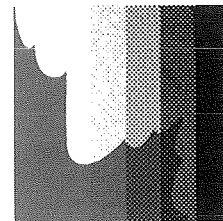


Canadian Environmental Law Research Foundation

La Fondation canadienne de recherche du droit de l'environnement



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WATER QUALITY AND AIR-BORNE TOXICS:  
SYMBOL OF THE NEXT GENERATION OF ENVIRONMENTAL PROBLEMS

A submission made to the  
Inquiry on Federal Water  
Policy by the Canadian  
Environmental Law  
Research Foundation

CIELAP Shelf:  
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Water Quality and Air-borne Toxics: Symbol of  
Next Generation of Environmental Problems

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Thank you for providing this opportunity to make known to the Inquiry on Federal Water Policy the views of the Canadian Environmental Law Research Foundation. Before proceeding, I should explain that the Research Foundation is a non-profit, independent, organization carrying out research and seminar/conference programs in a number of environmental law and policy areas. In preparing this submission, staff of the Foundation drew upon the findings of a research project currently in progress titled "Toxic and Oxidant Air Pollution: The need for Canadian and American law reform to solve a shared problem". This project is being done jointly with the Environmental Law Institute of Washington D.C., with funding provided through the generous financial support of the Donner Canadian Foundation, the W. Alton Jones Foundation of Virginia and the George Gund Foundation of Ohio.

We would like to limit our submission to the first item listed in the terms of reference of your Inquiry, which is:

to identify and substantiate the nature of emerging water issues, including the interjurisdictional dimensions thereof

More particularly, we intend to address the emerging problem of atmospheric deposition as a source of water quality contamination.

We have chosen this focus for our remarks for the following reasons:

1. Atmospheric deposition is very much an "emerging issue" in that only in recent years has air pollution from non-point sources come to be seen as a major source of water pollution and long-range transport come to be recognized as a significant aspect of air pollution.
2. Atmospheric deposition is also representative of a number of emerging environmental contaminant issues which require a different response

from traditional environmental management methodology. These new issues are typified by the following characteristics:

- they are contaminants of concern whatever their route into the environment because they persist and accumulate in the fat of animals, including humans. Thus traditional separation of air, land and water pollution controls is inappropriate.
- their long-term effects on health and the environment are unknown at this time;
- they have a wide number of different sources which makes control by a single agency or even a single political jurisdiction difficult;
- public concern for the environmental hazards they pose is such that they require a political and legal response, despite the fact that scientific information with respect to the problem is incomplete and uncertain.

In this submission, therefore, we intend to sketch the broad outlines of the problem of toxic contamination resulting from atmospheric deposition and to then identify the major issues which must be considered in fashioning an integrated, inter-jurisdictional and interagency regulatory response which is, necessarily grounded upon an uncertain and constantly changing data base. We will conclude with some general conclusions and suggestions for further lines of inquiry.

ATMOSPHERIC DEPOSITION AS A SOURCE OF WATER CONTAMINATION

Toxic substances are emitted into the air from a variety of sources such as manufacturing plants, electrical utilities, motor vehicles, incinerators or landfills and are then carried varying distances through the atmosphere. The best known example of such transport is the phenomenon known as acid rain. Other evidence, such as the discoveries of lead in Greenland ice and PCBs and pesticides in the oceans and an isolated lake located on Isle Royale in Lake Superior demonstrate how the atmosphere can distribute some toxic substances throughout the world.

There are connections between air, water and land which must be kept clearly in mind for a complete understanding of atmospheric deposition as a source of water pollution. Pollutants are carried varying distances in the atmosphere and then deposited to land or directly to surface water, either by means of precipitation or through dry deposition (or "fallout"). Runoff from land or percolation into ground water can bring these contaminants into surface water. Water, often carrying pollutants, then re-enters the atmosphere by means of evaporation, thus completing the hydrocycle. Some pollutants which do not dissolve in water can vaporize directly into the atmosphere.

Air is a dispersive medium, carrying pollutants great distances and thereby reducing levels at points further removed from their source. Water, on the other hand, is a concentrating medium, accumulating pollutants from throughout a drainage basin in bodies of water such as the Great Lakes. Thus, even if the atmosphere is contributing what appears to be insignificant amounts to a watershed, these can accumulate to toxic levels. (Some pollutants of course can be toxic at extremely low levels.)

We are all aware of the problem of toxic contamination in the Great Lakes.

There are a number of physical characteristics the Lakes have which make them particularly susceptible to toxic contamination. For example, their slow drainage rate prevents rapid dispersal and the low sediment load means toxics stay suspended in the water for a relatively long period of time, thus increasing the chance of exposure of aquatic organisms to such substances. However, we are less aware of the importance of atmospheric deposition to the contamination of the Lakes. It has been estimated that approximately 60% of the toxic contamination of all the Great Lakes results from atmospheric deposition, while the estimate is up to 80% for the upper Lakes.

The sources of many of the pollutants including PAH and lead are undoubtedly local, given the highly industrialized nature of the shores of the Lakes. However, long-range transport is also a factor. A recent study has shown that there is deposition of "new" DDT taking place in the northern U.S. and southern Canada which is transported through the atmosphere from Central America. Another study links the use of toxaphene on crops in Mississippi with deposition of the pesticide in Lake Michigan.

Only within recent years has science developed the ability to measure trace quantities of contaminants in water. Unfortunately, science has not developed an equivalent ability to explain in clear and unambiguous terms the significance which the presence of these contaminants has for aquatic life or for the long-term health of those human beings dependent upon exposed fish for food or this water for drinking supplies. By the same token, science is unable to state with certainty the specific sources of many of the contaminants carried through the atmosphere and the transformations and interactions taking place in the atmosphere.

Thus the problem of atmospheric deposition presents two major features which must be addressed by governments attempting to control the problem but which make control very difficult. These are the intergrated, interjurisdictional characteristics of the problem and the lack of scientific certainty.

THE NEED FOR AN INTEGRATED LAW AND POLICY RESPONSE

The traditional regulatory approach to environmental protection has been to concentrate on an individual pollutant in a particular medium - air, water or land - and to formulate distinct laws for each such problem, often administered by distinct agencies operating largely in isolation within their own political jurisdiction. For example, mercury emissions to the atmosphere from chloralkali plants have been controlled by the federal government under the Clean Air Act, while mercury effluents from chloralkali plants have been regulated separately under the Fisheries Act. Mercury is also regulated in air and water by provincial agencies such as, the Ministry of the Environment in Ontario, implementing the Environmental Protection Act and OWRA, which means that regulations differ greatly from province to province.

This approach was based upon the assumption that each environmental problem could be managed independently of all others. Thus, it was assumed that when standards for air emissions (which standards are designed to protect against threats to the environment or human health from pollutants while in the air) were met that adequate environmental protection was assured.

This compartmentalized approach, quite naturally, was first applied to solve the immediate and obvious environmental problems such as eutrophication of Lake Erie. All of us who are concerned with environmental protection are pleased with the progress which has been made in such areas during the past few decades.

Today, however, we face a new set of problems just as serious but far less obvious in their effects. To return to our example of atmospheric deposition, it is an extremely difficult task to formulate a regulatory scheme adequate to properly

control non-point sources of water pollution. There are a large number of sources and a great variety of different sources, each making small contributions to the aggregate problem. They are found within a large number of political jurisdictions and traditionally have been controlled by a large number of different regulatory laws and agencies.

To put in place such a regulatory framework, based upon legislation which fully recognizes the connections between all parts of the natural environment and which cuts across political and administrative boundaries, is the challenge which must now be faced.

We regret that we are unable to provide a simple solution at this time. We would suggest, however, that the first task is to fully recognize the nature of the problem and to then proceed, even if only in an experimental manner. Attention should be paid to models such as the 1978 Great Lakes Water Quality Agreement, based as it was on a ecosystem approach to environmental management in the Great Lakes basin.

Some existing laws are also worth examining. For example, the Environmental Contaminants Act attempts to incorporate a single regulatory framework for all uses of a chemical from "cradle to grave." The Canada Water Act allows for the use of management programs for particular bodies of water and for federal-provincial cooperative agreements.

The Inquiry on Federal Water Policy can play an extremely valuable role simply by impressing upon the Canadian Government the need to expand upon these early experiments in an integrated approach to environmental management.

## UNCERTAIN SCIENCE AND FEDERAL WATER POLICY

We would like to now address the second feature of what we consider to be the next generation of environmental problems - the uncertain, incomplete and constantly changing data base upon which any regulatory response must rest. As was illustrated earlier, science can not speak with certainty or unanimity respecting the sources, transport or environmental or human health consequences of the air-borne transport of toxic substances. Public concern is such, however, that the problem must be addressed by regulatory agencies despite the uncertainties.

We would suggest that this can best be done if the following three principles are kept clearly in mind.

1. Science and values - despite its goal of a value-free search for truth, the scientific process allows scientists to incorporate their values into their work. Values can influence the type of experiments done and the ultimate interpretation of results. The study "Political Economy of Environmental Hazards", recently published by the Law Reform Commission of Canada, demonstrates the way in which industry-sponsored scientific study almost invariably minimizes environmental hazards, in contrast to other independent studies of the same subject. Other research has found that while proponents often underestimate the risks, opponents of a particular undertaking can over-estimate the hazards involved. The policy-maker must recognize, therefore, that reliance on a single source of scientific information will not render the best control decision. It is important to ensure that the policy-making process receives input from a variety of institutions and perspectives.

2. Separation of science and policy - while recognizing that, in the final analysis, the task cannot be completely achieved, we must attempt, in so far as



possible, to separate the scientific (or data-gathering and interpretation) and policy-making processes. Science must be allowed to operate in as objective and neutral manner as possible and to then provide information to the policy process, at which point values and subjective judgments quite rightly come into play.

An example is given by William Ruckelshaus, Administrator of the Environmental Protection Agency in the United States, who is working to incorporate the distinction between "risk assessment" (the gathering of scientific evidence and evaluation of its implications) and "risk management" (the policy decisions which then are made based upon that scientific evidence) into the regulatory process.

Again, we do not have a specific recommendation to place before you but would suggest that your Inquiry seriously consider the institutional relationship between science and policy with respect to federal water management.

3. Policy and accountability - water quality contamination resulting from atmospheric deposition and other sources today poses a threat to public health. This means that individual citizens, whether they like it or not, are directly involved in the subject matter of your Inquiry. Obviously, the direct involvement of all citizens in all water policy decisions is not possible. However, the public interest can be protected by means of accountability mechanisms. Very briefly, these include such things as an open process which provides the public with information on the values and assumptions upon which decisions are based, which separates the science and policy functions and which provides maximum opportunities for participation by the public in the policy-making process.

CONCLUSIONS

In conclusion, we would like to repeat our belief that atmospheric deposition as a source of water contamination is a harbinger of new environmental problems which must be addressed in a new manner. We are convinced that the Inquiry on Federal Water Policy can play a most valuable role in stimulating public debate and discussion of the means in which society should act to control these new threats to our well-being.

We would like to thank you for giving us this opportunity to appear before you today.