United States Environmental Protection Agency
Region 10, Air & Radiation Division
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Technical Support Document
Non-Title V Air Quality Operating Permit

Interstate Concrete & Asphalt - Pendleton

Purpose of Owner-Requested Non-Title V Operating Permit And Technical Support Document

Title 40 Code of Federal Regulations Section 49.139 establishes a permitting program to provide for the establishment of Federally-enforceable requirements for air pollution sources located within Indian reservations in Idaho, Oregon and Washington. The owner or operator of an air pollution source who wishes to obtain a Federally-enforceable limitation on the source's actual emissions or potential to emit must submit an application to the Regional Administrator requesting such limitation. The United States Environmental Protection Agency (EPA) then develops the permit via a public process. The permit remains in effect until it is modified, revoked or terminated by the EPA in writing.

This document, the technical support document, fulfils the requirement of 40 CFR § 49.139(c)(3) by describing the proposed limitation and its effect on the actual emissions and/or potential to emit of the air pollution source. Unlike the Operating Permit, this Technical Support Document is not legally enforceable. The permittee is obligated to follow the terms of the permit. Any errors or omissions in the summaries provided here do not excuse the permittee from the requirements of the permit.

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1. EPA Authority to Issue Non-Title V Permits

On April 8, 2005 the United States Environmental Protection Agency (EPA) adopted regulations (70 FR 18074) codified at 40 CFR Parts 9 and 49, establishing Federal Implementation Plans under the Clean Air Act for Indian reservations in Idaho, Oregon and Washington. One Federal Implementation Plan, commonly referred to as the Federal Air Rules for Reservations (FARR), put in place basic air quality regulations to protect health and welfare on Indian reservations located in the Pacific Northwest. This permit has been developed pursuant to 40 CFR § 49.139 which creates a non-Title V permitting program for establishing Federally-enforceable requirements for air pollution sources on Indian reservations.

2. Project Description

2.1 Background

Three federal air quality programs exist that apply to primarily major sources of air pollution: Prevention of Significant Deterioration (PSD) construction permits; Title V operating permits; and Maximum Achievable Control Technology (MACT) standards. The definition of "major source" is slightly different in each program, but is generally based on the amount of pollutants emitted by a source. A source that would otherwise be major can avoid these programs by voluntarily limiting emissions of the regulated pollutants to less than the thresholds for applicability in each program. The EPA's non-Title V permit program, created in the FARR, can be used by sources to establish limits for avoiding PSD permitting, Title V permitting and MACT standards.

2.2 Request Description

On September 7, 2010, the EPA Region 10 received an application from Pioneer Asphalt, Inc. requesting emission limits be established for their plant on the Umatilla Indian Reservation, to avoid being subject to the PSD and Title V permitting programs. The applicant has indicated that their facility's potential to emit is less than the MACT thresholds.

On July 10, 2019, the EPA Region 10 received an application requesting a Change of Ownership. The new facility name was changed to Interstate Concrete & Asphalt – Pendleton (permittee).

3. Facility Information

3.1 Ownership & Location

The hot mix asphalt plant and aggregate handling and crushing activities are owned and operated by Interstate Concrete & Asphalt. This non-Title V permit establishes emission limits on the operation of the permittee's plant on the Umatilla Indian Reservation in Oregon.

3.2 Facility Description

The permittee's stationary hot mix asphalt (HMA) and aggregate handling and crushing plant produces aggregate and hot mix asphalt. On March 1, 2010, in a letter to the permittee, the EPA determined that the aggregate and hot mix asphalt production processes constituted one source for purposes of air permitting.

<u>Aggregate Handling and Processing - Raw Products and Handling</u>
Aggregates and recyclable aggregate products are picked up off-site and hauled to this facility. Raw products are segregated into like products; i.e., natural gravels, quarried rock, concrete rubble, and

recycled asphalt pavement (RAP). Stockpiling of raw products involves the use of front-end loaders and/or dozers to consolidate stockpiles and conserve space. The permittee performs no rock or aggregate extraction (i.e. mining) on-site.

Aggregate processing is dependent on the type of raw product and desired finished product. However, quarried rock, concrete rubble and recycled asphalt pavement are generally all processed through the crushing plant. Natural gravels are generally processed through a combination of the crushing plant (aggregate sized over 1.5 inches) and the aggregate washing plant for aggregates sized less than 1.5 inches.

Aggregate Crushing Plant

The crushing plant is fed with a rubber-tired, front-end loader and/or dozer depending upon the materials being processed and availability of equipment. The Belt Feeder discharges to a belt leading to the Scalp Screen. The Scalp Screen is elevated to allow it to discharge passing material to either a bypass belt or Coarse Material Washer. The Scalp Screen sizes material for the Jaw Crusher. Materials generally sized larger than 3 inches in diameter are processed through the Jaw Crusher, and the remaining material is bypassed via the bypass belt. The Jaw Crusher and bypass belt discharge on the conveyor to Screen #2. Screen #2 separates materials to be processed by the Cone Crusher, Surge Hopper – Impact Crusher or the Splitter. The Cone Crusher is "Closed Circuited" on this screen. The Splitter divides materials to be processed by either Screen #3 or the Kolman Screen via separate conveyors. Both of these screens can return materials to the Surge Hopper-Impact Crusher or stockpile conveyors. The Surge Hopper-Impact Crusher processes materials from 1.5 inches to various minus requirements depending upon the desired final product gradation.

Dust suppression is provided by the addition of water spray and fogging at conveyor discharge points and by the addition of water spray in the Cone Crusher.

Aggregate Washing Plant

The aggregate washing plant can be integrated with the crushing plant via the Scalp Screen or run independently via a separate feeder if raw materials are appropriately sized. However, generally, raw material is fed from the Scalp Screen to the Coarse Material Washer which washes the soils from the larger rock. Processed material is transferred from this unit to the Washing Screen where the material is further cleaned and sized. The sand is washed into the Sand Screw and the other sizes discharged to various belts for stockpiling. The Sand Screw further cleans the sands and discharges to a conveyor for stockpiling. The effluent from both the Coarse Material Washer and Sand Screw are discharged to settling ponds to allow time for particulates to settle before recycling as water to be used again in the washing process.

Finished Aggregate Material Handling

Finished aggregate products are stockpiled with a rubber-tired, front-end loader. These materials are then loaded into the Concrete Plant, Asphalt Plant or trucks for delivery to off-site projects/customers. Dust suppression for the material storage yard is provided by watering haul routes in unpaved areas and sweeping and flushing in the paved areas.

Hot Mix Asphalt Batch Plant - Raw Products and Handling

Aggregate materials are loaded into the Cold Aggregate Feed with a rubber-tired, front-end loader. Liquid asphalt products are delivered by contract haulers in insulated trucks and trailers. These products are then pumped into heated storage tanks adjacent to the batch plant.

Hot Mix Asphalt Drum Dryer and Mixer Plant

Aggregates are fed from the cold aggregate feed by conveyor to a single deck scalping screen for removal of any oversize materials. The material passing the screen is fed to the front of the aggregate dryer. The dryer is utilized to remove moisture from the aggregates, and mix in recycled asphalt and liquid asphalt with the dried aggregate. The dryer operates at a discharge temperature of 290-320 degrees Fahrenheit depending upon the mixing temperature requirements of the liquid asphalt being utilized. The dust blown from the dryer is routed to the baghouse, which filters the dust. The airflow passing through the bags is discharged from the stack of the baghouse exhaust fan. The dust removed by the baghouse is returned to the mixer portion of the dryer for incorporation into the hot mix asphalt product. The hot mix asphalt mixture discharged from the drier/mixer drops into a slate conveyor where it is transferred to the hot mix asphalt storage silo for storage until trucks are available to haul the mixture to various projects/customers.

The parallel-flow drum dryer and mixer is heated by burners fueled by propane or natural gas. Hot mix asphalt is stored in an above-ground storage tank, kept in a liquid state using a 2.50 MMBtu-per-hour heater. All fuels are stored in above-ground tanks. Electrical power is provided by a connection to the local grid. The facility Standard Industrial Classification code is 2951, Asphalt Paving Mixtures and Blocks. The drum dryer emissions are controlled by a baghouse (fabric filter). Water may be applied to aggregate crushing equipment and traffic areas to control fugitive dust.

Table 1 lists and describes the emission units and emission controls for the plant.

Table 1: Emission Units (EU)

EU #	Source Description	Emission Controls
1	**Aggregate Crushed Stone Processing Operations**: Telsmith 25x40 Jaw Crusher, Telsmith 48S Cone Crusher, Barmac MkII9600 Impact Crusher (Surge Hopper-Impact Crusher)	Water spray and fogging
2	**Aggregate Handling:** Aggregate transfer from crusher to surge piles; Aggregate transfer from inbound trucks to surge piles; Aggregate transfer from surge piles to stock piles; and Aggregate transfer from stock piles to HMA bins.	None
3	**Aggregate Wind Erosion:** Wind erosion of all exposed areas including piles	None
4	**Aggregate Truck and Loader Traffic:** Road dust caused by truck and loader traffic on paved and unpaved roads.	Water or dust palliative applications
5	**HMA Drum Dryer**: Pioneer 7.5 foot drum mixer; parallel-flow design drum; 300 ton/hour rated capacity; RAP capability; 50 MMBtu/hr burner, fueled with propane or natural gas only	65,000 ACF baghouse with 125 hp fan*
6	**Asphalt Tank Heater**: Heatec HOH-150; 2.50 MMBtu/hr; fueled with propane or natural gas only	
7	**5 - Storage Tanks:** **(1) Liquid Asphalt Cement Storage Tank:** 26,000 gallon capacity; heated (see tank heater) **(2) Liquid Asphalt Cement Storage Tank:** 12,000 gallon capacity; heated (see tank heater) **(3) Liquid Emulsion Storage Tank:** 10,000 gallon capacity to supply drum dryer	None

EU #	Source Description	Emission Controls
	(4) Propane Fuel Tank: 20,000 gallon capacity tank to supply drum dryer **(5) Propane Storage Tank:** 3,000 gallon capacity tank trailer to supply asphalt heater	
8	**Asphalt Aggregate Handling**: via trucks, loader and conveyors; to and from piles and to drum dryer; includes RAP and concrete rubble	None
9	**Asphalt Silo Filling**: via conveyor from drum dryer	None
10	**Asphalt Truck Loading and Fumes**: HMA truck load-out from silos and fumes from loaded truck bed while in plant	None
11	**Asphalt Traffic**: Trucks for loading and delivery of HMA product and Asphalt truck delivering asphalt to the HMA plant.	Water application

* All known emission controls are listed – required controls are noted with an asterisk

3.3 Local Air Quality

This reservation is currently unclassifiable or attains the national ambient air quality standards for all criteria pollutants. An area is unclassifiable when there is insufficient monitoring data. Areas of the country where air pollution levels exceed the national ambient air quality standards are designated "nonattainment." Note that PSD applies only in attainment and unclassifiable areas. Ambient air quality designations are presented in 40 CFR Part 81.

4. Regulatory Analysis and Permit Content

4.1 Evaluation of Request

The Clean Air Act requires all major sources to obtain a PSD permit to construct and a Title V permit to operate. Major sources of hazardous air pollutants (HAP) are also subject to the MACT program. The definition of "major" and the criteria for qualifying as a major source are slightly different for each of the three programs. HMA plants that have the potential to emit (PTE) 250 tons per year or more are subject to PSD. Sources that have the potential to emit 10 tons per year or more of any individual HAP or 25 tons per year or more of any combination of HAPs emitted (including fugitive emissions) are subject to the MACT program. Sources that have the potential to emit 100 tons per year or more or that are major for PSD or MACT purposes, are subject to Title V. PTE is based on the source's maximum capacity, operating 8760 hours per year and only considers emission controls or limits that are enforceable. Source categories subject to a New Source Performance Standard (NSPS) that was promulgated as of August 7, 1980, must count fugitive as well as non-fugitive criteria pollutants when determining major source status. NSPS Subpart I, originally promulgated in 1973, applies to HMA plants, so fugitive emissions must be counted when determining major source status for HMA plants.

As shown in Table 2, Interstate's HMA and aggregate plant has the potential to emit more than 250 tpy of PM and 100 tpy of CO, PM10, and PM2.5. The PTE of GHG emissions is predicted to be less than the major source threshold of 100,000 tpy on a carbon dioxide equivalent (CO2e) basis. Lead emissions are predicted to be nonexistent and well below the Title V and MACT applicability thresholds. HAP (total and individual) emissions are predicted to be well below the Title V and MACT applicability thresholds. See Appendix A for emission inventory details. Without enforceable emission limits Interstate's operation would be subject to PSD and Title V.

Table 2: Potential to Emit (PTE)

#	Emission Unit	Annual Potential Emissions (tons per year)[1]										
		CO	Pb	NOx	PM	PM10	PM2.5	SO2	VOC	GHG	HAP	HAPs
1	Aggregate Crushers	0	0	0	459	132	132	0	0	0	0	0
2	Aggregate Handling	0	0	0	7	3	<1	0	0	0	0	0
3	Aggregate Wind Erosion	0	0	0	<1	<1	0	0	0	0	0	0
4	Aggregate Traffic	0	0	0	188	51	5	0	0	0	0	0
5	Asphalt Drum Dryer	171	0	34	52	78	78	11	42	42,296	4	7
6	Asphalt Tank Heater	5	0	9	2	2	2	0	<1	8,459	<1	<1
7	Asphalt Storage Tanks	0	0	0	0	0	0	0	<1	0	<1	<1
8	Asphalt Aggregate Handling	0	0	0	11	5	<1	0	0	0	0	0
9	Asphalt Silo Filling	2	0	0	<1	<1	<1	0	16	0	<1	<1
10	Asphalt Truck Loading & Fumes	13	0	0	10	10	10	0	7	0	<1	<1
11	AsphaltTraffic	0	0	0	27	2	<1	0	0	0	0	0
	Calculated PTE	191	0	43	756	283	229	11	66	50,755	5	8
	New PTE Limits[2]	80	N/A	N/A	200	80	80	N/A	N/A	N/A	N/A	N/A

[1] Carbon monoxide; lead; nitrogen oxides; particulate matter; particulate matter less than 10 microns and 2.5 microns; sulfur dioxide; volatile organic compounds; Greenhouse Gases on a CO_2e basis; highest plant wide single HAP (Formaldehyde); total hazardous air pollutants.

[2] The PTE is capped by new limits created in this non-Title V permit.

The emission estimates considered each applicable emission limit paired with the fuel type that can be used by the equipment to determine the worst-case emissions that are allowed, assuming full-time operation at full capacity, which would produce approximately 1,971,000 tons of aggregate and 2,628,000 tons of HMA per year. Note that individual HAP PTE estimates were based on natural gas fuel for any single HAP. Source-wide HAP PTE was a summation of the emission units' total HAP PTE. PTE was also limited by applicable NSPS and FARR emission limits when the limits resulted in lower emissions than available emission estimation techniques predicted. Emission testing performed in 2010 demonstrated that actual PM emissions met the NSPS limit. The permittee can use the site-specific PM data to develop an emission factor for use when reporting actual emissions.

As explained in Section 2.2 above and in Table 2, to avoid being subject to Title V and PSD, the permittee has requested PTE limits (called synthetic minor limits) be created in a non-Title V permit. The permittee anticipates only seasonal operations, resulting in production of less than 24% (468,000 tpy of aggregate and 624,000 tpy of HMA) of the potential production (2.0 million tpy of aggregate and 3.5 million tpy of HMA) used in the emission estimates. At the lower production rate and using propane or natural gas fuels, the permittee is confident that its actual emissions will be well below the emission limits requested. Actual emissions will be determined using actual production rates, fuels and control efficiencies. If better emission factors (e.g. developed by testing the emissions from this source) are available that better reflect actual emissions, then those factors should be used. As described in more detail in Section 4.3, the permit will limit emissions on a rolling 12-month basis to:

- Not more than 200 tpy for PM (avoids PSD)

- Not more than 80 tpy for CO, PM10, and PM2.5 (avoids Title V)

A majority of the PM, PM10 and PM2.5 emissions, respectively, from this plant are expected to be fugitive emissions. Emission estimates do not take into account any unenforceable emission reductions techniques that the permittee might use (e.g. road watering) to comply with the fugitive dust or visible emission requirements that may apply. Techniques exist for quantifying emission reductions due to road watering. If the permittee relies upon controls to lower actual emissions, the EPA will require adequate documentation of the emission reduction techniques and applicable operational parameters that the quantification techniques employ. The permittee should discuss the use of such techniques with the EPA before using them for calculation, compliance and reporting purposes.

The emission inventory in Appendix A includes rock handling and crushing emission units because the permittee has indicated to the EPA that operation of these types of emission units are in support of the HMA plant. As explained in the EPA's letter of March 1, 2010 to the permittee, the facility's rock handling and crushing operation must be considered part of the HMA plant. Accordingly, the permittee will be required to account for the emissions from the rock handling and crushing operation, along with the HMA plant, to document compliance with the emission limits in this permit.

4.2 Other Federal Requirements

As part of EPA Region 10's direct federal implementation and oversight responsibilities, EPA Region 10 has a trust responsibility to each of the 271 federally recognized Indian tribes within the Pacific Northwest and Alaska. The trust responsibility stems from various legal authorities including the U.S. Constitution, Treaties, statutes, executive orders, and historical relations with Indian tribes. In general terms, the EPA is charged with considering the interest of tribes in planning and decision making processes. Each office within the EPA is mandated to establish procedures for regular and meaningful consultation and collaboration with Indian tribal governments in the development of EPA decisions that have tribal implications.

EPA Region 10's Office of Air, Waste and Toxics has contacted the Confederated Tribes of the Umatilla Indian Reservation to invite consultation on the Interstate Non-Title V operating permit application.

Endangered Species Act (ESA) – The EPA is obligated under ESA, Section 7, 16 U.S.C. §1531, to consider the impact that a federal project may have on listed species or critical habitats. The EPA considers ESA issues in the context of permitting decisions on a case-by-case basis. Based on the fact that the permit contains voluntarily-requested emission limits to an existing operation, it is the EPA's conclusion that the issuance of this permit will not affect a listed species or critical habitat. Therefore, no additional requirements will be added to this permit for ESA reasons. The EPA's no effect determination concludes the EPA's obligations under Section 7 of the ESA. (See Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species ACT, FWS and NMFS, March 1998, at Figure 1).

National Environmental Policy Act (NEPA) Review – Under Section 793(c) of the Energy Supply and Environmental Coordination Act of 1974, no action taken under the Clean Air Act shall be deemed a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969. This permit is an action taken under regulations implementing the Clean Air Act and is therefore exempt from NEPA.

National Historic Preservation Act (NHPA) – This project involves establishing limits on air emissions. No part of the facility will be physically altered directly as a result of this permit. Consequently, no adverse effects are expected, and further review under NHPA is not indicated.

Environmental Justice (EJ) – Under Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, signed on February 11, 1994, the EPA is directed, to the greatest extent practicable and permitted by law, to make achieving Environmental Justice (EJ) part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States.

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies. Meaningful involvement means that people have an opportunity to participate in decisions about activities that may affect their environment and/or health; the public's contribution can influence the regulatory agency's decision; their concerns will be considered in the decision making process; and the decision makers seek out and facilitate the involvement of those potentially affected. The EPA's goal is to provide an environment where all people enjoy the same degree of protection from environmental and health hazards and equal access to the decision-making process to maintain a healthy environment in which to live, learn, and work.

The EPA will solicit and will consider public input prior to final decision-making consistent with the FARR's Rule for Non-Title V Operating Permits – 40 CFR § 49.139. See Section 5.2 of this TSD for further details.

The EPA uses census tract data to help determine whether minority populations and low-income populations reside in an area to be impacted by a proposed permitting action. The EPA transposes onto maps the EJ indicators for people of color and poverty to help illustrate the project's physical proximity to EJ communities. For the benefit of communities living on Indian Reservations in the Pacific Northwest, maps displaying EJ indicators for people of color and poverty are available at the following the EPA Region 10 website: http://yosemite.epa.gov/R10/ocrej.nsf/environmental+justice/maps.

The proposed permit action does not authorize the permittee to generate new or additional air emissions, and by extension does not authorize new air quality impacts. The EPA has no information to suggest that issuance of this Non-Title V operating permit will result in a disproportionately high and adverse human health or environmental effect upon minority populations and low-income populations.

4.3 Permit Conditions

The permit establishes PTE limits as well as monitoring, recordkeeping and reporting requirements necessary to assure compliance with the limits. The permit is organized into four sections as follow:

1. General Conditions
2. Emission Limits and Work Practice Requirements
3. Monitoring and Recordkeeping Requirements
4. Reporting Requirements

An explanation of each condition in the permit follows:

Permit Section 1, General Conditions

Permit Condition 1.1 clarifies that the permitted source is a hot mix asphalt drum dryer and mixer as well as other ancillary equipment used as part of the process to produce hot mix asphalt (HMA) in combination with aggregate handling and crushing activities.

Permit Condition 1.2 requires the permittee to comply with the conditions in the permit.

Permit Condition 1.3 states that compliance with the permit (and site-specific conditions) allows the permittee to operate at the specified location.

Permit Condition 1.4 states that the permit does not relieve the permittee from complying with any other federal, tribal, state, or local laws or requirements that apply. This permit only creates owner-requested limits for the purposes explained above. The permit does not contain other Clean Air Act requirements to which the permitted facility is or may be subject, such as the FARR; New Source Performance Standards, 40 CFR Part 60; and National Emissions Standards for Hazardous Air Pollutants, 40 CFR Part 61, and 63. If in the future, the permittee chooses to relax the limits in Permit Section 2 such that the facility becomes a major source, additional permitting requirements may apply.

Permit Section 2, Emission Limits and Work Practice Standards

Permit Conditions 2.1 to 2.4 limit the PTE of the facility to 80% of the major source thresholds for PSD (PM), and Title V (CO, PM10, and PM2.5). The thresholds for each program are 250 tpy for PSD and 100 tpy for Title V. The non-Title V limits effectively restrict emissions for PSD purposes with the exception of PM which is no longer considered a regulated pollutant for Title V applicability purposes (which is the reason the limit is 200 tpy). These synthetic minor limits allow the permittee to be treated as a minor source for permitting purposes. Each limit is written as a rolling 12-month total where each month, actual emissions must be totaled for the last 12 months to determine compliance with the ton per year limit. Emission factors are relied upon for calculating actual emissions.

Limiting emissions to a value less than the major source threshold levels are necessary to account for the unknown uncertainty in the calculations employed when determining actual emissions generated by this source. Limiting these "calculated emissions" to a fraction of the threshold level helps assure that actual emissions remain below the major source threshold level. According to the Clean Air Act Stationary Source Compliance Monitoring Strategy, synthetic minor sources with PTE limits at 80 to 100% of the major source thresholds will be inspected on a once every five year frequency. Setting the limits within that range will help to ensure adequate compliance assurance.

Permit Condition 2.5 requires that, consistent with the application submitted, the permittee limit fuels combusted in the asphalt drum dryer and asphalt tank heater to only propane or natural gas. Use of a different fuel could require additional permit requirements.

Permit Condition 2.6 requires good operation of the fuel burning equipment (drum dryer and tank heater) and the drum dryer baghouse. Good operation generally implies proper operation and good maintenance of equipment - burner tuning and baghouse bag inspection and replacement as needed. The emission factors relied upon in this permit are assumed to reflect good operation, so good maintenance and operation of the equipment is necessary to ensure the factors are representative of actual operations. This permit condition also requires the baghouse be operated at all times the drum dryer is operated and receives any emissions generated by the drum dryer, again, to assure a level of emission control that reflects good operation and the emission factors relied upon.

Permit Section 3, Monitoring and Recordkeeping Requirements

Permit Conditions 3.1 to 3.5 Visible Emission Monitoring and Recordkeeping - These conditions require a daily survey (a plant walkthrough) for visible emissions, from the drum dryer baghouse stack, as well as specific follow-up steps (investigation, corrective action, RM9 observation and additional recordkeeping and reporting) if visible emissions are observed. If observed visible emissions cannot be eliminated within 24 hours, a RM9 opacity observation must be performed. Records of all surveys and observations are required to be kept for a period of five years. This requirement will help ensure that emissions do not exceed the limits created by this permit.

Permit Condition 3.6 Baghouse Inspection and Recordkeeping - This permit condition requires an annual internal inspection of the baghouse to check for wear, corrosion and bag degradation, blinding or channeling that could impair the performance of the unit. Again, the requirement to inspect and appropriately maintain the baghouse is believed to be necessary to ensure the emission factors used in the monthly compliance evaluation represent actual operations.

Permit Condition 3.7 Operations and Production Records - The permittee must track and record the operations and production of the plant, including aggregate handling and crushing equipment aggregated with this asphalt plant, such that facility-wide emissions can be reliably calculated on a monthly and 12-month basis and for troubleshooting compliance concerns. Records shall include all information necessary to perform emission calculations as required by Permit Condition 3.9. Emission estimation techniques, and the data needed, are described in detail in Appendix A to this TSD. Most of the data (production, fuel usage, baghouse pressure drop and fugitive dust controls) must be recorded each day. Other data, such as fuel sulfur and ash content, must be documented for each fuel load or through actual measurements to represent what is being burned at any time. Pursuant to Permit Condition 2.6, the drum dryer exhaust is required to be routed to the baghouse at all times and the baghouse must be kept in good operational condition. Permit Condition 3.6 requires the baghouse internals to be inspected annually. The permittee must document any period of operation when (1) the drum dryer exhaust is not routed to the baghouse and (2) the baghouse is not in good operation to assure compliance with Permit Condition 2.6.

Permit Condition 3.8 Equipment Installation – Some monitoring requirements will require the permittee to have equipment to indicate the operational parameters that must be recorded. The permittee can also automate some recordkeeping systems to assure data is recorded. For instance, baghouse pressure drop requires pressure reading instrumentation and can be linked to recording equipment. Some combustion devices can also be equipped with fuel usage measurement and recording instrumentation. All records can be manually recorded by plant personnel using the technique (or "system") the permittee determines is appropriate to comply with the permit. If monitoring equipment will be installed and used, this condition requires it to be appropriately calibrated and maintained.

Permit Condition 3.9 Emissions Calculations – Because compliance with the synthetic minor emission limits created in this permit must be determined on a rolling 12-month basis, this condition requires the permittee to confirm compliance with the emission limits in the permit every month. Permittees with EPA-issued permits that contain synthetic minor limits should always collect the necessary data to calculate emissions from its plant. This will allow them to be able to produce accurate emissions calculations for any period of time necessary. If the recordkeeping is routine for the plant personnel, it is also less likely that the source will make recordkeeping errors during the time it needs to report to the EPA.

The emission calculations should be based on the best emission factors available and actual operational and production data. Calculations should be performed as they are described in Appendix A; however, assumptions in Appendix A should be verified as needed and when better information is available, it should be used. For instance, emission factors from site-specific emission testing would likely be more

representative than basing emission on NSPS limits or AP-42. Techniques used for the calculations, including any new assumptions, must be clearly documented and acceptable to the EPA.

Permit Condition 3.10 Records Retention – This requirement, to keep all of the required records on site for a period of five years, makes the permit consistent with the other EPA recordkeeping requirements.

Permit Section 4, Reporting Requirements

Permit Condition 4.1 Notification of Deviations – To expedite the time it takes for the EPA to learn that the permittee is having compliance problems, this condition lists the information and timing for notifying the EPA about deviations from permit conditions. Operating circumstances that are of greatest concern (baghouse not operating or functioning improperly) must be reported by telephone within 24 hours of discovery with written follow-up within 10 days. Calculated exceedances of the permit emission limits are required to be reported in writing within 10 days of discovery. Notifications should include a clear, complete explanation of the exceedance or situation that warrants the notification so the EPA understands the severity of the situation.

Permit Condition 4.2 Annual Report – If the permittee operated during a given calendar year, the permittee must submit an emission report to the EPA that provides a summary of the operations (dates) and each calculated monthly and 12-month rolling emission total required in Permit Condition 3.9, including any 12-month totals exceeding the permit limits that were previously sent to the EPA under the deviation notification requirement in Permit Condition 4.1. The emission report is due annually by February 15 following any year in which the source operated. If the source operates every year, the source is required to report every year by February 15.

While monthly emissions data might show up in more than one report, each 12-month rolling total should only be reported once. Note that the emission report required by this permit is different than the annual registration report required by 40 CFR 49.138 in the FARR.

Permit Condition 4.3 and 4.4 Mailing Addresses and Telephone Numbers – The telephone number for telephone notifications has been included here. Copies of all notifications and reports must be sent to the Tribal environmental contact listed that represents the reservation on which the source operates.

5. Permit Procedures

5.1 Permit Revisions, Termination and Reissuance

The permittee should contact the EPA if they are considering requesting any revision to the conditions of this permit. The EPA will evaluate the regulatory options available to the permittee and advise them of same.

If the permittee wishes to terminate the permit, a written request must be submitted to the EPA explaining the reasons for the request and, if necessary for continued operation, submitting applications for any Clean Air Act permits or approvals that the permittee avoided by establishment of the limits contained in this permit.

This permit may be terminated, revised, or revoked and reissued by the EPA for cause. Cause exists to terminate, revise, or revoke and reissue this permit under the following circumstances:

1. This permit contains a material mistake;
2. Inaccurate statements were made in establishing the terms or conditions of this permit;

3. The permittee fails to comply with any condition of this permit; or
4. This permit must be terminated, revised, or reopened and reissued to assure compliance with Clean Air Act requirements.

5.2 Public Notice and Comment

As required under 40 CFR § 49.139(c), the draft operating permit will be publicly noticed and made available for public comment as follows:

1. Make available for public inspection a copy of the draft operating permit prepared by the EPA, the technical support document for the draft permit, the application, and all supporting materials including at least one location in the area affected by the air pollution source (see 40 CFR 49.139(c)(5)(i));
2. Publish public notice for this draft permit of the availability of the draft permit and supporting materials and of the opportunity to comment in a newspaper of general circulation (see 40 CFR 49.139(c)(5)(ii));
3. Provide copies of the notice to the owners or operators of the air pollution source, the Tribal governing body, and the Tribal environmental organizations as well as Oregon Department of Environmental Quality (see 40 CFR 49.139(c)(5)(iii)); and
4. Provide for a 30-day period for submittal of public comments, starting upon the date of publication of the notice (see 40 CFR 49.139(c)(5)(iv)).

As required in 40 CFR 49.139(c)(5)(iv) and (c)(6), the EPA will address any public comments in preparing a final permit and technical support document and will document a response to each comment explaining whether any changes to the permit resulted and the reason the change was or was not made. As required in 40 CFR 49.139(c)(7), the EPA will send the final permit and technical support document to each person who provided comments on the draft permit to operate and the EPA will make available the final permit and technical support document at all of the locations where the draft permit was made available.

The draft permit and technical support document were made available during a public comment period that lasted from July 2, 2013 to August 3, 2013. No comments were received during this time.

6. Abbreviations and Acronyms

AFS	Aerometric Information Retrieval System Facility Subset
CFR	Code of Federal Regulations
CO	Carbon monoxide
EJ	Environmental Justice
EPA	United States Environmental Protection Agency (also U.S. EPA or EPA)
ESA	Endangered Species Act
FARR	Federal Air Rules for Reservations
FR	Federal Register
HAP	Hazardous air pollutant (plural: HAPs)
HMA	Hot mix asphalt
MACT	Maximum Achievable Control Technology (Title 40 CFR Part 63)
NESHAP	National Emission Standards for Hazardous Air Pollutants (Title 40 CFR Parts 61 and 63)
NHPA	National Historical Preservation Act
NOx	Nitrogen oxides
NSPS	New Source Performance Standards (40 CFR Part 60)

PM	Particulate matter
PM10	Particulate matter ≤ 10 micrometers
PM2.5	Particulate matter ≤ 2.5 micrometers
PSD	Prevention of Significant Deterioration (40 CFR Part 52)
PTE	Potential to emit
RAP	Recycled asphalt pavement
SO2	Sulfur dioxide
Title V	Title V of the Clean Air Act
TPY	Tons per year
TSD	Technical Support Document
VOC	Volatile organic compound

Appendix A

Emission Inventory

Interstate Concrete & Asphalt - Pendleton

Technical Support Document
Non-Title V Air Quality Operating Permit
R10NT502401

Summary of Facility Potential Criteria Air Pollutant Emissions

Potential to Emit, (tons per year)

Aggregate Handling and Crushing Activities

	EU1 Aggregate Crushers	EU2 Aggregate Handling	EU3 Aggregate Wind Erosion	EU4 Aggregate Traffic	**Total**
Carbon Monoxide (CO)	0.0	0.0	0.0	0.0	0.0
Lead (Pb)	0.0	0.0	0.0	0.0	0.0
Nitrogen Oxides (NOx)	0.0	0.0	0.0	0.0	0.0
Particulate (PM)	459.1	6.8	0.2	187.5	653.5
Fine Particulates ≤ PM10 (PM10)	131.5	3.2	0.1	50.5	185.2
Fine Particulates ≤ PM2.5 (PM2.5)	131.5	0.5	0.0	5.1	137.1
Sulfur Dioxide (SO2)	0.0	0.0	0.0	0.0	0.0
Volatile Organic Compounds (VOC)	0.0	0.0	0.0	0.0	0.0
Greenhouse Gases (CO_2e)	0.0	0.0	0.0	0.0	0.0

Hot Mix Asphalt Plant (Point and Fugitive Sources)

	EU5 Drum Mixer (Point Source)	EU6 Asphalt Tank Heater (Point Source)	EU7 Storage Tanks (Point Sources)	EU8 Aggregate Handling (Fugitive Source)	EU9 Silo Filing (Point Source)	EU10 Asphalt Truck Loading & Fumes (Point Source)	EU11 Traffic (Fugitive Source)	**Total**
Carbon Monoxide (CO)	170.8	5.1	0.0	0.0	1.6	13.3	0.0	190.8
Lead (Pb)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nitrogen Oxids (NOx)	34.2	8.9	0.0	0.0	0.0	0.0	0.0	43.0
Particulate (PM)	52.3	2.0	0.0	10.7	0.8	9.7	27.0	102.4
Fine Particulates ≤ PM10 (PM10)	77.8	2.0	0.0	5.1	0.8	9.7	2.4	97.7
Fine Particulates ≤ PM2.5 (PM2.5)	77.8	2.0	0.0	0.8	0.8	9.7	0.7	91.7
Sulfur Dioxide (SO2)	11.2	0.0	0.0	0.0	0.0	0.0	0.0	11.2
Volatile Organic Compounds (VOC)	42.0	0.5	0.6	0.0	16.0	6.5	0.0	65.7
Greenhouse Gases (CO_2e)	42295.6	8459.1	0.0	0.0	0.0	0.0	0.0	50754.7

TOTAL SOURCE POTENTIAL TO EMIT

	Total
Carbon Monoxide (CO)	**190.8**
Lead (Pb)	0.0
Nitrogen Oxides (NOx)	43.0
Particulate (PM)	**755.9**
Fine Particulates < PM10 (PM10)	**282.9**
Fine Particulates < PM2.5 (PM2.5)	**228.8**
Sulfur Dioxide (SO2)	11.2
Volatile Organic Compounds (VOC)	65.7
Greenhouse Gases (CO_2e)	50754.7

Total Source PTE Limits

Carbon Monoxide (CO)	80	tpy, based on emission limit in FARR Non-Title V permit
Lead (Pb)	N/A	
Nitrogen Oxides (Nox)	N/A	
Particulates (PM)	200	tpy, based on emission limit in FARR Non-Title V permit
Fine Particulates (PM10)	80	tpy, based on emission limit in FARR Non-Title V permit
Fine Particulates (PM2.5)	80	tpy, based on emission limit in FARR Non-Title V permit
Sulfur Dioxide (SO2)	N/A	
Volatile Organic Compounds (VOC)	N/A	
Greenhouse Gases (GHGs)	N/A	

Note 1. The "Total Source Potential To Emit" table sums the values in the "Aggregate Handling and Crushing Activities" and "Hot Mix Asphalt" tables above.

Summary of Facility Potential Hazardous Air Pollutant (HAP) Emissions

Potential to Emit, (tons per year)

Inorganics	EU 5 Drum Dryer	EU 6 Asphalt Tank Heater	EU 7 Storage Tanks	EU 9 Silo Filling	EU 10 Truck Loading & Fumes	Single HAP Plantwide Totals (tpy)
Antimony Compounds	2.37E-04	0.00E+00				2.37E-04
Arsenic Compounds (incl arsine)	7.36E-04	1.21E-05				7.48E-04
Beryllium Compounds	0.00E+00	7.27E-07				7.27E-07
Cadmium Compounds	5.39E-04	6.67E-05				6.05E-04
Chromium Compounds (incl hexavalent)	7.23E-03	8.49E-05				7.31E-03
Cobalt Compounds	3.42E-05	5.09E-06				3.93E-05
Lead Compounds (not elemental lead)	8.15E-04	3.03E-05				8.45E-04
Manganese Compounds	1.01E-02	2.30E-05				1.01E-02
Mercury Compounds	3.15E-04	1.58E-05				3.31E-04
Nickel Compounds	8.28E-02	1.27E-04				8.29E-02
Phophorus Compounds	3.68E-02	0.00E+00				3.68E-02
Selenium Compounds	4.60E-04	1.45E-06				4.61E-04
Organics						0.00E+00
Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acrolein	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	5.12E-01	1.27E-04	1.78E-02	5.12E-03	3.59E-03	5.39E-01
Bromomethane (methyl bromide)	0.00E+00	0.00E+00	2.72E-03	7.85E-04	6.63E-04	4.17E-03
1,3-Butadiene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon Disulfide	0.00E+00	0.00E+00	8.88E-03	2.56E-03	8.98E-04	1.23E-02
Chloroethane (ethyl chloride)	0.00E+00	0.00E+00	2.22E-03	6.41E-04	1.45E-05	2.87E-03
Chloromethane (methyl chloride)	0.00E+00	0.00E+00	1.28E-02	3.68E-03	1.04E-03	1.75E-02
Cumene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dichlorobenzene	0.00E+00	7.27E-05	0.00E+00	0.00E+00	7.60E-03	7.67E-03
Dioxin (2,3,7,8 tetrachlorodibenzo-p-dioxin)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethyl Benzene	3.15E-01	0.00E+00	2.11E-02	6.09E-03	1.93E-02	3.62E-01
Formaldehyde	4.07E+00	4.55E-03	3.83E-01	1.10E-01	6.08E-03	4.58E+00
Furans (all PCDF)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hexane (incl n-Hexane)	1.21E+00	1.09E-01	5.55E-02	1.60E-02	1.04E-02	1.40E+00
Hydrochloric Acid (hydrogen chloride or HCL)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Isooctane (2,2,4-trimethylpentane)	5.26E-02	0.00E+00	1.72E-04	4.96E-05	1.24E-04	5.29E-02
Methyl Chloride (chloromethane)	0.00E+00	0.00E+00	1.50E-04	4.32E-05	0.00E+00	1.93E-04
Methyl Chloroform (1,1,1-trichloroethane)	6.31E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.31E-02
Methyl tert-Butyl Ether (MTBE)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene[1] (also a POM)	1.18E-01	3.70E-05	0.00E+00	6.07E-03	2.37E-02	1.48E-01
Phenol	0.00E+00	0.00E+00	0.00E+00	3.94E-03	2.23E-02	2.63E-02
Polycyclic Organic Matter* (incl naphthalene)	2.46E-01	4.23E-05	0.00E+00	3.81E-02	4.47E-02	3.29E-01
Propionaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Quinone	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Styrene	0.00E+00	0.00E+00	3.00E-03	8.65E-04	5.06E-04	4.37E-03
Tetrachloroethane	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.32E-04	5.32E-04
Toluene	1.97E-01	2.06E-04	3.44E-02	9.93E-03	1.45E-02	2.56E-01
Xylene (incl isomers and mixtures)	2.63E-01	0.00E+00	1.43E-01	4.12E-02	3.39E-02	4.80E-01

	EU 5 Drum Dryer	EU 6 Asphalt Tank Heater	EU 7 Storage Tanks	EU 9 Silo Filling	EU 10 Truck Loading & Fumes
Emission Unit HAP Totals	7.072	0.114	0.684	0.239	0.166

Plantwide Combination HAPs Total	8.276	tons per year	
Highest Plantwide Single HAP	4.577	tons per year	(formaldehyde)

Plantwide PTE Limits

Plantwide Combination HAPs Total	N/A	
Plantwide Single HAP Total	N/A	

Notes: 1. Emission-Unit HAP Totals will not equal the sum of individual pollutants
2. Isomers of xylene (m-, p-, o-) are grouped as Xylenes for applicability even though the individual isomers are each listed HAPs in the Clean Air Act
3. Emission units not shown are not known to emit HAPs

Greenhouse Gases (GHGs) Potential to Emit Emission Inventory

Emissions Unit: 1 to 8

Global Warming Potential:

CO_2	1
N_2O	310
CH_4	21

Firing Rate Drum Mixer Burner Capacity 50 MMBtu/hr
Asphalt Tank Heater 2.5 MMBtu/hr

Point Source Emissions

Unit ID	Description	Maximum Annual Capacity		Emission Factors[1,2]			Potential to Emit (tpy)			
				CO_2	N_2O	CH_4	CO_2	N_2O	CH_4	CO_2e
5	Drum Mixer - Propane	6,832,800	gallons	61.46	6.E-04	3.E-03	42,125	0.41	2.06	42,296
6	Asphalt Tank Heater - Propane	1,366,560	gallons	61.46	6.E-04	3.E-03	8,425	0.08	0.41	8,459
5	Drum Mixer - Natural Gas	426,070,039	scf	53.02	1.00E-04	1.00E-03	25,599	0.05	0.48	25,624
6	Asphalt Tank Heater - Natural Gas	21,303,502	scf	53.02	1.00E-04	1.00E-03	1,280	0.002	0.02	1,281
The following emission units have no known emissions of GHG:										
1	Aggregate Crusher									
2	Aggregate Handling									
3	Aggregate Wind Erosion									
4	Aggregate Traffic									
7	Asphalt Storage Tanks									
8	Asphalt Aggregate Handling and Screen									
9	Asphalt Silo Handling									
10	Asphalt Truck Loading & Fumes									
11	Asphalt Traffic									

Total from non-biomass-combustion sources: 50,755
(highest PTE based on propane fuel)

Physical Data and Conversions Used

453.59	g/lb	
2,000	lbs/ton	
0.091	MMBtu/gallon	Heat content of propane fuel (Part 98, Subpart C, Table C1)
1.03E-03	MMBtu/scf	Heat content of natural gas fuel (Part 98, Subpart C, Table C1)

Footnotes/Assumptions

1 Emission factors for Propane and Natural Gas are in units of kg/MMBtu
2 Emission factors are from 40 CFR Part 98 Subpart C, Tables C-1 and C-2

Default CO2 emission factor for propane	61.46	40 CFR Part 98, Table C-1
Default CO2 emission factor for natural gas	53.02	40 CFR Part 98, Table C-1
Default N_2O emission factor (kg N_2O/mmBtu) for propane	6.E-04	40 CFR Part 98, Table C-2
Default N_2O emission factor (kg N_2O/mmBtu) for natural gas	1.00E-04	40 CFR Part 98, Table C-2
Default CH_4emission factor (kg CH_4/mmBtu) for propane	3.E-03	40 CFR Part 98, Table C-2
Default CH_4emission factor (kg CH_4/mmBtu) for natural gas	1.00E-03	40 CFR Part 98, Table C-2

Criteria Air Pollutant Emission Inventory

Emission Unit: **#1 Aggregate Crushed Stone Processing Operations**
Description: Mineral PM is formed due to physical attrition of the stone during crushing, screening, conveying, loading, and unloading
Control: Wet Suppression
Capacity: 225 tons per hour (plant)
Operation: 8760 hours/year

Potential to Emit, (tons per year)

CO	
Lead	
NOx	
PM	459.06
PM10	131.48
PM2.5	131.48
SO2	
VOC	

Activity Description	Occurences	PM		PM10		PM2.5	
		EF	PTE TPY	EF	PTE TPY	EF	PTE TPY
Conveyeror transfer point	22	3.00E-03	65.04	1.10E-03	23.85	1.10E-03	23.85
Screening	2	2.50E-02	49.28	8.70E-03	17.15	8.70E-03	17.15
Fines screening	1	3.00E-01	295.65	7.20E-02	70.96	7.20E-02	70.96
Truck unloading	1	1.60E-05	0.02	1.60E-05	0.02	1.60E-05	0.02
Primary crushing	1	5.40E-03	5.32	2.40E-03	2.37	2.40E-03	2.37
Tertiary crushing	1	5.40E-03	5.32	2.40E-03	2.37	2.40E-03	2.37
Fines crushing	1	3.90E-02	38.43	1.50E-02	14.78	1.50E-02	14.78
TOTAL PTE TPY			459.06		131.48		131.48

Estimation Explanations

Emission factor (EF) units are lb/ton stone processed

Basis for all EF: AP-42, 08/04, Section 11.19.2, Table 11.19.2-2 (lb/Ton)

Note:
1. Tertiary crushing EFs utilized to estimate maximum possible emissions from primary crushing.
2. PM10 truck unloading EF utilized to estimate PM2.5 truck unloading emissions.
3. All EFs reflect uncontrolled emissions given that no regulation explicitly requires Pioneer to utilize water suppression.

Criteria Air Pollutant Emission Inventory

Emission Unit: **#2 Aggregate Handling and Processing Activities**
Description: a1. Aggregate transfer from crusher to surge piles (225 tons/hr)
a2. Aggregate transfer from inbound trucks to surge piles (75 tons/hr)

b1. Aggregate transfer from surge piles to stock piles (225 tons/hr)
b2. Aggregate transfer from surge piles to stock piles (75 tons/hr)

c. Aggregate transfer from stock piles to HMA bins (300 tons/hr)

Control:	none	
Capacity:	300	tons/hour
Operation:	8760	hours/year

Potential to Emit, (tons per year)

	5 transfers	
	EF	PTE TPY
CO		
Lead		
NOx		
PM	0.0010	6.8
PM10	0.0005	3.2
PM2.5	0.0001	0.5
SO2		
VOC		

Estimation Explanations
Emission factor (EF) units are lb/ton of aggregate handled
PM factor: AP-42, 11/06, Section 13.2.4, Equation 1 for each drop operation
Emission factor=k(0.0032)(U/5)^1.3/(M/2)^1.4

	U, mean wind speed:	8.6	mph, average wind speed during a calendar year over last 49 years of observations - NOAA Pendleton
	M, material moisture content:	3	%, conservative estimate based on EPA's Emission Inventory Improvement Program range of 3 - 7%
PM factor:	k, particle size multiplier:	0.74	from AP-42, Section 13.2.4
PM10 factor:	k, particle size multiplier:	0.35	from AP-42, Section 13.2.4
PM2.5 factor:	k, particle size multiplier:	0.053	from AP-42, Section 13.2.4

Emissions are multiplied by five to account for all five transfers

Criteria Air Pollutant Emission Inventory

Emission Unit: **#3 Aggregate Wind Erosion**
Description: Wind erosion of all exposed areas including piles

Control:	none	
Capacity:	300	tons/hour
Operation:	8760	hours/year
	2628000	tons/yr (tons/hr x hours/yr)
	50538.4615	tons/pile (assumes a 1 week supply is available on site so divide total yearly amount by 52)
	962637.363	ft3 per pile, assumes aggregate density is 105 lb/cu ft (Weights of Materials, page 393)
Pile height:	50	feet
Pile width:	200	feet
Pile length:	96.3	feet
Pile Footprint:	19,253	ft2
	0.44	acres, assumes 43560 ft2/acre

Potential to Emit, (tons per year)

	Wind erosion	
	EF (ton per acre-yr)	PTE TPY
CO		
Lead		
NOx		
PM	0.38	0.17
PM10	0.18	0.08
PM2.5	0.03	0.01
SO2		
VOC		

Estimation Explanations
Emission factor (EF) units are tons/acre per year
Stockpile size calculated based on maximum capacity, operating 8760 hr/yr

PM factor:	0.38 tons per acre based on AP-42, 10/98, Section 11.9, Table 11.9-4 for wind erosion of exposed areas
PM10 factor:	Engineering estimate - 47% of PM factor from ratio of transfer particle size multipliers (0.35/0.74) in AP-42,13.2.4,11/06
PM2.5 factor:	Engineering estimate - 7% of PM factor from ratio of transfer particle size multipliers (0.053/0.74) in AP-42,13.2.4,11/06

Criteria Air Pollutant Emission Inventory

Emission Unit: **#4 Truck and Loader Traffic**

Description:	Road dust caused by truck and loader traffic	
Control:	none	
Crusher Capacity:	225	tons per hour
HMA Loading Capacity:	300	tons per hour
Operation:	8760	hours/year

a. Truck delivery of fragmented stone: (225 tons/hr)

mean weight (empty):	17	tons
mean weight (loaded):	49.5	tons
W, mean weight (average):	33.25	tons
tons per trip:	32.5	tons
number of trips per year	60646	

paved road round trip distance traveled at plant while delivering fragmented stone to crusher:	0.15	miles	unpaved road round trip distance traveled at plant while delivering fragmented stone to crusher:	0.15	miles
vehicle miles traveled paved road:	9096.9	miles	vehicle miles traveled unpaved road:	9096.9	miles

b. Truck delivery of crushed stone: (75 tons/hr)

mean weight (empty):	17	tons
mean weight (loaded):	49.5	tons
W, mean weight (average):	33.25	tons
tons per trip:	32.5	tons
number of trips per year	20215	

paved road round trip distance traveled at plant while delivering fragmented stone to crusher:	0.15	miles	unpaved road round trip distance traveled at plant while delivering fragmented stone to crusher:	0.15	miles
vehicle miles traveled paved road:	3032.25	miles	vehicle miles traveled unpaved road:	3032.25	miles

c. Loader for delivering aggregate product from surge piles to stock piles: (300 tons/hr)

mean weight (empty):	34	tons
mean weight (loaded):	40	tons
W, mean weight (average):	37	tons
tons per trip:	6	tons
number of trips per year	438000	

paved round trip distance traveled between crusher surge pile and stockpiles:	0	miles	unpaved round trip distance traveled between crusher surge pile and stockpiles:	0.04	miles
vehicle miles traveled unpaved road:	0	miles	vehicle miles traveled unpaved road:	17520	

d. Loader for delivering aggregate product from stockpiles to HMA cold bins: (300 tons/hr)

mean weight (empty):	34	tons
mean weight (loaded):	40	tons
W, mean weight (average):	37	tons
tons per trip:	6	tons
number of trips per year	438000	

paved round trip distance traveled between stockpile and feed bins:	0	miles	unpaved round trip distance traveled between stockpile and feed bins:	0.04	miles
vehicle miles traveled unpaved road:	0	miles	vehicle miles traveled unpaved road:	17520	miles

Potential to Emit, (tons per year)

	Truck delivery of fragmented stone - paved road		Truck delivery of fragmented stone - unpaved road		Truck delivery of crushed stone - paved road		Truck delivery of crushed stone - unpaved road		Loader delivering product to stockpiles - unpaved road		Loader delivering product to HMA - unpaved road		Total
	EF	PTE TPY	EF	PTE TPY	EF	PTE TPY	EF	PTE TPY	EF	PTE TPY	EF	PTE TPY	PTE TPY
CO													
Lead													
NOx													
PM	0.23	1.05	5.57	25.34	0.23	1.05	5.57	25.34	7.69	67.35	7.69	67.35	187.48
PM10	0.05	0.21	1.42	6.46	0.05	0.21	1.42	6.46	2.12	18.56	2.12	18.56	50.46
PM2.5	0.01	0.05	0.14	0.65	0.01	0.05	0.14	0.65	0.21	1.86	0.21	1.86	5.11
SO2													
VOC													

Estimation Explanations

Emission factor (EF) units are lb/miles

Unpaved Roads

Predictive Emission Equations used to calculate Emission Factors from AP-42 11/06, Section 13.2.2, Equation 1a

PM factor: E=k*(s/12)^a*(W/3)^b(365-P)/365

W =		mean vehicle weight (tons) - see source data above
P =	98	average number of days in a calendar year during which at least 0.01 inches of precipitation is observed, NOAA - Pendleton
s =	4.8	surface material silt content (%), estimate based on AP-42 Table 13.2.2-1 for a plant road at a sand and gravel processing facility. This factor employed for trucks.
s =	7.1	surface material silt content (%), estimate based on AP-42 Table 13.2.2-1 for a material storage area at a sand and gravel processing facility. This factor employed for loader.
k =	4.9	empirical constant
a =	0.7	empirical constant
b =	0.45	empirical constant

PM10 factor: Same as for PM emission factor, except that

k =	1.50	empirical constant
a =	0.9	empirical constant
b =	0.45	empirical constant

PM2.5 factor: Same as for PM emission factor, except that

k =	0.15	empirical constant
a =	0.9	empirical constant
b =	0.45	empirical constant

Emission factor (EF) units are lb/miles

Paved Roads

Predictive Emission Equations used to calculate Emission Factors from AP-42 01/11, Section 13.2.1.3, Equation 2

PM factor: E=[k*(sL)^0.91*(W)^1.02)][1-P/(4*365)]

W =		mean vehicle weight (tons) - see source data above
P =	98	average number of days in a calendar year during which at least 0.01 inches of precipitation is observed, NOAA - Pendleton observations
k =	0.011	lb/VMT, empirical constant, for PM30, Table 13.2.1-1
sL =	0.6	silt loading (g/m2), based on AP-42 Table 13.2.1-2 ubiquitous baseline value for paved roads experiencing less than 500 trips per day (conservative assumption as value increases with increasing number of daily trips)
For PM10: k =	0.0022	empirical constant, for PM10, Table 13.2.1-1
For PM2.5: k =	0.00054	empirical constant, for PM2.5, Table 13.2.1-1

Criteria Air Pollutant Emission Inventory

Emission Unit: **#5 Asphalt Drum Mixer**
Description: Hot Mix Asphalt Plant Parallel-Flow Drum Mixer
Control: Fabric Filter
Fuel: Propane or Natural Gas
Firing Rate: 50 MMBtu/hr Estimated value based upon diesel firing at former location. See diesel fuel daily usage and HMA production for September 2, 1999. Value not used in emissions calculation.
((1964 gal / 1348.4 tons HMA) / 42 gal/bbl) * 5.8 MMBtu/bbl = 0.20 MMBtu/ton HMA.
250 ton HMA/hr * 0.20 MMBtu/ton HMA = 50 MMBtu/hr
Capacity: 300 tph hot mix asphalt
Operation: 8760 hours/year
Throughput: 2,628,000 tons per year hot mix asphalt

Potential to Emit, (tons per year)

Drum Mixer	Propane		Natural Gas		Max
	EF	PTE TPY	EF	PTE TPY	PTE TPY
CO	0.13	170.8	0.13	170.8	170.8
Lead	6.2E-07	0.001	6.2E-07	0.001	0.0
NOx	0.026	34.2	0.026	34.2	34.2
PM (filterable)	0.040	52.3	0.040	52.3	52.3
PM10 (total)	0.059	77.8	0.059	77.8	77.8
PM2.5 (total)	0.059	77.8	0.059	77.8	77.8
SO2	0.009	11.2	0.005	7.1	11.2
VOC	0.032	42.0	0.032	42.0	42.0

Estimation Explanations
Emission factor (EF) units are lb/ton HMA product.

CO factor: AP-42 3/04, Hot Mix Asphalt Plants, Table 11.1-7 -- natural gas-fired.
- Assume emissions resulting from combustion of natural gas are similar to emissions resulting from combustion of propane.

Lead factor: AP-42 3/04, Hot Mix Asphalt Plants, Table 11.1-12 -- natural gas or propane with fabric filter employed to meet NSPS PM limit.
NOx factor: AP-42 3/04, Hot Mix Asphalt Plants, Table 11.1-7 -- natural gas-fired dryer.
- Assume emissions resulting from combustion of natural gas are similar to emissions resulting from combustion of propane.

PM, PM10 factor: EF based on NSPS Subpart I limit and actual operating data from Pioneer's recently installed drum mixer that employs a fabric filter. Operating data was generated while emission unit was employed by Pioneer Asphalt, Inc at its current location.

EF = (gr/dscf) / (7000 gr/lb) * (dscf/min) * (60 min/hr) / (tph HMA)

Pioneer Sept. 2, 2010 stack test =	RUN 1	RUN 2	RUN 3	
NSPS PM Limit =	0.04	0.04	0.04	gr/dscf
stack flow during test =	26043	25372	24079	dscf/min
production during test =	213.3	230	208.3	ton/hr HMA
NSPS-based emission factor =	0.042	0.038	0.040	lb/ton HMA

Average NSPS-based EF = 0.040 lb/ton HMA

- Conservatively assume that all filterable PM is also filterable PM10.
- PM10 value does include condensable PM of 0.0194 condensable (inorganic and organic) per ap-42 dated 3/04 Table 11.1-3-- controlled total PM10 for propane or natural gas
- Per AP42, 11.1-3, footnote g: The data indicate that fuel type does not significantly effect PM emissions.

PM2.5 factor: EF based on NSPS Subpart I limit and actual operating data from Pioneer's recently installed drum mixer that employs a fabric filter. Operating data was generated while emission unit was employed by Pioneer Asphalt at its current location. See 40 CFR 60.92.

Average NSPS-based EF = 0.040 lb/ton HMA

- Conservatively assume that all PM10 is also PM2.5.
- PM2.5 value does include condensable PM, conservatively assume all PM10 is also PM2.5

SO2 factor: Option 1 reflects the PTE of the emission unit. The fuel sulfur content emission limitation considered in Option 1 is more stringent than the process source stack emission limit considered in Option 2.

Option 1: Propane EF based on FARR propane fuel sulfur limit of 1.1 grams per dscm and physical capacity of emission unit. See 40 CFR 49.130(d)(8).

EF = (S limit g/dscm) * (2.205 lb/1000 g) * (m3/35.31 ft3) * (vaporization ft3/gal) * (max burner firing rate gal/hr) * (2 lb SO2/lb S) / (tph HMA)

FARR gaseous fuel S limit =	1.1	g/m3	
vaporization of liquid propane =	36.38	ft3/gal at 60F	
max propane firing rate =	513	gal/hr	Based on heat input capacity of 50 MMBtu/hr.
SO2 fraction not staying in HMA =	0.5	See AP-42 3/2004, Table 11.1-5.	
max HMA production rate =	300	ton/hr	
propane emission factor =	0.009	lb/ton HMA	

Option 1:Natural Gas EF based on FARR propane fuel sulfur limit of 400 ppm and physical capacity of emission unit. See 40 CFR 49.130(d)(8).

For nat gas: EF = (ppmSlimit * 32 / 385.1E6)*(max mmBTU/hr)/(1020 Btu/cf fuel)*(2 lb SO2 per lb S)/(max tph HMA)*(1 - SO2 staying in HMA)
nat gas conversion: (ppm S) * (MW) / (385.1E6) = lb S / cf nat gas

	Natural Gas	
FARR S limit =	400	% by weight (nat gas is standard ppmv)
max burner firing rate =	5.00E+07	BTU/hr
fuel heating value =	1020	BTU/gal (nat gas is BTU/scf)
fuel weight =		lb/gal
max HMA production rate =	300	ton/hr HMA
SO2 staying in HMA =	50	% not to exceed 0.1 lb/ton (per AP-42 3/2004, Table 11.1-7)

emission factor = 0.005 lb/ton HMA

Option 2: Propane or Natural Gas EF based on FARR process source stack SO2 limit (40 CFR 49.129(d)(2)) of 500 ppm and actual test data as follows:

EF = (ppm) * (1.66E-7 lb/dscf / ppm) * (dscf/min) * (60 min/hr) / (tph HMA)

Pioneer Sept. 2, 2010 stack test =	RUN 1	RUN 2	RUN 3	
FARR SO2 limit =	500	500	500	ppm
measured flow rate =	26043	25372	24079	dscf/min
production during test =	213.3	230	208.3	ton/hr HMA
emission factor =	0.608	0.549	0.576	lb/ton HMA

Worst-case FARR-based emission factor = 0.608 lb/ton HMA

Option 3: EF Based on AP42, 3/04, Table 11.1-7 for natural gas
For natural gas: SO2 = 0.0034 lb/ton - so actual emissions should be lower
- Assume emissions resulting from combustion of natural gas are similar to emissions resulting from combustion of propane.

VOC factor: AP-42 3/04, Hot Mix Asphalt Plants, Table 11.1-8 -- natural gas-fired.
- Assume emissions resulting from combustion of natural gas are similar to emissions resulting from combustion of propane.

Criteria Air Pollutant Emission Inventory

Emission Unit: **#6 Asphalt Storage Tank Heater**
Description: Asphalt heater, Hetec Model HOH-150
Control: none
Fuel: Propane or Natural Gas
Capacity: 2.500 MMBtu/hr
Operation: 8760 hours/year
1,366,560 gallons propane / year (from application)

Potential to Emit, (tons per year)

	Propane		Natural Gas		Max
	EF (lb/1000gal)	PTE TPY	EF (lb/mmscf)	PTE TPY	PTE TPY
CO	7.50	5.1246	8.9	0.09554	5.12
Lead	0.00	0.0000	0.0005	5.4E-06	0.00
NOx	13.00	8.88264	100	1.07353	8.88
PM	0.20	0.136656	190.4	2.04374	2.04
PM10	0.70	0.478296	190.4	2.04374	2.04
PM2.5	0.70	0.478296	190.4	2.04374	2.04
SO2	0.0025	0.001729	0.6	0.00644	0.01
VOC	0.80	0.546624	5.500	0.05904	0.55

Estimation Explanations

Emission factor (EF) units are lb/1000 gallon of propane and lb/mmscf of natural gas

Propane fuel conversion factor = 90.5 mmBTU/1000 gal from AP42, App A
Natural gas conversion factor = 1.02E+03 Btu/scf from AP-42, Table 1.4-1, footnote a

CO factor: For propane: AP-42, 7/08, Table 1.5-1, boilers < 10mmbtu
For natural gas: AP-42 3/04, table 11.1-13, hot oil system fired with natural gas

Lead factor: For propane: no data available.
For natural gas: AP-42 7/98, Table1.4-2

NOx factor: For propane: AP-42, 7/08, Table 1.5-1, boilers < 10mmbtu
For natural gas: AP-42 7/98, Table1.4-1, small boilers uncontrolled

PM factor: For propane: AP-42, 7/08, Table 1.5-1, boilers < 10mmbtu, Total PM includes only filterable
Option 1 for natural gas: EF based on PM emission limits in FARR (40 CFR 49.125) = 0.1 grains/dscf at 7% O2
EF = (emission limit) / (7000 gr/lb) * (dscf-out/mmBtu-in) * (mmBtu/mmscf NG) = lb/mmscf Natural Gas
FARR PM Limit = 0.1 gr/dscf (tested at 0.026 gr/dscf counting front and back half)
Stack flow conversion factor 8710 dscf/mmBtu from 40 CFR 60 App A, Table 19-2 at 0% O2
FARR-based EF = 190.4 lb/mmscf natural gas
Option 2 for natural gas: AP-42 7/98, Table1.4-2, filterable; EF = 1.9 lb/mmscf
For natural gas: PM factor will be based on FARR limit, even though actual emissions are predicted to be much less

PM10 factor: For propane: AP-42, 7/08, Table 1.5-1, boilers < 10mmbtu, assume PM10= PM filterable and condensables.
● PM10 emission rate, intuitively, is less than or equal to PM emission rate.
For natural gas: All of the PM is assumed to be PM10 in AP-42 7/98, Table1.4-2, so use same EF

PM2.5 factor: For propane: assume PM2.5 = PM10 in the absence of any emission factor data specific to PM2.5.
● PM2.5 emission rate, intuitively, is less than or equal to PM10 emission rate.
For natural gas: assume PM10 is PM2.5 in AP-42 7/98, Table1.4-2, so use same EF

SO2 factor: For propane: EF = 0.10S AP-42 10/96, Table 1.5-1, boilers<100mmbtu, S expressed in units of gr/100ft3
AP-42 10/96, Table 1.5-1, boilers<100mmbtu, S expressed in units of g/m3=
= 0.0023S (0.1gr/100 ft3)(35.31ft3/m3)(0.0648 g/gr)
S = 1.1 g/m3 sulfur from FARR 40 CFR 49.130(d)(8)
EF = 0.0025 lb/1000 gal propane

Selection for propane: SO2 EF will be based on AP-42 and FARR fuel sulfur limit because it is more strict than FARR stack SO2 limit
For natural gas: AP-42 7/98, Table 1.4-2

VOC factor: For propane: AP-42, 7/08, Table 1.5-1, boilers < 10mmbtu (NMTOC calculated by subtracting methane contribution to TOC)
For natural gas: AP-42 7/98, Table1.4-2

Criteria Air Pollutant Emission Inventory

Emission Unit: **#7 Storage Tanks**
Description: Three tanks are used to store asphalt liquids
Tank 1 - Storage of liquid asphalt
Tank 2 - Storage of liquid asphalt
Tank 3 - Storage of liquid asphalt type substance (from applicant)

Parameter	Tank 1	Tank 2	Tank 3	Units
Liquid:	Asphalt	Asphalt	Asphalt	
Control:	none	none	none	
Capacity:	26,000	12,000	10,000	gallons
Operation:	22,495,680	11,247,840	10,000	EPA-calculated gallons per year throughput
TOC Emissions	739.74	369.87	0.33	lbs/yr TOC - Applicant did not provide data. Values based on EPA-calculated emissions

Potential to Emit, (tons per year)

	Tank 1 - Asphalt		Tank 2 - asphalt		Tank 3 - asphalt		Total
	EF	PTE TPY	EF	PTE TPY	EF	PTE TPY	PTE TPY
CO	0.097	3.6E-02	0.097	1.6E-05	0.097	0.0E+00	0.036
Lead							
NOx							
PM							
PM10							
PM2.5							
SO2							
VOC	1	3.70E-01	1	1.85E-01	1	1.6E-04	0.555

Estimation Explanations
Emission factors (EF) units in table are fraction (%/100) of Total Organic Compound (TOC) emissions from computer program
TOC Emissions: Tanks Computer Program (see AP-42, 7.1 (11/06)), lbs/yr; see application for computer program input details
EPA adjusted Tanks Computer Program output to reflect EPA-calculated annual liquid throughput as reflected in table below:

Parameter	Tank 1	Tank 2	Tank 3	Units
Modeled Operation:	2,313,000	2,313,000	2,313,000	Applicant did not provide modeled emissions. EPA used modeled emissions calculated for another hot mix asphalt plant (see Columbia Ready Mix, R10NT501700).
PTE Operation:	22,495,680	11,247,840	10,000	gallons per year throughput as calculated by EPA and presented below
Ratio of PTE Operation to Modeled Operation:	9.73	4.86	0.004	
Modeled TOC Emissions:	76.06	76.06	76.06	lbs/yr TOC - based on EPA calculated emissions from another hot mix asphalt plant (see Columbia Ready Mix, Inc, R10NT501700).
PTE TOC Emissions:	739.74	369.87	0.33	lbs/yr TOC - based on EPA calculated emissions from another hot mix asphalt plant (see Columbia Ready Mix, Inc, R10NT501700).

PTE Annual Asphalt Throughput:
Asphalt is assumed to be 5.5% wt of final HMA product and 8.57 lb/gal; so, gallons/ton of asphalt = (5.5/100)/(8.57 lb/gal)*(2000 lb/ton) = 12.84 gal/ton
Maximum HMA production = (300 tph)*(8760 hpy) = 2,628,000 tpy HMA; using (12.84 gpt)*(2,628,000 tpy) = 33,743,520 gal/yr liquid asphalt

VOC factor: For tank 1, 2 and 3 EF from AP-42, 3/04, table 11.1-16

CO factor: AP-42, 3/04, Page 11.1-9; multiply factor by TOC emissions

Criteria Air Pollutant Emission Inventory

Emission Unit: **#8 Aggregate Handling**
Description: a. Aggregate transfer from piles to storage bins (drop into bins)
b. Aggregate transfer from storage bins to conveyor belt (drop onto belt)
c. Aggregate transfer from conveyor belt to dryer (drop into dryer)

Control:	none	
Capacity:	300	tons/hour
Operation:	8760	hours/year

Potential to Emit, (tons per year)

	3 transfers	
	EF	PTE TPY
CO		
Lead		
NOx		
PM	0.0027	10.7
PM10	0.0013	5.1
PM2.5	0.0002	0.8
SO2		
VOC		

Estimation Explanations

Emission factor (EF) units are lb/ton of aggregate handled

PM factor: AP-42, 11/06, Section 13.2.4, Equation 1 for each drop operation
Emission factor=k(0.0032)(U/5)^1.3/(M/2)^1.4

	U, mean wind speed:	8.6	mph, average wind speed during a calendar year over last 49 years of observations - NOAA Pendleton
	M, material moisture content:	3	%, conservative estimate based on EPA's Emission Inventory Improvement Program range of 3 - 7%
PM factor:	k, particle size multiplier:	0.74	from AP-42 <30um
PM10 factor:	k, particle size multiplier:	0.35	from AP-42 <10um
PM2.5 factor:	k, particle size multiplier:	0.053	from AP-42 <2.5

Emissions are multiplied by three to account for all three transfers

Criteria Air Pollutant Emission Inventory

Emission Unit: **#9 Silo Filling**
Description: Loading of hot-mix asphalt mix (HMA mix) into Silo
Control: none
Capacity: 300 tons/hour
Operation: 8760 hours/year

Potential to Emit, (tons per year)

	Silo filling	
	EF	PTE TPY
CO	1.18E-03	1.55
Lead		0
NOx		0
PM	5.86E-04	0.77
PM10	5.86E-04	0.77
PM2.5	5.86E-04	0.77
SO2		0
VOC	1.22E-02	16.01

Estimation Explanations
Emission factor (EF) units are lb/ton of HMA handled
Predictive Emission Equations used to calculate Emission Factors from AP-42 3/04, Table 11.1-14

CO factor: $CO\ EF = 0.00488(-V)e^{((0.0251)(T+460)-20.43)}$

PM,PM10 factor: $PM10\ EF = 0.000332 + 0.00105(-V)e^{((0.0251)(T+460)-20.43)}$

- Conservatively assume that all PM is also PM10.
- Value does include condensable PM

PM2.5 factor: $PM2.5\ EF = 0.000332 + 0.00105(-V)e^{((0.0251)(T+460)-20.43)}$

- Conservatively assume that all PM is also PM2.5.
- Value does include condensable PM

VOC factor: $VOC\ EF = 0.0504(-V)e^{((0.0251)(T+460)-20.43)}$ (100% of TOC measured as propane, per AP42, Table 11.1-16)

V = asphalt volatility = -0.5 AP-42 default value
T = HMA mix temperature = 325 ^{O}F, AP-42 default value

Criteria Air Pollutant Emission Inventory

Emission Unit: **#10 Truck Loading & Fumes**
Description: a Load-out of hot-mix asphalt mix (HMA mix) from silo to asphalt trucks
b Fumes from HMA in loaded asphalt trucks while in plant
Control: none
Capacity: 300 tons hot mix asphalt/hour
Operation: 8760 hours/year

Potential to Emit, (tons per year)

	Silo loadout		Truck fumes		Total
	EF	PTE TPY	EF	PTE TPY	PTE TPY
CO	9.75E-03	12.81	3.52E-04	0.46	13.27
Lead					
NOx					
PM	7.34E-03	9.65			9.65
PM10	7.34E-03	9.65			9.65
PM2.5	7.34E-03	9.65			9.65
SO2					
VOC	3.91E-03	5.14	1.03E-03	1.36	6.50

Estimation Explanations
Emission factor (EF) units are lb/ton of HMA handled

a Silo Loadout

Predictive Emission Equations used to calculate Emission Factors from AP-42 3/04, Table 11.1-14

CO factor: $0.00558(-V)e^{((0.0251)(T+460)-20.43)}$

PM10 factor: $0.000181+0.0041(-V)e^{((0.0251)(T+460)-20.43)}$

- Conservatively assume that all PM is also PM10.
- Value does include condensable PM pursuant

PM2.5 factor: $0.000181+0.0041(-V)e^{((0.0251)(T+460)-20.43)}$

- Conservatively assume that all PM is also PM2.5.
- Value does not include condensable PM pursuant to EPA's May 16, 2008 final rulemaking.

VOC factor: $0.94[0.0172(-V)e^{((0.0251)(T+460)-20.43)}]$ (94% of TOC measured as propane, per AP42, Table 11.1-16)

TOC = $0.0172(-V)e^{((0.0251)(T+460)-20.43)}$ AP42, Table 11.1-16
V = asphalt volatility = -0.5 AP-42 default value
T = HMA mix temperature = 325 $^{\circ}$F, AP-42 default value

b Truck-load emissions (while in plant for approximately 8 minutes)
Emission factors from AP42, 11.1.2.5
TOC = 0.0011 lb/ton
CO factor: (32% of TOC measured as propane)
VOC factor: (94% of TOC measured as propane per AP42, Table 11.1-16)

Criteria Air Pollutant Emission Inventory

Emission Unit: **#11 Asphalt Truck and Loader Traffic**
Description: Road dust caused by asphalt truck and loader traffic
Control: none
Capacity: 300 tons per hour (plant)
Operation: 8760 hours/year

a. Truck delivery of asphalt cement to HMA plant:

mean weight (empty):	18	tons
mean weight (loaded):	52	tons
W, mean weight (average):	35	tons
tons per trip:	34	tons
percent HMA that is liquid asphalt:	6	%
number of trips per year	4638	

paved road round trip distance traveled at plant to unload raw material:	0.25	miles	unpaved road round trip distance traveled at plant to unload raw material:	0.15	miles
vehicle miles traveled paved road:	1159.5	miles	vehicle miles traveled unpaved road:	695.7	miles

b. HMA truck for loading and delivery of HMA product:

mean weight (empty):	17	tons
mean weight (loaded):	49.5	tons
W, mean weight (average):	33.25	tons
tons per trip:	32.5	tons
number of trips per year	80862	

paved road round trip distance traveled at plant to load and deliver product to customers:	0.25	miles	unpaved road round trip distance plant to load and deliver product to customers:	0.1	miles
vehicle miles traveled paved road:	20215.5	miles	vehicle miles traveled unpaved road:	8086.2	miles

Potential to Emit, (tons per year)

	asphalt cement truck - paved road		asphalt cement truck - unpaved road		HMA truck - paved road		HMA truck - unpaved road		Total
	EF	PTE TPY	EF	PTE TPY	EF	PTE TPY	EF	PTE TPY	PTE TPY
CO									
Lead									
NOx									
PM	0.24	0.14	5.70	1.98	0.23	2.32	5.57	22.53	26.97
PM10	0.05	0.03	0.44	0.15	0.05	0.46	0.44	1.76	2.41
PM2.5	0.01	0.01	0.15	0.05	0.01	0.11	0.14	0.57	0.75
SO2									
VOC									

Estimation Explanations
Emission factor (EF) units are lb/miles
Unpaved Roads.
Predictive Emission Equations used to calculate Emission Factors from AP-42 11/06, Section 13.2.2, Equation 1a
PM factor: E=k*(s/12)^a*(W/3)^b(365-P)/365

	W =		mean vehicle weight (tons) - see source data above
	P =	98	average number of days in a calendar year during which at least 0.01 inches of precipitation is observed, NOAA - Pendleton
	s =	4.8	surface material silt content (%), estimate based on AP-42 Table 13.2.2-1 for a plant road at a sand and gravel processing facility
For PM:	k =	4.9	empirical constant
	a =	0.7	empirical constant
	b =	0.45	empirical constant
For PM10:	k =	1.50	empirical constant
	a =	0.9	empirical constant
	b =	0.45	empirical constant
For PM2.5:	k =	0.15	empirical constant
	a =	0.9	empirical constant
	b =	0.45	empirical constant

Emission factor (EF) units are lb/miles
Paved Roads
Predictive Emission Equations used to calculate Emission Factors from AP-42 11/06, Section 13.2.1.3, Equation 1
PM factor: E=[k*(sL)^0.91*(W)^1.02)][1-P/(4*365)]

	W =		mean vehicle weight (tons) - see source data above
	P =	98	average number of days in a calendar year during which at least 0.01 inches of precipitation is observed, NOAA - Pendleton observations
	sL =	0.6	silt loading (g/m2), based on AP-42 Table 13.2.1-3 ubiquitous baseline value for paved roads experiencing less than 500 trips per day (conservative assumption as value increases with increasing number of daily trips)
For PM:	k =	0.011	lb/VMT, empirical constant, for PM30, Table 13.2.1-1
For PM10:	k =	0.0022	empirical constant, for PM10, Table 13.2.1-1
For PM2.5:	k =	0.00054	empirical constant, for PM2.5, Table 13.2.1-1

Hazardous Air Pollutant Emission Inventory

Emission Unit: **#5 Drum Dryer**
Description: Hot Mix Asphalt Plant Drum Dryer - parallel flow drum mix design, Pioneer 7.5ft Drum Mixer
Control: 65,000 ACF Bag House w/125 hp fan
Fuel: Natural Gas or Propane
Capacity: 300 tph hot mix asphalt Burner: 50 mmBtu/hr
Operation: 8760 hours/year
Fuel: 6,832,800 gallons/year (from application)

Potential to Emit, (tons per year)

Inorganics	Natural Gas	
	EF	PTE TPY
Antimony Compounds	1.80E-07	2.37E-04
Arsenic Compounds (incl arsine)	5.60E-07	7.36E-04
Beryllium Compounds	0.00E+00	0.00E+00
Cadmium Compounds	4.10E-07	5.39E-04
Chromium Compounds (incl hexavalent)	5.50E-06	7.23E-03
Cobalt Compounds	2.60E-08	3.42E-05
Lead Compounds (not elemental lead)	6.20E-07	8.15E-04
Manganese Compounds	7.70E-06	1.01E-02
Mercury Compounds	2.40E-07	3.15E-04
Nickel Compounds	6.30E-05	8.28E-02
Phophorus Compounds	2.80E-05	3.68E-02
Selenium Compounds	3.50E-07	4.60E-04
Organics		
Acetaldehyde	-	
Acrolein	-	
Benzene	3.90E-04	5.12E-01
Bromomethane (methyl bromide)	-	
1,3-Butadiene	-	
Carbon Disulfide	-	
Chloroethane (ethyl chloride)	-	
Chloromethane (methyl chloride)	-	
Dichlorobenzene	-	
Cumene	-	
Dioxin (2,3,7,8 tetrachlorodibenzo-p-dioxin)	-	
Ethyl Benzene	2.40E-04	3.15E-01
Formaldehyde	3.10E-03	4.07E+00
Furans (all PCDF)	-	
Hexane (includes n-Hexane)	9.20E-04	1.21E+00
Hydrochloric Acid (hydrogen chloride or HCL)	-	
Isooctane (2,2,4-trimethylpentane)	4.00E-05	5.26E-02
Methyl Chloride (chloromethane)	-	
Methyl Chloroform (1,1,1-trichloroethane)	4.80E-05	6.31E-02
Methyl tert-Butyl Ether (MTBE)	-	
Naphthalene (also a POM)	9.00E-05	1.18E-01
Phenol	-	
Polycyclic Organic Matter* (incl naphthalene)	1.87E-04	2.46E-01
Propionaldehyde	-	
Quinone	-	
Styrene	-	
Tetrachloroethane	-	
Toluene	1.50E-04	1.97E-01
Xylenes (inlc isomers and mixtures)	2.00E-04	2.63E-01
HAP Total	5.37E-03	7.07E+00

***Polycyclic Organic Matter**	Natural Gas	
	EF	PTE TPY
Acenaphthene	1.40E-06	1.84E-03
Acenaphthylene	8.60E-06	1.13E-02
Anthracene	2.20E-07	2.89E-04
Benzo(a)anthracene	2.10E-07	2.76E-04
Benzo(b)fluoranthene	1.00E-07	1.31E-04
Benzo(k)fluoranthene	4.10E-08	5.39E-05
Benzo(g,h,i)perylene	4.00E-08	5.26E-05
Benzo(a)pyrene	9.80E-09	1.29E-05
Benzo(e)pyrene	1.10E-07	1.45E-04
Chrysene	1.80E-07	2.37E-04
Dioxins (Total PCDD; incl 2,3,7,8 TCDD)	-	
Fluoranthene	6.10E-07	8.02E-04
Fluorene	3.80E-06	4.99E-03
Furans (all PCDF)	-	
Indeno(1,2,3-cd)pyrene	7.00E-09	9.20E-06
2-Methylnaphthalene	7.40E-05	9.72E-02
Naphthalene (also individual HAP)	9.00E-05	1.18E-01
Perylene	8.80E-09	1.16E-05
Phenanthrene	7.60E-06	9.99E-03
Pyrene	5.40E-07	7.10E-04
POM Subtotal	1.87E-04	2.46E-01

Estimation Explanations
Emission factor (EF) units are lb/ton HMA
Natural gas emission factors used as propane emission factors not provided in AP-42 for drum dryers
To avoid double-counting, "HAP Total" does not count naphthalene, dioxin (HAP) or furans separately because they are accounted for in "POM Subtotal"
Chromium EF: Chromium EF is assumed to include separately reported hexavalent chromium EF in AP-42
All other inorganics EF: AP-42, 3/04, Table 11.1-12 for natural gas or propane-fired dryer with fabric filter
Naphthalene EF: AP-42, 3/04, Table 11.1-10 for natural gas with fabric filter (is a HAP & POM)
POM EF: AP-42, 3/04, Table 11.1-10 for natural gas with fabric filter (includes naphthalene, dioxin & furans)
All other organics EF: AP-42, 3/04, Table 11.1-10 for natural gas with fabric filter

Hazardous Air Pollutant Emission Inventory

Emission Unit: **#6 Asphalt Tank Heater**
Description: Asphalt heater, Hetec Model HOH-150, model Hsp 35
Control: none
Fuel: Natural Gas or Propane
Capacity: 2.500 MMBtu/hr (from applicant)
Operation: 8760 hours/yr
Fuel Throughput: 1,366,560 gallons/year (from applicant)

Potential to Emit, (tons per year)

Inorganics	Natural Gas	
	EF	PTE TPY
Antimony Compounds	-	
Arsenic Compounds (incl arsine)	2.00E-04	1.21E-05
Beryllium Compounds	1.20E-05	7.27E-07
Cadmium Compounds	1.10E-03	6.67E-05
Chromium Compounds (incl hexavalent)	1.40E-03	8.49E-05
Cobalt Compounds	8.40E-05	5.09E-06
Lead Compounds (not elemental lead)	5.00E-04	3.03E-05
Manganese Compounds	3.80E-04	2.30E-05
Mercury Compounds	2.60E-04	1.58E-05
Nickel Compounds	2.10E-03	1.27E-04
Phophorus Compounds	-	
Selenium Compounds	2.40E-05	1.45E-06
Organics		
Acetaldehyde	-	
Acrolein	-	
Benzene	2.10E-03	1.27E-04
Bromomethane (methyl bromide)	-	
1,3-Butadiene	-	
Carbon Disulfide	-	
Chloroethane (ethyl chloride)	-	
Chloromethane (methyl chloride)	-	
Cumene	-	
Dichlorobenzene	1.20E-03	7.27E-05
Dioxin (2,3,7,8 tetrachlorodibenzo-p-dioxin)	-	
Ethyl Benzene	-	
Formaldehyde	7.50E-02	4.55E-03
Furans (all PCDF)	-	
Hexane (incl n-Hexane)	1.80E+00	1.09E-01
Hydrochloric Acid (hydrogen chloride)	-	
Isooctane (2,2,4-trimethylpentane)	-	
Methyl Chloride (chloromethane)	-	
Methyl Chloroform (1,1,1-trichloroethane)	-	
Methyl tert-Butyl Ether (MTBE)	-	
Naphthalene (also a POM)	6.10E-04	3.70E-05
Phenol	-	
Polycyclic Organic Matter* (incl naphthalene)	6.98E-04	4.23E-05
Propionaldehyde	-	
Quinone	-	
Styrene	-	
Tetrachloroethane	-	
Toluene	3.40E-03	2.06E-04
Xylene (incl isomers and mixtures)	-	
HAP Total		1.14E-01

*Polycyclic Organic Matter	Natural Gas	
	EF	PTE TPY
Acenaphthene	1.80E-06	1.09E-07
Acenaphthylene	1.80E-06	1.09E-07
Anthracene	2.40E-06	1.45E-07
Benzo(a)anthracene	1.80E-06	1.09E-07
Benzo(b)fluoranthene	1.80E-06	1.09E-07
Benzo(k)fluoranthene	1.80E-06	1.09E-07
Benzo(g,h,i)perylene	1.20E-06	7.27E-08
Benzo(a)pyrene	-	
Benzo(e)pyrene	1.20E-06	7.27E-08
Chrysene	1.80E-06	1.09E-07
Dibenzo(a,h)anthracene	1.20E-06	7.27E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	9.70E-07
Dioxins (Total PCDD; incl 2,3,7,8 TCDD)	-	
Fluoranthene	3.00E-06	1.82E-07
Fluorene	2.80E-06	1.70E-07
Furans (all PCDF)	-	
Indeno(1,2,3-cd)pyrene	1.80E-06	1.09E-07
3-Methylcloranthrene	1.80E-06	
2-Methylnaphthalene	2.40E-05	1.45E-06
Naphthalene (also individual HAP)	6.10E-04	3.70E-05
Perylene	-	
Phenanthrene	1.70E-05	1.03E-06
Pyrene	5.00E-06	3.03E-07
POM Subtotal	6.98E-04	4.22E-05

Estimation Explanations

Emission factor (EF) units are lb/mmscf natural gas converted to lb/mmBTU using the Natural gas conversion factor below
Natural gas emission factors were used as AP-42 does not provide propane emission factors

Propane fuel conversion factor = 90.5 mmBTU/1000 gal from AP42, 1.5
Natural gas conversion factor = 1020 Btu/scf from AP-42, Table 1.4-1, footnote a
Inorganics EF: For natural gas: AP-42 7/98, Table1.4-4
Organics and POM: For natural gas: AP-42 7/98, Table1.4-3
Lead: For natural gas: AP-42 7/98, Table1.4-2

Hazardous Air Pollutant Emission Inventory

Emission Unit: **#7 Asphalt Storage Tanks**
Description: Three tanks are used to store asphalt liquids
Tank 1 - Storage of liquid asphalt
Tank 2 - Storage of liquid asphalt
Tank 3 - Storage of liquid asphalt type substance (from applicant)

Parameter	Tank 1	Tank 2	Tank 3	Units
Liquid:	Asphalt	Asphalt	Asphalt	
Control:	none	none	none	
Capacity:	26,000	12,000	10,000	gallons
Operation:	22,495,680	11,247,840	10,000	EPA-calculated gallons per year throughput
TOC Emissions	739.74	369.87	0.33	lbs/yr TOC - Applicant did not provide data. Values based on EPA-calculated emissions

Potential to Emit, (tons per year)

	(Tank 1) Asphalt		(Tank 2) asphalt		(Tank 3) Asphalt		Total
Organics	EF	PTE TPY	EF	PTE TPY	EF	PTE TPY	PTE TPY
Acetaldehyde							
Acrolein							
Benzene	0.032	1.18E-02	0.032	5.92E-03	0.032	5.26E-06	1.78E-02
Bromomethane (methyl bromide)	0.0049	1.81E-03	0.0049	9.06E-04	0.0049	8.06E-07	2.72E-03
1,3-Butadiene							
Carbon Disulfide	0.016	5.92E-03	0.016	2.96E-03	0.016	2.63E-06	8.88E-03
Chloroethane (ethyl chloride)	0.004	1.48E-03	0.004	7.40E-04	0.004	6.58E-07	2.22E-03
Chloromethane (methyl chloride)	0.023	8.51E-03	0.023	4.25E-03	0.023	3.78E-06	1.28E-02
Cumene							
Dichlorobenzene							
Dioxin (2,3,7,8 tetrachlorodibenzo-p-dioxin)							
Ethyl Benzene	0.038	1.41E-02	0.038	7.03E-03	0.038	6.25E-06	2.11E-02
Formaldehyde	0.69	2.55E-01	0.69	1.28E-01	0.69	1.13E-04	3.83E-01
Furans (all PCDF)							
Hexane (incl n-Hexane)	0.1	3.70E-02	0.1	1.85E-02	0.1	1.64E-05	5.55E-02
Hydrochloric Acid (hydrogen chloride)							
Isooctane (2,2,4-trimethylpentane)	0.00031	1.15E-04	0.00031	5.73E-05	0.00031	5.10E-08	1.72E-04
Methyl Chloride (chloromethane)	0.00027	9.99E-05	0.00027	4.99E-05	0.00027	4.44E-08	1.50E-04
Methyl Chloroform (1,1,1-trichloroethane)							
Methyl tert-Butyl Ether (MTBE)							
Naphthalene* (also a POM)							
Phenol							
Polycyclic Organic Matter* (incl naphthalene)							
Propionaldehyde							
Quinone							
Styrene	0.0054	2.00E-03	0.0054	9.99E-04	0.0054	8.88E-07	3.00E-03
Tetrachloroethane							
Toluene	0.062	2.29E-02	0.062	1.15E-02	0.062	1.02E-05	3.44E-02
Xylene (incl isomers and mixtures)	0.257	9.51E-02	0.257	4.75E-02	0.257	4.23E-05	1.43E-01
HAP Total		4.56E-01		2.28E-01		2.03E-04	6.84E-01

Estimation Explanations
Emission factor (EF) units are % of organic PM for POM and phenol and fraction (%/100) of TOC for all other organics
TOC Emissions: Tanks Computer Program (see AP-42, 7.1 (11/06)), lbs/yr; see Columbia Ready Mix Inc., application for computer program input details
EPA adjusted Tanks Computer Program output to reflect EPA-calculated annual liquid throughput as reflected in table below:

Parameter	Tank 1	Tank 2	Tank 3	Units
Modeled Operation:	2,313,000	2,313,000	2,313,000	Applicant did not provide modeled emissions. EPA used modeled emissions calculated for another hot mix asphalt plant (see Columbia Ready Mix, R10NT501700).
PTE Operation:	22,495,680	11,247,840	10,000	gallons per year throughput as calculated by EPA and presented below
Ratio of PTE Operation to Modeled Operation:	9.73	4.86	0.004	
Modeled TOC Emissions:	76.06	76.06	76.06	lbs/yr TOC - based on EPA calculated emissions from another hot mix asphalt plant (see Columbia Ready Mix, Inc, R10NT501700).
PTE TOC Emissions:	739.74	369.87	0.33	lbs/yr TOC - based on EPA calculated emissions from another hot mix asphalt plant (see Columbia Ready Mix, Inc, R10NT501700).

PTE Annual Asphalt Throughput:
Asphalt is assumed to be 5.5% wt of final HMA product and 8.57 lb/gal; so, gallons/ton of asphalt = (5.5/100)/(8.57 lb/gal)*(2000 lb/ton) = 12.84 gal/ton
Maximum HMA production = (300 tph)*(8760 hpy) = 2,628,000 tpy HMA; using (12.84 gpt)*(2,628,000 tpy) = 33,743,520 gal/yr liquid asphalt
Per application, Tanks 1 and 2 are used to process the total liquid asphalt throughput of 33,743,520 gallons/year calculated above.
To avoid double-counting, "HAP Total" does not count naphthalene separately because naphthalene is accounted for in "POM Subtotal"
Xylenes EF: m-, o- and p- isomers are individually listed as HAPs but for applicability purposes, are grouped as Xylenes
All other organics EF: AP-42, 3/04, Table 11.1-16 - (TOC) organic volatile-based speciation percentages
TOC = VOC/100% (AP-42, 3/04, Table 11.1-16)

Hazardous Air Pollutant Emission Inventory

Emission Unit: **#9 Asphalt Silo Filling**
Description: Loading of hot-mix asphalt mix (HMA mix) into silo
Control: none
Capacity: 300 tph hot mix asphalt (from applicant)
Operation: 8,760 hours/yr

Potential to Emit, (tons per year)

Organics	EF	PTE TPY
Acetaldehyde		
Acrolein		
Benzene	0.032	5.12E-03
Bromomethane (methyl bromide)	0.0049	7.85E-04
1,3-Butadiene		
Carbon Disulfide	0.016	2.56E-03
Chloroethane (ethyl chloride)	0.004	6.41E-04
Chloromethane (methyl chloride)	0.023	3.68E-03
Cumene		
Dichlorobenzene		
Dioxin (2,3,7,8 tetrachlorodibenzo-p-dioxin)		
Ethyl Benzene	0.038	6.09E-03
Formaldehyde	0.69	1.10E-01
Furans (all PCDF)		
Hexane (incl n-Hexane)	0.1	1.60E-02
Hydrochloric Acid (hydrogen chloride)		
Isooctane (2,2,4-trimethylpentane)	0.00031	4.96E-05
Methyl Chloride (chloromethane)	0.00027	4.32E-05
Methyl Chloroform (1,1,1-trichloroethane)		
Methyl tert-Butyl Ether (MTBE)		
Naphthalene[1] (also a POM)	1.82	6.07E-03
Phenol	1.18	3.94E-03
Polycyclic Organic Matter* (incl naphthalene)	11.41	3.81E-02
Propionaldehyde		
Quinone		
Styrene	0.0054	8.65E-04
Tetrachloroethane		
Toluene	0.062	9.93E-03
Xylene (incl isomers and mixtures)	0.257	4.12E-02
HAP Total		2.39E-01

***Polycyclic Organic Matter**	EF	PTE TPY
Acenaphthene	0.47	1.57E-03
Acenaphthylene	0.014	4.67E-05
Anthracene	0.13	4.34E-04
Benzo(a)athracene	0.056	1.87E-04
Benzo(e)pyrene	0.0095	3.17E-05
Chrysene	0.21	7.01E-04
Fluoranthene	0.15	5.00E-04
Fluorene	1.01	3.37E-03
2-Methylnaphthalene	5.27	1.76E-02
Naphthalene (also individual HAP)	1.82	6.07E-03
Perylene	0.03	1.00E-04
Phenanthrene	1.8	6.00E-03
Pyrene	0.44	1.47E-03
POM Subtotal	11.41	3.81E-02

Estimation Explanations
Emission factor (EF) units are % of organic PM for POM and phenol and % of TOC for all other organics
To avoid double-counting, "HAP Total" does not count naphthalene separately because naphthalene is accounted for in "POM Subtotal"
Predictive emission factors from AP-42 Tbl 11.1-14 for silo filling

Xylenes EF: m-, o- and p- isomers are individually listed as HAPs but for applicability purposes, are grouped as Xylenes
POM, naphthalene and phenol EF: AP-42, 3/04, Table 11.1-15 - organic particulate-based speciation percentages (%/100 x PM)
All other organics EF: AP-42, 3/04, Table 11.1-16 - (TOC) organic volatile-based speciation percentages (%/100 x TOC)
TOC EF: $0.0504(-V)e^{((0.0251)(T+460)-20.43)}$ lb/ton HMA loaded into silo
Organic PM EF: $0.00105(-V)e^{((0.0251)(T+460)-20.43)}$ lb/ton HMA loaded into silo

V = asphalt volatility =	-0.5	AP-42 default value
T = HMA mix temperature =	325	^{O}F, AP-42 default value
TOC EF =	1.22E-02	lb/ton
TOC emissions =	1.60E+01	tons/year (TOC EF x annual capacity)
Organic PM EF =	2.54E-04	lb/ton
Organic PM emissions =	3.34E-01	tons/year (Organic PM EF x annual capacity)

Hazardous Air Pollutant Emission Inventory

Emission Unit: **#10 Asphalt Truck Loading & Fumes**
Description: a Load-out of hot-mix asphalt mix (HMA mix) from silo to asphalt trucks
b Fumes from loaded asphalt trucks while in plant
Control: none
Capacity: 300 tph hot mix asphalt (from applicant)
Operation: 8,760 hours/yr

Potential to Emit, (tons per year)

Organics	Truck loading		Truck-load fumes		Total
	EF	PTE TPY	EF	PTE TPY	PTE TPY
Acetaldehyde					
Acrolein					
Benzene	0.052	2.84E-03	0.052	7.52E-04	0.004
Bromomethane (methyl bromide)	0.0096	5.25E-04	0.0096	1.39E-04	0.001
1,3-Butadiene					
Carbon Disulfide	0.013	7.10E-04	0.013	1.88E-04	0.001
Chloroethane (ethyl chloride)	0.00021	1.15E-05	0.00021	3.04E-06	0.000
Chloromethane (methyl chloride)	0.015	8.20E-04	0.015	2.17E-04	0.001
Dichlorobenzene					
Cumene	0.11	6.01E-03	0.11	1.59E-03	0.008
Dioxin (2,3,7,8 tetrachlorodibenzo-p-dioxin)					
Ethyl Benzene	0.28	1.53E-02	0.28	4.05E-03	0.019
Formaldehyde	0.088	4.81E-03	0.088	1.27E-03	0.006
Furans (all PCDF)					
Hexane (incl n-Hexane)	0.15	8.20E-03	0.15	2.17E-03	0.010
Hydrochloric Acid (hydrogen chloride)					
Isooctane (2,2,4-trimethylpentane)	0.0018	9.84E-05	0.0018	2.60E-05	0.000
Methyl Chloride (chloromethane)					
Methyl Chloroform (1,1,1-trichloroethane)					
Methyl tert-Butyl Ether (MTBE)					
Naphthalene[1] (also a POM)	1.25	5.60E-03	1.25	1.81E-02	0.024
Phenol	1.18	5.29E-03	1.18	1.71E-02	0.022
Polycyclic Organic Matter* (incl naphthalene)	5.93	2.66E-02	1.25	1.81E-02	0.045
Propionaldehyde					
Quinone					
Styrene	0.00732	4.00E-04	0.00732	1.06E-04	0.001
Tetrachloroethane	0.0077	4.21E-04	0.0077	1.11E-04	0.001
Toluene	0.21	1.15E-02	0.21	3.04E-03	0.015
Xylene (incl isomers and mixtures)	0.49	2.68E-02	0.49	7.08E-03	0.034
HAP Total		1.10E-01		5.59E-02	1.66E-01

*Polycyclic Organic Matter	EF	PTE TPY	EF	PTE TPY
Acenaphthene	0.26	1.16E-03		
Acenaphthylene	0.028	1.25E-04		
Anthracene	0.07	3.14E-04		
Benzo(a)athracene	0.019	8.51E-05		
Benzo(b)fluoranthene	0.0076	3.40E-05		
Benzo(k)fluoranthene	0.0022	9.86E-06		
Benzo(g,h,l)perylene	0.0019	8.51E-06		
Benzo(a)pyrene	0.0023	1.03E-05		
Benzo(e)pyrene	0.0078	3.49E-05		
Chrysene	0.103	4.61E-04		
Dibenzo(a,h)anthracene	0.00037	1.66E-06		
Fluoranthene	0.05	2.24E-04		
Fluorene	0.77	3.45E-03		
Indeno(1,2,3-cd)pyrene	0.00047	2.11E-06		
2-Methylnaphthalene	2.38	1.07E-02		
Naphthalene (also individual HAP)	1.25	5.60E-03	1.25	1.81E-02
Perylene	0.022	9.86E-05		
Phenanthrene	0.81	3.63E-03		
Pyrene	0.15	6.72E-04		
POM Subtotal	5.93	2.66E-02	1.25	1.81E-02

Estimation Explanations
Emission factor (EF) units are % of organic PM for POM and phenol and % of TOC for all other organics
To avoid double-counting, "HAP Total" does not count naphthalene separately because naphthalene is accounted for in "POM Subtotal"
POM, naphthalene and phenol EF: AP-42, 3/04, Table 11.1-15 - organic particulate-based speciation percentages
All other organics EF: AP-42, 3/04, Table 11.1-16 - (TOC) organic volatile-based speciation percentages
Xylenes EF: m-, o- and p- isomers are individually listed as HAPs but for applicability purposes, are grouped as Xylenes

a. Truck loading predictive emission factors from AP-42 Tbl 11.1-14

TOC EF: $0.0172(-V)e^{((0.0251)(T+460)-20.43)}$ lb/ton HMA loaded out
Organic PM EF: $0.00141(-V)e^{((0.0251)(T+460)-20.43)}$ lb/ton HMA loaded out

V = asphalt volatility =	-0.5	AP-42 default value
T = HMA mix temperature =	325	^{O}F, AP-42 default value
TOC EF =	4.16E-03	lb/ton
TOC emissions =	5.46E+00	tons/year (TOC EF x annual capacity)
Organic PM EF =	3.41E-04	lb/ton
Organic PM emissions =	4.48E-01	tons/year (Organic PM EF x annual capacity)

b. Truck-load emission factors from AP42, 11.1.2.5

TOC EF:	1.10E-03	lb/ton HMA hauled by trucks
TOC emissions =	1.45	tons/year (TCO EF x annual capacity)