

NITROGEN OXIDES EMISSIONS FROM MOTOR VEHICLES
AS A CONTRIBUTOR OF OXIDANT AIR POLLUTION

SUBMITTED TO THE
SUB-COMMITTEE ON ACID RAIN
OF THE
STANDING COMMITTEE ON FISHERIES AND FORESTRY
HOUSE OF COMMONS

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BY THE
CANADIAN ENVIRONMENTAL LAW RESEARCH FOUNDATION

Thank you for giving us this opportunity to address your Sub-Committee on Acid Rain. Before proceeding to the delivery of our submission, we would like to say a few introductory words about the Canadian Environmental Law Research Foundation.

The Foundation is an independent research organization, in receipt of funding from a variety of different sources, which carries out studies in environmental law matters, in particular with respect to the problems posed by toxic chemicals in our society. The Foundation works in close conjunction with the Canadian Environmental Law Association. Unlike the Association, however, we do not litigate.

At the present time we are engaged in a study of toxic and oxidant air pollution which crosses the international border. This study is being carried out jointly with the Environmental Law Institute of Washington, D.C. and has been made possible by funding provided by the Donner Canadian Foundation and two American foundations. We have drawn upon the research findings associated with that study to prepare the submission which we shall make this evening. If any members of the Sub-Committee wish, we would be pleased to provide you with more information concerning either the Foundation or this particular study.

Although the Foundation shares the concerns about the effect of nitrogen-oxides ('NOx') emissions on acid deposition, we would like to limit our discussion this evening to our findings on oxidant air pollution. Nitrogen oxides are important precursors to oxidant as well as acid rain formation and, because the single most important source of NOx emissions is motor vehicles, changes in the emission standards will affect both acid rain and oxidant pollution.

Ozone is the most well-known, well-studied oxidant. It is not emitted directly, but is a "secondary pollutant" formed when NO_x and hydrocarbon emissions react in the atmosphere in the presence of sunlight. The highest ozone levels occur in summer during characteristic weather patterns. The areas of Canada which are susceptible to high ozone concentrations are Vancouver, Southern Ontario, Quebec and the Maritimes.

The Federal government has established ambient air quality objectives for ozone. The maximum "acceptable" level is 80 ppb - this is the level which is intended to protect against effects to vegetation and personal discomfort.

This acceptable air quality objective is regularly exceeded across Canada. In 1982, this level was exceeded more than 30 times in Montreal, 64 times in Quebec City, 31 times in both Windsor and London, 57 times in Sarnia and 27 times in Vancouver.

The maximum "tolerable" objective is 150 ppb - the level which, if exceeded, can create an intolerable risk to public health. Even this level has been exceeded in Canada. For example, in Montreal it was exceeded 4 times in 1982, and once or twice in each of the preceding three years.

Adverse health impacts are associated with high ozone levels. Reduced lung capacity, eye, nose and throat irritation and aggravation of chronic respiratory ailments such as asthma have all been linked to ozone exposure at levels experienced during episodes.

Not only does ozone affect human health, but its environmental effects exact a high economic cost. The most significant effects of ozone in Canada are felt in the agricultural areas of Southern Ontario. There damage to 15 sensitive crops, such as beans, potatoes, tobacco, tomatoes, etc., is estimated at \$20 million per year. Estimates for damage to crops in the United States range from \$200 to 430 million per year. In addition to agricultural crops, damage to forests is suspected -- but to date not well-studied in Canada.

As with acid rain precursors, a significant part of the oxidant precursor emissions in some parts of Canada come from the United States. This is probably the primary source of oxidants in the Maritimes. However, the urban Canadian contribution should not be downplayed -- it is the combination of the two which makes ozone damage in Canada so great. And, in Vancouver, high ozone levels are attributable almost exclusively to local emissions.

Obviously action must be taken to control oxidant air pollution. Changes to the motor vehicle emission standards are central to achieving control. This is because the precursor emissions of oxidants are oxides of nitrogen ("NO_x") and hydrocarbons and the single most important source of both types of emissions is motor vehicles.

In Canada, total NO_x emissions for 1980 were 1.8 million tonnes - 60.6% of these emissions come from "transportation" sources, which includes railroads and aircraft as well as road vehicles. It has been estimated that in the absence of changes to motor vehicle emission standards in Canada, the contribution of NO_x emissions from this sector is expected to increase ^{to} 70% by the year 2000.

In contrast, the contribution from transportation sources in the United States is now 44% of total NO_x emissions and is expected to increase by only 15% by 2000 - in large part because of the stricter emission standards which have been in place in that country since 1981.

We conclude that the present Canadian motor vehicle emission standards, including the NO_x standard, contribute to ozone levels in Canada which are high enough to regularly exceed acceptable air quality criteria. We therefore urge that the NO_x standard be changed and we recommend that it be set at the level of 1.0 grams per vehicle mile - the standard which has been imposed in the United States since 1981. Your Subcommittee made the same recommendation in its 1981 Report, Still Waters, but a change in the standard has yet to be implemented.

As part of our study on oxidant pollution we are looking at the adequacy of existing legislative arrangements. We believe that the mandate of Transport Canada under the Motor Vehicle Safety Act is limited to protection of public "safety" only. Because the most significant impacts of oxidant pollution in Canada are on vegetation it is important that standards be set at levels which will protect against these impacts as well as to protect human health. We therefore recommend that the responsibility for setting emission standards be transferred from Transport Canada to Environment Canada under the Clean Air Act.

This is another recommendation made by this Subcommittee which has not been implemented, 3 years later.

Setting a new vehicle standard is only the first step to ensuring a decrease in NO_x emissions: enforcement of that standard throughout the operating life of the vehicle is essential. Inadequate maintenance, equipment deterioration and

and intentional tampering all contribute to nearly half of vehicles failing to meet emission standards. We therefore recommend that the Government of Canada work with the provinces to develop effective methods for enforcing emission standards on motor vehicles in use throughout Canada.

In summary, we urge that your Subcommittee recommend in its report:

1. that the motor vehicle emission standard for nitrogen oxides be changed from 3.1 to 1.0 grams per vehicle mile

2. that jurisdiction to set motor vehicle emission standards be transferred from Transport Canada to Environment Canada

3. that the Government of Canada work with the provinces to develop effective mechanisms for enforcing the motor vehicle emission standards.

Respectfully submitted,

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