

SPECIAL REPORT

**UNDER THE 1978 GREAT LAKES
WATER QUALITY AGREEMENT**

ON POLLUTION IN THE NIAGARA RIVER



INTERNATIONAL JOINT COMMISSION

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SPECIAL REPORT ON POLLUTION IN THE NIAGARA RIVER

The International Joint Commission has, over the past several months, received a number of reports and submissions concerning the quality of the water of the Niagara River and about specific current or proposed discharges to that water body.

Under the 1978 Great Lakes Water Quality Agreement, the Commission has the responsibility for advising the Federal, State and Provincial Governments on problems of and matters relating to the quality of the boundary waters of the Great Lakes System including the adequacy of programs and other measures to achieve the Purpose and meet the General and Specific Objectives of the Agreement. The Agreement lists a number of Specific Water Quality Objectives as well as a broader objective for unspecified organic compounds that they should be "substantially absent in water or aquatic organisms", that is, at less than detection levels using the best available scientific methodology. In addition, Annex 12 concerning programs to deal with persistent toxic substances is based on a set of General Principles which state that:

- "(i) The intent of programs specified in this Annex is to virtually eliminate the input of persistent toxic substances in order to protect human health and to ensure the continued health and productivity of living aquatic resources and man's use thereof;
- "(ii) The philosophy adopted for control of inputs of persistent toxic substances shall be zero discharge."

A report prepared under the Canada-Ontario Agreement on Great Lakes Water Quality, "Environmental Baseline Report of the Niagara River" (June, 1980), has further concluded that the Niagara

River is a continuous source of organic compounds and metals associated with suspended sediments to Lake Ontario.

"For example, annual loading of suspended sediment-associated PCBs to the Lake is approximately 530 kg/yr. The major portion of the loading of PCBs and some pesticides enters the River adjacent to or downstream from Grand Island, New York. The Love Canal and Buffalo River areas in New York are also sources for numerous organics. Results of analyses of suspended sediment samples indicated instances of high concentrations of PCBs and Hexachlorobenzenes (HCBs) 3 to 5 times the mean values detected...

"All bottom sediment samples from the lower Niagara River and 83% of the samples from the upper Niagara River had concentrations of PCBs exceeding 50 parts per billion which is Environment Ontario's dredge spoil criterion. Also, a large percentage of sediment samples from the slower-moving section of the lower Niagara River exceeded the dredge spoil criteria for arsenic, chromium, and mercury indicating that the river section downstream from Queenston is an accumulation area for contaminated sediments."*

A number of other organic compounds have been found in the Niagara River for which specific objectives for the protection of fish and other biota and/or health implications have not been defined. While the significance of their presence cannot therefore be assessed, their very existence in the boundary waters is a matter for concern under the Great Lakes Water Quality Agreement under Annex 12 and the Specific Objective that they be at less than detection levels. Furthermore, the combined or synergistic effects of these substances are largely unknown. Recent studies by United States agencies have also found contamination of the Niagara River with consequent impacts on biota.

* Despite these contaminant levels, the Canada-Ontario study found that all water samples taken along the Ontario shoreline of the Niagara River met Canadian drinking water standards, and that concentrations of PCBs, total DDT and mercury have declined significantly since 1975 in spottail shiners.

In its November, 1980 report to the Commission, the Water Quality Board stated that recent studies had revealed certain Specific Objectives were being exceeded in the Niagara River. While average annual water quality conditions generally met the Specific Objectives of the 1978 Agreement, approximately 10% of the samples exceeded Specific Objectives. Specifically,

"Between 1975 and 1979, total iron levels increased but concentrations of other metals remained constant. Concentrations of copper in 1979 were 8 ug/L in the Lower Niagara, exceeding the Agreement objective of 5 ug/L. Similarly, concentrations of iron at the same site was 375 ug/L, and exceeded the Agreement objective of 300 ug/L.

"In the Upper Niagara River, the water quality objectives were exceeded occasionally for cadmium, copper and iron in 1979. The objectives for zinc, dieldrin, PCB, total DDT, heptachlor epoxide and endrin were exceeded infrequently in 1979.

"The 1979 loadings of PCBs, DDT, and mirex in suspended sediments to Lake Ontario were 533, 37 and 11 kg/yr, respectively. Levels of PCB and pesticides in suspended sediments in the vicinity of Grand Island and Fort Erie were equal to or less than half of the levels downstream from Grand Island. Analyses of 1979 water and suspended sediments indicated that the Buffalo River and the Tonawanda Channel are sources of such contaminants as PCB, dieldrin, DDT, arsenic, cadmium, chromium, copper, lead, nickel and zinc. In addition, the Buffalo River appears to be a source of α and γ -chlordane, lindane, α -BHC; the Tonawanda Channel is the source of HCB, endrin, heptachlor epoxide and mercury."

The Niagara River has consistently been identified since 1973 by the Water Quality Board as a Problem Area, that is, as an area where Specific Objectives were not being achieved.

On the basis of this preliminary information, the Commission is concerned about the quality of the Niagara River and its effects on Lake Ontario. This concern increases with the growing realization of the presence and effects of both the many abandoned or improperly-operating hazardous waste disposal sites (some of which have been found to be leaching pollutants to the Niagara River), and new or newly-found substances in the ecosystem

at concentrations that may be problematic. In addition, the Commission is concerned about the impact of additional proposed discharges to the Niagara River at a time when water quality in the River does not at present meet or is close to exceeding the Agreement objectives including that for unspecified organic compounds. While such discharges are important and must be considered in their own right, they must also be placed in the broader perspective of the quality of the River ecosystem and the ability to achieve the purpose, Specific and General Objectives of the 1978 Great Lakes Water Quality Agreement, as well as the General Principles of Annex 12 of the Agreement.

A specific example of additional discharge that has been proposed is the application of SCA Services Inc. of Porter, N.Y. to discharge up to 2 million gallons per day of treated effluent to the River. The Commission notes the decision of the State of New York on January 4, 1981 which revoked the SCA discharge permit. While SCA has challenged this action in the courts and the final outcome is not clear, the Commission is encouraged by this development and will follow further developments with great interest. In any event, the status of the SCA permit does not fundamentally affect the thrust of this report. Also, the Commission is pleased to note the announcement by the United States Justice Department of the clean up of the hazardous waste site of Hyde Park and its action to achieve agreement for three other sites in the Love Canal area. These actions may result in a more careful permit process in the future but at this time such actions similarly do not affect the thrust of this report.

On the basis of widespread concern over certain proposed discharges to the Great Lakes system, the Commission wrote to the Governments of Canada and the United States on May 8, 1980, requesting information on whether the permit granting and other regulatory processes with regard to specific point source discharges in all jurisdictions in the Basin incorporate provisions adequate to

achieve the purpose and objectives of the Great Lakes Water Quality Agreement, or steps are being taken by the Parties to ensure that this will occur.

Specifically the Commission requested that it be informed of the extent to which and mechanisms by which:

1. all jurisdictions in the Great Lakes Basin ensure the application of water quality standards, regulatory requirements or procedures that are consistent with the achievement of the General and Specific Objectives and the Purpose of the Great Lakes Water Quality Agreement, in the granting and administration of approvals for discharges to the Great Lakes system;
2. the cumulative effect of multiple sources of contaminants on the Great Lakes Basin ecosystem are taken into account in granting specific discharge permits within jurisdictions, and coordinated planning process are being developed and implemented to ensure consideration of these effects between jurisdictions and pursuant to Article II(c) and Annex 12 of the Agreement, and
3. various alternatives available for reducing the discharge of toxic substances to the Great Lakes ecosystem are taken into account in the consideration of specific discharge permits, in order to assess whether such permits are consistent with the prohibition and/or virtual elimination of such discharges further to Article II and Annex 12.

To date, the Commission has not received a reply to this request forwarded to the Governments pursuant to Article IX(1) of the 1978 Agreement.

The Commission, on the basis of the information that has been available to it, has drawn certain preliminary conclusions and further observations of which it wishes to advise the Governments. With respect to the above specific three questions, these are as follows:

1. The Great Lakes Water Quality Board informed the Commission, in its 1978 Annual Report, that the Province of Ontario had agreed that the revised water quality objectives contained in the 1978 Agreement shall be used to achieve and maintain water quality in the Great Lakes, and that, in the United States, revisions of State water quality standards were being based on criteria issued by the United States Environmental Protection Agency (EPA), Great Lakes Water Quality Agreement objectives and local considerations. The Commission must conclude, however, on the basis of the information it has obtained including documentation on proposed actions and the situation in the Niagara River, and the U.S. EPA document, "Comparison of the 1978 Great Lakes Water Quality Agreement Water Quality Objectives to State Standards and Ontario Objectives Applicable to the Great Lakes", that not all jurisdictions in fact ensure that regulatory procedures are based on achievement of the Agreement water quality objectives in contrast to using other criteria such as existing local standards (which in some cases are less restrictive than the Specific Objectives), available technology, and economic impact assessments.

The Commission must further note that, in the absence of designated limited use zones which under Article IV and Annex 2 of the Agreement can be proposed within a rigorous set of principles, it can only assume that the Specific Water Quality Objectives must be met at all points in the boundary waters as defined in the 1909 Boundary Waters Treaty, except for persistent toxic substances for which specific provisions are set out in Annex 12. It is evident that in some cases of already elevated or projected contaminant levels, the only means by which the Governments can ensure compliance

with the Agreement is by restricting or preventing further discharges until such time as the Specific Objectives can and will be met. This may well involve the reduction of discharges from existing sources before additional discharges can be permitted.

2. While the regulatory programs of the jurisdictions may attempt to achieve compliance with local standards or the water quality objectives, and may further assess the current state of the receiving water body in so doing, there is little evidence that the cumulative effect of many different sources and over time of persistent contaminants, either within or between jurisdictions, are a controlling factor in granting discharge permits. It is also necessary to clarify the extent to which the overall environmental planning and pollution control strategies of the jurisdictions take into account the total long-term assimilative capacity of the ecosystem in addition to time-specific ambient water quality objectives or standards. The elevated concentrations of PCBs and other compounds in the sediment of Lake Ontario, contrasted with low current levels in the water, illustrate the problem of the cumulative impact of small amounts of persistent organic compounds entering the ecosystem from many sources over a period of time.

3. The Commission recognizes that a new, well controlled point source discharge may well be beneficial if it results in the elimination of a number of currently inadequately treated point source discharges by their re-direction to a facility where the best available technology to recover, treat and dispose of the combined wastes is applied. If the new point source leads to a reduction in the overall discharge of persistent toxic substances, then it could be concluded that the project concerned represents a significant step, at least in the interim, towards "virtually eliminating" the input of those substances. With respect to the Great Lakes Basin, the Great Lakes Water Quality Agreement, and the binational context involved, however, such a conclusion would have to be based on assurance that there is a net decrease in the input of those

substances to the boundary waters of the Great Lakes Basin. The reduction of environmental inputs on a national or regional scale, without reference to the drainage basin, would not be adequate to demonstrate that the spirit of the Great Lakes Water Quality Agreement was being followed. It must also be demonstrated that no better alternative for the reduction of such substances is available at present.

Recommendations

The Commission recommends that:

- (1) a comprehensive and coordinated study of the Niagara River as a total system be undertaken, including identification of sources, concentrations, fate and probable effects of all detected organic compounds and metals, so that all jurisdictions and the Commission can assess the current problem and the required remedial actions and so that the jurisdictions can implement appropriate remedial or preventative action on a common basis;
- (2) a comprehensive and continuing monitoring program for the entire Niagara River and western end of Lake Ontario be developed and maintained, coordinated and supported by all relevant jurisdictions either within or coordinated with the Great Lakes International Surveillance Program. This program should, to the extent possible, reflect current understanding of interactions among pollutants and the need for a better understanding of pollutants present within the water bodies concerned but for which Specific Objectives or human health or biological criteria do not yet exist, and also should provide for sufficient interpretation of data to assess the effects of pollutants on the ecosystem of the Niagara River and Lake Ontario;

- (3) Governments prevent any additional discharges to the Niagara River that would increase the input of those substances for which the Specific Objectives under the 1978 Great Lakes Water Quality Agreement (including the objective for unspecified organic substances) are exceeded or likely to be exceeded. This policy should remain in effect until such time as the Governments are assured that those objectives will be met or limited use zones are designated in accordance with the process and criteria specified in Annex 2 of the Agreement, except for persistent toxic substances for which specific provisions are set out in Annex 12;
- (4) Governments review the implications of discharges of inorganic substances for which Specific Objectives do not exist under the 1978 Great Lakes Water Quality Agreement but which are present in the Niagara River in concentrations meriting concern (e.g. silver, germanium, tin, bismuth and thalium);
- (5) the Parties to the Great Lakes Water Quality Agreement respond in a timely manner with respect to each jurisdiction to the questions posed in the Commission's letter of May 8, 1980 so that the Commission may be in a better position to assess the adequacy of the relevant programs and other measures to fulfil the purpose and meet the General and Specific Objectives of the 1978 Great Lakes Water Quality Agreement;
- (6) the jurisdictions inform the Commission in detail as to the extent to which proposed or ongoing programs and pertinent specific discharge permits will result in a net increase or decrease in the amount of persistent toxic substances entering the ecosystem of the Great Lakes Basin and individual Lakes and Connecting Channels therein.



International Joint Commission
Great Lakes Regional Office
100 Ouellette Avenue
Eighth Floor
Windsor, Ontario
N9A 6T3