20.2.72 NMAC
NEW NSR AIR QUALITY PERMIT APPLICATION

For

MOUNTAIN STATES CONSTRUCTORS, INC.

MSCI HMA #3
Moriarty, NM

PREPARED BY
MONTROSE AIR QUALITY SERVICES, LLC
ALBUQUERQUE, NM
AUGUST 2022

Mail Application To:		**For Department use only:**
New Mexico Environment Department Air Quality Bureau Permits Section 525 Camino de los Marquez, Suite 1 Santa Fe, New Mexico, 87505 Phone: (505) 476-4300 Fax: (505) 476-4375 www.env.nm.gov/aqb		AIRS No.:

Universal Air Quality Permit Application

Use this application for NOI, NSR, or Title V sources.

Use this application for: the initial application, modifications, technical revisions, and renewals. For technical revisions, complete Sections, 1-A, 1-B, 2-E, 3, 9 and any other sections that are relevant to the requested action; coordination with the Air Quality Bureau permit staff prior to submittal is encouraged to clarify submittal requirements and to determine if more or less than these sections of the application are needed. Use this application for streamline permits as well. See Section 1-I for submittal instructions for other permits.

This application is submitted as (check all that apply)**:** ☐ Request for a No Permit Required Determination (no fee)
☐ **Updating** an application currently under NMED review. Include this page and all pages that are being updated (no fee required).
Construction Status: ☐ Not Constructed **X** Existing Permitted (or NOI) Facility ☐ Existing Non-permitted (or NOI) Facility
Minor Source: ☐ a NOI 20.2.73 NMAC **X** 20.2.72 NMAC application or revision ☐ 20.2.72.300 NMAC Streamline application
Title V Source: ☐ Title V (new) ☐ Title V renewal ☐ TV minor mod. ☐ TV significant mod. TV Acid Rain: ☐ New ☐ Renewal
PSD Major Source: ☐ PSD major source (new) ☐ minor modification to a PSD source ☐ a PSD major modification

Acknowledgements:

X I acknowledge that a pre-application meeting is available to me upon request. X Title V Operating, Title IV Acid Rain, and NPR applications have no fees.

X $500 NSR application Filing Fee enclosed OR ☐ The full permit fee associated with 10 fee points (required w/ streamline applications).

X Check No.: 157959 in the amount of $500.00

X I acknowledge the required submittal format for the hard copy application is printed double sided 'head-to-toe', 2-hole punched (except the Sect. 2 landscape tables is printed 'head-to-head'), numbered tab separators. Incl. a copy of the check on a separate page.

X I acknowledge there is an annual fee for permits in addition to the permit review fee: www.env.nm.gov/air-quality/permit-fees-2/.

☐ This facility qualifies for the small business fee reduction per 20.2.75.11.C. NMAC. The full $500.00 filing fee is included with this application and I understand the fee reduction will be calculated in the balance due invoice. The Small Business Certification Form has been previously submitted or is included with this application. (Small Business Environmental Assistance Program Information: www.env.nm.gov/air-quality/small-biz-eap-2/.)

Citation: Please provide the **low level citation** under which this application is being submitted: **20.2.72.200.A(1) NMAC**
(e.g. application for a new minor source would be 20.2.72.200.A NMAC, one example for a Technical Permit Revision is 20.2.72.219.B.1.b NMAC, a Title V acid rain application would be: 20.2.70.200.C NMAC)

Section 1 – Facility Information

Section 1-A: Company Information

		AI # if known (see 1st 3 to 5 #s of permit IDEA ID No.):	Updating Permit/NOI #: New NSR
1	Facility Name: MSCI HMA #3	Plant primary SIC Code (4 digits): 2951	
		Plant NAIC code (6 digits): 324121	
a	Facility Street Address (If no facility street address, provide directions from a prominent landmark): From the intersection of State Highway 41 and I-40 go south on State Highway 41. Turn east on Martinez Rd for 4 miles. Turn south on Stagecoach Rd. Travel 2 miles to entrance of Davis Pit.		
2	Plant Operator Company Name: Mountain States Constructors, Inc.	Phone/Fax: (505) 238-1537/(505) 292-5311	
a	Plant Operator Address: 3601 Pan American Freeway NE #111, Albuquerque, NM 87107		

b	Plant Operator's New Mexico Corporate ID or Tax ID: 85-0276974	
3	Plant Owner(s) name(s): Mountain States Constructors, Inc.	Phone/Fax: (505) 238-1537/(505) 292-5311
a	Plant Owner(s) Mailing Address(s): 3601 Pan American Freeway NE #111, Albuquerque, NM 87107	
4	Bill To (Company): Mountain States Constructors, Inc.	Phone/Fax: (505) 238-1537/(505) 292-5311
a	Mailing Address: 3601 Pan American Freeway NE #111, Albuquerque, NM 87107	E-mail: Neil@msconstructors.com
5	**X** Preparer: **X** Consultant: Paul Wade, Montrose Environmental Solutions, Inc	Phone/Fax: (505) 830-9680 x6/(505) 830-9678
a	Mailing Address: 3500G Comanche Rd NE, Albuquerque, NM 87107	E-mail: pwade@montrose-env.com
6	Plant Operator Contact: Neil Jackson	Phone/Fax: (505) 238-1537/(505) 292-5311
a	Address: 3601 Pan American Freeway NE #111, Albuquerque, NM 87107	E-mail: Neil@msconstructors.com
7	Air Permit Contact: Neil Jackson	Title: Environmental Manager
a	E-mail: Neil@msconstructors.com	Phone/Fax: (505) 238-1537/(505) 292-5311
b	Mailing Address: 3601 Pan American Freeway NE #111, Albuquerque, NM 87107	
c	The designated Air permit Contact will receive all official correspondence (i.e. letters, permits) from the Air Quality Bureau.	

Section 1-B: Current Facility Status

1.a	Has this facility already been constructed? ☒ Yes ☐ No **Operating under GCP-3-8180**	1.b If yes to question 1.a, is it currently operating in New Mexico? ☒ Yes ☐ No
2	If yes to question 1.a, was the existing facility subject to a Notice of Intent (NOI) (20.2.73 NMAC) before submittal of this application? ☒ Yes ☐ No	If yes to question 1.a, was the existing facility subject to a construction permit (20.2.72 NMAC) before submittal of this application? ☒ Yes ☐ No
3	Is the facility currently shut down? ☐ Yes ☒ No ☐ N/A	If yes, give month and year of shut down (MM/YY):
4	Was this facility constructed before 8/31/1972 and continuously operated since 1972? ☐ Yes ☒ No	
5	If Yes to question 3, has this facility been modified (see 20.2.72.7.P NMAC) or the capacity increased since 8/31/1972? ☐Yes ☐No ☒N/A	
6	Does this facility have a Title V operating permit (20.2.70 NMAC)? ☐ Yes ☒ No	If yes, the permit No. is: P-
7	Has this facility been issued a No Permit Required (NPR)? ☐ Yes ☒ No	If yes, the NPR No. is:
8	Has this facility been issued a Notice of Intent (NOI)? ☐ Yes ☒ No	If yes, the NOI No. is:
9	Does this facility have a construction permit (20.2.72/20.2.74 NMAC)? ☐ Yes ☒ No	If yes, the permit No. is:
10	Is this facility registered under a General permit (GCP-1, GCP-2, etc.)? ☒ Yes ☐ No	If yes, the register No. is: GCP-3-8180

Section 1-C: Facility Input Capacity & Production Rate

1	What is the facility's maximum input capacity, specify units (reference here and list capacities in Section 20, if more room is required)			
a	Current	Hourly: NA	Daily: NA	Annually: NA
b	Proposed	Hourly: HMA - 400 tons RAP – 400 tons FNG – 200 tons	Daily: HMA – 4,800 tons RAP – 5,600 tons FNG – 2,800 tons	Annually: HMA – 1,000,000 tons RAP – 1,752,000 tons FNG – 876,000 tons
2	What is the facility's maximum production rate, specify units (reference here and list capacities in Section 20, if more room is required)			

a	Current	Hourly: NA	Daily: NA	Annually: NA
b	Proposed	Hourly: HMA - 400 tons RAP – 400 tons FNG – 200 tons	Daily: HMA – 4,800 tons RAP – 5,600 tons FNG – 2,800 tons	Annually: HMA – 1,000,000 tons RAP – 1,752,000 tons FNG – 876,000 tons

Section 1-D: Facility Location Information

1	Section: 26, 27, 34, 35	Range: 9E	Township: 9N	County: Torrance	Elevation (ft): 6310
2	UTM Zone: ☐ 12 or ☒ 13			Datum: ☐ NAD 27 ☒ NAD 83 ☐ WGS 84	
a	UTM E (in meters, to nearest 10 meters): 411,810			UTM N (in meters, to nearest 10 meters): 3,869,800	
b	**AND** Latitude (deg., min., sec.): 34°, 58', 0.8881" N			Longitude (deg., min., sec.): 105°, 57', 57.7573" W	
3	Name and zip code of nearest New Mexico town: Moriarty, NM, 87035				
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary): From the intersection of State Highway 41 and I-40 go south on State Highway 41. Turn east on Martinez Rd for 4 miles. Turn south on Stagecoach Rd. Travel 2 miles to entrance of Davis Pit.				
5	The facility is 5.4 miles east-southeast of Moriarty.				
6	Status of land at facility (check one): **X** Private ☐ Indian/Pueblo ☐ Federal BLM ☐ Federal Forest Service ☐ Other (specify)				
7	List all municipalities, Indian tribes, and counties within a ten (10) mile radius (20.2.72.203.B.2 NMAC) of the property on which the facility is proposed to be constructed or operated: Moriarty, Torrance County, Santa Fe County				
8	**20.2.72** NMAC applications **only**: Will the property on which the facility is proposed to be constructed or operated be closer than 50 km (31 miles) to other states, Bernalillo County, or a Class I area (see www.env.nm.gov/aqb/modeling/class1areas.html)? ☒ Yes ☐ No (20.2.72.206.A.7 NMAC) If yes, list all with corresponding distances in kilometers: Bernalillo County - 17.2 km				
9	Name nearest Class I area: Pecos Wilderness Area				
10	Shortest distance (in km) from facility boundary to the boundary of the nearest Class I area (to the nearest 10 meters): 83.40 km				
11	Distance (meters) from the perimeter of the Area of Operations (AO is defined as the plant site inclusive of all disturbed lands, including mining overburden removal areas) to nearest residence, school or occupied structure: 0.6 miles				
12	Method(s) used to delineate the Restricted Area: Fencing, Signs and Gates at Entrance "**Restricted Area**" is an area to which public entry is effectively precluded. Effective barriers include continuous fencing, continuous walls, or other continuous barriers approved by the Department, such as rugged physical terrain with steep grade that would require special equipment to traverse. If a large property is completely enclosed by fencing, a restricted area within the property may be identified with signage only. Public roads cannot be part of a Restricted Area.				
13	Does the owner/operator intend to operate this source as a portable stationary source as defined in 20.2.72.7.X NMAC? ☒ Yes ☐ No A portable stationary source is not a mobile source, such as an automobile, but a source that can be installed permanently at one location or that can be re-installed at various locations, such as a hot mix asphalt plant that is moved to different job sites.				
14	Will this facility operate in conjunction with other air regulated parties on the same property? ☐ No ☒ Yes If yes, what is the name and permit number (if known) of the other facility? MSCI GCP Crush 4, GCP-2-8970				

Section 1-E: Proposed Operating Schedule (The 1-E.1 & 1-E.2 operating schedules may become conditions in the permit.)

1	Facility **maximum** operating ($\frac{\text{hours}}{\text{day}}$): 24	($\frac{\text{days}}{\text{week}}$): 7	($\frac{\text{weeks}}{\text{year}}$): 52	($\frac{\text{hours}}{\text{year}}$): HMA: 3500 RAP: 4380		
2	Facility's maximum daily operating schedule (if less than 24 $\frac{\text{hours}}{\text{day}}$)? Start:	☐AM ☐PM	End:	☐AM ☐PM		
3	Month and year of anticipated start of construction: Facility already constructed					
4	Month and year of anticipated construction completion: Upon issue of permit					
5	Month and year of anticipated startup of new or modified facility: Upon issue of permit					

6	Will this facility operate at this site for more than one year? ☐ Yes ☒ No

Section 1-F: Other Facility Information

1	Are there any current Notice of Violations (NOV), compliance orders, or any other compliance or enforcement issues related to this facility? ☐ Yes ☒ No If yes, specify:		
a	If yes, NOV date or description of issue:		NOV Tracking No:
b	Is this application in response to any issue listed in 1-F, 1 or 1a above? ☐ Yes ☐ No If Yes, provide the 1c & 1d info below:		
c	Document Title:	Date:	Requirement # (or page # and paragraph #):
d	Provide the required text to be inserted in this permit:		
2	Is air quality dispersion modeling or modeling waiver being submitted with this application? ☒ Yes ☐ No		
3	Does this facility require an "Air Toxics" permit under 20.2.72.400 NMAC & 20.2.72.502, Tables A and/or B? ☐ Yes ☒ No		
4	Will this facility be a source of federal Hazardous Air Pollutants (HAP)? ☒ Yes ☐ No		
a	If Yes, what type of source? ☐ **Major** (☐ ≥10 tpy of any single HAP **OR** ☐ ≥25 tpy of any combination of HAPS) **OR** ☒ **Minor** (☒ <10 tpy of any single HAP **AND** ☒ <25 tpy of any combination of HAPS)		
5	Is any unit exempt under 20.2.72.202.B.3 NMAC? ☐ Yes ☒ No		
a	If yes, include the name of company providing commercial electric power to the facility: _____ Commercial power is purchased from a commercial utility company, which specifically does not include power generated on site for the sole purpose of the user.		

Section 1-G: Streamline Application

(This section applies to 20.2.72.300 NMAC Streamline applications only)

1	☐ I have filled out Section 18, "Addendum for Streamline Applications." ☒ N/A (This is not a Streamline application.)

Section 1-H: Current Title V Information - Required for all applications from TV Sources

(Title V-source required information for all applications submitted pursuant to 20.2.72 NMAC (Minor Construction Permits), or 20.2.74/20.2.79 NMAC (Major PSD/NNSR applications), and/or 20.2.70 NMAC (Title V))

1	Responsible Official (R.O.) (20.2.70.300.D.2 NMAC):		Phone:
a	R.O. Title:	R.O. e-mail:	
b	R. O. Address:		
2	Alternate Responsible Official (20.2.70.300.D.2 NMAC):		Phone:
a	A. R.O. Title:	A. R.O. e-mail:	
b	A. R. O. Address:		
3	Company's Corporate or Partnership Relationship to any other Air Quality Permittee (List the names of any companies that have operating (20.2.70 NMAC) permits and with whom the applicant for this permit has a corporate or partnership relationship):		
4	Name of Parent Company ("Parent Company" means the primary name of the organization that owns the company to be permitted wholly or in part.):		
a	Address of Parent Company:		
5	Names of Subsidiary Companies ("Subsidiary Companies" means organizations, branches, divisions or subsidiaries, which are owned, wholly or in part, by the company to be permitted.):		
6	Telephone numbers & names of the owners' agents and site contacts familiar with plant operations:		

7	Affected Programs to include Other States, local air pollution control programs (i.e. Bernalillo) and Indian tribes: Will the property on which the facility is proposed to be constructed or operated be closer than 80 km (50 miles) from other states, local pollution control programs, and Indian tribes and pueblos (20.2.70.402.A.2 and 20.2.70.7.B)? If yes, state which ones and provide the distances in kilometers: Bernalillo County Air Quality Division - 17.2 km

Section 1-I – Submittal Requirements

Each 20.2.73 NMAC (**NOI**), a 20.2.70 NMAC (**Title V**), a 20.2.72 NMAC (**NSR** minor source), or 20.2.74 NMAC (**PSD**) application package shall consist of the following:

Hard Copy Submittal Requirements:

1) One hard copy **original signed and notarized application package** **printed double sided** **'head-to-toe'** **2-hole punched** as we bind the document on top, not on the side; except Section 2 (landscape tables), which should be head-to-head. Please use **numbered tab separators** in the hard copy submittal(s) as this facilitates the review process. For NOI submittals only, hard copies of UA1, Tables 2A, 2D & 2F, Section 3 and the signed Certification Page are required. Please include a copy of the check on a separate page.

2) If the application is for a minor NSR, PSD, NNSR, or Title V application, include one working hard **copy** for Department use. This copy should be printed in book form, 3-hole punched, and **must be double sided**. Note that this is in addition to the head-to-to 2-hole punched copy required in 1) above. Minor NSR Technical Permit revisions (20.2.72.219.B NMAC) only need to fill out Sections 1-A, 1-B, 3, and should fill out those portions of other Section(s) relevant to the technical permit revision. TV Minor Modifications need only fill out Sections 1-A, 1-B, 1-H, 3, and those portions of other Section(s) relevant to the minor modification. NMED may require additional portions of the application to be submitted, as needed.

3) The entire NOI or Permit application package, including the full modeling study, should be submitted electronically. Electronic files for applications for NOIs, any type of General Construction Permit (GCP), or technical revisions to NSRs must be submitted with compact disk (CD) or digital versatile disc (DVD). For these permit application submittals, **two** CD copies are required (in sleeves, not crystal cases, please), with additional CD copies as specified below. NOI applications require only a single CD submittal. Electronic files for other New Source Review (construction) permits/permit modifications or Title V permits/permit modifications can be submitted on CD/DVD or sent through AQB's secure file transfer service.

Electronic files sent by (check one):

X CD/DVD attached to paper application

☐ secure electronic transfer. Air Permit Contact Name_____

Email_____

Phone number _____

a. If the file transfer service is chosen by the applicant, after receipt of the application, the Bureau will email the applicant with instructions for submitting the electronic files through a secure file transfer service. Submission of the electronic files through the file transfer service needs to be completed within 3 business days after the invitation is received, so the applicant should ensure that the files are ready when sending the hard copy of the application. The applicant will not need a password to complete the transfer. **Do not use the file transfer service for NOIs, any type of GCP, or technical revisions to NSR permits.**

4) Optionally, the applicant may submit the files with the application on compact disk (CD) or digital versatile disc (DVD) following the instructions above and the instructions in 5 for applications subject to PSD review.

5) If **air dispersion modeling** is required by the application type, include the **NMED Modeling Waiver** and/or electronic air dispersion modeling report, input, and output files. The dispersion modeling ***summary report only*** should be submitted as hard copy(ies) unless otherwise indicated by the Bureau.

6) If the applicant submits the electronic files on CD and the application is subject to PSD review under 20.2.74 NMAC (PSD) or NNSR under 20.2.79 NMC include,
   a. one additional CD copy for US EPA,
   b. one additional CD copy for each federal land manager affected (NPS, USFS, FWS, USDI) and,
   c. one additional CD copy for each affected regulatory agency other than the Air Quality Bureau.

   If the application is submitted electronically through the secure file transfer service, these extra CDs do not need to be submitted.

Electronic Submittal Requirements [in addition to the required hard copy(ies)]:

1) All required electronic documents shall be submitted as 2 separate CDs or submitted through the AQB secure file transfer service. Submit a single PDF document of the entire application as submitted and the individual documents comprising the application.

2) The documents should also be submitted in Microsoft Office compatible file format (Word, Excel, etc.) allowing us to access the text and formulas in the documents (copy & paste). Any documents that cannot be submitted in a Microsoft Office compatible

format shall be saved as a PDF file from within the electronic document that created the file. If you are unable to provide Microsoft office compatible electronic files or internally generated PDF files of files (items that were not created electronically: i.e. brochures, maps, graphics, etc,), submit these items in hard copy format. We must be able to review the formulas and inputs that calculated the emissions.

3) It is preferred that this application form be submitted as 4 electronic files (3 MSWord docs: Universal Application section 1 [UA1], Universal Application section 3-19 [UA3], and Universal Application 4, the modeling report [UA4]) and 1 Excel file of the tables (Universal Application section 2 [UA2]). Please include as many of the 3-19 Sections as practical in a single MS Word electronic document. Create separate electronic file(s) if a single file becomes too large or if portions must be saved in a file format other than MS Word.

4) The electronic file names shall be a maximum of 25 characters long (including spaces, if any). The format of the electronic Universal Application shall be in the format: "A-3423-FacilityName". The "A" distinguishes the file as an application submittal, as opposed to other documents the Department itself puts into the database. Thus, all electronic application submittals should begin with "A-". Modifications to existing facilities should use the core permit number (i.e. '3423') the Department assigned to the facility as the next 4 digits. Use 'XXXX' for new facility applications. The format of any separate electronic submittals (additional submittals such as non-Word attachments, re-submittals, application updates) and Section document shall be in the format: "A-3423-9-description", where "9" stands for the section # (in this case Section 9-Public Notice). Please refrain, as much as possible, from submitting any scanned documents as this file format is extremely large, which uses up too much storage capacity in our database. Please take the time to fill out the header information throughout all submittals as this will identify any loose pages, including the Application Date (date submitted) & Revision number (0 for original, 1, 2, etc.; which will help keep track of subsequent partial update(s) to the original submittal. Do not use special symbols (#, @, etc.) in file names. The footer information should not be modified by the applicant.

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Table 2-A: Regulated Emission Sources

Unit and stack numbering must correspond throughout the application package. If applying for a NOI under 20.2.73 NMAC, equipment exemptions under 2.72.202 NMAC do not apply.

Unit Number[1]	Source Description	Make	Model #	Serial #	Manufacturer's Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture[2] / Date of Construction/ Reconstruction[2]	Controlled by Unit # / Emissions vented to Stack #	Source Classification Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
AGGPILE	Cold Aggregate/RAP Storage Pile	NA	NA	NA	30 cu yd/bin	210-370 tons/hr	Dec-18 2022	NA NA	30500203	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
1	Cold Aggregate 5-Feed Bin Loading	Astec	PCF-1014-5	18-222-346604-1-1	600 tph	210-370 tons/hr	Dec-18 2022	NA NA	30500216	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
2	Cold Aggregate Feed Bin Unloading (Conveyor)	Astec	PSS-412-60	18-222-346604-2-1	450 tons/hr	210-370 tons/hr	Dec-18 2022	C1 NA	30500217	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
3	Scalping Screen	Astec	PSS-412-60	18-222-346604-2-1	450 tons/hr	210-370 tons/hr	Dec-18 2022	C2 NA	30500204	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
4	Scalping Screen Unloading (Conveyor)	Astec	PSS-412-60	18-222-346604-2-1	450 tons/hr	210-370 tons/hr	Dec-18 2022	C1 NA	30500217	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
5	Pug Mill Load	Astec	PLM-T400-60	18-222-346604-4-1	450 tons/hr	210-370 tons/hr	Dec-18 2022	C1 NA	30500204	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
6	Pug Mill Unload (Conveyor)	Astec	PLM-T400-60	18-222-346604-4-1	450 tons/hr	216-376 tons/hr	Dec-18 2022	C1 NA	30500217	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
7	Conveyor Transfer to Slinger Conveyor	Astec	PSS-412-60	18-222-346604-2-1	450 tons/hr	216-376 tons/hr	Dec-18 2022	C1 NA	30500217	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
8	RAP 2-Feed Bin Loading	Astec	PRB-1014-2	18-222-346604-15-1	20 cu yd/bin	0-160 tons/hr	Dec-18 2022	NA NA	30500216	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
9	RAP Feed Bin Unloading (Conveyor)	Astec	PSS-48-50	18-222-346604-16-1	0-160 tons/hr	0-160 tons/hr	Dec-18 2022	C1 NA	30500217	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
10	RAP Screen	Astec	PSS-48-50	18-222-346604-16-1	0-160 tons/hr	0-160 tons/hr	Dec-18 2022	C2 NA	30500204	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
11	RAP Screen Unloading (Conveyor)	Astec	PSS-48-50	18-222-346604-16-1	0-160 tons/hr	0-160 tons/hr	Dec-18 2022	C1 NA	30500217	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
12	RAP Transfer Conveyor	Astec	PSS-48-50	18-222-346604-16-1	0-160 tons/hr	0-160 tons/hr	Dec-18 2022	C1 NA	30500217	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
13	Mineral Filler Silo	Dillman	DE-750_BBL	DE750BBL	750 BBL	Load 25 tph; Unload 6 tph	2010 2022	C4 1	30500213	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		

Unit Number[1]	Source Description	Make	Model #	Serial #	Manufacturer's Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture[2] / Date of Construction/ Reconstruction[2]	Controlled by Unit # / Emissions vented to Stack #	Source Classification Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
14	Drum Dryer/Mixer	Astec	PDB-9638	18-222-346604-9-1	400 tons/hr	400 tons/hr	Dec-18 2022	C5 2	30500201	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
15	Drum Mixer Unloading (Incline Conveyor)	Astec	SEB-10036	18-222-346604-9-1	400 tons/hr	400 tons/hr	Dec-18 2022	NA NA	30500221	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
16	Asphalt Silo Unloading	Astec	SEB-10036	18-222-346604-9-1	400 tons/hr	400 tons/hr	Dec-18 2022	NA NA	30500213	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
17	Main Plant Generator 31-2005	CAT	C32	JSJ03812	1675 hp; 1250 kW	1675 hp; 1250 kW	2020 2022	NA 3	30500299	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	CI	
18	Standby (Night) Generator 31-1901	Izuzu	DCA-20SPXU4F	8720565	40.2 hp; 30 kW	40.2 hp; 30 kW	2019 2022	NA 4	30500299	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	CI	
19	Asphalt Heater	Astec	HC-120AS	C18-082	1.2 mmBTU	1.2 mmBTU	Dec-18 2022	NA 5	30500208	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
20	Asphalt Cement Storage Tanks (2)	Astec	CHT-60DP	C18-109	30,000 gallons each	30,000 gallons each	Dec-18 2022	NA NA	30500212	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
TRCK	Haul Road Traffic	NA	NA	NA	308 trucks/day	308 trucks/day	NA 2022	C3 NA	30602011	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
YARD	HMA Yard	NA	NA	NA	400 tons/hr	400 tons/hr	NA 2022	NA NA	30502014	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
RAPPILE	RAP Raw Material Source	NA	NA	NA	400 tons/hr	400 tons/hr	NA 2022	NA NA	30502007	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
21	RAP Feeder/Hopper	Lippmann	4800 Impact Plant	20110337	400 tons/hr	400 tons/hr	2014 2022	NA NA	30502031	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
22	RAP Vertical Impact Crusher				400 tons/hr	400 tons/hr	2014 2022	NA NA	30502001	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
23	RAP Crusher Conveyor				400 tons/hr	400 tons/hr	2014 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
24	RAP Recycle Conveyor #2				400 tons/hr	400 tons/hr	2014 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
25	RAP Conveyor				400 tons/hr	400 tons/hr	2014 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		

Unit Number[1]	Source Description	Make	Model #	Serial #	Manufacturer's Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture[2] / Date of Construction/ Reconstruction[2]	Controlled by Unit # / Emissions vented to Stack #	Source Classification Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
26	RAP Screen Conveyor	Fab Tec	526 Screen Plant	TBD	400 tons/hr	400 tons/hr	2014 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
27	RAP 2-Deck Screen				400 tons/hr	400 tons/hr	2014 2022	NA NA	30502015	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
28	RAP Screen Conveyor				400 tons/hr	400 tons/hr	2014 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
29	RAP Screen Conveyor				400 tons/hr	400 tons/hr	2014 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
30	RAP Screen Conveyor				400 tons/hr	400 tons/hr	2014 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
31	RAP Recycle Conveyor #1				400 tons/hr	400 tons/hr	2014 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
32	RAP Waste Conveyor				400 tons/hr	400 tons/hr	2014 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
33	RAP Product Conveyor				400 tons/hr	400 tons/hr	2014 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
34	RAP Stacker Conveyor Drop to Pile				400 tons/hr	400 tons/hr	2014 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
35	RAP Product Storage Pile	NA	NA	NA	400 tons/hr	400 tons/hr	NA 2022	NA NA	30502007	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
36	RAP Plant Generator/Engine	CAT	C-13	NA	415 hp; 310 kW	415 hp; 310 kW	2014 2022	NA 6	30502099	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	CI	
37	Fold-N-Go Plant Feeder	Astec	FNG 2512K	62517	200 tons/hr	200 tons/hr	2005 2022	NA NA	30502031	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
38	Fold-N-Go Plant Feeder Conveyor				200 tons/hr	200 tons/hr	2005 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
39	Fold-N-Go Plant Screen				200 tons/hr	200 tons/hr	2005 2022	NA NA	30502015	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
40	Fold-N-Go Plant Screen Conveyor				200 tons/hr	200 tons/hr	2005 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		

Unit Number[1]	Source Description	Make	Model #	Serial #	Manufacturer's Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture[2] / Date of Construction/ Reconstruction[2]	Controlled by Unit # / Emissions vented to Stack #	Source Classification Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
41	Fold-N-Go Plant Stacker Conveyor				200 tons/hr	200 tons/hr	2005 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
42	Fold-N-Go Plant Screen Conveyor				200 tons/hr	200 tons/hr	2005 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
43	Fold-N-Go Plant Stacker Conveyor				200 tons/hr	200 tons/hr	2005 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
44	Fold-N-Go Plant Stacker Conveyor Drop to Pile				200 tons/hr	200 tons/hr	2005 2022	NA NA	30502006	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
45	Fold-N-Go Plant Generator/Engine	John Deere	4045TF270B	PE4045T537583	75 hp; 55.9 kW	75 hp; 55.9 kW	2005 2022	NA 7	30502099	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	CI	
										☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
										☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
										☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
										☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		

[1] Unit numbers must correspond to unit numbers in the previous permit unless a complete cross reference table of all units in both permits is provided.
[2] Specify dates required to determine regulatory applicability.
[3] To properly account for power conversion efficiencies, generator set rated capacity shall be reported as the rated capacity of the engine in horsepower, not the kilowatt capacity of the generator set.
[4] "4SLB" means four stroke lean burn engine, "4SRB" means four stroke rich burn engine, "2SLB" means two stroke lean burn engine, "CI" means compression ignition, and "SI" means spark ignition

Table 2-B: Insignificant Activities[1] (20.2.70 NMAC) OR Exempted Equipment (20.2.72 NMAC)

All 20.2.70 NMAC (Title V) applications must list all Insignificant Activities in this table. All 20.2.72 NMAC applications must list Exempted Equipment in this table. If equipment listed on this table is exempt under 20.2.72.202.B.5, include emissions calculations and emissions totals for 202.B.5 "similar functions" units, operations, and activities in Section 6, Calculations. Equipment and activities exempted under 20.2.72.202 NMAC may not necessarily be Insignificant under 20.2.70 NMAC (and vice versa). Unit & stack numbering must be consistent throughout the application package. Per Exemptions Policy 02-012.00 (see http://www.env.nm.gov/aqb/permit/aqb_pol.html), 20.2.72.202.B NMAC Exemptions do not apply, but 20.2.72.202.A NMAC exemptions do apply to NOI facilities under 20.2.73 NMAC. List 20.2.72.301.D.4 NMAC Auxiliary Equipment for Streamline applications in Table 2-A. The List of Insignificant Activities (for TV) can be found online at https://www.env.nm.gov/wp-content/uploads/sites/2/2017/10/InsignificantListTitleV.pdf. TV sources may elect to enter both TV Insignificant Activities and Part 72 Exemptions on this form.

Unit Number	Source Description	Manufacturer	Model No. / Serial No.	Max Capacity / Capacity Units	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5) / Insignificant Activity citation (e.g. IA List Item #1.a)	Date of Manufacture /Reconstruction[2] / Date of Installation /Construction[2]	For Each Piece of Equipment, Check Onc
T3	Burner Fuel Tank	NA	NA	10,000 Gallons	20.2.72.202.B.2.a	Dec-18	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			NA	10,000 Gallons	NA	Dec-18	
T4	Burner Fuel Tank	NA	NA	6,500 Gallons	20.2.72.202.B.2.a	Dec-18	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			NA	6,500 Gallons	NA	Dec-18	
T5	Diesel Fuel Tank	NA	NA	10,000 Gallons	20.2.72.202.B.2.a	Dec-18	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			NA	10,000 Gallons	NA	Dec-18	
T6	Evotherm Storage Tank	NA	NA	5,000 Gallons	NA	2021	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			NA	5,000 Gallons	1.a	2021	
T7	Water Storage Tank	NA	NA	5,000 Gallons	NA	Dec-18	☐ Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			NA	5,000 Gallons	1.a	Dec-18	
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced

[1] Insignificant activities exempted due to size or production rate are defined in 20.2.70.300.D.6, 20.2.70.7.Q NMAC, and the NMED/AQB List of Insignificant Activities, dated September 15, 2008. Emissions from these insignificant activities do not need to be reported, unless specifically requested.

[2] Specify date(s) required to determine regulatory applicability.

Table 2-C: Emissions Control Equipment

Unit and stack numbering must correspond throughout the application package. Only list control equipment for TAPs if the TAP's maximum uncontrolled emissions rate is over its respective threshold as listed in 20.2.72 NMAC, Subpart V, Tables A and B. In accordance with 20.2.72.203.A(3) and (8) NMAC, 20.2.70.300.D(5)(b) and (e) NMAC, and 20.2.73.200.B(7) NMAC, the permittee shall report all control devices and list each pollutant controlled by the control device regardless if the applicant takes credit for the reduction in emissions.

Control Equipment Unit No.	Control Equipment Description	Date Installed	Controlled Pollutant(s)	Controlling Emissions for Unit Number(s)[1]	Efficiency (% Control by Weight)	Method used to Estimate Efficiency
C1	Conveyor Transfer Points - Wet Dust Suppression System	TBD	Particulate	2, 4, 5, 6, 7, 9, 11, 12	PM - 95.33%	AP-42 11.19.2 Emission Factors
C2	Screen - Wet Dust Suppression System	TBD	Particulate	3, 10	PM - 91.20%	AP-42 11.19.2 Emission Factors
C3	Unpaved Roads - Asphalt Millings, Surfactant, and Water	TBD	Particulate	TRCK	90%	NMED Policy
C4	Silo Baghouse	TBD	Particulate	13	99%	Low End of Filter Control Efficiency
C5	Drum Mixer Baghouse	TBD	Particulate	14	99.88%	AP-42 11.1 Emission Factors

[1] List each control device on a separate line. For each control device, list all emission units controlled by the control device.

Table 2-D: Maximum Emissions (under normal operating conditions)

☐ **This Table was intentionally left blank because it would be identical to Table 2-E.**

Maximum Emissions are the emissions at maximum capacity and prior to (in the absence of) pollution control, emission-reducing process equipment, or any other emission reduction. Calculate the hourly emissions using the worst case hourly emissions for each pollutant. For each pollutant, calculate the annual emissions as if the facility were operating at maximum plant capacity without pollution controls for 8760 hours per year, unless otherwise approved by the Department. List Hazardous Air Pollutants (HAP) & Toxic Air Pollutants (TAPs) in Table 2-I. Unit & stack numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E-4).

Unit No.	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
AGGPILE									2.44	8.72	1.15	4.12	0.17	0.62				
1									1.39	4.95	0.66	2.34	0.10	0.35				
2									0.63	2.76	0.23	1.01	0.036	0.16				
3									5.25	23.0	1.83	8.00	0.28	1.21				
4									0.63	2.76	0.23	1.01	0.036	0.16				
5									0.65	2.84	0.24	1.04	0.037	0.16				
6									0.65	2.84	0.24	1.04	0.037	0.16				
7									0.65	2.84	0.24	1.04	0.037	0.16				
8									1.06	3.77	0.50	1.78	0.076	0.27				
9									0.48	2.10	0.18	0.77	0.027	0.12				
10									4.00	17.5	1.39	6.10	0.21	0.93				
11									0.48	2.10	0.18	0.77	0.027	0.12				
12									0.48	2.10	0.18	0.77	0.027	0.12				
13									18.3	19.2	11.8	12.4	2.33	2.44				
14	22.0	96.4	52.0	228	12.8	56.1	23.2	102	11200	49056	2600	11388	626	2742	0.02072	0.09075	0.0060	0.026
15			0.88	3.87	9.13	40.0			0.32	1.41	0.32	1.41	0.32	1.41	0.00058	0.00256		
16			1.01	4.43	3.12	13.6			0.33	1.44	0.33	1.44	0.33	1.44	0.00058	0.00256		
17	16.8	73.4	9.65	42.2	0.88	3.86	0.62	2.72	0.55	2.41	0.55	2.41	0.55	2.41			0.00010	0.00044
18	0.30	1.29	0.36	1.59	0.016	0.068	0.012	0.050	0.0020	0.0087	0.0020	0.0087	0.0020	0.0087			2.0E-06	8.8E-06
19	0.19	0.82	0.047	0.21	0.0032	0.014	0.067	0.29	0.019	0.082	0.019	0.082	0.019	0.082			1.1E-05	4.7E-05
20					0.030	0.13												
TRCK									106.2	375.8	27.1	95.8	2.71	9.58				
YARD			0.14	0.62	0.44	1.93												
RAPPILE									0.79	1.41	0.37	0.67	0.057	0.10				
21									0.79	1.41	0.37	0.67	0.057	0.10				
22									0.65	1.42	0.29	0.63	0.044	0.096				
23									0.36	0.79	0.13	0.29	0.020	0.044				
24									0.36	0.79	0.13	0.29	0.020	0.044				
25									0.36	0.79	0.13	0.29	0.020	0.044				
26									0.36	0.79	0.13	0.29	0.020	0.044				
27									3.00	6.57	1.04	2.29	0.16	0.35				
28									0.36	0.79	0.13	0.29	0.020	0.044				
29									0.36	0.79	0.13	0.29	0.020	0.044				

Unit No.	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
30									0.36	0.79	0.13	0.29	0.020	0.044				
31									0.36	0.79	0.13	0.29	0.020	0.044				
32									0.36	0.79	0.13	0.29	0.020	0.044				
33									0.36	0.79	0.13	0.29	0.020	0.044				
34									0.79	1.41	0.37	0.67	0.057	0.10				
35									0.79	1.41	0.37	0.67	0.057	0.10				
36	3.17	6.94	2.20	4.82	0.12	0.26	0.15	0.32	0.18	0.39	0.18	0.39	0.18	0.39			2.4E-05	5.2E-05
37									0.40	0.71	0.19	0.33	0.028	0.051				
38									0.18	0.39	0.07	0.14	0.010	0.022				
39									1.50	3.29	0.52	1.14	0.079	0.17				
40									0.18	0.39	0.07	0.14	0.010	0.022				
41									0.18	0.39	0.07	0.14	0.010	0.022				
42									0.18	0.39	0.07	0.14	0.010	0.022				
43									0.18	0.39	0.07	0.14	0.010	0.022				
44									0.40	0.71	0.19	0.33	0.028	0.051				
45	0.88	1.92	0.62	1.35	0.046	0.10	0.028	0.061	0.049	0.11	0.049	0.11	0.049	0.11			4.0E-06	1.0E-06
Totals	43.3	181	66.9	287	26.6	116	24.1	105	11358	49563	2653	11543	634	2766	0.022	0.096	0.0061	0.027

[1]**Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but PM is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

Table 2-E: Requested Allowable Emissions

Unit & stack numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or $1.41E^{-4}$).

Unit No.	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
AGGPILE									2.44	2.49	1.15	1.18	0.17	0.18				
1									1.39	1.41	0.66	0.67	0.10	0.10				
2									0.029	0.037	0.010	0.012	0.0027	0.0034				
3									0.46	0.58	0.16	0.19	0.011	0.013				
4									0.029	0.037	0.010	0.012	0.0027	0.0034				
5									0.030	0.038	0.010	0.012	0.0028	0.0035				
6									0.030	0.038	0.010	0.012	0.0028	0.0035				
7									0.030	0.038	0.010	0.012	0.0028	0.0035				
8									1.06	1.08	0.50	0.51	0.076	0.077				
9									0.022	0.028	0.0074	0.0092	0.0021	0.0026				
10									0.35	0.44	0.12	0.15	0.0080	0.010				
11									0.022	0.028	0.0074	0.0092	0.0021	0.0026				
12									0.022	0.028	0.0074	0.0092	0.0021	0.0026				
13									0.18	0.055	0.12	0.035	0.023	0.0070				
14	22.0	27.5	52.0	65.0	12.8	16.0	23.2	29.0	13.2	16.5	9.20	11.5	9.20	11.5	0.021	0.026	0.0060	0.0075
15			0.88	1.11	9.13	11.41			0.32	0.40	0.32	0.40	0.32	0.40	0.00058	0.00073		
16			1.01	1.26	3.12	3.89			0.33	0.41	0.33	0.41	0.33	0.41	0.00058	0.00073		
17	16.8	29.3	9.65	16.88	0.88	1.54	0.62	1.09	0.55	0.96	0.55	0.96	0.55	0.96			0.00010	0.00018
18	0.30	0.79	0.36	0.97	0.016	0.042	0.012	0.031	0.0020	0.0053	0.0020	0.0053	0.0020	0.0053			2.0E-06	3.0E-06
19	0.19	0.82	0.047	0.21	0.0032	0.014	0.067	0.29	0.019	0.082	0.019	0.082	0.019	0.082			1.1E-05	4.7E-05
20					0.030	0.13												
TRCK									10.62	10.72	2.71	2.73	0.27	0.27				
YARD			0.14	0.18	0.44	0.55												
RAPPILE									0.79	1.41	0.37	0.67	0.057	0.10				
21									0.79	1.41	0.37	0.67	0.057	0.10				
22									0.65	1.42	0.29	0.63	0.044	0.096				
23									0.36	0.79	0.13	0.29	0.020	0.044				
24									0.36	0.79	0.13	0.29	0.020	0.044				
25									0.36	0.79	0.13	0.29	0.020	0.044				
26									0.36	0.79	0.13	0.29	0.020	0.044				
27									3.00	6.57	1.04	2.29	0.16	0.35				
28									0.36	0.79	0.13	0.29	0.020	0.044				
29									0.36	0.79	0.13	0.29	0.020	0.044				
30									0.36	0.79	0.13	0.29	0.020	0.044				
31									0.36	0.79	0.13	0.29	0.020	0.044				
32									0.36	0.79	0.13	0.29	0.020	0.044				
33									0.36	0.79	0.13	0.29	0.020	0.044				
34									0.79	1.41	0.37	0.67	0.057	0.10				

Unit No.	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
35									0.79	1.41	0.37	0.67	0.06	0.10				
36	3.17	6.94	2.20	4.82	0.12	0.26	0.15	0.32	0.18	0.39	0.18	0.39	0.18	0.39			2.4E-05	5.2E-05
37									0.40	0.71	0.19	0.33	0.028	0.051				
38									0.18	0.39	0.066	0.14	0.010	0.022				
39									1.50	3.29	0.52	1.14	0.079	0.17				
40									0.18	0.39	0.066	0.14	0.010	0.022				
41									0.18	0.39	0.066	0.14	0.010	0.022				
42									0.18	0.39	0.066	0.14	0.010	0.022				
43									0.18	0.39	0.066	0.14	0.010	0.022				
44									0.40	0.71	0.19	0.33	0.028	0.051				
45	0.88	1.92	0.62	1.35	0.046	0.10	0.028	0.061	0.049	0.11	0.049	0.11	0.049	0.11			4.0E-06	1.0E-06
Totals	43.29	67.30	66.91	91.77	26.58	33.95	24.07	30.79	44.97	64.11	21.51	30.44	12.15	16.22	0.022	0.027	0.0061	0.0078

[1] **Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but it is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

Table 2-F: Additional Emissions during Startup, Shutdown, and Routine Maintenance (SSM)

X This table is intentionally left blank since all emissions at this facility due to routine or predictable startup, shutdown, or scehduled maintenance are no higher than those listed in Table 2-E and a malfunction emission limit is not already permitted or requested. If you are required to report GHG emissions as described in Section 6a, include any GHG emissions during Startup, Shutdown, and/or Scheduled Maintenance (SSM) in Table 2-P. Provide an explanations of SSM emissions in Section 6 and 6a.

All applications for facilities that have emissions during routine our predictable startup, shutdown or scheduled maintenance (SSM)[1], including NOI applications, must include in this table the Maximum Emissions during routine or predictable startup, shutdown and scheduled maintenance (20.2.7 NMAC, 20.2.72.203.A.3 NMAC, 20.2.73.200.D.2 NMAC). In Section 6 and 6a, provide emissions calculations for all SSM emissions reported in this table. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (https://www.env.nm.gov/aqb/permit/aqb_pol.html) for more detailed instructions. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E-4).

Unit No.	NOx		CO		VOC		SOx		PM[2]		PM10[2]		PM2.5[2]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Totals																		

[1] **For instance**, if the short term steady-state Table 2-E emissions are 5 lb/hr and the SSM rate is 12 lb/hr, enter 7 lb/hr in this table. If the annual steady-state Table 2-E emissions are 21.9 TPY, and the number of scheduled SSM events result in annual emissions of 31.9 TPY, enter 10.0 TPY in the table below.

[2] **Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but it is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

Table 2-G: Stack Exit and Fugitive Emission Rates for Special Stacks

X I have elected to leave this table blank because this facility does not have any stacks/vents that split emissions from a single source or combine emissions from more than one source listed in table 2-A. Additionally, the emission rates of all stacks match the Requested allowable emission rates stated in Table 2-E.

Use this table to list stack emissions (requested allowable) from split and combined stacks. List Toxic Air Pollutants (TAPs) and Hazardous Air Pollutants (HAPs) in Table 2-I. List all fugitives that are associated with the normal, routine, and non-emergency operation of the facility. Unit and stack numbering must correspond throughout the application package. Refer to Table 2-E for instructions on use of the "-" symbol and on significant figures.

Stack No.	Serving Unit Number(s) from Table 2-A	NOx		CO		VOC		SOx		PM		PM10		PM2.5		□ H_2S or □ Lead	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Totals:																	

Table 2-H: Stack Exit Conditions

Unit and stack numbering must correspond throughout the application package. Include the stack exit conditions for each unit that emits from a stack, including blowdown venting parameters and tank emissions. If the facility has multiple operating scenarios, complete a separate Table 2-H for each scenario and, for each, type scenario name here:

Stack Number	Serving Unit Number(s) from Table 2-A	Orientation (H-Horizontal V=Vertical)	Rain Caps (Yes or No)	Height Above Ground (ft)	Temp. (F)	Flow Rate		Moisture by Volume (%)	Velocity (ft/sec)	Inside Diameter (ft)
						(acfs)	(dscfs)			
1	13	H	No	65	0 K	8.33		Trace	10.6	1.00
2	14	V	No	23.3	270	1277.28	551.72	21.7	92.42	4.195
3	17	V	No	13	854.78	137.80		Trace	175.45	1.00
4	18	V	No	13	800	17.45		Trace	8.54	1.6125
5	19	V	Yes	10	600	23.56		Trace	30	1.00
6	36	H	No	10	854.7	42.00		Trace	308.00	0.4167
7	45	H	No	10	900	17.45		Trace	200	0.3333

Table 2-I: Stack Exit and Fugitive Emission Rates for HAPs and TAPs

In the table below, report the Potential to Emit for each HAP from each regulated emission unit listed in Table 2-A, only if the entire facility emits the HAP at a rate greater than or equal to one (1) ton per year For each such emission unit, HAPs shall be reported to the nearest 0.1 tpy. Each facility-wide Individual HAP total and the facility-wide Total HAPs shall be the sum of all HAP sources calculated to the nearest 0.1 ton per year. Per 20.2.72.403.A.1 NMAC, facilities not exempt [see 20.2.72.402.C NMAC] from TAP permitting shall report each TAP that has an uncontrolled emission rate in excess of its pounds per hour screening level specified in 20.2.72.502 NMAC. TAPs shall be reported using one more significant figure than the number of significant figures shown in the pound per hour threshold corresponding to the substance. Use the HAP nomenclature as it appears in Section 112 (b) of the 1990 CAAA and the TAP nomenclature as it listed in 20.2.72.502 NMAC. Include tank-flashing emissions estimates of HAPs in this table. For each HAP or TAP listed, fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected or the pollutant is emitted in a quantity less than the threshold amounts described above.

Stack No.	Unit No.(s)	Total HAPs		Formaldehyde X HAP or □ TAP		Toluene X HAP or □ TAP		Asphalt Fumes □ HAP or X TAP		Provide Pollutant Name Here □ HAP or □ TAP		Provide Pollutant Name Here □ HAP or □ TAP		Provide Pollutant Name Here □ HAP or □ TAP		Provide Pollutant Name Here □ HAP or □ TAP		Provide Pollutant Name Here □ HAP or □ TAP	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
2	14	4.19	5.24	1.24	1.55	1.16	1.45	4.80	6.00										
	15							0.14	0.18										
	16							0.065	0.082										
3	17	0.073	0.0098																
4	18	0.0013	0.00018																
5	19	0.0014	0.0031																
6	36	0.017	0.0029																
7	45	0.0033	0.00055																
	20							0.00038	0.0017										
	YARD							0.0066	0.0083										
Totals:		4.29	5.26	1.24	1.55	1.16	1.45	5.01	6.27										

Table 2-J: Fuel

Specify fuel characteristics and usage. Unit and stack numbering must correspond throughout the application package.

Unit No.	Fuel Type (low sulfur Diesel, ultra low sulfur diesel, Natural Gas, Coal, …)	Fuel Source: purchased commercial, pipeline quality natural gas, residue gas, raw/field natural gas, process gas (e.g. SRU tail gas) or other	Specify Units				
			Lower Heating Value	Hourly Usage	Annual Usage	% Sulfur	% Ash
14	On-Spec Burner Fuel Oil	purchased commercial	141,000	600.0 gallons	1,500,000 gallons	0.5	
17	#2 Diesel	purchased commercial	128,000	87.4 gallons	305,900 gallons	0.05	
18	#2 Diesel	purchased commercial	128,000	1.6 gallons	8,576 gallons	0.05	
19	#2 Diesel	purchased commercial	128,000	9.4 gallons	82,344 gallons	0.05	
36	#2 Diesel	purchased commercial	128,000	20.7 gallons	90,666 gallons	0.05	
45	#2 Diesel	purchased commercial	128,000	3.9 gallons	17,082 gallons	0.05	

Table 2-K: Liquid Data for Tanks Listed in Table 2-L

For each tank, list the liquid(s) to be stored in each tank. If it is expected that a tank may store a variety of hydrocarbon liquids, enter "mixed hydrocarbons" in the Composition column for that tank and enter the corresponding data of the most volatile liquid to be stored in the tank. If tank is to be used for storage of different materials, list all the materials in the "All Calculations" attachment, run the newest version of TANKS on each, and use the material with the highest emission rate to determine maximum uncontrolled and requested allowable emissions rate. The permit will specify the most volatile category of liquids that may be stored in each tank. Include appropriate tank-flashing modeling input data. Use additional sheets if necessary. Unit and stack numbering must correspond throughout the application package.

Tank No.	SCC Code	Material Name	Composition	Liquid Density (lb/gal)	Vapor Molecular Weight (lb/lb*mol)	Average Storage Conditions		Max Storage Conditions	
						Temperature (°F)	True Vapor Pressure (psia)	Temperature (°F)	True Vapor Pressure (psia)
T1	3-05-002-12	Hot Oil Asphalt Cement	Hot Oil Asphalt Cement	9.22	105	350	0.0347	350	0.0347
T2	3-05-002-12	Hot Oil Asphalt Cement	Hot Oil Asphalt Cement	9.22	105	350	0.0347	350	0.0347
T3	3-05-002-98	Burner Fuel Oil	Burner Fuel Oil	7.88	130	58.54	0.0062	65.66	0.0079
T4	3-05-002-98	Burner Fuel Oil	Burner Fuel Oil	7.88	130	58.54	0.0062	65.66	0.0079
T5	3-05-002-98	Diesel Fuel	Diesel Fuel	7.05	130	58.54	0.0062	65.66	0.0079

Table 2-L: Tank Data

Include appropriate tank-flashing modeling input data. Use an addendum to this table for unlisted data categories. Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary. See reference Table 2-L2. Note: 1.00 bbl = 10.159 M3 = 42.0 gal

Tank No.	Date Installed	Materials Stored	Seal Type (refer to Table 2-LR below)	Roof Type (refer to Table 2-LR below)	Capacity		Diameter (M)	Vapor Space (M)	Color (from Table VI-C)		Paint Condition (from Table VI-C)	Annual Throughput (gal/yr)	Turn-overs (per year)
					(bbl)	(M^3)			Roof	Shell			
T1	2018	Hot Oil Asphalt Cement	NA	FX	714.29	113.55	3.66	2.42	OT (Yellow)	OT (Yellow)	Good	6,507,600	216.90
T2	2018	Hot Oil Asphalt Cement	NA	FX	714.29	113.55	3.66	2.42	OT (Yellow)	OT (Yellow)	Good	6,507,600	216.90
T3	2018	Burner Fuel Oil	NA	FX	238.10	37.85	2.44	1.95	OT (Yellow)	OT (Yellow)	Good	909,091	90.90
T4	2018	Burner Fuel Oil	NA	FX	154.76	24.60	2.44	1.95	OT (Yellow)	OT (Yellow)	Good	590,909	90.90
T5	2018	Diesel Fuel	NA	FX	238.10	37.85	2.44	1.95	OT (Yellow)	OT (Yellow)	Good	504,568	50.46

Table 2-L2: Liquid Storage Tank Data Codes Reference Table

Roof Type	Seal Type, Welded Tank Seal Type		Seal Type, Riveted Tank Seal Type		Roof, Shell Color	Paint Condition
FX: Fixed Roof	**Mechanical Shoe Seal**	**Liquid-mounted resilient seal**	**Vapor-mounted resilient seal**	**Seal Type**	**WH**: White	Good
IF: Internal Floating Roof	**A**: Primary only	**A**: Primary only	**A**: Primary only	**A**: Mechanical shoe, primary only	**AS**: Aluminum (specular)	Poor
EF: External Floating Roof	**B**: Shoe-mounted secondary	**B**: Weather shield	**B**: Weather shield	**B**: Shoe-mounted secondary	**AD**: Aluminum (diffuse)	
P: Pressure	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**LG**: Light Gray	
					MG: Medium Gray	
					BL: Black	
					OT: Other (specify)	

Note: 1.00 bbl = 0.159 M^3 = 42.0 gal

Table 2-M: Materials Processed and Produced (Use additional sheets as necessary.)

Material Processed				Material Produced			
Description	**Chemical Composition**	**Phase (Gas, Liquid, or Solid)**	**Quantity (specify units)**	**Description**	**Chemical Composition**	**Phase**	**Quantity (specify units)**
Aggregate	Aggregate	Solid	210-370 TPH	Asphalt	Aggregate, RAP, Mineral Filler, Asphalt Cement	Solid	400 TPH
RAP	Recycled Asphalt Products	Solid	0-160 TPH				
Mineral Filler	Rock dust, Slag dust, Hydrated lime, Cement, Versabind, and/or Loess	Solid	6 TPH				
Asphalt Cement	Asphalt Cement	Heated Liquid	24 TPH				

Table 2-N: CEM Equipment

Enter Continuous Emissions Measurement (CEM) Data in this table. If CEM data will be used as part of a federally enforceable permit condition, or used to satisfy the requirements of a state or federal regulation, include a copy of the CEM's manufacturer specification sheet in the Information Used to Determine Emissions attachment. Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary.

Stack No.	Pollutant(s)	Manufacturer	Model No.	Serial No.	Sample Frequency	Averaging Time	Range	Sensitivity	Accuracy
NA									

Table 2-O: Parametric Emissions Measurement Equipment

Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary.

Unit No.	Parameter/Pollutant Measured	Location of Measurement	Unit of Measure	Acceptable Range	Frequency of Maintenance	Nature of Maintenance	Method of Recording	Averaging Time
13	Differential Pressure	Baghouse inlet and outlet	inches of water	1 - 3 inches	Annual	Calibrate	Datalogger	1 min
14	Differential Pressure	Baghouse inlet and outlet	inches of water	2 - 6 inches	Annual	Calibrate	Datalogger	1 min

Table 2-P: Greenhouse Gas Emissions

Applications submitted under 20.2.70, 20.2.72, & 20.2.74 NMAC are required to complete this Table. Power plants, Title V major sources, and PSD major sources must report and calculate all GHG emissions for each unit. Applicants must report potential emission rates in short tons per year (see Section 6.a for assistance). Include GHG emissions during Startup, Shutdown, and Scheduled Maintenance in this table. For minor source facilities that are not power plants, are not Title V, or are not PSD, there are three options for reporting GHGs 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHG as a second separate unit; OR 3) check the following box ☐ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

		CO_2 ton/yr	N_2O ton/yr	CH_4 ton/yr	SF_6 ton/yr	PFC/HFC ton/yr[2]									**Total GHG** Mass Basis ton/yr[4]	**Total CO_2e** ton/yr[5]
Unit No.	**GWPs** [1]	**1**	**298**	**25**	**22,800**	**footnote 3**										
14	**mass GHG**	16500													16500	
	CO_2e	16500														16500
17	**mass GHG**	3371													3371	
	CO_2e	3371														3371
18	**mass GHG**	124													124	
	CO_2e	124														124
19	**mass GHG**	857													857	
	CO_2e	857														857
36	**mass GHG**	1045													1045	
	CO_2e	1045														1045
45	**mass GHG**	189													189	
	CO_2e	189														189
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
Total	**mass GHG**	22086													22086	
	CO_2e	22086														22086

[1] **GWP** (Global Warming Potential): Applicants must use the most current GWPs codified in Table A-1 of 40 CFR part 98. GWPs are subject to change, therefore, applicants need to check 40 CFR 98 to confirm GWP values.

[2] For **HFCs** or **PFCs** describe the specific HFC or PFC compound and use a separate column for each individual compound.

[3] For each new compound, enter the appropriate GWP for each HFC or PFC compound from Table A-1 in 40 CFR 98.

[4] Green house gas emissions on a **mass basis** is the ton per year green house gas emission before adjustment with its GWP.

[5] **CO_2e** means Carbon Dioxide Equivalent and is calculated by multiplying the TPY mass emissions of the green house gas by its GWP.

Section 3

Application Summary

The **Application Summary** shall include a brief description of the facility and its process, the type of permit application, the applicable regulation (i.e. 20.2.72.200.A.X, or 20.2.73 NMAC) under which the application is being submitted, and any air quality permit numbers associated with this site. If this facility is to be collocated with another facility, provide details of the other facility including permit number(s). In case of a revision or modification to a facility, provide the lowest level regulatory citation (i.e. 20.2.72.219.B.1.d NMAC) under which the revision or modification is being requested. Also describe the proposed changes from the original permit, how the proposed modification will affect the facility's operations and emissions, de-bottlenecking impacts, and changes to the facility's major/minor status (both PSD & Title V).

The **Process Summary** shall include a brief description of the facility and its processes.

Startup, Shutdown, and Maintenance (SSM) routine or predictable emissions: Provide an overview of how SSM emissions are accounted for in this application. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on SSM emissions.

Mountain States Constructors, Inc. (MSCI) is applying for a new 20.2.72 NMAC air quality permit for a 400 ton per hour (TPH) recycled asphalt products (RAP) crushing and screening plant, 200 TPH RAP scalping screen, 400 TPH hot mix asphalt plant to be operated within county of Torrance, state of New Mexico. Regulation governing this permit application is 20.2.72.200.A(1) NMAC.

MSCI has retained Montrose Environmental Solutions, LLC (Montrose) to assist with the permit application. The plant will be identified as MSCI HMA #3 and will be located at the Davis Pit near Moriarty, NM, 87035. While facility-wide "potential" emission rates are greater than 100 tons per year for a single pollutant potentially making it a major source; with the proposed emission controls the facility emission rates will be below 100 tons per year and will be permitted as a "synthetic minor source".

HMA Plant

The 400 tph hot mix asphalt plant will include; aggregate/RAP storage piles, a 5-bin cold aggregate feeder, scalping screen, pug mill, mineral filler silo with screw conveyor and baghouse, drum dryer/mixer with baghouse, incline conveyor, asphalt silo, asphalt heater, six (6) transfer conveyors, Evotherm storage tank, and two (2) asphalt cement storage tanks. Evotherm promotes adhesion by acting as both a liquid antistrip and a warm mix asphalt (WMA). Evotherm is an easy-to-handle, pumpable liquid that contains no regulated HAPs or TAPs components. Evotherm and mineral filler will not be used in the mix concurrently. The plant will be powered by a 1250 kW (1675 hp) generator. A 30 kW (40.2 hp) standby (night) generator will provide electricity during periods the main generator is off. Processed asphalt will be transported from the HMA plant to off-site sales. The HMA plant will limit processing rates to 400 tph, 4,800 tons per day, and 1,000,000 tpy. The hours of operation are presented below in Table 3-1. Daily production rates are presented below in Table 3-3.

RAP Crushing and Screening Plant

The 400 tph RAP crushing and screening plant will include a feeder, vertical impact crusher, screen, ten (10) transfer conveyors, and stacker conveyors. The plant will be powered by a 415 horsepower (hp) engine. Processed RAP will be transported to the HMA plant and/or off-site sales. The RAP crushing and screening plant will limit hourly processing rate to 400 tph, 5,800 tons per day, and 1,752,000 tpy. Aggregate processing hours will be limited to daylight hours only. The hours of operation are presented below in Table 3-2. Daily production rates are presented below in Table 3-3.

RAP Scalping Screen (Fold-N-Go) Plant

The 200 tph RAP scalping screen plant will include a scalping screen and five (5) conveyors and stacker conveyor. The plant will be powered by a 75 horsepower (hp) engine. RAP material will be screened prior to input into the HMA plant. The RAP scalping screen plant will limit hourly processing rate to 200 tph, 2,900 tons per day, and 876,000 tpy. Aggregate processing hours will be limited to daylight hours only. The hours of operation are presented below in Table 3-2. Daily production rates are presented below in Table 3-3.

TABLE 3-1: HMA Production Hours of Operation (MST)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
1:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
2:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
3:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
4:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
5:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
6:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
7:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
8:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 PM	0.5	1	1	1	1	1	1	1	1	1	1	0
6:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
7:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
8:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
9:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
10:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
11:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
Total	10.5	24	24	24	24	24	24	24	24	24	24	10

TABLE 3-2: RAP Plants Production Hours of Operation (MST)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	1	1	1	1	1	0.5	0	0	0
6:00 AM	0	0.5	1	1	1	1	1	1	1	1	0.5	0
7:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
8:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 PM	0.5	1	1	1	1	1	1	1	1	1	0	0
6:00 PM	0	0	0	1	1	1	1	1	0.5	0	0	0
7:00 PM	0	0	0	0	0	0.5	0.5	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	**10.5**	**11.5**	**12**	**14**	**14**	**14.5**	**14.5**	**14**	**13**	**12**	**10.5**	**10**

TABLE 3-3: HMA and RAP Plants Daily Throughput

Month	HMA Tons Per Day	RAP Plant Tons Per Day	Fold-N-Go Screen Tons Per Day
January	4000	4000	2000
February	4800	4600	2300
March	4800	4800	2400
April	4800	5600	2800
May	4800	5600	2800
June	4800	5800	2900
July	4800	5800	2900
August	4800	5600	2800
September	4800	5200	2600
October	4800	4800	2400
November	4800	4200	2100
December	4000	4000	2000

Nighttime operations for the HMA plant will follow the guidelines issued by the department "Air Quality Permitting Guidelines for Night Operations of Crushing and Screening Plants, Hot Mix Asphalt Plants, and Concrete Batch Plants" (Ver.08/14/06). Nighttime conditions acceptable to Mountain States Constructors, Inc. include:

Construction and Operation
The permittee shall install data logger(s) capable of continuously recording differential pressure measured by magnahelic gauges or equivalent differential pressure gauges installed on the Drum Dryer/Mixer Baghouse (Unit 14, Control Unit C5).

Monitoring
The permittee shall, during nighttime loading of the Mineral Filler Silo (Unit 13, Control Unit C4), monitor the differential pressure across the Mineral Filler Silo Baghouse by the use of a differential pressure gauge to ensure it is within the manufacturers or facility determined specified operating range. One reading shall be taken during the silo loading operation.

The permittee shall, during nighttime operation of the plant continuously monitor and record the differential pressure across the Drum Dryer/Mixer Baghouse (Unit 14, Control Unit C5) by the use of a differential pressure gauge with a data recording system to ensure it is within the manufacturers or facility determined specified operating range.

The permittee shall, during nighttime operating hours, ensure fugitive dust control systems are functioning correctly for Units 2, 3, 4, 5, 6, 7, 9, 10, 11, and 12 per {CONDITION X}.

Recordkeeping
During night operation the permittee shall record, by the use of a data logger, a continuous record of the differential pressure across Drum Dryer/Mixer Baghouse (Unit 14, Control Unit C5).

During silo loading of the Mineral Filler Silo (Unit 13, Control Unit C4), the differential pressure shall be recorded once.

Routine or predictable emissions during Startup, Shutdown, and Maintenance (SSM)

No SSM emissions are predicted for this permit application. All control systems will be operational prior to the start or shutdown of asphalt production or aggregate processing. Maintenance will be performed during period with no production.

Section 4

Process Flow Sheet

A **process flow sheet** and/or block diagram indicating the individual equipment, all emission points and types of control applied to those points. The unit numbering system should be consistent throughout this application.

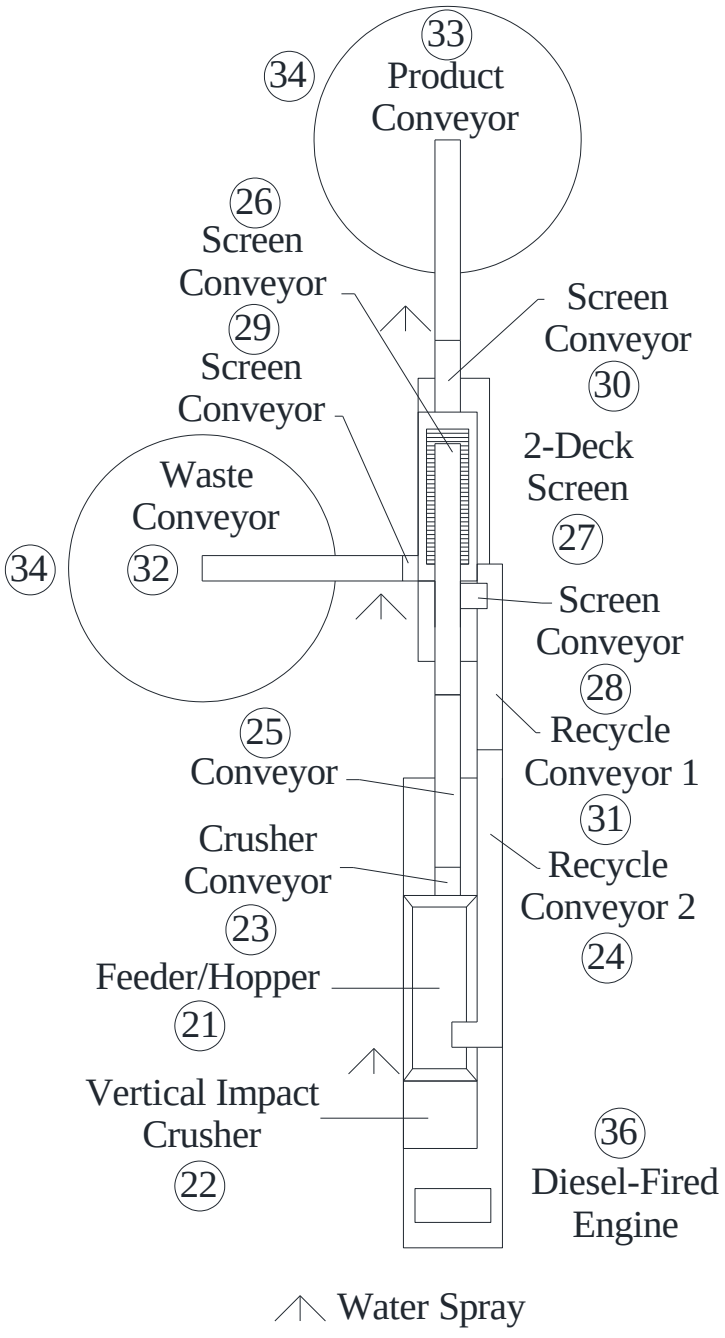


Figure 4-1: Process Flow – RAP Crushing and Screening Plant

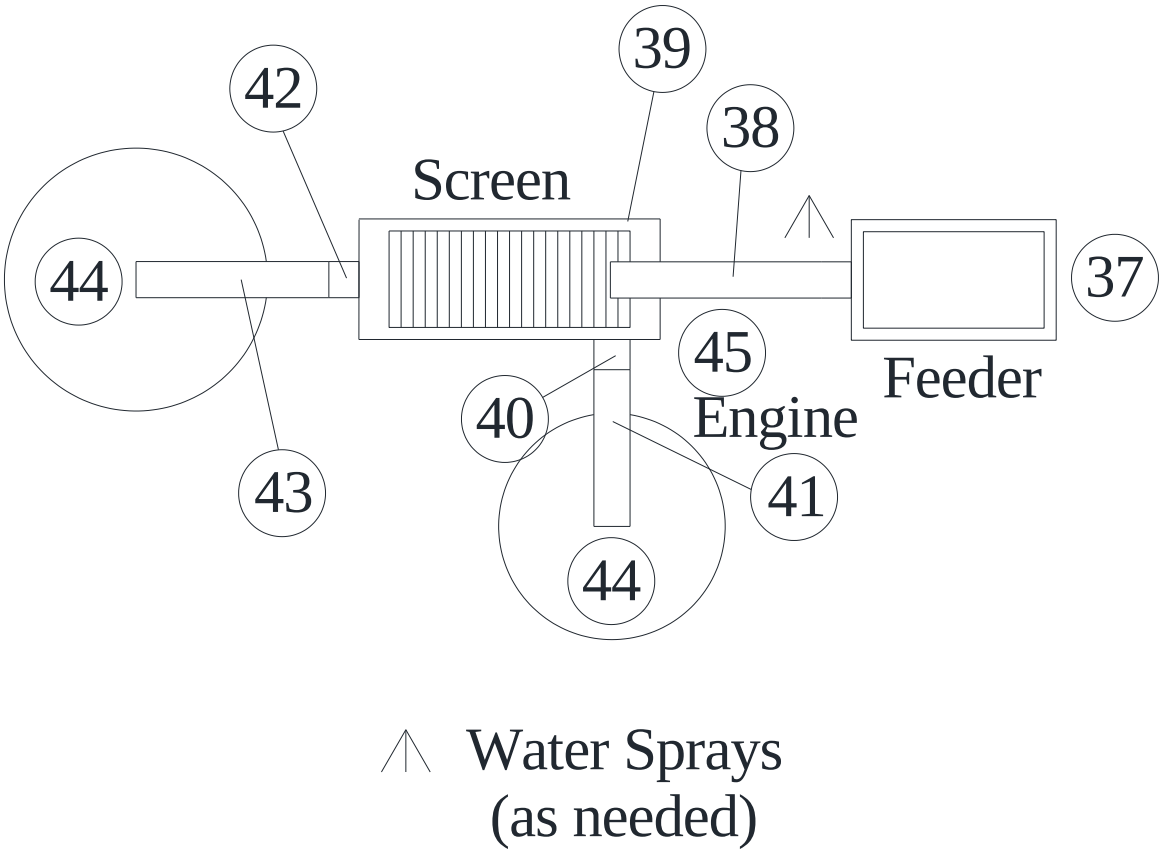


Figure 4-2: Process Flow – RAP Scalping Screen (Fold-N-Go) Plant

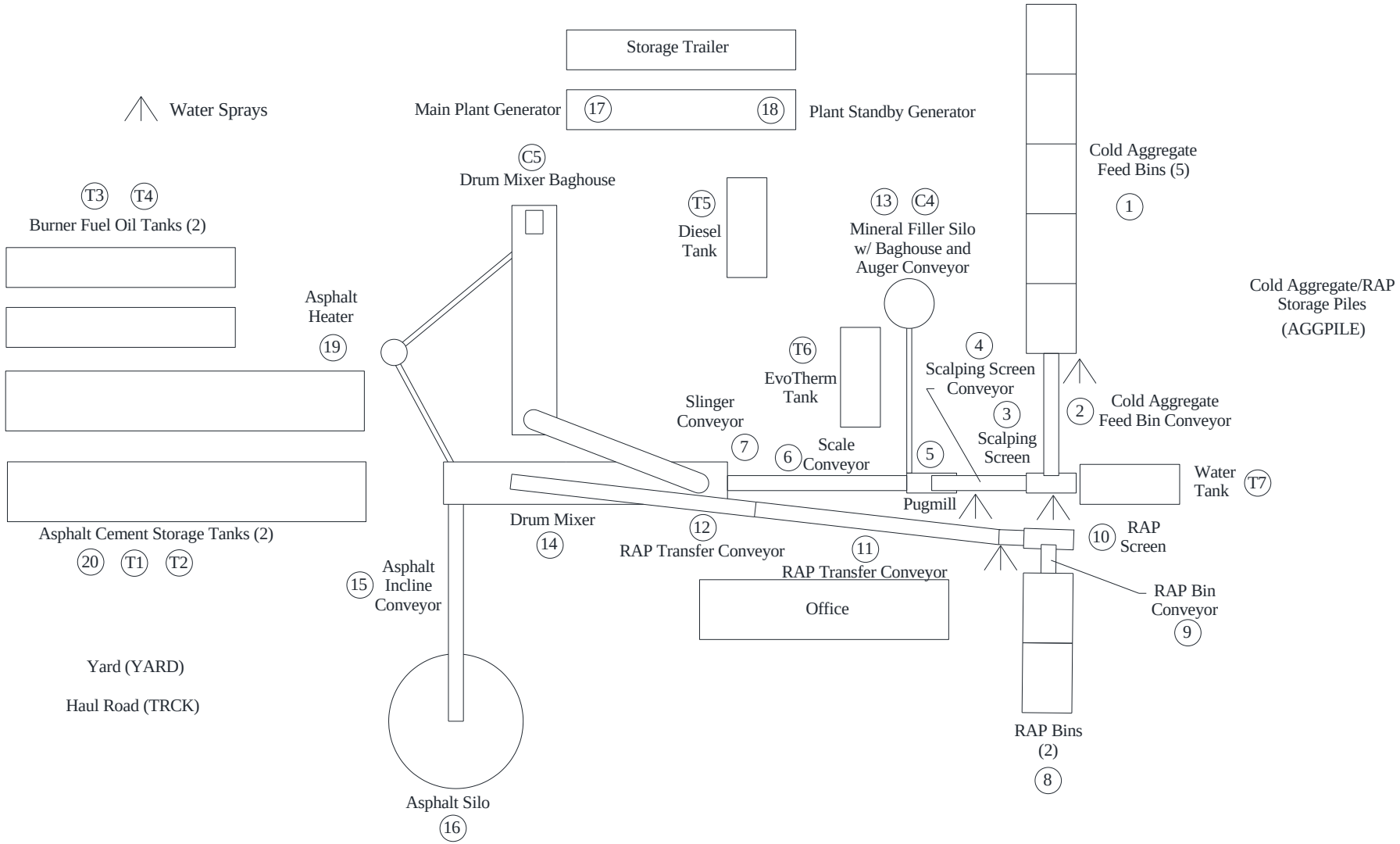


Figure 4-3: Process Flow – HMA Plant

Section 5

Plot Plan Drawn To Scale

A **plot plan drawn to scale** showing emissions points, roads, structures, tanks, and fences of property owned, leased, or under direct control of the applicant. This plot plan must clearly designate the restricted area as defined in UA1, Section 1-D.12. The unit numbering system should be consistent throughout this application.

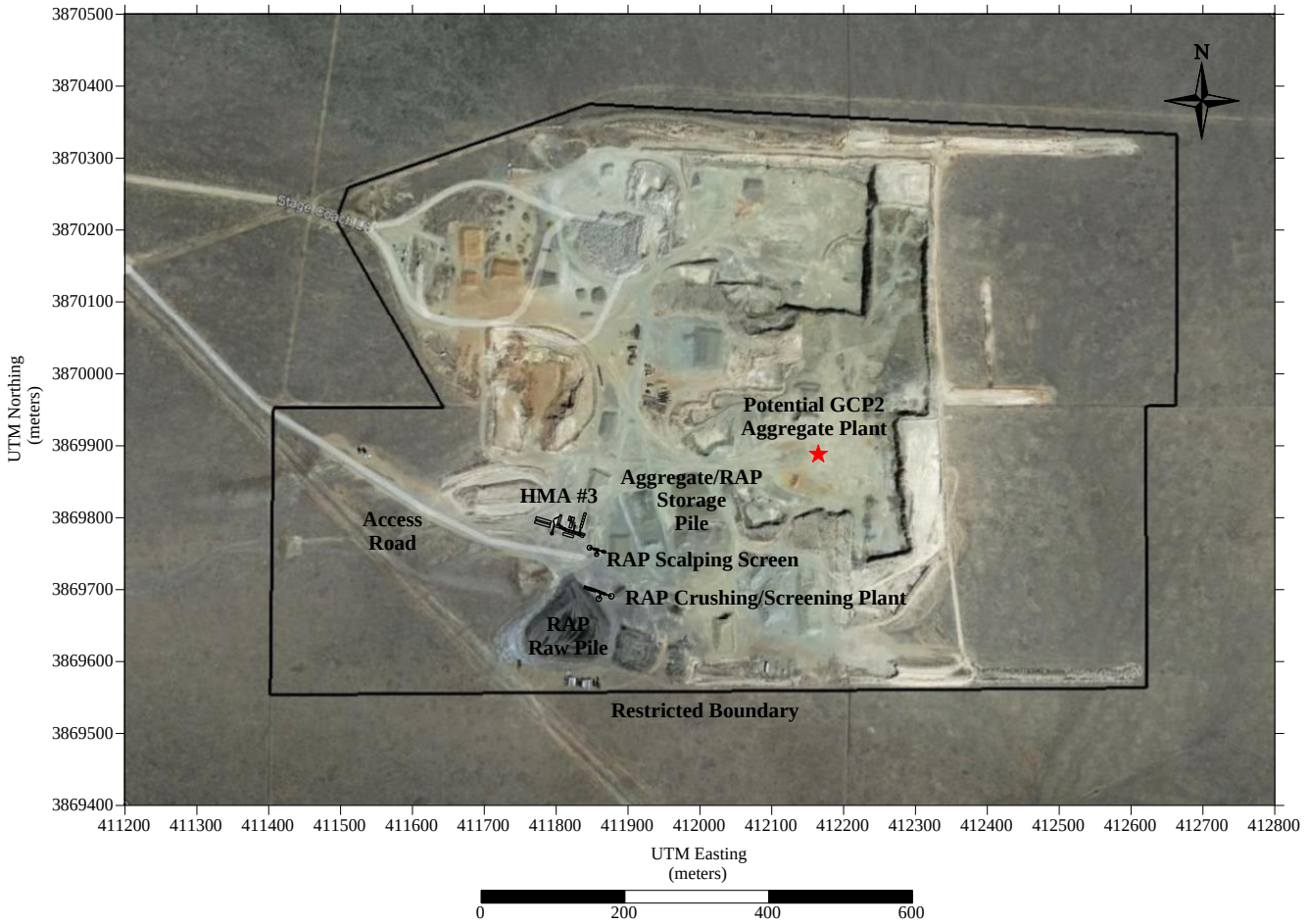


Figure 5-1: MSCI HMA #3 Site Layout

Section 6

All Calculations

Show all calculations used to determine both the hourly and annual controlled and uncontrolled emission rates. All calculations shall be performed keeping a minimum of three significant figures. Document the source of each emission factor used (if an emission rate is carried forward and not revised, then a statement to that effect is required). If identical units are being permitted and will be subject to the same operating conditions, submit calculations for only one unit and a note specifying what other units to which the calculations apply. All formulas and calculations used to calculate emissions must be submitted. The "Calculations" tab in the UA2 has been provided to allow calculations to be linked to the emissions tables. Add additional "Calc" tabs as needed. If the UA2 or other spread sheets are used, all calculation spread sheet(s) shall be submitted electronically in Microsoft Excel compatible format so that formulas and input values can be checked. Format all spread sheets and calculations such that the reviewer can follow the logic and verify the input values. Define all variables. If calculation spread sheets are not used, provide the original formulas with defined variables. Additionally, provide subsequent formulas showing the input values for each variable in the formula. All calculations, including those calculations are imbedded in the Calc tab of the UA2 portion of the application, the printed Calc tab(s), should be submitted under this section.

Tank Flashing Calculations: The information provided to the AQB shall include a discussion of the method used to estimate tank-flashing emissions, relative thresholds (i.e., NOI, permit, or major source (NSPS, PSD or Title V)), accuracy of the model, the input and output from simulation models and software, all calculations, documentation of any assumptions used, descriptions of sampling methods and conditions, copies of any lab sample analysis. If Hysis is used, all relevant input parameters shall be reported, including separator pressure, gas throughput, and all other relevant parameters necessary for flashing calculation.

SSM Calculations: It is the applicant's responsibility to provide an estimate of SSM emissions or to provide justification for not doing so. In this Section, provide emissions calculations for Startup, Shutdown, and Routine Maintenance (SSM) emissions listed in the Section 2 SSM and/or Section 22 GHG Tables and the rational for why the others are reported as zero (or left blank in the SSM/GHG Tables). Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on calculating SSM emissions. If SSM emissions are greater than those reported in the Section 2, Requested Allowables Table, modeling may be required to ensure compliance with the standards whether the application is NSR or Title V. Refer to the Modeling Section of this application for more guidance on modeling requirements.

Glycol Dehydrator Calculations: The information provided to the AQB shall include the manufacturer's maximum design recirculation rate for the glycol pump. If GRI-Glycalc is used, the full input summary report shall be included as well as a copy of the gas analysis that was used.

Road Calculations: Calculate fugitive particulate emissions and enter haul road fugitives in Tables 2-A, 2-D and 2-E for:

1. If you transport raw material, process material and/or product into or out of or within the facility and have PER emissions greater than 0.5 tpy.
2. If you transport raw material, process material and/or product into or out of the facility more frequently than one round trip per day.

Significant Figures:

A. All emissions standards are deemed to have at least two significant figures, but not more than three significant figures.

B. At least 5 significant figures shall be retained in all intermediate calculations.

C. In calculating emissions to determine compliance with an emission standard, the following rounding off procedures shall be used:

(1) If the first digit to be discarded is less than the number 5, the last digit retained shall not be changed;

(2) If the first digit discarded is greater than the number 5, or if it is the number 5 followed by at least one digit other than the number zero, the last figure retained shall be increased by one unit; **and**

(3) If the first digit discarded is exactly the number 5, followed only by zeros, the last digit retained shall be rounded upward if it is an odd number, but no adjustment shall be made if it is an even number.

(4) The final result of the calculation shall be expressed in the units of the standard.

Control Devices: In accordance with 20.2.72.203.A(3) and (8) NMAC, 20.2.70.300.D(5)(b) and (e) NMAC, and 20.2.73.200.B(7) NMAC, the permittee shall report all control devices and list each pollutant controlled by the control device regardless if the applicant takes credit for the reduction in emissions. The applicant can indicate in this section of the

application if they chose to not take credit for the reduction in emission rates. For notices of intent submitted under 20.2.73 NMAC, only uncontrolled emission rates can be considered to determine applicability unless the state or federal Acts require the control. This information is necessary to determine if federally enforceable conditions are necessary for the control device, and/or if the control device produces its own regulated pollutants or increases emission rates of other pollutants.

RAP Crushing/Screening Plant and RAP Scalping Screen Plant

Pre-Control Particulate Emission Rates

Material Handling ($PM_{2.5}$, PM_{10}, and PM)

To estimate material handling pre-control particulate emissions rates for crushing, screening, and conveyor transfer operations, emission factors were obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Aug. 2004, Section 11.19.2, Table 11.19.2-2. To determine missing $PM_{2.5}$ emission factors the ratio of 0.35/0.053 from $PM_{10}/PM_{2.5}$ *k* factors found in AP-42 Section 13.2.4 (11/2006) were used.

To estimate material handling particulate emission rates for aggregate handling operations (aggregate and RAP storage piles/ loading feed bins), an emission equation was obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, Section 13.2.4 (11/2004), where the k (TSP = 0.74, PM_{10} = 0.35, $PM_{2.5}$ = 0.053), wind speed for determining the maximum hourly emission rate is the NMED default of 11 MPH and for determining the annual emission rate is based on the average wind speed for Moriarty, found on the internet, of 9.4 mph (see Section 7) and the NMED default moisture content of 2 percent.

Uncontrolled annual emissions for tons per year (tpy) were calculated assuming daylight operation for 4380 hours per year. This limit is based on the natural limitation of daylight hours for the safety of MSCI personnel operating the RAP plants.

Aggregate Material Handling – Storage Piles, and Feed Bin Loading Emission Equation:

Maximum Hour Emission Factor

E (lbs/ton) = k x 0.0032 x $(U/5)^{1.3}$ / $(M/2)^{1.4}$

E_{PM} (lbs/ton) = 0.74 x 0.0032 x $(11/5)^{1.3}$ / $(2/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(11/5)^{1.3}$ / $(2/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.053 x 0.0032 x $(11/5)^{1.3}$ / $(2/2)^{1.4}$

E_{PM} (lbs/ton) = 0.00660 lbs/ton;

E_{PM10} (lbs/ton) = 0.00312 lbs/ton

$E_{PM2.5}$ (lbs/ton) = 0.00047 lbs/ton

Annual Emission Factor

E (lbs/ton) = k x 0.0032 x $(U/5)^{1.3}$ / $(M/2)^{1.4}$

E_{PM} (lbs/ton) = 0.74 x 0.0032 x $(9.4/5)^{1.3}$ / $(2/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(9.4/5)^{1.3}$ / $(2/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.053 x 0.0032 x $(9.4/5)^{1.3}$ / $(2/2)^{1.4}$

E_{PM} (lbs/ton) = 0.00538 lbs/ton;

E_{PM10} (lbs/ton) = 0.00254 lbs/ton

$E_{PM2.5}$ (lbs/ton) = 0.00039 lbs/ton

AP-42 Section 11.19.2 Table 11.19.2-2 Emission Factors:

All Bin Unloading and Conveyor Transfers = Uncontrolled Conveyor Transfer Point Emission Factor
Crushing = Uncontrolled Tertiary Crushing Emission Factor
Screening = Uncontrolled Screening Emission Factor

Material Handling Emission Factors:

Process Unit	PM Emission Factor (lbs/ton)	PM_{10} Emission Factor (lbs/ton)	$PM_{2.5}$ Emission Factor (lbs/ton)
Uncontrolled Tertiary Crushing	0.00540	0.00240	0.00036
Uncontrolled Screening	0.02500	0.00870	0.00130
Feed Bin Unloading, and Conveyor Transfers	0.00300	0.00110	0.00017
Uncontrolled Hourly RAP Storage Piles, RAP Feeder Loading	0.00660	0.00312	0.00047
Uncontrolled Annual RAP Storage Piles, RAP Feeder Loading	0.00538	0.00254	0.00039

These emission factors are reduced further to account for the inherent properties of RAP with a coating of asphalt which captures small particles within the material. Based on EPA documents "EIIP – Preferred and Alternative Methods for Estimating Air Emissions from Hot-Mix-Asphalt Plants, Final Report, July 1996, Table 3.2-1 Fugitive Dust – Crushed RAP material" the inherent typical efficiency of the material is 70% (see Section 7). The above emission factors are multiplied by 0.3 and are summarized below.

RAP Handling Emission Factors:

Process Unit	PM Emission Factor (lbs/ton)	PM_{10} Emission Factor (lbs/ton)	$PM_{2.5}$ Emission Factor (lbs/ton)
Uncontrolled Tertiary Crushing	0.00162	0.00072	0.00011
Uncontrolled Screening	0.00750	0.00261	0.00040
Feed Bin Unloading, and Conveyor Transfers	0.00090	0.00033	0.00005
Uncontrolled Hourly RAP Storage Piles, RAP Feeder Loading	0.00198	0.00094	0.00014
Uncontrolled Annual RAP Storage Piles, RAP Feeder Loading	0.00161	0.00076	0.00012

The following equation was used to calculate the hourly emission rate for each process unit:

Emission Rate (lbs/hour) = Process Rate (tons/hour) * Emission Factor (lbs/ton)

The following equation was used to calculate the annual emission rate for each process unit:

$$\text{Emission Rate (tons/year)} = \frac{\text{Emission Rate (lbs/hour)} * \text{Operating Hour (hrs/year)}}{\text{2000 lbs/ton}}$$

Table 6-1 Pre-Controlled Regulated Process Equipment Emission Rates

Unit #	Process Unit Description	Process Rate (tph)	PM Emission Rate (lbs/hr)	PM Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
21	RAP Feeder/Hopper	400	0.79	1.41	0.37	0.67	0.057	0.10
22	RAP Vertical Impact Crusher	400	0.65	1.42	0.29	0.63	0.044	0.096
23	RAP Crusher Conveyor	400	0.36	0.79	0.13	0.29	0.020	0.044
24	RAP Recycle Conveyor #2	400	0.36	0.79	0.13	0.29	0.020	0.044
25	RAP Conveyor	400	0.36	0.79	0.13	0.29	0.020	0.044
26	RAP Screen Conveyor	400	0.36	0.79	0.13	0.29	0.020	0.044
27	RAP 2-Deck Screen	400	3.00	6.57	1.04	2.29	0.16	0.35
28	RAP Screen Conveyor	400	0.36	0.79	0.13	0.29	0.020	0.044
29	RAP Screen Conveyor	400	0.36	0.79	0.13	0.29	0.020	0.044
30	RAP Screen Conveyor	400	0.36	0.79	0.13	0.29	0.020	0.044
31	RAP Recycle Conveyor #1	400	0.36	0.79	0.13	0.29	0.020	0.044
32	RAP Waste Conveyor	400	0.36	0.79	0.13	0.29	0.020	0.044
33	RAP Product Conveyor	400	0.36	0.79	0.13	0.29	0.020	0.044
34	RAP Stacker Conveyor Drop to Pile	400	0.79	1.41	0.37	0.67	0.057	0.10
37	Fold-N-Go Plant Feeder	200	0.40	0.71	0.19	0.33	0.028	0.051
38	Fold-N-Go Plant Feeder Conveyor	200	0.18	0.39	0.066	0.14	0.010	0.022
39	Fold-N-Go Plant Screen	200	1.50	3.29	0.52	1.14	0.079	0.17
40	Fold-N-Go Plant Screen Conveyor	200	0.18	0.39	0.066	0.14	0.010	0.022
41	Fold-N-Go Plant Stacker Conveyor	200	0.18	0.39	0.066	0.14	0.010	0.022
42	Fold-N-Go Plant Screen Conveyor	200	0.18	0.39	0.066	0.14	0.010	0.022
43	Fold-N-Go Plant Stacker Conveyor	200	0.18	0.39	0.066	0.14	0.010	0.022
44	Fold-N-Go Plant Stacker Conveyor Drop to Pile	200	0.40	0.71	0.19	0.33	0.028	0.051
		TOTALS	**12.02**	**25.37**	**4.63**	**9.68**	**0.70**	**1.47**

Table 6-2 Pre-Controlled Material Handling Fugitive Emission Rates

Emission Unit #	Process Unit Description	Process Rate (tph)	PM Emission Rate (lbs/hr)	PM Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
RAPPILE	RAP Raw Material Source	400	0.79	1.41	0.37	0.67	0.057	0.10
35	RAP Product Storage Pile	400	0.79	1.41	0.37	0.67	0.057	0.10
		TOTALS	**1.58**	**2.83**	**0.75**	**1.34**	**0.11**	**0.20**

Controlled Particulate Emission Rates

No controls or emission reductions for particulate matter are proposed for Unit RAPPILE, Units 21 – 35, and Units 37 - 44. No controls or emission reductions for combustion pollutants are proposed for the Units 36 and 45.

Estimates for 415 hp RAP Crushing and Screening Plant Diesel-Fired Engine (NO_X, CO, SO_2, VOC, PM, and CO_2)

A 415 horsepower (hp), 310 kilowatt (kW) engine (Unit 36) provides power to the RAP crushing and screening plant. Emission rates for NO_X, CO, PM and NMHC are based on Manufacturer emission factors (See Section 7). Sulfur dioxide (SO_2) emissions are estimated based on sulfur content of diesel fuel, not to exceed 0.05% fuel content and a fuel usage rate of 20.7 gal/hr. CO_2 emission rates are found in AP-42 Section 3.3. Uncontrolled annual emissions in tons per year (tpy) were calculated assuming daylight operation of 4380 hours per year.

Manufacturer:

Pollutant	Emission Factor (lbs/hr)
Nitrogen Oxide	3.17
Carbon Monoxides	2.20
Particulate	0.18
Hydrocarbons	0.12

Sulfur dioxide emission rate was calculated using the fuel consumption rate for this engine of 20.7 gallons per hour, a fuel density of 7.1 pounds per gallon, a fuel sulfur content of 500 PPM, and a sulfur to sulfur dioxide conversion factor of two (2). The following equation calculates the emission rate for sulfur dioxide (SO_2).

Emission Rate (lbs/hr) = Fuel (gal/hr) * Density lbs/gal * % Sulfur Content * Factor

$$\text{Emission Rate (lbs/hr)} = \frac{20.7 \text{ gallons}}{\text{hr}} \left| \frac{7.1 \text{ lbs}}{\text{gallon}} \right| \frac{0.0005 \text{ lbs Sulfur}}{\text{lbs of fuel}} \left| \frac{2 \text{ lbs Sulfur Dioxide}}{1 \text{ lb Sulfur}} \right.$$

Emission Rate (lbs/hr) = 0.15 lbs/hr

Carbon Dioxide emissions were estimated using AP-42 Table 3.3-1 emission factor of 1.15 lbs/hp-hr.

The following equation was used to calculate the annual emission rate for each engine pollutant:

$$\text{Emission Rate (tons/year)} = \frac{\text{Emission Rate (lbs/hour)} * \text{Operating Hour (hrs/year)}}{2000 \text{ lbs/ton}}$$

Table 6-5: Pre-Controlled Combustion Emission Rates

Process Unit Number	Pollutant	Engine Rating (hp)	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
36	NO_X	415	3.17	6.94
	CO	415	2.20	4.82
	SO_2	415	0.15	0.32
	VOC	415	0.12	0.26
	PM	415	0.18	0.39
	PM_{10}	415	0.18	0.39
	$PM_{2.5}$	415	0.18	0.39
	CO_2	415	477.3	1045.2

Estimates for 75 hp RAP Scalping Screen Plant Diesel-Fired Engine (NO_X, CO, SO_2, VOC, PM, and CO_2)

A 75 horsepower (hp), 55.9 kilowatt (kW) engine (Unit 45) provides power to the scalping screen plant. Emission rates for NO_X + NMHC, CO, PM and NMHC are based on EPA AP-42 Tier 2 emission factors. NO_X is 95% of NO_X + NMHC and NMHC is 5% of NO_X + NMHC. Sulfur dioxide (SO_2) emissions are estimated based on sulfur content of diesel fuel, not to exceed 0.05% fuel content and a fuel usage rate of 3.9 gal/hr. CO_2 emission rates are found in AP-42 Section 3.3. Uncontrolled annual emissions in tons per year (tpy) were calculated assuming daylight operation of 4380 hours per year.

EPA Tier 2:

Pollutant	Emission Factor (g/kW-hr)
Nitrogen Oxide + NMHC	7.50
Nitrogen Oxide	7.13
Carbon Monoxides	5.00
Particulate	0.40
Hydrocarbons	0.38

Sulfur dioxide emission rate was calculated using the fuel consumption rate for this engine of 3.9 gallons per hour, a fuel density of 7.1 pounds per gallon, a fuel sulfur content of 500 PPM, and a sulfur to sulfur dioxide conversion factor of two (2). The following equation calculates the emission rate for sulfur dioxide (SO_2).

Emission Rate (lbs/hr) = Fuel (gal/hr) * Density lbs/gal * % Sulfur Content * Factor

$$\text{Emission Rate (lbs/hr)} = \frac{3.9 \text{ gallons}}{\text{hr}} \left| \frac{7.1 \text{ lbs}}{\text{gallon}} \right| \frac{0.0005 \text{ lbs Sulfur}}{\text{lbs of fuel}} \left| \frac{2 \text{ lbs Sulfur Dioxide}}{1 \text{ lb Sulfur}} \right.$$

Emission Rate (lbs/hr) = 0.0028 lbs/hr

Carbon Dioxide emissions were estimated using AP-42 Table 3.3-1 emission factor of 1.15 lbs/hp-hr.

The following equation was used to calculate the annual emission rate for each engine pollutant:

$$\text{Emission Rate (tons/year)} = \frac{\text{Emission Rate (lbs/hour)} * \text{Operating Hour (hrs/year)}}{2000 \text{ lbs/ton}}$$

Table 6-7: Pre-Controlled Combustion Emission Rates

Process Unit Number	Pollutant	Engine Rating (hp)	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
45	NO_X	75	0.88	1.92
	CO	75	0.62	1.35
	SO_2	75	0.028	0.061
	VOC	75	0.046	0.10
	PM	75	0.049	0.11
	PM_{10}	75	0.049	0.11
	$PM_{2.5}$	75	0.049	0.11
	CO_2	75	86.25	188.89

Table 6-9 Summary of Uncontrolled NOx, CO, SO2, VOC, and PM Emission Rates – RAP Plants

Uncontrolled Emission Totals															
		NOx		CO		SO_2		VOC		PM		PM_{10}		$PM_{2.5}$	
Unit #	Description	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
RAPPILE	RAP Raw Material Source	-	-	-	-	-	-	-	-	0.79	1.41	0.37	0.67	0.057	0.10
21	RAP Feeder/Hopper	-	-	-	-	-	-	-	-	0.79	1.41	0.37	0.67	0.057	0.10
22	RAP Vertical Impact Crusher	-	-	-	-	-	-	-	-	0.65	1.42	0.29	0.63	0.044	0.096
23	RAP Crusher Conveyor	-	-	-	-	-	-	-	-	0.36	0.79	0.13	0.29	0.020	0.044
24	RAP Recycle Conveyor #2	-	-	-	-	-	-	-	-	0.36	0.79	0.13	0.29	0.020	0.044
25	RAP Conveyor	-	-	-	-	-	-	-	-	0.36	0.79	0.13	0.29	0.020	0.044
26	RAP Screen Conveyor	-	-	-	-	-	-	-	-	0.36	0.79	0.13	0.29	0.020	0.044
27	RAP 2-Deck Screen	-	-	-	-	-	-	-	-	3.00	6.57	1.04	2.29	0.16	0.35
28	RAP Screen Conveyor	-	-	-	-	-	-	-	-	0.36	0.79	0.13	0.29	0.020	0.044
29	RAP Screen Conveyor	-	-	-	-	-	-	-	-	0.36	0.79	0.13	0.29	0.020	0.044
30	RAP Screen Conveyor	-	-	-	-	-	-	-	-	0.36	0.79	0.13	0.29	0.020	0.044
31	RAP Recycle Conveyor #1	-	-	-	-	-	-	-	-	0.36	0.79	0.13	0.29	0.020	0.044
32	RAP Waste Conveyor	-	-	-	-	-	-	-	-	0.36	0.79	0.13	0.29	0.020	0.044
33	RAP Product Conveyor	-	-	-	-	-	-	-	-	0.36	0.79	0.13	0.29	0.020	0.044
34	RAP Stacker Conveyor Drop to Pile	-	-	-	-	-	-	-	-	0.79	1.41	0.37	0.67	0.057	0.10
35	RAP Product Storage Pile	-	-	-	-	-	-	-	-	0.79	1.41	0.37	0.67	0.057	0.10
36	RAP Plant Generator/Engine	3.17	6.94	2.20	4.82	0.15	0.32	0.12	0.26	0.18	0.39	0.18	0.39	0.18	0.39
37	Fold-N-Go Plant Feeder	-	-	-	-	-	-	-	-	0.40	0.71	0.19	0.33	0.028	0.051

Table 6-9 Summary of Uncontrolled NOx, CO, SO2, VOC, and PM Emission Rates – RAP Plants

Uncontrolled Emission Totals															
		NOx		CO		SO_2		VOC		PM		PM_{10}		$PM_{2.5}$	
Unit #	Description	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
38	Fold-N-Go Plant Feeder Conveyor	-	-	-	-	-	-	-	-	0.18	0.39	0.066	0.14	0.010	0.022
39	Fold-N-Go Plant Screen	-	-	-	-	-	-	-	-	1.50	3.29	0.52	1.14	0.079	0.17
40	Fold-N-Go Plant Screen Conveyor	-	-	-	-	-	-	-	-	0.18	0.39	0.066	0.14	0.010	0.022
41	Fold-N-Go Plant Stacker Conveyor	-	-	-	-	-	-	-	-	0.18	0.39	0.066	0.14	0.010	0.022
42	Fold-N-Go Plant Screen Conveyor	-	-	-	-	-	-	-	-	0.18	0.39	0.066	0.14	0.010	0.022
43	Fold-N-Go Plant Stacker Conveyor	-	-	-	-	-	-	-	-	0.18	0.39	0.066	0.14	0.010	0.022
44	Fold-N-Go Plant Stacker Conveyor Drop to Pile	-	-	-	-	-	-	-	-	0.40	0.71	0.19	0.33	0.028	0.051
45	Fold-N-Go Plant Engine	0.88	1.92	0.62	1.35	0.028	0.061	0.046	0.10	0.049	0.11	0.049	0.11	0.049	0.11
	Total	**4.05**	**8.87**	**2.82**	**6.17**	**0.17**	**0.38**	**0.17**	**0.36**	**13.84**	**28.70**	**5.61**	**11.52**	**1.04**	**2.17**

Estimates for Federal HAPs Air Pollutants

The RAP crushing and screening plant generator (Unit 36) and RAP scalping screen plant engine (Unit 45) are sources of HAPs as it appears in Section 112 (b) of the 1990 CAAA. Emissions of HAPs were determined for Units 36 and 45 generator/engines using AP-42 Section 3.3 and Section 1.3.

The following tables summarize the HAPs emission rates from the RAP crushing and screening plant generator and RAP scalping screen plant engine. Total combined HAPs emissions from RAP Plants are 0.020 pounds per hour and 0.0028 tons per year.

Table 6-11: HAPs Emission Rates from the RAP Crushing and Screening Plant Generator (36)

Horsepower Rating:	415	horsepower	
Fuel Usage:	20.7	gallons/hr	
MMBtu/hr:	2.6496	Btu	(based on 128000 Btu/gallon)
Btu x 10^-12/hr:	2.6496E-06	Btu x10^-12	(based on 128000 Btu/gallon)
Yearly Operating Hours:	4380	hours per year	

Type of Fuel: Diesel
Emission Factors AP-42 Section 3.3 and Section 1.3

Non-PAH HAPS	CAS#		Emission Factor (lbs/mmBtu)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Acetaldehyde	75-07-0		7.67E-04	0.002032	0.004451
Acrolein	107-02-8		9.25E-05	0.000245	0.000537
Benzene	71-43-2		9.33E-04	0.002472	0.005414
1,3-Butadiene	106-99-0		3.91E-05	0.000104	0.000227
Formaldehyde	50-00-0		1.18E-03	0.003127	0.006847
Propylene	115-07-1		2.58E-03	0.006836	0.014971
Toluene	108-88-3		4.09E-04	0.001084	0.002373
Xylene	1330-20-7		2.85E-04	0.000755	0.001654
		Total Non-PAH HAPS	6.29E-03	0.016654	0.036473

PAH HAPS	CAS#		Emission Factor (lbs/mmBtu)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Acenaphthene	83-32-9		1.42E-06	0.000004	0.000008
Acenaphthylene	208-96-8		5.06E-06	0.000013	0.000029
Anthracene	120-12-7		1.87E-06	0.000005	0.000011
Benzo(a)anthracene	56-55-3		1.68E-06	0.000004	0.000010
Benzo(a)pyrene	50-32-8		1.88E-07	0.000000	0.000001
Benzo(b)fluoranthene	205-99-2		9.91E-08	0.000000	0.000001
Benzo(a)pyrene	192-97-2		1.55E-07	0.000000	0.000001
Benzo(g,h,I)perylene	191-24-2		4.89E-07	0.000001	0.000003
Benzo(k)fluoranthene	207-08-9		1.55E-07	0.000000	0.000001
Dibenz(a,h)anthracene			5.83E-07	0.000002	0.000003
Chrysene	218-01-9		3.53E-07	0.000001	0.000002
Fluoranthene	206-44-0		7.61E-06	0.000020	0.000044
Fluorene	86-73-7		2.92E-05	0.000077	0.000169
Indeno(1,2,3-cd)pyrene	193-39-5		3.75E-07	0.000001	0.000002
Naphthalene	91-20-3		8.48E-05	0.000225	0.000492
Phenanthrene	85-01-8		2.94E-05	0.000078	0.000171
Pyrene	129-00-0		4.78E-06	0.000013	0.000028
		Total PAH HAPS	1.68E-04	0.000446	0.000976

HAPS Metals		Emission Factor (lbs/Btu^12)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Arsenic		4	0.000011	0.000023
Beryllium		3	0.000008	0.000017
Cadmium		3	0.000008	0.000017
Chromium		3	0.000008	0.000017
Lead		9	0.000024	0.000052
Manganese		6	0.000016	0.000035
Mercury		3	0.000008	0.000017
Nickel		3	0.000008	0.000017
Selenium		15	0.000040	0.000087
	Total Metals HAPS	49	0.000130	0.000284
	Total HAPS		**0.01723**	**0.00291**

Table 6-12: HAPs Emission Rates from the RAP Scalping Screen Engine (45)

Horsepower Rating:	75	horsepower	
Fuel Usage:	3.9	gallons/hr	
MMBtu/hr:	0.4992	Btu	(based on 128000 Btu/gallon)
Btu x 10^-12/hr:	4.992E-07	Btu x10^-12	(based on 128000 Btu/gallon)
Yearly Operating Hours:	3500	hours per year	

Type of Fuel: Diesel
Emission Factors AP-42 Section 3.3 and Section 1.3

Non-PAH HAPS	CAS#	Emission Factor (lbs/mmBtu)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Acetaldehyde	75-07-0	7.67E-04	0.000383	0.000839
Acrolein	107-02-8	9.25E-05	0.000046	0.000101
Benzene	71-43-2	9.33E-04	0.000466	0.001020
1,3-Butadiene	106-99-0	3.91E-05	0.000020	0.000043
Formaldehyde	50-00-0	1.18E-03	0.000589	0.001290
Propylene	115-07-1	2.58E-03	0.001288	0.002821
Toluene	108-88-3	4.09E-04	0.000204	0.000447
Xylene	1330-20-7	2.85E-04	0.000142	0.000312
	Total Non-PAH HAPS	6.29E-03	0.003138	0.006872

PAH HAPS	CAS#	Emission Factor (lbs/mmBtu)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Acenaphthene	83-32-9	1.42E-06	0.000001	0.000002
Acenaphthylene	208-96-8	5.06E-06	0.000003	0.000006
Anthracene	120-12-7	1.87E-06	0.000001	0.000002
Benzo(a)anthracene	56-55-3	1.68E-06	0.000001	0.000002
Benzo(a)pyrene	50-32-8	1.88E-07	0.000000	0.000000
Benzo(b)fluoranthene	205-99-2	9.91E-08	0.000000	0.000000
Benzo(a)pyrene	192-97-2	1.55E-07	0.000000	0.000000
Benzo(g,h,I)perylene	191-24-2	4.89E-07	0.000000	0.000001
Benzo(k)fluoranthene	207-08-9	1.55E-07	0.000000	0.000000
Dibenz(a,h)anthracene		5.83E-07	0.000000	0.000001
Chrysene	218-01-9	3.53E-07	0.000000	0.000000
Fluoranthene	206-44-0	7.61E-06	0.000004	0.000008
Fluorene	86-73-7	2.92E-05	0.000015	0.000032
Indeno(1,2,3-cd)pyrene	193-39-5	3.75E-07	0.000000	0.000000
Naphthalene	91-20-3	8.48E-05	0.000042	0.000093
Phenanthrene	85-01-8	2.94E-05	0.000015	0.000032
Pyrene	129-00-0	4.78E-06	0.000002	0.000005
	Total PAH HAPS	1.68E-04	0.000084	0.000184

HAPS Metals		Emission Factor (lbs/Btu^12)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Arsenic		4	0.000002	0.000004
Beryllium		3	0.000001	0.000003
Cadmium		3	0.000001	0.000003
Chromium		3	0.000001	0.000003
Lead		9	0.000004	0.000010
Manganese		6	0.000003	0.000007
Mercury		3	0.000001	0.000003
Nickel		3	0.000001	0.000003
Selenium		15	0.000007	0.000016
	Total Metals HAPS	49	0.000024	0.000054
	Total HAPS		**0.00325**	**0.00055**

Hot Mix Asphalt Plant

Pre-Control Particulate Emission Rates

Material Handling ($PM_{2.5}$, PM_{10}, and PM)

To estimate material handling pre-control particulate emissions rates for screening, pugmill, and conveyor transfer operations, emission factors were obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Aug. 2004, Section 11.19.2, Table 11.19.2-2. To determine missing $PM_{2.5}$ emission factors the ratio of 0.35/0.053 from $PM_{10}/PM_{2.5}$ *k* factors found in AP-42 Section 13.2.4 (11/2006) were used.

To estimate material handling pre-control particulate emission rates for aggregate handling operations (aggregate and RAP piles/ loading cold and RAP feed bins), an emission equation was obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, Section 13.2.4 (11/2004), where the k (PM = 0.74, PM_{10} = 0.35, $PM_{2.5}$ = 0.053), wind speed for determining the maximum hourly emission rate is the NMED default of 11 MPH and for determining the annual emission rate is based on the average wind speed for Moriarty found on the internet of 9.4 mph (see Section 7), and the NMED default moisture content of 2 percent.

The asphalt may will contain 1.5% mineral filler, if Evotherm is not used. Pre-control particulate emissions rates for mineral filler silo loading was obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, Section 11.12 (06/06), Table 11.12-2 "Cement Unloading to Elevated Storage Silo". To determine missing $PM_{2.5}$ emission factors the ratio of 1.92/0.38 from $PM_{10}/PM_{2.5}$ uncontrolled k factors found in AP-42 Section 11.12 (06/06), Table 11.12-4 "Central Mix Operation" was used.

Maximum hourly asphalt production is 400 tons per hours. Virgin aggregate/RAP/Mineral filler/Asphalt cement ratios used in estimating material handling particulate emission rates is equal to 52.5/40.0/1.5/6.0. These ratios are estimates and ratios may change with mix requirements, these are not requested permit conditions.

Aggregate/RAP Storage Piles and Cold/RAP Feed Bin Loading Emission Equation:
Maximum Hour Emission Factor

E (lbs/ton) = k x 0.0032 x $(U/5)^{1.3}$ / $(M/2)^{1.4}$
E_{PM} (lbs/ton) = 0.74 x 0.0032 x $(11/5)^{1.3}$ / $(2/2)^{1.4}$
E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(11/5)^{1.3}$ / $(2/2)^{1.4}$
$E_{PM2.5}$ (lbs/ton) = 0.053 x 0.0032 x $(11/5)^{1.3}$ / $(2/2)^{1.4}$
E_{PM} (lbs/ton) = 0.00660 lbs/ton;
E_{PM10} (lbs/ton) = 0.00312 lbs/ton
$E_{PM2.5}$ (lbs/ton) = 0.00047 lbs/ton

Aggregate/RAP Storage Piles and Cold/RAP Feed Bin Loading Emission Equation:
Annual Emission Factor

E (lbs/ton) = k x 0.0032 x $(U/5)^{1.3}$ / $(M/2)^{1.4}$
E_{PM} (lbs/ton) = 0.74 x 0.0032 x $(9.4/5)^{1.3}$ / $(2/2)^{1.4}$
E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(9.4/5)^{1.3}$ / $(2/2)^{1.4}$
$E_{PM2.5}$ (lbs/ton) = 0.053 x 0.0032 x $(9.4/5)^{1.3}$ / $(2/2)^{1.4}$
E_{PM} (lbs/ton) = 0.00538 lbs/ton;
E_{PM10} (lbs/ton) = 0.00254 lbs/ton
$E_{PM2.5}$ (lbs/ton) = 0.00039 lbs/ton

AP-42 Emission Factors:

All Bin Unloading and Conveyor Transfers = Uncontrolled Conveyor Transfer Point Emission Factor
Screening = Uncontrolled Screening Emission Factor
Pugmill Loading and Unloading = Uncontrolled Conveyor Transfer Point Emission Factor

Material Handling Emission Factors:

Process Unit	PM Emission Factor (lbs/ton)	PM_{10} Emission Factor (lbs/ton)	$PM_{2.5}$ Emission Factor (lbs/ton)
Uncontrolled Screening	0.02500	0.00870	0.00132
Uncontrolled Screen Unloading, Pug Mill Loading and Unloading, Feed Bin Unloading, and Conveyor Transfers	0.00300	0.00110	0.00017
Uncontrolled Aggregate Storage Piles, Cold Aggregate Feeder Loading Max Hourly	0.00660	0.00312	0.00047
Uncontrolled Aggregate Storage Piles, Cold Aggregate Feeder Loading Annual	0.00538	0.00254	0.00039

AP-42 Section 11.12 Table 11.12-2 Uncontrolled Emission Factors:

Process Unit	PM Emission Factor (lbs/ton)	PM_{10} Emission Factor (lbs/ton)	$PM_{2.5}$ Emission Factor (lbs/ton)
Mineral Filler Silo Loading	0.73	0.47	0.093

The following equation was used to calculate the hourly emission rate for each process unit:

Emission Rate (lbs/hour) = Process Rate (tons/hour) * Emission Factor (lbs/ton)

The following equation was used to calculate the annual emission rate for each process unit:

$$\text{Emission Rate (tons/year)} = \frac{\text{Emission Rate (lbs/hour)} * \text{Operating Hour (hrs/year)}}{\text{2000 lbs/ton}}$$

Table 6-13 Pre-Controlled Regulated Process Equipment Emission Rates

Unit #	Process Unit Description	Process Rate (tph)	PM Emission Rate (lbs/hr)	PM Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
AGGPILE	Cold Aggregate/RAP Storage Pile	376	2.44	8.72	1.15	4.12	0.17	0.62
1	Cold Aggregate Feed Bin Loading	210	1.39	4.95	0.66	2.34	0.10	0.35
2	Cold Aggregate Feed Bin Unloading (Conveyor)	210	0.63	2.76	0.23	1.01	0.036	0.16
3	Scalping Screen	210	5.25	23.0	1.83	8.00	0.28	1.21
4	Scalping Screen Unloading (Conveyor)	210	0.63	2.76	0.23	1.01	0.036	0.16
5	Pug Mill Load	216	0.65	2.84	0.24	1.04	0.037	0.16
6	Pug Mill Unload (Conveyor)	216	0.65	2.84	0.24	1.04	0.037	0.16
7	Conveyor Transfer to Slinger Conveyor	216	0.65	2.84	0.24	1.04	0.037	0.16
8	RAP Feed Bin Loading	160	1.06	3.77	0.50	1.78	0.076	0.27
9	RAP Feed Bin Unloading (Conveyor)	160	0.48	2.10	0.18	0.77	0.027	0.12
10	RAP Screen	160	4.00	17.5	1.39	6.10	0.21	0.93
11	RAP Screen Unloading (Conveyor)	160	0.48	2.10	0.18	0.77	0.027	0.12
12	RAP Transfer Conveyor	160	0.48	2.10	0.18	0.77	0.027	0.12
13	Mineral Filler Silo	25 tph, 52,560 tpy	18.3	19.2	11.8	12.4	2.33	2.44
TOTALS			**37.0**	**97.5**	**19.0**	**42.2**	**3.43**	**6.99**

HMA Plant Haul Truck Travel

Haul truck travel emissions were estimated using AP-42, Section 13.2.2 (ver.11/06) "Unpaved Roads" emission equation. The haul road to the plant will be unpaved. See Figure 5-1 for identification of haul road. Table 6-14 summarizes the emission rate for each haul truck category.

Unpaved Roads Plant HMA
AP-42, Section 13.2.2 (ver.11/06) "Unpaved Roads"

$$E = k * (s/12)^a * (W/3)^b * [(365 - p)/365] * VMT$$

Where k = constant PM2.5 = 0.15
PM10 = 1.5
PM = 4.9
s = % silt content (Table 13.2.2-1, "Sand and Gravel" 4.8%)
W = mean vehicle weight (26.5 tons – 15 tons truck, 23 tons load)
p = number of days with at least 0.01 in of precip. (70 days)
a = Constant PM2.5 = 0.9
PM10 = 0.9
PM = 0.7
b = Constant PM2.5 = 0.45
PM10 = 0.45
PM = 0.45
Vehicle Dust Control 0%

Trucks per Hour
Mineral Fill Trucks = 0.3 truck per hour average
Asphalt Cement Trucks = 1.0 truck per hour average
Asphalt Trucks = 17.4 truck per hour average
RAP Trucks = 7.0 truck per hour average

Trucks per Year (Uncontrolled)
Mineral Fill Trucks = 2,285 truck per year
Asphalt Cement Trucks = 9,141 truck per year
Asphalt Trucks = 152,348 truck per year
RAP Trucks = 60,939 truck per year

VMT =Vehicle Miles Traveled

Mineral Fill Trucks	Unpaved – 0.60176 miles per vehicle
Asphalt Cement Trucks	Unpaved – 0.60176 miles per vehicle
Aggregate Trucks	Unpaved – 0.60176 miles per vehicle
RAP Trucks	Unpaved – 0.60176 miles per vehicle

Miles Traveled
HMA Plant Unpaved – 15.43642 miles per hour; 135,223 miles per year

Reduction in emissions due to precipitation was only accounted for in the annual emission rate. Particulate emission rate per vehicle mile traveled for each particle size category is:

Hourly Emission Rate Factor – 0% Control
PM = 6.87692 lbs/VMT
PM10 = 1.75267 lbs/VMT
PM2.5 = 0.17527 lbs/VMT

Annual Emission Rate Factor – 0% Control
PM = 5.55806 lbs/VMT
PM10 = 1.41655 lbs/VMT
PM2.5 = 0.14165 lbs/VMT

Table 6-14: Pre-Controlled Haul Road Fugitive Dust Emission Rates

Process Unit Description	Process Rate	PM Emission Rate (lbs/hr)	PM Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
Mineral Filler Truck Emissions	0.15698 miles/hr; 1375 miles/yr	1.08	3.82	0.28	0.97	0.028	0.097
Asphalt Cement Truck Emissions	0.62792 miles/hr; 5501 miles/yr	4.32	15.29	1.10	3.90	0.11	0.39
Asphalt Truck Emissions Paved	10.46537 miles/hr; 91677 miles/yr	71.97	254.77	18.34	64.93	1.83	6.49
RAP Truck Emissions	4.18615 miles/hr; 36671 miles/yr	28.79	101.91	7.34	25.97	0.73	2.60
	Total	**106.16**	**375.79**	**27.06**	**95.77**	**2.71**	**9.58**

Drum Mix Hot Mix Asphalt Plant

Drum mix hot mix asphalt plant uncontrolled emissions were estimated using AP-42, Section 11.1 "Hot Mix Asphalt Plants" (revised 03/04), tables 11.1.3, 7, 8 and 14 emission equations. The drum dryer will be permitted to combust on-spec recycled oil. Hourly emission rates are based on maximum hourly asphalt production (400 tph) and maximum annual emission rates are based on operating 8760 hours per year. To determine missing $PM_{2.5}$ emission factor the sum of uncontrolled filterable from Table 11.1-4 plus uncontrolled organic and inorganic condensable in Table 11.1-3 was used. Silo filling and plant loadout emission factors were calculated using the default value of –0.5 for asphalt volatility (V) and a tank temperature setting of 350˚ F for HMA mix temperature (T).

Silo Filling

Total PM	$EF = 0.000332 + 0.00105(-V)e^{((0.0251)(T + 460) - 20.43)}$
TOC	$EF = 0.0504(-V)e^{((0.0251)(T + 460) - 20.43)}$
CO	$EF = 0.00488(-V)e^{((0.0251)(T + 460) - 20.43)}$

Plant Loadout

Total PM	$EF = 0.000181 + 0.00141(-V)e^{((0.0251)(T + 460) - 20.43)}$
TOC	$EF = 0.0172(-V)e^{((0.0251)(T + 460) - 20.43)}$
CO	$EF = 0.00558(-V)e^{((0.0251)(T + 460) - 20.43)}$

Yard emissions were found in AP-42 Section 11.1.2.5. TOC emission equation is 0.0011 lbs/ton of asphalt produced and CO is equal to the TOC emission rate times 0.32.

Emissions of VOCs (TOCs) from the asphalt cement storage tanks were determined with EPA's TANK 4.0.9d program and the procedures found in EPA's "Emission Factor Documentation for AP-42 Section 11.1 (12/2000) Section 4.4.5" for input to the TANK program.

AP-42 Section 11.1 Table 11.1-3, -4, -7, -8, and -14 Uncontrolled Emission Factors:

Process Unit	Pollutant	Emission Factor (lbs/ton)
Drum Mixer	NO_X	0.055
	CO	0.13
	SO_2	0.058
	VOC	0.032
	TOC	0.044
	PM	28.0
	PM_{10}	6.5
	$PM_{2.5}$	1.565
	CO_2	33.0
Silo Filling	CO	0.002210012
	TOC	0.022824716
	PM	0.000807515
	PM_{10}	0.000807515
	$PM_{2.5}$	0.000807515
Plant Loadout	CO	0.002527022
	TOC	0.007789387
	PM	0.000819549
	PM_{10}	0.000819549
	$PM_{2.5}$	0.000819549
Yard	CO	0.000352
	TOC	0.0011

The following equation was used to calculate the hourly emission rate for each process unit:

Emission Rate (lbs/hour) = Process Rate (tons/hour) * Emission Factor (lbs/ton)

The following equation was used to calculate the annual emission rate for each process unit:

$$\text{Emission Rate (tons/year)} = \frac{\text{Emission Rate (lbs/hour)} * \text{Operating Hour (hrs/year)}}{\text{2000 lbs/ton}}$$

Table 6-15: Pre-Controlled Hot Mix Plant Emission Rates

Process Unit Number	Process Unit Description	Pollutant	Average Hourly Process Rate (tons/hour)	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
14	Asphalt Drum Dryer/Mixer	NO_X	400	22.00	96.36
		CO	400	52.00	227.76
		SO_2	400	23.20	101.62
		VOC	400	12.80	56.06
		PM	400	11200.0	49056.0
		PM_{10}	400	2600.0	11388.0
		$PM_{2.5}$	400	626.0	2741.88
		CO_2	400	13200.0	57816.0
15	Silo Filling (Drum Mixer Unloading)	CO	400	0.88	3.87
		TOC	400	9.13	39.99
		PM	400	0.32	1.41
		PM_{10}	400	0.32	1.41
		$PM_{2.5}$	400	0.32	1.41
16	Plant Loadout (Asphalt Silo Unloading)	CO	400	1.01	1.01
		TOC	400	3.12	3.12
		PM	400	0.33	1.44
		PM_{10}	400	0.33	1.44
		$PM_{2.5}$	400	0.33	1.44
20	Asphalt Cement Storage Tanks (2)	TOC	30,000 gallons each	0.030	0.13
YARD	HMA YARD	TOC	400	0.44	1.93
		CO	400	0.14	0.62

Controlled Particulate Emission Rates

No controls or emission reductions for combustion emissions (NO_X, CO, SO_2, VOC, or TOC) are proposed for the drum dryer (14), unloading the drum mixer (15), asphalt silo (16), main plant generator (17), standby generator (18), and asphalt heater (19) with the exception of limiting annual production rates for production equipment.

Controlled Material Handling ($PM_{2.5}$, PM_{10}, and PM)

No fugitive dust controls or emission reductions are proposed for the aggregate storage piles (AGGPILE), loading of the cold aggregate feed bins (1), or loading of the RAP feed bins (8) with the exception of limiting annual production rates.

Fugitive dust control for unloading the cold aggregate feed bins onto the cold aggregate feed bin conveyor (2) and RAP feed bin conveyor (9) will be controlled, as needed, with enclosures and/or water sprays at the exit of the feed bins. It is estimated that these methods will control to an efficiency of 95.3 percent per AP42 Section 11.19.2, Table 11.19.2-2. Additional emission reductions include limiting annual production rates.

Fugitive dust control for the scalping screens (3 and 10) will be controlled, as needed, with enclosures and/or water sprays. It is estimated that these methods will control to an efficiency of 91.2 percent for screening operations per AP42 Section 11.19.2, Table 11.19.2-2. Additional emission reductions include limiting annual production rates.

Fugitive dust control for unloading the scalping screens (4 and 11), loading and unloading the pug mill (5 and 6), transfer from the scale conveyor to the sling conveyor (7), and RAP transfer conveyor (12) will be controlled, as needed, with enclosures and/or water sprays. It is estimated that these methods will control to an efficiency of 95.3 percent per AP42 Section 11.19.2, Table 11.19.2-2. Additional emission reductions include limiting annual production rates.

Particulate emissions from loading the mineral filler silo (13) will be controlled with a baghouse dust collector on the exhaust vent (C4). This dust collector consists of filter bags and is passive with no fan. It functions only when material is loaded into the silo. The filter bags are cleaned by air pulses at set intervals. Baghouse fines are dumped back into the silo. It is estimated that this method will control to an efficiency of 99 percent or greater based on information from filter bag specifications. Additional emission reductions include limiting annual production rates.

Particulate emissions from the drum dryer/mixer (14) will be controlled with a baghouse dust collector (C5) on the exhaust vent. It is estimated that this method will control to an efficiency of 99.88 percent per AP42 Section 11.1, Table 11.1-3 "controlled emission factor vs. uncontrolled emission factor". Baghouse fines are sent to a dust box. Additional emission reductions include limiting annual production rates.

No fugitive controls or emission reductions are proposed for unloading the drum dryer/mixer or asphalt silo (15, 16) with the exception of limiting annual production rates. No fugitive controls are proposed for yard emissions (YARD) or asphalt storage tanks (20).

To estimate material handling control particulate emissions rates for pug mill and conveyor transfer operations, emission factors were obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Aug. 2004, Section 11.19.2, Table 11.19.2-2.

To estimate material handling pre-control particulate emission rates for aggregate handling operations (aggregate storage piles and cold aggregate loading feed bins), an emission equation was obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, Section 13.2.4 (11/2004), where the k (PM = 0.74, PM_{10} = 0.35, $PM_{2.5}$ = 0.053), wind speed for determining the maximum hourly emission rate is the NMED default of 11 MPH and for determining the annual emission rate is based on the average wind speed for Moriarty found on the internet of 9.4 mph (see Section 7), and the NMED default moisture content of 2 percent.

The asphalt may will contain 1.5% mineral filler, if Evotherm is not used. Control particulate emissions rates for mineral filler silo loading was obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, Section 11.12 (06/06), Table 11.12-2 uncontrolled "Cement Unloading to Elevated Storage Silo" and a control efficiency of 99% for the baghouse.

Maximum hourly asphalt production is 400 tons per hours. Virgin aggregate/RAP/Mineral filler/Asphalt cement ratios used in estimating material handling particulate emission rates is equal to 52.5/40.0/1.5/6.0. These ratios are estimates and ratios may change with mix requirements, these are not requested permit conditions. Annual emissions in tons per year (tpy) were calculated assuming an annual production throughput of 1,000,000 tons of asphalt per year.

Aggregate/RAP Storage Piles and Cold/RAP Feed Bin Loading Emission Equation:

Maximum Hour Emission Factor

E (lbs/ton) = k x 0.0032 x $(U/5)^{1.3}$ / $(M/2)^{1.4}$

E_{PM} (lbs/ton) = 0.74 x 0.0032 x $(11/5)^{1.3}$ / $(2/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(11/5)^{1.3}$ / $(2/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.053 x 0.0032 x $(11/5)^{1.3}$ / $(2/2)^{1.4}$

E_{PM} (lbs/ton) = 0.00660 lbs/ton;

E_{PM10} (lbs/ton) = 0.00312 lbs/ton

$E_{PM2.5}$ (lbs/ton) = 0.00047 lbs/ton

Aggregate/RAP Storage Piles and Cold/RAP Feed Bin Loading Emission Equation:

Annual Emission Factor

E (lbs/ton) = k x 0.0032 x $(U/5)^{1.3}$ / $(M/2)^{1.4}$

E_{PM} (lbs/ton) = 0.74 x 0.0032 x $(9.4/5)^{1.3}$ / $(2/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(9.4/5)^{1.3}$ / $(2/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.053 x 0.0032 x $(9.4/5)^{1.3}$ / $(2/2)^{1.4}$

E_{PM} (lbs/ton) = 0.00538 lbs/ton;

E_{PM10} (lbs/ton) = 0.00254 lbs/ton

$E_{PM2.5}$ (lbs/ton) = 0.00039 lbs/ton

AP-42 Emission Factors:

Feed Bin Unloading = Controlled Conveyor Transfer Point Emission Factor
Crusher = Controlled Tertiary Crusher Emission Factor
Screen = Controlled Screening Emission Factor
Transfer Conveyor = Controlled Conveyor Transfer Point Emission Factor
Scalping Screen Conveyor = Controlled Conveyor Transfer Point Emission Factor
Pug Mill = Controlled Conveyor Transfer Point Emission Factor
Pug Mill Conveyor = Controlled Conveyor Transfer Point Emission Factor

Material Handling Emission Factors:

Process Unit	PM Emission Factor (lbs/ton)	PM_{10} Emission Factor (lbs/ton)	$PM_{2.5}$ Emission Factor (lbs/ton)
Feed Bin Unloading	0.00014	0.00005	0.000013
Controlled Screening	0.00220	0.00074	0.00005
Transfer Conveyor	0.00014	0.00005	0.000013
Controlled Pug Mill Loading and Unloading	0.00014	0.00005	0.000013
Uncontrolled Aggregate Storage Piles, Cold Aggregate Bin Loading Max Hourly	0.00660	0.00312	0.00047
Uncontrolled Aggregate Storage Piles, Cold Aggregate Bin Loading Annual	0.00538	0.00254	0.00039

AP-42 Section 11.12 Table 11.12-2 Uncontrolled Emission Factors with 99% Control Efficiency:

Process Unit	PM Emission Factor (lbs/ton)	PM_{10} Emission Factor (lbs/ton)	$PM_{2.5}$ Emission Factor (lbs/ton)
Mineral Filler Silo Loading	0.0073	0.0047	0.00093

The following equation was used to calculate the hourly emission rate for each process unit:

Emission Rate (lbs/hour) = Process Rate (tons/hour) * Emission Factor (lbs/ton)

The following equation was used to calculate the annual emission rate for each process unit:

$$\text{Emission Rate (tons/year)} = \frac{\text{Hourly Emission Rate (lbs/hour)} * \text{Operating Hour (hrs/year)}}{\text{2000 lbs/ton}}$$

Table 6-16 Controlled Regulated Process Equipment Emission Rates

Unit #	Process Unit Description	Process Rate (tph)	PM Emission Rate (lbs/hr)	PM Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
AGGPILE	Cold Aggregate/RAP Storage Pile	376	2.44	2.49	1.15	1.18	0.17	0.18
1	Cold Aggregate Feed Bin Loading	210	1.39	1.41	0.66	0.67	0.10	0.10
2	Cold Aggregate Feed Bin Unloading (Conveyor)	210	0.029	0.037	0.010	0.012	0.0027	0.0034
3	Scalping Screen	210	0.46	0.58	0.16	0.19	0.011	0.013
4	Scalping Screen Unloading (Conveyor)	210	0.029	0.037	0.010	0.012	0.0027	0.0034
5	Pug Mill Load	216	0.030	0.038	0.010	0.012	0.0028	0.0035
6	Pug Mill Unload (Conveyor)	216	0.030	0.038	0.010	0.012	0.0028	0.0035
7	Conveyor Transfer to Slinger Conveyor	216	0.030	0.038	0.010	0.012	0.0028	0.0035
8	RAP Feed Bin Loading	160	1.06	1.08	0.50	0.51	0.076	0.077
9	RAP Feed Bin Unloading (Conveyor)	160	0.022	0.028	0.0074	0.0092	0.0021	0.0026
10	RAP Screen	160	0.35	0.44	0.12	0.15	0.0080	0.010
11	RAP Screen Unloading (Conveyor)	160	0.022	0.028	0.0074	0.0092	0.0021	0.0026
12	RAP Transfer Conveyor	160	0.022	0.028	0.0074	0.0092	0.0021	0.0026
13	Mineral Filler Silo	25 tph, 15,000 tpy	0.18	0.055	0.12	0.035	0.023	0.0070
TOTALS			**6.10**	**6.32**	**2.77**	**2.82**	**0.41**	**0.41**

Controlled Haul Truck Travel

Haul truck travel emissions were estimated using AP-42, Section 13.2.2 (ver.11/06) "Unpaved Roads" emission equation. All other haul roads throughout the plant are unpaved that will be controlled with surfactants or millings, and water. Haul road traffic emission rates controlled by surfactants or millings, and water have applied a control efficiency of 90%. See Figure 5-1 for identification of haul road. Table 6-17 summarizes the emission rate for each haul truck category.

Unpaved Roads Plant HMA

AP-42, Section 13.2.2 (ver.11/06) "Unpaved Roads"

$$E = k * (s/12)^a * (W/3)^b * [(365 - p)/365] * VMT$$

Where k = constant PM2.5 = 0.15
PM10 = 1.5
PM = 4.9

s = % silt content (Table 13.2.2-1, "Sand and Gravel" 4.8%)

W = mean vehicle weight (26.5 tons – 15 tons truck, 23 tons load)

p = number of days with at least 0.01 in of precip. (70 days)

a = Constant PM2.5 = 0.9
PM10 = 0.9
PM = 0.7

b = Constant PM2.5 = 0.45
PM10 = 0.45
PM = 0.45

Vehicle Dust Control 90%

Trucks per Hour
Mineral Fill Trucks = 0.3 truck per hour average
Asphalt Cement Trucks = 1.0 truck per hour average
Asphalt Trucks = 17.4 truck per hour average
RAP Trucks = 7.0 truck per hour average

Trucks per Year (Controlled)
Mineral Fill Trucks = 652 truck per year
Asphalt Cement Trucks = 2,609 truck per year
Asphalt Trucks = 43,478 truck per year
RAP Trucks = 17,391 truck per year

VMT =Vehicle Miles Traveled

Mineral Fill Trucks	Unpaved – 0.60176 miles per vehicle
Asphalt Cement Trucks	Unpaved – 0.60176 miles per vehicle
Aggregate Trucks	Unpaved – 0.60176 miles per vehicle
RAP Trucks	Unpaved – 0.60176 miles per vehicle

Miles Traveled
HMA Plant Unpaved – 15.43642 miles per hour; 38,591 miles per year

Reduction in emissions due to precipitation was only accounted for in the annual emission rate. Particulate emission rate per vehicle mile traveled for each particle size category is:

Hourly Emission Rate Factor – 90% Control
PM = 0.68769 lbs/VMT
PM10 = 0.17527 lbs/VMT
PM2.5 = 0.01753 lbs/VMT

Annual Emission Rate Factor – 90% Control
PM = 0.55581 lbs/VMT
PM10 = 0.14165 lbs/VMT
PM2.5 = 0.01417 lbs/VMT

Table 6-17: Controlled Haul Road Fugitive Dust Emission Rates

Process Unit Description	Process Rate	PM Emission Rate (lbs/hr)	PM Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
Mineral Filler Truck Emissions	0.15698 miles/hr; 392 miles/yr	0.11	0.11	0.028	0.028	0.0028	0.0028
Asphalt Cement Truck Emissions	0.62792 miles/hr; 1,570 miles/yr	0.43	0.44	0.11	0.11	0.011	0.011
Asphalt Truck Emissions Paved	10.46537 miles/hr; 26,163 miles/yr	7.20	7.27	1.83	1.85	0.18	0.19
RAP Truck Emissions	4.18615 miles/hr; 10,465 miles/yr	2.88	2.91	0.73	0.74	0.073	0.074
	Total	**10.62**	**10.72**	**2.71**	**2.73**	**0.27**	**0.27**

Drum Mix Hot Mix Asphalt Plant

Particulate emissions from the drum dryer/mixer (14) will be controlled with a baghouse dust collector (C5) on the exhaust vent. This dust collector consists of filter bags and a fan that draws all the drum mixer exhaust through the dust collector. It is estimated that this method will control to an efficiency of 99.88 percent per AP42 Section 11.1, Table 11.1-3. Additional emission reductions include limiting annual production rates. No fugitive controls are proposed for unloading the drum dryer/mixer or asphalt silo (15, 16) with the exception of limiting annual production rates. No fugitive controls are proposed for yard emissions or asphalt storage tank emissions.

Drum mix hot mix asphalt plant controlled emissions were estimated using AP-42, Section 11.1 "Hot Mix Asphalt Plants" (revised 03/04), tables 11.1-3, -4, -7, -8 and -14 emission rates for all pollutants. The drum dryer will be permitted to combust on-spec recycled oil. Hourly emission rates are based on maximum hourly asphalt production (400 tph) and maximum annual asphalt production rates of 1,000,000 tons. To determine missing $PM_{2.5}$ emission factor the sum of uncontrolled filterable from Table 11.1-4 plus uncontrolled organic and inorganic condensable in Table 11.1-3 was used. Silo filling and plant loadout emission factors were calculated using the default value of –0.5 for asphalt volatility (V) and a tank temperature setting of 350˚ F for HMA mix temperature (T).

Silo Filling

Total PM	$EF = 0.000332 + 0.00105(-V)e^{((0.0251)(T + 460) - 20.43)}$
TOC	$EF = 0.0504(-V)e^{((0.0251)(T + 460) - 20.43)}$
CO	$EF = 0.00488(-V)e^{((0.0251)(T + 460) - 20.43)}$

Plant Loadout

Total PM	$EF = 0.000181 + 0.00141(-V)e^{((0.0251)(T + 460) - 20.43)}$
TOC	$EF = 0.0172(-V)e^{((0.0251)(T + 460) - 20.43)}$
CO	$EF = 0.00558(-V)e^{((0.0251)(T + 460) - 20.43)}$

Yard emissions were found in AP-42 Section 11.1.2.5. TOC emission equation is 0.0011 lbs/ton of asphalt produced and CO is equal to the TOC emission rate times 0.32.

Emissions of VOCs (TOCs) from the asphalt cement storage tanks were determined with EPA's TANK 4.0.9d program and the procedures found in EPA's "Emission Factor Documentation for AP-42 Section 11.1 (12/2000) Section 4.4.5" for input to the TANK program.

AP-42 Section 11.1 Table 11.1-3, -4, -7, -8, and -14 Controlled Emission Factors:

Process Unit	Pollutant	Emission Factor (lbs/ton)
Drum Mixer	NO_X	0.055
	CO	0.13
	SO_2	0.058
	VOC	0.032
	TOC	0.044
	PM	0.033
	PM_{10}	0.023
	$PM_{2.5}$	0.023
	CO_2	33.0
Silo Filling	CO	0.002210012
	TOC	0.022824716
	PM	0.000807515
	PM_{10}	0.000807515
	$PM_{2.5}$	0.000807515
Plant Loadout	CO	0.002527022
	TOC	0.007789387
	PM	0.000819549
	PM_{10}	0.000819549
	$PM_{2.5}$	0.000819549
Yard	CO	0.000352
	TOC	0.0011

The following equation was used to calculate the hourly emission rate for each process unit:

Emission Rate (lbs/hour) = Process Rate (tons/hour) * Emission Factor (lbs/ton)

The following equation was used to calculate the annual emission rate for each process unit:

$$\text{Emission Rate (tons/year)} = \frac{\text{Emission Rate (lbs/hour)} * \text{Operating Hour (hrs/year)}}{\text{2000 lbs/ton}}$$

Table 6-18: Controlled Hot Mix Plant Emission Rates

Process Unit Number	Process Unit Description	Pollutant	Average Hourly Process Rate (tons/hour)	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
14	Asphalt Drum Dryer/Mixer	NO_X	400	22.00	27.50
		CO	400	52.00	65.00
		SO_2	400	23.20	29.00
		VOC	400	12.80	16.00
		PM	400	13.20	16.50
		PM_{10}	400	9.20	11.50
		$PM_{2.5}$	400	9.20	11.50
		CO_2	400	13200.0	16500.0
15	Silo Filling (Drum Mixer Unloading)	CO	400	0.88	1.11
		TOC	400	9.13	11.41
		PM	400	0.32	0.40
		PM_{10}	400	0.32	0.40
		$PM_{2.5}$	400	0.32	0.40
16	Plant Loadout (Asphalt Silo Unloading)	CO	400	1.01	1.26
		TOC	400	3.12	3.89
		PM	400	0.33	0.41
		PM_{10}	400	0.33	0.41
		$PM_{2.5}$	400	0.33	0.41
20	Asphalt Cement Storage Tanks (2)	TOC	30,000 gallons each	0.030	0.13
YARD	HMA YARD	TOC	400	0.44	0.55
		CO	400	0.14	0.18

Diesel-Fired Asphalt Heater

One diesel asphalt heater (P5HMAHT) heats the asphalt oil before it is mixed with the aggregate in the drum dryer/mixer. The unit is rated at 1,200,000 Btu/hr. The estimated hourly diesel combusted is 9.4 gal/hr. Emissions of nitrogen oxides (NO_X), carbon monoxides (CO), sulfur dioxide (SO_2), hydrocarbons (VOC) and particulate (PM) are estimated using AP-42 Section 1.3 (9/98). Sulfur content of diesel will not exceed 0.05%. No controls are proposed for the fuel asphalt heater. Uncontrolled annual emissions in tons per year (tpy) were calculated assuming operation of 8760 hours per year. Controlled annual emissions in tons per year (tpy) were calculated assuming operation of 8760 hours per year.

AP-42 Emission Factors: Section 1.4

Diesel Emission Factors

Pollutant	Emission Factor
Nitrogen Oxides	20 lbs/1000 gallons
Carbon Monoxides	5.00 lbs/1000 gallons
Particulate	0.34 lbs/1000 gallons
Hydrocarbons	142S lbs/1000 gallons S = %sulfur
Sulfur Dioxides	2.00 lbs/1000 gallons
Carbon Dioxide	73.96 kg CO_2 per mmBTU

The following equation was used to calculate the hourly emission rate for asphalt heater pollutant (NO_X, CO, VOC, PM):

Emission Rate (lbs/hr) = EF (lbs/1000 gal) * fuel usage (gal/hr)

The following equation was used to calculate the hourly emission rate for asphalt heater pollutant (SO_2):

Emission Rate (lbs/hr) = 142 * Sulfur Content (0.05%) * fuel usage (9.4 gal/hr) / 1000 gal/hr

The following equation was used to calculate the hourly emission rate for asphalt heater pollutant (CO_2):

Emission Rate (lbs/hr) = 73.96 kg * fuel usage (120000 BTU) / 1000000 BTU * 2.20462 lbs/kg

The following equation was used to calculate the annual emission rate for asphalt heater pollutant (NO_X, CO, VOC, PM, SO_2, CO_2):

$$\text{Emission Rate (tons/year)} = \frac{\text{Emission Rate (lbs/hour)} * \text{Operating Hour (hrs/year)}}{\text{2000 lbs/ton}}$$

Table 6-19: Pre-Controlled Combustion Emission Rates for Asphalt Heater

Process Unit Number	Pollutant	Fuel Usage (gal/hr)	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
19	NO_X	9.4	0.188	0.821
	CO	9.4	0.047	0.205
	VOC	9.4	0.0032	0.014
	SO_2	9.4	0.067	0.292
	PM	9.4	0.019	0.082
	CO_2	9.4	195.7	857.0

Table 6-20: Controlled Combustion Emission Rates for Asphalt Heater

Process Unit Number	Pollutant	Fuel Usage (scf/hr)	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
19	NO_X	9.4	0.188	0.821
	CO	9.4	0.047	0.205
	VOC	9.4	0.0032	0.014
	SO_2	9.4	0.067	0.292
	PM	9.4	0.019	0.082
	CO_2	9.4	195.7	857.0

Estimates for 1675 hp HMA Plant Main Diesel-Fired Engine (NO_X, CO, SO_2, VOC, PM, and CO_2)

A 1675 horsepower (hp), 1250 kilowatt (kW) engine (Unit 17) provides power to the HMA plant. Emission rates for NO_X + NMHC, CO, PM and NMHC are based on EPA AP-42 Tier 2 emission factors. NO_X is 95% of NO_X + NMHC and NMHC is 5% of NO_X + NMHC. Sulfur dioxide (SO_2) emissions are estimated based on sulfur content of diesel fuel, not to exceed 0.05% fuel content and a fuel usage rate of 87.4 gal/hr. CO_2 emission rates are found in AP-42 Section 3.3. Uncontrolled annual emissions in tons per year (tpy) were calculated assuming daylight operation of 8760 hours per year. Controlled annual emissions in tons per year (tpy) were calculated assuming operation of 3500 hours per year.

Tier 2:

Pollutant	Emission Factor (g/kW-hr)
NMHC + NO_X	6.40
Nitrogen Oxide	6.08
Carbon Monoxides	3.50
Particulate	0.20
Hydrocarbons	0.32

Sulfur dioxide emission rate was calculated using the fuel consumption rate for this engine of 87.4 gallons per hour, a fuel density of 7.1 pounds per gallon, a fuel sulfur content of 500 PPM, and a sulfur to sulfur dioxide conversion factor of two (2). The following equation calculates the emission rate for sulfur dioxide (SO_2).

Emission Rate (lbs/hr) = Fuel (gal/hr) * Density lbs/gal * % Sulfur Content * Factor

$$\text{Emission Rate (lbs/hr)} = \frac{87.4 \text{ gallons}}{\text{hr}} \left| \frac{7.1 \text{ lbs}}{\text{gallon}} \right| \frac{0.0005 \text{ lbs Sulfur}}{\text{lbs of fuel}} \left| \frac{2 \text{ lbs Sulfur Dioxide}}{1 \text{ lb Sulfur}} \right.$$

Emission Rate (lbs/hr) = 0.62 lbs/hr

Carbon Dioxide emissions were estimated using AP-42 Table 3.3-1 emission factor of 1.15 lbs/hp-hr.

The following equation was used to calculate the annual emission rate for each engine pollutant:

$$\text{Emission Rate (tons/year)} = \frac{\text{Emission Rate (lbs/hour)} * \text{Operating Hour (hrs/year)}}{2000 \text{ lbs/ton}}$$

Table 6-21: Pre-Controlled Combustion Emission Rates

Process Unit Number	Pollutant	Engine Rating (hp)	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
17	NO_X	1675	16.75	73.39
	CO	1675	9.65	42.25
	SO_2	1675	0.62	2.72
	VOC	1675	0.88	3.86
	PM	1675	0.55	2.41
	PM_{10}	1675	0.55	2.41
	$PM_{2.5}$	1675	0.55	2.41
	CO_2	1675	1926.25	8436.98

Table 6-22: Controlled Combustion Emission Rates

Process Unit Number	Pollutant	Engine Rating (hp)	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
17	NO_X	1675	16.75	29.32
	CO	1675	9.65	16.88
	SO_2	1675	0.62	1.09
	VOC	1675	0.88	1.54
	PM	1675	0.55	0.96
	PM_{10}	1675	0.55	0.96
	$PM_{2.5}$	1675	0.55	0.96
	CO_2	1675	1926.25	3370.94

Estimates for 40.2 hp HMA Plant Standby Diesel-Fired Engine (NO_X, CO, SO_2, VOC, PM, and CO_2)

A 40.5 horsepower (hp), 30 kilowatt (kW) engine (Unit 18) provides standby power to the HMA plant. Emission rates for NO_X + NMHC, CO, PM and NMHC are based on EPA AP-42 Tier 4f emission factors. NO_X is 95% of NO_X + NMHC and NMHC is 5% of NO_X + NMHC. Sulfur dioxide (SO_2) emissions are estimated based on sulfur content of diesel fuel, not to exceed 0.0015% fuel content and a fuel usage rate of 1.6 gal/hr. CO_2 emission rates are found in AP-42 Section 3.3. Uncontrolled annual emissions in tons per year (tpy) were calculated assuming daylight operation of 8760 hours per year. Controlled annual emissions in tons per year (tpy) were calculated assuming operation of 3500 hours per year.

EPA Tier 2:

Pollutant	Emission Factor (g/kW-hr)
Nitrogen Oxide + NMHC	4.70
Nitrogen Oxide	4.47
Carbon Monoxides	5.50
Particulate	0.03
Hydrocarbons	0.24

Sulfur dioxide emission rate was calculated using the fuel consumption rate for this engine of 1.6 gallons per hour, a fuel density of 7.1 pounds per gallon, a fuel sulfur content of 15 PPM, and a sulfur to sulfur dioxide conversion factor of two (2). The following equation calculates the emission rate for sulfur dioxide (SO_2).

Emission Rate (lbs/hr) = Fuel (gal/hr) * Density lbs/gal * % Sulfur Content * Factor

$$\text{Emission Rate (lbs/hr)} = \frac{1.6 \text{ gallons}}{\text{hr}} \mid \frac{7.1 \text{ lbs}}{\text{gallon}} \mid \frac{0.000015 \text{ lbs Sulfur}}{\text{lbs of fuel}} \mid \frac{2 \text{ lbs Sulfur Dioxide}}{1 \text{ lb Sulfur}}$$

Emission Rate (lbs/hr) = 0.00035 lbs/hr

Carbon Dioxide emissions were estimated using AP-42 Table 3.3-1 emission factor of 1.15 lbs/hp-hr.

The following equation was used to calculate the annual emission rate for each engine pollutant:

$$\text{Emission Rate (tons/year)} = \frac{\text{Emission Rate (lbs/hour)} * \text{Operating Hour (hrs/year)}}{2000 \text{ lbs/ton}}$$

Table 6-23: Pre-Controlled Combustion Emission Rates

Process Unit Number	Pollutant	Engine Rating (hp)	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
18	NO_X	30	0.30	1.29
	CO	30	0.36	1.59
	SO_2	30	0.00035	0.0015
	VOC	30	0.016	0.068
	PM	30	0.0020	0.0087
	PM_{10}	30	0.0020	0.0087
	$PM_{2.5}$	30	0.0020	0.0087
	CO_2	30	46.23	202.49

Table 6-24: Controlled Combustion Emission Rates

Process Unit Number	Pollutant	Engine Rating (hp)	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
18	NO_X	30	0.30	0.79
	CO	30	0.36	0.97
	SO_2	30	0.00035	0.00092
	VOC	30	0.016	0.04
	PM	30	0.0020	0.0053
	PM_{10}	30	0.0020	0.0053
	$PM_{2.5}$	30	0.0020	0.0053
	CO_2	30	46.23	123.90

Table 6-25 Summary of Uncontrolled NOx, CO, SO_2, and PM HMA Emission Rates

Uncontrolled Emission Totals															
		NOx		CO		SO_2		VOC		PM		PM_{10}		$PM_{2.5}$	
Unit #	Description	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
AGGPILE	Cold Aggregate/RAP Storage Pile	-	-	-	-	-	-	-	-	2.44	8.72	1.15	4.12	0.17	0.62
1	Feed Bin Loading	-	-	-	-	-	-	-	-	1.39	4.95	0.66	2.34	0.10	0.35
2	Feed Bin Unloading	-	-	-	-	-	-	-	-	0.63	2.76	0.23	1.01	0.036	0.16
3	Scalping Screen	-	-	-	-	-	-	-	-	5.25	23.0	1.83	8.00	0.28	1.21
4	Scalping Screen Unloading	-	-	-	-	-	-	-	-	0.63	2.76	0.23	1.01	0.036	0.16
5	Pug Mill Load	-	-	-	-	-	-	-	-	0.65	2.84	0.24	1.04	0.037	0.16
6	Pug Mill Unload	-	-	-	-	-	-	-	-	0.65	2.84	0.24	1.04	0.037	0.16
7	Conveyor Transfer to Slinger Conveyor	-	-	-	-	-	-	-	-	0.65	2.84	0.24	1.04	0.037	0.16
8	RAP Bin Loading	-	-	-	-	-	-	-	-	1.06	3.77	0.50	1.78	0.076	0.27
9	RAP Bin Unloading	-	-	-	-	-	-	-	-	0.48	2.10	0.18	0.77	0.027	0.12
10	RAP Screen	-	-	-	-	-	-	-	-	4.00	17.5	1.39	6.10	0.21	0.93
11	RAP Screen Unloading	-	-	-	-	-	-	-	-	0.48	2.10	0.18	0.77	0.027	0.12
12	RAP Transfer Conveyor	-	-	-	-	-	-	-	-	0.48	2.10	0.18	0.77	0.027	0.12
13	Mineral Filler Silo Loading	-	-	-	-	-	-	-	-	18.3	19.2	11.8	12.4	2.33	2.44
14	Drum Dryer	22.0	96.4	52.0	228	23.2	102	12.8	56.1	11200	49056	2600	11388	626	2742
15	Drum Mixer Unloading	-	-	0.88	3.87	-	-	9.13	40.0	0.32	1.41	0.32	1.41	0.32	1.41
16	Asphalt Silo Unloading	-	-	1.01	4.43	-	-	3.12	13.6	0.33	1.44	0.33	1.44	0.33	1.44
17	Main Plant Generator	16.8	73.4	9.65	42.2	0.62	2.72	0.88	3.86	0.55	2.41	0.55	2.41	0.55	2.41
18	Standby Generator	0.30	1.29	0.36	1.59	0.00035	0.0015	0.016	0.068	0.0020	0.0087	0.0020	0.0087	0.0020	0.0087
19	Asphalt Heater	0.19	0.82	0.047	0.21	0.067	0.29	0.0032	0.014	0.019	0.082	0.019	0.082	0.019	0.082

Table 6-25 Summary of Uncontrolled NOx, CO, SO_2, and PM HMA Emission Rates

Uncontrolled Emission Totals															
		NOx		CO		SO_2		VOC		PM		PM_{10}		$PM_{2.5}$	
Unit #	Description	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
20	Asphalt Cement Storage Tanks (2)	-	-	-	-	-	-	0.030	0.13	-	-	-	-	-	-
TRCK	Haul Road Traffic	-	-	-	-	-	-	-	-	106.2	375.8	27.1	95.8	2.71	9.58
YARD	HMA Yard	-	-	0.14	0.62	-	-	0.44	1.93	-	-	-	-	-	-
	Total	**39.24**	**171.9**	**64.09**	**280.7**	**23.89**	**104.6**	**26.42**	**115.7**	**11344**	**49534**	**2647**	**11531**	**633.4**	**2763.8**

Table 6-26 Summary of Allowable NOx, CO, SO_2, and PM HMA Emission Rates

Uncontrolled Emission Totals															
		NOx		CO		SO_2		VOC		PM		PM_{10}		$PM_{2.5}$	
Unit #	Description	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
AGGPILE	Cold Aggregate/RAP Storage Pile	-	-	-	-	-	-	-	-	2.44	2.49	1.15	1.18	0.17	0.18
1	Feed Bin Loading	-	-	-	-	-	-	-	-	1.39	1.41	0.66	0.67	0.10	0.10
2	Feed Bin Unloading	-	-	-	-	-	-	-	-	0.029	0.037	0.010	0.012	0.0027	0.0034
3	Scalping Screen	-	-	-	-	-	-	-	-	0.46	0.58	0.16	0.19	0.011	0.013
4	Scalping Screen Unloading	-	-	-	-	-	-	-	-	0.029	0.037	0.010	0.012	0.0027	0.0034
5	Pug Mill Load	-	-	-	-	-	-	-	-	0.030	0.038	0.010	0.012	0.0028	0.0035
6	Pug Mill Unload	-	-	-	-	-	-	-	-	0.030	0.038	0.010	0.012	0.0028	0.0035
7	Conveyor Transfer to Slinger Conveyor	-	-	-	-	-	-	-	-	0.030	0.038	0.010	0.012	0.0028	0.0035
8	RAP Bin Loading	-	-	-	-	-	-	-	-	1.06	1.08	0.50	0.51	0.076	0.077
9	RAP Bin Unloading	-	-	-	-	-	-	-	-	0.022	0.028	0.0074	0.0092	0.0021	0.0026
10	RAP Screen	-	-	-	-	-	-	-	-	0.35	0.44	0.12	0.15	0.0080	0.010
11	RAP Screen Unloading	-	-	-	-	-	-	-	-	0.022	0.028	0.0074	0.0092	0.0021	0.0026
12	RAP Transfer Conveyor	-	-	-	-	-	-	-	-	0.022	0.028	0.0074	0.0092	0.0021	0.0026
13	Mineral Filler Silo Loading	-	-	-	-	-	-	-	-	0.18	0.055	0.12	0.035	0.023	0.0070
14	Drum Dryer	22.0	27.5	52.0	65.0	23.2	29.0	12.8	16.0	13.2	16.5	9.20	11.5	9.20	11.5
15	Drum Mixer Unloading	-	-	0.88	1.11	-	-	9.13	11.41	0.32	0.40	0.32	0.40	0.32	0.40
16	Asphalt Silo Unloading	-	-	1.01	1.26	-	-	3.12	3.89	0.33	0.41	0.33	0.41	0.33	0.41
17	Main Plant Generator	16.8	29.3	9.65	16.88	0.62	1.09	0.88	1.54	0.55	0.96	0.55	0.96	0.55	0.96
18	Standby Generator	0.30	0.79	0.36	0.97	0.00035	0.00092	0.016	0.042	0.0020	0.0053	0.0020	0.0053	0.0020	0.0053
19	Asphalt Heater	0.19	0.82	0.047	0.21	0.067	0.29	0.0032	0.014	0.019	0.082	0.019	0.082	0.019	0.082

Table 6-26 Summary of Allowable NOx, CO, SO_2, and PM HMA Emission Rates

Uncontrolled Emission Totals															
		NOx		CO		SO_2		VOC		PM		PM_{10}		$PM_{2.5}$	
Unit #	Description	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
20	Asphalt Cement Storage Tanks (2)	-	-	-	-	-	-	0.030	0.13	-	-	-	-	-	-
TRCK	Haul Road Traffic	-	-	-	-	-	-	-	-	10.62	10.72	2.71	2.73	0.27	0.27
YARD	HMA Yard	-	-	0.14	0.18	-	-	0.44	0.55	-	-	-	-	-	-
	Total	**39.24**	**58.43**	**64.09**	**85.60**	**23.89**	**30.38**	**26.42**	**33.59**	**31.14**	**35.41**	**15.90**	**18.92**	**11.10**	**14.05**

Estimates for State Toxic Air Pollutants (Asphalt Fumes)

The Hot Mix Asphalt Plant (HMA) drum dryer/mixer, asphalt silo loading, asphalt silo unloading, yard emissions, and heated asphalt cement storage tank are sources of asphalt fumes listed in the NMED's 20.2.72 NMAC, 502 "Toxic Air Pollutants and Emissions", Table A. Emissions of asphalt fumes from the drum dryer/mixer are based on PM organic condensable emission factors found in AP-42 Section 11.1, Table 11.1-3 (0.012 pounds per ton x 400 tons/hr) from the drum dryer/mixer baghouse stack or 4.80 pounds per hour/6.00 tons per year.

Emissions of asphalt fumes from the asphalt silo loading (15), asphalt plant unloading (16), yard (asphalt transported in asphalt trucks-YARD), and hot oil asphalt storage tanks (20) assumed that the emissions of concern from the silo filling, plant loadout, hot oil asphalt storage tanks, and yard asphalt fumes sources are the PAH HAPs plus other semi-volatile HAPs from the particulate (PM) organics and the volatile organic HAPs from the Total Organic Compounds (TOC). These two combined make up asphalt fume emissions from the silo filling, plant loadout, hot oil asphalt storage tanks, and yard sources. Using information found in AP-42 Section 11.1, Tables 11.1-14, 15, and 16 were reviewed and the following emission equations or emission factors were used to estimate asphalt fumes emissions from silo filling, silo unloading, hot oil asphalt storage tanks, and yard.

Drum Loadout
Asphalt Fumes $EF = 0.00036(-V)e^{((0.0251)(T+460)-20.43)}$

Silo Filling
Asphalt Fumes $EF = 0.00078(-V)e^{((0.0251)(T+460)-20.43)}$

Asphalt Storage Tanks
Asphalt Fumes EF = VOC emissions from TANKs * 1.3%

Yard
Asphalt Fumes EF = 0.0000165 lbs/ton of asphalt loaded

Silo filling and plant loadout emission factors were calculated using the default value of –0.5 for asphalt volatility (V) and a tank temperature setting of 350˚ F for HMA mix temperature (T). Inputting these values in to the equations gives you a pound per ton value of 0.0003532 lbs/ton and 0.0001630 lbs/ton or asphalt fumes emission rates of 0.14 pounds/hour/0.18 tons/yr and 0.065 pounds per hour/0.082 tons/yr (400 tph of asphalt production).

Emissions of asphalt fumes from the Yard were based on 1.5 percent of the TOC emission. Yard emission factors are found in AP-42 Section 11.1.2.5. TOC emission factor is 0.0011 lbs/ton of asphalt produced. Asphalt fumes emissions are 0.0000165 lbs/ton of asphalt produced or 0.0066 pounds per hour and 0.0083 tons/yr (400 tph of asphalt production).

Emissions of asphalt fumes from the asphalt cement storage (2) tanks (20) were determined with EPA's TANK 4.0.9d program and the procedures found in EPA's "Emission Factor Documentation for AP-42 Section 11.1 (12/2000) Section 4.4.5" for input to the TANK program. The annual VOC emissions for working and breathing losses from two 30,000 gallon tank were estimated at 258.42 pounds per year or 0.030 pounds per hour. Based on 1.3 percent of the VOC emissions (0.030 pounds per hour total from both tanks), the asphalt fumes emission rate is 0.00038 pounds per hour and 0.0017 tons/yr.

Total asphalt fumes from the HMA plant is 5.01 pounds per hour and 6.27 tons per year.

Estimates for State Toxic Air Pollutants (Calcium Hydroxide)

A potential mineral filler that will be used is lime (calcium hydroxide). Calcium hydroxide is listed in the NMED's 20.2.72 NMAC, 502 "Toxic Air Pollutants and Emissions", Table A. Controlled emissions of lime from the mineral filler silo during loading is 0.18 pounds per hour.

Estimates for Hydrogen Sulfide Pollutants

The Hot Mix Asphalt Plant (HMA) drum dryer/mixer, asphalt silo loading, and asphalt silo unloading are sources of hydrogen sulfide (H_2S) listed as a state regulated ambient air quality standard. Emission factors of H_2S from the drum dryer/mixer, asphalt silo loading, and asphalt silo unloading are based on a 2001 study performed by the North Carolina Division of Air Quality and the city of Salisbury, NC. From the study the H_2S emission factors from these sources are:

Process Unit Number	Process Unit Description	H_2S Emission Factor
14	Drum Dryer/Mixer and Baghouse	0.0000518 lbs/ton
15	Drum Mixer Unloading	0.000001460 lbs/ton
16	Asphalt Silo Unloading	0.000001460 lbs/ton

Table 6-27: Controlled Hot Mix Plant Emission Rates

Process Unit Number	Process Unit Description	Pollutant	Average Hourly Process Rate (tons/hour)	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
14	Drum Dryer/Mixer and Baghouse	H_2S	400	0.021	0.026
15	Drum Mixer Unloading	H_2S	400	0.00058	0.00073
16	Asphalt Silo Unloading	H_2S	400	0.00058	0.00073
			Total H_2S	**0.022**	**0.027**

Estimates for Federal HAPs Air Pollutants

The Hot Mix Asphalt Plant (HMA) drum dryer (14), main plant generator (17), standby generator (18), and asphalt heater (19) are sources of HAPs as it appears in Section 112 (b) of the 1990 CAAA. Emissions of HAPs were determined for the drum mixer using AP-42 Section 11.1 Tables 11.1-10, 11.1-12. Emissions of HAPs were determined for the plant generators using AP-42 Section 3.3 Table 3.3-2; Section 1.3 Table 1.3-10. Emissions of HAPs were determined for the asphalt heater using AP-42 Section 1.4.

The following tables summarize the HAPs emission rates from the drum mixer, main plant generator, standby generator, and asphalt heater. Total combined HAPs emissions from MSCI HMA Plant is 4.27 pounds per hour and 5.25 tons per year.

Table 6-28: HAPs Emission Rates from the Drum Dryer/Mixer (14)

EPA HAPS Emissions Drum Mixer Hot Mix Asphalt Plant with Fabric Filter

Average Hourly Production Rate:	400	tons per hour
Yearly Production Rate:	1000000	tons per year

Type of Fuel:	Waste Fuel Oil
Emission Factors	AP-42 Section 11.1 Tables 11.1-10, 11.1-12

Non-PAH HAPS	CAS#		Emission Factor (lbs/ton)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Acetaldehyde	75-07-0		1.3E-03	0.520000	0.650000
Acrolein	107-02-8		2.6E-05	0.010400	0.013000
Benzene	71-43-2		3.9E-04	0.156000	0.195000
Ethylbenzene	100-41-4		2.4E-04	0.096000	0.120000
Formaldehyde	50-00-0		3.1E-03	1.240000	1.550000
Hexane	110-54-3		9.2E-04	0.368000	0.460000
Isooctane	540-84-1		4.0E-05	0.016000	0.020000
Methyl Ethyl Ketone	78-93-3		2.0E-05	0.008000	0.010000
Propionaldehyde	123-38-6		1.3E-04	0.052000	0.065000
Quinone	106-51-4		1.6E-04	0.064000	0.080000
Methyl chorlform	71-55-6		4.8E-05	0.019200	0.024000
Toluene	108-88-3		2.9E-03	1.160000	1.450000
Xylene	1330-20-7		2.0E-04	0.080000	0.100000
		Total Non-PAH HAPS	9.5E-03	3.789600	4.737000

PAH HAPS	CAS#		Emission Factor (lbs/ton)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
2-Methylnaphthalene	91-57-6		1.7E-04	0.068000	0.085000
Acenaphthene	83-32-9		1.4E-06	0.000560	0.000700
Acenaphthylene	208-96-8		2.2E-05	0.008800	0.011000
Anthracene	120-12-7		3.1E-06	0.001240	0.001550
Benzo(a)anthracene	56-55-3		2.1E-07	0.000084	0.000105
Benzo(a)pyrene	50-32-8		9.8E-09	0.000004	0.000005
Benzo(b)fluoranthene	205-99-2		1.0E-07	0.000040	0.000050
Benzo(b)pyrene	192-97-2		1.1E-07	0.000044	0.000055
Benzo(g,h,l)perylene	191-24-2		4.0E-08	0.000016	0.000020
Benzo(k)fluoranthene	207-08-9		4.1E-08	0.000016	0.000021
Chrysene	218-01-9		1.8E-07	0.000072	0.000090
Fluoranthene	206-44-0		6.1E-07	0.000244	0.000305
Fluorene	86-73-7		1.1E-05	0.004400	0.005500
Indeno(1,2,3-cd)pyrene	193-39-5		7.0E-09	0.000003	0.000004
Naphthalene	91-20-3		6.5E-04	0.260000	0.325000
Perylene	198-55-0		8.8E-09	0.000004	0.000004
Phenanthrene	85-01-8		2.3E-05	0.009200	0.011500
Pyrene	129-00-0		3.0E-06	0.001200	0.001500
		Total PAH HAPS	8.8E-04	0.353927	0.442408

HAPS Metals		Emission Factor (lbs/ton)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Arsenic		5.6E-07	0.000224	0.000280
Beryllium		0.0E+00	0.000000	0.000000
Cadmium		4.1E-07	0.000164	0.000205
Chromium		5.5E-06	0.002200	0.002750
Cobalt		2.6E-08	0.000010	0.000013
Hexavalent Chromium		4.5E-07	0.000180	0.000225
Lead		1.5E-05	0.006000	0.007500
Manganese		7.7E-06	0.003080	0.003850
Mercury		2.6E-06	0.001040	0.001300
Nickel		6.3E-05	0.025200	0.031500
Phosphorus		2.8E-05	0.011200	0.014000
Selenium		3.5E-07	0.000140	0.000175
	Total Metals HAPS	1.2E-04	0.049438	0.061798
	Total HAPS		**4.19297**	**5.24121**

Table 6-29: HAPs Emission Rates from the Main Plant Generator (17)

Horsepower Rating:	1675	horsepower	
Fuel Usage:	87.4	gallons/hr	
MMBtu/hr:	11.1872	Btu	(based on 128000 Btu/gallon)
Btu x 10^-12/hr:	1.11872E-05	Btu x10^-12	(based on 128000 Btu/gallon)
Yearly Operating Hours:	3500	hours per year	

Type of Fuel: Diesel
Emission Factors AP-42 Section 3.3 and Section 1.3

Non-PAH HAPS	CAS#	Emission Factor (lbs/mmBtu)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Acetaldehyde	75-07-0	7.67E-04	0.008581	0.015016
Acrolein	107-02-8	9.25E-05	0.001035	0.001811
Benzene	71-43-2	9.33E-04	0.010438	0.018266
1,3-Butadiene	106-99-0	3.91E-05	0.000437	0.000765
Formaldehyde	50-00-0	1.18E-03	0.013201	0.023102
Propylene	115-07-1	2.58E-03	0.028863	0.050510
Toluene	108-88-3	4.09E-04	0.004576	0.008007
Xylene	1330-20-7	2.85E-04	0.003188	0.005580
	Total Non-PAH HAPS	6.29E-03	0.070318	0.123057

PAH HAPS	CAS#	Emission Factor (lbs/mmBtu)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Acenaphthene	83-32-9	1.42E-06	0.000016	0.000028
Acenaphthylene	208-96-8	5.06E-06	0.000057	0.000099
Anthracene	120-12-7	1.87E-06	0.000021	0.000037
Benzo(a)anthracene	56-55-3	1.68E-06	0.000019	0.000033
Benzo(a)pyrene	50-32-8	1.88E-07	0.000002	0.000004
Benzo(b)fluoranthene	205-99-2	9.91E-08	0.000001	0.000002
Benzo(a)pyrene	192-97-2	1.55E-07	0.000002	0.000003
Benzo(g,h,I)perylene	191-24-2	4.89E-07	0.000005	0.000010
Benzo(k)fluoranthene	207-08-9	1.55E-07	0.000002	0.000003
Dibenz(a,h)anthracene		5.83E-07	0.000007	0.000011
Chrysene	218-01-9	3.53E-07	0.000004	0.000007
Fluoranthene	206-44-0	7.61E-06	0.000085	0.000149
Fluorene	86-73-7	2.92E-05	0.000327	0.000572
Indeno(1,2,3-cd)pyrene	193-39-5	3.75E-07	0.000004	0.000007
Naphthalene	91-20-3	8.48E-05	0.000949	0.001660
Phenanthrene	85-01-8	2.94E-05	0.000329	0.000576
Pyrene	129-00-0	4.78E-06	0.000053	0.000094
	Total PAH HAPS	1.68E-04	0.001882	0.003293

HAPS Metals		Emission Factor (lbs/Btu^12)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Arsenic		4	0.000045	0.000078
Beryllium		3	0.000034	0.000059
Cadmium		3	0.000034	0.000059
Chromium		3	0.000034	0.000059
Lead		9	0.000101	0.000176
Manganese		6	0.000067	0.000117
Mercury		3	0.000034	0.000059
Nickel		3	0.000034	0.000059
Selenium		15	0.000168	0.000294
	Total Metals HAPS	49	0.000548	0.000959
	Total HAPS		**0.07275**	**0.00983**

Table 6-30: HAPs Emission Rates from the Standby Plant Generator (18)

Horsepower Rating:	40.2	horsepower	
Fuel Usage:	1.6	gallons/hr	
MMBtu/hr:	0.2048	Btu	(based on 128000 Btu/gallon)
Btu x 10^-12/hr:	2.048E-07	Btu x10^-12	(based on 128000 Btu/gallon)
Yearly Operating Hours:	5360	hours per year	

Type of Fuel: Diesel
Emission Factors AP-42 Section 3.3 and Section 1.3

Non-PAH HAPS	CAS#	Emission Factor (lbs/mmBtu)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Acetaldehyde	75-07-0	7.67E-04	0.000157	0.000421
Acrolein	107-02-8	9.25E-05	0.000019	0.000051
Benzene	71-43-2	9.33E-04	0.000191	0.000512
1,3-Butadiene	106-99-0	3.91E-05	0.000008	0.000021
Formaldehyde	50-00-0	1.18E-03	0.000242	0.000648
Propylene	115-07-1	2.58E-03	0.000528	0.001416
Toluene	108-88-3	4.09E-04	0.000084	0.000224
Xylene	1330-20-7	2.85E-04	0.000058	0.000156
	Total Non-PAH HAPS	6.29E-03	0.001287	0.003450

PAH HAPS	CAS#	Emission Factor (lbs/mmBtu)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Acenaphthene	83-32-9	1.42E-06	0.000000	0.000001
Acenaphthylene	208-96-8	5.06E-06	0.000001	0.000003
Anthracene	120-12-7	1.87E-06	0.000000	0.000001
Benzo(a)anthracene	56-55-3	1.68E-06	0.000000	0.000001
Benzo(a)pyrene	50-32-8	1.88E-07	0.000000	0.000000
Benzo(b)fluoranthene	205-99-2	9.91E-08	0.000000	0.000000
Benzo(a)pyrene	192-97-2	1.55E-07	0.000000	0.000000
Benzo(g,h,I)perylene	191-24-2	4.89E-07	0.000000	0.000000
Benzo(k)fluoranthene	207-08-9	1.55E-07	0.000000	0.000000
Dibenz(a,h)anthracene		5.83E-07	0.000000	0.000000
Chrysene	218-01-9	3.53E-07	0.000000	0.000000
Fluoranthene	206-44-0	7.61E-06	0.000002	0.000004
Fluorene	86-73-7	2.92E-05	0.000006	0.000016
Indeno(1,2,3-cd)pyrene	193-39-5	3.75E-07	0.000000	0.000000
Naphthalene	91-20-3	8.48E-05	0.000017	0.000047
Phenanthrene	85-01-8	2.94E-05	0.000006	0.000016
Pyrene	129-00-0	4.78E-06	0.000001	0.000003
	Total PAH HAPS	1.68E-04	0.000034	0.000092

HAPS Metals		Emission Factor (lbs/Btu^12)	Emission Rate (lbs/hr)	Emission Rate (ton/yr)
Arsenic		4	0.000001	0.000002
Beryllium		3	0.000001	0.000002
Cadmium		3	0.000001	0.000002
Chromium		3	0.000001	0.000002
Lead		9	0.000002	0.000005
Manganese		6	0.000001	0.000003
Mercury		3	0.000001	0.000002
Nickel		3	0.000001	0.000002
Selenium		15	0.000003	0.000008
	Total Metals HAPS	49	0.000010	0.000027
	Total HAPS		**0.00133**	**0.00028**

Table 6-31: HAPs Emission Rates from the Asphalt Heater (19)

Btu Rating	1.2	mmBtu/hr	(based on 128000 Btu/gallon)
Fuel Usage:	9.4	gallons/hr	
Btu x 10^-12/hr:	0.0000012	Btu x10^-12	(based on 128000 Btu/gallon)
Yearly Operating Hours:	8760	hours per year	

Type of Fuel:	Diesel
Emission Factors	AP-42 Section 1.3

Organic Compounds	**CAS#**		**Emission Factor (lbs/10^3 gal)**	**Emission Rate (lbs/hr)**	**Emission Rate (ton/yr)**
Acenaphthene	83-32-9		2.11E-05	0.000000	0.000001
Acenaphthylene	208-96-8		2.53E-07	0.000000	0.000000
Anthracene	120-12-7		1.22E-06	0.000000	0.000000
Benzene	71-43-2		2.14E-04	0.000002	0.000009
Benzo(a)anthracene	56-55-3		4.01E-06	0.000000	0.000000
Benzo(b,k)fluoranthene	205-99-2		1.48E-06	0.000000	0.000000
Benzo(g,h,I)perylene	191-24-2		2.26E-06	0.000000	0.000000
Chrysene	218-01-9		2.38E-06	0.000000	0.000000
Dibenz(a,h)anthracene			1.67E-06	0.000000	0.000000
Ethylbenzene	100-41-4		6.36E-05	0.000001	0.000003
Fluoranthene	206-44-0		4.84E-06	0.000000	0.000000
Fluorene	86-73-7		4.47E-06	0.000000	0.000000
Formaldehyde	50-00-0		6.10E-02	0.000573	0.002511
Indeno(1,2,3-cd)pyrene	193-39-5		2.14E-06	0.000000	0.000000
Naphthalene	91-20-3		1.13E-03	0.000011	0.000047
Phenanthrene	85-01-8		1.05E-05	0.000000	0.000000
Pyrene	129-00-0		4.25E-06	0.000000	0.000000
Toluene	108-88-3		6.20E-03	0.000058	0.000255
Xylene	1330-20-7		1.09E-04	0.000001	0.000004
		Total Organic Compounds	6.88E-02	0.000647	0.002832

HAPS Metals		**Emission Factor (lbs/Btu^12)**	**Emission Rate (lbs/hr)**	**Emission Rate (ton/yr)**
Arsenic		4	0.000005	0.000021
Beryllium		3	0.000004	0.000016
Cadmium		3	0.000004	0.000016
Chromium		3	0.000004	0.000016
Lead		9	0.000011	0.000047
Manganese		6	0.000007	0.000032
Mercury		3	0.000004	0.000016
Nickel		3	0.000004	0.000016
Selenium		15	0.000018	0.000079
	Total Metals HAPS	49	0.000059	0.000258
	Total HAPS		**0.00135**	**0.00309**

Table 6-32 Summary of Uncontrolled NOx, CO, SO_2, and PM Emission Rates for Whole Facility

Uncontrolled Emission Totals														
Description	**NOx**		**CO**		**SO_2**		**VOC**		**PM**		**PM_{10}**		**$PM_{2.5}$**	
	lbs/hr	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**
HMA Plant	39.24	171.9	64.09	280.7	23.89	104.6	26.42	115.7	11344	49534	2647	11531	633.4	2763.8
RAP Crushing & Screening/Scalping Screen Plants	4.05	8.87	2.82	6.17	0.17	0.38	0.17	0.36	13.84	28.70	5.61	11.52	1.04	2.17
Total	**43.3**	**181**	**66.9**	**287**	**24.1**	**105**	**26.6**	**116**	**11358**	**49563**	**2653**	**11543**	**634**	**2766**

Table 6-33 Summary of Allowable NOx, CO, SO_2, and PM Emission Rates for Whole Facility

Controlled Emission Totals														
Description	**NOx**		**CO**		**SO_2**		**VOC**		**PM**		**PM_{10}**		**$PM_{2.5}$**	
	lbs/hr	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**
HMA Plant	39.24	58.43	64.09	85.60	23.89	30.38	26.42	33.59	31.14	35.41	15.90	18.92	11.10	14.05
RAP Crushing & Screening/Scalping Screen Plants	4.05	8.87	2.82	6.17	0.17	0.38	0.17	0.36	13.84	28.70	5.61	11.52	1.04	2.17
Total	**43.29**	**67.30**	**66.91**	**91.77**	**24.07**	**30.79**	**26.58**	**33.95**	**44.97**	**64.11**	**21.51**	**30.44**	**12.15**	**16.22**

Table 6-34 Summary of Allowable HAPS and Asphalt Fumes Emission Rates for Whole Facility

Controlled Emission Totals				
Description	**HAPS**		**Asphalt Fumes (State TAPS)**	
	lbs/hr	**tons/yr**	**lbs/hr**	**tons/yr**
HMA Plant	4.27	5.25	5.01	6.27
RAP Crushing & Screening/Scalping Screen Plants	0.018	0.0025		
Total	**4.29**	**5.26**	**5.01**	**6.27**

Section 6.a

Green House Gas Emissions

(Submitting under 20.2.70, 20.2.72 20.2.74 NMAC)

Title V (20.2.70 NMAC), Minor NSR (20.2.72 NMAC), and PSD (20.2.74 NMAC) applicants must estimate and report greenhouse gas (GHG) emissions to verify the emission rates reported in the public notice, determine applicability to 40 CFR 60 Subparts, and to evaluate Prevention of Significant Deterioration (PSD) applicability. GHG emissions that are subject to air permit regulations consist of the sum of an aggregate group of these six greenhouse gases: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Calculating GHG Emissions:

1. Calculate the ton per year (tpy) GHG mass emissions and GHG CO_2e emissions from your facility.
2. GHG mass emissions are the sum of the total annual tons of greenhouse gases without adjusting with the global warming potentials (GWPs). GHG CO_2e emissions are the sum of the mass emissions of each individual GHG multiplied by its GWP found in Table A-1 in 40 CFR 98 Mandatory Greenhouse Gas Reporting.
3. Emissions from routine or predictable start up, shut down, and maintenance must be included.
4. Report GHG mass and GHG CO_2e emissions in Table 2-P of this application. Emissions are reported in **short** tons per year and represent each emission unit's Potential to Emit (PTE).
5. All Title V major sources, PSD major sources, and all power plants, whether major or not, must calculate and report GHG mass and CO2e emissions for each unit in Table 2-P.
6. For minor source facilities that are not power plants, are not Title V, and are not PSD there are three options for reporting GHGs in Table 2-P: 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHGs as a second separate unit; 3) or check the following ☐ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

Sources for Calculating GHG Emissions:

- Manufacturer's Data
- AP-42 Compilation of Air Pollutant Emission Factors at http://www.epa.gov/ttn/chief/ap42/index.html
- EPA's Internet emission factor database WebFIRE at http://cfpub.epa.gov/webfire/
- 40 CFR 98 Mandatory Green House Gas Reporting except that tons should be reported in short tons rather than in metric tons for the purpose of PSD applicability.
- API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry. August 2009 or most recent version.
- Sources listed on EPA's NSR Resources for Estimating GHG Emissions at http://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases:

Global Warming Potentials (GWP):
Applicants must use the Global Warming Potentials codified in Table A-1 of the most recent version of 40 CFR 98 Mandatory Greenhouse Gas Reporting. The GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to that of one unit mass of CO_2 over a specified time period.

"Greenhouse gas" for the purpose of air permit regulations is defined as the aggregate group of the following six gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. **(20.2.70.7 NMAC, 20.2.74.7 NMAC).** You may also find GHGs defined in 40 CFR 86.1818-12(a).

Metric to Short Ton Conversion:
Short tons for GHGs and other regulated pollutants are the standard unit of measure for PSD and title V permitting programs. 40 CFR 98 Mandatory Greenhouse Reporting requires metric tons.
1 metric ton = 1.10231 short tons (per Table A-2 to Subpart A of Part 98 – Units of Measure Conversions)

Section 7

Information Used To Determine Emissions

Information Used to Determine Emissions shall include the following:

- **X** If manufacturer data are used, include specifications for emissions units and control equipment, including control efficiencies specifications and sufficient engineering data for verification of control equipment operation, including design drawings, test reports, and design parameters that affect normal operation.
- ☐ If test data are used, include a copy of the complete test report. If the test data are for an emissions unit other than the one being permitted, the emission units must be identical. Test data may not be used if any difference in operating conditions of the unit being permitted and the unit represented in the test report significantly effect emission rates.
- **X** If the most current copy of AP-42 is used, reference the section and date located at the bottom of the page. Include a copy of the page containing the emissions factors, and clearly mark the factors used in the calculations.
- ☐ If an older version of AP-42 is used, include a complete copy of the section.
- **X** If an EPA document or other material is referenced, include a complete copy.
- ☐ Fuel specifications sheet.
- ☐ If computer models are used to estimate emissions, include an input summary (if available) and a detailed report, and a disk containing the input file(s) used to run the model. For tank-flashing emissions, include a discussion of the method used to estimate tank-flashing emissions, relative thresholds (i.e., permit or major source (NSPS, PSD or Title V)), accuracy of the model, the input and output from simulation models and software, all calculations, documentation of any assumptions used, descriptions of sampling methods and conditions, copies of any lab sample analysis.

A-XXXX-7-AP42S1-3	Asphalt Heater Combustion and HAPs Emission Factors
A-XXXX-7-AP42S1-3	Diesel-Fired Engine HAPs Emission Factors
A-XXXX-7-AP42S3-3	Diesel-Fired Engine HAPs Emission Factors
A-XXXX-7-AP42S11-1	HMA Plant and HAPs Emission Factors
A-XXXX-7-AP42S11-12	Mineral Filler Silo Emission Factors
A-XXXX-7-AP42S11-19-2	Screen, Pugmill, and Transfer Point Emission Factors
A-XXXX-7-AP42S13-2-2	Unpaved Road Emission Factors
A-XXXX-7-AP42S13-2-4	Material Handling Emission Factors
A-XXXX-7-WindspeedMoriarty	Internet Wind Speed Average
A-XXXX-7-Unit17&45Tier2	Unit 17: HMA Plant Main Engine
A-XXXX-7-Unit18Tier4f	Unit 18: HMA Plant Standby Engine
A-XXXX-7-Unit17&45Tier2	Unit 45: RAP Scalping Screen (Fold-N-Go) Engine
A-XXXX-7-Unit17Manuf	Unit 17: HMA Plant Main Engine Manufacturer
A-XXXX-7-Unit36Manuf	Unit 36: RAP Crushing and Screening Plant Engine
A-XXXX-7-EPAii03	EPA documents "EIIP – Preferred and Alternative Methods for Estimating Air Emissions from Hot-Mix-Asphalt Plants, Final Report, July 1996, Table 3.2-1 Fugitive Dust – Crushed RAP material"
A-XXXX-7-ACTANK1	Unit 20: HMA Plant Asphalt Cement Storage Tank (#1)
A-XXXX-7-ACTANK2	Unit 20: HMA Plant Asphalt Cement Storage Tank (#2)
A-XXXX-7-HMAEI.xls	MSCI HMA Plant Emissions Spreadsheet (Electronic File)

1.3 Fuel Oil Combustion

1.3.1 General[1-3]

Two major categories of fuel oil are burned by combustion sources: distillate oils and residual oils. These oils are further distinguished by grade numbers, with Nos. 1 and 2 being distillate oils; Nos. 5 and 6 being residual oils; and No. 4 being either distillate oil or a mixture of distillate and residual oils. No. 6 fuel oil is sometimes referred to as Bunker C. Distillate oils are more volatile and less viscous than residual oils. They have negligible nitrogen and ash contents and usually contain less than 0.3 percent sulfur (by weight). Distillate oils are used mainly in domestic and small commercial applications, and include kerosene and diesel fuels. Being more viscous and less volatile than distillate oils, the heavier residual oils (Nos. 5 and 6) may need to be heated for ease of handling and to facilitate proper atomization. Because residual oils are produced from the residue remaining after the lighter fractions (gasoline, kerosene, and distillate oils) have been removed from the crude oil, they contain significant quantities of ash, nitrogen, and sulfur. Residual oils are used mainly in utility, industrial, and large commercial applications.

1.3.2 Firing Practices[4]

The major boiler configurations for fuel oil-fired combustors are watertube, firetube, cast iron, and tubeless design. Boilers are classified according to design and orientation of heat transfer surfaces, burner configuration, and size. These factors can all strongly influence emissions as well as the potential for controlling emissions.

Watertube boilers are used in a variety of applications ranging from supplying large amounts of process steam to providing space heat for industrial facilities. In a watertube boiler, combustion heat is transferred to water flowing through tubes which line the furnace walls and boiler passes. The tube surfaces in the furnace (which houses the burner flame) absorb heat primarily by radiation from the flames. The tube surfaces in the boiler passes (adjacent to the primary furnace) absorb heat primarily by convective heat transfer.

Firetube boilers are used primarily for heating systems, industrial process steam generators, and portable power boilers. In firetube boilers, the hot combustion gases flow through the tubes while the water being heated circulates outside of the tubes. At high pressures and when subjected to large variations in steam demand, firetube units are more susceptible to structural failure than watertube boilers. This is because the high-pressure steam in firetube units is contained by the boiler walls rather than by multiple small-diameter watertubes, which are inherently stronger. As a consequence, firetube boilers are typically small and are used primarily where boiler loads are relatively constant. Nearly all firetube boilers are sold as packaged units because of their relatively small size.

A cast iron boiler is one in which combustion gases rise through a vertical heat exchanger and out through an exhaust duct. Water in the heat exchanger tubes is heated as it moves upward through the tubes. Cast iron boilers produce low pressure steam or hot water, and generally burn oil or natural gas. They are used primarily in the residential and commercial sectors.

Another type of heat transfer configuration used on smaller boilers is the tubeless design. This design incorporates nested pressure vessels with water in between the shells. Combustion gases are fired into the inner pressure vessel and are then sometimes recirculated outside the second vessel.

Table 1.3-9. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM FUEL OIL COMBUSTION[a]

Organic Compound	Average Emission Factor[b] ($lb/10^3$ Gal)	EMISSION FACTOR RATING
Benzene	2.14E-04	C
Ethylbenzene	6.36E-05[c]	E
Formaldehyde[d]	3.30E-02	C
Naphthalene	1.13E-03	C
1,1,1-Trichloroethane	2.36E-04[c]	E
Toluene	6.20E-03	D
o-Xylene	1.09E-04[c]	E
Acenaphthene	2.11E-05	C
Acenaphthylene	2.53E-07	D
Anthracene	1.22E-06	C
Benz(a)anthracene	4.01E-06	C
Benzo(b,k)fluoranthene	1.48E-06	C
Benzo(g,h,i)perylene	2.26E-06	C
Chrysene	2.38E-06	C
Dibenzo(a,h) anthracene	1.67E-06	D
Fluoranthene	4.84E-06	C
Fluorene	4.47E-06	C
Indo(1,2,3-cd)pyrene	2.14E-06	C
Phenanthrene	1.05E-05	C
Pyrene	4.25E-06	C
OCDD	3.10E-09[c]	E

[a] Data are for residual oil fired boilers, Source Classification Codes (SCCs) 1-01-004-01/04.
[b] References 64-72. To convert from $lb/10^3$ gal to $kg/10^3$ L, multiply by 0.12.
[c] Based on data from one source test (Reference 67).
[d] The formaldehyde number presented here is based only on data from utilities using No. 6 oil. The number presented in Table 1.3-7 is based on utility, commercial, and industrial boilers.

Table 1.3-10. EMISSION FACTORS FOR TRACE ELEMENTS FROM DISTILLATE FUEL OIL COMBUSTION SOURCES[a]

EMISSION FACTOR RATING: E

Firing Configuration (SCC)	Emission Factor (lb/10^{12} Btu)										
	As	Be	Cd	Cr	Cu	Pb	Hg	Mn	Ni	Se	Zn
Distillate oil fired (1-01-005-01, 1-02-005-01, 1-03-005-01)	4	3	3	3	6	9	3	6	3	15	4

[a] Data are for distillate oil fired boilers, SCC codes 1-01-005-01, 1-02-005-01, and 1-03-005-01. References 29-32, 40-44 and 83. To convert from lb/10^{12} Btu to pg/J, multiply by 0.43.

Table 1.3-11. EMISSION FACTORS FOR METALS FROM UNCONTROLLED NO. 6 FUEL OIL COMBUSTION[a]

Metal	Average Emission Factor[b, d] ($lb/10^3$ Gal)	EMISSION FACTOR RATING
Antimony	5.25E-03[c]	E
Arsenic	1.32E-03	C
Barium	2.57E-03	D
Beryllium	2.78E-05	C
Cadmium	3.98E-04	C
Chloride	3.47E-01	D
Chromium	8.45E-04	C
Chromium VI	2.48E-04	C
Cobalt	6.02E-03	D
Copper	1.76E-03	C
Fluoride	3.73E-02	D
Lead	1.51E-03	C
Manganese	3.00E-03	C
Mercury	1.13E-04	C
Molybdenum	7.87E-04	D
Nickel	8.45E-02	C
Phosphorous	9.46E-03	D
Selenium	6.83E-04	C
Vanadium	3.18E-02	D
Zinc	2.91E-02	D

[a] Data are for residual oil fired boilers, Source Classification Codes (SCCs) 1-01-004-01/04.

[b] References 64-72. 18 of 19 sources were uncontrolled and 1 source was controlled with low efficiency ESP. To convert from $lb/10^3$ gal to $kg/10^3$ L, multiply by 0.12.

[c] References 29-32,40-44.

[d] For oil/water mixture, reduce factors in proportion to water content of the fuel (due to dilution). To adjust the listed values for water content, multiply the listed value by 1-decimal fraction of water (ex: For fuel with 9 percent water by volume, multiply by 1-0.9=.91).

Table 3.3-1. EMISSION FACTORS FOR UNCONTROLLED GASOLINE AND DIESEL INDUSTRIAL ENGINES[a]

Pollutant	Gasoline Fuel (SCC 2-02-003-01, 2-03-003-01)		Diesel Fuel (SCC 2-02-001-02, 2-03-001-01)		EMISSION FACTOR RATING
	Emission Factor (lb/hp-hr) (power output)	Emission Factor (lb/MMBtu) (fuel input)	Emission Factor (lb/hp-hr) (power output)	Emission Factor (lb/MMBtu) (fuel input)	
NO_x	0.011	1.63	0.031	4.41	D
CO	0.439	62.7	6.68 E-03	0.95	D
SO_x	5.91 E-04	0.084	2.05 E-03	0.29	D
PM-10[b]	7.21 E-04	0.10	2.20 E-03	0.31	D
CO_2[c]	1.08	154	1.15	164	B
Aldehydes	4.85 E-04	0.07	4.63 E-04	0.07	D
TOC					
Exhaust	0.015	2.10	2.47 E-03	0.35	D
Evaporative	6.61 E-04	0.09	0.00	0.00	E
Crankcase	4.85 E-03	0.69	4.41 E-05	0.01	E
Refueling	1.08 E-03	0.15	0.00	0.00	E

[a] References 2,5-6,9-14. When necessary, an average brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr. To convert from lb/hp-hr to kg/kw-hr, multiply by 0.608. To convert from lb/MMBtu to ng/J, multiply by 430. SCC = Source Classification Code. TOC = total organic compounds.

[b] PM-10 = particulate matter less than or equal to 10 μm aerodynamic diameter. All particulate is assumed to be ≤ 1 μm in size.

[c] Assumes 99% conversion of carbon in fuel to CO_2 with 87 weight % carbon in diesel, 86 weight % carbon in gasoline, average BSFC of 7,000 Btu/hp-hr, diesel heating value of 19,300 Btu/lb, and gasoline heating value of 20,300 Btu/lb.

11.1 Hot Mix Asphalt Plants

11.1.1 General[1-3,23, 392-394]

Hot mix asphalt (HMA) paving materials are a mixture of size-graded, high quality aggregate (which can include reclaimed asphalt pavement [RAP]), and liquid asphalt cement, which is heated and mixed in measured quantities to produce HMA. Aggregate and RAP (if used) constitute over 92 percent by weight of the total mixture. Aside from the amount and grade of asphalt cement used, mix characteristics are determined by the relative amounts and types of aggregate and RAP used. A certain percentage of fine aggregate (less than 74 micrometers [μm] in physical diameter) is required for the production of good quality HMA.

Hot mix asphalt paving materials can be manufactured by: (1) batch mix plants, (2) continuous mix (mix outside dryer drum) plants, (3) parallel flow drum mix plants, and (4) counterflow drum mix plants. This order of listing generally reflects the chronological order of development and use within the HMA industry.

In 1996, approximately 500 million tons of HMA were produced at the 3,600 (estimated) active asphalt plants in the United States. Of these 3,600 plants, approximately 2,300 are batch plants, 1,000 are parallel flow drum mix plants, and 300 are counterflow drum mix plants. The total 1996 HMA production from batch and drum mix plants is estimated at about 240 million tons and 260 million tons, respectively. About 85 percent of plants being manufactured today are of the counterflow drum mix design, while batch plants and parallel flow drum mix plants account for 10 percent and 5 percent respectively. Continuous mix plants represent a very small fraction of the plants in use ($\leq$0.5 percent) and, therefore, are not discussed further.

An HMA plant can be constructed as a permanent plant, a skid-mounted (easily relocated) plant, or a portable plant. All plants can have RAP processing capabilities. Virtually all plants being manufactured today have RAP processing capability. Most plants have the capability to use either gaseous fuels (natural gas) or fuel oil. However, based upon Department of Energy and limited State inventory information, between 70 and 90 percent of the HMA is produced using natural gas as the fuel to dry and heat the aggregate.

11.1.1.1 Batch Mix Plants –

Figure 11.1-1 shows the batch mix HMA production process. Raw aggregate normally is stockpiled near the production unit. The bulk aggregate moisture content typically stabilizes between 3 to 5 percent by weight.

Processing begins as the aggregate is hauled from the storage piles and is placed in the appropriate hoppers of the cold feed unit. The material is metered from the hoppers onto a conveyer belt and is transported into a rotary dryer (typically gas- or oil-fired). Dryers are equipped with flights designed to shower the aggregate inside the drum to promote drying efficiency.

As the hot aggregate leaves the dryer, it drops into a bucket elevator and is transferred to a set of vibrating screens, where it is classified into as many as four different grades (sizes) and is dropped into individual "hot" bins according to size. At newer facilities, RAP also may be transferred to a separate heated storage bin. To control aggregate size distribution in the final batch mix, the operator opens various hot bins over a weigh hopper until the desired mix and weight are obtained. Concurrent with the aggregate being weighed, liquid asphalt cement is pumped from a heated storage tank to an asphalt bucket, where it is weighed to achieve the desired aggregate-to-asphalt cement ratio in the final mix.

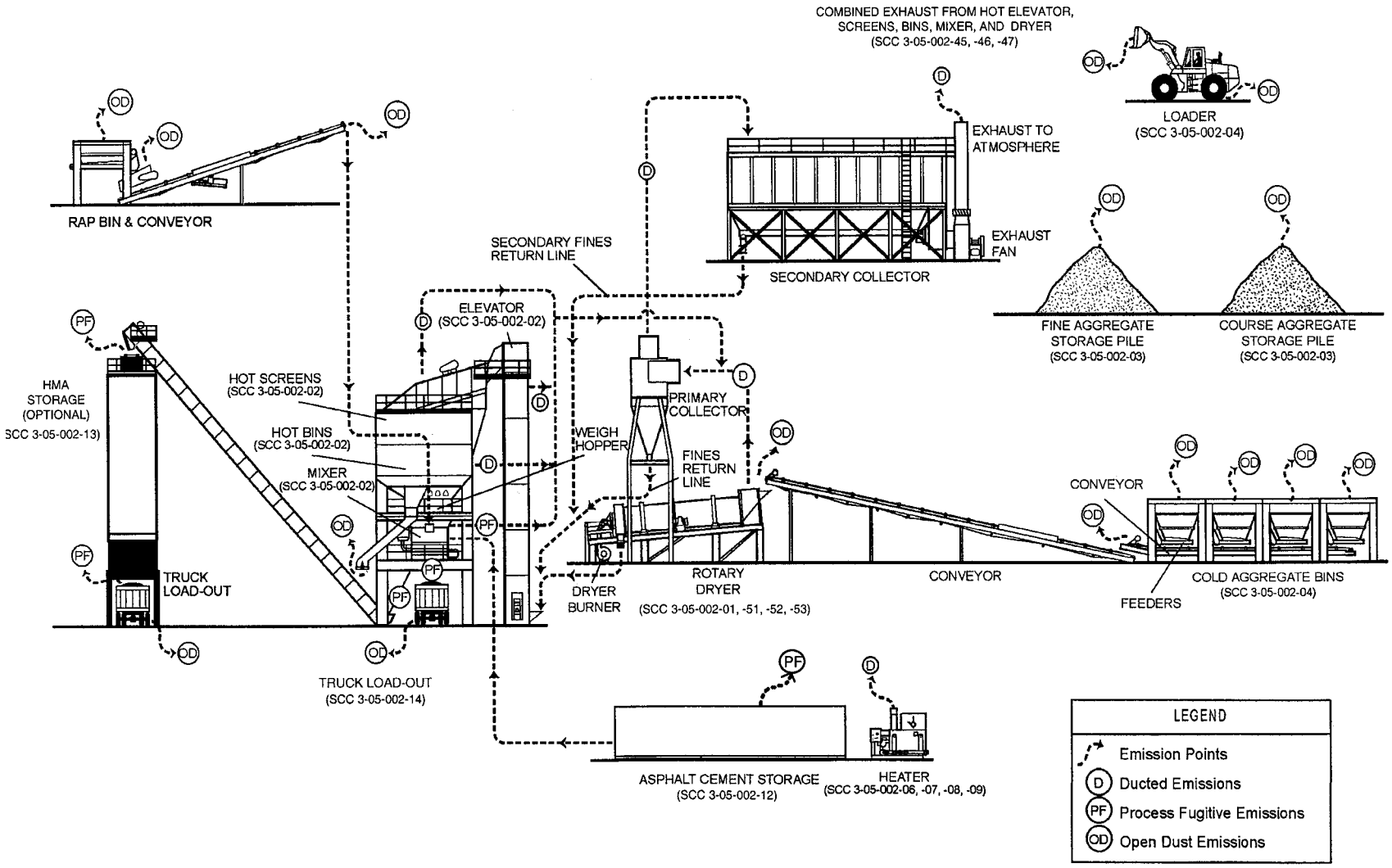


Figure 11.1-1. General process flow diagram for batch mix asphalt plants (source classification codes in parentheses).[3]

The aggregate from the weigh hopper is dropped into the mixer (pug mill) and dry-mixed for 6 to 10 seconds. The liquid asphalt is then dropped into the pug mill where it is mixed for an additional period of time. At older plants, RAP typically is conveyed directly to the pug mill from storage hoppers and combined with the hot aggregate. Total mixing time usually is less than 60 seconds. Then the hot mix is conveyed to a hot storage silo or is dropped directly into a truck and hauled to the job site.

11.1.1.2 Parallel Flow Drum Mix Plants –

Figure 11.1-2 shows the parallel flow drum mix process. This process is a continuous mixing type process, using proportioning cold feed controls for the process materials. The major difference between this process and the batch process is that the dryer is used not only to dry the material but also to mix the heated and dried aggregates with the liquid asphalt cement. Aggregate, which has been proportioned by size gradations, is introduced to the drum at the burner end. As the drum rotates, the aggregates, as well as the combustion products, move toward the other end of the drum in parallel. Liquid asphalt cement flow is controlled by a variable flow pump electronically linked to the new (virgin) aggregate and RAP weigh scales. The asphalt cement is introduced in the mixing zone midway down the drum in a lower temperature zone, along with any RAP and particulate matter (PM) from collectors.

The mixture is discharged at the end of the drum and is conveyed to either a surge bin or HMA storage silos, where it is loaded into transport trucks. The exhaust gases also exit the end of the drum and pass on to the collection system.

Parallel flow drum mixers have an advantage, in that mixing in the discharge end of the drum captures a substantial portion of the aggregate dust, therefore lowering the load on the downstream PM collection equipment. For this reason, most parallel flow drum mixers are followed only by primary collection equipment (usually a baghouse or venturi scrubber). However, because the mixing of aggregate and liquid asphalt cement occurs in the hot combustion product flow, organic emissions (gaseous and liquid aerosol) may be greater than in other asphalt mixing processes. Because data are not available to distinguish significant emissions differences between the two process designs, this effect on emissions cannot be verified.

11.1.1.3 Counterflow Drum Mix Plants –

Figure 11.1-3 shows a counterflow drum mix plant. In this type of plant, the material flow in the drum is opposite or counterflow to the direction of exhaust gases. In addition, the liquid asphalt cement mixing zone is located behind the burner flame zone so as to remove the materials from direct contact with hot exhaust gases.

Liquid asphalt cement flow is controlled by a variable flow pump which is electronically linked to the virgin aggregate and RAP weigh scales. It is injected into the mixing zone along with any RAP and particulate matter from primary and secondary collectors.

Because the liquid asphalt cement, virgin aggregate, and RAP are mixed in a zone removed from the exhaust gas stream, counterflow drum mix plants will likely have organic emissions (gaseous and liquid aerosol) that are lower than parallel flow drum mix plants. However, the available data are insufficient to discern any differences in emissions that result from differences in the two processes. A counterflow drum mix plant can normally process RAP at ratios up to 50 percent with little or no observed effect upon emissions.

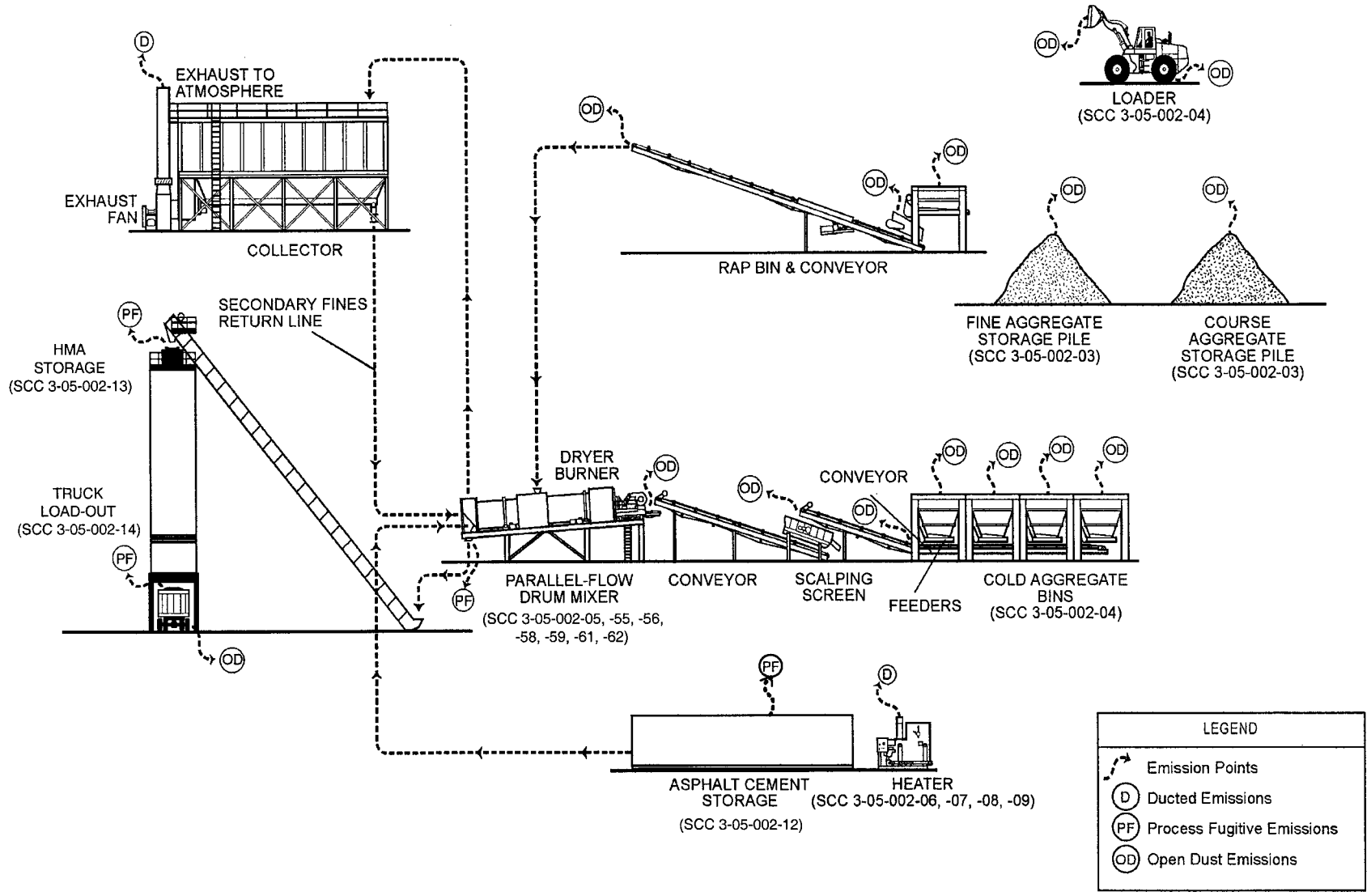


Figure 11.1-2. General process flow diagram for parallel-flow drum mix asphalt plants (source classification codes in parentheses).[3]

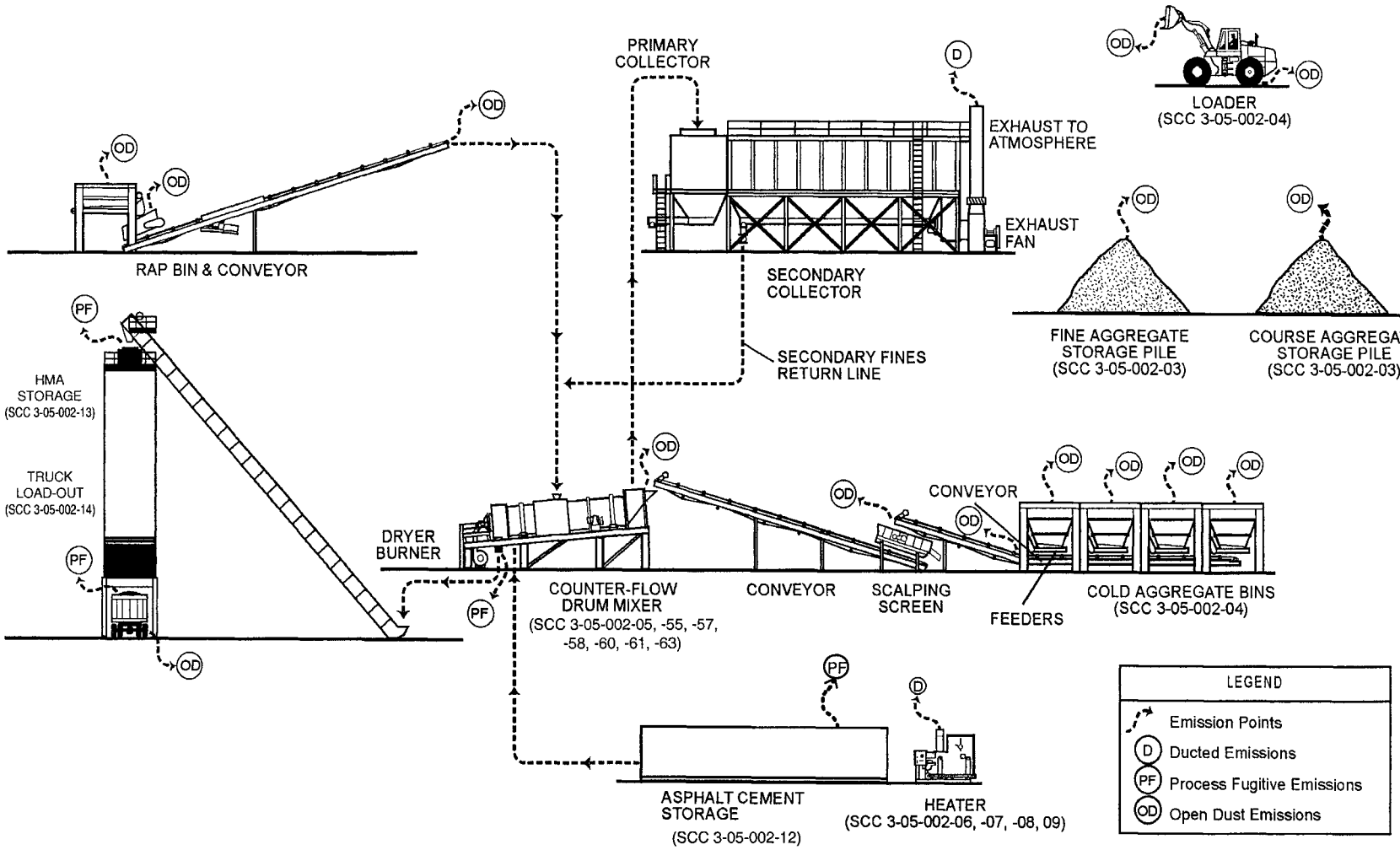


Figure 11.1-3. General process flow diagram for counter-flow drum mix asphalt plants (source classification codes in parentheses).[3]

11.1.1.4 Recycle Processes[393] –

In recent years, the use of RAP has been initiated in the HMA industry. Reclaimed asphalt pavement significantly reduces the amount of virgin rock and asphalt cement needed to produce HMA.

In the reclamation process, old asphalt pavement is removed from the road base. This material is then transported to the plant, and is crushed and screened to the appropriate size for further processing. The paving material is then heated and mixed with new aggregate (if applicable), and the proper amount of new asphalt cement is added to produce HMA that meets the required quality specifications.

11.1.2 Emissions And Controls[2-3,23]

Emissions from HMA plants may be divided into ducted production emissions, pre-production fugitive dust emissions, and other production-related fugitive emissions. Pre-production fugitive dust sources associated with HMA plants include vehicular traffic generating fugitive dust on paved and unpaved roads, aggregate material handling, and other aggregate processing operations. Fugitive dust may range from 0.1 μm to more than 300 μm in aerodynamic diameter. On average, 5 percent of cold aggregate feed is less than 74 μm (minus 200 mesh). Fugitive dust that may escape collection before primary control generally consists of PM with 50 to 70 percent of the total mass less than 74 μm. Uncontrolled PM emission factors for various types of fugitive sources in HMA plants are addressed in Sections 11.19.2, "Crushed Stone Processing", 13.2.1, "Paved Roads", 13.2.2, "Unpaved Roads", 13.2.3, "Heavy Construction Operations", and 13.2.4, "Aggregate Handling and Storage Piles." Production-related fugitive emissions and emissions from ducted production operations are discussed below. Emission points discussed below refer to Figure 11.1-1 for batch mix asphalt plants and to Figures 11.1-2 and 11.1-3 for drum mix plants.

11.1.2.1 Batch Mix Plants –

As with most facilities in the mineral products industry, batch mix HMA plants have two major categories of emissions: ducted sources (those vented to the atmosphere through some type of stack, vent, or pipe), and fugitive sources (those not confined to ducts and vents but emitted directly from the source to the ambient air). Ducted emissions are usually collected and transported by an industrial ventilation system having one or more fans or air movers, eventually to be emitted to the atmosphere through some type of stack. Fugitive emissions result from process and open sources and consist of a combination of gaseous pollutants and PM.

The most significant ducted source of emissions of most pollutants from batch mix HMA plants is the rotary drum dryer. The dryer emissions consist of water (as steam evaporated from the aggregate); PM; products of combustion (carbon dioxide [CO_2], nitrogen oxides [NO_x], and sulfur oxides [SO_x]); carbon monoxide (CO); and small amounts of organic compounds of various species (including volatile organic compounds [VOC], methane [CH_4], and hazardous air pollutants [HAP]). The CO and organic compound emissions result from incomplete combustion of the fuel. It is estimated that between 70 and 90 percent of the energy used at HMA plants is from the combustion of natural gas.

Other potential process sources include the hot-side conveying, classifying, and mixing equipment, which are vented either to the primary dust collector (along with the dryer gas) or to a separate dust collection system. The vents and enclosures that collect emissions from these sources are commonly called "fugitive air" or "scavenger" systems. The scavenger system may or may not have its own separate air mover device, depending on the particular facility. The emissions captured and transported by the scavenger system are mostly aggregate dust, but they may also contain gaseous organic compounds and a fine aerosol of condensed organic particles. This organic aerosol is created by the condensation of vapor into particles during cooling of organic vapors volatilized from the asphalt cement in the mixer (pug mill). The amount of organic aerosol produced depends to a large extent on the temperature of the asphalt cement and aggregate entering the pug mill. Organic vapor and its associated

aerosol also are emitted directly to the atmosphere as process fugitives during truck load-out, from the bed of the truck itself during transport to the job site, and from the asphalt storage tank. Both the low molecular weight organic compounds and the higher weight organic aerosol contain small amounts of HAP. The ducted emissions from the heated asphalt storage tanks include gaseous and aerosol organic compounds and combustion products from the tank heater.

The choice of applicable emission controls for PM emissions from the dryer and vent line includes dry mechanical collectors, scrubbers, and fabric filters. Attempts to apply electrostatic precipitators have met with little success. Practically all plants use primary dust collection equipment such as large diameter cyclones, skimmers, or settling chambers. These chambers often are used as classifiers to return collected material to the hot elevator and to combine it with the drier aggregate. To capture remaining PM, the primary collector effluent is ducted to a secondary collection device. Most plants use either a fabric filter or a venturi scrubber for secondary emissions control. As with any combustion process, the design, operation, and maintenance of the burner provides opportunities to minimize emissions of NO_x, CO, and organic compounds.

11.1.2.2 Parallel Flow Drum Mix Plants –

The most significant ducted source of emissions from parallel-flow drum mix plants is the rotary drum dryer. Emissions from the drum consist of water (as steam evaporated from the aggregate); PM; products of combustion; CO; and small amounts of organic compounds of various species (including VOC, CH_4, and HAP). The organic compound and CO emissions result from incomplete combustion of the fuel and from heating and mixing of the liquid asphalt cement inside the drum. Although it has been suggested that the processing of RAP materials at these type plants may increase organic compound emissions because of an increase in mixing zone temperature during processing, the data supporting this hypothesis are very weak. Specifically, although the data show a relationship only between RAP content and condensible organic particulate emissions, 89 percent of the variations in the data were the result of other unknown process variables.

Once the organic compounds cool after discharge from the process stack, some condense to form a fine organic aerosol or "blue smoke" plume. A number of process modifications or restrictions have been introduced to reduce blue smoke, including installation of flame shields, rearrangement of flights inside the drum, adjustments of the asphalt injection point, and other design changes.

11.1.2.3 Counterflow Drum Mix Plants –

The most significant ducted source of emissions from counterflow drum mix plants is the rotary drum dryer. Emissions from the drum consist of water (as steam evaporated from the aggregate); PM; products of combustion; CO; and small amounts of organic compounds of various species (including VOC, CH_4, and HAP). The CO and organic compound emissions result primarily from incomplete combustion of the fuel, and can also be released from the heated asphalt. Liquid asphalt cement, aggregate, and sometimes RAP, are mixed in a zone not in contact with the hot exhaust gas stream. As a result, kiln stack emissions of organic compounds from counterflow drum mix plants may be lower than parallel flow drum mix plants. However, variations in the emissions due to other unknown process variables are more significant. As a result, the emission factors for parallel flow and counterflow drum mix plants are the same.

11.1.2.4 Parallel and Counterflow Drum Mix Plants –

Process fugitive emissions associated with batch plant hot screens, elevators, and the mixer (pug mill) are not present in the drum mix processes. However, there are fugitive PM and VOC emissions from transport and handling of the HMA from the drum mixer to the storage silo and also from the load-out operations to the delivery trucks. Since the drum process is continuous, these plants have surge

bins or storage silos. The fugitive dust sources associated with drum mix plants are similar to those of batch mix plants with regard to truck traffic and to aggregate material feed and handling operations.

Table 11.1-1 presents emission factors for filterable PM and PM-10, condensable PM, and total PM for batch mix HMA plants. Particle size data for batch mix HMA plants, based on the control technology used, are shown in Table 11.1-2. Table 11.1-3 presents filterable PM and PM-10, condensable PM, and total PM emission factors for drum mix HMA plants. Particle size data for drum mix HMA plants, based on the control technology used, are shown in Table 11.1-4. Tables 11.1-5 and -6 present emission factors for CO, CO_2, NO_x, sulfur dioxide (SO_2), total organic compounds (TOC), formaldehyde, CH_4, and VOC from batch mix plants. Tables 11.1-7 and -8 present emission factors for CO, CO_2, NO_x, SO_2, TOC, CH_4, VOC, and hydrochloric acid (HCl) from drum mix plants. The emission factors for CO, NO_x, and organic compounds represent normal plant operations without scrutiny of the burner design, operation, and maintenance. Information provided in Reference 390 indicates that attention to burner design, periodic evaluation of burner operation, and appropriate maintenance can reduce these emissions. Table 11.1-9 presents organic pollutant emission factors for batch mix plants. Table 11.1-10 presents organic pollutant emission factors for drum mix plants. Tables 11.1-11 and -12 present metals emission factors for batch and drum mix plants, respectively. Table 11.1-13 presents organic pollutant emission factors for hot (asphalt) oil systems.

11.1.2.5 Fugitive Emissions from Production Operations –

Emission factors for HMA load-out and silo filling operations can be estimated using the data in Tables 11.1-14, -15, and -16. Table 11.1-14 presents predictive emission factor equations for HMA load-out and silo filling operations. Separate equations are presented for total PM, extractable organic PM (as measured by EPA Method 315), TOC, and CO. For example, to estimate total PM emissions from drum mix or batch mix plant load-out operations using an asphalt loss-on-heating of 0.41 percent and temperature of 290°F, the following calculation is made:

$$
\begin{aligned}
EF &= 0.000181 + 0.00141(-V)e^{((0.0251)(290 + 460) - 20.43)} \\
&= 0.000181 + 0.00141(-(-0.41))e^{((0.0251)(290 + 460) - 20.43)} \\
&= 0.000181 + 0.00141(0.41)e^{(-1.605)} \\
&= 0.000181 + 0.00141(0.41)(0.2009) \\
&= 0.000181 + 0.000116 \\
&= 0.00030 \text{ lb total PM/ton of asphalt loaded}
\end{aligned}
$$

Tables 11.1-15 and -16 present speciation profiles for organic particulate-based and volatile particulate-based compounds, respectively. The speciation profile shown in Table 11.1-15 can be applied to the extractable organic PM emission factors estimated by the equations in Table 11.1-14 to estimate emission factors for specific organic PM compounds. The speciation profile presented in Table 11.1-16 can be applied to the TOC emission factors estimated by the equations in Table 11.1-14 to estimate emission factors for specific volatile organic compounds. The derivations of the predictive emission factor equations and the speciation profiles can be found in Reference 1.

For example, to estimate TOC emissions from drum mix plant load-out operations using an asphalt loss-on-heating of 0.41 percent and temperature of 290°F, the following calculation is made:

$$
\begin{aligned}
EF &= 0.0172(-V)e^{((0.0251)(290 + 460) - 20.43)} \\
&= 0.0172(-(-0.41))e^{((0.0251)(290 + 460) - 20.43)} \\
&= 0.0172(0.41)e^{(-1.605)} \\
&= 0.0172(0.41)(0.2009) \\
&= 0.0014 \text{ lb TOC/ton of asphalt loaded}
\end{aligned}
$$

To estimate the benzene emissions from the same operation, use the TOC emission factor calculated above and apply the benzene fraction for load-out emissions from Table 11.1-16:

EF = 0.0014 (0.00052)
= 7.3×10^{-7} lb benzene/ton of asphalt loaded

Emissions from asphalt storage tanks can be estimated using the procedures described in AP-42 Section 7.1, Organic Liquid Storage Tanks, and the TANKS software. Site-specific data should be used for storage tank specifications and operating parameters, such as temperature. If site-specific data for Antoine's constants for an average asphalt binder used by the facility are unavailable, the following values for an average liquid asphalt binder can be used:

A = 75,350.06
B = 9.00346

These values should be inserted into the Antoine's equation in the following form:

$$\log_{10} P = \frac{-0.05223A}{T} + B$$

where:

P = vapor pressure, mm Hg
T = absolute temperature, Kelvin

The assumed average liquid molecular weight associated with these Antoine's constants is 1,000 atomic mass units and the average vapor molecular weight is 105. Emission factors estimated using these default values should be assigned a rating of E. Carbon monoxide emissions can be estimated by multiplying the THC emissions calculated by the TANKS program by 0.097 (the ratio of silo filling CO emissions to silo filling TOC emissions).

Vapors from the HMA loaded into transport trucks continue following load-out operations. The TOC emissions for the 8-minute period immediately following load-out (yard emissions) can be estimated using an emission factor of 0.00055 kg/Mg (0.0011 lb/ton) of asphalt loaded. This factor is assigned a rating of E. The derivation of this emission factor is described in Reference 1. Carbon monoxide emissions can be estimated by multiplying the TOC emissions by 0.32 (the ratio of truck load-out CO emissions to truck load-out THC emissions).

11.2.3 Updates Since the Fifth Edition

The Fifth Edition was released in January 1995. Revisions to this section since that date are summarized below. For further detail, consult the background report for this section. This and other documents can be found on the CHIEF Web Site at http://www.epa.gov/ttn/chief/, or by calling the Info CHIEF Help Desk at (919)541-1000.

December 2000

- All emission factors were revised and new factors were added. For selected pollutant emissions, separate factors were developed for distilate oil, No. 6 oil and waste oil fired dryers. Dioxin and Furan emission factors were developed for oil fired drum mix plants. Particulate, VOC and CO factors were developed for silo filling, truck load out and post truck load out operations at batch plants and drum mix plants. Organic species profiles were developed for silo filling, truck load out and post truck load out operations.

March 2004

- The emission factor for formaldehyde for oil fired hot oil heaters was revised. An emission factor for formaldehyde for gas fired hot oil heaters and emission factors for CO and CO_2 for gas and oil fired hot oil heaters were developed. (Table 11.1-13)

Table 11.1-1. PARTICULATE MATTER EMISSION FACTORS FOR BATCH MIX HOT MIX ASPHALT PLANTS[a]

Process	Filterable PM				Condensable PM[b]				Total PM			
	PM[c]	EMISSION FACTOR RATING	PM-10[d]	EMISSION FACTOR RATING	Inorganic	EMISSION FACTOR RATING	Organic	EMISSION FACTOR RATING	PM[e]	EMISSION FACTOR RATING	PM-10[f]	EMISSION FACTOR RATING
Dryer, hot screens, mixer[g] (SCC 3-05-002-45, -46, -47)												
Uncontrolled	32[h]	E	4.5	E	0.013[j]	E	0.0041[j]	E	32	E	4.5	E
Venturi or wet scrubber	0.12[k]	C	ND	NA	0.013[m]	B	0.0041[n]	B	0.14	C	ND	NA
Fabric filter	0.025[p]	A	0.0098	C	0.013[m]	A	0.0041[n]	A	0.042	B	0.027	C

[a] Factors are lb/ton of product. SCC = Source Classification Code. ND = no data. NA = not applicable. To convert from lb/ton to kg/Mg, multiply by 0.5.

[b] Condensable PM is that PM collected using an EPA Method 202, Method 5 (analysis of "back-half" or impingers), or equivalent sampling train.

[c] Filterable PM is that PM collected on or before the filter of an EPA Method 5 (or equivalent) sampling train.

[d] Particle size data from Reference 23 were used in conjunction with the filterable PM emission factors shown.

[e] Total PM is the sum of filterable PM, condensable inorganic PM, and condensable organic PM.

[f] Total PM-10 is the sum of filterable PM-10, condensable inorganic PM, and condensable organic PM.

[g] Batch mix dryer fired with natural gas, propane, fuel oil, waste oil, and coal. The data indicate that fuel type does not significantly effect PM emissions.

[h] Reference 5.

[j] Although no data are available for uncontrolled condensable PM, values are assumed to be equal to the controlled value measured.

[k] Reference 1, Table 4-19. Average of data from 16 facilities. Range: 0.047 to 0.40 lb/ton. Median: 0.049 lb/ton. Standard deviation: 0.11 lb/ton.

[m] Reference 1, Table 4-19. Average of data from 35 facilities. Range: 0.00073 to 0.12 lb/ton. Median: 0.0042 lb/ton. Standard deviation: 0.024 lb/ton.

[n] Reference 1, Table 4-19. Average of data from 24 facilities. Range: 0.000012 to 0.018 lb/ton. Median: 0.0026 lb/ton. Standard deviation: 0.0042 lb/ton.

[p] Reference 1, Table 4-19. Average of data from 89 facilities. Range: 0.0023 to 0.18 lb/ton. Median: 0.012 lb/ton. Standard deviation: 0.033 lb/ton.

Table 11.1-2. SUMMARY OF PARTICLE SIZE DISTRIBUTION FOR BATCH MIX DRYERS, HOT SCREENS, AND MIXERS[a]

EMISSION FACTOR RATING: E

Particle Size, μm[b]	Cumulative Mass Less Than or Equal to Stated Size (%)[c]		Emission Factors, lb/ton	
	Uncontrolled[d]	Fabric Filter	Uncontrolled[d]	Fabric Filter
1.0	ND	30[e]	ND	0.0075[e]
2.5	0.83	33[e]	0.27	0.0083[e]
5.0	3.5	36[e]	1.1	0.0090[e]
10.0	14	39[f]	4.5	0.0098[f]
15.0	23	47[e]	7.4	0.012[e]

[a] Emission factor units are lb/ton of HMA provided. Rounded to two significant figures. SCC 3-05-002-45, -46, -47. ND = no data available. To convert from lb/ton to kg/Mg, multiply by 0.5.

[b] Aerodynamic diameter.

[c] Applies only to the mass of filterable PM.

[d] References 23, Table 3-36. The emission factors are calculated using the particle size data from this reference in conjunction with the filterable PM emission factor shown in Table 11.1-1.

[e] References 23, Page J-61. The emission factors are calculated using the particle size data from this reference in conjunction with the filterable PM emission factor shown in Table 11.1-1.

[f] References 23-24. The emission factors are calculated using the particle size data from these references in conjunction with the filterable PM emission factor shown in Table 11.1-1.

Table 11.1-3. PARTICULATE MATTER EMISSION FACTORS FOR DRUM MIX HOT MIX ASPHALT PLANTS[a]

Process	Filterable PM				Condensable PM[b]				Total PM			
	PM[c]	EMISSION FACTOR RATING	PM-10[d]	EMISSION FACTOR RATING	Inorganic	EMISSION FACTOR RATING	Organic	EMISSION FACTOR RATING	PM[e]	EMISSION FACTOR RATING	PM-10[f]	EMISSION FACTOR RATING
Dryer[g] (SCC 3-05-002-05,-55 to -63)												
Uncontrolled	28[h]	D	6.4	D	0.0074[j]	E	0.058[k]	E	28	D	6.5	D
Venturi or wet scrubber	0.026[m]	A	ND	NA	0.0074[n]	A	0.012[p]	A	0.045	A	ND	NA
Fabric filter	0.014[q]	A	0.0039	C	0.0074[n]	A	0.012[p]	A	0.033	A	0.023	C

[a] Factors are lb/ton of product. SCC = Source Classification Code. ND = no data. NA = not applicable. To convert from lb/ton to kg/Mg, multiply by 0.5.

[b] Condensable PM is that PM collected using an EPA Method 202, Method 5 (analysis of "back-half" or impingers), or equivalent sampling train.

[c] Filterable PM is that PM collected on or before the filter of an EPA Method 5 (or equivalent) sampling train.

[d] Particle size data from Reference 23 were used in conjunction with the filterable PM emission factors shown.

[e] Total PM is the sum of filterable PM, condensable inorganic PM, and condensable organic PM.

[f] Total PM-10 is the sum of filterable PM-10, condensable inorganic PM, and condensable organic PM.

[g] Drum mix dryer fired with natural gas, propane, fuel oil, and waste oil. The data indicate that fuel type does not significantly effect PM emissions.

[h] References 31, 36-38, 340.

[j] Because no data are available for uncontrolled condensable inorganic PM, the emission factor is assumed to be equal to the maximum controlled condensable inorganic PM emission factor.

[k] References 36-37.

[m] Reference 1, Table 4-14. Average of data from 36 facilities. Range: 0.0036 to 0.097 lb/ton. Median: 0.020 lb/ton. Standard deviation: 0.022 lb/ton.

[n] Reference 1, Table 4-14. Average of data from 30 facilities. Range: 0.0012 to 0.027 lb/ton. Median: 0.0051 lb/ton. Standard deviation: 0.0063 lb/ton.

[p] Reference 1, Table 4-14. Average of data from 41 facilities. Range: 0.00035 to 0.074 lb/ton. Median: 0.0046 lb/ton. Standard deviation: 0.016 lb/ton.

[q] Reference 1, Table 4-14. Average of data from 155 facilities. Range: 0.00089 to 0.14 lb/ton. Median: 0.010 lb/ton. Standard deviation: 0.017 lb/ton.

Table 11.1-4. SUMMARY OF PARTICLE SIZE DISTRIBUTION FOR DRUM MIX DRYERS[a]

EMISSION FACTOR RATING: E

Particle Size, μm[b]	Cumulative Mass Less Than or Equal to Stated Size (%)[c]		Emission Factors, lb/ton	
	Uncontrolled[d]	Fabric Filter	Uncontrolled[d]	Fabric Filter
1.0	ND	15[e]	ND	0.0021[e]
2.5	5.5	21[f]	1.5	0.0029[f]
10.0	23	30[g]	6.4	0.0042[g]
15.0	27	35[d]	7.6	0.0049[d]

[a] Emission factor units are lb/ton of HMA produced. Rounded to two significant figures. SCC 3-05-002-05, and 3-05-002-55 to -63. ND = no data available. To convert from lb/ton to kg/Mg, multiply by 0.5.

[b] Aerodynamic diameter.

[c] Applies only to the mass of filterable PM.

[d] Reference 23, Table 3-35. The emission factors are calculated using the particle size data from this reference in conjunction with the filterable PM emission factor shown in Table 11.1-3.

[e] References 214, 229. The emission factors are calculated using the particle size data from these references in conjunction with the filterable PM emission factor shown in Table 11.1-3.

[f] References 23, 214, 229. The emission factors are calculated using the particle size data from these references in conjunction with the filterable PM emission factor shown in Table 11.1-3.

[g] Reference 23, 25, 229. The emission factors are calculated using the particle size data from these references in conjunction with the filterable PM emission factor shown in Table 11.1-3. EMISSION FACTOR RATING: D.

Table 11.1-5. EMISSION FACTORS FOR CO, CO_2, NO_x, AND SO_2 FROM BATCH MIX HOT MIX ASPHALT PLANTS[a]

Process	CO[b]	EMISSION FACTOR RATING	CO_2[c]	EMISSION FACTOR RATING	NO_x	EMISSION FACTOR RATING	SO_2[c]	EMISSION FACTOR RATING
Natural gas-fired dryer, hot screens, and mixer (SCC 3-05-002-45)	0.40	C	37[d]	A	0.025[e]	D	0.0046[f]	E
No. 2 fuel oil-fired dryer, hot screens, and mixer (SCC 3-05-002-46)	0.40	C	37[d]	A	0.12[g]	E	0.088[h]	E
Waste oil-fired dryer, hot screens, and mixer (SCC 3-05-002-47)	0.40	C	37[d]	A	0.12[g]	E	0.088[h]	E
Coal-fired dryer, hot screens, and mixer[j] (SCC 3-05-002-98)	ND	NA	37[d]	A	ND	NA	0.043[k]	E

[a] Emission factor units are lb per ton of HMA produced. SCC = Source Classification Code. ND = no data available. NA = not applicable. To convert from lb/ton to kg/Mg, multiply by 0.5.

[b] References 24, 34, 46-47, 49, 161, 204, 215-217, 282, 370, 378, 381. The CO emission factors represent normal plant operations without scrutiny of the burner design, operation, and maintenance. Information is available that indicates that attention to burner design, periodic evaluation of burner operation, and appropriate maintenance can reduce CO emissions. Data for dryers firing natural gas, No. 2 fuel oil, and No. 6 fuel oil were combined to develop a single emission factor because the magnitude of emissions was similar for dryers fired with these fuels.

[c] Emissions of CO_2 and SO_2 can also be estimated based on fuel usage and the fuel combustion emission factors (for the appropriate fuel) presented in AP-42 Chapter 1. The CO_2 emission factors are an average of all available data, regardless of the dryer fuel (emissions were similar from dryers firing any of the various fuels). Based on data for drum mix facilities, 50 percent of the fuel-bound sulfur, up to a maximum (as SO_2) of 0.1 lb/ton of product, is expected to be retained in the product, with the remainder emitted as SO_2.

[d] Reference 1, Table 4-20. Average of data from 115 facilities. Range: 6.9 to 160 lb/ton. Median: 32 lb/ton. Standard deviation: 22 lb/ton.

[e] References 24, 34, 46-47.

[f] References 46-47.

[g] References 49, 226.

[h] References 49, 226, 228, 385.

[j] Dryer fired with coal and supplemental natural gas or fuel oil.

[k] Reference 126.

Table 11.1-6. EMISSION FACTORS FOR TOC, METHANE, AND VOC FROM BATCH MIX HOT MIX ASPHALT PLANTS[a]

Process	TOC[b]	EMISSION FACTOR RATING	CH_4[c]	EMISSION FACTOR RATING	VOC[d]	EMISSION FACTOR RATING
Natural gas-fired dryer, hot screens, and mixer (SCC 3-05-002-45)	0.015[e]	D	0.0074	D	0.0082	D
No. 2 fuel oil-fired dryer, hot screens, and mixer (SCC 3-05-002-46)	0.015[e]	D	0.0074	D	0.0082	D
No. 6 fuel oil-fired dryer, hot screens, and mixer (SCC 3-05-002-47)	0.043[f]	E	0.0074	D	0.036	E

[a] Emission factor units are lb per ton of HMA produced. SCC = Source Classification Code. ND = no data available. NA = not applicable. To convert from lb/ton to kg/Mg, multiply by 0.5.

[b] TOC equals total hydrocarbons as propane, as measured with an EPA Method 25A or equivalent sampling train plus formaldehyde.

[c] References 24, 46-47, 49. Factor includes data from natural gas- and No. 6 fuel oil-fired dryers. Methane measured with an EPA Method 18 or equivalent sampling train.

[d] The VOC emission factors are equal to the TOC factors minus the methane emission factors; differences in values reported are due to rounding.

[e] References 24, 46-47, 155.

[f] Reference 49.

Table 11.1-7. EMISSION FACTORS FOR CO, CO_2, NO_x, AND SO_2 FROM DRUM MIX HOT MIX ASPHALT PLANTS[a]

Process	CO[b]	EMISSION FACTOR RATING	CO_2[c]	EMISSION FACTOR RATING	NO_x	EMISSION FACTOR RATING	SO_2[c]	EMISSION FACTOR RATING
Natural gas-fired dryer (SCC 3-05-002-55,-56,-57)	0.13	B	33[d]	A	0.026[e]	D	0.0034[f]	D
No. 2 fuel oil-fired dryer (SCC 3-05-002-58,-59,-60)	0.13	B	33[d]	A	0.055[g]	C	0.011[h]	E
Waste oil-fired dryer (SCC 3-05-002-61,-62,-63)	0.13	B	33[d]	A	0.055[g]	C	0.058[j]	B
Coal-fired dryer[k] (SCC 3-05-002-98)	ND	NA	33[d]	A	ND	NA	0.19[m]	E

[a] Emission factor units are lb per ton of HMA produced. SCC = Source Classification Code. ND = no data available. NA = not applicable. To convert from lb/ton to kg/Mg, multiply by 0.5.

[b] References 25, 44, 48, 50, 149, 154, 197, 214, 229, 254, 339-342, 344, 346, 347, 390. The CO emission factors represent normal plant operations without scrutiny of the burner design, operation, and maintenance. Information is available that indicates that attention to burner design, periodic evaluation of burner operation, and appropriate maintenance can reduce CO emissions. Data for dryers firing natural gas, No. 2 fuel oil, and No. 6 fuel oil were combined to develop a single emission factor because the magnitude of emissions was similar for dryers fired with these fuels.

[c] Emissions of CO_2 and SO_2 can also be estimated based on fuel usage and the fuel combustion emission factors (for the appropriate fuel) presented in AP-42 Chapter 1. The CO_2 emission factors are an average of all available data, regardless of the dryer fuel (emissions were similar from dryers firing any of the various fuels). Fifty percent of the fuel-bound sulfur, up to a maximum (as SO_2) of 0.1 lb/ton of product, is expected to be retained in the product, with the remainder emitted as SO_2.

[d] Reference 1, Table 4-15. Average of data from 180 facilities. Range: 2.6 to 96 lb/ton. Median: 31 lb/ton. Standard deviation: 13 lb/ton.

[e] References 44-45, 48, 209, 341, 342.

[f] References 44-45, 48.

[g] References 25, 50, 153, 214, 229, 344, 346, 347, 352-354.

[h] References 50, 119, 255, 340

[j] References 25, 299, 300, 339, 345, 351, 371-377, 379, 380, 386-388.

[k] Dryer fired with coal and supplemental natural gas or fuel oil.

[m] References 88, 108, 189-190.

Table 11.1-8. EMISSION FACTORS FOR TOC, METHANE, VOC, AND HCl FROM DRUM MIX HOT MIX ASPHALT PLANTS[a]

Process	TOC[b]	EMISSION FACTOR RATING	CH_4[c]	EMISSION FACTOR RATING	VOC[d]	EMISSION FACTOR RATING	HCl[e]	EMISSION FACTOR RATING
Natural gas-fired dryer (SCC 3-05-002-55, -56,-57)	0.044[f]	B	0.012	C	0.032	C	ND	NA
No. 2 fuel oil-fired dryer (SCC 3-05-002-58, -59,-60)	0.044[f]	B	0.012	C	0.032	C	ND	NA
Waste oil-fired dryer (SCC 3-05-002-61, -62,-63)	0.044[f]	E	0.012	C	0.032	E	0.00021	D

[a] Emission factor units are lb per ton of HMA produced. SCC = Source Classification Code. ND = no data available. NA = not applicable. To convert from lb/ton to kg/Mg, multiply by 0.5.

[b] TOC equals total hydrocarbons as propane as measured with an EPA Method 25A or equivalent sampling train plus formaldehyde.

[c] References 25, 44-45, 48, 50, 339-340, 355. Factor includes data from natural gas-, No. 2 fuel oil, and waste oil-fired dryers. Methane measured with an EPA Method 18 or equivalent sampling train.

[d] The VOC emission factors are equal to the TOC factors minus the sum of the methane emission factors and the emission factors for compounds with negligible photochemical reactivity shown in Table 11.1-10; differences in values reported are due to rounding.

[e] References 348, 374, 376, 379, 380.

[f] References 25, 44-45, 48, 50, 149, 153-154, 209-212, 214, 241, 242, 339-340, 355.

Table 11.1-9. EMISSION FACTORS FOR ORGANIC POLLUTANT EMISSIONS FROM BATCH MIX HOT MIX ASPHALT PLANTS[a]

Process	Pollutant		Emission Factor, lb/ton	Emission Factor Rating	Ref. Nos.
	CASRN	Name			
Natural gas- or No. 2 fuel oil-fired dryer, hot screens, and mixer with fabric filter (SCC 3-05-002-45,-46)	Non-PAH Hazardous Air Pollutants[b]				
	75-07-0	Acetaldehyde	0.00032	E	24,34
	71-43-2	Benzene	0.00028	D	24,34,46, 382
	100-41-4	Ethylbenzene	0.0022	D	24,46,47,49
	50-00-0	Formaldehyde	0.00074	D	24,34,46,47,49,226,382
	106-51-4	Quinone	0.00027	E	24
	108-88-3	Toluene	0.0010	D	24,34,46,47
	1330-20-7	Xylene	0.0027	D	24,46,47,49
		Total non-PAH HAPs	0.0075		
	PAH HAPs				
	91-57-6	2-Methylnaphthalene[c]	7.1×10^{-5}	D	24,47,49
	83-32-9	Acenaphthene[c]	9.0×10^{-7}	D	34,46,226
	208-96-8	Acenaphthylene[c]	5.8×10^{-7}	D	34,46,226
	120-12-7	Anthracene[c]	2.1×10^{-7}	D	34,46,226
	56-55-3	Benzo(a)anthracene[c]	4.6×10^{-9}	E	46,226
	50-32-8	Benzo(a)pyrene[c]	3.1×10^{-10}	E	226
	205-99-2	Benzo(b)fluoranthene[c]	9.4×10^{-9}	D	34,46,226
	191-24-2	Benzo(g,h,i)perylene[c]	5.0×10^{-10}	E	226
	207-08-9	Benzo(k)fluoranthene[c]	1.3×10^{-8}	E	34,226
	218-01-9	Chrysene[c]	3.8×10^{-9}	E	46,226
	53-70-3	Dibenz(a,h)anthracene[c]	9.5×10^{-11}	E	226
	206-44-0	Fluoranthene[c]	1.6×10^{-7}	D	34,46,47,226
	86-73-7	Fluorene[c]	1.6×10^{-6}	D	34,46,47,226
	193-39-5	Indeno(1,2,3-cd)pyrene[c]	3.0×10^{-10}	E	226
	91-20-3	Naphthalene	3.6×10^{-5}	D	34,46,47,49,226
	85-01-8	Phenanthrene[c]	2.6×10^{-6}	D	34,46,47,226
	129-00-0	Pyrene[c]	6.2×10^{-8}	D	34,46,226
		Total PAH HAPs	0.00011		
	Total HAPs		0.0076		
	Non-HAP organic compounds				
	100-52-7	Benzaldehyde	0.00013	E	24
	78-84-2	Butyraldehyde/ isobutyraldehyde	3.0×10^{-5}	E	24
	4170-30-3	Crotonaldehyde	2.9×10^{-5}	E	24
	66-25-1	Hexanal	2.4×10^{-5}	E	24
		Total non-HAPs	0.00019		

Table 11.1-9 (cont.)

Process	Pollutant		Emission Factor, lb/ton	Emission Factor Rating	Ref. Nos.
	CASRN	Name			
Waste oil-, drain oil-, or No. 6 fuel oil-fired dryer, hot screens, and mixer with fabric filter (SCC 3-05-002-47)	Non-PAH Hazardous Air Pollutants[b]				
	75-07-0	Acetaldehyde	0.00032	E	24,34
	71-43-2	Benzene	0.00028	D	24,34,46, 382
	100-41-4	Ethylbenzene	0.0022	D	24,46,47,49
	50-00-0	Formaldehyde	0.00074	D	24,34,46,47,49,226, 382
	106-51-4	Quinone	0.00027	E	24
	108-88-3	Toluene	0.0010	D	24,34,46,47
	1330-20-7	Xylene	0.0027	D	24,46,47,49
		Total non-PAH HAPs	0.0075		
	PAH HAPs[b]				
	91-57-6	2-Methylnaphthalene[c]	7.1×10^{-5}	D	24,47,49
	83-32-9	Acenaphthene[c]	9.0×10^{-7}	D	34,46,226
	208-96-8	Acenaphthylene[c]	5.8×10^{-7}	D	34,46,226
	120-12-7	Anthracene[c]	2.1×10^{-7}	D	34,46,226
	56-55-3	Benzo(a)anthracene[c]	4.6×10^{-9}	E	46,226
	50-32-8	Benzo(a)pyrene[c]	3.1×10^{-10}	E	226
	205-99-2	Benzo(b)fluoranthene[c]	9.4×10^{-9}	D	34,46,226
	191-24-2	Benzo(g,h,i)perylene[c]	5.0×10^{-10}	E	226
	207-08-9	Benzo(k)fluoranthene[c]	1.3×10^{-8}	E	34,226
	218-01-9	Chrysene[c]	3.8×10^{-9}	E	46,226
	53-70-3	Dibenz(a,h)anthracene[c]	9.5×10^{-11}	E	226
	206-44-0	Fluoranthene[c]	2.4×10^{-5}	E	49
	86-73-7	Fluorene[c]	1.6×10^{-6}	D	34,46,47,226
	193-39-5	Indeno(1,2,3-cd)pyrene[c]	3.0×10^{-10}	E	226
	91-20-3	Naphthalene	3.6×10^{-5}	D	34,46,47,49, 226
	85-01-8	Phenanthrene[c]	3.7×10^{-5}	E	49
	129-00-0	Pyrene[c]	5.5×10^{-5}	E	49
		Total PAH HAPs	0.00023		
	Total HAPs		0.0077		
	Non-HAP organic compounds				
	100-52-7	Benzaldehyde	0.00013	E	24
	78-84-2	Butyraldehyde/ isobutyraldehyde	3.0×10^{-5}	E	24
	4170-30-3	Crotonaldehyde	2.9×10^{-5}	E	24
	66-25-1	Hexanal	2.4×10^{-5}	E	24
		Total non-HAPs	0.00019		

[a] Emission factor units are lb/ton of hot mix asphalt produced. Factors represent uncontrolled emissions, unless noted. CASRN = Chemical Abstracts Service Registry Number. SCC = Source Classification Code. To convert from lb/ton to kg/Mg, multiply by 0.5.

[b] Hazardous air pollutants (HAP) as defined in the 1990 Clean Air Act Amendments (CAAA).

[c] Compound is classified as polycyclic organic matter, as defined in the 1990 CAAA.

Table 11.1-10. EMISSION FACTORS FOR ORGANIC POLLUTANT EMISSIONS FROM DRUM MIX HOT MIX ASPHALT PLANTS[a]

Process	Pollutant		Emission Factor, lb/ton	Emission Factor Rating	Ref. No.
	CASRN	Name			
Natural gas-fired dryer with fabric filter[b] (SCC 3-05-002-55, -56,-57)	Non-PAH hazardous air pollutants[c]				
	71-43-2	Benzene[d]	0.00039	A	25,44,45,50, 341, 342, 344-351, 373, 376, 377, 383, 384
	100-41-4	Ethylbenzene	0.00024	D	25,44,45
	50-00-0	Formaldehyde[e]	0.0031	A	25,35,44,45,50, 339-344, 347-349, 371-373, 384, 388
	110-54-3	Hexane	0.00092	E	339-340
	540-84-1	Isooctane (2,2,4-trimethylpentane)	4.0×10^{-5}	E	339-340
	71-55-6	Methyl chloroform[f]	4.8×10^{-5}	E	35
	108-88-3	Toluene	0.00015	D	35,44,45
	1330-20-7	Xylene	0.00020	D	25,44,45
		Total non-PAH HAPs	0.0051		
	PAH HAPs				
	91-57-6	2-Methylnaphthalene[g]	7.4×10^{-5}	D	44,45,48
	83-32-9	Acenaphthene[g]	1.4×10^{-6}	E	48
	208-96-8	Acenaphthylene[g]	8.6×10^{-6}	D	35,45,48
	120-12-7	Anthracene[g]	2.2×10^{-7}	E	35,48
	56-55-3	Benzo(a)anthracene[g]	2.1×10^{-7}	E	48
	50-32-8	Benzo(a)pyrene[g]	9.8×10^{-9}	E	48
	205-99-2	Benzo(b)fluoranthene[g]	1.0×10^{-7}	E	35,48
	192-97-2	Benzo(e)pyrene[g]	1.1×10^{-7}	E	48
	191-24-2	Benzo(g,h,i)perylene[g]	4.0×10^{-8}	E	48
	207-08-9	Benzo(k)fluoranthene[g]	4.1×10^{-8}	E	35,48
	218-01-9	Chrysene[g]	1.8×10^{-7}	E	35,48
	206-44-0	Fluoranthene[g]	6.1×10^{-7}	D	35,45,48
	86-73-7	Fluorene[g]	3.8×10^{-6}	D	35,45,48,163
	193-39-5	Indeno(1,2,3-cd)pyrene[g]	7.0×10^{-9}	E	48
	91-20-3	Naphthalene[g]	9.0×10^{-5}	D	35,44,45,48,163
	198-55-0	Perylene[g]	8.8×10^{-9}	E	48
	85-01-8	Phenanthrene[g]	7.6×10^{-6}	D	35,44,45,48,163
	129-00-0	Pyrene[g]	5.4×10^{-7}	D	45,48
		Total PAH HAPs	0.00019		

Table 11.1-10 (cont.)

Process	Pollutant		Emission Factor, lb/ton	Emission Factor Rating	Ref. No.
	CASRN	Name			
Natural gas-fired dryer with fabric filter[b] (SCC 3-05-002-55, -56,-57) (cont.)	Total HAPs		0.0053		
	Non-HAP organic compounds				
	106-97-8	Butane	0.00067	E	339
	74-85-1	Ethylene	0.0070	E	339-340
	142-82-5	Heptane	0.0094	E	339-340
	763-29-1	2-Methyl-1-pentene	0.0040	E	339,340
	513-35-9	2-Methyl-2-butene	0.00058	E	339,340
	96-14-0	3-Methylpentane	0.00019	D	339,340
	109-67-1	1-Pentene	0.0022	E	339-340
	109-66-0	n-Pentane	0.00021	E	339-340
		Total non-HAP organics	0.024		
No. 2 fuel oil-fired dryer with fabric filter (SCC 3-05-002-58, -59,-60)	Non-PAH HAPs[c]				
	71-43-2	Benzene[d]	0.00039	A	25,44,45,50, 341, 342, 344-351, 373, 376, 377, 383, 384
	100-41-4	Ethylbenzene	0.00024	D	25,44,45
	50-00-0	Formaldehyde[e]	0.0031	A	25,35,44,45,50, 339-344, 347-349, 371-373, 384, 388
	110-54-3	Hexane	0.00092	E	339-340
	540-84-1	Isooctane (2,2,4-trimethylpentane)	4.0×10^{-5}	E	339-340
	71-55-6	Methyl chloroform[f]	4.8×10^{-5}	E	35
	108-88-3	Toluene	0.0029	E	25, 50, 339-340
	1330-20-7	Xylene	0.00020	D	25,44,45
		Total non-PAH HAPs	0.0078		
	PAH HAPs				
	91-57-6	2-Methylnaphthalene[g]	0.00017	E	50
	83-32-9	Acenaphthene[g]	1.4×10^{-6}	E	48
	208-96-8	Acenaphthylene[g]	2.2×10^{-5}	E	50
	120-12-7	Anthracene[g]	3.1×10^{-6}	E	50,162
	56-55-3	Benzo(a)anthracene[g]	2.1×10^{-7}	E	48
	50-32-8	Benzo(a)pyrene[g]	9.8×10^{-9}	E	48
	205-99-2	Benzo(b)fluoranthene[g]	1.0×10^{-7}	E	35,48
	192-97-2	Benzo(e)pyrene[g]	1.1×10^{-7}	E	48

Table 11.1-10 (cont.)

Process	Pollutant		Emission Factor, lb/ton	Emission Factor Rating	Ref. No.
	CASRN	Name			
No. 2 fuel oil-fired dryer with fabric filter (SCC 3-05-002-58, -59,-60) (cont.)	191-24-2	Benzo(g,h,i)perylene[g]	4.0×10^{-8}	E	48
	207-08-9	Benzo(k)fluoranthene[g]	4.1×10^{-8}	E	35,48
	218-01-9	Chrysene[g]	1.8×10^{-7}	E	35,48
	206-44-0	Fluoranthene[g]	6.1×10^{-7}	D	35,45,48
	86-73-7	Fluorene[g]	1.1×10^{-5}	E	50,164
	193-39-5	Indeno(1,2,3-cd)pyrene[g]	7.0×10^{-9}	E	48
	91-20-3	Naphthalene[g]	0.00065	D	25,50,162,164
	198-55-0	Perylene[g]	8.8×10^{-9}	E	48
	85-01-8	Phenanthrene[g]	2.3×10^{-5}	D	50,162,164
	129-00-0	Pyrene[g]	3.0×10^{-6}	E	50
		Total PAH HAPs	0.00088		
		Total HAPs	0.0087		
	Non-HAP organic compounds				
	106-97-8	Butane	0.00067	E	339
	74-85-1	Ethylene	0.0070	E	339-340
	142-82-5	Heptane	0.0094	E	339-340
	763-29-1	2-Methyl-1-pentene	0.0040	E	339,340
	513-35-9	2-Methyl-2-butene	0.00058	E	339,340
	96-14-0	3-Methylpentane	0.00019	D	339,340
	109-67-1	1-Pentene	0.0022	E	339-340
	109-66-0	n-Pentane	0.00021	E	339-340
		Total non-HAP organics	0.024		

Table 11.1-10 (cont.)

Process	Pollutant		Emission Factor, lb/ton	Emission Factor Rating	Ref. No.
	CASRN	Name			
Fuel oil- or waste oil-fired dryer with fabric filter (SCC 3-05-002-58, -59,-60,-61,-62, -63)	Dioxins				
	1746-01-6	2,3,7,8-TCDD[g]	$2.1x10^{-13}$	E	339
		Total TCDD[g]	$9.3x10^{-13}$	E	339
	40321-76-4	1,2,3,7,8-PeCDD[g]	$3.1x10^{-13}$	E	339
		Total PeCDD[g]	$2.2x10^{-11}$	E	339-340
	39227-28-6	1,2,3,4,7,8-HxCDD[g]	$4.2x10^{-13}$	E	339
	57653-85-7	1,2,3,6,7,8-HxCDD[g]	$1.3x10^{-12}$	E	339
	19408-24-3	1,2,3,7,8,9-HxCDD[g]	$9.8x10^{-13}$	E	339
		Total HxCDD[g]	$1.2x10^{-11}$	E	339-340
	35822-46-9	1,2,3,4,6,7,8-HpCDD[g]	$4.8x10^{-12}$	E	339
		Total HpCDD[g]	$1.9x10^{-11}$	E	339-340
	3268-87-9	Octa CDD[g]	$2.5x10^{-11}$	E	339
		Total PCDD[g]	$7.9x10^{-11}$	E	339-340
	Furans				
	51207-31-9	2,3,7,8-TCDF[g]	$9.7x10^{-13}$	E	339
		Total TCDF[g]	$3.7x10^{-12}$	E	339-340
		1,2,3,7,8-PeCDF[g]	$4.3x10^{-12}$	E	339-340
		2,3,4,7,8-PeCDF[g]	$8.4x10^{-13}$	E	339
		Total PeCDF[g]	$8.4x10^{-11}$	E	339-340
		1,2,3,4,7,8-HxCDF[g]	$4.0x10^{-12}$	E	339
		1,2,3,6,7,8-HxCDF[g]	$1.2x10^{-12}$	E	339
		2,3,4,6,7,8-HxCDF[g]	$1.9x10^{-12}$	E	339
		1,2,3,7,8,9-HxCDF[g]	$8.4x10^{-12}$	E	340
		Total HxCDF[g]	$1.3x10^{-11}$	E	339-340
		1,2,3,4,6,7,8-HpCDF[g]	$6.5x10^{-12}$	E	339
		1,2,3,4,7,8,9-HpCDF[g]	$2.7x10^{-12}$	E	339
		Total HpCDF[g]	$1.0x10^{-11}$	E	339-340
	39001-02-0	Octa CDF[g]	$4.8x10^{-12}$	E	339
		Total PCDF[g]	$4.0x10^{-11}$	E	339-340
		Total PCDD/PCDF[g]	$1.2x10^{-10}$	E	339-340

Table 11.1-10 (cont.)

Process	Pollutant		Emission Factor, lb/ton	Emission Factor Rating	Ref. No.
	CASRN	Name			
Fuel oil- or waste oil-fired dryer (uncontrolled) (SCC 3-05-002-58, -59,-60,-61,-62, -63)	Hazardous air pollutants[c]				
	Dioxins				
		Total HxCDD[g]	$5.4x10^{-12}$	E	340
	35822-46-9	1,2,3,4,6,7,8-HpCDD[g]	$3.4x10^{-11}$	E	340
		Total HpCDD[g]	$7.1x10^{-11}$	E	340
	3268-87-9	Octa CDD[g]	$2.7x10^{-9}$	E	340
		Total PCDD[g]	$2.8x10^{-9}$	E	340
	Furans				
		Total TCDF[g]	$3.3x10^{-11}$	E	340
		Total PeCDF[g]	$7.4x10^{-11}$	E	340
		1,2,3,4,7,8-HxCDF[g]	$5.4x10^{-12}$	E	340
		2,3,4,6,7,8-HxCDF[g]	$1.6x10^{-12}$	E	340
		Total HxCDF[g]	$8.1x10^{-12}$	E	340
Fuel oil- or waste oil-fired dryer (uncontrolled) (SCC 3-05-002-58, -59,-60,-61,-62, -63) (cont.)		1,2,3,4,6,7,8-HpCDF[g]	$1.1x10^{-11}$	E	340
		Total HpCDF[g]	$3.8x10^{-11}$	E	340
		Total PCDF[g]	$1.5x10^{-10}$	E	340
		Total PCDD/PCDF[g]	$3.0x10^{-9}$	E	340

Table 11.1-10 (cont.)

Process	Pollutant		Emission Factor, lb/ton	Emission Factor Rating	Ref. No.
	CASRN	Name			
Waste oil-fired dryer with fabric filter (SCC 3-05-002-61, -62,-63)	Non-PAH HAPs[c]				
	75-07-0	Acetaldehyde	0.0013	E	25
	107-02-8	Acrolein	2.6×10^{-5}	E	25
	71-43-2	Benzene[d]	0.00039	A	25,44,45,50,341,342, 344-351, 373, 376, 377, 383, 384
	100-41-4	Ethylbenzene	0.00024	D	25,44,45
	50-00-0	Formaldehyde[e]	0.0031	A	25,35,44,45,50,339-344,347-349,371-373, 384, 388
	110-54-3	Hexane	0.00092	E	339-340
	540-84-1	Isooctane (2,2,4-trimethylpentane)	4.0×10^{-5}	E	339-340
	78-93-3	Methyl Ethyl Ketone	2.0×10^{-5}	E	25
	123-38-6	Propionaldehyde	0.00013	E	25
	106-51-4	Quinone	0.00016	E	25
	71-55-6	Methyl chloroform[f]	4.8×10^{-5}	E	35
	108-88-3	Toluene	0.0029	E	25, 50, 339-340
	1330-20-7	Xylene	0.00020	D	25,44,45
		Total non-PAH HAPs	0.0095		
	PAH HAPs				
	91-57-6	2-Methylnaphthalene[g]	0.00017	E	50
	83-32-9	Acenaphthene[g]	1.4×10^{-6}	E	48
	208-96-8	Acenaphthylene[g]	2.2×10^{-5}	E	50
	120-12-7	Anthracene[g]	3.1×10^{-6}	E	50,162
	56-55-3	Benzo(a)anthracene[g]	2.1×10^{-7}	E	48
	50-32-8	Benzo(a)pyrene[g]	9.8×10^{-9}	E	48
	205-99-2	Benzo(b)fluoranthene[g]	1.0×10^{-7}	E	35,48
	192-97-2	Benzo(e)pyrene[g]	1.1×10^{-7}	E	48
	191-24-2	Benzo(g,h,i)perylene[g]	4.0×10^{-8}	E	48

Table 11.1-10 (cont.)

Process	Pollutant		Emission Factor, lb/ton	Emission Factor Rating	Ref. No.
	CASRN	Name			
Waste oil-fired dryer with fabric filter (SCC 3-05-002-61, -62,-63) (cont.)	207-08-9	Benzo(k)fluoranthene[g]	$4.1x10^{-8}$	E	35,48
	218-01-9	Chrysene[g]	$1.8x10^{-7}$	E	35,48
	206-44-0	Fluoranthene[g]	$6.1x10^{-7}$	D	35,45,48
	86-73-7	Fluorene[g]	$1.1x10^{-5}$	E	50,164
	193-39-5	Indeno(1,2,3-cd)pyrene[g]	$7.0x10^{-9}$	E	48
	91-20-3	Naphthalene[g]	0.00065	D	25,50,162,164
	198-55-0	Perylene[g]	$8.8x10^{-9}$	E	48
	85-01-8	Phenanthrene[g]	$2.3x10^{-5}$	D	50,162,164
	129-00-0	Pyrene[g]	$3.0x10^{-6}$	E	50
		Total PAH HAPs	0.00088		
		Total HAPs	0.010		
	Non-HAP organic compounds				
	67-64-1	Acetone[f]	0.00083	E	25
	100-52-7	Benzaldehyde	0.00011	E	25
	106-97-8	Butane	0.00067	E	339
	78-84-2	Butyraldehyde	0.00016	E	25
	4170-30-3	Crotonaldehyde	$8.6x10^{-5}$	E	25
	74-85-1	Ethylene	0.0070	E	339, 340
	142-82-5	Heptane	0.0094	E	339, 340
	66-25-1	Hexanal	0.00011	E	25
	590-86-3	Isovaleraldehyde	$3.2x10^{-5}$	E	25
	763-29-1	2-Methyl-1-pentene	0.0040	E	339, 340
	513-35-9	2-Methyl-2-butene	0.00058	E	339, 340
	96-14-0	3-Methylpentane	0.00019	D	339, 340
	109-67-1	1-Pentene	0.0022	E	339, 340
	109-66-0	n-Pentane	0.00021	E	339, 340
	110-62-3	Valeraldehyde	$6.7x10^{-5}$	E	25
		Total non-HAP organics	0.026		

[a] Emission factor units are lb/ton of hot mix asphalt produced. Table includes data from both parallel flow and counterflow drum mix dryers. Organic compound emissions from counterflow systems are expected to be less than from parallel flow systems, but the available data are insufficient to quantify

accurately the difference in these emissions. CASRN = Chemical Abstracts Service Registry Number. SCC = Source Classification Code. To convert from lb/ton to kg/Mg, multiply by 0.5.

[b] Tests included dryers that were processing reclaimed asphalt pavement. Because of limited data, the effect of RAP processing on emissions could not be determined.

[c] Hazardous air pollutants (HAP) as defined in the 1990 Clean Air Act Amendments (CAAA).

[d] Based on data from 19 tests. Range: 0.000063 to 0.0012 lb/ton; median: 0.00030; Standard deviation: 0.00031.

[e] Based on data from 21 tests. Range: 0.0030 to 0.014 lb/ton; median: 0.0020; Standard deviation: 0.0036.

[f] Compound has negligible photochemical reactivity.

[g] Compound is classified as polycyclic organic matter, as defined in the 1990 CAAA. Total PCDD is the sum of the total tetra through octa dioxins; total PCDF is sum of the total tetra through octa furans; and total PCDD/PCDF is the sum of total PCDD and total PCDF.

Table 11.1-11. EMISSION FACTORS FOR METAL EMISSIONS FROM BATCH MIX HOT MIX ASPHALT PLANTS[a]

Process	Pollutant	Emission Factor, lb/ton	Emission Factor Rating	Reference Numbers
Dryer, hot screens, and mixer[b] (SCC 3-05-002-45,-46,-47)	Arsenic[c]	4.6×10^{-7}	D	34, 40, 226
	Barium	1.5×10^{-6}	E	24
	Beryllium[c]	1.5×10^{-7}	E	34, 226
	Cadmium[c]	6.1×10^{-7}	D	24, 34, 226
	Chromium[c]	5.7×10^{-7}	D	24, 34, 226
	Hexavalent chromium[c]	4.8×10^{-8}	E	34, 226
	Copper	2.8×10^{-6}	D	24, 34, 226
	Lead[c]	8.9×10^{-7}	D	24, 34, 226
	Manganese[c]	6.9×10^{-6}	D	24, 34, 226
	Mercury[c]	4.1×10^{-7}	E	34, 226
	Nickel[c]	3.0×10^{-6}	D	24, 34, 226
	Selenium[c]	4.9×10^{-7}	E	34, 226
	Zinc	6.8×10^{-6}	D	24, 34, 226

[a] Emission factor units are lb/ton of HMA produced. Emissions controlled by a fabric filter. SCC = Source Classification Code. To convert from lb/ton to kg/Mg, multiply by 0.5.

[b] Natural gas-, propane-, No. 2 fuel oil-, or waste oil-/drain oil-/No. 6 fuel oil-fired dryer. For waste oil-/drain oil-/No. 6 fuel oil-fired dryer, use a lead emission factor of 1.0×10^{-5} lb/ton (References 177 and 321, Emission factor rating: E) in lieu of the emission factor shown.

[c] Arsenic, beryllium, cadmium, chromium, hexavalent chromium, lead, manganese, mercury, nickel, and selenium are HAPs as defined in the 1990 CAAA.

Table 11.1-12. EMISSION FACTORS FOR METAL EMISSIONS FROM DRUM MIX HOT MIX ASPHALT PLANTS[a]

Process	Pollutant	Emission Factor, lb/ton	Emission Factor Rating	Reference Numbers
Fuel oil-fired dryer, uncontrolled (SCC 3-05-002-58, -59,-60)	Arsenic[b]	1.3×10^{-6}	E	340
	Barium	0.00025	E	340
	Beryllium[b]	0.0	E	340
	Cadmium[b]	4.2×10^{-6}	E	340
	Chromium[b]	2.4×10^{-5}	E	340
	Cobalt[b]	1.5×10^{-5}	E	340
	Copper	0.00017	E	340
	Lead[b]	0.00054	E	340
	Manganese[b]	0.00065	E	340
	Nickel[b]	0.0013	E	340
	Phosphorus[b]	0.0012	E	340
	Selenium[b]	2.4×10^{-6}	E	340
	Thallium	2.2×10^{-6}	E	340
	Zinc	0.00018	E	340
Natural gas- or propane-fired dryer, with fabric filter (SCC 3-05-002-55, -56,-57))	Antimony	1.8×10^{-7}	E	339
	Arsenic[b]	5.6×10^{-7}	D	25, 35, 339-340
	Barium	5.8×10^{-6}	E	25, 339-340
	Beryllium[b]	0.0	E	339-340
	Cadmium[b]	4.1×10^{-7}	D	25, 35, 162, 301, 339-340
	Chromium[b]	5.5×10^{-6}	C	25, 162-164, 301, 339-340
	Cobalt[b]	2.6×10^{-8}	E	339-340
	Copper	3.1×10^{-6}	D	25, 162-164, 339-340
	Hexavalent chromium[b]	4.5×10^{-7}	E	163
	Lead[b]	6.2×10^{-7}	E	35
	Manganese[b]	7.7×10^{-6}	D	25, 162-164, 339-340
	Mercury[b]	2.4×10^{-7}	E	35, 163
	Nickel[b]	6.3×10^{-5}	D	25, 163-164, 339-340
	Phosphorus[b]	2.8×10^{-5}	E	25, 339-340
	Silver	4.8×10^{-7}	E	25, 339-340
	Selenium[b]	3.5×10^{-7}	E	339-340
	Thallium	4.1×10^{-9}	E	339-340
	Zinc	6.1×10^{-5}	C	25, 35, 162-164, 339-340

Table 11.1-12 (cont.)

Process	Pollutant	Emission Factor, lb/ton	Emission Factor Rating	Reference Numbers
No. 2 fuel oil-fired dryer or waste oil/drain oil/No. 6 fuel oil-fired dryer, with fabric filter (SCC 3-05-002-58, -59,-60,-61,-62,-63)	Antimony	1.8×10^{-7}	E	339
	Arsenic[b]	5.6×10^{-7}	D	25, 35, 339-340
	Barium	5.8×10^{-6}	E	25, 339-340
	Beryllium[b]	0.0	E	339-340
	Cadmium[b]	4.1×10^{-7}	D	25, 35, 162, 301, 339-340
	Chromium[b]	5.5×10^{-6}	C	25, 162-164, 301, 339-340
	Cobalt[b]	2.6×10^{-8}	E	339-340
	Copper	3.1×10^{-6}	D	25, 162-164, 339-340
	Hexavalent chromium[b]	4.5×10^{-7}	E	163
	Lead[b]	1.5×10^{-5}	C	25, 162, 164, 178-179, 183, 301, 315, 339-340
	Manganese[b]	7.7×10^{-6}	D	25, 162-164, 339-340
	Mercury[b]	2.6×10^{-6}	D	162, 164, 339-340
	Nickel[b]	6.3×10^{-5}	D	25, 163-164, 339-340
	Phosphorus[b]	2.8×10^{-5}	E	25, 339-340
	Silver	4.8×10^{-7}	E	25, 339-340
	Selenium[b]	3.5×10^{-7}	E	339-340
	Thallium	4.1×10^{-9}	E	339-340
	Zinc	6.1×10^{-5}	C	25, 35, 162-164, 339-340

[a] Emission factor units are lb/ton of HMA produced. SCC = Source Classification Code. To convert from lb/ton to kg/Mg, multiply by 0.5. Emission factors apply to facilities processing virgin aggregate or a combination of virgin aggregate and RAP.

[b] Arsenic, beryllium, cadmium, chromium, hexavalent chromium, cobalt, lead, manganese, mercury, nickel, and selenium compounds are HAPs as defined in the 1990 CAAA. Elemental phosphorus also is a listed HAP, but the phosphorus measured by Method 29 is not elemental phosphorus.

Table 11.1-13. EMISSION FACTORS FOR HOT MIX ASPHALT HOT OIL SYSTEMS[a]

Process	Pollutant		Emission factor	Emission factor units	EMISSION FACTOR RATING	Reference
	CASRN	Name				
Hot oil system fired with natural gas (SCC 3-05-002-06)	630-08-0	Carbon monoxide	8.9×10^{-6}	lb/ft^3	C	395
	124-38-9	Carbon dioxide	0.20	lb/ft^3	C	395
	50-00-0	Formaldehyde	2.6×10^{-8}	lb/ft^3	C	395
Hot oil system fired with No. 2 fuel oil (SCC 3-05-002-08)	630-08-0	Carbon monoxide	0.0012	lb/gal	C	395
	124-38-9	Carbon dioxide	28	lb/gal	C	395
	50-00-0	Formaldehyde	3.5×10^{-6}	lb/gal	C	395
	83-32-9	Acenaphthene[b]	5.3×10^{-7}	lb/gal	E	35
	208-96-8	Acenaphthylene[b]	2.0×10^{-7}	lb/gal	E	35
	120-12-7	Anthracene[b]	1.8×10^{-7}	lb/gal	E	35
	205-99-2	Benzo(b)fluoranthene[b]	1.0×10^{-7}	lb/gal	E	35
	206-44-0	Fluoranthene[b]	4.4×10^{-8}	lb/gal	E	35
	86-73-7	Fluorene[b]	3.2×10^{-8}	lb/gal	E	35
	91-20-3	Naphthalene[b]	1.7×10^{-5}	lb/gal	E	35
	85-01-8	Phenanthrene[b]	4.9×10^{-6}	lb/gal	E	35
	129-00-0	Pyrene[b]	3.2×10^{-8}	lb/gal	E	35
	Dioxins					
	19408-74-3	1,2,3,7,8,9-HxCDD[b]	7.6×10^{-13}	lb/gal	E	35
	39227-28-6	1,2,3,4,7,8-HxCDD[b]	6.9×10^{-13}	lb/gal	E	35
		HxCDD[b]	6.2×10^{-12}	lb/gal	E	35
	35822-46-9	1,2,3,4,6,7,8-HpCDD[b]	1.5×10^{-11}	lb/gal	E	35
		HpCDD[b]	2.0×10^{-11}	lb/gal	E	35
	3268-87-9	OCDD[b]	1.6×10^{-10}	lb/gal	E	35
		Total PCDD	2.0×10^{-10}	lb/gal	E	35
	Furans					
		TCDF[b]	3.3×10^{-12}	lb/gal	E	35
		PeCDF[b]	4.8×10^{-13}	lb/gal	E	35
		HxCDF[b]	2.0×10^{-12}	lb/gal	E	35
		HpCDF[b]	9.7×10^{-12}	lb/gal	E	35
	67562-39-4	1,2,3,4,6,7,8-HpCDF[b]	3.5×10^{-12}	lb/gal	E	35
	39001-02-0	OCDF[b]	1.2×10^{-11}	lb/gal	E	35
		Total PCDF	3.1×10^{-11}	lb/gal	E	35
		Total PCDD/PCDF	2.3×10^{-10}	lb/gal	E	35

[a] Emission factor units are lb/gal of fuel consumed. To convert from pounds per standard cubic foot (lb/ft^3) to kilograms per standard cubic meter (kg/m^3), multiply by 16. To convert from lb/gal to kilograms per liter (kg/l), multiply by 0.12. CASRN = Chemical Abstracts Service Registry Number. SCC = Source Classification Code.

[b] Compound is classified as polycyclic organic matter, as defined in the 1990 Clean Air Act Amendments (CAAA). Total PCDD is the sum of the total tetra through octa dioxins; total PCDF is sum of the total tetra through octa furans; and total PCDD/PCDF is the sum of total PCDD and total PCDF.

Table 11.1-14. PREDICTIVE EMISSION FACTOR EQUATIONS FOR LOAD-OUT AND SILO FILLING OPERATIONS[a]

EMISSION FACTOR RATING: C

Source	Pollutant	Equation
Drum mix or batch mix plant load-out (SCC 3-05-002-14)	Total PM[b]	$EF = 0.000181 + 0.00141(-V)e^{((0.0251)(T + 460) - 20.43)}$
	Organic PM[c]	$EF = 0.00141(-V)e^{((0.0251)(T + 460) - 20.43)}$
	TOC[d]	$EF = 0.0172(-V)e^{((0.0251)(T + 460) - 20.43)}$
	CO	$EF = 0.00558(-V)e^{((0.0251)(T + 460) - 20.43)}$
Silo filling (SCC 3-05-002-13)	Total PM[b]	$EF = 0.000332 + 0.00105(-V)e^{((0.0251)(T + 460) - 20.43)}$
	Organic PM[c]	$EF = 0.00105(-V)e^{((0.0251)(T + 460) - 20.43)}$
	TOC[d]	$EF = 0.0504(-V)e^{((0.0251)(T + 460) - 20.43)}$
	CO	$EF = 0.00488(-V)e^{((0.0251)(T + 460) - 20.43)}$

[a] Emission factor units are lb/ton of HMA produced. SCC = Source Classification Code. To convert from lb/ton to kg/Mg, multiply by 0.5. EF = emission factor; V = asphalt volatility, as determined by ASTM Method D2872-88 "Effects of Heat and Air on a Moving Film of Asphalt (Rolling Thin Film Oven Test - RTFOT)," where a 0.5 percent loss-on-heating is expressed as "-0.5." Regional- or site-specific data for asphalt volatility should be used, whenever possible; otherwise, a default value of -0.5 should be used for V in these equations. T = HMA mix temperature in °F. Site-specific temperature data should be used, whenever possible; otherwise a default temperature of 325°F can be used. Reference 1, Tables 4-27 through 4-31, 4-34 through 4-36, and 4-38 through 4-41.

[b] Total PM, as measured by EPA Method 315 (EPA Method 5 plus the extractable organic particulate from the impingers). Total PM is assumed to be predominantly PM-2.5 since emissions consist of condensed vapors.

[c] Extractable organic PM, as measured by EPA Method 315 (methylene chloride extract of EPA Method 5 particulate plus methylene chloride extract of impinger particulate).

[d] TOC as propane, as measured with an EPA Method 25A sampling train or equivalent sampling train.

Table 11.1-15. SPECIATION PROFILES FOR LOAD-OUT, SILO FILLING, AND ASPHALT STORAGE EMISSIONS–ORGANIC PARTICULATE-BASED COMPOUNDS

EMISSION FACTOR RATING: C

Pollutant	CASRN[a]	Speciation Profile for Load-out and Yard Emissions[b] Compound/Organic PM[c]	Speciation Profile for Silo Filling and Asphalt Storage Tank Emissions Compound/Organic PM[c]
PAH HAPs			
Acenaphthene	83-32-9	0.26%	0.47%
Acenaphthylene	208-96-8	0.028%	0.014%
Anthracene	120-1207	0.070%	0.13%
Benzo(a)anthracene	56-55-3	0.019%	0.056%
Benzo(b)fluoranthene	205-99-2	0.0076%	ND[d]
Benzo(k)fluoranthene	207-08-9	0.0022%	ND[d]
Benzo(g,h,i)perylene	191-24-2	0.0019%	ND[d]
Benzo(a)pyrene	50-32-8	0.0023%	ND[d]
Benzo(e)pyrene	192-97-2	0.0078%	0.0095%
Chrysene	218-01-9	0.103%	0.21%
Dibenz(a,h)anthracene	53-70-3	0.00037%	ND[d]
Fluoranthene	206-44-0	0.050%	0.15%
Fluorene	86-73-7	0.77%	1.01%
Indeno(1,2,3-cd)pyrene	193-39-5	0.00047%	ND[d]
2-Methylnaphthalene	91-57-6	2.38%	5.27%
Naphthalene	91-20-3	1.25%	1.82%
Perylene	198-55-0	0.022%	0.030%
Phenanthrene	85-01-8	0.81%	1.80%
Pyrene	129-00-0	0.15%	0.44%
Total PAH HAPs		5.93%	11.40%
Other semi-volatile HAPs			
Phenol		1.18%	ND[d]

[a] Chemical Abstract Service Registry Number.
[b] Emissions from loaded trucks during the period between load-out and the time the truck departs the plant.
[c] Emission factor for compound is determined by multiplying the percentage presented for the compound by the emission factor for extractable organic particulate (organic PM) as determined from Table 11.1-14.
[d] ND = Measured data below detection limits.

Table 11.1-16. SPECIATION PROFILES FOR LOAD-OUT, SILO FILLING, AND ASPHALT STORAGE EMISSIONS–ORGANIC VOLATILE-BASED COMPOUNDS

EMISSION FACTOR RATING: C

Pollutant	CASRN	Speciation Profile for Load-Out and Yard Emissions Compound/TOC[a]	Speciation Profile for Silo Filling and Asphalt Storage Tank Emissions Compound/TOC (%)[a]
VOC[b]		94%[b]	100%
<u>Non-VOC/non-HAPs</u>			
Methane	74-82-8	6.5%	0.26%
Acetone	67-64-1	0.046%	0.055%
Ethylene	74-85-1	0.71%	1.1%
Total non-VOC/non-HAPS		7.3%	1.4%
<u>Volatile organic HAPS</u>			
Benzene	71-43-2	0.052%	0.032%
Bromomethane	74-83-9	0.0096%	0.0049%
2-Butanone	78-93-3	0.049%	0.039%
Carbon Disulfide	75-15-0	0.013%	0.016%
Chloroethane	75-00-3	0.00021%	0.0040%
Chloromethane	74-87-3	0.015%	0.023%
Cumene	92-82-8	0.11%	ND[c]
Ethylbenzene	100-41-4	0.28%	0.038%
Formaldehyde	50-00-0	0.088%	0.69%
n-Hexane	100-54-3	0.15%	0.10%
Isooctane	540-84-1	0.0018%	0.00031%
Methylene Chloride	75-09-2	0.0%[d]	0.00027%
MTBE	596899	0.0%[d]	ND[c]
Styrene	100-42-5	0.0073%	0.0054%
Tetrachloroethene	127-18-4	0.0077%	ND[c]
Toluene	100-88-3	0.21%	0.062%
1,1,1-Trichloroethane	71-55-6	0.0%[d]	ND[c]
Trichloroethene	79-01-6	0.0%[d]	ND[c]
Trichlorofluoromethane	75-69-4	0.0013%	ND[c]
m-/p-Xylene	1330-20-7	0.41%	0.2%
o-Xylene	95-47-6	0.08%	0.057%
Total volatile organic HAPs		1.5%	1.3%

Table 11.1-16 (cont.)

[a] Emission factor for compound is determined by multiplying the percentage presented for the compound by the emission factor for total organic compounds (TOC) as determined from Table 11.1-14.

[b] The VOC percentages are equal to 100 percent of TOC minus the methane, acetone, methylene chloride, and 1,1,1-trichloroethane percentages.

[c] ND = Measured data below detection limits. Additional compounds that were not detected are: acrylonitrile, allyl chloride, bromodichloromethane, bromoform, 1,3-butadiene, carbon tetrachloride, chlorobenzene, chloroform, dibromochloromethane, 1,2-dibromoethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloropropane, cis-1,3-dichloropropene, trans-1,3-dichloropropene, 1,2-epoxybutane, ethyl acrylate, 2-hexanone, iodomethane, methyl methacrylate, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, vinyl acetate, vinyl bromide, and vinyl chloride

[d] Values presented as 0.0% had background concentrations higher than the capture efficiency-corrected measured concentration.

11.12 CONCRETE BATCHING

11.12-1 Process Description [1-5]

Concrete is composed essentially of water, cement, sand (fine aggregate) and coarse aggregate. Coarse aggregate may consist of gravel, crushed stone or iron blast furnace slag. Some specialty aggregate products could be either heavyweight aggregate (of barite, magnetite, limonite, ilmenite, iron or steel) or lightweight aggregate (with sintered clay, shale, slate, diatomaceous shale, perlite, vermiculite, slag pumice, cinders, or sintered fly ash). Supplementary cementitious materials, also called mineral admixtures or pozzolan minerals may be added to make the concrete mixtures more economical, reduce permeability, increase strength, or influence other concrete properties. Typical examples are natural pozzolans, fly ash, ground granulated blast-furnace slag, and silica fume, which can be used individually with portland or blended cement or in different combinations. Chemical admixtures are usually liquid ingredients that are added to concrete to entrain air, reduce the water required to reach a required slump, retard or accelerate the setting rate, to make the concrete more flowable or other more specialized functions.

Approximately 75 percent of the U.S. concrete manufactured is produced at plants that store, convey, measure and discharge these constituents into trucks for transport to a job site. At most of these plants, sand, aggregate, cement and water are all gravity fed from the weight hopper into the mixer trucks. The concrete is mixed on the way to the site where the concrete is to be poured. At some of these plants, the concrete may also be manufactured in a central mix drum and transferred to a transport truck. Most of the remaining concrete manufactured are products cast in a factory setting. Precast products range from concrete bricks and paving stones to bridge girders, structural components, and panels for cladding. Concrete masonry, another type of manufactured concrete, may be best known for its conventional 8 x 8 x 16-inch block. In a few cases concrete is dry batched or prepared at a building construction site. Figure 11.12-1 is a generalized process diagram for concrete batching.

The raw materials can be delivered to a plant by rail, truck or barge. The cement is transferred to elevated storage silos pneumatically or by bucket elevator. The sand and coarse aggregate are transferred to elevated bins by front end loader, clam shell crane, belt conveyor, or bucket elevator. From these elevated bins, the constituents are fed by gravity or screw conveyor to weigh hoppers, which combine the proper amounts of each material.

11.12-2 Emissions and Controls [6-8]

Particulate matter, consisting primarily of cement and pozzolan dust but including some aggregate and sand dust emissions, is the primary pollutant of concern. In addition, there are emissions of metals that are associated with this particulate matter. All but one of the emission points are fugitive in nature. The only point sources are the transfer of cement and pozzolan material to silos, and these are usually vented to a fabric filter or “sock”. Fugitive sources include the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. The amount of fugitive emissions generated during the transfer of sand and aggregate depends primarily on the surface moisture content of these materials. The extent of fugitive emission control varies widely from plant to plant. Particulate emission factors for concrete batching are give in Tables 11.12-1 and 11.12-2.

Types of controls used may include water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, central duct collection systems, and the like. A major source of potential emissions, the movement of heavy trucks over unpaved or dusty surfaces in and around the plant, can be controlled by good maintenance and wetting of the road surface.

Predictive equations that allow for emission factor adjustment based on plant specific conditions are given in the Background Document for Chapter 11.12 and Chapter 13. Whenever plant specific data are available, they should be used with these predictive equations (e.g. Equations 11.12-1 through 11.12-3) in lieu of the general fugitive emission factors presented in Table 11.12-1 through11.12-5 in order to adjust to site specific conditions, such as moisture levels and localized wind speeds.

11.12-3 Updates since the 5th Edition.

October 2001 – This major revision of the section replaced emissions factors based upon engineering judgment and poorly documented and performed source test reports with emissions tests conducted at modern operating truck mix and central mix facilities. Emissions factors for both total PM and total PM_{10} were developed from this test data.

June 2006 – This revision of the section supplemented the two source tests with several additional source tests of central mix and truck mix facilities. The measurement of the capture efficiency, local wind speed and fines material moisture level was improved over the previous two source tests. In addition to quantifying total PM and PM_{10}, $PM_{2.5}$ emissions were quantified at all of the facilities. Single value emissions factors for truck mix and central mix operations were revised using all of the data. Additionally, parameterized emissions factor equations using local wind speed and fines material moisture content were developed from the newer data.

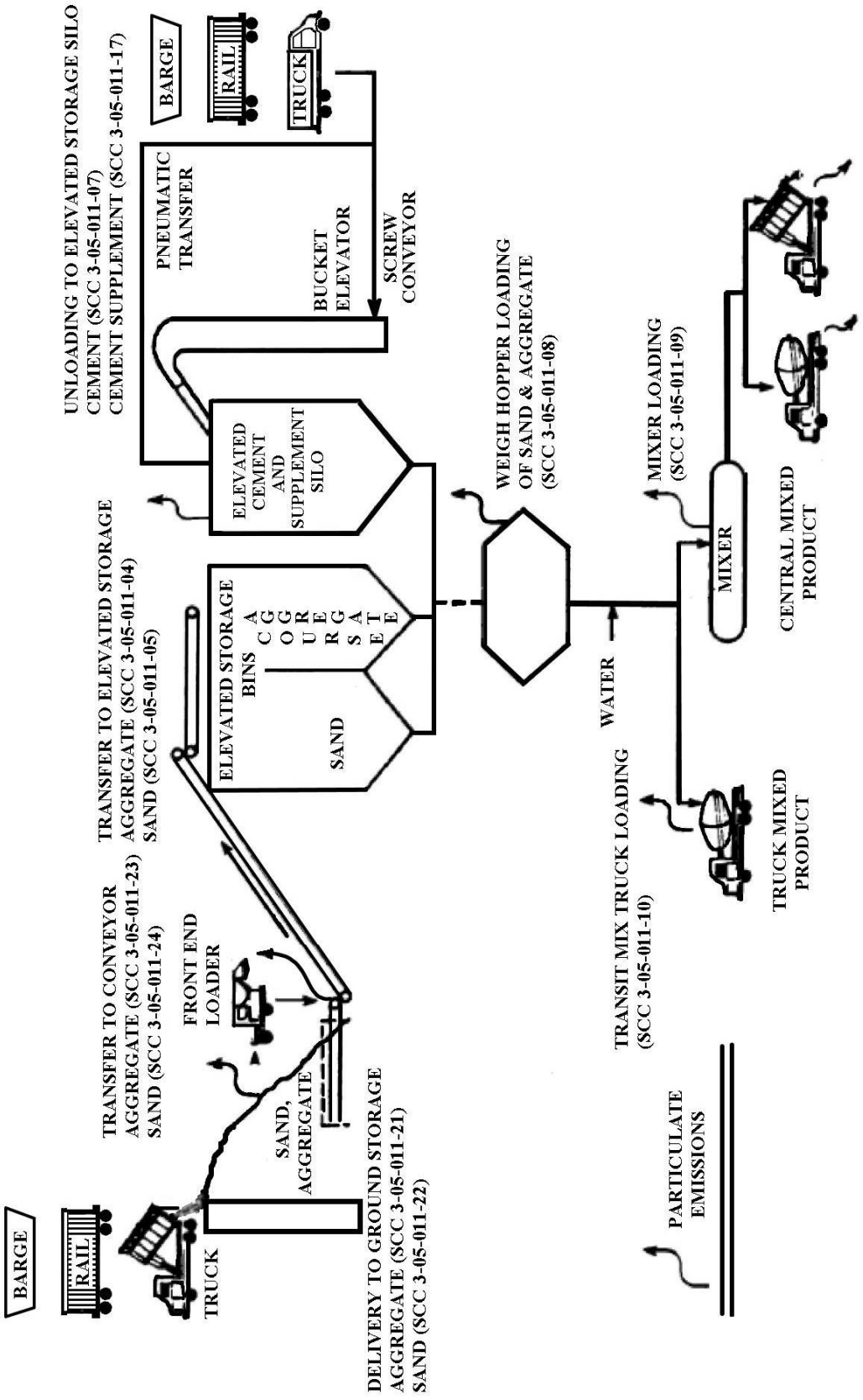


Figure 11.12-1. Typical Concrete Batching Process.

TABLE 11.12-1 (METRIC UNITS)
EMISSION FACTORS FOR CONCRETE BATCHING [a]

Source (SCC)	Uncontrolled				Controlled			
	Total PM	Emission Factor Rating	Total PM_{10}	Emission Factor Rating	Total PM	Emission Factor Rating	Total PM_{10}	Emission Factor Rating
Aggregate transfer [b] (3-05-011-04,-21,23)	0.0035	D	0.0017	D	ND		ND	
Sand transfer [b] (3-05-011-05,22,24)	0.0011	D	0.00051	D	ND		ND	
Cement unloading to elevated storage silo (pneumatic)[c] (3-05-011-07)	0.36	E	0.23	E	0.00050	D	0.00017	D
Cement supplement unloading to elevated storage silo (pneumatic)[d] (3-05-011-17)	1.57	E	0.65	E	0.0045	D	0.0024	E
Weigh hopper loading [e] (3-05-011-08)	0.0026	D	0.0013	D	ND		ND	
Mixer loading (central mix)[f] (3-05-011-09)	0.272 or Eqn. 11.12-1	B	0.067 or Eqn. 11.12-1	B	0.0087 or Eqn. 11.12-1	B	0.0024 or Eqn. 11.12-1	B
Truck loading (truck mix)[g] (3-05-011-10)	0.498	B	0.139	B	0.0280 or Eqn. 11.12-1	B	0.0080 or Eqn. 11.12-1	B
Vehicle traffic (paved roads)	See AP-42 Section 13.2.1							
Vehicle traffic (unpaved roads)	See AP-42 Section 13.2.2							
Wind erosion from aggregate and sand storage piles	See AP-42 Section 13.2.5							

ND = No data

[a] All emission factors are in kg of pollutant per Mg of material loaded unless noted otherwise. Loaded material includes course aggregate, sand, cement, cement supplement and the surface moisture associated with these materials. The average material composition of concrete batches presented in references 9 and 10 was 846 kg course aggregate, 648 kg sand, 223 kg cement and 33kg cement supplement. Approximately 75 liters of water was added to this solid material to produce 1826 kg of concrete.

[b] Reference 9 and 10. Emission factors are based upon an equation from AP-42, Section 13.2.2, with k_{PM-10} =.35, k_{PM} = .74, U = 10mph, $M_{aggregate}$ =1.77%, and M_{sand} = 4.17%. These moisture contents of the materials ($M_{aggregate}$ and M_{sand}) are the averages of the values obtained from Reference 9 and Reference 10.

[c] The uncontrolled PM & PM-10 emission factors were developed from Reference 9. The controlled emission factor for PM was developed from References 9, 10, 11, and 12. The controlled emission factor for PM-10 was developed from References 9 and 10.

[d] The controlled PM emission factor was developed from Reference 10 and Reference 12, whereas the controlled PM-10 emission factor was developed from only Reference 10.

[e] Emission factors were developed by using the Aggregate and Sand Transfer Emission Factors in conjunction with the ratio of aggregate and sand used in an average $yard^3$ of concrete. The unit for these emission factors is kg of pollutant per Mg of aggregate and sand.

[f] References 9, 10, and 14. The emission factor units are kg of pollutant per Mg of cement and cement supplement. The general factor is the arithmetic mean of all test data.

[g] Reference 9, 10, and 14. The emission factor units are kg of pollutant per Mg of cement and cement supplement. The general factor is the arithmetic mean of all test data.

TABLE 11.12-2 (ENGLISH UNITS)
EMISSION FACTORS FOR CONCRETE BATCHING [a]

Source (SCC)	Uncontrolled				Controlled			
	Total PM	Emission Factor Rating	Total PM_{10}	Emission Factor Rating	Total PM	Emission Factor Rating	Total PM_{10}	Emission Factor Rating
Aggregate transfer [b] (3-05-011-04,-21,23)	0.0069	D	0.0033	D	ND		ND	
Sand transfer [b] (3-05-011-05,22,24)	0.0021	D	0.00099	D	ND		ND	
Cement unloading to elevated storage silo (pneumatic)[c] (3-05-011-07)	0.72	E	0.46	E	0.00099	D	0.00034	D
Cement supplement unloading to elevated storage silo (pneumatic)[d] (3-05-011-17)	3.14	E	1.10	E	0.0089	D	0.0049	E
Weigh hopper loading [e] (3-05-011-08)	0.0051	D	0.0024	D	ND		ND	
Mixer loading (central mix)[f] (3-05-011-09)	0.544 or Eqn. 11.12-1	B	0.134 or Eqn. 11.12-1	B	0.0173 or Eqn. 11.12-1	B	0.0048 or Eqn. 11.12-1	B
Truck loading (truck mix)[g] (3-05-011-10)	0.995	B	0.278	B	0.0568 or Eqn. 11.12-1	B	0.0160 or Eqn. 11.12-1	B
Vehicle traffic (paved roads)	See AP-42 Section 13.2.1							
Vehicle traffic (unpaved roads)	See AP-42 Section 13.2.2							
Wind erosion from aggregate and sand storage piles	See AP-42 Section 13.2.5							

ND = No data

[a] All emission factors are in lb of pollutant per ton of material loaded unless noted otherwise. Loaded material includes course aggregate, sand, cement, cement supplement and the surface moisture associated with these materials. The average material composition of concrete batches presented in references 9 and 10 was 1865 lbs course aggregate, 1428 lbs sand, 491 lbs cement and 73 lbs cement supplement. Approximately 20 gallons of water was added to this solid material to produce 4024 lbs (one cubic yard) of concrete.

[b] Reference 9 and 10. Emission factors are based upon an equation from AP-42, Section 13.2.2, with k_{PM-10} =.35, k_{PM} = .74, U = 10mph, $M_{aggregate}$ =1.77%, and M_{sand} = 4.17%. These moisture contents of the materials ($M_{aggregate}$ and M_{sand}) are the averages of the values obtained from Reference 9 and Reference 10.

[c] The uncontrolled PM & PM-10 emission factors were developed from Reference 9. The controlled emission factor for PM was developed from References 9, 10, 11, and 12. The controlled emission factor for PM-10 was developed from References 9 and 10.

[d] The controlled PM emission factor was developed from Reference 10 and Reference 12, whereas the controlled PM-10 emission factor was developed from only Reference 10.

[e] Emission factors were developed by using the Aggregate and Sand Transfer Emission Factors in conjunction with the ratio of aggregate and sand used in an average yard^3 of concrete. The unit for these emission factors is lb of pollutant per ton of aggregate and sand.

[f] References 9, 10, and 14. The emission factor units are lb of pollutant per ton of cement and cement supplement. The general factor is the arithmetic mean of all test data.

[g] Reference 9, 10, and 14. The emission factor units are lb of pollutant per ton of cement and cement supplement. The general factor is the arithmetic mean of all test data.

The particulate matter emissions from truck mix and central mix loading operations are calculated in accordance with the values in Tables 11.12-1 or 11.12-2 or by Equation 11.12-1[14] when site specific data are available.

$$E = k\,(0.0032)\left[\frac{U^{a}}{M^{b}}\right] + c \qquad \text{Equation 11.12-1}$$

E	=	Emission factor in lbs./ton of cement and cement supplement
k	=	Particle size multiplier (dimensionless)
U	=	Wind speed, miles per hour (mph)
M	=	Minimum moisture (% by weight) of cement and cement supplement
a, b	=	Exponents
c	=	Constant

The parameters for Equation 11.12-1 are summarized in Tables 11.12-3 and 11.12-4.

Table 11.12-3. Equation Parameters for Truck Mix Operations

Condition	Parameter Category	k	a	b	c
Controlled[1]	Total PM	0.8	1.75	0.3	0.013
	PM_{10}	0.32	1.75	0.3	0.0052
	$PM_{10-2.5}$	0.288	1.75	0.3	0.00468
	$PM_{2.5}$	0.048	1.75	0.3	0.00078
Uncontrolled[1]	Total PM	0.995			
	PM_{10}	0.278			
	$PM_{10-2.5}$	0.228			
	$PM_{2.5}$	0.050			

Table 11.12-4. Equation Parameters for Central Mix Operations

Condition	Parameter Category	k	a	b	c
Controlled[1]	Total PM	0.19	0.95	0.9	0.0010
	PM_{10}	0.13	0.45	0.9	0.0010
	$PM_{10-2.5}$	0.12	0.45	0.9	0.0009
	$PM_{2.5}$	0.03	0.45	0.9	0.0002
Uncontrolled[1]	Total PM	5.90	0.6	1.3	0.120
	PM_{10}	1.92	0.4	1.3	0.040
	$PM_{10-2.5}$	1.71	0.4	1.3	0.036
	$PM_{2.5}$	0.38	0.4	1.3	0

1. Emission factors expressed in lbs/tons of cement and cement supplement

To convert from units of lbs/ton to units of kilograms per mega gram, the emissions calculated by Equation 11.12-1 should be divided by 2.0.

Particulate emission factors per yard of concrete for an average batch formulation at a typical facility are given in Tables 11.12-4 and 11.12-5. For truck mix loading and central mix loading, the

emissions of PM, PM-10, PM-10-2.5, and PM-2.5 are calculated by multiplying the emission factor calculated using Equation 11.12-2 by a factor of 0.140 to convert from emissions per ton of cement and cement supplement to emissions per yard of concrete. This equation is based on a typical concrete formulation of 564 pounds of cement and cement supplement in a total of 4,024 pounds of material (including aggregate, sand, and water). This calculation is summarized in Equation 11.12-2.

$$\text{PM, PM10, PM10 - 2.5, PM2.5 emissions}\left(\frac{\text{pounds}}{\text{yd}^3 \text{ of concrete}}\right) = 0.140\,(\text{Equation } 11.12-1 \text{ factor or Table } 11.12-2 \text{ Factor})$$

Equation 11.12-2

Metals emission factors for concrete batching are given in Tables 11.12-6 and 11.12-7. Alternatively, the metals emissions from ready mix plants can be calculated based on (1) the weighted average concentration of the metal in the cement and the cement supplement (i.e. flyash) and (2) on the total particulate matter emission factors calculated in accordance with Equation 11.12-3. Emission factors calculated using Equation 11.12-3 are rated D.

$$\text{Metal}_{EF} = \text{PM}_{EF}\left(\frac{aC + bS}{C + S}\right)$$

Equation 11.12-3

Where:

Metal_{EF}	=	Metal Emissions, Lbs. As per Ton of Cement and Cement Supplement
PM_{EF}	=	Controlled Particulate Matter Emission Factor (PM, PM10, or PM2.5) Lbs. per Ton of Cement and Cement Supplement
a	=	ppm of Metal in Cement
C	=	Quantity of Cement Used, Lbs. per hour
b	=	ppm of Metal in Cement Supplement
S	=	Quantity of Cement Supplement Used, Lbs. per hour

This equation is based on the assumption that 100% of the particulate matter emissions are material entrained from the cement and cement supplement streams. Equation 11.12-3 over-estimates total metal emissions to the extent that sand and fines from aggregate contribute to the total particulate matter emissions.

TABLE 11.12-5 (ENGLISH UNITS)
PLANT WIDE EMISSION FACTORS PER YARD OF TRUCK MIX CONCRETE [a]

	Uncontrolled		Controlled	
	PM (lb/yd^3)	PM-10 (lb/yd^3)	PM (lb/yd^3)	PM-10 (lb/yd^3)
Aggregate delivery to ground storage (3-05-011-21)	0.0064	0.0031	0.0064	0.0031
Sand delivery to ground storage (3-05-011-22)	0.0015	0.0007	0.0015	0.0007
Aggregate transfer to conveyor (3-05-011-23)	0.0064	0.0031	0.0064	0.0031
Sand transfer to conveyor (3-05-011-24)	0.0015	0.0007	0.0015	0.0007
Aggregate transfer to elevated storage (3-05-011-04)	0.0064	0.0031	0.0064	0.0031
Sand transfer to elevated storage (3-05-011-05)	0.0015	0.0007	0.0015	0.0007
Cement delivery to Silo (3-05-011-07 controlled)	0.0002	0.0001	0.0002	0.0001
Cement supplement delivery to Silo (3-05-011-17 controlled)	0.0003	0.0002	0.0003	0.0002
Weigh hopper loading (3-05-011-08)	0.0079	0.0038	0.0079	0.0038
Truck mix loading (3-05-011-10)	See Equation 11.12-2			

TABLE 11.12-6 (ENGLISH UNITS)
PLANT WIDE EMISSION FACTORS PER YARD OF CENTRAL MIX CONCRETE [a]

	Uncontrolled		Controlled	
	PM (lb/yd^3)	PM-10 (lb/yd^3)	PM (lb/yd^3)	PM-10 (lb/yd^3)
Aggregate delivery to ground storage (3-05-011-21)	0.0064	0.0031	0.0064	0.0031
Sand delivery to ground storage (3-05-011-22)	0.0015	0.0007	0.0015	0.0007
Aggregate transfer to conveyor (3-05-011-23)	0.0064	0.0031	0.0064	0.0031
Sand transfer to conveyor (3-05-011-24)	0.0015	0.0007	0.0015	0.0007
Aggregate transfer to elevated storage (3-05-011-04)	0.0064	0.0031	0.0064	0.0031
Sand transfer to elevated storage (3-05-011-05)	0.0015	0.0007	0.0015	0.0007
Cement delivery to Silo (3-05-011-07 controlled)	0.0002	0.0001	0.0002	0.0001
Cement supplement delivery to Silo (3-05-011-17 controlled)	0.0003	0.0002	0.0003	0.0002
Weigh hopper loading (3-05-011-08)	0.0079	0.0038	0.0079	0.0038
Central mix loading (3-05-011-09)	See Equation 11.12-2			

[a] Total facility emissions are the sum of the emissions calculated in Tables 11.12-4 or 11.12-5. Total facility emissions do not include road dust and wind blown dust. The emission factors in Tables 11.12-4 and 11.12-5 are based upon the following composition of one yard of concrete.

Coarse Aggregate	1865. pounds
Sand	1428. pounds
Cement	491. pounds
Cement Supplement	73. pounds
Water	20. gallons (167 pounds)

TABLE 11.12-7 (METRIC UNITS)
CONCRETE BATCH PLANT METAL EMISSION FACTORS [a]

	Arsenic	Beryllium	Cadmium	Total Chromium	Lead	Manganese	Nickel	Total Phosphorus	Selenium	Emission Factor Rating
Cement Silo Filling [b] (SCC 3-05-011-07)	8.38e-07	8.97e-09	1.17e-07	1.26e-07	3.68e-07	1.01e-04	8.83e-06	5.88e-05	ND	E
w/ Fabric Filter	2.12e-09	2.43e-10	2.43e-10	1.45e-08	5.46e-09	5.87e-08	2.09e-08	ND	ND	E
Cement Supplement Silo Filling [c] (SCC 3-05-011-17)	ND	ND	ND	ND	ND	ND	ND	ND	ND	E
w/ Fabric Filter	5.02e-07	4.52e-08	9.92e-09	6.10e-07	2.60e-07	1.28e-07	1.14e-06	1.77e-06	3.62e-08	E
Central Mix Batching [e] (SCC 3-05-011-09)	1.16e-07	ND	5.92e-09	7.11e-07	1.91e-07	3.06e-05	1.64e-06	1.01e-05	ND	E
w/ Fabric Filter	9.35e-09	ND	3.55e-10	6.34e-08	1.83e-08	1.89e-06	1.24e-07	6.04e-07	ND	E
Truck Loading [g] (SCC 3-05-011-10)	1.52e-06	1.22e-07	1.71e-08	5.71e-06	1.81e-06	3.06e-05	5.99e-06	1.92e-05	1.31e-06	E
w/ Fabric Filter	5.80e-07	5.18e-08	4.53e-09	2.05e-06	7.67e-07	1.04e-05	2.39e-06	6.16e-06	5.64e-08	E

ND=No data

[a] All emission factors are in kg of pollutant per Mg of material loaded unless noted otherwise. Loaded material includes course aggregate, sand, cement, cement supplement and the surface moisture associated with these materials. The average material composition of concrete batches presented in references 9 and 10 was 846 Kg course aggregate, 648 kg sand, 223 kg cement and 33kg cement supplement. Approximately 75 liters of water was added to this solid material to produce 1826 kg of concrete.

[b] The uncontrolled emission factors were developed from Reference 8. The controlled emission factors were developed form Reference 9 and 10. Although controlled emissions of phosphorous compounds were below detection, it is reasonable to assume that the effectiveness is comparable to the average effectiveness (98%) for the other metals.

[c] Reference 10.

[d] Reference 9. The emission factor units are kg of pollutant per Mg of cement and cement supplement. Emission factors were developed from a typical central mix operation. The average estimate of the percent of emissions captured during each run is 94%.

[e] Reference 9 and 10. The emission factor units are kg of pollutant per Mg of cement and cement supplement. Emission factors were developed from two typical truck mix loading operations. Based upon visual observations of every loading operation during the two test programs, the average capture efficiency during the testing was 71%.

TABLE 11.12-8 (ENGLISH UNITS)
CONCRETE BATCH PLANT METAL EMISSION FACTORS [a]

	Arsenic	Beryllium	Cadmium	Total Chromium	Lead	Manganese	Nickel	Total Phosphorus	Selenium	Emission Factor Rating
Cement Silo Filling [b] (SCC 3-05-011-07)	1.68e-06	1.79e-08	2.34e-07	2.52e-07	7.36e-07	2.02e-04	1.76e-05	1.18e-05	ND	E
w/ Fabric Filter	4.24e-09	4.86e-10	4.86e-10	2.90e-08	1.09e-08	1.17e-07	4.18e-08	ND	ND	E
Cement Supplement Silo Filling [c] (SCC 3-05-011-17)	ND	ND	ND	ND	ND	ND	ND	ND	ND	E
w/ Fabric Filter	1.00e-06	9.04e-08	1.98e-10	1.22e-06	5.20e-07	2.56e-07	2.28e-06	3.54e-06	7.24e-08	E
Central Mix Batching [e] (SCC 3-05-011-09)	2.32e-07	ND	1.18e-08	1.42e-06	3.82e-07	6.12e-05	3.28e-06	2.02e-05	ND	E
w/ Fabric Filter	1.87e-08	ND	7.10e-10	1.27e-07	3.66e-08	3.78e-06	2.48e-07	1.20e-06	ND	E
Truck Loading [g] (SCC 3-05-011-10)	3.04e-06	2.44e-07	3.42e-08	1.14e-05	3.62e-06	6.12e-05	1.19e-05	3.84e-05	2.62e-06	E
w/ Fabric Filter	1.16e-06	1.04e-07	9.06e-09	4.10e-06	1.53e-06	2.08e-05	4.78e-06	1.23e-05	1.13e-07	E

ND=No data

[a] All emission factors are in lb of pollutant per ton of material loaded unless noted otherwise. Loaded material includes course aggregate, sand, cement, cement supplement and the surface moisture associated with these materials. The average material composition of concrete batches presented in references 9 and 10 was 1865 lbs course aggregate, 1428 lbs sand, 491 lbs cement and 73 lbs cement supplement. Approximately 20 gallons of water was added to this solid material to produce 4024 lbs (one cubic yard) of concrete.

[b] The uncontrolled emission factors were developed from Reference 8. The controlled emission factors were developed form Reference 9 and 10. Although controlled emissions of phosphorous compounds were below detection, it is reasonable to assume that the effectiveness is comparable to the average effectiveness (98%) for the other metals.

[c] Reference 10.

[d] Reference 9. The emission factor units are lb of pollutant per ton of cement and cement supplement. Emission factors were developed from a typical central mix operation. The average estimate of the percent of emissions captured during each test run is 94%.

[e] Reference 9 and 10. The emission factor units are lb of pollutant per ton of cement and cement supplement. Emission factors were developed from two typical truck mix loading operations. Based upon visual observations of every loading operation during the two test programs, the average capture efficiency during the testing was 71%.

References for Section 11.12

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5. Portland Cement Association. (2001). Concrete Basics. Retrieved August 27, 2001 from the World Wide Web: http://www.portcement.org/cb/

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12. *Stack Test "Confidential"* (Test obtained from State of Tennessee), Environmental Consultants, Oklahoma City, OK, February 1976.

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11.19.2 Crushed Stone Processing and Pulverized Mineral Processing

11.19.2.1 Process Description [24, 25]

Crushed Stone Processing

Major rock types processed by the crushed stone industry include limestone, granite, dolomite, traprock, sandstone, quartz, and quartzite. Minor types include calcareous marl, marble, shell, and slate. Major mineral types processed by the pulverized minerals industry, a subset of the crushed stone processing industry, include calcium carbonate, talc, and barite. Industry classifications vary considerably and, in many cases, do not reflect actual geological definitions.

Rock and crushed stone products generally are loosened by drilling and blasting and then are loaded by power shovel or front-end loader into large haul trucks that transport the material to the processing operations. Techniques used for extraction vary with the nature and location of the deposit. Processing operations may include crushing, screening, size classification, material handling and storage operations. All of these processes can be significant sources of PM and PM-10 emissions if uncontrolled.

Quarried stone normally is delivered to the processing plant by truck and is dumped into a bin. A feeder is used as illustrated in Figure 11.19.2-1. The feeder or screens separate large boulders from finer rocks that do not require primary crushing, thus reducing the load to the primary crusher. Jaw, impactor, or gyratory crushers are usually used for initial reduction. The crusher product, normally 7.5 to 30 centimeters (3 to 12 inches) in diameter, and the grizzly throughs (undersize material) are discharged onto a belt conveyor and usually are conveyed to a surge pile for temporary storage or are sold as coarse aggregates.

The stone from the surge pile is conveyed to a vibrating inclined screen called the scalping screen. This unit separates oversized rock from the smaller stone. The undersized material from the scalping screen is considered to be a product stream and is transported to a storage pile and sold as base material. The stone that is too large to pass through the top deck of the scalping screen is processed in the secondary crusher. Cone crushers are commonly used for secondary crushing (although impact crushers are sometimes used), which typically reduces material to about 2.5 to 10 centimeters (1 to 4 inches). The material (throughs) from the second level of the screen bypasses the secondary crusher because it is sufficiently small for the last crushing step. The output from the secondary crusher and the throughs from the secondary screen are transported by conveyor to the tertiary circuit, which includes a sizing screen and a tertiary crusher.

Tertiary crushing is usually performed using cone crushers or other types of impactor crushers. Oversize material from the top deck of the sizing screen is fed to the tertiary crusher. The tertiary crusher output, which is typically about 0.50 to 2.5 centimeters (3/16th to 1 inch), is returned to the sizing screen. Various product streams with different size gradations are separated in the screening operation. The products are conveyed or trucked directly to finished product bins, to open area stock piles, or to other processing systems such as washing, air separators, and screens and classifiers (for the production of manufactured sand).

Some stone crushing plants produce manufactured sand. This is a small-sized rock product with a maximum size of 0.50 centimeters (3/16 th inch). Crushed stone from the tertiary sizing screen is sized in a vibrating inclined screen (fines screen) with relatively small mesh sizes.

Oversized material is processed in a cone crusher or a hammermill (fines crusher) adjusted to produce small diameter material. The output is returned to the fines screen for resizing.

In certain cases, stone washing is required to meet particulate end product specifications or demands.

Pulverized Mineral Processing

Pulverized minerals are produced at specialized processing plants. These plants supply mineral products ranging from sizes of approximately 1 micrometer to more than 75 micrometers aerodynamic diameter. Pharmaceutical, paint, plastics, pigment, rubber, and chemical industries use these products. Due to the specialized characteristics of the mineral products and the markets for these products, pulverized mineral processing plants have production rates that are less than 5% of the production capacities of conventional crushed stone plants. Two alternative processing systems for pulverized minerals are summarized in Figure 11-19.2-2.

In dry processing systems, the mineral aggregate material from conventional crushing and screening operations is subject to coarse and fine grinding primarily in roller mills and/or ball mills to reduce the material to the necessary product size range. A classifier is used to size the ground material and return oversized material that can be pulverized using either wet or dry processes. The classifier can either be associated with the grinding operation, or it can be a stand-alone process unit. Fabric filters control particulate matter emissions from the grinding operation and the classifier. The products are stored in silos and are shipped by truck or in bags.

In wet processing systems, the mineral aggregate material is processed in wet mode coarse and fine grinding operations. Beneficiation processes use flotation to separate mineral impurities. Finely ground material is concentrated and flash dried. Fabric filters are used to control particulate matter emissions from the flash dryer. The product is then stored in silos, bagged, and shipped.

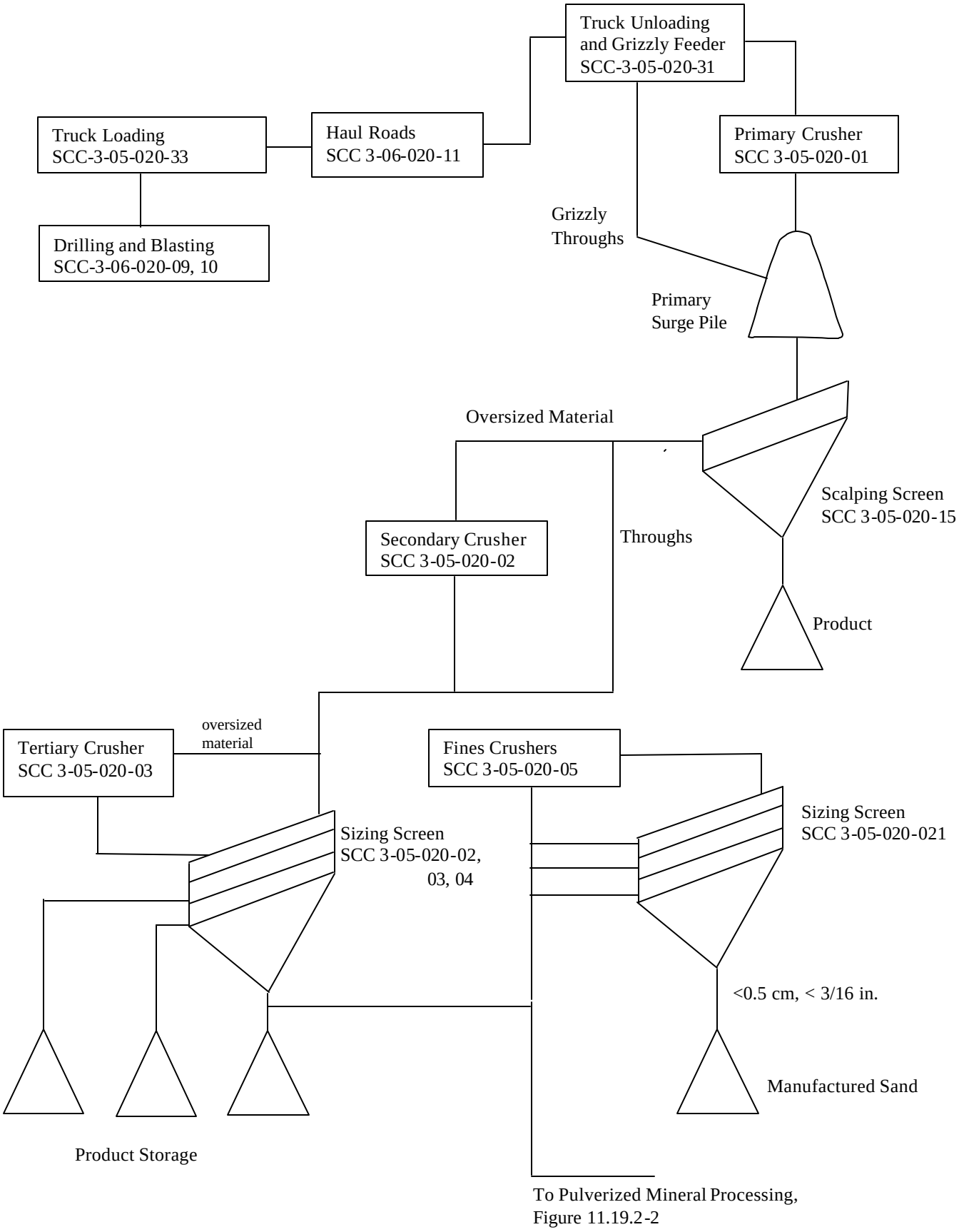


Figure 11.19.2-1. Typical stone processing plant

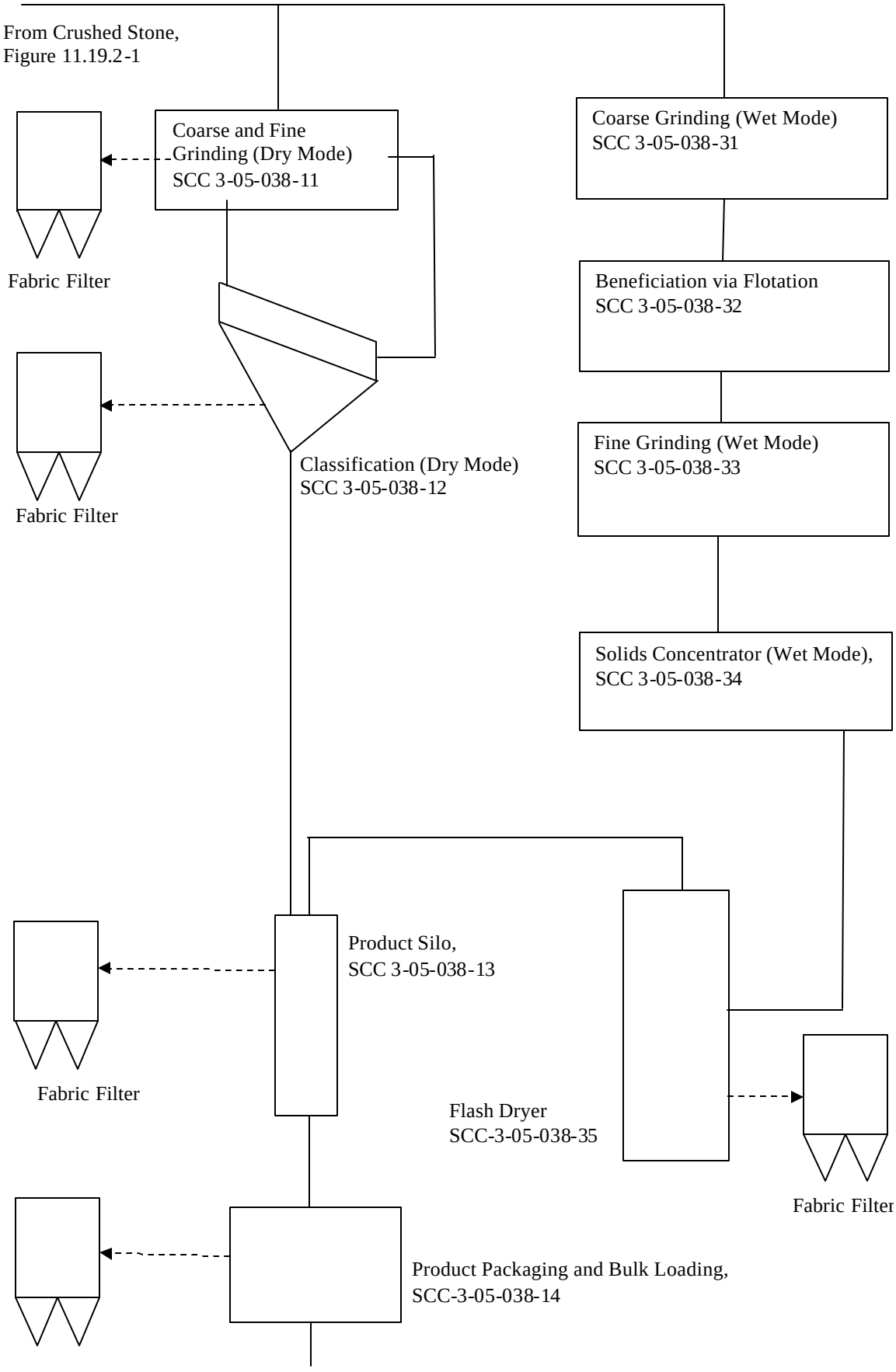


Figure 11.19.2-2 Flowchart for Pulverized Mineral Processing

11.19.2.2 Emissions and Controls [10, 11, 12, 13, 14, and 26]

Crushed Stone Processing

Emissions of PM, PM-10, and PM-2.5 occur from a number of operations in stone quarrying and processing. A substantial portion of these emissions consists of heavy particles that may settle out within the plant. As in other operations, crushed stone emission sources may be categorized as either process sources or fugitive dust sources. Process sources include those for which emissions are amenable to capture and subsequent control. Fugitive dust sources generally involve the reentrainment of settled dust by wind or machine movement. Emissions from process sources should be considered fugitive unless the sources are vented to a baghouse or are contained in an enclosure with a forced-air vent or stack. Factors affecting emissions from either source category include the stone size distribution and the surface moisture content of the stone processed, the process throughput rate, the type of equipment and operating practices used, and topographical and climatic factors.

Of graphical and seasonal factors, the primary variables affecting uncontrolled PM emissions are wind and material moisture content. Wind parameters vary with geographical location, season, and weather. It can be expected that the level of emissions from unenclosed sources (principally fugitive dust sources) will be greater during periods of high winds. The material moisture content also varies with geographical location, season, and weather. Therefore, the levels of uncontrolled emissions from both process emission sources and fugitive dust sources generally will be greater in arid regions of the country than in temperate ones and greater during the summer months because of a higher evaporation rate.

The moisture content of the material processed can have a substantial effect on emissions. This effect is evident throughout the processing operations. Surface wetness causes fine particles to agglomerate on or to adhere to the faces of larger stones, with a resulting dust suppression effect. However, as new fine particles are created by crushing and attrition and as the moisture content is reduced by evaporation, this suppressive effect diminishes and may disappear. Plants that use wet suppression systems (spray nozzles) to maintain relatively high material moisture contents can effectively control PM emissions throughout the process. Depending on the geographical and climatic conditions, the moisture content of mined rock can range from nearly zero to several percent. Because moisture content is usually expressed on a basis of overall weight percent, the actual moisture amount per unit area will vary with the size of the rock being handled. On a constant mass-fraction basis, the per-unit area moisture content varies inversely with the diameter of the rock. The suppressive effect of the moisture depends on both the absolute mass water content and the size of the rock product. Typically, wet material contains >1.5 percent water.

A variety of material, equipment, and operating factors can influence emissions from crushing. These factors include (1) stone type, (2) feed size and distribution, (3) moisture content, (4) throughput rate, (5) crusher type, (6) size reduction ratio, and (7) fines content. Insufficient data are available to present a matrix of rock crushing emission factors detailing the above classifications and variables. Available data indicate that PM-10 and PM-2.5 emissions from limestone and granite processing operations are similar. Therefore, the emission factors developed from the emissions data gathered at limestone and granite processing facilities are considered to be representative of typical crushed stone processing operations. Emission factors for filterable PM, PM-10, and PM-2.5 emissions from crushed stone processing operations are presented in Tables 11.19.2-1 (Metric units) and 11.19.2-2 (English units.)

Table 11.19.2-1 (Metric Units). EMISSION FACTORS FOR CRUSHED STONE PROCESSING OPERATIONS (kg/Mg)[a]

Source [b]	Total Particulate Matter [r,s]	EMISSION FACTOR RATING	Total PM-10	EMISSION FACTOR RATING	Total PM-2.5	EMISSION FACTOR RATING
Primary Crushing (SCC 3-05-020-01)	ND		ND[n]		ND[n]	
Primary Crushing (controlled) (SCC 3-05-020-01)	ND		ND[n]		ND[n]	
Secondary Crushing (SCC 3-05-020-02)	ND		ND[n]		ND[n]	
Secondary Crushing (controlled) (SCC 3-05-020-02)	ND		ND[n]		ND[n]	
Tertiary Crushing (SCC 3-050030-03)	0.0027[d]	E	0.0012[o]	C	ND[n]	
Tertiary Crushing (controlled) (SCC 3-05-020-03)	0.0006[d]	E	0.00027[p]	C	0.00005[q]	E
Fines Crushing (SCC 3-05-020-05)	0.0195[e]	E	0.0075[e]	E	ND	
Fines Crushing (controlled) (SCC 3-05-020-05)	0.0015[f]	E	0.0006[f]	E	0.000035[q]	E
Screening (SCC 3-05-020-02, 03)	0.0125[c]	E	0.0043[l]	C	ND	
Screening (controlled) (SCC 3-05-020-02, 03)	0.0011[d]	E	0.00037[m]	C	0.000025[q]	E
Fines Screening (SCC 3-05-020-21	0.15[g]	E	0.036[g]	E	ND	
Fines Screening (controlled) (SCC 3-05-020-21)	0.0018[g]	E	0.0011[g]	E	ND	
Conveyor Transfer Point (SCC 3-05-020-06)	0.0015[h]	E	0.00055[h]	D	ND	
Conveyor Transfer Point (controlled) (SCC 3-05-020-06)	0.00007[i]	E	2.3×10^{-5}[i]	D	6.5×10^{-6}[q]	E
Wet Drilling - Unfragmented Stone (SCC 3-05-020-10)	ND		4.0×10^{-5}[j]	E	ND	
Truck Unloading - Fragmented Stone (SCC 3-05-020-31)	ND		8.0×10^{-6}[j]	E	ND	
Truck Unloading - Conveyor, crushed stone (SCC 3-05-020-32)	ND		5.0×10^{-5}[k]	E	ND	

a. Emission factors represent uncontrolled emissions unless noted. Emission factors in kg/Mg of material throughput. SCC = Source Classification Code. ND = No data.

b. Controlled sources (with wet suppression) are those that are part of the processing plant that employs current wet suppression technology similar to the study group. The moisture content of the study group without wet suppression systems operating (uncontrolled) ranged from 0.21 to 1.3 percent, and the same facilities operating wet suppression systems (controlled) ranged from 0.55 to 2.88 percent. Due to carry over of the small amount of moisture required, it has been shown that each source, with the exception of crushers, does not need to employ direct water sprays. Although the moisture content was the only variable measured, other process features may have as much influence on emissions from a given source. Visual observations from each source under normal operating conditions are probably the best indicator of which emission factor is most appropriate. Plants that employ substandard control measures as indicated by visual observations should use the uncontrolled factor with appropriate control efficiency that best reflects the effectiveness of the controls employed.

c. References 1, 3, 7, and 8

d. References 3, 7, and 8

e. Reference 4

f. References 4 and 15

g. Reference 4

h. References 5 and 6

i. References 5, 6, and 15

j. Reference 11

k. Reference 12

l. References 1, 3, 7, and 8

m. References 1, 3, 7, 8, and 15

n. No data available, but emission factors for PM-10 for tertiary crushers can be used as an upper limit for primary or secondary crushing

o. References 2, 3, 7, 8

p. References 2, 3, 7, 8, and 15

q. Reference 15

r. PM emission factors are presented based on PM-100 data in the Background Support Document for Section 11.19.2

s. Emission factors for PM-30 and PM-50 are available in Figures 11.19.2-3 through 11.19.2-6.

Table 11.19.2-2 (English Units). EMISSION FACTORS FOR CRUSHED STONE PROCESSING OPERATIONS (lb/Ton)[a]

Source [b]	Total Particulate Matter [r,s]	EMISSION FACTOR RATING	Total PM-10	EMISSION FACTOR RATING	Total PM-2.5	EMISSION FACTOR RATING
Primary Crushing (SCC 3-05-020-01)	ND		ND[n]		ND[n]	
Primary Crushing (controlled) (SCC 3-05-020-01)	ND		ND[n]		ND[n]	
Secondary Crushing (SCC 3-05-020-02)	ND		ND[n]		ND[n]	
Secondary Crushing (controlled) (SCC 3-05-020-02)	ND		ND[n]		ND[n]	
Tertiary Crushing (SCC 3-050030-03)	0.0054[d]	E	0.0024[o]	C	ND[n]	
Tertiary Crushing (controlled) (SCC 3-05-020-03)	0.0012[d]	E	0.00054[p]	C	0.00010[q]	E
Fines Crushing (SCC 3-05-020-05)	0.0390[e]	E	0.0150[e]	E	ND	
Fines Crushing (controlled) (SCC 3-05-020-05)	0.0030[f]	E	0.0012[f]	E	0.000070[q]	E
Screening (SCC 3-05-020-02, 03)	0.025[c]	E	0.0087[l]	C	ND	
Screening (controlled) (SCC 3-05-020-02, 03)	0.0022[d]	E	0.00074[m]	C	0.000050[q]	E
Fines Screening (SCC 3-05-020-21)	0.30[g]	E	0.072[g]	E	ND	
Fines Screening (controlled) (SCC 3-05-020-21)	0.0036[g]	E	0.0022[g]	E	ND	
Conveyor Transfer Point (SCC 3-05-020-06)	0.0030[h]	E	0.00110[h]	D	ND	
Conveyor Transfer Point (controlled) (SCC 3-05-020-06)	0.00014[t]	E	4.6×10^{-5}[t]	D	1.3×10^{-5}[q]	E
Wet Drilling - Unfragmented Stone (SCC 3-05-020-10)	ND		8.0×10^{-5}[j]	E	ND	
Truck Unloading -Fragmented Stone (SCC 3-05-020-31)	ND		1.6×10^{-5}[j]	E	ND	
Truck Unloading - Conveyor, crushed stone (SCC 3-05-020-32)	ND		0.00010[k]	E	ND	

a. Emission factors represent uncontrolled emissions unless noted. Emission factors in lb/Ton of material of throughput. SCC = Source Classification Code. ND = No data.

b. Controlled sources (with wet suppression) are those that are part of the processing plant that employs current wet suppression technology similar to the study group. The moisture content of the study group without wet suppression systems operating (uncontrolled) ranged from 0.21 to 1.3 percent, and the same facilities operating wet suppression systems (controlled) ranged from 0.55 to 2.88 percent. Due to carry over of the small amount of moisture required, it has been shown that each source, with the exception of crushers, does not need to employ direct water sprays. Although the moisture content was the only variable measured, other process features may have as much influence on emissions from a given source. Visual observations from each source under normal operating conditions are probably the best indicator of which emission factor is most appropriate. Plants that employ substandard control measures as indicated by visual observations should use the uncontrolled factor with an appropriate control efficiency that best reflects the effectiveness of the controls employed.

c. References 1, 3, 7, and 8

d. References 3, 7, and 8

e. Reference 4

f. References 4 and 15

g. Reference 4

h. References 5 and 6

i. References 5, 6, and 15

j. Reference 11

k. Reference 12

l. References 1, 3, 7, and 8

m. References 1, 3, 7, 8, and 15

n. No data available, but emission factors for PM-10 for tertiary crushers can be used as an upper limit for primary or secondary crushing

o. References 2, 3, 7, 8

p. References 2, 3, 7, 8, and 15

q. Reference 15

r. PM emission factors are presented based on PM-100 data in the Background Support Document for Section 11.19.2

s. Emission factors for PM-30 and PM-50 are available in Figures 11.19.2-3 through 11.19.2-6.

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Emission factor estimates for stone quarry blasting operations are not presented because of the sparsity and unreliability of available tests. While a procedure for estimating blasting emissions is presented in Section 11.9, Western Surface Coal Mining, that procedure should not be applied to stone quarries because of dissimilarities in blasting techniques, material blasted, and size of blast areas. Emission factors for fugitive dust sources, including paved and unpaved roads, materials handling and transfer, and wind erosion of storage piles, can be determined using the predictive emission factor equations presented in AP-42 Section 13.2.

The data used in the preparation of the controlled PM calculations was derived from the individual A-rated tests for PM-2.5 and PM-10 summarized in the Background Support Document. For conveyor transfer points, the controlled PM value was derived from A-rated PM-2.5, PM-10, and PM data summarized in the Background Support Document.

The extrapolation line was drawn through the PM-2.5 value and the mean of the PM-10 values. PM emission factors were calculated for PM-30, PM-50, and PM-100. Each of these particle size limits is used by one or more regulatory agencies as the definition of total particulate matter. The graphical extrapolations used in calculating the emission factors are presented in Figures 11.19.2-3, -4, -5, and -6.

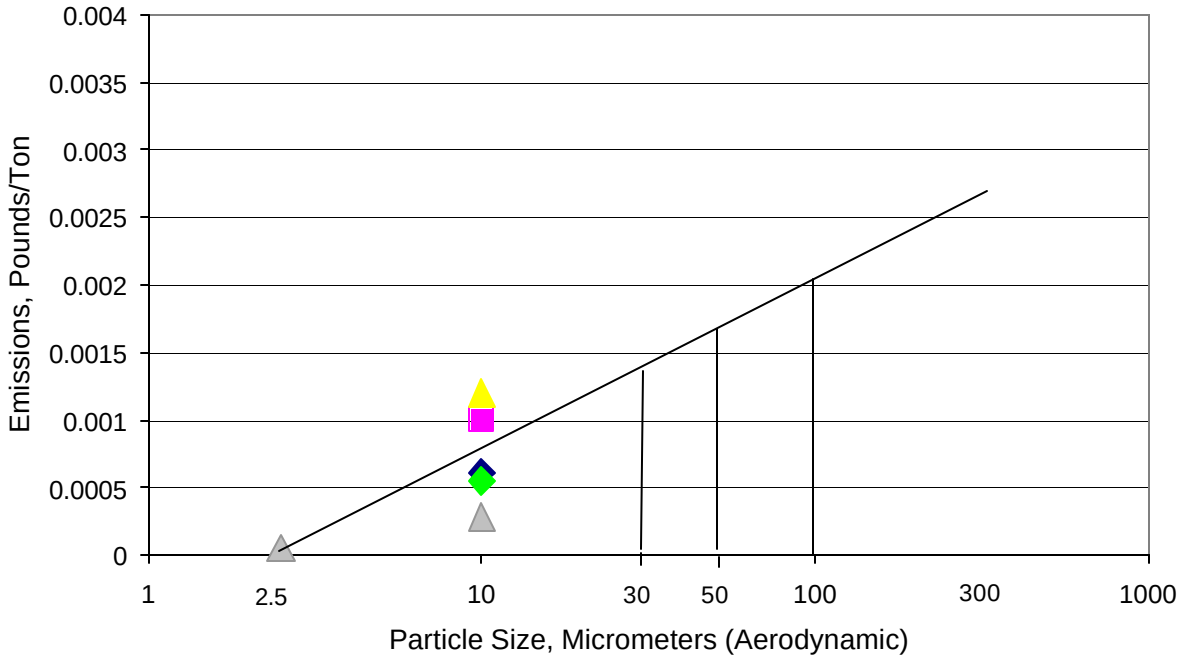


Figure 11-19-3. PM Emission Factor Calculation, Screening (Controlled)

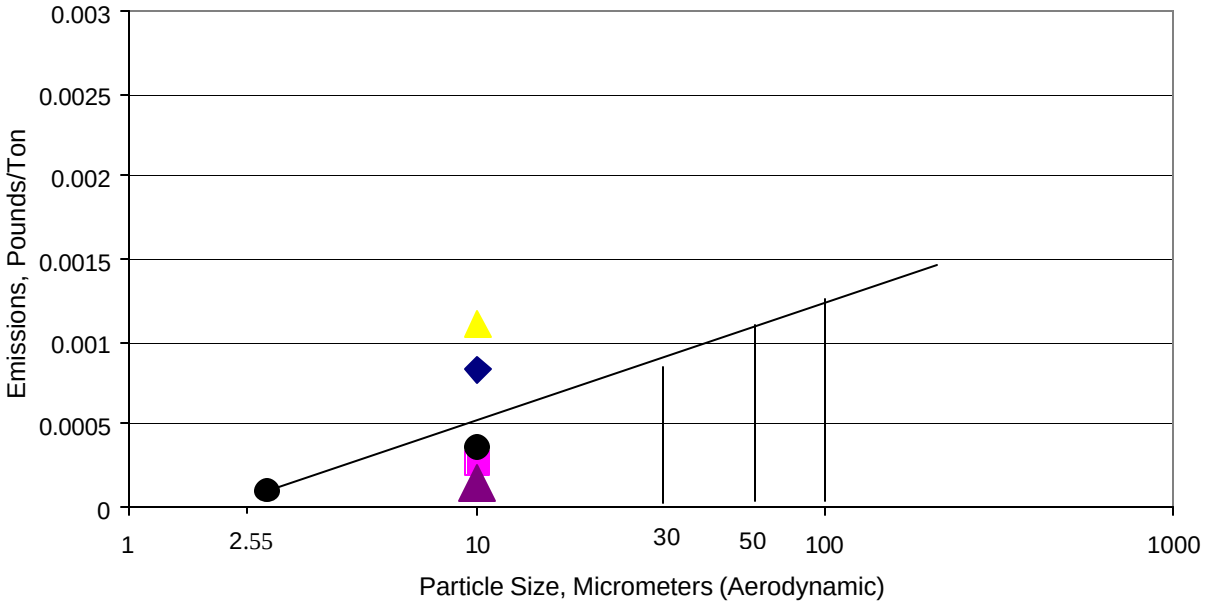


Figure 11.19-4. PM Emission Factor Calculation, Tertiary Crushing (Controlled)

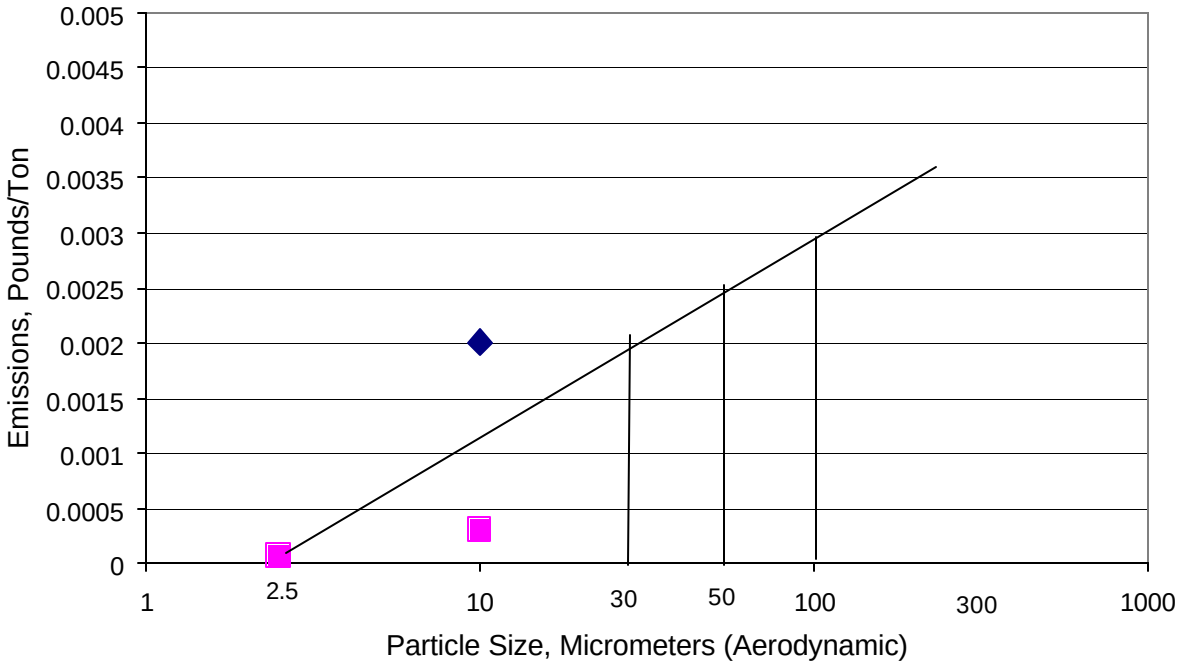


Figure 11-19.5. PM Emission Factor Calculation, Fines Crushing (Controlled)

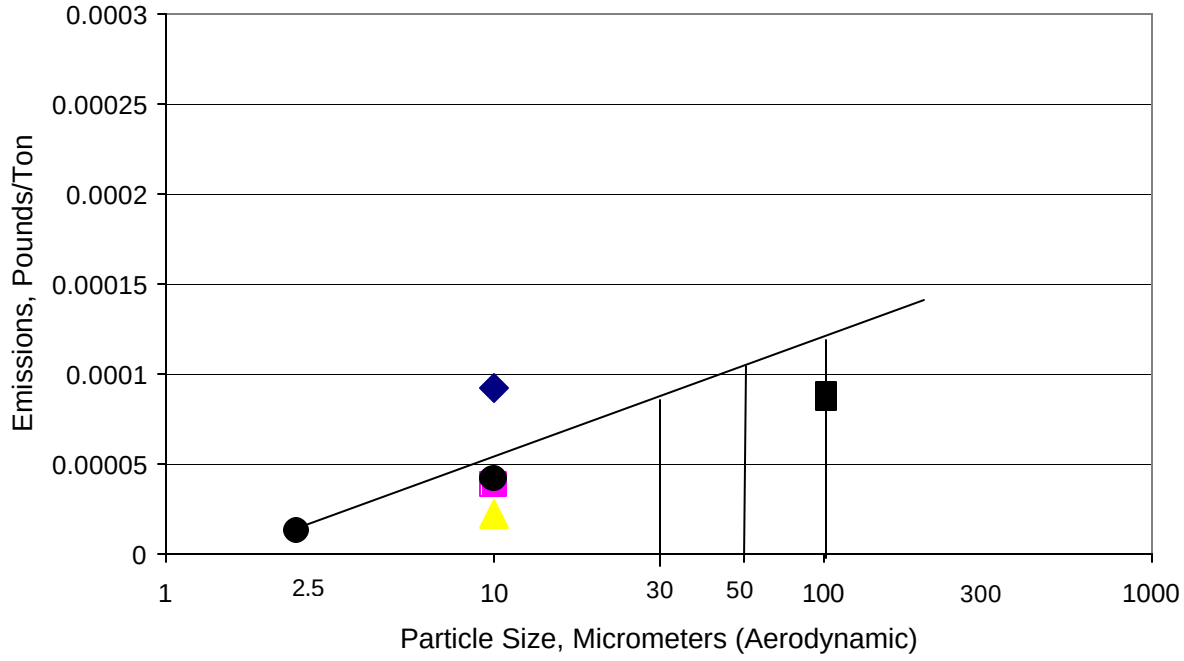


Figure 11.19-6. PM Emission Factor Calculation, Conveyor Transfer Points (Controlled)

The uncontrolled PM emission factors have been calculated from the controlled PM emission factors calculated in accordance with Figures 11.19.2-3 through 11.19.2-6. The PM-10 control efficiencies have been applied to the PM controlled emission factor data to calculate the uncontrolled PM emission rates.

Screening PM-10

Controlled = 0.00073 Lbs./Ton.

Uncontrolled = 0.00865 Lbs./Ton.

Efficiency = 91.6%

Tertiary Crushing PM-10

Controlled = 0.00054

Uncontrolled = 0.00243

Efficiency = 77.7%

Fines Crushing PM-10:

Controlled = 0.0012

Uncontrolled = 0.015

Efficiency = 92.0%

Conveyor Transfer Points PM-10

Controlled = 0.000045

Uncontrolled = 0.0011

Efficiency = 95.9%

The uncontrolled total particulate matter emission factor was calculated from the controlled total particulate matter using Equation 1:

$$\text{Uncontrolled emission factor} = \frac{\text{Controlled total particulate emission factor}}{(100\% - \text{PM-10 Efficiency }\%)/100\%}$$

Equation 1

The Total PM emission factors calculated using Figures 11.19.2-3 through 11.19.2-6 were developed because (1) there are more A-rated test data supporting the calculated values and (2) the extrapolated values provide the flexibility for agencies and source operators to select the most appropriate definition for Total PM. All of the Total PM emission factors have been rated as E due to the limited test data and the need to estimate emission factors using extrapolations of the PM-2.5 and PM-10 data.

Pulverized Mineral Processing

Emissions of particulate matter from dry mode pulverized mineral processing operations are controlled by pulse jet and envelope type fabric filter systems. Due to the low-to-moderate gas temperatures generated by the processing equipment, conventional felted filter media are used. Collection efficiencies for fabric filter-controlled dry process equipment exceed 99.5%. Emission factors for pulverized mineral processing operations are presented in Tables 11.19.2-3 and 11.19.2-4.

Table 11.19.2-3 (Metric Units). EMISSION FACTORS FOR PULVERIZED MINERAL PROCESSING OPERATIONS [a]

Source [b]	Total Particulate Matter	EMISSION FACTOR RATING	Total PM-10	EMISSION FACTOR RATING	Total PM-2.5	EMISSION FACTOR RATING
Grinding (Dry) with Fabric Filter Control (SCC 3-05-038-11)	0.0202	D	0.0169	B	0.0060	B
Classifiers (Dry) with Fabric Filter Control (SCC 3-05-038-12)	0.0112	E	0.0052	E	0.0020	E
Flash Drying with Fabric Filter Control (SCC 3-05-038-35)	0.0134	C	0.0073	C	0.0042	C
Product Storage with Fabric Filter Control (SCC 3-05-38-13)	0.0055	E	0.0008	E	0.0003	E

a. Emission factors represent controlled emissions unless noted. Emission factors are in kg/Mg of material throughput.

b. Date from references 16 through 23

Table 11.19.2-4 (English Units). EMISSION FACTORS FOR PULVERIZED MINERAL PROCESSING OPERATIONS [a]

Source [b]	Total Particulate Matter	EMISSION FACTOR RATING	Total PM-10	EMISSION FACTOR RATING	Total PM-2.5	EMISSION FACTOR RATING
Grinding (Dry) with Fabric Filter Control (SCC 3-05-038-11)	0.0404	D	0.0339	B	0.0121	B
Classifiers (Dry) with Fabric Filter Control (SCC 3-05-038-12)	0.0225	E	0.0104	E	0.0041	E
Flash Drying with Fabric Filter Control (SCC 3-05-038-35)	0.0268	C	0.0146	C	0.0083	C
Product Storage with Fabric Filter Control (SCC 3-05-038-13)	0.0099	E	0.0016	E	0.0006	E

a. Emission factors represent controlled emissions unless noted. Emission factors are in lb/Ton of material throughput.

b. Data from references 16 through 23

References for Section 11.19.2[1]

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[1] References 1 through 23 are identical to References 1 through 23 in the Background Support Document for AP-42, Section 11.19-2.

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15. T. Brozell, T. Holder, and J. Richards, *Measurement of PM-10 and PM2.5 Emission Factors at a Stone Crushing Plant*, National Stone Association, December 1996.

16. T. Brozell, and J. Richards, *$PM_{10}/PM_{2.5}$ Emission Factor Testing for the Pulverized Mineral Division of the National Stone, Sand and Gravel Association.* Report to the National Stone, Sand and Gravel Association; October 2001.

17. Frank Ward & Company, *A Report of Particulate Source Sampling Performed for Franklin Industrial Minerals Located in Sherwood, Tennessee,* Report to Franklin Industrial Minerals, August 1994.

18. Advanced Industrial Resources, LLC. *Performance Test Report of Baghouse No. 37 at Franklin Industrial Minerals, Report to Franklin Industrial Minerals,* November 1999.

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13.2.2 Unpaved Roads

13.2.2.1 General

When a vehicle travels an unpaved road, the force of the wheels on the road surface causes pulverization of surface material. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed.

The particulate emission factors presented in the previous draft version of this section of AP-42, dated October 2001, implicitly included the emissions from vehicles in the form of exhaust, brake wear, and tire wear as well as resuspended road surface material[25]. EPA included these sources in the emission factor equation for unpaved public roads (equation 1b in this section) since the field testing data used to develop the equation included both the direct emissions from vehicles and emissions from resuspension of road dust.

This version of the unpaved public road emission factor equation only estimates particulate emissions from resuspended road surface material [23, 26]. The particulate emissions from vehicle exhaust, brake wear, and tire wear are now estimated separately using EPA's MOBILE6.2 [24]. This approach eliminates the possibility of double counting emissions. Double counting results when employing the previous version of the emission factor equation in this section and MOBILE6.2 to estimate particulate emissions from vehicle traffic on unpaved public roads. It also incorporates the decrease in exhaust emissions that has occurred since the unpaved public road emission factor equation was developed. The previous version of the unpaved public road emission factor equation includes estimates of emissions from exhaust, brake wear, and tire wear based on emission rates for vehicles in the 1980 calendar year fleet. The amount of PM released from vehicle exhaust has decreased since 1980 due to lower new vehicle emission standards and changes in fuel characteristics.

13.2.2.2 Emissions Calculation And Correction Parameters[1-6]

The quantity of dust emissions from a given segment of unpaved road varies linearly with the volume of traffic. Field investigations also have shown that emissions depend on source parameters that characterize the condition of a particular road and the associated vehicle traffic. Characterization of these source parameters allow for "correction" of emission estimates to specific road and traffic conditions present on public and industrial roadways.

Dust emissions from unpaved roads have been found to vary directly with the fraction of silt (particles smaller than 75 micrometers [μm] in diameter) in the road surface materials.[1] The silt fraction is determined by measuring the proportion of loose dry surface dust that passes a 200-mesh screen, using the ASTM-C-136 method. A summary of this method is contained in Appendix C of AP-42. Table 13.2.2-1 summarizes measured silt values for industrial unpaved roads. Table 13.2.2-2 summarizes measured silt values for public unpaved roads. It should be noted that the ranges of silt content vary over two orders of magnitude. Therefore, the use of data from this table can potentially introduce considerable error. Use of this data is strongly discouraged when it is feasible to obtain locally gathered data.

Since the silt content of a rural dirt road will vary with geographic location, it should be measured for use in projecting emissions. As a conservative approximation, the silt content of the parent soil in the area can be used. Tests, however, show that road silt content is normally lower than in the surrounding parent soil, because the fines are continually removed by the vehicle traffic, leaving a higher percentage of coarse particles.

Other variables are important in addition to the silt content of the road surface material. For example, at industrial sites, where haul trucks and other heavy equipment are common, emissions are highly correlated with vehicle weight. On the other hand, there is far less variability in the weights of cars and pickup trucks that commonly travel publicly accessible unpaved roads throughout the United States. For those roads, the moisture content of the road surface material may be more dominant in determining differences in emission levels between, for example a hot, desert environment and a cool, moist location.

The PM-10 and TSP emission factors presented below are the outcomes from stepwise linear regressions of field emission test results of vehicles traveling over unpaved surfaces. Due to a limited amount of information available for PM-2.5, the expression for that particle size range has been scaled against the result for PM-10. Consequently, the quality rating for the PM-2.5 factor is lower than that for the PM-10 expression.

Table 13.2.2-1. TYPICAL SILT CONTENT VALUES OF SURFACE MATERIAL ON INDUSTRIAL UNPAVED ROADS[a]

Industry	Road Use Or Surface Material	Plant Sites	No. Of Samples	Silt Content (%)	
				Range	Mean
Copper smelting	Plant road	1	3	16 - 19	17
Iron and steel production	Plant road	19	135	0.2 - 19	6.0
Sand and gravel processing	Plant road	1	3	4.1 - 6.0	4.8
	Material storage area	1	1	-	7.1
Stone quarrying and processing	Plant road	2	10	2.4 - 16	10
	Haul road to/from pit	4	20	5.0-15	8.3
Taconite mining and processing	Service road	1	8	2.4 - 7.1	4.3
	Haul road to/from pit	1	12	3.9 - 9.7	5.8
Western surface coal mining	Haul road to/from pit	3	21	2.8 - 18	8.4
	Plant road	2	2	4.9 - 5.3	5.1
	Scraper route	3	10	7.2 - 25	17
	Haul road (freshly graded)	2	5	18 - 29	24
Construction sites	Scraper routes	7	20	0.56-23	8.5
Lumber sawmills	Log yards	2	2	4.8-12	8.4
Municipal solid waste landfills	Disposal routes	4	20	2.2 - 21	6.4

[a]References 1,5-15.

The following empirical expressions may be used to estimate the quantity in pounds (lb) of size-specific particulate emissions from an unpaved road, per vehicle mile traveled (VMT):

For vehicles traveling on unpaved surfaces at industrial sites, emissions are estimated from the following equation:

$$E = k\,(s/12)^a (W/3)^b \qquad (1a)$$

and, for vehicles traveling on publicly accessible roads, dominated by light duty vehicles, emissions may be estimated from the following:

$$E = \frac{k\,(s/12)^a (S/30)^d}{(M/0.5)^c} - C \qquad (1b)$$

where k, a, b, c and d are empirical constants (Reference 6) given below and

E = size-specific emission factor (lb/VMT)
s = surface material silt content (%)
W = mean vehicle weight (tons)
M = surface material moisture content (%)
S = mean vehicle speed (mph)
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

The source characteristics s, W and M are referred to as correction parameters for adjusting the emission estimates to local conditions. The metric conversion from lb/VMT to grams (g) per vehicle kilometer traveled (VKT) is as follows:

1 lb/VMT = 281.9 g/VKT

The constants for Equations 1a and 1b based on the stated aerodynamic particle sizes are shown in Tables 13.2.2-2 and 13.2.2-4. The PM-2.5 particle size multipliers (k-factors) are taken from Reference 27.

Table 13.2.2-2. CONSTANTS FOR EQUATIONS 1a AND 1b

Constant	Industrial Roads (Equation 1a)			Public Roads (Equation 1b)		
	PM-2.5	PM-10	PM-30*	PM-2.5	PM-10	PM-30*
k (lb/VMT)	0.15	1.5	4.9	0.18	1.8	6.0
a	0.9	0.9	0.7	1	1	1
b	0.45	0.45	0.45	-	-	-
c	-	-	-	0.2	0.2	0.3
d	-	-	-	0.5	0.5	0.3
Quality Rating	B	B	B	B	B	B

*Assumed equivalent to total suspended particulate matter (TSP)
"-" = not used in the emission factor equation

Table 13.2.2-2 also contains the quality ratings for the various size-specific versions of Equation 1a and 1b. The equation retains the assigned quality rating, if applied within the ranges of source conditions, shown in Table 13.2.2-3, that were tested in developing the equation:

Table 13.2.2-3. RANGE OF SOURCE CONDITIONS USED IN DEVELOPING EQUATION 1a AND 1b

Emission Factor	Surface Silt Content, %	Mean Vehicle Weight		Mean Vehicle Speed		Mean No. of Wheels	Surface Moisture Content, %
		Mg	ton	km/hr	mph		
Industrial Roads (Equation 1a)	1.8-25.2	1.8-260	2-290	8-69	5-43	4-17[a]	0.03-13
Public Roads (Equation 1b)	1.8-35	1.4-2.7	1.5-3	16-88	10-55	4-4.8	0.03-13

[a] See discussion in text.

As noted earlier, the models presented as Equations 1a and 1b were developed from tests of traffic on unpaved surfaces. Unpaved roads have a hard, generally nonporous surface that usually dries quickly after a rainfall or watering, because of traffic-enhanced natural evaporation. (Factors influencing how fast a road dries are discussed in Section 13.2.2.3, below.) The quality ratings given above pertain to the mid-range of the measured source conditions for the equation. A higher mean vehicle weight and a higher than normal traffic rate may be justified when performing a worst-case analysis of emissions from unpaved roads.

The emission factors for the exhaust, brake wear and tire wear of a 1980's vehicle fleet (*C*) was obtained from EPA's MOBILE6.2 model [23]. The emission factor also varies with aerodynamic size range

as shown in Table 13.2.2-4

Table 13.2.2-4. EMISSION FACTOR FOR 1980'S VEHICLE FLEET EXHAUST, BRAKE WEAR AND TIRE WEAR

Particle Size Range[a]	*C*, Emission Factor for Exhaust, Brake Wear and Tire Wear[b] lb/VMT
$PM_{2.5}$	0.00036
PM_{10}	0.00047
PM_{30}[c]	0.00047

[a] Refers to airborne particulate matter (PM-x) with an aerodynamic diameter equal to or less than x micrometers.
[b] Units shown are pounds per vehicle mile traveled (lb/VMT).
[c] PM-30 is sometimes termed "suspendable particulate" (SP) and is often used as a surrogate for TSP.

It is important to note that the vehicle-related source conditions refer to the average weight, speed, and number of wheels for all vehicles traveling the road. For example, if 98 percent of traffic on the road are 2-ton cars and trucks while the remaining 2 percent consists of 20-ton trucks, then the mean weight is 2.4 tons. More specifically, Equations 1a and 1b are *not* intended to be used to calculate a separate emission factor for each vehicle class within a mix of traffic on a given unpaved road. That is, in the example, one should *not* determine one factor for the 2-ton vehicles and a second factor for the 20-ton trucks. Instead, only one emission factor should be calculated that represents the "fleet" average of 2.4 tons for all vehicles traveling the road.

Moreover, to retain the quality ratings when addressing a group of unpaved roads, it is necessary that reliable correction parameter values be determined for the road in question. The field and laboratory procedures for determining road surface silt and moisture contents are given in AP-42 Appendices C.1 and C.2. Vehicle-related parameters should be developed by recording visual observations of traffic. In some cases, vehicle parameters for industrial unpaved roads can be determined by reviewing maintenance records or other information sources at the facility.

In the event that site-specific values for correction parameters cannot be obtained, then default values may be used.In the absence of site-specific silt content information, an appropriate mean value from Table 13.2.2-1 may be used as a default value, but the quality rating of the equation is reduced by two letters. Because of significant differences found between different types of road surfaces and between different areas of the country, use of the default moisture content value of 0.5 percent in Equation 1b is discouraged. The quality rating should be downgraded two letters when the default moisture content value is used. (It is assumed that readers addressing industrial roads have access to the information needed to develop average vehicle information in Equation 1a for their facility.)

The effect of routine watering to control emissions from unpaved roads is discussed below in Section 13.2.2.3, “Controls”. However, all roads are subject to some natural mitigation because of rainfall and other precipitation. The Equation 1a and 1b emission factors can be extrapolated to annual

average uncontrolled conditions (but including natural mitigation) under the simplifying assumption that annual average emissions are inversely proportional to the number of days with measurable (more than 0.254 mm [0.01 inch]) precipitation:

$$E_{ext} = E\ [(365 - P)/365] \quad (2)$$

where:

E_{ext} = annual size-specific emission factor extrapolated for natural mitigation, lb/VMT

E = emission factor from Equation 1a or 1b

P = number of days in a year with at least 0.254 mm (0.01 in) of precipitation (see below)

Figure 13.2.2-1 gives the geographical distribution for the mean annual number of "wet" days for the United States.

Equation 2 provides an estimate that accounts for precipitation on an annual average basis for the purpose of inventorying emissions. It should be noted that Equation 2 does not account for differences in the temporal distributions of the rain events, the quantity of rain during any event, or the potential for the rain to evaporate from the road surface. In the event that a finer temporal and spatial resolution is desired for inventories of public unpaved roads, estimates can be based on a more complex set of assumptions. These assumptions include:

1. The moisture content of the road surface material is increased in proportion to the quantity of water added;
2. The moisture content of the road surface material is reduced in proportion to the Class A pan evaporation rate;
3. The moisture content of the road surface material is reduced in proportion to the traffic volume; and
4. The moisture content of the road surface material varies between the extremes observed in the area. The CHIEF Web site (http://www.epa.gov/ttn/chief/ap42/ch13/related/c13s02-2.html) has a file which contains a spreadsheet program for calculating emission factors which are temporally and spatially resolved. Information required for use of the spreadsheet program includes monthly Class A pan evaporation values, hourly meteorological data for precipitation, humidity and snow cover, vehicle traffic information, and road surface material information.

It is emphasized that the simple assumption underlying Equation 2 and the more complex set of assumptions underlying the use of the procedure which produces a finer temporal and spatial resolution have not been verified in any rigorous manner. For this reason, the quality ratings for either approach should be downgraded one letter from the rating that would be applied to Equation 1.

13.2.2.3 Controls[18-22]

A wide variety of options exist to control emissions from unpaved roads. Options fall into the following three groupings:

1. Vehicle restrictions that limit the speed, weight or number of vehicles on the road;

2. Surface improvement, by measures such as (a) paving or (b) adding gravel or slag to a dirt road; and
3. Surface treatment, such as watering or treatment with chemical dust suppressants.

Available control options span broad ranges in terms of cost, efficiency, and applicability. For example, traffic controls provide moderate emission reductions (often at little cost) but are difficult to enforce. Although paving is highly effective, its high initial cost is often prohibitive. Furthermore, paving is not feasible for industrial roads subject to very heavy vehicles and/or spillage of material in transport. Watering and chemical suppressants, on the other hand, are potentially applicable to most industrial roads at moderate to low costs. However, these require frequent reapplication to maintain an acceptable level of control. Chemical suppressants are generally more cost-effective than water but not in cases of temporary roads (which are common at mines, landfills, and construction sites). In summary, then, one needs to consider not only the type and volume of traffic on the road but also how long the road will be in service when developing control plans.

Vehicle restrictions. These measures seek to limit the amount and type of traffic present on the road or to lower the mean vehicle speed. For example, many industrial plants have restricted employees from driving on plant property and have instead instituted bussing programs. This eliminates emissions due to employees traveling to/from their worksites. Although the heavier average vehicle weight of the busses increases the base emission factor, the decrease in vehicle-miles-traveled results in a lower overall emission rate.

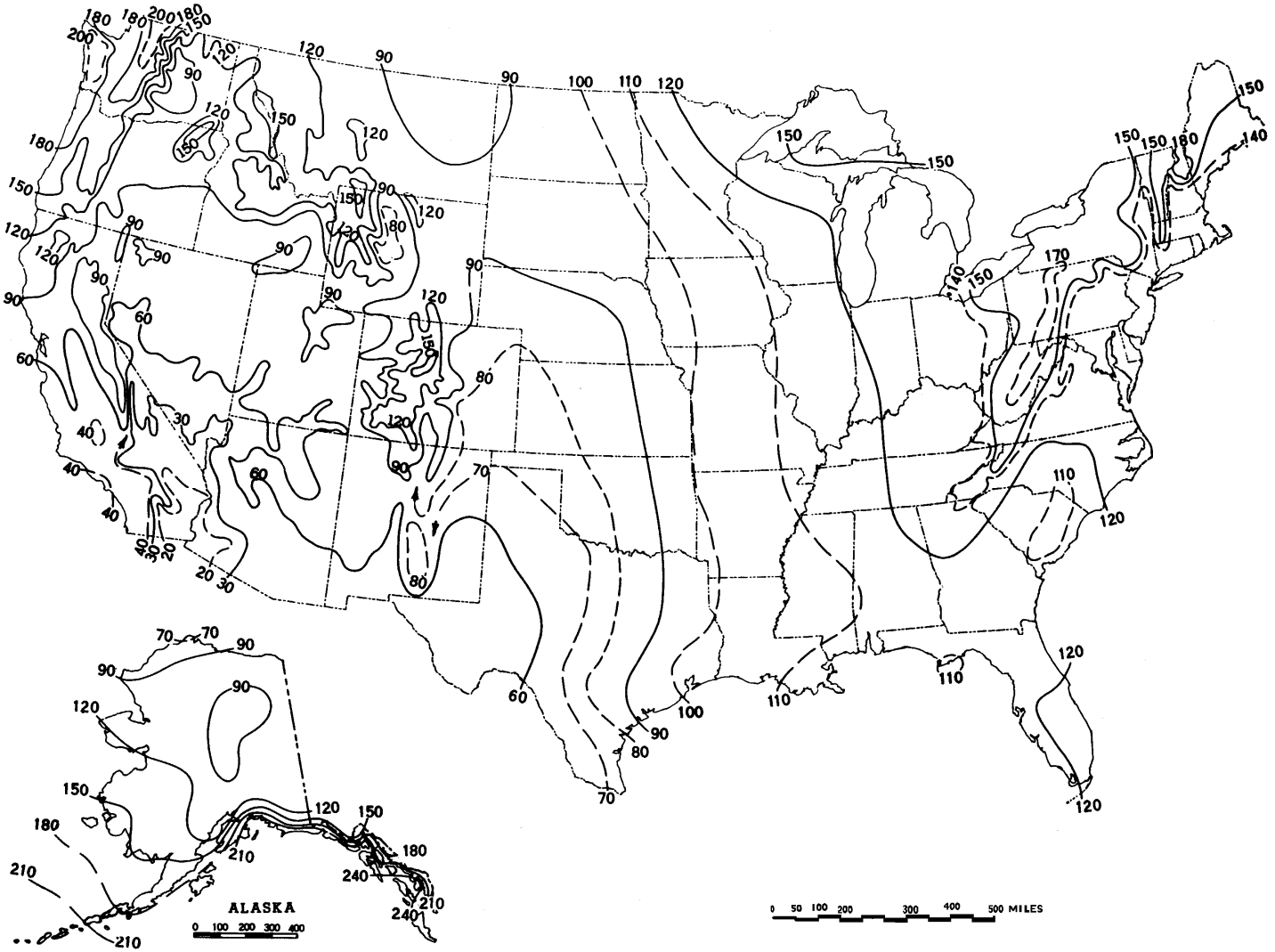


Figure 13.2.2-1. Mean number of days with 0.01 inch or more of precipitation in United States.

Surface improvements. Control options in this category alter the road surface. As opposed to the "surface treatments" discussed below, improvements are relatively "permanent" and do not require periodic retreatment.

The most obvious surface improvement is paving an unpaved road. This option is quite expensive and is probably most applicable to relatively short stretches of unpaved road with at least several hundred vehicle passes per day. Furthermore, if the newly paved road is located near unpaved areas or is used to transport material, it is essential that the control plan address routine cleaning of the newly paved road surface.

The control efficiencies achievable by paving can be estimated by comparing emission factors for unpaved and paved road conditions. The predictive emission factor equation for paved roads, given in Section 13.2.1, requires estimation of the silt loading on the traveled portion of the paved surface, which in turn depends on whether the pavement is periodically cleaned. Unless curbing is to be installed, the effects of vehicle excursion onto unpaved shoulders (berms) also must be taken into account in estimating the control efficiency of paving.

Other improvement methods cover the road surface with another material that has a lower silt content. Examples include placing gravel or slag on a dirt road. Control efficiency can be estimated by comparing the emission factors obtained using the silt contents before and after improvement. The silt content of the road surface should be determined after 3 to 6 months rather than immediately following placement. Control plans should address regular maintenance practices, such as grading, to retain larger aggregate on the traveled portion of the road.

Surface treatments refer to control options which require periodic reapplication. Treatments fall into the two main categories of (a) "wet suppression" (i. e., watering, possibly with surfactants or other additives), which keeps the road surface wet to control emissions and (b) "chemical stabilization/ treatment", which attempts to change the physical characteristics of the surface. The necessary reapplication frequency varies from several minutes for plain water under summertime conditions to several weeks or months for chemical dust suppressants.

Watering increases the moisture content, which conglomerates particles and reduces their likelihood to become suspended when vehicles pass over the surface. The control efficiency depends on how fast the road dries after water is added. This in turn depends on (a) the amount (per unit road surface area) of water added during each application; (b) the period of time between applications; (c) the weight, speed and number of vehicles traveling over the watered road during the period between applications; and (d) meteorological conditions (temperature, wind speed, cloud cover, etc.) that affect evaporation during the period.

Figure 13.2.2-2 presents a simple bilinear relationship between the instantaneous control efficiency due to watering and the resulting increase in surface moisture. The moisture ratio "M" (i.e., the x-axis in Figure 13.2.2-2) is found by dividing the surface moisture content of the watered road by the surface moisture content of the uncontrolled road. As the watered road surface dries, both the ratio M and the predicted instantaneous control efficiency (i.e., the y-axis in the figure) decrease. The figure shows that between the uncontrolled moisture content and a value twice as large, a small increase in moisture content results in a large increase in control efficiency. Beyond that, control efficiency grows slowly with increased moisture content.

Given the complicated nature of how the road dries, characterization of emissions from watered roadways is best done by collecting road surface material samples at various times between water truck passes. (Appendices C.1 and C.2 present the sampling and analysis procedures.) The moisture content measured can then be associated with a control efficiency by use of Figure 13.2.2-2. Samples that reflect average conditions during the watering cycle can take the form of either a series of samples between water applications or a single sample at the midpoint. It is essential that samples be collected during periods with active traffic on the road. Finally, because of different evaporation rates, it is recommended that samples be collected at various times during the year. If only one set of samples is to be collected, these must be collected during hot, summertime conditions.

When developing watering control plans for roads that do not yet exist, it is strongly recommended that the moisture cycle be established by sampling similar roads in the same geographic area. If the moisture cycle cannot be established by similar roads using established watering control plans, the more complex methodology used to estimate the mitigation of rainfall and other precipitation can be used to estimate the control provided by routine watering. An estimate of the maximum daytime Class A pan evaporation (based upon daily evaporation data published in the monthly Climatological Data for the state by the National Climatic Data Center) should be used to insure that adequate watering capability is available during periods of highest evaporation. The hourly precipitation values in the spreadsheet should be replaced with the equivalent inches of precipitation (where the equivalent of 1 inch of precipitation is provided by an application of 5.6 gallons of water per square yard of road). Information on the long term average annual evaporation and on the percentage that occurs between May and October was published in the Climatic Atlas (Reference 16). Figure 13.2.2-3 presents the geographical distribution for "Class A pan evaporation" throughout the United States. Figure 13.2.2-4 presents the geographical distribution of the percentage of this evaporation that occurs between May and October. The U. S. Weather Bureau Class A evaporation pan is a cylindrical metal container with a depth of 10 inches and a diameter of 48 inches. Periodic measurements are made of the changes of the water level.

The above methodology should be used only for prospective analyses and for designing watering programs for existing roadways. The quality rating of an emission factor for a watered road that is based on this methodology should be downgraded two letters. Periodic road surface samples should be collected and analyzed to verify the efficiency of the watering program.

As opposed to watering, chemical dust suppressants have much less frequent reapplication requirements. These materials suppress emissions by changing the physical characteristics of the existing road surface material. Many chemical unpaved road dust suppressants form a hardened surface that binds particles together. After several applications, a treated road often resembles a paved road except that the surface is not uniformly flat. Because the improved surface results in more grinding of small particles, the silt content of loose material on a highly controlled surface may be substantially higher than when the surface was uncontrolled. For this reason, the models presented as Equations 1a and 1b cannot be used to estimate emissions from chemically stabilized roads. Should the road be allowed to return to an

uncontrolled state with no visible signs of large-scale cementing of material, the Equation 1a and 1b emission factors could then be used to obtain conservatively high emission estimates.

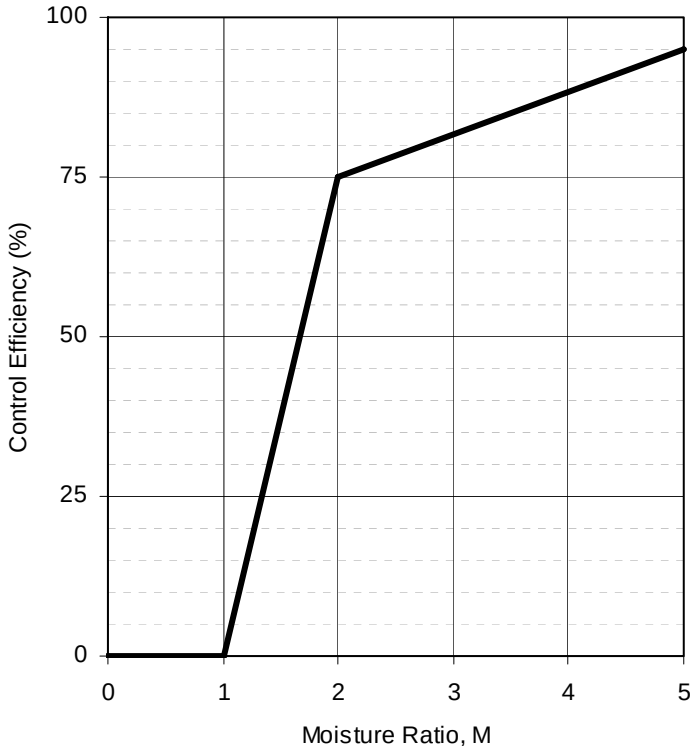


Figure 13.2.2-2. Watering control effectiveness for unpaved travel surfaces

The control effectiveness of chemical dust suppressants appears to depend on (a) the dilution rate used in the mixture; (b) the application rate (volume of solution per unit road surface area); (c) the time between applications; (d) the size, speed and amount of traffic during the period between applications; and (e) meteorological conditions (rainfall, freeze/thaw cycles, etc.) during the period. Other factors that affect the performance of dust suppressants include other traffic characteristics (e. g., cornering, track-on from unpaved areas) and road characteristics (e. g., bearing strength, grade). The variabilities in the above factors and differences between individual dust control products make the control efficiencies of chemical dust suppressants difficult to estimate. Past field testing of emissions from controlled unpaved roads has shown that chemical dust suppressants provide a PM-10 control efficiency of about 80 percent when applied at regular intervals of 2 weeks to 1 month.

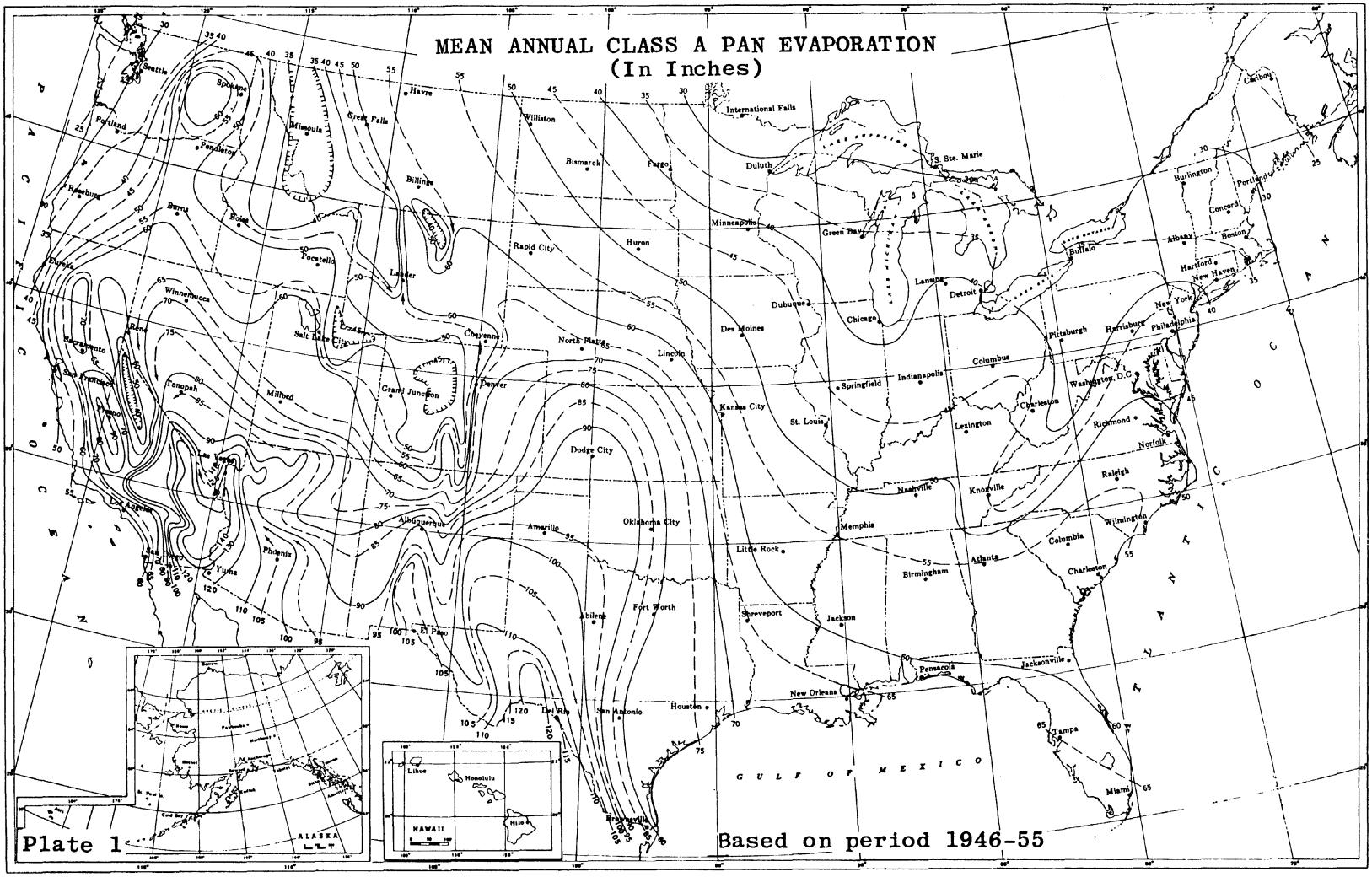


Figure 13.2.2-3. Annual evaporation data.

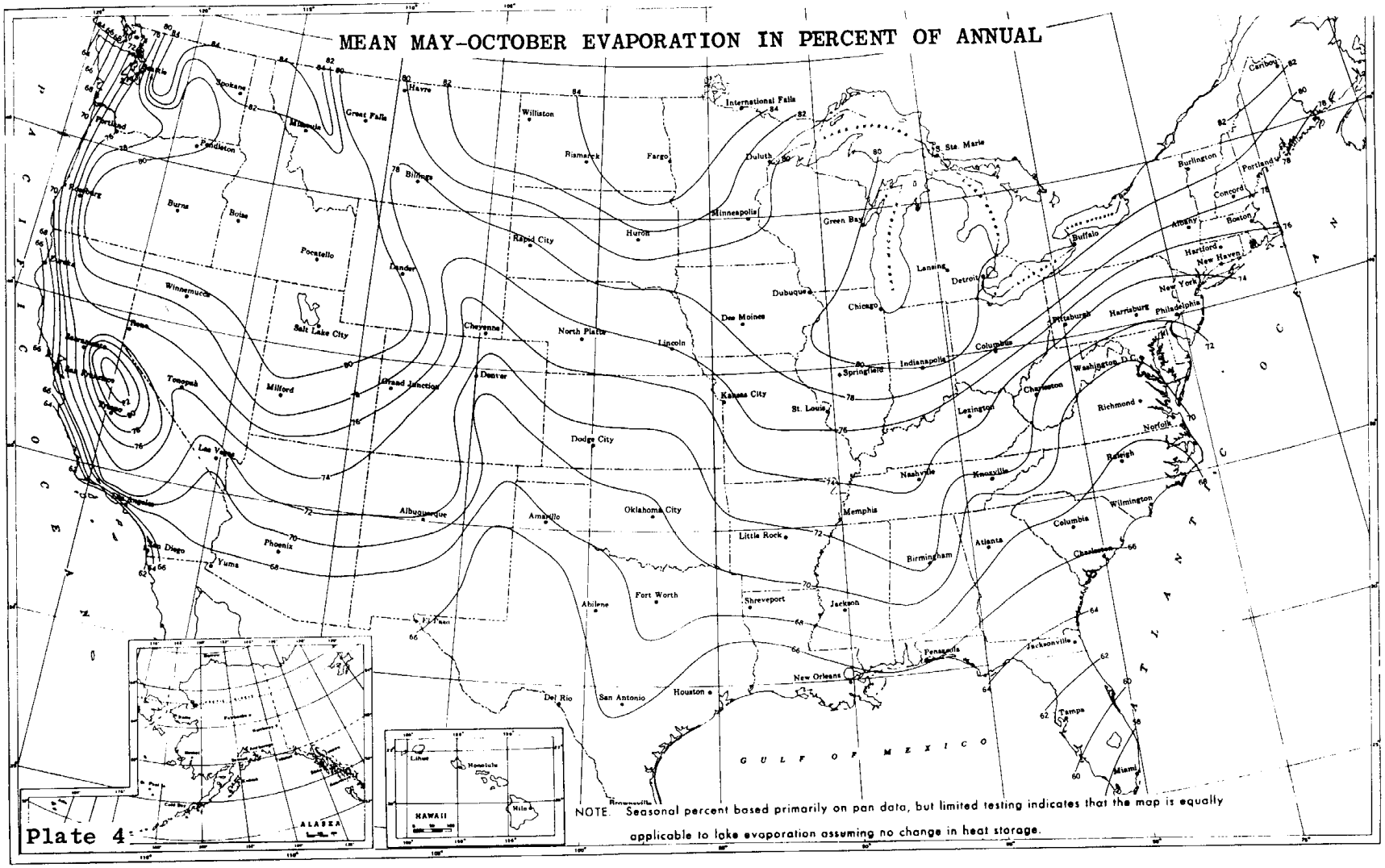


Figure 13.2.2-4. Geographical distribution of the percentage of evaporation occurring between May and October.

Petroleum resin products historically have been the dust suppressants (besides water) most widely used on industrial unpaved roads. Figure 13.2.2-5 presents a method to estimate average control efficiencies associated with petroleum resins applied to unpaved roads.[20] Several items should be noted:

1. The term "ground inventory" represents the total volume (per unit area) of petroleum resin concentrate (*not solution*) applied since the start of the dust control season.

2. Because petroleum resin products must be periodically reapplied to unpaved roads, the use of a time-averaged control efficiency value is appropriate. Figure 13.2.2-5 presents control efficiency values averaged over two common application intervals, 2 weeks and 1 month. Other application intervals will require interpolation.

3. Note that zero efficiency is assigned until the ground inventory reaches 0.05 gallon per square yard (gal/yd^2). Requiring a minimum ground inventory ensures that one must apply a reasonable amount of chemical dust suppressant to a road before claiming credit for emission control. Recall that the ground inventory refers to the amount of petroleum resin concentrate rather than the total solution.

As an example of the application of Figure 13.2.2-5, suppose that Equation 1a was used to estimate an emission factor of 7.1 lb/VMT for PM-10 from a particular road. Also, suppose that, starting on May 1, the road is treated with 0.221 gal/yd^2 of a solution (1 part petroleum resin to 5 parts water) on the first of each month through September. Then, the average controlled emission factors, shown in Table 13.2.2-5, are found.

Table 13.2-2-5. EXAMPLE OF AVERAGE CONTROLLED EMISSION FACTORS FOR SPECIFIC CONDITIONS

Period	Ground Inventory, gal/yd^2	Average Control Efficiency, %[a]	Average Controlled Emission Factor, lb/VMT
May	0.037	0	7.1
June	0.073	62	2.7
July	0.11	68	2.3
August	0.15	74	1.8
September	0.18	80	1.4

[a] From Figure 13.2.2-5, $\leq$10 µm. Zero efficiency assigned if ground inventory is less than 0.05 gal/yd^2. 1 lb/VMT = 281.9 g/VKT. 1 gal/yd^2 = 4.531 L/m^2.

Besides petroleum resins, other newer dust suppressants have also been successful in controlling emissions from unpaved roads. Specific test results for those chemicals, as well as for petroleum resins and watering, are provided in References 18 through 21.

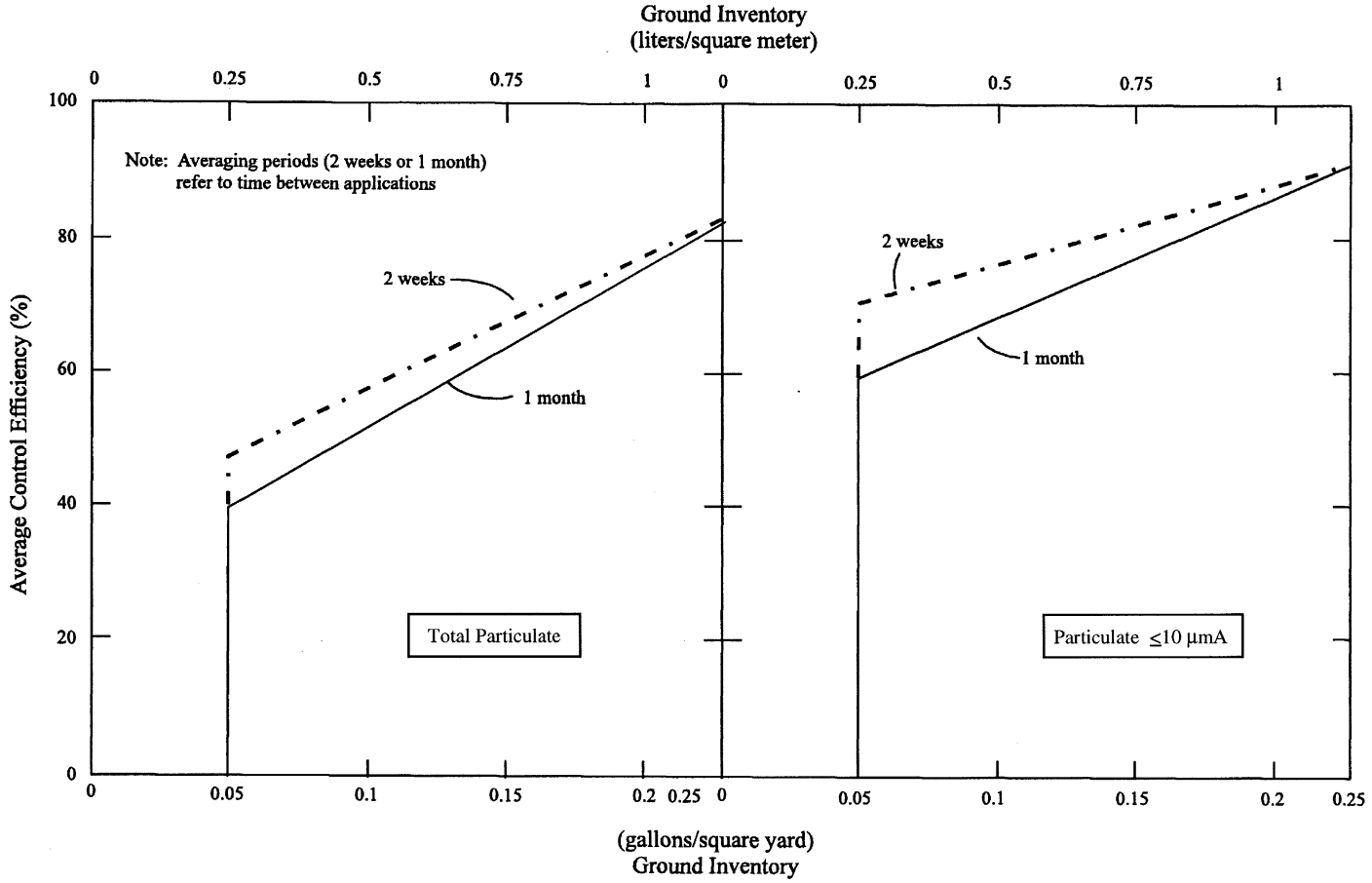


Figure 13.2.2-5. Average control efficiencies over common application intervals.

13.2.2.4 Updates Since The Fifth Edition

The Fifth Edition was released in January 1995. Revisions to this section since that date are summarized below. For further detail, consult the background report for this section (Reference 6).

October 1998 (Supplement E)– This was a major revision of this section. Significant changes to the text and the emission factor equations were made.

October 2001 – Separate emission factors for unpaved surfaces at industrial sites and publicly accessible roads were introduced. Figure 13.2.2-2 was included to provide control effectiveness estimates for watered roads.

December 2003 – The public road emission factor equation (equation 1b) was adjusted to remove the component of particulate emissions from exhaust, brake wear, and tire wear. The parameter C in the new equation varies with aerodynamic size range of the particulate matter. Table 13.2.2-4 was added to present the new coefficients.

January 2006 – The PM-2.5 particle size multipliers (i.e., factors) in Table 13.2.2-2 were modified and the quality ratings were upgraded from C to B based on the wind tunnel studies of a variety of dust emitting surface materials.

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13.2.4 Aggregate Handling And Storage Piles

13.2.4.1 General

Inherent in operations that use minerals in aggregate form is the maintenance of outdoor storage piles. Storage piles are usually left uncovered, partially because of the need for frequent material transfer into or out of storage.

Dust emissions occur at several points in the storage cycle, such as material loading onto the pile, disturbances by strong wind currents, and loadout from the pile. The movement of trucks and loading equipment in the storage pile area is also a substantial source of dust.

13.2.4.2 Emissions And Correction Parameters

The quantity of dust emissions from aggregate storage operations varies with the volume of aggregate passing through the storage cycle. Emissions also depend on 3 parameters of the condition of a particular storage pile: age of the pile, moisture content, and proportion of aggregate fines.

When freshly processed aggregate is loaded onto a storage pile, the potential for dust emissions is at a maximum. Fines are easily disaggregated and released to the atmosphere upon exposure to air currents, either from aggregate transfer itself or from high winds. As the aggregate pile weathers, however, potential for dust emissions is greatly reduced. Moisture causes aggregation and cementation of fines to the surfaces of larger particles. Any significant rainfall soaks the interior of the pile, and then the drying process is very slow.

Silt (particles equal to or less than 75 micrometers [μm] in diameter) content is determined by measuring the portion of dry aggregate material that passes through a 200-mesh screen, using ASTM-C-136 method.[1] Table 13.2.4-1 summarizes measured silt and moisture values for industrial aggregate materials.

Table 13.2.4-1. TYPICAL SILT AND MOISTURE CONTENTS OF MATERIALS AT VARIOUS INDUSTRIES[a]

Industry	No. Of Facilities	Material	Silt Content (%)			Moisture Content (%)		
			No. Of Samples	Range	Mean	No. Of Samples	Range	Mean
Iron and steel production	9	Pellet ore	13	1.3 - 13	4.3	11	0.64 - 4.0	2.2
		Lump ore	9	2.8 - 19	9.5	6	1.6 - 8.0	5.4
		Coal	12	2.0 - 7.7	4.6	11	2.8 - 11	4.8
		Slag	3	3.0 - 7.3	5.3	3	0.25 - 2.0	0.92
		Flue dust	3	2.7 - 23	13	1	—	7
		Coke breeze	2	4.4 - 5.4	4.9	2	6.4 - 9.2	7.8
		Blended ore	1	—	15	1	—	6.6
		Sinter	1	—	0.7	0	—	—
		Limestone	3	0.4 - 2.3	1.0	2	ND	0.2
Stone quarrying and processing	2	Crushed limestone	2	1.3 - 1.9	1.6	2	0.3 - 1.1	0.7
		Various limestone products	8	0.8 - 14	3.9	8	0.46 - 5.0	2.1
Taconite mining and processing	1	Pellets	9	2.2 - 5.4	3.4	7	0.05 - 2.0	0.9
		Tailings	2	ND	11	1	—	0.4
Western surface coal mining	4	Coal	15	3.4 - 16	6.2	7	2.8 - 20	6.9
		Overburden	15	3.8 - 15	7.5	0	—	—
		Exposed ground	3	5.1 - 21	15	3	0.8 - 6.4	3.4
Coal-fired power plant	1	Coal (as received)	60	0.6 - 4.8	2.2	59	2.7 - 7.4	4.5
Municipal solid waste landfills	4	Sand	1	—	2.6	1	—	7.4
		Slag	2	3.0 - 4.7	3.8	2	2.3 - 4.9	3.6
		Cover	5	5.0 - 16	9.0	5	8.9 - 16	12
		Clay/dirt mix	1	—	9.2	1	—	14
		Clay	2	4.5 - 7.4	6.0	2	8.9 - 11	10
		Fly ash	4	78 - 81	80	4	26 - 29	27
		Misc. fill materials	1	—	12	1	—	11

[a] References 1-10. ND = no data.

13.2.4.3 Predictive Emission Factor Equations

Total dust emissions from aggregate storage piles result from several distinct source activities within the storage cycle:

1. Loading of aggregate onto storage piles (batch or continuous drop operations).
2. Equipment traffic in storage area.
3. Wind erosion of pile surfaces and ground areas around piles.
4. Loadout of aggregate for shipment or for return to the process stream (batch or continuous drop operations).

Either adding aggregate material to a storage pile or removing it usually involves dropping the material onto a receiving surface. Truck dumping on the pile or loading out from the pile to a truck with a front-end loader are examples of batch drop operations. Adding material to the pile by a conveyor stacker is an example of a continuous drop operation.

The quantity of particulate emissions generated by either type of drop operation, per kilogram (kg) (ton) of material transferred, may be estimated, with a rating of A, using the following empirical expression:[11]

$$E = k(0.0016) \frac{\left(\frac{U}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \text{ (kg/megagram [Mg])} \quad (1)$$

$$E = k(0.0032) \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \text{ (pound [lb]/ton)}$$

where:

E = emission factor
k = particle size multiplier (dimensionless)
U = mean wind speed, meters per second (m/s) (miles per hour [mph])
M = material moisture content (%)

The particle size multiplier in the equation, k, varies with aerodynamic particle size range, as follows:

Aerodynamic Particle Size Multiplier (k) For Equation 1				
< 30 µm	< 15 µm	< 10 µm	< 5 µm	< 2.5 µm
0.74	0.48	0.35	0.20	0.053[a]

[a] Multiplier for < 2.5 µm taken from Reference 14.

The equation retains the assigned quality rating if applied within the ranges of source conditions that were tested in developing the equation, as follows. Note that silt content is included, even though silt content does not appear as a correction parameter in the equation. While it is reasonable to expect that silt content and emission factors are interrelated, no significant correlation between the 2 was found during the derivation of the equation, probably because most tests with high silt contents were conducted under lower winds, and vice versa. It is recommended that estimates from the equation be reduced 1 quality rating level if the silt content used in a particular application falls outside the range given:

Ranges Of Source Conditions For Equation 1			
Silt Content (%)	Moisture Content (%)	Wind Speed	
		m/s	mph
0.44 - 19	0.25 - 4.8	0.6 - 6.7	1.3 - 15

To retain the quality rating of the equation when it is applied to a specific facility, reliable correction parameters must be determined for specific sources of interest. The field and laboratory procedures for aggregate sampling are given in Reference 3. In the event that site-specific values for

correction parameters cannot be obtained, the appropriate mean from Table 13.2.4-1 may be used, but the quality rating of the equation is reduced by 1 letter.

For emissions from equipment traffic (trucks, front-end loaders, dozers, etc.) traveling between or on piles, it is recommended that the equations for vehicle traffic on unpaved surfaces be used (see Section 13.2.2). For vehicle travel between storage piles, the silt value(s) for the areas among the piles (which may differ from the silt values for the stored materials) should be used.

Worst-case emissions from storage pile areas occur under dry, windy conditions. Worst-case emissions from materials-handling operations may be calculated by substituting into the equation appropriate values for aggregate material moisture content and for anticipated wind speeds during the worst case averaging period, usually 24 hours. The treatment of dry conditions for Section 13.2.2, vehicle traffic, "Unpaved Roads", follows the methodology described in that section centering on parameter p. A separate set of nonclimatic correction parameters and source extent values corresponding to higher than normal storage pile activity also may be justified for the worst-case averaging period.

13.2.4.4 Controls[12-13]

Watering and the use of chemical wetting agents are the principal means for control of aggregate storage pile emissions. Enclosure or covering of inactive piles to reduce wind erosion can also reduce emissions. Watering is useful mainly to reduce emissions from vehicle traffic in the storage pile area. Watering of the storage piles themselves typically has only a very temporary slight effect on total emissions. A much more effective technique is to apply chemical agents (such as surfactants) that permit more extensive wetting. Continuous chemical treating of material loaded onto piles, coupled with watering or treatment of roadways, can reduce total particulate emissions from aggregate storage operations by up to 90 percent.[12]

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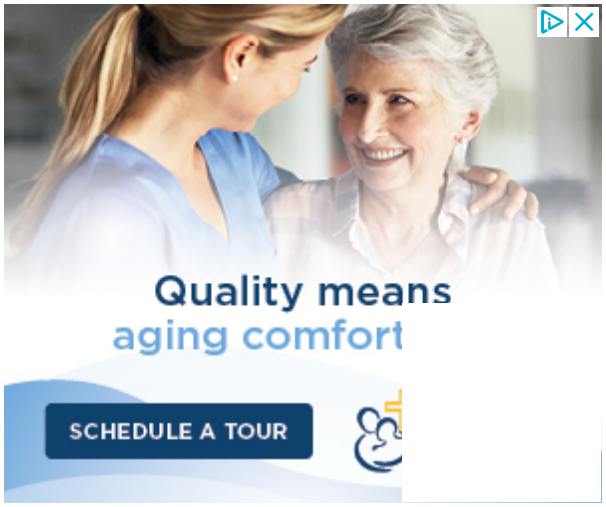
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Climate and Average Weather Year Round in Moriarty New Mexico, United States

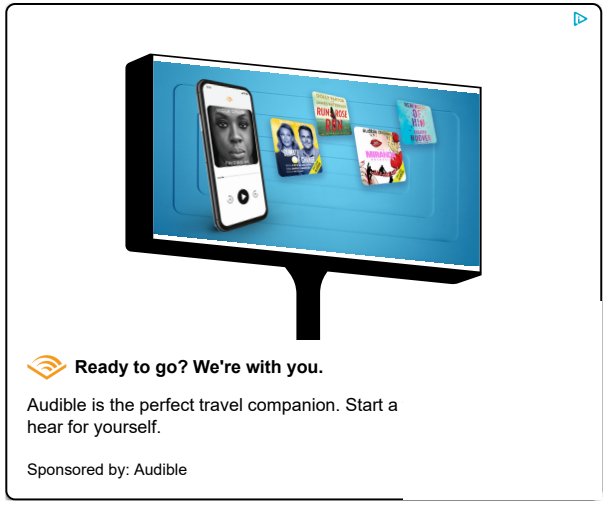
In Moriarty, the summers are warm; the winters are short, very cold, snowy, and windy; and it is mostly clear year round. Over the course of the year, the temperature typically varies from 24°F to 87°F and is rarely below 14°F or above 93°F.

Based on the tourism score, the best time of year to visit Moriarty for warm-weather activities is from early June to mid September.

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Climate in Moriarty

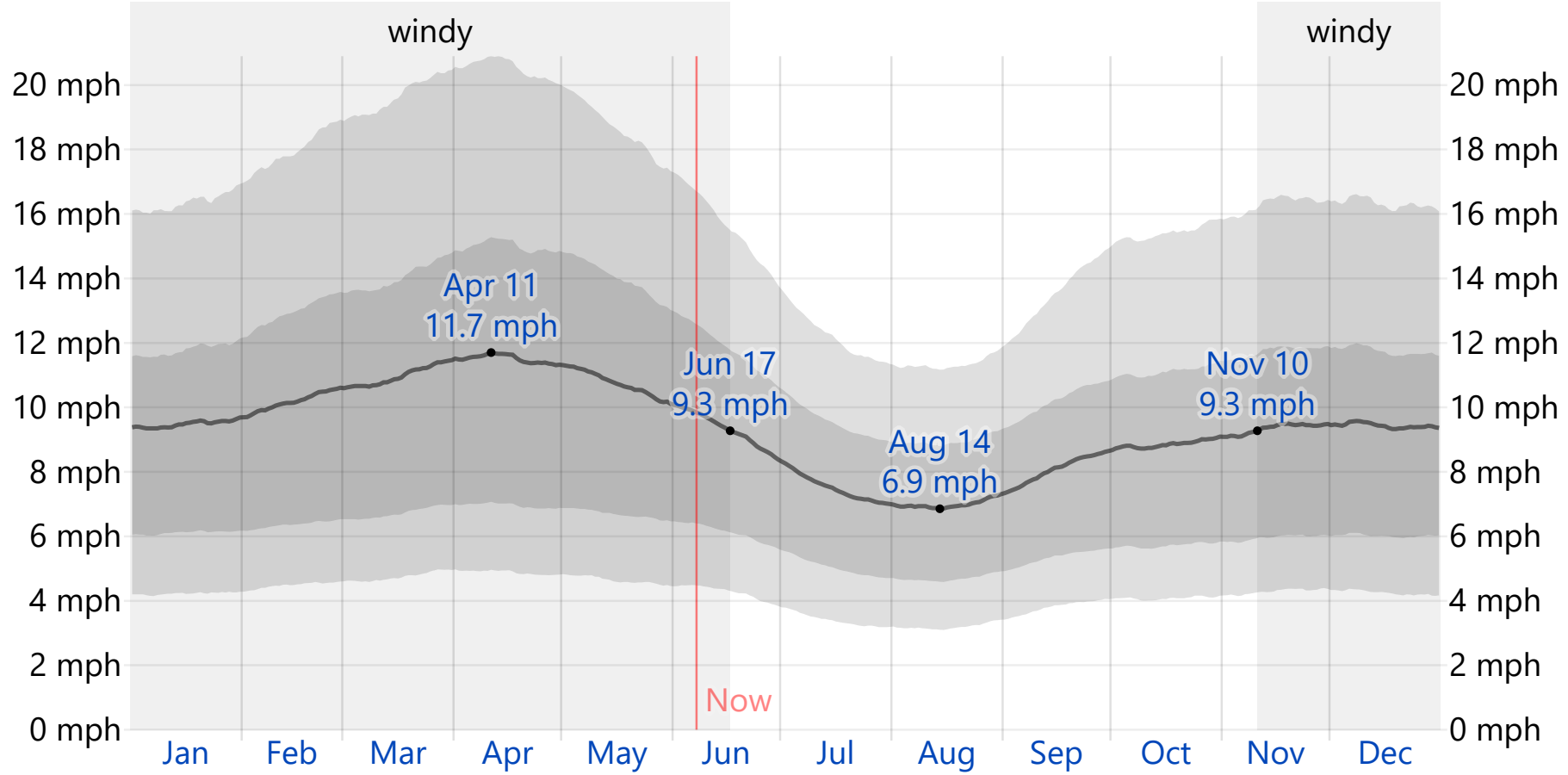
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Average Wind Speed in Moriarty

Compare (/compare/y/3307/Comparison-of-the-Average-Weather-in-Moriarty)

History: 2022 (/h/y/145620/2022/Historical-Weather-during-2022-at-Albuquerque-International-Airport-New-Mexico-United-States#Figures-WindSpeed) 2021 (/h/



The average of mean hourly wind speeds (dark gray line), with 25th to 75th and 10th to 90th percentile bands.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind Speed (mph)	9.5	10.2	11.0	11.5	10.7	9.3	7.5	7.0	8.1	8.9	9.4	9.4

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Nonroad Compression-Ignition Engines: Exhaust Emission Standards

	Rated Power (kW)	Tier	Model Year	NMHC (g/kW-hr)	NMHC + NOx (g/kW-hr)	NOx (g/kW-hr)	PM (g/kW-hr)	CO (g/kW-hr)	Smoke [a] (Percentage)	Useful Life (hours /years) [b]	Warranty Period (hours /years) [b]
Federal	kW < 8	1	2000-2004	-	10.5	-	1.0	8.0	20/15/50	3,000/5	1,500/2
		2	2005-2007	-	7.5	-	0.80	8.0			
		4	2008+	-	7.5	-	0.40 [c]	8.0			
	8 ≤ kW < 19	1	2000-2004	-	9.5	-	0.80	6.6		3,000/5	1,500/2
		2	2005-2007	-	7.5	-	0.80	6.6			
		4	2008+	-	7.5	-	0.40	6.6			
	19 ≤ kW < 37	1	1999-2003	-	9.5	-	0.80	5.5		5,000/7 [d]	3,000/5 [e]
		2	2004-2007	-	7.5	-	0.60	5.5			
		4	2008-2012	-	7.5	-	0.30	5.5			
			2013+	-	4.7	-	0.03	5.5			
	37 ≤ kW < 56	1	1998-2003	-	-	9.2	-	-		8,000/10	3,000/5
		2	2004-2007	-	7.5	-	0.40	5.0			
		3 [f]	2008-2011	-	4.7	-	0.40	5.0			
		4 (Option 1) [g]	2008-2012	-	4.7	-	0.30	5.0			
		4 (Option 2) [g]	2012	-	4.7	-	0.03	5.0			
		4	2013+	-	4.7	-	0.03	5.0			
	56 ≤ kW < 75	1	1998-2003	-	-	9.2	-	-			
		2	2004-2007	-	7.5	-	0.40	5.0			
		3	2008-2011	-	4.7	-	0.40	5.0			
		4	2012-2013 [h]	-	4.7	-	0.02	5.0			
			2014+ [i]	0.19	-	0.40	0.02	5.0			
	75 ≤ kW < 130	1	1997-2002	-	-	9.2	-	-			
		2	2003-2006	-	6.6	-	0.30	5.0			
		3	2007-2011	-	4.0	-	0.30	5.0			
		4	2012-2013 [h]	-	4.0	-	0.02	5.0			
			2014+	0.19	-	0.40	0.02	5.0			

Continued

	Rated Power (kW)	Tier	Model Year	NMHC (g/kW-hr)	NMHC + NOx (g/kW-hr	NOx (g/kW-hr	PM (g/kW-hr	CO (g/kW-hr)	Smoke [a] (Percentage)	Useful Life (hours /years) [b]	Warranty Period (hours /years) [b]
Federal	130 ≤ kW < 225	1	1996-2002	1.3 [j]	-	9.2	0.54	11.4	20/15/50	8,000/10	3,000/5
		2	2003-2005	-	6.6	-	0.20	3.5			
		3	2006-2010	-	4.0	-	0.20	3.5			
		4	2011-2013 [h]	-	4.0	-	0.02	3.5			
			2014+ [i]	0.19	-	0.40	0.02	3.5			
	225 ≤ kW < 450	1	1996-2000	1.3 [j]	-	9.2	0.54	11.4			
		2	2001-2005	-	6.4	-	0.20	3.5			
		3	2006-2010	-	4.0	-	0.20	3.5			
		4	2011-2013 [h]	-	4.0	-	0.02	3.5			
			2014+ [i]	0.19	-	0.40	0.02	3.5			
	450 ≤ kW < 560	1	1996-2001	1.3 [j]	-	9.2	0.54	11.4			
		2	2002-2005	-	6.4	-	0.20	3.5			
		3	2006-2010	-	4.0	-	0.20	3.5			
		4	2011-2013 [h]	-	4.0	-	0.02	3.5			
			2014+ [i]	0.19	-	0.40	0.02	3.5			
	560 ≤ kW < 900	1	2000-2005	1.3 [j]	-	9.2	0.54	11.4			
		2	2006-2010	-	6.4	-	0.20	3.5			
		4	2011-2014	0.40	-	3.5	0.10	3.5			
			2015+ [i]	0.19	-	3.5 [k]	0.04 [l]	3.5			
	kW > 900	1	2000-2005	1.3 [j]	-	9.2	0.54	11.4			
		2	2006-2010	-	6.4	-	0.20	3.5			
		4	2011-2014	0.40	-	3.5 [k]	0.10	3.5			
			2015+ [i]	0.19	-	3.5 [k]	0.04 [l]	3.5			

Notes on following page.

Notes:

- For Tier 1, 2, and 3 standards, exhaust emissions of nitrogen oxides (NOx), carbon monoxide (CO), hydrocarbons (HC), and non-methane hydrocarbons (NMHC) are measured using the procedures in 40 Code of Federal Regulations (CFR) Part 89 Subpart E. For Tier 1, 2, and 3 standards, particulate matter (PM) exhaust emissions are measured using the California Regulations for New 1996 and Later Heavy-Duty Off-Road Diesel Cycle Engines.
- For Tier 4 standards, engines are tested for transient and steady-state exhaust emissions using the procedures in 40 CFR Part 1039 Subpart F. Transient standards do not apply to engines below 37 kilowatts (kW) before the 2013 model year, constant-speed engines, engines certified to Option 1, and engines above 560 kW.
- Tier 2 and later model naturally aspirated nonroad engines shall not discharge crankcase emissions into the atmosphere unless these emissions are permanently routed into the exhaust. This prohibition does not apply to engines using turbochargers, pumps, blowers, or superchargers.
- In lieu of the Tier 1, 2, and 3 standards for NOX, NMHC + NOX, and PM, manufacturers may elect to participate in the averaging, banking, and trading (ABT) program described in 40 CFR Part 89 Subpart C.

a Smoke emissions may not exceed 20 percent during the acceleration mode, 15 percent during the lugging mode, and 50 percent during the peaks in either mode. Smoke emission standards do not apply to single-cylinder engines, constant-speed engines, or engines certified to a PM emission standard of 0.07 grams per kilowatt-hour (g/kW-hr) or lower. Smoke emissions are measured using procedures in 40 CFR Part 86 Subpart I.

b Useful life and warranty period are expressed hours and years, whichever comes first.

c Hand-startable air-cooled direct injection engines may optionally meet a PM standard of 0.60 g/kW-hr. These engines may optionally meet Tier 2 standards through the 2009 model years. In 2010 these engines are required to meet a PM standard of 0.60 g/kW-hr.

d Useful life for constant speed engines with rated speed 3,000 revolutions per minute (rpm) or higher is 5 years or 3,000 hours, whichever comes first.

e Warranty period for constant speed engines with rated speed 3,000 rpm or higher is 2 years or 1,500 hours, whichever comes first.

f These Tier 3 standards apply only to manufacturers selecting Tier 4 Option 2. Manufacturers selecting Tier 4 Option 1 will be meeting those standards in lieu of Tier 3 standards.

g A manufacturer may certify all their engines to either Option 1 or Option 2 sets of standards starting in the indicated model year. Manufacturers selecting Option 2 must meet Tier 3 standards in the 2008-2011 model years.

h These standards are phase-out standards. Not more than 50 percent of a manufacturer's engine production is allowed to meet these standards in each model year of the phase out period. Engines not meeting these standards must meet the final Tier 4 standards.

i These standards are phased in during the indicated years. At least 50 percent of a manufacturer's engine production must meet these standards during each year of the phase in. Engines not meeting these standards must meet the applicable phase-out standards.

j For Tier 1 engines the standard is for total hydrocarbons.

k The NOx standard for generator sets is 0.67 g/kW-hr.

l The PM standard for generator sets is 0.03 g/kW-hr.

Citations: Code of Federal Regulations (CFR) citations:

- 40 CFR 89.112 = Exhaust emission standards
- 40 CFR 1039.101 = Exhaust emission standards for after 2014 model year
- 40 CFR 1039.102 = Exhaust emission standards for model year 2014 and earlier
- 40 CFR 1039 Subpart F = Exhaust emissions transient and steady state test procedures
- 40 CFR 86 Subpart I = Smoke emission test procedures
- 40 CFR 1065 = Test equipment and emissions measurement procedures

Cat® C32

Diesel Generator Sets



Image shown may not reflect actual configuration

Bore – mm (in)	145 (5.7)
Stroke – mm (in)	162 (6.4)
Displacement – L (in^3)	32.1 (1959)
Compression Ratio	14.0:1
Aspiration	TA
Fuel System	EUI
Governor Type	ADEM™ A4

Standby 60 Hz ekW (kVA)	Mission Critical 60 Hz ekW (kVA)	Prime 60 Hz ekW (kVA)	Emissions Performance
1100 (1375.0)	1100 (1375.0)	1000 (1250.0)	U.S. EPA Emergency Stationary Use Only (Tier 2)
1250 (1562.5)	1250 (1562.5)	1136 (1420.0)	

Standard Features

Cat® Diesel Engine

- Designed and tested to meet the U.S. EPA Emergency Stationary Use Only (Tier 2) emission standards
- Reliable and consistent performance proven in thousands of applications worldwide

Generator Set Package

- Accepts 100% block load in one step and meets NFPA 110 loading requirements
- Conforms to ISO 8528-5 G3 load acceptance requirements
- Reliability is verified through prototype testing, which includes torsional vibration, fuel consumption, oil consumption, transient performance, and endurance testing

Alternators

- Superior motor starting capability minimizes the need for oversizing the generator
- Designed to match the performance and output characteristics of Cat diesel engines

Cooling System

- Cooling systems available to operate in ambient temperatures up to 50°C (122°F)
- Tested to ensure proper generator set cooling

EMCP 4 Control Panels

- User-friendly interface and navigation
- Scalable system to meet a wide range of installation requirements
- Expansion modules and site specific programming for specific customer requirements

Warranty

- 24 months/1000-hour warranty for standby and mission critical ratings
- 12 months/unlimited hour warranty for prime and continuous ratings
- Extended service protection is available to provide extended coverage options

Worldwide Product Support

- Cat dealers have over 1,800 dealer branch stores operating in 200 countries
- Your local Cat dealer provides extensive post-sale support, including maintenance and repair agreements

Financing

- Caterpillar offers an array of financial products to help you succeed through financial service excellence
- Options include loans, finance lease, operating lease, working capital, and revolving line of credit
- Contact your local Cat dealer for availability in your region

Optional Equipment

Engine

Air Cleaner

- ❑ Single element
- ❑ Dual element
- ❑ Heavy duty

Muffler

- ❑ Industrial grade (15 dB)

Starting

- ❑ Standard batteries
- ❑ Oversized batteries
- ❑ Standard electric starter
- ❑ Dual duty electric starter
- ❑ Jacket water heater

Alternator

Output voltage

- ❑ 220V ❑ 440V
- ❑ 240V ❑ 480V
- ❑ 380V ❑ 600V
- ❑ 400V

Temperature Rise (over 40°C ambient)

- ❑ 150°C
- ❑ 125°C/130°C
- ❑ 105°C
- ❑ 80°C

Winding type

- ❑ Random wound
- ❑ Form wound

Excitation

- ❑ Self excited
- ❑ Internal excitation (IE)
- ❑ Permanent magnet (PM)

Attachments

- ❑ Anti-condensation heater
- ❑ Stator and bearing temperature monitoring and protection

Power Termination

Type

- ❑ Bus bar
- ❑ Circuit breaker
- ❑ 400A ❑ 800A
- ❑ 1200A ❑ 1600A
- ❑ 2000A ❑ 2500A
- ❑ 3000A ❑ 3200A
- ❑ UL ❑ IEC
- ❑ 3-pole ❑ 4-pole
- ❑ Manually operated
- ❑ Electrically operated

Trip Unit

- ❑ LSI ❑ LSI-G
- ❑ LSIG-P

Factory Enclosure

- ❑ Weather protective
- ❑ Sound attenuated

Attachments

- ❑ Cold weather bundle
- ❑ DC lighting package
- ❑ AC lighting package
- ❑ Motorized louvers

Fuel Tank

- ❑ Sub-base
- ❑ 1000 gal (3875 L)
- ❑ 2000 gal (7570 L)
- ❑ 3600 gal (13627 L)

Control System

Controller

- ❑ EMCP 4.2B
- ❑ EMCP 4.3
- ❑ EMCP 4.4

Attachments

- ❑ Local annunciator module
- ❑ Remote annunciator module
- ❑ Expansion I/O module
- ❑ Remote monitoring software

Charging

- ❑ Battery charger – 10A

Vibration Isolators

- ❑ Rubber
- ❑ Spring
- ❑ Seismic rated

Cat Connect

Connectivity

- ❑ Ethernet
- ❑ Cellular
- ❑ Satellite

Extended Service Options

Terms

- ❑ 2 year (prime)
- ❑ 3 year
- ❑ 5 year
- ❑ 10 year

Coverage

- ❑ Silver
- ❑ Gold
- ❑ Platinum
- ❑ Platinum Plus

Ancillary Equipment

- ❑ Automatic transfer switch (ATS)
- ❑ Uninterruptible power supply (UPS)
- ❑ Paralleling switchgear
- ❑ Paralleling controls

Certifications

- ❑ UL 2200 Listed
- ❑ CSA
- ❑ IBC seismic certification
- ❑ OSHPD pre-approval

Note: *Some options may not be available on all models. Certifications may not be available with all model configurations. Consult factory for availability.*

Package Performance

Performance	Standby		Mission Critical		Prime	
Frequency	60 Hz		60 Hz		60 Hz	
Gen set power rating with fan	1250 ekW		1250 ekW		1136 ekW	
Gen set power rating with fan @ 0.8 power factor	1562.5 kVA		1562.5 kVA		1420.0 kVA	
Emissions	EPA ESE (Tier 2)		EPA ESE (Tier 2)		EPA ESE (Tier 2)	
Performance number	EM2324-09		EM2532-03		EM2538-01	
Fuel Consumption						
100% load with fan – L/hr (gal/hr)	330.9	(87.4)	330.9	(87.4)	306.6	(81.0)
75% load with fan – L/hr (gal/hr)	268.9	(71.0)	269.1	(71.1)	241.4	(63.8)
50% load with fan – L/hr (gal/hr)	181.1	(47.8)	181.3	(47.9)	167.5	(44.3)
25% load with fan – L/hr (gal/hr)	102.1	(27.0)	102.3	(27.0)	94.7	(25.0)
Cooling System						
Radiator air flow restriction (system) – kPa (in. water)	0.12	(0.48)	0.12	(0.48)	0.12	(0.48)
Radiator air flow – m^3/min (cfm)	1432	(50571)	1432	(50571)	1432	(50571)
Engine coolant capacity – L (gal)	55.0	(14.5)	55.0	(14.5)	55.0	(14.5)
Radiator coolant capacity – L (gal)	55.0	(14.5)	55.0	(14.5)	55.0	(14.5)
Total coolant capacity – L (gal)	110	(29.0)	110	(29.0)	110	(29.0)
Inlet Air						
Combustion air inlet flow rate – m^3/min (cfm)	118.0	(4168.3)	118.0	(4168.3)	114.4	(4039.9)
Exhaust System						
Exhaust stack gas temperature – °C (°F)	430.3	(806.6)	430.3	(806.6)	420.1	(788.2)
Exhaust gas flow rate – m^3/min (cfm)	283.4	(10005.8)	283.4	(10005.8)	270.7	(9558.9)
Exhaust system backpressure (maximum allowable) – kPa (in. water)	6.7	(27.0)	6.7	(27.0)	6.7	(27.0)
Heat Rejection						
Heat rejection to jacket water – kW (Btu/min)	403	(22908)	403	(22908)	390	(22199)
Heat rejection to exhaust (total) – kW (Btu/min)	1097	(62361)	1097	(62361)	1053	(59888)
Heat rejection to aftercooler – kW (Btu/min)	452	(25715)	452	(25715)	433	(24627)
Heat rejection to atmosphere from engine – kW (Btu/min)	222	(12620)	222	(12620)	209	(11880)
Heat rejection from alternator – kW (Btu/min)	58.9	(3350)	58.9	(3350)	52.2	(2969)
Emissions* (Nominal)						
NOx mg/Nm^3 (g/hp-h)	2416.9	(5.13)	2416.9	(5.13)	2127.0	(4.58)
CO mg/Nm^3 (g/hp-h)	53.0	(0.11)	53.0	(0.11)	40.4	(0.09)
HC mg/Nm^3 (g/hp-h)	21.6	(0.05)	21.6	(0.05)	22.2	(0.06)
PM mg/Nm^3 (g/hp-h)	5.1	(0.01)	5.1	(0.01)	6.8	(0.02)
Emissions* (Potential Site Variation)						
NOx mg/Nm^3 (g/hp-h)	2924.5	(6.20)	2924.5	(6.20)	2573.7	(5.54)
CO mg/Nm^3 (g/hp-h)	99.1	(0.21)	99.1	(0.21)	75.5	(0.16)
HC mg/Nm^3 (g/hp-h)	40.8	(0.10)	40.8	(0.10)	42.0	(0.10)
PM mg/Nm^3 (g/hp-h)	10.0	(0.02)	10.0	(0.02)	13.2	(0.03)

**mg/Nm^3 levels are corrected to 5% O_2. Contact your local Cat dealer for further information*

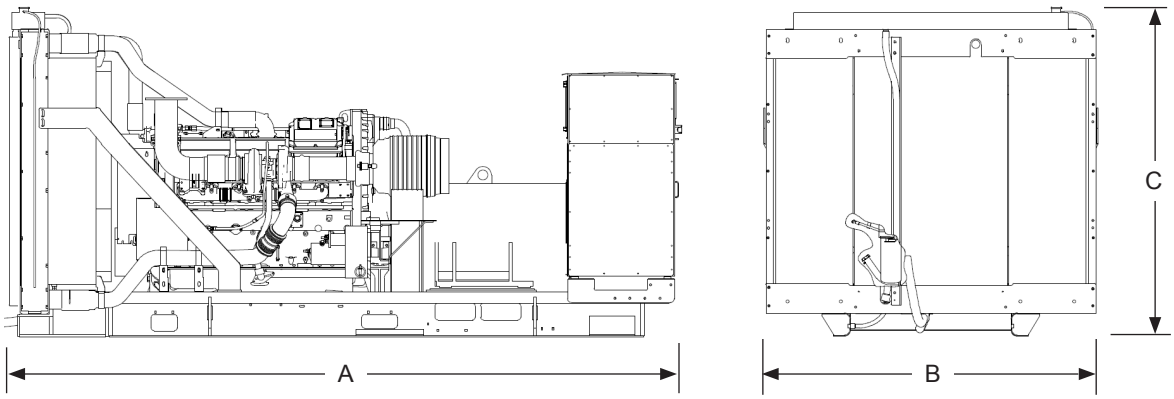
Package Performance

Performance	Standby		Mission Critical		Prime	
Frequency	60 Hz		60 Hz		60 Hz	
Gen set power rating with fan	1100 ekW		1100 ekW		1000 ekW	
Gen set power rating with fan @ 0.8 power factor	1375 kVA		1375 kVA		1250 kVA	
Emissions	EPA ESE (Tier 2)		EPA ESE (Tier 2)		EPA ESE (Tier 2)	
Performance number	EM2325-07		EM2533-03		EM2539-01	
Fuel Consumption						
100% load with fan – L/hr (gal/hr)	299.8	(79.2)	299.8	(79.2)	281.2	(74.3)
75% load with fan – L/hr (gal/hr)	232.8	(61.5)	232.8	(61.5)	210.6	(55.6)
50% load with fan – L/hr (gal/hr)	163.2	(43.1)	163.2	(43.1)	151.3	(40.0)
25% load with fan – L/hr (gal/hr)	92.3	(24.4)	92.3	(24.4)	85.4	(22.6)
Cooling System						
Radiator air flow restriction (system) – kPa (in. water)	0.12	(0.48)	0.12	(0.48)	0.12	(0.48)
Radiator air flow – m^3/min (cfm)	1432	(50571)	1432	(50571)	1432	(50571)
Engine coolant capacity – L (gal)	55.0	(14.5)	55.0	(14.5)	55.0	(14.5)
Radiator coolant capacity – L (gal)	55.0	(14.5)	55.0	(14.5)	55.0	(14.5)
Total coolant capacity – L (gal)	110	(29.0)	110	(29.0)	110	(29.0)
Inlet Air						
Combustion air inlet flow rate – m^3/min (cfm)	113.4	(4004.9)	113.4	(4004.9)	110.6	(3905.2)
Exhaust System						
Exhaust stack gas temperature – °C (°F)	417.3	(783.2)	417.3	(783.2)	410.6	(771.1)
Exhaust gas flow rate – m^3/min (cfm)	266.9	(9425.0)	266.9	(9425.0)	257.6	(9097.1)
Exhaust system backpressure (maximum allowable) – kPa (in. water)	6.7	(27.0)	6.7	(27.0)	6.7	(27.0)
Heat Rejection						
Heat rejection to jacket water – kW (Btu/min)	385	(21898)	385	(21898)	367	(20867)
Heat rejection to exhaust (total) – kW (Btu/min)	1036	(58923)	1036	(58923)	981	(55782)
Heat rejection to aftercooler – kW (Btu/min)	424	(24138)	424	(24138)	394	(22416)
Heat rejection to atmosphere from engine – kW (Btu/min)	204	(11618)	204	(11618)	190	(10824)
Heat rejection from alternator – kW (Btu/min)	54.2	(3082)	54.2	(3082)	49.3	(2804)
Emissions* (Nominal)						
NOx mg/Nm^3 (g/hp-h)	2018.8	(4.38)	2018.8	(4.38)	1717.3	(3.83)
CO mg/Nm^3 (g/hp-h)	37.4	(0.08)	37.4	(0.08)	41.4	(0.09)
HC mg/Nm^3 (g/hp-h)	22.5	(0.06)	22.5	(0.06)	23.2	(0.06)
PM mg/Nm^3 (g/hp-h)	7.2	(0.02)	7.2	(0.02)	8.3	(0.02)
Emissions* (Potential Site Variation)						
NOx mg/Nm^3 (g/hp-h)	2442.7	(5.30)	2442.7	(5.30)	2077.9	(4.63)
CO mg/Nm^3 (g/hp-h)	69.9	(0.15)	69.9	(0.15)	77.4	(0.17)
HC mg/Nm^3 (g/hp-h)	42.6	(0.11)	42.6	(0.11)	43.9	(0.11)
PM mg/Nm^3 (g/hp-h)	14.1	(0.04)	14.1	(0.04)	16.1	(0.04)

**mg/Nm^3 levels are corrected to 5% O_2. Contact your local Cat dealer for further information*

C32 Diesel Generator Sets
Electric Power

Weights and Dimensions



Standby 60 Hz ekW (kVA)	Mission Critical 60 Hz ekW (kVA)	Prime 60 Hz ekW (kVA)	Dim "A" mm (in)	Dim "B" mm (in)	Dim "C" mm (in)	Dry Weight kg (lb)
1100 (1375.0)	1100 (1375.0)	1000 (1250.0)	4285 (168.7)	2228 (87.7)	2194 (86.4)	7400 (16,314)
1250 (1562.5)	1250 (1562.5)	1136 (1420.0)	4385 (172.7)	2228 (87.7)	2194 (86.4)	7600 (16,755)

Note: *For reference only. Do not use for installation design. Contact your local Cat dealer for precise weights and dimensions.*

Ratings Definitions

Standby
Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Mission Critical
Output available with varying load for the duration of the interruption of the normal source power. Average power output is 85% of the mission critical power rating. Typical peak demand up to 100% of rated power for up to 5% of the operating time. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Prime
Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand is 100% of prime rated ekW with 10% overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year.

Applicable Codes and Standards
AS 1359, CSA C22.2 No. 100-04, UL 142, UL 489, UL 869, UL 2200, NFPA 37, NFPA 70, NFPA 99, NFPA 110, IBC, IEC 60034-1, ISO 3046, ISO 8528, NEMA MG1-22, NEMA MG1-33, 2014/35/EU, 2006/42/EC, 2014/30/EU.

Note: Codes may not be available in all model configurations. Please consult your local Cat dealer for availability.

Data Center Applications
- ISO 8528-1 Data Center Power (DCP) compliant per DCP application of Cat diesel generator set prime power rating.
- All ratings Tier III/Tier IV compliant per Uptime Institute requirements.
- All ratings ANSI/TIA-942 compliant for Rated-1 through Rated-4 data centers.

Fuel Rates
Fuel rates are based on fuel oil of 35º API [16°C (60ºF)] gravity having an LHV of 42,780 kJ/kg (18,390 Btu/lb) when used at 29ºC (85ºF) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.)

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The International System of Units (SI) is used in this publication.

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C32 PGDG, C32 PGBI
LEHE1349-05 (10/19)

Nonroad Compression-Ignition Engines: Exhaust Emission Standards

	Rated Power (kW)	Tier	Model Year	NMHC (g/kW-hr)	NMHC + NOx (g/kW-hr)	NOx (g/kW-hr)	PM (g/kW-hr)	CO (g/kW-hr)	Smoke [a] (Percentage)	Useful Life (hours /years) [b]	Warranty Period (hours /years) [b]
Federal	kW < 8	1	2000-2004	-	10.5	-	1.0	8.0	20/15/50	3,000/5	1,500/2
		2	2005-2007	-	7.5	-	0.80	8.0			
		4	2008+	-	7.5	-	0.40 [c]	8.0			
	8 ≤ kW < 19	1	2000-2004	-	9.5	-	0.80	6.6		3,000/5	1,500/2
		2	2005-2007	-	7.5	-	0.80	6.6			
		4	2008+	-	7.5	-	0.40	6.6			
	19 ≤ kW < 37	1	1999-2003	-	9.5	-	0.80	5.5		5,000/7 [d]	3,000/5 [e]
		2	2004-2007	-	7.5	-	0.60	5.5			
		4	2008-2012	-	7.5	-	0.30	5.5			
			2013+	-	4.7	-	0.03	5.5			
	37 ≤ kW < 56	1	1998-2003	-	-	9.2	-	-		8,000/10	3,000/5
		2	2004-2007	-	7.5	-	0.40	5.0			
		3 [f]	2008-2011	-	4.7	-	0.40	5.0			
		4 (Option 1) [g]	2008-2012	-	4.7	-	0.30	5.0			
		4 (Option 2) [g]	2012	-	4.7	-	0.03	5.0			
		4	2013+	-	4.7	-	0.03	5.0			
	56 ≤ kW < 75	1	1998-2003	-	-	9.2	-	-			
		2	2004-2007	-	7.5	-	0.40	5.0			
		3	2008-2011	-	4.7	-	0.40	5.0			
		4	2012-2013 [h]	-	4.7	-	0.02	5.0			
			2014+ [i]	0.19	-	0.40	0.02	5.0			
	75 ≤ kW < 130	1	1997-2002	-	-	9.2	-	-			
		2	2003-2006	-	6.6	-	0.30	5.0			
		3	2007-2011	-	4.0	-	0.30	5.0			
		4	2012-2013 [h]	-	4.0	-	0.02	5.0			
			2014+	0.19	-	0.40	0.02	5.0			

Continued

	Rated Power (kW)	Tier	Model Year	NMHC (g/kW-hr)	NMHC + NOx (g/kW-hr	NOx (g/kW-hr	PM (g/kW-hr	CO (g/kW-hr)	Smoke [a] (Percentage)	Useful Life (hours /years) [b]	Warranty Period (hours /years) [b]
Federal	130 ≤ kW < 225	1	1996-2002	1.3 [j]	-	9.2	0.54	11.4	20/15/50	8,000/10	3,000/5
		2	2003-2005	-	6.6	-	0.20	3.5			
		3	2006-2010	-	4.0	-	0.20	3.5			
		4	2011-2013 [h]	-	4.0	-	0.02	3.5			
			2014+ [i]	0.19	-	0.40	0.02	3.5			
	225 ≤ kW < 450	1	1996-2000	1.3 [j]	-	9.2	0.54	11.4			
		2	2001-2005	-	6.4	-	0.20	3.5			
		3	2006-2010	-	4.0	-	0.20	3.5			
		4	2011-2013 [h]	-	4.0	-	0.02	3.5			
			2014+ [i]	0.19	-	0.40	0.02	3.5			
	450 ≤ kW < 560	1	1996-2001	1.3 [j]	-	9.2	0.54	11.4			
		2	2002-2005	-	6.4	-	0.20	3.5			
		3	2006-2010	-	4.0	-	0.20	3.5			
		4	2011-2013 [h]	-	4.0	-	0.02	3.5			
			2014+ [i]	0.19	-	0.40	0.02	3.5			
	560 ≤ kW < 900	1	2000-2005	1.3 [j]	-	9.2	0.54	11.4			
		2	2006-2010	-	6.4	-	0.20	3.5			
		4	2011-2014	0.40	-	3.5	0.10	3.5			
			2015+ [i]	0.19	-	3.5 [k]	0.04 [l]	3.5			
	kW > 900	1	2000-2005	1.3 [j]	-	9.2	0.54	11.4			
		2	2006-2010	-	6.4	-	0.20	3.5			
		4	2011-2014	0.40	-	3.5 [k]	0.10	3.5			
			2015+ [i]	0.19	-	3.5 [k]	0.04 [l]	3.5			

Notes on following page.

Notes:

- For Tier 1, 2, and 3 standards, exhaust emissions of nitrogen oxides (NOx), carbon monoxide (CO), hydrocarbons (HC), and non-methane hydrocarbons (NMHC) are measured using the procedures in 40 Code of Federal Regulations (CFR) Part 89 Subpart E. For Tier 1, 2, and 3 standards, particulate matter (PM) exhaust emissions are measured using the California Regulations for New 1996 and Later Heavy-Duty Off-Road Diesel Cycle Engines.
- For Tier 4 standards, engines are tested for transient and steady-state exhaust emissions using the procedures in 40 CFR Part 1039 Subpart F. Transient standards do not apply to engines below 37 kilowatts (kW) before the 2013 model year, constant-speed engines, engines certified to Option 1, and engines above 560 kW.
- Tier 2 and later model naturally aspirated nonroad engines shall not discharge crankcase emissions into the atmosphere unless these emissions are permanently routed into the exhaust. This prohibition does not apply to engines using turbochargers, pumps, blowers, or superchargers.
- In lieu of the Tier 1, 2, and 3 standards for NOX, NMHC + NOX, and PM, manufacturers may elect to participate in the averaging, banking, and trading (ABT) program described in 40 CFR Part 89 Subpart C.

a Smoke emissions may not exceed 20 percent during the acceleration mode, 15 percent during the lugging mode, and 50 percent during the peaks in either mode. Smoke emission standards do not apply to single-cylinder engines, constant-speed engines, or engines certified to a PM emission standard of 0.07 grams per kilowatt-hour (g/kW-hr) or lower. Smoke emissions are measured using procedures in 40 CFR Part 86 Subpart I.

b Useful life and warranty period are expressed hours and years, whichever comes first.

c Hand-startable air-cooled direct injection engines may optionally meet a PM standard of 0.60 g/kW-hr. These engines may optionally meet Tier 2 standards through the 2009 model years. In 2010 these engines are required to meet a PM standard of 0.60 g/kW-hr.

d Useful life for constant speed engines with rated speed 3,000 revolutions per minute (rpm) or higher is 5 years or 3,000 hours, whichever comes first.

e Warranty period for constant speed engines with rated speed 3,000 rpm or higher is 2 years or 1,500 hours, whichever comes first.

f These Tier 3 standards apply only to manufacturers selecting Tier 4 Option 2. Manufacturers selecting Tier 4 Option 1 will be meeting those standards in lieu of Tier 3 standards.

g A manufacturer may certify all their engines to either Option 1 or Option 2 sets of standards starting in the indicated model year. Manufacturers selecting Option 2 must meet Tier 3 standards in the 2008-2011 model years.

h These standards are phase-out standards. Not more than 50 percent of a manufacturer's engine production is allowed to meet these standards in each model year of the phase out period. Engines not meeting these standards must meet the final Tier 4 standards.

i These standards are phased in during the indicated years. At least 50 percent of a manufacturer's engine production must meet these standards during each year of the phase in. Engines not meeting these standards must meet the applicable phase-out standards.

j For Tier 1 engines the standard is for total hydrocarbons.

k The NOx standard for generator sets is 0.67 g/kW-hr.

l The PM standard for generator sets is 0.03 g/kW-hr.

Citations: Code of Federal Regulations (CFR) citations:

- 40 CFR 89.112 = Exhaust emission standards
- 40 CFR 1039.101 = Exhaust emission standards for after 2014 model year
- 40 CFR 1039.102 = Exhaust emission standards for model year 2014 and earlier
- 40 CFR 1039 Subpart F = Exhaust emissions transient and steady state test procedures
- 40 CFR 86 Subpart I = Smoke emission test procedures
- 40 CFR 1065 = Test equipment and emissions measurement procedures

PERFORMANCE DATA[DM7686]

October 23, 2014

Performance Number: DM7686 **Change Level: 08**

SALES MODEL:	C13	**COMBUSTION:**	DI
ENGINE POWER (BHP):	415	**ENGINE SPEED (RPM):**	2,100
PEAK TORQUE (FT-LB):	1,398.4	**PEAK TORQUE SPEED (RPM):**	1,400
COMPRESSION RATIO:	17.3	**TORQUE RISE (%):**	35
RATING LEVEL:	INDUSTRIAL B	**ASPIRATION:**	TA
PUMP QUANTITY:	1	**AFTERCOOLER TYPE:**	ATAAC
FUEL TYPE:	DIESEL	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC, ATAAC
MANIFOLD TYPE:	DRY	**INLET MANIFOLD AIR TEMP (F):**	120
GOVERNOR TYPE:	ELEC	**JACKET WATER TEMP (F):**	192.2
INJECTOR TYPE:	EUI	**TURBO CONFIGURATION:**	SINGLE
REF EXH STACK DIAMETER (IN):	5	**TURBO QUANTITY:**	1
MAX OPERATING ALTITUDE (FT):	4,400	**TURBOCHARGER MODEL:**	GTA4502BS 1.33 A/R
		CERTIFICATION YEAR:	2006
		PISTON SPD @ RATED ENG SPD (FT/MIN):	2,163.4

INDUSTRY	SUBINDUSTRY	APPLICATION
INDUSTRIAL	FORESTRY	INDUSTRIAL
INDUSTRIAL	GENERAL INDUSTRIAL	INDUSTRIAL
OIL AND GAS	LAND PRODUCTION	INDUSTRIAL
INDUSTRIAL	AGRICULTURE	INDUSTRIAL
INDUSTRIAL	CONSTRUCTION	INDUSTRIAL
INDUSTRIAL	MATERIAL HANDLING	INDUSTRIAL
INDUSTRIAL	MINING	INDUSTRIAL
OIL AND GAS	WELL SERVICING	INDUSTRIAL

General Performance Data

ENGINE SPEED	ENGINE POWER	ENGINE TORQUE	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP
RPM	BHP	LB-FT	PSI	LB/BHP-HR	GAL/HR	IN-HG	DEG F	DEG F	IN-HG	DEG F
2,100	415	1,038	205	0.347	20.7	45.8	125.2	1,117.2	38.8	894.7
2,000	415	1,090	215	0.342	20.5	46.5	123.4	1,121.0	37.4	904.1
1,900	415	1,147	227	0.343	20.4	47.3	123.1	1,135.1	36.0	921.8
1,800	415	1,211	239	0.339	20.2	48.0	121.2	1,149.8	34.3	942.4
1,700	410	1,268	251	0.336	19.8	48.1	118.7	1,161.0	32.3	956.0
1,600	402	1,318	261	0.333	19.2	48.2	116.9	1,161.1	30.4	956.8
1,500	389	1,364	269	0.336	18.8	48.4	115.2	1,180.3	28.7	980.4
1,400	373	1,399	276	0.331	17.8	47.3	111.2	1,186.0	26.4	986.3
1,300	342	1,380	273	0.340	16.7	47.0	110.0	1,188.8	24.4	991.4
1,200	308	1,349	267	0.331	14.7	38.3	100.9	1,202.6	18.6	1,040.6
1,100	261	1,245	246	0.337	12.6	31.1	95.2	1,211.3	13.8	1,064.3

ENGINE SPEED	ENGINE POWER	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
RPM	BHP	IN-HG	DEG F	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
2,100	415	47	312.1	964.1	2,520.1	4,201.4	4,346.6	914.9	841.8
2,000	415	47	311.0	941.4	2,473.4	4,093.2	4,236.4	891.7	819.5
1,900	415	48	310.6	913.3	2,427.4	3,961.5	4,104.3	863.9	792.5
1,800	415	48	311.4	884.5	2,385.2	3,832.3	3,973.8	836.4	765.8
1,700	410	49	310.3	844.0	2,296.2	3,649.7	3,788.7	797.5	728.4
1,600	402	48	308.2	807.2	2,189.8	3,476.7	3,611.1	760.1	694.5
1,500	389	48	310.3	765.7	2,113.7	3,297.0	3,428.3	721.6	657.1
1,400	373	47	309.4	710.6	1,968.2	3,054.6	3,179.5	669.2	608.1
1,300	342	47	310.5	664.7	1,840.9	2,846.3	2,963.4	623.8	566.5
1,200	308	38	279.3	552.0	1,577.2	2,352.7	2,455.8	516.9	467.0
1,100	261	30	250.7	456.5	1,322.9	1,939.3	2,027.8	426.8	384.2

Emissions Data

RATED SPEED POTENTIAL SITE VARIATION: 2100 RPM

ENGINE POWER		BHP	415	311	208	104	41.5
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	1,437	794	417	220	140
TOTAL CO		G/HR	1,000	1,253	313	540	474
TOTAL HC		G/HR	55	75	114	137	169
PART MATTER		G/HR	83.0	82.1	48.0	75.6	72.4
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	1,613.1	1,076.6	780.1	723.6	785.1
TOTAL CO	(CORR 5% O2)	MG/NM3	1,120.7	1,705.6	597.9	1,773.9	2,665.4
TOTAL HC	(CORR 5% O2)	MG/NM3	53.0	88.8	184.8	389.8	819.8
PART MATTER	(CORR 5% O2)	MG/NM3	78.4	96.3	79.1	223.1	372.8
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	786	524	380	352	382
TOTAL CO	(CORR 5% O2)	PPM	897	1,364	478	1,419	2,132
TOTAL HC	(CORR 5% O2)	PPM	99	166	345	728	1,530
TOTAL NOX (AS NO2)		G/HP-HR	3.49	2.57	2.02	2.13	3.38
TOTAL CO		G/HP-HR	2.43	4.06	1.52	5.23	11.48
TOTAL HC		G/HP-HR	0.13	0.24	0.55	1.32	4.08
PART MATTER		G/HP-HR	0.20	0.27	0.23	0.73	1.75
TOTAL NOX (AS NO2)		LB/HR	3.17	1.75	0.92	0.49	0.31
TOTAL CO		LB/HR	2.20	2.76	0.69	1.19	1.05
TOTAL HC		LB/HR	0.12	0.17	0.25	0.30	0.37
PART MATTER		LB/HR	0.18	0.18	0.11	0.17	0.16

RATED SPEED NOMINAL DATA: 2100 RPM

ENGINE POWER		BHP	415	311	208	104	41.5
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	1,331	735	386	204	129
TOTAL CO		G/HR	535	670	167	289	254
TOTAL HC		G/HR	29	40	60	72	89
TOTAL CO2		KG/HR	213	172	126	71	42
PART MATTER		G/HR	42.6	42.1	24.6	38.7	37.1
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	1,493.6	996.8	722.3	670.0	727.0
TOTAL CO	(CORR 5% O2)	MG/NM3	599.3	912.1	319.7	948.6	1,425.3
TOTAL HC	(CORR 5% O2)	MG/NM3	28.0	47.0	97.8	206.2	433.8
PART MATTER	(CORR 5% O2)	MG/NM3	40.2	49.4	40.6	114.4	191.2
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	728	486	352	326	354
TOTAL CO	(CORR 5% O2)	PPM	479	730	256	759	1,140
TOTAL HC	(CORR 5% O2)	PPM	52	88	182	385	810
TOTAL NOX (AS NO2)		G/HP-HR	3.23	2.38	1.87	1.97	3.13
TOTAL CO		G/HP-HR	1.30	2.17	0.81	2.80	6.14
TOTAL HC		G/HP-HR	0.07	0.13	0.29	0.70	2.16
PART MATTER		G/HP-HR	0.10	0.14	0.12	0.38	0.90
TOTAL NOX (AS NO2)		LB/HR	2.93	1.62	0.85	0.45	0.29
TOTAL CO		LB/HR	1.18	1.48	0.37	0.64	0.56
TOTAL HC		LB/HR	0.06	0.09	0.13	0.16	0.20
TOTAL CO2		LB/HR	469	378	278	157	92
PART MATTER		LB/HR	0.09	0.09	0.05	0.09	0.08
OXYGEN IN EXH		%	10.7	12.5	14.1	15.5	17.1
DRY SMOKE OPACITY		%	1.4	1.5	0.9	2.0	2.0
BOSCH SMOKE NUMBER			0.97	1.04	0.54	1.27	1.29

Regulatory Information

EPA TIER 3		2005 - 2010		
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 89 SUBPART D AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	NON-ROAD	TIER 3	CO: 3.5 NOx + HC: 4.0 PM: 0.20

EU STAGE IIIA		2006 - 2010		
GASEOUS EMISSION DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN EU 97/68/EC, ECE REGULATION NO. 96 AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. GASEOUS EMISSION VALUES ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
EUROPE	EU	NON-ROAD	STAGE IIIA	CO: 3.5 NOx + HC: 4.0 PM: 0.20

IMO II	2011 - ----
GASEOUS EMISSIONS DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN REGULATION 13 OF REVISED ANNEX VI OF MARPOL 73/78 AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THIS ENGINE CONFORMS TO INTERNATIONAL MARINE ORGANIZATION'S (IMO) MARINE COMPRESSION-IGNITION EMISSION REGULATIONS.

VOLUME II: CHAPTER 3

PREFERRED AND ALTERNATIVE METHODS FOR ESTIMATING AIR EMISSIONS FROM HOT-MIX ASPHALT PLANTS

Final Report

July 1996

Prepared by:
Eastern Research Group, Inc.
Post Office Box 2010
Morrisville, North Carolina 27560

Prepared for:
Point Sources Committee
Emission Inventory Improvement Program

In the counterflow drum mixing process, the aggregate is proportioned through a cold feed system prior to introduction to the drying process. As opposed to the parallel flow drum mixing process though, the aggregate moves opposite to the flow of the exhaust gases. After drying and heating take place, the aggregate is transferred to a part of the drum that is not exposed to the exhaust gas and coated with asphalt cement. This process prevents stripping of the asphalt cement by the hot exhaust gas. If RAP is used, it is usually introduced into the coating chamber.

2.2 EMISSION SOURCES

Emissions from HMA plants derive from both controlled (i.e., ducted) and uncontrolled sources. Section 7 lists the source classification codes (SCCs) for these emission points.

2.2.1 MATERIAL HANDLING (FUGITIVE EMISSIONS)

Material handling includes the receipt, movement, and processing of fuel and materials used at the HMA facility. Fugitive particulate matter (PM) emissions from aggregate storage piles are typically caused by front-end loader operations that transport the aggregate to the cold feed unit hoppers. The amount of fugitive PM emissions from aggregate piles will be greater in strong winds (Gunkel, 1992). Piles of RAP, because RAP is coated with asphalt cement, are not likely to cause significant fugitive dust problems. Other pre-dryer fugitive emission sources include the transfer of aggregate from the cold feed unit hoppers to the dryer feed conveyor and, subsequently, to the dryer entrance. Aggregate moisture content prior to entry into the dryer is typically 3 percent to 7 percent. This moisture content, along with aggregate size classification, tend to minimize emissions from these sources, which contribute little to total facility PM emissions. PM less than or equal to 10 µm in diameter (PM_{10}) emissions from these sources are reported to account for about 19 percent of their total PM emissions (NAPA, 1995).

If crushing, breaking, or grinding operations occur at the plant, these may result in fugitive PM emissions (TNRCC, 1994). Also, fine particulate collected from the baghouses can be a source of fugitive emissions as the overflow PM is transported by truck (enclosed or tarped) for on-site disposal. At all HMA plants there may be PM and slight process fugitive volatile organic compound (VOC) emissions from the transport and handling of the hot-mix from the mixer to the storage silo and also from the load-out operations to the delivery trucks (EPA, 1994a). Small amounts of VOC emissions can also result from the transfer of liquid and gaseous fuels, although natural gas is normally transported in a pipeline (Gunkel, 1992, Wiese, 1995).

TABLE 3.2-1

TYPICAL HOT-MIX ASPHALT PLANT EMISSION CONTROL TECHNIQUES

Emission Source	Pollutant	Control Technique	Typical Efficiency (%)
Process	PM and PM_{10}	Cyclones	50 - 75[a,b]
		Multiple cyclones	90[c]
		Settling chamber	<50[b]
		Baghouse	99 - 99.97[a,d]
		Venturi scrubber	90 - 99.5[d,e]
	VOC	Dryer and combustion process modifications	37 - 86[f,g]
	SO_x	Limestone	50[b,e]
		Low sulfur fuel	80[c]
Fugitive dust	PM and PM_{10}	Paving and maintenance	60 - 99[g]
		Wetting and crusting agents	70[b] - 80[c]
		Crushed RAP material, asphalt shingles	70[h]

[a] Control efficiency dependent on particle size ratio and size of equipment.
[b] Source: Patterson, 1995c.
[c] Source: EIIP, 1995.
[d] Typical efficiencies at a hot-mix asphalt plant.
[e] Source: TNRCC, 1995.
[f] Source: Gunkel, 1992.
[g] Source: TNRCC, 1994.
[h] Source: Patterson, 1995a.

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	MSCI HMA Plant #3 30K Tank #1
City:	Moriarty
State:	New Mexico
Company:	Mountain States Constructors, Inc.
Type of Tank:	Horizontal Tank
Description:	30000 gallon tank

Tank Dimensions

Shell Length (ft):	52.00
Diameter (ft):	10.00
Volume (gallons):	30,000.00
Turnovers:	216.90
Net Throughput(gal/yr):	6,507,000.00
Is Tank Heated (y/n):	Y
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Red/Primer
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig)	0.00

Meteorological Data used in Emissions Calculations: Albuquerque, New Mexico (Avg Atmospheric Pressure = 12.15 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

MSCI HMA Plant #3 30K Tank #1 - Horizontal Tank
Moriarty, New Mexico

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Asphalt Cement	All	350.00	350.00	350.00	350.00	0.0347	0.0347	0.0347	105.0000			1,000.00	Option 3: A=75350.06, B=9.00346

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

MSCI HMA Plant #2 30K Tank #1 - Horizontal Tank
Moriarty, New Mexico

Annual Emission Calculations	
Standing Losses (lb):	0.0000
Vapor Space Volume (cu ft):	2,601.3188
Vapor Density (lb/cu ft):	0.0004
Vapor Space Expansion Factor:	0.0000
Vented Vapor Saturation Factor:	0.9909
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	2,601.3188
Tank Diameter (ft):	10.0000
Effective Diameter (ft):	25.7375
Vapor Space Outage (ft):	5.0000
Tank Shell Length (ft):	52.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0004
Vapor Molecular Weight (lb/lb-mole):	105.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0347
Daily Avg. Liquid Surface Temp. (deg. R):	809.6700
Daily Average Ambient Temp. (deg. F):	56.1542
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	809.6700
Tank Paint Solar Absorptance (Shell):	0.8900
Daily Total Solar Insulation Factor (Btu/sqft day):	1,765.3167
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0000
Daily Vapor Temperature Range (deg. R):	0.0000
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0347
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0347
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0347
Daily Avg. Liquid Surface Temp. (deg R):	809.6700
Daily Min. Liquid Surface Temp. (deg R):	809.6700
Daily Max. Liquid Surface Temp. (deg R):	809.6700
Daily Ambient Temp. Range (deg. R):	27.9250
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9909
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0347
Vapor Space Outage (ft):	5.0000
Working Losses (lb):	129.2121
Vapor Molecular Weight (lb/lb-mole):	105.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0347
Annual Net Throughput (gal/yr.):	6,507,000.0000
Annual Turnovers:	216.9000
Turnover Factor:	0.3050
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	0.7500
Total Losses (lb):	129.2121

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

MSCI HMA Plant #3 30K Tank #1 - Horizontal Tank
Moriarty, New Mexico

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Asphalt Cement	129.21	0.00	129.21

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	MSCI HMA Plant #3 30K Tank #2	
City:	Moriarty	
State:	New Mexico	
Company:	Mountain States Constructors, Inc.	
Type of Tank:	Horizontal Tank	
Description:	30000 gallon tank	
Tank Dimensions		
Shell Length (ft):		52.00
Diameter (ft):		10.00
Volume (gallons):		30,000.00
Turnovers:		216.90
Net Throughput(gal/yr):		6,507,000.00
Is Tank Heated (y/n):	Y	
Is Tank Underground (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Red/Primer	
Shell Condition	Good	
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meteorological Data used in Emissions Calculations: Albuquerque, New Mexico (Avg Atmospheric Pressure = 12.15 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

MSCI HMA Plant #3 30K Tank #2 - Horizontal Tank
Moriarty, New Mexico

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Asphalt Cement	All	350.00	350.00	350.00	350.00	0.0347	0.0347	0.0347	105.0000			1,000.00	Option 3: A=75350.06, B=9.00346

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

MSCI HMA Plant #2 30K Tank #2 - Horizontal Tank
Moriarty, New Mexico

Annual Emission Calculations	
Standing Losses (lb):	0.0000
Vapor Space Volume (cu ft):	2,601.3188
Vapor Density (lb/cu ft):	0.0004
Vapor Space Expansion Factor:	0.0000
Vented Vapor Saturation Factor:	0.9909
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	2,601.3188
Tank Diameter (ft):	10.0000
Effective Diameter (ft):	25.7375
Vapor Space Outage (ft):	5.0000
Tank Shell Length (ft):	52.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0004
Vapor Molecular Weight (lb/lb-mole):	105.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0347
Daily Avg. Liquid Surface Temp. (deg. R):	809.6700
Daily Average Ambient Temp. (deg. F):	56.1542
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	809.6700
Tank Paint Solar Absorptance (Shell):	0.8900
Daily Total Solar Insulation Factor (Btu/sqft day):	1,765.3167
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0000
Daily Vapor Temperature Range (deg. R):	0.0000
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0347
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0347
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0347
Daily Avg. Liquid Surface Temp. (deg R):	809.6700
Daily Min. Liquid Surface Temp. (deg R):	809.6700
Daily Max. Liquid Surface Temp. (deg R):	809.6700
Daily Ambient Temp. Range (deg. R):	27.9250
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9909
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0347
Vapor Space Outage (ft):	5.0000
Working Losses (lb):	129.2121
Vapor Molecular Weight (lb/lb-mole):	105.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0347
Annual Net Throughput (gal/yr.):	6,507,000.0000
Annual Turnovers:	216.9000
Turnover Factor:	0.3050
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	0.7500
Total Losses (lb):	129.2121

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

MSCI HMA Plant #3 30K Tank #2 - Horizontal Tank
Moriarty, New Mexico

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Asphalt Cement	129.21	0.00	129.21

Section 8

Map(s)

A map such as a 7.5 minute topographic quadrangle showing the exact location of the source. The map shall also include the following:

The UTM or Longitudinal coordinate system on both axes	An indicator showing which direction is north
A minimum radius around the plant of 0.8km (0.5 miles)	Access and haul roads
Topographic features of the area	Facility property boundaries
The name of the map	The area which will be restricted to public access
A graphical scale	

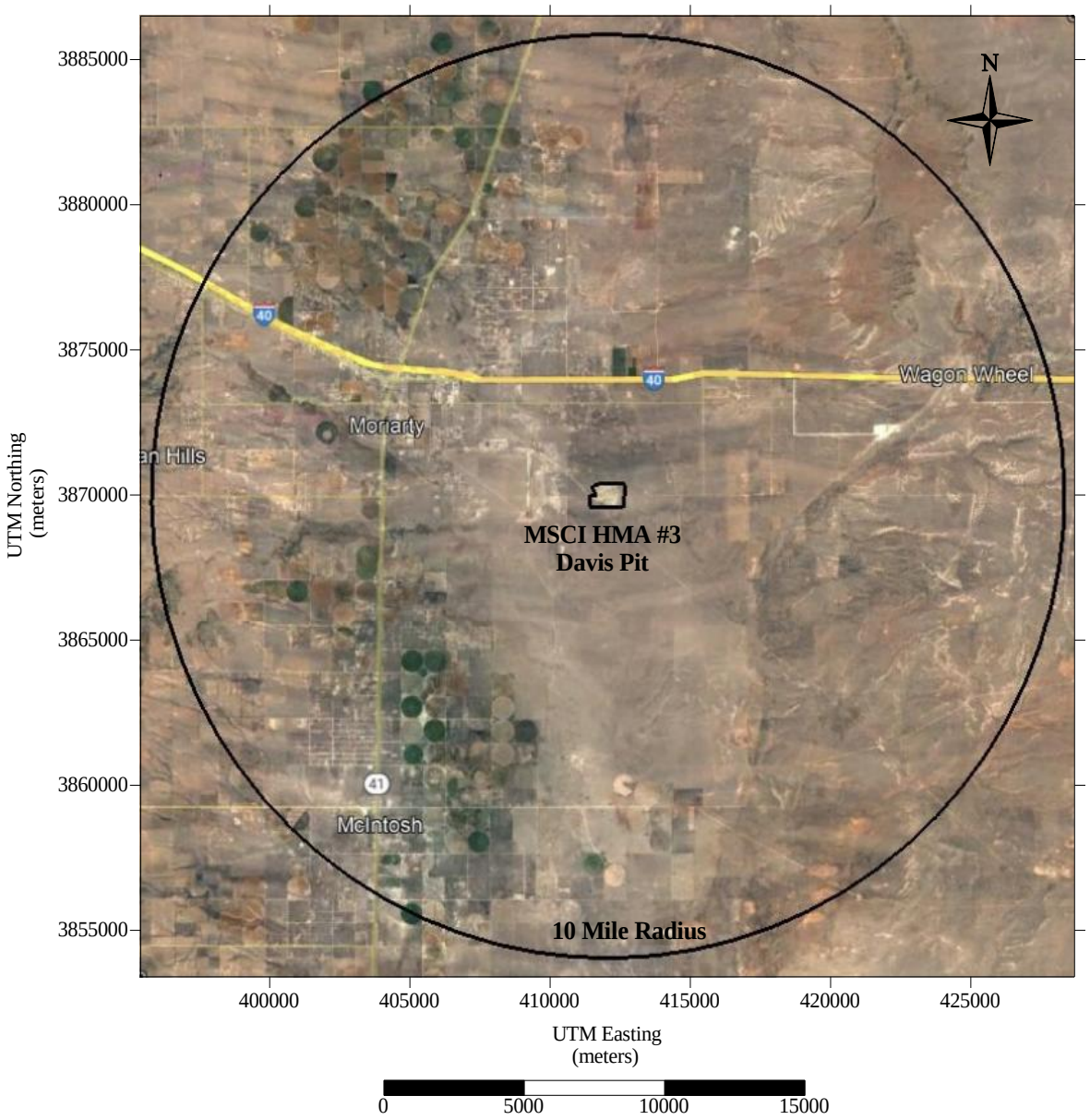


Figure 8.1: MSCI Davis Pit 10 Mile Radius

Section 9

Proof of Public Notice

(for NSR applications submitting under 20.2.72 or 20.2.74 NMAC)
(This proof is required by: 20.2.72.203.A.14 NMAC "Documentary Proof of applicant's public notice")

X I have read the AQB "Guidelines for Public Notification for Air Quality Permit Applications"
This document provides detailed instructions about public notice requirements for various permitting actions. It also provides public notice examples and certification forms. Material mistakes in the public notice will require a re-notice before issuance of the permit.

Unless otherwise allowed elsewhere in this document, the following items document proof of the applicant's Public Notification. Please include this page in your proof of public notice submittal with checkmarks indicating which documents are being submitted with the application.

New Permit and **Significant Permit Revision** public notices must include all items in this list.

Technical Revision public notices require only items 1, 5, 9, and 10.

Per the Guidelines for Public Notification document mentioned above, include:

1. X A copy of the certified letter receipts with post marks (20.2.72.203.B NMAC)
2. X A list of the places where the public notice has been posted in at least four publicly accessible and conspicuous places, including the proposed or existing facility entrance. (e.g: post office, library, grocery, etc.)
3. X A copy of the property tax record (20.2.72.203.B NMAC).
4. X A sample of the letters sent to the owners of record.
5. X A sample of the letters sent to counties, municipalities, and Indian tribes.
6. X A sample of the public notice posted and a verification of the local postings.
7. X A table of the noticed citizens, counties, municipalities and tribes and to whom the notices were sent in each group.
8. X A copy of the public service announcement (PSA) sent to a local radio station and documentary proof of submittal.
9. X A copy of the classified or legal ad including the page header (date and newspaper title) or its affidavit of publication stating the ad date, and a copy of the ad. When appropriate, this ad shall be printed in both English and Spanish.
10. X A copy of the display ad including the page header (date and newspaper title) or its affidavit of publication stating the ad date, and a copy of the ad. When appropriate, this ad shall be printed in both English and Spanish.
11. X A map with a graphic scale showing the facility boundary and the surrounding area in which owners of record were notified by mail. This is necessary for verification that the correct facility boundary was used in determining distance for notifying land owners of record.

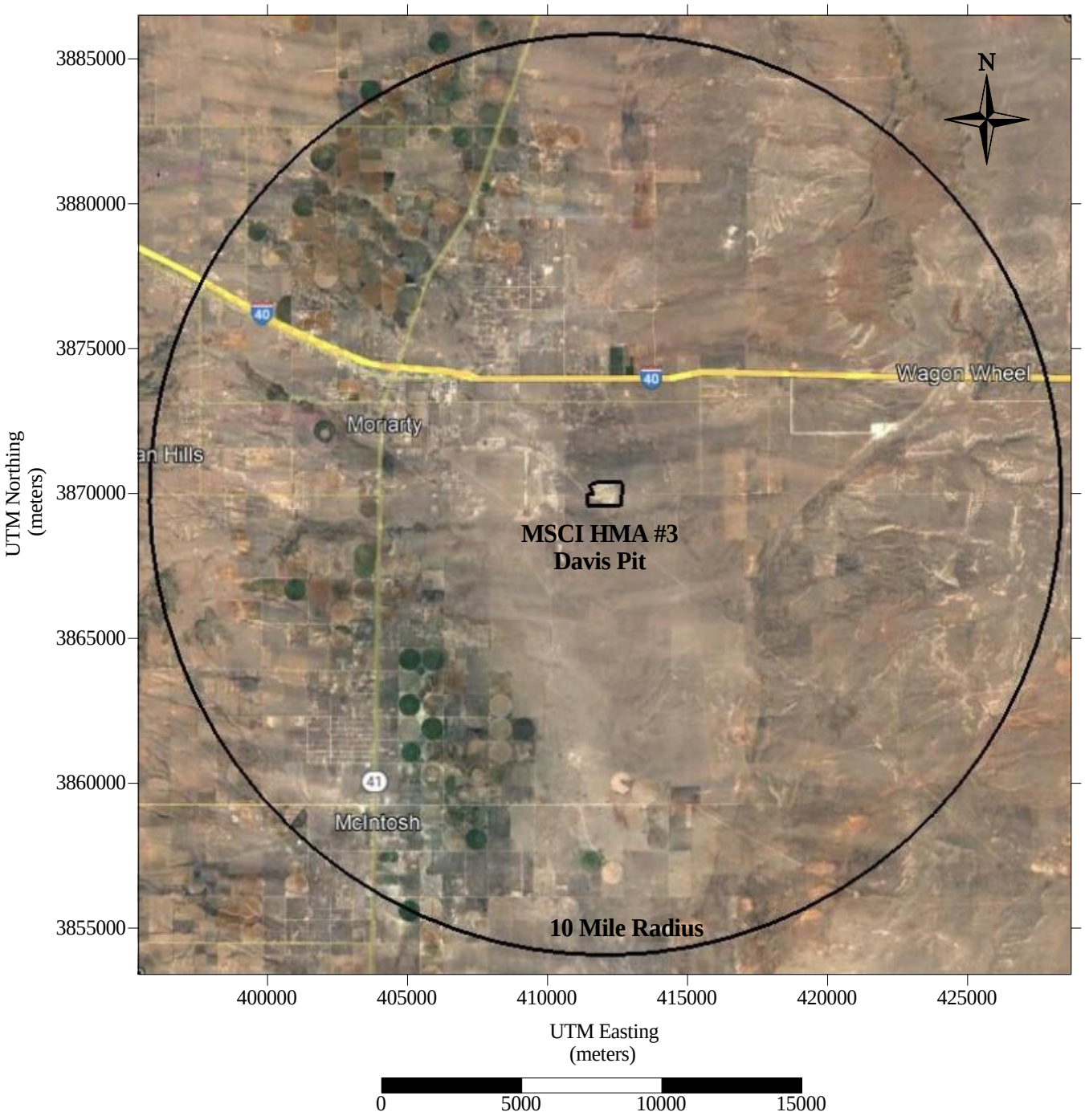


Figure 9-1: Ten-Mile Radius around Site

Government List within 10 Miles

Torrance County	Yvonne Otero, County Clerk	PO Box 767	Estancia	NM	87016
Santa Fe County	Katharine Clark, County Clerk	100 Catron Street	Santa Fe	NM	87501
City of Moriarty	Sheila Larranaga-Murphy, City Clerk	PO Box 130	Moriarty	NM	87035



Figure 9-2: Half Mile Radius around Site

Acct_No	OWNNAME	MAILADD	MCITY	STATE	ZIP
R011868	LILINGSTON YASIR	1695 W MAIN CIRCLE #2	DE PERE	WI	54115
R011851	MORIARTY LAND TRUST LLC CERA MARIO R	P O BOX 1471	MORIARTY	NM	87035
R011873	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R012073	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R011872	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R011867	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R011869	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R011874	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R018665	MCCLELLAN DONNA	1309 CALIFORNIA ST NE	ALBUQUERQUE	NM	871106825
R012163	CALLAHAN STEPHEN	19395 EMBER DR.	LONGPRAIRE	MN	56347
R012166	CALLAHAN STEPHEN	19395 EMBER DR.	LONGPRAIRE	MN	56347
R011876	ALARID ANTHONY	14 CAMINO CERRO LINDO	SANTA FE	NM	87507
R012158	ALARID ANTHONY	14 CAMINO CERRO LINDO	SANTA FE	NM	87507
R012146	KEPNER RAYMOND	3711 LILLO ST	LAS VEGAS	NV	89103
R012133	BLUNIER CLETUS B & MARTHA A TRUSTEES BLUNIER LIVING TRUST	1029 EVENING PRIMROSE LN	BERNALILLO	NM	87004
R012165	SEGURA EDWARD & LYDIA A	1947 W WILLOW AVE	AHAHEIM	CA	92804
R011866	CARRILLO CONSTRUCTION LLC	PO BOX 9844	SANTE FE	NM	87504
R011858	IWANCHUK FAMILY TRUST	1007 STAGECOACH RD	SANTA FE	NM	875011147
R012151	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R011863	IWANCHUK FAMILY TRUST	1007 STAGECOACH RD	SANTA FE	NM	875011147
R011865	IWANCHUK FAMILY TRUST	1007 STAGECOACH RD	SANTA FE	NM	875011147
R012164	ALARID ANTHONY	14 CAMINO CERRO LINDO	SANTA FE	NM	87507
R012160	BROCKLEHURST DWIGHT M	7703 CEDAR CANYON PL NE	ALBUQUERQUE	NM	871221631
R012172	WINTERS RICHARD J & GRIMM VICTORIA	PO BOX 134	PERALTA	NM	87042
R011860	IWANCHUK FAMILY TRUST	1007 STAGECOACH RD	SANTA FE	NM	875011147
R012058	MORIARTY LAND TRUST LLC SPANISH TRACE	PO BOX 3176	ALBUQUERQUE	NM	87190
R012060	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012079	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012057	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012088	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012068	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012084	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012061	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012157	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012059	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012076	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190

Acct_No	OWNNAME	MAILADD	MCITY	STATE	ZIP
R012085	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012053	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012072	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012078	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012083	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R011871	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R018213	ORTEGA FERMIN & JENNIE	PO BOX 483	MORIARTY	NM	870350483
R016331	HENSON STANLEY & MARY LOU	PO BOX 754	MORIARTY	NM	87035
R012170	BARDWELL-NELSON SCHULTE W R ETUX	7201 W LAKE MEAD BLVD STE 550	LAS VEGAS	NV	891288347
R012141	KEPNER RAYMOND	3711 LILLO ST	LAS VEGAS	NV	89103
R030014	DRIFTER PROPERTIES LLC	PO BOX 250	MORIARTY	NM	870350250
R028957	WALLIN KENNETH L & STEVEN D	P O BOX 250	MORIARTY	NM	87035
R012150	MONTOYA MICHAEL D	10226 STRONG AVE	WHITTIER	CA	90601
R011870	MONTOYA MICHAEL D	10226 STRONG AVE	WHTTIER	CA	90601
R012138	LUNA DIANA M	8912 5TH ST NW	ALBUQUERQUE	NM	87114
R012171	BARWELL-NELSON SCHULTE W R ETUX	7201 W LAKE MEAD BLVD STE 550	LAS VEGAS	NV	891288347
R012131	BLUNIER CLETUS B & MARTHA A TRUSTEES BLUNIER LIVING TRUST	1029 EVENING PRIMROSE LN	BERNALILLO	NM	87004
R029632	WALLIN KENNETH AND STEVEN D	P O BOX 250	MORIARTY	NM	87035
R012168	SEGURA EDWARD & LYDIA A	1947 W WILLOW AVE	AHAHEIM	CA	92804
R012155	ALARID ANTHONY	14 CAMINO CERRO LINDO	SANTA FE	NM	87507
R012128	BLUNIER CLETUS B & MARTHA A TRUSTEES BLUNIER LIVING TRUST	1029 EVENING PRIMROSE LN	BERNALILLO	NM	87004
R012169	SEGURA EDWARD & LYDIA A	1947 W WILLOW AVE	AHAHEIM	CA	92804
R012167	SEGURA EDWARD & LYDIA A	1947 W WILLOW AVE	AHAHEIM	CA	92804
R012154	MONTOYA MICHAEL D	10226 STRONG AVE	WHITTIER	CA	90601
R012148	MONTOYA MICHAEL D	10226 STRONG AVE	WHITTIER	CA	90601
R012124	FRATRICK MICHELLE	3512 SINGAPORE CIRCLE NE	ALBUQUERQUE	NM	87111
R012161	FUNTANILLA ANTHONY C	8447 SAN RAMON DRIVE	LAS VEGAS	NV	89147
R012159	FUNTANILLA ANTHONY C	8447 SAN RAMON DRIVE	LAS VEGAS	NV	89147
R012126	BLUNIER CLETUS B & MARTHA A TRUSTEES BLUNIER LIVING TRUST	1029 EVENING PRIMROSE LN	BERNALILLO	NM	87004
R021665	WINTERS RICHARD J & GRIMM VICTORIA	2475 COLE RD	BOSQUE FARMS	NM	87068
R012129	GONZALES BOBBY JR & GALLEGOS VICTO	PO BOX 3602	MORIARTY	NM	87035
R012062	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012075	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012055	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012054	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012069	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012065	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190

Acct_No	OWNNAME	MAILADD	MCITY	STATE	ZIP
R012173	BARDWELL-NELSON WINTERS RICHARD M ETAL	9020 LAZY BROOK NE	ALBUQUERQUE	NM	87113
R012063	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R026721	WALLIN CONSTRUCTION CO INC	PO BOX 250	MORIARTY	NM	87035
R028271	ORTEGA FERMIN FRANKLIN	PO BOX 827	MORIARTY	NM	870350827
R018672	WILLIAMS HOLDINGS LLC	PO BOX 805	EDGEWOOD	NM	870150805
R012140	LA FAMILIA UNIDA TRUST	614 CUTLER AVE NW	ALBUQUERQUE	NM	87102
R012136	LA FAMILIA UNIDA TRUST	614 CUTLER AVE NW	ALBUQUERQUE	NM	87102
R012134	MONTOYA JOSE A REV TRUST	6118 EDITH BLVD NE # 197	ALBUQUERQUE	NM	871075074
R012127	MONTOYA MARGARET C	7204 VILLA TULIPAN NE	ALBUQUERQUE	NM	87113
R012132	MONTOYA JOSE A REV TRUST	6118 EDITH BLVD NE # 197	ALBUQUERQUE	NM	871075074
R012130	MONTOYA MARY C	4008 DIABLO TRAIL PL NW	ALBUQUERQUE	NM	87114
	STATE OF NEW MEXICO	310 OLD SANTA FE TRAIL	SANTA FE	NM	87501

NOTICE

Mountain States Constructors, Inc. (MSCI) announces its intent to apply to the New Mexico Environment Department (NMED) for a new 20.2.72 NMAC New Source Review (NSR) Air Quality Permit for a hot mix asphalt plant southeast of Moriarty, New Mexico. The date the notarized MSCI new permit application will be submitted to the NMED Air Quality Bureau is estimated to be August 15, 2022.

The exact location of the facility known as, MSCI HMA #3, will be UTM Zone 13, UTM Easting 412,020, UTM Northing 3,869,700, NAD 83 in the Davis Pit. The approximate location of this site is 5.1 miles southeast of the intersection of Highways 333 and 41 in Moriarty, NM in Torrance County.

The proposed construction will consist of a 400 tph hot mix asphalt plant (HMA) which includes aggregate/RAP storage piles, a 5-bin cold aggregate feeder, scalping screen, pug mill, mineral filler silo with screw conveyor and baghouse, drum dryer/mixer with baghouse, incline conveyor, asphalt silo, asphalt heater, six (6) transfer conveyors, Evotherm storage tank, and two (2) asphalt cement storage tanks; a 400 tph RAP crushing and screening plant which includes a feeder, vertical impact crusher, screen, eight (8) transfer conveyors, and two (2) stacker conveyors; and a 200 tph RAP scalping screen plant which includes a scalping screen and five (5) conveyors and stacker conveyor. The HMA plant will be powered with a 1250 kW (1675 horsepower (hp)) generator and a 30 kW (40.2 hp) standby generator. The RAP crushing and screening plant will be powered by a 415 hp engine. The RAP scalping screen plant will be powered by a 75 hp engine.

The estimated maximum quantities of any regulated air contaminants will be as follows in pound per hour (pph) and tons per year (tpy). These reported emissions could change slightly during the course of the Department's review:

Pollutant:	Pounds per hour	Tons per year
PM_{10} (Total Facility)	21.5 pph	30.4 tpy
$PM_{2.5}$ (Total Facility)	12.2 pph	16.2 tpy
Sulfur Dioxide (SO_2)	24.1 pph	30.7 tpy
Nitrogen Oxides (NO_x)	43.3 pph	67.3 tpy
Carbon Monoxide (CO)	66.9 pph	91.8 tpy
Volatile Organic Compounds (VOC)	26.6 pph	34.0 tpy
Total sum of all Hazardous Air Pollutants (HAPs)	4.29 pph	5.26 tpy
Toxic Air Pollutant (TAP)	5.01 pph	6.27 tpy
Green House Gas Emissions as Total CO_2e	n/a	22,086 tpy

The maximum operating schedule of the plant is 24 hours per day, 7 days a week, a for the months of February through November and 8:00 AM to 6:00 PM (MST) for the months of December and January. The standard operating schedule of the plant is daylight hours, 7 days a week, 52 weeks per year.

The owner and/or operator of the Facility is:

Mountain States Constructors, Inc.
3601 Pan American Freeway NE #111
Albuquerque, New Mexico 87107
Phone: (505) 228-4485

If you have any comments about the construction or operation of this facility, and you want your comments to be made as part of the permit review process, you must submit your comments in writing to this address: Permit Programs Manager; New Mexico Environment Department; Air Quality Bureau; 525 Camino de los Marquez, Suite 1; Santa Fe, New Mexico; 87505-1816; (505) 476-4300; 1 800 224-7009; https://www.env.nm.gov/aqb/permit/aqb_draft_permits.html. Other comments and questions may be submitted verbally.

With your comments, please refer to the company name and facility name, or send a copy of this notice along with your comments. This information is necessary since the Department may have not yet received the permit application. Please include a legible return mailing address. Once the Department has completed its preliminary review of the application and its air quality impacts, the Department's notice will be published in the legal section of a newspaper circulated near the facility location.

Attención

Este es un aviso de la oficina de Calidad del Aire del Departamento del Medio Ambiente de Nuevo México, acerca de las emisiones producidas por un establecimiento en esta área. Si usted desea información en español, por favor comuníquese con esa oficina al teléfono 505-372-8373.

Notice of Non-Discrimination

NMED does not discriminate on the basis of race, color, national origin, disability, age or sex in the administration of its programs or activities, as required by applicable laws and regulations. NMED is responsible for coordination of compliance efforts and receipt of inquiries concerning non-discrimination requirements implemented by 40 C.F.R. Part 7, including Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972. If you have any questions about this notice or any of NMED's non-discrimination programs, policies or procedures, or if you believe that you have been discriminated against with respect to a NMED program or activity, you may contact: Kathryn Becker, Non-Discrimination Coordinator, NMED, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855, nd.coordinator@state.nm.us. You may also visit our website at https://www.env.nm.gov/non-employee-discrimination-complaint-page/ to learn how and where to file a complaint of discrimination.

General Posting of Notices – Certification

I, Neil Jackson, the undersigned, certify that on **August 10, 2022,** posted a true and correct copy of the attached Public Notice in the following publicly accessible and conspicuous places in Moriarty, Estancia, and Edgewood of Torrance and Santa Fe Counties, State of New Mexico on the following dates:

1. Mountain States Constructors, Inc.'s Davis Pit Facility Entrance August 10, 20200
2. Town of Edgwood, Town Hall August 10, 2022
3. City of Moriarty Post Office August 10, 2022
4. Town of Estancia, Town Hall August 10, 2022

Signed this 11 day of August, 2022,

Signature

8/11/2022
Date

Neil Jackson
Printed Name

Vice-President
Title {APPLICANT OR RELATIONSHIP TO APPLICANT}



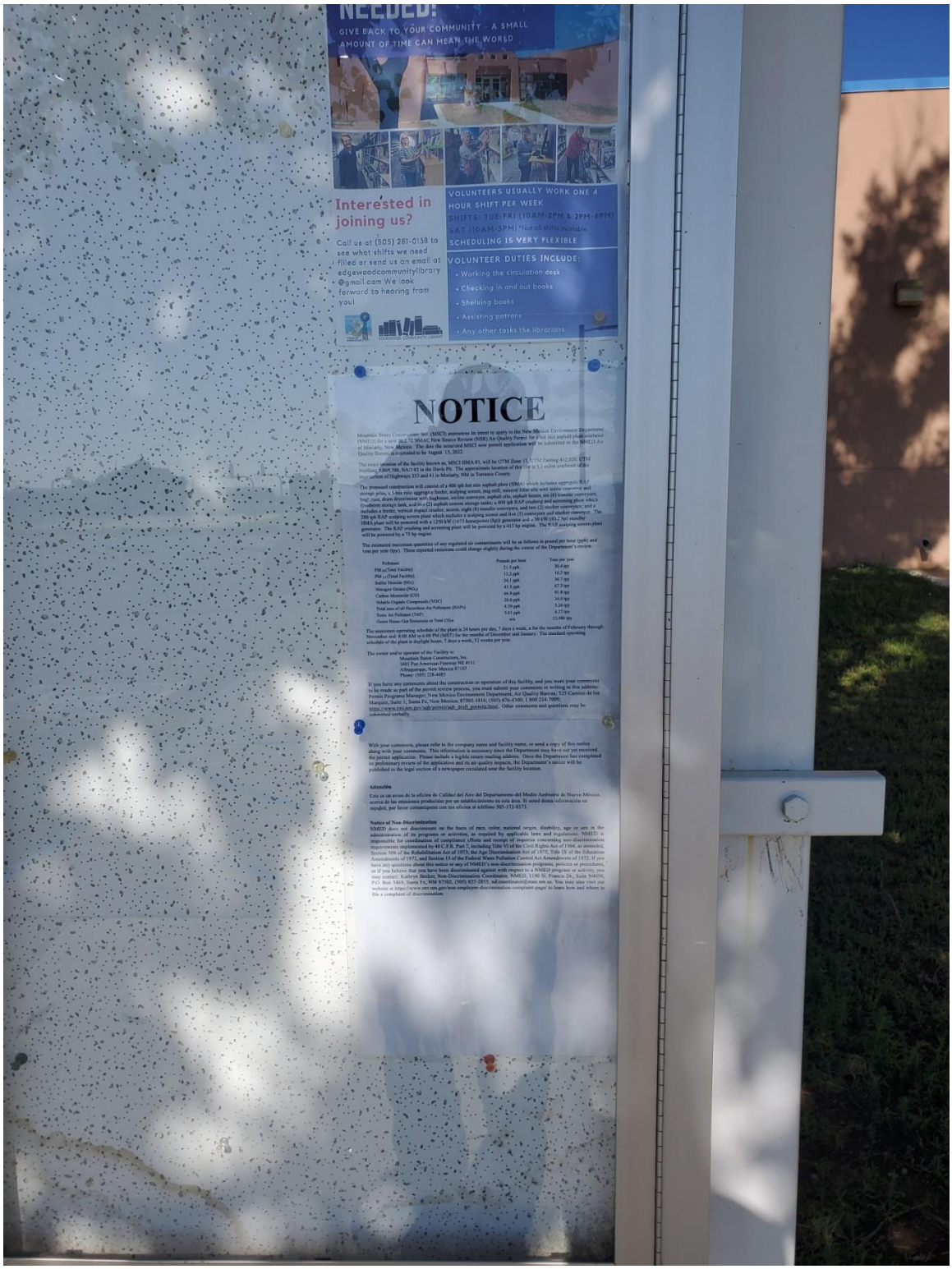
Davis Pit Photo #1



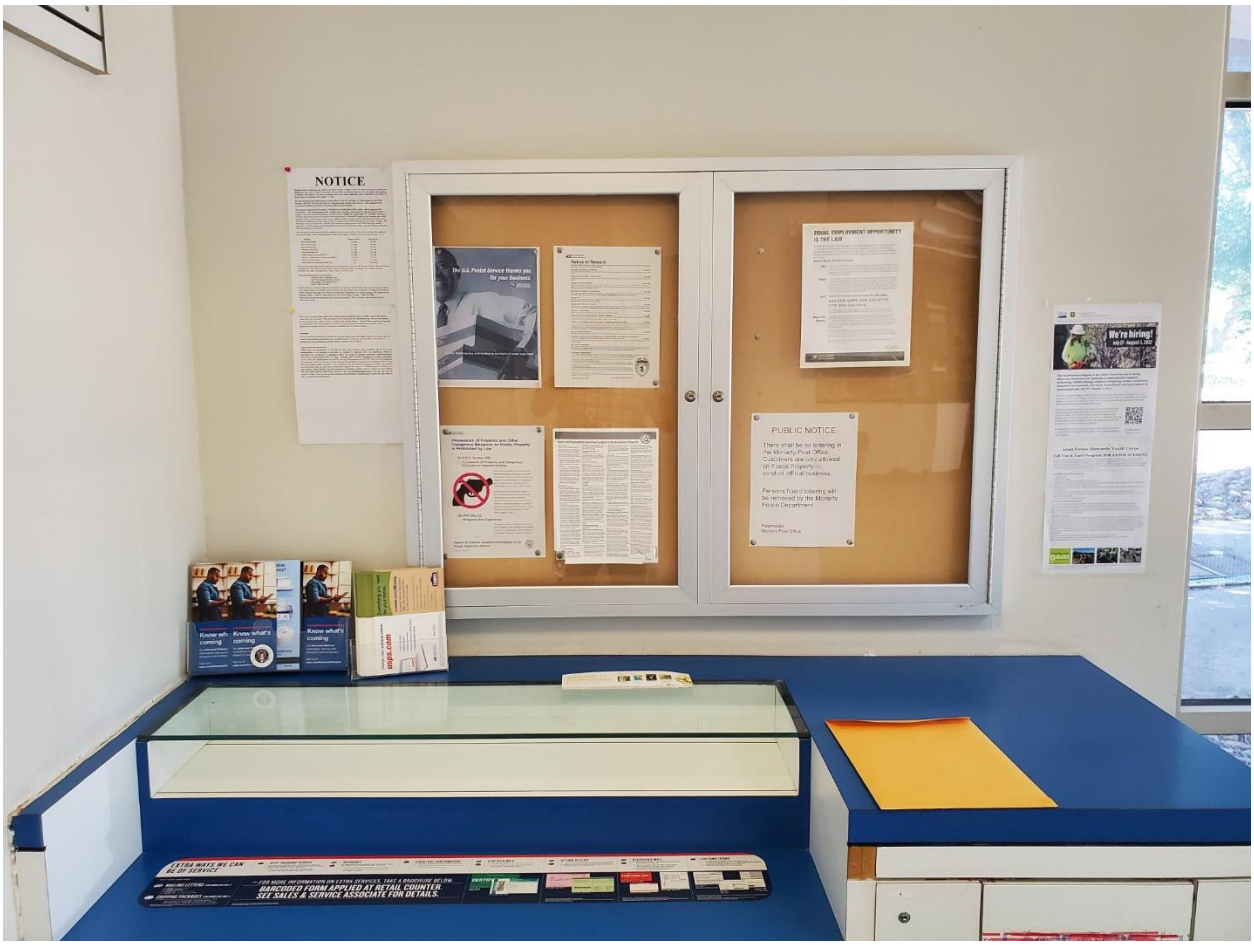
Davis Pit Photo #2



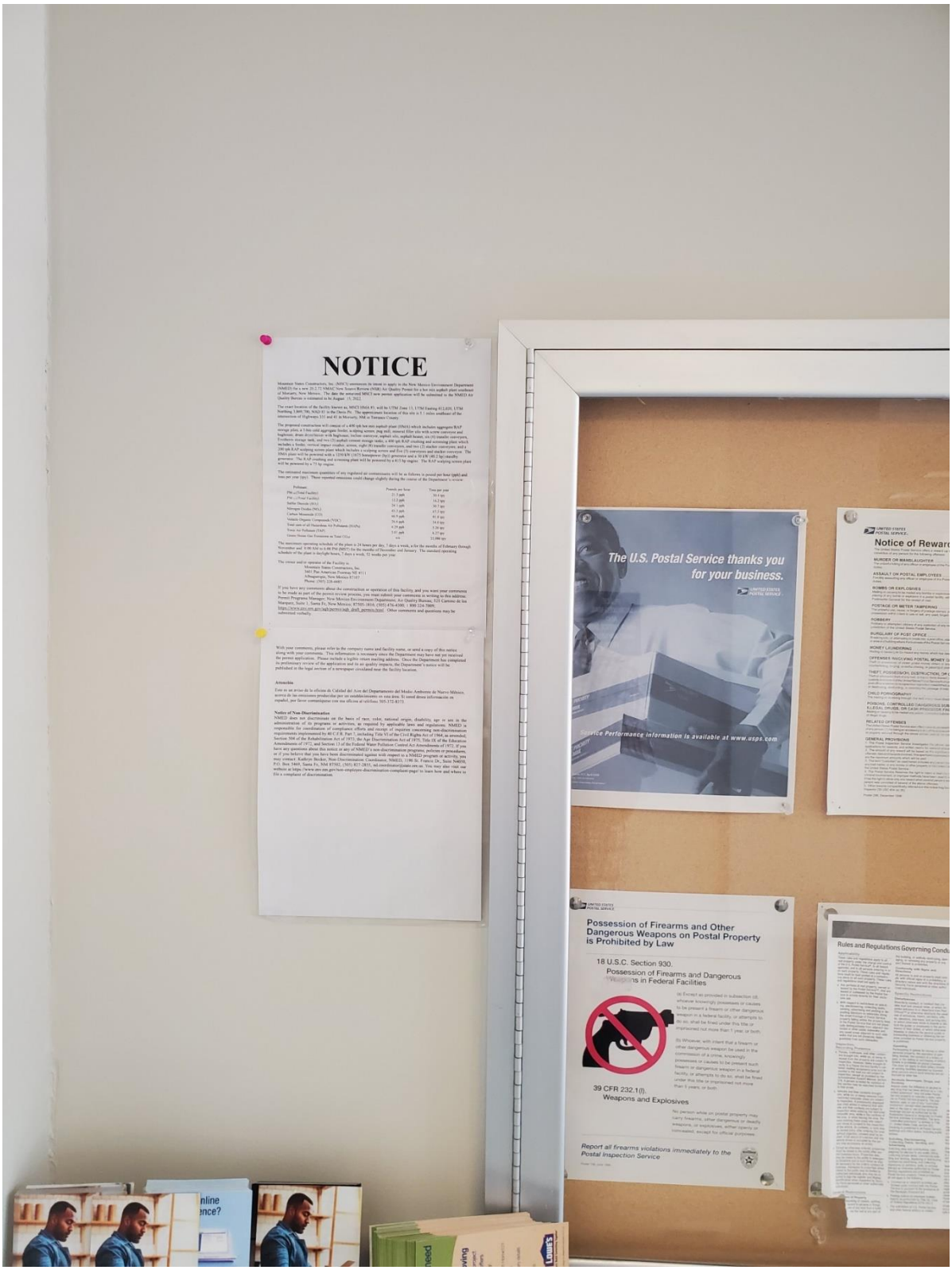
Town of Edgewood Town Hall Photo #1



Town of Edgewood Town Hall Photo #1



Moriarty Post Office Photo #1



Moriarty Post Office Photo #2



Town of Estancia Town Hall Photo #1



Town of Estancia Town Hall Photo #2

NOTICE OF AIR QUALITY PERMIT APPLICATION

Mountain States Constructors, Inc. (MSCI) announces its intent to apply to the New Mexico Environment Department (NMED) for a new 20.2.72 NMAC New Source Review (NSR) Air Quality Permit for a hot mix asphalt plant southeast of Moriarty, New Mexico. The date the notarized MSCI new permit application will be submitted to the NMED Air Quality Bureau is estimated to be August 15, 2022.

The exact location of the facility known as, MSCI HMA #3, will be UTM Zone 13, UTM Easting 412,020, UTM Northing 3,869,700, NAD 83 in the Davis Pit. The approximate location of this site is 5.1 miles southeast of the intersection of Highways 333 and 41 in Moriarty, NM in Torrance County.

The proposed construction will consist of a 400 tph hot mix asphalt plant (HMA) which includes aggregate/RAP storage piles, a 5-bin cold aggregate feeder, scalping screen, pug mill, mineral filler silo with screw conveyor and baghouse, drum dryer/mixer with baghouse, incline conveyor, asphalt silo, asphalt heater, six (6) transfer conveyors, Evotherm storage tank, and two (2) asphalt cement storage tanks; a 400 tph RAP crushing and screening plant which includes a feeder, vertical impact crusher, screen, eight (8) transfer conveyors, and two (2) stacker conveyors; and a 200 tph RAP scalping screen plant which includes a scalping screen and five (5) conveyors and stacker conveyor. The HMA plant will be powered with a 1250 kW (1675 horsepower (hp)) generator and a 30 kW (40.2 hp) standby generator. The RAP crushing and screening plant will be powered by a 415 hp engine. The RAP scalping screen plant will be powered by a 75 hp engine.
The estimated maximum quantities of any regulated air contaminants will be as follows in pound per hour (pph) and tons per year (tpy). These reported emissions could change slightly during the course of the Department's review:

Pollutant:	Pounds per hour	Tons per year
PM_{10} (Total Facility)	21.5 pph	30.4 tpy
$PM_{2.5}$ (Total Facility)	12.2 pph	16.2 tpy
Sulfur Dioxide (SO_2)	24.1 pph	30.7 tpy
Nitrogen Oxides (NO_x)	43.3 pph	67.3 tpy
Carbon Monoxide (CO)	66.9 pph	91.8 tpy
Volatile Organic Compounds (VOC)	26.6 pph	34.0 tpy
Total sum of all Hazardous Air Pollutants (HAPs)	4.29 pph	5.26 tpy
Toxic Air Pollutant (TAP)	5.01 pph	6.27 tpy
Green House Gas Emissions as Total CO_2e	n/a	22,086 tpy

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The owner and/or operator of the Facility is:

Mountain States Constructors, Inc.
3601 Pan American Freeway NE #111
Albuquerque, New Mexico 87107
Phone: (505) 228-4485

If you have any comments about the construction or operation of this facility, and you want your comments to be made as part of the permit review process, you must submit your comments in writing to this address: Permit Programs Manager; New Mexico Environment Department; Air Quality Bureau; 525 Camino de los Marquez, Suite 1; Santa Fe, New Mexico; 87505-1816; (505) 476-4300; 1 800 224-7009;

https://www.env.nm.gov/aqb/permit/aqb_draft_permits.html. Other comments and questions may be submitted verbally.

With your comments, please refer to the company name and facility name, or send a copy of this notice along with your comments. This information is necessary since the Department may have not yet received the permit application. Please include a legible return mailing address. Once the Department has completed its preliminary review of the application and its air quality impacts, the Department's notice will be published in the legal section of a newspaper circulated near the facility location.

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The Independent's CLASSIFIED ADS

Ads in our classifieds get results!

Line Ads: Up to 20 words is $6 + tax
For more than 20 words ad 25¢ a word

Display Ads: As low as $8 per week!
All display ads include free color. To place your ad contact 505-286-1212 or news.ind.ads@gmail.com today!

LEGAL NOTICE

NOTICE OF AIR QUALITY PERMIT APPLICATION

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Green House Gas Emissions as Total CO2e
n/a
22,086 tpy

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The owner and/or operator of the Facility is:
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3601 Pan American Freeway NE #111
Albuquerque, New Mexico 87107
Phone: (505) 228-4485

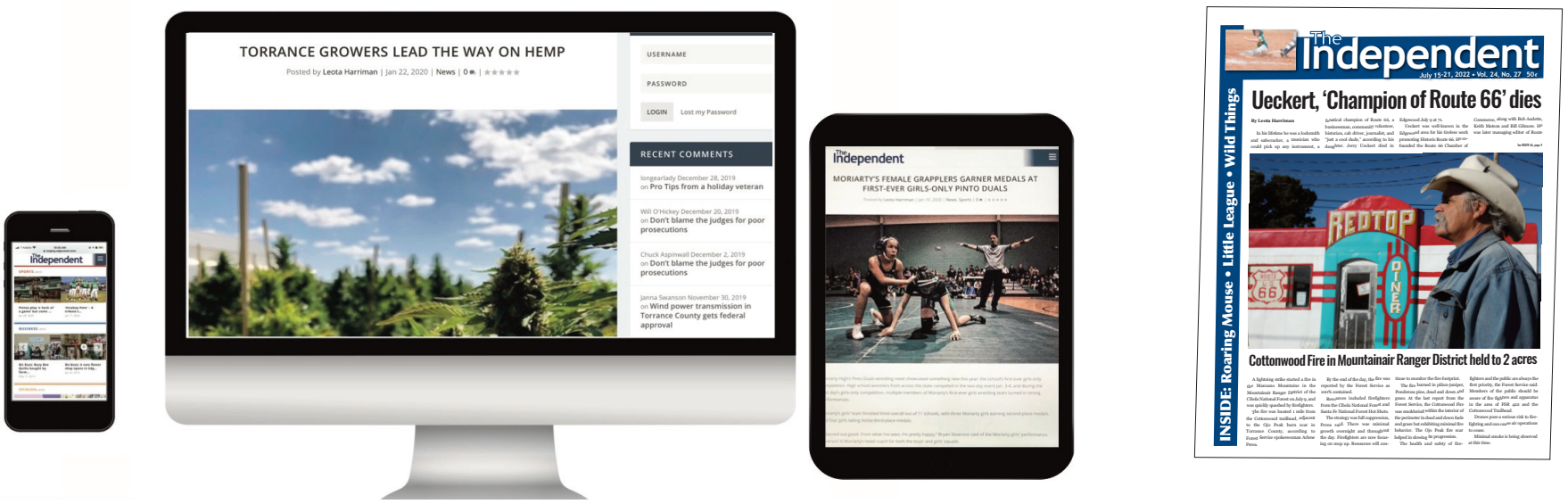
If you have any comments about the construction or operation of this facility, and you want your comments to be made as part of the permit review process, you must submit your comments in writing to this address: Permit Programs Manager; New Mexico Environment Department; Air Quality Bureau; 525 Camino de los Marquez, Suite 1; Santa Fe, New Mexico; 87505-1816; (505) 476-4300; 1 800 224-7009; https://www.env.nm.gov/aqb/permit/aqb_draft_permits.html.
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Notice of Non-Discrimination
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08/05/2022



Online at edgewood.news, in print Fridays

The Independent

AFFIDAVIT OF PUBLICATION

See Proof on Next Page

The Independent, Edgewood
P.O. Box 1056
(505) 286-1212

I, Tamara Bicknell-Lombardi, of lawful age, being duly sworn upon oath, deposes and says that I am the General Manager of The Independent, Edgewood, a publication that is a "legal newspaper" as that phrase is defined for the city of Edgewood, for the County of Santa Fe, in the state of New Mexico, that this affidavit is Page 1 of 3 with the full text of the sworn-to notice set forth on the pages that follow, and that the attachment hereto contains the correct copy of what was published in said legal newspaper in consecutive issues on the following dates:

PUBLICATION DATES:
5 Aug 2022

Notice ID: kVMTIT06kAzwv6bpztR4
Notice Name: Air Quality Permit Application

PUBLICATION FEE: $214.59

General Manager

VERIFICATION

STATE OF NEW MEXICO
COUNTY OF SANTA FE

Signed or attested before me on this

8 day of August, A.D. 2022

Celia Lesperance
Notary Public

My Commission Expires: ~~10/18/2022~~ 8.13.25

STATE OF NEW MEXICO
NOTARY PUBLIC
Celia Lesperance
Commission No. 1135195
August 13, 2025

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July 27, 2022

Yvonne Otero, County Clerk
Torrence County
PO Box 767
Estancia, NM 87016-0767

Dear Yvonne Otero:

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Sincerely,

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3601 Pan American Freeway NE #111
Albuquerque, New Mexico 87107

Government Entities within 10 Miles
August 2022

Torrence County	Yvonne Otero, County Clerk	PO Box 767	Estancia	NM	87016
Santa Fe County	Katharine Clark, County Clerk	100 Catron Street	Santa Fe	NM	87501
City of Moriarty	Sheila Larranaga-Murphy, City Clerk	PO Box 130	Moriarty	NM	87035

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Street: Torrence County
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City, S: Estancia, NM 87016-0767

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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Sent To: Katharine Clark, County Clerk
Street and Ap: Santa Fe County
100 Catron Street
City, State, Zi: Santa Fe, NM 87501

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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Sent To: Sheila Larranaga-Murphy, City Clerk
Street and: City of Moriarty
PO Box 130
City, State: Moriarty, NM 87035-0130

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

July 27, 2022

ANTHONY ALARID
14 CAMINO CERRO LINDO
SANTA FE, NM 87507-8625

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Nitrogen Oxides (NO_x)	43.3 pph	67.3 tpy
Carbon Monoxide (CO)	66.9 pph	91.8 tpy
Volatile Organic Compounds (VOC)	26.6 pph	34.0 tpy
Total sum of all Hazardous Air Pollutants (HAPs)	4.29 pph	5.26 tpy
Toxic Air Pollutant (TAP)	5.01 pph	6.27 tpy
Green House Gas Emissions as Total CO_2e	n/a	22,086 tpy

The maximum operating schedule of the plant is 24 hours per day, 7 days a week, a for the months of February through November and 8:00 AM to 6:00 PM (MST) for the months of December and January. The standard operating schedule of the plant is daylight hours, 7 days a week, 52 weeks per year.

The owner and/or operator of the Facility is:

Mountain States Constructors, Inc.
3601 Pan American Freeway NE #111
Albuquerque, New Mexico 87107
Phone: (505) 228-4485

If you have any comments about the construction or operation of this facility, and you want your comments to be made as part of the permit review process, you must submit your comments in writing to this address: Permit Programs Manager; New Mexico Environment Department; Air Quality Bureau; 525 Camino de los Marquez, Suite 1; Santa Fe, New Mexico; 87505-1816; (505) 476-4300; 1 800 224-7009; https://www.env.nm.gov/aqb/permit/aqb_draft_permits.html. Other comments and questions may be submitted verbally.

With your comments, please refer to the company name and facility name, or send a copy of this notice along with your comments. This information is necessary since the Department may have not yet received the permit application. Please include a legible return mailing address. Once the Department has completed its preliminary review of the application and its air quality impacts, the Department's notice will be published in the legal section of a newspaper circulated near the facility location.

Attención
Este es un aviso de la oficina de Calidad del Aire del Departamento del Medio Ambiente de Nuevo México, acerca de las emisiones producidas por un establecimiento en esta área. Si usted desea información en español, por favor comuníquese con esa oficina al teléfono 505-372-8373.

Notice of Non-Discrimination
NMED does not discriminate on the basis of race, color, national origin, disability, age or sex in the administration of its programs or activities, as required by applicable laws and regulations. NMED is responsible for coordination of compliance efforts and receipt of inquiries concerning non-discrimination requirements implemented by 40 C.F.R. Part 7, including Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972. If you have any questions about this notice or any of NMED's non-discrimination programs, policies or procedures, or if you believe that you have been discriminated against with respect to a NMED program or activity, you may contact: Kathryn Becker, Non-Discrimination Coordinator, NMED, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855, nd.coordinator@state.nm.us. You may also visit our website at https://www.env.nm.gov/non-employee-discrimination-complaint-page/ to learn how and where to file a complaint of discrimination.

Sincerely,

Mountain States Constructors, Inc.
3601 Pan American Freeway NE #111
Albuquerque, New Mexico 87107

AccountNo	NAME1	Address1	City	State	ZipCode
R011868	LILINGSTON YASIR	1695 W MAIN CIRCLE #2	DE PERE	WI	54115
R011851	MORIARTY LAND TRUST LLC CERA MARIO R	P O BOX 1471	MORIARTY	NM	87035
R011873	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R012073	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R011872	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R011867	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R011869	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R011874	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R018665	MCCLELLAN DONNA	1309 CALIFORNIA ST NE	ALBUQUERQUE	NM	871106825
R012163	CALLAHAN STEPHEN	19395 EMBER DR.	LONGPRAIRE	MN	56347
R012166	CALLAHAN STEPHEN	19395 EMBER DR.	LONGPRAIRE	MN	56347
R011876	ALARID ANTHONY	14 CAMINO CERRO LINDO	SANTA FE	NM	87507
R012158	ALARID ANTHONY	14 CAMINO CERRO LINDO	SANTA FE	NM	87507
R012146	KEPNER RAYMOND	3711 LILLO ST	LAS VEGAS	NV	89103
R012133	BLUNIER CLETUS B & MARTHA A TRUSTEES BLUNIER LIVING TRUST	1029 EVENING PRIMROSE LN	BERNALILLO	NM	87004
R012165	SEGURA EDWARD & LYDIA A	1947 W WILLOW AVE	AHAHEIM	CA	92804
R011866	CARRILLO CONSTRUCTION LLC	PO BOX 9844	SANTE FE	NM	87504
R011858	IWANCHUK FAMILY TRUST	1007 STAGECOACH RD	SANTA FE	NM	875011147
R012151	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R011863	IWANCHUK FAMILY TRUST	1007 STAGECOACH RD	SANTA FE	NM	875011147
R011865	IWANCHUK FAMILY TRUST	1007 STAGECOACH RD	SANTA FE	NM	875011147
R012164	ALARID ANTHONY	14 CAMINO CERRO LINDO	SANTA FE	NM	87507
R012160	BROCKLEHURST DWIGHT M	7703 CEDAR CANYON PL NE	ALBUQUERQUE	NM	871221631
R012172	WINTERS RICHARD J & GRIMM VICTORIA	PO BOX 134	PERALTA	NM	87042
R011860	IWANCHUK FAMILY TRUST	1007 STAGECOACH RD	SANTA FE	NM	875011147
R012058	MORIARTY LAND TRUST LLC SPANISH TRACE	PO BOX 3176	ALBUQUERQUE	NM	87190
R012060	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012079	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012057	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012088	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012068	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012084	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012061	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012157	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012059	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012076	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012085	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012053	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012072	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012078	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012083	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R011871	REYNALDO MORALES REV TRUST	2880 PLAZA VERDE	SANTA FE	NM	87507
R018213	ORTEGA FERMIN & JENNIE	PO BOX 483	MORIARTY	NM	870350483
R016331	HENSON STANLEY & MARY LOU	PO BOX 754	MORIARTY	NM	87035
R012170	BARDWELL-NELSON SCHULTE W R ETUX	7201 W LAKE MEAD BLVD STE 550	LAS VEGAS	NV	891288347
R012141	KEPNER RAYMOND	3711 LILLO ST	LAS VEGAS	NV	89103
R030014	DRIFTER PROPERTIES LLC	PO BOX 250	MORIARTY	NM	870350250
R028957	WALLIN KENNETH L & STEVEN D	P O BOX 250	MORIARTY	NM	87035
R012150	MONTOYA MICHAEL D	10226 STRONG AVE	WHITTIER	CA	90601
R011870	MONTOYA MICHAEL D	10226 STRONG AVE	WHTTIER	CA	90601
R012138	LUNA DIANA M	8912 5TH ST NW	ALBUQUERQUE	NM	87114
R012171	BARWELL-NELSON SCHULTE W R ETUX	7201 W LAKE MEAD BLVD STE 550	LAS VEGAS	NV	891288347
R012131	BLUNIER CLETUS B & MARTHA A TRUSTEES BLUNIER LIVING TRUST	1029 EVENING PRIMROSE LN	BERNALILLO	NM	87004
R029632	WALLIN KENNETH AND STEVEN D	P O BOX 250	MORIARTY	NM	87035
R012168	SEGURA EDWARD & LYDIA A	1947 W WILLOW AVE	AHAHEIM	CA	92804
R012155	ALARID ANTHONY	14 CAMINO CERRO LINDO	SANTA FE	NM	87507
R012128	BLUNIER CLETUS B & MARTHA A TRUSTEES BLUNIER LIVING TRUST	1029 EVENING PRIMROSE LN	BERNALILLO	NM	87004
R012169	SEGURA EDWARD & LYDIA A	1947 W WILLOW AVE	AHAHEIM	CA	92804
R012167	SEGURA EDWARD & LYDIA A	1947 W WILLOW AVE	AHAHEIM	CA	92804
R012154	MONTOYA MICHAEL D	10226 STRONG AVE	WHITTIER	CA	90601
R012148	MONTOYA MICHAEL D	10226 STRONG AVE	WHITTIER	CA	90601
R012124	FRATRICK MICHELLE	3512 SINGAPORE CIRCLE NE	ALBUQUERQUE	NM	87111
R012161	FUNTANILLA ANTHONY C	8447 SAN RAMON DRIVE	LAS VEGAS	NV	89147
R012159	FUNTANILLA ANTHONY C	8447 SAN RAMON DRIVE	LAS VEGAS	NV	89147
R012126	BLUNIER CLETUS B & MARTHA A TRUSTEES BLUNIER LIVING TRUST	1029 EVENING PRIMROSE LN	BERNALILLO	NM	87004
R021665	WINTERS RICHARD J & GRIMM VICTORIA	2475 COLE RD	BOSQUE FARMS	NM	87068
R012129	GONZALES BOBBY JR & GALLEGOS VICTO	PO BOX 3602	MORIARTY	NM	87035
R012062	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190

R012075	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012055	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012054	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012069	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012065	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R012173	BARDWELL-NELSON WINTERS RICHARD M ETAL	9020 LAZY BROOK NE	ALBUQUERQUE	NM	87113
R012063	MORIARTY LAND TRUST LLC	PO BOX 3176	ALBUQUERQUE	NM	87190
R026721	WALLIN CONSTRUCTION CO INC	PO BOX 250	MORIARTY	NM	87035
R028271	ORTEGA FERMIN FRANKLIN	PO BOX 827	MORIARTY	NM	870350827
R018672	WILLIAMS HOLDINGS LLC	PO BOX 805	EDGEWOOD	NM	870150805
R012140	LA FAMILIA UNIDA TRUST	614 CUTLER AVE NW	ALBUQUERQUE	NM	87102
R012136	LA FAMILIA UNIDA TRUST	614 CUTLER AVE NW	ALBUQUERQUE	NM	87102
R012134	MONTOYA JOSE A REV TRUST	6118 EDITH BLVD NE # 197	ALBUQUERQUE	NM	871075074
R012127	MONTOYA MARGARET C	7204 VILLA TULIPAN NE	ALBUQUERQUE	NM	87113
R012132	MONTOYA JOSE A REV TRUST	6118 EDITH BLVD NE # 197	ALBUQUERQUE	NM	871075074
R012130	MONTOYA MARY C	4008 DIABLO TRAIL PL NW	ALBUQUERQUE	NM	87114
	STATE OF NEW MEXICO	310 OLD SANTA FE TRAIL	SANTA FE	NM	87501-0000

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BERNALILLO, NM 87004-5784

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STANLEY & MARY LOU HENSON
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MORIARTY, NM 87035-0754

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IWANCHUK FAMILY TRUST
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SANTA FE, NM 87501-1147

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RAYMOND KEPNER
3711 LILLO ST
LAS VEGAS, NV 89103-2016

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City, State

LA FAMILIA UNIDA TRUST
614 CUTLER AVE NW
ALBUQUERQUE, NM 87102-1013

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DE PERE, WI 54115-6875

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6118 EDITH BLVD NE # 197
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ALBUQUERQUE, NM 87107-5074

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ALBUQUERQUE, NM 87113-1193

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ALBUQUERQUE, NM 87190-3176

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City, State, ZIP: P O BOX 1471 MORIARTY, NM 87035-1471

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City, State, : MORIARTY, NM 87035-0827

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Street and: 1947 W WILLOW AVE
City, State, AHAHEIM, CA 92804-2558

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City, State, Z: MORIARTY, NM 87035-0250

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Sent To: KENNETH AND STEVEN D WALLIN
Street and Apt. N: P O BOX 250
City, State, ZIP+: MORIARTY, NM 87035-0250

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Street and Apt. No.: PO BOX 805
City, State, ZIP+4: EDGEWOOD, NM 87015-0805

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Street and Apt. N: GRIMM
PO BOX 134
City, State, ZIP+: PERALTA, NM 87042-0134

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2475 COLE RD
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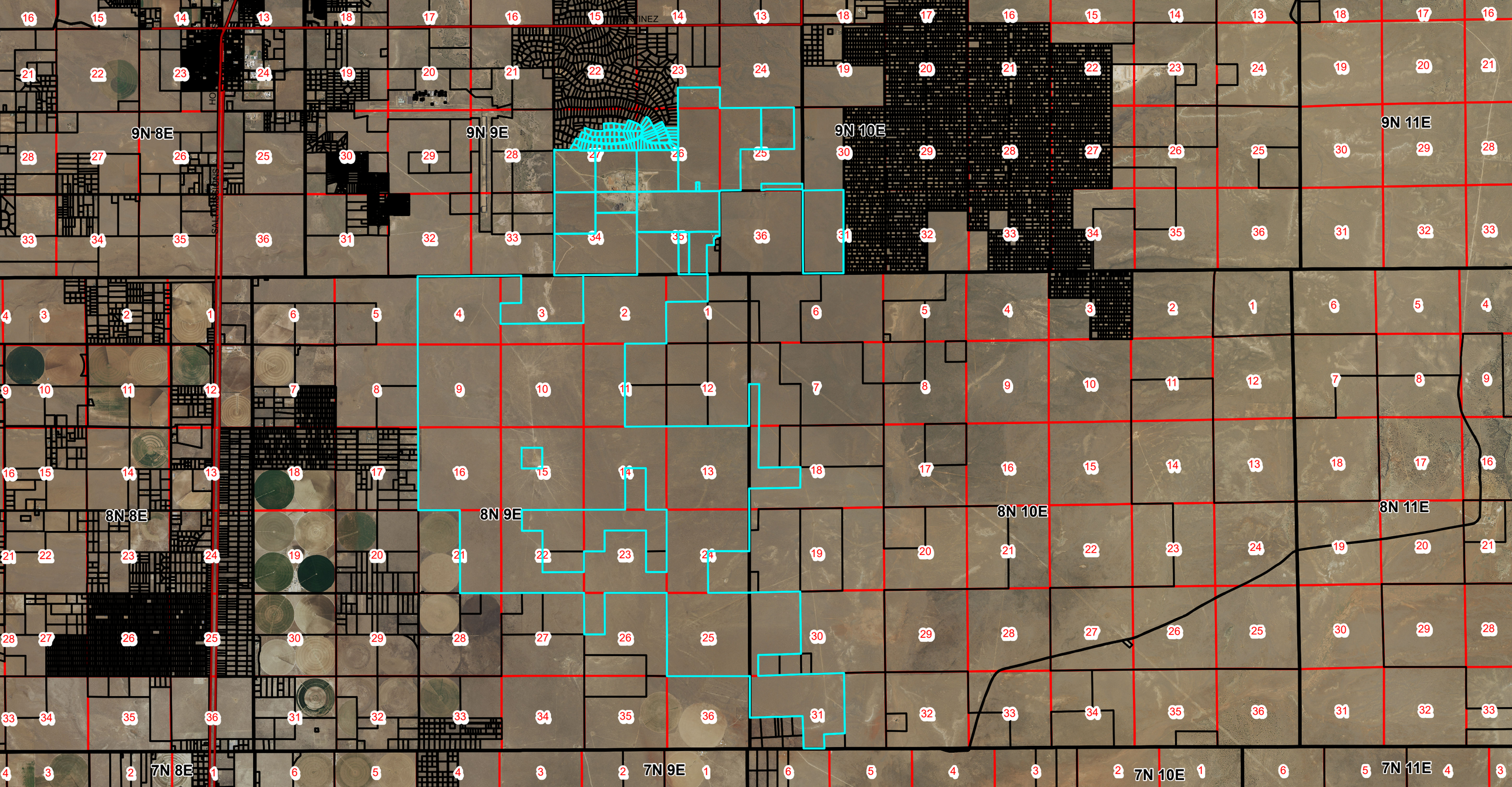
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SALTILLO
MARTINEZ

MONTROSE ENVIRONMENTAL

Paul Wade <pwade@montrose-env.com>

[EXTERNAL] .5 mile buffer

2 messages

Ruben Gastelum <RGastelum@tcnm.us> Wed, Jul 27, 2022 at 9:14 AM
To: "pwade@montrose-env.com" <pwade@montrose-env.com>

Mr. Wade,

The attachments show the lands connected to site that are within a .5 mile radius. All lands and owners are identified on the spreadsheet.

If you have any other questions or requests please let me know.

Ruben Gastelum

505-544-4344

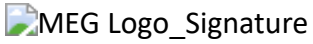
2 attachments

wade.xlsx
28K

Wade.pdf
4556K

Paul Wade <pwade@montrose-env.com> Wed, Jul 27, 2022 at 9:35 AM
To: Ruben Gastelum <RGastelum@tcnm.us>

Thank you Ruben
[Quoted text hidden]
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PUBLIC SERVICE ANNOUNCEMENT

Mountain States Constructors, Inc. (MSCI) announces its intent to apply to the New Mexico Environment Department (NMED) for a new 20.2.72 NMAC New Source Review (NSR) Air Quality Permit for a hot mix asphalt plant southeast of Moriarty, New Mexico. The date the notarized MSCI new permit application will be submitted to the NMED Air Quality Bureau is estimated to be August 15, 2022.

The exact location of the facility known as, MSCI Hot Mix Plant #3, will be UTM Zone 13, UTM Easting 412,020, UTM Northing 3,869,700, NAD 83 in the Davis Pit. The approximate location of this site is 5.1 miles southeast of the intersection of Highways 333 and 41 in Moriarty, NM in Torrance County.

The proposed construction will consist of a 400 tph hot mix asphalt plant (HMA) which includes aggregate/RAP storage piles, a 5-bin cold aggregate feeder, scalping screen, pug mill, mineral filler silo with screw conveyor and baghouse, drum dryer/mixer with baghouse, incline conveyor, asphalt silo, asphalt heater, six (6) transfer conveyors, Evotherm storage tank, and two (2) asphalt cement storage tanks; a 400 tph RAP crushing and screening plant which includes a feeder, vertical impact crusher, screen, eight (8) transfer conveyors, and two (2) stacker conveyors; and a 200 tph RAP scalping screen plant which includes a scalping screen and five (5) conveyors and stacker conveyor. The HMA plant will be powered with a 1250 kW (1675 horsepower (hp)) generator and a 30 kW (40.2 hp) standby generator. The RAP crushing and screening plant will be powered by a 415 hp engine. The RAP scalping screen plant will be powered by a 75 hp engine.

Public notices have been posted in the following locations for review by the public:

1. At Estancia Town Hall, 513 Williams Ave., Estancia, NM;
2. At Moriarty Post Office, 514 Route 66, Moriarty, NM;
3. At Edgewood Town Hall, 171-A State Rd 344, Edgewood, NM; and
4. At the main entrance to Mountain States Constructors, Inc.'s Davis Pit

The owner and/or operator of the Facility is:

Mountain States Constructors, Inc.
3601 Pan American Freeway NE #111
Albuquerque, New Mexico 87107

If you have any comments about the construction or operation of this facility, and you want your comments to be made as part of the permit review process, you must submit your comments in writing to this address:

Permit Programs Manager
New Mexico Environment Department
Air Quality Bureau
525 Camino de los Marquez, Suite 1
Santa Fe, New Mexico; 87505-1816
Telephone Number (505) 476-4300 or 1 800 224-7009

August 16, 2022

KRST Radio
500 4th St. NW
Albuquerque, NM 87102

CERTIFIED MAIL

Dear KRST Radio:

SUBJECT: PSA Request - Proposed Air Quality Construction Permit Application for Mountain States Constructors, Inc.

Attached is a copy of a public service announcement regarding a proposed air quality construction permit application for Mountain States Constructors, Inc. This announcement is being submitted by Montrose Air Quality Services, Albuquerque, NM on behalf of Mountain States Constructors, Inc.

The announcement request is being made to fulfill the requirements of the New Mexico Environmental Department air quality permitting regulations. Please consider reading the attached announcement as a public service message.

If you have any questions or need additional information, please contact me at (505) 830-9680 ext 6 (voice), (505) 830-9678 (fax) or email at pwade@montrose-env.com. You may also contact Mr. Neil Jackson, Mountain States Constructors, Inc at (505) 238-1537.

Thank you.

Sincerely,

Paul Wade

Paul Wade
Senior Project Manager

Montrose Air Quality Services, LLC
3500 Comanche Road NE Suite G
Albuquerque, NM 87107-4546

T: 505.830.9680 ext. 6
F: 505.830.9678
Pwade@montrose-env.com
www.montrose-env.com

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KRST Radio
500 4th. Street N.W.
Albuquerque, NM 87102

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Section 10

Written Description of the Routine Operations of the Facility

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A written description of the routine operations of the facility. Include a description of how each piece of equipment will be operated, how controls will be used, and the fate of both the products and waste generated. For modifications and/or revisions, explain how the changes will affect the existing process. In a separate paragraph describe the major process bottlenecks that limit production. The purpose of this description is to provide sufficient information about plant operations for the permit writer to determine appropriate emission sources.

The MSCI HMA #3 produces hot mix asphalt concrete. The operation is typical to a continuous drum mix HMA operation. Aggregate in loaded into the Cold Aggregate Feed Bins (Unit 1), where it is metered onto the Aggregate Feed Bin Collection Conveyor (Unit 2). From the Aggregate Feed Bin Collection Conveyor the aggregate is sent to the Scalping Screen (Unit 3) and Pug Mill (Unit 5). The Mineral Filler Silo and Augur (Unit 13) meters mineral filler into the Pug Mill. The Pug Mill mixes the aggregate and mineral filler together and empties onto the Pug Mill Conveyor (Unit 6). The Pug Mill Conveyor transfers the material onto the Slinger Conveyor (Unit 7) and sends the aggregate/mineral filler to the Drum Dryer (Unit 14). RAP is loaded into the RAP Feed Bin (Unit 8), where it is metered onto the RAP Feed Bin Conveyor (Unit 9) and then transferred to the RAP Screen (Unit 10). The RAP Transfer Conveyor (Unit 11) transports RAP to the RAP Scale Transfer Conveyor (Unit 12). The RAP Scale Conveyor transports RAP to the Drum Dryer/Mixer. There the material is dried and asphalt cement is added to make asphalt concrete. From the Drum Dryer/Mixer the asphalt concrete is sent by the Incline Conveyor (Unit 15) to the Asphalt Silo (Unit 16).

Control Units include a Drum Dryer/Mixer Dust Collector (C5) that captures particulates generated at the Drum Dryer/Mixer and Mineral Filler Silo Dust Collector (C4) that captures particulates generated during loading of the Mineral Filler Silo. Controlled particulates exhaust the Drum Dryer/Mixer Dust Collector Stack (Stack 2) and Mineral Filler Silo Dust Collector Stack (Stack 1).

Fugitive dust is controlled when material exits the Cold Aggregate or RAP Feed Bins to the Cold Aggregate or RAP Feed Bin Collection Conveyors with enclosures to reduce the chance that wind will blow any generated fugitive dust away and/or water sprays, as needed, at the exit of the feed bins.

Fugitive dust is controlled when material enters and exits the Scalping Screen (Unit 3), Pug Mill (Unit 4), and RAP Scalping Screen (Unit 10) with the addition of water, as needed, on the material at the Scalping Screen, Pug Mill, and RAP Scalping Screen.

Baghouse fines that are captured in the Drum Dryer/Mixer Dust Collector (Unit 14) are recycled back to the Drum Dryer using an enclosed loop with no visible emissions. During baghouse maintenance or relocation the remaining fines are removed from the baghouse and routed to a pit where a water truck controls any fugitive dust by adding additional moisture to the fines making it a slurry.

Baghouse fines that are captured in the Mineral Filler Silo Dust Collector (Unit 8) are recycled back to the Mineral Filler Silo.

There are no pollution controls for the Aggregate/RAP Storage Piles (Unit AGGPILE), Aggregate or RAP Feed Bins (Units 1, 8), Incline Belt (Unit 15), Asphalt Silo (Units 16), Main Plant Generator (Unit 17), Standby Plant Generator (Unit 18), Asphalt Heaters (Unit 19), or Hot Oil Asphalt Storage Tanks (2 total) (Unit 20).

All truck traffic travels to the HMA Plant on the Main Entrance road. The road is controlled with asphalt millings, surfactants, and watering to the HMA Plant. All truck traffic leaves the same way. Aggregate materials come from the aggregate plant onsite or on-site stockpiles.

Annual emissions are controlled by permit limits on annual production for processing equipment and hours of operation for generators and asphalt heaters.

Section 11
Source Determination

Source submitting under 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC

Sources applying for a construction permit, PSD permit, or operating permit shall evaluate surrounding and/or associated sources (including those sources directly connected to this source for business reasons) and complete this section. Responses to the following questions shall be consistent with the Air Quality Bureau's permitting guidance, Single Source Determination Guidance, which may be found on the Applications Page in the Permitting Section of the Air Quality Bureau website.

Typically, buildings, structures, installations, or facilities that have the same SIC code, that are under common ownership or control, and that are contiguous or adjacent constitute a single stationary source for 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC applicability purposes. Submission of your analysis of these factors in support of the responses below is optional, unless requested by NMED.

A. Identify the emission sources evaluated in this section (list and describe)**:** Hot Mix Asphalt Plant - produce asphalt concrete, RAP Crushing and Screening Plant – plant for processing recycling asphalt to size, RAP Scalping Screen Plant – recycled asphalt scalping screen, co-located GCP2 aggregate plant

B. Apply the 3 criteria for determining a single source:

SIC Code: Surrounding or associated sources belong to the same 2-digit industrial grouping (2-digit SIC code) as this facility, OR surrounding or associated sources that belong to different 2-digit SIC codes are support facilities for this source.

X Yes **☐ No**

Common Ownership or Control: Surrounding or associated sources are under common ownership or control as this source.

X Yes **☐ No**

Contiguous or Adjacent: Surrounding or associated sources are contiguous or adjacent with this source.

X Yes **☐ No**

C. Make a determination:

X The source, as described in this application, constitutes the entire source for 20.2.70, 20.2.72, 20.2.73, or 20.2.74 NMAC applicability purposes. If in "A" above you evaluated only the source that is the subject of this application, all "**YES**" boxes should be checked. If in "A" above you evaluated other sources as well, you must check **AT LEAST ONE** of the boxes "**NO**" to conclude that the source, as described in the application, is the entire source for 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC applicability purposes.

☐ The source, as described in this application, **does not** constitute the entire source for 20.2.70, 20.2.72, 20.2.73, or 20.2.74 NMAC applicability purposes (A permit may be issued for a portion of a source). The entire source consists of the following facilities or emissions sources (list and describe):

Section 12

Section 12.A
PSD Applicability Determination for All Sources

(Submitting under 20.2.72, 20.2.74 NMAC)

A PSD applicability determination for all sources. For sources applying for a significant permit revision, apply the applicable requirements of 20.2.74.AG and 20.2.74.200 NMAC and to determine whether this facility is a major or minor PSD source, and whether this modification is a major or a minor PSD modification. It may be helpful to refer to the procedures for Determining the Net Emissions Change at a Source as specified by Table A-5 (Page A.45) of the EPA New Source Review Workshop Manual to determine if the revision is subject to PSD review.

A. This facility is:

- **X** **a minor PSD source before and after this modification (if so, delete C and D below).**
- ☐ **a major PSD source before this modification. This modification will make this a PSD minor source.**
- ☐ **an existing PSD Major Source that has never had a major modification requiring a BACT analysis.**
- ☐ **an existing PSD Major Source that has had a major modification requiring a BACT analysis**
- ☐ **a new PSD Major Source after this modification.**

B. **This facility is not one of the listed 20.2.74.501 Table I – PSD Source Categories:**

a. **NOx: 67.3 TPY**
b. **CO: 91.8 TPY**
c. **VOC: 34.0 TPY**
d. **SOx: 30.8 TPY**
e. **PM: 64.1 TPY**
f. **PM10: 30.4 TPY**
g. **PM2.5: 16.2 TPY**
h. **Fluorides: <0.01 TPY**
i. **Lead: 0.0078 TPY**
j. **Sulfur compounds (listed in Table 2): NA**
k. **GHG: 22086 TPY**

Section 13

Determination of State & Federal Air Quality Regulations

This section lists each state and federal air quality regulation that may apply to your facility and/or equipment that are stationary sources of regulated air pollutants.

Not all state and federal air quality regulations are included in this list. Go to the Code of Federal Regulations (CFR) or to the Air Quality Bureau's regulation page to see the full set of air quality regulations.

Required Information for Specific Equipment:
For regulations that apply to specific source types, in the 'Justification' column **provide any information needed to determine if the regulation does or does not apply**. **For example**, to determine if emissions standards at 40 CFR 60, Subpart IIII apply to your three identical stationary engines, we need to know the construction date as defined in that regulation; the manufacturer date; the date of reconstruction or modification, if any; if they are or are not fire pump engines; if they are or are not emergency engines as defined in that regulation; their site ratings; and the cylinder displacement.

Required Information for Regulations that Apply to the Entire Facility:
See instructions in the 'Justification' column for the information that is needed to determine if an 'Entire Facility' type of regulation applies (e.g. 20.2.70 or 20.2.73 NMAC).

Regulatory Citations for Regulations That Do Not, but Could Apply:
If there is a state or federal air quality regulation that does not apply, but you have a piece of equipment in a source category for which a regulation has been promulgated, you must **provide the low level regulatory citation showing why your piece of equipment is not subject to or exempt from the regulation. For example** if you have a stationary internal combustion engine that is not subject to 40 CFR 63, Subpart ZZZZ because it is an existing 2 stroke lean burn stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, your citation would be 40 CFR 63.6590(b)(3)(i). **We don't want a discussion of every non-applicable regulation, but if it is possible a regulation could apply, explain why it does not. For example,** if your facility is a power plant, you do not need to include a citation to show that 40 CFR 60, Subpart OOO does not apply to your non-existent rock crusher.

Regulatory Citations for Emission Standards:
For each unit that is subject to an emission standard in a source specific regulation, such as 40 CFR 60, Subpart OOO or 40 CFR 63, Subpart HH, include the low level regulatory citation of that emission standard. Emission standards can be numerical emission limits, work practice standards, or other requirements such as maintenance. **Here are examples:** a glycol dehydrator is subject to the general standards at 63.764C(1)(i) through (iii); an engine is subject to 63.6601, Tables 2a and 2b; a crusher is subject to 60.672(b), Table 3 and all transfer points are subject to 60.672(e)(1)

Federally Enforceable Conditions:
All federal regulations are federally enforceable. All Air Quality Bureau State regulations are federally enforceable except for the following: affirmative defense portions at 20.2.7.6.B, 20.2.7.110(B)(15), 20.2.7.11 through 20.2.7.113, 20.2.7.115, and 20.2.7.116; 20.2.37; 20.2.42; 20.2.43; 20.2.62; 20.2.63; 20.2.86; 20.2.89; and 20.2.90 NMAC. Federally enforceable means that EPA can enforce the regulation as well as the Air Quality Bureau and federally enforceable regulations can count toward determining a facility's potential to emit (PTE) for the Title V, PSD, and nonattainment permit regulations.

INCLUDE ANY OTHER INFORMATION NEEDED TO COMPLETE AN APPLICABILITY DETERMINATION OR THAT IS RELEVENT TO YOUR FACILITY'S NOTICE OF INTENT OR PERMIT.

EPA Applicability Determination Index for 40 CFR 60, 61, 63, etc: http://cfpub.epa.gov/adi/

Table for STATE REGULATIONS:

STATE REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
20.2.1 NMAC	General Provisions	Yes	Facility	General Provisions apply to Notice of Intent, Construction, and Title V permit applications.
20.2.3 NMAC	Ambient Air Quality Standards NMAAQS	Yes	Facility	20.2.3 NMAC is a SIP approved regulation that limits the maximum allowable concentration of Sulfur Compounds, Carbon Monoxide and Nitrogen Dioxide.
20.2.7 NMAC	Excess Emissions	Yes	Facility	This facility is subject to 20.2.7 NMAC.
20.2.11 NMAC	Asphalt Process Equipment	Yes	13 (C4), 14 (C5)	These sources are subject to 20.2.11.108 NMAC and 20.2.11.109 NMAC.
20.2.61.109 NMAC	Smoke & Visible Emissions	Yes	17, 18, 19, 36, 45	Engines and heaters are Stationary Combustion Equipment. Specify units subject to this regulation. The facility stationary combustion equipment are subject to a 20 percent opacity limit.
20.2.70 NMAC	Operating Permits	No	Facility	This facility is not a Title V Operating Permit source. The facility consists of aggregate processing plants and HMA plants. Aggregate processing falls under 2-digit SIC Code Group 14 and HMA plants falls under 2-digit SIC Code Group 29. While aggregate material from aggregate processing plants is used in the HMA plant, since they are operating under different SIC Codes they are separate facilities for major source determination.
20.2.71 NMAC	Operating Permit Fees	No	Facility	This facility is not a Title V Operating Permit source.
20.2.72 NMAC	Construction Permits	Yes	Facility	Potential emission rate (PER) for the facility is greater than 10 pph or greater than 25 tpy for any pollutant subject to a state or federal ambient air quality standard.
20.2.73 NMAC	NOI & Emissions Inventory Requirements	Yes	Facility	**NOI:** 20.2.73.200 NMAC applies (requiring a NOI application) **Emissions Inventory Reporting:** 20.2.73.300 NMAC applies.
20.2.74 NMAC	Permits – Prevention of Significant Deterioration (PSD)	No	Facility	This facility is not a PSD major source.
20.2.75 NMAC	Construction Permit Fees	Yes	Facility	This facility is subject to 20.2.72 NMAC and is in turn subject to 20.2.75 NMAC.
20.2.77 NMAC	New Source Performance	Yes	Units subject to 40 CFR 60	This is a stationary source, which is subject to the requirements of 40 CFR Part 60.
20.2.78 NMAC	Emission Standards for HAPS	No	Units Subject to 40 CFR 61	This facility doesn't emit hazardous air pollutants which are subject to the requirements of 40 CFR Part 61.
20.2.79 NMAC	Permits – Nonattainment Areas	No	Facility	This facility is located in an Attainment Area.
20.2.80 NMAC	Stack Heights	Yes	13 (C4), 14 (C5), 17, 18, 19, 36, 45	The objective of this Part is to establish requirements for the evaluation of stack heights and other dispersion techniques in permitting decisions. The Department shall give no credit for reductions in emissions due to the length of a source's stack height that exceeds good engineering practice or due to any other dispersion technique. The facility will meet all requirements of good engineering practices.
20.2.82 NMAC	MACT Standards for source categories of HAPS	Yes	17, 18, 36, 45	This regulation applies to all sources emitting hazardous air pollutants, which are subject to the requirements of 40 CFR Part 63.

Table for Applicable FEDERAL REGULATIONS:

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
40 CFR 50	NAAQS	Yes	Facility	This is a 20.2.72 NMAC permit application.
NSPS 40 CFR 60, Subpart A	General Provisions	Yes	Units subject to 40 CFR 60	Subparts OOO, IIII, and I in 40 CFR 60 applies.
NSPS 40 CFR60.40, Subpart I	Subpart I, Performance Standards for **Hot Mix Asphalt Facilities**	Yes	13 (C4), 14 (C5)	The affected facility, that commences construction or modification after June 11, 1973, to which the provisions of this subpart apply is each hot mix asphalt facility. For the purpose of this subpart, a hot mix asphalt facility is comprised only of any combination of the following: dryers; systems for screening, handling, storing, and weighing hot aggregate; systems for loading, transferring, and storing mineral filler, systems for mixing hot mix asphalt; and the loading, transfer, and storage systems associated with emission control systems.
NSPS 40 CFR 60, Subpart Kb	Standards of Performance for **Volatile Organic Liquid Storage Vessels** (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced **After** July 23, 1984	No		This facility does not have storage vessels with a capacity greater than or equal to 75 cubic meters (m^3) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984.
NSPS 40 CFR Part 60 Subpart OOO	Standards of Performance for **Nonmetallic Mineral Processing Plants**	Yes	22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33	NSPS standards for non-metallic minerals apply to applicable crushers, screens, and conveyors.
NSPS 40 CFR 60 Subpart IIII	Standards of performance for Stationary Compression Ignition Internal Combustion Engines	Yes	17, 18, 36, 45	The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE). Units 17, 18, 36, and 45 are applicable to 60.4202(a) and Subpart IIII Table 1 emission standards for its year and size category if they are located at the same location for a period of 12 months.
NSPS 40 CFR Part 60 Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	No		See 40 CFR 60.4230 and EPA Region 1's Reciprocating Internal Combustion Guidance website.
NESHAP 40 CFR 61 Subpart A	General Provisions	No	Units Subject to 40 CFR 61	Applies if any other Subpart in 40 CFR 61 applies.
MACT 40 CFR 63, Subpart A	General Provisions	Yes	Units Subject to 40 CFR 63	Applies if any other Subpart in 40 CFR 63 applies.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
MACT 40 CFR 63 Subpart ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (**RICE MACT**)	Yes	17, 18, 36, 45	Facilities are subject to this subpart if they own or operate a stationary RICE, except if the stationary RICE is being tested at a stationary RICE test cell/stand. Applicable if the units are located at the same location for a period of 12 months.

Section 14

Operational Plan to Mitigate Emissions

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

☐ **Title V Sources** (20.2.70 NMAC)**:** By checking this box and certifying this application the permittee certifies that it has developed an **Operational Plan to Mitigate Emissions During Startups, Shutdowns, and Emergencies** defining the measures to be taken to mitigate source emissions during startups, shutdowns, and emergencies as required by 20.2.70.300.D.5(f) and (g) NMAC. This plan shall be kept on site to be made available to the Department upon request. This plan should not be submitted with this application.

X NSR (20.2.72 NMAC)**, PSD** (20.2.74 NMAC) **& Nonattainment** (20.2.79 NMAC) **Sources:** By checking this box and certifying this application the permittee certifies that it has developed an **Operational Plan to Mitigate Source Emissions During Malfunction, Startup, or Shutdown** defining the measures to be taken to mitigate source emissions during malfunction, startup, or shutdown as required by 20.2.72.203.A.5 NMAC. This plan shall be kept on site to be made available to the Department upon request. This plan should not be submitted with this application.

X Title V (20.2.70 NMAC)**, NSR** (20.2.72 NMAC)**, PSD** (20.2.74 NMAC) **& Nonattainment** (20.2.79 NMAC) **Sources:** By checking this box and certifying this application the permittee certifies that it has established and implemented a Plan to Minimize Emissions During Routine or Predictable Startup, Shutdown, and Scheduled Maintenance through work practice standards and good air pollution control practices as required by 20.2.7.14.A and B NMAC. This plan shall be kept on site or at the nearest field office to be made available to the Department upon request. This plan should not be submitted with this application.

Operational Plan to Mitigate Emissions and **Plan of Work Practices**

Startup

Prior to the production of asphalt, the drum mixer dust collector will be operational and functioning correctly per 20.2.11.108.A, 20.2.11.109, and applicable permit conditions.

Prior to loading of mineral filler, the mineral filler silo dust collector will be operational and functioning correctly per 20.2.11.108.A, 20.2.11.109, and applicable permit conditions.

Prior to the production of asphalt, feeder bin exit enclosures or other control measures will be functioning correctly to control fugitive emissions to an opacity limit of 20 percent per EPA Reference Method 9.

Prior to the production of asphalt, water sprays, or other control measures, for the scalping screen and pug mill will be functioning correctly and used as needed, to control fugitive emissions to an opacity limit of 20 percent per EPA Reference Method 9.

Upon visual inspection, all unpaved haul roads will be controlled with surfactants or other equivalent control methods, to minimize fugitive dust as required under applicable permit conditions.

Shutdown

All required control equipment will operate until all asphalt production ceases.

Maintenance

The feeder bin exit enclosures, asphalt drum mixer, drum mixer dust collector, equipment water sprays, and mineral filler silo dust collector will be maintained to prevent excess emissions during startup or shutdown. This facility will not have excess emissions during any maintenance procedures.

Malfunction

Upon malfunction where excess particulate emissions are observed from the feeder bin exit enclosures, asphalt drum mixer, drum mixer dust collector, scalping screen and pug mill water sprays, mineral filler silo dust collector, and baghouse loadout enclosure and watering, all asphalt production will cease until repairs to control equipment are made.

Upon malfunction where excess particulate emissions are observed from the feeder bin exit enclosures, and equipment water sprays, all aggregate processing will cease until repairs to control equipment are made.

Section 15

Alternative Operating Scenarios

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

Alternative Operating Scenarios: Provide all information required by the department to define alternative operating scenarios. This includes process, material and product changes; facility emissions information; air pollution control equipment requirements; any applicable requirements; monitoring, recordkeeping, and reporting requirements; and compliance certification requirements. Please ensure applicable Tables in this application are clearly marked to show alternative operating scenario.

Construction Scenarios: When a permit is modified authorizing new construction to an existing facility, NMED includes a condition to clearly address which permit condition(s) (from the previous permit and the new permit) govern during the interval between the date of issuance of the modification permit and the completion of construction of the modification(s). There are many possible variables that need to be addressed such as: Is simultaneous operation of the old and new units permitted and, if so for example, for how long and under what restraints? In general, these types of requirements will be addressed in Section A100 of the permit, but additional requirements may be added elsewhere. Look in A100 of our NSR and/or TV permit template for sample language dealing with these requirements. Find these permit templates at: https://www.env.nm.gov/aqb/permit/aqb_pol.html. Compliance with standards must be maintained during construction, which should not usually be a problem unless simultaneous operation of old and new equipment is requested.

In this section, under the bolded title "Construction Scenarios", specify any information necessary to write these conditions, such as: conservative-realistic estimated time for completion of construction of the various units, whether simultaneous operation of old and new units is being requested (and, if so, modeled), whether the old units will be removed or decommissioned, any PSD ramifications, any temporary limits requested during phased construction, whether any increase in emissions is being requested as SSM emissions or will instead be handled as a separate Construction Scenario (with corresponding emission limits and conditions, etc.

No alternative operating scenarios are proposed for this facility.

Section 16

Air Dispersion Modeling

1) Minor Source Construction (20.2.72 NMAC) and Prevention of Significant Deterioration (PSD) (20.2.74 NMAC) ambient impact analysis (modeling): Provide an ambient impact analysis as required at 20.2.72.203.A(4) and/or 20.2.74.303 NMAC and as outlined in the Air Quality Bureau's Dispersion Modeling Guidelines found on the Planning Section's modeling website. If air dispersion modeling has been waived for one or more pollutants, attach the AQB Modeling Section modeling waiver approval documentation.
2) SSM Modeling: Applicants must conduct dispersion modeling for the total short term emissions during routine or predictable startup, shutdown, or maintenance (SSM) using realistic worst case scenarios following guidance from the Air Quality Bureau's dispersion modeling section. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on SSM emissions modeling requirements.
3) Title V (20.2.70 NMAC) ambient impact analysis: Title V applications must specify the construction permit and/or Title V Permit number(s) for which air quality dispersion modeling was last approved. Facilities that have only a Title V permit, such as landfills and air curtain incinerators, are subject to the same modeling required for preconstruction permits required by 20.2.72 and 20.2.74 NMAC.

What is the purpose of this application?	Enter an X for each purpose that applies
New PSD major source or PSD major modification (20.2.74 NMAC). See #1 above.	
New Minor Source or significant permit revision under 20.2.72 NMAC (20.2.72.219.D NMAC). See #1 above. **Note:** Neither modeling nor a modeling waiver is required for VOC emissions.	**X**
Reporting existing pollutants that were not previously reported.	
Reporting existing pollutants where the ambient impact is being addressed for the first time.	
Title V application (new, renewal, significant, or minor modification. 20.2.70 NMAC). See #3 above.	
Relocation (20.2.72.202.B.4 or 72.202.D.3.c NMAC)	
Minor Source Technical Permit Revision 20.2.72.219.B.1.d.vi NMAC for like-kind unit replacements.	
Other: i.e. SSM modeling. See #2 above.	
This application does not require modeling since this is a No Permit Required (NPR) application.	
This application does not require modeling since this is a Notice of Intent (NOI) application (20.2.73 NMAC).	
This application does not require modeling according to 20.2.70.7.E(11), 20.2.72.203.A(4), 20.2.74.303, 20.2.79.109.D NMAC and in accordance with the Air Quality Bureau's Modeling Guidelines.	

Check each box that applies:

☐ See attached, approved modeling **waiver for all** pollutants from the facility.

☐ See attached, approved modeling **waiver for some** pollutants from the facility.

X Attached in Universal Application Form 4 (UA4) is a **modeling report for all** pollutants from the facility.

☐ Attached in UA4 is a **modeling report for some** pollutants from the facility.

☐ No modeling is required.

Universal Application 4

Air Dispersion Modeling Report

Refer to and complete Section 16 of the Universal Application form (UA3) to assist your determination as to whether modeling is required. If, after filling out Section 16, you are still unsure if modeling is required, e-mail the completed Section 16 to the AQB Modeling Manager for assistance in making this determination. If modeling is required, a modeling protocol would be submitted and approved prior to an application submittal. The protocol should be emailed to the modeling manager. A protocol is recommended but optional for minor sources and is required for new PSD sources or PSD major modifications. Fill out and submit this portion of the Universal Application form (UA4), the "Air Dispersion Modeling Report", only if air dispersion modeling is required for this application submittal. This serves as your modeling report submittal and should contain all the information needed to describe the modeling. No other modeling report or modeling protocol should be submitted with this permit application.

16-A: Identification

1	Name of facility:	MSCI HMA #3
2	Name of company:	Mountain States Constructors, Inc.
3	Current Permit number:	New Permit
4	Name of applicant's modeler:	Paul Wade
5	Phone number of modeler:	(505) 830-9680 ext 6
6	E-mail of modeler:	pwade@montrose-env.com

16-B: Brief

1	Was a modeling protocol submitted and approved?	Yes☒	No☐
2	Why is the modeling being done?	New Facility	
3	Describe the permit changes relevant to the modeling.		
	New Permit		
4	What geodetic datum was used in the modeling?	NAD83	
5	How long will the facility be at this location?	Less than a year	
6	Is the facility a major source with respect to Prevention of Significant Deterioration (PSD)?	Yes☐	No☒
7	Identify the Air Quality Control Region (AQCR) in which the facility is located	154	

8	List the PSD baseline dates for this region (minor or major, as appropriate).		
	NO2	NA	
	SO2	NA	
	PM10	NA	
	PM2.5	NA	
9	Provide the name and distance to Class I areas within 50 km of the facility (300 km for PSD permits).		
	None		
10	Is the facility located in a non-attainment area? If so describe below	Yes☐	No☒
11	Describe any special modeling requirements, such as streamline permit requirements.		
	None		

16-C: Modeling History of Facility

Describe the modeling history of the facility, including the air permit numbers, the pollutants modeled, the National Ambient Air Quality Standards (NAAQS), New Mexico AAQS (NMAAQS), and PSD increments modeled. (Do not include modeling waivers).

1	Pollutant	Latest permit and modification number that modeled the pollutant facility-wide.	Date of Permit	Comments
	CO	N/A	N/A	New Permitted Facility
	NO_2	N/A	N/A	New Permitted Facility
	SO_2	N/A	N/A	New Permitted Facility
	H_2S	N/A	N/A	New Permitted Facility
	PM2.5	N/A	N/A	New Permitted Facility
	PM10	N/A	N/A	New Permitted Facility
	Lead	N/A	N/A	Not a significant facility pollutant
	Ozone (PSD only)	N/A	N/A	Not a PSD Source
	NM Toxic Air Pollutants (20.2.72.402 NMAC)	N/A	N/A	New Permitted Facility

16-D: Modeling performed for this application

For each pollutant, indicate the modeling performed and submitted with this application.
Choose the most complicated modeling applicable for that pollutant, i.e., culpability analysis assumes ROI and cumulative analysis were also performed.

1	Pollutant	ROI	Cumulative analysis	Culpability analysis	Waiver approved	Pollutant not emitted or not changed.
	CO	☒	☐	☐	☐	☐
	NO_2	☒	☒	☐	☐	☐
	SO_2	☒	☒	☐	☐	☐

	H_2S	☒	☐	☐	☐	☐
	PM2.5	☒	☒	☐	☐	☐
	PM10	☒	☒	☐	☐	☐
	Lead	☐	☐	☐	☐	☐
	Ozone	☐	☐	☐	☐	☐
	State air toxic(s) (20.2.72.402 NMAC)	☒	☐	☐	☐	☐

16-E: New Mexico toxic air pollutants modeling

1 List any New Mexico toxic air pollutants (NMTAPs) from Tables A and B in 20.2.72.502 NMAC that are modeled for this application.
Asphalt Fumes, Calcium Hydroxide

2 List any NMTAPs that are emitted but not modeled because stack height correction factor. Add additional rows to the table below, if required.

Pollutant	Emission Rate (pounds/hour)	Emission Rate Screening Level (pounds/hour)	Stack Height (meters)	Correction Factor	Emission Rate/ Correction Factor
Asphalt Fumes	5.01	0.333	7.0	5	1.00
Calcium Hydroxide	0.18	0.333	19.8	19	0.018

16-F: Modeling options

1	Was the latest version of AERMOD used with regulatory default options? If not explain below.	Yes☐	No☒
	Latest version of AERMOD was used. All volumes sources were modeled in flat terrain mode.		

16-G: Surrounding source modeling

1	Date of surrounding source retrieval	08/01/2022

2 If the surrounding source inventory provided by the Air Quality Bureau was believed to be inaccurate, describe how the sources modeled differ from the inventory provided. If changes to the surrounding source inventory were made, use the table below to describe them. Add rows as needed.

PM10 and PM2.5 GCP emission sources were set to 71.25 tpy and 17.875 tpy, respectively.
GCP2 and GCP3 hours of operation were limited to daylight hours only.

AQB Source ID	Description of Corrections

16-H: Building and structure downwash

1	How many buildings are present at the facility?	0

2	How many above ground storage tanks are present at the facility?	7		
3	Was building downwash modeled for all buildings and tanks? If not explain why below.		Yes☐	No☒
	All storage tanks less than 10 feet in height.			
4	Building comments			

16-I: Receptors and modeled property boundary

1	"Restricted Area" is an area to which public entry is effectively precluded. Effective barriers include continuous fencing, continuous walls, or other continuous barriers approved by the Department, such as rugged physical terrain with a steep grade that would require special equipment to traverse. If a large property is completely enclosed by fencing, a restricted area within the property may be identified with signage only. Public roads cannot be part of a Restricted Area. A Restricted Area is required in order to exclude receptors from the facility property. If the facility does not have a Restricted Area, then receptors shall be placed within the property boundaries of the facility. Describe the fence or other physical barrier at the facility that defines the restricted area.						
	Facility is fenced with gates and "No Trespassing" signs.						
2	Receptors must be placed along publicly accessible roads in the restricted area. Are there public roads passing through the restricted area?					Yes☐	No☒
3	Are restricted area boundary coordinates included in the modeling files?					Yes☒	No☐
4	Describe the receptor grids and their spacing. The table below may be used, adding rows as needed.						
	Grid Type	Shape	Spacing	Start distance from restricted area or center of facility	End distance from restricted area or center of facility	Comments	
	Very Fine	Cartesian	50 meters	Border	500 Meters		
	Very Fine	Cartesian	100 meters	500 Meters	1 Kilometers		
	Fine	Cartesian	250 meters	1 Kilometers	3 Kilometers		
	Course	Cartesian	500 meters	3 Kilometers	10 Kilometers		
	Course	Cartesian	1000 meters	10 Kilometers	20 Kilometers		
	Very Course	Cartesian	2500 meters	20 Kilometers	50 Kilometers		
5	Describe receptor spacing along the fence line.						
	25 Meters						
6	Describe the PSD Class I area receptors.						
	NA						

16-J: Sensitive areas

1	Are there schools or hospitals or other sensitive areas near the facility? If so describe below. This information is optional (and purposely undefined) but may help determine issues related to public notice.	Yes☐	No☒
3	The modeling review process may need to be accelerated if there is a public hearing. Are there likely to be public comments opposing the permit application?	Yes☐	No☒

16-K: Modeling Scenarios

1	Identify, define, and describe all modeling scenarios. Examples of modeling scenarios include using different production rates, times of day, times of year, simultaneous or alternate operation of old and new equipment during transition periods, etc. Alternative operating scenarios should correspond to all parts of the Universal Application and should be fully described in Section 15 of the Universal Application (UA3).		
	For HMA Plant, they will limit model hours to the equivalent of 12 hours per day if operating at maximum to account for the requested permit daily production rate. For particulate modeling, 12 scenarios were run beginning with February - November months operating 12 hours starting at 12:00 AM to 12 PM. Scenario 2 modeling hours for February - November months two hours from 2 AM to 2 PM. This trend continues for all 12 scenarios. For December and January months, the operating hours will be 8 AM to 6 PM at maximum operating scenario. NO2 modeling was run for all hours of operation.		
2	Which scenario produces the highest concentrations? Why?		
	PM10 24 hour – Scenario 10, operating nighttime hours with low winds and low boundary layer PM2.5 24 hour – Scenario 11, operating nighttime hours with low winds and low boundary layer PM2.5 annual – Scenario 11, operating nighttime hours with low winds and low boundary layer		
3	Were emission factor sets used to limit emission rates or hours of operation? (This question pertains to the "SEASON", "MONTH", "HROFDY" and related factor sets, not to the factors used for calculating the maximum emission rate.)	Yes☒	No☐
4	If so, describe factors for each group of sources. List the sources in each group before the factor table for that group. (Modify or duplicate table as necessary. It's ok to put the table below section 16-K if it makes formatting easier.) Sources:		
5	If hourly, variable emission rates were used that were not described above, describe them below.		
	For the MSCI HMA #3 plant, the following hours lists the maximum hours of operation.		

HMA Production Hours of Operation (MST)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
1:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
2:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
3:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
4:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
5:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
6:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
7:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
8:00 AM	1	1	1	1	1	1	1	1	1	1	1	1

9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
6:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
7:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
8:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
9:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
10:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
11:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
Total	10	24	24	24	24	24	24	24	24	24	24	10

Since the HMA plant daily hours of operation running at maximum hourly production rate is less than the total hours of operation, twelve (12) PM modeling scenarios will be performed for each averaging period. For each scenario the hours of operation are shifted by two hours.

HMA Model Scenario Time Segments

Model Scenario	Time Segments 10-Hour Blocks January, December	Time Segments 12-Hour Blocks February through November
1	8 AM to 6 PM	12 AM to 12 PM
2	8 AM to 6 PM	2 AM to 2 PM
3	8 AM to 6 PM	4 AM to 4 PM
4	8 AM to 6 PM	6 AM to 6 PM
5	8 AM to 6 PM	8 AM to 8 PM
6	8 AM to 6 PM	10 AM to 10 PM
7	8 AM to 6 PM	12 PM to 12 AM
8	8 AM to 6 PM	2 PM to 2 AM
9	8 AM to 6 PM	4 PM to 4 AM
10	8 AM to 6 PM	6 PM to 6 AM
11	8 AM to 6 PM	8 PM to 8 AM
12	8 AM to 6 PM	10 PM to 10 AM

For the RAP plants, the following hours lists the maximum hours of operation (daylight hours).

RAP Plants Production Hours of Operation (MST)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0

1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	1	1	1	1	1	0.5	0	0	0
6:00 AM	0	0.5	1	1	1	1	1	1	1	1	0.5	0
7:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
8:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 PM	0.5	1	1	1	1	1	1	1	1	1	0	0
6:00 PM	0	0	0	1	1	1	1	1	0.5	0	0	0
7:00 PM	0	0	0	0	0	0.5	0.5	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	**10.5**	**11.5**	**12**	**14**	**14**	**14.5**	**14.5**	**14**	**13**	**12**	**10.5**	**10**

6	Were different emission rates used for short-term and annual modeling? If so describe below.	Yes☒	No☐
	For setback modeling, the annual particulate matter modeling included hourly factors based on limitations on annual production.		

16-L: NO_2 Modeling

1	Which types of NO_2 modeling were used? Check all that apply.	
	☒	ARM2 - 1 Hour and Annual
	☐	100% NO_X to NO_2 conversion
	☐	PVMRM
	☐	OLM
	☐	Other:
2	Describe the NO_2 modeling.	
	NO2 modeling included neighboring sources and no background concentrations.	

3	Were default NO_2/NO_X ratios (0.5 minimum, 0.9 maximum or equilibrium) used? If not describe and justify the ratios used below.	Yes☒	No☐
4	Describe the design value used for each averaging period modeled.		
	1-hour: 98th percentile as calculated by AERMOD Annual: One Year Annual Average		

16-M: Particulate Matter Modeling

1 Select the pollutants for which plume depletion modeling was used.

☐	PM2.5
☒	PM10
☐	None

2 Describe the particle size distributions used. Include the source of information.

PM_{10} emissions may be modeled using plume deposition. Plume deposition simulates the effect of gravity as particles "fall-out" from the plume to the ground as the plume travels downwind. Therefore, the farther the plume travels from the emission point to the receptor, the greater the effect of plume deposition and the greater the decrease in modeled impacts or concentrations. Particle size distribution, particle mass fraction, and particle density are required inputs to the model to perform this function.

Particle size distribution for fugitive dust during material handling, fugitive road dust on unpaved roads; lime silo baghouse exhaust; HMA asphalt particulate emissions; and combustion will use the particle size distribution found in the NMED Modeling Section approved values.

The mass-mean particle diameters were calculated using the formula:

$$d = ((d^3_1 + d^2_1 d_2 + d_1 d^2_2 + d^3_2) / 4)^{1/3}$$

Where: d = mass-mean particle diameter
d_1 = low end of particle size category range
d_2 = high end of particle size category range

Representative average particle densities were obtained from NMED accepted values.

Material	Density (g/cm^3)	Reference
Road Dust	2.5	NMED Value
Lime	3.3	NMED Value
HMA Asphalt	1.5	NMED Value
Combustion	1.5	NMED Value
Fugitive Dust	2.5	NMED Value

The size distribution for PM_{10} emission sources are presented in Tables below.

Road Vehicle Fugitive Dust Deposition Parameters

Particle Size Category (μm)	Mass Mean Particle Diameter (μm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0 – 2.5	1.57	25.0	2.5
2.5 – 10	6.91	75.0	2.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007 (Vehicle Fugitive)

Lime Baghouse Source Deposition Parameters

Particle Size Category (μm)	Mass Mean Particle Diameter (μm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0-2.5	1.57	25	3.3
2.5-10	6.91	75	3.3

Parameters based on baghouse exhaust capture percentages. (Lime Silo)

Combustion Source Deposition Parameters

Particle Size Category (μm)	Mass Mean Particle Diameter (μm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0 - 2.5	1.57	100	1.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007 (Combustion)

Asphalt Baghouse and Stack Source Deposition Parameters

Particle Size Category (μm)	Mass Mean Particle Diameter (μm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0-1.0	0.63	50.0	1.5
1.0-2.5	1.85	19.0	1.5
2.5-10	6.92	31.0	1.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007 (Asphalt Baghouse Stack)

Fugitive Dust Source Deposition Parameters

Particle Size Category (μm)	Mass Mean Particle Diameter (μm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0 - 2.5	1.57	7.8	2.5

	2.5 – 5	3.88	27.0	2.5
	5 – 10	7.77	65.2	2.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007 (Coal Handling).

3	Does the facility emit at least 40 tons per year of NO_X or at least 40 tons per year of SO_2? Sources that emit at least 40 tons per year of NO_X or at least 40 tons per year of SO_2 are considered to emit significant amounts of precursors and must account for secondary formation of PM2.5.	Yes☒	No☐
4	Was secondary PM modeled for PM2.5?	Yes☒	No☐

5

If MERPs were used to account for secondary PM2.5 fill out the information below. If another method was used describe below.

NO_X (ton/yr)	SO_2 (ton/yr)	$[PM2.5]_{annual}$	$[PM2.5]_{24\text{-hour}}$
67.3	30.8	0.000022	0.0057

Following recent EPA guidelines for conversion of NO_X and SO_2 emission rates to secondary $PM_{2.5}$ emissions, AAM Santa Fe Facility emissions are compared to appropriate western MERPs values (NO_X 24 Hr – 42498 tpy; NO_X Annual – 130260 tpy; SO_2 24 Hr – 9753 tpy; SO_2 Annual – 53898 tpy). The following equation, found in NMED AQB modeling guidance document on MERPs, was used to determine if secondary emission would cause violation with $PM_{2.5}$ NAAQS.

$PM_{2.5}$ annual = ((NO_X emission rate (tpy)/130260 + (SO_2 emission rate (tpy)/53898)) x 0.2 µg/m^3
$PM_{2.5}$ 24 hour = ((NO_X emission rate (tpy)/42498 + (SO_2 emission rate (tpy)/9753)) x 1.2 µg/m^3

$PM_{2.5}$ Annual
0.000022 µg/m^3 = (67.3/130260 + 30.8/53898) x 0.2 µg/m^3
$PM_{2.5}$ 24 Hour
0.0057 µg/m^3 = (67.3/42498 + 30.8/9753) x 1.2 µg/m^3

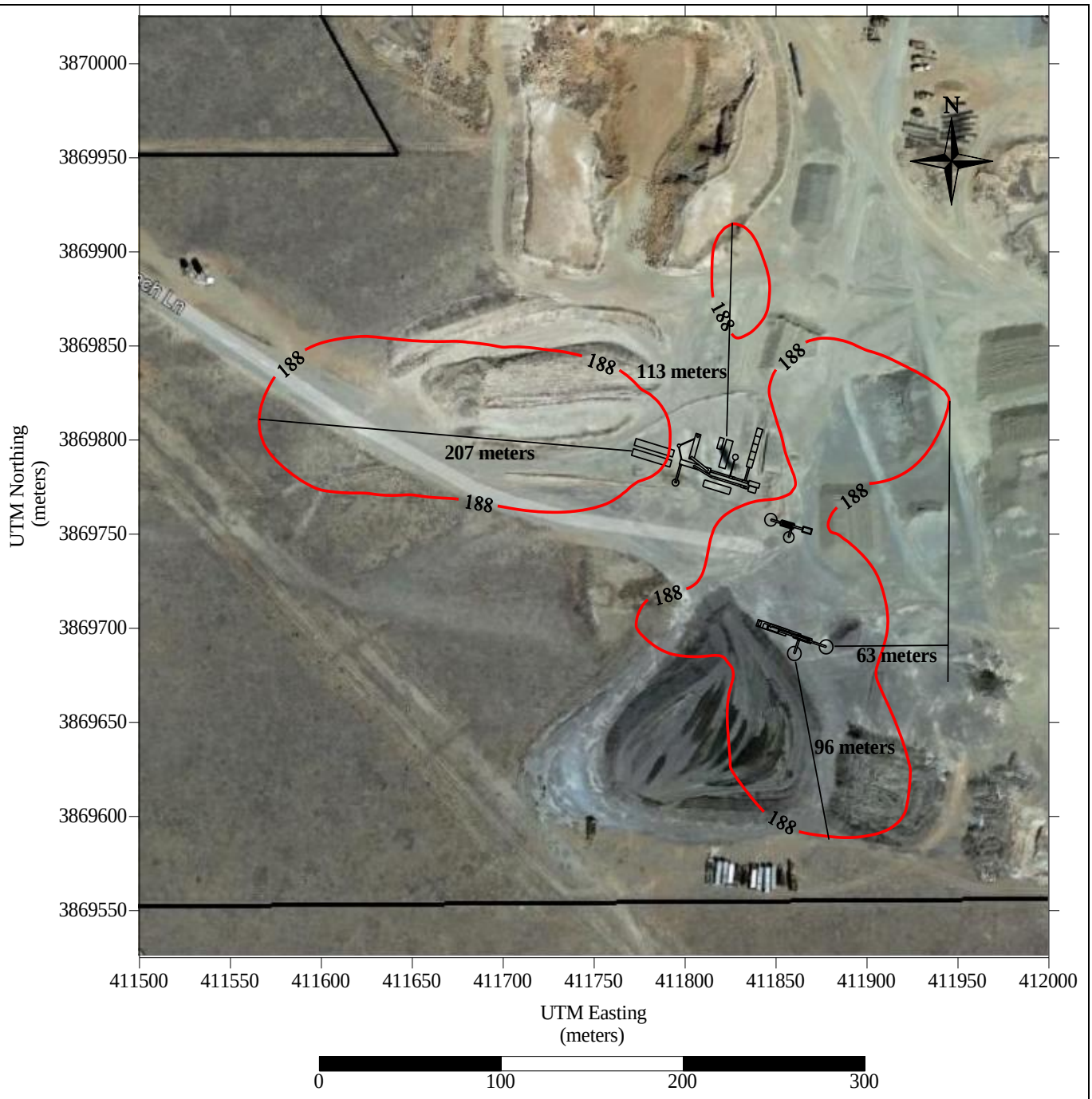
16-N: Setback Distances

Portable sources or sources that need flexibility in their site configuration requires that setback distances be determined between the emission sources and the restricted area boundary (e.g. fence line) for both the initial location and future locations. Describe the setback distances for the initial location.

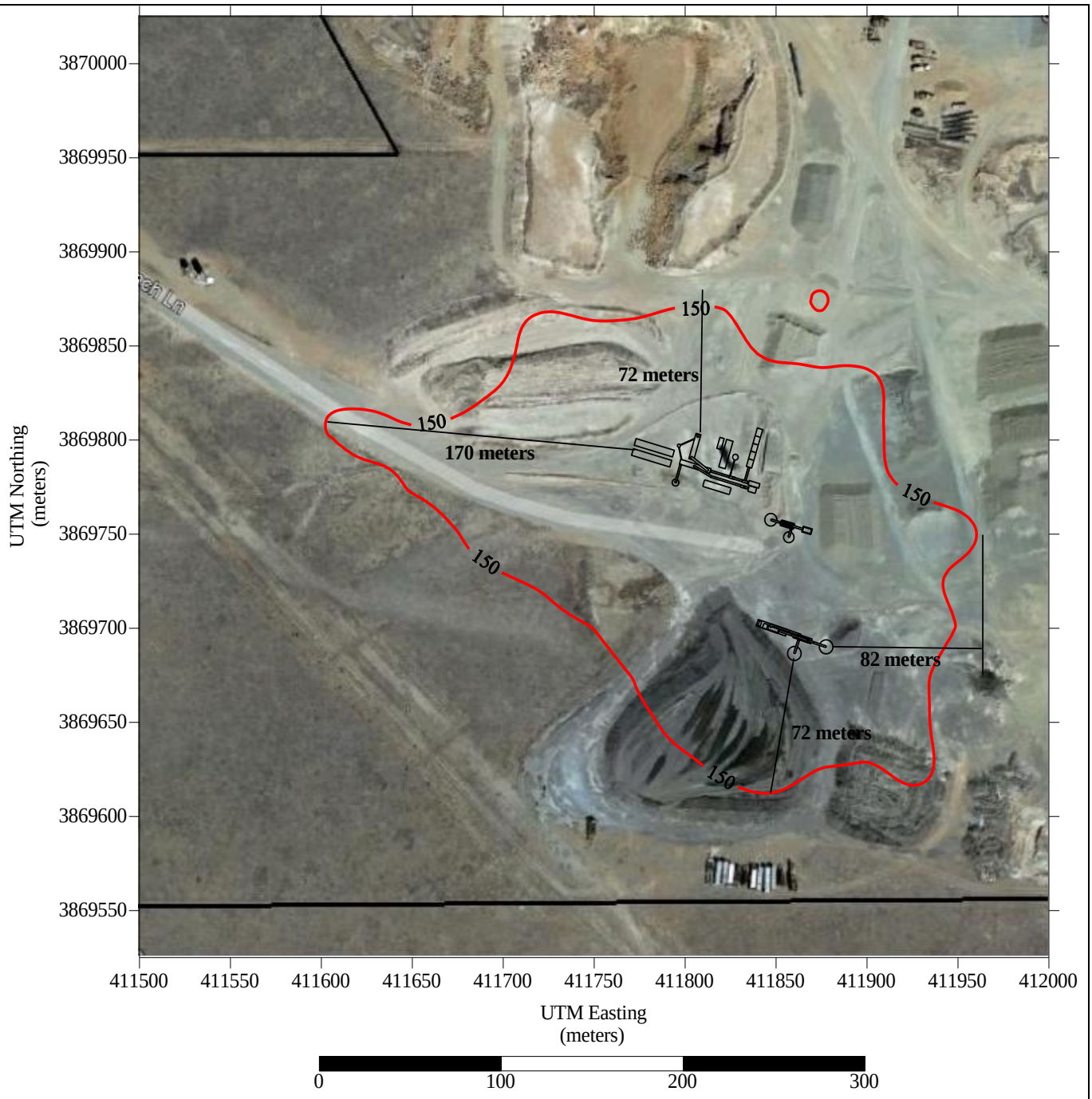
1

The PM10 and PM2.5 setback distances are based on site operating scenarios that produced the highest scenario modeled concentrations in the ROI modeling, Scenarios 1, 2, 8, 9, 10, 11, and 12. For initial site relocations, NO2 1-Hour and PM10 24-Hour produced the largest setback distances.

Direction at Site	Meters	Max Pollutant
West	207	NO2 1-Hour
South	96	NO2 1-Hour
East	82	PM10 24-Hour
North	113	NO2 1-Hour

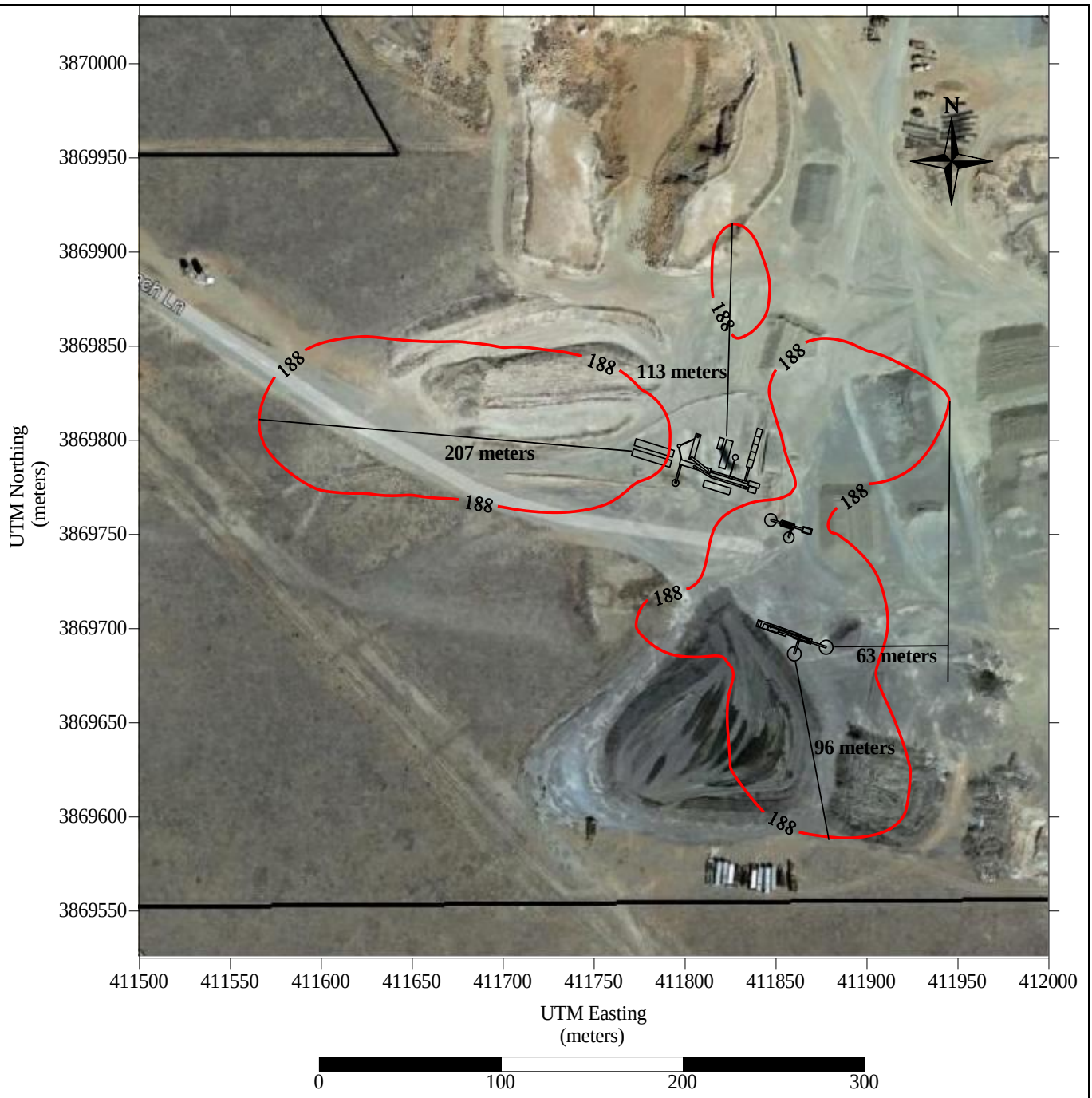


NO2 1 Hour Site Setback Modeling

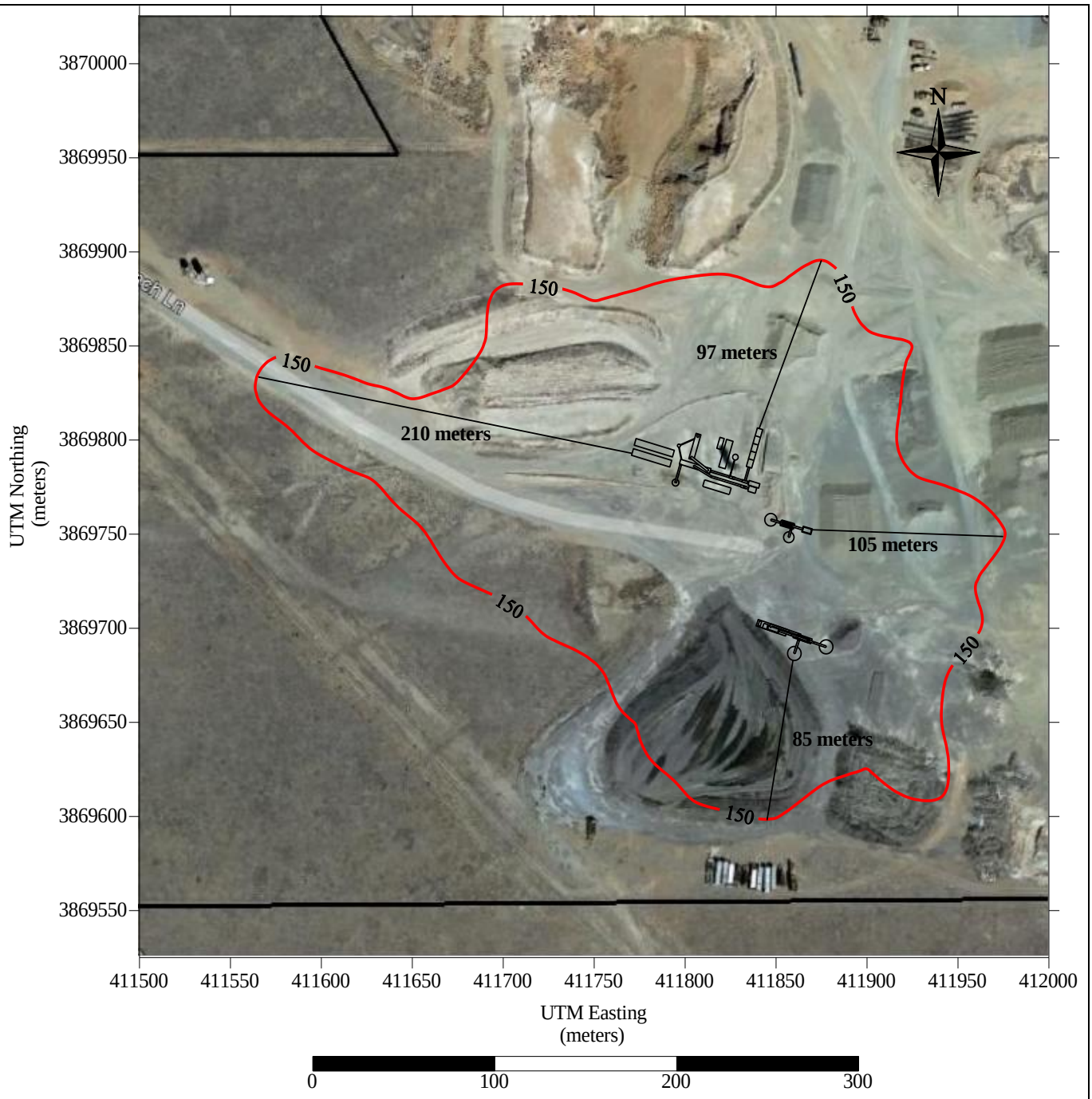


PM10 24 Hour Site Setback Modeling

2	Describe the requested, modeled, setback distances for future locations, if this permit is for a portable stationary source. Include a haul road in the relocation modeling.
	The PM10 and PM2.5 setback distances are based on site operating scenarios that produced the highest scenario modeled concentrations in the ROI modeling, Scenarios 1, 2, 8, 9, 10, 11, and 12. For new site relocations, NO2 1-Hour and PM10 24-Hour produced the largest setback distance. The largest relocation setback distance is 210 meters for PM10 24-Hour model. PM10 and PM2.5 backgrounds in the relocation setback modeling were based on Hobbs (Monitor 5ZS) background.



NO2 1 Hour Site Setback Modeling



PM10 24 Hour Site Setback Modeling

16-O: PSD Increment and Source IDs

1	The unit numbers in the Tables 2-A, 2-B, 2-C, 2-E, 2-F, and 2-I should match the ones in the modeling files. Do these match? If not, provide a cross-reference table between unit numbers if they do not match below.	Yes☐	No☒

Unit Number in UA-2	Unit Number in Modeling Files

Permit ID	Model ID	Source Description
AGGPILE	HMAPILE1-6	HMA Storage Pile Handling 1-6
1	HMABIN	HMA Bin Loading
2	HMATP1	HMA Bin Unloading
3	HMASCR	HMA Scalping Screen
4	HMATP2	HMA Scalping Screen Unloading
5	HMAPUG	HMA Pug Mill
6	HMATP3	HMA Pug Mill Unloading
7	HMATP4	HMA Conveyor Transfer to Drum Conveyor
8	RAPBIN	HMA RAP Bin Loading
9	RAPTP1	HMA RAP Bin Unloading
10	HMARAPSCR	HMA RAP Screen
11	RAPTP2	HMA RAP Screen Unloading
12	RAPTP3	HMA RAP Transfer Point
13	HMAFILL	HMA Mineral Filler Silo Loading
14	HMASTK	HMA Baghouse Stack
15	DRUMUNL	HMA Asphalt Silo Loading
16	HMASILO	HMA Asphalt Silo Unloading
17	HMAGEN	HMA Plant Generator
18	HMASGEN	HMA Plant Standby Generator
19	HMAHEAT	HMA Asphalt Cement Heater
20	ASPHTANK	Asphalt Cement Storage Tank
TRCK	HR_0001-0069	HMA Haul Road Volume 1-69
YARD	HR_0040-0069	HMA Haul Road Volume 40-69
RAPPILE	RAPPILE1	RAP Raw Material Source
21	RAPFEED	RAP Feeder/Hopper
22	RAPCRSH	RAP Vertical Impact Crusher
23	RAPCONV1	RAP Crusher Conveyor
24	RAPCONV2	RAP Recycle Conveyor #2
25	RAPCONV3	RAP Conveyor
26	RAPCONV4	RAP Screen Conveyor
27	RAPSCR	RAP 2-Deck Screen
28	RAPCONV5	RAP Screen Conveyor
29	RAPCONV6	RAP Screen Conveyor
30	RAPCONV7	RAP Screen Conveyor
31	RAPCONV8	RAP Recycle Conveyor #1
32	RAPCONV9	RAP Waste Conveyor
33	RAPCONV10	RAP Product Conveyor
34	RAPSTK1-2	RAP Stacker Conveyor Drop to Pile1-2
35	RAPPILE2	RAP Product Storage Pile
36	RAPENG	RAP Plant Engine
37	FNGFEED	Fold-N-Go Plant Feeder
38	FNGCONV1	Fold-N-Go Plant Feeder Conveyor
39	FNGSCR	Fold-N-Go Plant Screen
40	FNGCONV2	Fold-N-Go Plant Screen Conveyor
41	FNGSTK1	Fold-N-Go Plant Stacker Conveyor
42	FNGCONV3	Fold-N-Go Plant Screen Conveyor

43	FNGSTK2	Fold-N-Go Plant Stacker Conveyor	
44	FNGP1-2	Fold-N-Go Plant Stacker Conveyor Drop to Pile 1-2	
45	FNGENG	Fold-N-Go Plant Engine	

2	The emission rates in the Tables 2-E and 2-F should match the ones in the modeling files. Do these match? If not, explain why below.	Yes☐	No☒

Hourly model emission rates for material handling sources (Emissions calculated using AP-42 Section 13.2.4) are calculated using annual average windspeed for Moriarty.

Permit ID	Model ID	Source Description	Permit Emission Rate PM10 Lb/Hr	Permit Emission Rate PM2.5 Lb/Hr	Modeled Emission Rate PM10 Lb/Hr	Modeled Emission Rate PM2.5 Lb/Hr
AGGPILE	HMAPILE1 - 6	Cold Aggregate/RAP Storage Pile	1.15497	0.17489	0.94151	0.14257
1	HMABIN	Cold Aggregate Feed Bin Loading	0.65552	0.09926	0.53437	0.08092
RAPPILE	RAPPILE1	RAP Raw Material Source	0.37458	0.05672	0.30535	0.04624
21	RAPFEED	RAP Feeder/Hopper	0.37458	0.05672	0.30535	0.04624
34	RAPSTK1 - 2	RAP Stacker Conveyor Drop to Pile	0.37458	0.05672	0.30535	0.04624
35	RAPPILE2	RAP Product Storage Pile	0.37458	0.05672	0.30535	0.04624
37	FNGFEED	Fold-N-Go Plant Feeder	0.18729	0.02836	0.15268	0.02312
44	FNGP1 - 2	Fold-N-Go Plant Stacker Conveyor Drop to Pile	0.18729	0.02836	0.15268	0.02312

3	Have the minor NSR exempt sources or Title V Insignificant Activities" (Table 2-B) sources been modeled?	Yes☐	No☒

4 Which units consume increment for which pollutants?

Unit ID	NO_2	SO_2	PM10	PM2.5
NA				

5	PSD increment description for sources. (for unusual cases, i.e., baseline unit expanded emissions after baseline date).	NA

6	Are all the actual installation dates included in Table 2A of the application form, as required? This is necessary to verify the accuracy of PSD increment modeling. If not please explain how increment consumption status is determined for the missing installation dates below.	Yes☒	No☐

16-P: Flare Modeling

1 For each flare or flaring scenario, complete the following

Flare ID (and scenario)	Average Molecular Weight	Gross Heat Release (cal/s)	Effective Flare Diameter (m)
NA			

16-Q: Volume and Related Sources

1	Were the dimensions of volume sources different from standard dimensions in the Air Quality Bureau (AQB) Modeling Guidelines? If not please explain how increment consumption status is determined for the missing installation dates below.	Yes☒	No☐
2	Describe the determination of sigma-Y and sigma-Z for fugitive sources.		
	For storage piles the model inputs were based on the size of the pile (100 feet)/4.3 (sigma-Y) and a release height of 8 feet or a sigma-Z of 8ft*2/2.15. All others followed standard dimensions from Air Quality Bureau (AQB) Modeling Guidelines.		

3 Describe how the volume sources are related to unit numbers.
Or say they are the same.

Permit ID	Model ID	Source Description
AGGPILE	HMAPILE1-6	HMA Storage Pile Handling 1-6
1	HMABIN	HMA Bin Loading
2	HMATP1	HMA Bin Unloading
3	HMASCR	HMA Scalping Screen
4	HMATP2	HMA Scalping Screen Unloading
5	HMAPUG	HMA Pug Mill
6	HMATP3	HMA Pug Mill Unloading
7	HMATP4	HMA Conveyor Transfer to Drum Conveyor
8	RAPBIN	HMA RAP Bin Loading
9	RAPTP1	HMA RAP Bin Unloading
10	HMARAPSCR	HMA RAP Screen
11	RAPTP2	HMA RAP Screen Unloading
12	RAPTP3	HMA RAP Transfer Point
20	ASPHTANK	Asphalt Cement Storage Tank
TRCK	HR_0001-0069	HMA Haul Road Volume 1-69
YARD	HR_0040-0069	HMA Haul Road Volume 40-69
RAPPILE	RAPPILE1	RAP Raw Material Source
21	RAPFEED	RAP Feeder/Hopper
22	RAPCRSH	RAP Vertical Impact Crusher
23	RAPCONV1	RAP Crusher Conveyor
24	RAPCONV2	RAP Recycle Conveyor #2
25	RAPCONV3	RAP Conveyor
26	RAPCONV4	RAP Screen Conveyor
27	RAPSCR	RAP 2-Deck Screen
28	RAPCONV5	RAP Screen Conveyor
29	RAPCONV6	RAP Screen Conveyor
30	RAPCONV7	RAP Screen Conveyor
31	RAPCONV8	RAP Recycle Conveyor #1
32	RAPCONV9	RAP Waste Conveyor
33	RAPCONV10	RAP Product Conveyor
34	RAPSTK1-2	RAP Stacker Conveyor Drop to Pile1-2
35	RAPPILE2	RAP Product Storage Pile
37	FNGFEED	Fold-N-Go Plant Feeder
38	FNGCONV1	Fold-N-Go Plant Feeder Conveyor

	39	FNGSCR	Fold-N-Go Plant Screen
	40	FNGCONV2	Fold-N-Go Plant Screen Conveyor
	41	FNGSTK1	Fold-N-Go Plant Stacker Conveyor
	42	FNGCONV3	Fold-N-Go Plant Screen Conveyor
	43	FNGSTK2	Fold-N-Go Plant Stacker Conveyor
	44	FNGP1-2	Fold-N-Go Plant Stacker Conveyor Drop to Pile 1-2

4	Describe any open pits.
	NA
5	Describe emission units included in each open pit.
	NA

16-R: Background Concentrations

1	Were NMED provided background concentrations used? Identify the background station used below. If non-NMED provided background concentrations were used describe the data that was used.	Yes☒	No☐
	CO: Del Norte High School (350010023)		
	NO_2: N/A		
	PM2.5: Santa Fe (350490020)		
	PM10: Santa Fe (350490020)		
	SO_2: N/A		
	Other:		
	Comments: For NO2 1-Hour and Annual and SO2 1-Hour averaging periods modeling only neighboring sources were included.		
2	Were background concentrations refined to monthly or hourly values? If so describe below.	Yes☐	No☒

16-S: Meteorological Data

1	Was NMED provided meteorological data used? If so select the station used. City of Albuquerque model met set years 2014 to 2018.	Yes☐	No☒
2	If NMED provided meteorological data was not used describe the data set(s) used below. Discuss how missing data were handled, how stability class was determined, and how the data were processed.		

16-T: Terrain

1	Was complex terrain used in the modeling? If not, describe why below.	Yes☒	No☐
	Yes, for point sources only. For volume sources, model was run in source selected flat terrain mode. For setback modeling all sources are run in flat terrain mode.		
2	What was the source of the terrain data?		
	USGS National Elevation Data (NED)		

16-U: Modeling Files

Describe the modeling files: For PM10 and PM2.5 modeling, the ROI modeling included all discussed operating scenario. For the results of the ROI particulate matter modeling, the highest six model results were used in the CIA modeling.

File name (or folder and file name)	Pollutant(s)	Purpose (ROI/SIA, cumulative, culpability analysis, other)
MSCI HMA MoriartyCombustROI	NO2, CO, SO2	ROI/SIA
MSCI HMA MoriartyPMROIS1-12	PM10, PM2.5	ROI/SIA
MSCI HMA MoriartyNO2YrCIAARM	NO2 Annual	Cumulative
MSCI HMA MoriartyNO21hrCIAARM	NO2 1 hour	Cumulative, Culpability Analysis
MSCI HMA MoriartySO21hrCIA	SO2 1 hour	Cumulative
MSCI HMA MoriartyPM10CIAS1-12	PM10	Cumulative
MSCI HMA MoriartyPM25CIAS1-12	PM2.5	Cumulative
MSCI HMA MoriartyAF	Asphalt Fumes	TAPs Model
MSCI HMA MoriartyH2S	H2S	ROI/SIA
MSCI HMA MoriartyNO2AnnualSetback	NO2 Annual	Site and Relocation Setback
MSCI HMA MoriartyNO21hrSetback	NO2 1 hour	Site and Relocation Setback
MSCI HMA MoriartyPM10SetbackS1-12	PM10	Site and Relocation Setback
MSCI HMA MoriartyPM25YrSetbackS1-12	PM2.5 Annual	Site and Relocation Setback
MSCI HMA MoriartyPM2524HrSetbackS1-12	PM2.5 24 hour	Site and Relocation Setback

16-V: PSD New or Major Modification Applications

1	A new PSD major source or a major modification to an existing PSD major source requires additional analysis. Was preconstruction monitoring done (see 20.2.74.306 NMAC and PSD Preapplication Guidance on the AQB website)?	Yes☐	No☒
2	If not, did AQB approve an exemption from preconstruction monitoring?	Yes☐	No☒
3	Describe how preconstruction monitoring has been addressed or attach the approved preconstruction monitoring or monitoring exemption.		
	Not a PSD Source		
4	Describe the additional impacts analysis required at 20.2.74.304 NMAC.		
	Not a PSD Source		

5	If required, have ozone and **secondary PM2.5** ambient impacts analyses been completed? If so describe below.	Yes☒	No☐
	Secondary PM2.5 were calculated using Modeling Guideline MERPs		

16-W: Modeling Results

1	If ambient standards are exceeded because of surrounding sources, a culpability analysis is required for the source to show that the contribution from this source is less than the significance levels for the specific pollutant. Was culpability analysis performed? If so describe below.	Yes☒	No☐
	For NO2 1 hour NAAQS, a compressor station (Model ID: 1573E1) located east of the site shows exceedance. Review of the Max Count file the impacts from MSCI sources are insignificant during the hour		
2	Identify the maximum concentrations from the modeling analysis. Rows may be modified, added and removed from the table below as necessary. For PM10 24 hour, the maximum scenario was Scenario10. For PM2.5 24 hour, the maximum scenario was Scenario11. For PM2.5 Annual, the maximum scenario was Scenario10. All highest applicable concentrations were on the MSCI site boundary.		

Pollutant, Time Period and Standard	Modeled Facility Concentration (µg/m3)	Modeled Concentration with Surrounding Sources (µg/m3)	Secondary PM (µg/m3)	Background Concentration (µg/m3)	Cumulative Concentration (µg/m3)	Value of Standard (µg/m3)	Percent of Standard	Location		
								UTM E (m)	UTM N (m)	Elevation (ft)
Asphalt Fumes – 8 Hr	13.0	NA	NA	NA	NA	50	26.0	411646.0	3869954.0	1921.00
H2S – 1 hr	0.22	NA	NA	NA	NA	SIL – 1.0	22.0	411646.0	3869954.0	1921.00
NOx - Annual	5.8	9.7	NA	NA	9.7	94.0	10.3	411870.6	3869552.3	1926.42
NOx – 1 Hr	0.2	168.6	NA	NA	168.6	188.0	89.7	412167.1	3869550.6	1933.08
CO – 1 hr	358	NA	NA	NA	NA	SIL – 2000	17.9	411646.0	3869954.0	1921.00
CO – 8 Hr	165	NA	NA	NA	NA	SIL – 500	33.0	411870.6	3869552.3	1926.42
SO_2 – 1 Hr	73.7	73.8	NA	NA	73.8	196.4	37.6	411845.9	3869552.4	1925.78
$PM_{2.5}$ - Annual	3.0	3.12	0.000022	3.7	6.8	12.0	56.8	411646.0	3869954.0	1921.00
$PM_{2.5}$ – 24 Hr	11.5	11.6	0.0057	9.2	20.8	35	59.4	411646.0	3869954.0	1921.00
PM_{10} – 24 Hr	77.5	78.7	NA	22.7	101.4	150	67.6	411409.5	3869932.4	1914.23

16-X: Summary/conclusions

	A statement that modeling requirements have been satisfied and that the permit can be issued.
1	Dispersion modeling was performed for the new HMA permit application. All facility pollutants with ambient air quality standards were modeled to show compliance with those standards. All results of this modeling showed the facility in compliance with applicable ambient air quality standards.

DISPERSION MODEL PROTOCOL
MOUNTAIN STATES CONSTRUCTORS. INC.
NEW HMA PERMIT APPLICATION

Moriarty, New Mexico

PREPARED FOR

Mountain States Constructors, Inc.

Dated Revised July 26, 2022

Prepared by

Montrose Air Quality Services, LLC

MONTROSE
AIR QUALITY SERVICES

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1.0 INTRODUCTION

This dispersion modeling analysis will be conducted by Montrose Air Quality Service, LLC (Montrose) on behalf of Mountain States Constructors, Inc. (MSCI), to evaluate ambient air quality impacts for a 400 ton per hour (tph) hot mix asphalt (HMA) plant to be sited east-southeast of Moriarty, NM in the Davis Pit. MSCI is applying for a 20.2.72 NMAC new source review (NSR) permit. The permit will consist of an HMA plant, recycled asphalt products (RAP) processing plant, and Fold-N-Go RAP screening plant. The new plant will be identified as "MSCI HMA #3". The UTM coordinates of the proposed HMA plant will be; 411,800 meters E, 3,869,800 meters N, Zone 13, NAD 83.

The dispersion modeling will be conducted using the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee Dispersion Model (AERMOD), Version 21112. This model is recommended by EPA for determining Class II impacts within 50 km of the source being assessed. Additionally, AERMOD was developed to handle complex terrain. The objective of this evaluation is to determine whether ambient air concentrations from the maximum operation of the facility for nitrogen dioxide, (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter; both 10 microns or less (PM_{10}) and 2.5 microns or less ($PM_{2.5}$); are below Class II federal and state ambient air quality standards (NAAQS and NMAAQS) found in 40 CFR part 50 and the state of New Mexico's air quality regulation 20.2.3 NMAC from Davis Pit emission sources.

Figure 1 below shows the location of the site and proposed equipment layout.

HMA plant material handling equipment, stockpiles, and haul roads will be input into the model as volume sources. Exhaust stack sources; drum baghouse, generators/engines, mineral filler baghouse, and asphalt heater, will be input into the model as point sources. Model input parameters for feeders, screens, crushers, and transfer points will follow the NMED model guidelines Table 27. Model input parameters for haul roads will follow the NMED model guidelines Tables 28 and 29. Model input parameters for storage piles will be based on site conditions and AERMOD volume source methodologies.

The following limits will be requested for this permit application and will be included in the dispersion modeling analysis:

1. The new HMA and RAP plants will limit daily throughput to the following;

Month	HMA Tons Per Day	RAP Plant Tons Per Day	Fold-N-Go Screen Tons Per Day
January	4000	4000	2000
February	4800	4600	2300
March	4800	4800	2400
April	4800	4800	2400
May	4800	4800	2400
June	4800	4800	2400
July	4800	4800	2400
August	4800	4800	2400
September	4800	4800	2400
October	4800	4800	2400
November	4800	4200	2100
December	4000	4000	2000

2. With the daily limits of the HMA plant discussed above, the maximum annual production is 1,707,200 tons per year. The requested annual permit limit is 1,000,000 tons per year. The annual modeled hourly factor is then 1,000,000/1,707,200 = 0.586.

3. With the daily limits of the RAP plant discussed above, the maximum annual production is 1,683,400 tons per year. The requested annual permit limit is 350,000 tons per year. The annual modeled hourly factor is then 350,000/1,683,400 = 0.208.

4. With the daily limits of the Fold-N-Go screen discussed above, the maximum annual production is 841,700 tons per year. The requested annual permit limit is 350,000 tons per year. The annual modeled hourly factor is then 350,000/841,700 = 0.416.

5. Daily operating hours for the HMA plant will be daylight hours only for the months of December and January, and 24 hours per day for the months of February through November. Daily operating hours for the RAP plant will be daylight hours only. Daily operating hours for the Fold-N-Go screen will be daylight hours only.

1.1 FACILITY DESCRIPTION

MSCI HMA #3 400 tph hot mix asphalt plant will include; aggregate/RAP storage piles, a 5-bin cold aggregate feeder, scalping screen, pug mill, mineral filler silo with screw conveyor and baghouse, drum dryer/mixer with baghouse, incline conveyor, asphalt silo, asphalt heater, six (6) transfer conveyors, Evotherm storage tank, and two (2) asphalt cement storage tanks. The plant will be powered by a 1250 kW (1675 hp) generator. A 30 kW (40.2 hp) standby (night) generator will provide electricity during periods the main generator is off. Processed asphalt will be transported from the HMA plant to off-site sales. The HMA plant will limit processing rates to 400 tph, 4,800 tons per day, and 1,000,000 tpy. Presently it is operating under GCP-3-8180 permit at the Davis pit . The facility will also include two RAP processing plants.

1.1.1 RAP Crushing and Screening Plant

The 400 tph RAP crushing and screening plant will include a feeder, vertical impact crusher, screen, eight (8) transfer conveyors, and two (2) stacker conveyors. The plant will be powered by a 415 horsepower (hp) engine. Processed RAP will be transported to the HMA plant and/or off-site sales. The RAP crushing and screening plant will limit hourly processing rate to 400 tph, 4,800 tons per day, and 350,000 tpy. Aggregate processing hours will be limited to daylight hours only. .

1.1.2 RAP Scalping Screen Plant (Fold-N-Go)

The 200 tph RAP scalping screen plant will include a scalping screen and five (5) conveyors and stacker conveyor. The plant will be powered by a 75 horsepower (hp) engine. RAP material will be screened prior to input into the HMA plant. The RAP scalping screen plant will limit hourly processing rate to 200 tph, 2,400 tons per day, and 350,000 tpy. Aggregate processing hours will be limited to daylight hours only.

For the MSCI HMA #3 plant, the following hours lists the maximum hours of operation.

TABLE 1: HMA Production Hours of Operation (MST)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
1:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
2:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
3:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
4:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
5:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
6:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
7:00 AM	0	1	1	1	1	1	1	1	1	1	1	0
8:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
6:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
7:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
8:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
9:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
10:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
11:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
Total	10	24	24	24	24	24	24	24	24	24	24	10

Since the HMA plant daily hours of operation running at maximum hourly production rate is less than the total hours of operation, twelve (12) PM modeling scenarios will be performed for each averaging period. For each scenario the hours of operation are shifted by two hours.

TABLE 2: HMA Model Scenario Time Segments

Model Scenario	Time Segments 10-Hour Blocks January, December	Time Segments 12-Hour Blocks February through November
1	8 AM to 6 PM	12 AM to 12 PM
2	8 AM to 6 PM	2 AM to 2 PM
3	8 AM to 6 PM	4 AM to 4 PM
4	8 AM to 6 PM	6 AM to 6 PM
5	8 AM to 6 PM	8 AM to 8 PM
6	8 AM to 6 PM	10 AM to 10 PM
7	8 AM to 6 PM	12 PM to 12 AM
8	8 AM to 6 PM	2 PM to 2 AM
9	8 AM to 6 PM	4 PM to 4 AM
10	8 AM to 6 PM	6 PM to 6 AM
11	8 AM to 6 PM	8 PM to 8 AM
12	8 AM to 6 PM	10 PM to 10 AM

For the RAP plants, the following hours lists the maximum hours of operation (daylight hours).

TABLE 3: RAP Plants Production Hours of Operation (MST)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	1	1	1	1	1	0.5	0	0	0
6:00 AM	0	0.5	1	1	1	1	1	1	1	1	0.5	0
7:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
8:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 PM	0.5	1	1	1	1	1	1	1	1	1	0	0
6:00 PM	0	0	0	1	1	1	1	1	0.5	0	0	0
7:00 PM	0	0	0	0	0	0.5	0.5	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	**10.5**	**11.5**	**12**	**14**	**14**	**14.5**	**14.5**	**14**	**13**	**12**	**10.5**	**10**

Since the aggregate processing plants daily hours of operation running at maximum hourly production rate are less than the total hours of operation, the hours of operation will be split into two (2) particulate time scenarios morning and afternoon. The morning scenario will be used in HMA modeling scenarios 1 through 6 and the afternoon scenario will be used in HMA modeling scenarios 7 through 12.

TABLE 4: RAP Plant Model Scenario Time Segments Scenario 1 - 6

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	1	1	1	1	1	0.5	0	0	0
6:00 AM	0	0.5	1	1	1	1	1	1	1	1	0.5	0
7:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
8:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 PM	0	1	1	0	0	0	0	0	0.5	1	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	**10**	**11.5**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**10.5**	**10**

TABLE 5: RAP Plant Model Scenario Time Segments Scenario 7 - 12

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0.5	1	0	0	0	0	0	0.5	1	0.5	0
7:00 AM	1	1	1	1	1	0.5	0.5	1	1	1	1	1
8:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 PM	0	1	1	1	1	1	1	1	1	1	0	0
6:00 PM	0	0	0	1	1	1	1	1	0.5	0	0	0
7:00 PM	0	0	0	0	0	0.5	0.5	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	**10**	**11.5**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**10.5**	**10**

1.2 FACILITY IDENTIFICATION AND LOCATION

MSCI HMA #3 is located 5.4 miles east-southeast of Moriarty, New Mexico in Torrance County. The UTM Coordinates of the facility are approximately 411,800 meters East and 3,869,800 meters North, Zone 13, with NAD83 datum at an elevation of approximately 6,310 feet above mean sea level.

Figure 1 below presents a layout of the site showing the area where the HMA plant is located.

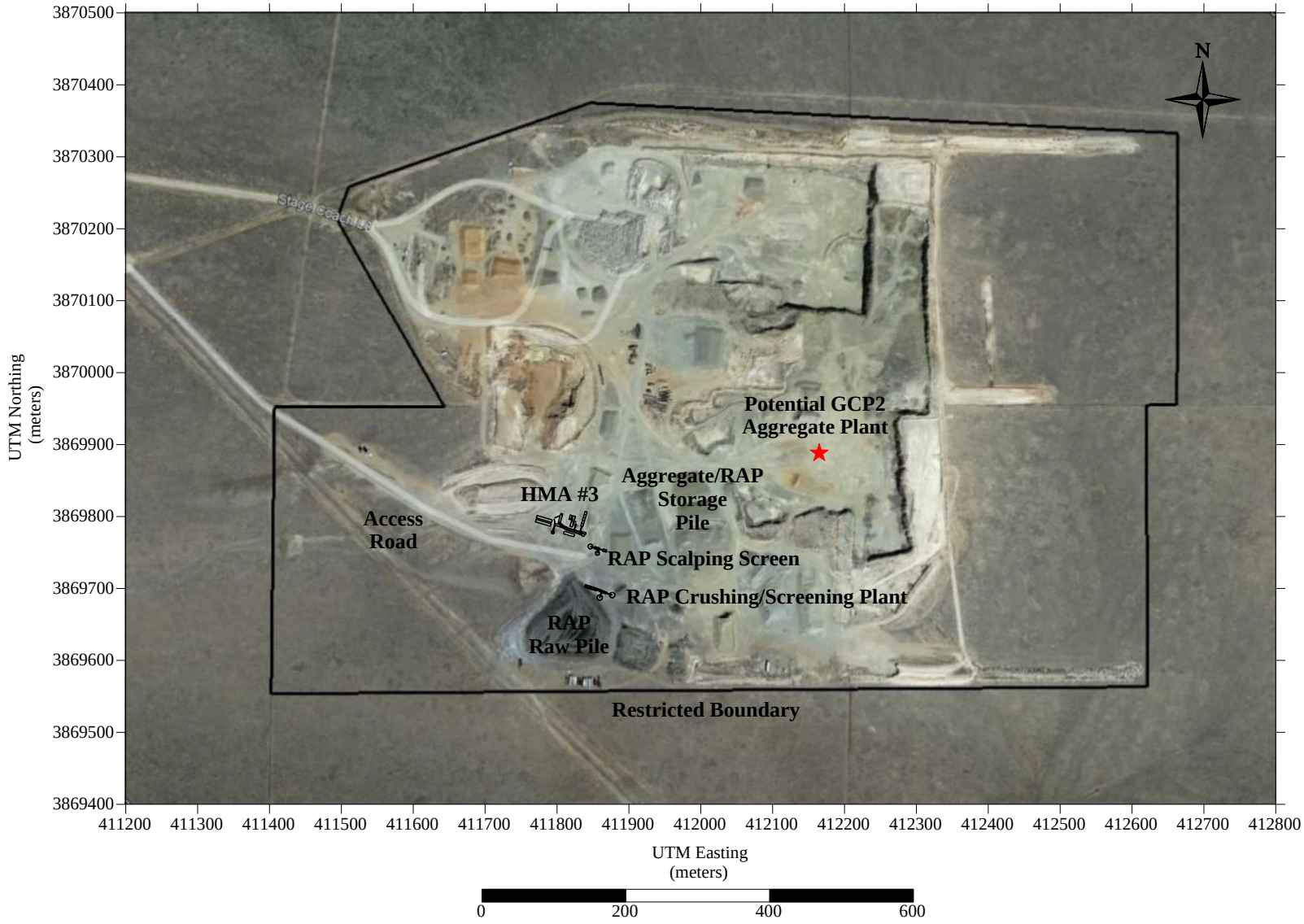


FIGURE 1: MSCI's MSCI HMA #3 Aerial View

2.0 SIGNIFICANT MONITORING AIR QUALITY IMPACT ANALYSIS

This section identifies the technical approach and dispersion model inputs that will be used for the Class II federal and State ambient air quality standards. NMED AQB requires that all applicable criteria pollutant emissions be modeled using the most recent versions of US EPA's approved models and be compared with National Ambient Air Quality Standards (NAAQS), and New Mexico Ambient Air Quality Standards (NMAAQS). Table 6 shows the NAAQS and NMAAQS (without footnotes) that the source's ambient impacts must meet in order to demonstrate compliance. Table 6 also lists the Class II Significant Impact Levels (SILs) which are used to assess whether a source has a significant impact at downwind receptors. Table 7 lists all standards for which modeling is not required by NMED AQB.

The dispersion modeling analysis will be performed to estimate concentrations resulting from the operation of the MSCI HMA #3 at the Davis Pit using the maximum hourly emission rates while all allowed emission sources are operating. The modeling will determine maximum off-site concentrations for nitrogen dioxide, (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with aerodynamic diameter less than 10 micrometers (PM_{10}) and particulate matter with aerodynamic diameter less than 2.5 micrometers ($PM_{2.5}$), for comparison with model significance levels, and national/New Mexico ambient air quality standards (AAQS). The modeling will follow the guidance and protocols outlined in the New Mexico Air Quality Bureau "Air Dispersion Modeling Guidelines" (Revised July 2022) and the most up to date EPA's *Guideline on Air Quality Models*.

Initial modeling will be performed with MSCI HMA #3 sources only to determine pollutant and averaging periods that exceeds pollutant SILs. If initial modeling for any pollutant and averaging period exceeds the SILs, then cumulative impact analysis (CIA) modeling will be performed for those pollutants, receptors with concentrations over the SIL, and averaging periods and will include significant neighboring sources along with background ambient concentrations as defined in the NMED's modeling guidelines.

TABLE 6: National and New Mexico Ambient Air Quality Standard Summary

Pollutant	Avg. Period	Sig. Lev. ($\mu g/m^3$)	Class I Sig. Lev. ($\mu g/m^3$)	NAAQS	NMAAQS	PSD Increment Class I	PSD Increment Class II
CO	8-hour	500		9,000 ppb(1)	8,700 ppb(2)		
	1-hour	2,000		35,000 ppb(1)	13,100 ppb(2)		
NO_2	annual	1.0	0.1	53 ppb(3)	50 ppb(2)	2.5 $\mu g/m^3$	25 $\mu g/m^3$
	24-hour	5.0			100 ppb(2)		
	1-hour	7.52		100 ppb(4)			
$PM_{2.5}$	annual	0.2	0.05	12 $\mu g/m^3$(5)		1 $\mu g/m^3$	4 $\mu g/m^3$
	24-hour	1.2	0.27	35 $\mu g/m^3$(6)		2 $\mu g/m^3$	9 $\mu g/m^3$
PM_{10}	annual	1.0	0.2			4 $\mu g/m^3$	17 $\mu g/m^3$
	24-hour	5.0	0.3	150 $\mu g/m^3$(7)		8 $\mu g/m^3$	30 $\mu g/m^3$
SO_2	annual	1.0	0.1		20 ppb(2)	2 $\mu g/m^3$	20 $\mu g/m^3$
	24-hour	5.0	0.2		100 ppb(2)	5 $\mu g/m^3$	91 $\mu g/m^3$
	3-hour	25.0	1.0	500 ppb(1)		25 $\mu g/m^3$	512 $\mu g/m^3$
	1-hour	7.8		75 ppb(8)			

Standards converted from ppb to $\mu g/m^3$ use a reference temperature of 25° C and a reference pressure of 760 millimeters of mercury.
(1) Not to be exceeded more than once each year.
(2) Not to be exceeded.
(3) Annual mean.
(4) 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
(5) Annual mean, averaged over 3 years.
(6) 98th percentile, averaged over 3 years.
(7) Not to be exceeded more than once per year on average over 3 years.
(8) 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.

TABLE 7: Standards for Which Modeling Is Not Required by NMED AQB.

Standard not Modeled	Surrogate that Demonstrates Compliance
CO 8-hour NAAQS	CO 8-hour NMAAQS
CO 1-hour NAAQS	CO 1-hour NMAAQS
NO_2 annual NAAQS	NO_2 annual NMAAQS
NO_2 24-hour NMAAQS	NO_2 1-hour NAAQS
O_3 8-hour	Regional modeling
SO_2 annual NMAAQS	SO_2 1-hour NAAQS
SO_2 24-hour NMAAQS	SO_2 1-hour NAAQS
SO_2 3-hour NAAQS	SO_2 1-hour NAAQS

2.1 DISPERSION MODEL SELECTION

The dispersion modeling will be conducted using the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee Dispersion Model (AERMOD), Version 21112. This model is recommended by EPA for determining Class II impacts within 50 km of the source being assessed. Additionally, AERMOD was developed to handle complex terrain. In this analysis, AERMOD will be used to estimate pollutant ambient air concentrations of NO_2, CO, SO_2, PM_{10} and $PM_{2.5}$ from MSCI's MSCI HMA #3 emission sources.

AERMOD is a Gaussian plume dispersion model that is based on planetary boundary layer principles for characterizing atmospheric stability. The model evaluates the non-Gaussian vertical behavior of plumes during convective conditions with the probability density function and the superposition of several Gaussian plumes. AERMOD modeling system has three components: AERMAP, AERMET, and AERMOD. AERMAP is the terrain preprocessor program. AERMET is the meteorological data preprocessor. AERMOD includes the dispersion modeling algorithms and was developed to handle simple and complex terrain issues using improved algorithms. AERMOD uses the dividing streamline concept to address plume interactions with elevated terrain.

AERMOD will be run using all the regulatory default options including use of stack-tip downwash, buoyancy-induced dispersion, calms processing routines, upper-bound downwash concentrations for super-squat buildings, default wind speed profile exponents, vertical potential temperature gradients, no use of gradual plume rise, and horizontal release stacks. Alpha options include the use of flat terrain mode for fugitive ground release sources. The model incorporated local terrain into the calculations for point sources and neighboring sources only.

2.2 BUILDING WAKE EVALUATION

AERMOD can account for building downwash and cavity zone effects. Evaluation of building downwash on adjacent stack sources is deemed necessary, since most (if not all) of the stack source heights may be below Good Engineering Practice (GEP) heights. The formula for GEP height estimation is:

$$H_s = H_b + 1.50L_b$$

where: H_s = GEP stack height

H_b = building height

L_b = the lesser building dimension of the height, length, or width

The effects of aerodynamic downwash due to buildings and other structures will be accounted for by using wind direction-specific building parameters calculated by the USEPA-approved Building Parameter Input Program Prime (BPIP-Prime (*Version 04274*)) and the algorithms included in the AERMOD air dispersion model. No buildings are located at the site so no analyzed with BPIP-Prime will be performed.

2.3 METEOROLOGICAL DATA

Dispersion model meteorological input file to be used in this modeling analysis is year 2014 - 18 Albuquerque met data available from the City of Albuquerque AQP.

2.4 RECEPTORS AND TOPOGRAPHY

For each pollutant, the radius of significant impact around the facility is established using a Cartesian grid. A 25-meter grid spacing is used for the facility boundary receptors. A 50-meter spacing and 100-meter spacing are extended to 500-meters and 1-km beyond the facility boundary, respectively from the facility boundary in each direction for a very fine grid resolution. Receptors for a fine grid resolution are placed with 250-meter spacing to a distance of 3-km from the facility boundary. Receptors for a course grid resolution are placed with 500-meter, 1000-meter, and 2500-meter spacing to a distance of 10-km, 20-km, and 50-km, respectively from the facility boundary.

All model receptors will be preprocessed using the AERMAP software (*Version 18081*) associated with AERMOD. The AERMAP software establishes a base elevation and a height scale for each receptor location. The height scale is a measure of the receptor's location and base elevation and its relation to the terrain feature that has the greatest influence in dispersion for that receptor. AERMAP will be processed using U.S. Geological Survey (USGS) national elevation data (NED). Output from AERMAP will be used as input to the AERMOD runstream file for each model run. The AERMAP domain will be large enough to encompass the 10 percent slope factor required for calculating the controlling hill height.

2.5 MODELED EMISSION SOURCES INPUTS

MSCI HMA #3 will operate a maximum of 7 days per week, 52 weeks per year with the HMA plant daily hours of operation summarized in Table 1 and the RAP and Fold-N-Go screen plants daily hours of operation are summarized in Table 3.

2.5.1 MSCI HMA #3 Road Vehicle Traffic Model Inputs

The unpaved road fugitive dust for truck traffic is modeled as a line of volume sources. The AQB's approved procedure for Modeling Haul Roads was followed to develop modeling input parameters for unpaved haul roads. Volume source characterization followed the steps described in the Air Quality Bureau's Guidelines.

2.5.2 MSCI HMA #3 Material Handling Volume Source Model Inputs

Material handling and processing will follow the procedure found in AQB's Modeling Guidelines for Fugitive Equipment Sources (Section 5.3.2).

2.5.3 MSCI HMA #3 Material Handling Point Source Model Inputs

For exhaust from engines, baghouse exhaust, and the asphalt heater, the release height will be the height from the ground to the exhaust exit height. For baghouse exhaust, the model input for the temperature will be 0 kelvin or ambient temperature will be used.

2.6 PARTICLE SIZE DISTRIBUTION

PM_{10} emissions may be modeled using plume deposition. Plume deposition simulates the effect of gravity as particles "fall-out" from the plume to the ground as the plume travels downwind. Therefore, the farther the plume travels from the emission point to the receptor, the greater the effect of plume deposition and the greater the decrease in modeled impacts or concentrations. Particle size distribution, particle mass fraction, and particle density are required inputs to the model to perform this function.

The particle size distribution data used in the modeling for material handling of aggregate will be based upon data obtained from the City of Albuquerque AQB's "Air Dispersion Modeling Guidelines for Air Quality Permitting", revised 02/03/2016, Table 1. Particle size distribution for fugitive road dust on paved and unpaved roads; neighboring lime silo baghouse exhaust; HMA asphalt particulate emissions; and combustion will use the particle size distribution found in the NMED Modeling Section approved values.

The mass-mean particle diameters were calculated using the formula:

$$d = ((d^3_1 + d^2_1 d_2 + d_1 d^2_2 + d^3_2) / 4)^{1/3}$$

Where: d = mass-mean particle diameter
d_1 = low end of particle size category range
d_2 = high end of particle size category range

Representative average particle densities were obtained from NMED accepted values.

Material	Density (g/cm^3)	Reference
Road Dust	2.5	NMED Value
Lime	3.3	NMED Value
HMA Asphalt	1.5	NMED Value
Combustion	1.5	NMED Value
Fugitive Dust	2.5	NMED Value

The size distribution for PM_{10} emission sources are presented in Tables 8 - 12.

TABLE 8: Road Vehicle Fugitive Dust Deposition Parameters

Particle Size Category (μm)	Mass Mean Particle Diameter (μm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0 – 2.5	1.57	25.0	2.5
2.5 – 10	6.91	75.0	2.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007 (Vehicle Fugitive)

TABLE 9: Lime Baghouse Source Deposition Parameters

Particle Size Category (μm)	Mass Mean Particle Diameter (μm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0-2.5	1.57	25	3.3
2.5-10	6.91	75	3.3

Parameters based on baghouse exhaust capture percentages. (Lime Silo)

TABLE 10: Combustion Source Deposition Parameters

Particle Size Category (μm)	Mass Mean Particle Diameter (μm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0 - 2.5	1.57	100	1.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007 (Combustion)

TABLE 11: Asphalt Baghouse and Stack Source Deposition Parameters

Particle Size Category (μm)	Mass Mean Particle Diameter (μm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0-1.0	0.63	50.0	1.5
1.0-2.5	1.85	19.0	1.5
2.5-10	6.92	31.0	1.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007 (Asphalt Baghouse Stack)

TABLE 12: Fugitive Dust Source Deposition Parameters

Particle Size Category (μm)	Mass Mean Particle Diameter (μm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0 - 2.5	1.57	7.8	2.5
2.5 – 5	3.88	27.0	2.5
5 – 10	7.77	65.2	2.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007 (Coal Handling).

2.7 PM2.5 SECONDARY EMISSIONS MODELING

Particulate matter includes both "primary" PM, which is directly emitted into the air, and "secondary" PM, which forms in the atmosphere from chemical reactions involving primary gaseous emissions of precursor air contaminants. Primary PM consists of carbon (soot)—emitted from cars, trucks, heavy equipment, forest fires, and burning waste—and crustal material from unpaved roads, stone crushing, construction sites, and metallurgical operations. Secondary PM forms in the atmosphere from gases. Some of these reactions require sunlight and/or water vapor. Secondary PM includes:

- Sulfates formed from SO_2 emissions from power plants and industrial facilities;
- Nitrates formed from NO_X emissions from cars, trucks, industrial facilities, and power plants; and
- Carbon formed from reactive organic gas (ROG or VOC) emissions from cars, trucks, industrial facilities, forest fires, and biogenic sources such as trees.

AERMOD does not account for secondary formation of $PM_{2.5}$ for near-field modeling. Any secondary contribution of the MSCI source emissions is not explicitly accounted for in the model results. While representative background monitoring data for $PM_{2.5}$ should adequately account for secondary contribution from existing background sources, the MSCI assessment of their potential contribution to cumulative impacts as secondary $PM_{2.5}$ was performed based on guidance from the NMED Modeling Section and using prescribed equations. The permit application for MSCI HMA #3 emissions of precursors include:

- NO_X – 65.5 tons per year (above SER)
- SO_2 – 30.6 tons per year (below SER)
- Volatile Organic Compounds (VOC) – 33.9 tons per year (below SER)
- Particulate Matter with an aerodynamic diameter of 2.5 micron or less ($PM_{2.5}$) – 14.8 tons per year (above SER).

The $PM_{2.5}$ secondary emission concentration analysis will follow EPA and NMED AQB guidelines. Following recent EPA guidelines for conversion of NO_X and SO_2 emission rates to secondary $PM_{2.5}$ emissions, MSCI emissions are compared to appropriate western MERPs values (NO_X 24-Hr – 1155 tpy; NO_X Annual – 3184 tpy; SO_2 24-Hr – 225 tpy; SO_2 Annual – 2289 tpy). The following equation, found in NMED AQB modeling guidance document on MERPs, will be added to determine if secondary emission would cause violation with $PM_{2.5}$ NAAQS.

$PM_{2.5}$ annual = ((NO_X emission rate (tpy)/3184 + (SO_2 emission rate (tpy)/2289)) x 0.2 µg/m^3

$PM_{2.5}$ annual = ((65.5/3184) + (30.6/2289)) x 0.2 µg/m^3 = **0.007 µg/m^3**

$PM_{2.5}$ 24 hour = ((NO_X emission rate (tpy)/1155 + (SO_2 emission rate (tpy)/225)) x 1.2 µg/m^3

$PM_{2.5}$ 24 hour = ((65.5/1155) + (30.6/225)) x 1.2 µg/m^3 = **0.23 µg/m^3**

2.8 NO_2 DISPERSION MODELING ANALYSIS

The AERMOD model predicts ground-level concentrations of any generic pollutant without chemical transformations. Thus, the modeled NO_X emission rate will give ground-level modeled concentrations of NO_X. NAAQS values are presented as NO_2.

EPA has a three-tier approach to modeling NO_2 concentrations.

- Tier I – total conversion, or all NOx = NO_2
- Tier II –Ambient Ratio Method 2 (ARM2)
- Tier III – case-by-case detailed screening methods, such as OLM and Plume Volume Molar Ratio Method (PVMRM) and NO_2/NO_X in-stack ratio

Initial modeling will be performed using both Tier I and Tier II methodologies. If these modeling iterations demonstrate that less conservative methods for determining 1-hour and annual NO_2 compliance would be needed for this project, then ambient impact of 1-hour and annual NOx predicted by the model will use Tier III – OLM or PVMRM.

For OLM or PVMRM, three inputs can be selected in the model, the ISR, the NO_2/NO_X equilibrium ratio for the ambient air, and the ambient ozone concentration. The ISR will be determined for each source or group of sources. The NO_2/NO_X equilibrium ratio will be the EPA default of 0.90. Ozone input will be from monitored ozone data collected from an approved monitoring station.

Based on EPA's ISR databases, a proposed conservative NO_2/NO_X ISR ratio for Diesel-fired RICE is 0.15. No data could be found for a hot mix asphalt drum, so to be conservative the EPA default ISR of 0.50 will be used. For diesel-fired combustion asphalt heater, the EPA ISR databases, a

proposed conservative NO_2/NO_X ISR ratio for diesel-fired combustion is less than 0.20. For neighboring sources, since the ISR has a diminishing impact on ambient NO_2/NO_X ratios as a plume is transported farther downwind due to mixing and reaction towards background ambient NO_2/NO_X ratios, a default ISR of 0.30 based on the NMED Modeling Guidelines will be used. Table 13 summarizes the ISR selected for each NO_X source in the NO_2 1-hour modeling.

TABLE 13: Summary of Selected ISR

Source Description	Selected ISR
HMA Baghouse Stack	0.50
HMA Diesel-Fired Asphalt Cement Heater	0.20
Plant Generator/Engine (RICE)	0.15
Neighboring Sources	0.30

Model Ozone Data

For OLM or PVMRM, modeling of the project-generated 1-hour NO_2 concentrations requires use of ambient monitored ozone concentrations. This hourly ozone data was provided by the Albuquerque Environmental Health Depart (AEHD) Air Quality Program (AQP) for the Del Norte monitoring station for the years 2014 – 2018.

2.9 SIGNIFICANT NEIGHBORING BACKGROUND SOURCES

For all Cumulative Impact Analysis (CIA) combustion emissions dispersion modeling (NO_X, CO, SO_2), will include all significant neighboring sources within 50 kilometers of the MSCI HMA #3. PM CIA particulate dispersion modeling will include all significant neighboring sources within 10 kilometers of the MSCI HMA #3 and regional monitored background. These sources will be obtained from the Air Quality Bureau's database.

2.10 REGIONAL BACKGROUND CONCENTRATIONS

Ambient background concentrations represent the contribution of pollutant sources that are not included in the modeling analysis, including naturally occurring sources. If the modeled concentration of a criteria pollutant is above the modeling significance level, the background concentration for each criteria pollutant will be added to the maximum modeled concentration to calculate the total estimated pollutant concentration for comparison with the AAQS.

The ambient background concentrations are listed in the Air Quality Bureau Guidelines for NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$. For CO and SO_2, MSCI is proposing using backgrounds for the generic "Rest of New Mexico". For PM_{10}, MSCI is proposing using backgrounds from the Santa Fe (Monitor ID 3HM). For $PM_{2.5}$, MSCI is proposing using backgrounds from the Santa Fe (Monitor ID 3SFA). For annual NO_2, MSCI is proposing using backgrounds from Del Norte

(Monitor ID 350010023).

	$PM_{2.5}$ ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	CO ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)
1 Hour				2148	10.1
8 Hour				1265	
24 Hour	9.2	22.7			
Annual	3.7		17.2		

NO_2 1-hour Background data

NO_2 1-hour background data was developed by the AEHD AQP based on the Tier 2 procedure found in EPA guidance documents[1] for determining background concentrations.

> *"Based on this guidance, we believe that an appropriate methodology for incorporating background concentrations in the cumulative impact assessment for the 1-hour NO_2 standard would be to use multiyear averages of the 98th-percentile of the available background concentrations by season and hour-of-day, excluding periods when the source in question is expected to impact the monitored concentration (which is only relevant for modified sources). For situations involving a significant mobile source component to the background monitored concentrations, inclusion of a day-of-week component to the temporal variability may also be appropriate. The rank associated with the 98th-percentile of daily maximum 1-hour values should be generally consistent with the number of "samples" within that distribution for each combination based on the temporal resolution but also account for the number of samples "ignored" in specifying the 98th-percentile based on the annual distribution. For example, Table 1 in Section 5 of Appendix S specifies the rank associated with the 98th-percentile value based on the annual number of days with valid data. Since the number of days per season will range from 90 to 92, Table 1 would indicate that the 2nd-highest value from the seasonal distribution should be used to represent the 98th-percentile. On the other hand, use of the 2nd-highest value for each season would effectively "ignore" only 4 values for the year rather than the 7 values "ignored" from the annual distribution. Balancing these considerations, we recommend that background values by season and hour-of-day used in this context should be based on the 3rd-highest value for each season and hour-of-day combination, whereas the 8th-highest value should be used if values vary by hour-of-day only. For more detailed temporal pairing, such as season by hour-of- day and day-of-week or month by hour-of-*

[1] Memo: "Additional Clarification Regarding Application of Appendix W Modeling Guidance for 1-hour N02 National Ambient Air Quality Standard" Tyler Fox, Leader, Air Quality Modeling Group, C439-01, dated March 1, 2011.

day, the 1st-highest values from the distribution for each temporal combination should be used."

The NO_2 background data was provided by the AEHD AQP Modeling Section and is presented below in Table 14.

TABLE 14: Monitored Seasonal NO_2 Background – 3rd Highest Hourly µg/m³

Hour	Winter	Spring	Summer	Fall
1	72.1	47.6	29.3	65.6
2	67.8	48.3	27.7	59.7
3	67.7	46.0	26.4	57.9
4	68.4	48.9	26.6	58.9
5	69.1	51.7	32.7	58.0
6	69.7	63.9	39.3	57.8
7	72.8	70.7	46.4	63.5
8	77.6	71.8	48.5	64.5
9	80.0	61.1	34.2	65.9
10	71.4	48.0	27.3	55.0
11	62.0	28.6	24.3	47.3
12	48.1	18.9	19.9	35.4
13	36.9	17.6	17.0	28.2
14	35.1	15.7	15.9	25.3
15	33.6	14.8	17.4	24.2
16	37.2	15.3	19.4	28.0
17	48.4	17.1	20.4	38.0
18	73.0	19.4	19.3	69.6
19	79.3	38.5	21.7	79.1
20	78.1	53.2	30.9	77.1
21	77.3	48.0	34.1	73.4
22	76.5	56.3	30.8	70.4
23	75.0	58.8	34.9	69.7
24	72.4	57.9	33.6	70.9

For AERMOD Version 21112, an error was found in PVMRM input of NO_2 background data. To resolve this issue, EPA recommends inputting into the model half of the seasonal/hour concentrations listed above.

[Quoted text hidden]

Peters, Eric, ENV <eric.peters@state.nm.us> Mon, Jul 25, 2022 at 5:28 PM
To: Paul Wade <pwade@montrose-env.com>
Cc: "Mustafa, Sufi A., ENV" <sufi.mustafa@state.nm.us>, "neil@msconstructors.com" <neil@msconstructors.com>

Paul,

I am reviewing your modeling protocol for Mountain States Constructors. I have the following comments.

Table 12 does not qualify the fraction of particles between 0 and 2.5 um in diameter for the plume depletion parameters. It does not appear appropriate to assume this fraction does not exist.

The protocol cites *Technical support document (TSD) for NO2-related AERMOD modifications, EPA- 454/B-15-004, July 2015 (https://gaftp.epa.gov/Air/aqmg/SCRAM/models/preferred/aermod/AERMOD_NO2_Changes_TSD.pdf)* as justification for using 0.2 in stack ratio when using OLM or PVMRM.

> (Owen & Brode, 2014) recommended that, in the absence of source-specific data, the national default of 0.5 be applied to the new or modifying source and sources in the immediate vicinity of the new or modifying source. However, since the ISR has a diminishing impact on ambient NO2/NOx ratios as a plume is transported farther downwind due to mixing and reaction towards background ambient NO2/NOx ratios, (Owen & Brode, 2014) recommended that more distant sources could use a default ISR of 0.2 in lieu of source specific data. According to the EPA ISR database, 67% of the tests indicated ISRs less than of 0.2. Given that the greatest impact of the NO2/NOx in-stack ratio is typically on the closest/closer receptors to a source and that the highest modeled impact also generally is close to a source, it is reasonable to set 0.2 as a default for the more distant nearby sources. (Owen & Brode, 2014) suggested sources that use a default of 0.2 will generally be greater than 1 to 3 km away from the primary source, with the distance dependent upon the relative strength of the primary and background sources as well as the relative location of the background sources with respect to the prominent wind direction and location of expected maximum impacts from the primary source.

According to this citation, NMED approves 0.2 in stack ratio for this purpose only when the surrounding sources are generally greater than 1 to 3 km away from the primary source. Otherwise, the 0.3 ratio NMED lists in the Modeling Guidelines may be used for surrounding sources.

I approve the use of Santa Fe particulate matter monitors (rather than the slightly closer Albuquerque monitors) because the Santa Fe meteorological data shows a predominant wind direction toward the facility and because the proposed location is much more rural than the Albuquerque monitors.

The discussion of 1-hour NO2 background concentration mentions the exclusion of hours where a specific source was impacting the monitor used to provide the concentrations. It is not clear what source was being excluded from the seasonal background analysis. Additional information will be needed before accepting the seasonal NO2 background concentrations provided.

Updated background concentrations and secondary PM2.5 formation factors are available in the new NM Modeling Guidelines: https://www.env.nm.gov/air-quality/modeling-publications/

I approve the remainder of the protocol.

Eric Peters

Eric Peters, Air Dispersion Modeler

New Mexico Environment Department / Air Quality Bureau

525 Camino de Los Marquez - Suite 1 / Santa Fe, NM, 87505

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From: Paul Wade <pwade@montrose-env.com>
Sent: Tuesday, June 14, 2022 1:44 PM
To: Mustafa, Sufi A., ENV <sufi.mustafa@state.nm.us>; Peters, Eric, ENV <eric.peters@state.nm.us>; neil@msconstructors.com
Subject: [EXTERNAL] Modeling Protocol MSCI HMA #3

[Quoted text hidden]

Paul Wade <pwade@montrose-env.com> Tue, Jul 26, 2022 at 5:31 PM
To: "Peters, Eric, ENV" <eric.peters@state.nm.us>
Cc: "Mustafa, Sufi A., ENV" <sufi.mustafa@state.nm.us>, "neil@msconstructors.com" <neil@msconstructors.com>

Eric
Attached is a revised model protocol for Mountain States. It addresses your concerns in your email.

I have revised the particle size distribution to the NMED Coal distribution instead of the city of Albuquerque's distribution.

For neighboring NO2 sources I will use 0.3 as the ISR.

I have updated the background concentrations to represent the new modeling guidelines.

As we discussed on the phone, the NO2 1hour backgrounds were developed by the city of Albuquerque for the Del Norte monitor station following EPA guidelines found in "Memo: “Additional Clarification Regarding Application of Appendix W Modeling Guidance for 1-hour N02 National Ambient Air Quality Standard” Tyler Fox, Leader, Air Quality Modeling Group, C439-01, dated March 1, 2011.". But most likely I will use the neighboring sources NO2 input in the NO2 1 hour model instead of using background.

Thanks for the review.

[Quoted text hidden]
--

MEG Logo_Signature

[Quoted text hidden]

MSCIHMAModelProtocol072622.pdf
735K

Peters, Eric, ENV <eric.peters@state.nm.us> Thu, Jul 28, 2022 at 11:25 AM
To: Paul Wade <pwade@montrose-env.com>
Cc: "Mustafa, Sufi A., ENV" <sufi.mustafa@state.nm.us>, "neil@msconstructors.com" <neil@msconstructors.com>

Paul,

Thank you for resolving all the questions I had about the protocol.

Eric

Section 17

Compliance Test History

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

To show compliance with existing NSR permits conditions, you must submit a compliance test history. The table below provides an example.

The HMA plant has performed a GCP-3 compliance test for the plant operating under GCP-3-8180.

Compliance Test History Table

Unit No.	Test Description	Test Date
13	GCP-3-8180 initial compliance test for Opacity	12/11/2019
14	GCP-3-8180 initial compliance test for CO, NO_X, PM Total, $PM_{2.5}$, and Opacity	12/11/2019
17	Initial compliance test for CO, NO_X, and Opacity	TBD
36	Initial compliance test for CO, NO_X, and Opacity	01/16/2015

Section 20

Other Relevant Information

Other relevant information. Use this attachment to clarify any part in the application that you think needs explaining. Reference the section, table, column, and/or field. Include any additional text, tables, calculations or clarifying information.

Additionally, the applicant may propose specific permit language for AQB consideration. In the case of a revision to an existing permit, the applicant should provide the old language and the new language in track changes format to highlight the proposed changes. If proposing language for a new facility or language for a new unit, submit the proposed operating condition(s), along with the associated monitoring, recordkeeping, and reporting conditions. In either case, please limit the proposed language to the affected portion of the permit.

No other relevant information.

Section 22: Certification

Company Name: Mountain States Constructors, Inc.

I, Neil Jackson, hereby certify that the information and data submitted in this application are true and as accurate as possible, to the best of my knowledge and professional expertise and experience.

Signed this 16 day of August, 2022, upon my oath or affirmation, before a notary of the State of New Mexico.

*Signature — August 16, 2022 (Date)

Neil Jackson (Printed Name) — Vice-President / Operations Manager (Title)

Scribed and sworn before me on this 16 day of August, 2022

My authorization as a notary of the State of New Mexico expires on the 2 day of June, 2023.

STATE OF NEW MEXICO
NOTARY PUBLIC
Stacy Walker
Commission No. 1097952
June 02, 2023

Stacy Walker — Notary's Signature — 8-16-2022 (Date)

Stacy Walker — Notary's Printed Name

*For Title V applications, the signature must be of the Responsible Official as defined in 20.2.70.7.AE NMAC.

MOUNTAIN STATES CONSTRUCTORS, INC., GENERAL ACCOUNT

157959

Vendor NM ENVIRON New Mexico Environmental Check 157959 08/17/22

Trx No	Invoice No	Inv Date	Job/Description	Gross	Discount	Check Amount
184083	NSR #30-1901	08/16/22	HMA #3 New NSR Per	500.00		500.00
				500.00	0.00	500.00

DOCUMENT CONTAINS COLOR BACKGROUND, VISIBLE FIBERS, TONER GRIP, AND WATERMARK PAPER - HOLD TO LIGHT TO VIEW

157959

MOUNTAIN STATES CONSTRUCTORS, INC.
GENERAL ACCOUNT
3601 PAN AMERICAN FREEWAY, NE, #111
ALBUQUERQUE, NM 87107
(505) 292-0108

BANK OF THE WEST
ALBUQUERQUE, NM

95-681/1070

157959

**********FIVE HUNDRED DOLLARS AND 00 CENTS**********

DATE 08/17/22

AMOUNT **********500.00

PAY TO THE ORDER OF:

NEW MEXICO ENVIRONMENTAL
AIR QUALITY BUREAU
525 CAMINO DE LOS MARQUEZ#1
SANTA FE NM 87505

Karen Page
AUTHORIZED SIGNATURE

AUTHORIZED SIGNATURE

HEAT GLANCE IF THESE COLORED SPOT DISAPPEARS THIS DOCUMENT IS AUTHENTIC

⑈157959⑈ ⑆107006813⑆ 29500552 4⑈

MONTROSE
AIR QUALITY SERVICES

August 17, 2022

New Mexico Environment Department
Air Quality Bureau
Permits Section
525 Camino de los Marquez, Suite 1
Santa Fe, New Mexico 87507-3313

Subject: Permit Application for MSCI HMA #3 Facility

To Whom it May Concern:

Attached please find two (2) hardcopies and three (3) electronic (CD) copies of the 20.2.72 NMAC Permit Application for Mountain States Constructors Inc's Davis Pit MSCI HMA #3 Facility. This letter is attached to the application copy that has the original notarized signature page (Section 22), along with an application submittal fee of $500.

Mountain States Constructors, Inc. (MSCI) is applying for a new 20.2.72 NMAC air quality permit for a 400 ton per hour (TPH) recycled asphalt products (RAP) crushing and screening plant, 200 TPH RAP scalping screen, 400 TPH hot mix asphalt plant to be operated within county of Torrance, state of New Mexico. Regulation governing this permit application is 20.2.72.200.A(1) NMAC.

Please let me know if you have any questions or need additional information.

Sincerely,

Paul Wade
Sr. Engineer
Montrose Air Quality Services, LLC

Cc: Neil Jackson, MSCI

Montrose Air Quality Services, LLC
3500 Comanche Road NE Suite G
Albuquerque, NM 87107-4546

T: 505.830.9680 ext. 6
F: 505.830.9678
Pwade@montrose-env.com
www.montrose-env.com