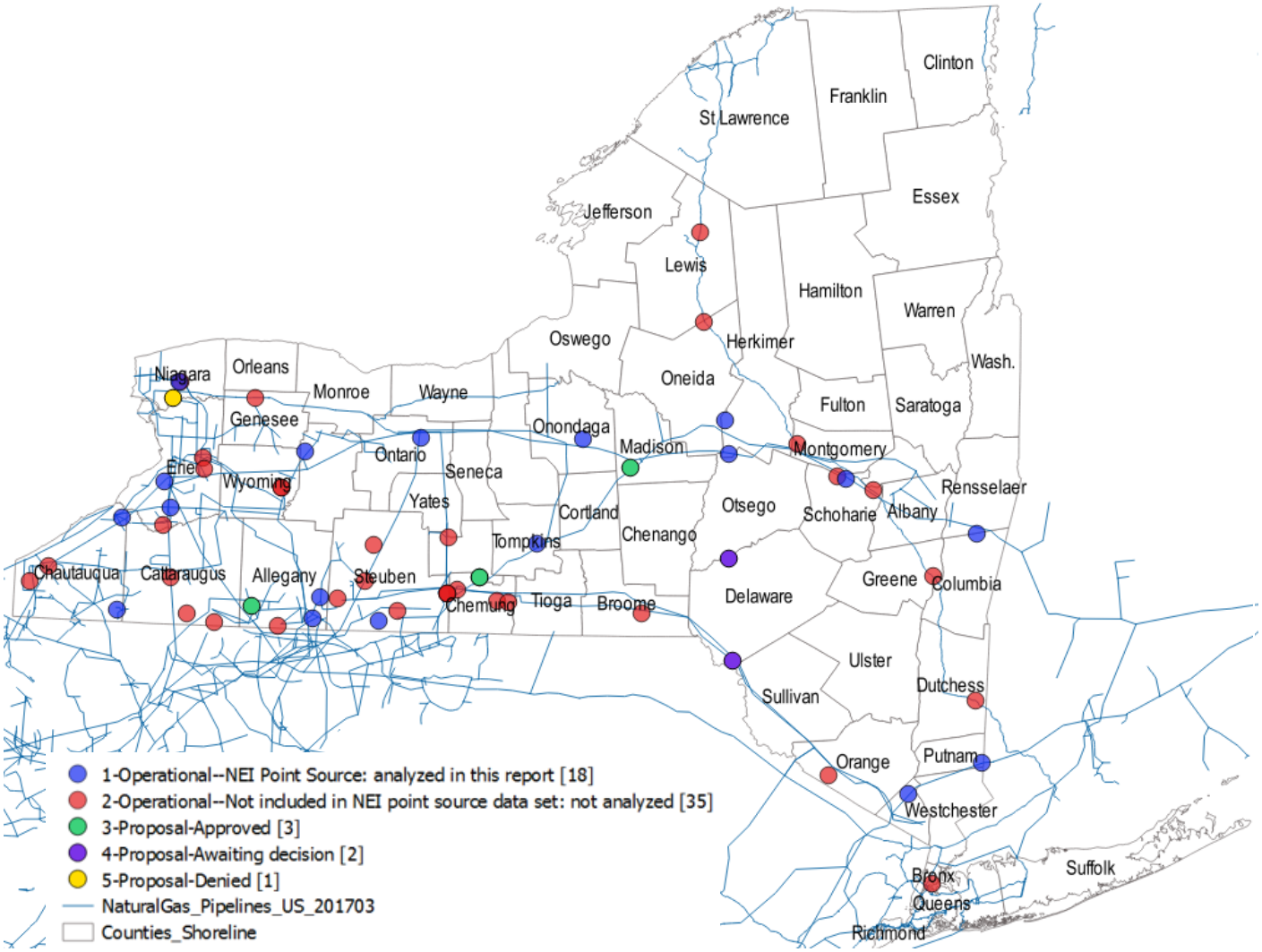
There are, by our preliminary estimates, more than 2,000 compressor stations operating under Title V permits in the U.S. (and an equal or greater number of non-Title V stations). Given the volume and toxicity of chemicals released by the 18 Title V facilities we studied, natural gas compressor stations represent a significant national public health problem.

Executive Summary

1. Natural Gas Compressor Stations in NYS

This report analyzes the emissions data for 18 as reported to the National Emissions Inventory (NEI) of the U.S. Environmental Protection Agency (EPA) as point sources of air pollution for the period 2008 to 2014. For the period 2008 to 2014, a total of 58 compressor stations were operational or seeking state and federal approval: operational (54), approved (3), awaiting approval (2) permit denied (1). National Emissions Inventory data is available for 18 of the state's 54-operational natural gas compressor stations. Four operational stations are seeking significant modifications requiring DEC approval. Eighteen of the state's 54 operational compressor stations are classified as "major polluters" and operate under Title V of the Clean Air Act (CAA). Pollution data for these sites is part of NEI's point source data set. These 18 sites are the subject of this analysis. The remaining 37 operational stations are permitted as a NYS "Air State Facility."

GHS emissions data is only available for 8 of the 18 compressor stations for which NEI data is available.



2. Total Releases: 40.2 million pounds

For the period 2008 to 2014, an estimated 1.5 billion pounds of point sources of air pollution were reported to NEI by facilities in NYS.

Releases from the state's national gas compressor stations accounted for approximately 40.2 million pounds or 2.7% of total on-site pollution reported to NEI.

This amounts to an annual average of 5.7 million pounds or 478,485 pounds per month, 15,731 pounds per day, 655 pounds per hour.

If each of the state's 19.8 million residents were given their fair share, each would receive a little more than 2 pounds over 7 years.

Analyzing emissions by each site's 5-digit NAICS code, based on NEI data national gas compressor stations were the 6th largest point (stationary) source of air-pollution in NYS. (If we were to include other sources of air pollution associated with natural gas not included in NAICS 48621, the volume and percentage would be significantly higher. By far the point source of air pollution in NYS is electric power generation (NAICS code 22111) which accounts for approximately 42.3% of the state total. A significant part of this amount is generated by burning natural gas.)

3. Total Releases by Chemical: 70

NYS's compressor stations reported releasing 70 individual chemicals or chemicals categories in the period 2008 to 2011 totaling approximately 40 million pounds. The volume of releases varies tremendously. Twelve chemicals have reported releases of less than one pound**.**

The largest pollutant, nitrogen oxides, had releases totaling 18.1 million pounds or 45.2% of the aggregate. Carbon monoxide ranked second (12.4 million pounds or 31%), followed by volatile organic compounds as a group (4.9 million pounds or 12.3%), formaldehyde (1,309,336 pounds or 3.27%), and PM10 Primary (Filt + Cond) (1,259,744 pounds or 3.15%). These five chemicals accounted for 95% of the total.

4. Total Releases by Compressor Stations: 18

All 18 compressor stations reporting to NEI reported toxic emissions which totaled 40,192,733 pounds.

The volume of total pollution by station varied widely. The lowest amount reported was one-quarter of a million pounds--a still considerable sum.

The largest release was from Tennessee Gas Pipeline Company's (TGPC) Compressor Station 245 in Herkimer County: 10.5 million pounds or slightly more than one-quarter (26.1%) of the state total. TGPC 's Compressor Station 229 & TEG Dehydration Facility in Erie County ranked second (5.1 million pounds or 12.8%), followed by TGPC's Compressor Station 249 in Schoharie County (4.3 million pounds or 10.8%).

These three facilities accounted for 19.9 million pounds or slightly less than one-half (49.54%) of all releases.

The top 5 stations accounted for 25.3 million pounds or slightly less (63.1%) than two-thirds of the state total.

Total Compressor Station Estimated Releases by Station: 2008-2014

Rank	Facility	County	Pounds										
1	TGPC CS 245	Herkimer	10,465,389	❶	❷	❸	❹	❺	❻	❼	❽	❾	❿	⑤
2	TGPC 229 & TEG DF	Erie	5,124,427	❶	❷	❸	❹	❺						
3	TGPC CS 249	Schoharie	4,323,285	❶	❷	❸	❹							
4	TGPC CS 241	Onondaga	3,039,661	❶	❷	❸								
5	TGPC CS 254	Columbia	2,393,661	❶	❷	④								
6	TGPC CS 237	Ontario	2,298,394	❶	❷	③								
7	AGT Stony Point CS	Rockland	2,013,478	❶	❷									
8	NFGSC Concord CS	Erie	1,733,171	❶	⑦									
9	AGT Southeast CS	Putnam	1,688,815	❶	⑦									
10	NFGSC Beech Hill CS	Allegany	1,387,592	❶	④									
11	NFGSC Independ. CS	Allegany	1,353,931	❶	③									
12	TGPC CS 224	Chautauqua	1,146,797	❶	①									
13	DTI Woodhull Station	Steuben	829,223	⑧										
14	DTI Borger CS	Tompkins	780,159	⑧										
15	NFGSC Nashville CS	Chautauqua	622,791	⑥										
16	TGPC CS 230-C	Niagara	485,610	⑤										
17	DTI Utica Station	Herkimer	281,369	③										
18	TGPC CS 233	Livingston	224,978	②										
			40,192,733											

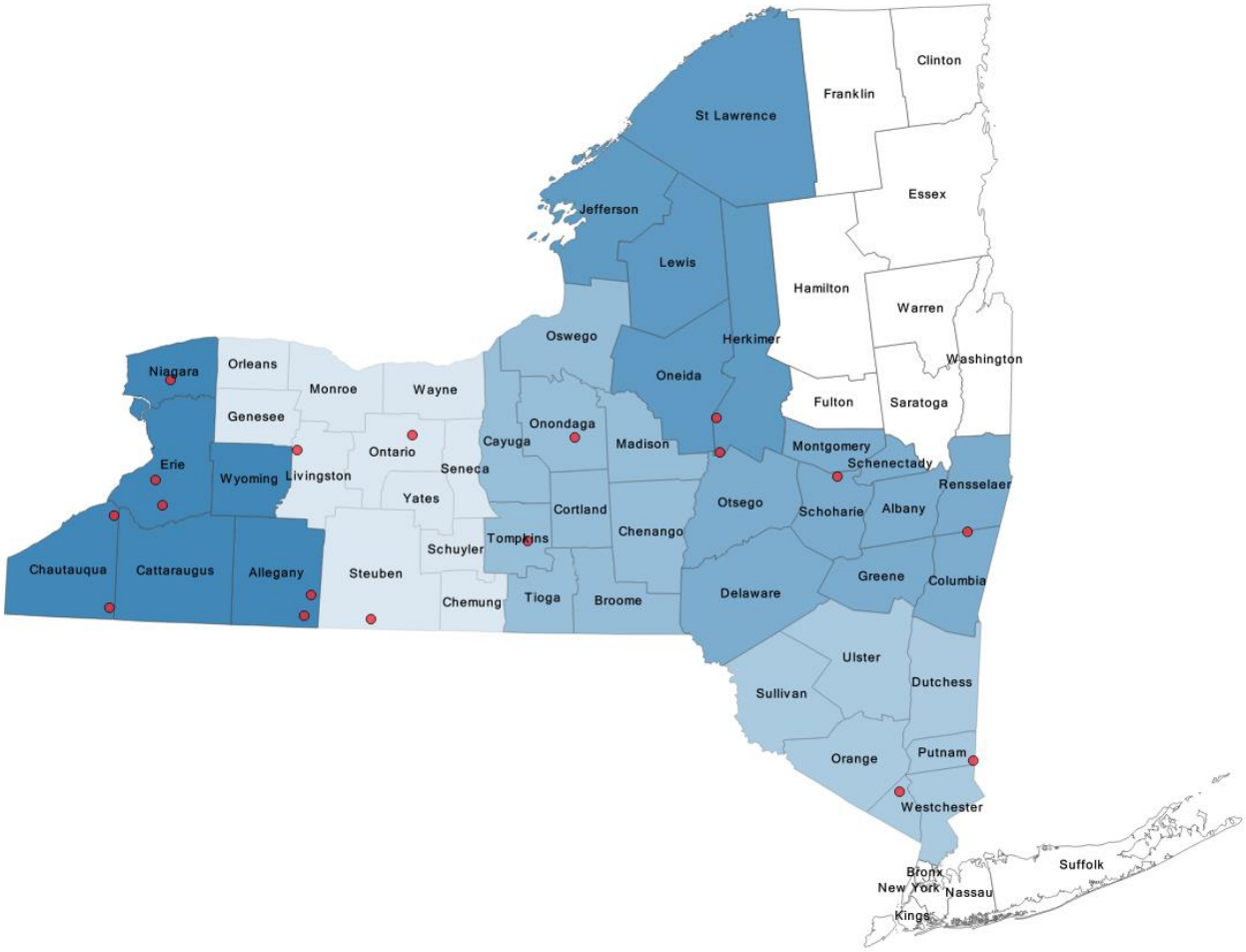
5. Total Releases by DEC Regions: 6

NYS DEC divides the state's 62 counties into 9 regions. The 18 operational compressor stations reporting to NEI are in 6 of NYS's 9 DEC regions encompassing 46 counties: 3-Lower Hudson Valley: 2, 4-Capital Region/Northern Catskills: 2, 6-Western Adirondacks/Eastern, Lake Ontario: 2, 7-Central New York: 2, 8-Western Finger Lakes: 3, 9-Western New York: 7.

Region 9, Western New York, ranked first with an estimated 11.7 million pounds (29.5%), closely followed by Region 2 (10.8 million pounds or 26.7%). Region 4 reported 6.7 million pounds (16.7%). These three regions accounted for nearly three-fourths (73%) of the state total.

Total Compressor Station Releases by DEC Region: 2008-2014

Rank	DEC Region	Pounds												
1	9: Western New York	11,646,722	❶	❷	❸	❹	❺	❻	❼	❽	❾	❿	⓫	⑦
2	6: W. Adirondacks / E. Lake Ontario	10,746,758	❶	❷	❸	❹	❺	❻	❼	❽	❾	❿	⑦	
3	4: Capital Region / N. Catskills	6,716,946	❶	❷	❸	❹	❺	❻	⑦					
4	7: Central New York	3,819,820	❶	❷	⑧									
5	3: Lower Hudson Valley	3,702,293	❶	❷	⑦									
6	8: Western Finger Lakes	3,352,596	❶	❷	③									

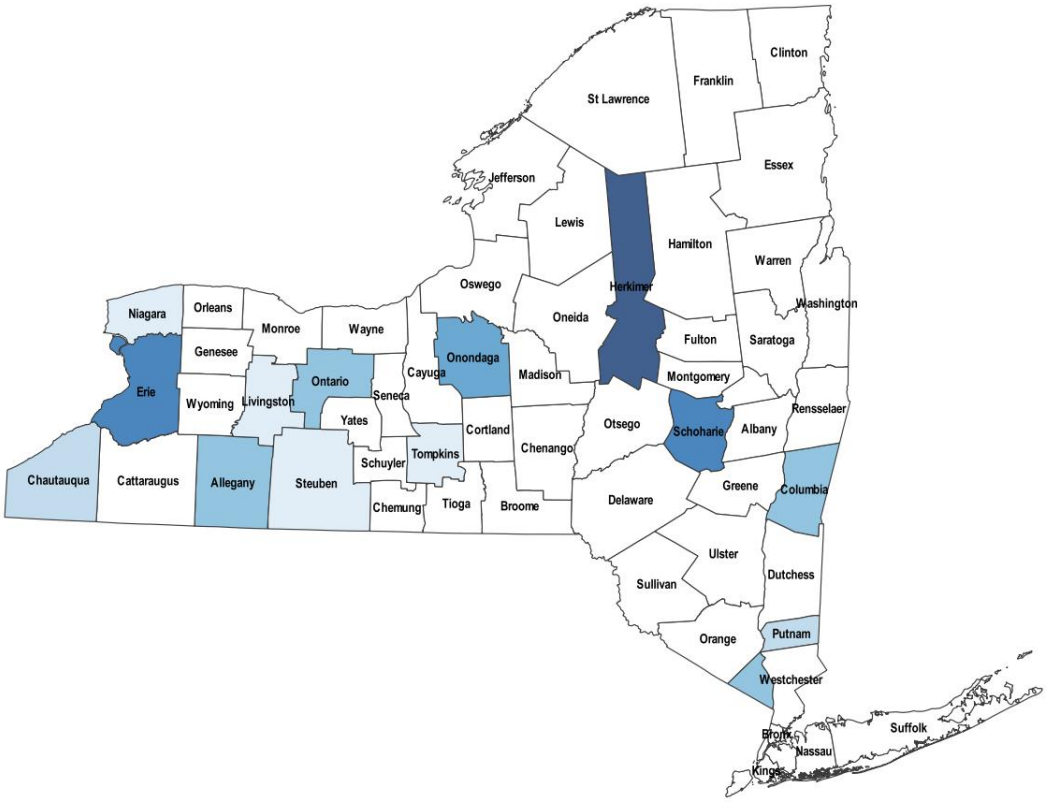


6. Total Releases by County: 14

The 18 natural gas compressor stations reporting to NEI are in 14 of NY's 62 counties: Allegany, Chautauqua, Columbia, Erie, Herkimer, Livingston, Niagara, Onondaga, Ontario, Putnam, Rockland, Schoharie, Steuben, and Tompkins. **Herkimer County ranked first with 10.7 million pounds or slightly more than one-fifth of the total (26.7%),** followed by Erie County with 6.9 million pounds (17.1%), and Schoharie with 4.3 million pounds (10.8%). These three counties accounted for slightly more than one-half (54.6%) of all releases: 22 million pounds. The top five counties were responsible for 27.7 million pounds or slightly more than two-thirds (69%) of the aggregate.

Total Compressor Station Releases by County: 2008-2014

Rank	County	DEC Region	Pounds										
1	Herkimer	6: W Adirondacks/E. L Ontario	10,746,757	❶	❷	❸	❹	❺	❻	❼	❽	❾	❿	⑦
2	Erie	9: Western New York	6,857,598	❶	❷	❸	❹	❺	❻	⑨				
3	Schoharie	4: Capital Region/N. Catskills	4,323,285	❶	❷	❸	❹	③						
4	Onondaga	7: Central New York	3,039,661	❶	❷	❸								
5	Allegany	9: Western New York	2,741,523	❶	❷	⑦								
6	Columbia	4: Capital Region/N. Catskills	2,393,660	❶	❷	④								
7	Ontario	8: Western Finger Lakes	2,298,394	❶	❷	③								
8	Rockland	3: Lower Hudson Valley	2,013,478	❶	❷									
9	Putnam	3: Lower Hudson Valley	1,688,814	❶	⑦									
10	Chautauqua	9: Western New York	1,561,991	❶	⑥									
11	Steuben	8: Western Finger Lakes	829,223	⑧										
12	Tompkins	7: Central New York	780,159	⑧										
13	Niagara	9: Western New York	485,609	⑤										
14	Livingston	8: Western Finger Lakes	224,978	②										



7. Total Releases by Zip Codes: 18

The 18 operational compressor stations reporting to NEI are in 18 zip codes. **Compressor stations were responsible for 92% of all recorded industrial emissions in their respective zip codes.** In 14 of these zip codes, emissions from natural gas compressor stations were the ***only*** point source of air pollution reported by NEI.

8. Total Releases per Square Mile

The distance and direction pollution travels from each natural gas compressor station on any given day (or any hour) is dependent on many factors, including: the height of the stack, chemical composition of the fuel, chemical composition of emissions, meteorological conditions (wind speed and direction, atmospheric stability and cloud cover), as well as local and regional geographical features.

Absent an independent analysis, most epidemiological studies assume that if stacks are short (which is the case for NYS compressor stations), on a typical day most air pollution that is inhaled has traveled a relatively short distance from a plant--something on the order of less than 10 miles—recognizing that on certain days pollution from a single plant can travel hundreds or even thousands of miles before it reaches the ground and is inhaled.

If we assume that the 10.5 million pounds of toxic releases generated by the largest polluter, TGPC's Compressor Station 245, fell within a 1-mile radius of the plant (a 2-mile diameter circle of 3.14 square miles), it amounts to 3.3 million pounds per square mile or approximately 0.12 pounds per square foot.

If, instead, we assume it fell within 1.5-mile radius of the plant (a 3-mile diameter circle of 7.07 square miles), it amounts to 1.5 million pounds per square mile.

9. Total Releases: Circular Area Population Profiles

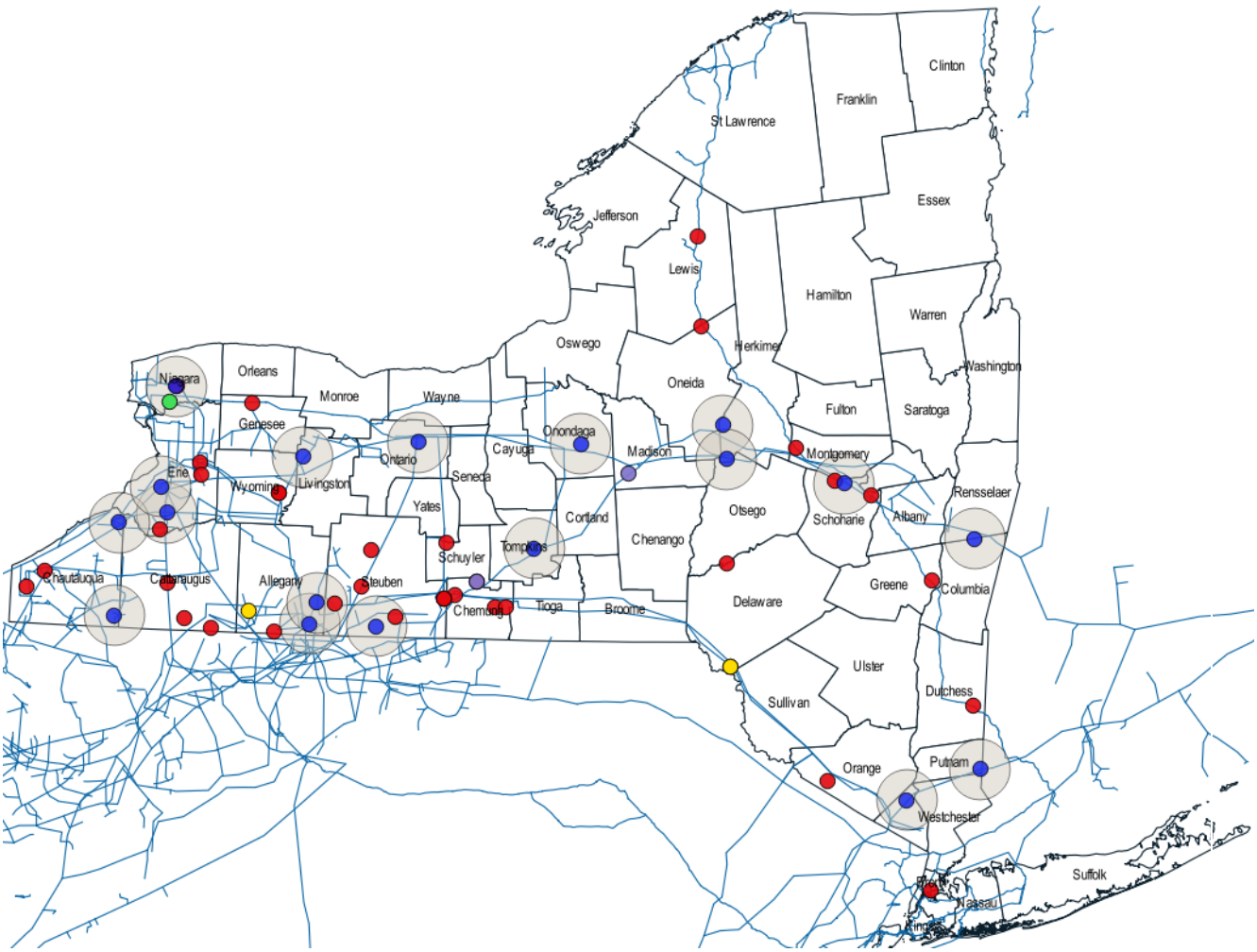
The number of people in New York State exposed to air pollution from natural gas compressor stations is significantly larger than generally recognized.

10-Mile Radius

Air pollution from a compressor station can easily travel 10 miles or more before returning to ground level.

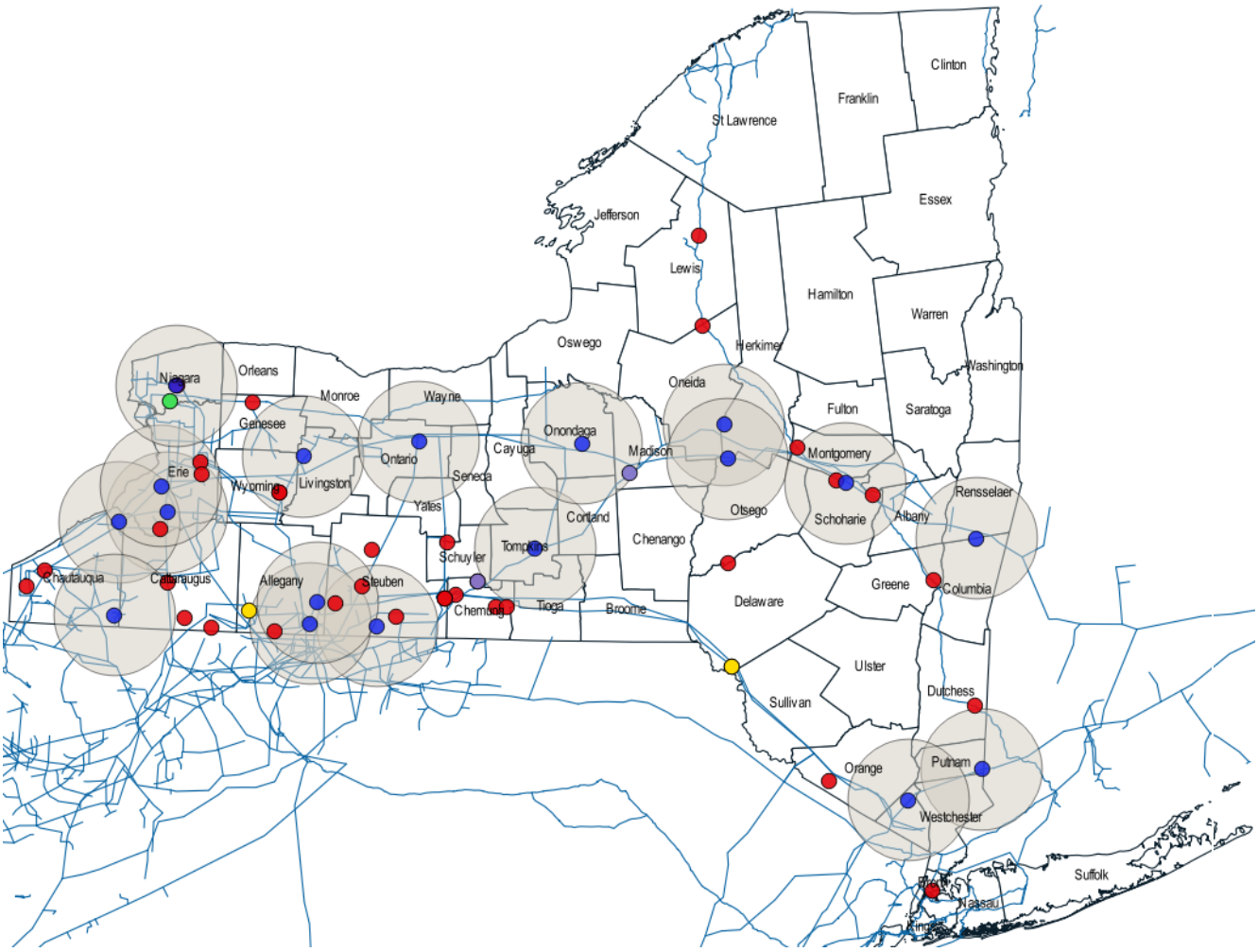
Approximately 1.6 million people live within 10 miles of the 18 natural gas compressor stations analyzed in this report—more than 1 out of 8 New Yorkers or 12.5% of the population, which works out to about 25 pounds per person over 7 years.

At this 10-mile radius, people in ~31 counties are potentially breathing air contaminated by compressor station pollutants: NY (27), CT (1), and PA (3).



20-Mile Radius

Expanded to 20 miles the number potentially affected is 5.7 million (more than 1 out of every 3 people) in 52 counties: NY (39), CT (3), MA (1), NJ (3), and PA (6).



2-Mile Radius

Approximately 33,516 people live within a 2-mile radius. If we assume all the pollution was limited to this radius, it works out to 1,201 pounds per person over 7 years.

(See section 2.5c.1. for more details)

10. Total Releases by Health Effects

The 70 chemicals released by NYS's natural gas compressor stations are linked to all 17 of the major categories of human disease as classified by the International Statistical Classification of Diseases and Related Health Problems, 10th edition (ICD-10). These are summarized in the table below.

Most chemicals are known to cause multiple categories of diseases. Formaldehyde is a good example. NEI shows releases totaling approximately 1.3 million pounds of this chemical. Formaldehyde is a known human carcinogen, so it is included as a chemical associated with neoplasms (ICD-10, Chapter 2). But it is also associated with virtually every other major category of human disease, so it would be included as contributing to the totals in the table below for chapters 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, and 18.

There were, for example 9.5 million pounds of 59 chemicals related to neoplastic diseases (malignant and benign neoplasms) released by 18 facilities in 14 counties, averaging 1.4 million pounds annually (ICD-10, Ch. 2). Or, to put it differently, 23.9% of all 40.2 million pounds of toxic chemicals released are carcinogens.

There were 16.2 million pounds of pollutants associated with circulatory diseases such as heart attacks and strokes (ICD-10, Ch. 9). The table below lists health effects by their ICD Chapter.

Toxic Releases by ICD-10 Chapter

New York State Natural Gas Compressor Stations: 2008 to 2014

ICD Ch.	Disease \ Disorders	Chemicals	Facilities	Counties	DEC Reg.	Pounds Annual Average	Pounds Total	% of Total Lbs.
1	Certain infectious and parasitic diseases	1	18	14	9	2,583,224	18,082,570	45.0
2	Neoplasms (malignant and benign)	59	18	14	9	1,362,610	9,538,272	23.9
3	Blood and blood-forming organs and certain disorders involving the immune mechanism	41	18	14	9	2,678,763	18,751,319	47.0
4	Endocrine, nutritional and metabolic	51	18	14	9	1,016,765	7,117,352	17.8
5	Mental and behavioral	34	18	14	9	2,678,042	18,746,295	47.0
6	Nervous system	42	18	14	9	2,713,070	18,991,490	47.6
7	Eye and adnexa	40	18	14	9	3,547,275	24,830,922	61.8
8	Ear and mastoid process	15	18	14	9	2,494,582	17,462,077	43.5
9	Circulatory system	31	18	14	9	2,321,403	16,249,821	40.4
10	Respiratory system	51	18	14	9	5,663,824	39,646,765	98.6
11	Digestive system	45	18	14	9	5,496,041	38,472,286	95.7
12	Skin and subcutaneous tissue	48	18	14	9	3,963,161	27,742,125	69.0
13	Musculoskeletal system and connective tissue	17	18	14	9	176,168	1,233,174	3.1
14	Genitourinary system	43	18	14	9	5,706,861	39,948,030	99.4
	1. Urinary system	33	18	14	9	915,867	6,411,070	16.0
	2. Reproductive system: pelvis, genitals and breasts	37	18	14	9	5,706,424	39,944,967	99.4
15	Pregnancy, childbirth and the puerperium	18	18	14	9	2,803,817	19,626,720	48.8
16	Certain conditions originating in the perinatal period	20	18	14	9	3,215,181	22,506,319	56.0
17	Congenital malformations, deformations, chromosomal abnormalities	59	18	14	9	5,663,578	39,645,048	98.7
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	43	18	14	9	5,663,743	39,646,203	98.7
	All Releases	**70**	**18**	**14**	**9**	**5,741,819**	**40,192,733**	**100%**

NYS Compressor Station Toxicants: 2008-2014

Total Releases by ICD-10 Disease Category (millions of pounds)	~40.2
1. Certain infectious and parasitic diseases*	18.1
2. Neoplasms (malignant and benign)	9.5
3. Blood and blood form, certain immune disorders	18.8
4. Endocrine and metabolic	18.8
5. Mental and behavioral	18.7
6. Nervous system	19.0
7. Eye and adnexa	24.8
8. Ear and mastoid process	17.5
9. Circulatory system	16.3
10. Respiratory system	39.6
11. Digestive system	38.5
12. Skin and subcutaneous tissue	27.7
13. Musculoskeletal system\connective tissue	1.2
14. Genitourinary system	39.9
Urinary system	6.4
Reproductive system: Pelvis, genitals and breasts	40.0
15. Pregnancy, childbirth, puerperium	19.6
16. Certain conditions originating in the perinatal period	22.5
17. Birth defects, chromosomal abnormalities	39.6
18. Symptoms, signs, findings nec	39.6

* Systemic effects resulting from the release of greenhouse gases.

11. Visualizing the Data

Scenario 1

It's difficult to visualize what 40.2 million pounds of pollution looks like.

The following might help.

Everyone's familiar with a 5-pound bag of flour. There's one in every kitchen.

Assume that the 40.2 million pounds of toxic pollution generated by the state's 18 compressor stations has the same density as flour, i.e., that 5-pounds of pollution would fit in a bag equivalent in size to a 5-pound bag of flour.

To put the 40.2 million pounds of compressor station pollution in 5-pound bags would require 8,038,545 bags.

Scenario 2

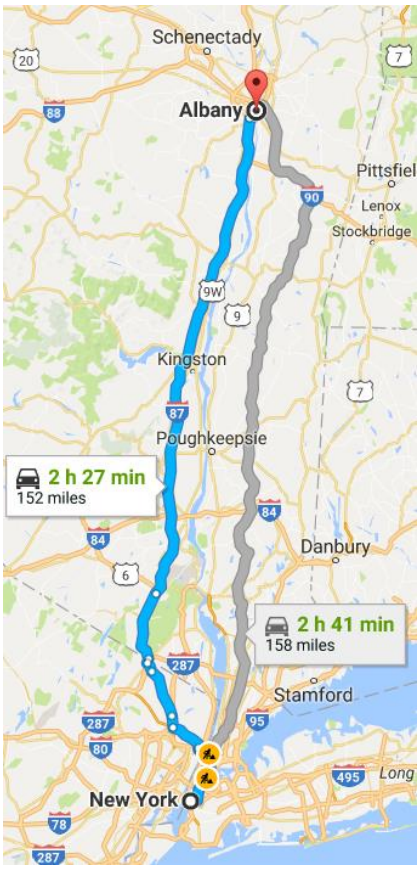
Let's go a step further. Let's say we wanted to take our 8 million bags of toxic pollution for a ride.

Assume we loaded all 7 years of compressor station pollution onto ½ - ton pickup trucks.

Each pickup could safely carry 1,000 pounds or 200 5-pound bags.

So, we'd have to load up 40,193 1-ton pickups (40.2 million pounds / 1,000)

Let's say each pickup is 20' long and we were backed up on the highway literally bumper to bumper: Our line of 40,193 1-ton pickup trucks would stretch 152 miles--exactly the distance from New York City to Albany.



Scenario 3

Another scenario.

Let's assume we aren't stuck in traffic and instead our 40,193 trucks filled with compressor station pollution are traveling 65 mph on the nation's highways with 576 feet between each truck (the distance the average driver needs to react in 6 seconds).

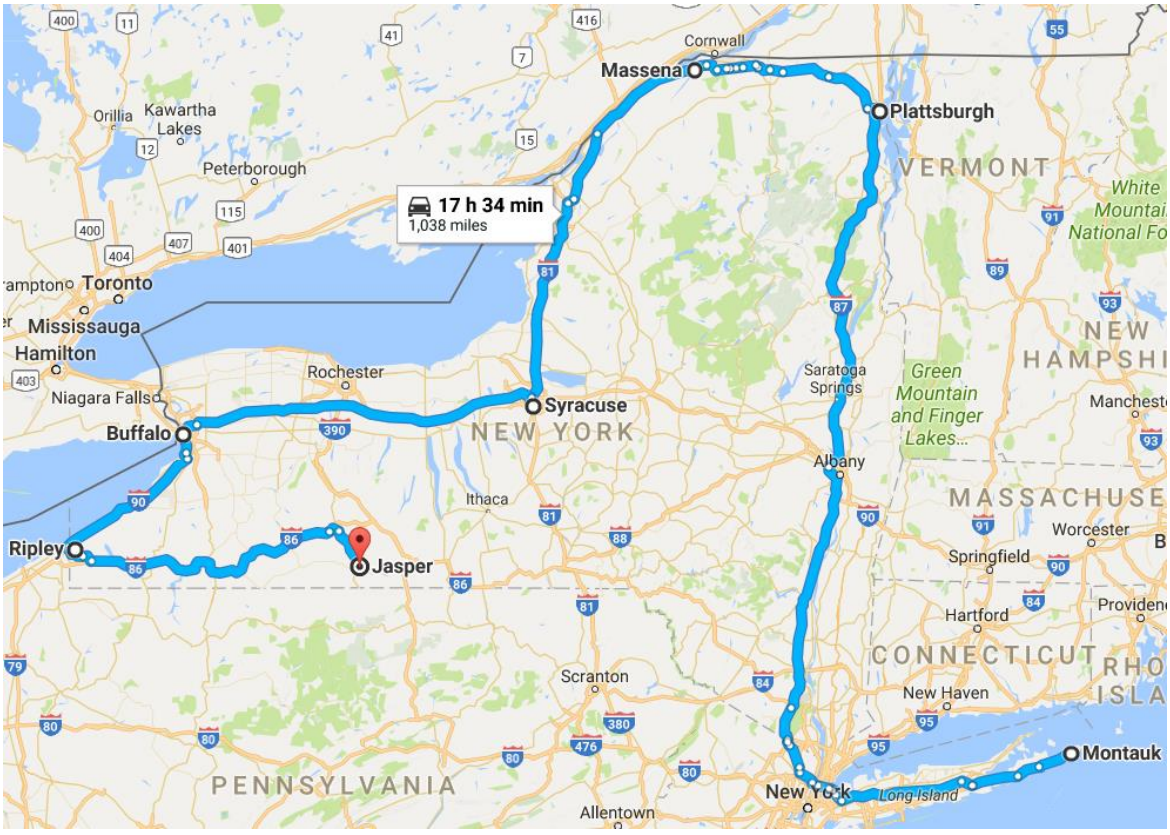
In this case our pollution convey would stretch about 4,537 miles (40,193 trucks x 596 feet / 5,280 feet) -- almost long enough to stretch from the easternmost location in the U.S., Houlton Maine, down to Miami, back up to Tampa, along the Gulf Coast to Houston, across Texas, New Mexico, Arizona and California to Los Angeles.

Scenario 4

A flour bags is 8” tall.

If we laid each of our 8,038,545 bags on their side they would stretch approximately 1,034 miles.

This is enough bags to line the interstates from Montauk Long Island, up to Plattsburgh, west to Massena, down to Syracuse, went to Buffalo, down to Ripley and east to Jasper.



Scenario 5

Everyone knows what a football field looks like.

New Era Field, home to the Buffalo Bills, is the only professional football field in NYS.

A football field measures 160’ x 360’ (57,600 sq. ft.).

Our flour bags measure 8” x 6” x 5”.

If we lay a flour bag on its widest sides, it measures 8” x 6” or 48 sq. inches.

It takes 14,400 bags to cover a football field with a single layer of 5-lb. bags to a height of 5”.

If we placed all 8 million bags one atop the other, we could cover New Era Field to a height of about 97’ -- roughly the height of a 10-story office building.

A second scenario: If we laid the bags next to each other along the 5” dimension (the shortest), since a football field is 100 yards or 300 feet, 0.417 ft per bag, times 8.04 million bags times 1 mile per 5280 ft yields 634 miles. Since a football field is 0.057 mi long, we would need 634/0.057 or about 11,000 football fields all lined up one after the other to “hold” this line of bags.

Introduction

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Contents of the Report

This report is divided into four chapters.

- Chapter 1, Background: provides a brief review of the issues which motivated this report.
- Chapter 2, Compressor Station Releases: identifies the locations of natural gas compressor stations in New York State (NYS) and the total volume of air pollution they generate based on the three most recent years of data collected by the U.S. Environmental Protection Agency's (EPA) National Emissions Inventory. Detailed analysis of total air pollution is analyzed by chemical, chemical category, NYS Department of Environmental Conservation (DEC) Regions, counties, and zip codes.
- Chapter 3, Health Effects: provides a detailed analysis of compressor station air pollutants for each of 17 major disease categories as defined by the International Classification of Diseases, 10th edition (ICD-10). For each disease category, gas compressor station air pollutants are analyzed by chemicals, by ICD categorization, facilities, DEC regions, and by counties.
- Chapter 4, Facilities: provides a profile of each of the compressor station studied in this report along with a summary of the health effects associated with the chemicals each generates.

Materials and Methods

Health effects

To facilitate the identification of toxic exposures and their potential health and environmental impacts, the author has created several proprietary SQL-compliant databases used in environmental and epidemiological studies:

1. Chemical Database: Contains essential data on slightly more than 21,000 unique chemicals or chemical categories, including names, synonyms, identification numbers, chemical and physical characteristics, and inclusion in federal, state and international reporting programs.
2. Occupational Database: Contains essential data on approximately 500 occupations or occupational grouping for which there are epidemiological assessments. Occupations are categorized according to the U.S. Bureau of Labor Statistics Standard Occupational Classification (2010).
3. Health Effects Database: Indexes approximately 120,000 peer-reviewed studies examining the impacts of toxic chemicals on human health and the environment. Each article is indexed by the relevant ICD-10 code. Fields include: chemical name or identifier, author, full reference, PMID, DOI, subject (human/animal), acute/chronic exposure, route of exposure (inhalation, skin, drinking water, diet, etc.). This database can be used to identify all health effects associated with a specific chemical or chemical category.

U.S. National Emissions Inventory

The rationale for the creation of NEI and some of its limitations are described in the draft of NEI's Technical Support Document, published in June 2014 (USEPA 2014):

> The NEI is created to provide EPA, federal and state decision makers, the U.S. public, and other countries the U.S.'s best and most complete estimates of CAP and HAP emissions. While EPA is not directly obligated to create the NEI under the Clean Air Act, the Act authorizes the EPA Administrator to implement data collection efforts needed to properly administer the NAAQS program. Therefore, the Office of Air Quality Planning and Standards (OAQPS) maintains the NEI program in support of the NAAQS. Furthermore, the Clean Air Act requires states to submit emissions to EPA as part of their State Implementation Plans (SIPs) that describe how they will attain the NAAQS. The NEI is used as a starting point for many SIP inventory development efforts and for states to obtain emissions from other states needed for their modeled attainment demonstrations.
>
> While the NAAQS program is the basis on which EPA collect s CAP emissions from the state, local, and tribal (S/L/T) air agencies, it does not require collection of HAP emissions. For this reason, the ***HAP reporting requirements are voluntary***. [authors' emphasis] Nevertheless, the HAP emissions are an essential part of the NEI program. These emissions estimates allow EPA to assess progress in meeting HAP reduction goals described in the Clean Air Act 4 amendments of 1990. These reductions seek to reduce the negative impacts to people of HAP emissions in the environment, and the NEI allows EPA to assess how much emissions have been reduced since 1990.

If "HAP reporting requirements are voluntary" by extension it seems reasonable to conclude that EPA isn't legally obligated to analyze the results of the inventory to identify all potential health impacts, to prioritize chemicals in terms of their greatest harm to health, or communicate this information to the general public or state regulators effectively.

The National Emissions Inventory is available to the public on EPA's website.

Data is published every 3 years. This report uses the last 3 years of published data: 2008, 2011, and 2014.

To estimate total releases over the 7-year period from 2008 through 2014, the average for 3 years was determined and multiplied by 7. Given the characteristics of the data, performing these calculations at different levels (e.g., facility versus country) sometimes produces slightly different totals, though the difference is small and not statistically meaningful.

U.S. EPA Greenhouse Gas Inventory

The major source of emissions of greenhouse gases is EPA's Greenhouse Gas Inventory:

> [T]he U.S. Greenhouse Gas Inventories developed by the U.S. government to meet U.S. commitments under the United Nations Framework Convention on Climate Change (UNFCCC). Article 4.1a of the UNFCCC requires that all countries periodically publish and make available to the Conference of the Parties (COP) inventories of anthropogenic emissions and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol.
>
> Subsequent decisions by the COP require the United States to submit these reports on an annual basis and include emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) and removal of these gases by sinks. (EPA GGI).

Available EPA Data: Chemicals, Emissions Types, Years

Data on pollution from natural gas compressor stations in New York State is drawn from 2 federal sources: U.S. EPA National Emissions Inventory (point sources) and U.S. EPA Greenhouse Gas Inventory.

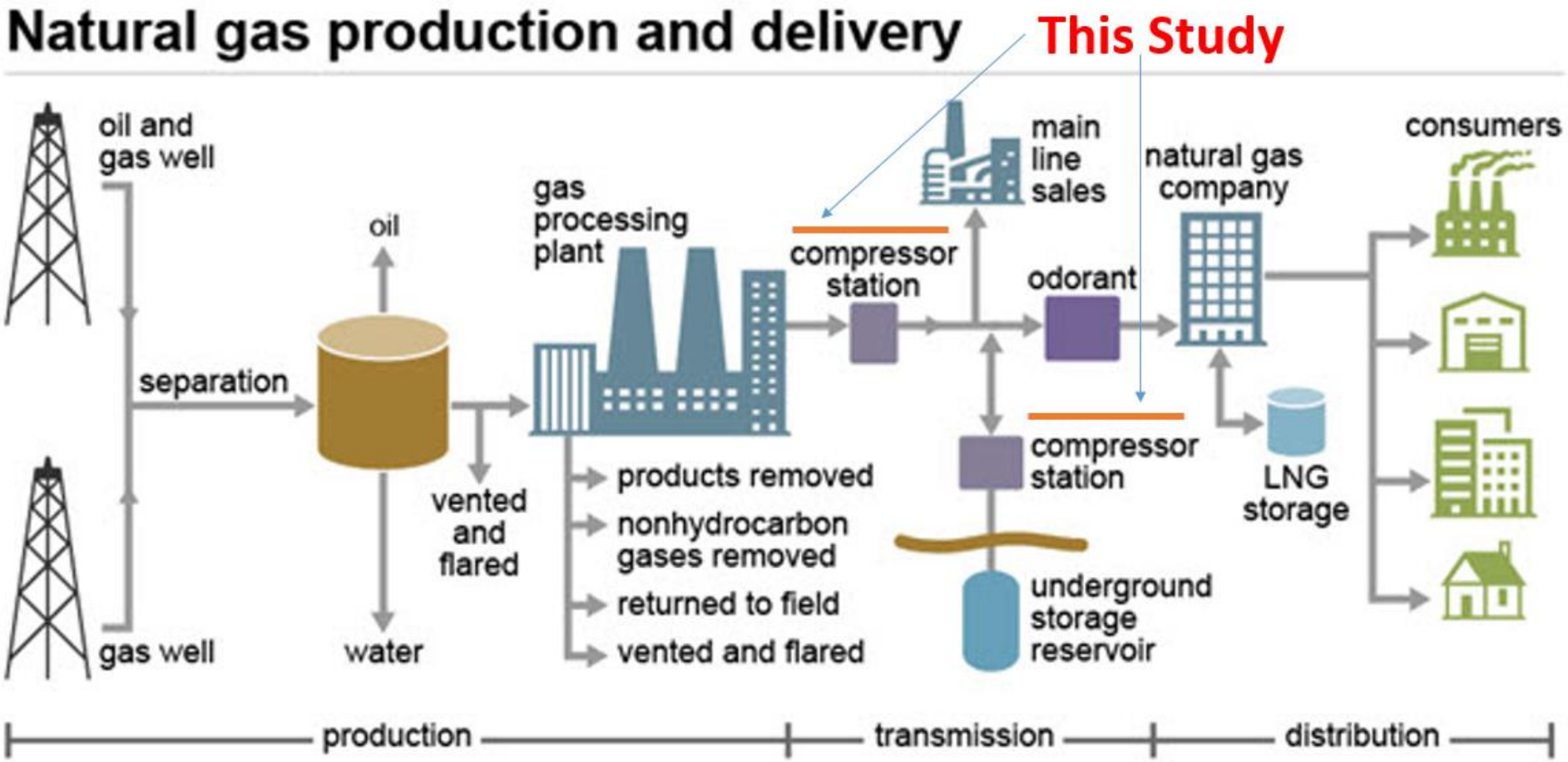
Stationary Sources

NEI's point source data set provides data on releases from stationary sources (aka point or stack) and provides information on 70 specific chemicals.

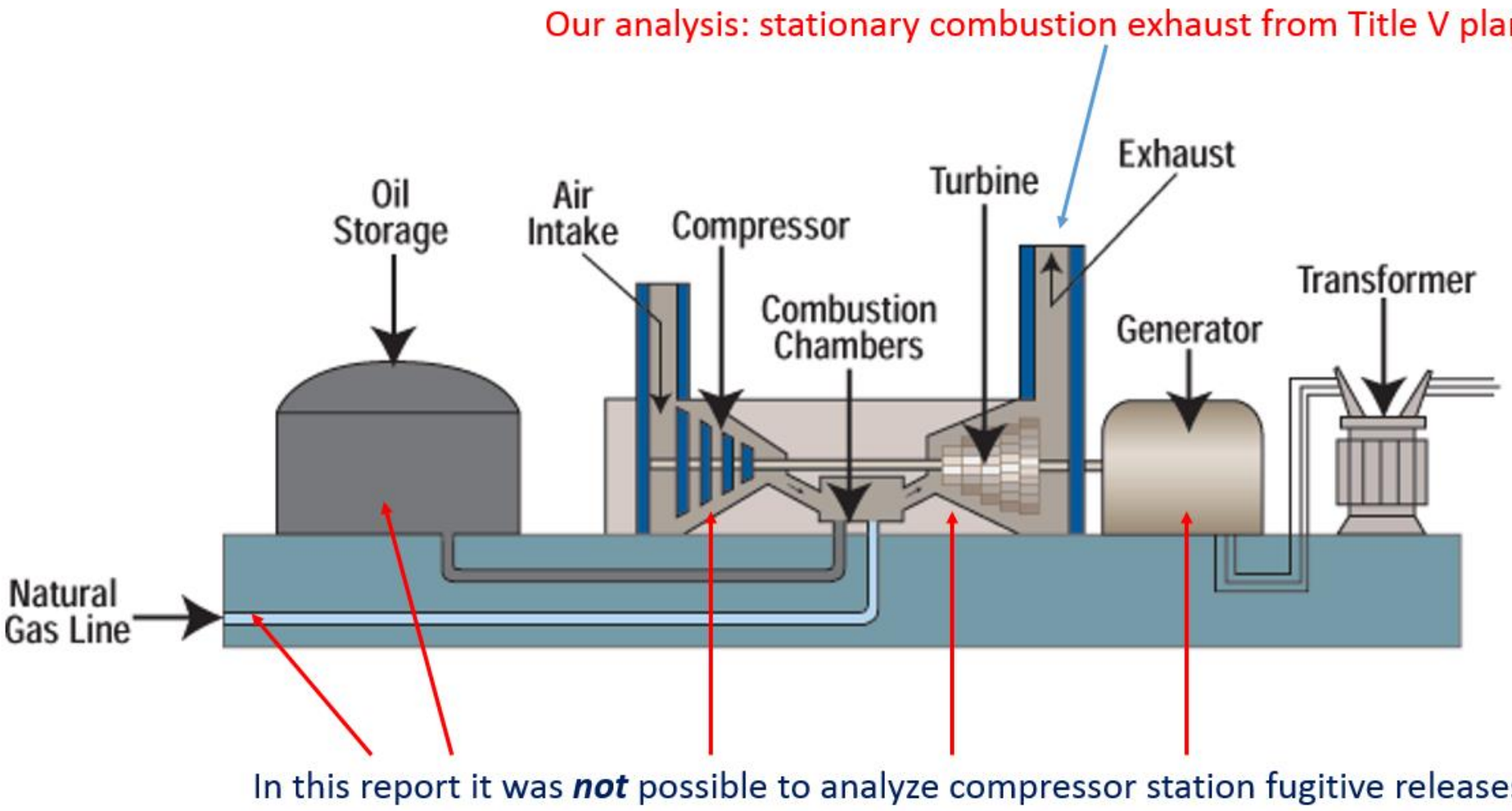
EPA's GHGI provides data on 2 chemicals not included in NEI's point data set for compressor stations: carbon dioxide and methane.

Fugitive Releases

EPA's GHGI provides data on 3 chemicals from fugitive sources at the compressor station site: carbon dioxide, methane and NOx. However, data is only available for 8 of NYS's 18 Title V compressor stations and this only begins in 2010.


Natural gas production and delivery
This Study
oil and gas well
separation
gas well
oil
water
vented and flared
gas processing plant
products removed
nonhydrocarbon gases removed
returned to field
vented and flared
compressor station
main line sales
odorant
compressor station
underground storage reservoir
natural gas company
LNG storage
consumers
production
transmission
distribution

Source: EIA


Our analysis: stationary combustion exhaust from Title V plant
Oil Storage
Air Intake
Compressor
Combustion Chambers
Turbine
Exhaust
Generator
Transformer
Natural Gas Line
In this report it was **not** possible to analyze compressor station fugitive releases

National Fuel's planned compressor station in Hinsdale (Cattaraugus County)

Source: National Fuel Gas Supply Corp.

Years of available data

EPA NEI reports data every third year—data is available for 2008, 2011 and 2014.

The data reported for NYS is fairly complete: 17 stations report data for all 3 years, while one reports for 2008 and 2011 but not for 2014.

The national data seems fairly incomplete: (a) 409 compressor stations that reported releases in 2008 had not data for 2011, and (b) 196 that reported data in 2008 showed no data for 2014, and (c) 426 that reported data in 2011 showed no data for 2014. In a few cases we suspect this is due to plant modifications but it is unlikely that this explains the extent of missing data.

Available EPA Natural Gas Compressor Station Data: Chemicals, Emissions Types, Years, Sources

√	Stationary (Stack) Combustion	70 chemicals *not* including Carbon dioxide or Methane	U.S. EPA National Emissions Inventory (Point Sources)
√	Stationary (Stack) Combustion	Carbon dioxide	U.S. EPA Greenhouse Gas Inventory (GHGI)
√	Stationary (Stack) Combustion	Methane	Not reported in either NEI or GHGI
√	Fugitive Emissions	Carbon dioxide	U.S. EPA Greenhouse Gas Inventory
√	Fugitive Emissions	Methane	U.S. EPA Greenhouse Gas Inventory
√	Fugitive Emissions	???	U.S. EPA NEI (Non-Point Sources): To be determined

#	Compressor Station	Town	County	2008	2009	2010	2011	2012	2013	2014	2015
Title V Permit	**18 Operational Compressor Stations**										
1	AG SE CS	Southeast	Putnam	√		√	√ √ √	√ √ √	√ √ √	√ √ √ √	√ √ √
2	AG Stony Point CS	Stony Point	Rockland	√		√	√ √	√ √ √	√ √ √	√ √ √ √	√ √ √
3	DTI Borger CS	Ithaca	Tompkins	√			√			√	
4	DTI Utica CS	Frankfort	Herkimer	√			√			√	
5	DTI Woodhull CS	Woodhull	Steuben	√			√			√	
6	NFGSC Beech Hill CS	Willing	Allegany	√			√			√	
7	NFGSC Concord CS	Concord	Erie	√			√		√	√ √ √	√ √ √
8	NFGSC Independence CS	Andover	Allegany	√			√		√	√ √ √	√ √ √
9	NFGSC Nashville CS	Hanover	Chautauqua	√			√				
10	TGPC CS 224	Clymer	Chautauqua	√			√ √ √	√ √ √	√ √ √	√ √ √ √	√ √ √
11	TGPC CS 229	Eden	Erie	√		√ √	√ √ √	√ √ √	√ √ √	√ √ √ √	√ √ √
12	TGPC CS 230-C	Lockport	Niagara	√			√			√ √ √ √	√ √ √
13	TGPC CS 233	York	Livingston	√			√			√	
14	TGPC CS 237	Manchester	Ontario	√			√			√	
15	TGPC CS 241	LaFayette	Onondaga	√		√ √	√ √ √	√ √ √	√ √ √	√ √ √ √	√ √ √
16	TGPC CS 245	Winfield	Herkimer	√		√ √	√ √ √	√ √ √	√ √ √	√ √ √ √	√ √ √
17	TGPC CS 249	Carlisle	Schoharie	√		√ √	√ √ √	√ √ √	√ √ √	√ √ √ √	√ √ √
18	TGPC CS 254	Chatham	Columbia	√			√ √ √	√ √ √	√ √ √	√ √ √ √	√ √ √

#	Compressor Station	Town	County	2008				2009				2010				2011				2012				2013				2014				2015			
Air State Facility Permit		38 Operational Compressor Stations																																	
1	CGTC Corning CS	Corning	Steuben																									√	√	√		√	√	√	
2	CGT Minisink CS	Wawayanda	Orange																									√	√	√		√	√	√	
3	IGTS Wright CS	Delanson	Schenectady									√	√			√	√	√		√	√	√		√	√	√		√	√	√		√	√	√	
4	TNG Hancock CS	Hancock	Delaware																									√		√		√		√	
5	WP Dunbar CS	Windsor	Broome																	√		√		√		√		√		√		√		√	

Identification of NYS Natural Gas Compressor Stations

The method used to identify natural gas compressor stations operating in NYS is described in Chapter 2.

Abbreviations

AG	Algonquin Gas Transmission LLC
DTI	Dominion Transmission Inc.
NFGSC	National Fuel Gas Supply Corp.
CFR	Code of Federal Regulations
ch	Chemical or chemicals
cs	Compressor Station
DEC	New York State Department of Environmental Conservation
deh	Dehydration
DOH	New York State Department of Health
EPA	U.S. Environmental Protection Agency
est'd	estimated
Fac	Facility or facilities
TGPC	Tennessee Gas Pipeline Company
FDA	Food and Drug Administration
FERC	Federal Energy Regulatory Commission
GHG	Greenhouse gas
IARC	International Agency for Research on Cancer
ICD-10	International Classification of Disease, 10th edition
Lbs.	pounds
ng	natural gas
nec	not elsewhere classified
ngfsct	natural gas fired stationary compressor turbine
NSPSs	New Source Performance Standards
NYS	New York State
REL	Recommended exposure limit
src	source
TBD	To be determined

Chapter 1. Background

1. Introduction

1.1. Pollution as a Cause of Human Disease

The causes of human disease are various and complex. The siting of industrial facilities is inherently problematic and political. Communities facing the prospect of a new natural gas compressor station or the expansion of an existing station, must grapple with both sets of concerns and, more difficult still, the specific question of how compressor station emissions may potentially harm human health.

It was only in relatively recent years that a large part of the scientific community accepted the view that environmental and occupational exposures to man-made chemicals and radiation are a significant threat to health. The creation of the U.S. Environmental Protection Agency (EPA) and the U.S. Occupational Agency (OSHA) in 1970 and the passage of the National Cancer Act the next year were each ***partly*** motivated by growing evidence of pollution as a cause of human diseases.

In the near half-century since these agencies and programs were created, significant progress has been made in reducing pollution in the U.S. But when the actual history is studied, it is clear that these advances only came because of sustained political efforts by people outside of government attempting to pressure those in government to do the right thing over the opposition of vested economic interests. Legislative measures are generally only taken many years after scientific warnings are first raised. And more often than not, these long overdue legislative measures are half-steps that are inadequately funded and ineffectively enforced.

While the positive steps that have been made should be recognized, the difference between what society needed to do to confront the problem of pollution and what has actually been done, is stark.

The two leading causes of death in the U.S. are cardiovascular disease and cancer. Environmental and occupational exposure to chemicals are a significant risk factor for both diseases. Based on data reported by the natural gas industry, this report shows that 18 compressor stations operating in New York State released a total of more than 40 million pounds of toxic air pollution in the period from 2008 to 2014, including 16.3 million pounds association with cardiovascular disease and 9.5 million pounds of carcinogens.

We are approaching the 50th anniversary of the creation of EPA and OSHA and President Nixon's declaration of "The War on Cancer". In 50 years the nation has made little progress in protecting the public from environmental exposures to known and suspected human carcinogens. Perhaps most importantly, this includes the failure of the existing approach to identifying and communicating environmental and occupational chemical risk.

1.2. President's Cancer Panel (2010)

The long-recognized failure of federal agencies to address the environmental causes of cancer led to the creation of the President's Cancer Panel (PCP) which between September 2008 and January 2009 convened four national meetings "to assess the state of environmental cancer research, policy and programs addressing known and potential effects of environmental exposure on cancer." More specifically, the Panel's assigned task was to appraise the National Cancer Program as established in accordance with the National Cancer Act of 1971 (P.L. 92-218), the Health Research Extension Act of 1987 (P.L. 99-158), the National Institutes of Health Revitalization Act of 1993 (P.L. 103-43), and Title V, Part A, Public Health Service Act (42 U.S.C. 281 et seq.). The Panel's overarching conclusion:

> Research on environmental causes of cancer has been limited by low priority and inadequate funding. . . There is a lack of emphasis on environmental research as a route to primary cancer prevention. . . Cancer prevention efforts have focused narrowly on smoking, other lifestyle behaviors and chemo-preventive interventions. Scientific evidence on individual and multiple environmental exposure effects on disease initiation and outcomes, and consequent health system and societal costs, are not being adequately integrated into national policy decisions and strategies for disease prevention, health care access and health system reform. (U.S. DHHS 2010)

With regard to this paper's primary concern, identifying the potential health risk associated with routine operations of natural gas compressor stations, four of the Panels critical conclusions are particularly relevant:

1. The Present Approach to Risk Assessment is Inadequate:

> [Exposure assessment] is needed more broadly to evaluate cancer risk associated with workplace or environmental exposures in the aggregate. In the U.S., most available exposure assessments are badly outdated. A comprehensive assessment of the extent of all environmental and workplace exposures, for example, has not been conducted since the flawed Doll and Peto estimates published in 1981 (Doll and Peto 1981). Although OSHA's mission is to ensure that workplace environments are safe, it does not conduct a comprehensive national review of carcinogens in the workplace. (U.S. DHHS 2010, p. 15)

> Cancer risk assessment also is hampered by lack of access to existing exposure data, especially for occupational/industrial exposures, and regarding levels of radon, asbestos, and other contaminants in schools and day care centers. (U.S. DHHS 2010, p. viii)

> Research Methodology and Data Collection Issues: In addition to measurement and standard-setting issues, environmental and occupational cancer research and assessment have suffered from methodologic and data collection weaknesses. (U.S. DHHS 2010, p. 10)

> Testimony, Paul Schulte, NIOSH: Right now, the numbers for how many workers are exposed to most of the known carcinogens are 20 to 30 years old so we don't really know what the contemporary workforce is experiencing in terms of exposure.

> Testimony, Sandra Steingraber, Ithaca College: Estimates of "attributable fractions" of the cancer burden due to occupation (approximately 4 percent), pollution (2 percent), industrial products (<1 percent), and medicines and medical procedures

(1 percent) are now believed to underestimate significantly the true toll of cancer related to these exposures." (U.S. DHHS 2010, p. 2)

Recommendation: A thorough new assessment of workplace chemical and other exposures is needed to quantify current health risks. Previous estimates of occupational cancer risk are outdated and should no longer be used by government or industry. (xii)

Recommendation: Measurement tool development and exposure assessment research, including the development of new research models and endpoints, should be accelerated to enable better quantification of exposures at individual, occupational, and population levels. (U.S. DHHS 2010, p. xiv)

Recommendation: Epidemiologic and hazard assessment research must be continued and strengthened in areas in which the evidence is unclear, especially research on workplace exposures, the impact of in utero and childhood exposures, and exposures that appear to have multigenerational effects. Current funding for federally supported occupational and environmental epidemiologic cancer research is inadequate. (U.S. DHHS 2010, p. 105)

2. **Workers, Other Populations with Known Exposures, and the General Public Require Full Disclosure of knowledge about Environmental Cancer Risks**

   Individuals and communities are not being provided all available information about environmental exposures they have experienced, the cumulative effects of such exposures, and how to minimize harmful exposures. (U.S. DHHS 2010, p. ix)

   Continued Epidemiologic and Other Environmental Cancer Research Is Needed: Cancer risk assessment . . . is hampered by lack of access to existing exposure data, especially for occupational/industrial exposures, and regarding levels of radon, asbestos, and other contaminants in schools and day care centers. (U.S. DHHS 2010, p. 98)

3. **Medical Professionals Need to Consider Occupational and Environmental Factors When Diagnosing Patient Illness**

   Physicians and other medical professionals rarely ask patients about their workplace and home environments when taking a medical history. Such information can be invaluable in discovering underlying causes of disease. Moreover, gathering this information would contribute substantially to the body of knowledge on environmental cancer risk. (U.S. DHHS 2010, p. ix)

4. **Inadequate Funding**

   Testimony: Elizabeth Fontham, Louisiana State University: Unfortunately, while budgets have waxed and waned on the federal level, a consistent finding, I would say, is that occupational and environmental exposures have been under addressed. (U.S. DHHS 2010, p. 5)

   NIOSH Work Group: In 1996, NIOSH convened a group of experts from academia, business, labor, and government to identify the gaps in occupational cancer research methods.60 The group's recommendations for strengthening research methods, which became part of NIOSH's National Occupational Research Agenda, focused on four broad areas: identification of occupational carcinogens, design of epidemiologic studies, risk assessment, and primary and secondary prevention (U.S. DHHS 2010, p. 10)

> For those who believe that environmental factors are a much-neglected risk factor for cancer (as well as for non-neoplastic diseases) PCP's conclusion is an important step in the right direction. (Everything the Panel has stated about the lack of attention to environmental and occupational causes of cancer could, in our opinion, also be said of non-neoplastic diseases.)

It is, we think, remarkable that those advancing the view that environmental exposures play only the smallest role in human cancer do so without ever discussing let alone conducting a detailed assessment of exposure, i.e., the extent to which Americans are exposed to chemical and radiologic carcinogens.

The starting place of scientific inquiry is identifying all possible factors which might in some measure affect the phenomenon under investigation. How is it possible to conclude that environmental causes are bit players without first having examined fundamental questions related to the extent and significance of exposures to man-made carcinogens? Such questions include: the total pounds of chemicals manufactured and imported, their number and characteristics, the number of chemicals approved for commercial use, the number and volume of chemicals produced by combustion (not intentionally manufactured), where and how exposures occur, their persistence in the environment, chemical synergism, issues related to exposure assessment, and the number of carcinogens found in human urine, blood and adipose tissue as well as evidence of neo-natal contamination?

Any summary account attempting to answer the question (however tentatively) "What causes cancer?" must include an analysis of these critical issues as well as a number of pertinent methodological concerns. Absent this framework any analysis which purports to claim that X% of Y cancers are caused by Z (or some combination of factors) is logically unsound—all of the possible relevant explanations have not been considered.

In this paper, we show that 18 of the state's ~40 natural gas compressor stations released an estimated 40.2 million pounds of toxic into the air over a 7-year period—an annual average of about 5.7 million pounds. The 7-year total included an estimated 9.5 million pounds of carcinogens (80% of which are classified as "know human carcinogens")—approximately 1.4 million pounds a year. The significance of this finding we believe, speaks for itself. Would a reasonable person who is presented with fact persist in the assertion that environmental factors are only a small causal factor? We don't think so.

Our establishing the extent of carcinogenic exposures in a single facility does not prove that they cause a specific percentage of a given cancer or all cancers at this work site, but it does demonstrate that an analysis consistent with the principles, methods and logic of scientific inquiry must seriously take environmental considerations into account.

In *Discourse on Method* Descartes advises that "when it is not in our power to determine what is true, we ought to follow what is most probable." It is this precept that has been the hallmark of modern science. It is, however, one which cannot be said to guide the nation's approach to preventing cancer. The tired assertion endlessly repeated that most cancers have little or no connection to environmental pollution is made without context or reference to physical realities--the extent and characteristics of chemical contamination and its documented effects. The environmental hypothesis is in no meaningful way refuted. It is simply dismissed. ***The physical reality of widespread, unavoidable chemical contamination is the large picture that must frame any meaningful discussion of cancer's etiology as well as risk assessment.***

1.3. Outdoor Air and Particulate Air Pollution: Known Human Carcinogens

What is that larger picture?

In 2013, the International Association for Research on Cancer, the specialized cancer agency of the World Health Organization, classified outdoor air as a known human carcinogen and a leading cause of cancer deaths.

IARC's study was "based on the independent review of more than 1,000 scientific papers from studies on five continents. The reviewed studies analyze the carcinogenicity of various pollutants present in outdoor air pollution, especially particulate matter and transportation-related pollution. The evaluation is driven by findings from large epidemiologic studies that included millions of people living in Europe, North and South America, and Asia."

After reviewing the extensive scientific literature IARC concluded that there is sufficient evidence to conclude that exposure to outdoor air pollution is a cause of lung cancer (Group 1) and that there is a positive association with an increased risk of bladder cancer.

From 2008 to 2014, NYS's natural gas compressor stations released an estimated 2.9 million pounds of particulate pollution, a major component of outdoor air pollution. Particulate airborne pollution was evaluated separately by IARC and was also classified as carcinogenic to humans (Group 1).

> The IARC evaluation showed an increasing risk of lung cancer with increasing levels of exposure to particulate matter and air pollution. Although the composition of air pollution and levels of exposure can vary dramatically between locations, the conclusions of the Working Group apply to all regions of the world.

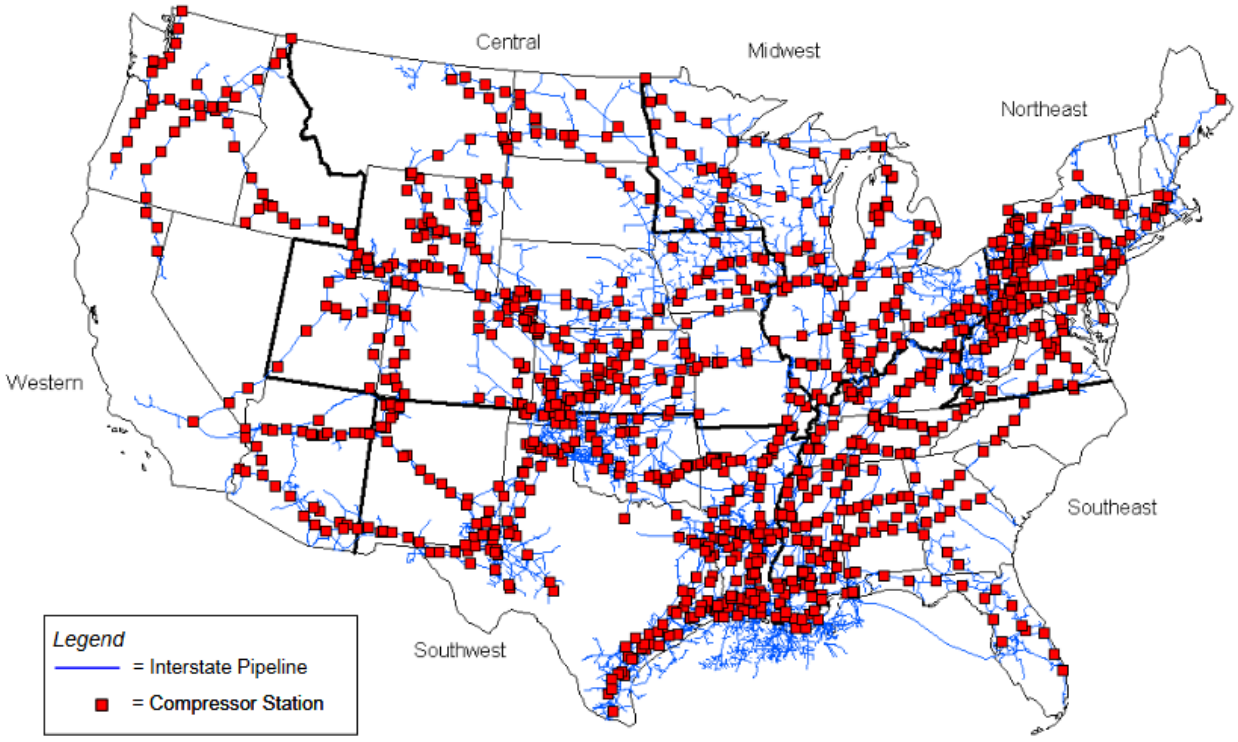
A recent Chinese study observed that cancer is rising in China in significant part to air pollution but that policies to systematically use cancer registry statistics and air pollution data to understand this problem are inadequate (which is also true in this country).

> Analyses on the cancer registry data show that cancer burden related to air pollution is on the rise in China and will likely increase further, but there is a lack of data to accurately predict the cancer burden. Past experience from other countries has sounded alarm of the link between air pollution and cancer. The quantitative association requires dedicated research as well as establishment of needed monitoring infrastructures and cancer registries. The air pollution-cancer link is a serious public health issue that needs urgent investigation. (Huang et al. 2014)

1.4. Expansion of Fracking Operations and Natural Gas Compressor Stations in the U.S.

In 2010, the U.S. Department of Energy reported there were 510,000 operational natural gas wells in the U.S., almost twice as many as there were in 2000, and that on average 13,00 new wells drilled each year during this 10-year period.

To keep pace with the unprecedent expansion of fracking operations, over the last two years the number of natural gas pipeline compressor stations has grown significantly. In 1996, there were approximately 1,047 compressor stations attached to the mainline grid with an installed horsepower of 13.4 million, capable of a daily combined throughput of 743 billion cubic feet. Ten years later there were 1,201 comparable stations (an increase of 17%) with 16.9 million installed horsepower capable of 881 billion cubic feet or a 19% increase in output. (EIA 2007-11)



Note: EIA has determined that publication of this figure does not raise security concerns, based on the application of Federal Geographic Data Committee's *Guidelines for Providing Appropriate Access to Geospatial Data in Response to Security Concerns.*
Source: Energy Information Administration, Natural Gas Division, Natural Gas Transportation Information System, Compressor Station Database.

Our own analysis of NEI's data for the period 2008 to 2014 shows 2,177 compressor stations as identified by NAICS 48261.

In NYS Title V compressor stations are classified as 48621. It is unclear to the authors whether all 2,177 stations with NAICS 48621 operate under a Title V permit.

Our preliminary estimate is that these 2,177 stations are responsible for more than 2.1 trillion pounds of stationary air pollutants. This may actually be an underestimation: (a) a significant number of stations reported releases in a given year but failed to report in one or more subsequent years, (b) some stations only reported releases as small as 2 pounds, and (c) it may not include all compressor stations (e.g., non-Title V stations).

Table 1.4.

U.S. National Gas Compressor Stations (NAICS Code 486210): 2,177

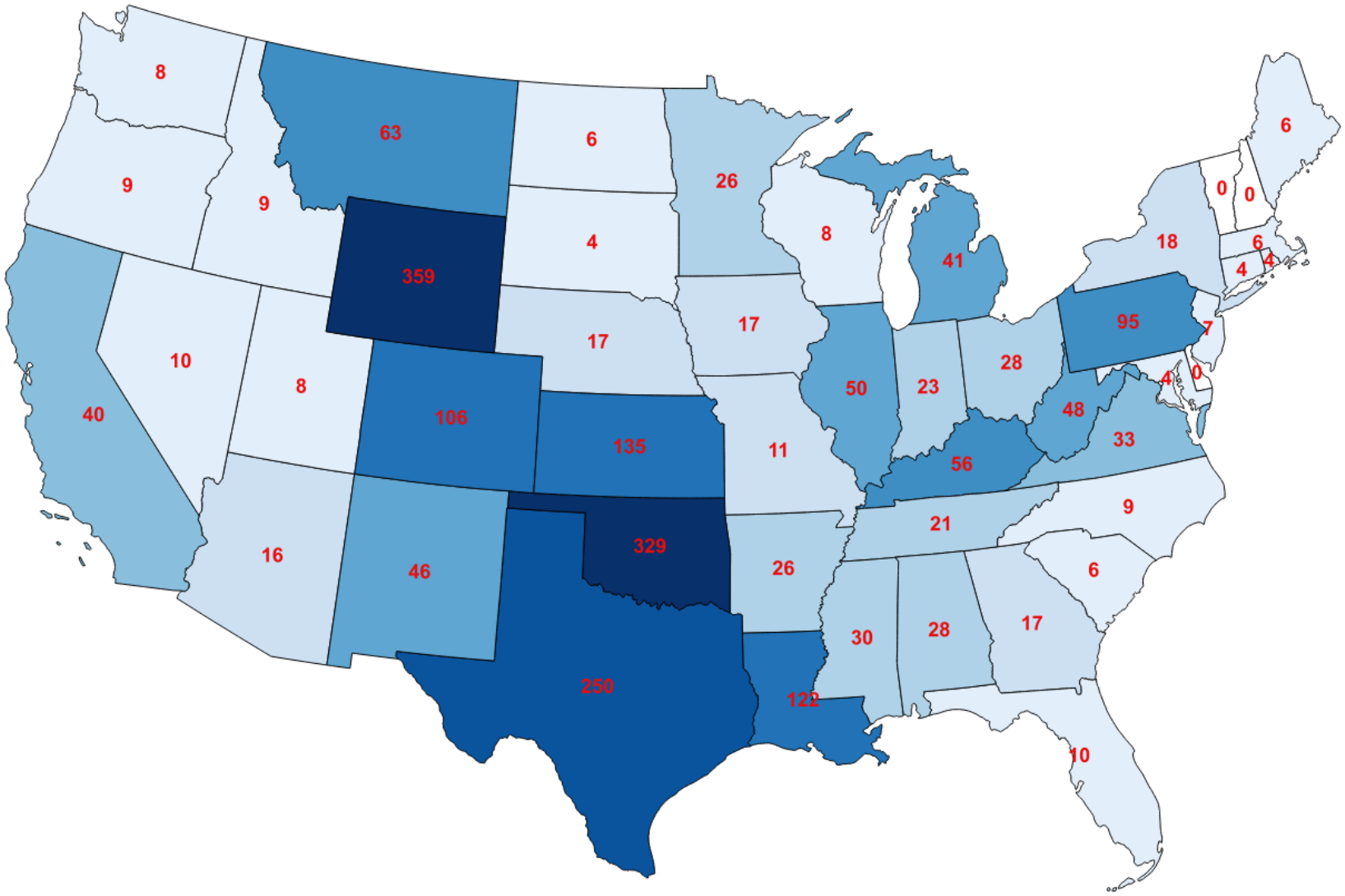
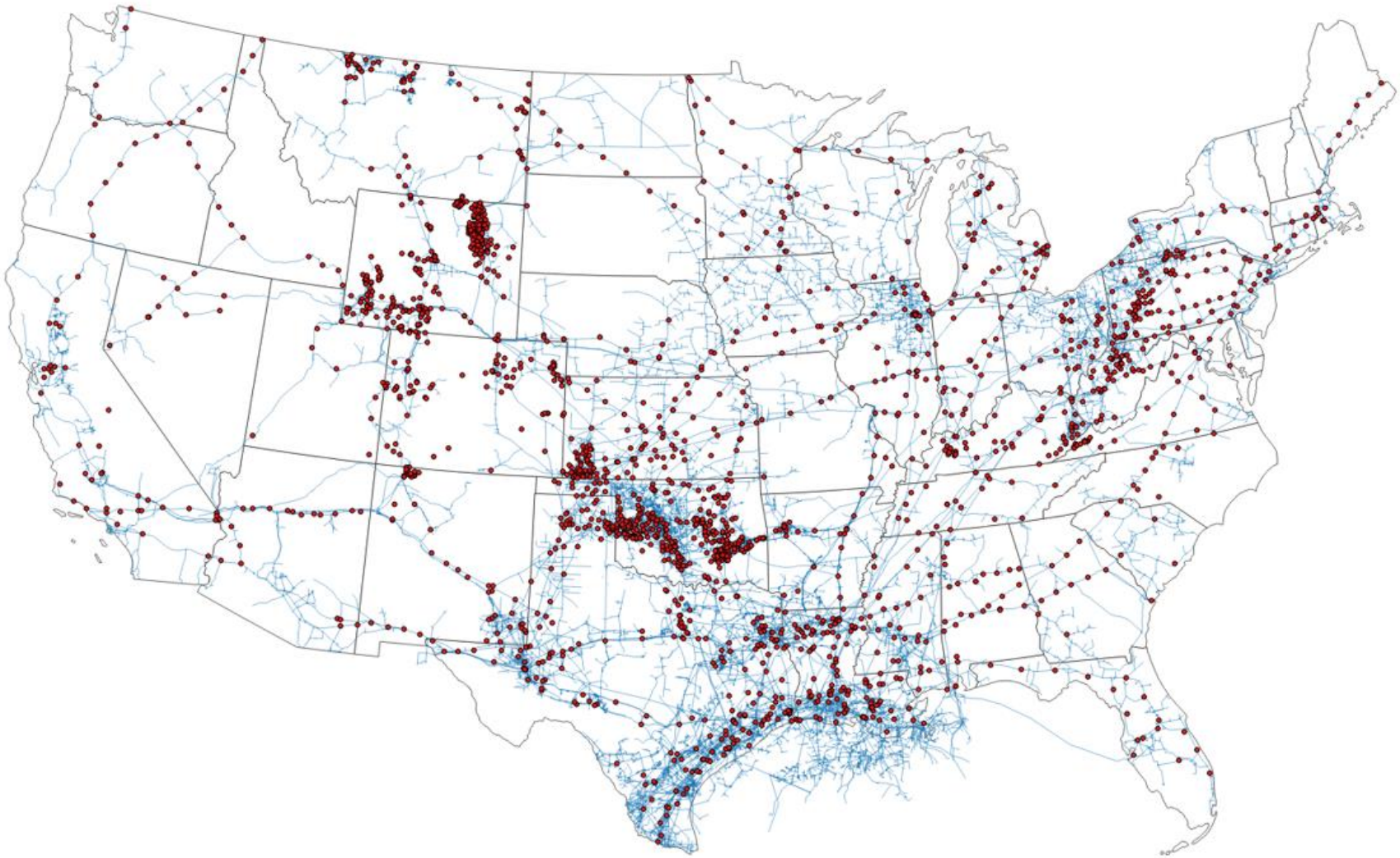


Table 1.4.

U.S. National Gas Compressor Stations (NAICS Code 486210): 2,177



1.5. The Legal Framework for Accessing the Health and Environmental Risks of Natural Gas Compressor Stations

1.5.1. The Halliburton Loophole

The expansion of unconventional gas operations in the U.S. has largely occurred without benefit of the nominal health and environmental safeguards governing the siting and operation of oil and gas operations in force prior to 2004.

Under the terms of the Energy Policy Act of 2005, oil and gas operations were exempted from almost all existing federal air and water regulations.

The provision in the Act that exempts the oil and gas operations from federal rules covering all other industrial operations is the result of then Vice President Dick Cheney's Energy Task Force and is universally known as the "Halliburton loophole".

Halliburton Corporation is one of the three largest manufactures of fracking fluids, making it one of the largest beneficiaries of the Act's disregard for even minimal health and safety concerns. Before becoming Vice President in 2001, Cheney was Halliburton's CEO.

In 1997 EPA was ordered to regulate hydraulic fracturing under the Safe Drinking Water Act (SDWA) by the U.S. Court of Appeals for the 11th Circuit (Atlanta), following the contamination of residential drinking water wells in Alabama. The Halliburton Loophole prohibits EPA from regulating the injection of fracturing fluids under the SDWA. In consequence, fracking wastewater is injected directly into or adjacent to underground drinking water without governmental oversight.

In response EPA undertook a 3-year study of the issue. Oil and gas industry representatives made up 5 of the 7 members of EPA's peer review panel, including a representative from Halliburton. The panel's findings, published in 2004, concluded that fracturing "poses little or no threat" to drinking water and that no further study of the question was necessary.

In its investigation, the transparently self-serving panel had ignored or concealed well documented evidence that fracking presents a significant threat to drinking water. Courageously, Weston Wilson, a 30-year veteran of the EPA in Denver, blew the whistle on the panel's violation of scientific principles and available evidence and the Agency's refusal to regulate what is clearly a hazard to public health. The weight of evidence in Wilson's charge that the panel's findings were "scientifically unsound" and the public outcry that followed, forced EPA inspector General Nikki Tinsley to conclude in March 2005 that there was sufficient evidence to justify a review of the panel's work.

It is at this point in the story that Cheney and his former employer Halliburton jumped into the breach--the passage of the Energy Policy Act effectively removed EPA from a meaningful regulation of fracking and related operations, not only of drinking water but also the terms of the Clean Water Act (CWA), the Clean Air Act, the Superfund Act, the Emergency Planning and Community Right-to-Know Act, and the National Environmental Policy Act.

1.5.2. Public Concerns about the Health Risks of Natural Gas Compressor Stations

The explosion in unregulated fracking operations made possible by the Halliburton Loophole has in turn resulted, as previously noted, in the expansion of natural gas compressor station operations and the constructions of thousands of miles of new pipelines.

As many knowledgeable observers have noted, existing federal, state and local policies that govern industrial site approval and the actual approval process fail adequately to protect the immediate and long-term health of the public or safeguarding the environment.

Many reasons account for this failure.

First and foremost is the view that development ("job creation") is the paramount concern of government.

Policies certainly exist on paper stating that assessments of potential harm to public health and the environment are an integral part of the approval process.

In actual practice, these "safeguards" are largely a legal formality at great variance from governmental assurances that the primary concern is the public's health and safety.

Only a small percentage of these proposals are rejected on grounds that they would unduly threaten public health and the environment; in most of these cases it is only because public interest groups could mount and sustain long legal and political struggles.

In the case of struggles attempting to prevent the construction of new or expansion of existing natural gas compression stations, they are waged without any quantitative assessment of potential immediate and long-term health risks associated with air emissions from these facilities.

When local officials or the public raise concerns about the potential health risks associated with natural gas compressor stations, the answer is always the same: "all required studies have been completed".

What does this mean?

When an average person hears an "expert's" confidently assertion that "all required studies have been completed", they conclude this should be taken to mean it won't cause immediate- or long-term damage to human health or the environment.

That, of course, is precisely the intention.

And to be truthful, this is what many people want to hear; they welcome such an assurance because it means the proposed plant is something they don't have to worry about or spend time and effort organizing against.

The purpose of the assertion "all required studies have been completed" is to quell public doubt and to silence scientific criticism.

The most important thing the public and local officials need to understand is that "all required studies have been completed" is not the same thing as saying (or the reality) that" there is no potential for increased risk of death or disease."

This is to say, the “required studies” do not, in our opinion, meaningfully protect human health.

The public works under the false assumption that the primary purpose of governmental regulations such as those under consideration is to determine what’s “safe”.

At best, such safeguards prevent egregious potential for harm, but often they don’t even do that.

There are several reasons for this.

The first is that preventing the public from any increased health risk is not the overriding goal of federal and state regulations. Rather, it is “balancing” potential harm from potential “benefits”.

This raises three obvious questions:

Who determines “the potential for harm”?

Who determines what constitutes a “benefit”?

And who determines what the balance between the two should be?

To state the obvious, it is not within the authority of the public, public health experts or independent scientific agencies to answer these questions.

The rules such as they are, have largely been written to advance the interests of industry even when public health and the environment are compromised. The case of the Halliburton Loophole is one obvious example. The refusal to take measures to address climate change is another.

Each of the 18 compressor stations analyzed in this report were required to complete 6 or more federal or state studies before they were given building permits. A few of these studies directly address health concerns, and in each case, they concluded that the proposed facility would meet governmental public health standards.

Let’s throw a few balls up in the air and try to juggle them.

> *First ball:* As previously indicated, IARC has concluded that breathing outdoor air increases everyone’s risk of cancer, meaning that each and every minute of our lives we’re breathing a cocktail of chemical carcinogens.
>
> *Second ball:* For more than 30 years EPA has maintained that any exposure to a known human carcinogen increases cancer risk.
>
> *Third ball:* Based on data collected by the natural gas industry and reported by EPA, the 40.2 million pounds of pollution released by the state’s compressor in a 7-year period included 9.5 million pounds of carcinogens (83% of which were classified as “known human carcinogens” by one or more authoritative agency).
>
> Fourth ball: All 18 compressor stations in NYS met all regulatory requirements and were granted building permits.

If the air we breathe is already filled with hundreds of known human carcinogens, any exposure to a single carcinogen increases the risk of developing cancer and

compressor stations add 5.7 million pounds of carcinogens to the state's air every year, how can compressor stations not increase the risk of cancer?

And is the assertion that "all required studies" fully protects public health in any meaningful sense plausible?

Anyone looking for an insight into the growing disillusionment of ordinary citizens with the regulatory process should attempt this logical juggling act.

Engineers and Industry Spokesmen Public Relations Posing as Public Health Experts

It also needs to be understood that the industry spokesman and DEC officials attempting to assure the public that compressor stations pose no threat to human health, are almost without exception people who have no training in public health, epidemiology or toxicology.

In the case of industry representatives, they are public relations specialists or company spokesman who have memorized their lines.

And in the case of the DEC, they are well-qualified scientifically trained engineers with different areas of expertise, but this is not equivalent to being a scientifically trained medical or public health expert.

The NYS DOH

It must also be recognized that historically DOH is reluctant to weigh in on such matters, preferring to let DEC carry the load.

In this connection, it's worth noting that we could locate no systematic analysis of compressor station pollution authored by the DOH.

The public only hears what engineers and public relations officials have to say on the health effects of compressor stations and natural gas pipelines ("all required studies have been completed") and little or nothing from the agency specifically tasked with protecting public health.

1.6. The Precautionary Principle and Legal Damage Awards

In most cases legislative action to protect the public from the danger of chemical exposures generally only occurs long after harm has been done. This highlights the weakness of the existing approach to chemical regulation—if regulations were adequate there would not be so many effected populations.

Rather than waiting for harm to occur, progressive public health advocates believe regulation should be based on the precautionary principle --concept that when there is some evidence for harm from a particular exposure, but the level of evidence falls short of being clearly established, steps should none-the-less be taken immediately to reduce exposure. Study of hazards from environmental exposures often take many years for definitive results to be obtained, and if one waits to take action until you can count the bodies you will have unnecessarily harmed people. Furthermore, the latency for many diseases is long, and therefore if you take no steps to reduce exposure once the evidence becomes totally clear there will be people who have been unnecessarily exposure who will be developing diseases for many years to come.

Finally, in legal cases it is common for juries to award damages based on proof of exposure to a substance known to cause a disease such as cancer, even if that person does not have cancer him or herself. The level of proof of exposure is usually that the body burden of a substance, for example PCBs or dioxins, is significantly higher than most Americans (usually somewhere between the 75-95th percentile from NHANES). Therefore, courts accept the concept that exposure to a chemical that causes a known disease proves elevated risk of the disease even if the disease has not yet occurred.

1.2. The Existing Literature

1.2.1. Peer-reviewed studies of natural gas compressor stations

To the authors' knowledge, there are no peer-reviewed papers examining the health effects associated with pollutants generated by natural gas compressor stations.

PubMed (pubmed.gov), a free resource developed and maintained by the National Center for Biotechnology Information (NCBI) at the National Library of Medicine® (NLM), provided access to more than 27 million citations for biomedical and life science research. The search terms "compressor station" and "natural gas compressor" only generate 28 citations. Only 9 of the 28 have as the primary subject matter compressor stations. In the others, compressor stations are essentially a passing reference.

None provide a quantitative assessment of the volume of compressor station emissions, chemical content of these emissions or their potential health impacts.

Subject	Author
Compressor Stations: major subject of the paper	
Compressor stations, criteria pollutants	Goetz et al. 2015
Compressor stations, methane emissions	Jakober et al. 2014, Litto et al. 2012, Mayfield et al. 2017, Nathan et al. 2015, Subramanian et al. 2015
Compressor stations, ocular melanoma associated w\electric motor frequency	Milham and Stetzer 2017.
Compressor stations, operations, pipeline energy optimization	Liu et al. 2014
Compressor stations, operations, turbine improvement	Mohamed et al. 2016
Compressor stations, triaryl phosphate poisoning in cattle.	Beck et al. 2012
Compressor stations, vent operations	García et al. 2012
Compressor stations, wildlife impacts from noise	Bunkley, et al. 2017
Fracking operations, animal health	Bamberger and Oswald 2014
Compressor Stations: passing reference	
Fracking operations, chemical pollution	Brown et al. 2015, Hildenbrand et al. 2016, Pekney et al. 2014, Lan et al. 2015, Lavoie et al. 2015, Chepenko et al. 2012)
Fracking operations, radon	Chepenko et al. 2012
Gas processing, ozone formation	Olaguer 2012
Health impacts, noise	Boyle et al. 2016
Methane emissions, plume characteristics	Payne et al. 2016
Natural gas operations, beef cattle reproduction and calf mortality	Waldner et al. 2012
Natural gas operations, CAP	Roy et al. 2014
Natural gas operations, methane emissions	Allen et al. 2014
Natural gas operations, methane emissions	Yacovitch et al. 2015
Natural gas operations, methane emissions	Zimmerle et al.
Natural gas operations, VOC emissions	Zielinska et al. 2015

1.2.2. NYS DEC

The author could locate no specific statement reviewing the volume of releases of emissions from compressor stations, their content or the impact of these chemicals on human health on DEC's website.

1.2.3. NYS DOH

In December 2014, NYS DOH published *A Public Health Review of High Volume Hydraulic Fracturing for Shale Gas Development* (NYSDOH 2014). The report provides a useful summary of peer-reviewed studies of the health impacts of unconventional gas development including compressor stations. To be precise, it contains 5 references to "compressor stations". But nowhere in this 186-page report is there a reference to the volume of emissions from compressor stations, their content or the impact of these chemicals on human health.

1.2.4. National Academy of Science's Health Impact Assessment of Shale Gas Extraction

In 2014 the National Academy of Science published *Health Impact Assessment of Shale Gas Extraction: Workshop Summary* (NYAS 2014). The report contains a great deal of important information about the pollution associated with fracking but almost nothing concerning the pollution associated with the transportation of natural gas.

The phrase "compressor station" appears 13 times. None of these references provide any quantitative assessment of compressor station emissions.

But the last reference to compressor stations which appears in the report's final paragraph does say something quite important.

> Finally, the panel was asked to comment on the testing of acute, short-term exposures versus low-level chronic exposures, for example, the low-level chronic exposures of farmers who leased out their land for hydraulic fracturing or homeowners who are living 100 feet from a compressor station and live with these emissions daily. The audience member noted that there has been remarkably little air and water testing in the U.S. gas fields to date, and the available testing efforts have shown exposures at "safe" levels, which is disheartening for people experiencing a multiplicity of health symptoms at these levels. . .

1.2.5. U.S. Environmental Protection Agency, Inspector General

A 2013 report from the United States Environmental Protection Agency ‘s Inspector General states that there is inadequate information available on direct measurement emissions from oil and gas production activities.

> High levels of growth in the oil and natural gas (gas) production sector, coupled with harmful pollutants emitted, have underscored the need for EPA to gain a better understanding of emissions and potential risks from the production of oil and gas. However, EPA has limited directly-measured air emissions data for air toxics and criteria pollutants for several important oil and gas production processes and sources, including well completions and evaporative ponds. Also, EPA does not have a comprehensive strategy for improving air emissions data for the oil and gas production sector; the Agency did not anticipate the tremendous growth of the sector, and previously only allocated limited resources to the issue. (USEPA 2013)

1.2.6. U.S. Agency for Toxic Substances and Disease Registry

A 2016 report by the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) of health particulate matter exposures in the vicinity of the Williams Central natural gas compressor station in Brooklyn Township, Susquehanna County, Pennsylvania, reached 2 fundamental conclusions:

> **Conclusion 1, Short term exposures:** Exposure to maximum levels of $PM_{2.5}$ may be harmful to unusually sensitive populations, such as those with respiratory or heart disease, but are not at levels that are a concern to the general population.
>
> **Conclusion 2, Chronic exposures:** The estimated annual average $PM_{2.5}$ concentration of 15 to 16 $\mu g/m^3$ may be harmful to the general population and sensitive subpopulations, including the elderly, children, and those with respiratory or heart disease.
>
> (USATSDR 2016)

1.3. Requests for Information

The need for quantitative information about the volume of pollution and its potential to cause adverse health impacts has been the subject of resolutions by local governments, public health advocates as well as local, regional and state environmental organizations.

1.3.1. Letter to Mr. Michael Higgins, NYS DEC, Division of Environmental Permits From the Westchester County Board of Legislators (February 2015)

Board of Legislators Resolution No. 80-2014 Resolution No. 80-2014 ("Resolution") calls for independent, transparent, continuous and comprehensive baseline air testing to establish the public 's exposure to toxins that are currently being emitted from the compressor stations prior to allowing any increase in emissions. Furthermore, the resolution calls upon all involved agencies, including NYSDEC, to evaluate cumulative short and long-term health impacts of the entire proposed AIM project, including the impact of emissions from all regional sources of emissions, prior to any expansion of these compressor stations. (Westchester 2015)

1.3.2. Letters to Governor Cuomo and Health Commissioner Howard A. Zucker From Concerned Health Professionals of New York, Physicians for Social Responsibility -- U.S., Physicians for Social Responsibility -- New York (October 14, 2015, May 29, 2014, February 27, 2013, October 4, 2012, March 16, 2012, December 12, 2011, October 5, 2011, March 26, 2011, February 28, 2011)

Compressor stations and pipelines are both major sources of air pollutants, including benzene and formaldehyde, that create serious health risks for those living nearby while offering little or no offsetting economic benefits. Compressor stations – used along regular intervals of most pipelines – in particular, are semi-permanent facilities that pollute the air 24 hours a day and expose nearby residents to levels of noise pollution known to induce negative health effects. Moreover, emerging data show that their day-to-day air emissions are highly episodic and create periods of potentially extreme exposures.

We have particular concerns about the air pollution events created by compressor station "blowdown" events, which are used for maintenance and to control pressure and can last for hours. The intentional or accidental releases of gas through valves create 30- to 60-meter-high gas plumes, causing high levels of contaminant release. Anecdotal accounts associate blowdowns with short term effects such as nosebleeds, burning eyes and throat, skin irritation, and headache. Given the chemicals released, we are deeply concerned about the possible long-term effects of these exposures, including cancer, asthma, heart disease and severe neurological impairments. We note that there exists neither a national nor a state inventory of compressor station accidents. We have yet to accumulate an extensive body of peer-reviewed research on the public health impacts of compressor stations, but our new report includes very troubling documentation of extensive leakage of methane and other contaminants. (CHPNY)

1.3.3. Letter to Mr. Christopher Hogan, NYSDEC, Division of Environmental Permits From 14 NYS Physicians (September 12, 2016)

> We are . . . greatly concerned that no state agency appears to be monitoring the ever increasing flow of information and scientific studies based on effects of UNGD and its associated infrastructure. On this point we would like to be mistaken; and please correct us if we are. But since the two-year Public Health Review of HVHF activities concluded in December 2014, it appears that DEC and DOH have "washed their hands" of the issue. Nevertheless, huge problems - with health impacts, quality of life and climate impacts associated with the proliferation of natural gas infrastructure in our state - are not going away. Someone needs to be paying attention to this, and "connecting the dots" - individual infrastructure projects must be considered not only separately but in their cumulative health, environmental, and climate impacts. We do not see this happening in New York State. (Medical Professionals 2016)

1.3.4. Public Statement: Mothers Out Front Mobilizing for a Livable Climate (Monroe County NY)

> It is somewhat difficult to find scientific literature completely focused on the impacts of compressor stations. . . (MOF)

1.4. Summary of health effects

Based on data submitted by the natural gas industry and collected by DEC and EPA we show that 18 compressor stations in NYS were responsible for releasing more than 40 million pounds of toxic air pollutants over a 7-year period, including:

- 9.5 million pounds of human carcinogens,
- 18.8 million pounds of chemicals associated with blood and immune system disorders,
- 18.8 million pounds associated with endocrine, nutritional and metabolic disorders,
- 18.7 million pounds of chemicals with mental and behavioral effects,
- 18.7 million pounds that affect the brain and central nervous system,
- 24.7 million pounds that affect the eye and adnexa,
- 17.5 million pounds that affect the ear and mastoid process,
- 16.3 million pounds associated with circulatory system diseases including heart attacks and strokes,
- 39.6 million pounds linked to respiratory system diseases,
- 38.5 million pounds linked to digestive system diseases,
- 27.7 million pounds associated with skin and subcutaneous tissue disorders,
- 1.2 million pounds linked to musculoskeletal system and connective tissue diseases,
- 39.9 million pounds with genitourinary system diseases,
- 6.4 million pounds with urinary system diseases and disorders,
- 39.9 million pounds connected to pelvis, genital and breast diseases including reproductive disorders
- 19.6 million pounds that affect pregnancy, childbirth and the puerperium,
- 22.5 million pounds with certain conditions originating in the perinatal period,
- 39.6 million pounds with congenital malformations, deformations, chromosomal abnormalities, and
- 39.6 million pounds with symptoms, signs and abnormal clinical and laboratory findings, nec.

What should the public make of this?

1.4.1. A substantial amount of health relevant information is not reaching the public

A tenant of health and community governance is public information and health and safety. Community members depend on Public Officials to provide information needed to protect their health. In the case of gas compressor stations substantive amounts of health relevant information is not reaching the public. Instead of informing the public, the information is mired in bureaucratic processes.

1.4.2. Governments' failure to analyze or communicate the results of its own data collection

The data analyzed in this report is collected by DEC and EPA. Neither agency has reported the total volume of pollution associated with the transportation of national gas, let alone analyzed these releases in terms of how they potentially impact human health.

It is the responsibility of each compressor station in NYS to estimate the total volume of pollution they generate as well as its chemical constituents and to report this information to DEC--and they do.

DEC is required to review this information and forward it to EPA--and they do.

EPA assembles this data and make it available to the public, which they do, not just for compressor station but for millions of other sites nationally.

It is not the most difficult thing in the world to use the information collected and apply a little math. But, if either the EPA or DEC have ever done so, it is not something to our knowledge that has been presented to the public. Nor have we found this information on their respective web sites.

The information that is collected is presented in formats that are not readily understood by local residents. To be useful, the most important conclusions and insights of technical data must be comprehensible to the average person.

1.4.3. DOH's failure to analyze the potential health impacts of compressor station pollution

For its part, even if EPA and DEC are not interested in analyzing the compressor station emission data they collect, there is nothing to prevent DOH from doing so.

DEC\EPAs' compressor station data is publicly available. DOH could download it and do the math.

Again, as far as the authors are aware, DOH has not done so.

1.4.4. Industry and governmental assurances that gas compressor stations "comply with all air quality requirements" and that they therefore pose no unreasonable threat to public health

Each of the 57 compressor stations that have been permitted by DEC have been approved based on the conclusion that they comply with all federal and state air quality requirements.

When members of the public or local officials question the potential health effects of compressor station pollution, the response from industry, EPA, DEC and DOH is always that "all legal requirements have been met" -- the clear implication being that if these "legal requirements" have been met, there is no reason to be concerned about adverse health effects.

For example, in a public statement issue by Dominion Transmission concerning its New Market Project, it states: "The FERC approved New Market on April 28, 2016 after 23 months of evaluating all environmental, health and safety concerns associated with the project."

Dominion poses the question, "What will be the environmental and public health concerns?"

Its answer:

> Any emissions from the compressor station will comply with all air quality requirements, which are established to protect the public health, safety and welfare. We would not operate the compressor station if we could not operate it according to stringent air quality regulations.
>
> Ensuring compliance with environmental requirements fall either to the Environmental Protection Agency (EPA) or state environmental agencies (states by delegation), depending on the specific permit and rule. (Dominion 2016)

Dominion is disingenuous. Their health and safety officials recognize, or should recognize, that Federal and State Environmental laws and regulations are designed to protect the general health of regional populations and not to protect any single group of locally exposed persons. The "stringent air quality regulations" that Dominion refers to are those established by EPA for the purpose of controlling regional levels of pollution and even in this limited context these regulations fail to protect the public from all manner of demonstrably harmful exposures.

Therefore, these regulations make three critical, scientifically questionable assumptions when applied to local pollution.

The "stringent air quality regulations" that Dominion refers to are those established by EPA.

It is beyond the scope of this project to provide a full analysis of this claim, but several brief observations are in order.

First, the regulation used to determine the potential health impacts of chemical exposure make three critical, scientifically questionable assumptions.

1. Individual Chemicals versus Chemical Mixtures

   First, it effectively assumes that an air standard can be set for a single chemical to protect against unnecessary risk. The problem here is that setting standards for individual chemicals makes very little sense when people are continuously exposed to multiple complex chemical mixtures.

   The mixture of any two chemicals can be additive (1 + 1 = 2), less than additive (1 + 1 = 1.5), or synergistic (1+1 = 2+).

NYS's national gas compressor stations reported releasing more than 70 chemicals.

This number includes 31 chemicals associated with circulatory diseases like heart attacks and strokes. Knowing how much risk is associated with a single circulatory toxicant tells us nothing about the real-world risk of being exposed to 31.

The state's compressor station reported releasing a total of 59 carcinogens, including 23 chemicals classified as "known human carcinogens" by an authoritative international, federal or state agency. Of the 9.6 million pounds of carcinogens released from 2008 to 2014, 83% were known to cause cancer in humans. The effect of being exposed to multiple carcinogens is not considered in EPA or DEC regulations.

2. Average versus Acute Exposures

EPA and DEC guidelines assume that the exposures from a facility occur evenly over time. In fact, for any given facility air pollution releases fluctuate widely. What this means is that at times of peak exposure individuals may breathe chemical concentrations greater than what is assumed to be safe. Studies have shown that levels of the carcinogens formaldehyde, benzene and 1,3-butadiene periodically exceed what federal and state guidelines consider safe at natural gas compressor stations in four states. (Macey et al. 2014).

3. Healthy versus health-compromised or particularly vulnerable populations

With a few exceptions, EPA and DEC guidelines assume that everyone is at equal risk from the harmful effects of air pollution. This is simply not the case. There are many populations who are at greater risk, including, infants, children, pregnant women, the elderly, those with compromised immune systems, and those already suffering from specific diseases or disorders.

Studies have shown that the cancer rates are proportional to levels of regional air pollution. These three points aside, it is plausible that the release of 9.6 million pounds of carcinogens in a 7-year period, and continued releases over the active use of the facility does increase the incidence of certain types of cancer.

When national economic concerns are given priority higher than community health it is necessary to provide simple and clear guidance to the person whose risk is increased. In those situations, it is not appropriate to compare risks to other sources or situations. Individuals who know that they are of enhanced risks, avoid polluted areas.

The environmental and health risks can be handled much more fairly. To do so requires recognition of commonly understood concepts and readily accessible information.

4. Other general concerns

Problems associated with risk assessments broadly understood and air pollution standards have been identified by a number of researchers (Goodman et al. 2013, Maynard et al. 1995, McClellan 2012, Mauderly et al. 2010.)

1.4.5. The absence of concrete information about potential health impacts in industry proposals

In the proposals we have reviewed, there is an absence of concrete information about exposures and their potential health impacts.

Millennium's proposal for its Highland Compressor Station is a case in point.

In July 2016, the company submitted its application proposal, *Millennium Pipeline Company, LLC Highland Compressor Station, Eastern System Upgrade Project, Air State Facility Permit Application* to regulators.

The 83-page report contains a great amount of important information but almost nothing substantive about potential adverse human health impacts.

A search of the document shows that the word "health" only appears four time

First, as a footnote to table **Table 2-1: Proposed Facility Emissions (tons/year).**

> (3) Trivial per 201-3.3(94) for emissions of "….oxygen, carbon dioxide, nitrogen, simple asphyxiants including methane and propane, trace constituents included in raw materials or byproducts, where the constituents are less than 1 percent by weight for any regulated air pollutant, or 0.1 percent by weight for any carcinogen listed by the United States Department of **Health** and Human Services' Seventh Annual Report on Carcinogens (1994). The definition of "regulated air pollutant" under 200.1(bu) does not include methane or ethane.

Second, in section **3.4.1 Exempt and Trivial Sources**, the same sentence is repeated.

> Blowdowns are considered a trivial activity per 6 NYCRR 201-3.3(94) which covers "Emissions of the following pollutants: water vapor, oxygen, carbon dioxide, nitrogen, inert gases such as argon, helium, neon, krypton and xenon, hydrogen, simple asphyxiants including methane and propane, trace constituents included in raw materials or byproducts, where the constituents are less than 1 percent by weight for any regulated air pollutant, or 0.1 percent by weight for any carcinogen listed by the United States Department of **Health** and Human Services' Seventh Annual Report on Carcinogens (1994)." The natural gas composition at the Highland Station meets the definition in 6 NYCRR 201-3.3 as shown in Appendix B.

Third, in section **3.6 New York State Department of Environmental Conservation Regulations:**

> If the agency considers that any project triggering minor NSR permitting could threaten attainment with the National Ambient Air Quality Standards (NAAQSs) or human **health** from toxic air pollutant (TAP) concentrations, NYSDEC can require air dispersion modeling for the Project. A site wide modeling analysis for criteria pollutants has been performed in accordance with their impact analysis modeling guidance, Policy DAR-10. In addition, a modeling analysis that addresses TAPs is performed per Policy DAR-1. This section details the NAAQS and TAPs modeling assessment for the proposed Highland Station.

And fourth, as an unchecked box in Rule Citation 201-3.2(c), item 20, "Municipal/Public **Health** Related."

A subsequent report by the company, Millennium Pipeline Company, LLC, Eastern System Upgrade Project, Hancock and Highland Compressor Stations, Human Health Risk Assessment (February 2017), addresses health concerns more explicitly. But, again, there is (a) no attempt to place compressor station pollutants within the context of the overall burden of pollution in NYS or (b) explicit discussion of the what the peer-reviewed science has to say about the potential health effects of releases.

1.6. Other sources of exposure to the 70 chemicals released by natural gas compressor stations

In the courses of a single day each of us is exposed to hundreds of toxic chemicals. Over a lifetime, the number is in the thousands or, more probably, tens of thousands.

It is often assumed, mistakenly in our view, that continuous exposure to high levels of toxic chemical are required to produce illness. In fact, illness may result from a small exposure, especially if exposure occurs continuously over time.

Compressor stations represents a significant source of airborne pollution in NYS, increasing the likelihood of disease, particularly for local communities. The potential health effects of compressor stations are clearly a principal concern for communities opposing their construction or expansion. As we try to show in these pages, the potential for harm is real and their concern justified. At the same time, it's necessary to not lose sight of the forest when we're looking at the trees. Pollution from compressor stations is a significant threat to human health, but it is one of many. All need to be understood and addressed.

A few essential facts:

- Each year the U.S. manufactures or imports trillions of pounds of chemicals. Of the 70 chemicals releases as combustion pollutants from natural gas compressor stations, 27 are produced at a volume of more than 1 million pounds annually in the U.S. Of this number, 13 are produced at more than 1 billion pounds and 3 at more than 10 billion pounds. (Given the limitations of EPA's reporting on chemical manufacturing and importation, these numbers are in all probably underestimations.)
- Companies don't manufacture or import chemicals with the intention of creating pollution but to use them in products. In the course of ***production***, a relatively small percentage of chemicals are released into the environment. In absolute numbers, of course, the volume of air and water pollution released and hazardous waste generated is extraordinary, but the most significant source of pollution occurs ***after production***, when chemicals incorporated into products and are used and in many cases, discarded. The single most important source of airborne pollution in the U.S. is the combustion of gasoline and diesel fuel in on-road vehicles. At present, the U.S. has 139 operating petroleum refineries, located in 39 states. Eighty-nine are located just four states: Texas, California, Oklahoma, and Louisiana, and these account for more 10 million of the 16.7 billion barrels produced daily. Studies consistently find extremely high levels of air and water pollution and significantly higher rates of human disease around refineries. But far more pollution is created and more people are exposed to its harmful effects when the 7 billion barrels of petroleum produced each year in the U.S. are used, most notably, when they are burned in cars, trucks, buses and planes or used as fuel for heat or electricity generation.
- Prior to EPA's creation in 1970, there was literally no national regulation of chemical production or chemical waste disposal and only the flimsiest air and water pollution regulations. In 1970, an estimated 65,000 chemicals were in use in the U.S. EPA "grandfathered" these chemicals, meaning that companies could continue to use them until the Agency had time to determine if their use should be continued. New chemicals would have to be approved for use by EPA prior to introduction, but they didn't have to be tested. Nearly a half century later, more 85,000 chemicals have now been approved for use by EPA under Toxic Substances Control Act (TSCA), but fewer than 1,000 have been systematically

evaluated for their potential to harm human health and the environment by a federal agency (EPA and NTP), and only a small number have been withdrawn from use.

- Even when a chemical is clearly shown to present significant harm to human health or the environment, it is extremely difficult to have its use terminated. The fact that a chemical has been shown to be a known human carcinogen does not, for example, mean it use is automatically prohibited or restricted. This only happens in the rarest of circumstances and only longer after the problem has been documented. The current controversy concerning chlorpyrifos, a pesticide known to effect childhood brain development, is a case in point.

- Of the estimated 85,000 chemicals approved for use in the U.S. by EPA, fewer than 1,500 are systematically tracked as environmental pollutants or as food and water contaminants. Of this number, fewer than 900 are tracked as air pollutants.

- Of the 319 chemicals in EPA National Emissions Inventory, 198 were reported as air pollutants in NYS in the period from 2008 to 2014, meaning the state's residents were exposed to 128 additional chemicals not related as compressor station releases.

- The 70 chemicals released as compressor station stack air pollutants can be found in many other point sources or air pollution reported by NEI. These same 70 chemicals are reported as non-point sources by NEI, and 40 as on-road and non-road sources. Thirty-five of these 70 chemicals are residential air pollutants.

- Forty-one of the 70 chemicals released as compressor station stack can be found in clothing and textiles, jewelry, personal care products, cosmetics, perfumes, skin, hair care products, hair dyes, shoes and leather products, tobacco products/smoking.

- Forty-four of the 70 chemicals released as compressor station stack pollutants can be found on food items.

- In recent years CDC's NHANES has studied the number of chemical contaminants found in our bodies. These studies and those of the Environmental Working Group (EWG) have shown that chemical contaminants found in our bodies are varied as are their potential health impacts., and that even those working in relatively "clean" occupations also suffer significant contamination. Perhaps the most startling finding is that chemical contamination occurs before births. Dozens of toxic chemicals can be found in umbilical cord blood or placenta, including many chemicals known or suspected of causing human cancer.

  Of the 70 chemicals released as compressor station stack pollutants, 48 are documented body burden contaminants, including: blood (29), breast milk (17), umbilical cord (20), placenta, sweat (3), urine (11), and unspecified (1).

- Air Pollution \ Cancer
  - Outdoor air is a known human carcinogen. (IARC)
  - In 2005, nearly all U.S. children (99.9%) lived in census tracts in which hazardous air pollutant (HAP) concentrations combined to exceed the 1-in-100,000 cancer risk benchmark. (US EPA)
  - 7% of children lived in census tracts in which HAPs combined to exceed the 1-in-10,000 cancer risk benchmark. (US EPA)

- Air Pollution \ Non-neoplastic diseases (health effects other than cancer)
  - 56% of children lived in census tracts in which at least one HAP exceeded the benchmark for health effects other than cancer. (U.S. EPA)

- In 2015, 59% of U.S. children lived in counties with measured pollutant concentrations above the levels of one or more national ambient air quality standards. (U.S. EPA)

- Drinking Water \ Health Standards
  - In 2015, approximately 7% of children served by community drinking water systems that did not meet all applicable health-based standards. (U.S. EPA)
  - Between 1993 and 2015, the estimated percentage of children served by community water systems that had at least one monitoring and reporting violation fluctuated between about 10% and 21%, and was 12% in 2015. (U.S. EPA)
- Drinking Water \ Detectable organophosphate pesticide residues (U.S. EPA)
  - In 2009, 35% of sampled apples
  - In 2007, 5% of sampled carrots
  - In 2008, 9% of sampled tomatoes
  - In 2009, 8% of sampled grapes
- Hazardous Waste
  - As of 2009, approximately 6% of all children in the United States lived within one mile of a Corrective Action or Superfund site that may not have had all human health protective measures in place, disproportionately affecting more Black children. (U.S. EPA)

Table 1.6a

Other sources of exposure to the 70 chemicals released by New York's natural gas compressor stations

High production chemicals: >= 1 million pounds annually	**27**
High production chemicals: >= 1 billion pounds annually	**13**
High production chemicals: >= 10 billion pounds annually	**3**

Ambient air		**70**
01	Ambient, point	70
02	Ambient, non-point	40
03	Ambient, mobile, on-road	40
04	Ambient, mobile, non-road	40
Residential exposures		**35**
01	**Residential, indoor**	21
01.01	Residential, indoor: buildings materials, furniture	14
01.02	Residential, indoor: air fresheners, candles, incense	23
01.03	Residential, indoor: home maintenance	2
01.04	Residential, indoor: home office	2
01.04	Residential, indoor: pet care	12
02	**Residential, outdoor**	10
02.01	Residential, outdoor, landscape and yard	7
02.02	Residential, outdoor, pesticides	7
Our Bodies		**41**
01	Clothing and textiles	3
02	Jewelry	19
03	Personal care products	3
04	Cosmetics, perfumes, skin	0
05	Hair care products	1
06	Hair dyes	7
07	Shoes and leather products	28
10	Tobacco products / smoking	28
Food		**44**
01	**Food items**	10
01.01	Dairy products	12
01.02	Fats, oils, fat emulsions	6
01.03	Edible ices	17
01.04	Fruits, vegetables, nuts, seeds	10
01.05	Confectionery	10
01.06	Cereals and cereal products	12
01.07	Baked products	14
01.08	Meat, poultry, game	25
01.09	Fish and shellfish products	6
01.10	Eggs and egg products	0
01.11	Sweeteners, including honey	5
01.12	Salts, spices, soups, sauces, salads, protein products	8
01.13	Baby food	7
01.14	Beverages, excluding dairy products	14
01.15	Ready-to-eat savories	9
01.16	Prepared foods	7
01.17	Fast food	5
01.18	Additives, colorings, flavorings	**36**

Sources: EPA Chemical Data Reporting System (CDRS), FDA Total Dietary Study (TDS), NLM Hazardous Substances Data Bank (HSDB).

Table 1.6b

Body Burden of Compressor Station Chemicals

NYS Natural Gas Compressor Stations, Reported NEI Emissions: 2008 to 2014

		Blood	Breast milk	Umbilical cord	Placenta	Sweat	Urine	Unspecified
#	Chemical	29	17	20	2	3	11	1
1	Acenaphthene	Y		Y				
2	Acenaphthylene	Y		Y				
3	Acetaldehyde		Y					
4	Anthracene	Y		Y				
5	Arsenic					Y	Y	
6	Benzene	Y	Y	Y				
7	Benzo(j,k)fluorene	Y		Y				
8	Benzo[a]pyrene							
9	Benzo[b]fluoranthene	Y						
10	Benzo[g,h,i]perylene	Y		Y	Y			
11	Benzo[k]fluoranthene	Y						
12	Beryllium						Y	
13	Butadiene, 1,3-						Y	
14	Cadmium	Y		Y		Y	Y	
15	Carbon monoxide	Y						
16	Carbon tetrachloride	Y	Y	Y				
17	Chlorobenzene	Y	Y					
18	Chloroform	Y		Y				
19	Cobalt						Y	
20	Ethyl benzene	Y	Y					
21	Ethyl chloride (Chloroethane)		Y					
22	Ethylene dichloride	Y	Y					
23	Ethylidene dichloride	Y						
24	Fluorene	Y		Y				
25	Hexane, n-							
26	Indeno[1,2,3-cd]pyrene	Y	Y	Y	Y			
27	Lead	Y				Y	Y	
28	Manganese	Y					Y	
29	Mercury	Y		Y			Y	
30	Methane dichloride	Y	Y	Y				
31	Methanol		Y					
32	Methylnaphthalene, 2-		Y					
33	Naphthalene	Y	Y	Y			Y	
34	Nickel							Y
35	Perchloroethylene	Y	Y					
36	Perylene	Y		Y				
37	Phenanthrene	Y		Y			Y	
38	Polycyclic aromatic hydrocarbons, total (PAHs Total)			Y				
39	Propylene dichloride	Y						
40	Pyrene	Y		Y				
41	Selenium	Y		Y				
42	Styrene		Y	Y				
43	Sulfur dioxide		Y					
44	Tetrachloroethane, 1,1,2,2-	Y						
45	Toluene	Y	Y					
46	Trichloroethane, 1,1,2-	Y						
47	Vinyl chloride						Y	
48	Xylene (mixed isomers)	Y	Y					

1.7. President's Obama's Cancer Panel

These specific points aside, it's useful to consider the claim that environmental pollution from natural gas compressor stations poses no threat to human health in the context of the findings of the President's Cancer Panel (2010).

Between September 2008 and January 2009, the President's Cancer Panel (PCP) convened four national meetings "to assess the state of environmental cancer research, policy and programs addressing known and potential effects of environmental exposure on cancer."

The Panel's report, released in 2010, came to this essential conclusion:

> "Research on environmental causes of cancer has been limited by low priority and inadequate funding. . . There is a lack of emphasis on environmental research as a route to primary cancer prevention. . . Cancer prevention efforts have focused narrowly on smoking, other lifestyle behaviors and chemo-preventive interventions. Scientific evidence on individual and multiple environmental exposure effects on disease initiation and outcomes, and consequent health system and societal costs, are not being adequately integrated into national policy decisions and strategies for disease prevention, health care access and health system reform." (U.S. DHHS 2010)

In the light of Panel's conclusion, the results of our study raise three significant questions:

First, what percentage of cancers is likely a consequence of exposure to chemical carcinogens?

Secondly, what is the impact of occupation as compared to non-occupation exposures?

Finally, how adequate are policies that both inform people of hazards and act to reduce exposure to chemical carcinogens?

There is considerable debate on the question of what percentages of cancers are due to exposure to chemical carcinogens, both in the workplace and elsewhere. Doll and Peto (1981) "provisionally estimated" that 4% of cancer was due to occupational exposures, but attributed most of this to lung cancer. Mokdad et al. (2004) ascribed only 2.3% of causes of death in the US to "toxic agents", but then attributed 18.1% to tobacco and 16.6% to poor diet and physical inactivity, not distinguishing the degree to which either was due to chemicals in tobacco or food. Schottenfeld et al. (2013) list tobacco, alcohol, ionizing radiation, solar radiation, infectious agents and obesity as risk factors for cancer, but totally ignore other chemical carcinogens other that occupational exposures. Prüss-Ustün and colleagues from the World Health Organization (2016) attribute 19% of all cancer to environmental factors, which includes 2-8% due to exposure in occupational exposures. Their report does not consider smoking, alcohol, diet or genetic factors. In discussing specific cancers, they attributed colon and rectal cancer to low physical activity, radiation and asbestos, but do not mention other chemical carcinogens in food. Chemical exposure is identified as a risk factor for breast, lymphoma, multiple myeloma, leukemia, larynx, bladder and melanoma cancers. Clapp et al. (2008) note that while overall cancer rates are declining (especially lung among men and colorectal in both sexes), some are rising (esophagus, liver, thyroid, melanoma, non-Hodgkin's, multiple myeloma, testicular, bladder, brain, and lung in women). Childhood cancers (leukemia and brain) are also rising. They and Belpomme et al. (2007) provide strong evidence that exposure to carcinogenic chemicals plays a major role in risk of these cancers. Christiani (2011) has suggested that 85-95% of cancer arise because of exposure to specific carcinogenic agents.

In addition to exposure to chemical carcinogens, cancer can be caused by genetics, infection and inflammation. Lichtenstein et al. (2000) reported an analysis of mono- and di-zygotic twins in Scandinavia in an effort to distinguish genetic from environmental factors in causation of cancer. They concluded that most cancers were due to environmental factors. Genetic factors were relatively unimportant in most cancers, although were significant in prostate (42%), colorectal (35%) and breast cancer (27%). Wu et al. (2016) examined intrinsic and extrinsic risk factors for cancer, and concluded that intrinsic factors contribute only modestly (less than 10-30%) to the risk. This is not to imply that individual genetic differences are unimportant, because polymorphisms of drug metabolizing enzymes serve as modulators of cancer susceptibility (Taningher et al., 1999).

These reports indicate that we do not have good understanding of the relative role of exposure to chemical carcinogens in overall cancer incidence beyond general knowledge that many chemicals to which humans are exposed cause cancer. Clearly carcinogenic chemicals are found in both the occupational and non-occupational environment. While the chemical exposure in an occupational setting differs from that of the general population, there are many carcinogens found in food, tobacco, personal care products, and indoor and outdoor air. Many use terms such as “life-style” to encompass such behaviors, without considering the carcinogenic chemicals that result from these behaviors. Workers have all of these non-occupational exposures as well as those specific to the workplace.

EPA’s official policy is that exposure to any level of carcinogen increases the risk of cancer. At the same time, EPA has a methodology to determine the extent of risk that rarely finds excessive risk. It is hard to fathom how the release of 9.6 million pounds of carcinogens in a 7-year period does not increase the incidence of cancer.

Chapter 2. Compressor Station Releases

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2.1. Number, Categorization and Operational Status of Facilities

This report analyzes the emissions data for 18 natural gas compressor stations in New York State (NYS) as reported to the National Emissions Inventory (NEI) of the U.S. Environmental Protection Agency (EPA) as point sources of air pollution for the period 2008 to 2014.

The author could not locate a single list of facilities involved in the storage and transportation of natural NYS from either state or federal sources.

One was created by reviewing all DEC air permits and identifying those that are compressor stations and comparing it to those listed in EPA's Envirofacts System.

This is a little more complicated than it might seem because there are a large number of permits and permit modifications, all compressor stations are not necessarily labeled as such, there are apparent inconsistence in NAICS and SIC classifications, and some sites have multiple functions.

Table 2.1

Facility Type	Total
Compressor stations	58
Operational	55
Proposed: Approved	2
Proposed: Denied approval	1

Dehydration facility	1
Gas turbine facility	4
Gate	3
Holding point tap	2
Metering & regulation station	19
Pig launching or receiving	1
Storage & filling	1
Unknown	2

We identified a total of 58 compressor stations, including operational (55), approved (2), denied (1,), and pending (3).

This list provides what the author believes is an accurate characterization of major natural gas facilities in NYS but it should not be considered comprehensive or final. Additional research would undoubtedly identify additional sites, especially minor ones, and clarify the function of several sites.

2.2. NYSDEC Air Pollution Control Permits and Registrations

Under the Clean Air Act and under New York State law and regulation, most notably 6 NYCRR Part 201, NYSDEC is required to issue permits for polluters. The two most common permits for large on-site polluters are: “Air Title V Facility permits” and “State facility permits”.

NYSDEC describes these as follows:

2.2.1. State Facility Permits

State facility permits are issued to facilities that are not considered to be major (as defined in the department's regulations), but that meet the criteria of Subpart 201-5. (link leaves DEC) These are generally large facilities with the following characteristics:

- Their actual emissions exceed 50 percent of the level that would make them major, but their potential to emit as defined in 6NYCRR Part 200 does not place them in the major category
- They require the use of permit conditions to limit emissions below thresholds that would make them subject to certain state or federal requirements
- They have been granted variances under the department's air regulations, or
- They are new facilities that are subject to New Source Performance Standards (NSPS) or that emit hazardous air pollutants. Instead, all DEC site.

2.2.2. Title V Permits

Title V facility permits, the second type of permit, are issued to facilities subject to Subpart 201-6. These include facilities that are judged to be major under the department's regulations, or that are subject to New Source Performance Standards (NSPSs), to a standard or other requirements regulating hazardous air pollutants or to federal acid rain program requirements.

Title V permits reduce violations of air pollution laws and improve enforcement of those laws by:

- Recording in one document all of the air pollution control requirements that apply to the source. This gives members of the public, regulators, and the source a clear picture of what the facility is required to do to keep its air pollution under the legal limits.
- Requiring the source to make regular reports on how it is tracking its emissions of pollution and the controls it is using to limit its emissions. These reports are public information, and you can get them from the permitting authority.
- Adding monitoring, testing, or record keeping requirements, where needed to assure that the source complies with its emission limits or other pollution control requirements.
- Requiring the source to certify each year whether or not it has met the air pollution requirements in its title V permit. These certifications are public information.
- Making the terms of the title V permit federally enforceable. This means that EPA and the public can enforce the terms of the permit, along with the State.

(Source: NYSDEC)

The legal intention of a Title V operating air permit is described by DEC as:

> The Title V operating air permit is intended to be a document containing only enforceable terms and conditions as well as any additional information, such as the identification of emission units, emission points, emission sources and processes, that makes the terms meaningful. 40 CFR Part 70.7(a)(5) requires that each Title V permit have an accompanying "...statement that sets forth the legal and factual basis for the draft permit conditions". The purpose for this permit review report is to satisfy the above requirement by providing pertinent details regarding the permit/application data and permit conditions in a more easily understandable format. This report will also include background narrative and explanations of regulatory decisions made by the reviewer. It should be emphasized that this permit review report, while based on information contained in the permit, is a separate document and is not itself an enforceable term and condition of the permit.

2.2.3. Changing permit status over time

A facility's permit status can change over time.

A station initially permitted with a permit type "Air State Facility" may subsequently seek site expansion or modifications which DEC may determine requires a "Title V" permit, or the reverse might be true.

To determine the present status of a particular station, see NYS DEC air permits:

Issued Title V Permits
http://www.dec.ny.gov/dardata/boss/afs/issued_atv.html

Draft Title V Permits
http://www.dec.ny.gov/dardata/boss/afs/draft_atv.html

Issued State Facility Permits
http://www.dec.ny.gov/dardata/boss/afs/issued_asf.html

Draft State Facility Permits
http://www.dec.ny.gov/dardata/boss/afs/draft_asf.html

2.3. Reporting Requirements for Compressor Stations with Title V Permits

Each permitted point-source of pollution must meet one or more state or federal reporting requirements.

The two tables which follow summarize the principal air pollution regulatory programs applicable for each of the 18 NYS compressor stations under review.

Table 2.3.1.

Applicable State and Federal Air Pollution Regulatory Programs by Facility

NYS Natural Gas Compressor Stations

			State and Federal Air Pollution Regulatory Programs									
Facility	**County**	**Town**	**PSD**	**NSR**	**NESHAP**	**MACT**	**NSPS**	**Title IV**	**Title V**	**Title VI**	**RACCT**	**SIP**
Count ("Yes"):			**4**	**0**	**0**	**14**	**7**	**0**	**18**	**0**	**18**	**18**
AGT Southeast CS	Putnam	Southeast	No	No	No	No	Yes	No	Yes	No	Yes	Yes
AGT Stony Point CS	Rockland	Stony Point	Yes	No	No	Yes	Yes	No	Yes	No	Yes	Yes
DTI Borger CS	Tompkins	Ithaca	Yes	No	No	No	Yes	No	Yes	No	Yes	Yes
DTI Utica Station	Herkimer	Frankfort	Yes	No	No	No	No	No	Yes	No	Yes	Yes
DTI Woodhull Station	Steuben	Woodhull	No	No	No	Yes	Yes	No	Yes	No	Yes	Yes
NFGSC Beech Hill CS	Allegany	Willing	No	No	No	Yes	No	No	Yes	No	Yes	Yes
NFGSC Concord CS	Erie	Concord	No	No	No	Yes	Yes	No	Yes	No	Yes	Yes
NFGSC Independ. CS	Allegany	Andover	No	No	No	Yes	No	No	Yes	No	Yes	Yes
NFGSC Nashville CS	Chautauqua	Hanover	No	No	No	No	No	No	Yes	No	Yes	Yes
TGPC 229 & TEG DF	Erie	Eden	No	No	No	Yes	No	No	Yes	No	Yes	Yes
TGPC CS 224	Chautauqua	Clymer	No	No	No	Yes	No	No	Yes	No	Yes	Yes
TGPC CS 230-C	Niagara	Lockport	No	No	No	Yes	No	No	Yes	No	Yes	Yes
TGPC CS 233	Livingston	York	No	No	No	Yes	Yes	No	Yes	No	Yes	Yes
TGPC CS 237	Ontario	Manchester, Phelps	No	No	No	Yes	No	No	Yes	No	Yes	Yes
TGPC CS 241	Onondaga	LaFayette	Yes	No	No	Yes	No	No	Yes	No	Yes	Yes
TGPC CS 245	Herkimer	Winfield	No	No	No	Yes	No	No	Yes	No	Yes	Yes
TGPC CS 249	Schoharie	Carlisle	No	No	No	Yes	No	No	Yes	No	Yes	Yes
TGPC CS 254	Columbia	Chatham	No	No	No	Yes	Yes	No	Yes	No	Yes	Yes

Source: Authors' review of NYS DEC permits.

Table 2.3.2.

Applicable State and Federal Air Pollution Regulatory Programs: Summary

NYS Natural Gas Compressor Stations

Regulatory Program	Description	No
Prevention of Significant Deterioration **PSD** **40 CFR 52**	Prevention of Significant Deterioration (40 CFR 52) - requirements which pertain to major stationary sources located in areas which are in attainment of National Ambient Air Quality Standards (NAAQS) for specified pollutants.	4
New Source Review **NSR** **6 NYCRR Part 231**	New Source Review (6 NYCRR Part 231) - requirements which pertain to major stationary sources located in areas which are in non-attainment of National Ambient Air Quality Standards (NAAQS) for specified pollutants.	0
National Emission Standards for Hazardous Air Pollutants **NESHAP** **40 CFR 61**	National Emission Standards for Hazardous Air Pollutants (40 CFR 61) - contaminant and source specific emission standards established prior to the Clean Air Act Amendments of 1990 (CAAA) which were developed for 9 air contaminants (inorganic arsenic, radon, benzene, vinyl chloride, asbestos, mercury, beryllium, radionuclides, and volatile HAP's).	0
Maximum Achievable Control Technology **MACT** **40 CFR 63**	Maximum Achievable Control Technology (40 CFR 63) - contaminant and source specific emission standards established by the 1990 CAAA. Under Section 112 of the CAAA, the US EPA is required to develop and promulgate emissions standards for new and existing sources. The standards are to be based on the best demonstrated control technology and practices in the regulated industry, otherwise known as MACT. The corresponding regulations apply to specific source types and contaminants.	14
New Source Performance Standards **NSPS** **40 CFR 60**	New Source Performance Standards (40 CFR 60) - standards of performance for specific stationary source categories developed by the US EPA under Section 111 of the CAAA. The standards apply only to those stationary sources which have been constructed or modified after the regulations have been proposed by publication in the Federal Register and only to the specific contaminant(s) listed in the regulation.	7
Title IV Acid Rain Control Program **Title IV** **40 CFR 72-78**	Title IV Acid Rain Control Program (40 CFR 72 thru 78) - regulations which mandate the implementation of the acid rain control program for large stationary combustion facilities.	0
Title V		18
Title VI Stratospheric Ozone Protection **Title VI** **40 CFR 82, Subparts A-G**	Title VI Stratospheric Ozone Protection (40 CFR 82, Subparts A thru G) - federal requirements that apply to sources which use a minimum quantity of CFC's (chlorofluorocarbons), HCFC's (hydrofluorocarbons) or other ozone depleting substances or regulated substitute substances in equipment such as air conditioners, refrigeration equipment or motor vehicle air conditioners or appliances.	0
Reasonably Available Control Technology **RACCT** **6 NYCRR Parts 212.10, 226, 227-2, 228, 229, 230, 232, 233, 234, 235, 236)**	Reasonably Available Control Technology (6 NYCRR Parts 212.10, 226, 227-2, 228, 229, 230, 232, 233, 234, 235, 236) - the lowest emission limit that a specific source is capable of meeting by application of control technology that is reasonably available, considering technological and economic feasibility. RACT is a control strategy used to limit emissions of VOC's and NOx for the purpose of attaining the air quality standard for ozone. The term as it is used in the above table refers to those state air pollution control regulations which specifically regulate VOC and NOx emissions.	18
State Implementation Plan **SIP** **40 CFR 52, Subpart HH**	State Implementation Plan (40 CFR 52, Subpart HH) - as per the CAAA, all states are empowered and required to devise the specific combination of controls that, when implemented, will bring about attainment of ambient air quality standards established by the federal government and the individual state. This specific combination of measures is referred to as the SIP. The term here refers to those state regulations that are approved to be included in the SIP and thus are considered federally enforceable.	18

2.4. U.S. EPA NEI Reporting for Compressor Stations

How a facility is permitted determines how its pollution data is tracked by NEI.

Compressor stations receiving a "Title V" permit are tracked by the system NEI uses for point air pollution sources. Compressor stations receiving a "State Facility Permit" are tracked by the system NEI uses for non-point sources of air pollution.

There is one exception: A single station with a "State Facility Permit" is being tracked as an NEI on-site polluter. It is unclear why this is the case.

2.4.1. Compressor Stations with a "Title V Permit"

The NEI for 2008-2014 includes data for 18 compressor stations in NYS.

There are, however, several additional sites classified as "Title V" facilities on the DEC's website which are not found in NEI. (We notified DEC of this discrepancy and are in conversation to determine why these sites are not included as NEI point polluters. The compressor sites found in NEI are the exclusive source or data for this report.)

North American Industry Classification System (NAICS) code 48621 is used to designate facilities whose main purpose is the transportation of natural gas. Each of the 18 sites analyzed have this classification.

2.4.2. Compressor Stations with a "State Facility Permit"

We have identified 19 non-Title V compressor stations which, based on federal and state guidelines, should be reported as non-point NEI sources. Because these stations are not easily identified within NEI and the time limits and scope of this project, an analysis of the pollution associated with their operation is not included in this report.

Table 2.4.2.

Facilities Categorization: Transportation of Natural Gas (NAICS 48621)

New York State

#	Status*	Name	Address	Town	Zip	DEC Reg.	County	NEI Point Src.	GHG
1	Op-EM	AGT Southeast CS	142 Tulip Rd	Southeast	10509	3	Putnam	√	√
2	Op-EM	AGT Stony Point CS	1 Lindberg Rd	Stony Point	10980	3	Rockland	√	√
	Op	CGTC Corning CS	4401 College Ave	Corning	14830	8	Steuben		√
	Op	CGTC Dundee CS	4620 Rte. 226	Starkey	14878	8	Yates		
	Op	CGTC North Greenwood CS	Brown Hollow Rd @ Kelly Rd	Greenwood	14839	8	Steuben		
	Op	DTI Borger CS	219 Ellis Hollow Creek Rd	Ithaca	14850	7	Tompkins	√	
	Op-EM	DTI Brookman CS	201 Casler Rd	Minden	13339	4	Montgomery		
	Op	DTI Canajoharie MRS	110 Gogus Rd	Canajoharie	12010	4	Montgomery		
	Op-EM	DTI Utica Station	Higby Rd	Frankfort	13340	6	Herkimer	√	
	Op	DTI Woodhull Station	974 CO RTE 99	Woodhull	14898	8	Steuben	√	
	Op	HSC	4511 Egypt Rd	Canandaigua	14424	8	Ontario		
	Op	Hunts Point Ave CS	332 Hunts Point Avenue		10474	2	Bronx		
	Op	IGTS Athens CS	915 Schoharie Tpk Cr 28	Athens	12015	4	Greene		
	Op	IGTS Boonville CS	3338 East Rd	Boonville	13309	6	Oneida		
	Op	IGTS Croghan CS	Old State Rd	Croghan	13327	6	Lewis		
	Op	IGTS Dover CS	186 Dover Furnace Rd	Dover Plains	12522	3	Dutchess		
	Op	IGTS Wright CS	320 Westfall Road	Delanson	12053	4	Schenectady		√
	Op	Millennium Minisink CS	107 Jacobs Rd	Wawayanda	10998	3	Orange		√
	Op	NFGSC Beech Hill CS	1161 Peet Rd	Willing	14895	9	Allegany	√	
	Op	NFGSC Concord CS	5510 Genesse Rd	Concord	14141	9	Erie	√	√
	Op	NFGSC Independence CS	2210 County Road 22	Andover	14806	9	Allegany	√	√
	Op	NFGSC Nashville CS	11413 Allegany Rd	Hanover	14062	9	Chautauqua	√	
	Op-EM	NFGSC Porterville CS	350 Hemstreet Rd	Aurora	14052	9	Erie		
	Op	NFGSC Zoar CS	Wilson & Conerts Rd	Collins	14034	9	Erie		
	Op	NP Hanover Mayville CS	5644 Bently Rd	Chautauqua	14757	9	Chautauqua		
	Op	TE Catlin Hill CS	Brown and Cemetery Rds	Catlin	14812	8	Chemung		
	Op-EM	TGP CS 230-C	7586 East Eden Road	Eden	14057	9	Erie		
	Op	TGPC 229 & TEG DF	7586 East Eden Road	Eden	14057	9	Erie	√	√
	Op	TGPC CS 224	9766 Ravlin Hill Rd	Clymer	14724	9	Chautauqua	√	√
	Op	TGPC CS 230-C	5186 Lockport Junction Rd	Lockport	14094	9	Niagara	√	√
	Op	TGPC CS 233	2262 Dow Rd	York	14533	8	Livingston	√	
	Op	TGPC CS 237	2001 Archer Road	Manchester, Phelps	14432	8	Ontario	√	
	Op	TGPC CS 241	3447 Sentinel Heights Rd	LaFayette	13084	7	Onondaga	√	√
	Op	TGPC CS 245	457 Burrows Rd	Winfield	13491	6	Herkimer	√	√
	Op	TGPC CS 249	2480 US Route 20	Carlisle	12031	4	Schoharie	√	√
	Op	TGPC CS 254	ST Rte 66	Chatham	12123	4	Columbia	√	√
	Op	TNG CS 249 - B	2840 US Route 20 East	Carlisle	12031	4	Schoharie		
	Op	TNG CS 405A	Mackey Rd	Woodhull	14809	8	Steuben		
	Op	WP Dunbar CS	414 Dunbar Rd	Windsor	13865	7	Broome		√
	App	DTI Horseheads CS	End of Bush Rd	Veteran	14845	8	Chemung		
	App	ESPC Oakfield CS	3309 Lockport Rd	Oakfield	14125	8	Genesee		
	Prp	DTI CS Prp.		Nassau		4	Rensselaer		
	Prp	DTI Sheds CS Prp.	Wilcox Rd	Georgetown	13072	7	Madison		
	Prp	NFGSC Hinsdale CS	SE of Philips Rd	Hinsdale	14743	9	Cattaraugus		
	Prp	TNG CS Prp.	2060 Otego Rd	Franklin	13775	3	Sullivan		
	Prp	TNG Hancock CS	1579 Hungary Hill Rd	Hancock	13783	4	Delaware		√
	Prp	TNG Market Path CS-Prp		Not released		4	Schoharie		
	Prp	TNG Supply Path Trail CS-Prp		Not released		4	Schoharie		
	Prp-D	NFGSC Pendleton CS Prp-Denied	Killian Rd	Pendleton		9	Niagara		

* Op-Operational, OP-EM -- Operational-Enhancements\Modifications, App -- Approved, Prp -- Proposed, Prp-D -- Proposal Denied

2.5. Total Releases

2.5a. Releases by Chemical

Table 2.5a.1.

Total Pounds by Chemical (ranked)

NYS Natural Gas Compressor Stations, Reported NEI Emissions: 2008 to 2014

Rank		Pounds						
	Description	2008	2011	2014	3-Years	3-Yr-Avg	7 Years	%
1	Nitrogen oxides (NO2)	2,269,341	2,993,049	2,487,284	7,749,673	2,583,224	18,082,571	45.22
2	Carbon monoxide	1,415,996	2,030,629	1,850,403	5,297,028	1,765,676	12,359,731	30.91
3	Volatile organic compounds	374,277	831,915	902,548	2,108,741	702,914	4,920,396	12.31
4	Formaldehyde	110,334	229,882	220,928	561,144	187,048	1,309,336	3.27
5	PM10 Primary (Filt + Cond)	107,946	242,279	189,665	539,890	179,963	1,259,744	3.15
6	PM 2.5 Primary (Filt + Cond)	92,595	220,983	160,507	474,085	158,028	1,106,198	2.77
7	PM Condensable	43,227	109,501	78,815	231,543	77,181	540,267	1.35
8	Sulfur dioxide	7,587	14,174	58,287	80,048	26,683	186,778	0.47
9	Acetaldehyde	4,385	15,091	8,797	28,272	9,424	65,969	0.16
10	Acrolein	3,226	11,742	7,628	22,596	7,532	52,723	0.13
11	Benzene	2,029	3,876	3,199	9,103	3,034	21,241	0.05
12	Methanol	1,381	4,324	2,580	8,286	2,762	19,333	0.05
13	Toluene	1,267	3,633	3,375	8,275	2,758	19,308	0.05
14	Hexane, n-	1,939	1,780	1,502	5,222	1,741	12,184	0.03
15	Xylene (mixed isomers)	360	1,460	1,777	3,598	1,199	8,394	0.02
16	Butadiene, 1,3-	273	999	751	2,022	674	4,719	0.01
17	Trimethylpentane, 2,2,4-	238	931	735	1,905	635	4,445	0.01
18	Ethyl benzene	155	577	466	1,198	399	2,794	0.01
19	Ammonia	262	238	174	674	225	1,573	0.00
20	Phenol	33	149	121	303	101	706	0.00
21	Naphthalene	50	154	94	298	99	696	0.00
22	Nickel	169	21	107	296	99	692	0.00
23	Biphenyl	68	178	49	296	99	690	0.00
24	Methane dichloride [1910.1052]	31	118	120	269	90	629	0.00
25	Propylene oxide	7	115	142	263	88	615	0.00
26	Manganese	104	0	47	150	50	350	0.00
27	Ethylene dibromide	29	71	49	149	50	347	0.00
28	Tetrachloroethane, 1,1,2,2-	26	64	42	132	44	309	0.00
29	Carbon tetrachloride	24	59	38	121	40	282	0.00
30	Trichloroethane, 1,1,2-	21	52	33	106	35	247	0.00
31	Styrene	18	49	33	100	33	234	0.00
32	Chloroform	18	45	19	83	28	193	0.00
33	Methylnaphthalene, 2-	15	55	12	82	27	191	0.00
34	Chlorobenzene	19	36	19	74	25	172	0.00
35	Propylene dichloride	17	35	18	70	23	164	0.00
36	Dichloropropene, 1,3	17	34	18	69	23	161	0.00
37	Ethylene dichloride	16	32	17	65	22	151	0.00
38	Ethylidene dichloride	15	31	16	62	21	144	0.00
39	Vinyl chloride	10	24	12	46	15	107	0.00
40	Mercury	17	7	6	30	10	70	0.00
41	Chromium (III) compounds (as Cr)	16	0	7	24	8	56	0.00
42	Phenanthrene	4	14	2	21	7	48	0.00
43	Polycyclic aromatic hydrocarbons, total (PAHs Total)		0	15	15	5	35	0.00
44	Cadmium	9	0	4	13	4	30	0.00
45	Fluorene	2	8	1	12	4	28	0.00
46	Benz[a]anthracene	4	2	2	8	3	19	0.00
47	Benzo(j,k)fluorene	2	2	1	5	2	11	0.00

Rank		Pounds						
	Description	2008	2011	2014	3-Years	3-Yr-Avg	7 Years	%
48	Anthracene	0	4	0	4	1	10	0.00
49	Perchloroethylene [PERC PCE, Tetrachloroethylene]	1	2	1	4	1	9	0.00
50	Acenaphthene	1	2	1	4	1	8	0.00
51	Pyrene	1	2	0	3	1	7	0.00
52	Ethyl chloride (Chloroethane)	1	2	0	3	1	6	0.00
53	Acenaphthylene	2		-	2	1	5	0.00
54	Chrysene	0	1	0	2	1	4	0.00
55	Chromium (VI) & inorganic Cr6+ compounds	1	0	0	1	0	2.3	0.00
56	Benzo[g,h,i]perylene	0	1	0	1	0	1.7	0.00
57	Benzo[b]fluoranthene	0	0	0	0	0	0.7	0.00
58	Lead	0	0	0	0	0	0.6	0.00
59	Benzo[e]pyrene	0			0	0	0.09	0.00
60	Arsenic	0	0	0	0	0	0.06	0.00
61	Cobalt	0	0	0	0	0	0.03	0.00
62	Indeno[1,2,3-cd]pyrene	0	0	0	0	0	0.02	0.00
63	Benzo[a]pyrene	0	0	0	0	0	0.01	0.00
64	Selenium	0	0	0	0	0	0.01	0.00
65	Perylene	0			0	0	0.00	0.00
66	Beryllium	0	0	0	0	0	0.00	0.00
67	Dimethylbenz[a]anthracene, 7,12-		0	0	0	0	0.00	0.00
68	Benzo[k]fluoranthene	0			0	0	0.00	0.00
69	Methylcholanthrene, 3-		0	-	0	0	0.00	0.00
70	Dibenz[a,h]anthracene	0			0	0	0.00	0.00

Table 2.5a.2.

Total Pounds by Chemical Category

NYS Natural Gas Compressor Stations, Reported NEI Emissions: 2008 to 2014

Category	Rank	Description	2008	2011	2014	3-Years	3-Yr-Avg	7 Years	%
			4,437,584	**6,718,435**	**5,980,468**	**17,136,487**	**5,712,162**	**39,985,136**	**100%**
Biphenyls	23	Biphenyl	68	178	49	296	99	**690**	0.00
CAPs	1	Nitrogen oxides (NO2)	2,269,341	2,993,049	2,487,284	7,749,673	2,583,224	18,082,571	45.22
CAPs	2	Carbon monoxide	1,415,996	2,030,629	1,850,403	5,297,028	1,765,676	12,359,731	30.91
CAPs	8	Sulfur dioxide	7,587	14,174	58,287	80,048	26,683	186,778	0.47
CAPs	19	Ammonia	262	238	174	674	225	1,573	0.00
			3,693,186	**5,038,090**	**4,396,148**	**13,127,423**	**4,375,808**	**30,630,653**	**76.6**
Metals	66	Beryllium	0	0	0	0	0	0.00	0.00
Metals, heavy	22	Nickel	169	21	107	296	99	692	0.00
Metals, heavy	26	Manganese	104	0	47	150	50	350	0.00
Metals, heavy	40	Mercury	17	7	6	30	10	70	0.00
Metals, heavy	41	Chromium (III) compounds (as Cr)	16	0	7	24	8	56	0.00
Metals, heavy	44	Cadmium	9	0	4	13	4	30	0.00
Metals, heavy	55	Cr6+ compounds	1	0	0	1	0	2.3	0.00
Metals, heavy	58	Lead	0	0	0	0	0	0.6	0.00
Metals, heavy	60	Arsenic	0	0	0	0	0	0.06	0.00
Metals, heavy	61	Cobalt	0	0	0	0	0	0.03	0.00
Metals, heavy	64	Selenium	0	0	0	0	0	0.01	0.00
			316	**28**	**171**	**514**	**171**	**171**	**0.00**
PAHs	43	Polycyclic aromatic hydrocarbons		0	15	15	5	35	0.00
PAHs	50	Acenaphthene	1	2	1	4	1	8	0.00
PAHs	59	Benzo[e]pyrene	0			0	0	0.09	0.00
PAHs	65	Perylene	0			0	0	0.00	0.00
PM10	5	PM10 Primary (Filt + Cond)	107,946	242,279	189,665	539,890	179,963	1,259,744	3.15
PM25	6	PM 2.5 Primary (Filt + Cond)	92,595	220,983	160,507	474,085	158,028	1,106,198	2.77
			200,542	**463,262**	**350,172**	**1,013,994**	**337,997**	**2,365,985.09**	**5.92**
PM-CON	7	PM Condensable	**43,227**	**109,501**	**78,815**	**231,543**	**77,181**	**540,267**	**1.35**
Solvents	20	Phenol	**33**	**149**	**121**	**303**	**101**	**706**	**0.00**
SVOCs	21	Naphthalene	50	154	94	298	99	696	0.00
SVOCs	33	Methylnaphthalene, 2-	15	55	12	82	27	191	0.00
SVOCs	42	Phenanthrene	4	14	2	21	7	48	0.00
SVOCs	45	Fluorene	2	8	1	12	4	28	0.00
SVOCs	46	Benz[a]anthracene	4	2	2	8	3	19	0.00
SVOCs	47	Benzo(j,k)fluorene	2	2	1	5	2	11	0.00
SVOCs	48	Anthracene	0	4	0	4	1	10	0.00
SVOCs	51	Pyrene	1	2	0	3	1	7	0.00
SVOCs	53	Acenaphthylene	2	0	0	2	1	5	0.00
SVOCs	54	Chrysene	0	1	0	2	1	4	0.00
SVOCs	56	Benzo[g,h,i]perylene	0	1	0	1	0	1.7	0.00
SVOCs	57	Benzo[b]fluoranthene	0	0	0	0	0	0.7	0.00
SVOCs	62	Indeno[1,2,3-cd]pyrene	0	0	0	0	0	0.02	0.00
SVOCs	63	Benzo[a]pyrene	0	0	0	0	0	0.01	0.00
SVOCs	67	Dimethylbenz[a]anthracene, 7,12-	0	0	0	0	0	0.00	0.00
SVOCs	68	Benzo[k]fluoranthene	0	0	0	0	0	0.00	0.00
SVOCs	69	Methylcholanthrene, 3-	0	0	0	0	0	0.00	0.00
SVOCs	70	Dibenz[a,h]anthracene	0	0	0	0	0	0.00	0.00
			80	**243**	**112**	**438**	**146**	**1021.43**	**0.0**

Category	Rank	Description	2008	2011	2014	3-Years	3-Yr-Avg	7 Years	%
VOCs	3	Volatile organic compounds	374,277	831,915	902,548	2,108,741	702,914	4,920,396	12.31
VOCs	4	Formaldehyde	110,334	229,882	220,928	561,144	187,048	1,309,336	3.27
VOCs	9	Acetaldehyde	4,385	15,091	8,797	28,272	9,424	65,969	0.16
VOCs	10	Acrolein	3,226	11,742	7,628	22,596	7,532	52,723	0.13
VOCs	11	Benzene	2,029	3,876	3,199	9,103	3,034	21,241	0.05
VOCs	12	Methanol	1,381	4,324	2,580	8,286	2,762	19,333	0.05
VOCs	13	Toluene	1,267	3,633	3,375	8,275	2,758	19,308	0.05
VOCs	14	Hexane, n-	1,939	1,780	1,502	5,222	1,741	12,184	0.03
VOCs	15	Xylene (mixed isomers)	360	1,460	1,777	3,598	1,199	8,394	0.02
VOCs	16	Butadiene, 1,3-	273	999	751	2,022	674	4,719	0.01
VOCs	17	Trimethylpentane, 2,2,4-	238	931	735	1,905	635	4,445	0.01
VOCs	18	Ethyl benzene	155	577	466	1,198	399	2,794	0.01
VOCs	24	Methane dichloride [1910.1052]	31	118	120	269	90	629	0.00
VOCs	25	Propylene oxide	7	115	142	263	88	615	0.00
VOCs	27	Ethylene dibromide	29	71	49	149	50	347	0.00
VOCs	28	Tetrachloroethane, 1,1,2,2-	26	64	42	132	44	309	0.00
VOCs	29	Carbon tetrachloride	24	59	38	121	40	282	0.00
VOCs	30	Trichloroethane, 1,1,2-	21	52	33	106	35	247	0.00
VOCs	31	Styrene	18	49	33	100	33	234	0.00
VOCs	32	Chloroform	18	45	19	83	28	193	0.00
VOCs	34	Chlorobenzene	19	36	19	74	25	172	0.00
VOCs	35	Propylene dichloride	17	35	18	70	23	164	0.00
VOCs	36	Dichloropropene, 1,3-	17	34	18	69	23	161	0.00
VOCs	37	Ethylene dichloride	16	32	17	65	22	151	0.00
VOCs	38	Ethylidene dichloride	15	31	16	62	21	144	0.00
VOCs	39	Vinyl chloride	10	24	12	46	15	107	0.00
VOCs	49	Perchloroethylene [PERC PCE, Tetrachloroethylene]	1	2	1	4	1	9	0.00
VOCs	52	Ethyl chloride (Chloroethane)	1	2	0	3	1	6	0.00
			500,134	**1,106,979**	**1,154,863**	**2,761,978**	**920,659**	**6,444,612**	**16.1**

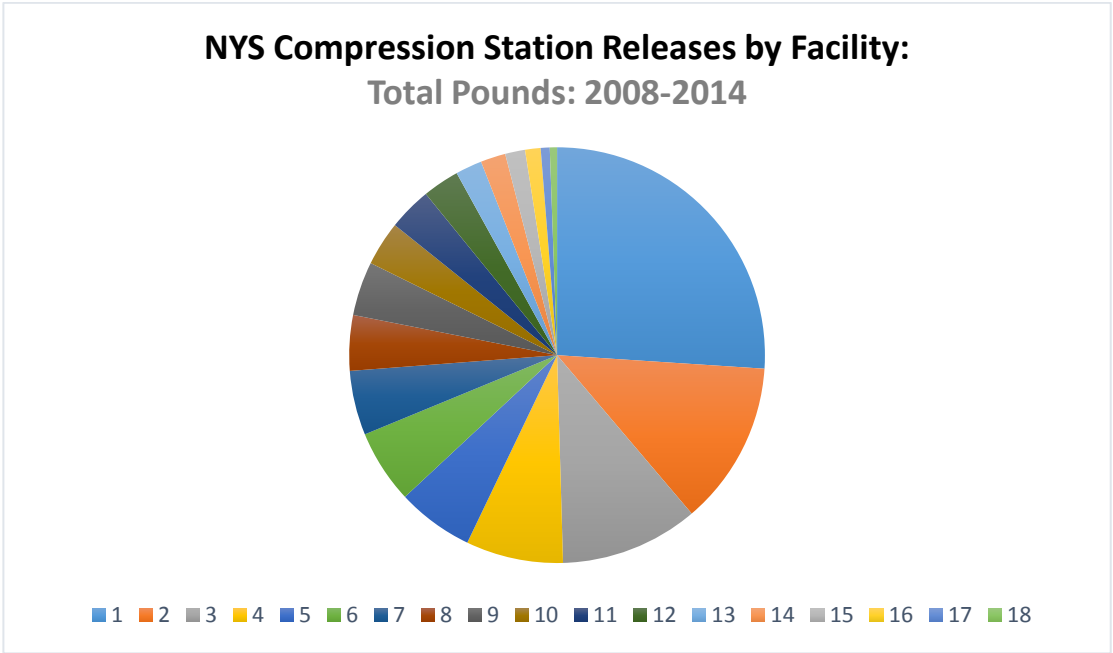
2.5c. Releases by Facility

Table 2.5c.

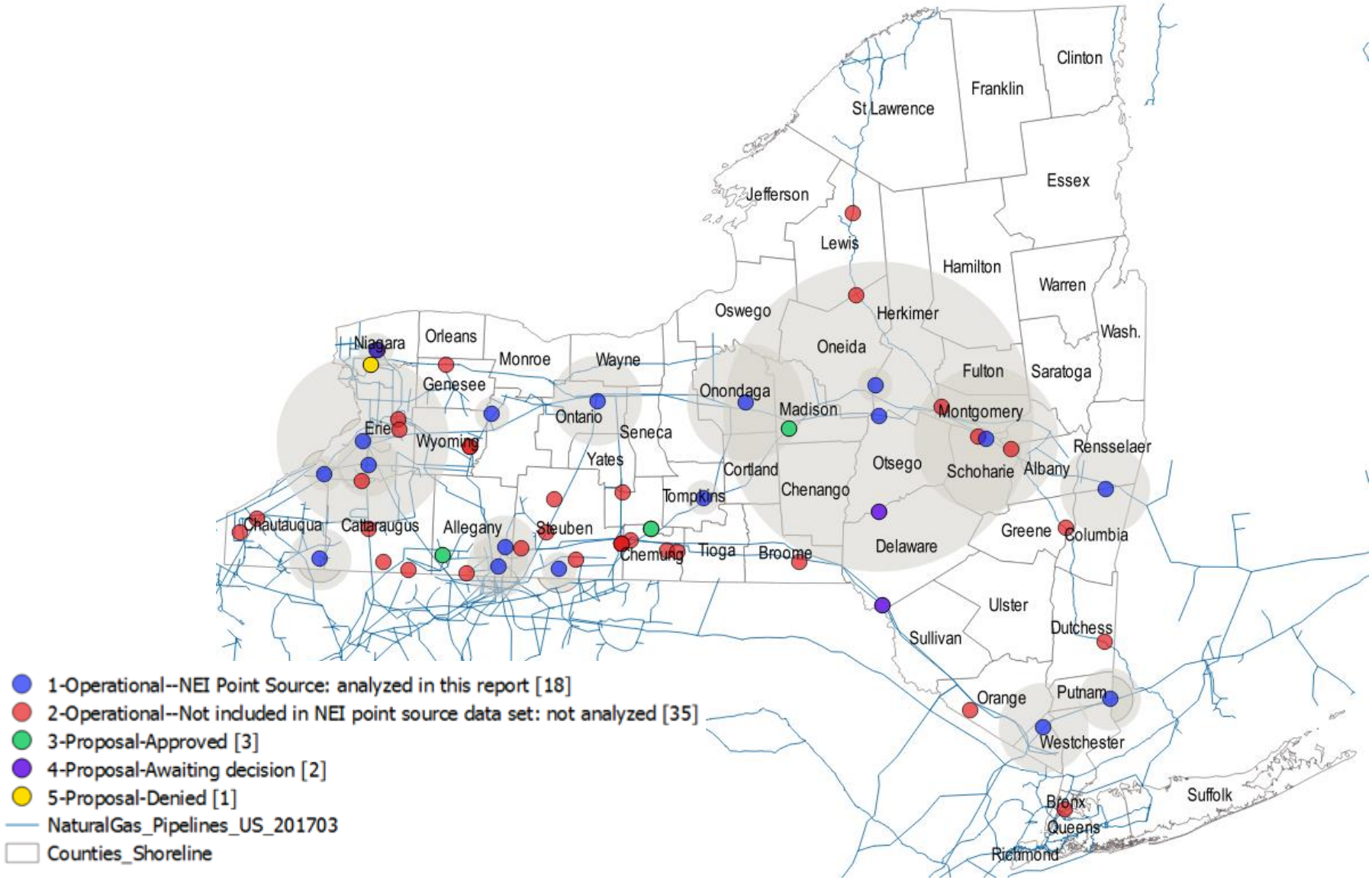
Total Pounds by Facility (ranked)

NYS Natural Gas Compressor Stations, Reported NEI Emissions: 2008 to 2014

Rank	Identification	Location		Chemicals			Pounds				7 Years (estimate)	
	Facility Name (Short)	Town	County	'08	'11	'14	2008	2011	2014	Average	Pounds	%
1	TGPC CS 245	Winfield	Herkimer	49	47	25	750,288	1,877,949	1,856,930	1,495,056	10,465,389	26.04
2	TGPC 229 & TEG DF	Eden	Erie	52	47	48	499,504	1,160,934	535,745	732,061	5,124,427	12.75
3	TGPC CS 249	Carlisle	Schoharie	49	27	26	712,001	569,088	571,747	617,612	4,323,285	10.76
4	TGPC CS 241	LaFayette	Onondaga	47	37	46	297,485	574,214	431,014	434,237	3,039,661	7.56
5	TGPC CS 254	Chatham	Columbia	27	16	9	288,373	260,770	476,712	341,952	2,393,661	5.96
6	TGPC CS 237	Manchester, Phelps	Ontario	9	8	5	321,292	482,043	181,691	328,342	2,298,394	5.72
7	AGT Stony Point CS	Stony Point	Rockland	46	24	23	244,039	268,064	350,815	287,640	2,013,478	5.01
8	NFGSC Concord CS	Concord	Erie	11	10	12	364,989	993	376,805	247,596	1,733,171	4.31
9	AGT Southeast CS	Southeast	Putnam	27	18	46	161,097	255,290	307,392	241,259	1,688,815	4.20
10	NFGSC Beech Hill CS	Willing	Allegany	20	20	21	115,405	202,835	276,443	198,227	1,387,592	3.45
11	NFGSC Independ. CS	Andover	Allegany	15	10	17	119,762	210,879	249,615	193,419	1,353,931	3.37
12	TGPC CS 224	Clymer	Chautauqua	47	45	47	44,133	391,407	55,945	163,828	1,146,797	2.85
13	DTI Woodhull Station	Woodhull	Steuben	44	54	58	104,802	209,130	41,449	118,460	829,223	2.06
14	DTI Borger CS	Ithaca	Tompkins	44	45	19	129,004	83,412	121,938	111,451	780,159	1.94
15	NFGSC Nashville CS	Hanover	Chautauqua	38	36		100,466	77,474		88,970	622,791	1.55
16	TGPC CS 230-C	Lockport	Niagara	27	26	27	83,451	2,791	121,877	69,373	485,610	1.21
17	DTI Utica Station	Frankfort	Herkimer	38	43	57	45,899	59,846	14,841	40,196	281,369	0.70
18	TGPC CS 233	York	Livingston	27	16	4	55,594	31,316	9,510	32,140	224,978	0.56
				67	**65**	**66**	**4,437,584**	**6,718,435**	**5,980,468**	**5,712,162**	**40,192,733**	**100%**



New York's 59 Compressor Stations



2.5c.1. Releases by Facility: Circular Area Air Pollution Profiles

Because most compressor stations are located in sparsely populated areas, it is widely believed that relatively few people are directly exposed to their air releases. An examination of actual population counts by distance from each station, reveals a more complex picture. While it is true that only 2,660 people live within ½ mile of the 18 compressor stations analyzed in this report, nearly 1.7 million live within 10-mile radius—more than 1 out of every 8 New Yorkers.

Table 2.5c.1a.

NYS Compressor Stations, Circular Area Profile, .05 to 30 Mile Radius: 2010

Total Population

	Location			Radius in miles								
Compressor Station	**Reg**	**County**	**Town**	**.05**	**1**	**2**	**3**	**5**	**10**	**15**	**20**	**30**
AG SE CS	3	Putnam	Southeast	261	799	3,323	12,564	57,347	236,568	402,810	761,783	2,341,903
AG Stony Point CS	3	Rockland	Stony Point	704	2,158	10,310	24,626	62,433	330,569	700,546	1,292,599	5,268,668
DTI Borger CS	7	Tompkins	Ithaca	144	396	2,184	5,155	53,097	84,565	115,705	170,961	328,040
DTI Utica Station	6	Herkimer	Frankfort	45	254	1,406	6,243	56,734	148,087	192,498	255,438	363,367
DTI Woodhull Station	8	Steuben	Woodhull	2	57	371	950	2,130	12,947	24,941	66,963	175,182
NFGSC Beech Hill CS	9	Allegany	Willing	43	64	329	687	2,999	14,592	27,665	49,547	116,261
NFGSC Concord CS	9	Erie	Concord	-	125	579	1,346	4,168	38,139	129,370	262,634	866,137
NFGSC Independ. CS	9	Allegany	Andover	839	1,080	1,377	1,639	2,638	19,772	42,188	59,407	132,614
NFGSC Nashville CS	9	Chautauqua	Hanover	41	166	579	1,320	6,920	31,268	78,625	121,441	432,158
TGPC CS 224	9	Chautauqua	Clymer	95	103	622	1,645	4,689	51,965	84,954	111,105	203,396
TGPC CS 229	9	Erie	Eden	151	726	3,803	11,106	34,960	131,667	323,483	684,972	1,066,965
TGPC CS 230-C	9	Niagara	Lockport	12	359	2,202	5,922	39,624	145,809	485,700	836,986	1,095,236
TGPC CS 233	8	Livingston	York	15	109	841	2,140	4,538	40,531	78,013	176,242	794,615
TGPC CS 237	8	Ontario	Manchester, Phelps	27	211	796	5,815	12,654	72,831	143,122	266,572	810,144
TGPC CS 241	7	Onondaga	LaFayette	218	460	1,627	4,484	25,469	257,224	385,855	496,520	704,663
TGPC CS 245	6	Herkimer	Winfield	-	166	1,366	1,969	4,470	16,826	84,588	210,758	379,224
TGPC CS 249	4	Schoharie	Carlisle	-	71	497	1,623	4,791	22,593	48,605	113,059	437,636
TGPC CS 254	4	Columbia	Chatham	10	137	643	1,622	7,455	40,695	127,791	441,231	841,606

Table 2.5c.1b.

NYS Title V Compressor Stations, Circular Area Profile at 10-Mile Radius, Counties and Exposed Population

Total Population

	Location		Counties						Exposed Population					
Compressor Station	**Reg**	**County**	**NY**	**CT**	**MA**	**NJ**	**PA**	**Total**	**NY**	**CT**	**MA**	**NJ**	**PA**	**Total**
AG SE CS	3	Putnam	3	0	0	0	0	**3**	83,417	148,176	0	0	0	**231,593**
AG Stony Point CS	3	Rockland	4	0	0	0	0	**4**	331,090	0	0	0	0	**331,090**
DTI Borger CS	7	Tompkins	1	0	0	0	0	**1**	80,226	0	0	0	0	**80,226**
DTI Utica Station	6	Herkimer	2	0	0	0	0	**2**	150,877	0	0	0	0	**150,877**
DTI Woodhull Station	8	Steuben	1	0	0	0	1	**2**	6,800	0	0	0	4,192	**10,992**
NFGSC Beech Hill CS	9	Allegany	2	0	0	0	1	**3**	12,650	0	0	0	1,305	**13,955**
NFGSC Concord CS	9	Erie	1	0	0	0	0	**1**	36,020	0	0	0	0	**36,020**
NFGSC Independ. CS	9	Allegany	2	0	0	0	0	**2**	19,472	0	0	0	0	**19,472**
NFGSC Nashville CS	9	Chautauqua	3	0	0	0	0	**3**	28,503	0	0	0	0	**28,503**
TGPC CS 224	9	Chautauqua	2	0	0	0	1	**3**	49,999	0	0	0	2,695	**52,694**
TGPC CS 229	9	Erie	1	0	0	0	0	**1**	136,180	0	0	0	0	**136,180**
TGPC CS 230-C	9	Niagara	2	0	0	0	0	**2**	144,562	0	0	0	0	**144,562**
TGPC CS 233	8	Livingston	3	0	0	0	0	**3**	37,769	0	0	0	0	**37,769**
TGPC CS 237	8	Ontario	2	0	0	0	0	**2**	68,821	0	0	0	0	**68,821**
TGPC CS 241	7	Onondaga	1	0	0	0	0	**1**	254,062	0	0	0	0	**254,062**
TGPC CS 245	6	Herkimer	4	0	0	0	0	**4**	16,828	0	0	0	0	**16,828**
TGPC CS 249	4	Schoharie	3	0	0	0	0	**3**	24,041	0	0	0	0	**24,041**
TGPC CS 254	4	Columbia	2	0	0	0	0	**2**	39,315	0	0	0	0	**39,315**

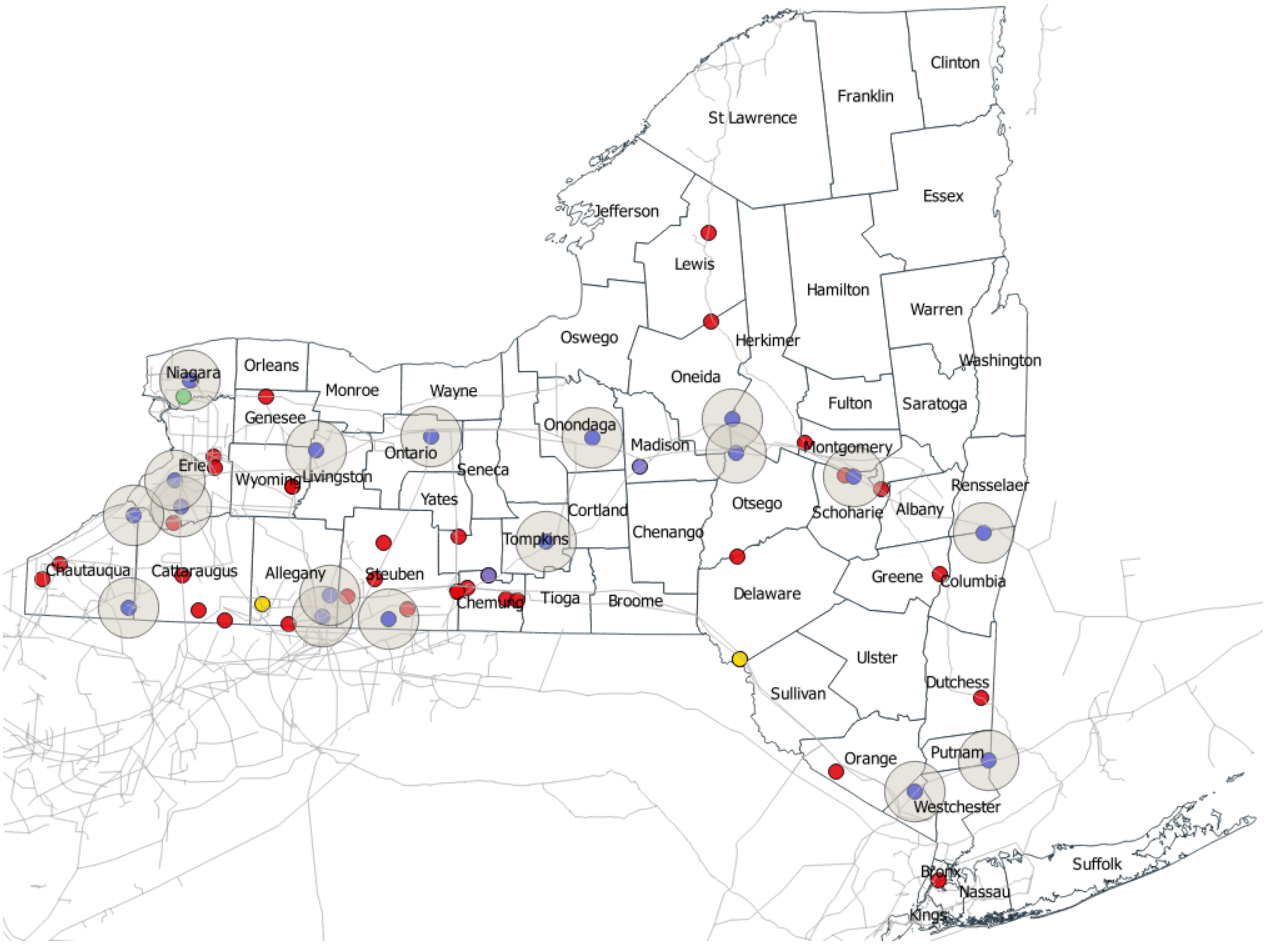


Table 2.5c.1c.

NYS Title V Compressor Stations, Circular Area Profile at 10-Mile Radius, By State and County

Total Population

#	ST	County	1. AG SE CS	2. AG Stony Point CS	3. DTI Borger CS	4. DTI Utica Station	5. DTI Woodhull Station	6. FGSC Beech Hill CS	7. NFGSC Concord CS	8. NFGSC Independence CS	9. NFGSC Nashville CS	10. TGPC CS 224	11. TGPC CS 229 & TEG DF	12. TGPC CS 230-C	13. TGPC CS 233	14. TGPC CS 237	15. TGPC CS 241	16. TGPC CS 245	17. TGPC CS 249	18. TGPC CS 254
1	CT	Fairfield	√																	
2	NY	Allegany						√		√										
3	NY	Cattaraugus									√	√	√							
4	NY	Chautauqua									√	√								
5	NY	Columbia																		√
6	NY	Dutchess																		
7	NY	Erie							√		√			√						
8	NY	Genesee													√					
9	NY	Herkimer				√												√		
10	NY	Livingston													√					
11	NY	Madison																√		
12	NY	Montgomery																	√	
13	NY	Niagara												√						
14	NY	Oneida				√												√		
15	NY	Onondaga															√			
16	NY	Ontario														√				
17	NY	Orange		√																
18	NY	Otsego																√		
19	NY	Putnam	√	√																
20	NY	Rensselaer																		√
21	NY	Rockland		√																
22	NY	Schenectady																	√	
23	NY	Schoharie																	√	
24	NY	Steuben					√	√		√										
26	NY	Tompkins			√															
25	NY	Wayne														√				
27	NY	Westchester	√	√																
28	NY	Wyoming													√					
29	PA	Potter						√												
30	PA	Tioga					√													
31	PA	Warren										√								

Table 2.5c.1d.

NYS Title V Compressor Stations, Circular Area Profile at 20-Mile Radius, Counties and Exposed Population

Total Population

	Location		Counties						Exposed Population					
Compressor Station	Reg	County	NY	CT	MA	NJ	PA	Total	NY	CT	MA	NJ	PA	Total
AG SE CS	3	Putnam	3	3	0	0	0	**6**	320,502	440,274	0	0	0	**760,776**
AG Stony Point CS	3	Rockland	4	0	0	2	0	**6**	983,807	0	0	300,950	0	**1,284,757**
DTI Borger CS	7	Tompkins	8	0	0	0	0	**8**	168,038	0	0	0	0	**168,038**
DTI Utica Station	6	Herkimer	4	0	0	0	0	**4**	258,872	0	0	0	0	**258,872**
DTI Woodhull Station	8	Steuben	2	0	0	0	2	**4**	48,746	0	0	0	15,138	**63,884**
NFGSC Beech Hill CS	9	Allegany	2	0	0	0	2	**4**	37,820	0	0	0	11,062	**48,882**
NFGSC Concord CS	9	Erie	4	0	0	0	0	**4**	258,402	0	0	0	0	**258,402**
NFGSC Independ. CS	9	Allegany	2	0	0	0	1	**3**	55,368	0	0	0	4,846	**60,214**
NFGSC Nashville CS	9	Chautauqua	3	0	0	0	0	**3**	122,243	0	0	0	0	**122,243**
TGPC CS 224	9	Chautauqua	2	0	0	0	3	**4**	83,777	0	0	0	34,618	**118,395**
TGPC CS 229	9	Erie	3	0	0	0	0	**3**	687,974	0	0	0	0	**687,974**
TGPC CS 230-C	9	Niagara	4	0	0	0	0	**4**	834,828	0	0	0	0	**834,828**
TGPC CS 233	8	Livingston	5	0	0	0	0	**5**	172,667	0	0	0	0	**172,667**
TGPC CS 237	8	Ontario	5	0	0	0	0	**5**	271,633	0	0	0	0	**271,633**
TGPC CS 241	7	Onondaga	4	0	0	0	0	**4**	504,522	0	0	0	0	**504,522**
TGPC CS 245	6	Herkimer	5	0	0	0	0	**5**	211,083	0	0	0	0	**211,083**
TGPC CS 249	4	Schoharie	6	0	0	0	0	**6**	115,788	0	0	0	0	**115,788**
TGPC CS 254	4	Columbia	4	0	1	0	0	**5**	376,937	0	65,680	0	0	**442,617**

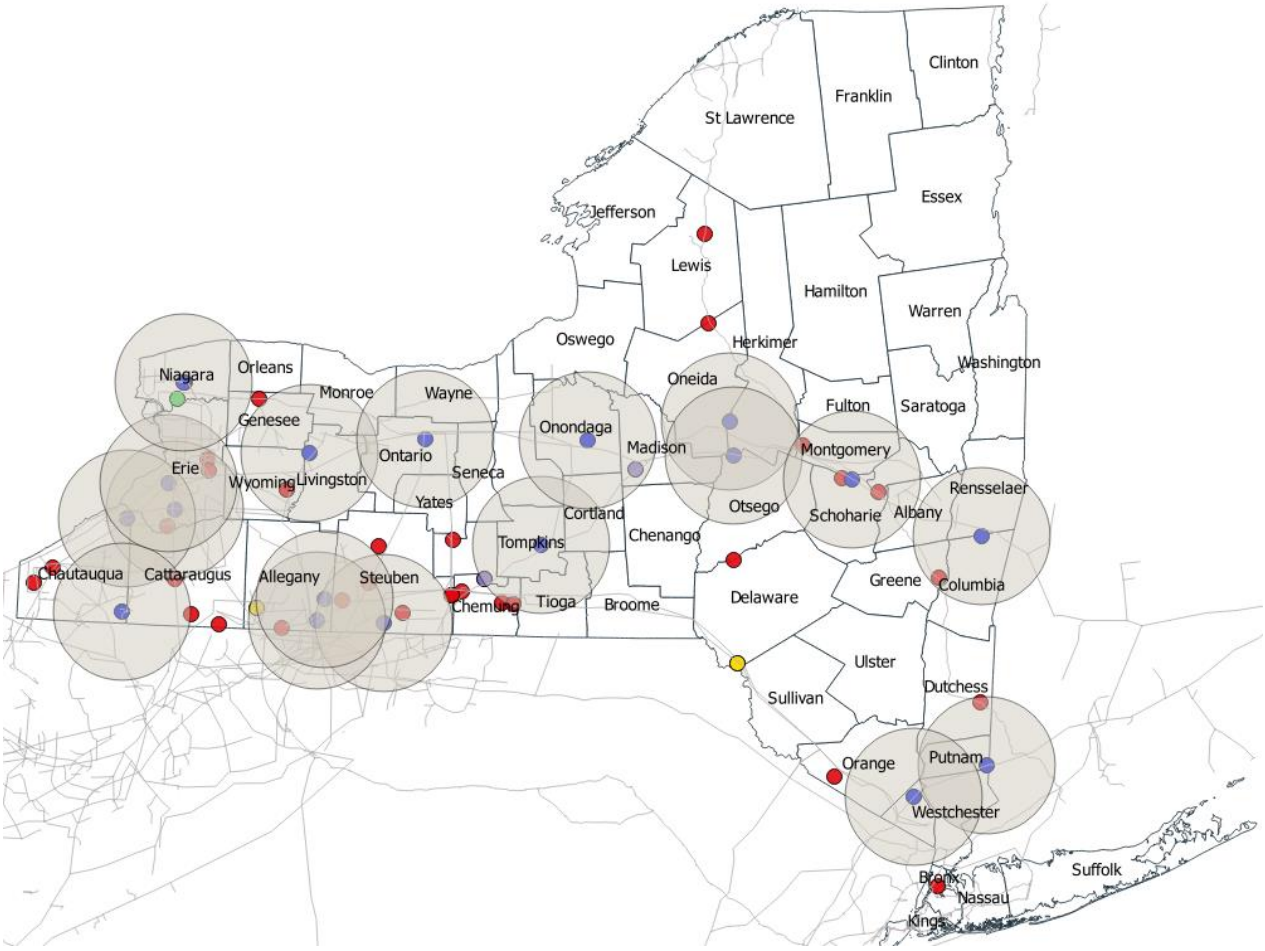


Table 2.5c.1e.

NYS Title V Compressor Stations, Circular Area Profile at 10-Mile Radius, By State and County

Total Population

#	ST	County	1. AG SE CS	2. AG Stony Point CS	3. DTI Borger CS	4. DTI Utica Station	5. DTI Woodhull Station	6. FGSC Beech Hill CS	7. NFGSC Concord CS	8. NFGSC Independence CS	9. NFGSC Nashville CS	10. TGPC CS 224	11. TGPC CS 229 & TEG DF	12. TGPC CS 230-C	13. TGPC CS 233	14. TGPC CS 237	15. TGPC CS 241	16. TGPC CS 245	17. TGPC CS 249	18. TGPC CS 254
1	CT	Fairfield	√	√																
2	CT	Litchfield	√																	
3	CT	New Haven	√																	
4	MA	Berkshire																		√
5	NJ	Bergen		√																
6	NJ	Passaic		√																
7	NJ	Sussex		√																
8	NY	Albany																	√	
9	NY	Allegany					√	√		√										
10	NY	Broome			√															
11	NY	Cattaraugus							√		√	√	√							
12	NY	Cayuga			√												√			
13	NY	Chautauqua							√		√	√	√							
14	NY	Chemung			√															
15	NY	Chenango																√		
16	NY	Columbia																		√
17	NY	Cortland															√			
18	NY	Dutchess		√																
19	NY	Erie							√		√		√	√						
20	NY	Fulton																	√	
21	NY	Genesee													√					
22	NY	Greene																		√
23	NY	Herkimer				√												√		
24	NY	Livingston												√	√					
25	NY	Madison				√											√	√		
26	NY	Montgomery																	√	
27	NY	Monroe												√		√				
28	NY	Niagara												√						
29	NY	Oneida				√												√		
30	NY	Onondaga															√			
31	NY	Ontario												√		√				
32	NY	Orange	√	√																
33	NY	Otsego				√												√	√	
34	NY	Putnam	√	√																
35	NY	Rensselaer																		√
36	NY	Rockland	√	√																
37	NY	Schenectady																	√	
38	NY	Schoharie																	√	
39	NY	Schuyler			√															
40	NY	Seneca																		
41	NY	Steuben					√	√		√										
42	NY	Tioga			√															
43	NY	Tompkins			√												√			
44	NY	Wayne														√				
45	NY	Westchester	√	√																
46	NY	Wyoming							√					√	√					
47	NY	Yates			√											√				
48	PA	Erie										√								
49	PA	Potter					√	√		√										
50	PA	Mc Kean										√								
51	PA	Tioga					√	√												
52	PA	Warren										√								

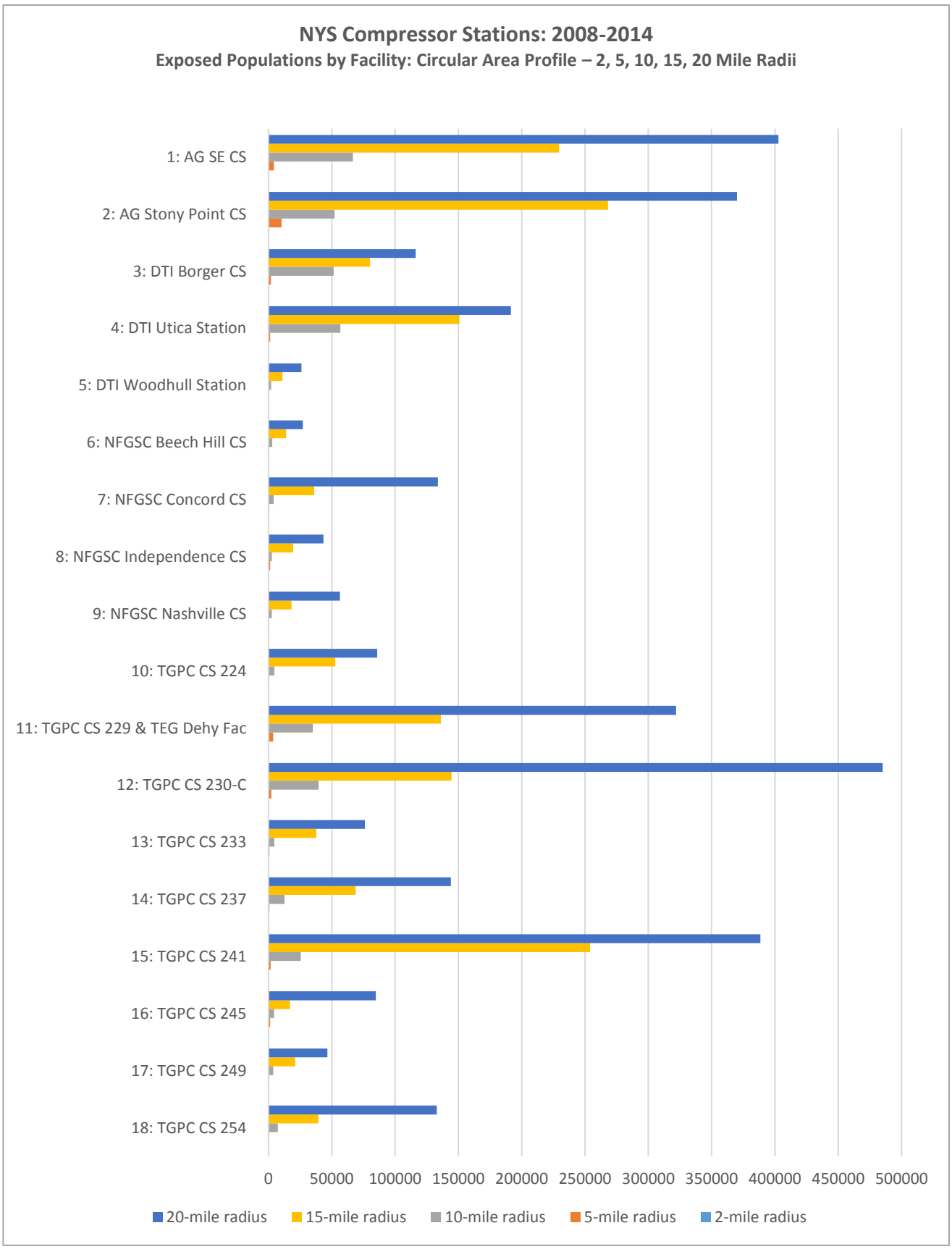

NYS Compressor Stations: 2008-2014
Exposed Populations by Facility: Circular Area Profile – 2, 5, 10, 15, 20 Mile Radii
1: AG SE CS
2: AG Stony Point CS
3: DTI Borger CS
4: DTI Utica Station
5: DTI Woodhull Station
6: NFGSC Beech Hill CS
7: NFGSC Concord CS
8: NFGSC Independence CS
9: NFGSC Nashville CS
10: TGPC CS 224
11: TGPC CS 229 & TEG Dehy Fac
12: TGPC CS 230-C
13: TGPC CS 233
14: TGPC CS 237
15: TGPC CS 241
16: TGPC CS 245
17: TGPC CS 249
18: TGPC CS 254
0
50000
100000
150000
200000
250000
300000
350000
400000
450000
500000
20-mile radius
15-mile radius
10-mile radius
5-mile radius
2-mile radius

Table 2.5c.1c.

Total Population by Facility: Circular Area Profile – .05 to 30 Mile Radii

NYS Natural Gas Compressor Stations: 2008-2014

	Facility	Location		Radius								
	Address \ County	ST	County	.05	1	2	3	5	10	15	20	30
1	AG SE CS	CT	Fairfield	0	328	1,463	7,535	37,921	148,176	210,298	388,132	916,829
	Southeast NY	CT	Litchfield	0	0	0	0	0	0	11,706	33,700	81,789
	Putnam County	CT	New Haven	0	0	0	0	0	0	0	18,442	276,243
		NY	Dutchess	0	0	0	0	0	0	13,654	58,321	110,574
		NY	Orange	0	0	0	0	0	0	0	0	110,574
		NY	Putnam	0	471	1,640	4,143	16,964	58,575	83,472	96,206	99,710
		NY	Rockland	0	0	0	0	0	0	0	165,975	135,426
		NY	Westchester	0	0	220	886	2,462	24,842	84,264	760,776	493,074
				261	**799**	**3,323**	**12,564**	**57,347**	**231,593**	**403,394**	**760,776**	**2,354,578**
2	AG Stony Point CS	CT	Fairfield	0	0	0	0	0	0	0	0	259,310
	Stony Point NY	NJ	Bergen	0	0	0	0	0	0	65,233	269,249	875,306
	Rockland County	NJ	Essex	0	0	0	0	0	0	0	0	67,681
		NJ	Hudson	0	0	0	0	0	0	0	0	10,027
		NJ	Morris	0	0	0	0	0	0	0	0	75,012
		NJ	Passaic	0	0	0	0	0	0	2,463	31,701	501,226
		NJ	Sussex	0	0	0	0	0	0	0	23,392	35,974
		NY	Bronx	0	0	0	0	0	0	0	0	1,225,424
		NY	Dutchess	0	0	0	0	0	0	0	213,509	126,685
		NY	New York	0	0	0	0	0	0	0	0	363,983
		NY	Orange	0	0	0	0	0	37,831	109,807	48,959	346,935
		NY	Putnam	0	0	0	0	0	3,599	18,565	311,687	98,438
		NY	Rockland	704	2,158	10,310	24,626	55,121	213,075	304,874	386,260	311,687
		NY	Ulster	0	0	0	0	0	0	0	0	22,511
		NY	Westchester	0	0	0	0	7,312	76,585	192,761	1,284,757	949,113
				704	**2,158**	**10,310**	**24,626**	**62,433**	**331,090**	**693,703**	**1,284,757**	**5,269,312**
3	DTI Borger CS	NY	Broome	0	0	0	0	0	0	0	1,444	53,802
	Ithaca NY	NY	Cayuga	0	0	0	0	0	0	985	5,103	16,463
	Tompkins County	NY	Chemung	0	0	0	0	0	0	0	510	30,899
		NY	Chenango	0	0	0	0	0	0	0	0	801
		NY	Cortland	0	0	0	0	0	0	0	0	48,356
		NY	Onondaga	0	0	0	0	0	0	0	0	4,424
		NY	Schuyler	0	0	0	0	0	0	0	5,297	15,137
		NY	Seneca	0	0	0	0	0	0	0	2,154	6,979
		NY	Tioga	0	0	0	0	0	0	6,003	14,105	43,956
		NY	Tompkins	144	396	2,184	5,155	53,097	80,226	101,564	101,564	101,564
		NY	Yates	0	0	0	0	0	0	0	0	4,428
				0	**0**	**0**	**0**	**0**	**80,226**	**116,305**	**168,038**	**326,809**

	Facility	Location		Radius								
	Address \ County	ST	County	.05	1	2	3	5	10	15	20	30
4	**DTI Utica Station**	NY	Chenango	0	0	0	0	0	0	0	0	5,724
	DTI Utica CS	NY	Fulton	0	0	0	0	0	0	0	0	1,924
	Herkimer County	NY	Herkimer	45	254	1,083	2,181	4,163	29,631	42,888	57,351	62,261
		NY	Madison	0	0	0	0	0	0	0	4,167	47,733
		NY	Montgomery	0	0	0	0	0	0	0	0	6,928
		NY	Oneida	0	0	323	4,062	52,571	121,246	146635	193,064	219,207
		NY	Otsego	0	0	0	0	0	0	1,901	4,290	19,201
				45	**254**	**1,406**	**6,243**	**56,734**	**150,877**	**191,424**	**258,872**	**362,978**
5	**DTI Woodhull Station**	NY	Allegany	0	0	0	0	0	0	0	684	20,261
	Woodhull NY	NY	Chemung	0	0	0	0	0	0	0	0	22,692
	Steuben County	NY	Schuyler	0	0	0	0	0	0	0	0	1,609
		NY	Steuben	2	57	371	950	2,031	6,800	16,285	48,062	86,265
		PA	Bradford	0	0	0	0	0	0	0	0	814
		PA	Potter	0	0	0	0	0	0	1,037	1,037	5,689
		PA	Tioga	0	0	0	0	99	4,192	8,680	14,101	34,867
				2	**57**	**371**	**950**	**2,130**	**10,992**	**26,002**	**63,884**	**172,197**
6	**FGSC Beech Hill CS**	NY	Allegany	43	64	329	687	2,605	12,105	19,352	28,464	42,429
	Willing NY	NY	Cattaraugus	0	0	0	0	0	0	0	0	11,656
	Allegany County	NY	Steuben	0	0	0	0	0	545	1,955	9,356	30,499
		PA	Mc Kean	0	0	0	0	0	0	0	0	5,843
		PA	Potter	0	0	0	0	394	1,305	5,867	7,868	15,351
		PA	Tioga	0	0	0	0	0	0	0	3,194	8,590
				43	**64**	**329**	**687**	**2,999**	**13,995**	**27,174**	**48,882**	**114,368**
7	**NFGSC Concord CS**	NY	Allegany	0	0	0	0	0	0	0	0	2,130
	Concord NY	NY	Cattaraugus	0	0	0	0	0	0	11,290	19,042	46,639
	Erie County	NY	Chautauqua	0	0	0	0	0	0	0	5,989	40,323
		NY	Erie	0	125	579	1,346	4,168	36,020	122,570	230,067	767,195
		NY	Genesee	0	0	0	0	0	0	0	0	1,155
		NY	Wyoming	0	0	0	0	0	0	0	3,304	14,281
				0	**125**	**579**	**1,346**	**4,168**	**36,020**	**133,860**	**258,402**	**871,723**
8	**NFGSC Independ. CS**	NY	Allegany	839	1,080	1,377	1,639	2,491	18,062	25,189	31,630	47,605
	Andover NY	NY	Cattaraugus	0	0	0	0	0	0	0	0	4,246
	Allegany County	NY	Livingston	0	0	0	0	0	0	0	0	7,318
		NY	Steuben	0	0	0	0	147	1,410	16,860	23,738	51,544
		PA	Mc Kean	0	0	0	0	0	0	0	0	641
		PA	Potter	0	0	0	0	0	0	1,305	4,846	12,175
		PA	Tioga	0	0	0	0	0	0	0	0	7,472
				839	**1,080**	**1,377**	**1,639**	**2,638**	**19,472**	**43,354**	**60,214**	**131,001**
9	**NFGSC Nashville CS**	NY	Cattaraugus	0	0	19	147	866	4,721	8,266	11,894	29,459
	Hanover NY	NY	Chautauqua	41	166	560	1,173	5,505	10,774	39,199	48,450	110,414
	Chautauqua County	PA	Erie	0	0	0	0	549	13,008	32,427	61,899	292,670
				41	**166**	**579**	**1,320**	**6,920**	**28,503**	**79,892**	**122,243**	**432,543**

	Facility	Location		Radius								
	Address \ County	ST	County	.05	1	2	3	5	10	15	20	30
10	TGPC CS 224	NY	Cattaraugus	0	0	12	43	253	2,866	5,803	13,694	33,184
	Clymer NY	NY	Chautauqua	95	103	610	1,602	4,321	47,133	59,704	70,083	104,211
	Chautauqua County	PA	Erie	0	0	0	0	0	0	0	0	886
		PA	Mc Kean	0	0	0	0	0	0	0	4,540	24,334
		PA	Warren	0	0	0	0	115	2,695	20,317	30,078	39,983
				95	**103**	**622**	**1,645**	**4,689**	**52,694**	**85,824**	**118,395**	**206,884**
11	TGPC CS 229 & TEG DF	NY	Cattaraugus	0	0	0	0	0	0	115	9,341	29,317
	Eden NY	NY	Chautauqua	0	0	0	0	0	0	0	5,152	29,114
	Erie County	NY	Erie	151	726	3,803	11,106	34,960	136,180	321,782	673,481	917,797
		NY	Genesee	0	0	0	0	0	0	0	0	4,787
		NY	Niagara	0	0	0	0	0	0	0	0	72,143
		NY	Wyoming	0	0	0	0	0	0	0	0	17,502
				151	**726**	**3,803**	**11,106**	**34,960**	**136,180**	**321,897**	**687,974**	**1,070,660**
12	TGPC CS 230-C	NY	Erie	0	0	0	0	0	33,009	277,098	607,651	822,818
	Lockport NY	NY	Genesee	0	0	0	0	0	0	0	1,494	18,499
	Niagara County	NY	Niagara	12	359	2,202	5,922	39,624	111,553	208,081	216,469	216,469
		NY	Orleans	0	0	0	0	0	0	0	9,214	26,607
		NY	Wyoming	0	0	0	0	0	0	0	0	**2,454**
				12	**359**	**2,202**	**5,922**	**39,624**	**144,562**	**485,179**	**834,828**	**1,086,847**
13	TGPC CS 233	NY	Allegany	0	0	0	0	0	0	0	0	5,331
	York NY	NY	Erie	0	0	0	0	0	0	0	0	5,496
	Livingston County	NY	Genesee	0	0	0	22	368	6,581	14,360	42,808	60,079
		NY	Livingston	15	109	841	2,013	3,579	26,388	41,687	56,647	65,393
		NY	Monroe	0	0	0	0	0	0	5,632	44,228	571,226
		NY	Ontario	0	0	0	0	0	0	0	2,148	36,095
		NY	Orleans	0	0	0	0	0	0	0	0	11,958
		NY	Wyoming	0	0	0	105	591	4,800	14,538	26,836	38,776
				15	109	**841**	**2,140**	**4,538**	**37,769**	**76,217**	**172,667**	**800,524**
14	TGPC CS 237	NY	Cayuga	0	0	0	0	0	0	0	0	20,233
	Manchester, Phelps NY	NY	Livingston	0	0	0	0	0	0	0	0	22,671
	Ontario County	NY	Monroe	0	0	0		0	0	3,963	75,265	509,857
		NY	Ontario	27	211	796	5,815	12,654	53,584	93,899	100,200	107,931
		NY	Seneca	0	0	0	0	0	0	7,558	20,829	33,097
		NY	Steuben	0	0	0	0	0	0	0	0	3,370
		NY	Wayne	0	0	0	0	0	15,237	37,245	64,847	90,461
		NY	Yates	0	0	0	0	0	0	1,458	10,492	24,006
				27	**211**	**796**	**5,815**	**12,654**	**68,821**	**144,123**	**271,633**	**811,626**
15	TGPC CS 241	NY	Cayuga	0	0	0	0	0	0	0	7,841	71,871
	LaFayette NY	NY	Chenango	0	0	0	0	0	0	0	0	2,522
	Onondaga County	NY	Cortland	0	0	0	0	0	0	2,228	5,932	41,458
		NY	Madison	0	0	0	0	0	0	16,456	30,214	63,437
		NY	Oneida	0	0	0	0	0	0	0	0	8,338
		NY	Onondaga	218	460	1,627	4,484	25,469	254,062	369,779	460,535	467,026
		NY	Oswego	0	0	0	0	0	0	0	0	36,965
		NY	Tompkins	0	0	0	0	0	0	0	0	8,227
				218	**460**	**1,627**	**4,484**	**25,469**	**254,062**	**388,463**	**504,522**	699,844

	Facility	Location		Radius								
	Address \ County	ST	County	.05	1	2	3	5	10	15	20	30
16	TGPC CS 245	NY	Chenango	0	0	0	0	0	0	0	3,307	20,317
	Winfield NY	NY	Fulton	0	0	0	0	0	0	0	0	1,924
	Herkimer County	NY	Herkimer	0	166	1,263	1,528	2,261	5,179	36,884	49,510	60,443
		NY	Madison	0	0	0	0	213	1,426	2,545	12,243	34,278
		NY	Montgomery	0	0	0	0	0	0	0	0	9,217
		NY	Oneida	0	0	0	108	966	5,933	35,350	128,462	195,132
		NY	Otsego	0	0	103	333	1,030	4,290	10,013	17,561	53,366
		NY	Schoharie	0	0	0	0	0	0	0	0	1,000
				0	**166**	**1,366**	**1,969**	**4,470**	**16,828**	**84,792**	**211,083**	**375,677**
17	TGPC CS 249	NY	Albany	0	0	0	0	0	0	0	8,411	96,415
	Carlisle NY	NY	Delaware	0	0	0	0	0	0	0	0	2,701
	Schoharie County	NY	Fulton	0	0	0	0	0	0	0	17,648	51,847
		NY	Greene	0	0	0	0	0	0	0	0	2,887
		NY	Herkimer	0	0	0	0	0	0	0	0	6,586
		NY	Montgomery	0	0	21	174	728	4,630	5,093	46,944	50,219
		NY	Otsego	0	0	0	0	0	0	0	3,476	13,485
		NY	Saratoga	0	0	0	0	0	0	0	0	23,460
		NY	Schenectady	0	0	0	0	0	0	1,437	9,936	154,727
		NY	Schoharie	0	71	476	1,449	4,063	16,500	17,511	29,373	32,749
				0	0	497	1.623	4,791	**21,130**	**24,041**	**115,788**	**435,076**
18	TGPC CS 254	MA	Berkshire	0	0	0	0	0	0	10,311	65,680	126,293
	Chatham NY	NY	Albany	0	0	0		0	0	24,105	194,709	298,289
	Columbia County	NY	Columbia	10	65	298	761	2,635	18,420	27,699	43,451	56,855
		NY	Greene	0	0	0	0	0	0	2,869	14,566	38,909
		NY	Rensselaer	0	72	345	861	4,820	20,895	67,895	124,211	152,634
		NY	Schenectady	0	0	0	0	0	0	0	0	102,292
		VT	Bennington	0	0	0	0	0	0	0	0	5,096
				10	**137**	**643**	**1,622**	**7,455**	**39,315**	**132,879**	**442,617**	**839,481**

At a given site the concentrations of pollutants is largely directly dependent on local emissions, but there are many important exceptions to this general rule.

In this connection, the most important fact to bear in mind is that ***human illness or an adverse environmental effect is not necessarily the result of the preponderance of pollutants in a place but may be caused by a single pollutant which may have traveled great distances and that relatively small quantities can be extremely dangerous.***

As we have already indicated, the distance air pollution travels and how much reaches ground level is dependent on many factors. On any given day, pollution from a given site can travel less than a mile, a few miles, hundreds of miles, thousands of miles, or around the globe.

A few local examples.

Chernobyl disaster

The meltdown of the Chernobyl nuclear power plant in the Ukraine on April 26, 1986, released 100 times more airborne radiation than the fallout from U.S. nuclear bombs dropped on Hiroshima and Nagasaki. More than 40% of Europe's land mass to the north and west and had measurable amounts of radiation contamination, including Austria, Belarus, Bulgaria, Finland, France, Germany, Great Britain, Greece, Iceland, Italy, Norway, Romania, Slovenia, Sweden, and Switzerland, wide territories to the south including Armenia, Georgia, northern Africa and the Emirates, and China to the west. By May 6th, contamination reached Canada and the U.S. – more than half-way around the globe. (Yablokov and Nesterenko 2009, Gould 1990). The conclusion reached by the UN Scientific Committee on the Effects of Atomic Radiation is that the Chernobyl disaster "Resulted in radioactive material becoming widely dispersed and deposited . . . throughout the northern hemisphere." And that "[r]eleases of radioactive materials were such that contamination of the ground was found to some extent in every country in the Northern Hemisphere." (UNSCEAR 2011). Measurable amounts of Iodine-131 from Chernobyl fallout were found in fresh milk (Feely et al. 1988) and New York City's air along with Cesium-137 (U.S. DOE 1986), total ground deposition of Iodine-131 and Cesium-137 in Chester, New Jersey (U.S. DOE 1986), and gross beta particles in precipitation in Montpelier, Vermont (U.S. EPA 1986).

Fallout from U.S. Nuclear Weapons Tests: Rochester and Troy NY

At dawn on July 16, 1945 in the dessert of Alamogordo, New Mexico, America exploded the world's first atomic weapon, code named "Trinity". Over the next few weeks Eastman Kodak headquarters were flooded with complaints from customers who had purchased sensitive X-ray film that it had been rendered unusable due to "fogging". Within a few weeks the company's scientists had determined that the strawboard, used as a stiffener board between film sheets produced in mills in Vincennes, Indiana had been contaminated "a new type radioactive containment not hitherto encountered." This, in turn, had produced black exposed spots on the company's film.

Alerted to the danger of open-air testing of nuclear weapons, Kodak began routinely measuring ambient radioactivity. In late January 29, 1951, the company's Geiger counters measured elevated levels of radioactivity brought to the ground by

a winter snow storm. The radiation was the result of a 1-kiloton nuclear test that had taken placed in Nevada two days earlier. On February 3, the *New York Times* ran a front-page story on the incident, highlighting the work of University of Rochester scientists who had quantified trace amounts of radioactivity in the city's snow. (Memmott 2016)

On April 28, 1953, the Geiger counters of Rensselaer Polytechnic Institute chemistry professor Herbert Clark began crackling away at surprising high levels. A severe rainstorm had brought down radiation from a nuclear test that had occurred three days earlier in the Nevada dessert. The blast from the 11,000-lb. nuclear bomb code-named Simon had risen to a height of 44,000 feet above sea level, where 115 miles an hour winds carried it to Troy, some 2,300 miles downwind in just a few days. Levels of radioactivity in drinking water measured the next day were 100 to 1000 times greater than natural background radioactivity. (Clark 1954, Lade 1953, Lade 1962, Heller 2003).

Depleted Uranium Contamination: Albany and Colonie NY

From the late 1950s through 1980, the National Lead company and the U.S. government operated a facility on Central Avenue in Colonie, New York, that

fashioned depleted uranium (DU) for use in U.S. armor-piercing shot and shell, and in the process exposed its workforce and nearby residents to significant levels of radioactive contaminants. During its years of operation there no efforts were made to systematically monitor air, soil, surface water or groundwater for excessive contamination at either the 18-acre work site or in the community where the plant was located. More than 20 years after the plant closed, researchers found measurable levels of DU among former workers and Colonie residents (Parrish et al. 2008). But DU contamination was not confined to National Lead property or even the nearby neighborhood of Roessleville. In the 1990s, air filters at Knolls Atomic Power Laboratory in Niskayuna, about 3.5 miles away, detected DU from National Lead. Even more alarming is that more than 25 miles away DU contamination was detected by the Kesselring Naval Nuclear Laboratory in Milton.

Elevated Rates of Birth Defects 10 miles from Natural Gas Wells

The chemicals found in the air around natural gas wells are generally the same chemicals found in compressor station emissions. McKenzie et al. found elevations in rates of birth defects of the cardiovascular system, and border-line elevations in rates of neurotube birth defects among people who live within ten miles of natural gas wells. This is a striking finding, as the study was of 124,842 births between 1996 and 2009, and the fact that birth defects are relatively rare and that more than half of the birth were the controls that did not live within ten miles of gas wells. There was also a significant association with the numbers of well and the distance. The author conclude that the result suggests a positive association between density and proximity to gas wells within a ten-mile radius and birth defects of the heart and possibly neurotube defects, but not with oral clefts, preterm birth or reduced fetal growth.

Small-Scale Spatial Variations

On the other end of the scale, small-scale spatial variations of only a few feet or yards have been shown to significantly effect personal exposure to ambient PAH concentrations. (Lovinsky-Desir et al. 2016)

Table 2.5c.1b.

Total Pounds by Facility: Circular Area Air Pollution Profile – .05-Mile Radius

NYS Natural Gas Compressor Stations, Reported NEI Emissions: 2008 to 2014

Rank	Identification	Location		Releases	.05-Mile Radius	
	Facility Name (Short)	Town	County	7-Years	Population	Lbs. per capita
1	DTI Woodhull Station	Woodhull	Steuben	829,223	2	414,611
2	TGPC CS 254	Chatham	Columbia	2,393,660	10	239,366
3	TGPC CS 237	Manchester, Phelps	Ontario	2,298,394	27	85,125
4	TGPC CS 249	Carlisle	Schoharie	4,323,285	94	45,992
5	TGPC CS 230-C	Lockport	Niagara	485,609	12	40,467
6	TGPC CS 229 & TEG DF	Eden	Erie	5,124,426	151	33,936
7	NFGSC Beech Hill CS	Willing	Allegany	1,387,592	43	32,269
8	NFGSC Nashville CS	Hanover	Chautauqua	622,791	26	23,953
9	TGPC CS 233	York	Livingston	224,978	15	14,998
10	TGPC CS 241	LaFayette	Onondaga	3,039,661	218	13,943
11	TGPC CS 224	Clymer	Chautauqua	1,146,797	95	12,071
12	DTI Borger CS	Ithaca	Tompkins	780,159	92	8,479
13	DTI Utica Station	Frankfort	Herkimer	281,369	45	6,252
14	AG SE CS	Southeast	Putnam	1,688,814	287	5,884
15	AG Stony Point CS	Stony Point	Rockland	2,013,478	704	2,860
16	NFGSC Independence CS	Andover	Allegany	1,353,931	839	1,613
17	TGPC CS 245	Winfield	Herkimer	10,465,388	0	--
18	NFGSC Concord CS	Concord	Erie	1,733,171	0	--
				40,192,726	**2,660**	**15,110**

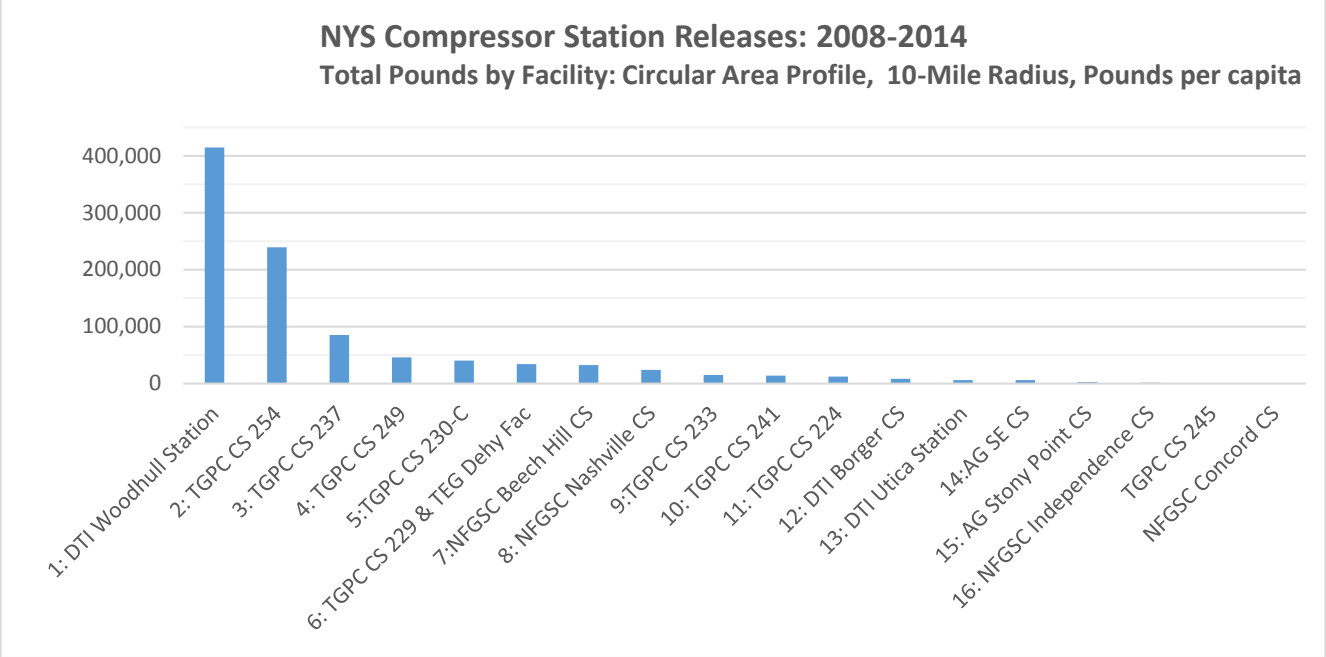

NYS Compressor Station Releases: 2008-2014
Total Pounds by Facility: Circular Area Profile, 10-Mile Radius, Pounds per capita
400,000
300,000
200,000
100,000
0
1: DTI Woodhull Station
2: TGPC CS 254
3: TGPC CS 237
4: TGPC CS 249
5:TGPC CS 230-C
6: TGPC CS 229 & TEG Dehy Fac
7:NFGSC Beech Hill CS
8: NFGSC Nashville CS
9:TGPC CS 233
10: TGPC CS 241
11: TGPC CS 224
12: DTI Borger CS
13: DTI Utica Station
14:AG SE CS
15: AG Stony Point CS
16: NFGSC Independence CS
TGPC CS 245
NFGSC Concord CS

Table 2.5c.1c.

Total Pounds by Facility: Circular Area Air Pollution Profile – 1-Mile Radius

NYS Natural Gas Compressor Stations, Reported NEI Emissions: 2008 to 2014

Rank	Identification	Location		Releases	1-Mile Radius	
	Facility Name (Short)	Town	County	7-Years	Population	Lbs. per capita
1	TGPC CS 245	Winfield	Herkimer	10,465,388	166	124,588
2	TGPC CS 249	Carlisle	Schoharie	4,323,285	154	28,073
3	NFGSC Concord CS	Concord	Erie	1,733,171	66	26,260
4	NFGSC Beech Hill CS	Willing	Allegany	1,387,592	64	21,681
5	TGPC CS 254	Chatham	Columbia	2,393,661	137	17,472
6	DTI Woodhull Station	Woodhull	Steuben	829,223	57	14,548
7	TGPC CS 224	Clymer	Chautauqua	1,146,797	103	11,134
8	TGPC CS 237	Manchester, Phelps	Ontario	2,298,394	211	10,893
9	TGPC CS 229 & TEG DF	Eden	Erie	5,124,427	726	7,058
10	TGPC CS 241	LaFayette	Onondaga	3,039,661	460	6,608
11	NFGSC Nashville CS	Hanover	Chautauqua	622,791	177	3,519
12	TGPC CS 233	York	Livingston	224,978	109	2,064
13	AG SE CS	Southeast	Putnam	1,688,815	845	1,999
14	DTI Borger CS	Ithaca	Tompkins	780,159	396	1,970
15	TGPC CS 230-C	Lockport	Niagara	485,610	359	1,353
16	NFGSC Independence CS	Andover	Allegany	1,353,931	1080	1,254
17	DTI Utica Station	Frankfort	Herkimer	281,369	254	1,108
18	AG Stony Point CS	Stony Point	Rockland	2,013,478	2158	933
				40,192,733	**7,522**	**5,343**

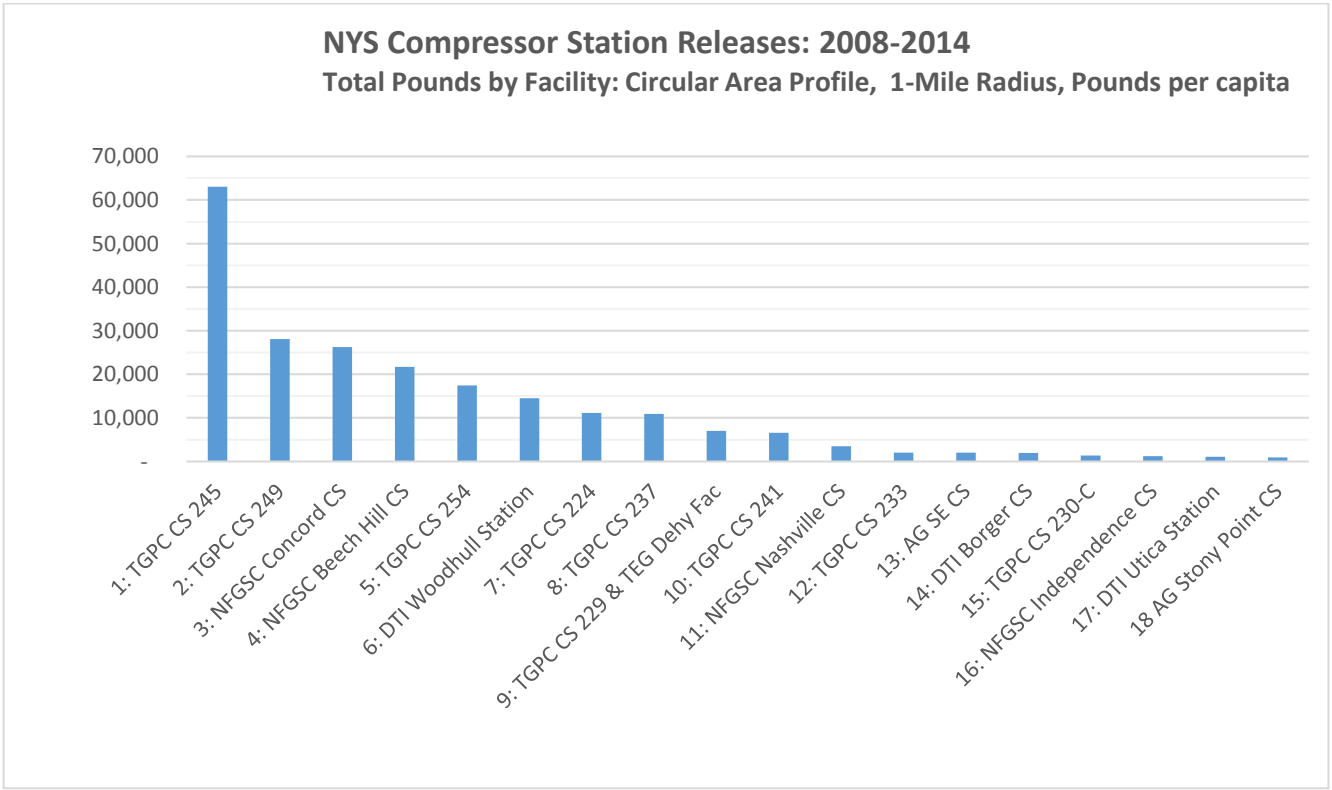


Table 2.5c.1d.

Total Pounds by Facility: Circular Area Air Pollution Profile – 2-Mile Radius

NYS Natural Gas Compressor Stations, Reported NEI Emissions: 2008 to 2014

Rank	Identification	Location		Releases	2-Mile Radius	
	Facility Name (Short)	Town	County	7-Years	Population	Lbs. per capita
1	TGPC CS 245	Winfield	Herkimer	10,465,389	1,366	7,661
2	TGPC CS 249	Carlisle	Schoharie	4,323,285	675	6,405
3	NFGSC Beech Hill CS	Willing	Allegany	1,387,592	329	4,218
4	TGPC CS 254	Chatham	Columbia	2,393,661	643	3,723
5	NFGSC Concord CS	Concord	Erie	1,733,171	529	3,276
6	TGPC CS 237	Manchester, Phelps	Ontario	2,298,394	796	2,887
7	DTI Woodhull Station	Woodhull	Steuben	829,223	371	2,235
8	TGPC CS 241	LaFayette	Onondaga	3,039,661	1,627	1,868
9	TGPC CS 224	Clymer	Chautauqua	1,146,797	622	1,844
10	NFGSC Nashville CS	Hanover	Chautauqua	622,791	383	1,626
11	TGPC CS 229 & TEG DF	Eden	Erie	5,124,427	3,803	1,347
12	NFGSC Independence CS	Andover	Allegany	1,353,931	1,377	983
13	DTI Borger CS	Ithaca	Tompkins	780,159	1,879	415
14	AG SE CS	Southeast	Putnam	1,688,815	4,307	392
15	TGPC CS 233	York	Livingston	224,978	841	268
16	TGPC CS 230-C	Lockport	Niagara	485,610	2,202	221
17	DTI Utica Station	Frankfort	Herkimer	281,369	1,406	200
18	AG Stony Point CS	Stony Point	Rockland	2,013,478	10,310	195
				40,192,733	**33,466**	**39,765**

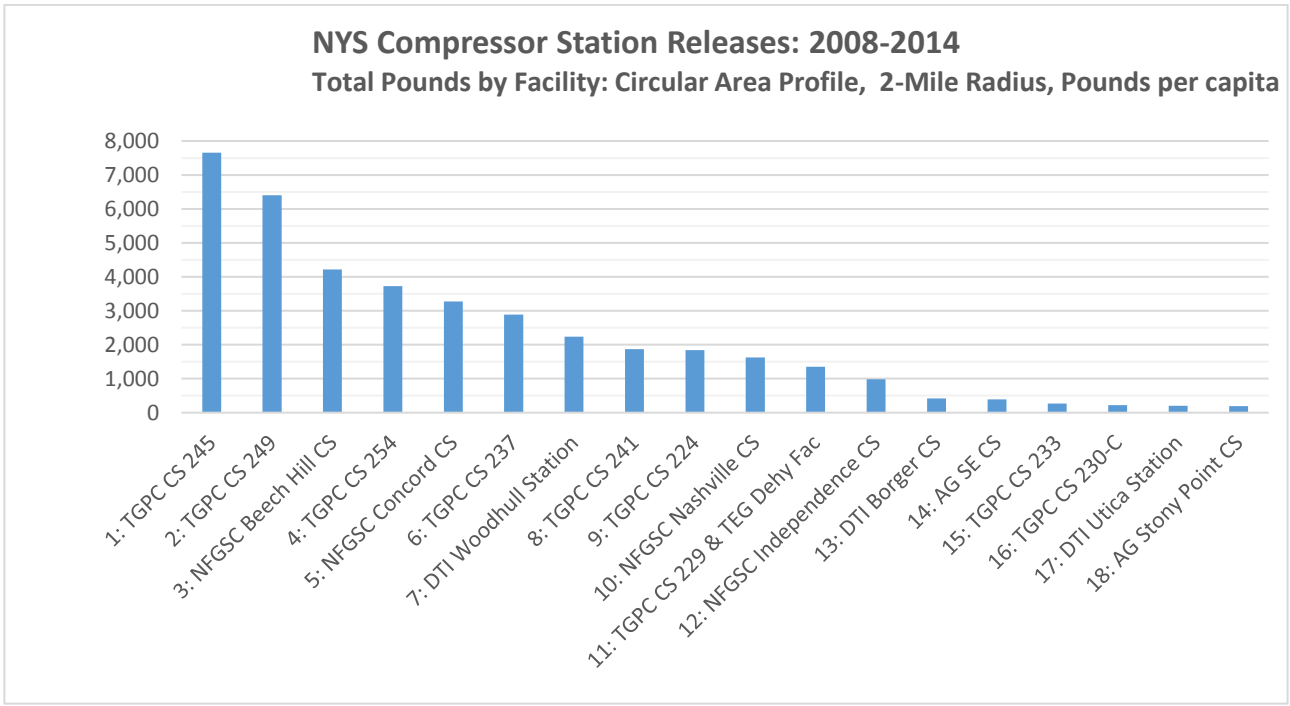


Table 2.5c.1d.

Total Pounds by Facility: Circular Area Air Pollution Profile – 3-Mile Radius

NYS Natural Gas Compressor Stations, Reported NEI Emissions: 2008 to 2014

Rank	Identification	Location		Releases	3-Mile Radius	
	Facility Name (Short)	Town	County	7-Years	Population	Lbs. per capita
1	TGPC CS 245	Winfield	Herkimer	10,465,388	1,969	5,315
2	TGPC CS 249	Carlisle	Schoharie	4,323,285	1,266	3,414
3	NFGSC Beech Hill CS	Willing	Allegany	1,387,592	687	2,019
4	TGPC CS 254	Chatham	Columbia	2,393,660	1,622	1,475
5	NFGSC Concord CS	Concord	Erie	1,733,171	1,297	1,336
6	NFGSC Nashville CS	Hanover	Chautauqua	622,791	675	922
7	DTI Woodhull Station	Woodhull	Steuben	829,223	950	872
8	NFGSC Independence CS	Andover	Allegany	1,353,931	1,639	826
9	TGPC CS 224	Clymer	Chautauqua	1,146,797	1,645	697
10	TGPC CS 241	LaFayette	Onondaga	3,039,661	4,484	677
11	TGPC CS 229 & TEG DF	Eden	Erie	5,124,426	11,106	461
12	TGPC CS 237	Manchester, Phelps	Ontario	2,298,394	5,815	395
13	DTI Borger CS	Ithaca	Tompkins	780,159	5,165	151
14	AG SE CS	Southeast	Putnam	1,688,814	13,824	122
15	TGPC CS 233	York	Livingston	224,978	2,140	105
16	TGPC CS 230-C	Lockport	Niagara	485,609	5,922	82
17	AG Stony Point CS	Stony Point	Rockland	2,013,478	24,626	81
18	DTI Utica Station	Frankfort	Herkimer	281,369	6,243	45
				40,192,726	**91,075**	**441**

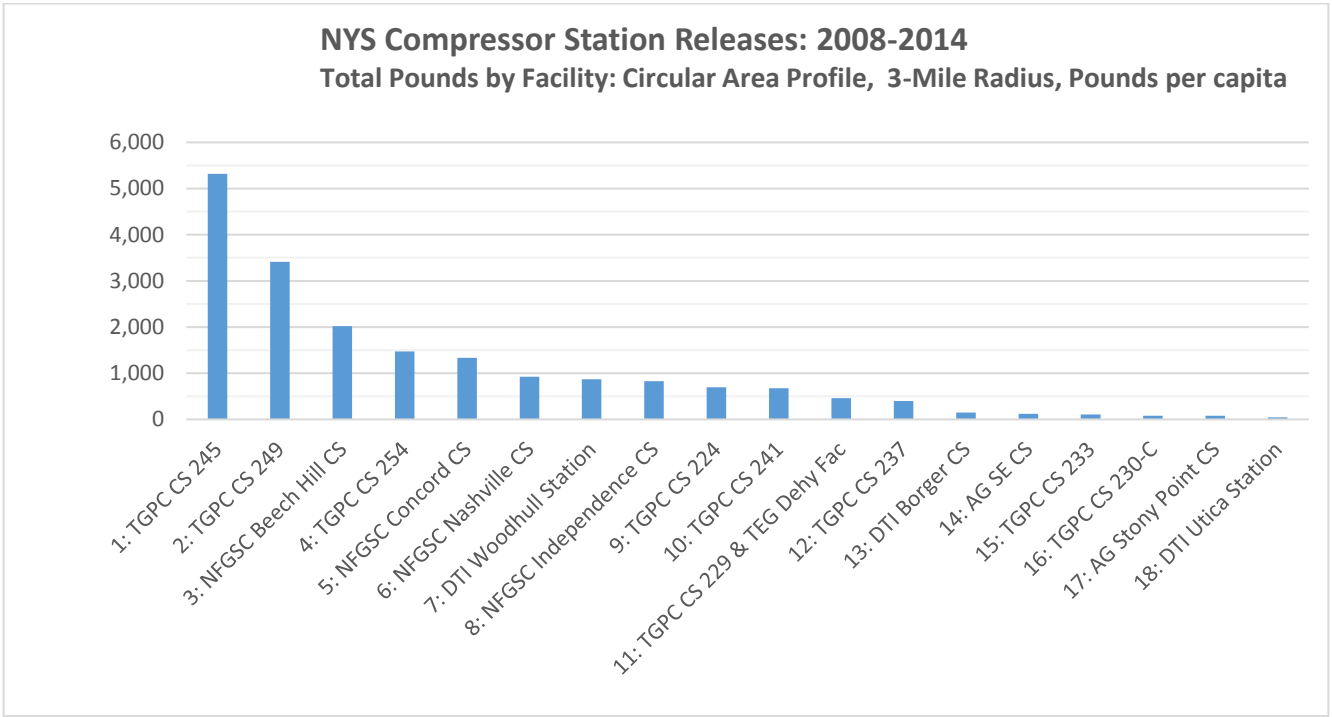


Table 2.5c.1f.

Total Pounds by Facility: Circular Area Air Pollution Profile – 5-Mile Radius

NYS Natural Gas Compressor Stations, Reported NEI Emissions: 2008 to 2014

Rank	Identification	Location		Releases	5-Mile Radius	
	Facility Name (Short)	Town	County	7-Years	Population	Lbs. per capita
1	TGPC CS 245	Winfield	Herkimer	10,465,389	4,470	2,341
2	TGPC CS 249	Carlisle	Schoharie	4,323,285	3,668	1,179
3	NFGSC Independence CS	Andover	Allegany	1,353,931	2,638	513
4	NFGSC Beech Hill CS	Willing	Allegany	1,387,592	2,999	463
5	NFGSC Concord CS	Concord	Erie	1,733,171	3,931	441
6	DTI Woodhull Station	Woodhull	Steuben	829,223	2,130	389
7	TGPC CS 254	Chatham	Columbia	2,393,661	7,455	321
8	TGPC CS 224	Clymer	Chautauqua	1,146,797	4,689	245
9	NFGSC Nashville CS	Hanover	Chautauqua	622,791	2,584	241
10	TGPC CS 237	Manchester, Phelps	Ontario	2,298,394	12,654	182
11	TGPC CS 229 & TEG DF	Eden	Erie	5,124,427	34,960	147
12	TGPC CS 241	LaFayette	Onondaga	3,039,661	25,469	119
13	TGPC CS 233	York	Livingston	224,978	4,538	50
14	AG Stony Point CS	Stony Point	Rockland	2,013,478	62,433	32
15	AG SE CS	Southeast	Putnam	1,688,815	66,671	25
16	DTI Borger CS	Ithaca	Tompkins	780,159	51,509	15
17	TGPC CS 230-C	Lockport	Niagara	485,610	39,624	12
18	DTI Utica Station	Frankfort	Herkimer	281,369	56,734	5
				40,192,733	**389,156**	**103**

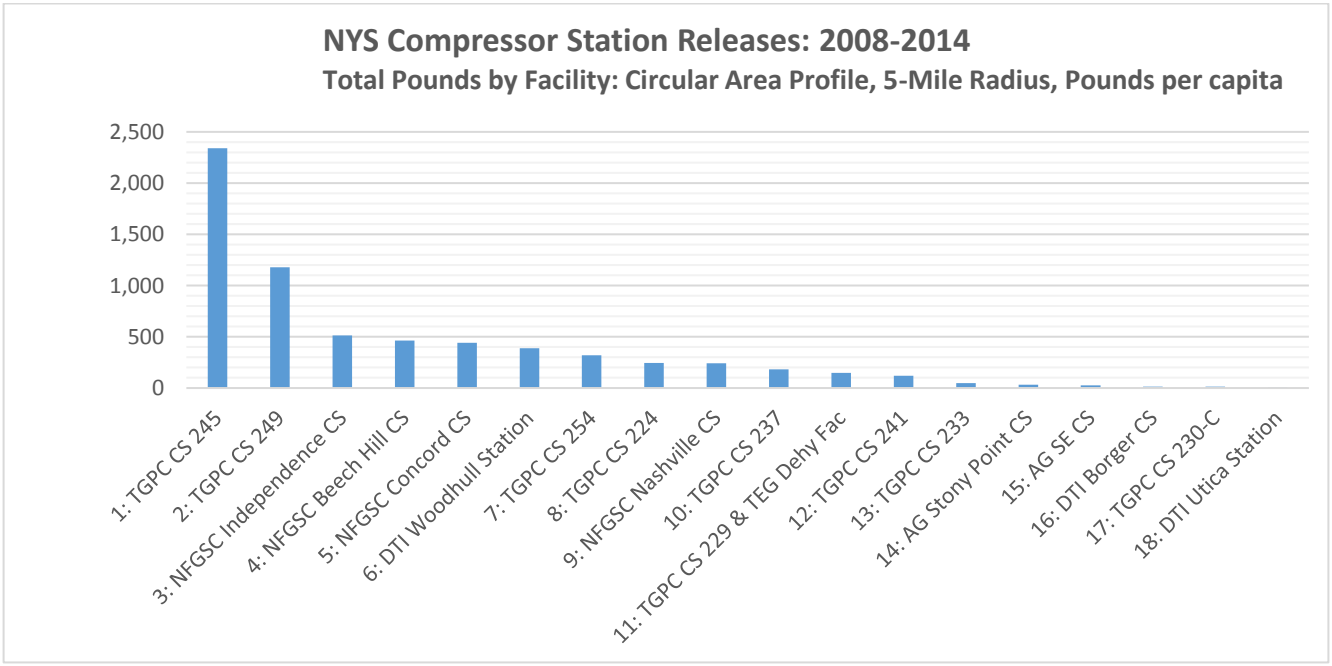
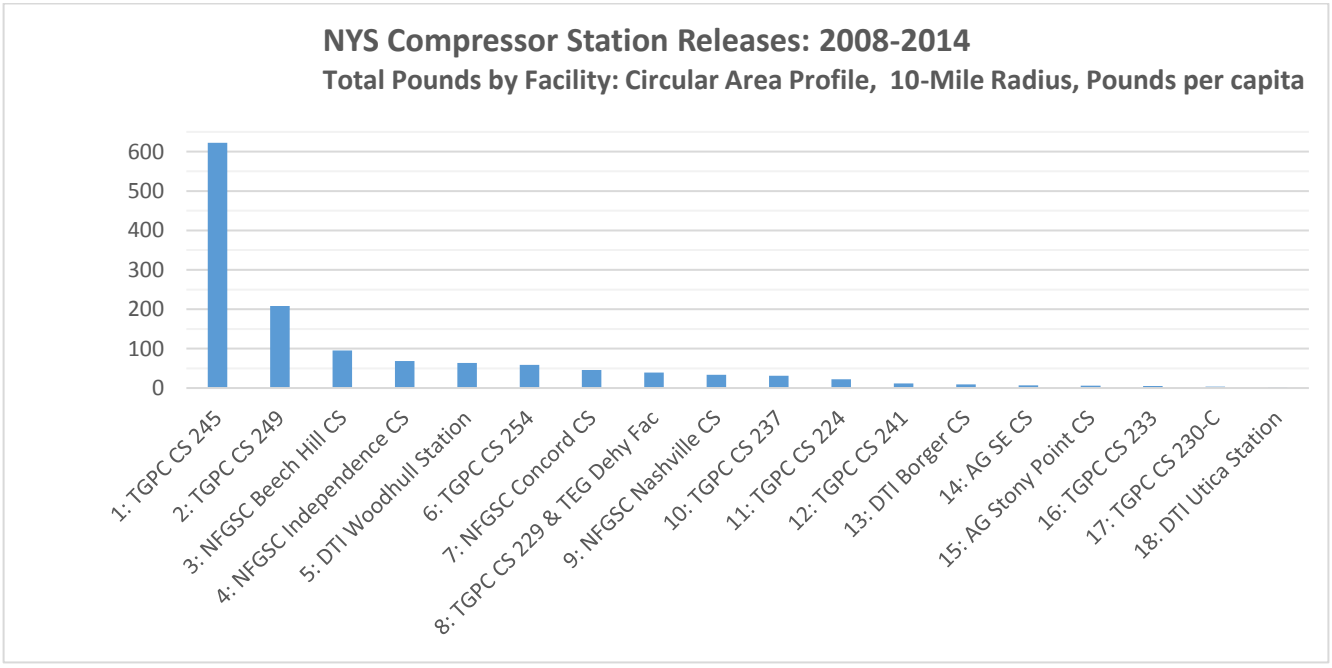


Table 2.5c.1g.

Total Pounds by Facility: Circular Area Air Pollution Profile – 10-Mile Radius

NYS Natural Gas Compressor Stations, Reported NEI Emissions: 2008 to 2014

Rank	Identification	Location		Releases	10-Mile Radius	
	Facility Name (Short)	Town	County	7-Years	Population	Lbs. per capita
1	TGPC CS 245	Winfield	Herkimer	10,465,389	16,826	622
2	TGPC CS 249	Carlisle	Schoharie	4,323,285	20,745	208
3	NFGSC Beech Hill CS	Willing	Allegany	1,387,592	14,592	95
4	NFGSC Independence CS	Andover	Allegany	1,353,931	19,772	68
5	DTI Woodhull Station	Woodhull	Steuben	829,223	12,947	64
6	TGPC CS 254	Chatham	Columbia	2,393,661	40,695	59
7	NFGSC Concord CS	Concord	Erie	1,733,171	37,974	46
8	TGPC CS 229 & TEG DF	Eden	Erie	5,124,427	131,667	39
9	NFGSC Nashville CS	Hanover	Chautauqua	622,791	18,661	33
10	TGPC CS 237	Manchester, Phelps	Ontario	2,298,394	72,831	32
11	TGPC CS 224	Clymer	Chautauqua	1,146,797	51,965	22
12	TGPC CS 241	LaFayette	Onondaga	3,039,661	257,224	12
13	DTI Borger CS	Ithaca	Tompkins	780,159	84,577	9
14	AG SE CS	Southeast	Putnam	1,688,815	235,473	7
15	AG Stony Point CS	Stony Point	Rockland	2,013,478	330,569	6
16	TGPC CS 233	York	Livingston	224,978	40,531	6
17	TGPC CS 230-C	Lockport	Niagara	485,610	145,809	3
18	DTI Utica Station	Frankfort	Herkimer	281,369	148,087	2
				40,192,733	**1,680,945**	**24**



2.5c.2. Total Pounds by Facility: Annual, Monthly, Daily and Hourly Averages

Table 2.5c.

Total Pounds by Facility: Annual, Monthly, Daily and Hourly Averages

NYS Natural Gas Compressor Stations, Reported NEI Emissions: 2008 to 2014

Rank	Identification	Location		7 Years Total	Annual Average	Monthly Average	Daily Average	Hourly Average
	Facility Name (Short)	Town	County					
1	TGPC CS 245	Winfield	Herkimer	10,465,388	1,495,055	124,588	4,096	171
2	TGPC 229 & TEG DF	Eden	Erie	5,124,426	732,061	61,005	2,006	84
3	TGPC CS 249	Carlisle	Schoharie	4,323,285	617,612	51,468	1,692	71
4	TGPC CS 241	LaFayette	Onondaga	3,039,661	434,237	36,186	1,190	50
5	TGPC CS 254	Chatham	Columbia	2,393,660	341,951	28,496	937	39
6	TGPC CS 237	Manchester, Phelps	Ontario	2,298,394	328,342	27,362	900	37
7	AGT Stony Point CS	Stony Point	Rockland	2,013,478	287,640	23,970	788	33
8	NFGSC Concord CS	Concord	Erie	1,733,171	247,596	20,633	678	28
9	AGT SOUTHEAST CS	Southeast	Putnam	1,688,814	241,259	20,105	661	28
10	NFGSC Beech Hill CS	Willing	Allegany	1,387,592	198,227	16,519	543	23
11	NFGSC Independence CS	Andover	Allegany	1,353,931	193,419	16,118	530	22
12	TGPC CS 224	Clymer	Chautauqua	1,146,797	163,828	13,652	449	19
13	DTI Woodhull Station	Woodhull	Steuben	829,223	118,460	9,872	325	14
14	DTI Borger CS	Ithaca	Tompkins	780,159	111,451	9,288	305	13
15	NFGSC Nashville CS	Hanover	Chautauqua	622,791	88,970	7,414	244	10
16	TGPC CS 230-C	Lockport	Niagara	485,609	69,373	5,781	190	8
17	DTI Utica Station	Frankfort	Herkimer	281,369	40,196	3,350	110	5
18	TGPC CS 233	York	Livingston	224,978	32,140	2,678	88	4
				40,192,726	**5,741,818**	**478,485**	**15,731**	**655**

2.5d. Releases by NYS DEC Region

The 18 compressor stations analyzed are in 6 of New York State's 9 DEC regions.

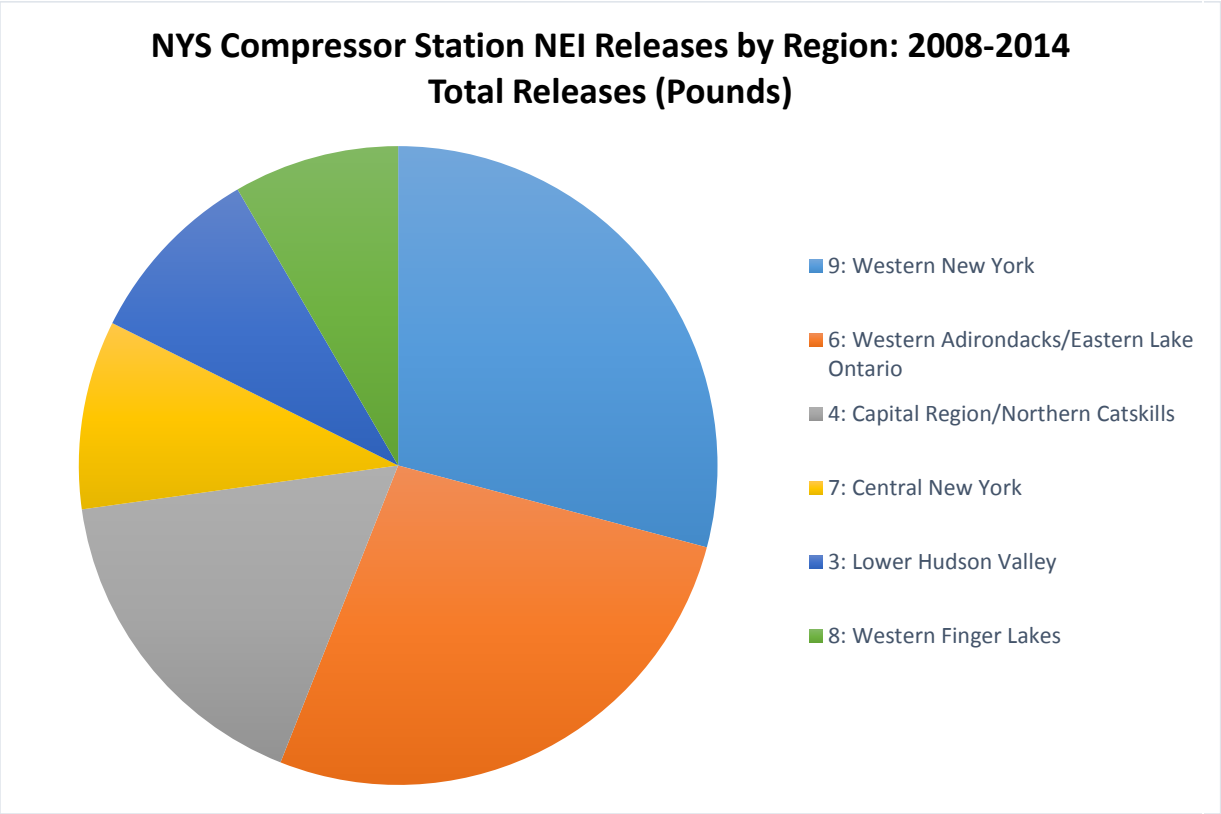
Region 9, Western New York, ranked first with 11.6 million pounds (29.1%), closely followed by Region 6, Western Adirondacks/Eastern Lake Ontario (10.7 million pounds or 27%). Region 4, Capital Region/Northern Catskills, ranked third with 6.7 million pounds (16.8%).

Table 2.5d.

Total Releases by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

NYS DEC Region		County		3 Years: 2008, 11, 14			7-Year Estimate: 2008-2014		
Rank	Number \ Name	Name	Rank	Fac	Ch	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	5	2	22	1,174,939	391,646	2,741,523	6.86
		Chautauqua	10	2	62	669,425	223,142	1,561,991	3.91
		Erie	2	2	55	2,938,971	979,657	6,857,598	17.15
		Niagara	13	1	27	208,118	69,373	485,610	1.21
				7	**67**	**4,991,452**	**1,663,817**	**11,646,722**	**29.13**
2	6: W. Adirondacks / E. Lake Ontario	Herkimer	1	**2**	**67**	**4,605,753**	**1,535,251**	**10,746,758**	**26.88**
3	4: Capital Region / N. Catskills	Columbia	6	1	27	1,025,855	341,952	2,393,661	5.99
		Schoharie	3	1	50	1,852,836	617,612	4,323,285	10.81
				2	**57**	**2,878,691**	**959,564**	**6,716,946**	**16.80**
4	7: Central New York	Onondaga	4	1	48	1,302,712	434,237	3,039,661	7.60
		Tompkins	12	1	47	334,354	111,451	780,159	1.95
				2	**68**	**1,637,066**	**545,689**	**3,819,820**	**9.55**
5	3: Lower Hudson Valley	Putnam	9	1	48	723,778	241,259	1,688,815	4.22
		Rockland	8	1	49	862,919	287,640	2,013,478	5.04
				2	**63**	**1,586,697**	**528,899**	**3,702,293**	**9.26**
6	8: Western Finger Lakes	Livingston	14	1	27	96,419	32,140	224,978	0.56
		Ontario	7	1	9	985,026	328,342	2,298,394	5.75
		Steuben	11	1	61	355,381	118,460	829,223	2.07
				3	**61**	**1,436,827**	**478,942**	**3,352,596**	**8.38**
				18	**70**	**17,136,487**	**5,712,162**	**39,985,136**	**100%**


NYS Compressor Station NEI Releases by Region: 2008-2014
Total Releases (Pounds)
9: Western New York
6: Western Adirondacks/Eastern Lake Ontario
4: Capital Region/Northern Catskills
7: Central New York
3: Lower Hudson Valley
8: Western Finger Lakes

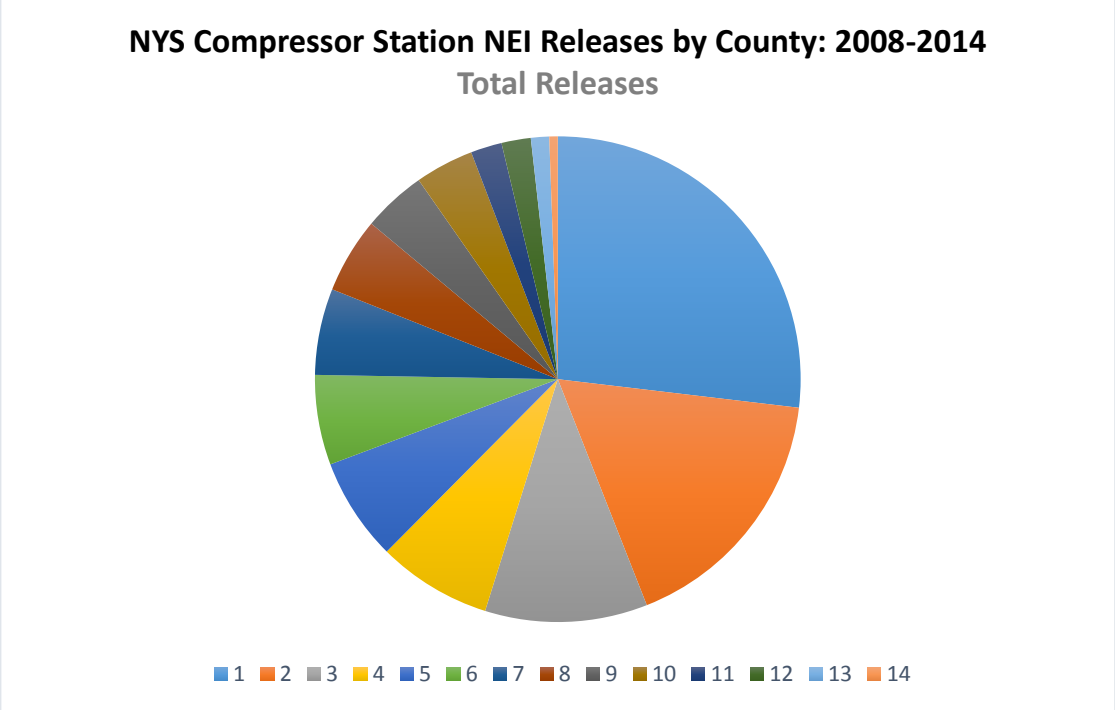
2.5e. Releases by County

Table 2.5e.

Total Pounds by County (ranked)

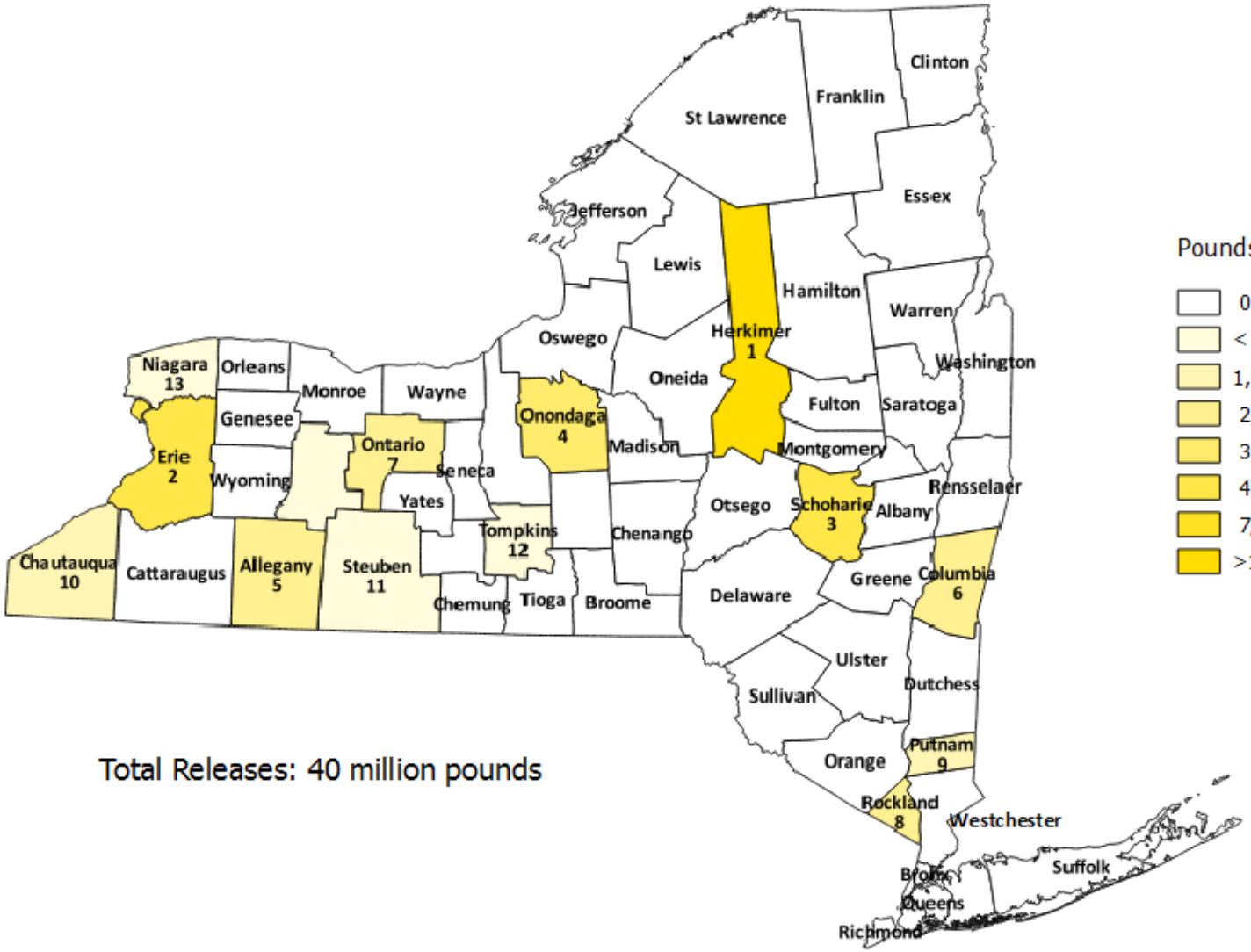
NYS Natural Gas Compressor Stations, Reported NEI Emissions: 2008 to 2014

Rank	Location				Pounds				7 Year Total	
	County	NY DEC Region	Fac	Ch	2008	2011	2014	3 Yr. Avg.	Pounds	%
1	Herkimer	6: W. Adirondacks/E. Lake Ontario	2	67	796,186	1,937,795	1,871,770	1,535,251	10,746,757	26.88
2	Erie	9: Western New York	2	55	864,493	1,161,927	912,550	979,656	6,857,598	17.15
3	Schoharie	4: Capital Region/N. Catskills	1	50	712,001	569,087	571,747	617,612	4,323,285	10.81
4	Onondaga	7: Central New York	1	48	297,484	574,213	431,013	434,237	3,039,661	7.60
5	Allegany	9: Western New York	2	22	235,166	413,713	526,058	391,646	2,741,523	6.86
6	Columbia	4: Capital Region/N. Catskills	1	27	288,373	260,769	476,711	341,951	2,393,660	5.99
7	Ontario	8: Western Finger Lakes	1	9	321,292	482,042	181,690	328,342	2,298,394	5.75
8	Rockland	3: Lower Hudson Valley	1	49	244,039	268,064	350,815	287,639	2,013,478	5.04
9	Putnam	3: Lower Hudson Valley	1	48	161,096	255,289	307,391	241,259	1,688,814	4.22
10	Chautauqua	9: Western New York	2	62	144,599	468,880	55,945	223,141	1,561,991	3.91
11	Steuben	8: Western Finger Lakes	1	61	104,802	209,129	41,449	118,460	829,223	2.07
12	Tompkins	7: Central New York	1	47	129,003	83,412	121,937	111,451	780,159	1.95
13	Niagara	9: Western New York	1	27	83,450	2,791	121,876	69,372	485,609	1.21
14	Livingston	8: Western Finger Lakes	1	27	55,594	31,315	9,509	32,139	224,978	0.56
			18		**4,437,578**	**6,718,426**	**5,980,461**	**5,712,156**	**39,985,130**	**100%**



NYS Natural Gas Compressor Stations: 2008-2014

Total Releases by County



Total Releases: 40 million pounds

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Chapter 3: Health Effects

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Introduction

For most diseases discussed in this study, there is evidence of a relationship between specific ***chemical exposures*** and specific health outcomes.

An increase in certain vector borne infectious and parasitic diseases may result due to a warmer climate created by greenhouse gases, not because of chemical exposure per se. This is best described as an instance of "systemic causation."

The WHO provides this definition of epidemiology:

> Epidemiology is the study of the distribution and determinants of health-related states or events (including disease), and the application of this study to the control of diseases and other health problems. Various methods can be used to carry out epidemiological investigations: surveillance and descriptive studies can be used to study distribution; analytical studies are used to study determinants. (WHO)

The reader should be aware (1) that within science different conceptions of causality are employed, and (2) there is a difference between how science establishes proof of a relationship and that required in legal adjudication.

In mathematics, one can prove a theorem with absolute certainty of 100%.

However, in medicine, epidemiology (a subset of medicine) and biology, one can never absolutely prove "causation." Therefore, science uses the "weight-of-the-evidence" and requires that multiple tests of association reach statistical significance at the 95% or 99% confidence interval—this is considered proof of associations so strong as to ***imply*** causation.

Because the subject matter of epidemiology is populations (not individuals), disease frequency (the rate of disease within a population), diseases patterns in time and place, credible scientific evidence is established when it reaches a 95% "Confidence Interval" (not 100% certainty). Epidemiologists describe the relationship between chemical exposure, co-morbidities and disease in terms of associations or probabilities, not in terms of cause and effect. To be more specific, the presence or absence of a property in a given population in terms of its exposure to a contaminant are expressed in epidemiology as an "odds ratio" (OR), "relative risk" or "risk ratio" (RR), or "hazard ratio" (HR).

When adjudicated in court, to prove harm from chemical exposure plaintiffs do not have to establish that the evidence of a relationship between a chemical exposure and a disease reaches 95% confidence (as it does in epidemiology) but rather that it is "more likely than not" that exposure caused the disease.

In these matters, an understanding of the principles of cognitive science are critical, specifically, the difference between "direct causation" and "systemic causation."

George Lakoff, Richard and Rhoda Goldman Distinguished Professor of Cognitive Science and Linguistics at the University of California at Berkeley, describes the difference concisely:

> Systemic causation is familiar. Smoking is a systemic cause of lung cancer. HIV is a systemic cause of AIDS. Working in coal mines is a systemic cause of black lung disease. Driving while drunk is a systemic cause of auto accidents. Sex without contraception is a systemic cause of unwanted pregnancies.
>
> There is a difference between systemic and direct causation. Punching someone in the nose is direct causation. Throwing a rock through a window is direct causation. Picking up a glass of water and taking a drink is direct causation. Slicing bread is direct causation. Stealing your wallet is direct causation. Any application of force to something or someone that always produces an

> immediate change to that thing or person is direct causation. When causation is direct, the word cause is unproblematic.
>
> Systemic causation, because it is less obvious, is more important to understand. A systemic cause may be one of a number of multiple causes. It may require some special conditions. It may be indirect, working through a network of more direct causes. It may be probabilistic, occurring with a significantly high probability. It may require a feedback mechanism. In general, causation in ecosystems, biological systems, economic systems, and social systems tends not to be direct, but is no less causal. And because it is not direct causation, it requires all the greater attention if it is to be understood and its negative effects controlled.
>
> Above all, it requires a name: systemic causation. (Lakoff 2017)

The only quibble we have is that Lakoff seems to suggest most people regard smoking as a systemic cause of lung cancer. We believe that if you asked most people, they would say "smoking causes lung cancer," the direct implication being it is a "direct cause." The term "systemic causation" is not in the vocabulary of the average person, and in our experience, it is rare to meet an epidemiologist who possess any familiarity with the concept per se (though their work generally assumes and sometimes expresses the idea). Equally important, most people don't understand that epidemiology is not the study of individuals but of populations.

In this study we document the presence of 70 chemicals as airborne contaminants released by stationary combustion at natural gas compressor stations as reported by NEI, two additional stack released reported by GHGI (carbon dioxide and methane) not reported by NEI, and three chemicals from fugitive sources reported by GHGI (carbon dioxide, methane and nitrous oxide). In all, there is documented data for 73 chemicals.

In understanding how and under what circumstances these chemicals individually or collectively may adversely affect human health, the terms reviewed above should all be considered.

We have two concerns: (a) the direct and systemic effects of chemicals on human health and (b) the systemic health effects caused by greenhouse gases.

Acute chemical exposures may produce immediate and obvious health effects. Exposures to high levels of carbon monoxide is toxic to all hemoglobic animals, including human. In ordinary parlance we would say that when carbon monoxide poisoning occurs the acute chemical exposure was the direct (and immediate) cause of death.

High levels of air pollution result in asthmatic attacks, but they are not the cause of the patient's underlying asthma. Because not everyone suffering from asthma has an asthmatic attack on days with particularly bad air pollution, the outcome is probabilistic, which is why an epidemiologist familiar with cognitive science would describe this as systemic causation.

Table 3a provides selected health effects for 6 compressor station pollutants indicating (a) the concern (chemical exposure or climate change) and (b) causation (direct or systemic).

Table 3b provide a list of all 70 stack pollutants and the major categories of disease they are positively associated with.

Table 3a.

Natural Gas Pollutant: Cause for Concern and Causation for Selected Chemicals and Selected Diseases

NYS Natural Gas Compressor Stations

Stack Rank	Chemical	Concern	Ch.	Title	Code	Disease description	Causation	Reference
1	**Nitrogen oxides** **Stack releases: 18,082,570 lbs.**	Climate change	1.	Certain infectious and parasitic diseases		E.g., tick borne diseases	Systemic cause	Systemic cause of disease resulting from a warmer climate and spread of infectious and parasitic diseases
		Chemical exposure	2.	Neoplasms	C30-C39	Malignant neoplasms, respiratory system and intrathoracic organs	Systemic cause	Chen et al. 2014, Hamra et al. 2015, Han et al. 2016
		Chemical exposure	2.	Neoplasms	C54	breast (carcinomas)	Systemic cause	Chen et al. 2012, Jørgensen et al. 2016
		Chemical exposure	4.	Endocrine diseases	E11	diabetes mellitus	Systemic cause	Coogan et al. 2012, Eze et al. 2014
		Chemical exposure	10.	Diseases of the respiratory system	J45	asthma	Systemic cause	Di Giampaolo et al. 2011, van der Vliet 2011
2	**Carbon monoxide** **Stack releases: 12,359,731 lbs.**	Chemical exposure	3.	Diseases of the blood, blood-forming organs, immune mechanism		Autoimmune disease	Systemic cause	Science Daily 6 September 2004, Nicholls 2001
		Chemical exposure	6.	Diseases of the nervous system	G30-G32	Other degenerative diseases of the nervous system	Systemic cause	Nicholls 2001
		Chemical exposure	9.	Diseases of the circulatory system	I20-I25	Ischemic heart diseases	Systemic cause	Alfted et al. 1989, Alfted et al. 1989, Nuvolone et al. 2011.
		Chemical exposure	10.	Respiratory system	J40-J47	Chronic lower respiratory diseases	Systemic cause	Sbihi et al. 2016, Tian et al. 2014
		Chemical exposure	20.	Poisoning and certain other consequences of external causes	T58	Toxic effect of carbon monoxide	Direct cause	NIOSH REL: TWA 35 ppm (40 mg/m^3) C 200 ppm (229 mg/m^3). Acute levels will without exception will sicken all exposed populations and at certain levels kill all people, so CO poisoning can be described as a direct cause poisoning and death. Approximately 40,000 people are treated for CO poisoning annually in the U.S. Signs and symptoms of high inhalation exposure include: headache, tachypnea, nausea, lassitude (weakness, exhaustion), dizziness, confusion, hallucinations; cyanosis; depressed S-T segment of electrocardiogram, angina, syncope (NIOSH Pocket Guide)
3	**Volatile organic chemicals** **Stack releases: 4,920,396 lbs.**	Chemical exposure	4	Endocrine, nutritional and metabolic diseases		endocrine system effects	Systemic cause	TEDX
		Chemical exposure	5.	Mental and behavioral disorders		coordination (loss) reduced cognitive capacity	Systemic cause Systemic cause	U.S. NIH ToxTown U.S. EPA, U.S. NIH
		Chemical exposure	6.	Nervous system diseases		CNS damage	Systemic cause	U.S. EPA, U.S. NIH
		Chemical exposure	9.	Circulatory system		cardiovascular disease	Systemic cause	Lin et al. 2013, Ye et al. 2017
4	**Formaldehyde** **Stack releases: 1,309,336 lbs.**	Chemical exposure	2.	Neoplasms		Malignant neoplasms	Systemic cause	Known human carcinogen (IARC, State of California)
		Chemical exposure	2.	Neoplasms	C00	Malignant neoplasms, lip	Systemic cause	Meshkov 2014
		Chemical exposure	2.	Neoplasms	C06	Malignant neoplasms, mouth	Systemic cause	Meshkov 2014
		Chemical exposure	2.	Neoplasms	C06	Malignant neoplasms, oral cavity	Systemic cause	Merletti et al, 1991
		Chemical exposure	2.	Neoplasms	C11	Malignant neoplasms, nasopharyngeal	Systemic cause	Coggon et al. 2014, Hauptmann et al. 2004, IARC, Marsh et al. 2002, Puñal-Riobóo et al. 2010, Roush et al. 1987, U.S. NTP ROC 13th
		Chemical exposure	2.	Neoplasms	C15	Malignant neoplasms, esophagus	Systemic cause	Coggon et al. 2014
		Chemical exposure	2.	Neoplasms	C16	Malignant neoplasms, stomach	Systemic cause	Coggon et al. 2014
		Chemical exposure	2.	Neoplasms	C22	Malignant neoplasms, liver	Systemic cause	Coggon et al. 2014
		Chemical exposure	20	Symptoms and signs		Varied	Direct cause	NIOSH REL: Ca TWA 0.016 ppm C 0.1 ppm [15-minute]

Stack Rank	Chemical	Concern	Ch.	Title	Code	Disease description	Causation	Reference
								High exposure levels will typically result in: irritation eyes, nose, throat, respiratory system; lacrimation (discharge of tears); cough; wheezing (NIOSH Pocket Guide)
NA	**Carbon dioxide**	Climate change	1.	Certain infectious and parasitic diseases		E.g., tick borne diseases	Systemic cause	Systemic cause of disease resulting from a warmer climate and spread of infectious and parasitic diseases
	Stack releases: Amount TBD	Chemical exposure	10.	Diseases of the respiratory system			Systemic cause	Wong et al. 2011
	Fugitive releases: Amount TBD	Chemical exposure	20	Symptoms and signs		Varied	Direct cause	NIOSH REL: TWA 5000 ppm (9000 mg/m^3) ST 30,000 ppm (54,000 mg/m^3). At high exposure levels inhalation symptoms include: headache, dizziness, restlessness, paresthesia; dyspnea (breathing difficulty); sweating, malaise (vague feeling of discomfort); increased heart rate, cardiac output, blood pressure; coma; asphyxia; convulsions. (NIOSH Pocket Guide)
NA	**Methane**	Climate change	1.	Certain infectious and parasitic diseases		E.g., tick borne diseases	Systemic cause	Systemic cause of disease resulting from a warmer climate and spread of infectious and parasitic diseases
	Fugitive releases: Amount TBD	Chemical exposure	10.	Respiratory system	J80	acute respiratory distress syndrome (ARDS)	Direct cause	acute respiratory distress syndrome (ARDS)
NA	**Nitrous oxides**	Climate change	1.	Certain infectious and parasitic diseases		E.g., tick borne diseases	Systemic cause	Systemic cause of disease resulting from a warmer climate and spread of infectious and parasitic diseases
	Fugitive releases: amount TBD	Chemical exposure	15	Pregnancy, childbirth and the puerperium		Miscarriage or fetal death	Systemic cause	ILO 1996
		Chemical exposure	17.	Congenital malformations and deformations		Birth defects, mutations, fetal damage	Systemic cause	ILO 1996
		Chemical exposure	20.	Poisoning and certain other consequences of external causes	T58	Toxic effect of carbon nitrogen oxides	Direct cause	NIOSH REL: TWA 25 ppm (46 mg/m3) (TWA over the time exposed) [*Note: REL for exposure to waste anesthetic gas.] At high exposure levels inhalation symptoms include: dyspnea (breathing difficulty); drowsiness, headache; asphyxia (NIOSH Pocket Guide)

Table 3b.

Chemicals and Health Effects Ranked by Total Pounds

NYS Natural Gas Compressor Stations, Reported NEI Emissions: 2008 to 2014

#	Chemical	Pounds	%	Neoplasms	Blood & immune system	Endocrine & related	Mental & Behavioral	Nervous system	Eye and adnexa	Ear and mastoid process	Circulatory	Respiratory	Digestive	Skin and subcutaneous	Musculoskeletal	Genitourinary`	Genitourinary: Urinary	Genitourinary: Pelvis, genitals and breasts	Pregnancy, childbirth and the puerperium	Perinatal period	Congenital malformations & chrom. abnormalities	Symptoms, signs, abnormal clinical & lab. findings	Injury, poisoning . . . external causes
				2	3	4	5	6	7	8	9	10	11	12	13	14	14a	14b	15	16	17	18	19
				59	41	52	35	42	44	16	42	51	49	52	6	46	37	36	12	26	57	48	12
1	Nitrogen oxides	18,082,571	45.22			√	√		√		√	√		√		√		√		√	√	√	
2	Carbon monoxide	12,359,731	30.91		√		√	√		√	√	√	√			√		√			√	√	
3	Volatile organic compounds	4,920,396	12.31	√	√	√	√	√	√	√	√	√	√	√		√	√	√			√	√	
4	Formaldehyde	1,309,336	3.27	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√
5	PM10 Primary (Filt + Cond)	1,259,744	3.15	√			√				√	√		√		√		√		√	√	√	
6	PM 2.5 Primary (Filt + Cond)	1,106,198	2.77	√			√				√	√		√		√		√		√	√	√	
7	PM Condensable	540,267	1.35	√		√	√							√		√		√		√	√		
8	Sulfur dioxide	186,778	0.47	√	√	√	√	√	√		√	√	√	√						√	√	√	√
9	Acetaldehyde	65,969	0.16	√	√	√	√	√	√		√	√		√		√	√	√	√	√	√	√	√
10	Acrolein	52,723	0.13	√				√	√		√	√	√	√					√		√	√	√
11	Benzene	21,241	0.05	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
12	Methanol	19,333	0.05	√	√	√	√	√	√		√	√	√	√		√	√	√		√	√	√	
13	Toluene	19,308	0.05	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	
14	Hexane	12,184	0.03	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√	
15	Xylene (mixed isomers)	8,394	0.02	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
16	1,3-Butadiene	4,719	0.01	√	√	√		√	√		√	√	√	√		√	√	√			√	√	
17	2,2,4-Trimethylpentane	4,445	0.01					√						√		√						√	
18	Ethyl benzene	2,794	0.01	√	√	√	√	√	√	√	√	√	√	√		√	√	√		√	√	√	
19	Ammonia	1,573	0.00	√	√	√	√	√	√		√	√	√	√		√	√					√	√
20	Phenol	706	0.00	√	√	√	√	√	√	√	√	√	√	√		√	√	√		√	√	√	√
21	Naphthalene	696	0.00	√	√	√	√	√	√		√	√	√	√		√	√		√		√	√	
22	Nickel	692	0.00	√	√		√	√	√		√	√	√	√		√	√	√		√	√	√	
23	Biphenyl	690	0.00	√		√		√	√		√	√	√	√		√	√				√	√	
24	Methane dichloride	629	0.00	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√
25	Propylene oxide	615	0.00	√	√		√	√	√		√	√	√	√		√	√	√			√	√	√
26	Manganese	350	0.00	√	√	√	√	√	√	√	√	√	√	√		√	√	√		√	√	√	
27	Ethylene dibromide	347	0.00	√	√	√	√	√	√			√	√	√		√	√	√			√	√	
28	1,1,2,2-Tetrachloroethane	309	0.00	√	√	√	√	√	√		√	√	√	√		√	√				√	√	
29	Carbon tetrachloride	282	0.00	√	√	√	√	√	√		√	√	√	√		√	√	√	√	√	√	√	
30	1,1,2-Trichloroethane	247	0.00	√	√		√	√			√		√	√		√	√				√		
31	Styrene	234	0.00	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	
32	Chloroform	193	0.00	√	√	√	√	√	√		√	√	√	√		√	√	√		√	√	√	

#	Chemical	Pounds	%	Neoplasms	Blood & immune system	Endocrine & related	Mental & Behavioral	Nervous system	Eye and adnexa	Ear and mastoid process	Circulatory	Respiratory	Digestive	Skin and subcutaneous	Musculoskeletal	Genitourinary`	Genitourinary: Urinary	Genitourinary: Pelvis, genitals and breasts	Pregnancy, childbirth and the puerperium	Perinatal period	Congenital malformations & chrom. abnormalities	Symptoms, signs, abnormal clinical & lab. findings	Injury, poisoning . . . external causes
				2	3	4	5	6	7	8	9	10	11	12	13	14	14a	14b	15	16	17	18	19
33	2-Methylnaphthalene	191	0.00	√	√		√		√			√										√	
34	Chlorobenzene	172	0.00	√	√	√	√	√	√		√	√	√	√	√	√	√				√	√	
35	Propylene dichloride	164	0.00	√	√			√				√	√			√	√				√	√	
36	1,3-Dichloropropene	161	0.00	√	√			√	√			√	√	√		√	√	√		√	√	√	
37	Ethylene dichloride	151	0.00	√	√	√	√	√	√		√	√	√	√		√	√	√			√	√	
38	Ethylidene dichloride	144	0.00	√				√	√		√	√	√			√	√	√					
39	Vinyl chloride	107	0.00	√	√		√	√	√	√	√	√	√	√		√		√			√	√	
40	Mercury	70	0.00	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√		√	√	
41	Chromium III	56	0.00			√			√			√	√	√								√	
42	Phenanthrene	48	0.00	√		√			√			√	√	√						√	√	√	√
43	PAHs Total	35	0.00	√																			
44	Cadmium	30	0.00	√	√	√	√	√	√	√	√	√	√	√		√	√	√		√	√	√	√
45	Fluorene	28	0.00			√							√								√		
46	Benz[a]anthracene	19	0.00	√		√															√		
47	Benzo(j,k)fluorene	11	0.00			√							√								√		
48	Anthracene	10	0.00	√		√			√			√	√	√							√	√	√
49	Perchloroethylene	9	0.00	√	√	√	√	√	√		√	√	√	√		√	√	√	√	√	√	√	
50	Acenaphthene	8	0.00										√							√			
51	Pyrene	7	0.00			√		√						√							√		
52	Ethyl chloride	6	0.00	√	√		√	√	√		√	√	√	√	√	√	√	√			√	√	
53	Acenaphthylene	5	0.00			√						√											
54	Chrysene	4	0.00	√		√															√		
55	Chromium (VI)	2	0.00	√		√			√			√	√	√								√	
56	Benzo[g,h,i]perylene	2	0.00	√	√								√								√		
57	Benzo[b]fluoranthene	1	0.00	√		√															√		
58	Lead	1	0.00	√	√	√	√	√	√	√	√	√	√	√		√	√	√		√	√	√	√
59	Benzo[e]pyrene	0.09	0.00			√															√		
60	Arsenic	0.06	0.00	√	√	√		√			√	√	√	√		√	√			√	√	√	
61	Cobalt	0.03	0.00	√	√	√		√	√	√	√	√	√	√		√	√	√			√	√	
62	Indeno[1,2,3-cd]pyrene	0.02	0.00	√		√															√		
63	Benzo[a]pyrene	0.01	0.00	√	√	√						√	√	√		√					√		
64	Selenium	0.01	0.00	√	√	√	√	√	√		√	√	√	√	√	√	√	√			√	√	
65	Perylene	0.0039	0.00			√																	
66	Beryllium	0.0034	0.00	√			√		√		√	√	√								√	√	
67	7,12-Dimethylbenz[a]anthracene	0.0033	0.00	√	√	√								√		√		√					
68	Benzo[k]fluoranthene	0.0029	0.00	√		√															√		
69	3-Methylcholanthrene	0.0003	0.00	√		√					√			√									
70	Dibenz[a,h]anthracene	0.0001	0.00	√		√								√							√		

3.1 Certain infectious and parasitic diseases (A00-B99)

As indicated above, for certain infectious and parasitic diseases (Chapter 1 of ICD-10), adverse health effects are not the result of chemical exposures per se, but the result of a warmer climate created by greenhouse gases which lead to their spread and in many cases increased virulence.

The spread of a wide range of both human and animal infectious disease as a result of climate change is unavoidable, and some effects are already clear (Bouzid et al. 2014, Caminade et al. 2014, Confalonieri et al. 2015, Gislason 2014, Heffernan 2013, Medlock and Leach 2014, Parham et al. 2014, Ogden et al. 2014, Rodríguez-Morales 2013, Shuman 2011).

A wide variety of non-infectious and non-parasitic diseases will also increase in incidence as a result of climate change including: allergic disease (Barne et al. 2013, Behrendt and Ring 2012, Bielory et al. 2012), cardiopulmonary disorders (De Blois et al. 2015, Rice et al. 2014), respiratory disease (Barne et al. 2013, Gerardi and Kellerman 2014, Lin et al. 2012, Takaro et al. 2013), and skin diseases (Andersen 2011, Andersen et al. 2012, Balato et al. 2013).

Everyone will be affected by the impact of climate change on health--more vulnerable populations include the elderly (Gamble et al. 2013), children (Bernstein et al. 2011), and manual workers (Applebaum et al. 2016).

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3.2. Neoplasms (C00-D48)

3.2.1. Carcinogens by Evidence of Carcinogenicity

Fifty-nine of the 70 chemicals released by NYS natural gas compressor stations are associated with neoplastic diseases.

All 18 stations had carcinogenic releases. These totaled an estimated 9.5 million pounds from 2008 to 2014--an annual average of 1.4 million pounds.

Chemicals associated with cancer represented 23.7% of all compressor station releases.

Of the 59 chemicals linked to cancer, 22 chemicals are categorized as “known” human carcinogens by one or more authoritative sources:

1. International Agency for Research on Cancer (IARC) -- the specialized cancer agency of the World Health Organization (WHO),
2. U.S. National Toxicology Program (NTP) -- National Institute of Environmental Health Sciences, National Institutes of Health,
3. U.S. Environmental Protection Agency (EPA),
4. U.S. National Institute for Occupational Safety and Health (NIOSH),
5. U.S. Occupational Safety and Health Administration (OSHA), and
6. State of California, Office of Environmental Health Hazard Assessment (CA/OEHHA) -- part of the California Environmental Protection Agency (Cal/EPA).

Known human carcinogens account for 83% of total carcinogens.

Table 3.2.1a.

Carcinogens by Evidence of Carcinogenicity

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

			Location			7 Years (estimate)		
Evidence of Carcinogenicity		Ch	Fac	Cn	DEC	Average Annual Pounds	Total Pounds	%
1	Authority: known human carcinogen	23	18	14	6	1,129,164	7,904,153	82.87
2	Authority: probable human carcinogen	2	18	14	6	105	738	.01
3	Authority: possible human carcinogen	18	18	14	6	13,020	91,140	.96
4	Peer-reviewed: positive human and animal evidence of carcinogenicity	17	17	13	6	39,004	273,032	2.86
5	Peer-reviewed: positive human evidence of carcinogenicity	14	14	12	6	181,162	1,268,140	13.30
6	Peer-reviewed: positive animal evidence of carcinogenicity	3	11	9	6	152	1,069	.01
	Total	**59**	**18**	**14**	**6**	**1,362,607**	**9,538,272**	**100%**

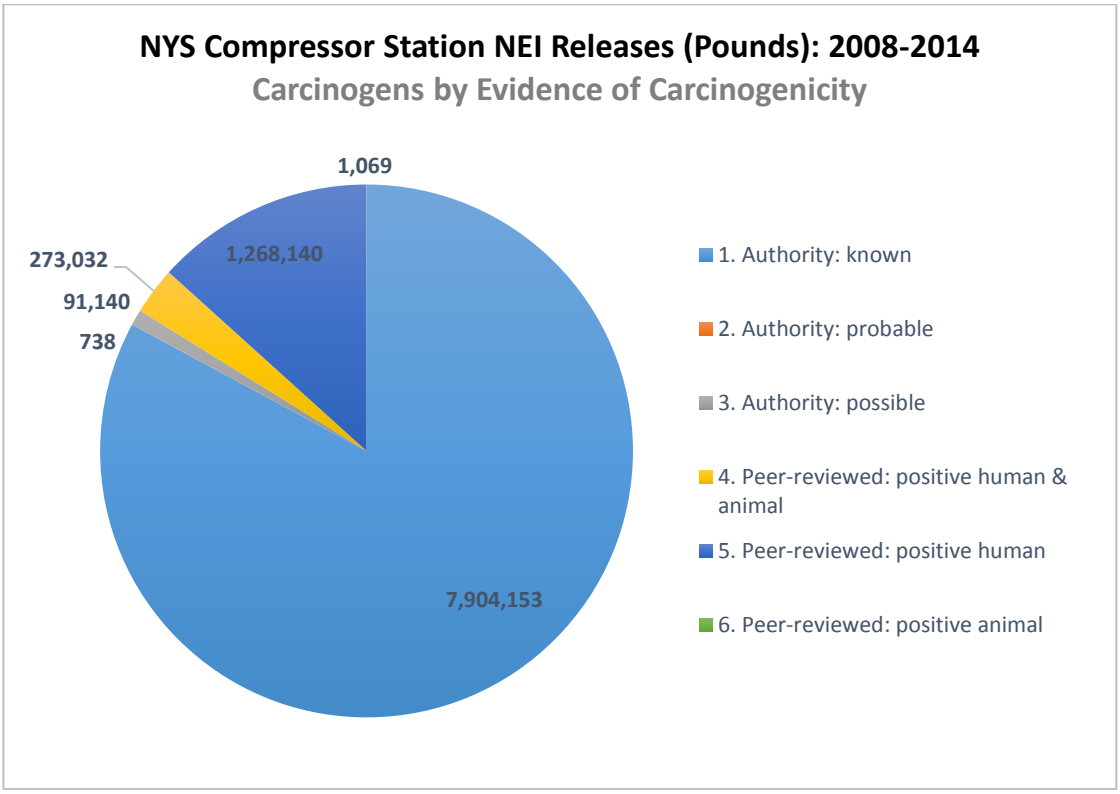


Table 3.2.1b.

Neoplastic Diseases by Chemical (Top 20 Carcinogens)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

			Authors 'Classification	IARC	IARC: Evidence, Human	IARC: Evidence, Animal	U.S. NTP	U.S. NIOSH	U.S. EPA	EPA: Evidence, Human	EPA: Evidence, Animal	U.S. OHA	California Proposition 65			Stomach		Anus	Liver and intrahepatic bile ducts			Nasal cavity		Trachea	Bronchus, lung	Skin	Connective and soft tissue	Breast, female	Uterus	Prostate	Kidney	Bladder	Adrenal gland	Leukemia and\or Lymphoma			Lymphoma	Non-Hodgkin's		Leukemia: mononuclear cell	Chronic lymphocytic leukemia	Myeloid leukemia
Rank	Name	Pounds		I										C14	C15	C16	C18	C21	C22	C23	C25	C30	C32	C33	C34	C44	C49	C50	C55	C61	C64	C67	C74		Leu		C85	C90.0	C91.0	C91.1	C92.0
1	Volatile organic compounds	4,920,395	1-K																																							
2	Formaldehyde	1,309,335	1-K	1	S	S	K	P	B1			R	K					S				L																			
3	PM10 Primary (Filt + Cond)	1,259,744	5-H										MC																													
4	PM2.5 Primary (Filt + Cond)	1,106,197	1-K	1									MC																													
5	PM Condensable	540,267	1-K	1																																						
6	Sulfur dioxide	186,778	5-H	3																																						
7	Remaining PM Fine	98,182	1-K	1																																						
8	Acetaldehyde	65,969	1-K	2B	I	S	R	P	B2				K					Sa					Sa		Sa																	
9	Acrolein	52,723	4-H-A	3	I	I																																				
10	Benzene	21,240	1-K	1	S	S	K	P	K/L			R	K																					S			L	L	L	L	S
11	Methanol	19,333	3-Ps							ND	ND																															
12	Toluene	19,308	4-H-A	3	I	Su																																				
13	Hexane	12,184	6-A																																							
14	Xylenes (mixed isomers)	8,394	4-H-A	3	I	I																																				
15	1,3-Butadiene	4,718	1-K	1	S	S	K	P	K			R	K																					S							
16	Ethyl benzene	2,794	1-K	2B	I	S			D				K																													
17	Ammonia	1,573	4-H-A																																							
18	Phenol	706	6-A	3	I	I																																				
19	Naphthalene	696		2B	I	S	R		C				K																													
20	Nickel	692		2B	S	S	R	P	A				K																													
21	Biphenyl	690	2-Pr						SEv																																	
22	Methylene chloride	629	1-K	2A	I	S	R	P	L			R	K																													
23	Propylene oxide	615		2B	I	S	R	P	B2				K																													
25	Ethylene dibromide	347		2A	I	S	R	P	L				K																													
26	1,1,2,2-Tetrachloroethane	309		3	I	L		P	L				K																													
27	Carbon tetrachloride	282		2B	I	S	R	P	L				K						Sa														Sa									
28	1,1,2-Trichloroethane	247		3	I	L		P	C				K																													
29	Styrene	234		2B	L	L	R						K																													

Rank	Name	Pounds	Authors 'Classification	IARC	IARC: Evidence, Human	IARC: Evidence, Animal	U.S. NTP	U.S. NIOSH	U.S. EPA	EPA: Evidence, Human	EPA: Evidence, Animal	U.S. OHA	California Proposition 65	C14	C15	Stomach	C18	C21	Liver and intrahepatic bile ducts	C23	C25	Nasal cavity	C32	Trachea	Bronchus, lung	Skin	Connective and soft tissue	Breast, female	Uterus	Prostate	Kidney	Bladder	Adrenal gland	Leukemia and\or Lymphoma	Leu	Lymphoma	Non-Hodgkin's	C90.0	Leukemia: mononuclear cell	Chronic lymphocytic leukemia	Myeloid leukemia
				I										C14	C15	C16	C18	C21	C22	C23	C25	C30	C32	C33	C34	C44	C49	C50	C55	C61	C64	C67	C74		Leu		C85		C91.0	C91.1	C92.0
30	Chloroform	193		2B	I	S	R	P	L				K						Sa															Sa							
33	Propylene dichloride	164		1	S	S	K	P					K						S																						
34	1,3-Dichloropropene	161		2B	ND	S	R		K/L				K			Sa									Sa							Sa								
35	Ethylene dichloride	151		2B			R	P	B2				K			Sa			Sa						Sa		Sa	Sa	Sa						Sa	Sa					
36	Ethylidene dichloride	144							C				K																											
37	Vinyl chloride	107		1	S	L	K		A			R	K						S																					
44	Cadmium	30		1			K	P	B1			R	K												S					S	S									
46	Benz[a]Anthracene	19		2B			R		B2				K											Sa	Sa	Sa														
48	Anthracene	10	6-A	3	ND	L			D	ND	I																													
49	Tetrachloroethylene	9		2A	L	S	R	P	L				K						S													L						S		
50	Pyrene	7		3					D	ND	I																													

3.2a. Releases by Chemical

Volatile organic compounds (VOCs) as a group were responsible for 51.6% of all statewide carcinogenic releases, slightly more than 4.9 million pounds. In addition to VOCs as a group, NEI also identifies specific VOCs. Individual VOCs have different levels of evidence of human carcinogenicity. Formaldehyde, which ranks 2nd, is classified by IARC as a known human carcinogen. Acetaldehyde, which ranks 7th, is classified as a possible human carcinogen by IARC. Methanol, which ranks 10th, is classified by EU as having limited evidence of human carcinogenicity (R40). There is both animal and human evidence for the carcinogenicity of acrolein, but it has not been classified by IARC because of the limited amount of evidence available. Benzene, which ranks 9th, is universally considered a known human carcinogen (IARC, NTP, EPA, OSHA, NIOSH, CA/OEHHA). VOCs as a group undoubtedly contain a mixture of individuals VOCs, some of which are classified as known, probable or possible human carcinogens, as well as some that have not been classified by an authoritative agency for various reasons including the lack of available evidence upon which to make an assessment. While not every VOC is a carcinogen, many are. The emission reporting category VOCs is, in our opinion, reflective of known human carcinogenic activity and we have included it as a known human carcinogen in this report. Formaldehyde ranked second with 1,309,335 pounds (13.7%), followed by PM10 with 1,259,744 pounds (13.2%). These three chemicals were responsible for 78.5% of all carcinogens released by the state's natural gas compressor stations. The top 10 chemicals accounted for 99.4% of all carcinogenic releases.

Table 3.2a.

Neoplastic Diseases by Chemical (Top 20 Carcinogens)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Volatile organic compounds	18	14	6	2,108,741	702,913	4,920,395	51.59
2	Formaldehyde	18	14	6	561,143	187,047	1,309,335	13.73
3	PM10 Primary (Filt + Cond)	18	14	6	539,890	179,963	1,259,744	13.21
4	PM2.5 Primary (Filt + Cond)	18	14	6	474,084	158,028	1,106,197	11.60
5	PM Condensable	18	14	6	231,543	77,181	540,267	5.66
6	Sulfur Dioxide	18	14	6	80,047	26,682	186,778	1.96
7	Acetaldehyde	14	13	6	28,272	9,424	65,969	0.69
8	Acrolein	14	13	6	22,595	7,531	52,723	0.55
9	Benzene	16	13	6	9,103	3,034	21,240	0.22
10	Methanol	8	7	6	8,285	2,761	19,333	0.20
11	Toluene	16	13	6	8,274	2,758	19,307	0.20
12	Hexane	13	10	6	5,221	1,740	12,183	0.13
13	Xylenes (Mixed Isomers)	15	13	6	3,597	1,199	8,394	0.09
14	1,3-Butadiene	14	13	6	2,022	674	4,718	0.05
15	Ethyl Benzene	15	13	6	1,197	399	2,794	0.03
16	Ammonia	8	7	5	674	224	1,573	0.02
17	Phenol	11	10	6	302	100	706	0.01
18	Naphthalene	15	13	6	298	99	696	0.01
19	Nickel	11	11	6	296	98	691	0.01
20	Biphenyl	6	6	5	295	98	690	0.01
		18	**14**	**6**	**4,085,879**	**1,361,953**	**9,533,733**	**99.97**

3.2b. Releases by ICD Category

Neoplasms are subdivided into 3 major groups: malignant neoplasms (C00-C97), in situ neoplasms (D00-D09), benign neoplasms (D10-D36), and neoplasms of uncertain or unknown behavior (D37-D48). Chemicals released by natural gas compressor stations in NYS are positively associated with all four. It should be remembered, that a single chemical can be associated with more than one category of disease.

Malignant neoplasms (C00-C97)

Malignant neoplasms are sub-divided into 14 groups--the primary consideration for categorization being the effected organ or organ system. Fifty-six chemicals released by NYS compressor stations (2008-2014) are associated with malignant neoplasms.

All 18 NYS compressor stations had reported releases of chemicals associated with malignant neoplasms.

Four of the top 5 polluters were facilities operated by the Tennessee Gas Pipeline Company. TGPC's Compressor Station 245 in Winfield ranked first with 1.7 million pounds or 18% of the total, followed by the company compressor in Carlisle (1.4 million pounds or 14.2%) and by its LaFayette facility (1.14 million pounds or 11.9%). These three sites were responsible for 4.2 million pounds or 44% of all statewide releases. The top 5 sites were responsible for 5.9 million pounds or slightly less than two-thirds (62.1%) of the state total. The facility average was 532,453 pounds. (Table 2c)

1. Lip, oral cavity and pharynx (C10-C14)

Fourteen chemicals released by NYS natural gas compressor stations are associated with malignant neoplasms of the lip, oral cavity and pharynx. Specific organs affected include: lips (C00), tongue (C02), buccal, mouth, and oral cavity (C06), salivary gland (C08), nasopharynx (C11), hypopharyngeal (C13), and oral cavity and pharynx (C14).

Four of the top 5 polluters were facilities operated by the Tennessee Gas Pipeline Company. TGPC's Compressor Station 245 in Winfield ranked first with 226.703 pounds or 15.7% of the total, followed by the company's compressor in LaFayette (186,512 pounds or 13%) and its Carlisle facility (159,281 pounds or 11.1%). These three sites were responsible for 572,496 pounds or 40% of all statewide releases. The top 5 sites were responsible for 852,720 pounds or more than one-half (59.2%) of the state total. The facility average was 80,029 pounds. (Table 2c.1)

2. Digestive organs (C15-C26)

Thirty-eight chemicals released by NYS natural gas compressor stations are associated with digestive system malignancies. Specific organs affected include: esophagus (C15), stomach (C16), duodenum, small intestine (C17), colon (C18), rectum (C20), anus (C21), liver (C22), biliary tract (C24), pancreas (C25), and spleen (C26).

Four of the top 5 polluters were facilities operated by the Tennessee Gas Pipeline Company. TGPC's Compressor Station 245 in Winfield ranked first with 187,951 pounds or 15.6% of the total, followed by the company's station in LaFayette (187,951 pounds or 12.9%) and its Carlisle facility (160,478 pounds or 11%). These three sites were responsible for 576,136 pounds or 39.4% of all statewide releases. The top 5 sites were responsible for 861,765 pounds or more than one-half (58.9%) of the state total. The facility average was 81,250 pounds. (Table 2c.2)

3. Respiratory system and intrathoracic organs (C30-C39)

Thirty-eight chemicals released by NYS natural gas compressor stations are associated with respiratory system and intrathoracic organ malignancies. Specific organs affected include: nasal cavity, nasal mucosa and paranasal sinus (C30), larynx, throat and trachea (C32), bronchus and lung (C34), cardiac and heart (C38), and respiratory tract (C39).

Four of the top 5 polluters were facilities operated by the Tennessee Gas Pipeline Company. TGPC's Compressor Station 245 in Winfield ranked first with 1.7 million pounds or 18.1% of the total, followed by the company's station in Carlisle (1.3 million pounds or 14.2%) and its LaFayette facility (1.1 million pounds or 11.9%). These three sites were responsible for 4.1 million pounds or 44.2% of all statewide releases. The top 5 sites were responsible for5.8 million pounds or slightly less than two-thirds (62.1%) of the state total. The facility average was 520,308 pounds. (Table 2c.3)

4. Bone and articular cartilage (C40-C41)

Thirty-five chemicals released by NYS natural gas compressor stations are associated with bone and articular cartilage malignancies, specifically, bone carcinoma and osteosarcoma subcutaneous tissue fibrosarcoma (C41).

Four of the top 5 polluters were facilities operated by the Tennessee Gas Pipeline Company. TGPC's Compressor Station 245 in Winfield ranked first with 1.6 million pounds or 18.4% of the total, followed by the company's station in Carlisle (1.2 million pounds or 14.1%) and its LaFayette facility (1 million pounds or 12%). These three sites were responsible for 3.9 million pounds or 44.5% of all statewide releases. The top 5 sites were responsible for 5.4 million pounds or slightly less than two-thirds (62.1%) of the state total. The facility average was 487,068 pounds. (Table 2c.4)

5. Skin (C43-C44)

Fourteen chemicals released by NYS natural gas compressor stations are associated with skin carcinomas (C44).

TGPC's Compressor Station 229 in Eden ranked first with 13,750 pounds or slightly more than half (51.5%) of the total, followed by AG Stony Point compressor (4,553 pounds or 17.1%) and DTI's Woodhull Station (2,883 pounds or 10.8%). These three sites were responsible for 21,187 pounds or more than three-fourths (79.4%) of all statewide releases. The top 5 sites were responsible for 24,199 pounds or 90.1% the state total. The facility average was 1,483 pounds. (Table 2c.5)

6. Connective and soft tissue (C45-C49)

Seventeen chemicals released by NYS natural gas compressor stations are associated with connective and soft tissue malignancies, specifically, peritoneal cavity carcinoma and peritoneum mesothelioma (C48), and blood vessel angiosarcoma, carcinoma and hemangiosarcoma, connective tissue carcinoma and sarcoma, heart hemangiosarcoma, liver hemangiosarcoma, and muscle carcinoma (C49).

AG Stony Point Compressor Station ranked first with 7.516 pounds or 27.5% the total, followed by TGPC's compressor in Eden (6,843 pounds or 25%) and AG's Southeast Station (4,304 pounds or 16%). These three sites were responsible for 18,663 pounds or slightly more than two-thirds (68.3%) of all statewide releases. The top 5 sites were responsible for 22,680 pounds or 83% the state total. The facility average was 1,519 pounds. (Table 2c.6)

7. Breast and female genital organs (C50-C58)

Twenty-five chemicals released by NYS natural gas compressor stations are associated with breast and female genital organ malignancies. Specific organs affected include: breast adenocarcinoma, carcinoma and carcinosarcoma (C50), cervical carcinoma (C53), carcinoma of the uterus (C55), and ovarian carcinoma and granulosa cell carcinoma (C56).

The top 5 polluters were facilities operated by the Tennessee Gas Pipeline Company. TGPC's Compressor Station 245 in Winfield ranked first with 766,684 pounds or 17.7% of the total, followed by the company's station in Carlisle (648,570 pounds or 15%) and its Eden facility (529,510 pounds or 12.2%). These three sites were responsible for 1.9 million pounds or 45% of all statewide releases. The top 5 sites were responsible for 2.8 million pounds or slightly less than two-thirds (63.5) of the state total. The facility average was 240,897 pounds. (Table 2c.7)

8. Male genital organs (C60-C63)

Thirteen chemicals released by NYS natural gas compressor stations are associated with male genital organ malignancies, specifically, prostate carcinomas (C61) and testes carcinomas (C62).

Four of the top 6 polluters were facilities operated by the Tennessee Gas Pipeline Company. TGPC's Compressor Station 245 in Winfield ranked first with 222,045 pounds or 15.9% of the total, followed by NFGSC's station in Concord (188,88 pounds or 13.5%) and TGPC's LaFayette facility (179,381 pounds or 12.6%). These three sites were responsible for 590,314 pounds or 42.2% of all statewide releases. The top 5 sites were responsible for 866,213 pounds or slightly less than two-thirds (61.9%) of the state total. The facility average was 77,773 pounds. (Table 2c.8)

9. Urinary organs (C64-C68)

Twenty-five chemicals released by NYS natural gas compressor stations are associated with urinary tract malignancies, specifically, kidney carcinoma, cortical adenocarcinoma, renal cell carcinoma (C64), urinary bladder carcinoma and transitional cell carcinoma (C67), and urogenital carcinomas (C68).

The top 4 polluters were facilities operated by the Tennessee Gas Pipeline Company. TGPC's Compressor Station 245 in Winfield ranked first with 222,047 pounds or 15.8% of the total, followed by the company's station in LaFayette (186,990 pounds or 13%) and its Carlisle facility (159,689 pounds or 11.1%). These three sites were responsible for 575,865 pounds or 39% of all statewide releases. The top 5 sites were responsible for 862,150 pounds or 59% of the state total. The facility average was 80,063 pounds. (Table 2c.9)

10. Malignant neoplasms: Eye, brain and central nervous system (C69-C72)

Twenty chemicals released by NYS natural gas compressor stations are associated with eye, brain and central nervous system malignancies, specifically, retinoblastoma and uveal melanoma (C69), brain malignant astrocytoma, carcinoma and glioma (C71), and central nervous system carcinomas (C72).

The top 4 polluters were facilities operated by the Tennessee Gas Pipeline Company. TGPC's Compressor Station 245 in Winfield ranked first with 222,607 pounds or 15.6% of the total, followed by the company's station in LaFayette (187,876 pounds or 12.9%) and its Carlisle facility (160,382 pounds or 11%). These three sites were

responsible for 575,865 pounds or 39.4 %of all statewide releases. The top 5 sites were responsible for 862,150 or 59% of the state total. The facility average was 81,202 pounds. (Table 2c.10)

11. Malignant neoplasms: Endocrine glands and related structures (C73-C75)

Ten chemicals released by NYS natural gas compressor stations are associated with endocrine glands and related structure malignancies, specifically, thyroid gland C-cell carcinoma, carcinomas and follicular cell carcinoma (C73) and adrenal gland malignant pheochromocytoma and carcinoma (C74), and pituitary gland carcinoma (C75).

Five of the top 6 polluters were facilities operated by the Tennessee Gas Pipeline Company. TGPC's Compressor Station 245 in Winfield ranked first with 222,166 pounds or 18.2% of the total, followed by NPGSC's Concord station (189,058 pounds or 14.7%) and TGPC's LaFayette facility (179,540 pounds or 12.6%). These three sites were responsible for 590,765 pounds, or 42% of all statewide releases. The top 5 sites were responsible for 877,093 or slightly less than two-thirds (62.2%) of the state total. The facility average was 78,393 pounds. (Table 2c.11)

12. Malignant neoplasms: Secondary and ill-defined (C76-C80)

Six chemicals released by NYS natural gas compressor stations are associated with secondary and ill-defined malignancies, specifically, head carcinoma (C76).

Algonquin Gas Transmission Company's facility in Stony Point, Rockland County, ranked first with 10,793 pounds or slightly less than one-third (32.4%) of the total, followed by the company's facility located in the village of Brewster in the town of Southeast (6,858 pounds or 20.6%). TCPC's station in Eden, Eire County, ranked third (5,172 pounds or 15.5%). These three sites were responsible for 22,823 or slightly more than two-thirds (68.5%) of the total. The top 5 sites were responsible for 28,724 or 86.2% of the state total. The facility average was 1,851 pounds. (Table 2c.12)

13. Malignant Neoplasms, Stated or Presumed to be Primary, of Lymphoid, Haematopoietic and Related Tissue (C81-C96)

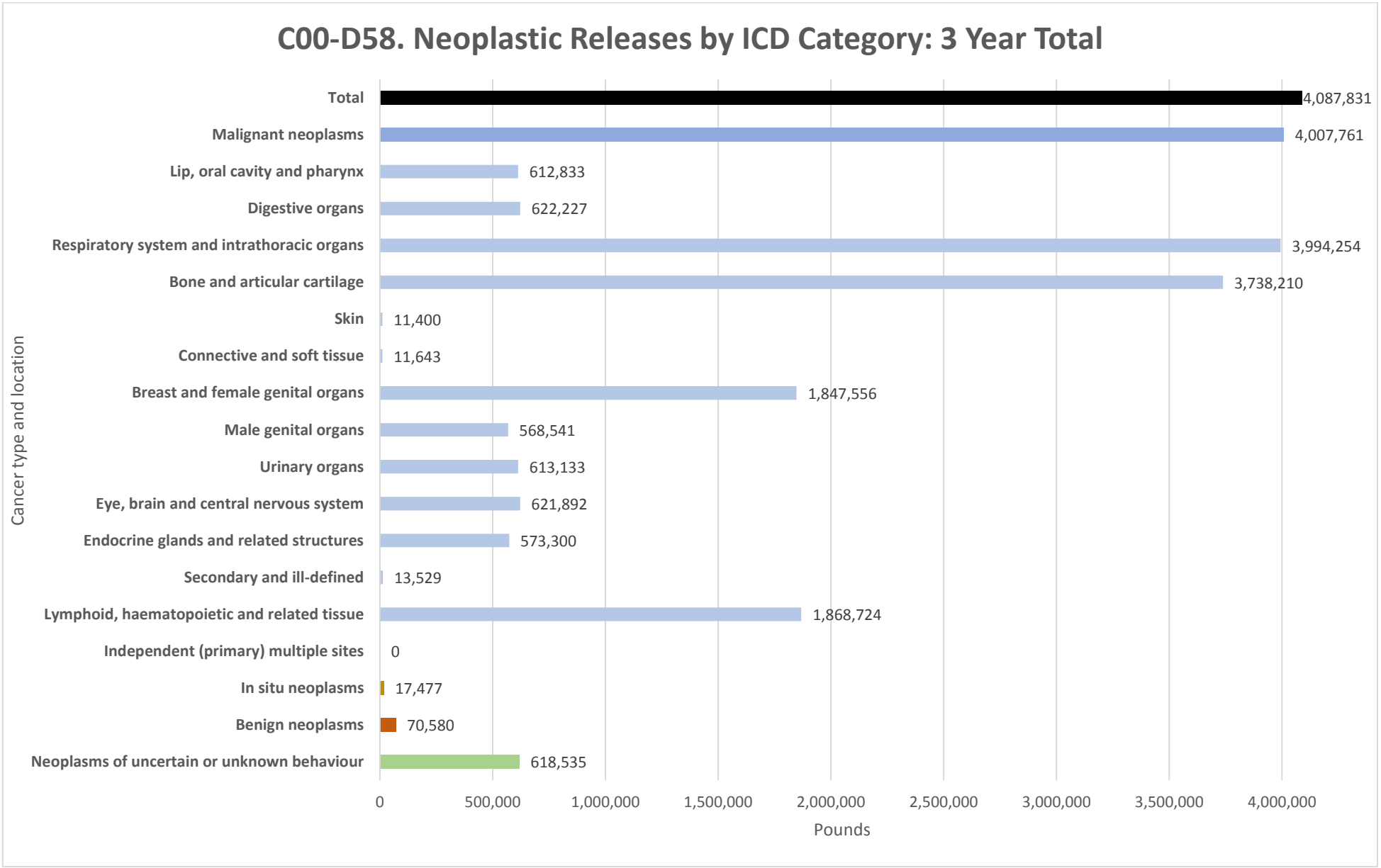
Thirty-one chemicals released by NYS natural gas compressor stations are associated with malignant neoplasms stated or presumed to be primary, of lymphoid, haematopoietic and related tissue. These diseases include: Hodgkin's disease (C81), other and unspecified types of non-Hodgkin's lymphoma, including histiocytic sarcomas, lymph sarcomas, lymph system carcinomas and reticulum cell sarcomas (C85), multiple myeloma and malignant plasma cell neoplasms (C90), lymphoid leukemia (C91), myeloid leukemia (C92), leukemia of unspecified cell type, including childhood leukemia (C95), and other and unspecified malignant neoplasms of lymphoid, haematopoietic and related tissue, including blood carcinoma, unspecified leukemia, hematologic and hematopoietic carcinoma (C96).

Table 3.b.

Neoplastic Diseases by ICD Category

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

ICD-10			Facilities				Chemicals				Pounds			
#	Code	Description	'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	C00-C97	Malignant neoplasms	18	18	17	18	53	54	54	56	744,394	1,679,621	1,583,745	4,007,761
2	C00-C14	Lip, oral cavity and pharynx	18	18	16	18	12	14	14	14	118,992	254,897	238,943	612,833
3	C15-C26	Digestive organs	18	18	16	18	37	38	38	38	121,690	258,670	241,866	622,227
4	C30-C39	Respiratory system and intrathoracic organs	18	18	17	18	36	37	37	38	740,798	1,673,574	1,579,882	3,994,254
5	C40-C41	Bone and articular cartilage	18	18	17	18	33	34	34	35	694,106	1,551,399	1,492,704	3,738,210
6	C43-C44	Skin	16	15	13	16	12	12	12	14	2,362	5,008	4,029	11,400
7	C45-C49	Connective and soft tissue	17	17	15	17	17	17	17	17	1,929	5,074	4,639	11,643
8	C50-C58	Breast and female genital organs	18	18	16	18	23	25	25	25	361,015	823,303	663,237	1,847,556
9	C60-C63	Male genital organs	18	17	16	18	12	13	13	13	111,217	233,176	224,147	568,541
10	C64-C68	Urinary organs	18	18	16	18	24	24	24	25	119,062	255,474	238,596	613,133
11	C69-C72	Eye, brain and central nervous system	18	18	16	18	20	20	20	20	121,282	258,655	241,954	621,892
12	C73-C75	Endocrine glands and related structures	18	17	16	18	10	10	10	10	112,911	235,120	225,269	573,300
13	C76-C80	Secondary and ill-defined	17	16	14	17	6	6	6	6	2,054	5,690	5,771	13,516
14	C81-C96	Malignant neoplasms, stated or presumed to be primary, of lymphoid, haematopoietic and related tissue	18	18	16	18	31	31	31	31	364,338	833,140	671,245	1,868,724
15	C97	Malignant neoplasms of independent (primary) multiple sites	0	0	0	0	0	0	0	0	0	0	0	0
16	D00-D09	In situ neoplasms	16	15	13	16	3	3	3	3	3,313	7,557	6,606	17,477
17	D10-D36	Benign neoplasms	17	17	14	17	27	27	27	27	12,499	35,013	23,068	70,580
18	D37-D48	Neoplasms of uncertain or unknown behavior	18	18	16	18	39	40	40	41	121,277	257,142	240,115	618,535
	C00-D48	**Total**	**18**	**18**	**17**	**18**	**56**	**57**	**57**	**59**	**751,985**	**1,693,810**	**1,642,034**	**4,087,831**


C00-D58. Neoplastic Releases by ICD Category: 3 Year Total
Cancer type and location
Total
Malignant neoplasms
Lip, oral cavity and pharynx
Digestive organs
Respiratory system and intrathoracic organs
Bone and articular cartilage
Skin
Connective and soft tissue
Breast and female genital organs
Male genital organs
Urinary organs
Eye, brain and central nervous system
Endocrine glands and related structures
Secondary and ill-defined
Lymphoid, haematopoietic and related tissue
Independent (primary) multiple sites
In situ neoplasms
Benign neoplasms
Neoplasms of uncertain or unknown behaviour
4,087,831
4,007,761
612,833
622,227
3,994,254
3,738,210
11,400
11,643
1,847,556
568,541
613,133
621,892
573,300
13,529
1,868,724
0
17,477
70,580
618,535
0
500,000
1,000,000
1,500,000
2,000,000
2,500,000
3,000,000
3,500,000
4,000,000
Pounds

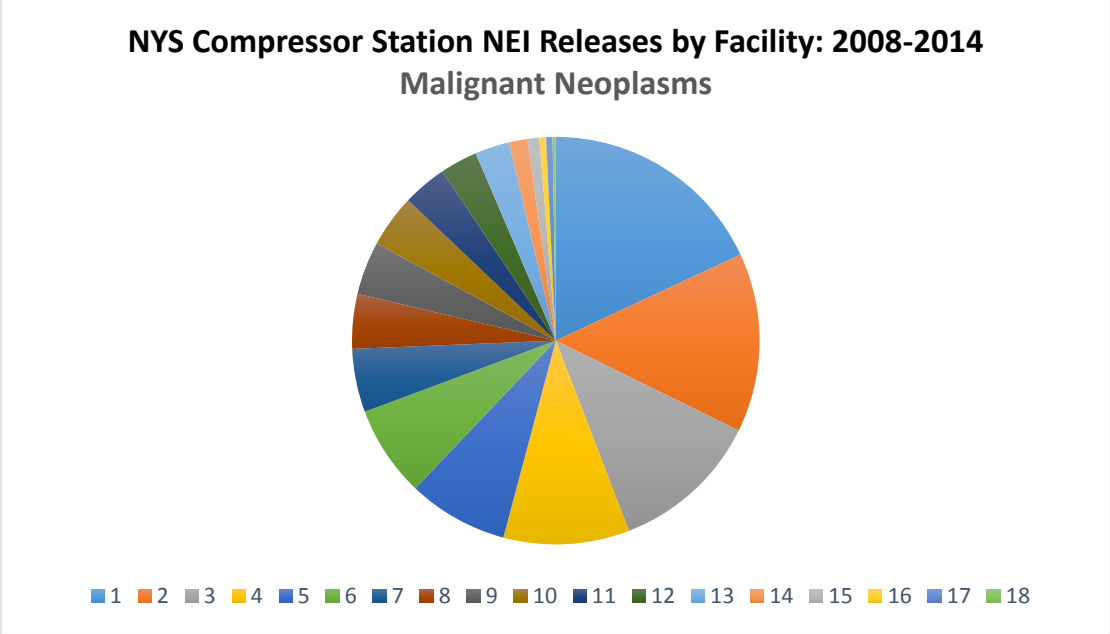
3.2c. Releases by Facility: Malignant Neoplasms (ICD-10, C00-C97)

Table 3.2c.

Releases by Facility: Malignant Neoplasms (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	37	37	21	727,214	1,696,834	18.06
2	TGPC CS 249	Carlisle	Schoharie	37	23	22	572,367	1,335,523	14.21
3	TGPC CS 241	LaFayette	Onondaga	36	27	36	478,876	1,117,377	11.89
4	TGPC 229 & TEG DF	Eden	Erie	39	37	38	402,207	938,485	9.99
5	AGT Stony Point CS	Stony Point	Rockland	38	20	19	320,291	747,345	7.95
6	TGPC CS 237	Manchester, Phelps	Ontario	6	5	2	291,438	680,022	7.24
7	AGT SOUTHEAST CS	Southeast	Putnam	22	15	35	202,269	471,962	5.02
8	NFGSC Concord CS	Concord	Erie	8	7	9	174,647	407,511	4.34
9	TGPC CS 254	Chatham	Columbia	22	13	6	170,250	397,250	4.23
10	NFGSC Independence CS	Andover	Allegany	12	7	14	168,124	392,290	4.17
11	DTI Woodhull Station	Woodhull	Steuben	34	43	47	141,039	329,091	3.50
12	TGPC CS 224	Clymer	Chautauqua	37	35	37	119,806	279,548	2.97
13	NFGSC Beech Hill CS	Willing	Allegany	17	17	18	110,198	257,128	2.74
14	NFGSC Nashville CS	Hanover	Chautauqua	28	26	-	39,184	137,144	1.46
15	DTI Utica Station	Frankfort	Herkimer	28	33	46	37,981	88,622	0.94
16	TGPC CS 230-C	Lockport	Niagara	22	21	22	21,038	49,090	0.52
17	DTI Borger CS	Ithaca	Tompkins	34	35	16	20,642	48,166	0.51
18	TGPC CS 233	York	Livingston	22	13	1	10,183	23,762	0.25
				53	**54**	**54**	**4,007,754**	**9,397,150**	**100%**



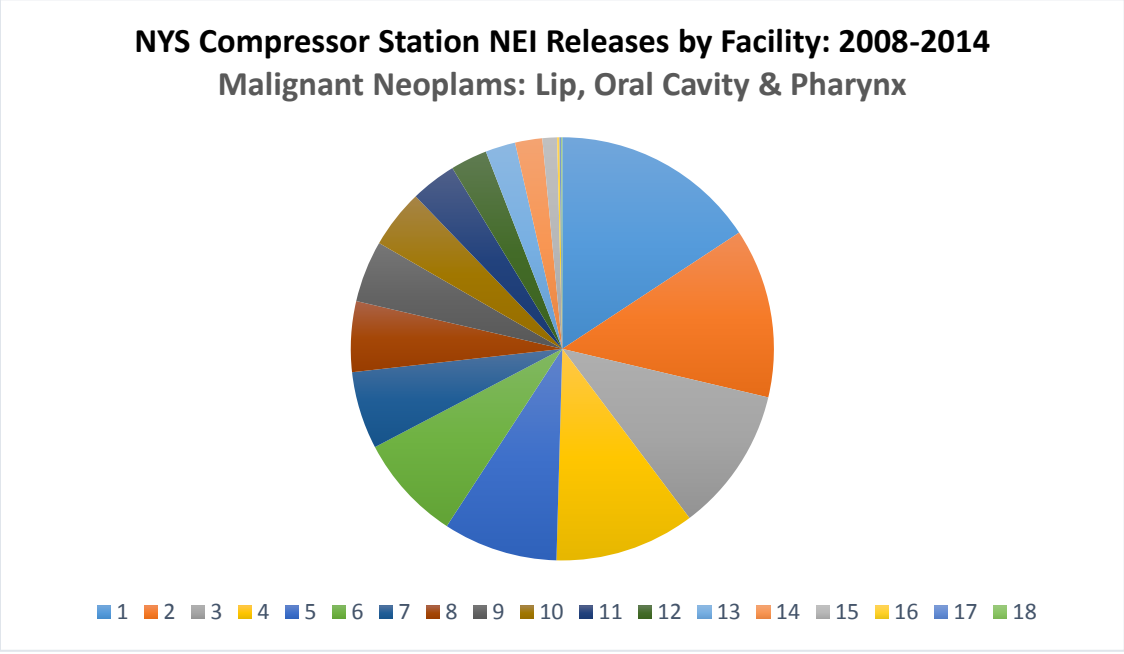
3.2c.1. Releases by Facility: Malignant Neoplasms, Lip, Oral Cavity & Pharynx (ICD-10, C00-C14)

Table 3.3.2c.1.

Releases by Facility: Malignant Neoplasms, Lip, Oral Cavity and Pharynx (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Rank	Facility Name (Short)	Location		Chemicals			7-Years (Pounds)		
		Town	County	'08	'11	'14	Average	Total	%
1	TGPC CS 245	Winfield	Herkimer	8	8	8	32,386	226,703	15.74
2	TGPC CS 241	LaFayette	Onondaga	8	8	8	26,645	186,512	12.95
3	TGPC CS 249	Carlisle	Schoharie	8	8	8	22,754	159,281	11.06
4	TGPC 229 & TEG DF	Eden	Erie	8	8	8	22,022	154,157	10.70
5	NFGSC Concord CS	Concord	Erie	2	1	3	18,010	126,067	8.75
6	TGPC CS 237	Manchester, Phelps	Ontario	1	1	1	16,708	116,956	8.12
7	AGT Stony Point CS	Stony Point	Rockland	10	7	8	12,190	85,332	5.92
8	TGPC CS 224	Clymer	Chautauqua	8	7	8	11,094	77,661	5.39
9	DTI Woodhull Station	Woodhull	Steuben	10	13	13	9,688	67,813	4.71
10	NFGSC Independence CS	Andover	Allegany	6	2	7	9,210	64,473	4.48
11	NFGSC Beech Hill CS	Willing	Allegany	7	7	7	7,182	50,271	3.49
12	AGT SOUTHEAST CS	Southeast	Putnam	7	6	10	5,789	40,520	2.81
13	TGPC CS 254	Chatham	Columbia	7	6	1	4,723	33,063	2.30
14	NFGSC Nashville CS	Hanover	Chautauqua	7	7	-	4,274	29,915	2.08
15	DTI Utica Station	Frankfort	Herkimer	7	11	13	2,295	16,063	1.12
16	TGPC CS 230-C	Lockport	Niagara	7	7	7	369	2,580	0.18
17	TGPC CS 233	York	Livingston	7	6	0	263	1,841	0.13
18	DTI Borger CS	Ithaca	Tompkins	10	12	6	189	1,322	0.09
				12	**14**	**14**	**205,790**	**1,440,530**	**100%**



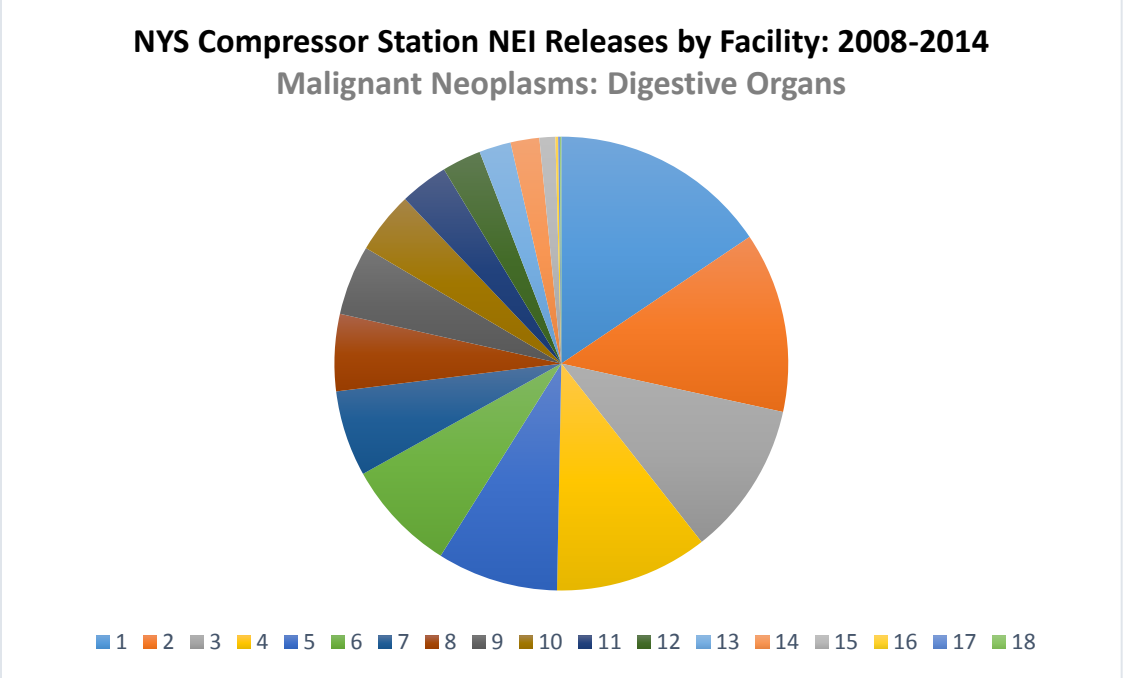
3.2c.2. Releases by Facility: Neoplasms, Digestive Organs

Table 3.2c.2.

Neoplastic Releases by Facility: Digestive Organs (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Rank	Facility Name (Short)	Location		Chemicals			7-Years (Pounds)		
		Town	County	'08	'11	'14	Average	Total	%
1	TGPC CS 245	Winfield	Herkimer	29	29	14	32,530	227,707	15.57
2	TGPC CS 241	LaFayette	Onondaga	28	19	28	26,850	187,951	12.85
3	TGPC CS 249	Carlisle	Schoharie	29	16	15	22,925	160,478	10.97
4	TGPC 229 & TEG DF	Eden	Erie	28	27	28	22,795	159,562	10.91
5	NFGSC Concord CS	Concord	Erie	4	3	5	18,010	126,068	8.62
6	TGPC CS 237	Manchester, Phelps	Ontario	2	1	1	16,709	116,964	8.00
7	AGT Stony Point CS	Stony Point	Rockland	29	13	13	12,785	89,493	6.12
8	TGPC CS 224	Clymer	Chautauqua	29	27	29	11,454	80,175	5.48
9	DTI Woodhull Station	Woodhull	Steuben	21	28	31	10,400	72,802	4.98
10	NFGSC Independence CS	Andover	Allegany	8	3	10	9,211	64,478	4.41
11	NFGSC Beech Hill CS	Willing	Allegany	12	12	13	7,184	50,288	3.44
12	AGT SOUTHEAST CS	Southeast	Putnam	14	9	21	5,830	40,810	2.79
13	TGPC CS 254	Chatham	Columbia	14	7	1	4,732	33,124	2.26
14	NFGSC Nashville CS	Hanover	Chautauqua	16	16	-	4,285	29,993	2.05
15	DTI Utica Station	Frankfort	Herkimer	16	19	30	2,356	16,492	1.13
16	TGPC CS 230-C	Lockport	Niagara	14	13	14	399	2,792	0.19
17	TGPC CS 233	York	Livingston	14	7	0	278	1,945	0.13
18	DTI Borger CS	Ithaca	Tompkins	21	21	11	198	1,389	0.10
				37	**37**	**38**	**208,930**	**1,462,509**	**100%**



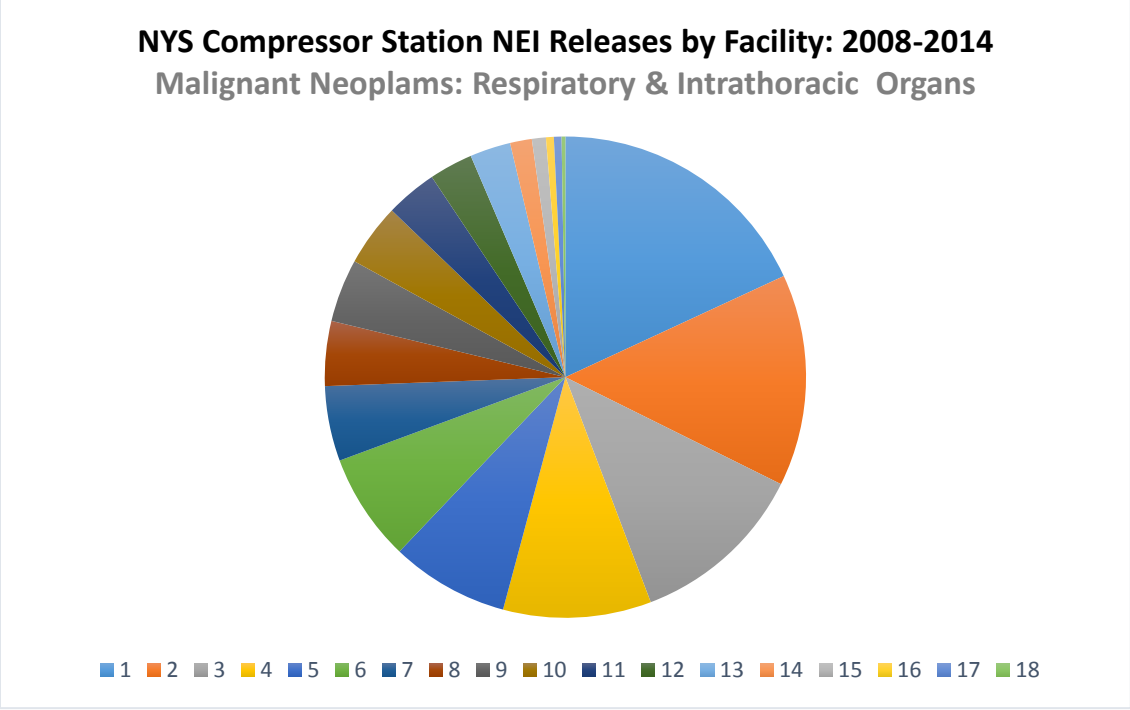
3.2c.3. Releases by Facility: Malignant Neoplasms, Respiratory System and Intrathoracic Organs (ICD-10, C30-C9)

Table 3.2c.3.

Neoplastic Releases by Facility: Respiratory System and Intrathoracic Organs (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Rank	Facility Name (Short)	Location		Chemicals			7-Years (Pounds)		
		Town	County	'08	'11	'14	Average	Total	%
1	TGPC CS 245	Winfield	Herkimer	25	25	17	242,124	1,694,870	18.10
2	TGPC CS 249	Carlisle	Schoharie	25	18	17	190,447	1,333,127	14.23
3	TGPC CS 241	LaFayette	Onondaga	24	21	24	159,204	1,114,430	11.90
4	TGPC 229 & TEG DF	Eden	Erie	27	26	27	133,041	931,287	9.94
5	AGT Stony Point CS	Stony Point	Rockland	27	17	17	106,158	743,107	7.93
6	TGPC CS 237	Manchester, Phelps	Ontario	5	5	2	97,145	680,015	7.26
7	AGT SOUTHEAST CS	Southeast	Putnam	20	13	26	67,392	471,742	5.04
8	NFGSC Concord CS	Concord	Erie	7	5	7	58,212	407,483	4.35
9	TGPC CS 254	Chatham	Columbia	20	12	5	56,703	396,923	4.24
10	NFGSC Independence CS	Andover	Allegany	10	6	11	55,998	391,984	4.19
11	DTI Woodhull Station	Woodhull	Steuben	27	33	33	46,203	323,418	3.45
12	TGPC CS 224	Clymer	Chautauqua	25	24	25	39,258	274,805	2.93
13	NFGSC Beech Hill CS	Willing	Allegany	15	15	15	36,636	256,454	2.74
14	NFGSC Nashville CS	Hanover	Chautauqua	21	20	0	19,553	136,871	1.46
15	DTI Utica Station	Frankfort	Herkimer	21	26	33	12,589	88,120	0.94
16	TGPC CS 230-C	Lockport	Niagara	20	19	20	7,007	49,046	0.52
17	DTI Borger CS	Ithaca	Tompkins	27	28	15	6,875	48,128	0.51
18	TGPC CS 233	York	Livingston	20	12	1	3,391	23,740	0.25
				36	**37**	**37**	**1,337,936**	**9,365,551**	**100%**



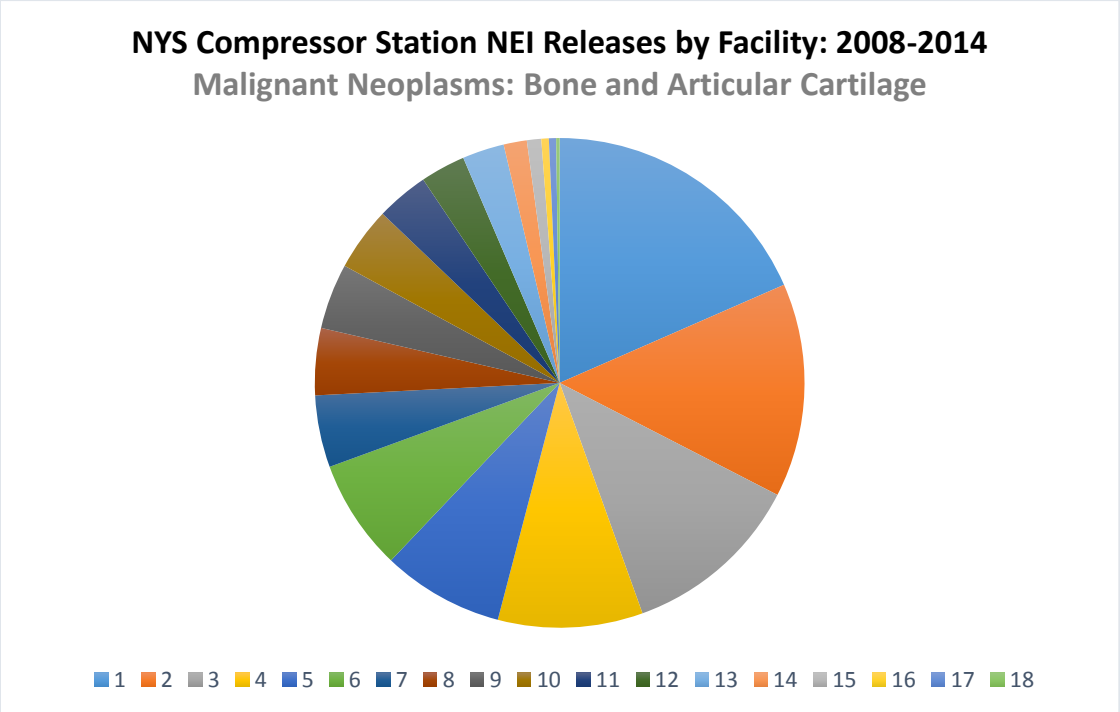
3.2c.4. Releases by Facility: Malignant Neoplasms, Bone and Articular Cartilage

Table 3.2c.4.

Releases by Facility: Malignant Neoplasms, Bone and Articular Cartilage (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Rank	Facility Name (Short)	Location		Chemicals			7-Years (Pounds)		
		Town	County	'08	'11	'14	Average	Total	%
1	TGPC CS 245	Winfield	Herkimer	22	22	14	230,920	1,616,443	18.44
2	TGPC CS 249	Carlisle	Schoharie	22	15	14	176,886	1,238,204	14.12
3	TGPC CS 241	LaFayette	Onondaga	21	18	21	149,626	1,047,383	11.95
4	TGPC 229 & TEG DF	Eden	Erie	24	23	24	119,758	838,307	9.56
5	AGT Stony Point CS	Stony Point	Rockland	25	14	14	100,508	703,556	8.02
6	TGPC CS 237	Manchester, Phelps	Ontario	4	4	2	91,916	643,411	7.34
7	AGT SOUTHEAST CS	Southeast	Putnam	18	11	24	59,530	416,713	4.75
8	NFGSC Independence CS	Andover	Allegany	9	5	10	55,385	387,695	4.42
9	NFGSC Concord CS	Concord	Erie	6	4	6	54,199	379,392	4.33
10	TGPC CS 254	Chatham	Columbia	18	10	4	52,602	368,212	4.20
11	DTI Woodhull Station	Woodhull	Steuben	25	30	30	43,265	302,855	3.45
12	TGPC CS 224	Clymer	Chautauqua	22	21	22	37,179	260,256	2.97
13	NFGSC Beech Hill CS	Willing	Allegany	13	13	13	34,633	242,428	2.77
14	NFGSC Nashville CS	Hanover	Chautauqua	20	19	0	19,171	134,194	1.53
15	DTI Utica Station	Frankfort	Herkimer	20	24	30	11,862	83,036	0.95
16	DTI Borger CS	Ithaca	Tompkins	25	26	13	6,195	43,362	0.49
17	TGPC CS 230-C	Lockport	Niagara	18	17	18	5,958	41,706	0.48
18	TGPC CS 233	York	Livingston	18	10	1	2,867	20,069	0.23
				33	**33**	**34**	**1,252,460**	**8,767,222**	**100%**



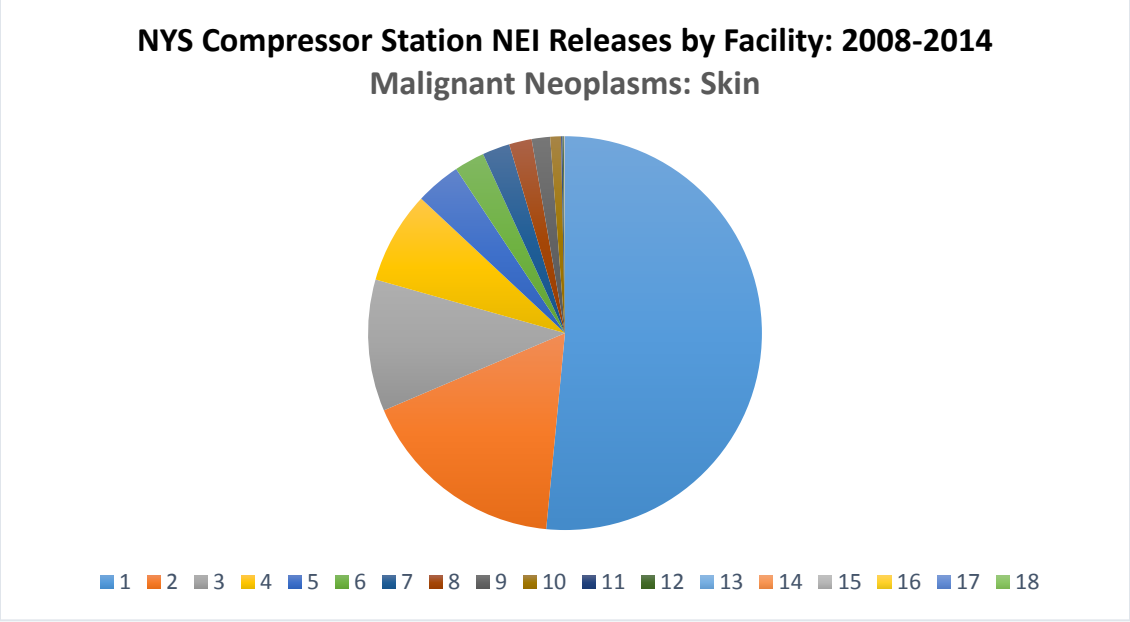
3.2c.5. Releases by Facility: Malignant Neoplasms, Skin (ICD-10, C43-C44)

Table 3.2c.5.

Releases by Facility: Malignant Neoplasms, Skin (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			3-Yr Avg.	7 Years (estimate)	
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Pounds	Pounds	%
1	TGPC 229 & TEG DF	Eden	Erie	9	8	8	1,964	13,750	51.53
2	AGT Stony Point CS	Stony Point	Rockland	6	3	2	650	4,553	17.06
3	DTI Woodhull Station	Woodhull	Steuben	8	9	11	412	2,883	10.80
4	AGT SOUTHEAST CS	Southeast	Putnam	3	2	8	289	2,022	7.58
5	TGPC CS 224	Clymer	Chautauqua	7	7	7	141	990	3.71
6	DTI Utica Station	Frankfort	Herkimer	7	8	11	95	665	2.49
7	TGPC CS 241	LaFayette	Onondaga	7	5	7	86	602	2.26
8	TGPC CS 249	Carlisle	Schoharie	7	4	4	71	495	1.86
9	TGPC CS 245	Winfield	Herkimer	7	7	4	58	404	1.51
10	TGPC CS 254	Chatham	Columbia	3	1	0	33	234	0.88
11	TGPC CS 230-C	Lockport	Niagara	3	3	3	5	36	0.14
12	TGPC CS 233	York	Livingston	3	1	0	4	28	0.10
13	DTI Borger CS	Ithaca	Tompkins	8	8	2	2	16	0.06
14	NFGSC Beech Hill CS	Willing	Allegany	2	2	2	1	7	0.03
15	NFGSC Nashville CS	Hanover	Chautauqua	7	5	0	0.01	0.09	0.00
16	TGPC CS 237	Manchester, Phelps	Ontario	0	0	0	0	0.00	0.00
17	NFGSC Independence CS	Andover	Allegany	0	0	0	0	0.00	0.00
18	NFGSC Concord CS	Concord	Erie	0	0	0	0	0.00	0.00
				12	**12**	**12**	**3,812**	**26,686**	**100%**



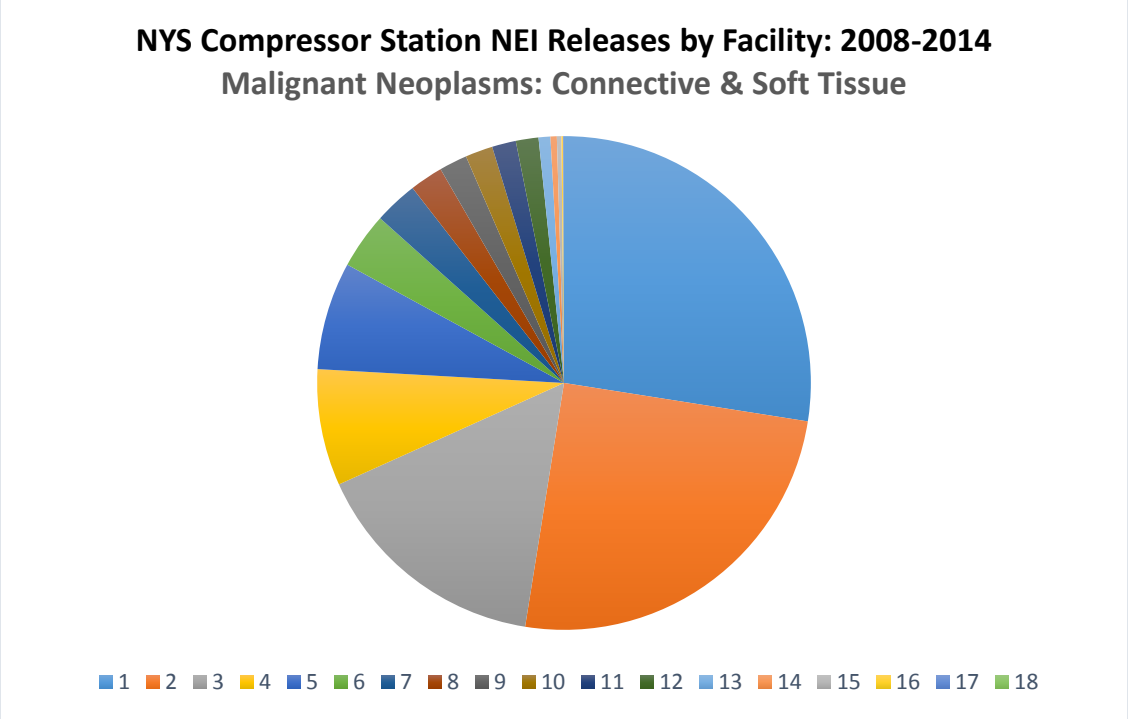
3.2c.6. Releases by Facility: Malignant Neoplasms, Connective and Soft Tissue

Table 3.2c.6.

Releases by Facility: Malignant Neoplasms, Connective and Soft Tissue (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			3-Yr Average	7 Years (estimate)	
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Pounds	Pounds	%
1	AGT Stony Point CS	Stony Point	Rockland	13	3	4	1,074	7,516	27.49
2	TGPC 229 & TEG DF	Eden	Erie	9	8	9	978	6,843	25.03
3	AGT SOUTHEAST CS	Southeast	Putnam	8	3	11	615	4,304	15.74
4	TGPC CS 254	Chatham	Columbia	8	2	1	298	2,088	7.64
5	DTI Woodhull Station	Woodhull	Steuben	12	13	14	276	1,930	7.06
6	TGPC CS 224	Clymer	Chautauqua	8	8	8	143	1,004	3.67
7	TGPC CS 230-C	Lockport	Niagara	8	7	8	112	783	2.86
8	TGPC CS 241	LaFayette	Onondaga	7	4	7	85	595	2.18
9	TGPC CS 233	York	Livingston	8	2	0	72	502	1.83
10	TGPC CS 249	Carlisle	Schoharie	8	4	4	70	493	1.80
11	DTI Utica Station	Frankfort	Herkimer	10	11	14	61	428	1.56
12	TGPC CS 245	Winfield	Herkimer	8	8	4	58	406	1.48
13	DTI Borger CS	Ithaca	Tompkins	12	12	4	30	211	0.77
14	NFGSC Concord CS	Concord	Erie	2	1	2	16	113	0.41
15	NFGSC Beech Hill CS	Willing	Allegany	4	4	4	12	81	0.30
16	NFGSC Independence CS	Andover	Allegany	3	1	3	4	30	0.11
17	NFGSC Nashville CS	Hanover	Chautauqua	10	10	0	2	15	0.06
18	TGPC CS 237	Manchester, Phelps	Ontario	0	0	0		0	0.00
				17	**17**	**17**	**3,906**	**27,341**	**100 %**



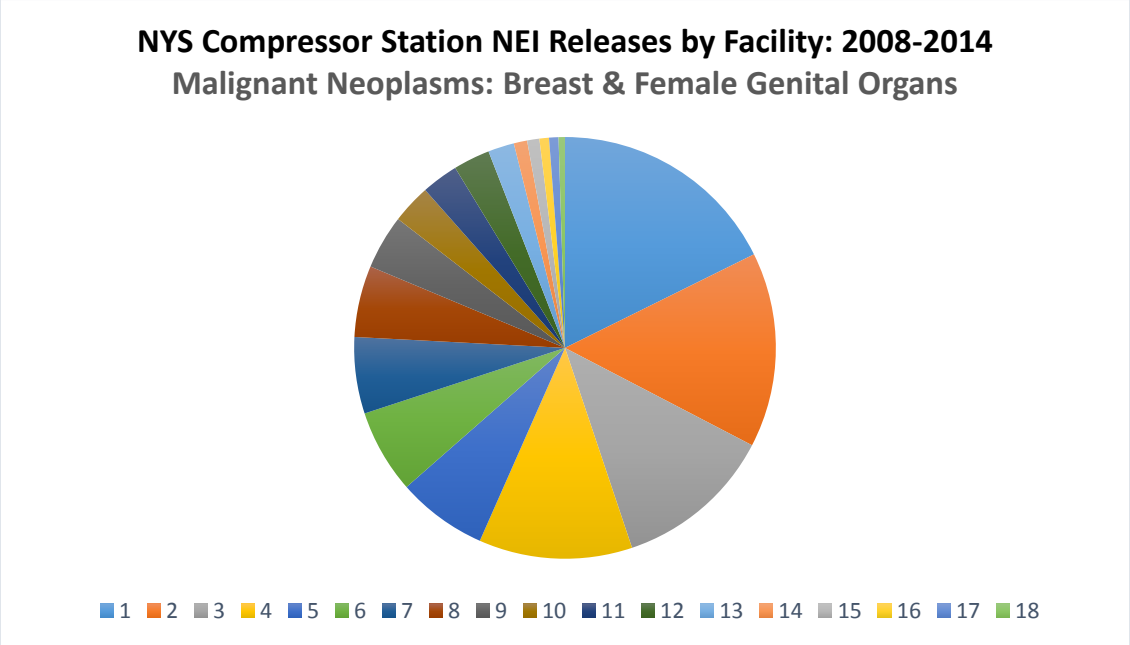
3.2c.7. Releases by Facility: Malignant Neoplasms, Breast and Female Genital Organs

Table 3.2c.7.

Releases by Facility: Malignant Neoplasms, Breast and Female Genital Organs (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			3-Yr Average	7 Years (estimate)	
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Pounds	Pounds	%
1	TGPC CS 245	Winfield	Herkimer	19	19	12	109,526	766,684	17.68
2	TGPC CS 249	Carlisle	Schoharie	19	12	12	92,652	648,570	14.96
3	TGPC 229 & TEG DF	Eden	Erie	17	17	17	75,644	529,510	12.21
4	TGPC CS 241	LaFayette	Onondaga	19	13	19	72,893	510,251	11.77
5	TGPC CS 237	Manchester, Phelps	Ontario	5	4	1	42,836	299,858	6.92
6	NFGSC Concord CS	Concord	Erie	5	4	5	39,852	278,969	6.43
7	AGT SOUTHEAST CS	Southeast	Putnam	11	8	14	36,301	254,113	5.86
8	AGT Stony Point CS	Stony Point	Rockland	17	9	9	33,931	237,522	5.48
9	TGPC CS 254	Chatham	Columbia	11	7	5	25,753	180,276	4.16
10	DTI Woodhull Station	Woodhull	Steuben	12	18	19	18,612	130,284	3.00
11	NFGSC Beech Hill CS	Willing	Allegany	9	9	9	17,439	122,076	2.82
12	TGPC CS 224	Clymer	Chautauqua	19	17	19	17,399	121,793	2.81
13	NFGSC Independence CS	Andover	Allegany	6	5	6	12,417	86,924	2.00
14	NFGSC Nashville CS	Hanover	Chautauqua	9	9	0	6,339	44,373	1.02
15	TGPC CS 230-C	Lockport	Niagara	11	11	11	5,817	40,721	0.94
16	DTI Utica Station	Frankfort	Herkimer	9	13	19	4,536	31,755	0.73
17	TGPC CS 233	York	Livingston	11	7	0	4,454	31,181	0.72
18	DTI Borger CS	Ithaca	Tompkins	12	14	8	3,040	21,283	0.49
				23	**25**	**24**	**619,441**	**4,336,143**	**100 %**



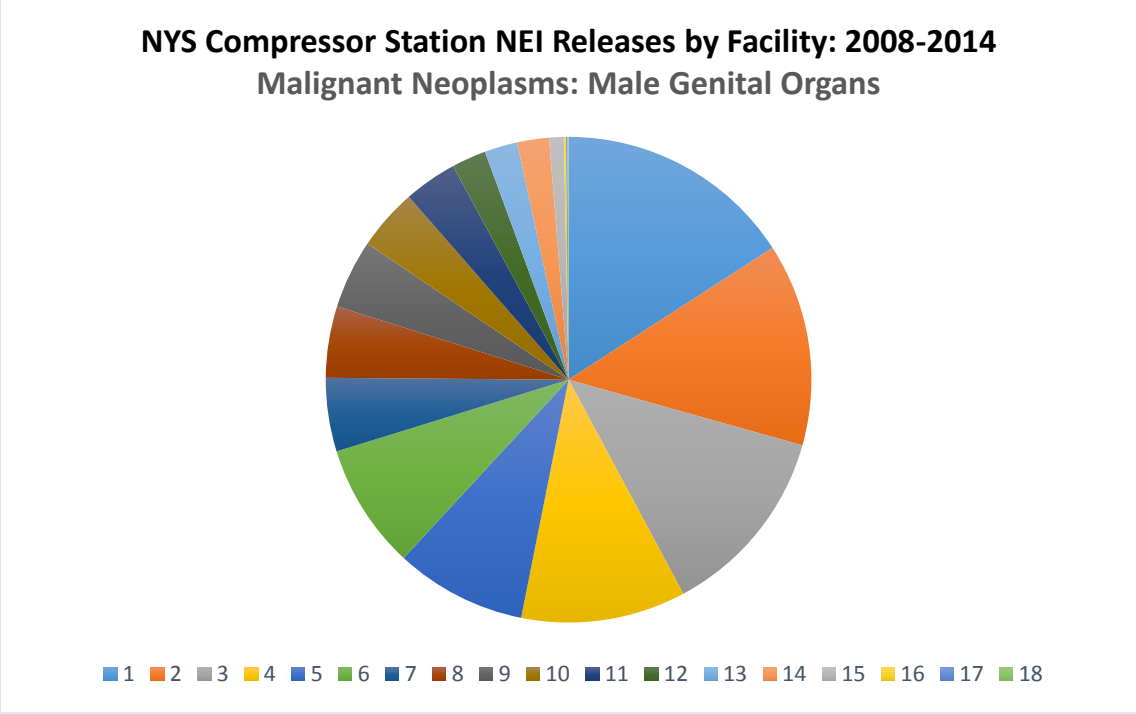
3.2c.8. Releases by Facility: Malignant Neoplasms, Male Genital Organs

Table 3.2c.8.

Releases by Facility: Malignant Neoplasms, Male Genital Organs (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			3-Yr Average	7 Years (estimate)	
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Pounds	Pounds	%
1	TGPC CS 245	Winfield	Herkimer	9	9	7	31,720	222,045	15.86
2	NFGSC Concord CS	Concord	Erie	1	0	1	26,984	188,888	13.49
3	TGPC CS 241	LaFayette	Onondaga	9	9	9	25,625	179,381	12.81
4	TGPC CS 249	Carlisle	Schoharie	9	9	8	21,934	153,543	10.97
5	TGPC 229 & TEG DF	Eden	Erie	8	8	8	17,479	122,356	8.74
6	TGPC CS 237	Manchester, Phelps	Ontario	1	1	1	16,708	116,956	8.35
7	AGT Stony Point CS	Stony Point	Rockland	7	6	5	9,786	68,506	4.89
8	TGPC CS 224	Clymer	Chautauqua	9	8	9	9,516	66,614	4.76
9	NFGSC Independence CS	Andover	Allegany	1	1	3	9,162	64,140	4.58
10	DTI Woodhull Station	Woodhull	Steuben	1	10	10	8,215	57,511	4.11
11	NFGSC Beech Hill CS	Willing	Allegany	4	4	4	7,072	49,504	3.54
12	AGT SOUTHEAST CS	Southeast	Putnam	5	4	6	4,587	32,109	2.29
13	TGPC CS 254	Chatham	Columbia	5	3	1	4,381	30,670	2.19
14	NFGSC Nashville CS	Hanover	Chautauqua	4	4	0	4,243	29,704	2.12
15	DTI Utica Station	Frankfort	Herkimer	4	6	9	1,947	13,631	0.97
16	TGPC CS 230-C	Lockport	Niagara	5	5	5	273	1,915	0.14
17	TGPC CS 233	York	Livingston	5	3	0	194	1,363	0.10
18	DTI Borger CS	Ithaca	Tompkins	7	7	4	152	1,070	0.08
				12	**13**	**13**	**199,978**	**1,399,906**	**100%**



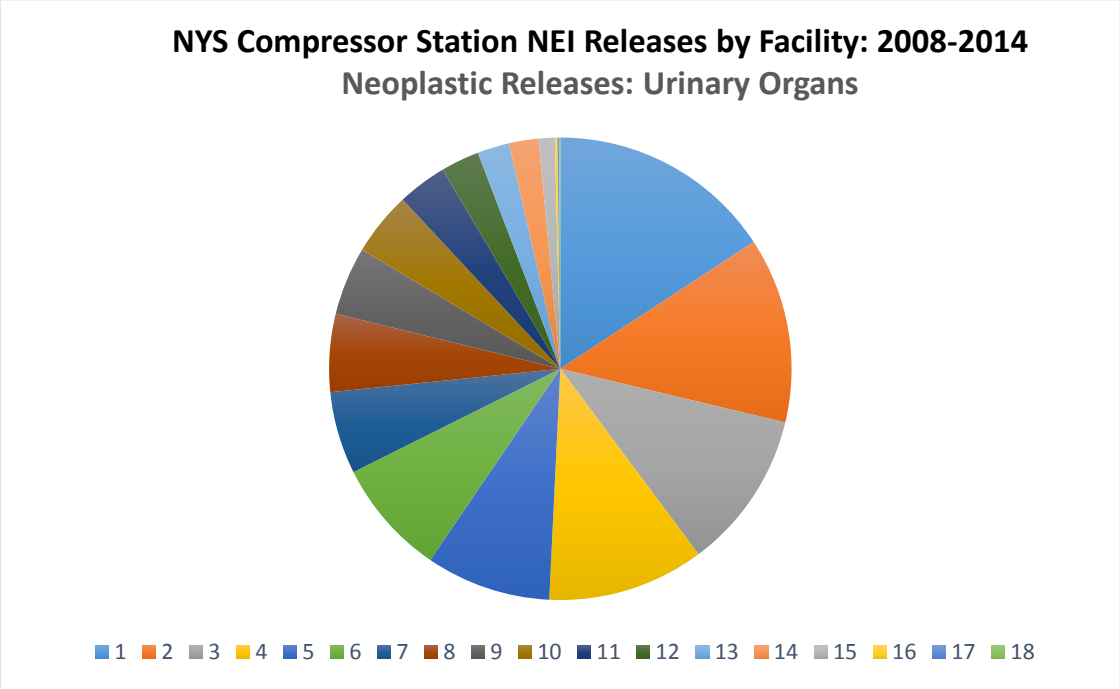
3.2c.9. Releases by Facility: Urinary Organs

Table 3.2c.9.

Neoplastic Releases by Facility: Urinary Organs (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			Pounds	7 Years (estimate)	
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Pounds	%
1	TGPC CS 245	Winfield	Herkimer	17	17	10	32,435	227,047	15.75
2	TGPC CS 241	LaFayette	Onondaga	16	13	16	26,713	186,990	12.98
3	TGPC CS 249	Carlisle	Schoharie	17	12	11	22,813	159,689	11.08
4	TGPC 229 & TEG DF	Eden	Erie	17	16	17	22,555	157,886	10.96
5	NFGSC Concord CS	Concord	Erie	4	2	4	18,006	126,040	8.75
6	TGPC CS 237	Manchester, Phelps	Ontario	2	1	1	16,709	116,964	8.12
7	AGT Stony Point CS	Stony Point	Rockland	17	9	8	11,843	82,900	5.75
8	TGPC CS 224	Clymer	Chautauqua	17	16	17	11,221	78,549	5.45
9	DTI Woodhull Station	Woodhull	Steuben	15	19	22	9,842	68,893	4.78
10	NFGSC Independence CS	Andover	Allegany	6	3	7	9,168	64,174	4.45
11	NFGSC Beech Hill CS	Willing	Allegany	8	8	8	7,081	49,565	3.44
12	AGT SOUTHEAST CS	Southeast	Putnam	12	6	15	5,538	38,766	2.69
13	TGPC CS 254	Chatham	Columbia	12	5	1	4,607	32,249	2.24
14	NFGSC Nashville CS	Hanover	Chautauqua	12	11	0	4,246	29,721	2.06
15	DTI Utica Station	Frankfort	Herkimer	12	13	21	2,324	16,269	1.13
16	TGPC CS 230-C	Lockport	Niagara	12	11	12	353	2,469	0.17
17	TGPC CS 233	York	Livingston	12	5	0	248	1,733	0.12
18	DTI Borger CS	Ithaca	Tompkins	15	14	7	175	1,227	0.09
				24	**24**	**24**	**205,876**	**1,441,130**	**100%**



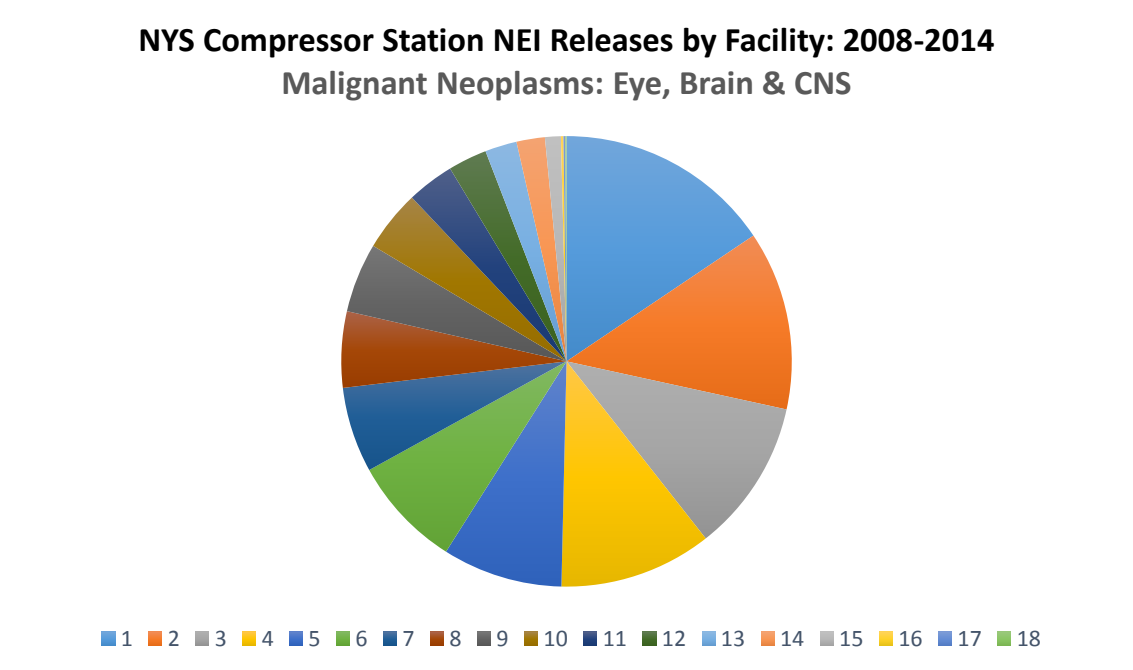
3.2c.10. Releases by Facility: Malignant Neoplasms, Eye, Brain and Central Nervous System (C69-C72)

Table 3.2c.10.

Releases by Facility: Malignant Neoplasms, Eye, Brain and Central Nervous System (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			Pounds	7 Years (estimate)	
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Pounds	%
1	TGPC CS 245	Winfield	Herkimer	18	18	14	32,515	227,607	15.57
2	TGPC CS 241	LaFayette	Onondaga	17	15	17	26,839	187,876	12.85
3	TGPC CS 249	Carlisle	Schoharie	18	14	14	22,912	160,382	10.97
4	TGPC 229 & TEG DF	Eden	Erie	15	14	15	22,892	160,246	10.96
5	NFGSC Concord CS	Concord	Erie	4	2	4	18,006	126,040	8.62
6	TGPC CS 237	Manchester, Phelps	Ontario	2	1	1	16,709	116,964	8.00
7	AGT Stony Point CS	Stony Point	Rockland	15	10	11	12,801	89,604	6.13
8	TGPC CS 224	Clymer	Chautauqua	18	16	18	11,403	79,821	5.46
9	DTI Woodhull Station	Woodhull	Steuben	12	16	18	10,419	72,931	4.99
10	NFGSC Independence CS	Andover	Allegany	7	3	9	9,168	64,177	4.39
11	NFGSC Beech Hill CS	Willing	Allegany	9	9	10	7,086	49,600	3.39
12	AGT SOUTHEAST CS	Southeast	Putnam	11	9	13	5,828	40,796	2.79
13	TGPC CS 254	Chatham	Columbia	11	7	2	4,770	33,391	2.28
14	NFGSC Nashville CS	Hanover	Chautauqua	8	8	0	4,257	29,798	2.04
15	DTI Utica Station	Frankfort	Herkimer	8	11	18	2,367	16,569	1.13
16	TGPC CS 230-C	Lockport	Niagara	11	10	11	375	2,626	0.18
17	TGPC CS 233	York	Livingston	11	7	0	268	1,874	0.13
18	DTI Borger CS	Ithaca	Tompkins	12	12	9	191	1,338	0.09
				20	**20**	**20**	**208,806**	**1,461,640**	**100**



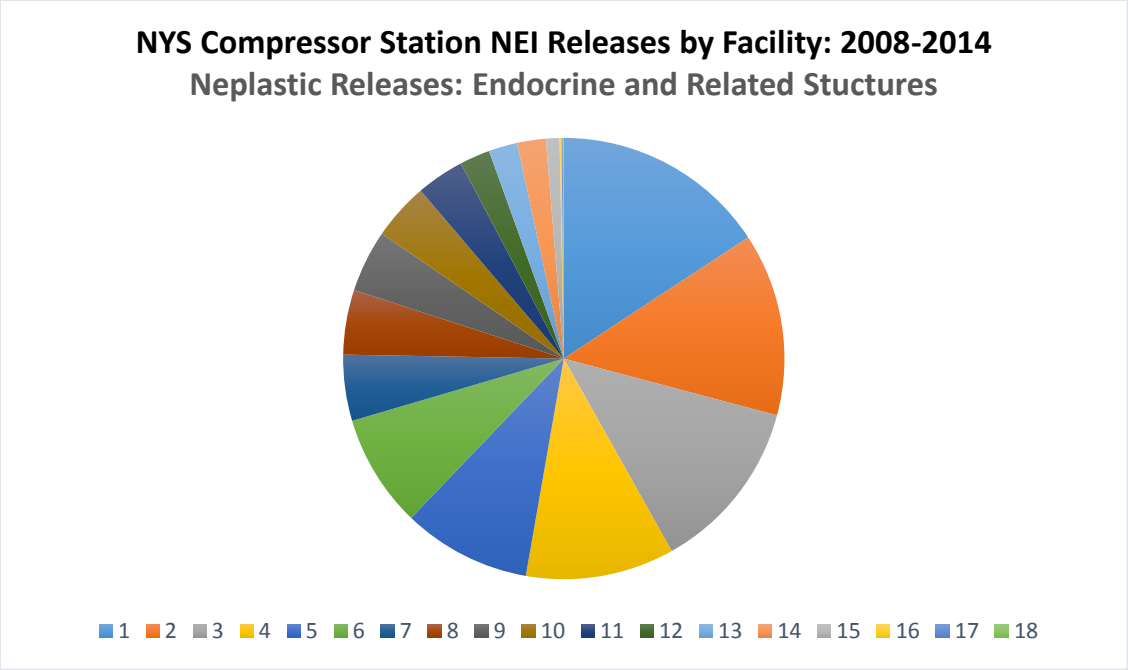
3.2c.11. Releases by Facility: Malignant Neoplasms, Endocrine Glands & Related Structures (C73-C75)

Table 3.2c.11.

Releases by Facility: Malignant Neoplasms, Endocrine Glands and Related Structures (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			3-Yr Average	7 Years (estimate)	
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Pounds	Pounds	%
1	TGPC CS 245	Winfield	Herkimer	7	7	3	31,738	222,166	18.18
2	NFGSC Concord CS	Concord	Erie	2	0	2	27,008	189,058	14.69
3	TGPC CS 241	LaFayette	Onondaga	7	3	7	25,649	179,540	12.58
4	TGPC CS 249	Carlisle	Schoharie	7	3	3	21,956	153,691	10.85
5	TGPC 229 & TEG DF	Eden	Erie	7	7	7	18,948	132,638	9.57
6	TGPC CS 237	Manchester, Phelps	Ontario	1	1	1	16,708	116,956	5.59
7	AGT Stony Point CS	Stony Point	Rockland	10	4	4	9,756	68,294	5.48
8	TGPC CS 224	Clymer	Chautauqua	7	7	7	9,565	66,955	5.25
9	NFGSC Independence CS	Andover	Allegany	3	2	3	9,167	64,169	4.83
10	DTI Woodhull Station	Woodhull	Steuben	6	10	9	8,441	59,084	4.05
11	NFGSC Beech Hill CS	Willing	Allegany	4	4	4	7,068	49,477	2.57
12	AGT SOUTHEAST CS	Southeast	Putnam	6	3	5	4,481	31,369	2.43
13	NFGSC Nashville CS	Hanover	Chautauqua	4	4	0	4,246	29,719	2.43
14	TGPC CS 254	Chatham	Columbia	6	2	1	4,234	29,641	1.15
15	DTI Utica Station	Frankfort	Herkimer	4	5	9	2,003	14,020	0.16
16	TGPC CS 230-C	Lockport	Niagara	6	6	6	282	1,972	0.11
17	TGPC CS 233	York	Livingston	6	2	0	189	1,320	0.08
18	DTI Borger CS	Ithaca	Tompkins	6	6	4	142	997	0.00
				10	**10**	**10**	**201,581**	**1,411,067**	**100%**



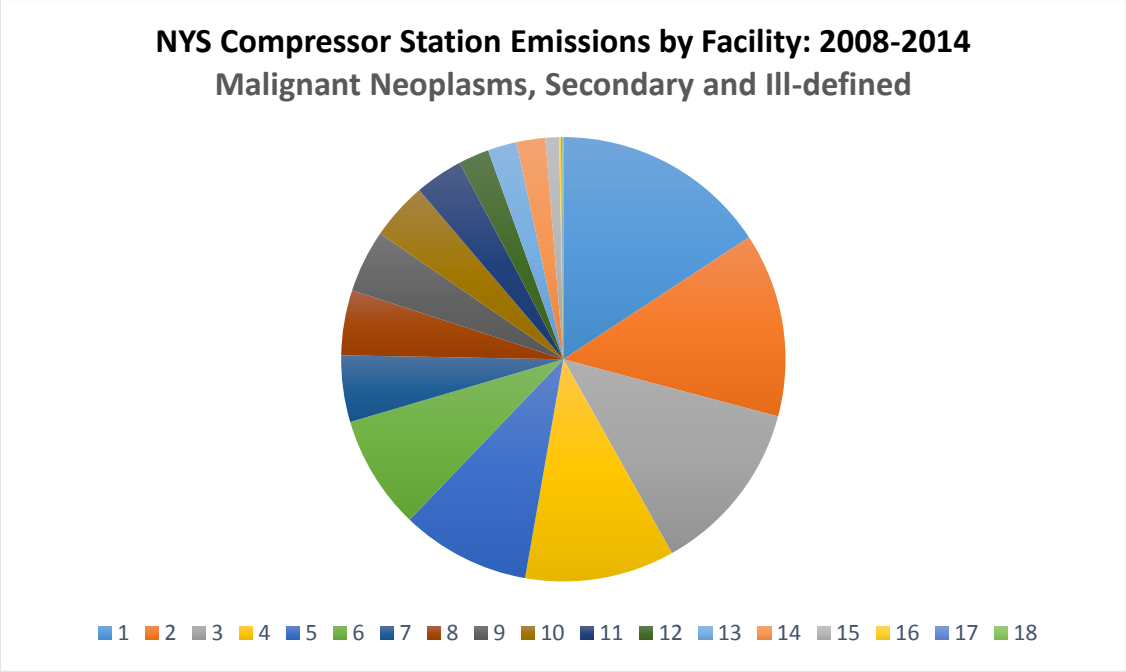
3.2c.12. Releases by Facility: Malignant Neoplasms, Secondary and Ill-defined (ICD-10, C76-C80)

Table 3.2c.12.

Releases by Facility: Malignant Neoplasms, Secondary and Ill-defined (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			3-Yr Average	7 Years (estimate)	
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Pounds	Pounds	%
1	AGT Stony Point CS	Stony Point	Rockland	5	3	3	1,542	10,793	32.39
2	AGT SOUTHEAST CS	Southeast	Putnam	5	3	5	980	6,858	20.58
3	TGPC 229 & TEG DF	Eden	Erie	4	4	4	739	5,172	15.52
4	TGPC CS 254	Chatham	Columbia	5	3	0	642	4,497	13.50
5	DTI Woodhull Station	Woodhull	Steuben	5	6	6	201	1,405	4.22
6	TGPC CS 230-C	Lockport	Niagara	5	5	5	137	962	2.89
7	TGPC CS 224	Clymer	Chautauqua	3	3	3	112	787	2.36
8	TGPC CS 233	York	Livingston	5	3	0	94	659	1.98
9	TGPC CS 241	LaFayette	Onondaga	3	3	3	72	507	1.52
10	TGPC CS 249	Carlisle	Schoharie	3	3	3	58	409	1.23
11	TGPC CS 245	Winfield	Herkimer	3	3	3	47	331	0.99
12	DTI Utica Station	Frankfort	Herkimer	3	5	6	44	306	0.92
13	DTI Borger CS	Ithaca	Tompkins	5	6	3	43	300	0.90
14	NFGSC Concord CS	Concord	Erie	1	0	1	24	170	0.51
15	NFGSC Beech Hill CS	Willing	Allegany	3	3	3	17	116	0.35
16	NFGSC Independence CS	Andover	Allegany	3	1	4	5	32	0.10
17	NFGSC Nashville CS	Hanover	Chautauqua	3	3	0	2	15	0.05
18	TGPC CS 237	Manchester, Phelps	Ontario	0	0	0		0	0.00
				6	**6**	**6**	**4,760**	**33,319**	**100%**



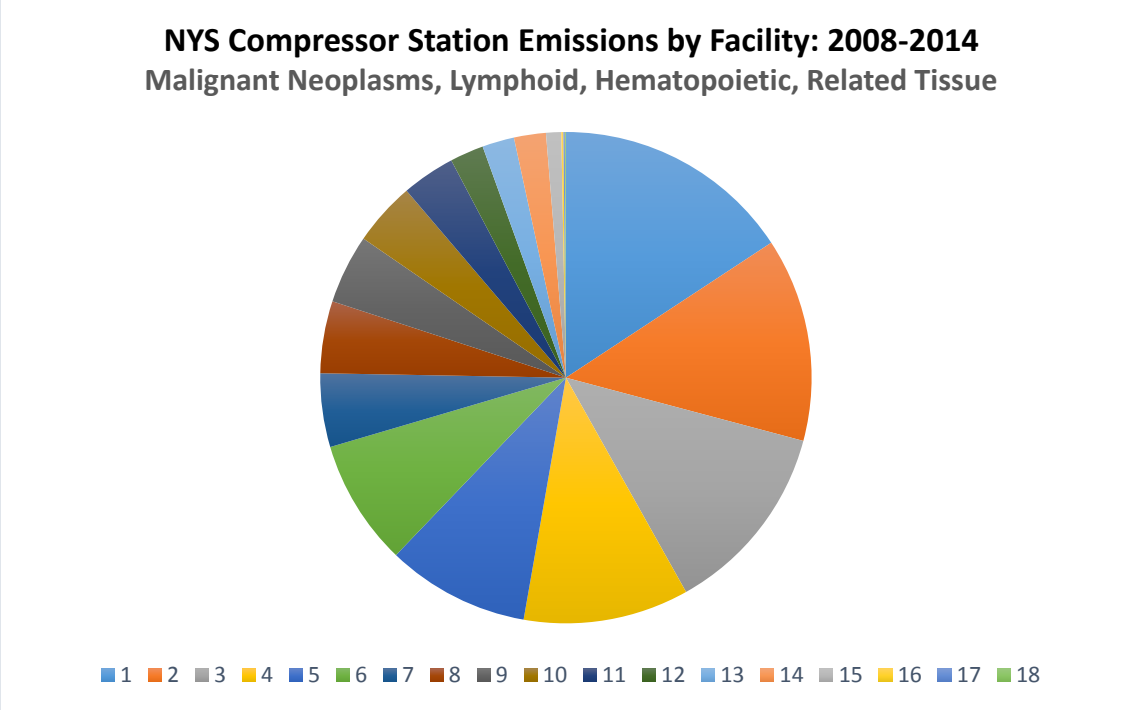
3.2c.13. Releases by Facility: Malignant Neoplasms, Stated or Presumed to be Primary, of Lymphoid, Hematopoietic and Related Tissue (ICD-10, C81-96)

Table 3.2c.13.

Releases by Facility: Malignant Neoplasms, Malignant Neoplasms, Stated or Presumed to be Primary, of Lymphoid, Hematopoietic and Related Tissue (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			3-Yr Average	7 Years (estimate)	
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Pounds	Pounds	%
1	TGPC CS 245	Winfield	Herkimer	23	23	15	109,764	768,346	17.52
2	TGPC CS 249	Carlisle	Schoharie	23	16	16	92,946	650,622	14.83
3	TGPC 229 & TEG DF	Eden	Erie	25	24	25	77,334	541,341	12.34
4	TGPC CS 241	LaFayette	Onondaga	22	16	22	73,255	512,783	11.69
5	TGPC CS 237	Manchester, Phelps	Ontario	4	4	1	42,836	299,851	6.84
6	NFGSC Concord CS	Concord	Erie	5	5	6	39,857	278,996	6.36
7	AGT SOUTHEAST CS	Southeast	Putnam	16	11	19	37,129	259,905	5.93
8	AGT Stony Point CS	Stony Point	Rockland	26	16	15	35,662	249,635	5.69
9	TGPC CS 254	Chatham	Columbia	16	10	5	26,113	182,788	4.17
10	DTI Woodhull Station	Woodhull	Steuben	19	24	27	19,186	134,302	3.06
11	TGPC CS 224	Clymer	Chautauqua	23	22	23	17,967	125,770	2.87
12	NFGSC Beech Hill CS	Willing	Allegany	13	13	13	17,550	122,849	2.80
13	NFGSC Independence CS	Andover	Allegany	9	4	9	12,461	87,225	1.99
14	NFGSC Nashville CS	Hanover	Chautauqua	15	15	0	6,367	44,568	1.02
15	TGPC CS 230-C	Lockport	Niagara	16	15	16	5,882	41,174	0.94
16	DTI Utica Station	Frankfort	Herkimer	15	18	27	4,637	32,462	0.74
17	TGPC CS 233	York	Livingston	16	10	0	4,510	31,567	0.72
18	DTI Borger CS	Ithaca	Tompkins	19	19	12	3,079	21,553	0.49
				31	**31**	**31**	**626,534**	**4,385,736**	**100%**



3.2d. Releases by DEC Region

The 18 compressor stations analyzed are in 6 of New York's 9 DEC regions. All 6 regions had releases of carcinogens.

DEC Region 9, Western New York, ranked first with 2.5 million pounds or 26% of the state total, followed by Region 6, Western Adirondacks/Eastern Lake Ontario (1,810,984 pounds or 19%) and Region 4, Capital Region/Northern Catskills (1,765,328 pounds or 18.5%). These three regions are responsible for slightly more than one-half (53%) of all toxic releases.

Table 3.2d.

C00-D58. Neoplastic Releases by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	NYS DEC Region	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	7	2	20	279,592	93,197	652,381	6.84
		Chautauqua	10	2	54	159,795	53,265	372,856	3.91
		Erie	2	2	45	583,207	194,402	1,360,816	14.27
		Niagara	12	1	23	29,917	9,972	69,806	0.73%
				7		1,052,511	**350,837**	**2,455,859**	**25.75**
2	6: W. Adirondacks/E. Lake Ontario	Herkimer	1	2	57	776,136	**258,712**	**1,810,984**	**18.99**
3	4: Capital Region/Northern Catskills	Columbia	9	1	23	173,569	57,856	404,994	4.25
		Schoharie	3	1	41	583,000	194,333	1,360,334	14.26
				2		756,569	**252,190**	**1,765,328**	**18.51**
4	7: Central New York	Onondaga	8	1	40	216,219	72,073	504,510	5.29
		Tompkins	5	1	42	331,393	110,464	773,250	8.11
				2		547,611	**182,537**	**1,277,760**	**13.40**
5	3: Lower Hudson Valley	Putnam	8	1	40	216,219	72,073	504,510	5.29
		Rockland	5	1	42	331,393	110,464	773,250	8.11
				2		547,611	**182,537**	**1,277,760**	**13.40**
6	8: Western Finger Lakes	Livingston	14	1	23	10,477	3,492	24,447	0.26
		Ontario	6	1	7	291,994	97,331	681,320	7.14
		Steuben	11	1	53	141,258	47,086	329,603	3.46
				3		443,730	**147,910**	**1,035,369**	**10.85**
				18	**59**	**4,087,832**	**1,362,611**	**9,538,274**	**100%**

3.2e. Releases by County

Herkimer County ranked first with 1.8 million pounds or 19% of the state total, followed by Erie County (1,360,816 pounds or 14.27%) and Schoharie with a slightly smaller total (1,360,333 pounds or 14.26%). These three counties are responsible for nearly one-half (47.5%) of all carcinogenic releases.

The top five counties were responsible for slightly more than two-thirds (67.6%) of the state total.

The 14-country average was 681,304 pounds.

Table 3.2e.

C00-D58. Neoplastic Releases by County (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	County	NYS DEC Region	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	57	776,135	258,711	1,810,983	18.99
2	Erie	9: Western New York	2	45	583,207	194,402	1,360,816	14.27
3	Schoharie	4: Capital Region/Northern Catskills	1	41	583,000	194,333	1,360,333	14.26
4	Onondaga	7: Central New York	1	40	488,561	162,853	1,139,975	11.95
5	Rockland	3: Lower Hudson Valley	1	42	331,392	110,464	773,249	8.11
6	Ontario	8: Western Finger Lakes	1	7	291,994	97,331	681,319	7.14
7	Allegany	9: Western New York	2	20	279,591	93,197	652,381	6.84
8	Putnam	3: Lower Hudson Valley	1	40	216,218	72,072	504,510	5.29
9	Columbia	4: Capital Region/Northern Catskills	1	23	173,569	57,856	404,994	4.25
10	Chautauqua	9: Western New York	2	54	159,795	53,265	372,855	3.91
11	Steuben	8: Western Finger Lakes	1	53	141,258	47,086	329,602	3.46
12	Niagara	9: Western New York	1	23	29,916	9,972	69,805	0.73
13	Tompkins	7: Central New York	1	40	22,713	7,571	52,997	0.56
14	Livingston	8: Western Finger Lakes	1	23	10,477	3,492	24,446	0.26
			18	**59**	**4,087,826**	**1,362,605**	**9,538,265**	**100**

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3.3. Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50-D89)

3.3a. Releases by Chemical

Forty-one of the 70 chemicals released by NYS natural gas compressor stations are associated with diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (ICD 10, Chapter 3). All 18 stations reported such releases. These totaled an estimated 18.7 million pounds from 2008 to 2014--an annual average of 2.7 million pounds.

Chemicals associated with blood and immune system diseases represented 47% of all reported natural gas compressor station releases.

Carbon monoxide was responsible for almost two-thirds (65.9%) of all statewide chemical releases. Volatile organic compounds as a group rank second with 4.9 million pounds (26.2%), followed by formaldehyde with 1.3 million pounds (7%). These three chemicals accounted for 99.1% of the state total.

Table 3.3a.

Diseases of the Blood and Blood-forming Organs and Certain Disorders Involving the Immune Mechanism by Chemical (Top 10 Chemicals by Pounds Released)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Carbon Monoxide	18	14	6	5,297,028	1,765,676	12,359,731	65.91
2	Volatile Organic Compounds	18	14	6	2,108,741	702,914	4,920,395	26.24
3	Formaldehyde	18	14	6	561,144	187,048	1,309,335	6.98
4	Acetaldehyde	14	13	6	28,272	9,424	65,969	0.35
5	Benzene	16	13	6	9,103	3,034	21,240	0.11
6	Methanol	8	7	6	8,286	2,762	19,333	0.10
7	Toluene	16	13	6	8,275	2,758	19,307	0.10
8	Hexane	13	10	6	5,222	1,741	12,183	0.06
9	Xylenes (Mixed Isomers)	15	13	6	3,598	1,199	8,394	0.04
10	1,3-Butadiene	14	13	6	2,022	674	4,718	0.03
		18	**14**	**6**	**8,031,690**	**2,677,230**	**18,740,605**	**99.94**

3.3b. Releases by ICD Category

Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism into 5 major groups. Chemicals released by natural gas compressor stations are positively associated with two of them. It should be remembered, that a single chemical can be associated with more than one category of disease.

D70-D77: Twenty-seven chemicals are associated with Coagulation defects, purpura and other hemorrhagic conditions These chemicals were released by all 18 stations.

D80-D89: Eighteen chemicals had effects broadly characterized as Other diseases of blood and blood-forming organs

Table 3.3b.

Diseases of the Blood and Blood-forming Organs and Certain Disorders Involving the Immune Mechanism by ICD Category

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	D50-D53	Nutritional anemias	0	0	0	0	0	0	0	0	0	0	0	0
2	D55-D64	Hemolytic anemias	0	0	0	0	0	0	0	0	0	0	0	0
3	D65-D69	Aplastic and other anemias	0	0	0	0	0	0	0	0	0	0	0	0
4	D70-D77	Coagulation defects, purpura and other hemorrhagic conditions	18	18	16	18	27	27	27	27	122,594	261,322	242,629	626,546
5	D80-D89	Other diseases of blood and blood-forming organs	18	18	17	18	17	18	18	18	1,534,607	2,284,799	2,088,789	5,908,195
	D50-D89	**Total**	**18**	**18**	**17**	**18**	**40**	**41**	**41**	**41**	**1,913,307**	**3,125,530**	**2,997,450**	**8,036,288**

3.3c. Releases by Facility

The top 6 polluters were facilities operated by the Tennessee Gas Pipeline Company.

TGPC's Compressor Station 245 in Winfield ranked first with 4.1 million pounds or slightly more than one-fifth of the total, followed by the Compressor 249 in Carlisle (2.1 million pounds or 11.1%) and by its LaFayette facility (2 million pounds or 10.3). These three sites were responsible for 8.1 million pounds or 43% of all statewide releases of chemicals associated with blood and immune system disorders.

The top 5 sites were responsible for 11 million pounds (58.5%) of the state total.

The facility average was 1,048,773 pounds.

Table 3.3c.

Diseases of the Blood and Blood-forming Organs and Certain Disorders Involving the Immune Mechanism by Facility

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	31	31	17	580,733	4,065,132	21.53
2	TGPC CS 249	Carlisle	Schoharie	31	18	18	299,205	2,094,438	11.09
3	TGPC CS 241	LaFayette	Onondaga	30	21	30	278,630	1,950,408	10.33
4	TGPC 229 & TEG DF	Eden	Erie	29	28	29	223,059	1,561,413	8.27
5	TGPC CS 237	Manchester, Phelps	Ontario	4	3	3	195,395	1,367,764	7.25
6	TGPC CS 254	Chatham	Columbia	17	10	4	161,398	1,129,784	5.98
7	AGT Stony Point CS	Stony Point	Rockland	33	15	16	154,988	1,084,914	5.75
8	NFGSC Independence CS	Andover	Allegany	10	5	12	147,748	1,034,239	5.48
9	NFGSC Beech Hill CS	Willing	Allegany	14	14	15	140,703	984,922	5.22
10	NFGSC Concord CS	Concord	Erie	6	5	7	133,625	935,372	4.95
11	TGPC CS 224	Clymer	Chautauqua	31	29	31	105,096	735,670	3.90
12	DTI Woodhull Station	Woodhull	Steuben	24	33	36	86,690	606,832	3.21
13	AGT SOUTHEAST CS	Southeast	Putnam	17	12	24	62,269	435,886	2.31
14	NFGSC Nashville CS	Hanover	Chautauqua	19	19	-	54,249	379,740	2.01
15	TGPC CS 230-C	Lockport	Niagara	17	16	17	22,498	157,488	0.83
16	DTI Utica Station	Frankfort	Herkimer	19	23	36	22,270	155,891	0.83
17	DTI Borger CS	Ithaca	Tompkins	24	25	13	21,652	151,564	0.80
18	TGPC CS 233	York	Livingston	17	10	2	6,638	46,465	0.25
				40	**41**	**41**	**2,696,846**	**18,877,920**	**100%**

3.3d Releases by DEC Region

Six of New York State's nine DEC regions reported releases of toxic chemicals associated with blood and immune system disorders.

DEC Region 9, Western New York, ranked first with an estimated 5.7 million pounds (30.2%) of releases from 2008 to 2014. Region 6, Western Adirondacks/Eastern Lake Ontario, second with 4.2 million pounds (22.5%), followed by Region 4, Capital Region/Northern Catskills with 3.2 million pounds (17.2%).

Table 3.3d.

D50-D89: Diseases of the Blood and Blood-forming Organs and Certain Disorders Involving the Immune Mechanism by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	NYS DEC Region	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	4	2	16	865,355	288,452	2,019,161	10.77
		Chautauqua	9	2	39	423,784	141,261	988,830	5.27
		Erie	2	2	32	1,070,051	356,684	2,496,785	13.32
		Niagara	12	1	17	67,495	22,498	157,488	0.84
				7	**40**	**2,426,684**	**808,895**	**5,662,264**	**30.20**
2	6: Adirondacks/E Lake Ontario	Herkimer	1	**2**	**40**	**1,809,010**	**603,003**	**4,221,023**	**22.51**
3	4: Capital Region/N. Catskills	Columbia	7	1	17	484,193	161,398	1,129,784	6.03
		Schoharie	3	1	31	897,616	299,205	2,094,438	11.17
				2	**35**	**1,381,809**	**460,603**	**3,224,222**	**17.19**
4	7: Central New York	Onondaga	5	1	30	835,889	278,630	1,950,408	10.40
		Tompkins	13	1	25	64,956	21,652	151,564	0.81
				2	**41**	**900,845**	**300,282**	**2,101,972**	**11.21**
5	8: Western Finger Lakes	Livingston	14	1	17	19,913	6,638	46,465	0.25
		Ontario	6	1	4	586,185	195,395	1,367,764	7.29
		Steuben	10	1	37	260,071	86,690	606,832	3.24
				3	**37**	**866,169**	**288,723**	**2,021,060**	**10.78**
6	3: Lower Hudson Valley	Livingston	11	1	26	186,808	62,269	435,886	2.32
		Ontario	8	1	33	464,963	154,988	1,084,914	5.79
				2	**39**	**651,772**	**217,257**	**1,520,800**	**8.11**
				18	**41**	**8,036,289**	**2,678,763**	**18,751,340**	**100**

3.3e. Releases by County

Herkimer County ranked first with 4.2 million pounds or 22.5% of the state total, followed by Erie County (2.5 million pounds or 13.3%) and Schoharie County (2.1 million pounds or 11.2%). These three counties are responsible for nearly one-half (48%) of all releases associated with blood and immune system diseases.

The top five counties were responsible for 12.8 million pounds or slightly more than two-thirds (68.2%) of the state total.

The 14-country average was 1,339,381 pounds.

Table 3.3e.

Diseases of the Blood and Blood-forming Organs and Certain Disorders Involving the Immune Mechanism by County (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	**County**	**NYS DEC Region**	**Fac's**	**Ch's**	**Total Pounds**	**Average Pounds**	**Total Pounds**	**%**
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	40	1,809,009	603,003	4,221,023	22.51
2	Erie	9: Western New York	2	32	1,070,050	356,684	2,496,785	13.32
3	Schoharie	4: Capital Region/Northern Catskills	1	31	897,616	299,205	2,094,438	11.17
4	Allegany	9: Western New York	2	16	865,354	288,452	2,019,161	10.77
5	Onondaga	7: Central New York	1	30	835,889	278,630	1,950,408	10.40
6	Ontario	8: Western Finger Lakes	1	4	586,184	195,395	1,367,764	7.29
7	Columbia	4: Capital Region/Northern Catskills	1	17	484,193	161,398	1,129,784	6.03
8	Rockland	3: Lower Hudson Valley	1	33	464,963	154,988	1,084,914	5.79
9	Chautauqua	9: Western New York	2	39	423,784	141,261	988,830	5.27
10	Steuben	8: Western Finger Lakes	1	37	260,070	86,690	606,832	3.24
11	Putnam	3: Lower Hudson Valley	1	26	186,808	62,269	435,886	2.32
12	Niagara	9: Western New York	1	17	67,494	22,498	157,488	0.84
13	Tompkins	7: Central New York	1	25	64,955	21,652	151,564	0.81
14	Livingston	8: Western Finger Lakes	1	17	19,913	6,638	46,465	0.25
			18	**41**	**8,036,282**	**2,678,763**	**18,751,340**	**100%**

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3.4. Endocrine, Nutritional and Metabolic Diseases (E00-E90)

3.4a. Releases by Chemical

Fifty-one of the 70 chemicals released by NYS natural gas compressor stations are associated with endocrine, nutritional and metabolic disorders (ICD 10, Chapter 4).

All 18 stations reported such releases. These totaled an estimated 7.1 million pounds from 2008 to 2014--an annual average of slightly more than 1 million pounds a year.

Chemicals associated with these effects accounted for 17.8% of all reported natural gas compressor station releases.

VOCs were responsible for 4.9 million pounds or slightly more than two-thirds (68.1%) of all statewide releases. Formaldehyde ranked second (1.3 million pounds or 18.4%), followed by PM Condensable (540,267 pounds or 7.6%). These three chemicals accounted for 95.1% of all releases.

The top 5 chemicals were responsible for 98.7% of the state total.

Table 3.4a.

E00-E90: Endocrine, Nutritional and Metabolic Diseases by Chemical

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Volatile Organic Compounds	18	14	6	2,108,741	702,914	4,920,396	69.13
2	Formaldehyde	18	14	6	561,144	187,048	1,309,336	18.40
3	PM Condensable	18	14	6	231,543	77,181	540,267	7.59
4	Sulfur Dioxide	18	14	6	80,048	26,683	186,778	2.62
5	Acetaldehyde	14	13	6	28,272	9,424	65,969	0.93
6	Benzene	16	13	6	9,103	3,034	21,241	0.30
7	Methanol	8	7	6	8,286	2,762	19,333	0.27
8	Toluene	16	13	6	8,275	2,758	19,308	0.27
9	Hexane	13	10	6	5,222	1,741	12,184	0.17
10	Xylenes (Mixed Isomers)	15	13	6	3,598	1,199	8,394	0.12
		18	**14**	**6**	**3,044,231**	**1,014,744**	**7,103,205**	**99.80**

3.4b. Releases by ICD Category

E00-E35: Forty-seven chemicals are associated with endocrine diseases. These include: adrenal weight change, androgen effects, delayed puberty, thymus weight changes, and thyroid hypofunction and other thyroid disorders.

E70-E90: Seventeen chemicals are associated with metabolic disorders. These include: biochemical and metabolic effects, homeostasis, hyperchloremic acidosis, and serum composition (changes: e.g. TP, bilirubin, cholesterol).

Table 3.04a.

E00-E90: Endocrine, Nutritional and Metabolic Diseases by ICD Category

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	E00-E35	Endocrine diseases	18	18	17	18	45	42	43	47	173,387	385,467	380,538	939,392
2	E40-E68	Nutritional diseases	0	0	0	0	0	0	0	0	0	0	0	0
3	E70-E90	Metabolic diseases	18	17	16	18	17	17	17	17	120,072	258,769	240,402	619,243
	E00-E90	**Total**	**18**	**18**	**17**	**18**	**49**	**46**	**47**	**51**	**547,971**	**1,218,450**	**1,283,873**	**3,050,294**

3.4c. Releases by Facility

All 18 natural gas compressor stations in NYS reported releasing these chemicals.

Four of the top 6 polluters were facilities operated by the Tennessee Gas Pipeline Company.

TGPC's Compressor Station 245 in Winfield ranked first with 1.3 million pounds (17.5%), followed by the Compressor Station 249 in Carlisle (948,972 pounds or 13.4%) and Compressor 241 in LaFayette (874,287 pounds or 12.2%). These three sites were responsible for 43% of all statewide releases.

The top 5 facilities were responsible for 61% of the total.

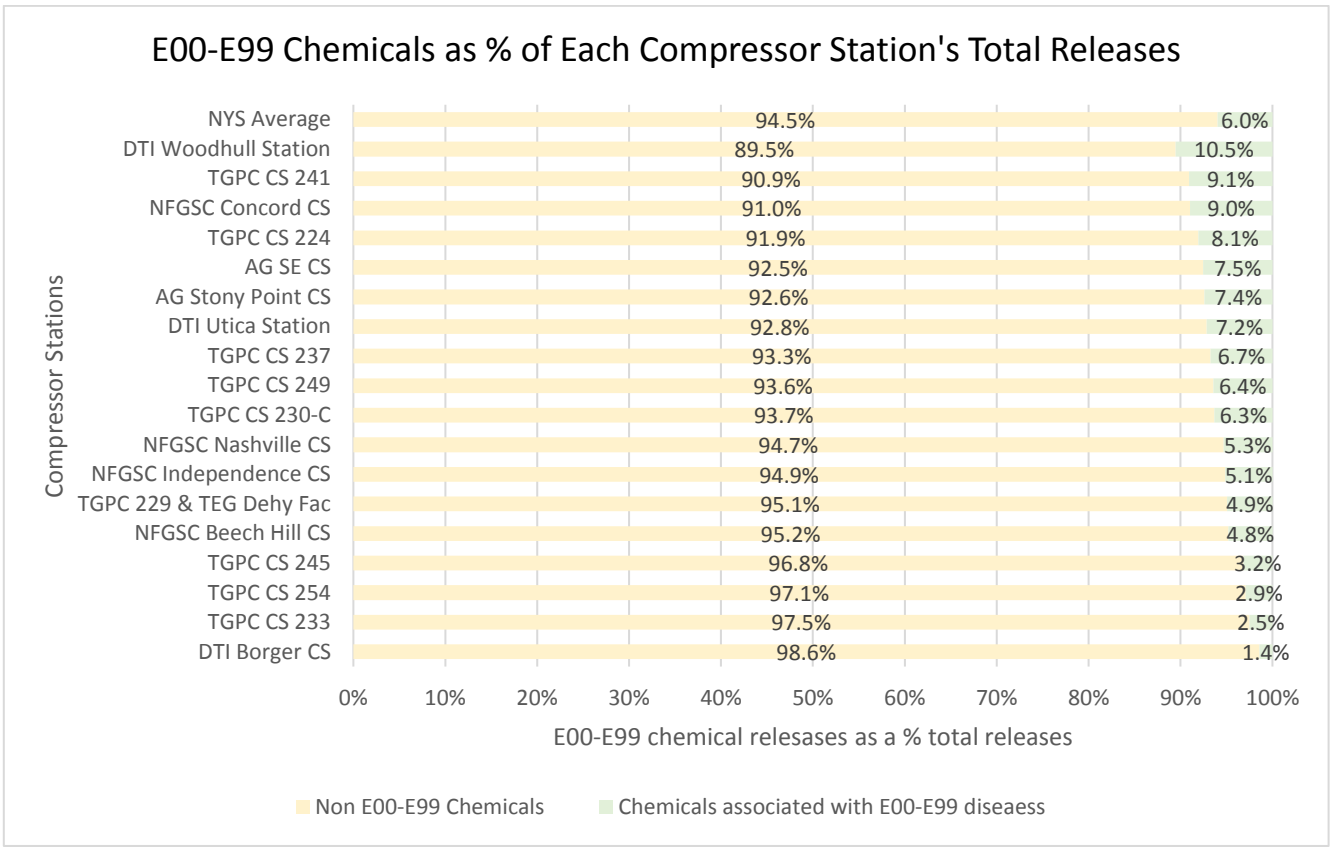
The facility average was 397,734 pounds.

Table 3.4c.

Endocrine, Nutritional and Metabolic Diseases by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	34	32	17	179,267	1,254,870	17.53
2	TGPC CS 249	Carlisle	Schoharie	34	18	18	136,996	958,972	13.39
3	TGPC CS 241	LaFayette	Onondaga	32	25	31	124,938	874,562	12.22
4	AGT Stony Point CS	Stony Point	Rockland	33	17	16	90,941	636,585	8.89
5	TGPC 229 & TEG DF	Eden	Erie	38	33	34	89,691	627,840	8.77
6	TGPC CS 237	Manchester, Phelps	Ontario	5	4	3	76,433	535,028	7.47
7	NFGSC Independence CS	Andover	Allegany	10	5	12	53,498	374,487	5.23
8	AGT SOUTHEAST CS	Southeast	Putnam	20	13	37	48,166	337,165	4.71
9	TGPC CS 254	Chatham	Columbia	20	11	5	40,522	283,651	3.96
10	NFGSC Concord CS	Concord	Erie	6	6	7	40,512	283,584	3.96
11	DTI Woodhull Station	Woodhull	Steuben	33	41	44	38,601	270,204	3.77
12	TGPC CS 224	Clymer	Chautauqua	32	30	32	34,003	238,018	3.32
13	NFGSC Beech Hill CS	Willing	Allegany	14	14	15	28,685	200,796	2.80
14	NFGSC Nashville CS	Hanover	Chautauqua	29	27	- -	17,947	125,632	1.75
15	DTI Utica Station	Frankfort	Herkimer	29	33	43	10,601	74,209	1.04
16	TGPC CS 230-C	Lockport	Niagara	20	19	20	5,433	38,028	0.53
17	DTI Borger CS	Ithaca	Tompkins	33	34	13	5,354	37,476	0.52
18	TGPC CS 233	York	Livingston	20	11	2	1,159	8,113	0.11
				49	**46**	**47**	**1,022,747**	**7,159,220**	**100%**


E00-E99 Chemicals as % of Each Compressor Station's Total Releases
Compressor Stations
NYS Average 94.5% 6.0%
DTI Woodhull Station 89.5% 10.5%
TGPC CS 241 90.9% 9.1%
NFGSC Concord CS 91.0% 9.0%
TGPC CS 224 91.9% 8.1%
AG SE CS 92.5% 7.5%
AG Stony Point CS 92.6% 7.4%
DTI Utica Station 92.8% 7.2%
TGPC CS 237 93.3% 6.7%
TGPC CS 249 93.6% 6.4%
TGPC CS 230-C 93.7% 6.3%
NFGSC Nashville CS 94.7% 5.3%
NFGSC Independence CS 94.9% 5.1%
TGPC 229 & TEG Dehy Fac 95.1% 4.9%
NFGSC Beech Hill CS 95.2% 4.8%
TGPC CS 245 96.8% 3.2%
TGPC CS 254 97.1% 2.9%
TGPC CS 233 97.5% 2.5%
DTI Borger CS 98.6% 1.4%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
E00-E99 chemical relesases as a % total releases
Non E00-E99 Chemicals
Chemicals associated with E00-E99 diseaess

3.4d. Releases by DEC Region

Six of New York State's nine DEC regions reported releases of chemicals associated with endocrine and metabolic diseases.

DEC Region 9, Western New York, ranked first with 1.8 million pounds (26%) from 2008 to 2014. Region 6, Western Adirondacks/Eastern Lake Ontario, ranked second with 1.3 million pounds (18.7%), closely followed by Region 3, Lower Hudson Valley, with 1.2 million pounds (17.5%).

Table 3.4d.

E00-E90: Endocrine, Nutritional and Metabolic Diseases by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	NYS DEC Region	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	6	2	15	246,550	82,183	575,284	8.08
		Chautauqua	9	2	45	137,903	45,968	321,773	4.52
		Erie	3	2	40	390,611	130,204	911,425	12.81
		Niagara	12	1	20	16,298	5,433	38,028	0.53
				7	**49**	**791,362**	**263,787**	**1,846,511**	**25.94**
2	6: W Adirondacks/E Lake Ontario	Herkimer	1	**2**	**50**	**569,606**	**189,869**	**1,329,080**	**18.67**
3	4: Capital Region/N. Catskills	Columbia	10	1	20	121,565	40,522	283,651	3.99
		Schoharie	2	1	34	410,988	136,996	958,972	13.47
				2	**39**	**532,553**	**177,518**	**1,242,624**	**17.46**
6	3: Lower Hudson Valley	Putnam	8	1	37	144,499	48,166	337,165	4.74
		Rockland	5	1	35	272,822	90,941	636,585	8.94
				2	**45**	**417,322**	**139,107**	**973,751**	**13.68**
4	7: Central New York	Onondaga	4	1	32	374,813	124,938	874,563	12.29
		Tompkins	13	1	36	16,061	5,354	37,476	0.53
				2	**49**	**390,874**	**130,291**	**912,039**	**12.81**
5	8: Western Finger Lakes	Livingston	14	1	20	3,477	1,159	8,114	0.11
		Ontario	7	1	5	229,298	76,433	535,029	7.52
		Steuben	11	1	46	115,802	38,601	270,204	3.80
				3	**46**	**348,577**	**116,192**	**813,347**	**11.43**
				18	**51**	**3,050,294**	**1,016,765**	**7,117,352**	**100**

3.4e. Releases by County

All fourteen counties where compressor stations are located reported releases of chemicals linked to endocrine and metabolic disorders.

Herkimer County ranked first with 1.3 million pounds or 18.7% of the state total, followed by Schoharie County (958,972 pounds or 13.5%) and Erie County (911,425 pounds or 12.8%). These three counties are responsible for nearly one-half (45%) of all releases.

The top five counties were responsible for 12.8 million pounds or slightly less than two-thirds (66.2%) of the state total.

The 14-country average was 508,382 pounds.

Table 3.4e.

E00-E90: Endocrine, Nutritional and Metabolic Diseases by County (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	County	NYS DEC Region	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	50	569,605	189,868	1,329,080	18.67
2	Schoharie	4: Capital Region/Northern Catskills	1	34	410,988	136,996	958,972	13.47
3	Erie	9: Western New York	2	40	390,610	130,203	911,425	12.81
4	Onondaga	7: Central New York	1	32	374,812	124,937	874,562	12.29
5	Rockland	3: Lower Hudson Valley	1	35	272,822	90,940	636,585	8.94
6	Allegany	9: Western New York	2	15	246,550	82,183	575,283	8.08
7	Ontario	8: Western Finger Lakes	1	5	229,298	76,432	535,028	7.52
8	Putnam	3: Lower Hudson Valley	1	37	144,499	48,166	337,165	4.74
9	Chautauqua	9: Western New York	2	45	137,902	45,967	321,773	4.52
10	Columbia	4: Capital Region/Northern Catskills	1	20	121,564	40,521	283,651	3.99
11	Steuben	8: Western Finger Lakes	1	46	115,801	38,600	270,204	3.80
12	Niagara	9: Western New York	1	20	16,297	5,432	38,028	0.53
13	Tompkins	7: Central New York	1	36	16,061	5,353	37,476	0.53
14	Livingston	8: Western Finger Lakes	1	20	3,477	1,159	8,113	0.11
			18	**50**	**3,050,286**	**1,016,757**	**7,117,345**	**100%**

3.5. Mental and Behavioral Disorders (F00-F99)

3.5a. Releases by Chemical

Thirty-four of the 70 chemicals released by NYS natural gas compressor reported to NEI are associated with mental and behavioral disorders (ICD-10, Chapter 5).

All 18 stations reported such releases. These totaled an estimated 18.7 million pounds from 2008 to 2014--an annual average of 2.7 million pounds.

Chemicals associated with mental and behavioral disorders represented 47% of all reported toxic releases reported from natural gas compressor stations reported to NEI.

Carbon monoxide was responsible for almost two-thirds (65.9%) of statewide releases of mental and behavioral system toxicants. Volatile organic compounds as a group ranked second (4.9 million pounds or 26.3%), followed by formaldehyde (1.3 million pounds or 7%). These three chemicals accounted for 99.96% of the state total.

Table 3.5a.

F00-F99: Mental and Behavioral Disorders by Chemical

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Carbon Monoxide	18	14	6	5,297,028	1,765,676	12,359,731	65.93
2	Volatile Organic Compounds	18	14	6	2,108,741	702,914	4,920,396	26.25
3	Formaldehyde	18	14	6	561,144	187,048	1,309,336	6.98
4	Acetaldehyde	14	13	6	28,272	9,424	65,969	0.35
5	Benzene	16	13	6	9,103	3,034	21,241	0.11
6	Methanol	8	7	6	8,286	2,762	19,333	0.10
7	Toluene	16	13	6	8,275	2,758	19,308	0.10
8	Hexane	13	10	6	5,222	1,741	12,184	0.06
9	Xylenes (Mixed Isomers)	15	13	6	3,598	1,199	8,394	0.04
10	Ethyl Benzene	15	13	6	1,198	399	2,794	0.01
		18	**14**	**6**	**8,030,865**	**2,676,955**	**18,738,685**	**99.96**

3.5b. Releases by ICD Category

Mental and behavioral disorders are divided into 11 major groups.

Chemicals released by natural gas compressor stations are positively associated with 8 of them. It should be remembered that a single chemical can be associated with more than one disease group.

F00-F09: Ten chemicals are associated with organic, including symptomatic, mental disorders. Specific effects associated with these eight chemicals include euphoria, hallucinations, mood disturbance, and personality changes. These chemicals were released by all 18 facilities.

F20-F29: Two chemicals, carbon monoxide and mercury, are associated with schizophrenia, schizotypal and delusional disorders, including delusions and psychosis (manic depressive). These chemicals were released by all 18 facilities.

F30-F39: Thirteen chemicals are associated with mood (affective) disorders. Excitement and depression are the two specific effects found in the peer-reviewed literature. These chemicals were released by all 18 facilities.

F40-F48: Twelve chemicals are associated with neurotic, stress-related and somatoform disorders, including anxiety, incoordination, panic attacks and stupor. These chemicals were released by all 18 facilities.

F50-F59: Nineteen chemicals are connected to behavioral syndromes associated with physiological disturbances and physical factors, specifically, aimless wandering behavior, anorexia (loss of appetite), mental alertness and unspecified behavioral effects These chemicals were released by all 18 facilities.

F60-F69: Two chemicals are associated with disorders of adult personality and behavior, specifically, aggression. Releases were reported by all 18 compressor stations.

F80-F89: Seven chemicals are connected to disorders of adult personality and behavior, including learning ability, decrease in manual dexterity and reduced cognitive capacity. These chemicals were released by all 18 facilities.

F99: Seven chemicals are associated with unspecified mental disorders.

Table 3.5b.

Mental and Behavioral Disorders by ICD Category

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	F00-F09	Organic, including symptomatic, mental disorders	18	18	17	18	10	10	10	10	1,418,739	2,038,854	1,856,547	5,314,142
2	F10-F19	Mental and behavioral disorders due to psychoactive substance use	0	0	0	0	0	0	0	0	0	0	0	0
3	F20-F29	Schizophrenia, schizotypal and delusional disorders	18	18	17	18	2	2	2	2	1,416,012	2,030,636	1,850,408	5,297,057
4	F30-F39	Mood (affective) disorders	18	18	17	18	13	13	13	13	1,530,052	2,267,329	2,075,954	5,873,337
5	F40-F48	Neurotic, stress-related and somatoform disorders	18	18	17	18	12	12	12	12	1,792,142	2,868,481	2,758,797	7,419,420
6	F50-F59	Behavioral syndromes associated with physiological disturbances and physical factors	18	18	16	18	19	19	19	19	119,618	255,264	237,598	612,481
7	F60-F69	Disorders of adult personality and behavior	18	18	17	18	2	2	2	2	1,526,329	2,260,511	2,071,330	5,858,171
8	F70-F79	Mental retardation	0	0	0	0	0	0	0	0	0	0	0	0
9	F80-F89	Disorders of psychological development	18	18	17	18	7	7	7	7	377,778	839,518	909,277	2,126,574
10	F90-F98	Behavioral and emotional disorders with onset usually occurring in childhood and adolescence	0	0	0	0	0	0	0	0	0	0	0	0
11	F99	Unspecified mental disorder	18	18	17	18	7	7	7	7	377,778	839,518	909,277	2,126,574
	F00-F99	**Total**	**18**	**18**	**17**	**18**	**34**	**34**	**34**	**34**	**1,913,000**	**3,124,461**	**2,996,664**	**8,034,126**

3.5c. Releases by Facility

All 18 natural gas compressor stations in NYS reported releasing chemicals associated with mental and behavioral disorders,

The top 6 polluters were facilities operated by the Tennessee Gas Pipeline Company.

TGPC's Compressor Station 245 in Winfield ranked first with 4.1 million pounds (22%), followed by Compressor Station 249 in Carlisle (2.1 million pounds or 11.1%) and Compressor 241 in LaFayette (2 million pounds or 10.3%). These three sites were responsible for 43% of all statewide releases.

The top 5 facilities were responsible for 58% of the total.

The facility average was 1,048,493 pounds.

Table 3.5c

Mental and Behavioral Disorders by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	27	27	16	580,710	4,064,973	21.54
2	TGPC CS 249	Carlisle	Schoharie	27	17	17	299,178	2,094,247	11.10
3	TGPC CS 241	LaFayette	Onondaga	26	19	26	278,597	1,950,179	10.33
4	TGPC 229 & TEG DF	Eden	Erie	24	23	24	222,733	1,559,128	8.26
5	TGPC CS 237	Manchester, Phelps	Ontario	4	3	3	195,395	1,367,764	7.25
6	TGPC CS 254	Chatham	Columbia	16	10	4	161,398	1,129,784	5.99
7	AGT Stony Point CS	Stony Point	Rockland	28	14	15	154,888	1,084,216	5.74
8	NFGSC Independ. CS	Andover	Allegany	10	5	12	147,748	1,034,239	5.48
9	NFGSC Beech Hill CS	Willing	Allegany	13	13	14	140,703	984,922	5.22
10	NFGSC Concord CS	Concord	Erie	6	5	7	133,625	935,372	4.96
11	TGPC CS 224	Clymer	Chautauqua	27	25	27	105,039	735,270	3.90
12	DTI Woodhull Station	Woodhull	Steuben	20	28	30	86,571	605,996	3.21
13	AGT SOUTHEAST CS	Southeast	Putnam	16	11	19	62,261	435,829	2.31
14	NFGSC Nashville CS	Hanover	Chautauqua	16	16	0	54,249	379,740	2.01
15	TGPC CS 230-C	Lockport	Niagara	16	15	16	22,498	157,487	0.83
16	DTI Utica Station	Frankfort	Herkimer	16	18	30	22,243	155,702	0.83
17	DTI Borger CS	Ithaca	Tompkins	20	20	12	21,652	151,563	0.80
18	TGPC CS 233	York	Livingston	16	10	2	6,638	46,464	0.25
				34	**34**	**34**	**2,696,125**	**18,872,875**	**100%**

Table 3.5c.2.

Mental and Behavioral Disorders as a % of Each Station's Total Releases

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Rank	Identification	Location		Pounds			Percent	
	Facility Name (Short)	Town	County	Total	Non-F00-F99	F00-F99	Non-F00-F99	F00-F99
1	DTI Woodhull Station	Woodhull	Steuben	829,223	559,019	270,204	67.4	32.6
2	AGT Stony Point CS	Stony Point	Rockland	2,013,478	1,376,893	636,585	68.4	31.6
3	TGPC CS 241	LaFayette	Onondaga	3,039,661	2,165,099	874,563	71.2	28.8
4	NFGSC Independence CS	Andover	Allegany	1,353,931	979,444	374,488	72.3	27.7
5	DTI Utica Station	Frankfort	Herkimer	281,369	207,160	74,209	73.6	26.4
6	TGPC CS 237	Manchester, Phelps	Ontario	2,298,394	1,763,365	535,029	76.7	23.3
7	TGPC CS 249	Carlisle	Schoharie	4,323,285	3,364,313	958,972	77.8	22.2
8	TGPC CS 224	Clymer	Chautauqua	1,146,797	908,779	238,018	79.2	20.8
9	NFGSC Nashville CS	Hanover	Chautauqua	622,791	497,159	125,632	79.8	20.2
10	AGT SOUTHEAST CS	Southeast	Putnam	1,688,815	1,351,650	337,165	80.0	20.0
11	NFGSC Concord CS	Concord	Erie	1,733,171	1,449,586	283,585	83.6	16.4
12	NFGSC Beech Hill CS	Willing	Allegany	1,387,592	1,186,796	200,796	85.5	14.5
13	TGPC 229 & TEG DF	Eden	Erie	5,124,427	4,496,586	627,840	87.7	12.3
14	TGPC CS 245	Winfield	Herkimer	10,465,389	9,210,518	1,254,871	88.0	12.0
15	TGPC CS 254	Chatham	Columbia	2,393,661	2,110,010	283,651	88.1	11.9
16	TGPC CS 230-C	Lockport	Niagara	485,610	447,581	38,028	92.2	7.8
17	DTI Borger CS	Ithaca	Tompkins	780,159	742,683	37,476	95.2	4.8
18	TGPC CS 233	York	Livingston	224,978	216,865	8,114	96.4	3.6
				40,192,733	**33,033,504**	**7,159,229**	**82.2**	**17.8**

3.5d. Releases by DEC Regions

The 18 compressor stations analyzed are in 6 of New York's 9 DEC regions. All 6 regions had releases of chemicals associated with mental and behavioral disorders.

DEC Region 9, Western New York, ranked first with 5.7 million pounds or slightly less than one-third of total releases from 2008 to 2014. Region 6, Western Adirondacks/Eastern Lake Ontario, second with 4.2 million pounds (22.5%), followed by Region 4, Capital Region/Northern Catskills, 3.2 million pounds (17.2%).

Table 3.5d.

Mental and Behavioral Disorders by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	NYS DEC Region	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	4	2	15	865,355	288,452	2,019,161	10.77
		Chautauqua	9	2	33	423,613	141,204	988,430	5.27
		Erie	2	2	27	1,069,071	356,357	2,494,500	13.31
		Niagara	12	1	16	67,494	22,498	157,487	0.84
				7	**34**	**2,425,533**	**808,511**	**5,659,578**	**30.19**
2	6: W. Adirondacks/E Lake Ontario	Herkimer	1	**2**	**33**	**1,808,861**	**602,954**	**4,220,675**	**22.51**
3	4: Capital Region/N. Catskills	Columbia	7	1	16	484,193	161,398	1,129,784	6.03
		Schoharie	3	1	27	897,534	299,178	2,094,247	11.17
				2	**31**	**1,381,727**	**460,576**	**3,224,031**	**17.20**
4	7: Central New York	Onondaga	5	1	26	835,791	278,597	1,950,179	10.40
		Tompkins	13	1	20	64,956	21,652	151,563	0.81
				2	**34**	**900,747**	**300,249**	**2,101,742**	**11.21**
5	8: Western Finger Lakes	Livingston	14	1	16	19,913	6,638	46,464	0.25
		Ontario	6	1	4	586,185	195,395	1,367,764	7.30
		Steuben	10	1	31	259,713	86,571	605,996	3.23
				3	**31**	**865,810**	**288,603**	**2,020,224**	**10.78**
6	3: Lower Hudson Valley	Putnam	11	1	21	186,784	62,261	435,829	2.32
		Rockland	8	1	28	464,664	154,888	1,084,216	5.78
				2	32	651,448	217,149	1,520,044	8.11
				18	**34**	**8,034,126**	**2,678,042**	**18,746,295**	**100%**

3.5e. Releases by County

All fourteen counties where compressor stations are located reported releases of chemicals linked to mental and behavioral disorders.

Herkimer County ranked first with 4.2 million pounds or 22.5% of the state total, followed by Erie County (2.5 million pounds or 13.3%) and Schoharie County (2 million pounds or 11.2%). These three counties are responsible for nearly one-half (47%) of all releases.

The top five counties were responsible for 12.8 million pounds or slightly more than two-thirds (68.1%) of the state total.

The 14-country average was 1,339,021 pounds.

Table 3.5e.

Mental and Behavioral Disorders by County (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	**County**	**NYS DEC Region**	**Fac's**	**Ch's**	**Total Pounds**	**Average Pounds**	**Total Pounds**	**%**
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	33	1,808,861	602,954	4,220,675	22.51
2	Erie	9: Western New York	2	27	1,069,071	356,357	2,494,500	13.31
3	Schoharie	4: Capital Region/Northern Catskills	1	27	897,534	299,178	2,094,247	11.17
4	Allegany	9: Western New York	2	15	865,355	288,452	2,019,161	10.77
5	Onondaga	7: Central New York	1	26	835,791	278,597	1,950,179	10.40
6	Ontario	8: Western Finger Lakes	1	4	586,185	195,395	1,367,764	7.30
7	Columbia	4: Capital Region/Northern Catskills	1	16	484,193	161,398	1,129,784	6.03
8	Rockland	3: Lower Hudson Valley	1	28	464,664	154,888	1,084,216	5.78
9	Chautauqua	9: Western New York	2	33	423,613	141,204	988,430	5.27
10	Steuben	8: Western Finger Lakes	1	31	259,713	86,571	605,996	3.23
11	Putnam	3: Lower Hudson Valley	1	21	186,784	62,261	435,829	2.32
12	Niagara	9: Western New York	1	16	67,494	22,498	157,487	0.84
13	Tompkins	7: Central New York	1	20	64,956	21,652	151,563	0.81
14	Livingston	8: Western Finger Lakes	1	16	19,913	6,638	46,464	0.25
			18	**34**	**8,034,126**	**2,678,042**	**18,746,295**	**100%**

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3.6. Diseases of the Nervous System (G00–G99)

3.6a. Releases by Chemical

Forty-two of the 70 chemicals released by NYS natural gas compressor stations are associated with nervous system disorders (ICD-10, Chapter 6). All 18 stations reported such releases. These totaled an estimated 19 million pounds from 2008 to 2014--an annual average of 2.7 million pounds.

Chemicals associated with nervous system diseases represent 47.6% of all reported toxic releases from NYS natural gas compressor stations reported to NEI.

Carbon monoxide was responsible for almost two-thirds (65.1%) of statewide releases of nervous system toxicants. Volatile organic compounds as a group ranked second (4.9 million pounds or 26%), followed by formaldehyde (1.3 million pounds or 6.9%). These three chemicals accounted for 97.9% of the state total.

Table 3.6a.

Diseases of the Nervous System by Chemical

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Carbon Monoxide	18	14	6	5,297,028	1,765,676	12,359,731	65.08
2	Volatile Organic Compounds	18	14	6	2,108,741	702,914	4,920,396	25.91
3	Formaldehyde	18	14	6	561,144	187,048	1,309,336	6.89
4	Sulfur Dioxide	18	14	6	80,048	26,683	186,778	0.98
5	Acetaldehyde	14	13	6	28,272	9,424	65,969	0.35
6	Acrolein	14	13	6	22,596	7,532	52,723	0.28
7	Benzene	16	13	6	9,103	3,034	21,241	0.11
8	Methanol	8	7	6	8,286	2,762	19,333	0.10
9	Toluene	16	13	6	8,275	2,758	19,308	0.10
10	Hexane	13	10	6	5,222	1,741	12,184	0.06
		18	**14**	**6**	**8,128,714**	**2,709,571**	**18,966,998**	**99.87**

3.6b. Releases by ICD Category

Diseases of the nervous system are subdivided into 11 major categories.

Chemicals released by natural gas compressor stations are positively associated with 6 of them. It should be remembered that a single chemical can be associated with more than one disease group.

G00-G09: Five chemicals are associated with inflammatory diseases of the central nervous system, specifically, amyotrophic lateral sclerosis. These chemicals were released by all 18 stations.

G20-G26: Two chemicals are associated with extrapyramidal and movement disorders, specifically, olfactory nerve changes. These chemicals were released by 8 stations.

G40-G47: Ten chemicals are associated with episodic and paroxysmal disorders, specifically, altered sleep time (including change in righting reflex), insomnia, peripheral nerve effects, sleep disorders, and sleepiness. These chemicals were released by 17 stations.

G60-G64: Two chemicals are associated with polyneuropathies and other disorders of the peripheral nervous system. These chemicals were released by all 18 stations.

G80-G83: One chemical, carbon monoxide, is associated with cerebral palsy and other paralytic syndromes. It is released by all stations.

G90-G99: Forty-two chemicals are associated with other disorders of the nervous system.

Table 3.6b.

G00-G99: Diseases of the Nervous System by ICD Code Group

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	G00-G09	Inflammatory diseases of the central nervous system	18	18	16	18	5	5	5	5	112,281	231,662	222,434	566,378
2	G10-G13	Systemic atrophies primarily affecting the central nervous system	0	0	0	0	0	0	0	0	0	0	0	0
3	G20-G26	Extrapyramidal and movement disorders	6	4	5	8	2	2	2	2	41	108	70	220
4	G30-G32	Other degenerative diseases of the nervous system	0	0	0	0	0	0	0	0	0	0	0	0
5	G40-G47	Episodic and paroxysmal disorders	17	16	14	17	10	10	10	10	7,391	23,902	15,437	46,732
6	G50-G59	Nerve, nerve root and plexus disorders	0	0	0	0	0	0	0	0	0	0	0	0
7	G60-G64	Polyneuropathies and other disorders of the peripheral nervous sys.	18	17	16	18	2	2	2	2	110,351	229,931	220,960	561,243
8	G70-G73	Diseases of myoneural junction and muscle	0	0	0	0	0	0	0	0	0	0	0	0
9	G80-G83	Cerebral palsy and other paralytic syndromes	18	18	17	18	1	1	1	1	1,415,995	2,030,629	1,850,402	5,297,027
10	G90-G99	Other disorders of the nervous system	18	18	17	18	42	42	42	42	1,924,189	3,151,601	3,063,418	8,139,210
	G00-G99	**Total**	**18**	**18**	**17**	**18**	**42**	**42**	**42**	**42**	**1,924,189**	**3,151,601**	**3,063,418**	**8,139,210**

3.6c. Releases by Facility

All 18 natural gas compressor stations in NYS reported releasing chemicals associated with nervous system disorders.

The top 6 polluters were facilities operated by the Tennessee Gas Pipeline Company.

TGPC's Compressor Station 245 in Winfield ranked first with 4.1 million pounds (22%), followed by Compressor Station 249 in Carlisle (2.1 million pounds or 11.1%) and Compressor 241 in LaFayette (2 million pounds or 10.3%). These three sites were responsible for 43% of all statewide releases.

The top 5 facilities were responsible for 58% of the total.

The facility average was 1,062,124 pounds.

Table 3.6c.

G00–G99: Diseases of the Nervous System by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	34	34	20	584,742	4,093,196	21.41
2	TGPC CS 249	Carlisle	Schoharie	34	21	21	303,242	2,122,694	11.10
3	TGPC CS 241	LaFayette	Onondaga	33	23	33	282,459	1,977,209	10.34
4	TGPC 229 & TEG DF	Eden	Erie	31	30	31	227,683	1,593,779	8.34
5	TGPC CS 237	Manchester, Phelps	Ontario	5	4	4	195,580	1,369,060	7.16
6	TGPC CS 254	Chatham	Columbia	19	12	5	162,516	1,137,610	5.95
7	AGT Stony Point CS	Stony Point	Rockland	36	17	18	159,633	1,117,432	5.84
8	NFGSC Independence CS	Andover	Allegany	11	6	13	147,851	1,034,958	5.41
9	NFGSC Beech Hill CS	Willing	Allegany	16	16	17	141,024	987,167	5.16
10	NFGSC Concord CS	Concord	Erie	7	6	8	133,787	936,510	4.90
11	TGPC CS 224	Clymer	Chautauqua	34	32	34	106,266	743,864	3.89
12	DTI Woodhull Station	Woodhull	Steuben	24	32	36	87,890	615,229	3.22
13	AGT SOUTHEAST CS	Southeast	Putnam	19	14	24	67,069	469,483	2.46
14	NFGSC Nashville CS	Hanover	Chautauqua	18	18	0	54,319	380,234	1.99
15	TGPC CS 230-C	Lockport	Niagara	19	18	19	25,460	178,217	0.93
16	DTI Utica Station	Frankfort	Herkimer	18	22	35	22,575	158,022	0.83
17	DTI Borger CS	Ithaca	Tompkins	24	24	15	22,343	156,403	0.82
18	TGPC CS 233	York	Livingston	19	12	3	6,737	47,157	0.25
				42	**42**	**42**	**2,731,176**	**19,118,224**	**100%**

3.6d. Releases by DEC Region

The 18 compressor stations analyzed are in 6 of New York's 9 DEC regions. All 6 regions had releases of chemicals associated with mental and nervous system disorders.

DEC Region 9, Western New York, ranked first with 5.7 million pounds or slightly less than one-third (30.2%) of total releases from 2008 to 2014. Region 6, Western Adirondacks/Eastern Lake Ontario, second with 4.3 million pounds (22.4%), followed by Region 4, Capital Region/Northern Catskills, 3.3 million pounds (17.2%).

Table 3.6d.

G00–G99: Diseases of the Nervous System by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	NYS DEC Region	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	4	2	18	866,625	288,875	2,022,126	10.65
		Chautauqua	9	2	41	427,437	142,479	997,353	5.25
		Erie	2	2	34	1,084,410	361,470	2,530,290	13.32
		Niagara	12	1	19	76,379	25,459	178,217	0.94
				7	**42**	**2,454,851**	**818,283**	**5,727,986**	**30.16**
2	6: W Adirondacks/E Lake Ontario	Herkimer	1	**2**	**41**	**1,821,950**	**607,316**	**4,251,218**	**22.38**
3	4: Capital Region/N. Catskills	Columbia	7	1	19	487,547	162,515	1,137,610	5.99
		Schoharie	3	1	34	909,726	303,242	2,122,694	11.18
				2	**38**	**1,397,273**	**465,757**	**3,260,304**	**17.17**
4	7: Central New York	Onondaga	5	1	33	847,375	282,458	1,977,209	10.41
		Tompkins	13	1	24	67,030	22,343	156,403	0.82
				2	**42**	**914,405**	**304,801**	**2,133,612**	**11.23**
5	8: Western Finger Lakes	Livingston	14	1	19	20,210	6,736	47,157	0.25
		Ontario	6	1	5	586,740	195,580	1,369,060	7.21
		Steuben	10	1	37	263,669	87,889	615,229	3.24
				3	**37**	**870,619**	**290,205**	**2,031,446**	**10.70**
6	3: Lower Hudson Valley	Putnam	11	1	26	201,207	67,069	469,483	2.47
		Rockland	8	1	36	478,899	159,633	1,117,432	5.88
				2	**39**	**680,106**	**226,702**	**1,586,915**	**8.36**
				18	**42**	**8,139,204**	**2,713,064**	**18,991,481**	**100%**

3.6e. Releases by County

All fourteen counties where compressor stations are located reported releases of chemicals linked to nervous system disorders.

Herkimer County ranked first with 4.3 million pounds or 22.4% of the state total, followed by Erie County (2.5 million pounds or 13.3%) and Schoharie County (2.1 million pounds or 11.2%). These three counties are responsible for nearly one-half (48.9%) of all releases.

The top five counties were responsible for 12.8 million pounds or slightly more than two-thirds (68%) of the state total.

The 14-country average was 1,356,535 pounds.

Table 3.6e.

G00–G99: Diseases of the Nervous System by County (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	**County**	**NYS DEC Region**	**Fac's**	**Ch's**	**Total Pounds**	**Average Pounds**	**Total Pounds**	**%**
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	41	1,821,951	607,317	4,251,219	22.38
2	Erie	9: Western New York	2	34	1,084,410	361,470	2,530,291	13.32
3	Schoharie	4: Capital Region/Northern Catskills	1	34	909,726	303,242	2,122,695	11.18
4	Allegany	9: Western New York	2	18	866,625	288,875	2,022,126	10.65
5	Onondaga	7: Central New York	1	33	847,376	282,459	1,977,210	10.41
6	Ontario	8: Western Finger Lakes	1	5	586,740	195,580	1,369,061	7.21
7	Columbia	4: Capital Region/Northern Catskills	1	19	487,547	162,516	1,137,610	5.99
8	Rockland	3: Lower Hudson Valley	1	36	478,900	159,633	1,117,433	5.88
9	Chautauqua	9: Western New York	2	41	427,437	142,479	997,354	5.25
10	Steuben	8: Western Finger Lakes	1	37	263,670	87,890	615,230	3.24
11	Putnam	3: Lower Hudson Valley	1	26	201,207.04	67,069.01	469,483.08	2.47
12	Niagara	9: Western New York	1	19	76,379.14	25,459.71	178,217.98	0.94
13	Tompkins	7: Central New York	1	24	67,030.16	22,343.39	156,403.70	0.82
14	Livingston	8: Western Finger Lakes	1	19	20,210	6,737	47,158	0.25
			18	**42**	**8,139,210**	**2,713,070**	**18,991,490**	**100%**

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3.7. Diseases of the Eye and Adnexa (H00-H59)

3.7a. Releases by Chemical

Forty-one of the 70 chemicals released by NYS natural gas compressor stations are associated with diseases of the eye and adnexa (ICD-10, Chapter 7). All 18 stations reported such releases. These totaled an estimated 24.7 million pounds from 2008 to 2014--an annual average of 3.5 million pounds.

Chemicals associated with eye and adnexa diseases represent 61.8% of all reported toxic releases from NYS natural gas compressor stations reported to NEI.

Nitrogen oxides were responsible for slightly less than three-fourths (73.2%) of statewide releases of chemicals linked to diseases of the eye and adnexa. Volatile organic compounds as a group ranked second (4.9 million pounds or 20%), followed by formaldehyde (1.3 million pounds or 5.3%). These three chemicals accounted for 98% of the state total.

Table 3.7a.

H00-H59. Diseases of the Eye and Adnexa by Chemical

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Nitrogen Oxides	18	14	6	7,749,673	2,583,224	18,082,571	73.17
2	Volatile Organic Compounds	18	14	6	2,108,741	702,914	4,920,396	19.91
3	Formaldehyde	18	14	6	561,144	187,048	1,309,336	5.30
4	Sulfur Dioxide	18	14	6	80,048	26,683	186,778	0.76
5	Acetaldehyde	14	13	6	28,272	9,424	65,969	0.27
6	Acrolein	14	13	6	22,596	7,532	52,723	0.21
7	Benzene	16	13	6	9,103	3,034	21,241	0.09
8	Methanol	8	7	6	8,286	2,762	19,333	0.08
9	Toluene	16	13	6	8,275	2,758	19,308	0.08
10	Hexane	13	10	6	5,222	1,741	12,184	0.05
		18	**14**	**6**	**10,581,359**	**3,527,120**	**24,689,838**	**99.90**

3.7b. Releases by ICD Category

Diseases of the eye and adnexa system are subdivided into 12 major groups. Chemicals released by natural gas compressor stations are positively associated with 8 of them. It should be remembered, that a single chemical can be associated with more than one category of disease.

H00-H06: Nine chemicals are associated with disorders of eyelid, lacrimal system and orbit. Specific effects include: lacrimation and ptosis. These chemicals were released by all 18 stations.

H10-H13: Ten chemicals are associated with conjunctival disorders. Specific effects include: conjunctivitis and conjunctival irritation. These chemicals were released by all 18 stations.

H15-H19: Three chemicals are associated with disorders of sclera and cornea. Specific effects include: cornea damage and clouding. These chemicals were released by 13 stations.

H20-H22: A single chemical, propylene oxide, is associated with disorders of iris and ciliary body, specifically, iritis. Eight stations reported releases of this chemical.

H30-H36: Three chemicals are associated with glaucoma. Eighteen stations reported its release.

H40-H42: Two chemicals are associated with glaucoma. Fourteen stations reported its release.

H53-H54: Eleven chemicals are associated with visual disturbances and blindness. Eighteen stations reported their release.

H55-H99: Thirty-nine chemicals are associated with other disorders of eye and adnexa.

Table 3.7b

H00-H59. Diseases of the Eye and Adnexa by Chemical

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	H00-H06	Disorders of eyelid, lacrimal system and orbit	18	17	16	18	9	9	9	9	112,005	235,242	224,320	571,568
2	H10-H13	Disorders of conjunctiva	18	18	17	18	10	10	10	10	487,727	1,070,740	1,130,225	2,688,693
3	H15-H19	Disorders of sclera and cornea	12	12	11	13	3	3	3	3	309	387	311	1,008
4	H20-H22	Disorders of iris & ciliary body	8	5	4	8	1	1	1	1	6	114	141	263
5	H25-H28	Disorders of lens	0	0	0	0	0	0	0	0	0	0	0	0
6	H30-H36	Disorders of choroid & retina	18	17	16	18	3	3	3	3	111,765	234,361	223,601	569,727
7	H40-H42	Glaucoma	14	10	10	14	2	2	2	2	40	117	124	282
8	H43-H45	Disorders of vitreous body and globe	0	0	0	0	0	0	0	0	0	0	0	0
9	H46-H48	Disorders of optic nerve and visual pathways	0	0	0	0	0	0	0	0	0	0	0	0
10	H49-H52	Disorders of ocular muscles, binocular movement, accommodation & refraction	0	0	0	0	0	0	0	0	0	0	0	0
11	H53-H54	Visual disturbances & blindness	18	18	16	18	11	11	11	11	115,165	240,009	228,723	583,898
12	H55-H59	Other disorders of eye and adnexa	18	18	17	18	39	39	39	39	2,777,490	4,113,923	3,700,237	10,591,651
	H00-H59	**Total**	**18**	**18**	**17**	**18**	**41**	**41**	**41**	**41**	**2,777,500**	**4,113,949**	**3,700,250**	**10,591,700**

3.7c. Releases by Facility

All 18 natural gas compressor stations in NYS reported releasing chemicals associated with diseases of the eye and adnexa.

The top 5 polluters were facilities operated by the Tennessee Gas Pipeline Company.

TGPC's Compressor Station 245 in Winfield ranked first with 7 million pounds (28.3%), followed by Compressor Station 229 in Eden (3.7 million pounds or 15%) and Compressor 249 in Carlisle (2.6 million pounds or 10.4%). These three sites were responsible for more than one-half (53.7%) of all statewide releases.

The top 5 facilities were responsible for slightly less than two-thirds (65.4%) of the total.

The facility average was 1,379,496 pounds.

Table 3.7c.

H00-H59: Diseases of the Eye and Adnexa by Facility

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	32	32	20	1,001,990	7,013,931	28.25
2	TGPC 229 & TEG DF	Eden	Erie	30	29	30	532,203	3,725,419	15.00
3	TGPC CS 249	Carlisle	Schoharie	32	21	21	368,835	2,581,844	10.40
4	TGPC CS 241	LaFayette	Onondaga	31	23	31	222,022	1,554,152	6.26
5	TGPC CS 254	Chatham	Columbia	19	12	5	194,478	1,361,349	5.48
6	AGT Stony Point CS	Stony Point	Rockland	33	18	18	192,160	1,345,120	5.42
7	AGT SOUTHEAST CS	Southeast	Putnam	19	14	25	183,354	1,283,480	5.17
8	TGPC CS 237	Manchester, Phelps	Ontario	5	4	4	177,838	1,244,864	5.01
9	NFGSC Concord CS	Concord	Erie	7	6	8	128,461	899,225	3.62
10	NFGSC Independ. CS	Andover	Allegany	11	6	13	95,203	666,418	2.68
11	DTI Borger CS	Ithaca	Tompkins	25	25	15	90,898	636,288	2.56
12	TGPC CS 224	Clymer	Chautauqua	32	30	32	84,987	594,909	2.40
13	NFGSC Beech Hill CS	Willing	Allegany	16	16	17	73,519	514,636	2.07
14	DTI Woodhull Station	Woodhull	Steuben	25	32	36	59,457	416,201	1.68
15	NFGSC Nashville CS	Hanover	Chautauqua	19	19	0	50,123	350,859	1.41
16	TGPC CS 230-C	Lockport	Niagara	19	18	19	42,774	299,420	1.21
17	DTI Utica Station	Frankfort	Herkimer	19	23	35	25,770	180,387	0.73
18	TGPC CS 233	York	Livingston	19	12	3	23,203	162,421	0.65
				41	**41**	**41**	**3,547,275**	**24,830,922**	**100%**

3.7d. Releases by DEC Region

The 18 compressor stations analyzed are in 6 of New York's 9 DEC regions. All 6 regions had releases of chemicals associated with mental and diseases of the eye and adnexa.

DEC Region 6, Western Adirondacks/Eastern Lake Ontario, ranked first with 7.2 million pounds or 20.3% of total releases from 2008 to 2014. Region 9, Western New York, was a close second with 6.9 million pounds (28.2%), followed by Region 4, Capital Region/Northern Catskills, 3.9 million pounds (16.1%).

Table 3.7d.

Diseases of the Eye and Adnexa by DEC Region

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

NYS DEC Region		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	No. \ Name	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	**6: W. Adirondacks/E Lake Ontario**	Herkimer	1	**2**	**40**	**3,083,279**	**1,027,760**	**7,194,317**	**29.30**
2	**9: Western New York**	Allegany	9	2	18	506,166	168,722	1,181,054	4.81
		Chautauqua	10	2	40	355,206	118,402	828,815	3.38
		Erie	2	2	33	1,981,990	660,663	4,624,644	18.84
		Niagara	13	1	19	128,323	42,774	299,420	1.22
				7	**41**	**2,971,686**	**990,562**	**6,933,933**	**28.24**
3	**4: Capital Region/Northern Catskills**	Columbia	5	1	19	583,435	194,478	1,361,349	5.54
		Schoharie	3	1	32	1,106,504	368,835	2,581,844	10.52
				2	**36**	**1,689,940**	**563,313**	**3,943,192**	**16.06**
4	**3: Lower Hudson Valley**	Putnam	7	1	27	550,063	183,354	1,283,480	5.23
		Rockland	6	1	34	576,480	192,160	1,345,120	5.48
				2	**38**	**1,126,543**	**375,514**	**2,628,600**	**10.71**
5	**7: Central New York**	Onondaga	4	1	31	666,065	222,022	1,554,152	6.33
		Tompkins	11	1	25	272,695	90,898	636,288	2.59
				2	**41**	**938,760**	**312,920**	**2,190,439**	**8.92**
6	**8: Western Finger Lakes**	Livingston	14	1	19	69,609	23,203	162,421	0.66
		Ontario	8	1	5	533,513	177,838	1,244,864	5.07
		Steuben	12	1	37	178,372	59,457	416,201	1.70
				2	**37**	**711,885**	**237,295**	**1,661,065**	**6.77**
				18	**41**	**10,522,092**	**3,507,364**	**24,551,547**	**100%**

3.7e. Releases by County

All fourteen counties where compressor stations are located reported releases of chemicals linked to diseases of the eye and adnexa.

Herkimer County ranked first with 7.2 million pounds or 29.1% of the state total, followed by Erie County (4.6 million pounds or 18.7%) and Schoharie County (2.6 million pounds or 10.5%). These three counties are responsible for more than one-half (58.3%) of all releases.

The top five counties were responsible for 17.3 million pounds or slightly more than two-thirds (70%) of the state total.

The 14-country average was 1,765,283 pounds.

Table 3.7e.

Diseases of the Eye and Adnexa by County

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	County	NYS DEC Region	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	40	3,083,279	1,027,760	7,194,317	29.11
2	Erie	9: Western New York	2	33	1,981,990	660,663	4,624,644	18.71
3	Schoharie	4: Capital Region/Northern Catskills	1	32	1,106,504	368,835	2,581,844	10.45
4	Onondaga	7: Central New York	1	31	666,065	222,022	1,554,152	6.29
5	Columbia	4: Capital Region/Northern Catskills	1	19	583,435	194,478	1,361,349	5.51
6	Rockland	3: Lower Hudson Valley	1	34	576,480	192,160	1,345,120	5.44
7	Putnam	3: Lower Hudson Valley	1	27	550,063	183,354	1,283,480	5.19
8	Ontario	8: Western Finger Lakes	1	5	533,513	177,838	1,244,864	5.04
9	Allegany	9: Western New York	2	18	506,166	168,722	1,181,054	4.78
10	Chautauqua	9: Western New York	2	40	355,206	118,402	828,815	3.35
11	Tompkins	7: Central New York	1	25	272,695	90,898	636,288	2.57
12	Steuben	8: Western Finger Lakes	1	37	178,372	59,457	416,201	1.68
13	Niagara	9: Western New York	1	19	128,323	42,774	299,420	1.21
14	Livingston	8: Western Finger Lakes	1	19	69,609	23,203	162,421	0.66
			18	**41**	**10,591,701**	**3,530,567**	**24,713,969**	**100%**

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3.8. Diseases of the Ear and Mastoid Process (H60-H95)

3.8a. Releases by Chemical

Fifteen of the 70 chemicals released by NYS natural gas compressor stations are associated with diseases of the ear and mastoid process (ICD-10, Chapter 8). All 18 stations reported such releases. These totaled an estimated 17.3 million pounds from 2008 to 2014--an annual average of 2.5 million pounds.

Chemicals associated with diseases of the ear and mastoid process represented 43.5% of all reported releases by natural gas compressor stations.

Two chemicals, carbon monoxide and volatile organic compounds, were responsible for 99.8% of all statewide releases.

Table 3.8a.

Diseases of the Ear and Mastoid Process by Chemical (Top 10 Chemicals by Pounds Released)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Carbon Monoxide	18	14	6	5,297,028	1,765,676	12,359,731	71.26
2	Volatile Organic Compounds	18	14	6	2,108,741	702,914	4,920,396	28.37
3	Benzene	16	13	6	9,103	3,034	21,241	0.12
4	Toluene	16	13	6	8,275	2,758	19,308	0.11
5	Hexane	13	10	6	5,222	1,741	12,184	0.07
6	Xylenes (Mixed Isomers)	15	13	6	3,598	1,199	8,394	0.05
7	Ethyl Benzene	15	13	6	1,198	399	2,794	0.02
8	Methylene Chloride	8	7	6	269	90	629	0.00
9	Manganese	9	9	6	150	50	350	0.00
10	Styrene	8	7	6	100	33	234	0.00
11	Vinyl Chloride	8	7	6	46	15	107	0.00
12	Mercury	16	13	6	30	10	70	0.00
13	Cadmium	9	9	6	13	4	30	0.00
14	Lead	16	12	6	0	0	1	0.00
15	Cobalt	6	6	5	0	0	0	0.00
		18	**14**	**6**	**7,433,772**	**2,477,924**	**17,345,468**	**100%**

3.8b. Releases by ICD Category

Diseases of the ear and mastoid process are subdivided into 4 major groups. Chemicals released by natural gas compressor stations are positively associated with two of them. It should be remembered, that a single chemical can be associated with more than one category of disease.

H80-H83: Fifteen chemicals are associated with diseases of inner ear, including, change in cochlear structure or function, hearing deficits and hearing disturbance. These chemicals were released by all 18 stations.

H90-H95: These fifteen all had effects broadly characterized as other disorders of ear, characterized as changes in hearing acuity, hearing loss, and ototoxicity.

Table 3.8b.

Diseases of the Ear and Mastoid Process by ICD Code Group

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	H60-H62	Diseases of external ear	0	0	0	0	0	0	0	0	0	0	0	0
2	H65-H75	Diseases of middle ear and mastoid	0	0	0	0	0	0	0	0	0	0	0	0
3	H80-H83	Diseases of inner ear	16	15	13	16	5	5	5	5	1,810	5,743	5,661	13,215
4	H90-H95	Other disorders of ear	18	18	17	18	15	15	15	15	1,796,211	2,874,068	2,763,491	7,433,772
	H60-H95	**Total**	**18**	**18**	**17**	**18**	**15**	**15**	**15**	**15**	**1,796,211**	**2,874,068**	**2,763,491**	**7,433,772**

3.8c. Releases by Facility

All 18 natural gas compressor stations in NYS reported releasing chemicals associated with diseases of the ear and mastoid process.

The top 6 polluters were facilities operated by the Tennessee Gas Pipeline Company.

TGPC's Compressor Station 245 in Winfield ranked first with 3.8 million pounds (22%), followed by Compressor Station 249 in Carlisle (1.9 million pounds or 11.1%) and Compressor 241 in Lafayette (1.8 million pounds or 10.1%). These three sites were responsible for 43.1% of all statewide releases.

The top 5 facilities were responsible for more than one-half (58.4%) of the total.

The facility average was 970,115 pounds.

Table 3.8c.

Diseases of the Ear and Mastoid Process by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	12	12	9	548,196	3,837,375	21.98
2	TGPC CS 249	Carlisle	Schoharie	12	9	9	276,272	1,933,902	11.07
3	TGPC CS 241	LaFayette	Onondaga	11	10	11	251,763	1,762,343	10.09
4	TGPC 229 & TEG DF	Eden	Erie	11	10	11	201,990	1,413,927	8.10
5	TGPC CS 237	Manchester, Phelps	Ontario	3	2	2	178,687	1,250,808	7.16
6	TGPC CS 254	Chatham	Columbia	10	6	2	157,064	1,099,446	6.30
7	AGT Stony Point CS	Stony Point	Rockland	14	8	9	144,424	1,010,968	5.79
8	NFGSC Independence CS	Andover	Allegany	7	3	9	138,539	969,770	5.55
9	NFGSC Beech Hill CS	Willing	Allegany	8	8	9	133,537	934,759	5.35
10	NFGSC Concord CS	Concord	Erie	4	4	4	115,615	809,305	4.63
11	TGPC CS 224	Clymer	Chautauqua	12	10	12	93,625	655,373	3.75
12	DTI Woodhull Station	Woodhull	Steuben	12	14	15	77,004	539,026	3.09
13	AGT SOUTHEAST CS	Southeast	Putnam	10	7	12	57,674	403,718	2.31
14	NFGSC Nashville CS	Hanover	Chautauqua	10	10	0	49,975	349,825	2.00
15	TGPC CS 230-C	Lockport	Niagara	10	9	10	22,205	155,432	0.89
16	DTI Borger CS	Ithaca	Tompkins	12	12	8	21,502	150,516	0.86
17	DTI Utica Station	Frankfort	Herkimer	10	11	15	20,007	140,050	0.80
18	TGPC CS 233	York	Livingston	10	6	2	6,505	45,534	0.26
				15	**15**	**15**	**2,494,582**	**17,462,077**	**100%**

3.8d. Releases by DEC Region

The 18 compressor stations analyzed are in 6 of New York's 9 DEC regions. All 6 regions had releases of chemicals associated with mental and diseases of the eye and adnexa.

Region 9, Western New York, ranked first with 5.2 million pounds or 29.9% of total releases from 2008 to 2014. DEC Region 6, Western Adirondacks/Eastern Lake Ontario, was second with 4 million pounds (23%), followed by Region 4, Capital Region/Northern Catskills, 3 million pounds (17.5%).

Table 3.8d.

Diseases of the Ear and Mastoid Process by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

NYS DEC Region		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	NYS DEC Region	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	4	2	9	816,226	272,075	1,904,528	10.98
		Chautauqua	9	2	15	380,824	126,941	888,589	5.12
		Erie	2	2	12	952,814	317,605	2,223,232	12.82
		Niagara	12	1	10	66,614	22,205	155,432	0.90
				7	**15**	**2,216,478**	**738,826**	**5,171,782**	**29.82**
2	6: W. Adirondacks/E. Lake Ontario	Herkimer	1	**2**	**15**	**1,704,611**	**568,204**	**3,977,425**	**22.93**
3	4: Capital Region/N. Catskills	Columbia	7	1	10	471,191	157,064	1,099,446	6.34
		Schoharie	3	1	12	828,815	276,272	1,933,902	11.15
				2	**14**	**1,300,006**	**433,335**	**3,033,348**	**17.49**
4	7: Central New York	Onondaga	5	1	11	755,290	251,763	1,762,343	10.16
		Tompkins	13	1	12	64,507	21,502	150,516	0.87
				2	**15**	**819,797**	**273,266**	**1,912,860**	**11.03**
5	8: Western Finger Lakes	Livingston	14	1	10	19,515	6,505	45,534	0.26
		Ontario	6	1	3	536,060	178,687	1,250,808	7.21
		Steuben	10	1	15	231,011	77,004	539,026	3.11
				3	**15**	**786,586**	**262,195**	**1,835,368**	**10.58**
6	3: Lower Hudson Valley	Putnam	11	1	12	173,022	57,674	403,718	2.33
		Rockland	8	1	14	433,272	144,424	1,010,968	5.83
				2	**15**	**606,294**	**202,098**	**1,414,686**	**8.16**
				18	**15**	**7,433,772**	**2,477,924**	**17,345,468**	**100%**

3.8e. Releases by County

All fourteen counties where compressor stations are located reported releases of chemicals linked to diseases of the ear and mastoid process.

Herkimer County ranked first with 4 million pounds or 23% of the state total, followed by Erie County (2.2 million pounds or 12.8%) and Schoharie County (2 million pounds or 11.2%). These three counties are responsible for slightly less than one-half (47%) of all releases.

The top five counties were responsible for 11.8 million pounds or slightly more than two-thirds (68%) of the state total.

The 14-country average was 1,238,962 pounds.

Table 3.8e.

Diseases of the Ear and Mastoid Process by County (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	**County**	**NYS DEC Region**	**Fac's**	**Ch's**	**Total Pounds**	**Average Pounds**	**Total Pounds**	**%**
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	15	1,704,611	568,204	3,977,424	22.93
2	Erie	9: Western New York	2	12	952,814	317,605	2,223,231	12.82
3	Schoharie	4: Capital Region/Northern Catskills	1	12	828,815	276,272	1,933,901	11.15
4	Allegany	9: Western New York	2	9	816,226	272,075	1,904,528	10.98
5	Onondaga	7: Central New York	1	11	755,290	251,763	1,762,343	10.16
6	Ontario	8: Western Finger Lakes	1	3	536,060	178,687	1,250,807	7.21
7	Columbia	4: Capital Region/Northern Catskills	1	10	471,191	157,064	1,099,446	6.34
8	Rockland	3: Lower Hudson Valley	1	14	433,272	144,424	1,010,967	5.83
9	Chautauqua	9: Western New York	2	15	380,824	126,941	888,589	5.12
10	Steuben	8: Western Finger Lakes	1	15	231,011	77,004	539,026	3.11
11	Putnam	3: Lower Hudson Valley	1	12	173,022	57,674	403,718	2.33
12	Niagara	9: Western New York	1	10	66,614	22,205	155,432	0.90
13	Tompkins	7: Central New York	1	12	64,507	21,502	150,516	0.87
14	Livingston	8: Western Finger Lakes	1	10	19,515	6,505	45,534	0.26
			18	**15**	**7,433,772**	**2,477,924**	**17,345,462**	**100%**

3.9. Diseases of the Circulatory System (I00-I99)

3.9a. Releases by Chemical

Thirty-one of the 70 chemicals released by NYS natural gas compressor stations are associated with diseases of the circulatory system (ICD-10 Chapter 9). All 18 stations reported such releases. These totaled an estimated 16.2 million pounds from 2008 to 2014--an annual average of 2.3 million pounds.

Eighteen of these 31 chemicals are categorized as known human circulatory system toxicants by U.S. ATSDR.

Carbon monoxide ranked first accounting for slightly more than three-fourths (76.5%) of the state total or 12.4 million pounds. Formaldehyde ranked second (1,309,335 pounds or 8.1%), closely followed by PM10 (1,259,744 pounds or 7.8%).

The average annual release was 5.6 million pounds.

Chemicals associated with circulatory system diseases represented 40.4% of releases by the state's natural gas compressor stations.

Table 3.9a.

Diseases of the Circulatory System by Chemical (Top 10 Chemicals by Pounds Released)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Carbon Monoxide	18	14	6	5,297,028	1,765,676	12,359,731	76.53
2	Formaldehyde	18	14	6	561,144	187,048	1,309,336	8.11
3	PM10 Primary (Filt + Cond)	18	14	6	539,890	179,963	1,259,744	7.80
4	PM2.5 Primary (Filt + Cond)	18	14	6	474,085	158,028	1,106,198	6.85
5	Acrolein	14	13	6	22,596	7,532	52,723	0.33
6	Methanol	8	7	6	8,286	2,762	19,333	0.12
7	Toluene	16	13	6	8,275	2,758	19,308	0.12
8	Hexane	13	10	6	5,222	1,741	12,184	0.08
9	1,3-Butadiene	14	13	6	2,022	674	4,719	0.03
10	Ammonia	8	7	5	674	225	1,573	0.01
		18	**14**	**6**	**6,919,221**	**2,306,407**	**16,144,849**	**99.97**

3.9b. Releases by ICD Category

Circulatory system diseases are subdivided into 10 major groups. Chemicals released by natural gas compressor stations in NYS are positively associated with four of them. It should be remembered, that a single chemical can be associated with more than one category of disease.

I10-I15: One chemical released by 14 of the 18 compressor stations reporting to NEI has been associated with hypertensive disease.

I10-I15: One chemical released by 16 of the 18 compressor stations reporting to NEI has been associated with chronic rheumatic heart diseases.

I30-I52: Sixteen chemicals are associated with other forms of heart disease. Specific diseases cite in the literature include: cardiac arrhythmia, heart weight change, increased cardiovascular mortality, and acute pulmonary edema. These chemicals were in the emission inventories of all 18 NYS compressor stations reporting to NEI and totaled 1.6 million pounds.

I70-I79: Six chemicals are associated with diseases of arteries, arterioles and capillaries: blood vessels changes and regional, general arteriolar or venous dilation. All 18 stations reported release of these chemicals. Aggregate releases totaled 569,641 pounds.

I95-I99: Twenty-two chemicals are associated with other and unspecified disorders of the circulatory system. These totaled 5.3 million pounds.

Table 3.9b.

Diseases of the Circulatory System by ICD Code Group

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	I00-I02	Acute rheumatic fever	0	0	0	0	0	0	0	0	0	0	0	0
2	I05-I09	Chronic rheumatic heart diseases	13	12	12	14	1	1	1	1	273	998	750	2,022
3	I10-I15	Hypertensive diseases	16	8	11	16	1	1	1	1	0	0	0	0
4	I20-I25	Ischemic heart diseases	0	0	0	0	0	0	0	0	0	0	0	0
5	I26-I28	Pulmonary heart disease and diseases of pulmonary circulation	0	0	0	0	0	0	0	0	0	0	0	0
6	I30-I52	Other forms of heart disease	18	18	16	18	16	16	16	16	312,721	697,573	575,238	1,585,533
7	I60-I69	Cerebrovascular diseases	0	0	0	0	0	0	0	0	0	0	0	0
8	I70-I79	Diseases of arteries, arterioles and capillaries	18	17	16	18	6	6	6	6	111,642	233,625	224,373	569,641
9	I80-I89	Diseases of veins, lymphatic vessels and lymph nodes, not elsewhere classified	0	0	0	0	0	0	0	0	0	0	0	0
10	I95-I99	Other and unspecified disorders of the circulatory system	18	18	17	18	22	22	22	22	1,424,545	2,053,712	1,866,817	5,345,075
	I00-I99	**Total**	**18**	**18**	**17**	**18**	**31**	**31**	**31**	**31**	**1,735,766**	**2,747,361**	**2,438,330**	**6,921,459**

3.9c. Releases by Facility

All 18 natural gas compressor stations in NYS reported releases chemicals associated with circulatory system disease.

The top 6 polluters were facilities operated by the Tennessee Gas Pipeline Company.

Tennessee Gas Pipeline Company Compressor Station 245, ranked first with 3.6 million pounds or 22% of the state total, followed by Compressor Station 245 in Carlisle (1.8 million pounds or 11.1%) and Compressor Station 241 in LaFayette (1.6 million pounds or 9.9%). These three facilities were responsible for 43% of the state total.

The top 5 facilities were responsible for 59% of all releases.

The facility average was 902,768 pounds.

Table 3.9c.

Diseases of the Circulatory System by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	23	23	15	514,643	3,602,504	22.17
2	TGPC CS 249	Carlisle	Schoharie	23	16	16	258,460	1,809,220	11.13
3	TGPC CS 241	LaFayette	Onondaga	22	17	22	229,876	1,609,133	9.90
4	TGPC 229 & TEG DF	Eden	Erie	20	19	20	211,102	1,477,716	9.09
5	TGPC CS 237	Manchester, Phelps	Ontario	5	4	2	161,984	1,133,891	6.98
6	TGPC CS 254	Chatham	Columbia	15	8	5	147,900	1,035,300	6.37
7	NFGSC Concord CS	Concord	Erie	7	6	8	133,132	931,923	5.73
8	NFGSC Beech Hill CS	Willing	Allegany	12	12	13	129,878	909,148	5.59
9	NFGSC Independence CS	Andover	Allegany	9	6	10	106,814	747,699	4.60
10	AGT Stony Point CS	Stony Point	Rockland	26	13	14	102,540	717,779	4.42
11	TGPC CS 224	Clymer	Chautauqua	23	21	23	88,805	621,634	3.83
12	DTI Woodhull Station	Woodhull	Steuben	19	25	26	67,558	472,907	2.91
13	AGT SOUTHEAST CS	Southeast	Putnam	15	10	18	55,141	385,987	2.38
14	NFGSC Nashville CS	Hanover	Chautauqua	16	16	0	42,750	299,248	1.84
15	TGPC CS 230-C	Lockport	Niagara	15	14	15	25,902	181,314	1.12
16	DTI Borger CS	Ithaca	Tompkins	19	19	11	20,045	140,315	0.86
17	DTI Utica Station	Frankfort	Herkimer	16	18	26	16,299	114,095	0.70
18	TGPC CS 233	York	Livingston	15	8	1	8,572	60,007	0.37
				31	**31**	**31**	**2,321,403**	**16,249,821**	**100%**

3.9d. Releases by DEC Region

The 18 compressor stations analyzed are in 6 of New York's 9 DEC regions. All 6 regions had releases of chemicals associated with circulatory diseases.

DEC Region 9, Western New York, ranked first with an estimated 5.1 million pounds of toxic releases from 2008 to 2014. This represented nearly one-third (31.4%) of the state total. Region 6, Western Adirondacks/Eastern Lake Ontario, ranked second (3.7 million pounds or 23%), followed by Region 4, Capital Region/Northern Catskills (2.8 million pounds or 17.6%).

Table 3.9d.

Diseases of the Circulatory System by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

NYS DEC Region		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	Number \ Name	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	4	2	14	710,077	236,692	1,656,847	10.26
		Chautauqua	8	2	30	351,913	117,304	821,132	5.08
		Erie	2	2	23	1,032,702	344,234	2,409,639	14.92
		Niagara	12	1	15	77,705	25,901	181,313	1.12
				7	**31**	**2,172,397**	**724,131**	**5,068,931**	**31.39**
2	**6: W. Adirondacks/E. Lake Ontario**	Herkimer	1	**2**	**30**	**1,592,828**	**530,942**	**3,716,599**	**23.01**
3	4: Capital Region/N. Catskills	Columbia	7	1	15	443,699	147,899	1,035,299	6.41
		Schoharie	3	1	23	775,379	258,459	1,809,219	11.20
				2	**27**	**1,219,078**	**406,358**	**2,844,518**	**17.61**
4	7: Central New York	Onondaga	5	1	22	689,628	229,876	1,609,132	9.96
		Tompkins	13	1	19	60,135	20,045	140,315	0.87
				2	**31**	**749,763**	**249,921**	**1,749,447**	**10.83**
5	8: Western Finger Lakes	Livingston	14	1	15	25,717	8,572	60,006	0.37
		Ontario	6	1	5	485,953	161,984	1,133,891	7.02
		Steuben	10	1	27	202,674	67,558	472,907	2.93
				3	**27**	**714,344**	**238,114**	**1,666,804**	**10.32**
6	3: Lower Hudson Valley	Putnam	11	1	20	165,423	55,141	385,987	2.39
		Rockland	9	1	26	307,619	102,539	717,779	4.44
				2	**29**	**473,042**	**157,680**	**1,103,766**	**6.83**
				18	**31**	**6,921,452**	**2,307,146**	**16,150,065**	**100%**

3.9e. Releases by County

All 14 counties where compressor station are located reported releases of chemicals linked to circulatory system diseases.

Herkimer County ranked first with 3.7 million pounds or 23% of the state total, followed by Erie County (2.4 million pounds or 14.9%) and Schoharie (1.8 million pounds or 11.2%). These three counties are responsible for nearly one-half (49.1%) of all toxic releases.

The top five counties were responsible for 69%.

The 14-country average was 1,153,577 pounds.

Table 3.9e.

Diseases of the Circulatory System by County (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	County	NYS DEC Region	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	30	1,592,828	530,943	3,716,599	23.01
2	Erie	9: Western New York	2	23	1,032,703	344,234	2,409,640	14.92
3	Schoharie	4: Capital Region/Northern Catskills	1	23	775,380	258,460	1,809,220	11.20
4	Allegany	9: Western New York	2	14	710,077	236,692	1,656,847	10.26
5	Onondaga	7: Central New York	1	22	689,628	229,876	1,609,133	9.96
6	Ontario	8: Western Finger Lakes	1	5	485,953	161,984	1,133,891	7.02
7	Columbia	4: Capital Region/Northern Catskills	1	15	443,700	147,900	1,035,300	6.41
8	Chautauqua	9: Western New York	2	30	351,914	117,305	821,133	5.08
9	Rockland	3: Lower Hudson Valley	1	26	307,620	102,540	717,779	4.44
10	Steuben	8: Western Finger Lakes	1	27	202,675	67,558	472,907	2.93
11	Putnam	3: Lower Hudson Valley	1	20	165,423	55,141	385,987	2.39
12	Niagara	9: Western New York	1	15	77,706	25,902	181,314	1.12
13	Tompkins	7: Central New York	1	19	60,135	20,045	140,315	0.87
14	Livingston	8: Western Finger Lakes	1	15	25,717	8,572	60,007	0.37
			18	**31**	**6,921,459**	**2,307,153**	**16,150,072**	**100%**

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3.10. Diseases of the Respiratory System (J00-J99)

3.10a. Releases by Chemical

Fifty-one of the 70 chemicals released by NYS natural gas compressor stations are associated with diseases of the respiratory system (ICD-10 Chapter 10). Releases of respiratory toxicants were reported by all 18 stations and totaled an estimated 39.6 million pounds from 2008 to 2014--an annual average of 5.7 million pounds.

Chemicals associated with respiratory system diseases represented 98.6% of releases by the state's natural gas compressor stations.

Thirty-five of these 51 chemicals are categorized as known human respiratory toxicants by one or more authoritative sources (U.S. ATSDR, U.S. NIOSH, U.S. OSHA, State of California OEHHA, or the European Union).

Nitrogen oxides ranked first with 18.1 million pounds or 46% of the total, followed by carbon monoxide (12.4 million pounds or 31.3%) and volatile organic compounds (4.9 million pounds or 12.5%). These three chemicals accounted for 35.4 million pounds or 89.7% of all releases.

The top 10 chemicals were responsible for 99.8% of all respiratory toxicants.

Table 3.10a.

Diseases of the Respiratory System by Chemical (Top 10 Chemicals by Pounds Released)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Yearly Average	Pounds	%
1	Nitrogen Oxides	18	14	6	7,749,673	2,583,224	18,082,571	45.85
2	Carbon Monoxide	18	14	6	5,297,028	1,765,676	12,359,731	31.34
3	Volatile Organic Compounds	18	14	6	2,108,741	702,914	4,920,396	12.48
4	Formaldehyde	18	14	6	561,144	187,048	1,309,336	3.32
5	PM10 Primary (Filt + Cond)	18	14	6	539,890	179,963	1,259,744	3.19
6	PM2.5 Primary (Filt + Cond)	18	14	6	474,085	158,028	1,106,198	2.80
7	Sulfur Dioxide	18	14	6	80,048	26,683	186,778	0.47
8	Acetaldehyde	14	13	6	28,272	9,424	65,969	0.17
9	Acrolein	14	13	6	22,596	7,532	52,723	0.13
10	Benzene	16	13	6	9,103	3,034	21,241	0.05
		18	**14**	**6**	**16,870,580**	**5,623,527**	**39,364,686**	**99.81**

3.10b. Releases by ICD Category

Respiratory system diseases are subdivided into 10 major groups. Chemicals released by natural gas compressor stations in NYS are positively associated with four of them. It should be remembered, that a single chemical can be associated with more than one category of disease.

J30-J39: Eleven chemicals are associated with other diseases of upper respiratory tract, including: epithelial cell hyperplasia of the larynx, mucous membrane irritation, nasal irritation, nasal lesions, nasal septum deviation and ulceration, perforated septum, pharynx irritation, and throat irritation. These were released by 18 facilities.

J40-J47: Twenty-three chemicals are associated with lung diseases due to external agents, including asthma and asthma-like allergy, bronchiolar constriction, bronchitis, bronchospasm, emphysema, and changes in pulmonary vascular resistance.

J68-J70: Twenty-five chemicals are associated with lung diseases due to external agents, including sensitization by inhalation, breathing difficulty and irregularities, bronchial irritation and pneumonia, chemical pneumonitis, exacerbation of preexisting breathing problems, pneumonia, and shortness of breath. These were released by 18 facilities.

J80-J84: Nine chemicals are associated with other respiratory diseases principally affecting the interstitium were released by all 18 facilities.

J95-J99: All fifty-one chemicals are associated with other or unspecified diseases of the respiratory system.

Table 3.10b.

Diseases of the Respiratory System by ICD Category (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	J00-J06	Acute upper respiratory infections	0	0	0	0	0	0	0	0	0	0	0	0
2	J09-J18	Influenza and Pneumonia	0	0	0	0	0	0	0	0	0	0	0	0
3	J20-J22	Other acute lower respiratory infections	0	0	0	0	0	0	0	0	0	0	0	0
4	J30-J39	Other diseases of upper respiratory tract	18	18	17	18	11	11	11	11	2,387,918	3,244,839	2,721,747	8,354,505
5	J40-J47	Chronic lower respiratory disease	18	18	17	18	25	25	25	25	4,386,826	6,587,700	5,886,833	16,861,360
6	J60-J70	Lung diseases due to external agents	18	18	17	18	23	23	23	23	1,546,400	2,309,453	2,153,249	6,009,103
7	J80-J84	Other respiratory diseases principally affecting the interstitium	18	18	17	18	9	9	9	9	2,384,131	3,238,346	2,717,314	8,339,793
8	J85-J86	Suppurative and necrotic conditions of lower respiratory tract	0	0	0	0	0	0	0	0	0	0	0	0
9	J90-J94	Other diseases of pleura	0	0	0	0	0	0	0	0	0	0	0	0
10	J95-J99	Other diseases of the respiratory system	18	18	17	18	51	50	51	51	4,394,088	6,607,931	5,900,863	16,902,883
	J00-J99	**Total**	**18**	**18**	**17**	**18**	**51**	**50**	**51**	**51**	**4,394,088**	**6,607,931**	**5,900,863**	**16,902,883**

3.10c. Releases by Facility

All natural gas compressor stations in NYS reported releases chemical associated with respiratory system disease.

The top 6 polluters were facilities operated by the Tennessee Gas Pipeline Company.

Tennessee Gas Pipeline Company Compressor Station 245, ranked first with 10.4 million pounds or 26.2% of the state total. Two other compressor station operated by that company ranked second and third: Compressor Station 229 in Eden (5 million pounds or 12.7%) and Compressor Station 249 in Carlisle (4.2 million pounds or 10.7%). These three facilities were responsible for slightly less than one-half (49.6%) of the state total.

The top 5 facilities were responsible for 63% of all releases.

The facility average was 2.2 million pounds.

Table 3.10c.

Diseases of the Respiratory System by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	38	37	23	1,484,234	10,389,639	26.21
2	TGPC 229 & TEG DF	Eden	Erie	37	35	36	721,422	5,049,951	12.74
3	TGPC CS 249	Carlisle	Schoharie	38	24	24	604,524	4,231,665	10.67
4	TGPC CS 241	LaFayette	Onondaga	37	27	36	425,243	2,976,701	7.51
5	TGPC CS 254	Chatham	Columbia	24	15	8	337,862	2,365,031	5.97
6	TGPC CS 237	Manchester, Phelps	Ontario	8	7	5	323,113	2,261,791	5.70
7	AGT Stony Point CS	Stony Point	Rockland	41	21	21	282,934	1,980,537	5.00
8	NFGSC Concord CS	Concord	Erie	10	9	11	243,583	1,705,081	4.30
9	AGT SOUTHEAST CS	Southeast	Putnam	24	17	33	233,542	1,634,796	4.12
10	NFGSC Beech Hill CS	Willing	Allegany	19	19	20	196,224	1,373,569	3.46
11	NFGSC Independence CS	Andover	Allegany	14	9	16	192,806	1,349,642	3.40
12	TGPC CS 224	Clymer	Chautauqua	37	35	37	162,657	1,138,602	2.87
13	DTI Woodhull Station	Woodhull	Steuben	33	40	44	116,642	816,493	2.06
14	DTI Borger CS	Ithaca	Tompkins	33	33	18	110,772	775,401	1.96
15	NFGSC Nashville CS	Hanover	Chautauqua	27	27	0	88,588	620,115	1.56
16	TGPC CS 230-C	Lockport	Niagara	24	23	24	68,325	478,274	1.21
17	DTI Utica Station	Frankfort	Herkimer	27	31	43	39,738	278,165	0.70
18	TGPC CS 233	York	Livingston	24	15	4	31,616	221,312	0.56
				51	**50**	**51**	**5,663,824**	**39,646,765**	**100%**

3.10d. Releases by DEC Region

The 18 compressor stations analyzed are in 6 of New York State's 9 DEC regions. All 6 regions had releases of chemicals associated with respiratory system diseases.

DEC Region 9, Western New York, ranked first with an estimated 29.2 million pounds (29.2%) of respiratory toxicants releases from 2008 to 2014. Region 6, Western Adirondacks/Eastern Lake Ontario, was a close second with 10.7 million pounds (27.05%).

Table 3.10d.

Diseases of the Respiratory System by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

NYS DEC Region		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	Number \ Name	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	5	2	21	1,167,090	389,030	2,723,211	6.90
		Chautauqua	10	2	49	665,147	221,715	1,552,011	3.94
		Erie	2	2	40	2,895,013	965,004	6,755,032	17.13
		Niagara	13	1	24	204,974	68,324	478,274	1.21
				7	**51**	**4,932,224**	**1,644,073**	**11,508,528**	**29.18**
2	6: W Adirondacks / E Lake Ontario	Herkimer	1	2	50	4,571,916	1,523,972	10,667,804	27.05
3	4: Capital Region / N. Catskills	Columbia	6	1	24	1,013,584	337,861	2,365,030	6.00
		Schoharie	3	1	38	1,813,570	604,523	4,231,665	10.73
				2	**44**	**2,827,154**	**942,384**	**6,596,695**	**16.73**
4	7: Central New York	Onondaga	4	1	37	1,275,728	425,242	2,976,700	7.55
		Tompkins	12	1	33	332,314	110,771	775,401	1.97
				2	**51**	**1,608,042**	**536,013**	**3,752,101**	**9.51**
6	3: Lower Hudson Valley	Putnam	9	1	35	700,626	233,542	1,634,795	4.15
		Rockland	8	1	42	848,801	282,933	1,980,536	5.02
				2	**48**	**1,549,427**	**516,475**	**3,615,331**	**9.17**
5	8: Western Finger Lakes	Livingston	14	1	24	94,848	31,616	221,312	0.56
		Ontario	7	1	8	969,338	323,112	2,261,790	5.73
		Steuben	11	1	45	349,925	116,641	816,492	2.07
				3	**45**	**1,414,111**	**471,369**	**3,299,594**	**8.37**
				18	**51**	**16,902,874**	**5,634,286**	**39,440,053**	**100%**

3.10e. Releases by County

All 14 counties where compressor stations are located reported releases of chemicals linked to respiratory system diseases.

Herkimer County ranked first with 10.7 million pounds or 27% of the state total, followed by Erie County (6.8 million pounds or 17.1%) and Schoharie County (4.2 million pounds or 10.7%). These three counties are responsible for more than one-half (54.9%) of all toxic releases.

The top five counties were responsible for 69%.

Table 3.10e.

Diseases of the Respiratory System by County (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	County	NYS DEC Region	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	50	4,571,916	1,523,972	10,667,804	27.05
2	Erie	9: Western New York	2	40	2,895,014	965,005	6,755,032	17.13
3	Schoharie	4: Capital Region/Northern Catskills	1	38	1,813,571	604,524	4,231,665	10.73
4	Onondaga	7: Central New York	1	37	1,275,729	425,243	2,976,701	7.55
5	Allegany	9: Western New York	2	21	1,167,091	389,030	2,723,212	6.90
6	Columbia	4: Capital Region/Northern Catskills	1	24	1,013,585	337,862	2,365,031	6.00
7	Ontario	8: Western Finger Lakes	1	8	969,339	323,113	2,261,791	5.73
8	Rockland	3: Lower Hudson Valley	1	42	848,801	282,934	1,980,537	5.02
9	Putnam	3: Lower Hudson Valley	1	35	700,627	233,542	1,634,796	4.15
10	Chautauqua	9: Western New York	2	49	665,148	221,716	1,552,012	3.94
11	Steuben	8: Western Finger Lakes	1	45	349,925	116,642	816,493	2.07
12	Tompkins	7: Central New York	1	33	332,315	110,772	775,401	1.97
13	Niagara	9: Western New York	1	24	204,975	68,325	478,274	1.21
14	Livingston	8: Western Finger Lakes	1	24	94,848	31,616	221,312	0.56
			18	**51**	**16,902,883**	**5,634,294**	**39,440,060**	**100%**

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3.11. Diseases of the Digestive System (K00-K93)

3.11a. Releases by Chemical

Fifty-two of the 70 chemicals released by NYS natural gas compressor stations are associated with digestive diseases (ICD-10 Chapter 11). Releases of digestive system toxicants were reported by all 18 stations and totaled an estimated 38.2 million pounds from 2008 to 2014--an annual average of 5.5 million pounds.

Chemicals associated with digestive system diseases represented 95.7% of releases by the state's natural gas compressor stations.

Nitrogen oxides ranked first with 18.1 million pounds or 47.3% of the total, followed by carbon monoxide (12.4 million pounds or 32.3%) and volatile organic compounds (4.9 million pounds or 12.9%). These three chemicals accounted for 35.4 million pounds or 92.4% of all releases.

The top 10 chemicals were responsible for 99.9% of all digestive toxicants.

The average annual release was 5.5 million pounds.

Table 3.11a.

Diseases of the Digestive System by Chemical (Top 10 Chemicals by Pounds Released)

NYS Natural Gas Compressor Stations, 2008-2014

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Nitrogen Oxides	18	14	6	7,749,673	2,583,224	18,082,571	47.25
2	Carbon Monoxide	18	14	6	5,297,028	1,765,676	12,359,731	32.30
3	Volatile Organic Compounds	18	14	6	2,108,741	702,914	4,920,396	12.86
4	Formaldehyde	18	14	6	561,144	187,048	1,309,336	3.42
5	PM10 Primary (Filt + Cond)	18	14	6	539,890	179,963	1,259,744	3.29
6	Sulfur Dioxide	18	14	6	80,048	26,683	186,778	0.49
7	Acrolein	14	13	6	22,596	7,532	52,723	0.14
8	Benzene	16	13	6	9,103	3,034	21,241	0.06
9	Methanol	8	7	6	8,286	2,762	19,333	0.05
10	Toluene	16	13	6	8,275	2,758	19,308	0.05
		18	**14**	**6**	**16,384,783**	**5,461,594**	**38,231,160**	**99.9**

3.11b. Releases by ICD Category

Digestive system diseases are subdivided into 9 major groups. Chemicals released by natural gas compressor stations in NYS are positively associated with 8 of them. It should be remembered, that a single chemical can be associated with more than one category of disease.

K00-K31: Seven chemicals are associated with diseases of esophagus, stomach and duodenum, including esophagus (change in structure or function of the esophagus, esophageal inflammation and ulceration, gastritis, and stomach bleeding. All 18 facilities reported releases.

K35-K38: Two chemicals are associated with diseases of the appendix.

K50-K52: Three chemicals are associated with noninfective enteritis and colitis.

K55-K63: Three chemicals are associated with other diseases of intestines, including enteric disease and small intestine (ulceration or bleeding).

K65-K67: A single chemical is associated with diseases of peritoneum.

K70-K77: Twenty-four chemicals are associated with diseases of the liver, including cirrhosis, hepatitis, and liver damage, fatty degeneration, function impairment, injury, swelling, and weight changes.

K80-K87: Three chemicals are associated with disorders of gallbladder, biliary tract and pancreas.

K90-K93: Thirty-eight chemicals are associated with other diseases of the digestive system.

Table 3.11b.

K00-K93: Diseases of the Digestive System by ICD Code Group

NYS Natural Gas Compressor Stations, 2008-2014

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	K00-K14	Diseases of oral cavity, salivary glands and jaws												
2	K20-K31	Diseases of esophagus, stomach and duodenum	18	18	16	18	7	7	7	7	112,677	234,109	224,355	571,142
3	K35-K38	Diseases of appendix	18	18	17	18	2	2	2	2	2,377,287	3,235,327	2,676,948	8,289,563
4	K50-K52	Noninfective enteritis and colitis	18	18	17	18	3	3	3	3	2,276,943	3,007,254	2,545,586	7,829,785
5	K55-K63	Other diseases of intestines	18	18	17	18	3	3	3	3	1,416,050	2,030,806	1,850,560	5,297,417
6	K65-K67	Diseases of peritoneum	6	4	5	8	1	1	1	1	23	59	37	120
7	K70-K77	Diseases of liver	18	18	17	18	24	24	24	24	488,496	1,073,708	1,133,230	2,695,435
8	K80-K87	Disorders of gallbladder, biliary tract and pancreas	16	15	13	16	3	3	3	3	3,428	8,249	5,811	17,488
9	K90-K93	Other diseases of the digestive system	18	18	17	18	38	38	38	38	127,387	272,114	300,025	699,527
	K00-K93	**Total**	**18**	**18**	**17**	**18**	**45**	**45**	**45**	**45**	**4,297,063**	**6,371,787**	**5,731,539**	**16,400,390**

3.11c. Releases by Facility

All natural gas compressor stations in NYS reported releases chemical associated with diseases of the digestive system.

The top 6 polluters were facilities operated by the Tennessee Gas Pipeline Company.

Tennessee Gas Pipeline Company Compressor Station 245, ranked first with 10.2 million pounds or 26.5% of the state total. Two other compressor station operated by that company ranked second and third: Compressor Station 229 in Eden (4.9 million pounds or 12.7%) and Compressor Station 249 in Carlisle (4 million pounds or 10.5%). These three facilities were responsible for slightly less than one-half (49.6%) of the state total.

The top 5 facilities were responsible for 63% of all releases.

The facility average was 2.1 million pounds.

Table 3.11c.

K00-K93: Diseases of the Digestive System by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	35	35	21	1,453,762	10,176,331	26.45
2	TGPC 229 & TEG DF	Eden	Erie	34	33	34	698,204	4,887,431	12.70
3	TGPC CS 249	Carlisle	Schoharie	35	22	22	576,081	4,032,565	10.48
4	TGPC CS 241	LaFayette	Onondaga	34	26	34	406,862	2,848,035	7.40
5	TGPC CS 254	Chatham	Columbia	21	13	7	329,499	2,306,496	6.00
6	TGPC CS 237	Manchester, Phelps	Ontario	7	6	5	313,810	2,196,672	5.71
7	AGT Stony Point CS	Stony Point	Rockland	36	19	19	273,624	1,915,369	4.98
8	NFGSC Concord CS	Concord	Erie	9	8	10	234,664	1,642,645	4.27
9	AGT SOUTHEAST CS	Southeast	Putnam	21	15	29	222,553	1,557,873	4.05
10	NFGSC Beech Hill CS	Willing	Allegany	17	17	18	192,242	1,345,695	3.50
11	NFGSC Independence CS	Andover	Allegany	13	8	15	191,487	1,340,411	3.48
12	TGPC CS 224	Clymer	Chautauqua	35	33	35	158,556	1,109,894	2.88
13	DTI Woodhull Station	Woodhull	Steuben	29	37	41	111,868	783,073	2.04
14	DTI Borger CS	Ithaca	Tompkins	29	29	16	110,016	770,114	2.00
15	NFGSC Nashville CS	Hanover	Chautauqua	24	24	0	87,732	614,122	1.60
16	TGPC CS 230-C	Lockport	Niagara	21	20	21	66,076	462,535	1.20
17	DTI Utica Station	Frankfort	Herkimer	24	27	40	38,557	269,902	0.70
18	TGPC CS 233	York	Livingston	21	13	4	30,446	213,124	0.55
				45	**45**	**45**	**5,496,041**	**38,472,286**	**100%**

3.11d. Releases by DEC Region

The 18 compressor stations analyzed are in 6 of New York State's 9 DEC regions. All 6 regions had releases of chemicals associated with respiratory system diseases.

DEC Region 9, Western New York, ranked first with an estimated 11.2 million pounds (29.3%) of digestive toxicants releases from 2008 to 2014. Region 6, Western Adirondacks/Eastern Lake Ontario, was a close second with 10.5 million pounds (27.3%), followed by Region 4, Capital Region/Northern Catskills (6.4 million pounds or 16.5%).

Table 3.11d.

K00-K93: Diseases of the Digestive System by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

NYS DEC Region		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	Number \ Name	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	5	2	19	1,151,188	383,729	2,686,106	7.02
		Chautauqua	10	2	44	651,132	217,044	1,519,309	3.97
		Erie	2	2	37	2,798,604	932,868	6,530,076	17.06
		Niagara	13	1	21	198,229	66,076	462,535	1.21
				7	**45**	**4,799,154**	**1,599,718**	**11,198,026**	**29.26**
2	6: W Adirondacks / E Lake Ontario	Herkimer	1	2	44	4,476,957	1,492,319	10,446,232	27.30
3	4: Capital Region / N Catskills	Columbia	6	1	21	988,498	329,499	2,306,496	6.03
		Schoharie	3	1	35	1,728,242	576,081	4,032,565	10.54
				2	**39**	**2,716,740**	**905,580**	**6,339,060**	**16.57**
4	7: Central New York	Onondaga	4	1	34	1,220,586	406,862	2,848,035	7.44
		Tompkins	12	1	29	330,049	110,016	770,114	2.01
				2	**45**	**1,550,635**	**516,878**	**3,618,149**	**9.45**
6	3: Lower Hudson Valley	Putnam	9	1	31	667,660	222,553	1,557,873	4.07
		Rockland	8	1	37	820,872	273,624	1,915,369	5.01
				2	**45**	**1,488,532**	**496,177**	**3,473,242**	**9.08**
5	8: Western Finger Lakes	Livingston	14	1	21	91,339	30,446	213,124	0.56
		Ontario	7	1	7	941,431	313,810	2,196,672	5.74
		Steuben	11	1	42	335,603	111,868	783,073	2.05
				3	**42**	**1,368,372**	**456,124**	**3,192,869**	**8.34**
				18	**45**	**16,400,391**	**5,466,797**	**38,267,578**	**100%**

3.11e. Releases by County

All 14 counties where compressor stations are located reported releases of chemicals linked to digestive system diseases.

Herkimer County ranked first with 10.5 million pounds or 27.3% of the state total, followed by Erie County (6.5 million pounds or 17.1%) and Schoharie County (4 million pounds or 10.5%). These three counties are responsible for more than one-half (54.9%) of all toxic releases.

The top five counties were responsible for 69.4%.

The country average was 2.7 million pounds.

Table 3.11e.

K00-K93: Diseases of the Digestive System by County (ranked)

NYS Natural Gas Compressor Stations, 2008-2014

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	County	NYS DEC Region	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	44	4,476,956	1,492,318	10,446,232	27.30
2	Erie	9: Western New York	2	37	2,798,604	932,868	6,530,076	17.06
3	Schoharie	4: Capital Region/Northern Catskills	1	35	1,728,242	576,080	4,032,564	10.54
4	Onondaga	7: Central New York	1	34	1,220,586	406,862	2,848,034	7.44
5	Allegany	9: Western New York	2	19	1,151,188	383,729	2,686,105	7.02
6	Columbia	4: Capital Region/Northern Catskills	1	21	988,498	329,499	2,306,495	6.03
7	Ontario	8: Western Finger Lakes	1	7	941,430	313,810	2,196,671	5.74
8	Rockland	3: Lower Hudson Valley	1	37	820,872	273,624	1,915,369	5.01
9	Putnam	3: Lower Hudson Valley	1	31	667,659	222,553	1,557,872	4.07
10	Chautauqua	9: Western New York	2	44	651,132	217,044	1,519,309	3.97
11	Steuben	8: Western Finger Lakes	1	42	335,602	111,867	783,072	2.05
12	Tompkins	7: Central New York	1	29	330,048	110,016	770,113	2.01
13	Niagara	9: Western New York	1	21	198,229	66,076	462,534	1.21
14	Livingston	8: Western Finger Lakes	1	21	91,338	30,446	213,124	0.56
			18	**45**	**16,400,384**	**5,466,792**	**38,267,570**	**100%**

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3.12. Diseases of the Skin and Subcutaneous Tissue (L00-L99)

3.12a. Releases by Chemical

Forty-eight of the 70 chemicals released by NYS natural gas compressor stations are associated with skin and subcutaneous tissue diseases (ICD-10 Chapter 12). Releases of these toxicants were reported by all 18 stations and totaled an estimated 27.6 million pounds from 2008 to 2014--an annual average of 3.9 million pounds.

Chemicals associated with diseases of the skin and subcutaneous tissue represented 69% of releases by the state's natural gas compressor stations.

Nitrogen oxides ranked first with 18.1 million pounds or slightly less than two-thirds (65.6%) of the total, followed by volatile organic compounds (4.9 million pounds or 17.8%) and formaldehyde (1.3 million pounds or 4.8%). These three chemicals accounted for 24.3 million pounds or 88.2 of all releases.

The top 10 chemicals were responsible for 96.6% of all cutaneous and subcutaneous toxicants.

Table 3.12a.

Diseases of the Skin and Subcutaneous Tissue (Top 10 Chemicals by Pounds Released)

NYS Natural Gas Compressor Stations, 2008-2014

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Nitrogen Oxides	18	14	6	7,749,673	2,583,224	18,082,571	65.56
2	Volatile Organic Compounds	18	14	6	2,108,741	702,914	4,920,396	17.84
3	Formaldehyde	18	14	6	561,144	187,048	1,309,336	4.75
4	PM10 Primary (Filt + Cond)	18	14	6	539,890	179,963	1,259,744	4.57
5	PM2.5 Primary (Filt + Cond)	18	14	6	474,085	158,028	1,106,198	4.01
6	PM Condensable	18	14	6	231,543	77,181	540,267	1.96
7	Sulfur Dioxide	18	14	6	80,048	26,683	186,778	0.68
8	Acetaldehyde	14	13	6	28,272	9,424	65,969	0.24
9	Acrolein	14	13	6	22,596	7,532	52,723	0.19
10	Benzene	16	13	6	9,103	3,034	21,241	0.08
		18	**14**	**6**	**11,805,095**	**3,935,032**	**27,545,222**	**99.87**

3.12b. Releases by ICD Category

Skin and subcutaneous diseases are subdivided into 8 major groups. Chemicals released by natural gas compressor stations in NYS are positively associated with 3 of them. It should be remembered, that a single chemical can be associated with more than one category of disease.

L20-L30: Seven chemicals are associated with dermatitis and eczema.

L50-L54: Five chemicals are associated with urticaria and erythema.

L80-L99: Forty-seven chemicals are associated with other disorders of the skin and subcutaneous tissue.

Table 3.12b.

L00-L99: Diseases of the Skin and Subcutaneous Tissue by ICD Category

NYS Natural Gas Compressor Stations, 2008-2014

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	L00-L08	Infections of the skin and subcutaneous tissue	0	0	0	0	0	0	0	0	0	0	0	0
2	L10-L14	Bullous disorders	0	0	0	0	0	0	0	0	0	0	0	0
3	L20-L30	Dermatitis and eczema	18	18	17	18	7	7	7	7	489,047	1,076,977	1,132,330	2,698,356
4	L40-L45	Papulosquamous disorders	0	0	0	0	0	0	0	0	0	0	0	0
5	L50-L54	Urticaria and erythema	18	18	17	18	5	5	5	5	376,503	833,995	904,262	2,114,761
6	L55-L59	Radiation-related disorders of the skin and subcutaneous tissue	0	0	0	0	0	0	0	0	0	0	0	0
7	L60-L75	Disorders of skin appendages	0	0	0	0	0	0	0	0	0	0	0	0
8	L80-L99	Other disorders of the skin and subcutaneous tissue	18	18	17	18	45	46	46	47	2,646,996	3,854,819	3,226,706	9,728,523
	L00-L99	**Total**	**18**	**18**	**17**	**18**	**46**	**47**	**47**	**48**	**3,021,274**	**4,686,735**	**4,129,254**	**11,837,264**

3.12c. Releases by Facility

All natural gas compressor stations in NYS reported releases chemical associated with diseases of the skin and subcutaneous tissue diseases.

The top 5 polluters were facilities operated by the Tennessee Gas Pipeline Company.

Tennessee Gas Pipeline Company Compressor Station 245, ranked first with 7.6 million pounds or 27.2% of the state total, followed by Compressor Station 229 in Eden (4.1 million pounds or 14.8%) and Compressor Station 249 in Carlisle (3.1 million pounds or 11.1%). These three facilities were responsible for slightly less than one-half (53.1%) of the state total.

The top 5 facilities were responsible for slightly less than two-thirds (65.3%) of all releases.

The facility average was 1.5 million pounds.

Table 3.12c.

L00-L99: Diseases of the Skin and Subcutaneous Tissue by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	35	35	22	1,079,145	7,554,017	27.23
2	TGPC 229 & TEG DF	Eden	Erie	35	34	35	586,143	4,103,000	14.79
3	TGPC CS 249	Carlisle	Schoharie	35	23	23	438,754	3,071,281	11.07
4	TGPC CS 241	LaFayette	Onondaga	34	26	34	268,300	1,878,097	6.77
5	TGPC CS 254	Chatham	Columbia	22	15	8	215,885	1,511,192	5.45
6	AGT Stony Point CS	Stony Point	Rockland	38	21	21	215,264	1,506,847	5.43
7	AGT SOUTHEAST CS	Southeast	Putnam	22	17	32	214,802	1,503,616	5.42
8	TGPC CS 237	Manchester, Phelps	Ontario	8	7	4	203,966	1,427,759	5.15
9	NFGSC Concord CS	Concord	Erie	10	9	11	150,324	1,052,268	3.79
10	NFGSC Independence CS	Andover	Allegany	14	9	16	98,457	689,200	2.48
11	DTI Borger CS	Ithaca	Tompkins	31	32	18	93,789	656,521	2.37
12	TGPC CS 224	Clymer	Chautauqua	35	33	35	91,319	639,232	2.30
13	NFGSC Beech Hill CS	Willing	Allegany	19	19	20	83,888	587,216	2.12
14	DTI Woodhull Station	Woodhull	Steuben	31	40	44	68,499	479,496	1.73
15	NFGSC Nashville CS	Hanover	Chautauqua	25	24	0	52,218	365,527	1.32
16	TGPC CS 230-C	Lockport	Niagara	22	21	22	48,326	338,285	1.22
17	DTI Utica Station	Frankfort	Herkimer	25	30	43	28,034	196,235	0.71
18	TGPC CS 233	York	Livingston	22	15	3	26,048	182,337	0.66
				46	**46**	**47**	**3,963,161**	**27,742,125**	**100%**

3.12d. Releases by DEC Region

The 18 compressor stations analyzed are in 6 of New York State's 9 DEC regions. All 6 regions had releases of chemicals associated with skin and subcutaneous tissue diseases.

DEC Region 6, Western Adirondacks/Eastern Lake Ontario, ranked first with 7,750,252 pounds (28.1%), closely followed by Region 9, Western New York (7,652,886 pounds or 27.7%). Region 4, Capital Region/Northern Catskills ranked third with 4.6 million pounds (16.6%).

Table 3.12d.

L00-L99: Diseases of the Skin and Subcutaneous Tissue by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

NYS DEC Region		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	Number \ Name	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
2	**6: W Adirondacks / E Lake Ontario**	Herkimer	1	**2**	**47**	**3,321,537**	**1,107,179**	**7,750,252**	**28.06**
1	**9: Western New York**	Allegany	9	2	21	547,036	182,345	1,276,416	4.62
		Chautauqua	10	2	45	378,393	126,131	882,916	3.20
		Erie	2	2	38	2,209,400	736,467	5,155,268	18.66
		Niagara	13	1	22	144,979	48,326	338,285	1.22
				7	**46**	**3,279,808**	**1,093,269**	**7,652,886**	**27.71**
3	**4: Capital Region / N Catskills**	Columbia	5	1	22	647,654	215,885	1,511,192	5.47
		Schoharie	3	1	35	1,316,263	438,754	3,071,281	11.12
				2	**39**	**1,963,917**	**654,639**	**4,582,474**	**16.59**
6	**3: Lower Hudson Valley**	Putnam	7	1	34	644,407	214,802	1,503,616	5.44
		Rockland	6	1	39	645,792	215,264	1,506,847	5.46
				2	**45**	**1,290,198**	**430,066**	**3,010,463**	10.90
4	**7: Central New York**	Onondaga	4	1	34	804,899	268,300	1,878,097	6.80
		Tompkins	11	1	33	281,366	93,789	656,521	2.38
				2	**48**	**1,086,265**	**362,088**	**2,534,617**	**9.18**
5	**8: Western Finger Lakes**	Livingston	14	1	22	78,144	26,048	182,337	0.66
		Ontario	8	1	8	611,897	203,966	1,427,759	5.17
		Steuben	12	1	46	205,498	68,499	479,496	1.74
				3	**46**	**895,539**	**298,513**	**2,089,592**	**7.57**
				18	**48**	**11,837,264**	**3,945,755**	**27,620,283**	**100%**

3.12e. Releases by County

All 14 counties where compressor stations are located reported releases of chemicals linked to cutaneous and subcutaneous diseases.

Herkimer County ranked first with 7.8 million pounds or 28.1% of the state total, followed by Erie County (5.2 million pounds or 18.7%) and Schoharie County (3.1 million pounds or 11.1%). These three counties are responsible for more than one-half (57.8%) of all toxic releases.

The top five counties were responsible for 70%.

The country average was 2 million pounds.

Table 3.12e

Diseases of the Skin and Subcutaneous Tissue by County (ranked)

NYS Natural Gas Compressor Stations, 2008-2014

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	**County**	**NYS DEC Region**	**Fac's**	**Ch's**	**Total Pounds**	**Average Pounds**	**Total Pounds**	**%**
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	47	3,321,537	1,107,179	7,750,252	28.06
2	Erie	9: Western New York	2	38	2,209,400	736,467	5,155,268	18.66
3	Schoharie	4: Capital Region/Northern Catskills	1	35	1,316,263	438,754	3,071,281	11.12
4	Onondaga	7: Central New York	1	34	804,899	268,300	1,878,097	6.80
5	Columbia	4: Capital Region/Northern Catskills	1	22	647,654	215,885	1,511,192	5.47
6	Rockland	3: Lower Hudson Valley	1	39	645,792	215,264	1,506,847	5.46
7	Putnam	3: Lower Hudson Valley	1	34	644,407	214,802	1,503,616	5.44
8	Ontario	8: Western Finger Lakes	1	8	611,897	203,966	1,427,759	5.17
9	Allegany	9: Western New York	2	21	547,036	182,345	1,276,416	4.62
10	Chautauqua	9: Western New York	2	45	378,393	126,131	882,916	3.20
11	Tompkins	7: Central New York	1	33	281,366	93,789	656,521	2.38
12	Steuben	8: Western Finger Lakes	1	46	205,498	68,499	479,496	1.74
13	Niagara	9: Western New York	1	22	144,979	48,326	338,285	1.22
14	Livingston	8: Western Finger Lakes	1	22	78,144	26,048	182,337	0.66
			18	**48**	**11,837,264**	**3,945,755**	**27,620,283**	**100%**

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3.13. Diseases of the Musculoskeletal System and Connective Tissue (M00-M99)

3.13a. Releases by Chemical

Seventeen of the 70 chemicals released by NYS natural gas compressor stations are associated with musculoskeletal system and connective tissue diseases (ICD-10 Chapter 13). Releases of these toxicants were reported by all 18 stations and totaled an estimated 1.2 million pounds from 2008 to 2014--an annual average of 3.9 million pounds.

Chemicals associated with musculoskeletal system and connective tissue diseases represented 3.1% of releases by the state's natural gas compressor stations.

PM 2.5 ranked first with 1.1 million pounds or 92.6% of the total, followed by benzene (21,241 pounds or 1.8%) and methanol (19,333 pounds or 1.6%). These three chemicals accounted for 96% of all releases.

Table 3.13a.

Diseases of the Musculoskeletal System and Connective Tissue by Chemical

NYS Natural Gas Compressor Stations, 2008-2014

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	PM2.5 Primary (Filt + Cond)	18	14	6	474,085	158,028	1,106,198	92.62
2	Benzene	16	13	6	9,103	3,034	21,241	1.78
3	Methanol	8	7	6	8,286	2,762	19,333	1.62
4	Toluene	16	13	6	8,275	2,758	19,308	1.62
5	Hexane	13	10	6	5,222	1,741	12,184	1.02
6	Xylenes (Mixed Isomers)	15	13	6	3,598	1,199	8,394	0.70
7	1,3-Butadiene	14	13	6	2,022	674	4,719	0.40
8	Ammonia	8	7	5	674	225	1,573	0.13
9	Propylene Oxide	8	8	5	263	88	615	0.05
10	Carbon Tetrachloride	8	7	6	121	40	282	0.02
11	Chloroform	9	8	6	83	28	193	0.02
12	Chlorobenzene	9	8	6	74	25	172	0.01
13	Mercury	16	13	6	30	10	70	0.01
14	Cadmium	9	9	6	13	4	30	0.00
15	Ethyl Chloride	4	4	4	3	1	6	0.00
16	Lead	16	12	6	0	0	1	0.00
17	Selenium	5	5	5	0	0	0	0.00
		18	**14**	**6**	**511,850**	**170,617**	**1,194,318**	**100%**

3.13b. Releases by ICD Category

Musculoskeletal system and connective tissue diseases are subdivided into 7 major groups. Chemicals released by natural gas compressor stations in NYS are positively associated with 5 of them. It should be remembered, that a single chemical can be associated with more than one category of disease.

M00-M25: A single chemical released by 5 stations is associated with arthropathies, specifically, "Kashin-Beck disease".

M30-M36: Three chemicals released by all 18 sites are associated with systemic connective tissue disorders: undifferentiated connective tissue disease (UCTD) and connective tissue disease (CTD).

M60-M79: Twelve chemicals released by all 18 sites are associated with soft tissue disorders: muscle contractility, spasticity or weakness.

M80-M90: The heavy metal cadmium, released by 9 sites, is associated with osteopathies.

M95-M99: Three chemicals are associated with other disorders of the musculoskeletal system and connective tissue

Table 3.13a.

Diseases of the Musculoskeletal System and Connective Tissue by ICD Category

NYS Natural Gas Compressor Stations, 2008-2014

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	M00-M25	Arthropathies	4	4	3	5	1	1	1	1	0.0004	0.0017	0.0006	0.0027
2	M30-M36	Systemic connective tissue disorders	18	18	15	18	3	3	3	3	94,984	226,319	165,482	486,785
3	M40-M54	Dorsopathies	0	0	0	0	0	0	0	0	0	0	0	0
4	M60-M79	Soft tissue disorders	18	17	14	18	12	12	12	12	7,236	15,111	11,804	34,152
5	M80-M90	Osteopathies	9	5	4	9	1	1	1	1	8	0	4	13
6	M91-M94	Chondropathies	0	0	0	0	0	0	0	0	0	0	0	0
7	M95-M99	Other disorders of the musculoskeletal system and connective tissue	10	9	8	11	3	3	3	3	19	37	19	76
	M00-M99	**Total**	**18**	**18**	**15**	**18**	**17**	**17**	**17**	**17**	**100,200**	**237,557**	**174,092**	**511,850**

3.13c. Releases by Facility

All natural gas compressor stations in NYS reported releases chemical associated with musculoskeletal system and connective tissue diseases.

The top 5 polluters were facilities operated by the Tennessee Gas Pipeline Company.

Tennessee Gas Pipeline Company Compressor Station 245, ranked first with 211,513 pounds or 17.2% of the state total, followed by Compressor Station 249 in Carlisle (196,907pounds or 16%) and Compressor Station 229 in Eden (170,674 pounds or 13.8%). These three facilities were responsible for one-half of the state total.

The top 5 facilities were responsible for slightly less than two-thirds (65.1%) of all releases.

The facility average was 68,510 million pounds over 7 years or 9,787 each year.

Table 3.13c.

Diseases of the Musculoskeletal System and Connective Tissue by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	13	13	8	30,216	211,513	17.15
2	TGPC CS 249	Carlisle	Schoharie	13	8	8	28,130	196,907	15.97
3	TGPC 229 & TEG DF	Eden	Erie	11	10	11	24,382	170,674	13.84
4	TGPC CS 241	LaFayette	Onondaga	12	9	12	17,983	125,878	10.21
5	TGPC CS 237	Manchester, Phelps	Ontario	2	1	0	13,956	97,690	7.92
6	AGT SOUTHEAST CS	Southeast	Putnam	9	6	12	11,741	82,189	6.66
7	AGT Stony Point CS	Stony Point	Rockland	14	8	10	11,115	77,803	6.31
8	NFGSC Concord CS	Concord	Erie	3	4	4	8,924	62,465	5.07
9	TGPC CS 254	Chatham	Columbia	9	4	1	8,668	60,676	4.92
10	DTI Woodhull Station	Woodhull	Steuben	12	15	15	5,165	36,154	2.93
11	NFGSC Beech Hill CS	Willing	Allegany	9	9	10	4,093	28,650	2.32
12	TGPC CS 224	Clymer	Chautauqua	13	12	13	3,494	24,460	1.98
13	TGPC CS 230-C	Lockport	Niagara	9	8	9	2,305	16,133	1.31
14	TGPC CS 233	York	Livingston	9	4	0	1,802	12,614	1.02
15	NFGSC Independence CS	Andover	Allegany	7	2	8	1,363	9,540	0.77
16	DTI Utica Station	Frankfort	Herkimer	9	11	15	1,140	7,978	0.65
17	NFGSC Nashville CS	Hanover	Chautauqua	9	9	0	895	6,266	0.51
18	DTI Borger CS	Ithaca	Tompkins	12	12	8	798	5,584	0.45
				17	**17**	**17**	**176,168**	**1,233,174**	**100%**

3.13d. Releases by DEC Region

The 18 compressor stations analyzed are in 6 of New York State's 9 DEC regions. All 6 regions had releases of chemicals associated with musculoskeletal system and connective tissue diseases.

Region 9, Western New York ranked first with 316,000 pounds (25.7%), followed by Region 6, Western Adirondacks/Eastern Lake Ontario (219,490 pounds or 17.8%) and Region 4, Capital Region/Northern Catskills (257,583 or 21%).

Table 3.13d.

Diseases of the Musculoskeletal System and Connective Tissue by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

NYS DEC Region		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	Number \ Name	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	9	2	10	16,367	5,456	38,191	3.10
		Chautauqua	11	2	16	12,273	4,091	28,637	2.33
		Erie	1	2	13	99,917	33,306	233,139	18.94
		Niagara	12	1	9	6,914	2,305	16,133	1.31
				7	**17**	**135,472**	**45,157**	**316,100**	**25.68**
2	6: W Adirondacks / E Lake Ontario	Herkimer	2	**2**	**16**	**94,067**	**31,356**	**219,490**	**17.83**
3	4: Capital Region / N Catskills	Columbia	8	1	9	26,004	8,668	60,676	4.93
		Schoharie	3	1	13	84,389	28,130	196,907	15.99
				2	**15**	**110,393**	**36,798**	**257,583**	**20.92**
6	3: Lower Hudson Valley	Putnam	6	1	13	35,224	11,741	82,189	6.68
		Rockland	7	1	14	33,344	11,115	77,803	6.32
				2	**16**	**68,568**	**22,856**	**159,992**	**13.00**
4	7: Central New York	Onondaga	4	1	12	53,948	17,983	125,878	10.22
		Tompkins	14	1	12	2,393	798	5,584	0.45
				2	**17**	**56,341**	**18,780**	**131,462**	**10.68**
5	8: Western Finger Lakes	Livingston	13	1	9	3,604	1,802	12,614	1.02
		Ontario	5	1	2	27,912	13,956	97,690	7.94
		Steuben	10	1	16	15,495	5,165	36,154	2.94
				3	**16**	**47,010**	**20,923**	**146,459**	**11.90**
				18	**17**	**511,850**	**175,869**	**1,231,086**	**100%**

3.13e. Releases by County

All 14 counties where compressor stations are located reported releases of chemicals linked to musculoskeletal system and connective tissue diseases.

Erie County ranked first with 233,139 pounds or 19% of the state total, followed by Herkimer County (219,490 pounds or 17.8%) and Schoharie County (196,906 pounds or 16%). These three counties are responsible for slightly more than one-half (53%) of all toxic releases.

The top five counties were responsible for 71%.

The country average was 87,934 pounds over a 7-year period or 12,562 pounds annually.

Table 3.13e.

Diseases of the Musculoskeletal System and Connective Tissue by County (ranked)

NYS Natural Gas Compressor Stations, 2008-2014

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	**County**	**NYS DEC Region**	**Fac's**	**Ch's**	**Total Pounds**	**Average Pounds**	**Total Pounds**	**%**
1	Erie	9: Western New York	2	13	99,916	33,305	233,139	18.94
2	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	16	94,067	31,355	219,490	17.83
3	Schoharie	4: Capital Region/Northern Catskills	1	13	84,388	28,129	196,906	15.99
4	Onondaga	7: Central New York	1	12	53,947	17,982	125,878	10.23
5	Ontario	8: Western Finger Lakes	1	2	27,911	13,955	97,690	7.94
6	Putnam	3: Lower Hudson Valley	1	13	35,223	11,741	82,188	6.68
7	Rockland	3: Lower Hudson Valley	1	14	33,344	11,114	77,802	6.32
8	Columbia	4: Capital Region/Northern Catskills	1	9	26,003	8,667	60,675	4.93
9	Allegany	9: Western New York	2	10	16,367	5,455	38,190	3.10
10	Steuben	8: Western Finger Lakes	1	16	15,494	5,164	36,154	2.94
11	Chautauqua	9: Western New York	2	16	12,273	4,091	28,637	2.33
12	Niagara	9: Western New York	1	9	6,914	2,304	16,133	1.31
13	Livingston	8: Western Finger Lakes	1	9	3,604	1,802	12,614	1.02
14	Tompkins	7: Central New York	1	12	2,393	797	5,583	0.45
			18	**17**	**511,844**	**175,861**	**1,231,079**	**100%**

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3.14. Diseases of the Genitourinary System (N00-N99)

3.14a. Releases by Chemicals

Forty-three of the 70 chemicals released by NYS natural gas compressor stations are associated with diseases of the genitourinary system (ICD-10, Chapter 14).

Releases of genitourinary toxicants were reported by all 18 stations and totaled an estimated 39.7 million pounds from 2008 to 2014--an annual average of 5.7 million pounds.

Chemicals associated with genitourinary system diseases represented 99.4% of releases by the state's natural gas compressor stations.

Or, to put it differently, ***of the 40.2 million pounds of chemicals released by NYS's compressor stations, 98.9% had one or more effects on the genitourinary system.***

Nitrogen oxides ranked first with 18.1 million pounds or nearly one-half (45.5%) of the total, followed by carbon monoxide (12.4 million pounds or 31.1%) and volatile organic compounds (4.9 million pounds or 12.4%). These three chemicals accounted for 35.4 million pounds or 89% of all releases.

The top 10 chemicals accounted for 99.9% of the state total.

Table 3.14a.

Diseases of the Genitourinary System (Top 10 Chemicals by Pounds Released)

NYS Natural Gas Compressor Stations, 2008-2014

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Nitrogen Oxides	18	14	6	7,749,673	2,583,224	18,082,571	45.50
2	Carbon Monoxide	18	14	6	5,297,028	1,765,676	12,359,731	31.10
3	Volatile Organic Compounds	18	14	6	2,108,741	702,914	4,920,396	12.38
4	Formaldehyde	18	14	6	561,144	187,048	1,309,336	3.29
5	PM10 Primary (Filt + Cond)	18	14	6	539,890	179,963	1,259,744	3.17
6	PM2.5 Primary (Filt + Cond)	18	14	6	474,085	158,028	1,106,198	2.78
7	PM Condensable	18	14	6	231,543	77,181	540,267	1.36
8	Acetaldehyde	14	13	6	28,272	9,424	65,969	0.17
9	Benzene	16	13	6	9,103	3,034	21,241	0.05
10	Methanol	8	7	6	8,286	2,762	19,333	0.05
		18	**14**	**6**	**17,007,765**	**5,669,255**	**39,684,785**	**99.86**

3.14b. Releases by ICD Category

Genitourinary system diseases are subdivided into 2 major groups. Chemicals released by natural gas compressor stations in NYS are positively associated with both. It should be remembered, that a single chemical can be associated with more than one category of disease.

N00-N39: Diseases of the urinary system

Thirty-three chemicals are associated with diseases of the urinary system.

One chemical has been implicated in renal failure (N17-N19).

N25-N29: Thirty-two chemicals are associated with other disorders of kidney and ureter. Effects on kidneys include: changes in blood vessels or in circulation, permanent damage, depressed function, necrosis, stones, injury, lesions or weight change.

N30-N39: Six chemicals are associated with other diseases of urinary system, including damage to the Cowper's gland and bladder weight change.

N40-N99: Diseases of the pelvis, genitals and breasts

Thirty-seven chemicals are associated with diseases of the pelvis, genitals and breasts that effect reproduction.

Twenty-two chemicals are associated with diseases of male genital organs (N40-N51), including: epididymis, low hormone levels, male impotence, reduced fertility, semen (chemical contamination of semen, low amount of semen and low number of swimming semen), seminal vesicle injury, sperm (abnormalities, irregulate shape and low number), and sterility.

A single chemical has been implicated in inflammatory diseases of female pelvic organs (N70-N77).

Nineteen have been connected to noninflammatory disorders of female genital tract (N80-N98): both primary infertility (infertility without any previous pregnancy) and secondary infertility (fertility problems occurring in a couple that has conceived on their own and had a child in the past), cervical erosion, effects on the ovaries (damage, weight changes and unspecified effects), menstrual problems including dysmenorrhea, endometrial stromal polyps, and vagina effects.

Table 3.14b

Diseases of the Genitourinary System by ICD Code Group

NYS Natural Gas Compressor Stations, 2008-2014

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	N00-N39	Diseases of the genitourinary system: urinary system	18	18	17	18	33	33	33	33	495,206	1,091,088	1,143,810	2,730,105
1.1	N00-N08	Glomerular diseases	0	0	0	0	0	0	0	0	0	0	0	0
1.2	N10-N16	Renal tubulo-interstitial diseases	0	0	0	0	0	0	0	0	0	0	0	0
1.3	N17-N19	Renal failure	6	7	8	8	1	1	1	1	1,381	4,324	2,580	8,285
1.4	N20-N23	Urolithiasis	0	0	0	0	0	0	0	0	0	0	0	0
1.5	N25-N29	Other disorders of kidney and ureter	18	18	17	18	32	32	32	32	494,933	1,090,089	1,143,059	2,728,082
1.6	N30-N39	Other diseases of urinary system	18	17	16	18	6	6	6	6	112,062	235,167	225,555	572,785
2	N40-N99	Diseases of the genitourinary system: pelvis, genitals and breasts	18	18	17	18	36	37	37	37	4,426,090	6,690,914	5,913,394	17,030,399
2.1	N40-N51	Diseases of male genital organs	18	18	17	18	22	22	22	22	1,533,660	2,275,644	2,083,319	5,892,625
2.2	N60-N64	Disorders of breast	0	0	0	0	0	0	0	0	0	0	0	0
2.3	N70-N77	Inflammatory diseases of female pelvic organs	18	17	16	18	1	1	1	1	110,333	229,882	220,927	561,143
2.4	N80-N98	Noninflammatory disorders of female genital tract	18	18	17	18	19	19	19	19	738,279	1,664,712	1,573,589	3,976,581
2.5	N99	Other disorders of genitourinary tract	18	18	17	18	29	30	30	30	1,733,463	2,737,002	2,433,354	6,903,820
	N00-N99	**Total**	**18**	**18**	**17**	**18**	**42**	**43**	**43**	**43**	**4,426,468**	**6,691,459**	**5,913,756**	**17,031,684**

3.14c. Releases by Facility

All natural gas compressor stations in NYS reported releases chemical associated with genitourinary system diseases.

The top 6 polluters were facilities operated by the Tennessee Gas Pipeline Company.

Tennessee Gas Pipeline Company Compressor Station 245, ranked first with 10.4 pounds, more than one-half (26.1%) of the state total, followed by Compressor Station 229 in Eden (5.1 million or 12.7%) and Compressor Station 249 in Carlisle (4.3 pounds or 10.8%). In aggregate, these three facilities were responsible for 19.8 million pounds or slightly less than one-half (49.6%) of the state total.

The top 5 facilities were responsible for 25.2 million pounds, slightly less than two-thirds (63.1%) of all releases.

The facility average was 2.2 million pounds over 7 years or 317,048 pounds each year.

Table 3.14c.

Diseases of the Genitourinary System by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	34	34	22	1,491,035	10,437,248	26.13
2	TGPC 229 & TEG DF	Eden	Erie	31	30	31	727,142	5,089,991	12.74
3	TGPC CS 249	Carlisle	Schoharie	34	23	23	613,568	4,294,974	10.75
4	TGPC CS 241	LaFayette	Onondaga	33	24	33	430,379	3,012,652	7.54
5	TGPC CS 254	Chatham	Columbia	21	14	8	340,832	2,385,827	5.97
6	TGPC CS 237	Manchester, Phelps	Ontario	8	7	4	328,157	2,297,097	5.75
7	AGT Stony Point CS	Stony Point	Rockland	36	19	20	282,892	1,980,244	4.96
8	NFGSC Concord CS	Concord	Erie	10	9	11	247,433	1,732,032	4.34
9	AGT SOUTHEAST CS	Southeast	Putnam	21	16	26	236,452	1,655,166	4.14
10	NFGSC Beech Hill CS	Willing	Allegany	18	18	19	197,907	1,385,347	3.47
11	NFGSC Independence CS	Andover	Allegany	14	9	16	193,316	1,353,211	3.39
12	TGPC CS 224	Clymer	Chautauqua	34	32	34	162,635	1,138,443	2.85
13	DTI Woodhull Station	Woodhull	Steuben	25	34	38	117,138	819,966	2.05
14	DTI Borger CS	Ithaca	Tompkins	25	26	17	110,760	775,319	1.94
15	NFGSC Nashville CS	Hanover	Chautauqua	20	20	0	88,900	622,297	1.56
16	TGPC CS 230-C	Lockport	Niagara	21	20	21	66,406	464,840	1.16
17	DTI Utica Station	Frankfort	Herkimer	20	24	37	39,872	279,102	0.70
18	TGPC CS 233	York	Livingston	21	14	3	32,039	224,273	0.56
				42	**43**	**43**	**5,706,861**	**39,948,030**	**100%**

3.14d. Releases by DEC Region

The 18 compressor stations analyzed are in 6 of New York State's 9 DEC regions. All 6 regions had releases of chemicals associated with genitourinary system diseases.

Region 9, Western New York ranked first with 2.7 million pounds (29.1%), closely followed by Region 6, Western Adirondacks/Eastern Lake Ontario (10.7 million pounds or 27%). Region 4, Capital Region/Northern Catskills, ranked third with 6.7 million pounds (16.8%).

Table 3.14d.

Diseases of the Genitourinary System by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

NYS DEC Region		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	Number \ Name	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	5	2	20	1,173,668	391,223	2,738,558	6.89
		Chautauqua	10	2	41	665,703	221,901	1,553,307	3.91
		Erie	2	2	34	2,923,724	974,575	6,822,023	17.17
		Niagara	13	1	21	199,217	66,406	464,840	1.17
				7	**42**	**4,962,312**	**1,654,104**	**11,578,729**	**29.14**
2	6: W Adirondacks / E Lake Ontario	Herkimer	1	**2**	**42**	**4,592,722**	**1,530,907**	**10,716,351**	**26.97**
3	4: Capital Region / N Catskills	Columbia	6	1	21	1,022,497	340,832	2,385,827	6.00
		Schoharie	3	1	34	1,840,703	613,568	4,294,974	10.81
				2	**38**	**2,863,201**	**954,400**	**6,680,801**	**16.81**
4	7: Central New York	Onondaga	4	1	33	1,291,137	430,379	3,012,652	7.58
		Tompkins	12	1	26	332,279	110,760	775,319	1.95
				2	**43**	**1,623,416**	**541,139**	**3,787,971**	**9.53**
6	3: Lower Hudson Valley	Putnam	9	1	28	709,357	236,452	1,655,166	4.16
		Rockland	8	1	36	848,676	282,892	1,980,244	4.98
				2	**40**	**1,558,033**	**519,344**	**3,635,410**	**9.15**
5	8: Western Finger Lakes	Livingston	14	1	21	96,117	32,039	224,273	0.56
		Ontario	7	1	8	984,470	328,157	2,297,097	5.78
		Steuben	11	1	39	351,414	117,138	819,966	2.06
				3	**39**	**1,432,001**	**477,334**	**3,341,336**	**8.41**
				18	**43**	**17,031,685**	**5,677,228**	**39,740,598**	**100%**

3.14e. Releases by County

All 14 counties where compressor stations are located reported releases of chemicals linked to genitourinary system diseases.

Herkimer County ranked first with 10.7 million pounds, more than one-quarter (27%) of the state total, followed by Erie County (6.8 million pounds or 17.2%) and Schoharie County (4.3 million pounds or 10.8%). These three counties are responsible for slightly more than one-half (53%) of all toxic releases.

The top five counties were responsible for 21.8 million pounds or more than one-half (55%) of the state total.

The country average was 2.8 million pounds over a 7-year period or 405,516 pounds annually.

Table 3.14e.

Diseases of the Genitourinary System by County (ranked)

NYS Natural Gas Compressor Stations, 2008-2014

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	County	NYS DEC Region	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	42	4,592,722	1,530,907	10,716,350	26.97
2	Erie	9: Western New York	2	34	2,923,724	974,575	6,822,022	17.17
3	Schoharie	4: Capital Region/Northern Catskills	1	34	1,840,703	613,568	4,294,974	10.81
4	Onondaga	7: Central New York	1	33	1,291,137	430,379	3,012,651	7.58
5	Allegany	9: Western New York	2	20	1,173,668	391,223	2,738,558	6.89
6	Columbia	4: Capital Region/Northern Catskills	1	21	1,022,497	340,832	2,385,826	6.00
7	Ontario	8: Western Finger Lakes	1	8	984,470	328,157	2,297,097	5.78
8	Rockland	3: Lower Hudson Valley	1	36	848,676	282,892	1,980,244	4.98
9	Putnam	3: Lower Hudson Valley	1	28	709,357	236,452	1,655,165	4.16
10	Chautauqua	9: Western New York	2	41	665,703	221,901	1,553,307	3.91
11	Steuben	8: Western Finger Lakes	1	39	351,414	117,138	819,966	2.06
12	Tompkins	7: Central New York	1	26	332,279	110,760	775,318	1.95
13	Niagara	9: Western New York	1	21	199,217	66,406	464,840	1.17
14	Livingston	8: Western Finger Lakes	1	21	96,117	32,039	224,272	0.56
			18	**43**	**17,031,685**	**5,677,228**	**39,740,590**	**100%**

3.15. Pregnancy, Childbirth and the Puerperium (O00-O99)

3.15a. Releases by Chemical

Eighteen of the 70 chemicals released by NYS natural gas compressor stations are associated with diseases of pregnancy, childbirth and the puerperium (ICD-10, Chapter 15).

Releases of these toxicants were reported by all 18 stations and totaled an estimated 19.5 million pounds from 2008 to 2014--an annual average of 2.8 million pounds.

Chemicals associated with diseases of pregnancy, childbirth and the puerperium represented 48.8% of releases by the state's natural gas compressor stations.

Or, to put it differently, ***of the 40.2 million pounds of chemicals released by NYS's compressor stations, slightly less than one-half (48.62%) had adverse effects on pregnancy, childbirth and the puerperium.***

Nitrogen oxides ranked first with 18.1 million pounds or (92.5%) of the total. Formaldehyde was a distant second (1.3 million pounds or 6.7%), followed by acetaldehyde (65,969 pounds or 0.34%).

These two chemicals accounted for 19.4 million pounds or 99.2% of all releases.

Table 3.15a.

Pregnancy, Childbirth and the Puerperium by Chemical (ranked)

NYS Natural Gas Compressor Stations, 2008-2014

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Nitrogen Oxides	18	14	6	7,749,673	2,583,224	18,082,571	92.54
2	Formaldehyde	18	14	6	561,144	187,048	1,309,336	6.70
3	Acetaldehyde	14	13	6	28,272	9,424	65,969	0.34
4	Acrolein	14	13	6	22,596	7,532	52,723	0.27
5	Toluene	16	13	6	8,275	2,758	19,308	0.10
6	Xylenes (Mixed Isomers)	15	13	6	3,598	1,199	8,394	0.04
7	Naphthalene	15	13	6	298	99	696	0.00
8	Methylene Chloride	8	7	6	269	90	629	0.00
9	Ethylene Dibromide	8	7	6	149	50	347	0.00
10	Carbon Tetrachloride	8	7	6	121	40	282	0.00
11	Styrene	8	7	6	100	33	234	0.00
12	Ethylene Dichloride	6	6	5	65	22	151	0.00
13	Vinyl Chloride	8	7	6	46	15	107	0.00
14	Mercury	16	13	6	30	10	70	0.00
15	Cadmium	9	9	6	13	4	30	0.00
16	Tetrachloroethylene	4	4	4	4	1	9	0.00
17	Lead	16	12	6	0	0	1	0.00
18	Arsenic	6	6	5	0	0	0.1	0.00
		18	**14**	**6**	**8,374,652**	**2,791,551**	**19,540,856**	**100%**

3.15b. Releases by ICD Category

Diseases of pregnancy, childbirth and the puerperium are subdivided into 8 major groups. Chemicals released by natural gas compressor stations in NYS are positively associated with three. It should be remembered, that a single chemical can be associated with more than one category of disease.

O00-O08: Fourteen chemicals, released by all 18 sites, are associated with pregnancy with abortive outcome.

O30-O48: Five chemicals are associated with maternal care related to the fetus and amniotic cavity and possible delivery problems.

O85-O92: A single chemicals is implicated in complications predominantly related to the puerperium.

Table 3.15b.

Pregnancy, Childbirth and the Puerperium by ICD Code Group

NYS Natural Gas Compressor Stations, 2008-2014

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	O00-O08	Pregnancy with abortive outcome	18	18	17	18	14	14	14	14	2,389,023	3,255,109	2,729,996	8,374,129
2	O10-O16	Edema, proteinuria and hypertensive disorders in pregnancy, childbirth and the puerperium	0	0	0	0	0	0	0	0	0	0	0	0
3	O20-O29	Other maternal disorders predominantly related to pregnancy	0	0	0	0	0	0	0	0	0	0	0	0
4	O30-O48	Maternal care related to the fetus and amniotic cavity and possible delivery problems	15	15	12	15	5	5	5	5	4,477	15,355	8,962	28,795
5	O60-O75	Complications of labor and delivery	0	0	0	0	0	0	0	0	0	0	0	0
6	O80-O84	Delivery	0	0	0	0	0	0	0	0	0	0	0	0
7	O85-O92	Complications predominantly related to the puerperium	18	17	16	18	1	1	1	1	110,333	229,882	220,927	561,143
8	O95-O99	Other obstetric conditions, not elsewhere classified	0	0	0	0	0	0	0	0	0	0	0	0
	O00-O99	**Total**	**18**	**18**	**17**	**18**	**18**	**18**	**18**	**18**	**2,389,116**	**3,255,374**	**2,730,161**	**8,374,652**

3.15c. Releases by Facility

All natural gas compressor stations in NYS reported chemical releases associated with pregnancy, childbirth and the puerperium diseases.

The top 4 polluters were facilities operated by the Tennessee Gas Pipeline Company.

Tennessee Gas Pipeline Company Compressor Station 245, ranked first with 6.1 pounds (30.9%), followed by Compressor Station 229 in Eden (3.3 million or 16.9%) and Compressor Station 249 in Carlisle (1.9 million pounds or 9.5%). In aggregate, these three facilities were responsible for 11.2 million pounds, more than one-half (57.3%) of the state total.

The top 5 facilities were responsible for 13.4 million pounds, slightly more than two-thirds (68.4%) of all releases.

The facility average was 1.1 million pounds over 7 years or 155,768 pounds each year.

Table 3.15c.

Pregnancy, Childbirth and the Puerperium by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	16	16	10	865,884	6,061,190	30.88
2	TGPC 229 & TEG DF	Eden	Erie	14	13	14	473,307	3,313,147	16.88
3	TGPC CS 249	Carlisle	Schoharie	16	10	10	267,623	1,873,364	9.54
4	TGPC CS 254	Chatham	Columbia	10	7	2	162,679	1,138,751	5.80
5	AGT SOUTHEAST CS	Southeast	Putnam	10	7	11	148,254	1,037,778	5.29
6	TGPC CS 241	LaFayette	Onondaga	15	11	15	132,651	928,556	4.73
7	TGPC CS 237	Manchester, Phelps	Ontario	3	2	2	123,343	863,403	4.40
8	AGT Stony Point CS	Stony Point	Rockland	16	8	9	117,278	820,945	4.18
9	NFGSC Concord CS	Concord	Erie	4	3	4	109,935	769,544	3.92
10	DTI Borger CS	Ithaca	Tompkins	11	11	8	86,398	604,785	3.08
11	TGPC CS 224	Clymer	Chautauqua	16	14	16	63,140	441,983	2.25
12	NFGSC Beech Hill CS	Willing	Allegany	9	9	9	53,918	377,423	1.92
13	NFGSC Independence CS	Andover	Allegany	6	3	6	51,476	360,334	1.84
14	TGPC CS 230-C	Lockport	Niagara	10	9	10	38,680	270,758	1.38
15	NFGSC Nashville CS	Hanover	Chautauqua	8	8	0	36,799	257,594	1.31
16	DTI Woodhull Station	Woodhull	Steuben	11	15	16	31,911	223,376	1.14
17	TGPC CS 233	York	Livingston	10	7	1	22,714	158,999	0.81
18	DTI Utica Station	Frankfort	Herkimer	8	11	16	17,827	124,788	0.64
				18	**18**	**18**	**2,803,817**	**19,626,720**	**100%**

3.15d. Releases by DEC Regions

The 18 compressor stations analyzed are in 6 of New York State's 9 DEC regions. All 6 regions had releases of chemicals associated with pregnancy, childbirth and the puerperium diseases.

Region 6, Western Adirondacks/Eastern Lake Ontario, ranked first with 6.2 million pounds, nearly one-half (46.3%) of the state total, closely followed by Region 9, Western New York (5.7 million pounds or 43.7%). Region 4, Capital Region/Northern Catskills, ranked third with 3 million pounds (14%).

Table 3.15d.

Pregnancy, Childbirth and the Puerperium by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

NYS DEC Region		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	Number \ Name	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	**6: W Adirondacks / E Lake Ontario**	Herkimer	1	**2**	**18**	**2,651,134**	**883,711**	**6,185,978**	**46.32**
2	**9: Western New York**	Allegany	9	2	9	316,181	105,394	737,756	5.52
		Chautauqua	10	2	18	263,020	87,673	613,712	4.60
		Erie	2	2	15	1,749,724	583,241	4,082,690	30.57
		Niagara	12	1	10	116,039	38,680	270,758	2.03
				7	**18**	**2,444,965**	**814,988**	**5,704,917**	**42.72**
3	**4: Capital Region / N Catskills**	Columbia	4	1	10	488,036	162,679	1,138,751	8.53
		Schoharie	3	1	16	802,870	267,623	1,873,364	14.03
				2	**17**	**1,290,907**	**430,302**	**3,012,116**	**22.55**
4	**3: Lower Hudson Valley**	Putnam	5	1	11	444,762	148,254	1,037,778	7.77
		Rockland	8	1	16	351,834	117,278	820,945	6.15
				2	**17**	**796,596**	**265,532**	**1,858,724**	**13.92**
4	**7: Central New York**	Onondaga	6	1	15	397,953	132,651	928,556	6.95
		Tompkins	11	1	11	259,194	86,398	604,785	4.53
				2	**18**	**657,146**	**219,049**	**1,533,342**	**11.48**
5	**8: Western Finger Lakes**	Livingston	14	1	10	68,143	22,714	158,999	1.19
		Ontario	7	1	3	370,030	123,343	863,403	6.47
		Steuben	13	1	16	95,733	31,911	223,376	1.67
				3	**18**	**533,905**	**177,968**	**1,245,779**	**9.33**
				16	**18**	**5,723,519**	**1,907,840**	**13,354,877**	**100%**

3.15e. Releases by County

All 14 counties where compressor stations are located reported releases of chemicals linked to genitourinary system diseases.

Herkimer County ranked first with 6.2 million pounds, slightly less than one-third (31.7%) of the state total, followed by Erie County (4.1 million pounds or 20.9%) and Schoharie County (1.9 million pounds or 9.6%). These three counties are responsible for 12.1 million pounds (62.1%) of all toxic releases.

The top five counties were responsible for 14.3 million pounds or nearly three-fourths (73.3%) of the state total.

The country average was 1.4 million pounds over a 7-year period or 199,396 pounds annually.

Table 3.15e.

Pregnancy, Childbirth and the Puerperium by County (ranked)

NYS Natural Gas Compressor Stations, 2008-2014

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	**County**	**NYS DEC Region**	**Fac's**	**Ch's**	**Total Pounds**	**Average Pounds**	**Total Pounds**	**%**
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	18	2,651,134	883,711	6,185,978	31.66
2	Erie	9: Western New York	2	15	1,749,724	583,241	4,082,690	20.89
3	Schoharie	4: Capital Region/Northern Catskills	1	16	802,870	267,623	1,873,364	9.59
4	Columbia	4: Capital Region/Northern Catskills	1	10	488,036	162,679	1,138,751	5.83
5	Putnam	3: Lower Hudson Valley	1	11	444,762	148,254	1,037,778	5.31
6	Onondaga	7: Central New York	1	15	397,953	132,651	928,556	4.75
7	Ontario	8: Western Finger Lakes	1	3	370,030	123,343	863,403	4.42
8	Rockland	3: Lower Hudson Valley	1	16	351,834	117,278	820,945	4.20
9	Allegany	9: Western New York	2	9	316,181	105,394	737,756	3.78
10	Chautauqua	9: Western New York	2	18	263,020	87,673	613,712	3.14
11	Tompkins	7: Central New York	1	11	259,194	86,398	604,785	3.09
12	Niagara	9: Western New York	1	10	116,039	38,680	270,758	1.39
13	Steuben	8: Western Finger Lakes	1	16	95,733	31,911	223,376	1.14
14	Livingston	8: Western Finger Lakes	1	10	68,143	22,714	158,999	0.81
			18	**18**	**8,374,652**	**2,791,551**	**19,540,856**	**100%**

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3.16. Certain Conditions Originating in the Perinatal Period (P00-P96)

3.16a. Releases by Chemical

Twenty of the 70 chemicals released by NYS natural gas compressor stations are associated with Certain Conditions Originating in the Perinatal Period (ICD-10, Chapter 16).

Releases of these toxicants were reported by all 18 stations and totaled an estimated 22.4 million pounds from 2008 to 2014--an annual average of 3.2 million pounds.

Or, to put it differently, ***of the 40.2 million pounds of chemicals released by NYS's compressor stations, 56% have been associated with certain conditions originating in the perinatal period.***

Nitrogen oxides ranked first with 18.1 million pounds, more than three-fourths (80.7%) of the total. Formaldehyde was a distant second (1,309,336 pounds or 5.8%), followed by PM 10 (1,259,744 million pounds or 3.8%). These three chemicals accounted for 19.4 million pounds or 92% of all releases.

The top 10 chemicals were responsible for virtually all releases (99.5%).

The annual average release was 3.2 million pounds.

Table 3.16a.

Certain Conditions Originating in the Perinatal Period by Chemical (ranked)

NYS Natural Gas Compressor Stations, 2008-2014

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Nitrogen Oxides	18	14	6	7,749,673	2,583,224	18,082,571	80.67
2	Formaldehyde	18	14	6	561,144	187,048	1,309,336	5.84
3	PM10 Primary (Filt + Cond)	18	14	6	539,890	179,963	1,259,744	5.62
4	PM2.5 Primary (Filt + Cond)	18	14	6	474,085	158,028	1,106,198	4.93
5	PM Condensible	18	14	6	231,543	77,181	540,267	2.41
6	Acetaldehyde	14	13	6	28,272	9,424	65,969	0.29
7	Benzene	16	13	6	9,103	3,034	21,241	0.09
8	Toluene	16	13	6	8,275	2,758	19,308	0.09
9	Xylenes (Mixed Isomers)	15	13	6	3,598	1,199	8,394	0.04
10	Phenol	11	10	6	303	101	706	0.00
					9,605,886	3,201,962	22,413,733	99.99
11	Nickel	11	11	6	296	99	692	0.00
12	Manganese	9	9	6	150	50	350	0.00
13	Carbon Tetrachloride	8	7	6	121	40	282	0.00
14	Styrene	8	7	6	100	33	234	0.00
15	Chloroform	9	8	6	83	28	193	0.00
16	Phenanthrene	11	9	6	21	7	48	0.00
17	Cadmium	9	9	6	13	4	30	0.00
18	Acenaphthene	10	8	6	4	1	8.3	0.00
19	Lead	16	12	6	0	0	1	0.00
20	Arsenic	6	6	5	0	0	0	0.00
					788	263	1,838	0.01
					9,606,673	**3,202,224**	**22,415,571**	**100%**

3.16b. Releases by ICD Category

Certain Conditions Originating in the Perinatal Period are subdivided into 10 major groups. Chemicals released by natural gas compressor stations in NYS are positively associated with three. It should be remembered, that a single chemical can be associated with more than one category of disease.

P05-P08: Twenty-one chemicals are associated with disorders related to length of gestation and fetal growth: birth weight (low or extremely low), growth statistics (e.g., reduced weight gain), preterm birth, and small for gestational age.

P50-P61: A single chemical has been connected to hemorrhagic and hematological disorders of fetus and newborn.

Table 3.16b.

Certain Conditions Originating in the Perinatal Period by ICD Code Group

NYS Natural Gas Compressor Stations, 2008-2014

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	P00-P04	Fetus and newborn affected by maternal factors and by complications of pregnancy, labor and delivery	0	0	0	0	0	0	0	0	0	0	0	0
2	P05-P08	Disorders related to length of gestation and fetal growth	18	18	17	18	19	19	19	19	2,631,857	3,820,078	3,154,716	9,606,652
3	P10-P15	Birth trauma	0	0	0	0	0	0	0	0	0	0	0	0
4	P20-P29	Respiratory and cardiovascular disorders specific to the perinatal period	0	0	0	0	0	0	0	0	0	0	0	0
5	P35-P39	Infections specific to the perinatal period	0	0	0	0	0	0	0	0	0	0	0	0
6	P50-P61	Hemorrhagic and hematological disorders of fetus and newborn	10	8	6	11	1	1	1	1	3	14	2	20
7	P70-P74	Transitory endocrine and metabolic disorders specific to fetus and newborn	0	0	0	0	0	0	0	0	0	0	0	0
8	P75-P78	Digestive system disorders of fetus and newborn	0	0	0	0	0	0	0	0	0	0	0	0
9	P80-P83	Conditions involving the integument and temperature regulation of fetus and newborn	0	0	0	0	0	0	0	0	0	0	0	0
10	P90-P96	Other disorders originating in the perinatal period	18	18	15	18	1	1	1	1	92,594	220,983	160,506	474,084
	P00-P96	**Total**	**18**	**18**	**17**	**18**	**20**	**20**	**20**	**20**	**2,631,861**	**3,820,092**	**3,154,718**	**9,606,673**

3.16c. Releases by Facility

All natural gas compressor stations in NYS reported chemical releases associated with certain conditions originating in the perinatal period.

Six of the 7 top polluters were facilities operated by the Tennessee Gas Pipeline Company, including the top 4.

Tennessee Gas Pipeline Company Compressor Station 245, ranked first with 6.6 million pounds (29.3%), followed by Compressor Station 229 in Eden (3.7 million pounds or 16.4%) and Compressor Station 249 in Carlisle (2.4 million pounds or 10.5%). In aggregate, these three facilities were responsible for 17.9 million pounds, slightly more than one-half (50.9%) of the state total.

The top 5 facilities were responsible for 22.5 million pounds, slightly less than two-thirds (66%) of all releases.

The facility average was 2 million pounds over 7 years or 278,879 pounds each year.

Table 3.16c.

Certain Conditions Originating in the Perinatal Period by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	16	16	10	942,678	6,598,747	29.32
2	TGPC 229 & TEG DF	Eden	Erie	16	15	16	526,098	3,682,688	16.36
3	TGPC CS 249	Carlisle	Schoharie	16	10	10	337,100	2,359,704	10.48
4	TGPC CS 254	Chatham	Columbia	14	10	6	184,150	1,289,055	5.73
5	AGT SOUTHEAST CS	Southeast	Putnam	14	10	17	179,875	1,259,125	5.59
6	TGPC CS 241	LaFayette	Onondaga	15	12	15	178,380	1,248,661	5.55
7	TGPC CS 237	Manchester, Phelps	Ontario	5	5	2	149,469	1,046,289	4.65
8	AGT Stony Point CS	Stony Point	Rockland	18	9	10	139,970	979,796	4.35
9	NFGSC Concord CS	Concord	Erie	7	5	7	131,814	922,698	4.10
10	DTI Borger CS	Ithaca	Tompkins	16	16	10	89,289	625,023	2.78
11	TGPC CS 224	Clymer	Chautauqua	16	16	16	68,616	480,315	2.13
12	NFGSC Beech Hill CS	Willing	Allegany	10	10	10	64,286	450,005	2.00
13	NFGSC Independence CS	Andover	Allegany	10	6	10	54,734	383,143	1.70
14	TGPC CS 230-C	Lockport	Niagara	14	13	14	44,297	310,080	1.38
15	DTI Woodhull Station	Woodhull	Steuben	16	19	20	40,062	280,440	1.25
16	NFGSC Nashville CS	Hanover	Chautauqua	14	14	0	38,896	272,276	1.21
17	TGPC CS 233	York	Livingston	14	10	1	25,581	179,072	0.80
18	DTI Utica Station	Frankfort	Herkimer	14	16	20	19,886	139,202	0.62
				20	**20**	**20**	**3,215,181**	**22,506,319**	**100%**

3.16d. Releases by DEC Region

The 18 compressor stations analyzed are in 6 of New York State's 9 DEC regions. All 6 regions had releases of chemicals associated with certain conditions originating in the perinatal period.

Region 6, Western Adirondacks/Eastern Lake Ontario, ranked first with 6.7 million pounds (30.1%), closely followed by Region 9, Western New York (6.4 million pounds or 28.6%). Region 4, Capital Region/Northern Catskills, ranked third with 3.6 million pounds (16.3%).

Table 3.16d.

Certain Conditions Originating in the Perinatal Period by County by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

NYS DEC Region		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	Number \ Name	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	6: W Adirondacks / E Lake Ontario	Herkimer	1	2	20	2,887,693	962,564	6,737,950	30.06
2	9: Western New York	Allegany	9	2	11	357,064	119,021	833,149	3.72
		Chautauqua	10	2	20	283,643	94,548	661,833	2.95
		Erie	2	2	17	1,973,737	657,912	4,605,387	20.55
		Niagara	12	1	14	132,892	44,297	310,080	1.38
				7	**20**	**2,747,335**	**915,778**	**6,410,449**	**28.60**
3	4: Capital Region / N Catskills	Columbia	4	1	14	552,453	184,151	1,289,056	5.75
		Schoharie	3	1	16	1,011,302	337,101	2,359,705	10.53
				2	**19**	**1,563,754**	**521,251**	**3,648,760**	**16.28**
4	3: Lower Hudson Valley	Putnam	5	1	18	539,625	179,875	1,259,126	5.62
		Rockland	8	1	18	419,913	139,971	979,796	4.37
				2	**20**	**959,538**	**319,846**	**2,238,922**	**9.99**
5	7: Central New York	Onondaga	6	1	15	535,141	178,380	1,248,662	5.57
		Tompkins	11	1	16	267,867	89,289	625,024	2.79
				2	**20**	**803,008**	**267,669**	**1,873,686**	**8.36**
6	8: Western Finger Lakes	Livingston	14	1	14	76,745	25,582	179,073	0.80
		Ontario	7	1	5	448,410	149,470	1,046,290	4.67
		Steuben	13	1	20	120,189	40,063	280,441	1.25
				3	**20**	**645,344**	**215,115**	**1,505,803**	**6.72**
				18	**20**	**9,606,673**	**3,202,224**	**22,415,571**	**100%**

3.16e. Releases by County

All 14 counties where compressor stations are located reported releases of chemicals linked to certain conditions originating in the perinatal period.

Herkimer County ranked first with 9.8 million pounds, (28%) of the state total, followed by Erie County (6.3 million pounds or 18.1%) and Schoharie County (3.6 million pounds or 10.4%). These three counties are responsible for 19.7 million pounds (56.4%) of all toxic releases.

The top five counties were responsible for 24.5 million pounds or 70% of the state total.

The country average was 2.5 million pounds over a 7-year period or 356,756 pounds annually.

Table 3.16e.

Certain Conditions Originating in the Perinatal Period by County (ranked)

NYS Natural Gas Compressor Stations, 2008-2014

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	**County**	**NYS DEC Region**	**Fac's**	**Ch's**	**Total Pounds**	**Average Pounds**	**Total Pounds**	**%**
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	20	2,887,693	962,564	6,737,950	30.06
2	Erie	9: Western New York	2	17	1,973,737	657,912	4,605,387	20.55
3	Schoharie	4: Capital Region/Northern Catskills	1	16	1,011,301	337,100	2,359,704	10.53
4	Columbia	4: Capital Region/Northern Catskills	1	14	552,452	184,150	1,289,055	5.75
5	Putnam	3: Lower Hudson Valley	1	18	539,625	179,875	1,259,125	5.62
6	Onondaga	7: Central New York	1	15	535,140	178,380	1,248,661	5.57
7	Ontario	8: Western Finger Lakes	1	5	448,409	149,469	1,046,289	4.67
8	Rockland	3: Lower Hudson Valley	1	18	419,912	139,970	979,796	4.37
9	Allegany	9: Western New York	2	11	357,063	119,021	833,148	3.72
10	Chautauqua	9: Western New York	2	20	283,642	94,547	661,832	2.95
11	Tompkins	7: Central New York	1	16	267,867	89,289	625,023	2.79
12	Niagara	9: Western New York	1	14	132,891	44,297	310,080	1.38
13	Steuben	8: Western Finger Lakes	1	20	120,188	40,062	280,440	1.25
14	Livingston	8: Western Finger Lakes	1	14	76,745	25,581	179,072	0.80
			18	**22**	**9,606,665**	**3,202,217**	**22,415,562**	**100%**

Table 3.16f.

Certain Conditions Originating in the Perinatal Period by chemical

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

#	Chemical name	U.S. EPA National Emissions Inventory Pounds	Congenital malformations, deformations and chromosomal abnormalities	Congenital malformations and deformations	Nervous system	Eye, ear, face and neck	Circulatory system	Respiratory system	Digestive system	Genital organs	Urinary system	Musculoskeletal system	Other	Chromosomal abnormalities, nec	California Proposition 65 Status
			Q00-Q99	Q00-Q89	Q00-Q07	Q10-Q18	Q20-Q28	Q30-Q34	Q35-Q45	Q50-Q56	Q60-Q64	Q65-Q79	Q80-Q89	Q90-Q99	CA P65
				1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2	
			59	57	16	4	9	4	19	2	9	19	55	32	
1	Acetaldehyde	65,969.0555	Y	Y	Y	Y			Y		Y	Y	Y	Y	
2	Acrolein	52,723.4283	Y	Y									Y		
3	Anthracene	9.9008	Y	Y									Y	Y	
4	Arsenic	0.0631	Y	Y	Y		Y	Y	Y				Y	Y	
5	Benz[a]anthracene	19.4738	Y	Y									Y	Y	
6	Benzene	21,240.5186	Y	Y	Y		Y		Y			Y	Y	Y	Known
7	Benzo(j,k)fluorene	10.6660	Y	Y									Y		
8	Benzo[a]pyrene	0.0133	Y	Y									Y	Y	
9	Benzo[b]fluoranthene	0.6858	Y	Y									Y		
10	Benzo[e]pyrene	0.0581	Y	Y									Y		
11	Benzo[g,h,i]perylene	1.7487	Y	Y									Y	Y	
12	Benzo[k]fluoranthene	0.0019	Y	Y									Y		
13	Beryllium	0.0034	Y	Y									Y		
14	Biphenyl	690.3042	Y	Y									Y		
15	Butadiene, 1,3-	4,718.8745	Y	Y								Y	Y	Y	Known
16	Cadmium	30.4906	Y	Y	Y	Y	Y		Y		Y	Y	Y	Y	Known
17	Carbon monoxide	12,359,731.3420	Y	Y	Y		Y		Y				Y		Known
18	Carbon tetrachloride	281.6842	Y	Y	Y				Y			Y	Y		
19	Chlorobenzene	171.9160	Y	Y				Y	Y			Y	Y	Y	
20	Chloroethane (Ethyl chloride)	5.9185	Y	Y									Y		
21	Chloroform	192.8606	Y	Y	Y				Y		Y	Y	Y	Y	Known
22	Chrysene	4.0913	Y	Y									Y	Y	
23	Cobalt	0.0264	Y	Y									Y	Y	
24	Dibenz[a,h]anthracene	0.0000	Y	Y									Y	Y	
25	Dichloropropene, 1,3-	160.9530	Y	Y									Y	Y	
26	Dimethylbenz[a]anthracene, 7,12-	0.0033	Y											Y	
27	Ethylbenzene	2,794.3829	Y	Y								Y	Y	Y	
28	Ethylene dibromide	346.9677	Y	Y				Y					Y	Y	Known
29	Ethylene dichloride	150.8763	Y	Y									Y	Y	
30	Fluorene	28.0605	Y	Y									Y		
31	Formaldehyde	1,309,335.5542	Y	Y					Y		Y	Y	Y	Y	
32	Hexane, n-	12,183.8539	Y	Y							Y	Y	Y	Y	
33	Indeno[1,2,3-cd]pyrene	0.0240	Y	Y									Y		
34	Lead	0.5586	Y	Y	Y		Y					Y	Y	Y	Known

#	Chemical name	U.S. EPA National Emissions Inventory Pounds	Congenital malformations, deformations and chromosomal abnormalities	Congenital malformations and deformations	Nervous system	Eye, ear, face and neck	Circulatory system	Respiratory system	Digestive system	Genital organs	Urinary system	Musculoskeletal system	Other	Chromosomal abnormalities, nec	California Proposition 65 Status
			Q00-Q99	Q00-Q89	Q00-Q07	Q10-Q18	Q20-Q28	Q30-Q34	Q35-Q45	Q50-Q56	Q60-Q64	Q65-Q79	Q80-Q89	Q90-Q99	CA P65
				1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2	
			59	57	16	4	9	4	19	2	9	19	55	32	
35	Manganese	350.2412	Y	Y	Y			Y	Y				Y		
36	Mercury	70.0315	Y	Y	Y								Y		
37	Methane dichloride [1910.1052]	628.7595	Y	Y							Y	Y	Y	Y	
38	Methanol	19,333.1517	Y	Y	Y	Y			Y	Y	Y	Y	Y		
39	Methylcholanthrene, 3-	0.0003	Y											Y	
40	Naphthalene	696.4536	Y	Y		Y						Y	Y	Y	
41	Nickel	691.7926	Y	Y									Y		Candidate
42	Nitrogen oxides (NO2)	18,082,570.5018	Y	Y	Y				Y						
43	Perchloroethylene	8.9808	Y	Y					Y			Y	Y	Y	
44	Phenanthrene	47.9187	Y	Y									Y		
45	Phenol	706.0520	Y	Y					Y			Y	Y	Y	
46	PM 2.5 Primary (Filt + Cond)	1,106,197.8579	Y	Y			Y		Y				Y		
47	PM10 Primary (Filt + Cond)	1,259,744.3362	Y	Y			Y		Y				Y		
48	Propylene dichloride	163.9497	Y	Y									Y		
49	Propylene oxide	614.7228	Y	Y					Y			Y	Y	Y	
50	Pyrene	7.0711	Y	Y									Y		
51	Selenium	0.0064	Y	Y									Y		
52	Styrene	233.7242	Y	Y						Y	Y		Y	Y	
53	Sulfur dioxide	186,778.1614	Y	Y			Y		Y				Y		
54	Tetrachloroethane, 1,1,2,2-	308.7690	Y	Y									Y	Y	
55	Toluene	19,307.6774	Y	Y	Y						Y	Y	Y	Y	Known
56	Trichloroethane, 1,1,2-	247.4703	Y	Y	Y										
57	Vinyl chloride	106.6165	Y	Y	Y								Y	Y	
58	Volatile organic compounds (VOCs)	4,920,395.6676	Y	Y	Y		Y		Y				Y		
59	Xylene (mixed isomers)	8,394.2111	Y	Y								Y	Y		

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17. Congenital Malformations, Deformations & Chromosomal Abnormalities (Q00-Q99)

3.17a. Releases by Chemical

The relationship between chemical exposures in utero and during the early postnatal period and adverse health effects has been well documented.

> "Epidemiological studies have shown that children's exposure to air pollutants during fetal development and early postnatal life is associated with many types of health problems including abnormal development (low birth weight [LBW], very low birth weight [VLBW], preterm birth [PTB], intrauterine growth restriction [IUGR], congenital defects, and intrauterine and infant mortality), decreased lung growth, increased rates of respiratory tract infections, childhood asthma, behavioral problems, and neurocognitive decrements." (Wang and Pinkerton 2007).

Fifty-nine of the 70 chemicals released by NYS natural gas compressor stations are associated with congenital malformations, deformations and chromosomal abnormalities (ICD-10, Chapter 17).

Releases of these toxicants were reported by all 18 stations and totaled an estimated 39.4 million pounds from 2008 to 2014--an annual average of 5.6 million pounds.

Or, to put it differently, ***of the 40.2 million pounds of chemicals released by NYS's compressor stations, 98% have been associated with congenital malformations, deformations and chromosomal abnormalities.*** Nitrogen oxides ranked first with 18.1 million pounds, slightly less than one-half (45.9%) of the state total. Carbon monoxide was second (12.4 million pounds or 31.3%), followed by volatile organic compounds (4.9 million pounds or 12.5%). These three chemicals accounted for 35.4 million pounds or 89.7 of all releases.

The top 10 chemicals were responsible for virtually all releases (99.8%). The annual average release was 5.6 million pounds.

Table 3.17a.

Congenital Malformations, Deformations & Chromosomal Abnormalities

NYS Natural Gas Compressor Stations, 2008-2014

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Nitrogen Oxides	18	14	6	7,749,673	2,583,224	18,082,571	45.85
2	Carbon Monoxide	18	14	6	5,297,028	1,765,676	12,359,731	31.34
3	Volatile Organic Compounds	18	14	6	2,108,741	702,914	4,920,396	12.48
4	Formaldehyde	18	14	6	561,144	187,048	1,309,336	3.32
5	PM10 Primary (Filt + Cond)	18	14	6	539,890	179,963	1,259,744	3.19
6	PM2.5 Primary (Filt + Cond)	18	14	6	474,085	158,028	1,106,198	2.80
7	Sulfur Dioxide	18	14	6	80,048	26,683	186,778	0.47
8	Acetaldehyde	14	13	6	28,272	9,424	65,969	0.17
9	Acrolein	14	13	6	22,596	7,532	52,723	0.13
10	Benzene	16	13	6	9,103	3,034	21,241	0.05
		18	**14**	**6**	**16,870,580**	**5,623,527**	**39,364,686**	**99.81**

3.17b. Releases by ICD Category

Congenital malformations, deformations & chromosomal abnormalities into 2 major disease categories. Chemicals released by natural gas compressor stations in NYS are positively associated with both.

It should be remembered, that a single chemical can be associated with more than one subcategory of disease within an ICD disease group (chapter) as well as with more than one disease group.

Q00-Q89: Congenital Malformation and Deformations

Fifty-seven chemicals are associated with congenital malformation and deformations. This includes:

Q00-Q07: Sixteen chemicals associated with nervous system malformations and deformations, including: brain abnormalities and defects (anencephaly, holoprosencephaly, microcephaly), CNS abnormalities and defects, cognitive developmental delay with greater language impairment, cognitive function, lower IQ, neural tube defects (opening to the spinal cord at the base of the brain), neurological impairment, spatial memory function impairment, and spina bifida.

Q10-Q18: Four chemicals are associated with eye, ear, face and neck malformations and deformations: ear abnormalities, eye abnormalities (anophthalmia and cataracts), facial clefts, and gross facial agenesis.

Q20-Q28: Ten chemicals are associated with circulatory system malformations and deformations, including

Table 3.17b.

Congenital Malformations, Deformations & Chromosomal Abnormalities by ICD Code Group

NYS Natural Gas Compressor Stations, 2008-2014

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	Q00-Q89	Congenital malformations and deformations	18	18	17	18	57	54	54	57	4,393,806	6,607,676	5,900,691	16,902,175
1.1	Q00-Q07	Nervous system	18	18	17	18	16	16	16	16	4,068,877	5,882,704	5,258,344	15,209,926
1.2	Q10-Q18	Eye, ear, face and neck	15	15	12	15	4	4	4	4	5,825	19,569	11,475	36,869
1.3	Q20-Q28	Circulatory system	18	18	17	18	10	10	10	10	4,269,779	6,336,905	5,651,896	16,258,581
1.4	Q30-Q34	Respiratory system	14	8	7	14	4	4	4	4	150	107	113	372
1.5	Q35-Q45	Digestive system	18	18	17	18	17	17	17	17	4,386,043	6,586,345	5,884,324	16,856,713
1.6	Q50-Q56	Genital organs	6	7	8	8	2	2	2	2	1,399	4,373	2,612	8,385
1.7	Q60-Q64	Urinary system	18	17	16	18	9	9	9	9	119,382	254,922	237,359	611,663
1.8	Q65-Q79	Musculoskeletal system	18	18	16	18	19	19	19	19	122,314	262,300	243,932	628,547
1.9	Q80-Q89	Other	18	18	17	18	55	52	52	55	2,124,445	3,614,575	3,413,375	9,152,395
2	Q90-Q99	Chromosomal abnormalities, nec	18	18	16	18	30	31	31	32	120,669	256,739	239,709	617,118
	Q00-Q99	**Total**	**18**	**18**	**17**	**18**	**57**	**56**	**56**	**59**	**4,393,806**	**6,607,676**	**5,900,691**	**16,902,175**

3.17c. Releases by Facility

All natural gas compressor stations in NYS reported chemical releases associated with congenital malformations, deformations & chromosomal abnormalities.

The top 6 polluters were facilities operated by the Tennessee Gas Pipeline Company.

Tennessee Gas Pipeline Company Compressor Station 245, ranked first with 10.4 million pounds, more than one-quarter (26.2%) of the state total. Compressor Station 229 in Eden ranked second (5 million pounds or 12.7%) followed by Compressor Station 249 in Carlisle (4.2 million pounds or 10.7%). In aggregate, these three facilities were responsible for 19.7 million pounds, slightly less than one-half (49.6%) of the state total.

The top 5 facilities were responsible for 25 million pounds, slightly less than two-thirds (63.1%) of all releases.

The facility average was 2.1 million pounds over 7 years or 314,643 pounds each year.

Table 3.17c.

Congenital Malformations, Deformations & Chromosomal Abnormalities by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	43	42	23	1,484,232	10,389,625	26.21
2	TGPC 229 & TEG DF	Eden	Erie	45	42	43	721,420	5,049,941	12.74
3	TGPC CS 249	Carlisle	Schoharie	43	24	24	604,523	4,231,660	10.67
4	TGPC CS 241	LaFayette	Onondaga	41	32	41	425,236	2,976,652	7.51
5	TGPC CS 254	Chatham	Columbia	24	15	8	337,861	2,365,027	5.97
6	TGPC CS 237	Manchester, Phelps	Ontario	8	7	5	323,113	2,261,791	5.71
7	AGT Stony Point CS	Stony Point	Rockland	40	22	20	282,935	1,980,542	5.00
8	NFGSC Concord CS	Concord	Erie	10	8	10	243,579	1,705,053	4.30
9	AGT SOUTHEAST CS	Southeast	Putnam	24	17	40	233,541	1,634,787	4.12
10	NFGSC Beech Hill CS	Willing	Allegany	18	18	19	196,128	1,372,896	3.46
11	NFGSC Independence CS	Andover	Allegany	13	9	15	192,763	1,349,341	3.40
12	TGPC CS 224	Clymer	Chautauqua	42	40	42	162,655	1,138,582	2.87
13	DTI Woodhull Station	Woodhull	Steuben	38	47	51	116,594	816,160	2.06
14	DTI Borger CS	Ithaca	Tompkins	38	39	18	110,770	775,390	1.96
15	NFGSC Nashville CS	Hanover	Chautauqua	32	30	0	88,560	619,919	1.56
16	TGPC CS 230-C	Lockport	Niagara	24	23	24	68,322	478,255	1.21
17	DTI Utica Station	Frankfort	Herkimer	32	37	50	39,732	278,121	0.70
18	TGPC CS 233	York	Livingston	24	15	4	31,615	221,306	0.56
				57	**56**	**56**	**5,663,578**	**39,645,048**	**100%**

3.17d. Releases by DEC Region

The 18 compressor stations analyzed are in 6 of New York State's 9 DEC regions. All 6 regions had releases of chemicals associated with congenital malformations, deformations and chromosomal abnormalities.

Region 9, Western New York, ranked first with 11.5 million pounds (29.2%), closely followed by Region 6, Western Adirondacks/Eastern Lake Ontario (10.7 million pounds or 27.1%). Region 4, Capital Region/Northern Catskills, ranked third with 6.7 million pounds (16.7%).

Table 3.17d.

Congenital Malformations, Deformations & Chromosomal Abnormalities by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

NYS DEC Region		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	Number \ Name	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	5	2	20	1,166,673	388,891	2,722,237	6.90
		Chautauqua	10	2	54	665,084	221,695	1,551,861	3.93
		Erie	2	2	47	2,894,998	964,999	6,754,994	17.13
		Niagara	13	1	24	204,966	68,322	478,254	1.21
				7	**57**	**4,931,721**	**1,643,907**	**11,507,346**	**29.18**
2	6: W Adirondacks / E Lake Ontario	Herkimer	1	**2**	**58**	**4,571,891**	**1,523,964**	**10,667,746**	**27.05**
3	4: Capital Region / N Catskills	Columbia	6	1	24	1,013,583	337,861	2,365,026	6.00
		Schoharie	3	1	43	1,813,569	604,523	4,231,659	10.73
				2	**48**	**2,827,151**	**942,384**	**6,596,685**	**16.73**
4	7: Central New York	Onondaga	4	1	41	1,275,708	425,236	2,976,651	7.55
		Tompkins	12	1	41	332,310	110,770	775,390	1.97
				2	**58**	**1,608,018**	**536,006**	**3,752,041**	**9.51**
6	3: Lower Hudson Valley	Putnam	9	1	42	700,623	233,541	1,634,787	4.15
		Rockland	8	1	42	848,804	282,935	1,980,541	5.02
				2	**53**	**1,549,427**	**516,476**	**3,615,328**	**9.17**
5	8: Western Finger Lakes	Livingston	14	1	24	94,845	31,615	221,305	0.56
		Ontario	7	1	8	969,339	323,113	2,261,790	5.73
		Steuben	11	1	54	349,783	116,594	816,160	2.07
				3	**54**	**1,413,967**	**471,322**	**3,299,255**	**8.37**
				18	**59**	**16,902,175**	**5,634,058**	**39,438,401**	**100%**

3.17e. Releases by County

All 14 counties where compressor stations are located reported releases of chemicals linked to congenital malformations, deformations & chromosomal abnormalities.

Herkimer County ranked first with 10.7 million pounds or (27%) of the state total, followed by Erie County (6.8 million pounds or 17.1%) and Schoharie County (4.2 million pounds or 10.7%). These three counties are responsible for 21.7 million pounds (56.4%) of all toxic releases.

The top five counties were responsible for 27.4 million pounds or more than two-thirds (69.34) of the state total.

The country average was 2.8 million pounds over a 7-year period or 402,433 pounds annually.

Table 3.17e.

Congenital Malformations, Deformations & Chromosomal Abnormalities by County (ranked)

NYS Natural Gas Compressor Stations, 2008-2014

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	County	NYS DEC Region	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	58	4,571,891	1,523,964	10,667,747	27.05
2	Erie	9: Western New York	2	47	2,894,998	964,999	6,754,994	17.13
3	Schoharie	4: Capital Region/Northern Catskills	1	43	1,813,569	604,523	4,231,660	10.73
4	Onondaga	7: Central New York	1	41	1,275,708	425,236	2,976,652	7.55
5	Allegany	9: Western New York	2	20	1,166,673	388,891	2,722,237	6.90
6	Columbia	4: Capital Region/Northern Catskills	1	24	1,013,583	337,861	2,365,027	6.00
7	Ontario	8: Western Finger Lakes	1	8	969,339	323,113	2,261,791	5.73
8	Rockland	3: Lower Hudson Valley	1	42	848,804	282,935	1,980,542	5.02
9	Putnam	3: Lower Hudson Valley	1	42	700,623	233,541	1,634,787	4.15
10	Chautauqua	9: Western New York	2	54	665,084	221,695	1,551,862	3.93
11	Steuben	8: Western Finger Lakes	1	54	349,783	116,594	816,160	2.07
12	Tompkins	7: Central New York	1	41	332,310	110,770	775,390	1.97
13	Niagara	9: Western New York	1	24	204,966	68,322	478,255	1.21
14	Livingston	8: Western Finger Lakes	1	24	94,845	31,615	221,306	0.56
			18	**59**	**16,902,175**	**5,634,058**	**39,438,408**	**100%**

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3.18. Symptoms, Signs and Abnormal Clinical and Laboratory Findings (R00-R99)

3.18a. Releases by Chemicals

Forty-three of the 70 chemicals released by NYS natural gas compressor stations are associated with congenital malformations, deformations and chromosomal abnormalities (ICD-10, Chapter 18).

Releases of these toxicants were reported by all 18 stations and totaled an estimated 39.4 million pounds from 2008 to 2014--an annual average of 5.6 million pounds.

Or, to put it differently, ***of the 40.2 million pounds of chemicals released by NYS's compressor stations, 98% have been associated with symptoms, signs and abnormal clinical and laboratory findings.***

Nitrogen oxides ranked first with 18.1 million pounds, slightly less than one-half (45.9%) of the state total. Carbon monoxide was second (12.4 million pounds or 31.3%), followed by volatile organic compounds (4.9 million pounds or 12.5%). These three chemicals accounted for 35.4 million pounds or 89.7 of all releases.

The top 10 chemicals were responsible for virtually all releases (99.8%).

The annual average release was 5.6 million pounds.

Table 3.18a.

Symptoms, Signs and Abnormal Clinical and Laboratory Findings by Chemical (Top 10)

NYS Natural Gas Compressor Stations, 2008-2014

Chemical		Location			3 Years	7 Year Estimate: 2008 to 2014		
Rank	Name	Fac's	Cn's	Reg's	Pounds	Average	Pounds	%
1	Nitrogen Oxides	18	14	6	7,749,673	2,583,224	18,082,571	45.85
2	Carbon Monoxide	18	14	6	5,297,028	1,765,676	12,359,731	31.34
3	Volatile Organic Compounds	18	14	6	2,108,741	702,914	4,920,396	12.48
4	Formaldehyde	18	14	6	561,144	187,048	1,309,336	3.32
5	PM10 Primary (Filt + Cond)	18	14	6	539,890	179,963	1,259,744	3.19
6	PM2.5 Primary (Filt + Cond)	18	14	6	474,085	158,028	1,106,198	2.80
7	Sulfur Dioxide	18	14	6	80,048	26,683	186,778	0.47
8	Acetaldehyde	14	13	6	28,272	9,424	65,969	0.17
9	Acrolein	14	13	6	22,596	7,532	52,723	0.13
10	Benzene	16	13	6	9,103	3,034	21,241	0.05
		18	**14**	**6**	**16,870,580**	**5,623,527**	**39,364,686**	**99.81**

3.18b. Releases by ICD Category

Symptoms, signs and abnormal clinical and laboratory findings into 3 major disease categories. Chemicals released by natural gas compressor stations in NYS are positively associated with two.

It should be remembered, that a single chemical can be associated with more than one subcategory of disease within an ICD disease group (chapter) as well as with more than one disease group.

R00-R69: Symptoms and signs

Forty-two chemicals are associated with symptoms, signs and abnormal clinical and laboratory findings. This includes:

R00-R09: Thirty chemicals are associated with circulatory and respiratory system symptoms: changes in blood pressure, chest discomfort (burning sensation, constriction, pain), dyspnea, epistaxis, heart palpitations, heart rate (bradycardia, tachycardia), phlegm, pulse rate decrease without fall in blood pressure, pulse rate increase without fall in blood pressure, and wheezing.

R10-R19: Twenty-eight chemicals associated with digestive system and abdomen symptoms: abdomen (colic, cramps and pain), nausea or vomiting, and unspecified liver effects.

R20-R23: Thirty-two chemicals are associated with skin and subcutaneous tissue symptoms: skin (burning sensation, cracking, discoloration, pain, paranesthesia, and rash), numbness in extremities, and a tingling sensation.

R30-R39: One chemical is associated with urinary system symptoms.

R40-R46: Thirty-four chemicals are associated with cognition, perception, emotional state and behavior: R40 (drowsiness, dizziness, somnolence), R41 (amnesia, confusion, memory disturbances, impairment and loss, mental confusion), R42 (dizziness, giddiness), R42 (lightheadedness and vertigo), R43 (anosmia, olfactory fatigue and unspecified effects), R43 (metallic or unpleasant taste in mouth), R45 (agitation or irritability), and R53 (lethargy).

R47-R49: Four chemicals are associated with speech and voice symptoms: R47 (speech (difficulties, disorders and impairment), and R49 (voice loss and disturbances).

R50-R69: Thirty-five chemicals are associated with general symptoms and signs: R50 (fever), R51 (headache), R53 (asthenia, alteration of classical conditioning, fatigue, listlessness, malaise, weakness), R55 (lowered consciousness), R56 (convulsions), R61 (diaphoresis), R63 (loss or decreased weight gain), R63 (altered fluid and food intake), R68 (chills), and R68 (decreased libido).

R70-R94: Abnormal clinical and laboratory findings, not elsewhere classified

Five chemicals are associated with abnormal clinical and laboratory findings, not elsewhere classified.

Table 3.18b.

Symptoms, Signs and Abnormal Clinical and Laboratory Findings by ICD Code Category

NYS Natural Gas Compressor Stations, 2008-2014

ICD-10			Facilities				Chemicals				Pounds			
#	Description		'08	'11	'14	Tot	'08	'11	'14	Tot	2008	2011	2014	Total
1	R00-R69	Symptoms and signs	18	18	17	18	42	42	42	42	4,301,427	6,386,827	5,740,302	16,428,557
1.1	R00-R09	Circulatory and respiratory systems	18	18	17	18	30	30	30	30	2,775,402	4,111,790	3,698,584	10,585,778
1.2	R10-R19	Digestive system and abdomen	18	18	17	18	28	28	28	28	4,296,286	6,369,501	5,729,821	16,395,609
1.3	R20-R23	Skin and subcutaneous tissue	18	18	16	18	32	32	32	32	233,958	516,707	441,385	1,192,051
1.4	R25-R29	Nervous and musculoskeletal systems	18	18	16	18	26	26	26	26	122,751	262,577	244,109	629,437
1.5	R30-R39	Urinary system	6	7	8	8	1	1	1	1	1,381	4,324	2,580	8,285
1.6	R40-R46	Cognition, perception, emotional state and behavior	18	18	17	18	34	34	34	34	1,913,213	3,125,300	2,997,323	8,035,836
1.7	R47-R49	Speech and voice	18	17	16	18	4	4	4	4	111,704	233,516	224,349	569,571
1.8	R50-R69	General symptoms and signs	18	18	17	18	35	35	35	35	4,293,722	6,372,351	5,681,897	16,347,971
2	R70-R94	Abnormal clinical and laboratory findings, not elsewhere classified	18	18	17	18	5	5	5	5	1,508,969	2,253,122	2,012,719	5,774,810
3	R95-R99	Ill-defined and unknown causes of mortality	0	0	0	0	0	0	0	0	0	0	0	0
	R00-R99	**Total**	**18**	**18**	**17**	**18**	**43**	**43**	**43**	**43**	**4,394,022**	**6,607,810**	**5,900,809**	**16,902,642**

3.18c. Releases by Facility

All natural gas compressor stations in NYS reported chemical releases associated with symptoms, signs and abnormal clinical and laboratory findings.

The top 6 polluters were facilities operated by the Tennessee Gas Pipeline Company.

Tennessee Gas Pipeline Company Compressor Station 245, ranked first with 10.4 million pounds, more than one-quarter (26.2%) of the state total. Compressor Station 229 in Eden ranked second (5. million pounds or 12.7%) followed by Compressor Station 249 in Carlisle (4.2 million pounds or 10.7%). In aggregate, these three facilities were responsible for 19.7 million pounds, slightly less than one-half (49.6%) of the state total.

The top 5 facilities were responsible for 25 million pounds, slightly less than two-thirds (63.1%) of all releases.

The facility average was 2.1 million pounds over 7 years or 314,652 pounds each year.

Table 3.18c.

Symptoms, Signs and Abnormal Clinical and Laboratory Findings by Facility (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

Facility		Location		Chemicals			7 Years (estimate)		
Rank	Facility Name (Short)	Town	County	'08	'11	'14	Average	Tot. Lbs.	%
1	TGPC CS 245	Winfield	Herkimer	34	34	23	1,484,228	10,389,599	26.21
2	TGPC 229 & TEG DF	Eden	Erie	32	31	32	721,386	5,049,701	12.74
3	TGPC CS 249	Carlisle	Schoharie	34	24	24	604,520	4,231,638	10.67
4	TGPC CS 241	LaFayette	Onondaga	33	26	33	425,231	2,976,619	7.51
5	TGPC CS 254	Chatham	Columbia	22	15	8	337,861	2,365,025	5.97
6	TGPC CS 237	Manchester, Phelps	Ontario	8	7	5	323,113	2,261,791	5.70
7	AGT Stony Point CS	Stony Point	Rockland	35	21	21	282,934	1,980,537	5.00
8	NFGSC Concord CS	Concord	Erie	10	9	11	243,583	1,705,081	4.30
9	AGT SOUTHEAST CS	Southeast	Putnam	22	17	28	233,540	1,634,783	4.12
10	NFGSC Beech Hill CS	Willing	Allegany	19	19	20	196,224	1,373,569	3.46
11	NFGSC Independence CS	Andover	Allegany	14	9	16	192,806	1,349,642	3.40
12	TGPC CS 224	Clymer	Chautauqua	34	32	34	162,642	1,138,497	2.87
13	DTI Woodhull Station	Woodhull	Steuben	28	35	39	116,642	816,492	2.06
14	DTI Borger CS	Ithaca	Tompkins	28	28	18	110,772	775,401	1.96
15	NFGSC Nashville CS	Hanover	Chautauqua	22	22	0	88,588	620,114	1.56
16	TGPC CS 230-C	Lockport	Niagara	22	21	22	68,321	478,245	1.21
17	DTI Utica Station	Frankfort	Herkimer	22	26	38	39,738	278,165	0.70
18	TGPC CS 233	York	Livingston	22	15	4	31,615	221,303	0.56
				43	**43**	**43**	**5,663,743**	**39,646,203**	**100%**

3.18d. Releases by DEC Region

The 18 compressor stations analyzed are in 6 of New York State's 9 DEC regions. All 6 regions had releases of chemicals associated with symptoms, signs and abnormal clinical and laboratory findings.

Region 9, Western New York, ranked first with 11.5 million pounds (29.2%), closely followed by Region 6, Western Adirondacks/Eastern Lake Ontario (10.7 million pounds or 27.1%). Region 4, Capital Region/Northern Catskills, ranked third with 6.7 million pounds (16.7%).

Table 3.18e.

Symptoms, Signs and Abnormal Clinical and Laboratory Findings by DEC Region (ranked)

NYS Natural Gas Compressor Station NEI Emissions, 2008 to 2011

NYS DEC Region		County		3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	Number \ Name	Name	Rank	Fac's	Ch's	Total Pounds	Average Pounds	Total Pounds	%
1	9: Western New York	Allegany	5	2	21	1,167,091	389,030	2,723,211	6.90
		Chautauqua	10	2	42	665,103	221,701	1,551,907	3.93
		Erie	2	2	35	2,894,907	964,969	6,754,782	17.13
		Niagara	13	1	22	204,962	68,321	478,244	1.21
				7	**43**	**4,932,063**	**1,644,021**	**11,508,144**	**29.18**
2	6: W Adirondacks / E Lake Ontario	Herkimer	1	**2**	**42**	**4,571,899**	**1,523,966**	**10,667,764**	**27.05**
3	4: Capital Region / N Catskills	Columbia	6	1	22	1,013,582	337,861	2,365,024	6.00
		Schoharie	3	1	34	1,813,559	604,520	4,231,637	10.73
				2	**38**	**2,827,141**	**942,380**	**6,596,661**	**16.73**
4	7: Central New York	Onondaga	4	1	33	1,275,694	425,231	2,976,619	7.55
		Tompkins	12	1	28	332,315	110,772	775,401	1.97
				2	**43**	**1,608,009**	**536,003**	**3,752,020**	**9.51**
6	3: Lower Hudson Valley	Putnam	9	1	30	700,621	233,540	1,634,782	4.15
		Rockland	8	1	36	848,801	282,934	1,980,536	5.02
				2	**40**	**1,549,423**	**516,474**	**3,615,318**	**9.17**
5	8: Western Finger Lakes	Livingston	14	1	22	94,844	31,615	221,302	0.56
		Ontario	7	1	8	969,339	323,113	2,261,790	5.73
		Steuben	11	1	40	349,925	116,642	816,492	2.07
				3	**40**	**1,414,108**	**471,369**	**3,299,584**	**8.37**
				18	**43**	**16,902,642**	**5,634,214**	**39,439,491**	**100%**

3.18e. Releases by County

All 14 counties where compressor stations are located reported releases of chemicals associated with symptoms, signs and abnormal clinical and laboratory findings.

Herkimer County ranked first with 10.7 million pounds or (27%) of the state total, followed by Erie County (6.8 million pounds or 17.1%) and Schoharie County (4.2 million pounds or 10.7%). These three counties are responsible for 21.7 million pounds (54.9%) of all toxic releases.

The top five counties were responsible for 27.4 million pounds or more than two-thirds (69.4%) of the state total.

The country average was 2.8 million pounds over a 7-year period or 402,444 pounds annually.

Table 3.18e.

Symptoms, Signs and Abnormal Clinical and Laboratory Findings by County (ranked)

NYS Natural Gas Compressor Stations, 2008-2014

			3 Years: 2008, 2011, 2014			7-Year Estimate: 2008-2014		
Rank	**County**	**NYS DEC Region**	**Fac's**	**Ch's**	**Total Pounds**	**Average Pounds**	**Total Pounds**	**%**
1	Herkimer	6: Western Adirondacks/E. Lake Ontario	2	42	4,571,899	1,523,966	10,667,764	27.05
2	Erie	9: Western New York	2	35	2,894,907	964,969	6,754,782	17.13
3	Schoharie	4: Capital Region/Northern Catskills	1	34	1,813,559	604,520	4,231,637	10.73
4	Onondaga	7: Central New York	1	33	1,275,694	425,231	2,976,619	7.55
5	Allegany	9: Western New York	2	21	1,167,091	389,030	2,723,211	6.90
6	Columbia	4: Capital Region/Northern Catskills	1	22	1,013,582	337,861	2,365,024	6.00
7	Ontario	8: Western Finger Lakes	1	8	969,339	323,113	2,261,790	5.73
8	Rockland	3: Lower Hudson Valley	1	36	848,801	282,934	1,980,536	5.02
9	Putnam	3: Lower Hudson Valley	1	30	700,621	233,540	1,634,782	4.15
10	Chautauqua	9: Western New York	2	42	665,103	221,701	1,551,907	3.93
11	Steuben	8: Western Finger Lakes	1	40	349,925	116,642	816,492	2.07
12	Tompkins	7: Central New York	1	28	332,315	110,772	775,401	1.97
13	Niagara	9: Western New York	1	22	204,962	68,321	478,244	1.21
14	Livingston	8: Western Finger Lakes	1	22	94,844	31,615	221,302	0.56
			18	**43**	**16,902,642**	**5,634,214**	**39,439,491**	**100%**

Chapter 4. Facility Profiles

Sources:

New York State Department of Environmental Conservation, U.S. Energy Information Administration, U.S. EPA Envirofacts, U.S. EPA National Emissions Inventory

* System Configuration - natural gas pipeline system design layout. Some systems are a combination of the trunk and grid. Where two are shown, the first represents the predominant system design.

  Trunk - systems are large-diameter long-distance trunklines that generally tie supply areas to natural gas market areas.

  Grid - systems are usually a network of many interconnections and delivery points that operate in and serve major natural gas market areas

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4.1. Algonquin Gas Southeast Compressor Station (Putnam, New York)

4.1a. Facility Profile

Table 4.1a.

Algonquin Gas Southeast Compressor Station: Facility Profile

Putnam NY

Facility name, short	AGT SOUTHEAST CS Southeast
Facility name, full	Algonquin Gas Southeast Compressor Station
EIS Facility ID	8474311
DEC Region	3 -- Lower Hudson Valley
County	Putnam
Town	Southeast
Village \ Hamlet	Brewster
Address	142 Tulip Rd
Zip	10509
DEC Facility ID	3373000060
DEC Permit Type	Air State Facility
DEC Permit ID	3-3730-00060/00013
DEC Permit Effective Date	7/15/2015
DEC Permit Description	
DEC Permit Review Report	
Company	Algonquin Gas Transmission LLC
Project	Algonquin Incremental Market (AIM)
Pipeline	Algonquin
Principal Supply Source	Interstate System
System Configuration (Primary / Secondary) *	Trunk/Grid
Status	Operational
Horsepower, existing	10,302
Horsepower, modifications\expansion	43,640

Table 4.1b.

Algonquin Gas Southeast Compressor Station: Health Effects of Releases by ICD-10 Chapter & Group

Putnam NY

International Classification of Disease, 10th edition			Ch #	2008-14 Estimated Lbs.		State Rank	% of State
Ch.	Description	Code		Average	Total		
2	Neoplasms	C00-D48	40	72,072	504,510	7	5.26
2a	Malignant neoplasms	C00-C97	37	67,423	471,962	7	5.02
2a.1	Lip, oral cavity and pharynx	C00-C14	11	5,788	40,519	12	2.81
2a.2	Digestive organs	C15-C26	23	5,830	40,810	12	2.79
2a.3	Respiratory system and intrathoracic organs	C30-C39	28	67,391	471,742	7	5.04
2a.4	Bone and articular cartilage	C40-C41	26	59,530	416,713	7	4.75
2a.5	Skin	C43-C44	8	288	2,021	4	7.58
2a.6	Connective and soft tissue	C45-C49	13	614	4,303	3	15.74
2a.07	Breast and female genital organs	C50-C58	15	36,301	254,113	7	5.86
2a.07.50	Female breast	C50	13	28,590	200,134	8	5.28
2a.07.55	Uterus	C55	3	9	64	9	1.31
2a.07.56	Ovary	C56	3	289	2,025	4	7.77
2a.08	Male genital organs	C60-C63	8	4,587	32,109	11	2.65
2a.09	Urinary organs	C64-C68	16	5,538	38,766	12	2.69
2a.10	Eye, brain and central nervous system	C69-C72	14	5,828	40,796	12	2.79
2a.11	Endocrine glands and related structures	C73-C75	7	4,481	31,369	11	2.57
2a.12	Secondary and ill-defined	C76-C80	6	979	6,858	2	20.69
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic and related tissue	C81-C96	20	37,129	259,904	7	5.93
2a.14	Malignant neoplasms of independent (primary) multiple sites	C97	0	0	0	0	0
2b	In situ neoplasms	D00-D09	2	834	5,841	3	13.98
2c	Benign neoplasms	D10-D36	17	967	6,771	8	4.09
2d	Neoplasms of uncertain or unknown behavior	D37-D48	27	5,582	39,074	12	2.69
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	24	62,269	435,885	13	2.31
4	Endocrine, nutritional and metabolic diseases	E00-E90	37	48,166	337,165	8	4.71
5	Mental and behavioral disorders	F00-F99	21	62,261	435,828	13	2.31
6	Diseases of the nervous system	G00-G99	26	67,069	469,483	13	2.46
7	Diseases of the eye and adnexa	H00-H59	27	183,354	1,283,479	7	5.17
8	Diseases of the ear and mastoid process	H60-H95	12	57,674	403,718	13	2.31
9	Diseases of the circulatory system	I00-I99	20	55,141	385,987	13	2.38
10	Diseases of the respiratory system	J00-J99	35	233,542	1,634,795	9	4.12
11	Diseases of the digestive system	K00-K93	31	222,553	1,557,872	9	4.05
12	Diseases of the skin and subcutaneous tissue	L00-L99	34	214,802	1,503,615	7	5.42
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	13	11,741	82,188	6	6.66
14	Diseases of the genitourinary system	N00-N99	28	236,452	1,655,165	9	4.14
14a	Diseases of the genitourinary system: urinary system	N00-N39	20	35,528	248,697	10	3.88
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	25	236,445	1,655,115	9	4.14
15	Pregnancy, childbirth and the puerperium	O00-O99	11	148,254	1,037,778	5	5.29
16	Certain conditions originating in the perinatal period	P00-P96	18	179,875	1,259,125	5	5.59
17	Congenital malformations, deformations, chromosomal abnormalities	Q00-Q99	42	233,541	1,634,787	9	4.12
18	Symptoms, signs and abnormal cl. and laboratory findings, nec	R00-R99	30	233,540	1,634,782	9	4.12
	Total Releases		**48**	**241,259**	**1,688,814**	**9**	**4.20**

4.2. Algonquin Gas Stony Point Compressor Station (Stony Point, New York)

4.2a. Facility Profile

Table 4.2a.

Algonquin Gas Stony Point Compressor Station: Facility Profile

Stony Point NY

Facility name, short	**AGT Stony Point CS**
Facility name, full	**Algonquin Gas Stony Point Compressor Station**
EIS Facility ID	**7952911**
DEC Region	**3 -- Lower Hudson Valley**
County	**Rockland**
Town	**Stony Point**
Village \ Hamlet	
Address	**1 Lindberg Rd**
Zip	**10980**
DEC Permit Type	**Air Title V Facility**
DEC Facility ID	**3392800001**
DEC Permit ID	**3-3928-00001/00027**
DEC Permit Effective Date	**12/21/2015**
Company	**Algonquin Gas Transmission LLC**
Project	**Algonquin Incremental Market (AIM)**
Pipeline	**Algonquin**
Principal Supply Source	**Interstate System**
System Configuration (Primary / Secondary) *	**Trunk/Grid**
Facility Status	**Operational \ Expansion under review**
Facility Status Dates	
Horsepower, existing	**12,000**
Horsepower, modifications\expansion	**One new compressor to be added at this site.**

Table 4.2b.

Algonquin Gas Stony Point Compressor Station: Health Effects of Facility Releases

Stony Point NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Ch.	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	5	42	110,464	773,249	8.07
2a	Malignant neoplasms	C00-C97	5	40	106,763	747,345	7.95
2a.1	Lip, oral cavity and pharynx	C00-C14	7	10	12,190	85,332	5.92
2a.2	Digestive organs	C15-C26	7	30	12,784	89,492	6.12
2a.3	Respiratory system and intrathoracic organs	C30-C39	5	29	106,158	743,106	7.93
2a.4	Bone and articular cartilage	C40-C41	5	26	100,507	703,555	8.02
2a.5	Skin	C43-C44	2	7	650	4,553	17.06
2a.6	Connective and soft tissue	C45-C49	1	13	1,073	7,515	27.49
2a.07	Breast and female genital organs	C50-C58	8	17	33,931	237,522	5.48
2a.07.50	Female breast	C50	7	16	29,326	205,287	5.41
2a.07.55	Uterus	C55	3	3	99	698	14.27
2a.07.56	Ovary	C56	2	3	649	4,548	17.44
2a.08	Male genital organs	C60-C63	6	10	9,786	68,506	5.66
2a.09	Urinary organs	C64-C68	7	19	11,842	82,899	5.75
2a.10	Eye, brain and central nervous system	C69-C72	7	16	12,800	89,604	6.13
2a.11	Endocrine glands and related structures	C73-C75	6	10	9,756	68,294	5.59
2a.12	Secondary and ill-defined	C76-C80	1	5	1,541	10,792	32.56
2a.13	Malignant neoplasms, lymphoid, haematopoietic, related	C81-C96	8	28	35,662	249,634	5.69
2a.14	Malignant neoplasms of independent (primary) multiple sites	C97					
2b	In situ neoplasms	D00-D09	2	3	1,444	10,109	24.19
2c	Benign neoplasms	D10-D36	2	22	3,270	22,896	13.84
2d	Neoplasms of uncertain or unknown behavior	D37-D48	7	30	12,248	85,739	5.90
3	Diseases of the blood and blood-forming organs, immune mechanism	D50-D89	7	29	154,987	1,084,914	5.75
4	Endocrine, nutritional and metabolic diseases	E00-E90	4	35	90,940	636,585	8.89
5	Mental and behavioral disorders	F00-F99	7	28	154,887	1,084,215	5.74
6	Diseases of the nervous system	G00-G99	7	36	159,633	1,117,432	5.84
7	Diseases of the eye and adnexa	H00-H59	6	33	192,160	1,345,120	5.42
8	Diseases of the ear and mastoid process	H60-H95	7	14	144,423	1,010,967	5.79
9	Diseases of the circulatory system	I00-I99	10	26	102,539	717,779	4.42
10	Diseases of the respiratory system	J00-J99	7	42	282,933	1,980,536	5.00
11	Diseases of the digestive system	K00-K93	7	37	273,624	1,915,369	4.98
12	Diseases of the skin and subcutaneous tissue	L00-L99	6	39	215,263	1,506,847	5.43
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	7	14	11,114	77,802	6.31
14	Diseases of the genitourinary system	N00-N99	7	36	282,892	1,980,244	4.96
14a	Diseases of the genitourinary system: urinary system	N00-N39	4	27	82,163	575,141	8.97
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	7	30	282,888	1,980,219	4.96
15	Pregnancy, childbirth and the puerperium	O00-O99	8	16	117,277	820,945	4.18
16	Certain conditions originating in the perinatal period	P00-P96	8	18	139,970	979,796	4.35
17	Congenital malformations, deformations and chromosomal ab.	Q00-Q99	7	42	282,934	1,980,541	5.00
18	Symptoms, signs and abnormal clinical, laboratory findings, nec	R00-R99	7	36	282,933	1,980,536	5.00
	Total Releases		**7**	**49**	**287,639**	**2,013,478**	**5.01**

4.3. DTI E.M. Borger Compressor Station (Ithaca NY)

4.3a. Facility Profile

Table 4.3a.

DTI E.M. Borger Compressor Station

Ithaca NY

Facility name, short	DTI Borger CS
Facility name, full	DTI E.M. Borger Compressor Station
EIS Facility ID	8542411
DEC Region	7 -- Central New York
County	Tompkins
Town	Ithaca
Village \ Hamlet	
Address	219 Ellis Hollow Creek
Zip	14850
DEC Permit Type	Air State Facility
DEC Facility ID	7502400007
DEC Permit ID	7-5024-00007/00004
DEC Permit Effective Date	01/08/2014
Company	Dominion Transportation Inc.
Project	New Market Project
Pipeline	Dominion
Principal Supply Source	
System Configuration (Primary / Secondary) *	
Facility Status	Operational
Facility Status Dates	
Horsepower, existing	18,430 HP
Horsepower, modifications\expansion	(1) Dresser Clark DC 990 5800 HP ngfsct, (1) Dresser Clark DC 990 5800 HP ngfsct, (1) Dresser Clark DC 990 5800 HP ngfsct, (1) Solar Turbines Inc. Taurus 70-1030S HP ngfsct

Table 4.2b.

DTI E.M. Borger Compressor Station: Health Effects of Facility Releases

Ithaca NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Ch.	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	17	40	7,571	52,998	0.55
2a	Malignant neoplasms	C00-C97	17	37	6,881	48,166	0.51
2a.1	Lip, oral cavity and pharynx	C00-C14	18	12	189	1,322	0.09
2a.2	Digestive organs	C15-C26	18	21	198	1,389	0.10
2a.3	Respiratory system and intrathoracic organs	C30-C39	17	29	6,875	48,128	0.51
2a.4	Bone and articular cartilage	C40-C41	16	27	6,195	43,362	0.49
2a.5	Skin	C43-C44	13	10	2	16	0.06
2a.6	Connective and soft tissue	C45-C49	13	12	30	211	0.77
2a.07	Breast and female genital organs	C50-C58	18	14	3,040	21,283	0.49
2a.07.50	Female breast	C50	18	12	2,361	16,525	0.44
2a.07.55	Uterus	C55	11	3	0	1	0.01
2a.07.56	Ovary	C56	13	3	2	16	0.06
2a.08	Male genital organs	C60-C63	18	7	153	1,070	0.08
2a.09	Urinary organs	C64-C68	18	15	175	1,227	0.09
2a.10	Eye, brain and central nervous system	C69-C72	18	12	191	1,338	0.09
2a.11	Endocrine glands and related structures	C73-C75	18	6	142	997	0.07
2a.12	Secondary and ill-defined	C76-C80	13	6	43	300	0.90
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	18	19	3,079	21,553	0.49
2a.14	Neoplasms of independent (primary) multiple sites	C97	0	0	0	0	0.00
2b	In situ neoplasms	D00-D09	13	2	27	188	0.45
2c	Benign neoplasms	D10-D36	13	15	27	187	0.11
2d	Neoplasms of uncertain or unknown behavior	D37-D48	18	26	186	1,305	0.09
3	Diseases of the blood, blood-forming organs¸ immune mechanism	D50-D89	17	22	21,652	151,564	0.80
4	Endocrine, nutritional and metabolic diseases	E00-E90	17	36	5,354	37,476	0.52
5	Mental and behavioral disorders	F00-F99	17	20	21,652	151,563	0.80
6	Diseases of the nervous system	G00-G99	17	24	22,343	156,404	0.82
7	Diseases of the eye and adnexa	H00-H59	11	25	90,898	636,288	2.56
8	Diseases of the ear and mastoid process	H60-H95	16	12	21,502	150,516	0.86
9	Diseases of the circulatory system	I00-I99	16	19	20,045	140,315	0.86
10	Diseases of the respiratory system	J00-J99	14	33	110,772	775,401	1.96
11	Diseases of the digestive system	K00-K93	14	29	110,016	770,114	2.00
12	Diseases of the skin and subcutaneous tissue	L00-L99	11	33	93,789	656,521	2.37
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	18	12	798	5,584	0.45
14	Diseases of the genitourinary system	N00-N99	14	26	110,760	775,319	1.94
14a	Diseases of the genitourinary system: urinary system	N00-N39	16	18	3,987	27,909	0.44
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	14	23	110,758	775,306	1.94
15	Pregnancy, childbirth and the puerperium	O00-O99	10	11	86,398	604,785	3.08
16	Certain conditions originating in the perinatal period	P00-P96	10	16	89,289	625,024	2.78
17	Congenital malformations, deformations, chromosomal abnormalities	Q00-Q99	14	41	110,770	775,390	1.96
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	14	28	110,772	775,401	1.96
	Total Releases		**14**	**47**	**111,451**	**780,159**	**1.94**

4.4. DTI Utica Station (Frankfurt NY)

4.4a. Facility Profile

Table 4.4a.

DTI Utica Station

Frankfurt NY

Facility name, short	DTI Utica Station
Facility name, full	DTI Utica Station
EIS Facility ID	8035211
DEC Region	6 -- Western Adirondacks/Eastern Lake Ontario
County	Herkimer
Town	Frankfort
Village \ Hamlet	
Address	1103 Higby Rd
Zip	13340
DEC Permit Type	Air Title V Facility
DEC Facility ID	6212600037
DEC Permit ID	6-2126-00037/00025
DEC Permit Effective Date	5/25/2016
DEC Permit Description	Application for renewal of Air Title V Facility.
DEC Permit Review Report	
Company	Dominion Transmission Inc.
Project	New Market Project
Pipeline	Dominion
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	5,550
	(5) 1,100 hp Cooper Bessemer GMVC-6 compressor units

Table 4.2b.

DTI Utica Station: Health Effects of Facility Releases

Frankfurt NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Ch.	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	15	51	12,696	88,873	0.93
2a	Malignant neoplasms	C00-C97	15	48	12,660	88,622	0.94
2a.1	Lip, oral cavity and pharynx	C00-C14	15	13	2,295	16,063	1.12
2a.2	Digestive organs	C15-C26	15	30	2,356	16,491	1.13
2a.3	Respiratory system and intrathoracic organs	C30-C39	15	34	12,589	88,120	0.94
2a.4	Bone and articular cartilage	C40-C41	15	31	11,862	83,035	0.95
2a.5	Skin	C43-C44	6	13	95	665	2.49
2a.6	Connective and soft tissue	C45-C49	11	14	61	427	1.56
2a.07	Breast and female genital organs	C50-C58	16	19	4,537	31,755	0.73
2a.07.50	Female breast	C50	16	17	4,098	28,687	0.76
2a.07.55	Uterus	C55	6	3	27	189	3.86
2a.07.56	Ovary	C56	6	3	94	660	2.53
2a.08	Male genital organs	C60-C63	15	11	1,947	13,631	0.97
2a.09	Urinary organs	C64-C68	15	22	2,324	16,269	1.13
2a.10	Eye, brain and central nervous system	C69-C72	15	18	2,367	16,568	1.13
2a.11	Endocrine glands and related structures	C73-C75	15	9	2,003	14,019	0.99
2a.12	Secondary and ill-defined	C76-C80	12	6	44	306	0.92
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	16	27	4,637	32,462	0.74
2a.14	Independent (primary) multiple sites	C97	0	0	0	0	0
2b	In situ neoplasms	D00-D09	7	3	100	702	1.68
2c	Benign neoplasms	D10-D36	9	20	669	4,682	2.83
2d	Neoplasms of uncertain or unknown behavior	D37-D48	15	35	2,347	16,430	1.13
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	16	31	22,270	155,891	0.83
4	Endocrine, nutritional and metabolic diseases	E00-E90	15	45	10,601	74,209	1.04
5	Mental and behavioral disorders	F00-F99	16	30	22,243	155,702	0.83
6	Diseases of the nervous system	G00-G99	16	35	22,575	158,022	0.83
7	Diseases of the eye and adnexa	H00-H59	17	34	25,770	180,386	0.73
8	Diseases of the ear and mastoid process	H60-H95	17	15	20,007	140,049	0.80
9	Diseases of the circulatory system	I00-I99	17	26	16,299	114,095	0.70
10	Diseases of the respiratory system	J00-J99	17	43	39,738	278,165	0.70
11	Diseases of the digestive system	K00-K93	17	40	38,557	269,901	0.70
12	Diseases of the skin and subcutaneous tissue	L00-L99	17	44	28,034	196,235	0.71
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	16	15	1,140	7,977	0.65
14	Diseases of the genitourinary system	N00-N99	17	37	39,872	279,102	0.70
14a	Diseases of the genitourinary system: urinary system	N00-N39	15	28	10,060	70,421	1.10
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	17	31	39,864	279,049	0.70
15	Pregnancy, childbirth and the puerperium	O00-O99	18	16	17,827	124,788	0.64
16	Certain conditions originating in the perinatal period	P00-P96	18	20	19,886	139,202	0.62
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	17	52	39,732	278,121	0.70
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	17	38	39,738	278,165	0.70
	Total Releases		**17**	**59**	**40,196**	**281,369**	**0.70**

4.5. DTI Woodhull Station (Woodhull NY)

4.5a. Facility Profile

Table 4.5a.

DTI Woodhull Station

Woodhull NY

Facility name, short	DTI Woodhull Station
Facility name, full	DTI Woodhull Station
EIS Facility ID	8437611
DEC Region	8
County	Steuben
Town	Woodhull
Village \ Hamlet	
Address	974 Co Rte 99
Zip	14898
DEC Permit Type	Air Title V Facility
DEC Facility ID	468200006
DEC Permit ID	8-4682-00006/00034
DEC Permit Effective Date	7/10/2014
DEC Permit Description	Title V Facility Permit renewal
DEC Permit Review Report	
Company	Dominion Transmission Inc.
Project	New Market Project
Pipeline	Dominion
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	14,700 HP
	(5) 2,000 HP reciprocating ngfce (2) 1,800 HP reciprocating ngfce (1) 1,100 HP reciprocating ngfce

Table 4.2b.

DTI Woodhull Station: Health Effects of Facility Releases

Woodhull NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Ch.	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	11	53	47,086	329,602	3.44
2a	Malignant neoplasms	C00-C97	11	50	47,013	329,091	3.50
2a.1	Lip, oral cavity and pharynx	C00-C14	9	13	9,688	67,813	4.71
2a.2	Digestive organs	C15-C26	9	32	10,400	72,801	4.98
2a.3	Respiratory system and intrathoracic organs	C30-C39	11	35	46,203	323,418	3.45
2a.4	Bone and articular cartilage	C40-C41	11	32	43,265	302,854	3.45
2a.5	Skin	C43-C44	3	13	412	2,883	10.80
2a.6	Connective and soft tissue	C45-C49	5	15	276	1,929	7.06
2a.07	Breast and female genital organs	C50-C58	10	20	18,612	130,284	3.00
2a.07.50	Female breast	C50	10	18	16,924	118,465	3.12
2a.07.55	Uterus	C55	2	3	119	835	17.06
2a.07.56	Ovary	C56	3	3	402	2,811	10.78
2a.08	Male genital organs	C60-C63	10	11	8,216	57,511	4.11
2a.09	Urinary organs	C64-C68	9	23	9,842	68,892	4.78
2a.10	Eye, brain and central nervous system	C69-C72	9	18	10,419	72,931	4.99
2a.11	Endocrine glands and related structures	C73-C75	10	10	8,441	59,084	4.19
2a.12	Secondary and ill-defined	C76-C80	5	6	201	1,404	4.22
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	10	28	19,186	134,302	3.06
2a.14	Independent (primary) multiple sites	C97	0	0	0	0	0
2b	In situ neoplasms	D00-D09	4	3	431	3,015	7.22
2c	Benign neoplasms	D10-D36	3	22	3,270	22,892	13.84
2d	Neoplasms of uncertain or unknown behavior	D37-D48	9	36	10,353	72,472	4.98
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	12	32	86,683	606,778	3.21
4	Endocrine, nutritional and metabolic diseases	E00-E90	11	46	38,601	270,204	3.77
5	Mental and behavioral disorders	F00-F99	12	31	86,571	605,996	3.21
6	Diseases of the nervous system	G00-G99	12	37	87,890	615,229	3.22
7	Diseases of the eye and adnexa	H00-H59	14	36	59,457	416,201	1.68
8	Diseases of the ear and mastoid process	H60-H95	12	15	77,004	539,026	3.09
9	Diseases of the circulatory system	I00-I99	12	27	67,558	472,907	2.91
10	Diseases of the respiratory system	J00-J99	13	45	116,642	816,492	2.06
11	Diseases of the digestive system	K00-K93	13	42	111,868	783,072	2.04
12	Diseases of the skin and subcutaneous tissue	L00-L99	14	46	68,499	479,496	1.73
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	10	16	5,165	36,154	2.93
14	Diseases of the genitourinary system	N00-N99	13	39	117,138	819,966	2.05
14a	Diseases of the genitourinary system: urinary system	N00-N39	8	30	36,570	255,987	3.99
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	13	33	117,052	819,363	2.05
15	Pregnancy, childbirth and the puerperium	O00-O99	16	16	31,911	223,376	1.14
16	Certain conditions originating in the perinatal period	P00-P96	15	20	40,063	280,440	1.25
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	13	54	116,594	816,160	2.06
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	13	40	116,642	816,492	2.06
	Total Releases		**13**	**61**	**118,460**	**829,223**	**2.06**

4.6. NFGSC Beech Hill Compressor Station (Willing NY)

4.6a. Facility Profile

Table 4.6a.

NFGSC Beech Hill Compressor Station

Willing NY

Facility name, short	NFGSC Beech Hill CS
Facility name, full	NFGSC Beech Hill Compressor Station
EIS Facility ID	8377711
DEC Region	9
County	Allegany
Town	Willing
Village \ Hamlet	
Address	1161 Peet Rd
Zip	14895
DEC Permit Type	Air Title V Facility
DEC Facility ID	9027400004
DEC Permit ID	9-0274-00004/00015
DEC Permit Effective Date	4/8/2013
DEC Permit Description	
DEC Permit Review Report	
Company	National Fuel Gas Supply Corp.
Project	Part of the Niagara Expansion Project and the Northern Access 2015 Project which are joint projects undertaken by National Fuel Gas Supply Corporation and Tennessee Gas Pipeline Company.
Pipeline	Empire (AKA "National Fuel")
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	8,350 HP
	(2) 2,750 HP reciprocating ngfce (1) 2,850 HP reciprocating ngfce
Total estimated releases (2008-2014): pounds	
Total estimated releases (2008-2014): rank	

Table 4.6b.

NFGSC Beech Hill Compressor Station: Health Effects of Facility Releases

Willing NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Ch.	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	13	19	37,053	259,370	2.71
2a	Malignant neoplasms	C00-C97	13	18	36,733	257,128	2.74
2a.1	Lip, oral cavity and pharynx	C00-C14	11	7	7,182	50,270	3.49
2a.2	Digestive organs	C15-C26	11	13	7,184	50,287	3.44
2a.3	Respiratory system and intrathoracic organs	C30-C39	13	15	36,636	256,453	2.74
2a.4	Bone and articular cartilage	C40-C41	13	13	34,633	242,427	2.77
2a.5	Skin	C43-C44	14	2	1	7	0.03
2a.6	Connective and soft tissue	C45-C49	15	4	12	80	0.30
2a.07	Breast and female genital organs	C50-C58	11	9	17,440	122,076	2.82
2a.07.50	Female breast	C50	12	8	15,436	108,053	2.85
2a.07.55	Uterus	C55	12	1	0	0	0.00
2a.07.56	Ovary	C56	14	2	1	7	0.03
2a.08	Male genital organs	C60-C63	11	4	7,072	49,504	3.54
2a.09	Urinary organs	C64-C68	11	8	7,081	49,564	3.44
2a.10	Eye, brain and central nervous system	C69-C72	11	10	7,086	49,599	3.39
2a.11	Endocrine glands and related structures	C73-C75	11	4	7,068	49,476	3.51
2a.12	Secondary and ill-defined	C76-C80	15	3	17	115	0.35
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	12	13	17,550	122,849	2.80
2a.14	Independent (primary) multiple sites	C97	0	0	0	0	0
2b	In situ neoplasms	D00-D09	14	2	10	72	0.17
2c	Benign neoplasms	D10-D36	16	9	9	64	0.04
2d	Neoplasms of uncertain or unknown behavior	D37-D48	11	12	7,179	50,255	3.46
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	9	15	140,703	984,922	5.22
4	Endocrine, nutritional and metabolic diseases	E00-E90	13	15	28,685	200,796	2.80
5	Mental and behavioral disorders	F00-F99	9	14	140,703	984,921	5.22
6	Diseases of the nervous system	G00-G99	9	17	141,024	987,167	5.16
7	Diseases of the eye and adnexa	H00-H59	13	17	73,519	514,635	2.07
8	Diseases of the ear and mastoid process	H60-H95	9	9	133,537	934,758	5.35
9	Diseases of the circulatory system	I00-I99	8	13	129,878	909,148	5.59
10	Diseases of the respiratory system	J00-J99	10	20	196,224	1,373,569	3.46
11	Diseases of the digestive system	K00-K93	10	18	192,242	1,345,694	3.50
12	Diseases of the skin and subcutaneous tissue	L00-L99	13	20	83,888	587,215	2.12
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	11	10	4,093	28,650	2.32
14	Diseases of the genitourinary system	N00-N99	10	19	197,907	1,385,347	3.47
14a	Diseases of the genitourinary system: urinary system	N00-N39	13	13	26,363	184,538	2.88
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	10	17	197,810	1,384,673	3.47
15	Pregnancy, childbirth and the puerperium	O00-O99	12	9	53,918	377,422	1.92
16	Certain conditions originating in the perinatal period	P00-P96	12	10	64,287	450,005	2.00
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	10	19	196,128	1,372,896	3.46
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	10	20	196,224	1,373,569	3.46
	Total Releases		**10**	**21**	**198,227**	**1,387,592**	**3.45**

4.7. NFGSC Concord Compressor Station (Concord NY)

4.7a. Facility Profile

Table 4.7a.

NFGSC Concord Compressor Station

Concord NY

Facility name, short	NFGSC Concord Compressor Station
Facility name, full	NFGSC Concord CS
EIS Facility ID	8503411
DEC Region	9
County	Erie
Town	Concord
Village \ Hamlet	Springville
Address	5510 Genesse Rd
Zip	14141
DEC Permit Type	Air Title V Facility
DEC Facility ID	9143800044
DEC Permit ID	9-1438-00044/00014
DEC Permit Effective Date	3/31/2015
DEC Permit Description	
DEC Permit Review Report	
Company	National Fuel Gas Supply Corp.
Project	Part of the Niagara Expansion Project and the Northern Access 2015 Project which are joint projects undertaken by National Fuel Gas Supply Corporation and Tennessee Gas Pipeline Company.
Pipeline	Empire (AKA "National Fuel")
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	
Horsepower, existing	
Total estimated releases (2008-2014): pounds	
Total estimated releases (2008-2014): rank	

Table 4.7b.

NFGSC Concord Compressor Station: Health Effects of Facility Releases

Concord NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Ch.	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	8	10	58,379	408,650	4.26
2a	Malignant neoplasms	C00-C97	8	9	58,216	407,511	4.34
2a.1	Lip, oral cavity and pharynx	C00-C14	5	3	18,010	126,066	8.75
2a.2	Digestive organs	C15-C26	5	5	18,010	126,067	8.62
2a.3	Respiratory system and intrathoracic organs	C30-C39	8	7	58,212	407,482	4.35
2a.4	Bone and articular cartilage	C40-C41	9	6	54,199	379,392	4.33
2a.5	Skin	C43-C44	--	--	0	0	0.00
2a.6	Connective and soft tissue	C45-C49	14	2	16	113	0.41
2a.07	Breast and female genital organs	C50-C58	6	5	39,853	278,969	6.43
2a.07.50	Female breast	C50	6	4	35,840	250,878	6.61
2a.07.55	Uterus	C55	--	--	0	0	0.00
2a.07.56	Ovary	C56	--	--	0	0	0.00
2a.08	Male genital organs	C60-C63	2	1	26,984	188,888	13.49
2a.09	Urinary organs	C64-C68	5	4	18,006	126,039	8.75
2a.10	Eye, brain and central nervous system	C69-C72	5	4	18,006	126,039	8.62
2a.11	Endocrine glands and related structures	C73-C75	2	2	27,008	189,058	13.40
2a.12	Secondary and ill-defined	C76-C80	14	1	24	170	0.51
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	6	6	39,857	278,996	6.36
2a.14	Independent (primary) multiple sites	C97	--	--	0	0	0.00
2b	In situ neoplasms	D00-D09	--	--	0	0	0.00
2c	Benign neoplasms	D10-D36	14	2	16	113	0.07
2d	Neoplasms of uncertain or unknown behavior	D37-D48	5	5	18,010	126,067	8.67
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	10	7	133,625	935,371	4.96
4	Endocrine, nutritional and metabolic diseases	E00-E90	10	7	40,512	283,584	3.96
5	Mental and behavioral disorders	F00-F99	10	7	133,625	935,371	4.96
6	Diseases of the nervous system	G00-G99	10	8	133,787	936,510	4.90
7	Diseases of the eye and adnexa	H00-H59	9	8	128,461	899,225	3.62
8	Diseases of the ear and mastoid process	H60-H95	10	4	115,615	809,305	4.63
9	Diseases of the circulatory system	I00-I99	7	8	133,132	931,923	5.73
10	Diseases of the respiratory system	J00-J99	8	11	243,583	1,705,081	4.30
11	Diseases of the digestive system	K00-K93	8	10	234,664	1,642,645	4.27
12	Diseases of the skin and subcutaneous tissue	L00-L99	9	11	150,324	1,052,268	3.79
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	8	4	8,924	62,464	5.07
14	Diseases of the genitourinary system	N00-N99	8	11	247,433	1,732,031	4.34
14a	Diseases of the genitourinary system: urinary system	N00-N39	9	6	36,353	254,468	3.97
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	8	10	247,429	1,732,003	4.34
15	Pregnancy, childbirth and the puerperium	O00-O99	9	4	109,935	769,543	3.92
16	Certain conditions originating in the perinatal period	P00-P96	9	7	131,814	922,698	4.10
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	8	10	243,579	1,705,053	4.30
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	8	11	243,583	1,705,081	4.30
	Total Releases		**8**	**12**	**247,596**	**1,733,171**	**4.31**

4.8. NFGSC Independence Compressor Station (Andover NY)

4.8a. Facility Profile

Table 4.8a.

NFGSC Independence Compressor Station

Andover NY

Facility name, short	NFGSC Independence Compressor Station
Facility name, full	NFGSC Independence CS
EIS Facility ID	8377611
DEC Region	9
County	Allegany
Town	Andover
Village \ Hamlet	
Address	2210 County Road 22
Zip	14806
DEC Permit Type	Air Title V Facility
DEC Facility ID	9026000009
DEC Permit ID	9-0260-00009/00016
DEC Permit Effective Date	4/9/2013
DEC Permit Description	
DEC Permit Review Report	
Company	National Fuel Gas Supply Corp.
Project	Part of the Niagara Expansion Project and the Northern Access 2015 Project which are joint projects undertaken by National Fuel Gas Supply Corporation and Tennessee Gas Pipeline Company.
Pipeline	Empire (AKA "National Fuel")
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	5,000
	(2) 1,000 HP reciprocating ngfce (2) 1,500 HP reciprocating ngfce
Total estimated releases (2008-2014): pounds	
Total estimated releases (2008-2014): rank	

Table 4.8b.

NFGSC Independence Compressor Station: Facility Releases by Health Effects (2008-2014)

Andover NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Chapter	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	10	15	56,144	393,010	4.10
2a	Malignant neoplasms	C00-C97	10	14	56,041	392,290	4.17
2a.1	Lip, oral cavity and pharynx	C00-C14	10	7	9,210	64,473	4.48
2a.2	Digestive organs	C15-C26	10	10	9,211	64,477	4.41
2a.3	Respiratory system and intrathoracic organs	C30-C39	10	11	55,997	391,984	4.19
2a.4	Bone and articular cartilage	C40-C41	8	10	55,385	387,695	4.42
2a.5	Skin	C43-C44	17	1	0	1	0.00
2a.6	Connective and soft tissue	C45-C49	16	3	4	30	0.11
2a.07	Breast and female genital organs	C50-C58	13	6	12,417	86,924	2.00
2a.07.50	Female breast	C50	13	5	11,805	82,636	2.18
2a.07.55	Uterus	C55	--	--	0	0	0.00
2a.07.56	Ovary	C56	17	1	0	1	0.00
2a.08	Male genital organs	C60-C63	9	3	9,162	64,140	4.58
2a.09	Urinary organs	C64-C68	10	7	9,167	64,173	4.45
2a.10	Eye, brain and central nervous system	C69-C72	10	9	9,168	64,176	4.39
2a.11	Endocrine glands and related structures	C73-C75	9	3	9,166	64,168	4.55
2a.12	Secondary and ill-defined	C76-C80	16	4	4	32	0.10
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	13	9	12,460	87,225	1.99
2a.14	Independent (primary) multiple sites	C97	--	--	0	0	0.00
2b	In situ neoplasms	D00-D09	15	2	.4	3	0.01
2c	Benign neoplasms	D10-D36	17	5	4	33	0.02
2d	Neoplasms of uncertain or unknown behavior	D37-D48	10	9	9,211	64,477	4.43
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	8	12	147,748	1,034,238	5.48
4	Endocrine, nutritional and metabolic diseases	E00-E90	7	12	53,498	374,487	5.23
5	Mental and behavioral disorders	F00-F99	8	12	147,748	1,034,238	5.48
6	Diseases of the nervous system	G00-G99	8	13	147,851	1,034,958	5.41
7	Diseases of the eye and adnexa	H00-H59	10	13	95,202	666,418	2.68
8	Diseases of the ear and mastoid process	H60-H95	8	9	138,538	969,769	5.55
9	Diseases of the circulatory system	I00-I99	9	10	106,814	747,699	4.60
10	Diseases of the respiratory system	J00-J99	11	16	192,806	1,349,642	3.40
11	Diseases of the digestive system	K00-K93	11	15	191,487	1,340,411	3.48
12	Diseases of the skin and subcutaneous tissue	L00-L99	10	16	98,457	689,200	2.48
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	15	8	1,362	9,540	0.77
14	Diseases of the genitourinary system	N00-N99	11	16	193,315	1,353,211	3.39
14a	Diseases of the genitourinary system: urinary system	N00-N39	7	10	52,786	369,507	5.76
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	11	15	193,272	1,352,909	3.39
15	Pregnancy, childbirth and the puerperium	O00-O99	13	6	51,476	360,333	1.84
16	Certain conditions originating in the perinatal period	P00-P96	13	10	54,734	383,143	1.70
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	11	15	192,762	1,349,340	3.40
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	11	16	192,806	1,349,642	3.40
	Total Releases		**11**	**17**	**193,418**	**1,353,931**	**3.37**

4.9. NFGSC Nashville Compressor Station (Hanover NY)

4.9a. Facility Profile

Table 4.9a.

NFGSC Nashville Compressor Station

Hanover NY

Facility name, short	NFGSC Nashville Compressor Station
Facility name, full	NFGSC Nashville CS
EIS Facility ID	7806511
DEC Region	9
County	Chautauqua
Town	Hanover
Village \ Hamlet	Forestville
Address	11413 Allegany Rd
Zip	14062
DEC Permit Type	Air State Facility
DEC Facility ID	9064600048
DEC Permit ID	9-0646-00048/00019
DEC Permit Effective Date	7/25/2014
DEC Permit Description	Permit modification was made to correct two administrative errors
DEC Permit Review Report	
Company	National Fuel Gas Supply Corp.
Project	Part of the Niagara Expansion Project and the Northern Access 2015 Project which are joint projects undertaken by National Fuel Gas Supply Corporation and Tennessee Gas Pipeline Company.
Pipeline	Empire (AKA "National Fuel")
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	1,028 HP
	(2) 660HP, (1) 225 HP, (1) 203 HP
Total estimated releases (2008-2014): pounds	
Total estimated releases (2008-2014): rank	

Table 4.9b.

NFGSC Nashville Compressor Station: Facility Releases by Health Effects (2008-2014)

Hanover NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Chapter	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	14	31	19,663	137,639	1.44
2a	Malignant neoplasms	C00-C97	14	28	19,592	137,144	1.46
2a.1	Lip, oral cavity and pharynx	C00-C14	14	7	4,274	29,915	2.08
2a.2	Digestive organs	C15-C26	14	16	4,285	29,993	2.05
2a.3	Respiratory system and intrathoracic organs	C30-C39	14	21	19,553	136,871	1.46
2a.4	Bone and articular cartilage	C40-C41	14	20	19,171	134,194	1.53
2a.5	Skin	C43-C44	15	7	0	0	0.00
2a.6	Connective and soft tissue	C45-C49	17	10	2	15	0.06
2a.07	Breast and female genital organs	C50-C58	14	9	6,339	44,374	1.02
2a.07.50	Female breast	C50	14	7	5,957	41,697	1.10
2a.07.55	Uterus	C55	13	2	0	0	0.00
2a.07.56	Ovary	C56	15	2	0	0	0.00
2a.08	Male genital organs	C60-C63	14	4	4,243	29,704	2.12
2a.09	Urinary organs	C64-C68	14	12	4,246	29,721	2.06
2a.10	Eye, brain and central nervous system	C69-C72	14	8	4,257	29,798	2.04
2a.11	Endocrine glands and related structures	C73-C75	13	4	4,246	29,719	2.11
2a.12	Secondary and ill-defined	C76-C80	17	3	2	15	0.05
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	14	15	6,367	44,568	1.02
2a.14	Independent (primary) multiple sites	C97	--	0	0	0	0.00
2b	In situ neoplasms	D00-D09	16	2	0	0	0.00
2c	Benign neoplasms	D10-D36	15	10	13	92	0.06
2d	Neoplasms of uncertain or unknown behavior	D37-D48	14	20	4,285	29,993	2.06
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	14	16	54,249	379,740	2.01
4	Endocrine, nutritional and metabolic diseases	E00-E90	14	29	17,947	125,632	1.75
5	Mental and behavioral disorders	F00-F99	14	16	54,249	379,740	2.01
6	Diseases of the nervous system	G00-G99	14	18	54,319	380,235	1.99
7	Diseases of the eye and adnexa	H00-H59	15	19	50,123	350,859	1.41
8	Diseases of the ear and mastoid process	H60-H95	14	10	49,975	349,825	2.00
9	Diseases of the circulatory system	I00-I99	14	16	42,750	299,248	1.84
10	Diseases of the respiratory system	J00-J99	15	27	88,588	620,115	1.56
11	Diseases of the digestive system	K00-K93	15	24	87,732	614,122	1.60
12	Diseases of the skin and subcutaneous tissue	L00-L99	15	25	52,218	365,527	1.32
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	17	9	895	6,266	0.51
14	Diseases of the genitourinary system	N00-N99	15	20	88,900	622,297	1.56
14a	Diseases of the genitourinary system: urinary system	N00-N39	14	13	17,497	122,476	1.91
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	15	17	88,872	622,101	1.56
15	Pregnancy, childbirth and the puerperium	O00-O99	15	8	36,799	257,594	1.31
16	Certain conditions originating in the perinatal period	P00-P96	16	14	38,897	272,276	1.21
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	15	32	88,560	619,919	1.56
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	15	22	88,588	620,114	1.56
	Total Releases		**15**	**38**	**88,970**	**622,791**	**1.55**

4.10. TGPC Compressor Station 224

4.10a. Facility Profile

Table 4.10a.

TGPC Compressor Station 224

Clymer NY

Facility name, short	TGPC Compressor Station 224
Facility name, full	TGPC CS 224
EIS Facility ID	7806411
DEC Region	9
County	Chautauqua
Town	Clymer
Village \ Hamlet	
Address	9766 Ravlin Hill Rd
Zip	14724
DEC Permit Type	Air Title V Facility
DEC Facility ID	9064200016
DEC Permit ID	9-0642-00016/00017
DEC Permit Effective Date	5/21/2013
DEC Permit Description	
DEC Permit Review Report	
Company	Tennessee Gas Pipeline Company
Project	Part of the Niagara Expansion Project by TGP/Kinder Morgan, which is related to National Fuel's Northern Access Project.
Pipeline	Tennessee Gas Pipeline
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	8,000 HP
	(4) 2000 HP4-cycle lean burn reciprocating ngfce
Total estimated releases (2008-2014): pounds	
Total estimated releases (2008-2014): rank	

Table 4.10b.

TGPC Compressor Station 224: Facility Releases by Health Effects (2008-2014)

Clymer NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Chapter	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	12	40	40,157	281,096	2.93
2a	Malignant neoplasms	C00-C97	12	37	39,935	279,548	2.97
2a.1	Lip, oral cavity and pharynx	C00-C14	8	8	11,094	77,661	5.39
2a.2	Digestive organs	C15-C26	8	29	11,454	80,175	5.48
2a.3	Respiratory system and intrathoracic organs	C30-C39	12	25	39,258	274,805	2.93
2a.4	Bone and articular cartilage	C40-C41	12	22	37,179	260,256	2.97
2a.5	Skin	C43-C44	5	7	141	990	3.71
2a.6	Connective and soft tissue	C45-C49	6	8	143	1,004	3.67
2a.07	Breast and female genital organs	C50-C58	12	19	17,399	121,793	2.81
2a.07.50	Female breast	C50	11	17	16,280	113,960	3.00
2a.07.55	Uterus	C55	4	3	52	365	7.44
2a.07.56	Ovary	C56	5	2	126	881	3.38
2a.08	Male genital organs	C60-C63	8	9	9,516	66,614	4.76
2a.09	Urinary organs	C64-C68	8	17	11,221	78,549	5.45
2a.10	Eye, brain and central nervous system	C69-C72	8	18	11,403	79,821	5.46
2a.11	Endocrine glands and related structures	C73-C75	8	7	9,565	66,955	4.75
2a.12	Secondary and ill-defined	C76-C80	7	3	112	787	2.36
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	11	23	17,967	125,770	2.87
2a.14	Independent (primary) multiple sites	C97	--	0	0	0	0.00
2b	In situ neoplasms	D00-D09	6	3	155	1,086	2.60
2c	Benign neoplasms	D10-D36	4	21	2,829	19,804	11.97
2d	Neoplasms of uncertain or unknown behavior	D37-D48	8	28	11,383	79,684	5.48
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	11	25	105,076	735,534	3.90
4	Endocrine, nutritional and metabolic diseases	E00-E90	12	32	34,003	238,018	3.32
5	Mental and behavioral disorders	F00-F99	11	27	105,039	735,270	3.90
6	Diseases of the nervous system	G00-G99	11	34	106,266	743,864	3.89
7	Diseases of the eye and adnexa	H00-H59	12	31	84,984	594,890	2.40
8	Diseases of the ear and mastoid process	H60-H95	11	12	93,625	655,373	3.75
9	Diseases of the circulatory system	I00-I99	11	23	88,805	621,634	3.83
10	Diseases of the respiratory system	J00-J99	12	37	162,657	1,138,602	2.87
11	Diseases of the digestive system	K00-K93	12	35	158,556	1,109,894	2.88
12	Diseases of the skin and subcutaneous tissue	L00-L99	12	35	91,319	639,232	2.30
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	12	13	3,494	24,460	1.98
14	Diseases of the genitourinary system	N00-N99	12	34	162,635	1,138,443	2.85
14a	Diseases of the genitourinary system: urinary system	N00-N39	12	26	32,594	228,156	3.56
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	12	30	162,603	1,138,223	2.85
15	Pregnancy, childbirth and the puerperium	O00-O99	11	16	63,140	441,983	2.25
16	Certain conditions originating in the perinatal period	P00-P96	11	16	68,616	480,315	2.13
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	12	42	162,655	1,138,582	2.87
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	12	34	162,642	1,138,497	2.87
	Total Releases		**12**	**47**	**163,828**	**1,146,797**	**2.85**

4.11. TGPC Compressor Station 229 & TEG Dehydration Facility (Eden NY)

4.11a. Facility Profile

Table 4.11a.

TGPC Compressor Station 229 & TEG Dehydration Facility

Eden NY

Facility name, short	TGPC Compressor Station 229 & TEG Dehydration Facility
Facility name, full	TGPC 229 & TEG DF
EIS Facility ID	8503511
DEC Region	9
County	Erie
Town	Eden
Village \ Hamlet	
Address	7586 East Eden Road
Zip	14057
DEC Permit Type	Air Title V Facility
DEC Facility ID	9143800044
DEC Permit ID	9-1440-00034/00021
DEC Permit Effective Date	7/31/2013
DEC Permit Description	
DEC Permit Review Report	
Company	Tennessee Gas Pipeline Company
Project	Part of the Niagara Expansion Project by TGP/Kinder Morgan, which is related to National Fuel's Northern Access Project.
Pipeline	Tennessee Gas Pipeline
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	9,714
Total estimated releases (2008-2014): pounds	
Total estimated releases (2008-2014): rank	

Table 4.11b.

TGPC Compressor Station 229 & TEG Dehydration: Facility Releases by Health Effects (2008-2014)

Eden NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Chapter	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	12	40	40,157	281,096	2.93
2a	Malignant neoplasms	C00-C97	12	37	39,935	279,548	2.97
2a.1	Lip, oral cavity and pharynx	C00-C14	8	8	11,094	77,661	5.39
2a.2	Digestive organs	C15-C26	8	29	11,454	80,175	5.48
2a.3	Respiratory system and intrathoracic organs	C30-C39	12	25	39,258	274,805	2.93
2a.4	Bone and articular cartilage	C40-C41	12	22	37,179	260,256	2.97
2a.5	Skin	C43-C44	5	7	141	990	3.71
2a.6	Connective and soft tissue	C45-C49	6	8	143	1,004	3.67
2a.07	Breast and female genital organs	C50-C58	12	19	17,399	121,793	2.81
2a.07.50	Female breast	C50	11	17	16,280	113,960	3.00
2a.07.55	Uterus	C55	4	3	52	365	7.44
2a.07.56	Ovary	C56	5	2	126	881	3.38
2a.08	Male genital organs	C60-C63	8	9	9,516	66,614	4.76
2a.09	Urinary organs	C64-C68	8	17	11,221	78,549	5.45
2a.10	Eye, brain and central nervous system	C69-C72	8	18	11,403	79,821	5.46
2a.11	Endocrine glands and related structures	C73-C75	8	7	9,565	66,955	4.75
2a.12	Secondary and ill-defined	C76-C80	7	3	112	787	2.36
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	11	23	17,967	125,770	2.87
2a.14	Independent (primary) multiple sites	C97					
2b	In situ neoplasms	D00-D09	6	3	155	1,086	2.60
2c	Benign neoplasms	D10-D36	4	21	2,829	19,804	11.97
2d	Neoplasms of uncertain or unknown behavior	D37-D48	8	28	11,383	79,684	5.48
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	11	25	105,076	735,534	3.90
4	Endocrine, nutritional and metabolic diseases	E00-E90	12	32	34,003	238,018	3.32
5	Mental and behavioral disorders	F00-F99	11	27	105,039	735,270	3.90
6	Diseases of the nervous system	G00-G99	11	34	106,266	743,864	3.89
7	Diseases of the eye and adnexa	H00-H59	12	31	84,984	594,890	2.40
8	Diseases of the ear and mastoid process	H60-H95	11	12	93,625	655,373	3.75
9	Diseases of the circulatory system	I00-I99	11	23	88,805	621,634	3.83
10	Diseases of the respiratory system	J00-J99	12	37	162,657	1,138,602	2.87
11	Diseases of the digestive system	K00-K93	12	35	158,556	1,109,894	2.88
12	Diseases of the skin and subcutaneous tissue	L00-L99	12	35	91,319	639,232	2.30
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	12	13	3,494	24,460	1.98
14	Diseases of the genitourinary system	N00-N99	12	34	162,635	1,138,443	2.85
14a	Diseases of the genitourinary system: urinary system	N00-N39	12	26	32,594	228,156	3.56
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	12	30	162,603	1,138,223	2.85
15	Pregnancy, childbirth and the puerperium	O00-O99	11	16	63,140	441,983	2.25
16	Certain conditions originating in the perinatal period	P00-P96	11	16	68,616	480,315	2.13
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	12	42	162,655	1,138,582	2.87
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	12	34	162,642	1,138,497	2.87
	Total Releases		12	47	163,828	1,146,797	2.85

4.12. TGPC Compressor Station 230-C (Lockport NY)

4.12a. Facility Profile

Table 4.12a.

TGPC Compressor Station 230-C

Lockport NY

Facility name, short	TGPC Compressor Station 230-C
Facility name, full	TGPC CS 230-C
EIS Facility ID	7417311
DEC Region	9
County	Niagara
Town	Lockport
Village \ Hamlet	
Address	5186 Lockport Junction Rd
Zip	14094
DEC Permit Type	Air State Facility
DEC Facility ID	9292000008
DEC Permit ID	9-2920-00008/00015
DEC Permit Effective Date	12/2/2014
DEC Permit Description	
DEC Permit Review Report	
Company	Tennessee Gas Pipeline Company
Project	Part of the Niagara Expansion Project by TGP/Kinder Morgan, which is related to National Fuel's Northern Access Project.
Pipeline	Tennessee Gas Pipeline
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	18,000
	(4) 4,500 HP Solar Centaur H compressor turbines
Total estimated releases (2008-2014): pounds	
Total estimated releases (2008-2014): rank	

Table 4.12b.

TGPC Compressor Station 230-C: Facility Releases by Health Effects

Lockport NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Chapter	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	16	23	9,972	69,806	0.73
2a	Malignant neoplasms	C00-C97	16	22	7,013	49,091	0.52
2a.1	Lip, oral cavity and pharynx	C00-C14	16	7	369	2,580	0.18
2a.2	Digestive organs	C15-C26	16	14	399	2,792	0.19
2a.3	Respiratory system and intrathoracic organs	C30-C39	16	20	7,007	49,046	0.52
2a.4	Bone and articular cartilage	C40-C41	17	18	5,958	41,706	0.48
2a.5	Skin	C43-C44	11	3	5	36	0.14
2a.6	Connective and soft tissue	C45-C49	7	8	112	783	2.86
2a.07	Breast and female genital organs	C50-C58	15	11	5,817	40,722	0.94
2a.07.50	Female breast	C50	15	10	4,771	33,396	0.88
2a.07.55	Uterus	C55	10	2	2	16	0.33
2a.07.56	Ovary	C56	11	3	6	44	0.17
2a.08	Male genital organs	C60-C63	16	5	274	1,915	0.14
2a.09	Urinary organs	C64-C68	16	12	353	2,469	0.17
2a.10	Eye, brain and central nervous system	C69-C72	16	11	375	2,626	0.18
2a.11	Endocrine glands and related structures	C73-C75	16	6	282	1,972	0.14
2a.12	Secondary and ill-defined	C76-C80	6	5	137	962	2.89
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	15	16	5,882	41,174	0.94
2a.14	Independent (primary) multiple sites	C97					
2b	In situ neoplasms	D00-D09	11	2	48	333	0.80
2c	Benign neoplasms	D10-D36	11	11	70	487	0.29
2d	Neoplasms of uncertain or unknown behavior	D37-D48	16	14	382	2,671	0.18
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	15	17	22,498	157,488	0.83
4	Endocrine, nutritional and metabolic diseases	E00-E90	16	20	5,433	38,028	0.53
5	Mental and behavioral disorders	F00-F99	15	16	22,498	157,487	0.83
6	Diseases of the nervous system	G00-G99	15	19	25,460	178,218	0.93
7	Diseases of the eye and adnexa	H00-H59	16	19	42,774	299,420	1.21
8	Diseases of the ear and mastoid process	H60-H95	15	10	22,205	155,432	0.89
9	Diseases of the circulatory system	I00-I99	15	15	25,902	181,314	1.12
10	Diseases of the respiratory system	J00-J99	16	24	68,325	478,274	1.21
11	Diseases of the digestive system	K00-K93	16	21	66,076	462,535	1.20
12	Diseases of the skin and subcutaneous tissue	L00-L99	16	22	48,326	338,285	1.22
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	13	9	2,305	16,133	1.31
14	Diseases of the genitourinary system	N00-N99	16	21	66,406	464,840	1.16
14a	Diseases of the genitourinary system: urinary system	N00-N39	17	14	1,428	9,997	0.16
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	16	20	66,405	464,837	1.16
15	Pregnancy, childbirth and the puerperium	O00-O99	14	10	38,680	270,758	1.38
16	Certain conditions originating in the perinatal period	P00-P96	14	14	44,297	310,080	1.38
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	16	24	68,322	478,255	1.21
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	16	22	68,321	478,245	1.21
	Total Releases		**16**	**27**	**69,373**	**485,610**	**1.21**

4.13. TGPC Compressor Station 233 (York NY)

4.13a. Facility Profile

Table 4.13a.

TGPC Compressor Station 233

York NY

Facility name, short	TGPC Compressor Station 233
Facility name, full	TGPC CS 233
EIS Facility ID	8471211
DEC Region	8
County	Livingston
Town	York
Village \ Hamlet	Piffard
Address	2262 Dow Rd
Zip	14533
DEC Permit Type	Air Title V Facility
DEC Facility ID	8245200008
DEC Permit ID	8-2452-00008/00007
DEC Permit Effective Date	10/28/2015
DEC Permit Description	
DEC Permit Review Report	
Company	Tennessee Gas Pipeline Company
Project	Part of the Niagara Expansion Project by TGP/Kinder Morgan, which is related to National Fuel's Northern Access Project.
Pipeline	Tennessee Gas Pipeline
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	9,000
	(2) 4,500 HP compressor engines
Total estimated releases (2008-2014): pounds	
Total estimated releases (2008-2014): rank	

Table 4.13b.

TGPC Compressor Station 233: Facility Releases by Health Effects

York NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Chapter	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	18	23	3,492	24,447	0.26
2a	Malignant neoplasms	C00-C97	18	22	3,395	23,762	0.25
2a.1	Lip, oral cavity and pharynx	C00-C14	17	7	263	1,841	0.13
2a.2	Digestive organs	C15-C26	17	14	278	1,945	0.13
2a.3	Respiratory system and intrathoracic organs	C30-C39	18	20	3,391	23,740	0.25
2a.4	Bone and articular cartilage	C40-C41	18	18	2,867	20,069	0.23
2a.5	Skin	C43-C44	12	3	4	28	0.10
2a.6	Connective and soft tissue	C45-C49	9	8	72	502	1.83
2a.07	Breast and female genital organs	C50-C58	17	11	4,455	31,182	0.72
2a.07.50	Female breast	C50	17	10	3,669	25,686	0.68
2a.07.55	Uterus	C55	18	2			0.00
2a.07.56	Ovary	C56	12	3	5	32	0.12
2a.08	Male genital organs	C60-C63	17	5	195	1,363	0.10
2a.09	Urinary organs	C64-C68	17	12	248	1,733	0.12
2a.10	Eye, brain and central nervous system	C69-C72	17	11	268	1,874	0.13
2a.11	Endocrine glands and related structures	C73-C75	17	6	189	1,320	0.09
2a.12	Secondary and ill-defined	C76-C80	8	5	94	659	1.98
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	17	16	4,510	31,567	0.72
2a.14	Independent (primary) multiple sites	C97					
2b	In situ neoplasms	D00-D09	12	2	40	283	0.68
2c	Benign neoplasms	D10-D36	12	11	45	314	0.19
2d	Neoplasms of uncertain or unknown behavior	D37-D48	17	14	263	1,843	0.13
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	18	17	6,638	46,465	0.25
4	Endocrine, nutritional and metabolic diseases	E00-E90	18	20	1,159	8,114	0.11
5	Mental and behavioral disorders	F00-F99	18	16	6,638	46,464	0.25
6	Diseases of the nervous system	G00-G99	18	19	6,737	47,158	0.25
7	Diseases of the eye and adnexa	H00-H59	18	19	23,203	162,421	0.65
8	Diseases of the ear and mastoid process	H60-H95	18	10	6,505	45,534	0.26
9	Diseases of the circulatory system	I00-I99	18	15	8,572	60,007	0.37
10	Diseases of the respiratory system	J00-J99	18	24	31,616	221,312	0.56
11	Diseases of the digestive system	K00-K93	18	21	30,446	213,124	0.55
12	Diseases of the skin and subcutaneous tissue	L00-L99	18	22	26,048	182,337	0.66
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	14	9	1,802	12,614	1.02
14	Diseases of the genitourinary system	N00-N99	18	21	32,039	224,273	0.56
14a	Diseases of the genitourinary system: urinary system	N00-N39	18	14	537	3,762	0.06
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	18	20	32,039	224,271	0.56
15	Pregnancy, childbirth and the puerperium	O00-O99	17	10	22,714	158,999	0.81
16	Certain conditions originating in the perinatal period	P00-P96	17	14	25,582	179,073	0.80
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	18	24	31,615	221,306	0.56
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	18	22	31,615	221,303	0.56
	Total Releases		18	27	32,140	224,978	0.56

2	Neoplasms	C00-D48	18	23	3,492	24,447	0.26
2a	Malignant neoplasms	C00-C97	18	22	3,395	23,762	0.25
2a.1	Lip, oral cavity and pharynx	C00-C14	17	7	263	1,841	0.13
2a.2	Digestive organs	C15-C26	17	14	278	1,945	0.13
2a.3	Respiratory system and intrathoracic organs	C30-C39	18	20	3,391	23,740	0.25
2a.4	Bone and articular cartilage	C40-C41	18	18	2,867	20,069	0.23
2a.5	Skin	C43-C44	12	3	4	28	0.10
2a.6	Connective and soft tissue	C45-C49	9	8	72	502	1.83
2a.07	Breast and female genital organs	C50-C58	17	11	4,455	31,182	0.72
2a.07.50	Female breast	C50	17	10	3,669	25,686	0.68
2a.07.55	Uterus	C55	18	2			0.00
2a.07.56	Ovary	C56	12	3	5	32	0.12
2a.08	Male genital organs	C60-C63	17	5	195	1,363	0.10
2a.09	Urinary organs	C64-C68	17	12	248	1,733	0.12
2a.10	Eye, brain and central nervous system	C69-C72	17	11	268	1,874	0.13
2a.11	Endocrine glands and related structures	C73-C75	17	6	189	1,320	0.09
2a.12	Secondary and ill-defined	C76-C80	8	5	94	659	1.98
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	17	16	4,510	31,567	0.72
2a.14	Independent (primary) multiple sites	C97					
2b	In situ neoplasms	D00-D09	12	2	40	283	0.68
2c	Benign neoplasms	D10-D36	12	11	45	314	0.19
2d	Neoplasms of uncertain or unknown behavior	D37-D48	17	14	263	1,843	0.13
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	18	17	6,638	46,465	0.25
4	Endocrine, nutritional and metabolic diseases	E00-E90	18	20	1,159	8,114	0.11
5	Mental and behavioral disorders	F00-F99	18	16	6,638	46,464	0.25
6	Diseases of the nervous system	G00-G99	18	19	6,737	47,158	0.25
7	Diseases of the eye and adnexa	H00-H59	18	19	23,203	162,421	0.65
8	Diseases of the ear and mastoid process	H60-H95	18	10	6,505	45,534	0.26
9	Diseases of the circulatory system	I00-I99	18	15	8,572	60,007	0.37
10	Diseases of the respiratory system	J00-J99	18	24	31,616	221,312	0.56
11	Diseases of the digestive system	K00-K93	18	21	30,446	213,124	0.55
12	Diseases of the skin and subcutaneous tissue	L00-L99	18	22	26,048	182,337	0.66
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	14	9	1,802	12,614	1.02
14	Diseases of the genitourinary system	N00-N99	18	21	32,039	224,273	0.56
14a	Diseases of the genitourinary system: urinary system	N00-N39	18	14	537	3,762	0.06
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	18	20	32,039	224,271	0.56
15	Pregnancy, childbirth and the puerperium	O00-O99	17	10	22,714	158,999	0.81
16	Certain conditions originating in the perinatal period	P00-P96	17	14	25,582	179,073	0.80
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	18	24	31,615	221,306	0.56
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	18	22	31,615	221,303	0.56
	Total Releases		18	27	32,140	224,978	0.56

4.14. TGPC Compressor Station 237 (Manchester, Phelps NY)

4.14a. Facility Profile

Table 4.14a.

TGPC Compressor Station 237

Manchester, Phelps NY

Facility name, short	TGPC Compressor Station 237
Facility name, full	TGPC CS 237
EIS Facility ID	7210411
DEC Region	8 -- Western Finger Lakes
County	Ontario
Town	Manchester, Phelps
Village \ Hamlet	Clifton Springs
Address	2001 Archer Road
Zip	14432
DEC Permit Type	Air Title V Facility
DEC Facility ID	323400013
DEC Permit ID	8-3234-00013/00011
DEC Permit Effective Date	6/14/2016
DEC Permit Description	Renewal of the Title V Facility Permit originally issued November 23, 1999 and previously renewed October 4, 2010.
DEC Permit Review Report	
Company	Tennessee Gas Pipeline Company
Project	Part of the Niagara Expansion Project by TGP/Kinder Morgan, which is related to National Fuel's Northern Access Project.
Pipeline	Tennessee Gas Pipeline
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	8,000
	(1) 4,000 HP reciprocating ngfce, (2) 2,000 HP reciprocating ngfce

Table 4.14b.

TGPC Compressor Station 237: Facility Releases by Health Effects

Manchester, Phelps NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Chapter	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	6	7	97,331	681,320	7.11
2a	Malignant neoplasms	C00-C97	6	6	97,146	680,023	7.24
2a.1	Lip, oral cavity and pharynx	C00-C14	6	1	16,708	116,956	8.12
2a.2	Digestive organs	C15-C26	6	2	16,709	116,964	8.00
2a.3	Respiratory system and intrathoracic organs	C30-C39	6	5	97,145	680,015	7.26
2a.4	Bone and articular cartilage	C40-C41	6	4	91,916	643,411	7.34
2a.5	Skin	C43-C44	--	0	0	0	0.00
2a.6	Connective and soft tissue	C45-C49	--	0	0	0	0.00
2a.07	Breast and female genital organs	C50-C58	5	5	42,837	299,859	6.92
2a.07.50	Female breast	C50	5	4	37,608	263,255	6.94
2a.07.55	Uterus	C55	--	0	0	0	0.00
2a.07.56	Ovary	C56	--	0	0	0	0.00
2a.08	Male genital organs	C60-C63	6	1	16,708	116,956	8.35
2a.09	Urinary organs	C64-C68	6	2	16,709	116,964	8.12
2a.10	Eye, brain and central nervous system	C69-C72	6	2	16,709	116,964	8.00
2a.11	Endocrine glands and related structures	C73-C75	6	1	16,708	116,956	8.29
2a.12	Secondary and ill-defined	C76-C80	--	0	0	0	0.00
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	5	4	42,836	299,851	6.84
2a.14	Independent (primary) multiple sites	C97	--	0	0	0	0.00
2b	In situ neoplasms	D00-D09	--	0	0	0	0.00
2c	Benign neoplasms	D10-D36	--	0	0	0	0.00
2d	Neoplasms of uncertain or unknown behavior	D37-D48	6	2	16,709	116,964	8.05
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	5	4	195,395	1,367,764	7.25
4	Endocrine, nutritional and metabolic diseases	E00-E90	6	5	76,433	535,029	7.47
5	Mental and behavioral disorders	F00-F99	5	4	195,395	1,367,764	7.25
6	Diseases of the nervous system	G00-G99	5	5	195,580	1,369,061	7.16
7	Diseases of the eye and adnexa	H00-H59	8	5	177,838	1,244,864	5.01
8	Diseases of the ear and mastoid process	H60-H95	5	3	178,687	1,250,808	7.16
9	Diseases of the circulatory system	I00-I99	5	5	161,984	1,133,891	6.98
10	Diseases of the respiratory system	J00-J99	6	8	323,113	2,261,791	5.70
11	Diseases of the digestive system	K00-K93	6	7	313,810	2,196,672	5.71
12	Diseases of the skin and subcutaneous tissue	L00-L99	8	8	203,966	1,427,759	5.15
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	5	2	13,956	97,690	7.92
14	Diseases of the genitourinary system	N00-N99	6	8	328,157	2,297,097	5.75
14a	Diseases of the genitourinary system: urinary system	N00-N39	6	3	71,018	497,128	7.75
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	6	8	328,157	2,297,097	5.75
15	Pregnancy, childbirth and the puerperium	O00-O99	7	3	123,343	863,403	4.40
16	Certain conditions originating in the perinatal period	P00-P96	7	5	149,470	1,046,290	4.65
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	6	8	323,113	2,261,791	5.71
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	6	8	323,113	2,261,791	5.70
	Total Releases		**6**	**9**	**328,342**	**2,298,394**	**5.72**

4.15. TGPC Compressor Station 241 (LaFayette NY)

4.15a. Facility Profile

Table 4.15a.

TGPC Compressor Station 241

LaFayette NY

Facility name, short	TGPC Compressor Station 241
Facility name, full	TGPC CS 241
EIS Facility ID	7436111
DEC Region	7 -- Central New York
County	Onondaga
Town	LaFayette
Village \ Hamlet	
Address	3447 Sentinel Heights Rd
Zip	13084
DEC Permit Type	Air Title V Facility
DEC Facility ID	7313400022
DEC Permit ID	7-3134-00022/00011
DEC Permit Effective Date	1/23/2012
DEC Permit Description	Title V Renewal and a modification to revise to the condition requiring that TGP comply with 6 NYCRR Part 212.
DEC Permit Review Report	
Company	Tennessee Gas Pipeline Company
Project	Part of the Niagara Expansion Project by TGP/Kinder Morgan, which is related to National Fuel's Northern Access Project.
Pipeline	Tennessee Gas Pipeline
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	6,800 HP

Table 4.15b.

TGPC Compressor Station 241: Facility Releases by Health Effects

LaFayette NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Chapter	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	3	40	162,854	1,139,976	11.89
2a	Malignant neoplasms	C00-C97	3	37	159,625	1,117,378	11.89
2a.1	Lip, oral cavity and pharynx	C00-C14	2	8	26,645	186,512	12.95
2a.2	Digestive organs	C15-C26	2	29	26,850	187,951	12.85
2a.3	Respiratory system and intrathoracic organs	C30-C39	3	25	159,204	1,114,430	11.90
2a.4	Bone and articular cartilage	C40-C41	3	22	149,626	1,047,383	11.95
2a.5	Skin	C43-C44	7	7	86	602	2.26
2a.6	Connective and soft tissue	C45-C49	8	7	85	595	2.18
2a.07	Breast and female genital organs	C50-C58	4	19	72,893	510,251	11.77
2a.07.50	Female breast	C50	4	17	63,931	447,517	11.80
2a.07.55	Uterus	C55	5	3	32	222	4.54
2a.07.56	Ovary	C56	7	2	82	572	2.19
2a.08	Male genital organs	C60-C63	3	10	25,626	179,381	12.81
2a.09	Urinary organs	C64-C68	2	17	26,713	186,990	12.98
2a.10	Eye, brain and central nervous system	C69-C72	2	17	26,839	187,876	12.85
2a.11	Endocrine glands and related structures	C73-C75	3	7	25,649	179,540	12.72
2a.12	Secondary and ill-defined	C76-C80	9	3	72	507	1.52
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	4	22	73,255	512,783	11.69
2a.14	Independent (primary) multiple sites	C97	--	0	0	0	0.00
2b	In situ neoplasms	D00-D09	8	3	99	690	1.65
2c	Benign neoplasms	D10-D36	5	20	1,801	12,605	7.62
2d	Neoplasms of uncertain or unknown behavior	D37-D48	2	27	26,809	187,665	12.91
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	3	24	278,616	1,950,313	10.33
4	Endocrine, nutritional and metabolic diseases	E00-E90	3	32	124,938	874,563	12.22
5	Mental and behavioral disorders	F00-F99	3	26	278,597	1,950,179	10.33
6	Diseases of the nervous system	G00-G99	3	33	282,459	1,977,210	10.34
7	Diseases of the eye and adnexa	H00-H59	4	30	222,020	1,554,140	6.26
8	Diseases of the ear and mastoid process	H60-H95	3	11	251,763	1,762,343	10.09
9	Diseases of the circulatory system	I00-I99	3	22	229,876	1,609,133	9.90
10	Diseases of the respiratory system	J00-J99	4	37	425,243	2,976,701	7.51
11	Diseases of the digestive system	K00-K93	4	34	406,862	2,848,035	7.40
12	Diseases of the skin and subcutaneous tissue	L00-L99	4	34	268,300	1,878,097	6.77
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	4	12	17,983	125,878	10.21
14	Diseases of the genitourinary system	N00-N99	4	33	430,379	3,012,652	7.54
14a	Diseases of the genitourinary system: urinary system	N00-N39	3	25	112,696	788,872	12.30
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	4	29	430,367	3,012,569	7.54
15	Pregnancy, childbirth and the puerperium	O00-O99	6	15	132,651	928,556	4.73
16	Certain conditions originating in the perinatal period	P00-P96	6	15	178,380	1,248,662	5.55
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	4	41	425,236	2,976,652	7.51
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	4	33	425,231	2,976,619	7.51
	Total Releases		**4**	**48**	**434,237**	**3,039,661**	**7.56**

4.16. TGPC Compressor Station 245 (Winfield NY)

4.16a. Facility Profile

Table 4.16a.

TGPC Compressor Station 245

Winfield NY

Facility name, short	TGPC Compressor Station 245
Facility name, full	TGPC CS 245
EIS Facility ID	8035411
DEC Region	6 -- Western Adirondacks / Eastern Lake Ontario
County	Herkimer
Town	Winfield
Village \ Hamlet	West Winfield
Address	457 Burrows Rd
Zip	13491
DEC Permit Type	Air Title V Facility
DEC Facility ID	6215600018
DEC Permit ID	6-2156-00018/00021
DEC Permit Effective Date	4/1/2015
DEC Permit Description	
DEC Permit Review Report	
Company	Tennessee Gas Pipeline Company
Project	Part of the Niagara Expansion Project by TGP/Kinder Morgan, which is related to National Fuel's Northern Access Project.
Pipeline	Tennessee Gas Pipeline
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	7,000
	(5) 1,400 hp Worthington UTC-165, 2-Stroke Lean Burn(2SLB) compressor engine
Total estimated releases (2008-2014): pounds	
Total estimated releases (2008-2014): rank	

Table 4.16b.

TGPC Compressor Station 245: Facility Releases by Health Effects

Winfield NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Chapter	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	3	40	162,854	1,139,976	11.89
2a	Malignant neoplasms	C00-C97	3	37	159,625	1,117,378	11.89
2a.1	Lip, oral cavity and pharynx	C00-C14	2	8	26,645	186,512	12.95
2a.2	Digestive organs	C15-C26	2	29	26,850	187,951	12.85
2a.3	Respiratory system and intrathoracic organs	C30-C39	3	25	159,204	1,114,430	11.90
2a.4	Bone and articular cartilage	C40-C41	3	22	149,626	1,047,383	11.95
2a.5	Skin	C43-C44	7	7	86	602	2.26
2a.6	Connective and soft tissue	C45-C49	8	7	85	595	2.18
2a.07	Breast and female genital organs	C50-C58	4	19	72,893	510,251	11.77
2a.07.50	Female breast	C50	4	17	63,931	447,517	11.80
2a.07.55	Uterus	C55	5	3	32	222	4.54
2a.07.56	Ovary	C56	7	2	82	572	2.19
2a.08	Male genital organs	C60-C63	3	10	25,626	179,381	12.81
2a.09	Urinary organs	C64-C68	2	17	26,713	186,990	12.98
2a.10	Eye, brain and central nervous system	C69-C72	2	17	26,839	187,876	12.85
2a.11	Endocrine glands and related structures	C73-C75	3	7	25,649	179,540	12.72
2a.12	Secondary and ill-defined	C76-C80	9	3	72	507	1.52
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	4	22	73,255	512,783	11.69
2a.14	Independent (primary) multiple sites	C97					
2b	In situ neoplasms	D00-D09	8	3	99	690	1.65
2c	Benign neoplasms	D10-D36	5	20	1,801	12,605	7.62
2d	Neoplasms of uncertain or unknown behavior	D37-D48	2	27	26,809	187,665	12.91
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	3	24	278,616	1,950,313	10.33
4	Endocrine, nutritional and metabolic diseases	E00-E90	3	32	124,938	874,563	12.22
5	Mental and behavioral disorders	F00-F99	3	26	278,597	1,950,179	10.33
6	Diseases of the nervous system	G00-G99	3	33	282,459	1,977,210	10.34
7	Diseases of the eye and adnexa	H00-H59	4	30	222,020	1,554,140	6.26
8	Diseases of the ear and mastoid process	H60-H95	3	11	251,763	1,762,343	10.09
9	Diseases of the circulatory system	I00-I99	3	22	229,876	1,609,133	9.90
10	Diseases of the respiratory system	J00-J99	4	37	425,243	2,976,701	7.51
11	Diseases of the digestive system	K00-K93	4	34	406,862	2,848,035	7.40
12	Diseases of the skin and subcutaneous tissue	L00-L99	4	34	268,300	1,878,097	6.77
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	4	12	17,983	125,878	10.21
14	Diseases of the genitourinary system	N00-N99	4	33	430,379	3,012,652	7.54
14a	Diseases of the genitourinary system: urinary system	N00-N39	3	25	112,696	788,872	12.30
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	4	29	430,367	3,012,569	7.54
15	Pregnancy, childbirth and the puerperium	O00-O99	6	15	132,651	928,556	4.73
16	Certain conditions originating in the perinatal period	P00-P96	6	15	178,380	1,248,662	5.55
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	4	41	425,236	2,976,652	7.51
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	4	33	425,231	2,976,619	7.51
	Total Releases		**4**	**48**	**434,237**	**3,039,661**	**7.56**

4.17. TGPC Compressor Station 249 (Carlisle NY)

4.17a. Facility Profile

Table 4.17a.

TGPC Compressor Station 249

Carlisle NY

Facility name, short	TGPC Compressor Station 249
Facility name, full	TGPC CS 249
EIS Facility ID	8435311
DEC Region	4
County	Schoharie
Town	Carlisle
Village \ Hamlet	
Address	2480 US Route 20
Zip	12031
DEC Permit Type	Air Title V Facility
DEC Facility ID	4432400005
DEC Permit ID	4-4324-00005/00007
DEC Permit Effective Date	11/6/2015
DEC Permit Description	Renewal of the Title V permit.
DEC Permit Review Report	
Company	Tennessee Gas Pipeline Company
Project	Part of the Niagara Expansion Project by TGP/Kinder Morgan, which is related to National Fuel's Northern Access Project.
Pipeline	Tennessee Gas Pipeline
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	9,100 HP
Total estimated releases (2008-2014): pounds	
Total estimated releases (2008-2014): rank	

Table 4.17b.

TGPC Compressor Station 249: Facility Releases by Health Effects

Carlisle NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Chapter	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	2	41	194,333	1,360,334	14.19
2a	Malignant neoplasms	C00-C97	2	38	190,789	1,335,524	14.21
2a.1	Lip, oral cavity and pharynx	C00-C14	3	8	22,754	159,281	11.06
2a.2	Digestive organs	C15-C26	3	30	22,925	160,478	10.97
2a.3	Respiratory system and intrathoracic organs	C30-C39	2	26	190,447	1,333,127	14.23
2a.4	Bone and articular cartilage	C40-C41	2	23	176,886	1,238,204	14.12
2a.5	Skin	C43-C44	8	7	71	495	1.86
2a.6	Connective and soft tissue	C45-C49	10	8	70	493	1.80
2a.07	Breast and female genital organs	C50-C58	2	19	92,653	648,571	14.96
2a.07.50	Female breast	C50	2	17	79,589	557,125	14.69
2a.07.55	Uterus	C55	7	3	26	183	3.73
2a.07.56	Ovary	C56	8	2	66	461	1.77
2a.08	Male genital organs	C60-C63	4	10	21,935	153,543	10.97
2a.09	Urinary organs	C64-C68	3	18	22,813	159,689	11.08
2a.10	Eye, brain and central nervous system	C69-C72	3	18	22,912	160,382	10.97
2a.11	Endocrine glands and related structures	C73-C75	4	7	21,956	153,691	10.89
2a.12	Secondary and ill-defined	C76-C80	10	3	58	409	1.23
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	2	23	92,946	650,622	14.83
2a.14	Independent (primary) multiple sites	C97	--	0	0	0	0.00
2b	In situ neoplasms	D00-D09	9	3	80	560	1.34
2c	Benign neoplasms	D10-D36	6	21	1,454	10,181	6.15
2d	Neoplasms of uncertain or unknown behavior	D37-D48	3	28	22,890	160,231	11.02
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	2	25	299,200	2,094,397	11.09
4	Endocrine, nutritional and metabolic diseases	E00-E90	2	34	136,996	958,972	13.39
5	Mental and behavioral disorders	F00-F99	2	27	299,178	2,094,247	11.10
6	Diseases of the nervous system	G00-G99	2	34	303,242	2,122,695	11.10
7	Diseases of the eye and adnexa	H00-H59	3	31	368,833	2,581,834	10.40
8	Diseases of the ear and mastoid process	H60-H95	2	12	276,272	1,933,902	11.07
9	Diseases of the circulatory system	I00-I99	2	23	258,460	1,809,220	11.13
10	Diseases of the respiratory system	J00-J99	3	38	604,524	4,231,665	10.67
11	Diseases of the digestive system	K00-K93	3	35	576,081	4,032,565	10.48
12	Diseases of the skin and subcutaneous tissue	L00-L99	3	35	438,754	3,071,281	11.07
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	2	13	28,130	196,907	15.97
14	Diseases of the genitourinary system	N00-N99	3	34	613,568	4,294,974	10.75
14a	Diseases of the genitourinary system: urinary system	N00-N39	2	26	120,350	842,447	13.14
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	3	30	613,556	4,294,893	10.75
15	Pregnancy, childbirth and the puerperium	O00-O99	3	16	267,623	1,873,364	9.54
16	Certain conditions originating in the perinatal period	P00-P96	3	16	337,101	2,359,705	10.48
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	3	43	604,523	4,231,660	10.67
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	3	34	604,520	4,231,638	10.67
	Total Releases		**3**	**50**	**617,612**	**4,323,285**	**10.76**

4.18. TGPC Compressor Station 254 (Chatham NY)

4.18a. Facility Profile

Table 4.18a.

TGPC Compressor Station 254

Chatham NY

Facility name, short	TGPC Compressor Station 254
Facility name, full	TGPC CS 254
EIS Facility ID	8525311
DEC Region	4
County	Columbia
Town	Chatham
Village \ Hamlet	Riders-Mills
Address	ST Rte 66 -- E Side S of County Line
Zip	12123
DEC Facility ID	4102600037
DEC Permit Type	Air Title V Facility
DEC Permit ID	4-1026-00037/00029
DEC Permit Effective Date	8/11/2014
DEC Permit Description	
DEC Permit Review Report	
Company	Tennessee Gas Pipeline Company
Project	Part of the Niagara Expansion Project by TGP/Kinder Morgan, which is related to National Fuel's Northern Access Project.
Pipeline	Tennessee Gas Pipeline
Principal Supply Source	
System Configuration (Primary/Secondary)	
Status	Operational
Horsepower, existing	10,475
	(1) gas turbine, (6) reciprocating engines

Table 4.18b.

TGPC Compressor Station 254: Facility Releases by Health Effects

Chatham NY

International Classification of Disease, 10th edition			State	Ch	2008-14 Estimated Lbs.		% of
Chapter	Description	Code	Rank	#	Average	Total	State
2	Neoplasms	C00-D48	9	23	57,856	404,994	4.23
2a	Malignant neoplasms	C00-C97	9	22	56,750	397,251	4.23
2a.1	Lip, oral cavity and pharynx	C00-C14	13	7	4,723	33,063	2.30
2a.2	Digestive organs	C15-C26	13	14	4,732	33,124	2.26
2a.3	Respiratory system and intrathoracic organs	C30-C39	9	20	56,703	396,923	4.24
2a.4	Bone and articular cartilage	C40-C41	10	18	52,602	368,212	4.20
2a.5	Skin	C43-C44	10	3	33	234	0.88
2a.6	Connective and soft tissue	C45-C49	4	8	298	2,088	7.64
2a.07	Breast and female genital organs	C50-C58	9	11	25,754	180,276	4.16
2a.07.50	Female breast	C50	9	10	21,664	151,648	4.00
2a.07.55	Uterus	C55	15	2			0.00
2a.07.56	Ovary	C56	10	3	34	237	0.91
2a.08	Male genital organs	C60-C63	13	5	4,382	30,671	2.19
2a.09	Urinary organs	C64-C68	13	12	4,607	32,249	2.24
2a.10	Eye, brain and central nervous system	C69-C72	13	11	4,770	33,391	2.28
2a.11	Endocrine glands and related structures	C73-C75	14	6	4,234	29,641	2.10
2a.12	Secondary and ill-defined	C76-C80	4	5	642	4,497	13.50
2a.13	Stated or presumed to be primary, of lymphoid, haematopoietic, related	C81-C96	9	16	26,113	182,788	4.17
2a.14	Independent (primary) multiple sites	C97	--	0	0	0	0.00
2b	In situ neoplasms	D00-D09	5	2	392	2,743	6.56
2c	Benign neoplasms	D10-D36	10	11	265	1,854	1.12
2d	Neoplasms of uncertain or unknown behavior	D37-D48	13	14	4,660	32,623	2.24
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	6	17	161,398	1,129,784	5.98
4	Endocrine, nutritional and metabolic diseases	E00-E90	9	20	40,522	283,651	3.96
5	Mental and behavioral disorders	F00-F99	6	16	161,398	1,129,784	5.99
6	Diseases of the nervous system	G00-G99	6	19	162,516	1,137,610	5.95
7	Diseases of the eye and adnexa	H00-H59	5	19	194,478	1,361,349	5.48
8	Diseases of the ear and mastoid process	H60-H95	6	10	157,064	1,099,446	6.30
9	Diseases of the circulatory system	I00-I99	6	15	147,900	1,035,300	6.37
10	Diseases of the respiratory system	J00-J99	5	24	337,862	2,365,031	5.97
11	Diseases of the digestive system	K00-K93	5	21	329,499	2,306,496	6.00
12	Diseases of the skin and subcutaneous tissue	L00-L99	5	22	215,885	1,511,192	5.45
13	Diseases of the musculoskeletal system and connective tissue	M00-M99	9	9	8,668	60,676	4.92
14	Diseases of the genitourinary system	N00-N99	5	21	340,832	2,385,827	5.97
14a	Diseases of the genitourinary system: urinary system	N00-N39	11	14	35,305	247,133	3.85
14b	Diseases of the genitourinary system: pelvis, genitals and breasts	N40-N99	5	20	340,830	2,385,810	5.97
15	Pregnancy, childbirth and the puerperium	O00-O99	4	10	162,679	1,138,751	5.80
16	Certain conditions originating in the perinatal period	P00-P96	4	14	184,151	1,289,056	5.73
17	Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	5	24	337,861	2,365,027	5.97
18	Symptoms, signs and abnormal clinical and laboratory findings, nec	R00-R99	5	22	337,861	2,365,025	5.97
	Total Releases		**5**	**27**	**341,952**	**2,393,661**	**5.96**

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