April 2013

BRONTE ASPHALT PLANT

Oakville Health Protection Air Quality By-Law Application for Approval

Submitted to:
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REPORT

Report Number: 12-1151-0213

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EXECUTIVE SUMMARY

This Town of Oakville (the Town) Health Protection Air Quality By-Law (HPAQB) Application for Approval (Application) was prepared to assess the potential health risk of emissions of fine particulate matter (FPM) from the existing Bronte Asphalt Plant (the Facility), owned and operated by Dufferin Construction Company, a division of Holcim (Canada) Inc. (Dufferin). This Application was prepared following the Oakville document "*Guidance for Implementation of Oakville Health Protection Air Quality By-Law 2010-035, Section 5 and 6 and Approval Requirements for Major Emitters v.5 June 2011*".

Dufferin Construction has been operating a hot mix asphalt (HMA) plant located at 731 Third Line in Oakville, Ontario (the Facility) for the past 30 years. Dufferin is a local provider of asphalt and construction services, that has helped improve local infrastructure within the Town of Oakville. In 2011, the company completed the widening of the QEW through Oakville which included the construction of high-occupancy vehicle (HOV) lanes to help alleviate traffic and gridlock. Secondary activities at the facility include recycled concrete and asphalt crushing operations, which is a sustainable practice through providing a replacement product for virgin aggregate in various concrete and asphalt products.

The primary sources of FPM from the Facility included in the assessment are the HMA batch plant, material receiving, transfer and storage, heating equipment and recycled concrete crushing. To determine the impact of the Facility on the airshed, average and annual emission rates were developed following regulatory accepted inventory calculation methods. These data, with the aid of the CALPUFF modelling system, were used to estimate the contribution of the facility to ambient levels of FPM in the airshed.

The Facility is currently permitted to operate under site-wide Environmental Compliance Approval 5859-798SLP dated December 31, 2007. Under the Town of Oakville (the Town) Health Protection Air Quality By-Law (HPAQB), the facility is considered a major emitter of FPM, as they directly emit more than 300 kilograms per year of this substance.

This assessment considered both average and maximum operating scenarios for the Facility. Due to the seasonality of construction operations, the batch plant is in operation April through December each year. Recycle crushing operations are carried out by a third party contractor and occur occasionally throughout the year for a maximum of 60 days per year.

Based on modelling results, the Facility does not significantly affect the existing airshed as the facility-induced FPM concentrations for average and maximum scenarios are less than 0.2 µg/m^3 (micrograms per cubic metre) annually, a criterion defined by the HPAQB. As a result, a health risk assessment is not required.

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1.0 INTRODUCTION

Dufferin Construction Company, a division of Holcim Canada Limited (Dufferin) has been operating a hot mix asphalt (HMA) plant located at 731 Third Line in Oakville, Ontario (the Facility) for the past 30 years. Dufferin is a local provider of asphalt and construction services, that has helped improve local infrastructure within the Town of Oakville. In 2011, the company completed the widening of the QEW through Oakville which included the construction of high-occupancy vehicle (HOV) lanes to help alleviate traffic and gridlock. A detailed summary of Dufferin's commitment to the Oakville community is provided in Appendix A.

The Facility is currently permitted to operate under site-wide Environmental Compliance Approval (ECA) (formerly referred to as Certificate of Approval) 5859-798SLP dated December 31, 2007. Under the Town of Oakville (the Town) Health Protection Air Quality By-Law (HPAQB), the facility is considered a major emitter of Fine Particulate Matter (FPM), as the Facility directly emits more than 300 kilograms per year of this substance.

As a major emitter, the HPAQB requires an application be filed no later than September 1, 2012. Dufferin requested an extension from the Town on this matter. This request was made to Mr. Jeffrey Lee, Research Policy Analyst - Air, Town of Oakville on August 24, 2012 in an email. This report (the Application) provides all of the required documentation required under Section 6 of the bylaw and was prepared following the Town's document "*Guidance for Implementation of Oakville Health Protection Air Quality By-Law 2010-035, Section 5 and 6 and Approval Requirements for Major Emitters v.5 June 2011*" (GIOHPAQB).

On June 22, 2012, representatives from Dufferin and Golder Associates Ltd (Golder) met with the Town for a preliminary consultation meeting. During this meeting it was confirmed the Facility is required to submit a permit for FPM. During this meeting general approaches to the Application were discussed. The Town did not provide any specific guidance as to the suggested approaches, however, emphasized the need to provide detailed rationale for the final project approach used in the Application and to follow GIOHPAQB. Subsequent communication occurred to clarify the approaches used in this application.

2.0 FACILITY DESCRIPTION

2.1 Facility Overview

At the Facility, the primary operation is the production of HMA. In this process, aggregate materials are heated and combined with asphalt cement to produce HMA for asphalt paving operations. The maximum production capacity of the plant is 300,000 tonnes per year of HMA. The North American Industry Classification System (NAICS) code that applies to this operation at the Facility is 324121 - Asphalt Paving Mixture & Block Manufacturing. The Facility is currently permitted to operate under site-wide ECA 5859-798SLP dated December 31, 2007. A copy of the ECA is provided in Appendix B.

At the Facility, two other distinct operations are conducted, including:

- Mobile equipment repair shop to service construction equipment that is used during road construction operations (NAICS 81111), and;
- Quality Assurance Laboratory for testing materials from off-site construction jobs (NAICS 541380)

The Facility stores waste concrete and recycled asphalt pavement (RAP) from construction projects, which is further used for recycling activities. This material is crushed at a portable crushing plant. The recycled concrete is delivered off-site to customers. The RAP is used on-site in the batch plant. The recycled concrete and asphalt crushing operations are carried out by 3rd party contractors. Dufferin does not own or operate this equipment, however, emissions estimates for this activity have been included as part of this Application. The production rate of the crushing operations can vary from 50 tonnes per hour up to 200 tonnes per hour, depending on the equipment brought on-site by the contractor.

Over the past 10 years, Dufferin has continually invested in reducing emissions from the site through the implementation of Best Management Practices (BMPs) for fugitive dust management, as well as equipment upgrades, including:

- Installation of low NO_x burner on dryer;
- Paving of all unpaved roads on-site;
- Installation of silencer on baghouse; and
- Installation of new coater asphalt coater system.

2.2 Location of the Facility

The Facility is located at 731 Third Line in Oakville, Ontario approximately 500 metres south of the Queen Elizabeth Highway (QEW). The site location and surrounding areas are zoned as industrial (E1 and E2). The following figures are provided to detail the location of the Facility and surrounding features:

- Figure 1 – Site Location Plan; and
- Figure 2 – Zoning Map.

The figures provided in this Application are all geo-referenced to the Universal Transverse Mercator (UTM) North American Datum of 1983 (NAD83) coordinate system, which is equivalent to the World Geodetic System of 1984 (WGS84) datum for the domain of interest.

The closest sensitive receptor is a residential area located approximately 450 metres to the south-southeast of the Facility. A second residential area is located approximately 750 metres northeast of the Facility. The QEW lies between this area and the Facility.

Near the Facility, the significant sources of FPM are the QEW (highway) and Third Line (major arterial road). Through a regional air quality study conducted by Halton Region (Golder, 2009), the highways and arterial roads have been demonstrated to be the single largest source of FMP in southern Halton.

2.3 Buildings

The Facility consists of three primary building structures; the HMA batch plant, shop and the quality assurance laboratory. The batch plant is a multi-tiered structure with a maximum height of approximately 16 metres. The shop is a two-storey building and the quality assurance laboratory is a single story building. The majority of sources at the site are fugitive releases, which are not incorporated into building downwash impacts of the dispersion model. All building structures that were considered for building downwash effects on emission release points.

Off-site buildings were not considered for building downwash as none of these structures fall within the building wake zone of point sources at the site.

2.4 Raw Materials, Products and Processes

The process activities at the Facility can be separated into three main emission source groups. These include:

- Asphalt Production;
- Ancillary Operations; and
- Recycle Concrete and Asphalt Crushing.

Asphalt Production

Asphalt is manufactured by combining raw aggregate materials with asphalt cement to produce an asphalt cement paving mixture. Raw aggregate materials used in the production process include coarse aggregate and RAP. RAP is old asphalt paving that is removed from road base and recycled back to the new asphalt cement mixture. This process results in a lower quantity of virgin aggregate being used in the mixture. The typical composition of the paving mixture is 75 % aggregates, 20 % RAP and 5 % asphalt cement. At the Facility, this process is carried out in a dryer and tower combination (batch mix plant).

Raw materials (aggregates and RAP) are delivered to the site by truck and stored in outdoor storage piles. From the storage piles, the raw materials are transferred to feed hoppers using a front-end loader. Materials are then transferred from the feed hopper to the dryers. In the dryer, moisture is removed from the aggregate and heating takes place. A bucket elevator transfers the hot aggregate to the mixing tower. Emissions from the dryer are ducted and controlled by a baghouse.

In the tower, the aggregate is stored in hot storage bins. The aggregate is then dropped into a weigh hopper. From the weigh hopper the aggregate is combined with asphalt cement in a pugmill to produce the finished product (i.e. coater system). The final product is then either stored in a heated storage silo or placed directly into a truck for delivery to customers. Approximately 20% of material is directly shipped to the trucks and 80% goes through the storage silos. All material transfer points of the mixing tower are enclosed and ducted to the baghouse.

The asphalt cement (binder) is stored in above ground heated storage tanks. These tanks are heated using a natural gas heater.

Typical daily and annual flow-through rates of raw material inputs to the process are summarized in Table 1.

Table 1: Daily and Annual Flow-Through Rates of Raw Materials

Raw Material	Daily Average Flow-Through Rate [tonnes/day]	Annual Average Flow-Through Rate [tonnes/year]
Aggregate and Sand	495	136,245
RAP	132	36,332
Asphalt Cement (binder)	33	9,083

Ancillary Operations

The on-site garage area is used for general site maintenance activities and minor repairs to construction equipment. Emission sources include parts washers and welding activities. For parts washers, dirty parts are cleaned manually by spraying solvent onto the parts in a sink like work area and excess solvent drains into an enclosed container through a small drain. The solvent drains into a remove reservoir (drum). The cover is closed whenever parts are not being handled in the cleaner. There is a separate welding shop in the garage building.

Other activities that occur at the site include general comfort heating, and ventilation for the offices. All combustion equipment at the site is natural gas fired, with the exception of one (1) heater located in the wash bay, which is No.2 fuel oil fired.

Recycled Concrete and RAP Crushing

Waste concrete and RAP from construction projects is delivered to the Facility for recycling activities. This material is crushed at the portable crushing plant and delivered to off-site customers or used in the process of asphalt production. The recycled concrete and asphalt crushing operations are carried out by 3rd party contractors. Dufferin does not own or operate this equipment, however, emissions estimates for this activity have been included as part of this Application. The production rate of the crushing operations can vary from 50 tonnes per hour up to 200 tonnes per hour, depending on the equipment brought in by the contractor. Crushing equipment is powered by diesel generators.

A simplified process flow diagram is provided in Figure 3.

2.5 Emission Sources

Emissions of FPM at the site occur from both ducted source releases and fugitive releases. Ducted process emissions include sources that are vented directly to the atmosphere through a stack. Fugitive emissions are those which result from process and open sources[1].

The primary sources of ducted emissions at the Facility are the rotary dryer, hot bins and mixer. All emissions from these sources are ducted to the baghouse prior to discharge to the atmosphere. The primary sources of fugitive emissions are raw material transfers (pre-production fugitives) and transfers of final product (production fugitives). A summary of sources of FPM at the Facility are summarized in Table 2.

[1] United States Environmental Protection Agency, Office of Air Quality Planning and Standards (February 2004). "Emission Factor Documentation for AP-42 Section 11.1 Hot Mix Asphalt Plants Final Report".

Table 2: Sources of Fine Particulate Matter

Source Group	Activity	Individual Sources
Asphalt Production	Material Transfers	▪ Aggregate/RAP truck delivery to storage pile. ▪ Transfer from storage pile to feed hoppers. ▪ Transfer from feed hoppers to conveyors. ▪ Transfer from conveyors dryer.
	Batching	▪ Drying. ▪ Transfer from dryer to mixing tower. ▪ Addition of asphalt cement & mixing in pugmill. ▪ Silo Loading/Truck Loading.
	Other Fugitive	▪ Drying. ▪ Transfer from dryer to mixing tower. ▪ Addition of asphalt cement & mixing in pugmill. ▪ Silo Loading/Truck Loading.
Ancillary Operations	Comfort Heating	▪ Combustion Sources (Boilers/Heaters).
	Bulk Chemical Storage	▪ Asphalt Cement Storage Tanks.
	Vehicle Maintenance	▪ Maintenance (Parts Washer). ▪ Welding.
	Quality Assurance	▪ Quality Laboratory.
Recycle Concrete and Asphalt Crushing	Material Transfers	▪ Used concrete delivery to storage pile. ▪ Transfer from storage pile to crusher. ▪ Transfer of crushed recycled concrete to truck for off-site delivery.
	Crushing	▪ Portable Crushing Operations.
	Other Fugitive	▪ Outdoor Storage Pile. ▪ Paved and Unpaved Roads.

The location of all sources at the Facility included in the assessment is provided in Figure 4. A summary of the source parameterization for dispersion modelling is provided in Appendix C.

2.6 Emission Totals

The summary of the daily and annual average emissions and daily and annual worst-case emissions are summarized in Table 2.

Table 3: Summary of Daily and Annual FPM Emission Rates

Source ID	Operations Area	Source Activity	Daily Average Emission Rate [kg/day]	Annual Average Emission Rate [kg/year]	Daily Worst Case Emission Rate [kg/day]	Annual Worst Case Emission Rate [kg/year]
1	Batch Plant	Raw Material Receipt	0.011	2.923	0.018	4.827
		Transfers from Piles to Batch Plant	0.011	2.923	0.018	4.827
		HMA - Silo and Load Out	0.189	52.054	0.313	85.965
		HMA- Dryer Screens Mixer	2.741	753.887	4.527	1245.000
		Storage Piles	0.003	0.862	0.003	0.862
		Batch Plant Total	***2.955***	***812.649***	***4.878***	***1341.48***
2	Recycled Crushing	Raw Material Receipt	0.001	0.355	0.003	0.709
		Recycled Concrete Crushing Operations	0.013	0.574	0.018	1.148
		Recycled Crushing Generator	0.639	26.181	0.639	38.314
		Recycle Crushing Total	0.653	27.109	0.660	40.170
3	Support Operations	Boilers/Heater	0.305	73.671	0.384	92.777
		Maintenance Welding	0.009	2.392	0.009	2.392
		Support Operations Total	***0.314***	***76.063***	***0.393***	***95.169***
All Operations		***Total***	***3.922***	**915.821**	**5.930**	**1476.819**

A detailed source listing and associated emission rate of FPM is provided in Appendix C.

2.7 Negligible Sources

Emissions from sources that directly emit less than 1 kg per year of FPM are considered to be negligible in quantity, as outlined in the GIOHPAB. At the Facility, sources that meet the negligibility criteria include:

- outdoor storage piles (0.86 kg per year); and
- sale of recycled concrete product (0.053 kg per year).

Other negligible sources include:

- paved roads – not required under the HPAQB;
- unpaved roads – distance travelled on unpaved roads is less than 10,000 km per year;
- quality laboratory testing - the QA/QC laboratory is used for quality testing of materials. Emissions of FPM are not expected from this source.

All negligible sources were excluded from the dispersion modelling assessment.

2.8 Average and Maximum Operating Scenarios

The Facility typically operates 12 hours per day, 5 days per week. Due to the seasonality of the construction industry, the batch plant operates from April through December. The other operations at the site include equipment maintenance. For recycled concrete and asphalt operations, a third party contractor is brought on site, and can operate a maximum of 60 days per year. These activities typically occur during lower production periods (winter and fall). A summary of the annual operations is provided in Table 4. Details of how these variable emissions were applied to the dispersion model are provided in Appendix C.

Table 4: Annual Operations Summary

Process Area	Annual Operating Schedule	Annual Average Production Rate	Maximum Annual Production Rate
Asphalt Batch Plant	April – December	181,660 tpy	300,000 tpy
Recycle Crushing Operations	3-4 times per year	72,964 tpy	145,927 tpy
Support Operations	Year Round	combustion sources : 80% of name plate capacity	combustion sources: name plate capacity

The average production rates were based on historic production data provided by Dufferin (Table 5). The variability around this data is also included and is based on the average percent change per year for each product.

Table 5: Historical Annual Production and Variability

	Annual Production Rate				Variability
Process Area	**2009**	**2010**	**2011**	**Average**	
Batch Plant	176,580	169,681	196,562	181,660	< 10%
Recycle Crushing[1]	8,763	79,065	24,941	72,964	<50%

[1] Recycled crushing activities are highly variable. To determine the annual calculation, the 2012 data was also included in the average. Outlier years (2008 and 2011 were omitted from the calculation.

Although the maximum potential production rate of the plant would derive a theoretical annual production rate of over 1.7 million tonnes, the local market demand and seasonality of construction operations limits the quantity of asphalt to be produced at this Facility. Dufferin estimates a maximum annual rate of 300,000 tonnes per year which is almost twice the average historical production rate at the Facility and is a conservative worst case estimate.

Recycle crushing operations are contracted to a third party contractor. In 2008, crushing activities were low, therefore this value was removed from the average to avoid under-representing the current typical rates. The maximum rate was set to 145,927 tonnes per year. This value is based on the capacity of the crushing equipment and MOE permit limitations, as well as historical production data estimates.

3.0 EMISSION CONTROL EQUIPMENT AND PROCEDURES AND EMISSIONS MONITORING

Dufferin has been a long standing member of the Ontario Hot Mix Asphalt Producers Association (OHMPA). As part of this organization, the Facility is committed to follow OHMPA's Environmental Best Practices Guide, which includes environmental best practices for emissions and maintenance of equipment on site. A copy of this guide is provided in Appendix B.

Dust controls can be categorized into best management practices and physical controls. Table 6 provides a summary of the individual best management practices and technologies considered that are typically used to control fugitive dust sources.

Table 6: List of Typical Control Technologies

	Technology	Vehicle Traffic	Loading/ Unloading of Haul Trucks	Storage Piles - Wind	Storage Piles - Maintenance	Storage Piles – Loading/ Unloading Activities	HMA Manufac-turing	Material Transfers (Drop Points)
Best Mgt Practices	Speed Limits	x						
	Vehicle Restrictions	x						
	Storage Pile Configuration			x	x			
	Storage Pile Heights			x	x			
	Drop Heights		x	x	x	x		x
	Meteorological Considerations	x	x	x	x	x		x
	Routine Maintenance						x	
	Truck Sizing (large trucks, fewer hauls)	x	x					
Physical Controls	Water Spray	x	x	x	x	x		x
	Additives/Suppressants	x	x	x			x	
	Partial Process Enclosure							x
	Windscreens fixed		x	x	x	x		x
	Windscreens - windward side		x	x	x	x		x
	Baghouse							
	Full Enclosure with Baghouse			x	x	x	x	x
	Concrete Blocks			x	x	x		
	Tarps		x	x	x	x		
	Road Vacuum Trucks	x						
	Road Water Trucks	x						
	Paving	x						
	Large size material addition to roads	x						
	Wheel Wash/Truck Wash Stations	x						
	Truck Covers (tarps)	x						
	Vegetative Cover			x				

3.1.1 Best Management Practices Plan

Dufferin has in place a Best Management Practices Plan (BMPP) to address fugitive dust issues. A BMPP documents the best management practices for the control of fugitive dust emissions from a Facility and documents the decision making process that was used to develop these BMPs.

Fugitive dust emissions can be reduced through BMPs that include physical controls, procedural controls and behavioural controls. Addressing all three of these aspects during the risk assessment phase is essential to identify the root cause of the emission. Many of the best practices cannot be quantified in one specific reduction technique, but will result in overall emissions reductions from the site.

The current Dufferin BMP successfully addresses housekeeping issues at the facility.

3.1.2 Maintenance of Pollution Control Equipment

A formal operating and maintenance process for pollution control equipment can prevent problems from occurring and, more importantly, maintain or improve the removal efficiency of the existing pollution control equipment. The baghouse at the Facility undergoes routine maintenance as required by their ECA.

3.1.3 Summary

Table 7 summarizes the emission mitigation practices employed at the Facility.

Table 7: Emission Control Practices

Equipment	Emission Control Device	Pollution Control Practice	Control Efficiency
Batch Plant Dryer, Screens, Mixer	Baghouse	A baghouse is used to control FPM from the batching process. This baghouse is operated and maintained under the current ECA	Baghouses have a typical efficiency rating of 95 %-99.99%.
Material Transfer	Best Management Practices	Movements of materials onsite follow the Best Management Practices document for the Facility	Emission controls vary depending on BMP employed. A table of typical control efficiencies achieved is summarized in Table 8.
Material Storage Piles	Best Management Practices	Movements of materials onsite follow the Best Management Practices document for the Facility	Emission controls vary depending on BMP employed. A table of typical control efficiencies achieved is summarized in Table 8.
Diesel Generator	Maintenance	Emission limits on engine specifications and sulphur content of fuel	Tier 2 emission standards are more stringent than Tier 1 standards, 30% lower for NOx, and 50% lower for fine particulate matter.

Table 8: Typical Control Efficiencies for Fugitive Dust Management

Control Type	Control Efficiency
Water Spray - Point of App.	75%
Chemical Additive - Application Point	85%
Baghouse Multiple Pickups	95%
Baghouse	99.0%
Windbreak, Windward Side	75%
Wind Breaks	30%
2-3 sided enclosure	90%
Enclosure (inside building)	90%
Covered Stockpile	100%

Details of individual control technologies applied to each activity/equipment are provided in Appendix C.

4.0 IDENTIFICATION AND QUANTIFICATION OF SUBSTANCES RELEASED TO AIR

Table 9 summarizes the total annual emissions of FPM, as this is the only health-risk air pollutants emitted from the Facility above major emission levels.

Table 9: Health-Risk Air Pollutant Total Annual Emissions

Pollutant	Annual Emissions [kg]	
	Average	Maximal
FPM	763.146	1228.333

4.1 Emission Estimation Methods

The basic equation for calculating emissions is:

$$R = SE * E * (1 - C)$$

Where:

R = estimated mass emission rate in the specified unit

SE = source extent (e.g. production rate, exposed area, distance travelled)

E = uncontrolled emission factor in the specified particle range (i.e. mass of uncontrolled emission per unit of source extent)

C = fractional efficiency of control

From this formula, it can be seen that changing any of the variables will result in an increase or decrease in emissions. Inherently, reducing the source extent will result in reduction of emissions

The emission calculation approach for each of the sources/source groups at the Facility are summarized in the sections below. Detailed calculations are also provided in Appendix C. This appendix also contains details on the SCC codes for the Facility as well as quality ratings for emission factors used.

4.1.1 Asphalt Production

As previously discussed, the primary sources of emissions from the asphalt production process are the dryer, screens, hot bins and mixer. Other fugitive emission sources include silo filling, truck load-out, and fugitive yard emissions. The emission sources in the asphalt plant include:

- Dryer, Screens, Hot Bins, Mixer (ducted to baghouse);
- Silo Filling; and
- Truck Load-out.

For these activities, the emission factors listed in Section 11.1 of US EPA AP-42 were applied to each source, based on the average and maximum production rates.

4.1.2 Materials Handling

The FPM emissions for materials handling sources (e.g., raw material delivery, onsite transfers) were calculated using Section 13.2.4 – Aggregate Handling and Storage piles. This formula, applies to batch or continuous drop operations.

For outdoor handling of materials, the average wind speed for the area was applied (Pearson Airport). This wind speed is recommended in the MOE "Addendum to Procedure for Preparing an Emission Summary and Dispersion Modelling Report, June 1998 Version" (September 2001). Typical material moisture contents were used in the calculations.

4.1.3 Storage Piles

For emission estimates from wind erosion from storage piles, the alternate methodology from the WRAP document (Chapter 9) was applied. From this equation, the storage piles were deemed to be negligible.

4.1.4 Emissions from Recycle Crushing

Emission factors from US EPA AP-42 Section 11.19.2 were applied to determine emission rates from recycle crushing operations.

4.1.5 Generators for Crushing Operations

The emission factor for $PM_{2.5}$ listed in the Tier II Emission Standards for Non-Road Diesel Engines was applied for the diesel generators used for the crushing operations. The emission factor is based on operating the generators at base load. These rates were used to derive the daily and annual worst-case emission rates, using the maximum capacities as well as the maximum number of days and hours of operation for the generators.

4.1.6 Combustion Emissions

For each natural gas source, the emission factors listed in Section 1.4 of US EPA AP-42 were applied, based on the maximum name plate capacity for each unit.

The emission factors listed in Section 1.3 of US EPA AP-42 were applied to the Oil Heater Furnace, based on the maximum name plate capacity for the unit.

4.1.7 Welding

The emission factor from welding operations was obtained from US EPA AP-42 Section 12.19.

5.0 EVALUATION

5.1 Modelling Approach and Model Selection

Atmospheric dispersion modelling was carried out using an updated version of the CALPUFF model. The CALPUFF model has many advancements including;

The CALPUFF modelling system is made up of three main components:

- The CALMET meteorological model that generates hourly wind and temperature fields in a three dimensional gridded modelling domain;
- The CALPUFF transport and dispersion model that advects “puffs” of material emitted from sources to calculate hourly concentration/fluxes at receptors of interest; and
- CALPOST post processor (used to extract the data of interest from CALPUFF binary output files).

The default model (CALPUFF V5.8) contains an input read error that does not allow the use of PRIME building downwash, which is considered to be more accurate in predicting concentrations within the building wake zone since it takes into account the effect of vertical wind shear and the variation in wind speed deficit with downwind distance. For this reason, a later version (CALPUFF V6.263) was used, where the error was corrected. It is our understanding that the there are no fundamental differences between the models. CALPUFF V6.263 has been applied to urban airshed modelling for the City of Toronto (Reference - Dr. Christopher Morgan and Regional Municipality of Halton (Reference - Mr. Peter Steer).

The following table provides additional information as per S.3.2.1.1 of the Town guidance document.

Table 10: Additional CALPUFF Information

Name of Model Used:	CALPUFF V6.263
Technical Issues which warrants use of Model:	Version 5.8 has a bug with respect to using building downwash using Prime input data. Problem Area 1 -- When performing cavity sampling for PRIME downwash, restrict primary source calculations to receptors downwind of primary source and add screen for receptors located far to the side (no impact). Without this restriction, the model may halt with an attempted division by zero. Receptors upwind of the source are processed for cavity impacts starting with Version 5.8, Level 070623. Modified: CAV_SAMP The model stops executing and returns an error message when by running BPIP-Prime with CALPUFF V5.8. The error message generated is provided in Appendix E.
References:	MCB-E.txt
Website:	http://www.src.com/calpuff/calpuff1.htm
Source Code:	See Appendix F

The following models and pre- and post-processors were used in the assessment:

- CALPUFF dispersion model (V6.263, level 080827);
- CALPOST post processor (V6.223);
- BPIP-Prime building downwash pre-processor (V04274); and
- CALMET was not required in this assessment as the CALPUFF-ready meteorological data were supplied by the Town.

The Town provides all applicants with identical Town Default Inputs (TDI) data to be used with the CALPUFF model. Golder received the following data from Mr. Jeffrey Lee of the Town in August 2012.

- Model domain;
- Fine gridded receptors with 100 meter spacing over the Town;
- Pre-processed meteorology data using CALMET (2004 to 2008);
- Geophysical data;
- Terrain data;
- Land use data;
- Coastline data;
- Background concentration data;
- Background hourly ozone data
- Background monthly ammonia data; and
- Background hourly FPM data.

5.2 Model Inputs

The CALPUFF model input and output files for the Facility have been provided on compact disc (Appendix D).

5.3 Source Parameters

For the purposes of the modelling, the sources at the facility were parameterized as area, point or volume sources. Table 11 is a summary of how each major source was parameterized in the model with detailed source characterization provided in Appendix C.

Table 11: Summary of Source Types Used for Dispersion Modelling

Process	Modelled as a Volume Source	Modelled as Point Source
Dryer Stack		X
HMA Storage Heater		X
Raw Material Delivery	X	
Raw Material Transfers	X	
Product Sales	X	
Fugitives from Batch Plant	X	
Combustion Sources	X	
Recycle Crushing	X	

Recommended procedures for source characterization of roads outlined in the National Sand Stone and Gravel Association's manual "Modeling Fugitive Dust Sources" were also followed (NSSGA, 2004).

Dispersion modelling input parameters are summarized in Table 12, and Table 13.

Table 12: Point Source Dispersion Modelling Input Parameters

Source ID	Description	x [UTM]	y [UTM]	Stack Height Above Grade [m]	Elevation	Stack Inner Diameter [m]	Stack Exit Velocity [m/s]	Stack Exit Gas Temp. [°C]	Stack Flow Rate [m³/s]
DS_01	Asphalt Plant Dryer Stack	603756.5	4808481.4	15.2	99.07	1.20	22.5	418.15	25.5
CS-01	HMA Storage Heater	603721.8	4808504.0	3.3	99.45	0.35	36.1	418.15	3.47

Table 13: Volume Source Dispersion Modelling Input Parameters

Source ID	Description	x	y	Release Height	Elevation	Initial Lateral	Initial Vertical
BP_01	Silo Filling and Loadout	603722.40	4808484.20	16.5	99.20	2.093	7.69
MH_01	Rap Delivery	603682.70	4808483.00	1.5	100.24	0.70	2.74
MH_02A	Aggregate and Sand Delivery	603766.80	4808509.40	1.5	98.08	0.70	2.74
MH_02B	Aggregate and Sand Delivery	603731.90	4808532.20	1.5	99.20	0.70	2.74
MH_02C	Aggregate and Sand Delivery	603782.90	4808485.60	1.5	98.06	0.70	2.74
MH_02d	Aggregate and Sand Delivery	603749.40	4808514.60	1.5	99.02	0.70	2.74
MH_02e	Aggregate and Sand Delivery	603791.20	4808469.20	1.5	98.58	0.70	2.74
MH_03	Recycled Concrete Delivery	603681.60	4808441.20	1.5	100.73	0.70	2.74
MH_04a	BP Feed Hopper	603764.50	4808473.00	5.0	99.0	0.70	2.79
MH_04b	BP Feed Hopper	603769.30	4808470.00	5.0	99.0	0.70	2.79
MH_04c	BP Feed Hopper	603774.00	4808467.00	5.0	99.0	0.70	2.79
MH_05	RAP Feed Hopper	603710.00	4808505.30	3.8	99.7	0.70	2.33
RC_01	Crushing Plant - Concrete	603658.80	4808415.60	5	101.04	1.64	2.33
RC_03	Crushing Plant - RAP	603658.40	4808480.00	5.0	101.0	1.64	2.33
VS_02	Shop (1)	603620.40	4808422.20	10.7	102.0	6.05	4.98
VS_03	Shop (2)	603589.90	4808429.30	10.7	102.3	6.05	4.98

Due to the variability in emission rates, the variable emission file option was used for the analysis. The details of how each source was entered to the variable emission file are provided in Appendix C.

5.3.1 Model Input Options

CALPUFF dispersion modelling has been completed using the following input options summarized in Table 14.

Table 14: Model Input Options

Model Input	Default Option Used	Non-Default Option Used
Meteorological Data	Yes - TDI	
Receptor Grid	Yes - TDI	
Land Use Data	Yes - TDI	
Terrain Data	Yes - TDI	
Coastline Data	Yes - TDI	
Background Concentrations	Yes - TDI	
▪ Ozone	not applicable	
▪ Ammonia	not applicable	
▪ FPM	Yes - TDI	

5.3.2 Non-Default Settings

All Town default settings were used in the model analysis.

5.3.3 Coordinate System

The UTM coordinate system was used to specify model object sources and buildings. All coordinates were defined in the NAD83 datum. Data supplied by the Town (e.g., receptor grids) were provided in WGS84 datum, which shows no difference compared to NAD83 datum for the domain of interest.

As outlined in the GIOHPAQB, receptors located within the property boundary can be excluded from the analysis. Based on this guidance, the following receptors were excluded:

- 603.630, 4808.517
- 603.728, 4808.517
- 603.603, 4808.392
- 603.728, 4808.392

5.3.4 Meteorology, Land Use and Terrain Data

CALMET meteorological data supplied by the Town were used in CALPUFF for this assessment. The CALMET meteorological data set, which takes into account effects such as slope flow and terrain channelling of winds, incorporated geophysical data such as land use and terrain data when it was developed. Due to the low resolution of the Town data set, base elevations for the receptor points, stacks and buildings were determined based on terrain data obtained from the MOE. The MOE provides terrain data in the form of Digital Elevation Model (DEM) files. The DEM files used in this assessment include the following:

- 0871_1.DEM;
- 0871_2.DEM;
- 0872_1.DEM; and
- 0872_2.DEM.

5.3.5 Receptors

Two sets of receptors were used for the modelling. One set corresponded to the CALMET meteorological grid and the other set was a finer resolution set of discrete receptors within the boundaries of Oakville supplied by the Town. As mentioned in Section 3.2.4, the elevations for the discrete receptors were obtained from the higher resolution MOE DEM files.

5.3.6 Building Downwash

Building wake effects were considered in this modelling study using the U.S. EPA's Building Profile Input Program (BPIP-PRIME). The inputs into this pre-processor include the coordinates and heights of the buildings and stacks. The BPIP output is used in the CALPUFF building wake effect calculations. Building locations and heights are provided in Figure 5.

5.3.7 Background and Cumulative Concentrations

Hourly background data for FPM were supplied by the Town. The data file contains hourly FPM data based on measurements taken at the MOE monitoring station in northeast Oakville. These hourly background FPM concentrations were added to the hourly facility-induced FPM concentrations to determine the cumulative concentrations.

5.3.8 Chemistry Models

The Facility is a major emitter for direct FPM releases only; therefore chemistry was not applied for the purposes of this application.

5.3.9 Species Modelled

Based on emission levels, the Facility is only required to model facility induced FPM.

5.3.10 Same Structure Contamination

There are no sensitive receptors within the property; therefore same structure contamination does not apply.

6.0 MAPPING

Table 15 summarizes the numeric results of the maximal total facility-induced (MTFI) for both the average and maximal scenarios. The results indicate the facility does not significantly affect the existing airshed in Oakville as the facility-induced FPM concentrations for both scenarios are less than 0.2 micrograms per cubic metre annually, a criterion defined by the HPAQB.

As discussed in Section 2.8, asphalt production at the Facility is a batch process in which production is directly linked to product demand. The use of asphalt is in construction operations, which typically run from April through December. During peak construction periods the plant may operate longer hours, however over a typical year the annual production is what is represented in the tables. Over the past three years, the facility has typically operated at approximately 50 % of the maximum rate used in the application. Over the next 10 years, it is anticipated the Facility will operate at maximum conditions less than 5% of the time.

Table 15: FPM Modelling Results

	MTFI "Average Emissions" Median Concentration (µg/m³)	MTFI "Maximal Emissions" Concentration (µg/m³)
Total Operations	0.12	0.18
Batch Plant Only	0.10	0.15
Crushing Operations Only	0.03	0.04

With all sources in operation (i.e., HMA production and recycle crushing), the highest predicted annual off-property concentration of FMP is 0.18 µg/m^3. This occurs at a receptor located to the east of the property, in an area that is not accessible by the public (rail right-of-way). The second highest receptor for the same period is located adjacent to the maximum concentration location, and has a maximum predicted concentration of 0.10 µg/m^3. This value is 46% lower than the maximum location.

The highest predicted annual off-property FMP concentration with only the HMA operations running (i.e., no recycle crushing) is 0.15 µg/m^3. This occurs at the same location as the 'Total Operations' scenario. The second highest receptor for the same period is located adjacent to the maximum concentration location, and has a maximum predicted concentration of 0.09 µg/m^3. This value is 40% lower than the maximum location. This suggests that the HMA operations are the most significant source in the modelling scenario.

With only the recycle crushing operations running, the highest predicted annual off-property FMP concentration of FMP is 0.04 µg/m^3. This also occurs at the same location as the 'all sources' scenario. The second highest concentration of 0.018 µg/m^3 occurs at the adjacent receptor, and is a 41% lower than the maximum location. The recycle crushing operation is a minor contributor to the FMP levels.

There is large variation in the year to year maximum predicted impacts, with 2004 producing the lowest concentrations and 2008 typically producing the highest concentrations. All concentrations decrease with distance from the site. At the residential areas near the Facility (approximately 400-700 metres from the plant) concentrations are predicted to be below 0.02 µg/m^3.

The assessment has demonstrated the Facility does not result in an affected airshed under both maximal and average emissions, therefore mapping is not required.

7.0 CONCLUSION

This HPAQB Application for Approval (Application) was prepared to assess the potential health risk of emissions of FPM and its precursors from the Facility. This Application was prepared following the Town's document "*Guidance for Implementation of Oakville Health Protection Air Quality By-Law 2010-035, Section 5 and 6 and Approval Requirements for Major Emitters v.5 June 2011*".

The major sources of FPM at the Facility are associated with the batch mix process. All of these sources were considered in this assessment. To closely reflect how the facility operates, variable emission rates, which were estimated based on U.S. EPA emission factors, were employed for the modelling assessment.

Based on modelling results, the Facility does not significantly affect the existing airshed in Oakville as the facility-induced FPM concentrations are less than 0.2 micrograms per cubic metre annually, a criterion defined by the Oakville Health Protection Air Quality By-Law. As a result, a health risk assessment is not required.

Report Signature Page

GOLDER ASSOCIATES LTD.

Tracy Hodges, B.Sc. (Hons), CCEP
Air Quality Engineer

Anthony Ciccone, Ph.D., P.Eng.
Principal

TMH/AC/ng

n:\active\2012\1151\12-1151-0213 dcc - oakville bylay - oakville\report\final\revision 3\12-1151-0213 rpt apr 2013 dcc bronte asphalt plant hpaqb v3.docx

FIGURES

599000 600000 601000 602000 603000 604000 605000 606000 607000

4812000 4811000 4810000 4809000 4808000 4807000 4806000

N

LEGEND

- Railways
- Watercourse
- Water Area, Permanent
- Approximate Property Boundary
- 3 km Buffer from Centre of Site

REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2006.4
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17
Imagery: Bing Maps © 2009 Microsoft Corporation and its data suppliers

500 250 0 500 1,000 1,500
METRES

SCALE 1:30,000

PROJECT
BRONTE ASPHALT PLANT
HPAQB APPLICATION

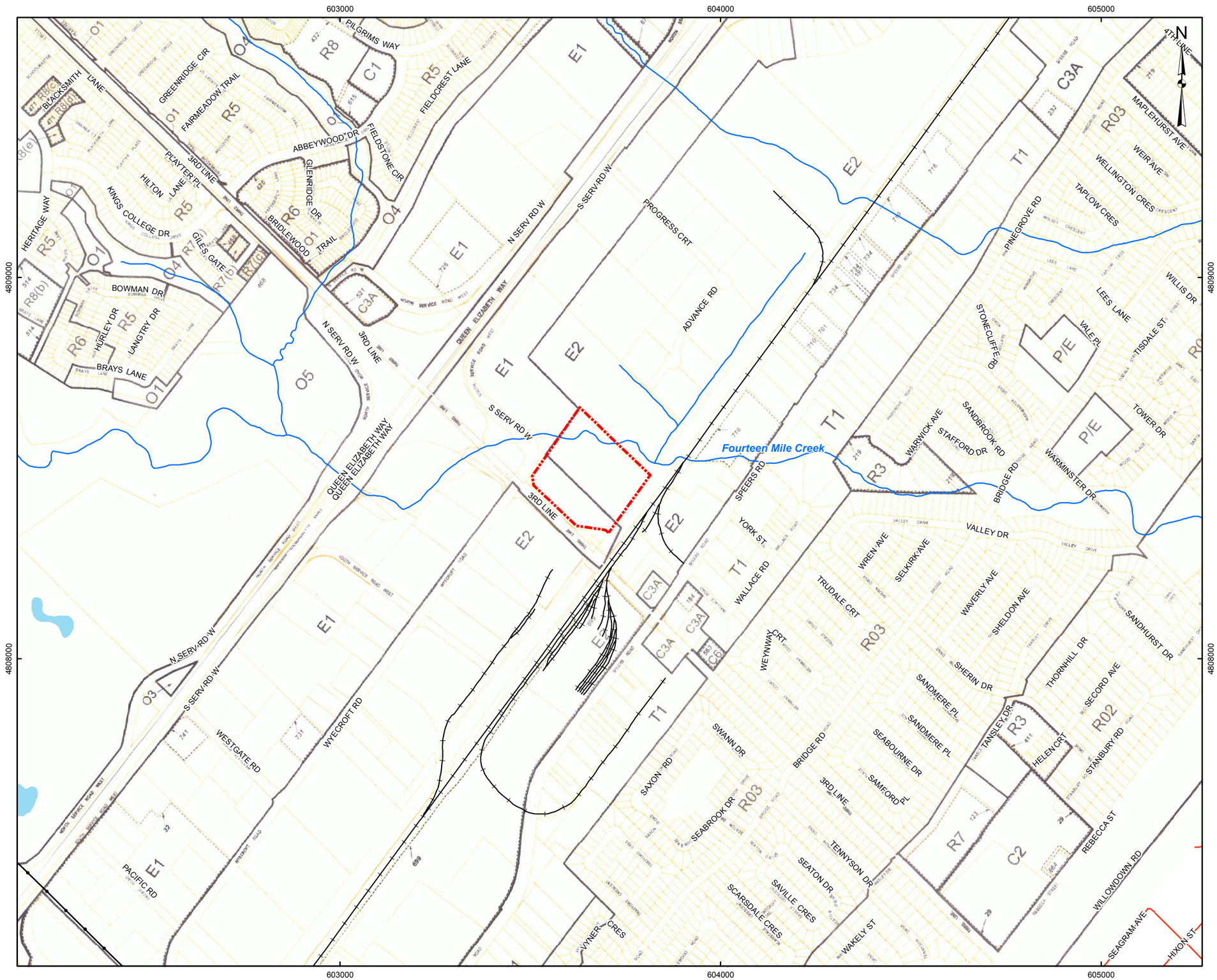
TITLE
SITE LOCATION PLAN

Golder Associates
Mississauga, Ontario

PROJECT NO. 12-1151-0213			SCALE AS SHOWN	REV. 0.0
DESIGN	KD	20 Jan. 2011		
GIS	KD	28 Sep. 2012		
CHECK	CM	6 Sep. 2012		
REVIEW	TH	28 Sep. 2012		

FIGURE: 1

G:\Projects\2012\12-1151-0213_Bronte_Asphalt_Plant\GIS\MXDs\Reporting\Site_Location.mxd



REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2006.4
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17
Zoning data obtained from Town of Oakville website.

200 100 0 200 400 600
METRES

SCALE 1:10,000

PROJECT
BRONTE ASPHALT PLANT
HPAQB APPLICATION

TITLE
LAND USE ZONING DESIGNATION

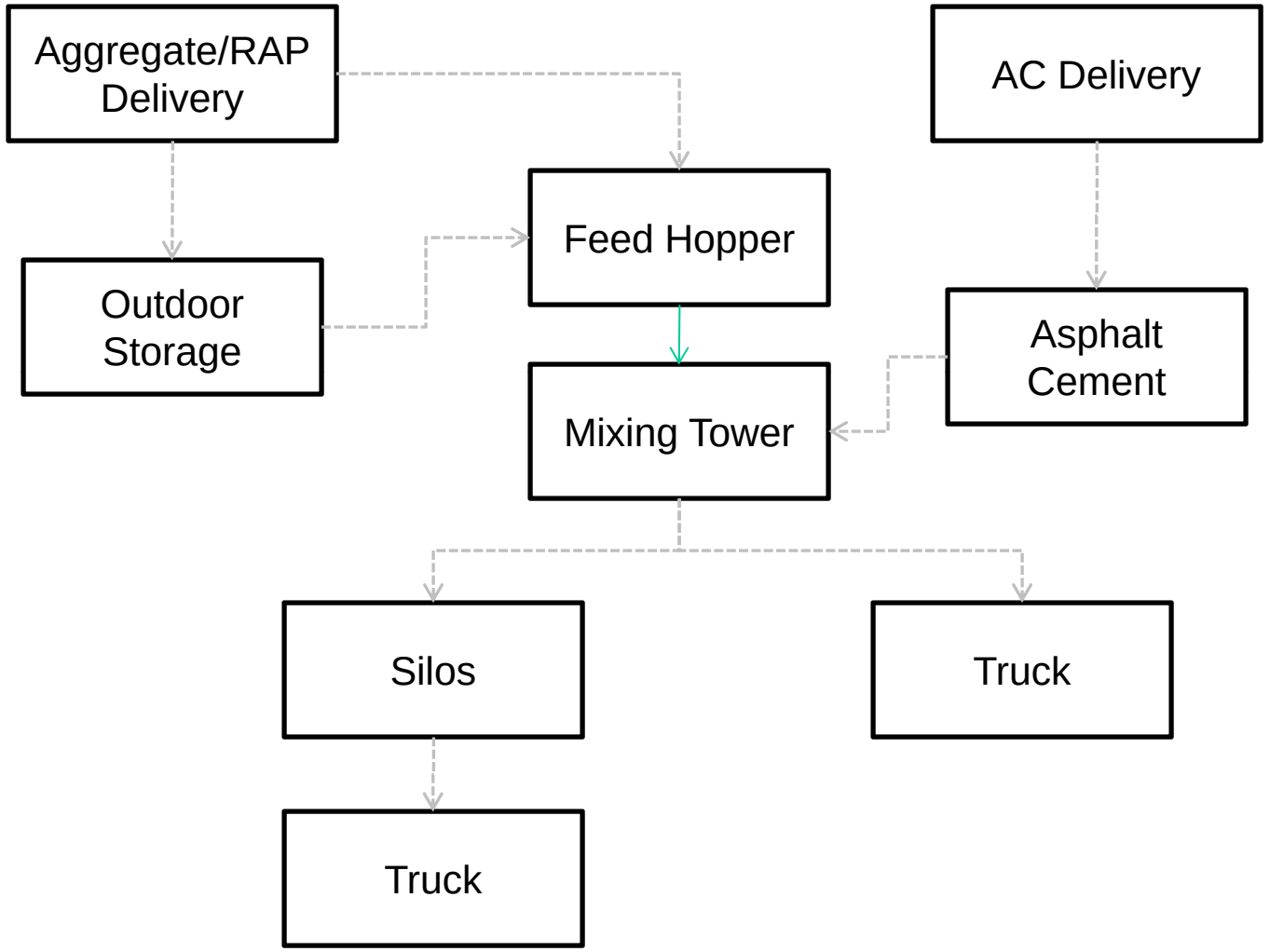
Golder Associates
Mississauga, Ontario

PROJECT NO. 12-1151-0213			SCALE AS SHOWN	REV. 0.0
DESIGN	KD	20 Jan. 2011	FIGURE: 2		
GIS	JR	6 Sep. 2012			
CHECK	CM	6 Sep. 2012			
REVIEW	TH	6 Sep. 2012			

G:\Projects\2012\12-1151-0213_Bronte_Asphalt_Plant\GIS\MXDs\ReportingZoning.mxd

SIMPLIFIED PROCESS FLOW DIAGRAM
Bronte Asphalt Plant
Oakville, ONTARIO

FIGURE 3



Date: September 28, 2012
Project: 12-1151-0213

Golder Associates

Made By: TMH
Checked By: CDK

LEGEND

- Dispersion Sources
- Railways
- Watercourse
- Stockpile

REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2006.4
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17
Imagery: Bing Maps © 2009 Microsoft Corporation and its data suppliers

20 10 0 20 40 60
METRES

SCALE 1:1,000

PROJECT
BRONTE ASPHALT PLANT
HPAQB APPLICATION

TITLE
DISPERSION SOURCES

Golder Associates
Mississauga, Ontario

PROJECT NO. 12-1151-0213			SCALE AS SHOWN	REV. 0.0
DESIGN	KD	20 Jan. 2011		
GIS	KD	14 Dec. 2012		
CHECK	CM	14 Dec. 2012		
REVIEW	TH	14 Dec. 2012		

FIGURE: 4

G:\Projects\2012\12-1151-0213_Bronte_Asphalt_Plant\GIS\MXDs\Reporting\Dispersion_Sources.mxd

603600 603700 603800

4808500 4808400

S SERVICE RD W

3RD LINE

Tanks
5m

Batch Plant
Tower
19.2m

BatchPlant
7m

Storage
Silos
15.5m

Feed
Hoppers
4.9m

Shop
10.7m

N

LEGEND

- Railways
- Watercourse
- Building Location with Height

REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2006.4
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17
Imagery: Bing Maps © 2009 Microsoft Corporation and its data suppliers

20 10 0 20 40 60
METRES

SCALE 1:1,000

PROJECT
BRONTE ASPHALT PLANT
HPAQB APPLICATION

TITLE
BUILDING LOCATIONS

Golder Associates
Mississauga, Ontario

PROJECT NO. 12-1151-0213			SCALE AS SHOWN	REV. 0.0
DESIGN	KD	20 Jan. 2011		
GIS	KD	14 Dec. 2012		
CHECK	CM	14 Dec. 2012		
REVIEW	TH	14 Dec. 2012		

FIGURE: 5

G:\Projects\2012\12-1151-0213_Bronte_Asphalt_Plant\GIS\MXDs\Reporting\Building_Locations.mxd

APPENDIX A

Dufferin's History and Commitment to Oakville

Dufferin Construction Company
690 Dorval Drive, Suite 200
Oakville,ON L6K 3W7
Canada

Tel: 905-842-2741
Fax:905-842-2137
www.dufferinconstruction.com

Background

Dufferin Construction Company, a division of Holcim (Canada) Inc., has been operating in the Town of Oakville for the past 30 years. Currently, we employee 60 full time salaried employees at our head office on Dorval Drive, and an additional 45 employees at our Bronte facility located on 3rd line which includes a repair shop and asphalt plant. Several other Dufferin Construction employees and their families call Oakville home.

Dufferin Construction is a local provider of asphalt and construction services, that has helped improve local infrastructure within the Town of Oakville. In 2011, the company completed the widening of the QEW through Oakville which included the construction of high-occupancy vehicle (HOV) lanes to help alleviate traffic and gridlock.

Dufferin Construction's parent company, Holcim Canada also provides construction materials to a variety of infrastructure and construction projects within Oakville. Dufferin Concrete, one of Dufferin Construction's sister companies, has been pouring concrete at the site of the new Oakville Hospital.

Dufferin Construction Bronte Plant

Halton Healthcare ready mix truck at ceremonial concrete pouring at new Oakville Hospital site

Our Commitment to the Community

Throughout the year, Holcim Canada and Dufferin Construction contribute to various activities, fundraisers and community initiatives as a means to give back and to help build the communities in which we live, work and play. Initiatives that we have led and/or contributed to in Oakville include:

Bronte Plant Open House

In May 2011, Dufferin Construction held its first ever open house at the Bronte Plant. We invited our external stakeholders to our site to meet some of our employees and learn about the process of producing asphalt products for road construction. It proved to be a great opportunity to ask questions

and ensure open and transparent communication between the company, the community and our many stakeholders. Holcim Canada and its Dufferin Aggregates and Dufferin Concrete divisions also participated in this open house by providing educational booths regarding their services.

Dufferin Construction Information Booth

Information Session for participants on the production of asphalt products.

Halton Healthcare Ready-Mix Drum Sponsorship Program

Recognizing its large presence in Halton Region and exemplifying its commitment to the communities in which it operates, in 2008, Holcim Canada launched its innovative ready-mix drum sponsorship program to raise money for the three (3) Halton Region hospitals, including the Oakville-Trafalgar Hospital. The program invites Holcim Canada business partners to donate funds to support the hospitals on an annual basis. Sponsors are then recognized by having their corporate logos placed on one of our two (2) concrete ready-mix trucks dedicated to the Halton Healthcare program. The investment in providing accessible and better healthcare in Halton Region is made possible through our partnership with and the generous contributions of our business partners and customers.

Since the program was launched, a total of $400,000 has been donated to Halton Healthcare Services to enable the hospitals to purchase lifesaving medical equipment.

Halton Healthcare Cheque Presentation (2011)

Halton Healthcare Ready-Mix Truck (2011)

Coronation Park Clean Up – Oakville

As part of our ongoing commitment to corporate social responsibility, Dufferin Construction contacted Town of Oakville councilors Cathy Duddeck (Regional Councilor - Ward 2) and Pam Damoff (Town Councilor – Ward 2) to ask for ideas about how the company could help the local community. Coronation Park, the premier waterfront park in Oakville, was identified as an area in need of clean-up and beautification, and suggested as an opportunity for Dufferin Construction to make a contribution.

Drawing on internal expertise and resources, the company completed a six (6) hour clean-up of the park on October 18, 2011 in cooperation with Oakville Parks and Recreation staff, and Councilors Damoff and Duddeck. The scope of work involved shoreline clean-up, painting of park benches and the pavilion, and clean-up around the play park area. Over 60 Dufferin Construction personnel volunteered their time for this initiative.

Dufferin Construction drew on the resources of sister organization, Dufferin Concrete, which supplied a small quantity of concrete to facilitate the repair of broken concrete in various areas around the park. In the spring of 2012, the company returned to the park and placed asphalt on deteriorated walkways. In addition to the supply and placement of asphalt, Dufferin Construction also coordinated the pouring of concrete slabs for the park benches.

Clean-up day at the park. Dufferin Construction and Town of Oakville staff discussing planned activities.

Line and walkway painting.

Joshua Valley Park Tree Planting

In May 2012, Holcim Canada partnered with the Joshua's Creek Residents Association and the Town of Oakville to plant 300 white pine and white spruce seedlings at the Joshua Valley Park to help maintain and enhance Oakville's tree canopy.

Habitat for Humanity – Oakville

On October 28, 2010, Holcim Canada staff volunteered at a Habitat for Humanity build event in Oakville. Staff completed a number of varying tasks to help construct the two (2) homes located on Elmwood Road in Oakville.

Holcim Volunteers at Oakville Habitat for Humanity Build

Oakville Trafalgar Memorial Hospital Classic

In 2011 and 2012, Holcim Canada participated in the OTMH Annual Classic. In addition to being a corporate sponsor, individual Holcim team members also raised funds.

Team Holcim at the 2011 OTMH Classic

APPENDIX B

ECA No. 5859-798SLP, OHMPA Environmental Best Practices Guide

Ontario

Ministry of the Environment

Ministère de l'Environnement

CERTIFICATE OF APPROVAL
AIR
NUMBER 5859-798SLP
Issue Date: December 31, 2007

St. Lawrence Cement Inc.
690 Dorval Drive, Suite 200
Oakville, Ontario
L6K 3W7

Site Location: 731 Third Line
Oakville Town, Regional Municipality of Halton

You have applied in accordance with Section 9 of the Environmental Protection Act for approval of:

One (1) permanent batch-type hot mix asphalt plant, having a maximum production rate of 250 tonnes per hour, consisting of the following:

- one (1) natural gas fired dryer, having a maximum heat input of 57,989,250 kilojoules per hour, with particulate emissions controlled by one (1) baghouse, having 975.5 square metres of Nomex filter bags and a pulse jet cleaning mechanism, exhausting into the atmosphere at a volumetric flow rate of 25.5 actual cubic metres per second at an approximate temperature of 145 degrees Celsius, through a stack, having an exit diameter of 1.2 metres and extending 15.2 metres above grade;

- one (1) 150 tonnes hot mix asphalt storage silo;

- two (2) liquid asphalt cement storage tanks having a maximum capacity of 55,000 litres and 75,000 litres respectively, equipped with one (1) natural gas fired hot oil heater, having a maximum heat input of 3,163,050 kilojoules per hour, discharging into the atmosphere at a maximum volumetric flow rate of 3.47 actual cubic metre per second through a stack, having an exit diameter of 0.35 metre, extending 1.3 metres above the roof and 3.3 metres above grade;

- one (1) exhaust silencer for the Asphalt Plant Exhaust Fan stack, capable of providing the following values of Insertion-Loss in 1/1 octave frequency bands:

Centre Frequency (Hertz)	63	125	250	500	1000	2000	4000	8000
Insertion-Loss (decibel)	2	6	12	12	10	8	5	2

all in accordance with the application for a Certificate of Approval (Air) submitted by St. Lawrence Cement Inc.dated April 7, 2005 signed by Scott Winger, and all supporting information associated with the application.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

(1) "Act" means the Environmental Protection Act;

(2) "Certificate" means this entire certificate of approval issued in accordance with Section 9 of the Act;

(3) "Company" means St. Lawrence Cement Inc.

(4) "Director" means any Ministry employee appointed by the Minister pursuant to Section 5 of the Act;

(5) "District Manager" means the District Manager, Halton-Peel District Office, Region of the Ministry;

(6) "Equipment" means the dryer, the baghouse, the hot mix asphalt storage silos, the liquid asphalt storage tanks and

ancillary equipment described in the Company's application, this Certificate and in the supporting documentation referred to herein, to the extent approved by this Certificate;

(7) "Manual" means a document or a set of documents that provides written instructions to staff of the Company;

(8) "Ministry" means the Ontario Ministry of the Environment;

(9) "Noise Control Measures" means measures to reduce the noise emissions from the Facility and/or Equipment described including, but not limited to, barriers, silencers, acoustical louvres, hoods and acoustical treatment;

(10) "Plant" means the permanent hot mix asphalt plant described in the Company's application, this Certificate and in the supporting documentation referred to herein, to the extent approved by this Certificate;

(11) "Publication NPC-205" means Publication NPC-205, Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban), October, 1995.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

OPERATION AND MAINTENANCE

Operation and Maintenance Manual

1. The Company shall ensure that the Plant and the Equipment are properly operated and maintained at all times. The Company shall:

(1) prepare, not later than three (3) months after the date of this Certificate, and update, as necessary, a Manual outlining the operating procedures and a maintenance program for the Plant and the Equipment, including:

(a) routine operating and maintenance procedures in accordance with good engineering practices and as recommended by the Equipment suppliers;

(b) emergency procedures;

(c) the frequency of inspection and replacement of filter bags;

(d) procedures for any record keeping activities relating to operation and maintenance of the Plant and the Equipment;

(e) procedures for recording and responding to environmental complaints relating to operation of the Plant; and

(f) all appropriate measures to minimize noise and odorous emissions from all potential sources; and

(2) implement the recommendations of the Manual.

Environmental Practices Guide

2. The Company shall ensure that the Plant is operated and maintained at all times according to the Environmental Practices Guide For Ontario Hot Mix Asphalt Plants, published by the Ontario Hot Mix Producers Association, dated February, 2002, or as amended.

Dust Suppression

3. The Company shall provide effective dust suppression to any potential sources of fugitive dust emissions resulting from

the operation of the Plant, including stockpiles and on-site truck traffic.

RECORD RETENTION

4. The Company shall retain, for a minimum of two (2) years from the date of their creation, all records and information related to or resulting from the operation, maintenance and monitoring activities required by this Certificate, and make these records available for review by staff of the Ministry upon request. The Company shall retain:

(1) all records on the maintenance, repair and inspection of the Plant and the Equipment;

(2) all records on the daily operation of the Plant and the Equipment, including :

(a) daily production rate;

(b) daily start-up and shut-down times of the Plant;

(c) the weight percentage of recycle asphalt paving material loaded into the Plant;

(d) the weight percentage of rubberized material and asphaltic cement loaded into the Plant;

(e) where continuous temperature monitoring equipment is not available, record mixing and load-out temperatures at least on a daily basis and with every changes in mix types;

(3) all records of any upset conditions associated with the operation of the Equipment;

(4) all records on any environmental complaints, including:

(a) a description, time and date of the incident;

(b) operating conditions (e.g. temperatures of asphalt cement and hot mix material being discharged, any upset conditions, spills of hot mix material, etc.) at the time of the incident;

(c) wind direction at the time of the incident; and

(d) a description of the measures taken to address the cause of the incident and to prevent a similar occurrence in the future.

NOTIFICATION OF COMPLAINTS

5. The Company shall notify the District Manager, in writing, of each environmental complaint within two (2) business days of the complaint. The notification shall include:

(1) a description of the nature of the complaint; and

(2) the time and date of the incident.

NOISE

6.1 The Company shall ensure that the noise emissions from the Plant comply with the limits set in Publication NPC-205.

6.2 The Company shall fully implement the Noise Control Measures prior commencement of operations of the Equipment or not later than three (3) months after the date of this Certificate.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition Nos. 1, 2, and 3 are included to emphasize that the Plant and the Equipment must be maintained and operated

according to a procedure that will result in compliance with the Act, the regulations and this Certificate.

2. Condition No. 4 is included to require the Company to keep records and to provide information to staff of the Ministry so that compliance with the Act, the regulations and this Certificate can be verified.

3. Condition No. 5 is included to require the Company to notify staff of the Ministry so that compliance with the Act, the regulations and this Certificate can be verified.

4. Conditions No. 6 are included to provide the minimum performance requirement considered necessary to prevent an adverse effect resulting from the operation of the Equipment.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written Notice served upon me, the Environmental Review Tribunal and in accordance with Section 47 of the Environmental Bill of Rights, S.O. 1993, Chapter 28, the Environmental Commissioner, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Environmental Commissioner
1075 Bay Street, 6th Floor
Suite 605
Toronto, Ontario
M5S 2B1

AND

The Director
Section 9, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

This instrument is subject to Section 38 of the Environmental Bill of Rights, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek leave to appeal within 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry at www.ene.gov.on.ca, you can determine when the leave to appeal period ends.

The above noted works are approved under Section 9 of the Environmental Protection Act.

DATED AT TORONTO this 31st day of December, 2007

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Section 9, *Environmental Protection Act*

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ENVIRONMENTAL PRACTICES GUIDE

Ontario Hot Mix Asphalt Plants

Fourth Edition 04/10

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SECTION ONE

Introduction

The Ontario Hot Mix Producers Association (OHMPA) and its member companies are committed to operating their hot mix asphalt production facilities in a safe, environmentally responsible manner. This "Hot Mix Plant Environmental Practices Guide (EPG)" was developed by OHMPA, in consultation with the Ontario Ministry of Environment (MOE). The guide includes sections on sources of air emissions including conventional contaminants such as particulate and volatile organic compounds (VOCs) as well as odour and noise; best practices to control and minimize air emissions and documentation requirements to demonstrate that the best practices are in place and are being utilized. The guide also includes sections on site management of waste and water.

This Guide is intended to assist plant operators in operating and maintaining their facilities in a manner that minimizes potential environmental impact. It attempts to outline a "best available practices" approach to environmental management, but does not claim to be all-inclusive or to cover all possible options. Users are advised to seek manufacturer and/or consultant advice where more extensive process and equipment controls are necessary.

The Guide may be used as a reference for dealing with specific concerns or complaints, and to ensure ongoing environmental responsibility. Information in this Guide is intended to assist hot mix producers by outlining "best practices" within the industry. It is the individual producer's responsibility to operate their plant(s) in compliance with the MOE's Certificate of Approval (Air and Noise) or Certificate of Approval (Water).

Any incident with an environmental impact, must by law, be reported to the MOE.

The 2010 EPG revision has been specifically produced to address more recent issues including ground water protection (Clean Water Act) and storm water management. Further direction on odour control, dust management, spills management and water management have also been included in this most recent edition (4th) of the OHMPA Guide. Since the last EPG revision in 2002 OHMPA has updated its air emissions calculator (ECHO 127 2007) to incorporate new requirements dictated by MOE and by Environment Canada's National Pollutant Release Inventory (NPRI) including the harmonization of emissions reporting to both agencies through Environment Canada's OWNERS on line site.

A typical report for an average producer is included as an example in this Guide in Appendix A. It should be noted that in all cases the reporting thresholds in the regulations are not the legal limits for emission generation, but simply a level that MOE and Environment Canada have chosen to begin collecting data.

SECTION TWO

Environmental Regulations Governing Hot Mix Asphalt Production

2.1 Air / Noise

Hot mix asphalt production is a highly regulated industry. With respect to air emissions (including noise), facilities must demonstrate compliance with the Ministry of the Environment Ontario Regulation 419/05 for Local Air Quality and with the Ministry's Noise Pollution Control (NPC) Documents in order to obtain a Certificate of Approval (Air & Noise) to operate as well as meeting rigid standards set out in Ontario Regulation 349 for Hot Mix Asphalt Facilities. Additional site-specific conditions can also be imposed in the Certificate of Approval (C of A). Facilities must also meet local municipal bylaw requirements.

On an annual basis facilities must determine if they need to report annual air emissions (and in a few cases waste transfers and water discharges) to the federal and provincial governments through the National Pollutant Release Inventory (NPRI) Regulation and Ontario Regulation 127. Over time Ontario Regulation 127 has been harmonized with Environment Canada's NPRI such that currently only air emissions of acetone are included under Ontario Regulation 127. For hot mix asphalt producers only the emissions that exceed the contaminant thresholds set out in the regulations need to be reported.

The annual reporting example for a typical hot mix asphalt production facility provided in Appendix A details less than a handful of substances that approach reporting levels. These substances, however, include Particulate Matter (PM), which includes PM10 and PM2.5. (PM10 means particulate smaller than10 micrometres in diameter and PM2.5 means particulate smaller 2.5 micrometres in diameter.)

It must be made clear that the reporting "thresholds" in NPRI and Ontario Regulation 127 are not related to the maximum amounts mandated by the federal and provincial governments but simply the point where each jurisdiction has decided it is of sufficient interest to them to begin the collection of data.

2.2 Waste

Waste is defined and regulated in Part V of Ontario's *Environmental Protection Act* ("EPA") and in Regulation 347 under the EPA. The EPA defines waste as something that "includes ashes, garbage, refuse, domestic waste, industrial waste, or municipal refuse and such other materials as are designated in the regulations". These definitions and how to apply them may in some cases be unclear. Ontario case law can provide the best guidance and clarification on the legislated definitions and designations of waste.

Notably, if a material which could be defined as a waste is one that has a reasonable value to the owner, and can be sold or has a legitimate use, then the material may not be subject to the requirement of Part V of the EPA. With that said, it is important for the producer to be able to demonstrate as well that the material in question does not have any hazardous environmental impacts associated with it.

If it is waste then to not be subject to waste approval and other waste requirements it must meet some exemption in Section 3 of O.Reg. 347, such as the exemptions for recycling activities.

2.3 Water

With respect to water regulations there are four aspects of current legislation that the operator should be aware of and plan accordingly.

The Clean Water Act regulates water quality and is designed to protect existing and future sources of drinking water from activities that are determined to be significant drinking water threats. In Ontario, area specific Source Protection Plans detail requirements that have to be complied with and operators are encouraged to source this information. These Plans are being developed by Source Protection Committee's and should be made available as early as 2010.

The Ontario Water Resources Act (OWRA), specifically Section 53, details obligations of a landowner with respect to the construction and operation of a "sewage works". A permit is required for such an undertaking (Certificate of Approval - Industrial Sewage Works). The Act's definition of a sewage works is very broad and typical endeavours that could trigger a potential permit requirement would be a settlement pond for a wet scrubber, and surface water discharges leaving the site. These permits will carry with them terms and conditions that the permit holder must comply with.

The OWRA Section 34 details obligations of the landowner to secure a permit (Permit to Take Water – PTTW) for the taking of water from a well or surface water source, if the removal is greater than 50,000 litres in any given day.

Finally the Ontario government is developing new regulations that will impose charges on industrial water under Ontario Regulation 450/07 – Charges for Industrial and Commercial Water Users. This regulation could also apply to the asphalt industry.

SECTION THREE

Hot Mix Asphalt Production Emissions Generated On-Site

The primary emissions associated with hot mix asphalt plants are air emissions and include particulates (dust); gases (including combustion gases and organic compounds); odour and noise. In addition, hot mix plants can generate some wastes from pollution control equipment, QA/QC laboratories and maintenance shops. Process waste water is generally not produced except at a limited number of plants that use wet dust collection systems. All plants have the potential to generate storm water run-off.

3.1 Air Emissions

3.1.1 Particulates

- Most of the particulate matter or "dust" which may be generated at the hot mix asphalt plant consists of inert mineral aggregate.

- Dust created in the hot mix production process may be categorized as either the "open fugitive" type or "ducted" type. See the plant process charts in Appendix C for identification of individual process sources.

- Open fugitive dust may be generated from the delivery, storage and handling of aggregates or from general plant and yard activities. Potential points of origin include stockpiles, cold feed bins, traffic areas, conveyor belts, screens and material transfer points.

- Ducted particulate matter is typically generated during the aggregate heating and drying process. It is properly managed through the asphalt plant's environmental control systems.

3.1.2 Gaseous Emissions

- Gaseous emissions from hot mix production consist primarily of Sulphur Oxides (SOx), Nitrogen Oxides (NOx), Carbon Monoxide (CO), Carbon Dioxide (CO2) and organic compounds including Volatile Organic Compounds (VOCs) and semi- volatile organic compounds such as Polycyclic Aromatic Hydrocarbons (PAHs).

- Notably, the most visible emission in an asphalt plant is the white plume from the plant's stack which is simply steam and is the direct result of drying the large aggregate component of the mix.

3.1.2.1 Combustion Gases

- Combustion gases (SOx, NOx, CO and CO2) are generated primarily from the dryer, hot oil heater and generators. The quantity is typically related to production volumes and energy efficiency of the dryer. The modern burners used in the process are by design typically highly efficient and can minimize the products of combustion.

- Nitrogen Oxides are influenced by the nitrogen content of the fuel, amount of excess air, flame temperature and burner type.

- Sulphur Oxides (SOx) are primarily influenced by the sulphur content in the fuel.

- Carbon monoxide (CO) emissions are usually related to an incomplete combustion process. Emission levels are determined by process efficiency, which may vary according to the type of fuel used.

- Carbon dioxide (CO2) emissions are the product of complete combustion of hydrocarbon fuels. Carbon dioxide emissions are currently not regulated at hot mix asphalt plants. Managing carbon dioxide (and other greenhouses gases including carbon monoxide) emissions may be a key environmental responsibility for hot mix asphalt producers in the future.

3.1.2.2 Organic Compounds

- Organic compound emissions originate from the use of organic materials (asphalt cement) and fuels in the production process.

- Potential sources of non-combustion related organic compound emissions include: asphalt cement tanks (especially during delivery), the batch or drum mixer, hot mix storage silos, and, load-out areas. Emissions of organic compounds from these sources are directly related to heating temperatures and the type of asphalt cement. The composition and percentage of Reclaimed Asphalt Pavement (RAP) used in a mix may also affect organic compound emissions.

3.1.3 Odour

- Odour is not considered a toxicological health concern but it is generally recognized as a potential nuisance that may affect neighbours.

- A major source of odour in hot mix production is asphalt cement. The degree of odour is related to the AC grade, its crude oil source and type, sulphur content and temperature. Points of origin include delivery vehicles, storage tanks and load-out areas.

- Other contributing sources of odour emissions may include the use of some aggregate types, special additives such as certain liquid anti-stripping agents or polymers, and the use of RAP in the mix.

- Historically petroleum-based solvents used as cleaners or release agents were a potential source of odours. These have essentially been replaced by environmentally friendly low odour products.

3.1.4 Noise

- Sources of noise emissions related to the hot mix plant operation originate from the burner and burner stack, fans, bucket elector or flat conveyor, drum/dryer, pugmill, pneumatic gates, dust augers, and diesel generators.

- Noise may also arise from associated yard activities, primarily related to equipment and vehicle operations including back-up alarms and truck tailgates.

- The perception of noise emissions are greatly influenced by the time of day or night, surrounding ambient noise levels, on and off-site structures, and terrain.

3.2 Waste

- The basic component materials for hot mix asphalt production are aggregates (processed virgin and RAP materials) and asphalt cement, and these materials are supplied in bulk and do not generate packaging wastes.

- In some plants surplus filler from a wet scrubber and fines from a baghouse may be discharged infrequently.

- A quality control laboratory may be a source of low volumes of solvents.

- Waste oils generated from periodic equipment maintenance (e.g. loaders, gear-boxes, hot oil heaters)

- Sources of conventional municipal waste may include the shop and office staff areas. Sanitary waste is generated in the normal day-to-day operation of the plant.

Notably, if a material which could be defined as a waste is one that has a reasonable

value to the owner, and can be sold or has a legitimate use, then the material may not be subject to the requirement of Part V of the EPA. With that said, it is important for the producer to be able to demonstrate as well that the material in question does not have any hazardous environmental impacts associated with it.

If it is waste then to not be subject to waste approval and other waste requirements it must meet some exemption in Section 3 of O.Reg. 347, such as the exemptions for recycling activities.

3.3 Water

- With the exception of plants utilizing wet dust collection systems (less than 10% of plants in Ontario), process waste water is not generated. Process waste water is typically collected in closed-circuit settling ponds.
- The only other source of water on-site is from storm water run-off.

SECTION FOUR

Environmental Best Practices

The best practices presented in this section of the Guide outline the suggested maintenance and operations procedures to mitigate plant emissions. Implementation of many of these environmental best practices can have added benefits of improved production efficiency and product quality.

Sample checklists for various components in the operation of a hot mix plant have been included for reference in Appendix E. These samples are available for use but should be modified by the user to be specific to their site and operations.

4.1 Controlling Particulate

As described in Section 3.1.1, sources of particulate matter may be defined as “open fugitive” or “ducted”. Section 4.1.1 describes environmental best practices for “open fugitive” sources, and Section 4.1.2 describes environmental best practices for “ducted” sources.

4.1.1 Open Fugitive Dust Controls

4.1.1.1 Yard Operations

Dust control methods include:

- When conditions dictate (very dry, windy, etc.) all roadways and working areas should be adequately watered, swept or given an application of a suitable dust suppressant to minimize the impact of airborne dust being created as the result of vehicle traffic. Sites should be assessed regularly to determine the need for dust control.
- The placement of recycled asphalt products or the paving of roadways and haulage ways will also reduce the amount of airborne dust created as the result of vehicle traffic
- All stockpile areas should be kept neat and orderly; stockpile heights should be kept to a reasonable minimum in order to reduce wind erosion.
- Stockpiles should be located as close as to possible to the cold feed bins in order to minimize travel distance with front end loaders from stockpiles to bins.

- Stockpiles should be positioned to take advantage of existing wind screens e.g. on site buildings, tree screens and berms.

- The speed of vehicular traffic should be controlled by setting speed limits on internal roads. Reduced speed limits reduce the amount of airborne dust created as the result of vehicle traffic.

- All vehicles delivering aggregates to the site should be tarped.

4.1.2 Material Transfer Through the Plant

- The height of material drop points at transfer locations should be kept to a minimum and be partially or fully enclosed as required.

- Conveyed materials should be effectively protected from wind by the trough configuration of the conveyor belt or shielded by a guard from wind erosion.

- Where installed, hydrated lime storage silos should be equipped with a ventilation filter and a vent valve. (Vent through a coupling to dust collection system.)

- The elevator housing and plant tower should be inspected for cracks and holes and repaired as required.

- Tight seals should be maintained at connections between elevator and screens.

- Rubbing-type seals should be properly fitted to maintain negative pressure at the connection to the dryer/collection system.

- Discharge valves, ducts and seals around dryer intake should be inspected and repaired or replaced as required.

- The number of transfer points in the whole system should be minimized – at design or during refit.

4.1.3 Ducted Dust Control Systems

- All dust control systems should function in accordance with the prescribed operator/maintenance manual recommendations and all maintenance records should be maintained.

4.1.3.1 Baghouse

- A baghouse is a large airtight structure placed in the exhaust air stream between the cyclone and the exhaust fan. Its sole function is to remove particulate / dust

from the aggregate that is entrained in the combustion / process air during the aggregate drying process. This is accomplished by passing the combustion air through cloth filter bags or socks contained within the baghouse.

- If the baghouse is sized and maintained properly, the collection efficiency for particles 10 micrometres to 1 micrometres in diameter is greater than 99%.

- To maintain proper collection and control efficiencies, the following operating procedures should be followed:

    - The baghouse should always be pre-heated to dry out any moisture or condensation prior to starting production.

    - Upon completion of production, a low fire setting to dry out the baghouse should be used.

    - While operating, the internal operating temperature / exhaust air entering the baghouse should be kept above the dew point (approximately 120^{o} C (250^{o} F)). This will prevent condensation in the baghouse that could cause “mudding” of the bags and reduced airflow.

    - The high temperature baghouse protection device should be working properly.

    - For Nomex bags, a high temperature setting of approximately 205o C (400o F) should be used. For any other fabric, talk to your filter bag supplier for specific operating temperatures.

    - All thermocouples should be the rapid response type and should be functioning properly.

    - Pressure-sensing devices should be operating properly, as they sense the pressure drop across the baghouse and activate the cleaning cycle when the pressure drop reaches a preset limit.

    Note: In general the preference is to have pressure drops closer to the lower end of the spectrum.

- Bags should not be over-cleaned, as this removes the filter cake, which reduces the filter efficiency of the bags.

- Over-cleaning can also have the following negative effects:

    - Premature failure of the filter bag.
    - Addition of unnecessary excess air that the system must handle, reducing efficiency (reverse air systems only).
    - Lower baghouse temperature, causing increased fuel usage (reverse air systems only).

- The air compressor should be sized to maintain a constant air pressure in accordance with manufacturer's specification and should be able to recover quickly after pulsing.

- Air leaks will keep you plant from running at peak efficiency.

- All bag access doors on top of the baghouse should be sealed to prevent air infiltration.

- A proper seal between the baghouse and cage should be maintained.

- The clean side of baghouse should be inspected from top inspection doors. Any dust present in this area will indicate holes in the bags or poor bag and cage seals. Replace bags or reseal as necessary.

- A black light inspection system should be used on the clean side of the baghouse to inspect for holes or improperly sealed bags that cannot be detected by the naked eye. Inspection should be completed annually as a minimum.

- The cleaning cycle should be adjusted to match production or type of mix being produced. General rule:
    - increase production = increase cleaning cycle
    - finer mixes = increase cleaning cycle

  Note: If the system is designed to clean based on pressure drop across baghouse, then this will not be required, as it will occur automatically.

- Proper alignment of cleaning air jets should be maintained. Improper alignment could damage bags.

- All rotary air locks and valves should be adjusted and operate properly, as discussed in the cyclone / duct work section.

- Compressed air used for pulse cleaning should be dry and free of oil residue. Moisture or oil will cause the dust to mud or blind the bags, reducing the efficiency of the baghouse.

4.1.3.2 Cyclone/Ductwork/Knockout Box

- A cyclone is a primary particulate collection device that uses centrifugal force to remove particulate/dust from an asphalt plant's production air stream. If sized and maintained properly, the cyclone is about 99% efficient at removing 30 micron-particulate and larger and about 60% efficient at removing 10 micron particulate. The knockout box is also a primary collection device that helps capture large particulates before entering the baghouse and returns them to the mix.

- Proper operation and maintenance of the primary collection equipment will provide the following benefits:

    - Allows re-introduction of the large particulate into the asphalt mix separate from the fine particulate, which must be very specifically controlled so as not to have a detrimental effect on mix quality.

    - Prevents premature wear on the bags in the baghouse that would occur if the large size particulate were not removed from the air stream.

    - Ensures properly sized fine particulates reach the baghouse to form a very dense cake on the bags, which increases their filtering efficiency.

- To maintain proper collection and control efficiencies, the following operating procedures should be followed:

    - All ductwork between the dryer and stack should be inspected so that holes or air leaks can be repaired.

    - The main body of the cyclone should be inspected so that holes in the main shell or liners can be repaired, worn outlet tubes can be replaced and plugged outlets can be unplugged.

    - Build-up of fines inside the cyclone or the valves should be prevented.

    - Any foreign debris that may become lodged in the cyclone or ductwork should be removed.

    - Exhaust gas volume at rates compatible with the production rate, and within the design parameters of the cyclone should be maintained.

    - Dust/particulate discharge valves should be operating properly. Valves must allow the particulate to be discharged without allowing excess air into the cyclone. Generally these valves are made up of two types: Rotary Air Locks and Tipping Valves.

4.1.3.3 Rotary Air Locks / Vane Feeders

- The tips of the vane should be adjusted to manufacturer's clearance specifications to ensure a tight seal and no blowback.

- Any build-up or caking on vanes should be removed, as this would reduce the volume of dust being removed, which could allow re-entrainment of the dust into the air.

- Seals should be checked to maintain proper operation.

4.1.3.4 Tipping Valves

- These valves can be very sensitive to binding or dragging, therefore, counterweights and seals should be adjusted to allow easy operation of the valve.

4.2 Controlling Combustion Emissions

- Gaseous emissions from the production of hot mix asphalt are primarily a result of the combustion process used to dry the moisture from aggregate prior to mixing with the asphalt cement.
- It is important to maintain the proper air to fuel ratio in the aggregate dryer burner in order to completely burn the fuel provided. Incomplete burning of fuel produces higher levels of carbon monoxide and hydrocarbons.
- It is important that the two vehicles of combustion, the burner and air systems work in harmony providing the two-fold environmental benefit of saving fuel while minimizing carbon monoxide and hydrocarbon emissions.

4.2.1 Burner

- All burner valves and linkages should be inspected for wear.
- Fuel pressure, air-fuel ratios, and combustion air pressure should function according the manufacturer's specifications.
- All moving parts should be lubricated as per the manufacturer's specifications.
- All filter systems and strainers should be regularly maintained.
- All nozzles should be clear of foreign materials.
- All blowers should be maintained according to manufacturer's specifications.
- Qualified personnel should perform any tune-ups or repairs as necessary. It is suggested that a tune-up be conducted annually to maintain efficiency.

4.2.2 Air Seals

- All drum and duct air seal points should be intact and in proper working order.
- Leaking air at any point throughout the system directly affects the air to fuel ratio.

4.2.3 Exhaust Fans

- The exhaust fan is an integral part of the asphalt production process. Its main functions are to:
    - Provide air for efficient combustion.
    - Remove products of combustion, (i.e. carbon dioxide, carbon monoxide and water vapour (steam)).
    - Remove and carry away moisture dissipated during the drying process of the aggregates.
    - Proper sizing, operation and maintenance of the exhaust fan promotes complete combustion and efficient operation of the asphalt plant.
    - Correct tension on drive belts should be maintained.
    - Fan blades should be checked for wear or dust build-up. This is an indication of holes in the bags or improper seals in the baghouse. Since the fan is on the clean side of the baghouse no dust should be present.
    - In wet scrubber applications, premature wear of the exhaust fan indicates ineffective or faulty primary dust collector efficiency, such as worn baffles and caking.
    - The fan impeller should be properly balanced.

4.2.4 Damper

- The fan damper is probably the most useful piece of equipment for controlling efficiency. The damper is most effective when the plant is running at less than full capacity. Proper operation of the exhaust fan damper will provide the correct amount of air for the combustion process.
- General rule of thumb is to adjust the damper to the point where it is just preventing puff back at the burner end of the drum.
- A properly maintained and operated damper will provide the following:
    - Decreased fuel consumption (less emissions).
    - Increased productivity.
    - Reduced process air velocity.
    - Limit entrainment of fines into the air.

- Increased contact time in the drum for air and aggregates (more efficient drying).
- Reduced abrasion of ductwork and equipment due to lower internal air speeds, and less particle entrainment.
- Reduced electrical savings, due to decreased load on the fan.
- Reduced load on the generator in a portable plant.
- Reduced pressure across the baghouse, thus extending the life of the bags and increasing efficiency.

4.2.5 Dryer Flights

- Dryer flights should be properly maintained to manufacturer's specifications. Proper veiling of aggregate enables the burner system to work at optimum levels.
- IMPORTANT: Never allow aggregate to veil or pass through the combustion zone of the burner's flame. This will create incomplete combustion, which will cause increased carbon monoxide and residual hydrocarbon levels.

4.2.6 Primary and Secondary Collectors

- Regularly inspect collector systems for material build up that may impede the smooth flow of air throughout the system.

4.2.7 Hot Oil Heater Systems

- Hot oil heater burner systems should be kept clean and functioning according to the manufacturer's specifications. Test the hot oil annually within the system to monitor for and prevent oxidation.
- Hot oil heater lines should be in good working order.

4.2.8 Thermocouples and Pressure Sensors

- Thermocouples and other sensors throughout the system are in place to monitor temperature and pressure changes within the system. It is important to regularly calibrate thermocouples and other sensors to keep them functioning at optimum levels.

4.2.9 Trucks and Loaders

- Vehicles and equipment not in use should be shut off during idle periods to reduce tailpipe emissions.

- Engines and equipment should be properly maintained, serviced and tuned up at regular intervals.

4.3 Controlling Organic Emissions and Odour

This section deals with the management of odours originating from the delivery and storage of asphalt cement and fuels at the plant. The Best Practices contained herein offer assistance to the plant manager to manage and minimize organic emissions and odours. For instance, maintaining the asphalt cement at the proper working temperature helps to diminish odour emissions and alleviates a potential nuisance to your neighbours.

General

- Be aware of the effects that prevailing winds have on odour distribution when considering plant location.

- Establish a complaint response plan.

- Monitor and record weather information daily. Include temperature, humidity, wind direction and speed on a regular basis.

4.3.1 Fuel Storage and Fuel Delivery

- Schedule fuel delivery during periods when the neighbours are least affected.

- If necessary, install an odour mitigation system on fuel storage tanks.

- Keep lids on fuel storage tanks closed.

- Establish a spills response plan.

- Fuel storage should comply with current Technical Standards and Safety Authority requirements.

4.3.2 Asphalt Cement Discharge and Storage

- Schedule asphalt cement delivery preferably during periods of least impact to neighbours.

- Require and check that the asphalt cement supplier maintains proper delivery temperatures.
- Maintain proper asphalt cement storage temperatures.
- If necessary, install an odour mitigation system on asphalt cement storage tanks.
- Record daily weather and wind information during asphalt cement unloading.
- Keep lids on asphalt cement storage tanks closed.
- Inspect all asphalt cement lines to keep them secure and in good working order.
- Design the load-out area to minimize spillage.
- Clean up any spillage immediately as per MSDS.

4.3.3 Anti Stripping Additives

- Utilize low odour anti-stripping additives whenever possible.
- Anti-stripping additives should be well blended.
- Store anti-stripping additives in accordance with manufacturer's recommendations

4.3.4 Hot Mix Asphalt Mixing and AC Pumping Temperatures

- Asphalt cement should not exceed recommended temperatures for pumping, delivery and mixing, as outlined in the following chart. The lower the asphalt cement temperature the lower the emissions.

Plant Mixing Temperature Chart

Performance Graded Asphalt Cement (PGAC)*	**HMA MIXING TEMP.**		**AC PUMPING TEMP. (Delivery)**	
	Min.	**Max.**	**Min.**	**Max.**
PG 52-34	120°C	150°C	110°C	160°C
PG 52-40	120°C	150°C	110°C	160°C
PG 58-22	125°C	160°C	115°C	165°C
PG 58-28	125°C	160°C	115°C	165°C
PG 58-34	125°C	160°C	115°C	165°C
PG 64-28	130°C	165°C	120°C	170°C
PG 64-34	135°C	170°C	125°C	170°C
PG 70-28	135°C	170°C	125°C	170°C
PG 70-34	135oC	170°C	125°C	170°C

- For specialty asphalt cements check with the asphalt cement supplier.

4.3.5 Discharge Areas

- Tarp all loads immediately following discharge of load from plant.
- Ensure HMA mix temperature at discharge does not exceed the temperatures indicated in the chart below.

Performance Graded Asphalt Cement (PGAC)*	**HOT MIX ASPHALT TEMPERATURE**				
Ambient Temp.	35 ^{o}C	25 ^{o}C	15 ^{o}C	5 ^{o}C	-5 ^{o}C
PG 52-34	140 ^{o}C	145 ^{o}C	150 ^{o}C	155 ^{o}C	155 ^{o}C
PG 52-40	135 ^{o}C	140 ^{o}C	145 ^{o}C	150 ^{o}C	150 ^{o}C
PG 58-22	145 ^{o}C	150 ^{o}C	155 ^{o}C	160 ^{o}C	160 ^{o}C
PG 58-28	145 ^{o}C	150 ^{o}C	155 ^{o}C	160 ^{o}C	160 ^{o}C
PG 58-34	145 ^{o}C	150 ^{o}C	155 ^{o}C	160 ^{o}C	160 ^{o}C
PG 64-28	155 ^{o}C	160 ^{o}C	165 ^{o}C	165 ^{o}C	165 ^{o}C
PG 64-34	150 ^{o}C	155 ^{o}C	160 ^{o}C	165 ^{o}C	170 ^{o}C
PG 70-28	150 ^{o}C	155 ^{o}C	160 ^{o}C	165 ^{o}C	170 ^{o}C
PG 70-34	150 ^{o}C	155 ^{o}C	160 ^{o}C	165 ^{o}C	170 ^{o}C

- Notes:
  - For specialty asphalt cements check with the asphalt cement supplier.
  - For time to placement exceeding one hour, add 5 ^{o}C. For haul time exceeding two hours, add 10 ^{o}C (not to exceed 170 ^{o}C maximum).
  -
  - For very windy conditions at the paver, add 5 ^{o}C.
  - For special mix types, recommended temperatures may require adjustments per consultant's recommendations.

4.4 Controlling Noise Emissions

- The following steps can be taken to minimize noise:
  - Aggregate stockpiles should be located strategically to act as a buffer to noise.
  - Landscaping and berms should be employed around the plant to reduce noise levels.

- Acoustical shields, insulated screens, timber walls and berms should be installed at strategically placed locations to absorb noise.
- Specialized acoustical abatement methods should be used on high noise sources, i.e., burners, fans.
- Rules should be enforced to restrict excessive braking, engine revving, horn blowing and tailgate slamming in the plant yard.
- A complaint response procedure should be established to deal with noise issues immediately.
- Appropriate back-up alarms should be considered.

4.5 Standard Practices for Waste Management

- Hot mix asphalt plant operations are traditionally low volume generators of excess materials that could be classified as waste as defined by the MOE and which would be subject to Part V of the EPA. Basic common sense site management practices should therefore be followed to deal with the handling and disposal of any waste that is generated. Recycling options should be exercised whenever possible.
- Laboratory solvents, waste oils and lubricants should be collected and disposed of off-site in conformance with MOE Regulations.
- Conventional municipal waste is subject to individual municipal requirements for handling and disposal. Wherever possible all municipal recycling practices should be used.
- Sanitary waste handling and disposal should comply with local municipal requirements.

4.6 Standard Practices for Water Management

4.6.1 General

- Clean storm water from lawns, parking lots, roads and natural areas is typically released into ditches, swales and other normal drainage ways. Processing plants should be enclosed to prevent storm water contact.
- Materials used in the asphalt process should be contained and controlled where appropriate to prevent contaminant release:
    - Aggregates (sand and stone) are natural earth materials that can generally be safely stored in outdoor stockpiles.

- Fuels and lubricants should be delivered, stored and used in accordance with the requirements of the Technical Standards & Safety Act.

- Asphalt cement cools rapidly and turns solid at ambient temperatures; it will not penetrate into the ground.

- Recycled concrete and asphalt stockpiles are not significant sources of contamination. These same materials are used everywhere for public infrastructure, including drinking water transmission and storage. OHMPA has confirmed this through recent leach testing of recycled concrete and asphalt (DBA Engineering, August 31, 2007).

- Biodegradable products should be used for truck box cleaning, replacing diesel fuel.

4.6.2 Wet Scrubbers – Centrifugal/Venturi

- Wet Scrubbers are operated in conjunction with settling ponds, and can be divided into the following two types: Low Energy Centrifugal Scrubbers and High Energy Venturi Scrubbers.

- Wet scrubbers should be sized correctly and operated according to manufacturers' specifications.

- Standard practices for plants having a wet scrubber include:

    - Water should be recycled using contained settling ponds.

    - The quantities of "make-up" water required to top up the water supply is normally less than 50,000 litres/day and does not require a Permit to Take Water.

    - The dust settling in the bottom of the ponds may be re-used in the processing plant, or it may be removed to an approved waste management site.

4.6.3 Settling Ponds

- In general, two ponds are used, one for settlement of the particulate and the other for clean water supply to the scrubber.

- Ponds should be sized to hold a minimum of one half day's wet scrubber requirements. Ponds should be a minimum 1.8m deep but with sufficient surface area to promote settling and cooling of the water.

- When the depth of settled fines reaches approximately one-third of the total pond depth, the material should be removed.
- Maintain the check-dam height to allow only clean water to pass from settling pond to supply pond.
- The supply side pond should be kept clean enough so as not to interfere with the pump, foot valve etc.
- Sufficient make up water should be added daily to maintain the pond volume.

SECTION FIVE

Records Keeping and Complaint Response

5.1 Records Keeping

- A copy of the plant Certificate(s) of Approval and the supporting documentation that made up the original application should be kept on site.
- The Environmental Practices Guide checklist should be maintained and reviewed in a timely manner by a knowledgeable representative of the company.
- The hot mix asphalt producer should maintain a file of up-to-date operating and maintenance instructions
- Records should be kept describing any maintenance, calibration and repairs to equipment.
- A wind vane or flag is suggested to monitor wind speed and direction on site. As a minimum observed weather information should be recorded daily. See weather record form included in Appendix D.
- Where continuous temperature recording equipment is not available, record mixing and load-out temperatures on a daily basis, or with changes in AC grade.
- Checklists should be developed, or borrowed from this guide, for regular maintenance and environmental management inspections. Records of the inspections should be kept, including documentation of all corrective actions taken. (See Appendix E.)
- Note any significant change to plant equipment or operations may affect your Certificate of Approval (Air).

5.2 Complaint Documentation and Response

- The hot mix producer should have in place a response plan to deal with cases where complaints are registered directly with the company, through the Ministry of Environment (MOE), or through appropriate municipal government agencies. The complaint response plan should document details such as:

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  - Date and time of the complaint.
  - Nature of the complaint.
  - Weather and wind conditions.

- Identification of the suspected source of the problem giving rise to the complaint.
- Measures taken to correct the problem.
- Assessment of the relative success of the measures taken in correcting the problem.
- Record of follow-up on the complaint.

- Most Certificates of Approval require that the plant notify the MOE in writing of an environmental complaint within 2 business days of receiving the complaint.

- The “Complaint Response Form”, Appendix F in this guide may be used as a model for documentation of complaint response.

- In the event of a formal complaint, the hot mix producer should use the check lists such as those contained in the appropriate sections of this Environmental Practices Guide to assist in investigating the cause of the complaint.

- Note: a plant may wish to keep a “no complaint” record as part of the daily checklist.

SECTION 6

Dust Management Plan and Spills Contingency Plan

OHMPA Environmental Practices Guide recommends that each plant have a site-specific Dust Management Plan and Spills Contingency Plan. Examples of such Plans are available through the Association.

The following sections provide general guidance on aspects that should be considered in these Plans.

6.1 Dust Management Plan

- The hot mix producer should have in place a Best Management Practices Plan for the control of fugitive dust emissions (i.e. a Dust Management Plan). The Plan should include:

- Identification of the main sources of fugitive dust emissions specific to each site such as:
    - On site traffic.
    - Paved roads/areas.
    - Un-paved roads/areas.
    - Material stockpiles.
    - Loading/unloading areas and loading/unloading techniques.
    - Material spills.
    - Material conveyance systems.
    - Exposed openings in process and storage buildings; and
    - General work areas.

- The plan should also address the potential causes for high dust emissions resulting from these sources along with preventative and control measures in place or under development to minimize the likelihood of high dust emissions from the sources of fugitive dust emissions. Details of the preventative and control measures should include:
    - A description of the control equipment (existing or to be installed)
    - A description of the preventative procedures (implemented or to be implemented); and/or
    - The frequency of occurrence of periodic preventative activities, including material application rates, as applicable

- Where the plan is not fully implemented or is in a state of change, an implementation schedule for the Best Management Practices Plan should be provided, including training of facility personnel.

- The plan should address inspection and maintenance procedures and verification initiatives to ensure effective implementation of the preventative and control measures.

- In order to be effective, the Plan must also employ on site and make readily available records that document the implementation of the elements of the plan on a periodic basis (daily, weekly, monthly, etc. as required by that portion of the plan). The record keeping requirements for each operation covered by the plan should be listed in the plan for clarity.

- Records should be reviewed frequently and the overall Plan should be reviewed annually to confirm that the fugitive dust is being well controlled on site.

6.2 Spills Preparedness, Response and Reporting

- The Hot Mix Producer should have a Spills Contingency Plan in place to deal with cases where liquid materials are released into the environment. Typical liquid materials at a hot mix plant may include (but may not be limited to) the following:
    - Asphalt Cement
    - Diesel/Furnace Oil
    - Gasoline
    - Heat Transfer Oil
    - Anti-stripping Agents
    - Asphalt Release Agents
    - Glycol/Antifreeze
    - Asphalt Emulsion (Tack Coat)

- A Spills Contingency Plan will help a hot mix producer to be prepared for a liquid spill, and will detail appropriate actions, roles and responsibilities in the event of a liquid spill. The Plan should be reviewed periodically, and training should be done (and documented) on a regular basis.

- The foundation of an effective Plan is built around an overview of the site, potential spill scenarios, and environmental impacts.

SECTION 7

Glossary of Terms, Acronyms and References

Terms and Acronyms

Actual Cubic Feet Per Minute (ACFM)
Volumetric flow rate of a gas or liquid at process or equipment conditions – temperature and pressure at elevation of equipment. Generally includes moisture volume.

ECHO 127 2007
Air Emissions Calculator revised in 2007.

Ambient Air Quality Criteria (AAQC's)
MOE limits for air contaminants released to the atmosphere.

Carbon Dioxide (CO2)
A product of complete combustion.

Carbon Monoxide (CO)
A gas which occurs in the atmosphere and is a primary product of incomplete combustion. Mobile sources, such as cars, trucks, etc., combined with other sources concentrate the gases, particularly in urban areas.

Combustion Products
The gaseous products resulting from the burning of any kind of material containing carbon and hydrogen, in a free or combined state. These products are primarily carbon oxides, nitrogen oxides, sulphur oxides, and water vapour.

Cubic Feet Per Minute (CFM)
Volumetric flow rate of a gas or liquid at operating conditions (temperature and pressure).

EPA
Ontario's Environmental Protection Act

Flights
Angled or cup-shaped lengths of metal attached to the interior of the drum for the purpose of lifting and dropping aggregates through the hot exhaust gas to achieve maximum heat transfer.

MSDS
Material Safety Data Sheets. A MSDS is a document that contains information on the potential hazards (health, fire, reactivity and environmental) and how to work safely with the chemical product.

NPRI
National Pollutant Release Inventory (NPRI) Regulation annual federal reporting regulation.

Nitrogen Oxides (NOX)
An air pollution term applied to a class of nitrogen bearing gases that are a primary product of combustion. The gases are known to be a primary factor in the formation of smog and acid rain. Usually expressed as nitrogen dioxide (NO2).

Organic Compound
Chemical compounds which contain carbon. Coal and oil based products are rich in carbon.

OWNERS
Environment Canada's site which stands for "One Window to National Environmental Reporting System" for the purposes of reporting annual emissions to NPRI and O.Reg. 127.

Oxygen (O2)
Oxygen, in its natural state, the active component of air in combustion chemistry.

Particulate Matter (PM2.5)
Particles which have an average diameter of 2.5 microns or less. These are components of dust, smoke, fumes, etc.

Particulate Matter (PM-10)
Particles which have an average diameter of 10 microns or less. These are components of dust, smoke, fumes, etc.

Polycyclic Aromatic Hydrocarbons (PAHs) or Polynuclear Aromatics (PNAs)
Two air pollution terms used synonymously to describe a class of organic compounds that are largely associated with combustion and petroleum-based products.

Reclaimed Asphalt Pavement (RAP)
Pavement that has been removed from a roadway or other paved area and is destined to be used as part of a recycled hot mix asphalt (HMA) pavement.

Stationary Source
Any building, structure, facility, or installation which emits, or has the potential to emit any air pollutant.

Sulphur Dioxide (SO2)
A product of combustion when sulphur is present in the fuel or aggregates.

Sulphur Oxides (SOX)
An air pollution term applied to a class of gases which are made of up sulphur and oxygen in different combinations. It is usually associated with the burning of fuels which contain sulphur, i.e. diesel, coal, #6 fuel oil, etc. The “x” is used to denote any combination of SO2 and SO3, believed to be contributors to acid rain.

Total Hydrocarbons (THCs)
An air pollution term often used to describe gases (organic compounds) emitted from combustion processes. It is often used synonymously with the term volatile organic compounds (VOCs) in non-combustion processes.

Total Organic Compounds (TOCs)
An air pollution term often used to describe gases (organic compounds) in the emissions from a manufacturing process. It is often used synonymously with the term volatile organic compounds (VOCs).

Volatile Organic Compounds (VOCs)
Sometimes used synonymously with THCs and TOCs. An air pollution term used to describe gases or vapours which are typically emitted from combustion or manufacturing processes and also which are known to participate in the chemical formation of ozone in the presence of sunlight and other gases, e.g. smog. Since mobile sources such as autos and trucks are a significant source of VOCs, urban centres are likely to be areas with higher concentrations.

Key References

UN 13 (CEMP –ET)	"Hot Mix Asphalt Paving Handbook" (Part Two Section 1-7) U.S. Army Corps of Engineerings
IS 52 & 52A (Combined)	"The Maintenance and Operation of Exhaust Systems in the Hot Mix Batch Plant" National Asphalt Pavement Association (NAPA)
QIP 120	"Control of Baghouse Fines" National Asphalt Pavement Association (NAPA)
IS 123	"Recycling Hot Mix Asphalt Pavements" National Asphalt Pavement Association (NAPA)
IS 73	"Fugitive Dust Control and Hot Mix Plants" National Asphalt Pavement Association (NAPA)
IS 101	"Guidelines for the Use of Baghouse Fines" National Asphalt Pavement Association (NAPA)
SR 177	"Determination of Non-Process Fugitive Dust Emissions From HMA Facility Operations" National Asphalt Pavement Association (NAPA)
IS 86	"Preventing Fires and Explosions in Hot Mix Asphalt Plants" National Asphalt Pavement Association (NAPA)
IS 52 & 52A	"The Maintenance and Operation of Exhaust Systems in the Hot Mix Batch Plant" National Asphalt Pavement Association (NAPA)
SR 166	"Evaluation of Stack Emissions From HMA Facility Operations" National Asphalt Pavement Association (NAPA)
IS 75	"Noise In and Around Asphalt Plants" National Asphalt Pavement Association (NAPA)
IS 122	"Spill Prevention Control and Countermeasures (SPCC) Plan Guidance Manual" National Asphalt Pavement Association (NAPA)
SR 167	"Storm Water Pollution Prevention Plan and Guidance Manual" National Asphalt Pavement Association (NAPA)

ASTEC

T 119	Dryer Drum Mixer (J. Don Brock)
T 121	Baghouse Fines (J. Don Brock)
T 126	Productivity (J. Don Brock & John Milstead)
T 128	Emissions (E. Gail Mize)
T 129	Stockpiles (George H. Simmons)
T 132	Aggregate Drying Theory & Practice (Malcolm Swanson & John Preston)
T 133	Heating, Mixing and Storing Modified Asphalt (Jim May & Tom Wilkey)

Websites:

Asphalt Institute: www.asphaltinstitute.org

National Asphalt Paving Association: www.hotmix.org

Astec: www.astecinc.com

APPENDIX A

Sample Output from ECHO 127 for a Batch Plant

Sample Output from Echo 127 for a Batch Plant

Industry Type: Recycle Crushing+HMA(Batch Mix) **Reporting Year:** 2009

General Site Information You may use the 'Copy Data' sheet to transfer data from last year's ECHO2003 file.

Site name: Typical Ontario Batch Plant

* City closest to the site: Toronto Pearson Int'l Airport

* 6-Digit NAICS Code: Primary 324121
Secondary
Tertiary

* Average wind speed: (Annual) 4.1 m/s (from closest city: 4.10 m/s)

* Denotes Required Information

Reporting Criteria Definition of Facility Definition of Hours of Labour

Please check all that apply:

- ☑ My facility has employees working 20,000 hrs or more (equivalent to 10 full-time employees) during the reporting year
- ☑ The cumulative name plate capacity of all stationary external-combustion equipment is less than 10 million BTU/hr
- ☑ The only type of fuel combusted in the stationary external-combustion equipment is commercial grade natural gas, liquefied petroleum gas, #1 or 2 fuel oil or any combination thereof

	Need to Report?	Remarks
Table 2A	NO	
Table 2B	YES	Report to OReg127 only the contaminants marked in column 'Need to Report'.
NPRI Parts 1-3	YES	Report to NPRI only the contaminants marked in column 'Need to Report'.
NPRI Parts 4-5	YES	Report to NPRI only the contaminants marked in column 'Need to Report'.

Sample Output from Echo 127 for a Batch Plant

Industry Type: Recycle Crushing+HMA(Batch Mix) **Reporting Year:** 2009

Part 1 - Combustion Equipment [Definition]

Not including dryer/hot screens in Hot Mix Plants

Please check all combustion equipment in your facility: [Fuel Usage Calculator]

☑ **Natural Gas-Fired Heaters (<100 million Btu/h each)**			
	Total annual fuel consumption:	5000 m^3	
☐ **Natural Gas-Fired Heaters (>100 million Btu/h each)**			
	Total annual fuel consumption:	m^3	
☐ **Propane-Fired Equipment (<100 million Btu/h each)**			
	Total annual fuel consumption:	L	
	Sulphur Content:	gr/100 ft^3	(Suggested value: 0.18 g/100ft3)
☐ **#6 Oil-Fired Equipment (<100 million Btu/h each) - Residual Oil**			
	Total annual fuel consumption:	L	
	Sulphur Content:	%	(Suggested Value: 2.8%)
☐ **#6 Oil-Fired Equipment (>100 million Btu/h each) - Residual Oil**			
	Total annual fuel consumption:	L	
	Sulphur Content:	%	(Suggested Value: 2.8%)
☐ **#2 Oil-Fired Equipment (<100 million Btu/h each) - Distillate Oil**			
	Total annual fuel consumption:	L	
	Sulphur Content:	%	(Suggested Value: 0.5%)
☐ **#2 Oil-Fired Equipment (>100 million Btu/h each) - Distillate Oil**			
	Total annual fuel consumption:	L	
	Sulphur Content:	%	(Suggested Value: 0.5%)
☐ **#5 Oil-Fired Equipment (<100 million Btu/h each)**			
	Total annual fuel consumption:	L	
	Sulphur Content:	%	(Suggested Value: 2.0%)
☐ **#5 Oil-Fired Equipment (>100 million Btu/h each)**			
	Total annual fuel consumption:	L	
	Sulphur Content:	%	(Suggested Value: 2.0%)
☐ **Waste Oil-Fired Heaters**			
	Total annual fuel consumption:	L	
	Ash Content:	%	(Suggested Value: 0.08%)
	Sulphur Content:	%	(Suggested Value: 2.8%)
	Lead Content:	%	(Suggested Value: 0.0064%)
☐ **Diesel Generator**			
	Total annual fuel consumption:	L	
☑ **Hot Asphalt Cement Storage Heater**			
	Type of fuel used:	Natural Gas	
	Total annual fuel consumption:	37500 m3	

Sample Output from Echo 127 for a Batch Plant

Industry Type: Recycle Crushing+HMA(Batch Mix) **Reporting Year:** 2009

Part 2 - Processing Equipment

Please check all processing equipment in your facility:

Make sure you have completed the raw material compositions in sheet "Raw Material" before you check Tables 2B and NPRI.

The information will be used to calculate MPO (Manufactured, Processed and Otherwise used) values.

*** For portable facilities, add up production at all operating locations during the year.**

For Recycle Crushing

☑ **"Primary" Crusher** — Description

Total annual tonnage processed:	10000	tonnes			
Control Device:	Water Spray				
Control Efficiency: PM:	80	%	(Suggested Eff:	80	%)
PM_{10}:	80	%	(Suggested Eff:	80	%)
$PM_{2.5}$:	80	%	(Suggested Eff:	80	%)

☐ **"Secondary" Crusher** — Description

Total annual tonnage processed:		tonnes			
Control Device:	Uncontrolled				
Control Efficiency: PM:		%	(Suggested Eff:	0	%)
PM_{10}:		%	(Suggested Eff:	0	%)
$PM_{2.5}$:		%	(Suggested Eff:	0	%)

☑ **Sizing Screen** — Description

Total annual tonnage processed:	10000	tonnes			
Control Device:	Water Spray				
Control Efficiency: PM:	80		(Suggested Eff:	80	%)
PM_{10}:	80	%	(Suggested Eff:	80	%)
$PM_{2.5}$:	80	%	(Suggested Eff:	80	%)

Conveyor Transfer Points (Recycling Crushing) Add/Edit Transfer Points

Transfer Points Summary (use the "Add/Edit Transfer Points" button above to edit transfer point information)

Type of Transfer Points	No. of Transfer Points	Total Annual Throughput (tonne/yr)
Open with No Control	0	0
Open with Water Spray	1	10,000
Partially Enclosed with No Control	0	0
Partially Enclosed with Water Spray	0	0
Fully Enclosed with No Control	0	0
Fully Enclosed with Water Spray	0	0

For Hot Mix Asphalt Facility

Note: For portable plant, add up production at all locations.

Total annual HMA produced:	100000	tonnes
Total annual asphalt cement used:	5000	tonnes

Material Handling for Hot Mix Asphalt

Total annual aggregates (**not** including RAP) used:	85000	tonnes	
Moisture content:	4	%	(Suggested Value: 4 %)
Number of drop points:	8		
Number of drop points with enclosure:	2		
# of scalping screens used to screen aggregates:	2		

Horizontal/Vertical Fixed Roof Asphalt Storage Tanks

Sample Output from Echo 127 for a Batch Plant

Industry Type: Recycle Crushing+HMA(Batch Mix) **Reporting Year:** 2009

	Type of Tank	Shell Length / Height (ft)	Shell Diameter (ft)	For Vertical Tanks Only: Max. Liquid Height (ft)	For Vertical Tanks Only: Avg. Liquid Height (ft)	Net throughput (tonnes/yr)	Min. Bulk Temp. (°F)	Max. Bulk Temp. (°F)	Paint Color/ Shade	Paint Condition	Control Device	Control Eff. (%)
1	Horizontal	32	10			4000	250	300	Gray (Light)	Good	Filtration	95
2	Horizontal	26	8			1000	250	325	Gray (Light)	Good	Filtration	95
3	Horizontal											
4	Horizontal											
5	Horizontal											
6	Horizontal											
7	Horizontal											
8	Horizontal											
9	Horizontal											
10	Horizontal											

For HMA Batch Mix or Continuous Batch Mix Plants :
(including the dryer, hot screens and mixer):

☑ **Natural Gas-Fired or Propane-Fired** — **Is the dryer capacity greater than 100 million BTU/hr?** YES

Control Device: Baghouse

Control Efficiency:

PM:	99.9 %	(Suggested Eff:	99.9	%)
PM_{10}:	99.8 %	(Suggested Eff:	99.8	%)
$PM_{2.5}$:	96.9 %	(Suggested Eff:	96.9	%)

Total annual natural gas consumption: 1000000 m^3 Total annual propane consumption: _____ L

☐ **#2 Oil-Fired** — **Is the dryer capacity greater than 100 million BTU/hr?**

Control Device: Uncontrolled

Control Efficiency:

PM:	%	(Suggested Eff:	0	%)
PM_{10}:	%	(Suggested Eff:	0	%)
$PM_{2.5}$:	%	(Suggested Eff:	0	%)

Total annual #2 oil consumption: _____ L

☐ **Waste Oil-Fired**

Total annual waste oil consumption: _____ L

Control Device: Uncontrolled

Control Efficiency:

PM:	%	(Suggested Eff:	0	%)
PM_{10}:	%	(Suggested Eff:	0	%)
$PM_{2.5}$:	%	(Suggested Eff:	0	%)

☐ **HMA Storage Silo**

HMA mix temperature: _____ °F (Suggested Value: 325 °F)

Total annual stored: _____ tonnes

Sample Output from Echo 127 for a Batch Plant

Industry Type: Recycle Crushing+HMA(Batch Mix) **Reporting Year:** 2009

Part 3 - Fugitives

General Information

Days of Rain (>= 0.2mm): annual 145 days (from closest city: 145.5)

Silt Content of Unpaved Roads: 8.3 % (Suggested Value: 8.3%)

Moisture Content of Unpaved Roads: 5 % (Suggested Value: 5.0%)

For Hot Mix Asphalt Facility

Aggregate/Recycle Concrete Delivery Trucks

From site entrance to aggregate/concrete storage area

Average Unloaded Truck Weight: 18 tonnes (Suggested Value: 18 tonnes)

Average Load Weight (Load only): 33 tonnes (Suggested Value: 33 tonnes)

Annual amount of Material Transported: 85000 tonnes

Unpaved Roads

Length of road (one way only): 150 m

Control Device: Water Spray/Truck

Control Efficiency: *(Note: Emissions from roads can be significant. Use the calculator in 'Unpaved' sheet to more accurately estimate the control efficiency.)*

PM:	70 %	(Suggested Eff:	70	%)
PM_{10}:	70 %	(Suggested Eff:	70	%)
$PM_{2.5}$:	70 %	(Suggested Eff:	70	%)

Asphalt Cement Delivery Tankers

From site entrance to Hot Asphalt Cement Storage

Average Unloaded Truck Weight: 19 tonnes (Suggested Value: 19 tonnes)

Average Load Weight (Load only): 38 tonnes (Suggested Value: 38 tonnes)

Annual amount of Material Transported: 5000 tonnes

Unpaved Roads

Length of road (one way only): 0 m

Control Device: Uncontrolled

Control Efficiency:

PM:	%	(Suggested Eff:	0	%)
PM_{10}:	%	(Suggested Eff:	0	%)
$PM_{2.5}$:	%	(Suggested Eff:	0	%)

Product Trucks

From site entrance to HMA loadout area

Average Unloaded Truck Weight: 14 tonnes (Suggested Value: 14 tonnes)

Average Load Weight (Load only): 21 tonnes (Suggested Value: 21 tonnes)

Annual amount of Material Transported: 100000 tonnes

Unpaved Roads

Length of road (one way only): 0 m

Control Device: Uncontrolled

Control Efficiency:

PM:	%	(Suggested Eff:	0	%)
PM_{10}:	%	(Suggested Eff:	0	%)
$PM_{2.5}$:	%	(Suggested Eff:	0	%)

Other On-Site Vehicles Travelling in Stockpiles Definition

Sample Output from Echo 127 for a Batch Plant

Industry Type: Recycle Crushing+HMA(Batch Mix) **Reporting Year:** 2009

Average Vehicle Weight	20	tonnes	(Suggested Value: 17-25 tonnes)		
Unpaved Roads					
Estimated total annual mileage on unpaved roads:	1700	km			
Control Device for unpaved roads:	Water Spray/Truck				
Control Efficiency: *(Note: Emissions from roads can be significant. Use the calculator in 'Unpaved' sheet to more accurately estimate the control efficiency.)*	PM:	70 %	(Suggested Eff:	70	%)
	PM_{10}:	70 %	(Suggested Eff:	70	%)
	$PM_{2.5}$:	70 %	(Suggested Eff:	70	%)

Wind Erosion of Stockpiles

% of time wind speed exceeds 5.4 m/s:	(Annual)	30 %	(from closest city:	29.71	%)
Weighted average silt content in stockpile material:	0.8233	%	(Sugg. Value: 0.1688% (limestone), 2.1324% (sand))		
Total stockpile surface area exposed:	1,516.96	m^2	Surface Area Calculator		
% of active stockpile:	18.00	%			
Control Device:	Uncontrolled				
Control Efficiency:	PM:	%	(Suggested Eff:	0	%)
	PM_{10}:	%	(Suggested Eff:	0	%)
	$PM_{2.5}$:	%	(Suggested Eff:	0	%)

After filling in the "Site Information" section, you may check emissions in Tables 2B and NPRI.

Sample Output from Echo 127 for a Batch Plant

Section B Emissions Summary

Site Name: Typical Ontario Batch Plant

6-Digit NAICS Code: 324121 (Primary)

Reporting Year: 2009

Check if MPO >= MOE Thresholds (see note 4 for details)			Emissions by Release Mode (tonne)							
Contaminant		CAS	Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Total Emissions (tonne)	MPO Threshold (tonne)	Need to Report?
ACETONE	☐	67-64-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	3	
* FURFURYL ALCOHOL †	☐	98-00-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
* TETRAHYDROFURAN †	☐	109-99-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
* TOTAL REDUCED SULPHUR (TRS) †	☐	N/A - M14	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PAH - ACENAPHTHENE †	☐	83-32-9	0.000000	0.00	0.000000	0.00	0.000045	0.000045	0.005	
PAH - ACENAPHTHYLENE †	☐	208-96-8	0.000000	0.00	0.000000	0.00	0.000029	0.000029	0.005	
PAH - FLUORENE †	☐	86-73-7	0.000000	0.00	0.000000	0.00	0.000050	0.000050	0.005	YES

Notes: 1. "*" denotes no emission factor available
2. "Other Emissions" refer to emissions calculated using emission factors that combine both stack and fugitive emissions.
3. All emissions are estimated using USEPA published emission factors.
4. Check the box if the contaminant can reasonably be expected to be manufactured or to be processed or otherwise used at the facility during the year in an amount equal to or greater than the threshold amount for the contaminant set out in column "MPO/Release Threshold". EIHCO2007 also calculate MPO for selected contaminants from amount of aggregate and cementing materials used. Therefore, you may need to report some contaminants even if you haven't checked the MPO box for those contaminants.
5. "†" denotes contaminants no longer reportable under O.Reg. 127, but rather reportable under NPRI. Refer to "OWNERS" sheet for a complete list of reportable substances under NPRI.

Sample Output from Echo 127 for a Batch Plant

Report to MOE and/or NPRI using the "OWNERS" interface: The Window to a National Environmental Reporting System (ONEBPRS), Government of Canada

Number of Contaminants to Report to MOE: 0 — Reporting Year: 2009

Do not need to report to MOE. Check substances reportable to NPRI.

Number of Contaminants to Report to NPRI: 4

Please report only the contaminants marked as 'YES' in column 'Need to Report' to NPRI (Parts 1 to 5).

ECHO2007 calculates the air releases portion only. You need to look at other media for NPRI reporting, if applicable.

ONMOE Table 2B Substances

Contaminant	CAS	Emissions by Release Mode (tonne)						MPO Threshold (tonne)	Need to Report?	Basis of Estimate	Reported Emissions in Previous Year (tonne)	% Change	Notes
		Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Road Dust						

NPRI Substances

Contaminant	CAS	Emissions by Release Mode (tonne)						Total Emissions (tonne)	MPO Release Threshold (tonne)	Need to Report ?	Basis of Estimate	Reported Emissions in Previous Year (tonne)	% Change	Notes
		Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Road Dust							
PART 1 Group 1 Substances														
PART 1 Group 2 Substances														
PART 1 Group 3 Substances														
PART 1 Group 4 Substances														
PART 2														
PAH - PLUORENE	86-73-7	0.000000	0.00	0.000000	0.00	0.000000	0.00	0.000000	(See Manual)	YES	E2 - Published Emission Factors		-	
PART 3														
PART 4		(Significant increase in particulate matter emissions may occur as a result of changes in reporting criteria or estimation methods for the 2007 reporting year. Refer to user's guide Section 5.0 FAQ #14 for details.)												
Carbon Monoxide	630-08-0	0.057184	0.00	0.000000	0.00	20.0000	0.00	20.0572	20	YES	E2 - Published Emission Factors		-	
PM_{25} - Particulate Matter <=2.5 Micrometers	NA - M00	0.001293	0.00	0.078344	0.00	0.438500	0.000000	0.491138	0.3	YES	E2 - Published Emission Factors		-	
PM_{10} - Particulate Matter <=10 Micrometers	NA - M09	0.001293	0.00	0.830328	0.00	0.844500	0.000000	1.67531	0.5	YES	E2 - Published Emission Factors		-	
PART 5 (Report only if VOC exceeds the 10 tonne threshold. Some substances are already in Part 1. See user's guide for details.)														

Sample Output from Echo 127 for a Batch Plant

NPRI Emissions Summary

Reporting Year: 2009

Site Name: Typical Ontario Batch Plant
6-Digit NAICS Code: 324121 (Primary)

Check if MPO >= MOE Thresholds (see note 4 for details)		Emissions by Release Mode (tonne)							
Contaminant	CAS	Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Total Emissions (tonne)	MPO/ Release Threshold (tonne)	Need to Report ?
ACETALDEHYDE	75-07-0	0.000000	0.00	0.000000	0.00	0.016000	0.016000	10	
* ACETONITRILE	75-05-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ACETOPHENONE	98-86-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
ACROLEIN	107-02-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ACRYLAMIDE	79-06-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ACRYLIC ACID	79-10-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ACRYLONITRILE	107-13-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ALKANES, C6-18, CHLORO	68920-70-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ALKANES, C10-13, CHLORO	85535-84-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ALLYL ALCOHOL	107-18-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ALLYL CHLORIDE	107-05-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
ALUMINUM	7429-90-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ALUMINUM OXIDE	1344-28-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* AMMONIA (TOTAL)	--	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ANILINE	62-53-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
ANTHRACENE	120-12-7	0.000000	0.00	0.000000	0.00	0.000011	0.000011	10	
ANTIMONY	--	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ASBESTOS	1332-21-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
BENZENE	71-43-2	0.000001	0.00	0.000000	0.00	0.014000	0.014001	10	
* BENZOYL CHLORIDE	98-88-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* BENZOYL PEROXIDE	94-36-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* BENZYL CHLORIDE	100-44-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* BIPHENYL	92-52-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* BIS(2-ETHYLHEXYL) ADIPATE	103-23-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* BIS(2-ETHYLHEXYL) PHTHALATE	117-81-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* BORON TRIFLUORIDE	7637-07-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
BROMINE	7726-95-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 1-BROMO-2-CHLOROETHANE	107-04-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
BROMOMETHANE	74-83-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
1,3-BUTADIENE	106-99-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2-BUTOXYETHANOL	111-76-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* BUTYL ACRYLATE	141-32-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 1-BUTYL ALCOHOL	78-83-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* N-BUTYL ALCOHOL	71-36-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* SEC-BUTYL ALCOHOL	78-92-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* TERT-BUTYL ALCOHOL	75-65-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* BUTYL BENZYL PHTHALATE	85-68-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 1,2-BUTYLENE OXIDE	106-88-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* BUTYRALDEHYDE	123-72-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* C.I. ACID GREEN 3	4680-78-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* C.I. BASIC GREEN 4	569-64-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* C.I. BASIC RED 1	989-38-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* C.I. DIRECT BLUE 218	28407-37-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* C.I. DISPERSE YELLOW 3	2832-40-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* C.I. FOOD RED 15	81-88-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* C.I. SOLVENT ORANGE 7	3118-97-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* C.I. SOLVENT YELLOW 14	842-07-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CALCIUM CYANAMIDE	156-62-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CALCIUM FLUORIDE	7789-75-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
CARBON DISULPHIDE	75-15-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CARBON TETRACHLORIDE	56-23-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CARBONYL SULPHIDE	463-58-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CATECHOL	120-80-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
CFC-11	75-69-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CFC-12	75-71-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CFC-13	75-72-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CFC-114	76-14-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CFC-115	76-15-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CHLORENDIC ACID	115-28-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
CHLORINE	7782-50-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CHLORINE DIOXIDE	10049-04-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CHLOROACETIC ACID	79-11-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CHLOROBENZENE	108-90-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
CHLOROETHANE	75-00-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CHLOROFORM	67-66-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
CHLOROMETHANE	74-87-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 3-CHLORO-2-METHYL-1-PROPENE	563-47-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 3-CHLOROPROPIONITRILE	542-76-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	

Sample Output from Echo 127 for a Batch Plant

NPRI Emissions Summary

Reporting Year: 2009

Site Name: Typical Ontario Batch Plant
6-Digit NAICS Code: 324121 (Primary)

	Check if MPO >= MOE Thresholds (see note 4 for details)		Emissions by Release Mode (tonne)							
	Contaminant	CAS	Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Total Emissions (tonne)	MPO/ Release Threshold (tonne)	Need to Report ?
	CHROMIUM	--	0.000001	0.00	0.000000	0.00	0.000029	0.000029	10	
	COBALT	--	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	COPPER	--	0.000001	0.00	0.000000	0.00	0.000140	0.000141	10	
*	CRESOL	1319-77-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	CROTONALDEHYDE	4170-30-3	0.000000	0.00	0.000000	0.00	0.001450	0.001450	10	
	CUMENE	98-82-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CUMENE HYDROPEROXIDE	80-15-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CYANIDES	--	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CYCLOHEXANE	110-82-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CYCLOHEXANOL	108-93-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	DECABROMODIPHENYL OXIDE	1163-19-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	2,4-DIAMINOTOLUENE	95-80-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	2,6-DI-T-BUTYL-4-METHYLPHENOL	128-37-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	DIBUTYL PHTHALATE	84-74-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	O-DICHLOROBENZENE	95-50-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	P-DICHLOROBENZENE	106-46-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	3,3'-DICHLOROBENZIDINE DIHYDROCHLORIDE	612-83-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	1,2-DICHLOROETHANE	107-06-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	DICHLOROMETHANE	75-09-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	2,4-DICHLOROPHENOL	120-83-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	1,2-DICHLOROPROPANE	78-87-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	DICYCLOPENTADIENE	77-73-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	DIETHANOLAMINE	111-42-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	DIETHYL PHTHALATE	84-66-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	DIETHYL SULPHATE	64-67-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	DIMETHYLAMINE	124-40-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	N,N-DIMETHYLANILINE	121-69-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	N,N-DIMETHYLFORMAMIDE	68-12-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	DIMETHYL PHENOL	1300-71-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	DIMETHYL PHTHALATE	131-11-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	DIMETHYL SULPHATE	77-78-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	4,6-DINITRO-O-CRESOL	534-52-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	2,4-DINITROTOLUENE	121-14-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	2,6-DINITROTOLUENE	606-20-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	DINITROTOLUENE	25321-14-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	DI-N-OCTYL PHTHALATE	117-84-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	1,4-DIOXANE	123-91-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	DIPHENYLAMINE	122-39-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	EPICHLOROHYDRIN	106-89-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	2-ETHOXYETHANOL	110-80-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	2-ETHOXYETHYL ACETATE	111-15-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ETHYL ACRYLATE	140-88-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	ETHYLBENZENE	100-41-4	0.000000	0.00	0.000000	0.00	0.110000	0.110000	10	
*	ETHYL CHLOROFORMATE	541-41-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	ETHYLENE	74-85-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ETHYLENE GLYCOL	107-21-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ETHYLENE OXIDE	75-21-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ETHYLENE THIOUREA	96-45-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	FLUORINE	7782-41-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	FORMALDEHYDE	50-00-0	0.000067	0.00	0.000000	0.00	0.037000	0.037067	10	
*	FORMIC ACID	64-18-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HALON 1211	353-59-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HALON 1301	75-63-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HCFC-22	75-45-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HCFC-122 AND ALL ISOMERS	41834-16-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HCFC-123 AND ALL ISOMERS	34077-87-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HCFC 124 AND ALL ISOMERS	63938-10-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HCFC-141B	1717-00-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HCFC-142B	75-68-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HEXACHLOROCYCLOPENTADIENE	77-47-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HEXACHLOROETHANE	67-72-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HEXACHLOROPHENE	70-30-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	N-HEXANE	110-54-3	0.001225	0.00	0.000000	0.00	0.000000	0.001225	10	
*	HYDRAZINE	302-01-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HYDROCHLORIC ACID	7647-01-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HYDROGEN CYANIDE	74-90-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HYDROGEN FLUORIDE	7664-39-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	HYDROGEN SULFIDE	7783-06-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	

Sample Output from Echo 127 for a Batch Plant

NPRI Emissions Summary

Reporting Year: 2009

Site Name: Typical Ontario Batch Plant
6-Digit NAICS Code: 324121 (Primary)

Check if MPO >= MOE Thresholds (see note 4 for details)			Emissions by Release Mode (tonne)							
Contaminant		CAS	Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Total Emissions (tonne)	MPO/ Release Threshold (tonne)	Need to Report ?
HYDROQUINONE		123-31-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
IRON PENTACARBONYL		13463-40-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
ISOBUTYRALDEHYDE		78-84-2	0.000000	0.00	0.000000	0.00	0.001500	0.001500	10	
ISOPHORONE DIISOCYANATE		4098-71-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
ISOPRENE		78-79-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
ISOPROPYL ALCOHOL		67-63-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
P,P'-ISOPROPYLIDENEDIPHENOL		80-05-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
ISOSAFROLE		120-58-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
LITHIUM CARBONATE		554-13-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
MALEIC ANHYDRIDE		108-31-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
MANGANESE		--	0.000000	0.00	0.000000	0.00	0.000345	0.000345	10	
2-MERCAPTOBENZOTHIAZOLE		149-30-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
METHANOL		67-56-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
2-METHOXYETHANOL		109-86-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
2-METHOXYETHYL ACETATE		110-49-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
METHYL ACRYLATE		96-33-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
METHYL TERT-BUTYL ETHER		1634-04-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
P,P'-METHYLENEBIS(2-CHLOROANILINE)		101-14-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
1,1-METHYLENEBIS(4-ISOCYANATOCYCLOHEXANE)		5124-30-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
METHYLENEBIS(PHENYLISOCYANATE)		101-68-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
P,P'-METHYLENEDIANILINE		101-77-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
METHYL ETHYL KETONE		78-93-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
METHYL IODIDE		74-88-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
METHYL ISOBUTYL KETONE		108-10-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
METHYL METHACRYLATE		80-62-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
N-METHYLOLACRYLAMIDE		924-42-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
2-METHYLPYRIDINE		109-06-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
N-METHYL-2-PYRROLIDONE		872-50-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
MICHLER'S KETONE		90-94-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
MOLYBDENUM TRIOXIDE		1313-27-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
NAPHTHALENE		91-20-3	0.000000	0.00	0.000000	0.00	0.001800	0.001800	10	
NICKEL		--	0.000001	0.00	0.000000	0.00	0.000150	0.000151	10	
NITRATE ION		--	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
NITRIC ACID		7697-37-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
NITRILOTRIACETIC ACID		139-13-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
P-NITROANILINE		100-01-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
NITROBENZENE		98-95-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
NITROGLYCERIN		55-63-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
P-NITROPHENOL		100-02-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
2-NITROPROPANE		79-46-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
N-NITROSODIPHENYLAMINE		86-30-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
NONYLPHENOL AND ITS ETHOXYLATES		*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
OCTYLPHENOL AND ITS ETHOXYLATES		*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PARALDEHYDE		123-63-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PENTACHLOROETHANE		76-01-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PERACETIC ACID		79-21-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PHENOL		108-95-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
P-PHENYLENEDIAMINE		106-50-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
O-PHENYLPHENOL		90-43-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PHOSGENE		75-44-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PHOSPHORUS (YELLOW OR WHITE)		7723-14-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PHOSPHORUS (TOTAL)		*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PHTHALIC ANHYDRIDE		85-44-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
POLYMERIC DIPHENYLMETHANE DIISOCYANATE		9016-87-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
POTASSIUM BROMATE		7758-01-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PROPARGYL ALCOHOL		107-19-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PROPIONALDEHYDE		123-38-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PROPYLENE		115-07-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PROPYLENE OXIDE		75-56-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PYRIDINE		110-86-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
QUINOLINE		91-22-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
P-QUINONE		106-51-4	0.000000	0.00	0.000000	0.00	0.013500	0.013500	10	
SAFROLE		94-59-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
SELENIUM		--	0.000000	0.00	0.000000	0.00	0.000025	0.000025	10	
SILVER		--	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
SODIUM FLUORIDE		7681-49-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
SODIUM NITRITE		7632-00-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
STYRENE		100-42-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	

Sample Output from Echo 127 for a Batch Plant

NPRI Emissions Summary — Reporting Year: 2009

Site Name: Typical Ontario Batch Plant
6-Digit NAICS Code: 324121 (Primary)

Check if MPO >= MOE Thresholds (see note 4 for details)		Emissions by Release Mode (tonne)							
Contaminant	CAS	Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Total Emissions (tonne)	MPO/ Release Threshold (tonne)	Need to Report ?
* STYRENE OXIDE	96-09-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* SULPHUR HEXAFLUORIDE	2551-62-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* SULPHURIC ACID	7664-93-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 1,1,1,2-TETRACHLOROETHANE	630-20-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 1,1,2,2-TETRACHLOROETHANE	79-34-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
TETRACHLOROETHYLENE	127-18-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* TETRACYCLINE HYDROCHLORIDE	64-75-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* THIOUREA	62-56-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* THORIUM DIOXIDE	1314-20-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* TITANIUM TETRACHLORIDE	7550-45-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
TOLUENE	108-88-3	0.000002	0.00	0.000000	0.00	0.050000	0.050002	10	
* TOLUENE-2,4-DIISOCYANATE	584-84-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* TOLUENE-2,6-DIISOCYANATE	91-08-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* TOLUENEDIISOCYANATE	26471-62-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 1,2,4-TRICHLOROBENZENE	120-82-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 1,1,2-TRICHLOROETHANE	79-00-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* TRICHLOROETHYLENE	79-01-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* TRIETHYLAMINE	121-44-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 1,2,4-TRIMETHYLBENZENE	95-63-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2,2,4-TRIMETHYLHEXAMETHYLENE DIISOCYANATE	16938-22-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2,4,4-TRIMETHYLHEXAMETHYLENE DIISOCYANATE	15646-96-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
VANADIUM	7440-62-2	0.000002	0.00	0.000000	0.00	0.000000	0.000002	10	
* VINYL ACETATE	108-05-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* VINYL CHLORIDE	75-01-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* VINYLIDENE CHLORIDE	75-35-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
XYLENE	1330-20-7	0.000000	0.00	0.000000	0.00	0.135000	0.135000	10	
ZINC	--	0.000020	0.00	0.000000	0.00	0.000340	0.000360	10	
PART 1 Group 2 Substances									
MERCURY	--	0.000001	0.00	0.000000	0.00	0.000021	0.000021	0.005	
PART 1 Group 3 Substances									
CADMIUM	--	0.000001	0.00	0.000000	0.00	0.000031	0.000031	0.005	
PART 1 Group 4 Substances									
ARSENIC	--	0.000000	0.00	0.000000	0.00	0.000023	0.000023	0.05	
HEXAVALENT CHROMIUM COMPOUNDS	--	0.000000	0.00	0.000000	0.00	0.000002	0.000002	0.05	
LEAD	--	0.000000	0.00	0.000000	0.00	0.000045	0.000045	0.05	
* TETRAETHYL LEAD	78-00-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.05	
PART 2									
BENZO(A)ANTHRACENE	56-55-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
BENZO(A)PHENANTHRENE	218-01-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
BENZO(A)PYRENE	50-32-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
BENZO(B)FLUORANTHENE	205-99-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
BENZO(E)PYRENE	192-97-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
BENZO(G,H,I)PERYLENE	191-24-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
* BENZO(J)FLUORANTHENE	205-82-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
BENZO(K)FLUORANTHENE	207-08-9	0.000000	0.00	0.000000	0.00	0.000001	0.000001	0.005	
* DIBENZO(A,J)ACRIDINE	224-42-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
DIBENZO(A,H)ANTHRACENE	53-70-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
* DIBENZO(A,I)PYRENE	189-55-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
* 7H-DIBENZO(C,G)CARBAZOLE	194-59-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
FLUORANTHENE	206-44-0	0.000000	0.00	0.000000	0.00	0.000008	0.000008	0.005	
INDENO(1,2,3-C,D)PYRENE	193-39-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
PERYLENE	198-55-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
PHENANTHRENE	85-01-8	0.000000	0.00	0.000000	0.00	0.000130	0.000130	0.005	
PYRENE	129-00-0	0.000000	0.00	0.000000	0.00	0.000003	0.000003	0.005	
PART 3									
* HEXACHLOROBENZENE	118-74-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	(See Manual)	
* POLYCHLORINATED DIBENZO-P-DIOXINS & POLYCHLORINATED DIBENZOFURANS	--	0.000000	0.00	0.000000	0.00	0.000000	0.000000	(See Manual)	
PART 4									
Carbon Monoxide	630-08-0	0.057184	0.00	0.000000	0.00	20.0000	20.0572	20	YES
Oxides of Nitrogen (Expressed as NO_2)	11104-93-1	0.068077	0.00	0.000000	0.00	1.2500	1.3181	20	
$PM_{2.5}$ - Particulate Matter <=2.5 Micrometers	--	0.001293	0.00	0.078344	0.00	0.418500	0.498138	0.3	YES
PM_{10} - Particulate Matter <=10 Micrometers	--	0.001293	0.00	0.810328	0.00	0.841500	1.6531	0.5	YES
Sulphur Dioxide	7446-09-5	0.000408	0.00	0.000000	0.00	0.230000	0.230408	20	
PM - Total Particulate Matter	--	0.001293	0.00	2.7745	0.00	2.2165	4.9923	20	
Volatile Organic Compounds (VOC)	--	0.003744	0.00	0.000000	0.00	0.410000	0.413744	10	
PART 5 (Report only if VOC exceeds the 10-tonne threshold. Some substances are already in Part 1. See user's guide for details.)									
* ACETYLENE	74-86-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
* ADIPIC ACID	124-04-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
* ANILINE	62-53-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	

Sample Output from Echo 127 for a Batch Plant

NPRI Emissions Summary — Reporting Year: 2009

Site Name: Typical Ontario Batch Plant
6-Digit NAICS Code: 324121 (Primary)

Check if MPO >= MOE Thresholds (see note 4 for details)			Emissions by Release Mode (tonne)							
	Contaminant	CAS	Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Total Emissions (tonne)	MPO/ Release Threshold (tonne)	Need to Report ?
	BENZENE	71-43-2	0.000001	0.00	0.000000	0.00	0.014000	0.014001	1	
	1,3-BUTADIENE	106-99-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	2-BUTOXYETHANOL	111-76-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	N-BUTYL ACETATE	123-86-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	CHLOROBENZENE	108-90-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	P-DICHLOROBENZENE	106-46-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	1,2-DICHLOROETHANE	107-06-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	DIMETHYLETHER	115-10-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	ETHYL ALCOHOL	64-17-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	ETHYL ACETATE	141-78-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	ETHYLENE	74-85-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	FORMALDEHYDE	50-00-0	0.000067	0.00	0.000000	0.00	0.037000	0.037067	1	
	N-HEXANE	110-54-3	0.001225	0.00	0.000000	0.00	0.000000	0.001225	1	
*	ISOPROPYL ALCOHOL	67-63-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	D-LIMONENE	5989-27-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	METHANOL	67-56-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	METHYL ETHYL KETONE	78-93-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	2-METHYL-3-HEXANONE	7379-12-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	METHYL ISOBUTYL KETONE	108-10-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	MYRCENE	123-35-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	BETA-PHELLANDRENE	555-10-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	PHENYL ISOCYANATE	103-71-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	ALPHA-PINENE	80-56-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	BETA-PINENE	127-91-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	PROPANE	74-98-6	0.002178	0.00	0.000000	0.00	0.000000	0.002178	1	
	PROPYLENE	115-07-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	STYRENE	100-42-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	1,2,4-TRIMETHYLBENZENE	95-63-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	TRIMETHYLFLUOROSILANE	420-56-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	TOLUENE	108-88-3	0.000002	0.00	0.000000	0.00	0.050000	0.050002	1	
*	VINYL ACETATE	108-05-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	ANTHRAQUINONE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	BUTANE	*	0.002859	0.00	0.000000	0.00	0.000000	0.002859	1	
*	BUTENE	25167-67-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	CYCLOHEPTANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	CYCLOHEXENE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	CYCLOOCTANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	DECANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	DIHYDRONAPTHALENE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	DODECANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	HEPTANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	HEXANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	HEXENE	25264-93-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	METHYLINDAN	27133-93-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	NONANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	OCTANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	PENTANE	*	0.003540	0.00	0.000000	0.00	0.000000	0.003540	1	
	PENTENE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	TERPENE	68956-56-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	TRIMETHLYBENZENE	25551-13-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	XYLENE	1330-30-7	0.000000	0.00	0.000000	0.00	0.135000	0.135000	1	
*	CREOSOTE	8001-58-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	HEAVY AROMATIC SOLVENT NAPHTHA	64742-94-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	LIGHT AROMATIC SOLVENT NAPHTHA	64742-95-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	MINERAL SPIRITS	64475-85-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	NAPHTHALENE	8030-30-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	STODDARD SOLVENT	8052-41-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
Added March 08:										
Part 2 PAH										
*	Dibenzo(a,h)acridine	226-36-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
*	Dibenzo(a,e)fluoranthene	5385-75-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
*	Dibenzo(a,e)pyrene	192-65-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
*	Dibenzo(a,h)pyrene	189-64-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	

APPENDIX B

Sample Output from Echo 127 for a Permanent Drum Mix Plant

Sample Output from Echo 127 for a Drum Mix Plant

Industry Type: Recycle Crushing+HMA(Drum Mix) **Reporting Year:** 2009

General Site Information You may use the 'Copy Data' sheet to transfer data from last year's ECHO2003 file.

Site name: Typical Ontario Drum Plant

* City closest to the site: Toronto Pearson Int'l Airport

* 6-Digit NAICS Code: Primary 324121
Secondary
Tertiary

* Average wind speed: (Annual) 4.1 m/s (from closest city: 4.10 m/s)

* Denotes Required Information

Reporting Criteria Definition of Facility Definition of Hours of Labour

Please check all that apply:

- ☑ My facility has employees working 20,000 hrs or more (equivalent to 10 full-time employees) during the reporting year
- ☑ The cumulative name plate capacity of all stationary external-combustion equipment is less than 10 million BTU/hr
- ☑ The only type of fuel combusted in the stationary external-combustion equipment is commercial grade natural gas, liquefied petroleum gas, #1 or 2 fuel oil or any combination thereof

	Need to Report?	Remarks
Table 2A	NO	
Table 2B	YES	Report to OReg127 only the contaminants marked in column 'Need to Report'.
NPRI Parts 1-3	YES	Report to NPRI only the contaminants marked in column 'Need to Report'.
NPRI Parts 4-5	YES	Report to NPRI only the contaminants marked in column 'Need to Report'.

Sample Output from Echo 127 for a Drum Mix Plant

Industry Type: Recycle Crushing+HMA(Drum Mix) **Reporting Year:** 2009

Part 1 - Combustion Equipment [Definition]

Not including dryer/hot screens in Hot Mix Plants

Please check all combustion equipment in your facility: [Fuel Usage Calculator]

- ☑ **Natural Gas-Fired Heaters (<100 million Btu/h each)**
  - Total annual fuel consumption: 5000 m^3
- ☐ **Natural Gas-Fired Heaters (>100 million Btu/h each)**
  - Total annual fuel consumption: _____ m^3
- ☐ **Propane-Fired Equipment (<100 million Btu/h each)**
  - Total annual fuel consumption: _____ L
  - Sulphur Content: _____ gr/100 ft^3 (Suggested value: 0.18 g/100ft3)
- ☐ **#6 Oil-Fired Equipment (<100 million Btu/h each) - Residual Oil**
  - Total annual fuel consumption: _____ L
  - Sulphur Content: _____ % (Suggested Value: 2.8%)
- ☐ **#6 Oil-Fired Equipment (>100 million Btu/h each) - Residual Oil**
  - Total annual fuel consumption: _____ L
  - Sulphur Content: _____ % (Suggested Value: 2.8%)
- ☐ **#2 Oil-Fired Equipment (<100 million Btu/h each) - Distillate Oil**
  - Total annual fuel consumption: _____ L
  - Sulphur Content: _____ % (Suggested Value: 0.5%)
- ☐ **#2 Oil-Fired Equipment (>100 million Btu/h each) - Distillate Oil**
  - Total annual fuel consumption: _____ L
  - Sulphur Content: _____ % (Suggested Value: 0.5%)
- ☐ **#5 Oil-Fired Equipment (<100 million Btu/h each)**
  - Total annual fuel consumption: _____ L
  - Sulphur Content: _____ % (Suggested Value: 2.0%)
- ☐ **#5 Oil-Fired Equipment (>100 million Btu/h each)**
  - Total annual fuel consumption: _____ L
  - Sulphur Content: _____ % (Suggested Value: 2.0%)
- ☐ **Waste Oil-Fired Heaters**
  - Total annual fuel consumption: _____ L
  - Ash Content: _____ % (Suggested Value: 0.08%)
  - Sulphur Content: _____ % (Suggested Value: 2.8%)
  - Lead Content: _____ % (Suggested Value: 0.0064%)
- ☐ **Diesel Generator**
  - Total annual fuel consumption: _____ L
- ☑ **Hot Asphalt Cement Storage Heater**
  - Type of fuel used: Natural Gas
  - Total annual fuel consumption: 37500 m3

Sample Output from Echo 127 for a Drum Mix Plant

Industry Type: Recycle Crushing+HMA(Drum Mix) **Reporting Year:** 2009

Part 2 - Processing Equipment

Please check all processing equipment in your facility:

Make sure you have completed the raw material compositions in sheet "Raw Material" before you check Tables 2B and NPRI.

The information will be used to calculate MPO (Manufactured, Processed and Otherwise used) values.

*** For portable facilities, add up production at all operating locations during the year.**

For Recycle Crushing

☑ **"Primary" Crusher** — Description

Total annual tonnage processed: 10000 tonnes

Control Device: Water Spray

Control Efficiency:

PM:	80 %	(Suggested Eff:	80	%)
PM_{10}:	80 %	(Suggested Eff:	80	%)
$PM_{2.5}$:	80 %	(Suggested Eff:	80	%)

☐ **"Secondary" Crusher** — Description

Total annual tonnage processed: tonnes

Control Device: Uncontrolled

Control Efficiency:

PM:	%	(Suggested Eff:	0	%)
PM_{10}:	%	(Suggested Eff:	0	%)
$PM_{2.5}$:	%	(Suggested Eff:	0	%)

☑ **Sizing Screen** — Description

Total annual tonnage processed: 10000 tonnes

Control Device: Water Spray

Control Efficiency:

PM:	80 %	(Suggested Eff:	80	%)
PM_{10}:	80 %	(Suggested Eff:	80	%)
$PM_{2.5}$:	80 %	(Suggested Eff:	80	%)

Conveyor Transfer Points (Recycling Crushing) — Add/Edit Transfer Points

Transfer Points Summary (use the "Add/Edit Transfer Points" button above to edit transfer point information)

Type of Transfer Points	No. of Transfer Points	Total Annual Throughput (tonne/yr)
Open with No Control	0	0
Open with Water Spray	1	10,000
Partially Enclosed with No Control	0	0
Partially Enclosed with Water Spray	0	0
Fully Enclosed with No Control	0	0
Fully Enclosed with Water Spray	0	0

For Hot Mix Asphalt Facility

Note: For portable plant, add up production at all locations.

Total annual HMA produced: 100000 tonnes

Total annual asphalt cement used: 5000 tonnes

Material Handling for Hot Mix Asphalt

Total annual aggregates (**not** including RAP) used: 85000 tonnes

Moisture content: 4 % (Suggested Value: 4 %)

Number of drop points: 8

Number of drop points with enclosure: 2

# of scalping screens used to screen aggregates: 2

Horizontal/Vertical Fixed Roof Asphalt Storage Tanks

Sample Output from Echo 127 for a Drum Mix Plant

Industry Type: Recycle Crushing+HMA(Drum Mix) **Reporting Year:** 2009

	Type of Tank	Shell Length / Height (ft)	Shell Diameter (ft)	For Vertical Tanks Only: Max. Liquid Height (ft)	For Vertical Tanks Only: Avg. Liquid Height (ft)	Net throughput (tonnes/yr)	Min. Bulk Temp. (°F)	Max. Bulk Temp. (°F)	Paint Color/ Shade	Paint Condition	Control Device	Control Eff. (%)
1	Horizontal	32	10			4000	250	300	Gray (Light)	Good	Filtration	95
2	Horizontal	26	8			1000	250	325	Gray (Light)	Good	Filtration	95
3	Horizontal											
4	Horizontal											
5	Horizontal											
6	Horizontal											
7	Horizontal											
8	Horizontal											
9	Horizontal											
10	Horizontal											

For HMA Drum Mix Plants (counter and parallel flow)

☑ **Natural Gas-Fired or Propane-Fired Dryer** — **Is the dryer capacity greater than 100 million BTU/hr?** YES

Control Device: Baghouse

Control Efficiency:

PM:	99.9 %	(Suggested Eff:	99.9	%)
PM_{10}:	99.9 %	(Suggested Eff:	99.9	%)
$PM_{2.5}$:	99.8 %	(Suggested Eff:	99.8	%)

Total annual natural gas consumption: 1000000 m^3 Total annual propane consumption: _____ L

☐ **#2 Oil-Fired Dryer** — **Is the dryer capacity greater than 100 million BTU/hr?**

Control Device: Uncontrolled

Control Efficiency:

PM:	_____ %	(Suggested Eff:	0	%)
PM_{10}:	_____ %	(Suggested Eff:	0	%)
$PM_{2.5}$:	_____ %	(Suggested Eff:	0	%)

Total annual #2 oil consumption: _____ L

☐ **Waste Oil-Fired Dryer**

Total annual waste oil consumption: _____ L

Control Device: Uncontrolled

Control Efficiency:

PM:	_____ %	(Suggested Eff:	0	%)
PM_{10}:	_____ %	(Suggested Eff:	0	%)
$PM_{2.5}$:	_____ %	(Suggested Eff:	0	%)

☐ **HMA Storage Silo**

HMA mix temperature: _____ °F (Suggested Value: 325 °F)

Total annual stored: _____ tonnes

Sample Output from Echo 127 for a Drum Mix Plant

Industry Type: Recycle Crushing+HMA(Drum Mix) **Reporting Year:** 2009

Part 3 - Fugitives

General Information

Days of Rain (>= 0.2mm): annual 145 days (from closest city: 145.5)

Silt Content of Unpaved Roads: 8.3 % (Suggested Value: 8.3%)

Moisture Content of Unpaved Roads: 5 % (Suggested Value: 5.0%)

For Hot Mix Asphalt Facility

Aggregate/Recycle Concrete Delivery Trucks

From site entrance to aggregate/concrete storage area

Average Unloaded Truck Weight: 18 tonnes (Suggested Value: 18 tonnes)

Average Load Weight (Load only): 33 tonnes (Suggested Value: 33 tonnes)

Annual amount of Material Transported: 85000 tonnes

Unpaved Roads

Length of road (one way only): 150 m

Control Device: Water Spray/Truck

Control Efficiency: *(Note: Emissions from roads can be significant. Use the calculator in 'Unpaved' sheet to more accurately estimate the control efficiency.)*

PM:	70 %	(Suggested Eff:	70	%)
PM_{10}:	70 %	(Suggested Eff:	70	%)
$PM_{2.5}$:	70 %	(Suggested Eff:	70	%)

Asphalt Cement Delivery Tankers

From site entrance to Hot Asphalt Cement Storage

Average Unloaded Truck Weight: 19 tonnes (Suggested Value: 19 tonnes)

Average Load Weight (Load only): 38 tonnes (Suggested Value: 38 tonnes)

Annual amount of Material Transported: 5000 tonnes

Unpaved Roads

Length of road (one way only): 0 m

Control Device: Uncontrolled

Control Efficiency:

PM:	%	(Suggested Eff:	0	%)
PM_{10}:	%	(Suggested Eff:	0	%)
$PM_{2.5}$:	%	(Suggested Eff:	0	%)

Product Trucks

From site entrance to HMA loadout area

Average Unloaded Truck Weight: 14 tonnes (Suggested Value: 14 tonnes)

Average Load Weight (Load only): 21 tonnes (Suggested Value: 21 tonnes)

Annual amount of Material Transported: 100000 tonnes

Unpaved Roads

Length of road (one way only): 0 m

Control Device: Uncontrolled

Control Efficiency:

PM:	%	(Suggested Eff:	0	%)
PM_{10}:	%	(Suggested Eff:	0	%)
$PM_{2.5}$:	%	(Suggested Eff:	0	%)

Other On-Site Vehicles Travelling in Stockpiles Definition

Sample Output from Echo 127 for a Drum Mix Plant

Industry Type: Recycle Crushing+HMA(Drum Mix) **Reporting Year:** 2009

Average Vehicle Weight: 20 tonnes (Suggested Value: 17-25 tonnes)

Unpaved Roads

Estimated total annual mileage on unpaved roads: 1700 km

Control Device for unpaved roads: Water Spray/Truck

Control Efficiency: *(Note: Emissions from roads can be significant. Use the calculator in 'Unpaved' sheet to more accurately estimate the control efficiency.)*

PM:	70 %	(Suggested Eff:	70	%)
PM_{10}:	70 %	(Suggested Eff:	70	%)
$PM_{2.5}$:	70 %	(Suggested Eff:	70	%)

Wind Erosion of Stockpiles

% of time wind speed exceeds 5.4 m/s: (Annual) 30 % (from closest city: 29.71 %)

Weighted average silt content in stockpile material: 0.8233 % (Sugg. Value: 0.1688% (limestone), 2.1324% (sand))

Total stockpile surface area exposed: 1,516.96 m^2 Surface Area Calculator

% of active stockpile: 18.00 %

Control Device: Uncontrolled

Control Efficiency:

PM:	%	(Suggested Eff:	0	%)
PM_{10}:	%	(Suggested Eff:	0	%)
$PM_{2.5}$:	%	(Suggested Eff:	0	%)

After filling in the "Site Information" section, you may check emissions in Tables 2B and NPRI.

Sample Output from Echo 127 for a Drum Mix Plant

Report to MOE and/or NPRI using the "OWNERS" interface: Use Window to a National Environmental Reporting System (ONNERS) - Government of Canada

Number of Contaminants to Report to MOE: 0 Reporting Year: 2009

Do not need to report to MOE. Check substances reportable to NPRI.

Number of Contaminants to Report to NPRI: 2

Please report only the contaminants marked as 'YES' in column 'Need to Report' to NPRI (Parts 1 to 5).

ECHO2007 calculates the air releases portion only. You need to look at other media for NPRI reporting, if applicable.

ONMOE Table 2B Substances

Contaminant	CAS	Emissions by Release Mode (tonne)					Total Emissions (tonne)	MPO Threshold (tonne)	Need to Report?	Basis of Estimate	Reported Emissions in Previous Year (tonne)	% Change	Notes
		Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Road Dust						

NPRI Substances

Contaminant	CAS	Emissions by Release Mode (tonne)						Total Emissions (tonne)	MPO Release Threshold (tonne)	Need to Report ?	Basis of Estimate	Reported Emissions in Previous Year (tonne)	% Change	Notes
		Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Road Dust							
PART 1 Group 1 Substances														
PART 1 Group 2 Substances														
PART 1 Group 3 Substances														
PART 1 Group 4 Substances														
PART 2														
PART 3 DIOXINE	86-73-7	0.000000	0.00	0.000000	0.00	0.000000	0.00	0.000000	(See Manual)	YES	E2 - Published Emission Factors		-	
PART 4														
PM$_{10}$ - Particulate Matter <=10 Micrometers	NA - M09	0.396293	0.00	0.839239	0.00	0.000000	0.000000	1.23466	0.5	YES	E2 - Published Emission Factors		-	
PART 5 (Report only if VOC exceeds the 10 tonne threshold. Some substances are already in Part 1. See user's guide for details.)														

Sample Output from Echo 127 for a Drum Mix Plant

Section B Emissions Summary — Reporting Year: 2009

Site Name: Typical Ontario Drum Plant
6-Digit NAICS Code: 324121 (Primary)

	Check if MPO >= MOE Thresholds (see note 4 for details)		CAS	Emissions by Release Mode (tonne)					Total Emissions (tonne)	MPO Threshold (tonne)	Need to Report?
	Contaminant			Stack/Point	Storage/ Handling	Fugitive	Spills	Other			
	ACETONE	☐	67-64-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	3	
*	FURFURYL ALCOHOL †	☐	98-00-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	TETRAHYDROFURAN †	☐	109-99-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	TOTAL REDUCED SULPHUR (TRS) †	☐	N/A - M14	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	PAH - ACENAPHTHENE †	☐	83-32-9	0.000070	0.00	0.000000	0.00	0.000000	0.000070	0.005	
	PAH - ACENAPHTHYLENE †	☐	208-96-8	0.000430	0.00	0.000000	0.00	0.000000	0.000430	0.005	
	PAH - FLUORENE †	☐	86-73-7	0.000190	0.00	0.000000	0.00	0.000000	0.000190	0.005	YES

Notes: 1. "*" denotes no emission factor available
2. "Other Emissions" refer to emissions calculated using emission factors that combine both stack and fugitive emissions.
3. All emissions are estimated using USEPA published emission factors.
4. Check the box if the contaminant can resonably be expected to be manufactured or to be processed or otherwise used at the facility during the year in an amount equal to or greater than the threshold amount for the contaminant set out in column "MPO/Release Threshold". EHCO2007 also calculate MPO for selected contaminants from amount of aggregate and cementing materials used. Therefore, you may need to report some contaminants even if you haven't checked the MPO box for those contaminants.
5. "†" denotes contaminants no longer reportable under O.Reg. 127, but rather reportable under NPRI. Refer to "OWNERS" sheet for a complete list of reportable substances under NPRI.

Sample Output from Echo 127 for a Drum Mix Plant

NPRI Emissions Summary — **Reporting Year:** 2009

Site Name: Typical Ontario Drum Plant
6-Digit NAICS Code: 324121 (Primary)

	Check if MPO >= MOE Thresholds (see note 4 for details)		Emissions by Release Mode (tonne)							
	Contaminant	CAS	Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Total Emissions (tonne)	MPO/ Release Threshold (tonne)	Need to Report ?
	ACETALDEHYDE	75-07-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ACETONITRILE	75-05-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ACETOPHENONE	98-86-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	ACROLEIN	107-02-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ACRYLAMIDE	79-06-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ACRYLIC ACID	79-10-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ACRYLONITRILE	107-13-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ALKANES, C6-18, CHLORO	68920-70-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ALKANES, C10-13, CHLORO	85535-84-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ALLYL ALCOHOL	107-18-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ALLYL CHLORIDE	107-05-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	ALUMINUM	7429-90-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ALUMINUM OXIDE	1344-28-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	AMMONIA (TOTAL)	--	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	ANILINE	62-53-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	ANTHRACENE	120-12-7	0.000011	0.00	0.000000	0.00	0.000000	0.000011	10	
	ANTIMONY	--	0.000009	0.00	0.000000	0.00	0.000000	0.000009	10	
*	ASBESTOS	1332-21-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	BENZENE	71-43-2	0.019501	0.00	0.000000	0.00	0.000000	0.019501	10	
*	BENZOYL CHLORIDE	98-88-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	BENZOYL PEROXIDE	94-36-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	BENZYL CHLORIDE	100-44-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	BIPHENYL	92-52-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	BIS(2-ETHYLHEXYL) ADIPATE	103-23-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	BIS(2-ETHYLHEXYL) PHTHALATE	117-81-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	BORON TRIFLUORIDE	7637-07-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	BROMINE	7726-95-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	1-BROMO-2-CHLOROETHANE	107-04-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	BROMOMETHANE	74-83-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	1,3-BUTADIENE	106-99-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	2-BUTOXYETHANOL	111-76-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	BUTYL ACRYLATE	141-32-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	I-BUTYL ALCOHOL	78-83-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	N-BUTYL ALCOHOL	71-36-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	SEC-BUTYL ALCOHOL	78-92-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	TERT-BUTYL ALCOHOL	75-65-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	BUTYL BENZYL PHTHALATE	85-68-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	1,2-BUTYLENE OXIDE	106-88-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	BUTYRALDEHYDE	123-72-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	C.I. ACID GREEN 3	4680-78-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	C.I. BASIC GREEN 4	569-64-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	C.I. BASIC RED 1	989-38-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	C.I. DIRECT BLUE 218	28407-37-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	C.I. DISPERSE YELLOW 3	2832-40-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	C.I. FOOD RED 15	81-88-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	C.I. SOLVENT ORANGE 7	3118-97-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	C.I. SOLVENT YELLOW 14	842-07-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CALCIUM CYANAMIDE	156-62-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CALCIUM FLUORIDE	7789-75-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	CARBON DISULPHIDE	75-15-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CARBON TETRACHLORIDE	56-23-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CARBONYL SULPHIDE	463-58-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CATECHOL	120-80-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	CFC-11	75-69-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CFC-12	75-71-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CFC-13	75-72-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CFC-114	76-14-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CFC-115	76-15-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CHLORENDIC ACID	115-28-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	CHLORINE	7782-50-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CHLORINE DIOXIDE	10049-04-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CHLOROACETIC ACID	79-11-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CHLOROBENZENE	108-90-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	CHLOROETHANE	75-00-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	CHLOROFORM	67-66-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	CHLOROMETHANE	74-87-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	3-CHLORO-2-METHYL-1-PROPENE	563-47-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	3-CHLOROPROPIONITRILE	542-76-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	

Sample Output from Echo 127 for a Drum Mix Plant

NPRI Emissions Summary — **Reporting Year:** 2009

Site Name: Typical Ontario Drum Plant
6-Digit NAICS Code: 324121 (Primary)

Check if MPO >= MOE Thresholds (see note 4 for details)			Emissions by Release Mode (tonne)							
Contaminant		CAS	Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Total Emissions (tonne)	MPO/ Release Threshold (tonne)	Need to Report ?
CHROMIUM		--	0.000276	0.00	0.000000	0.00	0.000000	0.000276	10	
COBALT		--	0.000001	0.00	0.000000	0.00	0.000000	0.000001	10	
COPPER		--	0.000156	0.00	0.000000	0.00	0.000000	0.000156	10	
* CRESOL		1319-77-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
CROTONALDEHYDE		4170-30-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
CUMENE		98-82-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CUMENE HYDROPEROXIDE		80-15-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CYANIDES		--	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CYCLOHEXANE		110-82-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* CYCLOHEXANOL		108-93-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* DECABROMODIPHENYL OXIDE		1163-19-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2,4-DIAMINOTOLUENE		95-80-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2,6-DI-T-BUTYL-4-METHYLPHENOL		128-37-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* DIBUTYL PHTHALATE		84-74-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* O-DICHLOROBENZENE		95-50-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* P-DICHLOROBENZENE		106-46-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 3,3'-DICHLOROBENZIDINE DIHYDROCHLORIDE		612-83-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 1,2-DICHLOROETHANE		107-06-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
DICHLOROMETHANE		75-09-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2,4-DICHLOROPHENOL		120-83-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 1,2-DICHLOROPROPANE		78-87-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* DICYCLOPENTADIENE		77-73-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* DIETHANOLAMINE		111-42-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* DIETHYL PHTHALATE		84-66-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* DIETHYL SULPHATE		64-67-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* DIMETHYLAMINE		124-40-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* N,N-DIMETHYLANILINE		121-69-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* N,N-DIMETHYLFORMAMIDE		68-12-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* DIMETHYL PHENOL		1300-71-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* DIMETHYL PHTHALATE		131-11-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* DIMETHYL SULPHATE		77-78-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 4,6-DINITRO-O-CRESOL		534-52-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2,4-DINITROTOLUENE		121-14-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2,6-DINITROTOLUENE		606-20-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* DINITROTOLUENE		25321-14-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* DI-N-OCTYL PHTHALATE		117-84-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 1,4-DIOXANE		123-91-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* DIPHENYLAMINE		122-39-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* EPICHLOROHYDRIN		106-89-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2-ETHOXYETHANOL		110-80-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2-ETHOXYETHYL ACETATE		111-15-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ETHYL ACRYLATE		140-88-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
ETHYLBENZENE		100-41-4	0.012000	0.00	0.000000	0.00	0.000000	0.012000	10	
* ETHYL CHLOROFORMATE		541-41-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
ETHYLENE		74-85-1	0.350000	0.00	0.000000	0.00	0.000000	0.350000	10	
* ETHYLENE GLYCOL		107-21-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ETHYLENE OXIDE		75-21-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ETHYLENE THIOUREA		96-45-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* FLUORINE		7782-41-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
FORMALDEHYDE		50-00-0	0.155067	0.00	0.000000	0.00	0.000000	0.155067	10	
* FORMIC ACID		64-18-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HALON 1211		353-59-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HALON 1301		75-63-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HCFC-22		75-45-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HCFC-122 AND ALL ISOMERS		41834-16-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HCFC-123 AND ALL ISOMERS		34077-87-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HCFC 124 AND ALL ISOMERS		63938-10-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HCFC-141B		1717-00-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HCFC-142B		75-68-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HEXACHLOROCYCLOPENTADIENE		77-47-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HEXACHLOROETHANE		67-72-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HEXACHLOROPHENE		70-30-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
N-HEXANE		110-54-3	0.047225	0.00	0.000000	0.00	0.000000	0.047225	10	
* HYDRAZINE		302-01-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HYDROCHLORIC ACID		7647-01-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HYDROGEN CYANIDE		74-90-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HYDROGEN FLUORIDE		7664-39-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* HYDROGEN SULFIDE		7783-06-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	

Sample Output from Echo 127 for a Drum Mix Plant

NPRI Emissions Summary — Reporting Year: 2009

Site Name: Typical Ontario Drum Plant
6-Digit NAICS Code: 324121 (Primary)

Check if MPO >= MOE Thresholds (see note 4 for details)			Emissions by Release Mode (tonne)							
Contaminant		CAS	Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Total Emissions (tonne)	MPO/ Release Threshold (tonne)	Need to Report ?
* HYDROQUINONE		123-31-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* IRON PENTACARBONYL		13463-40-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
ISOBUTYRALDEHYDE		78-84-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ISOPHORONE DIISOCYANATE		4098-71-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ISOPRENE		78-79-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ISOPROPYL ALCOHOL		67-63-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* P,P'-ISOPROPYLIDENEDIPHENOL		80-05-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* ISOSAFROLE		120-58-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* LITHIUM CARBONATE		554-13-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* MALEIC ANHYDRIDE		108-31-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
MANGANESE		--	0.000385	0.00	0.000000	0.00	0.000000	0.000385	10	
* 2-MERCAPTOBENZOTHIAZOLE		149-30-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* METHANOL		67-56-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2-METHOXYETHANOL		109-86-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2-METHOXYETHYL ACETATE		110-49-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* METHYL ACRYLATE		96-33-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* METHYL TERT-BUTYL ETHER		1634-04-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* P,P'-METHYLENEBIS(2-CHLOROANILINE)		101-14-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 1,1-METHYLENEBIS(4-ISOCYANATOCYCLOHEXANE)		5124-30-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* METHYLENEBIS(PHENYLISOCYANATE)		101-68-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* P,P'-METHYLENEDIANILINE		101-77-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
METHYL ETHYL KETONE		78-93-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* METHYL IODIDE		74-88-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* METHYL ISOBUTYL KETONE		108-10-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* METHYL METHACRYLATE		80-62-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* N-METHYLOLACRYLAMIDE		924-42-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2-METHYLPYRIDINE		109-06-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* N-METHYL-2-PYRROLIDONE		872-50-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* MICHLER'S KETONE		90-94-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* MOLYBDENUM TRIOXIDE		1313-27-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
NAPHTHALENE		91-20-3	0.004500	0.00	0.000000	0.00	0.000000	0.004500	10	
NICKEL		--	0.003151	0.00	0.000000	0.00	0.000000	0.003151	10	
* NITRATE ION		--	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* NITRIC ACID		7697-37-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* NITRILOTRIACETIC ACID		139-13-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* P-NITROANILINE		100-01-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* NITROBENZENE		98-95-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* NITROGLYCERIN		55-63-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* P-NITROPHENOL		100-02-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* 2-NITROPROPANE		79-46-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* N-NITROSODIPHENYLAMINE		86-30-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* NONYLPHENOL AND ITS ETHOXYLATES		*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* OCTYLPHENOL AND ITS ETHOXYLATES		*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* PARALDEHYDE		123-63-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* PENTACHLOROETHANE		76-01-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* PERACETIC ACID		79-21-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PHENOL		108-95-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* P-PHENYLENEDIAMINE		106-50-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* O-PHENYLPHENOL		90-43-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* PHOSGENE		75-44-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* PHOSPHORUS (YELLOW OR WHITE)		7723-14-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PHOSPHORUS (TOTAL)		*	0.001400	0.00	0.000000	0.00	0.000000	0.001400	10	
* PHTHALIC ANHYDRIDE		85-44-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* POLYMERIC DIPHENYLMETHANE DIISOCYANATE		9016-87-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* POTASSIUM BROMATE		7758-01-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* PROPARGYL ALCOHOL		107-19-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PROPIONALDEHYDE		123-38-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
PROPYLENE		115-07-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* PROPYLENE OXIDE		75-56-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* PYRIDINE		110-86-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* QUINOLINE		91-22-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
P-QUINONE		106-51-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* SAFROLE		94-59-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
SELENIUM		--	0.000018	0.00	0.000000	0.00	0.000000	0.000018	10	
SILVER		--	0.000024	0.00	0.000000	0.00	0.000000	0.000024	10	
* SODIUM FLUORIDE		7681-49-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
* SODIUM NITRITE		7632-00-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
STYRENE		100-42-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	

Sample Output from Echo 127 for a Drum Mix Plant

NPRI Emissions Summary — **Reporting Year:** 2009

Site Name: Typical Ontario Drum Plant
6-Digit NAICS Code: 324121 (Primary)

	Check if MPO >= MOE Thresholds (see note 4 for details)		Emissions by Release Mode (tonne)							
	Contaminant	CAS	Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Total Emissions (tonne)	MPO/ Release Threshold (tonne)	Need to Report ?
*	STYRENE OXIDE	96-09-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	SULPHUR HEXAFLUORIDE	2551-62-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	SULPHURIC ACID	7664-93-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	1,1,1,2-TETRACHLOROETHANE	630-20-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	1,1,2,2-TETRACHLOROETHANE	79-34-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	TETRACHLOROETHYLENE	127-18-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	TETRACYCLINE HYDROCHLORIDE	64-75-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	THIOUREA	62-56-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	THORIUM DIOXIDE	1314-20-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	TITANIUM TETRACHLORIDE	7550-45-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	TOLUENE	108-88-3	0.007502	0.00	0.000000	0.00	0.000000	0.007502	10	
*	TOLUENE-2,4-DIISOCYANATE	584-84-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	TOLUENE-2,6-DIISOCYANATE	91-08-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	TOLUENEDIISOCYANATE	26471-62-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	1,2,4-TRICHLOROBENZENE	120-82-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	1,1,2-TRICHLOROETHANE	79-00-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	TRICHLOROETHYLENE	79-01-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	TRIETHYLAMINE	121-44-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	1,2,4-TRIMETHYLBENZENE	95-63-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	2,2,4-TRIMETHYLHEXAMETHYLENE DIISOCYANATE	16938-22-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	2,4,4-TRIMETHYLHEXAMETHYLENE DIISOCYANATE	15646-96-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	VANADIUM	7440-62-2	0.000002	0.00	0.000000	0.00	0.000000	0.000002	10	
*	VINYL ACETATE	108-05-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	VINYL CHLORIDE	75-01-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
*	VINYLIDENE CHLORIDE	75-35-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	10	
	XYLENE	1330-20-7	0.010000	0.00	0.000000	0.00	0.000000	0.010000	10	
	ZINC	--	0.003070	0.00	0.000000	0.00	0.000000	0.003070	10	
	PART 1 Group 2 Substances									
	MERCURY	--	0.000013	0.00	0.000000	0.00	0.000000	0.000013	0.005	
	PART 1 Group 3 Substances									
	CADMIUM	--	0.000021	0.00	0.000000	0.00	0.000000	0.000021	0.005	
	PART 1 Group 4 Substances									
	ARSENIC	--	0.000028	0.00	0.000000	0.00	0.000000	0.000028	0.05	
	HEXAVALENT CHROMIUM COMPOUNDS	--	0.000023	0.00	0.000000	0.00	0.000000	0.000023	0.05	
	LEAD	--	0.000031	0.00	0.000000	0.00	0.000000	0.000031	0.05	
*	TETRAETHYL LEAD	78-00-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.05	
	PART 2									
	BENZO(A)ANTHRACENE	56-55-3	0.000011	0.00	0.000000	0.00	0.000000	0.000011	0.005	
	BENZO(A)PHENANTHRENE	218-01-9	0.000009	0.00	0.000000	0.00	0.000000	0.000009	0.005	
	BENZO(A)PYRENE	50-32-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
	BENZO(B)FLUORANTHENE	205-99-2	0.000005	0.00	0.000000	0.00	0.000000	0.000005	0.005	
	BENZO(E)PYRENE	192-97-2	0.000006	0.00	0.000000	0.00	0.000000	0.000006	0.005	
	BENZO(G,H,I)PERYLENE	191-24-2	0.000002	0.00	0.000000	0.00	0.000000	0.000002	0.005	
*	BENZO(J)FLUORANTHENE	205-82-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
	BENZO(K)FLUORANTHENE	207-08-9	0.000002	0.00	0.000000	0.00	0.000000	0.000002	0.005	
*	DIBENZO(A,J)ACRIDINE	224-42-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
	DIBENZO(A,H)ANTHRACENE	53-70-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
*	DIBENZO(A,I)PYRENE	189-55-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
*	7H-DIBENZO(C,G)CARBAZOLE	194-59-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
	FLUORANTHENE	206-44-0	0.000031	0.00	0.000000	0.00	0.000000	0.000031	0.005	
	INDENO(1,2,3-C,D)PYRENE	193-39-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
	PERYLENE	198-55-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
	PHENANTHRENE	85-01-8	0.000380	0.00	0.000000	0.00	0.000000	0.000380	0.005	
	PYRENE	129-00-0	0.000027	0.00	0.000000	0.00	0.000000	0.000027	0.005	
	PART 3									
*	HEXACHLOROBENZENE	118-74-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	(See Manual)	
*	POLYCHLORINATED DIBENZO-P-DIOXINS & POLYCHLORINATED DIBENZOFURANS	--	0.000000	0.00	0.000000	0.00	0.000000	0.000000	(See Manual)	
	PART 4									
	Carbon Monoxide	630-08-0	6.5572	0.00	0.000000	0.00	0.000000	6.5572	20	
	Oxides of Nitrogen (Expressed as NO_2)	11104-93-1	1.3681	0.00	0.000000	0.00	0.000000	1.3681	20	
	$PM_{2.5}$ - Particulate Matter <=2.5 Micrometers	--	0.151293	0.00	0.078344	0.00	0.000000	0.229638	0.3	
	PM_{10} - Particulate Matter <=10 Micrometers	--	0.396293	0.00	0.810329	0.00	0.000000	1.2066	0.5	YES
	Sulphur Dioxide	7446-09-5	0.170408	0.00	0.000000	0.00	0.000000	0.170408	20	
	PM - Total Particulate Matter	--	1.4763	0.00	2.7745	0.00	0.000000	4.2508	20	
	Volatile Organic Compounds (VOC)	--	1.6037	0.00	0.000000	0.00	0.000000	1.6037	10	
	PART 5 (Report only if VOC exceeds the 10-tonne threshold. Some substances are already in Part 1. See user's guide for details.)									
*	ACETYLENE	74-86-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	ADIPIC ACID	124-04-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	ANILINE	62-53-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	

Sample Output from Echo 127 for a Drum Mix Plant

NPRI Emissions Summary — Reporting Year: 2009

Site Name: Typical Ontario Drum Plant
6-Digit NAICS Code: 324121 (Primary)

Check if MPO >= MOE Thresholds (see note 4 for details)			Emissions by Release Mode (tonne)							
	Contaminant	CAS	Stack/Point	Storage/ Handling	Fugitive	Spills	Other	Total Emissions (tonne)	MPO/ Release Threshold (tonne)	Need to Report ?
	BENZENE	71-43-2	0.019501	0.00	0.000000	0.00	0.000000	0.019501	1	
	1,3-BUTADIENE	106-99-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	2-BUTOXYETHANOL	111-76-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	N-BUTYL ACETATE	123-86-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	CHLOROBENZENE	108-90-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	P-DICHLOROBENZENE	106-46-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	1,2-DICHLOROETHANE	107-06-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	DIMETHYLETHER	115-10-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	ETHYL ALCOHOL	64-17-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	ETHYL ACETATE	141-78-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	ETHYLENE	74-85-1	0.350000	0.00	0.000000	0.00	0.000000	0.350000	1	
	FORMALDEHYDE	50-00-0	0.155067	0.00	0.000000	0.00	0.000000	0.155067	1	
	N-HEXANE	110-54-3	0.047225	0.00	0.000000	0.00	0.000000	0.047225	1	
*	ISOPROPYL ALCOHOL	67-63-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	D-LIMONENE	5989-27-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	METHANOL	67-56-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	METHYL ETHYL KETONE	78-93-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	2-METHYL-3-HEXANONE	7379-12-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	METHYL ISOBUTYL KETONE	108-10-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	MYRCENE	123-35-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	BETA-PHELLANDRENE	555-10-2	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	PHENYL ISOCYANATE	103-71-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	ALPHA-PINENE	80-56-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	BETA-PINENE	127-91-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	PROPANE	74-98-6	0.002178	0.00	0.000000	0.00	0.000000	0.002178	1	
	PROPYLENE	115-07-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	STYRENE	100-42-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	1,2,4-TRIMETHYLBENZENE	95-63-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	TRIMETHYLFLUOROSILANE	420-56-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	TOLUENE	108-88-3	0.007502	0.00	0.000000	0.00	0.000000	0.007502	1	
*	VINYL ACETATE	108-05-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	ANTHRAQUINONE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	BUTANE	*	0.036359	0.00	0.000000	0.00	0.000000	0.036359	1	
*	BUTENE	25167-67-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	CYCLOHEPTANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	CYCLOHEXENE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	CYCLOOCTANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	DECANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	DIHYDRONAPTHALENE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	DODECANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	HEPTANE	*	0.470000	0.00	0.000000	0.00	0.000000	0.470000	1	
*	HEXANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	HEXENE	25264-93-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	METHYLINDAN	27133-93-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	NONANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	OCTANE	*	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	PENTANE	*	0.014040	0.00	0.000000	0.00	0.000000	0.014040	1	
	PENTENE	*	0.110000	0.00	0.000000	0.00	0.000000	0.110000	1	
*	TERPENE	68956-56-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	TRIMETHLYBENZENE	25551-13-7	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
	XYLENE	1330-30-7	0.010000	0.00	0.000000	0.00	0.000000	0.010000	1	
*	CREOSOTE	8001-58-9	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	HEAVY AROMATIC SOLVENT NAPHTHA	64742-94-5	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	LIGHT AROMATIC SOLVENT NAPHTHA	64742-95-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	MINERAL SPIRITS	64475-85-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	NAPHTHALENE	8030-30-6	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
*	STODDARD SOLVENT	8052-41-3	0.000000	0.00	0.000000	0.00	0.000000	0.000000	1	
Added March 08:										
Part 2 PAH										
*	Dibenzo(a,h)acridine	226-36-8	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
*	Dibenzo(a,e)fluoranthene	5385-75-1	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
*	Dibenzo(a,e)pyrene	192-65-4	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	
*	Dibenzo(a,h)pyrene	189-64-0	0.000000	0.00	0.000000	0.00	0.000000	0.000000	0.005	

APPENDIX C

Sample Plant Diagrams

General Process Flow Diagram for Batch Mix Asphalt Plants

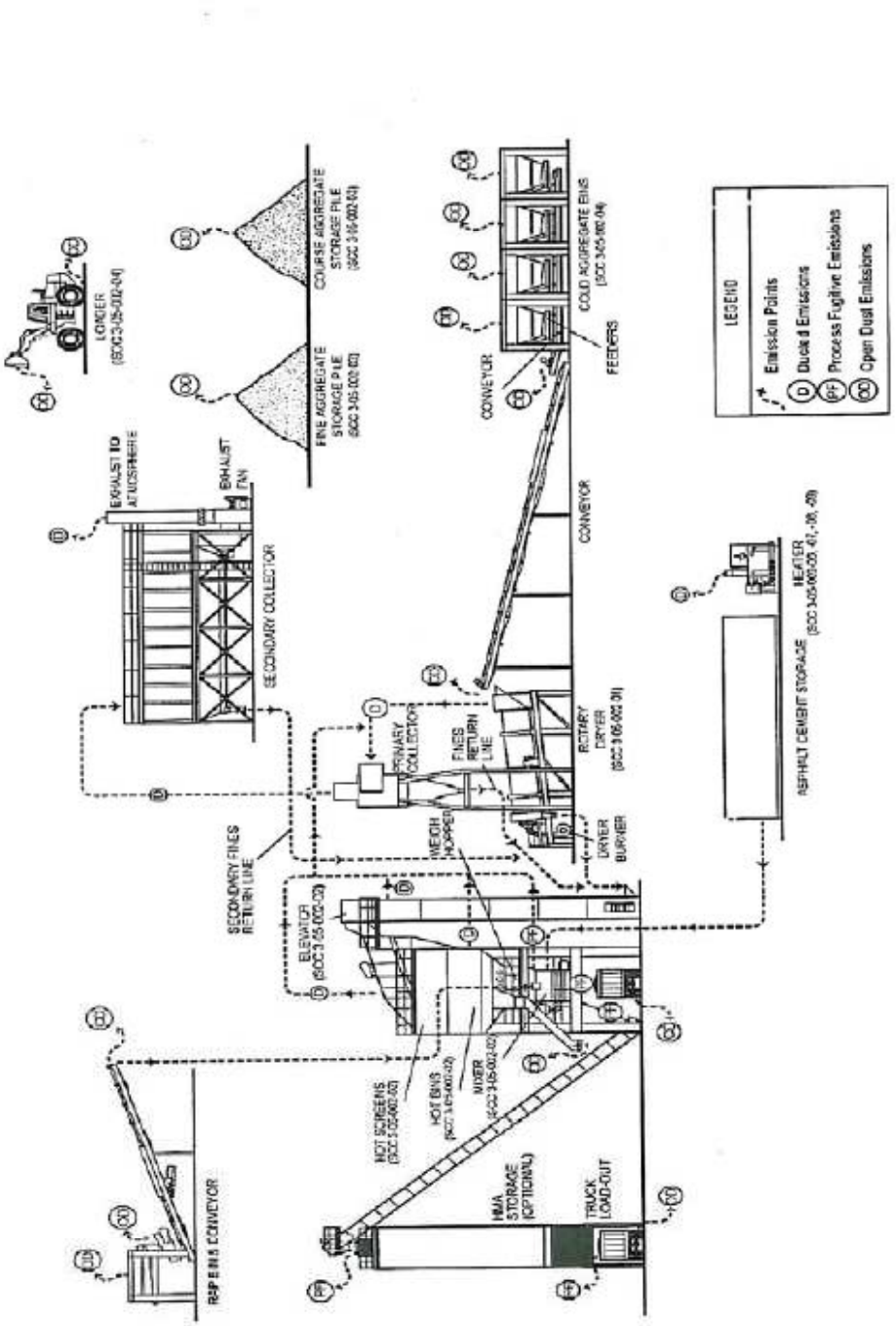

Figure 11.1-1. General process flow diagram for batch mix asphalt plants.[43] (Source Classification Codes in parentheses.)

General Process Flow Diagram for Drum Mix Asphalt Plants

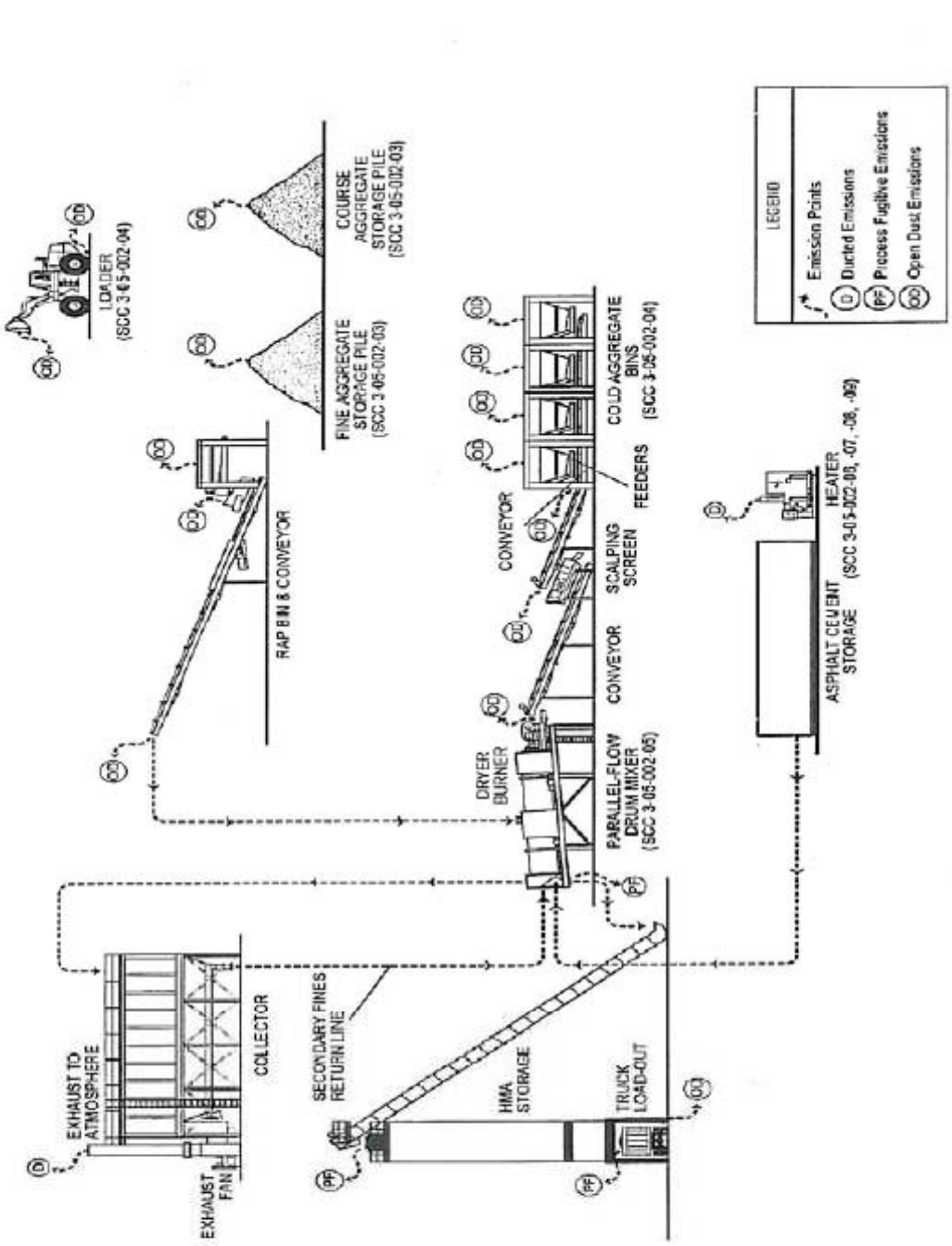

Figure 11.1-2. General process flow diagram for drum mix asphalt plants.[43] (Source Classification Cocs in parentheses.)

APPENDIX D

Sample Weather Record for a 5 day a Week Operation

Weather Record

Mon. **Date:** _____ **Temp.** Hi _____ Lo _____

Conditions: Sunny ❒ Pt. Cloudy ❒ Cloudy ❒ Overcast ❒

Wind: Still ❒ Light ❒ Gusting ❒ Strong ❒

Direction: _____ **Plant Operating Times**: Start: _____ End: _____

Tue. **Date:** _____ **Temp.** Hi _____ Lo _____

Conditions: Sunny ❒ Pt. Cloudy ❒ Cloudy ❒ Overcast ❒

Wind: Still ❒ Light ❒ Gusting ❒ Strong ❒

Direction: _____ **Plant Operating Times**: Start: _____ End: _____

Wed. **Date:** _____ **Temp.** Hi _____ Lo _____

Conditions: Sunny ❒ Pt. Cloudy ❒ Cloudy ❒ Overcast ❒

Wind: Still ❒ Light ❒ Gusting ❒ Strong ❒

Direction: _____ **Plant Operating Times**: Start: _____ End: _____

Thur. **Date:** _____ **Temp.** Hi _____ Lo _____

Conditions: Sunny ❒ Pt. Cloudy ❒ Cloudy ❒ Overcast ❒

Wind: Still ❒ Light ❒ Gusting ❒ Strong ❒

Direction: _____ **Plant Operating Times**: Start: _____ End: _____

Fri. **Date:** _____ **Temp.** Hi _____ Lo _____

Conditions: Sunny ❒ Pt. Cloudy ❒ Cloudy ❒ Overcast ❒

Wind: Still ❒ Light ❒ Gusting ❒ Strong ❒

Direction: _____ **Plant Operating Times**: Start: _____ End: _____

APPENDIX E

Environmental Best Practices Sample Checklists for Plant Operations

Checklist for Plant Yard

Plant yard paved areas maintained clean and dust free.	❑ Yes	❑ No
Unpaved yard areas treated regularly with water or other environmentally friendly suppressant.	❑ Yes	❑ No
Efficiently designed traffic patterns enforced.	❑ Yes	❑ No
Vehicle speeds in yard enforced to minimize dust generation.	❑ Yes	❑ No

Comments: _____

_____

_____

Checklist for Aggregate Delivery/Stockpiling

Ensure vehicles delivering aggregates are tarped.	❑ Yes	❑ No
Fine aggregate piles protected from wind by coarse piles.	❑ Yes	❑ No
Plant stockpiles located as close as possible to cold feed bins.	❑ Yes	❑ No
Plant stockpiles covered or treated with water or suitable wetting agent when material is especially dusty or when required by wind conditions.	❑ Yes	❑ No

Comments: _____

Checklist for Material Transfer

Hydrated lime storage silos ventilation filter and vent valve working.	❑ Yes	❑ No
Inspect elevator housing and plant tower for cracks and holes. Repair as required.	❑ Yes	❑ No
Inspect seal at connections between elevator and screens. Repair or correct as needed.	❑ Yes	❑ No
Inspect rubbing-type seals at the connection to the dryer/collection system. Repair or correct as needed.	❑ Yes	❑ No
Inspect discharge valves, ducts and seals around dryer intake. Repair or replace, as required.	❑ Yes	❑ No
(Batch Plants) Purging or draining for change in mix has dust creation minimized.	❑ Yes	❑ No

Comments: _____

_____

_____

Checklist for Cyclone / Duct Work

Are all joints sealed and airtight in the duct work?	❑ Yes	❑ No
Are any holes present in duct work or cyclone?	❑ Yes	❑ No
Is there any damage or wear to internal cyclone components? (i.e. outlet tube or liners?)	❑ Yes	❑ No
Is any of the duct work thin or worn?	❑ Yes	❑ No
Are cyclone and all duct work free from dust build-up or caking?	❑ Yes	❑ No
Are all rotary air locks and/or tipping valve adjusted and operating properly?	❑ Yes	❑ No

If you answer No to any item, please provide details below

_____

_____

_____

Checklist for Baghouse

Is baghouse preheated before start-up?	❑ Yes	❑ No
Is baghouse operated above dew point 121^{o} C (250^{o} F)?	❑ Yes	❑ No
Is the baghouse high temperature protection device operating properly?	❑ Yes	❑ No
Is the high temperature set point set 50^{o} F below the high operating temperature of the filter fabric?	❑ Yes	❑ No
Are all plant pressure sensing devices operating properly?	❑ Yes	❑ No
Are all thermocouples operating properly?	❑ Yes	❑ No
Are there any leaks in the shell of the baghouse? Or around any door seals?	❑ Yes	❑ No
Is the clean air cycle time set to clean the bags only as, and when, needed?	❑ Yes	❑ No
Inspect the baghouse bag: a) Are all bag seals intact? b) Is any dust present in this area?	❑ Yes ❑ Yes	❑ No ❑ No
Inspect bag with black light inspection system. Are there any indications of bag failure?	❑ Yes	❑ No
Are air jets properly aligned in the center of the bag aiming straight down into the bag?	❑ Yes	❑ No

If you answer No to any item, please provide details below.

_____

_____

_____

Checklist for Exhaust Fan

Are fan belts adjusted to the proper tension?	❑ Yes	❑ No
Are sheaves properly aligned and in good repair?	❑ Yes	❑ No
Is there any dust build-up on the fan impeller or internal fan housing?	❑ Yes	❑ No
Is fan balanced and running smoothly?	❑ Yes	❑ No
Are there any cracks / holes in the fan impeller (very dangerous - fix immediately).	❑ Yes	❑ No
Are there any signs of abrasive wear on the impeller?	❑ Yes	❑ No

If you answer No to any item, please provide details.

_____

_____

_____

Checklist for Damper

Is damper modulating motor functioning properly?	❑ Yes	❑ No
Are the damper linkages intact and lubricated?	❑ Yes	❑ No
Are the pressure sensors that actuate the damper functioning properly?	❑ Yes	❑ No
Are the blades of damper showing any signs of abrasive wear?	❑ Yes	❑ No

If you answer No to any item, please provide details.

_____

_____

_____

Checklist for Burner Operation

Check fuel valves for leaks.	❑ Yes	❑ No
Inspect and ensure linkages are in proper adjustment.	❑ Yes	❑ No
Lubricate moving parts.	❑ Yes	❑ No
Check nozzle for foreign materials to ensure proper flow of fuel.	❑ Yes	❑ No
Are filters and strainers in clean working order as per manufacturer's recommendations?	❑ Yes	❑ No
Are thermocouples couplers functioning properly?	❑ Yes	❑ No

Comments: _____

_____

_____

Checklist for Air Seals: Dryer, Duct Work, and Fugitive Emission Systems

Are Front and rear drums seals in working order?	❑ Yes	❑ No
Check and maintain flanges at interconnecting equipment.	❑ Yes	❑ No
Are all bag house seals in good working order?	❑ Yes	❑ No
Are seals at access points functioning properly?	❑ Yes	❑ No
Are joint seals on the fugitive emission system operating as specified?	❑ Yes	❑ No
Are seals at recycling collar and gate functioning as specified?	❑ Yes	❑ No
Are there signs of wear on the exhaust fan?	❑ Yes	❑ No
Are fan bearings in good working order?	❑ Yes	❑ No
Are drive belts in good working order?	❑ Yes	❑ No

Comments: _____

_____

_____

Checklist for Fuel Delivery and Storage

Has fuel delivery time and weather information been noted?	❑ Yes	❑ No
Are odour mitigation filters installed and in clean working order?	❑ Yes	❑ No
Has the supplier provided the requested fuel type?	❑ Yes	❑ No
Are all fuel lines within the system operating properly?	❑ Yes	❑ No
Are access points to fuel tanks closed?	❑ Yes	❑ No
Has the fuel supplier provided clean tanker verification?	❑ Yes	❑ No

Comments: _____

_____

_____

Checklist for Asphalt Cement Discharge and Storage; and Hot Mix Discharge

Are AC delivery temperatures within the proper discharge temperature range?	❑ Yes	❑ No
Are odour mitigation controls functioning properly?	❑ Yes	❑ No
Are AC storage temperatures within the prescribed temperature range?	❑ Yes	❑ No
Are AC storage tank lids closed?	❑ Yes	❑ No
Are all AC transfer lines intact and functioning properly?	❑ Yes	❑ No
Has weather information and time been recorded during unloading of AC?	❑ Yes	❑ No
Has anti stripping additive been well blended?	❑ Yes	❑ No
Is the fugitive emission collection system on the HMA functioning as designed?	❑ Yes	❑ No
Are transport vehicles tarping loads immediately following load out?	❑ Yes	❑ No
Are proper temperatures being maintained at HMA discharge?	❑ Yes	❑ No

Comments: _____

_____

_____

Checklist for Settling Ponds

Are settling ponds constructed to proper size and volume as per manufacturer's recommendations?	❑ Yes	❑ No
Is the sludge removed from the settling pond to maintain correct depth of water?	❑ Yes	❑ No
Is foot-valve free from debris?	❑ Yes	❑ No
Is sludge being disposed of in accordance with the plant C of A or local M.O.E. requests?	❑ Yes	❑ No

Checklist for Wet Scrubbers

Is water supply pump operating at correct pressure and volume?	❑ Yes	❑ No
Are water spray nozzles providing correct spray pattern and coverage?	❑ Yes	❑ No
Are all valves, manifolds and pipes free from plugging and leaking?	❑ Yes	❑ No
Is venturi adjusted to manufacturer's recommendations?	❑ Yes	❑ No
Are manometer/pressure drop readings in recommended operating ranges?	❑ Yes	❑ No
Is exhaust gas velocity and temperature entering the scrubber at the manufacturer's recommended design ranges?	❑ Yes	❑ No
Is the exit exhaust gas through the stack at recommended temperature range?	❑ Yes	❑ No
Is the plume form the stack visually acceptable and free from any dust tail?	❑ Yes	❑ No

Comments: _____

_____

_____

Checklist for Noise Issues

Check large horsepower electric motors for transmission of vibrations. Are vibration isolation motor mounts working correctly?	❑ Yes	❑ No
If equipped, is turbo blower intake silencer working correctly?	❑ Yes	❑ No
Is exhaust fan balanced and operating without vibrations?	❑ Yes	❑ No
Are chains on slat conveyors, bucket elevators and drum/dryer drives adjusted to the correct tension, without excess slack?	❑ Yes	❑ No
Are all bearings, gear boxes and drives lubricated correctly to prevent excess noise?	❑ Yes	❑ No
Are screen decks properly isolated and sealed?	❑ Yes	❑ No
Are screen deck mounting springs working correctly?	❑ Yes	❑ No

Comments: _____

_____

_____

Checklist for Site Management of Waste

Are environmentally-friendly (non-solvent) truck box release agents and asphalt cleaners used exclusively? ❑ Yes ❑ No

If no, action should be taken to eliminate release agents such as diesel fuel.

Are asphalt cement and fuel storage tanks located according to Fuel Safety Branch regulations (Ministry of Labour) with appropriate containment systems? ❑ Yes ❑ No

If no, action should be taken to ensure compliance with Provincial regulations and site management practices.

Are procedures and materials in place to clean up asphalt cement or fuel spills immediately? ❑ Yes ❑ No
Use sand to absorb spills prior to removal.

If no, materials such as sand or other environmental acceptable absorbent products should be made available as part of the site management plan and spill response procedures.

Are there dedicated vehicle maintenance areas on site with containment systems to address the collection, storage and disposal of waste oil and lubricants? ❑ Yes ❑ No

If no, site management activities should be amended to eliminate the risk of surface oil and grease contamination. Waste oil should be collected and stored in a proper container and disposed of through a licensed disposal firm.

Does the site management plan include maintenance logs for company vehicles and equipment and periodic in-house inspections to identify problem areas with respect to lubricant leakage? ❑ Yes ❑ No

If no, site management documentation requirements should be amended to include vehicle/equipment maintenance data.

Are laboratory solvents and chemicals recycled? ❑ Yes ❑ No

If no and recycling is not undertaken, the method of off-site disposal for used materials should be outlined in the site management plan and should meet Ministry of Environment regulations.

Does the plant have wet scrubber settling ponds? ❑ Yes ❑ No

If yes, the site management plan should address removal/disposal of sludge from the settling ponds in accordance with Certificate of Approval requirements (Wet Scrubber Systems). The groundwater and/or surface water quality should also be monitored as part of the management plan.

APPENDIX F

Sample Complaint Response Form

Complaint Response Form

Source of Complaint _____

Date _____ Time _____

Nature of Complaint

❒ Odour ❒ Noise ❒ Particulate Emission

❒ Gaseous Emission ❒ Groundwater Preservation ❒ Waste

Give Specific Details of Complaint _____

_____

Plant/Production Information

Plant Type: ❒ Batch ❒ Drum ❒ Other

Mix Type: ❒ HL Mix ❒ RAP Mix ❒ Other

Asphalt Cement type/grade _____

Additives _____

If RAP mix, note percentage of recycled material _____

Environmental Data

Air Temperature _____

Wind Speed _____ Wind Direction _____

❒ Sunshine ❒ Overcast ❒ Rain

Identify suspected source of problem _____

_____

Identify measures taken to resolve complaint _____

_____

Identify measures taken to follow up with complaint _____

_____

Other Comments _____

_____

Form Completed by _____ **Date** _____

Signature _____

Date Submitted to MOE _____

APPENDIX C

Emission Rate Calculations

ACTIVITY	EMISSIONS FROM MATERIAL TRANSFERS - MATERIAL RECEIPT

Activity Description	Raw materials are received on-site by truck and stored in outdoor storage piles prior to transfer to asphalt batch plant.

EMISSION ESTIMATION METHODOLOGY

Emission Source:	Emissions from raw material delivery and transfers
Methodology:	US EPA Emission Factor, Rating A
Source:	US EPA AP-42, Section 13.2.4 Aggregate Handling & Storage (11/06)

Equation (1)

$$E = k(0.0016)\frac{\left(\frac{U}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}(kg / megagram)$$

Where: E = Emission Factor (kg/Mg)
k = particle sized multiplier (dimesionless)
U = mean wind speed (m/s)
M = material moisture content (%)

Particle Size Multiplier (*k*)

Aerodynamic Particle Size Multiplier (k)				
< 30	**<15**	**<10**	**<5**	**<2.5**
0.74	0.48	0.35	0.2	0.053

Wind Speed Data

Annual Average:	4.1	m/s
Data Source	*Toronto (Pearson Airport) Climate Normals*	

Emission Factor Calculation

Pollutant	Material	Moisture Content [%]	Data Source of Moisture Content	Emission Factor (Uncontrolled) kg/Mg	Quality Rating
PM2.5	RAP	5.0	1	0.00005	A
	Agg/Sand	4.0	OHMPA	0.00007	A
	Recycled Concrete	6.2	OHMPA	0.00004	A

*OHMPA = Ontario Hot Mix Asphalt Producers Association

[1] "Quantification of Recycled Concrete Aggregate (RCA) Properties". Transportation Association of Canada Recycled Materials Resource Centre. Reclaimed Asphalt Pavement http://www.rmrc.unh.edu/tools/uguidelines/rap131.asp

EMISSION CALCULATION

WORST CASE EMISSIONS

Raw Material Deliveries to Site

BP Capacity	300,000 TPY

			Maximum Material Movements		
Raw Material	**SCC Code**	**Composition [%]**	**Tonnes Per Year**	**Tonnes Per Day**	**Days Per Year**
RAP	30500298	20%	60,000	218.2	275
Agg/Sand	30500298	75%	225,000	818.2	275
Recycled Concrete	30500298	—	72,964	265.3	275

1 Recycled concrete received is equal to 50% capacity of crusher.

2 RAP received is equal to production requirements for Batch Plant

Source ID	Raw Material	Movement	Quantity Per Day [tonnes]	Number of Drop [#]	Emission Factor [kg/tonne]	Control Type	Control Efficiency [%]	Daily Worst Case [kg/day]	Annual Worst Case [kg/year]
MH_01	RAP	Receipt of RAP	218.2	1	0.00005	windbreak	75%	0.003	0.788
MH_02	Agg/Sand	Receipt of Agg/Sand	818.2	1	0.00007	windbreak	75%	0.015	4.039
MH_03	Recycled Concrete	Receipt of Concrete	265.3	1	0.00004	windbreak	75%	0.003	0.709
							Total	**0.020**	**5.536**

Comments:
For the purposes of this assessment it was assumed that the quantity of material received per year is equivalent to the quantity of material requried in the process.

Sample Calculation:

Annual Worst Case Emission [kg/year] = Emission Factor [kg/t] * Production Rate [tonnes/year] * Control Efficiency
Annual Worst Case Emission [kg/year] = 0.0000525 [kg/t] * 60,000 [tpy RAP] * [1 - 0.75]
Annual Worst Case Emission [kg/year] = 0.788 [kg/yr]

Daily Worst Case Emission [kg/year] = Annual Emission Rate [kg/year]/ Operating Days Per Year
Daily Worst Case Emission [kg/year] = 0.788/275
Daily Worst Case Emission [kg/year] = 0.003

AVERAGE EMISSION TOTALS

Raw Material Deliveries to Site

BP Average	181,660 TPY

			AVERAGE MATERIAL MOVEMENTS		
Raw Material	**SCC Code**	**Composition [%]**	**Tonnes Per Year**	**Tonnes Per Day**	**Days Per Year**
RAP	30500298	20%	36331.9	132.1	275
Agg/Sand	30500298	75%	136244.6	495.4	275
Recycled Concrete	30500298	—	36481.8	132.7	275

1 Recycled concrete received is equal to 50% capacity of crusher.

2 RAP received is equal to production requirements for Batch Plant

Source ID	**Material Received**	**Movement**	**Quantity Per Day [tonnes]**	**Number of Drop Points [#]**	**Emission Factor [kg/tonne]**	**Control Type**	**Control Efficiency [%]**	**Average Emission Rate [kg/day]**	**Average Daily Emission [kg/year]**
MH_01	RAP	Receipt of RAP	132.1	1	0.00005	windbreak	75%	0.002	0.477
MH_02	Agg/Sand	Receipt of Agg/Sand	495.4	1	0.00007	windbreak	75%	0.009	2.446
MH_03	Recycled Concrete	Receipt of Concrete	132.7	1	0.00004	windbreak	75%	0.001	0.355
Total							**Total**	**0.012**	**3.277**

ACTIVITY	EMISSIONS FROM MATERIAL TRANSFERS - BATCH PLANT OPERATIONS

Activity Description	Aggregates/Sand and RAP are transferred from storage piles to the batch plant via front-end loader. The RAP is transferred from the RAP storage pile to the RAP feed hopper located on the north end of the batch plant. The aggregate/sand are transferred to the aggregate/sand feedhopper located on the south end of the plant.

EMISSION ESTIMATION METHODOLOGY

Emission Source:	Emissions from raw material transfers to batch plant
Methodology:	US EPA Emission Factor, Rating A
Source:	US EPA AP-42, Section 13.2.4 Aggregate Handling & Storage (11/06)

Equation (1)

$$E = k(0.0016)\frac{\left(\frac{U}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}(kg / megagram)$$

Where: E = Emission Factor (kg/Mg)
k = particle sized multiplier (dimesionless)
U = mean wind speed (m/s)
M = material moisture content (%)

Particle Size Multiplier (*k*)

Aerodynamic Particle Size Multiplier (k)				
< 30	**<15**	**<10**	**<5**	**<2.5**
0.74	0.48	0.35	0.2	0.053

Wind Speed Data

Annual Average:	4.1	m/s
Data Source	*Toronto (Pearson Airport) Climate Normals*	

Emission Factor Calculation

Pollutant	Material	Moisture Content [%]	Data Source of Moisture Content	Emission Factor (Uncontrolled) kg/Mg	Quality Rating
PM2.5	RAP	5.0	OHMPA	0.00005	A
	Aggregate/Sand	4.0	OHMPA	0.00007	A
	Recycled Concrete	6.2	OHMPA	0.00004	A

*OHMPA = Ontario Hot Mix Asphalt Producers Association

[1] "Quantification of Recycled Concrete Aggregate (RCA) Properties". Transportation Association of Canada Recycled Materials Resource Centre. Reclaimed Asphalt Pavement http://www.rmrc.unh.edu/tools/uguidelines/rap131.asp

EMISSION CALCULATION

WORST CASE EMISSIONS

Material Transfers From Piles to Processing Plant

BP Capacity	300,000 TPY

			Maximum Material Movements		
Raw Material	**SCC Code**	**% Composition of BP Mix**	**Tonnes Per Year**	**Tonnes Per Day**	**Days Per Year**
Aggregate/Sand	30500298	75%	225,000	818.18	275
RAP	30500298	20%	60,000	218.18	275

Source ID	Raw Material	Movement	Quantity Per Day [tonnes]	Number of Drop Points [#]	Emission Factor [kg/tonne]	Control Type	Control Efficiency [%]	Daily Worst Case Emission Rate [kg/day]	Annual Worst Case Emission Rate [kg/year]
MH_04	Aggregate/Sand	Agg/Sand to Feed Hopper	818.2	1	0.00007	windbreak	75%	0.015	4.039
MH_05	RAP	RAP to Feed Hopper	218.2	1	0.00005	windbreak	75%	0.003	0.788
							Total	**0.018**	**4.827**

Made By: TMH
Checked By: LAB

Sample Calculation:

Annual Worst Case Emission [kg/year] = Emission Factor [kg/t] * Production Rate [tonnes/year] * Control Efficiency
Annual Worst Case Emission [kg/year] = 0.0000525 [kg/t] * 60,000 [tpy RAP] * [1 - 0.75]
Annual Worst Case Emission [kg/year] = 0.788 [kg/yr]

Daily Worst Case Emission [kg/year] = Annual Emission Rate [kg/year]/ Operating Days Per Year
Daily Worst Case Emission [kg/year] = 0.788/275
Daily Worst Case Emission [kg/year] = 0.003

Comments
Recycled concrete is not used in the production of asphalt cement. It is crushed on site and delivered to offsite customers.

AVERAGE EMISSIONS TOTALS

Material Transfers From Piles to Processing Plant

BP Average	181,660 TPY

			Average Material Movements		
Raw Material	**SCC Code**	**% Composition of BP Mix**	**Tonnes Per Year**	**Tonnes Per Day**	**Days Per Year**
Aggregate/Sand	30500298	75%	136,245	495.44	275
RAP	30500298	20%	36,332	132.12	275

Source ID	Material Received	Movement	Quantity Per Day [tonnes]	Number of Drop Points [#]	Emission Factor [kg/tonne]	Control Type	Control Efficiency [%]	Daily Worst Case Emission Rate [kg/day]	Annual Worst Case Emission Rate [kg/year]
MH_04	Aggregate/Sand	Agg/Sand to Feed Hopper	495.4	1	0.00007	windbreak	75%	0.009	2.446
MH_05	RAP	RAP to Feed Hopper	132.1	1	0.00005	windbreak	75%	0.002	0.477
							Total	**0.011**	**2.923**

ACTIVITY	EMISSIONS FROM DRYER STACK - BATCH PLANT

Activity Description	Raw materials are processed to hot mix asphalt using a batch operation. The dryer is NG fired.

EMISSION ESTIMATION METHODOLOGY

Emission Source:	Emissions From Batch Plant Processing (Dryer/Screens/Mixer)
Methodology:	US EPA Emission Factor
Source:	Section 11.1 Hot Mix Asphalt Plants (3/04)

Emission Factors

Activity	SCC	Emission Factor		Calculation Details		
		lb/ton	kg/Mg	Methodology	Rating	Source
Dryer/Screens/Mixer	3-05-002-47	0.0083	0.0042	US EPA EF	E	Table 11.1-14

EMISSION CALCULATION

WORST CASE EMISSIONS

Source	Maximum Production Rate [tonnes/year]	Maximum Production Rate [tonnes/day]	Operating Days Per Year
HMA Production	300000	1091	275

Source	Description	Daily Worst Case Emission Rate [kg/day]	Annual Worst Case Emission Rate [kg/year]
DS_01	Dryer/Screens/Mixer	4.53	1245.00

AVERAGE EMISSION TOTALS

Source	Average Production Rate [tonnes/year]	Average Production Rate [tonnes/day]	Operating Days Per Year
HMA Production	181660	661	275

Source	Description	Daily Average Emission Rate [kg/day]	Annual Average Emission Rate [kg/year]
DS_01	Dryer/Screens/Mixer	2.74	753.89

ACTIVITY	EMISSIONS FROM BATCH PLANT - SILO FILLING AND LOAD OUT

Activity Description	Final HMA is either loaded directly to the truck, or temporarily stored in one of three HMA storage silos prior to delivery to off-site customers. Approximately 20% of product is directly truck loaded and 80% goes through the silo system.

EMISSION ESTIMATION METHODOLOGY

Emission Source:	Emissions From Silo Filling and Loadout
Methodology:	US EPA Emission Factor
Source:	Section 11.1 Hot Mix Asphalt Plants (3/04)

EMISSION FACTORS

	Temperature	Volatility
HMA	325 °F	-0.5

SILO FILLING

PM2.5 Predictive Emission Factor $EF = 0.000332 + 0.00105(-V)e^{((0.0251)(T+460)-20.43)}$

*assume TSP factor is 100% PM2.5

Calculation for SPM (PM2.5)

$EF = 0.000332 + 0.00105(-(-0.5)e^{((0.0251)(325+460)-20.43)}$
$EF = 0.000332 + 0.00105(0.5)e^{(-0.7265)}$
EF = 0.000332 + 0.0002539
EF = 0.0005859 lbs/ton of asphalt loaded
EF = 0.00068 * 0.5 (conversion from lbs/ton to kg/tonne)
EF = 0.000293 kg/tonne asphalt produced

LOAD OUT

PM2.5 Predictive Emission Factor $EF = 0.000181 + 0.00141(-V)e^{((0.0251)(T+460)-20.43)}$

*assume TSP factor is 100% PM2.5

Sample Calculation for SPM (Total PM)

$EF = 0.000181 + 0.00141(-(-0.5)e^{((0.0251)(325+460)-20.43)}$
$EF = 0.000181 + 0.00141(0.5)e^{(-0.7265)}$
EF = 0.000181 + 0.00034
EF = 0.0005219 lbs/ton of asphalt loaded
EF = 0.0005219 * 0.5 (conversion from lbs/ton to kg/tonne)
EF = 0.00026 kg/tonne asphalt loaded

Activity	SCC	Emission Factor	Calculation Details		
		kg/tonne	Methodology	Rating	Source
Silo Filling	3-05-002-13	2.93E-04	US EPA EF	C	Table 11.1-14
Load Out	3-05-002-14	2.61E-04	US EPA EF	C	Table 11.1-14

EMISSION CALCULATION

WORST CASE EMISSIONS

Source	% of HMA Flow Through	Maximum Production Rate [tonnes/year]	Maximum Production Rate [tonnes/day]	Operating Days Per Year
Silo Filling	80%	240000	873	275
Load Out	20%	60000	218	275

Source ID	Description	Quantity Per Day [tonnes]	Emission Factor [kg/tonne]	Daily Worst Case Emission Rate [kg/day]	Annual Worst Case Emission Rate [kg/year]
BP_01	Silo Filling	872.73	0.00029	0.256	70.307
BP_02	Load Out	218.18	0.00026	0.057	15.658
Total				0.313	85.965

AVERAGE EMISSION TOTALS

Source	% of HMA Flow Through	Maximum Production Rate	Average Production	Operating Days Per
Silo Filling	80%	145328	528	275
Load Out	20%	36332	132	275

Source ID	Description	Quantity Per Day [tonnes]	Emission Factor [kg/tonne]	Average Emission Rate [kg/day]	Annual Average Emission Rate [kg/year]
BP_01	Silo Filling	528.46	0.00029	0.155	42.573
BP_02	Load Out	132.12	0.00026	0.034	9.481
Total				0.1893	52.054

ACTIVITY	EMISSIONS FROM RECYCLE CRUSHING OPERATIONS

Activity Description	Recycled concrete product and RAP are received and stored in outdoor storage piles. These materials are crushed periodically throughout the year by a third party contractor. The RAP is used in the HMA process. Recycled concrete is delivered to off-site customers

EMISSION ESTIMATION METHODOLOGY

Emission Source:	Recycled Concrete Crushing Operations
Methodology:	US EPA Emission Factor
Source:	Section 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing (11/06)
	Section 13.2.4 Aggregate Handling & Storage (11/06)

EMISSION CALCULATION

Crushing Operations		Comments
Maximum Annual	145927.0 tonnes	Double average crushing conditions
Daily Operation	2432.1 tonnes	
Operating Days	60.0 days	Maximum allowable by permit

Crushed Stone Sales		Comments
Maximum Annual	13702.0 tonnes	Double typical sales value
Daily Operation	49.8 tonnes	
Operating Days	275.0 days	Assume shipping occurs daily

WORST CASE EMISSIONS

Source ID	Description	SCC	Emission Factor (controlled) kg/Tonne	Controls	Control Efficiency [%]	Daily Worst Case Emission Rate [kg/day]	Annual Worst Case Emission Rate (kg/year)	Comments
RCC-01	Primary Crushing	3-05-020-01	0.00005	water	90%	0.012	0.730	[1]
RCC-02	Screening	3-05-020-02,03	0.00003	water	90%	0.006	0.365	[2]
RCC-03	Crushed Stone Sales	3-05-020-98	0.00004	water	90%	0.000	0.053	[3]
			Totals			**0.018**	**1.148**	

[1] Emission factor from Table 11.19.2-1 for Tertiary Crushing (controlled)
[2] Emission factor from Table 11.19.2-1 for Screening (controlled)
[3] Emission factor from US EPA AP-42, Section 13.2.4 Aggregate Handling & Storage (11/06)
[4] Water spray is utilized during crushing operations

AVERAGE EMISSION TOTALS

Crushing Operations		Comments
Average Annual	72,964 tonnes	Average crushing rate.
Daily Operation	1779.6 tonnes	
Operating Days	41.0 days	Based on average days of third party contractor onsite

Crushed Stone Sales		Comments
Average Annual	6851 tonnes	Based on actual sales
Daily Operation	24.9 tonnes	
Operating Days	275.0 days	Assume shipping occurs daily

Source ID	Description	SCC	Emission Factor (controlled) kg/Tonne	Controls	Control Efficiency [%]	Daily Average Emission Rate [kg/day]	Annual Average Emission Rate (kg/year)	Comments
RCC-01	Primary Crusher	3-05-020-01	0.00005	water	90%	0.0089	0.365	[1]
RCC-02	Secondary Crusher	3-05-020-02,03	0.00003	water	90%	0.0044	0.182	[2]
RCC-03	Crushed Stone Sales	3-05-020-98	0.00004	water	90%	0.0001	0.027	[3]
			Total			**0.013**	**0.574**	

[1] Emission factor from Table 11.19.2-1 for Tertiary Crushing (controlled)
[2] Emission factor from Table 11.19.2-1 for Screening (controlled)
[3] Emission factor from US EPA AP-42, Section 13.2.4 Aggregate Handling & Storage (11/06)

ACTIVITY	EMISSIONS FROM RECYCLE CRUSHING OPERATIONS - Diesel Generator

Activity Description	Crushers/screener is powered by diesel generators.

EMISSION ESTIMATION METHODOLOGY

Emission Source:	Recycled Concrete Crushing Operations
Methodology:	Emission Factor
Source:	Tier III Emission Standards for Non-Road Diesel Engines

EMISSION CALCULATION

Contaminant	SCC	Emission Factor g/Hp-Hr	Reference
PM2.5	2-02-001-02	0.15	Tier II

*assume all SPM is less then 2.5 µm in diameter

WORST CASE EMISSIONS

Max Hours Per Day	10 hour per day
Days Per Year	60 days

Source ID	Max Capacity HP-Hr	Emission Factor (controlled) g/Hp-Hr	Base Load Factor	Daily Worst Case Emission Rate [kg/day]	Annual Worst Case Emission Rate (kg/year)
GEN-01	400.00	0.15	40%	0.239	14.317
GEN-02	400.00	0.15	60%	0.358	21.476
GEN-03	60.00	0.20	35%	0.042	2.520
Total				**0.639**	**38.314**

AVERAGE EMISSION TOTALS

Average Hours Per Day	10 hours per day
Days Per Year	41 days

Source ID	Max Capacity HP-Hr	Emission Factor (controlled) (g/Hp-Hr)	Base Load Factor	Daily Average Case Emission Rate [kg/day]	Annual Average Case Emission Rate (kg/year)
GEN-01	400.00	0.149	40%	0.239	9.784
GEN-02	400.00	0.15	60%	0.358	14.675
GEN-03	60.00	0.20	35%	0.042	1.722
Total				**0.639**	**26.181**

ACTIVITY	EMISSIONS FROM STORAGE PILES

Activity Descriptio	Raw materials are stored in outdoor storage piles. Piles are controlled through management of active areas and water spray

EMISSION ESTIMATION METHODOLOGY

Emission Source:	Wind Erosion From Storage Piles
Methodology:	Emission Factor
Source:	WRAP Document, Chapter 9, alternate methodology

Formula:

$$PM\ 2.5(lb\ /\ day\ /\ acre\ ) = 0.13 \times \left(s/1.5\right) \times \left(f/15\right)$$

Where:

E = Total Suspend Particulate Emission Factor

s = silt content of aggregate (%)

p = number of days with >= 0.25 mm precipitation per year

f = percentage of time unobstructed windspeed exceeds 5.4 m/s at mean pile height

EMISSION CALCULATION

WORST CASE EMISSIONS

Source ID	Source	SCC	% silt[1]	Number of Days with >= 2 mm precipitation[2]	Fraction of time wind >5.4 m/s at mean pile height[3]	Uncontrolled PM2.5 Emission Factor	Controlled Emission Factor[4]	Pile Surface Area			Daily Worst Case Emissions	Annual Worst Case Emissions
								Exposed Surface Area[3]	Active Area	Active Area		
			s	p	f	kg/acre/day	kg/acre/day	acre	%	acres	kg/day	[kg/year]
SP-1	RAP	30500203	1	191.8	30	0.17	0.02	0.494	5%	0.025	0.0004	0.114
SP-2	Agg/Sand 1	30500203	2.1	191.8	30	0.37	0.04	0.074	5%	0.004	0.0001	0.036
SP-3	Agg/Sand 2	30500203	2.1	191.8	30	0.37	0.04	0.099	5%	0.005	0.0002	0.049
SP-4	Agg/Sand 3	30500203	2.1	191.8	30	0.37	0.04	0.052	5%	0.003	0.0001	0.026
SP-5	Agg/Sand 4	30500203	2.1	191.8	30	0.37	0.04	0.074	5%	0.004	0.0001	0.036
SP-6	Agg/Sand 5	30500203	2.1	191.8	30	0.37	0.04	0.111	5%	0.006	0.0002	0.055
SP-7	Recycled Concrete (uncrushed)	30500203	1	191.8	30	0.17	0.02	1.152	5%	0.058	0.0010	0.266
SP-8	Recycled Concrete (crushed	30500203	1.6	191.8	30	0.27	0.03	0.758	5%	0.038	0.0010	0.280
										Total	**0.003**	**0.862**

Notes:

1 Silt content from OHMPA ECHO Calculator

2 From Climate Normals, Pearson Airport, Toronto, Ontario (precipitation + snow depth >5 cm)

3 For worst case scenario it was assumed that each day of the year 5% of the pile is made "available" for erosion potential

4 Assume watering control prior to wind event, 90 % control efficiency

Made By: TMH
Checked By: LAB

AVERAGE EMISSION TOTALS

Source ID	Source	SCC	% silt[1] *s*	Number of Days with >= 2 mm precipitation[2] *p*	Fraction of time wind >5.4 m/s at mean pile height[3] *f*	Uncontrolled PM2.5 Emission Factor kg/acre/day	Controlled Emission Factor4 kg/acre/day	Pile Surface Area			Daily Average Emissions kg/day	Annual Average Emissions [kg/year]
								Exposed Surface Area [3] acre	Active Area %	Active Area acres		
SP_1	RAP	30500203	1	191.8	29.71	0.17	0.02	0.494	5%	0.0247	0.0004	0.114
SP_2	Agg/Sand 1	30500203	2.1324	191.8	29.71	0.37	0.04	0.0741	5%	0.003705	0.0001	0.036
SP_3	Agg/Sand 2	30500203	2.1324	191.8	29.71	0.37	0.04	0.0988	5%	0.00494	0.0002	0.049
SP_4	Agg/Sand 3	30500203	2.1324	191.8	29.71	0.37	0.04	0.05187	5%	0.0025935	0.0001	0.026
SP_5	Agg/Sand 4	30500203	2.1324	191.8	29.71	0.37	0.04	0.073853	5%	0.00369265	0.0001	0.036
SP_6	Agg/Sand 5	30500203	2.1324	191.8	29.71	0.37	0.04	0.11115	5%	0.0055575	0.0002	0.055
SP_7	Recycled Concrete (uncrushed)	30500203	1	191.8	29.71	0.17	0.02	1.1521068	5%	0.05760534	0.0010	0.266
SP_8	Recycled Concrete (crushed)	30500203	1.6	191.8	29.71	0.27	0.03	0.75766756	5%	0.037883378	0.0010	0.280
										Total	**0.003**	**0.862**

Notes:

1 Silt content from AP-24, Section 13.2.4

2 From Climate Normals, Pearson Airport, Toronto, Ontario (precipitation + snow depth >5 cm)

3 For average scenario it was assumed that each day of the year 5% of the pile is made "available" for erosion potential

4 Assume watering control prior to wind event

ACTIVITY	EMISSIONS FROM SUPPORT OPERATIONS - OTHER HEATING SOURCES

EMISSION ESTIMATION METHODOLOGY

Emission Source:	Boilers and Heaters
Methodology:	US EPA Emission Factor
Sources:	US EPA AP-42 Section 1.4 - Natural Gas Combustion (7/98)
	US EPA AP-42 Section 1.3 - Fuel Oil Combustion (7/98)

Equipment Details

Source ID	Description	SCC	Fuel Type	Max Capacity MMBtu/hr
CS-01	HMA Storage Heater	Asphalt Plant	NG	3.00
CS-02	Steam Washer	Wash Bay	NG	0.37
CS-03	Oil Heater Furnance	Wash Bay	#2 Fuel Oil	0.16
RH-01	Gas Fired Heater	Garage - Welding	NG	0.13
RH-02	Gas Fired Heater	Garage - Welding	NG	0.13
RH-03	Gas Fired Heater	Garage - Shop	NG	0.13
RH-04	Gas Fired Heater	Garage - Shop	NG	0.13
RH-05	Gas Fired Heater	Garage - Shop	NG	0.13
RH-06	Gas Fired Heater	Garage - Shop	NG	0.13
RH-07	Gas Fired Heater	Garage - Shop	NG	0.13
RH-08	Gas Fired Heater	Garage - Shop	NG	0.13
RH-09	Gas Fired Heater	Garage - Shop	NG	0.13
RH-10	Gas Fired Heater	Garage - Shop	NG	0.13
RH-11	Gas Fired Heater	Garage - Shop	NG	0.13

Emission Calculation

Emission Factor

Fuel Type	SCC	Emission Factor				Quality Rating
		lbs/10^6 scf	lbs/10^3 gal	lb/MMBtu	g/MMBtu	g/MMBtu
Natural Gas	1-03-006-02	7.6	—	0.007	3.38	D
Fuel Oil	1-02-005-02/03	—	2	0.014	6.48	A
		kg/10^6 m3	Source			
HMA Heater	1-02-005-03	30.435	EC NPRI Toolbox			

*assume SPM is 100% PM2.5

WORST CASE EMISSIONS

Max Hours	24 hours per day

Source ID	Description	Fuel Type	Hours Per Day	Days Per Year	Max Capacity MMBtu/hr	Emisison Factor [g/MMBtu]	Daily Emission Rate [kg/day]	Annual Emission Rate [kg/year]
CS-01	HMA Storage Heater	NG	24	275	3.00	3.38	0.24	66.92
CS-02	Steam Washer	NG	3	275	0.37	3.38	0.00	1.03
CS-03	Oil Heater Furnance	#2 Fuel Oil	24	182	0.16	6.48	0.02	4.53
RH-01	Gas Fired Heater	NG	24	182	0.13	3.38	0.01	1.85
RH-02	Gas Fired Heater	NG	24	182	0.13	3.38	0.01	1.85
RH-03	Gas Fired Heater	NG	24	182	0.13	3.38	0.01	1.85
RH-04	Gas Fired Heater	NG	24	182	0.13	3.38	0.01	1.85
RH-05	Gas Fired Heater	NG	24	182	0.13	3.38	0.01	1.85
RH-06	Gas Fired Heater	NG	24	182	0.13	3.38	0.01	1.85
RH-07	Gas Fired Heater	NG	24	182	0.13	3.38	0.01	1.85
RH-08	Gas Fired Heater	NG	24	182	0.13	3.38	0.01	1.85
RH-09	Gas Fired Heater	NG	24	182	0.13	3.38	0.01	1.85
RH-10	Gas Fired Heater	NG	24	182	0.13	3.38	0.01	1.85
RH-11	Gas Fired Heater	NG	24	182	0.13	3.38	0.01	1.85
Total Emissions for all Combustion Sources							**0.38**	**92.78**

*Heaters only run during winter months

AVERAGE EMISSION TOTALS

Emission Calculations

Source ID	Description	Fuel Type	Hours Per Day	Days Per Year	Avg Capacity MMBtu/hr	Emisison Factor [g/MMBtu]	Daily Emission Rate [kg/day]	Annual Emission Rate [kg/year]
CS-01	HMA Storage Heater	NG	24	275	2.40	3.38	0.19	53.53
CS-02	Steam Washer	NG	1	275	0.30	3.38	0.00	0.28
CS-03	Oil Heater Furnance	#2 Fuel Oil	24	182	0.13	6.48	0.02	3.62
RH-01	Gas Fired Heater	NG	24	182	0.10	3.38	0.01	1.48
RH-02	Gas Fired Heater	NG	24	182	0.10	3.38	0.01	1.48
RH-03	Gas Fired Heater	NG	24	182	0.10	3.38	0.01	1.48
RH-04	Gas Fired Heater	NG	24	182	0.10	3.38	0.01	1.48
RH-05	Gas Fired Heater	NG	24	182	0.10	3.38	0.01	1.48
RH-06	Gas Fired Heater	NG	24	182	0.10	3.38	0.01	1.48
RH-07	Gas Fired Heater	NG	24	182	0.10	3.38	0.01	1.48
RH-08	Gas Fired Heater	NG	24	182	0.10	3.38	0.01	1.48
RH-09	Gas Fired Heater	NG	24	182	0.10	3.38	0.01	1.48
RH-10	Gas Fired Heater	NG	24	182	0.10	3.38	0.01	1.48
RH-11	Gas Fired Heater	NG	24	182	0.10	3.38	0.01	1.48
Total Emissions for all Combustion Sources							**0.30**	**73.67**

[1] Heaters only operate during cold months (October through March)

ACTIVITY	EMISSIONS FROM SUPPORT OPERATIONS - WELDING

Emission Source:	Weld-01
Methodology:	US EPA AP-42
Source:	12.19 Electric Arc Welding (1/95)

Process Description:	Welding of various parts occurs in the maintenance shop. Typical weld rod usage is 5 kg of rod every two weeks. For emission calculation purposes it was assummed that all emission occur during a 1/2-

Emission Calculation

Details of Weld Rods

Rod Type E7018

Useage Rate Actual 5 kg every 2 weeks

Weld Rod Type	Contaminant	CAS	Emission Factor (g/kg)	Emission Rate (g/s)	Estimateion Methodolology	Data Quality
E7018	3-09-051	-	18.40	0.0010	US EPA EF	C

WORST CASE EMISSIONS

Weld Rod Usage	0.5 kg/day

Source ID	Description	Emisison Factor [g/kg]	Daily Emission Rate [kg/day]	Annual Emission Rate [kg/year]	Emission Rate [g/s]
Weld-01	Maintenance Welding	18.40	0.01	2.39	0.0001

AVERAGE EMISSION TOTALS

Weld Rod Usage	0.5 kg/day

Source ID	Description	Emisison Factor [g/kg]	Daily Emission Rate [kg/day]	Annual Emission Rate [kg/year]	Emission Rate [g/s]
Weld-01	Maintenance Welding	18.40	0.01	2.39	0.0001

Source ID	Description	Average [kg/day]	Average [kg/year]	Maximum [kg/day]	Maximum [kg/year]	lours Per Da	Average [g/s]	Maximum [g/s]	Modelled	lodel Sourc
MH_01	RAP	1.74E-03	4.77E-01	2.87E-03	7.88E-01	12	7.10E-05	1.17E-04	Yes	MH_01
MH_02	Agg/Sand	8.89E-03	2.45E+00	1.47E-02	4.04E+00	12	3.64E-04	6.01E-04	Yes	MH_02
MH_03	Recycled Concrete	1.29E-03	3.55E-01	2.58E-03	7.09E-01	12	5.28E-05	1.06E-04	Yes	MH_03
MH_04	Aggregate/Sand	8.89E-03	2.45E+00	1.47E-02	4.04E+00	12	3.64E-04	6.01E-04	Yes	MH_04
MH_05	RAP	1.74E-03	4.77E-01	2.87E-03	7.88E-01	12	7.10E-05	1.17E-04	Yes	MH_05
DS_01	Dryer/Screens/Mixer	2.74E+00	7.54E+02	4.53E+00	1.25E+03	12	1.12E-01	1.85E-01	Yes	DS_01
BP_01	Silo Filling	1.55E-01	4.26E+01	2.56E-01	7.03E+01	12	6.34E-03	1.05E-02	Yes	BP_01
BP_02	Load Out	3.45E-02	9.48E+00	5.69E-02	1.57E+01	12	1.41E-03	2.33E-03	Yes	BP_01
RCC-01	Primary Crusher	8.90E-03	3.65E-01	1.22E-02	7.30E-01	10	2.47E-04	3.38E-04	Yes	RC_01
RCC-02	Secondary Crusher	4.45E-03	1.82E-01	6.08E-03	3.65E-01	10	1.24E-04	1.69E-04	Yes	RC_01
RCC-03	Crushed Stone Sales	9.68E-05	2.66E-02	1.94E-04	5.33E-02	12	3.96E-06	7.93E-06	Yes	RC_02
GEN-01	Generator	6.39E-01	2.62E+01	6.39E-01	3.83E+01	10	1.77E-02	1.77E-02	Yes	RC_01
CS-01	HMA Storage Heater	1.95E-01	5.35E+01	2.43E-01	6.69E+01	24	2.25E-03	2.82E-03	Yes	CS_01
CS-02	Steam Washer	1.00E-03	2.75E-01	3.75E-03	1.03E+00	24	1.16E-05	4.34E-05	Yes	Shop
CS-03	Oil Heater Furnance	1.99E-02	3.62E+00	2.49E-02	4.53E+00	24	2.30E-04	2.88E-04	Yes	Shop
RH-01	Gas Fired Heater	8.11E-03	1.48E+00	1.01E-02	1.85E+00	24	9.39E-05	1.17E-04	Yes	Shop
RH-02	Gas Fired Heater	8.11E-03	1.48E+00	1.01E-02	1.85E+00	24	9.39E-05	1.17E-04	Yes	Shop
RH-03	Gas Fired Heater	8.11E-03	1.48E+00	1.01E-02	1.85E+00	24	9.39E-05	1.17E-04	Yes	Shop
RH-04	Gas Fired Heater	8.11E-03	1.48E+00	1.01E-02	1.85E+00	24	9.39E-05	1.17E-04	Yes	Shop
RH-05	Gas Fired Heater	8.11E-03	1.48E+00	1.01E-02	1.85E+00	24	9.39E-05	1.17E-04	Yes	Shop
RH-06	Gas Fired Heater	8.11E-03	1.48E+00	1.01E-02	1.85E+00	24	9.39E-05	1.17E-04	Yes	Shop
RH-07	Gas Fired Heater	8.11E-03	1.48E+00	1.01E-02	1.85E+00	24	9.39E-05	1.17E-04	Yes	Shop
RH-09	Gas Fired Heater	8.11E-03	1.48E+00	1.01E-02	1.85E+00	24	9.39E-05	1.17E-04	Yes	Shop
RH-10	Gas Fired Heater	8.11E-03	1.48E+00	1.01E-02	1.85E+00	24	9.39E-05	1.17E-04	Yes	Shop
RH-11	Gas Fired Heater	8.11E-03	1.48E+00	1.01E-02	1.85E+00	24	9.39E-05	1.17E-04	Yes	Shop
Weld_01	Maintenance Welding	9.20E-03	2.39E+00	9.20E-03	2.39E+00	24	1.06E-04	1.06E-04	Yes	Shop
SP_1	RAP	4.24E-04	1.14E-01	4.24E-04	1.14E-01	24	—	—	No	No
SP_2	Agg/Sand 1	1.36E-04	3.65E-02	1.36E-04	3.65E-02	24	—	—	No	No
SP_3	Agg/Sand 2	1.81E-04	4.86E-02	1.81E-04	4.86E-02	24	—	—	No	No
SP_4	Agg/Sand 3	9.49E-05	2.55E-02	9.49E-05	2.55E-02	24	—	—	No	No
SP_5	Agg/Sand 4	1.35E-04	3.64E-02	1.35E-04	3.64E-02	24	—	—	No	No
SP_6	Agg/Sand 5	2.03E-04	5.47E-02	2.03E-04	5.47E-02	24	—	—	No	No
SP_7	Recycled Concrete (uncrus	9.89E-04	2.66E-01	9.89E-04	2.66E-01	24	—	—	No	No
SP_8	Recycled Concrete (crushe	1.04E-03	2.80E-01	1.04E-03	2.80E-01	24	—	—	No	No
Total		**3.91E+00**	**9.14E+02**	**5.92E+00**	**1.47E+03**		**1.43E-01**	**2.22E-01**		

lodel Source	Average [g/s]	Maximum [g/s]	Comments
MH_01	7.10E-05	1.17E-04	
MH_02	3.64E-04	6.01E-04	
MH_03	5.28E-05	1.06E-04	
MH_04	3.64E-04	6.01E-04	Split to 5 volumes for model
MH_05	7.10E-05	1.17E-04	
DS_01	1.12E-01	1.85E-01	
BP_01	7.75E-03	1.28E-02	
RC_01	1.81E-02	1.82E-02	Split to 2 Volumes For Model
RC_02	3.96E-06	7.93E-06	
CS_01	2.25E-03	2.82E-03	
Shop	1.29E-03	1.61E-03	Split to 2 Volumes For Model
	1.43E-01	**2.22E-01**	

Maximum Emission Rate - Monthly Distribution of Emissions

Description:	Due to the high variability in the production process throughout the year, the facility was modelled using a vaiable emission file. This was based on monthly production rates at the site. For all cases, the plant was set to operation 12 hours per day (7 am to 7 pm)

Step 1: Determine distribution of monthly production for the Facility

Month	Average Montly Production Rate [tonnes]	% of Total
January	0	0.00%
February	0	0.00%
March	0	0.00%
April	2156	1.19%
May	5586	3.08%
June	13369	7.36%
July	28059	15.45%
August	29439	16.21%
September	35042	19.29%
October	33246	18.30%
November	23473	12.92%
December	11290	6.21%
Total	**181660**	**100%**

Step 2: Determine monthly emission rate for each source for the batch plant. From the table below, hourly variable emission files were developed for the model sources

$$\text{Montly Emission Rate [g/s]} = \frac{\text{Annual Emission Rate [kg/year] * 1000 [g/kg] * Month Production Percentage [\%]}}{\text{days per month * 12 hours per day * 3600 seconds per hour}}$$

Sample Calculation for June, MH_01

Annual Emission Rate	0.788	kg/year
Days Per Month	30	
Hours Per Day	12	
Percent of Production	7.36%	

$$\text{June Emission Rate [g/s]} = \frac{\text{0.788 [kg/year] * 1000 * 7.36\%}}{\text{30 * 12 * 3600}}$$

June Emission Rate [g/s] = 4.475E-05 g/s

Maximum Emission Rate - Monthly Distribution of Emissions

Source ID	Description	Maximum [kg/year]		jan	feb	mar	apr	may	june	july	aug	sept	oct	nov	dec	Maximum Emission Rate (g/s)
			# Days	**31**	**28**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	
			% Prod.	**0.00%**	**0.00%**	**0.00%**	**1.19%**	**3.08%**	**7.36%**	**15.45%**	**16.21%**	**19.29%**	**18.30%**	**12.92%**	**6.21%**	
MH_01	RAP	0.788		0.00E+00	0.00E+00	0.00E+00	7.21E-06	1.81E-05	4.47E-05	9.09E-05	9.54E-05	1.17E-04	1.08E-04	7.86E-05	3.66E-05	1.17E-04
MH_02	Agg/Sand	4.039		0.00E+00	0.00E+00	0.00E+00	3.70E-05	9.27E-05	2.29E-04	4.66E-04	4.89E-04	6.01E-04	5.52E-04	4.03E-04	1.87E-04	6.01E-04
MH_03	Recycled Concrete	0.709		0.00E+00	0.00E+00	0.00E+00	6.49E-06	1.63E-05	4.03E-05	8.18E-05	8.58E-05	1.06E-04	9.69E-05	7.07E-05	3.29E-05	1.06E-04
MH_04	Aggregate/Sand	4.039		0.00E+00	0.00E+00	0.00E+00	3.70E-05	9.27E-05	2.29E-04	4.66E-04	4.89E-04	6.01E-04	5.52E-04	4.03E-04	1.87E-04	6.01E-04
MH_05	RAP	0.788		0.00E+00	0.00E+00	0.00E+00	7.21E-06	1.81E-05	4.47E-05	9.09E-05	9.54E-05	1.17E-04	1.08E-04	7.86E-05	3.66E-05	1.17E-04
DS_01	Dryer/Screens/Mixer	1245.000		0.00E+00	0.00E+00	0.00E+00	1.14E-02	2.86E-02	7.07E-02	1.44E-01	1.51E-01	1.85E-01	1.70E-01	1.24E-01	5.78E-02	1.85E-01
BP_01	Silo Filling	70.307		0.00E+00	0.00E+00	0.00E+00	6.44E-04	1.61E-03	3.99E-03	8.11E-03	8.51E-03	1.05E-02	9.61E-03	7.01E-03	3.26E-03	1.05E-02
BP_02	Load Out	15.658		0.00E+00	0.00E+00	0.00E+00	1.43E-04	3.60E-04	8.89E-04	1.81E-03	1.89E-03	2.33E-03	2.14E-03	1.56E-03	7.27E-04	2.33E-03
RCC-03	Crushed Stone Sales	0.053		0.00E+00	0.00E+00	0.00E+00	4.88E-07	1.22E-06	3.02E-06	6.14E-06	6.45E-06	7.93E-06	7.28E-06	5.31E-06	2.47E-06	7.93E-06

Calculation of Scaling Factor

jan	feb	mar	apr	may	june	july	aug	sept	oct	nov	dec
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31

Source ID	Description	Maximum [kg/year]		jan	feb	mar	apr	may	june	july	aug	sept	oct	nov	dec	Maximum Emission Rate (g/s)
			# Days	**31**	**28**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	
			% Prod.	**0.00%**	**0.00%**	**0.00%**	**1.19%**	**3.08%**	**7.36%**	**15.45%**	**16.21%**	**19.29%**	**18.30%**	**12.92%**	**6.21%**	
MH_01	RAP	0.477		0E+00	0E+00	0E+00	4E-06	1E-05	3E-05	6E-05	6E-05	7E-05	7E-05	5E-05	2E-05	7.10E-05
MH_02	Agg/Sand	2.446		0E+00	0E+00	0E+00	2E-05	6E-05	1E-04	3E-04	3E-04	4E-04	3E-04	2E-04	1E-04	3.64E-04
MH_03	Recycled Concrete	0.355		0E+00	0E+00	0E+00	3E-06	8E-06	2E-05	4E-05	4E-05	5E-05	5E-05	4E-05	2E-05	5.28E-05
MH_04	Aggregate/Sand	2.446		0E+00	0E+00	0E+00	2E-05	6E-05	1E-04	3E-04	3E-04	4E-04	3E-04	2E-04	1E-04	3.64E-04
MH_05	RAP	0.477		0E+00	0E+00	0E+00	4E-06	1E-05	3E-05	6E-05	6E-05	7E-05	7E-05	5E-05	2E-05	7.10E-05
DS_01	Dryer/Screens/Mixer	753.887		0E+00	0E+00	0E+00	7E-03	2E-02	4E-02	9E-02	9E-02	1E-01	1E-01	8E-02	3E-02	1.12E-01
BP_01	Silo Filling	42.573		0E+00	0E+00	0E+00	4E-04	1E-03	2E-03	5E-03	5E-03	6E-03	6E-03	4E-03	2E-03	6.34E-03
BP_02	Load Out	9.481		0E+00	0E+00	0E+00	9E-05	2E-04	5E-04	1E-03	1E-03	1E-03	1E-03	9E-04	4E-04	1.41E-03
RCC-03	Crushed Stone Sales	0.027		0E+00	0E+00	0E+00	2E-07	6E-07	2E-06	3E-06	3E-06	4E-06	4E-06	3E-06	1E-06	3.96E-06

Calculation of Scaling Factor

0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31
0.00	0.00	0.00	0.06	0.15	0.38	0.77	0.81	1.00	0.92	0.67	0.31

CALPUFF MODELLING	MODEL INPUT PARAMETERS

POINT SOURCES

		Stack Parameters									Emission Rates	
Source ID	Description	x [UTM]	y [UTM]	Stack Height Above Grade [m]	Elevation	Stack Inner Diameter [m]	Stack Exit Velocity [m/s]	Stack Exit Gas Temperature [°C]	Stack Volumetric Flow Rate [m³/s]	Stack Height Above Roof [m]	Average [g/s]	Max [g/s]
DS_01	Asphalt Plant Dryer Stack	603756.50	4808481.40	15.2	99.07	1.2	22.55	418.15	25.50	—	1.12E-01	1.85E-01
CS_01	Asphalt Plant Heater	603721.80	4808504.00	3.3	99.45	0.35	36.07	418.15	3.47	1.3	2.25E-03	2.82E-03

VOLUME SOURCES

		Volume								Emission Rates	
Source ID	Description	x	y	Release Height	Elevation	Initial Lateral	Initial Vertical	Length	Width	Average [g/s]	Max [g/s]
BP_01	Silo Filling and Loadout	603722.40	4808484.20	16.5	99.19	2.093	7.69	9	9	7.75E-03	1.28E-02
MH_01	Rap Delivery	603682.70	4808483.00	1.5	100.24	0.70	2.74	3	3	7.10E-05	1.17E-04
MH_02A	Aggregate and Sand Delivery	603766.80	4808509.40	1.5	98.08	0.70	2.74	3	3	7.28E-05	1.20E-04
MH_02B	Aggregate and Sand Delivery	603731.90	4808532.20	1.5	99.20	0.70	2.74	3	3	7.28E-05	1.20E-04
MH_02C	Aggregate and Sand Delivery	603782.90	4808485.60	1.5	98.06	0.70	2.74	3	3	7.28E-05	1.20E-04
MH_02d	Aggregate and Sand Delivery	603749.40	4808514.60	1.5	99.02	0.70	2.74	3	3	7.28E-05	1.20E-04
MH_02e	Aggregate and Sand Delivery	603791.20	4808469.20	1.5	98.58	0.70	2.74	3	3	7.28E-05	1.20E-04
MH_03	Recycled Concrete Delivery	603681.60	4808441.20	1.5	100.73	0.70	2.74	3	3	5.28E-05	1.06E-04
MH_04a	BP Feed Hopper	603764.50	4808473.00	5.0	99.0	0.70	2.79	3	3	1.21E-04	2.00E-04
MH_04b	BP Feed Hopper	603769.30	4808470.00	5.0	99.0	0.70	2.79	3	3	1.21E-04	2.00E-04
MH_04c	BP Feed Hopper	603774.00	4808467.00	5.0	99.0	0.70	2.79	3	3	1.21E-04	2.00E-04
MH_05	RAP Feed Hopper	603710.00	4808505.30	3.8	99.7	0.70	2.33	3	3	7.10E-05	1.17E-04
RC_01	Recycle Crushing Plant - Concrete	603658.80	4808415.60	5	101.04	2.326	2.33	10.0	10.0	9.05E-03	9.12E-03
RC_03	Recycle Crushing Plant - RAP	603658.40	4808480.00	5.0	101.0	2.326	2.33	10.0	10.0	9.05E-03	9.12E-03
VS_01	Shop (1)	603620.40	4808422.20	10.7	102.0	6.05	4.98	26.0	26.0	6.44E-04	8.06E-04
VS_02	Shop (2)	603589.90	4808429.30	10.7	102.3	6.05	4.98	26.0	26.0	6.44E-04	8.06E-04

Note: The emission rates listed are based on the maximum monthly emission rate. The actual modelled emission rates were based on a variable emission file.

APPENDIX D

CALPUFF Model Files (on CD)

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

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