Michigan-Ontario Air Pollution: Third Annual Report 1977 by the International Joint Commission

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THIRD ANNUAL REPORT

ON

MICHIGAN — ONTARIO

AIR POLLUTION

INTERNATIONAL JOINT COMMISSION

1978
MICHIGAN-ONTARIO
AIR POLLUTION

THIRD ANNUAL REPORT

INTERNATIONAL JOINT COMMISSION
Ottawa Washington
1978
The International Joint Commission was requested, in a 1975 Reference from the Governments of the United States and Canada, to examine into and report at least annually on the state of air quality in the Detroit-Windsor and Port Huron-Sarnia areas, and on the measures taken to improve such air quality, with particular regard to the Michigan/Ontario Memorandum of Understanding on Transboundary Air Pollution.

The Memorandum of Understanding, signed in November 1974, pledged the co-operation of the State of Michigan and the Province of Ontario in the implementation of air pollution control programs to achieve compliance with the air quality objectives recommended by the IJC in its 1972 Report on Transboundary Air Pollution: Detroit and St. Clair River Areas. These objectives were developed to protect the public health, safety, general welfare and property of the citizens on both sides of the International Boundary, and to serve as a minimum basis for the formulation of programs to reduce the emission of contaminants. Hence, a prime responsibility of the Commission under the Reference is to report on the adequacy of remedial programs to achieve the IJC objectives within a reasonable period of time.

The target date stated in the Memorandum of Understanding for the completion of control programs and other measures was December 31, 1978.
This is the Third Annual Report of the Commission pursuant to the Reference. It covers progress to the end of 1977, updates the concerns expressed in the Second Annual Report and identifies emerging problems. The information contained herein is based on reports from the Commission's International Michigan-Ontario Air Pollution Board which, in turn, relies heavily on the data collected and compiled by the Michigan-Ontario Transboundary Air Pollution (MOTAP) Committee established by Michigan and Ontario to assist them in carrying out the terms of the Memorandum of Understanding.

AMBIENT AIR QUALITY TRENDS

The severity of air pollution in the Detroit-Windsor and Port Huron-Sarnia areas has diminished considerably since 1972. The substantial decline in particulate and sulphur dioxide levels evident over the period 1972-1975, however, has levelled out and in some instances reversed during subsequent years. The ability to maintain particulate levels within the IJC objectives remains both elusive and unlikely to be reached with existing control strategies under certain meteorological conditions. The concern expressed by the Commission in its Second Annual Report with regard to trend reversals for various air quality indicators has been reinforced by the data for 1977 (although the reason for this situation is now somewhat clearer). According to preliminary data, this trend has continued for particulates into 1978. Sulphur dioxide levels now meet IJC objectives in the U.S. but continue to be problematic in Lambton County, Ontario. The Commission has also been made aware of the increasingly significant problem
of high ozone levels and the transboundary implications of this pollutant. Carbon monoxide, and nitrogen dioxide as well as odour problems are also monitored by the International Michigan-Ontario Air Pollution Board, but have not been of significant transboundary concern in recent years. Other pollutants, while of localized importance, have not been demonstrated to be transboundary in their impact and hence are not reported on by the Board.

Tables summarizing the data for suspended particulates, sulphur dioxide and ozone are provided in Attachment 1.

**Suspended Particulates**

Excursions above the IJC 24-hour objective occurred throughout the Reference area in 1977, ranging from about six percent of the samples in Macomb and Oakland Counties to about twenty percent in Wayne and Essex Counties. The percentage of observations exceeding the IJC objective increased in all U.S. Counties but declined in every county in the Canadian portion of the Reference area when compared to the previous year. In Canada, only Essex County (Windsor area) continued to have a higher percentage of excursions than in 1975.

The U.S. secondary standards, which are slightly less restrictive than but essentially equivalent to the IJC objectives, and which form the basis for U.S. remedial programs, were exceeded over much of the Detroit-Windsor area in 1977. The U.S. primary standards are considerably less restrictive than the IJC objectives but reflect levels for protecting public health. These were met throughout the region except for
a relatively small transboundary area of downtown Detroit and Windsor, while the number of people exposed to these higher levels diminished further from the previous year.

With respect to maximum recorded values, significant increase in the 24-hour maximum occurred in Essex and Macomb Counties. On a mean annual basis, however, maximum values generally showed no significant change, notwithstanding some slight increases, over 1976 and 1975.

The data can be characterized, in general, as showing that the major improvements in air quality evident from 1972 to 1975 have reached a plateau since 1975 and that, as the major industrial point sources have implemented control programs, particulate levels are affected by short term phenomena that result in a wide scatter of readings including some very high 24-hour levels. The distribution tends to be seasonal and related to meteorological conditions.

The primary cause appears to be fugitive or "non-point source" dust from roads, fields, storage piles, etc., which at times constitutes a large proportion of the air's suspended particulates and, together with point source emissions under present control requirements, results in temporary excursions above the particulate objective levels. The contribution of fugitive dust is most pronounced in non-industrial areas, where their sources are more common and the effect of point sources less pronounced. In addition, a significant proportion of fugitive particulates could originate in rural areas outside the study region during extended periods of high wind.
Two distinct types of weather patterns contribute to high suspended particulate concentrations in the air:

(i) periods of high wind during the drier spring and summer seasons when the natural fugitive emission inhibitors (snow and rain) are less frequent or non-existent,

(ii) classic stagnating conditions having light and variable winds, reduced visibility and strong low-level radiation inversion restricting vertical mixing.

Sulphur Dioxide

The data for sulphur dioxide during 1977 indicate a continued improvement in recorded levels compared to previous years. Only in Lambton County, Ontario are levels still problematic and do they result in a significant number of excursions above the IJC objectives. Most monitoring stations in Lambton County registered excursions above the one-hour objective and about one-quarter showed excursions above the 24-hour objective. The distribution of absolute increases and decreases in maximum recorded levels does not indicate an overall trend in levels compared to 1976.

A few short term excursions above the one-hour objective in Wayne and Essex Counties, mostly on May 20, 1977, were related to Detroit sources that have taken corrective action, and similar excursions in Macomb County were both marginal and localized. There were no violations of the 24-hour objective outside of Lambton County in 1977. Wayne County data indicate that sulphur dioxide levels remained well within the U.S. standards, which are analogous to the IJC objectives, during 1978.
Ozone

The large number of excursions above the United States standard and Ontario criterion for ozone, indicates that high levels of this pollutant are a persistent and growing problem. As far as can be determined with available data (see Attachment 1, Table 3) the incidence of excursions increased over the previous year in both 1976 and 1977, except in Wayne County where it declined in 1977, but remained greater than in 1975. Peak hourly values have generally declined, except in Sarnia, but remain considerably higher than recognized acceptable levels.

Until the implementation of a new U.S. primary/secondary standard in February 1979, the U.S. standard and Ontario criterion for ozone were identical at 0.08 parts per million, 1-hour maximum concentration. The new U.S. standard is 0.12 ppm. It is clear from available data that maximum values exceed this new standard throughout the U.S. portion of the Reference area, although the number of excursions above the new standard has not been tabulated.

Ozone is a substance having distributional characteristics rather different from the other air pollutants of concern in the Reference area. It is a secondary pollutant resulting from the photochemical reaction of nitrogen oxides and hydrocarbons and hence is caused by the conjunction of the primary pollutants over a large area and conducive meteorological conditions, typically warm, moist air moving from the south and southwest. Photochemical oxidant formulation is impacted significantly by long range transport of the air pollutants. The addition of local concentrations results in peaking above the widespread elevated levels,
often in rural areas downwind from large urban centres due to the time lapse for transportation to occur and central-urban scavenging of ozone by nitrogen oxide from mobile transport sources. Thus, the generalized movement of ozone and its precursors from south of Lake Erie is of transboundary concern, not only because they are the direct cause of elevated levels, but also because the background levels remove any local assimilative capacity for ozone below critical levels, under meteorological conditions that are common during the spring and summer seasons.

The critical measures of ozone concentrations are short term (hourly) peak values, rather than longer term, lower level concentrations. The data for the Reference area show that high levels have occurred frequently in recent years and over large areas. Additional information available to the Commission indicates that this is a problem common to most of the industrialized eastern United States and southern Ontario. Ozone is of concern because of the health implications (respiratory problems and eye irritation), vegetative damage to sensitive crops such as tobacco, grapes and leaf vegetables, effects on rubber and synthetic fabrics, and reduced visibility.

**Other Pollutants**

Carbon monoxide continued to be a localized problem at some sites in Wayne and Macomb Counties, but was not of transboundary significance. Nitrogen dioxide concentrations remained within applicable jurisdictional standards or criteria, except for two localized
excursions in Lambton County. There has been no apparent
trend for nitrogen dioxide concentrations in the Reference
area since 1972. No transboundary odour problems were
reported in 1977.
EMISSIONS FROM MAJOR POINT SOURCES IN 1977

Emissions of particulates and sulphur dioxide are monitored for all point sources emitting over 100 tons per year of either contaminant (major point sources). Data for these emissions are provided in Attachment 2.

**Suspended Particulates**

Total emissions of particulates from major point sources in the Reference area again declined from the previous year. The number of major point sources fell from 63 to 60, and emissions from those remaining decreased by 26 percent from 1976 levels. The greatest single reduction occurred as a result of regulatory compliance by Detroit Edison's thermal power plant in St. Clair County, which reduced its particulate emissions by 22,000 tons in 1977.

Since 1971, total particulate emissions from United States major point sources have declined from about 138,000 to 45,000 tons, so that they were, in 1977, about one-third the previous level. Canadian emissions increased from about 11,000 to 12,700 tons, due to a 46 percent increase in Lambton County over the same period, the only part of the boundary area in which major point source emissions increased. Despite the substantial decline in U.S. particulate emissions, they still represent almost 80 percent of such emissions in the boundary area and remain of transboundary concern, particularly when combined with the fugitive emission problem.
Sulphur Dioxide

Total emissions of sulphur dioxide from major point sources increased over those of 1976 by six percent, from 401,000 to 424,000 tons in 1977. The increases occurred primarily in Lambton and St. Clair Counties, while Wayne and Essex Counties continued to experience a reduction in emissions. Increases in Lambton County occurred at the Ontario Hydro generating station, Polysar and the new Petrosar plant, although all of these sources remained within the provincial emission standards and guidelines for each plant.

Despite the increased 1977 emissions in sulphur dioxide, they remained substantially below those of 1971 in all Counties. Over that period annual U.S. emissions have diminished from 711,000 to 241,000 tons, again by two-thirds, and annual Canadian emissions decreased from about 342,000 to 183,000 tons by almost one-half.

United States emissions constituted about 57 percent of the 1977 total from major point sources, but they do not result in air pollution levels that exceed the IJC objectives, except for occasional local incidents. The Canadian emissions, concentrated in Lambton County, do result in a significant number of excursions, especially for the one-hour objective, but these are the result of the lineation of plants along the river, combined with persistent winds in certain directions, rather than the failure of individual plants to meet current emissions criteria. This indicates the need to re-examine the basis of individual plant emission requirements under this particular situation.
EFFECTIVENESS OF ENFORCEMENT

By the end of 1977, 50 of the 60 remaining major point sources of particulates were in full compliance with jurisdictional requirements. Of the remainder, nine were on phased control programs and one was under litigation. Only one of the 81 major point sources of sulphur dioxide failed to meet full compliance by the end of 1977, and it was on a phased control program. The sources not in compliance are listed in Attachment 3.

Particulates

In its last Annual Report, the Commission expressed concern that the IJC objectives for suspended particulates could not be reached under current control strategies and that this was possibly due to the U.S. standards being less restrictive than the IJC objectives. It is evident that a substantial portion of the boundary area, in both Michigan and Ontario, fails to meet the U.S. secondary standards and hence the IJC objectives.

The International Michigan-Ontario Board has advised the Commission that the U.S. secondary standards and IJC objectives are essentially equivalent and that the current control strategies in Michigan were designed to meet these levels of air quality. It has become apparent, however, that due to the substantial contribution of fugitive emissions during periods of high winds, the U.S. secondary standards will not be satisfied throughout the boundary area even when all major point sources reach compliance or indeed eliminate their particulate emissions entirely. The fugitive
emissions emanate from a large number of "non-point" sources which, although they can be reduced to some extent, may not have a practicable solution under all meteorological conditions.

Nevertheless, the Commission continues to believe that the IJC objectives, which represent air quality adequate to protect human health, welfare and environmental values, should remain as the goals for air pollution controls on both sides of the International Boundary. It further believes that if U.S. secondary standards are met, the IJC objectives will be met for all practical purposes along the boundary. All practicable efforts should be made on both sides of the International Boundary to continue reducing the levels of suspended particulates in the air until these objectives are met. Thus, additional control strategies should be employed to compensate, where possible, for the elevated background particulate levels and non-point sources, and controls applied to those sources of fugitive emissions where the means are available, including both permanent and intermittent control techniques.

The Commission understands that the State of Michigan is developing a revised State Implementation Plan to address this problem. This procedure includes developing inventories of present and future emissions, dispersion modelling and the assessment of alternate control strategies. Hopefully, a new control strategy can be developed that will significantly reduce, if not eradicate under all circumstances, the geographical extent and frequency of failure to meet IJC objective levels, particularly with regard to transboundary excursions.
The increasing point source emissions of suspended particulates in Lambton County should be a matter of concern. This trend is the reverse of that in all other Counties within the Reference area where controls on such emissions have been successfully implemented.

The current need for reassessment of control strategies throughout the Reference area leads to a requirement for an updated inventory of sources of particulates both point and non-point. In order to develop a unified dispersion model for the binational airshed, a compatible inventory for both Michigan and Ontario, and hence a common methodology, should be developed. The Commission suggests that every effort be made within the Memorandum of Understanding to establish such an emissions inventory as soon as possible.

**Sulphur Dioxide**

While control strategies in the United States have been adequate to meet the IJC objectives in all but isolated, local incidents, the cumulative impact of emissions in Lambton County, and the increasing magnitude of such emissions, have resulted in the need to review the Ontario control strategy for the Sarnia area. In 1977, the Province of Ontario initiated a review of this strategy, with a view to preventing excursions above the IJC objectives, but a revised strategy has yet to be finalized. The Commission urges that this process be culminated as soon as possible and that an expeditious implementation schedule should be adopted.
Ozone

Due to the characteristic of ozone and its precursors being subject to long range atmospheric transport, the effectiveness of local control may be somewhat limited. The Commission recognizes that long range transport, both for this pollutant and in general, is being addressed by the U.S. national air pollution control strategy and is the subject of binational discussions between the Governments of Canada and the United States. The emergence of this pollutant, having much of its origin far distant from the Reference area, as one of the major air quality concerns in a region that has historically had poor air quality, can only underline the need for solutions to the long range transport problem.

Despite the importance of long range transport, it is apparent that the production of ozone precursors, primarily hydrocarbons, is resulting in the exacerbation of ozone levels in the Reference area, particularly Macomb, Essex and Lambton Counties and the rural region to the east. The impact on the number of excursions and their peak values is not clear, and varies with climatic conditions, but the overall peaking effect of local emissions is evident. Consequently, benefit is to be derived from a program to control ozone precursors in the urban areas of Detroit-Windsor and Port Huron-Sarnia. The State of Michigan has embarked on such a program under the U.S. Clean Air Act. The Commission recommends that the State of Michigan and the Province of Ontario co-operate in studying the means and effectiveness of further controlling ozone precursors from industrial and mobile sources in the region.
The Commission has noted that in February, 1979 the U.S. Environmental Protection Agency promulgated a new national ambient air quality standard for ozone of 0.12 parts per million which is less restrictive than the previous standard of 0.08 parts per million. Thus, the U.S. standard is no longer identical to the Ontario criterion which remains at 0.08 parts per million. The Commission believes that there is merit in having common objectives or standards in the Reference area, and it was on this basis that the Commission recommended common air quality objectives for this area in 1972, an approach that was also adopted in the Michigan-Ontario Memorandum of Understanding. No IJC objective for ozone was contained in the 1972 recommendations, but the Commission has requested further information from its Board concerning an appropriate level for such an objective.

**SURVEILLANCE**

The number of monitoring instruments for suspended particulates and sulphur dioxide is now considered to be adequate, when combined with a knowledge of emission sources and modelling results. The Commission has recommended elsewhere in this Report that the jurisdictions co-operate in improving present knowledge of emission sources, both point and non-point. This approach will allow the most effective use to be made of existing monitors, thus avoiding the high cost of additional monitoring.

Two new suspended particulate monitors in Essex County and an additional sulphur dioxide monitor in Lambton County were added to the network during 1977.
The number of ozone monitors is also considered adequate as levels do not vary greatly from place to place within the Counties. Any additional monitors should be placed in suburban and rural areas in order to determine maximum levels which tend to occur downwind of urban core areas.

Eight new ozone monitoring sites were established in 1977, six in Michigan and two in Ontario. Calibration methods for both jurisdictions were compared during 1977 to ensure the compatibility of ozone readings on both sides of the boundary.

POLLUTION INCIDENTS

In its Second Annual Report, the Commission noted the continued co-operation of jurisdictional control agencies but expressed concern over the lack of formal contingency plans for responding to accidental releases of contaminants to the atmosphere.

A procedure has been developed for the timely notification of air pollution officials on both sides of the boundary should accidental emissions of hazardous substances occur. An alerting system, whereby companies would notify officials of accidental spills that could create an emergency, is being developed. The Commission is still concerned, however, about the adequacy of formal contingency plans for dealing with accidental occurrences once they have been identified.

EXCHANGE OF DATA

The regular exchange of data, co-operative analysis and development of compatible measurement techniques has continued. This co-ordinated approach
to regional air quality problems is essential to increased knowledge of air pollution problems and policies and to the ultimate solution of such problems in the interests of both countries.

**SPECIAL STUDIES**

In the latter part of 1977, the Commission requested its Michigan-Ontario Air Pollution Board to review a proposal by Peerless Cement Company, Detroit, concerning the use of its cement kiln for the destruction of polychlorinated biphenyl (PCB) wastes. The study was initiated as a result of major concerns expressed by U.S. and Canadian citizens that the incineration of waste liquids contaminated by PCB's would present a serious transboundary environmental hazard.

The Board concluded, on the basis of a study carried out by a leading consultant in this field, that the proposed method was safe and the most environmentally acceptable method of disposing of PCB's. The Board endorsed the use of the Peerless cement kiln for PCB destruction, through incineration at high temperatures, providing that the proposed safeguards against malfunctions were implemented, that PCB burning occurred only during stable operating periods, and that an extensive monitoring program was carried out.

The Commission understands that this proposal has since been put in abeyance due to local opposition to transport and other potential hazards, and also notes that a similar proposal in the Toronto area is under provincial review. The Commission has asked the Board to review its conclusions based on the outcome of the provincial enquiry and other emerging information on PCB disposal, before the Commission comments.
ADMINISTRATION OF THE REFERENCE

In the introduction of this report, it was noted that the target date for the completion of control programs and other measures under the Michigan-Ontario Memorandum of Understanding on Transboundary Air Pollution was December 31, 1978. The advice of the Michigan-Ontario Air Pollution Board is that current air pollution control programs have not been adequate to ensure the achievement of the IJC objectives, but that additional regulations that would minimize this problem are under review. The Commission believes that every practicable effort should be made by all jurisdictions to continue the pursuit of the goals of the 1974 Memorandum of Understanding. The Commission has not been informed of a formal commitment to extend or revise this agreement, but believes that it would be appropriate to do so, if only by a reassessment of the target date. The Commission recommends that such a revision and renewal of commitment should be undertaken, with such specific programs and mechanisms as may be jointly agreed upon.

In the 1975 Reference to the Commission, the Governments of Canada and the United States made specific reference to sulphur dioxide, total suspended particulates and odours, and, more generally, mandated the Commission to report and make recommendations on "the adequacy of steps taken ... to prevent, abate and control air pollution." In this Report, the Commission has drawn attention to the severity of ozone levels in the Reference area and to the local impacts and control requirements for ozone and its precursors, notwithstanding the long range characteristics of a portion of this pollutant. It is the recommendation of the Commission,
therefore, that it be specifically authorized to continue its monitoring and advisory functions concerning this matter within the area under Reference. In the meantime, the Commission has determined that it is obliged to continue its monitoring and recommendations concerning this pollutant, and has so instructed its Board, pending any further direction from the Governments.
Signed this 26th day of June 1979 as the International Joint Commission's third annual report on Michigan-Ontario air pollution.

Robert J. Sugarman

Stuart M. Hodgson

Charles R. Ross

Bernard Beaupré

Kenneth M. Curtis

Jean R. Roy
Signed this 25th day of June 1942 as

The International Joint Commission's Third Annual
Report on Michigan-Ontario Air Pollution

Robert T. Buford
Senior M. Hodge
Charles L. Hoes
Bernard Benhoud
Lawrence E. Guttier

Jean R. Roy
<table>
<thead>
<tr>
<th>COUNTY</th>
<th>(No. of Stations)</th>
<th>% of Samples Exceeding 24-HR. Objective</th>
<th>MAXIMUM VALUE RECORDED (Objective 120µg/m³)</th>
<th>ANN. GEOMETRIC MEAN (Objective 60µg/m³)</th>
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<tbody>
<tr>
<td>St. Clair (6)</td>
<td>12.2  7.0  5.5  8.8</td>
<td>248  239  217  196</td>
<td>91  77  70  70</td>
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<tr>
<td>Macomb (12)</td>
<td>10.8  4.3  5.0  6.0</td>
<td>427  193  182  449</td>
<td>86  67  62  67</td>
<td></td>
</tr>
<tr>
<td>Oakland (5)</td>
<td>5.5  6.8  3.5  5.5</td>
<td>427  *  214  217</td>
<td>77  *  58  69</td>
<td></td>
</tr>
<tr>
<td>Lambton (4)</td>
<td>30.5  9.6  14.3  9.4</td>
<td>566  298  260  258</td>
<td>103  71  73  76</td>
<td></td>
</tr>
<tr>
<td>Wayne (17)</td>
<td>31.8  21.0  16.5  18.3</td>
<td>1085  320  385  337</td>
<td>189  131  124  143</td>
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<tr>
<td>Essex (8)</td>
<td>54.1  18.9  23.0  21.4</td>
<td>804  332  385  471</td>
<td>183  105  113  113</td>
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</tbody>
</table>

*Insufficient Data
### TABLE 2.
**SULPHUR DIOXIDE LEVELS IN RELATION TO IJC OBJECTIVES**

<table>
<thead>
<tr>
<th>COUNTY (No. of Stations)</th>
<th>NUMBER OF READINGS EXCEEDING</th>
<th>MAX. VALUE RECORDED AT WORST STATION 6</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>1-HR. OBJECTIVE</td>
<td>24-HR. OBJECTIVE</td>
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<tr>
<td>St. Clair (1)</td>
<td>18 4 2 0</td>
<td>1 0 0 0</td>
</tr>
<tr>
<td>Lambton (6)</td>
<td>168 40 43 34</td>
<td>24 5 11 6</td>
</tr>
<tr>
<td>Wayne (14)</td>
<td>82 8 48 2</td>
<td>24 4 5 0</td>
</tr>
<tr>
<td>Essex (2)</td>
<td>68 2 7 1</td>
<td>13 2 1 0</td>
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</table>

* Maximum concentration is not necessarily measured at the same station each year.*
### TABLE 3. OZONE LEVELS IN RELATION TO THE COMMON STANDARD/CRITERION OF 0.08 PPM

<table>
<thead>
<tr>
<th>COUNTY</th>
<th>NO. OF HOURLY EXCURSIONS</th>
<th>PEAK HOURLY VALUE (PPM)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>St Clair (Port Huron)</td>
<td>-</td>
<td>134*</td>
<td>141</td>
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<tr>
<td>Macomb</td>
<td>-</td>
<td>217</td>
<td>-</td>
</tr>
<tr>
<td>Oakland</td>
<td>-</td>
<td>26*</td>
<td>31</td>
</tr>
<tr>
<td>Lambton (Sarnia, worst site)</td>
<td>132</td>
<td>169</td>
<td>183</td>
</tr>
<tr>
<td>Wayne (worst site)</td>
<td>35</td>
<td>118</td>
<td>61</td>
</tr>
<tr>
<td>Essex (Windsor)</td>
<td>169</td>
<td>209</td>
<td>258</td>
</tr>
</tbody>
</table>

* The worst site for peak value is not necessarily the same as that for number of hourly excursions.

* Less than one year of observations.

Source: International Michigan-Ontario Air Pollution Board Third Annual Report (October 4, 1978)
## EMISSION TRENDS FROM MAJOR POINT SOURCES

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>St. Clair</td>
<td>42.8</td>
<td>20.4</td>
<td>5.1</td>
<td>322.5</td>
<td>92.4</td>
<td>101.5</td>
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<tr>
<td>Lambton</td>
<td>6.9</td>
<td>8.5</td>
<td>10.1</td>
<td>313.6</td>
<td>159.2</td>
<td>180.5</td>
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<td>Macomb</td>
<td>3.9</td>
<td>1.7</td>
<td>1.6</td>
<td>7.4</td>
<td>5.6</td>
<td>6.2</td>
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<tr>
<td>Oakland</td>
<td>5.0</td>
<td>1.5</td>
<td>1.5</td>
<td>8.8</td>
<td>6.3</td>
<td>6.5</td>
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<tr>
<td>Kent</td>
<td>N/A</td>
<td>0.1</td>
<td>0.1</td>
<td>N/A</td>
<td>0.6</td>
<td>1.0</td>
</tr>
<tr>
<td>Wayne</td>
<td>86.8</td>
<td>43.4</td>
<td>40.0</td>
<td>372.4</td>
<td>134.4</td>
<td>126.9</td>
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<tr>
<td>Essex</td>
<td>4.0</td>
<td>2.8</td>
<td>2.5</td>
<td>27.8</td>
<td>2.3</td>
<td>1.5</td>
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<tr>
<td>U.S. TOTAL</td>
<td>138.5</td>
<td>67.0</td>
<td>45.2</td>
<td>711.2</td>
<td>238.6</td>
<td>241.1</td>
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<td>CANADA TOTAL</td>
<td>10.9</td>
<td>11.4</td>
<td>12.7</td>
<td>341.3</td>
<td>162.1</td>
<td>183.1</td>
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<td>BOUNDARY AREA TOTAL</td>
<td>149.4</td>
<td>78.4</td>
<td>57.9</td>
<td>1,052.5</td>
<td>400.7</td>
<td>424.2</td>
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</table>

Source: International Michigan-Ontario Air Pollution Board, Third Annual Report (October 4, 1978) where more detailed data are available.
## Subject of Litigation (1)

<table>
<thead>
<tr>
<th>Major Point Sources Not in Full Compliance With Air Pollution Control Requirements in 1977</th>
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</thead>
<tbody>
<tr>
<td><strong>Central Wayne County Sanitation Authority</strong></td>
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</tbody>
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## Sources on Phased Programs (10)

<table>
<thead>
<tr>
<th>Ford Motor Co. - Wixom Assembly Plant</th>
<th>Sulphur Dioxide</th>
<th>January 1980</th>
<th>Oakland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ford Motor Co. - Steel Div. Coke &amp; Steel Mills</td>
<td>Particulate Matter</td>
<td>1978-82</td>
<td>Wayne</td>
</tr>
<tr>
<td>Great Lakes Steel Co. - Ecorse Steel Mill</td>
<td>Particulate Matter</td>
<td>1978-81</td>
<td>Wayne</td>
</tr>
<tr>
<td>Great Lakes Steel Co. - Zug Island Coke Ovens</td>
<td>Particulate Matter</td>
<td>1978-79</td>
<td>Wayne</td>
</tr>
<tr>
<td>Great Lakes Steel Co. - Zug Island Steel Mills</td>
<td>Particulate Matter</td>
<td>1979</td>
<td>Wayne</td>
</tr>
<tr>
<td>Grosse Pointe Clinton Incinerator Authority</td>
<td>Particulate Matter</td>
<td>1979</td>
<td>Macomb</td>
</tr>
<tr>
<td>Allied Chemical Co. (Semet Solvay)-Coke Ovens</td>
<td>Particulate Matter</td>
<td>1978-80</td>
<td>Wayne</td>
</tr>
<tr>
<td>Detroit Sewage Treatment Plant - Sludge Incinerators</td>
<td>Particulate Matter</td>
<td>1979-82</td>
<td>Wayne</td>
</tr>
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</table>