

ADAGE Emissions: Nitrogen Oxides (NOx)

Nitrogen Oxides, or NOx, is the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. Nitrogen Oxides form when fuel is burned at high temperatures, as in a combustion process. The EPA is working to reduce NOx levels.

Health and Environmental Impacts of NOx



Acid Rain - NOx and sulfur dioxide react with other substances in the air to form acids which fall to earth as rain, fog, snow, or dry particles. Some may be carried by the wind for hundreds of miles. Acid rain damages forests; causes deterioration of cars and buildings; and causes lakes and streams to become acidic and unsuitable for many fish.



Water Quality Deterioration - Increased nitrogen loading in water bodies, particularly coastal estuaries, upsets the chemical balance of nutrients used by aquatic plants and animals. Additional nitrogen leads to oxygen depletion and reduces fish and shellfish populations.



Ground-level Ozone (Smog) - is formed when NOx and volatile organic compounds (VOCs) react in the presence of heat and sunlight. Children, the elderly, people with lung diseases such as asthma, and people who work or exercise outside are susceptible to adverse effects such as damage to lung tissue and reduction in lung function. Ozone can be transported by wind currents and cause health impacts far from the original sources.



Particles - NOx react with ammonia, moisture, and other compounds to form nitric acid vapor and related particles. Human health concerns include effects on breathing and the respiratory system, damage to lung tissue, and premature death. Small particles penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease, such as emphysema and bronchitis, and aggravate existing heart disease.



Global Warming - One member of the NOx family, nitrous oxide, accumulates in the atmosphere with other greenhouse gases causing a gradual rise in the earth's temperature.



Toxic Chemicals - In the air, NOx reacts readily with common organic chemicals, and even ozone, to form a wide variety of toxic products, some of which may cause biological mutations. Examples of these chemicals include the nitrate radical, nitroarenes, and nitrosamines.

Text and images above are from the EPA publication, *How Nitrogen Oxides Affect the Way We Live and Breathe*.

How do ADAGE Nitrogen Oxide emissions compare to home woodstove emissions?

ADAGE recently distributed a chart which shows that their high-efficiency incinerator emits only 28% the NOx per ton of wood as compared to a home woodstove (.8 compared to 2.8). Of course, size matters. ADAGE is applying for a permit to incinerate 600,000 tons/year. The average home-owner who heats with wood burns up to 4 tons/year.



That means ADAGE will be burning wood at a rate equivalent to approximately 150,000 new woodstoves. Even with their "state-of-art" technology, ADAGE still will emit 28% as much NOx for tonnage burned, or **as much NOx as 42,000 new woodstoves** (150,000 x .28).

How ironic that the plant is being built 1/4 mile away from an Urban Growth Area where outdoor burning is permanently banned and no new permits are being issued for woodburning fireplaces.



The ADAGE Plant will emit 240 tons of NOx every year.¹

¹ Table 7.2 of the ADAGE filing with ORCAA

www.incineratorfreemasoncounty.org

Keeping Our Communities Safe and Liveable.