REPORT

Air Quality Assessment - Technical Study Report

DURHAM YORK
RESIDUAL WASTE STUDY

REPORT NO. 1009497

EXECUTIVE SUMMARY

This Report was prepared to evaluate the potential air quality related effects associated with the development of the Proposed Thermal Treatment Facility (the Facility) at the Proposed Site (the Site). This analysis includes the identification of mitigation measures and the resulting net effects associated with the Facility.

The Facility may process from 140,000 tonnes to 400,000 tonnes per year (tpy) of waste per year. For the purposes of this technical study report, the potential environmental effects of air contaminant emissions from the Facility have been assessed for the initial planned processing capacity 140,000 tpy and a maximum 400,000 tpy design capacity. For the initial 140,000 tpy scenario, there would be two completely independent waste processing trains. Each train would consist of a feed chute, stoker, integrated furnace/boiler, acid gas scrubber, a fabric filter bag house and associated ash and residue collection systems. Steam produced in each boiler would drive a turbine-generator to produce electricity for delivery to the grid, for in-plant use and potentially to provide district heating to the neighbouring Courtice Water Pollution Control Plant and Clarington Energy Park. The expansion to a 400,000 tpy capacity would be achieved by expanding the baseline 140,000 tpy Facility in two phases. The Phase I expansion would increase the total Facility waste processing capacity to 250,000 tpy, while the Phase II expansion would increase the Facility total capacity to 400,000 tpy. The 400,000 tpy Facility would include the two completely independent waste processing trains installed for the 140,000 tpy Facility (each 70,000 tpy), a single independent 110,000 tpy train (installed in the Phase I expansion) and a single independent 150,000 tpy train (installed in the Phase II expansion). The emissions from the Phase I expansion would exhaust from a second flue installed in the stack built for the 140,000 tpy Facility, while the emissions from the Phase II expansion would be exhausted from a new independent stack, identical in height to that of the 140,000 tpy facility stack.

The assessment of the potential environmental effects of each Facility on air quality was performed by conducting dispersion modelling to predict the downwind concentrations of air contaminants and comparing these predictions to regulatory standards, objectives and guidelines. The assessment consisted of the following elements:

- compilation of emissions inventories of Facility point and mobile sources;
- assessment of baseline ambient air quality conditions for Chemicals of Potential Concern (CoPC) from the existing published sources of air quality data and site-specific measurements;
- dispersion and deposition modelling of the Facility to provide input to the Human Health and Ecological Risk Assessment, and to support the assessment of potential environment effects, including cumulative effects, for the Environmental Assessment (EA); and,
- comparison of dispersion model predictions to ambient air quality criteria as well as evaluation of the incremental change in air quality associated with the Facility.

A summary of the results of the air quality assessment follows.

Ambient Air Quality Criteria, Objectives, and Standards

- The predicted downwind concentrations of air contaminants associated with emissions from both the 140,000 tpy and 400,000 tpy Facility scenarios meet the applicable ambient air quality criteria for all contaminants during normal operation (Facility operating continuously at maximum capacity).
- During process upsets (including start-up and shut-downs), the predicted downwind concentrations of air contaminant emissions from both the 140,000 tpy and 400,000 tpy Facility scenarios meet applicable air quality criteria for all contaminants.

Facility Emissions Limits

- The Facility emissions (for both the 140,000 tpy and 400,000 tpy scenarios) will meet or will be below the air contaminant emission limits placed on municipal waste incinerators by the current version of Ministry of the Environment (MOE) Guideline A-7 (dated 2004). This will be verified through continuous monitoring of stack emissions and annual stack tests. Monitoring data will be submitted to the MOE as required in Guideline A-7 and the conditions of the CofA issued for the facility by the MOE, should the project be approved.

Incremental Change in Ground Level Ozone Precursor Emissions

- Based on the magnitudes of the maximum nitrogen oxide (NO_X) and VOC emissions from the Facility relative to the air quality study area (AQSA), the change in ozone formation due to the Facility is expected to be nominal.

Incremental Change in Greenhouse Gas Emissions

- The incremental contribution of the Facility to total Ontario annual greenhouse gas (GHG) emissions would be 0.06% for the 140,000 tpy scenario, and 0.18% for the 400,000 tpy scenario. The incremental contribution of the Facility to total Canadian annual GHG emissions would be 0.018% for the 140,000 tpy scenario, and 0.052% for the 400,000 tpy scenario (based on projected 2010 GHG emission levels). Therefore, the quantities of Facility-related greenhouse gases (GHGs) are expected to be minimal relative to the Ontario and Canadian totals.

Odour Detectability

- Odour emissions have historically been associated with waste processing facilities. The Facility design implicitly acknowledges this issue through the incorporation of odour mitigation measures for normal operation. Based on the proposed mitigation measures for odour control (e.g., enclosed loading, negative air pressure inside Facility, fully enclosed trucks), there is not expected to be substantive adverse environmental effects at off-property locations due to the onsite operations.
- An odour mitigation plan will be developed after detailed design of the facility has been completed to address odour duing normal operations, start-ups and shut-downs as well non-routine occurences (process upsets). The odour mitigation plan will be submitted to the MOE during the environmental permitting process for the Facility.

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GLOSSARY AND ABBREVIATIONS

** An asterisk (*) beside a defined term indicates that the term is defined in the Environmental Assessment Act.*

Air Contaminant Emissions:	For stationary sources, the release or discharge of a pollutant from a facility or operation into the ambient air either by means of a stack, vent or as a fugitive dust, mist or vapour.
Alternative Fuel:	Fuel that is obtained via various mechanical and biological processes that recover materials such as plastics, fibre, wood and dried organic matter from the residual waste stream for input to a thermal process.
Anthropogenic:	Derived from human activities, as opposed to those occurring in natural environments without human influence
Application:	An application for approval to proceed with an undertaking under subsection 5(1) of the Environmental Assessment Act.
Approved Site or Facility:	A landfill site or waste management facility with a current valid Certificate of Approval.
Ash:	The non-combustible fraction that remains after combustion of waste.
Baghouse Residue:	Leftover material that is captured by an air pollution control / filtering device that removes dust and particles from the exhaust gas stream.
Bottom Ash:	The non-airborne ash resulting from burning waste in an incinerator. The material, which falls to the bottom of the combustion grate and is removed mechanically in a thermal treatment facility.
Calorific Value:	The amount of heat produced by a specific material type when combusted under specific conditions. Calorific Value is usually expressed in Calories or Joules per kilogram (i.e. Cal/Kg or J/Kg).

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Canadian Council of Ministers of the Environment (CCME):	A council made up of environmental ministers from provincial and federal levels of government that proposes nationally consistent environmental standards and objectives to achieve high levels of environmental quality for waste management, air pollution, and toxic chemicals across Canada.
Carbon Monoxide (CO):	A colourless, odourless gas produced by incomplete fossil fuel combustion.
Catalyst:	A substance that changes the speed or yield of a chemical reaction without being consumed or chemically changed by the chemical reaction.
Certificate of Approval:	A license or permit issued by the Ministry of the Environment for the operation of a waste management site/facility.
Cogeneration:	The generation of useful thermal and electric energy from the same fuel source.
Combustion Chamber:	The compartment where waste is burned in an incinerator.
Combustion Product:	Substance produced during the burning or oxidation of a material.
Combustion:	1. Burning, or rapid oxidation, accompanied by the release of energy in the form of heat and light. 2. Refers to controlled burning of waste, in which heat chemically alters organic compounds, converting into stable compounds such as carbon dioxide and water.
Commercial Waste:	All solid waste emanating from business establishments such as stores, markets, office buildings, restaurants, shopping centers, and theatres.
Compactor:	Equipment used to crush and compact waste, to reduce volume.
Contingency Plan:	A plan developed to be implemented should some aspect of the project need to be altered or some aspect of the operation fail (i.e. “Plan B”).

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Cyclone:	A cone-shaped air-cleaning device that collects and separates particles of different densities, from the air/gas stream, by using rapid rotational effects and gravity.
Director*:	Director of the Environmental Assessment and Approvals Branch, Ministry of the Environment.
Disposal Facilities:	Facilities for disposing of solid waste, including landfills and incinerators, intended for permanent containment or destruction of waste materials.
Disposal:	Final placement or destruction of wastes. Disposal is typically accomplished through use of approved sanitary landfills or incineration with or without energy recovery.
Durham:	The Regional Municipality of Durham or its geographic area, as the context requires.
Durham/York Residual Waste Study:	The Durham/York Residual Waste Study is a joint initiative between the Region of Durham and York Region to work together to find a way to manage solid waste remaining after at-source diversion.
Ecological/Environmental Risk Assessment (ERA):	A scientific method used to examine the nature and magnitude of risks from the exposure of plants and animals to contaminants in the environment.
Emission Factor:	A representative value that relates the quantity of pollutant release to the atmosphere with an activity or input associated with the release of that pollutant.
Emissions Trading:	The creation of surplus emission reductions at certain stacks, vents or similar emissions sources and the use of this surplus to meet or redefine pollution requirements applicable to other emissions sources. This allows one source to increase emissions when another source reduces them, maintaining an overall constant emission level. Facilities that reduce emissions substantially may "bank" their "credits" or sell them to other facilities or industries.

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Emissions:	Technically, all solid, liquid, or gaseous discharges from a processing facility, but normally referring to Air Emissions (with solids referred to as residue and liquids as effluent).
Energy Recovery:	The recovery of energy in the form of heat and/or power from the thermal treatment of waste. Generally applied to incineration, pyrolysis, gasification but can also include the combustion of landfill gas and gas produced from anaerobic digestion of organic materials.
Energy-from-Waste (EFW):	The recovery of energy in the form of heat and/or power from the thermal treatment of waste. Generally applied to incineration, pyrolysis, gasification but can also include the combustion of landfill gas and gas produced from anaerobic digestion of organic materials.
Environment*:	The environment is broadly defined under the Environmental Assessment Act as follows: (a) Air, land or water; (b) Plant and animal life, including human life; (c) The social, economic and cultural conditions that influence the life of humans or a community; (d) Any building, structure, machine or other device or thing made by humans; (e) Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities; or, (f) Any part or combination of the foregoing and the interrelationships between any two or more of them.

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Environmental Assessment:	Environmental assessment is a study, which assesses the potential environmental effects (positive or negative) of a proposal. Key components of an environmental assessment include consultation with government agencies and the public; consideration and evaluation of alternatives; and, the management of potential environmental effects. Conducting an environmental assessment promotes good environmental planning before decisions are made about proceeding with a proposal.
Environmental Assessment Act:	The *Environmental Assessment Act* (and amendments and regulations thereto) is a provincial statute that sets out a planning and decision-making process to evaluate the potential environmental effects of a proposed undertaking. Proponents wishing to proceed with an undertaking must document their planning and decision-making process and submit the results from their environmental assessment to the Minister for approval.
Environmental Effect:	The effect that a proposed undertaking or its alternatives has or could potentially have on the environment; either positive, neutral, or negative; direct or indirect; short- or long-term.
Environmental Protection Act (EPA):	An Ontario Act to provide for the protection and conservation of the natural environment.
Ferrous Metals:	Metals derived from iron or steel; products made from ferrous metals include appliances, furniture, containers, and packaging like steel drums and barrels. Recycled products include processing tin/steel cans, strapping, and metals from appliances into new products.
Flue Gas:	The exhaust air coming out of a stack or a chimney after combustion in the burner. It can include carbon oxides, water vapour, nitrogen oxides, sulphur oxides, particles and other chemical pollutants.
Fluidized Bed Incinerator:	An incinerator that uses a suspended bed of hot sand or other granular material to transfer heat directly to waste. Used mainly for destroying municipal sludge or other materials of uniform particle size.

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Fly Ash:	The airborne ash resulting from burning waste in an incinerator removed by air pollution control systems.
Fugitive Emissions:	Emissions not caught by a capture system.
Gigajoule (GJ):	A measurement of energy equal to 1 billion Joules. A typical single family household (approx. 2000 sq. ft.) uses approximately 60 to 90 GJ annually for heating (NRCan).
Grapple Feeding:	A process in which material is fed by a grapple into the processing system. Usually involves grasping a planned amount of the material from a large pile.
Grapple:	A mechanical device used to grasp materials (e.g., waste). A bucket with several hooks to grasp, hold and release material.
Greenhouse Effect:	The warming of the Earth's atmosphere attributed to a build-up of carbon dioxide or other gases; some scientists think that this build-up allows the sun's rays to heat the Earth, while making the infra-red radiation atmosphere opaque to infra-red radiation, thereby preventing a counterbalancing loss of heat.
GTA:	Greater Toronto Area
Hazardous Waste:	Materials that can pose a substantial or potential hazard to human health or to the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special MOE or EPA lists.
Impact Management Measures:	Measures which can lessen potential negative environmental effects or enhance positive environmental effects. These measures could include mitigation, compensation, or community enhancement.
Impact Studies:	Studies that assess potential for negative consequences (if any) of a proposed undertaking. Air, Visual, Natural Environmental, Traffic, Hydrogeological, Noise, Health Risk, Land Use and Hydrological Impact Studies are required under the Environmental Protection Act.

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Imports:	Municipal solid waste and recyclables that have been transported to a jurisdiction or locality for processing or final disposition (but that did not originate in that jurisdiction or locality).
Incineration:	A thermal treatment technology involving destruction of waste by controlled burning at high temperatures with the overall aim of reducing the volume of waste.
Incinerator:	A furnace for burning waste under controlled conditions.
Individual Environmental Assessment:	An Individual Environmental Assessment requires the following steps to fully address the requirements of the EAA: ▪ Preparation of the Proposed EA Terms of Reference; ▪ Submission of the EA Terms of Reference to the Minister of the Environment for Approval; ▪ Completion of the EA Study in accordance with approved EA Terms of Reference, and; ▪ Submission of the EA Study to the Minister of the Environment for Approval.
Landfills:	Sanitary landfills are outdoor disposal sites for non-hazardous solid wastes. Waste is spread in layers, compacted to the smallest practical volume, and covered by material applied at the end of each operating day.
Limestone Scrubbing:	Use of a limestone and water solution to remove gaseous sulphur from flue gas before it reaches the atmosphere.
Magnetic Separation:	Use of magnets to separate ferrous materials from a mixed municipal waste stream.
Mass Burn Incineration:	The incineration of waste with minimal initial pre-treatment or separation of wastes.
Mechanical Separation:	The physical separation of wastes by material type, size or density using trommels, cyclones, various screens and other equipment.

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Mechanical Treatment:	Involves the physical treatment of waste materials to recover recyclable materials and to prepare waste for further treatment or disposal.
Ministry of the Environment (MOE) Ontario:	The MOE monitors pollution and restoration trends in Ontario and uses that information to develop environmental laws, regulations, standards, policies, programs, and guidelines. The MOE works to provide cleaner air, land, and water for Ontarians.
Mitigation:	Measures taken to reduce adverse impacts on the environment.
Mixed Municipal Waste:	Solid waste that has not been sorted into specific categories (such as plastic, glass, yard trimmings)
Modular Facility:	A facility of several parallel units designed to allow for an expansion by adding additional units in parallel.
Moisture Content:	The percentage of a material that is water.
Monitoring:	Periodic or continuous surveillance or testing to determine the characteristics of a substance or the level of compliance with statutory requirements and/or pollutant levels in various media or in humans, plants, and animals.
Municipal Solid Waste (MSW):	Common garbage or trash generated by industries, businesses, institutions, and homes.
National Pollutant Release Inventory (NPRI):	The only legislated, nation-wide, publicly accessible inventory of information on annual releases to air, water, land, and disposal or recycling from all sectors in Canada.
Non-combustible waste:	Waste, which cannot be combusted (burned) even if energy is added. (e.g., stone, glass and metals).
Non-Ferrous Metals:	Nonmagnetic metals such as aluminum, lead, and copper. Products made all or in part from such metals include containers, packaging, appliances, furniture, electronic equipment and aluminum foil.

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Ontario:	The Province of Ontario, or its geographic area, as the context requires.
Ontario Guideline A-7:	Air emission guidelines developed by the Ministry of the Environment (MOE) to govern combustion and air pollution control requirements for new municipal waste incinerators and gasifiers in the Province of Ontario.
Ontario Regulation 347 (O. Reg. 347):	A regulation under the Environmental Protection Act that specifies standards and approval requirements for waste management sites and systems in Ontario.
Open Burning:	An uncontrolled fire.
Operation and Maintenance Costs:	Usually expressed annually, operation and maintenance costs are a sum of money to operate and maintain the facility in operating order (i.e., labour, utilities, equipment repairs, materials, supplies, disposal fees)
Organic Matter:	Carbonaceous waste contained in plant or animal matter and originating from domestic or industrial sources.
Organic:	Referring to or derived from living organisms. In chemistry, any compound containing carbon except carbon dioxide.
Particulate Matter:	A particle in solid or liquid phase that is suspended in air.
Pelletizing:	The compaction of waste into small pellets to be thermally processed in an incinerator or gasifier. Pellets are easier to manage and have a higher calorific value than regular uncompacted waste.
Point of Impingement (POI):	A defined point or points set at a defined distance from a facility (usually between the facility and sensitive community receptors) at which a specific limit for air pollutants must be met.
Pollutant:	Generally, any substance introduced into the environment that can adversely affect the usefulness of a resource or the health of humans, animals, or ecosystems.

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Pollution:	Generally, the presence of a substance in the environment that because of its chemical composition or quantity can prevent the functioning of natural processes and produce undesirable environmental and health effects
Post-Closure:	The time period, following the shutdown of a landfill, waste management or manufacturing facility; established for monitoring purposes.
Pozzolan:	A material used as an addition to Portland cement concrete mixtures to increase the long-term strength and other material properties of Portland cement concrete
Precipitator:	Pollution control device that collects particles from an air stream.
Project:	Encompasses the design, construction (including construction financing) and operation of the Thermal Treatment Facility, and includes the EA Study, the supply of municipal waste, and the sale of energy.
Proponent*:	A person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.
Proprietary Devices:	A device that is either used, produced, or marketed under exclusive legal right of the maker.
Pyrolysis:	Decomposition of waste and its constituent chemicals by heat in the absence of oxygen.
Quench:	A method to cool a substance quickly and suddenly after heating. Often performed by placing the hot material in water.
Receptor:	The person, plant or wildlife species that may be affected due to exposure to a contaminant.
Recycle/Reuse:	Minimizing waste generation by recovering and reprocessing usable products that might otherwise become waste (i.e., recycling of aluminum cans, paper, and bottles).

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Regions:	Durham and York collectively.
Residential Waste:	Waste generated in single and multi-family homes, including newspapers, clothing, disposable tableware, food packaging, cans, bottles, food scraps, and yard trimmings.
Residual:	Amount of a pollutant remaining in the environment after a natural or technological process has taken place; e.g., the sludge remaining after initial wastewater treatment, or particulates remaining in air after it passes through a scrubbing or other process.
Resource Recovery:	The process of obtaining matter or energy from materials formerly discarded.
Scrubber:	An air pollution device that uses a spray of water or reactant or a dry process to trap pollutants in emissions.
Selective Non-Catalytic Reduction (SNCR):	An air pollution control device that converts nitrogen oxide emissions into elemental nitrogen and water by injecting a chemical reagent (typically urea, or another ammonia-based solution) into the flue gas.
Siting:	The process of choosing a location for a facility.
Stack:	A chimney, smokestack, or vertical pipe that discharges flue gas or used air.
Stakeholder:	Any organization, governmental entity, or individual that has a stake in or may be impacted by a given approach to environmental regulation, pollution prevention, energy conservation, etc.

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Terms of Reference:	A document prepared by the proponent and submitted to the Ministry of the Environment for approval. The terms of reference sets out the framework for the planning and decision-making process to be followed by the proponent during the preparation of an environmental assessment. In other words, it is the proponent's work plan for what is going to be studied. If approved, the environmental assessment must be prepared according to the terms of reference.
Thermal Treatment:	Use of elevated temperatures to treat wastes (e.g., combustion or gasification).
Toxic Equivalents (TEQs):	Used to report toxicity-weighted masses of mixtures of dioxins. The dioxin toxicity equivalent value is compared to 2, 3, 7, 8, tetrachloridibenzo-*p*-dioxin, and determined by adding the products of the measured concentration of each dioxin and furan congener multiplied by the toxicity equivalent factor.
Transfer Station:	Facility where material is transferred from collection vehicles to larger trucks or rail cars for longer distance transport.
Trommel:	A rotary cylindrical screen typically inclined at a downward angle that separates materials of different physical size. Trommel screens are used to separate mixed recyclables, municipal solid waste components, or to screen finished compost from windrow and aerated static pile systems.
Undertaking*:	An enterprise, activity or a proposal, plan, or program that a proponent initiates or proposes to initiate.
United States Environmental Protection Agency AP-42 (U.S.-EPA AP-42):	U.S.-EPA document Compilation of Air Emission Factors, Volume 1: Stationary Point and Area Sources.
Urea:	A form of nitrogen that converts readily to ammonia.

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Waste Management System:	A set of facilities or equipment used in, and any operations carried out for, the management of waste including the collection, handling, transportation, storage, processing or disposal of waste, and may include diversion programs and facilities and one or more waste disposal sites.
Waste Stream:	The total flow of solid waste from homes, businesses, institutions, and manufacturing plants that is recycled, burned, or disposed of in landfills, or segments thereof such as the "residential waste stream" or the "recyclable waste stream."
Waste:	1. Refuse from places of human or animal habitation. 2. Unwanted materials left over from a manufacturing process.
Waste-to-Energy (WTE) Facility:	Facility where recovered municipal solid waste is converted into a usable form of energy, usually via combustion.
York:	The Regional Municipality of York or its geographic area, as context requires.

LIST OF ABBREVIATIONS

AAQC	Ambient Air Quality Criteria
APC	Air Pollution Control System
AQSA	Air Quality Study Area
C of A	Certificate of Approval
CAC	Criteria Air Contaminants
CCME	Canadian Council of Ministers of the Environment
CEAA	Canadian Environmental Assessment Act
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CoPC	Chemicals of potential concern
CWS	Canada Wide Standards
D/Fs	Dioxins and Furans
EA	Environmental assessment
EA ToR	Environmental Assessment Terms of Reference:
EAA	Environmental Assessment Act
EAAB	Ministry of Environment Environmental Assessment and Approvals Branch
EC	Environment Canada
EFW	Energy-from-Waste

EPA	Environmental Protection Act
ERA	Ecological/Environmental Risk Assessment
GJ	Gigajoule
GLC	Ground Level Concentrations
GTA	Greater Toronto Area
ha	Hectares
HAP	Hazardous Air Pollutants
HHERA	Human health and ecological risk assessment
JSL	Jurisdictional Screening Limits
MACT	Maximum achievable control technology
Max	Maximum
MBT	Mechanical, Biological Treatment
MCR	Maximum Continuous Rating
MCTD	Maximum Continuous Turndown
Min	Minimum
MOE	Ontario Ministry of the Environment
MPOI	Maximum point of impingement
MRF	Materials Recovery (or Recycling) Facility
MSW	Municipal Solid Waste
NAAQO	National Ambient Air Quality Objectives

NAICS	North American Industry Classification System
NAPS	National Air Pollution Surveillance
NGO	Non-Governmental Organizations
NPRI	National Pollutant Release Inventory
O. Reg. 347	Ontario Regulation 347
OPA	Ontario Power Authority
OPG	Ontario Power Generation
PAH	Polycyclic aromatic hydrocarbons
Particulate	A particle of a solid or liquid that is suspended in air.
PCB	Polychlorinated biphenyl
PCDD/PCDF	Polychlorinated dibenzo-p-dioxins and dibenzofurans
PM	Particulate Matter
POI	Point of Impingement
QA	Quality Assurance
QA/QC	Quality assurance/quality control
QC	Quality Control
RA	Risk assessment
SNCR	Selective Non-Catalytic Reduction
TEQ	Toxic equivalent quotient
TEQs	Toxic Equivalents

TSP	Total Suspended Particulate
tpy	Tonnes (1,000 kg) per year
U.S.	United States
U.S. EPA	United States Environmental Protection Agency
U.S.-EPA AP-42United States	Environmental Protection Agency AP-42
VOC	Volatile organic compounds
WTE	Waste-to-Energy

UNITS OF MEASUREMENT

Area

m^3	cubic metre
scf	standard cubic feet 35.3 scf / m^3

Mass/Weight

Re. Orders of Magnitude: x 10^2 = x 100, x10^3 = x 1000, etc.

g	gram	
mg	milligrams	1 x 10^{-3} grams
µg	Microgram	1 x 10^{-6} grams
ng	nanogram	1 x 10^{-9} grams
kg	kilogram	1 x 10^3 g
Mg	Megagram	1 x 10^6 g
pg	picogram	1 x 10^{-12} grams

t	metric tonne	1 x 10^3 kg
kt	kilotonne	1 x 106 kg
lb	pound	1 lb = 453.592 grams

Power

W	watt	
kW	kilowatt	1 x 10^3 W
MW	megawatt	1 x 10^6 W
GJ	Gigajoule = 1 x 10^9 J	

Volume

L	litre	
mL	millilitre	1 L = 1 x 10^3 mL
m^3	cubic metre	1 m^3 = 1 x 10^3 L
Rm^3	dry cubic metre of flue gas corrected to standard conditions (25°C, 101.3 kPa, 11% O_2) as defined by MOE APC on Incinerators Policy 01-03-02	

Time

s	second
min	minute
hr	hour
wk	week
y	year

Elements

Cd	Cadmium
Hg	Mercury
Pb	Lead
Al	Aluminum
As	Arsenic
Be	Beryllium
Cr	Chromium
Cu	Copper
Mn	Manganese
Ni	Nickel
Si	Silver
Tl	Thallium
Sn	Tin
V	Vanadium
Zn	Zinc

Compounds

CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide

CMA	Chlorinated Monocyclic Aromatics
HCl	Hydrogen Chloride
NO_x	Nitrogen Oxides
N_2O	Nitrous Oxide
$PM_{2.5}$	Particulate Matter Diameter <=2.5 μm
PAH	Polycyclic aromatic hydrocarbons
PBDE	Polybrominated diphenyl ethers
PCB	Polychlorinated biphenyl
PCDDs	Polychlorinated Dibenzodioxins
PCDD/F	Polychlorinated dibenzo-dioxin/furan
PCDFs	Polychlorinated Dibenzofurans
PCN	Polychlorinated naphthalene
PCP	Pentachlorophenol
SO_2	Sulphur Dioxide
TPM	Total Particulate Matter
VOC	Volatile organic compounds

Miscellaneous

°C	temperature in degrees Celsius
N/A	not available
%	percent
ppm (part per million)	mg/kg, µg/g, ng/mg, pg/µg, mg/L, µg/mL, ng/µL
ppb (part per billion)	µg/kg, ng/g, pg/mg, µg/L, ng/mL, pg/µL
ppt (part per trillion)	ng/kg, pg/g, fg/mg, ng/L, pg/mL, fg/µL
min	minimum
max	maximum

REPORT

1.0 INTRODUCTION

Durham and York Regions (the Regions) have partnered to undertake a joint Residual Waste Planning Study. Both municipalities are in need of a solution to manage the residual solid waste that remains after diversion. The Regions are working together to address the social, economic, and environmental concerns through an Environmental Assessment (EA) Study process to examine potential long-term residual waste management alternatives.

1.1 The Environmental Assessment Process

The purpose of the undertaking (i.e., the outcome of what this EA Study is intended to do) as described in the Approved EA Terms of Reference is:

> *"To process - physically, biologically and/or thermally - the waste that remains after the application of both Regions' at-source waste diversion programs in order to recover resources - both material and energy - and to minimize the amount of material requiring landfill disposal. In proceeding with this undertaking only those approaches that will meet or exceed all regulatory requirements will be considered."*

The EA Study follows a planning approach where environmental constraints or opportunities are considered in the context of the broadly defined environment under the *Environmental Assessment Act* (EAA) (i.e., the natural environment as well as the social, economic and heritage and other "environments" relevant to the undertaking) and potential effects are understood and addressed before development occurs. In accordance with the Approved EA Terms of Reference and EAA, the EA process evaluates alternatives considering potential effects on the environment; the availability of mitigative measures that address, in whole or in part, the potential effects; and, the comparison of the advantages and disadvantages of the remaining or "net" effects. The result of this process provides the planning rationale and support for a preferred approach and method to implement the undertaking.

The EA has been prepared and conducted in accordance with the EAA, including in accordance with the Approved Terms of Reference approved by Ontario's Minister of the Environment on March 31, 2006. There are currently no federal environmental assessment process triggers identified and, therefore, this Facility does not require approval under the *Canadian Environmental Assessment Act* (CEAA).

It is understood and contemplated that environmental management measures recommended as part of the EA process and this Technical Study Report will in many cases be refined, updated, modified and/or superceded as a result of subsequent approval processes.

This EA process essentially consists of three parts taking place in stages including:

- the Development and Approval of an EA Terms of Reference;
- the evaluation of “Alternatives to” the undertaking; and,
- the evaluation of “Alternative methods” of implementing the undertaking.

Refer to the Environmental Assessment for a detailed description of the EA process undertaken as part of the Durham/York Residual Waste EA Study.

1.2 Purpose of this Report

This Report entitled *Air Quality Assessment – Technical Study Report* has been prepared to assess the potential air quality related effects associated with the Proposed Thermal Treatment Facility (the Facility) at the Preferred Site (the Site), together with the identification of mitigation measures, and resulting net effects. This Report will form part of the supporting documentation and materials for the “Description of the Undertaking” completed as part of the EA Study.

1.3 Overview of Report Contents

This Report describes the existing air quality conditions related to the Proposed Thermal Treatment Site (the Site) followed by an analysis of potential effects, mitigation measures and net effects of the Proposed Thermal Treatment Facility (the Facility) on the subject aspect(s) of the environment followed by a summary of the monitoring requirements. The key components of the Report are as follows:

- study methodology;
- review of applicable regulatory requirements;
- review of baseline ambient air quality;
- emission inventory for the Project;
- dispersion modelling; and,
- comparison of model predictions to applicable air quality criteria.

The information contained in this Report has been used to complete the EA Study.

2.0 STUDY METHODOLOGY

Based on past experience, it is anticipated that a primary pathway for air contaminants to reach human and ecological receptors would be via airborne dispersion and deposition of contaminants during the operational period of the Facility. As a result, the key objectives of the study of the atmospheric environment were:

- to provide the data required to conduct the assessment of the potential environmental effects, including cumulative environmental effects, of the Project on air quality, local climate and climate change; and,
- to provide concentration and deposition data to the Human Health and Ecological Risk Assessment (HHERA) Team.

The assessment of the Facility's effect on air quality was performed by conducting dispersion modelling to predict the downwind concentrations of air contaminants and comparing these predictions to regulatory standards, objectives and guidelines. There are several steps to building a plume dispersion and deposition model. The preparation of a representative emissions inventory is key to a successful modelling prediction and directly influences the human health and ecological risk results as well.

The assessment of air quality effects related to the Facility consisted of the following elements:

- compilation of emissions inventories of point and mobile sources for the Facility;
- assessment of baseline ambient air quality conditions for Chemicals of Potential Concern (CoPCs) from the existing published sources of air quality data and site-specific measurements;
- dispersion and deposition modelling of the Facility to provide input to the HHERA, and to support the assessment of potential environmental effects, including cumulative environmental effects, for the EA; and,
- comparison of dispersion model predictions to ambient air quality criteria as well as evaluation of the incremental change in air quality associated with the Facility.

2.1 Methodology for Analysis of Potential Environmental Effects

In general, the criteria used in the analysis of potential environmental effects are divided into four main categories as follows:

- physical environment;
- biological environment;
- social and economic environments; and,
- human health and ecological risk.

Included in these categories are the following criteria that are discussed further in this Report.

- ambient air quality criteria, objectives, and standards;
- facility emissions limits;
- incremental change in ground level ozone (O_3) precursor emissions;
- incremental change in greenhouse gas (GHG) emissions; and,
- odour detectability.

Three timeframes were considered for potential environmental effects. These are:

Construction: The time during which the base Facility would be constructed and commissioned (a 30 month period for the initial 140,000 tpy Facility starting in June 2010).

Operation: The time during which the Facility would be operated (approximately 30 years).

***De-Commissioning*:** The time after the Facility would be closed (after operations cease) and the Facility equipment is removed.

The timeframes for the construction, operational and post-closure periods are commensurate with an undertaking of this type and scale.

2.2 Assessment Focus

Potential air quality issues associated with the Facility were evaluated in the context of the Facility emissions, other existing and planned industrial emissions sources in the Air Quality Study Area (AQSA), and the regulatory framework. The regulatory framework in Ontario identifies ambient air quality criteria for an extensive list of contaminants, applies emissions caps to selected industries and provides emissions limits for selected types of emission sources. There are also provincial, federal and international interests with respect to GHG emissions.

Table 2-1 lists air potential air quality issues which could be caused by emissions from the Facility. These issues were based on public input, review by the MOE, and professional judgement.

Table 2-1 Key Issues for Air

Project Phase	Key Issue	Relevance to Project
Construction	Facility emissions to atmosphere	Construction activities (e.g., site preparation, vehicle emissions) would result in emissions.
Operation	Facility emissions to atmosphere effects on community and residential receptors	The Facility will produce sulphur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter (PM), metals, polycyclic aromatic hydrocarbon (PAH) and VOC emissions. An emissions inventory was developed for the Facility and compared to AQ Study area emissions. Dispersion modelling was conducted to assess the ambient concentrations of contaminants.
	Production of ozone	Ambient nitrogen oxide (NO_x) emissions interact with anthropogenic and biogenic volatile organic compound (VOC) emissions to produce ground level O_3 downwind of emission sources. Southern Ontario has typically high ground level O_3 levels due primarily to transboundary impacts from the United States.
	Secondary particulate formation	Particulate Matter less than 2.5 microns in diameter ($PM_{2.5}$) and precursor fine particulate matter emissions would occur.
	Odour emissions	Waste processed by the Facility may have odour emissions.
	Contribution to GHG emissions	Combustion sources produce greenhouse gases such as carbon dioxide.
De-commissioning	Project emissions to atmosphere	Activities similar to Construction (e.g., site re-vegetation and vehicle use) would result in emissions

2.3 Study Area

For the purpose of this assessment, an Air Quality Study Area (AQSA) was defined to suit the assessment needs. The AQSA was defined as an area approximately 20 km to the east and west of the Site, 10 km to the south (extending into Lake Ontario) and 20 km to the north of the Site. The overall dimensions of the AQSA were 40 km by 30 km and are shown in Section 6, Figure 6-1.

2.4 Contaminants of Potential Concern

A wide range of substances can be emitted from industries such as the Facility. The expected emissions, based on the Facility-specific design and operation, formed the basis of selecting the substances for evaluation. A comprehensive list of Chemicals of Potential Concern (CoPCs) was developed for this study by including contaminants based on including the following:

- contaminants included in MOE Guideline A-7: Combustion and Air Pollution Control Requirements for New Municipal Incinerators;

- contaminants requested to have guaranteed emissions limits placed on them by the Regions of Durham/York in the project request for quotation;
- contaminants contained in the generic risk assessment report (*Energy from Waste Generic Risk Assessment Feasibility Study, 2007*) which were based on stack testing of the Region of Peel, Algonquin Power EFW Incinerator;
- review of contaminants included in the National Pollutant Release Inventory (NPRI) for waste incinerators; and,
- contaminants with O. Reg. 419 criteria that may be emitted during construction, operational and post-closure periods.

Utilizing this approach, a list of 118 CoPCs was developed. These CoPCs may be emitted to the atmosphere during thermal treatment operations. The CoPCs were reviewed and grouped to allow for comparison with regulatory air quality criteria and to assess potential effects on human health. The major contaminant groupings are:

- Criteria Air Contaminants (CACs) – substances with regulatory limits including SO_2, NO_2, CO, PM and ammonia (NH_3); and,
- Hazardous Air Pollutants (HAPs) - Substances that are capable of causing environmental or health effects including VOCs, PAHs, and metals).

The CoPCs that were considered in the subject analysis are presented in Table 2-2 of this Report. This CoPC list was used as a guide in developing the emissions inventory for the Facility. Note that some contaminants included in the CoPC list were not found to have appreciable emissions (e.g., styrene), and were not considered in the subsequent dispersion modelling assessment. Thus, the existence of a particular substance on the CoPC list indicates that emissions of this contaminant were considered in developing the emissions inventory, and not that the contaminant would actually be emitted from the Facility.

Other substances such as greenhouse gases (e.g., carbon dioxide, methane, nitrous oxide) were also considered for specific applications such as calculating greenhouse gas emissions.

Table 2-2 Summary of Contaminants of Potential Concern

Combustion Gases

Sulphur Dioxide (SO_2)
Hydrogen Chloride (HCl)
Hydrogen Fluoride (HF)
Oxides of Nitrogen (NO_x)
Carbon Monoxide (CO)
Particulate Matter PM_{10}
Particulate Matter $PM_{2.5}$
Total Particulate Matter
Ammonia (Slip at stack)
Total Volatile Organic Matter (as CH_4)

Chlorinated Polycyclic Aromatics

Dioxins (as TEQ Toxic Equivalents)
Polychlorinated Biphenyls (PCB)

Metals

Aluminum
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium (Cd)
Cadmium and Thallium (Cd + Th)
Chromium (hexavalent)
Total Chromium (and compounds)
Cobalt
Lead (Pb)
Mercury (Hg) - Vapour/Particulate phase
Nickel
Phosphorus
Silver
Selenium
Thallium
Tin
Vanadium
Zinc
Sum of (As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb)

Chlorinated Monocyclic Aromatics

Dichlorobenzene, 1,2 -
Tetrachlorobenzene, 1,2,4,5 -
Trichlorobenzene, 1,2,4 –
Tetrachlorophenol, 2,3,4,6 -
Trichlorophenol, 2,4,6 -
Dichlorophenol, 2,4 -
Pentachlorophenol
Hexachlorobenzene
Pentachlorobenzene

Polycyclic Organic Matter

Acenaphthylene
Acenaphthene
Anthracene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)fluorene
Benzo(b)fluorene
Benzo(ghi)perylene
Benzo(a)pyrene
Benzo(e)pyrene
Biphenyl
Chloronaphthalene, 2 -
Chrysene
Coronene
Dibenzo(a,c)anthracene
Dibenzo(a,h)anthracene
Dibenzo(a,e)pyrene
Dimethylanthracene, 9,10 –
dimethylbenzo(a)anthracene 7,12 –
Fluoranthene
Fluorine
Indeno(1,2,3 – cd)pyrene
Methylanthracene, 2-
Methylcholanthrene, 3-
Methylnaphthalene, 1-
Methylnaphthalene, 2-
Methylphenanthrene, 1-
Methylphenanthrene, 9-
Naphthalene
Perylene
Phenanthrene
Picene
Pyrene
Quinoline
Tetralin
Triphenylene
O-terphenyl
M-terphenyl
P-terphenyl

Volatile Organic Chemicals (VOC)

Acetaldehyde
Acetone
Acrolein
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Butadiene, 1,3 -
Butanone, 2 -
Carbon tetrachloride
Chloroform
Cumene
Dibromochloromethane
Dichlorodifluoromethane
Dichloroethane, 1,2 -
Dichloroethane, trans – 1,2 -
Dichloroethene, 1,1 -
Dichloromethane
Dichloropropane, 1,2 -
Ethylbenzene
Ethylene Dibromide
Formaldehyde
Mesitylene
Styrene
Tetrachloroethene
Toluene
Trichloroethane, 1,1,1 -
Trichloroethene
Trichloroethylene, 1,1,2 -
Trichlorofluoromethane
Trichlorotrifluoroethane
Vinyl chloride
Xylenes, m-, p- and o-

Phthalates

DEHP

Other

Phosphorus Pentachloride

3.0 DESCRIPTION OF EXISTING CONDITIONS

The following section includes a review of the existing baseline conditions.

3.1 Regulatory Framework

The Facility may be regulated or influenced by a number of air quality policy mechanisms, including:

- Ambient Air Quality Criteria (AAQC), Objectives, and Standards;
- provincial emissions limits and emissions trading regulations;
- Canada – U.S. Air Quality Agreement;
- emissions limits for specific types of equipment (i.e., boilers, turbines, storage tanks);
- emissions reporting through NPRI and O. Reg. 127; and,
- local municipal by-laws.

3.1.1 Ambient Air Quality Criteria

Regulatory agencies have identified ambient air quality criteria, objectives, and standards. These criteria are described below.

3.1.1.1 Provincial Air Quality Criteria

The provincial AAQCs relevant to the Facility are prescribed in Ontario Regulation 419/05 (O. Reg. 419). The Facility may be considered to be a new facility under O. Reg. 419, and as such, the Schedule 3 standards will apply. Where no O. Reg. 419 Schedule 3 standards were available for a particular contaminant, Ontario AAQCs and Jurisdictional Screening Limits (JSL) were considered. A summary of the pertinent air quality objectives, guidelines and standards for the CoPCs examined in this study is presented in Table 3-1. Proposed changes to ambient air quality criteria in O. Reg. 419 were also considered and included in Table 3-1.

Table 3-1 Summary of Applicable Provincial Air Quality Standards and Criteria

CoPC	CAS	O. Reg. 419 – Schedule 3			Ontario AAQC			JSL
		1-Hour (µg/m^3)	24-Hour (µg/m^3)	Other time Period (µg/m^3)	1-Hour (µg/m^3)	24-Hour (µg/m^3)	Other time Period (µg/m^3)	24-Hour (µg/m^3)
Combustion Gases								
Sulphur Dioxide (SO_2)	7446095	690	275	-	-	-	55; annual	-
Hydrogen Chloride (HCl)	7647010	-	20	-	-	-	-	-
Hydrogen Fluoride (HF)	7664393	-	0.86	0.34; 30-day	-	-	-	-
Oxides of Nitrogen (NO_X)	10102440	400	200	-	-	-	-	-
Carbon Monoxide (CO)	630080	-	-	6000; 1/2 hour	36200	-	15700; 8-hour	-
Total Particulate Matter	TPM	-	120	-	-	-	-	-
Ammonia (Slip at stack)	7664417	-	100	-	-	-	-	-
Chlorinated Polycyclic Aromatics								
Dioxins (as TEQ Toxic Equivalents)	n/a	-	-	-	-	5E-06	-	-
Polychlorinated Biphenyls (PCB)	1336363	-	-	-	-	0.15	0.035	-
Metals								
Aluminum	7429905	-	-	-	-	-	-	4.8
Antimony	7440360	-	25	-	-	-	-	-
Arsenic	7440382	-	0.3	-	-	-	-	-
Barium	7440393	-	-	-	-	10	-	-
Beryllium	7440417	-	0.01	-	-	-	-	-
Boron	7440428	-	120	-	-	-	-	-
Cadmium (Cd)	7440439	-	0.025	-	-	-	0.005; annual	-
Total Chromium (and compounds)	7440473	-	-	-	-	1.5	-	-
Cobalt	7440484	-	-	-	-	0.1	-	-
Lead (Pb)	7439921	-	0.5	0.2; 30-day	-	-	-	-
Mercury (Hg) - Vapour/ Particulate phase	7439976	-	2	-	-	-	-	-
Nickel	7440020	-	2	-	-	-	-	-
Phosphorus	7723140	-	-	-	-	-	-	0.35
Silver	7440224	-	1	-	-	-	-	-

Table 3-1 Summary of Applicable Provincial Air Quality Standards and Criteria

CoPC	CAS	O. Reg. 419 – Schedule 3			Ontario AAQC			JSL
		1-Hour (µg/m^3)	24-Hour (µg/m^3)	Other time Period (µg/m^3)	1-Hour (µg/m^3)	24-Hour (µg/m^3)	Other time Period (µg/m^3)	24-Hour (µg/m^3)
Selenium	7782492	-	-	-	-	10	-	-
Thallium	7440280	-	-	-	-	-	-	0.24
Tin	7440315	-	10	-	-	-	-	-
Vanadium	7440622	-	2	-	-	-	-	-
Zinc	7440666	-	120	-	-	-	-	-
Chlorinated Monocyclic Aromatics								
1,2-Dichlorobenzene	95501	-	-	-	30500	-	-	-
1,2,4,5-Tetrachlorobenzene	95943	-	-	-	-	-	-	1
1,2,4-Trichlorobenzene	120821	-	-	-	-	400	-	-
2,4,6-Trichlorophenol	88062	-	-	-	-	-	-	1.5
2,4-Dichlorophenol	120832	-	-	-	-	-	-	77
Pentachlorophenol	87865	-	-	-	-	20	-	-
Hexachlorobenzene	118741	-	-	-	-	-	-	0.011
Pentachlorobenzene	608935	-	-	-	-	-	-	3
Polycyclic Organic Matter								
Acenaphthylene	208968	-	-	-	-	-	-	3.5
Anthracene	120127	-	-	-	-	-	-	0.2
Benzo(ghi)perylene	191242	-	-	-	-	-	-	1.2
Benzo(a)pyrene	50328	-	-	-	-	0.0011	0.00022; annual	-
Biphenyl	92524	-	-	-	60	-	-	-
Fluoranthene	206440	-	-	-	-	-	-	140
1 – methylnaphthalene	90120	-	-	-	-	-	-	12
2 – methylnaphthalene	91576	-	-	-	-	-	-	10
Naphthalene	91203	-	22.5	50; 10 min	-	-	-	-
Pyrene	129000	-	-	-	-	-	-	0.2
Tetralin	119642	-	-	-	-	-	-	1200

Table 3-1 Summary of Applicable Provincial Air Quality Standards and Criteria

CoPC	CAS	O. Reg. 419 – Schedule 3			Ontario AAQC			JSL
		1-Hour (µg/m³)	24-Hour (µg/m³)	Other time Period (µg/m³)	1-Hour (µg/m³)	24-Hour (µg/m³)	Other time Period (µg/m³)	24-Hour (µg/m³)
Volatile Organic Chemicals (VOC)								
Acetaldehyde	75070	-	500	-	-	500	500; 1/2 hour	-
Bromoform	75252	-	-	-	-	55	-	-
Bromomethane	74839	-	-	-	-	1350	-	-
Carbon tetrachloride	56235	-	2.4	-	-	-	-	-
Chloroform	67663	-	1	-	-	-	0.2; annual	-
Dichlorodifluoromethane	75718	-	500000	-	-	-	-	-
Dichloroethene, 1,1 -	75354	-	10	-	-	-	-	-
Dichloromethane	75092	-	220	-	-	-	44; annual	-
Ethylbenzene	100414	-	-	-	-	1000	1900; 10 min	-
Ethylene Dibromide	106934	-	3	-	-	-	-	-
Formaldehyde	50000	-	65	-	-	-	-	-
Tetrachloroethene	127184	-	360	-	-	-	-	-
Toluene	108883	-	-	-	-	2000	-	-
Trichloroethane, 1,1,1 -	71556	-	115000	-	-	-	-	-
Trichloroethene	79016	-	12	-	-	-	2.3; annual	-
Trichlorofluoromethane	75694	-	-	-	-	6000	-	-
Vinyl chloride	75014	-	1	-	-	-	0.2; annual	-
Xylenes, m-, p- and o-	1330207	-	730	-	-	-	3000; 10 min	-

3.1.1.2 Federal Air Quality Objectives and Standards

Other applicable air quality criteria considered in the assessment were the National Ambient Air Quality Objectives (NAAQOs) and Canada Wide Standards (CWSs). The NAAQOs were established by the federal government in the early 1970s to protect human health and the environment by setting objectives for the following common air pollutants: carbon monoxide, nitrogen dioxide, ozone, sulphur dioxide and total suspended particulates. The objectives are denoted as “Desirable”, “Acceptable” and “Tolerable”. The Federal Objectives are defined as follows:

- the **Maximum Desirable Level** is the long-term goal for air quality and provides a basis for anti-degradation policy for unpolluted parts of the country, and for the continuing development of control technology;
- the **Maximum Acceptable Level** is intended to provide adequate protection against effects on soil, water, vegetation, materials, animals, visibility, personal comfort and well-being; and,
- the **Maximum Tolerable Level** denotes time-based concentrations of air contaminants beyond which, due to a diminishing margin of safety, appropriate action is required to protect the health of the general population.

The CWSs are based on intergovernmental agreements developed under the Canadian Council of Ministers of the Environment (CCME) Canada-wide Environmental Standards Sub-Agreement, which operates under the broader CCME Canada-wide Accord on Environmental Harmonization. The CWSs flow from the federal, provincial and territorial Minister’s desire to address key environmental protection and health risk issues that require concerted action across Canada. The CWSs represent co-operation toward a common goal, but involve no delegation of authority by any federal, provincial or territorial government.

A summary of the NAAQOs and CWSs is presented in Table 3-2.

Table 3-2 Summary of Federal NAAQOs and CWSs

Pollutant and units (alternative units in brackets)	Averaging Time Period	Canada Wide Standards	National Ambient Air Quality Objectives		
			Maximum Desirable	Maximum Acceptable	Maximum Tolerable
Sulphur dioxide μg m^{-3} (ppb)	1 hour	-	450 (172)	900 (344)	-
	24 hour	-	150 (57)	300 (115)	800 (306)
	Annual	-	30 (11)	60 (23)	-
Nitrogen dioxide μg m^{-3} (ppb)	1 hour	-	-	400 (213)	1,000 (532)
	24 hour	-	-	200 (106)	300 (160)
	Annual	-	60 (32)	100 (53)	-
Carbon Monoxide mg m^{-3} (ppm)	1 hour	-	15 (13)	35 (31)	-
	8 hour	-	6 (5)	15 (13)	20 (17)
Total Suspended Particulate Matter (TSP) μg m^{-3}	24 hour	-	-	120	400
	Annual	-	60	70	-

Table 3-2 Summary of Federal NAAQOs and CWSs

Pollutant and units (alternative units in brackets)	Averaging Time Period	Canada Wide Standards	National Ambient Air Quality Objectives		
			Maximum Desirable	Maximum Acceptable	Maximum Tolerable
$PM_{2.5}$ µg m^{-3}	24 hour	30[A]	-	-	-
Ozone µg m^{-3} (ppb)	1 hour	-	100 (51)	160 (82)	300 (153)
	8 hour	128[A1] (65)	-	-	-
	24 hour	-	30 (15)	50 (25)	-
	Annual	-	-	30 (15)	-

Notes:
[A] CCME (2000), Canada-Wide Standards for Respirable Particulate Matter and Ozone, effective by 2010. The Respirable Particulate Matter Objective is referenced to the 98^{th} percentile over three consecutive years, and the Ozone Objective is referenced to the on 4^{th} highest 8-hour average annual value, averaged over three consecutive years.

3.1.2 Canada – U.S. Air Quality Agreement

As the Project would be located within 100 km of the U.S. border (approximately 27 km), notification under Article V of the Ozone Annex to the Canada – U.S. Air Quality Agreement would be required. This notification is made to the Transboundary Air Issues Branch of Environment Canada. It should be noted that the Canada - U.S. border is located near the centre of Lake Ontario. The distance from the Facility to the nearest point on the U.S. shoreline is about 58 km, which is well outside the AQSA.

3.1.3 Codes, Guidelines and Standards

Air contaminant emissions from the Facility would be regulated or influenced by Ontario Guideline A7 - Air Pollution Control, Design and Operation Guidelines for Municipal Waste Thermal Treatment Facilities. This guideline provides guidance to applicants for Certificates of Approval issued under Section 9 and Part V of the *Environmental Protection Act* (EPA) when applying for Certificates of Approval for municipal waste thermal treatment facilities. The guideline sets out minimum expected standards that the Director will apply in considering applications on a case-by-case basis. The minimum requirements for emission control systems and maximum allowable “in-stack” contaminant emission levels, minimum design and operating parameters for thermal treatment facilities utilizing conventional incineration technology are all described.

A draft revision to Guideline A-7 was released by the MOE on March 13, 2009. A summary of the proposed revisions to the guideline versus the previous version (dated February, 2004) is presented in Table 3-3. Relative to the 2004 version of the Guideline, the proposed emissions levels of PM, NO_x, cadmium, lead, dioxins, and organic matter have decreased.

In their Request for Quotation sent to potential proponents to design and build the Facility, the Regions of Durham and York required the qualified proponents to provide maximum guaranteed emissions levels on a number of air contaminants including those specified in Guideline A-7. A summary of these maximum guaranteed stack emission limits is presented in Table 3-3. For contaminants such as PM, SO_2, HCl, NO_X, mercury, and lead, the Durham-York emission limits are lower than those proposed for revision in Guideline A-7. For cadmium, the emission limit is the same as the proposed revised A-7 limit.

For CO, dioxins/furans, and organic matter, the Durham-York emission limits are lower than the current A-7 levels but greater than the proposed revised A-7 levels. For these contaminants, the manufacturer guarantees on emissions which were the same as the Durham-York emission limits were utilized in the assessment.

Table 3-3 Summary of Proposed Changes to Emission Limits in Guideline A-7

Contaminant	Units	Guideline A-7 - 2004	Proposed A-7 Level	D/Y Required Stack Emission Level
Total PM	mg/Rm^3	17	14	9
Sulphur Dioxide (SO_2)	mg/Rm^3	56	56	35
Hydrochloric Acid (HCl)	mg/Rm^3	27	27	9
HF	mg/Rm^3	Not Specified	Not Specified	0.92
NO_X	mg/Rm^3	207	198	180
CO	mg/Rm^3	Not Specified	40	45
Mercury	$\mu g/Rm^3$	20	20	15
Cadmium	$\mu g/Rm^3$	14	7	7
Cadmium and Thallium	$\mu g/Rm^3$	Not Specified	Not Specified	46
Lead	$\mu g/Rm^3$	142	60	50
Sum of As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb	$\mu g/Rm^3$	Not Specified	Not Specified	460
Dioxins and Furans	pg/Rm^3	80	32	60
Organic Matter	mg/Rm^3	66	33	49

3.1.4 Emissions Reporting

Project emissions would be required to be reported under Environment Canada's National Pollutant Release Inventory (NPRI) program and Ontario Regulation 127.

3.1.5 Municipal Planning Policies and Bylaws

The Facility would be a component of Durham Region's Public Infrastructure and as such, its development is not required to conform with existing area municipal planning policies and zoning provisions.

3.2 Existing Baseline Conditions

The following sections describe the existing physical environment of the Air Quality Study Area (AQSA).

3.2.1 Topography

The AQSA is bisected in the east-west direction by the shore of Lake Ontario, with the Lake located to the south and Durham Region to the north. The lake is at elevation 70 m (metre) above mean sea level and along the shoreline there is an escarpment which is approximately 30 m above the water level. North of the Lake shore the topography of the AQSA is relatively flat with terrain elevations varying from 70 m to 355 m above mean sea level over the 40 by 30 km area.

3.2.2 Climate

The AQSA, located in Southern Ontario, has a humid continental climate which is typical for temperate regions in the mid-latitudes that are influenced by both polar and tropical air masses. In this climate, a large seasonal temperature variation occurs due to warm, humid summers and cold winters. Precipitation is well distributed throughout the year with a usual summer peak.

The climate in AQSA is highly influenced by the presence of the Great Lakes. The addition of moisture from the Great Lakes in autumn and winter increases precipitation, while the heat given off by the Great Lakes moderates temperatures during the colder winter months. In the spring and summer, the cooler waters of the Great Lakes act to moderate the heat of tropical air, which regularly approaches the area. The combination of uniform precipitation amounts year-round, delayed spring and autumn, and moderated temperatures in winter and summer makes Southern Ontario's climate one of the most suitable in Canada for both agriculture and human settlement (EC, 1997).

The AQSA experiences a variety of extreme weather events. In winter, major storms affect the region at least once or twice per year, with high winds and a mix of rain, freezing rain and snow. In summer, thunderstorms can produce heavy downpours, hail, damaging winds and occasional tornadoes. Stagnant tropical air masses can bring poor air quality, heat waves and drought. In autumn, an early frost can damage crops, and remnants of hurricanes occasionally produce high winds and excessive rainfalls (EC, 1997).

Long term climatological data in the vicinity of the proposed site is available from the meteorological stations listed in Table 3-4 below.

Table 3-4 Summary of Available Climatological Data

Climatological Station	Available Parameters
Oshawa	Temp/Precipitation
Bowmanville	Temp/Precipitation
Port Hope	Temp/Precipitation
Cobourg	Temp/Precipitation
Peterborough	Temp/Precipitation/Wind Speed and Direction/Humidity

The nearest station to the site with a required parameter was used in the following climate discussion. The climatology is based on 30-year Canadian Climate Normal data obtained from EC (1971 to 2000).

3.2.2.1 Temperature

A summary of the daily average, daily maximum and daily minimum temperatures on a monthly basis over the period 1971 to 2000 is presented in Table 3-5 (based on Bowmanville measurements). The daily average temperature for the area varies from -6.3 to 19.8ºC with an annual average temperature of 7.1ºC.

Table 3-5 Summary of Average Temperature Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Daily Average (ºC)	-6.3	-5.3	-0.5	6	12.2	17.1	19.8	18.9	14.7	8.4	3.1	-2.7	7.1
Daily Maximum (ºC)	-1.9	-0.9	4	10.9	17.8	22.8	25.5	24.5	20.2	13.4	6.9	1.2	12
Daily Minimum (ºC)	-10.7	-9.7	-4.9	1.1	6.6	11.3	14	13.2	9.2	3.4	-0.7	-6.6	2.2

3.2.2.2 Precipitation

A summary of the monthly average rainfall, snowfall, total precipitation (as equivalent rainfall based on a conversion factor for snowfall to equivalent rainfall of 0.1) and average snow depth on a monthly basis over the period 1971 to 2000 is presented in Table 3-6 (based on Bowmanville data). The annual average total precipitation for the area is about 858 millimetres (mm).

Table 3-6 Summary of Average Precipitation Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Rainfall (mm)	33.1	30.8	47.2	70	73.7	81.5	63.7	81	90.5	67.8	77.9	47.4	764.6
Snowfall (cm)	30	16.4	13.5	2.9	0	0	0	0	0	0.1	6.1	24.2	93.2
Precipitation (mm)	63.1	47.2	60.7	72.9	73.7	81.5	63.7	81	90.5	67.9	84	71.6	857.9

3.2.2.3 Humidity

A summary of the average morning relative humidity on a monthly basis over the period 1971 to 2000 is presented in Table 3-7 (based on Bowmanville data). The annual average relative humidity in the morning is about 88%.

Table 3-7 Summary of Average Relative Humidity Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Relative Humidity - 0600LST (%)	83	81.7	84.1	83.6	87.6	90.8	93.5	95.5	94.6	91.2	87.8	85.9	88.28

3.2.2.4 Wind Speed and Direction

In Table 3-8, climate normal data summarizing wind speed and directionality based on Peterborough measurements (the closest station with applicable data to the site) is presented. The annual average wind speed for the area is about 11 km/h and the most frequent wind direction, on an annual basis, is winds blowing from the west. It should be noted that the wind climate normal data is based on Peterborough which is located inland relative to the Site. In the vicinity of the Lake Ontario shoreline, winds may be more influenced by the presence of the Lake than those at Peterborough. The influence of the Lake on wind conditions was accounted for in the dispersion modelling assessment of the Facility emissions (see **Appendix C** for details).

Table 3-8 Summary of Wind Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Speed (km/h)	12.7	11.7	12.6	13	11	10	8.8	7.8	8.6	9.8	11.6	11.7	10.8
Most Frequent Direction	SW	W	W	W	W	W	W	W	SW	SW	SW	SW	W
Maximum Hourly Speed (km/h)	64	69	58	**70**	52	52	42	46	52	56	63	63	
Maximum Gust Speed (km/h)	100	87	117	101	109	104	98	**133**	89	89	100	104	
Direction of Maximum Gust	N	W	W	SW	S	W	NW	SW	W	W	SW	SW	SW
Days with Winds >= 52 km/h	1.2	0.3	0.6	0.7	0.5	0.2	0.1	0.2	0.2	0.1	0.4	0.6	
Days with Winds >= 63 km/h	0.4	0.1	0.1	0.1	0.2	0	0.1	0.1	0	0	0.2	0.1	

3.2.3 Sensitive Receptors

The Facility would be located on undeveloped land owned by the Region of Durham that is located south of Highway 401 in the Municipality of Clarington. The Site is on the west side of Osborne Road north of a CN Rail corridor. There are commercial properties north of the Site. The lands east and west of the Site are undeveloped and are currently used for agricultural purposes. The Courtice Water Pollution Control Plant is just south of the Site. The Darlington Nuclear Generating Station is located approximately 1.8 km to the east. The nearest major intersection is Highway 401 and Courtice Road, which is approximately 1.7 km from the Site.

The following sensitive receptors were identified and included in the subject air quality assessment:

- the closest residences in all compass directions surrounding the Facility;
- hospitals, schools, day care centres and nursing homes within the AQ study area. Data for these sources were compiled from various sources such as open houses, EA studies, grey literature sources and official plans.
- watersheds and water bodies;

- locations of known recreational use (i.e., sports fields, hiking, camping); and,
- receptors identified by the ecological and human health assessment team as required for input to their analyses.

A total of 391 sensitive receptors were identified and included in the assessment. A summary of the sensitive receptors is presented in Table 3-9 and the locations are presented in Figures 3-1 and 3-2.

Table 3-9 Summary of Special Receptors Considered in the Dispersion Modelling

ID	Description	UTM Easting (km)	UTM Northing (km)
1	Campground 10	678.53	4860.00
2	ECO 2	675.49	4860.36
3	Recreational 5	681.64	4860.35
4	ECO 4	676.83	4859.84
5	Bow Valley Cons. 3	685.77	4863.88
6	ECO 6	679.65	4859.99
7	ECO 7	681.58	4862.07
8	ECO 8	679.74	4861.05
9	ECO 9	687.22	4864.25
10	ECO 10	686.52	4861.99
11	ECO 11	679.87	4859.74
12	Recreational 4	681.58	4860.56
13	Future Industrial 9	680.70	4859.86
14	Future Industrial 10	680.61	4860.72
15	Harmony Creek	673.99	4865.64
16	Farewell Creek	678.08	4868.82
17	Farm A	681.38	4860.33
18	Farm B	682.88	4864.22
19	Farm C	678.93	4865.53
20	Zoo	687.22	4864.84
21	Cedar Crest Beach	686.65	4861.66
22	Darlington Prov. Park Beach	677.84	4859.72
23	OPG 1	682.26	4860.05
24	OPG 2	682.55	4859.89
25	OPG 3	682.82	4859.76
26	OPG 4	683.02	4859.94
27	OPG 5	683.32	4859.68
28	OPG 6	683.31	4860.02
29	OPG 7	683.72	4859.92

Table 3-9 Summary of Special Receptors Considered in the Dispersion Modelling

ID	Description	UTM Easting (km)	UTM Northing (km)
30	OPG 8	682.70	4860.00
31	OPG 9	684.35	4861.18
32	OPG 10	682.16	4861.23
33	St Mary's 1	684.56	4861.07
34	St Mary's 2	684.66	4861.32
35	St Mary's 3	684.91	4861.15
36	Court. Subdivision 1	677.33	4862.98
37	Court. Subdivision 2	676.19	4862.61
38	Court. Subdivision 3	675.97	4863.48
39	Court. Subdivision 4	676.61	4863.21
40	Court. Subdivision 5	676.83	4863.59
41	Court. Subdivision 6	677.20	4864.07
42	Court. Subdivision 7	677.72	4863.63
43	Court. Subdivision 8	678.27	4864.20
44	Court. Subdivision 9	678.18	4863.37
45	Court. Subdivision 10	677.18	4862.50
46	Bow. Subdivision 1	683.54	4864.22
47	Bow. Subdivision 2	683.77	4863.92
48	Bow. Subdivision 3	683.67	4863.53
49	Bow. Subdivision 4	684.50	4863.85
50	Bow. Subdivision 5	684.24	4863.52
51	Bow. Subdivision 6	684.27	4863.20
52	Bow. Subdivision 7	683.99	4862.63
53	Bow. Subdivision 8	684.61	4862.96
54	Bow. Subdivision 9	684.78	4863.33
55	Bow. Subdivision 10	685.27	4863.24
56	Osh/Court Subdivision 1	677.40	4860.98
57	Osh/Court Subdivision 2	676.63	4860.82
58	Osh/Court Subdivision 3	676.92	4861.92
59	Osh/Court Subdivision 4	676.73	4861.32
60	Osh/Court Subdivision 5	676.09	4861.39
61	Osh/Court Subdivision 6	676.18	4861.72
62	Osh/Court Subdivision 7	675.67	4861.78
63	Osh/Court Subdivision 8	676.05	4862.06
64	Osh/Court Subdivision 9	676.64	4862.13

Table 3-9 Summary of Special Receptors Considered in the Dispersion Modelling

ID	Description	UTM Easting (km)	UTM Northing (km)
65	Osh/Court Subdivision 10	676.57	4861.63
66	Bow. Subdivision 11	684.65	4863.18
67	Daycare B	685.17	4863.93
68	Daycare C	685.45	4863.10
69	Daycare D	685.53	4864.69
70	Daycare E	685.74	4864.79
71	Daycare F	685.52	4864.85
72	Daycare G	685.44	4864.88
73	Daycare H	686.36	4864.71
74	Daycare I	685.72	4865.13
75	Daycare J	678.26	4863.57
76	Daycare K	677.69	4864.04
77	Daycare L	676.48	4862.53
78	Daycare M	678.32	4864.76
79	Daycare N	678.51	4865.06
80	Daycare O	672.79	4863.94
81	Daycare P	673.95	4863.59
82	Daycare Q	671.75	4864.89
83	Daycare R	685.71	4864.67
84	Daycare S	684.18	4863.62
85	Daycare T	678.42	4864.48
86	Daycare U	685.33	4863.44
87	Daycare V	685.15	4863.24
88	Daycare W	672.68	4862.04
89	Daycare X	672.08	4865.29
90	Daycare Y	672.64	4859.66
91	Daycare Z	673.74	4858.96
92	Daycare AA	673.12	4863.39
93	Daycare BB	673.90	4862.28
94	Daycare CC	671.47	4861.80
95	Daycare DD	673.06	4862.63
96	Daycare EE	674.92	4863.96
97	Daycare FF	671.36	4862.95
98	Daycare GG	671.68	4862.71
99	Daycare HH	671.60	4860.14

Table 3-9 Summary of Special Receptors Considered in the Dispersion Modelling

ID	Description	UTM Easting (km)	UTM Northing (km)
100	Daycare II	670.95	4857.98
101	Daycare JJ	677.51	4864.74
102	Daycare KK	676.52	4862.68
103	Daycare LL	677.66	4863.60
104	Court. Subdivision 11	677.67	4863.41
105	Daycare NN	674.87	4864.67
106	Daycare OO	673.20	4864.75
107	Daycare PP	674.79	4864.92
108	Hospital	686.32	4864.40
109	Hospital (Children's)	676.06	4862.18
110	Hospital	671.23	4863.62
111	Comm. Resp. Services	676.05	4863.90
112	Hospital	671.71	4862.36
113	Retirement Residence A	684.20	4864.12
114	Retirement Residence B	685.48	4865.15
115	Retirement Residence C	686.84	4864.73
116	Retirement Residence D	673.48	4863.34
117	Retirement Residence E	671.83	4864.40
118	Retirement Residence F	671.61	4864.54
119	Retirement Residence G	671.36	4862.96
120	Retirement Residence H	671.51	4862.26
121	Retirement Residence I	672.60	4863.08
122	Retirement Residence J	671.72	4862.89
123	Retirement Residence K	686.72	4865.65
124	Retirement Residence L	676.17	4865.67
125	Retirement Residence M	676.12	4863.98
126	Bow. Subdivision 12	684.65	4863.18
127	Primary School B	685.38	4863.58
128	Primary School C	685.02	4863.95
129	Primary School D	686.24	4864.09
130	Primary School E	686.72	4863.73
131	Primary School F	686.36	4864.75
132	Primary School G	685.50	4865.01
133	Primary School H	686.73	4866.06
134	Primary School I	685.19	4866.57

Table 3-9 Summary of Special Receptors Considered in the Dispersion Modelling

ID	Description	UTM Easting (km)	UTM Northing (km)
135	Primary School J	685.97	4866.98
136	Primary School K	677.71	4864.73
137	Primary School L	675.99	4864.27
138	Primary School M	676.61	4862.74
139	Primary School N	677.22	4863.76
140	Primary School O	678.15	4863.87
141	Court. Subdivision 12	678.31	4863.60
142	Primary School Q	677.01	4862.47
143	Primary School R	677.43	4866.69
144	Primary School S	675.27	4863.56
145	Primary School T	673.48	4860.03
146	Primary School U	670.86	4860.71
147	Primary School V	672.66	4863.91
148	Primary School W	672.74	4859.23
149	Primary School X	673.58	4862.69
150	Primary School Y	673.71	4861.97
151	Primary School Z	672.37	4859.93
152	Primary School AA	672.56	4866.05
153	Primary School BB	675.10	4862.93
154	Primary School CC	673.24	4865.20
155	Primary School DD	674.16	4863.03
156	Primary School EE	671.91	4864.70
157	Primary School FF	673.29	4858.77
158	Primary School GG	671.66	4863.12
159	Primary School HH	673.85	4866.71
160	Primary School II	672.62	4862.11
161	Primary School JJ	673.57	4861.90
162	Primary School KK	671.79	4861.95
163	Primary School LL	673.76	4864.21
164	Primary School MM	672.24	4864.62
165	Primary School NN	673.21	4858.68
166	Primary School OO	675.47	4863.22
167	Primary School PP	672.44	4858.75
168	Primary School QQ	672.80	4864.44
169	Primary School RR	671.35	4863.28

Table 3-9 Summary of Special Receptors Considered in the Dispersion Modelling

ID	Description	UTM Easting (km)	UTM Northing (km)
170	Primary School SS	673.21	4862.13
171	Primary School TT	671.02	4860.95
172	Primary School UU	670.99	4861.09
173	Primary School VV	674.15	4862.29
174	Primary School WW	672.01	4861.71
175	Primary School XX	684.17	4863.62
176	Primary School YY	683.92	4866.64
177	Primary School ZZ	680.45	4865.77
178	Vacant School	685.61	4864.52
179	Secondary School A	686.29	4865.06
180	Secondary School B	683.88	4864.74
181	Secondary School C	684.65	4866.46
182	Secondary School D	678.10	4864.84
183	Secondary School E	678.47	4863.43
184	Secondary School F	674.14	4862.76
185	Secondary School G	673.82	4864.36
186	Secondary School H	673.15	4858.57
187	Secondary School I	671.29	4863.58
188	Secondary School J	671.44	4861.66
189	Secondary School K	673.24	4860.88
190	Secondary School L	684.25	4866.50
191	Secondary School M	673.91	4859.55
192	Secondary School N	675.05	4864.18
193	Adult School	685.28	4866.02
194	Bow. Valley Cons. 1	685.36	4864.52
195	Bow. Valley Cons. 2	685.63	4864.17
196	Bow. Valley Cons. 4	685.85	4863.64
197	Bow. Valley Cons. 5	686.16	4863.62
198	Bow. Valley Cons. 6	685.93	4863.38
199	Maple Grove 1	681.69	4864.72
200	Maple Grove 2	681.77	4864.63
201	Maple Grove 3	681.89	4864.51
202	Maple Grove 4	681.97	4864.44
203	Maple Grove 5	681.94	4864.68
204	Maple Grove 6	682.05	4864.59

Table 3-9 Summary of Special Receptors Considered in the Dispersion Modelling

ID	Description	UTM Easting (km)	UTM Northing (km)
205	Maple Grove 7	682.17	4864.63
206	Maple Grove 8	682.26	4864.52
207	Maple Grove 9	682.38	4864.59
208	Maple Grove 10	682.46	4864.50
209	Port Darlington 1	686.23	4861.16
210	Port Darlington 2	686.18	4861.25
211	Port Darlington 3	686.15	4861.29
212	Port Darlington 4	686.35	4861.34
213	Port Darlington 5	686.41	4861.45
214	Port Darlington 6	686.50	4861.60
215	Port Darlington 7	686.70	4861.79
216	Port Darlington 8	686.90	4861.96
217	Port Darlington 9	686.87	4862.12
218	Port Darlington 10	687.19	4862.05
219	Port Darlington 11	687.52	4862.13
220	Campground 1	678.65	4860.34
221	Campground 2	678.41	4860.15
222	Campground 3	678.65	4860.05
223	Campground 4	678.73	4859.86
224	Campground 5	678.51	4859.81
225	Campground 6	678.87	4859.70
226	Campground 7	678.72	4860.20
227	Campground 8	678.80	4860.01
228	Campground 9	678.85	4859.85
229	Solina 1	681.10	4861.68
230	Solina 2	681.12	4861.86
231	Solina 3	680.99	4861.98
232	Solina 4	680.97	4862.07
233	Solina 5	681.02	4862.09
234	Solina 6	680.94	4862.12
235	Solina 7	680.99	4862.18
236	Solina 8	680.98	4862.21
237	Solina 9	680.96	4862.29
238	Solina 10	680.86	4862.32
239	Solina 11	680.99	4862.40

Table 3-9 Summary of Special Receptors Considered in the Dispersion Modelling

ID	Description	UTM Easting (km)	UTM Northing (km)
240	Recreational 1	681.54	4860.87
241	Recreational 2	681.56	4860.69
242	Recreational 3	681.58	4860.61
243	Recreational 6	681.88	4860.25
244	Recreational 7	682.17	4860.32
245	Darlington 1	679.57	4861.05
246	Darlington 2	679.45	4861.05
247	Darlington 3	679.13	4860.95
248	Darlington 4	679.11	4860.94
249	Darlington 5	679.06	4860.99
250	Darlington 6	679.08	4860.93
251	Darlington 7	678.81	4860.84
252	Darlington 8	678.84	4860.78
253	Light Ind. 1	680.00	4861.03
254	Light Ind. 2	680.06	4861.06
255	Light Ind. 3	680.29	4861.15
256	Light Ind. 4	680.54	4861.20
257	Light Ind. 5	680.35	4861.29
258	Light Ind. 6	680.31	4861.28
259	Light Ind. 7	680.27	4861.26
260	Light Ind. 8	680.23	4861.25
261	Light Ind. 9	680.18	4861.23
262	Light Ind. 10	680.09	4861.19
263	Light Ind. 11	680.07	4861.25
264	Light Ind. 12	680.02	4861.19
265	Future Industrial 7	680.82	4860.22
266	Future Industrial 8	680.40	4860.73
267	Future Industrial 1	680.36	4859.96
268	Future Industrial 2	680.08	4859.99
269	Future Industrial 3	680.82	4860.71
270	Future Industrial 4	681.07	4859.94
271	Future Industrial 5	679.90	4860.07
272	Future Industrial 6	680.13	4860.69
273	Future Industrial 11	680.25	4860.26
274	Future Industrial 12	679.90	4860.51

Table 3-9 Summary of Special Receptors Considered in the Dispersion Modelling

ID	Description	UTM Easting (km)	UTM Northing (km)
275	Farm D	679.87	4860.45
276	Farm E	679.28	4859.98
277	Residence	679.39	4860.65
278	Farm F	679.26	4860.57
279	Residence	680.15	4861.30
280	Residence	679.94	4861.21
281	Farm G	680.86	4861.46
282	Farm H	681.39	4861.67
283	Residence	680.68	4861.60
284	Business	680.06	4861.34
285	Farm I	679.68	4861.21
286	Farm J	681.34	4861.79
287	Youth Centre	685.64	4864.81
288	Bowmanville Arena	685.46	4864.62
289	Bowmanville Rec. Complex	684.16	4864.60
290	Recreation Complex	684.59	4862.41
291	Superdog Central	681.49	4865.72
292	Equestrian Centre	681.57	4863.67
293	Flea Market	678.57	4862.82
294	Equestrian Centre	680.03	4867.32
295	Courtice Community Complex	678.10	4864.63
296	Former Restaurant	679.83	4860.70
297	Commercial	679.36	4861.02
298	GM Oshawa Headquarters	676.42	4860.46
299	Farm K	682.97	4862.20
300	Farm L	683.55	4861.96
301	Farm M	682.55	4862.32
302	Farm N	683.24	4862.39
303	Farm O	682.51	4862.86
304	Farm P	683.13	4863.65
305	Bennett 1	688.21	4862.51
306	Bennett 2	687.99	4863.22
307	Bennett 3	688.82	4862.84
308	Bennett 4	689.05	4863.37
309	Bennett 5	688.27	4863.76

Table 3-9 Summary of Special Receptors Considered in the Dispersion Modelling

ID	Description	UTM Easting (km)	UTM Northing (km)
310	Bennett 6	689.91	4863.10
311	Bennett 7	688.93	4864.39
312	Bennett 8	689.68	4863.84
313	Soper 1	687.56	4862.51
314	Soper 2	687.24	4863.17
315	Soper 3	687.02	4863.90
316	Soper 4	688.16	4865.39
317	Soper 5	685.03	4868.25
318	Soper 6	687.29	4867.04
319	Soper 7	685.68	4867.15
320	Soper 8	686.75	4865.87
321	Bowmanville 1	687.03	4862.37
322	Bowmanville 2	686.63	4863.02
323	Bowmanville 3	683.38	4865.37
324	Bowmanville 4	683.11	4867.15
325	Bowmanville 5	682.45	4869.42
326	Bowmanville 6	684.78	4864.89
327	Bowmanville 7	684.55	4866.40
328	Upper Tooley 1	679.94	4864.88
329	Upper Tooley 2	679.06	4863.89
330	Upper Tooley 3	679.71	4862.77
331	Upper Tooley 4	678.90	4861.80
332	Upper Tooley 5	680.35	4862.16
333	Upper Tooley 6	679.82	4861.63
334	Robinson 1	678.43	4860.94
335	Robinson 2	677.75	4861.24
336	Robinson 3	677.64	4861.79
337	Robinson 4	678.53	4862.14
338	Robinson 5	678.01	4862.78
339	Robinson 6	677.88	4860.59
340	F/B 1	677.44	4867.86
341	F/B 2	679.67	4866.61
342	F/B 3	678.66	4867.47
343	F/B 4	676.19	4866.84
344	F/B 5	678.27	4866.09

Table 3-9 Summary of Special Receptors Considered in the Dispersion Modelling

ID	Description	UTM Easting (km)	UTM Northing (km)
345	F/B 6	681.24	4867.10
346	F/B 7	682.17	4868.08
347	F/B 8	679.37	4868.63
348	F/B 9	680.31	4869.97
349	F/B 10	676.49	4869.29
350	F/B 11	676.85	4865.41
351	F/B 12	681.15	4868.68
352	F/B 13	675.42	4859.83
353	Second 1	675.15	4860.55
354	Second 2	675.30	4860.89
355	Second 3	675.65	4860.64
356	Second 4	675.67	4860.08
357	Second 5	676.04	4860.32
358	Second 6	675.92	4859.82
359	McLaughlin Bay 1	676.71	4860.90
360	McLaughlin Bay 2	677.31	4860.53
361	McLaughlin Bay 3	676.56	4860.26
362	McLaughlin Bay 4	676.70	4859.70
363	McLaughlin Bay 5	677.56	4860.06
364	McLaughlin Bay 6	678.20	4859.83
365	Harmony Creek 1	674.18	4861.02
366	Harmony Creek 2	674.59	4862.61
367	Harmony Creek 3	672.86	4862.81
368	Harmony Creek 4	675.67	4864.47
369	Harmony Creek 5	672.44	4864.71
370	Harmony Creek 6	674.83	4866.91
371	Harmony Creek 7	675.80	4868.59
372	Westside 1	686.08	4862.78
373	Westside 2	685.78	4862.14
374	Westside 3	685.08	4862.83
375	Darlington 1	680.98	4865.67
376	Darlington 2	680.91	4863.97
377	Darlington 3	682.60	4863.66
378	Darlington 4	682.21	4862.91
379	Darlington 5	683.22	4861.11

Table 3-9 Summary of Special Receptors Considered in the Dispersion Modelling

ID	Description	UTM Easting (km)	UTM Northing (km)
380	Darlington 6	683.95	4862.36
381	Darlington 7	685.36	4861.14
382	Bennett ECO/HH	688.61	4862.63
383	Oshawa ECO/HH	673.88	4859.13
384	Oshawa Creek 1	671.67	4862.79
385	Oshawa Creek 2	671.67	4861.59
386	Oshawa Creek 3	672.82	4861.29
387	Oshawa Creek 4	672.36	4860.26
388	Oshawa Creek 5	673.92	4860.12
389	Oshawa Creek 6	673.15	4859.42
390	Farm Q	677.41	4861.05
391	Commercial Market	688.28	4864.70

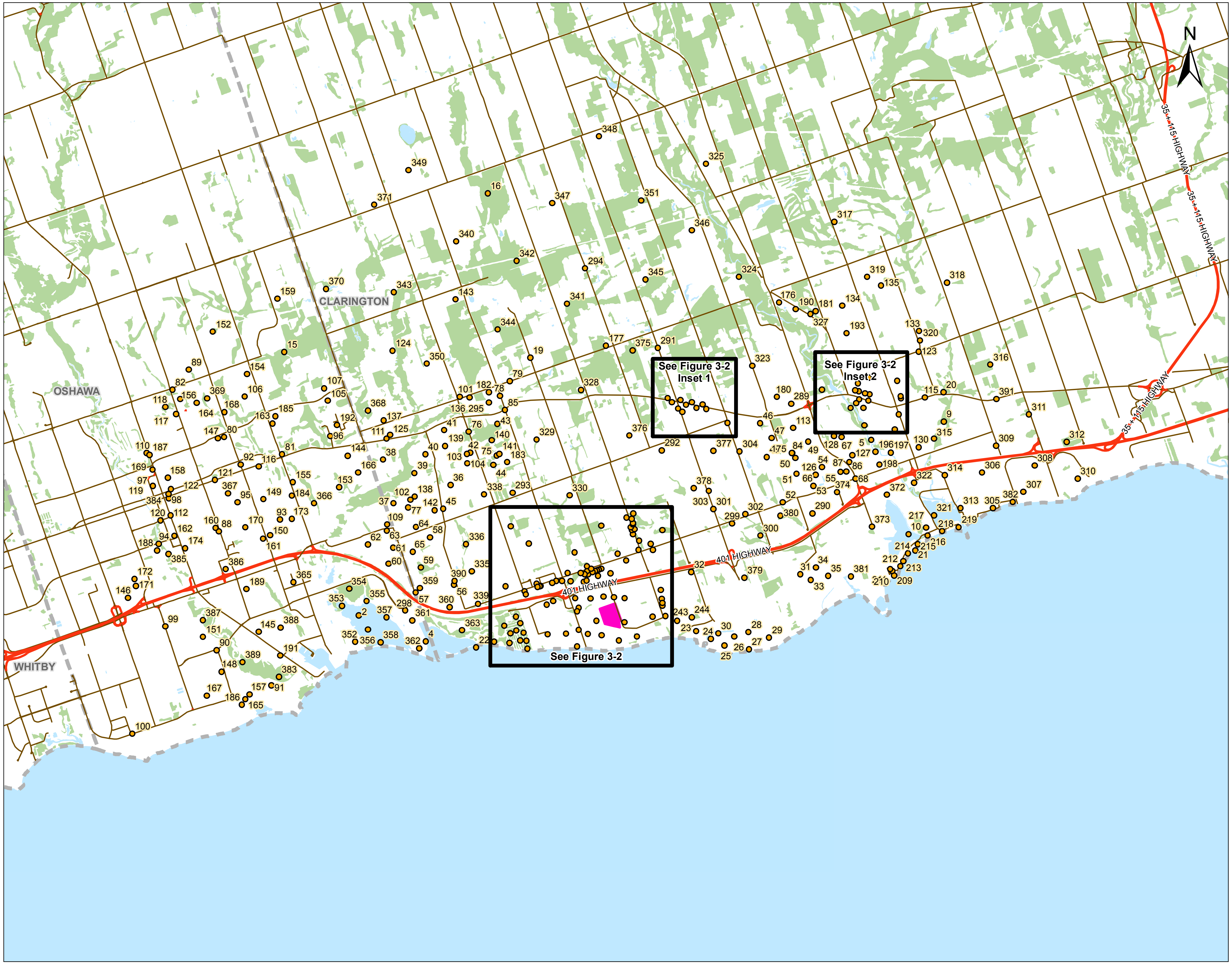
3.2.4 Local Air Quality

Jacques Whitford Stantec Limited conducted ambient air quality monitoring in the vicinity of the Site from September 2007 to December 2008. The monitoring station was located on the west side of Courtice Road, approximately 1.5 km south of Highway 401, and within the fenced area of the project office for the water pollution control plant. The location was approximately 2 km southwest from the Site. The purpose of the monitoring program was to develop a long-term ambient data set at the Site, which is required to develop suitable background ambient concentrations for use in the Environmental Assessment, Air Quality permitting, and Human Health and Ecological Risk Assessment.

Continuous ambient air quality monitoring of Criteria Air Contaminants (CACs) was conducted at the Courtice Road station for Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_X), Carbon Monoxide (CO), Ozone (O_3), and Particulate Matter smaller than 2.5 microns ($PM_{2.5}$). Hi-volume air samplers were installed to collect 24-hour average samples of Total Suspended Particulate (TSP) and metals, Polycyclic Aromatic Hydrocarbons (PAHs), and Dioxins and Furans (D/Fs). Ambient monitoring data from the Courtice Road station were compared with monitoring data collected at available monitoring stations operated by the Ontario Ministry of the Environment (MOE) to compare the levels in the vicinity of the Facility to other locations in Ontario.

YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

Locations of Sensitive Receptors



Data Provided By: Ministry of Natural Resources, 2008
Produced by Jacques Whitford under Licence with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2004-2009

- Sensitive Receptor Location
- Collector
- Highway
- Proposed EFW Facility Site
- Waterbody
- Wooded Area
- Municipal Lower tier Boundaries

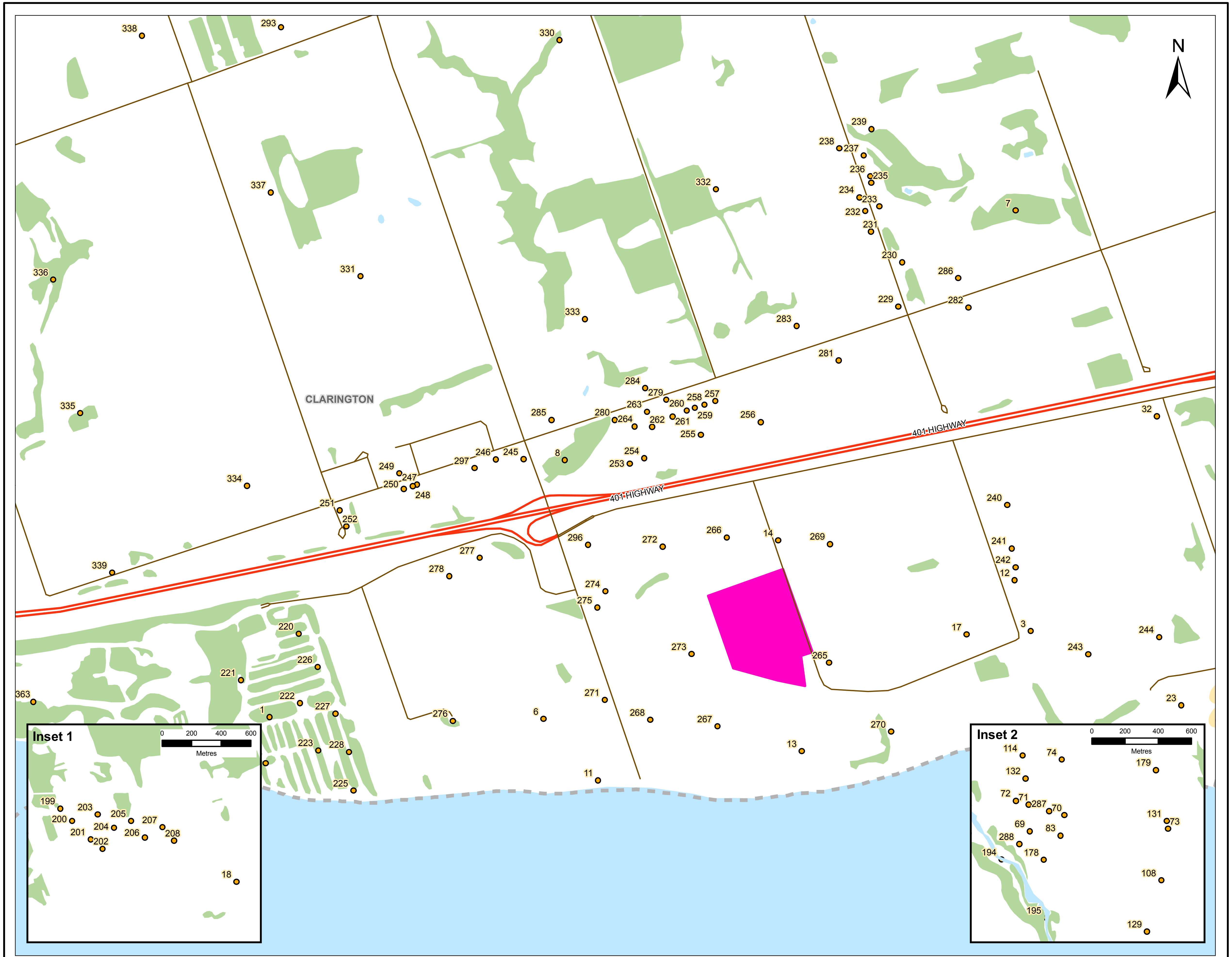
0 1 2 3
Kilomteres

1009497-041

Jacques Whitford

FIGURE NO.
3-1

Last Modified: May 5, 2009 By: S.Allen



YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

Detailed Locations of Sensitive Receptors as Indicated on Figure 3-2

Data Provided By: Ministry of Natural Resources, 2008
Produced by Jacques Whitford under Licence with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2004-2009

- Sensitive Receptor Location
- Collector
- Highway
- Waterbody
- Proposed EFW Facility Site

0 150 300 450
Metres

1009497-042

Jacques Whitford

FIGURE NO.
3-2

Last Modified: May 5, 2009 By: S.Allen

In addition to the ambient monitoring data collected at the Courtice Road station, data from monitoring stations operated under the National Air Pollution Surveillance (NAPS) Network by Environment Canada were used to characterize regional air quality and to develop background concentration levels for volatile organic compounds (VOCs), chlorinated monocyclic aromatics (CMAs), and Polychlorinated Biphenyls (PCB).

A detailed review of available ambient monitoring data is presented in **Appendix A** and is summarized below.

3.2.4.1 Sulphur Dioxide (SO_2)

Based on ambient monitoring at the Courtice monitoring station, hourly, daily and annual average SO_2 concentrations were well below the applicable ambient air quality criteria. The maximum hourly, 24-hour and annual average concentrations measured at the station were 115, 63 and 6 μg/m^3 respectively which are 17%, 23% and 11% of the applicable ambient air quality criteria.

The measured annual average SO_2 concentration of 6 μg/m^3 at the Courtice station is relatively low (less than 55%) when compared with MOE monitoring stations at various Ontario cities including Sarnia, Hamilton and Windsor. SO_2 monitoring at the MOE Oshawa station was discontinued in 2000.

3.2.4.2 Nitrogen Dioxide (NO_2)

NO_2 concentrations measured at the Courtice monitoring station were below the applicable AAQC for all averaging periods. The maximum hourly and 24-hour concentrations measured at the station were 202 and 105 μg/m^3, respectively, which are 51% and 53% of the MOE air quality criteria. Elevated NO_2 levels occur infrequently - hourly average NO_2 concentrations above 150 μg/m^3 occurred less than 0.1% of the time during the monitoring period, and daily average NO_2 concentrations above 100 μg/m^3 occurred approximately 0.2% of the time.

The measured annual average NO_2 level at the Courtice Road station was similar to that in other urbanized area of Ontario such as Toronto, Hamilton and Windsor, and was well below the annual NAAQO maximum desirable level of 60 μg/m^3. The Courtice monitoring station was situated about 1.5-km south of Highway 401, whose vehicle traffic is a significant source of nitrogen oxides. Stationary sources in the vicinity of the monitoring station that may contribute to the measured NO_2 levels include St. Marys Cement and the new water pollution control plant to the east of the monitoring station (which contains a ground-based flare). It is likely that the NO_2 levels measured at the station reflect its proximity to the highway and these stationary sources.

3.2.4.3 Particulate Matter less than 2.5 Microns ($PM_{2.5}$)

$PM_{2.5}$ monitoring was conducted at the Courtice Road monitoring station, and has been conducted at the MOE Oshawa station since 2001. The maximum daily average concentration measured at the MOE Oshawa station in 2007 was 38 μg/m^3 (microgram per cubic metre) while the average concentration was 6.8 μg/m^3. The 98th percentile, annual ambient measurement averaged over 3 years (2005 to 2007) for the MOE Oshawa station is 29 μg/m^3 and is just less than the CWS criteria of 30 μg/m^3.

The 98th percentile, annual ambient measurement averaged over the 15 month monitoring period at the Courtice Road station is 29 µg/m^3, which is indicative that $PM_{2.5}$ levels in the vicinity of the Facility are slightly below the CWS.

3.2.4.4 Ozone (O_3)

Ground level O_3 concentrations in Oshawa are generally high. The maximum measured O_3 concentration measured at the MOE Oshawa station was above the eight hour average CWS during 2007. Annual mean levels have an increasing trend from 1998 to 2007 and have exceeded the NAAQC of 30 µg/m^3, varying from 42 to 56 µg/m^3.

The maximum hourly, 8-hour, 24-hour and annual average concentrations measured at the station were 115.7, 86, 78.0 and 29.9 µg/m^3 respectively which are 70%, 67%, 156% and 99.7 % of the air quality criteria. The daily average O_3 concentrations were above the NAAQO approximately 6% of the time.

The MOE also reports that in 2007 the 24-hour NAAQO maximum acceptable level of 50 µg/m^3 was exceeded at all 40 stations where ozone measurements were taken. There were no exceedances recorded for the hourly NAAQO. As ozone is generated by complex chemical reactions in the atmosphere which occur over distances of 10s to 100s of kilometres from precursor emissions sources, this points to ozone as being a regional rather than local air quality issue.

3.2.4.5 Dioxins and Furans

Dioxins and furans (D/Fs) were monitored at the Courtice Station using a using a manually operated hi-volume sampler to collect 24-hour average samples. The total maximum measured toxic equivalent D/F concentration (0.041 pg TEQ/m^3) was well below the applicable criteria (less than 2% of the criteria).

3.2.4.6 Polycyclic Aromatic Hydrocarbons

Polycyclic Aromatic Hydrocarbons (PAHs) were monitored at the Courtice Station using a hi-volume sampler to collect 24-hour average samples. All PAHs were below their respective MOE criteria, at the most 0.3% of the criteria (acenaphthylene).

3.2.4.7 Metals

Metals and total suspended particulates (TSP) were monitored at the Courtice Station using a hi-volume sampler to collect 24-hour average samples. The maximum measured concentrations of all metals with MOE air quality criteria were below their applicable criteria. Of all the metals in the CoPC list, aluminum had the highest measured ambient concentration relative to its air quality criteria (9% of the criteria).

3.2.4.8 Volatile Organic Compounds (VOCs)

VOCs data from the years 2006 to 2008, primarily from three NAPS Toronto stations and the NAPs Newmarket station, were reviewed and used to conservatively characterise ambient VOC levels in the vicinity of the Facility. All maximum measured VOC concentrations were below their applicable air quality criteria.

3.2.4.9 Chlorinated Monocyclic Aromatics (CMAs)

Data for CMAs from the years 2006 to 2008 were extracted from three NAPs Toronto stations and the NAPs Newmarket station and used to conservatively characterise ambient CMA levels in the vicinity of the Facility. Hexachlorobenzene (HCB) and pentachlorophenol (PCP) data were only available at one of the Toronto NAPs station. All maximum measured CMA concentrations were below their applicable air quality criteria.

3.2.4.10 Polychlorinated Biphenyls (PCBs)

PCB monitoring data from the years 2006 to 2008 were extracted from two Toronto NAPs stations for use in conservatively representing ambient PCB levels in the vicinity of the Facility. The maximum measured PCB concentrations were below their applicable air quality criteria.

3.2.4.11 Background Concentration Levels

Background concentrations are used in dispersion modelling to represent the cumulative effect of other emissions sources (i.e., both anthropogenic and biogenic) in addition to the sources being included in the dispersion modelling. The MOE requires that 90th percentile ambient monitoring data be added to the dispersion model predictions to conservatively account for existing ambient concentrations. The background levels used in this study were therefore the 90^{th} percentile values for short-term averages. For annual averages, an annual average value was used as the background level.

Background concentrations for criteria air contaminants, PAHs, D/Fs and metals were developed from the Courtice Road ambient monitoring data. For VOCs, CMAs and PCB, background concentrations were developed using monitoring data from Environment Canada NAPs stations. Details of the methodology used to develop the background concentrations are presented in **Appendix A**.

A summary of background ambient concentrations developed for use in the Air Quality and Human Health and Ecological Risk Assessments is presented in Table 3-10.

Table 3-10 Summary of Background Concentrations used in the Air Quality Assessment

Contaminant	1 Hour – Average ($\mu g/m^3$)	8 - Hour – Average ($\mu g/m^3$)	24 Hour Average ($\mu g/m^3$)	Annual Average ($\mu g/m^3$)
Criteria Air Contaminants				
Sulphur Dioxide (SO_2)	19.5	N/A	19.3	5.9
Nitrogen Dioxide (NO_2)	64.6	N/A	58.2	37
Carbon Monoxide (CO)	1035	1036	1029	632
Particulate Matter PM_{10}	N/A	N/A	N/A	N/A
Particulate Matter $PM_{2.5}$	22.8	N/A	20.4	9.8
Total Particulate Matter	86.2	N/A	35.4	21.3
Polycyclic Aromatic Hydrocarbons and Dioxins and Furans	**1 Hour – Average ($\mu g/m^3$)**		**24 Hour Average ($\mu g/m^3$)**	**Annual Average ($\mu g/m^3$)**
Acenaphthylene	7.53E-04		3.09E-04	1.58E-04
Acenaphthene	3.04E-03		1.25E-03	5.48E-04
Anthracene	3.97E-04		1.63E-04	8.00E-05
Benzo(a)anthracene	1.65E-04		6.77E-05	5.63E-05
Benzo(b)fluoranthene	3.45E-04		1.42E-04	7.56E-05
Benzo(k)fluoranthene	1.65E-04		6.77E-05	5.63E-05
Benzo(a)fluorine	3.30E-04		1.35E-04	1.13E-04
Benzo(b)fluorine	3.30E-04		1.35E-04	1.13E-04
Benzo(ghi)perylene	1.72E-04		7.07E-05	5.85E-05
Benzo(a)pyrene	1.65E-04		6.77E-05	5.63E-05
Benzo(e)pyrene	3.30E-04		1.35E-04	1.13E-04
Biphenyl	3.32E-03		1.36E-03	5.21E-04
2-chloro0phthalene	3.30E-04		1.35E-04	1.13E-04
Chrysene	2.35E-04		9.64E-05	6.47E-05
Coronene	3.30E-04		1.35E-04	1.13E-04
Dibenzo(a,c)anthracene	N/A		N/A	N/A
Dibenzo(a,h)anthracene	1.65E-04		6.77E-05	5.63E-05
Dibenzo(a,e)pyrene	6.60E-04		2.71E-04	2.25E-04
9,10 – dimethylanthracene	1.32E-03		5.42E-04	4.51E-04
7,12 – dimethylbenzo(a)anthracene	3.30E-04		1.35E-04	1.13E-04
Fluoranthene	1.46E-03		6.01E-04	3.93E-04
Fluorine	N/A		N/A	N/A
Indeno(1,2,3 – cd)pyrene	1.65E-04		6.77E-05	5.63E-05
2 – methylanthracene	3.30E-04		1.35E-04	1.13E-04
3 – methylcholanthrene	6.60E-03		2.71E-03	2.25E-03
1 – methyl0phthalene	3.17E-03		1.30E-03	4.43E-04
2 – methyl0phthalene	5.33E-03		2.19E-03	7.56E-04
1 – methylphe0nthrene	3.30E-04		1.35E-04	1.13E-04
9 – methylphe0nthrene	N/A		N/A	N/A

Table 3-10 Summary of Background Concentrations used in the Air Quality Assessment

Polycyclic Aromatic Hydrocarbons and Dioxins and Furans	1 Hour – Average (µg/m^3)	24 Hour Average (µg/m^3)	Annual Average (µg/m^3)
Naphthalene	5.91E-03	2.43E-03	8.59E-04
Perylene	3.30E-04	1.35E-04	1.13E-04
Phenanthrene	6.26E-03	2.57E-03	1.71E-03
Picene	N/A	N/A	N/A
Pyrene	6.88E-04	2.83E-04	1.83E-04
Quinoline	1.32E-03	5.42E-04	4.51E-04
Tetralin	3.30E-04	1.35E-04	1.13E-04
Triphenylene	N/A	N/A	N/A
O-terphenyl	3.30E-04	1.35E-04	1.13E-04
M-terphenyl	3.30E-04	1.35E-04	1.13E-04
P-terphenyl	3.30E-04	1.35E-04	1.13E-04
Dioxins (as TEQ Toxic Equivalents)	5.77E-08	2.37E-08	1.66E-08
Metals	**1 Hour – Average (µg/m^3)**	**24 Hour Average (µg/m^3)**	**Annual Average (µg/m^3)**
Aluminum	5.17E-01	2.13E-01	1.14E-01
Antimony	7.35E-03	3.02E-03	2.93E-03
Arsenic	4.41E-03	1.81E-03	1.80E-03
Barium	1.99E-02	8.18E-03	4.95E-03
Beryllium	7.35E-04	3.02E-04	2.98E-04
Boron	1.85E-01	7.60E-02	1.54E-02
Cadmium (Cd)	1.47E-03	6.04E-04	6.01E-04
Cadmium and Thallium (Cd + Th)	N/A	N/A	N/A
Chromium (hexavalent)	N/A	N/A	N/A
Total Chromium (and compounds)	6.72E-03	2.76E-03	1.71E-03
Cobalt	1.47E-03	6.04E-04	5.96E-04
Lead (Pb)	1.21E-02	4.98E-03	3.29E-03
Mercury (Hg) - Vapour/Particulate phase	N/A	N/A	N/A
Nickel	1.09E-02	4.49E-03	2.24E-03
Phosphorus	1.75E-01	7.19E-02	4.67E-02
Silver	8.33E-04	3.42E-04	3.43E-04
Selenium	7.35E-03	3.02E-03	2.93E-03
Thallium	N/A	N/A	N/A
Tin	7.35E-03	3.02E-03	2.93E-03
Vanadium	3.77E-03	1.55E-03	7.70E-04
Zinc	1.03E-01	4.24E-02	2.54E-02
Sum of (As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb)	5.15E-01	2.12E-01	1.05E-01

Table 3-10 Summary of Background Concentrations used in the Air Quality Assessment

VOCs	1 Hour – Average (µg/m^3)	24 Hour Average (µg/m^3)	Annual Average (µg/m^3)
Acetaldehyde	4.3E+00	1.8E+00	1.0E+00
Acetone	1.1E+01	4.7E+00	3.4E+00
Benzene	2.9E+01	1.2E+01	3.9E+00
Bromodichloromethane	4.2E-02	1.7E-02	1.1E-02
Bromoform	7.2E-02	2.9E-02	2.3E-02
Bromomethane	2.2E-01	8.8E-02	9.8E-02
Butadiene, 1,3 -	4.8E-01	2.0E-01	1.2E-01
Butanone, 2 -	1.0E+01	4.1E+00	2.4E+00
Carbon tetrachloride	1.8E+00	7.4E-01	6.1E-01
Chloroform	5.5E-01	2.3E-01	1.6E-01
Cumene	1.7E-01	6.9E-02	3.8E-02
Dibromochloromethane	2.3E-02	9.4E-03	6.7E-03
Dichlorodifluoromethane	7.9E+00	3.2E+00	2.8E+00
Dichloroethane, 1,2 -	1.6E-01	6.6E-02	5.6E-02
Dichloroethane, trans – 1,2 -	2.1E-02	8.8E-03	2.8E-03
Dichloroethene, 1,1 -	6.1E-03	2.5E-03	5.8E-04
Dichloropropane, 1,2 -	4.6E-02	1.9E-02	1.5E-02
Ethylbenzene	3.0E+00	1.2E+00	6.9E-01
Ethylene Dibromide	1.3E-02	5.2E-03	1.8E-03
Formaldehyde	8.2E+00	3.4E+00	1.7E+00
Mesitylene	9.0E-01	3.7E-01	2.0E-01
Methylene chloride	3.1E+00	1.3E+00	7.6E-01
Styrene	5.6E+00	2.3E+00	1.3E+00
Tetrachloroethene	1.2E+00	4.9E-01	2.6E-01
Toluene	2.3E+01	9.5E+00	4.4E+00
Trichloroethane, 1,1,1 -	2.8E-01	1.1E-01	9.8E-02
Trichloroethene1	1.3E+00	5.4E-01	2.7E-01
Trichloroethylene, 1,1,2 -1	1.3E+00	5.4E-01	2.7E-01
Trichlorofluoromethane	5.2E+00	2.1E+00	1.9E+00
Trichlorotrifluoroethane	2.0E+00	8.1E-01	6.9E-01
Vinyl chloride	1.4E-02	5.9E-03	3.6E-03
Xylenes, m-, p- and o-	1.2E+01	4.8E+00	2.8E+00

Table 3-10 Summary of Background Concentrations used in the Air Quality Assessment

Chlorinated monocyclic aromatics	1 Hour – Average ($\mu g/m^3$)	24 Hour Average ($\mu g/m^3$)	Annual Average ($\mu g/m^3$)
1,2-Dichlorobenzene	2.63E-02	1.08E-02	4.66E-03
1,2,4,5-Tetrachlorobenzene	N/A	N/A	N/A
1,2,4-Trichlorobenzene	1.12E-01	4.58E-02	1.69E-02
2,3,4,6-Tetrachlorophenol	N/A	N/A	N/A
2,4,6-Trichlorophenol	N/A	N/A	N/A
2,4-Dichlorophenol	N/A	N/A	N/A
Pentachlorophenol	2.13E-03	8.76E-04	4.10E-04
Hexachlorobenzene	1.52E-04	6.25E-05	5.27E-05
Pentachlorobenzene	N/A	N/A	N/A
Polychlorinated Biphenyls	**1 Hour – Average ($\mu g/m^3$)**	**24 Hour Average ($\mu g/m^3$)**	**Annual Average ($\mu g/m^3$)**
Polychlorinated Biphenyls (PCB)	1.0E-04	4.2E-05	1.9E-05

Notes:

1. N/A – No background ambient monitoring data available for this contaminant.

4.0 EMISSION INVENTORY

The emissions inventory was based on available data on stack testing of similar units, published emission factors (i.e., AP-42) or manufacturer emissions guarantees. Emissions estimates are expected to conservative and represent worst-case short-term emissions from the Facility.

The range of operating conditions considered for the emissions inventory included normal operations as well process upsets, such as start-up and shut down.

4.1 Facility Description

The following sections describe the Facility operations and the equipment.

4.1.1 Facility Description

The Proposed Thermal Treatment Facility (the Facility) will initially process about 140,000 tonnes of municipal solid waste annually and may have a maximum design capacity of 400,000 tonnes of waste per year. For the initial 140,000 tpy Facility, there will be two completely independent waste processing trains at the Facility. Each train will consist of a feed chute, stoker, integrated furnace/boiler, acid gas scrubber, a fabric filter baghouse and associated ash and residue collection systems. Steam produced in the boilers will drive a turbine-generator to produce electricity for delivery to the grid, for in-plant use and potentially to provide district heating to the neighbouring Courtice Water Pollution Control Plant and Clarington Energy Business Park.

A Facility with a maximum design capcity of 400,000 tpy was also assessed. This capacity would be achieved by expanding the baseline 140,000 tpy Facility in two phases. The Phase I expansion would increase the total Facility waste processing capacity to 250,000 tpy, while the Phase II expansion would increase the Facility capacity to 400,000 tpy. The 400,000 tpy Facility would include the two completely independent waste processing trains installed for the 140,000 tpy Facility (each 70,000 tpy), a single independent 110,000 tpy train (installed in the Phase I expansion) and a single independent 150,000 tpy train (installed in the Phase II expansion). The emissions from the Phase I expansion would exhaust from a second flue installed in the stack built for the 140,000 tpy Facility, while the emissions from the Phase II expansion would be exhausted from a new independent stack, identical in height to that of the 140,000 tpy Facility stack. The Phase II expansion would be enclosed in new buildings onsite and include a second tipping building, refuse building, process building. Each train in the expanded Facility would utilize identical processing technologies and APC equipment, appropriately sized to the process train throughput.

A Site plan showing the layout of the initial 140,000 tpy scenario Facility is presented in Figure 4-1 and a site plan of the 400,000 tpy scenario Facility is shown in Figure 4-2. Simplified process flow diagrams of the Facility's operations, for both the 140,000 and 400,000 tpy design options are provided in **Appendix B.** Three-dimensional views of buildings and stacks for both design options are provided in **Appendix D**, Figures D3-1 and D3-2.

The following sub-sections describe the various operational components of the Facility, with particular focus on the waste processing train. The technology and process for each of the proposed trains would be identical to that described below but of varying capacity.

4.1.1.1 Waste Receiving, Storage and Handling

Refuse would be delivered to the Facility in standard packer vehicles or fully enclosed transfer trailers with capacities up to 92 m^3. Upon entering the Facility an automated truck scale would be used to weigh each truck in order to maintain an accurate accounting of all refuse delivered to the Facility.

After being weighed, incoming refuse trucks would proceed directly to a tipping building. In the 140,000 tpy Facility there would be a single tipping building, while in the 400,000 tpy Facility an additional tipping building would be built. The tipping area would be totally enclosed with two motor operated entrance/exit doors. The doors would remain closed except for when vehicles are entering or exiting the tipping building. The normal flow of solid waste trucks would be through entrance and exit doors located on opposite sides of the tipping building. Multiple tipping bays would be provided at the pit to allow simultaneous discharge of waste from multiple vehicles. Barriers would be provided at each tipping bay to prevent vehicles from backing into the storage pit. The tipping floor would be sloped towards the pit to permit wash down of the area. The storage pit would be sized to allow continued firing of the system over weekends and holidays. Four days of storage would be provided and distributed above and below the tipping floor level.

After discharging their load, the trucks leaving the tipping buildings would be weighed on a second scale as they exit the property to maintain a record of all residues, recovered ferrous and non-ferrous metals and unprocessed waste removed from the Facility.

In the tipping building(s), mobile equipment would be used to remove any non-processible items that need to be retrieved from the pit. Two overhead traveling bridge cranes with grapples would be used to mix refuse and transfer it from the pit to the charging hoppers of the furnaces. One of the cranes would be used to keep the tipping bay cleared and combustion units properly charged. The second crane provides backup and could be used during peak delivery times to assist in refuse pit management. The cranes span the entire length and width of the refuse storage pit, furnace hopper, and charging floor.

The tipping building(s) would be designed to draw combustion air from above the storage pit. This would maintain a negative pressure in the tipping building and help prevent the escape of dust and odour from the Facility. When the entrance/exit doors are closed during non-delivery hours, combustion air would be admitted to the tipping area from outside the buildings through manually operable louvers in the tipping building walls.

4.1.1.2 Refuse Combustion

Stoker

Each of the waste processing trains begins with the stoker. After being charged into the feed chute hoppers, the refuse would be metered onto the surface of a Martin stoker from the bottom of the feed chutes by hydraulic feed rams. The feed rams would be designed to provide an even distribution of refuse over the entire width of the grate. The proprietary reverse-reciprocating action of the Martin stoker grate agitates the fuel bed continuously in a manner which causes the refuse to burn from the bottom of the refuse bed, resulting in thorough burnout of combustible matter.

The grate bars of the Martin stoker are machined on their sides to achieve intimate contact between adjacent bars. Combustion air would be admitted to the refuse layer through specially designed air slots that would also be machined into the stoker grate bars. This feature ensures that consistent air distribution and proper combustion conditions would be maintained across the surface of the stoker at all times. It also minimizes the dropout of siftings between the grate bars and ensures high stoker combustion efficiency and low emissions of hydrocarbons, carbon monoxide and organic compounds relative to other stoker designs.

A series of five plenum chambers along the length of each grate run would admit primary combustion air at rates precisely controlled to suit the combustion conditions of each burning zone as the refuse moves from feed end to discharge. Dampers would control the air rate to the first four zones. Underfire air flow to the fifth zone is taken from the fourth zone. The dampers would be designed to individually regulate the amount of air fed into the various zones of each grate run. The Martin stokers would include a Covanta VLN™ system, which varies the excess air and secondary (overfire) air and uses an internal recirculated gas system to reduce the NO_x generated in the furnace as well as increasing the overall boiler efficiency.

Each stoker would be furnished with a Martin residue discharger that receives the stoker residue (burned-out material) and cools it in quench bath(s).

Furnace

For each train, the boiler furnace/combustion chamber would be located above the stoker grate and would be constructed of gas-tight, continuously welded waterwalls down to the grate surface. In the combustion chamber, unburned gases would be directed into a high temperature combustion zone. This permits the maximum burnout of non-aqueous condensable matter and eliminates odours. The combustion chamber exit temperature would be sufficiently high to destroy odorous vapours. At the furnace throat, overfire air nozzles would provide additional oxygen to combust unburned gases such as carbon monoxide and hydrocarbons.

Following combustion in the furnace, the products of combustion (flue gases) would pass through the boiler convection section, a superheater and an economizer. In the boiler convection section the flue gas would pass through screen tubes at the outlet of the furnace and flow downward through a platen style superheater section and its membrane water wall enclosure, thereby lowering gas temperature. As the flue gas leaves the convection surface, it enters and flows across the boiler superheater tube surface wherein the boiler steam would be superheated. This transfer of heat continues to lower flue gas temperature. Finally the flue gas passes across the boiler economizer tube surfaces to lower its temperature to the design temperature for entry to the air pollution control system.

The furnace would be designed and operated to minimize the concentration of combustion-related pollutants such as carbon monoxide and hydrocarbons. The boiler design would incorporate state-of-the-art features including combustion air distribution and control, location and sizing of heating surfaces and appropriate cleaning methods during operations.

4.1.1.3 Air Pollution Control Equipment

The waste combustion gas leaving the economizer of each train would be treated by an air pollution control system (APC) as follows:

1. Covanta's very low NO_X (VLN) system in the stoker;
2. Selective Non Catalytic reduction (SNCR). The SNCR system would consist of injecting ammonia into the first pass of the boiler resulting in the conversion of NO_X to nitrogen and water vapour. The combination of Covanta's very low NO_X system and the SNCR system would reduce NO_X emissions;
3. Mercury and dioxin/furan emissions would be controlled using a system that injects activated carbon into the flue gas after the economizer;
4. Acid gas scrubber. The scrubber removes a large percentage of the acid gases, such as sulphur dioxide and hydrogen chloride. The acid gas scrubber would either be a semi-dry design or a circulating dry design.
   a. In the semi-dry scrubber design, flue gas flows through the cylindrical vertical chamber of the scrubber where it would be intimately mixed with a mixture of lime and water droplets. The water droplets would be evaporated creating a mechanism to neutralize the acid gases and to form a dry entrained particulate.
   b. In the circulating dry scrubber design economizer flue gas is reacted with hydrated lime. Water is injected to maintain optimal humidity for the removal of acid gases. In order to maintain a fluidized bed within the scrubber vessel, ash and lime is re-circulated and re-injected into the scrubber.

   Acid gas removal performance would be controlled by adjusting the quantity of lime injected. Scrubber outlet temperature would be controlled by adjusting the quantity of dilution/spray water added to the scrubber.
5. A fabric filter baghouse to remove solid phase particulate matter. Fly ash particulate, carbon, scrubber reaction products and unreacted lime would be collected and removed from the flue gas by the baghouse. The filter cake which accumulates on the fabric filters also provides a substrate of unreacted lime carried over from the scrubber, allowing additional reaction with acid gases and further reduction of acid gas emissions.

After leaving the air pollution control system, the flue gas would pass through an induced draft fan and discharge to the atmosphere through the stack.

4.1.1.4 Residue Handling

From the quench chamber following the stoker, a hydraulically driven ram would push the residue up an inclined draining/drying chute where a low amplitude electromagnetic vibrator mounted on the chute would vibrate the residue. This vibratory motion acts to separate excess water from the residue, which drains back into the quench bath. The bottom ash containing enough moisture to prevent dusting (15 to 25 percent by weight) would then fall to a heavy duty vibrating pan conveyor with integral grizzly that services all of the boilers.

The vibratory conveyor/grizzly scalper removes large materials from the bottom ash before it is transferred by an enclosed inclined conveyor for transport to the residue storage building. Within the residue storage building a magnetic drum and a vibratory screen would be used to separate ferrous material from the bottom ash, and an eddy current separator would be used to remove the non-ferrous metal from the bottom ash. After separation, each material would be directed into dedicated storage bunkers that would store four days of each material. A front end loader would stack and recast the materials. The front end loader would also load residue trucks that would take the residue to its final location. To minimize any dust escaping to the environment during the conveying and separating process, the residue building would have a filtered ventilation system. The ventilation system would also draw air from the grizzly area up the inclined conveyor enclosure.

Fly ash would be collected separately from bottom ash. The fly ash handling system for each combustion train would collect the fly ash from the convection pass, superheater, economizer and the air pollution control system of that train. It would be collected via intermediate conveyors which would discharge into one of two redundant surge bins. Each surge bin would feed an ash conditioner that would combine and thoroughly mix the ash with Portland cement, pozzolan and water to fix any potentially harmful elements in the fly ash. The conditioned fly ash would then be discharged into the first of seven dedicated conditioned fly ash bunkers in the residue building. Each bunker would hold three days of conditioned fly ash. To maintain a consistent and manageable product, the conditioned fly ash would be turned regularly. After three days, the fly ash would be transferred to the adjacent three-day storage bunker. This process would be repeated as required for a total curing period of up to 21 days (3 days - 7 bunkers). After the fly ash has cured, it would be loaded into transportation vehicles by the front end loader. The conditioned fly ash would be kept separate from the bottom ash in the residue building by compartment walls.

4.1.1.5 Energy Production

The high pressure, superheated steam generated in the boilers would be fed to a turbine-generator, where electricity would be produced. The proposed turbine-generator system consists of one unit sized to handle the steam flow of the facility. Uncontrolled steam turbine extractions would supply the future district heating system, air heaters, the low pressure feedwater heaters and a de-aerator.

Exhaust steam from the turbine would enter an air cooled condenser which would be designed to accept the full turbine exhaust flow at the maximum continuous rating (MCR) steam flow. An independent closed cooling water loop with air-cooled heat exchangers would be provided for auxiliary cooling. The steam generating equipment would be designed to be operated independently of the turbine-generator by bypassing the turbine and routing the superheater outlet steam directly to the air-cooled condenser.

The condensate formed in the condenser would be pumped via condensate pumps through an air ejection condenser, gland steam condenser and low pressure feedwater heaters, where it would be heated prior to delivery to the deaerator. From the deaerator, heated feedwater would be pumped to the boilers' economizers. Two 50% capacity electric motor driven boiler feedwater pumps and one 100% capacity steam turbine driven boiler feedwater pump would be provided.

The electrical connection would consist of a step-up transformer, circuit breakers and other equipment and auxiliaries to convert the generator output voltage of 13.8 kV to 44 kV. The system would meet design and operational requirements for interconnection and delivery of electricity to Hydro One. A 200-300 kW emergency diesel generator will be provided for emergency back-up power.

4.1.1.6 Potable, Process and Waste Water

The proposed water and wastewater systems would be designed to provide suitable quality water to each process use. The Facility would be designed to be a zero wastewater discharge facility, with the exception of the Facility's sanitary uses.

Potable water would be used for fire protection, boiler feed water, minimal wash-down water, feed hopper cooling and irrigation. For boiler feed, makeup water would be directed to a two-pass reverse osmosis (RO) unit. Boiler makeup water would be stored in a storage tank and pumped as needed to the deaerator. The process wastewater generated throughout the Facility would be collected and reused wherever possible. Floor trenches would drain to a settling basin and collected wastewater would be used for quenching residue in the ash dischargers. Boiler blowdown and RO reject water would be used as scrubber slaking and dilution water, fly ash conditioning water and supplementary water supply to the settling basin. Sanitary wastewater would be discharged to the sewer.

A chemical feed system would be provided to minimize corrosion of the condensate and feedwater systems and to minimize corrosion, scaling and deposition in the boilers. The corrosion inhibitor system would utilize either ammonia or a filming amine that would be injected into the deaerator outlet piping. The oxygen scavenger system would utilize either sodium bisulphite or equivalent that would be injected into the deaerator. The boiler water chemical treatment system would utilize either phosphate or chelant that would be injected into the boiler drum or economizer inlet pipe.

4.1.2 NAICS Code

The North American Industry Classification System (NAICS) code for the facility will be 5622 – Waste Treatment and Disposal. The NAICS code for the facility is listed in Schedule 5 of Ontario Regulation 419/05.

4.1.3 Operating Schedule

The Facility would generally be operated 24 hours a day, 7 days a week with refuse receiving hours Monday through Saturday.

The furnace/boiler combustion units would be normally operated at unit Maximum Continuous Rating (MCR); however, they would be capable of operating at a Maximum Continuous Turndown (MCTD) point, safely and for extended periods, without supplemental fuel firing.

4.1.4 Potential Facility Emissions Sources

The following potential sources of emissions to the air were identified based on the process descriptions and data supplied by the Vendor for both the 140,000 and 400,000 tpy Facility scenarios. These sources were assessed for their significance following the requirements presented in MOE Guideline A-10 (see **Appendix B**) and the significant sources were included in the air quality assessment.

The following emissions sources were identified based on the Facility with an initial design capacity of 140,000 tpy:

- A conventional stack associated with air pollution control equipment on the waste processing trains which is defined by location, base elevation, stack height, stack diameter, gas exit velocity, gas exit temperature, and contaminant emission rates (the stack typically operates on a continuous basis with relatively constant emission rates);
- One 200-300 kW emergency diesel generator;
- Two 130 kW emergency diesel fire pumps;
- Diesel tanks for the emergency generator and fire pumps;
- Onsite vehicle traffic;
- Comfort heating of the administration and support buildings;
- A welding station in the storage and maintenance shop; and,
- Fugitive emissions associated with refuse, fly ash and bottom ash transport and handling.

The following emission sources would be added to the plant during Phase I and II expansions to a 400,000 tpy Facility:

- A second flue in the 140,000 tpy Facility stack for the Phase I expansion;
- A second conventional stack for the Phase II expansion to 400,000 tpy associated with the air pollution control equipment on the Phase II waste processing train which is defined by location, base elevation, stack height, stack diameter, gas exit velocity, gas exit temperature, and contaminant emission rates;
- A second 200-300 kW emergency diesel generator;

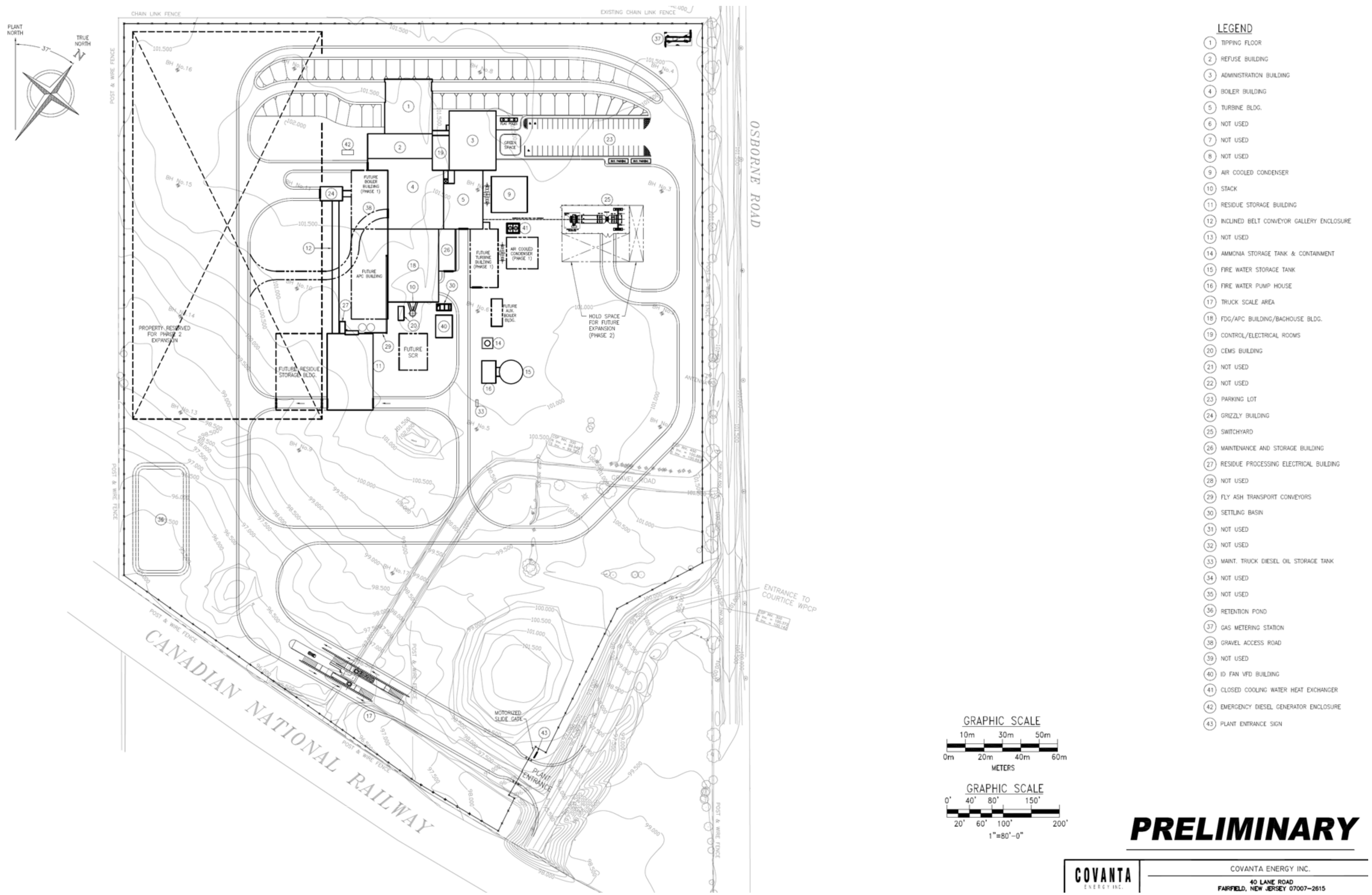


FIGURE 4-1

Proposed 140,000 tpy Facility Site Plan

DATE: 12/9/2009
PROJECT: 1009497

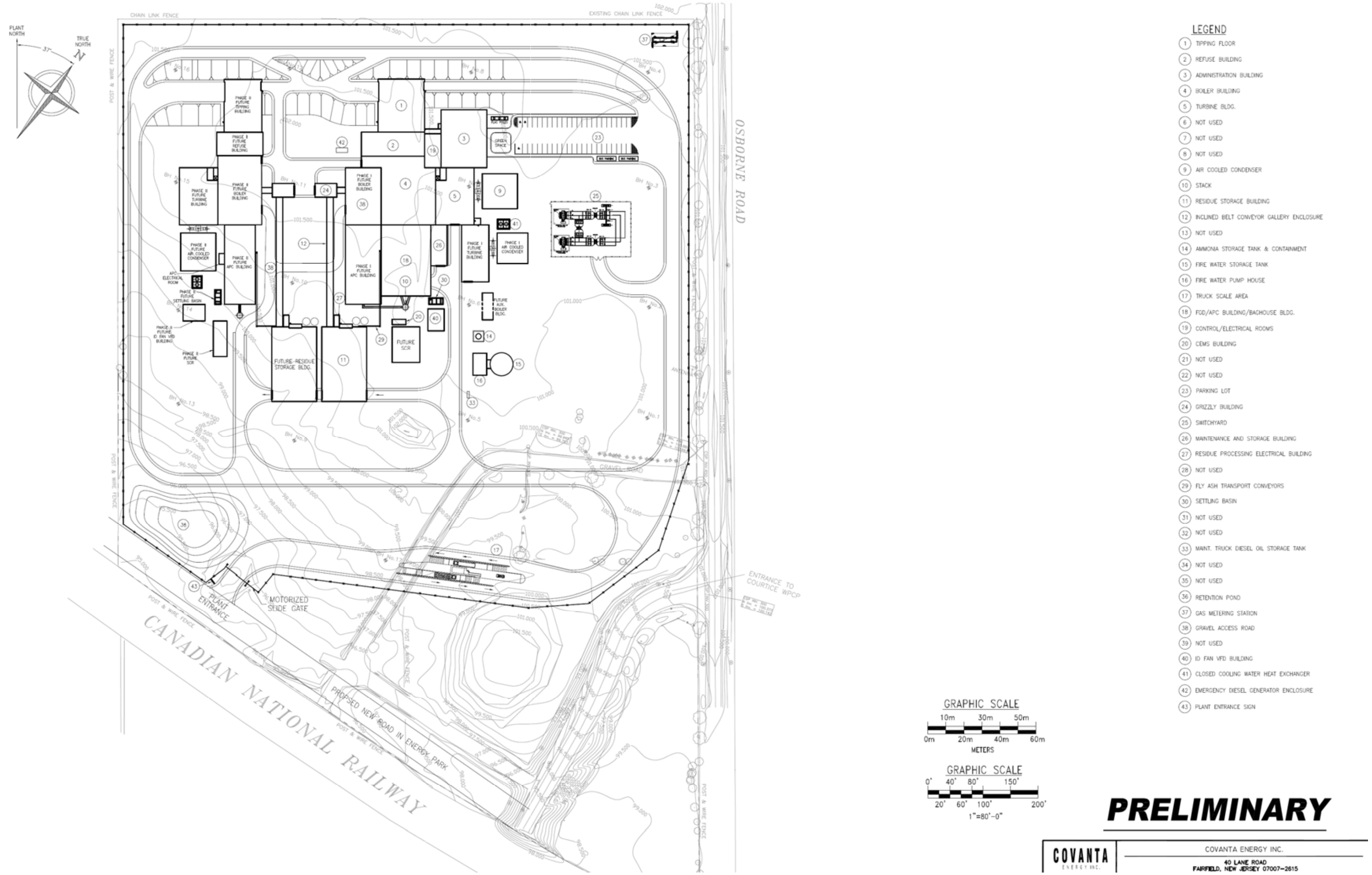


FIGURE 4-2

Proposed 400,000 tpy Facility Site Plan

DATE: 12/9/2009
PROJECT: 1009497

4.2 Facility Emissions

An emissions inventory for the operations of the Facility was prepared in accordance with S.26 of Ontario Regulation 419/05, and the MOE document *Procedure for Preparing an Emission Summary and Dispersion Modelling Report* dated July 2005.

4.2.1 Normal Facility Operation

Three different emissions scenarios were examined in order to bracket the worst-case air quality circumstances during normal operation of the Facility. These were:

- Scenario 1 –Facility operating at 100% capacity. This operating level is referred to as Maximum Continuous Rating (MCR), and results in the maximum contaminant emission rates under normal operating conditions for hourly, daily and annual averages.
- Scenario 2 –Facility operating at a reduced rate (75% of full load). This is the minimum operating rate of the Facility and is referred to as Maximum Continuous Turndown (MCTD). This operation may occur intermittently for short periods of time. During operation in this mode, emissions from the APC equipment are reduced, but stack flow rates are also reduced.
- Scenario 3 – Routine testing of the emergency diesel generator or emergency diesel fire pumps.

Emissions from both the 140,000 and 400,000 tpy Facility scenarios were estimated for all three scenarios. The nomenclature used to refer to these facility design options in this report are A and B, respectively. For example, emissions from the 140,000 tpy Facility operating at MCR would be denoted "Scenario 1A".

4.2.1.1 Normal Facility Operation (Scenarios 1 and 2)

Detailed summaries of the emissions sources included in the Facility assessment for the 140,000 tpy and 400,000 tpy Facility scenaris are presented in **Appendix B.**

A summary of Facility emissions of CACs after being treated by the emissions control equipment is presented in Table 4-1. A summary of Project HAPs after emission controls is presented in Table 4-2.

A total of 90 CoPCs were identified as having the potential to be emitted during operation of the Facility emissions. These were assessed through dispersion modelling. For CoPCs where no reliable source of speciation or emissions data was available from the proponent or literature sources (e.g., styrene, acetone), emission estimates could not be developed. Where this was the case, it is expected that emissions either do not occur or are negligible in magnitude.

Table 4-1 Maximum Facility CAC Emissions during Normal Operation (Scenarios 1 and 2)

Contaminant	Units	140,000 tpy Facility		400,000 tpy Facility	
		Scenario 1A - MCR	Scenario 2A – MCTD	Scenario 1B – MCR	Scenario 2B – MCTD
Sulphur Dioxide	kg/h	5.2	4.2	14.7	11.8
Nitrogen Oxides (as NO_2)	kg/h	18.0	14.4	50.9	40.8
Carbon Monoxide	kg/h	6.7	5.4	18.9	15.2
Particulate <44 µm (PM)	kg/h	1.3	1.1	3.8	3.0
Particulate <10 µm (PM_{10})	kg/h	1.3	1.1	3.8	3.0
Particulate <2.5 µm ($PM_{2.5}$)	kg/h	1.3	1.1	3.8	3.0
Ammonia	kg/h	0.8	0.6	2.3	1.8
Total VOCs	kg/h	7.3	5.8	20.6	16.5

Table 4-2 Maximum Facility HAP Emissions during Normal Operation (Scenarios 1 and 2)

Contaminant	Units	140,000 tpy Facility		400,000 tpy Facility	
		Scenario 1A - MCR	Scenario 2A – MCTD	Scenario 1B - MCR	Scenario 2B - MCTD
Hydrogen Chloride (HCl)	kg/h	1.3	1.1	3.8	3.0
Hydrogen Fluoride (HF)	kg/h	0.13	0.11	0.4	0.3
Dioxins (as TEQ Toxic Equivalents)	kg/h	8.9E-09	7.1E-09	2.53E-08	2.02E-08
Polychlorinated Biphenyls (PCB)	kg/h	1.1E-05	8.6E-06	3.04E-05	2.43E-05
Aluminum	kg/h	5.9E-03	4.7E-03	1.67E-02	1.34E-02
Antimony	kg/h	4.1E-04	3.3E-04	1.15E-03	9.23E-04

Table 4-2 Maximum Facility HAP Emissions during Normal Operation (Scenarios 1 and 2)

Contaminant	Units	140,000 tpy Facility		400,000 tpy Facility	
		Scenario 1A - MCR	Scenario 2A – MCTD	Scenario 1B - MCR	Scenario 2B - MCTD
Arsenic	kg/h	6.2E-05	5.0E-05	1.77E-04	1.41E-04
Barium	kg/h	3.1E-04	2.5E-04	8.90E-04	7.12E-04
Beryllium	kg/h	5.0E-05	4.0E-05	1.40E-04	1.12E-04
Boron	kg/h	2.3E-02	1.8E-02	6.44E-02	5.15E-02
Cadmium (Cd)	kg/h	1.0E-03	8.3E-04	2.95E-03	2.36E-03
Cadmium and Thallium (Cd + Th)	kg/h	6.8E-03	5.5E-03	1.94E-02	1.55E-02
Chromium (hexavalent)	kg/h	4.8E-05	3.8E-05	1.35E-04	1.08E-04
Total Chromium (and compounds)	kg/h	3.3E-04	2.7E-04	9.47E-04	7.58E-04
Cobalt	kg/h	8.6E-04	6.9E-04	2.44E-03	1.95E-03
Lead (Pb)	kg/h	7.4E-03	5.9E-03	2.11E-02	1.68E-02
Mercury (Hg) - Vapour/Particulate phase	kg/h	2.2E-03	1.8E-03	6.32E-03	5.05E-03
Nickel	kg/h	1.3E-02	1.0E-02	3.67E-02	2.93E-02
Phosphorus	kg/h	6.8E-03	5.5E-03	1.94E-02	1.55E-02
Silver	kg/h	5.0E-04	4.0E-04	1.41E-03	1.13E-03
Selenium	kg/h	7.1E-05	5.7E-05	2.02E-04	1.62E-04
Thallium	kg/h	5.8E-03	4.6E-03	1.64E-02	1.31E-02
Tin	kg/h	2.6E-03	2.1E-03	7.41E-03	5.93E-03
Vanadium	kg/h	1.7E-04	1.4E-04	4.90E-04	3.92E-04
Zinc	kg/h	3.0E-02	2.4E-02	8.40E-02	6.72E-02

Table 4-2 Maximum Facility HAP Emissions during Normal Operation (Scenarios 1 and 2)

Contaminant	Units	140,000 tpy Facility		400,000 tpy Facility	
		Scenario 1A - MCR	Scenario 2A – MCTD	Scenario 1B - MCR	Scenario 2B - MCTD
Sum of (As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb)	kg/h	6.8E-02	5.5E-02	1.94E-01	1.55E-01
1,2-Dichlorobenzene	kg/h	3.0E-04	2.4E-04	8.61E-04	6.89E-04
1,2,4,5-Tetrachlorobenzene	kg/h	7.7E-06	6.1E-06	2.17E-05	1.73E-05
1,2,4 – Trichlorobenzene	kg/h	7.7E-06	6.1E-06	2.17E-05	1.73E-05
2,3,4,6-Tetrachlorophenol	kg/h	2.6E-05	2.1E-05	7.32E-05	5.85E-05
2,4,6-Trichlorophenol	kg/h	7.8E-06	6.2E-06	2.20E-05	1.76E-05
2,4-Dichlorophenol	kg/h	1.5E-05	1.2E-05	4.34E-05	3.47E-05
Pentachlorophenol	kg/h	3.1E-05	2.5E-05	8.68E-05	6.94E-05
Hexachlorobenzene	kg/h	7.7E-06	6.1E-06	2.17E-05	1.73E-05
Pentachlorobenzene	kg/h	2.0E-05	1.6E-05	5.70E-05	4.56E-05
Acenaphthylene	kg/h	2.2E-06	1.7E-06	6.10E-06	4.88E-06
Acenaphthene	kg/h	2.8E-06	2.2E-06	7.83E-06	6.26E-06
Anthracene	kg/h	6.0E-07	4.8E-07	1.71E-06	1.37E-06
Benzo(a)anthracene	kg/h	2.2E-07	1.8E-07	6.32E-07	5.05E-07
Benzo(b)fluoranthene	kg/h	5.7E-07	4.6E-07	1.61E-06	1.29E-06
Benzo(k)fluoranthene	kg/h	1.5E-07	1.2E-07	4.25E-07	3.40E-07
Benzo(a)fluorene	kg/h	4.1E-06	3.3E-06	1.16E-05	9.31E-06
Benzo(b)fluorene	kg/h	2.8E-06	2.2E-06	7.96E-06	6.37E-06
Benzo(ghi)perylene	kg/h	6.1E-06	4.9E-06	1.74E-05	1.39E-05
Benzo(a)pyrene	kg/h	5.1E-07	4.1E-07	1.45E-06	1.16E-06

Table 4-2 Maximum Facility HAP Emissions during Normal Operation (Scenarios 1 and 2)

Contaminant	Units	140,000 tpy Facility		400,000 tpy Facility	
		Scenario 1A - MCR	Scenario 2A – MCTD	Scenario 1B - MCR	Scenario 2B - MCTD
Benzo(e)pyrene	kg/h	1.3E-06	1.0E-06	3.67E-06	2.93E-06
Biphenyl	kg/h	4.4E-04	3.5E-04	1.26E-03	1.00E-03
Chrysene	kg/h	5.6E-07	4.5E-07	1.59E-06	1.27E-06
Dibenzo(a,c)anthracene	kg/h	4.0E-06	3.2E-06	1.13E-05	9.03E-06
Dibenzo(a,h)anthracene	kg/h	1.8E-07	1.4E-07	5.09E-07	4.08E-07
Fluoranthene	kg/h	6.2E-06	4.9E-06	1.75E-05	1.40E-05
Fluorine	kg/h	4.7E-06	3.7E-06	1.32E-05	1.05E-05
Indeno(1,2,3 – cd)pyrene	kg/h	1.1E-06	9.0E-07	3.17E-06	2.54E-06
1 – methylnaphthalene	kg/h	1.5E-05	1.2E-05	4.13E-05	3.31E-05
2 – methylnaphthalene	kg/h	8.1E-05	6.5E-05	2.29E-04	1.83E-04
Naphthalene	kg/h	6.3E-05	5.0E-05	1.78E-04	1.42E-04
Perylene	kg/h	2.2E-07	1.8E-07	6.36E-07	5.09E-07
Phenanthrene	kg/h	1.4E-05	1.1E-05	3.98E-05	3.19E-05
Pyrene	kg/h	7.5E-06	6.0E-06	2.11E-05	1.69E-05
Tetralin	kg/h	7.4E-05	5.9E-05	2.10E-04	1.68E-04
O-terphenyl	kg/h	1.2E-05	9.7E-06	3.44E-05	2.76E-05
Acetaldehyde	kg/h	7.8E-08	6.3E-08	2.24E-07	1.79E-07
Benzene	kg/h	4.6E-03	3.7E-03	1.31E-02	1.04E-02
Bromodichloromethane	kg/h	2.7E-02	2.2E-02	7.81E-02	6.25E-02
Bromoform	kg/h	7.5E-03	6.0E-03	2.14E-02	1.71E-02

Table 4-2 Maximum Facility HAP Emissions during Normal Operation (Scenarios 1 and 2)

Contaminant	Units	140,000 tpy Facility		400,000 tpy Facility	
		Scenario 1A - MCR	Scenario 2A – MCTD	Scenario 1B - MCR	Scenario 2B - MCTD
Bromomethane	kg/h	5.4E-03	4.3E-03	1.52E-02	1.21E-02
Carbon tetrachloride	kg/h	4.7E-05	3.7E-05	1.33E-04	1.06E-04
Chloroform	kg/h	7.6E-05	6.1E-05	2.15E-04	1.72E-04
Dichlorodifluoromethane	kg/h	1.3E-02	1.0E-02	3.67E-02	2.93E-02
Dichloroethene, 1,1 -	kg/h	8.4E-05	6.7E-05	2.38E-04	1.90E-04
Dichloromethane	kg/h	2.6E-02	2.1E-02	7.41E-02	5.93E-02
Ethylbenzene	kg/h	1.5E-04	1.2E-04	4.36E-04	3.49E-04
Ethylene Dibromide	kg/h	4.4E-05	3.5E-05	1.25E-04	1.00E-04
Formaldehyde	kg/h	7.1E-03	5.6E-03	2.00E-02	1.60E-02
Tetrachloroethene	kg/h	8.4E-04	6.7E-04	2.39E-03	1.91E-03
Toluene	kg/h	7.5E-03	6.0E-03	2.12E-02	1.69E-02
Trichloroethane, 1,1,1 -	kg/h	2.1E-04	1.7E-04	6.01E-04	4.81E-04
Trichloroethene	kg/h	7.3E-05	5.8E-05	2.07E-04	1.66E-04
Trichloroethylene, 1,1,2 -	kg/h	7.3E-05	5.8E-05	2.07E-04	1.66E-04
Trichlorofluoromethane	kg/h	2.6E-02	2.0E-02	7.25E-02	5.80E-02
Vinyl chloride	kg/h	6.5E-03	5.2E-03	1.84E-02	1.47E-02
Xylenes, m-, p- and o-	kg/h	9.0E-02	7.2E-02	2.54E-01	2.03E-01

4.2.1.2 Scenario 3 – Routine Diesel Generator Testing

This emissions scenario examined emissions from both the 140,000 tpy and 400,000 tpy Facility scenarios during routine testing of diesel powered emergency equipment (two 300-kW diesel generators and two 130 kW diesel fire pumps). Routine testing of all the diesel powered equipment would not normally be conducted concurrently. Evaluation of only the worst case diesel emissions source (one diesel generator) was, therefore, required to determine maximum off-property changes in air quality. The diesel generator(s), in addition to having higher emission rates than the diesel fire pumps, would also be located closer to the property line (about 70 m from the nearest property line versus 116 m for the fire pumps) therefore would be expected to result in higher off-property impacts. Detailed emissions calculations for these sources are presented in **Appendix B** and summary of the total Facility emission rates during diesel generator testing are presented in Table 4-3.

In the dispersion modelling assessment conducted for this scenario, the Facility was assumed to be operating at normal capacity (MCR) and emissions from the main stack (140,000 tpy Facility) or stacks (400,000 tpy Facility) were included with those from the diesel generator to assess the cumulative contributions of the two sources to changes in air quality.

Table 4-3 Maximum Facility CAC Emissions during Testing of the Emergency Generator (Scenario 3)

Contaminant	Units	Emission Rate	
		Scenario 3A – MCR, 140,000 tpy Facility	Scenario 3B – MCR, 400,000 tpy Facility
Sulphur Dioxide	kg/h	5.7	15.2
Nitrogen Oxides (as NO_2)	kg/h	26.1	59.0
Carbon Monoxide	kg/h	8.4	20.6
Particulate <44 μm (PM)	kg/h	1.9	4.4
Particulate <10 μm (PM_{10})	kg/h	1.9	4.4
Particulate <2.5 μm ($PM_{2.5}$)	kg/h	1.9	4.4

4.2.2 Process Upsets

It is possible for emissions levels to be higher than those during normal operation as a result of various process upsets such as start-ups, shut-downs and malfunctions of the combustion units or the APC equipment. These events would be expected to occur infrequently and be of relatively short duration.

To examine the potential changes in air quality due to process upsets, the U.S. EPA *Guidance Document on Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities* (U.S. EPA, 2005b) recommends that when site specific data are not available or are inappropriate for deriving an upset factor, that upset emissions be estimated by using a procedure based on work by the California Air Resources Board (CARB) (1990), which is provided below.

"Estimating Emissions from Process Upsets: To represent stack emission rates during process upsets, multiply the emission rate developed from the trial burn data by 2.8 for organics and 1.45 for metals. These factors are derived by assuming that emissions during process upsets are 10 times greater than emissions measured during the trial burn. Since the unit does not operate under upset conditions continually, the factor must be adjusted to account for only the period of time, on an annual basis, which the units operate under upset conditions. For organic compounds, the facility is assumed to operate as measured during the trial burn 80 percent of the year and operate under upset conditions 20 percent of the year [(0.80)(1)+(0.20)(10)=2.8]. For metals, the combustion unit is assumed to operate as measured during the trial burn 95 percent of the year and operate under upset conditions the remaining 5 percent of the year [(0.95)(1)+(0.05)(10)=1.45]."

Based on this discussion, the following approach was used to estimate emissions from the 140,000 tpy Facility during process upsets:

- For determining short-term (1-hour to 24-hour average) ground level CoPC concentrations, the emission rates for the Facility under normal operation (presented in Tables 4-1 and 4-2) were conservatively increased by a factor of ten. This factor was applied to all CoPCs except for SO_2 and NO_x for which manufacturer data on uncontrolled flue gas concentrations were available. SO_2 and NO_x emissions were increased by factors of 16 and 1.63 respectively, as specified in the data received from the manufacturer.
- For calculating annual average concentrations, the emission rates of metals and CACs were increased by the EPA recommended factor of 1.45 noted above, with the exception of SO_2 and NO_x. For these contaminants the emission rates were increased by factors of 1.75 and 1.03 respectively, based the increased flue gas concentrations noted above and operating under upset conditions 5% of the year.
- For calculating annual average concentrations of all other CoPCs, the emission rates were increased by the EPA recommended factor of 2.8.

These process upset emission rates will provide a very conservative estimate of worst-case emission rates (particularly for HAPs) that could be expected to be encountered over the course of an operating year. On an annual basis, the factor of 2.8 utilized for most CoPCs is based on the assumption that the Facility operates under process upset conditions 20% of the time (which is equivalent to the Facility operating under process upset conditions about 6-years out of a 30-year operating life). This is a highly conservative assumption. Covanta has indicated that the Facility would start-up or shut-down a single train at a time, therefore multiplying the entire emissions from the stack (emissions from two trains) by the short-term factor of 10 is also very conservative, as this would imply that the either both trains were starting up or shutting down simultaneously (which is unlikely to occur based on information from Covanta) or that the emission control equipment on both trains failed simultaneously (again a very unlikely and therefore conservative assumption). Additionally, Covanta has indicated that in the event of a major failure of the pollution control equipment, the process train could be shut down in less than one hour. Therefore assuming that this condition would occur for the full 24-hour period when predicting maximum 24-hour average ground level concentrations during a process upset is also very conservative.

To predict maximum short-term (1-hour to 24-hour average) ground level concentrations due to process upsets for the 400,000 tpy Facility, emissions during process upsets were estimated by conservatively assuming a process upset occurring simultaneously in two out of three APC systems and associated processing trains. A process upset was assumed to occur for the process trains associated with original flue of the 140,000 tpy Facility (Stack 1, flue 1) simultaneously with a process upset on the process train installed in the Phase I facility expansion (Stack 2). The process train APC equipment associated with the Phase I expansion (Stack 1, flue 2) were assumed to be functioning normally. Emissions from the units assumed to be experiencing process upsets were calculated using the same methodology and conservative factors applied for the 140,000 tpy Facility. This methodology is also expected to be very conservative as, for case of a start-up or shut-down, it assumes that up to three process trains would be starting up or shutting down simultaneously, whereas Covanta has indicated that standard practice will be to start-up/shut-down a single process train at a time. In the case of APC equipment failure, this method assumes that the APC equipment on three of the four process trains fails simultaneously and then operates for over 24-hours in this condition. Failure of multiple APC units simultaneously is very unlikely and a major failure on a process train would result in the unit being shutdown within an hour, rather than operating for 24-hours. Therefore the maximum predicted hourly and 24-hour ground level concentrations using this methodology are expected to be very conservative.

To predict maximum long-term (annual average) concentrations during process upsets of the 400,000 tpy Facility, it was conservatively assumed that each stack and flue would experience process upset conditions an equal amount of time on an annual basis (based on the percentages of time noted previously). Emissions were increased for all three exhaust streams using the same methodology applied for process upsets from 140,000 tpy Facility on an annual basis. Again, this is a highly conservative method as it would be equivalent to each of the four process trains in the 400,000 tpy Facility operating in a process upset condition for up to six years out of a 30-year operating period.

4.2.3 Odour Emissions

The refuse to be processed in the proposed Facility would be a heterogeneous mixture of many materials and may include odorous substances. Potential odour emissions sources associated with the processing of the refuse would be:

- truck transportation of waste onto the site;
- refuse handling and storage on site; and,
- refuse combustion.

The primary potential source of odour at the Facility is the waste delivery trucks entering or queuing to enter the plant. The following text describes the potential for odours to arise from various Facility activities and the mitigation measures employed to reduce odours in each case.

Refuse would be delivered to the Facility in standard packer vehicles or fully enclosed transfer trailers with capacities up to 92 m^3. Upon entering the Facility an automated truck scale would be used to weigh each truck in order to maintain an accurate accounting of all refuse delivered to the Facility. In the worst-case, no more than 4-5 waste delivery vehicles would be present on-site (queuing) for at most 5 minutes. Since the trucks will be dispatched only from Regional waste transfer stations, the number of trucks that would be queued on site would be controlled. The refuse is removed from the trucks inside the tipping building. The tipping building(s) would be equipped with multiple bays to minimize refuse truck line-ups outside the tipping building(s) during peak truck arrival periods. As all trucks would be enclosed until they enter the tipping building, substantive off-property odours due to these sources are not expected. Additionally a quantitative analysis of odour from refuse trucks was not possible as no publically available quantitative data on odour emission rates from refuse trucks could be located for use in the assessment.

The tipping building(s) would be equipped with motor operated entrance/exit doors. The doors would remain closed except for when vehicles are entering or exiting the tipping buildings. The doors would be equipped with automatic sensors to open the door as a truck approaches and close it immediately after the truck exits.

The tipping building(s) would be designed to draw the air from above the storage pit. This would maintain a negative pressure in the tipping building and help prevent the escape of dust and odour from the Facility. When the entrance/exit doors are closed during non-delivery hours, air would be admitted to the tipping area from outside the buildings through manually operable louvers in the tipping building walls. In both cases, air would be drawn up into the APC such that all odorous contaminants emitted in the tipping building(s) would be treated by the pollution control equipment and exhausted in a controlled fashion from the facility stack at a height of 87 meters above ground level. Therefore, substantive off-property odours are not expected from the tipping building(s) during normal opreation.

The air from the tipping building(s)/storage pit(s) would be combusted with the waste in the stokers and the resulting combustion gases passed to the boiler furnace/combustion chambers. In the combustion chambers, unburned gases from refuse combustion in the stokers would be directed into a high temperature combustion zone to permit the maximum burnout of vapours and elimination of odours. The flue gas would then be routed through the APC equipment trains, which include scrubbers (which will also aide in reducing odours). The low level emissions of VOCs from the stacks are not expected to have an appreciable potential for odour.

Based on the proposed mitigation measures for odour control noted above, during normal on-site operations there is not expected to be adverse off-property odour effects. A complete facility shut-down, in which the tipping building might not be maintained under negative pressure would only occur during steam turbine overhauls, which typically would occur every three to five years. As these are planned events, measures to minimize the amount of waste present in the Facility to curtail odour emissions would be implemented. During process upsets or start-ups and shut-downs there also would be a potential for increased odour emissions from the facility. These eventualities will be addressed through an odour mitigation plan which will be developed after detailed design of the facility has been completed.

4.2.4 Canada – U.S. Air Quality Agreement Notification

According to Article V of the Ozone Annex to the Canada – U.S. Air Quality Agreement, since the facility is located within 100 km of the Canada-U.S. border, formal notification is required if the total emission of any of the listed contaminants in the agreement exceeds the one-tonne per year criteria. Based on the calculations provided in **Appendix B** for Operating Scenario 1B (MCR – 400,000 tpy Facility), the following contaminants are expected to exceed this reporting criterion:

- Ammonia with a maximum emission rate of 19.1 tonnes per year (tpy);
- Hydrochloric acid with a maximum emission rate of 31.8 tpy; and,
- Hydrogen Fluoride with a maximum emission rate of 3.2 tpy.

Note that these annual estimates are conservative as they assume emissions from the larger 400,000 tpy Facility. A copy of the draft Trans-boundary Agreement Notification is included in **Appendix C**.

4.3 Vehicle Emissions

Emissions from vehicle operation (e.g., onsite vehicles and waste/ash trucks) associated with the Facility were assessed in conjunction with the Facility stationary source emissions to determine the net impact from all potential emissions onsite. Since the MOE air quality criteria are applicable to stationary sources only, the model predictions were compared to the federal NAAQOs and assessed at the special receptors, which include the locations of the nearest residences to the Site.

The number of vehicles and their operating hours were developed using the same methodology as was used in the *Traffic Assessment – Technical Study Report*, (URS, 2009). These estimates, reflecting a worst-case 400,000 tpy Facility, were developed assuming a total number of 77 waste trucks (59 transfer trailers and compactors and 18 ash, chemical supply, ferrous, and non-ferrous metal trucks) would be operating on the Site between 8 a.m. and 4 p.m., with approximately half of the waste deliveries occurring between the hours of 8 a.m. to 10 a.m. and 2 p.m. to 4 p.m. Based on the data provided in the URS report as well as additional facility information, it was conservatively assumed that 46 employee passenger vehicles would be driven onsite at different hours of the day corresponding to the beginning of each shift at the Facility. Since the operating hours and number and type of vehicles at each hour during the day was not constant, emission rates for each hour were estimated separately based on the number and type of the vehicles during that hour.

To ensure conservative estimates of the traffic emissions, the numbers noted above (77 waste trucks, 46 passenger vehicles daily) were used in estimating emissions for both the 140,000 tpy and 400,000 tpy Facility scenarios, and thus represent a conservative estimate of the contribution of vehicle emissions to the net impact from all potential emissions onsite.

Details of the emissions estimation methodologies, emission rates and modelling parameters are provided in **Appendix B**.

4.4 Construction Emissions

Construction of the 140,000 tpy Facility would take place over a 30 month period starting in June 2010. This phase likely represents the worst-case construction scenario given that both the site infrastructure as well as the first two waste processing trains would be completed at this time. Construction was not assessed for the 400,000 tpy Facility since the increase in capacity would be achieved through two expansions that would be expected to involve lower levels of construction activities than those associated with the construction of the initial 140,000 tpy Facility

Construction activities for the 140,000 tpy Facility would include:

- site preparation (e.g., clearing, cut and fill, site levelling) and foundations;
- structural steel erection and major equipment delivery; and,
- process equipment installation, piping, electrical work, etc.

A summary of the estimated activity levels occurring during each of these stages in construction is presented in Table 4-4.

Table 4-4 Summary of Preliminary Estimates of Construction Activities and Levels

Activity	Hours	Peak Labour on Site	Deliveries on/off Site	Onsite Equipment
Site prep/foundations	7 AM – 6 PM	50	40 dump/concrete trucks per day	Trucks, bulldozers, scrapers, cranes, pick-up trucks
Steel erection/major equipment delivery	7 AM – 6 PM	150	10 transport trucks/day	Cranes, forklifts, pick-up trucks
Process equipment installation	7 AM – 6 PM	200 (average of about 125)	5 transport trucks/day	Cranes, forklifts, pick-up trucks, paving equipment

Construction emissions are expected to occur intermittently during daylight hours over the duration of the construction period (about 30 months). The number of large trucks travelling on and offsite during the construction period on a daily basis is expected to be less than the daily number of waste truck deliveries anticipated during normal operation of the Facility. There would likely be a greater volume of passenger vehicle traffic to and from the site during construction (from the construction labour force) relative to Facility operation; however, passenger vehicles have much lower emissions than heavy trucks (see **Appendix B**, Tables B3-18 and B3-19 for a comparison). Therefore the offsite air quality effects due to vehicle traffic during the construction period are expected to be no greater than those during normal operation of the Facility (which is assessed in Section 7.3.2).

Dust emissions from construction activities could have a temporary effect on local air quality. These emissions are associated with land clearing, ground excavation, cut-and-fill operations and equipment traffic on the Site. Generally, fugitive dust emissions tend to: (1) be proportional to the disturbed land area and the level of construction activity; (2) be limited to periods of the day and week when the construction activities take place; and (3) vary substantially from day to day with varying meteorological conditions. Under dry, windy conditions, wet suppression can be used to control these fugitive dust sources.

Vehicles on the construction site are sources of exhaust emissions from fuel combustion. Construction activities such as welding, use of solvents, sand blasting and painting can also affect air quality in the construction area. These activities are typically localized and can be mitigated through implementation of vehicle and equipment maintenance programs.

The emissions from construction of the Facility are not expected to be different from those occurring on other medium-sized construction sites in Ontario. Relative to operational emissions, construction emissions would be minor, short-term and transitory, and as such, were not modelled. Construction emissions are exempted from the Ontario Certificate of Approval process under O. Reg. 524/98.

4.5 Decommissioning (Closure Period) Emissions

Facility decommissioning would entail removal of process units and related facilities and re-vegetation of the area. Decommissioning emissions are expected to be no greater than construction emissions and were therefore assessed qualitatively.

4.6 Existing and Future Development

The following section describes emissions of chemicals of potential concern (CoPC) from industrial and residential sources other than the Facility in the local study area.

4.6.1 Existing Industrial Point Sources

To assess the potential cumulative environmental effect of the Facility on local air quality, emissions from other local industrial facilities were examined in combination with anticipated emissions from the Facility.

Emissions data for industrial land sources within a 20 km radius of the Facility were compiled from Environment Canada's National Pollutant Release Inventory (NPRI) for 2007 (the most recent year with published data). Thirty-five existing industrial sources were identified in a review of the NPRI data. These include:

A.G. Simpson Automotive Oshawa
Andrew Canada
Atlantic Packaging Products Ltd. Whitby
Ball Packaging Whitby
Canada Building Materials Whitby, Plant No. 84
College Woodwork, Kingsway College
Hydro One Bowmanville Switching Station
Lafarge Canada Inc. Property No. 20 Agg. Site
Lofthouse Brass Whitby
McAsphalt Industries Oshawa
Nemato Corp. Whitby
Oshawa Car Assembly Plant, GM Of Canada

Corbett Creek W.P.C.P.
Darlington Nuclear
Delphi Trilink Plant
Detox Environmental Ltd. Bowmanville
Dufferin Aggregates, Mosport Pit
Dufferin Concrete, Bowmanville
Dufferin Concrete, Whitby
EHC Global Oshawa
Exopack Whitby
Gerdau Ameristeel Whitby
Hanson Pipe & Products Canada, Whitby
Harmony Creek W.P.C.P.
Oshawa Metal Centre, GM Of Canada
Oshawa Truck Assembly Centre, GM Of Canada
Permacon Oshawa
Port Darlington W.P.C.P.
Pringle Creek W.P.C.P.
Safety-Kleen Canada Inc. Oshawa
Smurfit-MBI Whitby
St Mary's Cement Bowmanville
Veyance Technologies Canada Inc. Bowmanville
Whitby Cogeneration L.P.
Woodbridge Foam Whitby

The following table provides a summary of the industrial emissions released within the study area in 2007, comparing the totals to the anticipated emissions from both the 140,000 and 400,000 tpy Facility scenarios.

In most cases, the Project contribution to the study area industrial emissions would be minimal. In cases where the Facility could release a substance unique to the study area, the percent contribution of the Project would be high, but overall the magnitude of the total amount released into the study area would be low.

4.6.2 Existing Non-Industry Emissions

Non-industrial emission sources such as transportation, residential and commercial operations contribute to local air quality. For comparative purposes, community emissions (non-industrial sources and industrial emissions not required to be reported to NPRI for criteria air contaminants (CACs) within the study area were estimated with data available from Environment Canada for the 2005 reporting year (most recent year available). NPRI data for non-industrial sources is organized by census boundary. The census boundaries of Whitby, Oshawa and Clarington best represent the non-industrial community within the study area.

A map showing the extent of those census boundaries is presented in the figure below (Figure 4-3). Due to the relatively coarse spatial resolution of the available emissions data, the community boundaries do not directly correspond to the study area boundaries, but overall are expected to provide a reasonable estimate of emissions within the study area.

Table 4-5 Emissions of CoPCs from Existing Industrial Point Sources in the Air Quality Study Area

Contaminants of Potential Concern	Units	Emissions from Existing Industrial Point Sources	140,000 tpy Facility			400,000 tpy Facility		
			Facility Emissions	Total Emissions (Existing + Facility)	Facility Contribution to Regional Total	Facility Emissions	Total Emissions (Existing + Facility)	Facility Contribution to Regional Industrial Total
Criteria Air Contaminants								
Sulphur Dioxide (SO_2)	tpy	4224	44	4268	1%	124	4348	3%
Nitrogen Oxides (NO_X)	tpy	4785	151	4936	3%	428	5213	8%
Carbon Monoxide (CO)	tpy	3764	56	3820	1%	159	3923	4%
Total Particulate	tpy	560	11	571	2%	32	592	5%
Metals								
Cadmium	kg/yr	43	8.7	52	17%	24.8	68	37%
Chromium VI	kg/yr	31	0.4	31	1%	1.1	32	4%
Lead	kg/yr	866	62.4	928	7%	176.8	1043	17%
Mercury	kg/yr	107	18.7	126	15%	53.0	160	33%
Polycyclic Aromatic Hydrocarbons (PAHs)								
Acenaphthylene	kg/yr	none reported	0.018	0.018	-	0.051	0.051	-
Acenaphthene	kg/yr	none reported	0.023	0.023	-	0.066	0.066	-
Anthracene	kg/yr	none reported	0.005	0.005	-	0.014	0.014	-
Benzo(a)anthracene	kg/yr	0.164	0.002	0.166	1%	0.005	0.169	3%
Benzo(b)fluoranthene	kg/yr	0.164	0.005	0.169	3%	0.014	0.178	8%
Benzo(k)fluoranthene	kg/yr	0.164	0.001	0.165	1%	0.004	0.168	2%

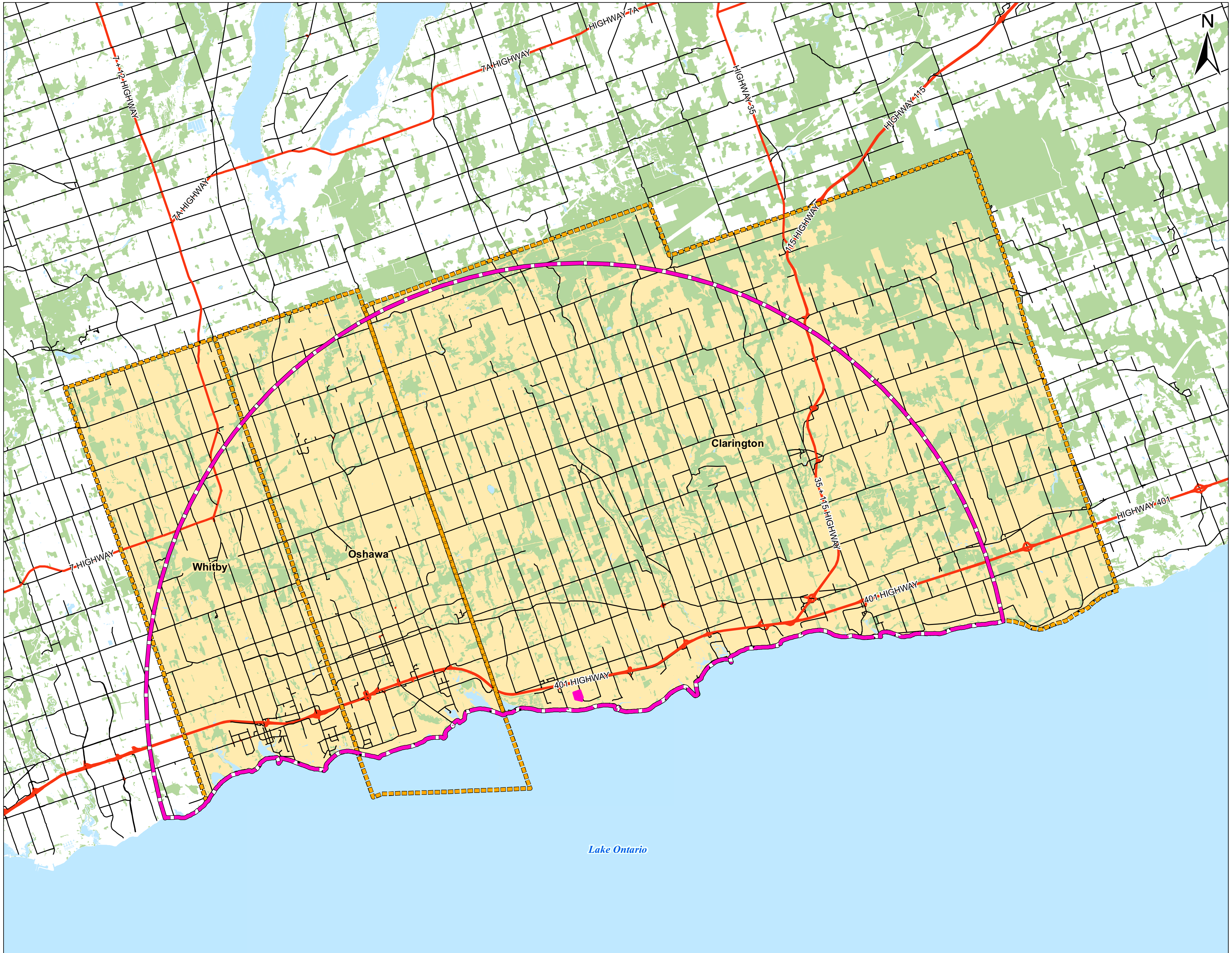
Table 4-5 Emissions of CoPCs from Existing Industrial Point Sources in the Air Quality Study Area

Contaminants of Potential Concern	Units	Emissions from Existing Industrial Point Sources	140,000 tpy Facility			400,000 tpy Facility		
			Facility Emissions	Total Emissions (Existing + Facility)	Facility Contribution to Regional Total	Facility Emissions	Total Emissions (Existing + Facility)	Facility Contribution to Regional Industrial Total
Benzo(ghi)perylene	kg/yr	0.164	0.052	0.216	24%	0.15	0.310	47%
Benzo(a)pyrene	kg/yr	0.164	0.004	0.168	3%	0.012	0.176	7%
Benzo(e)pyrene	kg/yr	0.160	0.011	0.171	6%	0.031	0.191	16%
Chrysene	kg/yr	none reported	0.005	0.005	-	0.013	0.013	-
Dibenzo(a,h)anthracene	kg/yr	none reported	0.002	0.002	-	0.004	0.004	-
Fluoranthene	kg/yr	2.323	0.052	2.37	2%	0.147	2.47	6%
Indeno(1,2,3 – cd)pyrene	kg/yr	0.164	0.009	0.173	5%	0.027	0.191	14%
2 – methylnaphthalene	kg/yr	none reported	0.68	0.68	-	1.92	1.92	-
Naphthalene	kg/yr	none reported	0.53	0.53	-	1.5	1.5	-
Perylene	kg/yr	0.330	0.002	0.33	1%	0.005	0.34	2%
Phenanthrene	kg/yr	71.94	0.12	72.1	0.2%	0.34	72.2	0%
Pyrene	kg/yr	1.800	0.063	1.86	3%	0.18	1.98	9%
Other Contaminants of Potential Concern								
Dioxins and Furans (as Toxic Equivalents, TEQ)	grams/yr TEQ	0.216	0.075	0.29	26%	0.212	0.43	50%
Volatile Organic Compounds (VOC)	tpy	2257	61.2	2318	3%	173.3	2430	7%

YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

Census Boundaries

Data Provided By: Ministry of Natural Resources, 2008
Produced by Jacques Whitford under Licence with the Ontario
Ministry of Natural Resources © Queen's Printer for Ontario, 2004-2008



Collector
Highway
20 km Buffer North, East and West of Site
Census Boundary
Proposed Site Location
Wooded Area
Waterbody

0 1.5 3 4.5
Kilometers - 1:175,000

1009497-033

Jacques Whitford

FIGURE NO. **4-3**

Last Modified: April 27, 2009 By: S.Allen

Community emissions are presented in Table 4-6 below. In this table, “Industrial Area Sources” refers to those industrial sources not required to report to NPRI because they do not meet the specified criteria, and should not be confused with industrial point sources (e.g. factories) that report annually to the NPRI.

Table 4-6 Community Emissions from the Study Area, NPRI 2005

Contaminant	Industrial Area Sources (tpy)	Fuel Combustion (tpy)	Transportation (tpy)	Incineration (tpy)	Misc. (tpy)	Open Sources (tpy)	Total Community Emissions (tpy)
Carbon Monoxide (CO)	1,692	4,448	30,359	29	32	77	36,636
Ammonia (NH_3)	11	13	53	1	146	691	916
Nitrogen Oxides (NO_2)	569	758	4,682	2	0	3	6,014
Particulate <44 µm (PM)	1,715	720	362	1	91	46,037	48,927
Particulate <10 µm (PM_{10})	602	681	353	0.1	89	14,080	15,805
Particulate <2.5 µm ($PM_{2.5}$)	327	672	328	0.05	86	2,352	3,765
Sulphur Dioxide (SO_2)	100	369	203	23	0	0.4	695
Volatile Organic Compounds (VOC)	139	902	2,921	5	5,131	469	9,566

The following trends in emissions releases can be seen:

- Study area emissions of SO_2 are dominated by fuel combustion sources;
- CO emissions are dominated by transportation emissions;
- NO_2 emissions are also dominated by transportation emissions;
- Particulate matter emissions (PM, PM_{10} and $PM_{2.5}$) are dominated by open sources (such as wind erosion of agricultural fields, etc);
- VOC emissions are divided between transportation and miscellaneous non-industrial sources (such as fuel and solvent use, printing and surface coatings); and,
- Ammonia (NH_3) emissions are dominated by open sources (expected to be mainly agricultural emissions).

A comparison of the emissions from the 140,000 and 400,000 tpy Facility scenarios in contrast to existing community and industrial emissions is outlined in Table 4-7 below. The table shows that for both design options, the Facility emissions are minimal relative to the existing industrial and non-industrial community emissions.

Table 4-7 Project Impact on Community CAC Emissions

Contaminant	Community Emissions (tpy)	Existing Industrial Emissions (tpy)	140,000 tpy Facility			400,000 tpy Facility		
			Facility Emissions (tpy)	Total Emissions[1] (tpy)	Facility Contribution to Regional Total	Facility Emissions (tpy)	Total Emissions[1] (tpy)	Facility Contribution to Regional Total
Carbon Monoxide (CO)	36,636	3,764	56	40,456	0.14%	159	40,559	0.4%
Ammonia (NH_3)	916	157	7	1,080	0.65%	19	1,092	1.7%
Nitrogen Oxides (NO_2)	6,014	4,785	151	10,950	1.4%	428	11,227	3.8%
Particulate <44 µm (PM)	48,927	560	11	49,498	0.02%	32	49,519	0.06%
Particulate <10 µm (PM_{10})	15,805	446	11	16,262	0.07%	32	16,283	0.2%
Particulate <2.5 µm ($PM_{2.5}$)	3,765	173	11	3,949	0.28%	32	3,970	0.8%
Sulphur Dioxide (SO_2)	695	4,224	44	4,963	0.89%	124	5,043	2.5%
Volatile Organic Compounds (VOC)	9,566	2,257	61	11,884	0.51%	173	11,996	1.4%

Notes:
1 – Total Emissions refers to the sum of the Community Emissions, Existing Industrial Emissions and the Facility Emissions

4.6.3 Future Development

A summary of proposed development projects identified for the AQSA is presented in Table 4-8.

Table 4-8 Summary of Proposed Development Projects

Proposed Development Project	Estimated Start Date	Potential to Change Air Quality
St. Marys Alternate Fuels	unknown	Yes
Darlington B Nuclear Generating Station	2010-2026	Yes
Aggregate Transfer Station and Asphalt plant (Baseline Road and Solina Road)	unknown	No
Clarington Energy Business Park	Ongoing development	Yes (Proposed Thermal Treatment Facility).
Highway 401 widening	Conceptual, unknown	Yes
Proposed 401-407 Eastlink	2012	Yes
Planned GO Transit Line, Station and Rail Maintenance Facility	2020	No

Of these projects, the aggregate transfer station and GO transit line/station are expected to have little potential to substantively affect regional air quality. The impact of additional development in the Clarington Energy Business Park would be dependent on the type of future development, which is uncertain at this time, and therefore could not be assessed further. The Highway 401 widening may affect air quality as this would allow for increased vehicle use on the highway, but additional details were not available at this time to evaluate these changes.

The following were considered major developments and evaluated for their potential to impact ambient air quality in the AQSA.

Ontario Power Generation – New Nuclear Units

In June 2006, Ontario Power Generation (OPG) started the federal approvals process for the construction of new nuclear units at the Darlington Nuclear Generating Station. If approved, construction will begin mid-2011, to be completed and operational by 2018. This project involves the addition of up to four nuclear reactors next to the Darlington nuclear station. When complete, the Darlington site hopes to be able to meet the base-load electricity requirements of the Province of Ontario.

Over the past year, OPG has undertaken a number of environmental baseline studies, including studies on traffic patterns, cultural heritage, and the effect of additional proposed facilities in the Region, including the Project.

Air contaminant and GHG emissions from the proposed nuclear units will be comprised of different substances than those emitted by the Facility (primarily water vapour and trace amounts of radioactive compounds such as tritium). For that reason, there are no substantive emission sources to consider in conjunction with the Facility emissions.

St Marys Cement Alternate Fuel Demonstration Project

The St. Marys Cement Plant, located approximately 4.2 km east of the Facility, is currently evaluating the economic and environmental feasibility of using alternative fuels as a potential substitute for fossil fuels. Prior to permanently utilizing the alternative fuel, St. Marys Cement wishes to obtain the necessary permits to proceed with an Alternative Fuel Demonstration Project and to use this information to consider the viability of permanent use of alternative fuels. The alternative fuel demonstration would substitute alternative fuel for a portion of the fossil fuel used at the St. Marys cement plant over approximately 24 days, in order to gather site-specific air emission data from the plant to determine the environmental feasibility of using three alternative fuel types. Preliminary data supplied by St. Marys in its application for the required Air permits suggests that the changes in air quality associated with the use of alternative fuels would be negligible. Therefore, it is not anticipated that this Project would change background ambient air quality.

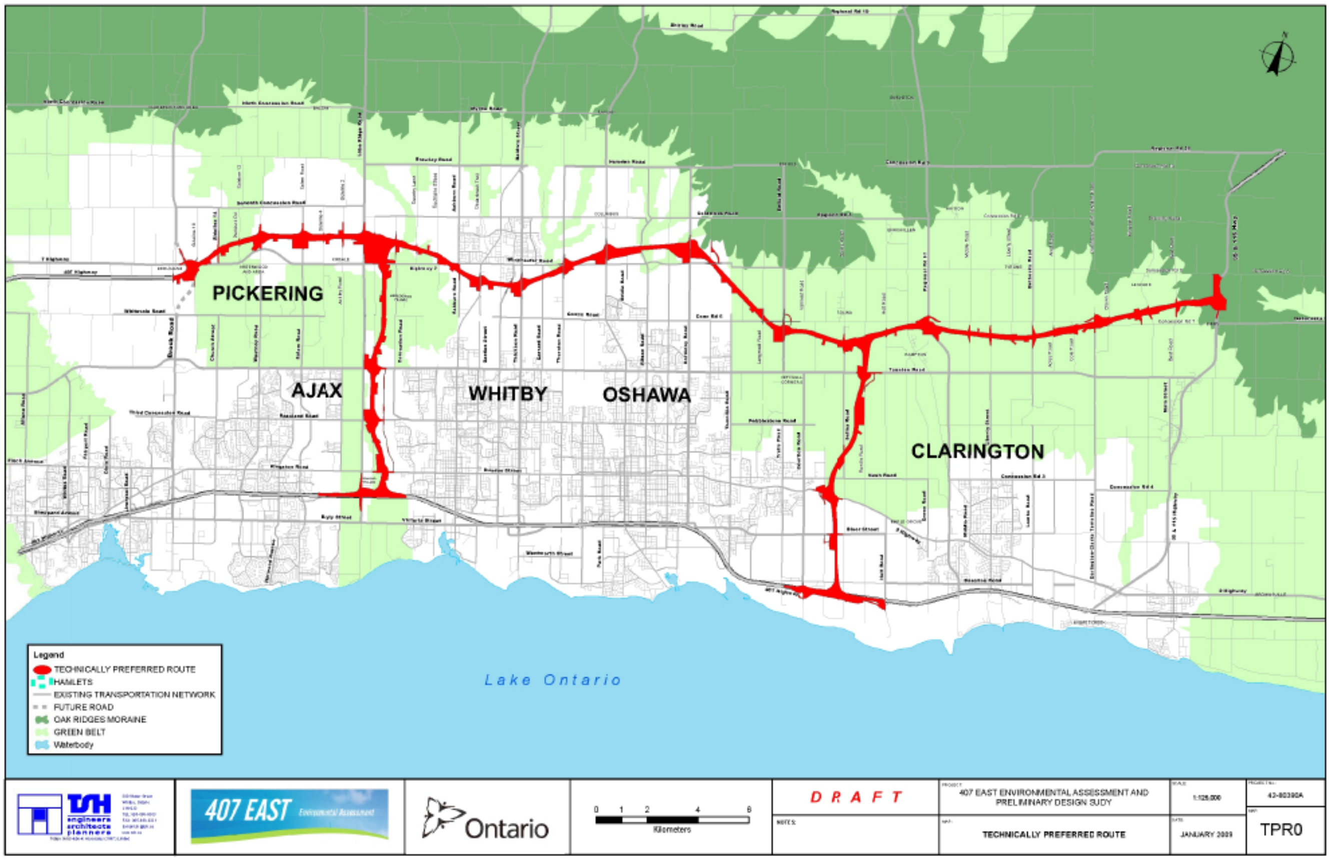
407 Electronic Toll Route (ETR) Expansion Link

The Ontario Ministry of Transportation is currently carrying out an Environmental Assessment study to cope with long-term transportation needs in the Region of Durham and surrounding areas. As such, in 2006, a new highway was recommended extending Highway 407 in an easterly direction from Brock Road in Pickering to Highway 35/115 in Clarington, with two north-south links connecting Highway 401 to the proposed extension of Highway 407. The proposed route is shown in the figure below.

One of the proposed links runs north-south, connecting the proposed segment of Highway 407 at Taunton and Rundle Rd, to Highway 401 between Hancock Rd and Solina Rd (called the 407 Durham East Link). The proposed link terminates approximately one kilometre northeast of the Project site.

Future traffic volumes would add additional tailpipe emissions to the local area. In Table 4-9 below, a comparison of CAC emission estimates from the proposed 407 Durham East Link, to the Facility itself (both 140,000 and 400,000 tpy options), and existing industrial and non-industrial sources is provided. Highway 407 emission estimates are based on projected traffic volumes in year 2013 and 2031, and a combination of light and heavy duty traffic for a non-toll scenario (worst-case). Forecasts were provided by the 407 East Environmental Assessment Team based on the December 2008 "*Growing Durham Land Use*" municipal population and employment estimates and land use allocation.

Figure 4-4 Proposed 407 Expansion Route



Map Reference: 407 East Environmental Assessment Technically Preferred Route, available to the public at http://www.407eastea.com/tpr.html

Table 4-9 Comparison of Emissions – Facility and Highway 407 Expansion

Contaminant	407 Emissions 2013 (tpy)	407 Emissions 2031 (tpy)	140,000 tpy Facility Emissions (tpy)	400,000 tpy Facility Emissions (tpy)	Community and Industrial Emissions (tpy)
Carbon Monoxide (CO)	777	1,271	56	159	40,512
Nitrogen Oxides (NO_2)	97	159	151	428	10,950
Particulate <10 µm (PM_{10})	2	4	11	32	15,805
Particulate <2.5 µm ($PM_{2.5}$)	1	2	11	32	3,765
Volatile Organic Compounds (VOC)	33	54	61	173	11,884

As can be seen from the table (Table 4-9), the proposed Highway 407 may potentially contribute to CO emissions in the area, while the Facility CO emissions for either capacity are relatively small. Facility NO_X emissions are higher in magnitude than Highway 407 emissions, but both are small relative to the community and industrial emissions. For particulate and VOC emissions, the Facility and Highway 407 emissions are small relative to community/industrial emissions. Thus, while the proposed 407 expansion has the potential to cause changes in air quality in the AQSA, the magnitude of emissions are small compared to existing regional emissions. As such, the potential cumulative changes in air quality due emissions from the 407 expansion in addition to emissions from the Facility were assessed, considered nominal and therefore assessed qualitatively (not modelled) in this study.

5.0 FACILITY DESIGN AND MITIGATION MEASURES

The following sections describe the design and operating options that will be used to mitigate air quality effects.

5.1 Construction Emission Control

During construction, any cleared vegetation would be mulched, removed from the site and disposed at a secure location rather than burned to eliminate smoke emissions. No open burning will be allowed on the Site.

Also, to reduce the potential for wind-blown dust under dry, windy conditions, the following mitigation measures would be used:

- Controlled exits will be employed to stabilize all construction entrances and exits and prevent mud from tracking on roadways from construction vehicles;
- Temporary and permanent grassing will be used for all areas of disturbance;
- Dust control will be used during dry conditions to prevent any blowing of dust;
- Work will be staged consistent with MOE requirements;
- All disturbed land will be stabilized within 14 days. In the event that temporary grassing cannot be performed due to cold weather conditions, mulching will be provided. Permanent grassing of the Site will be provided once warm weather grasses can be planted; and,
- Exhaust emission controls for construction equipment will meet Ontario Drive Clean standards and proper maintenance of equipment and vehicles will be conducted.

In addition to the proposed mitigation measures specified above, the following mitigation measures are recommended by Jacques Whitford Stantec Limited:

- The implementation of an idling policy to minimize the consumption of fuel when the equipment and vehicles are stationary for extended periods of time;
- Adherence to a comprehensive equipment preventative maintenance program to maintain the vehicles in top condition, to maximize fuel efficiency and vehicle performance; and,
- Where possible, implement plans to minimize the length of haul routes to and at the Site.

5.2 Operations Emission Control

A number of mitigation measures will be implemented to control emissions to the atmosphere during operations, which are discussed in this section.

The Facility would be designed, constructed and operated in accordance with good engineering practice, generally accepted industry standards and currently adopted applicable codes and regulations. All equipment and materials will be new and unused and will, at the minimum, comply with generally accepted industry standards.

5.2.1 Air Pollution Control Devices

Combustion gas leaving the economizer of each unit will be treated by an air pollution control system (APC) that will include the following series of equipment and processes to treat the flue gas.

1. Covanta's very low NO_X (VLN) system in the stoker.
2. Selective Non Catalytic reduction (SNCR) for additional NO_X control.
3. Activated carbon injection after the economizer for mercury and dioxin/furan control. The quantity of activated carbon injected into the flue gas will be automatically controlled to the required feed rate.
4. Acid gas scrubber for removal of gases such as sulphur dioxide and hydrogen chloride. To ensure efficient acid gas removal, the lime concentration of the slurry or hydrated lime fed to the scrubber will be automatically adjusted in response to the flue gas SO_2 content. Scrubber outlet temperature will be controlled using the dilution (or spray) water control valve. The lime and water flow to the scrubber will be automatically controlled so that the temperature of the flue gases and the SO_2 concentration is maintained at the set point.
5. A fabric filter baghouse to remove solid phase particulate matter.

A continuous emission monitoring (CEM) system will be provided to continuously monitor and record the following parameters:

- Baghouse outlet: opacity, moisture, CO, O_2, NO_X, SO_2, HCl, and HF. The opacity measurements will be used as the leak detection system to monitor filter bag condition;
- Economizer outlet: O_2, SO_2, CO;
- Flue gas temperatures at the inlet of the boiler convection section and at the baghouse inlet or each boiler;
- Temperature and pressure of the feedwater and steam for each boiler; and,
- Mass flow rate of steam for each boiler.

The CEM system will be equipped with communication devices and software to enable transmission of CEM data to remote locations at the Region's discretion. An electronic display board will be mounted on the Facility exterior that will display the real time emissions and most recent stack test results. The electronic display will be large enough to be seen by visiting public.

A long-term continuous dioxin/furan sampling device will be installed. The long-term sampling apparatus will be based on the isokinetic sampling of flue gas and the adsorption of dioxins on an exchangeable adsorption-resin-filled cartridge. The system will consist of three primary system components:

- A titanium sampling probe with probe shaft and heat exchanger;
- A cartridge unit as a collection point; and,
- A control cabinet.

The titanium probe will be used for both the isokinetic sampling and cooling of the flue gas to less than 50°C. Flue gas conditions and isokineticity will be monitored using sensors in the probe. The dioxins will be collected over a period of up to one month and the sampling cartridge sent for laboratory analysis.

Reagent feed rates, combustion temperature and other process temperatures will be continuously measured. The monitors will be certified, calibrated and maintained in accordance with the manufacturer's specifications, requirements of the Certificate of Approval issued by the MOE, and all applicable Provincial and Regional performance specifications and quality assurance procedures.

5.2.2 Other Process Design Considerations

The following considerations for reduction in emissions to the environment will be included in the facility design:

- The furnace will be designed to provide at least a one second retention time of an incineration temperature of 1,000°C in the combustion zone while processing waste between all guaranteed heating values. Automatic auxiliary burners (low NO_X design) will be supplied to maintain this temperature and residence time. During waste feeding and non-emergency shutdown, the temperature in the furnace will not fall below 1,000°C.
- To assure that all particles entrained in the gas are solid and dry so as to avoid having semi-soft sticky particles entering the screen tubes, superheater, and boiler bank, the gas temperature entering the closed space horizontal superheater will not exceed 770°C. The design temperatures of gas entering the closed space horizontal superheater at MCR will be 700°C or less.

5.2.3 Fugitive Emissions

The following controls and strategies will be used to control fugitive emissions from the proposed Facility.

- All materials loading and unloading will be managed to prevent scattering and blowing of debris.
- The boilers, refuse storage areas, residue storage areas, air pollution control areas and turbines/ generators will be fully enclosed.
- The residue building(s) will be equipped with roll-up doors to allow vehicles to drive through.
- All residue storage areas will be roofed (i.e., protected from rain), drained, and filtration ventilated.

- The fly ash will be mixed with Portland cement, pozzolan and water for micro encapsulation (chelation) prior to truck loading and subsequent transportation.
- Residue handling systems will be designed for a minimum number of transfer points to minimize drops which can result in air emissions.
- The residue storage building(s) and all conveyors external to buildings will be completely enclosed and filtration ventilated. The residue storage building(s) will be provided with a filtered ventilation system. The residue storage building(s) will not be connected to any other structures in such a fashion as to enable dust to infiltrate to other parts of the Facility.
- Residue containers or trucks will be loaded in enclosed buildings. Residue containers will be enclosed, watertight and covered so as not to present a hazard to either plant personnel or the general public while residue is being loaded and transported to the landfill.
- In general, all residue loading and unloading systems will be designed to be dust free and designed to meet requirements for residue loadout established by the MOE. In particular, no visible emissions of dust from any doorway, window, vent, louver or other opening will be allowed.
- Between the furnaces and the residue storage buildings, the residue handling systems will be fully automatic. Sensors will be provided with alarms for readout and recorded in the Central Control Room for any system failure.
- All residue mixing and/or handling areas will be fully enclosed, well ventilated and sufficiently protected from extreme weather conditions (e.g., freezing conditions). In addition, all such areas will be designed to facilitate cleanup and good housekeeping.
- All outside conveyors handling residue will be fully enclosed. All outdoor APC fly ash conveyors will be insulated and heat traced.

5.2.4 Odour

Odour emissions have historically been associated with waste processing facilities. The Facility design implicitly acknowledges this issue through the incorporation of odour mitigation measures for normal operation including:

- Controlling the number of trucks that would be queued on site through communication with Regional waste transfer stations from where trucks would be dispatched;
- The refuse will be removed from the trucks inside the tipping building. The tipping building(s) would be equipped with multiple bays to minimize refuse truck line-ups outside the tipping building(s) during peak truck arrival periods;
- The tipping building(s) would be equipped with motor operated entrance/exit doors. The doors would remain closed except for when vehicles are entering or exiting the tipping buildings. The doors would be equipped with automatic sensors to open the door as a truck approaches and close it immediately after the truck exits;
- The tipping building(s) would be designed to draw the air from above the storage pit. This would maintain a negative pressure in the tipping building and help prevent the escape of odour from the Facility;

- The air from the tipping building(s)/storage pit(s) would be combusted with the waste in the stokers and the resulting combustion gases passed to the boiler furnace/combustion chambers where unburned gases would be directed into a high temperature combustion zone to permit the maximum burnout of vapours and elimination of odours; and,
- The flue gas from the boilers would be routed through the APC equipment trains, which include scrubbers which aide in reducing odours.

An odour mitigation plan will be developed after detailed design of the facility has been completed to address odour emissions duing normal operations, start-ups and shut-downs as well non-routine occurances (process upsets). The odour mitigation plan will be submitted to the MOE during the environmental permitting process for the Facility.

6.0 MODELLING ASSESSMENT APPROACH

In this study, two different dispersion models were used depending on the required application. A summary of the dispersion modelling approaches is presented in Table 6-1, and the models and approaches used are discussed in the following sections.

Table 6-1 Summary of Dispersion Modelling Approaches

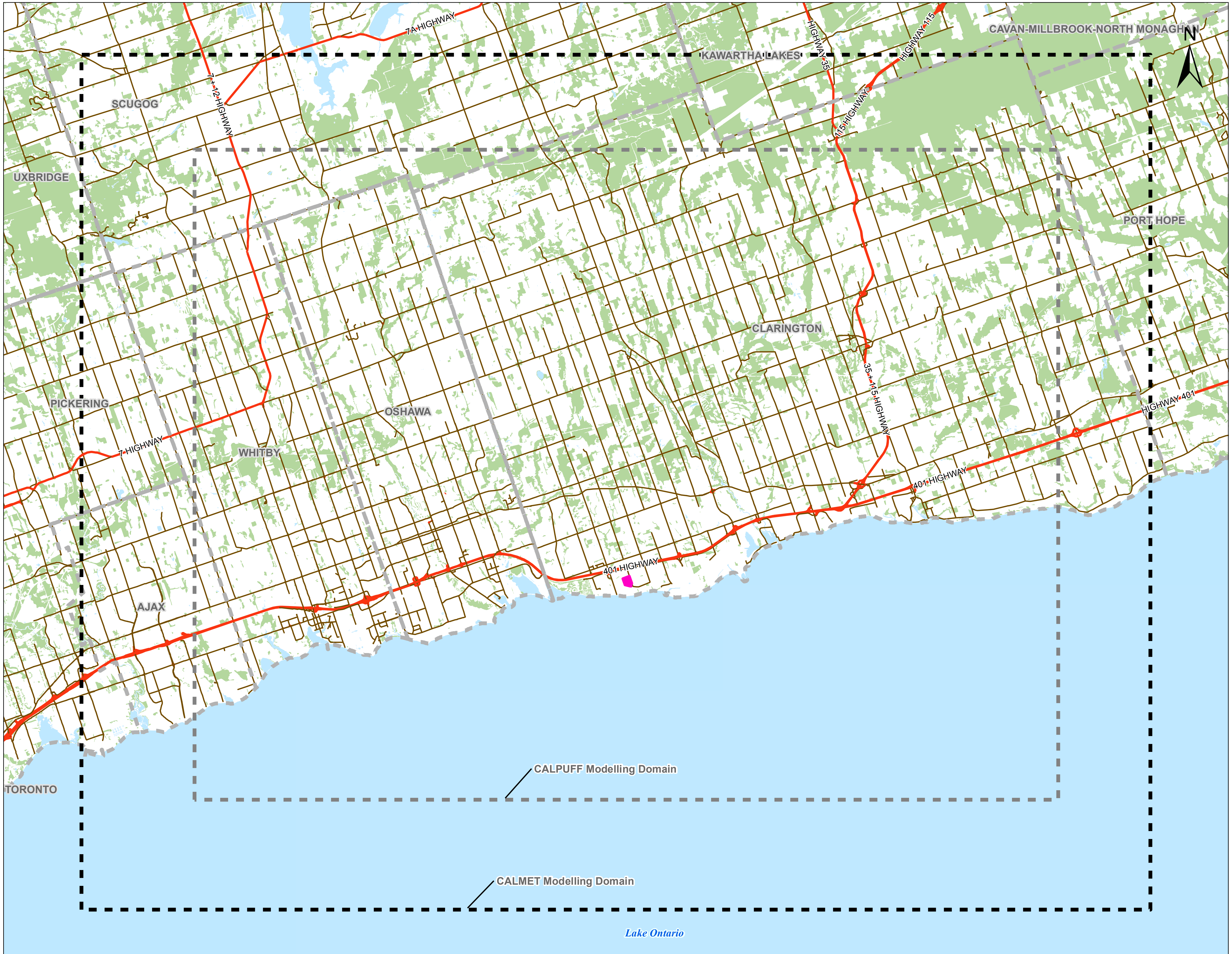
Application	Model	Rationale
Prediction of Ground Level Concentrations due to Proposed Thermal Treatment Facility operation (stationary source assessment and stationary + onsite traffic assessment)	CALPUFF	MOE alternative model. Chosen since AERMOD does not model thermal internal boundary layer effects.
Secondary Particulate Formation	CALPUFF	MOE alternative model. Chosen since AERMOD does not model this effect.
Offsite Traffic	CAL3QHCR	MOE alternative model. Chosen as it accounts for both free flow and queuing traffic.

6.1 Modelling Domains

The assessment area for air quality dispersion modelling was comprised of a 40 km by 30 km domain, which is the same as the AQSA. The modelling domain is presented in Figure 6-1.

6.2 Ground Level Concentration Predictions

The CALPUFF dispersion model was used to predict ground level concentrations of CoPCs and is appropriate for short and long-range dispersion predictions. The detailed methodology used for the CALPUFF modelling is presented in **Appendix D**.



YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

Air Quality Study Area and Dispersion Modelling Domain

Data Provided By: Ministry of Natural Resources, 2008
Produced by Jacques Whitford under Licence with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2004-2009

Collector
Highway
CALMET Modelling Domain
Air Quality Study Area
CALPUFF Modelling Domain
Proposed EFW Facility Site
Wooded Area
Waterbody
Waterbody

0 1.5 3 4.5
Kilomteres

1009497-040

Jacques Whitford

FIGURE NO.
6-1

Last Modified: April 28, 2009 By: S.Allen

6.3 Secondary Particulate Formation

The CALPUFF model was used to predict secondary $PM_{2.5}$ formation due to precursor SO_2 and NO_X emissions. The model predicts particulate nitrate NO_3^-, which can exist as an aerosol (i.e., dissolved in a water droplet) or as a particle (e.g., NH_4NO_3). Similarly, sulphate SO_4^{2-} can also exist as an aerosol (i.e., dissolved in a water droplet) or as a particle (e.g., $(NH_4)_2SO_4$). In the analysis, the predicted NO_3^- and SO_4^{2-} concentrations from the CALPUFF model were assumed to react with ambient ammonia (NH_3) to produce ammonium nitrate and ammonium sulphate, respectively. The predicted ambient ammonium sulphate and ammonium nitrate concentrations were then added to the CALPUFF predicted primary $PM_{2.5}$ concentrations to estimate the total (primary plus secondary) particulate concentrations.

The detailed methodology for predicting secondary particulate formation with the CALPUFF model is presented in **Appendix D**.

6.4 Offsite Traffic

Offsite vehicle emissions were modelled using the U.S. E.P.A. CAL3QHCR traffic dispersion model. This model is listed as an acceptable alternative model by the MOE for dispersion modelling of traffic emissions (MOE, 2009a). CAL3QHCR is a roadway dispersion model that can process hourly meteorological data with time varying emissions, traffic and intersection signalization data. At signalized intersections, it accounts for idling emission rates from vehicles. CAL3QHCR can accommodate both free-flowing roads and signalized intersections and predict concentrations of carbon monoxide (CO), particulates (PM) and other inert contaminants. It was selected for use in this assessment due to its ability to predict concentrations due to both free flowing traffic as well as traffic queues (for which the additional traffic due to the Facility required assessment). A description of the model inputs and methodology used for the offsite traffic modelling is presented in **Appendix E.**

7.0 RESULTS OF ANALYSIS

This section presents the results of the dispersion modelling analyses. The results are presented for the Facility alone (both 140,000 tpy and 400,000 tpy design scenarios) as well as the Facility in conjunction with measured background concentrations in order to evaluate the potential for cumulative effects.

7.1 Thermal Treatment Facility Emissions

The following sub-sections present the predicted ground level concentrations (GLCs) using the CALPUFF dispersion model, over a 40 x 40 km grid of receptors for air contaminants emitted from the Facility under both the 140,000 tpy and 400,000 tpy design options. In these sections stationary emissions sources only are addressed, as these are the sources required to be modelled for comparison to Ontario regulatory criteria. An assessment of Facility stationary and mobile emissions is presented in Section 7.3.

For each of the contaminants, results of the dispersion modelling are presented in summary tables as well as graphically in contour plots. The predicted maximum concentrations as well as the predicted statistical maximum concentrations are presented in the summary tables. The predicted statistical maximum concentrations account for meteorological anomalies as per the Air Dispersion Modelling Guideline for Ontario (MOE, 2009a). For 1-hour averaging periods, this involves removing the eight highest predicted values for each calendar year. The maximum 1-hour average was then selected from the remaining values over the 5-year period. For 8-hour and 24-hour averaging periods, the highest maximum predicted value was removed for each calendar year. The next highest value was then selected over the five year period.

The particulate (TPM, PM_{10} and $PM_{2.5}$) concentration predictions presented in this section include both primary particulate (stack emissions) and secondary particulate (atmospheric transformation) contributions. The predictions do not account for plume depletion due to contaminant deposition and are therefore conservative.

For predicted nitrogen dioxide concentrations, it was conservatively assumed that all NO_x from the emissions sources (normally a mixture of NO and NO_2) was emitted as NO_2. This is a conservative assumption as normally only 10-15% of NO_x emissions from combustion sources are emitted as NO_2. This conservative methodology is consistent with MOE requirements specified in Guideline A-11.

7.1.1 Normal Facility Operation (Scenarios 1 and 2)

7.1.1.1 Full Domain Modelling Results

Summaries of the maximum predicted GLCs for each of the Thermal Treatment Facility routine operating scenarios (Scenario 1 – MCR and Scenario 2 - MCTD) are presented in Tables 7-1 and 7-2 for the 140,000 tpy Facility and in Tables 7-3 and 7-4 for the 400,000 tpy Facility, and discussed in Section 4.2.1. The values presented in these tables are the maximum predicted values over all the off-property receptors included in the modeling (gridded and special receptors). Estimated background concentrations, as discussed in Section 3, were added to the maximum model-predicted values and compared to applicable regulatory limits to assess potential cumulative changes in air quality.

The maximum predicted GLCs were corrected for meteorological anomalies following the guidance supplied by the MOE dispersion guidance document (MOE 2009a) for all contaminants and averaging periods.

Of all CoPCs, the highest predicted GLC relative to its regulatory criteria due to the Facility alone was nitrogen dioxide at 11% for the 140,000 tpy Facility and 24% for the 400,000 tpy Facility. When cumulative effects were considered by adding background levels to the maximum predicted GLC for each CoPC, the predicted maximum GLCs were still well below the applicable criteria for both operating scenarios and Facility processing capacities.

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentrations ($\mu g/m^3$)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Background ($\mu g/m^3$)	% of Criteria
Sulphur Dioxide (SO_2)	7446-09-5	1 Hr	690	1.45E+00	19.5	681.00	4859.66	12.69	2%	32.21	5%
		24 Hr	275		19.3	679.55	4861.16	1.75	1%	21.04	8%
		Annual	55[3]		5.9	681.45	4861.56	0.05	<0.1%	5.97	11%
Hydrogen Chloride (HCl)	7647-01-0	1 Hr		3.72E-01	-	681.00	4859.66	3.26			
		24 Hr	20		-	679.55	4861.16	0.45	2%		
		Annual			-	681.45	4861.56	0.01			
Hydrogen Fluoride (HF)	7664-39-3	1 Hr		3.72E-02	-	681.00	4859.66	0.33			
		24 Hr	0.86		-	679.55	4861.16	0.05	5%		
		30 day	0.34		-	679.55	4861.16	0.02	5%		
		Annual			-	681.45	4861.56	1.31E-03			
Nitrogen Dioxide (NO_2)	10102-44-0	1 Hr	400	5.00E+00	64.6	681.00	4859.66	43.87	11%	108.45	27%
		24 Hr	200		58.2	679.55	4861.16	6.06	3%	64.28	32%
		Annual	100[5]		37	681.45	4861.56	0.18	<0.1%	37.21	37%
Carbon Monoxide (CO)	630-08-0	1/2 hr	6000	1.86E+00	1257	681.00	4859.66	19.81	<0.1%	1276.92	21%
		1 Hr	36200[3]		1035	681.00	4859.66	16.32	<0.1%	1051.66	3%
		8 Hr	15700[3]		1036	679.65	4861.06	5.06	<0.1%	1041.06	7%
		24 Hr			1029	679.55	4861.16	2.25		1031.24	
		Annual			632	681.45	4861.56	0.07		631.73	

Table 7-1 **Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)**

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Background (µg/m³)	% of Criteria
		1 Hr			-	677.30	4863.11	3.67			
Particulate Matter PM_{10}	PM10	24 Hr	50[3]	3.72E-01	-	680.39	4860.32	0.53	1%		
		Annual			-	681.75	4862.16	0.02			
		1 Hr			22.8	677.30	4863.11	3.67		26.49	
Particulate Matter $PM_{2.5}$	PM25	24 Hr	30[6]	3.72E-01	20.4	680.39	4860.32	0.53	2%	20.96	70%
		Annual			9.8	681.75	4862.16	0.02		9.79	
		1 Hr			86.2	677.30	4863.11	3.67		89.83	
Total Particulate Matter	TPM	24 Hr	120	3.72E-01	35.4	680.39	4860.32	0.53	<0.1%	35.92	30%
		Annual	60[5]		21.3	681.75	4862.16	0.02	<0.1%	21.29	35%
		1 Hr			-	681.00	4859.66	1.96			
Ammonia (Slip at stack)	<ammonia>	24 Hr	100[3]	2.23E-01	-	679.55	4861.16	0.27	<0.1%		
		Annual			-	681.45	4861.56	7.85E-03			
		1 Hr			-	681.00	4859.66	17.77			
Organic Matter (as CH_4)	VOC	24 Hr		2.02E+00	-	679.55	4861.16	2.45			
		Annual			-	681.45	4861.56	0.07			

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentrations ($\mu g/m^3$)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Background ($\mu g/m^3$)	% of Criteria
Chlorinated Polycyclic Aromatics											
		1 Hr			5.77E-08	681.00	4859.66	2.18E-08		7.95E-08	
Dioxins (as TEQ Toxic Equivalents)	<dioxin>	24 Hr	5.00E-06	2.48E-09	2.37E-08	679.55	4861.16	3.00E-09	<0.1%	2.67E-08	<1.1%
		Annual			1.66E-08	681.45	4861.56	8.72E-11		1.67E-08	
		1 Hr			1.02E-04	681.00	4859.66	2.62E-05		1.28E-04	
Polychlorinated Biphenyls (PCB)	<pcb>	24 Hr	0.15	2.98E-06	4.20E-05	679.55	4861.16	3.62E-06	<0.1%	4.56E-05	0%
		Annual	0.035		1.85E-05	681.45	4861.56	1.05E-07	<0.1%	1.86E-05	0%
Metals											
		1 Hr			0.52	681.00	4859.66	0.01		0.53	
Aluminum	7429-90-5	24 Hr	4.8[4]	1.64E-03	0.21	679.55	4861.16	1.99E-03	<0.1%	0.21	4%
		Annual			0.11	681.45	4861.56	5.78E-05		0.11	
		1 Hr			7.35E-03	681.00	4859.66	9.94E-04		8.34E-03	
Antimony	7440-36-0	24 Hr	25	1.13E-04	3.02E-03	679.55	4861.16	1.37E-04	<0.1%	3.15E-03	<0.1%
		Annual			2.93E-03	681.45	4861.56	3.98E-06		2.93E-03	
		1 Hr			4.41E-03	681.00	4859.66	1.52E-04		4.56E-03	
Arsenic	7440-38-2	24 Hr	0.3[2]	1.73E-05	1.81E-03	679.55	4861.16	2.10E-05	<0.1%	1.83E-03	1%
		Annual			1.80E-03	681.45	4861.56	6.10E-07		1.80E-03	

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentrations ($\mu g/m^3$)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Background ($\mu g/m^3$)	% of Criteria
		1 Hr			0.02	681.00	4859.66	7.67E-04		0.02	
Barium	7440-39-3	24 Hr	10[2]	8.73E-05	8.18E-03	679.55	4861.16	1.06E-04	<0.1%	8.29E-03	<0.1%
		Annual			4.95E-03	681.45	4861.56	3.07E-06		4.95E-03	
		1 Hr			7.35E-04	681.00	4859.66	1.21E-04		8.56E-04	
Beryllium	7440-41-7	24 Hr	0.01	1.38E-05	3.02E-04	679.55	4861.16	1.67E-05	<0.1%	3.19E-04	3%
		Annual			2.98E-04	681.45	4861.56	4.84E-07		2.98E-04	
		1 Hr			0.19	681.00	4859.66	0.06		0.24	
Boron	7440-42-8	24 Hr	120	6.32E-03	0.08	679.55	4861.16	7.66E-03	<0.1%	0.08	<0.1%
		Annual			0.02	681.45	4861.56	2.22E-04		0.02	
		1 Hr			1.47E-03	681.00	4859.66	2.54E-03		4.01E-03	
Cadmium (Cd)	7440-43-9	24 Hr	0.025	2.89E-04	6.04E-04	679.55	4861.16	3.51E-04	1%	9.55E-04	4%
		Annual	0.005[3]		6.01E-04	681.45	4861.56	1.02E-05	<0.1%	6.11E-04	12%
		1 Hr			-	681.00	4859.66	0.02			
Cadmium and Thallium (Cd + Th)	<cdth>	24 Hr		1.90E-03	-	679.55	4861.16	2.30E-03			
		Annual			-	681.45	4861.56	6.69E-05			
		1 Hr			-	681.00	4859.66	1.16E-04			
Chromium (hexavalent)	<ch-hexa>	24 Hr		1.32E-05	-	679.55	4861.16	1.60E-05			
		Annual			-	681.45	4861.56	4.65E-07			

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Background (µg/m³)	% of Criteria
Total Chromium (and compounds)	7440-47-3	1 Hr		9.29E-05	6.72E-03	681.00	4859.66	8.16E-04		7.53E-03	
		24 Hr	1.5[3]		2.76E-03	679.55	4861.16	1.13E-04	<0.1%	2.87E-03	<0.1%
		Annual			1.71E-03	681.45	4861.56	3.27E-06		1.71E-03	
Cobalt	7440-48-4	1 Hr		2.39E-04	1.47E-03	681.00	4859.66	2.10E-03		3.57E-03	
		24 Hr	0.1[3]		6.04E-04	679.55	4861.16	2.90E-04	<0.1%	8.94E-04	1%
		Annual			5.96E-04	681.45	4861.56	8.42E-06		6.04E-04	
Lead (Pb)	7439-92-1	1 Hr		2.07E-03	0.01	681.00	4859.66	0.02		0.03	
		24 Hr	0.5		4.98E-03	679.55	4861.16	2.50E-03	1%	7.48E-03	1%
		30 day	0.2		1.92E-03	679.55	4861.16	9.66E-04	0%	2.89E-03	1%
		Annual			3.29E-03	681.45	4861.56	7.27E-05		3.36E-03	
Mercury (Hg) - Vapour/Particulate phase	7439-97-6	1 Hr		6.20E-04	-	681.00	4859.66	5.44E-03			
		24 Hr	2		-	679.55	4861.16	7.51E-04	<0.1%		
		Annual			-	681.45	4861.56	2.18E-05			
Nickel	7440-02-0	1 Hr		3.60E-03	0.01	681.00	4859.66	0.03		0.04	
		24 Hr	2		4.49E-03	679.55	4861.16	4.36E-03	<0.1%	8.85E-03	<0.1%
		Annual			2.24E-03	681.45	4861.56	1.27E-04		2.37E-03	
Phosphorus	7723-14-0	1 Hr		1.90E-03	0.18	681.00	4859.66	0.02		0.19	
		24 Hr	0.35[4]		0.07	679.55	4861.16	2.31E-03	1%	0.07	21%
		Annual			0.05	681.45	4861.56	6.69E-05		0.05	

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Background (µg/m³)	% of Criteria
Silver	7440-22-4	1 Hr		1.38E-04	8.33E-04	681.00	4859.66	1.22E-03		2.05E-03	
		24 Hr	1		3.42E-04	679.55	4861.16	1.68E-04	<0.1%	5.10E-04	<0.1%
		Annual			3.43E-04	681.45	4861.56	4.87E-06		3.48E-04	
Selenium	7782-49-2	1 Hr		1.98E-05	7.35E-03	681.00	4859.66	1.74E-04		7.52E-03	
		24 Hr	10[2]		3.02E-03	679.55	4861.16	2.40E-05	<0.1%	3.04E-03	<0.1%
		Annual			2.93E-03	681.45	4861.56	6.98E-07		2.93E-03	
Thallium	7440-28-0	1 Hr		1.61E-03	-	681.00	4859.66	0.01			
		24 Hr	0.24[4]		-	679.55	4861.16	1.95E-03	1%		
		Annual			-	681.45	4861.56	5.67E-05			
Tin	7440-31-5	1 Hr		7.27E-04	7.35E-03	681.00	4859.66	6.38E-03		0.01	
		24 Hr	10		3.02E-03	679.55	4861.16	8.81E-04	<0.1%	3.90E-03	<0.1%
		Annual			2.93E-03	681.45	4861.56	2.56E-05		2.95E-03	
Vanadium	7440-62-2	1 Hr		4.80E-05	3.77E-03	681.00	4859.66	4.22E-04		4.19E-03	
		24 Hr	2		1.55E-03	679.55	4861.16	5.82E-05	<0.1%	1.61E-03	<0.1%
		Annual			7.70E-04	681.45	4861.56	1.69E-06		7.71E-04	
Zinc	7440-66-6	1 Hr		8.24E-03	0.10	681.00	4859.66	0.07		0.18	
		24 Hr	120		0.04	679.55	4861.16	9.99E-03	<0.1%	0.05	<0.1%
		Annual			0.03	681.45	4861.56	2.90E-04		0.03	
Sum of (As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb)	<sum>	1 Hr		1.90E-02	0.52	681.00	4859.66	0.17		0.68	
		24 Hr			0.21	679.55	4861.16	0.02		0.23	
		Annual			0.11	681.45	4861.56	6.69E-04		0.11	

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m^3)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m^3)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m^3)	% of Criteria	Predicted Statistical Max Concentration + Background (µg/m^3)	% of Criteria
Chlorinated Monocyclic Aromatics											
1,2-Dichlorobenzene	95-50-1	1 Hr	30500[2]	8.45E-05	0.03	681.00	4859.66	7.42E-04	<0.1%	0.03	<0.1%
		24 Hr			0.01	679.55	4861.16	1.02E-04		0.01	
		Annual			4.66E-03	681.45	4861.56	2.97E-06		4.67E-03	
1,2,4,5-Tetrachlorobenzene	95-94-3	1 Hr		2.13E-06	-	681.00	4859.66	1.87E-05			
		24 Hr	1[4]		-	679.55	4861.16	2.58E-06	<0.1%		
		Annual			-	681.45	4861.56	7.49E-08			
1,2,4 – Trichlorobenzene	120-82-1	1 Hr		2.13E-06	0.11	681.00	4859.66	1.87E-05		0.11	
		24 Hr	400[2]		0.05	679.55	4861.16	2.58E-06	<0.1%	0.05	<0.1%
		Annual			0.02	681.45	4861.56	7.49E-08		0.02	
2,3,4,6-Tetrachlorophenol	58-90-2	1 Hr		7.18E-06	-	681.00	4859.66	6.30E-05			
		24 Hr			-	679.55	4861.16	8.70E-06			
		Annual			-	681.45	4861.56	2.53E-07			
2,4,6-Trichlorophenol	88-06-2	1 Hr		2.16E-06	-	681.00	4859.66	1.90E-05			
		24 Hr	1.5[4]		-	679.55	4861.16	2.62E-06	<0.1%		
		Annual			-	681.45	4861.56	7.61E-08			
2,4-Dichlorophenol	120-83-2	1 Hr		4.25E-06	-	681.00	4859.66	3.73E-05			
		24 Hr	77[4]		-	679.55	4861.16	5.16E-06	<0.1%		
		Annual			-	681.45	4861.56	1.50E-07			

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Background (µg/m³)	% of Criteria
Pentachlorophenol	87-86-5	1 Hr		8.52E-06	2.13E-03	681.00	4859.66	7.48E-05		2.21E-03	
		24 Hr	20[2]		8.76E-04	679.55	4861.16	1.03E-05	<0.1%	8.87E-04	<0.1%
		Annual			4.10E-04	681.45	4861.56	3.00E-07		4.11E-04	
Hexachlorobenzene	118-74-1	1 Hr		2.13E-06	1.52E-04	681.00	4859.66	1.87E-05		1.71E-04	
		24 Hr	0.011[4]		6.25E-05	679.55	4861.16	2.58E-06	<0.1%	6.51E-05	1%
		Annual			5.27E-05	681.45	4861.56	7.49E-08		5.28E-05	
Pentachlorobenzene	608-93-5	1 Hr		5.59E-06	-	681.00	4859.66	4.91E-05			
		24 Hr	3[4]		-	679.55	4861.16	6.77E-06	<0.1%		
		Annual			-	681.45	4861.56	1.97E-07			
Polycyclic Organic Matter											
Acenaphthylene	208-96-8	1 Hr		5.99E-07	7.53E-04	681.00	4859.66	5.26E-06		7.58E-04	
		24 Hr	3.5[4]		3.09E-04	679.55	4861.16	7.26E-07	<0.1%	3.10E-04	<0.1%
		Annual			1.58E-04	681.45	4861.56	2.11E-08		1.58E-04	
Acenaphthene	83-32-9	1 Hr		7.68E-07	3.04E-03	681.00	4859.66	6.74E-06		3.05E-03	
		24 Hr			1.25E-03	679.55	4861.16	9.31E-07		1.25E-03	
		Annual			5.48E-04	681.45	4861.56	2.70E-08		5.48E-04	
Anthracene	120-12-7	1 Hr		1.68E-07	3.97E-04	681.00	4859.66	1.48E-06		3.98E-04	
		24 Hr	0.2[4]		1.63E-04	679.55	4861.16	2.04E-07	<0.1%	1.63E-04	<0.1%
		Annual			8.00E-05	681.45	4861.56	5.92E-09		8.00E-05	

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Background (µg/m³)	% of Criteria
Benzo(a)anthracene	56-55-6	1 Hr		6.20E-08	1.65E-04	681.00	4859.66	5.44E-07		1.65E-04	
		24 Hr			6.77E-05	679.55	4861.16	7.51E-08		6.78E-05	
		Annual			5.63E-05	681.45	4861.56	2.18E-09		5.63E-05	
Benzo(b)fluoranthene	205-99-2	1 Hr		1.58E-07	3.45E-04	681.00	4859.66	1.39E-06		3.46E-04	
		24 Hr			1.42E-04	679.55	4861.16	1.92E-07		1.42E-04	
		Annual			7.56E-05	681.45	4861.56	5.57E-09		7.56E-05	
Benzo(k)fluoranthene	207-08-9	1 Hr		4.17E-08	1.65E-04	681.00	4859.66	3.66E-07		1.65E-04	
		24 Hr			6.77E-05	679.55	4861.16	5.06E-08		6.78E-05	
		Annual			5.63E-05	681.45	4861.56	1.47E-09		5.63E-05	
Benzo(a)fluorene	238-84-6	1 Hr		1.14E-06	3.30E-04	681.00	4859.66	1.00E-05		3.40E-04	
		24 Hr			1.35E-04	679.55	4861.16	1.38E-06		1.37E-04	
		Annual			1.13E-04	681.45	4861.56	4.02E-08		1.13E-04	
Benzo(b)fluorene	243-17-4	1 Hr		7.81E-07	3.30E-04	681.00	4859.66	6.86E-06		3.37E-04	
		24 Hr			1.35E-04	679.55	4861.16	9.47E-07		1.36E-04	
		Annual			1.13E-04	681.45	4861.56	2.75E-08		1.13E-04	
Benzo(ghi)perylene	191-24-2	1 Hr		1.71E-06	1.72E-04	681.00	4859.66	1.50E-05		1.87E-04	
		24 Hr	1.2[4]		7.07E-05	679.55	4861.16	2.07E-06	<0.1%	7.28E-05	<0.1%
		Annual			5.85E-05	681.45	4861.56	6.00E-08		5.85E-05	

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Background (µg/m³)	% of Criteria
Benzo(a)pyrene	50-32-8	1 Hr		1.42E-07	1.65E-04	681.00	4859.66	1.25E-06		1.66E-04	
		24 Hr	0.0011		6.77E-05	679.55	4861.16	1.72E-07	<0.1%	6.79E-05	6%
		Annual	0.0003[3]		5.63E-05	681.45	4861.56	5.00E-09	<0.1%	5.63E-05	19%
Benzo(e)pyrene	192-97-2	1 Hr		3.60E-07	3.30E-04	681.00	4859.66	3.16E-06		3.33E-04	
		24 Hr			1.35E-04	679.55	4861.16	4.36E-07		1.36E-04	
		Annual			1.13E-04	681.45	4861.56	1.27E-08		1.13E-04	
Biphenyl	92-52-4	1 Hr	60[2]	1.23E-04	3.32E-03	681.00	4859.66	1.08E-03	<0.1%	4.40E-03	<0.1%
		24 Hr			1.36E-03	679.55	4861.16	1.49E-04		1.51E-03	
		Annual			5.21E-04	681.45	4861.56	4.34E-06		5.25E-04	
Chrysene	218-01-9	1 Hr		1.56E-07	2.35E-04	681.00	4859.66	1.37E-06		2.36E-04	
		24 Hr			9.64E-05	679.55	4861.16	1.89E-07		9.66E-05	
		Annual			6.47E-05	681.45	4861.56	5.48E-09		6.47E-05	
Dibenzo(a,c)anthracene	215-58-7	1 Hr		1.11E-06	-	681.00	4859.66	9.72E-06			
		24 Hr			-	679.55	4861.16	1.34E-06			
		Annual			-	681.45	4861.56	3.90E-08			
Dibenzo(a,h)anthracene	53-70-3	1 Hr		5.00E-08	1.65E-04	681.00	4859.66	4.39E-07		1.65E-04	
		24 Hr			6.77E-05	679.55	4861.16	6.06E-08		6.78E-05	
		Annual			5.63E-05	681.45	4861.56	1.76E-09		5.63E-05	

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Background (µg/m³)	% of Criteria
Fluoranthene	206-44-0	1 Hr		1.72E-06	1.46E-03	681.00	4859.66	1.51E-05		1.48E-03	
		24 Hr	140[4]		6.01E-04	679.55	4861.16	2.08E-06	<0.1%	6.03E-04	<0.1%
		Annual			3.93E-04	681.45	4861.56	6.05E-08		3.93E-04	
Fluorine	7782-41-4	1 Hr		1.29E-06	-	681.00	4859.66	1.13E-05			
		24 Hr			-	679.55	4861.16	1.57E-06			
		Annual			-	681.45	4861.56	4.55E-08			
Indeno (1,2,3 – cd)pyrene	193-39-5	1 Hr		3.11E-07	1.65E-04	681.00	4859.66	2.73E-06		1.68E-04	
		24 Hr			6.77E-05	679.55	4861.16	3.78E-07		6.81E-05	
		Annual			5.63E-05	681.45	4861.56	1.10E-08		5.63E-05	
1 – methylnaphthalene	90-12-0	1 Hr		4.06E-06	3.17E-03	681.00	4859.66	3.56E-05		3.21E-03	
		24 Hr	12[4]		1.30E-03	679.55	4861.16	4.92E-06	<0.1%	1.31E-03	<0.1%
		Annual			4.43E-04	681.45	4861.56	1.43E-07		4.44E-04	
2 – methylnaphthalene	91-57-6	1 Hr		2.25E-05	5.33E-03	681.00	4859.66	1.97E-04		5.53E-03	
		24 Hr	10[4]		2.19E-03	679.55	4861.16	2.72E-05	<0.1%	2.22E-03	<0.1%
		Annual			7.56E-04	681.45	4861.56	7.91E-07		7.57E-04	
Naphthalene	91-20-3	10 min	50	1.75E-05	9.77E-03	681.00	4859.66	2.53E-04	<0.1%	0.01	<0.1%
		1 Hr			5.91E-03	681.00	4859.66	1.53E-04		6.07E-03	
		24 Hr	22.5		2.43E-03	679.55	4861.16	2.12E-05	<0.1%	2.45E-03	<0.1%
		Annual			8.59E-04	681.45	4861.56	6.15E-07		8.60E-04	

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m^3)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m^3)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m^3)	% of Criteria	Predicted Statistical Max Concentration + Background (µg/m^3)	% of Criteria
Perylene	198-55-0	1 Hr		6.24E-08	3.30E-04	681.00	4859.66	5.48E-07		3.30E-04	
		24 Hr			1.35E-04	679.55	4861.16	7.56E-08		1.36E-04	
		Annual			1.13E-04	681.45	4861.56	2.19E-09		1.13E-04	
Phenanthrene	85-01-8	1 Hr		3.91E-06	6.26E-03	681.00	4859.66	3.43E-05		6.30E-03	
		24 Hr			2.57E-03	679.55	4861.16	4.74E-06		2.58E-03	
		Annual			1.71E-03	681.45	4861.56	1.37E-07		1.71E-03	
Pyrene	129-00-0	1 Hr		2.07E-06	6.88E-04	681.00	4859.66	1.82E-05		7.06E-04	
		24 Hr	0.2[4]		2.83E-04	679.55	4861.16	2.51E-06	<0.1%	2.85E-04	<0.1%
		Annual			1.83E-04	681.45	4861.56	7.30E-08		1.83E-04	
Tetralin	119-64-2	1 Hr		2.06E-05	3.30E-04	681.00	4859.66	1.81E-04		5.11E-04	
		24 Hr	1200[4]		1.35E-04	679.55	4861.16	2.50E-05	<0.1%	1.60E-04	<0.1%
		Annual			1.13E-04	681.45	4861.56	7.25E-07		1.13E-04	
O-terphenyl	84-15-1	1 Hr		3.38E-06	3.30E-04	681.00	4859.66	2.97E-05		3.59E-04	
		24 Hr			1.35E-04	679.55	4861.16	4.10E-06		1.40E-04	
		Annual			1.13E-04	681.45	4861.56	1.19E-07		1.13E-04	
Volatile Organic Chemicals (VOC)											
Acetaldehyde	75-07-0	1/2 Hr	500	2.99E-08	5.21	681.00	4859.66	3.19E-07	<0.1%	5.21	1%
		1 Hr			4.29	681.00	4859.66	2.62E-07		4.29	
		24 Hr	500		1.76	679.55	4861.16	3.62E-08	<0.1%	1.76	<0.1%
		Annual			1.05	681.45	4861.56	1.05E-09		1.05	

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Background (µg/m³)	% of Criteria
Benzene	71-43-2	1 Hr		1.28E-03	28.81	681.00	4859.66	0.01		28.82	
		24 Hr			11.83	679.55	4861.16	1.55E-03		11.83	
		Annual			3.94	681.45	4861.56	4.51E-05		3.94	
Bromodichloromethane	75-27-4	1 Hr		1.04E-02	0.04	681.00	4859.66	0.09		0.13	
		24 Hr			0.02	679.55	4861.16	0.01		0.03	
		Annual			0.01	681.45	4861.56	3.67E-04		0.01	
Bromoform	75-25-2	1 Hr		2.85E-03	0.07	681.00	4859.66	0.03		0.10	
		24 Hr	55[2]		0.03	679.55	4861.16	3.46E-03	<0.1%	0.03	<0.1%
		Annual			0.02	681.45	4861.56	1.00E-04		0.02	
Bromomethane	74-83-9	1 Hr		1.49E-03	0.22	681.00	4859.66	0.01		0.23	
		24 Hr	1350[3]		0.09	679.55	4861.16	1.80E-03	<0.1%	0.09	<0.1%
		Annual			0.10	681.45	4861.56	5.23E-05		0.10	
Carbon tetrachloride	56-23-5	1 Hr		1.78E-05	1.80	681.00	4859.66	1.56E-04		1.80	
		24 Hr	2.4		0.74	679.55	4861.16	2.16E-05	<0.1%	0.74	31%
		Annual			0.61	681.45	4861.56	6.26E-07		0.61	
Chloroform	67-66-3	1 Hr		2.11E-05	0.55	681.00	4859.66	1.85E-04		0.55	
		24 Hr	1		0.23	679.55	4861.16	2.55E-05	<0.1%	0.23	23%
		Annual	0.2[3]		0.16	681.45	4861.56	7.41E-07	<0.1%	0.16	81%

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentrations ($\mu g/m^3$)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Background ($\mu g/m^3$)	% of Criteria
		1 Hr			7.87	681.00	4859.66	0.03		7.91	
Dichlorodifluoromethane	75-71-8	24 Hr	500000[2]	3.60E-03	3.23	679.55	4861.16	4.36E-03	<0.1%	3.24	<0.1%
		Annual			2.81	681.45	4861.56	1.27E-04		2.81	
		1 Hr			6.09E-03	681.00	4859.66	2.05E-04		6.29E-03	
Dichloroethene, 1,1 -	75-35-4	24 Hr	10	2.34E-05	2.50E-03	679.55	4861.16	2.83E-05	<0.1%	2.53E-03	<0.1%
		Annual			5.76E-04	681.45	4861.56	8.22E-07		5.77E-04	
		1 Hr			3.08	681.00	4859.66	0.06		3.14	
Dichloromethane	75-09-2	24 Hr	220	7.27E-03	1.27	679.55	4861.16	8.81E-03	<0.1%	1.27	1%
		Annual	44[3]		0.76	681.45	4861.56	2.56E-04	<0.1%	0.76	2%
		10 min	1900[2]		5.00	681.00	4859.66	6.20E-04	<0.1%	5.00	<0.1%
Ethylbenzene	100-41-4	1 Hr		4.28E-05	3.03	681.00	4859.66	3.76E-04		3.03	
		24 Hr	1000		1.24	679.55	4861.16	5.19E-05	<0.1%	1.24	<0.1%
		Annual			0.69	681.45	4861.56	1.51E-06		0.69	
		1 Hr			0.01	681.00	4859.66	1.47E-04		0.01	
Ethylene Dibromide	106-93-4	24 Hr	3[2]	1.67E-05	5.20E-03	679.55	4861.16	2.03E-05	<0.1%	5.22E-03	<0.1%
		Annual			1.84E-03	681.45	4861.56	5.89E-07		1.84E-03	
		1 Hr			8.23	681.00	4859.66	0.02		8.25	
Formaldehyde	50-00-0	24 Hr	65	1.96E-03	3.38	679.55	4861.16	2.38E-03	<0.1%	3.38	5%
		Annual			1.66	681.45	4861.56	6.90E-05		1.66	

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentrations ($\mu g/m^3$)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Background ($\mu g/m^3$)	% of Criteria
Tetrachloroethene	127-18-4	1 Hr		2.34E-04	1.20	681.00	4859.66	2.06E-03		1.20	
		24 Hr	360		0.49	679.55	4861.16	2.84E-04	<0.1%	0.49	<0.1%
		Annual			0.26	681.45	4861.56	8.24E-06		0.26	
Toluene	108-88-3	10 Min		2.08E-03	38.09	681.00	4859.66	0.03		38.12	
		1 Hr			23.06	681.00	4859.66	0.02		23.08	
		24 Hr	2000[2]		9.47	679.55	4861.16	2.52E-03	<0.1%	9.48	<0.1%
		Annual			4.40	681.45	4861.56	7.31E-05		4.40	
Trichloroethane, 1,1,1 -	71-55-6	1 Hr		5.90E-05	0.28	681.00	4859.66	5.18E-04		0.28	
		24 Hr	115000		0.11	679.55	4861.16	7.15E-05	<0.1%	0.11	<0.1%
		Annual			0.10	681.45	4861.56	2.07E-06		0.10	
Trichloroethene	79-01-6	1 Hr		2.03E-05	1.31	681.00	4859.66	1.78E-04		1.31	
		24 Hr	12		0.54	679.55	4861.16	2.46E-05	<0.1%	0.54	4%
		Annual	2.3[3]		0.27	681.45	4861.56	7.15E-07	<0.1%	0.27	12%
Trichlorofluoromethane	75-69-4	1 Hr		7.11E-03	5.23	681.00	4859.66	0.06		5.29	
		24 Hr	6000[2]		2.15	679.55	4861.16	8.62E-03	<0.1%	2.16	<0.1%
		Annual			1.89	681.45	4861.56	2.50E-04		1.89	

Table 7-1 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1A (MCR, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentrations ($\mu g/m^3$)	UTM Coordinate		Scenario 1A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Background ($\mu g/m^3$)	% of Criteria
Vinyl chloride	75-01-4	1 Hr		1.80E-03	0.01	681.00	4859.66	0.02		0.03	
		24 Hr	1		5.88E-03	679.55	4861.16	2.18E-03	0%	8.06E-03	1%
		Annual	0.2[3]		3.65E-03	681.45	4861.56	6.34E-05	<0.1%	3.71E-03	2%
Xylenes, m-, p- and o-	<xylene>	10 min	3000	2.49E-02	19.40	681.00	4859.66	0.36	<0.1%	19.76	1%
		1 Hr			11.75	681.00	4859.66	0.22		11.97	
		24 Hr	730		4.83	679.55	4861.16	0.03	<0.1%	4.86	1%
		Annual			2.76	681.45	4861.56	8.78E-04		2.76	

Notes:

[1] Reg419/05 Schedule 3 Criteria unless stated otherwise

[2] O. Reg. 419 Guidelines

[3] Ontario's ambient air quality criteria

[4] Jurisdictional Screening Level List (JSL)

[5] National Ambient Air Quality Objectives (NAAQO) Max Desirable Level

[6] CCME (2000), Canada-Wide Standards for Respirable Particulate Matter

Table 7-2 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2A (MCTD, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 2A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Sulphur Dioxide (SO_2)	7446-09-5	1 Hr	690	1.16	19.5	680.00	4860.41	11.06	2%	30.58	4%
		24 Hr	275		19.3	680.65	4861.01	1.51	1%	20.80	8%
Hydrogen Chloride (HCl)	7647-01-0	1 Hr		0.30	-	680.00	4860.41	2.84			
		24 Hr	20		-	680.65	4861.01	0.39	2%		
Hydrogen Fluoride (HF)	7664-39-3	1 Hr		0.03	-	680.00	4860.41	0.28			
		24 Hr	0.86		-	680.65	4861.01	0.04	5%		
		30 day	0.34		-	680.65	4861.01	0.01	4%		
Nitrogen Dioxide (NO_2)	10102-44-0	1 Hr	400	4.00	64.6	680.00	4860.41	38.22	10%	102.79	26%
		24 Hr	200		58.2	680.65	4861.01	5.22	3%	63.44	32%
Carbon Monoxide (CO)	630-08-0	1/2 hr	6000	1.49	1257	680.00	4860.41	17.26	<0.1%	1274.36	21%
		1 Hr	36200[3]		1035	680.00	4860.41	14.21	<0.1%	1049.55	3%
		8 Hr	15700[3]		1036	679.65	4861.06	1.94	<0.1%	1037.94	7%
		24 Hr			1029	680.65	4861.01	1.94		1030.93	
Particulate Matter PM_{10}	PM10	1 Hr		0.30	-	680.53	4860.12	3.14			
		24 Hr	50[3]		-	680.50	4861.06	0.49	1%		
Particulate Matter $PM_{2.5}$	PM25	1 Hr		0.30	22.8	680.53	4860.12	3.14		25.96	
		24 Hr	30[6]		20.4	680.50	4861.06	0.49	2%	20.92	70%
Total Particulate Matter	TPM	1 Hr		0.30	86.2	680.53	4860.12	3.14		89.30	
		24 Hr	120		35.4	680.50	4861.06	0.49	<0.1%	35.88	30%

Table 7-2 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2A (MCTD, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 2A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Ammonia (Slip at stack)	<ammonia>	1 Hr		0.18	-	680.00	4860.41	1.71			
		24 Hr	100[3]		-	680.65	4861.01	0.23	<0.1%		
Organic Matter (as CH_4)	VOC	1 Hr		1.62	-	680.00	4860.41	15.48			
		24 Hr			-	680.65	4861.01	2.11			
Chlorinated Polycyclic Aromatics											
Dioxins (as TEQ Toxic Equivalents)	<dioxin>	1 Hr		1.98E-09	5.77E-08	680.00	4860.41	1.90E-08		7.67E-08	
		24 Hr	5.00E-06		2.37E-08	680.65	4861.01	2.59E-09	<0.1%	2.63E-08	<1.1%
Polychlorinated Biphenyls (PCB)	<pcb>	1 Hr		2.39E-06	1.02E-04	680.00	4860.41	2.28E-05		1.25E-04	
		24 Hr	0.15		4.20E-05	680.65	4861.01	3.11E-06	<0.1%	4.51E-05	<0.1%
Metals											
Aluminum	7429-90-5	1 Hr		1.31E-03	0.52	680.00	4860.41	0.01		0.53	
		24 Hr	4.8[4]		0.21	680.65	4861.01	1.71E-03	<0.1%	0.21	4%
Antimony	7440-36-0	1 Hr		9.05E-05	7.35E-03	680.00	4860.41	8.65E-04		8.21E-03	
		24 Hr	25		3.02E-03	680.65	4861.01	1.18E-04	<0.1%	3.14E-03	<0.1%
Arsenic	7440-38-2	1 Hr		1.39E-05	4.41E-03	680.00	4860.41	1.33E-04		4.54E-03	
		24 Hr	0.3[2]		1.81E-03	680.65	4861.01	1.81E-05	<0.1%	1.83E-03	1%
Barium	7440-39-3	1 Hr		6.99E-05	0.02	680.00	4860.41	6.68E-04		0.02	
		24 Hr	10[2]		8.18E-03	680.65	4861.01	9.12E-05	<0.1%	8.27E-03	<0.1%
Beryllium	7440-41-7	1 Hr		1.10E-05	7.35E-04	680.00	4860.41	1.05E-04		8.41E-04	
		24 Hr	0.01		3.02E-04	680.65	4861.01	1.44E-05	<0.1%	3.16E-04	3%

Table 7-2 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2A (MCTD, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentrations ($\mu g/m^3$)	UTM Coordinate		Scenario 2A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
Boron	7440-42-8	1 Hr		5.06E-03	0.19	680.00	4860.41	0.05		0.23	
		24 Hr	120		0.08	680.65	4861.01	6.60E-03	<0.1%	0.08	<0.1%
Cadmium (Cd)	7440-43-9	1 Hr		2.31E-04	1.47E-03	680.00	4860.41	2.21E-03		3.68E-03	
		24 Hr	0.025		6.04E-04	680.65	4861.01	3.02E-04	1%	9.06E-04	4%
Cadmium and Thallium (Cd + Th)	<cdth>	1 Hr		1.52E-03	-	680.00	4860.41	0.01			
		24 Hr			-	680.65	4861.01	1.98E-03			
Chromium (hexavalent)	<ch-hexa>	1 Hr		1.06E-05	-	680.00	4860.41	1.01E-04			
		24 Hr			-	680.65	4861.01	1.38E-05			
Total Chromium (and compounds)	7440-47-3	1 Hr		7.43E-05	6.72E-03	680.00	4860.41	7.11E-04		7.43E-03	
		24 Hr	1.5[3]		2.76E-03	680.65	4861.01	9.71E-05	<0.1%	2.86E-03	<0.1%
Cobalt	7440-48-4	1 Hr		1.91E-04	1.47E-03	680.00	4860.41	1.83E-03		3.30E-03	
		24 Hr	0.1[3]		6.04E-04	680.65	4861.01	2.50E-04	<0.1%	8.54E-04	1%
Lead (Pb)	7439-92-1	1 Hr		1.65E-03	0.01	680.00	4860.41	0.02		0.03	
		24 Hr	0.5		4.98E-03	680.65	4861.01	2.16E-03	<0.1%	7.13E-03	1%
		30 day	0.2		1.92E-03	680.65	4861.01	8.32E-04	<0.1%	2.75E-03	1%
Mercury (Hg) - Vapour/Particulate phase	7439-97-6	1 Hr		4.96E-04	-	680.00	4860.41	4.74E-03			
		24 Hr	2		-	680.65	4861.01	6.47E-04	<0.1%		
Nickel	7440-02-0	1 Hr		2.88E-03	0.01	680.00	4860.41	0.03		0.04	
		24 Hr	2		4.49E-03	680.65	4861.01	3.76E-03	<0.1%	8.25E-03	<0.1%

Table 7-2 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2A (MCTD, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 2A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Phosphorus	7723-14-0	1 Hr		1.52E-03	0.18	680.00	4860.41	0.01		0.19	
		24 Hr	0.35[4]		0.07	680.65	4861.01	1.99E-03	1%	0.07	21%
Silver	7440-22-4	1 Hr		1.11E-04	8.33E-04	680.00	4860.41	1.06E-03		1.89E-03	
		24 Hr	1		3.42E-04	680.65	4861.01	1.45E-04	<0.1%	4.87E-04	<0.1%
Selenium	7782-49-2	1 Hr		1.59E-05	7.35E-03	680.00	4860.41	1.52E-04		7.50E-03	
		24 Hr	10[2]		3.02E-03	680.65	4861.01	2.07E-05	<0.1%	3.04E-03	<0.1%
Thallium	7440-28-0	1 Hr		1.29E-03	-	680.00	4860.41	0.01			
		24 Hr	0.24[4]		-	680.65	4861.01	1.68E-03	1%		
Tin	7440-31-5	1 Hr		5.81E-04	7.35E-03	680.00	4860.41	5.56E-03		0.01	
		24 Hr	10		3.02E-03	680.65	4861.01	7.59E-04	<0.1%	3.78E-03	<0.1%
Vanadium	7440-62-2	1 Hr		3.84E-05	3.77E-03	680.00	4860.41	3.67E-04		4.14E-03	
		24 Hr	2		1.55E-03	680.65	4861.01	5.02E-05	<0.1%	1.60E-03	<0.1%
Zinc	7440-66-6	1 Hr		6.59E-03	0.10	680.00	4860.41	0.06		0.17	
		24 Hr	120		0.04	680.65	4861.01	8.61E-03	<0.1%	0.05	<0.1%
Sum of (As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb)	<sum>	1 Hr		0.02	0.52	680.00	4860.41	0.15		0.66	
		24 Hr			0.21	680.65	4861.01	0.02		0.23	

Table 7-2 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2A (MCTD, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentrations ($\mu g/m^3$)	UTM Coordinate		Scenario 2A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
Chlorinated Monocyclic Aromatics											
1,2-Dichlorobenzene	95-50-1	1 Hr	30500[2]	6.76E-05	0.03	680.00	4860.41	6.46E-04	<0.1%	0.03	<0.1%
		24 Hr			0.01	680.65	4861.01	8.82E-05		0.01	
1,2,4,5-Tetrachlorobenzene	95-94-3	1 Hr		1.70E-06	-	680.00	4860.41	1.63E-05			
		24 Hr	1[4]		-	680.65	4861.01	2.22E-06	<0.1%		
1,2,4 – Trichlorobenzene	120-82-1	1 Hr		1.70E-06	0.11	680.00	4860.41	1.63E-05		0.11	
		24 Hr	400[2]		0.05	680.65	4861.01	2.22E-06	<0.1%	0.05	<0.1%
2,3,4,6-Tetrachlorophenol	58-90-2	1 Hr		5.74E-06	-	680.00	4860.41	5.49E-05			
		24 Hr			-	680.65	4861.01	7.50E-06			
2,4,6-Trichlorophenol	88-06-2	1 Hr		1.73E-06	-	680.00	4860.41	1.65E-05			
		24 Hr	1.5[4]		-	680.65	4861.01	2.26E-06	<0.1%		
2,4-Dichlorophenol	120-83-2	1 Hr		3.40E-06	-	680.00	4860.41	3.25E-05			
		24 Hr	77[4]		-	680.65	4861.01	4.44E-06	<0.1%		
Pentachlorophenol	87-86-5	1 Hr		6.81E-06	2.13E-03	680.00	4860.41	6.51E-05		2.20E-03	
		24 Hr	20[2]		8.76E-04	680.65	4861.01	8.90E-06	<0.1%	8.85E-04	<0.1%
Hexachlorobenzene	118-74-1	1 Hr		1.70E-06	1.52E-04	680.00	4860.41	1.63E-05		1.68E-04	
		24 Hr	0.011[4]		6.25E-05	680.65	4861.01	2.22E-06	<0.1%	6.47E-05	1%
Pentachlorobenzene	608-93-5	1 Hr		4.47E-06	-	680.00	4860.41	4.27E-05			
		24 Hr	3[4]		-	680.65	4861.01	5.84E-06	<0.1%		

Table 7-2 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2A (MCTD, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 2A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Polycyclic Organic Matter											
Acenaphthylene	208-96-8	1 Hr		4.79E-07	7.53E-04	680.00	4860.41	4.58E-06		7.57E-04	
		24 Hr	3.5[4]		3.09E-04	680.65	4861.01	1.07E-06	<0.1%	3.10E-04	<0.1%
Acenaphthene	83-32-9	1 Hr		6.15E-07	3.04E-03	680.00	4860.41	5.87E-06		3.05E-03	
		24 Hr			1.25E-03	680.65	4861.01	1.38E-06		1.25E-03	
Anthracene	120-12-7	1 Hr		1.34E-07	3.97E-04	680.00	4860.41	1.29E-06		3.98E-04	
		24 Hr	0.2[4]		1.63E-04	680.65	4861.01	3.01E-07	<0.1%	1.63E-04	<0.1%
Benzo(a)anthracene	56-55-6	1 Hr		4.96E-08	1.65E-04	680.00	4860.41	4.74E-07		1.65E-04	
		24 Hr			6.77E-05	680.65	4861.01	1.11E-07		6.78E-05	
Benzo(b)fluoranthene	205-99-2	1 Hr		1.27E-07	3.45E-04	680.00	4860.41	1.21E-06		3.46E-04	
		24 Hr			1.42E-04	680.65	4861.01	2.83E-07		1.42E-04	
Benzo(k)fluoranthene	207-08-9	1 Hr		3.34E-08	1.65E-04	680.00	4860.41	3.19E-07		1.65E-04	
		24 Hr			6.77E-05	680.65	4861.01	7.47E-08		6.78E-05	
Benzo(a)fluorene	238-84-6	1 Hr		9.13E-07	3.30E-04	680.00	4860.41	8.73E-06		3.39E-04	
		24 Hr			1.35E-04	680.65	4861.01	2.04E-06		1.37E-04	
Benzo(b)fluorene	243-17-4	1 Hr		6.25E-07	3.30E-04	680.00	4860.41	5.97E-06		3.36E-04	
		24 Hr			1.35E-04	680.65	4861.01	1.40E-06		1.37E-04	
Benzo(ghi)perylene	191-24-2	1 Hr		1.36E-06	1.72E-04	680.00	4860.41	1.30E-05		1.85E-04	
		24 Hr	1.2[4]		7.07E-05	680.65	4861.01	3.05E-06	<0.1%	7.38E-05	<0.1%

Table 7-2 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2A (MCTD, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentrations ($\mu g/m^3$)	UTM Coordinate		Scenario 2A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
Benzo(a)pyrene	50-32-8	1 Hr		1.14E-07	1.65E-04	680.00	4860.41	1.09E-06		1.66E-04	
		24 Hr	0.0011		6.77E-05	680.65	4861.01	2.54E-07	<0.1%	6.80E-05	6%
Benzo(e)pyrene	192-97-2	1 Hr		2.88E-07	3.30E-04	680.00	4860.41	2.75E-06		3.33E-04	
		24 Hr			1.35E-04	680.65	4861.01	6.44E-07		1.36E-04	
Biphenyl	92-52-4	1 Hr	60[2]	9.86E-05	3.32E-03	680.00	4860.41	9.42E-04	<0.1%	4.26E-03	<0.1%
		24 Hr			1.36E-03	680.65	4861.01	2.21E-04		1.58E-03	
Chrysene	218-01-9	1 Hr		1.25E-07	2.35E-04	680.00	4860.41	1.19E-06		2.36E-04	
		24 Hr			9.64E-05	680.65	4861.01	2.79E-07		9.67E-05	
Dibenzo(a,c)anthracene	215-58-7	1 Hr		8.86E-07	-	680.00	4860.41	8.46E-06			
		24 Hr			-	680.65	4861.01	1.98E-06			
Dibenzo(a,h)anthracene	53-70-3	1 Hr		4.00E-08	1.65E-04	680.00	4860.41	3.82E-07		1.65E-04	
		24 Hr			6.77E-05	680.65	4861.01	8.95E-08		6.78E-05	
Fluoranthene	206-44-0	1 Hr		1.37E-06	1.46E-03	680.00	4860.41	1.31E-05		1.48E-03	
		24 Hr	140[4]		6.01E-04	680.65	4861.01	3.08E-06	<0.1%	6.04E-04	<0.1%
Fluorine	7782-41-4	1 Hr		1.03E-06	-	680.00	4860.41	9.89E-06			
		24 Hr			-	680.65	4861.01	2.31E-06			
Indeno(1,2,3 – cd)pyrene	193-39-5	1 Hr		2.49E-07	1.65E-04	680.00	4860.41	2.38E-06		1.67E-04	
		24 Hr			6.77E-05	680.65	4861.01	5.58E-07		6.83E-05	
1 – methylnaphthalene	90-12-0	1 Hr		3.24E-06	3.17E-03	680.00	4860.41	3.10E-05		3.20E-03	
		24 Hr	12[4]		1.30E-03	680.65	4861.01	7.26E-06	<0.1%	1.31E-03	<0.1%

Table 7-2 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2A (MCTD, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 2A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
2 – methylnaphthalene	91-57-6	1 Hr		1.80E-05	5.33E-03	680.00	4860.41	1.72E-04		5.50E-03	
		24 Hr	10[4]		2.19E-03	680.65	4861.01	4.02E-05	<0.1%	2.23E-03	<0.1%
Naphthalene	91-20-3	10 min	50	1.40E-05	9.77E-03	680.00	4860.41	2.21E-04	<0.1%	9.99E-03	<0.1%
		1 Hr			5.91E-03	680.00	4860.41	1.34E-04		6.05E-03	
		24 Hr	22.5		2.43E-03	680.65	4861.01	3.13E-05	<0.1%	2.46E-03	<0.1%
Perylene	198-55-0	1 Hr		4.99E-08	3.30E-04	680.00	4860.41	4.77E-07		3.30E-04	
		24 Hr			1.35E-04	680.65	4861.01	1.12E-07		1.36E-04	
Phenanthrene	85-01-8	1 Hr		3.13E-06	6.26E-03	680.00	4860.41	2.99E-05		6.29E-03	
		24 Hr			2.57E-03	680.65	4861.01	7.00E-06		2.58E-03	
Pyrene	129-00-0	1 Hr		1.66E-06	6.88E-04	680.00	4860.41	1.59E-05		7.04E-04	
		24 Hr	0.2[4]		2.83E-04	680.65	4861.01	3.71E-06	<0.1%	2.86E-04	<0.1%
Tetralin	119-64-2	1 Hr		1.65E-05	3.30E-04	680.00	4860.41	1.57E-04		4.87E-04	
		24 Hr	1200[4]		1.35E-04	680.65	4861.01	3.69E-05	<0.1%	1.72E-04	<0.1%
O-terphenyl	84-15-1	1 Hr		2.70E-06	3.30E-04	680.00	4860.41	2.58E-05		3.56E-04	
		24 Hr			1.35E-04	680.65	4861.01	6.05E-06		1.42E-04	

Table 7-2 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2A (MCTD, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 2A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Volatile Organic Chemicals (VOC)											
Acetaldehyde	75-07-0	1/2 Hr	500	2.40E-08	5.21	680.00	4860.41	2.78E-07	<0.1%	5.21	1%
		1 Hr			4.29	680.00	4860.41	2.29E-07		4.29	
		24 Hr	500		1.76	680.65	4861.01	5.37E-08	<0.1%	1.76	<0.1%
Benzene	71-43-2	1 Hr		1.02E-03	28.81	680.00	4860.41	9.79E-03		28.82	
		24 Hr			11.83	680.65	4861.01	2.29E-03		11.83	
Bromodichloromethane	75-27-4	1 Hr		8.37E-03	0.04	680.00	4860.41	0.08		0.12	
		24 Hr			0.02	680.65	4861.01	0.02		0.04	
Bromoform	75-25-2	1 Hr		2.29E-03	0.07	680.00	4860.41	0.02		0.09	
		24 Hr	55[2]		0.03	680.65	4861.01	5.12E-03	<0.1%	0.03	<0.1%
Bromomethane	74-83-9	1 Hr		1.19E-03	0.22	680.00	4860.41	0.01		0.23	
		24 Hr	1350[3]		0.09	680.65	4861.01	2.66E-03	<0.1%	0.09	<0.1%
Carbon tetrachloride	56-23-5	1 Hr		1.43E-05	1.80	680.00	4860.41	1.36E-04		1.80	
		24 Hr	2.4		0.74	680.65	4861.01	3.19E-05	<0.1%	0.74	31%
Chloroform	67-66-3	1 Hr		1.69E-05	0.55	680.00	4860.41	1.61E-04		0.55	
		24 Hr	1		0.23	680.65	4861.01	3.77E-05	<0.1%	0.23	23%
Dichlorodifluoromethane	75-71-8	1 Hr		2.88E-03	7.87	680.00	4860.41	0.03		7.90	
		24 Hr	500000[2]		3.23	680.65	4861.01	6.44E-03	<0.1%	3.24	<0.1%
Dichloroethene, 1,1 -	75-35-4	1 Hr		1.87E-05	6.09E-03	680.00	4860.41	1.79E-04		6.27E-03	
		24 Hr	10		2.50E-03	680.65	4861.01	4.18E-05	<0.1%	2.54E-03	<0.1%

Table 7-2 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2A (MCTD, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m^3)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m^3)	UTM Coordinate		Scenario 2A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m^3)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m^3)	% of Criteria
Dichloromethane	75-09-2	1 Hr		5.82E-03	3.08	680.00	4860.41	0.06		3.14	
		24 Hr	220		1.27	680.65	4861.01	0.01	<0.1%	1.28	1%
Ethylbenzene	100-41-4	10 min	1900[2]	3.42E-05	5.00	680.00	4860.41	5.40E-04	<0.1%	5.00	<0.1%
		1 Hr			3.03	680.00	4860.41	3.27E-04		3.03	
		24 Hr	1000		1.24	680.65	4861.01	7.66E-05	<0.1%	1.24	<0.1%
Ethylene Dibromide	106-93-4	1 Hr		1.34E-05	0.01	680.00	4860.41	1.28E-04		0.01	
		24 Hr	3[2]		5.20E-03	680.65	4861.01	3.01E-05	<0.1%	5.23E-03	<0.1%
Formaldehyde	50-00-0	1 Hr		1.57E-03	8.23	680.00	4860.41	0.02		8.24	
		24 Hr	65		3.38	680.65	4861.01	3.51E-03	<0.1%	3.38	5%
Tetrachloroethene	127-18-4	1 Hr		1.87E-04	1.20	680.00	4860.41	1.79E-03		1.20	
		24 Hr	360		0.49	680.65	4861.01	4.19E-04	<0.1%	0.49	<0.1%
Toluene	108-88-3	10 Min		1.66E-03	38.09	680.00	4860.41	0.03		38.12	
		1 Hr			23.06	680.00	4860.41	0.02		23.08	
		24 Hr	2000[2]		9.47	680.65	4861.01	3.72E-03	<0.1%	9.48	<0.1%
Trichloroethane, 1,1,1 -	71-55-6	1 Hr		4.72E-05	0.28	680.00	4860.41	4.51E-04		0.28	
		24 Hr	115000		0.11	680.65	4861.01	1.06E-04	<0.1%	0.11	<0.1%
Trichloroethene	79-01-6	1 Hr		1.62E-05	1.31	680.00	4860.41	1.55E-04		1.31	
		24 Hr	12		0.54	680.65	4861.01	3.64E-05	<0.1%	0.54	4%
Trichlorofluoromethane	75-69-4	1 Hr		5.69E-03	5.23	680.00	4860.41	0.05		5.28	
		24 Hr	6000[2]		2.15	680.65	4861.01	0.01	<0.1%	2.16	<0.1%

Table 7-2 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2A (MCTD, 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentrations (µg/m³)	UTM Coordinate		Scenario 2A			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Vinyl chloride	75-01-4	1 Hr		1.44E-03	0.01	680.00	4860.41	0.01		0.03	
		24 Hr	1		5.88E-03	680.65	4861.01	3.23E-03	<0.1%	9.11E-03	1%
Xylenes, m-, p- and o-	<xylene>	10 min	3000	0.02	19.40	680.00	4860.41	0.32	<0.1%	19.72	1%
		1 Hr			11.75	680.00	4860.41	0.19		11.94	
		24 Hr	730		4.83	680.65	4861.01	0.04	<0.1%	4.87	1%

Notes:
[1] Reg419/05 Schedule 3 Criteria unless stated otherwise
[2] O. Reg. 419 Guidelines
[3] Ontario's ambient air quality criteria
[4] Jurisdictional Screening Level List (JSL)
[5] National Ambient Air Quality Objectives (NAAQO) Max Desirable Level
[6] CCME (2000), Canada-Wide Standards for Respirable Particulate Matter

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Sulphur Dioxide (SO_2)	7446-09-5	1 Hr	690	4.09E+00	19.5	680.63	4860.56	27.53	4%	47.05	7%
		24 Hr	275		19.3	676.80	4859.61	3.32	1%	22.61	8%
		Annual	55[3]		5.9	678.55	4860.76	0.11	0.3%	6.04	11%
Hydrogen Chloride (HCl)	7647-01-0	1 Hr		1.05E+00	-	680.63	4860.56	7.08			
		24 Hr	20		-	676.80	4859.61	0.85	4%		
		Annual			-	678.55	4860.76	0.03			
Hydrogen Fluoride (HF)	7664-39-3	1 Hr		1.05E-01	-	680.63	4860.56	0.71			
		24 Hr	0.86		-	676.80	4859.61	0.09	10%		
		30 day	0.34		-	676.80	4859.61	0.03	10%		
		Annual			-	678.55	4860.76	2.90E-03			
Nitrogen Oxides (NO_2)	10102-44-0	1 Hr	400	1.42E+01	64.6	680.63	4860.56	95.17	24%	159.74	40%
		24 Hr	200		58.2	676.80	4859.61	11.47	6%	69.69	35%
		Annual	100[5]		37	678.55	4860.76	0.39	<0.1%	37.42	37%
Carbon Monoxide (CO)	630-08-0	1/2 hr	6000	5.26E+00	1257	680.63	4860.56	42.97	<1.1%	1300.08	22%
		1 Hr	36200[3]		1035	680.63	4860.56	35.39	<0.1%	1070.73	3%
		8 Hr	15700[3]		1036	680.10	4860.36	11.31	<0.1%	1047.31	7%
		24 Hr			1029	676.80	4859.61	4.27		1033.25	
		Annual			632	678.55	4860.76	0.15		631.81	

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Particulate Matter PM_{10}	PM10	1 Hr		1.05E+00	-	680.55	4861.76	8.25			
		24 Hr	50[3]		-	677.80	4862.61	1.00	2%		
		Annual			-	681.75	4862.16	0.03			
Particulate Matter $PM_{2.5}$	PM25	1 Hr		1.05E+00	22.8	680.55	4861.76	8.25		31.07	
		24 Hr	30[6]		20.4	677.80	4862.61	1.00	3%	21.44	71%
		Annual			9.8	681.75	4862.16	0.03		9.81	
Total Particulate Matter	TPM	1 Hr		1.05E+00	86.2	680.55	4861.76	8.25		94.41	
		24 Hr	120		35.4	677.80	4862.61	1.00	<1.1%	36.39	30%
		Annual	60[5]		21.3	681.75	4862.16	0.03	<0.1%	21.31	36%
Ammonia (Slip at stack)	<ammonia>	1 Hr		6.32E-01	-	680.63	4860.56	4.25			
		24 Hr	100[3]		-	676.80	4859.61	0.51	1%		
		Annual			-	678.55	4860.76	0.02			
Organic Matter (as CH_4)	VOC	1 Hr		5.73E+00	-	680.63	4860.56	38.54			
		24 Hr			-	676.80	4859.61	4.65			
		Annual			-	678.55	4860.76	0.16			

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Chlorinated Polycyclic Aromatics											
Dioxins (as TEQ Toxic Equivalents)	<dioxin>	1 Hr		7.02E-09	5.77E-08	680.63	4860.56	4.72E-08		1.05E-07	
		24 Hr	5.00E-06		2.37E-08	676.80	4859.61	5.69E-09	0.1%	2.94E-08	<1.1%
		Annual			1.66E-08	678.55	4860.76	1.94E-10		1.68E-08	
Polychlorinated Biphenyls (PCB)	<pcb>	1 Hr		8.44E-06	1.02E-04	680.63	4860.56	5.68E-05		1.59E-04	
		24 Hr	0.15		4.20E-05	676.80	4859.61	6.84E-06	<0.1%	4.89E-05	0%
		Annual	0.035		1.85E-05	678.55	4860.76	2.33E-07	<0.1%	1.87E-05	0%
Metals											
Aluminum	7429-90-5	1 Hr		4.65E-03	0.52	680.63	4860.56	0.03		0.55	
		24 Hr	4.8[4]		0.21	676.80	4859.61	3.77E-03	<0.1%	0.22	5%
		Annual			0.11	678.55	4860.76	1.28E-04		0.11	
Antimony	7440-36-0	1 Hr		3.20E-04	7.35E-03	680.63	4860.56	2.16E-03		9.50E-03	
		24 Hr	25		3.02E-03	676.80	4859.61	2.60E-04	<0.1%	3.28E-03	<0.1%
		Annual			2.93E-03	678.55	4860.76	8.84E-06		2.94E-03	
Arsenic	7440-38-2	1 Hr		4.91E-05	4.41E-03	680.63	4860.56	3.30E-04		4.74E-03	
		24 Hr	0.3[2]		1.81E-03	676.80	4859.61	3.98E-05	<0.1%	1.85E-03	1%
		Annual			1.80E-03	678.55	4860.76	1.36E-06		1.80E-03	

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentration ($\mu g/m^3$)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
Barium	7440-39-3	1 Hr		2.47E-04	0.02	680.63	4860.56	1.66E-03		0.02	
		24 Hr	10[2]		8.18E-03	676.80	4859.61	2.00E-04	<0.1%	8.38E-03	<0.1%
		Annual			4.95E-03	678.55	4860.76	6.82E-06		4.96E-03	
Beryllium	7440-41-7	1 Hr		3.90E-05	7.35E-04	680.63	4860.56	2.62E-04		9.97E-04	
		24 Hr	0.01		3.02E-04	676.80	4859.61	3.16E-05	<0.1%	3.34E-04	3%
		Annual			2.98E-04	678.55	4860.76	1.07E-06		2.99E-04	
Boron	7440-42-8	1 Hr		1.79E-02	0.19	680.63	4860.56	0.12		0.31	
		24 Hr	120		0.08	676.80	4859.61	0.01	<0.1%	0.09	<0.1%
		Annual			0.02	678.55	4860.76	4.94E-04		0.02	
Cadmium (Cd)	7440-43-9	1 Hr		8.19E-04	1.47E-03	680.63	4860.56	5.51E-03		6.98E-03	
		24 Hr	0.025		6.04E-04	676.80	4859.61	6.64E-04	3%	1.27E-03	5%
		Annual	0.005[3]		6.01E-04	678.55	4860.76	2.26E-05	<0.1%	6.24E-04	12%
Cadmium and Thallium (Cd + Th)	<cdth>	1 Hr		5.38E-03	-	680.63	4860.56	0.04			
		24 Hr			-	676.80	4859.61	4.36E-03			
		Annual			-	678.55	4860.76	1.48E-04			

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m^3)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m^3)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m^3)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m^3)	% of Criteria
Chromium (hexavalent)	<ch-hexa>	1 Hr		3.74E-05	-	680.63	4860.56	2.52E-04			
		24 Hr			-	676.80	4859.61	3.03E-05			
		Annual			-	678.55	4860.76	1.03E-06			
Total Chromium (and compounds)	7440-47-3	1 Hr		2.63E-04	6.72E-03	680.63	4860.56	1.77E-03		8.49E-03	
		24 Hr	1.5[3]		2.76E-03	676.80	4859.61	2.13E-04	<0.1%	2.97E-03	<0.1%
		Annual			1.71E-03	678.55	4860.76	7.26E-06		1.72E-03	
Cobalt	7440-48-4	1 Hr		6.78E-04	1.47E-03	680.63	4860.56	4.56E-03		6.03E-03	
		24 Hr	0.1[3]		6.04E-04	676.80	4859.61	5.49E-04	1%	1.15E-03	1%
		Annual			5.96E-04	678.55	4860.76	1.87E-05		6.14E-04	
Lead (Pb)	7439-92-1	1 Hr		5.85E-03	0.01	680.63	4860.56	0.04		0.05	
		24 Hr	0.5		4.98E-03	676.80	4859.61	4.74E-03	1%	9.72E-03	2%
		30 day	0.2		1.92E-03	676.80	4859.61	1.83E-03	1%	3.75E-03	2%
		Annual			3.29E-03	678.55	4860.76	1.61E-04		3.45E-03	
Mercury (Hg) - Vapour/Particulate phase	7439-97-6	1 Hr		1.75E-03	-	680.63	4860.56	0.01			
		24 Hr	2		-	676.80	4859.61	1.42E-03	<0.1%		
		Annual			-	678.55	4860.76	4.84E-05			
Nickel	7440-02-0	1 Hr		1.02E-02	0.01	680.63	4860.56	0.07		0.08	
		24 Hr	2		4.49E-03	676.80	4859.61	8.26E-03	<0.1%	0.01	1%
		Annual			2.24E-03	678.55	4860.76	2.81E-04		2.52E-03	

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentration ($\mu g/m^3$)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
Phosphorus	7723-14-0	1 Hr		5.38E-03	0.18	680.63	4860.56	0.04		0.21	
		24 Hr	0.35[4]		0.07	676.80	4859.61	4.36E-03	1%	0.08	22%
		Annual			0.05	678.55	4860.76	1.49E-04		0.05	
Silver	7440-22-4	1 Hr		3.92E-04	8.33E-04	680.63	4860.56	2.64E-03		3.47E-03	
		24 Hr	1		3.42E-04	676.80	4859.61	3.18E-04	<0.1%	6.60E-04	<0.1%
		Annual			3.43E-04	678.55	4860.76	1.08E-05		3.54E-04	
Selenium	7782-49-2	1 Hr		5.61E-05	7.35E-03	680.63	4860.56	3.78E-04		7.72E-03	
		24 Hr	10[2]		3.02E-03	676.80	4859.61	4.55E-05	<0.1%	3.06E-03	<0.1%
		Annual			2.93E-03	678.55	4860.76	1.55E-06		2.93E-03	
Thallium	7440-28-0	1 Hr		4.56E-03	-	680.63	4860.56	0.03			
		24 Hr	0.24[4]		-	676.80	4859.61	3.70E-03	2%		
		Annual			-	678.55	4860.76	1.26E-04			
Tin	7440-31-5	1 Hr		2.06E-03	7.35E-03	680.63	4860.56	0.01		0.02	
		24 Hr	10		3.02E-03	676.80	4859.61	1.67E-03	<0.1%	4.69E-03	<0.1%
		Annual			2.93E-03	678.55	4860.76	5.68E-05		2.98E-03	
Vanadium	7440-62-2	1 Hr		1.36E-04	3.77E-03	680.63	4860.56	9.15E-04		4.69E-03	
		24 Hr	2		1.55E-03	676.80	4859.61	1.10E-04	<0.1%	1.66E-03	<0.1%
		Annual			7.70E-04	678.55	4860.76	3.75E-06		7.73E-04	

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentration ($\mu g/m^3$)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
		1 Hr			0.10	680.63	4860.56	0.16		0.26	
Zinc	7440-66-6	24 Hr	120	2.33E-02	0.04	676.80	4859.61	0.02	<0.1%	0.06	<0.1%
		Annual			0.03	678.55	4860.76	6.44E-04		0.03	
		1 Hr			0.52	680.63	4860.56	0.36		0.88	
Sum of (As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb)	<sum>	24 Hr		5.38E-02	0.21	676.80	4859.61	0.04		0.26	
		Annual			0.11	678.55	4860.76	1.48E-03		0.11	
Chlorinated Monocyclic Aromatics											
		1 Hr	30500[2]		0.03	680.63	4860.56	1.61E-03	<0.1%	0.03	<0.1%
1,2-Dichlorobenzene	95-50-1	24 Hr		2.39E-04	0.01	676.80	4859.61	1.94E-04		0.01	
		Annual			4.66E-03	678.55	4860.76	6.60E-06		4.67E-03	
		1 Hr			-	680.63	4860.56	4.05E-05			
1,2,4,5-Tetrachlorobenzene	95-94-3	24 Hr	1[4]	6.02E-06	-	676.80	4859.61	4.88E-06	<0.1%		
		Annual			-	678.55	4860.76	1.66E-07			
		1 Hr			0.11	680.63	4860.56	4.05E-05		0.11	
1,2,4 – Trichlorobenzene	120-82-1	24 Hr	400[2]	6.02E-06	0.05	676.80	4859.61	4.88E-06	<0.1%	0.05	<0.1%
		Annual			0.02	678.55	4860.76	1.66E-07		0.02	
		1 Hr			-	680.63	4860.56	1.37E-04			
2,3,4,6-Tetrachlorophenol	58-90-2	24 Hr		2.03E-05	-	676.80	4859.61	1.65E-05			
		Annual			-	678.55	4860.76	5.61E-07			

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
2,4,6-Trichlorophenol	88-06-2	1 Hr		6.12E-06	-	680.63	4860.56	4.12E-05			
		24 Hr	1.5[4]		-	676.80	4859.61	4.96E-06	<0.1%		
		Annual			-	678.55	4860.76	1.69E-07			
2,4-Dichlorophenol	120-83-2	1 Hr		1.20E-05	-	680.63	4860.56	8.10E-05			
		24 Hr	77[4]		-	676.80	4859.61	9.76E-06	<0.1%		
		Annual			-	678.55	4860.76	3.32E-07			
Pentachlorophenol	87-86-5	1 Hr		2.41E-05	2.13E-03	680.63	4860.56	1.62E-04		2.30E-03	
		24 Hr	20[2]		8.76E-04	676.80	4859.61	1.95E-05	<0.1%	8.96E-04	<0.1%
		Annual			4.10E-04	678.55	4860.76	6.65E-07		4.11E-04	
Hexachlorobenzene	118-74-1	1 Hr		6.02E-06	1.52E-04	680.63	4860.56	4.05E-05		1.93E-04	
		24 Hr	0.011[4]		6.25E-05	676.80	4859.61	4.88E-06	<0.1%	6.74E-05	1%
		Annual			5.27E-05	678.55	4860.76	1.66E-07		5.29E-05	
Pentachlorobenzene	608-93-5	1 Hr		1.58E-05	-	680.63	4860.56	1.06E-04			
		24 Hr	3[4]		-	676.80	4859.61	1.28E-05	<0.1%		
		Annual			-	678.55	4860.76	4.37E-07			

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Polycyclic Organic Matter											
Acenaphthylene	208-96-8	1 Hr		1.70E-06	7.53E-04	680.63	4860.56	1.14E-05		7.64E-04	
		24 Hr	3.5[4]		3.09E-04	676.80	4859.61	1.37E-06	<0.1%	3.10E-04	<0.1%
		Annual			1.58E-04	678.55	4860.76	4.68E-08		1.58E-04	
Acenaphthene	83-32-9	1 Hr		2.18E-06	3.04E-03	680.63	4860.56	1.46E-05		3.06E-03	
		24 Hr			1.25E-03	676.80	4859.61	1.76E-06		1.25E-03	
		Annual			5.48E-04	678.55	4860.76	6.00E-08		5.48E-04	
Anthracene	120-12-7	1 Hr		4.76E-07	3.97E-04	680.63	4860.56	3.20E-06		4.00E-04	
		24 Hr	0.2[4]		1.63E-04	676.80	4859.61	3.86E-07	<0.1%	1.63E-04	<0.1%
		Annual			8.00E-05	678.55	4860.76	1.31E-08		8.00E-05	
Benzo(a)anthracene	56-55-6	1 Hr		1.75E-07	1.65E-04	680.63	4860.56	1.18E-06		1.66E-04	
		24 Hr			6.77E-05	676.80	4859.61	1.42E-07		6.79E-05	
		Annual			5.63E-05	678.55	4860.76	4.84E-09		5.63E-05	
Benzo(b)fluoranthene	205-99-2	1 Hr		4.48E-07	3.45E-04	680.63	4860.56	3.01E-06		3.48E-04	
		24 Hr			1.42E-04	676.80	4859.61	3.63E-07		1.42E-04	
		Annual			7.56E-05	678.55	4860.76	1.24E-08		7.56E-05	
Benzo(k)fluoranthene	207-08-9	1 Hr		1.18E-07	1.65E-04	680.63	4860.56	7.94E-07		1.66E-04	
		24 Hr			6.77E-05	676.80	4859.61	9.57E-08		6.78E-05	
		Annual			5.63E-05	678.55	4860.76	3.26E-09		5.63E-05	

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m^3)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m^3)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m^3)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m^3)	% of Criteria
Benzo(a)fluorene	238-84-6	1 Hr		3.23E-06	3.30E-04	680.63	4860.56	2.17E-05		3.52E-04	
		24 Hr			1.35E-04	676.80	4859.61	2.62E-06		1.38E-04	
		Annual			1.13E-04	678.55	4860.76	8.92E-08		1.13E-04	
Benzo(b)fluorene	243-17-4	1 Hr		2.21E-06	3.30E-04	680.63	4860.56	1.49E-05		3.45E-04	
		24 Hr			1.35E-04	676.80	4859.61	1.79E-06		1.37E-04	
		Annual			1.13E-04	678.55	4860.76	6.10E-08		1.13E-04	
Benzo(ghi)perylene	191-24-2	1 Hr		4.83E-06	1.72E-04	680.63	4860.56	3.25E-05		2.05E-04	
		24 Hr	1.2[4]		7.07E-05	676.80	4859.61	3.92E-06	<0.1%	7.47E-05	<0.1%
		Annual			5.85E-05	678.55	4860.76	1.33E-07		5.86E-05	
Benzo(a)pyrene	50-32-8	1 Hr		4.02E-07	1.65E-04	680.63	4860.56	2.71E-06		1.68E-04	
		24 Hr	0.0011		6.77E-05	676.80	4859.61	3.26E-07	<0.1%	6.81E-05	6%
		Annual	0.0003[3]		5.63E-05	678.55	4860.76	1.11E-08	<0.1%	5.63E-05	19%
Benzo(e)pyrene	192-97-2	1 Hr		1.02E-06	3.30E-04	680.63	4860.56	6.85E-06		3.37E-04	
		24 Hr			1.35E-04	676.80	4859.61	8.26E-07		1.36E-04	
		Annual			1.13E-04	678.55	4860.76	2.81E-08		1.13E-04	
Biphenyl	92-52-4	1 Hr	60[2]	3.49E-04	3.32E-03	680.63	4860.56	2.35E-03	<0.1%	5.67E-03	<0.1%
		24 Hr			1.36E-03	676.80	4859.61	2.83E-04		1.65E-03	
		Annual			5.21E-04	678.55	4860.76	9.63E-06		5.30E-04	

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Chrysene	218-01-9	1 Hr		4.41E-07	2.35E-04	680.63	4860.56	2.97E-06		2.38E-04	
		24 Hr			9.64E-05	676.80	4859.61	3.57E-07		9.68E-05	
		Annual			6.47E-05	678.55	4860.76	1.22E-08		6.47E-05	
Dibenzo(a,c)anthracene	215-58-7	1 Hr		3.13E-06	-	680.63	4860.56	2.11E-05			
		24 Hr			-	676.80	4859.61	2.54E-06			
		Annual			-	678.55	4860.76	8.65E-08			
Dibenzo(a,h)anthracene	53-70-3	1 Hr		1.42E-07	1.65E-04	680.63	4860.56	9.52E-07		1.66E-04	
		24 Hr			6.77E-05	676.80	4859.61	1.15E-07		6.78E-05	
		Annual			5.63E-05	678.55	4860.76	3.90E-09		5.63E-05	
Fluoranthene	206-44-0	1 Hr		4.87E-06	1.46E-03	680.63	4860.56	3.27E-05		1.50E-03	
		24 Hr	140[4]		6.01E-04	676.80	4859.61	3.94E-06	<0.1%	6.05E-04	<0.1%
		Annual			3.93E-04	678.55	4860.76	1.34E-07		3.93E-04	
Fluorine	7782-41-4	1 Hr		3.66E-06	-	680.63	4860.56	2.46E-05			
		24 Hr			-	676.80	4859.61	2.97E-06			
		Annual			-	678.55	4860.76	1.01E-07			
Indeno(1,2,3 – cd)pyrene	193-39-5	1 Hr		8.82E-07	1.65E-04	680.63	4860.56	5.93E-06		1.71E-04	
		24 Hr			6.77E-05	676.80	4859.61	7.15E-07		6.84E-05	
		Annual			5.63E-05	678.55	4860.76	2.43E-08		5.64E-05	

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m^3)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m^3)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m^3)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m^3)	% of Criteria
1 – methylnaphthalene	90-12-0	1 Hr		1.15E-05	3.17E-03	680.63	4860.56	7.72E-05		3.25E-03	
		24 Hr	12[4]		1.30E-03	676.80	4859.61	9.31E-06	<0.1%	1.31E-03	<0.1%
		Annual			4.43E-04	678.55	4860.76	3.17E-07		4.44E-04	
2 – methylnaphthalene	91-57-6	1 Hr		6.36E-05	5.33E-03	680.63	4860.56	4.28E-04		5.76E-03	
		24 Hr	10[4]		2.19E-03	676.80	4859.61	5.16E-05	<0.1%	2.24E-03	<0.1%
		Annual			7.56E-04	678.55	4860.76	1.76E-06		7.58E-04	
Naphthalene	91-20-3	10 min	50	4.95E-05	9.77E-03	680.63	4860.56	5.49E-04	<0.1%	0.01	<0.1%
		1 Hr			5.91E-03	680.63	4860.56	3.33E-04		6.25E-03	
		24 Hr	22.5		2.43E-03	676.80	4859.61	4.01E-05	<0.1%	2.47E-03	<0.1%
		Annual			8.59E-04	678.55	4860.76	1.37E-06		8.61E-04	
Perylene	198-55-0	1 Hr		1.77E-07	3.30E-04	680.63	4860.56	1.19E-06		3.31E-04	
		24 Hr			1.35E-04	676.80	4859.61	1.43E-07		1.36E-04	
		Annual			1.13E-04	678.55	4860.76	4.87E-09		1.13E-04	
Phenanthrene	85-01-8	1 Hr		1.11E-05	6.26E-03	680.63	4860.56	7.44E-05		6.34E-03	
		24 Hr			2.57E-03	676.80	4859.61	8.97E-06		2.58E-03	
		Annual			1.71E-03	678.55	4860.76	3.05E-07		1.71E-03	
Pyrene	129-00-0	1 Hr		5.87E-06	6.88E-04	680.63	4860.56	3.95E-05		7.27E-04	
		24 Hr	0.2[4]		2.83E-04	676.80	4859.61	4.76E-06	<0.1%	2.87E-04	<0.1%
		Annual			1.83E-04	678.55	4860.76	1.62E-07		1.83E-04	

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Tetralin	119-64-2	1 Hr		5.83E-05	3.30E-04	680.63	4860.56	3.92E-04		7.22E-04	
		24 Hr	1200[4]		1.35E-04	676.80	4859.61	4.73E-05	<0.1%	1.83E-04	<0.1%
		Annual			1.13E-04	678.55	4860.76	1.61E-06		1.14E-04	
O-terphenyl	84-15-1	1 Hr		9.57E-06	3.30E-04	680.63	4860.56	6.44E-05		3.94E-04	
		24 Hr			1.35E-04	676.80	4859.61	7.76E-06		1.43E-04	
		Annual			1.13E-04	678.55	4860.76	2.64E-07		1.13E-04	
Volatile Organic Chemicals (VOC)											
Acetaldehyde	75-07-0	1/2 Hr	500	6.22E-08	5.21	680.63	4860.56	5.07E-07	<0.1%	5.21	1%
		1 Hr			4.29	680.63	4860.56	4.18E-07		4.29	
		24 Hr	500		1.76	676.80	4859.61	5.04E-08	<0.1%	1.76	<0.1%
		Annual			1.05	678.55	4860.76	1.71E-09		1.05	
Benzene	71-43-2	1 Hr		3.63E-03	28.81	680.63	4860.56	0.02		28.83	
		24 Hr			11.83	676.80	4859.61	2.94E-03		11.83	
		Annual			3.94	678.55	4860.76	1.00E-04		3.94	
Bromodichloromethane	75-27-4	1 Hr		2.17E-02	0.04	680.63	4860.56	0.15		0.19	
		24 Hr			0.02	676.80	4859.61	0.02		0.03	
		Annual			0.01	678.55	4860.76	5.98E-04		0.01	

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Bromoform	75-25-2	1 Hr		5.93E-03	0.07	680.63	4860.56	0.04		0.11	
		24 Hr	55[2]		0.03	676.80	4859.61	4.80E-03	<0.1%	0.03	<0.1%
		Annual			0.02	678.55	4860.76	1.64E-04		0.02	
Bromomethane	74-83-9	1 Hr		4.21E-03	0.22	680.63	4860.56	0.03		0.24	
		24 Hr	1350[3]		0.09	676.80	4859.61	3.41E-03	<0.1%	0.09	<0.1%
		Annual			0.10	678.55	4860.76	1.16E-04		0.10	
Carbon tetrachloride	56-23-5	1 Hr		3.70E-05	1.80	680.63	4860.56	2.49E-04		1.80	
		24 Hr	2.4		0.74	676.80	4859.61	3.00E-05	<0.1%	0.74	31%
		Annual			0.61	678.55	4860.76	1.02E-06		0.61	
Chloroform	67-66-3	1 Hr		5.96E-05	0.55	680.63	4860.56	4.01E-04		0.55	
		24 Hr	1		0.23	676.80	4859.61	4.83E-05	<0.1%	0.23	23%
		Annual	0.2[3]		0.16	678.55	4860.76	1.65E-06	<0.1%	0.16	81%
Dichlorodifluoromethane	75-71-8	1 Hr		1.02E-02	7.87	680.63	4860.56	0.07		7.94	
		24 Hr	500000[2]		3.23	676.80	4859.61	8.25E-03	<0.1%	3.24	<0.1%
		Annual			2.81	678.55	4860.76	2.81E-04		2.81	
Dichloroethene, 1,1 -	75-35-4	1 Hr		6.61E-05	6.09E-03	680.63	4860.56	4.45E-04		6.53E-03	
		24 Hr	10		2.50E-03	676.80	4859.61	5.36E-05	<0.1%	2.55E-03	<0.1%
		Annual			5.76E-04	678.55	4860.76	1.82E-06		5.78E-04	

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Dichloromethane	75-09-2	1 Hr		2.06E-02	3.08	680.63	4860.56	0.14		3.22	
		24 Hr	220		1.27	676.80	4859.61	0.02	<0.1%	1.28	1%
		Annual	44[3]		0.76	678.55	4860.76	5.68E-04	<0.1%	0.76	2%
Ethylbenzene	100-41-4	10 min	1900[2]	1.21E-04	5.00	680.63	4860.56	1.35E-03	<0.1%	5.00	<0.1%
		1 Hr			3.03	680.63	4860.56	8.15E-04		3.03	
		24 Hr	1000		1.24	676.80	4859.61	9.82E-05	<0.1%	1.24	<0.1%
		Annual			0.69	678.55	4860.76	3.34E-06		0.69	
Ethylene Dibromide	106-93-4	1 Hr		3.48E-05	0.01	680.63	4860.56	2.34E-04		0.01	
		24 Hr	3[2]		5.20E-03	676.80	4859.61	2.82E-05	<0.1%	5.23E-03	<0.1%
		Annual			1.84E-03	678.55	4860.76	9.60E-07		1.84E-03	
Formaldehyde	50-00-0	1 Hr		5.55E-03	8.23	680.63	4860.56	0.04		8.27	
		24 Hr	65		3.38	676.80	4859.61	4.50E-03	<0.1%	3.38	5%
		Annual			1.66	678.55	4860.76	1.53E-04		1.66	
Tetrachloroethene	127-18-4	1 Hr		6.63E-04	1.20	680.63	4860.56	4.46E-03		1.20	
		24 Hr	360		0.49	676.80	4859.61	5.38E-04	<0.1%	0.49	<0.1%
		Annual			0.26	678.55	4860.76	1.83E-05		0.26	
Toluene	108-88-3	10 Min		5.88E-03	38.09	680.63	4860.56	0.07		38.16	
		1 Hr			23.06	680.63	4860.56	0.04		23.10	
		24 Hr	2000[2]		9.47	676.80	4859.61	4.77E-03	<0.1%	9.48	<0.1%
		Annual			4.40	678.55	4860.76	1.62E-04		4.40	

Table 7-3 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 1B (MCR, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM Coordinate		Scenario 1B - MCR			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Trichloroethane, 1,1,1 -	71-55-6	1 Hr		1.67E-04	0.28	680.63	4860.56	1.12E-03		0.28	
		24 Hr	115000		0.11	676.80	4859.61	1.35E-04	<0.1%	0.11	<0.1%
		Annual			0.10	678.55	4860.76	4.61E-06		0.10	
Trichloroethene	79-01-6	1 Hr		5.75E-05	1.31	680.63	4860.56	3.87E-04		1.31	
		24 Hr	12		0.54	676.80	4859.61	4.66E-05	<0.1%	0.54	4%
		Annual	2.3[3]		0.27	678.55	4860.76	1.59E-06	<0.1%	0.27	12%
Trichlorofluoromethane	75-69-4	1 Hr		2.01E-02	5.23	680.63	4860.56	0.14		5.36	
		24 Hr	6000[2]		2.15	676.80	4859.61	0.02	<0.1%	2.16	<0.1%
		Annual			1.89	678.55	4860.76	5.56E-04		1.89	
Vinyl chloride	75-01-4	1 Hr		5.10E-03	0.01	680.63	4860.56	0.03		0.05	
		24 Hr	1		5.88E-03	676.80	4859.61	4.13E-03	0.4%	0.01	1%
		Annual	0.2[3]		3.65E-03	678.55	4860.76	1.41E-04	<0.1%	3.79E-03	2%
Xylenes, m-, p- and o-	<xylene>	10 min	3000	7.06E-02	19.40	680.63	4860.56	0.78	<0.1%	20.19	1%
		1 Hr			11.75	680.63	4860.56	0.48		12.22	
		24 Hr	730		4.83	676.80	4859.61	0.06	<0.1%	4.88	1%
		Annual			2.76	678.55	4860.76	1.95E-03		2.76	

Notes:
[1] Reg419/05 Schedule 3 Criteria unless stated otherwise
[2] O. Reg. 419 Guidelines
[3] Ontario's ambient air quality criteria
[4] Jurisdictional Screening Level List (JSL)
[5] National Ambient Air Quality Objectives (NAAQO) Max Desirable Level
[6] CCME (2000), Canada-Wide Standards for Respirable Particulate Matter

Table 7-4 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2B (MCTD, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m^3)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m^3)	UTM coordinate		Scenario 2B - MCTD			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m^3)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m^3)	% of Criteria
Sulphur Dioxide (SO_2)	7446-09-5	1 Hr	690	3.27	19.5	680.64	4860.55	25.28	4%	44.80	6%
		24 Hr	275		19.3	680.40	4860.91	3.03	1%	22.32	8%
Hydrogen Chloride (HCl)	7647-01-0	1 Hr		0.84	-	680.64	4860.55	6.50			
		24 Hr	20		-	680.40	4860.91	0.78	4%		
Hydrogen Fluoride (HF)	7664-39-3	1 Hr		0.08	-	680.64	4860.55	0.65			
		24 Hr	0.86		-	680.40	4860.91	0.08	9%		
		30 day	0.34		-	680.40	4860.91	0.03	9%		
Nitrogen Oxides (NO_2)	10102-44-0	1 Hr	400	11.32	64.6	680.64	4860.55	87.39	22%	151.96	38%
		24 Hr	200		58.2	680.40	4860.91	10.49	5%	68.71	34%
Carbon Monoxide (CO)	630-08-0	1/2 hr	6000	4.21	1257	680.64	4860.55	39.46	1%	1296.57	22%
		1 Hr	36200[3]		1035	680.64	4860.55	32.50	<0.1%	1067.84	3%
		8 Hr	15700[3]		1036	680.10	4860.36	10.67	<0.1%	1046.67	7%
		24 Hr			1029	680.40	4860.91	3.90		1032.88	
Particulate Matter PM_{10}	PM10	1 Hr		0.84	-	677.30	4863.11	7.88			
		24 Hr	50 [3]		-	680.53	4860.14	1.02	2%		
Particulate Matter $PM_{2.5}$	PM25	1 Hr		0.84	22.8	677.30	4863.11	7.88		30.70	
		24 Hr	30[6]		20.4	680.53	4860.14	1.02	3%	21.45	72%
Total Particulate Matter	TPM	1 Hr		0.84	86.2	677.30	4863.11	7.88		94.04	
		24 Hr	120		35.4	680.53	4860.14	1.02	<1.1%	36.41	30%
Ammonia (Slip at stack)	<ammonia>	1 Hr		0.51	-	680.64	4860.55	3.90			
		24 Hr	100[3]		-	680.40	4860.91	0.47	<0.1%		

Table 7-4 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2B (MCTD, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentration ($\mu g/m^3$)	UTM coordinate		Scenario 2B - MCTD			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
Organic Matter (as CH_4)	VOC	1 Hr		4.58	-	680.64	4860.55	35.39			
		24 Hr			-	680.40	4860.91	4.25			
Chlorinated Polycyclic Aromatics											
Dioxins (as TEQ Toxic Equivalents)	<dioxin>	1 Hr		5.61E-09	5.77E-08	680.64	4860.55	4.33E-08		1.01E-07	
		24 Hr	5.00E-06		2.37E-08	680.40	4860.91	5.20E-09	<0.1%	2.89E-08	<1.1%
Polychlorinated Biphenyls (PCB)	<pcb>	1 Hr		6.76E-06	1.02E-04	680.64	4860.55	5.21E-05		1.54E-04	
		24 Hr	0.15		4.20E-05	680.40	4860.91	6.26E-06	<0.1%	4.83E-05	0.03%
Metals											
Aluminum	7429-90-5	1 Hr		3.72E-03	0.52	680.64	4860.55	0.03		0.55	
		24 Hr	4.8[4]		0.21	680.40	4860.91	3.44E-03	<0.1%	0.22	4%
Antimony	7440-36-0	1 Hr		2.56E-04	7.35E-03	680.64	4860.55	1.98E-03		9.32E-03	
		24 Hr	25		3.02E-03	680.40	4860.91	2.37E-04	<0.1%	3.25E-03	<0.1%
Arsenic	7440-38-2	1 Hr		3.93E-05	4.41E-03	680.64	4860.55	3.03E-04		4.71E-03	
		24 Hr	0.3[2]		1.81E-03	680.40	4860.91	3.64E-05	<0.1%	1.85E-03	1%
Barium	7440-39-3	1 Hr		1.98E-04	0.02	680.64	4860.55	1.53E-03		0.02	
		24 Hr	10[2]		8.18E-03	680.40	4860.91	1.83E-04	<0.1%	8.37E-03	<0.1%
Beryllium	7440-41-7	1 Hr		3.12E-05	7.35E-04	680.64	4860.55	2.41E-04		9.76E-04	
		24 Hr	0.01		3.02E-04	680.40	4860.91	2.89E-05	<0.1%	3.31E-04	3%
Boron	7440-42-8	1 Hr		0.01	0.19	680.64	4860.55	0.11		0.30	
		24 Hr	120		0.08	680.40	4860.91	0.01	<0.1%	0.09	<0.1%

Table 7-4 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2B (MCTD, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentration ($\mu g/m^3$)	UTM coordinate		Scenario 2B - MCTD			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
Cadmium (Cd)	7440-43-9	1 Hr		6.55E-04	1.47E-03	680.64	4860.55	5.06E-03		6.53E-03	
		24 Hr	0.025		6.04E-04	680.40	4860.91	6.07E-04	2%	1.21E-03	5%
Cadmium and Thallium (Cd + Th)	<cdth>	1 Hr		4.30E-03	-	680.64	4860.55	0.03			
		24 Hr			-	680.40	4860.91	3.99E-03			
Chromium (hexavalent)	<ch-hexa>	1 Hr		2.99E-05	-	680.64	4860.55	2.31E-04			
		24 Hr			-	680.40	4860.91	2.77E-05			
Total Chromium (and compounds)	7440-47-3	1 Hr		2.11E-04	6.72E-03	680.64	4860.55	1.63E-03		8.34E-03	
		24 Hr	1.5[3]		2.76E-03	680.40	4860.91	1.95E-04	<0.1%	2.95E-03	<0.1%
Cobalt	7440-48-4	1 Hr		5.42E-04	1.47E-03	680.64	4860.55	4.18E-03		5.66E-03	
		24 Hr	0.1[3]		6.04E-04	680.40	4860.91	5.02E-04	1%	1.11E-03	1%
Lead (Pb)	7439-92-1	1 Hr		4.68E-03	0.01	680.64	4860.55	0.04		0.05	
		24 Hr	0.5		4.98E-03	680.40	4860.91	4.33E-03	1%	9.31E-03	2%
		30 day	0.2		1.92E-03	680.40	4860.91	1.67E-03	1%	3.59E-03	2%
Mercury (Hg) - Vapour/Particulate phase	7439-97-6	1 Hr		1.40E-03	-	680.64	4860.55	0.01			
		24 Hr	2		-	680.40	4860.91	1.30E-03	<0.1%		
Nickel	7440-02-0	1 Hr		8.15E-03	0.01	680.64	4860.55	0.06		0.07	
		24 Hr	2		4.49E-03	680.40	4860.91	7.55E-03	<0.1%	0.01	<1.1%
Phosphorus	7723-14-0	1 Hr		4.31E-03	0.18	680.64	4860.55	0.03		0.21	
		24 Hr	0.35[4]		0.07	680.40	4860.91	3.99E-03	1%	0.08	22%

Table 7-4 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2B (MCTD, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM coordinate		Scenario 2B - MCTD			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Silver	7440-22-4	1 Hr		3.14E-04	8.33E-04	680.64	4860.55	2.42E-03		3.25E-03	
		24 Hr	1		3.42E-04	680.40	4860.91	2.90E-04	<0.1%	6.32E-04	<0.1%
Selenium	7782-49-2	1 Hr		4.49E-05	7.35E-03	680.64	4860.55	3.47E-04		7.69E-03	
		24 Hr	10[2]		3.02E-03	680.40	4860.91	4.16E-05	<0.1%	3.06E-03	<0.1%
Thallium	7440-28-0	1 Hr		3.65E-03	-	680.64	4860.55	0.03			
		24 Hr	0.24[4]		-	680.40	4860.91	3.38E-03	1%		
Tin	7440-31-5	1 Hr		1.65E-03	7.35E-03	680.64	4860.55	0.01		0.02	
		24 Hr	10		3.02E-03	680.40	4860.91	1.52E-03	<0.1%	4.54E-03	<0.1%
Vanadium	7440-62-2	1 Hr		1.09E-04	3.77E-03	680.64	4860.55	8.40E-04		4.61E-03	
		24 Hr	2		1.55E-03	680.40	4860.91	1.01E-04	<0.1%	1.65E-03	<0.1%
Zinc	7440-66-6	1 Hr		0.02	0.10	680.64	4860.55	0.14		0.25	
		24 Hr	120		0.04	680.40	4860.91	0.02	<0.1%	0.06	<0.1%
Sum of (As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb)	<sum>	1 Hr		0.04	0.52	680.64	4860.55	0.33		0.85	
		24 Hr			0.21	680.40	4860.91	0.04		0.25	
Chlorinated Monocyclic Aromatics											
1,2-Dichlorobenzene	95-50-1	1 Hr	30500[2]	1.91E-04	0.03	680.64	4860.55	1.48E-03	<0.1%	0.03	<0.1%
		24 Hr			0.01	680.40	4860.91	1.77E-04		0.01	
1,2,4,5-Tetrachlorobenzene	95-94-3	1 Hr		4.82E-06	-	680.64	4860.55	3.72E-05			
		24 Hr	1[4]		-	680.40	4860.91	4.46E-06	<0.1%		

Table 7-4 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2B (MCTD, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM coordinate		Scenario 2B - MCTD			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
1,2,4 – Trichlorobenzene	120-82-1	1 Hr		4.82E-06	0.11	680.64	4860.55	3.72E-05		0.11	
		24 Hr	400[2]		0.05	680.40	4860.91	4.46E-06	<0.1%	0.05	<0.1%
2,3,4,6-Tetrachlorophenol	58-90-2	1 Hr		1.63E-05	-	680.64	4860.55	1.26E-04			
		24 Hr			-	680.40	4860.91	1.51E-05			
2,4,6-Trichlorophenol	88-06-2	1 Hr		4.90E-06	-	680.64	4860.55	3.78E-05			
		24 Hr	1.5[4]		-	680.40	4860.91	4.53E-06	<0.1%		
2,4-Dichlorophenol	120-83-2	1 Hr		9.64E-06	-	680.64	4860.55	7.44E-05			
		24 Hr	77[4]		-	680.40	4860.91	8.93E-06	<0.1%		
Pentachlorophenol	87-86-5	1 Hr		1.93E-05	2.13E-03	680.64	4860.55	1.49E-04		2.28E-03	
		24 Hr	20[2]		8.76E-04	680.40	4860.91	1.79E-05	<0.1%	8.94E-04	<0.1%
Hexachlorobenzene	118-74-1	1 Hr		4.82E-06	1.52E-04	680.64	4860.55	3.72E-05		1.89E-04	
		24 Hr	0.011[4]		6.25E-05	680.40	4860.91	4.46E-06	<0.1%	6.69E-05	1%
Pentachlorobenzene	608-93-5	1 Hr		1.27E-05	-	680.64	4860.55	9.77E-05			
		24 Hr	3[4]		-	680.40	4860.91	1.17E-05	<0.1%		
Polycyclic Organic Matter											
Acenaphthylene	208-96-8	1 Hr		1.36E-06	7.53E-04	680.64	4860.55	1.05E-05		7.63E-04	
		24 Hr	3.5[4]		3.09E-04	680.40	4860.91	1.26E-06	<0.1%	3.10E-04	<0.1%
Acenaphthene	83-32-9	1 Hr		1.74E-06	3.04E-03	680.64	4860.55	1.34E-05		3.06E-03	
		24 Hr			1.25E-03	680.40	4860.91	1.61E-06		1.25E-03	

Table 7-4 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2B (MCTD, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Contaminant Emission Rate (g/s)	Background Concentration ($\mu g/m^3$)	UTM coordinate		Scenario 2B - MCTD			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
Anthracene	120-12-7	1 Hr		3.81E-07	3.97E-04	680.64	4860.55	2.94E-06		4.00E-04	
		24 Hr	0.2[4]		1.63E-04	680.40	4860.91	3.53E-07	<0.1%	1.63E-04	<0.1%
Benzo(a)anthracene	56-55-6	1 Hr		1.40E-07	1.65E-04	680.64	4860.55	1.08E-06		1.66E-04	
		24 Hr			6.77E-05	680.40	4860.91	1.30E-07		6.79E-05	
Benzo(b)fluoranthene	205-99-2	1 Hr		3.58E-07	3.45E-04	680.64	4860.55	2.77E-06		3.47E-04	
		24 Hr			1.42E-04	680.40	4860.91	3.32E-07		1.42E-04	
Benzo(k)fluoranthene	207-08-9	1 Hr		9.45E-08	1.65E-04	680.64	4860.55	7.29E-07		1.66E-04	
		24 Hr			6.77E-05	680.40	4860.91	8.75E-08		6.78E-05	
Benzo(a)fluorene	238-84-6	1 Hr		2.59E-06	3.30E-04	680.64	4860.55	2.00E-05		3.50E-04	
		24 Hr			1.35E-04	680.40	4860.91	2.40E-06		1.38E-04	
Benzo(b)fluorene	243-17-4	1 Hr		1.77E-06	3.30E-04	680.64	4860.55	1.37E-05		3.43E-04	
		24 Hr			1.35E-04	680.40	4860.91	1.64E-06		1.37E-04	
Benzo(ghi)perylene	191-24-2	1 Hr		3.86E-06	1.72E-04	680.64	4860.55	2.98E-05		2.02E-04	
		24 Hr	1.2[4]		7.07E-05	680.40	4860.91	3.58E-06	<0.1%	7.43E-05	<0.1%
Benzo(a)pyrene	50-32-8	1 Hr		3.22E-07	1.65E-04	680.64	4860.55	2.48E-06		1.67E-04	
		24 Hr	0.0011		6.77E-05	680.40	4860.91	2.98E-07	<0.1%	6.80E-05	6%
Benzo(e)pyrene	192-97-2	1 Hr		8.15E-07	3.30E-04	680.64	4860.55	6.29E-06		3.36E-04	
		24 Hr			1.35E-04	680.40	4860.91	7.55E-07		1.36E-04	
Biphenyl	92-52-4	1 Hr	60[2]	2.79E-04	3.32E-03	680.64	4860.55	2.15E-03	<0.1%	5.47E-03	<0.1%
		24 Hr			1.36E-03	680.40	4860.91	2.59E-04		1.62E-03	

Table 7-4 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2B (MCTD, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (μg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (μg/m³)	UTM coordinate		Scenario 2B - MCTD			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (μg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (μg/m³)	% of Criteria
Chrysene	218-01-9	1 Hr		3.53E-07	2.35E-04	680.64	4860.55	2.72E-06		2.37E-04	
		24 Hr			9.64E-05	680.40	4860.91	3.27E-07		9.67E-05	
Dibenzo(a,c)anthracene	215-58-7	1 Hr		2.51E-06	-	680.64	4860.55	1.94E-05			
		24 Hr			-	680.40	4860.91	2.32E-06			
Dibenzo(a,h)anthracene	53-70-3	1 Hr		1.13E-07	1.65E-04	680.64	4860.55	8.74E-07		1.66E-04	
		24 Hr			6.77E-05	680.40	4860.91	1.05E-07		6.78E-05	
Fluoranthene	206-44-0	1 Hr		3.89E-06	1.46E-03	680.64	4860.55	3.00E-05		1.49E-03	
		24 Hr	140[4]		6.01E-04	680.40	4860.91	3.61E-06	<0.1%	6.05E-04	<0.1%
Fluorine	7782-41-4	1 Hr		2.93E-06	-	680.64	4860.55	2.26E-05			
		24 Hr			-	680.40	4860.91	2.71E-06			
Indeno(1,2,3 – cd)pyrene	193-39-5	1 Hr		7.05E-07	1.65E-04	680.64	4860.55	5.45E-06		1.70E-04	
		24 Hr			6.77E-05	680.40	4860.91	6.53E-07		6.84E-05	
1 – methylnaphthalene	90-12-0	1 Hr		9.19E-06	3.17E-03	680.64	4860.55	7.09E-05		3.24E-03	
		24 Hr	12[4]		1.30E-03	680.40	4860.91	8.51E-06	<0.1%	1.31E-03	<0.1%
2 – methylnaphthalene	91-57-6	1 Hr		5.09E-05	5.33E-03	680.64	4860.55	3.93E-04		5.72E-03	
		24 Hr	10[4]		2.19E-03	680.40	4860.91	4.71E-05	<0.1%	2.24E-03	<0.1%
Naphthalene	91-20-3	10 min	50	3.96E-05	9.77E-03	680.64	4860.55	5.05E-04	<0.1%	0.01	<0.1%
		1 Hr			5.91E-03	680.64	4860.55	3.06E-04		6.22E-03	
		24 Hr	22.5		2.43E-03	680.40	4860.91	3.67E-05	<0.1%	2.47E-03	<0.1%
Perylene	198-55-0	1 Hr		1.41E-07	3.30E-04	680.64	4860.55	1.09E-06		3.31E-04	
		24 Hr			1.35E-04	680.40	4860.91	1.31E-07		1.36E-04	

Table 7-4 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2B (MCTD, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM coordinate		Scenario 2B - MCTD			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Phenanthrene	85-01-8	1 Hr		8.85E-06	6.26E-03	680.64	4860.55	6.83E-05		6.33E-03	
		24 Hr			2.57E-03	680.40	4860.91	8.20E-06		2.58E-03	
Pyrene	129-00-0	1 Hr		4.70E-06	6.88E-04	680.64	4860.55	3.63E-05		7.24E-04	
		24 Hr	0.2[4]		2.83E-04	680.40	4860.91	4.35E-06	<0.1%	2.87E-04	<0.1%
Tetralin	119-64-2	1 Hr		4.66E-05	3.30E-04	680.64	4860.55	3.60E-04		6.90E-04	
		24 Hr	1200[4]		1.35E-04	680.40	4860.91	4.32E-05	<0.1%	1.79E-04	<0.1%
O-terphenyl	84-15-1	1 Hr		7.66E-06	3.30E-04	680.64	4860.55	5.91E-05		3.89E-04	
		24 Hr			1.35E-04	680.40	4860.91	7.09E-06		1.43E-04	
Volatile Organic Chemicals (VOC)											
Acetaldehyde	75-07-0	1/2 Hr	500	4.97E-08	5.21	680.64	4860.55	4.67E-07	<0.1%	5.21	1%
		1 Hr			4.29	680.64	4860.55	3.84E-07		4.29	
		24 Hr	500		1.76	680.40	4860.91	4.61E-08	<0.1%	1.76	<0.1%
Benzene	71-43-2	1 Hr		2.90E-03	28.81	680.64	4860.55	0.02		28.83	
		24 Hr			11.83	680.40	4860.91	2.69E-03		11.83	
Bromodichloromethane	75-27-4	1 Hr		0.02	0.04	680.64	4860.55	0.13		0.18	
		24 Hr			0.02	680.40	4860.91	0.02		0.03	
Bromoform	75-25-2	1 Hr		4.74E-03	0.07	680.64	4860.55	0.04		0.11	
		24 Hr	55[2]		0.03	680.40	4860.91	4.40E-03	<0.1%	0.03	<0.1%
Bromomethane	74-83-9	1 Hr		3.37E-03	0.22	680.64	4860.55	0.03		0.24	
		24 Hr	1350[3]		0.09	680.40	4860.91	3.12E-03	<0.1%	0.09	<0.1%

Table 7-4 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2B (MCTD, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m^3)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m^3)	UTM coordinate		Scenario 2B - MCTD			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m^3)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m^3)	% of Criteria
Carbon tetrachloride	56-23-5	1 Hr		2.96E-05	1.80	680.64	4860.55	2.29E-04		1.80	
		24 Hr	2.4		0.74	680.40	4860.91	2.74E-05	<0.1%	0.74	31%
Chloroform	67-66-3	1 Hr		4.77E-05	0.55	680.64	4860.55	3.68E-04		0.55	
		24 Hr	1		0.23	680.40	4860.91	4.42E-05	<0.1%	0.23	23%
Dichlorodifluoromethane	75-71-8	1 Hr		8.15E-03	7.87	680.64	4860.55	0.06		7.94	
		24 Hr	500000[2]		3.23	680.40	4860.91	7.54E-03	<0.1%	3.24	<0.1%
Dichloroethene, 1,1 -	75-35-4	1 Hr		5.29E-05	6.09E-03	680.64	4860.55	4.08E-04		6.50E-03	
		24 Hr	10		2.50E-03	680.40	4860.91	4.90E-05	<0.1%	2.55E-03	<0.1%
Dichloromethane	75-09-2	1 Hr		0.02	3.08	680.64	4860.55	0.13		3.21	
		24 Hr	220		1.27	680.40	4860.91	0.02	<0.1%	1.28	1%
Ethylbenzene	100-41-4	10 min	1900[2]	9.69E-05	5.00	680.64	4860.55	1.24E-03	<0.1%	5.00	<0.1%
		1 Hr			3.03	680.64	4860.55	7.48E-04		3.03	
		24 Hr	1000		1.24	680.40	4860.91	8.98E-05	<0.1%	1.24	<0.1%
Ethylene Dibromide	106-93-4	1 Hr		2.78E-05	0.01	680.64	4860.55	2.15E-04		0.01	
		24 Hr	3[2]		5.20E-03	680.40	4860.91	2.58E-05	<0.1%	5.23E-03	<0.1%
Formaldehyde	50-00-0	1 Hr		4.44E-03	8.23	680.64	4860.55	0.03		8.26	
		24 Hr	65		3.38	680.40	4860.91	4.12E-03	<0.1%	3.38	5%
Tetrachloroethene	127-18-4	1 Hr		5.30E-04	1.20	680.64	4860.55	4.10E-03		1.20	
		24 Hr	360		0.49	680.40	4860.91	4.91E-04	<0.1%	0.49	<0.1%

Table 7-4 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 2B (MCTD, 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Contaminant Emission Rate (g/s)	Background Concentration (µg/m³)	UTM coordinate		Scenario 2B - MCTD			
						Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
Toluene	108-88-3	10 Min		4.70E-03	38.09	680.64	4860.55	0.06		38.15	
		1 Hr			23.06	680.64	4860.55	0.04		23.10	
		24 Hr	2000[2]		9.47	680.40	4860.91	4.36E-03	<0.1%	9.48	<0.1%
Trichloroethane, 1,1,1 -	71-55-6	1 Hr		1.34E-04	0.28	680.64	4860.55	1.03E-03		0.28	
		24 Hr	115000		0.11	680.40	4860.91	1.24E-04	<0.1%	0.11	<0.1%
Trichloroethene	79-01-6	1 Hr		4.60E-05	1.31	680.64	4860.55	3.55E-04		1.31	
		24 Hr	12		0.54	680.40	4860.91	4.26E-05	<0.1%	0.54	4%
Trichlorofluoromethane	75-69-4	1 Hr		0.02	5.23	680.64	4860.55	0.12		5.35	
		24 Hr	6000[2]		2.15	680.40	4860.91	0.01	<0.1%	2.16	<0.1%
Vinyl chloride	75-01-4	1 Hr		4.08E-03	0.01	680.64	4860.55	0.03		0.05	
		24 Hr	1		5.88E-03	680.40	4860.91	3.78E-03	<0.1%	9.66E-03	1%
Xylenes, m-, p- and o-	<xylene>	10 min	3000	0.06	19.40	680.64	4860.55	0.72	<0.1%	20.12	1%
		1 Hr			11.75	680.64	4860.55	0.44		12.18	
		24 Hr	730		4.83	680.40	4860.91	0.05	<0.1%	4.88	1%

Notes:
[1] Reg419/05 Schedule 3 Criteria unless stated otherwise
[2] O. Reg. 419 Guidelines
[3] Ontario's ambient air quality criteria
[4] Jurisdictional Screening Level List (JSL)
[5] National Ambient Air Quality Objectives (NAAQO) Max Desirable Level
[6] CCME (2000), Canada-Wide Standards for Respirable Particulate Matter

Contour plots of the maximum predicted ground level concentrations for a unit emission rate (Facility wide emission rate of 1 g/s) from the Facility stack(s) are presented in Figures 7-1 through 7-10 for hourly, 24-hour and annual averaging periods and for 140,000 tpy and 400,000 tpy Facility scenarios. For both the 140,000 and 400,000 tpy Facility stack emissions, the plotted ground level concentrations in µg/m^3 per g/s can be multiplied by the facility contaminant emission rate in g/s to arrive at the ground level concentration of each contaminant. Since emissions were calculated using the same emission methodologies for both stacks for the 400,000 tpy Facility, the ratio of emissions from the two stacks are constant regardless of contaminant. Therefore, the change in downwind concentrations from contaminant to contaminant will scale linearly with changes in Facility-wide emissions for both the 140,000 tpy (1 stack) and 400,000 tpy (2 stack) design options. In Figures 7-1 to 7-10, the maximum predicted GLCs for hourly and 24-hour averages for Operating Scenarios 1 and 2 (MCR and MCTD) are presented, while for annual averages only Scenario 1, the normal operating levels of the Facility (MCR), are presented.

In Figures 7-1 to 7-4, the maximum 1-hour average predicted ground-level concentrations for a unit emission rate (1 g/s Facility-wide) for the MCR and MCTD release scenarios are presented for both the 140,000 tpy and 400,000 tpy Facility capacities. The contour plots for the 140,000 tpy Facility (Figures 7-1 and 7-2) show that for both the MCR and MCTD operating cases, the model predicted similar concentration contour patterns over the AQSA, except in close proximity to the proposed Facility. Contour plots for the 400,000 tpy Facility at MCR and MCTD also predicted similar concentration contour patterns over the AQSA, with differences in close proximity to the proposed Facility and in areas over Lake Ontario. In all but one case, the maximum predicted ground level concentrations occur to the northwest of the Facility near the property line.

For the 140,000 tpy Facility, the predicted statistical maximum ground level concentration for the unit emission rate is slightly higher (about 10%) for Scenario 2A (MCTD) than Scenario 1A (MCR) due to the lower stack exit velocity associated with turndown operation. However, since the actual stack emission rates for Scenario 1A are about 20% higher than Scenario 2A, when multiplied by the unit emission rates, the net result is higher ground level predictions for Scenario 1A.

Similarly, for the 400,000 tpy Facility, the predicted 1-hour statistical maximum ground level concentration for the unit emission rate is slightly higher for Scenario 2B (MCTD) than in Scenario 2A (MCTD). However, since the actual Facility emission rates for Scenario 2B are about 20% higher than Scenario 2A (MCR), the resultant ground-level concentrations are higher for Scenario 2A than 2B.

The predicted maximum ground level concentrations for the 140,000 tpy Facility unit emission rate are higher than those for the 400,000 tpy Facility with a unit emission rate. This is due to the unit emissions being divided between the additional flues and stacks in the larger facility, as compared to the 140,000 Facility scenario. However, once the results are multiplied by the actual emission rates, the 400,000 tpy Facility scenario ground level predictions will be higher since the Facility-wide emissions from the 400,000 tpy Facility scenario are larger than those for the 140,000 tpy Facility scenario.

Figures 7-5, 7-6, 7-7 and 7-8 present contour plots of the maximum predicted 24-hour average ground level concentrations for a Facility-wide unit emission rate for Scenarios 1A, 2A, 1B and 2B respectively. As with the hourly predictions, the 24-hour average model predictions for Scenarios 1A and 2A, and Scenarios 1B and 2B show similar concentration contour patterns and locations of maxima. The predicted statistical maximum 24-hour average ground level concentrations for the unit emission rates are slightly higher for Scenario 2 (MCTD) than Scenario 1 (MCR) for both the 140,000 tpy and 400,000 tpy Facility scenarios.

Figures 7-9 and 7-10 present the contour plots of maximum annual average concentrations (maximum year over the 5-year data set) for facility-wide unit emission rates for the 140,000 tpy Facility (Scenario 1A) and 400,000 tpy facility (scenario 1B), which are the expected long-term operating levels. The maximum predicted ground level concentration occurs about 1.5 km northeast of the 140,000 tpy Facility, and 2 km west of the 400,000 tpy Facility. The difference in the locations of the maximum ground level concentrations are due to the different sources present at the two Facility scenarios: emissions from the 140,000 tpy Facility occur from a single stack, while those for the 400,000 tpy Facility occur from two physically separate stacks.

Using the Facility-wide unit emission rate results, the maximum predicted ground level concentrations of specific contaminants from the Facility stack(s) were calculated by multiplying the predicted concentrations for a unit emission rate by the actual emission rate of that contaminant.

Contour plots of maximum predicted ground level concentrations (including background concentrations to account for cumulative effects) of several specific CoPCs are presented in the following subsections along with discussion of the results.

Legend

Maximum GLC

Facility

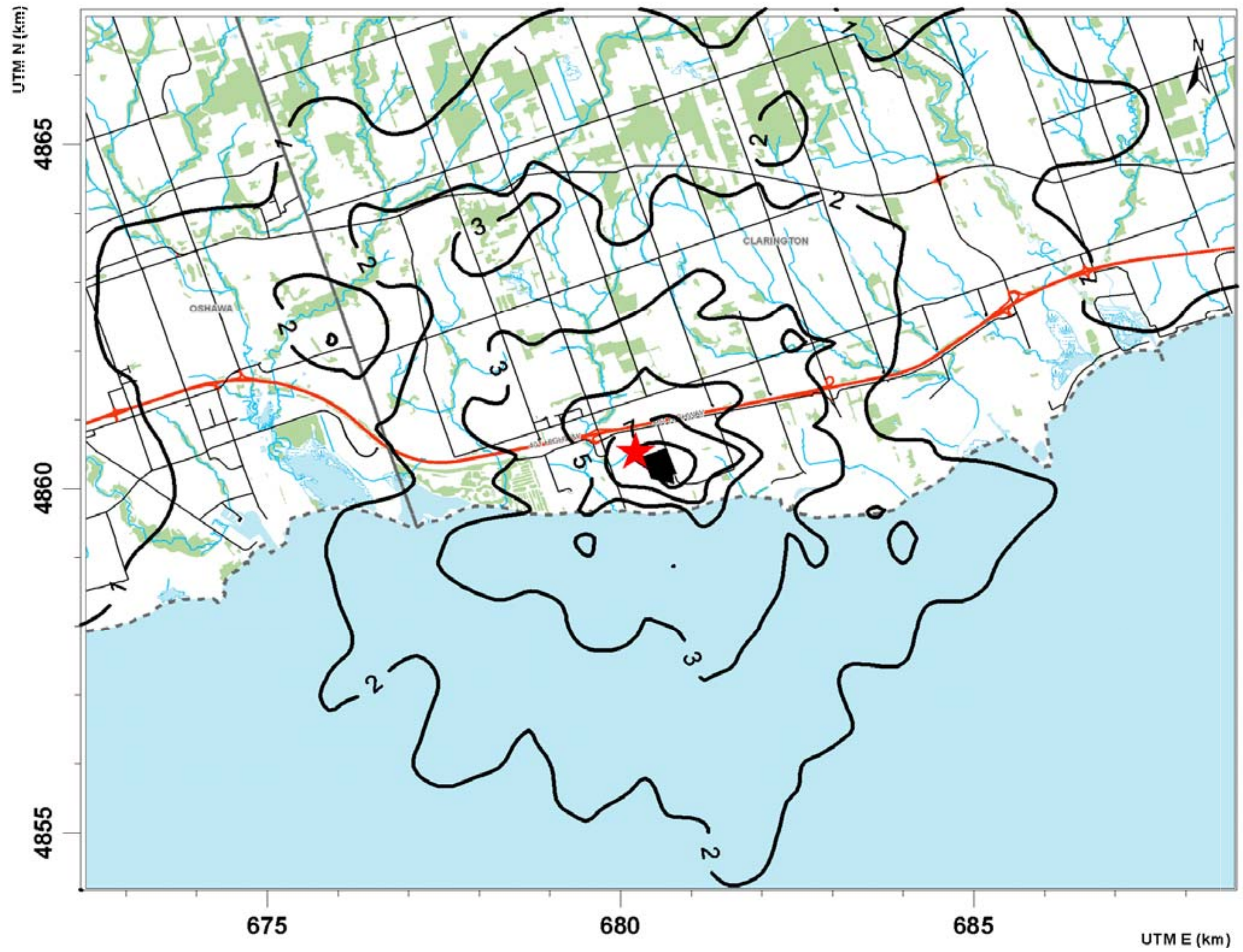
FIGURE 7-1

Plot of Maximum Predicted Hourly-Average Ground Level Concentrations due to a Facility-Wide Unit Emission Rate (1 g/s) Release

Scenario 1A (MCR, 140,000 tpy Facility)

Predicted Statistical Maximum GLC = 8.78 (µg/m^3)/(g/s)

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

Maximum GLC

Facility

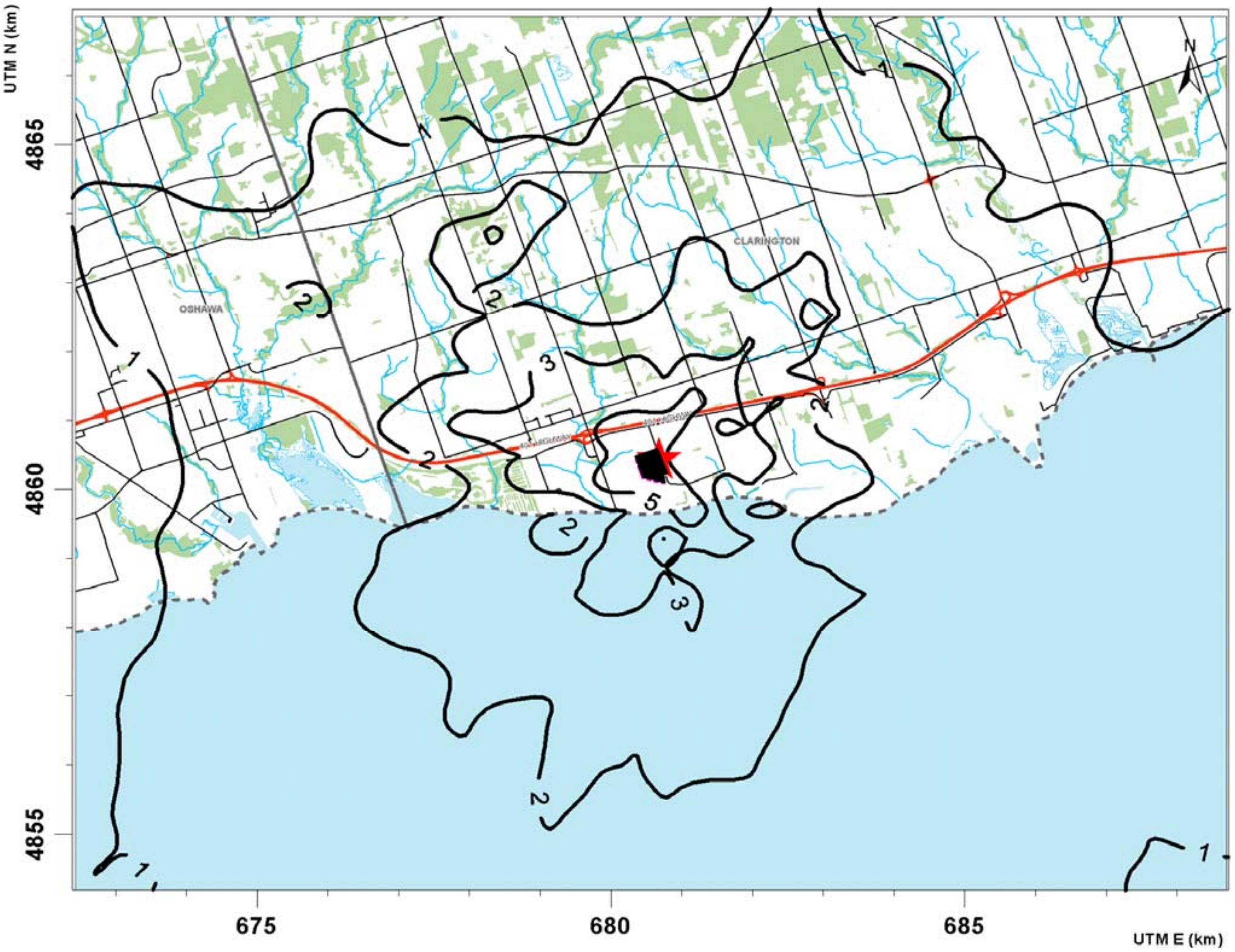
FIGURE 7-2

Plot of Maximum Predicted Hourly-Average Ground Level Concentrations due to a Facility-Wide Unit Emission Rate (1 g/s) Release

Scenario 2A (MCTD, 140,000 tpy Facility)

Predicted Statistical Maximum GLC = 9.63 (μg/m^3)/(g/s)

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

Maximum GLC

Facility

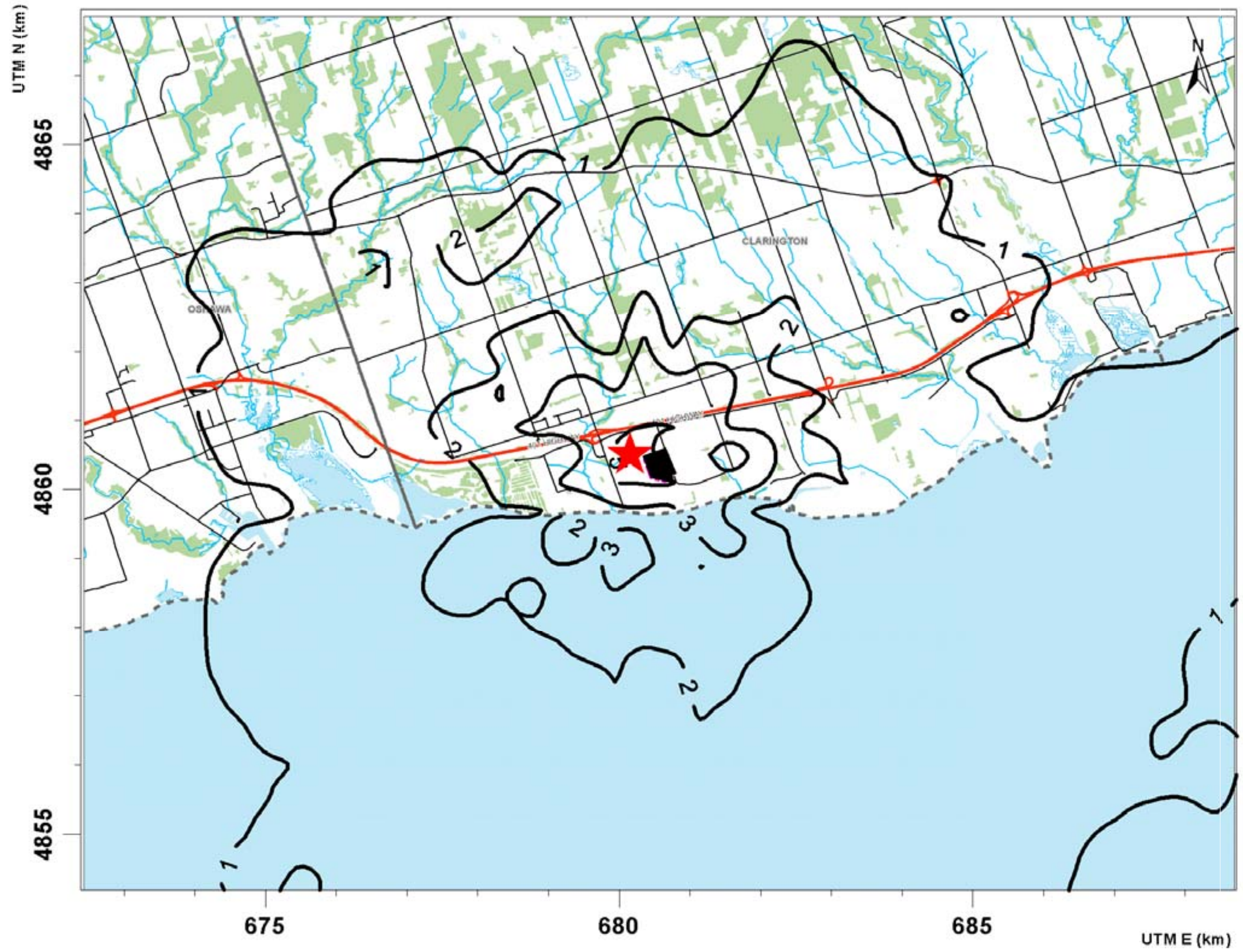
FIGURE 7-3

Plot of Maximum Predicted Hourly-Average Ground Level Concentrations due to a Facility-Wide Unit Emission Rate (1 g/s) Release

Scenario 1B (MCR, 400,000 tpy Facility)

Predicted Statistical Maximum GLC = 6.70 (µg/m^3)/(g/s)

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

★ Maximum GLC

■ Facility

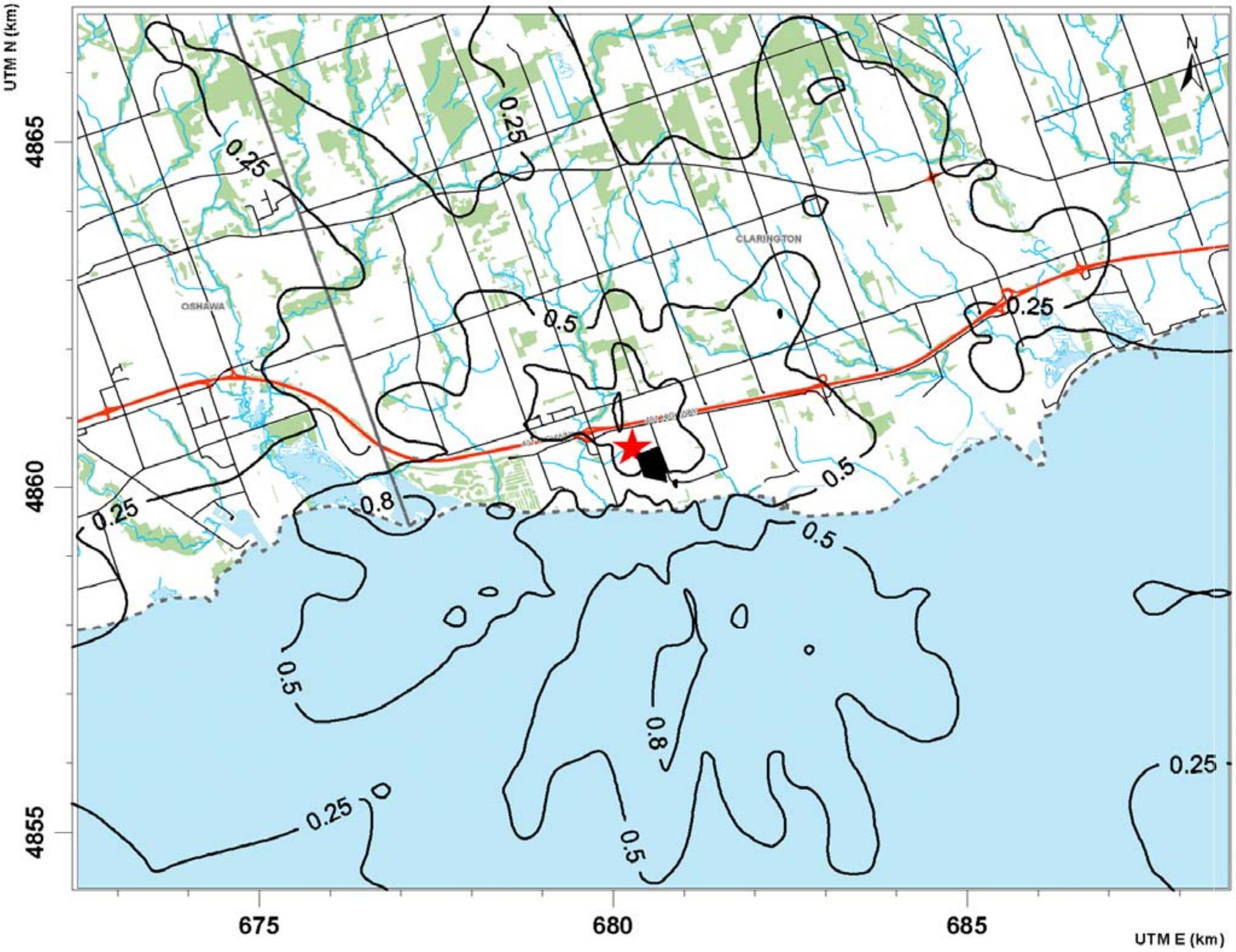
FIGURE 7-4

Plot of Maximum Predicted Hourly-Average Ground Level Concentrations due to a Facility-Wide Unit Emission Rate (1 g/s) Release

Scenario 2B (MCTD, 400,000 tpy Facility)

Predicted Statistical Maximum GLC = 7.7 (μg/m^3)/(g/s)

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

Maximum GLC

Facility

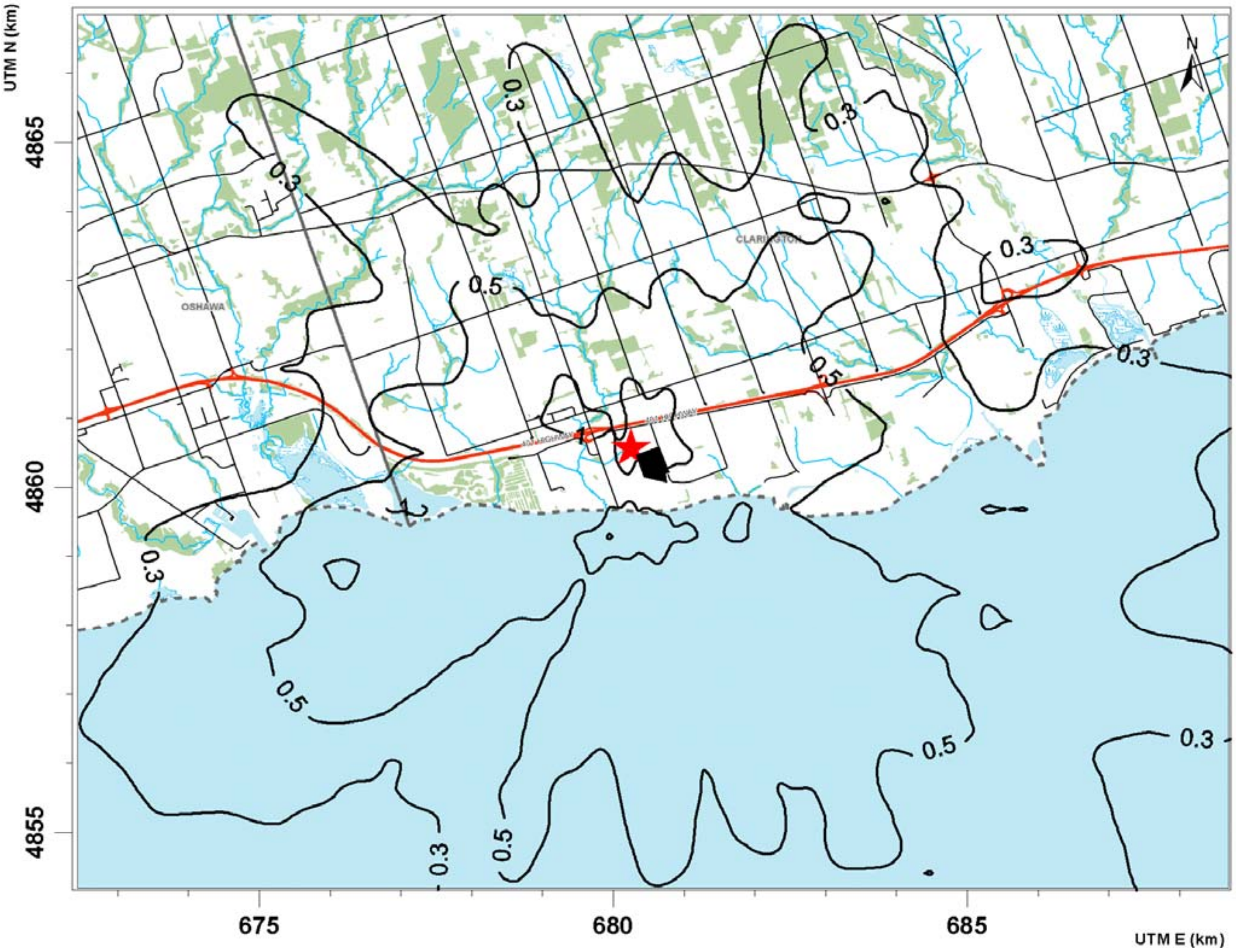
FIGURE 7-5

Plot of Maximum Predicted 24-Hour-Average Ground Level Concentrations due to a Facility-Wide Unit Emission Rate (1 g/s) Release

Scenario 1A (MCR, 140,000 tpy Facility)

Predicted Statistical Maximum GLC = 1.21 (μg/m^3)/(g/s)

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

Maximum GLC

Facility

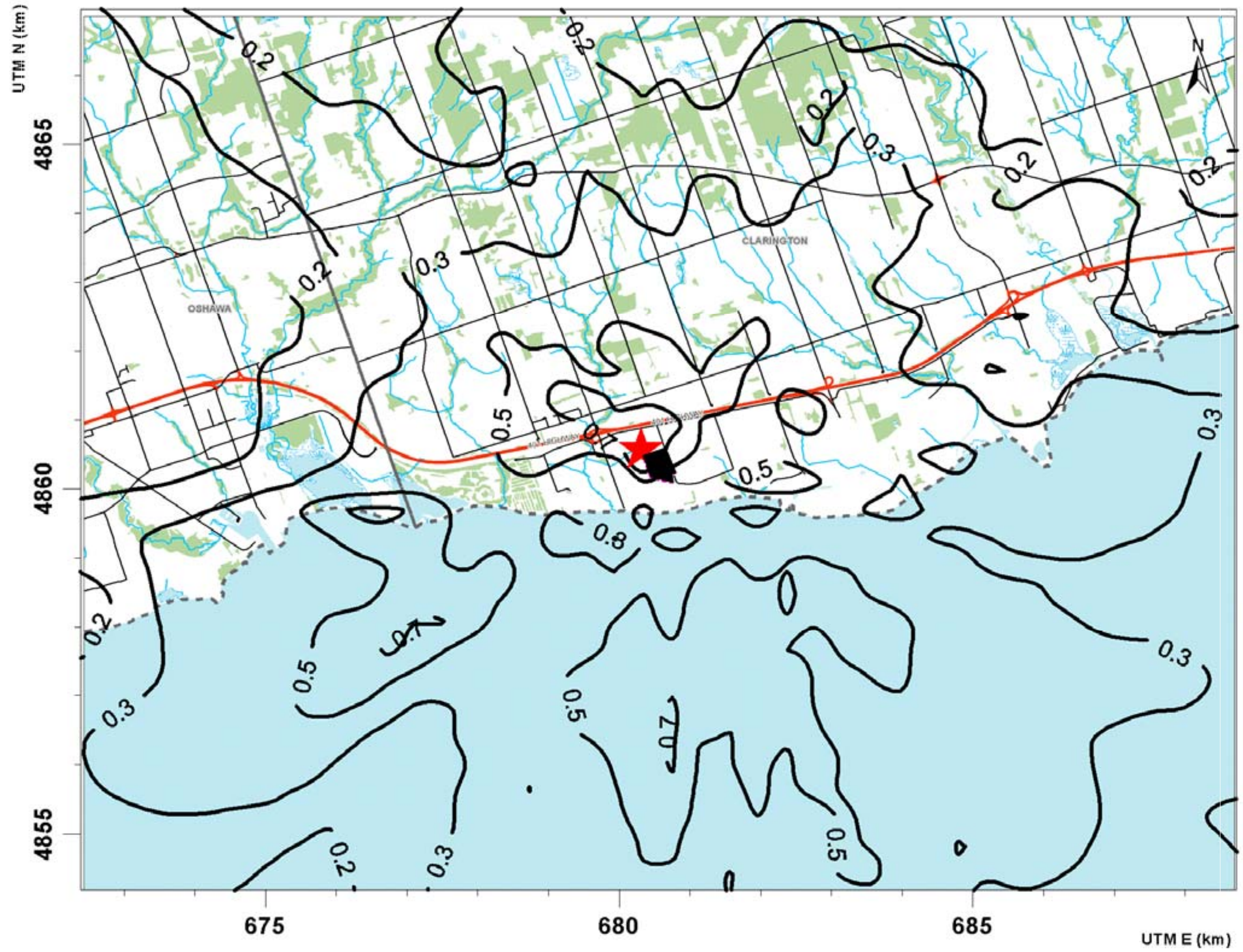
FIGURE 7-6

Plot of Maximum Predicted 24-Hour-Average Ground Level Concentrations due to a Facility-Wide Unit Emission Rate (1 g/s) Release

Scenario 2A (MCTD, 140,000 tpy Facility)

Predicted Statistical Maximum GLC = 1.31 (µg/m^3)/(g/s)

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

★ Maximum GLC

■ Facility

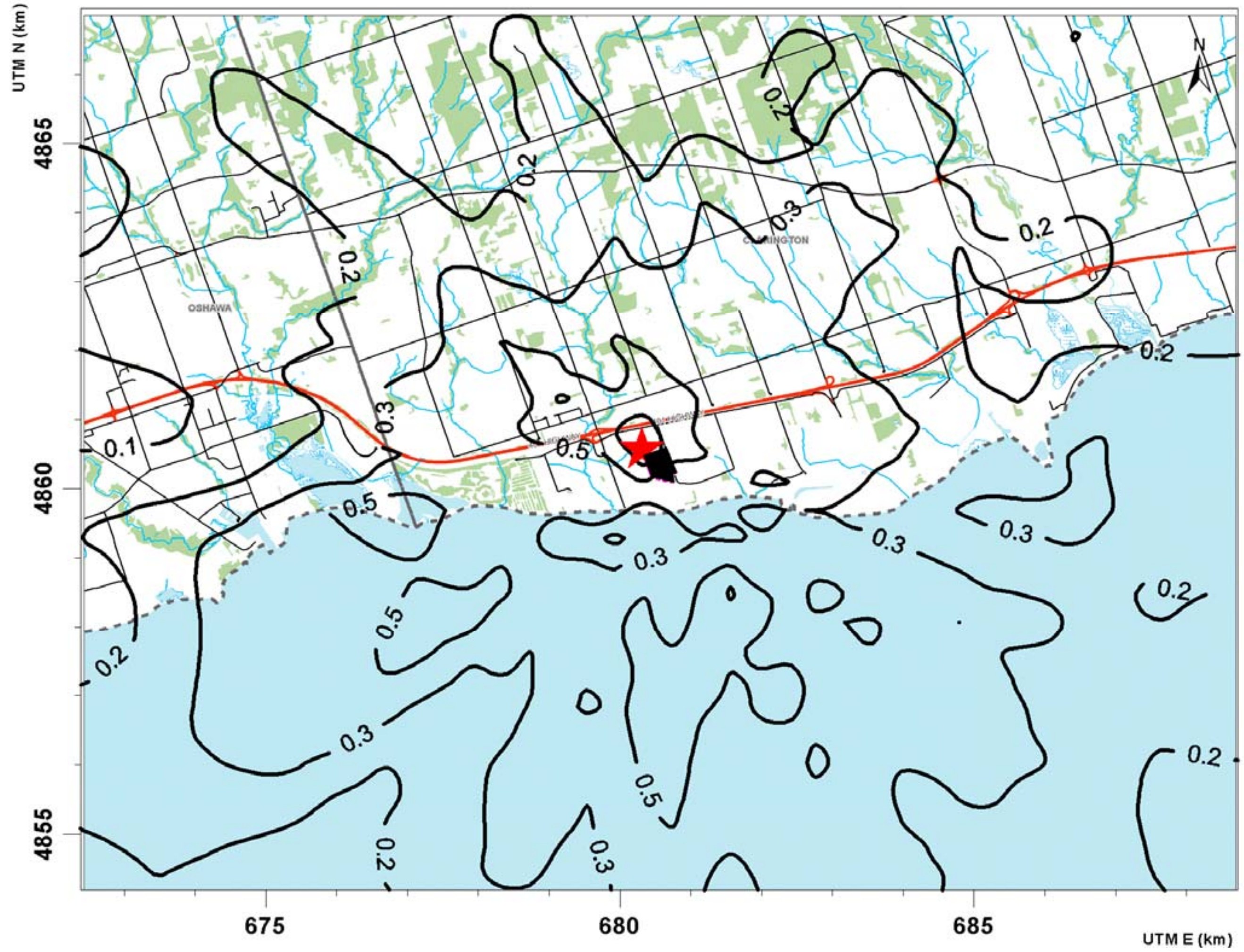
FIGURE 7-7

Plot of Maximum Predicted 24-Hour-Average Ground Level Concentrations due to a Facility-Wide Unit Emission Rate (1 g/s) Release

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

Scenario 1B (MCR, 400,000 tpy Facility)

Predicted Statistical Maximum GLC = 0.81 (μg/m^3)/(g/s)



Legend

★ Maximum GLC

■ Facility

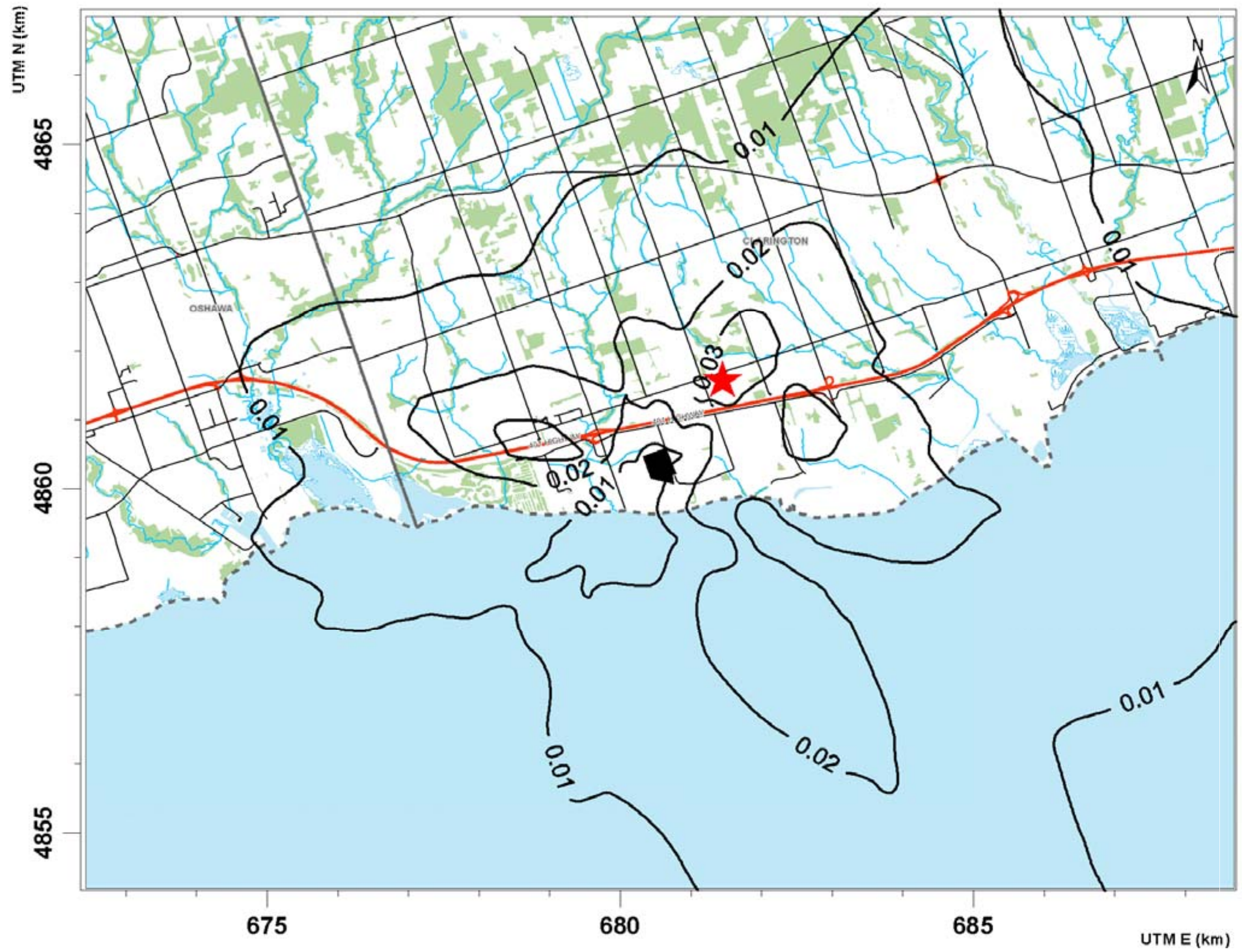
FIGURE 7-8

Plot of Maximum Predicted 24-Hour-Average Ground Level Concentrations due to a Facility-Wide Unit Emission Rate (1 g/s) Release

Scenario 2B (MCTD, 400,000 tpy Facility)

Predicted Statistical Maximum GLC = 0.93 (µg/m^3)/(g/s)

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

★ Maximum GLC

■ Facility

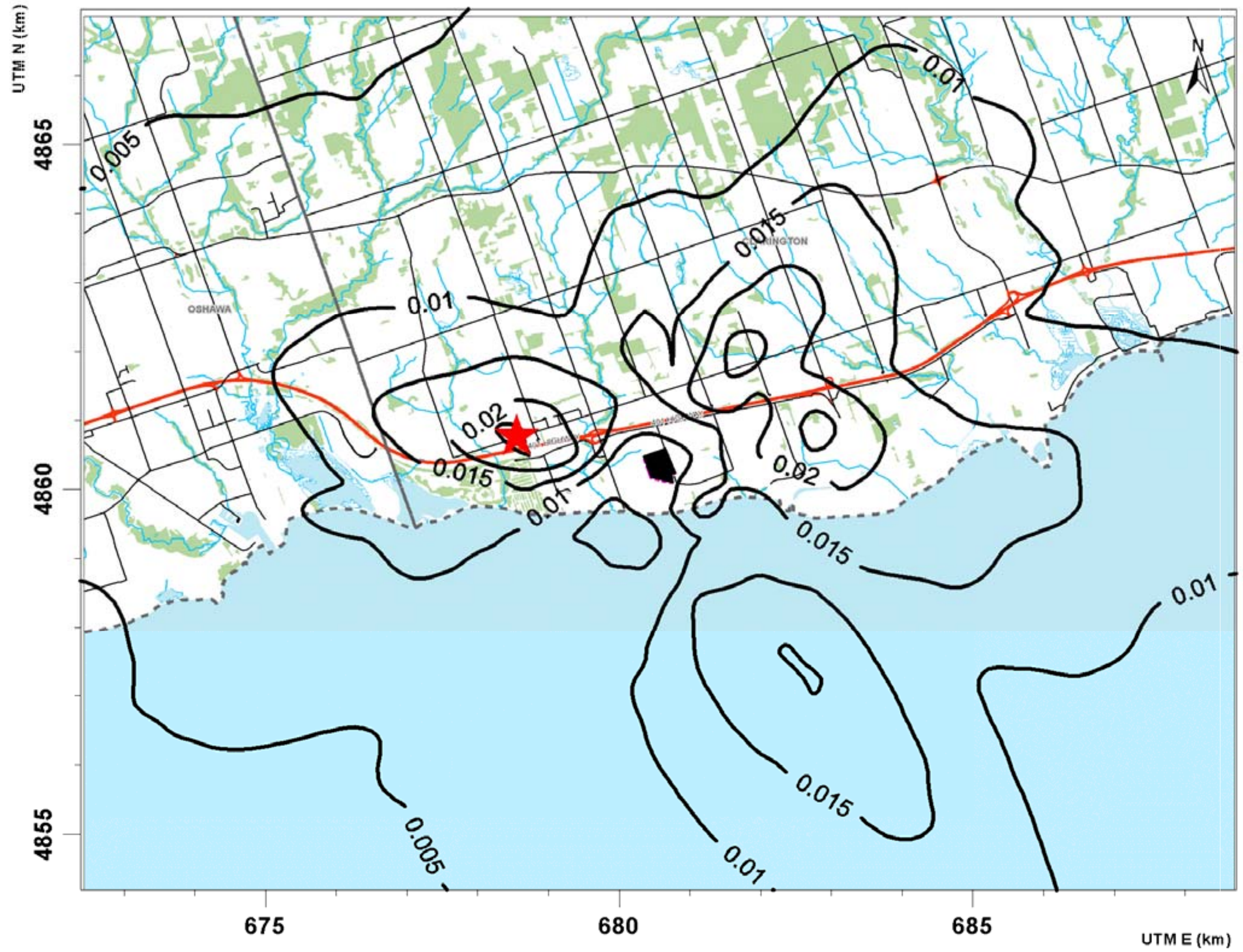
FIGURE 7-9

Plot of Maximum Predicted Annual-Average Ground Level Concentrations due to a Facility-Wide Unit Emission Rate (1 g/s) Release

Scenario 1A (MCR, 140,000 tpy Facility)

Predicted Statistical Maximum GLC = 0.035 ($\mu g/m^3$)/(g/s)

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

Maximum GLC

Facility

FIGURE 7-10

Plot of Maximum Predicted Annual-Average Ground Level Concentrations due to a Facility-Wide Unit Emission Rate (1 g/s) Release

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

Scenario 1B (MCR, 400,000 tpy Facility)

Predicted Statistical Maximum GLC = 0.028 (μg/m^3)/(g/s)

Nitrogen Dioxide

Contour plots of the maximum predicted hourly and 24-hour nitrogen dioxide ground level concentrations (including background) for the 140,000 tpy and 400,00 tpy Facility scenarios are presented in Figures 7-11, 7-12, 7-13 and 7-14 respectively. For hourly and 24-hour averaging periods, the higher of the predicted concentrations due to the Facility operating at either MCR or MCTD (Scenarios 1 and 2) were added to the measured background NO_2 concentration representative of the area and plotted. The annual average NO_2 contour plots for the 140,000 and 400,000 Facility scenarios (Figures 7-15 and 7-16) are based on the MCR operating scenarios, which are the expected long-term operating levels of the Facility.

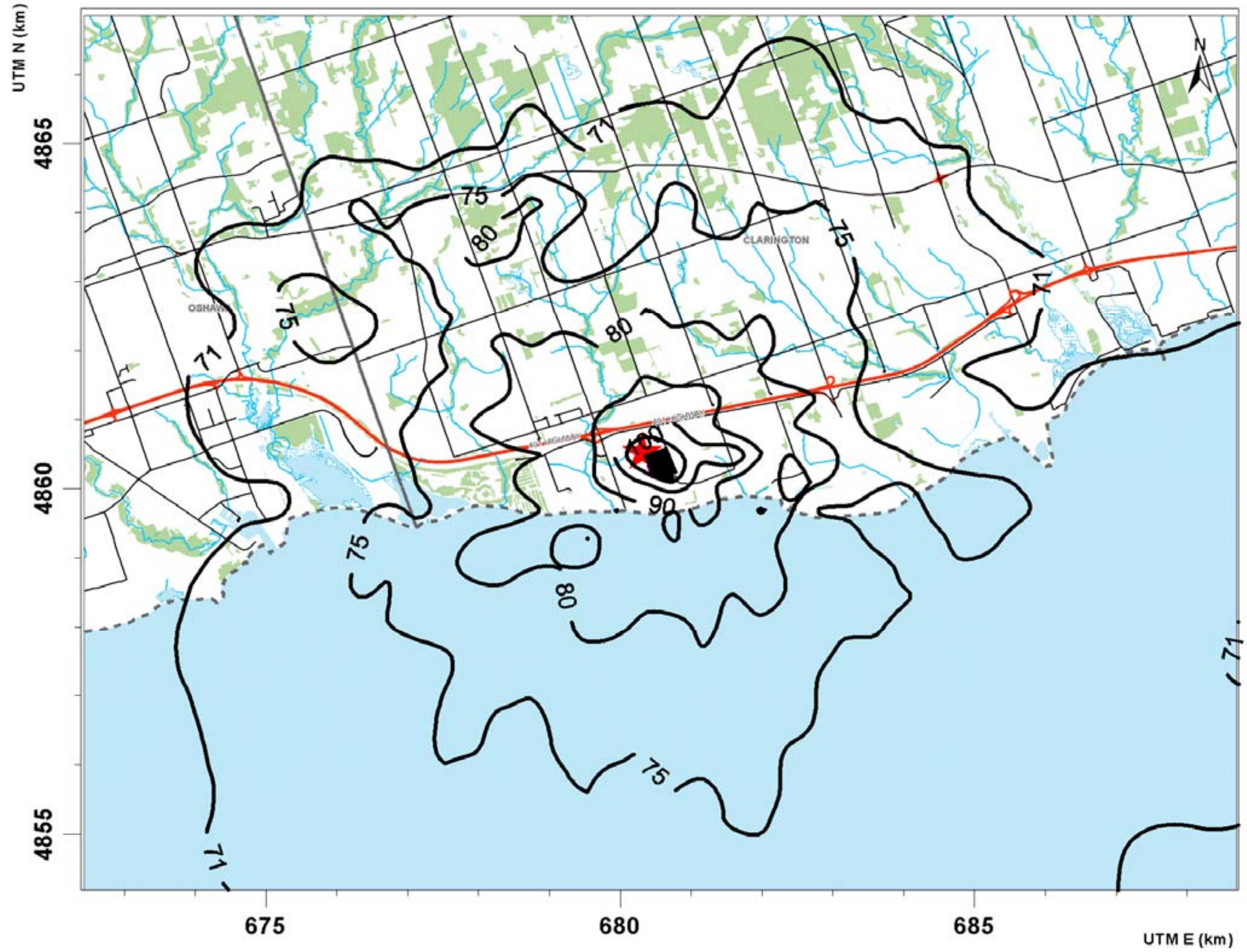
The estimated background NO_2 concentrations in the AQSA are 64.6, 58.2 and 37 µg/m^3 for hourly, 24-hour and annual averaging periods respectively.

The maximum hourly ground level NO_2 prediction falls to within 10% above the background level within 6-7 km of the 140,000 tpy Facility, and falls to roughly 15% above background level within roughly 8-9 km of the 400,000 tpy Facility.

The maximum predicted 24-hour NO_2 concentration for the 140,000 tpy Facility is roughly 10% above the background level and decreases to less than 5% above the background level within 5-6 km. For the 400,000 tpy Facility, the NO_2 concentration is around 20% above the background level, and decreases to less than 7% above the background level within 7-8 km.

The maximum predicted annual average NO_2 GLC is less than 0.5% above the background level for the 140,000 tpy Facility, and 1% above background for the 400,000 tpy Facility.

The predicted statistical maximum concentrations, inclusive of background concentrations, are below the applicable MOE criteria for all averaging periods.



Legend

Maximum GLC

Facility

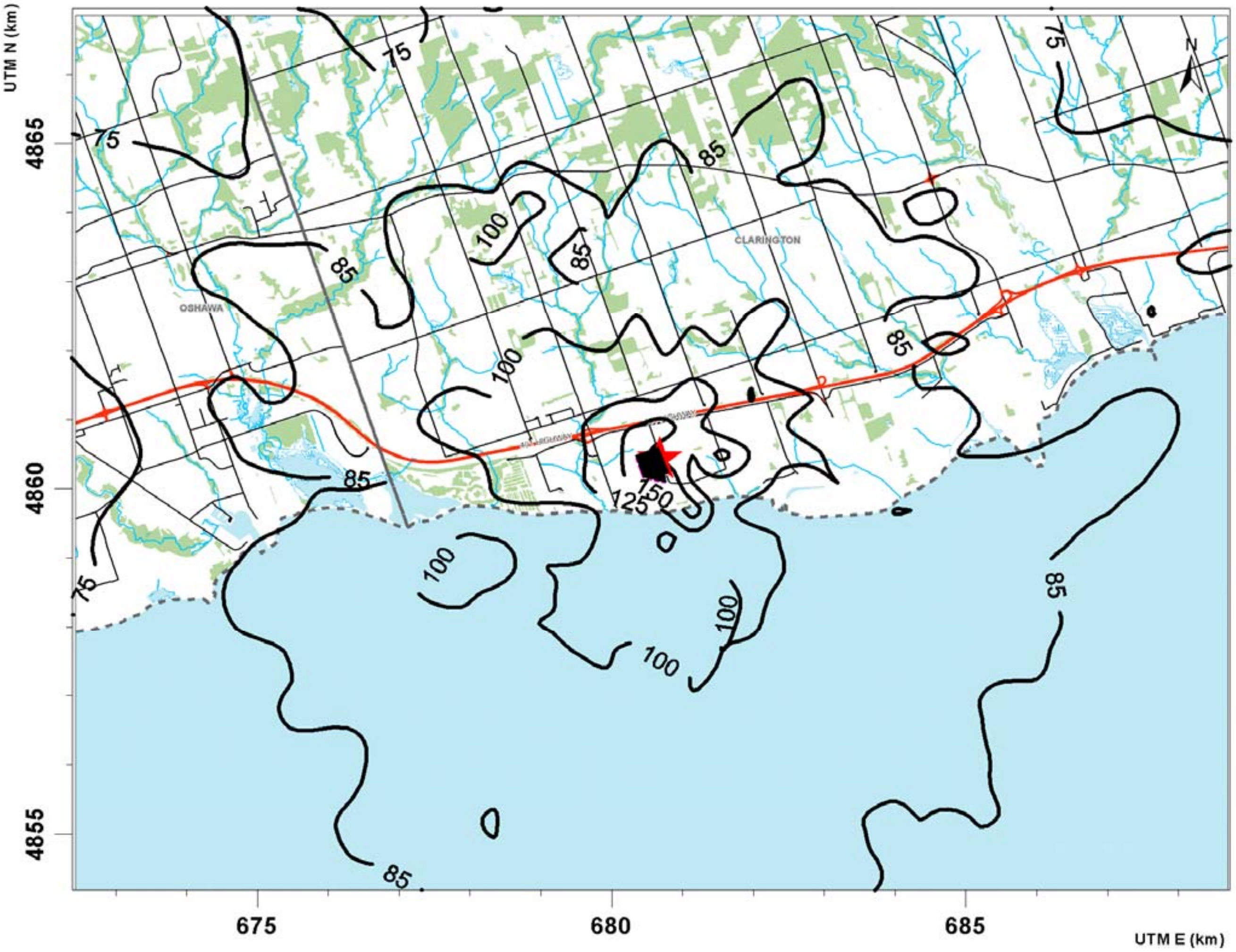
FIGURE 7-11

Maximum Predicted Hourly-Average NO_2 Ground Level Concentration Contours (Including Background)

140,000 tpy Facility

Criterion = 400 µg/m^3
Predicted Statistical Maximum GLC = 108.5 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

★ Maximum GLC

■ Facility

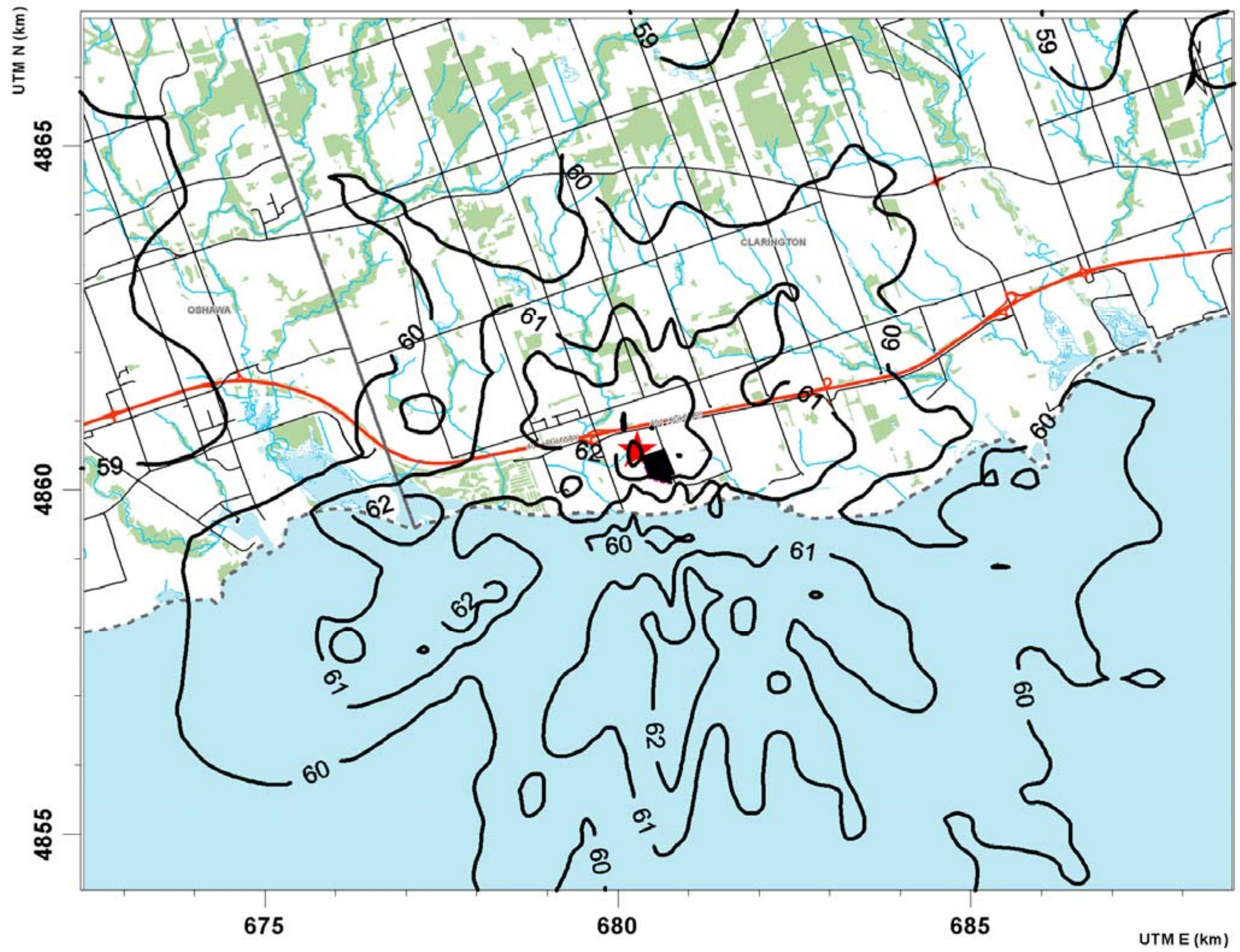
FIGURE 7-12

Maximum Predicted Hourly-Average NO_2 Ground Level Concentration Contours (Including Background)

400,000 tpy Facility

Criterion = 400 µg/m^3
Predicted Statistical Maximum GLC = 159.8 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

★ Maximum GLC

■ Facility

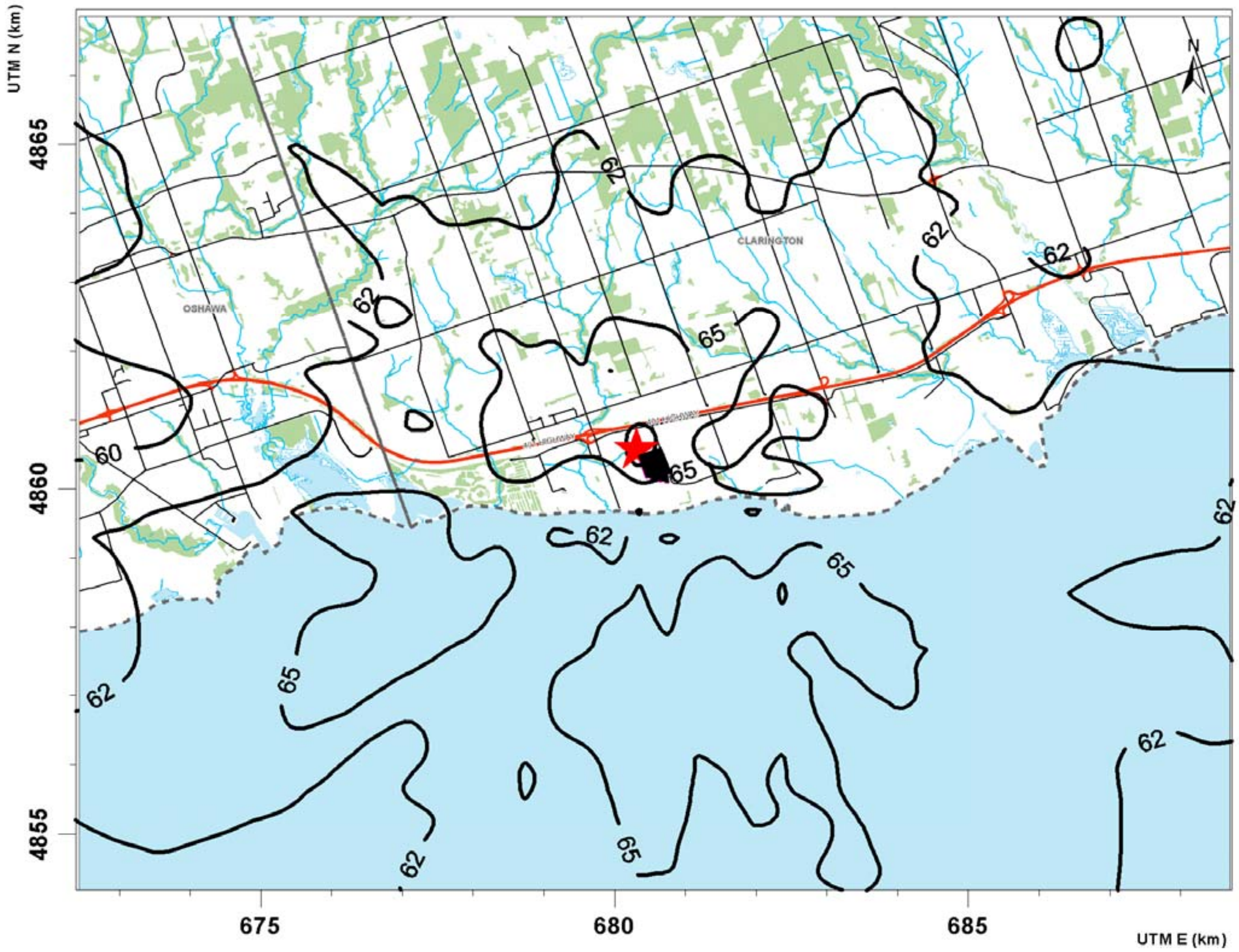
FIGURE 7-13

Maximum Predicted 24-Hour Average NO_2 Ground Level Concentration Contours (Including Background)

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

140,000 tpy Facility

Criterion =200 µg/m^3
Predicted Statistical Maximum GLC = 64.3 µg/m^3



Legend

Maximum GLC

Facility

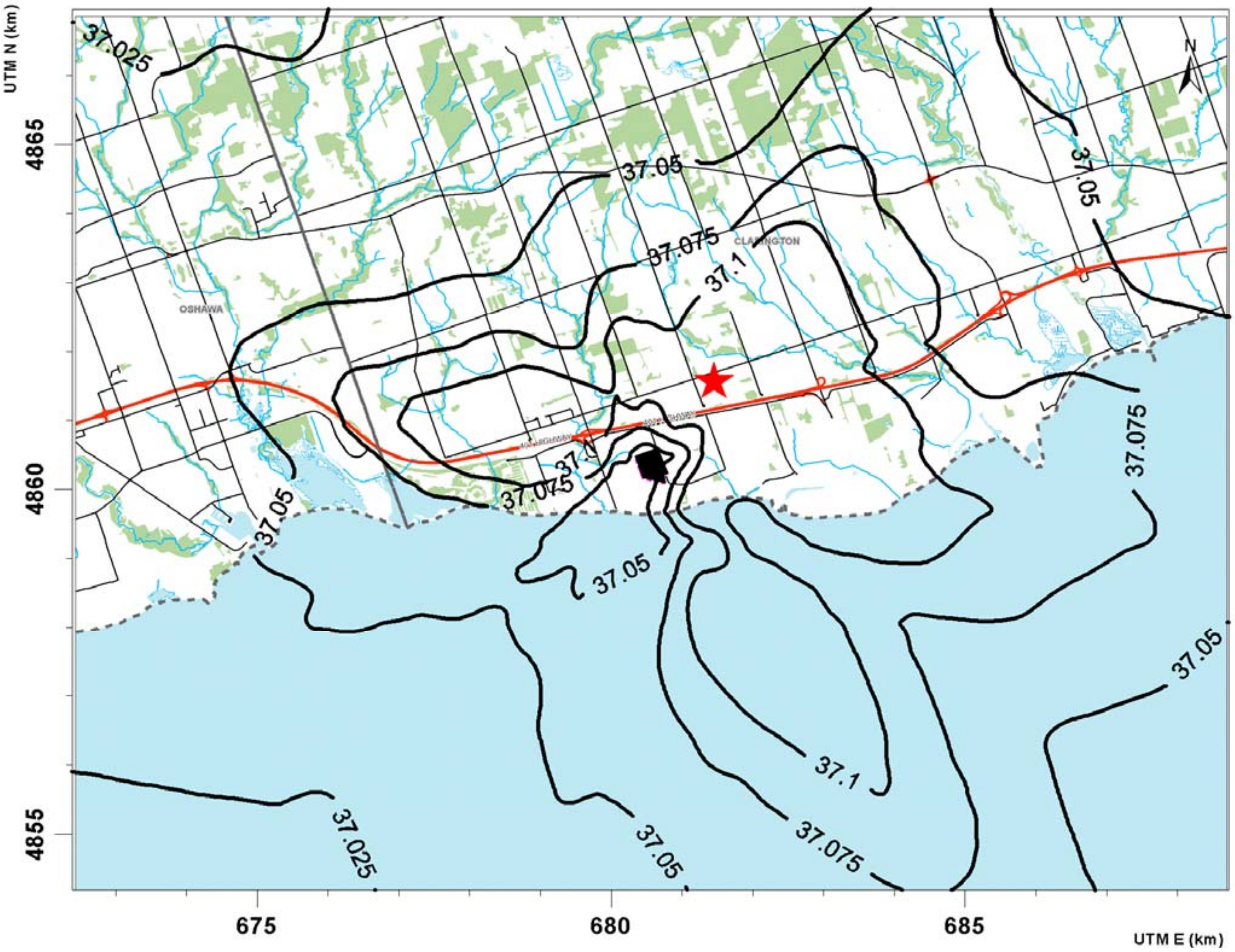
FIGURE 7-14

Maximum Predicted 24-Hour Average NO_2 Ground Level Concentration Contours (Including Background)

400,000 tpy Facility

Criterion =200 µg/m^3
Predicted Statistical Maximum GLC = 69.67 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

★ Maximum GLC

■ Facility

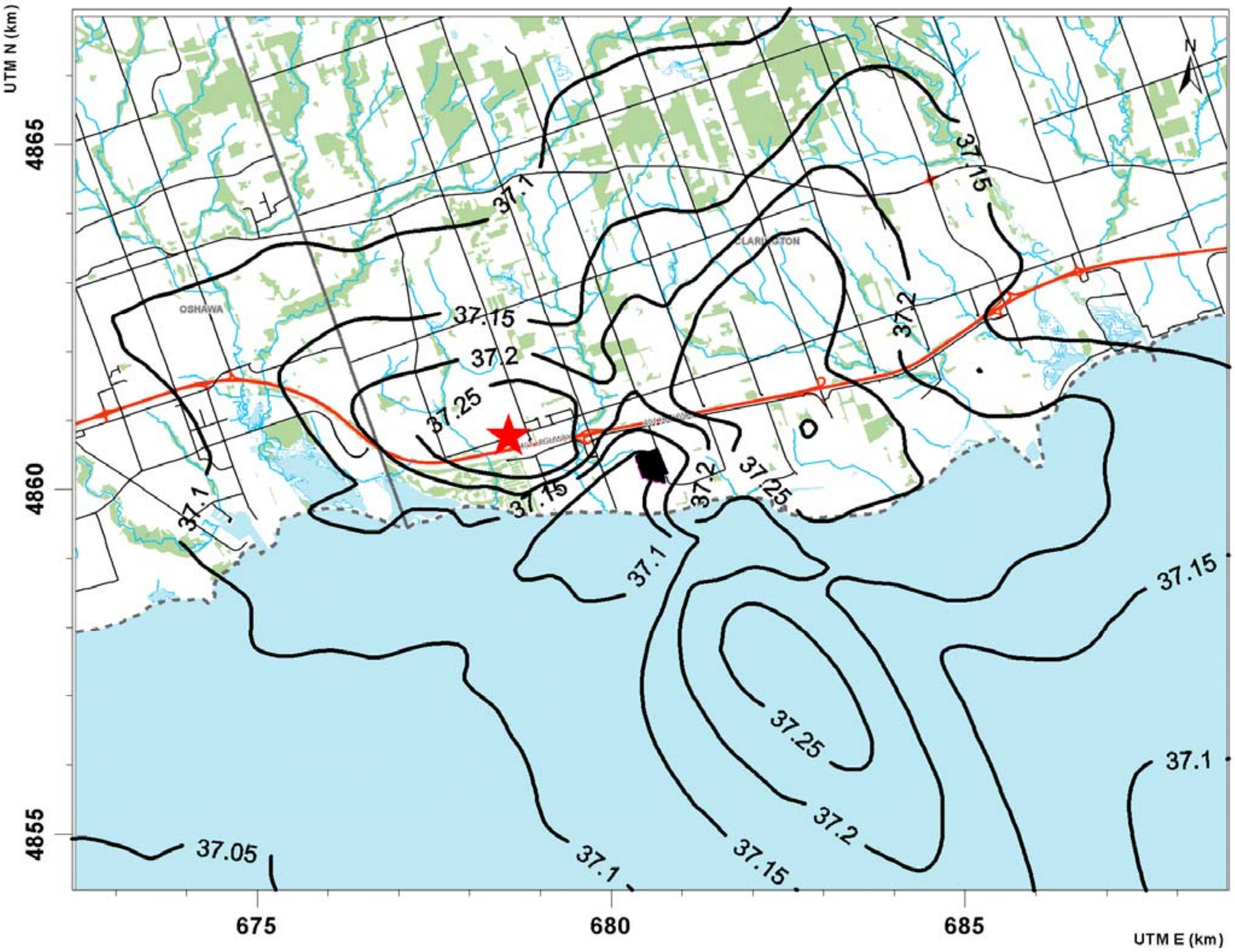
FIGURE 7-15

Maximum Predicted Annual Average NO_2 Ground Level Concentration Contours (Including Background)

140,000 tpy Facility

Criterion = 100 µg/m^3
Predicted Statistical Maximum GLC = 37.2 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

Maximum GLC

Facility

FIGURE 7-16

Maximum Predicted Annual Average NO_2 Ground Level Concentration Contours (Including Background)

400,000 tpy Facility

Criterion = 100 µg/m^3
Predicted Statistical Maximum GLC = 37.4 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

Sulphur Dioxide

Contour plots of the maximum predicted hourly and 24-hour average sulphur dioxide ground level concentrations are presented in Figures 7-17 to 7-20 for the 140,000 tpy and 400,000 tpy Facility scenarios. For hourly and 24-hour averaging periods, the higher of the predicted concentrations due to the Facility operating at either MCR or MCTD (Scenario 1 and 2) were added to the measured background SO_2 concentration representative of the area and plotted. The annual average SO_2 contour plots (Figures 7-21 and 7-22) are based on the MCR operating scenario for the 140,000 tpy and 400,000 tpy Facility scenarios respectively.

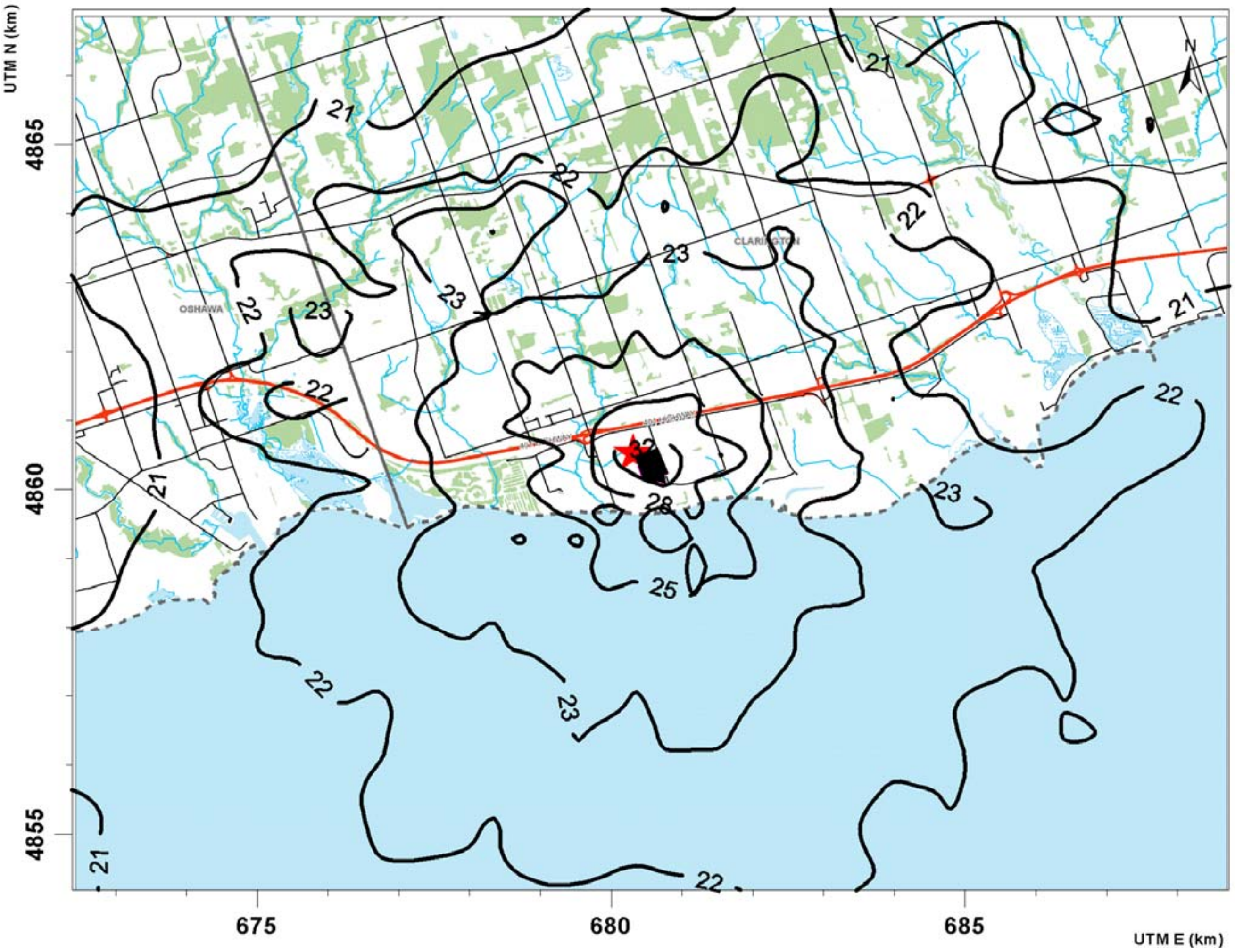
The background SO_2 concentration levels for the AQSA are 19.5, 19.3 and 5.9 µg/m^3 for hourly, 24-hour and annual averaging periods respectively.

The maximum hourly average ground level SO_2 prediction falls to within 10% above the background level within about 5-6 km of the 140,000 tpy Facility, and falls to roughly 30% above background level within 5-6 km of the 400,000 tpy Facility.

The maximum predicted 24-hour SO_2 concentration for the 140,000 tpy Facility is roughly 10% above the background level and decreases to less than 5% above the background level within 6-7 km. For the 400,000 tpy Facility, the SO_2 concentration is predicted to be 17% above the background level, and decreases to approximately 5% above the background level within 7-8 km.

The maximum predicted annual average SO_2 GLC is less than 1% above the background level for the 140,000 tpy Facility, and less than 2% above background for the 400,000 tpy Facility.

The predicted statistical maximum concentrations, inclusive of background concentrations, are well below applicable MOE criteria for all averaging periods.



Legend

★ Maximum GLC

■ Facility

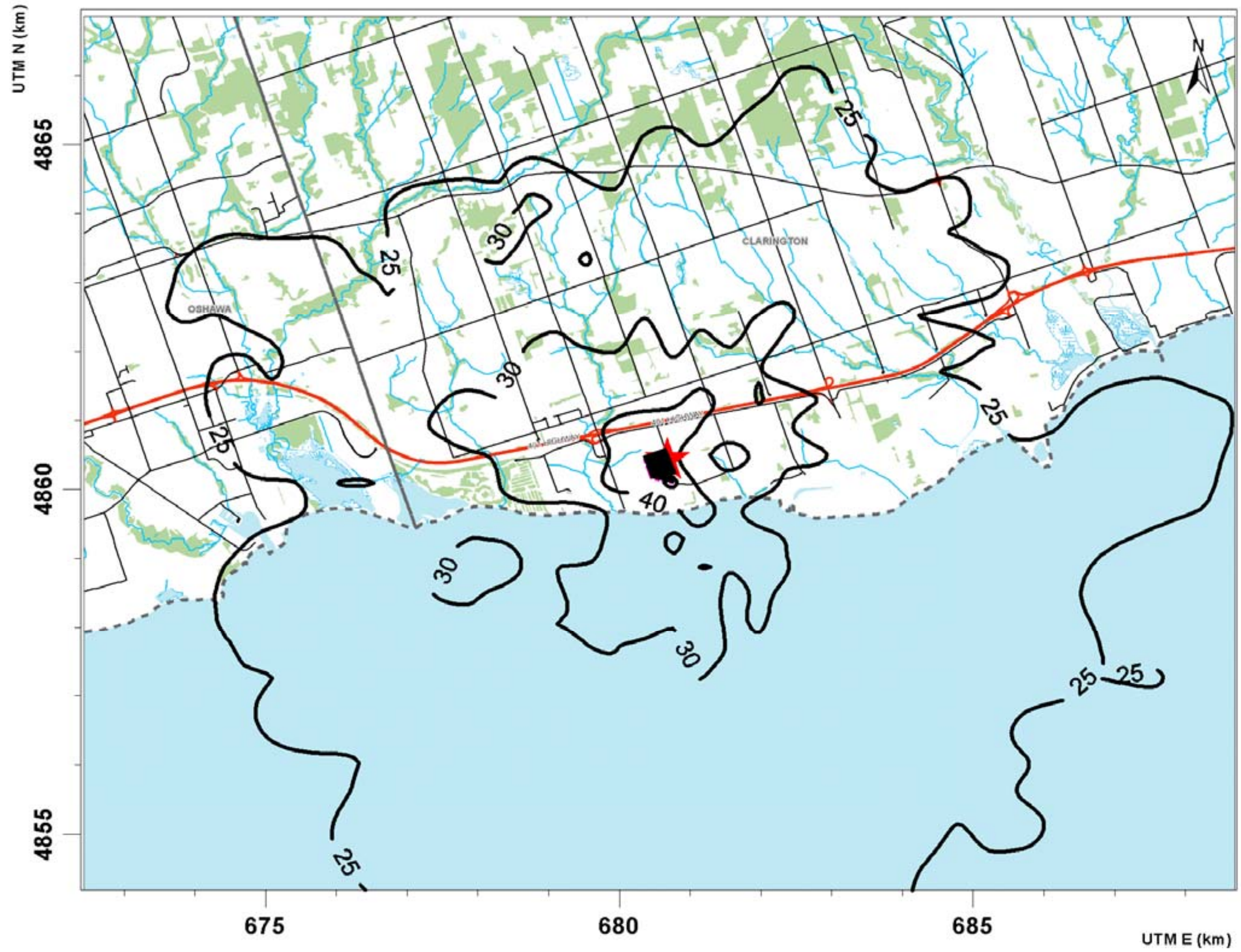
FIGURE 7-17

Maximum Predicted Hourly-Average SO_2 Ground Level Concentration Contours (Including Background)

140,000 tpy Facility

Criterion = 690 µg/m^3
Predicted Statistical Maximum GLC = 32.2 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

Maximum GLC

Facility

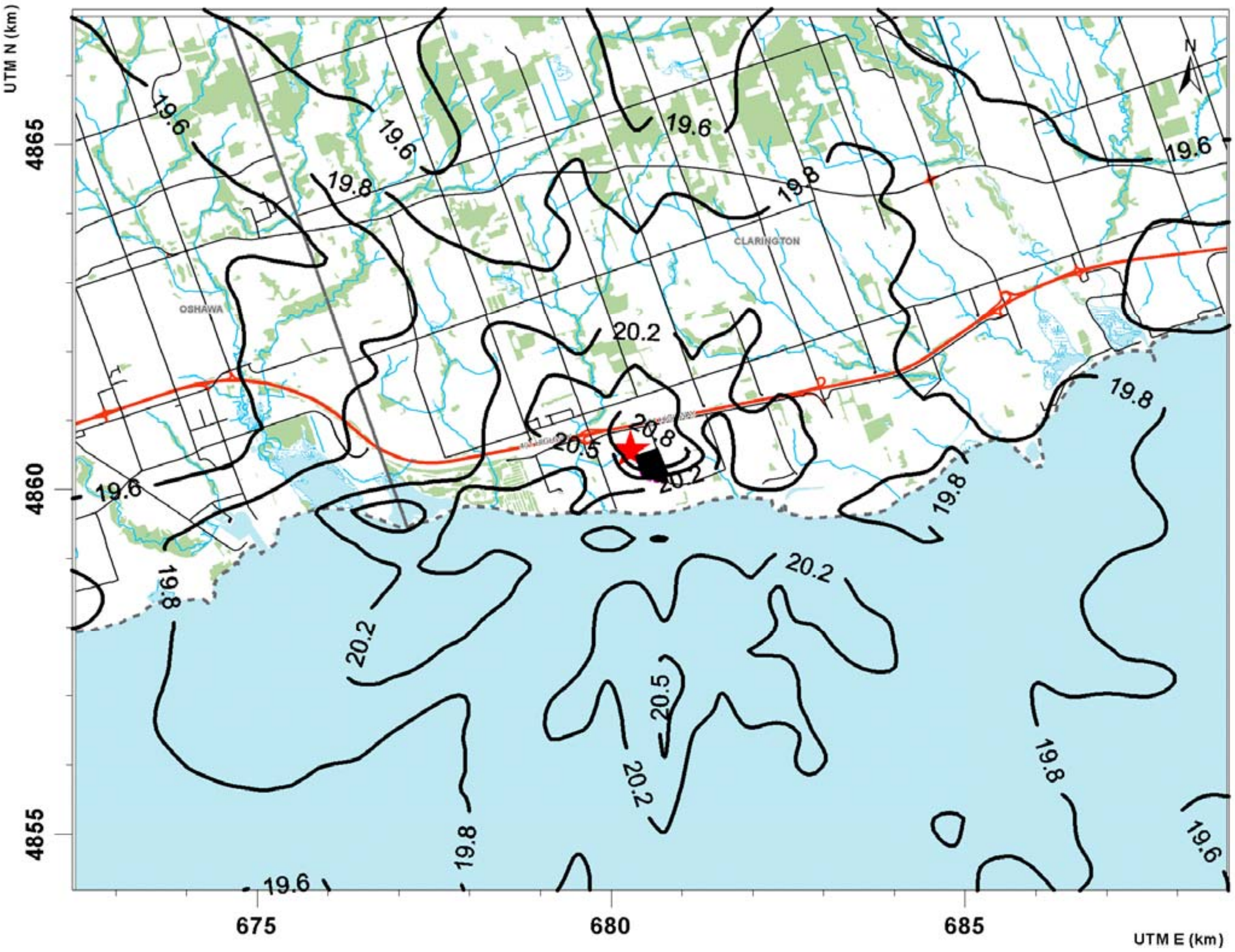
FIGURE 7-18

Maximum Predicted Hourly-Average SO_2 Ground Level Concentration Contours (Including Background)

400,000 tpy Facility

Criterion = 690 µg/m^3
Predicted Statistical Maximum GLC = 47.05 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

Maximum GLC

Facility

FIGURE 7-19

Maximum Predicted 24-Average SO_2 Ground Level Concentration Contours (Including Background)

140,000 tpy Facility

Criterion = 275 µg/m^3
Predicted Statistical Maximum GLC = 21.05 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

Legend

★ Maximum GLC

■ Facility

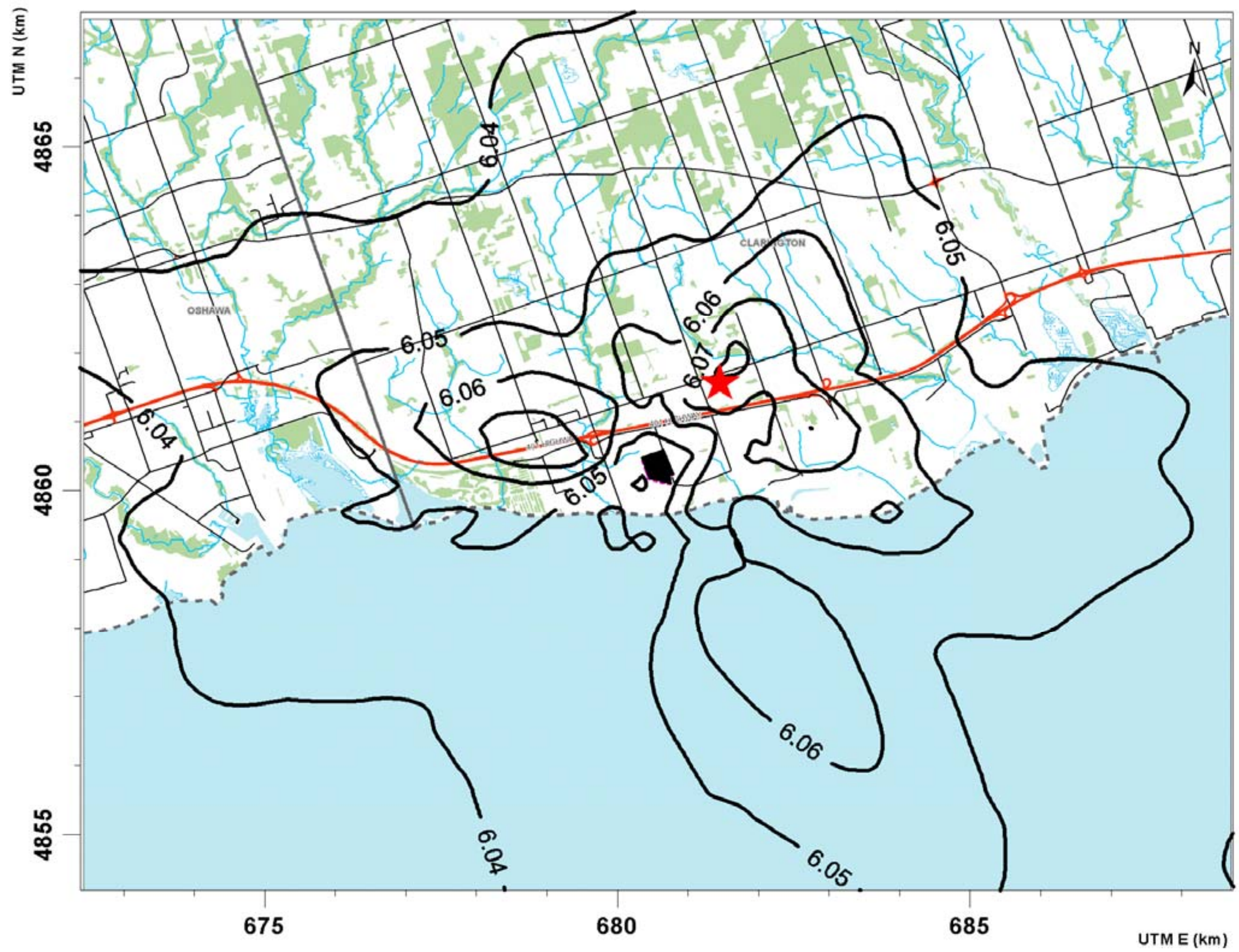
FIGURE 7-20

Maximum Predicted 24-Average SO_2 Ground Level Concentration Contours (Including Background)

400,000 tpy Facility

Criterion = 275 µg/m^3
Predicted Statistical Maximum GLC = 22.62 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

★ Maximum GLC

■ Facility

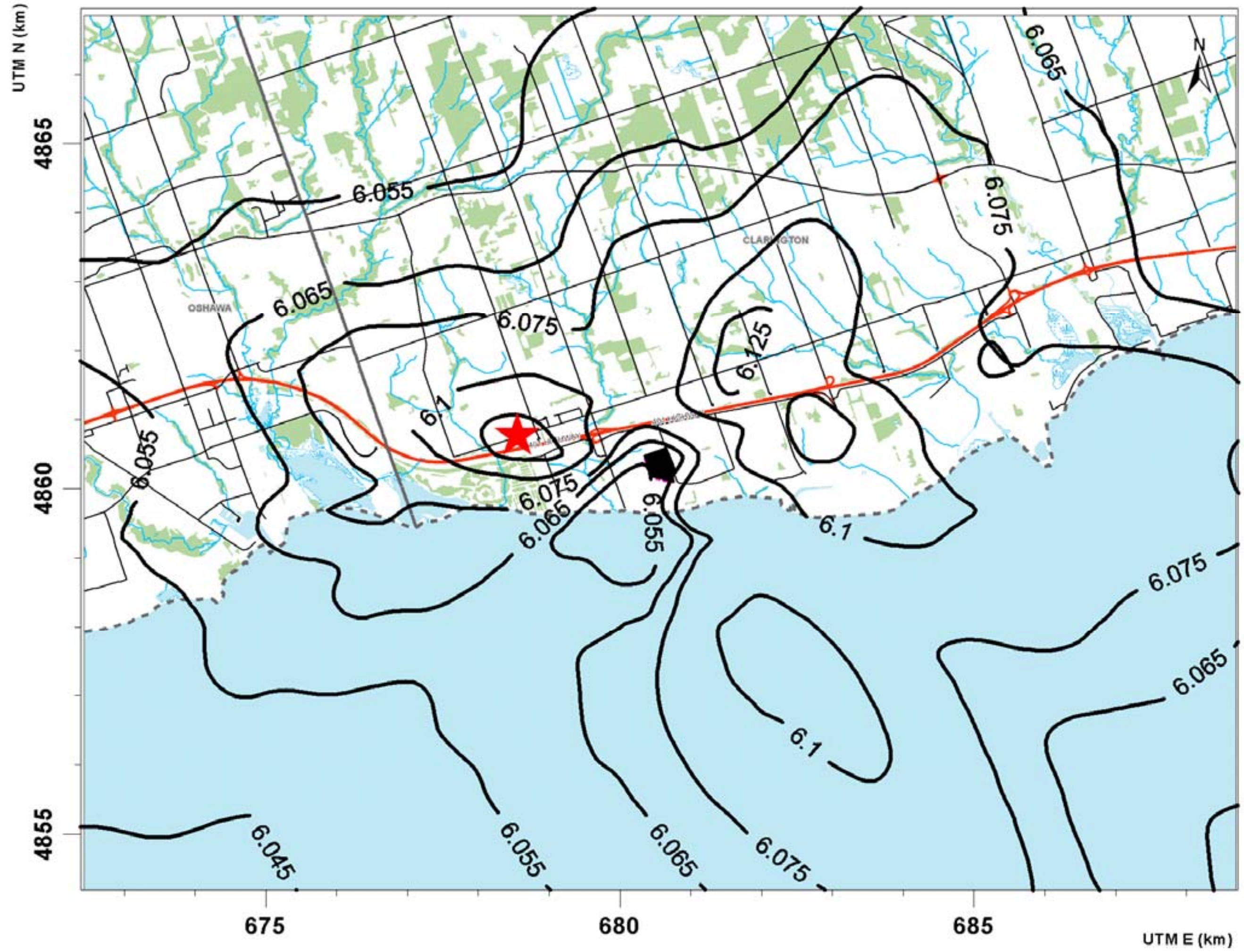
FIGURE 7-21

Maximum Predicted Annual Average SO_2 Ground Level Concentration Contours (Including Background)

140,000 tpy Facility

Criterion = 55 µg/m^3
Predicted Statistical Maximum GLC = 5.97 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

Maximum GLC

Facility

FIGURE 7-22

Maximum Predicted Annual Average SO_2 Ground Level Concentration Contours (Including Background)

400,000 tpy Facility

Criterion = 55 µg/m^3
Predicted Statistical Maximum GLC = 6.14 µg/m^3

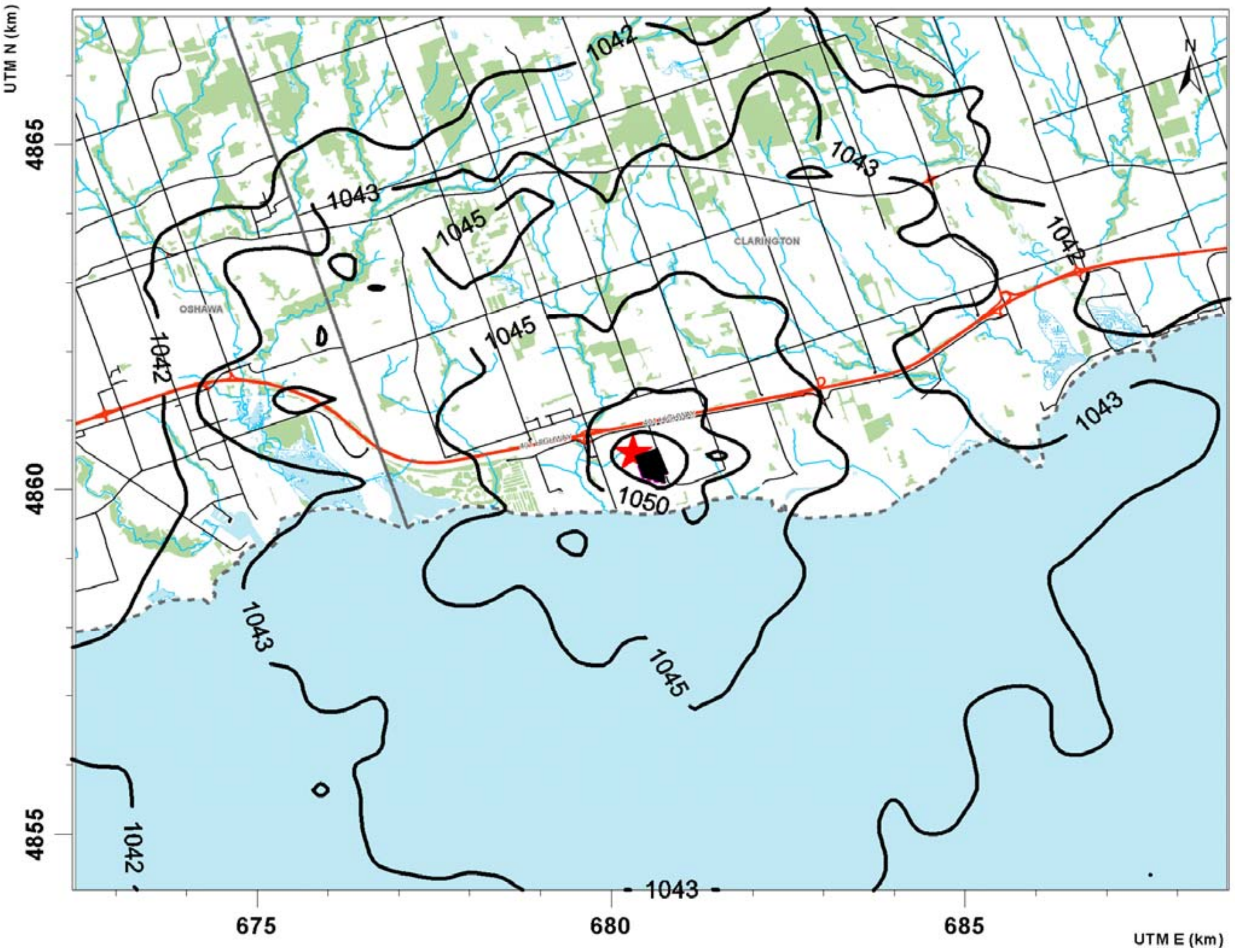
Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

Carbon Monoxide

Contour plots of the maximum predicted hourly, 8-hour and 24-hour average carbon monoxide ground level concentrations are presented in Figures 7-23 to 7-28. In these plots, the higher of the predicted concentrations due to the Facility operating at either MCR or MCTD (Scenario 1 or 2) were added to the measured background CO concentration for hourly, 8-hour and 24-hour averages.

The background CO concentration levels for the AQSA are 1035, 1036 and 1029 μg/m^3 for hourly, 8-hour and 24-hour averaging periods respectively. The maximum hourly, 8-hour and 24-hour average ground level CO predictions for the 140,000 tpy Facility are less than 2%, 1% and 0.5% above background levels respectively. The maximum hourly, 8-hour and 24-hour average ground level CO predictions for the 400,000 tpy Facility are less than 5%, 1% and 0.5% respectively above background levels.

The predicted statistical maximum concentrations, inclusive of background concentrations, are well below applicable MOE criteria for all averaging periods.



Legend

Maximum GLC

Facility

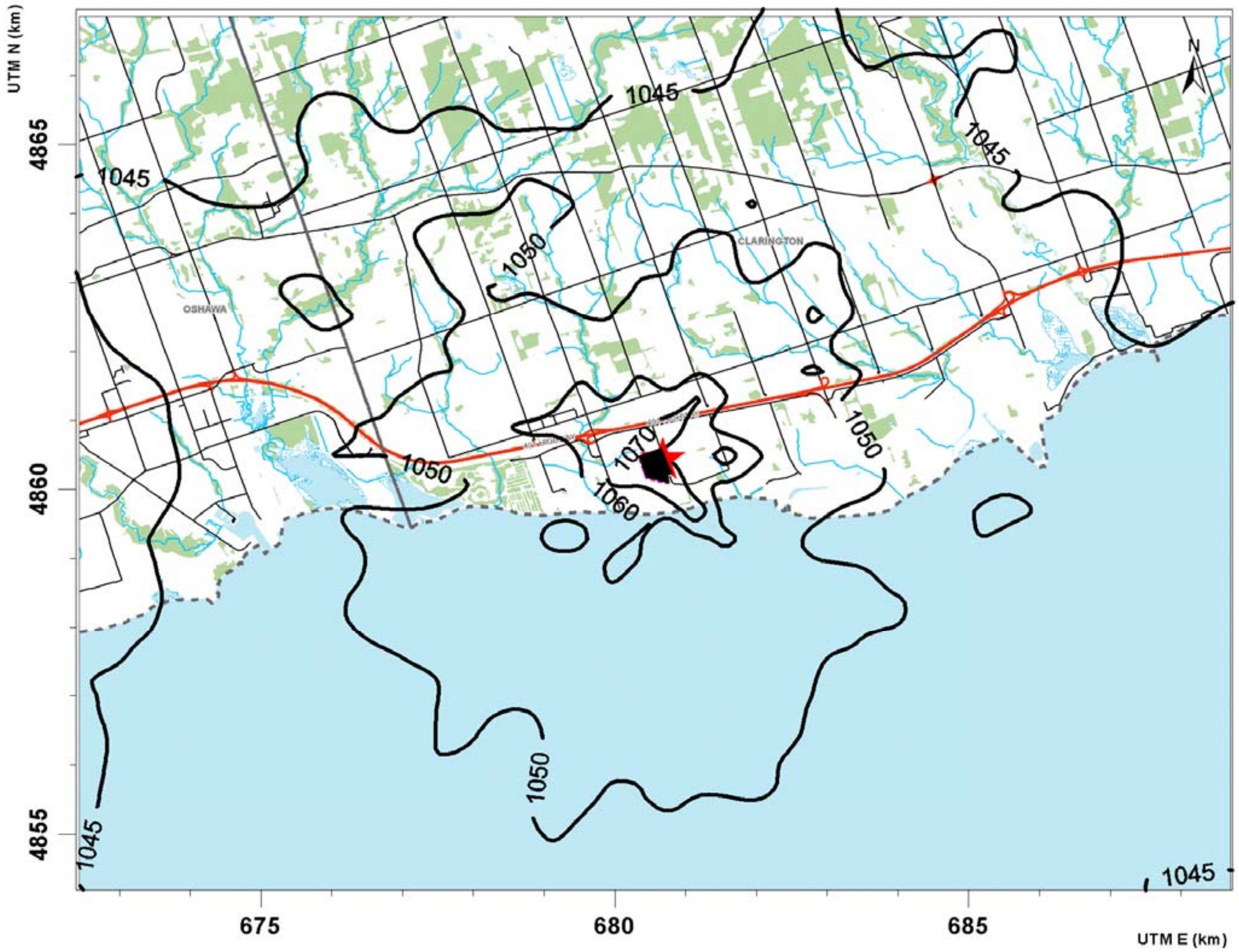
FIGURE 7-23

Maximum Predicted Hourly-Average CO Ground Level Concentration Contours (Including Background)

140,000 tpy Facility

Criterion = 36200 µg/m^3
Predicted Statistical Maximum GLC = 1056.3 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

★ Maximum GLC

■ Facility

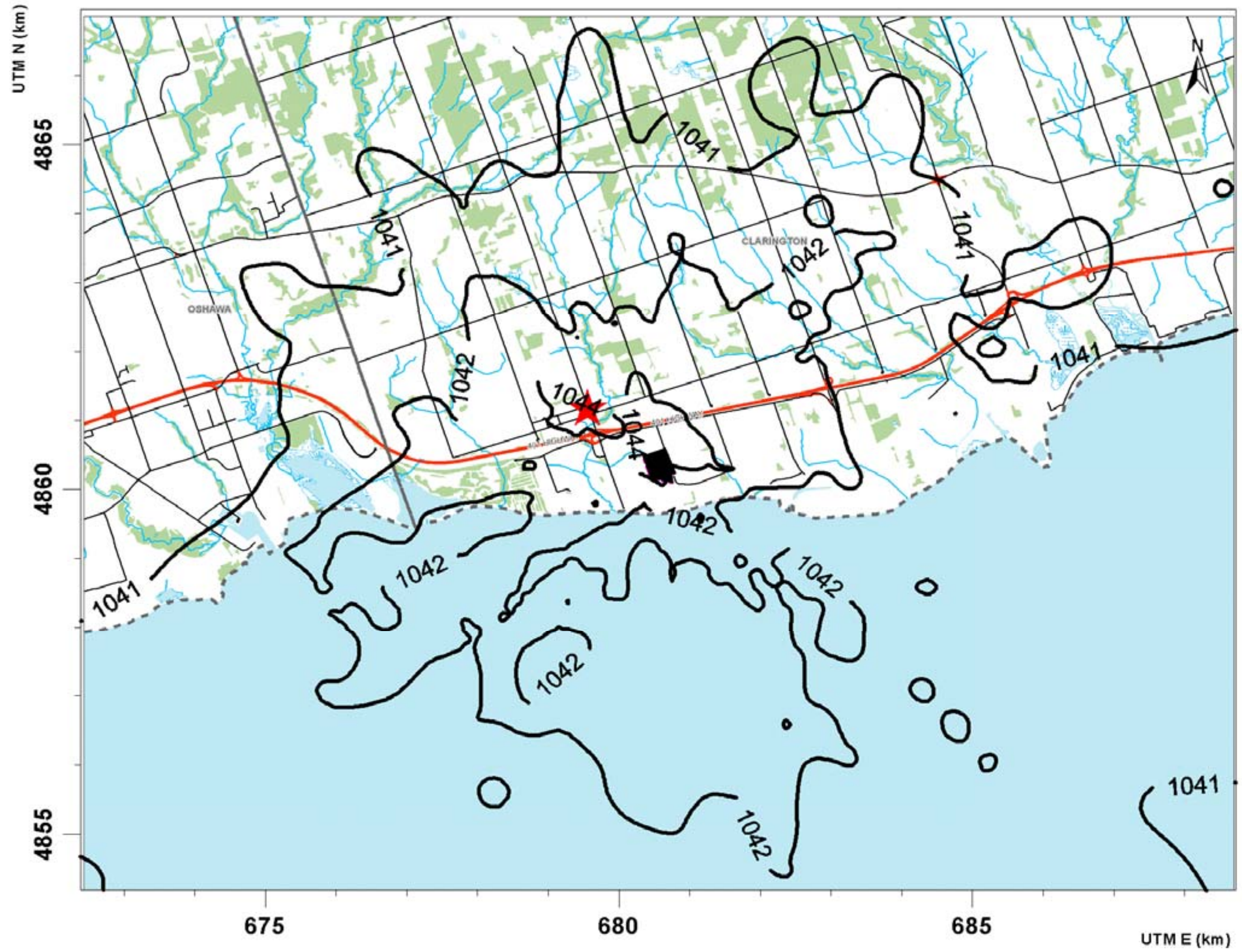
FIGURE 7-24

Maximum Predicted Hourly-Average CO Ground Level Concentration Contours (Including Background)

400,000 tpy Facility

Criterion = 36200 μg/m^3
Predicted Statistical Maximum GLC = 1075.4 μg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

★ Maximum GLC

■ Facility

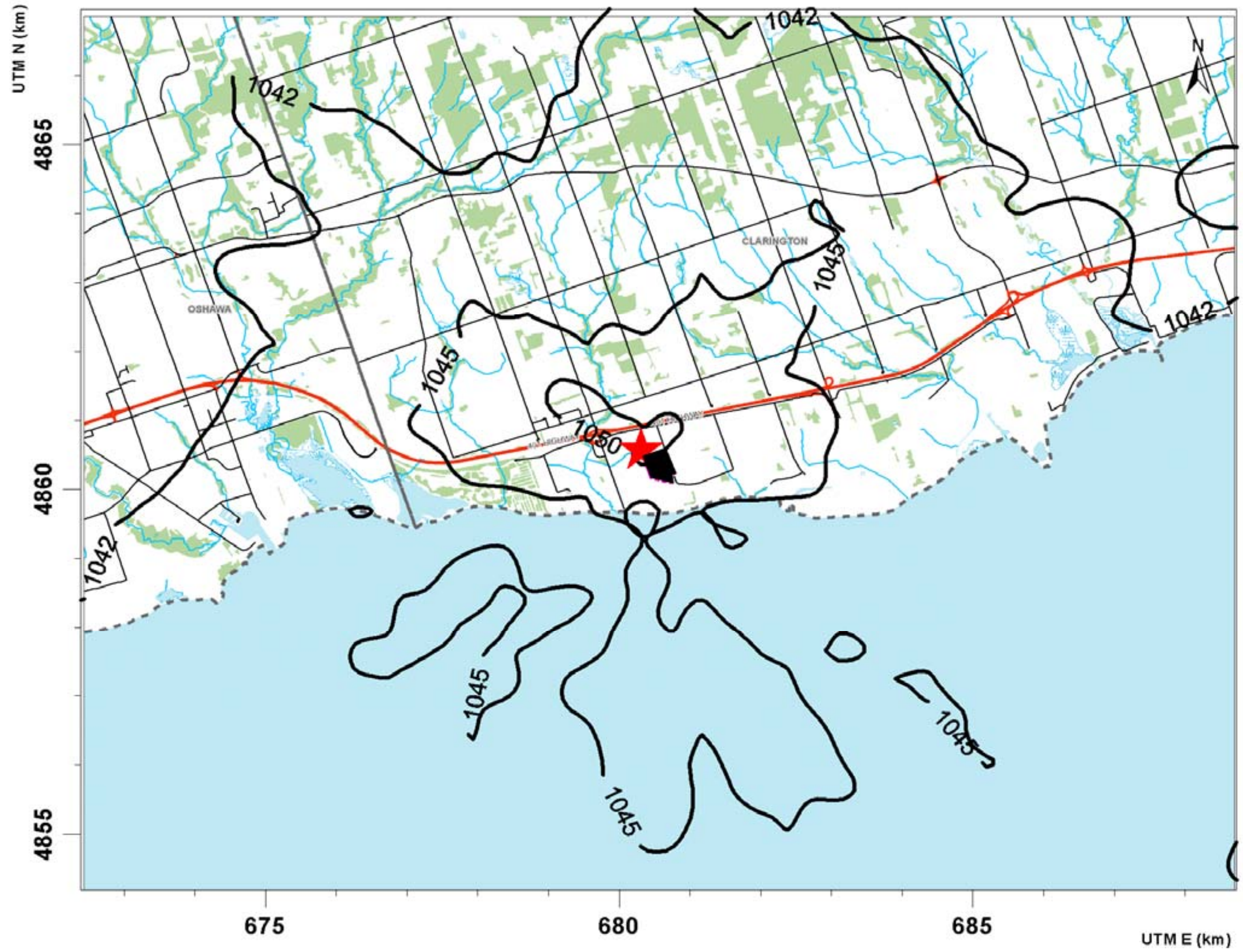
FIGURE 7-25

Maximum Predicted 8-Hour Average CO Ground Level Concentration Contours (Including Background)

140,000 tpy Facility

Criterion = 15700 µg/m^3
Predicted Statistical Maximum GLC = 1045.1 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

Maximum GLC

Facility

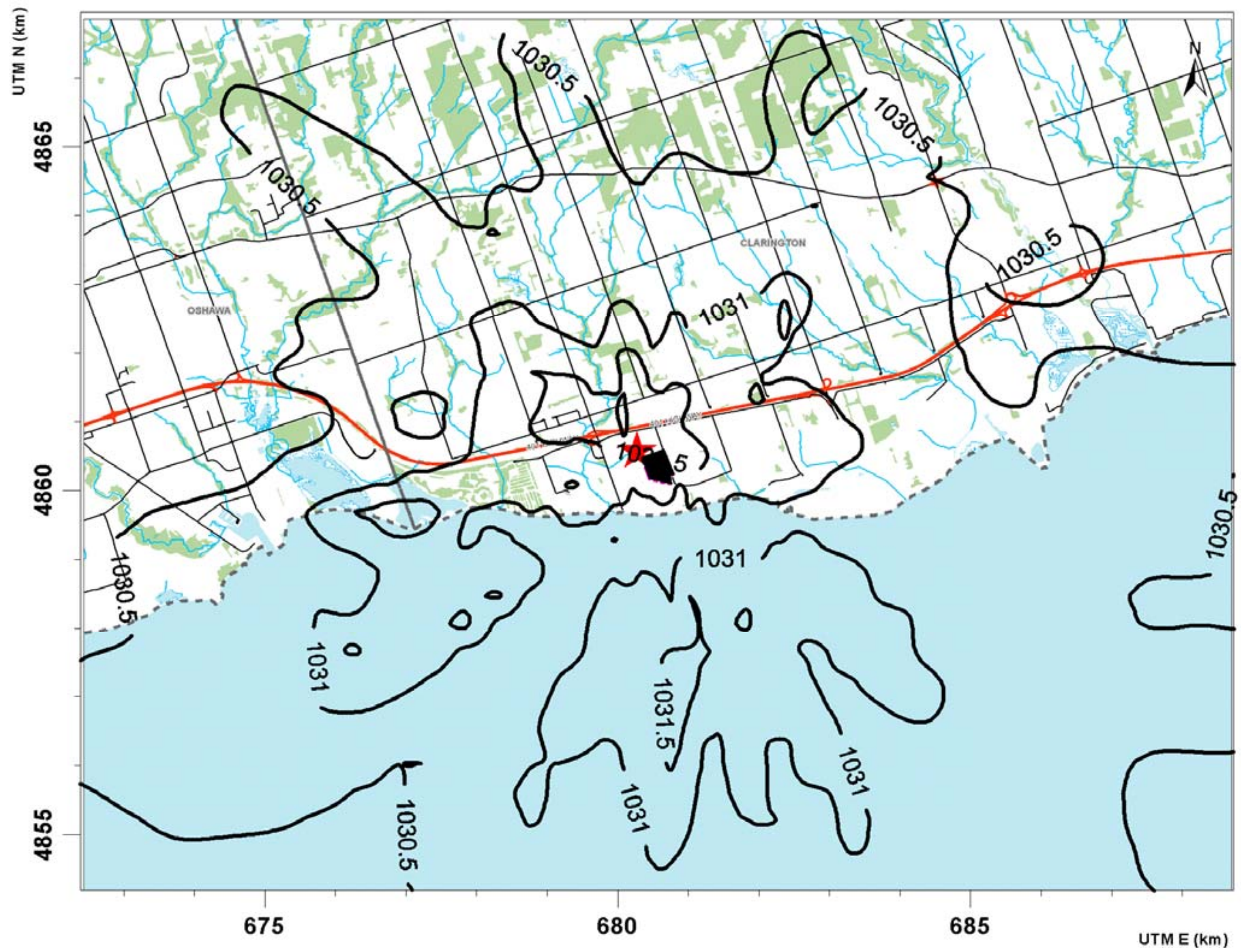
FIGURE 7-26

Maximum Predicted 8-Hour Average CO Ground Level Concentration Contours (Including Background)

400,000 tpy Facility

Criterion = 15700 µg/m^3
Predicted Statistical Maximum GLC = 1051.3 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

Maximum GLC

Facility

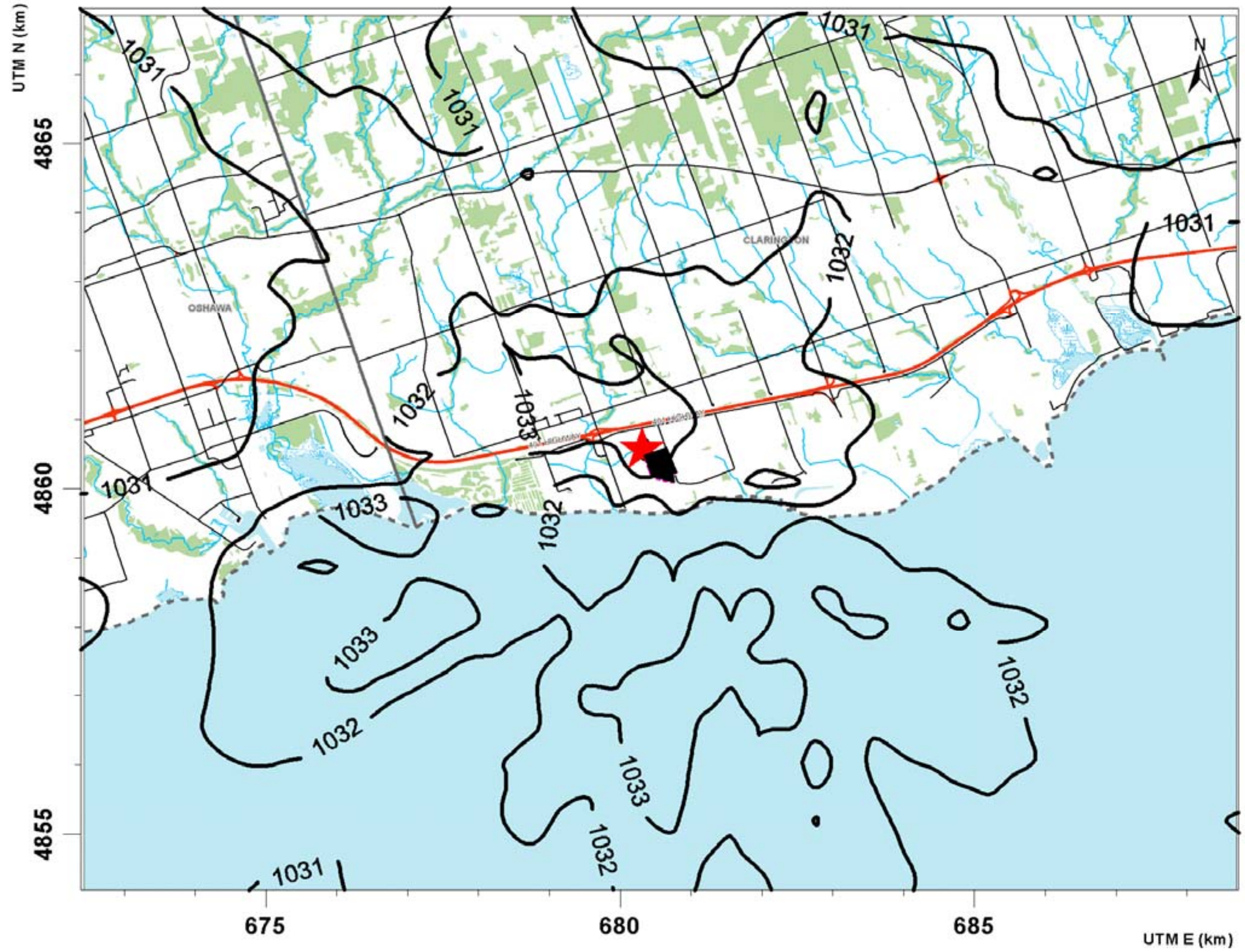
FIGURE 7-27

Maximum Predicted 24-Hour Average CO Ground Level Concentration Contours (Including Background)

140,000 tpy Facility

Predicted Statistical Maximum GLC = 1032.3 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

Maximum GLC

Facility

FIGURE 7-28

Maximum Predicted 24-Hour Average CO Ground Level Concentration Contours (Including Background)

400,000 tpy Facility

Predicted Statistical Maximum GLC = 1034.3 μg/m^3

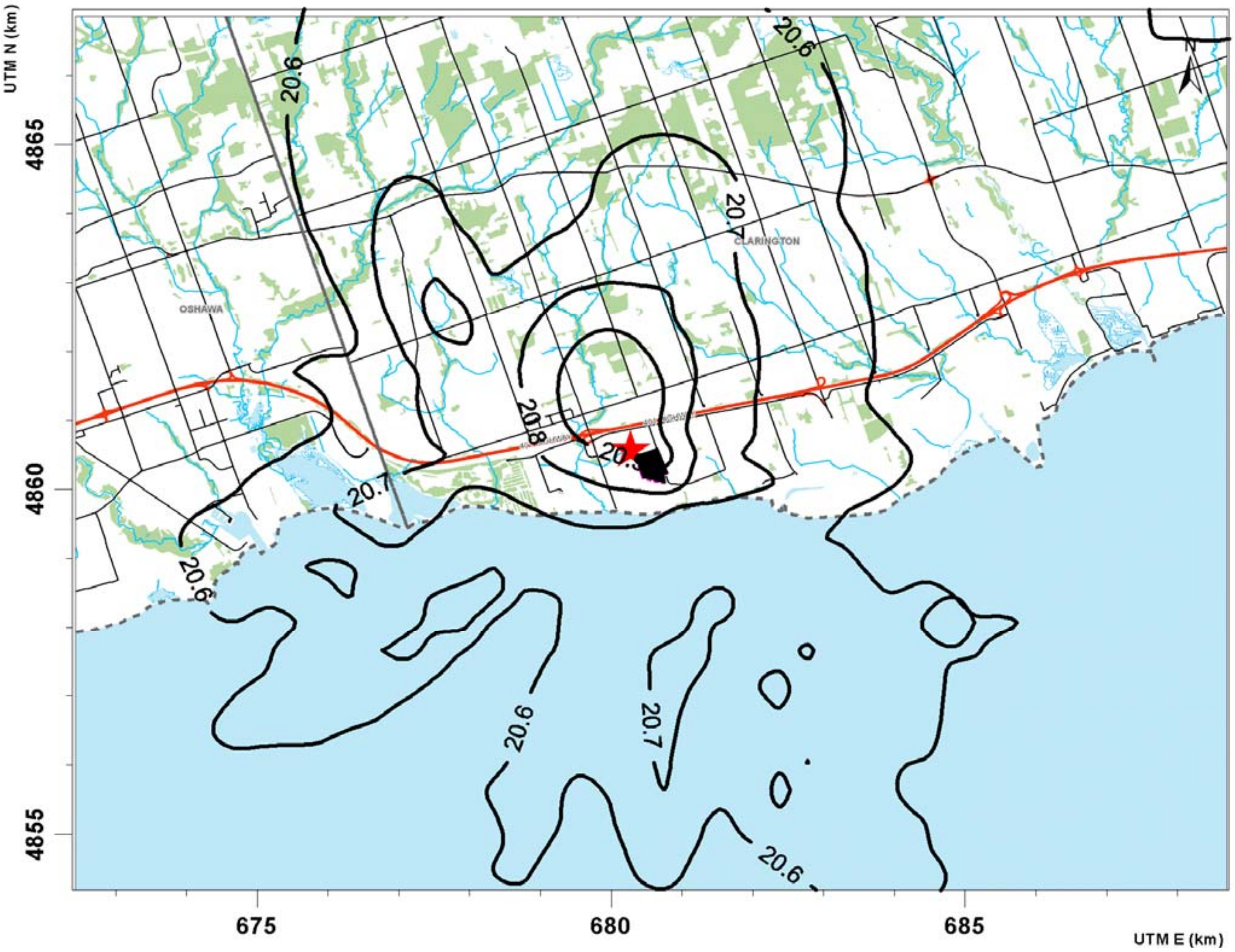
Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

Fine Particulate Matter ($PM_{2.5}$)

Contour plots of the maximum predicted 24-hour average $PM_{2.5}$ ground level concentrations (including background) are presented in Figures 7-29 and 7-30. The higher of the predicted concentrations due to the Facility operating at either MCR or MCTD (Scenario 1 or 2) were added to the measured background $PM_{2.5}$ concentration in this figure. Secondary particulate formation was included in this analysis.

The maximum predicted 24-hour-average $PM_{2.5}$ concentration of 20.9 µg/m^{3}occurs to the northwest of the 140,000 tpy Facility and is only about 2.5% above the current background levels in the area. The maximum predicted 24-hour-average $PM_{2.5}$ concentration of 21.4 µg/m^3 for the 400,000 tpy Facility occurs to the northwest of the Site and is approximately 5% above the current background levels in the area.

The predicted statistical maximum concentrations, inclusive of background concentrations, are below the applicable CWS criteria.



Legend

★ Maximum GLC

■ Facility

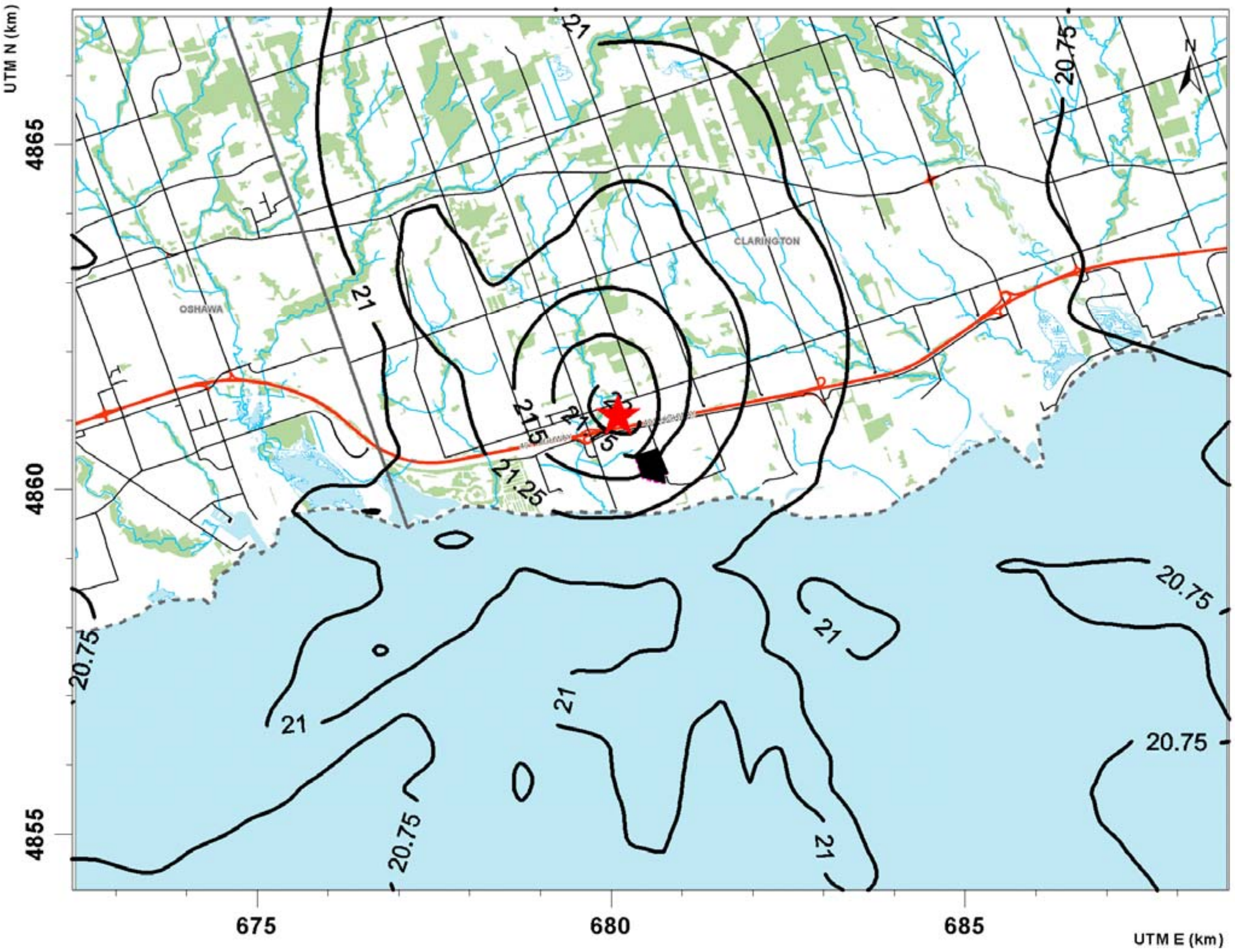
FIGURE 7-29

Maximum Predicted 24-Hour-Average $PM_{2.5}$ Ground Level Concentration Contours (Including Background)

140,000 tpy Facility

Criterion = 30 µg/m^3
Predicted Statistical Maximum GLC = 20.9 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

★ Maximum GLC

■ Facility

FIGURE 7-30

Maximum Predicted 24-Hour-Average $PM_{2.5}$ Ground Level Concentration Contours (Including Background)

400,000 tpy Facility

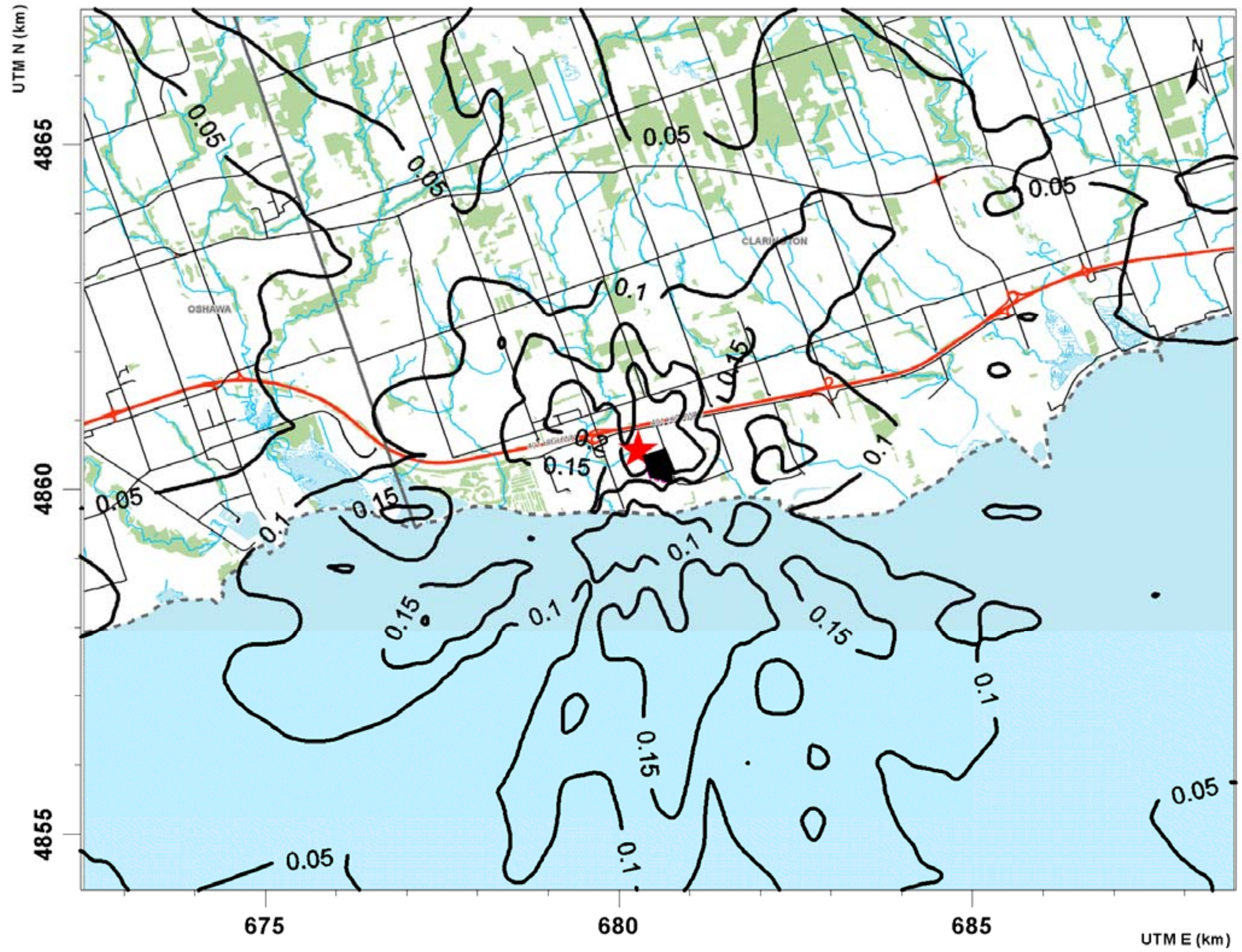
Criterion = 30 µg/m^3
Predicted Statistical Maximum GLC = 21.4 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

Ammonia

Contour plots of the maximum predicted 24-hour average ground level ammonia concentrations are presented in Figures 7-31 and 7-32. The higher of the predicted concentrations due to the Facility operating at either MCR or MCTD (Scenario 1 or 2) are presented. No data was available to determine background NH_3 levels, therefore these figures present the predicted concentrations due to the Facility alone.

The maximum predicted 24-hour-average ammonia concentration of 0.27 µg/m^3 occurs to the northwest of 140,000 tpy Facility and is well below the applicable MOE criteria of 100 µg/m^3. The maximum predicted 24-hour-average ammonia concentration of 0.5 µg/m^3 occurs to the northwest of the 400,000 tpy Facility and is also well below the applicable MOE criteria.



Legend

Maximum GLC

Facility

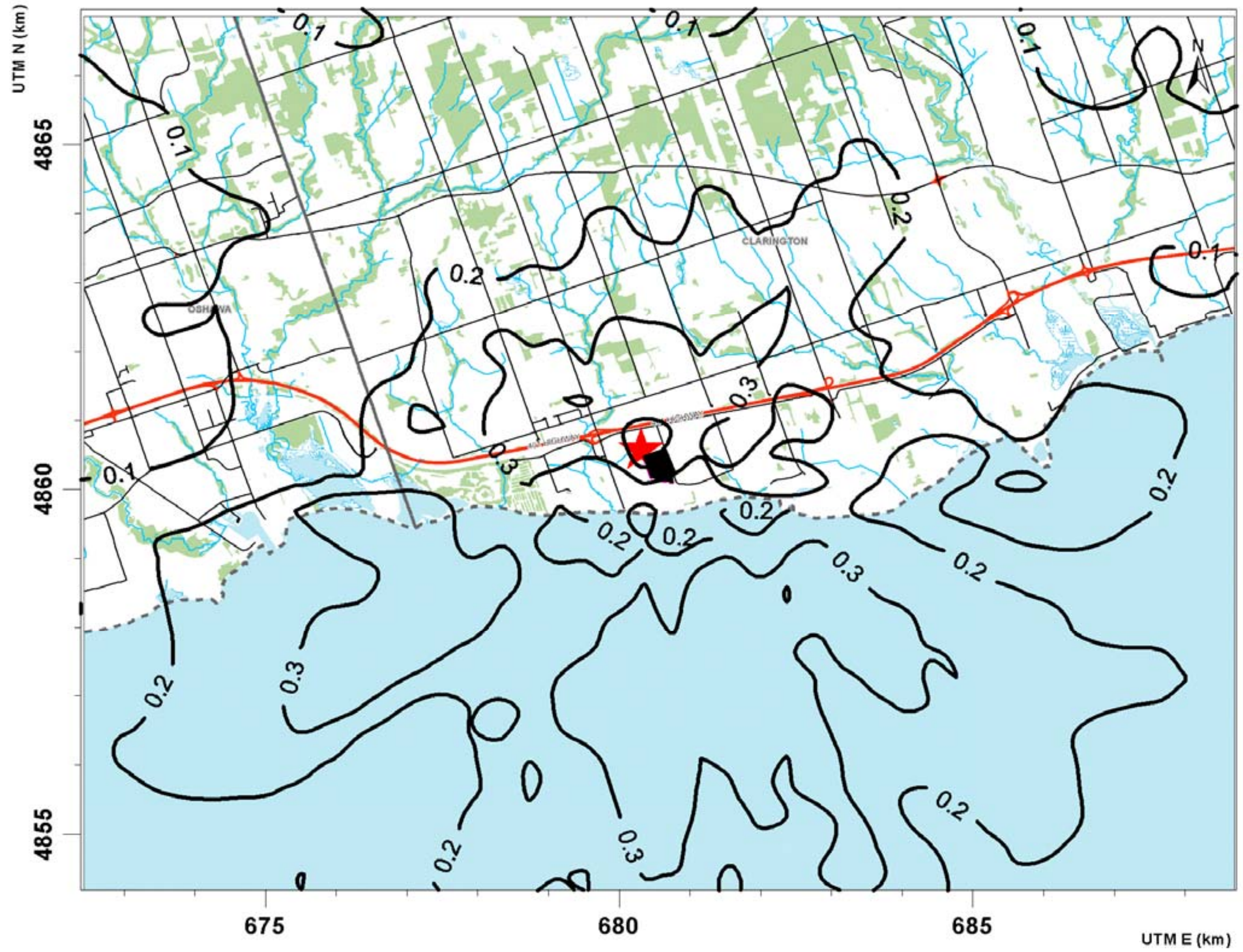
FIGURE 7-31

Maximum Predicted 24-Hour-Average NH_3 Ground Level Concentration Contours

140,000 tpy Facility

Criterion = 100 µg/m^3
Predicted Statistical Maximum GLC = 0.27 µg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

Maximum GLC

Facility

FIGURE 7-32

Maximum Predicted 24-Hour-Average NH_3 Ground Level Concentration Contours

400,000 tpy Facility

Criterion = 100 μg/m^3
Predicted Statistical Maximum GLC = 0.5 μg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

Dioxins and Furans

Contour plots of the maximum predicted 24-hour average dioxin/furan TEQ ground level concentrations are presented in Figures 7-33 and 7-34 for a 140,000 tpy and 400,000 tpy Facility scenarios respectively. The higher of the predicted concentrations due to the Facility operating at either MCR or MCTD (Scenario 1 or 2) were added to the measured background dioxin concentration in these figures.

The maximum predicted cumulative 24-hour average TEQ concentration of 2.7×10^{-8} µg/m^3 (2.7×10^{-2} pg) occurs to the northwest of the 140,000 tpy Facility and is only about 15% above the current background levels in the area and well below the MOE criteria of 5 pg/m^3.

For the 400,000 tpy Facility, the maximum predicted cumulative 24-hour average TEQ concentration of 2.9×10^{-8} µg/m^3 (2.9×10^{-2} pg) occurs to the northwest of Facility and is about 30% above the current background levels in the area and well below the MOE criteria of 5 pg/m^3.

Legend

★ Maximum GLC

■ Facility

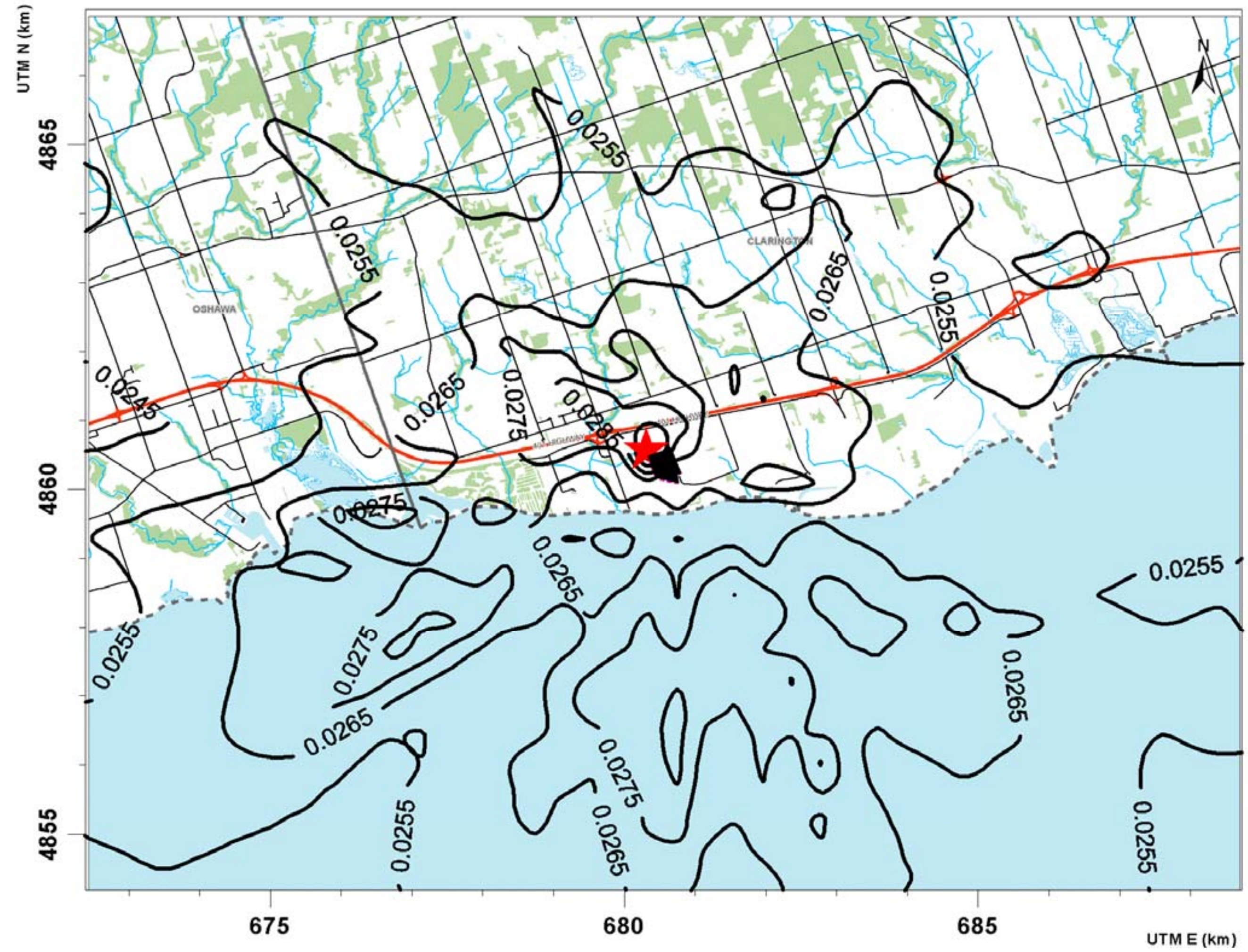
FIGURE 7-33

Maximum Predicted 24-Hour-Average Dioxin and Furans TEQ Ground Level Concentration Contours (Including Background)

140,000 tpy Facility

Criterion = 5.0 pg/m^3
Predicted Statistical Maximum GLC = 2.7E-02 pg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497



Legend

★ Maximum GLC

■ Facility

FIGURE 7-34

Maximum Predicted 24-Hour-Average Dioxin and Furans TEQ Ground Level Concentration Contours (Including Background)

400,000 tpy Facility

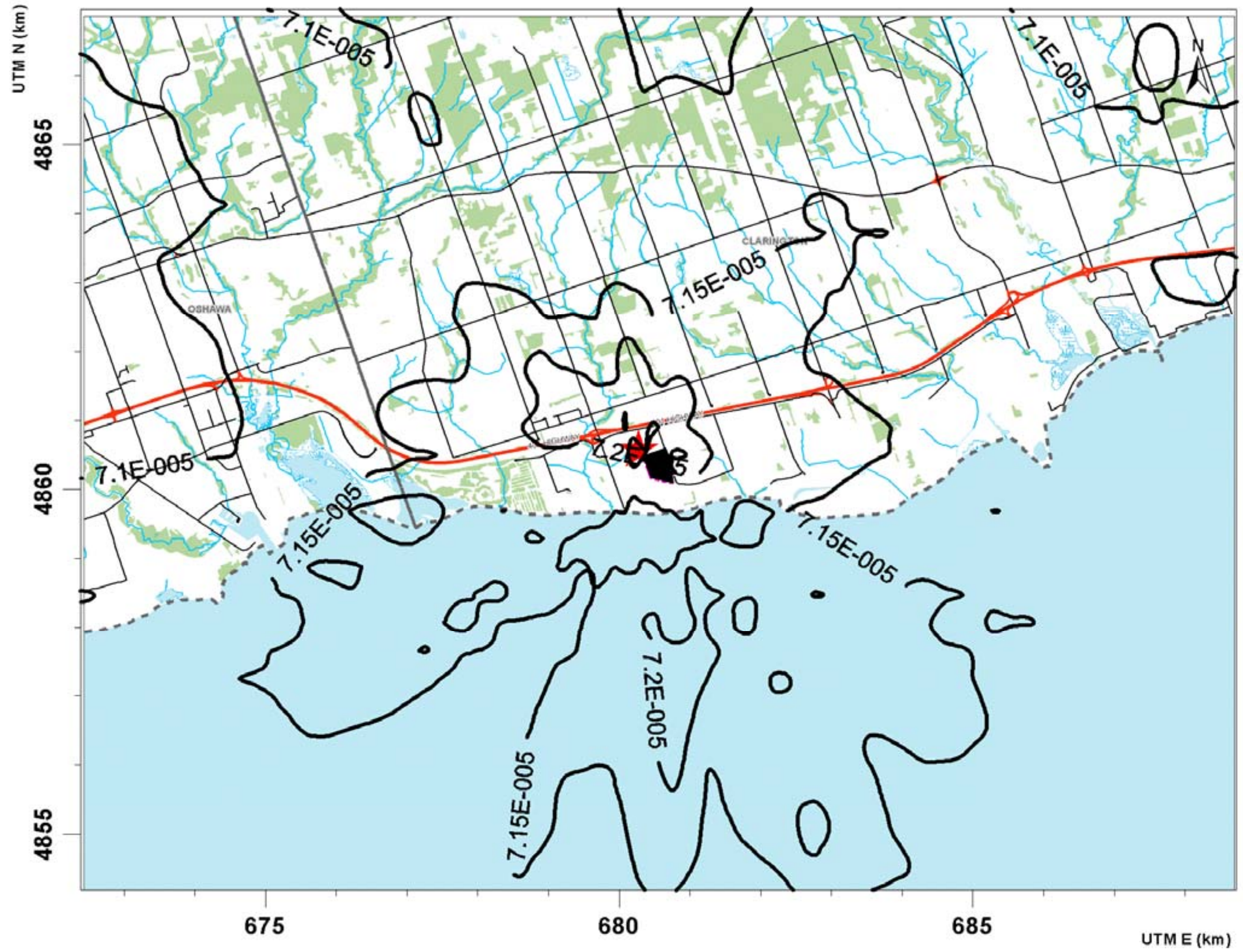
Criterion = 5.0E pg/m^3
Predicted Statistical Maximum GLC = 0.029 pg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

Polycyclic Aromatic Hydrocarbons

Contour plots of the maximum predicted 24-hour average concentrations of an individual PAH species (benzo(ghi)perylene) are presented in Figures 7-35 and 7-36 for the 140,000 tpy and 400,000 tpy Facility scenarios. The higher of the predicted concentrations due to the Facility operating at either MCR or MCTD (Scenario 1 or 2) were added to the measured background concentration in these figures.

The 24-hour average background benzo(ghi)perylene concentration level for the AQSA is 7.07×10^{-5} µg/m^3. The maximum predicted 24-hour benzo(ghi)perylene concentration for the 140,000 tpy Facility is about 3% above the background level and less than 0.01% of the MOE criteria. For a 400,000 tpy Facility, the maximum predicted 24-hour benzo(ghi)perylene concentration is about 6% above the background level and 0.01% of the MOE criteria.



Legend

★ Maximum GLC

■ Facility

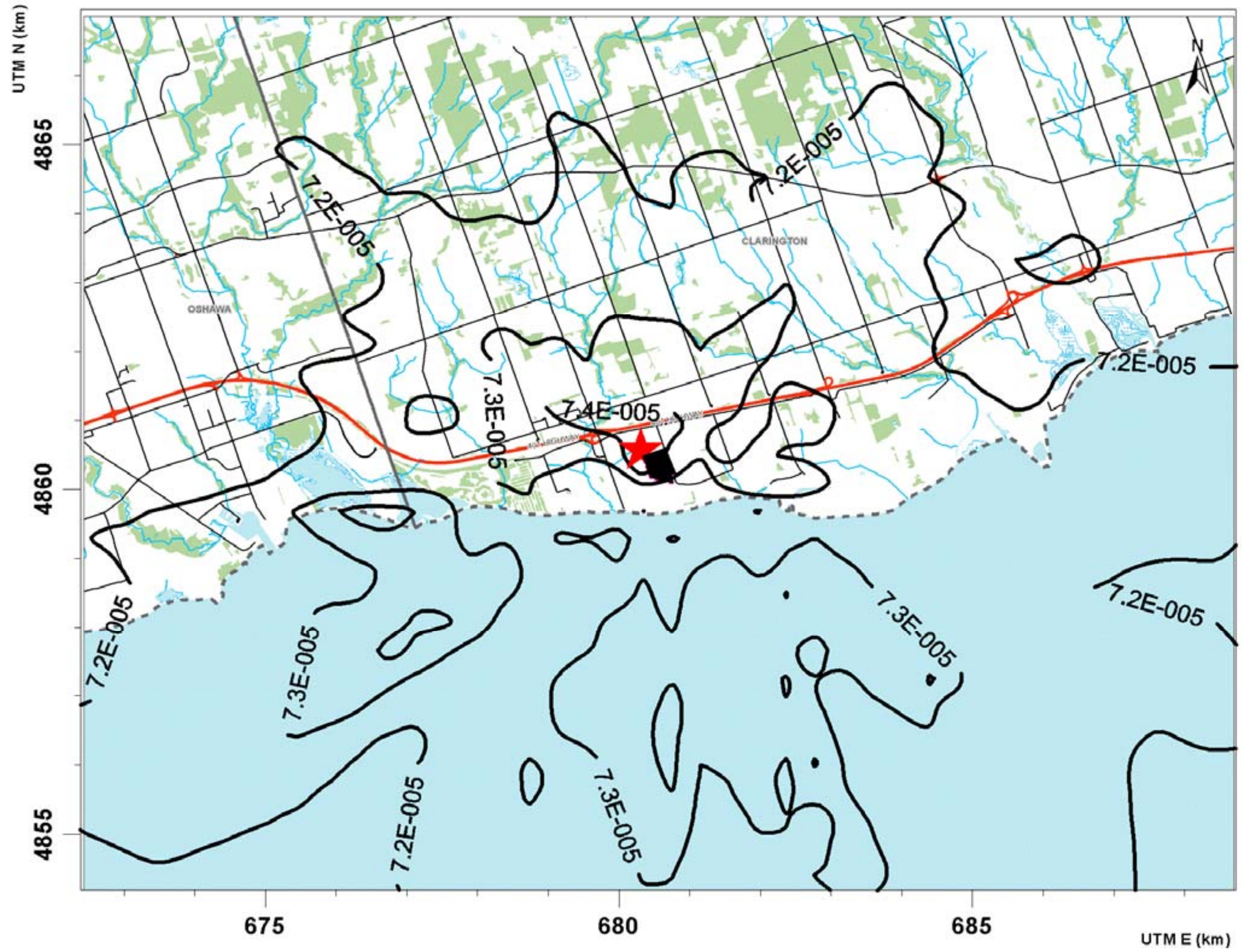
FIGURE 7-35

Maximum Predicted 24-Hour-Average Benzo (ghi) Perylene Ground Level Concentration Contours (Including Background)

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

140,000 tpy Facility

Criterion = 1.2 µg/m^3
Predicted Statistical Maximum GLC = 7.3E-05 µg/m^3



Legend

★ Maximum GLC

■ Facility

FIGURE 7-36

Maximum Predicted 24-Hour-Average Benzo (ghi) Perylene Ground Level Concentration Contours (Including Background)

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

400,000 tpy Facility

Criterion = 1.2 µg/m^3
Predicted Statistical Maximum GLC = 7.5E-05 µg/m^3

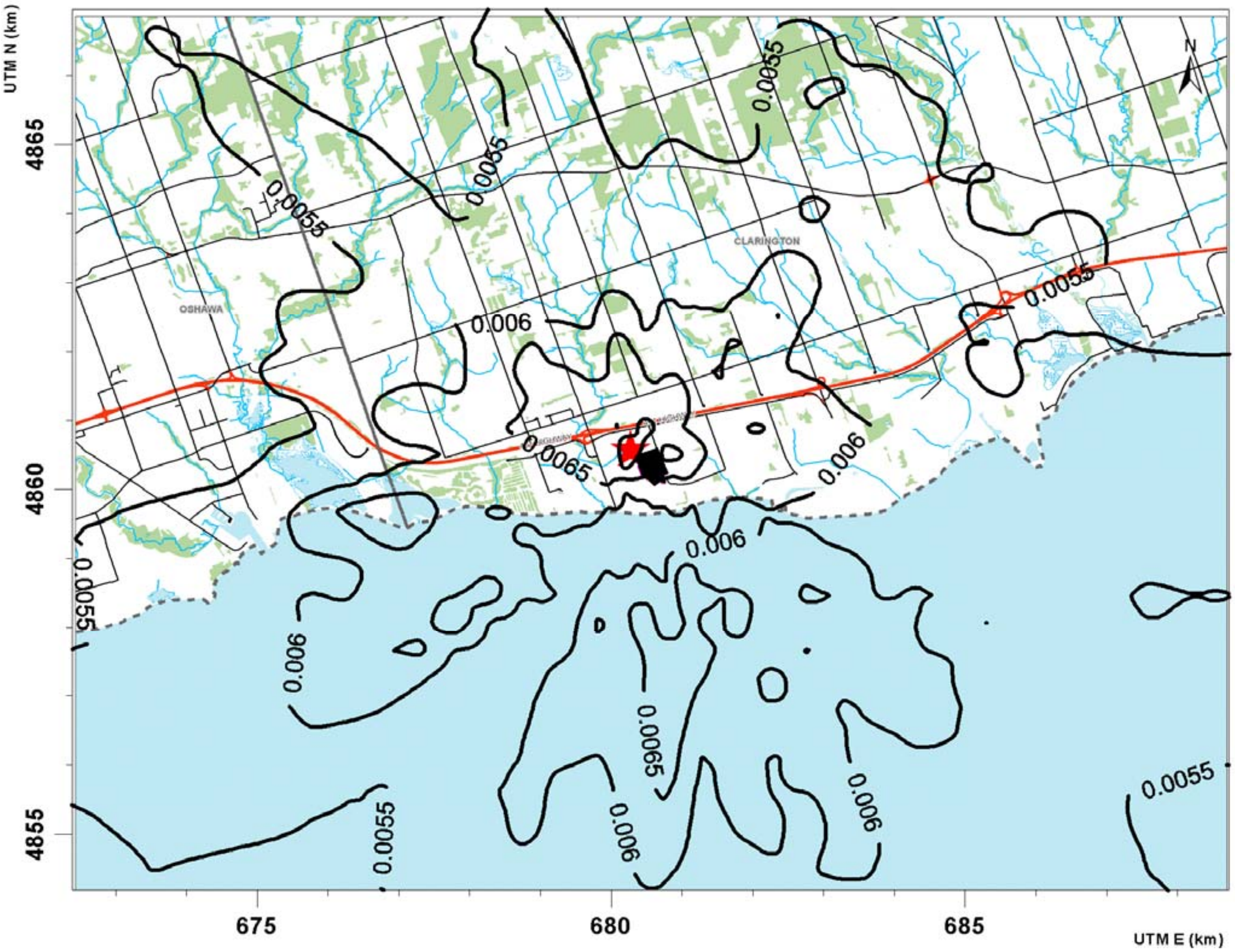
Lead

Contour plots of the maximum predicted 24-hour average Lead (Pb) ground level concentrations are presented in Figures 7-37 and 7-38. The higher of the predicted concentrations due to the Facility operating at either MCR or MCTD (Scenario 1 or 2) were added to the measured background Pb concentration in this figure.

The background Pb concentration level for the AQSA is 4.98×10^{-3} µg/m^3 for a 24-hour averaging period. The maximum predicted 24-hour Pb concentration for the 140,000 tpy Facility is about 50% above the background level and decreases to about 10% above the background level within about 5 to 8 km of the Facility (depending on direction from the Facility).

The maximum predicted 24-hour Pb concentration for a 400,000 tpy Facility is about 93% above the background level and decreases to about 40% above the background level within about 5-6 km of the Facility.

The predicted statistical maximum concentrations for the 140,000 tpy and 400,000 tpy Facility scenarios, inclusive of background concentration, are well below the applicable criteria of 0.5 µg/m^3 (1% of criteria for the 140,000 tpy Facility, and 2% of criteria for the 400,000 tpy Facility).



Legend

★ Maximum GLC

■ Facility

FIGURE 7-37

Maximum Predicted 24-Hour-Average Lead Ground Level Concentration Contours (Including Background)

140,000 tpy Facility

Criterion = 0.5 μg/m³
Predicted Statistical Maximum GLC = 7.5E-03 μg/m³

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

Legend

★ Maximum GLC

■ Facility

FIGURE 7-38

Maximum Predicted 24-Hour-Average Lead Ground Level Concentration Contours (Including Background)

400,000 tpy Facility

Criterion = 0.5 μg/m^3
Predicted Statistical Maximum GLC = 9.7E-03 μg/m^3

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 12/9/2009
PROJECT: 1009497

7.1.1.2 Special Receptor Modelling Results

Summaries of the maximum predicted GLCs over all the special receptors for Scenarios 1 and 2 are presented in Tables 7-5, 7-6, for a 140,000 tpy Facility and in Tables 7-7 and 7-8 for a 400,000 tpy Facility. In these tables, the maximum predicted contaminant concentrations (not accounting for meteorological anomalies) are presented. Therefore, the values presented in these tables are conservative relative to the MOE requirements in Guideline A-11, which are based on the statistical maxima (meteorological anomalies removed). Only hourly, 24-hour and annual average concentrations are presented in these tables, as these were the averaging periods of interest for the HHERA team.

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Sulphur Dioxide (SO_2)	1 Hr	690	19.5	19.54	39.06	6%	273	Future Industrial 11	680.25	4860.26
	24 Hr	275	19.3	2.28	21.57	8%	266	Future Industrial 8	680.40	4860.73
	Annual	55[3]	5.9	0.05	5.98	11%	7	ECO 7	681.58	4862.07
Hydrogen Chloride (HCl)	1 Hr			5.03			273	Future Industrial 11	680.25	4860.26
	24 Hr	20		0.59		3%	266	Future Industrial 8	680.40	4860.73
	Annual			0.01			7	ECO 7	681.58	4862.07
Hydrogen Fluoride (HF)	1 Hr			0.50			273	Future Industrial 11	680.25	4860.26
	24 Hr	0.86		0.06		7%	266	Future Industrial 8	680.40	4860.73
	Annual			1.32E-03			7	ECO 7	681.58	4862.07
Nitrogen Oxides (NO_x)	1 Hr	400	64.6	67.56	132.13	33%	273	Future Industrial 11	680.25	4860.26
	24 Hr	200	58.2	7.88	66.10	33%	266	Future Industrial 8	680.40	4860.73
	Annual	100[5]	37	0.18	37.21	37%	7	ECO 7	681.58	4862.07
Carbon Monoxide (CO)	1 Hr	36200[3]	1035	25.13	1060.46	3%	273	Future Industrial 11	680.25	4860.26
	24 Hr		1029	2.93	1031.92		266	Future Industrial 8	680.40	4860.73
	Annual		632	0.07	631.73		7	ECO 7	681.58	4862.07
Particulate Matter PM_{10}	1 Hr			5.89	5.89		273	Future Industrial 11	680.25	4860.26
	24 Hr	50[3]		0.67	0.67	1%	266	Future Industrial 8	680.40	4860.73
	Annual			0.02	0.02		7	ECO 7	681.58	4862.07
Particulate Matter $PM_{2.5}$	1 Hr		22.8	5.89	28.71		273	Future Industrial 11	680.25	4860.26
	24 Hr	30[6]	20.4	0.67	21.10	70%	266	Future Industrial 8	680.40	4860.73
	Annual		9.8	0.02	9.79		7	ECO 7	681.58	4862.07

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Total Particulate Matter	1 Hr		86.2	5.89	92.05		273	Future Industrial 11	680.25	4860.26
	24 Hr	120	35.4	0.67	36.06	30%	266	Future Industrial 8	680.40	4860.73
	Annual	60[5]	21.3	0.02	21.29	35%	7	ECO 7	681.58	4862.07
Ammonia (Slip at stack)	1 Hr			3.02			273	Future Industrial 11	680.25	4860.26
	24 Hr	100[3]		0.35		<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual			7.91E-03			7	ECO 7	681.58	4862.07
Organic Matter (as CH_4)	1 Hr			27.36			273	Future Industrial 11	680.25	4860.26
	24 Hr			3.19			266	Future Industrial 8	680.40	4860.73
	Annual			0.07			7	ECO 7	681.58	4862.07
Chlorinated Polycyclic Aromatics										
Dioxins (as TEQ Toxic Equivalents)	1 Hr		4.71E-08	3.35E-08	8.06E-08		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.93E-08	3.94E-09	2.33E-08		266	Future Industrial 8	680.40	4860.73
	Annual		1.66E-08	8.80E-11	1.67E-08		7	ECO 7	681.58	4862.07
Polychlorinated Biphenyls (PCB)	1 Hr		1.02E-04	4.03E-05	1.43E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.15	4.20E-05	4.75E-06	4.68E-05	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual	0.035	1.85E-05	1.06E-07	1.86E-05	<0.1%	7	ECO 7	681.58	4862.07
Metals										
Aluminum	1 Hr		0.52	0.02	0.54		273	Future Industrial 11	680.25	4860.26
	24 Hr	4.8[4]	0.21	2.61E-03	0.22	4%	266	Future Industrial 8	680.40	4860.73
	Annual		0.11	5.83E-05	0.11		7	ECO 7	681.58	4862.07

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (μg/m³)	Background Concentration (μg/m³)	Maximum Predicted Concentration (μg/m³) [7]	Total Concentration (Facility + Background) (μg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Antimony	1 Hr		7.35E-03	1.53E-03	0.03		273	Future Industrial 11	680.25	4860.26
	24 Hr	25	3.02E-03	1.80E-04	5.63E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		2.93E-03	4.02E-06	2.99E-03		7	ECO 7	681.58	4862.07
Arsenic	1 Hr		4.41E-03	2.34E-04	5.94E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.3[2]	1.81E-03	2.76E-05	1.99E-03	<1.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.80E-03	6.16E-07	1.80E-03		7	ECO 7	681.58	4862.07
Barium	1 Hr		0.02	1.18E-03	0.02		273	Future Industrial 11	680.25	4860.26
	24 Hr	10[2]	8.18E-03	1.39E-04	8.21E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		4.95E-03	3.10E-06	4.95E-03		7	ECO 7	681.58	4862.07
Beryllium	1 Hr		7.35E-04	1.86E-04	1.92E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.01	3.02E-04	2.19E-05	4.41E-04	<4.1%	266	Future Industrial 8	680.40	4860.73
	Annual		2.98E-04	4.88E-07	3.01E-04		7	ECO 7	681.58	4862.07
Boron	1 Hr		0.19	0.09	0.19		273	Future Industrial 11	680.25	4860.26
	24 Hr	120	0.08	0.01	0.08	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.02	2.24E-04	0.02		7	ECO 7	681.58	4862.07
Cadmium (Cd)	1 Hr		1.47E-03	3.91E-03	0.09		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.025	6.04E-04	4.60E-04	0.01	43%	266	Future Industrial 8	680.40	4860.73
	Annual	0.005[3]	6.01E-04	1.03E-05	8.25E-04	17%	7	ECO 7	681.58	4862.07
Cadmium and Thallium (Cd + Th)	1 Hr			0.03			273	Future Industrial 11	680.25	4860.26
	24 Hr			3.02E-03			266	Future Industrial 8	680.40	4860.73
	Annual			6.75E-05			7	ECO 7	681.58	4862.07

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Chromium (hexavalent)	1 Hr			1.79E-04			273	Future Industrial 11	680.25	4860.26
	24 Hr			2.10E-05			266	Future Industrial 8	680.40	4860.73
	Annual			4.69E-07			7	ECO 7	681.58	4862.07
Total Chromium (and compounds)	1 Hr		6.72E-03	1.26E-03	6.89E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	1.5[3]	2.76E-03	1.48E-04	2.78E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.71E-03	3.30E-06	1.71E-03		7	ECO 7	681.58	4862.07
Cobalt	1 Hr		1.47E-03	3.23E-03	2.73E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.1[3]	6.04E-04	3.81E-04	7.52E-04	1%	266	Future Industrial 8	680.40	4860.73
	Annual		5.96E-04	8.50E-06	5.99E-04		7	ECO 7	681.58	4862.07
Lead (Pb)	1 Hr		0.01	0.03	0.02		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.5	4.98E-03	3.29E-03	5.36E-03	1%	266	Future Industrial 8	680.40	4860.73
	Annual		3.29E-03	7.33E-05	3.30E-03		7	ECO 7	681.58	4862.07
Mercury (Hg) - Vapour/Particulate phase	1 Hr			8.37E-03			273	Future Industrial 11	680.25	4860.26
	24 Hr	2		9.86E-04		<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual			2.20E-05			7	ECO 7	681.58	4862.07
Nickel	1 Hr		0.01	0.05	0.02		273	Future Industrial 11	680.25	4860.26
	24 Hr	2	4.49E-03	5.73E-03	5.47E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		2.24E-03	1.28E-04	2.26E-03		7	ECO 7	681.58	4862.07
Phosphorus	1 Hr		0.18	0.03	0.22		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.35[4]	0.07	3.03E-03	0.08	22%	266	Future Industrial 8	680.40	4860.73
	Annual		0.05	6.75E-05	0.05		7	ECO 7	681.58	4862.07

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Silver	1 Hr		8.33E-04	1.87E-03	0.03		273	Future Industrial 11	680.25	4860.26
	24 Hr	1	3.42E-04	2.20E-04	3.37E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		3.43E-04	4.91E-06	4.11E-04		7	ECO 7	681.58	4862.07
Selenium	1 Hr		7.35E-03	2.68E-04	9.22E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	10[2]	3.02E-03	3.16E-05	3.24E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		2.93E-03	7.04E-07	2.93E-03		7	ECO 7	681.58	4862.07
Thallium	1 Hr			0.02			273	Future Industrial 11	680.25	4860.26
	24 Hr	0.24[4]		2.56E-03		1%	266	Future Industrial 8	680.40	4860.73
	Annual			5.72E-05			7	ECO 7	681.58	4862.07
Tin	1 Hr		7.35E-03	9.82E-03	0.03		273	Future Industrial 11	680.25	4860.26
	24 Hr	10	3.02E-03	1.16E-03	5.58E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		2.93E-03	2.58E-05	2.98E-03		7	ECO 7	681.58	4862.07
Vanadium	1 Hr		3.77E-03	6.49E-04	0.01		273	Future Industrial 11	680.25	4860.26
	24 Hr	2	1.55E-03	7.64E-05	2.71E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		7.70E-04	1.71E-06	7.95E-04		7	ECO 7	681.58	4862.07
Zinc	1 Hr		0.10	0.11	0.10		273	Future Industrial 11	680.25	4860.26
	24 Hr	120	0.04	0.01	0.04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.03	2.93E-04	0.03		7	ECO 7	681.58	4862.07
Sum of (As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb)	1 Hr		0.52	0.26	0.63		273	Future Industrial 11	680.25	4860.26
	24 Hr		0.21	0.03	0.22		266	Future Industrial 8	680.40	4860.73
	Annual		0.11	6.73E-04	0.11		7	ECO 7	681.58	4862.07

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Chlorinated Monocyclic Aromatics										
1,2-Dichlorobenzene	1 Hr	30500[2]	0.03	1.14E-03	0.03	<0.1%	273	Future Industrial 11	680.25	4860.26
	24 Hr		0.01	1.33E-04	0.01		266	Future Industrial 8	680.40	4860.73
	Annual		4.66E-03	2.99E-06	4.67E-03		7	ECO 7	681.58	4862.07
1,2,4,5-Tetrachlorobenzene	1 Hr			2.88E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr	1[4]		3.35E-06		<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual			7.54E-08			7	ECO 7	681.58	4862.07
1,2,4 – Trichlorobenzene	1 Hr		0.11	2.88E-05	0.11		273	Future Industrial 11	680.25	4860.26
	24 Hr	400[2]	0.05	3.35E-06	0.05	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.02	7.54E-08	0.02		7	ECO 7	681.58	4862.07
2,3,4,6-Tetrachlorophenol	1 Hr			9.71E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr			1.13E-05			266	Future Industrial 8	680.40	4860.73
	Annual			2.54E-07			7	ECO 7	681.58	4862.07
2,4,6-Trichlorophenol	1 Hr			2.92E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr	1.5[4]		3.41E-06		<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual			7.66E-08			7	ECO 7	681.58	4862.07
2,4-Dichlorophenol	1 Hr			5.75E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr	77[4]		6.71E-06		<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual			1.51E-07			7	ECO 7	681.58	4862.07

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (μg/m³)	Background Concentration (μg/m³)	Maximum Predicted Concentration (μg/m³) [7]	Total Concentration (Facility + Background) (μg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Pentachlorophenol	1 Hr		2.13E-03	1.15E-04	2.25E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	20[2]	8.76E-04	1.34E-05	8.90E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		4.10E-04	3.02E-07	4.11E-04		7	ECO 7	681.58	4862.07
Hexachlorobenzene	1 Hr		1.52E-04	2.88E-05	1.81E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.011[4]	6.25E-05	3.35E-06	6.58E-05	1%	266	Future Industrial 8	680.40	4860.73
	Annual		5.27E-05	7.54E-08	5.28E-05		7	ECO 7	681.58	4862.07
Pentachlorobenzene	1 Hr			7.55E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr	3[4]		8.81E-06		<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual			1.98E-07			7	ECO 7	681.58	4862.07
Polycyclic Organic Matter										
Acenaphthylene	1 Hr		7.53E-04	8.09E-06	7.61E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	3.5[4]	3.09E-04	9.53E-07	3.10E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.58E-04	2.13E-08	1.58E-04		7	ECO 7	681.58	4862.07
Acenaphthene	1 Hr		3.04E-03	1.04E-05	3.05E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.25E-03	1.22E-06	1.25E-03		266	Future Industrial 8	680.40	4860.73
	Annual		5.48E-04	2.73E-08	5.48E-04		7	ECO 7	681.58	4862.07
Anthracene	1 Hr		3.97E-04	2.27E-06	3.99E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.2[4]	1.63E-04	2.68E-07	1.63E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		8.00E-05	5.97E-09	8.00E-05		7	ECO 7	681.58	4862.07

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Benzo(a)anthracene	1 Hr		1.65E-04	8.37E-07	1.66E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		6.77E-05	9.86E-08	6.78E-05		266	Future Industrial 8	680.40	4860.73
	Annual		5.63E-05	2.20E-09	5.63E-05		7	ECO 7	681.58	4862.07
Benzo(b)fluoranthene	1 Hr		3.45E-04	2.14E-06	3.47E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.42E-04	2.52E-07	1.42E-04		266	Future Industrial 8	680.40	4860.73
	Annual		7.56E-05	5.62E-09	7.56E-05		7	ECO 7	681.58	4862.07
Benzo(k)fluoranthene	1 Hr		1.65E-04	5.64E-07	1.65E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		6.77E-05	6.64E-08	6.78E-05		266	Future Industrial 8	680.40	4860.73
	Annual		5.63E-05	1.48E-09	5.63E-05		7	ECO 7	681.58	4862.07
Benzo(a)fluorene	1 Hr		3.30E-04	1.54E-05	3.45E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	1.82E-06	1.37E-04		266	Future Industrial 8	680.40	4860.73
	Annual		1.13E-04	4.05E-08	1.13E-04		7	ECO 7	681.58	4862.07
Benzo(b)fluorene	1 Hr		3.30E-04	1.06E-05	3.40E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	1.24E-06	1.37E-04		266	Future Industrial 8	680.40	4860.73
	Annual		1.13E-04	2.77E-08	1.13E-04		7	ECO 7	681.58	4862.07
Benzo(ghi)perylene	1 Hr		1.72E-04	2.31E-05	1.95E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	1.2[4]	7.07E-05	2.71E-06	7.35E-05	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		5.85E-05	6.06E-08	5.85E-05		7	ECO 7	681.58	4862.07
Benzo(a)pyrene	1 Hr		1.65E-04	1.92E-06	1.67E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.0011	6.77E-05	2.26E-07	6.80E-05	6%	266	Future Industrial 8	680.40	4860.73
	Annual	0.0003[3]	5.63E-05	5.04E-09	5.63E-05	19%	7	ECO 7	681.58	4862.07

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Benzo(e)pyrene	1 Hr		3.30E-04	4.86E-06	3.35E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	5.73E-07	1.36E-04		266	Future Industrial 8	680.40	4860.73
	Annual		1.13E-04	1.28E-08	1.13E-04		7	ECO 7	681.58	4862.07
Biphenyl	1 Hr	60[2]	3.32E-03	1.67E-03	4.98E-03	<0.1%	273	Future Industrial 11	680.25	4860.26
	24 Hr		1.36E-03	1.96E-04	1.56E-03		266	Future Industrial 8	680.40	4860.73
	Annual		5.21E-04	4.37E-06	5.25E-04		7	ECO 7	681.58	4862.07
Chrysene	1 Hr		2.35E-04	2.10E-06	2.37E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		9.64E-05	2.48E-07	9.67E-05		266	Future Industrial 8	680.40	4860.73
	Annual		6.47E-05	5.53E-09	6.47E-05		7	ECO 7	681.58	4862.07
Dibenzo(a,c)anthracene	1 Hr			1.50E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr			1.76E-06			266	Future Industrial 8	680.40	4860.73
	Annual			3.93E-08			7	ECO 7	681.58	4862.07
Dibenzo(a,h)anthracene	1 Hr		1.65E-04	6.75E-07	1.66E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		6.77E-05	7.95E-08	6.78E-05		266	Future Industrial 8	680.40	4860.73
	Annual		5.63E-05	1.77E-09	5.63E-05		7	ECO 7	681.58	4862.07
Fluoranthene	1 Hr		1.46E-03	2.32E-05	1.49E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	140[4]	6.01E-04	2.73E-06	6.04E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		3.93E-04	6.10E-08	3.93E-04		7	ECO 7	681.58	4862.07
Fluorine	1 Hr			1.75E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr			2.06E-06			266	Future Industrial 8	680.40	4860.73
	Annual			4.59E-08			7	ECO 7	681.58	4862.07

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Indeno(1,2,3 – cd)pyrene	1 Hr		1.65E-04	4.21E-06	1.69E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		6.77E-05	4.96E-07	6.82E-05		266	Future Industrial 8	680.40	4860.73
	Annual		5.63E-05	1.11E-08	5.63E-05		7	ECO 7	681.58	4862.07
1 – methylnaphthalene	1 Hr		3.17E-03	5.48E-05	3.23E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	12[4]	1.30E-03	6.45E-06	1.31E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		4.43E-04	1.44E-07	4.44E-04		7	ECO 7	681.58	4862.07
2 – methylnaphthalene	1 Hr		5.33E-03	3.04E-04	5.63E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	10[4]	2.19E-03	3.58E-05	2.23E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		7.56E-04	7.98E-07	7.57E-04		7	ECO 7	681.58	4862.07
Naphthalene	1 Hr		5.91E-03	2.36E-04	6.15E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	22.5	2.43E-03	2.78E-05	2.46E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		8.59E-04	6.20E-07	8.60E-04		7	ECO 7	681.58	4862.07
Perylene	1 Hr		3.30E-04	8.43E-07	3.31E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	9.93E-08	1.36E-04		266	Future Industrial 8	680.40	4860.73
	Annual		1.13E-04	2.21E-09	1.13E-04		7	ECO 7	681.58	4862.07
Phenanthrene	1 Hr		6.26E-03	5.28E-05	6.32E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr		2.57E-03	6.22E-06	2.58E-03		266	Future Industrial 8	680.40	4860.73
	Annual		1.71E-03	1.39E-07	1.71E-03		7	ECO 7	681.58	4862.07
Pyrene	1 Hr		6.88E-04	2.80E-05	7.16E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.2[4]	2.83E-04	3.30E-06	2.86E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.83E-04	7.36E-08	1.83E-04		7	ECO 7	681.58	4862.07

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Maximum Predicted Concentration ($\mu g/m^3$) [7]	Total Concentration (Facility + Background) ($\mu g/m^3$)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Tetralin	1 Hr		3.30E-04	2.78E-04	6.08E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	1200[4]	1.35E-04	3.28E-05	1.68E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.13E-04	7.31E-07	1.13E-04		7	ECO 7	681.58	4862.07
O-terphenyl	1 Hr		3.30E-04	4.57E-05	3.75E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	5.38E-06	1.41E-04		266	Future Industrial 8	680.40	4860.73
	Annual		1.13E-04	1.20E-07	1.13E-04		7	ECO 7	681.58	4862.07
Volatile Organic Chemicals (VOC)										
Acetaldehyde	1/2 Hr	500	5.21	4.91E-07	5.21	1%	273	Future Industrial 11	680.25	4860.26
	1 Hr		4.29	4.04E-07	4.29		273	Future Industrial 11	680.25	4860.26
	24 Hr	500	1.76	4.71E-08	1.76	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.05	1.06E-09	1.05		7	ECO 7	681.58	4862.07
Benzene	1 Hr		28.81	0.02	28.83		273	Future Industrial 11	680.25	4860.26
	24 Hr		11.83	2.02E-03	11.83		266	Future Industrial 8	680.40	4860.73
	Annual		3.94	4.54E-05	3.94		7	ECO 7	681.58	4862.07
Bromodichloromethane	1 Hr		0.04	0.14	0.18		273	Future Industrial 11	680.25	4860.26
	24 Hr		0.02	0.02	0.03		266	Future Industrial 8	680.40	4860.73
	Annual		0.01	3.70E-04	0.01		7	ECO 7	681.58	4862.07
Bromoform	1 Hr		0.07	0.04	0.11		273	Future Industrial 11	680.25	4860.26
	24 Hr	55[2]	0.03	4.50E-03	0.03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.02	1.01E-04	0.02		7	ECO 7	681.58	4862.07

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Bromomethane	1 Hr		0.22	0.02	0.24		273	Future Industrial 11	680.25	4860.26
	24 Hr	1350[3]	0.09	2.34E-03	0.09	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.10	5.27E-05	0.10		7	ECO 7	681.58	4862.07
Carbon tetrachloride	1 Hr		1.80	2.40E-04	1.80		273	Future Industrial 11	680.25	4860.26
	24 Hr	2.4	0.74	2.80E-05	0.74	31%	266	Future Industrial 8	680.40	4860.73
	Annual		0.61	6.30E-07	0.61		7	ECO 7	681.58	4862.07
Chloroform	1 Hr		0.55	2.85E-04	0.55		273	Future Industrial 11	680.25	4860.26
	24 Hr	1	0.23	3.32E-05	0.23	23%	266	Future Industrial 8	680.40	4860.73
	Annual	0.2[3]	0.16	7.47E-07	0.16	81%	7	ECO 7	681.58	4862.07
Dichlorodifluoromethane	1 Hr		7.87	0.05	7.92		273	Future Industrial 11	680.25	4860.26
	24 Hr	500000[2]	3.23	5.67E-03	3.24	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		2.81	1.27E-04	2.81		7	ECO 7	681.58	4862.07
Dichloroethene, 1,1 -	1 Hr		6.09E-03	3.16E-04	6.40E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	10	2.50E-03	3.68E-05	2.54E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		5.76E-04	8.28E-07	5.77E-04		7	ECO 7	681.58	4862.07
Dichloromethane	1 Hr		3.08	0.10	3.18		273	Future Industrial 11	680.25	4860.26
	24 Hr	220	1.27	0.01	1.28	1%	266	Future Industrial 8	680.40	4860.73
	Annual	44[3]	0.76	2.58E-04	0.76	2%	7	ECO 7	681.58	4862.07
Ethylbenzene	1 Hr		3.03	5.78E-04	3.03		273	Future Industrial 11	680.25	4860.26
	24 Hr	1000	1.24	6.75E-05	1.24	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.69	1.52E-06	0.69		7	ECO 7	681.58	4862.07

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Ethylene Dibromide	1 Hr		0.01	2.26E-04	0.01		273	Future Industrial 11	680.25	4860.26
	24 Hr	3[2]	5.20E-03	2.64E-05	5.23E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.84E-03	5.93E-07	1.84E-03		7	ECO 7	681.58	4862.07
Formaldehyde	1 Hr		8.23	0.03	8.26		273	Future Industrial 11	680.25	4860.26
	24 Hr	65	3.38	3.09E-03	3.38	5%	266	Future Industrial 8	680.40	4860.73
	Annual		1.66	6.95E-05	1.66		7	ECO 7	681.58	4862.07
Tetrachloroethene	1 Hr		1.20	3.17E-03	1.20		273	Future Industrial 11	680.25	4860.26
	24 Hr	360	0.49	3.69E-04	0.49	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.26	8.30E-06	0.26		7	ECO 7	681.58	4862.07
Toluene	1 Hr		23.06	0.03	23.09		273	Future Industrial 11	680.25	4860.26
	24 Hr	2000[2]	9.47	3.27E-03	9.48	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		4.40	7.36E-05	4.40		7	ECO 7	681.58	4862.07
Trichloroethane, 1,1,1 -	1 Hr		0.28	7.97E-04	0.28		273	Future Industrial 11	680.25	4860.26
	24 Hr	115000	0.11	9.30E-05	0.11	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.10	2.09E-06	0.10		7	ECO 7	681.58	4862.07
Trichloroethene	1 Hr		1.31	2.75E-04	1.31		273	Future Industrial 11	680.25	4860.26
	24 Hr	12	0.54	3.20E-05	0.54	4%	266	Future Industrial 8	680.40	4860.73
	Annual	2.3[3]	0.27	7.20E-07	0.27	12%	7	ECO 7	681.58	4862.07
Trichlorofluoromethane	1 Hr		5.23	0.10	5.32		273	Future Industrial 11	680.25	4860.26
	24 Hr	6000[2]	2.15	0.01	2.16	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.89	2.52E-04	1.89		7	ECO 7	681.58	4862.07

Table 7-5 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1A (MCR 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Vinyl chloride	1 Hr		0.01	0.02	0.04		273	Future Industrial 11	680.25	4860.26
	24 Hr	1	5.88E-03	2.84E-03	8.72E-03	1%	266	Future Industrial 8	680.40	4860.73
	Annual	0.2[3]	3.65E-03	6.38E-05	3.71E-03	<2.1%	7	ECO 7	681.58	4862.07
Xylenes, m-, p- and o-	1 Hr		11.75	0.34	12.09		273	Future Industrial 11	680.25	4860.26
	24 Hr	730	4.83	0.04	4.86	1%	266	Future Industrial 8	680.40	4860.73
	Annual		2.76	8.84E-04	2.76		7	ECO 7	681.58	4862.07

Notes:
[1] Reg419/05 Schedule 3 Criteria unless stated otherwise
[2] O. Reg. 419 Guidelines
[3] Ontario's ambient air quality criteria
[4] Jurisdictional Screening Level List (JSL)
[5] National Ambient Air Quality Objectives (NAAQO) Max Desirable Level
[6] CCME (2000), Canada-Wide Standards for Respirable Particulate Matter
[7] Maximum predicted concentrations not accounting for statistical anomalies.

Table 7-6 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 2A (MCTD 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Sulphur Dioxide (SO_2)	1 Hr	690	19.5	15.67	35.19	5%	273	Future Industrial 11	680.25	4860.26
	24 Hr	275	19.3	1.98	21.27	8%	266	Future Industrial 8	680.40	4860.73
Hydrogen Chloride (HCl)	1 Hr			4.03			273	Future Industrial 11	680.25	4860.26
	24 Hr	20		0.51		3%	266	Future Industrial 8	680.40	4860.73
Hydrogen Fluoride (HF)	1 Hr			0.40			273	Future Industrial 11	680.25	4860.26
	24 Hr	0.86		0.05		6%	266	Future Industrial 8	680.40	4860.73
Nitrogen Oxides (NO_2)	1 Hr	400	64.6	54.16	118.73	30%	273	Future Industrial 11	680.25	4860.26
	24 Hr	200	58.2	6.85	65.07	33%	266	Future Industrial 8	680.40	4860.73
Carbon Monoxide (CO)	1 Hr	36200[3]	1035	20.14	1055.48	3%	273	Future Industrial 11	680.25	4860.26
	24 Hr		1029	2.55	1031.53		266	Future Industrial 8	680.40	4860.73
Particulate Matter PM_{10}	1 Hr			5.67			273	Future Industrial 11	680.25	4860.26
	24 Hr	50[6]		0.58		1%	266	Future Industrial 8	680.40	4860.73
Particulate Matter $PM_{2.5}$	1 Hr		22.8	5.67	28.49		273	Future Industrial 11	680.25	4860.26
	24 Hr	30[3]	20.4	0.58	21.02	70%	266	Future Industrial 8	680.40	4860.73
Total Particulate Matte	1 Hr		86.2	5.67	91.83		273	Future Industrial 11	680.25	4860.26
	24 Hr	120	35.4	0.58	35.97	30%	266	Future Industrial 8	680.40	4860.73
Ammonia (Slip at stack)	1 Hr			2.42			273	Future Industrial 11	680.25	4860.26
	24 Hr	100[3]		0.31		<0.1%	266	Future Industrial 8	680.40	4860.73
Organic Matter (as CH_4)	1 Hr			21.93			273	Future Industrial 11	680.25	4860.26
	24 Hr			2.78			266	Future Industrial 8	680.40	4860.73

Table 7-6 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 2A (MCTD 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Chlorinated Polycyclic Aromatics										
Dioxins (as TEQ Toxic Equivalents)	1 Hr		5.78E-08	2.69E-08	8.46E-08		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.000005	2.37E-08	3.40E-09	2.71E-08	<1.1%	266	Future Industrial 8	680.40	4860.73
Polychlorinated Biphenyls (PCB)	1 Hr		1.02E-04	3.23E-05	1.35E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.15	4.20E-05	4.09E-06	4.61E-05	<0.1%	266	Future Industrial 8	680.40	4860.73
Metals										
Aluminum	1 Hr		0.52	0.02	0.54		273	Future Industrial 11	680.25	4860.26
	24 Hr	4.8[4]	0.21	2.25E-03	0.21	4%	266	Future Industrial 8	680.40	4860.73
Antimony	1 Hr		7.35E-03	1.23E-03	0.03		273	Future Industrial 11	680.25	4860.26
	24 Hr	25	3.02E-03	1.55E-04	5.27E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Arsenic	1 Hr		4.41E-03	1.88E-04	5.63E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.3[2]	1.81E-03	2.38E-05	1.97E-03	<1.1%	266	Future Industrial 8	680.40	4860.73
Barium	1 Hr		0.02	9.46E-04	0.02		273	Future Industrial 11	680.25	4860.26
	24 Hr	10[2]	8.18E-03	1.20E-04	8.21E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Beryllium	1 Hr		7.35E-04	1.49E-04	1.68E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.01	3.02E-04	1.89E-05	4.22E-04	<4.1%	266	Future Industrial 8	680.40	4860.73
Boron	1 Hr		0.19	0.07	0.19		273	Future Industrial 11	680.25	4860.26
	24 Hr	120	0.08	8.66E-03	0.08	<0.1%	266	Future Industrial 8	680.40	4860.73
Cadmium (Cd)	1 Hr		1.47E-03	3.13E-03	0.07		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.025	6.04E-04	3.96E-04	9.27E-03	37%	266	Future Industrial 8	680.40	4860.73

Table 7-6 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 2A (MCTD 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Cadmium and Thallium (Cd + Th)	1 Hr			0.02			273	Future Industrial 11	680.25	4860.26
	24 Hr			2.61E-03			266	Future Industrial 8	680.40	4860.73
Chromium (hexavalent)	1 Hr			1.43E-04			273	Future Industrial 11	680.25	4860.26
	24 Hr			1.81E-05			266	Future Industrial 8	680.40	4860.73
Total Chromium (and compounds)	1 Hr		6.72E-03	1.01E-03	6.86E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	1.5[3]	2.76E-03	1.27E-04	2.78E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Cobalt	1 Hr		1.47E-03	2.59E-03	2.48E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.1[3]	6.04E-04	3.28E-04	7.32E-04	1%	266	Future Industrial 8	680.40	4860.73
Lead (Pb)	1 Hr		0.01	0.02	0.01		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.5	4.98E-03	2.83E-03	5.30E-03	1%	266	Future Industrial 8	680.40	4860.73
Mercury (Hg) - Vapour/Particulate phase	1 Hr			6.71E-03			273	Future Industrial 11	680.25	4860.26
	24 Hr	2		8.49E-04		<0.1%	266	Future Industrial 8	680.40	4860.73
Nickel	1 Hr		0.01	0.04	0.02		273	Future Industrial 11	680.25	4860.26
	24 Hr	2	4.49E-03	4.93E-03	5.34E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Phosphorus	1 Hr		0.18	0.02	0.21		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.35[4]	0.07	2.61E-03	0.08	22%	266	Future Industrial 8	680.40	4860.73
Silver	1 Hr		8.33E-04	1.50E-03	0.02		273	Future Industrial 11	680.25	4860.26
	24 Hr	1	3.42E-04	1.90E-04	2.95E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Selenium	1 Hr		7.35E-03	2.15E-04	8.85E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	10[2]	3.02E-03	2.72E-05	3.21E-03	<0.1%	266	Future Industrial 8	680.40	4860.73

Table 7-6 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 2A (MCTD 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Thallium	1 Hr			0.02			273	Future Industrial 11	680.25	4860.26
	24 Hr	0.24[4]		2.21E-03		1%	266	Future Industrial 8	680.40	4860.73
Tin	1 Hr		7.35E-03	7.88E-03	0.02		273	Future Industrial 11	680.25	4860.26
	24 Hr	10	3.02E-03	9.97E-04	5.23E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Vanadium	1 Hr		3.77E-03	5.21E-04	0.01		273	Future Industrial 11	680.25	4860.26
	24 Hr	2	1.55E-03	6.59E-05	2.55E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Zinc	1 Hr		0.10	0.09	0.10		273	Future Industrial 11	680.25	4860.26
	24 Hr	120	0.04	0.01	0.04	<0.1%	266	Future Industrial 8	680.40	4860.73
Sum of (As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb)	1 Hr		0.52	0.21	0.60		273	Future Industrial 11	680.25	4860.26
	24 Hr		0.21	0.03	0.22		266	Future Industrial 8	680.40	4860.73
Chlorinated Monocyclic Aromatics										
1,2-Dichlorobenzene	1 Hr	30500[2]	0.03	9.16E-04	0.03	<0.1%	273	Future Industrial 11	680.25	4860.26
	24 Hr		0.01	1.16E-04	0.01		266	Future Industrial 8	680.40	4860.73
1,2,4,5-Tetrachlorobenzene	1 Hr			2.31E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr	1[4]		2.92E-06		<0.1%	266	Future Industrial 8	680.40	4860.73
1,2,4 – Trichlorobenzene	1 Hr		0.11	2.31E-05	0.11		273	Future Industrial 11	680.25	4860.26
	24 Hr	400[2]	0.05	2.92E-06	0.05	<0.1%	266	Future Industrial 8	680.40	4860.73
2,3,4,6-Tetrachlorophenol	1 Hr			7.78E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr			9.84E-06			266	Future Industrial 8	680.40	4860.73
2,4,6-Trichlorophenol	1 Hr			2.34E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr	1.5[4]		2.96E-06		<0.1%	266	Future Industrial 8	680.40	4860.73

Table 7-6 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 2A (MCTD 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
2,4-Dichlorophenol	1 Hr			4.61E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr	77[4]		5.83E-06		<0.1%	266	Future Industrial 8	680.40	4860.73
Pentachlorophenol	1 Hr		2.13E-03	9.23E-05	2.23E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	20[2]	8.76E-04	1.17E-05	8.88E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
Hexachlorobenzene	1 Hr		1.52E-04	2.31E-05	1.75E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.011[4]	6.25E-05	2.92E-06	6.54E-05	1%	266	Future Industrial 8	680.40	4860.73
Pentachlorobenzene	1 Hr			6.05E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr	3[4]		7.66E-06		<0.1%	266	Future Industrial 8	680.40	4860.73
Polycyclic Organic Matter										
Acenaphthylene	1 Hr		7.53E-04	6.49E-06	7.59E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	3.5[4]	3.09E-04	8.21E-07	3.10E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
Acenaphthene	1 Hr		3.04E-03	8.32E-06	3.05E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.25E-03	1.05E-06	1.25E-03		266	Future Industrial 8	680.40	4860.73
Anthracene	1 Hr		3.97E-04	1.82E-06	3.99E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.2[4]	1.63E-04	2.30E-07	1.63E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
Benzo(a)anthracene	1 Hr		1.65E-04	6.71E-07	1.66E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		6.77E-05	8.49E-08	6.78E-05		266	Future Industrial 8	680.40	4860.73
Benzo(b)fluoranthene	1 Hr		3.45E-04	1.71E-06	3.46E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.42E-04	2.17E-07	1.42E-04		266	Future Industrial 8	680.40	4860.73
Benzo(k)fluoranthene	1 Hr		1.65E-04	4.52E-07	1.65E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		6.77E-05	5.72E-08	6.78E-05		266	Future Industrial 8	680.40	4860.73

Table 7-6 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 2A (MCTD 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Benzo(a)fluorene	1 Hr		3.30E-04	1.24E-05	3.42E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	1.57E-06	1.37E-04		266	Future Industrial 8	680.40	4860.73
Benzo(b)fluorene	1 Hr		3.30E-04	8.46E-06	3.38E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	1.07E-06	1.37E-04		266	Future Industrial 8	680.40	4860.73
Benzo(ghi)perylene	1 Hr		1.72E-04	1.85E-05	1.91E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	1.2[4]	7.07E-05	2.34E-06	7.31E-05	<0.1%	266	Future Industrial 8	680.40	4860.73
Benzo(a)pyrene	1 Hr		1.65E-04	1.54E-06	1.66E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.0011	6.77E-05	1.95E-07	6.79E-05	6%	266	Future Industrial 8	680.40	4860.73
Benzo(e)pyrene	1 Hr		3.30E-04	3.90E-06	3.34E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	4.93E-07	1.36E-04		266	Future Industrial 8	680.40	4860.73
Biphenyl	1 Hr	60[2]	3.32E-03	1.34E-03	4.65E-03	<0.1%	273	Future Industrial 11	680.25	4860.26
	24 Hr		1.36E-03	1.69E-04	1.53E-03		266	Future Industrial 8	680.40	4860.73
Chrysene	1 Hr		2.35E-04	1.69E-06	2.36E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		9.64E-05	2.14E-07	9.66E-05		266	Future Industrial 8	680.40	4860.73
Dibenzo(a,c)anthracene	1 Hr			1.20E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr			1.52E-06			266	Future Industrial 8	680.40	4860.73
Dibenzo(a,h)anthracene	1 Hr		1.65E-04	5.42E-07	1.65E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		6.77E-05	6.85E-08	6.78E-05		266	Future Industrial 8	680.40	4860.73
Fluoranthene	1 Hr		1.46E-03	1.86E-05	1.48E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	140[4]	6.01E-04	2.36E-06	6.03E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
Fluorine	1 Hr		#N/A	1.40E-05	#N/A		273	Future Industrial 11	680.25	4860.26
	24 Hr		#N/A	1.77E-06	#N/A		266	Future Industrial 8	680.40	4860.73

Table 7-6 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 2A (MCTD 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Maximum Predicted Concentration ($\mu g/m^3$) [7]	Total Concentration (Facility + Background) ($\mu g/m^3$)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Indeno(1,2,3 – cd)pyrene	1 Hr		1.65E-04	3.37E-06	1.68E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		6.77E-05	4.27E-07	6.82E-05		266	Future Industrial 8	680.40	4860.73
1 – methylnaphthalene	1 Hr		3.17E-03	4.39E-05	3.22E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	12[4]	1.30E-03	5.56E-06	1.31E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
2 – methylnaphthalene	1 Hr		5.33E-03	2.43E-04	5.57E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	10[4]	2.19E-03	3.08E-05	2.22E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Naphthalene	1 Hr		5.91E-03	1.89E-04	6.10E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	22.5	2.43E-03	2.40E-05	2.45E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Perylene	1 Hr		3.30E-04	6.76E-07	3.30E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	8.55E-08	1.36E-04		266	Future Industrial 8	680.40	4860.73
Phenanthrene	1 Hr		6.26E-03	4.23E-05	6.31E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr		2.57E-03	5.36E-06	2.58E-03		266	Future Industrial 8	680.40	4860.73
Pyrene	1 Hr		6.88E-04	2.25E-05	7.10E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.2[4]	2.83E-04	2.84E-06	2.85E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
Tetralin	1 Hr		3.30E-04	2.23E-04	5.53E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	1200[4]	1.35E-04	2.82E-05	1.64E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
O-terphenyl	1 Hr		3.30E-04	3.66E-05	3.66E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	4.63E-06	1.40E-04		266	Future Industrial 8	680.40	4860.73

Table 7-6 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 2A (MCTD 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Volatile Organic Chemicals (VOC)										
Acetaldehyde	1/2 Hr	500	5.21	3.94E-07	5.21	1%	273	Future Industrial 11	680.25	4860.26
	1 Hr		4.29	3.25E-07	4.29		273	Future Industrial 11	680.25	4860.26
	24 Hr	500	1.76	4.11E-08	1.76	<0.1%	266	Future Industrial 8	680.40	4860.73
Benzene	1 Hr		28.81	0.01	28.82		273	Future Industrial 11	680.25	4860.26
	24 Hr		11.83	1.76E-03	11.83		266	Future Industrial 8	680.40	4860.73
Bromodichloromethane	1 Hr		0.04	0.11	0.16		273	Future Industrial 11	680.25	4860.26
	24 Hr		0.02	0.01	0.03		266	Future Industrial 8	680.40	4860.73
Bromoform	1 Hr		0.07	0.03	0.10		273	Future Industrial 11	680.25	4860.26
	24 Hr	55[2]	0.03	3.92E-03	0.03	<0.1%	266	Future Industrial 8	680.40	4860.73
Bromomethane	1 Hr		0.22	0.02	0.23		273	Future Industrial 11	680.25	4860.26
	24 Hr	1350[3]	0.09	2.04E-03	0.09	<0.1%	266	Future Industrial 8	680.40	4860.73
Carbon tetrachloride	1 Hr		1.80	1.93E-04	1.80		273	Future Industrial 11	680.25	4860.26
	24 Hr	2.4	0.74	2.44E-05	0.74	31%	266	Future Industrial 8	680.40	4860.73
Chloroform	1 Hr		0.55	2.28E-04	0.55		273	Future Industrial 11	680.25	4860.26
	24 Hr	1	0.23	2.89E-05	0.23	23%	266	Future Industrial 8	680.40	4860.73
Dichlorodifluoromethane	1 Hr		7.87	0.04	7.91		273	Future Industrial 11	680.25	4860.26
	24 Hr	500000[2]	3.23	4.93E-03	3.24	<0.1%	266	Future Industrial 8	680.40	4860.73
Dichloroethene, 1,1 -	1 Hr		6.09E-03	2.53E-04	6.34E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	10	2.50E-03	3.20E-05	2.53E-03	<0.1%	266	Future Industrial 8	680.40	4860.73

Table 7-6 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 2A (MCTD 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Dichloromethane	1 Hr		3.08	0.08	3.16		273	Future Industrial 11	680.25	4860.26
	24 Hr	220	1.27	9.97E-03	1.27	1%	266	Future Industrial 8	680.40	4860.73
Ethylbenzene	1 Hr		3.03	4.64E-04	3.03		273	Future Industrial 11	680.25	4860.26
	24 Hr	1000	1.24	5.87E-05	1.24	<0.1%	266	Future Industrial 8	680.40	4860.73
Ethylene Dibromide	1 Hr		0.01	1.82E-04	0.01		273	Future Industrial 11	680.25	4860.26
	24 Hr	3[2]	5.20E-03	2.30E-05	5.22E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Formaldehyde	1 Hr		8.23	0.02	8.25		273	Future Industrial 11	680.25	4860.26
	24 Hr	65	3.38	2.69E-03	3.38	5%	266	Future Industrial 8	680.40	4860.73
Tetrachloroethene	1 Hr		1.20	2.54E-03	1.20		273	Future Industrial 11	680.25	4860.26
	24 Hr	360	0.49	3.21E-04	0.49	<0.1%	266	Future Industrial 8	680.40	4860.73
Toluene	1 Hr		23.06	0.02	23.09		273	Future Industrial 11	680.25	4860.26
	24 Hr	2000[2]	9.47	2.85E-03	9.48	<0.1%	266	Future Industrial 8	680.40	4860.73
Trichloroethane, 1,1,1 -	1 Hr		0.28	6.39E-04	0.28		273	Future Industrial 11	680.25	4860.26
	24 Hr	115000	0.11	8.08E-05	0.11	<0.1%	266	Future Industrial 8	680.40	4860.73
Trichloroethene	1 Hr		1.31	2.20E-04	1.31		273	Future Industrial 11	680.25	4860.26
	24 Hr	12	0.54	2.78E-05	0.54	4%	266	Future Industrial 8	680.40	4860.73
Trichlorofluoromethane	1 Hr		5.23	0.08	5.30		273	Future Industrial 11	680.25	4860.26
	24 Hr	6000[2]	2.15	9.75E-03	2.16	<0.1%	266	Future Industrial 8	680.40	4860.73

Table 7-6 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 2A (MCTD 140,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Vinyl chloride	1 Hr		0.01	0.02	0.03		273	Future Industrial 11	680.25	4860.26
	24 Hr	1	5.88E-03	2.47E-03	8.35E-03	1%	266	Future Industrial 8	680.40	4860.73
Xylenes, m-, p- and o-	1 Hr		11.75	0.27	12.02		273	Future Industrial 11	680.25	4860.26
	24 Hr	730	4.83	0.03	4.86	1%	266	Future Industrial 8	680.40	4860.73

Notes:
[1] Reg419/05 Schedule 3 Criteria unless stated otherwise
[2] O. Reg. 419 Guidelines
[3] Ontario's ambient air quality criteria
[4] Jurisdictional Screening Level List (JSL)
[5] National Ambient Air Quality Objectives (NAAQO) Max Desirable Level
[6] CCME (2000), Canada-Wide Standards for Respirable Particulate Matter
[7] Maximum predicted concentrations not accounting for statistical anomalies.

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Sulphur Dioxide (SO_2)	1 Hr	690	19.5	34.30	53.82	8%	273	Future Industrial 11	680.25	4860.26
	24 Hr	275	19.3	4.10	23.39	9%	266	Future Industrial 8	680.40	4860.73
	Annual	55[3]	5.9	0.11	6.03	11%	7	ECO 7	681.58	4862.07
Hydrogen Chloride (HCl)	1 Hr			8.82			266	Future Industrial 8	680.40	4860.73
	24 Hr	20		1.05		5%	266	Future Industrial 8	680.40	4860.73
	Annual			0.03			7	ECO 7	681.58	4862.07
Hydrogen Fluoride (HF)	1 Hr			0.88			266	Future Industrial 8	680.40	4860.73
	24 Hr	0.86		0.11		12%	266	Future Industrial 8	680.40	4860.73
	Annual			2.77E-03			7	ECO 7	681.58	4862.07
Nitrogen Oxides (NO_2)	1 Hr	400	64.6	118.57	183.14	46%	266	Future Industrial 8	680.40	4860.73
	24 Hr	200	58.2	14.18	72.40	36%	266	Future Industrial 8	680.40	4860.73
	Annual	100[5]	37	0.37	37.41	37%	7	ECO 7	681.58	4862.07
Carbon Monoxide (CO)	1 Hr	36200[3]	1035	44.10	1079.44	3%	266	Future Industrial 8	680.40	4860.73
	24 Hr		1029	5.27	1034.26		266	Future Industrial 8	680.40	4860.73
	Annual		632	0.14	631.80		7	ECO 7	681.58	4862.07
Particulate Matter PM_{10}	1 Hr			10.52			14	Future Industrial 10	680.61	4860.72
	24 Hr	50 [3]		1.71		3%	262	Light Ind. 10	680.09	4861.19
	Annual			0.03			7	ECO 7	681.58	4862.07
Particulate Matter $PM_{2.5}$	1 Hr		22.8	10.52	33.34		14	Future Industrial 10	680.61	4860.72
	24 Hr	30[6]	20.4	1.71	22.14	74%	262	Light Ind. 10	680.09	4861.19
	Annual		9.8	0.03	9.81		7	ECO 7	681.58	4862.07

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Total Particulate Matter	1 Hr		86.2	10.52	96.68		14	Future Industrial 10	680.61	4860.72
	24 Hr	120	35.4	1.71	37.10	31%	262	Light Ind. 10	680.09	4861.19
	Annual	60 [5]	21.3	0.03	21.31	36%	7	ECO 7	681.58	4862.07
Ammonia (Slip at stack)	1 Hr			5.29			266	Future Industrial 8	680.40	4860.73
	24 Hr	100 [3]		0.63		<1.1%	266	Future Industrial 8	680.40	4860.73
	Annual			0.02			7	ECO 7	681.58	4862.07
Organic Matter (as CH_4)	1 Hr			48.02			266	Future Industrial 8	680.40	4860.73
	24 Hr			5.74			266	Future Industrial 8	680.40	4860.73
	Annual			0.15			7	ECO 7	681.58	4862.07
Chlorinated Polycyclic Aromatics										
Dioxins (as TEQ Toxic Equivalents)	1 Hr		5.77E-08	5.88E-08	1.16E-07		266	Future Industrial 8	680.40	4860.73
	24 Hr		2.37E-08	7.03E-09	3.07E-08	1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.66E-08	1.85E-10	1.68E-08		7	ECO 7	681.58	4862.07
Polychlorinated Biphenyls (PCB)	1 Hr		1.02E-04	7.08E-05	1.73E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr	0.15	4.20E-05	8.46E-06	5.05E-05	0%	266	Future Industrial 8	680.40	4860.73
	Annual	0.035	1.85E-05	2.22E-07	1.87E-05	0%	7	ECO 7	681.58	4862.07
Metals										
Aluminum	1 Hr		0.52	0.04	0.56		266	Future Industrial 8	680.40	4860.73
	24 Hr[4]	4.8	0.21	4.66E-03	0.22	5%	266	Future Industrial 8	680.40	4860.73
	Annual		0.11	1.22E-04	0.11		7	ECO 7	681.58	4862.07

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Antimony	1 Hr		7.35E-03	2.68E-03	0.01		266	Future Industrial 8	680.40	4860.73
	24 Hr	25	3.02E-03	3.21E-04	3.34E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		2.93E-03	8.43E-06	2.94E-03		7	ECO 7	681.58	4862.07
Arsenic	1 Hr		4.41E-03	4.12E-04	4.82E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr[2]	0.3	1.81E-03	4.92E-05	1.86E-03	1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.80E-03	1.29E-06	1.80E-03		7	ECO 7	681.58	4862.07
Barium	1 Hr		0.02	2.07E-03	0.02		266	Future Industrial 8	680.40	4860.73
	24 Hr[2]	10	8.18E-03	2.48E-04	8.43E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		4.95E-03	6.51E-06	4.96E-03		7	ECO 7	681.58	4862.07
Beryllium	1 Hr		7.35E-04	3.26E-04	1.06E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr	0.01	3.02E-04	3.90E-05	3.41E-04	3%	266	Future Industrial 8	680.40	4860.73
	Annual		2.98E-04	1.03E-06	2.99E-04		7	ECO 7	681.58	4862.07
Boron	1 Hr		0.19	0.15	0.34		266	Future Industrial 8	680.40	4860.73
	24 Hr	120	0.08	0.02	0.09	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.02	4.71E-04	0.02		7	ECO 7	681.58	4862.07
Cadmium (Cd)	1 Hr		1.47E-03	6.86E-03	8.33E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr	0.025	6.04E-04	8.20E-04	1.42E-03	6%	266	Future Industrial 8	680.40	4860.73
	Annual[3]	0.005	6.01E-04	2.15E-05	6.22E-04	12%	7	ECO 7	681.58	4862.07
Cadmium and Thallium (Cd + Th)	1 Hr			0.05			266	Future Industrial 8	680.40	4860.73
	24 Hr			5.39E-03			266	Future Industrial 8	680.40	4860.73
	Annual			1.42E-04			7	ECO 7	681.58	4862.07

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Maximum Predicted Concentration ($\mu g/m^3$) [7]	Total Concentration (Facility + Background) ($\mu g/m^3$)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Chromium (hexavalent)	1 Hr			3.14E-04			266	Future Industrial 8	680.40	4860.73
	24 Hr			3.75E-05			266	Future Industrial 8	680.40	4860.73
	Annual			9.85E-07			7	ECO 7	681.58	4862.07
Total Chromium (and compounds)	1 Hr		6.72E-03	2.20E-03	8.92E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr[3]	1.5	2.76E-03	2.64E-04	3.02E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.71E-03	6.92E-06	1.72E-03		7	ECO 7	681.58	4862.07
Cobalt	1 Hr		1.47E-03	5.68E-03	7.15E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr[3]	0.1	6.04E-04	6.79E-04	1.28E-03	1%	266	Future Industrial 8	680.40	4860.73
	Annual		5.96E-04	1.78E-05	6.13E-04		7	ECO 7	681.58	4862.07
Lead (Pb)	1 Hr		0.01	0.05	0.06		266	Future Industrial 8	680.40	4860.73
	24 Hr	0.5	4.98E-03	5.86E-03	0.01	2%	266	Future Industrial 8	680.40	4860.73
	Annual		3.29E-03	1.54E-04	3.44E-03		7	ECO 7	681.58	4862.07
Mercury (Hg) - Vapour/Particulate phase	1 Hr			0.01			266	Future Industrial 8	680.40	4860.73
	24 Hr	2		1.76E-03		<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual			4.62E-05			7	ECO 7	681.58	4862.07
Nickel	1 Hr		0.01	0.09	0.10		266	Future Industrial 8	680.40	4860.73
	24 Hr	2	4.49E-03	0.01	0.01	<1.1%	266	Future Industrial 8	680.40	4860.73
	Annual		2.24E-03	2.68E-04	2.51E-03		7	ECO 7	681.58	4862.07
Phosphorus	1 Hr		0.18	0.05	0.22		266	Future Industrial 8	680.40	4860.73
	24 Hr[4]	0.35	0.07	5.39E-03	0.08	22%	266	Future Industrial 8	680.40	4860.73
	Annual		0.05	1.42E-04	0.05		7	ECO 7	681.58	4862.07

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (μg/m³)	Background Concentration (μg/m³)	Maximum Predicted Concentration (μg/m³) [7]	Total Concentration (Facility + Background) (μg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Silver	1 Hr		8.33E-04	3.28E-03	4.12E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr	1	3.42E-04	3.93E-04	7.35E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		3.43E-04	1.03E-05	3.54E-04		7	ECO 7	681.58	4862.07
Selenium	1 Hr		7.35E-03	4.70E-04	7.82E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr[2]	10	3.02E-03	5.62E-05	3.07E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		2.93E-03	1.48E-06	2.93E-03		7	ECO 7	681.58	4862.07
Thallium	1 Hr			0.04			266	Future Industrial 8	680.40	4860.73
	24 Hr[4]	0.24		4.57E-03		<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual			1.20E-04			7	ECO 7	681.58	4862.07
Tin	1 Hr		7.35E-03	0.02	0.02		266	Future Industrial 8	680.40	4860.73
	24 Hr	10	3.02E-03	2.06E-03	5.08E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		2.93E-03	5.42E-05	2.98E-03		7	ECO 7	681.58	4862.07
Vanadium	1 Hr		3.77E-03	1.14E-03	4.91E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr	2	1.55E-03	1.36E-04	1.69E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		7.70E-04	3.58E-06	7.73E-04		7	ECO 7	681.58	4862.07
Zinc	1 Hr		0.10	0.20	0.30		266	Future Industrial 8	680.40	4860.73
	24 Hr	120	0.04	0.02	0.07	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.03	6.14E-04	0.03		7	ECO 7	681.58	4862.07
Sum of (As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb)	1 Hr		0.52	0.45	0.97		266	Future Industrial 8	680.40	4860.73
	24 Hr		0.21	0.05	0.27		266	Future Industrial 8	680.40	4860.73
	Annual		0.11	1.42E-03	0.11		7	ECO 7	681.58	4862.07

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m^3)	Background Concentration (µg/m^3)	Maximum Predicted Concentration (µg/m^3) [7]	Total Concentration (Facility + Background) (µg/m^3)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Chlorinated Monocyclic Aromatics										
1,2-Dichlorobenzene	1 Hr	30500[2]	0.03	2.00E-03	0.03	<0.1%	266	Future Industrial 8	680.40	4860.73
	24 Hr		0.01	2.40E-04	0.01		266	Future Industrial 8	680.40	4860.73
	Annual		4.66E-03	6.30E-06	4.67E-03		7	ECO 7	681.58	4862.07
1,2,4,5-Tetrachlorobenzene	1 Hr			5.05E-05			266	Future Industrial 8	680.40	4860.73
	24 Hr	1[4]		6.03E-06		<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual			1.58E-07			7	ECO 7	681.58	4862.07
1,2,4 – Trichlorobenzene	1 Hr		0.11	5.05E-05	0.11		266	Future Industrial 8	680.40	4860.73
	24 Hr	400[2]	0.05	6.03E-06	0.05	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.02	1.58E-07	0.02		7	ECO 7	681.58	4862.07
2,3,4,6-Tetrachlorophenol	1 Hr			1.70E-04			266	Future Industrial 8	680.40	4860.73
	24 Hr			2.04E-05			266	Future Industrial 8	680.40	4860.73
	Annual			5.35E-07			7	ECO 7	681.58	4862.07
2,4,6-Trichlorophenol	1 Hr			5.13E-05			266	Future Industrial 8	680.40	4860.73
	24 Hr	1.5[4]		6.13E-06		<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual			1.61E-07			7	ECO 7	681.58	4862.07
2,4-Dichlorophenol	1 Hr			1.01E-04			266	Future Industrial 8	680.40	4860.73
	24 Hr	77[4]		1.21E-05		<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual			3.17E-07			7	ECO 7	681.58	4862.07

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m^3)	Background Concentration (µg/m^3)	Maximum Predicted Concentration (µg/m^3) [7]	Total Concentration (Facility + Background) (µg/m^3)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Pentachlorophenol	1 Hr		2.13E-03	2.02E-04	2.34E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr	20[2]	8.76E-04	2.42E-05	9.00E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		4.10E-04	6.35E-07	4.11E-04		7	ECO 7	681.58	4862.07
Hexachlorobenzene	1 Hr		1.52E-04	5.05E-05	2.03E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr	0.011[4]	6.25E-05	6.03E-06	6.85E-05	1%	266	Future Industrial 8	680.40	4860.73
	Annual		5.27E-05	1.58E-07	5.29E-05		7	ECO 7	681.58	4862.07
Pentachlorobenzene	1 Hr			1.33E-04			266	Future Industrial 8	680.40	4860.73
	24 Hr	3[4]		1.58E-05		<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual			4.16E-07			7	ECO 7	681.58	4862.07
Polycyclic Organic Matter										
Acenaphthylene	1 Hr		7.53E-04	1.42E-05	7.67E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr	3.5[4]	3.09E-04	1.70E-06	3.11E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.58E-04	4.46E-08	1.58E-04		7	ECO 7	681.58	4862.07
Acenaphthene	1 Hr		3.04E-03	1.82E-05	3.06E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr		1.25E-03	2.18E-06	1.25E-03		266	Future Industrial 8	680.40	4860.73
	Annual		5.48E-04	5.72E-08	5.48E-04		7	ECO 7	681.58	4862.07
Anthracene	1 Hr		3.97E-04	3.99E-06	4.01E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr	0.2[4]	1.63E-04	4.77E-07	1.63E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		8.00E-05	1.25E-08	8.00E-05		7	ECO 7	681.58	4862.07

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (μg/m³)	Background Concentration (μg/m³)	Maximum Predicted Concentration (μg/m³) [7]	Total Concentration (Facility + Background) (μg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Benzo(a)anthracene	1 Hr		1.65E-04	1.47E-06	1.66E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr		6.77E-05	1.76E-07	6.79E-05		266	Future Industrial 8	680.40	4860.73
	Annual		5.63E-05	4.62E-09	5.63E-05		7	ECO 7	681.58	4862.07
Benzo(b)fluoranthene	1 Hr		3.45E-04	3.75E-06	3.48E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr		1.42E-04	4.49E-07	1.42E-04		266	Future Industrial 8	680.40	4860.73
	Annual		7.56E-05	1.18E-08	7.56E-05		7	ECO 7	681.58	4862.07
Benzo(k)fluoranthene	1 Hr		1.65E-04	9.90E-07	1.66E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr		6.77E-05	1.18E-07	6.78E-05		266	Future Industrial 8	680.40	4860.73
	Annual		5.63E-05	3.11E-09	5.63E-05		7	ECO 7	681.58	4862.07
Benzo(a)fluorene	1 Hr		3.30E-04	2.71E-05	3.57E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr		1.35E-04	3.24E-06	1.39E-04		266	Future Industrial 8	680.40	4860.73
	Annual		1.13E-04	8.51E-08	1.13E-04		7	ECO 7	681.58	4862.07
Benzo(b)fluorene	1 Hr		3.30E-04	1.85E-05	3.48E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr		1.35E-04	2.22E-06	1.38E-04		266	Future Industrial 8	680.40	4860.73
	Annual		1.13E-04	5.82E-08	1.13E-04		7	ECO 7	681.58	4862.07
Benzo(ghi)perylene	1 Hr		1.72E-04	4.05E-05	2.13E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr	1.2[4]	7.07E-05	4.84E-06	7.56E-05	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		5.85E-05	1.27E-07	5.86E-05		7	ECO 7	681.58	4862.07
Benzo(a)pyrene	1 Hr		1.65E-04	3.37E-06	1.68E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr	0.0011	6.77E-05	4.03E-07	6.81E-05	6%	266	Future Industrial 8	680.40	4860.73
	Annual	0.0003[3]	5.63E-05	1.06E-08	5.63E-05	19%	7	ECO 7	681.58	4862.07

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)[7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Benzo(e)pyrene	1 Hr		3.30E-04	8.54E-06	3.38E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr		1.35E-04	1.02E-06	1.36E-04		266	Future Industrial 8	680.40	4860.73
	Annual		1.13E-04	2.68E-08	1.13E-04		7	ECO 7	681.58	4862.07
Biphenyl	1 Hr	60[2]	3.32E-03	2.92E-03	6.24E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	24 Hr		1.36E-03	3.50E-04	1.71E-03		266	Future Industrial 8	680.40	4860.73
	Annual		5.21E-04	9.18E-06	5.30E-04		7	ECO 7	681.58	4862.07
Chrysene	1 Hr		2.35E-04	3.69E-06	2.38E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr		9.64E-05	4.42E-07	9.69E-05		266	Future Industrial 8	680.40	4860.73
	Annual		6.47E-05	1.16E-08	6.47E-05		7	ECO 7	681.58	4862.07
Dibenzo(a,c)anthracene	1 Hr			2.63E-05			266	Future Industrial 8	680.40	4860.73
	24 Hr			3.14E-06			266	Future Industrial 8	680.40	4860.73
	Annual			8.25E-08			7	ECO 7	681.58	4862.07
Dibenzo(a,h)anthracene	1 Hr		1.65E-04	1.19E-06	1.66E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr		6.77E-05	1.42E-07	6.79E-05		266	Future Industrial 8	680.40	4860.73
	Annual		5.63E-05	3.72E-09	5.63E-05		7	ECO 7	681.58	4862.07
Fluoranthene	1 Hr		1.46E-03	4.08E-05	1.50E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr	140[4]	6.01E-04	4.87E-06	6.06E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		3.93E-04	1.28E-07	3.93E-04		7	ECO 7	681.58	4862.07
Fluorine	1 Hr			3.07E-05			266	Future Industrial 8	680.40	4860.73
	24 Hr			3.67E-06			266	Future Industrial 8	680.40	4860.73
	Annual			9.63E-08			7	ECO 7	681.58	4862.07

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Indeno(1,2,3 – cd)pyrene	1 Hr		1.65E-04	7.39E-06	1.72E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr		6.77E-05	8.83E-07	6.86E-05		266	Future Industrial 8	680.40	4860.73
	Annual		5.63E-05	2.32E-08	5.64E-05		7	ECO 7	681.58	4862.07
1 – methylnaphthalene	1 Hr		3.17E-03	9.62E-05	3.27E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr	12[4]	1.30E-03	1.15E-05	1.31E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		4.43E-04	3.02E-07	4.44E-04		7	ECO 7	681.58	4862.07
2 – methylnaphthalene	1 Hr		5.33E-03	5.33E-04	5.86E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr	10[4]	2.19E-03	6.37E-05	2.25E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		7.56E-04	1.67E-06	7.58E-04		7	ECO 7	681.58	4862.07
Naphthalene	1 Hr		5.91E-03	4.15E-04	6.33E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr	22.5	2.43E-03	4.96E-05	2.48E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		8.59E-04	1.30E-06	8.60E-04		7	ECO 7	681.58	4862.07
Perylene	1 Hr		3.30E-04	1.48E-06	3.31E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr		1.35E-04	1.77E-07	1.36E-04		266	Future Industrial 8	680.40	4860.73
	Annual		1.13E-04	4.65E-09	1.13E-04		7	ECO 7	681.58	4862.07
Phenanthrene	1 Hr		6.26E-03	9.27E-05	6.36E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr		2.57E-03	1.11E-05	2.58E-03		266	Future Industrial 8	680.40	4860.73
	Annual		1.71E-03	2.91E-07	1.71E-03		7	ECO 7	681.58	4862.07
Pyrene	1 Hr		6.88E-04	4.92E-05	7.37E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr	0.2[4]	2.83E-04	5.88E-06	2.88E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.83E-04	1.54E-07	1.83E-04		7	ECO 7	681.58	4862.07

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Tetralin	1 Hr		3.30E-04	4.89E-04	8.18E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr	1200[4]	1.35E-04	5.84E-05	1.94E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.13E-04	1.53E-06	1.14E-04		7	ECO 7	681.58	4862.07
O-terphenyl	1 Hr		3.30E-04	8.02E-05	4.10E-04		266	Future Industrial 8	680.40	4860.73
	24 Hr		1.35E-04	9.59E-06	1.45E-04		266	Future Industrial 8	680.40	4860.73
	Annual		1.13E-04	2.52E-07	1.13E-04		7	ECO 7	681.58	4862.07
Volatile Organic Chemicals (VOC)										
Acetaldehyde	1/2 Hr	500	5.21	6.30E-07	5.21	1%	266	Future Industrial 8	680.40	4860.73
	1 Hr		4.29	5.19E-07	4.29		266	Future Industrial 8	680.40	4860.73
	24 Hr	500	1.76	6.22E-08	1.76	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.05	1.63E-09	1.05		7	ECO 7	681.58	4862.07
Benzene	1 Hr		28.81	0.03	28.84		266	Future Industrial 8	680.40	4860.73
	24 Hr		11.83	3.63E-03	11.84		266	Future Industrial 8	680.40	4860.73
	Annual		3.94	9.54E-05	3.94		7	ECO 7	681.58	4862.07
Bromodichloromethane	1 Hr		0.04	0.18	0.22		266	Future Industrial 8	680.40	4860.73
	24 Hr		0.02	0.02	0.04		266	Future Industrial 8	680.40	4860.73
	Annual		0.01	5.70E-04	0.01		7	ECO 7	681.58	4862.07
Bromoform	1 Hr		0.07	0.05	0.12		266	Future Industrial 8	680.40	4860.73
	24 Hr	55[2]	0.03	5.94E-03	0.04	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.02	1.56E-04	0.02		7	ECO 7	681.58	4862.07

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Bromomethane	1 Hr		0.22	0.04	0.25		266	Future Industrial 8	680.40	4860.73
	24 Hr	1350[3]	0.09	4.22E-03	0.09	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.10	1.11E-04	0.10		7	ECO 7	681.58	4862.07
Carbon tetrachloride	1 Hr		1.80	3.09E-04	1.80		266	Future Industrial 8	680.40	4860.73
	24 Hr	2.4	0.74	3.70E-05	0.74	31%	266	Future Industrial 8	680.40	4860.73
	Annual		0.61	9.72E-07	0.61		7	ECO 7	681.58	4862.07
Chloroform	1 Hr		0.55	5.00E-04	0.55		266	Future Industrial 8	680.40	4860.73
	24 Hr	1	0.23	5.98E-05	0.23	23%	266	Future Industrial 8	680.40	4860.73
	Annual	0.2[3]	0.16	1.57E-06	0.16	81%	7	ECO 7	681.58	4862.07
Dichlorodifluoromethane	1 Hr		7.87	0.09	7.96		266	Future Industrial 8	680.40	4860.73
	24 Hr	500000[2]	3.23	0.01	3.24	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		2.81	2.68E-04	2.81		7	ECO 7	681.58	4862.07
Dichloroethene, 1,1 -	1 Hr		6.09E-03	5.54E-04	6.64E-03		266	Future Industrial 8	680.40	4860.73
	24 Hr	10	2.50E-03	6.63E-05	2.57E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		5.76E-04	1.74E-06	5.78E-04		7	ECO 7	681.58	4862.07
Dichloromethane	1 Hr		3.08	0.17	3.25		266	Future Industrial 8	680.40	4860.73
	24 Hr	220	1.27	0.02	1.29	1%	266	Future Industrial 8	680.40	4860.73
	Annual	44[3]	0.76	5.42E-04	0.76	2%	7	ECO 7	681.58	4862.07
Ethylbenzene	1 Hr		3.03	1.02E-03	3.03		266	Future Industrial 8	680.40	4860.73
	24 Hr	1000	1.24	1.21E-04	1.24	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.69	3.19E-06	0.69		7	ECO 7	681.58	4862.07

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Ethylene Dibromide	1 Hr		0.01	2.91E-04	0.01		266	Future Industrial 8	680.40	4860.73
	24 Hr	3[2]	5.20E-03	3.49E-05	5.23E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.84E-03	9.15E-07	1.84E-03		7	ECO 7	681.58	4862.07
Formaldehyde	1 Hr		8.23	0.05	8.28		266	Future Industrial 8	680.40	4860.73
	24 Hr	65	3.38	5.56E-03	3.39	5%	266	Future Industrial 8	680.40	4860.73
	Annual		1.66	1.46E-04	1.66		7	ECO 7	681.58	4862.07
Tetrachloroethene	1 Hr		1.20	5.56E-03	1.20		266	Future Industrial 8	680.40	4860.73
	24 Hr	360	0.49	6.64E-04	0.49	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.26	1.74E-05	0.26		7	ECO 7	681.58	4862.07
Toluene	1 Hr		23.06	0.05	23.11		266	Future Industrial 8	680.40	4860.73
	24 Hr	2000[2]	9.47	5.89E-03	9.48	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		4.40	1.55E-04	4.40		7	ECO 7	681.58	4862.07
Trichloroethane, 1,1,1 -	1 Hr		0.28	1.40E-03	0.28		266	Future Industrial 8	680.40	4860.73
	24 Hr	115000	0.11	1.67E-04	0.11	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		0.10	4.39E-06	0.10		7	ECO 7	681.58	4862.07
Trichloroethene	1 Hr		1.31	4.82E-04	1.31		266	Future Industrial 8	680.40	4860.73
	24 Hr	12	0.54	5.76E-05	0.54	4%	266	Future Industrial 8	680.40	4860.73
	Annual	2.3[3]	0.27	1.51E-06	0.27	12%	7	ECO 7	681.58	4862.07

Table 7-7 Summary of Maximum Predicted Concentrations at Special Receptors - Scenario 1B (MCR 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Trichlorofluoromethane	1 Hr		5.23	0.17	5.40		266	Future Industrial 8	680.40	4860.73
	24 Hr	6000[2]	2.15	0.02	2.17	<0.1%	266	Future Industrial 8	680.40	4860.73
	Annual		1.89	5.30E-04	1.89		7	ECO 7	681.58	4862.07
Vinyl chloride	1 Hr		0.01	0.04	0.06		266	Future Industrial 8	680.40	4860.73
	24 Hr	1	5.88E-03	5.11E-03	0.01	1%	266	Future Industrial 8	680.40	4860.73
	Annual	0.2[3]	3.65E-03	1.34E-04	3.78E-03	2%	7	ECO 7	681.58	4862.07
Xylenes, m-, p- and o-	1 Hr		11.75	0.59	12.34		266	Future Industrial 8	680.40	4860.73
	24 Hr	730	4.83	0.07	4.90	1%	266	Future Industrial 8	680.40	4860.73
	Annual		2.76	1.86E-03	2.76		7	ECO 7	681.58	4862.07

Notes:
[1] Reg419/05 Schedule 3 Criteria unless stated otherwise
[2] O. Reg. 419 Guidelines
[3] Ontario's ambient air quality criteria
[4] Jurisdictional Screening Level List (JSL)
[5] National Ambient Air Quality Objectives (NAAQO) Max Desirable Level
[6] CCME (2000), Canada-Wide Standards for Respirable Particulate Matter
[7] Maximum predicted concentrations not accounting for statistical anomalies.

Table 7-8 Summary of Maximum Predicted Concentrations at the Special Receptors - Scenario 2B (MCTD 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Maximum Predicted Concentration ($\mu g/m^3$) [7]	Total Concentration (Facility + Background) ($\mu g/m^3$)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Sulphur Dioxide (SO_2)	1 Hr	690	19.5	30.06	49.58	7%	273	Future Industrial 11	680.25	4860.26
	24 Hr	275	19.3	4.05	23.34	8%	266	Future Industrial 8	680.40	4860.73
Hydrogen Chloride (HCl)	1 Hr			7.73			273	Future Industrial 11	680.25	4860.26
	24 Hr	20		1.04		5%	266	Future Industrial 8	680.40	4860.73
Hydrogen Fluoride (HF)	1 Hr			0.77			273	Future Industrial 11	680.25	4860.26
	24 Hr	0.86		0.10		12%	266	Future Industrial 8	680.40	4860.73
Nitrogen Oxides (NO_2)	1 Hr	400	64.6	103.91	168.48	42%	273	Future Industrial 11	680.25	4860.26
	24 Hr	200	58.2	14.02	72.24	36%	266	Future Industrial 8	680.40	4860.73
Carbon Monoxide (CO)	1 Hr	36200[3]	1035	38.64	1073.98	3%	273	Future Industrial 11	680.25	4860.26
	24 Hr		1029	5.21	1034.20		266	Future Industrial 8	680.40	4860.73
Particulate Matter PM_{10}	1 Hr			9.87			265	Future Industrial 7	680.82	4860.22
	24 Hr	50[3]		1.39		3%	266	Future Industrial 8	680.40	4860.73
Particulate Matter $PM_{2.5}$	1 Hr		22.8	9.87	32.69		265	Future Industrial 7	680.82	4860.22
	24 Hr	30[6]	20.4	1.39	21.82	73%	266	Future Industrial 8	680.40	4860.73
Total Particulate Matter	1 Hr		86.2	9.87	96.03		265	Future Industrial 7	680.82	4860.22
	24 Hr	120	35.4	1.39	36.78	31%	266	Future Industrial 8	680.40	4860.73
Ammonia (Slip at stack)	1 Hr			4.64			273	Future Industrial 11	680.25	4860.26
	24 Hr	100[3]		0.63		<1.1%	266	Future Industrial 8	680.40	4860.73
Organic Matter (as CH4)	1 Hr			42.08			273	Future Industrial 11	680.25	4860.26
	24 Hr			5.68			266	Future Industrial 8	680.40	4860.73

Table 7-8 Summary of Maximum Predicted Concentrations at the Special Receptors - Scenario 2B (MCTD 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Chlorinated Polycyclic Aromatics										
Dioxins (as TEQ Toxic Equivalents)	1 Hr		5.78E-08	5.15E-08	1.09E-07		273	Future Industrial 11	680.25	4860.26
	24 Hr	5.00E-06	2.37E-08	6.95E-09	3.07E-08	1%	266	Future Industrial 8	680.40	4860.73
Polychlorinated Biphenyls (PCB)	1 Hr		1.02E-04	6.20E-05	1.64E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.15	4.20E-05	8.36E-06	5.04E-05	<0.1%	266	Future Industrial 8	680.40	4860.73
Metals										
Aluminum	1 Hr		0.52	0.03	0.55		273	Future Industrial 11	680.25	4860.26
	24 Hr[4]	4.8	0.21	4.60E-03	0.22	5%	266	Future Industrial 8	680.40	4860.73
Antimony	1 Hr		7.35E-03	2.35E-03	9.70E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	25	3.02E-03	3.17E-04	3.33E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Arsenic	1 Hr		4.41E-03	3.61E-04	4.77E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr[2]	0.3	1.81E-03	4.87E-05	1.86E-03	1%	266	Future Industrial 8	680.40	4860.73
Barium	1 Hr		0.02	1.82E-03	0.02		273	Future Industrial 11	680.25	4860.26
	24 Hr[2]	10	8.18E-03	2.45E-04	8.43E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Beryllium	1 Hr		7.35E-04	2.86E-04	1.02E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.01	3.02E-04	3.86E-05	3.41E-04	3%	266	Future Industrial 8	680.40	4860.73
Boron	1 Hr		0.19	0.13	0.32		273	Future Industrial 11	680.25	4860.26
	24 Hr	120	0.08	0.02	0.09	<0.1%	266	Future Industrial 8	680.40	4860.73
Cadmium (Cd)	1 Hr		1.47E-03	6.01E-03	7.48E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.025	6.04E-04	8.11E-04	1.41E-03	6%	266	Future Industrial 8	680.40	4860.73

Table 7-8 Summary of Maximum Predicted Concentrations at the Special Receptors - Scenario 2B (MCTD 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Cadmium and Thallium (Cd + Th)	1 Hr			0.04			273	Future Industrial 11	680.25	4860.26
	24 Hr			5.33E-03			266	Future Industrial 8	680.40	4860.73
Chromium (hexavalent)	1 Hr			2.75E-04			273	Future Industrial 11	680.25	4860.26
	24 Hr			3.71E-05			266	Future Industrial 8	680.40	4860.73
Total Chromium (and compounds)	1 Hr		6.72E-03	1.93E-03	8.65E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr[3]	1.5	2.76E-03	2.61E-04	3.02E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Cobalt	1 Hr		1.47E-03	4.98E-03	6.45E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr[3]	0.1	6.04E-04	6.71E-04	1.28E-03	1%	266	Future Industrial 8	680.40	4860.73
Lead (Pb)	1 Hr		0.01	0.04	0.06		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.5	4.98E-03	5.79E-03	0.01	2%	266	Future Industrial 8	680.40	4860.73
Mercury (Hg) - Vapour/Particulate phase	1 Hr			0.01			273	Future Industrial 11	680.25	4860.26
	24 Hr	2		1.74E-03		<0.1%	266	Future Industrial 8	680.40	4860.73
Nickel	1 Hr		0.01	0.07	0.09		273	Future Industrial 11	680.25	4860.26
	24 Hr	2	4.49E-03	0.01	0.01	<1.1%	266	Future Industrial 8	680.40	4860.73
Phosphorus	1 Hr		0.18	0.04	0.21		273	Future Industrial 11	680.25	4860.26
	24 Hr[4]	0.35	0.07	5.33E-03	0.08	22%	266	Future Industrial 8	680.40	4860.73
Silver	1 Hr		8.33E-04	2.88E-03	3.71E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	1	3.42E-04	3.88E-04	7.30E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
Selenium	1 Hr		7.35E-03	4.12E-04	7.76E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr[2]	10	3.02E-03	5.56E-05	3.07E-03	<0.1%	266	Future Industrial 8	680.40	4860.73

Table 7-8 Summary of Maximum Predicted Concentrations at the Special Receptors - Scenario 2B (MCTD 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Thallium	1 Hr			0.03			273	Future Industrial 11	680.25	4860.26
	24 Hr[4]	0.24		4.52E-03		<0.1%	266	Future Industrial 8	680.40	4860.73
Tin	1 Hr		7.35E-03	0.02	0.02		273	Future Industrial 11	680.25	4860.26
	24 Hr	10	3.02E-03	2.04E-03	5.06E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Vanadium	1 Hr		3.77E-03	9.99E-04	4.77E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	2	1.55E-03	1.35E-04	1.68E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Zinc	1 Hr		0.10	0.17	0.27		273	Future Industrial 11	680.25	4860.26
	24 Hr	120	0.04	0.02	0.07	<0.1%	266	Future Industrial 8	680.40	4860.73
Sum of (As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb)	1 Hr		0.52	0.40	0.91		273	Future Industrial 11	680.25	4860.26
	24 Hr		0.21	0.05	0.26		266	Future Industrial 8	680.40	4860.73
Chlorinated Monocyclic Aromatics										
1,2-Dichlorobenzene	1 Hr	30500[2]	0.03	1.76E-03	0.03	<0.1%	273	Future Industrial 11	680.25	4860.26
	24 Hr		0.01	2.37E-04	0.01		266	Future Industrial 8	680.40	4860.73
1,2,4,5-Tetrachlorobenzene	1 Hr			4.42E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr	1[4]		5.97E-06		<0.1%	266	Future Industrial 8	680.40	4860.73
1,2,4 – Trichlorobenzene	1 Hr		0.11	4.42E-05	0.11		273	Future Industrial 11	680.25	4860.26
	24 Hr	400[2]	0.05	5.97E-06	0.05	<0.1%	266	Future Industrial 8	680.40	4860.73
2,3,4,6-Tetrachlorophenol	1 Hr			1.49E-04			273	Future Industrial 11	680.25	4860.26
	24 Hr			2.01E-05			266	Future Industrial 8	680.40	4860.73

Table 7-8 Summary of Maximum Predicted Concentrations at the Special Receptors - Scenario 2B (MCTD 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
2,4,6-Trichlorophenol	1 Hr			4.49E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr	1.5[4]		6.06E-06		<0.1%	266	Future Industrial 8	680.40	4860.73
2,4-Dichlorophenol	1 Hr			8.85E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr	77[4]		1.19E-05		<0.1%	266	Future Industrial 8	680.40	4860.73
Pentachlorophenol	1 Hr		2.13E-03	1.77E-04	2.31E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	20[2]	8.76E-04	2.39E-05	9.00E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
Hexachlorobenzene	1 Hr		1.52E-04	4.42E-05	1.96E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.011[4]	6.25E-05	5.97E-06	6.84E-05	1%	266	Future Industrial 8	680.40	4860.73
Pentachlorobenzene	1 Hr			1.16E-04			273	Future Industrial 11	680.25	4860.26
	24 Hr	3[4]		1.57E-05		<0.1%	266	Future Industrial 8	680.40	4860.73
Polycyclic Organic Matter										
Acenaphthylene	1 Hr		7.53E-04	1.25E-05	7.65E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	3.5[4]	3.09E-04	1.68E-06	3.11E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
Acenaphthene	1 Hr		3.04E-03	1.60E-05	3.06E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.25E-03	2.15E-06	1.25E-03		266	Future Industrial 8	680.40	4860.73
Anthracene	1 Hr		3.97E-04	3.50E-06	4.00E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.2[4]	1.63E-04	4.71E-07	1.63E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
Benzo(a)anthracene	1 Hr		1.65E-04	1.29E-06	1.66E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		6.77E-05	1.74E-07	6.79E-05		266	Future Industrial 8	680.40	4860.73

Table 7-8 Summary of Maximum Predicted Concentrations at the Special Receptors - Scenario 2B (MCTD 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Benzo(b)fluoranthene	1 Hr		3.45E-04	3.29E-06	3.48E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.42E-04	4.44E-07	1.42E-04		266	Future Industrial 8	680.40	4860.73
Benzo(k)fluoranthene	1 Hr		1.65E-04	8.67E-07	1.66E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		6.77E-05	1.17E-07	6.78E-05		266	Future Industrial 8	680.40	4860.73
Benzo(a)fluorene	1 Hr		3.30E-04	2.37E-05	3.54E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	3.20E-06	1.39E-04		266	Future Industrial 8	680.40	4860.73
Benzo(b)fluorene	1 Hr		3.30E-04	1.62E-05	3.46E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	2.19E-06	1.38E-04		266	Future Industrial 8	680.40	4860.73
Benzo(ghi)perylene	1 Hr		1.72E-04	3.55E-05	2.08E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	1.2[4]	7.07E-05	4.78E-06	7.55E-05	<0.1%	266	Future Industrial 8	680.40	4860.73
Benzo(a)pyrene	1 Hr		1.65E-04	2.95E-06	1.68E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.0011	6.77E-05	3.98E-07	6.81E-05	6%	266	Future Industrial 8	680.40	4860.73
Benzo(e)pyrene	1 Hr		3.30E-04	7.48E-06	3.37E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	1.01E-06	1.36E-04		266	Future Industrial 8	680.40	4860.73
Biphenyl	1 Hr	60[2]	3.32E-03	2.56E-03	5.88E-03	<0.1%	273	Future Industrial 11	680.25	4860.26
	24 Hr		1.36E-03	3.46E-04	1.71E-03		266	Future Industrial 8	680.40	4860.73
Chrysene	1 Hr		2.35E-04	3.24E-06	2.38E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		9.64E-05	4.37E-07	9.69E-05		266	Future Industrial 8	680.40	4860.73
Dibenzo(a,c)anthracene	1 Hr			2.30E-05			273	Future Industrial 11	680.25	4860.26
	24 Hr			3.10E-06			266	Future Industrial 8	680.40	4860.73

Table 7-8 Summary of Maximum Predicted Concentrations at the Special Receptors - Scenario 2B (MCTD 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Dibenzo(a,h)anthracene	1 Hr		1.65E-04	1.04E-06	1.66E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		6.77E-05	1.40E-07	6.79E-05		266	Future Industrial 8	680.40	4860.73
Fluoranthene	1 Hr		1.46E-03	3.57E-05	1.50E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	140[4]	6.01E-04	4.82E-06	6.06E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
Fluorine	1 Hr		#N/A	2.69E-05	#N/A		273	Future Industrial 11	680.25	4860.26
	24 Hr		#N/A	3.63E-06	#N/A		266	Future Industrial 8	680.40	4860.73
Indeno(1,2,3 – cd)pyrene	1 Hr		1.65E-04	6.48E-06	1.71E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		6.77E-05	8.73E-07	6.86E-05		266	Future Industrial 8	680.40	4860.73
1 – methylnaphthalene	1 Hr		3.17E-03	8.43E-05	3.26E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	12[4]	1.30E-03	1.14E-05	1.31E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
2 – methylnaphthalene	1 Hr		5.33E-03	4.67E-04	5.80E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	10[4]	2.19E-03	6.30E-05	2.25E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Naphthalene	1 Hr		5.91E-03	3.63E-04	6.28E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	22.5	2.43E-03	4.90E-05	2.48E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Perylene	1 Hr		3.30E-04	1.30E-06	3.31E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	1.75E-07	1.36E-04		266	Future Industrial 8	680.40	4860.73
Phenanthrene	1 Hr		6.26E-03	8.12E-05	6.35E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr		2.57E-03	1.10E-05	2.58E-03		266	Future Industrial 8	680.40	4860.73
Pyrene	1 Hr		6.88E-04	4.31E-05	7.31E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	0.2[4]	2.83E-04	5.81E-06	2.88E-04	<0.1%	266	Future Industrial 8	680.40	4860.73

Table 7-8 Summary of Maximum Predicted Concentrations at the Special Receptors - Scenario 2B (MCTD 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Tetralin	1 Hr		3.30E-04	4.28E-04	7.58E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr	1200[4]	1.35E-04	5.78E-05	1.93E-04	<0.1%	266	Future Industrial 8	680.40	4860.73
O-terphenyl	1 Hr		3.30E-04	7.03E-05	4.00E-04		273	Future Industrial 11	680.25	4860.26
	24 Hr		1.35E-04	9.48E-06	1.45E-04		266	Future Industrial 8	680.40	4860.73
Volatile Organic Chemicals (VOC)										
Acetaldehyde	1/2 Hr	500	5.21	5.54E-07	5.21	1%	273	Future Industrial 11	680.25	4860.26
	1 Hr		4.29	4.56E-07	4.29		273	Future Industrial 11	680.25	4860.26
	24 Hr	500	1.76	6.16E-08	1.76	<0.1%	266	Future Industrial 8	680.40	4860.73
Benzene	1 Hr		28.81	0.03	28.83		273	Future Industrial 11	680.25	4860.26
	24 Hr		11.83	3.59E-03	11.84		266	Future Industrial 8	680.40	4860.73
Bromodichloromethane	1 Hr		0.04	0.16	0.20		273	Future Industrial 11	680.25	4860.26
	24 Hr		0.02	0.02	0.04		266	Future Industrial 8	680.40	4860.73
Bromoform	1 Hr		0.07	0.04	0.12		273	Future Industrial 11	680.25	4860.26
	24 Hr	55[2]	0.03	5.88E-03	0.04	<0.1%	266	Future Industrial 8	680.40	4860.73
Bromomethane	1 Hr		0.22	0.03	0.25		273	Future Industrial 11	680.25	4860.26
	24 Hr	1350[3]	0.09	4.17E-03	0.09	<0.1%	266	Future Industrial 8	680.40	4860.73
Carbon tetrachloride	1 Hr		1.80	2.71E-04	1.80		273	Future Industrial 11	680.25	4860.26
	24 Hr	2.4	0.74	3.66E-05	0.74	31%	266	Future Industrial 8	680.40	4860.73
Chloroform	1 Hr		0.55	4.38E-04	0.55		273	Future Industrial 11	680.25	4860.26
	24 Hr	1	0.23	5.91E-05	0.23	23%	266	Future Industrial 8	680.40	4860.73

Table 7-8 Summary of Maximum Predicted Concentrations at the Special Receptors - Scenario 2B (MCTD 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Dichlorodifluoromethane	1 Hr		7.87	0.07	7.95		273	Future Industrial 11	680.25	4860.26
	24 Hr	500000[2]	3.23	0.01	3.24	<0.1%	266	Future Industrial 8	680.40	4860.73
Dichloroethene, 1,1 -	1 Hr		6.09E-03	4.86E-04	6.57E-03		273	Future Industrial 11	680.25	4860.26
	24 Hr	10	2.50E-03	6.55E-05	2.57E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Dichloromethane	1 Hr		3.08	0.15	3.23		273	Future Industrial 11	680.25	4860.26
	24 Hr	220	1.27	0.02	1.29	1%	266	Future Industrial 8	680.40	4860.73
Ethylbenzene	1 Hr		3.03	8.90E-04	3.03		273	Future Industrial 11	680.25	4860.26
	24 Hr	1000	1.24	1.20E-04	1.24	<0.1%	266	Future Industrial 8	680.40	4860.73
Ethylene Dibromide	1 Hr		0.01	2.55E-04	0.01		273	Future Industrial 11	680.25	4860.26
	24 Hr	3[2]	5.20E-03	3.45E-05	5.23E-03	<0.1%	266	Future Industrial 8	680.40	4860.73
Formaldehyde	1 Hr		8.23	0.04	8.27		273	Future Industrial 11	680.25	4860.26
	24 Hr	65	3.38	5.50E-03	3.39	5%	266	Future Industrial 8	680.40	4860.73
Tetrachloroethene	1 Hr		1.20	4.87E-03	1.20		273	Future Industrial 11	680.25	4860.26
	24 Hr	360	0.49	6.57E-04	0.49	<0.1%	266	Future Industrial 8	680.40	4860.73
Toluene	1 Hr		23.06	0.04	23.11		273	Future Industrial 11	680.25	4860.26
	24 Hr	2000[2]	9.47	5.82E-03	9.48	<0.1%	266	Future Industrial 8	680.40	4860.73
Trichloroethane, 1,1,1 -	1 Hr		0.28	1.23E-03	0.28		273	Future Industrial 11	680.25	4860.26
	24 Hr	115000	0.11	1.65E-04	0.11	<0.1%	266	Future Industrial 8	680.40	4860.73
Trichloroethene	1 Hr		1.31	4.22E-04	1.31		273	Future Industrial 11	680.25	4860.26
	24 Hr	12	0.54	5.70E-05	0.54	4%	266	Future Industrial 8	680.40	4860.73

Table 7-8 Summary of Maximum Predicted Concentrations at the Special Receptors - Scenario 2B (MCTD 400,000 tpy Facility)

Contaminant	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³) [7]	Total Concentration (Facility + Background) (µg/m³)	% of Criteria	Special Receptor #	Description	UTM Easting (km)	UTM Northing (km)
Trichlorofluoromethane	1 Hr		5.23	0.15	5.37		273	Future Industrial 11	680.25	4860.26
	24 Hr	6000[2]	2.15	0.02	2.17	<0.1%	266	Future Industrial 8	680.40	4860.73
Vinyl chloride	1 Hr		0.01	0.04	0.05		273	Future Industrial 11	680.25	4860.26
	24 Hr	1	5.88E-03	5.05E-03	0.01	1%	266	Future Industrial 8	680.40	4860.73
Xylenes, m-, p- and o-	1 Hr		11.75	0.52	12.27		273	Future Industrial 11	680.25	4860.26
	24 Hr	730	4.83	0.07	4.90	1%	266	Future Industrial 8	680.40	4860.73

Notes:
[1] Reg419/05 Schedule 3 Criteria unless stated otherwise
[2] O. Reg. 419 Guidelines
[3] Ontario's ambient air quality criteria
[4] Jurisdictional Screening Level List (JSL)
[5] National Ambient Air Quality Objectives (NAAQO) Max Desirable Level
[6] CCME (2000), Canada-Wide Standards for Respirable Particulate Matter
[7] Maximum predicted concentrations not accounting for statistical anomalies.

7.1.2 Emissions during Emergency Diesel Generator Testing (Scenario 3)

The Facility will accommodate up to two 200-300 kW emergency diesel generators (1 for the 140,000 tpy Facility, and a second added for the 400,000 tpy Facility). A summary of the maximum predicted GLCs during routine testing of a Facility emergency diesel generator (concurrent with the Facility operating at MCR – the normal operating condition) is presented in Table 7-9 for the 140,000 tpy Facility, and Table 7-10 for the 400,000 tpy Facility. The values presented are the maximum predicted values over all the off-property and fence line receptors included in the modeling. Estimated background concentrations, as discussed in Section 3, were added to the maximum model-predicted values and compared to applicable regulatory limits to assess potential cumulative changes in air quality. It is noted and emphasized that for routine testing of emergency generators, the MOE has specified a NO_2 point of impingement criteria of 1880 µg/m^3 on a half-hour averaging period and this ½-hour criteria was used rather than an hourly criteria for NO_2.

The particulate matter concentration predictions presented in this section include both primary particulate (stack emissions) and secondary particulate (atmospheric transformation) contributions. The predictions do not account for plume depletion due to contaminant deposition and are therefore conservative.

The dispersion modelling demonstrates that the maximum predicted ground level concentrations of CoPCs from the routine testing of the emergency diesel generators during the normal operation of the thermal treatment process will be below applicable MOE criteria for both the 140,000 and 400,000 tpy Facility scenarios.

Table 7-9 Summary of Statistical Maximum Predicted Concentrations - Scenario 3A (Emergency Diesel Generator Testing for 140,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	UTM Coordinate		Scenario 3A - 140,000 tpy Facility at MCR + Diesel Generator Testing			
					Easting (km)	Northing (km)	Predicted Statistical Max Concentration ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Background ($\mu g/m^3$)	% of Criteria
Sulphur Dioxide (SO_2)	7446-09-5	1 Hr	690	19.5	680.51	4860.54	65.0	9%	84.5	12%
Nitrogen Dioxide (NO_2)	10102-44-0	1/2 Hr	1880[2]	78.4	680.51	4860.54	1158.0	62%	1236.4	66%
Carbon Monoxide (CO)	630-08-0	1/2 Hr	6000	1257	680.51	4860.54	252.7	4%	1509.8	25%
		1 Hr	36200	1035	680.51	4860.54	208.1	1%	1243.4	3%
Total Particulate Matter	TPM	1 Hr	N/A	86.2	680.51	4860.54	69.4		155.5	

Notes:
[1] Reg. 419/05 Schedule 3 Criteria unless stated otherwise
[2] MOE Criteria for emergency diesel generator testing

Table 7-10 Summary of Statistical Maximum Predicted Ground Level Contaminant Concentrations - Scenario 3B (Emergency Diesel Generator Testing for 400,000 tpy Facility)

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentration (µg/m³)	UTM Coordinate		Scenario 3B - 400,000 tpy Facility at MCR + Diesel Generator Testing			
					Easting (km)	Northing (km)	Predicted Statistical Max Concentration (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Background (µg/m³)	% of Criteria
Sulphur Dioxide (SO_2)	7446-09-5	1 Hr	690	19.5	680.45	4860.53	67.6	10%	87.1	13%
Nitrogen Dioxide (NO_2)	10102-44-0	1/2 Hr	1880[2]	78.4	680.45	4860.53	1241.9	66%	1320.3	70%
Carbon Monoxide (CO)	630-08-0	1/2 Hr	6000	1257	680.45	4860.53	267.8	4%	1524.9	25%
		1 Hr	36200	1035	680.45	4860.53	220.6	1%	1255.9	3%
Total Particulate Matter	TPM	1 Hr	N/A	86.2	680.45	4860.53	73.1		159.2	

Notes:
[1] Reg. 419/05 Schedule 3 Criteria unless stated otherwise
[2] MOE Criteria for emergency diesel generator testing

7.2 Process Upsets

The maximum predicted ground level concentrations of all CoPCs due to process upset conditions are presented in Table 7-11 for the 140,000 tpy Facility and Table 7-12 for the 400,000 tpy Facility.

In this analysis, CoPC emissions rates for the 140,000 tpy Facility for short-term averaging periods (1-hour to 24-hour averages) were conservatively increased by a factor of ten for all CoPCs except NO_x and SO_2 (for which vendor data were used). Annual emissions for the 140,000 tpy Facility were conservatively increased by factors of 1.45 or 2.8 (depending on CoPC) except for SO_2 and NO_x for which vendor data was applied (see Section 4.2.3 for additional details).

To predict maximum short-term (1-hour to 24-hour average) ground level concentrations from the 400,000 tpy Facility, emissions during process upsets were estimated by conservatively assuming a process upset occurring simultaneously in two out of three APC systems and associated processing trains. Emissions from the units assumed to be experiencing process upsets were calculated using the same methodology applied for the 140,000 tpy Facility. To predict maximum long-term (annual average) concentrations during process upsets at the 400,000 tpy Facility, it was conservatively assumed that each stack would be under process upset conditions the same amount of the time on an annual basis. Emissions were increased for all three exhaust streams on an annual basis using the same methodology applied for process upsets from the 140,000 tpy Facility.

Of all CoPCs, the highest predicted GLC relative to its regulatory criteria due to the Facility alone under process upset conditions was hydrogen fluoride at 52% for the 140,000 tpy Facility, and 78% for the 400,000 tpy Facility. When cumulative environmental effects were considered by adding background levels to the maximum predicted GLC for each CoPC, the predicted maximum GLCs were still below the applicable criteria.

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentrations (µg/m³)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
					Easting (km)	Northing (km)				
Sulphur Dioxide (SO_2)	7446-09-5	1 Hr	690	19.5	681.00	4859.66	203.05	29%	222.57	32%
		24 Hr	275	19.3	679.55	4861.16	28.04	10%	47.33	17%
		Annual	55[3]	5.9	681.45	4861.56	0.09	<0.1%	6.01	11%
Hydrogen Chloride (HCl)	7647-01-0	1 Hr		-	681.00	4859.66	32.63			
		24 Hr	20	-	679.55	4861.16	4.51	23%		
		Annual		-	681.45	4861.56	0.02			
Hydrogen Fluoride (HF)	7664-39-3	1 Hr		-	681.00	4859.66	3.26			
		24 Hr	0.86	-	679.55	4861.16	0.45	52%		
		30 day	0.34	-	679.55	4861.16	0.03	7%		
		Annual		-	681.45	4861.56	1.90E-03			
Nitrogen Dioxide (NO_2)	10102-44-0	1 Hr	400	64.6	681.00	4859.66	71.51	18%	136.09	34%
		24 Hr	200	58.2	679.55	4861.16	9.88	5%	68.10	34%
		Annual	100[5]	37	681.45	4861.56	0.18	<0.1%	37.21	37%
Carbon Monoxide (CO)	630-08-0	1/2 hr	6000	1257	681.00	4859.66	198.12	3%	1455.22	24%
		1 Hr	36200[3]	1035	681.00	4859.66	163.17	<0.1%	1198.51	3%
		8 Hr	15700[3]	1036	679.55	4861.16	50.56	<0.1%	1086.56	7%
		24 Hr		1029	679.55	4861.16	22.53		1051.52	
		Annual		632	681.45	4861.56	0.09		631.76	
Particulate Matter PM_{10}	PM_{10}	1 Hr		-	677.30	4863.11	36.72			
		24 Hr	50[3]	-	680.39	4860.32	5.28	11%		
		Annual		-	681.75	4862.16	0.02			

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentrations (µg/m³)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
					Easting (km)	Northing (km)				
Particulate Matter $PM_{2.5}$	PM_{25}	1 Hr		22.8	677.30	4863.11	36.72		59.54	
		24 Hr	30[6]	20.4	680.39	4860.32	5.28	18%	25.71	86%
		Annual		9.8	681.75	4862.16	0.02		9.80	
Total Particulate Matter	TPM	1 Hr		86.2	677.30	4863.11	36.72		122.88	
		24 Hr	120	35.4	680.39	4860.32	5.28	4%	40.67	34%
		Annual	60 [5]	21.3	681.75	4862.16	0.02	<0.1%	21.30	35%
Ammonia (Slip at stack)	<ammonia>	1 Hr		-	681.00	4859.66	19.58			
		24 Hr	100[3]	-	679.55	4861.16	2.70	3%		
		Annual		-	681.45	4861.56	0.01			
Organic Matter (as CH_4)	VOC	1 Hr		-	681.00	4859.66	177.67			
		24 Hr		-	679.55	4861.16	24.54			
		Annual		-	681.45	4861.56	0.20			
Chlorinated Polycyclic Aromatics										
Dioxins (as TEQ Toxic Equivalents)	<dioxin>	1 Hr		5.77E-08	681.00	4859.66	2.18E-07		2.75E-07	
		24 Hr	5.00E-06	2.37E-08	679.55	4861.16	3.00E-08	1%	5.37E-08	1%
		Annual		1.66E-08	681.45	4861.56	2.44E-10		1.68E-08	
Polychlorinated Biphenyls (PCB)	<pcb>	1 Hr		1.02E-04	681.00	4859.66	2.62E-04		3.64E-04	
		24 Hr		4.20E-05	679.55	4861.16	3.62E-05	<0.1%	7.82E-05	<0.1%
		Annual		1.85E-05	681.45	4861.56	2.94E-07	<0.1%	1.88E-05	<0.1%

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentrations (µg/m³)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
					Easting (km)	Northing (km)				
Metals										
Aluminum	7429-90-5	1 Hr		0.52	681.00	4859.66	0.14		0.66	
		24 Hr	4.8[4]	0.21	679.55	4861.16	0.02	<0.1%	0.23	5%
		Annual		0.11	681.45	4861.56	8.38E-05		0.11	
Antimony	7440-36-0	1 Hr		7.35E-03	681.00	4859.66	9.94E-03		0.02	
		24 Hr	25	3.02E-03	679.55	4861.16	1.37E-03	<0.1%	4.39E-03	<0.1%
		Annual		2.93E-03	681.45	4861.56	5.77E-06		2.93E-03	
Arsenic	7440-38-2	1 Hr		4.41E-03	681.00	4859.66	1.52E-03		5.93E-03	
		24 Hr	0.3[2]	1.81E-03	679.55	4861.16	2.10E-04	<0.1%	2.02E-03	1%
		Annual		1.80E-03	681.45	4861.56	8.85E-07		1.80E-03	
Barium	7440-39-3	1 Hr		0.02	681.00	4859.66	7.67E-03		0.03	
		24 Hr	10[2]	8.18E-03	679.55	4861.16	1.06E-03	<0.1%	9.24E-03	<0.1%
		Annual		4.95E-03	681.45	4861.56	4.46E-06		4.95E-03	
Beryllium	7440-41-7	1 Hr		7.35E-04	681.00	4859.66	1.21E-03		1.94E-03	
		24 Hr	0.01	3.02E-04	679.55	4861.16	1.67E-04	2%	4.69E-04	5%
		Annual		2.98E-04	681.45	4861.56	7.02E-07		2.98E-04	
Boron	7440-42-8	1 Hr		0.19	681.00	4859.66	0.55		0.74	
		24 Hr	120	0.08	679.55	4861.16	0.08	<0.1%	0.15	<0.1%
		Annual		0.02	681.45	4861.56	3.22E-04		0.02	
Cadmium (Cd)	7440-43-9	1 Hr		1.47E-03	681.00	4859.66	0.03		0.03	
		24 Hr	0.025	6.04E-04	679.55	4861.16	3.51E-03	14%	4.11E-03	16%
		Annual	0.005[3]	6.01E-04	681.45	4861.56	1.48E-05	<0.1%	6.16E-04	12%

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentrations ($\mu g/m^3$)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
					Easting (km)	Northing (km)				
Cadmium and Thallium (Cd + Th)	<cdth>	1 Hr		-	681.00	4859.66	0.17			
		24 Hr		-	679.55	4861.16	0.02			
		Annual		-	681.45	4861.56	9.69E-05			
Chromium (hexavalent)	<ch-hexa>	1 Hr		-	681.00	4859.66	1.16E-03			
		24 Hr		-	679.55	4861.16	1.60E-04			
		Annual		-	681.45	4861.56	6.74E-07			
Total Chromium (and compounds)	7440-47-3	1 Hr		6.72E-03	681.00	4859.66	8.16E-03		0.01	
		24 Hr	1.5[3]	2.76E-03	679.55	4861.16	1.13E-03	<0.1%	3.88E-03	<0.1%
		Annual		1.71E-03	681.45	4861.56	4.74E-06		1.72E-03	
Cobalt	7440-48-4	1 Hr		1.47E-03	681.00	4859.66	0.02		0.02	
		24 Hr	0.1[3]	6.04E-04	679.55	4861.16	2.90E-03	3%	3.51E-03	4%
		Annual		5.96E-04	681.45	4861.56	1.22E-05		6.08E-04	
Lead (Pb)	7439-92-1	1 Hr		0.01	681.00	4859.66	0.18		0.19	
		24 Hr	0.5	4.98E-03	679.55	4861.16	0.03	5%	0.03	6%
		30 day	0.2	1.92E-03	679.55	4861.16	1.40E-03	<1.1%	3.32E-03	2%
		Annual		3.29E-03	681.45	4861.56	1.05E-04		3.39E-03	
Mercury (Hg) - Vapour/Particulate phase	7439-97-6	1 Hr		-	681.00	4859.66	0.05			
		24 Hr	2	-	679.55	4861.16	7.51E-03	<0.1%		
		Annual		-	681.45	4861.56	3.16E-05			
Nickel	7440-02-0	1 Hr		0.01	681.00	4859.66	0.32		0.33	
		24 Hr	2	4.49E-03	679.55	4861.16	0.04	2%	0.05	2%
		Annual		2.24E-03	681.45	4861.56	1.84E-04		2.43E-03	

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentrations (µg/m³)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
					Easting (km)	Northing (km)				
Phosphorus	7723-14-0	1 Hr		0.18	681.00	4859.66	0.17		0.34	
		24 Hr	0.35[4]	0.07	679.55	4861.16	0.02	7%	0.09	27%
		Annual		0.05	681.45	4861.56	9.70E-05		0.05	
Silver	7440-22-4	1 Hr		8.33E-04	681.00	4859.66	0.01		0.01	
		24 Hr	1	3.42E-04	679.55	4861.16	1.68E-03	<0.1%	2.02E-03	<0.1%
		Annual		3.43E-04	681.45	4861.56	7.06E-06		3.50E-04	
Selenium	7782-49-2	1 Hr		7.35E-03	681.00	4859.66	1.74E-03		9.09E-03	
		24 Hr	10[2]	3.02E-03	679.55	4861.16	2.40E-04	<0.1%	3.26E-03	<0.1%
		Annual		2.93E-03	681.45	4861.56	1.01E-06		2.93E-03	
Thallium	7440-28-0	1 Hr		-	681.00	4859.66	0.14			
		24 Hr	0.24[4]	-	679.55	4861.16	0.02	8%		
		Annual		-	681.45	4861.56	8.22E-05			
Tin	7440-31-5	1 Hr		7.35E-03	681.00	4859.66	0.06		0.07	
		24 Hr	10	3.02E-03	679.55	4861.16	8.81E-03	<0.1%	0.01	<0.1%
		Annual		2.93E-03	681.45	4861.56	3.71E-05		2.96E-03	
Vanadium	7440-62-2	1 Hr		3.77E-03	681.00	4859.66	4.22E-03		7.99E-03	
		24 Hr	2	1.55E-03	679.55	4861.16	5.82E-04	<0.1%	2.13E-03	<0.1%
		Annual		7.70E-04	681.45	4861.56	2.45E-06		7.72E-04	
Zinc	7440-66-6	1 Hr		0.10	681.00	4859.66	0.72		0.83	
		24 Hr	120	0.04	679.55	4861.16	0.10	<0.1%	0.14	<0.1%
		Annual		0.03	681.45	4861.56	4.21E-04		0.03	

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m^3)	Background Concentrations (µg/m^3)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m^3)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m^3)	% of Criteria
					Easting (km)	Northing (km)				
Sum of (As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb)	<sum>	1 Hr		0.52	681.00	4859.66	1.67		2.18	
		24 Hr		0.21	679.55	4861.16	0.23		0.44	
		Annual		0.11	681.45	4861.56	9.69E-04		0.11	
Chlorinated Monocyclic Aromatics										
1,2-Dichlorobenzene	95-50-1	1 Hr	30500[2]	0.03	681.00	4859.66	7.42E-03	<0.1%	0.03	<0.1%
		24 Hr		0.01	679.55	4861.16	1.02E-03		0.01	
		Annual		4.66E-03	681.45	4861.56	8.32E-06		4.67E-03	
1,2,4,5-Tetrachlorobenzene	95-94-3	1 Hr		-	681.00	4859.66	1.87E-04			
		24 Hr	1[4]	-	679.55	4861.16	2.58E-05	<0.1%		
		Annual		-	681.45	4861.56	2.10E-07			
1,2,4 – Trichlorobenzene	120-82-1	1 Hr		0.11	681.00	4859.66	1.87E-04		0.11	
		24 Hr	400[2]	0.05	679.55	4861.16	2.58E-05	<0.1%	0.05	<0.1%
		Annual		0.02	681.45	4861.56	2.10E-07		0.02	
2,3,4,6-Tetrachlorophenol	58-90-2	1 Hr		-	681.00	4859.66	6.30E-04			
		24 Hr		-	679.55	4861.16	8.70E-05			
		Annual		-	681.45	4861.56	7.07E-07			
2,4,6-Trichlorophenol	88-06-2	1 Hr		-	681.00	4859.66	1.90E-04			
		24 Hr	1.5[4]	-	679.55	4861.16	2.62E-05	<0.1%		
		Annual		-	681.45	4861.56	2.13E-07			
2,4-Dichlorophenol	120-83-2	1 Hr		-	681.00	4859.66	3.73E-04			
		24 Hr	77[4]	-	679.55	4861.16	5.16E-05	<0.1%		
		Annual		-	681.45	4861.56	4.19E-07			

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentrations (µg/m³)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
					Easting (km)	Northing (km)				
Pentachlorophenol	87-86-5	1 Hr		2.13E-03	681.00	4859.66	7.48E-04		2.88E-03	
		24 Hr	20[2]	8.76E-04	679.55	4861.16	1.03E-04	<0.1%	9.80E-04	<0.1%
		Annual		4.10E-04	681.45	4861.56	8.39E-07		4.11E-04	
Hexachlorobenzene	118-74-1	1 Hr		1.52E-04	681.00	4859.66	1.87E-04		3.39E-04	
		24 Hr	0.011[4]	6.25E-05	679.55	4861.16	2.58E-05	<0.1%	8.83E-05	1%
		Annual		5.27E-05	681.45	4861.56	2.10E-07		5.29E-05	
Pentachlorobenzene	608-93-5	1 Hr		-	681.00	4859.66	4.91E-04			
		24 Hr	3[4]	-	679.55	4861.16	6.77E-05	<0.1%		
		Annual		-	681.45	4861.56	5.51E-07			
Polycyclic Organic Matter										
Acenaphthylene	208-96-8	1 Hr		7.53E-04	681.00	4859.66	5.26E-05		8.05E-04	
		24 Hr	3.5[4]	3.09E-04	679.55	4861.16	7.26E-06	<0.1%	3.16E-04	0%
		Annual		1.58E-04	681.45	4861.56	5.90E-08		1.58E-04	
Acenaphthene	83-32-9	1 Hr		3.04E-03	681.00	4859.66	6.74E-05		3.11E-03	
		24 Hr		1.25E-03	679.55	4861.16	9.31E-06		1.26E-03	
		Annual		5.48E-04	681.45	4861.56	7.57E-08		5.48E-04	
Anthracene	120-12-7	1 Hr		3.97E-04	681.00	4859.66	1.48E-05		4.12E-04	
		24 Hr	0.2[4]	1.63E-04	679.55	4861.16	2.04E-06	<0.1%	1.65E-04	<0.1%
		Annual		8.00E-05	681.45	4861.56	1.66E-08		8.00E-05	
Benzo(a)anthracene	56-55-6	1 Hr		1.65E-04	681.00	4859.66	5.44E-06		1.70E-04	
		24 Hr		6.77E-05	679.55	4861.16	7.51E-07		6.85E-05	
		Annual		5.63E-05	681.45	4861.56	6.10E-09		5.63E-05	

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentrations (µg/m³)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
					Easting (km)	Northing (km)				
Benzo(b)fluoranthene	205-99-2	1 Hr		3.45E-04	681.00	4859.66	1.39E-05		3.58E-04	
		24 Hr		1.42E-04	679.55	4861.16	1.92E-06		1.43E-04	
		Annual		7.56E-05	681.45	4861.56	1.56E-08		7.57E-05	
Benzo(k)fluoranthene	207-08-9	1 Hr		1.65E-04	681.00	4859.66	3.66E-06		1.69E-04	
		24 Hr		6.77E-05	679.55	4861.16	5.06E-07		6.82E-05	
		Annual		5.63E-05	681.45	4861.56	4.11E-09		5.63E-05	
Benzo(a)fluorene	238-84-6	1 Hr		3.30E-04	681.00	4859.66	1.00E-04		4.30E-04	
		24 Hr		1.35E-04	679.55	4861.16	1.38E-05		1.49E-04	
		Annual		1.13E-04	681.45	4861.56	1.12E-07		1.13E-04	
Benzo(b)fluorene	243-17-4	1 Hr		3.30E-04	681.00	4859.66	6.86E-05		3.98E-04	
		24 Hr		1.35E-04	679.55	4861.16	9.47E-06		1.45E-04	
		Annual		1.13E-04	681.45	4861.56	7.70E-08		1.13E-04	
Benzo(ghi)perylene	191-24-2	1 Hr		1.72E-04	681.00	4859.66	1.50E-04		3.22E-04	
		24 Hr	1.2[4]	7.07E-05	679.55	4861.16	2.07E-05	<0.1%	9.14E-05	<0.1%
		Annual		5.85E-05	681.45	4861.56	1.68E-07		5.86E-05	
Benzo(a)pyrene	50-32-8	1 Hr		1.65E-04	681.00	4859.66	1.25E-05		1.77E-04	
		24 Hr	0.0011	6.77E-05	679.55	4861.16	1.72E-06	<0.1%	6.95E-05	6%
		Annual	0.0003[3]	5.63E-05	681.45	4861.56	1.40E-08	<0.1%	5.64E-05	19%
Benzo(e)pyrene	192-97-2	1 Hr		3.30E-04	681.00	4859.66	3.16E-05		3.61E-04	
		24 Hr		1.35E-04	679.55	4861.16	4.36E-06		1.40E-04	
		Annual		1.13E-04	681.45	4861.56	3.54E-08		1.13E-04	

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentrations (µg/m³)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
					Easting (km)	Northing (km)				
Biphenyl	92-52-4	1 Hr	60[2]	3.32E-03	681.00	4859.66	0.01	<0.1%	0.01	<0.1%
		24 Hr		1.36E-03	679.55	4861.16	1.49E-03		2.86E-03	
		Annual		5.21E-04	681.45	4861.56	1.21E-05		5.33E-04	
Chrysene	218-01-9	1 Hr		2.35E-04	681.00	4859.66	1.37E-05		2.48E-04	
		24 Hr		9.64E-05	679.55	4861.16	1.89E-06		9.83E-05	
		Annual		6.47E-05	681.45	4861.56	1.53E-08		6.47E-05	
Coronene	191-07-1	1 Hr		3.30E-04	681.00	4859.66	0.00E+00		3.30E-04	
		24 Hr		1.35E-04	679.55	4861.16	0.00E+00		1.35E-04	
		Annual		1.13E-04	681.45	4861.56	0.00E+00		1.13E-04	
Dibenzo(a,c)anthracene	215-58-7	1 Hr		-	681.00	4859.66	9.72E-05			
		24 Hr		-	679.55	4861.16	1.34E-05			
		Annual		-	681.45	4861.56	1.09E-07			
Dibenzo(a,h)anthracene	53-70-3	1 Hr		1.65E-04	681.00	4859.66	4.39E-06		1.69E-04	
		24 Hr		6.77E-05	679.55	4861.16	6.06E-07		6.83E-05	
		Annual		5.63E-05	681.45	4861.56	4.92E-09		5.63E-05	
9,10 – dimethylanthracene	781-43-1	1 Hr		1.32E-03	681.00	4859.66	0.00E+00		1.32E-03	
		24 Hr		5.42E-04	679.55	4861.16	0.00E+00		5.42E-04	
		Annual		4.51E-04	681.45	4861.56	0.00E+00		4.51E-04	
Fluoranthene	206-44-0	1 Hr		1.46E-03	681.00	4859.66	1.51E-04		1.61E-03	
		24 Hr	140[4]	6.01E-04	679.55	4861.16	2.08E-05	<0.1%	6.22E-04	<0.1%
		Annual		3.93E-04	681.45	4861.56	1.69E-07		3.93E-04	

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentrations (µg/m³)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
					Easting (km)	Northing (km)				
Fluorine	7782-41-4	1 Hr		-	681.00	4859.66	1.13E-04			
		24 Hr		-	679.55	4861.16	1.57E-05			
		Annual		-	681.45	4861.56	1.27E-07			
Indeno(1,2,3 – cd)pyrene	193-39-5	1 Hr		1.65E-04	681.00	4859.66	2.73E-05		1.92E-04	
		24 Hr		6.77E-05	679.55	4861.16	3.78E-06		7.15E-05	
		Annual		5.63E-05	681.45	4861.56	3.07E-08		5.64E-05	
1 – methylnaphthalene	90-12-0	1 Hr		3.17E-03	681.00	4859.66	3.56E-04		3.53E-03	
		24 Hr	12[4]	1.30E-03	679.55	4861.16	4.92E-05	<0.1%	1.35E-03	<0.1%
		Annual		4.43E-04	681.45	4861.56	4.00E-07		4.44E-04	
2 – methylnaphthalene	91-57-6	1 Hr		5.33E-03	681.00	4859.66	1.97E-03		7.30E-03	
		24 Hr	10[4]	2.19E-03	679.55	4861.16	2.72E-04	<0.1%	2.46E-03	<0.1%
		Annual		7.56E-04	681.45	4861.56	2.21E-06		7.58E-04	
Naphthalene	91-20-3	10 min	50	9.77E-03	681.00	4859.66	2.53E-03	<0.1%	0.01	<0.1%
		1 Hr		5.91E-03	681.00	4859.66	1.53E-03		7.45E-03	
		24 Hr	22.5	2.43E-03	679.55	4861.16	2.12E-04	<0.1%	2.64E-03	<0.1%
		Annual		8.59E-04	681.45	4861.56	1.72E-06		8.61E-04	
Perylene	198-55-0	1 Hr		3.30E-04	681.00	4859.66	5.48E-06		3.35E-04	
		24 Hr		1.35E-04	679.55	4861.16	7.56E-07		1.36E-04	
		Annual		1.13E-04	681.45	4861.56	6.15E-09		1.13E-04	
Phenanthrene	85-01-8	1 Hr		6.26E-03	681.00	4859.66	3.43E-04		6.61E-03	
		24 Hr		2.57E-03	679.55	4861.16	4.74E-05		2.62E-03	
		Annual		1.71E-03	681.45	4861.56	3.85E-07		1.71E-03	

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentrations ($\mu g/m^3$)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
					Easting (km)	Northing (km)				
Pyrene	129-00-0	1/2 Hr	0.6[4]	8.35E-04	681.00	4859.66	2.21E-04	<0.1%	1.06E-03	<0.1%
		1 Hr		6.88E-04	681.00	4859.66	1.82E-04		8.70E-04	
		24 Hr	0.2[4]	2.83E-04	679.55	4861.16	2.51E-05	<0.1%	3.08E-04	<0.1%
		Annual		1.83E-04	681.45	4861.56	2.04E-07		1.83E-04	
Tetralin	119-64-2	1 Hr		3.30E-04	681.00	4859.66	1.81E-03		2.14E-03	
		24 Hr	1200[4]	1.35E-04	679.55	4861.16	2.50E-04	<0.1%	3.85E-04	<0.1%
		Annual		1.13E-04	681.45	4861.56	2.03E-06		1.15E-04	
O-terphenyl	84-15-1	1 Hr		3.30E-04	681.00	4859.66	2.97E-04		6.26E-04	
		24 Hr		1.35E-04	679.55	4861.16	4.10E-05		1.76E-04	
		Annual		1.13E-04	681.45	4861.56	3.33E-07		1.13E-04	
Volatile Organic Chemicals (VOC)										
Acetaldehyde	75-07-0	1/2 Hr	500	5.21	681.00	4859.66	3.19E-06	<0.1%	5.21	1%
		1 Hr		4.29	681.00	4859.66	2.62E-06		4.29	
		24 Hr	500	1.76	679.55	4861.16	3.62E-07	<0.1%	1.76	<0.1%
		Annual		1.05	681.45	4861.56	2.95E-09		1.05	
Benzene	71-43-2	1 Hr		28.81	681.00	4859.66	0.11		28.92	
		24 Hr		11.83	679.55	4861.16	0.02		11.85	
		Annual		3.94	681.45	4861.56	1.26E-04		3.94	
Bromodichloromethane	75-27-4	1 Hr		0.04	681.00	4859.66	0.92		0.96	
		24 Hr		0.02	679.55	4861.16	0.13		0.14	
		Annual		0.01	681.45	4861.56	1.03E-03		0.01	

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (μg/m³)	Background Concentrations (μg/m³)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset (μg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (μg/m³)	% of Criteria
					Easting (km)	Northing (km)				
Bromoform	75-25-2	1 Hr		0.07	681.00	4859.66	0.25		0.32	
		24 Hr	55[2]	0.03	679.55	4861.16	0.03	<0.1%	0.06	<0.1%
		Annual		0.02	681.45	4861.56	2.81E-04		0.02	
Bromomethane	74-83-9	1 Hr		0.22	681.00	4859.66	0.13		0.35	
		24 Hr	1350[3]	0.09	679.55	4861.16	0.02	<0.1%	0.11	<0.1%
		Annual		0.10	681.45	4861.56	1.46E-04		0.10	
Carbon tetrachloride	56-23-5	1 Hr		1.80	681.00	4859.66	1.56E-03		1.80	
		24 Hr	2.4	0.74	679.55	4861.16	2.16E-04	<0.1%	0.74	31%
		Annual		0.61	681.45	4861.56	1.75E-06		0.61	
Chloroform	67-66-3	1 Hr		0.55	681.00	4859.66	1.85E-03		0.55	
		24 Hr	1	0.23	679.55	4861.16	2.55E-04	<0.1%	0.23	23%
		Annual	0.2[3]	0.16	681.45	4861.56	2.08E-06	<0.1%	0.16	81%
Dichlorodifluoromethane	75-71-8	1 Hr		7.87	681.00	4859.66	0.32		8.19	
		24 Hr	500000[2]	3.23	679.55	4861.16	0.04	<0.1%	3.28	<0.1%
		Annual		2.81	681.45	4861.56	3.54E-04		2.81	
Dichloroethene, 1,1 -	75-35-4	1 Hr		6.09E-03	681.00	4859.66	2.05E-03		8.14E-03	
		24 Hr	10	2.50E-03	679.55	4861.16	2.83E-04	<0.1%	2.78E-03	<0.1%
		Annual		5.76E-04	681.45	4861.56	2.30E-06		5.78E-04	
Dichloromethane	75-09-2	1 Hr		3.08	681.00	4859.66	0.64		3.72	
		24 Hr	220	1.27	679.55	4861.16	0.09	<0.1%	1.35	1%
		Annual	44[3]	0.76	681.45	4861.56	7.16E-04	<0.1%	0.76	2%

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentrations ($\mu g/m^3$)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
					Easting (km)	Northing (km)				
Ethylbenzene	100-41-4	10 min	1900 [2]	5.00	681.00	4859.66	6.20E-03	<0.1%	5.01	<0.1%
		1 Hr		3.03	681.00	4859.66	3.76E-03		3.03	
		24 Hr	1000	1.24	679.55	4861.16	5.19E-04	<0.1%	1.24	<0.1%
		Annual		0.69	681.45	4861.56	4.22E-06		0.69	
Ethylene Dibromide	106-93-4	1 Hr		0.01	681.00	4859.66	1.47E-03		0.01	
		24 Hr	3[2]	5.20E-03	679.55	4861.16	2.03E-04	<0.1%	5.40E-03	<0.1%
		Annual		1.84E-03	681.45	4861.56	1.65E-06		1.84E-03	
Formaldehyde	50-00-0	1 Hr		8.23	681.00	4859.66	0.17		8.40	
		24 Hr	65	3.38	679.55	4861.16	0.02	<0.1%	3.40	5%
		Annual		1.66	681.45	4861.56	1.93E-04		1.66	
Tetrachloroethene	127-18-4	1 Hr		1.20	681.00	4859.66	0.02		1.22	
		24 Hr	360	0.49	679.55	4861.16	2.84E-03	<0.1%	0.50	<0.1%
		Annual		0.26	681.45	4861.56	2.31E-05		0.26	
Toluene	108-88-3	10 Min		38.09	681.00	4859.66	0.30		38.39	
		1 Hr		23.06	681.00	4859.66	0.18		23.25	
		24 Hr	2000[2]	9.47	679.55	4861.16	0.03	<0.1%	9.50	<0.1%
		Annual		4.40	681.45	4861.56	2.05E-04		4.40	
Trichloroethane, 1,1,1 -	71-55-6	1 Hr		0.28	681.00	4859.66	5.18E-03		0.28	
		24 Hr	115000	0.11	679.55	4861.16	7.15E-04	<0.1%	0.11	<0.1%
		Annual		0.10	681.45	4861.56	5.81E-06		0.10	

Table 7-11 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 140,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentrations ($\mu g/m^3$)	UTM Coordinate		Predicted Statistical Max Concentration for Process Upset ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
					Easting (km)	Northing (km)				
Trichloroethene	79-01-6	1 Hr		1.31	681.00	4859.66	1.78E-03		1.31	
		24 Hr	12	0.54	679.55	4861.16	2.46E-04	<0.1%	0.54	4%
		Annual	2.3[3]	0.27	681.45	4861.56	2.00E-06	<0.1%	0.27	12%
Trichlorofluoromethane	75-69-4	1 Hr		5.23	681.00	4859.66	0.62		5.85	
		24 Hr	6000[2]	2.15	679.55	4861.16	0.09	<0.1%	2.23	<0.1%
		Annual		1.89	681.45	4861.56	7.01E-04		1.89	
Vinyl chloride	75-01-4	1 Hr		0.01	681.00	4859.66	0.16		0.17	
		24 Hr	1	5.88E-03	679.55	4861.16	0.02	2%	0.03	3%
		Annual	0.2[3]	3.65E-03	681.45	4861.56	1.77E-04	<0.1%	3.83E-03	2%
Xylenes, m-, p- and o-	<xylene>	10 min	3000	19.40	681.00	4859.66	3.62	<0.1%	23.02	1%
		1 Hr		11.75	681.00	4859.66	2.19		13.94	
		24 Hr	730	4.83	679.55	4861.16	0.30	<0.1%	5.13	1%
		Annual		2.76	681.45	4861.56	2.46E-03		2.76	

Notes:
[1] Reg419/05 Schedule 3 Criteria unless stated otherwise
[2] O. Reg. 419 Guidelines
[3] Ontario's ambient air quality criteria
[4] Jurisdictional Screening Level List (JSL)
[5] National Ambient Air Quality Objectives (NAAQO) Max Desirable Level
[6] CCME (2000), Canada-Wide Standards for Respirable Particulate Matter

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentrations (µg/m³)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
					x (km)	y (km)				
Sulphur Dioxide (SO_2)	7446-09-5	1 Hr	690	19.5	680.65	4860.52	340.94	49%	360.46	52%
		24 Hr	275	19.3	676.80	4859.61	41.13	15%	60.42	22%
		Annual	55[3]	5.9	678.55	4860.76	0.20	<0.1%	6.12	11%
Hydrogen Chloride (HCl)	7647-01-0	1 Hr		-	680.65	4860.52	55.32			
		24 Hr	20	-	676.80	4859.61	6.68	33%		
		Annual		-	678.55	4860.76	0.04			
Hydrogen Fluoride (HF)	7664-39-3	1 Hr		-	680.65	4860.52	5.53			
		24 Hr	0.86	-	676.80	4859.61	0.67	78%		
		30 day	0.34	-	676.80	4859.61	0.04	11%		
		Annual		-	678.55	4860.76	4.21E-03			
Nitrogen Oxides (NO_2)	10102-44-0	1 Hr	400	64.6	680.64	4860.55	140.38	35%	204.95	51%
		24 Hr	200	58.2	676.80	4859.61	16.99	8%	75.22	38%
		Annual	100[5]	37	678.55	4860.76	0.40	<0.1%	37.44	37%
Carbon Monoxide (CO)	630-08-0	1/2 hr	6000	1257	680.65	4860.52	335.86	<6.1%	1592.97	27%
		1 Hr	36200[3]	1035	680.65	4860.52	276.61	1%	1311.95	4%
		8 Hr	15700[3]	1036	680.10	4860.36	85.90	1%	1121.90	7%
		24 Hr		1029	676.80	4859.61	33.41		1062.39	
		Annual		632	678.55	4860.76	0.21		631.88	
Particulate Matter PM_{10}	PM10	1 Hr		-	680.64	4860.55	56.81			
		24 Hr	50[3]	-	682.30	4857.11	6.83	14%		
		Annual		-	681.75	4862.16	0.05			

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentrations (µg/m³)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
					x (km)	y (km)				
Particulate Matter $PM_{2.5}$	PM25	1 Hr		22.82	680.64	4860.55	56.81		79.63	
		24 Hr	30[6]	20.43	682.30	4857.11	6.83	23%	27.27	91%
		Annual		9.78	681.75	4862.16	0.05		9.83	
Total Particulate Matter	TPM	1 Hr		86.16	680.64	4860.55	56.81		142.97	
		24 Hr	120	35.39	682.30	4857.11	6.83	6%	42.22	35%
		Annual	60[5]	21.28	681.75	4862.16	0.05	<0.1%	21.32	36%
Ammonia (Slip at stack)	<ammonia>	1 Hr		-	680.65	4860.52	33.19			
		24 Hr	100[3]	-	676.80	4859.61	4.01	4%		
		Annual		-	678.55	4860.76	0.03			
Organic Matter (as CH_4)	VOC	1 Hr		-	680.65	4860.52	301.20			
		24 Hr		-	676.80	4859.61	36.38			
		Annual		-	678.55	4860.76	0.44			
Chlorinated Polycyclic Aromatics										
Dioxins (as TEQ Toxic Equivalents)	<dioxin>	1 Hr		5.77E-08	680.65	4860.52	3.69E-07		4.27E-07	
		24 Hr	5.00E-06	2.37E-08	676.80	4859.61	4.45E-08	1%	6.82E-08	<1.1%
		Annual		1.66E-08	678.55	4860.76	5.42E-10		1.71E-08	
Polychlorinated Biphenyls (PCB)	<pcb>	1 Hr		1.02E-04	680.65	4860.52	4.44E-04		5.46E-04	
		24 Hr	0.15	4.20E-05	676.80	4859.61	5.36E-05	<0.1%	9.56E-05	<0.1%
		Annual	0.035	1.85E-05	678.55	4860.76	6.52E-07	<0.1%	1.92E-05	<0.1%

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentrations ($\mu g/m^3$)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
					x (km)	y (km)				
Metals										
Aluminum	7429-90-5	1 Hr		0.52	680.65	4860.52	0.24		0.76	
		24 Hr	4.8[4]	0.21	676.80	4859.61	0.03	1%	0.24	5%
		Annual		0.11	678.55	4860.76	1.86E-04		0.11	
Antimony	7440-36-0	1 Hr		7.35E-03	680.65	4860.52	0.02		0.02	
		24 Hr	25	3.02E-03	676.80	4859.61	2.03E-03	<0.1%	5.05E-03	<0.1%
		Annual		2.93E-03	678.55	4860.76	1.28E-05		2.94E-03	
Arsenic	7440-38-2	1 Hr		4.41E-03	680.65	4860.52	2.58E-03		6.99E-03	
		24 Hr	0.3[2]	1.81E-03	676.80	4859.61	3.12E-04	<0.1%	2.12E-03	1%
		Annual		1.80E-03	678.55	4860.76	1.97E-06		1.80E-03	
Barium	7440-39-3	1 Hr		0.02	680.65	4860.52	0.01		0.03	
		24 Hr	10[2]	8.18E-03	676.80	4859.61	1.57E-03	<0.1%	9.75E-03	<0.1%
		Annual		4.95E-03	678.55	4860.76	9.89E-06		4.96E-03	
Beryllium	7440-41-7	1 Hr		7.35E-04	680.65	4860.52	2.05E-03		2.78E-03	
		24 Hr	0.01	3.02E-04	676.80	4859.61	2.47E-04	2%	5.49E-04	5%
		Annual		2.98E-04	678.55	4860.76	1.56E-06		2.99E-04	
Boron	7440-42-8	1 Hr		0.19	680.65	4860.52	0.94		1.13	
		24 Hr	120	0.08	676.80	4859.61	0.11	<0.1%	0.19	<0.1%
		Annual		0.02	678.55	4860.76	7.16E-04		0.02	

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentrations ($\mu g/m^3$)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
					x (km)	y (km)				
Cadmium (Cd)	7440-43-9	1 Hr		1.47E-03	680.65	4860.52	0.04		0.04	
		24 Hr	0.025	6.04E-04	676.80	4859.61	5.20E-03	21%	5.80E-03	23%
		Annual	0.005[3]	6.01E-04	678.55	4860.76	3.28E-05	1%	6.34E-04	13%
Cadmium and Thallium (Cd + Th)	<cdth>	1 Hr		-	680.65	4860.52	0.28			
		24 Hr		-	676.80	4859.61	0.03			
		Annual		-	678.55	4860.76	2.15E-04			
Chromium (hexavalent)	<ch-hexa>	1 Hr		-	680.65	4860.52	1.97E-03			
		24 Hr		-	676.80	4859.61	2.38E-04			
		Annual		-	678.55	4860.76	1.50E-06			
Total Chromium (and compounds)	7440-47-3	1 Hr		6.72E-03	680.65	4860.52	0.01		0.02	
		24 Hr	1.5[3]	2.76E-03	676.80	4859.61	1.67E-03	0%	4.43E-03	<0.1%
		Annual		1.71E-03	678.55	4860.76	1.05E-05		1.72E-03	
Cobalt	7440-48-4	1 Hr		1.47E-03	680.65	4860.52	0.04		0.04	
		24 Hr	0.1[3]	6.04E-04	676.80	4859.61	4.30E-03	4%	4.90E-03	5%
		Annual		5.96E-04	678.55	4860.76	2.71E-05		6.23E-04	
Lead (Pb)	7439-92-1	1 Hr		0.01	680.65	4860.52	0.31		0.32	
		24 Hr	0.5	4.98E-03	676.80	4859.61	0.04	7%	0.04	8%
		30 day	0.2	1.92E-03	676.80	4859.61	2.08E-03	1%	4.00E-03	2%
		Annual		3.29E-03	678.55	4860.76	2.34E-04		3.52E-03	

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentrations (µg/m³)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
					x (km)	y (km)				
Mercury (Hg) - Vapour/Particulate phase	7439-97-6	1 Hr		-	680.65	4860.52	0.09			
		24 Hr	2	-	676.80	4859.61	0.01	1%		
		Annual		-	678.55	4860.76	7.02E-05			
Nickel	7440-02-0	1 Hr		0.01	680.65	4860.52	0.54		0.55	
		24 Hr	2	4.49E-03	676.80	4859.61	0.06	3%	0.07	3%
		Annual		2.24E-03	678.55	4860.76	4.08E-04		2.65E-03	
Phosphorus	7723-14-0	1 Hr		0.18	680.65	4860.52	0.28		0.46	
		24 Hr	0.35[4]	0.07	676.80	4859.61	0.03	10%	0.11	30%
		Annual		0.05	678.55	4860.76	2.15E-04		0.05	
Silver	7440-22-4	1 Hr		8.33E-04	680.65	4860.52	0.02		0.02	
		24 Hr	1	3.42E-04	676.80	4859.61	2.49E-03	<0.1%	2.83E-03	<0.1%
		Annual		3.43E-04	678.55	4860.76	1.57E-05		3.59E-04	
Selenium	7782-49-2	1 Hr		7.35E-03	680.65	4860.52	2.95E-03		0.01	
		24 Hr	10[2]	3.02E-03	676.80	4859.61	3.56E-04	<0.1%	3.37E-03	<0.1%
		Annual		2.93E-03	678.55	4860.76	2.25E-06		2.93E-03	
Thallium	7440-28-0	1 Hr		-	680.65	4860.52	0.24			
		24 Hr	0.24[4]	-	676.80	4859.61	0.03	12%		
		Annual		-	678.55	4860.76	1.82E-04			
Tin	7440-31-5	1 Hr		7.35E-03	680.65	4860.52	0.11		0.12	
		24 Hr	10	3.02E-03	676.80	4859.61	0.01	<0.1%	0.02	<0.1%
		Annual		2.93E-03	678.55	4860.76	8.23E-05		3.01E-03	

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentrations ($\mu g/m^3$)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
					x (km)	y (km)				
Vanadium	7440-62-2	1 Hr		3.77E-03	680.65	4860.52	7.15E-03		0.01	
		24 Hr	2	1.55E-03	676.80	4859.61	8.63E-04	<0.1%	2.41E-03	<0.1%
		Annual		7.70E-04	678.55	4860.76	5.44E-06		7.75E-04	
Zinc	7440-66-6	1 Hr		0.10	680.65	4860.52	1.23		1.33	
		24 Hr	120	0.04	676.80	4859.61	0.15	<0.1%	0.19	<0.1%
		Annual		0.03	678.55	4860.76	9.34E-04		0.03	
Sum of (As, Ni, Co, Pb, Cr, Cu, V, Mn, Sb)	<sum>	1 Hr		0.52	680.65	4860.52	2.83		3.34	
		24 Hr		0.21	676.80	4859.61	0.34		0.55	
		Annual		0.11	678.55	4860.76	2.15E-03		0.11	
Chlorinated Monocyclic Aromatics										
1,2-Dichlorobenzene	95-50-1	1 Hr	30500[2]	0.03	680.65	4860.52	0.01	<0.1%	0.04	<0.1%
		24 Hr		0.01	676.80	4859.61	1.52E-03		0.01	
		Annual		4.66E-03	678.55	4860.76	1.85E-05		4.68E-03	
1,2,4,5-Tetrachlorobenzene	95-94-3	1 Hr		-	680.65	4860.52	3.17E-04			
		24 Hr	1[4]	-	676.80	4859.61	3.82E-05	<0.1%		
		Annual		-	678.55	4860.76	4.65E-07			
1,2,4 – Trichlorobenzene	120-82-1	1 Hr		0.11	680.65	4860.52	3.17E-04		0.11	
		24 Hr	400[2]	0.05	676.80	4859.61	3.82E-05	<0.1%	0.05	<0.1%
		Annual		0.02	678.55	4860.76	4.65E-07		0.02	
2,3,4,6-Tetrachlorophenol	58-90-2	1 Hr		-	680.65	4860.52	1.07E-03			
		24 Hr		-	676.80	4859.61	1.29E-04			
		Annual		-	678.55	4860.76	1.57E-06			

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentrations ($\mu g/m^3$)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
					x (km)	y (km)				
2,4,6-Trichlorophenol	88-06-2	1 Hr		-	680.65	4860.52	3.22E-04			
		24 Hr	1.5[4]	-	676.80	4859.61	3.88E-05	<0.1%		
		Annual		-	678.55	4860.76	4.73E-07			
2,4-Dichlorophenol	120-83-2	1 Hr		-	680.65	4860.52	6.33E-04			
		24 Hr	77[4]	-	676.80	4859.61	7.65E-05	<0.1%		
		Annual		-	678.55	4860.76	9.31E-07			
Pentachlorophenol	87-86-5	1 Hr		2.13E-03	680.65	4860.52	1.27E-03		3.40E-03	
		24 Hr	20[2]	8.76E-04	676.80	4859.61	1.53E-04	<0.1%	1.03E-03	<0.1%
		Annual		4.10E-04	678.55	4860.76	1.86E-06		4.12E-04	
Hexachlorobenzene	118-74-1	1 Hr		1.52E-04	680.65	4860.52	3.17E-04		4.69E-04	
		24 Hr	0.011[4]	6.25E-05	676.80	4859.61	3.82E-05	0%	1.01E-04	1%
		Annual		5.27E-05	678.55	4860.76	4.65E-07		5.32E-05	
Pentachlorobenzene	608-93-5	1 Hr		-	680.65	4860.52	8.32E-04			
		24 Hr	3[4]	-	676.80	4859.61	1.00E-04	<0.1%		
		Annual		-	678.55	4860.76	1.22E-06			
Polycyclic Organic Matter										
Acenaphthylene	208-96-8	1 Hr		7.53E-04	680.65	4860.52	8.91E-05		8.42E-04	
		24 Hr	3.5[4]	3.09E-04	676.80	4859.61	1.08E-05	<0.1%	3.20E-04	<0.1%
		Annual		1.58E-04	678.55	4860.76	1.31E-07		1.58E-04	

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentrations ($\mu g/m^3$)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
					x (km)	y (km)				
Acenaphthene	83-32-9	1 Hr		3.04E-03	680.65	4860.52	1.14E-04		3.16E-03	
		24 Hr		1.25E-03	676.80	4859.61	1.38E-05		1.26E-03	
		Annual		5.48E-04	678.55	4860.76	1.68E-07		5.48E-04	
Anthracene	120-12-7	1 Hr		3.97E-04	680.65	4860.52	2.50E-05		4.22E-04	
		24 Hr	0.2[4]	1.63E-04	676.80	4859.61	3.02E-06	<0.1%	1.66E-04	<0.1%
		Annual		8.00E-05	678.55	4860.76	3.68E-08		8.01E-05	
Benzo(a)anthracene	56-55-6	1 Hr		1.65E-04	680.65	4860.52	9.22E-06		1.74E-04	
		24 Hr		6.77E-05	676.80	4859.61	1.11E-06		6.88E-05	
		Annual		5.63E-05	678.55	4860.76	1.36E-08		5.63E-05	
Benzo(b)fluoranthene	205-99-2	1 Hr		3.45E-04	680.65	4860.52	2.35E-05		3.68E-04	
		24 Hr		1.42E-04	676.80	4859.61	2.84E-06		1.44E-04	
		Annual		7.56E-05	678.55	4860.76	3.46E-08		7.57E-05	
Benzo(k)fluoranthene	207-08-9	1 Hr		1.65E-04	680.65	4860.52	6.21E-06		1.71E-04	
		24 Hr		6.77E-05	676.80	4859.61	7.50E-07		6.85E-05	
		Annual		5.63E-05	678.55	4860.76	9.13E-09		5.63E-05	
Benzo(a)fluorene	238-84-6	1 Hr		3.30E-04	680.65	4860.52	1.70E-04		5.00E-04	
		24 Hr		1.35E-04	676.80	4859.61	2.05E-05		1.56E-04	
		Annual		1.13E-04	678.55	4860.76	2.50E-07		1.13E-04	
Benzo(b)fluorene	243-17-4	1 Hr		3.30E-04	680.65	4860.52	1.16E-04		4.46E-04	
		24 Hr		1.35E-04	676.80	4859.61	1.40E-05		1.49E-04	
		Annual		1.13E-04	678.55	4860.76	1.71E-07		1.13E-04	

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentrations ($\mu g/m^3$)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
					x (km)	y (km)				
Benzo(ghi)perylene	191-24-2	1 Hr		1.72E-04	680.65	4860.52	2.54E-04		4.26E-04	
		24 Hr	1.2[4]	7.07E-05	676.80	4859.61	3.07E-05	<0.1%	1.01E-04	<0.1%
		Annual		5.85E-05	678.55	4860.76	3.73E-07		5.88E-05	
Benzo(a)pyrene	50-32-8	1 Hr		1.65E-04	680.65	4860.52	2.11E-05		1.86E-04	
		24 Hr	0.0011	6.77E-05	676.80	4859.61	2.55E-06	<0.1%	7.03E-05	6%
		Annual	0.0003[3]	5.63E-05	678.55	4860.76	3.11E-08	<0.1%	5.64E-05	19%
Benzo(e)pyrene	192-97-2	1 Hr		3.30E-04	680.65	4860.52	5.35E-05		3.83E-04	
		24 Hr		1.35E-04	676.80	4859.61	6.47E-06		1.42E-04	
		Annual		1.13E-04	678.55	4860.76	7.87E-08		1.13E-04	
Biphenyl	92-52-4	1 Hr	60[2]	3.32E-03	680.65	4860.52	0.02	<0.1%	0.02	<0.1%
		24 Hr		1.36E-03	676.80	4859.61	2.21E-03		3.58E-03	
		Annual		5.21E-04	678.55	4860.76	2.70E-05		5.48E-04	
Chrysene	218-01-9	1 Hr		2.35E-04	680.65	4860.52	2.32E-05		2.58E-04	
		24 Hr		9.64E-05	676.80	4859.61	2.80E-06		9.92E-05	
		Annual		6.47E-05	678.55	4860.76	3.41E-08		6.47E-05	
Dibenzo(a,c)anthracene	215-58-7	1 Hr		-	680.65	4860.52	1.65E-04			
		24 Hr		-	676.80	4859.61	1.99E-05			
		Annual		-	678.55	4860.76	2.42E-07			
Dibenzo(a,h)anthracene	53-70-3	1 Hr		1.65E-04	680.65	4860.52	7.44E-06		1.72E-04	
		24 Hr		6.77E-05	676.80	4859.61	8.98E-07		6.86E-05	
		Annual		5.63E-05	678.55	4860.76	1.09E-08		5.63E-05	

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentrations (µg/m³)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
					x (km)	y (km)				
Fluoranthene	206-44-0	1 Hr		1.46E-03	680.65	4860.52	2.56E-04		1.72E-03	
		24 Hr	140[4]	6.01E-04	676.80	4859.61	3.09E-05	<0.1%	6.32E-04	<0.1%
		Annual		3.93E-04	678.55	4860.76	3.76E-07		3.93E-04	
Fluorine	7782-41-4	1 Hr		-	680.65	4860.52	1.92E-04			
		24 Hr		-	676.80	4859.61	2.32E-05			
		Annual		-	678.55	4860.76	2.83E-07			
Indeno(1,2,3 – cd)pyrene	193-39-5	1 Hr		1.65E-04	680.65	4860.52	4.63E-05		2.11E-04	
		24 Hr		6.77E-05	676.80	4859.61	5.60E-06		7.33E-05	
		Annual		5.63E-05	678.55	4860.76	6.81E-08		5.64E-05	
1 – methylnaphthalene	90-12-0	1 Hr		3.17E-03	680.65	4860.52	6.04E-04		3.78E-03	
		24 Hr	12[4]	1.30E-03	676.80	4859.61	7.29E-05	<0.1%	1.38E-03	<0.1%
		Annual		4.43E-04	678.55	4860.76	8.87E-07		4.44E-04	
2 – methylnaphthalene	91-57-6	1 Hr		5.33E-03	680.65	4860.52	3.34E-03		8.67E-03	
		24 Hr	10[4]	2.19E-03	676.80	4859.61	4.04E-04	<0.1%	2.59E-03	<0.1%
		Annual		7.56E-04	678.55	4860.76	4.92E-06		7.61E-04	
Naphthalene	91-20-3	10 min	50	9.77E-03	680.65	4860.52	4.29E-03	<0.1%	0.01	<0.1%
		1 Hr		5.91E-03	680.65	4860.52	2.60E-03		8.51E-03	
		24 Hr	22.5	2.43E-03	676.80	4859.61	3.14E-04	<0.1%	2.74E-03	<0.1%
		Annual		8.59E-04	678.55	4860.76	3.82E-06		8.63E-04	
Perylene	198-55-0	1 Hr		3.30E-04	680.65	4860.52	9.28E-06		3.39E-04	
		24 Hr		1.35E-04	676.80	4859.61	1.12E-06		1.37E-04	
		Annual		1.13E-04	678.55	4860.76	1.36E-08		1.13E-04	

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentrations ($\mu g/m^3$)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
					x (km)	y (km)				
Phenanthrene	85-01-8	1 Hr		6.26E-03	680.65	4860.52	5.82E-04		6.85E-03	
		24 Hr		2.57E-03	676.80	4859.61	7.02E-05		2.64E-03	
		Annual		1.71E-03	678.55	4860.76	8.55E-07		1.71E-03	
Pyrene	129-00-0	1 Hr		6.88E-04	680.65	4860.52	3.09E-04		9.97E-04	
		24 Hr	0.2[4]	2.83E-04	676.80	4859.61	3.73E-05	<0.1%	3.20E-04	<0.1%
		Annual		1.83E-04	678.55	4860.76	4.54E-07		1.83E-04	
Tetralin	119-64-2	1 Hr		3.30E-04	680.65	4860.52	3.06E-03		3.39E-03	
		24 Hr	1200[4]	1.35E-04	676.80	4859.61	3.70E-04	<0.1%	5.06E-04	<0.1%
		Annual		1.13E-04	678.55	4860.76	4.51E-06		1.17E-04	
O-terphenyl	84-15-1	1 Hr		3.30E-04	680.65	4860.52	5.03E-04		8.33E-04	
		24 Hr		1.35E-04	676.80	4859.61	6.07E-05		1.96E-04	
		Annual		1.13E-04	678.55	4860.76	7.39E-07		1.13E-04	
Volatile Organic Chemicals (VOC)										
Acetaldehyde	75-07-0	1/2 Hr	500	5.21	680.65	4860.52	3.97E-06	<0.1%	5.21	1%
		1 Hr		4.29	680.65	4860.52	3.27E-06		4.29	
		24 Hr	500	1.76	676.80	4859.61	3.95E-07	<0.1%	1.76	<0.1%
		Annual		1.05	678.55	4860.76	4.80E-09		1.05	
Benzene	71-43-2	1 Hr		28.81	680.65	4860.52	0.19		29.00	
		24 Hr		11.83	676.80	4859.61	0.02		11.86	
		Annual		3.94	678.55	4860.76	2.80E-04		3.94	

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m³)	Background Concentrations (µg/m³)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m³)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m³)	% of Criteria
					x (km)	y (km)				
Bromodichloromethane	75-27-4	1 Hr		0.04	680.65	4860.52	1.14		1.18	
		24 Hr		0.02	676.80	4859.61	0.14		0.16	
		Annual		0.01	678.55	4860.76	1.67E-03		0.01	
Bromoform	75-25-2	1 Hr		0.07	680.65	4860.52	0.31		0.38	
		24 Hr	55[2]	0.03	676.80	4859.61	0.04	<0.1%	0.07	<0.1%
		Annual		0.02	678.55	4860.76	4.58E-04		0.02	
Bromomethane	74-83-9	1 Hr		0.22	680.65	4860.52	0.22		0.44	
		24 Hr	1350[3]	0.09	676.80	4859.61	0.03	<0.1%	0.12	<0.1%
		Annual		0.10	678.55	4860.76	3.25E-04		0.10	
Carbon tetrachloride	56-23-5	1 Hr		1.80	680.65	4860.52	1.94E-03		1.80	
		24 Hr	2.4	0.74	676.80	4859.61	2.35E-04	<0.1%	0.74	31%
		Annual		0.61	678.55	4860.76	2.85E-06		0.61	
Chloroform	67-66-3	1 Hr		0.55	680.65	4860.52	3.13E-03		0.55	
		24 Hr	1	0.23	676.80	4859.61	3.79E-04	<0.1%	0.23	23%
		Annual	0.2[3]	0.16	678.55	4860.76	4.61E-06	<0.1%	0.16	81%
Dichlorodifluoromethane	75-71-8	1 Hr		7.87	680.65	4860.52	0.54		8.41	
		24 Hr	500000[2]	3.23	676.80	4859.61	0.06	<0.1%	3.30	<0.1%
		Annual		2.81	678.55	4860.76	7.87E-04		2.81	
Dichloroethene, 1,1 -	75-35-4	1 Hr		6.09E-03	680.65	4860.52	3.48E-03		9.56E-03	
		24 Hr	10	2.50E-03	676.80	4859.61	4.20E-04	<0.1%	2.92E-03	<0.1%
		Annual		5.76E-04	678.55	4860.76	5.11E-06		5.81E-04	

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] ($\mu g/m^3$)	Background Concentrations ($\mu g/m^3$)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset ($\mu g/m^3$)	% of Criteria	Predicted Statistical Max Concentration + Back Ground ($\mu g/m^3$)	% of Criteria
					x (km)	y (km)				
Dichloromethane	75-09-2	1 Hr		3.08	680.65	4860.52	1.08		4.16	
		24 Hr	220	1.27	676.80	4859.61	0.13	<0.1%	1.40	1%
		Annual	44[3]	0.76	678.55	4860.76	1.59E-03	<0.1%	0.76	2%
Ethylbenzene	100-41-4	10 min	1900[2]	5.00	680.65	4860.52	0.01	<0.1%	5.01	<0.1%
		1 Hr		3.03	680.65	4860.52	6.37E-03		3.03	
		24 Hr	1000	1.24	676.80	4859.61	7.69E-04	<0.1%	1.24	<0.1%
		Annual		0.69	678.55	4860.76	9.36E-06		0.69	
Ethylene Dibromide	106-93-4	1 Hr		0.01	680.65	4860.52	1.83E-03		0.01	
		24 Hr	3[2]	5.20E-03	676.80	4859.61	2.21E-04	<0.1%	5.42E-03	<0.1%
		Annual		1.84E-03	678.55	4860.76	2.69E-06		1.85E-03	
Formaldehyde	50-00-0	1 Hr		8.23	680.65	4860.52	0.29		8.52	
		24 Hr	65	3.38	676.80	4859.61	0.04	<0.1%	3.42	5%
		Annual		1.66	678.55	4860.76	4.29E-04		1.66	
Tetrachloroethene	127-18-4	1 Hr		1.20	680.65	4860.52	0.03		1.23	
		24 Hr	360	0.49	676.80	4859.61	4.21E-03	<0.1%	0.50	<0.1%
		Annual		0.26	678.55	4860.76	5.12E-05		0.26	
Toluene	108-88-3	10 Min		38.09	680.65	4860.52	0.51		38.60	
		1 Hr		23.06	680.65	4860.52	0.31		23.37	
		24 Hr	2000[2]	9.47	676.80	4859.61	0.04	<0.1%	9.51	<0.1%
		Annual		4.40	678.55	4860.76	4.54E-04		4.40	

Table 7-12 Summary of the Statistical Maximum Predicted Concentrations due to Process Upsets for the 400,000 tpy Facility

Contaminant	CAS #	Averaging Period	Criteria[1] (µg/m^3)	Background Concentrations (µg/m^3)	UTM coordinate		Predicted Statistical Max Concentration for Process Upset (µg/m^3)	% of Criteria	Predicted Statistical Max Concentration + Back Ground (µg/m^3)	% of Criteria
					x (km)	y (km)				
Trichloroethane, 1,1,1 -	71-55-6	1 Hr		0.28	680.65	4860.52	8.77E-03		0.29	
		24 Hr	115000	0.11	676.80	4859.61	1.06E-03	<0.1%	0.11	<0.1%
		Annual		0.10	678.55	4860.76	1.29E-05		0.10	
Trichloroethene	79-01-6	1 Hr		1.31	680.65	4860.52	3.02E-03		1.31	
		24 Hr	12	0.54	676.80	4859.61	3.65E-04	<0.1%	0.54	4%
		Annual	2.3[3]	0.27	678.55	4860.76	4.44E-06	<0.1%	0.27	12%
Trichlorofluoromethane	75-69-4	1 Hr		5.23	680.65	4860.52	1.06		6.29	
		24 Hr	6000[2]	2.15	676.80	4859.61	0.13	<0.1%	2.27	<0.1%
		Annual		1.89	678.55	4860.76	1.56E-03		1.89	
Vinyl chloride	75-01-4	1 Hr		0.01	680.65	4860.52	0.27		0.28	
		24 Hr	1	5.88E-03	676.80	4859.61	0.03	3%	0.04	4%
		Annual	0.2[3]	3.65E-03	678.55	4860.76	3.94E-04	<0.1%	4.04E-03	2%
Xylenes, m-, p- and o-	<xylene>	10 min	3000	19.40	680.65	4860.52	6.13	<0.1%	25.53	1%
		1 Hr		11.75	680.65	4860.52	3.71		15.46	
		24 Hr	730	4.83	676.80	4859.61	0.45	<0.1%	5.27	1%
		Annual		2.76	678.55	4860.76	5.46E-03		2.77	

Notes:
1 Reg419/05 Schedule 3 Criteria unless stated otherwise
2 O. Reg. 419 Guidelines
3 Ontario's ambient air quality criteria
4 Jurisdictional Screening Level List (JSL)
5 National Ambient Air Quality Objectives (NAAQO) Max Desirable Level
6 CCME (2000), Canada-Wide Standards for Respirable Particulate Matter

7.3 Deposition Results

Summaries of the predicted annual average wet and dry CoPC depositions at each special receptor are presented in **Appendix G** for both the 140,000 and 400,000 tpy Facility scenarios. There are no provincial air quality criteria against which to compare these predictions. The deposition predictions were used in the human health and ecological risk assessment and the results are discussed further in the Human Health and Ecological Risk Assessment report. The deposition results are based on the Facility during normal operations for both the 140,000 and 400,000 tpy capacities.

To account for process upsets in the deposition modelling predictions, Facility emission rates were increased on an annual basis following the methodology discussed in Section 4.2.2. Based on this approach, Facility emission rates were multiplied by the following factors:

- 1.45 for all metals and CACs except for SO_2 and NO_2;
- 1.03 for NO_2;
- 1.75 for SO_2; and,
- 2.8 for all other CoPCs.

A discussion of deposition during process upsets is also included in the HHERA report.

7.4 Vehicle Emissions

7.4.1 Onsite Vehicle Emissions

Emissions from vehicle operation (e.g. onsite vehicles and waste/ash trucks) associated with the Facility were assessed in conjunction with the emissions from the Facility itself (i.e., onsite mobile and stationary sources). Cumulative effects were assessed by adding measured background concentrations to the dispersion model predictions. Emissions of SO_2, NO_2, CO and $PM_{2.5}$ were assessed. The off-property effects of these emissions were assessed at the special receptors. Since the MOE air quality criteria are applicable to stationary sources only, the model predictions were compared to the federal NAAQOs. A detailed summary of the dispersion modelling methodology used for this analysis is presented in **Appendix B**.

The maximum predicted SO_2, NO_2, CO and $PM_{2.5}$ concentrations over all special receptors for the onsite vehicle emissions in combination with Facility emissions are shown in Tables 7-13 and 7-14 for Scenario 1 (MCR) for the 140,000 and 400,000 tpy Facility scenarios respectively. Tables of the model predictions at individual receptors are presented in **Appendix H**. In these tables, the maximum predicted contaminant concentration (not accounting for meteorological anomalies) is conservatively presented. The model predictions indicate the cumulative impact of the proposed Facility emissions (stationary plus mobile sources) in conjunction with the background concentrations would comply with the NAAQO and CWS criteria in all cases for NO_2, $SO_{2,}$ CO and $PM_{2.5}$.

Table 7-13 Summary of Maximum Predicted Ground Level Concentrations over the Special Receptors due to the 140,000 tpy Facility Stationary Sources (Scenario 1A, MCR) and Onsite Vehicle Traffic.

Contaminant	CAS #	Averaging Period	Criteria[1] (μg/m^3)	Background Concentration (μg/m^3)	Maximum Predicted Concentration (μg/m^3)	Total Concentration (Facility + background) (μg/m^3)	% of Criteria	Special Rreceptor #	Description	UTM E (km)	UTM N (km)
Sulphur Dioxide (SO_2)	7446-09-5	1 Hr	900	19.5	19.60	39.1	4%	273	Future Industrial 11	680.25	4860.26
		24 Hr	300	19.3	2.29	21.6	7%	266	Future Industrial 8	680.40	4860.73
		Annual	60	5.9	0.05	6.0	10%	7	ECO 7	681.58	4862.07
Nitrogen Dioxide (NO_2)	10102-44-0	1 Hr	400	64.6	67.71	132.3	33%	273	Future Industrial 11	680.25	4860.26
		24 Hr	200	58.2	7.98	66.2	33%	266	Future Industrial 8	680.40	4860.73
		Annual	100	37	0.18	37.2	37%	282	Farmer	681.39	4861.67
Carbon Monoxide (CO)	630-08-0	1 Hr	35000	1035	45.81	1081.2	3%	265	Future Industrial 7	680.82	4860.22
		8 Hr	15700	1036	8.30	1044.3	7%	266	Future Industrial 8	680.40	4860.73
		24 Hr		1029	3.07	1032.1		266	Future Industrial 8	680.82	4860.22
		Annual		632	0.14	631.8		265	Future Industrial 7	680.82	4860.22
Particulate Matter $PM_{2.5}$	PM25	1 Hr		22.8	5.92	28.7		14	Future Industrial 10	680.61	4860.72
		24 Hr	30 [2]	20.4	0.71	21.1	70%	266	Future Industrial 8	680.40	4860.73
		Annual		9.8	0.03	9.8		265	Future Industrial 7	680.82	4860.22

Notes:

[1] Federal NAAQO Maximum Acceptable Levels unless otherwise noted

[2] Canada Wide Standard

[3] Ontario's ambient air quality criteria

Table 7-14 Summary of Maximum Predicted Ground Level Concentrations over the Special Receptors due to the 400,000 tpy Facility Stationary Sources (Scenario 1B, MCR) and Onsite Vehicle Traffic.

Contaminant	CAS #	Averaging Period	Criteria[1] (μg/m³)	Background Concentration (μg/m³)	Maximum Predicted Concentration (μg/m³)	Total Concentration (Facility + background) (μg/m³)	% of Criteria	Special receptor #	Description	UTM E (km)	UTM N (km)
Sulphur Dioxide (SO_2)	7446-09-5	1 Hr	900	19.6	34.26	53.8	6%	273	Future Industrial 11	680.25	4860.26
		24 Hr	300	19.3	4.10	23.4	8%	266	Future Industrial 8	680.40	4860.73
		Annual	60	5.9	0.11	6.0	10%	7	ECO 7	681.58	4862.07
Nitrogen Dioxide (NO_2)	10102-44-0	1 Hr	400	64.6	118.69	183.3	46%	273	Future Industrial 11	680.25	4860.26
		24 Hr	200	58.2	14.27	72.5	36%	266	Future Industrial 8	680.40	4860.73
		Annual	100	37	0.37	37.4	37%	7	ECO 7	681.58	4862.07
Carbon Monoxide (CO)	630-08-0	1 Hr	35000	1035	45.81	1085.8	3%	265	Future Industrial 7	680.82	4860.22
		8 Hr	15700	1036	15.23	1051.2	7%	245	Darlington 1	679.57	4861.05
		24 Hr		1029	5.40	1035.4		265	Future Industrial 7	680.82	4860.22
		Annual		632	0.15	630.2		265	Future Industrial 7	680.82	4860.22
Particulate Matter $PM_{2.5}$	PM25	1 Hr		22.8	10.55	33.4		14	Future Industrial 10	680.61	4860.72
		24 Hr	30[2]	20.4	1.71	22.1	74%	254	Light Ind. 2	680.06	4861.06
		Annual		9.8	0.03	9.8		7	ECO 7	681.58	4862.07

Notes:

[1] Federal NAAQO Maximum Acceptable Levels unless otherwise noted

[2] Canada Wide Standard

[3] Ontario's ambient air quality criteria

7.4.2 Assessment of Facility Related Offsite Vehicle Emissions

Emissions from offsite traffic associated with the Facility in combination with onsite stationary and mobile source emissions for both the 140,000 tpy and 400,000 tpy scenarios were assessed. Measured background concentrations were also considered to account for cumulative effects.

The baseline offsite vehicle emissions were based on traffic volumes provided in the URS report *Traffic Assessment – Technical Study Report*, (URS, 2007). The Facility related offsite vehicle emissions were also developed from traffic data provided in the same document., The estimated offsite vehicle emissions for a 400,000 tpy Facility were conservatively modelled for both the 140,000 tpy and 400,000 tpy scenarios. The offsite vehicle emissions were modelled using the U.S. E.P.A. CAL3QHCR traffic dispersion model. This model is listed as an alternative model by the MOE, and is suitable for dispersion modelling of traffic emissions (MOE, 2009a). Emissions of SO_2, NO_2, CO, and $PM_{2.5}$ were assessed. Maximum GLC predictions from the CAL3QHCR model for offsite vehicle traffic were conservatively combined with the maximum CALPUFF predictions for onsite stationary source emissions and measured background concentrations. The assessment was conducted for the special receptor locations in close proximity to the roads on which traffic into the Facility would travel. This methodology is expected to be conservative as it assumes that the maximum predicted concentration due to vehicle traffic occurs simultaneously with the maximum predicted concentration from onsite emissions.

In Table 7-15, the predicted ground-level concentrations due to current (baseline) traffic levels on the roads in the vicinity of the Facility are presented alongside the predictions of the concentrations due to increased traffic levels on these roads when the Facility would be in operation. The increased traffic levels due to the Facility were based on a 400,000 tpy Facility. Tables of the model predictions at all the individual receptors considered are presented in **Appendix I**. In these tables, the maximum predicted contaminant concentration (not accounting for meteorological anomalies) is presented. The model predictions were conservatively added to measured background levels to determine the cumulative change in air quality at these receptors due to additional vehicle traffic on the local roads. The largest increase in a contaminant concentration over the special receptors due to the additional vehicle traffic on local roads was 7.1% for NO_2.

Tables 7-16 and 7-17 present a summary of the maximum predicted cumulative impact of the Facility emissions (stationary and mobile onsite sources) in conjunction with local (offsite) traffic predictions for the 140,000 tpy and 400,000 tpy Facility scenarios respectively. The measured background concentrations were also added to the model predictions to conservatively account for cumulative effects. The model predictions indicate that the concentrations of all contaminants at all special receptors would be below their respective NAAQO and CWS criteria.

Table 7-15 Summary of Maximum Predicted Changes in Ground Level Concentrations over the Special Receptors due to Changes in Offsite Vehicle Traffic based a 400,000 tpy Facility.

Contaminant	Averaging Period	Background Concentration (µg/m^3) (1)	Predicted Concentrations due to Vehicle Traffic: Baseline (µg/m^3) (2)	Predicted Concentrations due to Vehicle Traffic: with Facility (µg/m^3) (3)	Predicted Concentrations due to Vehicle Traffic + Background: Baseline (µg/m^3)	Predicted Concentrations due to Vehicle Traffic + Background: with Facility (µg/m^3)	Percent Change in Concentration from Baseline due to Offsite Facility-Related Vehicle Traffic
Carbon Monoxide (CO)	1 Hr	1035	3116.04	3129.79	4151.38	4165.13	1.0%
	24 Hr	1029	568.52	569.78	1597.50	1598.77	0.2%
	Annual	632	108.97	109.21	740.63	740.88	<0.1%
Nitrogen Oxides (NO_2)	1 Hr	64.6	90.98	98.24	155.55	162.82	7.1%
	24 Hr	58.2	47.52	48.02	105.74	106.24	1.1%
	Annual	37	9.44	9.55	46.47	46.59	0.5%
Particulate Matter $PM_{2.5}$	1 Hr	22.8	7.47	7.62	30.29	30.44	1.0%
	24 Hr	20.4	0.69	0.69	21.12	21.13	0.1%
	Annual	9.8	0.14	0.14	9.92	9.92	<0.1%
Sulphur Dioxide (SO_2)	1 Hr	19.5	1.87	1.88	21.39	21.41	0.1%
	24 Hr	19.3	0.17	0.17	19.46	19.46	<0.1%
	Annual	5.9	0.03	0.03	5.96	5.96	<0.1%

Notes: 1 – Current ambient background levels (including industrial, commercial, vehicle and residential emissions)
2 – Baseline - CAL3QHCR predictions of current vehicle emissions
3 – With Facility - CAL3QHCR predictions of current vehicle emissions plus proposed EFW offsite vehicle emissions

Table 7-16 Summary of Maximum Predicted Ground Level Concentrations over the Special Receptors due to the Thermal Treatment Facility Stationary Sources, Onsite Vehicle Traffic, and Offsite Vehicle Traffic - (140,000 tpy Facility)

Contaminant	Averaging Period	Criteria ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$) (1)	Maximum Predicted Concentration due to Facility (2) ($\mu g/m^3$)	Total Concentration (Facility + Background) ($\mu g/m^3$)	% of Criteria
Carbon Monoxide (CO)	1 Hr	36200	1035	3136.29	4171.63	12%
	24 Hr	-	1029	571.15	1600.13	-
	Annual	-	632	109.27	740.94	-
Nitrogen Oxides (NO_2)	1 Hr	400	64.6	128.59	193.16	48%
	24 Hr	200	58.2	51.68	109.90	55%
	Annual	100	37	9.65	46.68	47%
Particulate Matter $PM_{2.5}$	1 Hr	-	22.8	9.79	32.61	-
	24 Hr	30	20.4	1.21	21.64	72%
	Annual	-	9.8	0.15	9.93	-
Sulphur Dioxide (SO_2)	1 Hr	690	19.5	20.07	39.59	6%
	24 Hr	275	19.3	1.91	21.20	8%
	Annual	55	5.9	0.07	5.99	11%

Notes: 1 – Current ambient background levels (including industrial, commercial, vehicle and residential emissions)
2 – CAL3QHCR predictions of current vehicle emissions plus proposed EFW offsite vehicle emissions + EFW onsite stationary and mobile source emissions for 140,000 tonne/year facility

Table 7-17 Summary of Maximum Predicted Ground Level Concentrations over the Special Receptors due to the Thermal Treatment Facility Stationary Sources, Onsite Vehicle Traffic, and Offsite Vehicle Traffic – (400,000 tpy Facility)

Contaminant	Averaging Period	Criteria (μg/m³)	Background Concentration (μg/m³) (1)	Maximum Predicted Concentration due to Facility (μg/m³) (2)	Total Concentration (Facility + Background) (μg/m³)	% of Criteria
Carbon Monoxide (CO)	1 Hr	36200	1035	3149.51	4184.84	12%
	24 Hr	-	1029	572.77	1601.76	-
	Annual	-	632	109.33	740.99	-
Nitrogen Oxides (NO_2)	1 Hr	400	64.6	189.14	253.71	63%
	24 Hr	200	58.2	56.06	114.28	57%
	Annual	100	37	9.75	46.78	47%
Particulate Matter $PM_{2.5}$	1 Hr	-	22.8	14.16	36.98	-
	24 Hr	30	20.4	2.14	22.57	75%
	Annual	-	9.8	0.16	9.94	-
Sulphur Dioxide (SO_2)	1 Hr	690	19.5	34.73	54.25	8%
	24 Hr	275	19.3	3.40	22.69	8%
	Annual	55	5.9	0.11	6.03	11%

Notes: 1 – Current ambient background levels (including industrial, commercial, vehicle and residential emissions)
2 – CAL3QHCR predictions of current vehicle emissions plus proposed EFW offsite vehicle emissions + EFW onsite stationary and mobile source emissions for 400,000 tonne/year facility

7.5 Ozone Formation

Where a proposed facility emits NO_X and/or VOC, there may be a potential for augmentation of ozone concentrations due to precursor NO_X and VOC emissions, particularly in warmer months in mid-day. This occurs when the precursor chemicals are present in conjunction with the appropriate meteorological conditions (i.e., strong solar radiation, high temperatures and low wind speeds). In the immediate vicinity of NO_X emission sources, O_3 concentrations may be decreased due to the NO to NO_2 conversion reaction. Photochemical production of O_3 tends to occur at larger distances downwind (in the order of tens to hundreds of kilometres).

In Table 7–18, the Air Quality Study Area and Facility annual average precursor NO_2 and VOC emissions for both the 140,000 and 400,000 tpy Facility scenarios are presented. The emissions are expected to be conservative as they are based on the manufacturer guarantees which are upper limits on emissions, and assume the Facility runs continuously at its maximum rating throughout the entire year. The total annual Project NO_2 and VOC emissions are small relative to the AQ study area emissions.

Table 7-18 Comparison of Annual Average Ozone Precursor Emissions

Case		NO_2 (tpy)	VOC (tpy)
AQ Study Area Emissions (1)		10,950	11,884
140,000 tpy Facility	Total Annual Emissions(2)	151	61
	Percent of AQ Study Area Emissions	1.4%	0.5%
400,000 tpy Facility	Total Annual Emissions (2)	428	173
	Percent of AQ Study area emissions	3.9%	1.5%

Notes:
1 – 2005 NPRI emissions for commercial and residential emissions and 2007 industrial source emissions
2 – Conservative estimate based on MCR conditions

Based on the magnitudes of the maximum NO_x and VOC emissions for the Project relative to the Air Quality Study Area, the change in ozone formation is expected to be small. This qualitative assessment methodology is consistent with that used for other environmental assessments in Ontario and Canada.

8.0 GREENHOUSE GASES AND CLIMATE CHANGE

A Greenhouse gas (GHG) is defined as any gas in the atmosphere that absorbs infrared radiation. Greenhouse gases include water vapour (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), halogenated fluorocarbons (HCFCs), ozone (O_3), perfluorinated carbons (PFCs), and hydrofluorocarbons (HFCs). GHGs are transparent to most incoming solar radiation, but absorb outgoing terrestrial (infrared) radiation, and in turn re-emit it into the atmosphere. The net effect is a trapping of energy and a tendency to warm the earth's atmosphere, land, and water surfaces.

The scientific consensus is that increases in atmospheric concentrations of GHGs (mainly CO_2, CH_4, and N_2O) have grown significantly and are causing changes in global climate. These changes are largely attributed to human activities. Managing CO_2 emissions from fossil fuel use (coal, oil and natural gas), land use changes, and agriculture is critical to addressing anthropogenic climate change. Our lifestyles, economies, health, and social well-being are all affected by climate, and changes have the potential to impact all regions of the world. Even if significant measures to reduce greenhouse gas emissions were introduced now, some additional degree of climate warming is expected for decades to come. To reduce the impacts of climate change and take advantage of new opportunities, countries, industries, and individuals will need to find responsible ways to manage GHGs, and to use energy more efficiently.

The Facility would result in the emission of GHGs, thereby contributing to national and provincial GHG emission totals. GHGs are considered in this section of the assessment because of the importance of climate change as a provincial, national and international issue.

8.1.1 GHG Emissions for Canada and Ontario: 1990 - 2020

GHGs including CO_2, CH_4, and N_2O are emitted from both natural and anthropogenic sources. Total greenhouse gas emissions are normally reported as carbon dioxide equivalents (CO_{2e}). This is accomplished by multiplying the emission rate of each substance by its global warming potential (GWP) relative to CO_2. The GWP of the three main greenhouse gases: CO_2, CH_4 and N_2O) are as follows: CO_2 = 1.0, CH_4 = 21, and N_2O = 310. Therefore, CO_{2e} is equal to ((CO_2 mass x 1.0) + (CH_4 mass x 21) + (N_2O mass x 310)).

The Canadian and Ontario total GHG emissions for the years 1990-2020 are presented in Table 8-1. The most complete Canadian total GHG emissions estimates and projections to 2020 were published in 2005 (NRCan, 2005). Since 2005 some estimates have been changed owing to revisions of methodologies (Environment Canada, 2007d).

Revised figures reflecting the current policies of the Government of Canada and the Government of Ontario are not reflected in projections for 2010 through 2020. As yet, there are no published data suitable for updating the CO_{2e} totals in Table 8.1.

Table 8-1 Greenhouse Gas Emissions for Canada and Ontario: 1990 - 2020

Year	Canadian Total CO_2e [1] (tonnes)	Ontario Total CO_2e [2] (tonnes)
2020	845,000,000	235,000,000
2015	813,000,000	230,000,000
2010	764,000,000	220,000,000
2005	728,000,000	203,000,000
2000	694,000,000	203,000,000
1995	653,000,000	176,000,000
1990	601,000,000	177,000,000

Notes:
[1] Canada Total GHG Emissions as per NRCan, 2005.
[2] Ontario Total 1990 – 2000 GHG Emissions as per Environment Canada, 2007d. 2005 – 2020 GHG Emissions as per Environment Canada, 2006. Note that 1995 emissions are represented by reported emissions for 2004.

8.1.2 Operating

GHGs would be emitted from the Facility, primarily from the operation of the boilers. GHG emissions (CO_2 ,$CH_4$and N_2O) from the facility were estimated using the following assumptions:

- A CO_2 emission factor of 985 kg/Mg of refuse combusted (U.S. EPA AP-42, Table 2.1-3 for mass burn water wall combustors) was used.
- The base 140,000 tpy Facility annual consumption of refuse would be 140,000 tonnes per year;
- The expanded 400,000 tpy Facility annual consumption of refuse would be 400,000 tonnes per year;
- An emission factor of 2 mg/Nm^3 was used to estimate N_2O emissions (IPCC, 2006);
- The global warming potential of N_2O = 310;
- Under oxidative conditions, methane levels in the flue gas will be near zero (IPCC 2006); and,
- Methane can be created in waste storage if there are low oxygen levels resulting in anaerobic processes. This only occurs when wastes are stored for a long time and not well agitated (IPCC, 2006). Since wastes would only be stored for a short time in the refuse pit (the pit has a four day capacity) there would be no methane formation

A summary of the estimated annual GHG emissions from both the 140 and 400,000 tpy Facility options are presented in Table 8-2.

Table 8-2 Summary of Project Annual GHG Emissions

GHG	140,000 tpy Facility		400,000 tpy Facility	
	ktonne/year	ktonne CO_2 eq /year	ktonne/year	ktonne CO_2 eq /year
CO_2	138	138	394	394
N_2O	0.0025	0.77	0.007	0.81
CH_4	Negligible	Negligible	Negligible	Negligible
Total	-	139	-	395

The incremental contribution of the Facility to total Ontario annual GHG emissions would be 0.06% for the 140,000 tpy Facility, and 0.18% for the 400,000 tpy Facility. The incremental contribution of the Facility to total Canadian annual GHG emissions would be 0.018% for the 140,000 tpy Facility, and 0.052% for the 400,000 tpy Facility (based on projected 2010 GHG emission levels).

9.0 IMPACT MANAGEMENT

A summary of recommended Facility mitigation measures follows.

9.1 Emissions Mitigation

9.1.1 Construction

During construction of the Facility, mitigation measures including the following have been proposed:

- Controlled exits will be employed to stabilize all construction entrances and exits and prevent mud from tracking on roadways from construction vehicles;
- Temporary and permanent grassing will be used for all areas of disturbance; and,
- Dust control will be used during dry conditions to prevent any blowing of dust;

In addition to the proposed mitigation measures specified above, the following mitigation measures are recommended by Jacques Whitford Stantec Limited:

- The implementation of an idling policy to minimize the consumption of fuel when the equipment and vehicles are stationary for extended periods of time;
- Adherence to a comprehensive equipment preventative maintenance program to maintain the vehicles in top condition, to maximize fuel efficiency and vehicle performance; and,
- Where possible, implement plans to minimize haul routes to and at the Site.

It is recommended that the effectiveness of these measures be regularly reviewed through the construction period and revised accordingly.

9.1.2 Operation

The design of the proposed Facility includes the following emissions control equipment and processes to treat the flue gas:

- Covanta's very low NO_X (VLN) system in the stoker;
- Selective Non Catalytic reduction (SNCR) for additional NO_X control;
- Activated carbon injection after the economizer for mercury and dioxin/furan control;
- Acid gas scrubber for removal of gases such as sulphur dioxide and hydrogen chloride; and,
- A fabric filter baghouse to remove solid phase particulate matter.

The dispersion modeling of the Facility's emissions predicts that, with mitigation, the maximum ground level concentrations of all CoPCs are expected to be below the applicable regulatory criteria. Therefore additional mitigation beyond that already proposed for the operation of the Facility is not required.

9.2 Ambient Monitoring

9.2.1 Construction Monitoring

Construction emissions, primarily particulate matter due to site preparation activities and road dust have the potential to result in short-term adverse air quality effects if not adequately controlled. Ambient monitoring for PM during construction is recommended to confirm the effectiveness of the proposed mitigation measures. In the event the monitoring shows adverse environmental effects, the construction mitigation techniques should be revised.

9.2.2 Operational Monitoring

The proponent will be required to quantify and report emissions under Guideline A-7 as well as submit the required annual report to the federal government's NPRI program for its emissions under the *Canadian Environmental Protection Act, 1999* (CEPA) and to Ontario under O. Reg. 127. The following emission source monitoring would be undertaken to meet these requirements.

9.2.2.1 Continuous Emissions Monitoring

A continuous emission monitoring (CEM) system will be provided to continuously monitor and record:

- Baghouse outlet: opacity, moisture, CO, O_2, NO_X, SO_2, HCl, and HF. The opacity measurements will be used as the filter bag leak detection system to monitor bag condition;
- Economizer outlet: O_2, SO_2, CO;
- Flue gas temperatures at the inlet of the boiler convection section and at the baghouse inlet;
- Temperature and pressure of the feedwater and steam for each boiler; and,
- Mass flow rate of steam for each boiler.

A long-term continuous dioxins sampling device will be installed using isokinetic sampling of flue gas and the adsorption of dioxins onto an exchangeable adsorption-resin-filled cartridge

9.2.2.2 Stack Testing

In Guideline A-7, it is noted that emission testing requirements will be included in the Certificate of Approval for a thermal treatment facility in order to verify compliance with the limits set out in the Certificate of Approval issued for the F acility. Completion of testing in accordance with the Ontario Source Testing Code under maximum operating feed rates for the equipment is normally required within six months of start up and annually thereafter. Annual testing is expected to be included in the C ofA for the Facility. The air contaminants to be sampled will be determined in consultation with the MOE but would be expected to include dioxins, combustion gases and selected HAPs.

9.2.2.3 Emissions Reporting

NPRI reporting requirements would be met by a combination of monitoring or direct measurements, mass balance, process specific emission factors or engineering estimates.

10.0 SUMMARY AND CONCLUSIONS

The potential for Facility-related emissions to cause adverse environmental effects on ambient air quality was assessed in this study. The assessment was done for the most part, by comparing the maximum model-predicted concentrations to ambient air criteria for each assessment case. As such, the assessment focussed on the worst case scenario with the highest potential to cause environmental effects. This is a conservative approach.

10.1 Main Study Findings

A summary of the key air quality findings relating to the Facility follows.

Ambient Air Quality Criteria, Objectives, and Standards

- Downwind ambient concentrations of air contaminants emitted from both the 140,000 tpy and 400,000 tpy Facility scenarios are predicted to meet all applicable ambient air quality criteria during normal operation.
- During process upsets (including start-up and shut-downs) downwind concentrations due to air contaminant emissions from both the 140,000 tpy and 400,000 tpy Facility scenarios are predicted to meet applicable ambient air quality criteria for all contaminants. Process upsets used conservative emissions estimates based on EPA guidance.

Facility Emissions Limits

- The Facility emissions will meet or will be below the air contaminant emission limits placed on municipal waste incinerators by the current version of Ministry of the Environment (MOE) Guideline A-7 (dated 2004). This will be verified through continuous monitoring of stack emissions and annual stack tests. Monitoring data will be submitted to the MOE as required in Guideline A-7 and the conditions of the C of A issued for the facility by the MOE, should the Project be approved.

Incremental Change in Ground Level Ozone Precursor Emissions

- Based on the magnitudes of the maximum nitrogen oxide (NO_X) and VOC emissions for the Project relative to the AQSA, the change in ozone formation due to the Project is expected to be minimal.

Incremental Change in Greenhouse Gas Emissions

- The incremental contribution of the Facility to total Ontario annual GHG emissions would be 0.06% for the 140,000 tpy Facility, and 0.18% for the 400,000 tpy Facility. The incremental contribution of the Facility to total Canadian annual GHG emissions would be 0.018% for the 140,000 tpy Facility, and 0.052% for the 400,000 tpy Facility (based on projected 2010 GHG emission levels). Therefore, the quantities of Facility-related greenhouse gases (GHGs) are expected to be minimal relative to the Ontario and Canadian totals.

Odour Detectability

- Based on the proposed mitigation measures for odour control (e.g., enclosed loading, negative air pressure inside Facility, fully enclosed trucks), there is not expected to be adverse environmental effects associated with odour at off-property locations due to the onsite operations.

- An odour mitigation plan will be developed after detailed design of the facility has been completed to address odour duing normal operations, start-ups and shut-downs as well non-routine occurences (process upsets). The odour mitigation plan will be submitted to the MOE during the environmental permitting process for the Facility

10.2 Closing

This air quality assessment was conducted following generally accepted methodologies to establish existing (baseline) conditions, estimate emissions and predict the maximum downwind ground-level concentrations and long-term depositions for all relevant air contaminants due to Facility operation. As such, the findings of this study, as described in this Report are, for the most part, based on dispersion model predictions. These model predictions have varying levels of confidence but all are appropriate and acceptable for use in this assessment and the EA. The approach taken is conservative and represents a “best estimate” approach for air quality assessments.

The air quality assessment has demonstrated that the Facility would meet the applicable air quality criteria (with consideration given to cumulative environmental effects). The potential environmental and human health consequences of the predicted changes are discussed in separate reports.

11.0 CLOSURE

This Report has been prepared by Jacques Whitford Stantec Limited. The assessment represents the conditions at the subject property only at the time of the assessment, and is based on the information referenced and contained in the Report. The conclusions presented herein respecting current conditions, and potential future conditions are at the subject property resulting from the Facility, represent the best judgment of the assessor based on current environmental standards. Jacques Whitford Stantec Limited attests that to the best of our knowledge, the information presented in this Report is accurate. The use of this Report for other projects without written permission of Durham Region, York Region and Jacques Whitford Stantec Limited is solely at the user's own risk.

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APPENDIX A

Ambient Air Quality

APPENDIX B

Emission Inventory

APPENDIX C

Trans-Boundary Notification

APPENDIX D

CALPUFF Methodology

APPENDIX E

CAL3QHCR Methodology

APPENDIX F

Concentration Predictions at Special Receptors

APPENDIX G

Deposition Predictions at Special Receptors

APPENDIX H

Concentration Predictions at Special Receptors Due to Onsite Traffic

APPENDIX I

Concentration Predictions at Special Receptors Due to On and Offsite Traffic