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environmental best practices guide for hot mix asphalt plants

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SECTION ONE

HOT MIX ASPHALT PRODUCTION EMISSIONS

INTRODUCTION

The operation of asphalt plants in Canada is governed for the most part by provincial statute, although Environment Canada does have an oversight function, and some municipal governments have also introduced bylaws further regulating asphalt plant operation. In all cases, asphalt plant owners must be aware that provincial, and where applicable, municipal regulations must be adhered to at all times. A list of relevant provincial and municipal regulations governing asphalt plants, along with corresponding website locations, can be found in *Appendix 1*.

This guide, however, is intended to compliment existing regulations. It provides useful information and recommendations related to facility operations to assist owners meet their environmental responsibilities, and where possible, to exceed those requirements.

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 2* 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, and 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.

GASEOUS EMISSIONS

Gaseous emissions are the products of combustion from all sources. They are directly related to production volumes and energy consumption. The most obvious emission in an asphalt plant is the white plume from the plant's stack and is the direct result of drying the large aggregate component of the mix; which is simply steam.

Gaseous emissions of hot mix production consist of Sulphur Oxides (SOx), Nitrogen Oxides (NOx), Carbon Monoxide (CO) and Total Organic Compounds (TOCs).

Inorganic Emissions

Inorganic gases (SOx, NOx, CO) are from the production process and are generally/directly related to the combustion process in the dryer. The types of burners used in the process are by design highly efficient ensuring the products of combustion are well within regulated levels.

Nitrogen Oxides (NOx) originate from the combustion in the dryer, drum, and hot oil heaters or generator sets. They are influenced by the nitrogen content of the fuel, amount of excess air, flame temperature and burner type.

Sulphur Oxides (SOx) are also created by the burning process in the dryer/drum, hot oil heaters and diesel generator sets. They are influenced by the sulphur content in the fuel.

Carbon monoxide (CO) emissions are usually related to an incomplete combustion process in the dryer/drum, the hot oil burner and generator sets. Emission levels are determined by process efficiency, which may vary according to the type of fuel.

Total Organic Compounds (TOC)
Organic emissions, another product of combustion, consist of a large group of substances generally referred to as hydrocarbons.

Hydrocarbon emissions originate with the use of organic materials (asphalt cement) and fuels in the production process. Incomplete fuel combustion is the main source of hydrocarbon emissions in the hot mix operation.

Potential sources of hydrocarbon 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 are directly related to heating temperatures and the type of asphalt cement. The composition of Reclaimed Asphalt Pavement (RAP) used in a mix may also affect hydrocarbon emissions.

ODOUR
Odour is an environmental concern, generally recognized as a potential nuisance that may affect neighbours.

A major source of odour in hot mix production is asphalt cement and is related to 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. Also of concern are fuels with high sulphur content and petroleum-based solvents used as cleaners or release agents.

NOISE
Sources of noise emissions related to the hot mix plant operation originate from the burner, fans and diesel generators. Noise may also arise from associated yard activities, primarily related to equipment and vehicle operations. The perception of noise emissions are greatly influenced by the time of day or night and surrounding ambient noise levels.

WASTE
Very little municipal waste is created in hot mix asphalt production. Materials are supplied in bulk so there are no packaging wastes. Baghouse dust is normally re-used, as is material from rejected mixes. In some plants surplus filler from a wet scrubber may be discharged infrequently in dampened or in slurry form. Most provincial Certificates of Approval dictate disposal methods for sludge from wet scrubbers.

The plant laboratory may be a minor source of chemical wastes (i.e. solvents).

Other sources of waste may include the workshop and office staff areas. Sanitary waste disposal is also a factor to be considered.

RAP is not a waste material and should be recycled/reused.

SECTION TWO

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.

PARTICULATES

Particulates of concern generated at a plant site are PM10 and PM2.5. While the ducted emissions are controlled by the plant emission controls, open fugitive emissions can also be significant and attention should be paid to areas where fugitive dust is likely to occur.

PLANT YARD

- Paved areas should be maintained clean and dust free. Gravel surfaced areas should be treated regularly with water or other environmentally friendly suppressants. Crushed RAP or millings can also be effective in reducing dust.
- Establish efficient traffic patterns to minimize dust generation.
- Vehicle speeds in yard must be controlled to minimize dust generation.

AGGREGATE DELIVERY / STOCKPILING

- Ensure vehicles delivering aggregates are tarped.
- Locate and manage stockpiles to minimize dust generation. Factors to consider include:
  - Fine aggregate piles protected from wind by coarse piles (prevailing wind);
  - Stockpiles should be located as close as possible to cold feed bins to minimize loader travel;
  - Where water is available, and when near a residential area, stockpiles can be covered or treated with water or suitable wetting agent when material is especially dusty or when required by wind conditions.

MATERIAL TRANSFER

- Equip hydrated lime storage silos with a ventilation filter and a vent valve. (Vent through a coupling to dust collection system.)
- Inspect elevator housing and plant tower for cracks and holes. Repair as required.
- Ensure tight seal at connections between elevator and screens.
- Ensure rubbing-type seals are properly fitted to maintain negative pressure at the connection to the dryer/ collection system.
- Inspect discharge valves, ducts and seals around dryer intake. Repair or replace, as required.
- Minimize number of transfer points in the whole system – at design or during refit.
- When purging or draining the plant for change in mix, ensure that dust creation is minimized.

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 remove particulates before entering the baghouse.

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

- Reduced wear and abrasion in the plant due to the removal of the large size particulate.
- Allow 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 was 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 ensure proper operation and collection efficiency, the following operating procedures should be followed:

- Inspect all ductwork between the dryer and stack to ensure that there are no holes or air leaks present.
- Ensure main body of cyclone has no holes in the main shell or liners, no worn outlet tubes and no plugged outlets.
- Do not allow build-up of fines inside the cyclone or the valves.
- Remove any foreign debris that may become lodged in the cyclone or ductwork.
- Maintain exhaust gas volume at rates compatible with the production rate, and within the design parameters of the cyclone.

Ensure dust/particulate discharge valves are 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.

ROTARY AIR LOCKS / VANE FEEDERS

- Adjust the tips of the vane to manufacturer's clearance specifications to ensure a tight seal and no blowback.
- Remove any build-up or caking on vanes, as this would reduce the volume of dust being removed, which could allow re-entrainment of the dust into the air.
- Check that seals are operating properly.

TIPPING VALVES

These valves can be very sensitive to binding or dragging, therefore adjust counterweights and seals to ensure easy operation of valve.

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 microns to 1 micron in diameter is up to 99% and for particles down to .5 microns is 75%.

To ensure proper operation and collection efficiency, the following operating procedures should be followed:

- Always preheat the baghouse to dry out any moisture or condensation prior to starting production.
- Upon completion of production use low fire setting to dry out the baghouse.
- While operating, keep internal operating temperature / exhaust air entering the baghouse 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.
- Ensure the high temperature baghouse protection device is working properly.
- For nomex bags, use a high temperature setting of approximately 205^{o} C (400^{o} F). For other fabric, talk to your filter bag supplier for specific operating temperatures.
- Ensure all thermocouples are the rapid response type and are functioning properly.
- Ensure pressure-sensing devices are operating properly, as they sense the pressure drop across the baghouse and activate the cleaning cycle when the pressure drop across the baghouse reaches a preset limit. (Approximately 3” to 7” WG for pulse jet system and 8” to 10” WG for reverse air system).

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

- Do not over-clean the bags, 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 increase fuel usage (reverse air systems only).
  - Prolonged and unnecessary operation of air compressor or requirement of oversized air compressor. (Pulse jet type only) Generally the air compressor should be sized to maintain a constant air pressure of 550 to 760 kPa (80 to 110 psi) and should be able to recover quickly after pulsing.
- Ensure there are no leaks or holes in the baghouse or ductwork. As a general rule of thumb, holes or unsealed areas closest to the burner have the most effect on the efficiency of the system. However, any addition of ambient air that can be prevented will allow your plant to run at peak efficiency.
- Ensure all bag access doors on top of house are sealed to prevent air infiltration.
- Ensure proper seal between bag and cage.
- Inspect clean side of baghouse from top inspections 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.
- Use a black light inspection system on the clean side of the house to inspect for holes or improperly sealed bags that cannot be detected by the naked eye. Inspection should be completed annually as a minimum.
- Adjust cleaning cycle to match production or type of mix being produced. General rule:
  - increase production = increase cleaning cycle
  - finer mixes = increase cleaning cycle

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

- Ensure proper alignment of cleaning air jets. Improper alignment could damage bags.
- Ensure all rotary air locks and valves are adjusted and operating properly, as discussed in the cyclone / duct work section.
- Ensure that compressed air used for pulse cleaning is dry and free of oil residue. Moisture or oil will cause the dust to mud or blind the bags, reducing the efficiency of the house.

WET SCRUBBERS - CENTRIFUGAL / VENTURI

Wet Scrubbers, operated in conjunction with settling ponds, can be divided into the following two categories:

Low Energy Centrifugal Scrubbers

The exhaust gases enter the body of the Scrubber where they pass through a series of water sprays that allow the water droplets to capture the fine dust particles. The wetted particles are then forced outward to the wall of the separator, by centrifugal action, and then settle out through the drain and on to the settling ponds.

- 95% efficient down to the 5 micron size material.
- Considerable reduction in efficiency down to the 1 micron size.
- Operating pressure drop between 2” – 6” Water Gage (WG).
- Water required approximately 6.5 gal/min per 1,000 CFM of exhaust.

High Energy Venturi Scrubbers

Prior to the exhaust gases entering the body of the separator they are forced through an adjustable narrowing section of the duct, known as a Venturi, where water is sprayed directly into the gas stream. The Venturi causes the gases to be accelerated to a high velocity, that also atomizes the water spray into a fine mist. The fine mist then entraps the dust particles prior to entering the body of the separator, where the wetted particles are removed by centrifugal action, then settle out through the drain and on to the settling ponds.

- 98% efficient down to the 5 micron size material.
- 95% efficient down to the 1 micron size material.
- Operating pressure drop usually 20” WG.
- Water required approximately 8 gal/min per 1,000 CFM of exhaust.

SETTLING PONDS

The settling ponds can be the most overlooked part of the plant’s emission control system. Normally, 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 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.
- Ensure that the supply side pond is clean enough so as not to interfere with the pump, foot valve etc.

Add sufficient make up water daily, to maintain pond volume.

EXHAUST FANS / DAMPERS

The exhaust fan is an integral part of the asphalt production process. Its main functions are:

- Provide air for efficient combustion.
- Remove products of combustion, i.e. oxygen, nitrogen, carbon dioxide, carbon monoxide and water vapour (steam).
- Remove and carry away moisture dissipated during the drying process of the aggregates.

Provide excess scavenged air that is used to capture scavenged dust from fugitive emission sources around the plant.

Proper sizing operation and maintenance of the exhaust fan ensures complete combustion and efficient operation of the asphalt plant. Therefore:

- Ensure correct tension on drive belts.
- Check for wear or dust build-up on the fan blades. 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.
- Ensure the fan impeller is properly balanced.

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. Ensure the exhaust fan damper is operating properly. This will provide the correct amount of air for the combustion process.

General rule of thumb is to adjust the damper to prevent potential 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.
- Preventing entrainment of fines into the air.
- Increase contact time in drum for air and aggregates (more efficient drying).
- Reduced abrasion of ductwork and equipment due to lower internal air speeds, and less particle entrainment.
- Electrical savings, due to decreased load on fan.
- Reduce load on generator in a portable plant.
- Lower the pressure across the baghouse, thus extending the life of the bags and increasing efficiency.

CONTROLLING EMISSIONS AND ODOURS

GASEOUS EMISSIONS / BURNER

Gaseous emissions from the production of hot mix asphalt are a direct result of the combustion process. Asphalt plants utilize combustion to dry the moisture from aggregate prior to mixing with the asphalt cement.

It is important to ensure the proper air to fuel ratio is maintained 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.

BURNER

- Ensure all burner valves and linkages are inspected for wear.
- Ensure fuel pressure, air-fuel ratios, and combustion air pressure is functioning according to the manufacturer's specifications.

Ensure all moving points are lubricated as per the manufacturer's specifications.

- Ensure all filters systems and strainers are regularly maintained.
- Ensure nozzles are clear of foreign materials.
- Ensure blowers are 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 ensure efficiency.

AIR SEALS

- Ensure that all drum and duct air seal points are intact and in proper working order.
- Leaking air at any point throughout the system directly affects the air to fuel ratio.
- General rule of thumb: Air leaks furthest from the burner have the most negative impact on the combustion process.

DAMPER

Ensure the damper system is functioning to its fullest potential. A properly functioning damper system is a key component in controlling the fuel to air ratio.

DRYER FLIGHTS

Ensure that dryer flights are properly maintained to manufacturer 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 CO and hydrocarbon levels.

PRIMARY AND SECONDARY COLLECTORS

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

HOT OIL HEATER SYSTEMS

Ensure hot oil heater burners systems are clean and functioning according to the manufacturer's specifications. Test the hot oil annually within the system to ensure oxidation is not taking place.

Ensure that hot oil heater lines are in good working order.

THERMOCOUPLES AND PRESSURE SENSORS

Thermocouples and other sensors throughout the system are in place to monitor temperature and pressure change within the system. It is important to regularly calibrate thermocouples and other sensors to ensure they are functioning at optimum levels.

TRUCKS AND LOADERS

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

Ensure engines and equipment are properly maintained, serviced and tuned up on regular intervals.

FUELS

Utilize low sulphur fuel wherever possible to minimize sulphurous emission from the stack.

RECORD KEEPING

Keep fuel usage records and note any changes in fuel consumption.

- Monitor and record the weather on a daily basis. Include the temperature, wind velocity and direction if possible.

See Appendix 3 for a weather record form.

DELIVERY & STORAGE OF ASPHALT CEMENT AND FUEL

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 ensure that odours are controlled as best as possible. For instance, maintaining the asphalt cement at the proper working temperature helps to diminish odour emissions and alleviates the potential nuisance to your neighbours.

GENERAL

- Be aware of the effects 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.

FUEL STORAGE AND FUEL DELIVERY

- Schedule fuel delivery during periods when the neighbours are least affected.
- Utilize low sulphur fuels whenever possible.
- 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 provincial Technical Standards and Safety Authority requirements.

ASPHALT CEMENT DISCHARGE AND STORAGE

- Schedule asphalt cement delivery preferably during periods of least impact to neighbours.
- Ensure asphalt cement supplier maintains proper delivery temperatures.
- If necessary, install an odour mitigation system on asphalt cement storage tanks.

Maintain Proper Asphalt Cement Storage Temperatures

- Record weather and wind information during asphalt cement unloading.
- Keep lids on asphalt cement storage tanks closed.
- Ensure all asphalt cement lines are secure and in good working order.
- Design load-out area to minimize spillage.
- Clean up any spillage immediately as per Material Safety Data Sheets.

ANTI STRIPPING ADDITIVES

- Utilize low odour anti-stripping additives whenever possible.
- Ensure that anti-stripping additives are well blended.

ASPHALT CEMENT MIXING / PUMPING TEMPERATURES

Whenever possible ensure that asphalt cement does not exceed recommended temperatures for pumping, delivery and mixing, as outlined in the following chart.

PLANT MIXING TEMPERATURE CHART

Performance Graded Asphalt Cement (PGAC)*	MIXING		PUMPING TEMP (Delivery)	
	Minimum	Maximum	Minimum	Maximum
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	135°C	170°C	125°C	170°C

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

DISCHARGE AREAS

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

Performance Graded Asphalt Cement (PGAC)*	AMBIENT TEMPERATURE				
	35 °C	25 °C	15 °C	5 °C	-5 °C
PG 52-34	140 °C	145 °C	150 °C	155 °C	155 °C
PG 52-40	135 °C	140 °C	145 °C	150 °C	150 °C
PG 58-22	145 °C	150 °C	155 °C	160 °C	160 °C
PG 58-28	145 °C	150 °C	155 °C	160 °C	160 °C
PG 58-34	145 °C	150 °C	155 °C	160 °C	160 °C
PG 64-28	155 °C	160 °C	165 °C	165 °C	165 °C
PG 64-34	150 °C	155 °C	160 °C	165 °C	170 °C
PG 70-28	150 °C	155 °C	160 °C	165 °C	170 °C
PG 70-34	150 °C	155 °C	160 °C	165 °C	170 °C

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

NOISE

Noise at a facility can be generated from one or all of the following:

- Turbo blower or burner
- Combustion chamber
- Exhaust fan
- Bucket elevator or slat conveyor
- Drum/dryer
- Pugmill
- Pneumatic gates
- Generator
- Mobile equipment back-up alarms
- Truck slamming tail gates
- Dust augers
- Screendeck

The following steps can be taken to minimize noise:

- Locate aggregate stockpiles in strategic areas to act as a buffer to noise.
- Use landscaping and berms around the plant to reduce noise levels.
- Use acoustical shields, insulated screens, timber walls and berms at strategically placed locations to absorb noise.
- Use specialized acoustical abatement methods on high noise source, i.e., burners, fans.
- Enforce rules restricting excessive braking, engine revving, horn blowing and tailgate slamming in the plant yard.
- Establish a complaint response procedure to deal with noise issues immediately.

It is suggested that readings be taken periodically around the site to ensure compliance.

SITE MANAGEMENT OF WASTE AND GROUNDWATER

Hot mix asphalt plant operations are traditionally low volume generators of excess materials that are classified as waste. Therefore basic "common sense site management practices" can eliminate potential problems. The term "waste" can be defined as any excess material that is generated from a site that contains putrescible materials (materials that decay) or soluble or decomposable chemical substances. 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.

Baghouse dust is a bi-product of aggregate handling and hot mix asphalt production and is a reusable resource, and is not normally a waste material. RAP is commonly accepted as a valuable re-usable resource, and is commonly used as an aggregate component in hot mix asphalt production and in the production of aggregates for granular base.

In some plants surplus filler from a wet scrubber and fines from baghouses may be discharged infrequently in dampened or slurrified form. The Certificate of Approval for the plant outlines accepted off-site disposal methods for sludge from wet scrubbers.

A quality control laboratory may be a source of low volumes of solvents. The off-site disposal of solvents should comply with provincial regulations.

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 and disposal should be addressed to comply with local municipal requirements. Waste oils should be collected and disposed of off site in conformance with provincial regulations.

Proper site management practices will eliminate the risk of impairment to water quality in nearby watercourses or water bodies. Spill containment systems for above ground storage tanks should be used. Expansion of plant yard areas by progressive in-filling should include a plan for surface grading and drainage to avoid erosion. As well, fill materials should be managed to avoid the placement of reclaimed wood, grubbing materials, or other objectionable materials close to watercourses and water bodies.

Prior to expansion of existing plant facilities, or setup of new plants, due diligence procedures should be followed to establish the site conditions.

SECTION THREE

RECORDS KEEPING AND COMPLAINT RESPONSE

RECORDS KEEPING

- A copy of the plant Certificate of Approval 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 all original manufacturers' operating and maintenance instructions manuals.
- Records should be kept describing any maintenance and repairs to original equipment.
- For stationary, permanent operations, a weather station is suggested to monitor temperature, wind speed and direction on site. As a minimum, and for portable plants, a weather station may not be necessary, however, observed weather information should be recorded daily. See weather record form included in Appendix C.
- 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 2.)
- Where continuous temperature recording equipment is not available, record mixing and load-out temperatures on a daily basis, or with changes in mix types.
- Equipment calibrations should be maintained where applicable.

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 appropriate provincial Ministry, or through appropriate municipal government agencies. The complaint response plan should document details such as:

- 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

The "Complaint Response Form", Appendix 4 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 ensure that all check list items contained in the appropriate section of this Environmental Practices Guide have been investigated.

GLOSSARY OF TERMS

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.

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, sulfur oxides, and water vapour. Oxygen may also be a product in the presence of excess air or if incomplete combustion occurs.

Cubic Feet Per Minute (CFM)
Volumetric flow rate of a gas or liquid that does not indicate current conditions.

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.

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.

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

Ozone (O3)
A gas which is known to be a primary component of smog within a 7 to 10 mile zone above the earth's surface. Ozone in the atmosphere is produced through a complex set of chemical reactions involving other gases (nitrogen oxides and volatile organic compounds) and sunlight. Since ozone (smog) is a product of a reaction in the atmosphere, the focus of regulation is on gases which react to form O3, i.e. volatile organic compounds (VOCs) and nitrogen oxides (NOx).

Particulate Matter (PM-2.5)
Particles which are captured in a specifically defined EPA test procedure and analysis and have an average diameter of 2.5 microns or less. These are components of dust, smoke, fumes, etc.

Particulate Matter (PM-10)
Particles which are captured in a specifically defined EPA test procedure and analysis and 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. Because they tend to condense at atmospheric temperatures, they diffract light and are often associated with blue haze, they are sometimes referred to as semi-volatile organic compounds.

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.

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

Sulfur Oxides (SOX)
An air pollution term applied to a class of gases which are made of up sulfur and oxygen in different combinations. It is usually associated with the burning of fuels which contain sulfur, i.e. diesel, coal, #6 fuel oil, kerosene, 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 *"Napa 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)

APPENDIX 1

TABLE 1
SUMMARY OF THE MAIN CANADIAN HOT-MIX ASPHALT PRODUCTION REGULATIONS

PROVINCE / TERRITORY	ACT / REGULATIONS / STANDARD / WEBSITE	SUMMARY OF REQUIREMENTS	SPECIFIC POLLUTANTS TARGETED
New Brunswick	**Clean Air Act** • N.B. Reg. 97-923 • http://www.gnb.ca/0062/regs/c-5-2 reg,htm **Clean Environment Act** • N.B. Reg. 82-126 • http://www.gnb.ca/0062/regs/82-126.htm	**Approvals required under:** • Air Quality Regulation and/or • Water Quality Regulation	Particulate matter, CO, So_2, NO_x, $TNMHC_s$
Nova Scotia	**Environment Act** • N.S. Reg. 47/95 • N.S. Reg. 55/95 • http://www.gov.ns.ca/just/regulations/regs/env4795.htm	**Approvals required under:** • Activities Designation Regulation • Air Quality Regulation	Air Quality
Newfoundland	**Environment Act** • CNR Reg. 957/96 • http://www.gov.nf.ca/hoa/sr/	**Approvals required under:** • Air Pollution Control Regulations	Air Quality
Prince Edward Island	**Environmental Act** • No.EC377/92 • http://www.gov.pe.ca/statutes/pdf/e-09.pdf **General Provisions and Contract Specifications for Highway Construction (DOTPW)** • Reg. 603.05	**Approvals required under:** • Air Quality Regulations	Particulate matter, CO, So_2, NO_x
Quebec	**Environmental Quality Act** • (c. Q-2, r.25) • http://www.publicationsduquebec.gov.qc.ca/home.php (order “Environmental Quality Act)	**Approvals required under:** • Regulation Respecting Hot Mix Asphalt Plants	Opacity, Particulate matter
Ontario	**Environmental Protection Act** • O. Reg. 349 • O. Reg. 338 • O. Reg. 337 • O. Reg. 346 • O. Reg. 127 • http://www.ene.gov.on.ca/envision/gp/4391e.pdf	**Approvals required under the Regulations for:** • Hot-Mix Asphalt Facilities • Boilers • Ambient Air Quality Criteria • Air Quality • Emissions Reporting	Opacity, Particulate matter

PROVINCE / TERRITORY	ACT / REGULATIONS / STANDARD / WEBSITE	SUMMARY OF REQUIREMENTS	SPECIFIC POLLUTANTS TARGETED
Manitoba	**Environment Act** • C.C.S.M. c.E125, Sect 10(1) • http://web2.gov.mb.ca/laws/statutes/ccsm/el25e,php	**Licenses required for:** • Class 1 Developments	Opacity, Particulate matter
Saskatchewan	**Clean Air Act** • Chap. 12.1, Reg. 1, 1989 • http://www.qp.gov.sk.ca/index.cfm?fuseaction=publications.details&up=1000	**Approvals required under:** • Clean Air Regulations	Opacity
Alberta	**Environmental Protection and Enhancement Act** • AR 124-93 • http://www.qp.gov.ab.ca/documents/Acts/E12.cfm?frm_isbn=0779717287	**Approvals issued under:** • Air Emissions Regulation	Opacity, Particulate matter
British Columbia	**Waste Management Act** • B.C. Reg. 217/97 • http://www.qp.gov.bc.ca/statreg/reg/W/WasteMgmt/217_97.htm	**Approvals issued under:** • Asphalt Plant Regulation	CO, Organics, Opacity, Particulate matter
GVRD (Greater Vancouver Regional District)	**Bylaw No. 937, 1999** • http://www.gvrd.bc.ca/air/business_bylaws.htm		CO, Organics, Opacity, Particulate matter
NWT / Nunavut	**Environmental Protection Act** • R.R.N.W.T c.E-23 • http://www.canlii.org/nt/regu/pdf/REG074.pdf	Consolidation of Asphalt Paving Industry Regulations	Opacity, Particulate matter
Yukon	**Environment Act** • http://www.environmentyukon.gov.yk.ca/epa/content/airregs.pdf	**Permits issued under:** • Air Emission Regulations	Opacity, Particulate matter

APPENDIX 2

ENVIRONMENTAL BEST PRACTICES CHECKLIST

PARTICULATES

PLANT YARD

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

Comments: _____

_____

_____

AGGREGATE DELIVERY/STOCKPILING

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

Comments: _____

_____

_____

ENVIRONMENTAL BEST PRACTICES CHECKLIST

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: _____

_____

_____

PLANT CHECK LIST 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 ❑

PLANT CHECK LIST FOR WET SCUBBERS

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: _____

_____

_____

PLANT CHECK LIST
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.

_____

_____

_____

_____

_____

BAGHOUSE

Is baghouse preheated before start-up?	Yes ❑	No ❑
Is baghouse operated above dew point 250° F?	Yes ❑	No ❑
Is the baghouse high temperature protection device operating properly?	Yes ❑	No ❑
Is the high temperature set point set 50° 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?	Yes ❑	No ❑
b) Is any dust present in this area?	Yes ❑	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.

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 below.

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 below.

_____

_____

_____

GASEOUS EMISSIONS CHECKLIST

Burner Operation

Check fuel valves for leaks.	Yes ❑	No ❑
Inspect and ensure linkages are in proper adjustment.	Yes ❑	No ❑
Ensure lubrication of moving parts is maintained.	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: _____

_____

_____

AIR SEALS: DRYER, DUCT WORK, AND FUGITIVE EMISSION SYSTEMS

Are front and rear drum seals in working order?	Yes ❑	No ❑
Check and maintain flanges at interconnecting equipment.	Yes ❑	No ❑
Are seals at feed and discharge chute in working order?	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: _____

_____

_____

EXHAUST FAN
ODOUR/FUEL DELIVERY & STORAGE OF ASPHALT CEMENT
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: _____

_____

_____

ASPHALT CEMENT DISCHARGE AND STORAGE

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

Comments: _____

_____

_____

NOISE CHECKLIST

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: _____

_____

_____

SITE MANAGEMENT OF WASTE AND GROUNDWATER WASTE

Are environmentally-friendly (non-solvent) truck box release agents and asphalt cleaners used exclusively? If no, action should be taken to eliminate release agents such as diesel fuel. Yes ❑ No ❑

Are asphalt cement and fuel storage tanks located according to Fuel Safety Branch regulations (Ministry of Labour) with appropriate containment systems? If no, action should be taken to ensure compliance with Provincial regulations and site management practices. Yes ❑ No ❑

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

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

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

Are laboratory solvents and chemicals recycled? 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. Yes ❑ No ❑

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

APPENDIX 3

WEATHER RECORD

MONDAY

Date: _____ Temperature: _____ Hi _____ Low _____

Conditions: Sunny ❑ Partly Cloudy ❑ Cloudy ❑ Overcast ❑

Wind: Still ❑ Light ❑ Gusting ❑ Strong ❑

Direction: _____ Operating Times: _____ Start: _____ End: _____

TUESDAY

Date: _____ Temperature: _____ Hi _____ Low _____

Conditions: Sunny ❑ Partly Cloudy ❑ Cloudy ❑ Overcast ❑

Wind: Still ❑ Light ❑ Gusting ❑ Strong ❑

Direction: _____ Operating Times: _____ Start: _____ End: _____

WEDNESDAY

Date: _____ Temperature: _____ Hi _____ Low _____

Conditions: Sunny ❑ Partly Cloudy ❑ Cloudy ❑ Overcast ❑

Wind: Still ❑ Light ❑ Gusting ❑ Strong ❑

Direction: _____ Operating Times: _____ Start: _____ End: _____

THURSDAY

Date: _____ Temperature: _____ Hi _____ Low _____

Conditions: Sunny ❑ Partly Cloudy ❑ Cloudy ❑ Overcast ❑

Wind: Still ❑ Light ❑ Gusting ❑ Strong ❑

Direction: _____ Operating Times: _____ Start: _____ End: _____

FRIDAY

Date: _____ Temperature: _____ Hi _____ Low _____

Conditions: Sunny ❑ Partly Cloudy ❑ Cloudy ❑ Overcast ❑

Wind: Still ❑ Light ❑ Gusting ❑ Strong ❑

Direction: _____ Operating Times: _____ Start: _____ End: _____

APPENDIX 4

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 Date

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 _____ Signature _____

NOTES