APPENDIX I

Draft Report on Air Dispersion Modelling

Durham/York Residual Waste Study

Report on Air Dispersion Modelling

(Appendix I to Energy-From-Waste Generic Risk Assessment Feasibility Study)

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Executive Summary

This report has been prepared as part of the Durham-York Residual Waste Study and is intended to provide the ambient air concentrations and wet and dry depositions of the selected pollutants of concern that are emitted from the proposed energy from waste facility in the area surrounding the facility. This report will act as a supporting document to the human health and ecological risk assessment.

The proposed Durham-York EFW facility has been sized for three thermal treatment units, each complete with heat recovery and air pollution control systems and capable of processing 400 tonnes per day of residual MSW for a total facility capacity of 1,200 tonnes per day. This will allow for a maximum final stage capacity of the proposed thermal treatment facility of 400,000 tonnes of solid, non-hazardous waste per year, based on three process units operating with a projected downtime of 9%. The majority of the exhaust stack air emission estimates used in this study are based on pollutant emission concentration values obtained from annual stack testing of the existing Algonquin Power EFW plant in Ontario and presented in section 2.3. The air emission estimates from on-site traffic due to waste delivery and ash removal are based on US EPA MOBILE6.2 emission factors for heavy-duty diesel vehicles predicted for the calendar year 2010 and are presented in section 2.4.

The MOE approved air dispersion model AERMOD was used together with meteorological files prepared using AERMET from Toronto Pearson hourly data and Buffalo Upper Air data following the MOE prescription for the air dispersion modelling of the emissions released from the proposed MSW thermal treatment facility. Particle phase and vapour phase average concentrations as well as dry depositions and wet depositions of the selected pollutants of concern were determined at all ground level receptors.

The ground level receptor grid extends 10 km from the facility with grid spacing of 20 m out to a distance of 200 meters, 50 m spacing from a distance of 200 m to a distance of 500 m, 100 m spacing from a distance of 500 m to a distance of 1 km, 200 m spacing from a distance of 1 km to a distance of 2 km, and 500 m spacing from a distance of 2 km to a distance of 10 km.

The resulting maximum concentrations (1-hour, 24-hour and annual averages) and dry and wet depositions (1-hour, 24-hour and annual totals) for each selected pollutant released from the proposed EFW facility are shown in Tables A1 to A3, Appendix A.

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Appendix A: Maximum Concentrations and Depositions

Appendix B: Emission Rate Estimates

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Glossary of Abbreviations

AAQC	Ambient air quality criteria
APC	Air pollution control
E	10 to the power of (exponential formatting)
EFW	Energy from waste
Cd	Cadmium
cm^3/s	Cubic centimetres per second
g/cm^3	Grams per cubic centimeter
g/hr	Grams per hour
g/km	Grams per kilometer
g/s	Grams per second
g/s/unit	Grams per second per combustion unit
ha	Hectare
HCl	Hydrochloric acid
Hg	Mercury
hr	Hour
km	Kilometer
m	Meter
m/s	Meters per second
m^3/s	Cubic meters per second
MOE	Ministry of the Environment
MSW	Municipal solid waste
NO_x	Nitrogen oxides
PAC	Powdered activated carbon
$Pa\text{-}m^3/mol$	Pascal meters cubed per mole
Pb	Lead
PCBs	Polychlorinated biphenyls
PM	Particulate matter
$PM_{2.5}$	Particulate matter equal or less than 2.5 microns
PM_{10}	Particulate matter equal or less than 10 microns
POI	Point of impingement
R	Dry reference conditions at 25 degrees Celsius and 101.3 kilopascals
s/cm	Seconds per centimeter
SCR	Selective catalytic reduction
SO_2	Sulphur dioxide
TEQ	Toxicity equivalent
$\mu g/m^3$	Micrograms per cubic meter
$\mu g/Rm^3$	Micrograms per reference cubic meter
°C	Degrees Celsius
%	Percent

1. Introduction

This report has been prepared as part of the Durham-York Residual Waste Study and is intended to provide the ambient air concentrations and wet and dry depositions of the selected pollutants of concern that are emitted from the proposed energy from waste facility. This report will act as a supporting document to the human health and ecological risk assessment.

1.1 Facility Description

1.1.1 Overview

The maximum final stage capacity of the thermal treatment facility used in this study is 400,000 tonnes of solid, non-hazardous waste per year. It is assumed that this capacity will be sufficient to satisfy the long-term disposal needs of Durham and York's residual Municipal solid waste (MSW). The facility is assumed to consist of three individual processing lines, each capable of processing 400 tonnes per day of residual MSW for a total capacity of 1,200 tonnes per day and an average projected downtime of 9%. Each processing line will be comprised of a thermal treatment unit, a heat recovery boiler and an air pollution control system. Each processing line will have its own stack flue contained in a common enclosure, the "exhaust stack". This configuration allows for an initial smaller-sized facility with the ability to increase in size to suit the growth in disposal requirements of residual MSW. The location of the thermal treatment facility will be within Durham and York Regions.

1.1.2 Process Description

All modern thermal treatment technologies are designed to maximize combustion control and minimize the emission of products of incomplete combustion. Air pollution control systems are required for exhaust gases of any thermal treatment facility regardless of the technology chosen. Based on the facility processing capacity selected for this study and the current available and proven technologies for that size, it is assumed that a mass burn thermal treatment facility is best suited for this application.

Mass burn thermal treatment is a well-established technology developed and improved over the past 100 years for energy generation from MSW. The units are typically large in capacity (200 to 1,000 tonnes MSW per day) and involve operations that can range from single-stage combustion to a form of two-stage combustion.

Waste is fed into a single combustion chamber typically "as received" or with some degree of pre-processing. The combustion of the waste occurs in three stages:

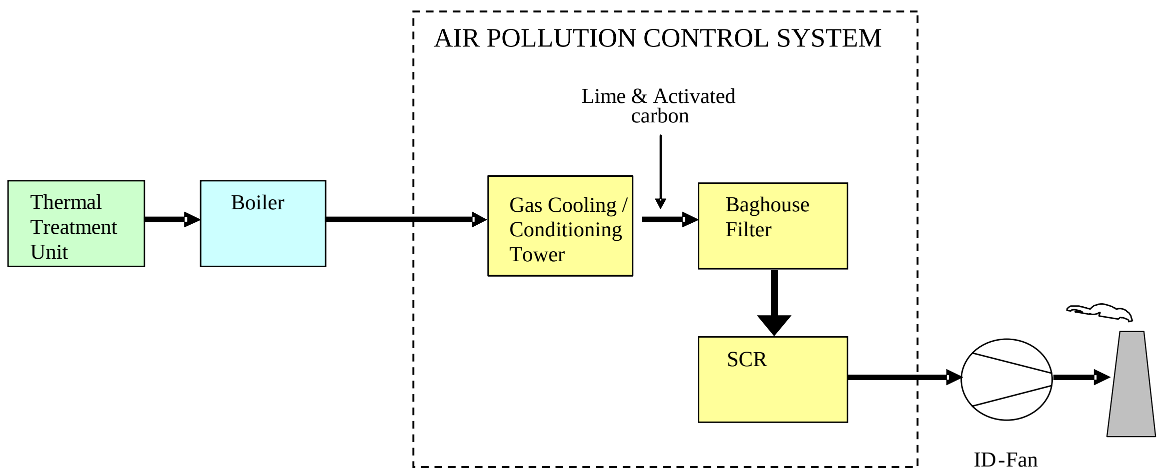
- Drying - the water content of the waste is reduced;
- Primary burning - the combustible materials are oxidized; and,
- Finish burning - fixed carbon is oxidized.

Depending upon the temperature and oxygen content of operations and the design of the internal physical configuration of the combustion chamber, waste can be oxidized in either a single or two-stage function, where waste is partially oxidized (solid converted to gas state) on the grate(s) and subsequently oxidized in the zone of the combustion chamber above the grate(s). The latter form of unit design is more commonly employed, as it yields better control of combustion, more complete 'burn-out' (i.e. less ash of a more inert nature) and more optimal energy recovery.

1.1.3 Air Pollution Control System

An efficient combustion process using high combustion gas temperature (minimum 1000°C) and residence time (minimum 1 second) will prevent formation or reduce emissions of toxic organics such as dioxins/furans. In addition, an air pollution control (APC) system will clean the exhaust gases from thermal treatment prior to discharge into the atmosphere. Following high temperature combustion, air pollution control systems are used to cool flue gases, scrub acidic gases and capture particulate matter and various pollutants such as heavy metals and trace organics. Equipment typically used in air pollution control systems includes a flue gas cooling / conditioning tower, a wet, dry or combination scrubber, a powdered activated carbon (PAC) injection system, a baghouse, and a selective catalytic reduction (SCR) system. The air pollution control system is designed to reduce the release of acid gases (HCl, SO_2, NO_x), heavy metals (i.e. mercury, etc.), particulate matter, and trace organics (i.e. dioxins/furans, etc.). For the purposes of this assessment, a dry scrubber system (see Figure 1-1 below) was assumed in estimating the emission performance of the proposed energy-from-waste (EFW) facility. A dry scrubber system was chosen over a wet scrubber system to reduce the visual plume that would be formed in our climate.

Figure 1-1 – Dry Scrubber APC System Schematic

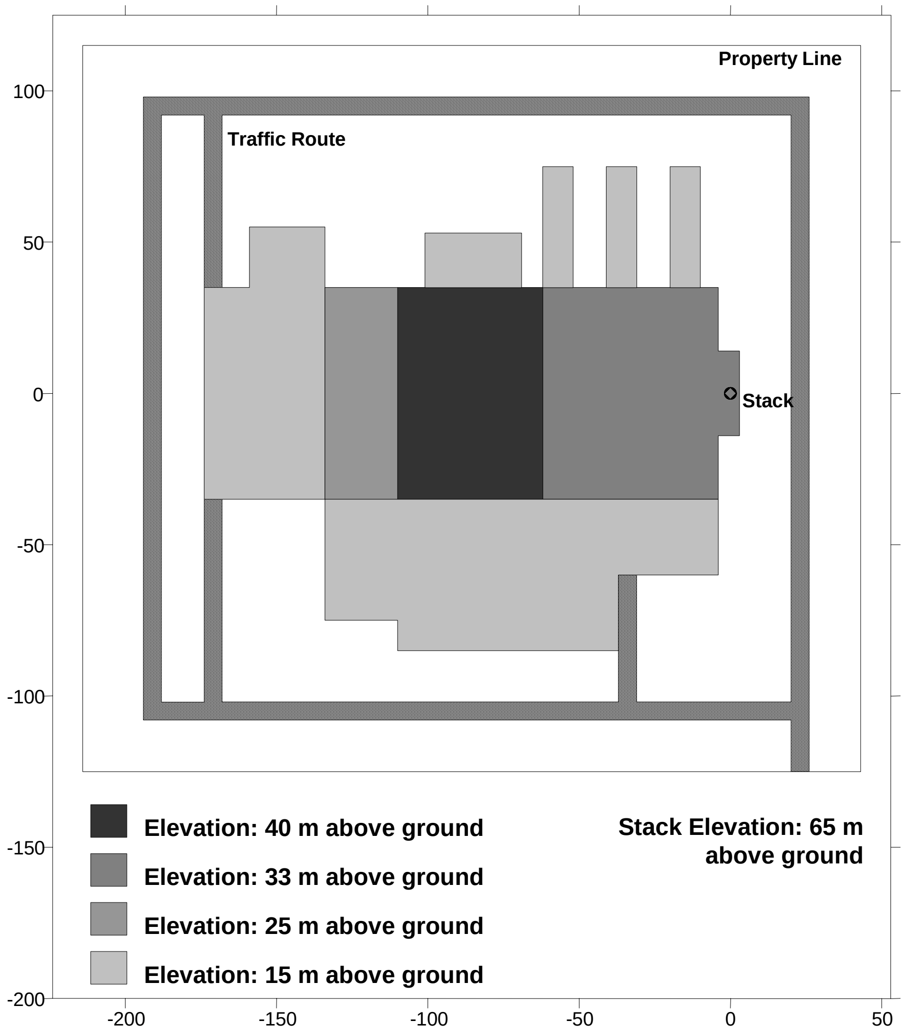


1.2 Site Plan

The configuration and sizing of the proposed thermal treatment facility has been developed based on the anticipated maximum final stage capacity of the proposed facility as well as various North American EFW facilities' site characteristics.

For this study, the proposed thermal treatment facility is estimated to occupy a 257 m by 240 m rectangular property or a minimum of 6.2 ha of land. It is assumed that the property line is 40 m away from the facility building in all four directions (south, north, west & east). All the facility internal roads and truck waiting and parking areas are located within the property boundary. The overall dimensions of the facility building have been sized to 177 m long by 160 m wide and will house a waste receiving/storage area, a thermal treatment unit/heat recovery boiler/air pollution control area, a steam turbine/generator area and an ash processing area. The height of the building will vary between 15 m and 40 m with the highest section being above the thermal treatment unit/heat recovery boiler area. The height of the exhaust stack, located at the end of the building, is estimated to be 65 m above grade. The site plan configuration and building heights are shown in Figure 1-2.

Figure 1-2 - Site Plan Schematic of the Proposed MSW Thermal Treatment Facility



2. Air Emissions

2.1 Emission Sources

The major source of air emissions associated with the operation of an MSW thermal treatment facility is the exhaust from waste combustion after treatment by the APC system. Air emissions from waste delivery and ash removal on-site traffic were also included for commonly emitted pollutants in the air dispersion modelling of the proposed Durham-York EFW facility.

The pollutants of concern that are emitted into the atmosphere from the facility exhaust stack of the MSW thermal treatment facility, as outlined in the Ministry of Environment (MOE) Guideline A-7: Combustion and Air Pollution Control Requirement for New Municipal Incinerators, include:

- Particulate Matter (PM);
- Cadmium (Cd);
- Lead (Pb);
- Mercury (Hg);
- Dioxins and Furans;
- Hydrochloric Acid (HCl);
- Sulphur Dioxide (SO_2);
- Nitrogen Oxides (NO_x); and,
- Organic Matter.

The pollutants considered in the risk assessment air modelling include the above Guideline A-7 pollutants as well as twelve (12) additional metals, nine (9) chlorinated monocyclic aromatics, two (2) additional combustion gases, polychlorinated biphenyls, eleven (11) polycyclic aromatic hydrocarbons and six (6) volatile organic compounds. Refer to Table 2-1 for a complete listing of the pollutants considered.

2.2 Operating Scenarios Considered

The proposed thermal treatment facility will operate continuously, 52 weeks per year, 7 days per week and 24 hours per day. The emission estimates for the pollutants of concern are based on three potential operating scenarios.

- **Operating Scenario 1** considers the maximum facility final stage capacity of three process units running at full capacity for a total of 400,000 tonnes MSW per year;
- **Operating Scenario 2** considers the facility capacity of two process units running at full capacity for a total of 266,667 tonnes MSW per year; and
- **Operating Scenario 3** considers the facility capacity of one process unit running at full capacity for a total of 133,333 tonnes MSW per year.

The maximum facility final stage capacity of 400,000 tonnes MSW per year is based on three process units with a capacity of 400 tonnes MSW per day each and a projected average downtime of 9%.

2.3 Stack Air Emission Estimates

For the Guideline A-7 pollutants, the Guideline A-7 emission concentration limits were used to determine stack emission rates. These emission concentrations are considered conservative, as the facility must as a minimum meet these limits. Modern MSW thermal treatment facilities typically operate well within these limits and are constantly improving.

For pollutants of concern where in-stack concentration limits (Guideline A-7) do not exist, actual measured in-stack concentrations have been used to provide expected emissions from the proposed facility to input into the dispersion modelling. Since technology is constantly improving, it is expected that a new facility can improve on these emissions.

The majority of the exhaust stack air emission estimates used in this study are based on pollutant emission concentration values obtained from annual stack testing of the existing Algonquin Power EFW plant in Ontario. The air pollution control (APC) system implemented in the proposed facility will be at minimum equivalent to the APC system currently used in the existing EFW plant in Ontario. The maximum emission concentrations reported from the 2003, 2004 and 2005 stack testing of the existing facility and the estimated exhaust gas flow rate for the proposed 400,000 tonnes MSW per year thermal treatment facility are applied in the air dispersion modelling to illustrate realistic maximum emissions for the proposed technology.

Volatile organic compounds are not included in the annual stack testing of the existing facility. The air emissions of these six (6) pollutants, therefore, were obtained from specialized stack testing performed at the existing facility in December 1992 and March 1993.

Based on the above, the exhaust stack air emission rate estimates used in this study for the proposed 400,000 tonnes MSW per year MSW thermal treatment facility are shown in Table B-1, Appendix B and summarized in Table 2-1 below.

Table 2-1 - Exhaust Stack Emission Estimates

Pollutants of Concern	Emission Concentration ($\mu g/Rm^3$)	Emission Rate (g/s/unit)
Metals		
Antimony	2.74E+00	4.63E-05
Arsenic	6.04E-01	1.02E-05
Barium	4.74E+00	8.01E-05
Beryllium	*6.40E-02*	*1.08E-06*
Boron	1.53E+02	2.59E-03
Cadmium *	1.40E+01	2.37E-04
Chromium	1.27E+00	2.15E-05
Cobalt	1.18E-01	1.99E-06
Lead *	1.42E+02	2.40E-03
Mercury *	2.00E+01	3.38E-04
Nickel	3.36E+00	5.68E-05
Phosphorus	2.31E+01	3.90E-04
Silver	4.70E-01	7.94E-06

Pollutants of Concern	Emission Concentration ($\mu g/Rm^3$)	Emission Rate (g/s/unit)
Vanadium	6.70E-01	1.13E-05
Zinc	4.97E+01	8.40E-04
Chlorinated Monocyclic Aromatics		
1,2-Dichlorobenzene	*5.15E-02*	*8.70E-07*
1,2,4-Trichlorodibenzene	*5.15E-02*	*8.70E-07*
1,2,4,5-Tetrachlorobenzene	*5.15E-02*	*8.70E-07*
Pentachlorobenzene	*5.15E-02*	*8.70E-07*
Hexachlorobenzene	*5.15E-02*	*8.70E-07*
2,4-Dichlorophenol	*1.03E-01*	*1.74E-06*
2,4,6-Trichlorophenol	*5.15E-02*	*8.70E-07*
2,3,4,6-Tetrachlorophenol	*5.15E-02*	*8.70E-07*
Pentachlorophenol	*6.16E-02*	*1.04E-06*
Combustion Gases		
Particulate Matter $PM_{2.5}$ */**	1.70E+04	2.87E-01
Carbon Monoxide	2.26E+04	3.82E-01
Hydrogen Chloride *	2.70E+04	4.56E-01
Hydrogen Fluoride	2.41E+01	4.07E-04
Nitrogen Oxides (as NO_2) *	2.07E+05	3.50E+00
Sulphur Oxides *	5.60E+04	9.46E-01
Chlorinated Polycyclic Aromatics		
PCB	7.22E-02	1.22E-06
2,3,7,8-TCDD TEQ *	8.00E-05	1.35E-09
2,3,7,8-TCDD TEQ ***	*1.01E-05*	*1.71E-10*
Polycyclic Aromatic Hydrocarbons		
Benzo(a)pyrene	*2.68E-02*	*4.53E-07*
Benzo(a)anthracene	*2.68E-02*	*4.53E-07*
Benzo(b)fluoranthene	*2.68E-02*	*4.53E-07*
Benzo(g,h,i)perylene	*2.68E-02*	*4.53E-07*
Benzo(k)fluoranthene	*2.68E-02*	*4.53E-07*
Chrysene	*2.68E-02*	*4.53E-07*
Dibenzo(a,h)anthracene	*2.68E-02*	*4.53E-07*
Indeno(1,2,3-c,d)pyrene	*2.68E-02*	*4.53E-07*
Anthracene	*2.68E-02*	*4.53E-07*
Naphthalene	1.64E-01	2.77E-06
Phenanthrene	8.21E-02	1.39E-06
Volatile Organic Compounds		
Benzene	4.80E+01	8.11E-04
Chloroform	5.10E-01	8.62E-06
Dichloromethane	1.76E+02	2.97E-03

Pollutants of Concern	Emission Concentration ($\mu g/Rm^3$)	Emission Rate (g/s/unit)
Formaldehyde	4.75E+01	8.03E-04
Tetrachloroethylene	5.67E+00	9.58E-05
Vinyl Chloride	*5.95E-01*	*1.01E-05*
Phthalates		
DEHP	N/A	N/A

R = dry reference conditions at 25°C and 101.3 kPa
Italics = analytical detection limits used for non-detected pollutants
* MOE Guideline A-7 emission concentration limit
** Assumes that particulate matter above $PM_{2.5}$ will be captured by the air pollution control equipment and the Guideline A-7 emission concentration limit is comprised of $PM_{2.5}$ only
*** Maximum concentration measured at similar EFW facility also considered in risk assessment
N/A = not available (not tested at similar EFW facility)

2.4 Traffic Air Emission Estimates

The air emissions from on-site traffic due to waste delivery and ash removal are based on US EPA MOBILE6.2 emission factors for heavy-duty diesel vehicles predicted for the calendar year 2010, which is based on an average vehicle emission factor for the 25 most recent model years (1986 to 2010) and assumes that the proposed facility will start up in 2010. The waste delivery and ash removal traffic are modelled as three volume sources with variable emissions due to different days and times of emissions and also different on-site routes.

The waste delivery traffic emission estimates are based on a predicted eighty-seven delivery trucks per day, with 80% of the deliveries occurring between the hours of 8 a.m. to10 a.m. and 2 p.m. to 4 p.m. and the remaining 20% of the deliveries occurring between the hours of 10 a.m. to 2 p.m. During the busy traffic times of 8 a.m. to10 a.m. and 2 p.m. to 4 p.m., it is estimated that 5.8 waste delivery trucks are idling on-site while waiting to unload. During the off-busy traffic times of 10 a.m. to 2 p.m., it is estimated that 0.725 waste delivery trucks are idling on-site while waiting to unload. The ash removal traffic emission estimates are based on a predicated ten removal trucks per day.

The estimated emission rates for waste delivery and ash removal traffic are shown in Tables B-2 and B-3, Appendix B and summarized in Tables 2-2 and 2-3 below, respectively.

Table 2-2 - Waste Delivery Traffic Emission Estimates

Pollutant	Travelling Truck Exhaust Emission Rate (g/km)	Emission Rate Monday to Friday 8 a.m. to 10 a.m. & 2 p.m. to 4 p.m. (g/s)	Emission Rate Monday to Friday 10 a.m. to 2 p.m. (g/s)
Particulate Matter PM_{10}	0.132	5.34E-04	1.34E-04
Particulate Matter $PM_{2.5}$	0.106	4.32E-04	1.08E-04
Carbon Monoxide	1.16	4.72E-03	1.18E-03
Benzene	0.008	3.15E-05	7.88E-06
Nitrogen Oxides (as NO_2)	4.59	1.87E-02	4.66E-03
Sulphur Oxides	0.0008	3.33E-05	8.33E-06

Pollutant	Idling Truck Exhaust Emission Rate (g/hr)	Emission Rate Monday to Friday 8 a.m. to 10 a.m. & 2 p.m. to 4 p.m. (g/s)	Emission Rate Monday to Friday 10 a.m. to 2 p.m. (g/s)
Particulate Matter PM_{10}	1.150	1.85E-03	2.32E-04
Particulate Matter $PM_{2.5}$	1.058	1.70E-03	2.13E-04

Table 2-3 - Ash Removal Traffic Emission Estimates

Pollutant	Travelling Truck Exhaust Emission Rate (g/km)	Emission Rate Monday to Sunday (g/s)
Particulate Matter PM_{10}	0.132	4.02E-05
Particulate Matter $PM_{2.5}$	0.106	3.25E-05
Carbon Monoxide	1.16	3.55E-04
Benzene	0.008	2.37E-06
Nitrogen Oxides (as NO_2)	4.59	1.40E-03
Sulphur Oxides	0.0008	2.51E-06

3. Air Dispersion Modelling

3.1 Modelling Methodology

The MOE approved air dispersion model AERMOD (version 04300) was used for the air dispersion modelling of the proposed MSW thermal treatment facility to determine maximum ground level concentrations as well as dry and wet depositions. This section of the report discusses the methodology, inputs and results of the air dispersion modelling.

3.2 AERMOD Model

The AERMOD dispersion model is a U.S. Environmental Protection Agency (U.S. EPA) approved model used to support their regulatory modelling programs. AERMOD is also an approved dispersion model for target greenfield facilities for permitting in Ontario (Section 6 of Regulation 419/05). The AERMOD modelling system is made up of the AERMOD dispersion model, the AERMET meteorological pre-processor and the AERMAP terrain pre-processor.

AERMOD is a steady-state plume dispersion model that simulates the transport and dispersion of pollutants from multiple point, area or volume sources in both simple and complex terrain. AERMOD utilizes the advanced Plume Rise Model Enhancements (PRIME) algorithm to account for the effects of building wake. AERMOD employs modern atmospheric boundary layer theory and treats interactions of plumes and the ground surface under convective conditions. The model uses actual upper atmosphere and surface profile meteorological data rather than constant predefined meteorological conditions.

Some of the capabilities of AERMOD are:

- AERMOD can be used to model pollutant emissions from many sources for continuous release of pollutants;

- The model can handle different source types including point (stack), volume (roads), and area (storage piles);
- Source emission rates can be treated as constant or variable by month, season, hour-of-day, or other variable operational periods;
- AERMOD uses real historic meteorological data;
- AERMET processes surface and upper weather data and provides vertical profiles of atmospheric parameters for AERMOD; and
- AERMAP can be used to generate terrain elevations for all receptor locations.

3.3 Modelling Input Data

The AERMOD dispersion modelling inputs used in the regionally based air dispersion modelling for the purposes of the human health and ecological risk assessment are discussed hereafter.

3.3.1 Coordinate System

The local Cartesian grid system with (x,y) coordinates was used in the dispersion modelling. The location of the stack is set as the origin (0,0) of the coordinate system.

3.3.2 Receptor Grid and Area of Modelling Coverage

The selected Cartesian grid area of modelling coverage expands 10 km from the facility with regulatory grid spacing of 20 m out to a distance of 200 m from all emission sources, 50 m spacing from a distance of 200 m to a distance of 500 m, 100 m spacing from a distance of 500 m to a distance of 1 km, 200 m spacing from a distance of 1 km to a distance of 2 km, and 500 m spacing from a distance of 2 km to a distance of 10 km. No receptors were located within the property boundary for this modelling exercise. The ground level receptor grid is shown in Figures 3-1 and 3-2.

Figure 3-1 - Receptor Grid (10 km x 10 km)

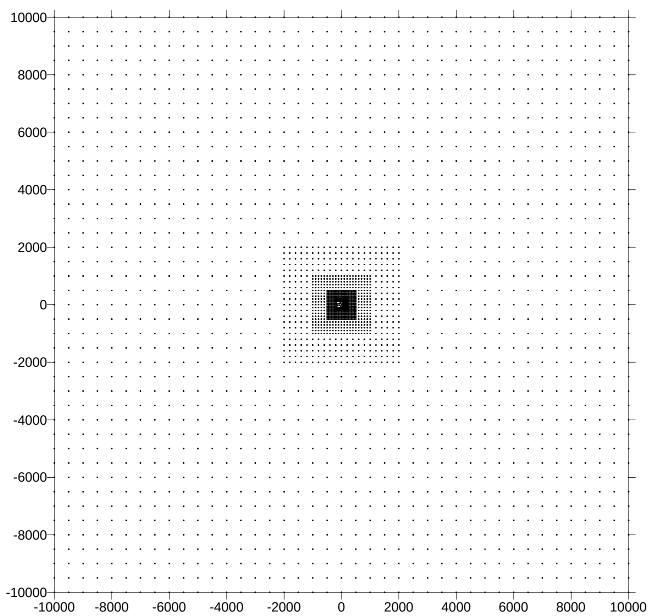
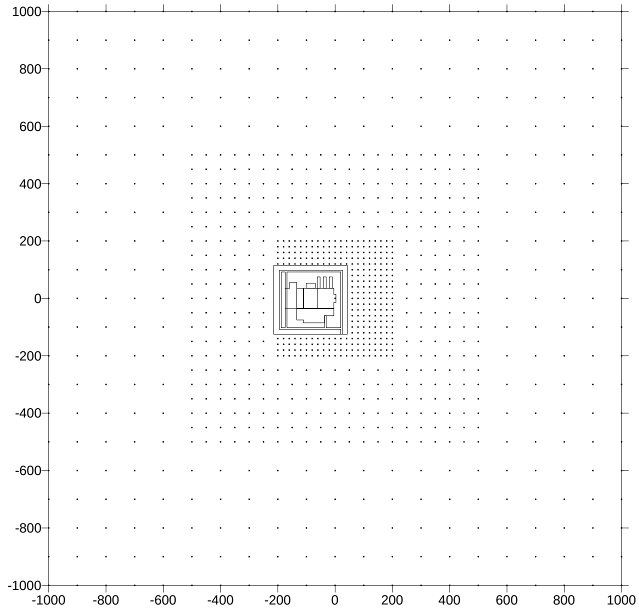


Figure 3-2 - Receptor Grid (1 km x 1 km)



3.3.3 Averaging Periods

1-hour, 24-hour and annual averaging periods were modelled in the air dispersion modelling of the proposed EFW Thermal Treatment Facility.

3.3.4 Land Use Characteristics

Typically, an area within a 3 km radius around the facility is considered for land use characteristics. Since the location of the proposed thermal treatment facility is unknown at this stage, the land characteristics considered in the modelling exercise were regionally based rather than site specific. It is assumed, however, that the site is in the proximity of Lake Ontario in order to cover the situations that can occur near the shoreline.

The monthly vegetation categories considered for deposition modelling were transitional spring with partial green coverage or short annuals from March to May, midsummer with lush vegetation from June to August, autumn with unharvested cropland for September to November and winter with snow on ground for December to February. The directional land use categories considered were grassy suburban areas to the north (from 260° clockwise to 100°) of the facility and bodies of water to the south (from 100° clockwise to 260°).

3.3.5 Lake Effects

The presence of a lake in close proximity to the site is considered in the air dispersion modeling since lake effect conditions can cause higher concentrations of emitted pollutants when in close proximity to the lake. It is assumed that the facility might be located north of Lake Ontario within 1 km of the shoreline. This possibility and the resultant lake effects on the concentration modelling were considered with the use of the ISC3 SCREEN model, which considers the presence of shoreline thermal internal boundary layer (TIBL).

The SCREEN model was used to calculate the maximum concentration both with and without lake effects where the facility is located within the vicinity of the lake at different distances (200, 400 and 600 m) from the shoreline. In comparing the results of modelled emissions from the stack based on 1 g/s of any contaminant with and without lake effects, an adjustment factor was determined for each distance and applied to the maximum 1-hr average concentrations determined through AERMOD modelling occurring in potential TIBL hours (from May to September). The overall maximum concentration using the SCREEN model for the non-shoreline case (without lake effects) was 3.5 µg/m^3. Table 3-1 below shows the adjustment factors as determined for each facility location by dividing the maximum shoreline concentration for each facility location by the maximum non-shoreline concentration (3.5 µg/m^3).

Table 3-1 - Shoreline Modelling Adjustment Factors

Facility Location Inland Distance (m)	Single Source Maximum Shoreline Concentration (µg/m^3)	Adjustment Factor
200	11.92	3.5
400	13.17	3.8
600	14.91	4.3

A facility that is located further inland than 650 m does not intersect the TIBL, so no adjustment factor was applied. The SCREEN model results show that the maximum shoreline concentrations occur between 1,200 m and 1,270 m inland no matter where the stack is placed, with the maximum occurring closer to the stack as the facility is moved further inland. This distance corresponds to the location where the plume centreline intersects the TIBL slope for the maximum TIBL as assumed in the SCREEN model.

The maximum particle and vapour phase ground level concentrations during potential TIBL hours (occurring from May to September) considering potential lake effects for each pollutant are shown in Table A-4, Appendix A. Particulate matter, carbon monoxide, nitrogen oxides and benzene ground level concentrations are not adjusted for lake effects since the contribution from traffic sources to the ground level concentrations are much higher than from the stack source.

3.3.6 Terrain

Since the topography of Durham and York Regions is relatively flat, a flat terrain is assumed in this modelling exercise.

3.3.7 Meteorological Data

The requirement for wet deposition estimates in the risk assessment precludes the use of the Regional Meteorological Data Files prepared by the MOE. Since the precipitation data is not available in the Regional Files, the AERMET pre-processor was used to generate the necessary files complete with the wet deposition parameters. The methodology used to incorporate Environment Canada precipitation data in the MOE Regional Meteorological Data Files is described below.

The Buffalo Radiosonde Data for the period 1996-2000 in the standard format (TD6201) was used as the upper air data. This is read directly by the extract function of AERMET without any changes required. The surface data was obtained from Environment Canada Pearson

International Airport hourlies. These are provided by Environment Canada Climate Services in the Canadian Archive Format, and include hourly precipitation data as well as pressure, humidity, ceiling and visibility parameters. The MOE procedure for treating calms and interpolating missing data was used to fill in missing information. This included randomizing the wind direction for interpolated calms and setting a minimum wind speed for calms of 1 m/s.

Since AERMET cannot read the Canadian Archive formatted hourly file, the sophMET processor was used to convert the file to the SAMSON format, which accommodates all of the parameters. The AERMET extract routine is then run on the resulting file to produce the standard quality assured meteorological raw data. The file was then merged with the quality assured upper air extract to produce the merged data file.

The merged raw file was processed by AERMET to produce the surface and profile files. To localize the meteorological data, it was assumed that the site is located within several hundred meters of the lake (from 100 degrees clockwise to 260 degrees) with the land use (from 260 degrees clockwise to 100 degrees) being an average of urban and crops to represent the likely location of the site. The input surface characteristics, which influence the boundary layer parameter estimates, are shown in Table 3-2 below. The surface characteristics were considered to vary by season. The albedo is the fraction of total incident solar radiation reflected by the surface back to space without absorption, the Bowen ratio indicates the surface moisture and the surface roughness length is related to the height of wind flow obstacles.

Table 3-2 - Surface Land Use Characteristics

Season / Direction	Albedo	Bowen	Roughness
Winter / 260° to100°	0.6	1.5	0.3
Winter / 100° to 260°	0.2	1.5	0.001
Sping / 260° to100°	0.16	0.6	0.4
Spring / 100° to 260°	0.12	0.1	0.001
Summer / 260° to100°	0.19	0.8	0.4
Summer / 100° to 260°	0.1	0.1	0.001
Fall / 260° to100°	0.19	1.0	0.4
Fall / 100° to 260°	0.1	0.1	0.001

The hourly data for the 5 year period 1996-2000 from Pearson International Airport as processed by AERMET for the purposes of modeling maximum impacts was used to derive a wind rose representative of the winds for the general area of the proposed EFW facility, shown in Figure 3-3 below.

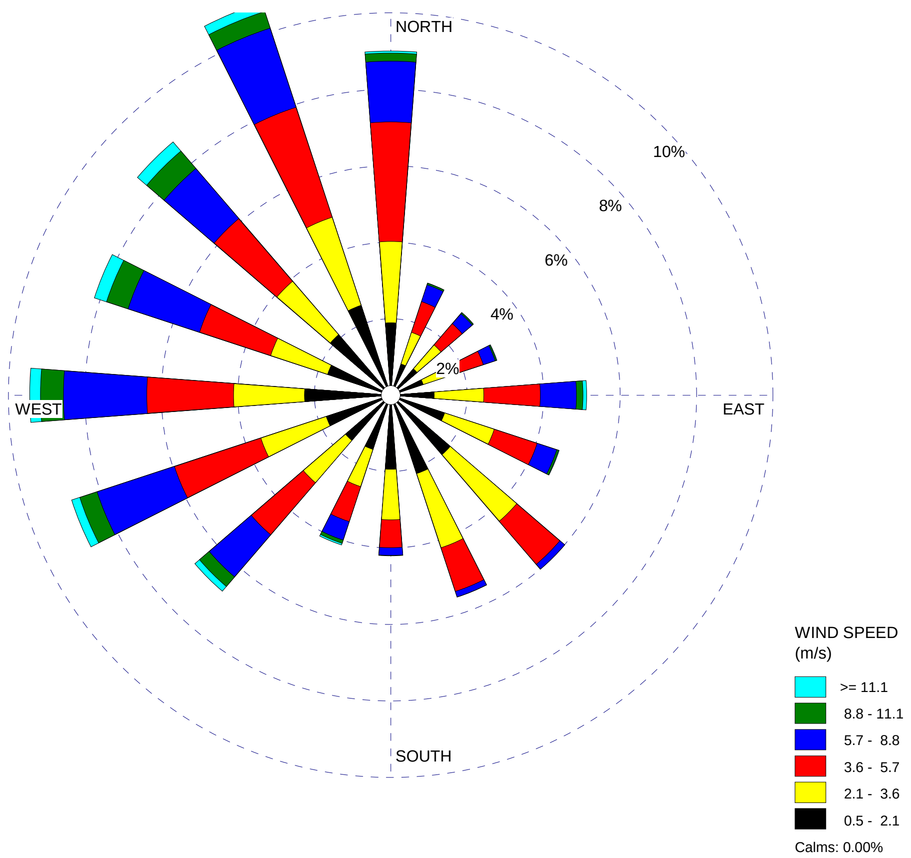
In the wind rose representation, the percent of the total time that the wind blows from each of 16 cardinal directions is shown graphically with the length of the rose petal representing the percentage of the total time from the indicated direction (as read from the label on each concentric circle).

Each of the rose petals is made up of a number of coloured sections going outwards from black to yellow to red, etc., with the length of each of the colours representing the proportion of the wind from that sector which falls in the speed range as indicated in the legend to the right of the rose.

Figure 3-3 – Wind Rose

WIND ROSE PLOT:
MOE Regional Data valid for York/Durham
Based on Pearson International Airport Hourly Data

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	1996-2000 **Jan 1 - Dec 31** **00:00 - 23:00**	**EarthGuard Environmental**	
		MODELER:	
	CALM WINDS: **0.00%**	TOTAL COUNT: **43744 hrs.**	
	AVG. WIND SPEED: **4.19 m/s**	DATE: **06/12/07**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Overall the predominant winds are from the Northwest and Southwest, with low frequency from the Northeast and Southern quadrants. For a site within several kilometres of the shoreline of Lake Ontario, there would be an enhancement in the frequency of Northwest as well as Southeast winds as a result of the development of lake and land breezes during the summer months.

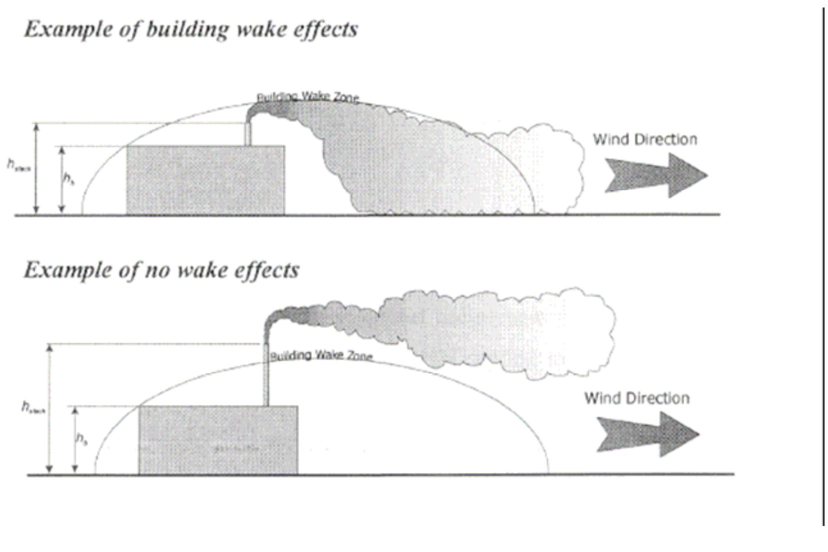
The average wind speed was determined as 4.2 m/s, while the calm hours show as zero. This is a result of the replacement of calm winds with a minimum of 1 m/s wind as required for the AERMOD modeling. The recorded calm periods in the raw data amount to 3.3% of the time.

In order to test the sensitivity of the maximum prediction to the choice of surface characteristics (intermediate urban/crops vs. crops), a second data set was created with the site characteristics on the north side of the facility being set to the same values as used in the MOE regional file for CROPS. The potential impact of surface characteristics on the maximum emission concentrations was assessed for nitrogen oxides, the largest emitted contaminant. Table A5 in Appendix A shows the maximum ground level concentrations and wet and dry depositions of nitrogen oxides with the use of AERMET derived MET data files for intermediate urban/crops surface data as well as AERMET derived MET data files for crops surface data for comparison purposes. The results of the sensitivity analysis showed that the maximum ground level concentrations were within 6% for all averaging periods.

3.3.8 Building Downwash

Buildings present an obstruction to the wind flow and create turbulent flow in their wake zone, with the potential to create stagnant or re-circulating flows in the cavity zone downwind of the building. Such conditions can cause higher ground level concentrations close to the facility. Building wake effects are illustrated in Figure 3.3. Plumes that are released within the wake zone and cannot escape the building influence can be caught in the turbulent zone and produce high concentrations. The effects of these wake zones were considered in the AERMOD modelling. The building information was developed using the U.S. EPA's Building Profile Input Program (BPIP), a pre-processor for AERMOD. The inputs for the pre-processor include the coordinates and heights of the buildings and stack. The information from BPIP is used in the building wake effect calculations.

Figure 3-4 - Building Wake Effects



The PRIME algorithm also allows for the wind speed deficit induced by the building to change with respect to the distance from the building. These factors improve the accuracy of predicted concentrations within building wake zones.

To take into account building wake, the dimensions and heights of the buildings shown on the site plan in Figure 1-2 as detailed in Table C-1, Appendix C are input to the dispersion model.

3.3.9 Source Summary

The waste combustion exhaust stack and the on-site traffic are the emission sources considered for the air dispersion modelling of the proposed MSW thermal treatment facility. The emission source data is summarized in Table 3-3 and 3-4 below.

The flue gas exhaust flow rates are based on information previously obtained from various thermal treatment technology suppliers adjusted for each operating scenario. The flue gas exhaust temperature and velocity are typical for MSW combustion facilities equipped with the selected air pollution control system, including selective catalytic reduction (SCR) system. Since each unit has a dedicated flue, the stack exit velocity is the same for each operating scenario. The equivalent stack diameters of two and three flues are applied for the operating scenarios of two and three units running.

Table 3-3 - Point Source Summary

Source ID / Description	Source Data						
	Stack Volumetric Flow Rate	Stack Exit Velocity	Stack Exit Gas Temp.	Equivalent Stack Inner Diameter	Stack Height above Grade	Stack Height Above Roof	Source Coordinate (x,y)
	(m^3/s)	(m/s)	(°C)	(m)	(m)	(m)	(m)
Exhaust Stack (3 units running)	90	18	232	2.52	65	32	(0,0)
Exhaust Stack (2 units running)	60	18	232	2.06	65	32	(0,0)
Exhaust Stack (1 unit running)	30	18	232	1.46	65	32	(0,0)

The traffic volume source release heights are based on average truck above ground centers. As suggested in the AERMOD user's guide (August 2002, Table 3-1), the initial lateral dimensions were determined to be the volume source lengths divided by 4.3 and the initial vertical dimensions were determined to be the volume source release heights divided by 2.15. Refer to Table B-2 and B-3, Appendix B, for waste delivery and ash removal traffic details.

Table 3-4 - Volume Source Summary

Source ID / Description	Source Data					
	Location	Release Height	Volume Source Length	Initial Lateral Dimension	Volume Source Height	Initial Vertical Dimension
	(x,y)	(m)	(m)	(m)	(m)	(m)
Waste Delivery	(-74,-5)	1.6	207	48.2	1.6	0.759
Ash Removal	(-85,-5)	1.8	221	51.5	1.8	0.814

3.3.10 Data Requirements

The risk assessment requires estimates of inhalation as well as ingestion via water and food of each of the emitted contaminants. Since the fate of the emissions is dependent on the physical form of the substance, both particle phase and vapour phase average concentrations as well as dry depositions and wet depositions were determined at all ground level receptors.

In order to obtain both particle phase and vapour phase results for each pollutant, their partition in the plume as a gas or particulate would have to be established. For this study, the vapour fractions of each pollutant were obtained from the US EPA Human Health Risk Assessment Protocol (HHRAP) Companion Database, as modified per the suggestions of Jacques Whitford Limited, and are presented in Table B-1, Appendix B.

Particle phase dry deposition modelling requires particle size distribution data. Since the air pollution control (APC) system implemented in the proposed facility will be at minimum equivalent to the APC system currently used in the existing EFW plant in Ontario, it is assumed that all particulate emissions from the stack will be less than 2.5 microns in size.

The particle size distribution for the traffic sources are based on US EPA MOBILE6.2 emission factors for heavy-duty diesel vehicles in the calendar year 2010. The traffic sources particle size distributions are summarized in Tables 3-5 and 3-6 below.

Table 3-5 - Particle Size Distribution of Traffic Sources (Exhaust while travelling)

Diameter (microns)	Mass Fraction	Particulate Density (g/cm^3)
1.25	0.809	1
6.25	0.191	1

Table 3-6 - Particle Size Distribution of Traffic Sources (Exhaust while idling)

Diameter (microns)	Mass Fraction	Particulate Density (g/cm^3)
1.25	0.920	1
6.25	0.080	1

Vapour phase dry and wet deposition modelling requires specific chemical properties of diffusivity in air, diffusivity in water, Henry’s law constant and leaf resistance. Most of the chemical properties applied were estimated from “Deposition Parameterisations for the Industrial Source Complex (ISC3) Model”, Wesely, Doskey, and Shannon, June 2002, as summarized in Table 3-7 below. The combustion gas chemical properties were estimated from several sources including AERMOD references and National Institute of Standards and Technology (NIST) databases.

Table 3-7 - Physicochemical Vapour Properties

Vapour Type	Diffusivity in Air D_a (cm^2/s)	Diffusivity in Water $D_w \times 10^5$ (cm^2/s)	Henry’s Law Constant H ($Pa\text{-}m^3/mol$)	Leaf Resistance r_{cl} (s/cm)
Combustion Gases	8.00E-06	1.00E+01	4.20E-03	1.00E+07
Volatile Organic Compounds (VOC)	1.07E-01	1.22E+00	1.02E+03	4.85E+04

Vapour Type	Diffusivity in Air D_a (cm^2/s)	Diffusivity in Water $D_w \times 10^5$ (cm^2/s)	Henry's Law Constant H ($Pa\text{-}m^3/mol$)	Leaf Resistance r_{cl} (s/cm)
Hydrogen Chloride & Hydrogen Fluoride	3.00E-05	1.00E+01	1.00E-12	1.00E+07
Polycyclic Aromatic Hydrocarbons (PAH)	5.31E-02	4.75E-01	1.71E+00	2.14E+01
Chlorinated Monocyclic Aromatics (CMA) Chlorinated Polycyclic Aromatics (CPA)	5.56E-02	5.20E-01	1.22E+02	1.64+03
Metals (except Antimony & Mercury)	8.27E-02	1.01E+00	9.90E-02	1.00E+07
Antimony	7.72E-02	9.57E-01	2.53E+03	1.00E+07
Mercury	6.00E-06	1.00E+01	6.00E-06	1.00E+07

It should be noted that since the test method used to determine mercury emissions at the existing thermal treatment facility in Ontario does not allow speciation of the quantities of each form of mercury, the physiochemical vapour properties of divalent mercury (Hg^{2+}) were applied for deposition modelling purposes as a conservative estimate as it is likely to produce higher despositions than other forms of mercury.

3.3.11 Input Summary

The air dispersion modelling input data is summarized in Table 3-8 below. Property line, building, source and receptor coordinates are shown in Table C-1, Appendix C.

Table 3-8 - Dispersion Modelling Input Summary

Title	Description of How the Approved Dispersion Model was used
Area of Modelling Coverage	Ground level; 20 km x 20 km square grid centered on the stack
Averaging Periods	1-hour, 24-hour and annual
Land Use	Sector Dependent
Terrain	Flat
Meteorological Data	AERMET processed from Environment Canada hourly and Buffalo upper air data
Building Downwash	Yes
Operating Conditions	Scenario 1
	Scenario 2
	Scenario 3
Source Summary	As summarised in Tables 3-3 and 3-4
Source Emissions Rates	As summarized in Tables 2-1, 2-2 and 2-3
Data types	Concentrations and dry and wet depositions
Combined Effect of Assumptions for Operating Conditions and Emission Rates	Yes
Pollutant types	Particulate and vapour phase pollutants as listed in Tables 2-1, 2-2 and 2-3

3.4 Dispersion Modelling Results

This report has been prepared as part of the Durham-York Residual Waste Study and is intended to provide the ambient air concentrations and wet and dry depositions of the selected pollutants of concern that are emitted from the proposed energy from waste facility in the area surrounding the facility.

The air dispersion modelling was carried out using the sophMOD software interface to AERMOD. Each pollutant or selected pollutant group of concern identified in this study was modelled using estimated emission concentrations and exhaust flow rates for each operating scenario from the selected MSW thermal treatment facility.

The maximum particle and vapour phase ground level concentrations and their locations obtained from modelling, based on exhaust stack emissions of 1 g/s for three operating scenarios, are shown in Table C-2, Appendix C. The maximum particle and vapour phase dry depositions and their locations, based on exhaust stack emissions of 1 g/s for three operating scenarios, are shown in Table C-3, Appendix C. The maximum particle and vapour phase wet depositions and their locations, based on exhaust stack emissions of 1 g/s for three operating scenarios, are shown in Table C-4, Appendix C.

The resulting maximum ground level concentrations and maximum dry and wet depositions for each pollutant are shown in Tables A-1 to A-3, Appendix A. The values for the pollutants emitted from the exhaust stack as well as traffic sources are direct modelling results. The results for pollutants emitted from the exhaust stack only are calculated by multiplying the appropriate concentrations in Tables C-1 to C-3, Appendix C, by the individual pollutant emission rates in Table B-1, Appendix B.

The maximum hourly ground level concentration isopleths of dioxins/furans (TEQ), mercury, PCB, $PM_{2.5}$ and NO_x are shown in Figures D1 to D5, Appendix D. A comparison of the maximum hourly ground level concentrations to applicable O. Reg. 419/05 standards, point of impingement (POI) guidelines or ambient air quality criteria (AAQC) is shown for each isopleths diagram.

Appendix A

Maximum Concentrations and Depositions

Table A1: Maximum Pollutant Ground Level Concentrations (ug/m^3)

Pollutant	Operating Scenario 1: Three (3) process units running						Operating Scenario 2: Two (2) process units running						Operating Scenario 3: One (1) process unit running					
	1-hour average		24-hour average		annual average		1-hour average		24-hour average		annual average		1-hour average		24-hour average		annual average	
	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour
Location of maxima (x,y) ***	(200,700)	(200,700)	(100,-300)	(100,-300)	(150,-350)	(150,-350)	(300,700)	(300,700)	(100,-300)	(100,-300)	(150,-350)	(150,-350)	(200,700)	(200,700)	(100,-300)	(100,-300)	(100,-300)	(100,-300)
Metals																		
Antimony	8.22E-04	0.00E+00	3.65E-04	0.00E+00	3.76E-05	0.00E+00	6.50E-04	0.00E+00	2.79E-04	0.00E+00	3.20E-05	0.00E+00	4.19E-04	0.00E+00	1.69E-04	0.00E+00	2.35E-05	0.00E+00
Arsenic	1.80E-04	1.09E-06	7.99E-05	4.81E-07	8.24E-06	4.97E-08	1.43E-04	8.60E-07	6.11E-05	3.68E-07	7.00E-06	4.22E-08	9.17E-05	5.54E-07	3.70E-05	2.22E-07	5.14E-06	3.10E-08
Barium	1.41E-03	1.28E-05	6.25E-04	5.66E-06	6.45E-05	5.85E-07	1.11E-03	1.01E-05	4.78E-04	4.33E-06	5.48E-05	4.97E-07	7.18E-04	6.52E-06	2.89E-04	2.62E-06	4.02E-05	3.65E-07
Beryllium	1.90E-05	1.73E-07	8.44E-06	7.65E-08	8.71E-07	7.90E-09	1.51E-05	1.37E-07	6.46E-06	5.84E-08	7.40E-07	6.71E-09	9.69E-06	8.80E-08	3.91E-06	3.53E-08	5.43E-07	4.92E-09
Boron	4.59E-02	0.00E+00	2.04E-02	0.00E+00	2.10E-03	0.00E+00	3.63E-02	0.00E+00	1.56E-02	0.00E+00	1.78E-03	0.00E+00	2.34E-02	0.00E+00	9.42E-03	0.00E+00	1.31E-03	0.00E+00
Cadmium *	4.16E-03	3.78E-05	1.85E-03	1.67E-05	1.90E-04	1.73E-06	3.29E-03	2.99E-05	1.41E-03	1.28E-05	1.62E-04	1.47E-06	2.12E-03	1.92E-05	8.55E-04	7.73E-06	1.19E-04	1.08E-06
Chromium	3.78E-04	3.43E-06	1.68E-04	1.52E-06	1.73E-05	1.57E-07	2.99E-04	2.71E-06	1.28E-04	1.16E-06	1.47E-05	1.33E-07	1.92E-04	1.75E-06	7.75E-05	7.01E-07	1.08E-05	9.77E-08
Cobalt	3.54E-05	0.00E+00	1.57E-05	0.00E+00	1.62E-06	0.00E+00	2.80E-05	0.00E+00	1.20E-05	0.00E+00	1.38E-06	0.00E+00	1.80E-05	0.00E+00	7.27E-06	0.00E+00	1.01E-06	0.00E+00
Lead *	4.23E-02	2.98E-04	1.88E-02	1.32E-04	1.94E-03	1.36E-05	3.35E-02	2.36E-04	1.44E-02	1.01E-04	1.64E-03	1.16E-05	2.15E-02	1.52E-04	8.69E-03	6.10E-05	1.21E-03	8.50E-06
Mercury *	9.00E-04	5.10E-03	3.99E-04	2.26E-03	4.12E-05	2.33E-04	7.12E-04	4.03E-03	3.05E-04	1.72E-03	3.50E-05	1.98E-04	4.58E-04	2.60E-03	1.85E-04	1.04E-03	2.57E-05	1.45E-04
Nickel	9.99E-04	9.07E-06	4.43E-04	4.01E-06	4.57E-05	4.15E-07	7.90E-04	7.18E-06	3.39E-04	3.07E-06	3.88E-05	3.52E-07	5.09E-04	4.62E-06	2.05E-04	1.86E-06	2.85E-05	2.59E-07
Phosphorus	6.93E-03	0.00E+00	3.07E-03	0.00E+00	3.17E-04	0.00E+00	5.48E-03	0.00E+00	2.35E-03	0.00E+00	2.69E-04	0.00E+00	3.53E-03	0.00E+00	1.42E-03	0.00E+00	1.98E-04	0.00E+00
Silver	1.40E-04	1.27E-06	6.20E-05	5.61E-07	6.39E-06	5.80E-08	1.11E-04	1.00E-06	4.74E-05	4.29E-07	5.43E-06	4.93E-08	7.12E-05	6.46E-07	2.87E-05	2.60E-07	3.99E-06	3.62E-08
Vanadium	2.01E-04	0.00E+00	8.92E-05	0.00E+00	9.20E-06	0.00E+00	1.59E-04	0.00E+00	6.82E-05	0.00E+00	7.81E-06	0.00E+00	1.02E-04	0.00E+00	4.13E-05	0.00E+00	5.73E-06	0.00E+00
Zinc	1.48E-02	1.19E-04	6.56E-03	5.28E-05	6.77E-04	5.45E-06	1.17E-02	9.44E-05	5.02E-03	4.03E-05	5.75E-04	4.63E-06	7.53E-03	6.07E-05	3.04E-03	2.44E-05	4.22E-04	3.40E-06
Chlorinated Monocyclic Aromatics																		
1,2-Dichlorobenzene	0.00E+00	1.55E-05	0.00E+00	6.84E-06	0.00E+00	7.06E-07	0.00E+00	1.22E-05	0.00E+00	5.22E-06	0.00E+00	6.00E-07	0.00E+00	7.87E-06	0.00E+00	3.16E-06	0.00E+00	4.40E-07
1,2,4-Trichlorodibenzene	0.00E+00	1.55E-05	0.00E+00	6.84E-06	0.00E+00	7.06E-07	0.00E+00	1.22E-05	0.00E+00	5.22E-06	0.00E+00	6.00E-07	0.00E+00	7.87E-06	0.00E+00	3.16E-06	0.00E+00	4.40E-07
1,2,4,5-Tetrachlorobenzene	0.00E+00	1.55E-05	0.00E+00	6.84E-06	0.00E+00	7.06E-07	0.00E+00	1.22E-05	0.00E+00	5.22E-06	0.00E+00	6.00E-07	0.00E+00	7.87E-06	0.00E+00	3.16E-06	0.00E+00	4.40E-07
Pentachlorobenzene	0.00E+00	1.55E-05	0.00E+00	6.84E-06	0.00E+00	7.06E-07	0.00E+00	1.22E-05	0.00E+00	5.22E-06	0.00E+00	6.00E-07	0.00E+00	7.87E-06	0.00E+00	3.16E-06	0.00E+00	4.40E-07
Hexachlorobenzene	0.00E+00	1.55E-05	0.00E+00	6.84E-06	0.00E+00	7.06E-07	0.00E+00	1.22E-05	0.00E+00	5.22E-06	0.00E+00	6.00E-07	0.00E+00	7.87E-06	0.00E+00	3.16E-06	0.00E+00	4.40E-07
2,4-Dichlorophenol	0.00E+00	3.09E-05	0.00E+00	1.37E-05	0.00E+00	1.41E-06	0.00E+00	2.44E-05	0.00E+00	1.04E-05	0.00E+00	1.20E-06	0.00E+00	1.57E-05	0.00E+00	6.32E-06	0.00E+00	8.81E-07
2,4,6-Trichlorophenol	0.00E+00	1.55E-05	0.00E+00	6.84E-06	0.00E+00	7.06E-07	0.00E+00	1.22E-05	0.00E+00	5.22E-06	0.00E+00	6.00E-07	0.00E+00	7.87E-06	0.00E+00	3.16E-06	0.00E+00	4.40E-07
2,3,4,6-Tetrachlorophenol	0.00E+00	1.55E-05	0.00E+00	6.84E-06	0.00E+00	7.06E-07	0.00E+00	1.22E-05	0.00E+00	5.22E-06	0.00E+00	6.00E-07	0.00E+00	7.87E-06	0.00E+00	3.16E-06	0.00E+00	4.40E-07
Pentachlorophenol	1.85E-08	1.85E-05	8.20E-09	8.17E-06	8.46E-10	8.44E-07	1.46E-08	1.46E-05	6.27E-09	6.24E-06	7.18E-10	7.17E-07	9.41E-09	9.40E-06	3.79E-09	3.78E-06	5.27E-10	5.26E-07
Combustion Gases																		
Total Particulate Matter PM ** (see note 1)	7.81E+00	0.00E+00	2.27E+00	0.00E+00	2.35E-01	0.00E+00	7.81E+00	0.00E+00	1.73E+00	0.00E+00	2.00E-01	0.00E+00	7.81E+00	0.00E+00	1.05E+00	0.00E+00	1.48E-01	0.00E+00
Particulate Matter PM10 ** (see note 1)	7.81E+00	0.00E+00	2.27E+00	0.00E+00	2.35E-01	0.00E+00	7.81E+00	0.00E+00	1.73E+00	0.00E+00	2.00E-01	0.00E+00	7.81E+00	0.00E+00	1.05E+00	0.00E+00	1.48E-01	0.00E+00
Particulate Matter PM2.5 */** (see note 1)	6.92E+00	0.00E+00	2.27E+00	0.00E+00	2.35E-01	0.00E+00	6.92E+00	0.00E+00	1.73E+00	0.00E+00	2.00E-01	0.00E+00	6.92E+00	0.00E+00	1.05E+00	0.00E+00	1.48E-01	0.00E+00
Carbon Monoxide ** (see note 2)	0.00E+00	1.61E+01	0.00E+00	3.03E+00	0.00E+00	3.19E-01	0.00E+00	1.61E+01	0.00E+00	2.31E+00	0.00E+00	2.71E-01	0.00E+00	1.61E+01	0.00E+00	1.47E+00	0.00E+00	2.04E-01
Hydrogen Chloride *	0.00E+00	8.10E+00	0.00E+00	3.58E+00	0.00E+00	3.70E-01	0.00E+00	6.41E+00	0.00E+00	2.74E+00	0.00E+00	3.14E-01	0.00E+00	4.12E+00	0.00E+00	1.66E+00	0.00E+00	2.31E-01
Hydrogen Fluoride	0.00E+00	7.23E-03	0.00E+00	3.20E-03	0.00E+00	3.30E-04	0.00E+00	5.72E-03	0.00E+00	2.44E-03	0.00E+00	2.81E-04	0.00E+00	3.68E-03	0.00E+00	1.48E-03	0.00E+00	2.06E-04
Nitrogen Oxides (as NO2) */** (see note 3)	0.00E+00	6.38E+01	0.00E+00	2.76E+01	0.00E+00	2.87E+00	0.00E+00	6.38E+01	0.00E+00	2.12E+01	0.00E+00	2.45E+00	0.00E+00	6.38E+01	0.00E+00	1.28E+01	0.00E+00	1.81E+00
Sulphur Oxides */**	0.00E+00	1.68E+01	0.00E+00	7.46E+00	0.00E+00	7.69E-01	0.00E+00	1.33E+01	0.00E+00	5.69E+00	0.00E+00	6.52E-01	0.00E+00	8.55E+00	0.00E+00	3.45E+00	0.00E+00	4.79E-01
Chlorinated Polycyclic Aromatics																		
PCB	9.75E-08	2.16E-05	4.32E-08	9.54E-06	4.46E-09	9.86E-07	7.71E-08	1.71E-05	3.31E-08	7.29E-06	3.79E-09	8.37E-07	4.96E-08	1.10E-05	2.00E-08	4.41E-06	2.78E-09	6.14E-07
2,3,7,8-TCDD TEQ *	8.07E-09	1.59E-08	3.58E-09	7.05E-09	3.69E-10	7.28E-10	6.38E-09	1.26E-08	2.74E-09	5.39E-09	3.13E-10	6.19E-10	4.11E-09	8.11E-09	1.66E-09	3.26E-09	2.30E-10	4.54E-10
2,3,7,8-TCDD TEQ	1.02E-09	2.01E-09	4.52E-10	8.90E-10	4.66E-11	9.20E-11	8.05E-10	1.59E-09	3.45E-10	6.80E-10	3.96E-11	7.81E-11	5.18E-10	1.02E-09	2.09E-10	4.11E-10	2.90E-11	5.73E-11
Polycyclic Aromatic Hydrocarbons																		
Benzo(a)pyrene	5.68E-06	2.36E-06	2.52E-06	1.05E-06	2.60E-07	1.08E-07	4.49E-06	1.87E-06	1.93E-06	7.99E-07	2.21E-07	9.18E-08	2.89E-06	1.20E-06	1.17E-06	4.83E-07	1.62E-07	6.74E-08
Benzo(a)anthracene	4.16E-06	3.88E-06	1.84E-06	1.72E-06	1.90E-07	1.77E-07	3.29E-06	3.07E-06	1.41E-06	1.31E-06	1.62E-07	1.51E-07	2.12E-06	1.98E-06	8.53E-07	7.94E-07	1.19E-07	1.11E-07
Benzo(b)fluoranthene	2.73E-07	7.77E-06	1.21E-07	3.44E-06	1.25E-08	3.55E-07	2.16E-07	6.14E-06	9.27E-08	2.63E-06	1.06E-08	3.02E-07	1.39E-07	3.95E-06	5.61E-08	1.59E-06	7.80E-09	2.21E-07
Benzo(g,h,i)perylene	5.68E-06	2.36E-06	2.52E-06	1.05E-06	2.60E-07	1.08E-07	4.49E-06	1.87E-06	1.93E-06	7.99E-07	2.21E-07	9.18E-08	2.89E-06	1.20E-06	1.17E-06	4.83E-07	1.62E-07	6.74E-08
Benzo(k)fluoranthene	5.85E-06	2.20E-06	2.59E-06	9.71E-07	2.67E-07	1.00E-07	4.62E-06	1.74E-06	1.98E-06	7.42E-07	2.27E-07	8.52E-08	2.98E-06	1.12E-06	1.20E-06	4.49E-07	1.67E-07	6.25E-08
Chrysene	2.06E-06	5.98E-06	9.13E-07	2.65E-06	9.42E-08	2.73E-07	1.63E-06	4.73E-06	6.98E-07	2.02E-06	8.00E-08	2.32E-07	1.05E-06	3.05E-06	4.23E-07	1.22E-06	5.87E-08	1.70E-07
Dibenzo(a,h)anthracene	7.60E-06	4.42E-07	3.37E-06	1.96E-07	3.48E-07	2.02E-08	6.01E-06	3.50E-07	2.58E-06	1.50E-07	2.95E-07	1.72E-08	3.87E-06	2.25E-07	1.56E-06	9.04E-08	2.17E-07	1.26E-08
Indeno(1,2,3-c,d)pyrene	8.00E-06	4.02E-08	3.55E-06	1.78E-08	3.66E-07	1.84E-09	6.33E-06	3.18E-08	2.71E-06	1.36E-08	3.11E-07	1.56E-09	4.07E-06	2.05E-08	1.64E-06	8.22E-09	2.28E-07	1.15E-09
Anthracene	1.61E-08	8.02E-06	7.13E-09	3.55E-06	7.36E-10	3.67E-07	1.27E-08	6.35E-06	5.46E-09	2.71E-06	6.25E-10	3.12E-07	8.19E-09	4.09E-06	3.30E-09	1.64E-06	4.59E-10	2.29E-07
Naphthalene	0.00E+00	4.92E-05	0.00E+00	2.18E-05	0.00E+00	2.25E-06	0.00E+00	3.89E-05	0.00E+00	1.66E-05	0.00E+00	1.91E-06	0.00E+00	2.51E-05	0.00E+00	1.01E-05	0.00E+00	1.40E-06
Phenanthrene	2.46E-08	2.46E-05	1.09E-08	1.09E-05	1.13E-09	1.12E-06	1.95E-08	1.95E-05	8.36E-09	8.32E-06	9.57E-10	9.55E-07	1.25E-08	1.25E-05	5.06E-09	5.03E-06	7.03E-10	7.01E-07
Volatile Organic Compounds																		
Benzene ** (see note 4)	0.00E+00	1.08E-01	0.00E+00	9.85E-03	0.00E+00	7.10E-04	0.00E+00	1.08E-01	0.00E+00	9.85E-03	0.00E+00	6.10E-04	0.00E+00	1.08E-01	0.00E+00	9.85E-03	0.00E+00	5.30E-04
Chloroform	0.00E+00	1.53E-04	0.00E+00	6.77E-05	0.00E+00	6.99E-06	0.00E+00	1.21E-04	0.00E+00	5.17E-05	0.00E+00	5.94E-06	0.00E+00	7.79E-05	0.00E+00	3.13E-05	0.00E+00	4.36E-06
Dichloromethane	0.00E+00	5.27E-02	0.00E+00	2.33E-02	0.00E+00	2.41E-03	0.00E+00	4.17E-02	0.00E+00	1.78E-02	0.00E+00	2.05E-03	0.00E+00	2.68E-02	0.00E+00	1.08E-02	0.00E+00	1.50E-03
Formaldehyde	0.00E+00	1.42E-02	0.00E+00	6.30E-03	0.00E+00	6.51E-04	0.00E+00	1.13E-02	0.00E+00	4.82E-03	0.00E+00	5.53E-04	0.00E+00	7.25E-03	0.00E+00	2.91E-03	0.00E+00	4.06E-04
Tetrachloroethylene	0.00E+00	1.70E-03	0.00E+00	7.53E-04	0.00E+00	7.77E-05	0.00E+00	1.35E-03	0.00E+00	5.75E-04	0.00E+00	6.60E-05	0.00E+00	8.66E-04	0.00E+00	3.48E-04	0.00E+00	4.85E-05
Vinyl Chloride	0.00E+00	1.79E-04	0.00E+00	7.90E-05	0.00E+00	8.16E-06	0.00E+00	1.41E-04	0.00E+00	6.04E-05	0.00E+00	6.93E-06	0.00E+00	9.09E-05	0.00E+00	3.65E-05	0.00E+00	5.09E-06
Phthalates																		
DEHP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

* MOE Guideline A-7 criteria

** Includes emissions from facility traffic

*** Relative to stack location (0,0) in metres

<u>NOTES:</u>

1) The maximum 1-hour average concentrations occur at (-80,120) due to large influence of traffic sources

2) The maximum 1-hour average concentrations occur at (-20,120) due to large influence of traffic sources

3) The maximum 1-hour average concentrations occur at (-20,120) due to large influence of traffic sources

4) The maximum 1-hour average concentrations occur at (-20,120) due to large influence of traffic sources

N/A = not available (not tested at similar EFW facility)

Table A2: Maximum Pollutant Dry Depositions (g/m^2)

Pollutant	Operating Scenario 1: Three (3) process units running						Operating Scenario 2: Two (2) process units running						Operating Scenario 3: One (1) process unit running					
	1-hour total		24-hour total		annual total		1-hour total		24-hour total		annual total		1-hour total		24-hour total		annual total	
	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour
Metals																		
Antimony	7.17E-08	0.00E+00	2.65E-07	0.00E+00	5.82E-07	0.00E+00	7.38E-08	0.00E+00	2.73E-07	0.00E+00	4.22E-07	0.00E+00	5.06E-08	0.00E+00	1.88E-07	0.00E+00	5.26E-09	0.00E+00
Arsenic	1.57E-08	2.29E-10	5.81E-08	3.10E-09	1.27E-07	4.24E-08	1.62E-08	1.71E-10	5.99E-08	2.30E-09	9.25E-08	3.43E-08	1.11E-08	9.93E-11	4.13E-08	1.34E-09	1.15E-09	2.36E-08
Barium	1.23E-07	2.69E-09	4.54E-07	3.64E-08	9.97E-07	4.99E-07	1.27E-07	2.01E-09	4.69E-07	2.71E-08	7.24E-07	4.04E-07	8.67E-08	1.17E-09	3.23E-07	1.57E-08	9.02E-09	2.78E-07
Beryllium	1.66E-09	3.63E-11	6.13E-09	4.92E-10	1.35E-08	6.73E-09	1.71E-09	2.72E-11	6.33E-09	3.66E-10	9.78E-09	5.46E-09	1.17E-09	1.58E-11	4.36E-09	2.13E-10	1.22E-10	3.75E-09
Boron	4.00E-06	0.00E+00	1.48E-05	0.00E+00	3.25E-05	0.00E+00	4.12E-06	0.00E+00	1.53E-05	0.00E+00	2.36E-05	0.00E+00	2.82E-06	0.00E+00	1.05E-05	0.00E+00	2.94E-07	0.00E+00
Cadmium *	3.63E-07	7.95E-09	1.34E-06	1.08E-07	2.94E-06	1.47E-06	3.74E-07	5.94E-09	1.38E-06	8.00E-08	2.14E-06	1.19E-06	2.56E-07	3.45E-09	9.54E-07	4.65E-08	2.66E-08	8.20E-07
Chromium	3.29E-08	7.21E-10	1.22E-07	9.76E-09	2.67E-07	1.34E-07	3.39E-08	5.39E-10	1.26E-07	7.26E-09	1.94E-07	1.08E-07	2.32E-08	3.13E-10	8.65E-08	4.22E-09	2.42E-09	7.44E-08
Cobalt	3.09E-09	0.00E+00	1.14E-08	0.00E+00	2.50E-08	0.00E+00	3.18E-09	0.00E+00	1.18E-08	0.00E+00	1.82E-08	0.00E+00	2.18E-09	0.00E+00	8.11E-09	0.00E+00	2.27E-10	0.00E+00
Lead *	3.69E-06	6.27E-08	1.36E-05	8.49E-07	2.99E-05	1.16E-05	3.80E-06	4.69E-08	1.41E-05	6.31E-07	2.17E-05	9.41E-06	2.60E-06	2.72E-08	9.70E-06	3.67E-07	2.71E-07	6.47E-06
Mercury *	7.85E-08	2.77E-09	2.90E-07	3.41E-08	6.37E-07	7.60E-07	8.08E-08	1.90E-09	2.99E-07	2.53E-08	4.62E-07	6.23E-07	5.54E-08	1.07E-09	2.06E-07	1.47E-08	5.76E-09	4.32E-07
Nickel	8.71E-08	1.91E-09	3.22E-07	2.58E-08	7.07E-07	3.53E-07	8.97E-08	1.43E-09	3.32E-07	1.92E-08	5.13E-07	2.86E-07	6.15E-08	8.29E-10	2.29E-07	1.12E-08	6.40E-09	1.97E-07
Phosphorus	6.04E-07	0.00E+00	2.23E-06	0.00E+00	4.90E-06	0.00E+00	6.23E-07	0.00E+00	2.30E-06	0.00E+00	3.56E-06	0.00E+00	4.26E-07	0.00E+00	1.59E-06	0.00E+00	4.44E-08	0.00E+00
Silver	1.22E-08	2.67E-10	4.50E-08	3.61E-09	9.89E-08	4.94E-08	1.26E-08	1.99E-10	4.65E-08	2.69E-09	7.18E-08	4.01E-08	8.60E-09	1.16E-10	3.20E-08	1.56E-09	8.95E-10	2.75E-08
Vanadium	1.75E-08	0.00E+00	6.48E-08	0.00E+00	1.42E-07	0.00E+00	1.81E-08	0.00E+00	6.68E-08	0.00E+00	1.03E-07	0.00E+00	1.24E-08	0.00E+00	4.61E-08	0.00E+00	1.29E-09	0.00E+00
Zinc	1.29E-06	2.51E-08	4.77E-06	3.40E-07	1.05E-05	4.65E-06	1.33E-06	1.87E-08	4.92E-06	2.52E-07	7.60E-06	3.77E-06	9.10E-07	1.09E-08	3.39E-06	1.47E-07	9.47E-08	2.59E-06
Chlorinated Monocyclic Aromatics																		
1,2-Dichlorobenzene	0.00E+00	2.47E-09	0.00E+00	3.43E-08	0.00E+00	3.16E-07	0.00E+00	1.73E-09	0.00E+00	2.55E-08	0.00E+00	2.56E-07	0.00E+00	9.61E-10	0.00E+00	1.48E-08	0.00E+00	1.79E-07
1,2,4-Trichlorodibenzene	0.00E+00	2.47E-09	0.00E+00	3.43E-08	0.00E+00	3.16E-07	0.00E+00	1.73E-09	0.00E+00	2.55E-08	0.00E+00	2.56E-07	0.00E+00	9.61E-10	0.00E+00	1.48E-08	0.00E+00	1.79E-07
1,2,4,5-Tetrachlorobenzene	0.00E+00	2.47E-09	0.00E+00	3.43E-08	0.00E+00	3.16E-07	0.00E+00	1.73E-09	0.00E+00	2.55E-08	0.00E+00	2.56E-07	0.00E+00	9.61E-10	0.00E+00	1.48E-08	0.00E+00	1.79E-07
Pentachlorobenzene	0.00E+00	2.47E-09	0.00E+00	3.43E-08	0.00E+00	3.16E-07	0.00E+00	1.73E-09	0.00E+00	2.55E-08	0.00E+00	2.56E-07	0.00E+00	9.61E-10	0.00E+00	1.48E-08	0.00E+00	1.79E-07
Hexachlorobenzene	0.00E+00	2.47E-09	0.00E+00	3.43E-08	0.00E+00	3.16E-07	0.00E+00	1.73E-09	0.00E+00	2.55E-08	0.00E+00	2.56E-07	0.00E+00	9.61E-10	0.00E+00	1.48E-08	0.00E+00	1.79E-07
2,4-Dichlorophenol	0.00E+00	4.95E-09	0.00E+00	6.85E-08	0.00E+00	6.32E-07	0.00E+00	3.46E-09	0.00E+00	5.10E-08	0.00E+00	5.13E-07	0.00E+00	1.92E-09	0.00E+00	2.96E-08	0.00E+00	3.59E-07
2,4,6-Trichlorophenol	0.00E+00	2.47E-09	0.00E+00	3.43E-08	0.00E+00	3.16E-07	0.00E+00	1.73E-09	0.00E+00	2.55E-08	0.00E+00	2.56E-07	0.00E+00	9.61E-10	0.00E+00	1.48E-08	0.00E+00	1.79E-07
2,3,4,6-Tetrachlorophenol	0.00E+00	2.47E-09	0.00E+00	3.43E-08	0.00E+00	3.16E-07	0.00E+00	1.73E-09	0.00E+00	2.55E-08	0.00E+00	2.56E-07	0.00E+00	9.61E-10	0.00E+00	1.48E-08	0.00E+00	1.79E-07
Pentachlorophenol	1.61E-12	2.96E-09	5.96E-12	4.09E-08	1.31E-11	3.77E-07	1.66E-12	2.07E-09	6.15E-12	3.05E-08	9.49E-12	3.06E-07	1.14E-12	1.15E-09	4.24E-12	1.77E-08	1.18E-13	2.14E-07
Combustion Gases																		
Total Particulate Matter PM **	4.45E-04	0.00E+00	1.65E-03	0.00E+00	3.81E-03	0.00E+00	3.05E-04	0.00E+00	1.14E-03	0.00E+00	2.82E-03	0.00E+00	1.57E-04	0.00E+00	5.91E-04	0.00E+00	1.76E-03	0.00E+00
Particulate Matter PM10 **	4.45E-04	0.00E+00	1.65E-03	0.00E+00	3.81E-03	0.00E+00	3.05E-04	0.00E+00	1.14E-03	0.00E+00	2.82E-03	0.00E+00	1.57E-04	0.00E+00	5.91E-04	0.00E+00	1.76E-03	0.00E+00
Particulate Matter PM2.5 */**	4.45E-04	0.00E+00	1.65E-03	0.00E+00	3.62E-03	0.00E+00	3.05E-04	0.00E+00	1.13E-03	0.00E+00	2.63E-03	0.00E+00	1.57E-04	0.00E+00	5.85E-04	0.00E+00	1.53E-03	0.00E+00
Carbon Monoxide **	0.00E+00	4.75E-06	0.00E+00	5.65E-05	0.00E+00	1.24E-03	0.00E+00	3.25E-06	0.00E+00	4.19E-05	0.00E+00	1.01E-03	0.00E+00	1.82E-06	0.00E+00	2.45E-05	0.00E+00	7.08E-04
Hydrogen Chloride *	0.00E+00	1.43E-05	0.00E+00	2.07E-04	0.00E+00	4.56E-03	0.00E+00	9.78E-06	0.00E+00	1.48E-04	0.00E+00	3.65E-03	0.00E+00	5.32E-06	0.00E+00	8.17E-05	0.00E+00	2.42E-03
Hydrogen Fluoride	0.00E+00	1.27E-08	0.00E+00	1.85E-07	0.00E+00	4.07E-06	0.00E+00	8.73E-09	0.00E+00	1.32E-07	0.00E+00	3.26E-06	0.00E+00	4.75E-09	0.00E+00	7.29E-08	0.00E+00	2.16E-06
Nitrogen Oxides (as NO2) */**	0.00E+00	4.34E-05	0.00E+00	5.14E-04	0.00E+00	1.13E-02	0.00E+00	2.97E-05	0.00E+00	3.83E-04	0.00E+00	9.22E-03	0.00E+00	1.67E-05	0.00E+00	2.23E-04	0.00E+00	6.41E-03
Sulphur Oxides */**	0.00E+00	1.17E-05	0.00E+00	1.39E-04	0.00E+00	3.03E-03	0.00E+00	8.02E-06	0.00E+00	1.03E-04	0.00E+00	2.48E-03	0.00E+00	4.50E-06	0.00E+00	6.00E-05	0.00E+00	1.72E-03
Chlorinated Polycyclic Aromatics																		
PCB	8.50E-12	3.45E-09	3.14E-11	4.78E-08	6.90E-11	4.41E-07	8.76E-12	2.41E-09	3.24E-11	3.56E-08	5.01E-11	3.58E-07	6.00E-12	1.34E-09	2.23E-11	2.07E-08	6.24E-13	2.50E-07
2,3,7,8-TCDD TEQ *	7.03E-13	2.55E-12	2.60E-12	3.53E-11	5.71E-12	3.26E-10	7.24E-13	1.78E-12	2.68E-12	2.63E-11	4.14E-12	2.65E-10	4.96E-13	9.91E-13	1.85E-12	1.53E-11	5.16E-14	1.85E-10
2,3,7,8-TCDD TEQ	8.88E-14	3.22E-13	3.28E-13	4.46E-12	7.20E-13	4.11E-11	9.15E-14	2.25E-13	3.39E-13	3.32E-12	5.23E-13	3.34E-11	6.26E-14	1.25E-13	2.33E-13	1.93E-12	6.52E-15	2.34E-11
Polycyclic Aromatic Hydrocarbons																		
Benzo(a)pyrene	4.95E-10	3.94E-10	1.83E-09	5.38E-09	4.02E-09	6.23E-08	5.10E-10	2.94E-10	1.89E-09	4.00E-09	2.92E-09	5.06E-08	3.49E-10	1.71E-10	1.30E-09	2.33E-09	3.63E-11	3.49E-08
Benzo(a)anthracene	3.63E-10	6.47E-10	1.34E-09	8.84E-09	2.94E-09	1.02E-07	3.73E-10	4.83E-10	1.38E-09	6.58E-09	2.14E-09	8.31E-08	2.56E-10	2.81E-10	9.53E-10	3.82E-09	2.66E-11	5.73E-08
Benzo(b)fluoranthene	2.38E-11	1.29E-09	8.81E-11	1.77E-08	1.93E-10	2.05E-07	2.46E-11	9.67E-10	9.09E-11	1.32E-08	1.40E-10	1.66E-07	1.68E-11	5.62E-10	6.27E-11	7.64E-09	1.75E-12	1.15E-07
Benzo(g,h,i)perylene	4.95E-10	3.94E-10	1.83E-09	5.38E-09	4.02E-09	6.23E-08	5.10E-10	2.94E-10	1.89E-09	4.00E-09	2.92E-09	5.06E-08	3.49E-10	1.71E-10	1.30E-09	2.33E-09	3.63E-11	3.49E-08
Benzo(k)fluoranthene	5.10E-10	3.66E-10	1.88E-09	5.00E-09	4.14E-09	5.79E-08	5.25E-10	2.73E-10	1.94E-09	3.72E-09	3.00E-09	4.70E-08	3.60E-10	1.59E-10	1.34E-09	2.16E-09	3.74E-11	3.24E-08
Chrysene	1.80E-10	9.96E-10	6.63E-10	1.36E-08	1.46E-09	1.58E-07	1.85E-10	7.45E-10	6.84E-10	1.01E-08	1.06E-09	1.28E-07	1.27E-10	4.33E-10	4.72E-10	5.89E-09	1.32E-11	8.83E-08
Dibenzo(a,h)anthracene	6.63E-10	7.37E-11	2.45E-09	1.01E-09	5.38E-09	1.17E-08	6.83E-10	5.50E-11	2.53E-09	7.49E-10	3.90E-09	9.46E-09	4.67E-10	3.20E-11	1.74E-09	4.35E-10	4.86E-11	6.52E-09
Indeno(1,2,3-c,d)pyrene	6.98E-10	6.70E-12	2.58E-09	9.16E-11	5.66E-09	1.06E-09	7.19E-10	5.00E-12	2.66E-09	6.81E-11	4.11E-09	8.60E-10	4.92E-10	2.91E-12	1.83E-09	3.96E-11	5.12E-11	5.93E-10
Anthracene	1.40E-12	1.34E-09	5.18E-12	1.83E-08	1.14E-11	2.12E-07	1.44E-12	9.99E-10	5.35E-12	1.36E-08	8.26E-12	1.72E-07	9.89E-13	5.81E-10	3.69E-12	7.90E-09	1.03E-13	1.18E-07
Naphthalene	0.00E+00	8.20E-09	0.00E+00	1.12E-07	0.00E+00	1.30E-06	0.00E+00	6.12E-09	0.00E+00	8.33E-08	0.00E+00	1.05E-06	0.00E+00	3.56E-09	0.00E+00	4.84E-08	0.00E+00	7.26E-07
Phenanthrene	2.15E-12	4.10E-09	7.94E-12	5.60E-08	1.74E-11	6.49E-07	2.21E-12	3.06E-09	8.19E-12	4.17E-08	1.27E-11	5.26E-07	1.52E-12	1.78E-09	5.65E-12	2.42E-08	1.58E-13	3.63E-07
Volatile Organic Compounds																		
Benzene **	0.00E+00	3.19E-06	0.00E+00	3.12E-05	0.00E+00	3.24E-04	0.00E+00	2.22E-06	0.00E+00	2.33E-05	0.00E+00	2.71E-04	0.00E+00	1.29E-06	0.00E+00	1.38E-05	0.00E+00	1.93E-04
Chloroform	0.00E+00	3.38E-08	0.00E+00	3.28E-07	0.00E+00	3.39E-06	0.00E+00	2.36E-08	0.00E+00	2.44E-07	0.00E+00	2.79E-06	0.00E+00	1.24E-08	0.00E+00	1.42E-07	0.00E+00	1.96E-06
Dichloromethane	0.00E+00	1.17E-05	0.00E+00	1.13E-04	0.00E+00	1.17E-03	0.00E+00	8.13E-06	0.00E+00	8.42E-05	0.00E+00	9.62E-04	0.00E+00	4.29E-06	0.00E+00	4.90E-05	0.00E+00	6.77E-04
Formaldehyde	0.00E+00	3.15E-06	0.00E+00	3.05E-05	0.00E+00	3.16E-04	0.00E+00	2.20E-06	0.00E+00	2.27E-05	0.00E+00	2.60E-04	0.00E+00	1.16E-06	0.00E+00	1.33E-05	0.00E+00	1.83E-04
Tetrachloroethylene	0.00E+00	3.76E-07	0.00E+00	3.65E-06	0.00E+00	3.77E-05	0.00E+00	2.62E-07	0.00E+00	2.72E-06	0.00E+00	3.10E-05	0.00E+00	1.38E-07	0.00E+00	1.58E-06	0.00E+00	2.18E-05
Vinyl Chloride	0.00E+00	3.95E-08	0.00E+00	3.83E-07	0.00E+00	3.96E-06	0.00E+00	2.75E-08	0.00E+00	2.85E-07	0.00E+00	3.26E-06	0.00E+00	1.45E-08	0.00E+00	1.66E-07	0.00E+00	2.29E-06
Phthalates																		
DEHP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

* MOE Guideline A-7 criteria
** Includes emissions from facility traffic
NOTES:
- No adjustments are made to deposition maximas as a result of lake effects (adjustments were not determined)
N/A = not available (not tested at similar EFW facility)

Table A3: Maximum Pollutant Wet Depositions (g/m2)

Pollutant	Operating Scenario 1: Three (3) process units running						Operating Scenario 2: Two (2) process units running						Operating Scenario 3: One (1) process unit running					
	1-hour total		24-hour total		annual total		1-hour total		24-hour total		annual total		1-hour total		24-hour total		annual total	
	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour
Metals																		
Antimony	2.75E-09	0.00E+00	2.75E-09	0.00E+00	1.57E-08	0.00E+00	3.01E-09	0.00E+00	4.17E-09	0.00E+00	1.07E-08	0.00E+00	2.33E-09	0.00E+00	2.92E-09	0.00E+00	5.26E-09	0.00E+00
Arsenic	6.03E-10	1.38E-09	6.03E-10	1.40E-09	3.45E-09	3.10E-09	6.58E-10	1.01E-09	9.14E-10	1.01E-09	2.34E-09	2.04E-09	5.11E-10	5.86E-10	6.41E-10	5.86E-10	1.15E-09	9.96E-10
Barium	4.72E-09	1.63E-08	4.72E-09	1.64E-08	2.70E-08	3.65E-08	5.15E-09	1.19E-08	7.15E-09	1.19E-08	1.83E-08	2.41E-08	4.00E-09	6.90E-09	5.01E-09	6.90E-09	9.02E-09	1.17E-08
Beryllium	6.37E-11	2.20E-10	6.37E-11	2.22E-10	3.65E-10	4.93E-10	6.96E-11	1.60E-10	9.66E-11	1.60E-10	2.47E-10	3.25E-10	5.40E-11	9.31E-11	6.77E-11	9.32E-11	1.22E-10	1.58E-10
Boron	1.54E-07	0.00E+00	1.54E-07	0.00E+00	8.79E-07	0.00E+00	1.68E-07	0.00E+00	2.33E-07	0.00E+00	5.95E-07	0.00E+00	1.30E-07	0.00E+00	1.63E-07	0.00E+00	2.94E-07	0.00E+00
Cadmium *	1.39E-08	4.81E-08	1.39E-08	4.85E-08	7.97E-08	1.08E-07	1.52E-08	3.50E-08	2.11E-08	3.50E-08	5.40E-08	7.10E-08	1.18E-08	2.04E-08	1.48E-08	2.04E-08	2.66E-08	3.46E-08
Chromium	1.26E-09	4.36E-09	1.26E-09	4.40E-09	7.23E-09	9.78E-09	1.38E-09	3.18E-09	1.92E-09	3.18E-09	4.90E-09	6.44E-09	1.07E-09	1.85E-09	1.34E-09	1.85E-09	2.42E-09	3.14E-09
Cobalt	1.19E-10	0.00E+00	1.19E-10	0.00E+00	6.78E-10	0.00E+00	1.29E-10	0.00E+00	1.80E-10	0.00E+00	4.59E-10	0.00E+00	1.00E-10	0.00E+00	1.26E-10	0.00E+00	2.27E-10	0.00E+00
Lead *	1.42E-07	3.80E-07	1.42E-07	3.83E-07	8.10E-07	8.51E-07	1.55E-07	2.76E-07	2.15E-07	2.76E-07	5.49E-07	5.60E-07	1.20E-07	1.61E-07	1.50E-07	1.61E-07	2.71E-07	2.73E-07
Mercury *	3.01E-09	9.48E-14	3.01E-09	9.48E-14	1.72E-08	1.47E-13	3.29E-09	6.90E-14	4.57E-09	6.90E-14	1.17E-08	9.77E-14	2.55E-09	4.02E-14	3.20E-09	4.02E-14	5.76E-09	5.17E-14
Nickel	3.35E-09	1.15E-08	3.35E-09	1.16E-08	1.91E-08	2.59E-08	3.65E-09	8.40E-09	5.07E-09	8.40E-09	1.30E-08	1.71E-08	2.83E-09	4.89E-09	3.55E-09	4.89E-09	6.40E-09	8.31E-09
Phosphorus	2.32E-08	0.00E+00	2.32E-08	0.00E+00	1.33E-07	0.00E+00	2.53E-08	0.00E+00	3.52E-08	0.00E+00	8.99E-08	0.00E+00	1.97E-08	0.00E+00	2.47E-08	0.00E+00	4.44E-08	0.00E+00
Silver	4.68E-10	1.62E-09	4.68E-10	1.63E-09	2.68E-09	3.62E-09	5.11E-10	1.18E-09	7.09E-10	1.18E-09	1.81E-09	2.39E-09	3.96E-10	6.84E-10	4.97E-10	6.84E-10	8.95E-10	1.16E-09
Vanadium	6.73E-10	0.00E+00	6.73E-10	0.00E+00	3.85E-09	0.00E+00	7.35E-10	0.00E+00	1.02E-09	0.00E+00	2.61E-09	0.00E+00	5.70E-10	0.00E+00	7.15E-10	0.00E+00	1.29E-09	0.00E+00
Zinc	4.95E-08	1.52E-07	4.95E-08	1.53E-07	2.83E-07	3.40E-07	5.41E-08	1.10E-07	7.51E-08	1.10E-07	1.92E-07	2.24E-07	4.20E-08	6.43E-08	5.26E-08	6.43E-08	9.47E-08	1.09E-07
Chlorinated Monocyclic Aromatics																		
1,2-Dichlorobenzene	0.00E+00	2.28E-11	0.00E+00	2.28E-11	0.00E+00	3.61E-11	0.00E+00	1.66E-11	0.00E+00	1.66E-11	0.00E+00	2.38E-11	0.00E+00	9.66E-12	0.00E+00	9.66E-12	0.00E+00	1.30E-11
1,2,4-Trichlorodibenzene	0.00E+00	2.28E-11	0.00E+00	2.28E-11	0.00E+00	3.61E-11	0.00E+00	1.66E-11	0.00E+00	1.66E-11	0.00E+00	2.38E-11	0.00E+00	9.66E-12	0.00E+00	9.66E-12	0.00E+00	1.30E-11
1,2,4,5-Tetrachlorobenzene	0.00E+00	2.28E-11	0.00E+00	2.28E-11	0.00E+00	3.61E-11	0.00E+00	1.66E-11	0.00E+00	1.66E-11	0.00E+00	2.38E-11	0.00E+00	9.66E-12	0.00E+00	9.66E-12	0.00E+00	1.30E-11
Pentachlorobenzene	0.00E+00	2.28E-11	0.00E+00	2.28E-11	0.00E+00	3.61E-11	0.00E+00	1.66E-11	0.00E+00	1.66E-11	0.00E+00	2.38E-11	0.00E+00	9.66E-12	0.00E+00	9.66E-12	0.00E+00	1.30E-11
Hexachlorobenzene	0.00E+00	2.28E-11	0.00E+00	2.28E-11	0.00E+00	3.61E-11	0.00E+00	1.66E-11	0.00E+00	1.66E-11	0.00E+00	2.38E-11	0.00E+00	9.66E-12	0.00E+00	9.66E-12	0.00E+00	1.30E-11
2,4-Dichlorophenol	0.00E+00	4.56E-11	0.00E+00	4.56E-11	0.00E+00	7.22E-11	0.00E+00	3.32E-11	0.00E+00	3.32E-11	0.00E+00	4.76E-11	0.00E+00	1.93E-11	0.00E+00	1.93E-11	0.00E+00	2.60E-11
2,4,6-Trichlorophenol	0.00E+00	2.28E-11	0.00E+00	2.28E-11	0.00E+00	3.61E-11	0.00E+00	1.66E-11	0.00E+00	1.66E-11	0.00E+00	2.38E-11	0.00E+00	9.66E-12	0.00E+00	9.66E-12	0.00E+00	1.30E-11
2,3,4,6-Tetrachlorophenol	0.00E+00	2.28E-11	0.00E+00	2.28E-11	0.00E+00	3.61E-11	0.00E+00	1.66E-11	0.00E+00	1.66E-11	0.00E+00	2.38E-11	0.00E+00	9.66E-12	0.00E+00	9.66E-12	0.00E+00	1.30E-11
Pentachlorophenol	6.19E-14	2.73E-11	6.19E-14	2.73E-11	3.54E-13	4.32E-11	6.76E-14	1.98E-11	9.38E-14	1.98E-11	2.40E-13	2.84E-11	5.24E-14	1.15E-11	6.57E-14	1.15E-11	1.18E-13	1.56E-11
Combustion Gases																		
Total Particulate Matter PM **	1.72E-05	0.00E+00	2.51E-05	0.00E+00	1.05E-04	0.00E+00	1.25E-05	0.00E+00	1.77E-05	0.00E+00	7.30E-05	0.00E+00	7.31E-06	0.00E+00	9.60E-06	0.00E+00	3.88E-05	0.00E+00
Particulate Matter PM10 **	1.72E-05	0.00E+00	2.51E-05	0.00E+00	1.05E-04	0.00E+00	1.25E-05	0.00E+00	1.77E-05	0.00E+00	7.30E-05	0.00E+00	7.31E-06	0.00E+00	9.60E-06	0.00E+00	3.88E-05	0.00E+00
Particulate Matter PM2.5 */**	1.71E-05	0.00E+00	2.47E-05	0.00E+00	9.78E-05	0.00E+00	1.24E-05	0.00E+00	1.72E-05	0.00E+00	6.61E-05	0.00E+00	7.23E-06	0.00E+00	9.07E-06	0.00E+00	3.27E-05	0.00E+00
Carbon Monoxide **	0.00E+00	8.93E-07	0.00E+00	1.12E-06	0.00E+00	4.09E-06	0.00E+00	6.48E-07	0.00E+00	7.77E-07	0.00E+00	2.76E-06	0.00E+00	3.77E-07	0.00E+00	4.07E-07	0.00E+00	1.37E-06
Hydrogen Chloride *	0.00E+00	3.99E-06	0.00E+00	4.98E-06	0.00E+00	1.82E-05	0.00E+00	2.90E-06	0.00E+00	3.48E-06	0.00E+00	1.23E-05	0.00E+00	1.69E-06	0.00E+00	1.82E-06	0.00E+00	6.12E-06
Hydrogen Fluoride	0.00E+00	3.56E-09	0.00E+00	4.44E-09	0.00E+00	1.63E-08	0.00E+00	2.59E-09	0.00E+00	3.11E-09	0.00E+00	1.10E-08	0.00E+00	1.51E-09	0.00E+00	1.62E-09	0.00E+00	5.47E-09
Nitrogen Oxides (as NO2) */**	0.00E+00	8.16E-06	0.00E+00	1.02E-05	0.00E+00	3.73E-05	0.00E+00	5.93E-06	0.00E+00	7.12E-06	0.00E+00	2.53E-05	0.00E+00	3.45E-06	0.00E+00	3.72E-06	0.00E+00	1.25E-05
Sulphur Oxides */**	0.00E+00	2.21E-06	0.00E+00	2.75E-06	0.00E+00	1.01E-05	0.00E+00	1.60E-06	0.00E+00	1.92E-06	0.00E+00	6.82E-06	0.00E+00	9.34E-07	0.00E+00	1.01E-06	0.00E+00	3.39E-06
Chlorinated Polycyclic Aromatics																		
PCB	3.26E-13	3.18E-11	3.26E-13	3.18E-11	1.87E-12	5.04E-11	3.56E-13	2.32E-11	4.95E-13	2.32E-11	1.26E-12	3.32E-11	2.77E-13	1.35E-11	3.47E-13	1.35E-11	6.24E-13	1.82E-11
2,3,7,8-TCDD TEQ *	2.70E-14	2.35E-14	2.70E-14	2.35E-14	1.54E-13	3.73E-14	2.95E-14	1.71E-14	4.09E-14	1.71E-14	1.05E-13	2.45E-14	2.29E-14	9.97E-15	2.87E-14	9.97E-15	5.16E-14	1.34E-14
2,3,7,8-TCDD TEQ	3.41E-15	2.97E-15	3.41E-15	2.97E-15	1.95E-14	4.70E-15	3.72E-15	2.16E-15	5.17E-15	2.16E-15	1.32E-14	3.10E-15	2.89E-15	1.26E-15	3.62E-15	1.26E-15	6.52E-15	1.70E-15
Polycyclic Aromatic Hydrocarbons																		
Benzo(a)pyrene	1.90E-11	2.48E-10	1.90E-11	2.48E-10	1.09E-10	3.94E-10	2.08E-11	1.81E-10	2.88E-11	1.81E-10	7.36E-11	2.60E-10	1.61E-11	1.05E-10	2.02E-11	1.05E-10	3.63E-11	1.42E-10
Benzo(a)anthracene	1.39E-11	4.08E-10	1.39E-11	4.08E-10	7.96E-11	6.47E-10	1.52E-11	2.97E-10	2.11E-11	2.97E-10	5.39E-11	4.26E-10	1.18E-11	1.73E-10	1.48E-11	1.73E-10	2.66E-11	2.33E-10
Benzo(b)fluoranthene	9.16E-13	8.16E-10	9.16E-13	8.16E-10	5.24E-12	1.29E-09	9.99E-13	5.94E-10	1.39E-12	5.94E-10	3.54E-12	8.53E-10	7.76E-13	3.46E-10	9.72E-13	3.46E-10	1.75E-12	4.66E-10
Benzo(g,h,i)perylene	1.90E-11	2.48E-10	1.90E-11	2.48E-10	1.09E-10	3.94E-10	2.08E-11	1.81E-10	2.88E-11	1.81E-10	7.36E-11	2.60E-10	1.61E-11	1.05E-10	2.02E-11	1.05E-10	3.63E-11	1.42E-10
Benzo(k)fluoranthene	1.96E-11	2.31E-10	1.96E-11	2.31E-10	1.12E-10	3.66E-10	2.14E-11	1.68E-10	2.97E-11	1.68E-10	7.58E-11	2.41E-10	1.66E-11	9.77E-11	2.08E-11	9.77E-11	3.74E-11	1.32E-10
Chrysene	6.89E-12	6.29E-10	6.89E-12	6.29E-10	3.94E-11	9.97E-10	7.52E-12	4.58E-10	1.04E-11	4.58E-10	2.67E-11	6.57E-10	5.84E-12	2.66E-10	7.32E-12	2.66E-10	1.32E-11	3.59E-10
Dibenzo(a,h)anthracene	2.54E-11	4.65E-11	2.54E-11	4.65E-11	1.46E-10	7.37E-11	2.78E-11	3.38E-11	3.86E-11	3.38E-11	9.85E-11	4.86E-11	2.16E-11	1.97E-11	2.70E-11	1.97E-11	4.86E-11	2.65E-11
Indeno(1,2,3-c,d)pyrene	2.68E-11	4.23E-12	2.68E-11	4.23E-12	1.53E-10	6.70E-12	2.92E-11	3.07E-12	4.06E-11	3.08E-12	1.04E-10	4.41E-12	2.27E-11	1.79E-12	2.85E-11	1.79E-12	5.12E-11	2.41E-12
Anthracene	5.39E-14	8.43E-10	5.39E-14	8.44E-10	3.08E-13	1.34E-09	5.88E-14	6.14E-10	8.16E-14	6.14E-10	2.09E-13	8.81E-10	4.56E-14	3.57E-10	5.72E-14	3.57E-10	1.03E-13	4.82E-10
Naphthalene	0.00E+00	5.17E-09	0.00E+00	5.17E-09	0.00E+00	8.20E-09	0.00E+00	3.76E-09	0.00E+00	3.76E-09	0.00E+00	5.40E-09	0.00E+00	2.19E-09	0.00E+00	2.19E-09	0.00E+00	2.95E-09
Phenanthrene	8.25E-14	2.59E-09	8.25E-14	2.59E-09	4.72E-13	4.10E-09	9.00E-14	1.88E-09	1.25E-13	1.88E-09	3.19E-13	2.70E-09	6.99E-14	1.10E-09	8.76E-14	1.10E-09	1.58E-13	1.48E-09
Volatile Organic Compounds																		
Benzene **	0.00E+00	2.54E-09	0.00E+00	2.54E-09	0.00E+00	4.03E-09	0.00E+00	1.85E-09	0.00E+00	1.85E-09	0.00E+00	2.65E-09	0.00E+00	1.08E-09	0.00E+00	1.08E-09	0.00E+00	1.45E-09
Chloroform	0.00E+00	2.70E-11	0.00E+00	2.70E-11	0.00E+00	4.28E-11	0.00E+00	1.97E-11	0.00E+00	1.97E-11	0.00E+00	2.82E-11	0.00E+00	1.14E-11	0.00E+00	1.14E-11	0.00E+00	1.54E-11
Dichloromethane	0.00E+00	9.31E-09	0.00E+00	9.31E-09	0.00E+00	1.47E-08	0.00E+00	6.77E-09	0.00E+00	6.77E-09	0.00E+00	9.71E-09	0.00E+00	3.94E-09	0.00E+00	3.94E-09	0.00E+00	5.31E-09
Formaldehyde	0.00E+00	2.52E-09	0.00E+00	2.52E-09	0.00E+00	3.98E-09	0.00E+00	1.83E-09	0.00E+00	1.83E-09	0.00E+00	2.62E-09	0.00E+00	1.07E-09	0.00E+00	1.07E-09	0.00E+00	1.44E-09
Tetrachloroethylene	0.00E+00	3.00E-10	0.00E+00	3.00E-10	0.00E+00	4.76E-10	0.00E+00	2.19E-10	0.00E+00	2.19E-10	0.00E+00	3.13E-10	0.00E+00	1.27E-10	0.00E+00	1.27E-10	0.00E+00	1.72E-10
Vinyl Chloride	0.00E+00	3.15E-11	0.00E+00	3.15E-11	0.00E+00	4.99E-11	0.00E+00	2.29E-11	0.00E+00	2.29E-11	0.00E+00	3.29E-11	0.00E+00	1.34E-11	0.00E+00	1.34E-11	0.00E+00	1.80E-11
Phthalates																		
DEHP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

* MOE Guideline A-7 criteria
** Includes emissions from facility traffic

NOTES:

- No adjustments are made to deposition maximas as a result of lake effects (adjustments were not determined)

N/A = not available (not tested at similar EFW facility)

Table A4: Maximum Pollutant Ground Level 1-Hour Average Concentrations Considering Lake Effects (ug/m^3)

Pollutant	Operating Scenario 1: Three (3) process units running								Operating Scenario 2: Two (2) process units running								Operating Scenario 3: One (1) process unit running							
	Facility located 200 m from shore		Facility located 400 m from shore		Facility located 650 m from shore		Facility located > 650 m from shore		Facility located 200 m from shore		Facility located 400 m from shore		Facility located 650 m from shore		Facility located > 650 m from shore		Facility located 200 m from shore		Facility located 400 m from shore		Facility located 650 m from shore		Facility located > 650 m from shore	
	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour
Metals																								
Antimony	2.69E-03	0.00E+00	2.92E-03	0.00E+00	3.31E-03	0.00E+00	8.22E-04	0.00E+00	2.12E-03	0.00E+00	2.30E-03	0.00E+00	2.60E-03	0.00E+00	6.50E-04	0.00E+00	1.47E-03	0.00E+00	1.59E-03	0.00E+00	1.80E-03	0.00E+00	4.19E-04	0.00E+00
Arsenic	5.90E-04	3.81E-06	6.41E-04	4.13E-06	7.25E-04	4.68E-06	1.80E-04	1.09E-06	4.64E-04	3.01E-06	5.03E-04	3.27E-06	5.69E-04	3.70E-06	1.43E-04	8.60E-07	3.21E-04	1.94E-06	3.49E-04	2.10E-06	3.94E-04	2.38E-06	9.17E-05	5.54E-07
Barium	4.62E-03	4.48E-05	5.01E-03	4.86E-05	5.67E-03	5.50E-05	1.41E-03	1.28E-05	3.63E-03	3.54E-05	3.94E-03	3.85E-05	4.46E-03	4.35E-05	1.11E-03	1.01E-05	2.51E-03	2.28E-05	2.73E-03	2.48E-05	3.09E-03	2.80E-05	7.18E-04	6.52E-06
Beryllium	6.23E-05	6.05E-07	6.77E-05	6.57E-07	7.66E-05	7.43E-07	1.90E-05	1.73E-07	4.90E-05	4.78E-07	5.32E-05	5.19E-07	6.02E-05	5.88E-07	1.51E-05	1.37E-07	3.39E-05	3.08E-07	3.68E-05	3.34E-07	4.17E-05	3.78E-07	9.69E-06	8.80E-08
Boron	1.50E-01	0.00E+00	1.63E-01	0.00E+00	1.85E-01	0.00E+00	4.59E-02	0.00E+00	1.18E-01	0.00E+00	1.28E-01	0.00E+00	1.45E-01	0.00E+00	3.63E-02	0.00E+00	8.18E-02	0.00E+00	8.88E-02	0.00E+00	1.01E-01	0.00E+00	2.34E-02	0.00E+00
Cadmium *	1.36E-02	1.32E-04	1.48E-02	1.44E-04	1.68E-02	1.63E-04	4.16E-03	3.78E-05	1.07E-02	1.05E-04	1.16E-02	1.14E-04	1.32E-02	1.29E-04	3.29E-03	2.99E-05	7.42E-03	6.74E-05	8.05E-03	7.31E-05	9.11E-03	8.28E-05	2.12E-03	1.92E-05
Chromium	1.24E-03	1.20E-05	1.34E-03	1.30E-05	1.52E-03	1.47E-05	3.78E-04	3.43E-06	9.72E-04	9.49E-06	1.05E-03	1.03E-05	1.19E-03	1.17E-05	2.99E-04	2.71E-06	6.73E-04	6.11E-06	7.31E-04	6.63E-06	8.27E-04	7.51E-06	1.92E-04	1.75E-06
Cobalt	1.16E-04	0.00E+00	1.26E-04	0.00E+00	1.42E-04	0.00E+00	3.54E-05	0.00E+00	9.11E-05	0.00E+00	9.89E-05	0.00E+00	1.12E-04	0.00E+00	2.80E-05	0.00E+00	6.31E-05	0.00E+00	6.85E-05	0.00E+00	7.75E-05	0.00E+00	1.80E-05	0.00E+00
Lead *	1.39E-01	1.04E-03	1.50E-01	1.13E-03	1.70E-01	1.28E-03	4.23E-02	2.98E-04	1.09E-01	8.26E-04	1.18E-01	8.96E-04	1.34E-01	1.01E-03	3.35E-02	2.36E-04	7.54E-02	5.31E-04	8.19E-02	5.77E-04	9.26E-02	6.53E-04	2.15E-02	1.52E-04
Mercury *	2.95E-03	1.67E-02	3.20E-03	1.81E-02	3.62E-03	2.05E-02	9.00E-04	5.10E-03	2.32E-03	1.31E-02	2.51E-03	1.42E-02	2.85E-03	1.61E-02	7.12E-04	4.03E-03	1.60E-03	9.09E-03	1.74E-03	9.87E-03	1.97E-03	1.12E-02	4.58E-04	2.60E-03
Nickel	3.27E-03	2.97E-05	3.55E-03	3.23E-05	4.02E-03	3.65E-05	9.99E-04	9.07E-06	2.57E-03	2.33E-05	2.79E-03	2.53E-05	3.16E-03	2.87E-05	7.90E-04	7.18E-06	1.78E-03	1.62E-05	1.93E-03	1.76E-05	2.19E-03	1.99E-05	5.09E-04	4.62E-06
Phosphorus	2.27E-02	0.00E+00	2.46E-02	0.00E+00	2.79E-02	0.00E+00	6.93E-03	0.00E+00	1.78E-02	0.00E+00	1.94E-02	0.00E+00	2.19E-02	0.00E+00	5.48E-03	0.00E+00	1.24E-02	0.00E+00	1.34E-02	0.00E+00	1.52E-02	0.00E+00	3.53E-03	0.00E+00
Silver	4.58E-04	4.16E-06	4.97E-04	4.51E-06	5.62E-04	5.11E-06	1.40E-04	1.27E-06	3.60E-04	3.27E-06	3.90E-04	3.55E-06	4.42E-04	4.01E-06	1.11E-04	1.00E-06	2.49E-04	2.26E-06	2.70E-04	2.46E-06	3.06E-04	2.78E-06	7.12E-05	6.46E-07
Vanadium	6.59E-04	0.00E+00	7.15E-04	0.00E+00	8.09E-04	0.00E+00	2.01E-04	0.00E+00	5.17E-04	0.00E+00	5.62E-04	0.00E+00	6.36E-04	0.00E+00	1.59E-04	0.00E+00	3.58E-04	0.00E+00	3.89E-04	0.00E+00	4.40E-04	0.00E+00	1.02E-04	0.00E+00
Zinc	4.85E-02	3.91E-04	5.26E-02	4.24E-04	5.95E-02	4.80E-04	1.48E-02	1.19E-04	3.81E-02	3.07E-04	4.13E-02	3.33E-04	4.68E-02	3.77E-04	1.17E-02	9.44E-05	2.64E-02	2.13E-04	2.86E-02	2.31E-04	3.24E-02	2.61E-04	7.53E-03	6.07E-05
Chlorinated Monocyclic Aromatics																								
1,2-Dichlorobenzene	0.00E+00	5.06E-05	0.00E+00	5.49E-05	0.00E+00	6.22E-05	0.00E+00	1.55E-05	0.00E+00	3.98E-05	0.00E+00	4.32E-05	0.00E+00	4.88E-05	0.00E+00	1.22E-05	0.00E+00	2.75E-05	0.00E+00	2.99E-05	0.00E+00	3.38E-05	0.00E+00	7.87E-06
1,2,4-Trichlorodibenzene	0.00E+00	5.06E-05	0.00E+00	5.49E-05	0.00E+00	6.22E-05	0.00E+00	1.55E-05	0.00E+00	3.98E-05	0.00E+00	4.32E-05	0.00E+00	4.88E-05	0.00E+00	1.22E-05	0.00E+00	2.75E-05	0.00E+00	2.99E-05	0.00E+00	3.38E-05	0.00E+00	7.87E-06
1,2,4,5-Tetrachlorobenzene	0.00E+00	5.06E-05	0.00E+00	5.49E-05	0.00E+00	6.22E-05	0.00E+00	1.55E-05	0.00E+00	3.98E-05	0.00E+00	4.32E-05	0.00E+00	4.88E-05	0.00E+00	1.22E-05	0.00E+00	2.75E-05	0.00E+00	2.99E-05	0.00E+00	3.38E-05	0.00E+00	7.87E-06
Pentachlorobenzene	0.00E+00	5.06E-05	0.00E+00	5.49E-05	0.00E+00	6.22E-05	0.00E+00	1.55E-05	0.00E+00	3.98E-05	0.00E+00	4.32E-05	0.00E+00	4.88E-05	0.00E+00	1.22E-05	0.00E+00	2.75E-05	0.00E+00	2.99E-05	0.00E+00	3.38E-05	0.00E+00	7.87E-06
Hexachlorobenzene	0.00E+00	5.06E-05	0.00E+00	5.49E-05	0.00E+00	6.22E-05	0.00E+00	1.55E-05	0.00E+00	3.98E-05	0.00E+00	4.32E-05	0.00E+00	4.88E-05	0.00E+00	1.22E-05	0.00E+00	2.75E-05	0.00E+00	2.99E-05	0.00E+00	3.38E-05	0.00E+00	7.87E-06
2,4-Dichlorophenol	0.00E+00	1.01E-04	0.00E+00	1.10E-04	0.00E+00	1.24E-04	0.00E+00	3.09E-05	0.00E+00	7.95E-05	0.00E+00	8.63E-05	0.00E+00	9.77E-05	0.00E+00	2.44E-05	0.00E+00	5.51E-05	0.00E+00	5.98E-05	0.00E+00	6.77E-05	0.00E+00	1.57E-05
2,4,6-Trichlorophenol	0.00E+00	5.06E-05	0.00E+00	5.49E-05	0.00E+00	6.22E-05	0.00E+00	1.55E-05	0.00E+00	3.98E-05	0.00E+00	4.32E-05	0.00E+00	4.88E-05	0.00E+00	1.22E-05	0.00E+00	2.75E-05	0.00E+00	2.99E-05	0.00E+00	3.38E-05	0.00E+00	7.87E-06
2,3,4,6-Tetrachlorophenol	0.00E+00	5.06E-05	0.00E+00	5.49E-05	0.00E+00	6.22E-05	0.00E+00	1.55E-05	0.00E+00	3.98E-05	0.00E+00	4.32E-05	0.00E+00	4.88E-05	0.00E+00	1.22E-05	0.00E+00	2.75E-05	0.00E+00	2.99E-05	0.00E+00	3.38E-05	0.00E+00	7.87E-06
Pentachlorophenol	6.05E-08	6.05E-05	6.57E-08	6.57E-05	7.44E-08	7.43E-05	1.85E-08	1.85E-05	4.76E-08	4.75E-05	5.16E-08	5.16E-05	5.84E-08	5.84E-05	1.46E-08	1.46E-05	3.29E-08	3.29E-05	3.58E-08	3.57E-05	4.05E-08	4.04E-05	9.41E-09	9.40E-06
Combustion Gases																								
Total Particulate Matter PM **/***	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00
Particulate Matter PM10 **/***	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00	7.81E+00	0.00E+00
Particulate Matter PM2.5 */**/***	6.92E+00	0.00E+00	6.92E+00	0.00E+00	6.92E+00	0.00E+00	6.92E+00	0.00E+00	6.92E+00	0.00E+00	6.92E+00	0.00E+00	6.92E+00	0.00E+00	6.92E+00	0.00E+00	6.92E+00	0.00E+00	6.92E+00	0.00E+00	6.92E+00	0.00E+00	6.92E+00	0.00E+00
Carbon Monoxide **/***	0.00E+00	1.61E+01	0.00E+00	1.61E+01	0.00E+00	1.61E+01	0.00E+00	1.61E+01	0.00E+00	1.78E+01	0.00E+00	1.93E+01	0.00E+00	2.19E+01	0.00E+00	1.61E+01	0.00E+00	1.26E+01	0.00E+00	1.36E+01	0.00E+00	1.54E+01	0.00E+00	1.61E+01
Hydrogen Chloride *	0.00E+00	2.65E+01	0.00E+00	2.88E+01	0.00E+00	3.26E+01	0.00E+00	8.10E+00	0.00E+00	2.08E+01	0.00E+00	2.26E+01	0.00E+00	2.56E+01	0.00E+00	6.41E+00	0.00E+00	1.44E+01	0.00E+00	1.57E+01	0.00E+00	1.77E+01	0.00E+00	4.12E+00
Hydrogen Fluoride	0.00E+00	2.37E-02	0.00E+00	2.57E-02	0.00E+00	2.91E-02	0.00E+00	7.23E-03	0.00E+00	1.86E-02	0.00E+00	2.02E-02	0.00E+00	2.29E-02	0.00E+00	5.72E-03	0.00E+00	1.29E-02	0.00E+00	1.40E-02	0.00E+00	1.58E-02	0.00E+00	3.68E-03
Nitrogen Oxides (as NO2) */**/***	0.00E+00	6.38E+01	0.00E+00	6.38E+01	0.00E+00	6.38E+01	0.00E+00	6.38E+01	0.00E+00	6.38E+01	0.00E+00	6.38E+01	0.00E+00	6.38E+01	0.00E+00	6.38E+01	0.00E+00	6.38E+01	0.00E+00	6.38E+01	0.00E+00	6.38E+01	0.00E+00	6.38E+01
Sulphur Oxides */**	0.00E+00	1.68E+01	0.00E+00	1.68E+01	0.00E+00	1.68E+01	0.00E+00	1.68E+01	0.00E+00	1.33E+01	0.00E+00	1.33E+01	0.00E+00	1.33E+01	0.00E+00	1.33E+01	0.00E+00	8.55E+00	0.00E+00	8.55E+00	0.00E+00	8.55E+00	0.00E+00	8.55E+00
Chlorinated Polycyclic Aromatics																								
PCB	3.19E-07	7.06E-05	3.47E-07	7.67E-05	3.92E-07	8.68E-05	9.75E-08	2.16E-05	2.51E-07	5.55E-05	2.72E-07	6.02E-05	3.08E-07	6.82E-05	7.71E-08	1.71E-05	1.74E-07	3.84E-05	1.89E-07	4.17E-05	2.13E-07	4.72E-05	4.96E-08	1.10E-05
2,3,7,8-TCDD TEQ *	2.64E-08	5.22E-08	2.87E-08	5.67E-08	3.25E-08	6.41E-08	8.07E-09	1.59E-08	2.08E-08	4.10E-08	2.25E-08	4.45E-08	2.55E-08	5.04E-08	6.38E-09	1.26E-08	1.44E-08	2.84E-08	1.56E-08	3.08E-08	1.77E-08	3.49E-08	4.11E-09	8.11E-09
2,3,7,8-TCDD TEQ	3.34E-09	6.59E-09	3.62E-09	7.16E-09	4.10E-09	8.10E-09	1.02E-09	2.01E-09	2.62E-09	5.18E-09	2.84E-09	5.62E-09	3.22E-09	6.36E-09	8.05E-10	1.59E-09	1.81E-09	3.59E-09	1.97E-09	3.89E-09	2.23E-09	4.40E-09	5.18E-10	1.02E-09
Polycyclic Aromatic Hydrocarbons																								
Benzo(a)pyrene	1.86E-05	7.74E-06	2.02E-05	8.41E-06	2.28E-05	9.51E-06	5.68E-06	2.36E-06	1.46E-05	6.08E-06	1.59E-05	6.60E-06	1.79E-05	7.47E-06	4.49E-06	1.87E-06	1.01E-05	4.21E-06	1.10E-05	4.57E-06	1.24E-05	5.18E-06	2.89E-06	1.20E-06
Benzo(a)anthracene	1.36E-05	1.27E-05	1.48E-05	1.38E-05	1.67E-05	1.56E-05	4.16E-06	3.88E-06	1.07E-05	9.99E-06	1.16E-05	1.08E-05	1.31E-05	1.23E-05	3.29E-06	3.07E-06	7.41E-06	6.92E-06	8.04E-06	7.51E-06	9.10E-06	8.50E-06	2.12E-06	1.98E-06
Benzo(b)fluoranthene	8.96E-07	2.54E-05	9.72E-07	2.76E-05	1.10E-06	3.13E-05	2.73E-07	7.77E-06	7.04E-07	2.00E-05	7.64E-07	2.17E-05	8.64E-07	2.46E-05	2.16E-07	6.14E-06	4.87E-07	1.38E-05	5.29E-07	1.50E-05	5.99E-07	1.70E-05	1.39E-07	3.95E-06
Benzo(g,h,i)perylene	1.86E-05	7.74E-06	2.02E-05	8.41E-06	2.28E-05	9.51E-06	5.68E-06	2.36E-06	1.46E-05	6.08E-06	1.59E-05	6.60E-06	1.79E-05	7.47E-06	4.49E-06	1.87E-06	1.01E-05	4.21E-06	1.10E-05	4.57E-06	1.24E-05	5.18E-06	2.89E-06	1.20E-06
Benzo(k)fluoranthene	1.91E-05	7.19E-06	2.08E-05	7.81E-06	2.35E-05	8.83E-06	5.85E-06	2.20E-06	1.50E-05	5.65E-06	1.63E-05	6.13E-06	1.85E-05	6.94E-06	4.62E-06	1.74E-06	1.04E-05	3.91E-06	1.13E-05	4.25E-06	1.28E-05	4.81E-06	2.98E-06	1.12E-06
Chrysene	6.74E-06	1.96E-05	7.32E-06	2.13E-05	8.28E-06	2.41E-05	2.06E-06	5.98E-06	5.30E-06	1.54E-05	5.75E-06	1.67E-05	6.51E-06	1.89E-05	1.63E-06	4.73E-06	3.67E-06	1.07E-05	3.98E-06	1.16E-05	4.51E-06	1.31E-05	1.05E-06	3.05E-06
Dibenzo(a,h)anthracene	2.49E-05	1.45E-06	2.70E-05	1.57E-06	3.06E-05	1.78E-06	7.60E-06	4.42E-07	1.96E-05	1.14E-06	2.12E-05	1.24E-06	2.40E-05	1.40E-06	6.01E-06	3.50E-07	1.35E-05	7.88E-07	1.47E-05	8.56E-07	1.66E-05	9.68E-07	3.87E-06	2.25E-07
Indeno(1,2,3-c,d)pyrene	2.62E-05	1.32E-07	2.85E-05	1.43E-07	3.22E-05	1.62E-07	8.00E-06	4.02E-08	2.06E-05	1.03E-07	2.24E-05	1.12E-07	2.53E-05	1.27E-07	6.33E-06	3.18E-08	1.43E-05	7.16E-08	1.55E-05	7.78E-08	1.75E-05	8.80E-08	4.07E-06	2.05E-08
Anthracene	5.27E-08	2.63E-05	5.72E-08	2.85E-05	6.47E-08	3.23E-05	1.61E-08	8.02E-06	4.14E-08	2.06E-05	4.49E-08	2.24E-05	5.08E-08	2.54E-05	1.27E-08	6.35E-06	2.87E-08	1.43E-05	3.11E-08	1.55E-05	3.52E-08	1.76E-05	8.19E-09	4.09E-06
Naphthalene	0.00E+00	1.61E-04	0.00E+00	1.75E-04	0.00E+00	1.98E-04	0.00E+00	4.92E-05	0.00E+00	1.27E-04	0.00E+00	1.37E-04	0.00E+00	1.56E-04	0.00E+00	3.89E-05	0.00E+00	8.77E-05	0.00E+00	9.52E-05	0.00E+00	1.08E-04	0.00E+00	2.51E-05
Phenanthrene	8.07E-08	8.06E-05	8.76E-08	8.75E-05	9.91E-08	9.90E-05	2.46E-08	2.46E-05	6.34E-08	6.33E-05	6.88E-08	6.87E-05	7.79E-08	7.78E-05	1.95E-08	1.95E-05	4.39E-08	4.38E-05	4.77E-08	4.76E-05	5.39E-08	5.39E-05	1.25E-08	1.25E-05
Volatile Organic Compounds																								
Benzene **/***	0.00E+00	4.94E-02	0.00E+00	5.37E-02	0.00E+00	6.07E-02	0.00E+00	1.08E-01	0.00E+00	4.59E-02	0.00E+00	4.98E-02	0.00E+00	5.64E-02	0.00E+00	1.08E-01	0.00E+00	4.59E-02	0.00E+00	4.98E-02	0.00E+00	5.64E-02	0.00E+00	1.08E-01
Chloroform	0.00E+00	5.01E-04	0.00E+00	5.44E-04	0.00E+00	6.16E-04	0.00E+00	1.53E-04	0.00E+00	3.94E-04	0.00E+00	4.27E-04	0.00E+00	4.84E-04	0.00E+00	1.21E-04	0.00E+00	2.73E-04	0.00E+00	2.96E-04	0.00E+00	3.35E-04	0.00E+00	7.79E-05
Dichloromethane	0.00E+00	1.73E-01	0.00E+00	1.87E-01	0.00E+00	2.12E-01	0.00E+00	5.27E-02	0.00E+00	1.36E-01	0.00E+00	1.47E-01	0.00E+00	1.67E-01	0.00E+00	4.17E-02	0.00E+00	9.39E-02	0.00E+00	1.02E-01	0.00E+00	1.15E-01	0.00E+00	2.68E-02
Formaldehyde	0.00E+00	4.67E-02	0.00E+00	5.07E-02	0.00E+00	5.73E-02	0.00E+00	1.42E-02	0.00E+00	3.67E-02	0.00E+00	3.98E-02	0.00E+00	4.50E-02	0.00E+00	1.13E-02	0.00E+00	2.54E-02	0.00E+00	2.76E-02	0.00E+00	3.12E-02	0.00E+00	7.25E-03
Tetrachloroethylene	0.00E+00	5.57E-03	0.00E+00	6.05E-03	0.00E+00	6.85E-03	0.00E+00	1.70E-03	0.00E+00	4.38E-03	0.00E+00	4.75E-03	0.00E+00	5.38E-03	0.00E+00	1.35E-03	0.00E+00	3.03E-03	0.00E+00	3.29E-03	0.00E+00	3.72E-03	0.00E+00	8.66E-04
Vinyl Chloride	0.00E+00	5.85E-04	0.00E+00	6.35E-04	0.00E+00	7.18E-04	0.00E+00	1.79E-04	0.00E+00	4.59E-04	0.00E+00	4.99E-04	0.00E+00	5.64E-04	0.00E+00	1.41E-04	0.00E+00	3.18E-04	0.00E+00	3.45E-04	0.00E+00	3.91E-04	0.00E+00	9.09E-05
Phthalates																								
DEHP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

* MOE Guideline A-7 criteria

** Includes emissions from facility traffic

*** Particulate Matter PM10, Particulate Matter PM2.5, Carbon Monoxide, Nitrogen Oxides and Benzene are not adjusted for lake effects due to large influence of traffic sources

NOTES:

- The location of the maximum is 1,200 to 1,270 m inland for all shoreline cases, regardless of the facility location
- Adjustments for lake effects based on comparison performed with Screen3 modelling

N/A = not available (not tested at similar EFW facility)

Table A5: Comparison of derived MET data versus CROPS MET data

Concentration (ug/m^3)

Pollutant	Operating Scenario 1: Three (3) process units running					
	1-hour average		24-hour average		annual average	
	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour
Combustion Gases						
Nitrogen Oxides (as NO2) using AERMET derived (intermediate urban/crops surface) MET data	0.00E+00	6.38E+01	0.00E+00	2.76E+01	0.00E+00	2.87E+00
Nitrogen Oxides (as NO2) using AERMET derived (crops surface) MET data	0.00E+00	6.77E+01	0.00E+00	2.85E+01	0.00E+00	2.70E+00

Dry Deposition (g/m^2)

Pollutant	Operating Scenario 1: Three (3) process units running					
	1-hour total		24-hour total		annual total	
	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour
Combustion Gases						
Nitrogen Oxides (as NO2) using AERMET derived (intermediate urban/crops surface) MET data	0.00E+00	4.34E-05	0.00E+00	5.14E-04	0.00E+00	1.13E-02
Nitrogen Oxides (as NO2) using AERMET derived (crops surface) MET data	0.00E+00	3.74E-05	0.00E+00	4.93E-04	0.00E+00	8.80E-03

Wet Deposition (g/m^2)

Pollutant	Operating Scenario 1: Three (3) process units running					
	1-hour total		24-hour total		annual total	
	Particulate	Vapour	Particulate	Vapour	Particulate	Vapour
Combustion Gases						
Nitrogen Oxides (as NO2) using AERMET derived (intermediate urban/crops surface) MET data	0.00E+00	8.16E-06	0.00E+00	1.02E-05	0.00E+00	3.73E-05
Nitrogen Oxides (as NO2) using AERMET derived (crops surface) MET data	0.00E+00	8.42E-06	0.00E+00	1.02E-05	0.00E+00	3.75E-05

Appendix B

Emission Rate Estimates

Table B1: Exhaust Stack Emission Rate Estimates

Pollutant	Existing Modern EFW Facility *	Proposed Durham/York EFW Facility (400,000 TPY - 3 units)			Percentage of pollutant partitioned to ***	
	Emission Concentration (ug/Rm3 @ 11% O2)	Stack Gas Flow Rate (Rm3/s)	Maximum Emission Rate (g/s)	Maximum Emission Rate (g/s/unit)	Particulate	Vapor
Metals						
Antimony	2.74E+00	50.7	1.39E-04	4.63E-05	100.0%	0.0%
Arsenic	6.04E-01	50.7	3.06E-05	1.02E-05	99.4%	0.6%
Barium	4.74E+00	50.7	2.40E-04	8.01E-05	99.1%	0.9%
Beryllium	*6.40E-02*	50.7	*3.24E-06*	*1.08E-06*	99.1%	0.9%
Boron	1.53E+02	50.7	7.76E-03	2.59E-03	100.0%	0.0%
Cadmium **	1.40E+01	50.7	7.10E-04	2.37E-04	99.1%	0.9%
Chromium	1.27E+00	50.7	6.44E-05	2.15E-05	99.1%	0.9%
Cobalt	1.18E-01	50.7	5.98E-06	1.99E-06	100.0%	0.0%
Lead **	1.42E+02	50.7	7.20E-03	2.40E-03	99.3%	0.7%
Mercury **	2.00E+01	50.7	1.01E-03	3.38E-04	15.0%	85.0%
Nickel	3.36E+00	50.7	1.70E-04	5.68E-05	99.1%	0.9%
Phosphorus	2.31E+01	50.7	1.17E-03	3.90E-04	100.0%	0.0%
Silver	4.70E-01	50.7	2.38E-05	7.94E-06	99.1%	0.9%
Vanadium	6.70E-01	50.7	3.40E-05	1.13E-05	100.0%	0.0%
Zinc	4.97E+01	50.7	2.52E-03	8.40E-04	99.2%	0.8%
Chlorinated Monocyclic Aromatics						
1,2-Dichlorobenzene	*5.15E-02*	50.7	*2.61E-06*	*8.70E-07*	0.0%	100.0%
1,2,4-Trichlorodibenzene	*5.15E-02*	50.7	*2.61E-06*	*8.70E-07*	0.0%	100.0%
1,2,4,5-Tetrachlorobenzene	*5.15E-02*	50.7	*2.61E-06*	*8.70E-07*	0.0%	100.0%
Pentachlorobenzene	*5.15E-02*	50.7	*2.61E-06*	*8.70E-07*	0.0%	100.0%
Hexachlorobenzene	*5.15E-02*	50.7	*2.61E-06*	*8.70E-07*	0.0%	100.0%
2,4-Dichlorophenol	*1.03E-01*	50.7	*5.22E-06*	*1.74E-06*	0.0%	100.0%
2,4,6-Trichlorophenol	*5.15E-02*	50.7	*2.61E-06*	*8.70E-07*	0.0%	100.0%
2,3,4,6-Tetrachlorophenol	*5.15E-02*	50.7	*2.61E-06*	*8.70E-07*	0.0%	100.0%
Pentachlorophenol	*6.16E-02*	50.7	*3.12E-06*	*1.04E-06*	0.1%	99.9%
Combustion Gases						
Particulate Matter PM2.5 **	1.70E+04	50.7	8.62E-01	2.87E-01	100.0%	0.0%
Carbon Monoxide	2.26E+04	50.7	1.15E+00	3.82E-01	0.0%	100.0%
Hydrogen Chloride **	2.70E+04	50.7	1.37E+00	4.56E-01	0.0%	100.0%
Hydrogen Fluoride	2.41E+01	50.7	1.22E-03	4.07E-04	0.0%	100.0%
Nitrogen Oxides (as NO2) **	2.07E+05	50.7	1.05E+01	3.50E+00	0.0%	100.0%
Sulphur Oxides **	5.60E+04	50.7	2.84E+00	9.46E-01	0.0%	100.0%
Chlorinated Polycyclic Aromatics						
PCB	7.22E-02	50.7	3.66E-06	1.22E-06	0.4%	99.6%
2,3,7,8-TCDD TEQ **	8.00E-05	50.7	4.06E-09	1.35E-09	33.6%	66.4%
2,3,7,8-TCDD TEQ	*1.01E-05*	50.7	*5.12E-10*	*1.71E-10*	33.6%	66.4%
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene	*2.68E-02*	50.7	*1.36E-06*	*4.53E-07*	70.6%	29.4%
Benzo(a)anthracene	*2.68E-02*	50.7	*1.36E-06*	*4.53E-07*	51.7%	48.3%
Benzo(b)fluoranthene	*2.68E-02*	50.7	*1.36E-06*	*4.53E-07*	3.4%	96.6%
Benzo(g,h,i)perylene	*2.68E-02*	50.7	*1.36E-06*	*4.53E-07*	70.6%	29.4%
Benzo(k)fluoranthene	*2.68E-02*	50.7	*1.36E-06*	*4.53E-07*	72.7%	27.3%
Chrysene	*2.68E-02*	50.7	*1.36E-06*	*4.53E-07*	25.6%	74.4%
Dibenzo(a,h)anthracene	*2.68E-02*	50.7	*1.36E-06*	*4.53E-07*	94.5%	5.5%
Indeno(1,2,3-c,d)pyrene	*2.68E-02*	50.7	*1.36E-06*	*4.53E-07*	99.5%	0.5%
Anthracene	*2.68E-02*	50.7	*1.36E-06*	*4.53E-07*	0.2%	99.8%
Naphthalene	1.64E-01	50.7	8.31E-06	2.77E-06	0.0%	100.0%
Phenanthrene	8.21E-02	50.7	4.16E-06	1.39E-06	0.1%	99.9%
Volatile Organic Compounds						
Benzene	4.80E+01	50.7	2.43E-03	8.11E-04	0.0%	100.0%
Chloroform	5.10E-01	50.7	2.59E-05	8.62E-06	0.0%	100.0%
Dichloromethane	1.76E+02	50.7	8.91E-03	2.97E-03	0.0%	100.0%
Formaldehyde	4.75E+01	50.7	2.41E-03	8.03E-04	0.0%	100.0%
Tetrachloroethylene	5.67E+00	50.7	2.87E-04	9.58E-05	0.0%	100.0%
Vinyl Chloride	*5.95E-01*	50.7	*3.02E-05*	*1.01E-05*	0.0%	100.0%
Phthalates						
DEHP	N/A	50.7	N/A	N/A	N/A	N/A

R = dry, reference conditions @ 25C and 101.3 kPa

Italics = analytical detection limits used for non-detected pollutants

* Maximum values measured over the last three stack testing programs (most recent VOC test data from December 1992 and March 1993)

** MOE Guideline A-7 criteria

*** Contaminant vapour fractions obtained for the US EPA HHRAP database or Jacques Whitford's suggestions

N/A = not available (not tested at similar EFW facility)

Table B2: Waste Delivery Truck Emission Rate Estimates

Pollutant	MOBILE6 Travelling Truck Exhaust Emissions	Truck Exhaust Emissions	Average Distance Travelled at Facility	Mon - Fri (8-10 & 14-16) Frequency of Trucks at Facility	Mon - Fri (8-10 & 14-16) Proposed Durham/York EFW Facility	Mon - Fri (10-14) Frequency of Trucks at Facility	Mon - Fri (10-14) Proposed Durham/York EFW Facility
	(g/mi)	(g/km)	(km/truck)	(trucks/second)	g/s	(trucks/second)	g/s
Particulate Matter PM10	0.2117	0.132	0.84	4.83E-03	5.34E-04	1.21E-03	1.34E-04
Particulate Matter PM2.5	0.1713	0.106	0.84	4.83E-03	4.32E-04	1.21E-03	1.08E-04
Carbon Monoxide	1.870	1.16	0.84	4.83E-03	4.72E-03	1.21E-03	1.18E-03
Benzene	0.0125	0.008	0.84	4.83E-03	3.15E-05	1.21E-03	7.88E-06
Nitrogen Oxides (as NO2)	7.394	4.59	0.84	4.83E-03	1.87E-02	1.21E-03	4.66E-03
Sulphur Oxides	0.0132	0.008	0.84	4.83E-03	3.33E-05	1.21E-03	8.33E-06

Pollutant	MOBILE6 Idling Truck Exhaust Emissions	Mon - Fri (8-10 & 14-16) * Proposed Durham/York EFW Facility	Mon - Fri (10-14) ** Proposed Durham/York EFW Facility
	(g/hr)	g/s	g/s
Particulate Matter PM10	1.150	1.85E-03	2.32E-04
Particulate Matter PM2.5	1.058	1.70E-03	2.13E-04

TRUCK TYPE	DAYS/WEEK	TRUCKS/DAY	TRUCK WIDTH	TRUCK LENGTH	TRUCK HEIGHT
Transfer Trailor	5	23	2.5	21	4
Collection Truck	5	64	2.5	8	3
WEIGHTED AVERAGE			2.5	11	3.3
				release height	1.6

Table B3: Ash Removal Truck Emission Rate Estimates

Pollutant	MOBILE6 Travelling Truck Exhaust Emissions	Truck Exhaust Emissions	Average Distance Travelled at Facility	Mon - Sun Frequency of Trucks at Facility	Mon - Sun Proposed Durham/York EFW Facility
	(g/mi)	(g/km)	(km/truck)	(trucks/second)	g/s
Particulate Matter PM10	0.2117	0.132	0.88	3.47E-04	4.02E-05
Particulate Matter PM2.5	0.1713	0.106	0.88	3.47E-04	3.25E-05
Carbon Monoxide	1.870	1.16	0.88	3.47E-04	3.55E-04
Benzene	0.0125	0.008	0.88	3.47E-04	2.37E-06
Nitrogen Oxides (as NO2)	7.394	4.59	0.88	3.47E-04	1.40E-03
Sulphur Oxides	0.0132	0.008	0.88	3.47E-04	2.51E-06

TRUCK TYPE	DAYS/WEEK	TRUCKS/DAY	TRUCK WIDTH	TRUCK LENGTH	TRUCK HEIGHT
Ash Truck	7	10	2.5	17	3.5
				release height	1.8

Assumptions:

* During the busy traffic times of 8-10 & 14-16, it is estimated that 5.8 waste delivery trucks are idling on-site

** During the off-busy traffic times of 10-14, it is estimated that 0.725 waste delivery trucks are idling on-site

Appendix C

Dispersion Modelling Inputs and Results

Table C1: AERMOD-PRIME Dispersion Modelling Input Information

Property Line Coordinates

Corner	X Location (m)	Y Location (m)	
1	-214	115	40 m buffer
2	-214	-125	
3	43	-125	
4	43	115	

Building Coordinates

Corner	X Location (m)	Y Location (m)	Elevation (m above grade)
Tier 1			
1	-174	35	15
2	-159	35	
3	-159	55	
4	-134	55	
5	-134	35	
6	-101	35	
7	-101	53	
8	-69	53	
9	-69	35	
10	-62	35	
11	-62	75	
12	-52	75	
13	-52	35	
14	-41	35	
15	-41	75	
16	-31	75	
17	-31	35	
18	-20	35	
19	-20	75	
20	-10	75	
21	-10	35	
22	-4	35	
23	-4	14	
24	3	14	
25	3	-14	
26	-4	-14	
27	-4	-60	
28	-37	-60	
29	-37	-85	
30	-110	-85	
31	-110	-75	
32	-134	-75	
33	-134	-35	
34	-174	-35	
Tier 2			
35	-134	35	25
36	-4	35	
37	-4	14	
38	3	14	
39	3	-14	
40	-4	-14	
41	-4	-35	
42	-134	-35	
Tier 3			
43	-110	35	33
44	-4	35	
45	-4	14	
46	3	14	
47	3	-14	
48	-4	-14	
49	-4	-35	
50	-110	-35	
Tier 4			
51	-110	35	40
52	-62	35	
53	-62	-35	
54	-110	-35	

Point Source

Coordinate (m)	x	y	Elevation (above roof)	Elevation (above grade)	Exit Gas Temperature (deg. C)	Exit Velocity (m/s)
Exhaust Stack	0	0	32	65	232	18

Volume Sources

Coordinate	Location (x,y)	Release height (m)	Length of side (m)	Lateral dimension (m)	Vertical dimension of source (m)	Vertical dim. (m)
Waste Delivery	(-74,-5)	1.6	207	48.2	1.6	0.759
Ash Removal	(-85,-5)	1.8	221	51.5	1.8	0.814

Receptor Grid

X Location (m)	Y Location (m)	Interval size	Elevation (above grade)
-200 to 200	-200 to 200	20 m	0 m
-500 to 500	-500 to 500	50 m	0 m
-1000 to 1000	-1000 to 1000	100 m	0 m
-2000 to 2000	-2000 to 2000	200 m	0 m
-10000 to 10000	-10000 to 10000	500 m	0 m

Table C2: Maximum Ground Level Concentrations

Source Identifier	Source Description	Source Data							
		Stack Volumetric Flow Rate (m^3/s)	Equivalent Stack Inner Diameter (m)	Emission Rate (g/s)	Averaging Period (hours)	PM2.5 Particle Phase Concentration (ug/m3)	Location (x,y)	Vapour Phase Concentration (ug/m3)	Location (x,y)
Operating Scenario 1: Three (3) process units running									
STACK	Common Stack	90	2.52	1	1	5.91869	(200,700)	5.91779	(200,700)
				1	24	2.62544	(100,-300)	2.61798	(100,-300)
				1	Annual	0.27075	(150,-350)	0.27045	(150,-350)
Operating Scenario 2: Two (2) process units running									
STACK	Common Stack	60	2.06	1	1	7.02234	(300,700)	7.02100	(300,700)
				1	24	3.01112	(100,-300)	3.00139	(100,-300)
				1	Annual	0.34502	(150,-350)	0.34457	(150,-350)
Operating Scenario 3: One (1) process unit running									
STACK	Common Stack	30	1.46	1	1	9.04014	(200,700)	9.03815	(200,700)
				1	24	3.64458	(100,-300)	3.63046	(100,-300)
				1	Annual	0.50645	(100,-300)	0.50587	(100,-300)

Note: Emission concentrations include incinerator stack emissions only (no traffic emissions) with emission rate of 1 g/s

Table C3: Maximum Ground Level Dry Depositions

Source Identifier	Source Description	Stack Volumetric Flow Rate (m^3/s)	Stack Inner Diameter (m)	Emission Rate (g/s)	Totaling Period (hours)	PM2.5 Particle Phase Deposition (g/m2)	Location (x,y)	Metal* Vapour Phase Deposition (g/m2)	Location (x,y)	Antimony Vapour Phase Deposition (g/m2)	Location (x,y)	Mercury Vapour Phase Deposition (g/m2)	Location (x,y)	CMA & CPA Vapour Phase Deposition (g/m2)	Location (x,y)	PAH Vapour Phase Deposition (g/m2)	Location (x,y)	VOC Vapour Phase Deposition (g/m2)	Location (x,y)	HCl & HF Vapour Phase Deposition (g/m2)	Location (x,y)
Operating Scenario 1: Three (3) process units running																					
STACK	Common Stack	90	2.52	1	1	0.00051606	(120,-180)	0.0012443	(-100,-140)	0.0011188	(60,-200)	0.0000032170	(100,-250)	0.00094716	(60,-120)	0.000985687	(-100,-140)	0.0013091	(60,-120)	0.000010434	(100,-250)
				1	24	0.0019071	(120,-180)	0.016847	(100,-250)	0.0099601	(150,-250)	0.000039531	(100,-250)	0.013123	(100,-250)	0.013477	(100,-250)	0.012683	(100,-250)	0.00015153	(100,-250)
				1	Annual	0.0041864	(150,-250)	0.23056	(150,-350)	0.10224	(150,-350)	0.00088193	(150,-350)	0.12095	(150,-350)	0.156031	(150,-350)	0.13111	(150,-350)	0.0033300	(100,-300)
Operating Scenario 2: Two (2) process units running																					
STACK	Common Stack	60	2.06	1	1	0.00053156	(120,-180)	0.0013948	(-100,-140)	0.0011699	(100,-250)	0.0000033077	(100,-250)	0.00099318	(100,-250)	0.00110487	(-100,-140)	0.0013694	(100,-250)	0.000010717	(100,-250)
				1	24	0.0019676	(120,-180)	0.018785	(100,-250)	0.010612	(150,-250)	0.000044112	(100,-250)	0.014640	(100,-250)	0.015029	(100,-250)	0.014172	(100,-250)	0.00016246	(100,-250)
				1	Annual	0.0045601	(150,-250)	0.28022	(150,-350)	0.12670	(100,-300)	0.00108370	(150,-350)	0.14735	(100,-300)	0.189891	(150,-350)	0.16197	(100,-300)	0.0039985	(100,-300)
Operating Scenario 3: One (1) process unit running																					
STACK	Common Stack	30	1.46	1	1	0.00054604	(120,-180)	0.0016218	(-100,-140)	0.0012339	(100,-250)	0.0000037316	(100,-140)	0.00110390	(-120,-140)	0.00128477	(-100,-140)	0.0014443	(100,-250)	0.000011667	(-100,-140)
				1	24	0.0020346	(120,-180)	0.021832	(100,-250)	0.013015	(100,-300)	0.000051321	(100,-250)	0.017025	(100,-250)	0.0174684	(100,-250)	0.016514	(100,-250)	0.00017902	(100,-250)
				1	Annual	0.00011366	(100,-200)	0.38492	(100,-300)	0.17891	(100,-300)	0.00150530	(100,-300)	0.20604	(100,-300)	0.261919	(100,-300)	0.22788	(100,-300)	0.0052991	(100,-300)

Source Data: columns from Stack Volumetric Flow Rate through the last Location column.

CMA = Chlorinated Monocyclic Aromatic
CPA = Chlorinated Polycyclic Aromatic
PAH = Polycyclic Aromatic Hydrocarbon
VOC = Volatile Organic Compound
HCl & HF = Hydrogen Chloride and Hydrogen Fluoride
Note: Emission depositions include incinerator stack emissions only (no traffic emissions) with emission rate of 1 g/s
* Except Antimony and Mercury

Table C4: Maximum Ground Level Wet Depositions

Source Identifier	Source Description	Stack Volumetric Flow Rate (m^3/s)	Stack Inner Diameter (m)	Emission Rate (g/s)	Totaling Period (hours)	PM2.5 Particle Phase Deposition (g/m2)	Location (x,y)	Metal* Vapour Phase Deposition (g/m2)	Location (x,y)	Antimony Vapour Phase Deposition (g/m2)	Location (x,y)	Mercury Vapour Phase Deposition (g/m2)	Location (x,y)	CMA & CPA Vapour Phase Deposition (g/m2)	Location (x,y)	PAH Vapour Phase Deposition (g/m2)	Location (x,y)	VOC Vapour Phase Deposition (g/m2)	Location (x,y)	HCl & HF Vapour Phase Deposition (g/m2)	Location (x,y)
Operating Scenario 1: Three (3) process units running																					
STACK	Common Stack	90	2.52	1	1	0.000019819	(60,-60)	0.0075309	(60,-60)	0.00000042132	(60,-60)	0.00000000011	(60,-60)	0.0000087369	(60,-60)	0.000621997	(60,-60)	0.0000010450	(60,-60)	0.0000029123	(60,-60)
				1	24	0.000028649	(-20,120)	0.0075973	(-20,120)	0.00000042135	(60,-60)	0.00000000011	(60,-60)	0.0000087375	(60,-60)	0.00062204	(60,-60)	0.0000010451	(60,-60)	0.0000036353	(-20,120)
				1	Annual	0.00011336	(-40,120)	0.016884	(-40,120)	0.00000066701	(-40,120)	0.00000000017	(40,-120)	0.000013832	(40,-120)	0.000986322	(-40,120)	0.0000016545	(40,-120)	0.000013307	(40,-120)
Operating Scenario 2: Two (2) process units running																					
STACK	Common Stack	60	2.06	1	1	0.000021632	(60,-60)	0.0082198	(60,-60)	0.00000045986	(60,-60)	0.00000000012	(60,-60)	0.0000095361	(60,-60)	0.000678894	(60,-60)	0.0000011406	(60,-60)	0.0000031787	(60,-60)
				1	24	0.000030034	(-20,120)	0.0082206	(60,-60)	0.00000045989	(60,-60)	0.00000000012	(60,-60)	0.0000095368	(60,-60)	0.000678943	(60,-60)	0.0000011407	(60,-60)	0.0000038133	(-20,120)
				1	Annual	0.00011509	(-40,120)	0.016681	(-40,120)	0.00000065908	(-40,120)	0.00000000017	(40,-120)	0.000013668	(40,-120)	0.000974579	(-40,120)	0.0000016348	(40,-120)	0.000013523	(40,-120)
Operating Scenario 3: One (1) process unit running																					
STACK	Common Stack	30	1.46	1	1	0.000025182	(60,-60)	0.0095688	(60,-60)	0.00000053533	(60,-60)	0.00000000014	(60,-60)	0.0000111010	(60,-60)	0.00079031	(60,-60)	0.0000013278	(60,-60)	0.0000037004	(60,-60)
				1	24	0.000031573	(-40,120)	0.0095697	(60,-60)	0.00000053536	(60,-60)	0.00000000014	(60,-60)	0.0000111020	(60,-60)	0.000790366	(60,-60)	0.0000013279	(60,-60)	0.0000039889	(40,-120)
				1	Annual	0.00011366	(-20,120)	0.016261	(-20,120)	0.00000072165	(60,-60)	0.00000000018	(60,-60)	0.000014965	(60,-60)	0.0010658	(60,-60)	0.0000017900	(60,-60)	0.000013423	(-20,120)

CMA = Chlorinated Monocyclic Aromatic
CPA = Chlorinated Polycyclic Aromatic
PAH = Polycyclic Aromatic Hydrocarbon
VOC = Volatile Organic Compound
HCl & HF = Hydrogen Chloride and Hydrogen Fluoride
Note: Emission depositions include incinerator stack emissions only (no traffic emissions) with emission rate of 1 g/s
* Except Antimony and Mercury

Table C5: Maximum Ground Level Concentrations During Potential TIBL Hours (occuring from May to September)

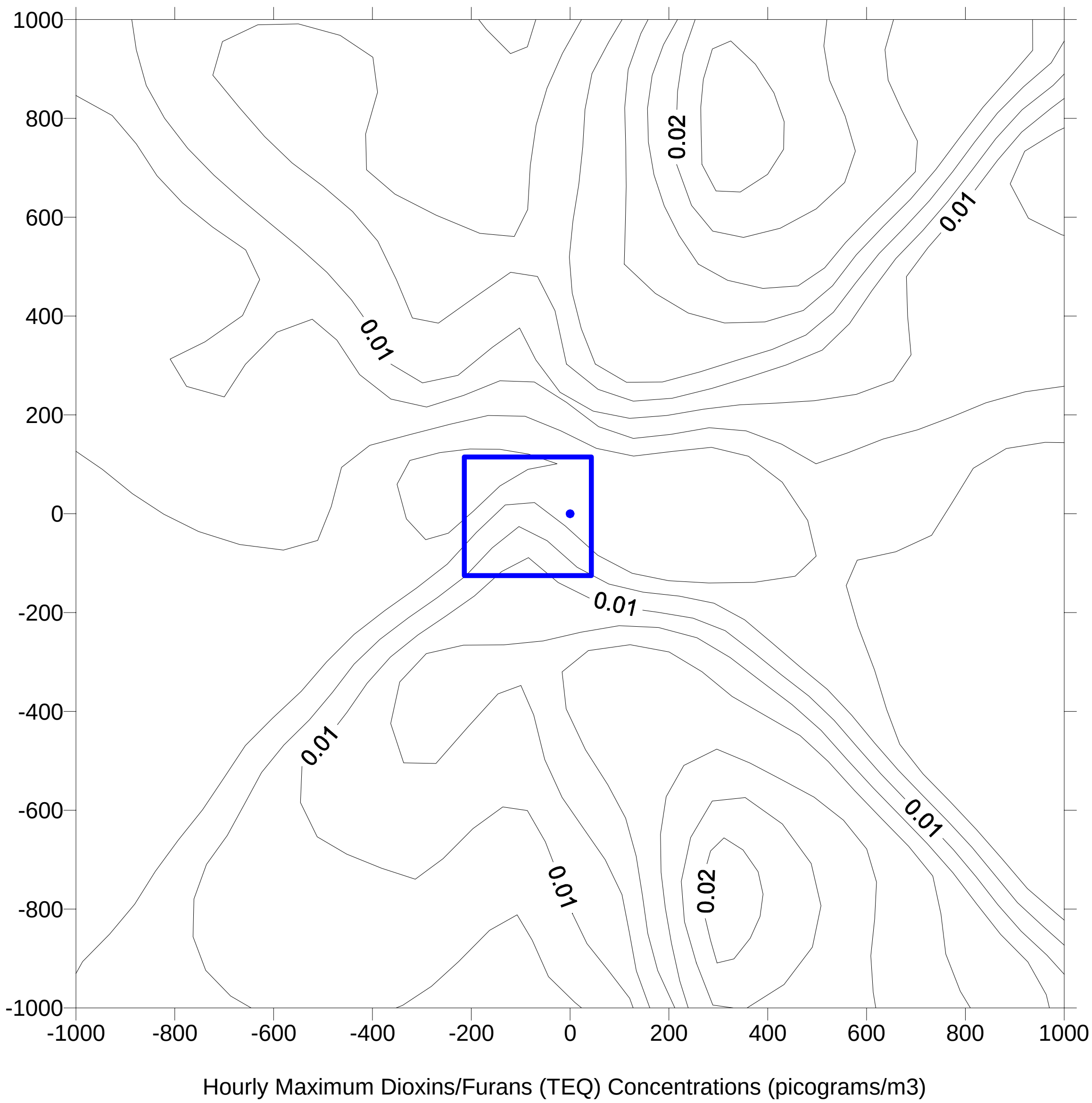
Source Identifier	Source Description	Source Data					
		Stack Volumetric Flow Rate (m^3/s)	Equivalent Stack Inner Diameter (m)	Emission Rate (g/s)	Averaging Period (hours)	PM2.5 Particle Phase Concentration (ug/m3)	Vapour Phase Concentration (ug/m3)
Operating Scenario 1: Three (3) process units running							
STACK	Common Stack	90	2.52	1	1	5.53876	5.53787
				1	24		
				1	Annual		
Operating Scenario 2: Two (2) process units running							
STACK	Common Stack	60	2.06	1	1	6.52641	6.52493
				1	24		
				1	Annual		
Operating Scenario 3: One (1) process unit running							
STACK	Common Stack	30	1.46	1	1	9.04014	9.03815
				1	24		
				1	Annual		

Note: Emission concentrations include incinerator stack emissions only (no traffic emissions) with emission rate of 1 g/s

Appendix D

Concentration Isopleths

Figure D1: Dioxins/Furans (TEQ) Maximum Hourly Ground Level Concentrations

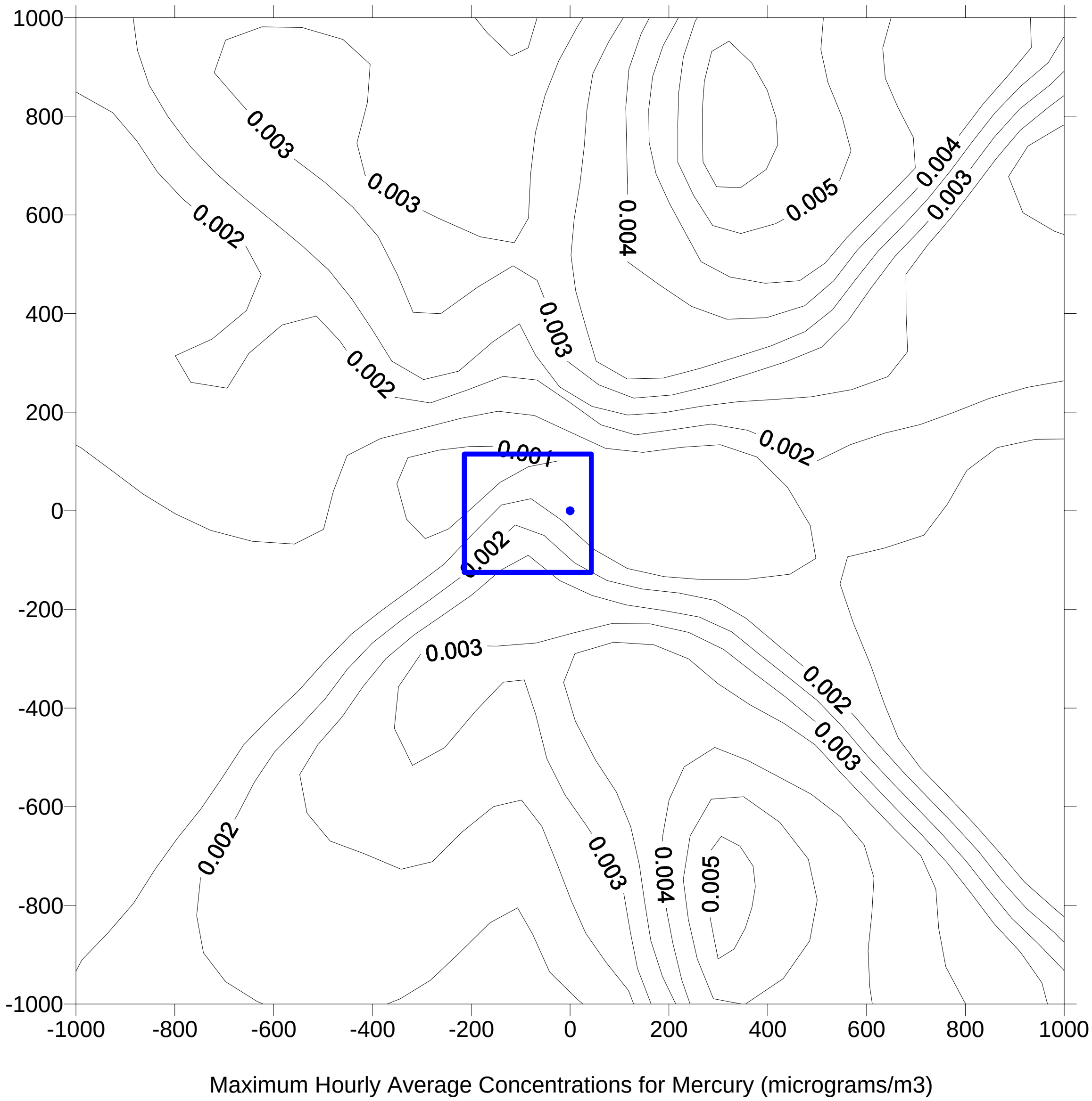


Maximum Hourly Average Concentration for Dioxins/Furans = 0.0234 pg TEQ/m^3 (0.2% of Point of Impingement Guideline) based on emissions at Guideline A-7 limit

Hourly* Point of Impingement (POI) Guideline for dioxins/furans = 12.5 pg TEQ/m^3
* Based on POI guideline for dioxins/furans = 15 pg TEQ/m^3 as a half-hour average converted with average period conversion factor of 1.2

	Less than 10% of guideline
(yellow)	10% to 25% of guideline
(orange)	25% to 50% of guideline
(red)	50% to 100% of guideline

Figure D2: Mercury Maximum Hourly Ground Level Concentrations

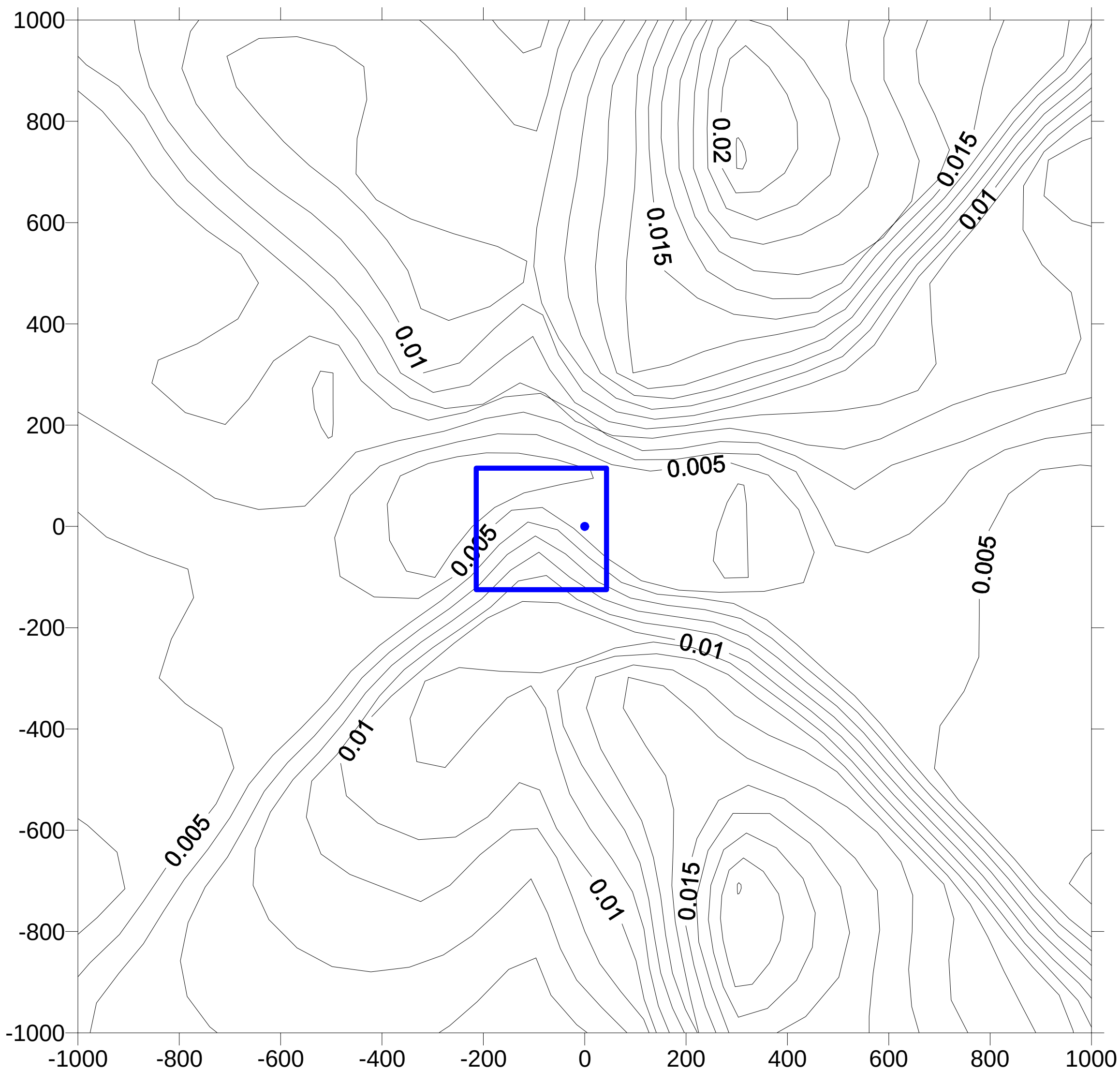


Maximum Hourly Average Concentration for Mercury = 0.00583 μg/m^3 (0.1% of O. Reg. 419/05 Schedule 3 standard) based on emissions at Guideline A-7 limit

Hourly* O. Reg. 419/05 Schedule 3 standard for Mercury = 5 μg/m^3
* Based on O. Reg. 419/05 Schedule 3 standard for mercury = 2 μg/m^3 as a 24-hour average converted with average period conversion factor 0.4

	Less than 10% of standard
	10% to 25% of standard
	25% to 50% of standard
	50% to 100% of standard

Figure D3: PCBs Maximum Hourly Ground Level Concentrations



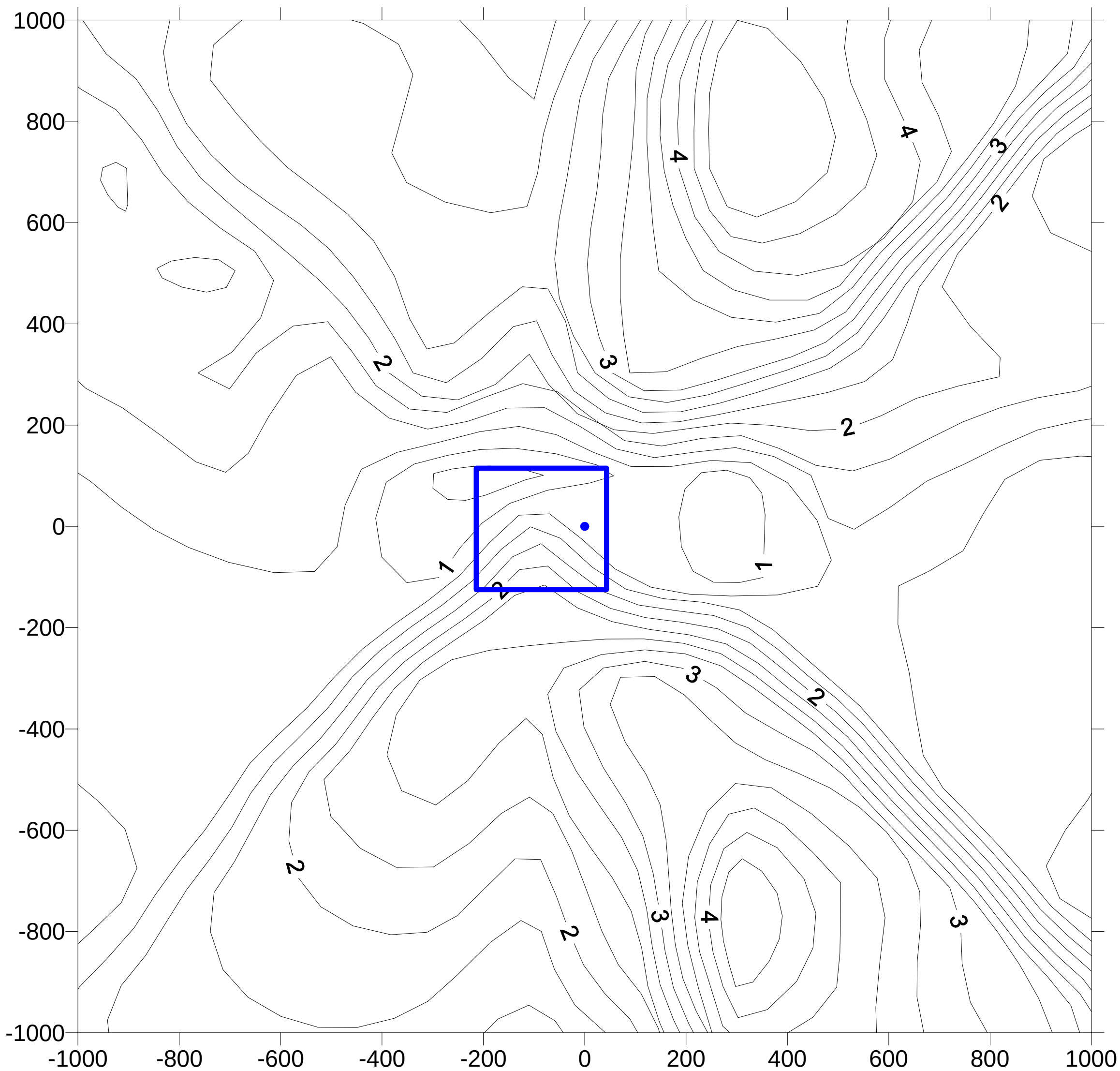
Maximum Hourly Average Concentrations for PCBs (10^-3 micrograms/m3)

Maximum Hourly Average Concentration for PCBs = 0.0000211 μg/m^3 (0.001% of Point of Impingement Guideline)

Hourly Point of Impingement (POI) Guideline for PCBs = 0.375 μg/m^3
* Based on point of impingement guideline for PCBs = 0.45 μg/m^3 as a half-hour average converted with average period conversion factor 1.2

	Less than 10% of standard
	10% to 25% of standard
	25% to 50% of standard
	50% to 100% of standard

Figure D4: PM2.5 Maximum Hourly Ground Level Concentrations



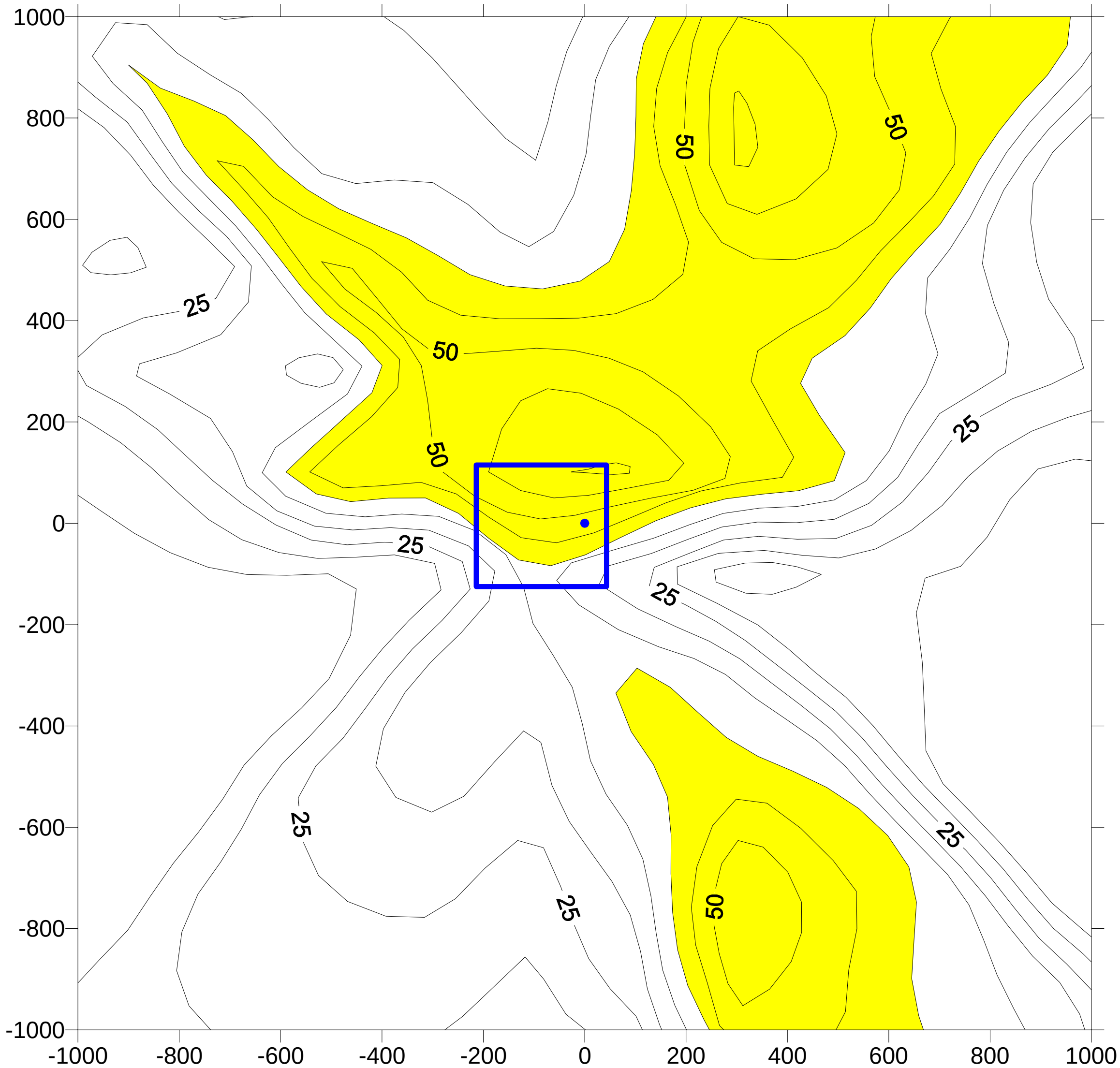
Maximum Hourly Average Concentrations for PM2.5 (micrograms/m3)

Maximum Hourly Average Concentration for PM2.5 = 4.97 μg/m^3 (7% of CWS standard) based on emissions at Guideline A-7 limit

Hourly Canada-wide Standard (CWS) for PM2.5 = 75 μg/m^3
* Based on CWS ambient standard for PM2.5 = 30 μg/m^3 as a 24-hour average converted with average period conversion factor of 0.4

	Less than 10% of standard
	10% to 25% of standard
	25% to 50% of standard
	50% to 100% of standard

Figure D5: NO_x Maximum Hourly Ground Level Concentrations



Maximum Hourly Average Concentrations for NOx (micrograms/m3)

Maximum Hourly Average Concentration for NO_x = 60.8 µg/m^3 (15% of O. Reg. 419/05 Schedule 3 standard) based on emissions at Guideline A-7 limit

Hourly O. Reg. 419/05 Schedule 3 standard for NO_x = 400 µg/m^3

(white)	Less than 10% of standard
(yellow)	10% to 25% of standard
(orange)	25% to 50% of standard
(red)	50% to 100% of standard