8. Gaps in knowledge

8.1. Potency of contaminants

This study has identified areas, where regulatory agencies differ significantly in their assessment for some contaminants. It is recommended that the City remains up to date on the regulatory status of these chemicals.

8.2. Occupational exposure

Very little up to date information is available about occupational exposure to contaminants in Toronto. Occupational exposures tend to be significantly higher than environmental exposures; therefore occupationally exposed individuals may be, in most instances, at greater risk than individuals exposed to environmental levels. On the other hand, only some employees in some sectors are occupationally exposed to a given contaminant, while environmental exposures are likely to affect a greater number of residents.

The available occupational exposure information is so limited that obtaining a better estimate for the magnitude of occupational exposure and the number of exposed workers should be considered a high priority. It is recommended that this be done on a sector-by-sector basis. This report can be used to identify the priority sectors for the estimation. The estimation should be extended to a wider range of contaminants than the ones addressed in this report. It is recommended that the CAREX database be utilized more extensively than what has been accomplished in this report. The CAREX database contains over 130 carcinogens. A similar process could be used to estimate the number of Torontonians occupationally exposed to most of the carcinogens for which CAREX has data.

8.3. Environmental emissions and exposures

8.3.1. Air

From the human health perspective, air should be given priority over other routes of exposure. Although the estimates of contaminant air levels could always be updated and refined, the levels of air contaminants contained in this report are reasonably well defined for the purpose of conducting a risk assessment. There are relatively few major industrial sources of emissions. Furthermore, senior governments would likely have included such sources in their emissions inventories, from which emission data are readily available. ToxProbe therefore recommends that Toronto not duplicate the work of other groups but focus its resources on small and area emission sources. These sources most likely have a greater impact on Toronto residents, because they are numerous and are releasing contaminants closer to the ground level, affecting directly the local population. Besides emission rates, it is also important to estimate the number and location of these sources. It is strongly recommended that the City proceed on a sector-by-sector rather than on a

chemical-by-chemical basis because many risk management options will control more than one contaminant. If resources are limited, estimating emission rates from area sources should be the first priority followed by estimating emission rates from other small sources. These sources can be prioritized according to the likelihood of their emissions impacting on human health in Toronto. Finally, it is important to estimate indoor air exposure within the city as a function of the type and the age of the building, building location and the use of the building.

8.3.2. Food

Produce sold in supermarkets varies with the season, with the exact location where it was grown, the treatment received during growth and with how it is prepared. The presence of contaminants in food is expected to be quite heterogeneous and to change over time. It would therefore be difficult to estimate the levels of contaminants in food based on a small study, although some data are available from the Canada Food Inspection Agency (http://www.cfia-acia.agr.ca/english/index/fssae.shtml), which has the overall responsibility for food quality. The City could, however, focus on home-grown produce. No information exists on the number of households consuming home-grown produce, the proportion of home-grown produce consumed annually or the range of contamination found in Toronto grown produce.

8.3.3. Sediment and surface waters

Contact with sediments and surface waters could theoretically lead to significant exposure to contaminants. This could be particularly true for those contaminants found in high concentration in the sediment. Suspended particles could be ingested during swimming, bathing and they can cling firmly to the skin even after the person step outside of the water. Currently, there are no human health-based guidelines for exposure to surface water and sediments, which apply to Toronto.

8.3.4. Drinking water

Other than due to occurrence of an unexpected technical failure or serious contamination of Toronto's drinking water source, Toronto drinking water is not expected to be a major source of the ten environmental contaminants now or in the future.

8.3.5. Local fish consumption, cigarette smoking, fireplaces and woodstoves

Ontario Ministry of the Environment publishes the *1999 - 2000 Guide to Eating Ontario Sport Fish* (http://www.ene.gov.on.ca/envision/guide/index.htm), which provides sufficient guidance to Toronto residents with regards to sport fish consumption. Similarly, the City is aware of the important impact smoking has on human health and is taking concrete steps to reduce second-hand smoking.

Burning of wood (or coal, if it still takes place) in woodstoves and fireplaces can produce very high levels of PAHs and other contaminants both indoors and outdoors in the surrounding area. Exposure to these contaminants could lead to a significant risk to the users. At present, the City may not have any information regarding the number of households using woodstoves and fireplaces, the duration and the frequency of

their uses. There are some data on the impact of these sources on indoor and outdoor contaminant air levels, but further study needs to be considered to delineate better the extent of woodstove and fireplace usage in Toronto. Assessment of the significance of these sources could await the outcome of the study.

8.4. Missing - an overview of environmental and occupational issues facing the City

This report attempts not only to summarize the existing data, but also to make comparison of possible impact whenever the data permit. The toxicity, release and human exposure of individual chemicals have been estimated in many jurisdictions. There has been less success in utilizing the available information to paint a comprehensive (big picture) picture of the state of occupational and environmental risk from these chemicals. Such an overview could be used to prioritize occupational and environmental issues in an informed manner. A systematic approach of this sort would also help to identify the data gaps better. Working towards developing such a big picture is strongly recommended.