

# Section 1: Air Quality in Peel Region

This section explores changes in Peel’s air quality and examines key sources of pollutants in Peel.

Peel’s air quality is monitored by a network of monitoring stations operated by the Ontario Ministry of the Environment. Over the study period of this report, both ambient and site specific air quality monitoring stations were in place in Peel. Ambient (or general) air quality was monitored by one monitoring station located in Mississauga. An additional ambient air quality monitoring station was opened in Brampton in 2000. Data collected from these sites forms the basis of the Air Quality Index (AQI) and Air Pollution Index (API), the results of which are reported to the public in the form of air quality advisories and smog alerts. This data has been summarized in this report, and is presented in the first part of this section entitled “Air Pollution Index (API) and Air Quality Index (AQI)”. More detailed information on this topic is provided in the Technical report.

Within the study period of this report air quality in Peel was also monitored by site-specific monitoring stations located in close proximity to known sources of pollutants.

In 1987 twenty-four site specific monitoring stations measured concentrations of one or more pollutants (mainly Fluoridation Rate or Total Dustfall). Between 1987 and 2000, many of these site specific monitoring stations were phased-out, and the responsibility for monitoring air pollutants in Peel was increasingly transferred to the larger ambient multi-pollutant air quality monitoring stations, of which there are only two in the Region. Data collected at site specific monitoring stations in Peel is presented in the “Outdoor Air Quality” portion of this section.

Information on the types and quantity of pollutants released into the air by industry in Peel, is recorded in the National Pollutant Registry Index (NPRI). Facilities which produce air pollutants in Peel (that are designated as NPRI substances) must file reports with Environment Canada. In 1996, air was the most common medium into which pollutants were released in Canada<sup>6</sup>. Volumes of these air pollutants have decreased very little since this time. Facilities located in Peel continue to be among the largest emitters in Canada of some of these pollutants. Other Peel facilities reported the release of substances deemed as Toxic or Carcinogenic under the Canadian Environmental Protection Act. Details on NPRI pollutants and the locations of the facilities emitting them are provided in the National Pollutant Registry Index portion of this section.



Smog, associated with poor air quality is becoming a more common sight. Visibility on a day with “Good” air quality (upper photo) often differs significantly from days with “Poor” air quality (lower photo).

## **AIR POLLUTION INDEX AND AIR QUALITY INDEX**

Atmospheric quality is measured by two real-time information systems in Ontario, the Air Pollution Index (API) and the Air Quality Index (AQI). These systems measure concentrations of key atmospheric pollutants and their results are reported to affected industry and the public based on their potency and the potential for adverse effects on human and environmental health. The API is used to measure key contaminants, and forms the basis for targeted reductions of key pollutants in times of poor air quality. The AQI serves mainly as a public information tool and is used to determine when Smog Advisories are issued.

### **AIR POLLUTION INDEX (API) IN PEEL REGION**

The API is designed to protect human health by prompting control mechanisms to reduce pollutant emissions when the index, or concentrations of the pollutant, reach threshold levels. The API is driven by the combination of two factors: adverse meteorological conditions (AMC), and the concentration of two key pollutants, sulphur dioxide (SO<sub>2</sub>) and suspended particulate (SP). The Ontario Ministry of the Environment (MOE) keeps a list of the most significant stationary sources. When adverse conditions or elevated concentrations are expected, the MOE can order these sources to temporarily reduce or eliminate emissions to prevent potentially harmful conditions.

Although the API provides an important mechanism for protecting human and environmental health, elevated API readings are rarely recorded in Peel. Between 1990 and 2000, the API did not exceed the “Acceptable Level” reading in Peel. The last reported exceedance was in October, 1989, when readings slightly above “Acceptable Levels” (Air Pollution Advisory Level) were reported over a 20 hour period <sup>7</sup>.

### **AIR QUALITY INDEX (AQI) READINGS IN PEEL REGION**

Unlike the API, which generally aims to control the emissions of key polluters, the AQI is mainly an information and advisory tool. The AQI measures ambient concentrations of six key contaminants hourly:

- carbon monoxide (CO)
- nitrogen dioxide (NO<sub>2</sub>)
- ozone (O<sub>3</sub>)
- total reduced sulphur compounds (TRS)
- suspended particles (SP) and
- sulphur dioxide (SO<sub>2</sub>).

The AQI is divided into five levels of severity (Table 1.1). In general, values of 0 to 31 have few or no known health effects. Those of 32 to 49 can damage vegetation and cause respiratory irritation in sensitive people when active. Values of 50 to 99 can cause decreased visibility, irritation for people with sensitive respiratory systems at rest, and damage to some plants. Those above 100 may cause severe odour, serious respiratory effects and disorientation, and extensive damage to vegetation.

Levels of the six contaminants are measured continually and compared against Ambient Air Quality Criteria. The contaminant with the highest concentration in proportion to these criteria forms the basis of the AQI.

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**Table 1.1: Air Quality Index Categories**

<b>AQI VALUE</b>	<b>CATEGORY</b>
1-15	Very Good
16-31	Good
32-49	Moderate
50-99	Poor
100+	Very Poor

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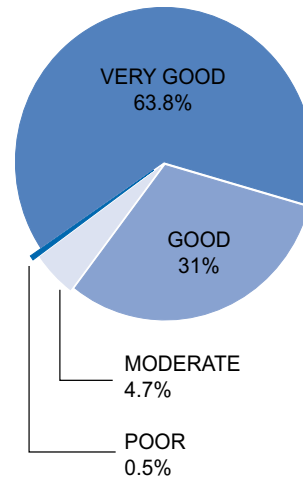
### **AQI READINGS IN PEEL REGION**

In 1995, some of the criteria on which the AQI is established were changed. The ‘Poor’ threshold for ozone was dropped from 121ppb to 81ppb, in effect pushing the previous ‘Moderate’ category into the ‘Poor’ for ozone<sup>8</sup>. With these new criteria, the hours of Poor, Moderate and Good air quality have increased, while Very Good air quality measurements have dropped significantly. Because of these changes, air quality listings in the last (1995) State of the Environment Atmosphere Report cannot be directly compared to those in this document. Data presented in this report has been adapted by the MOE to accommodate this change.

Despite these changes, a 2001 Toronto Public Health report entitled “*Condition Critical: Fixing our Smog Warning System*” suggested that the current AQI system does not accurately represent the health risk posed by poor air quality conditions<sup>9</sup>. The report stated that over 90 per cent of the premature deaths and hospitalizations that are linked to air quality conditions occur when the air quality in the city has been rated as ‘Good’ or ‘Very Good’ according to the AQI system. The report also suggests that the current AQI system does not adequately trigger smog alerts on days when the air quality poses a significant health risk. To remedy this problem, recommendations were made to alter the AQI system included adding fine particles (PM<sub>2.5</sub>) to the list of pollutants recorded under the AQI system, and to replace the current AQI categories with more appropriate classifications reflecting health risk. Other recommendations included updating health information accompanying AQI readings and updating regulatory standards for pollutants recorded under the AQI system<sup>10</sup>.

From 1990 to 2000, air quality in the Region was considered to be ‘Very Good’ or ‘Good’ 94.8 per cent of the time. Very Good measurements were recorded about 64 per cent of the time, and Good about 31 per cent. During the other 5.2 per cent of the time ‘Moderate’ readings were recorded approximately 4.8 per cent of the time, and ‘Poor’ less than half a per cent (0.43 per cent) of the time. No readings of ‘Very Poor’ have been recorded in Peel Region (Figure 1.1)<sup>11</sup>.

**Figure 1.1: Average AQI Values (1990 - 2000)**



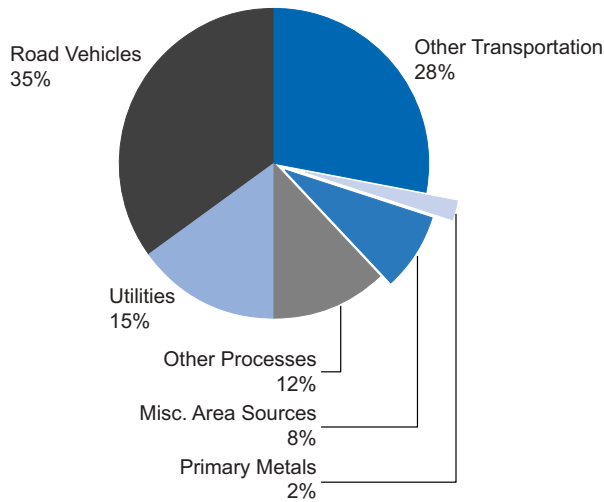
Source: Ontario Ministry of the Environment, 2002. Air Quality in Ontario: 2000 Report.

### **WHAT TYPES OF AIR POLLUTANTS ARE BEING RECORDED?**

From 1990 to 2000, ozone was responsible for approximately 93.5 per cent of all readings over 31 in Peel Region. Suspended particles were responsible for 6.4 per cent of readings over 31. No other pollutants were responsible for an AQI reading of greater than 31 during this time period<sup>12</sup>.

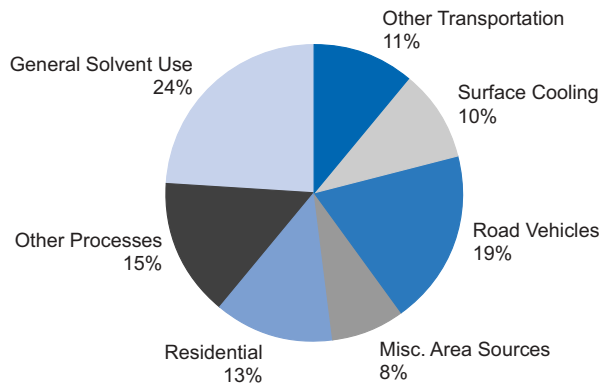
Ground-level ozone is not emitted directly into the atmosphere; it is formed when Nitrogen Oxides (NO<sub>x</sub>) and Volatile Organic Compounds (VOCs) react in the presence of sunlight<sup>13</sup>. Key sources of NO<sub>x</sub> in Ontario include the transportation, utility and industrial sectors. In 2000, the transportation sector accounted for approximately 63 per cent of NO<sub>x</sub> emissions in Ontario<sup>14</sup>. Key sources of VOCs in Ontario include solvent use, the transportation, industrial and residential sectors. Approximately 30 per cent of VOCs were emitted by the transportation sector in 2000<sup>15</sup>. Additional sources of NO<sub>x</sub> and VOCs in Ontario are illustrated in Figure 1.2 and 1.3 respectively.

**Figure 1.2: Ontario Nitrogen Oxides Emissions by Sector  
(Emissions From Human Activity, 2000 Estimates)**



Source: Ontario Ministry of the Environment, 2002. Air Quality in Ontario: 2000.  
© Queen's Printer for Ontario.

**Figure 1.3: Ontario VOC Emissions by Sector  
(Emissions From Human Activity, 2000 Estimates)**



Source: Ontario Ministry of the Environment, 2002. Air Quality in Ontario: 2000.  
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## HOW DO OZONE LEVELS IN PEEL COMPARE TO OTHER AREAS IN THE GTA?

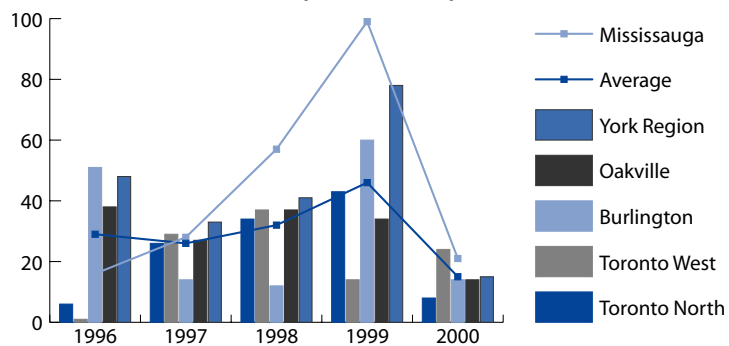
AQI monitoring is completed at eleven stations across the GTA. Five of these stations are located in areas adjacent to Peel. These include north Toronto, west Toronto, Burlington, Oakville and York Region. Sufficient data is not yet available for comparison from the new Brampton AQI monitoring station.

Figure 1.4 illustrates the number of hours in which air quality readings of 'Poor' (readings that are in excess of provincial criterion) were recorded at the one AQI station in Peel (located in Mississauga) in comparison to the five closest AQI sites from 1996 to 2001. Of the stations analyzed over this period, Mississauga recorded the greatest total number of 'Poor' air quality hours; a total

more than double that of Etobicoke<sup>16</sup>. This is largely the result of higher than normal pollutant concentrations recorded in 1998 and 1999. Of the ten GTA monitoring stations in operation in 1998, only Scarborough recorded a higher number of hours of 'Poor' air quality with 59, while Mississauga recorded 57. In 1999, Mississauga recorded the highest number of hours, of the ten GTA stations. Ninety-nine hours of 'Poor' air quality were recorded in Mississauga that year. This can in part be attributed to two significant multi-day smog episodes that affected southern Ontario that year, leading to the greatest number of zone exceedance days in Ontario in that decade<sup>17</sup>.

In 1998 and 1999, approximately 99 per cent and 98 per cent of Mississauga's 'Poor' air quality hours respectively, were the result of ozone concentrations exceeding the provincial ambient air quality criterion (AAQC) of 80 ppb<sup>18</sup>.

**Figure 1.4: 'Poor' Air Quality in Mississauga and Surrounding Areas, (1996 - 2000)**



Source: Ontario Ministry of the Environment, 2002. Air Quality in Ontario: 2000.  
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### WHAT ARE THE HEALTH EFFECTS OF THESE POLLUTANTS?

At low concentrations, ground-level ozone can cause irritation of the lungs and breathing difficulties in humans. At higher concentrations, respiratory distress and damage may occur which may lead to increased hospitalisation and premature death. In the environment, ozone can cause damage to agricultural crops, forests and natural vegetation<sup>19</sup>.

Sulphur Dioxide can cause respiratory discomfort or illness, and may aggravate existing respiratory or cardiovascular disease. In the environment, SO<sub>2</sub> may be transformed into sulphuric acid, damaging lakes and water bodies, trees and crops. The effects of these pollutants on humans may be significantly amplified in those with asthma or those with existing respiratory or cardiovascular ailments<sup>20</sup>. In 2001 approximately 5 per cent of hospitalizations for asthma in Peel were attributed to air pollution<sup>21</sup>.

For additional information on ozone concentrations in Peel, please see the Outdoor Air Quality section of this report. Up-to-date AQI information is available on the MOE website at [www.airqualityontario.com](http://www.airqualityontario.com) or by calling 1-800-387-7768.

# OUTDOOR AIR QUALITY

## *PARTICULATE AND GASEOUS POLLUTANTS*

Outdoor air quality in Peel Region is an important issue affecting every resident. There are many sources of air pollution in Peel, including cars, power generating stations, and Pearson International Airport. Because of these emissions, the Region of Peel, in conjunction with the Ministry of Environment (MOE), takes part in a continuous air monitoring program which monitors site specific concentrations of pollutants at key locations. Outdoor sources of particulate or gaseous pollutants arising from human activity can be classified into two major types<sup>22</sup>:

- 1) Stationary sources: These include industrial sources such as chemical manufacturing and power generation; rural-area sources such as mining and quarrying; and community sources such as home heating, incinerators and laundry services.
- 2) Mobile sources: These include any type of combustion engine such as gas-powered cars, farm equipment and dust from vehicle traffic.



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Peel Region is home to a variety of different industries. Site specific air quality monitoring stations are located near industrialized areas to measure concentrations of key pollutants.

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### *Why is This Issue Important?*

Every time we breathe we are exposed to a mixture of gases and particulates in the air.

The body is susceptible to some of the by-products of both commercial and industrial processes. Exposure to high pollutant levels can also cause such problems as asthma, respiratory distress, heart problems and decreased lung capacity<sup>23</sup>. The impact of these pollutants on human health depends upon the physical properties of the contaminant, its concentration in the air, the rate and depth of one's breathing, and one's general health<sup>24</sup>.

## WHAT IS THE STATE OF OUTDOOR AIR QUALITY IN PEEL REGION?

### PARTICULATE POLLUTANTS



The health of wetlands and other vital ecological features in the Region is affected by high concentrations of gaseous and particulate pollutants.

#### Fluoridation Rate (FLR)

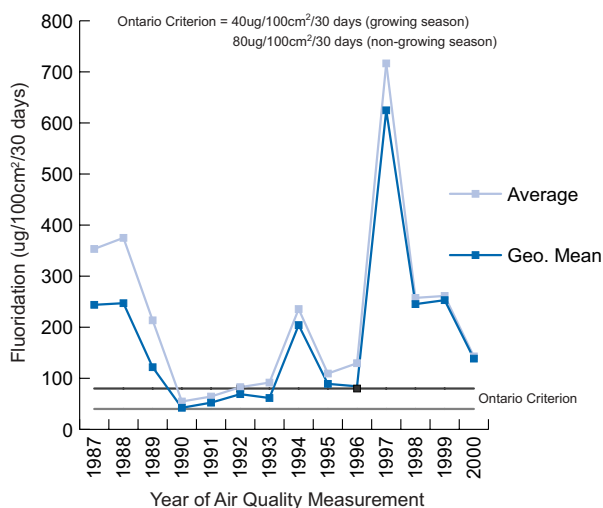
Fluorides are released into the atmosphere from fossil fuel power plants, brick manufacturing plants, fertilizer plants, petroleum refineries and the steel industry. Fluoride concentrations normally found in ambient air are not hazardous to human health. In the environment, continued accumulation will result in a breakdown of plant chemical processes and structure, and have also been found to cause injury to domestic and wild animals.

Between 1987 and 2000, the fluoridation rate was monitored at 14 stations in Brampton and Mississauga; all are site specific, located near sources of fluoride emissions. The Southern Ontario Criterion for fluoride is 40 ug/100cm<sup>2</sup>/30 days in the non-growing season (November to March) and 80 ug/100cm<sup>2</sup>/30 days in the growing season.

In 1997, the annual average FLR greatly exceeded the Ontario criterion. The large increase in fluoridation rates in 1997 was, on closer investigation, linked to two stations, both at the corner of Highway 410 and Wanless Drive in Brampton. In the period between 1998 and 2000, the levels of fluoride consistently dropped, reaching levels just above the Ontario criterion<sup>25</sup>.

Over the study period, the maximum mean concentration was in 1997 with a value of 625 ug/100cm<sup>2</sup>/30days, well exceeding the Ontario criterion. The minimum mean concentration was in 1990 at 41 ug/100cm<sup>2</sup>/30days (Figure 1.5).

Figure 1.5: Average Fluoridation Rates in Peel Region (1987 - 2000)



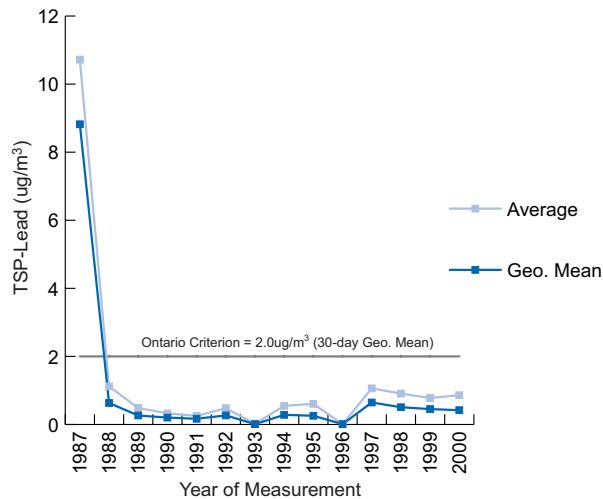
Source: Ontario Ministry of the Environment Air Quality Monitoring Branch, 2001

## Lead

Lead is emitted into the atmosphere during numerous industrial activities. Atmospheric lead is not generally associated with vegetation damage. In humans, lead accumulates in human tissue and affects multiple organs. The highest levels of lead in total suspended particulates (TSP) were found in 1987 at the Dixie Road and Queensway station. After this peak, average lead in TSP levels in Peel Region from 1988 to 2000 remained far below the Ontario criterion (Figure 1.6)<sup>26</sup>.

The maximum annual mean concentration of lead in TSP was found in 1987 at a level of 8.7ug/m<sup>3</sup>; significantly above the MOE criterion of 2.0 ug/m<sup>3</sup>. The minimum was found twice, once in 1993 and again in 1996, with levels just below 0.1ug/m<sup>3</sup>.

**Figure 1.6: Average Lead TSP in Peel Region (1987 - 2000)**



Source: Ontario Ministry of the Environment Air Quality Monitoring Branch, 2001

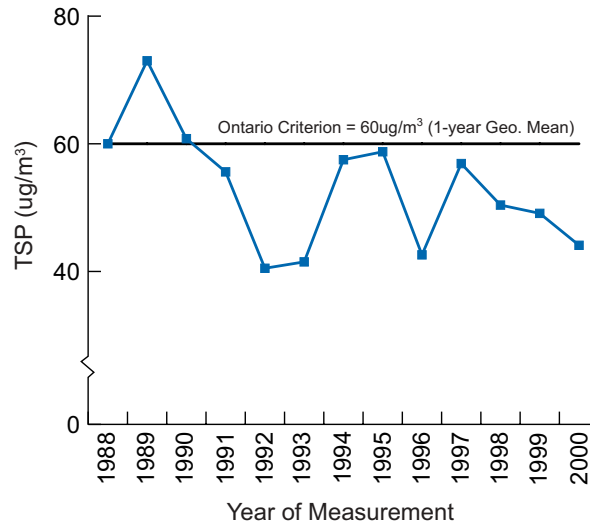
## Total Suspended Particulate (TSP)

TSP measures the release of all particles between 0.1 and 100 microns in diameter into the atmosphere. Once emitted, TSP can: reduce visibility, produce soiling when it settles, damage vegetation, increase corrosion and, if smaller than 10 microns, penetrate lungs and contribute to respiratory disease. The human health effects from exposure to suspended particulates can depend on the size of the particles, the depth to which they can penetrate the lung, and the duration of exposure<sup>27</sup>. TSP was monitored at five stations between 1987 and 2000.

Since 1990, the average annual mean concentrations of TSP have remained below the Provincial annual criteria (Figure 1.7). The annual criteria was surpassed four times between 1988 and 1996<sup>28</sup>.

The maximum mean annual concentration in this period was found in 1989 at  $73 \text{ ug/m}^3$ , while the minimum mean annual concentration was found in 1992 at  $40.5 \text{ ug/m}^3$ .

**Figure 1.7: Average TSP - Annual Means (1988 - 2000)**



Source: Ontario Ministry of the Environment Air Quality Monitoring Branch, 2001

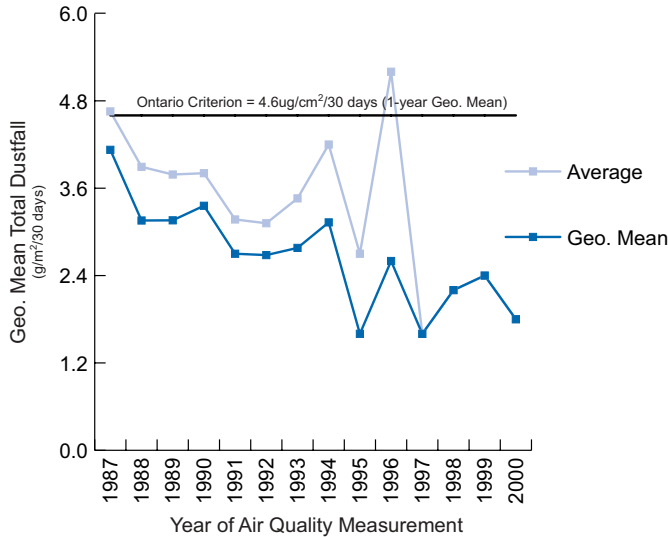
### *Total Dustfall (TDF)*

Similar to TSP, Total Dustfall is a measure of the amount of particulate in the atmosphere that is capable of settling. The only health effects associated with TDF occur when toxic components are present. Twenty stations in Peel Region monitored TDF concentrations over the study period. All of them are site specific and located near Mississauga's industrial areas.

Total Dustfall from 1987 to 2000 fluctuated between about 1.5 and  $5.5 \text{ g/m}^2/30 \text{ days}$  (Figure 1.8). Starting in 1987, Total Dustfall levels steadily decreased until 1993, which logged a slight increase. During this time the average annual mean (all stations) was not exceeded, though the annual mean was surpassed six times at individual stations. From 1998 to 2000, Total Dustfall was consistently below provincial criteria of  $4.6 \text{ ug/m}^2/30 \text{ days}$ <sup>29</sup>.

The maximum mean annual concentration was found in 1987 at  $4.1 \text{ g/m}^2/30 \text{ days}$ , while the minimum mean annual concentration was in 1995 at  $1.5 \text{ g/m}^2/30 \text{ days}$ .

**Figure 1.8: Total Dustfall in Peel Region (1987 - 2000)**



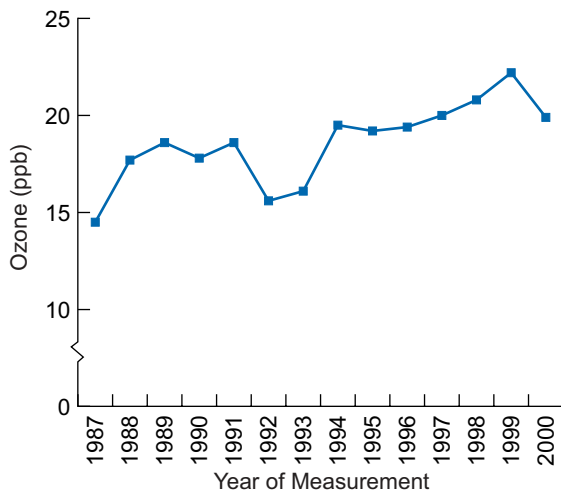
Source: Ontario Ministry of the Environment Air Quality Monitoring Branch, 2001

## GASEOUS POLLUTANTS

### Ground-level Ozone

Ozone is considered the most damaging pollutant affecting vegetation in Canada. It is also the most prevalent cause of poor air quality in Peel<sup>30</sup>. Overall, between 1987 and 2000, the one-hour criterion of 80 ppb was exceeded 108 times in 1988, falling to only 16 times in 1996, then going back up to 57 times in 1998. Annual mean levels increased from approximately 14.5 ppb to 20 ppb<sup>31</sup> (Figure 1.9).

**Figure 1.9: Average Ozone Levels - Annual Means (1987 - 2000)**



Source: Ontario Ministry of the Environment Air Quality Monitoring Branch, 2001

No annual criterion presently exists for ground-level ozone. Ozone was monitored at one site in Peel Region (the Air Quality Index station) located at the intersection of Highway 10 and the Queensway in Mississauga.

The maximum annual concentration was found in 1999 at 22.2 ppb. The minimum was in 1987, at 14.5 ppb. The maximum hourly concentration was found in 1988 at 177 ppb, and the minimum in 1996 at 93 ppb.

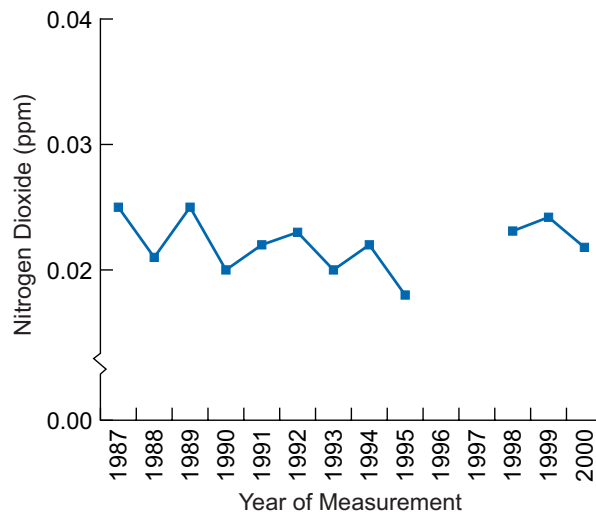
### *Nitrogen Oxides (NO<sub>x</sub>)*

Nitrogen Oxides are a group of gases formed from the reaction between nitrogen and oxygen in the atmosphere. Nitrogen Oxides are emitted during high temperature combustion of fossil fuels and microbial activity in soils. Nitrogen dioxide can significantly affect both the environment and human health. In the environment, it significantly suppresses the growth of vegetation. In humans, nitrogen dioxide is linked to increased susceptibility to respiratory infection, increased airway resistance in asthmatics, and decreased pulmonary function<sup>32</sup>.

The largest sources of Nitrogen Oxides in Ontario are the transportation sector and industrial processes. In Peel Region these two sectors account for 40 per cent and 16 per cent of total NO<sub>x</sub> emissions respectively. The largest single contributor of NO<sub>x</sub> emissions in Peel Region (41 per cent) is the electrical utilities sector<sup>33</sup>.

Between 1987 and 2000, nitrogen dioxide never exceeded either the one-hour or the 24-hour maximum thresholds of 0.20 ppm and 0.10 ppm respectively. Over this period, the maximum annual mean nitrogen dioxide concentrations were in 1987 and 1989, at 0.025 ppm, while the minimum annual levels were in 1995 at 0.018 ppm (Figure 1.10). No provincial annual criterion presently exists for NO<sub>x</sub><sup>34</sup>.

**Figure 1.10: Nitrogen Dioxide Levels - Annual Means (1987 - 2000)**



Source: Ontario Ministry of the Environment Air Quality Monitoring Branch, 2001

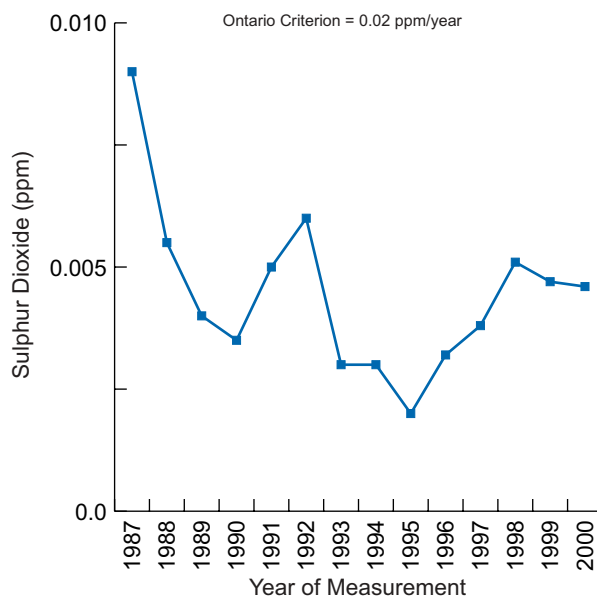
## Sulphur Dioxide (SO<sub>2</sub>)

Sulphur dioxide can harm vegetation and human health. In the environment, it mixes with oxygen and water to form sulphuric acid, a component of acid rain responsible for the acidification of lakes, deterioration of structural materials and reduction of forests, vegetation and wildlife. Sulphur dioxide is also a highly soluble gas that is easily absorbed into the human airway system. Health effects include breathing discomfort, respiratory illness, alterations of normal lung defences and aggravation of existing respiratory and cardiovascular diseases<sup>35</sup>.

Over the study period, approximately 80 per cent of the sulphur dioxide emitted in Peel Region originated from electric utilities<sup>36</sup>.

Between 1987 and 2000, the mean annual maximum threshold (of 0.02 ppm) was not exceeded at any station in Peel Region (Figure 1.11). The one-hour maximum threshold was exceeded once in 1988 and not again after that. The 24-hour maximum threshold was not exceeded in the 13 years under study<sup>37</sup>.

**Figure 1.11: Average Sulphur Dioxide Levels - Annual Means (1987 - 2000)**



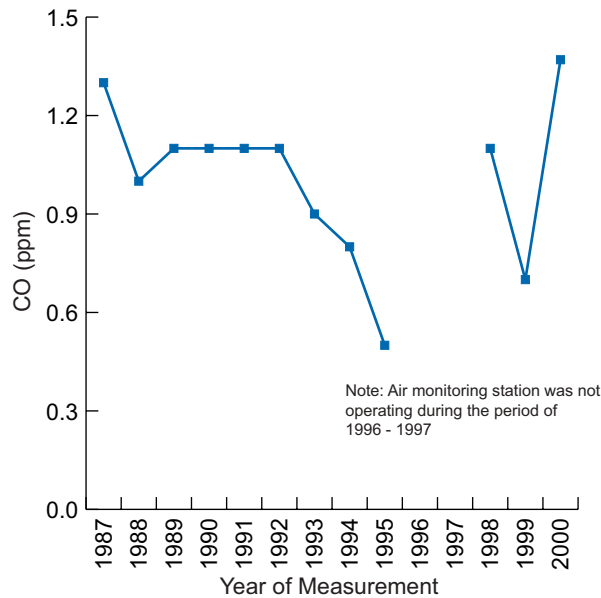
Source: Ontario Ministry of the Environment Air Quality Monitoring Branch, 2001

## Carbon Monoxide (CO)

Carbon monoxide is emitted during the incomplete combustion of fossil fuels. Motor vehicles are the most significant source, accounting for some 84 per cent of all the CO emitted in Peel Region<sup>38</sup>. Carbon monoxide is not considered a significant risk to vegetation. However, vegetation plays an important role in filtering CO pollutants from the air. In the human body, CO interferes with the blood's ability to carry oxygen.

Carbon monoxide is monitored at one station in Peel at the Queensway and Hurontario Street in Mississauga. The one-hour criterion of 30 ppm was exceeded eight times in 1989, but not in any other year for both the one hour and eight-hour (13 ppm) criterion. Although concentrations did rise in 2000, levels were still far below Provincial criteria. Between 1987 and 2000, overall CO levels in Peel Region were stable<sup>39</sup> (Figure 1.12). There is presently no annual Provincial criterion for CO.

**Figure 1.12: Carbon Monoxide - Annual Means (1987 - 2000)**



Source: Ontario Ministry of the Environment Air Quality Monitoring Branch, 2001

### FURTHER CONSIDERATIONS

It is important to note that established standards do not take into account the interactions that may occur between different pollutants, causing additive or synergistic effects. Additive effects result when two or more pollutants combine to produce an effect whose magnitude is increased exactly by the number of pollutants added together. There may also be synergistic effects when two or more pollutants interact, creating a greater overall effect than each would on its own.

Over the study period, a significant number of site-specific air quality monitoring stations were taken out of operation in Peel. Should these stations not reopen, and data is not provided from other sources, the monitoring of site-specific pollutant concentrations may not be possible in future Region of Peel SOE reports.

## NATIONAL POLLUTANT RELEASE INVENTORY (NPRI)

The National Pollutant Release Inventory (NPRI) is a federal government program created to provide Canadians with information about the types and quantities of pollutants that are released by facilities in their own communities. The NPRI provides annual data on substances released on-site at these facilities, (into air, water, land, or through underground deep well injection) substances transferred off-site for disposal, and transferred off-site for recycling. In total, 268 substances were included in the NPRI in 2000.

### WHO MUST REPORT?

All facilities in Canada are legally required to submit a report to Environment Canada annually if they manufacture, process, or otherwise use one of the NPRI listed substances *and* the following general criteria are met\*:

- Employees worked a total of 20,000 hours or more (equivalent to 10 full-time employees) during the applicable calendar year, and
- The facility manufactured, processed or otherwise used 10 tonnes (10,000 kg) or more of an NPRI substance in this calendar year at a concentration of 1 per cent by weight or greater<sup>40</sup>.

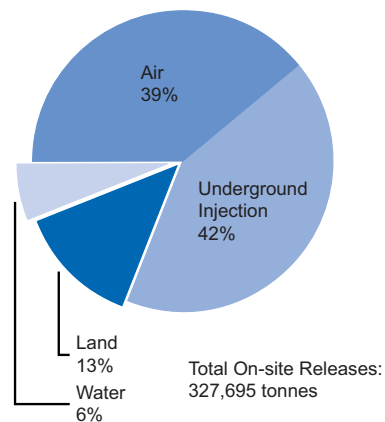
### WHY IS IT IMPORTANT TO REPORT NPRI DATA?

NPRI data can help us identify sources of pollution and possible health and environmental risks. According to the NPRI, in 1996 the atmosphere was “the most common release medium, receiving 68.6 per cent of the total weight of pollutants released”<sup>41</sup>. Since 1996, additional substances added to the NPRI, have made underground injection the most common medium (Table 1.2).

**Table 1.2: Summary of NPRI Information - On-Site Releases in Canada, 1999**

	1999 All Substances	1999 New Substances	% Attributed to New Substances
Total Facilities	2,190	424	19.4
Pollutants Reported	172	41	23.8
On-site Releases (tonnes):			
<b>Air</b>	<b>127,311.8</b>	<b>14,297.2</b>	<b>11.2</b>
Water	20,789.7	107.4	0.5
Land	43,833.5	13,327.7	30.4
Underground Injection	135,562.2	119,937.9	88.5
Total On-site Releases	327,694.9	147,684.9	45.1

Source: Environment Canada, 2001, 1999 NPRI National Summary Report



\* Some exemptions exist for educational facilities, primary resource extraction industries, and industries selling but not using products containing NPRI substances among others.

Pollutants released into the air represent about 39% of the total volume of NPRI pollutants released in Canada.

Although the way in which the pollutants are being released is changing, the volumes of pollutants being released into the air have changed very little, and constitute a significant portion of the total. From 1997 to 1999, volumes of NPRI pollutants released in the air decreased by 1.5 per cent. Table 1.3 illustrates this balance\*.

**Table 1.3: National Summary of NPRI Information - On-Site Releases (1997 - 1999)**

	1997	1998	1999	% Change 1997-1999
Total Facilities	1,865	1,911	2,044	7.0
Total Reports	6,819	6,966	7,404	6.3
Pollutants Reported	136	135	131	-3.0
On-site Releases (tonnes):				
<b>Air</b>	<b>90,968.4</b>	<b>88,958.9</b>	<b>89,560.9</b>	<b>-1.5</b>
Water	15,298.0	12,320.5	14,603.5	-4.5
Land	18,324.4	18,313.0	29,429.7	60.6
Underground Injection	17,664.6	16,419.7	15,624.3	-11.5
Total On-site Releases	142,455.7	136,190.3	149,399.5	4.9

Source: Environment Canada, 2001, 1999 NPRI National Summary Report

As shown in Table 1.4, in 1999, approximately 80 per cent of the total on-site releases in Canada were related to five industries. In a similar fashion, twenty-five (of the 268 NPRI) pollutants comprised more than 88 per cent of all pollutants released into the air in Canada in 1999<sup>42</sup>. The five pollutants discharged into the air in the largest quantities in 1999 are shown in Table 1.5.

**Table 1.4: On-Site Releases by Industrial Sector in Canada - 1999**

In 1999, 80% of the total on-site releases were related to five industries. These are:

- |   |                |
|---|----------------|
| 1) Crude Petroleum and Natural Gas Industries | 132 718 tonnes |
| 2) Chemical and Chemical Products Industries  | 63 646 tonnes  |
| 3) Paper and Allied Products Industries       | 33 830 tonnes  |
| 4) Other Utility Industries                   | 19 532 tonnes  |
| 5) Primary Metal Industries                   | 18 815 tonnes  |

Source: Environment Canada, 2001, 1999 NPRI National Summary Report

**Table 1.5: Largest Quantities of NPRI Pollutants Released into the Air in Canada, 1999**

- 1) Methanol
- 2) Ammonia
- 3) Hydrochloric Acid
- 4) Sulphuric Acid
- 5) Hydrogen Sulphide

Source: Environment Canada, 2001, 1999 NPRI National Summary Report

\*1999 figures appear significantly lower than those on the previous page as new substances have not been added.

## **FACILITIES REPORTING NPRI RELEASES IN PEEL REGION**

In 2000, 35 facilities in Mississauga, 37 facilities in Brampton, and 3 facilities in Caledon (Bolton) reported on-site releases of NPRI pollutants (Figure 1.13). In 1999, 17 Peel facilities reported on-site releases ranked by volume in the top 10 (nationally) for 14 air pollutants. In some cases, more than one Peel facility ranked within the top 10 for one of the pollutants.

For three of these 14 pollutants, (including Isopropyl Alcohol, Maleic Anhydride, and Toluene) Peel facilities ranked number one nationally in the volumes of these pollutants that they released into the air. For four of the 14 pollutants, two or more Peel facilities ranked within the top 10 nationally<sup>43</sup>.

## **HEALTH EFFECTS OF NPRI AIR POLLUTANTS**

Some substances on the NPRI list have been determined under the *Canadian Environmental Protection Act 1999* (CEPA) to be CEPA Toxic or carcinogenic. A substance is deemed to be toxic if it is entering or may enter the environment in a quantity or concentration, or under conditions that:

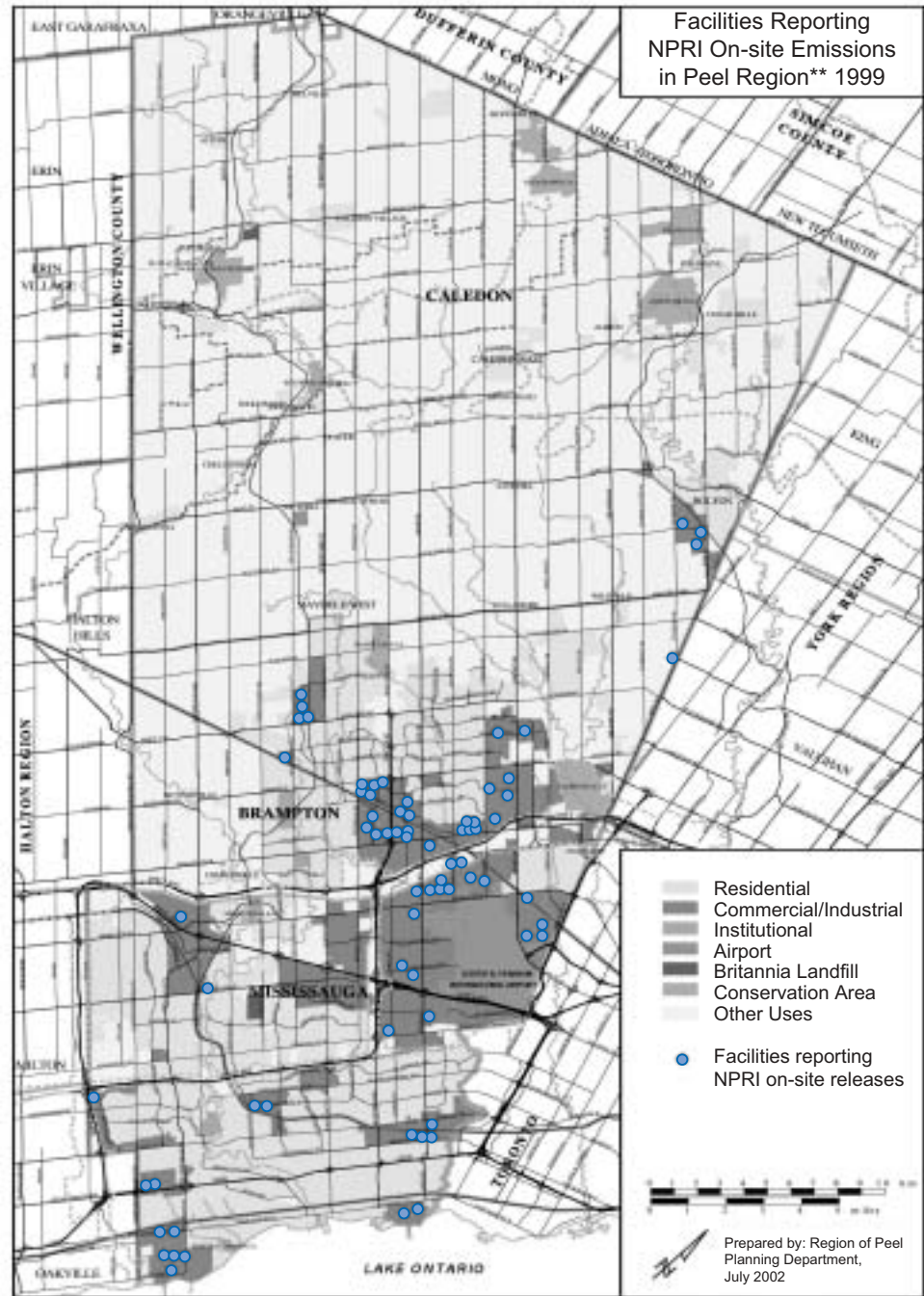
- 1) have or may have an immediate or long-term harmful effect on the environment;
- 2) constitute or may constitute a danger to the environment on which human life depends; or
- 3) constitute or may constitute a danger in Canada to human life or health.

NPRI's definition of carcinogen comes from the International Agency for Research on Cancer. It denotes an exposure that can increase the incidence of cancer.

In the year 2000, there were twenty-three NPRI, CEPA Toxic substances released into the air in Peel Region (from multiple sources). These included dichloromethane, formaldehyde, hydrogen fluoride, mercury, phenanthrene, as some of the largest by volume. All of the twenty-three CEPA Toxic pollutants released in Peel were released in Mississauga. Eight of the CEPA Toxic pollutants were released in Brampton. No facilities in Caledon reported a release of a CEPA Toxic substance<sup>44</sup>.

The human health effects associated with CEPA Toxic pollutants released in Peel may include respiratory and cardio-pulmonary injury, damage to vital tissue and organs, and illness. In the environment these substances can be moderately to severely toxic in aquatic ecosystems. As an example, mercury, which can be emitted by incinerators and other sources into the air, can be transformed into a substance known as methyl mercury when deposited in a water body. This substance can be extremely toxic to both humans and the environment, as concentrations can build-up in organisms up the food chain<sup>45</sup>.

**Figure 1.13: Facilities Reporting On-Site Emissions of NPRI Pollutants in Peel Region 1999**



\*\* Locations are approximate. Contact Environment Canada for more detailed information.

Source: Environment Canada, 2001, 1999 NPRI National Summary Report

**WANT MORE INFORMATION ON THE NPRI PROGRAM?**

Please see the Technical version of this report for more information on the health effects of CEPA Toxic substances, and further details on NPRI pollutants in Peel, or visit the NPRI web site:

[www.ec.gc.ca/pdb/npri/npri\\_home\\_e.cfm](http://www.ec.gc.ca/pdb/npri/npri_home_e.cfm)) or call 416-739-5886/5891.