



STAFF REPORT FOR INFORMATION

Update to Health Impact Assessment for Biosolids Management at the Highland Creek Treatment Plant

Date:	April 21, 2011
To:	Public Works and Infrastructure Committee
From:	Medical Officer of Health
Wards:	Ward 44 - Scarborough East
Reference Number:	

SUMMARY

Toronto Public Health conducted a rapid health impact assessment for biosolids management options at the Highland Creek Treatment Plant. This assessment used data from the 2009 Biosolids Master Plan Update. Since then, Toronto Water has proposed to use a fluidized bed incinerator with an enhanced wet system air pollution control. This report reviews this additional information and finds the results consistent with the previous analysis that indicates that beneficial use options are likely to have the lowest adverse impact on air quality.

Financial Impact

There are no financial impacts from the adoption of this report.

DECISION HISTORY

At the request of the Public Works and Infrastructure Committee, Toronto Public Health undertook a Rapid Health Impact Assessment for Biosolids Management at the Highland Creek Treatment Plant (see <http://www.toronto.ca/legdocs/mmis/2011/pw/bgrd/backgroundfile-37363.pdf>).

The April 7, 2011 staff report from General Manager of Toronto Water *Biosolids Master Plan Update - Highland Creek Treatment Plant* (<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2011.PW3.4>), which the Committee is considering at its meeting of April 26, 2011, includes additional information on the proposed enhanced wet system for air pollution control in an upgraded incinerator at the Highland Creek Treatment Plant. This report uses the additional information available to update the health impact assessment.

The rapid health impact assessment report assessment used information from the October 2009 Biosolids Master Plan Update.¹ It concluded that the most important and quantifiable health impact of biosolids management is through air quality. It also noted that additional pollution control measures proposed for use with the incineration option could reduce the difference in air quality impacts between incineration and beneficial use of biosolids.

COMMENTS

Impact of air pollution control equipment on total releases

The rapid health impact assessment used the data from the 2009 Biosolids Master Plan Update because it provided comparable data for the different biosolids management options under consideration. The data reviewed included releases to air from the Highland Creek Treatment Plant, the pollutant removal efficiency for the fluidized bed incinerator (both the base case and with enhanced wet system pollution control), and predicted ground level concentrations. The additional information provided for the enhanced wet system pollution control is not directly comparable to the data provided in the Master Plan report. Several assumptions were made in assessing the health impacts. These assumptions are that the emission profile for fluidized bed and multiple hearth incinerators are the similar; most of the air releases at the Highland Creek treatment plant are from the incinerator; and that there is no removal of substances for which no removal efficiencies have been provided (for example carbon monoxide). The Ashbridges Bay Treatment Plant was used as a comparison to represent a facility that does not incinerate.²

Based on this analysis, it was estimated that the enhanced wet system could reduce the total mass of air releases by 11-18 percent when compared to the base case fluidized bed incinerator option considered in the Master Plan Update.

Potential Health Impact of Air Releases

The air releases from waste water treatment plants are made up mixtures of pollutants (see Table 1). These individual pollutants each have different inherent toxicity, and because of this simply comparing the total amount of releases is not an appropriate way to compare the health impacts of the various options.

Table 1: Pollutants released to Air that are reported to the National Pollutants Release Inventory by the Highland Creek Treatment Plant

Ammonia (NH ₃)	Lead (Pb)
Arsenic (As)	Mercury (Hg)
Cadmium (Cd)	Nitrogen oxides (NO _x)
Carbon monoxide (CO)	Particulate matter (PM _{2.5})
Copper (Cu)	Particulate matter (PM ₁₀)

¹ Toronto Water, 2009. City of Toronto Biosolids Master Plan Update, September 2009. Prepared for the City of Toronto by AECOM Canada Ltd. <http://www.toronto.ca/wes/techservices/involved/www/biosolids/>

² This includes data from NPRI and the 2005 Air Emissions from the Ashbridges Bay Treatment Plant, prepared for Toronto Public Health. http://www.toronto.ca/health/hphe/abtp_emissions.htm

Dioxins and furans	Phosphorous (P)
Hexachlorobenzene (HCB)	Lead (Pb)

A common method to compare the potential health impacts from different sources is to use the toxic equivalence potential (TEP) to get a score for the relative overall toxic impact for each mixture.³ The higher the toxic equivalence potential, the greater the relative health impact for that source of pollutants. Two TEP scores are usually calculated: one for the potential for cancer effects and the other for non-cancer effects, such as effects on specific organs (for example on the liver or kidney), reproductive effects, nervous system effects or immune system effects.

In the case of Highland Creek, two pollutants, carbon monoxide and nitrogen oxides, make up 90-95 percent of the total releases to air at the Highland Creek Treatment Plant. However, together they account for less than one percent of the total toxic equivalence potential.

Installation of a fluidized bed incinerator (base case) would result in a large reduction in the overall toxic equivalence potential of releases from the Highland Creek Treatment plant. The enhanced pollution control Toronto Water is proposing will reduce that even further. This will likely result in exposures that are below the health benchmark of one in one million excess lifetime cancer risk for specific cancer-causing pollutants.

The analysis also shows that the toxic equivalence potential for beneficial use options is even lower than that for a fluidized bed incinerator with enhanced pollution control.

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SIGNATURE

³ Hertwich EG, Mateles SF, Pease WS, McKone TE. 2001. Human toxicity potentials for life cycle assessment and Toxic Release Inventory risk screening. Environmental Toxicology and Chemistry. 20(4):928-939.

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