SIGNIFICANT REVISION PERMIT APPLICATION
NSR PERMIT 0689-M2R4

American Gypsum Bernalillo Plant

Prepared By:

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April 2019

Trinity Project 173201.0123

Environmental solutions delivered uncommonly well

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April 11, 2019

Mr. Ted Schooley
Permit Programs Manager
NMED Air Quality Bureau
525 Camino de los Marquez Suite 1
Santa Fe, NM 87505-1816

RE: Significant Revision Permit Application; NSR Permit 0689-M2R4
American Gypsum Bernalillo (Wallboard) Plant

Dear Mr. Schooley:

On behalf of American Gypsum Company (American Gypsum), Trinity Consultants is submitting this Significant Revision permit application to the New Mexico Air Quality Bureau for a revision to permit no. 0689-M2R4 in accordance with 20.2.72.219.D(1) New Mexico Administrative Code (NMAC), to authorize changes to its Bernalillo Plant. The function of the facility is to produce wallboard from raw gypsum. The proposed changes involve updating calculation methodologies for many of the permitted emission units and permitting emissions for haul roads.

The format and content of this application are consistent with the Bureau's current policy regarding NSR significant revision applications; it is a complete application package using the latest Universal Application forms. A check in the amount of $500 for the permit application fee is submitted with this application.

Enclosed are two hard copies of the application (the original and a photocopy) and two disks containing the electronic files. Please feel free to contact me at (505) 266-6611 if you have any questions regarding this application.

Sincerely,

Andrew Glen
Managing Consultant

Trinity Project File 173201.0123

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. For NOI applications, submit the entire UA1, UA2, and UA3 applications on a single CD (no copies are needed). For NOIs, hard copies of UA1, Tables 2A, 2D & 2F, Section 3 and the signed Certification Page are required.

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 ☑ Existing Permitted (or NOI) Facility ☐ Existing Non-permitted (or NOI) Facility
Minor Source: ☐ a NOI 20.2.73 NMAC ☑ 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:

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

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

☑ Check No.: 642182 in the amount of $500

☑ 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.

☐ This facility qualifies to receive assistance from the Small Business Environmental Assistance program (SBEAP) and qualifies for 50% of the normal application and permit fees. Enclosed is a check for 50% of the normal application fee which will be verified with the Small Business Certification Form for your company.

☐ This facility qualifies to receive assistance from the Small Business Environmental Assistance Program (SBEAP) but does not qualify for 50% of the normal application and permit fees. To see if you qualify for SBEAP assistance and for the small business certification form go to https://www.env.nm.gov/aqb/sbap/small_business_criteria.html).

Citation: Please provide the **low level citation** under which this application is being submitted: **20.2.72.219.D(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.): 1104	Updating Permit/NOI #: A-0689-M2R4
1	Facility Name: American Gypsum Bernalillo Wallboard Facility	Plant primary SIC Code (4 digits): 3275	
		Plant NAIC code (6 digits): 327420	
a	Facility Street Address (If no facility street address, provide directions from a prominent landmark): 1000 North Hill Road, Bernalillo NM 87004		
2	Plant Operator Company Name: American Gypsum Company	Phone/Fax: (505) 346-2138 / (505) 797-1982	
a	Plant Operator Address: P.O. Box 90820, Albuquerque, New Mexico 87199		

b	Plant Operator's New Mexico Corporate ID or Tax ID: 85-0311955	
3	Plant Owner(s) name(s): American Gypsum Company	Phone/Fax: (505) 867-5200 / (505) 797-1982
a	Plant Owner(s) Mailing Address(s): P.O. Box 90820, Albuquerque, New Mexico 87199	
4	Bill To (Company): American Gypsum Company	Phone/Fax: (505) 867-5200 / (505) 797-1982
a	Mailing Address: P.O. Box 90820, Albuquerque, New Mexico 87199	E-mail: tom.dillon@americangypsum.com
5	☑ Preparer: ☑ Consultant: Andrew Glen	Phone/Fax: (505) 266-6611
a	Mailing Address: 9400 Holly Ave., NE Bldg 3 Ste 300, Albuquerque, NM 87122	E-mail: aglen@trinityconsultants.com
6	Plant Operator Contact: Tom Dillon	Phone/Fax: (505) 771-4722
a	Address: 1000 North Hill Road, Bernalillo, NM 87004	E-mail: tom.dillon@americangypsum.com
7	Air Permit Contact: Tom Dillon	Title: Plant Manager
a	E-mail: tom.dillon@americangypsum.com	Phone/Fax: (505) 771-4722
b	Mailing Address: 1000 North Hill Road, Bernalillo, NM 87004	

Section 1-B: Current Facility Status

1.a	Has this facility already been constructed? ☑ Yes ☐ No	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	If yes, give month and year of shut down (MM/YY): N/A
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: P225R2
7	Has this facility been issued a No Permit Required (NPR)? ☐ Yes ☑ No	If yes, the NPR No. is: N/A
8	Has this facility been issued a Notice of Intent (NOI)? ☐ Yes ☑ No	If yes, the NOI No. is: N/A
9	Does this facility have a construction permit (20.2.72/20.2.74 NMAC)? ☑ Yes ☐ No	If yes, the permit No. is: 0689-M2R4
10	Is this facility registered under a General permit (GCP-1, GCP-2, etc.)? ☐ Yes ☑ No	If yes, the register No. is: N/A

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: 200 ton/hr gypsum rock	Daily: 4,800 ton/day gypsum rock	Annually: 500,000 ton/yr gypsum rock
b	Proposed	Hourly: 200 ton/hr gypsum rock	Daily: 4,800 ton/day gypsum rock	Annually: 500,000 ton/yr gypsum rock
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: 200 ton/hr gypsum rock	Daily: 4,800 ton/day gypsum rock	Annually: 500,000 ton/yr gypsum rock
b	Proposed	Hourly: 200 ton/hr gypsum rock	Daily: 4,800 ton/day gypsum rock	Annually: 500,000 ton/yr gypsum rock

Section 1-D: Facility Location Information

1	Section: 28	Range: 4E	Township: 13N	County: Sandoval	Elevation (ft): 5,111
2	UTM Zone: ☐ 12 or ☑ 13			Datum: ☐ NAD 27 ☐ NAD 83 ☑ WGS 84	
a	UTM E (in meters, to nearest 10 meters): 361,180 m E			UTM N (in meters, to nearest 10 meters): 3,910,730 m N	
b	AND Latitude (deg., min., sec.): 35˚ 19′ 48.30″ N			Longitude (deg., min., sec.): 106˚ 31’ 39” W	
3	Name and zip code of nearest New Mexico town: Located in the City of Bernalillo, NM 87004				
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary): From Albuquerque take I-25 north to exit 242. Turn Right on N. Hill Rd. Facility is located at 1000 N Hill Rd.				
5	The facility is located in the City of Bernalillo.				
6	Status of land at facility (check one): ☑ 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: *Municipalities:* Bernalillo 0.0 miles *Indian Tribes:* Santa Ana Indian Reservation, 1.2 miles; Sandia Indian Reservation, 3.5 miles; and San Felipe Indian Reservation, 10.0 miles *Counties:* Bernalillo County 0.6 miles				
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: 12 km from Bernalillo County and 44 km from Bandelier Wilderness.				
9	Name nearest Class I area: Bandelier Wilderness				
10	Shortest distance (in km) from facility boundary to the boundary of the nearest Class I area (to the nearest 10 meters): 44 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: ~50 meters				
12	Method(s) used to delineate the Restricted Area: Fencing “**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?				

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	($\frac{\text{hours}}{\text{year}}$): 8,760		
2	Facility’s maximum daily operating schedule (if less than 24 $\frac{\text{hours}}{\text{day}}$)? Start: N/A		☐AM ☐PM	End: N/A		☐AM ☐PM
3	Month and year of anticipated start of construction: Facility has been constructed under previous permits.					
4	Month and year of anticipated construction completion: Facility has been constructed under previous permits.					
5	Month and year of anticipated startup of new or modified facility: After receiving the 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: N/A		NOV Tracking No: N/A
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: N/A	Date: N/A	Requirement # (or page # and paragraph #): N/A
d	Provide the required text to be inserted in this permit: N/A		
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: N/A 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): Tom Dillon	Phone: 505-771-4722
a	R.O. Title: Plant Manager	R.O. e-mail: tom.dillon@americangypsum.com
b	R. O. Address: 1000 North Hill Road, Bernalillo, NM 87004	
2	Alternate Responsible Official (20.2.70.300.D.2 NMAC): Ray Dabria	Phone: (505) 771-4721
a	A. R.O. Title: Project Engineer	A. R.O. e-mail: ray.dabria@americangypsum.com
b	A. R. O. Address: P.O. Box 90820, Albuquerque, New Mexico 87199	
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): N/A	
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.): Eagle Materials Inc.	
a	Address of Parent Company: 5960 Berkshire Lane, Suite 800, Dallas TX 75225-6068	
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.): None.	
6	Telephone numbers & names of the owners' agents and site contacts familiar with plant operations: Tom Dillon, 505-771-4722	

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: *Other States:* None *Indian Tribes:* Santa Ana Indian Reservation, 1.9 km; Sandia Indian Reservation, 5.6 km; and San Felipe Indian Reservation, 16 km *Local Pollution Control Programs:* Albuquerque-Bernalillo County Air Quality Control Board, 12 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 does not need to be 2-hole punched, but **must be double sided**. 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 on compact disk(s) (CD). For 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.

4) If **air dispersion modeling** is required by the application type, include the **NMED Modeling Waiver** **OR** one additional electronic copy of the air dispersion modeling including the input and output files. The dispersion modeling ***summary report only*** should be submitted as hard copy(ies) unless otherwise indicated by the Bureau. The complete dispersion modeling study, including all input/output files, should be submitted electronically as part of the electronic submittal.

5) If 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.

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

1) All required electronic documents shall be submitted in duplicate (2 separate CDs). 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 with the number of additional hard copies corresponding to the number of CD copies required. 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 3 electronic files (2 MSWord docs: Universal Application section 1 and Universal Application section 3-19) and 1 Excel file of the tables (Universal Application section 2) on the CD(s). 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 # (0 for original, 1, 2, etc.; which will help keep track of subsequent partial update(s) to the original submittal. The footer information should not be modified by the applicant.

Table of Contents

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.
1	Gypsum Rock Load-in	NA	NA	NA	4,800 tons/day	4,800 tons/day	Unknown / 1988	NA / Fugitive	305 02032	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	N/A
2a	Rock Storage & Reclaim	NA	NA	NA	4,800 tons/day	4,800 tons/day	Unknown / 1988	2 / Fugitive	Multiple source, refer to calculations	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
2b	Rock Storage Loading	NA	NA	NA	4,800 tons/day	4,800 tons/day	Unknown / 1988	2 / Fugitive	Multiple source, refer to calculations	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
3	Rock Tank	NA	NA	NA	4,800 tons/day	4,800 tons/day	Unknown / 1988	3 / 3	305 02006	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
4	Calciner Furnace / Ball Mill	Claudius Peters	NA	TKZ849 / 304	50 MMbtu/hr	50 MMbtu/hr	Unknown / 1988	4 / 4	3050512 & 3050515	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	N/A
5	Stucco Storage	NA	NA	NA	425,000 tons/yr	425,000 tons/yr	Unknown / 1988	5 / 5	305 01514	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
6	Stucco Storage	NA	NA	NA	425,000 tons/yr	425,000 tons/yr	Unknown / 1988	6 / 6	305 01514	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
7	Starch Receiving	NA	NA	NA	2,700 tons/year	2,700 tons/year	Unknown / 1988	7 / 7	305 02006	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
8	Starch Use	NA	NA	NA	2,700 tons/year	2,700 tons/year	Unknown / 1988	8 / Fugitive	305 02006	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
9	Accelerator and MiscDry Additives	NA	NA	NA	2,500 tons/year	2,500 tons/year	Unknown / 1988	9 / Fugitive	305 02006	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
10	Misc. Dry Additives & Stucco Metering	NA	NA	NA	54.87 tons/hr	54.87 tons/hr	Unknown / 1988	10 / Fugitive	305 02006	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
11	Dryer	NA	NA	NA	90 Mmbtu/hr	90 Mmbtu/hr	Unknown / 1988	N/A / 11	305 01503	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	N/A
12	Edge Trimmer	NA	NA	NA	753.42 (100 sq ft/hr)	753.42 (100 sq ft/hr)	Unknown / 1988	12 / Fugitive	305 01521	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
13	Sleutter Production	NA	NA	NA	150.68 (100 sq ft/hr)	150.68 (100 sq ft/hr)	Unknown / 1988	13 / Fugitive	305 01521	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A

[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-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 #	Manufact-urer'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 Classi-fication Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
14	Enclosed Stucco Conveyance System	NA	NA	NA	11,500 acfm,	11,500 acfm,	2017 2017	N/A 14	305 01504	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
15	Paved Roads	NA	NA	NA	4,800 tons/day	4,800 tons/day	Unknown 1988	NA Fugitive	305 02032	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
										☐ 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		
										☐ 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] 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 http://www.env.nm.gov/aqb/forms/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
IA-1	Diesel Fuel Storage Tank for refueling company trucks	Unknown	Unknown	20,000 gal	20.2.72.202A.(3)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	20,000 gal	----	Unknown	
IA-2	Gasoline Fuel Storage Tank for Refueling company trucks	Unknown	Unknown	2,000 gal	20.2.72.202A.(3)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	2,000 gal	----	Unknown	
IA-3	Office heaters and water heats used for comfort heating that are less than 5 MMBtu/hr	Unknown	Unknown	< 5 MMBtu/hr	20.2.72.202B.(1)(a)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	< 5 MMBtu/hr	----	Unknown	
Tank No. 1	Recycle Water Tank	Unknown	Unknown	7.9	20.2.72.202B.(5)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	cubic meter	----	Unknown	
Tank No. 2	Clear Water Tank	Unknown	Unknown	53.0	20.2.72.202B.(5)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	cubic meter	----	Unknown	
Tank No. 3	Pulp Water Tank	Unknown	Unknown	53.0	20.2.72.202B.(5)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	cubic meter	----	Unknown	
Tank No. 4	Pump Mixer / Water and paper	Unknown	Unknown	~ 7.6	20.2.72.202B.(5)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	cubic meter	----	Unknown	
Tank No. 5	Dispersant Use Tank / Sodium, Potassium Sulfate and Water	Unknown	Unknown	0.76	20.2.72.202B.(5)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	cubic meter	----	Unknown	
Tank No. 6	Retarder Use Tank / Water and Penta-NA Diethylenetriamine Pentaacetate	Unknown	Unknown	0.76	20.2.72.202B.(5)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	cubic meter	----	Unknown	
Tank No. 7	Soap Use Tank / Ammonium Salt of Ethoxy-lated Alcohol Sulfate	Unknown	Unknown	0.70	20.2.72.202B.(5)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	cubic meter	----	Unknown	
Tank No. 8	Emulsion Use Tank	Unknown	Unknown	3.4	20.2.72.202B.(5)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	cubic meter	----	Unknown	
Tank No. 9	Glue Use Tank / Glue	Unknown	Unknown	0.38	20.2.72.202B.(5)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	cubic meter	----	Unknown	
Tank No. 10	Glue Mixer Tank / Glue	Unknown	Unknown	0.38	20.2.72.202B.(5)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	cubic meter	----	Unknown	
Tank No. 11	Chilled Water Makeup Tank / Water	Unknown	Unknown	26.5	20.2.72.202B.(5)	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	cubic meter	----	Unknown	

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
Tank No. 12	Chilled Water Use Tank / Water	Unknown	Unknown Unknown	5.3 cubic meter	20.2.72.202B.(5) ----	Unknown Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Tank No. 13	Foam Water Tank / Water	Unknown	Unknown Unknown	5.3 cubic meter	20.2.72.202B.(5) ----	Unknown Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Tank No. 14	Bladder Water Tank /	Unknown	Unknown Unknown	~0.57 cubic meter	20.2.72.202B.(5) ----	Unknown Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Tank No. 15	Water Tank	Unknown	Unknown Unknown	1892.7 cubic meter	20.2.72.202B.(5) ----	Unknown Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Tank No. 16	Dispersant Storage Tank / Sodium, Potassium Sulfate and Water	Unknown	Unknown Unknown	64.4 cubic meter	20.2.72.202B.(5) ----	Unknown Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Tank No. 17	Soap Storage Tank / Ammonium Salt of Ethoxy-lated Alcohol Sulfate	Unknown	Unknown Unknown	64.4 cubic meter	20.2.72.202B.(5) ----	Unknown Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Tank No. 18	Retarder Storage Tank / Water and Penta-NA Diethylenetriamine Pentaacetate	Unknown	Unknown Unknown	64.4 cubic meter	20.2.72.202B.(5) ----	Unknown Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Tank No. 19	Diesel Storage Tank	Unknown	Unknown Unknown	75.7 cubic meter	20.2.72.202B.(5) ----	Unknown Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Tank No. 20	Gasoline Storage Tank	Unknown	Unknown Unknown	7.6 cubic meter	20.2.72.202B.(5) ----	Unknown Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Tank No. 21	Propane Pressurize Storage Tank	Unknown	Unknown Unknown	1000.0 gallons	20.2.72.202B.(5) ----	Unknown Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Tank No. 22	Hot Melt Glue Tank / 1 butene propene polymer	Unknown	Unknown Unknown	Unknown cubic meter	20.2.72.202B.(5) ----	Unknown Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Stockpile	indoor stockpile	Not Applicable	Unknown Unknown	Unknown cubic meter	20.2.72.202B.(5) ----	Unknown Unknown	☑ 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
1	Gypsum rock load in enclosure. Fugitive Source	Unknown	PM_{10}, $PM_{2.5}$	1	N/A	Engineering Judgement
2	Baghouse - Rock storage and reclaim (crusher, conceyors, elevator)	Unknown	PM_{10}, $PM_{2.5}$	2	N/A	NSPS Subpart OOO,
3	Baghouse - Rock tank storage bin	Unknown	PM_{10}, $PM_{2.5}$	3	N/A	NSPS Subpart OOO,
4	Baghouse x2 - Calciner	Unknown	PM_{10}, $PM_{2.5}$	4	N/A	NSPS Subpart OOO,
5	Baghouse - Stucco Storage Tank	Unknown	PM_{10}, $PM_{2.5}$	5	N/A	NSPS Subpart OOO,
6	Baghouse - Stucco Storage Tank	Unknown	PM_{10}, $PM_{2.5}$	6	N/A	NSPS Subpart OOO,
7	Baghouse - Starch receiving	Unknown	PM_{10}, $PM_{2.5}$	7	N/A	NSPS Subpart OOO,
8	Baghouse - Starch use	Unknown	PM_{10}, $PM_{2.5}$	8	N/A	NSPS Subpart OOO,
9	Baghouse - Accelerator and misc. dry additive receiving	Unknown	PM_{10}, $PM_{2.5}$	9	N/A	NSPS Subpart OOO,
10	Baghouse - Misc. dry additives and stucco metering	Unknown	PM_{10}, $PM_{2.5}$	10	N/A	NSPS Subpart OOO,
12	Baghouse x2 - Edge Trimmer	Unknown	PM_{10}, $PM_{2.5}$	12	N/A	NSPS Subpart OOO,
13	Baghouse - Sleutter Production	Unknown	PM_{10}, $PM_{2.5}$	13	N/A	NSPS Subpart OOO,
14	Baghouse - Enclosed Stucco	Unknown	PM_{10}, $PM_{2.5}$	14	N/A	NSPS Subpart OOO,

[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		TSP[2]		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
1	-	-	-	-	-	-	-	-	-	-	0.62	0.78	0.095	0.12	-	-	-	-
2a	-	-	-	-	-	-	-	-	-	-	0.16	0.20	0.024	0.030	-	-	-	-
2b	-	-	-	-	-	-	-	-	-	-	3.10	13.6	3.10	13.58	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	0.22	0.96	0.22	0.96	-	-	-	-
4	6.75	29.57	4.67	20.44	0.31	1.34	0.39	1.73	-	-	4.67	20.4	0.96	4.20	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	0.45	1.98	0.14	0.59	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	0.45	1.98	0.14	0.59	-	-	-	-
7	-	-	-	-	-	-	-	-	-	-	0.23	1.00	0.068	0.30	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	0.076	0.33	0.023	0.10	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	0.076	0.33	0.023	0.10	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	0.76	3.33	0.23	1.00	-	-	-	-
11	10.00	43.80	13.60	59.57	0.55	2.41	0.21	0.94	-	-	0.95	4.16	0.43	1.87	-	-	-	-
12 - North	-	-	-	-	-	-	-	-	-	-	480.00	2102.40	480.00	2102.40	-	-	-	-
12 - South	-	-	-	-	-	-	-	-	-	-	480.00	2102.40	480.00	2102.40	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	75.34	330.00	75.34	330.00	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	0.99	4.34	0.30	1.30	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	18.46	65.36	1.85	6.54	-	-	-	-
Totals	16.75	73.37	18.27	80.01	0.86	3.75	0.61	2.66	-	-	1066.56	4653.57	1042.92	4566.09	-	-	-	-

[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 TSP unless TSP is set equal to PM10 and PM2.5.

[2] **TSP: Standard has been repealed.**

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		TSP[2]		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
1	-	-	-	-	-	-	-	-	-	-	0.31	0.39	0.047	0.059	-	-	-	-
2a	-	-	-	-	-	-	-	-	-	-	0.16	0.20	0.024	0.030	-	-	-	-
2b	-	-	-	-	-	-	-	-	-	-	1.90	8.32	0.57	2.50	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	0.076	0.33	0.023	0.10	-	-	-	-
4	6.75	29.57	4.67	20.44	0.31	1.34	0.39	1.73	-	-	4.67	20.44	0.96	4.20	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	0.45	1.98	0.14	0.59	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	0.45	1.98	0.14	0.59	-	-	-	-
7	-	-	-	-	-	-	-	-	-	-	0.23	1.00	0.068	0.30	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	0.076	0.33	0.023	0.10	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	0.076	0.33	0.023	0.10	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	0.76	3.33	0.23	1.00	-	-	-	-
11	10.00	43.80	13.60	59.57	0.55	2.41	0.21	0.94	-	-	0.95	4.16	0.43	1.87	-	-	-	-
12 - North	-	-	-	-	-	-	-	-	-	-	0.41	1.79	0.41	1.79	-	-	-	-
12 - South	-	-	-	-	-	-	-	-	-	-	0.35	1.52	0.35	1.52	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	0.38	1.66	0.38	1.66	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	0.99	4.34	0.30	1.30	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	0.18	0.65	0.018	0.065	-	-	-	-
Totals	16.75	73.37	18.27	80.01	0.86	3.75	0.61	2.66	-	-	12.41	52.76	4.12	17.79	-	-	-	-

[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 TSP unless TSP is set equal to PM10 and PM2.5.

[2] **TSP: Standard has been repealed.**

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

☐ 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		TSP[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
SSM/M	-	-	-	-	-	-	-	-	-	-	-	10	-	10	-	-	-	-
Totals	-	-	-	-	-	-	-	-	-	-	-	10	-	10	-	-	-	-

[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.

[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 TSP unless TSP is set equal to PM10 and PM2.5.

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

☐ 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		TSP		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)			
Fugitive	1	N/A	N/A (indoor discharge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	2	V	N/A (indoor discharge)	50	70.00	167	N/A	N/A	53.05	2.00
3	3	V	No	96.0	70.0	400.0	N/A	N/A	41.9	0.5
4	4	V	No	80.0	315.0	826.6	N/A	N/A	52.4	4.50
5	5	V	No	81.0	200.0	61.6	N/A	N/A	191.7	0.6
6	6	V	No	81.0	200.0	62.0	N/A	N/A	191.7	0.64
7	7	V	No	84.0	70.0	20.0	N/A	N/A	125.8	0.5
Fugitive	8	N/A	N/A (indoor discharge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fugitive	9	N/A	N/A (indoor discharge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fugitive	10	N/A	N/A (indoor discharge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	11	V	No	53	210.00	833.3	N/A	N/A	42.44	5.00
Fugitive	12	V	N/A (indoor discharge)	N/A	70	66	N/A	N/A	N/A	0.83
Fugitive	13	V	N/A (indoor discharge)	N/A	70	33	N/A	N/A	N/A	0.83
14	14	V	No	25	200.00	20	N/A	N/A	61.0	2.00
Fugitive	15	N/A	N/A (Haul Road)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fugitive	16	N/A	N/A (indoor discharge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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		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		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
Fugitive	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fugitive	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	4	0.13	0.57	Refer to attached Calculations for a complete list of the HAPS emissions generated using GRI-HAP 3.1 Detail Emision Report.														-	-
5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fugitive	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fugitive	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fugitive	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	11	0.23	1.03	Refer to attached Calculations for a complete list of the HAPS emissions generated using GRI-HAP 3.1 Detail Emision Report.														-	-
Fugitive	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fugitive	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals:		0.36	1.60																

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
4	Natural Gas	Purchased Commercial	900 BTU/scf	55. Mscf	584 MMscf	0.75 gr/100 scf	N/A
11	Natural Gas	Purchased Commercial	900 BTU/scf	100 Mscf	1,051 MMscf	0.75 gr/100 scf	N/A

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)
N/A. Please refer to the Tank are identified in Table 2-B.									

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			
N/A. Please refer to the Tank are identified in Table 2-B.													

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)**
Gypsum	CaSO4 2H2O	N/A	500,000 tpy	Gypsum	CaSO4 2H2O	N/A	500,000 tpy

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
N/A: This facility does not have CEM Equipment.									

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
N/A: This facility does not have Parametric Measurement Equipment.								

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**										
1	**mass GHG**	-	-	-	-	-									-	-
	CO_2e	-	-	-	-	-									-	-
2	**mass GHG**	-	-	-	-	-									-	-
	CO_2e	-	-	-	-	-									-	-
3	**mass GHG**	-	-	-	-	-									-	-
	CO_2e	-	-	-	-	-									-	-
4	**mass GHG**	25,591.5	0.05	0.48	-	-									25,592.0	-
	CO_2e	25,591.5	14.4	12.1	-	-									-	25,617.9
5	**mass GHG**	-	-	-	-	-									-	-
	CO_2e	-	-	-	-	-									-	-
6	**mass GHG**	-	-	-	-	-									-	-
	CO_2e	-	-	-	-	-									-	-
7	**mass GHG**	-	-	-	-	-									-	-
	CO_2e	-	-	-	-	-									-	-
8	**mass GHG**	-	-	-	-	-									-	-
	CO_2e	-	-	-	-	-									-	-
9	**mass GHG**	-	-	-	-	-									-	-
	CO_2e	-	-	-	-	-									-	-
10	**mass GHG**	-	-	-	-	-									-	-
	CO_2e	-	-	-	-	-									-	-
11	**mass GHG**	46,065	0.09	0.87	-	-									46,066	-
	CO_2e	46,065	25.9	21.7	-	-									-	46,112
12	**mass GHG**	-	-	-	-	-									-	-
	CO_2e	-	-	-	-	-									-	-
13	**mass GHG**	-	-	-	-	-									-	-
	CO_2e	-	-	-	-	-									-	-
14	**mass GHG**	-	-	-	-	-									-	-
	CO_2e	-	-	-	-	-									-	-
15	**mass GHG**	-	-	-	-	-									-	-
	CO_2e	-	-	-	-	-									-	-
Total	**mass GHG**	71,656	0.14	1.35											71,658	-
	CO_2e	71,656	40.27	33.79											-	71,730

[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).

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

American Gypsum's Bernalillo Wallboard Plant processes gypsum to make gypsum wallboard. The plant processes 500,000 tons per year of gypsum. The facility currently operates under NSR Permit 0689-M2R4 and Title V Operating Permit P225R2.

The below table lists the proposed changes that are being requested for the facility with this permit application:

Emission Source	Description	Proposed Change
EP-1	Gypsum Rock Load-in	Proposed increase in the PM_{10}, and $PM_{2.5}$ emission limits due to an updated calculation methodology.
EP-2a	Rock Storage and Reclaim	Proposed increase in the PM_{10} and $PM_{2.5}$ emission limits due to an updated calculation methodology. Previously Units EP-2a and EP-2b emissions were combined and permitted under Unit 2. With this application Unit 2 will now become Unis EP-2a and EP-2b.
EP-2b	Gypsum Reclaim Load-in	
EP-3	Rock Tank	Proposed reduction in the $PM_{2.5}$ emission limit due to an updated calculation methodology.
EP-4	Furnace/Ball Mill	Proposed increase in the NOx and VOC emission limits and proposed reduction in the CO, SO_2, PM_{10}, and $PM_{2.5}$ emission limits due to an updated calculation methodology. Increase in sulfur content of natural gas from 0.2 gr/100 scf to 0.75 gr/100 scf to match tariff sheet provided by New Mexico Gas Company.
EP-5	Stucco Storage	Proposed reduction in the PM_{10}, and $PM_{2.5}$ emission limits due to an updated calculation methodology.
EP-6	Stucco Storage	
EP-7	Starch Receiving	Proposed reduction in the $PM_{2.5}$ emission limit due to an updated calculation methodology.
EP-8	Starch Use	Proposed increase in the PM_{10}, and $PM_{2.5}$ emission limits due to an updated calculation methodology.

EP-9	Accelerator and Misc. Dry Additives	Proposed increase in the PM_{10}, and $PM_{2.5}$ emission limits due to an updated calculation methodology.
EP-10	Misc. Dry Additives and Stucco Metering	Proposed increase in the PM_{10}, and $PM_{2.5}$ emission limits due to an updated calculation methodology.
EP-11	Dryer	Proposed reduction in the NOx, VOC, and $PM_{2.5}$ emission limits due to an updated calculation methodology. Proposed reduction in the CO emission limit due to more recent stack testing data with an included safety factor. Proposed increase in the SO_2 emission limit due to an updated calculation methodology. Increase in sulfur content of natural gas from 0.2 gr/100 scf to 0.75 gr/100 scf to match Tariff sheet provided by New Mexico Gas Company.
EP-14	Enclosed Stucco Conveyance System	Proposed reduction in the $PM_{2.5}$ emission limit due to an updated calculation methodology.
EP-15	Haul Road Emissions	Addition of a haul road which will include PM_{10} and $PM_{2.5}$ emissions.
EP-2b, EP-8, EP-9, EP-10, EP-12 North, EP-12 South, and EP-13	Multiple units	These emission units are enclosed within a building. Conservatively, as they units are inside a building only a certain percentage of the emissions will vent to the atmosphere. A reduction factor is used to estimate the fraction of emissions leaving the building through loading bay doors. Section 6 in this application will show the emission rates from each unit, any controls applied to the unit and the building retention reduction.

The aforementioned updated calculation methodologies for all the emission sources are clearly described in Section 6 of this application.

Per 20.2.72.219.D(1), this proposed revision will require a significant revision since it does not meet the criteria under the provisions for administrative or technical permit revisions.

The modification to facility wide emission rates associated with this permit modification will reduce the source emissions below Title V thresholds. As there are no physical changes associated with this permit modification, the facility will no longer be a Title V facility after the permit issuance.

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.

A process flow sheet has been attached to the following page.

Not Controlled
Note: Emissions are discharged inside building.

Truck Dump Building

Gypsum Rock Mine Truck

EU No. 1
Gypsum Road Load-in

Recycling Building (waste wallboard)

Recycled Wallboard Norba/flake-breaker

EU No. 2
Rock Storage and Reclaim

CU No. 2
Bag House / Filter
Note: Emissions discharged inside building.

Rock Storage Building

CU No. 3
Bag House / Filter
Note: Emissions from the transfer are also collected by this control.

EU No. 3
Rock Tank

CU No. 4
Bag House / Filter

CP Mill

Natural Gas-Fired Furnace

EU No. 4
Calciner

Enclosed Stucco Conveyance System {With integrated process dust collector}

Emission Unit No. # 14

CU No. "5" Bag House / Filter

CU No. "6" Bag House / Filter

EU No. 5
Stucco Storage Silo

EU No. 6
Stucco Storage Silo

CU No. 7
Bag House / Filter

EU No. 7
Starch Receiving

Starch Storage Silo

CU No. 8
Bag House / Filter

Starch Metering

EU No. 8
Starch Use
Note: Vents indoors

CU No. 9
Bag House / Filter
Note: Vents indoors

EU No. 9
Accelerator and Miscellaneous Dry Additives Receiving

CU No. 10
Bag House / Filter
Note: Vents indoors

Stucco Metering

Accelerator and Miscellaneous Dry Additives Metering

EU No. 10
Miscellaneous Dry Additives and Stucco Metering

Mixing

CU No. 13
Bag House / Filter
Note: Vents indoors

CU No. 12
Bag House / Filter

Not Controlled
Stacked Emission

Natural Gas-Fire d Furnace

EU No. 13
Sleutter Production

EU No. 12 – North and 12 - South
Edge Trimmer
Note: Vents indoors

EU No. 11
Direct Heat Dryer

EU No. 15
Haul Roads

Emission Control Units

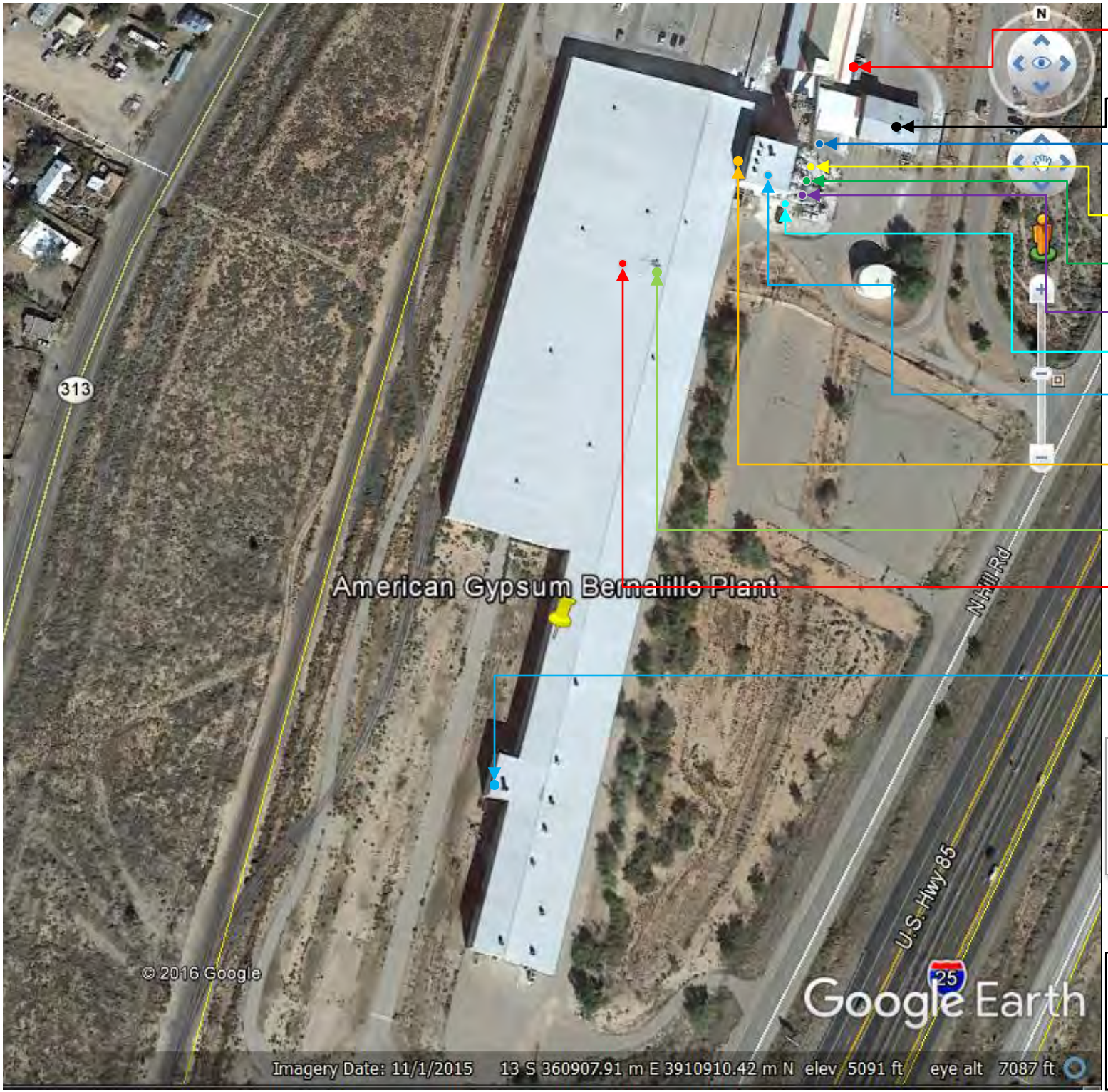
Emission Unit No. #

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.

A plot plan has been attached to the following page.



Notes:
1-Plot shows approximate locations of Emission Units.
2- Haul Road Emissions "Traffic Segments" are not shown. Refer to the calculations for additional information.

American Gypsum Bernalillo Wallboard Plant
1000 North Hill Road Bernalillo, NM 87004

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.

For all the calculations included in this application, the following assumptions and data were used:

1) Peak gypsum rock loading rate = 4,800 tons/day
2) Gypsum rock processing rate = 500,000 tons/yr
3) TSP is removed from all calculations due to the repeal of the standard on November 30, 2018.
4) Assumes 8,760 hrs/yr operation for annual emission calculations
5) For emission units controlled by baghouses, maximum particulate concentration of 0.05 grams/dscm was used in accordance with NSPS Subpart OOO, 40 CRF 60.672
6) Stucco Production = 85% Gypsum Rock Production

Please note that Units 2b, 8, 9, 10, 12, and 13 are controlled by multiple baghouses, which emit inside the main building. This building is approximately 390 meters long and has large bay doors at each end for loading/unloading vehicles. As such, American Gypsum has conservatively modeled a fraction of the emissions emitting from the stacks located within the building as volume sources at the ends of the building (bay doors). The emissions represented in Table 2-E and described in this section are the emissions at the stack tip for units 8, 9, 10, 12 and 13 (post baghouses that release inside the building). The combined emissions from these units are modeled as "SouthP" and "NorthP" (as shown in the Table below) and include a 90% reduction in emissions due to the building retention.

Model ID	Unit ID	Table 2-E Emission Rates (lb/hr) – Emissions Post Baghouse		Building Reduced Emission Rate (lb/hr) – Emissions Vented to the Atmosphere		Modeled Emission Rate (lb/hr) – Combined Emissions Vented to the Atmosphere at each Bay Door	
		$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
NorthP	8	0.023	0.076	0.0023	0.0076	0.0273	0.0912
	9	0.023	0.076	0.0023	0.0076		
	10	0.228	0.760	0.0228	0.0760		
SouthP	12 (Combined)	0.757	0.757	0.0757	0.0757	0.1137	0.1137
	13	0.380	0.380	0.0380	0.0380		

Emission Unit 1: Gypsum Rock Load-In

For Emission Unit 1, PM_{10}, and $PM_{2.5}$ emission rates were calculated using Equation 1 and parameters from AP-42, Chapter 13.2.4. The mean wind speed and material moisture content used in Equation 1 are NMED accepted default values. A conservative 50% reduction was assumed for all pollutants based on the West Regional Air Partnership's (WRAP) Fugitive Dust Handbook. Table 4-2 of the WRAP guidance allows a 75% control efficiency for a 3-sided enclosure. The gypsum rock load-in operation is conducted within a roofed building consisting of four solid walls with openings for vehicles to enter and exit during unloading. In addition, the unloading operation is from the bottom of a trailer into an enclosed underground storage pit. Based on the building and operational setup a 50 % control was deemed conservative in the estimation of controlled emissions for EU1.

Emission Unit 2a: Gypsum Reclaim Load-in

Emissions associated with Emission Unit 2a were calculated using emission factors and equations from AP-42, Chapter 13.2.4.3. This methodology accounts for the cumulative emissions from aggregate storage piles including:

- Loading of aggregate onto storage piles
- Equipment traffic in storage area
- Wind erosion of pile surfaces and ground areas around piles
- Loadout of aggregate

Therefore, this method will conservatively estimate the emissions from the unloading of material into the reclaim crusher or onto a stockpile. This process unit emits within a large enclosed building, which is open on one side for loader/vehicle entry. As such, an additional control of 75% control was applied to the controlled indoor emissions based on Table 4-2, *Control Efficiencies for Materials Handling*, in Chapter 4 of the West Regional Air Partnership's (WRAP) fugitive dust handbook, which outlines a 75% reduction for fugitive emission sources enclosed within 3-sided enclosures.

Emission Unit 2b: Rock Storage and Reclaim

Emission Unit 2b consists of the sum of the following individual emission sources which make up the rock storage and reclaim: Crushing, Screening and several different transfer conveyors including the elevated Tripper belt. Emission factors from AP-42, Table 11.19.2-2 for each of the individual sources were combined into a composite emission factor to calculate uncontrolled emissions for this unit.

The design flow rate and maximum particulate concentration of 0.05 grams/dscm (NSPS OOO requirement) of the baghouse were used to calculate controlled emissions for this source. $PM_{2.5}$ emissions were further refined and estimated to be 30% of PM10 emissions based on particle size distribution data from AP-42, Appendix B-2, Table B.2.2. A safety factor of 25% was added to all the emission rates.

Emission Unit 3: Rock Tank

The uncontrolled emissions associated with this source were calculated using an emission factor for a conveyor transfer point obtained from AP-42, Table 11.19.2-2 (8/04).

This process includes a baghouse whose design flow rate and maximum particulate concentration of 0.05 grams/dscm (NSPS OOO requirement) were used to calculate controlled emissions for this source. $PM_{2.5}$ emissions were further refined and estimated to be 30% of TSP emissions based on particle size distribution data from AP-42, Appendix B-2, Table B.2.2. A safety factor of 25% was added to all the emission rates for this unit.

Emission Unit 4: Calciner

For Emission Unit 4's combustion emissions, CO, VOC, and PM emission limits were calculated using emission factors for small boilers from AP-42, Tables 1.4-1 and 1.4-2 (7/98). NO_x emissions were calculated using 2017 test data with a 25% safety factor. SO_2 emissions were calculated using 1990 test data, with a 25% safety factor, and a maximum fuel gas sulfur content of 0.75 grains of total sulfur per 100 standard cubic feet of natural gas per the New Mexico Gas Company Tariff sheet.

The PM_{10} emission limits from the calcining dust collector were calculated using the dust collector's flow rate and maximum particulate concentration of 0.05 grams/dscm (NSPS OOO requirement). $PM_{2.5}$ emissions were based on 2017 test data, including a 25% safety factor.

Greenhouse Gases for this emission source were calculated in accordance with the 40 CFR Part 98, Subpart C- General Stationary Fuel Combustion Sources (Eq. C-1a).

GRI-HAPCalc 3.01 was used to calculate total HAP emissions.

Emission Units 5 and 6: Stucco Storage

The emissions associated with the dust collector for these two emission sources were calculated using the dust collector design flow value and a maximum particulate concentration of 0.05 grams/dscm (NSPS OOO requirement). $PM_{2.5}$ emissions were further refined and estimated to be 30% of PM emissions based on particle size distribution data from AP-42, Appendix B-2, Table B.2.2.

Emission Unit 7: Starch Receiving

The process for this emission unit includes a baghouse whose design flow rate and maximum particulate concentration of 0.05 grams/dscm (NSPS OOO requirement) were used to calculate controlled emissions for this source. $PM_{2.5}$ emissions were further refined and estimated to be 30% of PM emissions based on particle size distribution data from AP-42, Appendix B-2, Table B.2.2. A safety factor of 25% was added to all the emission rates.

Emission Unit 8: Starch Use (emits inside building)

A dust collector controls this source. As such, the controlled emissions were calculated using the dust collector design flow value and maximum particulate concentration of 0.05 grams/dscm (NSPS OOO requirement). $PM_{2.5}$ emissions were further refined and estimated to be 30% of TSP emissions based on particle size distribution data from AP-42, Appendix B-2, Table B.2.2. A safety factor of 25% was added to all the emission rates. This source is combined with other sources within the building to be modeled as "NorthP" which has an addition control of 90% due to building retention.

Emission Unit 9: Accelerator & Misc. Dry Additives Receiving (emits inside building)

A dust collector controls this source. As such, the controlled emissions were calculated using the dust collector design flow value and maximum particulate concentration of 0.05 grams/dscm (NSPS OOO requirement). $PM_{2.5}$ emissions were further refined and estimated to be 30% of TSP emissions based on particle size distribution data from AP-42, Appendix B-2, Table B.2.2. A safety factor of 25% was added to all the emission rates. This source is combined with other sources within the building to be modeled as "NorthP" which has an addition control of 90% due to building retention.

Emission Unit 10: Misc. Dry Additive and Stucco Metering (emits inside building)

A dust collector controls this source. As such, the controlled emissions were calculated using the dust collector design flow and maximum particulate concentration of 0.05 grams/dscm (NSPS OOO requirement). $PM_{2.5}$ emissions were further refined and estimated to be 30% of TSP emissions based on particle size distribution data from AP-42, Appendix B-2, Table B.2.2. A safety factor of 25% was added to all the emission rates. This source is combined with other sources within the building to be modeled as "NorthP" which has an addition control of 90% due to building retention.

Emission Unit 11: Direct Heat Dyer

For Emission Unit 11, NO_x, VOC, and PM emissions were calculated using emission factors for small boilers from AP-42, Tables 1.4-1 and 1.4-2 (7/98). $PM_{2.5}$ emissions were further refined and estimated to be 45% of PM emissions based on particle size distribution data from AP-42, Appendix B-2, Table B.2.2. A 25% safety factor was added to the PM_{10}, and $PM_{2.5}$ emissions. CO emissions were calculated using 2017 test data with an added 100% safety factor. SO_2 emissions were calculated based on a maximum fuel gas sulfur content of 0.75 grains of total sulfur per 100 standard cubic feet of natural gas.

Emission Units 12 - North and 12 - South: Edge Trimmer

The uncontrolled emissions associated with Emission Units 12 – North and 12 - South were calculated using an emission factor for end sawing from AP-42, Table 11.16-2 (1/95). An individual dust collector controls each of these sources. As such, the controlled emissions were calculated using the dust collector design flow and maximum particulate concentration of 0.05 grams/dscm (NSPS OOO requirement).

Emission Unit 13: Sleutter Production

The uncontrolled emissions associated with Emission Unit 13 were calculated using an emission factor for end sawing from AP-42, Table 11.16-2 (1/95). A dust collector controls this source. As such, the controlled emissions were calculated using the dust collector design flow and maximum particulate concentration of 0.05 grams/dscm (NSPS OOO requirement). A safety factor of 25% was added to all the emission rates.

Emission Unit 14: Enclosed Stucco Conveyance System {with an integrated process dust collector}

The emissions associated with this source were calculated using the maximum flow rate of the process dust collector and a maximum particulate concentration of 0.014 grains/dscf, as required by NSPS OOO. $PM_{2.5}$ emissions were further refined and estimated to be 30% of PM emissions based on particle size distribution data from AP-42, Appendix B-2, Table B.2.2.

Emission Unit 15: Paved Roads

Uncontrolled haul road emissions were calculated using emission factors and equations from AP-42, Chapter 13.2.2. Since the facility roads are frequented by three different truck types (loaded rock trucks, empty wallboard trucks, and loaded wallboard trucks), emissions were calculated for five combinations of road segments and truck types. The surface material silt content and the number of wet days used in the Chapter 13.2.2 equations were based on NMED accepted values. The haul roads onsite are paved and as such a control efficient of 99% was applied to estimate the controlled emissions. This control efficiency is obtained from Table 6-6 of the WRAP guidance handbook for paving unpaved roads.

Startup, Shutdown, and Maintenance (SSM) & Malfunction Emissions

In accordance with NMED's *SSM Permitting and Implementation Guidance*, American Gypsum is requesting a conservative total limit of 10 tpy each for PM_{10}, and $PM_{2.5}$ for SSM and malfunction events at the facility.

Gypsum Rock Load-In — Emission Point 1

Source Description: Fugitive source inside building (open on 2 sides)

Process Data

4,800.00	tons/day	Peak gypsum rock loading rate
500,000.00	tons/yr	Annual gypsum rock processing rate

Emission Factor Parameters

	0.35	from AP-42 13.2.4(8/04)	PM_{10} Particle Size Mutiplier
	0.053	from AP-42 13.2.4 (8/04)	$PM_{2.5}$ Particle Size Multiplier
	2.00	% moisture content	NMED accepted value
	11.00	MPH	NMED accepted value
PM_{10}	0.0031	lb/ton	emission factor (E), AP-42 13.2.4
$PM_{2.5}$	0.0005	lb/ton	emission factor (E), AP-42 13.2.4

Emission Rates

PM_{10}	$PM_{2.5}$	Units	
0.00	0.00	lb/ton	Emission factor
0.62	0.09	lb/hr	lb/ton*ton/day/24
0.78	0.12	tpy	E * ton (rock)/yr / 2000 lb/ton
0.31	0.05	lb/hr	50% enclosure credit
0.39	0.06	tpy	

Note 1

50% reduction for a 2 sided structure is conservatively applied to the PM_{10}/$PM_{2.5}$ emissions based on West Regional Air Partnership's (WRAP) Fugitive Dust Handbook (September 7, 2006) for a 3 sided structure (75%). The unloading operation is conducted in a building with 4 solid walls with a roof and openings for vehicles to enter/exit on two of the walls. The unloading is from the bottom of a trailer into an underground (enclosed) storage pit. Therefore assuming a 50% control is a conservative estimate.

Gypsum Reclaim Load -In

Emission Point 2a

Source Description Fugitive source inside building (open on 1 side)

Process Data

4,800	tons/day	Peak gypsum rock loading rate
500,000	tons/yr	Annual gypsum rock processing rate

Emission Factor Parameters

0.35	from AP-42 13.2.4	PM_{10} Particle Size Mutiplier
0.053	from AP-42 13.2.4	$PM_{2.5}$ Particle Size Multiplier
2.00	%	Moisture content
11.00	MPH	

PM_{10}	0.0031	lb/ton	emission factor (E)
$PM_{2.5}$	0.0005	lb/ton	emission factor (E)

Emission Rates

PM_{10}	$PM_{2.5}$	Units	
0.0031	0.0005	lb/ton	E
0.1561	0.0236	lb/hr	lb/ton*ton/day/24
0.20	0.03	tpy	lb/ton * ton (rock)/yr / 2000 lb/ton

Note 1 75% reduction for a 3 sided structure is conservatively applied to the PM/PM10 fugitive emissions based on West Regional Air Partnership's (WRAP) Fugitive Dust Handbook (September 7, 2006).

Rock Storage and Reclaim — Emission Point 2b

Source Description: Controlled Source exhaust outside building

Process Data

4,800	tons/day	Peak gypsum rock loading rate
500,000	tons/yr	Annual gypsum rock processing rate

Uncontrolled Emission Rates

Process Description	PM_{10}	$PM_{2.5}$	Reference:
Crusher	0.0024	0.0024	AP-42 Table 11.19.2-2 (08/04) (SCC 3-050030-03)
Screening	0.0087	0.0087	AP-42 Table 11.19.2-2 (08/04) (SCC 3-05-020-02)
Transfer to screw conveyor	0.0011	0.0011	AP-42 Table 11.19.2-2 (08/04) (SCC 3-05-020-06)
Transfer to elevator	0.0011	0.0011	AP-42 Table 11.19.2-2 (08/04) (SCC 3-05-020-06)
Transfer to conveyor	0.0011	0.0011	AP-42 Table 11.19.2-2 (08/04) (SCC 3-05-020-06)
Transfer to storage pile	0.0011	0.0011	AP-42 Table 11.19.2-2 (08/04) (SCC 3-05-020-06)
Composite Emission Factor	0.016	0.016	lb/ton

Hourly and Annual Emission Rates

$PM_{10}=PM_{2.5}$

$$\frac{0.016\ \text{lb}}{\text{ton}} \times \frac{4{,}800\ \text{ton}}{\text{day}} \times \frac{1\ \text{day}}{24\ \text{hr}} = \frac{3.100\ \text{lb}}{\text{hr}}$$

$$\frac{13.578\ \text{ton}}{\text{year}}$$

Controlled Emission Rates

Dust Collector flow data:	8,108.7	scfm	
	13,782.6	ascm/hr	scfm ÷ 35.3 ft3/m3 * 60 min/hr.
NSPS Subpart OOO	0.05	g/dscm	Maximum particulate concentration per 40 CFR 60.672

Maximum Emissions from Baghouse allowed under NSPS Subpart OOO, 40 CFR 60.672

Hourly and Annual Emission Rates

PM_{10}[1]

$$\frac{0.05\ \frac{g}{scm} \times 13{,}782.6\ \frac{scm}{hr} \times 1\ lb \times (1+0.25)}{453.6\ g} = 1.90\ \frac{lb}{hr}$$

$$8.32\ \frac{ton}{year}$$

$PM_{2.5}$[1] = (0.3) PM_{10} AP-42 Appendix B-2 Table B.2.2

$$\frac{0.3 \times 0.05\ \frac{g}{scm} \times 13{,}782.6\ \frac{scm}{hr} \times 1\ lb \times (1+0.25)}{453.6\ g} = 0.570\ \frac{lb}{hr}$$

$$2.50\ \frac{ton}{year}$$

[1] A 25% safety factor was added to all the pollutants.

Dust Collector Design Rates

Data	Units	Source	
15.24	meters	Stack Height	
10,000.0	acfm	Design flow through baghouse	
70.0	ºF	Stack temperature, ºF	Ambient
294.3	K	Stack temperature, K	(ºF-32) ÷ 1.8 + 273.15
5,111.0	ft.	Site elevation, ft.	Site data
1,557.8	m	Site elevation, meters	ft. MSL * 0.3048 m/ft.
839.3	mb	Ambient pressure	Hess, Introduction to Theoretical Meteorology, eq. 6-8
8,108.7	scfm	Flow through baghouse (standard conditions)	
		acfm * 839.3 mb ÷ 1013 mb * 288 K ÷ 294.26 K (ideal gas)	
2	ft.	stack diameter	
53.05	ft/s	Stack velocity	
50	ft	Stack Height	

Rock Tank

Emission Point 3

Source Description: Point Source

Process Data

4,800	tons/day	Peak gypsum rock loading rate
500,000	tons/yr	Annual gypsum rock processing rate

Uncontrolled Emission Rates

Process Description	PM_{10}	$PM_{2.5}$[1]	Reference:
Rock Tank	0.0011	0.0011	lb/ton AP-42 Table 11.19.2-2 (08/04) (SCC 3-05-020-06)

[1] As a conservative approach, it was assumed that $PM_{2.5}$=PM_{10}

Hourly and Annual Emission Rates

PM_{10} = $PM_{2.5}$

$$\frac{0.00110\ \text{lbs}}{\text{ton}} \times \frac{4{,}800\ \text{ton}}{\text{day}} \times \frac{1\ \text{day}}{24\ \text{hr}} = \begin{array}{|r|l|} \hline 0.22 & \text{lb/hr} \\ \hline 0.96 & \text{ton/year} \\ \hline \end{array}$$

Controlled Emission Rates

dust collector flow data:	324.3	scfm	Refer to Baghouse Data
	551.3	scm/hr	scfm ÷ 35.3 ft^3/m^3 * 60 min/hr.
NSPS Subpart OOO	0.050	g/dscm	Maximum particulate concentration per 40 CFR 60.672

Maximum Emission from Baghouse allowed under NSPS Subpart OOO, 40 CFR 60.672

Hourly and Annual Emission Rates[1]

PM_{10}

$$\frac{0.05\ \text{g}}{\text{scm}} \times \frac{551.3\ \text{scm}}{\text{hr}} \times \frac{1\ \text{lb}}{453.6\ \text{g}} \times \frac{(1+0.25)}{\text{25\% Safety Factor}} = \begin{array}{|r|l|} \hline 0.076 & \text{lb/hr} \\ \hline 0.33 & \text{ton/yr} \\ \hline \end{array}$$

$PM_{2.5}$ = (0.3) PM_{10} AP-42 Appendix B-2 Table B.2.2

$$\frac{0.30}{} \times \frac{0.050\ \text{g}}{\text{scm}} \times \frac{551.3\ \text{scm}}{\text{hr}} \times \frac{1\ \text{lb}}{453.6\ \text{g}} \times \frac{(1+0.25)}{\text{25\% Safety Factor}} = \begin{array}{|r|l|} \hline 0.023 & \text{lb/hr} \\ \hline 0.10 & \text{ton/year} \\ \hline \end{array}$$

[1] A 25% safety factor was added to all the pollutants.

Dust Collector Design Rates

Data	Units	Source	
400	acfm	design flow	
70	ºF	Stack temperature	
294.3	K	Stack temperature, K	(ºF-32) ÷ 1.8 + 273.15
5,111.0	ft. MSL	Site elevation, ft.	Site data
1,557.8	m	Site elevation, meters	ft. MSL * 0.3048 m/ft.
96.0	ft	Stack height	
0.45	ft	Stack diameter	
839.3	mb	Ambient pressure	Hess, Introduction to Theoretical Meteorology
324.3	scfm	Flow through baghouse (standard conditions)	
		acfm * 839.3 mb ÷ 1013 mb * 288 K ÷ 294.26 K (ideal gas)	
41.9	ft/s	Stack velocity	

Calciner Furnace Ball Mill — Emission Point 4

Source Description: Point Source

Process Data

500,000.00	tons/yr	Gypsum rock processing rate	
425,000.00	tons/yr	Stucco production rate-85% of rock	
48.52	tons/hr	Stucco production rate, 8760 hrs/yr	

Fuel Data

50	MMBtu/hr	Nameplate heat rate	
900	Btu/scf	Nominal fuel LHV	
55.6	Mscf/hr	Hourly fuel usage	Heat rate ÷ fuel heat value ÷ 1000
584.0	MMscf/yr	Annual fuel usage	Assumes 8760 hrs/yr operation, with an added 20% safety factor

Emission Rates

Calcining--SO_2

0.22	lb/hr.	SO_2 emissions from 1990 test data
0.28	lb/hr.	Tested emissions + safety factor (25%)

Calcining--PM 2.5

0.54	lb/hr.	Maximum TSP emissions from 2017 test data + 25% safety factor

Calcining--NO_x

6.75	lb/hr	Maximum NOx emissions from 2017 test data + 25% safety factor

NO_X, CO, VOC, SO_2, PM (furnace)

NO_X	CO	VOC	SO_2[1]	PM (Total)	Units	Reference
----	84	5.5	----	7.6	lb/MMscf	AP-42 Table 1.4-1,2 (1-01-006-02)
6.75	----	----	0.28	----	lb/hr	2017 test data (NO_x) 1990 test data (SO_2)
----	----	----	0.12	----	lb/hr	0.75 gr S/100 scf added
----	4.67	0.31	----	0.42	lb/hr	lb/MMscf * MMscf/hr (AP-42)
6.75	4.67	0.31	0.39	0.42	lb/hr	sum
29.57	20.44	1.34	1.73	1.85	tpy	Assumes 8760 hrs./yr.

Note: This specific source has SCC 30501511.

New Mexico Gas Sulfur Content Gas Analysis: 0.75 gr S/100 scf

[1] 0.75 gr S/100 scf * fuel scf/hr * 1 lb/7000 gr * 64 lb SO2/ 32 lb S = lb/hr SO2

Process Emission Rates--TSP, PM-10, PM2.5 (mill)

Dust Collector flow data:	22,659.9	dscfm	Stack flow (see below)
	38,515.4	scm/hr	scfm ÷ 35.3 ft^3/m^3 * 60 min/hr.
NSPS Subpart OOO	0.050	g/dscm	NSPS Subpart OOO 40 CFR 60.672

Maximum Emission from dust collector allowed under NSPS Subpart OOO, 40 CFR 60.672

PM_{10}

$$0.05\ \frac{g}{scm} \times 38{,}515.4\ \frac{scm}{hr} \times \frac{1}{453.6}\ \frac{lb}{g} = 4.25\ \frac{lb}{hr}$$

$$4.25\ \frac{lb}{hr} \times 18.60\ \frac{ton}{year}$$

$PM_{2.5}$ = 0.54 lb/hr Conservative assumption based on 2017 stack test + 25 % Safety Factor

Emissions Summary, Sum of Above Emission Calculations (sum combustion + dust collector)

NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$ [2]	Total HAPs[1]	
6.8	4.67	0.31	0.39	4.67	0.96	-	lb/hr
29.6	20.4	1.3	1.7	20.4	4.2	0.57	tpy

[1] Total HAP emissions were calculated using GRI HAPCalc.

[2] Total $PM_{2.5}$ = Short term emission rate from Calcining + Combustion emissions.

Dust Collector Flow Rate Data and Stack Parameters:

Data	Units	Source	
50,000.0	acfm	Flow through stack (actual)	Engineering data
315.0	ºF	Stack temperature	Engineering data
430.4	K	Stack temperature	(F-32) / 1.8 + 273.5
5,111.0	ft. MSL	Site elevation	Site data
839.3	mb	Ambient pressure at site elevation	(see baghouse sample calculation)
27,721.2	wscfm	Flow through stack (standard)	acfm * 839.3 mb ÷ 1013 mb * 288 K ÷ 430.4 K
371.0	lb/min	Water content of stack flow	Engineering estimate
1,661.0	lb/min	Dry air content of stack flow	Engineering estimate
0.8		Ratio of dry air to total flow	dry air / (dry air + water)
22,659.9	dscfm	Flow thorough stack (standard)	dry/total ratio * wscfm
80.0	ft.	Stack height	Engineering data
54.0	in	Stack diameter	Measured
52.4	ft./sec	Stack velocity	stack flow / stack area

GHG Emissions

Pollutant	Emission Factor (lb/10^6 scf)	Emission (tons/yr)
SO_2	0.6	0.2
TOC	11	3.2
Methane	2.3	0.7

where: MMscf = 10^6 scf
Per AP-42 (7/98) Table 1.4.-2

Greenhouse Gases Emissions from Natural Gas Combustion

Subpart C- General Stationary Fuel Combustion Sources 98.30

$CO_2 = 1 \times 10^{-3} \times Gas \times EF$ (Eq. C-1a)

where:

CO_2 = Annual CO_2 mass emission from natural gas combustion (metric ton).

Gas = Annual natural gas usage, from billing records (mmBtu)

EF = Fuel-specific default CO_2 emission factor for natural gas (kg CO_2/mmBtu)

Table C1 of this subpart : 53.02 (kg CO_2/mmBtu)

50.00	MMBtu	8,760	hrs	53.02	kg CO_2	1	Metric Ton
	hr		yr		MMBtu	1000	kg

CO_2 = 23,222.8 metric ton/yr
25,591.5 ton (US)/yr

CH_4 or N_2O = 1 x 10-3 x Fuel x EF (Eq. C-8b)

where:

CH_4 or N_2O = Annual Emission from the combustion of natural gas (metric tons)

CH_4 = 1.0 x 10-3 kg CH4/mmBtu

50.00	MMBtu	8,760	hrs	1.00E-03	kg CH_4	1	Metric Ton
	hr		yr		MMBtu	1000	kg

CH_4 = 0.44 metric ton/yr
0.48 ton (US)/yr

Converted to CO_{2e} 0.48 25 = 12.07 tons/yr CO_{2e}

N_2O = 1.0 x 10-4 kg N_20/mmBtu

50.00	MMBtu	8,760	hrs	1.00E-04	kg CH_4	1	Metric Ton
	hr		yr		MMBtu	1000	kg

N_2O 0.04 metric ton/yr
0.05 ton (US)/yr

Converted to CO_{2e} 0.05 298 = 14.38 tons/yr CO_{2e}

Stucco Storage — Emission Points 5 & 6

Source Description: Point Source

Emission Rates

Dust Collector flow data: 2,409.0 scfm — Refer to Baghouse Data
4,094.6 scm/hr — scfm ÷ 35.3 ft^3/m^3 * 60 min/hr.
NSPS Subpart OOO 0.050 g/dscm — Maximum particulate concentration per 40 CFR 60.672

Maximum Emissions from Baghouse allowed under NSPS Subpart OOO, 40 CFR 60.672

PM_{10}

$$\frac{0.05 \text{ g}}{\text{scm}} \times 4{,}094.6 \text{ scm} \times \frac{1 \text{ hr}}{453.6 \text{ g}} \times \frac{1 \text{ lb}}{\text{g}} = 0.45 \frac{\text{lb}}{\text{hr}}$$

$$0.45 \frac{\text{lb}}{\text{hr}} \times 1.98 \frac{\text{ton}}{\text{year}}$$

$PM2.5 = (0.30)\ PM_{10}$ AP-42 Appendix B-2 Table B.2.2

$$\frac{0.050 \text{ g}}{\text{scm}} \times 4{,}094.6 \text{ scm} \times \frac{1 \text{ hr}}{453.6 \text{ g}} \times \frac{1 \text{ lb}}{\text{g}} \times 0.3 = 0.14 \frac{\text{lb}}{\text{hr}}$$

$$0.14 \frac{\text{lb}}{\text{hr}} \times 0.59 \frac{\text{ton}}{\text{yr}}$$

Baghouse Flow Rate Data and Stack Parameters:

3,700.0	acfm	Flow through baghouse	Engineering data
200.0	ºF	Stack temperature, ºF	Estimated
366.5	K	Stack temperature, K	(ºF-32) ÷ 1.8 + 273.15
5,111.0	ft	Site elevation	Site data
1,557.8	m	Site elevation	ft MSL * 0.3048 m/ft
839.3	mb	Ambient pressure at site elevation	Hess, Introduction to Theoretical Meteorology, eq. 6-8
2,409.0	scfm	Flow through baghouse (standard)	acfm * 839.3 mb ÷ 1013 mb * 288 K ÷ 366.48 K
81.0	ft	Stack height	Measured
0.64	ft	Stack diameter	Measured
191.7	ft/sec	Stack velocity	acfm ÷ stack area

Starch Receiving

Emission Point 7

Source Description: Point Source

Process Data

500,000.0	tons/yr	Gypsum rock processing rate
10.8	lb/ton	Starch usage rate

Emission Rates[1]

Baghouse flow data:	973.0	scfm	Refer to Baghouse Data
	1,653.9	scm/hr	scfm ÷ 35.3 ft^3/m^3 * 60 min/hr.
NSPS Subpart OOO	0.050	g/dscm	Maximum particulate concentration per 40 CFR 60.672

Maximum Emission from Baghouse allowed under NSPS Subpart OOO, 40 CFR 60.672

PM_{10}

$$0.05 \frac{g}{scm} \times 1{,}653.9 \frac{scm}{hr} \times \frac{1}{453.6} \frac{lb}{g} \times (1+0.25)\ \text{25\% Safety Factor} = 0.23 \frac{lb}{hr}$$

$$0.23 \frac{lb}{hr} \times 1.00 \frac{ton}{year}$$

$PM_{2.5} = (0.30)\ PM_{10}$ AP-42 Appendix B-2 Table B.2.2

$$0.30 \times 0.050 \frac{g}{scm} \times 1{,}653.9 \frac{scm}{hr} \times \frac{1}{453.6} \frac{lb}{g} \times (1+0.25)\ \text{25\% Safety Factor} = 0.068 \frac{lb}{hr}$$

$$0.068 \frac{lb}{hr} \times 0.30 \frac{ton}{yr}$$

[1] A 25% safety factor was added to all the pollutants.

Baghouse Flow Rate Data and Stack Parameters:

1,200.0	acfm	Flow through baghouse	Engineering data
70.0	ºF	Stack temperature, ºF	Estimated
294.3	K	Stack temperature, K	(ºF-32) ÷ 1.8 + 273.15
5,111.0	ft MSL	Site elevation	Site data
1,557.8	m	Site elevation	ft MSL * 0.3048 m/ft
839.3	mb	Ambient pressure at site elevation	Hess, Introduction to Theoretical Meteorology, eq. 6-8
973.0	scfm	Flow through baghouse (standard)	acfm * 839.3 mb ÷ 1013 mb * 288 K ÷ 294.3 K
0.45	ft	Stack Diameter	
84.0	ft	Stack height	Measured
125.75	ft/s	Stack velocity	

Starch Use

Emission Point 8

Source Description: Controlled source emits within building

Emission Rates

Dust Collector flow data: 324.3 scfm Refer to Baghouse Data
551.3 scm/hr scfm ÷ 35.3 ft^3/m^3 * 60 min/hr.
NSPS Subpart OOO 0.050 g/dscm Maximum particulate concentration per 40 CFR 60.672

PM_{10}[1]

$$\frac{0.05 \text{ g}}{\text{scm}} \times \frac{551.3 \text{ scm}}{\text{hr}} \times \frac{1}{453.6} \times \frac{\text{lb}}{\text{g}} \times (1+0.25) \text{ 25\% Safety Factor} = \frac{0.0760 \text{ lb}}{\text{hr}}$$

$$\frac{0.333 \text{ ton}}{\text{year}}$$

$PM_{2.5}$[1] = (0.30) PM_{10} AP-42 Appendix B-2 Table B.2.2

$$\frac{0.3}{} \times \frac{0.050 \text{ g}}{\text{scm}} \times \frac{551.3 \text{ scm}}{\text{hr}} \times \frac{1}{453.6} \times \frac{\text{lb}}{\text{g}} \times (1+0.25) \text{ 25\% Safety Factor} = \frac{0.0228 \text{ lb}}{\text{hr}}$$

$$\frac{0.100 \text{ ton}}{\text{yr}}$$

[1] A 25% safety factor was added to all the pollutants.

Dust Collector Flow Rate Data and Stack Parameters:

400.0	acfm	Flow through baghouse	Engineering data
70.0	ºF	Stack temperature, ºF	Estimated
294.3	K	Stack temperature, K	(ºF-32) ÷ 1.8 + 273.15
5,111.0	ft MSL	Site elevation	Site data
1,557.8	m	Site elevation	ft MSL * 0.3048 m/ft
839.3	mb	Ambient pressure at site elevation	Hess, Introduction to Theoretical Meteorology, eq. 6-8
324.3	scfm	Flow through baghouse (standard)	acfm * 839.3 mb ÷ 1013 mb * 288 K ÷ 294.3 K
0.38	ft	Stack diameter	
32	ft	Stack height	

Misc. Dry Additives Receiving

Emission Point 9

Source Description: Controlled source emits within building

Emission Rates

Dust Collector flow data:	324.35	scfm	Refer to Baghouse Data
	551.3	scm/hr	scfm ÷ 35.3 ft^3/m^3 * 60 min/hr.
NSPS Subpart OOO	0.050	g/dscm	Maximum particulate concentration per 40 CFR 60.672

PM_{10}[1]

$$\frac{0.05\ \frac{g}{scm} \times 551.3\ \frac{scm}{hr} \times 1\ \frac{lb}{453.6\ g} \times (1+0.25)}{\text{25\% Safety Factor}} = 0.076\ \frac{lb}{hr}$$

$$0.076\ \frac{lb}{hr} \times 0.333\ \frac{ton}{year}$$

$PM_{2.5}$[1] = (0.30) PM_{10} AP-42 Appendix B-2 Table B.2.2

$$\frac{0.3 \times 0.050\ \frac{g}{scm} \times 551.3\ \frac{scm}{hr} \times 1\ \frac{lb}{453.6\ g} \times (1+0.25)}{\text{25\% Safety Factor}} = 0.0228\ \frac{lb}{hr}$$

$$0.0228\ \frac{lb}{hr} \times 0.10\ \frac{ton}{yr}$$

[1] A 25% safety factor was added to all the pollutants.

Dust Collector Flow Rate Data and Stack Parameters:

400.0	acfm	Flow through baghouse	Engineering data
70.0	ºF	Stack temperature, ºF	Estimated
294.3	K	Stack temperature, K	(ºF-32) ÷ 1.8 + 273.15
5,111.0	ft MSL	Site elevation	Site data
1,557.8	m	Site elevation	ft MSL * 0.3048 m/ft
839.3	mb	Ambient pressure at site elevation	Hess, Introduction to Theoretical Meteorology, eq. 6-8
324.3	scfm	Flow through baghouse (standard)	acfm * 839.3 mb ÷ 1013 mb * 288 K ÷ 294.3 K
12.0	ft	Stack height	
0.375	ft	Stack diameter	

Misc. Dry Additives/Stucco Metering

Emission Point 10

Source Description: Controlled source emits within building

Emission Rates

Dust Collector flow data:	3,243.5	scfm	Refer to Baghouse Data
	5,513.0	scm/hr	scfm ÷ 35.3 ft^3/m^3 * 60 min/hr.
NSPS Subpart OOO	0.050	g/dscm	Maximum particulate concentration per 40 CFR 60.672

PM_{10}[1]

$$\frac{0.05\ \frac{g}{scm} \times 5{,}513.0\ \frac{scm}{hr} \times 1\ \frac{lb}{453.6\ g} \times (1+0.25)}{25\%\ \text{Safety Factor}} = 0.760\ \frac{lb}{hr}$$

$$0.760\ \frac{lb}{hr} = 3.33\ \frac{ton}{year}$$

$PM_{2.5}$[1] = (0.30) PM_{10} AP-42 Appendix B-2 Table B.2.2

$$\frac{0.3 \times 0.050\ \frac{g}{scm} \times 5{,}513.0\ \frac{scm}{hr} \times 1\ \frac{lb}{453.6\ g} \times (1+0.25)}{25\%\ \text{Safety Factor}} = 0.23\ \frac{lb}{hr}$$

$$0.23\ \frac{lb}{hr} = 1.00\ \frac{ton}{yr}$$

[1] A 25% safety factor was added to all the pollutants.

Dust Collector Flow Rate Data and Stack Parameters:

4,000.0	acfm	Flow through baghouse	Engineering data
70.0	ºF	Stack temperature, ºF	Estimated
294.3	K	Stack temperature, K	(ºF-32) ÷ 1.8 + 273.15
5,111.0	ft MSL	Site elevation	Site data
1,557.8	m	Site elevation	ft MSL * 0.3048 m/ft
839.3	mb	Ambient pressure at site elevation	Hess, Introduction to Theoretical Meteorology, eq. 6-8
3,243.5	scfm	Flow through baghouse (standard)	acfm * 839.3 mb ÷ 1013 mb * 288 K ÷ 294.3 K
30.0	ft	Stack height	
1	ft	Stack diameter	

Direct Heat Dryer — Emission Point 11

Source Description: Point Source

Fuel Data

90.0	MMBtu/hr	heat capacity	Manufacturers data
900.0	Btu/scf	Nominal fuel heating value	
100.0	Mscf/hr	Hourly fuel usage	Heat rate ÷ fuel heat value ÷ 1000
1,051.2	MMscf/yr	Annual fuel usage	Assumes 8760 hrs/yr operation, with an added 20% safety factor

Emissions - NO_X, CO, VOC, SO_2, PM

NO_X	CO	VOC	SO_2	PM (Total)	HAPs	Units	Reference
100	----	5.5	----	7.6	----	lb/MMscf	AP-42 Table 1.4-1,2 (1-01-006-02)
----	----	----	----	----	0.23	lb/hr	GRI HAPCalc 3.01
----	----	----	0.21	----	----	lb/hr	NM Gas Sulfur Content Contract
10.00	----	0.55	----	0.76	----	lb/hr	lb/MMscf * MMscf/hr
----	13.6	----	----	----	----	lb/hr	2017 Test Data + 100% safety factor
----		----	----	0.95	----	lb/hr	25% safety factor
43.8	59.6	2.4	0.94	4.2	1.0	tpy	Assumes 8760 hrs/yr

Emissions - PM10 & PM2.5

PM_{10} = PM (Total)	0.950	lb/hr	
	4.2	tpy	
$PM_{2.5}$ = 0.45 TSP	0.428	lb/hr	AP-42 Appendix B-2 Table B.2.2
	1.872	tpy	

Note: This specific source has SCC 30501511.
New Mexico Gas Sulfur Content Gas Analysis: 0.75 gr S/100 scf
0.75 gr S/100 scf * fuel scf/hr * 1 lb/7000 gr * 64 lb SO2/ 32 lb S = lb/hr SO2

Stack Parameters:

210.0	°F	Exhaust temp (Tstk)	Estimated
50,000.0	acfm	Exhaust flow	Engineering data
60.0	in	Stack diameter	Measured
42.4	ft/sec	Exhaust velocity	Exhaust flow ÷ stack area
53.0	ft.	Stack height	Measured
833.3	acfs	Exhaust Flow	

GHG Emissions

Annual fuel usage 1051.2 MMscf/yr

Greenhouse Gases Emissions from Natural Gas Combustion

Subpart C- General Stationary Fuel Combustion Sources 98.30

$CO_2 = 1 \times 10^{-3} \times Gas \times EF$ (Eq. C-1a)

where:

CO_2 = Annual CO_2 mass emission from natural gas combustion (metric ton).

Gas = Annual natural gas usage, from billing records (mmBtu)

EF = Fuel-specific default CO_2 emission factor for natural gas (kg CO_2/mmBtu)

Table C1 of this subpart = 53.02 (kg CO_2/mmBtu)

90.00	MMBtu / hr	8,760	hrs / yr	53.02	kg CO_2 / MMBtu	1 / 1000	Metric Ton / kg

CO_2 = 41,801.0 metric ton/yr

46,064.7 ton (US)/yr

CH_4 or N_2O = 1 x 10-3 x Fuel x (Eq. C-8b)

where:

CH_4 or N_2O = Annual Emission from the combustion of natural gas (metric tons)

CH_4 = 1.0 x 10-3 kg CH4/mmBtu

90.0	MMBtu / hr	8,760	hrs / yr	1.0E-03	kg CH_4 / MMBtu	1 / 1000	Metric Ton / kg

CH_4 = 0.79 metric ton/yr

0.87 ton (US)/yr

Converted to CO_{2e} 0.87 25 = 21.7 tons/yr CO_{2e}

90.0	MMBtu / hr	8,760	hrs / yr	1.0E-04	kg CH_4 / MMBtu	1 / 1000	Metric Ton / kg

N_2O 0.08 metric ton/yr

0.09 ton (US)/yr

Converted to CO_{2e} 0.09 298 = 25.9 tons/yr CO_{2e}

Edge Trimmer

Emission Point 12 - North

Source Description: Point Source located and emits within building

1.2	M sq ft/ton	Gross board production, engineering estimate
96.0	M sq ft/hr	Gross board production, engineering estimate
960.0	100 sq ft/hr	Gross board production, engineering estimate

Uncontrolled Emission Rates

Description	PM_{10}	$PM_{2.5}$	Units	Reference:
Edge Trimmer	0.50	0.50	lb/100 sq ft	AP-42 Table 11.16-2 (1/95) for end sawing

Hourly Emission Rates (Uncontrolled)

$PM_{10} = PM_{2.5}$

$$\frac{0.50\ \text{lb}}{100\ \text{sq ft}} \times \frac{960.0\ \text{100 sq ft}}{\text{hr}} = \frac{480.00\ \text{lb}}{\text{hr}}$$

Yearly Emission Rates

$PM_{10} = PM_{2.5}$

$$\frac{480.00\ \text{lb}}{\text{hr}} \times \frac{8{,}760\ \text{hr}}{\text{year}} \times \frac{1\ \text{ton}}{2{,}000\ \text{lbs}} = \frac{2102.4\ \text{ton}}{\text{year}}$$

Controlled Emission Rates

Baghouse flow data:	2,186.8	scfm	Refer to Baghouse Data
	3,716.9	scm/hr	scfm ÷ 35.3 ft^3/m^3 * 60 min/hr.
NSPS Subpart OOO	0.050	g/dscm	Maximum particulate concentration per 40 CFR 60.672

Maximum Emission from Baghouse allowed under NSPS Subpart OOO, 40 CFR 60.672

$PM_{10} = PM_{2.5}$

$$\frac{0.050\ \text{g}}{\text{scm}} \times \frac{3{,}716.9\ \text{scm}}{\text{hr}} \times \frac{1\ \text{lb}}{453.6\ \text{g}} = \frac{0.41\ \text{lb}}{\text{hr}}$$

$$\frac{0.41\ \text{lb}}{\text{hr}} \times \frac{8{,}760\ \text{hr}}{\text{year}} \times \frac{1\ \text{ton}}{2{,}000\ \text{lbs}} = \frac{1.79\ \text{ton}}{\text{year}}$$

Edge Trimmer (continued) Emission Point 12 - North

Baghouse Flow Rate Data and Stack Parameters:

2,819.0	acfm	Flow through baghouse		Engineering data
94.0	ºF	Stack temperature, ºF		Stack test data
307.6	K	Stack temperature, K		(ºF-32) ÷ 1.8 + 273.15
5,111.0	ft	Site elevation		Site data
1,557.8	m	Site elevation		ft MSL * 0.3048 m/ft
839.3	mb	Ambient pressure at site elevation		Hess, Introduction to Theoretical Meteorology
2,186.8	scfm	Flow through baghouse (standard)		acfm * 839.3 mb ÷ 1013 mb * 288 K ÷ 294.3 K
17.0	ft.	Stack height	Engineering estimate	
1.0	ft.	Stack diameter	Engineering estimate	
70.00	ºF	Stack temperature	Ambient	
59.82	ft/sec	Stack velocity	acfm (from above) ÷ stack area	
46.983	acfs			

Edge Trimmer

Emission Point 12 - South

Source Description: Point Source located and emits within building

500,000	ton/yr	Gypsum rock usage rate
57.1	ton/hr	Gypsum rock usage, assuming 8760 hrs/yr
1.2	M sq ft/ton	Gross board production, engineering estimate
96.0	M sq ft/hr	Gross board production, engineering estimate
960.0	100 sq ft/hr	Gross board production, engineering estimate

Uncontrolled Emission Rates

Description	PM_{10}	$PM_{2.5}$	Units	Reference:
Edge Trimmer	0.50	0.50	lb/100 sq ft	AP-42 Table 11.16-2 (1/95) for end sawing

Hourly Emission Rates (Uncontrolled)

$PM_{10} = PM_{2.5}$

$$0.50 \frac{\text{lb}}{100\ \text{sq ft}} \times 960.0 \frac{100\ \text{sq ft}}{\text{hr}} = 480.00 \frac{\text{lb}}{\text{hr}}$$

Yearly Emission Rates

$PM_{10} = PM_{2.5}$

$$480.00 \frac{\text{lb}}{\text{hr}} \times 8{,}760 \frac{\text{hr}}{\text{year}} \times \frac{1}{2{,}000} \frac{\text{ton}}{\text{lbs}} = 2102.4 \frac{\text{ton}}{\text{year}}$$

Controlled Emission Rates

Baghouse flow data:	1,855.8	scfm	Refer to Baghouse Data
	3,154.3	scm/hr	scfm ÷ 35.3 ft^3/m^3 * 60 min/hr.
NSPS Subpart OOO	0.050	g/dscm	Maximum particulate concentration per 40 CFR 60.672

Maximum Emission from Baghouse allowed under NSPS Subpart OOO, 40 CFR 60.672

$PM_{10} = PM_{2.5}$

$$0.050 \frac{\text{g}}{\text{scm}} \times 3{,}154.3 \frac{\text{scm}}{\text{hr}} \times \frac{1}{453.6} \frac{\text{lb}}{\text{g}} = 0.35 \frac{\text{lb}}{\text{hr}}$$

$$0.35 \frac{\text{lb}}{\text{hr}} \times 8{,}760 \frac{\text{hr}}{\text{year}} \times \frac{1}{2{,}000} \frac{\text{ton}}{\text{lbs}} = 1.52 \frac{\text{ton}}{\text{year}}$$

Edge Trimmer (continued) Emission Point 12 - South

Baghouse Flow Rate Data and Stack Parameters:

2,375.0	acfm	Flow through baghouse		Engineering data
90.0	ºF	Stack temperature, ºF		Stack test data
305.4	K	Stack temperature, K		(ºF-32) ÷ 1.8 + 273.15
5,111.0	ft	Site elevation		Site data
1,557.8	m	Site elevation		ft MSL * 0.3048 m/ft
839.3	mb	Ambient pressure at site elevation		Hess, Introduction to Theoretical Meteorology
1,855.8	scfm	Flow through baghouse (standard)		acfm * 839.3 mb ÷ 1013 mb * 288 K ÷ 294.3 K
17.0	ft.	Stack height	Engineering estimate	
1.0	ft.	Stack diameter	Engineering estimate	
70.00	ºF	Stack temperature	Ambient	
50.40	ft/sec	Stack velocity	acfm (from above) ÷ stack area	
39.583	acfs			

Sleutter Production

Emission Point 13

Source Description: Point Source emits inside the building

Process Data

500,000.0	ton/yr	Gypsum rock usage rate	
57.1	ton/hr	Gypsum rock usage, assuming 8760 hrs./yr	
62.8	ton/hr	Gypsum rock usage, with 10% safety factor	
1.2	M sq ft/ton	Gross board production, engineering estimate	
75.3	M sq ft/hr	Gross board production, engineering estimate	
753.4	100 sq ft/hr	Gross board production, engineering estimate	
0.20	sq ft Sleutter per sq ft board		Engineering estimate
150.7	100 sq ft/hr		Sleutter area

Uncontrolled Emission Rates

Description	PM_{10}	$PM_{2.5}$	Units	Reference:
Sleutter Production	0.50	0.50	ɔ/100 sq	AP-42 Table 11.16-2 (1/95)

Hourly Emission Rates

$PM_{10} = PM_{2.5}$

$$\frac{0.50 \text{ lb}}{100 \text{ sq ft}} \times \frac{150.7 \text{ 100 sq ft}}{\text{hr}} = \frac{75.3 \text{ lb}}{\text{hr}}$$

Yearly Emission Rates

$PM_{10} = PM_{2.5}$

$$\frac{75.3 \text{ lb}}{\text{hr}} \times \frac{8{,}760 \text{ hr}}{\text{year}} \times \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} = \frac{330.0 \text{ ton}}{\text{year}}$$

Controlled Emission Rates

Baghouse flow data:	1,621.7	scfm	Refer to Baghouse Data
	2,756.5	scm/hr	scfm ÷ 35.3 ft^3/m^3 * 60 min/hr.
NSPS Subpart OOO	0.050	g/dscm	Maximum particulate concentration per 40 CFR 60.672

Maximum Emission from Baghouse allowed under NSPS Subpart OOO, 40 CFR 60.672

$PM_{10} = PM_{2.5}$ [1]

$$\frac{0.050 \text{ g}}{\text{scm}} \times \frac{2{,}756.5 \text{ scm}}{\text{hr}} \times \frac{1 \text{ lb}}{453.6 \text{ g}} \times (1+0.25) = \frac{0.380 \text{ lb}}{\text{hr}}$$

(25% safety factor added)

$$\frac{0.380 \text{ lb}}{\text{hr}} = \frac{1.66 \text{ ton}}{\text{yr}}$$

[1] A 25% safety factor was added to all the pollutants.

Baghouse Flow Rate Data and Stack Parameters:

2,000.0	acfm	Flow through baghouse		Estimated
70.0	ºF	Stack temperature, ºF		Estimated
294.3	K	Stack temperature, K		(ºF-32) ÷ 1.8 + 273.15
5,111.0	ft MSL	Site elevation		Site data
1,557.8	m	Site elevation		ft MSL * 0.3048 m/ft
839.3	mb	Ambient pressure at site elevation		Hess, Introduction to Theoretical Meteorology
1,621.7	scfm	Flow through baghouse (standard)		acfm * 839.3 mb ÷ 1013 mb * 288 K ÷ 294.3 K
1.0	ft.	Stack diameter	Engineering estimate	
8.5	ft	Stack height		
42.44	ft./sec	Stack velocity	acfm (from above) ÷ stack area	

Enclosed Stucco Conveyance System — Emission Point 14

Source Description: Point Source

Process Data

0.014	gr/dscf	NSPS Subpart OOO, 40 CFR 60.672 requirement for units installed after 2008	
8,250.0	dscf/min	Maximum Baghouse flow, standard cubic ft per minute	
495,000.0	dscf/hr	Baghouse flow, standard cubic feet per hour	dscf/min * 60 min/hr
0.99	lb/hr	Emissions from baghouse	gr/dscf * dscf/hr ÷ 7,000 gr/lb
4.3	tons/yr	Assumes 8760 hrs/yr operation	

Emission Rates

PM_{10}

$$\frac{0.014 \text{ gr}}{\text{dscf}} \times \frac{495{,}000.0 \text{ dscf}}{\text{hr}} \times \frac{1 \text{ lb}}{7000 \text{ g}} = \frac{0.99 \text{ lb}}{\text{hr}}$$

$$\frac{4.34 \text{ ton}}{\text{year}}$$

$PM_{2.5} = (0.30)\ PM_{10}$ AP-42 Appendix B-2 Table B.2.2

$$\frac{0.30}{} \times \frac{0.014 \text{ gr}}{\text{dscf}} \times \frac{495{,}000.0 \text{ dscf}}{\text{hr}} \times \frac{1 \text{ lb}}{7000 \text{ g}} = \frac{0.30 \text{ lb}}{\text{hr}}$$

$$\frac{1.30 \text{ ton}}{\text{yr}}$$

Dust Collector Flow Rate

11,500.0	acfm	Flow through baghouse	Engineering data
200.0	ºF	Stack temperature, ºF	Estimated
366.5	K	Stack temperature, K	(ºF-32) ÷ 1.8 + 273.15
5,111.0	ft MSL	Site elevation	Site data
1,557.8	m	Site elevation	ft MSL * 0.3048 m/ft
839.3	mb	Ambient pressure at site elevation	Hess, Introduction to Theoretical Meteorology, eq. 6-8
7,487.4	scfm	Flow through baghouse (standard)	acfm * 839.3 mb ÷ 1013 mb * 288 K ÷ 366.48 K

Stack Parameters

25.0	ft	Stack height	Estimated
2.0	ft	Stack diameter	Estimated
200.0	ºF	Stack temperature, ºF	Estimated
61.0	ft/sec	Stack velocity	acfm ÷ stack area
18.60	m/s		

Haul Roads

Emission Point 15

Segment 1A: Entrance Road, Loaded Rock Trucks

Rock Trucks Weight Data[a]		
Truck's Empty Weight:	26,500.0	lbs
Truck's Loaded Weight:	86,500.0	
Cargo Weight:	60,000.0	

Facility Production Limits		
Daily Rate	4,800.0	tons/day
	9,600,000.0	lbs/day
Max Truck	160.0	Per Day
	6.7	per hour

Wallboard Trucks Weight Data[a]		
Truck's Empty Weight:	31,000.0	
Truck's Loaded Weight:	79,000.0	
Cargo Weight:	48,000.0	

Facility Production Limits			
Daily Rate	4,800.0	tons/day	
	9,600,000.0	lbs/day	
Max Truck	200.0	Per Day	Based on one loading port
	8.3	per hour	

Note:

[a] Weight information provided by Ray Dabria by email on May 24, 2017.

Traffic Description: This segment is used by three different trucks types.

- Loaded Rock Trucks entering to the site from the state road. These trucks will continue it path on **Segment 2**.
- Empty wallboard trucks entering to the site from the state road. They will continue on **Segment 4**.
- Loaded wallboard trucks coming from **Segment 5** on their way to leave the site and entering the state road.

Total Length = 0.17 miles

Control Efficiency[9] = 99%

Loaded Rock Trucks Segment Calculations, based on AP-42 Sec. 13.2.2-2, Equation 2

Calculation Parameters											Hourly Emission Factors		Annual Emission Factors	
	s		W	P	k		a		b		E^2		E_{ext}^2	
Facility Operating Hours	Surface material AP-42 mean silt content[1]	Average Load Size	Vehicle + Cargo Weight, tons	AP-42 Map Wet Days[2]	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
	%	tons	tons	day	lb/VMT	lb/VMT					lb/VMT	lb/VMT	lb/VMT	lb/VMT
8,760.0	4.8	30.0	43.3	70	1.5	0.15	0.9	0.9	0.45	0.45	2.2	0.22	1.8	0.18

1 Per NMED Department Accepted Values Memo, default value to be used for silt content for Chapter 13.2.2 is: 4.8%.

2 AP-42 13.2.2, Equation 1a

AP-42 13.2.2, Equation 2

3 PM_{30} emission factor in equation is assumed as a surrogate for TSP emissions

Calculation Inputs				**Uncontrolled Emission Rate[7,8]**				**Controlled Emission Rate[9]**			
Trips per Load	Effective Segment Length[4]	Ave. Number of trips per hour[5]	VMT[6] each hour	PM_{10}		$PM_{2.5}$		PM_{10}		$PM_{2.5}$	
	mi	T	miles	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	0.17	7.00	1.19	2.600	9.204	0.260	0.920	0.026	0.092	0.003	0.009

*4 Effective Segment Length is based on the segment length * the number of trips*

5 Production Daily Capacity Limit / 2 Rock unloading bays

6 VMT = Vehicle Miles Travelled

*7 Uncontrolled Hourly Emission Rate (lb/hr) = E * VMT*

*8 Uncontrolled Emission Rate (tpy) = E_{ext} * VMT * 8760 hr/yr / 2000 lb/ton*

9 Based on Table 6-6, WRAP guidance. This value is the control efficiency for the control measure of paving unpaved roads.

Haul Roads

Emission Point 15

Segment 1B: Shared Entrance Road, Loaded and Unloaded Wall Board Trucks

Total Length= 0.16 miles

Unloaded Wallboard Trucks Segment Calculations, based on AP-42 Sec. 13.2.1.3 January, 2011, Equation 1

Calculation Parameters											Hourly Emission Factors		Annual Emission Factors	
	s		W	P	k		a		b		E^2		$E_{ext}{}^2$	
Facility Operating Hours	Surface material AP-42 mean silt content [1]	Average Load Size	Vehicle + Cargo Weight, tons	AP42 Map Wet Days [2]	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
	%	tons	tons	day	lb/VMT	lb/VMT					lb/VMT	lb/VMT	lb/VMT	lb/VMT
8,760.0	4.8	0.0	15.5	70	1.5	0.15	0.9	0.9	0.45	0.45	1.38	0.14	1.11	0.11

1 Per NMED Department Accepted Values Memo, default value to be used for silt content for Chaprter 13.2.2 is: 4.8%.

2 AP-42 13.2.2, Equation 1a
AP-42 13.2.2, Equation 2

3 PM_{30} emission factor in equation is assumed as a surrogate for TSP emissions

Calculation Inputs				**Uncontrolled Emission Rate [7,8]**				**Controlled Emission Rate [9]**			
Trips per Load	Effective Segment Length [4]	Ave. Number of trips per hour [5]	VMT [6] each hour	PM_{10}		$PM_{2.5}$		PM_{10}		$PM_{2.5}$	
	mi	T	miles	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	0.16	8.33	1.33	1.84	6.50	0.18	0.65	0.02	0.06	0.00	0.01

*4 Effective Segment Length is based on the segment length * the number of trips*

5 Production Daily Capacity Limit / 2 Rock unloading bays

6 VMT = Vehicle Miles Travelled

*7 Uncontrolled Hourly Emission Rate (lb/hr) = E * VMT*

*8 Uncontrolled Emission Rate (tpy) = E_{ext} * VMT * 8760 hr/yr / 2000 lb/ton*

9 Control efficiency based on NMED guidance

Haul Roads

Segment 1B: Shared Entrance Road, Loaded and Unloaded Wall Board Trucks (Continuation)

Loaded Wallboard Trucks Segment Calculations, based on AP-42 Sec. 13.2.1.3 January, 2011, Equation 1

Calculation Parameters											Hourly Emission Factors		Annual Emission factors	
	s		W	P	k		a		b		E^2		E_{ext}^2	
Facility Operating Hours	Surface material AP-42 mean silt content [1]	Average Load Size	Vehicle + Cargo Weight, tons	AP42 Map Wet Days [2]	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
	%	tons	tons		lb/VMT	lb/VMT					lb/VMT	lb/VMT	lb/VMT	lb/VMT
8,760.0	4.8	24.0	39.5	70	1.5	0.15	0.9	0.9	0.45	0.45	2.10	0.21	1.70	0.17

1 Per NMED Department Accepted Values Memo, default value to be used for silt content for Chaprter 13.2.2 is: 4.8%.

2 AP-42 13.2.2, Equation 1a

AP-42 13.2.2, Equation 2

3 PM_{30} emission factor in equation is assumed as a surrogate for TSP emissions

Calculation Inputs				**Uncontrolled Emission Rate [7,8]**				**Controlled Emission Rate [9]**			
Trips per Load	Effective Segment Length [4]	Ave. Number of trips per hour [5]	VMT [6] each hour	PM_{10}		$PM_{2.5}$		PM_{10}		$PM_{2.5}$	
	mi	T	miles	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	0.16	8.33	1.33	2.80	9.90	0.28	0.99	0.03	0.10	0.00	0.01

*4 Effective Segment Length is based on the segment length * the number of trips*

5 Production Daily Capacity Limit / 2 Rock unloading bays

6 VMT = Vehicle Miles Travelled

*7 Uncontrolled Hourly Emission Rate (lb/hr) = E * VMT*

*8 Uncontrolled Emission Rate (tpy) = E_{ext} * VMT * 8760 hr/yr / 2000 lb/ton*

9 Control efficiency based on NMED guidance

Particle Emission for this Road Segment			
PM_{10}		$PM_{2.5}$	
lb/hr	tpy	lb/hr	tpy
7.233	25.60	0.723	2.560

Particle Emission for this Road Segment			
PM_{10}		$PM_{2.5}$	
lb/hr	tpy	lb/hr	tpy
0.07	0.26	0.0072	0.03

Haul Roads

Emission Point 15

Segment 2: Loaded Rock Trucks driving towards raw material unloading station

Loaded Rock Trucks Weight Data[a]

Truck's Empty Weight:	26,500.0	lbs
Truck's Loaded Weight:	86,500.0	
Cargo Weight:	60,000.0	

Facility Production Limits

Daily Rate	4,800.0	tons/day
	9,600,000.0	lbs/day
Max Truck	160.0	Per Day
	6.7	per hour

Note:
[a] Weight information provided by Ray Dabria by email on May 24, 2017.
Traffic Description: This segment is only used loaded rock trucks heading to the rock unloading bays.
●Once the trucks unload their cargo, they leave the property by driving on **Segment 3**.

Total Length = 0.06 miles

Control Efficiency[9] = 99%

Loaded Rock Trucks Segment Calculations, based on AP-42 Sec. 13.2.1.3 January, 2011, Equation 1

Calculation Parameters											Hourly Emission Factors		Annual Emission Factors	
	s		W	P	k		a		b		E^2		E_{ext}^2	
Facility Operating Hours	Surface material AP-42 mean silt content [1]	Average Load Size	Vehicle + Cargo Weight, tons	AP42 Map Wet Days[2]	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
	%	tons	tons	day	lb/VMT	lb/VMT					lb/VMT	lb/VMT	lb/VMT	lb/VMT
8,760.0	4.8	30.0	43.3	70	1.5	0.15	0.9	0.9	0.45	0.45	2.1849	0.2185	1.7659	0.1766

1 Per NMED Department Accepted Values Memo, default value to be used for silt content for Chaprter 13.2.2 is: 4.8%.
2 AP-42 13.2.2, Equation 1a
AP-42 13.2.2, Equation 2
3 PM_{30} emission factor in equation is assumed as a surrogate for TSP emissions

Calculation Inputs				**Uncontrolled Emission Rate[7,8]**				**Controlled Emission Rate[9]**			
Trips per Load	Effective Segment Length[4]	Ave. Number of trips per hour[5]	VMT[6] each hour	PM_{10}		$PM_{2.5}$		PM_{10}		$PM_{2.5}$	
	mi	T	miles	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	0.06	7.00	0.42	0.92	3.25	0.09	0.32	0.01	0.03	0.00	0.00

*4 Effective Segment Length is based on the segment length * the number of trips*
5 Production Daily Capacity Limit / 2 Rock unloading bays
6 VMT = Vehicle Miles Travelled
*7 Uncontrolled Hourly Emission Rate (lb/hr) = E * VMT*
*8 Uncontrolled Emission Rate (tpy) = E_{ext} * VMT * 8760 hr/yr / 2000 lb/ton*
Control efficiency based on NMED guidance.
9 Based on Table 6-6, WRAP guidance. This value is the control efficiency for the control measure of paving unpaved roads.

Particle Emission for this Road Segment			
PM_{10}		$PM_{2.5}$	
lb/hr	tpy	lb/hr	tpy
9.18E-01	3.25E+00	9.18E-02	3.25E-01

Particle Emission for this Road Segment			
PM_{10}		$PM_{2.5}$	
lb/hr	tpy	lb/hr	tpy
9.18E-03	3.25E-02	9.18E-04	3.25E-03

Haul Roads

Segment 3: Unloaded Rock Trucks driving away from the raw material unloading station

Loaded Rock Trucks Weight Data[a]		
Truck's Empty Weight:	26,500.0	lbs
Truck's Loaded Weight:	86,500.0	
Cargo Weight:	60,000.0	

Facility Production Limits		
Daily Rate	4,800.0	tons/day
	9,600,000.0	lbs/day
Max Truck	160.0	Per Day
	6.7	per hour

Note:
[a] Weight information provided by Ray Dabria by email on May 24, 2017.
Traffic Description: This segment is used unloaded rock trucks leaving the site.

Total Length = 0.11 miles

Control Efficiency[9] = 99%

Unloaded Rock Trucks Segment Calculations, based on AP-42 Sec. 13.2.1.3 January, 2011, Equation 1

Calculation Parameters											Hourly Emission Factors		Annual Emission Factors	
	s		W	P	k		a		b		E^2		E_{ext}^2	
Facility Operating Hours	Surface material AP-42 mean silt content[1]	Average Load Size	Vehicle Weight, tons	AP42 Map Wet Days[2]	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
	%	tons	tons	day	lb/VMT	lb/VMT					lb/VMT	lb/VMT	lb/VMT	lb/VMT
8,760.0	4.8	30.0	13.3	70	1.5	0.15	0.9	0.9	0.45	0.45	1.283	0.128	1.04E+00	1.04E-01

1 Per NMED Department Accepted Values Memo, default value to be used for silt content for Chaprter 13.2.2 is: 4.8%.
2 AP-42 13.2.2, Equation 1a
AP-42 13.2.2, Equation 2
3 PM_{30} emission factor in equation is assumed as a surrogate for TSP emissions

Calculation Inputs				**Uncontrolled Emission Rate[7,8]**				**Controlled Emission Rate[9]**			
Trips per Load	Effective Segment Length[4]	Ave. Number of trips per hour[5]	VMT[6] each hour	PM_{10}		$PM_{2.5}$		PM_{10}		$PM_{2.5}$	
	mi	T	miles	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	0.11	7.00	0.77	0.988	3.497	0.0988	0.350	0.010	0.035	0.0010	0.003

*4 Effective Segment Length is based on the segment length * the number of trips*
5 Production Daily Capacity Limit / 2 Rock unloading bays
6 VMT = Vehicle Miles Travelled
*7 Uncontrolled Hourly Emission Rate (lb/hr) = E * VMT*
*8 Uncontrolled Emission Rate (tpy) = E_{ext} * VMT * 8760 hr/yr / 2000 lb/ton*
Control efficiency based on NMED guidance
9 Based on Table 6-6, WRAP guidance. This value is the control efficiency for the control measure of paving unpaved roads.

Particle Emission for this Road Segment			
PM_{10}		$PM_{2.5}$	
lb/hr	tpy	lb/hr	tpy
0.988	3.497	0.0988	0.350

Particle Emission for this Road Segment			
PM_{10}		$PM_{2.5}$	
lb/hr	tpy	lb/hr	tpy
0.010	0.03	0.001	0.003

Haul Roads

Segment 4: Unloaded wallboard truck driving to the materials loading station

Wallboard Trucks Weight Data[a]	
Truck's Empty Weight:	31,000.0
Truck's Loaded Weight:	79,000.0
Cargo Weight:	48,000.0

Facility Production Limits			
Daily Rate	4,800.0	tons/day	
	9,600,000.0	lbs/day	
Max Truck	200.0	Per Day	Based on one loading port
	8.3	per hour	

Note:

[a] Weight information provided by Ray Dabria by email on May 24, 2017.

Traffic Description: This segment is used by the unloaded wallboard trucks type on their way to reach the material loading area.

- Once the wallboard have been loaded in the truck the leave the building heading to **Segments 5** and then to **Segment 1**.

Total Length = 0.63 miles

Control Efficiency = 99%

Unloaded Wallboard Trucks Segment Calculations, based on AP-42 Sec. 13.2.1.3 January, 2011, Equation 1

Calculation Parameters											Hourly Emission Factors		Annual Emission Factors	
	s		W	P	k		a		b		E^2		E_{ext}^2	
Facility Operating Hours	Surface material AP-42 mean silt content [1]	Average Load Size	Vehicle Weight, tons	AP42 Map Wet Days[2]	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
	%	tons	tons	day	lb/VMT	lb/VMT					lb/VMT	lb/VMT	lb/VMT	lb/VMT
8,760.0	4.8	0.0	15.5	70	1.5	0.15	0.9	0.9	0.45	0.45	1.377	0.138	1.11	0.11

1 Per NMED Department Accepted Values Memo, default value to be used for silt content for Chaprter 13.2.2 is: 4.8%.

2 AP-42 13.2.2, Equation 1a

AP-42 13.2.2, Equation 2

3 PM_{30} emission factor in equation is assumed as a surrogate for TSP emissions

Calculation Inputs				**Uncontrolled Emission Rate[6,7]**				**Controlled Emission Rate[8]**			
Trips per Load	Effective Segment Length[4]	Ave. Number of trips per hour	VMT[5] each hour	PM_{10}		$PM_{2.5}$		PM_{10}		$PM_{2.5}$	
	mi	T	miles	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	0.63	8.33	5.25	7.23	25.59	0.72	2.56	0.07	0.26	0.01	0.03

*4 Effective Segment Length is based on the segment length * the number of trips*

5 VMT = Vehicle Miles Travelled

*6 Uncontrolled Hourly Emission Rate (lb/hr) = E * VMT*

*7 Uncontrolled Emission Rate (tpy) = E_{ext} * VMT * 8760 hr/yr / 2000 lb/ton*

8 Control efficiency based on NMED guidance

Particle Emission for this Road Segment			
PM_{10}		$PM_{2.5}$	
lb/hr	tpy	lb/hr	tpy
7.229	25.589	0.7229	2.559

Particle Emission for this Road Segment			
PM_{10}		$PM_{2.5}$	
lb/hr	tpy	lb/hr	tpy
0.07	0.26	0.007	0.026

Haul Roads

Segment 5: Loaded wallboard truck driving away from the materials loading station

Wallboard Trucks Weight Data[a]

Truck's Empty Weight:	31,000.0
Truck's Loaded Weight:	79,000.0
Cargo Weight:	48,000.0

Facility Production Limits

Daily Rate	4,800.0	tons/day
	9,600,000.0	lbs/day
Max Truck	200.0	Per Day
	8.3	per hour

Based on one loading port

Note:
[a] Weight information provided by Ray Dabria by email on May 24, 2017.
Traffic Description: This segment is used by the wallboard loaded truck leaving the material loading dock.
●These truck will drive to Segment 1 in order to leave the site and access the state road.

Total Length = 0.12 miles

Control Efficiency = 99%

Loaded Wallboard Trucks Segment Calculations, based on AP-42 Sec. 13.2.1.3 January, 2011, Equation 1

Calculation Parameters											Hourly Emission Factors		Annual Emission Factors	
	s		W	P	k		a		b		E^2		E_{ext}^2	
Facility Operating Hours	Surface material AP-42 mean silt content [1]	Cargo Average Load Size	Mean Vehicle + Load Weight, tons	AP42 Map Wet Days[2]	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
	%	tons	tons	day	lb/VMT	lb/VMT					lb/VMT	lb/VMT	lb/VMT	lb/VMT
8,760.0	4.8	24.0	39.5	70	1.5	0.15	0.90	0.90	0.45	0.45	2.098	0.210	1.70	0.17

1 Per NMED Department Accepted Values Memo, default value to be used for silt content for Chaprter 13.2.2 is: 4.8%.
2 AP-42 13.2.2, Equation 1a
AP-42 13.2.2, Equation 2
3 PM_{30} emission factor in equation is assumed as a surrogate for TSP emissions

Calculation Inputs				**Uncontrolled Emission Rate[6,7]**				**Controlled Emission Rate[8]**			
Trips per Load	Effective Segment Length[4]	Ave. Number of trips per hour	VMT[5] each hour	PM_{10}		$PM_{2.5}$		PM_{10}		$PM_{2.5}$	
	mi	T	miles	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	0.12	8.33	1.00	2.10E+00	7.43E+00	2.10E-01	7.43E-01	2.10E-02	7.43E-02	2.10E-03	7.43E-03

*4 Effective Segment Length is based on the segment length * the number of trips*
5 VMT = Vehicle Miles Travelled
*6 Uncontrolled Hourly Emission Rate (lb/hr) = E * VMT*
*7 Uncontrolled Emission Rate (tpy) = E_{ext} * VMT * 8760 hr/yr / 2000 lb/ton*
Control efficiency based on NMED guidance

Particle Emission for this Road Segment			
PM_{10}		$PM_{2.5}$	
lb/hr	tpy	lb/hr	tpy
2.0975	7.425	0.2098	0.7425

Particle Emission for this Road Segment			
PM_{10}		$PM_{2.5}$	
lb/hr	tpy	lb/hr	tpy
0.021	0.074	0.0021	0.007

Total Haul Road Particulate Emissions							
Uncontrolled				**Controlled**			
PM_{10}		$PM_{2.5}$		PM_{10}		$PM_{2.5}$	
lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
18.46	65.36	1.846	6.54	0.18	0.65	0.018	0.07

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:

- ☐ 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.
- ☐ 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.
- ☐ 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.

Emission Units 1, 2a, 12 - North, 12 – South, 13

- Table 4-2, WRAP Fugitive Dust Handbook (September 7, 2006)

Emission Units 1 and 2a

- AP-42, Chapter 13.2.4 (08/04)

Emission Units 2b, 3

- AP-42, Table 11.19.2-2 (08/04)

Emission Units 12 – North, 12 – South, and 13

- AP-42, Table 11.16-2 (1/95)

Emission Units 7, 8, 9, 10, 11 and 14

- AP-42, Appendix B-2, Table B.2.2

Emission Units 4 and 11

- 2017 stack test data
- 1990 stack test data
- AP-42, Tables 1.4-1 and 1.4-2
- New Mexico Gas Company Transportation Contract (Fuel sulfur guarantee)
- GRI HAPCalc report

Emission Unit 2a

- AP-42, Chapter 13.2.2

Units subject to NSPS OOO

- Table 2, Subpart OOO of Part 60

Emission Unit 15

- Guidance document for Department accepted default values for percent silt, wind speed, moisture content, and control efficiencies for haul road control measures

WRAP Fugitive Dust Handbook

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PREFACE

In 2004 the Western Regional Air Partnership's (WRAP) Dust Emissions Joint Forum (DEJF) selected Countess Environmental to prepare a fugitive dust handbook and an associated website (www.wrapair.org/forums/dejf/fdh) for accessing the information contained in the handbook. The material presented in the original handbook released on November 15, 2004 addressed the estimation of uncontrolled fugitive dust emissions and emission reductions achieved by demonstrated control techniques for eight major fugitive dust source categories. In 2006 WRAP hired Countess Environmental to update the handbook. The updates included revising each chapter in the handbook to reflect the new PM2.5/PM10 ratios developed for WRAP by the Midwest Research Institute (MRI) in 2005, addressing four additional major fugitive dust source categories as well as several minor source categories, and updating the existing chapters.

The material in this handbook focuses on fugitive dust emissions "at the source" and does not evaluate factors related to the transport and impact of emissions on downwind locations where ambient air monitoring occurs. The methods for estimation of dust emissions rely primarily on AP-42 with additional references to alternative methods adopted by state and local control agencies in the WRAP region. With regard to emission factor correction parameters, source extent/activity levels, control efficiencies for demonstrated control techniques, and emission reductions by natural mitigation and add-on control measures, sources of data are identified and default values are provided in tables throughout the handbook. Graphs, charts, and tables are provided throughout the handbook to assist the end user.

The handbook:

(a) compiles technical and policy evaluations for the benefit of WRAP members, stakeholders, and other interested parties when addressing specific air quality issues and when developing regional haze implementation plans;

(b) incorporates available information from both the public (federal, state and local air quality agencies) and private sectors (e.g., reports addressing options to reduce fugitive dust emissions in areas of the country classified as nonattainment for PM10); and

(c) serves as a comprehensive reference resource tool of currently available technical information on emission estimation methodologies and control measures for the following twelve fugitive dust source categories: agricultural tilling, agricultural harvesting, construction and demolition, materials handling, paved roads, unpaved roads, mineral products industry, abrasive blasting, livestock husbandry, and windblown dust emissions from agricultural fields, material storage piles, and exposed open areas.

This handbook is not intended to suggest any preferred method to be used by stakeholders in preparation of SIPs and/or Conformity analyses but rather to outline the most commonly adopted methodologies currently used in the US. The information contained in this handbook has been derived from a variety of sources each with its own accuracy and use limitations. Because many formulae and factors incorporate default values that have been derived for average US conditions, area specific factors should be used whenever they are available. Additionally, the

input terms (commonly referred to as "correction factors") used in any given emission factor equation presented in this handbook were obtained using a specific test methodology and are designed to give an estimate of the emission from a specific activity or source under specific conditions. As a result the emission estimate must be used appropriately in any downstream application such as dispersion modeling of primary PM emissions.

It is important to note that EPA's criteria for exceedances, violations, and model calibration and validation are based on ambient data from the National Ambient Air Monitoring Sites. It should be further noted that estimates of the relative contribution of fugitive dust to ambient PM concentrations based on chemical analysis of exposed filters are usually much lower than that based on emission inventory estimates, in some cases by a factor of 4. Part of this discrepancy between ambient measurements and emission estimates is due to the near source deposition losses of freshly generated fugitive dust emissions. It is not an objective of this handbook to resolve this modeling discrepancy issue. It is the role of modelers to incorporate deposition losses into their dispersion models and to account for the formation of secondary PM, which in many areas of the country are responsible for an overwhelming contribution to exceedances of the federal PM NAAQS.

Applicability to Tribes

The Regional Haze Rule explicitly recognizes the authority of tribes to implement the provisions of the Rule, in accordance with principles of Federal Indian law, and as provided by the Clean Air Act §301(d) and the Tribal Authority Rule (TAR) (40 CFR §§49.1– .11). Those provisions create the following framework:

1. Absent special circumstances, reservation lands are not subject to state jurisdiction.

2. Federally recognized tribes may apply for and receive delegation of federal authority to implement CAA programs, including visibility regulation, or "reasonably severable" elements of such programs (40 CFR §§49.3, 49.7). The mechanism for this delegation is a Tribal Implementation Plan (TIP). A reasonably severable element is one that is not integrally related to program elements that are not included in the plan submittal, and is consistent with applicable statutory and regulatory requirements.

3. The Regional Haze Rule expressly provides that tribal visibility programs are "not dependent on the strategies selected by the state or states in which the tribe is located" (64. Fed. Reg. 35756), and that the authority to implement §309 TIPs extends to all tribes within the GCVTC region (40 CFR §51.309(d)(12).

4. The EPA has indicated that under the TAR tribes are not required to submit §309 TIPs by the end of 2003; rather they may choose to opt-in to §309 programs at a later date (67 Fed. Reg. 30439).

5. Where a tribe does not seek delegation through a TIP, EPA, as necessary and appropriate, will promulgate a Federal Implementation Plan (FIP) within reasonable timeframes to protect air quality in Indian country (40 CFR §49.11). EPA is committed to consulting with tribes on a

government-to-government basis in developing tribe-specific or generally applicable TIPs where necessary (see, e.g., 63 Fed. Reg.7263-64).

It is our hope that the findings and recommendations of this handbook will prove useful to tribes, whether they choose to submit full or partial 308 or 309 TIPs, or work with EPA to develop FIPs. We realize that the amount of modification necessary will vary considerably from tribe to tribe and we have striven to ensure that all references to tribes in the document are consistent with principles of tribal sovereignty and autonomy as reflected in the above framework. Any inconsistency with this framework is strictly inadvertent and not an attempt to impose requirements on tribes which are not present under existing law.

Tribes, along with states and federal agencies, are full partners in the WRAP, having equal representation on the WRAP Board as states. Whether Board members or not, it must be remembered that all tribes are governments, as distinguished from the "stakeholders" (private interest) which participate on Forums and Committees but are not eligible for the Board. Despite this equality of representation on the Board, tribes are very differently situated than states. There are over four hundred federally recognized tribes in the WRAP region, including Alaska. The sheer number of tribes makes full participation impossible. Moreover, many tribes are faced with pressing environmental, economic, and social issues, and do not have the resources to participate in an effort such as the WRAP, however important its goals may be. These factors necessarily limit the level of tribal input into and endorsement of WRAP products.

The tribal participants in the WRAP, including Board members, Forum and Committee members and co-chairs, make their best effort to ensure that WRAP products are in the best interest of the tribes, the environment, and the public. One interest is to ensure that WRAP policies, as implemented by states and tribes, will not constrain the future options of tribes who are not involved in the WRAP. With these considerations and limitations in mind, the tribal participants have joined the state, federal, and private stakeholder interests in approving this handbook as a consensus document.

EXECUTIVE SUMMARY

This fugitive dust handbook addresses the estimation of uncontrolled fugitive dust emissions and emission reductions achieved by demonstrated control techniques for twelve major and several minor fugitive dust source categories. The handbook focuses on fugitive dust emissions "at the source" and does not evaluate factors related to the transport and impact of emissions on downwind locations where ambient air monitoring occurs. The methods for estimating emissions draw (a) from established methods published by the USEPA, specifically AP-42: Compilation of Air Pollutant Emission Factors that are available from the Internet (www.epa.gov/ttn/chief/ap42), and (b) from alternate methods adopted by state and local air control agencies in the WRAP region such as the California Air Resources Board (www.arb.ca.gov/ei/areasrc/areameth.htm), Clark County, Nevada (www.co.clark.nv.us/air_quality), and Maricopa County, Arizona (www.maricopa.gov/envsvc/air). Sources of data are identified and default values for emission factor correction parameters, source extent/activity levels, control efficiencies, and emission reductions by natural mitigation and add-on control measures are provided in tables throughout the handbook.

The handbook has several distinct features that give it a major advantage over the use of AP-42 or other resource documents. The handbook is a comprehensive document that contains all the necessary information to develop control strategies for major sources of fugitive dust. These features include:

(a) extensive documentation of emission estimation methods adopted by both federal and state agencies as well as methods in the "developmental" stage;
(b) detailed discussion of demonstrated control measures;
(c) lists of published control efficiencies for a large number of fugitive dust control measures;
(d) example regulatory formats adopted by state and local agencies in the WRAP region;
(e) compliance tools to assure that the regulations are being followed; and
(f) a detailed methodology for calculating the cost-effectiveness of different fugitive dust control measures, plus sample calculations for control measure cost-effectiveness for each fugitive dust source category.

The handbook and associated website (www.wrapair.org/forums/dejf/fdh) are intended to:

(a) support technical and policy evaluations by WRAP members, stakeholders, and other interested parties when addressing specific air quality issues and when developing regional haze implementation plans;

(b) incorporate available information from both the public and private sectors that address options to reduce fugitive dust emissions in areas of the country classified as nonattainment for PM10; and

(c) provide a comprehensive resource on emission estimation methodologies and control measures for the following twelve fugitive dust source categories: agricultural tilling, agricultural harvesting, construction and demolition, materials handling, paved roads, unpaved roads, minerals products industry, abrasive blasting, livestock husbandry, and windblown dust emissions from agricultural fields, material storage piles, and exposed open areas.

The handbook contains separate, stand-alone chapters for each of the twelve major fugitive dust source categories identified above. Because the chapters are meant to stand alone, there is some redundancy between chapters. Each chapter contains a discussion of characterization of the source emissions, established emissions estimation methodologies, demonstrated control techniques, regulatory formats, compliance tools, a sample control measure cost-effectiveness calculation, and references. A separate chapter addressing several minor fugitive dust source categories and several appendices are also included in the handbook. Appendix A contains a discussion of test methods used to quantify fugitive dust emission rates. Appendix B contains cost information for demonstrated control measures. Appendix C contains a step-wise method to calculate the cost-effectiveness of different fugitive dust control measures. Appendix D contains a brief discussion of fugitive PM10 management plans and record keeping requirements mandated by one of the air quality districts within the WRAP region.

A list of fugitive dust control measures that have been implemented by jurisdictions designated by the USEPA as nonattainment for federal PM10 standards is presented in the table below. The published PM10 control efficiencies for different fugitive dust control measures vary over relatively large ranges as reflected in the table. The user of the handbook is cautioned to review the assumptions included in the original publications (i.e., references identified in each chapter of the handbook) before selecting a specific PM10 control efficiency for a given control measure. It should be noted that Midwest Research Institute (MRI) found no significant differences in the measured control efficiencies for the PM2.5 and PM10 size fractions of unpaved road emissions based on repeated field measurements of uncontrolled and controlled emissions. Thus, without actual published PM2.5 control efficiencies, the user may wish to utilize the published PM10 values for both size fractions.

Many control cost-effectiveness estimates were reviewed in preparation of this handbook. Some of these estimates contain assumptions that are difficult to substantiate and often appear unrealistic. Depending on which assumptions are used, the control cost-effectiveness estimates can vary by one to two orders of magnitude. Thus, rather than presenting existing cost-effectiveness estimates, the handbook presents a detailed methodology to calculate the cost-effectiveness of different fugitive dust control measures. This methodology is presented in Appendix C. The handbook user is advised to calculate the cost-effectiveness values for different fugitive dust control options based on current cost data and caveats that are applicable to the particular situation.

One of the dustiest construction operations is cutting and filling using scrapers, with the highest emissions occurring during scraper transit. In a 1999 MRI field study,[5] it was found that watering can provide a high level of PM10 control efficiency for scraper transit emissions. Average control efficiency remained above 75% approximately 2 hours after watering. The average PM10 efficiency decay rate for water was found to vary from approximately 3% to 14% hour. The decay rate depended upon relative humidity in a manner consistent with the effect of humidity on the rate of evaporation. Test results for watered scraper transit routes showed a steep increase in control efficiency with a doubling of surface moisture and little additional control efficiency at higher moisture levels. This is in keeping with past studies that found that control efficiency data can be successfully fitted by a bilinear function. In another recent MRI field study (MRI, 2001),[20] tests of mud and dirt trackout indicated that a 10% soil moisture content represents a reasonable first estimate of the point at which watering becomes counter productive. The control efficiencies afforded by graveling or paving of a 7.6 m (25 ft) access apron were in the range of 40% to 50%.

Table 3-7 summarizes tested control measures and reported control efficiencies for dust control measures applied to construction and demolition operation.

Table 3-7. Control Efficiencies for Control Measures for Construction/Demolition[20, 21]

Control measure	Source component	PM10 control efficiency	References/Comments
Apply water every 4 hrs within 100 feet of a structure being demolished	Active demolition and debris removal	36%	MRI, April 2001, test series 701. 4-hour watering interval (Scenario: lot remains vacant 6 mo after demolition)
Gravel apron, 25" long by road width	Trackout	46%	MRI, April 2001
Apply dust suppressants (e.g., polymer emulsion)	Post-demolition stabilization	84%	CARB April 2002; for actively disturbed areas
Apply water to disturbed soils after demolition is completed or at the end of each day of cleanup	Demolition Activities	10%	MRI, April 2001, test series 701. 14-hour watering interval.
Prohibit demolition activities when wind speeds exceed 25 mph	Demolition Activities	98%	Estimated for high wind days in absence of soil disturbance activities
Apply water at various intervals to disturbed areas within construction site	Construction Activities	61%	MRI, April 2001, test series 701. 3.2-hour watering interval
		74%	MRI, April 2001, test series 701. 2.1-hour watering interval
Require minimum soil moisture of 12% for earthmoving	Scraper loading and unloading	69%	AP-42 emission factor equation for materials handling due to increasing soil moisture from 1.4% to 12%
Limit on-site vehicle speeds to 15 mph (Scenario: radar enforcement)	Construction traffic	57%	Assume linear relationship between PM10 emissions and uncontrolled vehicle speed of 35 mph

by the liquid and the ability of the liquid to "wet" small particles. There are two types of wet suppression systems—liquid sprays which use water or water/surfactant mixtures as the wetting agent and systems that supply foams as the wetting agent.

Liquid spray wet suppression systems can be used to control dust emissions from materials handling at conveyor transfer points. The wetting agent can be water or a combination of water and a chemical surfactant. This surfactant, or surface-active agent, reduces the surface tension of the water. As a result, the quantity of liquid needed to achieve good control is reduced.

Watering is also useful to reduce emissions from vehicle traffic in the storage pile area. 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%.[13, 14]

Table 4-2 presents a summary of control measures and reported control efficiencies for materials handling that includes the application of a continuous water spray at a conveyor transfer point and two control measures for storage piles.

Table 4-2. Control Efficiencies for Control Measures for Materials Handling

Control measure	PM10 control efficiency	References/comments
Continuous water spray at conveyor transfer point	62%	The control efficiency achieved by increasing the moisture content of the material from 1% to 2% is calculated utilizing the AP-42 emission factor equation for materials handling which contains a correction term for moisture content.
Require construction of 3-sided enclosures with 50% porosity for storage pile	75%	Sierra Research, 2003.[15] Determined through modeling of open area windblown emissions with 50% reduction in wind speed and assuming no emission reduction when winds approach open side.
Water the storage pile by hand or apply cover when wind events are declared	90%	Fitz et al., April 2000.[16]

4.4 Regulatory Formats

Fugitive dust control options have been embedded in many regulations for state and local agencies in the WRAP region. Regulatory formats specify the threshold source size that triggers the need for control application. Example regulatory formats for several local air quality agencies in the WRAP region are presented in Table 4-3. The website addresses for obtaining information on fugitive dust regulations for local air quality districts within California, for Clark County, NV, and for Maricopa County, AZ, are as follows:

- Districts within California: www.arb.ca.gov/drdb/drdb.htm
- Clark County, NV: www.co.clark.nv.us/air_quality/regs.htm
- Maricopa County, AZ: http://www.maricopa.gov/envsvc/air/ruledesc.asp

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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14. C. Cowherd, *Background Document for Revisions to Fine Fraction Ratios &sed for AP-42 Fugitive Dust Emission Factors*. Prepared by Midwest Research Institute for Western Governors Association, Western Regional Air Partnership, Denver, CO, February 1, 2006.

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.

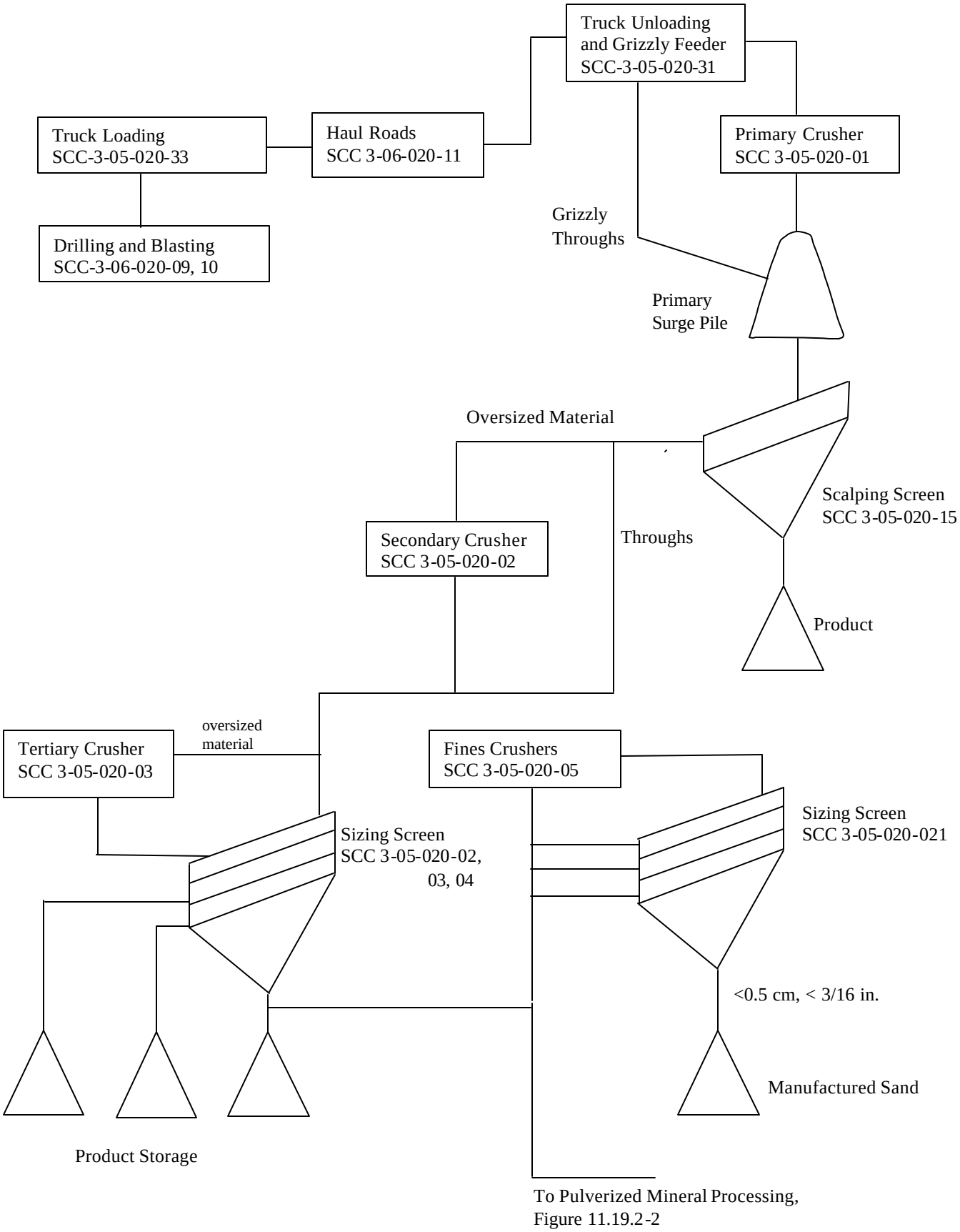

Figure 11.19.2-1. Typical stone processing plant

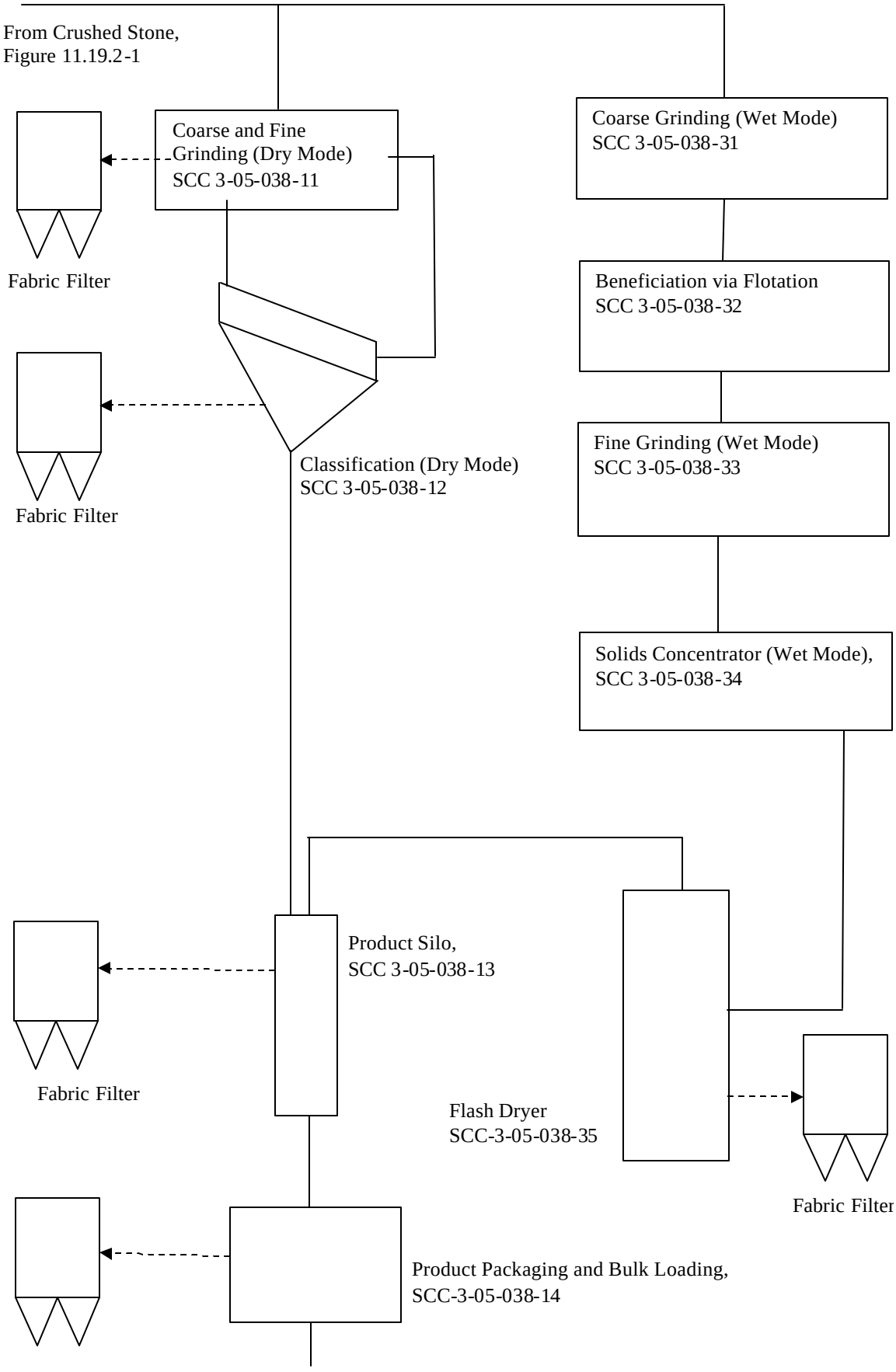

Figure 11.19.2-2 Flowchart for Pulverized Mineral Processing

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 Loading - 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.

Note: Truck Unloading - Conveyor, crushed stone (SCC 3-05-020-32) was corrected to Truck Loading - Conveyor, crushed stone (SCC 3-05-020-32). October 1, 2010.

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[i]	E	4.6×10^{-5}[i]	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 Loading - 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.

Note: Truck Unloading - Conveyor, crushed stone (SCC 3-05-020-32) was corrected to Truck Loading - Conveyor, crushed stone (SCC 3-05-020-32). October 1, 2010.

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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.

11.16 Gypsum Manufacturing

11.16.1 Process Description[1-2]

Gypsum is calcium sulfate dihydrate ($CaSO_4 \cdot 2H_2O$), a white or gray naturally occurring mineral. Raw gypsum ore is processed into a variety of products such as a portland cement additive, soil conditioner, industrial and building plasters, and gypsum wallboard. To produce plasters or wallboard, gypsum must be partially dehydrated or calcined to produce calcium sulfate hemihydrate ($CaSO_4 \cdot \frac{1}{2}H_2O$), commonly called stucco.

A flow diagram for a typical gypsum process producing both crude and finished gypsum products is shown in Figure 11.16-1. In this process gypsum is crushed, dried, ground, and calcined. Not all of the operations shown in Figure 11.16-1 are performed at all gypsum plants. Some plants produce only wallboard, and many plants do not produce soil conditioner.

Gypsum ore, from quarries and underground mines, is crushed and stockpiled near a plant. As needed, the stockpiled ore is further crushed and screened to about 50 millimeters (2 inches) in diameter. If the moisture content of the mined ore is greater than about 0.5 weight percent, the ore must be dried in a rotary dryer or a heated roller mill. Ore dried in a rotary dryer is conveyed to a roller mill, where it is ground to the extent that 90 percent of it is less 149 micrometers (µm) (100 mesh). The ground gypsum exits the mill in a gas stream and is collected in a product cyclone. Ore is sometimes dried in the roller mill by heating the gas stream, so that drying and grinding are accomplished simultaneously and no rotary dryer is needed. The finely ground gypsum ore is known as landplaster, which may be used as a soil conditioner.

In most plants, landplaster is fed to kettle calciners or flash calciners, where it is heated to remove three-quarters of the chemically bound water to form stucco. Calcination occurs at approximately 120 to 150°C (250 to 300°F), and 0.908 megagrams (Mg) (1 ton) of gypsum calcines to about 0.77 Mg (0.85 ton) of stucco.

In kettle calciners, the gypsum is indirectly heated by hot combustion gas passed through flues in the kettle, and the stucco product is discharged into a "hot pit" located below the kettle. Kettle calciners may be operated in either batch or continuous mode. In flash calciners, the gypsum is directly contacted with hot gases, and the stucco product is collected at the bottom of the calciner.

At some gypsum plants, drying, grinding, and calcining are performed in heated impact mills. In these mills hot gas contacts gypsum as it is ground. The gas dries and calcines the ore and then conveys the stucco to a product cyclone for collection. The use of heated impact mills eliminates the need for rotary dryers, calciners, and roller mills.

Gypsum and stucco are usually transferred from one process to another by means of screw conveyors or bucket elevators. Storage bins or silos are normally located downstream of roller mills and calciners but may also be used elsewhere.

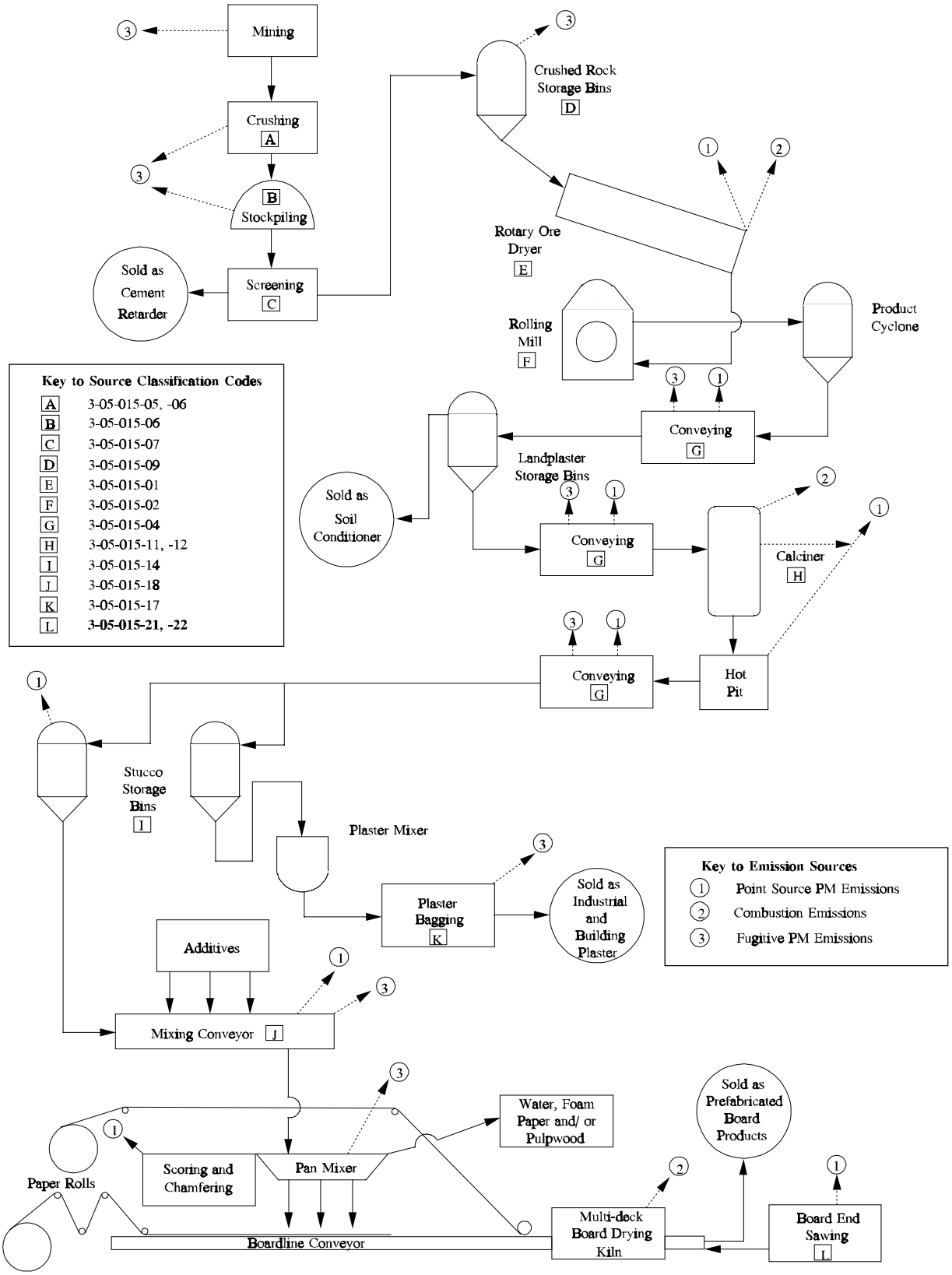


Figure 11.16-1. Overall process flow diagram for gypsum processing.[2]

In the manufacture of plasters, stucco is ground further in a tube or ball mill and then batch-mixed with retarders and stabilizers to produce plasters with specific setting rates. The thoroughly mixed plaster is fed continuously from intermediate storage bins to a bagging operation.

In the manufacture of wallboard, stucco from storage is first mixed with dry additives such as perlite, starch, fiberglass, or vermiculite. This dry mix is combined with water, soap foam, accelerators and shredded paper, or pulpwood in a pin mixer at the head of a board forming line. The slurry is then spread between 2 paper sheets that serve as a mold. The edges of the paper are scored, and sometimes chamfered, to allow precise folding of the paper to form the edges of the board. As the wet board travels the length of a conveying line, the calcium sulfate hemihydrate combines with the water in the slurry to form solid calcium sulfate dihydrate, or gypsum, resulting in rigid board. The board is rough-cut to length, and it enters a multideck kiln dryer, where it is dried by direct contact with hot combustion gases or by indirect steam heating. The dried board is conveyed to the board end sawing area and is trimmed and bundled for shipment.

11.16.2 Emissions And Controls[2,7]

Potential emission sources in gypsum processing plants are shown in Figure 11.16-1. While particulate matter (PM) is the dominant pollutant in gypsum processing plants, several sources may emit gaseous pollutants also. The major sources of PM emissions include rotary ore dryers, grinding mills, calciners, and board end sawing operations. Particulate matter emission factors for these operations are shown in Table 11.16-1 and 11.16-2. In addition, emission factors for PM less than or equal to 10 μm in aerodynamic diameter (PM-10) emissions from selected processes are presented in Tables 11.16-1 and 11.16-2. All of these factors are based on output production rates. Particle size data for ore dryers, calciners, and board end sawing operations are shown in Tables 11.16-2 and 11.16-3.

The uncontrolled emission factors presented in Table 11.16-1 and 11.16-2 represent the process dust entering the emission control device. It is important to note that emission control devices are frequently needed to collect the product from some gypsum processes and, thus, are commonly thought of by the industry as process equipment and not as added control devices.

Emissions sources in gypsum plants are most often controlled with fabric filters. These sources include:

- rotary ore dryers (SCC 3-05-015-01)
- roller mills (SCC 3-05-015-02)
- impact mills (SCC 3-05-015-13)
- kettle calciners (SCC 3-05-015-11)
- flash calciners (SCC 3-05-015-12)
- board end sawing (SCC 3-05-015-21,-22)
- scoring and chamfering (SCC 3-05-015-__)
- plaster mixing and bagging (SCC 3-05-015-16,-17)
- conveying systems (SCC 3-05-015-04)
- storage bins (SCC 3-05-015-09,-10,-14)

Uncontrolled emissions from scoring and chamfering, plaster mixing and bagging, conveying systems, and storage bins are not well quantified.

Emissions from some gypsum sources are also controlled with electrostatic precipitators (ESP). These sources include rotary ore dryers, roller mills, kettle calciners, and conveying systems. Although rotary ore dryers may be controlled separately, emissions from roller mills and conveying systems are usually controlled jointly with kettle calciner emissions. Moisture in the kettle calciner exit gas improves the ESP performance by lowering the resistivity of the dust.

Table 11.16-1 (Metric Units). EMISSION FACTORS FOR GYPSUM PROCESSING[a]

EMISSION FACTOR RATING: D

Process	Filterable PM[b]	PM-10	CO_2[c]
Crushers, screens, stockpiles, and roads (SCC 3-05-015-05,-06,-07,-08)	—[d]	—[d]	NA
Rotary ore dryers (SCC 3-05-015-01)	0.0042(FFF)$^{1.7}$[e]	0.00034(FFF)$^{1.7}$	12[f]
Rotary ore dryers w/fabric filters (SCC 3-05-015-01)	0.020[g]	0.0052	NA
Roller mills w/cyclones (SCC 3-05-015-02)	1.3[h]	ND	NA
Roller mills w/fabric filters (SCC 3-05-015-02)	0.060[h]	ND	NA
Roller mill and kettle calciner w/electrostatic precipitators (SCC 3-05-015-02,-11)	0.050[h,j]	ND	ND
Continuous kettle calciners and hot pit (SCC 3-05-015-11)	21[k]	13	ND
Continuous kettle calciners and hot pit w/fabric filters (SCC 3-05-015-11)	0.0030[k]	ND	NA
Continuous kettle calciners w/cyclones and electrostatic precipitators (SCC 3-05-015-11)	0.050[k]	ND	NA
Flash calciners (SCC 3-05-015-12)	19[m]	7.2[m]	55[n]
Flash calciners w/fabric filters (SCC 3-05-015-12)	0.020[m]	0.017[m]	ND
Impact mills w/cyclones (SCC 3-05-015-13)	50[p]	ND	NA
Impact mills w/fabric filters (SCC 3-05-015-13)	0.010[p]	ND	NA
Board end sawing--2.4-m boards (SCC 3-05-015-21)	0.040[q]	ND	NA
Board end sawing--3.7-m boards (SCC 3-05-015-22)	0.030[q]	ND	NA
Board end sawing w/fabric filters--2.4-and 3.7-m boards (SCC 3-05-015-21,-22)	36[r]	27[r]	NA

[a] Factors represent uncontrolled emissions unless otherwise specified. All emission factors are kg/Mg of output rate. SCC = Source Classification Code. NA = not applicable. ND = no data.

[b] Filterable PM is that PM collected on or prior to an EPA Method 5 (or equivalent) sampling train.

Table 11.16-1 (cont.).

[c] Typical pollution control devices generally have a negligible effect on CO_2 emissions.
[d] Factors for these operations are in Sections 11.19 and 13.2.
[e] References 3-4,8,11-12. Equation is for the emission rate upstream of any process cyclones and applies only to concurrent rotary ore dryers with flow rates of 7.5 cubic meters per second (m^3/s) or less. FFF in the uncontrolled emission factor equation is "flow feed factor," the ratio of gas mass rate per unit dryer cross section area to the dry mass feed rate, in the following units: (kg/hr-m^2 of gas flow)/(Mg/hr dry feed). Measured uncontrolled emission factors for 4.2 and 5.7 m^3/s range from 5 to 60 kg/Mg.
[f] References 3-4.
[g] References 3-4,8,11-12. Applies to rotary dryers with and without cyclones upstream of fabric filter.
[h] References 11-14. Applies to both heated and unheated roller mills.
[j] References 11-14. Factor is for combined emissions from roller mills and kettle calciners, based on the sum of the roller mill and kettle calciner output rates.
[k] References 4-5,11,13-14. Emission factors based on the kettle and the hot pit do not apply to batch kettle calciners.
[m] References 3,6,10.
[n] References 3,6,9.
[p] References 9,15. As used here, an impact mill is a process unit used to dry, grind, and calcine gypsum simultaneously.
[q] References 4-5,16. Emission factor units = kg/m^2. Based on 13-mm board thickness and 1.2 m board width. For other thicknesses, multiply the appropriate emission factor by 0.079 times board thickness in mm.
[r] References 4-5,16. Emission factor units = $kg/10^6\ m^2$.

Table 11.16-2 (English Units). EMISSION FACTORS FOR GYPSUM PROCESSING[a]

EMISSION FACTOR RATING: D

Process	Filterable PM[b]	PM-10	CO_2[c]
Crushers, screens, stockpiles, and roads (SCC 3-05-015-05,-06,-07,-08)	—[d]	—[d]	NA
Rotary ore dryers (SCC 3-05-015-01)	0.16(FFF)$^{1.77}$[e]	0.013(FFF)$^{1.7}$	23[f]
Rotary ore dryers w/fabric filters (SCC 3-05-015-01)	0.040[g]	0.010	NA
Roller mills w/cyclones (SCC 3-05-015-02)	2.6[h]	ND	NA
Roller mills w/fabric filters (SCC 3-05-015-02)	0.12[h]	ND	NA
Roller mill and kettle calciner w/electrostatic precipitators (SCC 3-05-015-02,-11)	0.090[h,j]	ND	ND
Continuous kettle calciners and hot pit (SCC 3-05-015-11)	41[k]	26	ND
Continuous kettle calciners and hot pit w/fabric filters (SCC 3-05-015-11)	0.0060[k]	ND	NA
Continuous kettle calciners w/cyclones and electrostatic precipitators (SCC 3-05-015-11)	0.090[k]	ND	NA
Flash calciners (SCC 3-05-015-12)	37[m]	14[m]	110[n]
Flash calciners w/fabric filters (SCC 3-05-015-12)	0.040[m]	0.034[m]	ND
Impact mills w/cyclones (SCC 3-05-015-13)	100[p]	ND	NA
Impact mills w/fabric filters (SCC 3-05-015-13)	0.020[p]	ND	NA
Board end sawing--8-ft boards (SCC 3-05-015-21)	0.80[q]	ND	NA
Board end sawing--12-ft boards (SCC 3-05-015-22)	0.50[q]	ND	NA
Board end sawing w/fabric filters--8- and 12-ft boards (SCC 3-05-015-21,-22)	7.5[r]	5.7[r]	NA

[a] Factors represent uncontrolled emissions unless otherwise specified. All emission factors are lb/ton of output rate. SCC = Source Classification Codes. NA = not applicable. ND = no data.

APPENDIX B.2

GENERALIZED PARTICLE SIZE DISTRIBUTIONS

CONTENTS

Appendix B.2

Generalized Particle Size Distributions

B.2.1 Rationale For Developing Generalized Particle Size Distributions

The preparation of size-specific particulate emission inventories requires size distribution information for each process. Particle size distributions for many processes are contained in appropriate industry sections of this document. Because particle size information for many processes of local impact and concern are unavailable, this appendix provides "generic" particle size distributions applicable to these processes. The concept of the "generic" particle size distribution is based on categorizing measured particle size data from similar processes generating emissions from similar materials. These generic distributions have been developed from sampled size distributions from about 200 sources.

Generic particle size distributions are approximations. They should be used only in the absence of source-specific particle size distributions for areawide emission inventories.

B.2.2 How To Use The Generalized Particle Size Distributions For Uncontrolled Processes

Figure B.2-1 provides an example calculation to assist the analyst in preparing particle size-specific emission estimates using generic size distributions.

The following instructions for the calculation apply to each particulate emission source for which a particle size distribution is desired and for which no source specific particle size information is given elsewhere in this document:

1. Identify and review the AP-42 section dealing with that process.

2. Obtain the uncontrolled particulate emission factor for the process from the main text of AP-42, and calculate uncontrolled total particulate emissions.

3. Obtain the category number of the appropriate generic particle size distribution from Table B.2-1.

4. Obtain the particle size distribution for the appropriate category from Table B.2-2. Apply the particle size distribution to the uncontrolled particulate emissions.

Instructions for calculating the controlled size-specific emissions are given in Table B.2-3 and illustrated in Figure B.2-1.

Figure B.2-1. Example calculation for determining uncontrolled and controlled particle size-specific emissions.

SOURCE IDENTIFICATION
Source name and address: ABC Brick Manufacturing
24 Dusty Way
Anywhere, USA

Process description: Dryers/Grinders
AP-42 Section: 8.3, Bricks And Related Clay Products
Uncontrolled AP-42 emission factor: 96 lbs/ton (units)
Activity parameter: 63,700 tons/year (units)
Uncontrolled emissions: 3057.6 tons/year (units)

UNCONTROLLED SIZE EMISSIONS
Category name: Mechanically Generated/Aggregated, Unprocessed Ores
Category number: 3

	Particle size (μm)		
	≤ 2.5	≤ 6	≤ 10
Generic distribution, Cumulative percent equal to or less than the size:	15	34	51
Cumulative mass ≤ particle size emissions (tons/year):	458.6	1039.6	1559.4

CONTROLLED SIZE EMISSIONS*
Type of control device: Fabric Filter

	Particle size (μm)		
	0 - 2.5	2.5 - 6	6 - 10
Collection efficiency (Table B.2-3):	99.0	99.5	99.5
Mass in size range** before control (tons/year):	458.6	581.0	519.8
Mass in size range after control (tons/year):	4.59	2.91	2.60
Cumulative mass (tons/year):	4.59	7.50	10.10

* These data do not include results for the greater than 10 μm particle size range.
** Uncontrolled size data are cumulative percent equal to or less than the size. Control efficiency data apply only to size range and are not cumulative.

Table B.2-1. PARTICLE SIZE CATEGORY BY AP-42 SECTION

AP-42 Section	Source Category	Category Number*
	External combustion	
1.1	Bituminous and subbituminous coal combustion	a
1.2	Anthracite coal combustion	a
1.3	Fuel oil combustion	
	Residual oil	
	Utility	a
	Commercial	a
	Distillate oil	
	Utility	a
	Commercial	a
	Residential	a
1.4	Natural gas combustion	a
1.5	Liquefied petroleum gas	a
1.6	Wood waste combustion in boilers	a
1.7	Lignite combustion	a
1.8	Bagasse combustion	b
1.9	Residential fireplaces	a
1.10	Residential wood stoves	a
1.11	Waste oil combustion	a
	Solid waste disposal	
2.1	Refuse combustion	a
2.2	Sewage sludge incineration	a
2.7	Conical burners (wood waste)	2
	Internal combustion engines	
	Highway vehicles	c
3.2	Off highway vehicles	1
	Organic chemical processes	
6.4	Paint and varnish	4
6.5	Phthalic anhydride	9
6.8	Soap and detergents	a
	Inorganic chemical processes	
8.2	Urea	a
8.3	Ammonium nitrate fertilizers	a
8.4	Ammonium sulfate	
	Rotary dryer	b
	Fluidized bed dryer	b
8.5	Phosphate fertilizers	3
8.5.3	Ammonium phosphates	
	Reactor/ammoniator-granulator	4
	Dryer/cooler	4
8.7	Hydrofluoric acid	
	Spar drying	3
	Spar handling	3
	Transfer	3
8.9	Phosphoric acid (thermal process)	a
8.10	Sulfuric acid	b
8.12	Sodium carbonate	a
	Food and agricultural	
9.3.1	Defoliation and harvesting of cotton	
	Trailer loading	6
	Transport	6
9.3.2	Harvesting of grain	
	Harvesting machine	6
	Truck loading	6
	Field transport	6
9.5.2	Meat smokehouses	9
9.7	Cotton ginning	b
9.9.1	Grain elevators and processing plants	a
9.9.4	Alfalfa dehydrating	
	Primary cyclone	b
	Meal collector cyclone	7
	Pellet cooler cyclone	7
	Pellet regrind cyclone	7
9.9.7	Starch manufacturing	7
9.12	Fermentation	6,7
9.13.2	Coffee roasting	6
	Wood products	
10.2	Chemical wood pulping	a
10.7	Charcoal	9
	Mineral products	
11.1	Hot mix asphalt plants	a
11.3	Bricks and related clay products	
	Raw materials handling	
	Dryers, grinders, etc.	b

Table B.2-1 (cont.).

AP-42 Section	Source Category	Category Number*
	Tunnel/periodic kilns	
	Gas fired	a
	Oil fired	a
	Coal fired	a
11.5	Refractory manufacturing	
	Raw material dryer	3
	Raw material crushing and screening	3
	Electric arc melting	8
	Curing oven	3
11.6	Portland cement manufacturing	
	Dry process	
	Kilns	a
	Dryers, grinders, etc.	4
	Wet process	
	Kilns	a
	Dryers, grinders, etc.	4
11.7	Ceramic clay manufacturing	
	Drying	3
	Grinding	4
	Storage	3
11.8	Clay and fly ash sintering	
	Fly ash sintering, crushing, screening, yard storage	5
	Clay mixed with coke	
	Crushing, screening, yard storage	3
11.9	Western surface coal mining	a
11.10	Coal cleaning	3
11.12	Concrete batching	3
11.13	Glass fiber manufacturing	
	Unloading and conveying	3
	Storage bins	3
	Mixing and weighing	3
	Glass furnace - wool	a
	Glass furnace - textile	a
11.15	Glass manufacturing	a
11.16	Gypsum manufacturing	
	Rotary ore dryer	a
	Roller mill	4
	Impact mill	4
	Flash calciner	a
	Continuous kettle calciner	a
11.17	Lime manufacturing	a
11.18	Mineral wool manufacturing	
	Cupola	8
	Reverberatory furnace	8
	Blow chamber	8
	Curing oven	9
	Cooler	9
11.19.1	Sand and gravel processing	
	Continuous drop	
	Transfer station	a
	Pile formation - stacker	a
	Batch drop	a
	Active storage piles	a
	Vehicle traffic on unpaved road	a
11.19.2	Crushed stone processing	
	Dry crushing	
	Primary crushing	a
	Secondary crushing and screening	a
	Tertiary crushing and screening	3
	Recrushing and screening	4
	Fines mill	4
	Screening, conveying, handling	a
11.21	Phosphate rock processing	
	Drying	a
	Calcining	a
	Grinding	b
	Transfer and storage	3
11.23	Taconite ore processing	
	Fine crushing	4

Table B.2-1 (cont.).

AP-42 Section	Source Category	Category Number*
	Waste gas	a
	Pellet handling	4
	Grate discharge	5
	Grate feed	4
	Bentonite blending	4
	Coarse crushing	3
	Ore transfer	3
	Bentonite transfer	4
	Unpaved roads	a
11.24	Metallic minerals processing	a
	Metallurgical	
12.1	Primary aluminum production	
	Bauxite grinding	4
	Aluminum hydroxide calcining	5
	Anode baking furnace	9
	Prebake cell	a
	Vertical Soderberg	8
	Horizontal Soderberg	a
12.2	Coke manufacturing	a
12.3	Primary copper smelting	a
12.4	Ferroalloy production	a
12.5	Iron and steel production	
	Blast furnace	
	Slips	a
	Cast house	a
	Sintering	
	Windbox	a
	Sinter discharge	a
	Basic oxygen furnace	a
	Electric arc furnace	a
12.6	Primary lead smelting	a
12.7	Zinc smelting	8
12.8	Secondary aluminum operations	
	Sweating furnace	8
	Smelting	
	Crucible furnace	8
	Reverberatory furnace	a
12.9	Secondary copper smelting	
	and alloying	8
12.10	Gray iron foundries	a
12.11	Secondary lead processing	a
12.12	Secondary magnesium smelting	8
12.13	Steel foundries - melting	b
12.14	Secondary zinc processing	8
12.15	Storage battery production	b
12.18	Leadbearing ore crushing and grinding	4
	Miscellaneous sources	
13.1	Wildfires and prescribed burning	a
13.2	Fugitive dust	a

* Data for numbered categories are given Table B.2-2. Particle size data on "a" categories are found in the AP-42 text; for "b" categories, in Appendix B.1; and for "c" categories, in AP-42 *Volume II: Mobile Sources*.

Figure B.2-2. CALCULATION SHEET

SOURCE IDENTIFICATION
Source name and address: _____
_____
_____

Process description: _____
AP-42 Section: _____
Uncontrolled AP-42
emission factor: _____ (units)
Activity parameter: _____ (units)
Uncontrolled emissions: _____ (units)

UNCONTROLLED SIZE EMISSIONS
Category name: _____
Category number: ____

	Particle size (μm)		
	≤ 2.5	≤ 6	≤ 10
Generic distribution, Cumulative percent equal to or less than the size:			
Cumulative mass ≤ particle size emissions (tons/year):			

CONTROLLED SIZE EMISSIONS*
Type of control device: _____

	Particle size (μm)		
	0 - 2.5	2.5 - 6	6 - 10
Collection efficiency (Table B.2-3):			
Mass in size range** before control (tons/year):			
Mass in size range after control (tons/year):			
Cumulative mass (tons/year):			

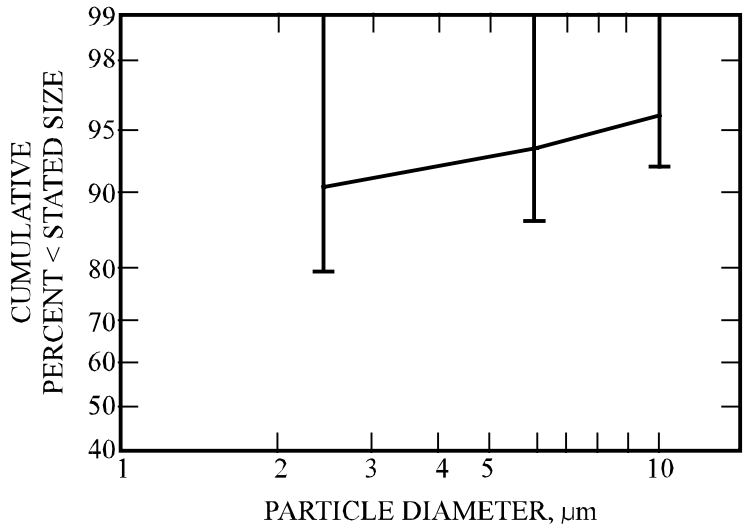
* These data do not include results for the greater than 10 μm particle size range.
** Uncontrolled size data are cumulative percent equal to or less than the size. Control efficiency data apply only to size range and are not cumulative.

Table B.2-2. DESCRIPTION OF PARTICLE SIZE CATEGORIES

Category: 1
Process: Stationary Internal Combustion Engines
Material: Gasoline and Diesel Fuel

Category 1 covers size-specific emissions from stationary internal combustion engines. The particulate emissions are generated from fuel combustion.

REFERENCES: 1,9



Particle Size, μm	Cumulative % ≤ Stated Size (Uncontrolled)	Minimum Value	Maximum Value	Standard Deviation
1.0[a]	82			
2.0[a]	88			
2.5	90	78	99	11
3.0[a]	90			
4.0[a]	92			
5.0[a]	93			
6.0	93	86	99	7
10.0	96	92	99	4

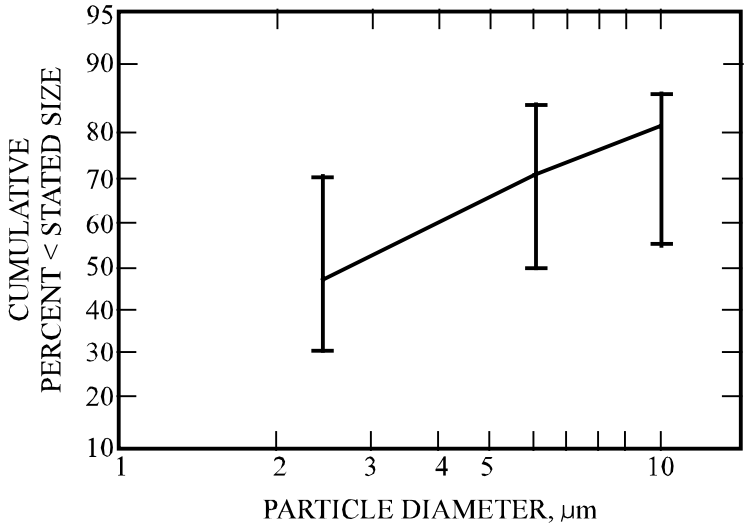
[a] Value calculated from data reported at 2.5, 6.0, and 10.0 μm. No statistical parameters are given for the calculated value.

Table B.2.2 (cont.).

Category: 2
Process: Combustion
Material: Mixed Fuels

Category 2 covers boilers firing a mixture of fuels, regardless of the fuel combination. The fuels include gas, coal, coke, and petroleum. Particulate emissions are generated by firing these miscellaneous fuels.

REFERENCE: 1



Particle Size, μm	Cumulative % ≤ Stated Size (Uncontrolled)	Minimum Value	Maximum Value	Standard Deviation
1.0[a]	23			
2.0[a]	40			
2.5	45	32	70	17
3.0[a]	50			
4.0[a]	58			
5.0[a]	64			
6.0	70	49	84	14
10.0	79	56	87	12

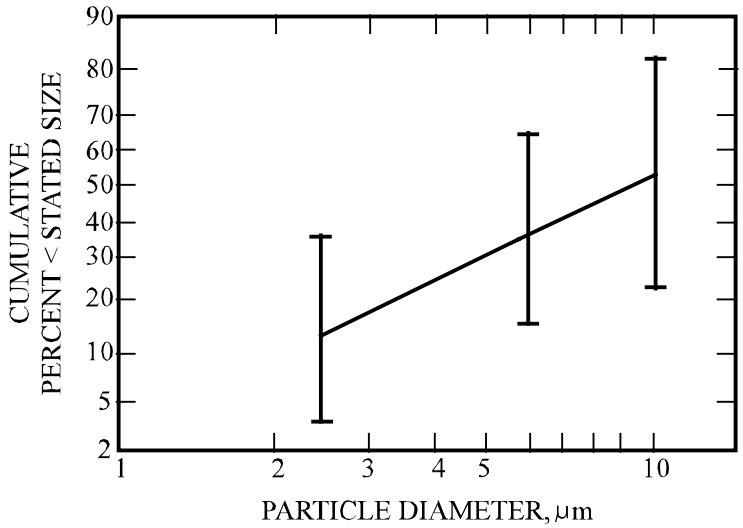
[a] Value calculated from data reported at 2.5, 6.0, and 10.0 μm. No statistical parameters are given for the calculated value.

Table B.2.2 (cont.).

Category: 3
Process: Mechanically Generated
Material: Aggregate, Unprocessed Ores

Category 3 covers material handling and processing of aggregate and unprocessed ore. This broad category includes emissions from milling, grinding, crushing, screening, conveying, cooling, and drying of material. Emissions are generated through either the movement of the material or the interaction of the material with mechanical devices.

REFERENCES: 1-2,4,7



Particle Size, µm	Cumulative % ≤ Stated Size (Uncontrolled)	Minimum Value	Maximum Value	Standard Deviation
1.0[a]	4			
2.0[a]	11			
2.5	15	3	35	7
3.0[a]	18			
4.0[a]	25			
5.0[a]	30			
6.0	34	15	65	13
10.0	51	23	81	14

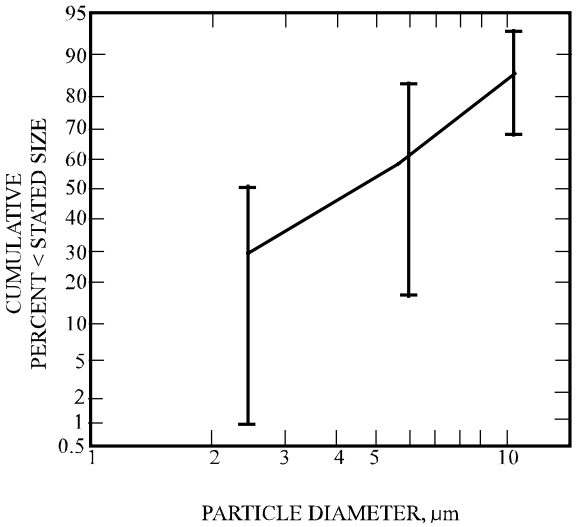
[a] Value calculated from data reported at 2.5, 6.0, and 10.0 µm. No statistical parameters are given for the calculated value.

Table B.2.2 (cont.).

Category: 4
Process: Mechanically Generated
Material: Processed Ores and Nonmetallic Minerals

Category 4 covers material handling and processing of processed ores and minerals. While similar to Category 3, processed ores can be expected to have a greater size consistency than unprocessed ores. Particulate emissions are a result of agitating the materials by screening or transfer during size reduction and beneficiation of the materials by grinding and fine milling and by drying.

REFERENCE: 1



Particle Size, µm	Cumulative % ≤ Stated Size (Uncontrolled)	Minimum Value	Maximum Value	Standard Deviation
1.0[a]	6			
2.0[a]	21			
2.5	30	1	51	19
3.0[a]	36			
4.0[a]	48			
5.0[a]	58			
6.0	62	17	83	17
10.0	85	70	93	7

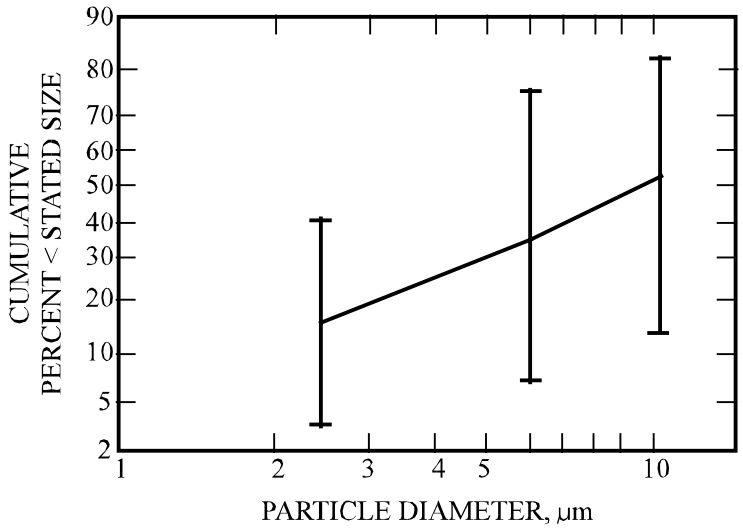
[a] Value calculated from data reported at 2.5, 6.0, and 10.0 µm. No statistical parameters are given for the calculated value.

Table B.2.2 (cont.).

Category: 5
Process: Calcining and Other Heat Reaction Processes
Material: Aggregate, Unprocessed Ores

Category 5 covers the use of calciners and kilns in processing a variety of aggregates and unprocessed ores. Emissions are a result of these high temperature operations.

REFERENCES: 1-2,8



Particle Size, μm	Cumulative % ≤ Stated Size (Uncontrolled)	Minimum Value	Maximum Value	Standard Deviation
1.0[a]	6			
2.0[a]	13			
2.5	18	3	42	11
3.0[a]	21			
4.0[a]	28			
5.0[a]	33			
6.0	37	13	74	19
10.0	53	25	84	19

[a] Value calculated from data reported at 2.5, 6.0, and 10.0 μm. No statistical parameters are given for the calculated value.

A. Summary:

Table 1A: Data Summary, North Trim Unit 12

Parameters	North Trim, Unit 12 Baghouse			Average or Permit
Test Date: October 17, 2017	Run #1	Run #2	Run #3	
Stack Velocity, fps	60	59	60	60
Stack Flow, ACFM	2,825	2,798	2,833	2,819
Stack Flow, DSCFM	2,264	2,235	2,237	2,246
Stack Temp, deg F	90	94	100	95
Stack Pressure, in Hg	25.2	25.2	25.2	25.2
Sampling Time, minutes	60	60	60	60
Ave. Sq. Rt. Pitot ΔP, in H2O	0.96	0.95	0.95	0.95
TSP Emission, gr/DSCF	0.0014	0.0006	0.0011	0.0010
TSP Emission, lb/hr	0.027	0.012	0.022	0.020
TSP Permit, lb/hr				0.8
Plant Throughput: Tons/Hr	27.72	27.72	27.72	27.72

Table 1B: Data Summary, South Trim Unit 12

Parameters	South Trim, Unit 12 Baghouse			Average or Permit
Test Date: October 17-18, 2017	Run #1	Run #2	Run #3	
Stack Velocity, fps	49	51	51	50
Stack Flow, ACFM	2,307	2,420	2,397	2,375
Stack Flow, DSCFM	1,797	1,936	1,914	1,882
Stack Temp, deg F	105	90	90	95
Stack Pressure, in Hg	25.2	25.06	25.06	25.1
Sampling Time, minutes	60	60	60	60
Ave. Sq. Rt. Pitot ΔP, in H2O	0.77	0.82	0.81	0.80
TSP Emission, gr/DSCF	0.0006	0.0005	0.006	0.006
TSP Emission, lb/hr	0.009	0.008	0.009	0.008
TSP Permit, lb/hr				0.8
Plant Throughput: Tons/Hr	26.1	26.1	26.1	26.1

B. Operating Conditions:

The North Trim Unit was operating at 27.72 tons per hour average for all tests. The South Trim Unit was operating at 26.1 tons per hour average for all tests. Combined Unit 12 throughput was 53.82 tons per hour (471,500) tons per year if operated continuously).

C. Control Equipment Operating Parameters:

Baghouse pressure drops: North stack 5.7 inches water pressure drop, South stack 5.6 inches water pressure drop.

D. Measured vs Modeled Parameters:

Not applicable.

A. Summary:

Table 1: Data Summary, Mill Unit 4

Parameters	Mill, Unit 4 Baghouse			Average or Permit
Test Date: October 16, 2017	**Run #1**	**Run #2**	**Run #3**	
Stack Velocity, fps	42	43	43	43
Stack Flow, ACFM	37,128	37,900	38,016	37,682
Stack Flow, DSCFM	15,611	14,588	14,482	14,894
Stack Temp, deg F	329	338	336	334
Stack Pressure, in Hg	25.2	25.2	25.2	25.2
Sampling Time, minutes	60	60	60	60
Ave. Sq. Rt. Pitot ΔP, in H2O	0.54	0.54	0.54	0.54
TSP Emission, gr/DSCF	0.0032	0.0015	0.0011	0.0019
TSP Emission, lb/hr	0.43	0.18	0.14	0.25
TSP Permit, lb/hr				12.6
NOx Emission, lb/hr	5.0	5.4	4.9	5.1
NOx Permit, lb/hr				6.7
CO Emission, lb/hr	2.9	3.6	3.9	3.5
CO Permit, lb/hr				16.8
Plant Throughput: Tons/Hr	50.9	50.9	50.9	50.9

B. Operating Conditions:

The Mill Unit was operating with a Gypsum rock throughput of 50.9 tons per hour average for all tests. The natural gas input was 39.4 mmBtu/hr.

C. Control Equipment Operating Parameters:

Unit 4 has two baghouses. Both baghouses were operating at 4 inches water pressure drop.

D. Measured vs Modeled Parameters:

Not applicable.

American Gypsum Bernalillo Plant

Data Summary, Dryer Unit 11

Parameters	Dryer, Unit 11			Average or Permit
Test Date: October 19, 2017	Run #1	Run #2	Run #3	
Stack Velocity, fps	58	58	58	58
Stack Flow, ACFM	68,430	68,460	68,639	68,510
Stack Flow, DSCFM	27,370	27,361	27,593	27,441
Stack Temp, deg F	202	205	206	204
Stack Pressure, in Hg	25.0	25.0	25.0	25.0
Sampling Time, minutes	60	60	60	60
Ave. Sq. Rt. Pitot ΔP, in H2O	0.78	0.78	0.78	0.78
TSP Emission, gr/DSCF	0.0007	0.0006	0.0008	0.0007
TSP Emission, lb/hr	0.168	0.136	0.183	0.162
TSP Permit, lb/hr				0.9
NOx Emission, lb/hr	3.6	5.5	6.5	5.2
NOx Permit, lb/hr				12
CO Emission, lb/hr	5.1	6.3	6.8	6.1
CO Permit, lb/hr				36.1
Plant Throughput: Tons/Hr	110	110	110	110

Operating Conditions:

The Mill Unit was operating at 110 tons per hour average for all tests.

Control Equipment Operating Parameters:

The baghouse was operating at 4 inches water pressure drop.

A. Summary:

Table 1: Data Summary, Stucco Conveyor Unit 14

Parameters	Stucco Conveyor, Unit 14 Baghouse			Average or Permit
Test Date: October 20, 2017	Run #1	Run #2	Run #3	
Stack Velocity, fps	148	150	147	148
Stack Flow, ACFM	10,185	10,290	10,127	10,201
Stack Flow, DSCFM	7,307	7,355	7,307	7,323
Stack Temp, deg F	124	125	129	126
Stack Pressure, in Hg	23.9	23.9	23.9	23.9
Sampling Time, minutes	60	60	60	60
Ave. Sq. Rt. Pitot ΔP, in H2O	2.24	2.26	2.23	2.25
TSP Emission, gr/DSCF	0.0038	0.0030	0.0046	0.0038
TSP Emission, lb/hr	0.43	0.18	0.14	0.25
TSP Permit, lb/hr				0.99
Plant Throughput: Tons/Hr	50.9	50.9	50.9	50.9

B. Operating Conditions:

The Stucco Conveyer Unit 14 was operating with a gypsum rock throughput of 50.9 tons per hour average for all tests. If operated in this state continuously, the annual throughput would be 432,700 tons.

C. Control Equipment Operating Parameters:

The baghouse was operating at 4.8 inches water pressure drop.

D. Measured vs Modeled Parameters:

Not applicable.

PARTICULATES AND NOx ANALYSES OF CALCINER AND DRYER EMISSIONS AT CENTEX CORPORATION BERNALILLO, NEW MEXICO

by

Kramer & Associates, Inc.

December, 1990

TABLE 1

DRYER AND CALCINER EMISSIONS TEST DATA SUMMARY

	SOURCE TEST NUMBER				
	1	2	3	Average	Permit Allowabl
Calciner:					
TSP, lb/hr	2.39	1.28	2.18	1.95	3.86
gr/dscf	0.014	0.008	0.014	0.012	0.022
NOx, lb/hr average	2.67			2.67	6.6
ppmv average	37.46			37.46	
SO2, lb/hr average	0.22	0.16	0.17	0.18	3.8
Dryer:					
NOx, lb/hr average				4.87	7.9
ppmv average				43.23	

1.4 Natural Gas Combustion

1.4.1 General[1-2]

Natural gas is one of the major combustion fuels used throughout the country. It is mainly used to generate industrial and utility electric power, produce industrial process steam and heat, and heat residential and commercial space. Natural gas consists of a high percentage of methane (generally above 85 percent) and varying amounts of ethane, propane, butane, and inerts (typically nitrogen, carbon dioxide, and helium). The average gross heating value of natural gas is approximately 1,020 British thermal units per standard cubic foot (Btu/scf), usually varying from 950 to 1,050 Btu/scf.

1.4.2 Firing Practices[3-5]

There are three major types of boilers used for natural gas combustion in commercial, industrial, and utility applications: watertube, firetube, and cast iron. Watertube boilers are designed to pass water through the inside of heat transfer tubes while the outside of the tubes is heated by direct contact with the hot combustion gases and through radiant heat transfer. The watertube design is the most common in utility and large industrial boilers. Watertube boilers are used for a variety of applications, ranging from providing large amounts of process steam, to providing hot water or steam for space heating, to generating high-temperature, high-pressure steam for producing electricity. Furthermore, watertube boilers can be distinguished either as field erected units or packaged units.

Field erected boilers are boilers that are constructed on site and comprise the larger sized watertube boilers. Generally, boilers with heat input levels greater than 100 MMBtu/hr, are field erected. Field erected units usually have multiple burners and, given the customized nature of their construction, also have greater operational flexibility and NO_x control options. Field erected units can also be further categorized as wall-fired or tangential-fired. Wall-fired units are characterized by multiple individual burners located on a single wall or on opposing walls of the furnace while tangential units have several rows of air and fuel nozzles located in each of the four corners of the boiler.

Package units are constructed off-site and shipped to the location where they are needed. While the heat input levels of packaged units may range up to 250 MMBtu/hr, the physical size of these units are constrained by shipping considerations and generally have heat input levels less than 100 MMBtu/hr. Packaged units are always wall-fired units with one or more individual burners. Given the size limitations imposed on packaged boilers, they have limited operational flexibility and cannot feasibly incorporate some NO_x control options.

Firetube boilers are designed such that the hot combustion gases flow through tubes, which heat the water circulating outside of the tubes. These boilers are used primarily for space heating systems, industrial process steam, and portable power boilers. Firetube boilers are almost exclusively packaged units. The two major types of firetube units are Scotch Marine boilers and the older firebox boilers. In cast iron boilers, as in firetube boilers, the hot gases are contained inside the tubes and the water being heated circulates outside the tubes. However, the units are constructed of cast iron rather than steel. Virtually all cast iron boilers are constructed as package boilers. These boilers are used to produce either low-pressure steam or hot water, and are most commonly used in small commercial applications.

Natural gas is also combusted in residential boilers and furnaces. Residential boilers and furnaces generally resemble firetube boilers with flue gas traveling through several channels or tubes with water or air circulated outside the channels or tubes.

1.4.3 Emissions[3-4]

The emissions from natural gas-fired boilers and furnaces include nitrogen oxides (NO_x), carbon monoxide (CO), and carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), volatile organic compounds (VOCs), trace amounts of sulfur dioxide (SO_2), and particulate matter (PM).

Nitrogen Oxides -

Nitrogen oxides formation occurs by three fundamentally different mechanisms. The principal mechanism of NO_x formation in natural gas combustion is thermal NO_x. The thermal NO_x mechanism occurs through the thermal dissociation and subsequent reaction of nitrogen (N_2) and oxygen (O_2) molecules in the combustion air. Most NO_x formed through the thermal NO_x mechanism occurs in the high temperature flame zone near the burners. The formation of thermal NO_x is affected by three furnace-zone factors: (1) oxygen concentration, (2) peak temperature, and (3) time of exposure at peak temperature. As these three factors increase, NO_x emission levels increase. The emission trends due to changes in these factors are fairly consistent for all types of natural gas-fired boilers and furnaces. Emission levels vary considerably with the type and size of combustor and with operating conditions (e.g., combustion air temperature, volumetric heat release rate, load, and excess oxygen level).

The second mechanism of NO_x formation, called prompt NO_x, occurs through early reactions of nitrogen molecules in the combustion air and hydrocarbon radicals from the fuel. Prompt NO_x reactions occur within the flame and are usually negligible when compared to the amount of NO_x formed through the thermal NO_x mechanism. However, prompt NO_x levels may become significant with ultra-low-NO_x burners.

The third mechanism of NO_x formation, called fuel NO_x, stems from the evolution and reaction of fuel-bound nitrogen compounds with oxygen. Due to the characteristically low fuel nitrogen content of natural gas, NO_x formation through the fuel NO_x mechanism is insignificant.

Carbon Monoxide -

The rate of CO emissions from boilers depends on the efficiency of natural gas combustion. Improperly tuned boilers and boilers operating at off-design levels decrease combustion efficiency resulting in increased CO emissions. In some cases, the addition of NO_x control systems such as low NO_x burners and flue gas recirculation (FGR) may also reduce combustion efficiency, resulting in higher CO emissions relative to uncontrolled boilers.

Volatile Organic Compounds -

The rate of VOC emissions from boilers and furnaces also depends on combustion efficiency. VOC emissions are minimized by combustion practices that promote high combustion temperatures, long residence times at those temperatures, and turbulent mixing of fuel and combustion air. Trace amounts of VOC species in the natural gas fuel (e.g., formaldehyde and benzene) may also contribute to VOC emissions if they are not completely combusted in the boiler.

Sulfur Oxides -

Emissions of SO_2 from natural gas-fired boilers are low because pipeline quality natural gas typically has sulfur levels of 2,000 grains per million cubic feet. However, sulfur-containing odorants are added to natural gas for detecting leaks, leading to small amounts of SO_2 emissions. Boilers combusting unprocessed natural gas may have higher SO_2 emissions due to higher levels of sulfur in the natural gas. For these units, a sulfur mass balance should be used to determine SO_2 emissions.

Particulate Matter -

Because natural gas is a gaseous fuel, filterable PM emissions are typically low. Particulate matter from natural gas combustion has been estimated to be less than 1 micrometer in size and has filterable and condensable fractions. Particulate matter in natural gas combustion are usually larger molecular weight hydrocarbons that are not fully combusted. Increased PM emissions may result from poor air/fuel mixing or maintenance problems.

Greenhouse Gases -[6-9]

CO_2, CH_4, and N_2O emissions are all produced during natural gas combustion. In properly tuned boilers, nearly all of the fuel carbon (99.9 percent) in natural gas is converted to CO_2 during the combustion process. This conversion is relatively independent of boiler or combustor type. Fuel carbon not converted to CO_2 results in CH_4, CO, and/or VOC emissions and is due to incomplete combustion. Even in boilers operating with poor combustion efficiency, the amount of CH_4, CO, and VOC produced is insignificant compared to CO_2 levels.

Formation of N_2O during the combustion process is affected by two furnace-zone factors. N_2O emissions are minimized when combustion temperatures are kept high (above 1475°F) and excess oxygen is kept to a minimum (less than 1 percent).

Methane emissions are highest during low-temperature combustion or incomplete combustion, such as the start-up or shut-down cycle for boilers. Typically, conditions that favor formation of N_2O also favor emissions of methane.

1.4.4 Controls[4,10]

NO_x Controls -

Currently, the two most prevalent combustion control techniques used to reduce NO_x emissions from natural gas-fired boilers are flue gas recirculation (FGR) and low NO_x burners. In an FGR system, a portion of the flue gas is recycled from the stack to the burner windbox. Upon entering the windbox, the recirculated gas is mixed with combustion air prior to being fed to the burner. The recycled flue gas consists of combustion products which act as inerts during combustion of the fuel/air mixture. The FGR system reduces NO_x emissions by two mechanisms. Primarily, the recirculated gas acts as a dilutent to reduce combustion temperatures, thus suppressing the thermal NO_x mechanism. To a lesser extent, FGR also reduces NO_x formation by lowering the oxygen concentration in the primary flame zone. The amount of recirculated flue gas is a key operating parameter influencing NO_x emission rates for these systems. An FGR system is normally used in combination with specially designed low NO_x burners capable of sustaining a stable flame with the increased inert gas flow resulting from the use of FGR. When low NO_x burners and FGR are used in combination, these techniques are capable of reducing NO_x emissions by 60 to 90 percent.

Low NO_x burners reduce NO_x by accomplishing the combustion process in stages. Staging partially delays the combustion process, resulting in a cooler flame which suppresses thermal NO_x formation. The two most common types of low NO_x burners being applied to natural gas-fired boilers are staged air burners and staged fuel burners. NO_x emission reductions of 40 to 85 percent (relative to uncontrolled emission levels) have been observed with low NO_x burners.

Other combustion control techniques used to reduce NO_x emissions include staged combustion and gas reburning. In staged combustion (e.g., burners-out-of-service and overfire air), the degree of staging is a key operating parameter influencing NO_x emission rates. Gas reburning is similar to the use of overfire in the use of combustion staging. However, gas reburning injects additional amounts of natural gas in the upper furnace, just before the overfire air ports, to provide increased reduction of NO_x to NO_2.

Two postcombustion technologies that may be applied to natural gas-fired boilers to reduce NO_x emissions are selective noncatalytic reduction (SNCR) and selective catalytic reduction (SCR). The SNCR system injects ammonia (NH_3) or urea into combustion flue gases (in a specific temperature zone) to reduce NO_x emission. The Alternative Control Techniques (ACT) document for NO_x emissions from utility boilers, maximum SNCR performance was estimated to range from 25 to 40 percent for natural gas-fired boilers.[12] Performance data available from several natural gas fired utility boilers with SNCR show a 24 percent reduction in NO_x for applications on wall-fired boilers and a 13 percent reduction in

NO_x for applications on tangential-fired boilers.[11] In many situations, a boiler may have an SNCR system installed to trim NO_x emissions to meet permitted levels. In these cases, the SNCR system may not be operated to achieve maximum NO_x reduction. The SCR system involves injecting NH_3 into the flue gas in the presence of a catalyst to reduce NO_x emissions. No data were available on SCR performance on natural gas fired boilers at the time of this publication. However, the ACT Document for utility boilers estimates NO_x reduction efficiencies for SCR control ranging from 80 to 90 percent.[12]

Emission factors for natural gas combustion in boilers and furnaces are presented in Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4.[11] Tables in this section present emission factors on a volume basis ($lb/10^6$ scf). To convert to an energy basis (lb/MMBtu), divide by a heating value of 1,020 MMBtu/10^6 scf. For the purposes of developing emission factors, natural gas combustors have been organized into three general categories: large wall-fired boilers with greater than 100 MMBtu/hr of heat input, boilers and residential furnaces with less than 100 MMBtu/hr of heat input, and tangential-fired boilers. Boilers within these categories share the same general design and operating characteristics and hence have similar emission characteristics when combusting natural gas.

Emission factors are rated from A to E to provide the user with an indication of how "good" the factor is, with "A" being excellent and "E" being poor. The criteria that are used to determine a rating for an emission factor can be found in the Emission Factor Documentation for AP-42 Section 1.4 and in the introduction to the AP-42 document.

1.4.5 Updates Since the Fifth Edition

The Fifth Edition was released in January 1995. Revisions to this section are summarized below. For further detail, consult the Emission Factor Documentation for this section. These and other documents can be found on the Emission Factor and Inventory Group (EFIG) home page (http://www.epa.gov/ttn/chief).

Supplement D, March 1998

- Text was revised concerning Firing Practices, Emissions, and Controls.
- All emission factors were updated based on 482 data points taken from 151 source tests. Many new emission factors have been added for speciated organic compounds, including hazardous air pollutants.

July 1998 - minor changes

- Footnote D was added to table 1.4-3 to explain why the sum of individual HAP may exceed VOC or TOC, the web address was updated, and the references were reordered.

Table 1.4-1. EMISSION FACTORS FOR NITROGEN OXIDES (NO_x) AND CARBON MONOXIDE (CO) FROM NATURAL GAS COMBUSTION[a]

Combustor Type (MMBtu/hr Heat Input) [SCC]	NO_x[b]		CO	
	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
Large Wall-Fired Boilers (>100) [1-01-006-01, 1-02-006-01, 1-03-006-01]				
Uncontrolled (Pre-NSPS)[c]	280	A	84	B
Uncontrolled (Post-NSPS)[c]	190	A	84	B
Controlled - Low NO_x burners	140	A	84	B
Controlled - Flue gas recirculation	100	D	84	B
Small Boilers (<100) [1-01-006-02, 1-02-006-02, 1-03-006-02, 1-03-006-03]				
Uncontrolled	100	B	84	B
Controlled - Low NO_x burners	50	D	84	B
Controlled - Low NO_x burners/Flue gas recirculation	32	C	84	B
Tangential-Fired Boilers (All Sizes) [1-01-006-04]				
Uncontrolled	170	A	24	C
Controlled - Flue gas recirculation	76	D	98	D
Residential Furnaces (<0.3) [No SCC]				
Uncontrolled	94	B	40	B

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. Emission factors are based on an average natural gas higher heating value of 1,020 Btu/scf. To convert from $lb/10^6$ scf to lb/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. SCC = Source Classification Code. ND = no data. NA = not applicable.

[b] Expressed as NO_2. For large and small wall fired boilers with SNCR control, apply a 24 percent reduction to the appropriate NO_X emission factor. For tangential-fired boilers with SNCR control, apply a 13 percent reduction to the appropriate NO_X emission factor.

[c] NSPS=New Source Performance Standard as defined in 40 CFR 60 Subparts D and Db. Post-NSPS units are boilers with greater than 250 MMBtu/hr of heat input that commenced construction modification, or reconstruction after August 17, 1971, and units with heat input capacities between 100 and 250 MMBtu/hr that commenced construction modification, or reconstruction after June 19, 1984.

TABLE 1.4-2. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM NATURAL GAS COMBUSTION[a]

Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
CO_2[b]	120,000	A
Lead	0.0005	D
N_2O (Uncontrolled)	2.2	E
N_2O (Controlled-low-NO_X burner)	0.64	E
PM (Total)[c]	7.6	D
PM (Condensable)[c]	5.7	D
PM (Filterable)[c]	1.9	B
SO_2[d]	0.6	A
TOC	11	B
Methane	2.3	B
VOC	5.5	C

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $lb/10^6$ scf to 1b/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. TOC = Total Organic Compounds. VOC = Volatile Organic Compounds.

[b] Based on approximately 100% conversion of fuel carbon to CO_2. $CO_2[lb/10^6 \text{ scf}] = (3.67)(CON)(C)(D)$, where CON = fractional conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.76), and D = density of fuel, 4.2×10^4 $lb/10^6$ scf.

[c] All PM (total, condensible, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM_{10}, $PM_{2.5}$ or PM_1 emissions. Total PM is the sum of the filterable PM and condensible PM. Condensible PM is the particulate matter collected using EPA Method 202 (or equivalent). Filterable PM is the particulate matter collected on, or prior to, the filter of an EPA Method 5 (or equivalent) sampling train.

[d] Based on 100% conversion of fuel sulfur to SO_2. Assumes sulfur content is natural gas of 2,000 grains/10^6 scf. The SO_2 emission factor in this table can be converted to other natural gas sulfur contents by multiplying the SO_2 emission factor by the ratio of the site-specific sulfur content (grains/10^6 scf) to 2,000 grains/10^6 scf.

TABLE 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION[a]

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
91-57-6	2-Methylnaphthalene[b, c]	2.4E-05	D
56-49-5	3-Methylchloranthrene[b, c]	<1.8E-06	E
	7,12-Dimethylbenz(a)anthracene[b,c]	<1.6E-05	E
83-32-9	Acenaphthene[b,c]	<1.8E-06	E
203-96-8	Acenaphthylene[b,c]	<1.8E-06	E
120-12-7	Anthracene[b,c]	<2.4E-06	E
56-55-3	Benz(a)anthracene[b,c]	<1.8E-06	E
71-43-2	Benzene[b]	2.1E-03	B
50-32-8	Benzo(a)pyrene[b,c]	<1.2E-06	E
205-99-2	Benzo(b)fluoranthene[b,c]	<1.8E-06	E
191-24-2	Benzo(g,h,i)perylene[b,c]	<1.2E-06	E
207-08-9	Benzo(k)fluoranthene[b,c]	<1.8E-06	E
106-97-8	Butane	2.1E+00	E
218-01-9	Chrysene[b,c]	<1.8E-06	E
53-70-3	Dibenzo(a,h)anthracene[b,c]	<1.2E-06	E
25321-22-6	Dichlorobenzene[b]	1.2E-03	E
74-84-0	Ethane	3.1E+00	E
206-44-0	Fluoranthene[b,c]	3.0E-06	E
86-73-7	Fluorene[b,c]	2.8E-06	E
50-00-0	Formaldehyde[b]	7.5E-02	B
110-54-3	Hexane[b]	1.8E+00	E
193-39-5	Indeno(1,2,3-cd)pyrene[b,c]	<1.8E-06	E
91-20-3	Naphthalene[b]	6.1E-04	E
109-66-0	Pentane	2.6E+00	E
85-01-8	Phenanathrene[b,c]	1.7E-05	D
74-98-6	Propane	1.6E+00	E

V. QUALITY

5.1 All Gas Tendered at Receipt Point(s) shall be of merchantable pipeline quality. Gas Tendered through interstate pipelines and at tailgates of cryogenic or lean oil processing plants shall be deemed to be of merchantable pipeline quality. Currently, the cryogenic or lean oil processing plants located in New Mexico on the Company's system are the Williams Kutz 1 and Kutz 2 plants, Duke's Artesia and Eunice plants and Frontier's Maljamar and ABO plants. All Gas Tendered from other sources shall be reasonably free of objectionable material, and commercially free of dust, gums or gumforming constituents, liquids or solid matter and any other substance, which interferes with the intended purpose of merchantability of Gas, or causes interference with the proper and safe operation of the lines, meters, regulators, or other appliances through which it may flow; and which must conform to the following specifications.

(a) Shall not contain more than a trace indication of oils and other liquids that are employed in the operation of Gas processing and/or compression facilities.

(b) Shall be commercially free of water in their liquid state at the temperature and pressure at which delivered, and in no event contain water vapor in excess of seven (7) points per million cubic feet. The water vapor content shall be determined by use of dew-point apparatus approved by the Bureau of Mines, or by any other method that is deemed appropriate for the condition(s).

(c) Shall not contain more than three quarters (3/4) grains of total sulfur per one hundred (100) standard cubic feet, which includes hydrogen sulfide, carbonyl sulfide, carbon disulfide, mercaptans, mono- di- and poly- sulfides. The Gas shall also meet the following individual specifications for hydrogen sulfide (H_2S) and mercaptans:

i. Hydrogen sulfide: The Gas shall not contain more than one-quarter (1/4) grain per one hundred (100) standard cubic feet.

ii. Mercaptan sulfur: The gas shall not have mercaptan sulfur content greater than three tenths (0.3) grain per one hundred (100) standard cubic feet.

(d) Shall not contain in excess of 2-mol% of carbon dioxide (CO_2).

(e) Shall not contain in excess of 0.2-mol% of oxygen (O_2). Every effort shall be made to keep the Gas free of oxygen.

(f) Shall not contain in excess of 5-mol% of total inert gases.

(g) Shall be commercially free of hydrocarbons and not have a hydrocarbon dew point that exceeds fifteen degrees Fahrenheit (15°F) between 100 and 1,000 Psia.

(h) Shall not be delivered into any of the Company's transmission or distribution pipeline systems at a temperature less than forty degrees Fahrenheit (40°F) nor greater than one hundred twenty degrees Fahrenheit (120°F).

GRI-HAPCalc ® 3.01
External Combustion Devices Report

Facility ID:	**AG - BERNALILLO**	**Notes:**
Operation Type:	**PRODUCTION**	
Facility Name:	**AMERICAN GYPSUM BERANLILLO**	
User Name:		
Units of Measure:	**U.S. STANDARD**	

Note: Emissions less than 5.00E-09 tons (or tonnes) per year are considered insignificant and are treated as zero. These emissions are indicated on the report with a "0". Emissions between 5.00E-09 and 5.00E-05 tons (or tonnes) per year are represented on the report with "0.0000".

External Combustion Devices

Unit Name: CALCINER

Hours of Operation:	8,760	Yearly
Heat Input:	50.00	MMBtu/hr
Fuel Type:	NATURAL GAS	
Device Type:	BURNER	
Emission Factor Set:	EPA > FIELD > LITERATURE	
Additional EF Set:	-NONE-	

Calculated Emissions (ton/yr)

Chemical Name	Emissions	Emission Factor	Emission Factor Set
HAPs			
3-Methylcholanthrene	0.0000	0.0000000018 lb/MMBtu	EPA
7,12-Dimethylbenz(a)anthracene	0.0000	0.0000000157 lb/MMBtu	EPA
Formaldehyde	0.0161	0.0000735294 lb/MMBtu	EPA
Methanol	0.0949	0.0004333330 lb/MMBtu	GRI Field
Acetaldehyde	0.0637	0.0002909000 lb/MMBtu	GRI Field
1,3-Butadiene	0.0000	0.0000001830 lb/MMBtu	GRI Field
Benzene	0.0005	0.0000020588 lb/MMBtu	EPA
Toluene	0.0007	0.0000033333 lb/MMBtu	EPA
Ethylbenzene	0.0000	0.0000000720 lb/MMBtu	GRI Field
Xylenes(m,p,o)	0.0002	0.0000010610 lb/MMBtu	GRI Field
2,2,4-Trimethylpentane	0.0071	0.0000323000 lb/MMBtu	GRI Field
n-Hexane	0.3865	0.0017647059 lb/MMBtu	EPA
Phenol	0.0000	0.0000000950 lb/MMBtu	GRI Field
Naphthalene	0.0001	0.0000005980 lb/MMBtu	EPA
2-Methylnaphthalene	0.0000	0.0000000235 lb/MMBtu	EPA
Acenaphthylene	0.0000	0.0000000018 lb/MMBtu	EPA
Biphenyl	0.0003	0.0000011500 lb/MMBtu	GRI Field
Acenaphthene	0.0000	0.0000000018 lb/MMBtu	EPA
Fluorene	0.0000	0.0000000027 lb/MMBtu	EPA
Anthracene	0.0000	0.0000000024 lb/MMBtu	EPA
Phenanthrene	0.0000	0.0000000167 lb/MMBtu	EPA
Fluoranthene	0.0000	0.0000000029 lb/MMBtu	EPA
Pyrene	0.0000	0.0000000049 lb/MMBtu	EPA
Benz(a)anthracene	0.0000	0.0000000018 lb/MMBtu	EPA

Chrysene	0.0000	0.0000000018 lb/MMBtu	EPA
Benzo(a)pyrene	0.0000	0.0000000012 lb/MMBtu	EPA
Benzo(b)fluoranthene	0.0000	0.0000000018 lb/MMBtu	EPA
Benzo(k)fluoranthene	0.0000	0.0000000018 lb/MMBtu	EPA
Benzo(g,h,i)perylene	0.0000	0.0000000012 lb/MMBtu	EPA
Indeno(1,2,3-c,d)pyrene	0.0000	0.0000000018 lb/MMBtu	EPA
Dibenz(a,h)anthracene	0.0000	0.0000000012 lb/MMBtu	EPA
Lead	0.0001	0.0000004902 lb/MMBtu	EPA
Total	0.5702		

Criteria Pollutants

VOC	1.1809	0.0053921569 lb/MMBtu	EPA
PM	1.6318	0.0074509804 lb/MMBtu	EPA
PM, Condensible	1.2238	0.0055882353 lb/MMBtu	EPA
PM, Filterable	0.4079	0.0018627451 lb/MMBtu	EPA
CO	18.0353	0.0823529410 lb/MMBtu	EPA
NMHC	1.8679	0.0085294118 lb/MMBtu	EPA
NOx	21.4706	0.0980392157 lb/MMBtu	EPA
SO2	0.1288	0.0005880000 lb/MMBtu	EPA

Other Pollutants

Dichlorobenzene	0.0003	0.0000011765 lb/MMBtu	EPA
Methane	0.4938	0.0022549020 lb/MMBtu	EPA
Acetylene	1.1676	0.0053314000 lb/MMBtu	GRI Field
Ethylene	0.1153	0.0005264000 lb/MMBtu	GRI Field
Ethane	0.6656	0.0030392157 lb/MMBtu	EPA
Propylene	0.2044	0.0009333330 lb/MMBtu	GRI Field
Propane	0.3435	0.0015686275 lb/MMBtu	EPA
Butane	0.4509	0.0020588235 lb/MMBtu	EPA
Cyclopentane	0.0089	0.0000405000 lb/MMBtu	GRI Field
Pentane	0.5582	0.0025490196 lb/MMBtu	EPA
n-Pentane	0.4380	0.0020000000 lb/MMBtu	GRI Field
Cyclohexane	0.0099	0.0000451000 lb/MMBtu	GRI Field
Methylcyclohexane	0.0370	0.0001691000 lb/MMBtu	GRI Field
n-Octane	0.0111	0.0000506000 lb/MMBtu	GRI Field
n-Nonane	0.0011	0.0000050000 lb/MMBtu	GRI Field
CO2	25,764.7059	117.6470588235 lb/MMBtu	EPA

Unit Name: UNIT 11

Hours of Operation: 8,760 Yearly
Heat Input: 90.00 MMBtu/hr
Fuel Type: NATURAL GAS
Device Type: BURNER
Emission Factor Set: EPA > FIELD > LITERATURE
Additional EF Set: -NONE-

Calculated Emissions (ton/yr)

Chemical Name	Emissions	Emission Factor	Emission Factor Set

HAPs

3-Methylcholanthrene	0.0000	0.0000000018 lb/MMBtu	EPA
7,12-Dimethylbenz(a)anthracene	0.0000	0.0000000157 lb/MMBtu	EPA
Formaldehyde	0.0290	0.0000735294 lb/MMBtu	EPA
Methanol	0.1708	0.0004333330 lb/MMBtu	GRI Field
Acetaldehyde	0.1147	0.0002909000 lb/MMBtu	GRI Field
1,3-Butadiene	0.0001	0.0000001830 lb/MMBtu	GRI Field
Benzene	0.0008	0.0000020588 lb/MMBtu	EPA
Toluene	0.0013	0.0000033333 lb/MMBtu	EPA
Ethylbenzene	0.0000	0.0000000720 lb/MMBtu	GRI Field
Xylenes(m,p,o)	0.0004	0.0000010610 lb/MMBtu	GRI Field
2,2,4-Trimethylpentane	0.0127	0.0000323000 lb/MMBtu	GRI Field
n-Hexane	0.6956	0.0017647059 lb/MMBtu	EPA
Phenol	0.0000	0.0000000950 lb/MMBtu	GRI Field
Naphthalene	0.0002	0.0000005980 lb/MMBtu	EPA
2-Methylnaphthalene	0.0000	0.0000000235 lb/MMBtu	EPA
Acenaphthylene	0.0000	0.0000000018 lb/MMBtu	EPA
Biphenyl	0.0005	0.0000011500 lb/MMBtu	GRI Field
Acenaphthene	0.0000	0.0000000018 lb/MMBtu	EPA
Fluorene	0.0000	0.0000000027 lb/MMBtu	EPA
Anthracene	0.0000	0.0000000024 lb/MMBtu	EPA
Phenanthrene	0.0000	0.0000000167 lb/MMBtu	EPA
Fluoranthene	0.0000	0.0000000029 lb/MMBtu	EPA
Pyrene	0.0000	0.0000000049 lb/MMBtu	EPA
Benz(a)anthracene	0.0000	0.0000000018 lb/MMBtu	EPA
Chrysene	0.0000	0.0000000018 lb/MMBtu	EPA
Benzo(a)pyrene	0.0000	0.0000000012 lb/MMBtu	EPA
Benzo(b)fluoranthene	0.0000	0.0000000018 lb/MMBtu	EPA
Benzo(k)fluoranthene	0.0000	0.0000000018 lb/MMBtu	EPA
Benzo(g,h,i)perylene	0.0000	0.0000000012 lb/MMBtu	EPA
Indeno(1,2,3-c,d)pyrene	0.0000	0.0000000018 lb/MMBtu	EPA
Dibenz(a,h)anthracene	0.0000	0.0000000012 lb/MMBtu	EPA
Lead	0.0002	0.0000004902 lb/MMBtu	EPA
Total	1.0263		

Criteria Pollutants

VOC	2.1256	0.0053921569 lb/MMBtu	EPA
PM	2.9372	0.0074509804 lb/MMBtu	EPA
PM, Condensible	2.2029	0.0055882353 lb/MMBtu	EPA
PM, Filterable	0.7343	0.0018627451 lb/MMBtu	EPA
CO	32.4635	0.0823529410 lb/MMBtu	EPA
NMHC	3.3623	0.0085294118 lb/MMBtu	EPA
NOx	38.6471	0.0980392157 lb/MMBtu	EPA
SO2	0.2318	0.0005880000 lb/MMBtu	EPA

Other Pollutants

Dichlorobenzene	0.0005	0.0000011765 lb/MMBtu	EPA
Methane	0.8889	0.0022549020 lb/MMBtu	EPA
Acetylene	2.1016	0.0053314000 lb/MMBtu	GRI Field
Ethylene	0.2075	0.0005264000 lb/MMBtu	GRI Field
Ethane	1.1981	0.0030392157 lb/MMBtu	EPA
Propylene	0.3679	0.0009333330 lb/MMBtu	GRI Field

Propane	0.6184	0.0015686275 lb/MMBtu	EPA
Butane	0.8116	0.0020588235 lb/MMBtu	EPA
Cyclopentane	0.0160	0.0000405000 lb/MMBtu	GRI Field
Pentane	1.0048	0.0025490196 lb/MMBtu	EPA
n-Pentane	0.7884	0.0020000000 lb/MMBtu	GRI Field
Cyclohexane	0.0178	0.0000451000 lb/MMBtu	GRI Field
Methylcyclohexane	0.0667	0.0001691000 lb/MMBtu	GRI Field
n-Octane	0.0199	0.0000506000 lb/MMBtu	GRI Field
n-Nonane	0.0020	0.0000050000 lb/MMBtu	GRI Field
CO2	46,376.4706	117.6470588235 lb/MMBtu	EPA

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:

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

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

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

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.

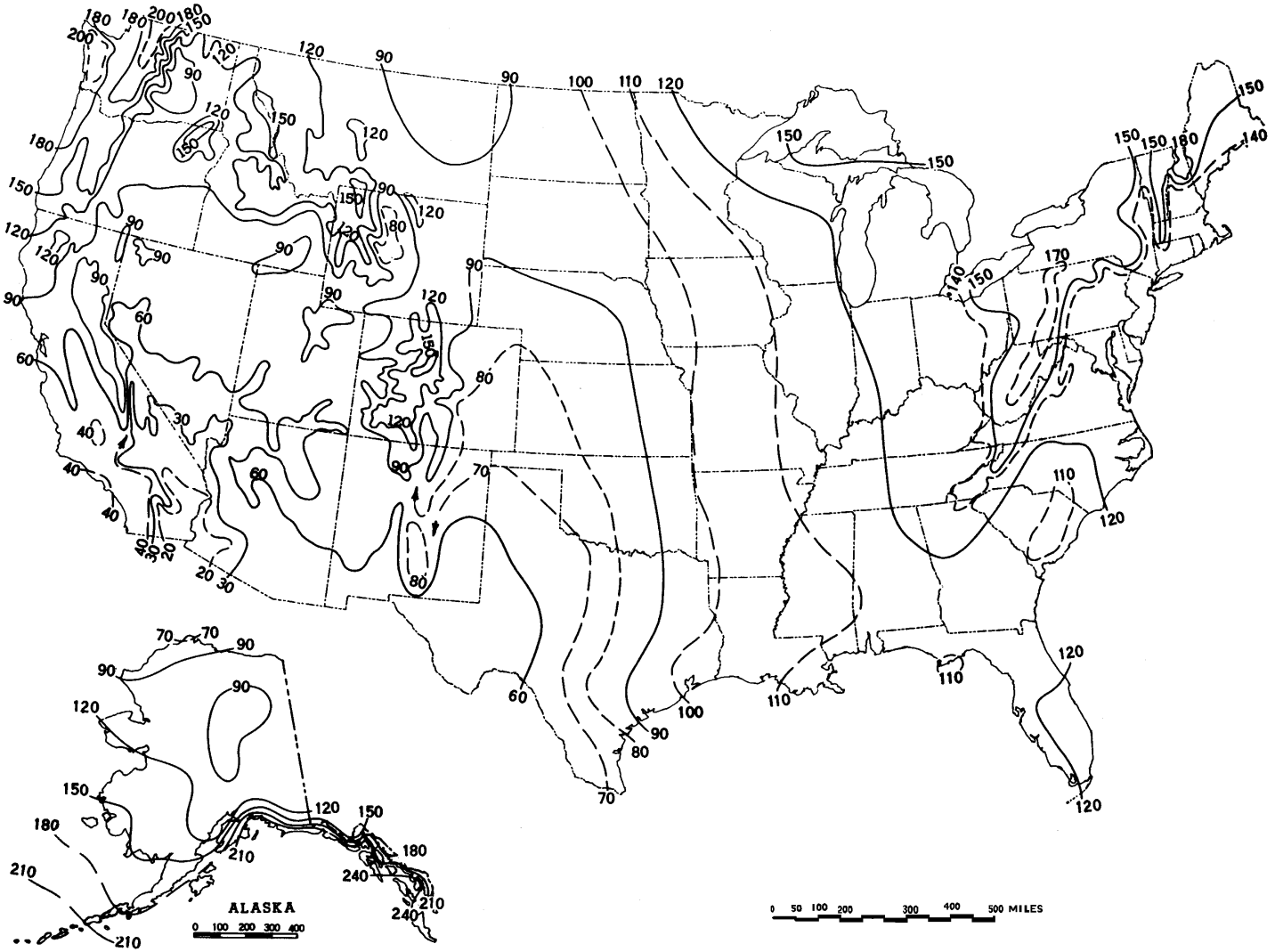


Figure 13.2.2-1. Mean number of days with 0.01 inch or more of precipitation in United States.

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Title 40 → Chapter I → Subchapter C → Part 60 → Subpart OOO

Title 40: Protection of Environment
PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

Subpart OOO—Standards of Performance for Nonmetallic Mineral Processing Plants

Contents

SOURCE: 74 FR 19309, Apr. 28, 2009, unless otherwise noted.

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§60.670 Applicability and designation of affected facility.

(a)(1) Except as provided in paragraphs (a)(2), (b), (c), and (d) of this section, the provisions of this subpart are applicable to the following affected facilities in fixed or portable nonmetallic mineral processing plants: each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, enclosed truck or railcar loading station. Also, crushers and grinding mills at hot mix asphalt facilities that reduce the size of nonmetallic minerals embedded in recycled asphalt pavement and subsequent affected facilities up to, but not including, the first storage silo or bin are subject to the provisions of this subpart.

(2) The provisions of this subpart do not apply to the following operations: All facilities located in underground mines; plants without crushers or grinding mills above ground; and wet material processing operations (as defined in §60.671).

(b) An affected facility that is subject to the provisions of subparts F or I of this part or that follows in the plant process any facility subject to the provisions of subparts F or I of this part is not subject to the provisions of this subpart.

(c) Facilities at the following plants are not subject to the provisions of this subpart:

(1) Fixed sand and gravel plants and crushed stone plants with capacities, as defined in §60.671, of 23 megagrams per hour (25 tons per hour) or less;

(2) Portable sand and gravel plants and crushed stone plants with capacities, as defined in §60.671, of 136 megagrams per hour (150 tons per hour) or less; and

(3) Common clay plants and pumice plants with capacities, as defined in §60.671, of 9 megagrams per hour (10 tons per hour) or less.

(d)(1) When an existing facility is replaced by a piece of equipment of equal or smaller size, as defined in §60.671, having the same function as the existing facility, and there is no increase in the amount of emissions, the new facility is exempt from the provisions of §§60.672, 60.674, and 60.675 except as provided for in paragraph (d)(3) of this section.

(2) An owner or operator complying with paragraph (d)(1) of this section shall submit the information required in §60.676(a).

(3) An owner or operator replacing all existing facilities in a production line with new facilities does not qualify for the exemption described in paragraph (d)(1) of this section and must comply with the provisions of §§60.672, 60.674 and 60.675.

(e) An affected facility under paragraph (a) of this section that commences construction, modification, or reconstruction after August 31, 1983, is subject to the requirements of this part.

(f) Table 1 of this subpart specifies the provisions of subpart A of this part 60 that do not apply to owners and operators of affected facilities subject to this subpart or that apply with certain exceptions.

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§60.671 Definitions.

All terms used in this subpart, but not specifically defined in this section, shall have the meaning given them in the Act and in subpart A of this part.

Bagging operation means the mechanical process by which bags are filled with nonmetallic minerals.

Belt conveyor means a conveying device that transports material from one location to another by means of an endless belt that is carried on a series of idlers and routed around a pulley at each end.

Bucket elevator means a conveying device of nonmetallic minerals consisting of a head and foot assembly which supports and drives an endless single or double strand chain or belt to which buckets are attached.

Building means any frame structure with a roof.

Capacity means the cumulative rated capacity of all initial crushers that are part of the plant.

Capture system means the equipment (including enclosures, hoods, ducts, fans, dampers, etc.) used to capture and transport particulate matter generated by one or more affected facilities to a control device.

Control device means the air pollution control equipment used to reduce particulate matter emissions released to the atmosphere from one or more affected facilities at a nonmetallic mineral processing plant.

Conveying system means a device for transporting materials from one piece of equipment or location to another location within a plant. Conveying systems include but are not limited to the following: Feeders, belt conveyors, bucket elevators and pneumatic systems.

Crush or *Crushing* means to reduce the size of nonmetallic mineral material by means of physical impaction of the crusher or grinding mill upon the material.

Crusher means a machine used to crush any nonmetallic minerals, and includes, but is not limited to, the following types: Jaw, gyratory, cone, roll, rod mill, hammermill, and impactor.

Enclosed truck or railcar loading station means that portion of a nonmetallic mineral processing plant where nonmetallic minerals are loaded by an enclosed conveying system into enclosed trucks or railcars.

Fixed plant means any nonmetallic mineral processing plant at which the processing equipment specified in §60.670(a) is attached by a cable, chain, turnbuckle, bolt or other means (except electrical connections) to any anchor, slab, or structure including bedrock.

Fugitive emission means particulate matter that is not collected by a capture system and is released to the atmosphere at the point of generation.

Grinding mill means a machine used for the wet or dry fine crushing of any nonmetallic mineral. Grinding mills include, but are not limited to, the following types: Hammer, roller, rod, pebble and ball, and fluid energy. The grinding mill includes the air conveying system, air separator, or air classifier, where such systems are used.

Initial crusher means any crusher into which nonmetallic minerals can be fed without prior crushing in the plant.

Nonmetallic mineral means any of the following minerals or any mixture of which the majority is any of the following minerals:

(1) Crushed and Broken Stone, including Limestone, Dolomite, Granite, Traprock, Sandstone, Quartz, Quartzite, Marl, Marble, Slate, Shale, Oil Shale, and Shell.

(2) Sand and Gravel.

(3) Clay including Kaolin, Fireclay, Bentonite, Fuller's Earth, Ball Clay, and Common Clay.

(4) Rock Salt.

(5) Gypsum (natural or synthetic).

(6) Sodium Compounds, including Sodium Carbonate, Sodium Chloride, and Sodium Sulfate.

(7) Pumice.

(8) Gilsonite.

(9) Talc and Pyrophyllite.

(10) Boron, including Borax, Kernite, and Colemanite.

(11) Barite.

(12) Fluorospar.

(13) Feldspar.

(14) Diatomite.

(15) Perlite.

(16) Vermiculite.

(17) Mica.

(18) Kyanite, including Andalusite, Sillimanite, Topaz, and Dumortierite.

Nonmetallic mineral processing plant means any combination of equipment that is used to crush or grind any nonmetallic mineral wherever located, including lime plants, power plants, steel mills, asphalt concrete plants, portland cement plants, or any other facility processing nonmetallic minerals except as provided in §60.670 (b) and (c).

Portable plant means any nonmetallic mineral processing plant that is mounted on any chassis or skids and may be moved by the application of a lifting or pulling force. In addition, there shall be no cable, chain, turnbuckle, bolt or other means (except electrical connections)

by which any piece of equipment is attached or clamped to any anchor, slab, or structure, including bedrock that must be removed prior to the application of a lifting or pulling force for the purpose of transporting the unit.

Production line means all affected facilities (crushers, grinding mills, screening operations, bucket elevators, belt conveyors, bagging operations, storage bins, and enclosed truck and railcar loading stations) which are directly connected or are connected together by a conveying system.

Saturated material means, for purposes of this subpart, mineral material with sufficient surface moisture such that particulate matter emissions are not generated from processing of the material through screening operations, bucket elevators and belt conveyors. Material that is wetted solely by wet suppression systems is not considered to be "saturated" for purposes of this definition.

Screening operation means a device for separating material according to size by passing undersize material through one or more mesh surfaces (screens) in series, and retaining oversize material on the mesh surfaces (screens). Grizzly feeders associated with truck dumping and static (non-moving) grizzlies used anywhere in the nonmetallic mineral processing plant are not considered to be screening operations.

Seasonal shut down means shut down of an affected facility for a period of at least 45 consecutive days due to weather or seasonal market conditions.

Size means the rated capacity in tons per hour of a crusher, grinding mill, bucket elevator, bagging operation, or enclosed truck or railcar loading station; the total surface area of the top screen of a screening operation; the width of a conveyor belt; and the rated capacity in tons of a storage bin.

Stack emission means the particulate matter that is released to the atmosphere from a capture system.

Storage bin means a facility for storage (including surge bins) of nonmetallic minerals prior to further processing or loading.

Transfer point means a point in a conveying operation where the nonmetallic mineral is transferred to or from a belt conveyor except where the nonmetallic mineral is being transferred to a stockpile.

Truck dumping means the unloading of nonmetallic minerals from movable vehicles designed to transport nonmetallic minerals from one location to another. Movable vehicles include but are not limited to: Trucks, front end loaders, skip hoists, and railcars.

Vent means an opening through which there is mechanically induced air flow for the purpose of exhausting from a building air carrying particulate matter emissions from one or more affected facilities.

Wet material processing operation(s) means any of the following:

(1) Wet screening operations (as defined in this section) and subsequent screening operations, bucket elevators and belt conveyors in the production line that process saturated materials (as defined in this section) up to the first crusher, grinding mill or storage bin in the production line; or

(2) Screening operations, bucket elevators and belt conveyors in the production line downstream of wet mining operations (as defined in this section) that process saturated materials (as defined in this section) up to the first crusher, grinding mill or storage bin in the production line.

Wet mining operation means a mining or dredging operation designed and operated to extract any nonmetallic mineral regulated under this subpart from deposits existing at or below the water table, where the nonmetallic mineral is saturated with water.

Wet screening operation means a screening operation at a nonmetallic mineral processing plant which removes unwanted material or which separates marketable fines from the product by a washing process which is designed and operated at all times such that the product is saturated with water.

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§60.672 Standard for particulate matter (PM).

(a) Affected facilities must meet the stack emission limits and compliance requirements in Table 2 of this subpart within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup as required under §60.8. The requirements in Table 2 of this subpart apply for affected facilities with capture systems used to capture and transport particulate matter to a control device.

(b) Affected facilities must meet the fugitive emission limits and compliance requirements in Table 3 of this subpart within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup as required under §60.11. The requirements in Table 3 of this subpart apply for fugitive emissions from affected facilities without capture systems and for fugitive emissions escaping capture systems.

(c) [Reserved]

(d) Truck dumping of nonmetallic minerals into any screening operation, feed hopper, or crusher is exempt from the requirements of this section.

(e) If any transfer point on a conveyor belt or any other affected facility is enclosed in a building, then each enclosed affected facility must comply with the emission limits in paragraphs (a) and (b) of this section, or the building enclosing the affected facility or facilities must comply with the following emission limits:

(1) Fugitive emissions from the building openings (except for vents as defined in §60.671) must not exceed 7 percent opacity; and

(2) Vents (as defined in §60.671) in the building must meet the applicable stack emission limits and compliance requirements in Table 2 of this subpart.

(f) Any baghouse that controls emissions from only an individual, enclosed storage bin is exempt from the applicable stack PM concentration limit (and associated performance testing) in Table 2 of this subpart but must meet the applicable stack opacity limit and compliance requirements in Table 2 of this subpart. This exemption from the stack PM concentration limit does not apply for multiple storage bins with combined stack emissions.

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§60.673 Reconstruction.

(a) The cost of replacement of ore-contact surfaces on processing equipment shall not be considered in calculating either the "fixed capital cost of the new components" or the "fixed capital cost that would be required to construct a comparable new facility" under §60.15. Ore-contact surfaces are crushing surfaces; screen meshes, bars, and plates; conveyor belts; and elevator buckets.

(b) Under §60.15, the "fixed capital cost of the new components" includes the fixed capital cost of all depreciable components (except components specified in paragraph (a) of this section) which are or will be replaced pursuant to all continuous programs of component replacement commenced within any 2-year period following August 31, 1983.

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§60.674 Monitoring of operations.

(a) The owner or operator of any affected facility subject to the provisions of this subpart which uses a wet scrubber to control emissions shall install, calibrate, maintain and operate the following monitoring devices:

(1) A device for the continuous measurement of the pressure loss of the gas stream through the scrubber. The monitoring device must be certified by the manufacturer to be accurate within ±250 pascals ±1 inch water gauge pressure and must be calibrated on an annual basis in accordance with manufacturer's instructions.

(2) A device for the continuous measurement of the scrubbing liquid flow rate to the wet scrubber. The monitoring device must be certified by the manufacturer to be accurate within ±5 percent of design scrubbing liquid flow rate and must be calibrated on an annual basis in accordance with manufacturer's instructions.

(b) The owner or operator of any affected facility for which construction, modification, or reconstruction commenced on or after April 22, 2008, that uses wet suppression to control emissions from the affected facility must perform monthly periodic inspections to check that water is flowing to discharge spray nozzles in the wet suppression system. The owner or operator must initiate corrective action within 24 hours and complete corrective action as expediently as practical if the owner or operator finds that water is not flowing properly during an inspection of the water spray nozzles. The owner or operator must record each inspection of the water spray nozzles, including the date of each inspection and any corrective actions taken, in the logbook required under §60.676(b).

(1) If an affected facility relies on water carryover from upstream water sprays to control fugitive emissions, then that affected facility is exempt from the 5-year repeat testing requirement specified in Table 3 of this subpart provided that the affected facility meets the criteria in paragraphs (b)(1)(i) and (ii) of this section:

(i) The owner or operator of the affected facility conducts periodic inspections of the upstream water spray(s) that are responsible for controlling fugitive emissions from the affected facility. These inspections are conducted according to paragraph (b) of this section and §60.676 (b), and

(ii) The owner or operator of the affected facility designates which upstream water spray(s) will be periodically inspected at the time of the initial performance test required under §60.11 of this part and §60.675 of this subpart.

(2) If an affected facility that routinely uses wet suppression water sprays ceases operation of the water sprays or is using a control mechanism to reduce fugitive emissions other than water sprays during the monthly inspection (for example, water from recent rainfall), the logbook entry required under §60.676(b) must specify the control mechanism being used instead of the water sprays.

(c) Except as specified in paragraph (d) or (e) of this section, the owner or operator of any affected facility for which construction, modification, or reconstruction commenced on or after April 22, 2008, that uses a baghouse to control emissions must conduct quarterly 30-minute visible emissions inspections using EPA Method 22 (40 CFR part 60, Appendix A-7). The Method 22 (40 CFR part 60, Appendix A-7) test shall be conducted while the baghouse is operating. The test is successful if no visible emissions are observed. If any visible emissions are observed, the owner or operator of the affected facility must initiate corrective action within 24 hours to return the baghouse to normal operation. The owner or operator must record each Method 22 (40 CFR part 60, Appendix A-7) test, including the date and any corrective actions taken, in the logbook required under §60.676(b). The owner or operator of the affected facility may establish a different baghouse-specific success level for the visible emissions test (other than no visible emissions) by conducting a PM performance test according to §60.675(b) simultaneously with a Method 22 (40 CFR part 60, Appendix A-7) to determine what constitutes normal visible emissions from that affected facility's baghouse when it is in compliance with the applicable PM concentration limit in Table 2 of this subpart. The revised visible emissions success level must be incorporated into the permit for the affected facility.

(d) As an alternative to the periodic Method 22 (40 CFR part 60, Appendix A-7) visible emissions inspections specified in paragraph (c) of this section, the owner or operator of any affected facility for which construction, modification, or reconstruction commenced on or after April 22, 2008, that uses a baghouse to control emissions may use a bag leak detection system. The owner or operator must install, operate, and maintain the bag leak detection system according to paragraphs (d)(1) through (3) of this section.

(1) Each bag leak detection system must meet the specifications and requirements in paragraphs (d)(1)(i) through (viii) of this section.

(i) The bag leak detection system must be certified by the manufacturer to be capable of detecting PM emissions at concentrations of 1 milligram per dry standard cubic meter (0.00044 grains per actual cubic foot) or less.

(ii) The bag leak detection system sensor must provide output of relative PM loadings. The owner or operator shall continuously record the output from the bag leak detection system using electronic or other means (*e.g.*, using a strip chart recorder or a data logger).

(iii) The bag leak detection system must be equipped with an alarm system that will sound when the system detects an increase in relative particulate loading over the alarm set point established according to paragraph (d)(1)(iv) of this section, and the alarm must be located such that it can be heard by the appropriate plant personnel.

(iv) In the initial adjustment of the bag leak detection system, the owner or operator must establish, at a minimum, the baseline output by adjusting the sensitivity (range) and the averaging period of the device, the alarm set points, and the alarm delay time.

(v) Following initial adjustment, the owner or operator shall not adjust the averaging period, alarm set point, or alarm delay time without approval from the Administrator or delegated authority except as provided in paragraph (d)(1)(vi) of this section.

(vi) Once per quarter, the owner or operator may adjust the sensitivity of the bag leak detection system to account for seasonal effects, including temperature and humidity, according to the procedures identified in the site-specific monitoring plan required by paragraph (d)(2) of this section.

(vii) The owner or operator must install the bag leak detection sensor downstream of the fabric filter.

(viii) Where multiple detectors are required, the system's instrumentation and alarm may be shared among detectors.

(2) The owner or operator of the affected facility must develop and submit to the Administrator or delegated authority for approval of a site-specific monitoring plan for each bag leak detection system. The owner or operator must operate and maintain the bag leak detection system according to the site-specific monitoring plan at all times. Each monitoring plan must describe the items in paragraphs (d)(2)(i) through (vi) of this section.

(i) Installation of the bag leak detection system;

(ii) Initial and periodic adjustment of the bag leak detection system, including how the alarm set-point will be established;

(iii) Operation of the bag leak detection system, including quality assurance procedures;

(iv) How the bag leak detection system will be maintained, including a routine maintenance schedule and spare parts inventory list;

(v) How the bag leak detection system output will be recorded and stored; and

(vi) Corrective action procedures as specified in paragraph (d)(3) of this section. In approving the site-specific monitoring plan, the Administrator or delegated authority may allow owners and operators more than 3 hours to alleviate a specific condition that causes an alarm if the owner or operator identifies in the monitoring plan this specific condition as one that could lead to an alarm, adequately explains why it is not feasible to alleviate this condition within 3 hours of the time the alarm occurs, and demonstrates that the requested time will ensure alleviation of this condition as expeditiously as practicable.

(3) For each bag leak detection system, the owner or operator must initiate procedures to determine the cause of every alarm within 1 hour of the alarm. Except as provided in paragraph (d)(2)(vi) of this section, the owner or operator must alleviate the cause of the alarm within 3 hours of the alarm by taking whatever corrective action(s) are necessary. Corrective actions may include, but are not limited to the following:

(i) Inspecting the fabric filter for air leaks, torn or broken bags or filter media, or any other condition that may cause an increase in PM emissions;

(ii) Sealing off defective bags or filter media;

(iii) Replacing defective bags or filter media or otherwise repairing the control device;

(iv) Sealing off a defective fabric filter compartment;

(v) Cleaning the bag leak detection system probe or otherwise repairing the bag leak detection system; or

(vi) Shutting down the process producing the PM emissions.

(e) As an alternative to the periodic Method 22 (40 CFR part 60, Appendix A-7) visible emissions inspections specified in paragraph (c) of this section, the owner or operator of any affected facility that is subject to the requirements for processed stone handling operations in the Lime Manufacturing NESHAP (40 CFR part 63, subpart AAAAA) may follow the continuous compliance requirements in row 1 items (i) through (iii) of table 6 to subpart AAAAA of 40 CFR part 63.

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§60.675 Test methods and procedures.

(a) In conducting the performance tests required in §60.8, the owner or operator shall use as reference methods and procedures the test methods in appendices A-1 through A-7 of this part or other methods and procedures as specified in this section, except as provided in §60.8(b). Acceptable alternative methods and procedures are given in paragraph (e) of this section.

(b) The owner or operator shall determine compliance with the PM standards in §60.672(a) as follows:

(1) Except as specified in paragraphs (e)(3) and (4) of this section, Method 5 of Appendix A-3 of this part or Method 17 of Appendix A-6 of this part shall be used to determine the particulate matter concentration. The sample volume shall be at least 1.70 dscm (60 dscf). For Method 5 (40 CFR part 60, Appendix A-3), if the gas stream being sampled is at ambient temperature, the sampling probe and filter may be operated without heaters. If the gas stream is above ambient temperature, the sampling probe and filter may be operated at a temperature high enough, but no higher than 121 °C (250 °F), to prevent water condensation on the filter.

(2) Method 9 of Appendix A-4 of this part and the procedures in §60.11 shall be used to determine opacity.

(c)(1) In determining compliance with the particulate matter standards in §60.672(b) or §60.672(e)(1), the owner or operator shall use Method 9 of Appendix A-4 of this part and the procedures in §60.11, with the following additions:

(i) The minimum distance between the observer and the emission source shall be 4.57 meters (15 feet).

(ii) The observer shall, when possible, select a position that minimizes interference from other fugitive emission sources (*e.g.,* road dust). The required observer position relative to the sun (Method 9 of Appendix A-4 of this part, Section 2.1) must be followed.

(iii) For affected facilities using wet dust suppression for particulate matter control, a visible mist is sometimes generated by the spray. The water mist must not be confused with particulate matter emissions and is not to be considered a visible emission. When a water mist of this nature is present, the observation of emissions is to be made at a point in the plume where the mist is no longer visible.

(2)(i) In determining compliance with the opacity of stack emissions from any baghouse that controls emissions only from an individual enclosed storage bin under §60.672(f) of this subpart, using Method 9 (40 CFR part 60, Appendix A-4), the duration of the Method 9 (40 CFR part 60, Appendix A-4) observations shall be 1 hour (ten 6-minute averages).

(ii) The duration of the Method 9 (40 CFR part 60, Appendix A-4) observations may be reduced to the duration the affected facility operates (but not less than 30 minutes) for baghouses that control storage bins or enclosed truck or railcar loading stations that operate for less than 1 hour at a time.

(3) When determining compliance with the fugitive emissions standard for any affected facility described under §60.672(b) or §60.672(e)(1) of this subpart, the duration of the Method 9 (40 CFR part 60, Appendix A-4) observations must be 30 minutes (five 6-minute averages). Compliance with the applicable fugitive emission limits in Table 3 of this subpart must be based on the average of the five 6-minute averages.

(d) To demonstrate compliance with the fugitive emission limits for buildings specified in §60.672(e)(1), the owner or operator must complete the testing specified in paragraph (d)(1) and (2) of this section. Performance tests must be conducted while all affected facilities inside the building are operating.

(1) If the building encloses any affected facility that commences construction, modification, or reconstruction on or after April 22, 2008, the owner or operator of the affected facility must conduct an initial Method 9 (40 CFR part 60, Appendix A-4) performance test according to this section and §60.11.

(2) If the building encloses only affected facilities that commenced construction, modification, or reconstruction before April 22, 2008, and the owner or operator has previously conducted an initial Method 22 (40 CFR part 60, Appendix A-7) performance test showing zero visible emissions, then the owner or operator has demonstrated compliance with the opacity limit in §60.672(e)(1). If the owner or operator has not conducted an initial performance test for the building before April 22, 2008, then the owner or operator must conduct an initial Method 9 (40 CFR part 60, Appendix A-4) performance test according to this section and §60.11 to show compliance with the opacity limit in §60.672(e)(1).

(e) The owner or operator may use the following as alternatives to the reference methods and procedures specified in this section:

(1) For the method and procedure of paragraph (c) of this section, if emissions from two or more facilities continuously interfere so that the opacity of fugitive emissions from an individual affected facility cannot be read, either of the following procedures may be used:

(i) Use for the combined emission stream the highest fugitive opacity standard applicable to any of the individual affected facilities contributing to the emissions stream.

(ii) Separate the emissions so that the opacity of emissions from each affected facility can be read.

(2) A single visible emission observer may conduct visible emission observations for up to three fugitive, stack, or vent emission points within a 15-second interval if the following conditions are met:

(i) No more than three emission points may be read concurrently.

(ii) All three emission points must be within a 70 degree viewing sector or angle in front of the observer such that the proper sun position can be maintained for all three points.

(iii) If an opacity reading for any one of the three emission points equals or exceeds the applicable standard, then the observer must stop taking readings for the other two points and continue reading just that single point.

(3) Method 5I of Appendix A-3 of this part may be used to determine the PM concentration as an alternative to the methods specified in paragraph (b)(1) of this section. Method 5I (40 CFR part 60, Appendix A-3) may be useful for affected facilities that operate for less than 1 hour at a time such as (but not limited to) storage bins or enclosed truck or railcar loading stations.

(4) In some cases, velocities of exhaust gases from building vents may be too low to measure accurately with the type S pitot tube specified in EPA Method 2 of Appendix A-1 of this part [*i.e.,* velocity head <1.3 mm H_2O (0.05 in. H_2O)] and referred to in EPA Method 5 of Appendix A-3 of this part. For these conditions, the owner or operator may determine the average gas flow rate produced by the power fans (*e.g.,* from vendor-supplied fan curves) to the building vent. The owner or operator may calculate the average gas velocity at the building vent measurement site using Equation 1 of this section and use this average velocity in determining and maintaining isokinetic sampling rates.

$$v_e = \frac{Q_f}{A_e} \quad \text{(Eq. 1)}$$

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Where:

V_e = average building vent velocity (feet per minute);

Q_f = average fan flow rate (cubic feet per minute); and

A_e = area of building vent and measurement location (square feet).

(f) To comply with §60.676(d), the owner or operator shall record the measurements as required in §60.676(c) using the monitoring devices in §60.674 (a)(1) and (2) during each particulate matter run and shall determine the averages.

(g) For performance tests involving only Method 9 (40 CFR part 60 Appendix A-4) testing, the owner or operator may reduce the 30-day advance notification of performance test in §60.7(a)(6) and 60.8(d) to a 7-day advance notification.

(h) [Reserved]

(i) If the initial performance test date for an affected facility falls during a seasonal shut down (as defined in §60.671 of this subpart) of the affected facility, then with approval from the permitting authority, the owner or operator may postpone the initial performance test until no later than 60 calendar days after resuming operation of the affected facility.

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§60.676 Reporting and recordkeeping.

(a) Each owner or operator seeking to comply with §60.670(d) shall submit to the Administrator the following information about the existing facility being replaced and the replacement piece of equipment.

(1) For a crusher, grinding mill, bucket elevator, bagging operation, or enclosed truck or railcar loading station:

(i) The rated capacity in megagrams or tons per hour of the existing facility being replaced and

(ii) The rated capacity in tons per hour of the replacement equipment.

(2) For a screening operation:

(i) The total surface area of the top screen of the existing screening operation being replaced and

(ii) The total surface area of the top screen of the replacement screening operation.

(3) For a conveyor belt:

(i) The width of the existing belt being replaced and

(ii) The width of the replacement conveyor belt.

(4) For a storage bin:

(i) The rated capacity in megagrams or tons of the existing storage bin being replaced and

(ii) The rated capacity in megagrams or tons of replacement storage bins.

(b)(1) Owners or operators of affected facilities (as defined in §§60.670 and 60.671) for which construction, modification, or reconstruction commenced on or after April 22, 2008, must record each periodic inspection required under §60.674(b) or (c), including dates and any corrective actions taken, in a logbook (in written or electronic format). The owner or operator must keep the logbook onsite and make hard or electronic copies (whichever is requested) of the logbook available to the Administrator upon request.

(2) For each bag leak detection system installed and operated according to §60.674(d), the owner or operator must keep the records specified in paragraphs (b)(2)(i) through (iii) of this section.

(i) Records of the bag leak detection system output;

(ii) Records of bag leak detection system adjustments, including the date and time of the adjustment, the initial bag leak detection system settings, and the final bag leak detection system settings; and

(iii) The date and time of all bag leak detection system alarms, the time that procedures to determine the cause of the alarm were initiated, the cause of the alarm, an explanation of the actions taken, the date and time the cause of the alarm was alleviated, and whether the cause of the alarm was alleviated within 3 hours of the alarm.

(3) The owner or operator of each affected facility demonstrating compliance according to §60.674(e) by following the requirements for processed stone handling operations in the Lime Manufacturing NESHAP (40 CFR part 63, subpart AAAAA) must maintain records of visible emissions observations required by §63.7132(a)(3) and (b) of 40 CFR part 63, subpart AAAAA.

(c) During the initial performance test of a wet scrubber, and daily thereafter, the owner or operator shall record the measurements of both the change in pressure of the gas stream across the scrubber and the scrubbing liquid flow rate.

(d) After the initial performance test of a wet scrubber, the owner or operator shall submit semiannual reports to the Administrator of occurrences when the measurements of the scrubber pressure loss and liquid flow rate decrease by more than 30 percent from the average determined during the most recent performance test.

(e) The reports required under paragraph (d) of this section shall be postmarked within 30 days following end of the second and fourth calendar quarters.

(f) The owner or operator of any affected facility shall submit written reports of the results of all performance tests conducted to demonstrate compliance with the standards set forth in §60.672 of this subpart, including reports of opacity observations made using Method 9 (40 CFR part 60, Appendix A-4) to demonstrate compliance with §60.672(b), (e) and (f).

(g) The owner or operator of any wet material processing operation that processes saturated and subsequently processes unsaturated materials, shall submit a report of this change within 30 days following such change. At the time of such change, this screening operation, bucket elevator, or belt conveyor becomes subject to the applicable opacity limit in §60.672(b) and the emission test requirements of §60.11.

(h) The subpart A requirement under §60.7(a)(1) for notification of the date construction or reconstruction commenced is waived for affected facilities under this subpart.

(i) A notification of the actual date of initial startup of each affected facility shall be submitted to the Administrator.

(1) For a combination of affected facilities in a production line that begin actual initial startup on the same day, a single notification of startup may be submitted by the owner or operator to the Administrator. The notification shall be postmarked within 15 days after such date and shall include a description of each affected facility, equipment manufacturer, and serial number of the equipment, if available.

(2) For portable aggregate processing plants, the notification of the actual date of initial startup shall include both the home office and the current address or location of the portable plant.

(j) The requirements of this section remain in force until and unless the Agency, in delegating enforcement authority to a State under section 111(c) of the Act, approves reporting requirements or an alternative means of compliance surveillance adopted by such States. In that event, affected facilities within the State will be relieved of the obligation to comply with the reporting requirements of this section, provided that they comply with requirements established by the State.

(k) Notifications and reports required under this subpart and under subpart A of this part to demonstrate compliance with this subpart need only to be sent to the EPA Region or the State which has been delegated authority according to §60.4(b).

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Table 1 to Subpart OOO of Part 60—Exceptions to Applicability of Subpart A to Subpart OOO

Subpart A reference	Applies to subpart OOO	Explanation
60.4, Address	Yes	Except in §60.4(a) and (b) submittals need not be submitted to both the EPA Region and delegated State authority (§60.676(k)).
60.7, Notification and recordkeeping	Yes	Except in (a)(1) notification of the date construction or reconstruction commenced (§60.676 (h)).
		Also, except in (a)(6) performance tests involving only Method 9 (40 CFR part 60, Appendix A-4) require a 7-day advance notification instead of 30 days (§60.675(g)).
60.8, Performance tests	Yes	Except in (d) performance tests involving only Method 9 (40 CFR part 60, Appendix A-4) require a 7-day advance notification instead of 30 days (§60.675(g)).
60.11, Compliance with standards and maintenance requirements	Yes	Except in (b) under certain conditions (§§60.675(c)), Method 9 (40 CFR part 60, Appendix A-4) observation is reduced from 3 hours to 30 minutes for fugitive emissions.
60.18, General control device	No	Flares will not be used to comply with the emission limits.

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Table 2 to Subpart OOO of Part 60—Stack Emission Limits for Affected Facilities With Capture Systems

For * * *	The owner or operator must meet a PM limit of * * *	And the owner or operator must meet an opacity limit of * * *	The owner or operator must demonstrate compliance with these limits by conducting * * *
Affected facilities (as defined in §§60.670 and 60.671) that commenced construction, modification, or reconstruction after August 31, 1983 but before April 22, 2008	0.05 g/dscm (0.022 gr/dscf)[a]	7 percent for dry control devices[b]	An initial performance test according to §60.8 of this part and §60.675 of this subpart; and Monitoring of wet scrubber parameters according to §60.674(a) and §60.676(c), (d), and (e).
Affected facilities (as defined in §§60.670 and 60.671) that commence construction, modification, or reconstruction on or after April 22, 2008	0.032 g/dscm (0.014 gr/dscf)[a]	Not applicable (except for individual enclosed storage bins) 7 percent for dry control devices on individual enclosed storage bins	An initial performance test according to §60.8 of this part and §60.675 of this subpart; and Monitoring of wet scrubber parameters according to §60.674(a) and §60.676(c), (d), and (e); and
			Monitoring of baghouses according to §60.674(c), (d), or (e) and §60.676(b).

[a]Exceptions to the PM limit apply for individual enclosed storage bins and other equipment. See §60.672(d) through (f).

[b]The stack opacity limit and associated opacity testing requirements do not apply for affected facilities using wet scrubbers.

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Table 3 to Subpart OOO of Part 60—Fugitive Emission Limits

For * * *	The owner or operator must meet the following fugitive emissions limit for grinding mills, screening operations, bucket elevators, transfer points on belt conveyors, bagging operations, storage bins, enclosed truck or railcar loading stations or from any other affected facility (as defined in §§60.670 and 60.671) * * *	The owner or operator must meet the following fugitive emissions limit for crushers at which a capture system is not used * * *	The owner or operator must demonstrate compliance with these limits by conducting * * *
Affected facilities (as defined in §§60.670 and 60.671) that commenced construction, modification, or reconstruction after August 31, 1983 but before April 22, 2008	10 percent opacity	15 percent opacity	An initial performance test according to §60.11 of this part and §60.675 of this subpart.
Affected facilities (as defined in §§60.670 and 60.671) that commence construction, modification, or reconstruction on or after April 22, 2008	7 percent opacity	12 percent opacity	An initial performance test according to §60.11 of this part and §60.675 of this subpart; and Periodic inspections of water sprays according to §60.674(b) and §60.676(b); and
			A repeat performance test according to §60.11 of this part and §60.675 of this subpart within 5 years from the previous performance test for fugitive emissions from affected facilities without water

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DEPARTMENT ACCEPTED VALUES FOR:
AGGREGATE HANDLING, STORAGE PILE, and HAUL ROAD EMISSIONS

TO: Applicants and Air Quality Bureau Permitting Staff

SUBJECT: Department accepted default values for percent silt, wind speed, moisture content, and control efficiencies for haul road control measures

This guidance document provides the Department accepted default values for correction parameters in the emission calculation equations for aggregate handling and storage piles emissions in construction permit applications and notices of intent submitted under 20.2.72 and 20.2.73 NMAC; and the Department accepted control efficiencies for haul road control measures for applications submitted under 20.2.72 NMAC.

Aggregate Handling and Storage Pile Emission Calculations

Applicants should calculate the particulate matter emissions from aggregate handling and storage piles using the EPA's AP-42 Chapter 13.2.4.
http://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0204.pdf

Equation 1 from Chapter 13.2.4 requires users to input values for two correction parameters, U and M, where U = mean wind speed and M = material moisture content. Below are the accepted values for U and M:

Default Values for Chapter 13.2.4, Equation 1:

Parameter	Default Value
U = Mean wind speed (miles per hour)	11 mph
M = Material moisture content (% water)	2%

Applicants must receive preapproval from the Department if they wish to assume a higher moisture content and/or a lower wind speed in these calculations. Higher moisture contents may require site specific testing either as a permit condition or submitted with the application. Applicants may assume higher wind speeds and lower percent moisture content in their calculations without prior approval from the Department.

Haul Road Emissions and Control Measure Efficiencies

Applicants should calculate the particulate matter emissions from unpaved haul roads using the EPA's AP-42 Chapter 13.2.2. http://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0202.pdf

Equation 1(a) from Chapter 13.2.2 requires users to input values for two correction parameters, s and W, where s = surface material silt content (%) and W = mean vehicle weight (tons). The applicant should calculate the mean vehicle weight in accordance with the chapter's instructions. Below is the accepted value for the parameter s:

Default Values for Chapter 13.2.2, Equation 1(a):

Parameter	Default Value
s = surface material silt content (%)	4.8%

Applicants may use a higher silt content without prior approval from the Department. Use of a lower silt content requires prior approval from the Department and may require site specific testing in support of the request.

Equation 2 from Chapter 13.2.2 allows users to take credit for the number of days that receive precipitation in excess of 0.01 inches, in the annual emissions calculation, where P = number of days in a year with at least 0.01 inches of precipitation.

Default Values for Chapter 13.2.2, Equation 2:

Parameter	Default Value
P = number of days in a year with at least 0.01 inches of precipitation	70 days

Applications submitted under Part 72 may request to apply control measures to reduce the particulate matter emissions from facility haul roads. Applications submitted under Part 73 may not consider any emission reduction from control measures in the potential emission rate calculation, as registrations issued under Part 73 are not federally enforceable under the Clean Air Act or the New Mexico Air Quality Control Act. In order for those control measures to be federally enforceable, the controls must be a requirement in an air quality permit.

Below are the Department accepted control efficiencies for various haul road control measures:

Haul Road Control Measures and Control Efficiency:

Control Measure	Control Efficiency
None	0%
Base course **or** watering	60%
Base course **and** watering	80%
Base course **and** surfactant	90%
Paved **and** Swept	95%

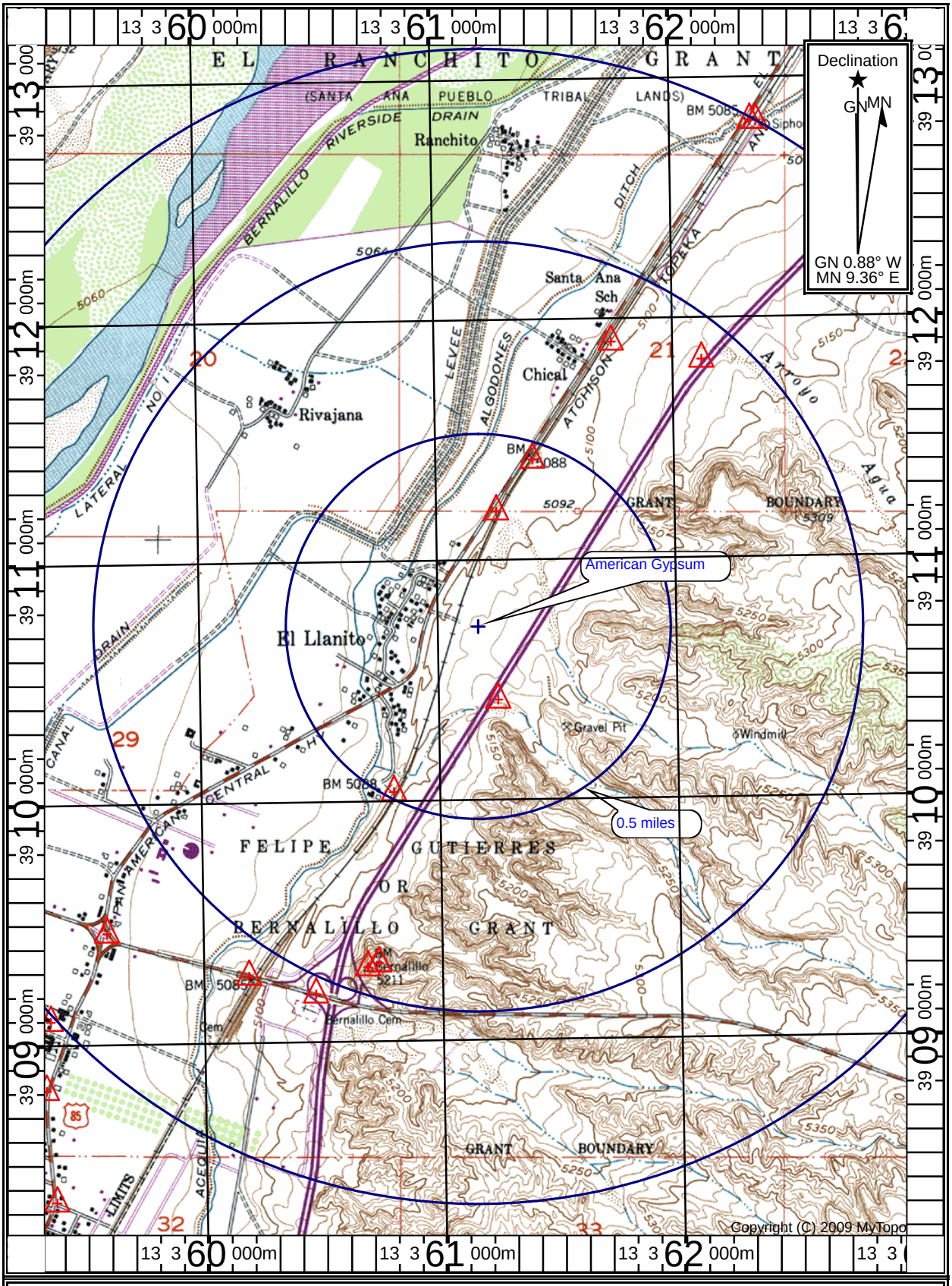
Section 8

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	

A map has been attached to the following page.



SCALE 1:24000

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MILES
0 1000 2000 3000 4000

Map Name: BERNALILLO
Print Date: 01/05/17

Scale: 1 inch = 2,000 ft.
Map Center: 13 0361157 E 39106

Horizontal Datum: WGS84

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")

☑ **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.

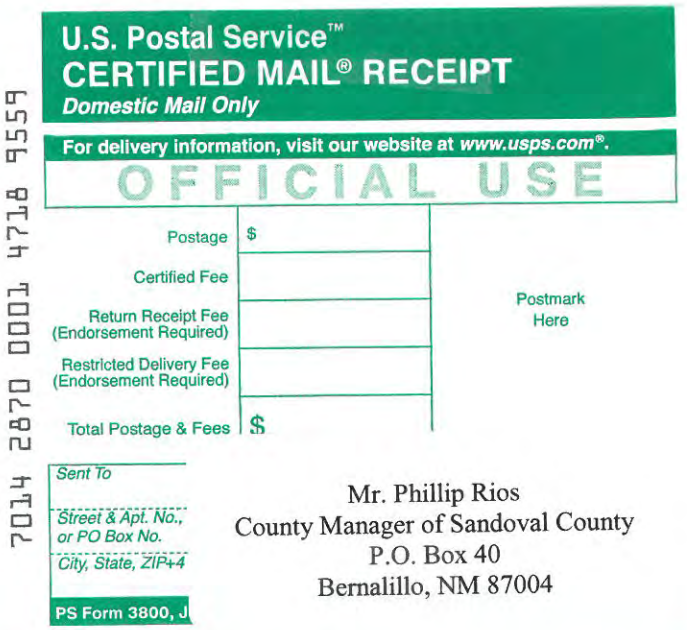
Technical Revision public notices require only items 1, 5, 9, and 10.

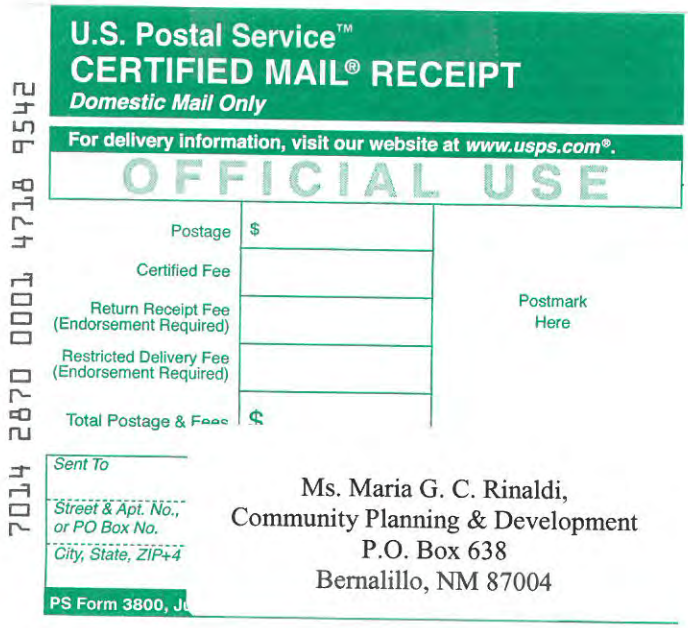
Per the Guidelines for Public Notification document mentioned above, include:

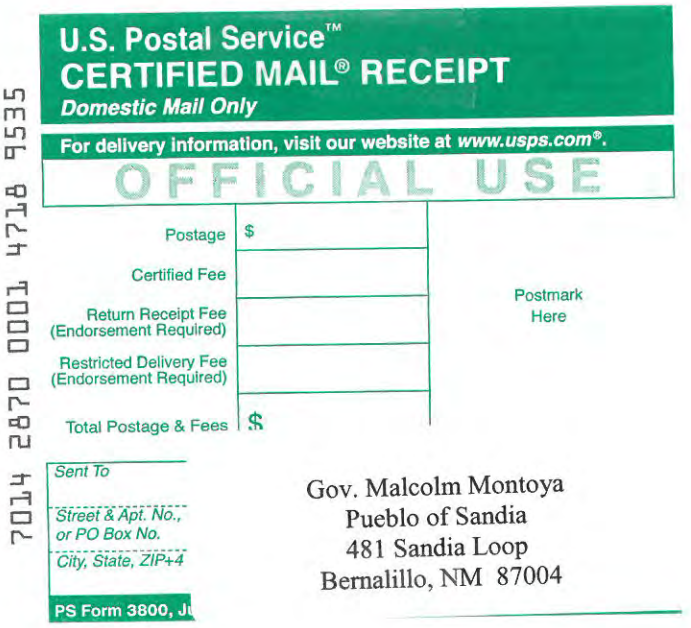
1. ☑ A copy of the certified letter receipts with post marks (20.2.72.203.B NMAC)
2. ☑ A list of the places where the public notice has been posted in at least four publicly accessible and conspicuous places, including the proposed or existing facility entrance. (e.g: post office, library, grocery, etc.)
3. ☑ A copy of the property tax record (20.2.72.203.B NMAC).
4. ☑ A sample of the letters sent to the owners of record.
5. ☑ A sample of the letters sent to counties, municipalities, and Indian tribes.
6. ☑ A sample of the public notice posted and a verification of the local postings.
7. ☑ A table of the noticed citizens, counties, municipalities and tribes and to whom the notices were sent in each group.
8. ☑ A copy of the public service announcement (PSA) sent to a local radio station and documentary proof of submittal.
9. ☑ 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. ☑ 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. ☑ 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.

The required public notice items have been attached to this application.


U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only
For delivery information, visit our website at www.usps.com®.
OFFICIAL USE
Postage $
Certified Fee
Return Receipt Fee (Endorsement Required)
Restricted Delivery Fee (Endorsement Required)
Total Postage & Fees $
Postmark Here
Sent To
Street & Apt. No., or PO Box No.
City, State, ZIP+4
PS Form 3800, Ju
7014 2870 0001 4718 7791
Mr. Scott A. Kominiak – Mayor
Village of Corrales
4324 Corrales Rd.
Corrales, NM 87048


U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only
For delivery information, visit our website at www.usps.com®.
OFFICIAL USE
Postage $
Certified Fee
Return Receipt Fee (Endorsement Required)
Restricted Delivery Fee (Endorsement Required)
Total Postage & Fees $
Postmark Here
Sent To
Street & Apt. No., or PO Box No.
City, State, ZIP+4
PS Form 3800, J
7014 2870 0001 4718 9559
Mr. Phillip Rios
County Manager of Sandoval County
P.O. Box 40
Bernalillo, NM 87004


U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only
For delivery information, visit our website at www.usps.com®.
OFFICIAL USE
Postage $
Certified Fee
Return Receipt Fee (Endorsement Required)
Restricted Delivery Fee (Endorsement Required)
Total Postage & Fees $
Postmark Here
Sent To
Street & Apt. No., or PO Box No.
City, State, ZIP+4
PS Form 3800, Ju
7014 2870 0001 4718 9542
Ms. Maria G. C. Rinaldi,
Community Planning & Development
P.O. Box 638
Bernalillo, NM 87004


U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only
For delivery information, visit our website at www.usps.com®.
OFFICIAL USE
Postage $
Certified Fee
Return Receipt Fee (Endorsement Required)
Restricted Delivery Fee (Endorsement Required)
Total Postage & Fees $
Postmark Here
Sent To
Street & Apt. No., or PO Box No.
City, State, ZIP+4
PS Form 3800, Ju
7014 2870 0001 4718 9535
Gov. Malcolm Montoya
Pueblo of Sandia
481 Sandia Loop
Bernalillo, NM 87004


U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only
For delivery information, visit our website at www.usps.com®.
OFFICIAL USE
Postage $
Certified Fee
Return Receipt Fee (Endorsement Required)
Restricted Delivery Fee (Endorsement Required)
Total Postage & Fees $
Postmark Here
Sent To
Street & Apt. No., or PO Box No.
City, State, ZIP+4
PS Form 3800, Ju
7014 2870 0001 4718 7777
Ms. Julie Morgas Baca
County Manager of Bernalillo County
PO Box 542
Albuquerque, NM 87103-0542


U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only
For delivery information, visit our website at www.usps.com®.
OFFICIAL USE
Postage $
Certified Fee
Return Receipt Fee (Endorsement Required)
Restricted Delivery Fee (Endorsement Required)
Total Postage & Fees $
Postmark Here
Sent To
Street & Apt. No.
or PO Box No.
City, State, ZIP+
PS Form 3800,
7014 2870 0001 4718 7807
Keith Riesberg
Rio Rancho City Manager
Rio Rancho City Hall
3200 Civic Center Circle NE
Rio Rancho, NM 87144

7014 2870 0001 4718 9511

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

OFFICIAL USE

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To
Street & Apt. No., or PO Box No.
City, State, ZIP+4

Gov. Anthony Ortiz
Pueblo of San Felipe
P.O. Box 4339
San Felipe Pueblo, NM 87001

PS Form 3800, Ju

7014 2870 0001 4718 9504

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

OFFICIAL USE

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To
Street & A
or PO Box
City, State

Mr. Alan Hatch / Santa Ana DNR Director
Pueblo of Santa Ana / Tamaya Pueblo
2 Dove Rd.
Pueblo of Santa Ana, NM 87004

PS Form
tions

7014 2870 0001 4718 7784

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

OFFICIAL USE

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To
Street & Apt. No., or PO Box No.
City, State, ZIP+4

Ms. Mary Lou Leonard
City of Albuquerque
Environmental Health Department Director
PO Box 1293
Albuquerque, NM 87103

PS Form 3800, Ju

001 008237 (022) TO $ 6.67
First Class Package
Tracking# 70142870000147187784

002 008237 (022) TO $ 6.67
First Class Package
Tracking# 70142870000147189511

003 008237 (022) TO $ 6.67
First Class Package
Tracking# 70142870000147187791

004 008237 (022) TO $ 6.67
First Class Package
Tracking# 70142870000147189559

005 008237 (022) TO $ 6.67
First Class Package
Tracking# 70142870000147189535

006 008237 (022) TO $ 6.67
First Class Package
Tracking# 70142870000147189504

007 008237 (022) TO $ 6.67
First Class Package
Tracking# 70142870000147187777

008 008237 (022) TO $ 6.67
First Class Package
Tracking# 70142870000147189542

009 008237 (022) TO $ 6.67
First Class Package
Tracking# 70142870000147187807

General Posting of Notices – Certification

I, RAY DARCIA, the undersigned, certify that on **April 10, 2019,** posted a true and correct copy of the attached Public Notice in the following publicly accessible and conspicuous places in Bernalillo of Sandoval County, State of New Mexico on the following dates:

1. Facility entrance
   April 10, 2019
2. U.S Post Office
   145 Calle Del Presidente
   Bernalillo, NM 87004
   April 10, 2019
3. Bernalillo Municipal Courthouse
   829 Camino Del Pueblo,
   Bernalillo, NM 87044
   April 10, 2019
4. Bernalillo Library
   124 Calle Melinche
   Bernalillo, NM 87004
   April 10, 2019

Signed this 10 day of April, 2019

Signature

4-10-19
Date

RAY DARCIA
Printed Name

MANAGER
Title

NOTICE

American Gypsum Company announces its application to the New Mexico Environment Department for an air quality permit for the modification of its Bernalillo Wallboard facility. The expected date of application submittal to the Air Quality Bureau is April 5, 2019.

The exact location for the facility known as, American Gypsum Bernalillo Wallboard facility, is at latitude 35 deg, 19 min, 48.3 sec and longitude -106 deg, 31 min, 39 sec. The approximate location of this facility is 1.1 miles north of the intersection of Hwy 550 and N Hill Road in Sandoval County.

The proposed modification consists of updates to the SO_2, TSP, PM_{10}, and $PM_{2.5}$ emission limits for all the permitted units at the facility due to a more refined calculation methodology. In addition, this application consists of adding emissions due to haul roads and load-in of gypsum reclaim.

The estimated maximum quantities of any regulated air contaminant will be as follows in pound per hour (pph) and tons per year (tpy) and could change slightly during the course of the Department's review:

Pollutant	Pounds per hour	Tons per year
PM_{10}	14 pph	69 tpy
$PM_{2.5}$	5 pph	31 tpy
Sulfur Dioxide (SO_2)	1 pph	3 tpy
Nitrogen Oxides (NO_x)	18 pph	81 tpy
Carbon Monoxide (CO)	20 pph	88 tpy
Volatile Organic Compounds (VOC)	1 pph	4 tpy
Total sum of all Hazardous Air Pollutants (HAPs)	1 pph	2 tpy
Toxic Air Pollutant (TAP)	n/a	n/a
Green House Gas Emissions as Total CO_2e	n/a	<75,000 tpy

The standard and maximum operating schedules of the facility will be from 12:00 a.m. to 11:59 p.m. 7 days a week and a maximum of 52 weeks per year.

The owner and operator of the Facility is:

American Gypsum Company
P.O. Box 90820
Albuquerque, NM 87199

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.

Atención

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 505-476-5557.

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, you may contact: Kristine Pintado, Non-Discrimination Coordinator, New Mexico Environment Department, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855, nd.coordinator@state.nm.us. If you believe that you have been discriminated against with respect to a NMED program or activity, you may contact the Non-Discrimination Coordinator identified above or visit our website at https://www.env.nm.gov/NMED/EJ/index.html to learn how and where to file a complaint of discrimination.

March 27, 2019

SENT VIA CERTIFIED MAIL

To Whom It May Concern,

American Gypsum Company announces its application to the New Mexico Environment Department for an air quality permit for the modification of its Bernalillo Wallboard facility. The expected date of application submittal to the Air Quality Bureau is April 5, 2019.

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Sincerely,
American Gypsum Company
P.O. Box 90820
Albuquerque, NM 87199

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, you may contact: Kristine Pintado, Non-Discrimination Coordinator, New Mexico Environment Department, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855, nd.coordinator@state.nm.us. If you believe that you have been discriminated against with respect to a NMED program or activity, you may contact the Non-Discrimination Coordinator identified above or visit our website at https://www.env.nm.gov/NMED/EJ/index.html to learn how and where to file a complaint of discrimination.

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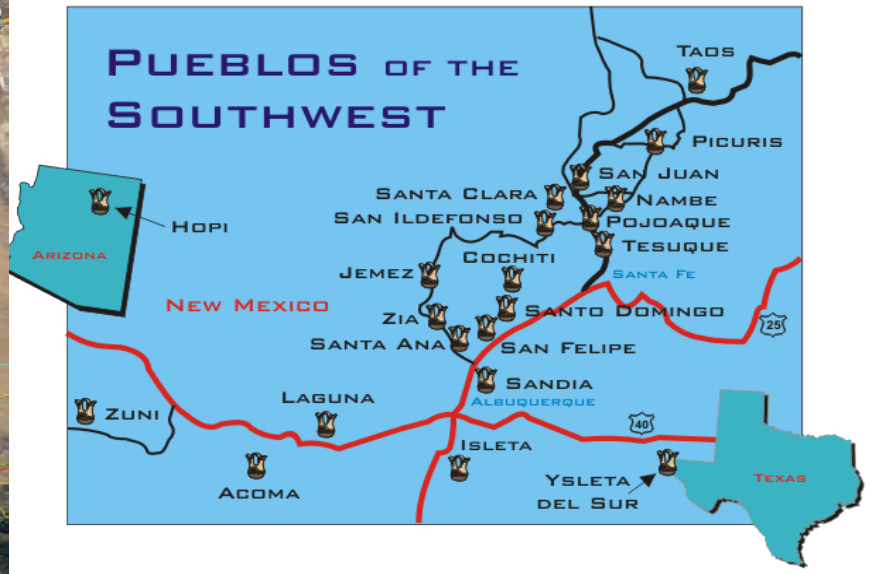
Table of Noticed Counties, Indian Tribes, Municipalities, and Land Owners

Contact:	Name:	Postal Address:
Mr. Alan Hatch / Santa Ana DNR Director	Pueblo of Santa Ana / Tamaya Pueblo	2 Dove Rd Pueblo of Santa Ana, NM 87004
Gov. Anthony Ortiz	Pueblo of San Felipe	P.O. Box 4339 San Felipe Pueblo, NM 87001
Gov. Malcolm Montoya	Pueblo of Sandia	481 Sandia Loop Bernalillo, NM 87004
Ms. Maria G. C. Rinaldi, Community Planning & Development	Bernalillo Town	P.O. Box 638 Bernalillo, NM 87004
Mr. Phillip Rios, County Manager	Sandoval County	P.O. Box 40 Bernalillo NM 87004
Ms. Julie Morgas Baca, County Manager	Bernalillo County	PO Box 542 Albuquerque, NM 87103-0542
Ms. Mary Lou Leonard, Director - Environmental Health Department	Albuquerque City	PO Box 1293 Albuquerque, NM 87103
Mr. Scott A. Kominiak - Mayor	Village of Corrales, NM	Village of Corrales 4324 Corrales Road Corrales, New Mexico 87048
Keith Riesberg, City Manager	Rio Rancho City	Rio Rancho City Hall, 3200 Civic Center Circle NE Rio Rancho, NM 87144



9400 Holly Avenue NE | Bldg 3, Suite 300 | Albuquerque, NM 87122 | P (505) 266-6611
trinityconsultants.com

VIA EMAIL

To:	KDSK 93.7 FM	**From:**	Jake Zenker, Trinity Consultants
Phone:	505-891-9044	**Pages:**	1 – including cover
Fax:	N/A	**Phone:**	(505) 266-6611
Email:	Debra@kdsk.com	**Email:**	jzenker@trinityconsultants.com
Subject:	PSA	**Date:**	***April 11, 2019***

☒ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Comments:

As part of the air quality permit process, New Mexico requires applicants to submit a public service announcement identifying the proposed permit action and providing information as to how the public can comment on this action. Below is such an announcement. Would you air it as a PSA?

Radio Public Service Announcement
NOTICE

American Gypsum Company announces its application to the New Mexico Environment Department for an air quality permit for the modification of its Bernalillo Wallboard facility. The facility, known as American Gypsum Bernalillo Wallboard facility, produces wallboard from raw gypsum. The proposed modification consists of updates to the SO2, TSP, PM10, and PM2.5 emission limits for all the permitted units at the facility due to a more refined calculation methodology. In addition, this application consists of adding emissions due to haul roads and load-in of gypsum reclaim.

The exact location of the Bernalillo Wallboard facility is at latitude 35 deg, 19 min, 48.3 sec and longitude -106 deg, 31 min, 39 sec. The approximate location of this facility is 1.1 miles north of the intersection of Hwy 550 and N Hill Road in Sandoval County.

The owner and operator of the facility is American Gypsum Company at P.O. Box 90820, Albuquerque, NM 87199.

Public Notice of this application is posted at the U.S Post Office at 145 Calle Del Presidente in Bernalillo, NM; the Bernalillo Municipal Courthouse at 829 Camino del Pueblo in Bernalillo, NM; the Bernalillo Library at 124 Calle Melinche in Bernalillo, NM; and at the Bernalillo Wallboard facility entrance.

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, contact the New Mexico Environment Department Air Quality Bureau at (505) 476-4300.

Submittal of Public Service Announcement – Certification

I, John Zenker, the undersigned, certify that on **April 11, 2019**, submitted a public service announcement to **KDSK 93.7** that serves the City of **Bernalillo, Bernalillo** County, New Mexico, in which the source is located and that **KDSK 93.7 DID NOT RESPOND.**

Signed this 11th day of April, 2019.

Signature

4/11/2019
Date

John Zenker
Printed Name

Consultant, Trinity Consultants, Inc.

NOTICE OF AIR QUALITY PERMIT APPLICATION

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AFFIDAVIT OF PUBLICATION

STATE OF NEW MEXICO

County of Sandoval SS

Elise Rodriguez , the undersigned, on oath states that she is an authorized Representative of Rio Rancho Observer, and that this newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Session Laws of 1937, and that payment therefore has been made of assessed as court cost; that the notice, copy of which hereto attached, was published in said paper in the regular daily edition, for 1 time(s) on the following date(s):

04/07/2019

OFFICIAL SEAL
Susan Ramirez
NOTARY PUBLIC - STATE OF NEW MEXICO
My Commission Expires: 2/15/2023

Sworn and subscribed before me, a Notary Public, in and for the County of Sandoval and State of New Mexico this 8 day of April of 2019

PRICE $200.73

Statement to come at the end of month.

ACCOUNT NUMBER 1023565

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Observer: April 7, 2019

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ARGEN DUNCAN/*Observer*

Representatives from Lovelace Health System, University of New Mexico Medical Group and the Rio Rancho Regional Chamber of Commerce join Mayor Gregg Hull, third from right, for a ribbon-cutting at the new Lovelace UNM Outpatient Rehabilitation clinic at 111 NM 528 in Rio Rancho on March 26.

Physical rehab center opens in RR

By Amanda Britt
Observer intern

A new Lovelace UNM Outpatient Rehabilitation clinic is giving Rio Ranchoans a place to recover from injuries without having to cross the river.

The clinic celebrated its opening with a ribbon-cutting ceremony on March 26 at its location at NM 528 and Rockaway Boulevard.

The University of New Mexico Medical Group Inc. partnered with Lovelace Heath System in 2017 with the goal of expanding services to communities across the state, including Rio Rancho.

UNM Medical Group CEO Jill Klar said she is pleased to bring the clinic to Rio Rancho.

"This opens and expands services for pain, physical therapy, sports medicine and stroke rehabilitation, services that were not available before," she said.

The partnership has allowed the Rio Rancho rehabilitation facility to host a new physician residency in physical medicine and rehabilitation, which is the first in the state.

According to UNM information, physical medicine and rehabilitation include two branches of care: traditional inpatient services, including treatment of amputees, stroke patients and those with spinal conditions and injuries, and the outpatient setting for spinal treatment, sports medicine and pain management.

The partnership is expected to give patients better access to their providers.

Klar said she is pleased with the progress the clinic has made and the impact the partnership has had on the community.

"It's all about patients having easy access to these services," she said.

The Lovelace UNM facility also provides cognitive rehabilitation, neurological rehabilitation, occupational and physical therapy, speech therapy and more. A complete list of services and information to schedule an appointment can be found at lovelace.com.

PdV

From page - 1

procured for PdV, he predicted the road could be completed within 36 months.

"I think since about 2002, it has always been about the money," he said. "There was not any coordinated effort by local government and state to get this thing done."

Black said PdV has been gaining momentum in the last few years because city planners have realized I-25 cannot be expanded any more.

"Plus, there cannot be any more expansion on the West Side without a truck-rated high-speed commuter and mass-transit access highway," he said.

Steve Jenkins, CEO of Sandoval Economic Alliance, said the notion of PdV was brought to his attention within his first week of taking his position.

"I knew that this was one of the most important economic roadways, not just for us here in Sandoval County, but for the whole state," Jenkins said. "This is because it would open up the west metro for development."

Without PdV, he said, there isn't anywhere else to grow economically since the metro area is surrounded.

"On three sides, you've got pueblos, and then on one side, you've got mountains," Jenkins said. "The only place to grow is to the west, and that roadway opens up all of that for development, which will fuel the state's economy also."

He said he has never been in a state where it has taken this long to get a road done.

"Why has it taken so long to get a roadway that matters so much done?" Jenkins asked.

One suggestion he made was grouping all 160 parcels as one acquisition to streamline the process of completion.

Steve Jenkins

"I think we are getting there in the acquisition of the right-of-way, but we do need construction money set aside by the legislature that triggers the federal funds to do the construction," he said. "This road needs to be a true bypass; it needs to be four lanes divided with limited access for it to work well."

After looking at some of the existing businesses on the southern side of where PdV would begin, Jenkins said there is upward of $1 billion of future development tied into the completion of the road.

Black said as it stands now, there are 23 miles of road left from the Sandoval County line to the edge of Unser Boulevard that still needs to be researched for acquisition.

Correction

Dr. Sanjay Kholwadala's former title was incorrectly listed on page 4 of the Health and Wellness special section, published March 31. His title was chief of the emergency department for Lovelace Westside Hospital.

The *Observer* strives for factual accuracy and will correct any errors for the record. To report an error, call 891-7172 or a number in the staff listing on page 2.

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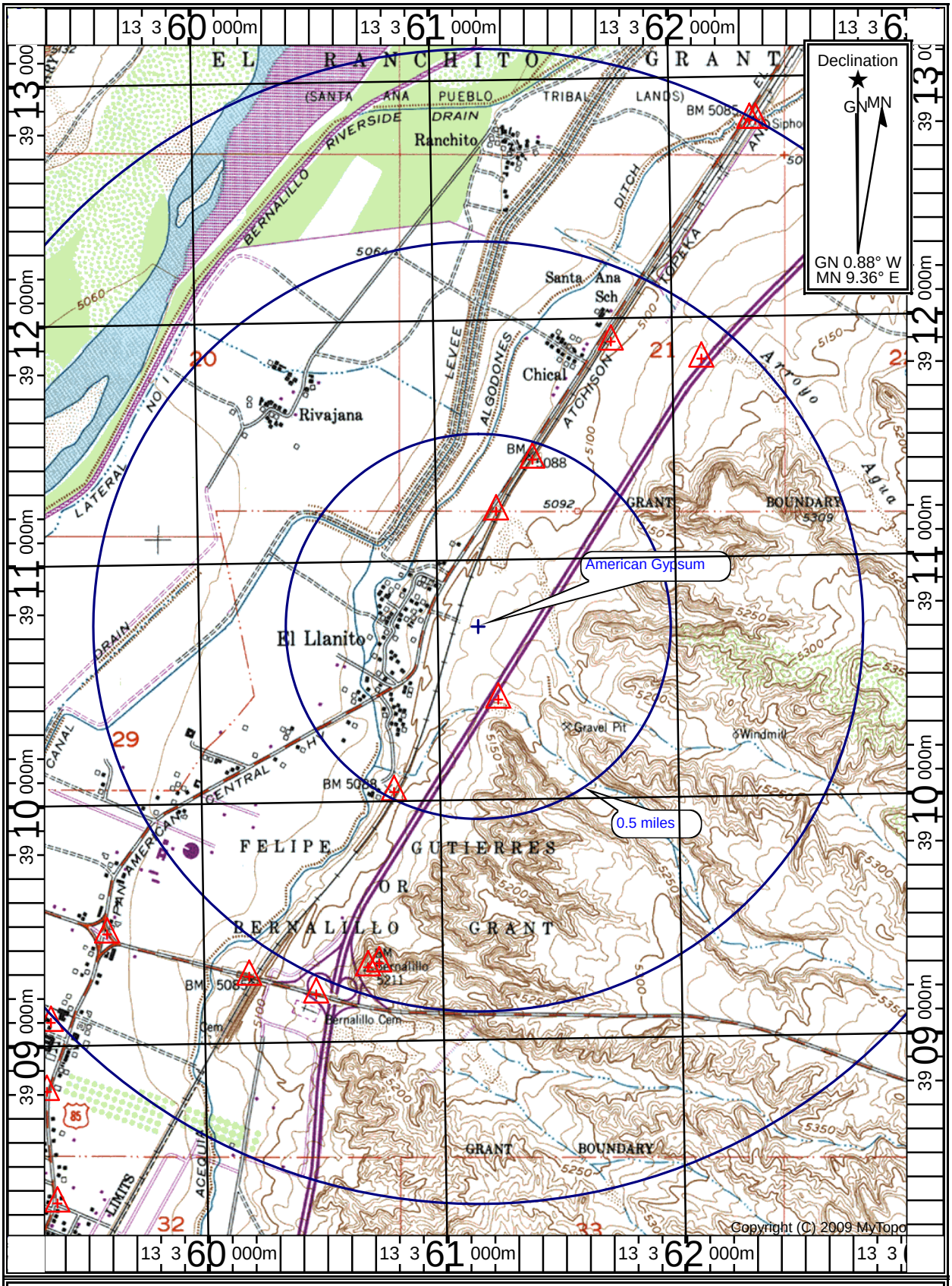
OFFICIAL SEAL
Susan Ramirez
NOTARY PUBLIC - STATE OF NEW MEXICO
My Commission Expires: 2/15/2023



SCALE 1:24000

0 1 2
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0 1000 2000 3000 4000

Map Name: BERNALILLO
Print Date: 01/05/17

Scale: 1 inch = 2,000 ft.
Map Center: 13 0361157 E 39106

Horizontal Datum: WGS84

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.

Emission Unit No: 1: Gypsum Rock Load-In

The function of the facility is to produce wallboard from raw gypsum. The plant is currently permitted to process 500,000 tons per year of gypsum. The plant utilizes a Claudius Peters unit, which incorporates grinding and flash calcining in a single unit.

Emission Unit 2a: Rock House Reclaim Loading

Reclaimed and milled gypsum are re-introduced to the system through the rock house reclaim feeder. This activity occurs within the rock storage building.

Emission Unit No. 2b: Rock Storage and Reclaim

A belt conveyor feeds the rock from the receiving hopper and recycled wallboard from the Norba/flake-breaker into the hammer mill crusher, located inside the crusher building. In the recycle building, between the truck dump building and the crusher building, waste wallboard is deposited into the Norba grinder, where it is ground into small pieces. The ground waste wallboard exits the Norba into a flake-breaker where the waste wallboard and any paper pieces are further reduced in size. From the flake-breaker, the ground-up waste wallboard is deposited onto the belt conveyor with the incoming rock and conveyed into the hammer mill crusher. After crushing in the hammer mill, the gypsum is lifted by a bucket elevator, carried by belt conveyor, and deposited either into the rock storage pile inside the rock storage building or into the rock tank via the tripper belt. Occasionally, when rock is not available by truck, rock is reclaimed from the rock storage pile. In this process, rock is removed from the rock storage pile by front-end loader and deposited into the reclaim hopper inside the rock storage building. From the reclaim hopper, rock is lifted by the bucket elevator, carried by the belt conveyor, and deposited into the rock tank.

A dust collector, **Emission Point 2b**, collects fugitive dust from these operations.

Emission Unit No. 3: Rock Tank

Crushed gypsum is conveyed from the rock storage building to a rock tank. Emissions from the transfer are controlled by a bin vent filter.

Emission Unit No. 4: Calciner furnace ball mill

From the rock tank, gypsum is conveyed into the CP mill for final grinding. The gypsum is also calcined (or de-watered) in this operation to produce stucco. A natural gas-fired furnace provides heat for this process. Particulate emissions are controlled by a dust collector, which is **Emission Point 4**. The dust collector is part of the calcining process; the process depends on the dust collector to capture and retain the desired product-powdered, dehydrated gypsum.

The mass of stucco produced by the calcining process is approximately 15% less than that of the mass of the gypsum fed into the calcining process due to water removal. The maximum stucco production rate is therefore approximately 15% less than the maximum daily and annual rock processing rates.

The calcining process is a source of combustion pollutants from the natural gas-fired heating element; a source of SO_2 released from gypsum as a byproduct of the calcining process and a source of particulates from the calcining dust collector.

Emission Units No. 5 and 6: Stucco Storage

The stucco produced by the calciner is mechanically conveyed to one of two stucco storage silos. Emissions from these transfers are controlled by bin vent filters (**Emission Points 5 and 6**).

Emission Unit No. 7: Starch Receiving

Starch, used as an additive to the stucco, is received into the plant by truck and pneumatically conveyed into the starch silo (located east of the mill building) for storage. Dust from this transfer is controlled by a dust collector, **Emission Point 7**.

Maximum short-term potential emissions will occur while the starch is transferred into the storage silo, which is limited by the capacity of the transfer system. Annual potential emissions are determined by annual starch usage, which is limited by the rock processing rate.

The bin vent dust collector emits to the ambient air.

Emission Unit No. 8: Starch Receiving

Starch is pneumatically conveyed from the starch storage silo into the starch use bin, located inside the mill building. Dust from this transfer is controlled by a dust collector, **Emission Point 8**, which vents inside the mill building.

Emission Unit No. 9: Accelerator and Miscellaneous Dry Additives Receiving

Accelerator and other dry additives are received into the plant in bags. The bags are dumped into a hopper. Emissions from this transfer into the hopper are controlled by a dust collector, **Emission Point 9**, that vents indoors in the production building.

Emission Unit No. 10: Miscellaneous Dry Additives and Stucco Metering

The accelerator and other dry additives are pneumatically conveyed from the bag-dump hopper to the corresponding use bins. The accelerator and other dry additives are metered from the use bins into the additive screw conveyor that carries them to the mixer.

Stucco is removed from the stucco storage silos by screw conveyors and lifted by a bucket elevator into the stucco use bin. The stucco is then metered from the use bin and moved by screw conveyor into the mixer.

The stucco, accelerator, and other dry additives are combined with water in the mixer to form a slurry.

Emissions from these activities are controlled by a dust collector, **Emission Point 10**, that vents indoors into the mill building.

Emission Unit No. 11: Direct Heat Dryer

The slurry from the mixer is deposited onto a moving, continuous face sheet of wallboard paper. A moving, continuous back sheet of paper is then laid down over the slurry to sandwich the slurry between the two sheets of paper. The papered board is fed through a forming plate to form the wallboard to the desired width and thickness. The formed board is then placed on a flat belt conveyor to allow the slurry to set up. The board is cut to rough length and fed into the direct heat dryer to dry the wallboard. The dryer is fueled by natural gas and is **Emission Point 11**.

The dryer is a source of combustion pollutants—NOx, CO, SO_2, VOCs, and particulates.

Emission Unit No. 12 – North and 12 - South: Edge Trimmer

After the dried wallboard is removed from the dryer, it is trimmed to length, taped, and stacked. Emissions from each set of end saws has its own dust collector that discharges to two independent emission points (**Emission Points 12 – North and 12 - South**).

The finished wallboard is stacked inside the maintenance warehouse until it is shipped by flatbed trailers or by rail.

Emission Unit No. 13: Sleutter Production

Another emissions-generating activity at the plant is the Sleutter machine. The Sleutter machine, located inside the maintenance/warehouse building, uses reject wallboard to make the slats used in wallboard stacking. Emissions are controlled by a dust collector (**Emission Point 13**) that vents inside the production building.

Emission Unit 14: Enclosed Stucco Conveyance System

The Enclosed Stucco Conveyance System modified the previously permitted pneumatic conveyor that fed Stucco Silo 5 and 6 with an enclosed bucket elevator and air slide. The feed system will remain totally enclosed and emit inside an enclosure that incorporates a dust collector to collect particles that release within the enclosure. The dust collector is necessary to maintain airflow, collect product released within the enclosure, and maintain a clean and operational system.

Emission Unit 15: Paved Roads

All roads on-site are paved. There are two main routes used within the facility. The entrance and exit of raw feed trucks and the entrance and exit of wallboard product trucks through the production building are included under this emission source.

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)**:**
See Table 2-A.

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.

☑ **Yes** ☐ **No**

Common Ownership or Control: Surrounding or associated sources are under common ownership or control as this source.

☑ **Yes** ☐ **No**

Contiguous or Adjacent: Surrounding or associated sources are contiguous or adjacent with this source.

☑ **Yes** ☐ **No**

C. Make a determination:

☑ 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:

- ☑ **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 or is not] one of the listed 20.2.74.501 Table I – PSD Source Categories. The "project" emissions** for this modification are **[significant or not significant]. [Discuss why.] The "project" emissions listed below [do or do not] only result from changes described in this permit application, thus no emissions from other [revisions or modifications, past or future] to this facility. Also, specifically discuss whether this project results in "de-bottlenecking", or other associated emissions resulting in higher emissions. The project emissions (before netting) for this project are as follows [see Table 2 in 20.2.74.502 NMAC for a complete list of significance levels]:**

a. **NOx: XX.X TPY**
b. **CO: XX.X TPY**
c. **VOC: XX.X TPY**
d. **SOx: XX.X TPY**
e. **TSP (PM): XX.X TPY**
f. **PM10: XX.X TPY**
g. **PM2.5: XX.X TPY**
h. **Fluorides: XX.X TPY**
i. **Lead: XX.X TPY**
j. **Sulfur compounds (listed in Table 2): XX.X TPY**
k. **GHG: XX.X TPY**

C. If this is an existing PSD major source, or any facility with emissions greater than 250 TPY (or 100 TPY for 20.2.74.501 Table 1 – PSD Source Categories), determine whether any permit modifications are related, or could be considered a single project with this action, and provide an explanation for your determination whether a PSD modification is triggered.

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/

To save paper and to standardize the application format, delete this sentence, and begin your submittal for this attachment on this page.

Example of a 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 State Implementation Plan (SIP) approved regulation that limits the maximum allowable concentration of Total Suspended Particulates, Sulfur Compounds, Carbon Monoxide and Nitrogen Dioxide. The facility is in compliance with all applicable NMAAQS standards.
20.2.7 NMAC	Excess Emissions	Yes	Facility	Since the facility has individual pieces of equipment that are subject to emissions limits in a permit or numerical emissions standards in a federal or state regulation, this regulation applies to the facility.
20.2.13 NMAC	Gypsum Processing Plant	Yes	Facility	This facility is a gypsum processing plant and hence, it is subject to this regulation.
20.2.33 NMAC	Gas Burning Equipment - Nitrogen Dioxide	No	N/A	This facility does not have gas burning equipment **(external combustion emission sources, such as gas fired boilers and heaters)** having a heat input of greater than 1,000,000 million British Thermal Units per year per unit. The facility is not subject to this regulation.
20.2.34 NMAC	Oil Burning Equipment: NO_2	No	N/A	This facility does not have oil burning equipment **(external combustion emission sources, such as oil fired boilers and heaters)** having a heat input of greater than 1,000,000 million British Thermal Units per year per unit. The facility is not subject to this regulation.
20.2.35 NMAC	Natural Gas Processing Plant – Sulfur	No	N/A	This facility is not a natural gas processing plant; therefore, it is not subject to this regulation.
20.2.38 NMAC	Hydrocarbon Storage Facility	No	N/A	This regulation does not apply to this facility as it does not have any equipment subject to the requirements of 20.2.38 NMAC.
20.2.39 NMAC	Sulfur Recovery Plant - Sulfur	No	N/A	This regulation does not apply to this facility as it does not have a sulfur recovery plant.
20.2.61.109 NMAC	Smoke & Visible Emissions	Yes	Units 4, 11	This regulation that limits opacity to 20% applies to Stationary Combustion Equipment, such as engines, boilers, heaters, and flares unless your equipment is subject to another state regulation that limits particulate matter such as 20.2.19 NMAC (see 20.2.61.109 NMAC). Units 4 and 11 are subject to this regulation.
20.2.70 NMAC	Operating Permits	No	N/A	Prior to this application, the facility was a Title V source but once this permit is issued, the facility will no longer be a Title V source.
20.2.71 NMAC	Operating Permit Fees	No	N/A	Prior to this application the facility was a Title V source, but once this permit modification is issued the facility will no longer be a Title V source. As such it will no longer be subject to the requirements of this regulation.
20.2.72 NMAC	Construction Permits	Yes	Facility	The facility is subject to this regulation and is currently permitted under NSR Permit No. 0689-M2R4
20.2.73 NMAC	NOI & Emissions Inventory Requirements	Yes	Facility	The **Emissions Inventory Reporting** requirements per 20.2.73.300 NMAC apply since the facility is subject to 20.2.72 and emits more than 10 tons of PM10, PM2.5, NOx and CO in any calendar year.
20.2.74 NMAC	Permits – Prevention of Significant Deterioration (PSD)	No	N/A	The facility is not subject to this regulation as it is not a PSD major source.

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.)
20.2.75 NMAC	Construction Permit Fees	Yes	Facility	This regulation applies since American Gypsum is submitting this application pursuant to 20.2.72.
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	N/A	This facility does not emit hazardous air pollutants which are subject to the requirements of 40 CFR Part 61.
20.2.79 NMAC	Permits – Nonattainment Areas	No	N/A	The facility is not located in a non-attainment area; therefore, it is not subject to the requirements of this regulation.
20.2.80 NMAC	Stack Heights	No	N/A	This regulation establishes requirements for the evaluation of stack heights and other dispersion techniques. This regulation does not apply as all stacks at the facility follow good engineering practice.
20.2.82 NMAC	MACT Standards for source categories of HAPS	No	N/A	This facility is not subject to this regulation since it does not have any sources regulated under 40 CFR 63.

Example of a Table for Applicable FEDERAL REGULATIONS (Note: This is not an exhaustive list):

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
40 CFR 50	NAAQS	Yes	Facility	This applies to the facility since it is subject to 20.2.72.
NSPS 40 CFR 60, Subpart A	General Provisions	Yes	Units subject to 40 CFR 60	Applies if any other Subpart in 40 CFR 60 applies.
NSPS 40 CFR60.40a, Subpart Da	Subpart Da, Performance Standards for **Electric Utility Steam Generating Units**	No	N/A	The facility does not have any applicable electric utility steam generating units; hence, it is not subject to this regulation.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
NSPS 40 CFR60.40b Subpart Db	**Electric Utility Steam Generating Units**	No	N/A	The facility does not have any applicable electric utility steam generating units; hence, it is not subject to this regulation.
40 CFR 60.40c, Subpart Dc	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units	No	N/A	The facility does not have any applicable steam generating units for which construction, modification or reconstruction commenced after June 9, 1989 and that have a maximum design heat input capacity of 29 MW (100 MMBtu/hr) or less, but greater than or equal to 2.9 MW (10 MMBtu/hr). Hence, this regulation does not apply.
NSPS 40 CFR 60, Subpart Ka	Standards of Performance for **Storage Vessels for Petroleum Liquids** for which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and **Prior** to July 23, 1984	No	N/A	This regulation sets standards of performance for storage vessels for Petroleum Liquids for which Construction, Reconstruction, or Modification commenced after May 18, 1978, and prior to July 23, 1984. This facility does not have any storage vessels that are subject to this regulation.
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	N/A	This regulation sets 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. This facility does not have any storage vessels subject to this regulation.
NSPS 40 CFR 60.330 Subpart GG	**Stationary Gas Turbines**	No	N/A	This facility does not have any stationary gas turbines subject to this regulation.
NSPS 40 CFR 60, Subpart OOO	Standards of Performance for Nonmetallic Mineral Processing Plants	Yes	Units 2b, 3, 4, 5, 6, 7, 8 , 9, 10, 11*, 12 – North*, 12 – South*, 13*, 14	Units 2b, 3, 4, 5, 6, 7, 8, 9, 10, and 14 are subject to the requirements under NSPS OOO. *Units 11, 12 – North, 12 – South, and 13 are not subject to NSPS OOO but American Gypsum chooses to comply with any applicable

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
				requirements under this regulation. Units 8, 9, 10, 12 – North, 12 –South and 13 have emission points inside a building but will comply with NSPS OOO 60.672(e)(1).
NSPS 40 CFR 60 Subpart IIII	Standards of performance for Stationary Compression Ignition Internal Combustion Engines	No	N/A	This regulation sets standards of performance for stationary compression ignition internal combustion engines. This facility does not have any engines that meet the requirements of this regulation.
NSPS 40 CFR Part 60 Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	No	N/A	This regulation sets standards of performance for stationary spark ignition internal combustion engines. This facility does not have any engines that meet the requirements of this regulation.
NESHAP 40 CFR 61 Subpart A	General Provisions	No	N/A	Does not apply since no subpart in 40 CFR 61 applies to this facility.
NESHAP 40 CFR 61 Subpart E	National Emission Standards for **Mercury**	No	N/A	This facility is not a stationary source which processes mercury ore to recover mercury, uses mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide, and incinerates or dries wastewater treatment plant sludge. Hence, the facility is not subject to this regulation.
NESHAP 40 CFR 61 Subpart V	National Emission Standards for **Equipment Leaks** (Fugitive Emission Sources)	No	N/A	This regulation establishes national emission standards for equipment leaks (fugitive emission sources). The facility does not have equipment that operates in volatile hazardous air pollutant (VHAP) service [40 CFR Part 61.240]. The regulated activities subject to this regulation do not take place at this facility. The facility is not subject to this regulation.
MACT 40 CFR 63, Subpart A	General Provisions	No	N/A	Does not apply to the facility since there are no sources at the facility subject to any of the subparts in 40 CFR 63.
MACT 40 CFR 63.760 Subpart HH	**Oil and Natural Gas Production Facilities**	No	N/A	This regulation establishes national emission standards for hazardous air pollutants from oil and natural gas production facilities. This facility is not an oil or natural gas production facility; therefore, it is not subject to the requirements of 40 CFR 63 Subpart HH.
MACT 40 CFR 63 Subpart HHH		No	N/A	This subpart applies to owners and operators of natural gas transmission and storage facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final end user (if there is no local distribution company), and that are major sources of hazardous air pollutants (HAP) emissions as defined in §63.1271. This facility is not a natural gas transmission or storage facility that transports or stores natural gas prior to entering the pipeline to a local distribution company or to a final end user; therefore, it is not subject to this regulation.
MACT 40 CFR 63 Subpart DDDDD	National Emission Standards for Hazardous Air Pollutants for Major Industrial, Commercial, and	No	N/A	This regulation establishes national emission limitations and work practice standards for hazardous air pollutants (HAP) emitted from industrial, commercial, and institutional boilers and process heaters located at major sources of HAP. Since this facility is not a major source of HAP emissions, this regulation does not apply to this facility and its emission units.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
	Institutional Boilers & Process Heaters			
MACT 40 CFR 63 Subpart UUUUU	National Emission Standards for Hazardous Air Pollutants Coal & Oil Fire Electric Utility Steam Generating Unit	No	N/A	There are no steam generating units at this facility; therefore, it is not subject to this regulation.
MACT 40 CFR 63 Subpart ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (**RICE MACT**)	No	N/A	This regulation establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. Since there are no RICE units at the facility, this regulation does not apply to the facility.
40 CFR 64	**Compliance Assurance Monitoring**	No	N/A	This regulation applies only to Title V Major Sources. Since this facility is not a Title V major source, it is not subject to this regulation.
40 CFR 68	**Chemical Accident Prevention**	No	N/A	This regulation applies to an owner or operator of a stationary source that has more than a threshold quantity of a regulated substance in a process, as determined under §68.115. This facility does not have more than a threshold quantity of a regulated substance, as determined under 68.115, and is therefore not an affected source.
Title IV – Acid Rain 40 CFR 72	**Acid Rain**	No	N/A	The purpose of this regulation is to establish certain general provisions and the operating permit program requirements for affected sources and affected units under the Acid Rain Program, pursuant to title IV of the Clean Air Act. This facility is not an affected source under the Acid Rain Program; therefore, it is not subject to this regulation.
Title IV – Acid Rain 40 CFR 73	**Sulfur Dioxide** Allowance Emissions	No	N/A	This regulation establishes sulfur dioxide allowance emissions for certain types of facilities. This facility is not an acid rain source. This regulation does not apply.
Title IV-Acid Rain 40 CFR 75	**Continuous Emissions Monitoring**	No	N/A	This facility does not generate commercial electric power or electric power for sale, therefore it is not subject to this regulation.
Title IV – Acid Rain 40 CFR 76	**Acid Rain** Nitrogen Oxides **Emission Reduction Program**	No	N/A	This regulation establishes an acid rain nitrogen oxides emission reduction program. This regulation applies to each coal-fired utility unit that is subject to an acid rain emissions limitation or reduction requirement for SO_2. This part does not apply because the facility does not operate any coal-fired units [40 CFR Part 76.1].

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
Title VI – 40 CFR 82	Protection of **Stratospheric Ozone**	No	N/A	This facility does not own appliances containing CFCs; therefore, it is not subject to this regulation.

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.

☑ **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.

☐ **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.

Startup and shutdown procedures are performed according to guidelines, which dictate proper procedures to minimize emissions from the facility during such activities.

Equipment located at the plant are equipped with various safety devices that aid in preventing excess emissions to the atmosphere in the event of an operational emergency. In the event of a malfunction, startup, shutdown, or scheduled maintenance in which emission rates from the facility exceed permitted allowable, American Gypsum will notify the AQB in accordance with 20.2.7 NMAC and the equipment responsible for the exceedance will be repaired as soon as possible.

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.

N/A – No alternative operating scenarios are being requested with this application.

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.
☑ 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.

March 27, 2019

Air Dispersion Modeling Protocol

American Gypsum

Bernalillo Wallboard Facility

Introduction

Purpose of Modeling

The American Gypsum Bernalillo Facility is proposing a significant revision to the NSR Permit 0689-M2-R4. The proposed changes involve the update of calculation methodologies and the inclusion of haul roads and gypsum reclaim load-in.

Facility Description and Location

The Bernalillo Wallboard Plant processes gypsum to make gypsum wallboard. The plant will process 500,000 tons per year of gypsum. The facility is located within the city of Bernalillo. The UTM coordinates of the facility will be 361,180 meters east, 3,910,730 meters north with a WGS84 datum and an elevation of approximately 5,111 ft.

Proposed Modeling

Model Input Options

Dispersion modeling for this facility will be performed with the latest version of AERMOD, v18081. The models were used to determine the impacts for NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$ and will be executed for all applicable averaging periods in regulatory default mode. The facility is a mix of volume and point sources.

In addition, several sources are located within enclosures or within enclosed buildings. Where sources are located within buildings or enclosures, cumulative emissions from these sources will be modeled as volume sources at the respective building bay openings. These sources are listed below:

1. Unit 1 Gypsum Rock Load-In – Emissions will be allocated as 4 volume sources exiting at one of four bay openings located on the north and south end of the building.
2. Units 8 through 10 emit within the enclosed additives building add-on to the main building. The north-bay is closest to these sources. As such, emissions from units 8-10 will be modeled as a single volume source through the building's north-bay opening.
3. Units 12 and 13 emit within the main building closest to the south bay opening. As such, emissions from units 12 and 13 will be modeled as a single volume source through the building south-bay opening.

Receptor Grid Description and Elevation Data

The center point of the facility will be designated at 361,180 meters east and, 3,910,730 meters north in Zone 13 and will serve as the center point for all receptor grids. Table 1 below describes the variable

receptor grid to be used in this modeling analysis. There is a fence surrounding the perimeter of the facility to restrict public access. The fence was modeled with a spacing of 25 meters.

Table 1. Receptor Grid.

Grid	Start Point (meters from center)	End Point (meters from center)	Receptor spacing (m)
Fine Grid	0	500	50
Medium Grid	500	1,000	100
Coarse Grid	1,000	5,000	500
Very Coarse Grid	5,000	10,000	1,000
Most Coarse	10,000	25,000	2,500

The elevations of receptors and facility sources will be determined using the most recent DEM data currently available. Elevations for surrounding sources will be preserved as provided by Eric Peters, Air Dispersion Modeler at the NMED Air Quality Bureau.

Meteorological Data

The air dispersion modeling will use Bernalillo County one-year (1997) meteorological data downloaded from the NMED website.

Sources to be Modeled

The table below show the sources which will be modeled at the facility.

Table 2. Sources included in the model

ID	Unit	Source Type	Modeled Source
1	Gypsum Rock Load-in	Volume	NE_Bay
		Volume	NW_Bay
		Volume	SE_Bay
		Volume	SW_Bay
2a	Rock Storage Loading	Volume	ROCKH
2b	Rock Storage & Reclaim	Point	2
3	Rock Tank	Point	3
4	Calciner Furnace / Ball Mill	Point	4
5	Stucco Storage	Point	5
6	Stucco Storage	Point	6
7	Starch Receiving	Point	7
8	Starch Use	Volume	NorthP
9	Accelerator and MiscDry Additives		
10	Misc. Dry Additives & Stucco Metering		
11	Dryer	Point	11
12	Edge Trimmer	Volume	SouthP
13	Sleutter Production		
14	Enclosed Stucco Conveyance System	Horizontal Point	14H
15	Paved Roads	Volume	HRS1A_1 through HRS1A_16; HRS1B_1 through HRS1B_15; HRS2_1 through HRS2_7; HRS3_1 through HRS3_8; HRS4_1 through HRS4_77; HRS5_1 through HRS5_15

Significance Analysis and Cumulative Impact Analysis (CIA)

The modeled ground-level concentrations will be compared to the corresponding significant impact levels (SILs) to determine whether any modeled ground-level concentrations at any receptor locations are greater than the SIL (i.e., “significant” receptors). If the significance analysis reveals that modeled ground-level concentrations for a particular pollutant and averaging period are greater than the applicable SIL, a Cumulative Impact Analysis (CIA) will be performed at the significant receptors.

If significant, the CIA will be performed including impacts from the facility sources, any surrounding sources within 10 km of the facility, and background concentrations. The inclusion of surrounding

sources will follow the guidance shown in Table 6C: “Modeling the Design Value Summary (Default Modeling)” from the New Mexico Air Quality Bureau Modeling Guideline dated February 7, 2019.

If applicable, the monitors listed in Table 2 below will be used for background concentrations as they are nearest and most representative of the facility.

Table 3. Background Monitors

Pollutant	Monitor ID	Averaging Period		
		1-hr	24-hr	Annual
PM_{10}	350490020	N/A	23	-
$PM_{2.5}$	350010023	N/A	10.8	4.6
SO_2	350010023	N/A	N/A	N/A
NO_2	350010023	83.8	-	20.2

If required, adjustments to surrounding source parameters will be made per the guidance in Section 4.8.1 of the Modeling Guidelines and documented in the modeling report. Surrounding source locations and elevations will be preserved as provided.

PSD Class II Increment Analysis

If the results of the significance analysis for NO_2, SO_2, PM_{10} and $PM_{2.5}$ indicate concentrations greater than the significance levels, PSD Class II increment analysis will be conducted for the appropriate pollutants and averaging periods. The major source baseline dates as shown in Table 9 of the Modeling Guidelines will be used. If required, the PSD increment analysis will be conducted including all PSD increment consuming and expanding sources within 25 km of the facility as well as any sources within 50 km of the facility with emissions of 1,000 lb/hr or more per Table 6C of the Modeling Guidelines. The predicted maximum concentrations will be compared with the appropriate Class II PSD standards.

PSD Class I Areas Analysis

The nearest Class I area is Bandelier Wilderness at 44 km from the facility. Class I area analysis for NO_2, SO_2, PM_{10} and $PM_{2.5}$ may be applicable as the national park is within the 50 km inclusion zone for PSD minor sources.

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: Bernalillo Wallboard Facility
2	Name of company: American Gypsum
3	Current Permit number: 0689-M2-R4
4	Name of applicant's modeler: Andrew Glen
5	Phone number of modeler: (505) 266-6611
6	E-mail of modeler: aglen@trinityconsultants.com

16-B: Brief

1	Why is the modeling being done? Adding new equipment		
2	Describe the permit changes relevant to the modeling. **The proposed changes involve the update of calculation methodologies and the inclusion of haul roads and gypsum reclaim load-in.**		
3	What geodetic datum was used in the modeling? WGS84		
4	How long will the facility be at this location? **Permanent.**		
5	Is the facility a major source with respect to Prevention of Significant Deterioration (PSD)?	Yes	No ☑

6	Identify the Air Quality Control Region (AQCR) in which the facility is located. **152**
7	List the PSD baseline dates for this region (minor or major, as appropriate). **NO2: March 26, 1997; SO2: May 14, 1981; PM10: March 26, 1997; PM2.5: February 11, 2013.**
8	Provide the name and distance to Class I areas within 50 km of the facility (300 km for PSD permits). **44 km Bandelier Wilderness**
9	Is the facility located in a non-attainment area? If so, describe. **No**
10	Describe any special modeling requirements, such as streamline permit requirements. **N/A**

16-C: Modeling History of Facility

1 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).

Pollutant	Latest permit and modification number that modeled the pollutant facility-wide.	Date of Permit	Comments
CO	0689-M2	November 1, 2001	
NO_2	0689-M2	November 1, 2001	
SO_2	0689-M2	November 1, 2001	
H_2S	N/A	N/A	
PM2.5	0689-M2	November 1, 2001	
PM10	0689-M2	November 1, 2001	
TSP	0689-M2	November 1, 2001	
Lead	N/A	N/A	
Ozone (PSD only)	N/A	N/A	
NM Toxic Air Pollutants (20.2.72.402 NMAC)	N/A	N/A	

16-D: Modeling performed for this application

1 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.

Pollutant	ROI	Cumulative analysis	Culpability analysis	Waiver approved	Pollutant not emitted or not changed.
CO	X				
NO_2		X	X		
SO_2	X				
H_2S					X

	PM2.5		X			
	PM10		X			
	TSP		N/A			
	Lead					X
	Ozone					X
	State air toxic(s) (20.2.72.402 NMAC)					X

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. **N/A – There are no New Mexico TAPs that are modeled for this application.**

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

16-F: Modeling options

1	What model(s) were used for the modeling? Why? **BREEZE AERMOD with US EPA executable v18081 was used. This is the most recent version of AERMOD available.**
2	What model options were used and why were they considered appropriate to the application? **The CO, NO_2, SO_2, $PM_{2.5}$, and PM_{10} models were run in regulatory default mode. ARM2 will be used to account for the conversion from NO_X to NO_2.**

16-G: Surrounding source modeling

1

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 unmerged list of sources to describe the changes.

ID	Adjustments		
	$PM_{2.5}$	PM_{10}	NO_2
70	• Adjusted TSP emission rate x 0.1875 as per NMED modeling guidance; • Permit 3831 lists hours of operation 8am to 6pm	• Adjusted TSP emission rate x 0.25 as per NMED modeling guidance; • Permit 3831 lists hours of operation 8am to 6pm	• Permit 3831 lists hours of operation 8am to 6pm
85	• Adjusted TSP emission rate x 0.1875 as per NMED modeling guidance; • GCP daylight hours only 6am to 6pm	• Adjusted TSP emission rate x 0.25 as per NMED modeling guidance; • GCP daylight hours only 6am to 6pm	• GCP daylight hours only 6am to 6pm
112	• Adjusted TSP emission rate x 0.1875 as per NMED modeling guidance; • GCP daylight hours only 6am to 6pm	• Adjusted TSP emission rate x 0.25 as per NMED modeling guidance; • GCP daylight hours only 6am to 6pm	• GCP daylight hours only 6am to 6pm
123			• GCP daylight hours only 6am to 6pm
125			• GCP daylight hours only 6am to 6pm
126			• GCP daylight hours only 6am to 6pm

2

Date of surrounding source retrieval.

The surrounding sources were retrieved from Eric Peters (NMED) on March 26, 2019.

AQB Source ID	Description of Corrections

16-H: Building and structure downwash

1	How many buildings are present at the facility?	**8**

2	How many above ground storage tanks are present at the facility?	**0**	
3	Was building downwash modeled for all buildings?	☑ Yes	No
4	If not, explain why.		
5	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. **This facility has a fence which defines the restricted area.**		
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.

Grid	Start Point (meters from center)	End Point (meters from center)	Receptor spacing (m)
Fine Grid	0	500	50
Medium Grid	500	1,000	100
Coarse Grid	1,000	5,000	500
Very Coarse Grid	5,000	10,000	1,000
Most Coarse	10,000	25,000	2,500

5	Describe receptor spacing along the fence line. **25 meter spacing.**
6	Describe the PSD Class I area receptors. **Class I areas receptors were downloaded from the NPS website (https://www.nature.nps.gov/air/maps/receptors/) for Bandelier Wilderness.**

16-J: Sensitive areas

1	Are there schools or hospitals or other sensitive areas near the facility? This information is optional (and purposely undefined), but may help determine issues related to public notice.	Yes	No ☑
2	If so, describe.		
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). **Only one operational scenario was modeled for the facility and is listed under the "FAC" source group in the modeling. This source group contains all sources which emit to the ambient environment.**		
2	Which scenario produces the highest concentrations? Why? **N/A**		
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

Hour of Day	Factor	Hour of Day	Factor
1		13	
2		14	
3		15	
4		16	
5		17	
6		18	
7		19	
8		20	
9		21	
10		22	
11		23	
12		24	

If hourly, variable emission rates were used that were not described above, describe them here:

6	Were different emission rates used for short-term and annual modeling?	Yes	No ☑
7	If yes, describe.		

	N/A

16-L: NO_2 Modeling

1	Which types of NO_2 modeling were used? Check all that apply.	
		100% NO_X to NO_2 conversion
		ARM
		PVMRM
		OLM
	☑	ARM2
		Other:
2	Describe the NO_2 modeling. **The NO_2 model was executed in regulatory default mode with ARM2 selected.**	
3	In-stack NO_2/NO_X ratio(s) used in modeling. **The EPA AERMOD default in-stack ratios were used in the modeling, 0.5 for the minimum and 0.9 for the maximum as per NMED modeling guidance February 7, 2019).**	
4	Equilibrium NO_2/NO_X ratio(s) used in modeling. **The EPA AERMOD default equilibrium ratios were used in the modeling.**	
5	Describe/justify the use of the ratios chosen. **EPA AERMOD default values were used.**	
6	Describe the design value used for each averaging period modeled. 1-hour: **High eighth high**	

16-M: Particulate Matter Modeling

1	Select the pollutants for which plume depletion modeling was used. **N/A No plume depletion was used.**	
		PM2.5
		PM10
		TSP
		None
2	Describe the particle size distributions used. Include the source of information.	

	N/A No plume depletion was used.		
3	Was secondary PM modeled for PM2.5? Only required for PSD major modifications that are significant for NOx and/or SOx. Optional for minor sources, but allows use of high eighth high.	Yes	No ☑

16-N: Setback Distances and Source Classification

1	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. **None**		
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.		
3	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?	Yes	No ☑

4 Provide a cross-reference table between unit numbers if they do not match. It's ok to place the table below section 16-N for easier formatting.

ID	Unit	Source Type	Modeled Source
1	Gypsum Rock Load-in	Volume	NE_Bay
		Volume	NW_Bay
		Volume	SE_Bay
		Volume	SW_Bay
2a	Rock Storage Loading	Volume	ROCKH
2b	Rock Storage & Reclaim	Point	2
3	Rock Tank	Point	3
4	Calciner Furnace / Ball Mill	Point	4
5	Stucco Storage	Point	5
6	Stucco Storage	Point	6
7	Starch Receiving	Point	7
8	Starch Use	Volume	NorthP
9	Accelerator and MiscDry Additives		
10	Misc. Dry Additives & Stucco Metering		

11	Dryer	Point	11
12	Edge Trimmer	Volume	SouthP
13	Sleutter Production		
14	Enclosed Stucco Conveyance System	Horizontal Point	14H
15	Paved Roads	Volume	HRS1A_1 through HRS1A_16; HRS1B_1 through HRS1B_15; HRS2_1 through HRS2_7; HRS3_1 through HRS3_8; HRS4_1 through HRS4_77; HRS5_1 through HRS5_15

1. **Unit 1 Gypsum Rock Load-In – Emissions will be allocated as 4 volume sources exiting at one of four bay openings located on the north and south end of the building.**
2. **Units 8 through 10 emit within the enclosed additives building add-on to the main building. The north-bay is closest to these sources. As such, emissions from units 8-10 will be modeled as a single volume source through the building's north-bay opening.**
3. **Units 12 and 13 emit within the main building closest to the south bay opening. As such, emissions from units 12 and 13 will be modeled as a single volume source through the building south-bay opening.**

5	The emission rates in the Tables 2-E and 2-F should match the ones in the modeling files. Do these match?	Yes	No ☑

6

If not, explain why.
Units 8, 9, 10, 12 and 13 are controlled by baghouses which emit inside the main building. This building is approximately 390 meters long and has large bay doors at each end for loading/unloading vehicles. Typically as these units are inside a building they would not require modeling. However, American Gypsum has conservatively modeled a fraction of the emissions released from the indoor stacks as volume sources at the remote ends of the building. As such the emissions represented in Table 2-E are the emissions at the stack tip for units 8, 9, 10, 12 and 13 whereas the combined emissions from these units are modeled as "SouthP" and "NorthP" in the model with a 90% reduction due to building retention.

Model ID	Unit ID	Table 2-E Emission Rates (lb/hr)		Building Reduced Emission Rate (lb/hr)		Modeled Emission Rate (lb/hr)	
		$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
NorthP	8	0.023	0.076	0.0023	0.0076	0.0273	0.0912
	9	0.023	0.076	0.0023	0.0076		
	10	0.228	0.760	0.0228	0.0760		

SouthP	12 (Combined)	0.757	0.757	0.0757	0.0757	0.1137	0.1137
	13	0.380	0.380	0.0380	0.0380		

7	Have the minor NSR exempt sources or Title V Insignificant Activities" (Table 2-B) sources been modeled?	Yes	No ☑

8 Which units consume increment for which pollutants?

ID	Unit	Date of Construction	Baseline, Consumer, Expander Air Control Region 152			
			NO_2	SO_2	PM_{10}	$PM_{2.5}$
			3/26/1997	5/14/1981	3/26/1997	2/11/2013
1	Gypsum Rock Load-in	1988	Baseline	Consumer	Baseline	Baseline
2a	Rock Storage & Reclaim	1988	Baseline	Consumer	Baseline	Baseline
2b	Rock Storage Loading	1988	Baseline	Consumer	Baseline	Baseline
3	Rock Tank	1988	Baseline	Consumer	Baseline	Baseline
4	Calciner Furnace / Ball Mill	1988	Baseline	Consumer	Baseline	Baseline
5	Stucco Storage	1988	Baseline	Consumer	Baseline	Baseline
6	Stucco Storage	1988	Baseline	Consumer	Baseline	Baseline
7	Starch Receiving	1988	Baseline	Consumer	Baseline	Baseline
8	Starch Use	1988	Baseline	Consumer	Baseline	Baseline
9	Accelerator and MiscDry Additives	1988	Baseline	Consumer	Baseline	Baseline
10	Misc. Dry Additives & Stucco Metering	1988	Baseline	Consumer	Baseline	Baseline
11	Dryer	1988	Baseline	Consumer	Baseline	Baseline
12	Edge Trimmer	1988	Baseline	Consumer	Baseline	Baseline
13	Sleutter Production	1988	Baseline	Consumer	Baseline	Baseline
14	Enclosed Stucco Conveyance System	2017	Consumer	Consumer	Consumer	Consumer
15	Paved Roads	1988	Baseline	Consumer	Baseline	Baseline

9 PSD increment description for sources.
(for unusual cases, i.e., baseline unit expanded emissions after baseline date).

10	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.	Yes ☑	No
11	If not please explain how increment consumption status is determined for the missing installation dates.		

16-O: Flare Modeling

1	For each flare or flaring scenario, complete the following **N/A No Flares**			
	Flare ID (and scenario)	Average Molecular Weight	Gross Heat Release (cal/s)	Effective Flare Diameter (m)

16-P: Volume and Related Sources

1	Were the dimensions of volume sources different from standard dimensions in the Air Quality Bureau (AQB) Modeling Guidelines?	Yes ☑	No
2	If the dimensions of volume sources are different from standard dimensions in the AQB Modeling Guidelines, describe how the dimensions were determined. **Many of the units vent into the building. As a conservative measure, these emissions were modeled assuming the emissions escape to the atmosphere through open loading bay doors. As such the size of the bay doors were used to determine the sigma-Y and sigma-Z.**		
3	Describe the determination of sigma-Y and sigma-Z for fugitive sources. **Haul roads utilized NMED guidance.** **NE_Bay; NW_Bay; SW_Bay; SE_Bay; NorthP and SouthP use an X dimension of 14 m and a Y dimension of 20 meters which corresponds to a sigma x = 3.26 and sigma y = 9.30 meters.**		
4	Describe how the volume sources are related to unit numbers. Or say they are the same. **See Section 16-N Part 4.**		
5	Describe any open pits. **No Pits**		
6	Describe emission units included in each open pit. **N/A**		

16-Q: Background Concentrations

1 Identify and justify the background concentrations used.

The background concentrations were taken from the NMED modeling guidance (February 7, 2019).

Pollutant	Monitor ID	Averaging Period		
		1-hr	24-hr	Annual
PM_{10}	350490020	N/A	23	-
$PM_{2.5}$	350010023	N/A	10.8	4.6
SO_2	350010023	N/A	N/A	N/A
NO_2	350010023	83.8	-	20.2

2	Were background concentrations refined to monthly or hourly values?	Yes	No ☑

16-R: Meteorological Data

1 Identify and justify the meteorological data set(s) used.

The 1997 Bernalillo Meteorological dataset was used for this modeling. This dataset is provided by the NMED.

2 Discuss how missing data were handled, how stability class was determined, and how the data were processed, if the Bureau did not provide the data.

N/A – the data was provided by the NMED.

16-S: Terrain

1 Was complex terrain used in the modeling? If no, describe why.

Yes, all terrain was assessed using AERMAP.

2 What was the source of the terrain data?

DEM Data

16-T: Modeling Files

1 Describe the modeling files:

The modeling files being submitted are listed below.

File name (or folder and file name)	Pollutant(s)	Purpose (ROI/SIA, cumulative, culpability analysis, other)

	\Modeling\CO\SIL	CO	SIL
	\Modeling\NO2\SIL	NO2	SIL
	\Modeling\SO2\SIL	SO2	SIL
	\Modeling\PM2.5\SIL	PM2.5	SIL
	\Modeling\PM10\SIL	PM10	SIL
	\Modeling\NO2\CIA\CIA	NO2	CIA
	\Modeling\NO2\CIA\PSD Inc	NO2	PSD Increment
	\Modeling\NO2\CIA\PSD Class I	NO2	PSD Class I
	\Modeling\PM2.5\CIA\CIA	PM2.5	CIA
	\Modeling\PM2.5\CIA\PSD Inc	PM2.5	PSD Increment
	\Modeling\PM2.5\CIA\PSD Class I	PM2.5	PSD Class I
	\Modeling\PM10\CIA\CIA	PM10	CIA
	\Modeling\PM10\CIA\PSD Inc	PM10	PSD Increment
	\Modeling\PM10\CIA\PSD Class I	PM10	PSD Class I

16-U: 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.		
4	Describe the additional impacts analysis required at 20.2.74.304 NMAC.		
5	If required, have ozone and secondary PM2.5 ambient impacts analyses been completed?		

16-V: 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.
2	Identify the maximum concentrations from the modeling analysis.

Pollutant	Period	Facility Concentration (µg/m3)	Total Modeled Concentration (µg/m3)	Total Modeled Concentration (PPM)	Background Concentration	Cumulative Concentration	Standard	Value of Standard	Units of Standard, Background, and Total	Percent of Standard
CO	8-hr	99.8	99.8				Significance	500	µg/m^3	20.0
CO	1-hr	443.7	443.7				Significance	2000	µg/m^3	22.2
NO_2	Annual	7.1	7.1				Significance	1	µg/m3	Significant
NO_2	24-hr	27.2	27.2				Significance	5	µg/m^3	Significant
NO_2	1-hr	163.2	163.2				Significance	7.54	µg/m^3	Significant
$PM_{2.5}$	Annual	2.8	2.8				Significance	0.3	µg/m^3	Significant
$PM_{2.5}$	24-hr	9.2	9.2				Significance	1.2	µg/m^3	Significant
PM_{10}	Annual	17.1	17.1				Significance	1	µg/m^3	Significant
PM_{10}	24-hr	42.3	42.3				Significance	5	µg/m^3	Significant
TSP	Annual	N/A	N/A				Significance	1	µg/m^3	N/A
TSP	24-hr	N/A	N/A				Significance	5	µg/m^3	N/A
SO_2	Annual	0.2	0.2				Significance	1	µg/m^2	20.1
SO_2	24-hr	0.8	0.8				Significance	5	µg/m^3	17.0
SO_2	3-hr	2.8	2.8				Significance	25	µg/m^3	11.2
SO_2	1-hr	6.9	6.9				Significance	7.8	µg/m^3	88.0
NO_2	Annual	7.1	9.2			27.3	NMAAQS	94.02	µg/m3	27.4
NO_2 [1]	1-hr	117.5	117.5			116.9	NAAQS	188.06	µg/m^3	62.2
$PM_{2.5}$	Annual	2.8	3.5		4.6	8.1	NAAQS	12	µg/m^3	67.4
$PM_{2.5}$	24-hr	9.2	14.2		10.8	25.0	NAAQS	35	µg/m^3	71.5
PM_{10}	24-hr	42.3	43.3		23.0	66.3	NAAQS	150	µg/m^3	44.2
TSP	Annual	N/A	N/A		N/A	57.4	NMAAQS	60	µg/m^3	N/A
TSP	24-hr	N/A	N/A		N/A	128.0	NMAAQS	150	µg/m^3	N/A

NO_2	Annual	0.00	0.30			0.30	PSD Class II	25	µg/m^3	1.2
PM_{10}	Annual	3.18	2.97			2.97	PSD Class II	17	µg/m^3	17.5
PM_{10}	24-hr	15.7	15.6			15.6	PSD Class II	30	µg/m^3	52.1
$PM_{2.5}$	Annual	0.84	0.90			0.90	PSD Class II	4	µg/m^3	22.6
$PM_{2.5}$	24-hr	6.1	6.15			6.15	PSD Class II	9	µg/m^3	68.3
NO_2	Annual	0.17	0.17			0.17	PSD Class I	2.5	µg/m^3	4.7
PM_{10}	Annual	0.007	0.007			0.007	PSD Class I	4	µg/m^3	0.18
PM_{10}	24-hr	0.04	0.04			0.04	PSD Class I	8	µg/m^3	0.53
$PM_{2.5}$	Annual	0.0007	0.0007			0.0007	PSD Class I	1	µg/m^3	0.07
$PM_{2.5}$	24-hr	0.004	0.004			0.004	PSD Class I	2	µg/m^3	0.23

1 For NO2 1 hr CIA modeling a culpability analysis was performed. During this analysis when the modeled concentrations from facility + neighboring sources exceeded the NAAQS of 188.03 µg/m3 the maximum concentration of facility only emissions = 1.17 µg/m3 which is below the significance value for 1 hr NO2.

16-W: Location of maximum concentrations

1 Identify the locations of the maximum concentrations.

Pollutant	Period	UTM East (m)	UTM North (m)	Elevation (ft)	Distance (m)	Radius of Impact (ROI) (m)
CO	8-hr	361,025	3,910,507	1,557	272	N/A
CO	1-hr	361,025	3,910,507	1,557	272	N/A
NO_2	Annual	361,017	3,910,397	1,558	371	16,770
NO_2	24-hr	361,217	3,910,512	1,561	221	1,124
NO_2	1-hr	361,025	3,910,507	1,557	272	1,124
$PM_{2.5}$	Annual	361,144	3,910,888	1,556	162	990
$PM_{2.5}$	24-hr	361,355	3,910,800	1,559	188	1,586
PM_{10}	Annual	361,364	3,910,823	1,560	206	1,586
PM_{10}	24-hr	361,274	3,910,740	1,560	94	1,586
SO_2	Annual	361,017	3,910,482	1,556	297	N/A
SO_2	24-hr	361,017	3,910,397	1,558	371	N/A

SO_2	3-hr	361,025	3,910,506	1,558	273	N/A
SO_2	1-hr	361,025	3,910,507	1,557	272	N/A

16-X: Summary/conclusions

1	A statement that modeling requirements have been satisfied and that the permit can be issued. **This modeling has demonstrated that American Gypsum Bernalillo Wallboard facility emissions will neither cause nor contribute to an exceedance of the NAAQS, NMAAQS, or PSD Increment standards.**

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.

Compliance Test History Table

Unit No.	Test Description	Test Date
4	Initial Compliance Test for NOx and CO per EPA Reference Methods 1 Through 4, Method 7E for NOx, Method 10 for CO, Method 5 for TSP, contained in 40 CFR Title 40, Part 60, Appendix A For TSP and PM10 in accordance with 40CFR 51, Appendix M, Method 201. As required under NSR 689-M2, Specific Conditions 6. d)	Refer to Note 1
11		

Note 1: NSR Permit 689-M2 issued on Nov 1st, 2001 under Specific Conditions 6: Compliance Test required American Gypsum to perform an initial compliance test on Unit(s) No. 4 and 11 for NO_x and CO. These compliance tests were performed, but due to fact that this activity took place more than 10 years ago it has been impossible to obtain the specific date they were performed. Beside these compliance tests, no additional tests have been required for these emission sources or others at the site.

Compliance testing has been completed systematically for emission sources per most recent permits.

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.

N/A – No other relevant information.

Section 22: Certification

Company Name: _____

I, _____, 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 ____ day of _____, _____, upon my oath or affirmation, before a notary of the State of

_____.

_____ _____
*Signature Date

_____ _____
Printed Name Title

Scribed and sworn before me on this ____ day of _____, _____.

My authorization as a notary of the State of _____ expires on the

_____ day of _____, _____.

_____ _____
Notary's Signature Date

_____
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.