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C O M P L I A N C E  
A S P H A L T A U D I T  
R E P O R T  
2 0 1 7  
*Environmental Management Act*



August 2017



## Executive Summary

The audit set out to evaluate asphalt plants operating within the Province of British Columbia (BC) between 2013 and 2015 to determine their level of compliance with the Asphalt Plant Regulation (APR) and the *Environmental Management Act* (EMA). The objectives of the audit were to:

1. Determine overall industry compliance rate with the APR;
2. Determine industry compliance rates for registration, monitoring, operating and reporting requirements; and
3. Provide recommendations to improve compliance within the asphalt plant industry.

Asphalt is a naturally occurring hydrocarbon product, which can also be produced through the refinement of crude oil. Most of the asphalt produced in BC is used in the construction and maintenance of roads. The manufacturing of asphalt causes the release of particulates, greenhouse gases, fugitive dust and odours into the atmosphere, which may have an effect on environmental and human health if not properly managed. To ensure the asphalt plant industry is operating in a manner that does not detrimentally affect the environment and human health, the Government of BC brought into force the APR under EMA, which regulates the asphalt plant sector.

There are currently 95 asphalt plants registered and authorised to operate within BC. Forty-eight asphalt plants (four hot-in-place and 44 hot mix) were assessed to determine the compliance rate of the asphalt plant industry with the APR. The audit focused on the registration, monitoring, operating, reporting, and relocation requirements identified in the APR. The overall industry compliance rate with the APR is 27%. Registration requirements (76%) and relocation requirements (100%) having the highest rate of compliance. The remaining monitoring, operating, and reporting requirements in the APR were below 20%. Factors leading to the observed non-compliance rates included:

- Failure to measure opacity;
- Exceeding APR concentration limits; and
- Not providing required specifications during monitoring.

Given the results of the audit and the feedback from industry representatives during post inspection follow-ups, the following recommendations have been made:

### For the Asphalt Industry

1. Ensure the person conducting air emission stack testing is certified to measure opacity;
2. Plan stack tests during July and August when weather and daylight are most suitable to determine opacity;
3. Explore ways to minimize costs and find efficiencies for stack testing at the required production rates;
4. Explore if other technologies (e.g. Digital Opacity Compliance System ) could help with measuring opacity;; and
5. Ensure operators maintain asphalt plants regularly to prevent exceedances in APR concentration limits.

### Compliance Promotion

6. Provide information package on the APR and what plants can do to ensure compliance; and
7. Continue to work with MOTI in areas of joint responsibility for asphalt plant operations.

**Continue developing the Code of Practice for Asphalt Plants:**

8. Bring newer asphalt technologies under regulations;
9. Establish a single set of air emission standards for BC;
10. Remove the current requirement for sampling at 80% of the maximum production rate and replace it with a requirement to sample at historical average production – based on a rolling average over the three months from June to August;
11. Introduce rules that prohibit fuel switching for monitoring purposes; and

Introduce a requirement for an environmental, dust, and odour management plan for all asphalt plants including portable recycled asphalt pavement (PRAP) plants.

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## Introduction

Asphalt, also referred to as bitumen (Figure 1), is a hydrocarbon product that can occur naturally (e.g. Alberta Oil Sands) or be commercially produced. Commercially, asphalt is produced during the refinement of crude oil into various usable petroleum products (e.g. gasoline) through the distillation process. Asphalt is the heaviest component of crude oil and is left behind as a heavy residue at the bottom of the distiller once the refining process is complete.

In British Columbia (BC), the majority of asphalt is combined with aggregate (e.g. gravel) and used for the construction and maintenance of roads (Figure 2). The mixing and heating process used to combine asphalt and aggregate causes the release of air emissions that have the potential to impact air quality if not properly monitored (Advameg Inc. 2017). The release of particulate matter (e.g. PM<sub>2.5</sub>), greenhouse gases (e.g. CO<sub>2</sub>), fugitive dust, and odours from emissions are the main environmental and human health concerns (ENV 2012). The most significant risk to air quality posed by the asphalt industry is associated with the emission of fine particulates. Specifically, “inhalable” particulates < 10 micrometres (µm) in diameter and “respirable” particulates < 2.5 µm in diameter (by comparison, the average human hair is about 70 µm in diameter).



**Figure 1 - Raw Bitumen (Hage 2016)**



**Figure 2 - Asphalt being used during road construction (Hoda 2017)**



**Figure 3 - Stack emissions from an asphalt plant**

This audit evaluates a portion of asphalt plants operating within BC to determine their level of compliance with current administrative and emission standards outlined in the Asphalt Plant Regulation (APR) under the *Environmental Management Act* (EMA).

The objectives of the audit are to:

1. Determine overall industry compliance rate with the APR;
2. Determine industry compliance rates for registration, monitoring, operating and reporting requirements; and
3. Provide recommendations to improve compliance within the asphalt plant industry.

## Regulatory Context

Effective regulations contribute to a safe and healthy environment for British Columbians, sustainable economic development, and clear and predictable decisions for the public and business community.

### Ministry of Environment and Climate Change Strategy Mandate

The Ministry of Environment and Climate Change Strategy (the Ministry) is responsible for the protection, management and conservation of B.C.'s water, land, air and living resources. In order to fulfil this mandate, the ministry establishes and administers a broad suite of regulatory requirements.

### *Environmental Management Act* and Regulations

The *Environmental Management Act* (EMA) is one of the key ministry statutes governing environmental protection and management in British Columbia. EMA regulates industrial and municipal waste discharges, pollution, air quality, hazardous waste and contaminated site remediation (Appendix 1). It provides powers and authorities for ministry staff to verify compliance, to prevent and correct detrimental environmental impacts, and to take enforcement action and respond to environmental emergencies.

### Asphalt Plant Regulation

In BC, any industry, trade, business, activity or operation must comply with all applicable **regulatory requirements** under EMA. These regulatory requirements are outlined in a variety of specific regulations or Codes of Practice.

The Asphalt Plant Regulation specifically outlines the registration, monitoring, operating, and reporting requirements the asphalt plants must adhere to in order to be exempt from EMA. In order for an asphalt plant owner to become exempt from Sections 6(2) and 6(3) of EMA; they must first register their plant under the APR (Appendix 1).

Currently, the provincial government is working on replacing the APR with a Code of Practice for the asphalt industry. Starting in 2012, the Ministry sought feedback from the asphalt sector, members of the public, and other government agencies to develop an Asphalt Plant Code of Practice to replace the APR.



## Requirements

Asphalt plants in BC are regulated and authorised under the APR. Key definitions in the regulation that are applicable include:

- **hot-in-place asphalt recycling plant** means a plant that recycles existing pavement by heating, scarifying and removing the pavement, by adding new asphalt or other material to the removed pavement and by replacing the pavement in place, all as a continuous operation;
- **hot mix asphalt plant** means a plant, including its emission control equipment, that is used for the production of hot mix asphalt by mixing hot dry aggregate with bitumen;

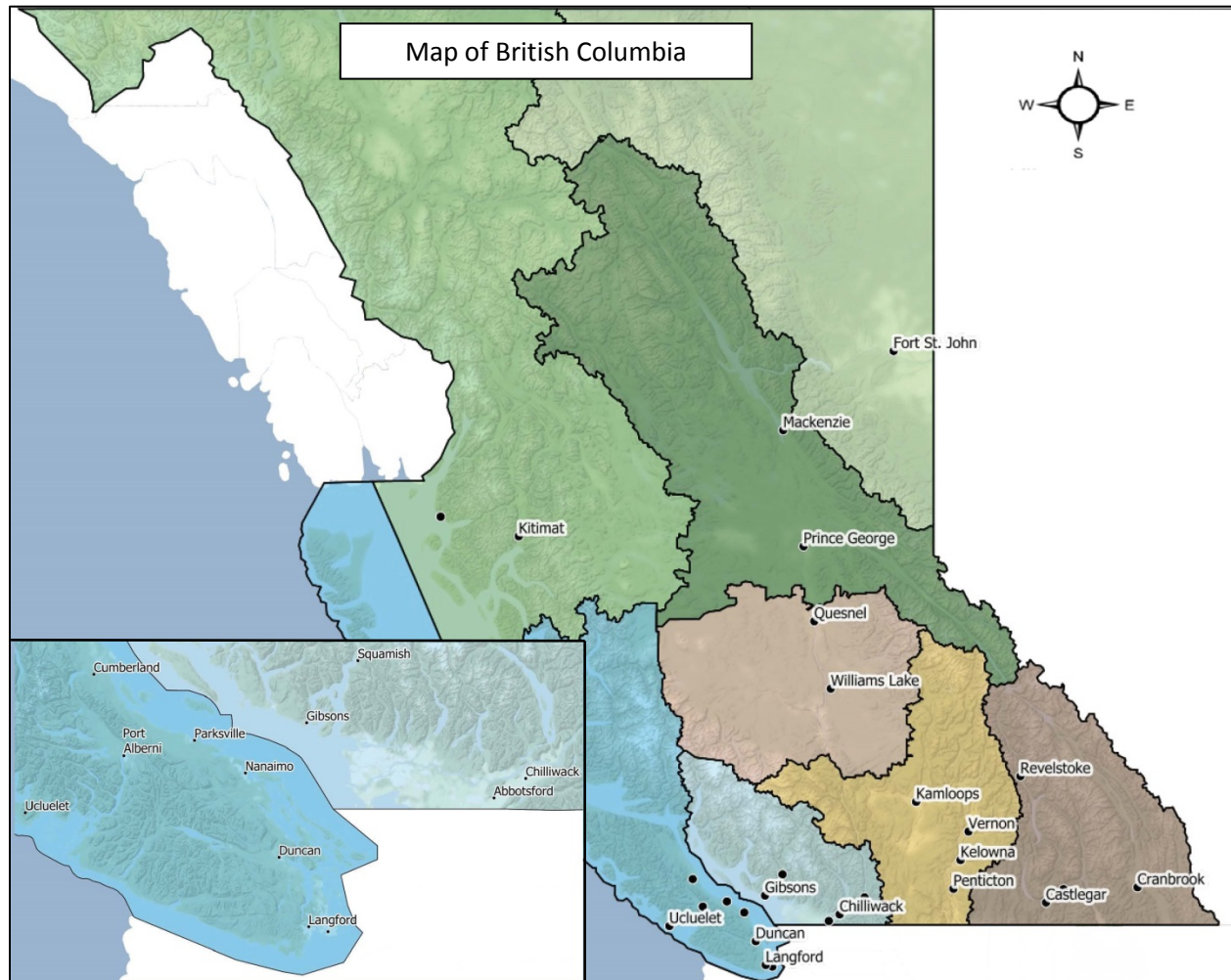
The Sections of the APR that are included in the audit include registration, monitoring, operating, and reporting requirements. Applicable APR Sections are summarized in Table 1 below.

**Table 1 – Applicable Asphalt Plant Regulation Sections**

Section Number	Section Name	Hot-in-Place Plants	Hot Mix Plants
3	Registration Requirements	√	√
5	Hot-in-Place Emission Limits and Operating Parameters	√	
6	Hot-in-Place Monitoring Requirements	√	
11	Hot Mix Emission Limits and Operating Parameters		√
13	Hot Mix Monitoring Requirements		√
17	Hot Mix Notification for Relocation of Mobile Plants		√

## Audit Approach

There are currently 95 asphalt plants registered and authorised to operate within BC, of which 48 were assessed in the audit (Appendix 2). The 48 plants were divided into two groups; four hot-in-place asphalt recycling (hot-in-place; Appendix 3) and 44 hot mix/cutback asphalt (hot mix; Appendix 3). Plants were randomly selected to ensure there was a wide range of company and plant sizes to ensure an accurate representation of the industry (Figure 4).



**Figure 4 - Geographic distribution of asphalt plants included in the audit**

Desktop inspections were completed by Ministry Environmental Protection Officers (EPO). EPOs consulted the Provincial Asphalt Regulation Specialist (PARS) database for registration and annual tonnage information (Section 3; Appendix 1), stack monitoring data and monitoring reports (Sections 5, 6, 11, 13; Appendix 1), and relocation notifications (Section 17; Appendix 1). Furthermore, the provincial Authorizations Management System (AMS) was also used to confirm registration requirements outlined in the APR (Section 3; Appendix 1).

### Compliance Determinations

EPOs assigned one of four compliance determinations for each Section of the APR assessed. The four determinations used in the audit are defined as:

1. **In** – plants have met the requirements of Sections and/or Subsections of the APR.
2. **Out** – given to plants that do not meet the requirements of Sections and/or Subsections of the APR.
3. **Not Applicable** – plants that produced zero tonnes of asphalt within a year.
4. **Not Determined** – compliance was unable to be determined with Sections and/or Subsections of the APR.

An overall compliance determination of either “In” or “Out” was assigned to each plant assessed in the audit.

### **Compliance/Enforcement Response Determinations**

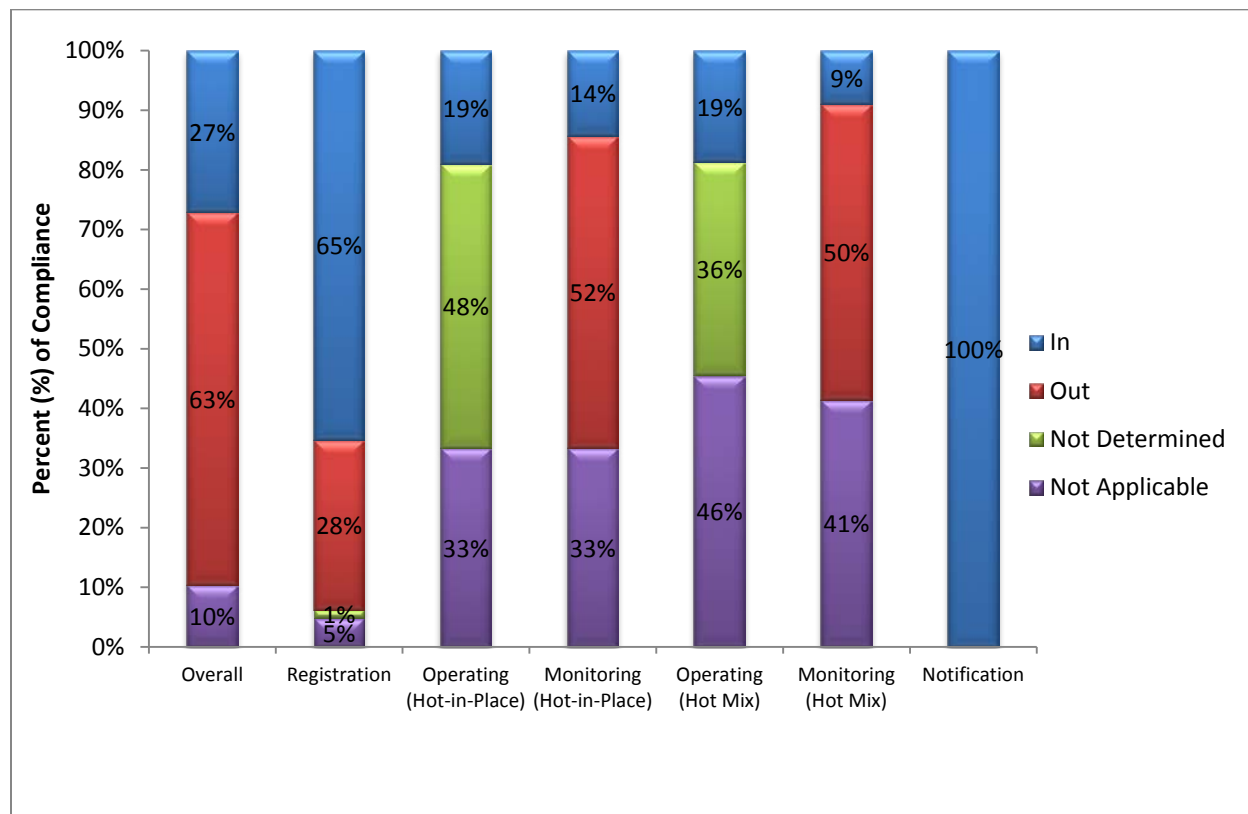
A final decision on the appropriate compliance/enforcement response for individual plants was based on the EPOs professional judgement and a consideration of the Non-Compliance Decision Matrix found in the Ministry Compliance and Enforcement Policy and Procedure, Version 3, 2013 (Appendix 4).

### **Post Inspection Follow-ups with Industry Representatives**

Whenever possible, the audit team had discussions with asphalt plant owners/operators and environmental consultants. All plant owners/operators had the opportunity to contact the audit team and discuss the final inspection report. Information from those discussions was compiled by the audit team and is summarized in this report.

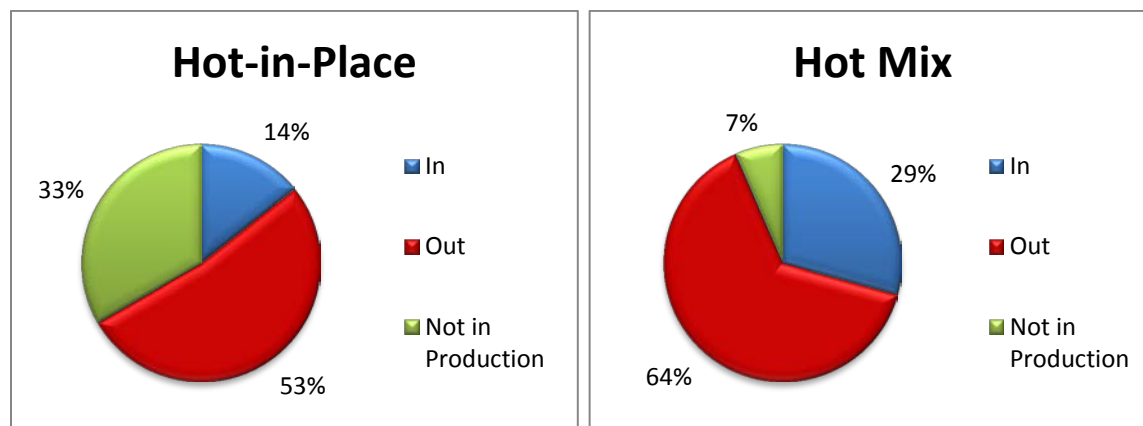
## Results of the Audit

Overall, the percentage of asphalt plants in compliance with the APR was relatively low at 27% (Figure 5). The majority of plants were unable to demonstrate compliance in at least one of the Sections between 2013 and 2015 (Figure 5). In most cases, the observed non-compliances were minor administrative and environmental infractions.



**Figure 5 - Percentage of compliance by Section of the APR**

Hot-in-place plants had a lower proportion of plants (14% hot-in-place vs. 29% hot mix) in compliance between 2013 and 2015 (Figure 6).



**Figure 6 - Overall percentage of compliance for authorized asphalt plants**

## Asphalt Plant Registration Requirements (Section 3)

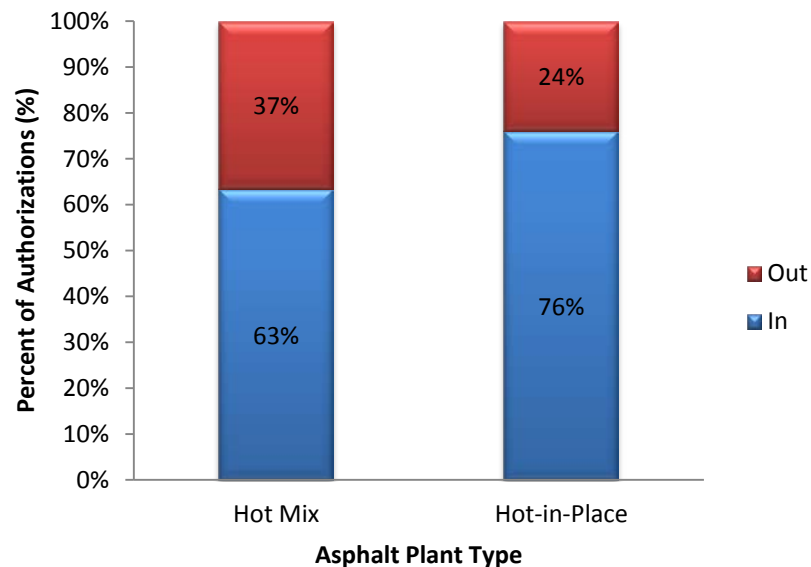
The Subsections assessed under Section 3 had the second highest number of plants in compliance. This is due to the clear registration process and the continued efforts of the PARS to send out reminder emails to ensure plants are submitting their annual tonnages on time.

Under Section 3(1) of the APR anyone who wishes to own or operate an asphalt plant must register their plant with the Ministry.

- Between 2013 and 2015, plants were 100% compliant with Section 3(1).

Section 3(4)(c) requires all registered plants outside of the Greater Vancouver Regional District (GVRD) to submit their tonnage from the previous year by January 31. The annual tonnage is used to determine the monitoring regime in Section 13.

- Between 2013 and 2015, 76% of hot-in-place and 63% of hot mix plants were determined to be in compliance with the APR (Figure 7);
- Beginning in 2014 the number of hot-in-place plants in compliance decreased by 15%; and
- Hot mix plants in compliance decreased by 8% in 2014 and 7% in 2015.



**Figure 7 - Hot-in-Place and Hot Mix asphalt plants meeting tonnage reporting requirements Section 3(4)(c) of APR**

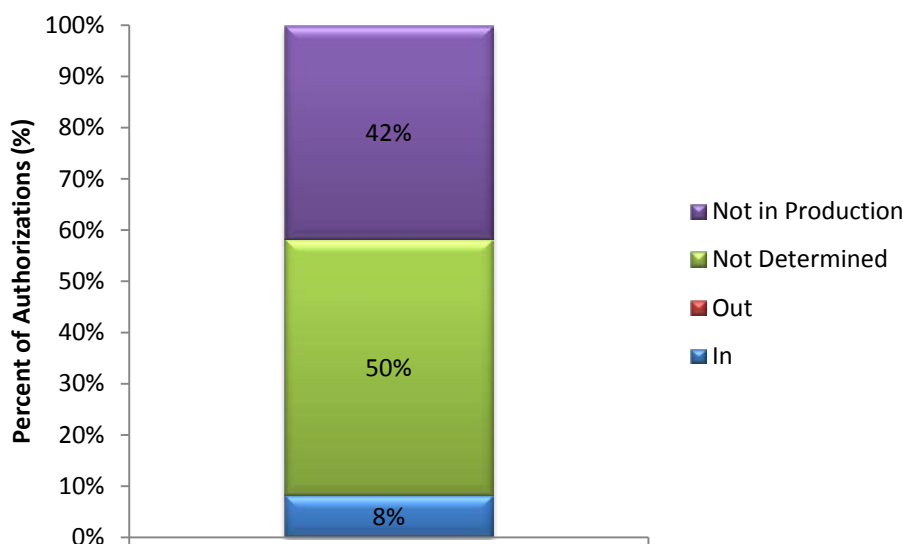
## Hot-in-Place Plant Emission Limits and Operating Parameters (Section 5 (1))

Section 5(1) requires the owner and/or operator of a hot-in-place plant to not exceed the discharge concentration limits or the production limits for specified parameters (Table 2). Eight percent of hot-in-place plants were in compliance, 0% were out of compliance. Of the remaining plants, compliance with the parameter concentrations (Table 2) was unable to be determined for 50% of the plants for failing to measure all parameters in Table 2 and 42% of the plants were not in production (not applicable).

Based on the above observed compliance frequencies, measured organic compounds in the air discharge were most frequently out of compliance by exceeding APR concentration limits in Table 2. Compliance could not be determined consistently with organic removal efficiency and opacity due to the parameter not being measured (Figure 8). There were no reported exceedances in carbon monoxide.

**Table 2 - APR air emission limits for Hot-in-Place asphalt plants**

Parameter	APR Concentration Limits	APR Production Limits
Carbon Monoxide	500 mg/m <sup>3</sup>	50 g/tonne
Organics	50 mg/m <sup>3</sup>	2.5 g/tonne
Organic Removal Efficiency	-	80%
Opacity	20%	-



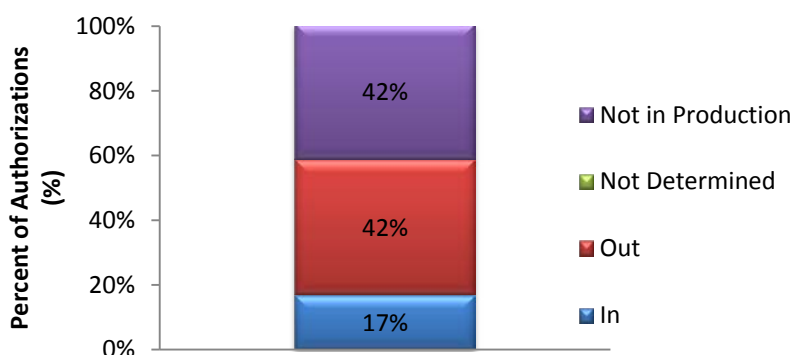
**Figure 8 - Hot-in-Place plant compliance rates with the monitoring requirements in Section 5(1) of the APR**

## Hot-in-Place Plant Operating and Reporting Requirements (Section 6)

Section 6 of the APR outlines the operating and reporting requirements for plant owners/operators. Overall, the number of plants found in compliance with Section 6 was 14%.

Hot-in-place plants, under Section 6(2), are required to conduct stack monitoring at their maximum registered production rate.

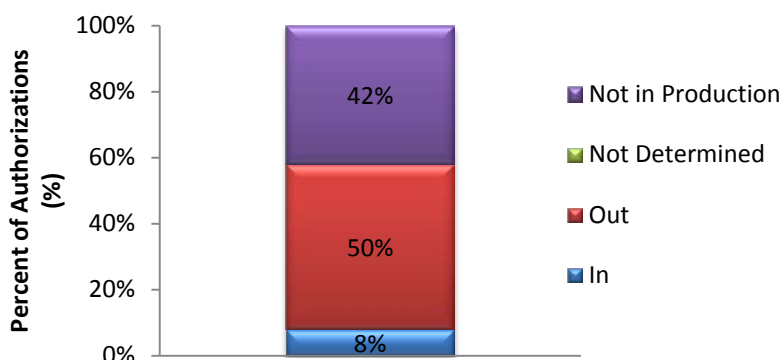
- 17% of hot-in-place plants were in compliance (Figure 9).
- The number of plants in compliance increased from 0% in 2013 to 17% in 2015.
- 42 % of hot-in-place plants were out of compliance with Section 6(2) for not operating at the plants registered maximum production rate as indicated in the plants registration information submitted to the Ministry in Section 3(1).



**Figure 9 - Hot-in-Place plant compliance rates with operating requirements in Section 6(2) of the APR**

Section 6(3)(f) requires owners and/or operators of hot-in-place plants to report the concentration limits for the parameters measured in Section 5(1).

- 50% of hot-in-place plants were out of compliance with Section 6(3).
- Only one plant over the three years included in this audit was found to be in compliance (Figure 10).



**Figure 10 - Hot-in-Place plant compliance rates with reporting requirements in Section 6(3) of the APR**

## Hot Mix Emission Limits and Operating Parameters (Section 11)

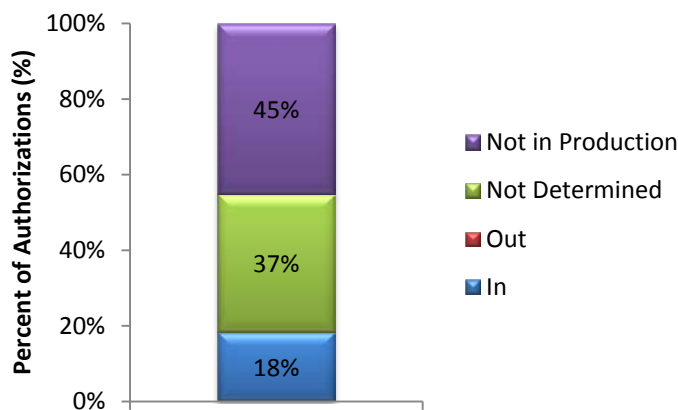
Overall, hot mix plants that were 1) located in the Lower Fraser Valley or Prince George, 2) new (Post 1997), or 3) modified (Pre-1997) had a higher rate of compliance with APR concentration limits (Table 3) compared to all other plants' concentration limits (Table 3). If plants failed to measure or exceeded a single concentration limit the plant was found out of compliance.

**Table 3 - APR air emission limits for Hot Mix asphalt plants**

Parameter	APR Concentration Limits: • Lower Fraser Valley • Prince George Area • New Plants (Post 1997) • Modified Plants (Pre 1997)	APR Concentration Limits: Other Plants
Particulates	90 mg/m <sup>3</sup>	120 mg/m <sup>3</sup>
Organics	60 mg/m <sup>3</sup>	120 mg/m <sup>3</sup>
Opacity	20%	20%
Carbon Monoxide	200 mg/m <sup>3</sup>	400 mg/m <sup>3</sup>

Section 11 requires an owner and/or operator of a hot mix plant to monitor air emission concentrations to ensure that they do not exceed the limits outlined in Table 3. Plant location and age determines which column in Table 3 hot mix owners/operators use during air emission testing

- 45% of hot mix plants did not produce asphalt between 2013 and 2015 based on annual asphalt production submissions to the Ministry.
- 18% of hot mix plants were in compliance with the parameter concentrations outlined in Section 11 (Table 3).
- All reported total particulates exceedances were from plants required to meet the APR concentration limits for Other Plants (Table 3).
- All reported organics exceedances were from plants required to meet the APR concentration limits for Other Plants (Table 3).



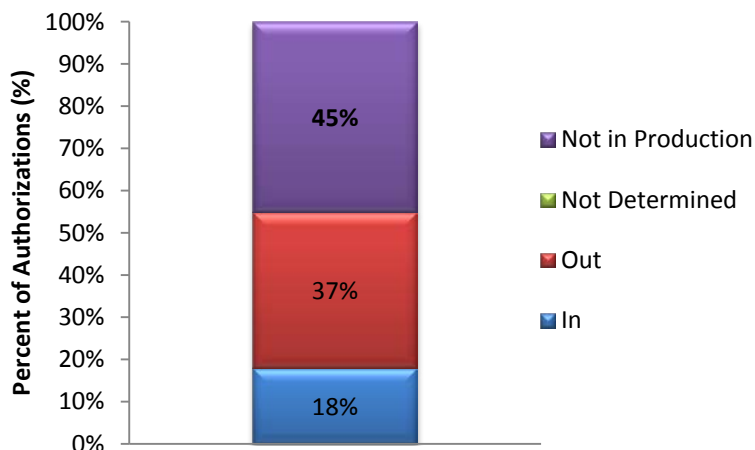
**Figure 11 - Hot Mix plant compliance rates with the monitoring requirements in Section 11 of the APR**



## Hot Mix Operating and Monitoring Requirements (Section 13)

Under Section 13(1)(b), hot mix plants are required to operate at 80% or more of the maximum registered production rate when conducting stack monitoring.

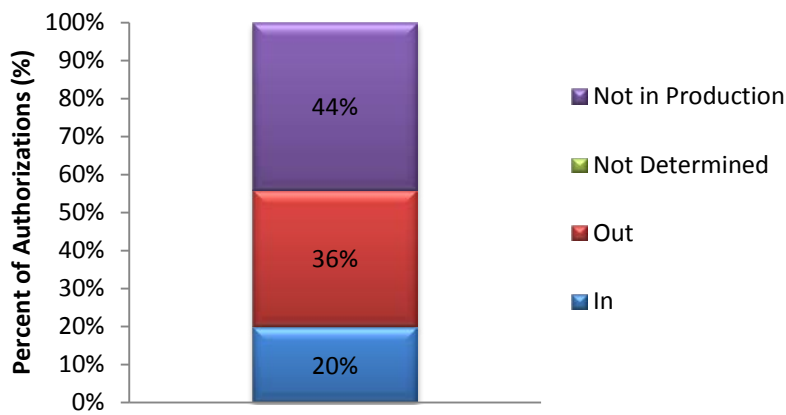
- 18% of hot mix plants were in compliance with Section 13(1)(b) of the APR (Figure 12).
- 37% of hot mix plants were out of compliance.
- 45% of hot mix plants did not produce asphalt during at least year between 2013 and 2015 (Figure 12).



**Figure 12 - Hot Mix plant compliance rates with the operating requirements in Section 13(1)(b) of the APR**

Section 13(3)(h) requires owners and/or operators of hot mix plants to report the APR concentration limits for the parameters measured in Section 11.

- The number of hot mix plants in compliance with Section 13(3)(h) was 20% between the years of 2013 and 2015 (Figure 13).
- 36% of hot mix plants were found out of compliance with this Section of the APR.
- A high proportion of plants (44%) did not produce asphalt during at least 1 year.



**Figure 13 - Hot Mix plant compliance rate with the reporting requirements in Section 13(3)(h) of the APR**

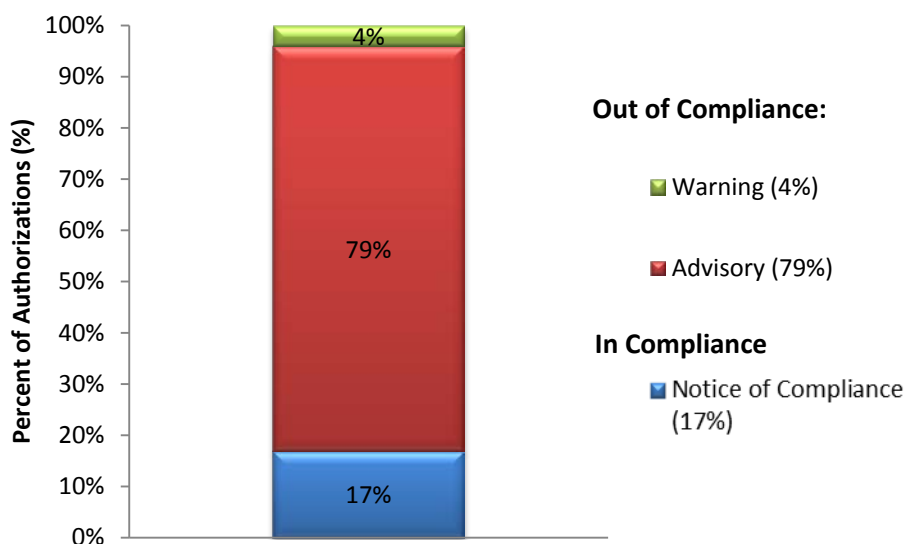
## Hot Mix Notification for Relocation of Mobile Plants (Section 17)

Section 17 requires that the owner or operator of a mobile plant must provide notice to a director, in writing, at least 14 days before the relocation of the mobile plant.

Out of the 44 registered hot mix plants included in the audit, 10 plants actually moved locations between 2013 and 2015. The 10 plants that did relocate for projects were 100% compliant with Section 17 of the APR.

### Responding to Non-Compliances

The type of ministry response to non-compliance was based on consideration of the Non-Compliance Decision Matrix found in the Ministry Compliance and Enforcement Policy and Procedure, Version 3, 2013 (Appendix 4). Of the 48 plants assessed in the audit, 83% were out of compliance and the remaining 17% were in compliance with the APR (Figure 14).



**Figure 14 - Ministry compliance responses**

Figure 14 shows the vast majority of inspections (100%) were either in compliance or only required the issuance of a first level enforcement response (advisory or warning) to address the non-compliance(s). Advisories are issued when the non-compliance has little to no environmental impact or it is administrative in nature and the regulated party is cooperative. Warnings are similar to advisories; however, warnings are issued when there is minor to moderate, temporary impact to the environment or a more significant administrative non-compliance, and where the regulated party is still cooperative.

## Other Observations

Asphalt plant owners/operators, along with their environmental consultants, were given an opportunity to discuss the final inspection reports with the audit team. The following is a summary of comments received:

- The low rate of compliance with Section 5 and 11 of the APR was due to inclement weather and night projects which prevent air monitoring staff from measuring opacity.
- Current regulatory requirements for monitoring are not feasible due to a number of environmental factors like:
  - Temperature of the asphalt;
  - Type of asphalt;
  - Ambient temperature;
  - Relative humidity; and
  - Current operating requirements while monitoring are financially burdensome.

## Conclusions/Recommendations

There is an increasing concern over air quality in BC due to continued growth in the industrial sector. This audit set out to determine the following:

1. Determine overall industry compliance rate with the APR;
2. Determine compliance rate for the sections of the APR assessed;
3. Assess whether amendments to the APR or finalisation of the Asphalt Plant Code of Practice is required to increase compliance; and
4. Provide recommendations to improve compliance within the asphalt plant industry.

Through the audit process and subsequent discussions with asphalt plant owners, there were a number of challenges identified in the audit which need to be overcome to ensure a high rate of compliance with current regulations. Based on these challenges this audit recommends the following:

1. Ensure the person conducting air emission stack testing is certified to measure opacity;
2. Plan stack tests during July and August when weather and daylight are most suitable to determine opacity;
3. Explore ways to minimize costs and find efficiencies for stack testing at the required production rates;
4. Explore if other technologies (e.g. Digital Opacity Compliance System ) could help with measuring opacity;; and
5. Ensure operators maintain asphalt plants regularly to prevent exceedances in APR concentration limits.

### Compliance Promotion

6. Provide information package on the APR and what plants can do to ensure compliance; and
7. Continue to work with MOTI in areas of joint responsibility for asphalt plant operations.

### Continue developing the Code of Practice for Asphalt Plants:

8. Bring newer asphalt technologies under regulations;
9. Establish a single set of air emission standards for BC;

10. Remove the current requirement for sampling at 80% of the maximum production rate and replace it with a requirement to sample at historical average production – based on a rolling average over the three months from June to August;
11. Introduce rules that prohibit fuel switching for monitoring purposes; and

Introduce a requirement for an environmental, dust, and odour management plan for all asphalt plants including portable recycled asphalt pavement (PRAP) plants.

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## Appendix 1 – Legislation

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## Appendix 1 – Legislation

Asphalt plants are regulated and authorised under the *Environmental Management Act* (EMA). Definitions in the regulation include:

### *Environmental Management Act (EMA)*

#### **Section 6 –Waste Disposal**

6(2) Subject to subsection (5), a person must not introduce or cause or allow waste to be introduced into the environment in the course of conducting a prescribed industry, trade or business.

6(3) Subject to subsection (5), a person must not introduce or cause or allow to be introduced into the environment, waste produced by a prescribed activity or operation.

In order for an asphalt plant owner to become exempt from Sections 6(2) and 6(3) of EMA; they must first register their plant under the APR. For the purpose of the audit, the following Sections of the APR were assessed to determine compliance:

### **Asphalt Plant Regulation (APR)**

#### **Section 3 – Registration Requirements**

3(1) Every owner or operator must register and provide the information required by subsection (2) within 30 days after acquiring the ownership of a hot-in-place asphalt recycling plant or hot mix asphalt plant

...

3(4) an owner or operator who operates in British Columbia outside the Greater Vancouver Regional District must...

(c) provide in writing, by January 31 of each year to a director, a statement which indicates the amount of asphalt produced from the registered hot-in-place or hot mix asphalt plant during the previous calendar year while operating in British Columbia

...

#### **Section 5 – Emission Limits and Operating Parameters**

5(1) The owner or operator of a hot-in-place asphalt recycling plant must not permit the discharge of emissions which exceed the concentration limits in Column 2 or the production limits in Column 3 set out opposite the parameter in Column 1 of Schedule A

...

#### **Section 6 – Monitoring Requirements**

6(2) Stack monitoring must be performed when required by a director and with the hot-in-place asphalt recycling plant operating at its maximum production rate as submitted under section 3(2)(h).

6(3) the following information must be collected when performing stack monitoring...

(f) the emission levels of those parameters as specified in Column 1 of Schedule A in the concentration and production units set out opposite in Columns 2 and 3;

...

## **Section 11 – Emission Limits and Operating Parameters**

11(1) The owner or operator of a hot mix asphalt plant manufactured on or after June 27, 1997 must not permit the discharge of emissions which exceed the concentration limits in Column 2 of Schedule B set out opposite the parameter in Column 1.

11(2) The owner or operator of a hot mix asphalt plant manufactured before June 27, 1997 and located in the Lower Fraser Valley must not permit the discharge of emissions which exceed the concentration limits in Column 2 of Schedule B set out opposite the parameter in Column 1.

11(2.1) The owner or operator of a hot mix asphalt plant manufactured before June 27, 1997 and located outside the Lower Fraser Valley must not permit the discharge of emissions which exceed the concentration limits in Column 3 of Schedule B set out opposite the parameter in Column 1.

11(2.2) The owner or operator of a hot mix asphalt plant manufactured before June 27, 1997 and located in the Prince George Area must not permit the discharge of emissions which exceed the concentration limits in Column 2 of Schedule B set out opposite the following parameters in Column 1:

(a) Particulates;

(b) Opacity;

(c) Carbon Monoxide.

11(2.3) Effective January 1, 2008, the owner or operator of a hot mix asphalt plant manufactured before June 27, 1997 and located in the Prince George Area must not permit the discharge of emissions which exceed the concentration limits in Column 2 of Schedule B set out opposite the Organics parameter in Column 1

...

## **Section 13 – Monitoring Requirements**

13(1) Stack monitoring on each hot mix asphalt plant aggregate dryer discharge must be performed....

(b) When the plant is operating at 80% or more of maximum plant production rate as submitted in the application for registration under section 3(2) (h) or as authorised by a director....

13(1.1) Stack monitoring must be performed

(a) Subject to paragraph (b), once in each calendar year, or

(b) Once in every second calendar year

(i) for a plant that produced 10,000 tonnes or more of hot mix asphalt in the previous calendar year, if the 3 most recent annual stack monitoring results for the plant

comply with the concentration limits for the discharge of emissions set out in Schedule B, or

(ii) For a plant that produced less than 10,000 tonnes of hot mix asphalt in the previous calendar year.

....

13(3) the following information must be collected when performing stack monitoring...

(h) Emission rate for particulates, organics and carbon monoxide in Schedule B expressed as grams per tonne of hot mix asphalt produced...

#### **Section 17 – Notification for Relocation of Mobile Plants**

17(1) The owner or operator of a mobile plant must provide notice to a director, in writing, at least 14 days before the relocation of the mobile plant, a plan of operation which includes all of the following:

(a) registration information submitted under section 3 (2)

...



## Appendix 2 – List of Authorized Asphalt Plants Included in the Audit

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## Appendix 2 – List of Authorized Asphalt Plants Included in the Audit

**Table 1 – List of plants included in the audit**

Authorization Number	Company Name	Authorization Number	Company Name
<b>Hot-in-Place Asphalt Recycling Plants</b>			
14243	Imperial Paving Limited	18107	Peter's Bros. Construction Ltd.
14503	Green Roads Recycling Ltd.	18285	Okanagan Aggregates Ltd.
14546	Peter's Bros. Construction Ltd.	107249	Arc Asphalt Recycling Inc.
17879	YCS Holdings Ltd. doing business as Pittman Asphalt		
<b>Hot Mix/Cutback Asphalt Plants</b>			
2677	O.K. Industries Ltd. doing business as Duncan Paving Company	15908	B.A. Blacktop Limited
2719	B A Dawson Blacktop Ltd.	15945	Peter's Bros. Construction Ltd.
2768	Island Asphalt Ltd.	16435	Okanagan Aggregates Ltd.
2801	Lafarge Canada Inc.	16860	Interoute Construction Ltd. doing business as Selkirk Paving Ltd.
3845	Lafarge Canada Inc. doing business as Columbia Bitulithic	17215	Pittman Asphalt, Div. of YCS Holdings Ltd.
3956	Tayco Paving Co. Ltd.	17812	Peter's Bros. Construction Ltd.
4086	Peter's Bros. Paving 1981 Ltd.	104836	R. D. Moyon Holdings Ltd. doing business as Center City Paving & Aggregate
5030	Alpine Paving 1978 Ltd.	105347	Dawson Construction Limited
5499	Dawson Construction Limited	105419	Power Paving Ltd.
6081	Capital City Paving Ltd.	106096	Vernon Paving Ltd.
6089	Emil Anderson Construction Co. Ltd.	106144	YCS Holdings Ltd. doing business as Pittman Asphalt
6471	Haylock Bros. Paving Ltd.	106255	Knelsen Rock Products Ltd.
7545	Selkirk Paving Ltd.	106630	Interoute Construction Ltd. doing business as DGS Astro Paving
8839	Lafarge Canada Inc. doing business as Rayner Bracht Construction	106636	Interoute Construction Ltd. doing business as Valley Blacktop
1121	Martens Asphalt Ltd.	106743	Hoban Equipment Ltd.
12008	Cantex Engineering and Construction Co. Ltd.	107819	Power Paving Ltd.
13373	Interoute Construction Ltd. doing business as DGS Astro Paving	107853	Interoute Construction Ltd. doing business as Selkirk Paving Ltd.
13596	Peter's Bros. Construction Ltd.	107877	Grandview Blacktop Ltd.
14518	Dawson Construction Limited	107923	YCS Holdings Ltd. doing business as Kentron Construction
14643	Dawson Construction Limited	108325	YCS Holdings Ltd. doing business as Adventure Paving
15170	Okanagan Aggregates Ltd.		





## Appendix 3 – Examples of Asphalt Plant Configurations

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## Appendix 3 – Examples of Asphalt Plant Configurations

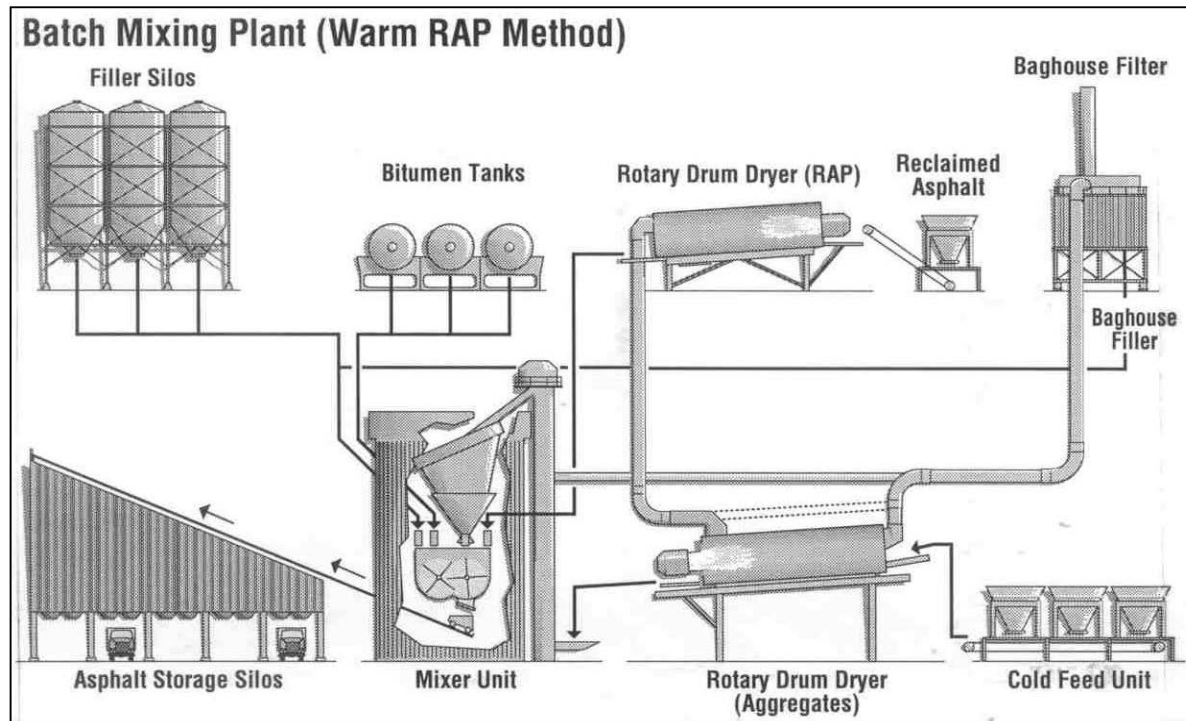


Figure 1 – An example of a hot-in-place batch mixing plant that is capable of recycling asphalt (Source: EPA 2007).

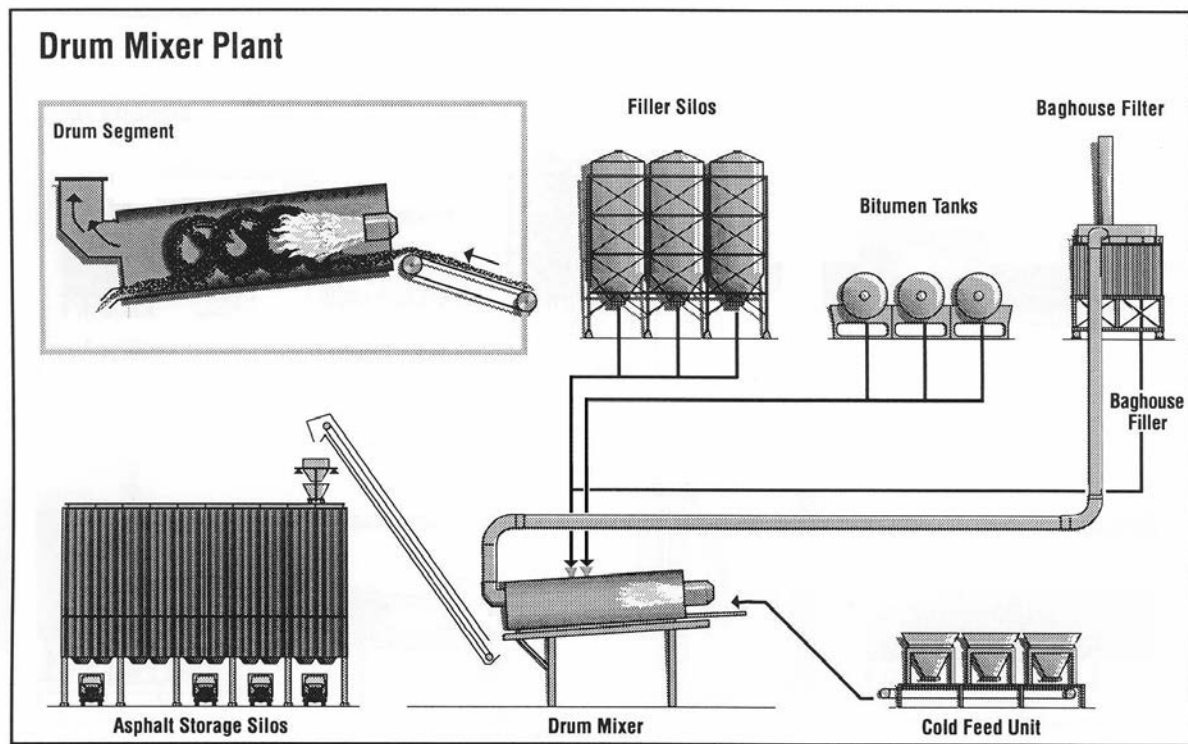


Figure 2 - An example of a hot mix drum mixer asphalt plant (Source: EPA 2007).



## Appendix 4 – Non-Compliance Decision Matrix

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## Appendix 4 – Non-Compliance Decision Matrix

		ESCALATING ENVIRONMENTAL, HUMAN HEALTH OR SAFETY (ACTUAL OR POTENTIAL)				
		LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
DIMINISHING LIKELIHOOD OF COMPLIANCE (COMPLIANCE HISTORY/WILLINGNESS AND CAPACITY TO COMPLY)	CATEGORY A (HIGH)	ADVISORY	ADVISORY - WARNING	WARNING - ORDER - ADMIN SANCTION - AP	ORDER - ADMIN SANCTION - AP - INVESTIGATION	INVESTIGATION  <div>Note: An investigation is always necessary prior to issuance of a <b>ticket</b>, recommendation of <b>formal charges</b> or use of <b>restorative justice</b> therefore these tools are not shown on the matrix. Depending on the outcome, an investigation could also culminate in the issuance of a warning, administrative sanction or penalty, or an order.</div>
	CATEGORY B	ADVISORY - WARNING	WARNING - AP	INVESTIGATION		
	CATEGORY C	WARNING - AP	WARNING - ORDER - ADMIN SANCTION - AP - INVESTIGATION			
	CATEGORY D	WARNING - ORDER - ADMIN SANCTION - AP				
	CATEGORY E (LOW)	ORDER - ADMIN SANCTION - AP - INVESTIGATION				

### Categories of Likelihood of Compliance

### Categories of Likelihood of Compliance

(Compliance History/Willingness and Capacity to Comply)

#### CATEGORY A - Indications of future and ongoing compliance are very high

- No previous occurrences of non-compliance;
- Good demonstrated awareness of and/or capacity to meet regulatory requirement; and/or
- Offender has a reasonable and cooperative attitude.

#### CATEGORY B - Indications of future and ongoing compliance are uncertain

- Few previous occurrences of non-compliance; and/or
- Questionable awareness of and/or capacity to meet regulatory requirement.

#### CATEGORY C - Indications of future and ongoing compliance are unlikely

- Numerous previous occurrences of non-compliance; and/or
- Little or no awareness of and/or capacity to meet regulatory requirement.

#### CATEGORY D - No indication of future and ongoing compliance

- Wilful violation of ministry regulatory requirement; and/or
- Little or no demonstrated willingness or capacity to meet regulatory requirement.

#### CATEGORY E - No indication of future and ongoing compliance

- Hindering or obstructing a ministry official;
- Refusing to furnish required information; and/or
- Intentionally including false or misleading information in any required document.

### Levels of Escalating Environmental, Human Health or Safety Impacts



### Levels of Escalating Environmental, Human Health or Safety Impacts

(Actual or Potential)

#### LEVEL 1

- Non-compliance that does not result or is unlikely to result in any environmental, human health or safety impact; or
- Minor administrative non-compliance.

#### LEVEL 2

- Non-compliance resulting in a minor, temporary impact to the environment or minor, temporary threat to human health or safety; or
- Significant administrative non-compliance.

#### LEVEL 3

- Non-compliance resulting in a moderate, temporary impact to the environment or moderate, temporary threat to human health or safety.

#### LEVEL 4

- Non-compliance resulting in a significant impact to the environment or significant threat to human health or safety (may be temporary or permanent).

#### LEVEL 5

- Known or likely human health impact that is severe in effect, i.e. resulting in hospitalization and/or long term human health consequences.