Potential Environmental and Human Health Impacts Associated with the Minisink Compressor Station Millennium Pipeline Company

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Minisink Compressor Station Units

- Two 6,130 horsepower natural gas-fired turbin driven centrifugal compressor units
- Fuel oil heater
- Emergency electrical power generator
- Turbin lube oil cooler
- Filter separator with liquid tank
- Unit blowdown silencers

Emissions at the Minisink Compressor Station in Tons per Year

Emissions	Two Compressor Turbins*	Total
Carbon Monoxide	28.7	29.6
Nitrogen Oxide	28.3	28.8
Particulate Matter 10	11	11.04
Particulate Matter 2.5	11	11.04
Sulfur Dioxide	7.2	7.2
Volatile Organic Compounds	3.3	3.43
Green House Gases	61,066	61,751
Hazardous Air Pollutants	0.52	0.63

- Other minor emission sources include the Emergency Generator and the Fuel Gas Heater
- *Source of emissions detected with the FLIR Camera

Emissions from Compressor Stations

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

Chemicals Released into the Air from Compressor Facilities

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

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

- Irritates skin, eyes, nose, throat and lungs
- Respiratory impacts
- Sinus problems
- Allergic reactions
- Headaches
- Dizziness, Light headedness
- Nausea, Vomiting
- Skin rashes
- Fatigue
- Weakness
- Tense and Nervous
- Joint and muscle aches and pains
- Vision Impairment
- Personality changes
- Depression, Anxiety
- Irritability
- Confusion
- Drowsiness
- Weakness
- Irregular Heartbeat

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

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

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

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

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

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

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

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

Emergency Response

- Compressor stations are an explosive hazard, a fire hazard and a toxic hazard.
- The methane/natural gas and associated hydrocarbons such as ethane, propane, butane and pentane, transported in the pipelines are vented and released in large quantities at the compressor station locations during blow down events and during accidental release events.
- Methane is an explosion and fire hazard. When Methane being released into the air comes in contact with a spark source, a major explosion and fire can occur.
- Compressor stations also are the site of leaks and spills of toxic chemicals used in the compressor station operations. Such leaks and spills contaminate soils, surface and ground water resources and surrounding flora and fauna.
- The Marcellus shale has large quantities of radioactive components such as Radium 226 and 228. The radioactive components contaminate the natural gas stream and build up in the units of compressor facilities. Radium 226 is a bone seeker and causes bone and lung cancer.

Emergency Response (continued)

- The county emergency response agency is usually the first responder to the event. The agency is also responsible for issuing an evacuation order or a shelter in place order.
- Responding to events at compressor stations can be a complex situation. Explosive methane can be present in the air. Toxic chemicals can be present in the air, in containers on site and as spills and leaks on the surface of the facility.
- Emergency responders need to be aware, trained, equipped and prepared to address multiple threats when responding to events at compressor stations. They must be equipped with explosive level monitoring equipment, appropriate fire fighting equipment and monitors for radioactive components when responding to compressor station events.

Department of Transportation

- The U. S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration regulates pipelines and compressor stations along pipelines.
- Compressor stations must be operated and maintained in accordance with DOT Minimum Federal Safety Standards
- An emergency plan is required to minimize the hazards in emergencies. The emergency plan must include:
  - Procedures for addressing emergency events, gas leakage, fires and explosions
  - Procedures for maintaining communications with local fire, police and public officials and coordinating emergency responses
  - Protecting people first and then property

CPV Valley Energy Center Wawayanda, Orange County

- 630 megawatt natural gas powered electric generating facility
- using natural gas from the Millennium pipeline
- Two-combined cycle combustion generators
- Heat recovery steam generator
- Steam turbin generator
- Low Nitrogen Oxide natural gas auxiliary boiler
- Back up fuel ultra-low sulfur distillate oil -965,000 gallon storage tank
- 15,000 gallon aqueous ammonia storage tank
- 400,000 gallon demineralized water tank
- Process water – treated waste water from the City of Middletown Sewage Treatment Plant

Emission Limits from CPV Energy Center (tons per year)

- Carbon Monoxide 344
- Nitrogen Oxide 186.8
- PM 2.5 95
- Volatile Organic Compounds 65
- Sulfur Dioxide 42
- Sulfuric Acid 13
- Carbon Dioxide 2,164,438

Emission Reduction Credits

- Volatile Organic Compounds 75 tons per year
- Purchased Emission Reduction Credits from:
  - Arbill Industries, Inc. PA 17 tons/year
  - S. Walter Packaging Corp. PA 58 tons/year
- Total VOC 65 ton/year +75 ton/year = 140 tons/year

- Nitrogen Oxide 216 tons per year
- Purchased Emission Reduction Credits from:
  - American Video Glass LLC (Sony) PA 216 tons/year

- Total NOX Emissions
- 186.8 tons/year + 216 tons/year = 402.8 tons/year

Emissions from Valley Energy Center Power Plant Greater then Emissions from Minisink Compressor Facility

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

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

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