



Breathing Easy About New Air Pollution Standards

Part I : THE CALL

by
Kathryn Rowberg
Department of Chemistry
Purdue University Calumet

Notice of Town Hall Meeting on Air Quality

A meeting will be held Saturday night in the town hall to address the quality of the air in northwest Indiana. The meeting will start with an information session given by representatives of the U.S. Environmental Protection Agency (EPA) and the Indiana Department of Environmental Management (IDEM). Indiana is required to reduce nitrogen oxides (NO_x) emissions and must submit a State Implementation Plan (SIP) by December 2000. Join us to discuss the issue and provide input to IDEM on ways to reduce NO_x in the region.

The Call for State Implementation Plans for NO_x

Under the Clean Air Act, the U.S. Environmental Protection Agency (EPA) publishes National Ambient Air Quality Standards (NAAQS) for important air pollutants. Each state must then adopt a State Implementation Plan (SIP) providing for the implementation, maintenance, and enforcement of the NAAQS. The SIP is submitted to the EPA for approval. If the SIP is found deficient, the EPA may apply a federal implementation plan in its place. Even if a SIP is approved, the EPA may call for revisions as necessary if the SIP no longer complies with the law.

EPA reviews NAAQS periodically to determine whether the standards are adequately protecting public health. In 1997, the EPA determined that the ozone standard was inadequate and set a more stringent standard.

Every state monitors ozone. When a state exceeds the NAAQS, it is in nonattainment. Northeastern states had high levels of ozone in summer and were in nonattainment. These states claimed their ozone problem was due in part to upwind states releasing ozone-forming pollutants that contributed significantly to ozone problems in downwind states.

Through extensive computer modeling of air transport processes, it was determined that Indiana contributed at least two parts per billion (ppb) or four percent of the ozone exceedances in New York City. Therefore, the EPA ordered Indiana and 18 other eastern states to revise their SIPs to improve air quality within the state and reduce interstate transport of ozone.

Specifically, EPA required that each state reduce emissions of nitrogen oxides (NO_x--precursors of ozone), in what is known as the NO_x SIP call. Indiana must reduce allowed NO_x levels 36 percent by 2007. The Indiana Department of Environmental Management (IDEM) is the agency charged to write the Indiana SIP for NO_x.

[Go to Part II: TOWN HALL MEETING](#)

Date Posted: 11/07/00 mb

Image Credit: Photo courtesy of the Galveston Houston Association for Smog Prevention (GHASP), <http://www.neosoft.com/~ghasp/index.html>



Home

Breathing Easy About New Air Pollution Standards

Part II: TOWN HALL MEETING

by

Kathryn Rowberg

Department of Chemistry
Purdue University Calumet

Town Spokesperson: As the spokesperson for this town hall meeting, I would like to call the meeting to order. We have assembled here to learn more about the NO_x State Implementation Plan required by the Environmental Protection Agency and to hear the concerns of affected individuals and institutions. As an outcome of this meeting, we want to develop a list of ideas and vote on the best solutions to recommend to the Indiana Department of Environmental Management.

To start, I would like to call on the representative from EPA, who will describe the situation.

EPA Representative: I am here to describe why EPA is requesting a State Implementation Plan to reduce NO_x emissions in Indiana. I'll begin by explaining some technical information about ozone and nitrogen dioxides, and then I'll describe the sequence of events that led up to this request. Copies of my notes are available for those interested.

NO_x is the term used for the many nitrogen oxides that are air pollutants. One nitrogen oxide is NO, nitric oxide, which is formed in combustion engines and boilers. NO reacts with oxygen to form another oxide called nitrogen dioxide, or NO₂. NO_x are irritating gases and in the presence of water vapor contribute to acidic rain. NO_x also are reactants that along with volatile organic compounds and sunlight form ozone at the ground level, another air pollutant. Ground-level ozone affects the environment differently from stratospheric ozone, which is a thin layer containing ozone that stops ultraviolet light from reaching the earth. Chlorofluorocarbons are reducing this layer, but that is a different issue.

Ground-level ozone pollution is more commonly called smog. Ozone days occur during the long sunshine-filled days of late spring, summer, and early fall. Since ozone formation requires sunlight, ozone is not produced until after the sun rises. Typically, as commuter traffic begins to build, the concentrations of volatile organic compounds (VOCs) and NO_x begin to increase until the sun begins reacting with NO_x and creating ozone.

Ozone causes breathing problems and can cause asthmatic episodes. Ozone also causes harm to some crops. Recently, the EPA set a new eight-hour health standard of 0.08 parts per million to replace the previous standard after determining that human health was not adequately protected. All states are required to attain the new ozone standard.

Unfortunately, some states will not be able to attain the new ozone standard, partly because of pollution not originating in their state but from other states. The EPA determined that about 20

upwind states were significant contributors to the ozone problem of northeastern states. If those states reduce their NO_x emissions, downwind states should be able to attain the standards. As an aside, I should inform you that when states don't meet the standards, or are in nonattainment, they lose federal road repair money and other benefits.

Before I discuss Indiana, I would like to paint a broader picture of NO_x pollution. Over the nation, the major sources of NO_x are from transportation (49 percent), utilities (29 percent), and industry (17.3 percent). As you can see, the major source of NO_x is from mobile sources-- cars, trucks, motorcycles, boats, gas powered tools like lawnmowers, and recreational vehicles. On the surface it appears that regulating mobile sources would be best. They may be difficult to regulate, however, since many of the trucks driving through a state are not licensed there. Expressway traffic may not be exclusively local but in-transit. Also, emissions from mobile sources tend to stay at the ground level and remain localized, and are not transported to far away states.

By contrast, utility and industry emissions affect more than our local environment. Emissions from tall stacks can travel hundreds of miles and impact the air quality of cities far downwind. In addition, utilities and industries have state permits for emissions, and therefore are easier to regulate. The EPA has determined that Indiana contributes significantly to the ozone problem in other states and requires that Indiana write a State Implementation Plan to reduce NO_x emissions. This reduction will improve your air quality and reduce the amount of ozone transported to other states. The Indiana Department of Environmental Management (IDEM) will be responsible for submitting the plan.

Town Spokesperson: Thank you for this clarification. The next invited speaker will be our IDEM representative.

IDEM Representative: By 2007, the EPA requires a reduction of 200,000 tons (36 percent) in NO_x emissions. Even though IDEM disagrees with EPA on the extent of NO_x reductions required by Indiana to address the transport of ozone to other states, Indiana must submit a NO_x SIP to EPA. Furthermore, the EPA has specified electric utilities and cement kilns must be included in the NO_x emission reduction plan.

Fortunately, EPA allows every state to work at the regional level to determine the sources of NO_x emissions to control. Since Indiana's NO_x emissions come from a variety of large and small stationary and mobile sources, it is up to each region to make recommendations based on community input as to the sources that IDEM will include in the Indiana NO_x SIP. Meetings similar to this one are being held around the state to generate comments that will be considered by IDEM when creating the NO_x State Implementation Plan.

Town Spokesperson: Thank you. Since this information is quite involved, I will allow groups 20 minutes to work through the list of questions given to clarify the situation.

Questions

1. Explain how ozone is formed (describe factors such as names of the reactants, season of year, time of day, air transport phenomena).
2. How does this ozone problem differ from the ozone "hole" problem?

3. What are NO_x and VOCs, and what are their major sources?
4. Why was Indiana one of the states required to participate in the NO_x SIP call?
5. What might happen if Indiana's NO_x SIP isn't accepted by the EPA?
6. List four ways NO_x emissions could be reduced. Determine possible consequences if these NO_x control measures are applied.

[Go To Part III: PUBLIC COMMENTS](#)



Home



Breathing Easy About New Air Pollution Standards

Part III: PUBLIC COMMENTS

by
Kathryn Rowberg
Department of Chemistry
Purdue University Calumet

Town Spokesperson: Comments and suggestions will be taken now from the community regarding NO_x emission reduction. Please introduce yourself and state your affiliation, if any.

Small Coal-Burning Power Plant Representative (no NO_x controls installed): The price of electricity in Indiana is 5.3 cents per kilowatt-hour, which is around half of that of the East Coast, where the price ranges from 9.5 to 11.5 cents per kilowatt-hour. Our plant strained to spend millions of dollars installing flue gas scrubbers to reduce SO_x emissions significantly and did so without a large increase in the cost of electricity. Since we have completed the installation of the SO_x scrubbers, we would have to invest in additional technology to reduce NO_x emissions that will require several additional millions.

This cost cannot be absorbed by the plant after our recent investment and will cause drastic electricity price increases. Many homeowners are already on tight budgets and should not shoulder the cost when electricity-generating plants are not the largest source of NO_x. In addition, the higher cost of electricity will discourage new businesses and expansion of existing firms. That will hurt job creation and wage growth.

Although electric plants are not mobile and therefore are easier to target for restrictions, consider that utilities contribute less than one-third of the NO_x problem nationally. The burden of NO_x reduction should be spread around and not just targeted to electric utilities and cement kilns.

Large Coal-Burning Power Plant Representative (NO_x controls installed): Although our utility has already made significant efforts to reduce NO_x emissions, in light of the current situation, some NO_x reductions from electric utilities are reasonable. The utility industry has endorsed a statewide, annual average NO_x emission rate. We believe that all electric utilities should have the same allowed NO_x emission rate that we have achieved with our NO_x controls.

Driver's Union Representative: If the numbers from the EPA are lumped together, we see that 49 percent of the problem comes from transportation and 46 percent comes from utilities and industries. That is nearly even. It seems everyone should participate in reducing emissions. The city could create a bus and train rapid transit system, and people could be rewarded for carpooling or commuting to work using rapid transit. We have needed a regional transportation system for a long time and we now have a tremendous incentive to create one.

Irate Resident: Why should we have to pay for any of this? The majority of our traffic is trucks--just look at the expressway! We should require all those trucks to pay for their pollution. Also, think of how much pollution comes from Chicago! We are choking on her exhaust and emissions. Chicago should have to clean up its act first so smaller towns can determine if we are even part of the problem.

Cement Kiln Representative: I represent a large cement kiln far from any of the ozone nonattainment regions in Indiana. The cement industry has investigated reducing NO_x emissions, but there are very few options for kiln operators to employ. Most of the new technology to control NO_x emission has been developed for boilers and doesn't apply to kilns.

I can represent one and only one cement kiln because every cement kiln is unique in its process technology. Any NO_x control technology that might be developed for my plant probably wouldn't work at another plant. It is unrealistic to specify one control technology for all cement kilns and impractical to develop different technologies for each cement kiln. An alternative approach is to allow each cement kiln autonomy to determine how best to reduce NO_x emissions. A less flexible approach might reduce competitiveness and product quality at smaller kilns.

National Trucking Association Representative: Heavy duty diesel and gas trucks are mistakenly thought of as dirty. In recent years, engine technology and good maintenance have created a fleet of clean trucks used in long-distance hauling. In fact, 47 percent of NO_x mobile emissions comes from cars and light duty trucks (SUVs), while only 18 percent comes from heavy-duty diesel trucks and buses. Furthermore, 30 percent of NO_x mobile emission comes from off-highway diesel equipment like the equipment used in the endless road and building construction. The emissions from airports aren't even considered, although we are contemplating enlarging the airport.

Doubting Resident: How can we be sure of all this information. I can't even see NO_x, so I'm not sure they're even there. My health is just fine. Every week I read about some new scare in the newspaper and the next week people are laughing about the incident. And what about all the mathematical models predicting how much we need to reduce NO_x. Models are just that--models. They are not reality. How can we be sure that we truly need to go to this expense for something that isn't visible and for some predictions based on models?

Industry Lawyer: Petitions for review have been filed in federal court to challenge the EPA's action in promulgating the new ozone standards. The two major concerns are whether an "intelligible principle" was used to set the new standard for ozone and whether EPA's adoption of the new standards is within constitutional bounds. The United States Court of Appeals blocked the EPA from enforcing the new standard. The Supreme Court has agreed to examine these issues and will likely rule on them next year.

Therefore, IDEM should take care to avoid submitting a SIP based on these unaccepted stringent ozone standards. If the new ozone standard is not upheld in court, the state will likely still be held to any NO_x SIP based on them. The SIP should state that Indiana's plan implements current federal laws and standards, not EPA standards, which are not upheld in court.

Business Leader: My small business is in the process of expanding and I don't need surprises.

I want to be involved in the decisions being made, and I would like to be a leader in ensuring clean air for our residents and for future generations, but I need to establish my business first. If reductions are implemented across the board for all businesses, I won't be able to expand. How can I help our community if I can't get my feet on the ground?

High School Guidance Counselor: The EPA is making the assumption that our most pressing concern at this time is ground-level ozone and NO_x pollution. However, if you look at the top causes of deaths to our children in this region, it is not air pollution, it is violent crime and automobile accidents. Can our community address the issues that are most pressing instead of simply responding to what the federal government mandates to be important?

Town Spokesperson: Thank you all for your valuable comments. We have recorded them for further study. Now it is time for us to determine which NO_x emission sources to control. IDEM will determine the reductions for each source. Please speak up as to which sources you would like to be included and then everyone will have up to four votes. No more than one vote may be given to any one source. The votes will be tabulated and the sources listed in order of total votes and used by IDEM to create the NO_x State Implementation Plan.



Home

