

The logo for the Toronto Staff Report, featuring a stylized building icon to the left of the word "TORONTO" in a large, bold, sans-serif font, followed by "STAFF REPORT" in a smaller, bold, sans-serif font. A horizontal line is positioned below the text.

TORONTO STAFF REPORT

April 29, 2005

To: Board of Health

From: Dr. David McKeown, Medical Officer of Health

Subject: Air Emissions and Health Status Studies for South Riverdale and The Beaches Communities
Ward 30 - Toronto-Danforth and Ward 32 - Beaches-East York

Purpose:

To report on the findings and conclusions of the Air Emissions and Health Status studies undertaken for South Riverdale and The Beaches communities in fulfillment of the Ashbridges Bay Treatment Plant Environmental Assessment.

Financial Implications and Impact Statement:

There are no financial implications resulting from the adoption of this report. Any financial impacts for City departments stemming from implementation of the recommendations will be considered through future budget processes.

Recommendations:

It is recommended that:

- (1) the Board of Health request the Ontario Minister of the Environment to consider the cumulative impact of emissions from any new or modified industrial facility on adjacent residential areas with elevated burden of illness/mortality, or that have a disproportionate share of pollution point sources, such as in South Riverdale, prior to issuing a Certificate of Approval;
- (2) the General Manager of Toronto Water:
 - (a) continue to monitor chemical levels in the water entering and exiting the Ashbridges Bay Treatment Plant (ABTP) to gain a better understanding of potential release of these chemicals from the plant to the air through evaporation and other processes;

- (b) periodically update the emission inventory of the ABTP to reflect new information regarding on-site new and existing equipment or changes to the wastewater;
 - (c) conduct analytical testing for polycyclic aromatic hydrocarbons in air emissions at large release points at the ABTP; and
 - (d) test the final clarifiers at the ABTP using an appropriate and approved method to determine the potential emissions of sulphur-bearing substances;
- (3) the Executive Director of Technical Services Division examine the air quality impact of emissions of sources in these communities, including the ABTP; and
 - (4) the appropriate City Officials be authorized and directed to take the necessary action to give effect thereto.

Background:

In the early 1990s, the Works Department of the Metropolitan Toronto government planned to make major modifications and improvements to the operation of the Ashbridges Bay Treatment Plant (ABTP). An environmental assessment process was initiated as required under the Ontario Environmental Assessment Act.

As part of the ABTP Environmental Assessment (EA), a mediation process was initiated in 1998 between Toronto Works and Emergency Services (WES) and the community. In 2001, in order to fulfil the agreements arising from the EA mediation process, the Commissioner of WES agreed to fund three studies requested by the community signatories to the mediation agreement. The Medical Officer of Health was requested by WES to commission and oversee the completion of these studies. The studies are:

- (1) Biosolids Pellet Review Study: Human Health and Ecological Risk Assessment;
- (2) Health Status Study for the South Riverdale and Beaches Communities; and
- (3) ABTP Air Emissions Study.

This report provides summaries of the findings, conclusions and interpretations for the latter two of these studies. The Biosolids Pellet Review Study was the subject of a previous report titled, "Health and Ecological Risk Associated with Toronto Biosolids Pellets" considered at the November 2004 meeting of the Board of Health. The full technical reports and executive summaries for all three studies are available on the Toronto Public Health website (www.toronto.ca/health).

This report to the Board of Health was prepared in consultation with staff from Works and Emergency Services and Urban Development Services.

Comments:

History of the Studies:

Since the early 1970s, residents of South Riverdale have been concerned about the effects of local industries on the environment and their health. Of particular concern were emissions from the Canada Metals plant, the Ashbridges Bay Treatment Plant (ABTP) and other incinerators, and the local rendering and tanning industries. The Beaches community is adjacent to South Riverdale, located “downwind” of many of these industries, and thus may have been subject to the same or possibly higher levels of industrial pollution.

While many large industrial facilities had either closed or re-located by the end of the 1990s, the residents of these communities have remained concerned about what they have described as the “cumulative effects” of previous and current exposures to pollutants from these industries. Today the ABTP is one of the few large-scale industrial plants remaining in this area.

The Air Emissions and Health Status studies were begun in 2003 and were conducted concurrently, under the direction of a common Project Advisory Committee (PAC) assembled by Toronto Public Health. The PAC included representatives from the local community, and environmental and/or health non-governmental organisations, as identified in Appendix 1. For each of the studies, Toronto Public Health also formed a project team composed of City staff, academic experts in the field and consultants (Appendix 1). PAC members provided input on the following aspects of the studies: the terms of reference; selection of consultants to undertake the research; and assessment scenarios. PAC members also had the opportunity to comment on the draft technical reports. Both studies underwent independent academic peer review to ensure that the methodology, analysis and interpretation of results were appropriate. The Air Emissions study provided useful contextual information for conducting the Health Status study. Overviews of each study are found in Appendices 2 and 3.

Air Emissions Study:

The Ashbridges Bay Treatment Plant Air Emissions study results help to better characterize the impact of the ABTP on local air quality. The Air Emissions study predicts that with the closing of the incinerators (2003) and the installation of odour control measures (by 2010), the impact of ABTP emissions on local air quality in the two study neighbourhoods is reduced. All chemicals that were detected met Ontario Ambient Air Quality Criteria (AAQC) and Point of Impingement (POI) standards for all scenarios in both communities. With the exception of cadmium and hydrogen sulphide, emissions of the chemicals detected at the ABTP were below health benchmarks in both communities and for all time periods assessed. Substances that are present at levels below health benchmarks are expected to have negligible health risks. Cadmium was above the health benchmark only in the past when the incinerator was in operation. Hydrogen sulphide levels were between its two health benchmarks for scenarios 1, 2 or 3. Although the ABTP is a large point source of emissions, its contribution is relatively small when compared to the Ontario AAQC, health benchmarks and city-wide ambient air quality measurements.

While not actually detected in ABTP the modelled air levels of benzo[a]pyrene (B[a]P) were found to be above the AAQC and health benchmarks. This is likely an overestimation because very conservative assumptions have been used in estimating B[a]P air emissions. Although B[a]P and other polycyclic aromatic hydrocarbons (PAHs) are not expected to have an actual impact on local air quality, as a precaution, it is recommended that analytical testing for PAHs (including B[a]P) in air emissions from all sources at the ABTP be conducted to confirm that these emissions are indeed insignificant.

Measurements of emissions from the final clarifiers were not included in the emission inventory because there was some question concerning the validity of these data. Though the emissions from this source are not expected to be significant with respect to health, Toronto Water should still test the final clarifiers for potential emissions of sulphur-bearing substances.

Although the ABTP has only a relatively small impact on local air quality, it is appropriate nonetheless, that Toronto Water continue to monitor the chemicals coming into and released from the ABTP to gain a better understanding of potential emissions. As well, it is appropriate for Toronto Water to periodically update the emission inventory of the ABTP as changes are made to plant operations. Given that there is no comprehensive monitoring of emissions from other sources in these communities, it would be helpful to expand the analytical work on air quality to examine the impact of emissions from other sources in these communities.

Health Status Study:

Data available for the Health Status study limited the illness and mortality comparisons to the past. Data on deaths gave a picture of mortality from 15 to 26 years ago. The data on cancer cases were from 6 to 20 years ago and hospital admission data covered the time period from 7 to 20 years ago. Use of older health outcome data provides insights into health status at the time when the ABTP incinerator was in full operation, which continued until 9 years ago.

Data analyses indicate that there were no differences in rates of cancer (either deaths due to cancer or reported new cases of cancer) for South Riverdale or The Beaches in comparison to their closest matched communities.

South Riverdale had higher rates of mortality and illness from circulatory disease compared to neighbourhoods that were socio-economically similar and compared to the former City of Toronto as a whole. For example, for 1979 to 1983, the standardized mortality rate (SMR) for males from circulatory disease was about 4.6 deaths per 1000 men, whereas for the former City it was 4.1 deaths per 1000 men. The circulatory disease SMRs for males in the South Riverdale comparison communities ranged from 3.5 to 4.3 per 1000 men.

Relative to its comparison communities, The Beaches had higher mortality and hospital admission rates for circulatory and respiratory illness. For example, for 1979 to 1983, the SMR for males from circulatory disease was about 3.9 deaths per 1000 men in The Beaches, compared to rates of 3.6 and 3.3 per 1000 men in the two comparison neighbourhoods. For 1985 to 1988, the standardized male hospitalization rates for circulatory causes was 13.5 hospital admissions

per 1000 men for The Beaches and 11.4 and 13.5 hospital admissions per 1000 men in the two comparison neighbourhoods.

Comparison of the SMRs and standardized hospitalization rates indicates that health status may have been improving in the study communities. These trends fit what has been observed in Toronto and elsewhere in Canada in recent decades.

Although the aim was to match comparison and study communities for socio-economic characteristics, exact matches were not possible. The health differences observed for the past in The Beaches compared to other communities may therefore, be related largely to the income differences. Income levels and other socio-economic features are surrogates for important health risk factors such as cigarette smoking, nutritional or other diseases. The health status differences observed here for The Beaches group are within the range that would be expected based on differences in income levels among these three communities.

In South Riverdale, the explanation may also rest with differences in risk factors that relate to income levels, but it may also relate to greater exposure to environmental pollution. The current study cannot determine what portion of the higher mortality or hospital admission rates in either of these communities can be attributed to income differences, environmental pollution, or specifically to emissions from the ABTP.

As an interpretive research framework, the concept of environmental justice (which examines the spatial distribution of pollutant sources and correlations with community characteristics such as income levels, minority status or ethnicity) recognizes that pollutant sources tend to be located more often in lower income areas, which is a concern that has been expressed by the South Riverdale community. Research in Hamilton and elsewhere has shown that people living in low income areas are more likely to be exposed to air pollution. As well, it has been hypothesized in other research, that people of lower income levels are more susceptible to the health impacts associated with airborne pollution. Scientific studies are adding weight to the opinion that public health policy should, where possible, promote more equitable distribution of pollutant sources, or minimally, should “be more diligent in the health surveillance of high-risk populations” (Jerrett et al, 2001: 956).

The Medical Officer of Health is committed to examining the variability in health status across Toronto according to local social and demographic characteristics. TPH’s investigation of key health status indicators by small health planning areas in the City is helping to identify areas that might be considered at greater risk for health problems. As well, the City’s Social Policy Analysis and Research unit (SPAR) in collaboration with TPH, regularly summarizes Toronto census data to produce neighbourhood profiles. In addition, TPH is monitoring progress on independent academic research that seeks to map pollutant exposure data (capturing levels of NO₂, an indicator of pollution from vehicle exhaust) with health status and income level data across the City. These efforts can assist in further distinguishing and addressing health, social, economic and air pollution exposure inequalities across the City.

To reduce environmental exposure disparities and to ensure that existing or proposed facilities do not exacerbate current health disparities, cumulative exposure to environmental pollutants needs

to be considered in the relevant approvals processes. This responsibility rests with the Ontario Ministry of the Environment (MOE) which, through the Certificate of Approval process, ensures that all facilities in Ontario meet existing environmental laws for pollutant emissions. When assessing or reviewing pollutant sources, the MOE should introduce a method of addressing the cumulative impact of the air emissions on surrounding and downwind residential areas.

Further investigation to define more precisely the impact of environment as opposed to income or other health-influencing characteristics on the health status of these two neighbourhoods in the past is likely not feasible. Such study designs were ruled out in the early consultations to determine what would be the most effective type of study to conduct. In light of observed and predicted improvements to air quality from operation changes at the ABTP, such a study would not add useful information to efforts to further improve health and air quality in South Riverdale or The Beaches for now and in the future.

Conclusions:

Toronto Public Health oversaw two studies on behalf of Toronto Works and Emergency Services. The Air Emissions study was undertaken to give a more comprehensive picture of total air emissions from the Ashbridges Bay Treatment Plant (ABTP) and to assess the impact of emissions on air quality in South Riverdale and The Beaches neighbourhoods. The Health Status study was conducted to help address community concerns about their environmental health. Its main goal was to determine whether in the past, particularly during times of full operation of the ABTP incinerator, the South Riverdale and Beaches communities experienced greater rates of illness or death than would be expected in comparable neighbourhoods in the City of Toronto. These studies were completed in order to assist WES in fulfilling mediation agreements arising from the ABTP Environmental Assessment (EA).

Past changes to the processes at the ABTP have changed the emission profile of the facility, especially beginning in 2003, once incineration was stopped. Additional measures to control odour will reduce emissions of chemicals from the plant even further. The impact of ABTP emissions on air quality in the two study communities is similar. All chemicals that were detected met their AAQC and POI standards for all scenarios in both communities. In addition, most of the detected chemicals met their respective health benchmarks. Although the ABTP is a large point source of emissions, its contribution to local pollution is relatively small when compared with existing levels of pollutants in the City's ambient air. The current emissions of detected chemicals from the ABTP meet provincial air quality criteria and are below health benchmarks.

It is recommended that Toronto Water continue to monitor the chemical levels in the water entering and exiting the ABTP to gain a better understanding of potential release of these chemicals to the air through evaporation and other processes. As well, Toronto Water should periodically update the emission inventory of the ABTP to reflect changes to plant operations. Further, Toronto Water should test emissions from the ABTP to confirm that emissions of PAHs (including B[a]P) are indeed insignificant, as well as to determine the emissions of sulphur-bearing substances. Finally, the City's Technical Services Division is supportive of playing a role by examining the air quality impact of emission sources in these communities, including the

ABTP. These actions will help further clarify the picture of emissions from the ABTP and other sources and the potential impacts of these emissions on air quality in these two communities.

Further study would not likely help to determine what portion of the higher mortality or hospital admission rates that were seen in the past for The Beaches or South Riverdale relative to their comparison neighbourhoods might be attributed to income differences, environmental pollution or specifically to emissions from the ABTP. The health profiles presented in the study for these neighbourhoods reflect conditions in the past. However, the trends observed over the time period of the study suggest that health status has improved. The results from the Health Status Study suggest that what influenced health in these communities in the past, particularly in South Riverdale, may relate to inequalities in local income levels or an inequitable distribution of local sources of industrial pollution. TPH continues to investigate health status indicators across the City to uncover and address such health inequalities.

In addition, it is recommended that the Ontario Minister of the Environment consider the cumulative impact of emissions from any new or modified industrial facility on adjacent residential areas with elevated rates of illness or mortality, or that have a disproportionate share of pollution point sources, such as in South Riverdale, prior to issuing a Certificate of Approval.

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Dr. David McKeown
Medical Officer of Health

List of Attachments:

Appendix 1: Acknowledgements of Project Teams, Co-Investigators and Project Advisory Committee

Appendix 2: Overview of Air Emissions Study

Appendix 3: Overview of Health Status Study

Reference:

Jerrett, M., et al. A GIS - environmental justice analysis of particulate air pollution in Hamilton, Canada. *Environ. & Planning A*. 2001 33: 955-73.