

MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 102018-009 Project Number: 2018-07-006
Installation Number: 171-0021

Parent Company: Helena Agri-Enterprises, LLC

Parent Company Address: 4546 Corporate Drive, Suite 170, De Moines, IA 50266

Installation Name: Helena Agri-Enterprises, LLC- Unionville, MO Facility

Installation Address: 2605 Birch Street, Unionville, MO 63565

Location Information: Putnam County, S03, T65, R19

Application for Authority to Construct was made for:
Dry Fertilizer Facility. This review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

Standard Conditions (on reverse) are applicable to this permit.

Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

Kendall B. Hale for

Director or Designee
Department of Natural Resources

OCT 15 2018

Effective Date

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Enforcement and Compliance Section of the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Enforcement and Compliance Section of the Department's Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available within 30 days of actual startup. Also, you must notify the Department's regional office responsible for the area within which you are located within 15 days after the actual start up of this (these) air contaminant source(s).

A copy of the permit application and this permit and permit review shall be kept at the installation address and shall be made available to Department's personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant source(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit using the contact information below.

Contact Information:

Missouri Department of Natural Resources
Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102-0176
(573) 751-4817

The regional office information can be found at the following website:

<http://dnr.mo.gov/regions/>

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."

Helena Agri-Enterprises, LLC- Unionville, MO Facility
Putnam County, S03, T65, R19

1. PM₁₀ Emission Limitation
 - A. Helena Agri-Enterprises, LLC- Unionville, MO Facility shall emit less than 15.0 tons of PM₁₀ in any consecutive 12-month period from emission points listed below in Table 1.

Table 1- List of Emission Points at Helena Agri-Enterprises, LLC-Unionville

Emission Point	Description
DF-1	Truck unloading to drag conveyor
DF-2	Conveyor dump into overbin chain paddle conveyor
DF-3	Overbin chain paddle conveyor to storage bin
DF-4	Bulk fertilizer dump to blend hopper
DF-5	Bulk fertilizer blend hopper to blend auger
DF-6	Additive dump to blend hopper
DF-7	Additive blend hopper to blend auger
DF-8	Blend auger to load-out belt conveyor receiving pit
DF-9	Load-out belt conveyor dump to truck
DF-10	Bulk fertilizer dump to outdoor blend hopper
DF-11	Bulk fertilizer to outdoor conveyor 1
DF-12	Bulk fertilizer conveyor 1 to horizontal blender
DF-13	Bulk fertilizer from horizontal blender to outdoor conveyor 2
DF-14	Bulk fertilizer outdoor conveyor 2 dump to truck
HR-1	Haul roads

- B. Attachment A or equivalent forms, such as electronic forms, approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Conditions 1.A. Add SSM emission from the same 12 month period as reported to the Air Pollution Control Program in accordance with 10 CSR 10-6.050
2. Record Keeping and Reporting Requirements
 - A. Helena Agri-Enterprises, LLC- Unionville, MO Facility shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Resources' personnel upon request. These records shall include SDS for all materials used.

- B. Helena Agri-Enterprises, LLC- Unionville, MO Facility shall report to the Air Pollution Control Program's Compliance/Enforcement Section, by mail at P.O. Box 176, Jefferson City, MO 65102 or by email at AirComplianceReporting@dnr.mo.gov, no later than 10 days after the end of the month during which any record required by this permit shows an exceedance of a limitation imposed by this permit.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (5) REVIEW

Project Number: 2018-07-006
Installation ID Number: 171-0021
Permit Number: 102018-009

Installation Address:

Helena Agri-Enterprises, LLC- Unionville, MO Facility
2605 Birch Street
Unionville, MO 63565

Parent Company:

Helena Agri-Enterprises, LLC
4546 Corporate Drive, Suite 170
De Moines, IA 50266

Putnam County, S03, T65, R19

REVIEW SUMMARY

- Helena Agri-Enterprises, LLC- Unionville, MO Facility has applied for authority to construct a dry fertilizer facility.
- The application was deemed complete on July 27, 2018.
- HAP emissions are not expected from the proposed equipment.
- None of the New Source Performance Standards (NSPS) apply to the installation.
- None of the NESHAPs apply to this installation. None of the currently promulgated MACT regulations apply to the proposed equipment.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of PM₁₀ are conditioned below de minimis levels.
- This installation is located in Putnam County, an attainment/unclassifiable area for all criteria pollutants.
- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 250 tons per year and fugitive emissions are not counted toward major source applicability.
- Ambient air quality modeling was not performed since potential emissions of the application are below de minimis levels.

- Emissions testing is not required for the equipment as a part of this permit..
- No Operating Permit is required for this installation.
- Approval of this permit is recommended with special conditions.

PROJECT/INSTALLATION DESCRIPTION

Helena Agri- Enterprises, LLC – Unionville, MO facility would like to operate a 120 tons/hour (tph) dry bulk fertilizer storage and distribution facility. The facility is bottlenecked by their receiving conveyors at 120 tph. The process consists of a series of conveyance and blending located inside of the dry fertilizer building and a series of conveyance and blending located outside the dry fertilizer building. The majority (97.5%) of process operations is conducted using the series of conveyance and blending located inside the dry fertilizer building. "Process operations in the dry fertilizer building are conducted by unloading dry fertilizer from a delivery truck onto an outdoor drag conveyor pit (DF-1) that conveys dry bulk fertilizer onto an overbin chain paddle conveyor (DF-2) located inside the dry fertilizer building. The overbin chain paddle conveyor dumps fertilizer into respective storage bin (DF-3) inside the building. Facility personnel use a front-end loader to dump dry fertilizer into a series of blend hoppers (DF-4). The blend hoppers regulate the amount of dry fertilizer that is dumped to the blend auger (DF-5) for dry fertilizer blending. Facility personnel dump super sacks of dry additives (i.e. micro-nutrients) into a series of additive blend hoppers (DF-6). The additive blend hoppers regulate the amount of dry micro-nutrients that is dumped to the blender auger (DF-7) for dry fertilizer. The blend auger simultaneously blends and conveys dry fertilizer to the load-out belt conveyor pit (DF-8) for delivery truck loadout (DF-9) inside the dry fertilizer building." Process operations outside the dry fertilizer building are conducted by unloading dry bulk fertilizer from a front-end loader into the outdoor blend hopper (DF-10) that regulate the amount of dry fertilizer that is dumped to the outdoor conveyor (DF-11). The outdoor conveyor dumps dry fertilizer into the horizontal blender (DF-12) for dry fertilizer blending. The horizontal blender is reversed when facility personnel are prepared for load-out onto the outdoor conveyor (DF-13) that conveys and dumps dry fertilizer into a delivery truck for load-out (DF-14).

No permits have previously been issued to Helena Agri-Enterprises, LLC- Unionville, MO Facility from the Air Pollution Control Program.

EMISSIONS/CONTROLS EVALUATION

The emission factors used in this analysis were obtained from the EPA's WebFIRE database (SCC 3-01-027-09, Ammonium Nitrate Production Bulk Loading) and (SCC 3-01-040-07, Urea Production Bulk Loading). Particle distribution used in grain distribution was used to determine the emission factors for PM_{2.5}. All emission were considered uncontrolled.

Haul road emissions were calculated using the predictive equation found in AP-42 Section 13.2.2 Unpaved Roads (November 2006).

The following table provides an emissions summary for this project. Existing potential and existing actual emissions are not available as this is a new facility. Potential emissions of the project represent the potential emissions of the whole installation assuming continuous operation (8760 hours per year).

Table 2: Emissions Summary (tpy)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions (EIQs)	Unconditioned Potential Emissions of the Project	New Installation Conditioned Potential
PM	25.0	N/A	N/A	172.53	23.28
PM ₁₀	15.0	N/A	N/A	111.15	<15.0
PM _{2.5}	10.0	N/A	N/A	35.57	4.80
SO _x	40.0	N/A	N/A	N/A	N/A
NO _x	40.0	N/A	N/A	N/A	N/A
VOC	40.0	N/A	N/A	N/A	N/A
CO	100.0	N/A	N/A	N/A	N/A
GHG (CO ₂ e)	N/A	N/A	N/A	N/A	N/A
GHG (mass)	N/A	N/A	N/A	N/A	N/A
HAPs	10.0/25.0	N/A	N/A	N/A	N/A

N/A = Not Applicable; N/D = Not Determined

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of PM₁₀ are conditioned below de minimis levels.

APPLICABLE REQUIREMENTS

Helena Agri-Enterprises, LLC- Unionville, MO Facility shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved.

GENERAL REQUIREMENTS

- *Operating Permits*, 10 CSR 10-6.065
 - No Operating Permit is required for this installation because all emissions

are conditioned below de minimis levels. There are no federal regulations requiring an operating permit.

- *Start-Up, Shutdown, and Malfunction Conditions*, 10 CSR 10-6.050
- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110
 - Per 10 CSR 10-6.110(4)(B)2.B(II) and (4)(B)2.C(II) a full EIQ is required for the first full calendar year the equipment (or modifications) approved by this permit are in operation.
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, 10 CSR 10-6.170
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Restriction of Emission of Odors*, 10 CSR 10-6.165

SPECIFIC REQUIREMENTS

- *Restriction of Emission of Particulate Matter From Industrial Processes*, 10 CSR 10-6.400. The weigh hopper's potential emission rate of 2.40 pounds per hour of PM and the truck loading potential emission rate of 2.40 pounds per hour of PM are individually below the process weight of 53.13 pounds per hour and therefore complies with this regulation.

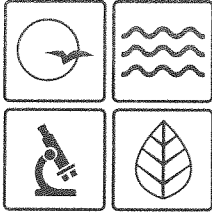
STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, it is recommended that this permit be granted with special conditions.

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated June 26, 2018, received July 5, 2018, designating Helena Agri-Enterprises, LLC as the owner and operator of the installation.



Missouri Department of

dnr.mo.gov

NATURAL RESOURCES

Michael L. Parson, Governor

Carol S. Comer, Director

OCT 15 2018

Mr. Jacob Shipley
Branch Manager
Helena Agri-Enterprises, LLC- Unionville, MO Facility
25597 US Highway 136
Unionville, MO 63565

RE: New Source Review Permit - Project Number: 2018-07-006

Dear Mr. Shipley:

Enclosed with this letter is your permit to construct. Please study it carefully and refer to Appendix A for a list of common abbreviations and acronyms used in the permit. Also, note the special conditions on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files. Operation in accordance with these conditions, your new source review permit application is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

This permit may include requirements with which you may not be familiar. If you would like the department to meet with you to discuss how to understand and satisfy the requirements contained in this permit, an appointment referred to as a Compliance Assistance Visit (CAV) can be set up with you. To request a CAV, please contact your local regional office or fill out an online request. The regional office contact information can be found at the following website: <http://dnr.mo.gov/regions/>. The online CAV request can be found at <http://dnr.mo.gov/cav/compliance.htm>.

If you were adversely affected by this permit decision, you may be entitled to pursue an appeal before the administrative hearing commission pursuant to Sections 621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the administrative hearing commission within thirty days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the administrative hearing commission, whose contact information is: Administrative Hearing Commission, United States Post Office Building, 131 West High Street, Third Floor, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: www.oa.mo.gov/ahc.



Recycled paper

Mr. Jacob Shipley
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If you have any questions regarding this permit, please do not hesitate to contact Jordan Hull, at the Department of Natural Resources' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM



Susan Heckenkamp
New Source Review Unit Chief

SH:jhj

Enclosures

c: Northeast Regional Office
PAMS File: 2018-07-006

Permit Number: 102018-009

APPENDIX A

Abbreviations and Acronyms

%percent	Mgal1,000 gallons
°Fdegrees Fahrenheit	MWmegawatt
acfmactual cubic feet per minute	MHDRmaximum hourly design rate
BACTBest Available Control Technology	MMBtuMillion British thermal units
BMPsBest Management Practices	MMCFmillion cubic feet
BtuBritish thermal unit	MSDSMaterial Safety Data Sheet
CAM Compliance Assurance Monitoring	NAAQSNational Ambient Air Quality Standards
CASChemical Abstracts Service	NESHAPs National Emissions Standards for Hazardous Air Pollutants
CEMS Continuous Emission Monitor System	NO_xnitrogen oxides
CFRCode of Federal Regulations	NSPSNew Source Performance Standards
COcarbon monoxide	NSRNew Source Review
CO₂carbon dioxide	PMparticulate matter
CO_{2e}carbon dioxide equivalent	PM_{2.5}particulate matter less than 2.5 microns in aerodynamic diameter
COMS Continuous Opacity Monitoring System	PM₁₀particulate matter less than 10 microns in aerodynamic diameter
CSRCode of State Regulations	ppmparts per million
dscfdry standard cubic feet	PSDPrevention of Significant Deterioration
EQEmission Inventory Questionnaire	PTEpotential to emit
EPEmission Point	RACTReasonable Available Control Technology
EPAEnvironmental Protection Agency	RALRisk Assessment Level
EUEmission Unit	SCCSource Classification Code
fpsfeet per second	scfmstandard cubic feet per minute
ftfeet	SDSSafety Data Sheet
GACTGenerally Available Control Technology	SICStandard Industrial Classification
GHGGreenhouse Gas	SIPState Implementation Plan
gpmgallons per minute	SMALScreening Model Action Levels
grgrains	SO_xsulfur oxides
GWPGlobal Warming Potential	SO₂sulfur dioxide
HAPHazardous Air Pollutant	SSMStartup, Shutdown & Malfunction
hrhour	tphtons per hour
hphorsepower	tpytons per year
lbpound	VMTvehicle miles traveled
lbs/hrpounds per hour	VOCVolatile Organic Compound
MACTMaximum Achievable Control Technology	
µg/m³micrograms per cubic meter	
m/smeters per second	

Emission Point	Description	True MHDR (Tons/hour)	Bottlenecked MHDR (tons/hour)	Pollutant	Emission Factor (lb/ton)	Emission Rate (lb/hour)	PTE (tons/year)
DF-1	Truck unloading to drag conveyor	120	120	PM	0.02	2.40	10.51
				PM10	0.017	2.04	8.94
				PM2.5	0.006	0.72	3.15
DF-2	Conveyor dump into overbin chain paddle conveyor	120	120	PM	0.02	2.40	10.51
				PM10	0.017	2.04	8.94
				PM2.5	0.006	0.72	3.15
DF-3	overbin chain paddle conveyor to storage bins	120	120	PM	0.02	2.40	10.51
				PM10	0.017	2.04	8.94
				PM2.5	0.006	0.72	3.15
DF-4	Bulk fertilizer dump to Blende Hopper	150	120	PM	0.02	2.40	10.51
				PM10	0.017	2.04	8.94
				PM2.5	0.006	0.72	3.15
DF-5	Bulk Fertilizer blend hopper to blend Auger	150	120	PM	0.020	2.40	10.51
				PM10	0.017	2.04	8.94
				PM2.5	0.006	0.72	3.15
DF-6	Additive dump to blend hopper	150	120	PM	0.020	2.40	10.51
				PM10	0.017	2.04	8.94
				PM2.5	0.006	0.80	3.94
DF-7	Additive blend hopper to blend auger	150	120	PM	0.02	2.40	10.51
				PM10	0.017	2.04	8.94
				PM2.5	0.006	0.72	3.15
DF-8	Blend auger to load-out belt conveyor receiving pit	150	120	PM	0.020	2.40	10.51
				PM10	0.017	2.04	8.94
				PM2.5	0.006	0.72	3.15
DF-9	Load-out belt Conveyor dump to truck	150	120	PM	0.020	2.40	10.51
				PM10	0.017	2.04	8.94
				PM2.5	0.006	0.72	3.15
DF-10	Bulk fertilizer dump to outdoor blend hopper	35	35	PM	0.020	0.70	3.07
				PM10	0.017	0.60	2.61
				PM2.5	0.006	0.21	0.92
DF-11	Bulk fertilizer blend hopper dump to outdoor conveyor 1	35	35	PM	0.020	0.70	3.07
				PM10	0.017	0.60	2.61
				PM2.5	0.006	0.21	0.92
DF-12	Bulk fertilizer outdoor conveyor 1 to horizontal blender	35	35	PM	0.020	0.70	3.07
				PM10	0.017	0.60	2.61
				PM2.5	0.006	0.21	0.92
DF-13	Bulk fertilizer horizontal blender dump to outdoor conveyor 2	35	35	PM	0.020	0.70	3.07
				PM10	0.017	0.60	2.61
				PM2.5	0.006	0.21	0.92
DF-14	Bulk fertilizer outdoor conveyor 2 dump to truck	35	35	PM	0.02	0.70	3.07
				PM10	0.017	0.60	2.61
				PM2.5	0.006	0.21	0.92
*Bottlenecked from receiving conveyor (120 tph)							
HR-1	Haul Road	See Haul Road spread Sheet		PM	See Haul Road spread Sheet		62.5822471
				PM10			17.70324672
				PM2.5			1.803335691

Total PTE	
PM	172.53
PM10	111.151
PM2.5	35.57

PM10 Composite Emission Factor for project 2018-07-006
0.211473643 lb/ton

148,810 tons of production to stay below de minimis limit for PM10

15,734,6964

E=55.0 P.11 - 40
P=Process Rate=MHDR
E= 53.12635968

Process Rate 120
Allowable lb/hr 53.12635968
Potential lb/hr 2.04E+00 Weigh hopper EP-5 2.04E+00 Truck Loading EP-6
2.04 lb/hr from the weigh hopper EP-5 is less than 58.57 lb/hr, therefore the aggregate weigh hopper is in compliance with the process rate rule 10 CSR 6.400
2.04 lb/hr from the truck loading EP-6 is less than 58.57 lb/hr, therefore the aggregate weigh hopper is in compliance with the process rate rule 10 CSR 6.400

Activity	MHDR		Truck Types				Truck Type		We (tons)		WF (tons)	
	(tons/hr)	(trips/hr)	type	semi	Bucket	type	We*	WF*	type			
Fertilizer Load in/out	240.0	9.600		100%			15	40	semi	15	40	
skidsteer transfer	120.0	100.000		100%			4.1	5.3	Bucket	4.1	5.3	
title	0.000						0	0	type			
title	0.000						0	0				
title	0.000						0	0				
title	0.000						0	0				
title	0.000						0	0				
title	0.000						0	0				
title	0.000						0	0				

truck type row must sum to 100% per each activity

1=empty
2=full
3=both

Road Segment ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14
D one way (feet)	528	128												
D one way (miles)	0.100	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fertilizer Load in/out	3													
skidsteer transfer		3												
title														
title														
title														
title														
title														

W	27.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fertilizer Load in/out	0.000	4.700	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
skidsteer transfer	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
title	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
title	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
title	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
title	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
title	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
title	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
title	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
W	27.50	4.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Surface	Unpaved	Paved	Unpaved	Unpaved	Unpaved	Unpaved	Unpaved	Unpaved	Unpaved	Unpaved	Unpaved	Unpaved	Unpaved	Paved

E(PM2.5) (lbs/VMT):	0.29174	0.00285	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
E(PM10) (lbs/VMT):	2.91738	0.01163	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
E(PM30) (lbs/VMT):	10.25933	0.05816	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Exet(PM2.5) (lbs/VMT):	0.20781	0.00265	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Exet(PM10) (lbs/VMT):	2.07814	0.01079	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Exet(PM30) (lbs/VMT):	7.30802	0.05397	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Fertilizer Load in/out	1.92	0	0	0	0	0	0	0	0	0	0	0	0	0
skidsteer transfer	0	4.8	0	0	0	0	0	0	0	0	0	0	0	0
title	0	0	0	0	0	0	0	0	0	0	0	0	0	0
title	0	0	0	0	0	0	0	0	0	0	0	0	0	0
title	0	0	0	0	0	0	0	0	0	0	0	0	0	0
title	0	0	0	0	0	0	0	0	0	0	0	0	0	0
title	0	0	0	0	0	0	0	0	0	0	0	0	0	0
title	0	0	0	0	0	0	0	0	0	0	0	0	0	0
title	0	0	0	0	0	0	0	0	0	0	0	0	0	0
title	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MHDR	1.92	4.8	0	0	0	0	0	0	0	0	0	0	0	0

PTE PM2.5 (lb/hr)	0.560138	0.013704	0	0	0	0	0	0	0	0	0	0	0	0
PTE PM10 (lb/hr)	5.601377	0.05583	0	0	0	0	0	0	0	0	0	0	0	0
PTE PM30 (lb/hr)	19.69791	0.278152	0	0	0	0	0	0	0	0	0	0	0	0
PTE PM2.5 (lb/hr) w/ rain	0.399002	0.012718	0	0	0	0	0	0	0	0	0	0	0	0
PTE PM10 (lb/hr) w/ rain	3.990022	0.051815	0	0	0	0	0	0	0	0	0	0	0	0
PTE PM30 (lb/hr) w/ rain	14.03139	0.259076	0	0	0	0	0	0	0	0	0	0	0	0
PTE PM2.5 (tons/yr)	2.453403	0.060023	0	0	0	0	0	0	0	0	0	0	0	0
PTE PM10 (tons/yr)	24.53403	0.244537	0	0	0	0	0	0	0	0	0	0	0	0
PTE PM30 (tons/yr)	86.27687	1.222687	0	0	0	0	0	0	0	0	0	0	0	0
PTE PM2.5 (tons/yr) w/ rain	1.74763	0.055706	0	0	0	0	0	0	0	0	0	0	0	0
PTE PM10 (tons/yr) w/ rain	17.4763	0.226951	0	0	0	0	0	0	0	0	0	0	0	0
PTE PM30 (tons/yr) w/ rain	61.45749	1.134754	0	0	0	0	0	0	0	0	0	0	0	0

Totals	PM	PM10	PM2.5
Fertilizer Load in/out	14.03139	3.990022	0.399002
skidsteer transfer	0.259076	0.051815	0.012718
title	0	0	0
title	0	0	0
title	0	0	0
title	0	0	0
title	0	0	0
title	0	0	0
Sum PTE (lb/hr)	14.29047	4.041837	0.41172
Sum PTE (Tons/yr)	62.59226	17.70326	1.803336

Haul Road BMP's	Control Efficiency %		
	PM	PM10	PM2.5
No Control	0	0	0

Haul/Road/Haul Truck/Material Hauled Information														
Haul Road ID No.:	1	2	3	4	5	6	7	8	9	10	11	12	13	14
W (tons)	27.50	4.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
sL (g/m ²):	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
P:	105	105	105	105	105	105	105	105	105	105	105	105	105	105
N:	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Haul Roads - Max Hourly VMT Rate and Emission Factor Calculations														
E(PM _{2.5})(lbs/VMT):	0.0173	0.0029	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
E(PM ₁₀)(lbs/VMT):	0.0705	0.0116	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
E(PM ₃₀)(lbs/VMT):	0.3525	0.0582	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Eext(PM _{2.5})(lbs/VMT):	0.0161	0.0026	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Eext(PM ₁₀)(lbs/VMT):	0.0654	0.0108	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Eext(PM ₃₀)(lbs/VMT):	0.3272	0.0540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

E = k(sL)^{0.91} * (W)^{1.02} where:

E = particulate emission factor (having units matching the units of k)

k = particle size multiplier for particle size range and units of interest

sL = road surface silt loading (grams per square meter) (g/m²)

W = average weight (tons) of the vehicles traveling the road

Table 13.2.1-1 PARTICLE SIZE MULTIPLIERS FOR PAVED ROAD EQUATION

Size range	k (lb/VMT)
PM2.5	0.00054
PM10	0.0022
PM15	0.0027
PM30	0.011

Eext = [k(sL)^{0.91} * (W)^{1.02}](1-P/(4N)) where:

k, sL, W and S are as defined above and

Eext = annual average emission factor in the same units as k

P = number of "wet" days with at least 0.01 inch of precipitation during the averaging period

N = number of days in the averaging period (365 for annual)

The equations retain the quality rating of A (D for PM2.5), if applied within the range of source conditions that were

Silt loading:

0.03-400 g/m²

0.04-570 grains/square foot (ft²)

Mean vehicle weight:

1.8-38 megagrams (Mg)

2.0-42 tons

Mean vehicle speed:

1-88 kilometers per hour (kph)

1-55 miles per hour (mph)

The upper 95% confidence levels of equation 1 for PM10 is best described with equations using an exponent of 1.14

E95% = k(sL)^{1.14} * (W)^{1.19}

E95%(PM_{2.5})(lbs/VMT): 0.0311 0.0038 0.0000 0.0000 0.0000 0.0000

E95%(PM₁₀)(lbs/VMT): 0.1266 0.0155 0.0000 0.0000 0.0000 0.0000

Haul Road/Haul Truck/Material Hauled Information														
Haul Road ID No.:	1	2	3	4	5	6	7	8	9	10	11	12	13	14
W (tons):	27.50	4.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
s (%):	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
P (days):	105	105	105	105	105	105	105	105	105	105	105	105	105	105
E(PM2.5) (lbs/VMT):	0.2917	0.1317	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
E(PM10) (lbs/VMT):	2.9174	1.3175	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
E(PM30) (lbs/VMT):	10.2593	4.6330	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Eext(PM2.5) (lbs/VMT):	0.2078	0.0938	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Eext(PM10) (lbs/VMT):	2.0781	0.9385	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Eext(PM30) (lbs/VMT):	7.3080	3.3002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

E = $k (s/12)^a * (W/3)^b$ where:
 E = size-specific emission factor (lb/VMT)
 s = surface material silt content (%)
 W = mean vehicle weight (tons)

Constants for Equation

Particle Size	Constant		
	k(lb/VMT)	a	b
PM2.5	0.15	0.9	0.45
PM10	1.5	0.9	0.45
PM30	4.9	0.7	0.45

Eext = $E[(365-P)/365]$ where E is defined above and:
 Eext = annual size-specific emission factor extrapolated for natural mitigation (lb/VMT)
 P = number of days in a year with at least 0.01 inch of precipitation