TORONTO

STAFF REPORT
ACTION REQUIRED

National Pollutant Release Inventory: Toronto's 2005 Annual Report

Date:	November 14, 2007
To:	Parks and Environment Committee
From:	Richard Butts, Deputy City Manager
Wards:	All
Reference Number:	P:\2007\ClusterB\PPFA\TEO\PE07014

SUMMARY

The National Pollution Release Inventory ("NPRI") is Canada's national database containing information on annually collected data of releases of substances to the air, land and water by major industrial facilities, such as chemical plants, and public works facilities, such as the City of Toronto's Ashbridges Bay Treatment Plant. It is Canada's only national, legislated, publicly accessible emissions inventory. Data specific to certain industries and communities can be identified and collated from the inventory.

The NPRI inventory is a major starting point for identifying and monitoring sources of pollution and for the management of risks to the environment and human health, as well as monitoring indicators for the quality of our air, land and water. It is also emerging as an indicator for corporate environmental performance and as a tool to encourage and promote pollution reduction.

Environment Canada makes the information available to Canadians in a detailed inventory that can be accessed and searched through its on-line database.

This report focuses on those industrial and public works facilities that are located in Toronto and submitted emissions data to Environment Canada in 2005. The year 2005 is the most recent year for which a complete and verified set of inventory data is available.

In addition to identifying quantities of emissions to air, water and land from industrial sources and City corporate sources for 2005, this report provides comparative analysis with prior years to show trends, and identifies emission increases and decreases for specific substances found within the reported emissions.

RECOMMENDATIONS

Deputy City Manager Richard Butts recommends that:

1) the City Manager be requested to direct all City of Toronto Agencies, Boards, Commissions, Corporations and Divisions to provide their submitted reports to the National Pollutant Release Inventory, Ontario Ministry of the Environment (Ontario Regulation 127/01) and Statistics Canada (respecting Greenhouse Gas Emissions), as applicable, or all relevant equivalent data if they are below reporting thresholds to the Toronto Environment Office for summary and inclusion in subsequent annual reports; and

2) the Director of the Toronto Environment Office be directed to:

    i. establish a liaison process with all City of Toronto Agencies, Boards, Commissions, Corporations and Divisions in connection with the provision of reports and data cited in Recommendation No. 1, including a template to provide for consistent provision of information;

    ii. collaborate with Toronto Public Health to complete the development process for a National Pollutant Release Inventory annual report template with the group of experts who have been engaged to provide comment and feedback on the annual reporting process and utilize the template for the design of Toronto's 2006 Annual National Pollutant Release Inventory Report;

    iii. collaborate with Toronto Public Health in a joint reporting process for future annual reports; and

    iv. proceed to issue an "executive summary" of Toronto's Annual Report in connection with the National Pollutant Release Inventory for 2005, which will be designed for the general public.

Financial Impact

There is no financial impact, the estimated cost to produce the annual report is $13,500 and funding can be accommodated within 2007 Toronto Environment Office (TEO) Operating Budget and requested 2008 TEO Base Operating Budget as per the details provided in the table below.

Cost Centre	Description	2007	2008
WT0059	Air Quality, Data Collection and Modelling	$3,500	$10,000

The Deputy City Manager and Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

At the December 8, 2004 meeting of the Works Committee, the Acting Commissioner of Works and Emergency Services was requested to report on the article "Down and dirty in the GTA" that appeared in the December 8, 2004 edition of the Toronto Star. The article was based on "Shattering the Myth of Pollution Progress in Canada: a National Report", co-authored by Environmental Defence Canada and Canadian Environmental Law Association. That report was based on data contained in Environment Canada's 2004 National Pollutant Release Inventory report.

The Star article focused on the quantity of reported pollutant emissions released to air and water in the Toronto area. It advised that the Toronto area is far more polluted than a decade ago, that emissions for the Toronto area increased 167% between 1995 and 2002; and "sewage treatment plants" are the worst sources of pollution in the GTA.

The Works Committee at its meeting of April 27, 2005 considered a staff report (dated April 7, 2005) in response to the request from the Committee to provide an evaluation of the Star article. The report concluded that the data cited in the Star article as proof of increased levels of pollution in the Toronto area between 1995 and 2002 was misleading, since it was not based on a comparison of similar data sets. Using the data given, it was not accurate to conclude that the Toronto area was "far more polluted that it was a decade ago".

The Works Committee adopted the report and recommended that the Executive Director, Technical Services, provide an annual report to the Works Committee on the City's annual emissions to provide a public reporting process through Council. Subsequently, staffing re-arrangements moved the reporting responsibility to the Toronto Environment Office.

A staff report regarding reported community and corporate emissions in Toronto (dated September 24, 2007) was provided to the Parks and Environment Committee (October 10, 2007) where it was deferred to the November 6, 2007 meeting. At the subsequent Parks and Environment Committee meeting (November 6, 2007) the report was reopened and referred to the Deputy City Manager, Richard Butts, with a request that he report to the following Parks and Environment Committee on November 28, 2007.

Recommendations of the Parks and Environment Committee meeting of October 10, 2007 respecting the deferred and referred report still stand.

COMMENTS

Meeting of Community-Based Experts on Environmental Reporting

In keeping with the Parks and Environment Committee's Recommendation 1b of October 10, 2007 to "meet with experts and correct technical issues, if any, in the report and report on those matters to the November meeting of the Parks and Environment Committee", a meeting was held (November 5, 2007) which was chaired by Councillor Fletcher and attended by Katrina Miller (Toronto Environmental Alliance), Jennifer Foulds (Environmental Defence), Fe de Leon (Canadian Environmental Law Association), John Jackson (Pollution Watch, Great Lakes United) and City staff of Toronto Public Health's Environment Protection Office and Toronto Environment Office.

The experts cited above have expertise and experience in communicating NPRI data to the community.

Consensus and Conclusions for Future Reports

The expert group provided comprehensive input from a strategic perspective concerning community expectations of the content of an annual report concerning NPRI reporting and specific technical feedback on the staff report.

Presented below are the key outcomes provided by the expert group:

- The focus of future reports should go beyond tonnage summaries and be health based and relevant health factors should be included in order to provide a context for the public concerning the relative impact of the reported emissions.

- Utilize data obtained only from NPRI published databases and not from MOE's O.Reg 127/01 database.

- Greater emphasis should be placed on the releases of toxic chemicals from facilities, but discussion of Criteria Air Contaminants should also remain.

- A template for future reports should be developed by the Toronto Environment Office and Toronto Public Health and circulated to expert group for review and comment. Specific suggestions included:

a) the reports should be written in clear language to increase accessibility by the public, include trend analysis and health implications and identify limitations of historical data used and changing reporting requirements and practices;

b) the reports should provide context for the data collected including why the data is collected, from whom and how the information is used (i.e. by reporting facilities, by governments, by the community, including non-governmental agencies), how the information is used to guide policy, and to increase awareness of chemicals used/released by facilities so that they can consider ways to decrease emissions;

c) the reports should include City corporate data as submitted to NPRI and information from City ABCCDs on how they have used the information to consider and implement pollution prevention activities;

d) success stories from Toronto respecting pollution avoidance are to be emphasized and used to encourage others to do likewise. An example cited is the pilot project co-ordinated by Toronto Public Health in a City-operated Print Shop (PDU) facility that demonstrated how, even for an operation with "green" programs underway, tracking environmental information can identify further pollution prevention opportunities. A pollution prevention audit of the PDU identified additional opportunities to improve regulatory compliance, expand environmental programs and proactively communicate with the community; and

e) data and information that would be generated by the proposed Environmental Reporting and Disclosure bylaw, (also referred to at the Community Right to Know by-law) be incorporated into future reports, if the By-law is adopted by City Council.

Relating to the present report, content has been adjusted to reflect consensus points and two technical changes have been incorporated to better reflect the reporting process and information, as follows:

a) NPRI chronology of changes and reporting requirements has been included (Appendix A) and references to reporting being voluntary prior to 2002 has been clarified by noting that reporting on the emission of certain substances was required from the initiation of NPRI in 1993 and that it was legislated under the Canadian Environmental Protection Act in 1999, and that the Criteria Air Emissions were only required to be reported after 2002.

b) References in text and tables to the natural biogenic emissions of volatile organic compounds ("VOCs") in Toronto from trees and other botanical sources has been removed, as scientific understanding of the issue is incomplete at this time and VOCs from trees are not part of the NPRI.

National Pollutant Release Inventory

The NPRI was established in 1992 and was later legislated under the Canadian Environmental Protection Act, (CEPA 1999). The NPRI now requires industrial, commercial, institutional and public works facilities to report information on releases and transfers of specific pollutants to the air, water and land, as well as disposals and off-site transfers for recycling, to the Government of Canada on an annual basis. Environment Canada now makes the information available to Canadians in an annual summary, and maintains an inventory that can be accessed and searched through an on-line database.

Only facilities that meet established reporting criteria, based on size of workforce and/or emissions released, are required to report to the NPRI. Not all the reports that are provided to NPRI are ultimately published; many facilities simply report to confirm they have no "requirement" to report, though they may have had to do so in previous years. The requirements to report to the NPRI are governed by thresholds reflecting the number of employees at a facility as well as the mass or volume of a released substance. All the reports forwarded to the NPRI are not automatically reported on by the NPRI or disclosed on their website. Smaller discharges are exempted from the NPRI report summary and web-site disclosure.

There are currently 341 substances that are identified by the NPRI to be reported by facilities across Canada. Currently there are 8,700 facilities that report to Ottawa their releases and transfers.

Pollutants from mobile sources such as from trucks and cars, or from stationary sources such as households, or facilities that release pollutants on a smaller scale as well as certain sector activities, such as agriculture and some mining activities, are not included in the NPRI but historically have been reported on the NPRI website as emitting Criteria Air Contaminants ("CAC's") only (see Appendix C). These latter "reported data" are model estimated by NPRI or Environment Canada staff to correspond to regionally monitored ambient air quality data rather than reported from private or corporate sources. These area source estimates do not include estimates of toxic chemical or "reported substances" as are released from subject facilities.

CAC's are pollutants to air and include for Environment Canada and NPRI purposes:

- Total Particulate Matter (TPM)
- Particulate Matter less than or equal to 10 microns aerodynamic diameter (PM_{10})
- Particulate Matter less than or equal to 2.5 microns aerodynamic diameter ($PM_{2.5}$)
- Sulphur Oxides (SOx)
- Nitrogen Oxides (NOx)
- Volatile Organic Compounds (VOC)
- Carbon Monoxide (CO)
- Ammonia (NH_3).

These air pollutants affect human health and contribute to air pollution problems such as smog, acid rain, and visibility.

Emissions that are required to be reported are most commonly based on any of several acceptable methods, including emissions estimation models, emission factoring, predictive emissions monitoring, source testing, mass balance equations, and engineering calculations as well as, albeit very rarely, continuous emissions monitoring systems.

Employing continuous emissions monitoring is uncommon. Using techniques to estimate point source emissions (i.e. as from smokestacks and identifiable vents, etc.) results in a well proven, robust and conservative accounting, but estimating the "fugitive emissions" (i.e. non-point source related emissions from a facility's "area") as are associated with a facility's general operations or material storage is often considered to be less reliable and less verifiable.

The individual reports made by facilities are most commonly based on their own emissions estimates using industry specific, but standard, methodologies.

A chronology of the history of the NPRI is presented in Appendix A of this report.

Additional information on the NPRI, including its history, objectives, community perspectives, types of substances reported, relationship to Ontario Regulation 127/102, and an explanation of Criteria Air Contaminants, is presented in Appendix B of this report.

Mandatory Reporting Regulations

There are three reporting regulations "belonging" to three different organizations that have to be adhered to in Toronto by the City and by the owners of industrial facilities alike, which are: the NPRI Inventory; the MOE's Regulation 127/01 ("O.Reg 127"); and Statistics Canada.

NPRI requires facilities to report their emissions into air, water and land, whereas O.Reg 127 only requires facilities to report their emissions into air. Statistics Canada also "collects" Greenhouse Gas ("GHG") emission data on behalf of Environment Canada, but only for GHG emissions from very large GHG emitters. Facilities that emit greater than 100,000 tonnes per annum are considered to be very large and are required to report.

The substance lists and applicable report threshold levels are not identical between NPRI and O.Reg 127 and though harmonized in 2006, O.Reg 127 still requires, above and beyond NPRI requirements, the estimation and reporting of additional volatile organic compounds ("VOCs") and additional fine particulate matter (PM_{10} and $PM_{2.5}$) from a facility. This includes reporting fine particulate emissions from paved and unpaved road surfaces within a facility's property.

Ontario Regulation 127/1

The MOE's Airborne Contaminant Discharge Monitoring and Reporting Regulation (O. Reg. 127/01) came into effect on May 1, 2001. Since then it has been introduced in phases and now applies to all O.Reg 127 designated industries which include electric power generators (Class A); iron and steel manufacturer, petroleum refineries and chemical manufacturers (Class B); bulk dry cleaners; waste management services; and auto body repair services (Class C).

The MOE harmonized its reporting requirements with those of the NPRI in 2006. The amendment to O.Reg 127 has removed substances that must be reported elsewhere and has de-listed substances considered to present minimal risk to the environment or human health. However, additional details regarding VOC emissions to air and emissions of fine particulate matter from roads at a facility are still reported to O./Reg 127.

All Ontario based reporting facilities report via the national web-based reporting system called OWNERS (the "One Window to National Environmental Reporting System") to fulfil NPRI and O.Reg 127 requirements alike.

Facility Greenhouse Gas Emissions Reporting (Federal)

The Federal government requires facilities that emit the equivalent of 100,000 tonnes or more of Greenhouse Gases (in equivalent CO_2 units or "eCO_2") to report their emissions to Statistics Canada's GHG Emissions Reporting program. Few emitters have to report. For example, the City has only had to report on 2 of its 23 public works related facilities. Toronto's landfill-related methane emissions from only two of its former landfill sites, Keele Valley and Brock West (both beyond the City's boundary), are required to report to Statistics Canada. Statistics Canada forwards the data to Environment Canada.

No facility or industry within the boundary of Toronto emits as much as 100,000 tonnes, and is therefore not required to report. Across Ontario, of the 79 facilities in 2004 and 83 facilities in 2005 that reported and were published by Environment Canada, none were in Toronto.

The Federal GHG Emissions Reporting program is not synonymous with the federal National Inventory Report ("NIR"), which contains GHG emissions data and is submitted to the United Nations Framework Convention on Climate Change (UNFCCC) annually.

The emissions from all of Toronto's landfills are individually published by the City in partnership with the Toronto Atmospheric Fund, in "Greenhouse Gases and Air Pollutants in the City of Toronto" (2007) [http://www.toronto.ca/taf/pdf/taf-inventory-0606.pdf].

NPRI Reporting - Toronto's Emissions

1994 is the first year for which comprehensive reported emissions data is available from NPRI for Toronto; 2005 is the most recent year for which it is fully available.

Between 1994 and 2001 reporting to NPRI was of questionable completeness and accuracy; not all emissions were reported and many of those that were, may have been inaccurately estimated or reported. The data for the first mandatory reporting year of CAC's (2002) includes several major anomalies in the data from community facilities in Toronto that may represent actual conditions, but are more likely the consequence of misunderstandings with the details of the newly introduced requirements that lead to reporting errors which probably have still to be fully verified and are still subject to potential change.

The data reported for 2003, 2004 and 2005 should be considered more representative of the reality, than data for the years up to and including 2002. Data for 2006 is expected to be fully released by NPRI in the Fall of 2007. Some data is already available in draft form but it is not complete and is subject to query, review and alteration. The 2006 data will form the basis for TEO's next annual report and Technical Appendix.

What does NPRI Reporting mean to Toronto?

The intent of the data collection and publishing process required and undertaken by NPRI is to provide the public of Canada with access to basic information about pollutants as emissions released, disposed or transferred in their community.

The public can access NPRI's data about facilities in Toronto by going to NPRI home page and accessing "On-line Data Search", "Location-based Search" and entering "M" (rather than first three letters/digits of postal code as instructed) to see a listing of 370 facilities (as of November 4th 2007 for 2005) that are published as reporting in Toronto.

"Clicking- on" each facility (by name or by NPRI ID) reveals the substances and amount reported. Entering and searching by the first three digits of a postal code (i.e. the "Forward Sorting Area") will reveal industrial facilities reporting within that geography. However, care needs to be taken in accepting all such data too readily. For example, within the currently identified 370 facilities are included facilities located far from Toronto – including power generating facilities in Northern Ontario.

On the same page a tabulation of CAC's is included (currently updated to March 2007) for the selected area of search ("M" is Toronto in this example).

The Toronto data presented in Appendix C has been taken from an NPRI combined database of May 2007 which does not include the O.Reg 127/01 reports for Toronto as found on the non-combined NPRI database. The database used by TEO has also been

checked and verified to remove such inconsistencies as non local inclusions by TEO. A mechanism to track NPRI's corrected changes as between their various databases would be very beneficial for all users.

These are emission estimates as developed for air quality modelling purposes and matched to monitored ambient air quality concentrations) for the selected area. Emissions from all sources (point, area, mobile and open sources) are aggregated and summed up by source category. The uncertainty in the data is much larger for smaller geographic areas (i.e. postal code, urban centres and communities).

The ability to access NPRI data allows residents of Toronto to examine the emissions that originate in their own neighbourhoods. As emissions do not equate with ambient or local existing concentrations, this does not indicate what people breathe as concentrations are effected by external factors, such as trans-boundary air movements.

NPRI, and by their own admission, does not include any health impacts relating to the emissions, nor can such be inferred without further detailed health focussed analysis of the emissions and the resultant concentrations in land, air and water.

How does NPRI link to Pollution Prevention?

Environment Canada, defines pollution prevention as "the use of processes, practices, materials, products, substances or energy that avoid or minimize the creation of pollutants and waste and reduce the overall risk to the environment or human health" (CEPA, 1999). Effectively, pollution prevention changes the focus from the "end of pipe" to the "start of pipe", or at least moves the focus "back up the pipe".

Pollution prevention is about avoiding the creation of pollution and waste rather than trying to clean it up or manage it after the fact. Traditionally, waste has been managed through treatment, control equipment, and land filling which are also referred to as "end-of-pipe". Pollution prevention involves moving or looking "up the pipe" to determine how to best eliminate or reduce waste at the source.

Remediation, disposal and pollution control have environmental benefits and are important environmental protection efforts but are not as effective as avoiding the creation of waste and pollution in the first place. Pollution prevention is Environment Canada's preferred approach to environmental protection.

Facilities that are required to report to the NPRI (based on the criteria and thresholds cited above) are also required to report their pollution prevention actions to NPRI. The requested information concerning pollution prevention is mostly qualitative in nature but allows the opportunity for facilities to comment on any quantitative results they may have.

The act of requiring a facility to report makes facilities aware of their emissions into the environment and this can encourage and lead to operational changes to reduce use of substances that lead to reporting requirements.

How does Toronto's Sewer Use By-Law relate to Pollution Prevention?

The City of Toronto's Sewer Use By-law, (Municipal Code, Chapter 681), is designed to protect water quality. It sets strict limits on heavy metals and toxic organic compounds in wastewater discharged to the sanitary and stormwater sewers and natural watercourses, helps facilities identify ways of reducing and/or eliminating pollutants at source, and works to improve the quality of biosolids.

The City of Toronto is one of the first municipalities in Canada to incorporate pollution prevention requirements into its Sewer use By-law.

The key objectives of Toronto's Sewer Use By-law are to:

- help facilities identify ways of reducing and/or eliminating pollutants at the source;
- continuously improve the quality of biosolids; and
- protect water quality.

The new by-law established more stringent limits on most of the 11 heavy metals found in the Ontario Guidelines for Utilisation of Biosolids and Other Wastes on Agricultural Land and includes 27 toxic organics.

What isn't addressed by NPRI?

The NPRI does not require data to be submitted from smaller facilities or from large facility that are below the reporting criteria. Thresholds are typically based on the mass of emissions and number of employees and are considered high by many. A total of 8,900 facilities currently report to NPRI from across the whole of Canada.

NPRI data from facilities represent only some of the chemicals released and transferred to the environment. Other substances, such as greenhouse gases, many pesticides, and other pollutants, are not part of the current list of NPRI substances.

Although the NPRI program collects data on the release and transfer of pollutants from a broad range of industrial and non-industrial sectors, not all sources in those sectors are obliged to report to the NPRI. Some facilities are exempt or do not meet the reporting

thresholds because of their size. Other sources, such as mobile sources, commercial establishments and households may release small amounts of pollutants individually, but as a group they can account for a very large portion of the releases of some pollutants.

Different factors must be considered before drawing conclusions about the environmental performance of specific industrial sectors. It is important to consider the relative size of the facility, the complexity of the process and the technologies that are available. It would be wrong to assume that facilities or industrial sectors with the largest releases or transfers are less inclined than others to prevent and control pollution. Consideration should also be given to the fact that the NPRI list of substances and reporting criteria may change, and very often has changed, from year to year.

Risks to the environment and human health from on-site releases of pollutants cannot be determined from NPRI data alone. Risk depends on many factors, such as the toxicity of the pollutant, the extent of the exposure, the type of release or transfer and the environment in which the pollutant is released. Identifying report thresholds does not identify safe pollution levels.

What does NPRI say about Pollution and its Trends?

The total tonnes of reported "substances released" into Toronto's air, water and land, as well as their combined total, for the years 1994 to 2005 are shown in Table 1: "Reported Substance Release in Toronto (1994-2005)", enclosed in Appendix C.

The overall trend between 1994 and 2005 is one of increased "reported emissions". A discontinuity clearly exists at 2002, especially in respect to "emissions to air", which jump from amounts in the 3,000 to 4,000 tonne range, before 2002, to amounts in the 17,000 to 18,000 tonne range, after 2002. This is due to the changed reporting requirements rather than changed emission levels.

The reported "emissions to land" are of very small amounts prior to 1999 and again after 2002 and probably reflect the changes in reporting requirements and their common interpretation and understanding. In 2002, and since then, the emissions that were previously reported as "emissions to land", are included in the "disposal to land" (see Table 4, Appendix C).

The pattern of gradually increasing releases to water between 1994 and 2005 follows the changes in reporting procedures followed by the City (and its predecessors) rather than operational changes and is discussed more fully in the next section (see "What does NPRI say about the Corporation of the City of Toronto's Pollution and its Trends").

The City is the reporting source of effectively 100 percent of the emissions to water resulting from the City's operation of wastewater treatment plants that receive effluent from the community as a whole, including industry, via the sewer system network and treat the wastewater before discharging it, in keeping with established guidelines and

standards, into Lake Ontario through outfalls several kilometres offshore. In large part, the inferred "real increase" is a function of the City's growing population and growing economic size and vitality.

The overall change (by tonnage) for all emissions as to land, air and water and between 2004 and 2005 is 12 tonnes, or 0.03%. This represents an increase of releases to water and a reduction of the releases to air, while the releases to land remained essentially constant.

Table 4: "Reported Disposal in Toronto (1994-2005)" enclosed in Appendix C, presents a summary of the tonnage disposed or recycled in Toronto between 1994 and 2005. The amounts disposed and recycled have both followed an upward trend since 1994, with a maximum amount recycled in 2005 and a maximum amount disposed in 2003. There has, however, been a marked increase in the amounts disposed by a facility at its own site (or "on-site") since 2002. "On-site" disposal most commonly involves injection into underground wells.

It is not clear if the one facility reporting this activity in Toronto for 2005 actually does this. The Director of the TEO will request in writing that NPRI staff clarify this matter.

What Does NPRI say about the Corporation of the City of Toronto's Pollution and its Trends?

Since the first year of mandatory reporting the City has estimated and reported emissions from 24 operational facilities to NPRI, the MOE (O.Reg. 127/01) and Statistics Canada (GHG data forwarded to Environment Canada). A total of nine City Corporation facilities (four wastewater treatment plants, four water treatment plants and one closed landfill) report to NPRI. Of these, the one landfill and the four wastewater treatment plants plus a further four water treatment plants, seven solid waste transfer stations and six garages or yards also report via NPRI to O.Reg 127.

One facility, the City's Print Shop, has changed its operational practices and the substances employed in their processes since 2004 and no longer has emissions to report. Two facilities (Brock West and Keele Valley landfills) report to the Statistics Canada maintained GHG inventory.

There were 23 City Corporation facilities that reported to NPRI and O.Reg 127 and Statistics Canada in 2005, but only 8 are published by NPRI - four wastewater treatment plants and four water treatment plants. The data reported by the other corporate facilities that report via NPRI to O.Reg 127 are, however, available via links on the NPRI website. Data reported to Statistics Canada is only published on the GHG Inventory website.

The largest emitters of "reportable substances" from the City facilities are the City's wastewater treatment plants. The pattern of increased releases to water as between 1994 and 2005 has been identified as being a consequence of two independent characteristics:

a) the City is the recipient, and treats, all wastewater from all residential, commercial, institutional and industrial sources in Toronto and discharges the treated effluent to the lake; and

b) the reporting procedures and requirements to be followed have been upgraded resulting in a significant increase in the amounts reported rather than the amounts released.

The substances with the two largest releases to water from the wastewater treatment facilities are ammonia and nitrate. Almost all of the ammonia and nitrate in the wastewater process originates from human and animal waste. The Provincially established standards for the concentrations of these compounds contained in the treated wastewater that is released to the lake are very low, only 15 mg/L or less for ammonia and less than 40 mg/L for nitrate.

The standard for drinking water is obviously lower at 10 mg/L for nitrates and the provincial water quality objective is even lower at 20 µmg/L for ammonia. The Ashbridges Bay Treatment Plant, for example, discharges an average of 8.2 mg/L of nitrates in the treated effluent to the lake. At these concentrations their effect on the lake water quality is negligible. The Canadian standard for nitrate in drinking water is less than 45 mg/L.

The original source of the emissions to water reported by the City's wastewater treatment plants is homes, businesses and industries. The homes, businesses and the industries that have permits with the City of Toronto to discharge into City sewers do not report emissions to water to NPRI as NPRI wants to avoid double counting the discharge. The reason the City's treatment plants can be labelled as big single sources is a function of the City's population and economic size.

What Does this Report Answer?

This report indicates the background, strengths and limitations of NPRI – not just the data. The relevant data can, however, be found as summarized in Appendix C, which depicts data for the City "Corporation" and the Toronto "Community" respecting "releases" to land, air and water in Toronto.

The main body of the report is supported by five appendices, listed alphabetically from "A" to "E":

- Appendix A History of the NPRI
- Appendix B Questions and Answers Concerning the NPRI
- Appendix C The Big Picture Corporate and Community Data
- Appendix D Comparisons and Context
- Appendix E Emissions by Ward and Spatial Distribution.

What Doesn't This Report Answer?

Like the NPRI it portrays, this report indicates emissions but not their significance, presence or their impact or concentrations in the environment (land, air and water) nor their cumulative or ecotoxic impacts. This report also does not attempt to the address public or environmental health impacts of the releases.

This report, though reporting on the NPRI data, identifies the City's priority context is with health – the health of people and the health of the environment. To which end, this report carries a recommendation that TEO and Toronto Public Health collaborate in the design of a joint reporting process for future annual reports.

Future reports may require additional resources to accomplish this appropriately and will be reported on separately.

How does this Report Link with "Community Right to Know"?

The current NPRI requirements do not require reporting from the majority of Toronto facilities that may use or emit chemical substances. Currently about 11,000 Toronto businesses may be using chemicals but just 370 report to and their reported data is published by the NPRI.

The Board of Health has requested that Toronto Public Health develop a proposed Environmental Reporting & Disclosure bylaw that fills the information gap. The proposed bylaw would require certain businesses to annually report to the City if they use or release chemical substances that are of greatest concern to health. In addition it may require reporting of greenhouse gas releases. A report from the Medical Officer of Health concerning the proposed by-law is scheduled for submission to City Council in 2008.

The intent of the bylaw is to help businesses become more aware of their use and release of these chemicals and greenhouse gases and find ways to prevent this pollution. The data collected is also intended to be publicly accessible and provided in a manner that helps the public understand the information.

If Council endorses the bylaw, the information collected would be considered, along with the data collected through the NPRI process, in annual reports authored by Toronto Public Health and the Toronto Environment Office.

CONCLUSIONS

The change in emissions by facilities in Toronto reporting to NPRI between 2004 and 2005 is very minor. The total emissions reported in 2004 were 39,824 tonnes. In 2005 there were an extra 12 tonnes (or an extra 0.03%) reported for a total of 39,844 tonnes. There were, however, fewer air emissions, similar land emissions, and more emissions to water that balanced to the 12 tonne increase.

NPRI addresses the larger emissions from mostly larger facilities that exceed tonnage based and employee count based thresholds for reporting. NPRI does not attempt to capture small business and facilities, and those that are under the reporting thresholds. In Toronto, the possibility of obtaining data of these omissions is to be addressed as part of the Environmental Reporting and Disclosure bylaw scheduled to be brought forward by the Medial Officer of Health in 2008.

The emissions of the City of Toronto should be fully presented in future annual reports as the Corporation should lead-by-example. TEO acts as the liaison and clearing house between NPRI and all City divisions and will continue to be able to present the data submitted by City Divisions to NPRI in future. TEO does not have similar access to the City's ABCCs. It is recommended that such information, and all similar information, should be provided to TEO to benefit future evaluation and reporting.

The Toronto Community data presented in Appendix C has been taken from an NPRI database of releases occurring in 2005 as was amended by NPRI in May 2007 and has been checked and verified to remove inconsistencies by TEO. NPRI also verify and improve the accuracy of their data bases from time to time.

In order to improve the content and accuracy of future annual reports the Director of the Toronto Environment Office will request Environment Canada and the Ontario Ministry of the Environment to:

i. provide all written comments requested and received from all reporting facilities located in Toronto regarding requested clarifications on identified anomalies and significant changes from year to year, in order to permit for accurate analysis and understanding of changing emissions in Toronto; and

ii. provide date stamps to all changes to their annual databases, following initial approved web-based publication, to facilitate the recognition of adopted changes over time.

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ATTACHMENTS

Appendix A History of the NPRI
Appendix B Questions and Answers Concerning the NPRI
Appendix C The Big Picture – Corporate and Community Data
Appendix D Comparisons and Context
Appendix E Emissions by Ward and Spatial Distribution

Appendix A.

HISTORY OF THE NPRI

The NPRI was created in 1992 to collect data on pollutants of concern in Canada. Facility reporting requirements were established shortly afterwards. The first publication of any reported data relates to 1993 but data for 1994 is taken as the preferred starting point of significance.

The NPRI was subsequently legislated in 1999 under the *Canadian Environmental Protection Act, 1999, subsection 46(1).* Consequently, NPRI reporting is now both a legal and mandatory requirement and applies to those who release or dispose of specified substances in amounts greater than established thresholds and/or where the number of facility workers employed is greater than established thresholds.

The key milestones in the history of the NPRI include:

1992	NPRI was established.
1993	NPRI list of Part 1 substances was created and expanded based on a uniform 10 tonnes "Manufactured, Processed or Otherwise Used" threshold for reporting.
1995	Introduction of by-product definition and changes to 10 tonnes threshold to capture large releases of substances at low concentration.
1995	First data of Reported Substances was released – data related to 1993.
1997	General review of the NPRI resulted in mandatory reporting of pollution prevention activities and the voluntary reporting of (recycle, reduce and re-use) activities.
1998	Ad Hoc Work Group on Substances formed.

1999	NPRI was legislated under the Canadian Environmental Protection Act, (CEPA 1999).
1999	73 substances added to NPRI.
2000	A permanent consultative process was developed, including the establishment of a Multi-stakeholder Work Group on Substances and a document on how to propose changes.
2002	Criteria air contaminants were added (NOx, SOx, VOC, CO, TPM, PM_{10}, $PM_{2.5}$) with release thresholds and new data requirements - stack height, etc.
2003	Speciated volatile organic compounds (VOCs) were added in Part V.
2005	On-line electronic reporting mechanism called "One Window to National Environmental Reporting System" (OWNERS) was launched.

(after: http://www.ec.gc.ca/pdb/npri/consultations/2006-2008/FinalReport/p1_e.cfm#1)

Appendix B.

QUESTIONS AND ANSWERS CONCERNING THE NPRI

What are the Objectives of the NPRI?

The objectives of the NPRI are described by Environment Canada as follows:

- to track releases and transfers of substances of concern
- to improve public access to pollution information
- to provide information to identify and take action on environmental priorities
- to provide information to implement policy initiatives and risk management measures
- to provide information to encourage voluntary action
- to track progress in pollution prevention
- to support targeted regulatory initiatives
- to support international reporting commitments.

How Does NPRI Help Communities Address Pollutants?

NPRI data is considered to be useful for a wide variety of stakeholders, including community groups, reporting facilities, governments, and for the purposes of bilateral arrangements between the United States and Canada.

The NPRI provides access to information on the releases and transfers of key pollutants in communities. It is the only national, legislated, publicly accessible Canadian emissions inventory. Data can be identified in respect to specific industries and for specific communities.

The NPRI inventory is a major starting point for identifying and monitoring sources of pollution. The NPRI inventory is an important consideration in managing risks to the environment and human health as well as in monitoring indicators for the quality of our air, land, and water. It is also emerging as an indicator for corporate environmental performance and a tool to encourage and promote pollution reduction.

Who Is Required to Report?

Companies operating facilities as well as other institutions and commercial enterprises that release substances to land, air or water that meet the reporting thresholds for substances identified in the Canada Gazette are required to report.

Many specific substance thresholds relate to a 10 tonne release threshold, another key threshold is the 20,000 employee-hours-per-year threshold, and a third threshold is substance concentration percentage being greater than 1%. All three threshold criteria are typically taken together such that it is necessary at a facility to have more than 20,000 employee-hours, and more than 10 tonnes of a listed substance involved in the manufacture, processing or otherwise used at the facility, and a greater release concentration than 1% to be required to report.

However, if a facility is engaged in waste or sewage sludge incineration, wood preservation, fuel terminal operations or municipal waste water collection and treatment it is necessary to report regardless of the number of employees.

What Types of Information Must Be Reported?

If a facility meets the NPRI reporting thresholds for the list of substances specified, that company must report the following:

- information about the company, its location and number of employees
- information about each substance that meets the reporting requirements, including the substance name and Chemical Abstracts Service registry, the nature of the activities (such as whether the substance is manufactured, processed or otherwise used at the facility),
- the quantity of the substance that is released at the facility to water, air or land, underground injection and/or

- the quantity of the substance that is transferred off site to another location for final disposal or treatment prior to disposal and the nature of the treatment
- the quantity of each reported substance that is transferred off-site for recycling and for energy recovery, and the address of the receiving facility
- the reasons for year-to-year changes in releases, transfers and recycling
- information on anticipated changes (mandatory for the three years following the reporting year) in releases, transfers and recycling, and
- information on the types of pollution prevention activities undertaken at the facility.

Who Does Not Report to NPRI?

Only facilities that meet established reporting criteria are required to report to the NPRI. Many other pollutant releases are not included as part of the required reporting but are estimated and reported separately under separate programs. This includes pollutants from:

- mobile sources such as trucks and cars, boats, trains and planes
- household sources such as basement furnaces and boilers
- fugitive sources such as from facilities
- smaller facility sources that release pollutants on a smaller scale, and
- certain sector sources such as agriculture, education and some mining activities.

What is reported?

Substances that are either “a release” to land, air or water, or are “a disposal” or “a transfer” to land may have to be reported. Information about the facility and its operations also has to be reported as do pollution prevention measures employed, even though undertaking such measures remains voluntary.

What is considered a Release?

A release is an on-site discharge of a pollutant to the environment. This includes emissions to air, discharges to surface waters, releases to land within the boundaries of the facility and underground injection.

Releases are further subdivided as follows:

1. Releases to Air: stack/point, storage/handling, fugitive, spills, other non-point
2. Releases to Surface Water**:** direct discharge, spills, leaks
3. Releases to Land**:** landfill, land treatment, spills, leaks, other
4. Underground Injection.

Releases to surface waters do not include transfers to municipal sewage treatment plants.
These are considered transfers to off-site facilities and are reported accordingly.
A leak differs from a spill in terms of the time required for an event. Spills normally occur over a period of hours to days, whereas leaks occur over periods of days to months.
Underground injection is one method of waste disposal. Wastes are injected into known
geological formations, generally at great depths. One facility in Toronto reported this type of release in 2005 but it has not been possible to confirm that it was an accurate report. TEO will undertake follow-up clarification with staff of NPRI.

What is a Transfer for Disposal?

A transfer is a shipment of a listed pollutant in waste to an off-site location. Facilities must provide the name and location of the off-site facility receiving the shipment. Waste is defined as material that is sent for final disposal or for treatment prior to final disposal.

Five treatment methods are listed for off-site transfers for disposal:

1. physical treatment such as encapsulation and vitrification,
2. chemical treatment such as stabilization and neutralization,
3. biological treatment such as bio-oxidation,

4. incineration or thermal treatment where energy is not recovered, and
5. municipal sewage treatment plant (MSTP).

Additionally, there are four off-site disposal methods listed:

1. containment in a landfill,
2. containment in other storage,
3. underground injection where pollutants are injected into known geologic formations, and
4. land treatment used for the purpose of land application or land farming.

Off-site transfers for disposal are reported separately from on-site releases because:

- off-site transfers represent a movement of the pollutant to a different geographic location than that of the facility
- transfers off-site may not necessarily represent entry of the pollutant into the environment
- management of the pollutant becomes the responsibility of another owner or operator
- reporting on off-site transfers completes information on fate of the pollutant, and
- wastes could be transferred a number of times leading to some double counting.

The NPRI requires that only the quantity of the listed pollutant in the waste be reported.
Waste materials, such as sludge, are often a mixture of many compounds associated with
water and other inert material with a small quantity of potentially hazardous pollutants. As a result, the total reported to the NPRI may be smaller than the quantity reported in other inventories since only the net weight of a listed pollutant is reported.

What are the Substances that have to be reported?

The 341 substances that had to be reported on for 2005 were identified and published in the Canada Gazette, Part 1, February 25, 2006. A full listing of all the 341 substances that had to be reported on is provided in Appendix C to this report.

The NPRI substances are grouped into five parts based on their reporting criteria as follows:

Part 1A Substances Core Substances

- Reports are required for substances in this section if they are manufactured, processed or otherwise used at a facility in a quantity of 10 tonnes or more and employees (including contractors) worked 20,000 hours or more at the facility.

Part 1B Substances Alternate Threshold Substances

- Reports are required for substances in this section if they are manufactured, processed or otherwise used at a facility in a quantity of 50 kilograms or more and employees (including contractors) worked 20,000 hours or more at the facility.

Part 2 Substances Polycyclic Aromatic Hydrocarbons

- Reports are required for substances in this section if Polycyclic Aromatic Hydrocarbons (PAHs) are incidentally manufactured, and released, disposed or transferred from a facility in a combined quantity of 50 kilograms or more and employees (including contractors) worked 20,000 hours or more at the facility. Wood preservation facilities have to report regardless of release quantity.

Part 3 Substances Dioxins, Furans and Hexachlorobenzene

- Reports are required for substances in this section if the facility is engaged in one or more specific activities.

Part 4 Substances Criteria Air Contaminants (CAC's)

- All facilities are required to consider 's released from stationary combustion equipment, in the quantities listed below, regardless of the number of employees. Facilities with greater than 20,000 employee-hours (including contractors) must consider all sources of the 7 identified CAC substances. Facilities with less than 20,000 employee-hours report only on a four substance subset if the facility releases 20 tonnes or more of the identified four CAC's to the air.

The full listing of all the substances that have to be reported is included in Table 6 in Appendix C. Further details can be found on the NPRI web site at http://www.ec.gc.ca/pdb/npri/2006Guidance/brochure2006/brochure2006_e.cfm

How is the Required Data Reported?

A combined Federal-Provincial reporting system has been created for reporting facilities. An on-line electronic reporting mechanism called "One Window to National Environmental Reporting System" (OWNERS) was launched in March 2005 and was first used to collect data for the 2004 reporting year. It was developed by Environment Canada, in collaboration with provincial partners and other stakeholders. It is fully supported by the NPRI, which also played a significant role in developing the system.

Though reporting has been harmonized, public access routes to the submitted data have not been harmonized. Data from Toronto facilities is uniformly sent via OWNERS to Environment Canada and to the Ontario Ministry of Environment (On MOE), after which it is separated and NPRI required data is "sent" to the NPRI data base and O.Reg 127/01 data is "sent" to the MOE data base.

What is reported Under Environmental Performance Agreements?

In June 2001, Environment Canada published the Policy Framework for Environmental Performance Agreements. Environmental Performance Agreements (EPAs) are non-legislative agreements, which meet core design criteria and have been negotiated among parties to achieve specific environmental results. EPAs are voluntary initiatives that stem from Environment Canada's experience with Memoranda of Understanding. To ensure a one-window approach for reporting information to Environment Canada, EPA reporting requirements have been integrated into the NPRI reporting software. (Further details can be found at http://www.ec.gc.ca/epa-epe.)

What is reported to the Ontario Ministry of Environment (Ontario Regulation 127/012)?

On May 1, 2000, the MOE introduced The Airborne Contaminant Discharge Monitoring and Reporting Regulation [O.Reg.227/00] as its first phase of its air emissions monitoring and reporting regulation. This regulation only applied to the electricity generating sector and required mandatory monitoring and reporting on 28 key pollutants including carbon dioxide, oxides of nitrogen and sulphur

dioxide, which contribute to climate change, smog and acid rain. Air releases for only 8 months in 2000 were reported under this regulation.

On May 1, 2001, MOE announced Ontario Regulation 127/01[O.Reg.127/01], which expanded the previous regulation to cover industrial, commercial, institutional and municipal facilities for 358 substances, including the NPRI substances. Additional substances included methane, carbon monoxide, particulate matter and volatile organic compounds. Seasonal reporting for some substances for which seasonality was a critical factor such as smog formation became mandatory as well. The first annual reporting deadline for O.Reg.127/01 was June 1, 2002.

In May 2001, the Ontario Ministry of the Environment (MOE) issued the Airborne Contaminant Discharge Monitoring and Reporting Regulation (O.Reg.127/01) under the authority of the Ontario Environmental Protection Act. In response to requests from industry for a one-window approach to reporting to inventories, Environment Canada worked with the MOE to include the reporting form for O.Reg.127/01 within the NPRI reporting form.

Unlike the NPRI reporting which applies to releases and disposals to land, air and water, Ontario Regulation 127/01 only relates to releases to air.

What are Criteria Air Contaminants?

Criteria Air Contaminants (CAC's) are pollutants to air and include for Environment Canada and NPRI purposes:

- Total Particulate Matter (TPM)
- Particulate Matter less than or equal to 10 Microns (PM_{10})
- Particulate Matter less than or equal to 2.5 Microns ($PM_{2.5}$)
- Sulphur Oxides (SOx)
- Nitrogen Oxides (NOx)
- Volatile Organic Compounds (VOC)
- Carbon Monoxide (CO)
- Ammonia (NH_3).

These air pollutants affect human health and contribute to air pollution problems such as smog, acid rain, and visibility.

CAC emissions are summarized by Environment Canada in national emission inventories which include measures and/or estimates of the emissions from various sources such as transportation vehicles, residential fuel combustion, landfill sites, incineration, paved and unpaved roads, forest fires and industrial sources. The emission inventories, trend and projections were compiled in a collaboration between national, provincial, territorial, and regional environmental agencies using the latest emission estimation methodologies and statistics.

The national emission inventories for CAC's are to be updated annually by Environment Canada. The 2006 emissions inventory is expected to be available in the spring of 2008.

Why Were CAC's Added to the Reporting Requirements?

Environment Canada had two reasons for adding CAC's to the NPRI substance list in 2002. One was the need for more comprehensive data for domestic and international inventories and programs. The other reason was to provide information to the public. Information about CAC emissions enables governments to monitor and assess whether risk management for various sources of CAC's is resulting in lower emissions. For modelling air quality and other purposes, emission inventories are needed for all sources of emissions – industrial, commercial, mobile, natural and household. Inventories that contain all sources of emissions are referred to as comprehensive emissions inventories.

What Greenhouse Gas Reporting Obligations do Facilities Have?

Greenhouse gas emissions are reported separately from NPRI requirements. Statistics Canada requires facilities that produce more than 100,000 tonnes equivalent carbon dioxide (eCO_2) annually to report their emissions. No facilities within the boundaries of Toronto emit above this reporting threshold. However, two former landfills under the care and control of Toronto Solid Waste Management are reported on to Statistics Canada. Statistics Canada forwards the GHG emissions data to Environment Canada.

Appendix C.

THE BIG PICTURE – CORPORATE AND COMMUNITY DATA

Terminology Employed

In this document the following terminology is adhered to. Any substance "released" to land, air or water is a "Release". This includes the original NPRI term for "Released Substances" (RS) as well as the later included "Criteria Air Contaminants" (CAC's). Both sets of substances are, of course, reported, but it permits clarification and emphasis to be placed on the toxics and heavy metals and the carcinogenic substances when necessary and avoids subsuming this important group within "Reported Substances".

This report tracks releases from both the City of Toronto, essentially from City Divisions such as Toronto Water and other service providers (but not from its associated agencies, boards, commissions and corporations) as well as from all other facilities and enterprises that report to (or via) NPRI in the Toronto "community". The Toronto community is comprised primarily of private sector industrial facilities, commercial enterprises and institutional bodies including hospitals, but not primary and secondary schools. Some government and government related bodies are also included, such as the Greater Toronto Transit Authority.

The adopted simplification of terms adopted in this report to distinguish the two groupings is "Corporation" (i.e. City government facilities) and "Community" (i.e. facilities and enterprises in the private sector and institutional facilities). The term "Combined Community and Corporation" is adopted to represent "all", to ensure clarity.

All data in all tables are consistently presented in tonnes.

Part 1 Trends through Time – Annual Totals Compared (Tonnes)

The Community of Toronto's (including Corporation) Reported NPRI Emissions 1994 to 2005

The total tonnes of reported "substances released" into Toronto's air, water and land, as well as their combined total, for the years 1994 to 2005 are shown in Table 1a: "Reported Substance Releases in Toronto (1994-2005)", presented below.

The overall trend between 1994 and 2005 is one of increased "reported emissions". A discontinuity clearly exists at 2002, the first year for the reporting of Criteria Air Contaminants (CAC's) as part of the releases or "emissions to air", which jump from amounts in the 3,000 to 4,000 tonne range, before 2002, to amounts in the 17,000 to 18,000 tonne range, after 2002. This is due to the changed reporting requirements rather than changed emission levels. The reported "emissions to land" are of very small amounts prior to 1999 and again after 2002 and probably reflect the confusions surrounding the changes in reporting requirements and their common interpretation and misunderstanding. In 2002, and since then, the emissions that were previously reported as "emissions to land", are included in the "disposal to land" (see Table 2, below).

The pattern of gradually increasing releases to water between 1994 and 2005 follows the changes in reporting procedures followed by the City (and its predecessors) rather than operational changes and is discussed more fully in the section below. The City is the reporting source of effectively 100 percent of the emissions to water resulting from the City's operation of wastewater treatment plants that receive effluent from the community as a whole, including industry, via the sewer system network and treat the wastewater before discharging it, in keeping with established guidelines and standards, into Lake Ontario. In large part, the inferred "real increase" is a function of the City's growing population and growing economic size and vitality.

Table 1a and Figure 1 depict the pattern of "Releases" in Toronto as they were reported to NPRI in the period 1994 to 2004. The reported substances, reporting thresholds and reporting facilities were not constant over this time period.

The overall pattern of releases shows a similarity of released totals (i.e. to air, water and land combined) between 1994 and 1996, but a marked increase in the amounts emitted to water in the period 1997 through 2002.

The releases to land increase greatly between 1999 through 2001, but are effectively diminished to previous levels from 2002 through 2005.

The releases to water increase by obvious steps in 1997 and 2002-2003. These changes very largely reflect changes in NPRI reporting requirements and Toronto Water's compliance. Toronto Water's predecessor (Metro Toronto, Public Works) began reporting in 1997 and changed and improved its reporting methodology in 2003 and 2004 respectively, thereby changing the base condition from a norm of between 5,000 and 8,000 tonnes to a current norm of approximately 23,000 tonnes.

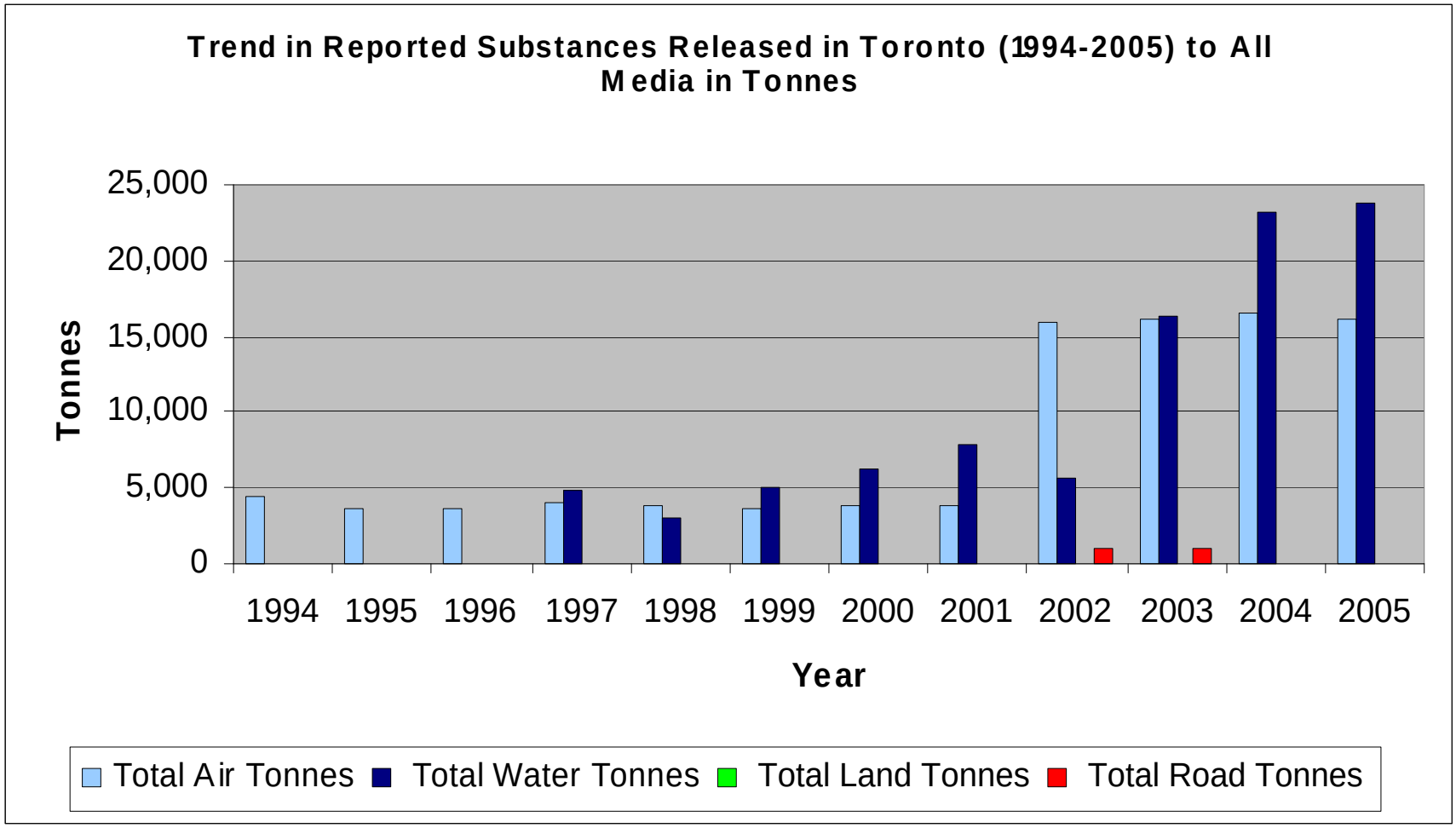
The emissions to air show a marked increase at the time of the start of mandatory reporting of Criteria Air Contaminants as in 2002 from a previous norm of approximately 3,500 to 4,000 tonnes to a new norm of approximately 17,000 to 18,000 tonnes. This is interpreted as an effectively constant emissions situation but one depicted within changed reporting requirements.

The overall change (by tonnage) for all emissions as to land, air and water and between 2004 and 2005, is 12 tonnes, or 0.03%. This represents an increase of releases to water and a reduction of the releases to land, while the releases to land remained essentially constant.

Table 1a: Trend in Reported Substances Released in Toronto (1994-2005) to All Media in Tonnes.

Year	Facility Count	Total Air Releases	Total Water Releases	Total Land Releases	Total Releases
1994	163	4,394	5	0	4,399
1995	153	3,670	6	0	3,677
1996	160	3,675	6	0	3,681
1997	167	3,988	4,818	0	8,806
1998	165	3,772	3,050	0	6,823
1999	162	3,631	4,990	41	8,662
2000	175	3,817	6,343	85	10,244
2001	194	3,789	7,945	35	11,769
2002	298	16,014	5,579	0	21,594
2003	324	16,201	16,302	0	32,503
2004	337	16,564	23,260	0	39,824
2005	334	16,064	23,780	0	39,844

Figure 1: Graphical Depiction of Data in Table 1.



Trends in the Corporation's releases are shown below in Table 1b which indicates the inclusion of Criteria Air Contaminants (CAC's), from 2002 onwards, and the changes in reporting procedures as followed by the City of Toronto in regards to releases to water in 2003 and again in 2004. The adjustments in reporting procedures can be clearly seen in 2002 for releases to air, and in 2003 for releases to water.

Table 1b: Trend in Reported Substances Released by the City of Toronto Corporation to All Media in Tonnes.

Year	Corporation Releases To Air	Corporation Releases To Water	Corporation Releases To Land	Corporation Releases To All
1994				
1995				
1996				
1997	28.7	4,814.4	0.0	4,843.1
1998	3.7	3,047.1	0.0	3,050.8
1999	0.0	4,989.9	0.0	4,989.9
2000	0.1	6,342.8	0.0	6,342.8
2001	0.2	7,945.1	0.0	7,945.3
2002	452.9	5,562.1	0.0	6,015.0
2003	354.6	16,285.6	0.0	16,640.2
2004	287.7	23,243.6	0.0	23,531.2
2005	398.0	23,765.1	0.0	24,163.0

Table 1b & 1c Note: The readily apparent discrepancy between components and totals is presented here as presented by NPRI. The discrepancy is consistently seen for all years of NPRI data for Toronto and relates to NPRI's own summation of intermittent discrepancies at the facility level. Elsewhere in this present report, NPRI "totals data" respecting community emissions is replaced with data calculated by the Toronto Environment Office from reported facility emissions; the same discrepancy does not occur in respect to City of Toronto corporation data.

Community Releases (Emissions) to Air

Table 2: CAC's & Reported Substances Released to Air (1994-2005) clearly shows the influence reporting changes had in 2002 on the totals released to air. Table 2 also shows that the tonnage of Reported Substances released in Toronto between 1994 and 2005 declined from approximately 4,000 tonnes to approximately 3,000 tonnes.

Table 2: CAC's & Reported Substances Released to Air

Year	Criteria Air Contaminants (CACs)	Reported Substances	Total
1994	0.00	4,393.94	4,393.94
1995	0.00	3,670.02	3,670.02
1996	0.00	3,674.71	3,674.71
1997	0.00	3,987.59	3,987.59
1998	0.00	3,772.15	3,772.15
1999	0.00	3,630.84	3,630.84
2000	0.00	3,816.90	3,816.90
2001	0.00	3,788.80	3,788.80
2002	12,192.23	3,821.69	16,013.92
2003	12,762.81	3,437.99	16,200.80
2004	13,269.92	3,294.37	16,564.28
2005	13,244.31	2,819.47	16,063.78

Table 3: CAC's released to Air (1994-2005) in Tonnes shows the variation of the specific CAC's as reported over time. In Table 3 the standard double counting practice respecting particulate matter has been avoided as cited below in the listing of abbreviated elements.

- NOx is "oxides of nitrogen" (expressed as NO_2 or nitrogen dioxide)
- SOx is oxides of sulphur" (exported as SO_2 or sulphur dioxide)
- CO is carbon monoxide
- VOC is volatile organic compounds that participate in atmospheric photochemical reactions (and includes PAHs etc)

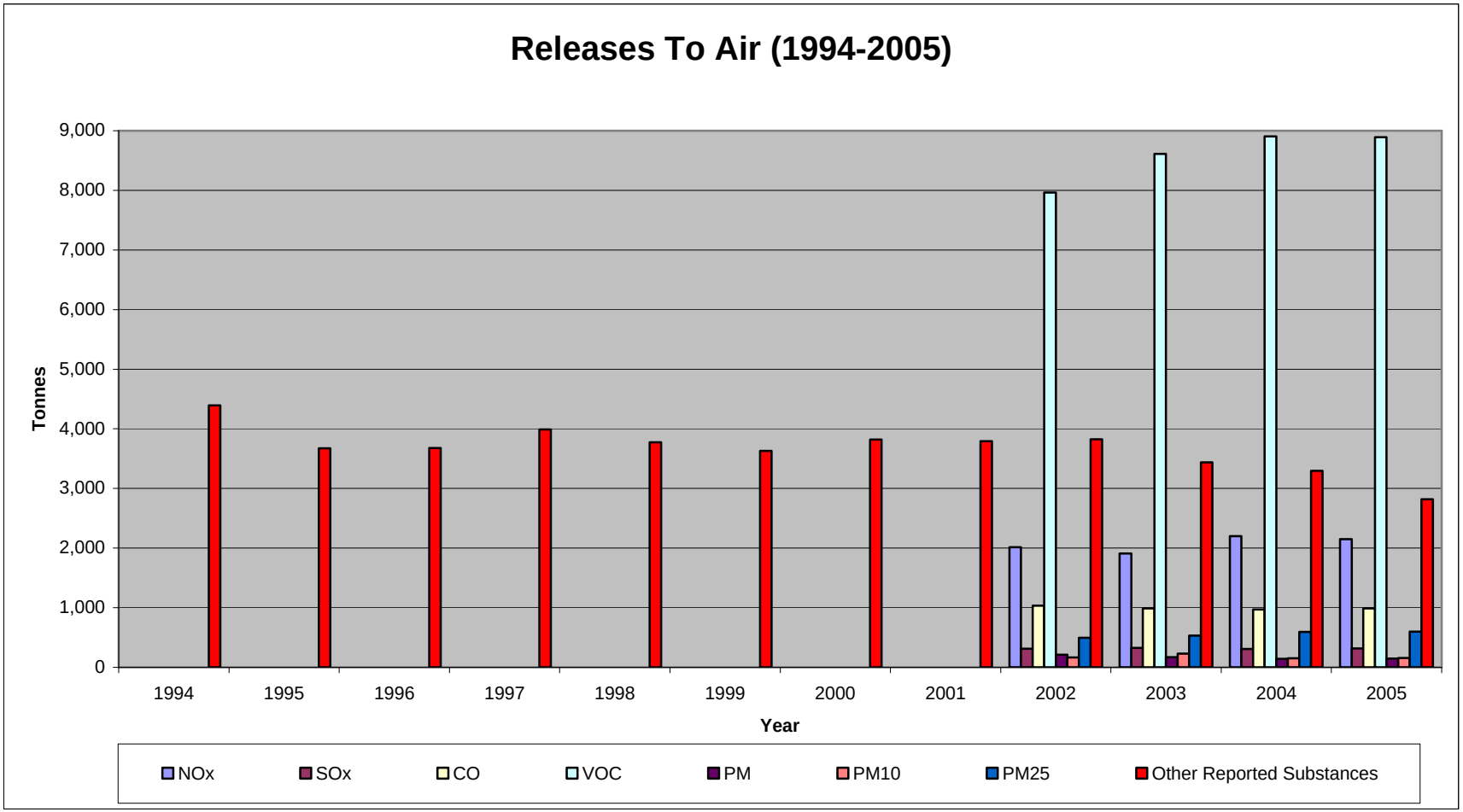
- PMis particulate matter (with aerodynamic diameter coarser than 100 microns) but here excludes PM_{10} and $PM_{2.5}$ sub-sets
- PM10 is the coarse fraction of "fine particulate matter" (with aerodynamic diameter less than less than 10 microns but greater, for the purposes of this table only, than 2.5 microns)
- PM2.5 is the fine fraction of "fine particulate matter" (with aerodynamic diameter less than less than 2.5 microns).

Table 3: CAC's Released to Air (1994-2005) in Tonnes.

Year	NOx	SOx	CO	VOC	PM	PM10	PM25	Total
1994	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	2,016	310	1,033	7,961	211	167	494	12,192
2003	1,908	325	986	8,610	169	230	534	12,763
2004	2,197	308	970	8,905	143	152	594	13,270
2005	2,149	318	986	8,891	146	157	598	13,244

Figure 2 depicts a gradual reduction in the amounts of "Reported Substances" between 1994 and 2005, but a noticeable increase due to the newly required reporting of CAC's in 2002 and subsequently. The individual CAC's as reported between 2002 and 2005 can also be seen to be dominated by high tonnage releases of VOCs.

Figure 2: Releases to Air (1994-2005)



Total Reported Disposals to Land (1994-2005)

The NPRI also collects and publishes data regarding the amount of material that a reporting facility recycles or disposes. Recycling includes any activity that prevents material from being disposed. Disposal can include on-site and off-site disposal of substances to landfill, land application (as might be employed in the disposal of biosolids cake, (i.e. sewage sludge which has been digested and dewatered) or underground injection, or to a treatment process prior to its final disposal.

Table 4: "Reported Substance Disposal in Toronto (1994-2005)" presents a summary of the tonnage disposed or recycled in Toronto between 1994 and 2005. The amounts disposed and recycled have both followed an upward trend since 1994, with a maximum amount recycled in 2005 and a maximum amount disposed in 2003. There has, however, been a marked increase in the amounts disposed by a facility at its own site (or "on-site") since 2002. Across Canada, "on-site" disposal most commonly involves injection into underground wells. It is not clear if the one facility reporting this activity in Toronto for 2005 actually does this. It is recommended that NPRI be requested to provide the City with relevant information in such cases, to confirm or deny the presence of such activities in Toronto.

Table 4 shows: a) an increase over time in the number of facilities reporting and the total amounts reported; and b) the strong influence of changing regulations and general confusion as to what and how releases had to be reported, especially in 2002 and 2003; and c) the changing costs of various disposal and treatment opportunities.

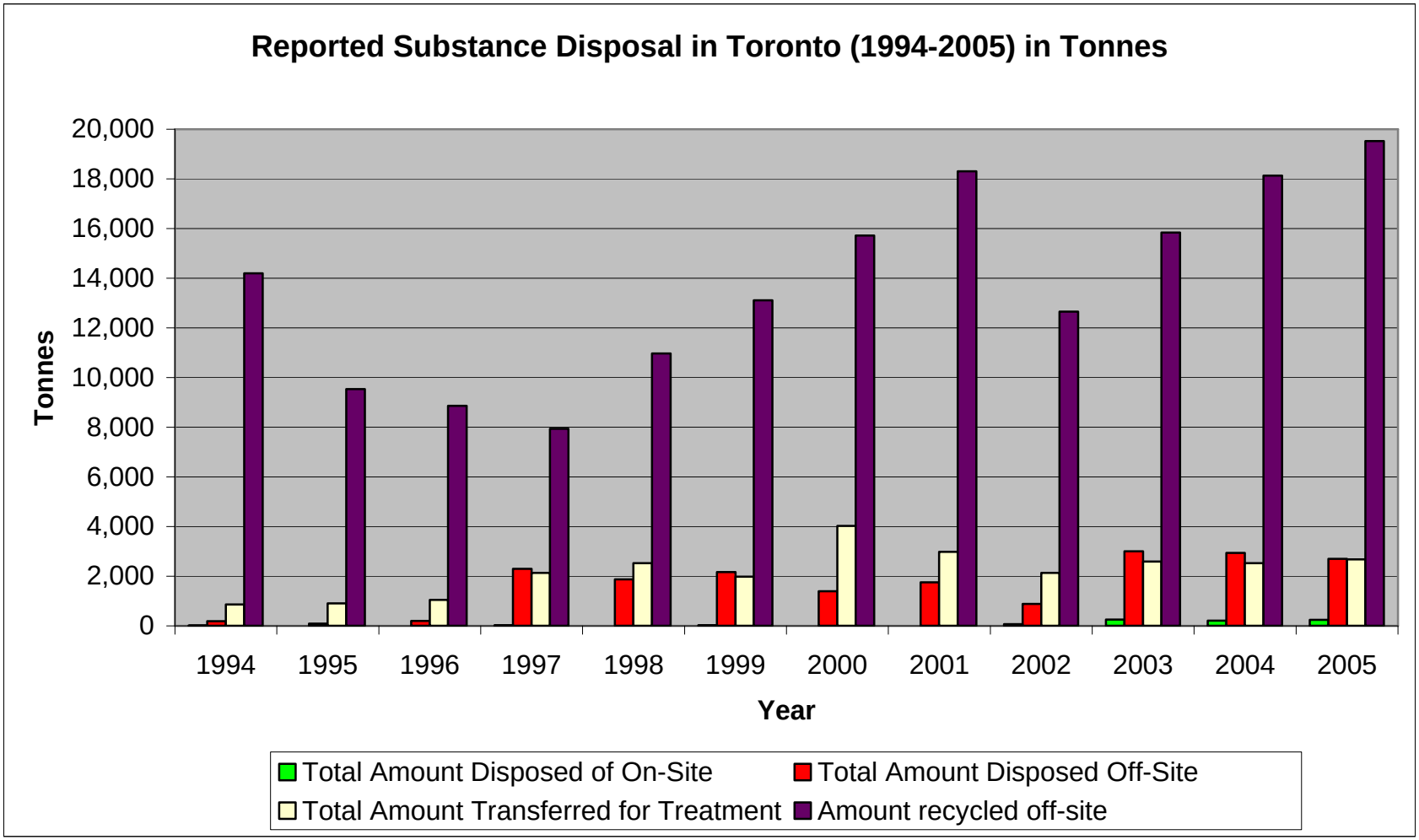
The table shows a mostly gradual increase of material reported as disposed on-site (Column C) by facilities in Toronto between 1994 and 2005, with an obvious "step-up" in 2002 and 2003 – the years that reporting became mandatory and the regulation more fully understood respectively. The amounts reported to have been disposed of off-site (Column D) increased a few years earlier, around 1997, and with the exception of years leading up to and including 2002 (when draft regulations and reporting requirements were known and being varyingly addressed), remained fairly constant between 1997 and 2005. The reported amounts transferred for treatment (Column E) also increased around 1997, peaked in 2000, and remained fairly constant from 2003 to 2005. The amounts "disposed" by recycling (Column G) have encouragingly been seen to increase overall in the period 1994-2005. Figure 3, found below, provides a graphic representation of the same data set.

Table 4: Reported Disposals in Toronto (1994-2005) in Tonnes.

Year (A)	Facility Count (B)	Total Amount Disposed of On-Site (C)	Total Amount Disposed Off-Site (D)	Total Amount Transferred for Treatment (E)	Amount Disposed of On-site & Off-Site and Transferred for Treatment (F)	Amount Recycled Off-Site (G)
1994	163	7	185	859	1,050	14,197
1995	153	2	82	900	984	9,530
1996	160	0	192	1,038	1,231	8,855
1997	167	24	2,292	2,135	4,451	7,934
1998	165	0	1,868	2,517	4,385	10,963
1999	162	24	2,162	1,981	4,167	13,106
2000	175	0	1,395	4,024	5,419	15,721
2001	194	0	1,751	2,979	4,730	18,309
2002	298	69	883	2,132	3,084	12,651
2003	324	251	3,001	2,590	5,842	15,836
2004	337	211	2,933	2,521	5,665	18,127
2005	334	239	2,694	2,672	5,604	19,526

Table Note: Column F represents the sum of the Columns C , D and E. Column G is not included in the total represented in Column F.

Figure 3: Reported Disposals to Land in Toronto (1994-2005) in Tonnes.



Trends in Releases, Disposals and Transfers (1994-2005)

Table 5 presents a summary of all releases and all transfers and disposals released from combined Community and Corporation sources to the three media and to the various on-site and off-site end-points. (The specific data of on-site and off-site disposals and transfers for treatment have been combined as "Disposals and Transfers" in subsequent tables of this document.)

Table 5: Total of All Releases & Disposals by Media and End-Point (1994-2005).

Year	Total Air Releases	Total Water Releases	Total Land Releases	Total Release Releases	Total Amount Disposed of On-Site	Total Amount Disposed Off-Site	Total Amount Transferred for Treatment	Amount Disposed of On-site & Off-Site and Transferred for Treatment	Amount Recycled Off-Site
1994	4,393.94	5.42	0.13	4,399.49	7.10	184.52	858.72	1,050.33	14,196.69
1995	3,670.02	6.24	0.49	3,676.75	1.55	82.38	900.35	984.28	9,530.02
1996	3,674.71	5.60	0.40	3,680.71	0.10	192.11	1,038.39	1,230.60	8,855.18
1997	3,987.59	4,818.09	0.40	8,806.09	24.20	2,292.27	2,134.79	4,451.27	7,933.52
1998	3,772.15	3,050.43	0.30	6,822.88	0.22	1,868.33	2,516.73	4,385.27	10,962.77
1999	3,630.84	4,989.88	41.00	8,661.72	23.90	2,162.16	1,980.84	4,166.91	13,105.71
2000	3,816.90	6,342.77	84.56	10,244.22	0.00	1,394.68	4,023.89	5,418.57	15,721.44
2001	3,788.80	7,945.13	34.91	11,768.83	0.00	1,750.91	2,978.77	4,729.68	18,309.19
2002	16,013.92	5,579.48	0.39	21,593.78	69.05	882.53	2,132.17	3,083.75	12,651.38
2003	16,200.80	16,301.65	0.30	32,502.75	251.20	3,000.81	2,590.33	5,842.34	15,835.50
2004	16,564.28	23,259.87	0.30	39,824.45	210.86	2,933.14	2,521.09	5,665.08	18,126.64
2005	16,063.78	23,779.66	0.30	39,843.74	238.93	2,693.71	2,671.83	5,604.48	19,526.03

As shown in Table 5, releases to air and water increased, but it is important to note that changing reporting requirements are principally responsible for the increased tonnages. This will become even more readily apparent in the following Part 2. As such it is probably more appropriate to view the more recent changes as more indicative of real changes. Comparisons between the reports for 2004 and 2005 show little significant difference.

Part 2: Specific Substances Released in 2005 – Individual Totals (Tonnes)

Releases to Air, Land and Water from Combined Community and Corporation Sources

The list of identifiable "Reported Substances" in Canada includes 104 substances that essentially have low mass releases but are of potentially high significance, as well as seven Criteria Air Contaminants that are of much higher mass but of lower potential significance, especially when compared to other sources of the same CAC substances (see Appendix D: Comparisons and Contexts). In Toronto not all of the possible substances that could have been reported were reported as being released or disposed into Toronto's environment in 2005.

Table 6, found below, shows a list of 111 reportable substances if released to air, water and land (tonnes) and also includes the tonnage of each released. (Note: CAC's are identified by shading as below; other reported substances are not shaded.)

Releases to Air

Excluding releases of CAC's and looking at the 104 of the 111 reported substances, only 76 had releases to air associated with them in Toronto in 2005. A total of eight of these are seen in Table 6 as showing 0.00 tonnes which is due to rounding. These eight (substances listed as numbers 68 to 76) were all emitted in less than 5 kg amounts by the specific reporting companies in 2005 . The 76 substance, for example, "Dioxins and furans" actually has an associated release of 0.000000219 tonnes, or 219 grams. No releases of substances 77 to 104 were reported in Toronto for 2005. A total of 227 facilities in Toronto collectively produced the tonnages presented in Table 6 as being released to air.

Total Releases (as to Air, Land and Water collectively)

Table 6: includes 111 substances that are to be reported on if released in Toronto. Substances 1 through 76 indicate amounts greater than 5 kg to have been collectively released of each. Of the other 35 substances, 8 (substances 77 to 84) show as zero due to rounding, and 27 (substances 85 to 111) are not reported as having been released to land, air or water in Toronto in 2005 in any amount.

Table 6 also indicates "disposals" (as to land) and "recycled" tonnages. The amount recycled is not considered a pollutant but it is reported on to NPRI.

Substances 1 through 59 indicate amounts greater than 5 kg to have been collectively disposed or transferred of each. Of the other 52 substances, 24 (substances 60 to 84) show as zero due to rounding, and 28 (substances 85 to 111) are not reported as having been released to land, air or water in Toronto in 2005 in any amount.

Table 6: Reported Substances and Criteria Air Contaminants as "Releases", "Disposals" and "Recycled" by the Combined Community and Corporation to All Media (2005).

	CAS Number	Substance Description	Releases to Air	Releases to Water	Releases to Land	Total Releases	Disposals to Land	Recycled
1	NA - 17	Nitrate ion in solution at pH >= 6.0	0.00	16,835.00	0.00	16,835.00	135.65	0.00
2	**NA - M16**	**Volatile Organic Compounds (VOCs)**	**8,890.59**	**0.00**	**0.00**	**8,890.59**	**0.00**	**0.00**
3	NA - 16	Ammonia (Total)	108.72	6,607.00	0.00	6,715.72	1,429.92	52.86
4	**11104-93-1**	**NOx (oxides of nitrogen)**	**2,148.81**	**0.00**	**0.00**	**2,148.81**	**0.00**	**0.00**
5	**630-08-0**	**Carbon monoxide**	**985.65**	**0.00**	**0.00**	**985.65**	**0.00**	**0.00**
6	108-88-3	Toluene	624.55	0.00	0.00	624.55	127.00	883.57
7	**NA - M10**	**PM2.5 - Particulate Matter <= 2.5 Microns**	**598.25**	**0.00**	**0.00**	**598.25**	**0.00**	**0.00**
8	67-63-0	Isopropyl alcohol	389.80	0.00	0.00	389.80	55.61	5.00
9	78-93-3	Methyl ethyl ketone	341.25	0.00	0.00	341.25	68.73	89.94
10	**7446-09-5**	**Sulphur dioxide**	**318.00**	**0.00**	**0.00**	**318.00**	**0.00**	**0.00**
11	67-56-1	Methanol	276.49	14.46	0.00	290.95	242.13	2.71
12	NA - 22	Phosphorus (total)	0.07	286.96	0.00	287.03	2,116.91	42.48
13	75-68-3	Hydrotrichlorodifluoroethane (HCFC-142B)	201.04	0.00	0.00	201.04	0.00	0.00
14	1330-20-7	Xylene (mixed isomers)	199.22	0.00	0.00	199.22	218.55	743.98

15	**NA - M09**	**PM10 - Particulate Matter <= 10 Microns**	**157.30**	**0.00**	**0.00**	**157.30**	**0.00**	**0.00**
16	**NA - M08**	**PM - Total Particulate Matter**	**145.71**	**0.00**	**0.00**	**145.71**	**0.00**	**0.00**
17	108-10-1	Methyl isobutyl ketone	94.64	0.00	0.00	94.64	15.89	32.05
18	100-42-5	Styrene	93.90	0.00	0.00	93.90	0.04	0.00
19	75-09-2	Dichloromethane	66.98	0.00	0.00	66.98	0.00	2.80
20	111-76-2	Butyl cellosolve	61.44	0.00	0.00	61.44	3.41	7.08
21	71-36-3	n-Butyl alcohol	51.93	0.00	0.00	51.93	3.34	10.62
22	7429-90-5	Aluminum (fume or dust)	50.70	0.00	0.00	50.70	13.04	1,530.14
23	110-54-3	n-Hexane	42.67	0.00	0.00	42.67	0.00	1.35
24	NA - 14	Zinc (and its compounds)	3.88	25.04	0.30	29.22	220.30	3,010.92
25	50-00-0	Formaldehyde	23.80	0.00	0.00	23.80	3.22	0.00
26	NA - 20	Nonylphenol and its ethoxylates	17.63	0.00	0.00	17.63	5.04	0.00
27	7632-00-0	Sodium nitrite	16.37	0.00	0.00	16.37	0.02	0.00
28	80-62-6	Methyl methacrylate	16.36	0.00	0.00	16.36	0.67	0.00
29	100-41-4	Ethylbenzene	16.19	0.00	0.00	16.19	18.00	91.10
30	108-95-2	Phenol (and its salts)	13.84	0.00	0.00	13.84	0.36	0.25
31	78-83-1	i-Butyl alcohol	13.02	0.00	0.00	13.02	0.17	0.00
32	75-45-6	HCFC-22	12.18	0.00	0.00	12.18	0.00	0.00
33	111-42-2	Diethanolamine (and its salts)	11.93	0.00	0.00	11.93	0.00	0.00
34	75-07-0	Acetaldehyde	11.63	0.00	0.00	11.63	0.00	0.00
35	75-05-8	Acetonitrile	10.30	0.00	0.00	10.30	0.00	0.00
36	872-50-4	N-Methyl-2-pyrrolidone	7.83	0.00	0.00	7.83	3.17	0.00
37	NA - 06	Copper (and its compounds)	0.77	6.25	0.00	7.02	112.91	1,753.12
38	108-05-4	Vinyl acetate	6.52	0.00	0.00	6.52	1.21	2.86
39	95-63-6	1,2,4-Trimethylbenzene	6.26	0.00	0.00	6.26	3.76	13.81
40	7647-01-0	Hydrochloric acid	5.31	0.00	0.00	5.31	23.54	73.45
41	NA - 08	Lead (and its compounds)	0.43	4.39	0.00	4.82	15.78	147.72
42	107-21-1	Ethylene glycol	3.92	0.00	0.00	3.92	7.43	0.00
43	7697-37-2	Nitric acid	3.05	0.00	0.00	3.05	67.07	5.10
44	115-07-1	Propylene	2.39	0.00	0.00	2.39	0.00	0.00
45	128-37-0	2,6-Di-t-butyl-4-methylphenol	2.06	0.00	0.00	2.06	0.00	0.00
46	1717-00-6	HCFC-141b	1.52	0.00	0.00	1.52	0.00	0.00
47	103-23-1	Bis(2-ethylhexyl) adipate	1.34	0.00	0.00	1.34	0.00	103.31
48	NA - 04	Chromium (and its compounds)	1.15	0.00	0.00	1.15	35.57	304.75
49	91-20-3	Naphthalene	1.10	0.00	0.00	1.10	0.69	0.00
50	7664-93-9	Sulphuric acid	0.95	0.00	0.00	0.95	450.34	9,570.40
51	79-01-6	Trichloroethylene	0.83	0.00	0.00	0.83	1.20	1.92
52	75-21-8	Ethylene oxide	0.63	0.00	0.00	0.63	0.00	0.00

53	98-82-8	Cumene	0.37	0.00	0.00	0.37	0.37	0.00
54	121-44-8	Triethylamine	0.34	0.00	0.00	0.34	0.00	0.00
55	127-18-4	Tetrachloroethylene	0.30	0.00	0.00	0.30	0.83	4.44
56	NA - 02	Arsenic (and its compounds)	0.01	0.25	0.00	0.26	0.54	0.00
57	78-92-2	sec-Butyl alcohol	0.25	0.00	0.00	0.25	0.00	0.00
58	NA - 03	Cadmium (and its compounds)	0.02	0.23	0.00	0.25	3.66	0.06
59	NA - 11	Nickel (and its compounds)	0.24	0.00	0.00	0.24	37.31	179.07
60	NA - 09	Manganese (and its compounds)	0.24	0.00	0.00	0.24	0.86	763.46
61	141-32-2	Butyl acrylate	0.20	0.00	0.00	0.20	0.08	0.00
62	NA - 19	Hexavalent chromium compounds	0.13	0.03	0.00	0.16	3.19	0.68
63	1344-28-1	Aluminum oxide (fibrous forms)	0.14	0.00	0.00	0.14	3.06	0.00
64	80-05-7	p,p'-Isopropylidenediphenol	0.12	0.00	0.00	0.12	0.49	0.00
65	107-13-1	Acrylonitrile	0.11	0.00	0.00	0.11	0.02	0.00
66	71-43-2	Benzene	0.10	0.00	0.00	0.10	0.01	0.00
67	131-11-3	Dimethyl phthalate	0.09	0.00	0.00	0.09	0.00	0.00
68	110-82-7	Cyclohexane	0.07	0.00	0.00	0.07	0.00	0.00
69	26471-62-5	Toluenediisocyanate (mixed isomers)	0.06	0.00	0.00	0.06	0.00	0.00
70	NA - 10	Mercury (and its compounds)	0.01	0.04	0.00	0.05	4.02	0.55
71	140-88-5	Ethyl acrylate	0.03	0.00	0.00	0.03	0.02	0.00
72	NA - 12	Selenium (and its compounds)	0.03	0.00	0.00	0.03	0.00	0.00
73	NA - 05	Cobalt (and its compounds)	0.01	0.00	0.00	0.01	0.00	0.00
74	7782-50-5	Chlorine	0.01	0.00	0.00	0.01	0.00	0.01
75	85-44-9	Phthalic anhydride	0.01	0.00	0.00	0.01	0.00	0.00
76	NA - 13	Silver (and its compounds)	0.01	0.00	0.00	0.01	0.00	32.72
77	79-10-7	Acrylic acid (and its salts)	0.00	0.00	0.00	0.00	2.20	0.00
78	101-68-8	Methylenebis(phenylisocyanate)	0.00	0.00	0.00	0.00	75.68	41.95
79	1163-19-5	Decabromodiphenyl oxide	0.00	0.00	0.00	0.00	0.90	9.06
80	NA - 01	Antimony (and its compounds)	0.00	0.00	0.00	0.00	0.72	10.60
81	7664-39-3	Hydrogen fluoride	0.00	0.00	0.00	0.00	0.05	0.00
82	NA - 07	Cyanides (ionic)	0.00	0.00	0.00	0.00	0.00	0.00
83	118-74-1	Hexachlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00
84	NA - D/F	Dioxins and furans	0.00	0.00	0.00	0.00	0.00	0.00
85	1332-21-4	Asbestos (friable form)	0.00	0.00	0.00	0.00	46.40	0.00
86	85-68-7	Butyl benzyl phthalate	0.00	0.00	0.00	0.00	20.23	0.00
87	NA - 21	Octylphenol and its ethoxylates	0.00	0.00	0.00	0.00	1.63	0.00
88	67-66-3	Chloroform	0.00	0.00	0.00	0.00	1.20	0.00
89	94-36-0	Benzoyl peroxide	0.00	0.00	0.00	0.00	0.36	0.00
90	4098-71-9	Isophorone diisocyanate	0.00	0.00	0.00	0.00	0.01	0.00

91	96-33-3	Methyl acrylate	0.00	0.00	0.00	0.00	0.00	0.00
92	84-74-2	Dibutyl phthalate	0.00	0.00	0.00	0.00	0.00	0.00
93	79-06-1	Acrylamide	0.00	0.00	0.00	0.00	0.00	0.00
94	122-39-4	Diphenylamine	0.00	0.00	0.00	0.00	0.00	0.15
95	5124-30-1	1,1-Methylenebis(4-isocyanatocyclohexane)	0.00	0.00	0.00	0.00	0.00	0.00
96	106-99-0	1,3-Butadiene	0.00	0.00	0.00	0.00	0.00	0.00
97	149-30-4	2-Mercaptobenzothiazole	0.00	0.00	0.00	0.00	0.00	0.00
98	612-83-9	3,3'-Dichlorobenzidine dihydrochloride	0.00	0.00	0.00	0.00	0.00	0.00
99	117-81-7	Bis(2-ethylhexyl) phthalate	0.00	0.00	0.00	0.00	0.00	0.00
100	569-64-2	C.I. Basic Green 4	0.00	0.00	0.00	0.00	0.00	0.00
101	989-38-8	C.I. Basic Red 1	0.00	0.00	0.00	0.00	0.00	0.00
102	64-18-6	Formic acid	0.00	0.00	0.00	0.00	0.00	0.00
103	74-90-8	Hydrogen cyanide	0.00	0.00	0.00	0.00	0.00	0.00
104	123-31-9	Hydroquinone (and its salts)	0.00	0.00	0.00	0.00	0.00	0.00
105	108-31-6	Maleic anhydride	0.00	0.00	0.00	0.00	0.00	0.00
106	1634-04-4	Methyl tert-butyl ether	0.00	0.00	0.00	0.00	0.00	0.00
107	924-42-5	N-Methylolacrylamide	0.00	0.00	0.00	0.00	0.00	0.00
108	139-13-9	Nitrilotriacetic acid (and its salts)	0.00	0.00	0.00	0.00	0.00	0.00
109	9016-87-9	Polymeric diphenylmethane diisocyanate	0.00	0.00	0.00	0.00	0.00	0.00
110	584-84-9	Toluene-2,4-diisocyanate	0.00	0.00	0.00	0.00	0.00	0.00
111	91-08-7	Toluene-2,6-diisocyanate	0.00	0.00	0.00	0.00	0.00	0.00

EMISSIONS BY SECTORS

Combined Community and Corporation Releases, Disposals, and Transfers by Sector (2005)

To evaluate the contributions by "standard Canadian industrial sector" classifications (SIC-2 codes as CAN SI2 codes) in Toronto (2005,) the first two digits were used to create a listing of 30 "sectors". (Using the first four digits would have created 10 sectors. Only two and four digits can be used to create "sectors".)

Table 7: Releases to Land, Air and Water and Disposals (to Land) and Recycling by "30 Sectors" for the Combined Community and Corporation) in Tonnes in 2005, presents the releases to land, air and water and the total disposals and other transfers to land, and the amount recycled by "30 Sectors" for the Community (including the City Corporation) in Tonnes in 2005.

Clearly, the Corporations releases to water make local government service industries the leading contributor or sector. The contribution of this sector is explored more fully further below. Behind that sector, the two sectors involving printing, publishing and paper production are seen as being the next most significant by tonnage released. The traditionally recognized plastic, mineral, petroleum, chemical and metal fabricating related sectors also appear high in the rankings. Food industries also appear prominently in the table.

The City of Toronto's four wastewater treatment plants classified as local government service industries again clearly rank first when based on the amount disposed on-site, off-site and transferred for treatment. The contribution of this sector is explored more fully further below. After local government services, the two sectors involving metal fabrication and business service industries (which includes development services and industrial services) plus chemical and petroleum related sectors are noticeably ranked highest).

Table 7: Releases to Land, Air and Water and Disposals (to Land) and Recycling by "30 Sectors" for the Combined Community and Corporation in Tonnes in 2005

	CAN-SI2	Description	Count	Total Air Releases	Total Water Releases	Total Land Releases	Total Releases	Total Disposals	Recycled
1	83	Local Government Service Industries	4	398.0	23,765.1	0.0	24,163.1	3,677.8	0.0
2	28	Printing, Publishing and Allied Ind.	21	2,963.6	0.0	0.0	2,963.6	47.0	865.1
3	16	Plastic Products Industries	24	2,170.1	0.0	0.0	2,170.1	2.1	114.1
4	27	Paper and Allied Products Industries	6	1,718.1	0.0	0.0	1,718.1	5.3	0.0
5	35	Non-metallic Mineral Products Industries	12	1,613.9	0.0	0.0	1,613.9	14.7	18.8
6	36	Refined Petroleum and Coal Products Ind.	9	1,487.6	0.0	0.0	1,487.6	142.0	9,551.3
7	37	Chemical and Chemical Products Ind.	50	1,085.1	0.0	0.0	1,085.1	334.5	881.8
8	10	Food Industries	27	1,000.7	0.0	0.0	1,000.7	113.6	25.1
9	30	Fabricated Metal Products Ind. (Except Machinery and Trans. Equipment Ind.)	40	808.9	14.5	0.0	823.5	577.4	2,796.3
10	26	Furniture and Fixture Industries	9	594.4	0.1	0.0	594.5	18.7	45.6
11	29	Primary Metal Industries	5	572.9	0.0	0.0	572.9	13.4	1,702.6
12	49	Other Utility Industries	7	457.2	0.0	0.0	457.2	0.0	0.0
13	39	Other Manufacturing Industries	28	228.2	0.0	0.0	228.2	51.7	775.7
14	11	Beverage Industries	3	191.8	0.0	0.0	191.8	0.0	0.3
15	99	Other Service Industries	2	188.9	0.0	0.0	188.9	0.0	0.0
16	51	Petroleum Products Industries, Wholesale	4	154.7	0.0	0.0	154.7	0.1	0.0
17	32	Transportation Equipment Industries	9	153.2	0.0	0.0	153.2	12.6	1,369.2
18	85	Educational Service Industries	1	86.1	0.0	0.0	86.1	0.0	0.0
19	77	Business Service Industries	24	46.8	0.0	0.0	46.8	402.0	0.0
20	33	Electrical and Electronic Products Ind.	15	32.0	0.0	0.0	32.0	56.9	615.3
21	25	Wood Industries	2	31.2	0.0	0.0	31.2	0.0	0.0
22	75	Real Estate Operating. (Except Developers)	14	25.3	0.0	0.0	25.3	0.0	0.0
23	15	Rubber Products Industries	8	20.6	0.0	0.3	20.9	29.5	358.1
24	44	Service Ind. Incidental to Construction	1	20.9	0.0	0.0	20.9	32.0	21.2
25	31	Machinery Industries (Except Elec. Machinery)	1	6.6	0.0	0.0	6.6	73.2	11.1
26	47	Storage and Warehousing Industries	1	5.6	0.0	0.0	5.6	0.0	3.1
27	6	Mining Industries	1	0.5	0.0	0.0	0.5	0.0	0.0
28	56	Metals, Hardware, Plumbing, Heating and Building Materials Industries, Wholesale	2	0.5	0.0	0.0	0.5	0.0	370.8
29	48	Communication Industries	1	0.5	0.0	0.0	0.5	0.0	0.0
30	86	Health and Social Service Industries	3	0.0	0.0	0.0	0.0	0.0	0.5
		Total	**334**	**16,063.8**	**23,779.7**	**0.3**	**39,843.7**	**5,604.5**	**19,526.0**

City of Toronto "Corporation" – Releases, Disposals and Transfers

Since the first year of the City Corporation's reporting to NPRI the City has estimated and reported emissions from 24 operational facilities to NPRI, the MOE (O.Reg. 127/01) and Statistics Canada (GHG data forwarded to Environment Canada). A total of nine City Corporation facilities (four wastewater treatment plants, four water treatment plants and one closed landfill) report to NPRI. Of these, the one landfill and the four wastewater treatment plants plus a further four water treatment plants, seven solid waste transfer stations and six garages or yards also report to O.Reg 127. One facility, the City's Print Shop, has changed its operational practices and the substances employed in their processes since 2004 and no longer has emissions to report. Two facilities (Brock West and Keele Valley landfills) report to the Statistics Canada maintained GHG inventory.

There were 23 City facilities that reported to NPRI and O.Reg 127 and Statistics Canada in 2005, but only 8 are published by NPRI - four wastewater treatment plants and four water treatment plants. The data reported by the other corporate facilities that report to O.Reg 127 are, however, available via links on the NPRI website. Data reported to Statistics Canada is only published on the GHG Inventory website.

The largest emitters of "reportable substances" from the City facilities are the City's wastewater treatment plants. The pattern of increased releases to water as between 1994 and 2005 has been identified, as above, as being a consequence of two City facility independent characteristics:

a) the City is the recipient of all wastewater from all residential, commercial, institutional and industrial sources in Toronto and discharges the treated effluent to the lake; and

b) the reporting procedures and requirements to be followed have been upgraded resulting in a significant increase in the amounts reported rather than the amounts released.

See "Map 1: Community Releases to Water by Sewershed via the Corporation's Four Wastewater Treatment Plants in 2005" in Appendix E.

Note: The only ABCC that has reported to the NPRI and O.Reg 127 is Toronto Transit Commission. They reported to O.Reg 127 between 2002-2004, but did not do so in 2005. The only substance reported was HFC-134A (tetrafluoroethane is a haloalkane refrigerant) at less than 100 kilograms.

Table 8: List of 23 Reporting Facilities for 2005 NPRI / O. Reg. 127 and GHG Reporting for City of Toronto.

Count	Facility	Address	NPRI ID	MOE ID	GHG ID	Facility Type
1	FJ Horgan Filtration	201 Copperfield Rd	003921			Filtration Plant
2	Island Filtration	Lakeshore Ave	007043			Filtration Plant
3	RC Harris Filtration Plant	1 Nursewood Rd.	003923			Filtration Plant
4	RL Clark Filtration Plant	1-45 Twenty Third St.	003919			Filtration Plant
5	Brock West Landfill	Conc.3 W Of Brock Rd			Gp17DE	Landfill
6	Keele Valley Landfill	McNaughton Road	007371	9307	GnDFE9	Landfill
7	Ashbridges Bay TP	9 Leslie Street	002240	5616		Water Treatment Plant
8	Highland Creek TP	51 Beechgrove Drive	004435	5630		Water Treatment Plant
9	Humber TP	130 The Queensway	002238	5632		Water Treatment Plant
10	North Toronto Treatment Plant	21 Redway Road	005884	5636		Water Treatment Plant
11	Bermondsey Transfer Stn	188 Bermondsey Road	8800000056	9287		Transfer Station
12	Commissioner's St. Transfer Stn	400 Commissioners Street	8800000052	9286		Transfer Station
13	Disco Transfer Stn	120 Disco Road	8800000068	9305		Transfer Station
14	Dufferin Transfer Stn	35 Vanley Crescent	8800000053	9304		Transfer Station
15	Ingram Transfer Stn	50 Ingram Drive	8800000054	9281		Transfer Station
16	Scarborough Transfer Stn	1 Transfer Place	8800000055	9284		Transfer Station
17	Victoria Park Transfer Stn	3350 Victoria Park Avenue	8800000073	9285		Transfer Station
18	1116 King St. West	1116 King Street West	8800000072	9292		Works Yard
19	843 Eastern Garage	843 Eastern Avenue	8800000070	9294		Works Yard
20	Bering Yard	320 Bering Avenue	8800000067	9295		Works Yard
21	Disco Yd	150 Disco Road	8800000066	9303		Works Yard
22	Eastern & Booth Blocks	433 Eastern Avenue	8800000071	9291		Works Yard
23	Finch Yd	1026 Finch Avenue West	8800000069	9293		Works Yard
	City Clerk's Office Print Shop	90 Niagara Street				Print Shop (no longer has to report)

Note: The presence of an "Identity Label i.e. ID) for NPRI, MOE or GHG, indicates that a report is made by the corresponding facility.

The City Corporation's "releases" are dominated by the releases to water. Table 9: Reported Substances and Criteria Air Contaminants as "Releases" and as "Disposals and Transfers" by the City Corporation to All Media (2005) shows the releases by substance and the disposals and transfers by substance and City facility source.

Table 9: Reported Substances and Criteria Air Contaminants as "Releases" and as "Disposals and Transfers" by the City Corporation to All Media (2005)

Facility	CAS Number	Substance Description	Total Air Releases	Total Water Releases	Total Land Releases	Total Releases	Total Disposals	Recycled
Ashbridges Bay Treatment Plant	NA - 16	Ammonia (Total)	0.00	3,833.00	0.00	3,833.00	346.90	0.00
Ashbridges Bay Treatment Plant	NA - 02	Arsenic (and its compounds)	0.00	0.15	0.00	0.15	0.11	0.00
Ashbridges Bay Treatment Plant	NA - 03	Cadmium (and its compounds)	0.00	0.17	0.00	0.17	0.09	0.00
Ashbridges Bay Treatment Plant	630-08-0	Carbon monoxide	20.90	0.00	0.00	20.90	0.00	0.00
Ashbridges Bay Treatment Plant	7782-50-5	Chlorine	0.00	0.00	0.00	0.00	0.00	0.00
Ashbridges Bay Treatment Plant	NA - 06	Copper (and its compounds)	0.00	4.40	0.00	4.40	48.20	0.00
Ashbridges Bay Treatment Plant	NA - 08	Lead (and its compounds)	0.00	2.70	0.00	2.70	2.73	0.00
Ashbridges Bay Treatment Plant	NA - 10	Mercury (and its compounds)	0.00	0.03	0.00	0.03	0.05	0.00
Ashbridges Bay Treatment Plant	NA - 17	Nitrate ion in solution at pH >= 6.0	0.00	12,260.00	0.00	12,260.00	0.00	0.00
Ashbridges Bay Treatment Plant	11104-93-1	NOx (oxides of nitrogen)	69.80	0.00	0.00	69.80	0.00	0.00
Ashbridges Bay Treatment Plant	NA - 22	Phosphorus (total)	0.00	180.00	0.00	180.00	1,228.00	0.00
Ashbridges Bay Treatment Plant	NA - M09	PM10 - Particulate Matter <= 10 Microns	0.00	0.00	0.00	0.00	0.00	0.00
Ashbridges Bay Treatment Plant	NA - M10	PM2.5 - Particulate Matter <= 2.5 Microns	1.89	0.00	0.00	1.89	0.00	0.00
Ashbridges Bay Treatment Plant	NA - 14	Zinc (and its compounds)	0.00	15.00	0.00	15.00	32.31	0.00
F.J. Horgan Filtration Plant	NA - 16	Ammonia (Total)	0.00	0.00	0.00	0.00	0.00	0.00
F.J. Horgan Filtration Plant	7782-50-5	Chlorine	0.00	0.00	0.00	0.00	0.00	0.00
Highland Creek Treatment Plant	NA - 16	Ammonia (Total)	0.10	530.00	0.00	530.10	0.00	0.00
Highland Creek Treatment Plant	NA - 02	Arsenic (and its compounds)	0.01	0.02	0.00	0.03	0.03	0.00
Highland Creek Treatment Plant	NA - 03	Cadmium (and its compounds)	0.01	0.04	0.00	0.04	0.03	0.00
Highland Creek Treatment Plant	630-08-0	Carbon monoxide	110.00	0.00	0.00	110.00	0.00	0.00
Highland Creek Treatment Plant	NA - 06	Copper (and its compounds)	0.00	1.60	0.00	1.60	23.30	0.00
Highland Creek Treatment Plant	NA - D/F	Dioxins and furans	0.00	0.00	0.00	0.00	0.00	0.00
Highland Creek Treatment Plant	118-74-1	Hexachlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00
Highland Creek Treatment Plant	NA - 08	Lead (and its compounds)	0.04	0.55	0.00	0.59	0.80	0.00
Highland Creek Treatment Plant	NA - 10	Mercury (and its compounds)	0.01	0.01	0.00	0.02	0.00	0.00
Highland Creek Treatment Plant	NA - 17	Nitrate ion in solution at pH >= 6.0	0.00	4,000.00	0.00	4,000.00	0.00	0.00
Highland Creek Treatment Plant	11104-93-1	NOx (oxides of nitrogen)	148.00	0.00	0.00	148.00	0.00	0.00
Highland Creek Treatment Plant	NA - 22	Phosphorus (total)	0.04	37.00	0.00	37.04	401.00	0.00
Highland Creek Treatment Plant	NA - M09	PM10 - Particulate Matter <= 10 Microns	0.40	0.00	0.00	0.40	0.00	0.00
Highland Creek Treatment Plant	NA - M10	PM2.5 - Particulate Matter <= 2.5 Microns	10.00	0.00	0.00	10.00	0.00	0.00

Highland Creek Treatment Plant	NA - 14	Zinc (and its compounds)	0.13	3.44	0.00	3.57	14.55	0.00
Humber Treatment Plant	NA - 16	Ammonia (Total)	0.00	1,960.00	0.00	1,960.00	1,035.00	0.00
Humber Treatment Plant	NA - 02	Arsenic (and its compounds)	0.00	0.09	0.00	0.09	0.03	0.00
Humber Treatment Plant	NA - 03	Cadmium (and its compounds)	0.00	0.02	0.00	0.02	0.10	0.00
Humber Treatment Plant	7782-50-5	Chlorine	0.00	0.00	0.00	0.00	0.00	0.00
Humber Treatment Plant	NA - 06	Copper (and its compounds)	0.00	0.20	0.00	0.20	20.80	0.00
Humber Treatment Plant	NA - 08	Lead (and its compounds)	0.00	0.97	0.00	0.97	1.29	0.00
Humber Treatment Plant	NA - 10	Mercury (and its compounds)	0.00	0.00	0.00	0.00	0.02	0.00
Humber Treatment Plant	NA - 17	Nitrate ion in solution at pH >= 6.0	0.00	474.00	0.00	474.00	2.30	0.00
Humber Treatment Plant	11104-93-1	NOx (oxides of nitrogen)	35.70	0.00	0.00	35.70	0.00	0.00
Humber Treatment Plant	NA - 22	Phosphorus (total)	0.00	63.10	0.00	63.10	437.00	0.00
Humber Treatment Plant	NA - M09	PM10 - Particulate Matter <= 10 Microns	0.00	0.00	0.00	0.00	0.00	0.00
Humber Treatment Plant	NA - M10	PM2.5 - Particulate Matter <= 2.5 Microns	0.97	0.00	0.00	0.97	0.00	0.00
Humber Treatment Plant	NA - 14	Zinc (and its compounds)	0.00	6.60	0.00	6.60	20.80	0.00
Island Filtration Plant	7782-50-5	Chlorine	0.00	0.00	0.00	0.00	0.00	0.00
North Toronto Treatment Plant	NA - 16	Ammonia (Total)	0.00	284.00	0.00	284.00	19.70	0.00
North Toronto Treatment Plant	NA - 03	Cadmium (and its compounds)	0.00	0.01	0.00	0.01	0.00	0.00
North Toronto Treatment Plant	NA - 08	Lead (and its compounds)	0.00	0.17	0.00	0.17	0.05	0.00
North Toronto Treatment Plant	NA - 17	Nitrate ion in solution at pH >= 6.0	0.00	101.00	0.00	101.00	0.00	0.00
North Toronto Treatment Plant	NA - 22	Phosphorus (total)	0.00	6.80	0.00	6.80	42.60	0.00
R.C. Harris Filtration Plant	NA - 16	Ammonia (Total)	0.00	0.00	0.00	0.00	0.00	0.00
R.C. Harris Filtration Plant	7782-50-5	Chlorine	0.00	0.00	0.00	0.00	0.00	0.00
R.L. Clark Filtration Plant	NA - 16	Ammonia (Total)	0.00	0.00	0.00	0.00	0.00	0.00
R.L. Clark Filtration Plant	7782-50-5	Chlorine	0.00	0.00	0.00	0.00	0.00	0.00

Table 10: Reported Substances and Criteria Air Contaminants as "Releases" and as "Disposed or Transferred" by the City Corporation to All Media (2005)

Substance Description	Total Air Releases	Total Water Releases	Total Land Releases	Total Release Releases	Amount Disposed of On-site & Off-Site and Transferred for Treatment	Amount Recycled Off-Site
Nitrate ion in solution at pH >= 6.0	0.00	16,835.00	0.00	16,835.00	2.30	0.00
Ammonia (Total)	0.10	6,607.00	0.00	6,607.10	1,401.60	0.00
Phosphorus (total)	0.04	286.90	0.00	286.94	2,108.60	0.00
NOx (oxides of nitrogen)	253.50	0.00	0.00	253.50	0.00	0.00
Carbon monoxide	130.90	0.00	0.00	130.90	0.00	0.00
Zinc (and its compounds)	0.13	25.04	0.00	25.17	67.66	0.00
PM2.5 - Particulate Matter <= 2.5 Microns	12.86	0.00	0.00	12.86	0.00	0.00
Copper (and its compounds)	0.00	6.20	0.00	6.20	92.30	0.00
Lead (and its compounds)	0.04	4.39	0.00	4.42	4.87	0.00
PM10 - Particulate Matter <= 10 Microns	0.40	0.00	0.00	0.40	0.00	0.00
Arsenic (and its compounds)	0.01	0.25	0.00	0.26	0.17	0.00
Cadmium (and its compounds)	0.01	0.23	0.00	0.24	0.22	0.00
Mercury (and its compounds)	0.01	0.04	0.00	0.05	0.07	0.00
Hexachlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00
Dioxins and furans	0.00	0.00	0.00	0.00	0.00	0.00
Chlorine	0.00	0.00	0.00	0.00	0.00	0.00
Total	397.99	23,765.05	0.00	24,163.05	3,677.79	0.00

Releases from City Corporation

Table 11 provides the additional air related emissions data (air and road) as reported by the City via NPRI but which is required and received by the Ontario Ministry of the Environment under Ontario Regulation 127/01.

Table 11: 2005 O. Reg 127 Reporting for the City of Toronto.

Facility	CAS Number	Substance Description	Total Air Releases	Total Road Releases	Total Air & Road Releases
1116 KING STREET WEST	NA - M08	PM - particulate matter from road dust	0.00	0.04	0.04
	NA - M09	PM10 - particulate matter from road dust <=10 microns	0.00	0.04	0.04
	NA - M10	PM2.5 - particulate matter from road dust <=2.5 microns	0.00	0.04	0.04
843 EASTERN AVENUE	NA - M08	PM - particulate matter from road dust	0.00	0.08	0.08
	NA - M09	PM10 – particulate matter from road dust <=10 microns	0.00	0.08	0.08
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	0.00	0.08	0.08
ASHBRIDGES BAY TREATMENT PLANT	NA - M09	PM10 – particulate matter from road dust <=10 microns	1.89	0.00	1.89
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	1.89	0.00	1.89
BERING YARD	NA - M08	PM - particulate matter from road dust	0.00	0.02	0.02
	NA - M09	PM10 – particulate matter from road dust <=10 microns	0.00	0.02	0.02
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	0.00	0.02	0.02
BERMONDSEY TRANSFER STATION	NA - M08	PM - particulate matter from road dust	0.00	6.15	6.15
	NA - M09	PM10 – particulate matter from road dust <=10 microns	0.00	1.17	1.17
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	0.00	0.28	0.28
COMMISSIONERS ST TRANSFER STN	NA - M08	PM - particulate matter from road dust	0.00	3.51	3.51
	NA - M09	PM10 – particulate matter from road dust <=10 microns	0.00	0.69	0.69
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	0.00	0.18	0.18
DISCO TRANSFER STATION	NA - M08	PM - particulate matter from road dust	0.00	8.34	8.34
	NA - M09	PM10 – particulate matter from road dust <=10 microns	0.00	1.60	1.60
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	0.00	0.38	0.38
DISCO YARD	NA - M08	PM - particulate matter from road dust	0.00	0.04	0.04
	NA - M09	PM10 – particulate matter from road dust <=10 microns	0.00	0.04	0.04
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	0.00	0.04	0.04
DUFFERIN TRANSFER STATION	NA - M08	PM - particulate matter from road dust	0.00	8.63	8.63
	NA - M09	PM10 – particulate matter from road dust <=10 microns	0.00	1.67	1.67
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	0.00	0.41	0.41
EASTERN AND BOOTH BLOCKS	NA - M08	PM - particulate matter from road dust	0.00	0.06	0.06
	NA - M09	PM10 – particulate matter from road dust <=10 microns	0.00	0.06	0.06
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	0.00	0.06	0.06
FINCH YARD	NA - M08	PM - particulate matter from road dust	0.00	0.03	0.03
	NA - M09	PM10 – particulate matter from road dust <=10 microns	0.00	0.03	0.03

	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	0.00	0.03	0.03
HIGHLAND CREEK TREATMENT PLANT	NA - M09	PM10 – particulate matter from road dust <=10 microns	10.40	0.00	10.40
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	10.00	0.00	10.00
HUMBER TREATMENT PLANT	NA - M09	PM10 – particulate matter from road dust <=10 microns	0.97	0.00	0.97
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	0.97	0.00	0.97
INGRAM TRANSFER STATION	NA - M08	PM - particulate matter from road dust	0.00	5.72	5.72
	NA - M09	PM10 – particulate matter from road dust <=10 microns	0.00	1.10	1.10
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	0.00	0.27	0.27
SCARBOROUGH TRANSFER STATION	NA - M08	PM - particulate matter from road dust	0.00	4.89	4.89
	NA - M09	PM10 – particulate matter from road dust <=10 microns	0.00	0.94	0.94
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	0.00	0.23	0.23
VICTORIA PARK TRANSFER STATION	NA - M08	PM - particulate matter from road dust	0.00	1.73	1.73
	NA - M09	PM10 – particulate matter from road dust <=10 microns	0.00	0.34	0.34
	NA - M10	PM2.5 – particulate matter from road dust <=2.5 microns	0.00	0.09	0.09

City Corporation Emissions from (Disused) Landfills

The City currently has care and control of four of its former landfill sites – Keele Valley, Brock West, Beare Road and Thackeray. The City has to report Greenhouse Gas Emissions for Brock West and Keele Valley, and three particulate matter parameters respecting several specific activities relating to Keele Valley, plus others also relating to particulate matter to O.Reg 127/01 as found below in Table 12, and Tables 13a, 13b.

Table 12: Green House Gas Emission Reporting for the City of Toronto

Facility Name	CO2 (tonnes)	CO2 (tonnes CO_2e)	CH4 (tonnes)	CH4 (tonnes CO_2e)	Total of All Gases (tonnes CO_2e)
Brock West Landfill			5,365.90	112,683.91	112,683.91
Keele Valley Landfill	14,329.94	14,329.94	7,470.56	156,881.76	171,211.70

*Note: The 171,211.70 tonnes of eCO2 reported in 2005 will increase by almost a 1/3.

Table 13a: NPRI Releases for Keele Valley Landfill

CAS Number	Substance	Stack / Point	Storage / Handling	Fugitive	Spills	Other	Total
NA - M08	PM - Total Particulate Matter	0.003	69.794	17.456	0	0.003	87.256
NA - M09	PM10 - Particulate Matter <= 10 Microns	0.001	34.158	4.898	0	0.003	39.06
NA - M10	PM2.5 - Particulate Matter <= 2.5 Microns	0.001	12.554	0.864	0	0.003	13.422

Table 13b: O. Reg 127 Releases for Keele Valley Landfill

CAS Number	Substance	Stack / Point	Storage / Handling	Fugitive	Spills	Other	Road Dust	Total
NA - M08	PM - Total Particulate Matter	0	0	0	0	0	17.456	17.456
NA - M08 M	PM - Total Particulate Matter - [MOE]	0	0	0	0	0	32.183	32.183
NA - M09 M	PM10 - Particulate Matter <= 10 Microns - [MOE]	0	0	0	0	0	4.817	4.817
NA - M09	PM10 - Particulate Matter <= 10 Microns	0	0	0	0	0	4.897	4.897
NA - M10 M	PM2.5 - Particulate Matter <= 2.5 Microns - [MOE]	0	0	0	0	0	0.864	0.864
NA - M10	PM2.5 - Particulate Matter <= 2.5 Microns	0	0	0	0	0	0	0

*Note: Even though the Keele Valley is a City of Toronto owned facility, it "exists" in the City of Vaughan, and, therefore, its totals were not included with the other data and tables in this report.

Releases to Water by the City Corporation

The four water treatment plants: R.L Clark Filtration Plant (Ward 6), R.C. Harris Filtration Plant (Ward 36), Island Filtration Plant (Ward 28), and F.J. Horgan Filtration Plant (Ward 44) are uniformly shown to have no emissions to air, water or land. The four wastewater treatment plants: the Humber Treatment Plant (Ward 5), the North Toronto Treatment Plant (Ward 29), the Ashbridges Bay Treatment Plant (Ward 32), and the Highland Creek Treatment Plant (Ward 44) report no emissions to land but clearly have large emission reports to water and to air.

The substances with the two largest releases to water from the wastewater treatment facilities are ammonia and nitrate. Almost all of the ammonia and nitrate in the wastewater process originates from human and animal waste. The Provincially established standards for the concentrations of these compounds contained in the treated wastewater that is released to the lake are very low, only 15 mg/L or less for ammonia and less than 40 mg/L for nitrate. The standard for drinking water is obviously lower at 10 mg/L for nitrates and the provincial water quality objective is even lower at 20 µmg/L for ammonia. The Ashbridges Bay Treatment Plant, for example, discharges an average of 8.2 mg/L of nitrates in the treated effluent to the lake. At these concentrations their effect on the lake water quality is negligible. The Canadian standard for nitrate in drinking water is less than 45 mg/L.

The original source of the emissions to water reported by the City's wastewater treatment plants is homes, businesses and industries. The homes, businesses and the industries that have permits with the City of Toronto to discharge into City sewers do not report emissions to water to NPRI as NPRI wants to avoid double counting the discharge. The reason the City's treatment plants can be labelled as big single sources is a function of the City's population and economic size.

The total wastewater plant inflow (i.e. for all four plants) in 2005 was approximately 440 BL (1 BL = 1 million cubic metres = 1 billion litres). Which means that even very small concentrations of any compounds in the release is greatly enlarged as a total release in tonnes. (Even a concentration of only 0.01 mg/L (or 1/millionth of a tonne) produces one tonne when multiplied by a flow of 100,000,000 m3.)

The Certificates of Approval (CofA) for treatment plants specify four substances in the outflow that have to meet standards. It can vary by plant, but the standards set for the City's largest plant at Ashbridges Bay compared to effluent released are shown in Table 14. All of Toronto's wastewater treatment plants meet their individual CofA standards.

Table 14: Ashbridges Bay Wastewater Treatment Plant: Comparison of Approved Release Concentration Maximums with Actual Releases in 2005

	Certificates of Approval	Treated Effluent in 2005
Suspended Solids	25 mg/L	8 mg / mL
Carbonaceous Biological Oxygen Demand	25 mg/L	5 mg/L
Total Phosphorous	1 mg/L	0.7 mg/L
E.Coli.	200 colonies / 100 mL	3 colonies / 100 mL

Beyond the CofA controlled releases, NPRI requires reporting of metals (arsenic, cadmium, copper, lead, mercury and zinc) plus ammonia, nitrate ion, and phosphorous.

The cumulative amounts of metals released, despite the very low concentrations, by plant are shown in Table 15.

Table 15: Releases of Reported Substances to Water by the City's Wastewater Treatment Plants (tonnes)

Substances Reported to NPRI	Humber TP	North Toronto TP	Ashbridges Bay TP	Highland Creek TP
Arsenic	<1	0	<1	<1
Cadmium	<1	<1	<1	<1
Copper	<1	0	4	2
Lead	<1	<1	3	<1
Mercury	<1	0	<1	<1
Zinc	7	0	15	3
Ammonia	1,960	284	3,833	530
Nitrate Ion	474	101	12,260	4,000
Phosphorous	63	7	180	37

Tables 16 and 17 indicate the relative contribution of releases to water from Corporation and Community facilities. Table 16 indicates the amount released by specific facilities, and Table 17 indicates the individual Reported Substances released by the same facilities.

Table 16: Reported Releases to Water by Facility

Facility Name	Total Releases To Water
Ashbridges Bay Treatment Plant	16,295.44
Highland Creek Treatment Plant	4,572.66
Humber Treatment Plant	2,504.98
North Toronto Treatment Plant	391.98
Emirfi Shield Plating Inc.	**14.53**
Teknion Furniture Systems	**0.06**
M. Stanton Electroplating Ltd.	**0.01**
Total	**23,779.66**

Table 17: Reported Releases to Water by Company

Company	Substance Description	Total Releases To Water
City of Toronto Treatment Plants	Nitrate ion in solution at pH >= 6.0	16,835.00
City of Toronto Treatment Plants	Ammonia (Total)	6,607.00
City of Toronto Treatment Plants	Phosphorus (total)	286.90
City of Toronto Treatment Plants	Zinc (and its compounds)	25.04
Emirfi Shield Plating Inc	Methanol	14.46
City of Toronto Treatment Plants	Copper (and its compounds)	6.20
City of Toronto Treatment Plants	Lead (and its compounds)	4.39
City of Toronto Treatment Plants	Arsenic (and its compounds)	0.25
City of Toronto Treatment Plants	Cadmium (and its compounds)	0.23

Teknion Furniture Systems	Phosphorus (total)	0.06
Emirfi Shield Plating Inc	Copper (and its compounds)	0.05
City of Toronto Treatment Plants	Mercury (and its compounds)	0.04
Emirfi Shield Plating Inc	Hexavalent chromium compounds	0.02
M. Stanton Electroplating Ltd.	Hexavalent chromium compounds	0.01
Emirfi Shield Plating Inc	Lead (and its compounds)	0.00
Total		**23,779.66**

Appendix D.

COMPARISONS AND CONTEXTS

CAC Emission Tonnages in Perspective

The 334 Toronto-based facilities reporting to NPRI can be coded into 101 standard "industrial categories". The majority of these are related to metals and product manufacturing, or chemical products and pharmaceuticals which are typically seen as "industrial" and potentially significant pollution sources. Many others, however, are related to such categories as: business services, scientific and technical services, building operators, and the "makers" of biscuits, bread and other bakery products, fluid milk, canned fruit and vegetable preserves, dairy products, and brewery products.

The inclusion of food preparation "industries" greatly influences the amounts of reported Criteria Air Contaminants (CAC's), as using natural gas to cook foodstuffs releases the same substances as does cooking at home with natural gas, and indeed the same CAC's are released from using natural gas in furnaces and boilers to heat homes and provide hot water.

To place the city-wide reported CAC's in perspective it is helpful to compare the NPRI reported tonnages with the known and estimated amounts of CAC's that are released to air in Toronto. The six standard CAC's (CO, NOx, PM_{10}, $PM_{2.5}$, SO2 and VOCs), which are modelled in TEO's air quality model are given known and estimated inputs from building heating, vehicle propulsion, industrial smokestacks and area emissions (the latter includes estimates of fugitive industrial emissions).

The City's modelled data inputs identifies vehicles as producing 367,736 tonnes of CAC's in Toronto and buildings burning natural gas as producing 12,310 tonnes. To further place those reported CAC emissions from the burning of natural gas for "industrial cooking", which total 1,235 tonnes, in a City-wide perspective, a total of 12,310 tonnes, or 10 times as much, of all CAC's combined are produced each year in Toronto just from the natural gas used residentially for space heating, water heating and cooking. The CAC emissions from cars and buildings in the City are clearly far greater than the reported CAC emissions from industrial facilities.

A more reliable relative indicator here is to examine NOx only (as combined CAC tonnages that include large amounts of naturally created VOCs are distorting). NPRI report a combined facilities production of NOx of 2,150 tonnes. TEO estimates and models twice this amount at 5,490 tonnes of NOx as from industrial smokestacks and fugitive facility emissions, plus another 34,120 from vehicles (or mobile sources) and from space heating of buildings in the City. The following table identifies the relevant quantities.

Table 18: Comparing NPRI Reported Facility Emissions with TEO "Known & Estimated" Facility Emissions and City-wide Emissions (tonnes).

	NPRI's Facility Sources	TEO 's ALL Sources	TEO's Point Sources	TEO's Building Sources	TEO's Other Areas	TEO's Mobile Sources
CAC's	13,244	436,025	4,639	12,246	640,050	367,736
- NOx	2,149	39,607	1,749	6,684	3,740	27,434
- Other CAC's	2,205	396,418	1,617	5,245	74,257	315,299
Reported Substances	2,819	na	na	na	na	na
All Substances	16,064	436,025	4,639	12,246	640,050	367,736

Table Notes:
1 Data of TEO's All Sources, Point Sources, Building Sources, Other Areas, Mobile Sources are extracted from the data provided (as by Environment Canada and Ontario Ministry of the Environment) and/or created with the help of City of Toronto data and private sector data (e.g. Enbridge Inc).
2. Building Sources are based on Enbridge supplied combustion of natural gas data.
3. CO is the largest "other CAC's" at 48,010 tonnes (facilities), at 306,170 tonnes (mobiles) and 4,150 tonnes (buildings), but CO does not create ambient ground level concentrations in Toronto that are in excess of standards.
4. NPRI includes all fine particles less than 100 microns i.e. PM_{100}, PM_{10} and $PM_{2.5}$, but TEO only includes all fine particles less than 10 microns i.e. PM_{10} and $PM_{2.5}$.
5. VOCs from Area Sources are not included in this Table, and are therefore not included under ALL Sources either.

Clearly, a large amount of emissions remain unaccounted for in the standard reporting authorities' requirements. However, it is also apparent that a larger amount of CAC emissions as reported by large single source industry facilities emanates from the myriad of smaller sources, primarily homes and vehicles. Such emissions need not be reported individually, but can be estimated (as modeled by TEO) and reported collectively.

Table 19: Total Community and Corporation Emissions Compared (in tonnes) as Published by NPRI

	Total to Air	Total to Water	Total to Land	TOTAL
Community Emissions	15,666	14.6	0.3	15,681
Corporation Emissions	398.0	23,765	0	24,163
Corporation Emissions as % of Total*	2%	100%	0%	61%
TOTAL COMBINED COMMUNTIY AND CORPORATE EMISSIONS	16,064	23,780	0	39,844

NPRI's Criteria Air Contaminants (CAC's) Estimates for Toronto (Combined Community and Corporation)

Another comparative perspective can be found on the NPRI web-site is a Summary of Criteria Air Contaminant (CAC's) emissions as updated in March 2007, which can be "searched" to indicate "emission estimates" for Toronto. Emissions from all sources (point, area, mobile and open sources) were aggregated and summed up by source category as by Environment Canada. (Though Environment Canada clearly footnotes that the uncertainty in the data estimates is "…larger for small geographic areas i.e. postal code, urban centres and communities".)

Table 20: NPRI Summary of Criteria Air Contaminant (CAC's) Emissions for Toronto in 2005 (as estimated in March 2007)

Source Category	TPM	PM10	PM2.5	SOX	NOX	VOC	CO	NH3
Industrial	10,917	4,215	2,246	3,269	5,342	11,196	7,779	627
Fuel Combustion	6,928	6,556	6,510	1,463	7,313	8,615	40,437	333
Transportation	3,015	2,944	2,791	2,349	33,023	21,457	169,647	31
Incineration	22	21	15	42	497	179	479	6
Miscellaneous	1,062	1,059	1,030	0	7	41,350	843	673
Open Sources	139,190	33,223	7,072	0	3	604	55	2
Total	**161,133**	**48,017**	**19,666**	**7,125**	**46,185**	**83,401**	**219,241**	**1,671**

The source estimates can be further resolved for each source category (except "industrial") to provide the following estimated data for fuel combustion (Table 20a), transportation (Table 20b), incineration (Table 20c), Miscellaneous (Table 20d), and Open Sources (Table 20e).

Table 20a: Fuel Combustion

Source Sector	TPM	PM10	PM2.5	SOX	NOX	VOC	CO	NH3
COMMERCIAL FUEL COMBUSTION	418	391	363	595	3,440	185	788	244
RESIDENTIAL FUEL COMBUSTION	390	366	358	789	3,318	229	1,300	39
RESIDENTIAL FUELWOOD COMBUSTION	6,120	5,799	5,790	79	554	8,201	38,349	50
Total	**6,928**	**6,556**	**6,510**	**1,463**	**7,313**	**8,615**	**40,437**	**333**

Table 20b: Transportation

Source Sector	TPM	PM10	PM2.5	SOX	NOX	VOC	CO	NH3
AIR TRANSPORTATION	158.13	87.44	61.67	295.82	4,891.83	592.24	3,197.21	0.99
HEAVY-DUTY DIESEL VEHICLES	62.98	62.98	58.16	39.48	1,602.49	55.23	373.22	2.08
HEAVY-DUTY GASOLINE TRUCKS	0.11	0.10	0.09	0.42	11.01	1.87	29.64	0.07
LIGHT-DUTY DIESEL TRUCKS	0.09	0.09	0.09	0.07	0.78	0.32	0.61	0.00
LIGHT-DUTY DIESEL VEHICLES	0.04	0.04	0.03	0.02	0.31	0.09	0.33	0.00
LIGHT-DUTY GASOLINE TRUCKS	0.39	0.38	0.34	2.74	39.98	39.47	734.36	2.62
LIGHT-DUTY GASOLINE VEHICLES	0.32	0.31	0.30	2.80	47.26	48.52	830.03	3.70
MARINE TRANSPORTATION	162.13	162.13	149.16	938.00	2,884.59	387.04	246.94	3.24
MOTORCYCLES	0.01	0.01	0.01	0.02	0.78	2.87	10.24	0.01
OFF-ROAD USE OF GASOLINE	2,618.44	2,618.44	2,512.93	1,053.47	23,160.13	20,311.63	164,155.83	18.12
RAIL TRANSPORTATION	8.57	8.57	7.29	16.59	383.83	18.09	68.77	0.03
TIRE WEAR	3.31	3.28	1.13	0.00	0.00	0.00	0.00	0.00
Total	**3,014.51**	**2,943.76**	**2,791.19**	**2,349.43**	**33,022.99**	**21,457.36**	**169,647.19**	**30.86**

Table 20c: Incineration

Source Sector	TPM	PM10	PM2.5	SOX	NOX	VOC	CO	NH3
CREMATION	0.00	0.00	0.00	0.40	2.27	0.10	1.03	0.00
INDUSTRIAL & COMMERCIAL INCINERATION	0.86	0.58	0.47	28.98	34.20	36.67	121.73	4.64
MUNICIPAL INCINERATION	0.78	0.00	0.00	12.83	11.98	0.00	1.91	1.48
OTHER UTILITIES	20.38	20.38	14.87	0.09	448.85	141.84	354.63	0.15
Total	**22.02**	**20.96**	**15.34**	**42.31**	**497.30**	**178.61**	**479.30**	**6.27**

Table 20d: Miscellaneous

Source Sector	TPM	PM10	PM2.5	SOX	NOX	VOC	CO	NH3
CIGARETTE SMOKING	44.37	44.37	44.37	0.00	0.00	0.74	209.90	0.35
DRY CLEANING	0.00	0.00	0.00	0.00	0.00	7.40	0.00	0.00
FUEL MARKETING	0.00	0.00	0.00	0.00	0.00	6,466.10	0.00	0.00
GENERAL SOLVENT USE	0.00	0.00	0.00	0.00	0.00	21,270.27	0.00	0.00
PESTICIDES AND FERTILIZER APPLICATION	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.61
PRINTING	0.41	0.41	0.41	0.01	6.81	5,493.35	0.17	0.87
STRUCTURAL FIRES	316.63	313.47	284.97	0.00	0.00	307.13	633.27	0.00
SURFACE COATINGS	0.00	0.00	0.00	0.00	0.00	7,804.99	0.00	0.00
MEAT COOKING	700.59	700.59	700.59	0.00	0.00	0.00	0.00	0.00
HUMAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	671.25
Total	**1,062.03**	**1,058.85**	**1,030.34**	**0.01**	**6.81**	**41,349.99**	**843.34**	**673.08**

Table 20e: Open Sources

Source Sector	TPM	PM10	PM2.5	SOX	NOX	VOC	CO	NH3
AGRICULTURE - ANIMALS	0.58	0.49	0.08	0.00	0.00	0.72	0.00	1.30
AGRICULTURE - TILLING AND WIND EROSION	1,660.76	808.27	23.47	0.00	0.00	0.00	0.00	0.00
CONSTRUCTION	56,582.12	16,971.16	3,359.70	0.00	0.00	0.00	0.00	0.00
LANDFILL SITES	245.02	0.00	0.00	0.00	0.00	590.07	0.00	0.00
MINE TAILINGS	153.21	12.26	3.06	0.00	0.00	0.00	0.00	0.00
DUST FROM PAVED ROADS	1.61	0.52	0.08	0.00	0.00	0.00	0.00	0.00
PRESCRIBED BURNING	8.92	8.54	7.96	0.42	2.72	13.07	55.13	0.28
DUST FROM UNPAVED ROADS	80,537.61	15,421.50	3,678.11	0.00	0.00	0.00	0.00	0.00
Total	**139,189.84**	**33,222.74**	**7,072.46**	**0.42**	**2.72**	**603.86**	**55.13**	**1.58**

Appendix E.

EMISSIONS BY WARDS AND SPATIAL DISTRIBUTIONS

Community Releases, Disposals and Transfers in 2005 by Wards

NPRI and O.Reg 127 collected and reported emissions in 2005 from 334 facilities in Toronto, three fewer than in 2004. Total emissions between 2004 and 2005 increased by 12 tonnes which represents the summation of fewer emissions to air, more emissions to water and effectively the same amount of emissions to land. The reported emissions to air decreased by 500 tonnes, or by 2.8% less than in 2004; emissions to water increased by 520 tonnes or by 2.2% more than in 2004.

The difference between the facility provided data showing a decreased emission to air and an increased emission to water of 12 tonnes is not reflected in the summation provided in the NPRI National Database which indicates 13.5 tonnes. This discrepancy is consistently seen for all years of NPRI data for Toronto and relates to NPRI's own summation of intermittent discrepancies at the facility level. For the purpose of this present report, NPRI "totals data" respecting community emissions is replaced with data calculated by the Toronto Environment Office from reported facility emissions; the same discrepancy does not occur in respect to corporation data, as discussed in the following section.

In the four years since 2002 the tonnage of reported CAC's in Toronto has increased, by almost 10%, from 13,200 to 14,400 tonnes. Over the same period, 2002 – 2005 inclusive, the reported emissions of the Reported Substances have decreased, by approximately 26%, from 3,820 tonnes to 2,820 tonnes.

The Reported Substances includes many compounds and includes 22 of the 25 substances of priority health concern recently identified by the Medical Officer of Health - see report to Board of Health, "Strategy to Enhance Access to Environmental Information in Toronto", from the Medial Officer of Health, June 8, 2007 [http://www.toronto.ca/health/hphe/pdf/boh_july2007_access_to_environmental_information.pdf], which recommends that the Medical Officer of Health develop an environmental reporting program to require facilities in Toronto to report the use and emissions of 25 substances of priority health concern, and report to the Board of Health in 2008 on a draft bylaw and implementation plan.

The recent report of the Medical Officer of Health, estimates more than 8,000 facilities in Toronto which potentially create emissions of substances of interest to Toronto Public Health that could beneficially be reported to NPRI as an adjunct to its reporting procedures for Toronto. If fully implemented for Toronto, this would obviously require a doubling of NPRI's data and information handling capacity.

This action is intended to obtain, for the City, data and information respecting releases to the air, land and water that are not currently required by NPRI or O.Reg 127. There are approximately 71,500 businesses in Toronto, estimates suggest that 9,600 commercial or industrial businesses in Toronto may be using or releasing chemicals to air, land or water. These are to be considered for inclusion as part of a new reporting requirement scheduled to be reported to Council by the Medial Officer of Health in 2008.

Table 21: Community Emissions by Wards (2005) in Tonnes.

Ward	Ward	Facility Count	Total Air Releases	Total Water Releases	Total Land Releases	Total Release
Etobicoke North (1)	1	11	261	0	0	261
Etobicoke North (2)	2	39	1,953	0	0	1,953
Etobicoke Centre (3)	3	5	55	0	0	55
Etobicoke Centre (4)	4	0	0	0	0	0
Etobicoke-Lakeshore (5)	5	15	2,166	0	0	2,166
Etobicoke-Lakeshore (6)	6	27	1,170	0	0	1,170
York West (7)	7	30	2,236	0	0	2,236
York West (8)	8	21	560	0	0	560
York Centre (9)	9	3	34	0	0	34
York Centre (10)	10	1	39	0	0	39
York South-Weston (11)	11	8	370	0	0	370
York South-Weston (12)	12	4	1	0	0	1
Parkdale-High Park (13)	13	0	0	0	0	0
Parkdale-High Park (14)	14	1	120	0	0	120
Eglinton-Lawrence (15)	15	5	11	0	0	11
Eglinton-Lawrence (16)	16	0	0	0	0	0
Davenport (17)	17	2	0	0	0	0
Davenport (18)	18	4	132	0	0	132
Trinity-Spadina (19)	19	2	5	0	0	5

Trinity-Spadina (20)	20	12	147	0	0	147
St. Paul's (21)	21	0	0	0	0	0
St. Paul's (22)	22	0	0	0	0	0
Willowdale (23)	23	2	3	0	0	3
Willowdale (24)	24	2	122	0	0	122
Don Valley West (25)	25	1	0	0	0	0
Don Valley West (26)	26	12	804	0	0	804
Toronto Centre-Rosedale (27)	27	8	276	0	0	276
Toronto Centre-Rosedale (28)	28	12	267	0	0	267
Toronto-Danforth (29)	29	2	4	392	0	396
Toronto-Danforth (30)	30	9	494	0	0	494
Beaches-East York (31)	31	3	25	0	0	25
Beaches-East York (32)	32	0	93	0	0	93
Don Valley East (33)	33	5	68	0	0	68
Don Valley East (34)	34	4	87	0	0	87
Scarborough Southwest (35)	35	12	459	15	0	474
Scarborough Southwest (36)	36	2	317	0	0	317
Scarborough Centre (37)	37	19	971	0	0	971
Scarborough Centre (38)	38	7	20	0	0	20
Scarborough-Agincourt (39)	39	3	12	0	0	12
Scarborough-Agincourt (40)	40	3	8	0	0	8
Scarborough-Rouge River (41)	41	17	1,386	0	0	1,386
Scarborough-Rouge River (42)	42	9	175	0	0	175
Scarborough East (43)	43	0	0	0	0	0
Scarborough East (44)	44	9	1,210	0	0	1,210
Lake Ontario (off-shore)		3	0	23,373	0	23,373
Total		**334**	**16,064**	**23,780**	**0**	**39,844**

The spatial distribution of the emissions to air, land and water are not uniform across the City. Table 21: Community Emissions by Ward (found above) shows the numeric distribution of all of Toronto's reporting facilities and their combined emissions to air, land and water in 2005 for each Ward. Though the 334 reporting facilities are located throughout the City: Etobicoke-York with 142, North York with 56, Toronto and East York with 54, and Scarborough with 82, there are also five Wards (Wards 4, 13, 21, 22 and 43) that have no reporting facilities within them. However, the greater the number of facilities (above zero) in a Ward, or division of the City, does not indicate a higher relative tonnage released in any Ward. The largest combined tonnage released in any Ward occurs in a

Ward with only one reporting facility – Beaches - East York (Ward 32). (The emissions reported by the Ashbridges Bay Treatment Plant in Ward 32 are discussed more fully in the section below, addressing City of Toronto - Emissions.)

Although no other industry in Ward 32 reports their releases this should not be interpreted as implying no other industries release substances in Ward 32 – but rather merely that the national thresholds are set such that other industry in Ward 32, as in all other wards of the City, are not required to report their releases, if any.

The reported emissions to water occur from industries located in wards that are adjacent to Lake Ontario (Wards 32 and 44) or the major rivers (Wards 5, 29 and 35); the biggest three releases from which emanate from three of the City's three wastewater treatment plants. The combined release to water of almost 24,000 tonnes is significantly greater, as an amount, than the combined release to air of approximately 17,000 tonnes – but though the tonnages are high, the concentrations as of ammonia and nitrate releases to the lake, are within drinking water guide line standards and are released at offshore depths that are considered to have minimal, if any, impact on the environment or human health. The reported releases to land occur in three wards only (Wards 11, 17 and 30) and only total to 300 kilograms when combined.

The emissions to air are more ubiquitous; reported emissions to air occur in 39 of the 44 wards of the City, but such emissions diffuse subsequently in air to impact ambient concentrations in other wards, including the other 5 wards that have no emissions. However, emissions to air rather than resultant concentrations in air are addressed here.

Total combined tonnages by ward do not reflect the potential severity of any release to the public. Individual substances usually have individual impacts. But though people may suffer from combined exposures and impacts - these are not addressed by combined tonnages released. Theoretically, a gram of one substance may have as much of an impact as a tonne of another substance. Further, the relative amount of emissions to air in a ward does not necessarily reflect the relative concentrations of airborne gases or particles to which a ward's local residents or workers are exposed. Exposure is also a function of time spent in proximity to a specific concentration. Individual sensitivity is also not reflected in simple tonnages released of any individual substance, nor is the eco-toxicity (i.e. combined toxicities) or combinations of impacts on an individual addressed.

The air quality concentrations that result from the NPRI's reported releases to air are not a simple function of the amount released. All contaminants emitted into the air do not equally impact air quality. Nor do equal amounts of even the same emission equally cause equal resultant air quality concentrations. Air quality is a function of the physical diffusion of the emissions and subsequent chemical transformations and not just a simple reflection of the amount or tonnage of the emissions released into the air.

The MOE requires that large and impacting releases of substances when released to the air must be released from smokestacks. As such, local concentrations of such substances are very much reduced by increased vertical and horizontal dispersion and mixing, or dilution.

The reported tonnages of releases to air include the basic six Criteria Air Contaminants (CAC's - NOx, SOx, CO, VOC, PM_{10}, and $PM_{2.5}$) as well as what is referred to as by the NPRI as "Reported Substances". CAC's released to air did not have to be reported prior to 2002.

Spatial Distributions

"Map 1: Community Releases to Water by Sewershed Via the Corporations Four Wastewater Plants in 2005", spatially illustrates the data seen previously in Appendix C. Releases to Lake Ontario are made at depth and off-shore. Map 1 shows the relative proportion of Arsenic, Cadmium, Copper, Lead, Mercury, Zinc, Ammonia, Nitrate Ion, and Phosphorous released via the plants to Lake Ontario. The map "appears" only to show Nitrate Ion (as medium grey) and Ammonia (as dark grey). Phosphorous is also included but is so small a relative amount that it is only the thickness of a line. The three plants have a total release of Arsenic, Cadmium, Copper, Lead, Mercury, Zinc, Ammonia, Nitrate Ion, and Phosphorous of: Humber Treatment Plant with 1,700 tonnes, Ashbridges Bay Treatment Plant with 17,000 tonnes, and Highland Creek Treatment Plant with 8,500 tonnes. The contributions made by the Corporation's four Wastewater Treatment Plants are the only releases included in Map 1. The relatively minor releases as reported to NPRI by private sector companies are not included in Map 1.

The spatial distribution of the reported released total tonnage to air, land and water by Ward is shown in "Map 2: Community Releases to Air, Water & Land by Ward, 2005". Clearly, not all Wards include Community facilities that emit the same amounts of pollutants.

Criteria Air Contaminants (CAC's) and "Reported Substances" (i.e. toxic compounds) can be distinguished in the NPRI database, and "Map 3: Community Releases of Reported Substances and CAC's by Ward in 2005", shows the relative significance of CAC and non-CAC emissions based only on tonnage released. The majority of the CAC's that are released to the air in Toronto are released within only approximately 6 of the City's 42 wards. Emissions to air are dispersed and diffused by winds (air movement) that leads to

weaker concentrations that impact down wind wards. If effluent emanates from a tall smokestack, the local ward is less likely to be impacted than wards further downwind. The contribution made by the Community via the Corporation's four Wastewater Treatment Plants are not included in Maps 2 and 3.

The tonnage emitted in a Ward when "mapped" and standardized per square kilometre (to avoid improper spatial representation) is shown in "Map 4: Community Releases Standardized by Ward Area, 2005". The information presented in Map 4 indicates the tonnages released by ward standardized to express what amounts to a point source emission, based on the tonnage released per unit area of land space in a ward. Clearly, some wards have a stronger industrial base than do some others. The contribution made by the Community via the Corporation's Four Wastewater Treatment Plants are not included in Map 4.

Individual plant facility contributions are shown graphically and examined to show multi-point sources across the City in "Map 5: Community Releases from 330 Facilities, 2005" (this differs from Map 2 and Map 3 which combine facilities within each ward to indicates ward releases). The contribution made by the Community via the Corporation's Four Wastewater Treatment Plants are not included in Map 5.

Maps 1 through 5 are attached.