Permit to Install Application
Hot Mix Asphalt Plant

Ajax Materials Corporation
Genesee Township Plant
Genesee Charter Township, Michigan

Project No. 201405
December 21, 2020

fishbeck
Engineers | Architects | Scientists | Constructors

EGLE

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES AND ENERGY

PERMIT TO INSTALL APPLICATION

For authority to install, construct, reconstruct, relocate, or modify process, fuel-burning or refuse burning equipment and/or control equipment. Permits to install are required by administrative rules pursuant to Section 5505 of 1994

FOR EGLE USE
APPLICATION NUMBER

Please type or print clearly. The "Application Instructions" and "Information Required for an Administratively Complete Permit to Install Application" are available on the Air Quality Division (AQD) Permit Web Page at www.deq.state.mi.us/aps/nsr_information.shtml. Please call the AQD at 517-284-6804 if you have not been contacted within 15 days of your application submittal.

RECEIVED
DEC 28 2020
AIR QUALITY DIVISION

1. FACILITY CODES: State Registration Number (SRN) and North American Industry Classification System (NAICS)
SRN: NAICS: 3 2 4 1 2 1

2. APPLICANT NAME: (Business License Name of Corporation, Partnership, Individual Owner, Government Agency)
Ajax Materials Corporation

3. APPLICANT ADDRESS: (Number and Street)		MAIL CODE:	
1957 Crooks Road, Suite A			
CITY: (City, Village or Township)	STATE:	ZIP CODE:	COUNTY:
Troy	MI	48084	Oakland

4. EQUIPMENT OR PROCESS LOCATION: (Number and Street – if different than Item 3)
Northeast Corner of Carpenter Road and Energy Drive

CITY: (City, Village or Township)	ZIP CODE:	COUNTY:
Genesee Charter Township	48505	Genesee

5. GENERAL NATURE OF BUSINESS:
Hot mix asphalt manufacturer

6. EQUIPMENT OR PROCESS DESCRIPTION: (A Description MUST Be Provided Here. Include Emission Unit IDs. Attach additional sheets if necessary; number and date each page of the submittal.)
Ajax is proposing to install a new Hot Mix Asphalt Plant to include a 500 tph counter-flow drum mix plant, 100,000 cfm baghouse, six asphalt cement tanks with a small natural gas heater, eight HMA storage silos, RAP and aggregate feed bins.

7. REASON FOR APPLICATION: (Check all that apply.)
- [x] INSTALLATION / CONSTRUCTION OF NEW EQUIPMENT OR PROCESS
- [ ] RECONSTRUCTION / MODIFICATION / RELOCATION OF EXISTING EQUIPMENT OR PROCESS – **DATE INSTALLED:**
- [ ] OTHER – DESCRIBE

8. IF THE EQUIPMENT OR PROCESS THAT WILL BE COVERED BY THIS PERMIT TO INSTALL (PTI) IS CURRENTLY COVERED BY ANY ACTIVE PERMITS, LIST THE PTI NUMBER(S): N/A

9. DOES THIS FACILITY HAVE AN EXISTING RENEWABLE OPERATING PERMIT (ROP)? [x] NOT APPLICABLE [ ] PENDING APPLICATION [ ] YES
PENDING APPLICATION OR ROP NUMBER:

10. AUTHORIZED EMPLOYEE:	TITLE:	PHONE NUMBER: (Include Area Code)
Mark E. Boden	Vice President	248.244.3300
SIGNATURE: Mark E Boden	DATE: 12/22//2020	E-MAIL ADDRESS: mboden@ajaxpaving.com

11. CONTACT: (If different than Authorized Employee. The person to contact with questions regarding this application)	PHONE NUMBER: (Include Area Code)
Stephanie A. Jarrett Kathleen T. Anderson	248.324.2146 810.845.3925
CONTACT AFFILIATION: Fishbeck Ajax Materials Corporation, In House Consultant	E-MAIL ADDRESS: sajarrett@fishbeck.com kanderson@ajaxpaving.com

12. IS THE CONTACT PERSON AUTHORIZED TO NEGOTIATE THE TERMS AND CONDITIONS OF THE PERMIT TO INSTALL? [x] YES [ ] NO

FOR EGLE USE ONLY - DO NOT WRITE BELOW

DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203:	
DATE PERMIT TO INSTALL APPROVED:	SIGNATURE:
DATE APPLICATION / PTI VOIDED:	SIGNATURE:
DATE APPLICATION DENIED:	SIGNATURE:

A PERMIT CERTIFICATE WILL BE ISSUED UPON APPROVAL OF A PERMIT TO INSTALL

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Engineers | Architects | Scientists | Constructors

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List of Abbreviations/Acronyms

acfm	actual cubic feet per minute
AER	allowable emission rates
AERMET	AERMOD Meteorological Preprocessor
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AQD	Air Quality Division
AQD-22	Dispersion Modeling Guidance for Federally Regulated Pollutants
ARM	Ambient Ratio Method
BACT	Best Available Control Technology
BPIP Prime	Building Profile Input Program Prime
Btu	British thermal units
CAA	Clean Air Act
CAIR	Clean Air Interstate Rules
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
°F	degrees Fahrenheit

EGLE	Michigan Department of Environment, Great Lakes, and Energy
GEP	good engineering practice
gr/dscf	grains per dry standard cubic foot
HAP	hazardous air pollutant
HCl	hydrochloric acid
HMA	hot mix asphalt
hr/day	hours per day
hr/yr	hours per year
IRSL	Initial Risk Screening Level
ITSL	Initial Threshold Screening Level
km	kilometer(s)
LAER	lowest achievable emission rate
lb	pound(s)
lb/hr	pounds per hour
lb/MMBtu	pounds per million Btus
MACT	Maximum Achievable Control Technology
$\mu g/m^3$	micrograms per cubic meter
MDEQ	Michigan Department of Environmental Quality (became EGLE April 22, 2019)
MMBtu/hr	million Btus per hour
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAD83	North American Datum of 1983
NED	National Elevation Dataset
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
NSR	New Source Review
O_3	ozone
PAI	Predicted Ambient Impact
PAC	polynuclear aromatic compounds
Pb	lead
PM	particulate matter
$PM_{2.5}$	fine particulate matter less than 2.5 microns
PM_{10}	fine particulate matter less than 10 microns
ppm	parts per million
PSD	prevention of significant deterioration
PTE	potential to emit
PTI	Permit to Install
RAP	recycled asphalt product
RUO	recycled used oil
ROP	Renewable Operating Permit
SCC	Source Classification Code
sf	square foot/feet
SDS	Safety Data Sheet
SER	significant emission rate
SIL	significant impact levels
SO_2	sulfur dioxide

TAC	toxic air contaminant
T-BACT	Best Available Control Technology for Toxics
tph	tons per hour
tpy	tons per year
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
VOC	volatile organic compound

1.0 Executive Summary

Fishbeck has been retained by Ajax Materials Corporation (Ajax) to submit a request for a PTI for their proposed new HMA process to be located on Energy Drive in Genesee Charter Township, Michigan. This document contains the information required to evaluate the application for the permit, including a description of the plant, equipment, operating schedule, projected emissions characteristics, a BACT Analysis, and an air toxics demonstration.

The Ajax facility will manufacture HMA, primarily for the road construction industry. As part of this project, Ajax is proposing to install a 500 tph counter-flow drum mixer and associated 100,000 cfm baghouse, RAP and aggregate feed bins, six new asphalt cement tanks with a small natural gas heater, and eight 300 ton HMA storage silos.

The proposed project is not subject to PSD review for any criteria pollutants. The following NSPS has been determined to apply to this project: *Subpart I – Standards for Performance of Hot Mix Asphalt Facilities*.

Federal NESHAPs have been evaluated; no NESHAPs apply to this project.

A dispersion modeling analysis is provided for NO_X, SO_2, PM_{10} and $PM_{2.5}$. Impacts have been demonstrated to be compliant with applicable NAAQS and PSD Increments.

EGLE Rule 225 requires that the predicted maximum ambient impact from the emission of TACs from new and modified sources not exceed health-based screening levels. Compliance with these health-based screening levels have been demonstrated as the PAIs for all TACs are below the applicable air quality screening levels utilizing air dispersion modeling.

2.0 Process Overview

2.1 Process Description

Ajax will manufacture HMA paving materials, primarily for the road construction industry, using a counter-flow drum mixer/dryer process. HMA paving materials are a mixture of aggregates and asphalt cement, which is heated and mixed at metered proportions; RAP is often used to reduce the quantity of virgin aggregates required in the mix. This practice reuses a waste material and reduces the amount of new natural resources needed. As RAP also contains hardened asphalt cement, the quantity of liquid asphalt cement that must be added to the mix is also reduced. The HMA manufacturing process involves combustion of a fuel to dry and heat the aggregates. These actions are carried out in a rotating, direct-fired drum dryer/mixer. Natural gas will be used as the primary fuel at the plant; propane and fuel oils, including RUO, may also be used at the plant.

In a counter-flow drum mixer, the aggregates are moved through a rotating drum in the opposite direction as the fuel combustion products. The drum is inclined with the aggregate feed chute located at the top and the dryer burner located at the bottom. RAP is added at the approximate midpoint of the dryer drum. Asphalt cement is introduced in the lower end of the drum, usually in the last 10 to 12 feet, where rotation of the drum coats the aggregate with the asphalt cement. The asphalt cement mixing zone is located behind the burner flame zone to prevent direct contact with the flame zone.

A discharge chute for the finished product is located at the lower end of the inclined drum. HMA is conveyed to a surge bin and then to the HMA storage silos, where it is loaded into transport trucks. Exhaust gases from the dryer/mixer, including the products of combustion, exit the end of the drum and are controlled by a fabric filter collector.

The plant configuration will include eight HMA silos and a truck load out area with sides that extend toward the ground. Exhaust gases from the load out area will be routed back to the burning zone of the HMA plant or to a standalone collection system for blue smoke control.

A location map is provided as Figure 1 and a proposed site plan is presented as Figure 2.

2.2 Description of Proposed Modification

Ajax is proposing to build a new HMA plant. This plant will include installing a 500 tph counterflow drum, 100,000 cfm baghouse, RAP and feed bins, eight 300-ton HMA silos, six asphalt cement tanks with a small natural gas heater. If RUO is used in the future, an RUO tank will also be installed.

The proposed maximum operating schedule is 24 hours per day, 7 days per week, 52 weeks per year. To limit the plant's potential to emit, Ajax will agree to limit the total annual HMA production to 887,560 tpy of HMA.

3.0 Regulatory Review

3.1 Michigan Air Pollution Control Regulations

3.1.1 Rule 201 – PTI Requirements

Any process or process equipment installed after August 15, 1967, which may emit an air contaminant requires a PTI prior to installation, construction, reconstruction, relocation, alteration, or modification unless specifically exempt. The proposed plant construction will require a PTI.

3.1.2 Rules 224 to 230 – Air Toxics Requirements

Rules 224 to 230, effective November 10, 1998, apply to any proposed, new, or modified process or process equipment for which an application for a PTI is required and which emits a TAC. A **TAC** is defined in Michigan rules as:

> *... any air contaminant for which there is no National Ambient Air Quality Standard (NAAQS) and which is or may become harmful to public health or the environment when present in the outdoor atmosphere in sufficient quantities and duration.*

A new or modified source of TACs is required to comply both with T-BACT and with health-based screening level requirements.

3.1.2.1 <u>Rule 224 – T-BACT Requirement for New and Modified Sources of Air Toxics</u>

Rule 224 requires that emissions of TACs from a new or modified source not exceed the maximum allowable emission rate that results from the application of the T-BACT.

Rule 224(2) provides exemptions from the T-BACT requirements for:

- Emission unit(s) subject to a standard for HAPs promulgated under 112(d) of the CAA, or for which a control technology determination has been made under Section 112(g) or 112(j). Section 112(d)(6) of the CAA requires the USEPA to review and revise the MACT standards, as necessary, taking into account developments in practices, processes, and control technologies. This exemption applies to both regulated HAPs and other VOCs or PM which are controlled by the same technology. [Rule 224(2)(a)].
- TACs that are carcinogens which have emission rates less than 0.1 lb/hr and an IRSL greater than 0.1 $\mu g/m^3$, or TACs that are not carcinogens which have emission rates less than 1.0 lb/hr and ITSLs greater than 200 $\mu g/m^3$. [Rule 224(2)(b)].
- Emission units(s) which only emit VOCs or PM that comply with BACT or LAER. [Rule 224(2)(c)].
- Engines, turbines, boilers, and process heaters with heat input capacities up to 100 MMBtu/hr which fire natural gas, diesel, or biodiesel, provided that the effective stack is vertical, unobstructed, and is at least 1.5 times the building height and the building setback is at least 100 feet from the property line. [Rule 224(2)(d)].

A T-BACT analysis is provided in Section 5.0.

3.1.2.2 Rules 225 To 230 – Health-Based Screening Level Requirement for New or Modified Sources of Air Toxics

Rule 225 requires that emissions of TACs not exceed the maximum allowable emission rate that results in a predicted maximum ambient impact above the ITSL, the IRSL, or both.

Rule 227 indicates that compliance with the health-based screening level provisions of Rule 225 can be determined by any of the following:

- Pursuant to Rule 227(1)(a), the emission rate of each TAC is not greater than the rates determined from the algorithms in Table 21 [of Rule 227].
- Pursuant to Rule 227(1)(b), the emission rate of each TAC is not greater than the rate determined from the Ambient Impact Ratio matrix screening methodology in Table 22 [of Rule 227] or determined by any other screening method approved by EGLE.
- The maximum ambient impact of each TAC is less than the applicable screening level determined using the maximum hourly emission rate in accordance with the air quality modeling provisions of Rule 240, 241, or both.

A dispersion modeling analysis for TACs is provided in Section 6.0.

3.1.3 Rule 301 – Standards for Density of Emissions

Rule 301 establishes limitations for the density of particulate emissions. The proposed plant is not expected to have any effect on the ability to comply with the visible emission limitations of Rule 301. Rule 301 limits visible emissions as follows:

- A 6-minute average of 20% opacity, except for one 6-minute average per hour of not more than 27% opacity.
- A limit specified by an applicable federal Standard for the Performance of NSPS. HMA plants are subject to NSPS-Subpart I, which limits opacity to 20%.
- A limit specified as a condition of a PTI or Permit to Operate.

Ajax is confident the new HMA plant will be able to comply with the opacity limitations specified in Rule 301 and NSPS-Subpart I.

3.1.4 Rule 331 – Emission of PM

Rule 331 (Table 31, F) stipulates that asphalt paving plants located outside of Priority I and II areas shall not exceed an emission rate of 0.30 lb of particulate per 1,000 lb of exhaust gas. The proposed HMA plant is subject to the NSPS Subpart I, which limits emissions to 0.04 gr/dscf, which is equivalent to approximately 0.076 lb particulate per 1,000 lb of exhaust gas; therefore, Ajax is confident the drum mixer/dryer will continue to comply with the PM limitations specified in Rule 331.

3.1.5 Rule 702 – VOC BACT

New sources of VOC are subject to Rule 702 which requires an emission limitation based upon the application of BACT. New sources are defined in Rule 701 as:

> *... any process or process equipment which is either placed into operation on or after July 1, 1979, or for which an application for a Permit to Install, pursuant to the provision of Part 2 of these rules, is made to the department on or after July 1, 1979, or both, except for any process or process equipment which is defined as an existing source pursuant to R336.1601 (Rule 601).*

BACT for VOCs is discussed in Section 5.0, BACT Analysis, of this document.

3.1.6 *Rule 901 – Nuisance Odors and Dust*

Rule 901 prohibits the emissions of air contaminants in quantities that cause either:

- Injurious effects to human health or safety, animal life, plant life of significant economic value, or property.
- Unreasonable interference with the comfortable enjoyment of life and property.

The HMA plant will includes eight HMA silos and a truck load enclosure with sides that extend toward ground. Exhaust gases from the load out area will be routed back to the burning zone of the HMA plant or to a standalone collection system.

3.1.7 *Part 18 – Prevention of Significant Deterioration*

The primary provisions of the PSD Program require that new major stationary sources and major modifications at existing major stationary sources be carefully reviewed prior to onsite construction to ensure compliance with the NAAQS, the applicable PSD Increment provisions, and the requirement to apply BACT on the project's significant emission increases of NSR regulated pollutants. The PSD Program also requires evaluation of potential visibility impacts to federally designated Class I areas, evaluation of air quality impacts as a result of secondary growth associated with the project, and a minimum 30-day public comment process.

The Ajax facility will be located in Genesee County, which is currently in attainment with all NAAQS, which includes: PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, O_3, and Pb. Both NO_X and VOCs are regulated for controlling O_3 formation in the ambient air because they both participate in ambient photochemical reactions that result in O_3.

A determination must be made as to whether the PSD Program is applicable to the proposed construction. This determination is based on whether emissions at the stationary source will be greater than 250 tpy for the pollutants in attainment. As demonstrated in this application, the Ajax facility will accept enforceable emission limits and a production limit of 887,560 tpy, which will limit emissions of attainment air pollutants to less than 250 tpy. As a result, the proposed HMA plant is not subject to the PSD Program.

3.1.8 *EGLE Dispersion Modeling Guidance*

Policy and Procedure AQD 22, *Dispersion Modeling Guidance for Federally Regulated Pollutants*, was issued to address when dispersion modeling is required as part of the PTI Application. The intent of AQD-22 was to ensure that projects do not interfere with the NAAQS or PSD Increment. Pursuant to EGLE guidelines, this determination must be made for both *major source* and *minor source* applications.

The project emissions exceed the SER for SO_2, NO_X, $PM_{2.5}$, and PM_{10}; therefore, a dispersion modeling analysis for these pollutants is provided in Section 6. Pursuant to Table 2 of AQD-22, an analysis is not required for CO, as project emissions are below 100% of the SER.

3.2 Federal Regulations

3.2.1 *40 CFR 60 Subpart I– NSPS*

The NSPS require that new emission sources emit less pollutants than existing sources. 40 CFR 60, Subpart I, promulgated July 25, 1977, requires performance standards for HMA. The standards are in effect for equipment constructed, modified, or reconstructed after June 11, 1973. Ajax is subject to an NSPS emission limit for PM of 0.04 gr/dscf of exhaust gas specified in 40 CFR §60.92(a)(1) (the Standard). The NSPS also sets a visible emission limitation, found in 40 CFR §60.92(a)(2), of less than 20% opacity. Compliance testing will be performed following construction and commissioning of the new drum mixer/dryer using the federal reference methods specified in the Standard.

Ajax is confident the plant will comply with the PM and opacity limitations specified in NSPS, Subpart I.

3.2.2 40 CFR 61 and 63 – NESHAPS

Projects of this nature may also be subject to federal requirements for the control of HAP emissions. The first step to determining applicability is to review the pollutant- and source-specific regulations promulgated in 40 CFR §61 and §63; these regulations are collectively known as NESHAPs. The second step for determining applicability is to evaluate whether the modification will be a major source of HAPs and, therefore, subject to the case-by-case MACT requirements pursuant to Section 112(g) of the federal CAA.

NESHAPs apply to both major and area sources of HAPs. A **major source of HAPs** is defined in Section 112 of the CAA, in part as *a stationary source that has a PTE 10 tpy or more of any HAP, or 25 tpy of any combination of HAPs subject to regulation under the CAA*. The design capacity of the drum mixer/dryer, operating 24 hours per day and 365 days per year would result in a total annual production of 4,380,000 tons HMA. Based on this operational capacity, emissions of combined HAPs would be greater than 25 tpy and the facility would meet the definition of a major source of HAPs. However, Ajax will agree to an enforceable operational restriction (annual production limit) to limit the emissions of HAPs to below the major threshold levels.

The facility will be an *area source* of HAP emissions. No area source NESHAP requirements currently apply to this type of source.

3.2.3 40 CFR 70 – Title V

The Ajax HMA plant will not be subject to the Title V (Michigan's ROP) program; issuance of this PTI will not affect the status with respect to Title V.

4.0 Emission Calculations Summary

Emissions were estimated using AP-42, EGLE emission factors, and other standard industry calculations. Tables 1, 2, and 3 summarize the short-term and annual emissions of the HMA plant. The footnotes contained in these tables describe the methods used to calculate emissions.

4.1 PM Emissions

For the counter-flow HMA plant, PM emissions are calculated based on the NSPS emission limit of 0.04 gr/dscf of exhaust gas. This calculation involves the rated capacity of the exhaust fan and the amount of moisture in exhaust gases. HMA plant capacities are rated based on a specific percentage of moisture in the incoming aggregates; the average aggregate moisture content for similar sources is approximately 5%. As the moisture content of the incoming aggregates increases, the capacity of the HMA plant decreases; therefore, PM emissions are calculated based on the plant running at its rated capacity and aggregates' moisture content. The air flow must be converted from actual cubic feet per minute to dry standard cubic feet per minute, using the ideal gas law (PV = nRT). See Appendix 1 for the PM calculation methodology.

4.2 SO_2 Emissions

The proposed emission factor, in pounds of SO_2 per ton of HMA produced, is based on RUO sulfur content of 1% and a 43% control for SO_2 from RAP. As the plant will typically run on natural gas, the SO_2 emissions provided in Table 2 are extremely conservative.

4.3 NO_X Emissions

The proposed emission factor, in pounds of NO_X per ton of HMA produced, was based on EGLE Fact Sheet No. 9842 for HMA Plants. The emission factor for SCC 3-05-002-46 (HMA Batch Plants) was used as a conservative approach to calculate the maximum emission rate of NO_X.

4.4 CO Emissions

The proposed emission factor, in pounds of CO per ton of HMA produced, was based on the on EGLE Fact Sheet No. 9842 for HMA Plants, which is the EGLE default CO factor for HMA plants. The emission factor for SCC 3-05-002-10 (Waste Oil Heaters for HMA plants) was used as a conservative approach to calculate the maximum emission rate of CO.

4.5 VOC Emissions

The proposed emission factor, in pounds of VOC per ton of HMA produced, was taken from AP-42, Section 11.1, Table 11.1-8 for a waste oil-fired counter-flow drum mix plant. This emission factor, along with a 100% safety factor, was used to estimate the maximum emission rate of VOC.

4.6 Lead

The proposed emission factor, in pounds of Pb per ton of HMA produced, was based on maximum parts per million allowed in RUO (100 ppm) and 98% control for baghouse. The proposed emission factor was used for the calculation of the maximum emission rate of Pb.

4.7 HAPs and TACs

Emissions of sulfuric acid, nickel, manganese, benzene, formaldehyde, isomers of xylene, toluene, acrolein, and ethylbenzene are based on the current emission limits and the default allowable emission rates from a paper titled *Eliminating the Mandatory Testing Requirement for Toxic Air Contaminants for Hot Mix Asphalt Plants in Michigan* (MDEQ-AQD, June 1, 2012). All other HAP and TAC emissions were estimated using the maximum USEPA Web-fire emission factor for drum mix plants for each fuel used at the plant with a safety factor.

The proposed HCl emission factor, in pounds of HCl per ton of HMA produced, was based on maximum halogen content of RUO (1,000 ppm) and a 61% expected reduction in the HCl emissions based on the nature of an HMA drum mix plant. The proposed emission factor was used for the calculation of the maximum emission rate of HCl. See Appendix 2 for the HCl calculation methodology.

4.8 Miscellaneous Combustion Equipment

The emissions for the small natural gas asphalt cement tank heater are provided in Tables 4 and 5, and were estimated using Web-fire emission factors for SCC 1-02-006-03 (Boiler with a Heat Input Capacity of Less Than 10 MMBtu/hr). In instances where appropriate emission factors do not exist in SCC 1-02-006-03, emission factors for SCC 1-02-006-02 were used (Boiler with a Heat Input Capacity of Greater Than 10 MMBtu/hr).

5.0 BACT Analysis

5.1 Description

Emissions from the HMA dryer/mixer will be controlled by a two-part system designed primarily to control particulate emissions. The exhaust gases from the proposed counter-flow HMA plant will be controlled by a primary collector followed by a fabric filter collector (baghouse) before being exhausted to the atmosphere through a stack. All particulate matter collected by the primary collector and baghouse are returned to the mixing zone of the drum where the asphalt cement is added. This ensures the particulates adhere to the asphalt cement and are not re-entrained in the exhaust gases. The baghouse is currently the most commonly used control device for HMA facilities and is considered to represent T-BACT for new HMA facilities.

Rule 702 requires BACT for VOCs for new and modified sources. There has been significant discussion between the HMA industry and regulators regarding whether newer plant designs, such as counter-flow or dual drum, represent BACT for HMA plants. Data supporting such conclusions is generally subjective rather than objective and quantifiable. VOC emissions from all of the fuels currently used are minimized by using good combustion controls. Good combustion controls will be ensured by regular burner inspections and routine monitoring of CO using a hand-held monitor. Maintaining good combustion control is in Ajax's best interest, as good combustion control is directly related to fuel efficiency and fuel is one of the HMA industry's highest operating costs.

6.0 Air Quality Modeling and Air Toxic Evaluation

As presented in Table 1, the project emissions from the proposed project exceed the SER thresholds for NO_X, SO_2, $PM_{2.5}$, and PM_{10} established pursuant to 40 CFR 52.21 and Michigan Rule 1802 (R 336.1802). Therefore, a detailed dispersion modeling analysis for the PSD Increments and compliance with the NAAQS is required as a part of the application. Federal ambient standards have been developed for criteria pollutants consisting of PSD Increments and NAAQS. Compliance with the federal ambient standards for criteria pollutants has been demonstrated through air dispersion modeling as discussed in Section 6.2.

As stated in Rule 225 (R 336.1225), EGLE requires that the ambient impact of the TACs released from a rule subject source be estimated and compared to established air quality standards. An air toxics demonstration is presented in Section 6.3.

Secondary formation analyses for $PM_{2.5}$ and O_3 have not been included as part of the application. Pursuant to current guidance, secondary formation analyses are not required when a project is not subject to PSD regulations.

Model selection and input parameters, used for both criteria pollutant and TAC modeling analyses, are presented in Section 6.1.

6.1 Model Parameters

6.1.1 Model Selection

The model selected for the air dispersion analysis was the AERMOD, Version 19191. Effective December 9, 2005, this model was established as the USEPA-preferred air dispersion model for steady state operations. AERMOD is a modeling system that incorporates air dispersion based on planetary boundary layer turbulence, structure, and scaling concepts, including treatment of both surface and elevated sources and both simple and complex terrain.

BEE line software, which incorporates the USEPA algorithm for the AERMOD program, was used. The software, referred to as BEEST, Version 12.01, was developed by Providence Engineering and Environmental Group, LLC.

6.1.2 GEP Stack Height Analysis

Prior to running the air dispersion model, the potential for building downwash to affect the plume must be evaluated. Building downwash represents the effect that nearby structures have on the air flow near the stack. If the stack is within the area of influence of the building, the swirls and eddies caused by obstruction of the air flow near buildings can affect the plume dispersion.

A GEP analysis was performed using software developed by Providence Engineering and Environmental Group, LLC. The software includes the USEPA BPIP-Prime code for calculating projected building widths. This analysis was run for all buildings depicted in Figure 2. The highest calculated formula GEP stack height of any structure was 97.9 feet (29.84 meters). GEP stack height is the greater of GEP formula stack height or 65 meters (213.3 feet). The structure heights and stack height are listed in Tables 6 and 7, respectively. The stack height is less than the GEP stack height; therefore, direction-specific building effects calculated for each wind direction were entered into the dispersion model as described in the next section.

6.1.3 Model Input Parameters

The direction specific building dimensions calculated during the GEP stack height analysis were entered into the model.

Figure 1 illustrates the site topography. As demonstrated in the figure, the modeling area is relatively flat; however, actual terrain data was used in the model. Figure 2 identifies the stack location.

Land use in the area is predominantly rural; therefore, default rural dispersion coefficients were selected for the model.

The emission source included in this analysis is a point source, with a vertically unobstructed discharge. Model input parameters for this source are provided in Table 7.

6.1.3.1 Receptor Grids

Ajax will prevent access to the property by the general public through a combination of fencing, berms, trees, and shrubs. Therefore, receptors were placed at 25-meter intervals around the inaccessible property line. Dense grids of 25-meter and 50-meter intervals surround the property, and grids of 100 meters, 250 meters, and 500 meters cover the outlying areas to a distance of 10 kilometers. All coordinates are provided in the UTM NAD83 coordinate system. [1]

Terrain elevations at receptors were obtained using the BEEST program and USGS NED 1/3 arc-second data. BEEST implements the AERMAP model (Version 18081), which includes processing routines that extract NED data to determine receptor terrain elevations for air quality model input. The NED data used in the modeling had a resolution of 10 meters (1/3 arc-second) and NAD83 datum.

6.1.3.2 Meteorological Data

The meteorological data used in the model was 1-minute data from Bishop International Airport, Flint (FNT) 2019 (Surface Station No. 14826) and White Lake, 2019 (Upper Air Station No. 4830). The meteorological data was provided by EGLE and was processed using the ADJ_U* option in AERMET (Version 18081). All criteria pollutant and TAC modeling was conducted utilizing one year of meteorological data (2019).

6.1.3.3 NO_X Transformation

Tier 1 default modeling was utilized, where 100% of NO_X is conservatively assumed to be NO_2.

6.2 Criteria Pollutant Modeling

A dispersion modeling analysis has been conducted for the criteria pollutants for which emissions are above the SER criteria. As presented in Table 1, these include NO_X, SO_2, $PM_{2.5}$, and PM_{10}. CO emissions are below 100% of the SER and, pursuant to AQD-22, do not require modeling.

If emissions of the modeled pollutants result in impacts that exceed the SILs, a detailed dispersion modeling impact analysis to demonstrate compliance with the federal PSD Increments and NAAQS is required as a part of the application. If impacts are less than the SILs, no additional modeling is necessary.

Emission rates for the baghouse were conservatively determined for use in the modeling demonstration and are presented in Table 7.

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[1] UTM NAD83 Universal Transverse Mercator North American Datum of 1983

6.2.1 *Significant Impact Analysis*

A significant impact analysis is typically the first step in criteria pollutant modeling. The SIL analysis included impacts from the baghouse.

As presented in Table 8, predicted impacts from the baghouse for NO_2, SO_2, $PM_{2.5}$, and PM_{10} were above the applicable SILs, except for annual PM_{10} impacts. Therefore, additional analyses have been conducted, as discussed in Section 6.2.2.

The USEPA has revoked the previously promulgated SILs for $PM_{2.5}$. However, USEPA guidance (April 17, 2018)[2] provides SILs, which the USEPA has documented should be appropriate for all Class II Areas, as well as alternative SILs that can be selected on a case-by-case basis. The SILs recommended in this USEPA guidance have been used in the analysis. Specifically, the following SILs were utilized for the Class II analysis:

- NAAQS SIL
  - 0.2 $\mu g/m^3$ for Annual $PM_{2.5}$
  - 1.2 $\mu g/m^3$ for 24-hr $PM_{2.5}$
- Increment SIL
  - 0.2 $\mu g/m^3$ for Annual $PM_{2.5}$
  - 1.2 $\mu g/m^3$ for 24-hr $PM_{2.5}$

6.2.2 *NAAQS and Increment Analyses*

Because impacts from the proposed project exceed the applicable SILs (except annual PM_{10}), additional analyses have been performed for the pollutants and averaging times as follows:

- 1-hour NO_2 (NAAQS modeling; no Increment established)
- Annual NO_2 (NAAQS and Increment modeling)
- 24-hour and annual $PM_{2.5}$ (NAAQS and Increment modeling)
- 24-hour PM_{10} (NAAQS and Increment modeling)
- 1-hour SO_2 (NAAQS modeling; no Increment established)
- 3-hour, 24-hour, and Annual SO_2 (NAAQS and Increment modeling)

The first step in the additional analysis is typically to define the significant impact receptors for the project. These are the receptors from the SIL analysis at which the impacts from the project were determined to exceed the SIL. Although there is an SO_2 additional source to consider for NAAQS modeling, the entire SIL grid was used for all Increment and NAAQS modeling for all pollutants to simplify review.

EGLE was contacted to determine which additional sources should be considered in the Increment and NAAQS analyses, as well as appropriate background concentrations to be used in the model. EGLE determined that there was one additional SO_2 source that needed to be included for the analysis. The additional source determination and background data provided by EGLE are presented in Appendix 3.

The model was run for the proposed maximum emission rate for each pollutant from the baghouse; therefore, the model PAI is equal to the actual PAI in $\mu g/m^3$. The results of the Increment and NAAQS analyses are presented in Tables 9 and 10, respectively. Compliance with Increment and NAAQS are demonstrated. The electronic model input/output files are provided in Appendix 4 (of the original EGLE application only).

[2] https://www.epa.gov/sites/production/files/2018-04/documents/sils_policy_guidance_document_final_signed_4-17-18.pdf

6.3 Air Toxics Modeling Demonstration

In Rule 225 (R 336.1225) of the Air Pollution Control Commission General Rules, EGLE requires that the ambient impact of the TACs released from a rule-subject source be estimated and compared to established air quality standards. To estimate the ambient air concentrations, each contaminant concentration is calculated at the stack, assuming peak loading conditions. The contaminant loading from the stack is then subjected to air dispersion modeling to simulate the effect of local meteorological conditions. The ambient concentration at hypothetical ground level receptors is then calculated and compared to the air quality screening levels as developed by EGLE.

6.3.1 Model Input Parameters

Model input is addressed in Section 6.1.3.

6.3.2 Results of TAC Modeling Analysis

The input parameter emission rate was 1 lb/hr; therefore, the model output is in units of $\mu g/m^3$ per lb/hr. To estimate the actual PAI, the model PAI was multiplied by the maximum emission rate in lb/hr. The unitized model results are included as Table 11. A flash drive containing the electronic model input/output files is provided in Appendix 4 (of the original EGLE version only).

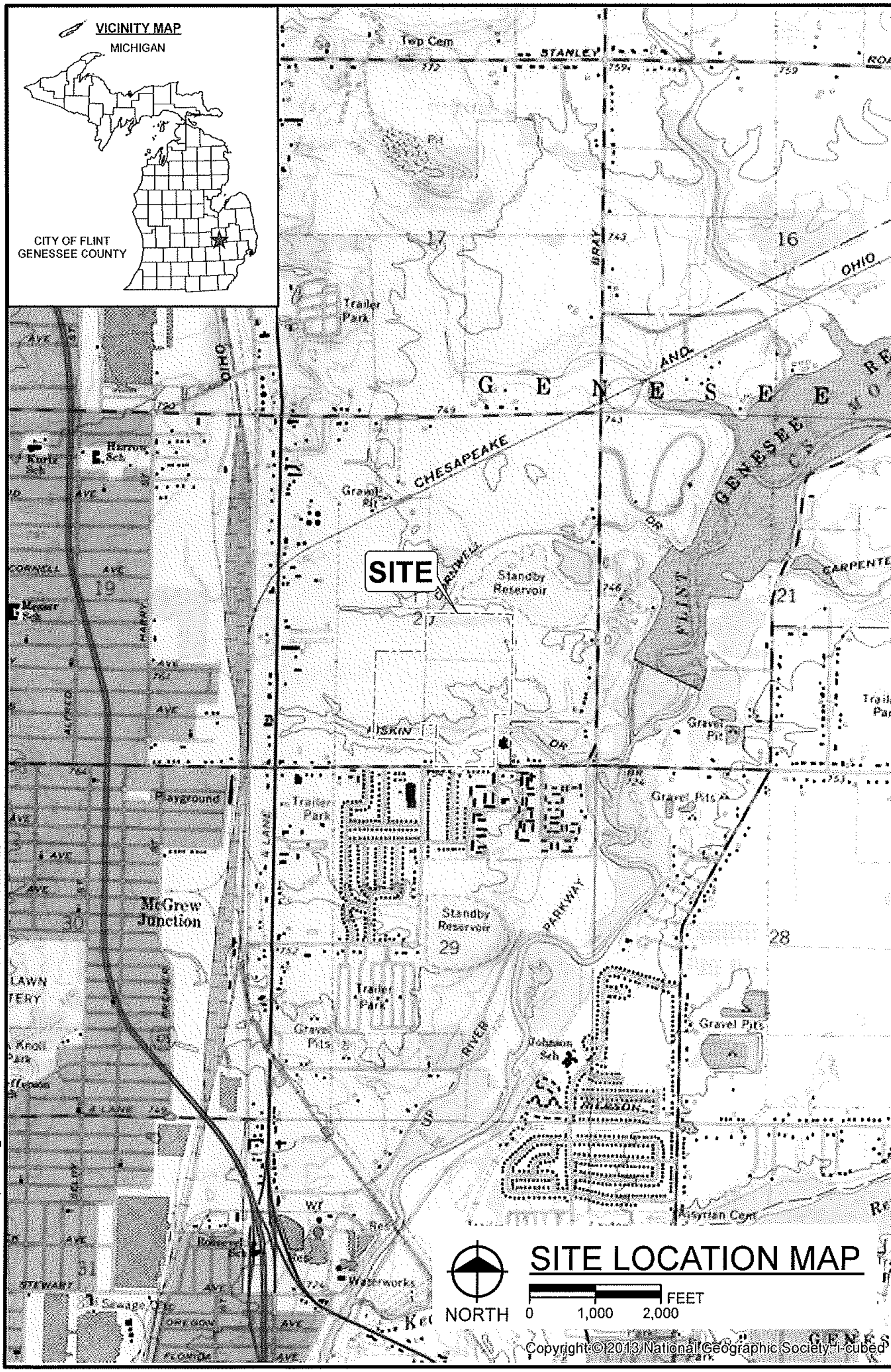
The actual PAI in $\mu g/m^3$ is then compared to the screening level. For the polycyclic aromatic hydrocarbons designated by Footnote 5 on the screening level list, the emission rate was multiplied by the relative potency factors as described in an MDEQ memorandum dated February 7, 2017. As indicated in Table 12 the PAIs for all TACs are below the applicable air quality screening levels obtained from the EGLE-AQD *List of Screening Levels*.

7.0 Summary and Conclusion

Ajax manufactures HMA. The proposed plant identified in this permit will be located on Energy Drive, in Genesee Charter Township, Michigan. Ajax is requesting to construct a new HMA plant including the installation of a 500 tph counter-flow drum mixer, a 100,000 cfm rated baghouse, RAP and feed bins, eight storage silos, and six asphalt cement tanks with a small natural gas heater. To support the proposed construction, this application incudes an analysis of state and federal air regulatory requirements applicable to the requested installations as well as the demonstration of how the plant will comply with those applicable requirements.

Michigan Rule 702 requires the application of BACT for new sources of VOCs. BACT was demonstrated for the Ajax facility.

Air toxic dispersion modeling estimated the ambient impact of a variety of HAPs and TACs predicted to be emitted from an HMA plant. The calculated maximum concentrations were compared to the ITSLs provided by EGLE-AQD. A comparison indicated that Ajax's proposed HMA plant complies with the current Michigan air toxic regulations.



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AJAX Materials
Energy Drive, Genesee Charter Township, Michigan

Permit to Install Application

PROJECT NO.
201405

FIGURE NO.
1

PLOT INFO: Z:\2020\201405\CAD\GIS\mapdoc\FIG01_SITE LOCATION MAP.mxd Date: 12/9/2020 9:01:10 AM User: rsacord

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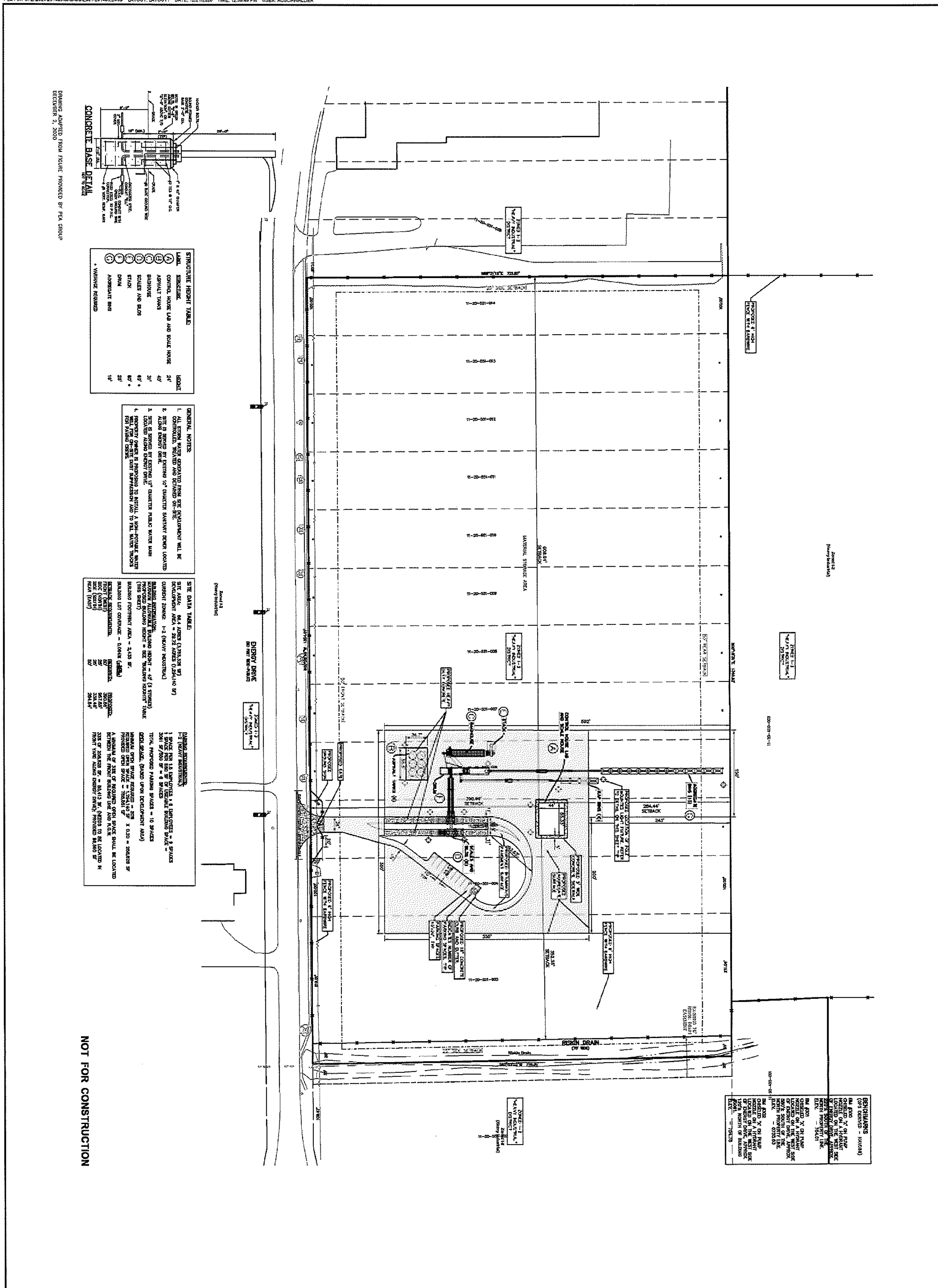

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AJAX Materials

Energy Drive, Genesee Charter Township, Michigan

Permit to Install
Application

REVISIONS

NOT FOR CONSTRUCTION

Drawn By
Designer
Reviewer
Manager

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PROJECT NO.
201405

SHEET NO.

Table 1 – Project Emission Summary
Air Permit to Install
Ajax Materials, Genesee Twp, Michigan

Pollutant	HMA Dryer Emissions (tpy)	AC Tank Heater Emissions (tpy)	Significant Emission Rate	% of SER	Exceeds SER?	PSD Major Source Threshold	Exceeds Major Source Threshold
CO	89.2	0.7	*100*	89.9%	No	*250*	No
NO_X	53.3	0.9	*40*	135%	Yes	*250*	No
PM	16.2	0.0	*25*	65%	No	*250*	No
PM_{10}	29.5	0.1	*15*	197%	Yes	*250*	No
$PM_{2.5}$	29.5	0.1	*10*	295%	Yes	*250*	No
SO_2	79.0	0.0	*40*	198%	Yes	*250*	No
VOC	28.4	0.0	*40*	71%	No	*250*	No
CO_2	21,967	1,024.7	*See CO2e*				
CH_4	8.0	0.0					
N_2O	--	0.0					
CO_2e	22,167	1,025.8	*75,000*	31%	No	NA	NA
Lead	0.01	0.0	*0.6*	2%	No	NA	NA
Fluorides	--	--	*3.0*	0.0	Yes	NA	NA
H_2S	--	--	*10.0*	0.0	Yes	NA	NA
H_2SO_4	1.4	--	*7*	20%	No	NA	NA
Highest Single HAP (HCl)	3.3	0.0	*NA*	NA	NA	NA	No
Aggregate HAPs*	22.5	0.0	*NA*	NA	NA	NA	No

*Will limit single HAPs to 8.9 tpy, and aggregate HAPs to 22.5 tpy.

Table 2 - HMA Counter-flow Drum Dryer NSR Regulated Pollutant Estimated Emissions
Air Permit to Install
Ajax Materials, Genesee Twp, Michigan

Maximum Short Term Production	tons HMA/hr	500
Annual Production Limit	tons HMA/yr	887,562
Types of Fuel Permitted	Natural Gas, Propane , Fuel Oil 2-6, RUO	
Density of Fuel Oil (avg)	lb/gal	7.4
Fuel Oil/RUO Sulfur Content	% by weight	1.0

NSR Regulated Pollutant	Emission Factor (see notes)	Notes	Maximum Short Term Emissions (lb/hr)	Annual Emissions (tpy)
CO	0.201 lb/ton HMA	1	100.5	89.2
NO_x	0.12 lb/ton HMA	1	60.0	53.3
PM	0.04 lb/ton HMA	3	18.2	16.2
PM_{10}	0.07 lb/ton HMA	3	33.2	29.5
$PM_{2.5}$	0.07 lb/ton HMA	3	33.2	29.5
SO_2	0.18 lb/ton HMA	2	89.1	79.0
VOC	6.4E-02 lb/ton HMA	4	32.0	28.4
CO_2	49.5 lb/ton HMA	5	24,750	21,967
CH_4	1.8E-02 lb/ton HMA	5	9.0	8.0
N_2O	-- --		--	--
CO_2e	49.95 lb/ton HMA	6	24,975	22,167
Lead	3.0E-05 lb/ton HMA	7	0.02	0.01
Fluorides	-- --		--	--
H_2S	-- --		--	--
H_2SO_4	3.2E-03 lb/ton HMA	8	1.6	1.4

[1] Emission factor is from the MDEQ Emission Factor Calculation Fact Sheet for HMA Plants waste oil asphalt heaters (3-05-002-10) for CO; and batch plant factor (3-05-002-46) for NOX.
[2] Emission factor is based on RUO sulfur content of 1% and a 43% control for SO2 from RAP - See SO2/RAP calculation methodology below
[3] PM emissions are based on NSPS emission limit of 0.4 grains/DSCF. See Appendix 2 for particulate emission calculation data. PM10 and PM2.5 emissions are based on PM emissions plus AP-42 condensible emissions, plus H2SO4 and HCL emissions, which are assumed to form condensible PM.
[4] VOC emission factor from AP-42, Section 11.1, Table 11.1-8 for waste oil fired dryer, plus a 100% safety factor.
[5] Emission factor is from EPA Webfire emission factor for #6 oil-fired counterflow drum mix plant (3-05-002-63); plus a 50% safety factor
[6] CO_2e emision factor based on global warming potentials for CO2 (1), CH4 (25) and N2O (298) obtained from 40 CFR 98 Subparts A and C, respectively.
[7] Lead emission factor is based on maximum ppm allowed in RUO (100 ppm) and 98% control for baghouse, as follows:
7.4 lb/gal * 100 ppm/1e6 X 2 gal oil/ton HMA X (1-.98)
[8] AQD Default Allowable Emission Rate from June 2012 "Eliminating the Mandatory Testing Requirement for Toxic Air Contaminants for Hot Mix Asphalt Plants in Michigan"

Table 2 - HMA Counter-flow Drum Dryer NSR Regulated Pollutant Estimated Emissions
Air Permit to Install
Ajax Materials, Genesee Twp, Michigan

Emission Calculation Methods

PM
See particulate emission calculation methodology. Particulate is assumed to be less than 10 microns in diameter.

SO_2 (RAP)
Design Capacity Emissions (lb/hr) = [Design Material Usage (ton of HMA/hr) x Unit Fuel Consumption (gal/ton) x Fuel Density (lb/gal) x (Sulfur Content (% by Weight)/100) x 64 (lb SO_2)/32 (lb S)] x (1 - (43 (% SO_2 control for RAP)/100))
Potential Emissions (lb/hr) = [Permit Limit Material Usage (ton of HMA/hr) x Unit Fuel Consumption (gal/ton) x Fuel Density (lb/gal) x (Sulfur Content (% by Weight)/100) x 64 (lb SO_2)/32 (lb S)/((1/2000) (lb/ton)] x (1 - (43 (% SO_2 control for RAP)/100))
Expected Emissions (lb/hr) = [Expected Material Usage (ton of HMA/hr) x Unit Fuel Consumption (gal/ton) x Fuel Density (lb/gal) x (Sulfur Content (% by Weight)/100) x 64 (lb SO_2)/32 (lb S)/((1/2000) (lb/ton))] x (1 - (43 (% SO_2 control for RAP)/100))

NO_x CO, VOC
Design Capacity Emissions (lb/hr) = Design Material Usage (ton of HMA/hr) x Emission Factor (lb/ton)
Potential Emissions (ton/yr) = Permit Limit Material Usage (ton of HMA/yr) x Emission Factor (lb/ton) x 1/2000 (ton/lb)
Expected Emissions (ton/yr) = Expected Material Usage (ton of HMA/yr) x Emission Factor (lb/ton) x 1/2000 (ton/lb)

CO_2e
CO_2e (lb/hr) = CO_2 (lb/hr) x 1 + CH_4 (lb/hr) x 25 + N_2O (lb/hr) x 298

E_{ST} = Maximum Short Term HMA Production (ton HMA/hr) X EF
E_A = E_F X Annual Production Limit (ton HMA/yr) / 2,000 lb/ton
where:
E_{ST} = Short Term Emissions (lb/hr);
E_A = Annual Emissions (tpy);
EF = emission factor (lb/ton HMA)

Table 3 - HMA Counter-flow Drum Dryer TAC Emissions

Air Permit to Install

Ajax Materials, Genesee Twp, Michigan

Material Usage	tons/hr	500
Annual Production Limit	tons HMA/yr	887,562

Toxic Air Contaminant	CAS No.	Emission Factor (see notes)	Note	Maximum Short Term Emissions (lb/hr)	Annual Emissions (tpy)	HAP?
Ethylbenzene	100-41-4	1.0E-03 lb/ton HMA	1	5.00E-01	0.44	Yes
Benzaldehyde	100-52-7	2.2E-04 lb/ton HMA	5	1.10E-01	0.10	No
Quinone	106-51-4	3.5E-04 lb/ton HMA	3	1.76E-01	0.16	Yes
n-Butane	106-97-8	1.3E-03 lb/ton HMA	5	6.70E-01	0.59	No
Acrolein	107-02-8	1.0E-03 lb/ton HMA	1	5.00E-01	0.44	Yes
Toluene	108-88-3	6.0E-03 lb/ton HMA	1	3.00E+00	2.66	Yes
N-Pentane	109-66-0	4.2E-04 lb/ton HMA	5	2.10E-01	0.19	No
1-Pentene	109-67-1	4.4E-03 lb/ton HMA	5	2.20E+00	1.95	No
N-Hexane	110-54-3	2.0E-03 lb/ton HMA	3	1.01E+00	0.90	Yes
Valeraldehyde	110-62-3	1.3E-04 lb/ton HMA	5	6.70E-02	0.06	No
Anthracene	120-12-7	6.8E-06 lb/ton HMA	3	3.41E-03	3.03E-03	Yes
Propionaldehyde	123-38-6	2.9E-04 lb/ton HMA	3	1.43E-01	0.13	Yes
Butyraldehyde	123-72-8	3.2E-04 lb/ton HMA	5	1.60E-01	0.14	No
Pyrene	129-00-0	6.6E-06 lb/ton HMA	3	3.30E-03	0.00	Yes
Isomers of xylene	1330-20-7	1.0E-03 lb/ton HMA	1	5.00E-01	0.44	Yes
Heptane	142-82-5	1.9E-02 lb/ton HMA	5	9.40E+00	8.34	No
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	4.6E-13 lb/ton HMA	3	2.31E-10	2.05E-10	Yes
Chromium (VI)	18540-29-9	3.0E-06 lb/ton HMA	2	1.50E-03	1.33E-03	Yes
Benzo (g,h,i) perylene	191-24-2	8.8E-08 lb/ton HMA	3	4.40E-05	3.91E-05	Yes
Benzo (e) pyrene	192-97-2	2.4E-07 lb/ton HMA	3	1.21E-04	1.07E-04	Yes
Indeno(1,2,3-cd)pyrene	193-39-5	1.5E-08 lb/ton HMA	3	7.70E-06	6.83E-06	Yes
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	2.2E-12 lb/ton HMA	3	1.08E-09	9.57E-10	Yes
Perylene	198-55-0	1.9E-08 lb/ton HMA	3	9.68E-06	8.59E-06	Yes
Benzo (b) fluoranthene	205-99-2	2.2E-07 lb/ton HMA	3	1.10E-04	9.76E-05	Yes
Fluoranthene	206-44-0	1.3E-06 lb/ton HMA	3	6.71E-04	0.00	Yes
Benzo (k) fluoranthene	207-08-9	9.0E-08 lb/ton HMA	3	4.51E-05	4.00E-05	Yes
Acenaphthylene	208-96-8	4.8E-05 lb/ton HMA	3	2.42E-02	0.02	Yes
Chrysene	218-01-9	4.0E-07 lb/ton HMA	3	1.98E-04	1.76E-04	Yes

Table 3 - HMA Counter-flow Drum Dryer TAC Emissions
Air Permit to Install
Ajax Materials, Genesee Twp, Michigan

Material Usage	tons/hr	500
Annual Production Limit	tons HMA/yr	887,562

Toxic Air Contaminant	CAS No.	Emission Factor (see notes)	Note	Maximum Short Term Emissions (lb/hr)	Annual Emissions (tpy)	HAP?
Octachlorodibenzo-p-dioxins, total	3268-87-9	5.9E-09 lb/ton HMA	3	2.97E-06	2.64E-06	Yes
Hexachlorodibenzo-p-dioxins, total	34465-46-8	1.2E-11 lb/ton HMA	3	5.94E-09	5.27E-09	Yes
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	7.5E-11 lb/ton HMA	3	3.74E-08	3.32E-08	Yes
Octachlorodibenzofurans, total	39001-02-0	1.1E-11 lb/ton HMA	3	5.28E-09	4.69E-09	Yes
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	9.2E-13 lb/ton HMA	3	4.62E-10	4.10E-10	Yes
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	6.8E-13 lb/ton HMA	3	3.41E-10	3.03E-10	Yes
2-Butenal	4170-30-3	1.7E-04 lb/ton HMA	5	8.60E-02	0.08	No
Formaldehyde	50-00-0	1.0E-02 lb/ton HMA	1	5.00E+00	4.44	Yes
Benzo (a) pyrene	50-32-8	2.2E-08 lb/ton HMA	3	1.08E-05	9.57E-06	Yes
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	2.1E-12 lb/ton HMA	3	1.07E-09	9.47E-10	Yes
2-Methyl-2-butene	513-35-9	1.2E-03 lb/ton HMA	5	5.80E-01	0.51	No
2,2,4-Trimethylpentane	540-84-1	8.8E-05 lb/ton HMA	3	4.40E-02	0.04	Yes
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	5.9E-12 lb/ton HMA	3	2.97E-09	2.64E-09	Yes
Benzo (a) anthracene	56-55-3	4.6E-07 lb/ton HMA	3	2.31E-04	2.05E-04	Yes
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	1.8E-12 lb/ton HMA	3	9.24E-10	8.20E-10	Yes
1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	9.5E-12 lb/ton HMA	3	4.73E-09	4.20E-09	Yes
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	2.6E-12 lb/ton HMA	3	1.32E-09	1.17E-09	Yes
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	2.9E-12 lb/ton HMA	3	1.43E-09	1.27E-09	Yes
Isovaleraldehyde	590-86-3	6.4E-05 lb/ton HMA	5	3.20E-02	0.03	No
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	3.5E-12 lb/ton HMA	3	1.76E-09	1.56E-09	Yes
Hexanal	66-25-1	2.2E-04 lb/ton HMA	5	1.10E-01	0.10	No
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	2.4E-11 lb/ton HMA	3	1.21E-08	1.07E-08	Yes
Acetone	67-64-1	1.7E-03 lb/ton HMA	5	8.30E-01	0.74	No
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	1.2E-11 lb/ton HMA	3	5.94E-09	5.27E-09	Yes
Benzene	71-43-2	1.0E-03 lb/ton HMA	1	5.00E-01	0.44	Yes
1,1,1-Trichloroethane	71-55-6	1.1E-04 lb/ton HMA	3	5.28E-02	0.05	Yes
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	1.8E-11 lb/ton HMA	3	9.24E-09	8.20E-09	Yes
Manganese	7439-96-5	5.0E-05 lb/ton HMA	1	2.50E-02	0.02	Yes

Table 3 - HMA Counter-flow Drum Dryer TAC Emissions
Air Permit to Install
Ajax Materials, Genesee Twp, Michigan

Material Usage	tons/hr	500
Annual Production Limit	tons HMA/yr	887,562

Toxic Air Contaminant	CAS No.	Emission Factor (see notes)	Note	Maximum Short Term Emissions (lb/hr)	Annual Emissions (tpy)	HAP?
Mercury	7439-97-6	1.0E-06 lb/ton HMA	8	5.20E-04	4.62E-04	Yes
Nickel	7440-02-0	1.0E-04 lb/ton HMA	1	5.00E-02	0.04	Yes
Silver	7440-22-4	1.9E-06 lb/ton HMA	9	9.60E-04	8.52E-04	No
Thallium	7440-28-0	8.8E-06 lb/ton HMA	6	4.40E-03	3.91E-03	No
Antimony	7440-36-0	7.2E-07 lb/ton HMA	8	3.60E-04	3.20E-04	Yes
Arsenic	7440-38-2	3.0E-06 lb/ton HMA	2	1.50E-03	0.00	Yes
Barium	7440-39-3	1.0E-03 lb/ton HMA	6	5.00E-01	0.44	No
Beryllium	7440-41-7	0.0E+00 lb/ton HMA	8	0.00E+00	0.00	Yes
Cadmium	7440-43-9	1.0E-06 lb/ton HMA	2	5.00E-04	0.00	Yes
Chromium	7440-47-3	3.0E-06 lb/ton HMA	2	1.50E-03	0.00	Yes
Cobalt	7440-48-4	6.0E-05 lb/ton HMA	7	3.00E-02	0.03	Yes
Copper	7440-50-8	6.8E-04 lb/ton HMA	6	3.40E-01	0.30	No
Zinc	7440-66-6	7.2E-04 lb/ton HMA	6	3.60E-01	0.32	No
Ethylene	74-85-1	1.4E-02 lb/ton HMA	5	7.00E+00	6.21	No
Acetaldehyde	75-07-0	2.9E-03 lb/ton HMA	3	1.43E+00	1.27	Yes
2-Methyl-1-pentene	763-29-1	8.0E-03 lb/ton HMA	5	4.00E+00	3.55	No
Hydrogen chloride	7647-01-0	7.4E-03 lb/ton HMA	10	3.71E+00	3.29	Yes
Phosphorus (yellow or white)	7723-14-0	4.8E-03 lb/ton HMA	7	2.40E+00	2.13	Yes
Selenium	7782-49-2	9.6E-06 lb/ton HMA	7	4.80E-03	0.00	Yes
Methyl ethyl ketone	78-93-3	4.0E-05 lb/ton HMA	5	2.00E-02	0.02	No
Acenaphthene	83-32-9	3.1E-06 lb/ton HMA	3	1.54E-03	0.00	Yes
Phenanthrene	85-01-8	5.1E-05 lb/ton HMA	3	2.53E-02	0.02	Yes
Fluorene	86-73-7	2.4E-05 lb/ton HMA	3	1.21E-02	0.01	Yes
Naphthalene	91-20-3	1.0E-03 lb/ton HMA	1	5.00E-01	0.44	Yes
2-Methyl Naphthalene	91-57-6	3.7E-04 lb/ton HMA	3	1.87E-01	0.17	Yes
3-Methylpentane	96-14-0	4.2E-04 lb/ton HMA	5	2.09E-01	0.19	No
Heptachlorodibenzofurans, total		8.4E-11 lb/ton HMA	5	4.18E-08	3.71E-08	Yes
Heptachlorodibenzo-p-dioxins, total		1.6E-10 lb/ton HMA	5	7.81E-08	6.93E-08	Yes

Table 3 - HMA Counter-flow Drum Dryer TAC Emissions
Air Permit to Install
Ajax Materials, Genesee Twp, Michigan

Material Usage	tons/hr	500
Annual Production Limit	tons HMA/yr	887,562

Toxic Air Contaminant	CAS No.	Emission Factor (see notes)	Note	Maximum Short Term Emissions (lb/hr)	Annual Emissions (tpy)	HAP?
Hexachlorodibenzofurans, total		1.8E-11 lb/ton HMA	5	8.91E-09	7.91E-09	Yes
Pentachlorodibenzofurans, total		1.6E-10 lb/ton HMA	5	8.14E-08	7.22E-08	Yes
Pentachlorodibenzo-p-dioxins, total		4.8E-11 lb/ton HMA	5	2.42E-08	2.15E-08	Yes
Polychlorinated dibenzofurans, total		3.3E-10 lb/ton HMA	5	1.65E-07	1.46E-07	Yes
Polychlorinated dibenzo-p-dioxins and furans, total		6.6E-09 lb/ton HMA	5	3.30E-06	2.93E-06	Yes
Polychlorinated dibenzo-p-dioxins, total		6.2E-09 lb/ton HMA	5	3.08E-06	2.73E-06	Yes
Tetrachlorodibenzofurans, total		7.3E-11 lb/ton HMA	5	3.63E-08	3.22E-08	Yes
Tetrachlorodibenzo-p-dioxins, total		2.0E-12 lb/ton HMA	5	1.02E-09	9.08E-10	Yes

[1]Emission factor is AQD Default Allowable Emission Rate from June 2012 *Eliminating the Mandatory Testing Requirement for Toxic Air Contaminants for Hot Mix Asphalt Plants in*

[2] Emission factor is based on maximum ppm allowed in RUO and 98% control for baghouse, as follows: 7.4 lb/gal * 100 ppm/1e6 X 2 gal oil/ton HMA X (1-.98). Max ppm allowed for Arsenic is 5 ppm. Max ppm allowed for Cr is 10 ppm. Max ppm allowed for Cd is 2 ppm.

[3]Emission factor is based on #6 Oil-Fired Counterflow Drum Mix HMA Plant (3-05-002-63); plus a Gaseous HAP safety factor of 2.2

[4]Emission factor is based on #2 Oil-Fired Counterflow Drum Mix HMA Plant (3-05-002-60); plus a Gaseous HAP safety factor of 2.2

[5]Emission factor is based on #6 Oil-Fired Counterflow Drum Mix HMA Plant (3-05-002-63); plus a Gaseous TAC safety factor of 2.0

[6]Emission factor is based on #2 Oil-Fired Counterflow Drum Mix HMA Plant (3-05-002-60); plus a Metal TAC safety factor of 4

[7]Emission factor is based on #2 Oil-Fired Counterflow Drum Mix HMA Plant (3-05-002-60); plus a Metal HAP safety factor of 4

[8]Emission factor is based on #6 Oil-Fired Counterflow Drum Mix HMA Plant (3-05-002-63); plus a Metal HAP safety factor of 4

[9]Emission factor is based on #6 Oil-Fired Counterflow Drum Mix HMA Plant (3-05-002-63); plus a Metal TAC safety factor of 4

[10]Hydrochloric Acid pph emissions based on 1000 ppm Halogen RUO. Assumes all Halogens are Cl and are converted to HCl with a 61% capture in process. See emission factor calculations.

Emission Calculation Methods

E_{ST} = Maximum Short Term HMA Production (ton HMA/hr) X EF

E_A = E_F X Annual Production Limit (ton HMA/yr) / 2,000 lb/ton

where:

E_{ST} = Short Term Emissions (lb/hr);

E_A = Annual Emissions (tpy);

EF = emission factor (lb/ton HMA)

Table 4 - Miscellaneous Combustion Equipment - NSR Emissions
Air Permit to Install
Ajax Materials, Genesee Twp, Michigan

		AC Tank Heater
Heat Input Capacity	MMBtu/hr	2.0
Heat Input Capacity	MMcf/hr	1.96E-03
Annual Operating Hours	hr/yr	8,760
Annual Heat Input Limit or Capacity	MMBtu/yr	17,520
Fuel Heat Value	MMBtu/MMcf	1,020

NSR Regulated Pollutant	Emission Factor (See Notes)	Notes	Maximum Short Term Emissions per Unit (lb/hr)	Annual Emissions (tpy)
CO	84 lb/MMCF	1	0.2	0.72
NO_X	100 lb/MMCF	1	0.2	0.86
PM	1.9 lb/MMCF	1	0.0	0.02
PM_{10}	7.6 lb/MMCF	1	0.0	0.07
$PM_{2.5}$	7.6 lb/MMCF	1	0.0	0.07
SO_2	0.6 lb/MMCF	1	0.0	0.01
VOC	5.5 lb/MMCF	1	0.0	0.05
CO_2	53.1 kg/MMBtu	2	234	1024.72
CH_4	1.0E-03 kg/MMBtu	2	0.0	0.02
N_2O	1.0E-04 kg/MMBtu	2	0.0	0.00
CO_2e	53.1 kg/MMBtu	2	234	1025.78
Lead	5.0E-04 lb/MMCF	3	9.80E-07	4.29E-06

[1] Emission factors are from Web-fire for SCC 1-02-006-03 for a Boiler with a heat input capacity of less than 10 MMBtu/hr.

[2] CO_2e global warming potential and emission factors obtained from 40 CFR 98 Subparts A and C, respectively. The global warming potential for CH_4 (25) and N_2O (298) are consistent with the USEPA published changes on November 29, 2013.

[3] Emission factors are from Web-fire for SCC 1-02-006-02 for a Boiler with a heat input capacity of greater than 10

Emission Calculation Methods

Using lb/MMCF Emission Factors

$E_{ST} = C_{MMCF} \times EF_{MMCF}$

Using kg/MMBtu Emission Factors

$E_{ST} = C_{HI} \times 2.20462\ lb/kg \times EF_{kg}$

$E_A = E_{ST} \times$ *Annual Operating Hours / 2,000 lb/ton*

where:

E_{ST} = *Short Term Emissions (lb/hr);*
E_A = *Annual Maximum Emissions (tpy);*
C_{MMCF} = *Max Fuel Usage (MMCF/hr); and*
EF_{MMCF} = *emission factor (lb/MMCF)*
C_{HI} = *Heat Input Capacity (MMBtu/hr); and*
EF_{kg} = *emission factor (kg/MMBtu)*

Table 5 - Miscellaneous Combustion Equipment - TAC Emissions

Air Permit to Install

Ajax Materials, Genesee Twp, Michigan

		AC Tank Heater
Heat Input Capacity	MMBtu/hr	2.0
Heat Input Capacity	MMcf/hr	1.96E-03
Annual Operating Hours	hr/yr	8,760
Annual Heat Input Limit or Capacity	MMBtu/yr	17,520
Fuel Heat Value	MMBtu/MMcf	1,020

Toxic Air Contaminant	CAS No.	Emission Factor (See Notes)		Notes	Maximum Short Term Emissions per Unit (lb/hr)	Annual Emissions (tpy)	HAP?
Formaldehyde	50-00-0	7.50E-02	lb/MMCF	1	1.47E-04	6.44E-04	Yes
Benzo (a) pyrene	50-32-8	1.20E-06	lb/MMCF	1	2.35E-09	1.03E-08	Yes
Dibenzo(a,h) anthracene	53-70-3	1.20E-06	lb/MMCF	1	2.35E-09	1.03E-08	Yes
3-Methylcholanthrene	56-49-5	1.80E-06	lb/MMCF	1	3.53E-09	1.55E-08	Yes
Benzo (a) anthracene	56-55-3	1.80E-06	lb/MMCF	1	3.53E-09	1.55E-08	Yes
Dimethylbenz(a)anthracene	57-97-6	1.60E-05	lb/MMCF	1	3.14E-08	1.37E-07	Yes
Benzene	71-43-2	2.10E-03	lb/MMCF	1	4.12E-06	1.80E-05	Yes
Acenaphthene	83-32-9	1.80E-06	lb/MMCF	1	3.53E-09	1.55E-08	Yes
Phenanthrene	85-01-8	1.70E-05	lb/MMCF	1	3.33E-08	1.46E-07	Yes
Fluorene	86-73-7	2.80E-06	lb/MMCF	1	5.49E-09	2.40E-08	Yes
Naphthalene	91-20-3	6.10E-04	lb/MMCF	1	1.20E-06	5.24E-06	Yes
2-Methyl Naphthalene	91-57-6	2.40E-05	lb/MMCF	1	4.71E-08	2.06E-07	Yes
Toluene	108-88-3	3.40E-03	lb/MMCF	1	6.67E-06	2.92E-05	Yes
N-Hexane	110-54-3	1.80E+00	lb/MMCF	1	3.53E-03	1.55E-02	Yes
Anthracene	120-12-7	2.40E-06	lb/MMCF	1	4.71E-09	2.06E-08	Yes
Pyrene	129-00-0	5.00E-06	lb/MMCF	1	9.80E-09	4.29E-08	Yes
Benzo (g,h,i) perylene	191-24-2	1.20E-06	lb/MMCF	1	2.35E-09	1.03E-08	Yes
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	lb/MMCF	1	3.53E-09	1.55E-08	Yes
Benzo (b) fluoranthene	205-99-2	1.80E-06	lb/MMCF	1	3.53E-09	1.55E-08	Yes
Fluoranthene	206-44-0	3.00E-06	lb/MMCF	1	5.88E-09	2.58E-08	Yes
Benzo (k) fluoranthene	207-08-9	1.80E-06	lb/MMCF	1	3.53E-09	1.55E-08	Yes
Acenaphthylene	208-96-8	1.80E-06	lb/MMCF	1	3.53E-09	1.55E-08	Yes
Chrysene	218-01-9	1.80E-06	lb/MMCF	1	3.53E-09	1.55E-08	Yes
Manganese	7439-96-5	3.80E-04	lb/MMCF	1	7.45E-07	3.26E-06	Yes
Mercury	7439-97-6	2.60E-04	lb/MMCF	1	5.10E-07	2.23E-06	Yes
Molybdenum	7439-98-7	1.10E-03	lb/MMCF	1	2.16E-06	9.45E-06	No
Nickel	7440-02-0	2.10E-03	lb/MMCF	1	4.12E-06	1.80E-05	Yes
Arsenic	7440-38-2	2.00E-04	lb/MMCF	1	3.92E-07	1.72E-06	Yes
Barium	7440-39-3	4.40E-03	lb/MMCF	1	8.63E-06	3.78E-05	No

Table 5 - Miscellaneous Combustion Equipment - TAC Emissions

Air Permit to Install

Ajax Materials, Genesee Twp, Michigan

		AC Tank Heater
Heat Input Capacity	MMBtu/hr	2.0
Heat Input Capacity	MMcf/hr	1.96E-03
Annual Operating Hours	hr/yr	8,760
Annual Heat Input Limit or Capacity	MMBtu/yr	17,520
Fuel Heat Value	MMBtu/MMcf	1,020

Toxic Air Contaminant	CAS No.	Emission Factor (See Notes)		Notes	Maximum Short Term Emissions per Unit (lb/hr)	Annual Emissions (tpy)	HAP?
Beryllium	7440-41-7	1.20E-05	lb/MMCF	1	2.35E-08	1.03E-07	Yes
Cadmium	7440-43-9	1.10E-03	lb/MMCF	1	2.16E-06	9.45E-06	Yes
Chromium	7440-47-3	1.40E-03	lb/MMCF	1	2.75E-06	1.20E-05	Yes
Cobalt	7440-48-4	8.40E-05	lb/MMCF	1	1.65E-07	7.21E-07	Yes
Copper	7440-50-8	8.50E-04	lb/MMCF	1	1.67E-06	7.30E-06	No
Vanadium	7440-62-2	2.30E-03	lb/MMCF	1	4.51E-06	1.98E-05	No
Zinc	7440-66-6	2.90E-02	lb/MMCF	1	5.69E-05	2.49E-04	No
Ammonia	7664-41-7	3.20E+00	lb/MMCF	1	6.27E-03	2.75E-02	No
Selenium	7782-49-2	2.40E-05	lb/MMCF	1	4.71E-08	2.06E-07	Yes
Dichlorobenzene, mixed isomers	25321-22-6	1.20E-03	lb/MMCF	1	2.35E-06	1.03E-05	No
				Aggregate HAPs	**3.70E-03**	**1.62E-02**	

[1] Emission factors are from Web-fire for SCC 1-02-006-02 because no TAC factors are available for SCC 1-02-006-03.

Emission Calculation Methods

Using lb/MMCF Emission Factors

$E_{ST} = C_{MMCF} \times EF_{MMCF}$

$E_A = E_{ST} \times \text{Annual Operating Hours} / 2{,}000 \text{ lb/ton}$

where:

E_{ST} = *Short Term Emissions (lb/hr);*

E_A = *Annual Maximum Emissions (tpy);*

C_{MMCF} = *Max Fuel Usage (MMCF/hr); and*

EF_{MMCF} = *emission factor (lb/MMCF)*

Table 6 – Structure Heights

Air Permit to Install

Ajax Materials, Genesee Twp, Michigan

Structure ID in Model	Height (ft)
CTRL_BLD	24
AC_Tank1	40
AC_Tank2	40
AC_Tank3	40
AC_Tank4	40
AC_Tank5	40
AC_Tank6	40
RUO_Tank	40

Note: This table represents the structures for which the stack is located within the downwash area of the structure ("5L"). Other equipment onsite is elevated and does not obstruct air flow; elevated equipment was not included in the model.

Refer to the model for identification of each structure.

Table 7 – Model Input Parameters
Air Permit to Install
Ajax Materials, Genesee Twp, Michigan

Source	Model Name	Discharge Type	NAD 83 UTM Coordinates (m)		Base Elevation (feet)	Stack Height (feet)	Exhaust Temperature (°F)	Exhaust Flow Rate (acfm)	Exit Velocity (fps)	Stack Diameter (inches)	NO_x Emission Rate (lbs/hr)	PM_{10} Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (lbs/hr)	SO_2 Emission Rate (lbs/hr)
			Easting	Northing										
HMA Counterflow Drum Dryer	STACK	DEFAULT	282,851	4,772,991	752.1	80	300	100,000	66.1	68	60.0	33.2	33.2	89.1

NA Not Applicable

Table 8 – SIL Model Results Summary
Air Permit to Install
Ajax Materials, Genesee Twp, Michigan

Pollutant	Maximum Predicted Impacts (2019) (μg/m^3)	SIL (μg/m^3)	SIL Averaging Period	Exceeds SIL
NO_2	42.66	7.5	1-hr	Yes
NO_2	1.07	1	Annual	Yes
PM_{10}	7.30	5	24-hr	Yes
PM_{10}	0.59	1	Annual	No
PM_{25}	7.30	1.2	24-hr	Yes
PM_{25}	0.59	0.2	Annual	Yes
SO_2	84.40	7.8	1-hr	Yes
SO_2	68.54	25	3-hr	Yes
SO_2	26.11	5	24-hr	Yes
SO_2	2.11	1	Annual	Yes

Note: The impact for 1-hour NO_2 represents Tier 1, where 100% of NO_x is conservatively assumed to be NO_2.

Table 9 – Increment Model Results Summary

Air Permit to Install

Ajax Materials, Genesee Twp, Michigan

Pollutant	Maximum Predicted Impacts (2019) ($\mu g/m^3$)	Increment ($\mu g/m^3$)	Increment Averaging Period	Exceeds Increment
NO_2	1.07	25	Annual	No
PM_{10}	7.30	30	24-hr	No
PM_{25}	7.30	9	24-hr	No
PM_{25}	0.59	4	Annual	No
SO_2	68.54	512	3-hr	No
SO_2	26.11	91	24-hr	No
SO_2	2.11	20	Annual	No

Note: The impact for 1-hour NO_2 represents Tier 1, where 100% of NO_x is conservatively assumed to be NO_2.

Table 10 – NAAQS Model Results Summary
Air Permit to Install
Ajax Materials, Genesee Twp, Michigan

Pollutant	Maximum Predicted Impacts (2019) ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Combined Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	NAAQS Averaging Period	Exceeds NAAQS
NO_2	42.66	69.2	111.84	188	1-hr	No
NO_2	1.07	12.2	13.27	100	Annual	No
PM_{10}	7.30	35.0	42.30	150	24-hr	No
PM_{25}	7.30	17.1	24.37	35	24-hr	No
PM_{25}	0.59	7.1	7.67	12	Annual	No
SO_2	84.40	10.7	95.14	196	1-hr	No
SO_2	68.55	10.2	78.76	1300	3-hr	No

Note: The impact for 1-hour NO_2 represents Tier 1, where 100% of NO_x is conservatively assumed to be NO_2.

Table 11 – Unitized Model Results

Air Permit to Install

Ajax Materials, Genesee Twp, Michigan

Averaging Period	Model PAI ($\mu g/m^3$)(lb/hr)
Annual	0.01777
1-HR	0.71101
8-HR	0.46745
24-HR	0.21994

The impacts presented in this table represent the unitized impact from each TAC emission source modeled at 1 lb/hr.

Averaging Period (µg/m³)	Basis	Percent of Screening Level	Pass/Fail	FootNote
annual	IRSL	14.8%	PASS	-
8 hr	ITSL	0.4%	PASS	-
annual	ITSL	0.1%	PASS	-
8 hr	2nd ITSL	1.0%	PASS	
annual	ITSL	0.0%	PASS	-
annual	IRSL	13.3%	PASS	-
8 hr	ITSL	4.7%	PASS	35
24 hr	ITSL	0.0%	PASS	-
annual	IRSL	0.0%	PASS	
annual	IRSL	1.5%	PASS	-
annual	ITSL	0.0%	PASS	-
8 hr	ITSL	7.0%	PASS	42
annual	IRSL	83.1%	PASS	
8 hr	ITSL	7.9%	PASS	-
8 hr	ITSL	0.8%	PASS	C
annual	ITSL	0.0%	PASS	-
annual	ITSL	0.3%	PASS	-
annual	IRSL	5.1%	PASS	
annual	ITSL	0.3%	PASS	13
1 hr	2nd ITSL	0.1%	PASS	
24 hr	ITSL	2.6%	PASS	32
8 hr	ITSL	0.1%	PASS	34
24 hr	ITSL	0.0%	PASS	-
annual	ITSL	0.0%	PASS	-
annual	ITSL	0.4%	PASS	-
annual	ITSL	0.0%	PASS	-
annual	ITSL	0.3%	PASS	-
8 hr	2nd ITSL	0.0%	PASS	
annual	IRSL	11.1%	PASS	
annual	ITSL	0.0%	PASS	-
8 hr	ITSL	0.0%	PASS	-
annual	ITSL	2.8%	PASS	9,13
1 hr	2nd ITSL	0.9%	PASS	

Table 12 - Predicted Ambient Impacts

Air Permit to Install

Ajax Materials, Genesee Twp, Michigan

Toxic Air Contaminant	CAS No.	Emissions (lb/hr)	Model Results ($\mu g/m^3$)/(lb/hr)	PAI ($\mu g/m^3$)	Screening Level ($\mu g/m^3$)
Nickel	7440-02-0	0.05	0.018	8.89E-04	0.006
Silver	7440-22-4	9.60E-04	0.467	4.49E-04	0.1
Thallium	7440-28-0	4.40E-03	0.018	7.82E-05	0.1
			0.467	2.06E-03	0.2
Antimony	7440-36-0	3.60E-04	0.018	6.40E-06	0.2
Arsenic	7440-38-2	1.50E-03	0.018	2.67E-05	0.0002
Barium	7440-39-3	0.50	0.467	2.34E-01	5
Beryllium	7440-41-7	-	0.220	0.00E+00	0.02
			0.018	0.00E+00	0.0004
Cadmium	7440-43-9	5.00E-04	0.018	8.89E-06	0.0006
Chromium	7440-47-3	1.50E-03	0.018	2.67E-05	0.5
Cobalt	7440-48-4	0.03	0.467	1.40E-02	0.2
		6.08E-03	0.018	1.08E-04	0.00013
Copper	7440-50-8	0.34	0.467	1.59E-01	2
Zinc	7440-66-6	0.36	0.467	1.68E-01	20
Ethylene	74-85-1	7.00	0.018	1.24E-01	6240
Acetaldehyde	75-07-0	1.43	0.018	2.54E-02	9
			0.018	2.54E-02	0.5
Hydrogen chloride	7647-01-0	3.71	0.018	6.59E-02	20
			0.711	2.64E+00	2100
Phosphorus (yellow or white)	7723-14-0	2.40	0.220	5.28E-01	20
Selenium	7782-49-2	4.80E-03	0.467	2.24E-03	2
Methyl ethyl ketone	78-93-3	0.02	0.220	4.40E-03	5000
Acenaphthene	83-32-9	1.54E-03	0.018	2.74E-05	210
Phenanthrene	85-01-8	0.03	0.018	4.50E-04	0.1
Fluorene	86-73-7	0.01	0.018	2.15E-04	140
Naphthalene	91-20-3	0.50	0.018	8.89E-03	3
			0.467	2.34E-01	520
			0.018	8.89E-03	0.08
2-Methyl Naphthalene	91-57-6	0.19	0.018	3.32E-03	10
3-Methylpentane	96-14-0	0.21	0.467	9.77E-02	3500
H2SO4	7664-93-9	1.60	0.018	2.84E-02	1
			0.711	1.14E+00	120

Appendix 1

Appendix 1 - Particulate Emissions
Air Permit to Install
Ajax Materials, Genesee Twp, Michigan

Plant Capacity Rating	=	500	TPH	
Amount of Aggregate	=	473	TPH	
Amount of Asphalt Cement	=	27	TPH	Average AC Content 5.35%
Yearly Production Limitation	=	887,562	TPY	
Density of Oil	=	7.40	Lbs/gal	
Oil Fuel Use	=	2.5	Gals/ton HMA Produced (#2 ruonded up)	
Specific Volume of H_2O	=	26.799	ft^3/lb @ 212 °F	
Moisture Content	=	5.00	%	Manufacturer's maximum moisture content
Baghouse Temperature	=	300	°F	
Baghouse Fan Rating	=	100,000	ACFM	
NSPS PM Limit	=	0.04	Grain/DSCF	

Specific Volume of H_2O = [(Specific Volume of H_2O) x (Baghouse Temperature + 460)]/(212 +460)
= [26.80 x (300 + 460)]/(212 + 460)
= 30.31 ft3/lb @ 249 °F

Amount of H_2O in Exhaust Gas = (Moisture Content/100) x (Amount of Aggregate - TPH) x (2000 Lbs/Ton)
= (5.00 /100) x (473 TPH) x (2000 lbs/ton)
= 47,300 PPH
= 788.33 Lbs./Min.

Total Volume of H_2O in Exhaust Gases = (Amount of Aggregate) x (Specific Volume of H_2O)
= (788.33 lbs/min) x (30.31 ft^3/lb)
= 23,893 ft^3/min

Exhaust Gas Flow Rate (ACFM -dry) = (Fan Rating) - (Volume of H_2O)
= (100,000 ACFM) - (23,893 ACFM)
= 76,107 ACFM

Exhaust Gas Flow Rate (DSCFM) = [(Exhaust Gas Flow Rate ACFM dry) x (70 °F + 460)]/(300 °F + 460)
= [76,107 ACFM x (70 oF + 460)/(300 oF + 460)
= 53,075 DSCFM

Allowed Hourly Particulate Emissions = (NSPS PM Limit) x (Exhaust Gas Flow Rate DSCFM) x (1 lb/7000 grains) x (60 mins/hr)
= (0.04 grain/DSCFM) x (53,075 DSCFM) x (1 lb/7,000 grains) x (60 mins/hr)
= 18.20 Lbs/Hr
*Emission factor for H2SO4 is based on prior permitting modeling results

Particulate Emission Factor (Lbs/Ton HMA) ılfur (Allowed Hourly Particulate Emissions) / Plant Capacity Rating
= 18.20 Lbs/Hr / 500 Tons HMA/Hr
= 0.04 Lbs/Ton HMA

Requested Allowed Annual Particulate Emissions = Particulate Emission Factor (Lbs/Ton HMA) x Yearly Production Limitation
= 0.036 Lbs/Ton HMA x 887,562 Tons HMA/Yr
= 32,302 Lbs/Yr
= 16.2 Tons/Yr

Appendix 2

Appendix 2 - Hydrogen Chloride Emissions

Air Permit to Install
Ajax Materials, Genesee Twp, Michigan

Rated Dryer Capacity	=	500	TPH
Yearly Production Limitation	=	887,562	TPY
Density of Oil	=	7.40	Lbs/gal
Maximum Halogen Content	=	1.00E-03	Lb/lb
Annual Average Halogen Content	=	1.00E-03	Lb/lb
Oil Fuel Use	=	2.5	Gals/ton HMA Produced (#2 rounded up)
Maximum Potential Oil Usage	=	1,250	Gal/hr
Molecular Weight of Chlorine	=	35.45	Moles
Molecular Weight of Hydrogen	=	1.01	Moles

Hydrogen Chloride Emission Calculations

Total Chlorine Emissions = Oil Usage (Gal/hr) x Density of Oil (Lb/gal) x Halogen Content (lb/lb)
= 1,250 gal/hr x 7.4 lb/gal x 0.0010 lb halogen/lb oil
= 9.25 lb/hr (based on 4000 ppm oil)
= 1,250 gal/hr x 7.4 lb/gal x 0.00100 lb halogen/lb oil
= 9.25 lb/hr (based on 3450 ppm oil)

HCl Emission Factor = $\dfrac{\text{(Molecular Weight of Chlorine + Molecular Weight of Hydrogen)}}{\text{Molecular Weight of Chlorine}}$

$= \dfrac{(35.5 + 1.01)}{35.5}$

= 1.03 lb HCl/lb Cl

Maximum Potential HCl Emissions = Total Chlorine Emissions (lbs/hr) x HCl Emission Factor
= 9.25 lbs Cl/hr x 1.03 lb HCl/lb Cl
= 9.51 lbs/hr (based on 1000 ppm oil)

HCl Emission Factor = $\dfrac{\text{Maximum Potential HCl Emissions (lbs/hr)}}{\text{Rated Dryer Capacity (tons/hr)}}$

$= \dfrac{9.51 \text{ lbs/hr}}{500 \text{ tons HMA/hr}}$

= 0.0190 lb HCl/ton HMA Produced (based on 1000 ppm oil)

Expected reduction in the theoretical HCl emission rate of 61%.

Expected HCl Emission Factor = HCl Emission Factor x (1 - stack test reduction)
= 0.019 x (1 - 0.61)
= 0.0074 lb HCl/ton HMA Produced (based on 1000 ppm oil)

Appendix 3

Appendix 3 - EGLE Additional Source and Background Concentration Data
Air Permit to Install
Ajax Materials, Genesee Twp, Michigan

	NO2 Lansing		PM-10 Grand Rapids	PM-2.5 Flint		SO2 Grand Rapids			
Year	1-hr 98th pctl	Annual Avg	24-hr Max	24-hr 98th pctl	Annual Avg	1-hr 99th pctl	3-hr Max	24-hr Max	Annual Avg
2017	36.4	6.5	34.0	16.8	7.10	4.0	3.0	1.5	0.38
2018	29.9	6.5	31.0	16.9	7.33	4.4	3.9	1.1	0.12
2019	44.1	6.4	104.0	17.5	6.81	3.9	3.1	0.9	0.39
	36.8 ppb	**6.5** ppb		**17.1** ug/m3	7.1 ug/m3	**4.1** ppb	**3.9** ppb	**1.5** ppb	**0.39** ppb

NAAQS MODELING BACKGROUND SUMMARY

NO2		PM-10	PM-2.5		SO2			
69.2 ug/m3	12.2 ug/m3	35.0 ug/m3 (3-yr 4th High)	17.1 ug/m3	7.1 ug/m3	10.7 ug/m3	10.2 ug/m3	3.9 ug/m3	1.0 ug/m3

SRN	COMPANY	POL	Facility Emissions (lb/hr)	(tpy)	SOURCE	UTM EAST	UTM NORTH	Local X Coord (meters)	Local Y Coord (meters)	Source Dist. (km)	Stack Information Hgt. (ft)	Dia (inches)	Temp (deg F)	Flow (ACFM)	Velocity (m/s)	Discharge Type
N3570	GENESEE POWER STATION LIMITED PARTNERSHIP	SO2	4.80	21.00	NAAQS	~~282,650~~	~~4,773,500~~	-578	405	0.7	220.0	94.0	337.0	199833	21.08	Vertical
						282,670	4,773,725									

Appendix 4

Appendix 4 is provided on the enclosed flash drive in the *original* EGLE copy only.

	NO2 Lansing		PM-10 Grand Rapids	PM-2.5 Flint		SO2 Grand Rapids			
	1-hr 98th pctl	Annual Avg	24-hr Max	24-hr 98th pctl	Annual Avg	1-hr 99th pctl	3-hr Max	24-hr Max	Annual Avg
Year									
2017	36.4	6.5	34.0	16.8	7.10	4.0	3.0	1.5	0.38
2018	29.9	6.5	31.0	16.9	7.33	4.4	3.9	1.1	0.12
2019	44.1	6.4	104.0	17.5	6.81	3.9	3.1	0.9	0.39
	36.8	**6.5**		**17.1**	**7.1**	**4.1**	**3.9**	**1.5**	**0.39**
	ppb	ppb		ug/m3	ug/m3	ppb	ppb	ppb	ppb

NAAQS MODELING BACKGROUND SUMMARY

NO2		PM-10	PM-2.5		SO2			
69.2	**12.2**	**35.0**	**17.1**	**7.1**	**10.7**	**10.2**	**3.9**	**1.0**
ug/m3	**ug/m3**	ug/m3	**ug/m3**	**ug/m3**	ug/m3	ug/m3	ug/m3	ug/m3
		(3-yr 4th High)						