20.11.41 NMAC "AUTHORITY-TO-CONSTRUCT" AIR QUALITY PERMIT 1638-M2 MODIFICATION APPLICATION

Albuquerque, New Mexico

PREPARED FOR
DUKE CITY REDI-MIX, LLC

JANUARY 2020

Prepared by

Montrose Air Quality Services, LLC

MONTROSE
AIR QUALITY SERVICES

Introduction

Duke City Redi-Mix, LLC (Duke City) is applying for a 20.11.41 NMAC Permit Modification for existing Permit 1638-M2, to operate a portable concrete batch plant within the county of Bernalillo, state of New Mexico.

The proposed modified plant is rated by the manufacturer at 225 cubic yards per hour. The proposed Duke City's Albuquerque Concrete Plant is a Model Lo-Pro 12HP portable plant manufactured by CON-E-CO and includes; aggregate/sand storage piles, an aggregate/sand feeder and radial conveyor, 4-bin aggregate bin, weight batcher with delivery conveyor, cement silo, cement/fly ash split silo, 12 yard truck loading, cement/fly ash batcher, central baghouse, fly ash guppy, existing 3.8 MMBtu/hr hot water, and concrete additive.

Duke City has retained Montrose Air Quality Services (Montrose) to assist with the permit application. The plant is identified as Duke City's Albuquerque Concrete Plant and is located at 7711 Broadway SE in Albuquerque, NM. The site is located within Section 30, Township 9N, and Range 3E.

Duke City will limit the hourly and annual concrete production to 225 cubic yards per hour and 1,000,000 cubic yards per year. Concrete operations will be recorded by the plant's data management system to show compliance with hourly and annual throughput limits. Particulate emissions will be controlled by a central baghouse for silos/guppy loading and unloading, cement/fly ash weigh batcher loading and unloading, and the truck mixer. No malfunction for the baghouse is anticipated, but if a malfunction occurs the unit will be shut down until repairs are completed and any excess emissions emitted during the malfunction will be notified to the department per 20.11.90 NMAC. Disturbed areas and material handling fugitive emissions will be controlled by the application of water, as needed.

A process flow diagram can be seen in Figure A-1. The CBP site location and layout can be seen in Figure A-2. A facility location topographical map can be seen in Attachment D.

The preliminary operational plan defining the measures to be taken to mitigate source emissions during malfunction, startup, or shutdown are as follows:

STARTUP AND SHUTDOWN PROCEDURES

Water Truck

Startup
Check water supply, inspect nozzles and open all associated valves before startup.

Shutdown
Inspect nozzles and close all associated valves after shutdown.

Baghouse

Startup
Visual inspection of: product lines, vent lines and all fittings, including dust shroud, baghouse blower before startup.

Shutdown
Check that all pressurized systems are off.

OPERATIONS PLAN

Water Truck Operation

A water truck to be operated, as needed, at plant site disturbed areas, storage piles, and haul truck traffic areas to prevent excess visible emissions. These activities include; unpaved haul roads, storage piles and active disturbed areas. Water spray application rate will be determined based on the occurrence of visible dust and may vary depending on existing road conditions, traffic, wind, temperature, and precipitation.

Baghouse Operation

The baghouse will be operated at all times when pertinent equipment is operating. A visual inspection of the baghouse exit during operation will be done once per day to make sure no excess visible emissions occur to verify the baghouse is operating correctly.

MAINTENANCE PLAN

Water Truck Maintenance

A safety check and equipment check will be conducted daily. Normal vehicle maintenance will be performed regularly or as needed.

Processing Plant Water Spray Dust Suppression Maintenance

Visual inspections will be made monthly to verify proper functioning of equipment. When emissions are suspected to approach compliance values, equipment will be checked for problems.

If you have any questions regarding this permit application please call Paul Wade of Montrose Air Quality Services at (505) 830-9680 x 6 or Miles Shiver of Duke City Redi-Mix, LLC at (505) 877-5777.

The contents of this application packet include:

20.11.41 NMAC Permit Checklist
20.11.41 NMAC Permit Fee Review
20.11.41 NMAC Permit Application Forms
Attachment A: Figure A-1: Facility Site Process Flow Diagram
Figure A-2: Facility Site Layout
Attachment B: Emission Calculations
Attachment C: Emission Calculations Background Data
Attachment D: Figure E-1: 7.5 Minute USGS Topographic Map
Attachment E: Facility Description
Attachment F: Regulatory Applicability Determinations
Attachment G: Dispersion Modeling Summary and Report
Attachment H: Public Notice Documentation

City of Albuquerque

Environmental Health Department
Air Quality Program

Permit Application Checklist

Any person seeking a permit under 20.11.41 NMAC, Authority-to-Construct Permits, shall do so by filing a written application with the Department. Prior to ruling a submitted application complete each application submitted shall contain the required items listed below. **This checklist must be returned with the application.**

Applications that are ruled incomplete because of missing information will delay any determination or the issuance of the permit. The Department reserves the right to request additional relevant information prior to ruling the application complete in accordance with 20.11.41 NMAC.

All applicants shall:

1. † Fill out and submit the *Pre-permit Application Meeting Request* form
   a. ☐ Attach a copy to this application

2. **X** Attend the pre-permit application meeting
   a. ☐ Attach a copy of the completed *Pre-permit Application Meeting Checklist* to this application

3. **X** Provide public notice to the appropriate parties
   a. X Attach a copy of the completed *Notice of Intent to Construct* form to this form
      i. Neighborhood Association(s): _____
      _____
      ii. Coalition(s): _____
   b. ☐ Attach a copy of the completed *Public Sign Notice Guideline* form

4. Fill out and submit the *Permit Application*. All applications shall:

   A. X be made on a form provided by the Department. Additional text, tables, calculations or clarifying information may also be attached to the form.

   B. X at the time of application, include documentary proof that all applicable permit application review fees have been paid as required by 20 NMAC 11.02. Please refer to the attached permit application worksheet.

   C. X contain the applicant's name, address, and the names and addresses of all other owners or operators of the emission sources.

D. X contain the name, address, and phone number of a person to contact regarding questions about the facility.

E. X indicate the date the application was completed and submitted

F. X contain the company name, which identifies this particular site.

G. X contain a written description of the facility and/or modification including all operations affecting air emissions.

H. X contain the maximum and standard operating schedules for the source after completion of construction or modification in terms of hours per day, days per week, and weeks per year.

I. X provide sufficient information to describe the quantities and nature of any regulated air contaminant (including any amount of a hazardous air pollutant) that the source will emit during:

- Normal operation
- Maximum operation
- Abnormal emissions from malfunction, start-up and shutdown

J. X include anticipated operational needs to allow for reasonable operational scenarios to avoid delays from needing additional permitting in the future.

K. X contain a map, such as a 7.5-minute USGS topographic quadrangle, showing the exact location of the source; and include physical address of the proposed source.

L. X contain an aerial photograph showing the proposed location of each process equipment unit involved in the proposed construction, modification, relocation, or technical revision of the source except for federal agencies or departments involved in national defense or national security as confirmed and agreed to by the department in writing.

M. X contain the UTM zone and UTM coordinates.

N. X include the four digit Standard Industrialized Code (SIC) and the North American Industrial Classification System (NAICS).

O. X contain the types and **potential emission rate** amounts of any regulated air contaminants the new source or modification will emit. Complete appropriate sections of the application; attachments can be used to supplement the application, but not replace it.

P. X contain the types and **controlled** amounts of any regulated air contaminants the new source or modification will emit. Complete appropriate sections of the application; attachments can be used to supplement the application, but not replace it.

Q. X contain the basis or source for each emission rate (include the manufacturer's specification sheets, AP-42 Section sheets, test data, or other data when used as the source).

R. X contain all calculations used to estimate **potential emission rate** and **controlled** emissions.

S. X contain the basis for the estimated control efficiencies and sufficient engineering data for verification of the control equipment operation, including if necessary, design drawings, test reports, and factors which affect the normal operation (e.g. limits to normal operation).

T. X contain fuel data for each existing and/or proposed piece of fuel burning equipment.

U. X contain the anticipated maximum production capacity of the entire facility and the requested production capacity after construction and/or modification.

V. X contain the stack and exhaust gas parameters for all existing and proposed emission stacks.

W. X provide an ambient impact analysis using a atmospheric dispersion model approved by the US Environmental Protection Agency (EPA), and the Department to demonstrate compliance with the ambient air quality standards for the City of Albuquerque and Bernalillo County (See 20.11.01 NMAC). If you are modifying an existing source, the modeling must include the emissions of the entire source to demonstrate the impact the new or modified source(s) will have on existing plant emissions.

X. X contain a preliminary operational plan defining the measures to be taken to mitigate source emissions during malfunction, startup, or shutdown.

Y. X contain a process flow sheet, including a material balance, of all components of the facility that would be involved in routine operations. Indicate all emission points, including fugitive points.

Z. X contain a full description, including all calculations and the basis for all control efficiencies presented, of the equipment to be used for air pollution control. This shall include a process flow sheet or, if the Department so requires, layout and assembly drawings, design plans, test reports and factors which affect the normal equipment operation, including control and/or process equipment operating limitations.

AA. ☐ contain description of the equipment or methods proposed by the applicant to be used for emission measurement.

BB. X be signed under oath or affirmation by a corporate officer, authorized to bind the company into legal agreements, certifying to the best of his or her knowledge the truth of all information submitted.

City of Albuquerque

Environmental Health Department
Air Quality Program

Permit Application Review Fee Instructions

All source registration, authority-to-construct, and operating permit applications for stationary or portable sources shall be charged an application review fee according to the fee schedule in 20.11.2 NMAC. These filing fees are required for both new construction, reconstruction, and permit modifications applications. Qualified small businesses as defined in 20.11.2 NMAC may be eligible to pay one-half of the application review fees and 100% of all applicable federal program review fees.

Please fill out the permit application review fee checklist and submit with a check or money order payable to the "City of Albuquerque Fund 242" and either:

1. be delivered in person to the Albuquerque Environmental Health Department, 3rd floor, Suite 3023 or Suite 3027, Albuquerque-Bernalillo County Government Center, south building, One Civic Plaza NW, Albuquerque, NM or,

2. mailed to Attn: Air Quality Program, Albuquerque Environmental Health Department, P.O. Box 1293, Albuquerque, NM 87103.

The department will provide a receipt of payment to the applicant. The person delivering or filing a submittal shall attach a copy of the receipt of payment to the submittal as proof of payment Application review fees shall not be refunded without the written approval of the manager. If a refund is requested, a reasonable professional service fee to cover the costs of staff time involved in processing such requests shall be assessed. Please refer to 20.11.2 NMAC (effective January 10, 2011) for more detail concerning the "Fees" regulation as this checklist does not relieve the applicant from any applicable requirement of the regulation.

City of Albuquerque

Environmental Health Department
Air Quality Program

Permit Application Review Fee Checklist

Please completely fill out the information in each section. Incompleteness of this checklist may result in the Albuquerque Environmental Health Department not accepting the application review fees. If you should have any questions concerning this checklist, please call 768-1972.

I. COMPANY INFORMATION:

Company Name	Duke City Redi-Mix, LLC		
Company Address	PO Box 250, Moriarty, NM 87035		
Facility Name	Albuquerque Concrete Plant		
Facility Address	7711 Broadway SE, Albuquerque, NM 87105		
Contact Person	Miles Shiver		
Contact Person Phone Number	(505) 877-5777		
Are these application review fees for an existing permitted source located within the City of Albuquerque or Bernalillo County?	**Yes**	**No**	
If yes, what is the permit number associated with this modification?	**Permit #1638-M2**		
Is this application review fee for a Qualified Small Business as defined in 20.11.2 NMAC? (See Definition of Qualified Small Business on Page 4)	**Yes**	**No**	

II. STATIONARY SOURCE APPLICATION REVIEW FEES:

If the application is for a new stationary source facility, please check all that apply. If this application is for a modification to an existing permit please see Section III.

Check All That Apply	Stationary Sources	Review Fee	Program Element
	Air Quality Notifications		
	AQN New Application	$562.00	2801
	AQN Technical Amendment	$307.00	2802
	AQN Transfer of a Prior Authorization	$307.00	2803
X	*Not Applicable*	*See Sections Below*	
	Stationary Source Review Fees (Not Based on Proposed Allowable Emission Rate)		
	Source Registration required by 20.11.40 NMAC	$ 573.00	2401
	A Stationary Source that requires a permit pursuant to 20.11.41 NMAC or other board regulations and are not subject to the below proposed allowable emission rates	$ 1,146.00	2301
X	*Not Applicable*	*See Sections Below*	
	Stationary Source Review Fees (Based on the Proposed Allowable Emission Rate for the single highest fee pollutant)		
	Proposed Allowable Emission Rate Equal to or greater than 1 tpy and less than 5 tpy	$ 859.00	2302
	Proposed Allowable Emission Rate Equal to or greater than 5 tpy and less than 25 tpy	$ 1,719.00	2303
	Proposed Allowable Emission Rate Equal to or greater than 25 tpy and less than 50 tpy	$ 3,438.00	2304
	Proposed Allowable Emission Rate Equal to or greater than 50 tpy and less than 75 tpy	$ 5,157.00	2305
	Proposed Allowable Emission Rate Equal to or greater than 75 tpy and less than 100 tpy	$ 6,876.00	2306
	Proposed Allowable Emission Rate Equal to or greater than 100 tpy	$8,594.00	2307
X	*Not Applicable*	*See Section Above*	

Federal Program Review Fees (In addition to the Stationary Source Application Review Fees above)			
	40 CFR 60 - "New Source Performance Standards" (NSPS)	$ 1,146.00	2308
	40 CFR 61 - "Emission Standards for Hazardous Air Pollutants (NESHAPs)	$ 1,146.00	2309
	40 CFR 63 - (NESHAPs) Promulgated Standards	$ 1,146.00	2310
	40 CFR 63 - (NESHAPs) Case-by-Case MACT Review	$ 11,459.00	2311
	20.11.61 NMAC, Prevention of Significant Deterioration (PSD) Permit	$ 5,730.00	2312
	20.11.60 NMAC, Non-Attainment Area Permit	$ 5,730.00	2313
X	*Not Applicable*	*Not Applicable*	

III. MODIFICATION TO EXISTING PERMIT APPLICATION REVIEW FEES:

If the permit application is for a modification to an existing permit, please check all that apply. If this application is for a new stationary source facility, please see Section II.

Check All That Apply	Modifications	Review Fee	Program Element
Modification Application Review Fees (Not Based on Proposed Allowable Emission Rate)			
	Proposed modification to an existing stationary source that requires a permit pursuant to 20.11.41 NMAC or other board regulations and are not subject to the below proposed allowable emission rates	$ 1,146.00	2321
X	*Not Applicable*	*See Sections Below*	
Modification Application Review Fees (Based on the Proposed Allowable Emission Rate for the single highest fee pollutant)			
	Proposed Allowable Emission Rate Equal to or greater than 1 tpy and less than 5 tpy	$ 859.00	2322
X	Proposed Allowable Emission Rate Equal to or greater than 5 tpy and less than 25 tpy	$ 1,719.00	2323
	Proposed Allowable Emission Rate Equal to or greater than 25 tpy and less than 50 tpy	$ 3,438.00	2324
	Proposed Allowable Emission Rate Equal to or greater than 50 tpy and less than 75 tpy	$ 5,157.00	2325
	Proposed Allowable Emission Rate Equal to or greater than 75 tpy and less than 100 tpy	$ 6,876.00	2326
	Proposed Allowable Emission Rate Equal to or greater than 100 tpy	$ 8,594.00	2327
	Not Applicable	*See Section Above*	
Major Modifications Review Fees (In addition to the Modification Application Review Fees above)			
	20.11.60 NMAC, Permitting in Non-Attainment Areas	$ 5,730.00	2333
	20.11.61 NMAC, Prevention of Significant Deterioration	$ 5,730.00	2334
X	*Not Applicable*	*Not Applicable*	
Federal Program Review Fees (This section applies only if a Federal Program Review is triggered by the proposed modification) (These fees are in addition to the Modification and Major Modification Application Review Fees above)			
	40 CFR 60 - "New Source Performance Standards" (NSPS)	$ 1,146.00	2328
	40 CFR 61 - "Emission Standards for Hazardous Air Pollutants (NESHAPs)	$ 1,146.00	2329
	40 CFR 63 - (NESHAPs) Promulgated Standards	$ 1,146.00	2330
	40 CFR 63 - (NESHAPs) Case-by-Case MACT Review	$11,459.00	2331
	20.11.61 NMAC, Prevention of Significant Deterioration (PSD) Permit	$ 5,730.00	2332
	20.11.60 NMAC, Non-Attainment Area Permit	$ 5,730.00	2333
X	*Not Applicable*	*Not Applicable*	

IV. ADMINISTRATIVE AND TECHNICAL REVISION APPLICATION REVIEW FEES:

If the permit application is for an administrative or technical revision of an existing permit issued pursuant to 20.11.41 NMAC, please check one that applies.

Check One	Revision Type	Review Fee	Program Element
	Administrative Revisions	$ 250.00	2340
	Technical Revisions	$ 500.00	2341
X	*Not Applicable*	*See Sections II, III or V*	

V. PORTABLE STATIONARY SOURCE RELOCATION FEES:

If the permit application is for a portable stationary source relocation of an existing permit, please check one that applies.

Check One	Portable Stationary Source Relocation Type	Review Fee	Program Element
	No New Air Dispersion Modeling Required	$ 500.00	2501
X	New Air Dispersion Modeling Required	$ 750.00	2502
	Not Applicable	*See Sections II, III or V*	

VI. Please submit a check or money order in the amount shown for the total application review fee.

Section Totals	Review Fee Amount
Section II Total	NA
Section III Total	$1,719
Section IV Total	NA
Section V Total	$750
Total Application Review Fee	**$2,469**

I, the undersigned, a responsible official of the applicant company, certify that to the best of my knowledge, the information stated on this checklist, give a true and complete representation of the permit application review fees which are being submitted. I also understand that an incorrect submittal of permit application reviews may cause an incompleteness determination of the submitted permit application and that the balance of the appropriate permit application review fees shall be paid in full prior to further processing of the application.

Signed this 3 **day of** January **20** 20

Miles Shiver — **Print Name**

General Manager — **Print Title**

Signature

Definition of Qualified Small Business as defined in 20.11.2 NMAC:
"Qualified small business" means a business that meets all of the following requirements:

(1) a business that has 100 or fewer employees;
(2) a small business concern as defined by the federal Small Business Act;
(3) a source that emits less than 50 tons per year of any individual regulated air pollutant, or less than 75 tons per year of all regulated air pollutants combined; and
(4) a source that is not a major source or major stationary source.

Note: Beginning January 1, 2011, and every January 1 thereafter, an increase based on the consumer price index shall be added to the application review fees. The application review fees established in Subsection A through D of 20.11.2.18 NMAC shall be adjusted by an amount equal to the increase in the consumer price index for the immediately-preceding year. Application review fee adjustments equal to or greater than fifty cents ($0.50) shall be rounded up to the next highest whole dollar. Application review fee adjustments totaling less than fifty cents ($0.50) shall be rounded down to the next lowest whole dollar. The department shall post the application review fees on the city of Albuquerque environmental health department air quality program website.

Albuquerque Environmental Health Department - Air Quality Program
Please mail this application to **P.O. Box 1293, Albuquerque, NM 87103**
or hand deliver between 8:00am - 5:00pm Monday - Friday to:
3rd Floor, Suite 3023 - One Civic Plaza NW, Albuquerque, New Mexico 87103
(505) 768 – 1972 aqd@cabq.gov (505) 768 - 1977 (Fax)

Application for Air Pollutant Sources in Bernalillo County
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)

Clearly handwrite or type

Corporate Information
Submittal Date: 01/03/2020

1. Company Name: Duke City Redi-Mix, LLC
2. Street Address: 717C West Abrahames Zip: 87035
3. Company City: Moriarty 4. Company State: New Mexico 5. Company Phone: (505) 832-6800 6. Company Fax: (505) 832-1428
7. Company Mailing Address: PO Box 250, Moriarty, NM Zip: 87035
8. Company Contact and Title: Miles Shiver, General Manager 9. Phone: (505) 877-5777
10. E-mail: miles@dukecityredimix.com

Stationary Source (Facility) Information: **[Provide a plot plan (legal description/drawing of facility property) with overlay sketch of facility processes; Location of emission points; Pollutant type and distances to property boundaries]**

1. Facility Name Albuquerque Concrete Plant 2. Street Address 7711 Broadway SW
3. City Albuquerque 4. State NM 5. Facility Phone (505) 877-5777 6. Facility Fax (505) 452-0806
7. Facility Mailing Address (Local) SAME AS ABOVE Zip: 87105
8. Latitude - Longitude or UTM Coordinates of Facility 348,610E 3,872,190N Zone 13, NAD 83
9. Facility Contact and Title: Miles Shiver, General Manager 10. Phone: (505) 877-5777 11. E-mail: miles@dukecityredimix.com

General Operation Information (if any further information request does not pertain to your facility, write N/A on the line or in the box)

1. Facility Type (description of your facility operations): Concrete Batch Plant
2. Standard Industrial Classification (SIC 4 digit #): 3273
3. North American Industry Classification System (NAICS Code #): 327320
4. Is facility currently operating in Bernalillo County. Yes If yes, date of original construction 06/ /2001
   If no, planned startup is / /
5. Is facility permanent Yes If no, give dates for requested temporary operation - from / / through / /
6. Is facility process equipment new Yes If no, give actual or estimated manufacture or installation dates in the Process Equipment Table.
7. Is application for a modification, expansion, or reconstruction (altering process, or adding, or replacing process equipment, etc.) to an existing facility which will result in a change in emissions Yes. If yes, give the manufacture date of modified, added, or replacement equipment in the Process Equipment Table modification date column, or the operation changes to existing process/equipment which cause an emission increase.

8. Is facility operation (circle one) [Continuous Intermittent **Batch**]

9. Estimated % of production Jan-Mar 22% Apr-Jun 26% Jul-Sep 27% Oct-Dec 25%

10. Current or requested operating times of facility 24 hrs/day 7 days/wk 52 wks/yr 12 mos/yr

11. Production Limit of 225 cubic yards per hour and 1,000,000 cubic yards per year.

12. Business hrs 24 Hours per Day

13. Will there be special or seasonal operating times other than shown above No If yes, explain

14. Raw materials processed: Aggregate, Sand, Cement, Fly Ash, Water, Additives

15. Saleable item(s) produced: Ready Mix Concrete

15. Permitting Action Being Requested

☐ New Permit X Permit Modification ☐ Technical Permit Revision ☐ Administrative Permit Revision

Current Permit #: 1638-M2 Current Permit #: _____ Current Permit #: _____

PROCESS EQUIPMENT TABLE

(Generator-Crusher-Screen-Conveyor-Boiler-Mixer-Spray Guns-Saws-Sander-Oven-Dryer-Furnace-Incinerator, etc.) Match the Process Equipment Units listed on this Table to the same numbered line if also listed on Emissions & Stack Table (page 6).

Process Equipment Unit	Manufacturer	Model #	Serial #	Manufacture Date	Installation Date	Modification Date	Size or Process Rate (Hp;kW;Btu;ft³;lbs; tons;yd³;etc.)	Fuel Type
1. Haul Roads	NA	NA	NA	NA	6/2001	TBD	36.5 TRUCK/HR. 162,051 TRUCK/YEAR.	
2.Feeder	CON-E-CO	LO-PRO 12HP	TBD	TBD	6/2001	TBD	337.5 TONS/HR. 1,500,000 TONS/YR.	
3. Radial Conveyor					6/2001	TBD	337.5 TONS/HR. 1,500,000 TONS/YR.	
4. 4- Bin Aggregate Feeder					6/2001	TBD	337.5 TONS/HR. 1,500,000 TONS/YR.	
5,6. Weigh Batcher with Delivery Conveyor					6/2001	TBD	337.5 TONS/HR. 1,500,000 TONS/YR.	
7. Truck Loading with Central Dust Collector					6/2001	TBD	225 YDS/HR. 1,000,000 YDS/YR.	
8.Cement/ Fly Ash Batcher with Central Dust Collector					6/2001	TBD	69.9 TONS/HR. 310,500 TONS/YR.	
9.Cement Silo with Central Dust Collector					6/2001	TBD	Cement 55.0 TONS/HR. 244,500 TONS/YR.	
10. Cement/Fly Ash Split Silo with Central Dust Collector					6/2001	TBD	Fly Ash 14.9 TONS/HR. 66,000 TONS/YR.	
12. Aggregate/Sand Storage Piles	NA	NA	NA	NA	6/2001	TBD	337.5 TONS/HR. 1,500,000 TONS/YR.	
17.CBP Hot Water Heater	Thermal Eng. Of Arizona	DC-110	HDA-06-2946	2006	11/29/06	NA	3.8 MMBtu/HR. YR.	Propane/ Natural Gas
20. Fly Ash Guppy with Central Dust Collector	Industras Gonzalez	NA	3AHEST101Y M3AH095	NA	April 2007	TBD	1800 cubic feet	

1. Basis for Equipment Size or Process Rate (Manufacturers data, Field Observation/Test, etc.) Manufacture Data
   Submit information for each unit as an attachment

NOTE: Copy this table if additional space is needed (begin numbering with 16., 17., etc.)

TABLE EXEMPTED SOURCES AND EXEMPTED ACTIVITIES

(Generator-Crusher-Screen-Conveyor-Boiler-Mixer-Spray Guns-Saws-Sander-Oven-Dryer-Furnace-Incinerator, etc.) Match the Process Equipment Units listed on this Table to the same numbered line if also listed on Emissions & Stack Table (page 6).

Process Equipment Unit	Manufacturer	Model #	Serial #	Manufacture Date	Installation Date	Modification Date	Size or Process Rate (Hp,kW,Btu,ft³,lbs; tons;yd³;etc.)	Fuel Type
1.							HR. YR.	
2.							HR. YR.	
3.							HR. YR.	
4.							HR. YR.	
5.							HR. YR.	
6.							HR. YR.	
7.							HR. YR.	
8.							HR. YR.	
9.							HR. YR.	
10.							HR. YR.	
11.							HR. YR.	
12.							HR. YR.	
13.							HR. YR.	
14.							HR. YR.	
15.							HR. YR.	

1. Basis for Equipment Size or Process Rate (Manufacturers data, Field Observation/Test, etc.)_____
Submit information for each unit as an attachment

NOTE: **Copy this table if additional space is needed (begin numbering with 16., 17., etc.)**

Application for Air Pollutant Sources in Bernalillo County
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)
UNCONTROLLED EMISSIONS OF INDIVIDUAL AND COMBINED PROCESSES

(Process potential under physical/operational limitations during a 24 hr/day and 365 day/year = 8,760 hrs)

Process Equipment Unit*	Carbon Monoxide (CO)	Oxides of Nitrogen (NOx)	Nonmethane Hydrocarbons NMHC (VOCs)	Oxides of Sulfur (SOx)	Total Suspended Particulate Matter (TSP)	Method(s) used for Determination of Emissions (AP-42, Material balance, field tests, manufacturers data, etc.)
1. Haul Roads	1. lbs/hr	lbs/hr	lbs/hr	lbs/hr	60.0 lbs/hr	AP-42 13.2 Unpaved Road (12/03)
	1a. tons/yr	tons/yr	tons/yr	tons/yr	219.6 tons/yr	
2. Feeder	2. lbs/hr	lbs/hr	lbs/hr	lbs/hr	1.07 lbs/hr	AP-42 13.2.4
	2a. tons/yr	tons/yr	tons/yr	tons/yr	4.71 tons/yr	
3. Radial Conveyor	3. lbs/hr	lbs/hr	lbs/hr	lbs/hr	1.01 lbs/hr	AP-42 11.19.2 Table 11.19.2-2 "Conveyor Transfer Point"
	3a. tons/yr	tons/yr	tons/yr	tons/yr	4.43 tons/yr	
4. Aggregate Bin (4 bins)	4. lbs/hr	lbs/hr	lbs/hr	lbs/hr	1.07 lbs/hr	AP-42 13.2.4
	4a. tons/yr	tons/yr	tons/yr	tons/yr	4.71 tons/yr	
5,6. Aggregate Weigh Batcher and Conveyor	5,6. lbs/hr	lbs/hr	lbs/hr	lbs/hr	1.01 lbs/hr	AP-42 11.19.2 Table 11.19.2-2 "Conveyor Transfer Point"
	5,6a. tons/yr	tons/yr	tons/yr	tons/yr	4.43 tons/yr	
7. Truck Loading	7. lbs/hr	lbs/hr	lbs/hr	lbs/hr	63.2 lbs/hr	CON-E-CO Manufacture Data "Truck Mix" 0.281 lb/cuyd
	7a. tons/yr	tons/yr	tons/yr	tons/yr	161.5 tons/yr	
8. Cement/Fly Ash Batcher	8. lbs/hr	lbs/hr	lbs/hr	lbs/hr	34.4 lbs/hr	CON-E-CO Manufacture Data "Central Mix" 0.153 lb/cuyd
	8a. tons/yr	tons/yr	tons/yr	tons/yr	88.0 tons/yr	
9. Cement Silo	9. lbs/hr	lbs/hr	lbs/hr	lbs/hr	39.8 lbs/hr	CON-E-CO Manufacture Data "Cement Silo" 0.177 lb/cuyd
	9a. tons/yr	tons/yr	tons/yr	tons/yr	101.8 tons/yr	
10,20. Fly Ash Silo with Guppy	10,20. lbs/hr	lbs/hr	lbs/hr	lbs/hr	25.9 lbs/hr	CON-E-CO Manufacture Data "Fly Ash Silo" 0.115 lb/cuyd
	10,20a. tons/yr	tons/yr	tons/yr	tons/yr	66.1 tons/yr	
12. Aggregate Storage Piles	12. lbs/hr	lbs/hr	lbs/hr	lbs/hr	1.41 lbs/hr	AP-42 13.2.4
	12a. tons/yr	tons/yr	tons/yr	tons/yr	6.16 tons/yr	
17. Concrete Bath Plant Hot Water Heater	17. 0.14 lbs/hr	0.33 lbs/hr	0.095 lbs/hr	0.062 lbs/hr	0.018 lbs/hr	Manufacturer's Data
	17a. 0.62 tons/yr	1.46 tons/yr	0.42 tons/yr	0.27 tons/yr	0.080 tons/yr	
Totals of Uncontrolled Emissions (1 - 17)	0.14 lbs/hr	0.33 lbs/hr	0.095 lbs/hr	0.062 lbs/hr	229 lbs/hr	
	0.62 tons/yr	1.46 tons/yr	0.42 tons/yr	0.27 tons/yr	661 tons/yr	

*** If any one (1) of these process units, or combination of units, has an uncontrolled emission greater than (>) 10 lbs/hr or 25 tons/yr for any of the above pollutants (based on 8760 hrs of operation), then a permit will be required. Complete this application along with additional checklist information requested on accompanying instruction sheet. Copy this Table if additional space is needed (begin numbering with 11., 12., etc.)**

*** If all of these process units, individually and in combination, have an uncontrolled emission less than or equal to (≤) 10 lbs/hr or 25 tons/yr for all of the above pollutants (based on 8760 hrs of operation), but > 1 ton/yr for any of the above pollutants - then a source registration is required.**

If your facility does not require a registration or permit, based on above emissions, complete the remainder of this application to determine if a registration or permit would be required for Toxic or Hazardous air pollutants used at your facility.

CONTROLLED EMISSIONS OF INDIVIDUAL AND COMBINED PROCESSES

(Based on current operations with emission controls OR requested operations with emission controls)

Process Equipment Units listed on this Table should match up to the same numbered line and Unit as listed on Uncontrolled Table (pg. 3)

Process Equipment Unit		Carbon Monoxide (CO)	Oxides of Nitrogen (NOx)	Nonmethane Hydrocarbons NMHC (VOCs)	Oxides of Sulfur (SOx)	Total Suspended Particulate Matter (TSP)	Control Method	% Efficiency
1. Haul Roads	1.	lbs/hr	lbs/hr	lbs/hr	lbs/hr	6.00 lbs/hr	Surface Stabilizers and Watering	90.0
	1a.	tons/yr	tons/yr	tons/yr	tons/yr	11.14 tons/yr		
2. Feeder	2.	lbs/hr	lbs/hr	lbs/hr	lbs/hr	1.07 lbs/hr	None	0.0
	2a.	tons/yr	tons/yr	tons/yr	tons/yr	2.39 tons/yr		
3. Radial Conveyor	3.	lbs/hr	lbs/hr	lbs/hr	lbs/hr	1.01 lbs/hr	None	0.0
	3a.	tons/yr	tons/yr	tons/yr	tons/yr	2.25 tons/yr		
4. Aggregate Bin (4 bins)	4.	lbs/hr	lbs/hr	lbs/hr	lbs/hr	1.07 lbs/hr	None	0.0
	4a.	tons/yr	tons/yr	tons/yr	tons/yr	2.39 tons/yr		
5,6. Aggregate Weigh Batcher and Conveyor	5,6.	lbs/hr	lbs/hr	lbs/hr	lbs/hr	1.01 lbs/hr	None	0.0
	5,6a.	tons/yr	tons/yr	tons/yr	tons/yr	2.25 tons/yr		
7. Truck Loading with Central Baghouse	7,8,9,10,20.	lbs/hr	lbs/hr	lbs/hr	lbs/hr	0.16 lbs/hr	Dust Collector	>99.9
8. Cement/Fly Ash Batcher with Central Baghouse							Dust Collector	
9. Cement Silo with Central Baghouse	7,8,9,10,20a.	tons/yr	tons/yr	tons/yr	tons/yr	0.36 tons/yr	Dust Collector	
10,20. Fly Ash Silo with Guppy with Central Baghouse							Dust Collector	
12. Aggregate Storage Piles	12.	lbs/hr	lbs/hr	lbs/hr	lbs/hr	1.41 lbs/hr	None	0.0
	12a.	tons/yr	tons/yr	tons/yr	tons/yr	3.12 tons/yr		
17. Concrete Bath Plant Hot Water Heater	17.	0.14 lbs/hr	0.33 lbs/hr	0.095 lbs/hr	0.062 lbs/hr	0.018 lbs/hr	None	0.0
	17a.	0.62 tons/yr	1.46 tons/yr	0.42 tons/yr	0.27 tons/yr	0.080 tons/yr		
Totals of Controlled Emissions (1 - 17)		0.14 lbs/hr	0.33 lbs/hr	0.095 lbs/hr	0.062 lbs/hr	11.76 lbs/hr		
		0.62 tons/yr	1.46 tons/yr	0.42 tons/yr	0.27 tons/yr	23.98 tons/yr		

1. Basis for Control Equipment % Efficiency (Manufacturers data, Field Observation/Test, AP-42, etc.) Manufacturers data – 7, 8, 9, 10, 20; Field Observation – Unpaved Roads (1) Submit information for each unit as an attachment

2. Explain and give estimated amounts of any Fugitive Emission associated with facility processes

NOTE: **Copy this table if additional space is needed (begin numbering with 16., 17., etc.)**

**TOXIC EMISSIONS

VOLATILE, HAZARDOUS, & VOLATILE HAZARDOUS AIR POLLUTANT EMISSION TABLE

Product Categories (Coatings, Solvents, Thinners, etc.)	Volatile Organic Compound (VOC), Hazardous Air Pollutant (HAP), or Volatile Hazardous Air Pollutant (VHAP) Primary To The Representative As Purchased Product	Chemical Abstract Service Number (CAS) Of VOC, HAP, Or VHAP From Representative As Purchased Product	VOC, HAP, Or VHAP Concentration Of Representative As Purchased Product (pounds/gallon, or %)	1. How were Concentrations Determined (CPDS, MSDS, etc.)	Total Product Purchases For Category	(-)	Quantity Of Product Recovered & Disposed For Category	(=)	Total Product Usage For Category
I. NA					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
II.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
III.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
IV.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
V.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
VI.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
VII.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
VIII.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
IX.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
X.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
TOTAL >>>>>>>					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr

1. Basis for percent (%) determinations (Certified Product Data Sheets, Material Safety Data Sheets, etc.). Submit, as an attachment, information on one (1) product from each Category listed above which best represents the average of all the products purchased in that Category. Copy this Table if additional space is needed (begin numbering with XI., XII., etc.)

**NOTE: A REGISTRATION IS REQUIRED, AT MINIMUM, FOR ANY AMOUNT OF HAP OR VHAP EMISSION.
A PERMIT MAY BE REQUIRED FOR THESE EMISSIONS, DETERMINED ON A CASE-BY-CASE EVALUATION.

Application for Air Pollutant Sources in Bernalillo County
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)

MATERIAL AND FUEL STORAGE TABLE

(Tanks, barrels, silos, stockpiles, etc.) Copy this table if additional space is needed (begin numbering with 6., 7., etc.)

Storage Equipment	Product Stored	Capacity (bbls - tons gal - acres,etc)	Above or Below Ground	Construction (welded, riveted) & Color	Install Date	Loading Rate	Offloading Rate	True Vapor Pressure	Control Equipment	Seal Type	% Eff.
1. Aggregate Pile	Aggregate	1 Acre	Above	NA	TBD	213.8 TONS/HR. 950,000 TONS/YR.	213.8 TONS/HR. 950,000 TONS/YR.	Psia	None	N/A	0.0
2. Sand pile	Washed Sand	0.5 Acre	Above	NA	TBD	123.8 TONS/HR. 550,000 TONS/YR.	123.8 TONS/HR. 550,000 TONS/YR.	Psia	None	N/A	0.0
3. Cement Silo I	Cement	735 bbl	Above	NA	TBD	25 TONS/HR. Max 244,500 TONS/YR.	Max 55.0 TONS/HR. Max 244,500 TONS/YR.	Psia	Dust Collector	N/A	99.9
4. Cement Silo II	Cement	783 bbl	Above	NA	TBD	25 TONS/HR. Max 244,500 TONS/YR.	Max 55.0 TONS/HR. Max 244,500 TONS/YR.	Psia	Dust Collector	N/A	99.9
5. Fly Ash Silo III	Fly Ash	392 bbl	Above	NA	TBD	25 TONS/HR. 66,000 TONS/YR.	14.9 TONS/HR. 66,000 TONS/YR.	Psia	Dust Collector	N/A	99.9
6. Fly Ash Guppy	Fly Ash	1800 cubic feet	Above	NA	April 2007	25 TONS/HR. 66,000 TONS/YR.	14.9 TONS/HR. 66,000 TONS/YR.	Psia	Dust Collector	N/A	99.9
7. Vehicle Fuel Tank	#2 Diesel	10,000 gallons	Above	Welded/yellow	6/2002	HR. YR.	HR. YR.	>15 Psia	N/A	N/A	N/A
8. Off Road Tank	#2 Diesel	2,480 gallons	Above	Welded/yellow	6/2002	HR. YR.	HR. YR.	>15 Psia	N/A	N/A	N/A
9. Propane	Propane	2,200 gallons	Above	Pressurized	11/2006	HR. YR.	HR. YR.	Psia	N/A	N/A	N/A

1. Basis for Loading/Offloading Rate (Manufacturers data, Field Observation/Test, etc.) Submit information for each unit as an attachment
Field Observation – 1, 2

2. Basis for Control Equipment % Efficiency (Manufacturers data, Field Observation/Test, AP-42, etc.) Submit information for each unit as an attachment
Manufacturers data – 3, 4, 5

Application for Air Pollutant Sources in Bernalillo County
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)

STACK AND EMISSION MEASUREMENT TABLE

If any equipment from the Process Equipment Table (Page 2) is also listed in this Stack Table, use the same numbered line for the Process Equipment unit on both Tables to show the association between the Process Equipment and its Stack. Copy this table if additional space is needed (begin numbering with 6., 7., etc.).

Process Equipment	Pollutant (CO,NOx,TSP, Toluene,etc)	Control Equipment	Control Efficiency	Stack Height & Diameter in feet	Stack Temp.	Stack Velocity & Exit Direction	Emission Measurement Equipment Type	Range-Sensitivity-Accuracy-
7, 8, 9, 10, 20 Central Dust Collector	PM	Dust Collector	99.9	Height – 40 feet Diameter – 1.53 feet	Ambient	Velocity – 77.6 ft/sec Direction - Horiz	None	None
17. Concrete Batch Plant Hot Water Heater	PM, CO, NOx, VOC, SO2	None	0.0	Height – 12 feet Diameter – 1.5 feet	90° F	Velocity – 9.4 ft/sec Direction - Vert	None	None
3.								
4.								

1. Basis for Control Equipment % Efficiency (Manufacturers data, Field Observation/Test, AP-42, etc.) Submit information for each unit as an attachment
Manufacturers data – 7, 8, 9, 10, 20

I, the undersigned, a responsible officer of the applicant company, certify that to the best of my knowledge, the information stated on this application, together with associated drawings, specifications, and other data, give a true and complete representation of the existing, modified existing, or planned new stationary source with respect to air pollution sources and control equipment. I also understand that any significant omissions, errors, or misrepresentations in these data will be cause for revocation of part or all of the resulting registration or permit.

Signed this 3rd day of January, 20 20

Miles Shiver
Print Name

General Manager
Print Title

Wm Shiver, III
Signature

Attachment A
Facility Plot Plan

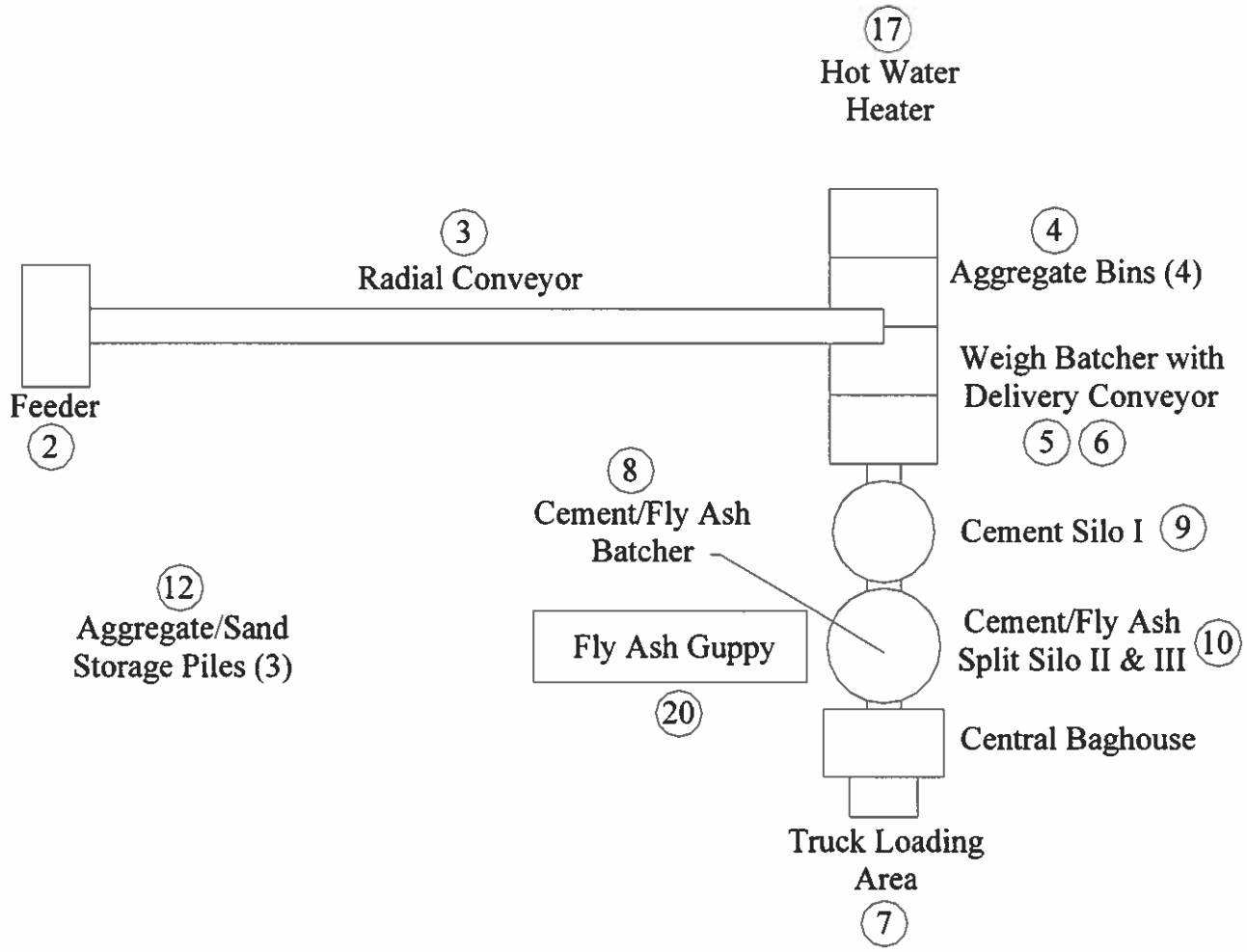


Figure A-1: Duke City's Albuquerque Concrete Plant Process Flow

Figure A-2: Duke City's Albuquerque Concrete Plant Site Location

Attachment B
Emissions Calculations

1.0 Pre-Control Particulate Emission Rates

1.1 Estimates for Pre-Control Material Handling ($PM_{2.5}$, PM_{10} and PM)

Typical composition of one cubic yard of concrete produced at the Albuquerque Concrete Plant will be:

Concrete Design Mix for One Cubic Yard

Materials	Weight Per Cubic Yard (in lbs)	Weights Per 225 Cubic Yards (in ton)
Cement	489	55.0
Fly Ash	132	14.9
Water	260	29.3
Coarse Aggregate(gravel)	1900	213.8
Fine Aggregate (sand)	1100	123.8
Total	3881	436.6

Hourly raw material throughputs used in material handling emission equations are based on the tons per hour throughput.

Aggregate/Sand = 337.6 tons/hour
Cement = 55.0 tons/hour
Fly Ash = 14.9 tons/hour

To estimate material handling pre-control particulate emission rates for aggregate handling operations (loading storage piles, loading feeder, aggregate bin loading), an emission equation was obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, Section 13.2.4 (1/1995), where the k is a constant (PM = 0.74, PM10 = 0.35, PM2.5 = 0.053), wind speed is the Albuquerque 1996 – 2006 wind speed of 8.5 mph, and a moisture content for the aggregate of 1.77% and sand of 4.17% (AP-42 Section 11.12, Table 11.12-2, Footnote b). The normalized moisture content for sand and aggregate is 2.65%. To estimate pre-control particulate emissions rates for aggregate handling transfer points (unloading of the feeder, unloading the aggregate weigh batcher), emission factors were obtained from AP-42 Section 11.19.2, Table 11.19.2-2, "Conveyor Transfer Point". Uncontrolled PM2.5 emission rate is based on the PM2.5/PM10 k factor of 0.053/0.35 found in AP-42 Section 13.2.4 and PM10 emission factor of 0.0110 lbs/ton. To estimate pre-control particulate emission rates for silo/guppy loading, cement/fly

ash batcher loading operations, and concrete truck loading, emission equations were obtained from CON-E-CO manufacture data sheet found in Attachment C. For these sources PM=PM10=PM2.5.

Source	Pounds per Cubic Yards	Cubic Yards per Hour
Cement Silo	0.177	225
Fly Ash Silo/Guppy	0.115	225
Cement/Fly Ash Batcher	0.153	225
Truck Loading	0.281	225

Maximum rated material throughput is 225 cubic yards per hour. Annual uncontrolled emissions in tons per year (tpy) were calculated assuming operation for 8760 hours per year.

EPA's AP-42, Section 13.2-4 (01/95)

Aggregate Handling Emission Equation

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

E_{PM} (lbs/ton) = 0.74 x 0.0032 x $(8.5/5)^{1.3}$ / $(1.77/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(8.5/5)^{1.3}$ / $(1.77/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.053 x 0.0032 x $(8.5/5)^{1.3}$ / $(1.77/2)^{1.4}$

E_{PM} = 0.00560 lbs/ton; E_{PM10} = 0.00265 lbs/ton; $E_{PM2.5}$ = 0.00040 lbs/ton

Sand Handling Emission Equation

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

E_{PM} (lbs/ton) = 0.74 x 0.0032 x $(8.5/5)^{1.3}$ / $(4.17/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(8.5/5)^{1.3}$ / $(4.17/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.053 x 0.0032 x $(8.5/5)^{1.3}$ / $(4.17/2)^{1.4}$

E_{PM} = 0.00169 lbs/ton; E_{PM10} = 0.00080 lbs/ton; $E_{PM2.5}$ = 0.00012 lbs/ton

Aggregate/Sand Handling Emission Equation

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

E_{PM} (lbs/ton) = 0.74 x 0.0032 x $(8.5/5)^{1.3}$ / $(2.65/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(8.5/5)^{1.3}$ / $(2.65/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.053 x 0.0032 x $(8.5/5)^{1.3}$ / $(2.65/2)^{1.4}$

E_{PM} = 0.00318 lbs/ton; E_{PM10} = 0.00151 lbs/ton; $E_{PM2.5}$ = 0.00023 lbs/ton

EPA's AP-42, Section 11.19.2-2 (08/04)

Uncontrolled Conveyor Transfer Emission Factor

E_{PM} = 0.0030 lbs/ton; E_{PM10} = 0.00110 lbs/ton; $E_{PM2.5}$ = 0.000167 lbs/ton

Emission Factors:

Process Unit	PM2.5 Emission Factor (lbs/ton)	PM10 Emission Factor (lbs/ton)	PM Emission Factor (lbs/ton)
Aggregate Material Handling	0.00040	0.00265	0.00560
Sand Material Handling	0.00012	0.00080	0.00169
Aggregate/Sand Material Handling	0.00023	0.00151	0.00318
Aggregate Transfer Points	0.000167	0.00110	0.0030

The following equations were used to calculate the hourly emission rate for each process unit:

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

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

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

Table B-1: Pre-Controlled Material Handling Particulate Emissions (PER)

Process Unit #	Process Unit Description	Process Rate	PM Emission Rate (lbs/hr)	PM Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
2	Aggregate/Sand Feeder Loading	337.5 tph	1.07	4.71	0.51	2.23	0.077	0.34
3	Radial Conveyor	337.5 tph	1.01	4.43	0.37	1.63	0.056	0.25
4	4-Bin Aggregate Feeder	337.5 tph	1.07	4.71	0.51	2.23	0.077	0.34
5,6	Aggregate Batcher and Conveyor	337.5 tph	1.01	4.43	0.37	1.63	0.056	0.25
7	Truck Loading	225 cuyd	63.2	161.5	63.2	162	63.2	161.5
8	Cement/Fly Ash Batcher	225 cuyd	25.9	66.1	25.9	66.1	25.9	66.1
9	Cement Loading	225 cuyd	34.4	88.0	34.4	88.0	34.4	88.0
10,20	Fly Ash Loading	225 cuyd	39.8	101.8	39.8	101.8	39.8	101.8
12	Aggregate Pile Loading	213.8 tph	1.41	6.16	0.66	2.91	0.10	0.44
	Sand Pile Loading	123.8 tph						
		TOTALS	**168.9**	**441.8**	**165.8**	**428.0**	**163.7**	**419.0**

1.2 Haul Truck Travel

Haul truck travel emissions were estimated using AP-42, Section 13.2.2 (ver.11/06) "Unpaved Roads" emission equation. The haul road around the plant will be unpaved but controlled with millings and watering. Haul trucks will be used to deliver cement, fly ash, aggregate material, and transport concrete product.

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

Where k = constant PM = 4.9
PM10 = 1.5
PM2.5 = 0.15
s = % silt content (Table 13.2.2-1, "Sand and Gravel" 4.8%)
W = mean delivery vehicle weight (27.5 tons per truck)
W = mean concrete truck weight (25 tons)
p = number of days with at least 0.01 in of precip. (Figure 13.2.2-1= 60 days)
(used only for annual emission calculations)
a = Constant PM = 0.7
PM10 = 0.9
PM2.5 = 0.9
b = Constant PM = 0.45
PM10 = 0.45
PM2.5 = 0.45
VMT = Aggregate, Cement, Fly Ash Vehicle Miles Traveled
(roundtrip = 0.32299 miles)
VMT = Concrete Vehicle Miles Traveled
(roundtrip = 0.15926 miles)

Cement Trucks = 2.4 trucks/hr
Fly Ash Trucks = 0.6 trucks/hr
Aggregate Trucks = 14.7 trucks/hr
Concrete Trucks = 18.8 trucks/hr

Hourly Emission Factor
Delivery Trucks Lbs/VMT = 6.9925 lbs/hr PM; 1.7821 lbs/hr PM10; 0.17821 lbs/hr PM2.5
Concrete Trucks Lbs/VMT = 6.6990 lbs/hr PM; 1.7073 lbs/hr PM10; 0.17073 lbs/hr PM2.5

Annual Emission Factor
Delivery Trucks Lbs/VMT = 5.8431 lbs/hr PM; 1.4892 lbs/hr PM10; 0.14892 lbs/hr PM2.5
Concrete Trucks Lbs/VMT = 5.5977 lbs/hr PM; 1.4267 lbs/hr PM10; 0.14267 lbs/hr PM2.5

	PM Uncontrolled			
Max. Truck Emissions Road	60.0	lbs/hr	219.6	tons/yr
	PM10 Uncontrolled			
	15.29	lbs/hr	55.97	tons/yr
	PM2.5 Uncontrolled			
	1.53	lbs/hr	5.60	tons/yr

2.0 Estimates for Controlled Material Handling Air Pollutants ($PM_{2.5}$, PM_{10}, and PM) (PTE)

To estimate material handling control particulate emission rates for aggregate handling operations (loading storage piles, loading feed hopper, aggregate bin loading), an emission equation was obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, Section 13.2.4 (1/1995), where the k is a constant (PM = 0.74, PM10 = 0.35, PM2.5 = 0.053), wind speed is the Albuquerque 1996 – 2006 wind speed of 8.5 mph, and a moisture content for the aggregate of 1.77% and sand of 4.17% (AP-42 Section 11.12, Table 11.12-2, Footnote b). The weighted average moisture content for sand and aggregate is 2.65% ((1.77 * 213.75 + 4.17 * 123.75)/337.5). To estimate particulate emissions rates for aggregate handling transfer points (unloading of the feeder, loading the aggregate bin, unloading the aggregate weigh batcher), emission factors were obtained from AP-42 Section 11.19.2, Table 11.19.2-2, "Conveyor Transfer Point Uncontrolled". Additional reductions for annual emissions are found in limiting annual production.

A control efficiency of 90% (Water/Surface Stabilizers) will be used for unpaved truck traffic fugitive dust particulate emissions. Additional reductions for annual emissions are found in limiting annual haul truck traffic.

Maximum rated material throughput is 225 cubic yards per hour. Annual emissions in tons per year (tpy) were calculated assuming operation of 1,000,000 cubic yards per year.

EPA's AP-42, Section 13.2-4 (01/95)

Aggregate Handling Emission Equation

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

E_{PM} (lbs/ton) = 0.74 x 0.0032 x $(8.5/5)^{1.3}$ / $(1.77/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(8.5/5)^{1.3}$ / $(1.77/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.0.053 x 0.0032 x $(8.5/5)^{1.3}$ / $(1.77/2)^{1.4}$

E_{PM} = 0.00560 lbs/ton; E_{PM10} = 0.00265 lbs/ton; $E_{PM2.5}$ = 0.00040 lbs/ton

Sand Handling Emission Equation

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

E_{PM} (lbs/ton) = 0.74 x 0.0032 x $(8.5/5)^{1.3}$ / $(4.17/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(8.5/5)^{1.3}$ / $(4.17/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.0.053 x 0.0032 x $(8.5/5)^{1.3}$ / $(4.17/2)^{1.4}$

E_{PM} = 0.00169 lbs/ton; E_{PM10} = 0.00080 lbs/ton; $E_{PM2.5}$ = 0.00012 lbs/ton

Aggregate/Sand Handling Emission Equation

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

E_{PM} (lbs/ton) = 0.74 x 0.0032 x $(8.5/5)^{1.3}$ / $(2.5/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(8.5/5)^{1.3}$ / $(2.5/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.0.053 x 0.0032 x $(8.5/5)^{1.3}$ / $(2.5/2)^{1.4}$

E_{PM} = 0.00345 lbs/ton; E_{PM10} = 0.00163 lbs/ton; $E_{PM2.5}$ = 0.00025 lbs/ton

EPA's AP-42, Section 11.19.2-2 (08/04)

Uncontrolled Conveyor Transfer Emission Factor

E_{PM} = 0.0030 lbs/ton; E_{PM10} = 0.00110 lbs/ton; $E_{PM2.5}$ = 0.000167 lbs/ton

Controlled Emission Factors:

Process Unit	PM2.5 Emission Factor (lbs/ton)	PM10 Emission Factor (lbs/ton)	PM Emission Factor (lbs/ton)
Aggregate Material Handling	0.00040	0.00265	0.00560
Sand Material Handling	0.00012	0.00080	0.00169
Aggregate/Sand Material Handling	0.00025	0.00163	0.00345
Aggregate Feeder Transfer Point	0.000167	0.000110	0.00300
Aggregate Bin Transfer Point	0.000167	0.000110	0.00300

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

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

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

$$\text{Emission Rate (tons/year)} = \frac{\text{Controlled Emission Factor (lbs/ton)} * \text{Process Rate (tons/year)}}{\text{2000 lbs/ton}}$$

Table B-2: Controlled Material Handling Particulate Emission Rates

Process Unit #	Process Unit Description	Process Rate	PM Emission Rate (lbs/hr)	PM Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
2	Aggregate/Sand Feeder Loading	337.5 tph, 1,724,625 tpy	1.07	2.39	0.51	1.13	0.077	0.17
3	Radial Conveyor	337.5 tph, 1,724,625 tpy	1.01	2.25	0.37	0.83	0.056	0.12
4	4-Bin Aggregate Feeder	337.5 tph, 1,724,625 tpy	1.07	2.39	0.51	1.13	0.077	0.17
5,6	Aggregate Batcher and Conveyor	337.5 tph, 1,724,625 tpy	1.01	2.25	0.37	0.83	0.056	0.12
12	Aggregate Pile Loading	213.8 tph 1,092,263 tpy	1.41	3.12	0.66	1.48	0.10	0.22
	Sand Pile Loading	123.8 tph 632,363 tpy						
		TOTALS	**5.58**	**12.40**	**2.42**	**5.39**	**0.37**	**0.82**

Haul truck travel emissions were estimated using AP-42, Section 13.2.2 (ver.11/06) "Unpaved Roads" emission equation. The haul road around the plant will be unpaved but controlled with millings and watering. Haul trucks will be used to deliver cement, fly ash, aggregate material, and transport concrete product. Unpaved roads will be controlled with surface stabilizers and watering.

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

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

s = % silt content (Table 13.2.2-1, "Sand and Gravel" 4.8%)
W = mean delivery vehicle weight (27.5 tons per truck)
W = mean concrete truck weight (25 tons)

p = number of days with at least 0.01 in of precip. (Figure 13.2.2-1= 60 days)
(used only for annual emission calculations)

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

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

Control Efficiency = 90%

VMT = Aggregate Vehicle Miles Traveled
(roundtrip = 0.32299 miles/vehicle; 3,433.6 miles/yr)
VMT = Cement Vehicle Miles Traveled
(roundtrip = 0.32299 miles/vehicle; 926.9 miles/yr)
VMT = Fly Ash Vehicle Miles Traveled
(roundtrip = 0.32299 miles/vehicle; 21,064.8 miles/yr)
VMT = Concrete Vehicle Miles Traveled
(roundtrip = 0.15926 miles/vehicle; 13,271.8 miles/yr)

Cement Trucks = 2.4 trucks/hr
Fly Ash Trucks = 0.6 trucks/hr
Aggregate Trucks = 14.7 trucks/hr
Concrete Trucks = 18.8 trucks/hr

Hourly Emission Factor
Delivery Trucks Lbs/VMT = 0.69925 lbs/VMT PM; 0.17821 lbs/ VMT PM10; 0.017821 lbs/ VMT PM2.5
Concrete Trucks Lbs/VMT = 0.66990 lbs/ VMT PM; 0.17073 lbs/ VMT PM10; 0.017073 lbs/ VMT PM2.5

Annual Emission Factor
Delivery Trucks Lbs/VMT = 0.58431 lbs/hr PM; 0.14892 lbs/hr PM10; 0.014892 lbs/hr PM2.5
Concrete Trucks Lbs/VMT = 0.55977 lbs/hr PM; 0.14267 lbs/hr PM10; 0.014267 lbs/hr PM2.5

Table B-3: Controlled Vehicle Fugitive Dust Emission Rates

Process Unit Number	Process Unit Description	PM Emission Rate (lbs/hr)	PM Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
1	Cement Trucks	0.54	1.00	0.14	0.26	0.014	0.026
	Fly Ash Trucks	0.15	0.27	0.037	0.069	0.0037	0.0069
	Aggregate Trucks	3.31	6.15	0.84	1.57	0.084	0.16
	Concrete Trucks	2.00	3.71	0.51	0.95	0.051	0.095
	Total	**6.00**	**11.14**	**1.53**	**2.84**	**0.15**	**0.28**

Controlled Emissions from Dust Collector

Particulate emissions are controlled by a dust collector for truck loading, cement/fly ash batcher, cement silo, cement/fly ash split silo, and fly ash guppy. Manufacturer's specifications list a particulate control efficiency of 99.9% from the dust collector exhaust. The following emission rates use the uncontrolled emission rates from these sources in Table B-1 and applies a 99.9% control efficiency.

Table B-4: Controlled Dust Collector Particulate Emissions (PER)

Process Unit #	Process Unit Description	Process Rate	PM Emission Rate (lbs/hr)	PM Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
7	Truck Loading	225 cuyd	0.063	0.14	0.063	0.14	0.063	0.14
9	Cement Loading	225 cuyd	0.040	0.089	0.040	0.089	0.040	0.089
8	Cement/Fly Ash Batcher	225 cuyd	0.034	0.077	0.034	0.077	0.034	0.077
10,20	Fly Ash Loading	225 cuyd	0.026	0.058	0.026	0.058	0.026	0.058
TOTALS FROM BAGHOUSE			0.16	0.36	0.16	0.36	0.16	0.36

3.0 Estimates for Hot Water Boiler (NO_X, CO, SO_2, VOC and PM)

The hot water boiler keeps the water warm during cold periods. The hot water boiler is rated at 3.8 MMBtu/hr. The hot water boiler will burn propane with total sulfur content less than 15 gr/100scf and will never burn coal, wood, or any grade of fuel oil. Emission factors for NO_X, CO, VOC, and PM were obtained from the burner manufacturer for this boiler firing propane. Emission factors for SO_2 were obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, Section 1.5 (10/96), Table 1.5-1. Based on a boiler Btu rating of 3.8 million and a propane heat rating of 91,500 Btu/gal, the approximately amount of propane burned per hour will be 41.5 gal/hr. Uncontrolled annual emissions were based on 8760 hours per year. Controlled annual emissions were based on 8760 hours per year.

Power Flame Incorporated - Manufacturer's Emission Factors:

Pollutant	Emission Factor (lbs/10^6 Btu)
Nitrogen Oxides (75 PPM)	0.088
Carbon Monoxides (50 PPM)	0.037
Particulate	0.0048
Hydrocarbons	0.025

Emission Rate (lbs/hr) = Emission Factor (lbs/10^6 Btu) * Boiler Rating (10^6 Btu/hr)

AP-42 Section 1.5 Table 1.5-1 Emission Factor:

Pollutant	Emission Factor (lbs/10^3 gal)
Sulfur Dioxide	0.10S

S = propane sulfur content in grains per 100 scf = 15 gr/100 scf

Emission Rate (lbs/hr) = Emission Factor (lbs/10^3 scf) * S * Fuel Usage (10^3 gal/hr)

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

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

Table B-5: Pre-Controlled Combustion Emission Rates

Emission Unit Number	Pollutant	Thermal Rating (BTU_{max})	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
17	NO_X	3,800,000	0.33	1.46
	CO	3,800,000	0.14	0.62
	SO_2	3,800,000	0.062	0.27
	VOC	3,800,000	0.10	0.42
	PM	3,800,000	0.018	0.080

Table B-6: Controlled Combustion Emission Rates

Emission Unit Number	Pollutant	Thermal Rating (BTU_{max})	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
17	NO_X	3,800,000	0.33	1.46
	CO	3,800,000	0.14	0.62
	SO_2	3,800,000	0.062	0.27
	VOC	3,800,000	0.10	0.42
	PM	3,800,000	0.018	0.080

Duke City Redi-Mix LLC Albuquerque Concrete Batch Plant Emissions Inventory
225 CuFt/Hr; 1,000,000 CuFt per Year

Road Traffic
AP-42 13.2 Unpaved Road (12/03)
Equation:
E = k(s/12)^a*(W/3)^b*[(365-p)/365]

Annual emissions only include p factor

k TSP	4.9		
k PM10	1.5		
k PM2.5	0.15		
a TSP	0.7		
a PM10	0.9		
a PM2.5	0.9		
b TSP	0.45		
b PM10	0.45		
b PM2.5	0.45		
% Silt Content = s	4.8 %	Sand and Gravel (AP-42 13.2.2-1)	
precipitation days/yr	60 days	AP-42 Figure 13.2.2-1	
Hours per year	8760 hrs		
Vehicle control	90 %	Surface Stabilizers and Watering	

Cement Truck VMT	520	meter/vehicle	0.322992875	RT miles/vehicle
Flyash Truck VMT	520	meter/vehicle	0.322992875	RT miles/vehicle
Aggregate Truck VMT	520	meter/vehicle	0.322992875	RT miles/vehicle
Concrete Truck VMT	256	meter/vehicle	0.159260971	RT miles/vehicle

Max. Cement Truck/hr	2.4	truck/hr	23	tons/load	55.0	tons/hr
Max. Flyash Truck/hr	0.6	truck/hr	23	tons/load	14.9	tons/hr
Max. Aggregate Truck/hr	14.7	truck/hr	23	tons/load	337.5	tons/hr
Max. Concrete Truck/hr	18.8	truck/hr	12	cuyd/load	225.0	cuyd/hr
	36.5	truck/hr				

Max. Cement Truck/yr	10630.4	truck/yr	23	tons/load	244500.0	tons/yr
Max. Flyash Truck/yr	2869.6	truck/yr	23	tons/load	66000.0	tons/yr
Max. Aggregate Truck/yr	65217.4	truck/yr	23	tons/load	1500000.0	tons/yr
Max. Concrete Truck/yr	83333.3	truck/yr	12	cuyd/load	1000000.0	tons/yr
	162050.7	truck/yr				

Cement Truck VMT	0.77255	RT miles/hr	6767.54	miles/yr uncontrolled	3433.55	miles/yr controlled
Flyash Truck VMT	0.20854	RT miles/hr	1826.82	miles/yr uncontrolled	926.85	miles/yr controlled
Aggregate Truck VMT	4.73957	RT miles/hr	41518.63	miles/yr uncontrolled	21064.75	miles/yr controlled
Concrete Truck VMT	2.98614	RT miles/hr	26158.61	miles/yr uncontrolled	13271.75	miles/yr controlled
			76271.60		38696.90	

Cement Truck weight	27.5 tons
Flyash Truck weight	27.5 tons
Aggregate Truck weight	27.5 tons
Concrete Truck weight	25 tons

		TSP Uncontrolled			TSP Control		
Max. Cement Truck Emissions		5.4021	lbs/hr	19.7716 tons/yr	0.5402	lbs/hr	1.0031 tons/yr
Max. Flyash Truck Emissions		1.4582	lbs/hr	5.3371 tons/yr	0.1458	lbs/hr	0.2708 tons/yr
Max. Aggregate Truck Emissions		33.1415	lbs/hr	121.2979 tons/yr	3.3141	lbs/hr	6.1541 tons/yr
Max. Concrete Truck Emissions		20.0040	lbs/hr	73.2147 tons/yr	2.0004	lbs/hr	3.7146 tons/yr
	total combined traffic	60.0058	lbs/hr	219.6212 tons/yr	6.0006	lbs/hr	11.1426 tons/yr

		PM10 Uncontrolled			PM10 Control		
Max. Cement Truck Emissions		1.3768	lbs/hr	5.0390 tons/yr	0.1377	lbs/hr	0.2557 tons/yr
Max. Flyash Truck Emissions		0.3716	lbs/hr	1.3602 tons/yr	0.0372	lbs/hr	0.0690 tons/yr
Max. Aggregate Truck Emissions		8.4465	lbs/hr	30.9144 tons/yr	0.8447	lbs/hr	1.5685 tons/yr
Max. Concrete Truck Emissions		5.0983	lbs/hr	18.6597 tons/yr	0.5098	lbs/hr	0.9467 tons/yr
	total combined traffic	15.2933	lbs/hr	55.9734 tons/yr	1.5293	lbs/hr	2.8398 tons/yr

		PM2.5 Uncontrolled			PM2.5 Control		
Max. Cement Truck Emissions		0.1377	lbs/hr	0.5039 tons/yr	0.0138	lbs/hr	0.0256 tons/yr
Max. Flyash Truck Emissions		0.0372	lbs/hr	0.1360 tons/yr	0.0037	lbs/hr	0.0069 tons/yr
Max. Aggregate Truck Emissions		0.8447	lbs/hr	3.0914 tons/yr	0.0845	lbs/hr	0.1568 tons/yr
Max. Concrete Truck Emissions		0.5098	lbs/hr	1.8660 tons/yr	0.0510	lbs/hr	0.0947 tons/yr
	total combined traffic	1.5293	lbs/hr	5.5973 tons/yr	0.1529	lbs/hr	0.2840 tons/yr

Duke City Redi-Mix LLC Albuquerque Concrete Batch Plant Emissions Inventory
225 CuFt/Hr; 1,000,000 CuFt per Year

Cement/Fly Ash Weigh Batcher

Uncontrolled emissions based on Manufacture Data

E(TSP) =	0.153 lbs/yd	Uncontrolled Batcher Loading TSP
E(PM10) =	0.153 lbs/yd	Uncontrolled Batcher Loading PM10
E(PM2.5) =	0.153 lbs/yd	Uncontrolled Batcher Loading PM2.5

Max Yards Concrete 225 yds/hr 1000000 yds/yr

	lb/hr	tons/yr
E(tsp) uncontrolled batcher load	34.43	76.5
E(pm10) uncontrolled batcher load	34.43	76.5
E(pm2.5) uncontrolled batcher load	34.43	76.5

Controlled based on baghouse exit control efficiency of 99.9%
Control Efficiency 99.9%

	lb/hr	tons/yr
E(tsp) controlled batcher load	0.034	0.077
E(pm10) controlled batcher load	0.034	0.077
E(pm2.5) controlled batcher load	0.034	0.077

Cement Silos

Uncontrolled emissions based on Manufacture Data

E(TSP) =	0.177 lbs/yd	Uncontrolled Cement Silo Loading TSP
E(PM10) =	0.177 lbs/yd	Uncontrolled Cement Silo Loading PM10
E(PM2.5) =	0.177 lbs/yd	Uncontrolled Cement Silo Loading PM2.5

Max Yards Concrete 225 yds/hr 1000000 yds/yr

	lb/hr	tons/yr
E(tsp) uncontrolled cement silo load	39.83	88.5
E(pm10) uncontrolled cement silo load	39.83	88.5
E(pm2.5) uncontrolled cement silo load	39.83	88.5

Controlled based on baghouse exit control efficiency of 99.9%
Control Efficiency 99.9%

	lb/hr	tons/yr
E(tsp) controlled cement silo load	0.040	0.089
E(pm10) controlled cement silo load	0.040	0.089
E(pm2.5) controlled cement silo load	0.040	0.089

Flyash Silo/Guppy

Uncontrolled emissions based on Manufacture Data

E(TSP) =	0.115 lbs/yd	Uncontrolled Flyash Silo Loading TSP
E(PM10) =	0.115 lbs/yd	Uncontrolled Flyash Silo Loading PM10
E(PM2.5) =	0.115 lbs/yd	Uncontrolled Flyash Silo Loading PM2.5

Max Yards Concrete 225 yds/hr 1000000 yds/yr

	lb/hr	tons/yr
E(tsp) uncontrolled flyash silo load	25.88	57.5
E(pm10) uncontrolled flyash silo load	25.88	57.5
E(pm2.5) uncontrolled flyash silo load	25.88	57.5

Controlled based on baghouse exit control efficiency of 99.9%
Control Efficiency 99.9%

	lb/hr	tons/yr
E(tsp) controlled flyash silo load	0.026	0.058
E(pm10) controlled flyash silo load	0.026	0.058
E(pm2.5) controlled flyash silo load	0.026	0.058

Total Central Baghouse

	lb/hr	tons/yr
E(tsp) controlled flyash silo load	0.16	0.36
E(pm10) controlled flyash silo load	0.16	0.36
E(pm2.5) controlled flyash silo load	0.16	0.36

Duke City Redi-Mix LLC Albuquerque Concrete Batch Plant Emissions Inventory
225 CuFt/Hr; 1,000,000 CuFt per Year

Aggregate and Sand Feeder Unloading

AP-42 11.19.2 Table 11.19.2-2 "Conveyor Transfer Point"

Max tph	337.5	tph	4725 ton/day	1500000 ton/yr
E(tsp) Uncontrolled	0.003	lbs/ton		
E(pm10) Uncontrolled	0.0011	lbs/ton		
E(pm2.5) Uncontrolled	0.000167	lbs/ton		

	lb/hr	tons/yr
E(tsp) Uncontrolled	1.01250	4.43475
E(pm10) Uncontrolled	0.37125	1.62608
E(pm10) Uncontrolled	0.05622	0.24623

	lb/hr	tons/yr	
E(tsp) Uncontrolled	1.01250	2.25000	Limit Annual Material Throughput
E(pm10) Uncontrolled	0.37125	0.82500	Limit Annual Material Throughput
E(pm10) Uncontrolled	0.05622	0.12493	Limit Annual Material Throughput

Aggregate Bin Loading

AP-42 13.2.4 $E = k \times (0.0032) \times (U/5)^{1.3} / (M/2)^{1.4}$ lbs/ton

Max tph	337.5	tph	1500000 ton/yr
k(tsp)	0.74		
k(pm10)	0.35		
k(pm2.5)	0.053		
U	8.5	MPH	Albuquerque WS 1996-2006
M	2.65	%	Calculated weighted average aggregate and sand

	lb/hr	tons/yr
E(tsp) Uncontrolled	1.07433	4.70556
E(pm10) Uncontrolled	0.50813	2.22560
E(pm2.5) Uncontrolled	0.07695	0.33702

	lb/hr	tons/yr	
E(tsp) Controlled	1.07433	2.38740	Limit Annual Material Throughput
E(pm10) Controlled	0.50813	1.12917	Limit Annual Material Throughput
E(pm2.5) Controlled	0.07695	0.17099	Limit Annual Material Throughput

Weight Batcher Belt Loading

AP-42 11.19.2 Table 11.19.2-2 "Conveyor Transfer Point"

Max tph	337.5	tph	1500000 ton/yr
E(tsp) Uncontrolled	0.003	lbs/ton	
E(pm10) Uncontrolled	0.0011	lbs/ton	
E(pm2.5) Uncontrolled	0.000167	lbs/ton	

	lb/hr	tons/yr
E(tsp) Uncontrolled	1.01250	4.43475
E(pm10) Uncontrolled	0.37125	1.62608
E(pm10) Uncontrolled	0.05622	0.24623

	lb/hr	tons/yr	
E(tsp) Controlled	1.01250	2.25000	Limit Annual Material Throughput
E(pm10) Controlled	0.37125	0.82500	Limit Annual Material Throughput
E(pm2.5) Controlled	0.05622	0.12493	Limit Annual Material Throughput

Truck Loading

Uncontrolled emissions based on Manufacturer Data

E(TSP) =	0.281	lbs/yd	Uncontrolled Truck Loading TSP
E(PM10) =	0.281	lbs/yd	Uncontrolled Truck Loading PM10
E(PM2.5) =	0.281	lbs/yd	Uncontrolled Truck Loading PM2.5

Max Yards Concrete	225	yds/hr	1000000 yds/yr

	lb/hr	tons/yr
E(tsp) uncontrolled truck load	63.23	140.5
E(pm10) uncontrolled truck load	63.23	140.5
E(pm2.5) uncontrolled truck load	63.23	140.5

Controlled based on baghouse exit control efficiency of 99.9%

Control Efficiency	99.9%

	lb/hr	tons/yr
E(tsp) controlled truck load	0.063	0.14
E(pm10) controlled truck load	0.063	0.14
E(pm2.5) controlled truck load	0.063	0.14

Duke City Redi-Mix LLC Albuquerque Concrete Batch Plant Emissions Inventory
225 CuFt/Hr; 1,000,000 CuFt per Year

Typical cuyd of concrete

	pound/yd	tons/hr	tons/yr		
total concrete	3881	436.6	1,940,500		
aggregate	1900	213.8	950,000		
sand	1100	123.8	550,000	337.5	1,500,000
cement	489	55.0	244,500		
flyash	132	14.9	66,000	69.9	310,500
water	260	29.3	130,000		

plant capacity	225	cuyd/hr	
plant capacity	3150	cuyd/day	
plant capacity	1000000	cuyd/yr	
Daily hours of operation	24	hrs/day	
Hours per year of operation based on annual throughput	4444	hrs/yr	(not a requested permit limit)
Uncontrolled hrs/yr of operation	8760	hrs/yr	

Aggregate Storage Pile Handling

AP-42 13.2.4 E = k x (0.0032) x (U/5)^1.3 / (M/2)^1.4 lbs/ton

Max tph	213.75	tph	950000 ton/yr
k(tsp)	0.74		
k(pm10)	0.35		
k(pm2.5)	0.053		
U	8.5	MPH	Albuquerque WS 1996-2006
M	1.77	%	AP-42 Section 11.12, Table 11.12-2, footnote b

	lb/hr	tons/yr	
E(tsp) Uncontrolled	1.19716	5.24354	
E(pm10) Uncontrolled	0.56622	2.48005	
E(pm2.5) Uncontrolled	0.08574	0.37555	
E(tsp) Controlled	1.19716	2.66035	Limit Annual Material Throughput
E(pm10) Controlled	0.56622	1.25827	Limit Annual Material Throughput
E(pm2.5) Controlled	0.08574	0.19054	Limit Annual Material Throughput

Sand Storage Pile Handling

AP-42 13.2.4 E = k x (0.0032) x (U/5)^1.3 / (M/2)^1.4 lbs/ton

Max tph	123.75	tph	550000 ton/yr
k(tsp)	0.74		
k(pm10)	0.35		
k(pm2.5)	0.053		
U	8.5	MPH	Albuquerque WS 1996-2006
M	4.17	%	AP-42 Section 11.12, Table 11.12-2, footnote b

	lb/hr	tons/yr	
E(tsp) Uncontrolled	0.20882	0.91461	
E(pm10) Uncontrolled	0.09876	0.43259	
E(pm2.5) Uncontrolled	0.01496	0.06551	
E(tsp) Controlled	0.20882	0.46403	Limit Annual Material Throughput
E(pm10) Controlled	0.09876	0.21948	Limit Annual Material Throughput
E(pm2.5) Controlled	0.01496	0.03323	Limit Annual Material Throughput

Aggregate and Sand Feeder Loading

AP-42 13.2.4 E = k x (0.0032) x (U/5)^1.3 / (M/2)^1.4 lbs/ton

Max tph	337.5	tph	1500000 ton/yr
k(tsp)	0.74		
k(pm10)	0.35		
k(pm2.5)	0.053		
U	8.5	MPH	Albuquerque WS 1996-2006
M	2.65	%	Calculated weighted average aggregate and sand

	lb/hr	tons/yr	
E(tsp) Uncontrolled	1.07433	4.70556	
E(pm10) Uncontrolled	0.50813	2.22560	
E(pm2.5) Uncontrolled	0.07695	0.33702	
E(tsp) Uncontrolled	1.07433	2.38740	Limit Annual Material Throughput
E(pm10) Uncontrolled	0.50813	1.12917	Limit Annual Material Throughput
E(pm2.5) Uncontrolled	0.07695	0.17099	Limit Annual Material Throughput

Attachment C
Emissions Calculations Background

PTE Emission Totals

ID #	Source Description	NOx		CO		SO2		VOC		PM		PM10		PM2.5	
		lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
1	Haul Road									60.0	219.6	15.29	56.0	1.53	5.60
2	Feeder									1.07	4.71	0.51	2.23	0.077	0.337
3	Conveyor									1.01	4.43	0.37	1.63	0.056	0.246
4	Aggregate Bin									1.07	4.71	0.51	2.23	0.077	0.34
5,6	Aggregate Weigh Batcher and Conveyor									1.01	4.43	0.37	1.63	0.056	0.25
7	Truck Loading									63.2	161.5	63.2	162	63.2	161.5
8	Cement/Fly Ash Batcher									34.4	88.0	34.4	88.0	34.4	88.0
9	Cement Silo									39.8	101.8	39.8	101.8	39.8	101.8
10,20	Fly Ash Silo with Guppy									25.9	66.1	25.9	66.1	25.9	66.1
12	Storage Piles									1.41	6.16	0.66	2.91	0.10	0.44
17	Concrete Batch Plant Heater	0.33	1.46	0.14	0.62	0.062	0.27	0.095	0.42	0.018	0.080	0.018	0.080	0.018	0.080
	Total	**0.33**	**1.46**	**0.14**	**0.62**	**0.062**	**0.27**	**0.095**	**0.42**	**229**	**661**	**181**	**484**	**165**	**425**

PER Emission Totals

ID #	Source Description	NOx		CO		SO2		VOC		PM		PM10		PM2.5	
		lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
1	Haul Road									6.00	11.14	1.53	2.84	0.15	0.28
2	Feeder									1.07	2.39	0.51	1.13	0.077	0.17
3	Conveyor									1.01	2.25	0.37	0.83	0.056	0.12
4	Aggregate Bin									1.07	2.39	0.51	1.13	0.077	0.17
5,6	Aggregate Weigh Batcher and Conveyor									1.01	2.25	0.37	0.83	0.056	0.12
7,8,9,10,20	Central Dust Collector									0.16	0.36	0.16	0.36	0.16	0.36
12	Storage Piles									1.41	3.12	0.66	1.48	0.10	0.22
17	Concrete Batch Plant Heater	0.33	1.46	0.14	0.62	0.062	0.27	0.095	0.42	0.018	0.080	0.018	0.080	0.018	0.080
	Total	**0.33**	**1.46**	**0.14**	**0.62**	**0.062**	**0.27**	**0.095**	**0.42**	**11.76**	**23.98**	**4.13**	**8.67**	**0.70**	**1.54**

Duke City Redi-Mix, LLC Heater Emissions

Concrete Batch Heater

Manufacturer	NOx, CO, VOC and PM Emissions		
Heater	3.8 MMBTU/hr	Heat Rate	91500 BTU/gal
	41.5 gal/hr	sulfur content (S)	15 gr/100scf

Uncontrolled Hours	8760
Controlled Hours	8760

Emission Factors

NOx	0.0880	lbs/MMBtu
CO	0.0370	lbs/MMBtu
VOC	0.0250	lbs/MMBtu
Sulfur	10S	lbs/1000 scf
PM	0.0048	lbs/MMBtu

Calculated Uncontrolled Emissions

NOx	0.33	lbs/hr	1.46	tons/yr
CO	0.14	lbs/hr	0.62	tons/yr
VOC	0.10	lbs/hr	0.42	tons/yr
SO2	0.062	lbs/hr	0.27	tons/yr
PM	0.018	lbs/hr	0.080	tons/yr

Calculated Controlled Emissions

NOx	0.33	lbs/hr	1.46	tons/yr
CO	0.14	lbs/hr	0.62	tons/yr
VOC	0.10	lbs/hr	0.42	tons/yr
SO2	0.062	lbs/hr	0.27	tons/yr
PM	0.018	lbs/hr	0.080	tons/yr

Duke City Redi-Mix, LLC Albuquerque Concrete Batch Plant Emissions Inventory
225 CuFt/Hr; 1,000,000 CuFt per Year
Emission Totals

Uncontrolled Emission Totals

ID #	Source Description	NOx		CO		SO2		VOC		PM		PM10		PM2.5	
		lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
1	Haul Road									60.0	219.6	15.29	55.97	1.53	5.60
2	Feeder									1.07	4.71	0.51	2.23	0.077	0.337
3	Conveyor									1.01	4.43	0.37	1.63	0.056	0.246
4	Aggregate Bin									1.07	4.71	0.51	2.23	0.077	0.34
5,6	Aggregate Weigh Batcher and Conveyor									1.01	4.43	0.37	1.63	0.056	0.25
7	Truck Loading									63.2	140.5	63.2	141	63.2	140.5
8	Cement/Fly Ash Batcher									34.4	76.5	34.4	76.5	34.4	76.5
9	Cement Silo									39.8	88.5	39.8	88.5	39.8	88.5
10,20	Fly Ash Silo with Guppy									25.9	57.5	25.9	57.5	25.9	57.5
12	Storage Piles									1.41	6.16	0.66	2.91	0.10	0.44
17	Concrete Batch Plant Heater	0.33	1.46	0.14	0.62	0.062	0.27	0.095	0.42	0.018	0.080	0.018	0.080	0.018	0.080
	Total	**0.33**	**1.46**	**0.14**	**0.62**	**0.062**	**0.27**	**0.095**	**0.42**	**229**	**607**	**181**	**430**	**165**	**370**

Controlled Emission Totals

ID #	Source Description	NOx		CO		SO2		VOC		PM		PM10		PM2.5	
		lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
1	Haul Road									6.00	11.14	1.53	2.84	0.15	0.28
2	Feeder									1.07	2.39	0.51	1.13	0.077	0.17
3	Conveyor									1.01	2.25	0.37	0.83	0.056	0.12
4	Aggregate Bin									1.07	2.39	0.51	1.13	0.077	0.17
5,6	Aggregate Weigh Batcher and Conveyor									1.01	2.25	0.37	0.83	0.06	0.12
7,8,9,10,13,20	Central Dust Collector									0.16	0.36	0.16	0.36	0.16	0.36
12	Storage Piles									1.41	3.12	0.66	1.48	0.10	0.22
17	Concrete Batch Plant Heater	0.33	1.46	0.14	0.62	0.062	0.27	0.095	0.42	0.018	0.080	0.018	0.080	0.018	0.080
	Total	**0.33**	**1.46**	**0.14**	**0.62**	**0.062**	**0.27**	**0.095**	**0.42**	**11.76**	**23.98**	**4.13**	**8.67**	**0.70**	**1.54**

11.12 Concrete Batching

11.12.1 Process Description [1-5]

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

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

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

11.12.2 Emissions and Controls [6-8]

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

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

Source (SCC)	Uncontrolled				Controlled			
	Total PM	Emission Factor Rating	Total PM_{10}	Emission Factor Rating	Total PM	Emission Factor Rating	Total PM_{10}	Emission Factor Rating
Aggregate transfer [b] (3-05-011-04,-21,23)	0.0069	D	0.0033	D	ND		ND	
Sand transfer [b] (3-05-011-05,22,24)	0.0021	D	0.00099	D	ND		ND	
Cement unloading to elevated storage silo (pneumatic)[c] (3-05-011-07)	0.73	E	0.47	E	0.00099	D	0.00034	D
Cement supplement unloading to elevated storage silo (pneumatic)[d] (3-05-011-17)	3.14	E	1.10	E	0.0089	D	0.0049	E
Weigh hopper loading [e] (3-05-011-08)	0.0048	D	0.0028	D	ND		ND	
Mixer loading (central mix)[f] (3-05-011-09)	0.572 or Eqn. 11.12-1	B	0.156 or Eqn. 11.12-1	B	0.0184 or Eqn. 11.12-1	B	0.0055 or Eqn. 11.12-1	B
Truck loading (truck mix)[g] (3-05-011-10)	1.118	B	0.310	B	0.098 or Eqn. 11.12-1	B	0.0263 or Eqn. 11.12-1	B
Vehicle traffic (paved roads)	See AP-42 Section 13.2.1, Paved Roads							
Vehicle traffic (unpaved roads)	See AP-42 Section 13.2.2, Unpaved Roads							
Wind erosion from aggregate and sand storage piles	See AP-42 Section 13.2.5, Industrial Wind Erosion							

ND = No data

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

[b] Reference 9 and 10. Emission factors are based upon an equation from AP-42, section 13.2.4 Aggregate Handling And Storage Piles, equation 1 with k_{PM-10} =.35, k_{PM} = .74, U = 10mph, $M_{aggregate}$ =1.77%, and M_{sand} = 4.17%. These moisture contents of the materials ($M_{aggregate}$ and M_{sand}) are the averages of the values obtained from Reference 9 and Reference 10.

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

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

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

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

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

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

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

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

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

Table 11.12-3. Equation Parameters for Truck Mix Operations

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

Table 11.12-4. Equation Parameters for Central Mix Operations

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

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

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

Particulate emission factors per yard of concrete for an average batch formulation at a typical facility are given in Tables 11.12-5 and 11.12-6. For truck mix loading and central mix loading, the

13.2.2 Unpaved Roads

13.2.2.1 General

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

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

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

13.2.2.2 Emissions Calculation And Correction Parameters[1-6]

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

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

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

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

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

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

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

[a]References 1,5-15.

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

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

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

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

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

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

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

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

1 lb/VMT = 281.9 g/VKT

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

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

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

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

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

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

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

[a] See discussion in text.

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

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

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.

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

NEW MEXICO

AVERAGE WIND SPEED - MPH

STATION	ID	Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
ALAMOGORDO AIRPORT ASOS	KALM	1996-2006	5.1	6.3	7.1	7.9	7.1	6.9	6.1	5.3	5.2	5.2	5.0	5.0	6.0
ALAMOGORDO-HOLLOMAN AFB	KHMN	1996-2006	8.5	9.7	10.6	11.8	10.8	10.6	9.8	9.1	8.8	8.5	8.1	8.3	9.6
ALBUQUERQUE AP ASOS	KABQ	1996-2006	7.0	8.2	9.3	11.1	10.0	10.0	8.7	8.3	8.0	7.9	7.2	6.9	8.5
ALBUQUERQUE-DBLE EAGLE	KAEG	1999-2006	7.1	7.9	9.0	10.6	9.5	8.6	7.0	6.2	7.0	6.5	6.5	6.1	7.7
ARTESIA AIRPORT ASOS	KATS	1997-2006	7.8	9.1	10.1	10.9	10.2	9.9	7.8	6.9	7.6	7.8	7.6	7.4	8.5
CARLSBAD AIRPORT ASOS	KCNM	1996-2006	9.2	9.8	10.9	11.4	10.4	9.9	8.5	7.7	8.2	8.5	8.4	8.8	9.3
CLAYTON MUNI AP ASOS	KCAO	1996-2006	11.9	12.7	13.4	14.6	13.4	13.0	11.7	10.8	11.8	12.1	12.1	12.0	12.4
CLINES CORNERS	KCQC	1998-2006	16.2	16.1	15.7	16.9	14.6	13.5	10.6	10.1	11.8	13.3	15.0	16.0	14.1
CLOVIS AIRPORT AWOS	KCVN	1996-2006	12.3	12.3	13.4	13.8	12.4	11.9	9.7	8.9	9.7	10.9	11.6	12.2	11.6
CLOVIS-CANNON AFB	KCVS	1996-2006	12.5	12.6	13.6	13.8	12.2	12.5	10.7	10.0	10.2	11.3	11.7	12.4	12.0
DEMING AIRPORT ASOS	KDMN	1996-2006	8.7	9.7	10.9	12.0	10.6	10.1	8.9	8.1	8.4	8.2	8.5	8.1	9.3
FARMINGTON AIRPORT ASOS	KFMN	1996-2006	7.3	8.3	9.0	9.8	9.4	9.4	8.7	8.2	8.0	7.8	7.6	7.3	8.4
GALLUP AIRPORT ASOS	KGUP	1996-2006	5.7	6.9	7.8	10.0	9.0	8.8	6.9	6.0	6.5	6.1	5.6	5.3	7.0
GRANTS-MILAN AP ASOS	KGNT	1997-2006	7.8	8.8	9.6	10.9	10.0	9.8	8.1	7.2	7.9	8.4	8.0	7.6	8.7
HOBBS AIRPORT AWOS	KHOB	1996-2006	11.3	11.9	12.6	13.4	12.5	12.3	11.0	10.0	10.2	10.6	10.7	11.1	11.4
LAS CRUCES AIRPORT AWOS	KLRU	2000-2006	6.4	7.5	8.8	10.1	8.7	8.2	6.8	6.0	6.2	6.1	6.4	6.0	7.3
LAS VEGAS AIRPORT ASOS	KLVS	1996-2006	10.9	12.2	12.5	14.3	12.4	11.8	10.0	9.2	10.9	10.8	11.0	10.9	11.4
LOS ALAMOS AP AWOS	KLAM	2005-2006	3.9	5.7	7.5	8.1	7.1	7.3	5.3	4.8	5.7	5.1	4.4	3.2	5.4
RATON AIRPORT ASOS	KRTN	1998-2006	8.9	9.4	10.4	12.2	10.8	10.2	8.4	8.1	8.6	9.0	8.6	8.5	9.4
ROSWELL AIRPORT ASOS	KROW	1996-2006	7.4	8.9	9.9	11.1	10.3	10.2	8.8	7.9	8.3	8.0	7.5	7.3	8.8
RUIDOSO AIRPORT AWOS	KSRR	1996-2006	8.8	9.6	10.0	11.6	10.0	8.4	5.9	5.3	6.4	7.4	7.9	8.7	8.3
SANTA FE AIRPORT ASOS	KSAF	1996-2006	8.9	9.5	9.9	11.2	10.6	10.5	9.2	8.8	8.8	9.1	8.7	8.5	9.5
SILVER CITY AP AWOS	KSVC	1999-2006	8.1	8.7	9.9	10.8	10.2	9.9	8.5	7.2	6.9	7.6	7.9	7.7	8.5
TAOS AIRPORT AWOS	KSKX	1996-2006	5.8	6.5	7.7	9.1	8.6	8.5	7.1	6.6	6.7	6.6	6.0	5.7	7.0
TRUTH OR CONSEQ AP ASOS	KTCS	1996-2006	7.4	8.7	9.9	11.1	10.4	9.8	8.1	7.4	7.7	8.0	7.7	7.3	8.6
TUCUMCARI AIRPORT ASOS	KTCC	1999-2006	10.0	11.2	11.9	13.6	11.9	11.6	9.9	9.3	10.0	10.0	10.4	10.2	10.8

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.

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[t]	E	0.0012[t]	E	0.000070[q]	E
Screening (SCC 3-05-020-02, 03)	0.025[c]	E	0.0087[l]	C	ND	
Screening (controlled) (SCC 3-05-020-02, 03)	0.0022[d]	E	0.00074[m]	C	0.000050[q]	E
Fines Screening (SCC 3-05-020-21)	0.30[g]	E	0.072[g]	E	ND	
Fines Screening (controlled) (SCC 3-05-020-21)	0.0036[g]	E	0.0022[g]	E	ND	
Conveyor Transfer Point (SCC 3-05-020-06)	0.0030[h]	E	0.00110[h]	D	ND	
Conveyor Transfer Point (controlled) (SCC 3-05-020-06)	0.00014[t]	E	4.6×10^{-5}[n]	D	1.3×10^{-5}[q]	E
Wet Drilling - Unfragmented Stone (SCC 3-05-020-10)	ND		8.0×10^{-5}[j]	E	ND	
Truck Unloading -Fragmented Stone (SCC 3-05-020-31)	ND		1.6×10^{-5}[j]	E	ND	
Truck Unloading - Conveyor, crushed stone (SCC 3-05-020-32)	ND		0.00010[k]	E	ND	

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

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

c. References 1, 3, 7, and 8

d. References 3, 7, and 8

e. Reference 4

f. References 4 and 15

g. Reference 4

h. References 5 and 6

i. References 5, 6, and 15

j. Reference 11

k. Reference 12

l. References 1, 3, 7, and 8

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

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

o. References 2, 3, 7, 8

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

q. Reference 15

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

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

CON-E-CO.

An Oshkosh Corporation Company

SPECIFICATIONS FOR MODEL PJ-1400D DUST COLLECTION SYSTEM

MODEL CON-E-CO-PJ-1400D	
NUMBER OF BAGS	96
NOMINAL BAG DIAMETER	6"
NOMINAL BAG LENGTH	120"
TOTAL FILTRATION AREA	1427 SQ. FT.
MIN. DESIGN EFFICIENCY OF DUST COLLECTOR	99.9%
AIR TO CLOTH RATIO	6.0 ACFM / SQ. FT.
FILTRATION VELOCITY	6.0 FT. / MIN
BLOWER HP	20 HP
STATIC PRESSURE DROP	6" (INCHES OF WATER)
AIR CAPACITY	8,560 C.F.M.
DISCHARGE AREA	1.84 SQ. FT.
DISCHARGE VELOCITY	77.5 FT. / SEC.
DIRECTION OF AIR DISCHARGE	HORIZONTAL
DISCHARGE SHAPE	13 ¼"x 20" RECTANGLE
OUTLET MOISTURE CONTENT	IDEALLY ZERO
CLEANING MECHANISM	PULSE JET
FREQUENCY OF CLEANING	VARIABLE
NORMAL OPERATING TEMP & PRESSURE	AMBIENT

BAG SPECIFICATIONS	
BAG DIAMETER	5.93"
BAG LENGTH	121"
CONSTRUCTION	SEAMED
FIBER	POLYESTER FELT
FINISH	SINGED
WEIGHT	16 OZ / SQ. YD.
PERMEABILITY (.5" WATER)	20-30 CFM
FIBER SIZE	2.5 DENIER AVERAGE

TYPICAL MIXER SHROUD SPECIFICATION	
SHROUD SIZE	6'-0" - 8'-0"
CURTAIN LENGTH	8'-0"
CAPTURE VELOCITY (with mixer truck in loading position)	182 FT/MIN
DUCT SIZE	(2) - 14" DIA
DUCT VELOCITY	3740 FT/MIN

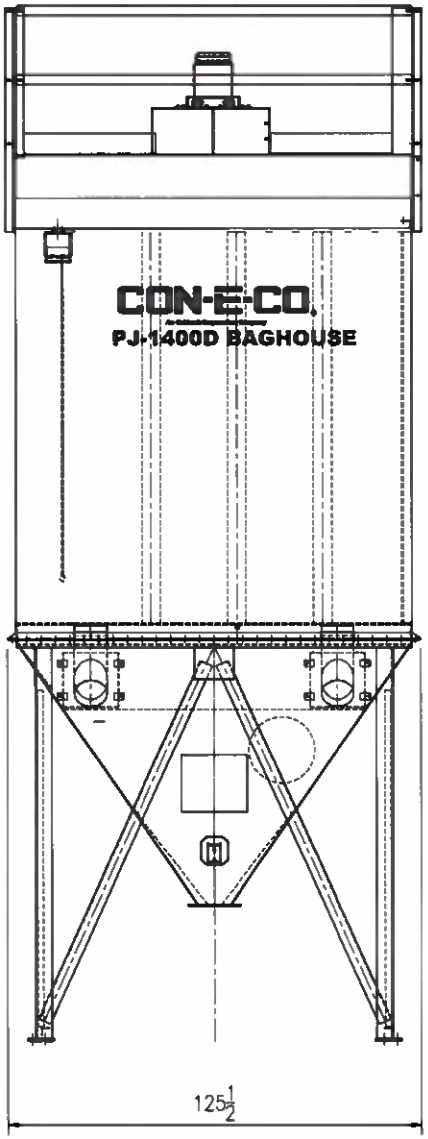
INTO BAGS

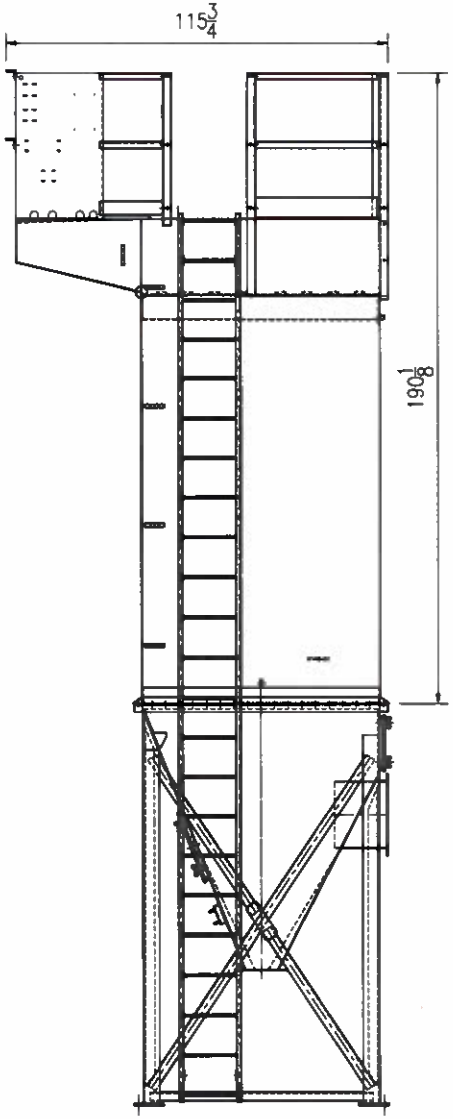
	INTO BAGS
CEMENT SILO	
LB / HR	.177 LB/YD^3 * ___YD^3/HR
GR / FT^3	.014 GR HR/LB FT^3 * ___LB/HR
FLYASH SILO	
LB / HR	.115 LB/YD^3 * ___YD^3/HR
GR / FT^3	.014 GR HR/LB FT^3 * ___LB/HR
CENTRAL MIX	
LB / HR	.153 LB/YD^3 * ___YD^3/HR
GR / FT^3	.014 GR HR/LB FT^3 * ___LB/HR
TRUCK MIX	
LB / HR	.281 LB/YD^3 * ___YD^3/HR
GR / FT^3	.014 GR HR/LB FT^3 * ___LB/HR

OUT OF BAGS

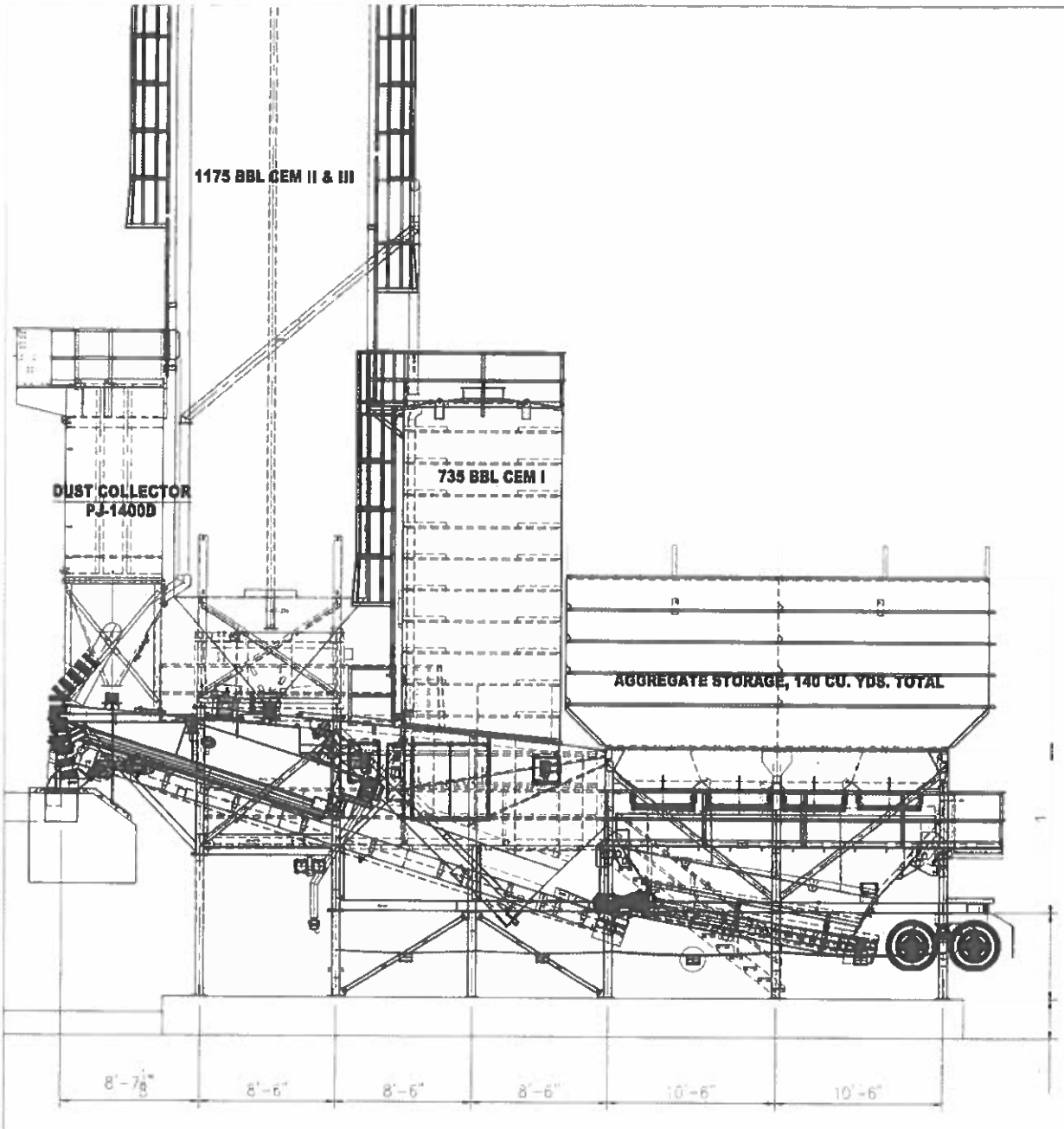
FOR ALL OUT OF BAGS VALUES, MULTIPLY THE INTO BAGS VALUES BY .001.

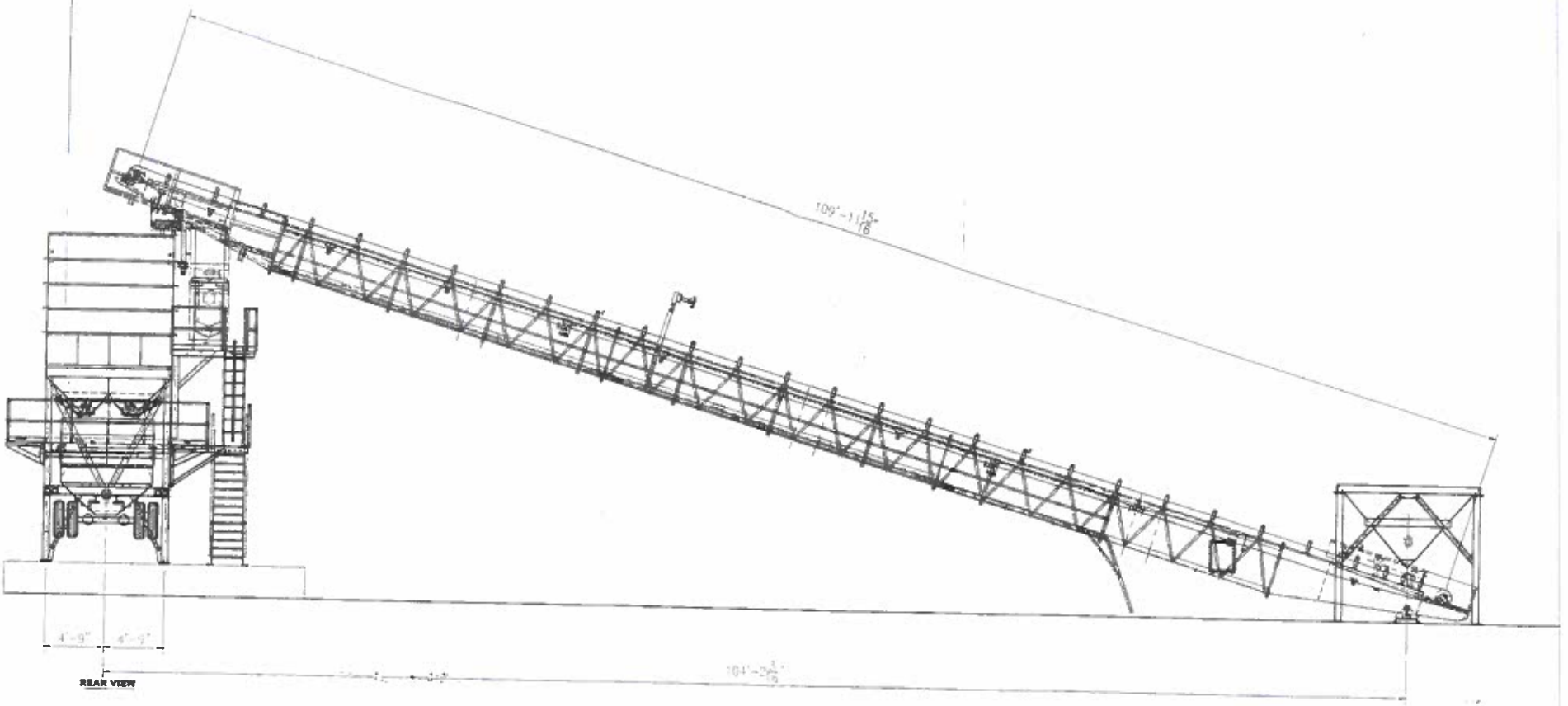
SOLID PRODUCTS. SOLID PERFORMANCE.
237 N. 13TH ST - PO Box 430 - Blair, NE 68008
Phone: 800-656-2651 Fax: 402-426-4181 Service/Parts Fax: (402)-533-9292
E-MAIL: parts@con-e-co.com WEBSITE: www.con-e-co.com





				E		SCALE 1/2"=1'-0"	TITLE PJ-1400D	JOB NO.	ITEM CODE	COPY
				D		DATE 5/2/2011	CUSTOMER CON-E-CO			PART NO.
				C		DRAWN	CHECKED	LOCATION BLAIR, NE.	CON-E-CO An Oshkosh Corporation Company	
				B		VERIFY	CHECKED			DRAWING
				A					SIZE C	REV
HEAT ANAL.	HEAT NO.	DATE	APPR.	NO.	REVISION					


1175 BBL CEM II & III
735 BBL CEM I
DUST COLLECTOR
PJ-1400D
AGGREGATE STORAGE, 140 CU. YDS. TOTAL
8'-7 1/8"
8'-6"
8'-6"
8'-6"
10'-6"
10'-6"



NEXT ASSY.	PRIDE	DATE	APPR.	NO.	REVISION
				E	
				D	
				C	
				B	
				A	

SCALE: 1/8"=1'-0"
DATE: 3/4/19
DRAWN: DLH
CHECKED:
WEIGHT:
CHECKED:

TITLE: **LO-PRO 12HP (LP12HP) PLANT ASSEMBLY**
CUSTOMER: **DUKE CITY REDI-MIX**
LOCATION:

JOB NO.
ITEM CODE
COP

CON-E-CO
An Oshkosh Corporation Company

concrete equipment company
237 N 13th St. Blair, NE 68008
phone: 402-426-4181
website.con-e-co.com

PAR

SIZE: D | REV.: A | OBS.:
DWG.
P8

Attachment D
USGS Topographic Maps

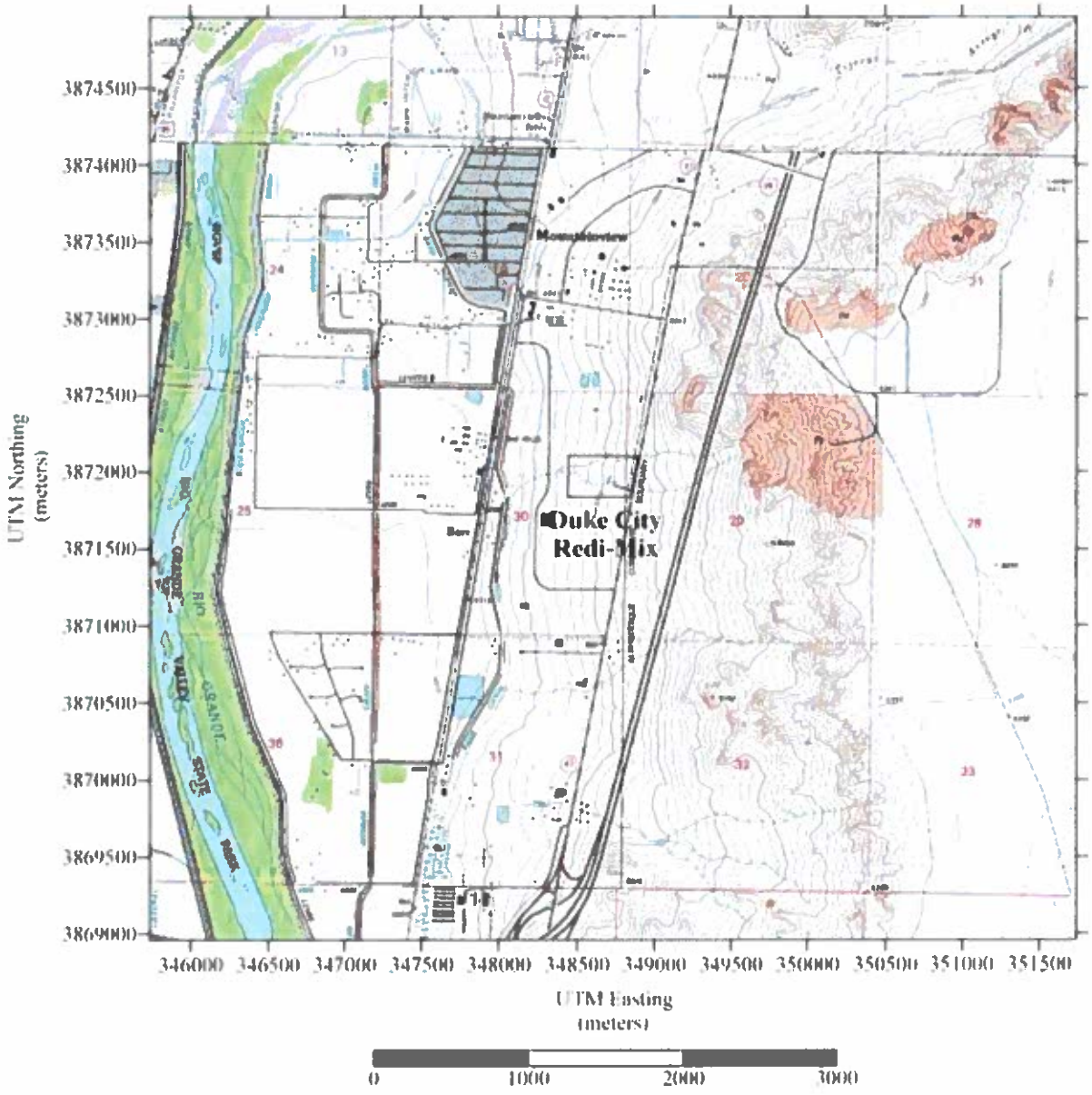


Figure D-1: 7 ½ Minute Topo Map Showing Site Location
Albuquerque East 7 ½ Minute Quadrant
NAD 83

Attachment E
Facility Process Description

Process Flow Description

The proposed replacement Duke City's Albuquerque Concrete Plant is a Model Lo-Pro 12HP portable plant manufactured by CON-E-CO and includes; aggregate/sand storage piles, an aggregate/sand feeder and radial conveyor, 4-bin aggregate bin, weight batcher with delivery conveyor, cement silo, cement/fly ash split silo, 12 yard truck loading, cement/fly ash batcher, central baghouse, fly ash guppy, existing 3.8 MMBtu/hr hot water, and concrete additive.

Raw aggregate rock and washed sand will be delivered and stored on site. A front-end loader will take material from the storage piles (Unit 12) and load the aggregate feeder (Unit 2). From the aggregate feeder the material will be transferred by radial conveyor (Unit 3) to a 4-bin aggregate bin (Unit 4). When needed, measured quantities of sand and aggregate will be dropped into the weight batcher (Unit 5). The measured materials will be transferred to the 12-yard truck loading (Unit 7) by a delivery conveyor (Unit 6), where the aggregate material is combined with cement, fly ash, additives, and water.

Fugitive dust will be controlled by several methods. Dust created during aggregate handling will be kept to a minimum by adding water to the aggregate piles, as needed. The central baghouse will control fugitive dust emissions from truck loading (Unit 7), loading the cement silo (Unit 9), loading the fly ash silo/guppy (Unit 10 and 20), and loading the cement and fly ash batcher (Unit 8). Surface stabilizers and watering (90% control) will be used to minimize fugitive dust on the unpaved truck traffic areas (Unit 1) leading in and out of the facility. Process flow diagram is presented as Figure A-1 in Attachment A.

Attachment G
Dispersion Modeling Summary

Federal Regulations

40 CFR 50 – National Ambient Air Quality Standards: Applicable to Duke City

Requirement: Compliance with federal ambient air quality standards.

Compliance: Duke City's Concrete Batch Plant demonstrated compliance by performing and submitting dispersion modeling analysis for applicable pollutants per Albuquerque/ Bernalillo County and New Mexico State Environmental Department's modeling guidelines in the original and revised permit applications. For this revision the department has waived modeling analysis due to the size of the additional units' emissions.

40 CFR 60 Dc – NSPS Standards of Performance for Small Industrial-Commercial-Institutional Stream Generating Units: Not Applicable to Duke City

Requirement: For any affected facility to which this subpart applies is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 100 million Btu per hour of less, but greater than or equal to 10 million Btu per hour. A steam generating unit is defined as a device that combusts any fuel and produces steam or heats water or any other heat transfer medium.

Compliance: The hot water boiler is rated at 3.8 million BTU per hour, which is below the limits of this subpart making this boiler not applicable for Subpart Dc.

20.11.67 NMAC–Equipment, Emissions, Limitations: Not Applicable to Duke City

Requirement: To prevent equipment covered by this Part from being constructed, placed, maintained, altered, used, or operated unless the equipment meets the applicable emission limitations established by 20.11.67 NMAC.

Compliance: No stationary source for Orchard Heaters; Kraft Mills; Coal, Oil, or Gas Burning Equipment is located on site.

20.11.90 NMAC– Administration, Enforcement, Inspection: Applicable to Duke City

Requirement: General requirement on record keeping and data submission. Duke City will notify the bureau regarding periods of excess emissions along with cause of the excess and actions taken to minimize duration and recurrence.

Compliance: It is expected that specific record keeping and data submission requirements will be specified in the 20.11.41 NMAC permit issued to Duke City. It is expected the 20.11.41 NMAC permit issued to Duke City will contain specific methods for determining compliance with each specific emission limitation. Duke City's Airport Concrete Plant will report any periods of excess emissions as required by specific 20.11.90 NMAC provisions.

20.11.41 NMAC– Authority to Construct: Applicable to Duke City

Requirement: Requires the facility to obtain a permit prior to start of construction.

Compliance: Duke City Redi-Mix, LLC. is applying for a modified 20.11.41 NMAC permit with this application.

20.11.49 NMAC– Excess Emissions: Applicable to Duke City

Requirement: To implement requirements for the reporting of excess emissions and establish affirmative defense provisions for facility owners and operators for excess emissions.

Compliance: Duke City will report all excess emissions following 20.11.49 NMAC guidelines.

20.11.63 NMAC– New Source Performance Standards: Not Applicable to Duke City

Requirement: Adoption of all federal 40 CFR Part 60 new source performance standards.

Compliance: No 40 CFR Part 60 NSPS have been identified for this permit application.

20.11.64 NMAC– Emission Standards for Hazardous Air Pollutants for Stationary Sources: Not Applicable to Duke City

Requirement: Adoption of all federal 40 CFR Part 61 and 63 National Emissions Standards for Hazardous Air Pollutants (HAPS).

Compliance: No 40 CFR Part 63 NSPS have been identified for this permit application.

20.11.66 NMAC– Process Equipment: Applicable to Duke City

Requirement: The objective of this Part is to achieve attainment of regulatory air pollution standards and to minimize air pollution emissions.

Compliance: Except as otherwise provided in this section, Duke City shall not cause or allow the emission of particulate matter to the atmosphere from process equipment in any one hour in total quantities in excess of the amount shown in 20.11.66.18 NMAC Table 1.

The following is a list of city and federal regulations that may or may not be applicable to Duke City

Albuquerque/Bernalillo County Regulations

20.11.1 NMAC– General Provisions: Applicable to Duke City

Requirement: Compliance with ambient air quality standards.

Compliance: Compliance with 20.11.8 NMAC is compliance with this regulation.

20.11.2 NMAC– Permit Fees: Applicable to Duke City

Requirement: A one-time permit application fee will be assessed by the Albuquerque/Bernalillo County Environmental Department.

Compliance: Duke City will pay all required permit revision application fees applicable to their facility.

20.11.5 NMAC– Visible Air Contaminants: Applicable to Duke City

Requirement: Places limits of 20 percent opacity on stationary combustion equipment.

Compliance: Duke City will perform any required opacity observations for the concrete plant hot water heater using Method 9 and/or Method 22 with certified opacity observers.

20.11.8 NMAC– Ambient Air Quality Standards: Applicable to Duke City

Requirement: Compliance with state and federal ambient air quality standards.

Compliance: Duke City's Albuquerque Concrete Plant demonstrated compliance by performing and submitting dispersion modeling analysis for applicable pollutants per Albuquerque/ Bernalillo County and New Mexico State Environmental Department's modeling guidelines.

Attachment F
Regulatory Applicability Determinations


7711
PROPOSED AIR QUALITY CONSTRUCTION PERMIT

THIS DOCUMENT HAS AN ARTIFICIAL WATERMARK IN PAPER. SEE BACK SIDE FOR OTHER SECURITY FEATURES

DUKE CITY REDI-MIX, LLC
P.O. BOX 250
MORIARTY, NM 87035
(505) 877-5777

WELLS FARGO NEW MEXICO, N.A.
P.O. BOX 370 MORIARTY, N.M. 87035

95-219
1070

038408

DATE 01/02/2020

AMOUNT 2469.00

PAY Two thousand four hundred sixty-nine and 00/100 dollars

TO THE ORDER OF
CITY OF ALBUQUERQUE - AIR QUAL
PO BOX 1313
ALBUQUERQUE NM 87103-1313

AUTHORIZED SIGNATURE

"038408" "107002192" 347101209O"

DUKE CITY REDI-MIX, LLC 038408

CITY OF ALBUQUERQUE - AIR QUAL
PO BOX 1313
ALBUQUERQUE NM 87103-1313

DUKE CITY REDI-MIX, LLC 038408

Invoice Date	Invoice #	Gross Amt	Discount	Paid Amount
01/02/20	PERMIT AP 2020	2469.00	.00	2469.00

DISPERSION MODEL REPORT FOR DUKE CITY REDI-MIX, LLC AIR QUALITY PERMIT 1638-M2 MODIFICATION APPLICATION

Albuquerque, New Mexico

PREPARED FOR
DUKE CITY REDI-MIX, LLC

January 3, 2020

Prepared by

Montrose Air Quality Services, LLC.

MONTROSE
AIR QUALITY SERVICES

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1.0 INTRODUCTION

This dispersion modeling analysis will be conducted by Montrose Air Quality Services, LLC. (Montrose) on behalf of Duke City Redi-Mix, LLC (Duke City), to evaluate ambient air quality impacts for a replacement concrete batch plant (CBP). Duke City is applying for a 20.11.41 NMAC Permit Modification for existing Permit 1638-M2. The plant is identified as Duke City's Albuquerque Concrete Plant and is located at 7711 Broadway SE in Albuquerque, NM. The UTM coordinates of the proposed CBP will be; 352,580 easting, 3,877,490 northing, zone 13, NAD 83. The objective of this evaluation is to determine whether ambient air concentrations from the maximum operation of the proposed project for nitrogen dioxide, carbon monoxide, sulfur dioxide, and particulate matter; both 10 microns or less (PM_{10}) and 2.5 microns or less ($PM_{2.5}$); are below Class II federal and state ambient air quality standards (NAAQS and NMAAQS) found in 40 CFR part 50 and the City of Albuquerque/Bernalillo County (COABC) air quality regulation 20.11.8 NMAC.

The permit revision consists of a new concrete batch plant (CBP) to replace the existing CBP. The location of the new CBP will move northwest of the existing CBP approximately 200 feet. Along with moving the CBP, all storage piles and haul roads will be reoriented. After construction and startup of the new CBP, the existing CBP will be removed. The list below presents the requested equipment change for this permit revision.

Permit ID #	Source Description	Permitting Action
1	Haul Road	Modification (Reorient)
2	Feeder	Modification (Replace)
3	Radial Conveyor	Modification (Replace)
4	Aggregate Bin (3)	Modification (Replace)
5,6	Aggregate Weigh Batcher and Conveyor	Modification (Replace)
7	Truck Loadout	Modification (Replace)
8	Cement and Fly Ash Batcher	Modification (Replace)
9	Cement Silo Loading	Modification (Replace)
10	Fly Ash Silo Loading	Modification (Replace)
11	Fly Ash Silo Screw Conveyor	Remove
20	Fly Ash Guppy	No Change
12	Storage Piles	Modification (Reorient)
13	Central Baghouse	Modification (Replace)
17	Hot Water Heater	No Change
18	Wind Erosion	Remove
19	Cement Guppy	Remove

The dispersion modeling will be conducted using the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee Dispersion Model (AERMOD), Version 19191. This model is recommended by EPA for determining Class II impacts within 50 km of the source being assessed. Additionally, AERMOD was developed to handle complex terrain. In this analysis, AERMOD will be used to estimate pollutant ambient air concentrations from the Duke City CBP emission sources. Montrose employs the general modeling procedures outlined in "Permit Modeling Guidelines, Albuquerque Environmental Health Department", revised 12/20/2018, "New Mexico Air Pollution Control Bureau, Dispersion Modeling Guidelines", revised 01/01/2019, and the most up to date EPA's *Guideline on Air Quality Models.*

Aggregate material handling equipment, stockpiles, and haul roads will be input into the model as volume sources. Sources with stack releases will be input into the model as point sources.

Presently co-located at the site is a recycle crusher that operates under Southway Construction's Permit 3104. Duke City Redi-Mix is no longer receiving recycle material at this site. While there is recyclable material at the site, this material will all be processed by Southway Construction prior to initial operation of the new concrete batch plant. Southway Construction will submit to the Air Quality Program a letter stating the equipment, operating under Permit 3104, will no longer process material at this site after June 30, 2020. The processed recycle material that remains stored on site will be removed, as needed, by haul trucks at an estimated rate of 4 trucks per hour (100 tph) during daylight hours. This activity, along with loading haul trucks with recycle material, will be included in the cumulative impact dispersion modeling analysis.

Additional activities that occur at the Duke City Redi-Mix site is truck traffic delivery and sale of decorative rocks. Based on discussion with Duke City Redi-Mix staff, this activity does not exceed one 25-ton load delivery truck an hour and one 25-ton load customer truck an hour. It also included emissions from one truck unloading and one truck loading an hour at 25 tons per load. All these activities occur during daylight hours and will be included in the cumulative dispersion modeling.

Additional nitrogen dioxide neighboring sources that have been identified by the COABC AQP Program to be included in the cumulative impact dispersion model analysis are: Albuquerque Products Terminal, Permit #0422-M2-9TR; Black Rock Services, Permit #1694-M3; Albuquerque Asphalt's HMA, Permit #3291-M1; Onate Feed, Permit #1563-M1; NM Terminal Services, Permit #3340; and NM Aggregates, Permit #1435-M1

Figure 1 below shows the location of the site overview.

Figure 1: Duke City Redi-Mix's Albuquerque Concrete Plant Site Overview

2.0 DISPERSION MODELING PROTOCOL

This section identifies the technical approach and dispersion model inputs that will be used for the Class II federal and State ambient air quality standards for this source. COABC Air Quality Program (AQP) requires that all applicable criteria pollutant emissions be modeled using the most recent versions of US EPA's approved models and be compared with National Ambient Air Quality Standards (NAAQS), and Bernalillo County Ambient Air Quality Standards. Table 1 shows the NAAQS and Bernalillo County Ambient Air Quality Standards that the source's ambient impacts must meet in order to demonstrate compliance. Table 1 also lists the Class II Significant Impact Levels (SILs) which are used to assess whether a source has a significant impact at downwind receptors.

The dispersion modeling analysis will be performed to estimate concentrations resulting from the operation of the Duke City sources using the proposed maximum permitted emission while all emission sources are operating. The modeling will determine the maximum off-site concentrations for nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter; both 10 microns or less (PM_{10}) and 2.5 microns or less ($PM_{2.5}$), for comparison with modeling significance levels, national/Bernalillo County ambient air quality standards (AAQS). The modeling will follow the guidance and protocols outlined in the "Permit Modeling Guidelines, Albuquerque Environmental Health Department", revised 10/10/2019, "New Mexico Air Pollution Control Bureau, Dispersion Modeling Guidelines", revised 01/01/2019, and the most up to date EPA's *Guideline on Air Quality Models*.

Initial modeling will be performed with Duke City sources only to determine pollutant and averaging periods that exceeds pollutant SILs. If initial modeling for any pollutant and averaging period exceeds SILs, then cumulative modeling will be performed for those pollutants and averaging periods for all receptors that exceeds the SILs and will include co-located and significant neighboring sources along with background ambient concentrations.

TABLE 1: National and New Mexico Ambient Air Quality Standard Summary

Pollutant	Avg. Period	Sig. Lev. ($\mu g/m^3$)	Class I Sig. Lev. ($\mu g/m^3$)	NAAQS	NMAAQS	PSD Increment Class I	PSD Increment Class II
CO	8-hour	500		9,000 ppb[1]	8,700 ppb[2]		
	1-hour	2,000		35,000 ppb[1]	13,100 ppb[2]		
NO_2	annual	1.0	0.1	53 ppb[3]	50 ppb[2]	2.5 $\mu g/m^3$	25 $\mu g/m^3$
	24-hour	5.0			100 ppb[2]		
	1-hour	7.52		100 ppb[4]			
$PM_{2.5}$	annual	0.2	0.05	12 $\mu g/m^3$[5]		1 $\mu g/m^3$	4 $\mu g/m^3$
	24-hour	1.2	0.27	35 $\mu g/m^3$[6]		2 $\mu g/m^3$	9 $\mu g/m^3$
PM_{10}	annual	1.0	0.2			4 $\mu g/m^3$	17 $\mu g/m^3$
	24-hour	5.0	0.3	150 $\mu g/m^3$[7]		8 $\mu g/m^3$	30 $\mu g/m^3$
SO_2	annual	1.0	0.1		20 ppb[2]	2 $\mu g/m^3$	20 $\mu g/m^3$
	24-hour	5.0	0.2		100 ppb[2]	5 $\mu g/m^3$	91 $\mu g/m^3$
	3-hour	25.0	1.0	500 ppb[1]		25 $\mu g/m^3$	512 $\mu g/m^3$
	1-hour	7.8		75 ppb[8]			

Standards converted from ppb to $\mu g/m^3$ use a reference temperature of 25° C and a reference pressure of 760 millimeters of mercury.

(1) Not to be exceeded more than once each year.
(2) Not to be exceeded.
(3) Annual mean.
(4) 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
(5) Annual mean, averaged over 3 years.
(6) 98th percentile, averaged over 3 years.
(7) Not to be exceeded more than once per year on average over 3 years.
(8) 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.

2.1 DISPERSION MODEL SELECTION

The dispersion modeling will be conducted using the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee Dispersion Model (AERMOD), Version 19191. This model is recommended by EPA for determining Class II impacts within 50 km of the source being assessed. Additionally, AERMOD was developed to handle complex terrain. In this analysis, AERMOD will be used to estimate pollutant ambient air concentrations of NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$ from Duke City emission sources.

AERMOD is a Gaussian plume dispersion model that is based on planetary boundary layer principles for characterizing atmospheric stability. The model evaluates the non-Gaussian vertical behavior of plumes during convective conditions with the probability density function and the superposition of several Gaussian plumes. AERMOD modeling system has three components: AERMAP, AERMET, and AERMOD. AERMAP is the terrain preprocessor program. AERMET is the meteorological data preprocessor. AERMOD includes the dispersion modeling algorithms and was developed to handle simple and complex terrain issues using improved algorithms. AERMOD uses the dividing streamline concept to address plume interactions with elevated terrain.

AERMOD was run using all the regulatory default options including use of:

- Gradual Plume Rise
- Stack-tip Downwash
- Buoyancy-induced Dispersion
- Calms and Missing Data Processing Routine
- Upper-bound downwash concentrations for super-squat buildings
- Default wind speed profile exponents
- Calculate Vertical Potential Temperature Gradient
- No use of gradual plume rise
- Rural Dispersion

2.2 BUILDING WAKE EFFECTS

Duke City structures, hot water heater building and office, will be included in the model to determine building downwash source parameters using the BPIP-Prime program. The results of the BPIP-Prime output will be inputted into the AERMOD model.

2.3 METEOROLOGICAL DATA

Dispersion model meteorological input file to be used in this modeling analysis are years 2001 - 2005 Albuquerque met data (AERMET version 19191 dated 09/08/2019) available from the COABC AQP.

2.4 RECEPTORS AND TOPOGRAPHY

Modeling will be completed using as many receptor locations to ensure that the maximum estimated impacts are identified. Initial radius of impact modeling will be performed with receptors within 3 kilometers of the model boundary. Because of the nature of the emissions from the site, it is expected the maximum concentrations will be on or near the site fenceline.

The refined receptor grid will include receptors located at 50 meters apart out to 500 meters from the property line, 100 meters apart from 500 meters out to 1000 meters, and 250 meters apart from 1000 meters out to 3000 meters. Fenceline receptor spacing will be 25 meters.

All refined model receptors will be preprocessed using the AERMAP software associated with AERMOD. The AERMAP software establishes a base elevation and a height scale for each receptor location. The height scale is a measure of the receptor's location and base elevation and its relation to the terrain feature that has the greatest influence in dispersion for that receptor. AERMAP will be run using U.S. Geological Survey (USGS) national elevation data (NED) data. Output from AERMAP will be used as input to the AERMOD runstream file for each model run.

2.5 MODELED EMISSION SOURCES INPUTS

The proposed permitted operating time for the facilities concrete production is 24 hours per day, 7 days per week at 225 cubic yards per hour. The permitted operating time for the facilities concrete production is 24 hours per day as seen in Table 2. Within those hours the plant will limit daily throughput to 3,150 cubic yards per day or an equivalent to operate at maximum hourly throughput of 225 cubic yards per hour for 14 hours. For the Duke City combustion emission source, this will be modeled for all proposed operating hours found in Table 2. For particulate modeling, the 14-hour blocks vary starting from 12 AM, then shifting on 2-hour intervals for 12 separate model runs as summarized on Table 3. Using the results of the significant impact particulate modeling, CIA modeling will include Duke City Redi-Mix CBP sources, activities involved with truck traffic delivery and sale of decorative rocks, and truck removal of Duke City Redi-Mix stored recycled material removal by haul truck.

TABLE 2: CBP Daily Hours of Operation (MST) (Hot Water Heater Model Hours)

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

TABLE 3: Albuquerque Concrete Plant Particulate Model Scenario Time Segments

Model Scenario	January - December Time Segments 14-Hour Blocks
1	12 AM to 2 PM
2	2 AM to 4 PM
3	4 AM to 6 PM
4	6 AM to 8 PM
5	8 AM to 10 PM
6	10 AM to 12 AM
7	12 PM to 2 AM
8	2 PM to 4 AM
9	4 PM to 6 AM
10	6 PM to 8 AM
11	8 PM to 10 AM
12	10 PM to 12 PM

2.5.1 Duke City Facility Road Vehicle Traffic Model Inputs

The access road fugitive dust for truck traffic from the CBP, decorative rack sales, and haul truck removal of recycled material will be modeled as a line of volume sources. The NMED AQB's approved procedure for Modeling Haul Roads will be followed to develop modeling input parameters for haul roads. Volume source characterization followed the steps described in the NMED Air Quality Bureau's Guidelines.

2.5.2 Duke City Facility Material Handling Volume Source Model Inputs

Particulate emissions from material handling and process from aggregate unloading, transfers and storage will be modeled as volume sources. Model input parameters for the feeder, aggregate bins, and transfer points follow the NMED Air Quality Bureau's model guidelines Table 27 and site release heights. CBP storage piles (SP1, SP2, SP3), and decorative rock (DRL) model inputs were based on a pile length of 50 feet for CBP storage piles or 32 feet for decorative rock storage piles (SYINIT), dust plume height of 16 feet (SZINIT), and release height of 8 feet.

2.5.3 Duke City Facility Point Source Model Inputs

Emissions from the central dust collector exhaust stack and combustion source will be modeled as point sources. Model input parameters are based on information provided by the manufacturer on release heights, release diameters, release velocity or flow rates, and exhaust temperatures. For horizontal or raincap releases, the AERMOD version for horizontal and raincap releases will be used with actual release parameters.

Tables 4 through 6 summarize the model input for the Duke City Plant.

TABLE 4: Summary of Particulate Model Inputs for Point Sources at the Duke City CBP

Source Description	Model ID	Stack Height (m)	Stack Temp. (K)	Exit Vel. (m/s)	Stack Dia. (m)	PM10 Emission Rate (lbs/hr)	PM2.5 Emission Rate (lbs/hr)
Concrete Plant Central Baghouse (Unit 7,8,9,10,20)	TMBH	12.1920	0.0000	19.0062	0.5029	0.16335	0.16335
Concrete Batch Plant Heater (Unit 17)	CBPH	3.6576	305.3700	2.8651	0.4572	0.01824	0.01824

TABLE 5: Summary of Combustion Model Inputs for Point Sources at the Duke City CBP

Source Description	Model ID	Stack Height (m)	Stack Temp. (K)	Exit Vel. (m/s)	Stack Dia. (m)	NOx Emission Rate (lbs/hr)	CO Emission Rate (lbs/hr)	SO2 Emission Rate (lbs/hr)
Concrete Batch Plant Heater (Unit 17)	CBPH	3.6576	305.3700	2.8651	0.4572	0.33440	0.14060	0.06230

TABLE 6: Summary of Model Inputs for Volume Sources at the Duke City CBP

Source Description	Model ID	Release Height (meter)	Horizontal Dimension (meters)	Vertical Dimension (meters)	PM10 Emission Rate (lbs/hr)	PM2.5 Emission Rate (lbs/hr)
Feed Hopper Loading (Unit 2)	FH	6.0000	1.1600	2.3300	0.50813	0.07695
Feed Hopper Unloading to Conveyor (Unit 3)	TP	2.0000	0.4700	0.9300	0.37125	0.05622
Aggregate Bin Loading (Unit 4)	AB	4.0000	1.1600	2.3300	0.50813	0.07695
Aggregate Weigh Batcher and Conveyor (Unit 5,6)	WH	2.0000	1.1600	2.3300	0.37125	0.05622
Storage Piles (Aggregate) (Unit 12)	SP1	2.4384	3.5500	2.2683	0.22166	0.03357
Storage Piles (Aggregate) (Unit 12)	SP2	2.4384	3.5500	2.2683	0.22166	0.03357

Source Description	Model ID	Release Height (meter)	Horizontal Dimension (meters)	Vertical Dimension (meters)	PM10 Emission Rate (lbs/hr)	PM2.5 Emission Rate (lbs/hr)
Storage Piles (Sand) (Unit 12)	SP3	2.4384	3.5500	2.2683	0.22166	0.03357
Cement, Fly Ash, and Aggregate Truck Route Volume 1-37 (each)	AGG_0001-37	3.4000	6.0500	3.1600	0.02755	0.00276
Concrete Truck Route Volume 1-37 (each)	CON_0001-37	3.4000	6.0500	3.1600	0.01378	0.00138

Table 7 summarizes the model input for the additional activities. Recycle haul trucks will remove stored recycle material at a rate of 100 tons per hour (tph) (4 trucks/hr), which includes loading of the haul trucks. Decorative rock sales include one delivery truck per hour and one customer truck per hour (25 tons/hr), along with unloading and loading of decorative rock. Material handling particulate emission rates were calculated using the most recent approved emission factors found in AP-42 Section 13.2.4. Truck travel on unpaved roads, with a control efficiency of 60%, were calculated using the most recent approved emission factors found in AP-42 Section 13.2.2.

TABLE 7: Summary of Model Inputs for Volume Sources for Additional Activities at Duke City Redi-Mix

Source Description	Model ID	Release Height (meter)	Horizontal Dimension (meters)	Vertical Dimension (meters)	PM10 Emission Rate (lbs/hr)	PM2.5 Emission Rate (lbs/hr)
Recycle Material Truck Loading	RMTL	6.0000	1.1600	2.3300	0.22326	0.03381
Recycle Material Unpaved Haul Road Volume 1 – 59 (each)	RMH_0001-59	3.40	6.05	3.16	0.02405	0.00240
Decorative Rock Bin Loading	DRL	2.4384	2.1265	2.2683	0.05581	0.00845
Decorative Rock Truck Loading	DRTL	6.0000	1.1600	2.3300	0.05581	0.00845
Decorative Rock Truck Route Volume 1 – 36 (each)	DEC_0001-36	3.40	6.05	3.16	0.01251	0.00125

2.6 $PM_{2.5}$ SECONDARY EMISSIONS MODELING

The form of the $PM_{2.5}$ 24-hour design value is based on the 98th percentile or the highest 8th high result. Calculated $PM_{2.5}$ combustion emission rates included into the model consist of both filterable and condensable components. Secondary $PM_{2.5}$ emissions from combustion sources are created by the conversion to nitrates and sulfates as the exhaust plume travels away from the source and mixes with ambient air. Fugitive dust emission sources do not consist of a condensable component and will not create secondary emissions of $PM_{2.5}$.

$PM_{2.5}$ secondary emission concentration analysis will follow EPA guidelines. Based on requested permitted emission rates, the Tier 1 analysis was used since direct $PM_{2.5}$ emissions are less than 10 tpy, and NOx and SO_2 emissions are less than 40 tpy. The comparison with the $PM_{2.5}$ 24-hour NAAQS with model results will be based on the 98th percentile or highest 8th high.

2.7 NO_2 MODELING – MULTI-TIERED SCREENING APPROACH

The AERMOD model predicts ground-level concentrations of any generic pollutant without chemical transformations. Thus, the modeled NO_X emission rate will give ground-level modeled concentrations of NO_X. NAAQS values are presented as NO_2.

EPA has a three-tier approach to modeling NO_2 concentrations.

- Tier I – total conversion, or all NOx = NO_2
- Tier II –Ambient Ratio Method 2 (ARM2)
- Tier III – case-by-case detailed screening methods, such as OLM and Plume Volume Molar Ratio Method (PVMRM) and NO_2/NO_X in-stack ratio

Initial modeling will be performed using both Tier I and Tier II methodologies. If these modeling iterations demonstrate that less conservative methods for determining 1-hour, 24-hour, and annual NO_2 compliance would be needed for this project, then ambient impact of 1-hour, 24-hour, and annual NOx predicted by the model will use Tier III – OLM or PVMRM.

For PVMRM, three inputs can be selected in the model, the ISR, the NO_2/NO_X equilibrium ratio for the ambient air, and the ambient ozone concentration. The ISR will be determined for each source or group of sources. The NO_2/NO_X equilibrium ratio will be the EPA default of 0.90. Ozone input will be from monitored ozone data collected from city monitoring station.

It is evident from modeling experience that at distances close to a modeled source, the modeled NO_2/NO_X ratio (and, thus, the NO_2 concentration) is highly dependent upon the assumed in-stack ratio. The use of the default ratio of 0.5 can result in large over predictions at a facility fence line.

Proposed NO_2/NOx ratio are listed below.

Source Description	NO_2/NOx Ratio
Duke City Hot Water Heater	0.5 (EPA Default)
Neighbor Sources - Not a Diesel-Fired Engine	0.5 (EPA Default)
Neighbor Sources - Diesel-Fired Engines	0.15 (EPA ISR Database)

For NO_X, NAAQS and NMAAQS applicable averaging periods include 1-hour, 24-hour and annual averages.

Model Ozone Data

For PVMRM, modeling of the project-generated 1-hour NO_2 concentrations requires use of ambient monitored O_3 concentrations. Background ambient O_3 concentrations for the project area during the 2001-2005 meteorological data years have been obtained from the Del Norte (Years 2001 - 2002)[1] monitoring station and South Valley (Years 2003 – 2005) monitoring station, which is the monitoring site nearest to the project.

Concerning data substitution for missing hourly O_3 ambient monitoring data, the hourly O_3 data are used within the AERMOD air dispersion model when operated using the PVMRM option that simulates the atmospheric chemistry of O_3 reacting with initially emitted nitric oxide (NO) to form NO_2. If there is only a limited amount of O_3 in the plume, then the reaction is limited, forming less NO_2 than occurs with the simplifying assumption of complete conversion. The model disperses the initial NO_X emissions, which are mostly NO, during each of the 8,760 hours in a 365-day year. If the hourly ambient O_3 data from the nearest monitoring station have missing data, the missing O_3 hours are given substituted concentrations with the following procedure to better simulate the resulting NO_2 concentrations:

- If two or fewer consecutive hours of O_3 ambient concentrations are missing, the missing concentrations will be based on the highest previous or subsequent hour concentrations.
- If three or more consecutive hours of O_3 ambient concentrations are missing, then substitution for each missing concentration will be based on the highest 1 hour for same hour in the day over that month. Example: for data missing in January for the first hour of the day will be substituted for the highest value for all first hour of the day in January, etc.

[1] Ozone monitoring did not begin at the South Valley monitoring station until July 2002. Del Norte monitoring station data is substituted for years 2001 - 2002 into the background ozone data input into the dispersion model.

2.8 AMBIENT MODELING BACKGROUND

Ambient background concentrations will be added to the dispersion modeling results and compared to the NAAQS and NMAAQS. Background concentrations were obtained from the COABC AQP Modeling Section with the exception of the 1-hour NO_2 background methodology discussed below.

CO 1-hr:	2366 micrograms per cubic meter
CO 8-hr:	1450 micrograms per cubic meter
NO_2 24 Hour:	30 micrograms per cubic meter
NO_2 Annual:	30 micrograms per cubic meter
SO_2 1-hr:	13.1 micrograms per cubic meter
SO_2 24-hr:	0 micrograms per cubic meter
SO_2 Annual:	0 micrograms per cubic meter
PM_{10} 24-hr:	35 micrograms per cubic meter
$PM_{2.5}$ 24-hr:	20.0 micrograms per cubic meter
$PM_{2.5}$ annual:	7.8 micrograms per cubic meter

NO_2 1-hour Background data

NO_2 1-hour background data will be based on the Tier 2 procedure found in EPA guidance documents[2] for determining background concentrations.

> *"Based on this guidance, we believe that an appropriate methodology for incorporating background concentrations in the cumulative impact assessment for the 1-hour NO_2 standard would be to use multiyear averages of the 98th-percentile of the available background concentrations by season and hour-of-day, excluding periods when the source in question is expected to impact the monitored concentration (which is only relevant for modified sources). For situations involving a significant mobile source component to the background monitored concentrations, inclusion of a day-of-week component to the temporal variability may also be appropriate. The rank associated with the 98th-percentile of daily maximum 1-hour values should be generally consistent with the number of "samples" within that distribution for each combination based on the temporal resolution but also account for the number of samples "ignored" in specifying the 98th-percentile based on the annual distribution. For example, Table 1 in Section 5 of Appendix S specifies the rank associated with the 98th-percentile value based on the annual number of days with valid data. Since the number of days per season will range from 90 to 92, Table 1 would indicate that the 2nd-highest value from the seasonal distribution should be used to represent the 98th-percentile. On the other hand, use of the 2nd-highest value for each season would effectively "ignore" only 4 values for the year rather than the 7 values "ignored" from the annual distribution. Balancing these considerations, we recommend that background values by season and hour-of-day used in this context should be based on the 3rd-highest value for each season and hour-of-day combination, whereas the 8th-highest value should be used if values vary by hour-of-day only. For more detailed temporal pairing, such as season by hour-of- day and day-of-week or month by hour-of-*

[2] Memo: "Additional Clarification Regarding Application of Appendix W Modeling Guidance for 1-hour NO2 National Ambient Air Quality Standard" Tyler Fox, Leader, Air Quality Modeling Group, C439-01, dated March 1, 2011.

day, the 1st-highest values from the distribution for each temporal combination should be used."

The NO_2 background data was provided by the COAAQP Modeling Section and is presented below in Table 8.

TABLE 8: Monitored Seasonal NO_2 Background – 3rd Highest Hourly µg/m³

Hour	Winter	Spring	Summer	Fall
1	72.1	47.6	29.3	65.6
2	67.8	48.3	27.7	59.7
3	67.7	46	26.4	57.9
4	68.4	48.9	26.6	58.9
5	69.1	51.7	32.7	58
6	69.7	63.9	39.3	57.8
7	72.8	70.7	46.4	63.5
8	77.6	71.8	48.5	64.5
9	80	61.1	34.2	65.9
10	71.4	48	27.3	55
11	62	28.6	24.3	47.3
12	48.1	18.9	19.9	35.4
13	36.9	17.6	17	28.2
14	35.1	15.7	15.9	25.3
15	33.6	14.8	17.4	24.2
16	37.2	15.3	19.4	28
17	48.4	17.1	20.4	38
18	73	19.4	19.3	69.6
19	79.3	38.5	21.7	79.1
20	78.1	53.2	30.9	77.1
21	77.3	48	34.1	73.4
22	76.5	56.3	30.8	70.4
23	75	58.8	34.9	69.7
24	72.4	57.9	33.6	70.9

3.0 MODEL SUMMARY

This section summarizes the model results for Class II federal ambient air quality standards for this facility, following the technical approach approved in Section 2 of this report. Model results show for each modeled criteria pollutant and applicable averaging periods for nitrogen dioxide, carbon monoxide, sulfur dioxide, and particulate matter; both 10 microns or less (PM_{10}) and 2.5 microns or less ($PM_{2.5}$), the modified Duke City CBP does not contribute to an exceedance of Class II federal and state ambient air quality standards (NAAQS and NMAAQS) and the City of Albuquerque/Bernalillo County (COABC) air quality regulation 20.11.8 NMAC. The modeling followed the guidance and protocols outlined in the model protocol found in Section 2 of this report; the "Permit Modeling Guidelines, Albuquerque Environmental Health Department", revised 12/20/2018; "New Mexico Air Pollution Control Bureau, Dispersion Modeling Guidelines", revised 01/01/2019; and the most up to date EPA's *Guideline on Air Quality Models.*

The proposed permitted operating time for the facilities concrete production is 24 hours per day, 7 days per week at 225 cubic yards per hour, but within those hours the plant will limit daily throughput to 3,150 cubic yards per day or an equivalent to operate at maximum hourly throughput of 225 cubic yards per hour for 14 hours. The permitted operating time for the facilities concrete production and hot water heater is 24 hours per day as seen in Table 9. For the Duke City hot water heater, this will be modeled for all proposed operating hours found in Table 9. For particulate modeling, the 14-hour blocks scenarios vary starting from 12 AM, then shifting on 2-hour intervals for 12 separate model runs as summarized in Table 10. Using the results of the significant impact particulate modeling, CIA particulate modeling includes Duke City Redi-Mix CBP sources, activities involved with truck traffic delivery and sale of decorative rocks, and truck removal of Duke City Redi-Mix stored recycled material by haul truck.

Additional nitrogen dioxide neighboring sources that have been identified by the COABC AQP Program included in the cumulative impact dispersion model analysis are: Albuquerque Products Terminal, Permit #0422-M2-9TR; Black Rock Services, Permit #1694-M3; Albuquerque Asphalt's HMA, Permit #3291-M1; Onate Feed, Permit #1563-M1; NM Terminal Services, Permit #3340; and NM Aggregates, Permit #1435-M1.

TABLE 9: CBP Daily Hours of Operation (MST) (Hot Water Heater Model Hours)

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

TABLE 10: Albuquerque Concrete Plant Particulate Model Scenario Time Segments

Model Scenario	January - December Time Segments 14-Hour Blocks
1	12 AM to 2 PM
2	2 AM to 4 PM
3	4 AM to 6 PM
4	6 AM to 8 PM
5	8 AM to 10 PM
6	10 AM to 12 AM
7	12 PM to 2 AM
8	2 PM to 4 AM
9	4 PM to 6 AM
10	6 PM to 8 AM
11	8 PM to 10 AM
12	10 PM to 12 PM

3.1 SIGNIFICANT IMPACT LEVEL (SILs) MODELING ANALYSIS

Significant impact level AERMOD dispersion modeling was completed for NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$. All SIL models were run in terrain mode with Duke City CBP emission sources only. Table 11 lists the results of the modeling for pollutants and averaging periods that falls below the applicable SILs.

TABLE 11: Summary of Air Dispersion Modeling Results below SILs

Parameter	Maximum Modeled Concentration ($\mu g/m^3$)	Significant Impact Level ($\mu g/m^3$)	% of SIL
CO 1 Hr.	22.2	2000	1.1
CO 8 Hr.	9.8	500	2.0
SO_2 3 Hr.	6.2	25.0	24.8
SO_2 24 Hr.	2.5	5.0	50.0
SO_2 Annual	0.40	1.0	40.0

For CO 1-hour and 8-hour averaging periods and SO_2 3-hour, 24-hour and annual averaging periods the model results show impacts below the SILs. No cumulative impact analysis modeling was performed for CO 1-hour and 8-hour averaging periods and SO_2 3-hour, 24-hour and annual averaging periods.

3.2 CUMULATIVE IMPACT ANALYSIS (CIA) MODEL RESULTS

The model results using the maximum operation at Duke City CBP, significant neighboring sources, and approved ambient background are summarized below in Table 12. Dispersion modeling analysis followed the modeling protocol outline in Section 2 of this report.

TABLE 12: Summary of CIA Modeling Results Including Background

Parameter	Maximum Modeled Concentration ($\mu g/m^3$)	Significant Impact Level ($\mu g/m^3$)	Maximum Modeled Concentration With Background ($\mu g/m^3$)	Lowest Applicable Standard ($\mu g/m^3$)	% of Standard
NO_2 1 Hr. 8th highest 1-hour daily maximum	34.9	7.52	111.0	188	59.0
NO_2 24 Hr.	15.4	5	45.4	188	24.1
NO_2 Annual	3.0	1	33.0	94	35.1
$PM_{2.5}$ 24 Hr. High 8th High	8.8	1.2	28.8	35	82.3
$PM_{2.5}$ Annual	3.0	0.2	10.8	12	90.0
PM_{10} 24 Hr. High 2nd High	106.6	5	141.6	150	94.4
SO_2 1 Hr. 4th highest 1-hour daily maximum	8.0	7.8	21.1	196.4	10.7

Note: Background concentrations are found in Section 2.8 of the modeling protocol. Dispersion modeling inputs and settings are presented in Section 2.

3.2.1 NO_2 Cumulative Impact Analysis Modeling Results

NO_2 CIA modeling was performed with terrain elevations and building downwash for Duke City CBP. NO_X emission rates represented the maximum hourly rate for Duke City CBP hot water heater, significant neighboring sources, and for all Duke City CBP initial modeling receptors that were above the NO_2 SILs. Significant neighbors include; Albuquerque Products Terminal, Permit #0422-M2-9TR; Black Rock Services, Permit #1694-M3; Albuquerque Asphalt's HMA, Permit #3291-M1; Onate Feed, Permit #1563-M1; NM Terminal Services, Permit #3340; and NM Aggregates, Permit #1435-M1.

Table 13 shows the NO_2 8th highest 1-hour daily maximum 24-hour maximum, and annual model results and highest impact locations for receptors above the SILs.

TABLE 13: NO_2 CIA MODEL RESULTS

	Modeled Concentration ($\mu g/m^3$)	Modeled Concentration With Background ($\mu g/m^3$)	Location UTMs E/N	
NO_2 1 Hr. 8th highest 1-hour daily maximum	34.9	111.0	348704.7	3872323.6
NO_2 24 Hr.	15.4	45.4	348634.1	3872055.9
NO_2 Annual	3.0	33.0	348634.1	3872055.9

For NO_2 1-hour modeling, the Tier III PVMRM approach found in Section 2.7 of this report was used for the analysis. For NO_2 24-hour modeling and annual averaging periods, the Tier II ARM2 approach found in Section 2.7 of this report was used for the analysis.

Dispersion modeling meteorology and ozone for this analysis included 5 years of data, 2001 – 2005 Albuquerque Meteorological data, was obtained from the COABC AQP.

Albuquerque Del Norte Monitor, years 2012 – 2014, 1-hour and annual NO_2 background concentrations found in Section 2.8 of this report were added to the modeled results and compared to the lowest applicable ambient standard.

Model results show the highest 24-hour and annual concentrations, where Duke City CBP source makes a significant contribution, occurred along the southern Duke City CBP restricted boundary. For the NO_2 1-hour model, where Duke City CBP source makes a significant contribution, occurred along the northern Duke City CBP restricted boundary.

Figure 2 shows aa aerial map of the NO_2 8th highest 1-hour daily maximum concentration, highest 24-hour concentration, and highest annual concentration locations including background where Duke City CBP sources contribute above the NO_2 SILs.

Figure 2: Aerial Map Showing the Location of the NO_2 Highest Concentration Model Result ($\mu g/m^3$)

3.2.2 $PM_{2.5}$ Direct and Secondary Formation CIA Modeling Results

Particulate matter includes both "primary" PM, which is directly emitted into the air, and "secondary" PM, which forms indirectly from fuel combustion and other sources. Primary PM consists of carbon (soot)—emitted from cars, trucks, heavy equipment, forest fires, and burning waste—and crustal material from unpaved roads, stone crushing, construction sites, and metallurgical operations. Secondary PM forms in the atmosphere from gases. Some of these reactions require sunlight and/or water vapor. Secondary PM includes:

- Sulfates formed from sulfur dioxide emissions from power plants and industrial facilities;
- Nitrates formed from nitrogen oxide emissions from cars, trucks, industrial facilities, and power plants; and
- Carbon formed from reactive organic gas emissions from cars, trucks, industrial facilities, forest fires, and biogenic sources such as trees.

AERMOD does not account for secondary formation of $PM_{2.5}$ for near-field modeling. Any secondary contribution of the Duke City CBP's source emissions is not explicitly accounted for in the model results. While representative background monitoring data for $PM_{2.5}$ should adequately account for secondary contribution from existing background sources, Duke City CBP sources emits less than significant emission rate (SER) of $PM_{2.5}$ precursors (NO_X, SO_2, VOC), so no assessment of their potential contribution to cumulative impacts as secondary $PM_{2.5}$ was performed. Total permit modification emissions of precursors include:

- Nitrogen Oxides (NO_X) – 1.5 tons per year (below SER)
- Sulfur Dioxides (SO_2) – 0.27 tons per year (below SER)
- Volatile Organic Carbon (VOC) – 0.42 tons per year (below SER).

For the Duke City CBP, direct "primary" $PM_{2.5}$ emission rates are less than 10 tons per year (Significant Emission Rate - SER), and NO_X and SO_2 emission rates are less than 40 tons per year (SER), falling into category "Case 1" in EPA's May, 2014 "Guidance for $PM_{2.5}$ Permit Modeling". For Case 1, no secondary $PM_{2.5}$ ambient impacts associated with the Duke City CBP are required to be addressed.

CIA direct "primary" $PM_{2.5}$ modeling was performed with terrain and meteorology which included 5 years of data, 2001 – 2005 Albuquerque Meteorological data, obtained from the AEHD AQP. Modeling was performed for both 24 hour and annual averaging periods with maximum $PM_{2.5}$ hourly emission rate for Duke City CBP sources, additional Duke City activities, and all Duke City CBP initial modeling receptors that were above the $PM_{2.5}$ SILs. $PM_{2.5}$ emission rates represented the maximum hourly rate for all emission sources. South Valley representative 24-hour and annual $PM_{2.5}$ background concentrations was added to the modeled results and compared to the lowest applicable ambient standard. The 24-hour and annual background concentrations that were used for $PM_{2.5}$ averaging periods are found in Section 2.8 of this report.

Results showed that direct "primary" $PM_{2.5}$ annual averaging period from Duke City CBP sources, where Duke City CBP source makes a significant contribution, are located on the northern Duke City CBP boundary. Results showed that direct "primary" $PM_{2.5}$ 24-hour averaging period from Duke City CBP sources, where Duke City CBP source makes a significant contribution, are located on the southern Duke City CBP boundary. The result from direct "primary" $PM_{2.5}$ emissions dispersion modeling, plus a representative $PM_{2.5}$ background concentrations from Section 2.8 of this report, which includes monitored secondary $PM_{2.5}$ concentrations, were used to show compliance with national $PM_{2.5}$ annual and 24-hour average AAQS. Table 14 below presents the results of all 12 model scenario results. The scenario with the highest modeled concentrations is highlighted below.

TABLE 14: $PM_{2.5}$ CIA MODEL RESULTS FOR EACH SCENARIO

Model Scenario	24 Hour Average Highest 8th High ($\mu g/m^3$)	24 Hour Average Highest 8th High with Background ($\mu g/m^3$)	Annual Average High ($\mu g/m^3$)	Annual Average High with Background ($\mu g/m^3$)
1	7.50	27.50	2.36	10.16
2	6.43	26.43	2.03	9.83
3	5.68	25.68	1.76	9.56
4	5.76	25.76	1.76	9.56
5	5.80	25.80	1.81	9.61
6	6.33	26.33	2.04	9.84
7	6.82	26.82	2.32	10.12
8	7.62	27.62	2.62	10.42
9	8.27	28.27	2.92	10.72
10	8.79	28.79	3.00	10.80
11	8.76	28.76	2.81	10.61
12	8.31	28.31	2.63	10.43

Table 15 shows the $PM_{2.5}$ 8th highest 24-hour daily maximum and annual model results and locations.

TABLE 15: $PM_{2.5}$ CIA MODEL RESULTS

	Modeled Concentration ($\mu g/m^3$)	Modeled Concentration With Background ($\mu g/m^3$)	Location UTMs E/N	
24 Hour Average Highest 8th High	8.8	28.8	348586.9	3872056.2
Annual Average	3.0	10.8	348506.0	3872326.7

Figure 3 summarize the results of the modeling analysis.

Figure 3: Aerial Map Showing the Location of the $PM_{2.5}$ Highest Model Results ($\mu g/m^3$)

3.2.3 PM_{10} Cumulative Impact Analysis Modeling Results

CIA PM_{10} modeling was performed with terrain and meteorology which included 5 years of data, 2001 – 2005 Albuquerque Meteorological data, obtained from the AEHD AQP. Modeling was performed for 24-hour averaging period with maximum PM_{10} hourly emission rate for Duke City CBP sources and all Duke City CBP initial modeling receptors that were above the PM_{10} SILs. South Valley representative 24-hour PM_{10} background concentrations was added to the modeled results and compared to the lowest applicable ambient standard. The 24-hour background concentrations that were used for PM_{10} averaging period are found in Section 2.8 of this report.

Results showed that PM_{10}, where Duke City CBP source makes a significant contribution, is located on the southern Duke City CBP boundary.

The result from PM_{10} emissions dispersion modeling, plus a representative PM_{10} background concentrations from Section 2.8 of this report, were used to show compliance with national PM_{10} 24-hour average AAQS. Table 16 below presents the results of all 12 model scenario results. The scenario with the highest modeled concentrations is highlighted below.

TABLE 16: PM_{10} CIA MODEL RESULTS FOR EACH SCENARIO

Model Scenario	24 Hour Average 2nd High (µg/m³)	24 Hour Average 2nd High with Background (µg/m³)
1	93.31	128.31
2	71.25	106.25
3	67.19	102.19
4	63.74	98.74
5	65.80	100.80
6	72.04	107.04
7	72.46	107.46
8	81.18	116.18
9	94.46	129.46
10	106.56	141.56
11	98.77	133.77
12	93.41	128.41

Table 17 shows the PM_{10} 2nd highest 24-hour daily maximum model result and location.

TABLE 17: PM_{10} CIA MODEL RESULTS

	Modeled Concentration ($\mu g/m^3$)	Modeled Concentration With Background ($\mu g/m^3$)	Location UTMs E/N	
24 Hour Average Highest 2nd High	106.6	141.6	348586.9	3872056.2

Figure 4 summarize the results of the modeling analysis.

Figure 4: Aerial Map Showing the Location of the PM_{10} Highest Model Results ($\mu g/m^3$)

3.2.4 SO_2 1-Hour Cumulative Impact Analysis Modeling Results

SO_2 1-Hour CIA modeling was performed with terrain elevations and building downwash for Duke City CBP. SO_2 emission rates represented the maximum hourly rate for Duke City CBP hot water heater for all Duke City CBP initial modeling receptors that were above the SO_2 1-Hour SILs.

Table 18 shows the SO_2 4th highest 1-hour daily maximum model result and highest concentration location.

TABLE 18: SO_2 CIA MODEL RESULTS

	Modeled Concentration ($\mu g/m^3$)	Modeled Concentration With Background ($\mu g/m^3$)	Location UTMs E/N	
1 Hour Average Highest 4th High	8.0	21.1	348634.1	3872055.9

Dispersion modeling meteorology for this analysis included 5 years of data, 2001 – 2005 Albuquerque Meteorological data, was obtained from the COABC AQP.

Albuquerque city-wide 1-hour SO_2 background concentrations found in Section 2.8 of this report were added to the 1-hour modeled results and compared to the lowest applicable ambient standard.

Maximum 1-hour concentration, where Duke City CBP source makes a significant contribution, occurred along the southern Duke City CBP restricted boundary.

Figure 5 shows an aerial map of the SO_2 4th highest 1 hour daily maximum concentration location including background where Duke City CBP sources contribute above the SO_2 SILs.

Figure 5: Aerial Map Showing the Location of the SO_2 Highest Model Results ($\mu g/m^3$)

Modeling File List

Model File Name	Description
DukeCity1638ROICOMBUST	Duke City CBP Combustion ROI modeling
DukeCity1638ROIPMS1-112	Duke City CBP PM10 and PM2.5 ROI modeling, operating scenarios 1 - 12
DukeCity1638CIANO2	Duke City CBP CIA NO2 ARM2 24-hour and annual averaging periods
DukeCity1638CIANO21HR	Duke City CBP CIA NO2 PVMRM 1-hour averaging period, includes identified neighboring sources
DukeCity1638CIASO21HR	Duke City CBP CIA SO2 1-hour averaging periods
DukeCity1638CIAPMS1-12	Duke City CBP CIA PM10 and PM2.5 CIA modeling, operating scenarios 1 – 12, Includes additional activities, decorative rock and recycle material removal, at Duke City CBP site operating daylight hours.

Attachment H
Public Notice Documentation

Tim Keller,
Mayor

Public Participation

**List of Neighborhood Associations,
Neighborhood Coalitions and Interested Parties
MEMORANDUM**

Leon Espinoza, Acting
Director

To: File
From: Regan Eyerman
Senior Environmental Health Scientist
Subject: Determination of Neighborhood Associations and Coalitions within 0.5 miles of Duke City Redi-Mix Albuquerque Concrete Plant, 7711 Broadway Blvd SE, Albuquerque, NM 87105; and Interested Parties registered with the Air Quality Program
Date: December 24, 2019

DETERMINATION:

On December 23, 2019 I used the City of Albuquerque Zoning Advanced Map Viewer (http://sharepoint.cabq.gov/gis) to review which City of Albuquerque (COA) Neighborhood Associations (NAs) and Neighborhood Coalitions (NCs) and which Bernalillo County (BC) NAs and NCs are located within 0.5 miles of Duke City Redi-Mix Albuquerque Concrete Plant, 7711 Broadway Blvd SE, Albuquerque, NM 87105.

I then used the City of Albuquerque Office of Neighborhood Coordination's Monthly Master NA List dated December 2019 and the Bernalillo County Monthly Neighborhood Association December 2019 Excel file to determine the contact information for each NA and NC located within 0.5 miles of Duke City Redi-Mix Albuquerque Concrete Plant, 7711 Broadway Blvd SE, Albuquerque, NM 87105. Additionally, on December 24, 2019, I checked the Interested Parties Excel Sheet to include the individuals that have requested to be notified of all permitting actions subject to public participation by department through the Air Quality Website.

The table below contains the contact information, which will be used in the applicant's public notice.

City of Albuquerque and/or BC Association or Coalition, and Interested Parties	Name	Email or Mailing Address
District 6 Coalition of HOA	Dominic Peralta	4district6@gmail.com
	Paul Sanchez	paulsanchez7771@gmail.com
Mountain View NA	Nora Garcia	ngarcia49@yahoo.com
	Julian Vargas	javargasconst@gmail.com
Mountain View Community Action	Marla Painter	marladesk@gmail.com
	Josie Lopez	josiemlopez@gmail.com
South Valley Alliance	Sara Newton Juarez	snjart@yahoo.com
	Zoe Economou	zoecon@unm.edu
South Valley Coalition	Roberto Roibal	rroibal@comcast.net
	Marcia Fernandez	mbfernandez1@gmail.com
Holly Frontier	Katharine Boyer	katharine.boyer@hollyfrontier.com
None	Esther Abeyta	sjna1@live.com

None	Steven Abeyta	stevenabeyta@gmail.com
Acme Environmental, Inc.	Brett Engel	acmebrettengel@gmail.com
U.S. Fish & Wildlife Service	JenniferOwen-White	jennifer_owenwhite@fws.gov
Friends of Valle de Oro National Wildlife Refuge	Aryn LaBrake	aryn@friendsofvalledeoro.org
The University of New Mexico	William Monette	wmonette@unm.edu

SUBJECT: Public Notice of Proposed Air Quality Construction Permit Application

Dear Neighborhood Association/Coalition Representative(s),

Why did I receive this public notice?
You are receiving this notice in accordance with New Mexico Administrative Code (NMAC) 20.11.41.13.B(1) which requires any applicant seeking an Air Quality Construction Permit pursuant to 20.11.41 NMAC to provide public notice by certified mail or electronic mail to the designated representative(s) of the recognized neighborhood associations and recognized coalitions that are within one-half mile of the exterior boundaries of the property on which the source is or is proposed to be located.

What is the Air Quality Permit application review process?
The City of Albuquerque, Environmental Health Department, Air Quality Program (Program) is responsible for the review and issuance of Air Quality Permits for any stationary source of air contaminants within Bernalillo County. Once the application is received, the Program reviews each application and rules it either complete or incomplete. Complete applications will then go through a 30-day public comment period. Within 90 days after the Program has ruled the application complete, the Program shall issue the permit, issue the permit subject to conditions, or deny the requested permit or permit modification. The Program shall hold a Public Information Hearing pursuant to 20.11.41.15 NMAC if the Director determines there is significant public interest and a significant air quality issue is involved.

What do I need to know about this proposed application?

Applicant Name	Duke City Redi-Mix, LLC
Site or Facility Name	Concrete Batch Plant
Site or Facility Address	7711 Broadway SW, Albuquerque, NM 87105
New or Existing Source	Existing Source Operating Under Permit #1638-M2
Anticipated Date of Application Submittal	December 30, 2019
Summary of Proposed Source to Be Permitted	The permit application is to replace the existing concrete batch plant with a new state-of-the-art concrete batch plant. The proposed modified concrete batch plant is rated by the manufacturer at 225 cubic yards per hour. Duke City Redi-Mix will limit daily and annual production rates to 3150 cubic yards per day and 1,000,000 cubic yards per year. The modified Duke City's Albuquerque Concrete Plant is a Model Lo-Pro 12HP portable plant manufactured by CON-E-CO and includes; aggregate/sand storage piles, an aggregate/sand feeder and radial conveyor, 4-bin aggregate bin, weight batcher with delivery conveyor, cement silo, cement/fly ash split silo, 12 yard truck loading, cement/fly ash batcher, central baghouse, fly ash guppy, existing 3.8 MMBtu/hr hot water, and concrete additive. Hours of operation for the facility will 24 hours per day, 7 days per week.

What emission limits and operating schedule are being requested?
See attached Notice of Intent to Construct form for this information.

How do I get additional information regarding this proposed application?
For inquiries regarding the proposed source, contact:

- Miles Shiver
- miles@dukecityredimix.com
- (505) 877-5777

For inquiries regarding the air quality permitting process, contact:

- City of Albuquerque Environmental Health Department Air Quality Program
- aqd@cabq.gov
- (505) 768-1972

Notice of Intent to Construct

Under 20.11.41.13B NMAC, the owner/operator is required to *provide public notice by certified mail or electronic mail to the designated representative(s) of the recognized neighborhood associations and recognized coalitions that are with-in one-half mile of the exterior boundaries of the property on which the source is or is proposed to be located* if they propose to construct or establish a new facility or make modifications to an existing facility that is subject to 20.11.41 NMAC – Construction Permits. **A copy of this form must be included with the application.**

Applicant's Name and Address: Duke City Redi-Mix, LLC, 7711 Broadway SW, Albuquerque, NM 87105; Mail Address: PO Box 250, Moriarty, NM 87035

Owner / Operator's Name and Address: Duke City Redi-Mix, LLC, 717C West Abrahames, Moriarty, NM 87035

Actual or Estimated Date the Application will be submitted to the Department: December 30, 2019

Exact Location of the Source or Proposed Source: 7711 Broadway SW, Albuquerque, NM 87105. UTM coordinate is 348,610 Easting; 3,872,190 Nothing, NAD 83, Zone 13.

Description of the Source: The permit application is to replace the existing concrete batch plant with a new state-of-the-art concrete batch plant. The proposed modified concrete batch plant is rated by the manufacturer at 225 cubic yards per hour.

Nature of the Business: Concrete batch plant to produce concrete at a maximum rate of 225 cubic yards per hour.

Process or Change for which the permit is requested: Permit will include a modified concrete batch plant which will process 225 cubic yards per hour, 3,150 cubic yards per day, and 1,000,000 cubic yards per year of concrete.

Preliminary Estimate of the Maximum Quantities of each regulated air contaminant the source will emit:

Initial Construction Permit

	Pounds Per Hour (lbs/hr)	Tons Per Year (tpy)
CO	0.14	0.31
NOx	0.33	0.73
NOx + NMHC	***	***
VOC	0.10	0.21
SO_2	0.06	0.14
TSP	8.72	15.83
PM10	3.39	5.93
PM2.5	0.92	1.68
VHAP	***	***

Net Changes In Emissions

(Only for permit Modifications or Technical Revisions)

	lbs/hr	tpy	Estimated Total TPY
CO	+/- NC	+ 0.31	0.62
NOx	+/- NC	+ 0.73	1.46
NOx + NMHC	+/- ***	+/- ***	***
VOC	+/- NC	+ 0.21	0.42
SO_2	+/- NC	+ 0.14	0.27
TSP	+ 3.04	+ 8.15	23.98
PM10	+ 0.74	+ 2.74	8.67
PM2.5	- 0.22	- 0.14	1.54
VHAP	+/- ***	+/- ***	***

City of Albuquerque- Environmental Health Department
Air Quality Program- Permitting Division
Phone: (505) 768-1972 Email: aqd@cabq.gov

Maximum Operating Schedule: 24 hours per day, 7 days per week, up to 3,150 cubic yards per day

Normal Operating Schedule: Daylight hours, 7 days per week, up to 3,150 cubic yards per day

Current Contact Information for Comments and Inquires:

Name: Miles Shiver, General Manager
Address: P.O. BOX 250, Moriarty, NM 87035
Phone Number: (505) 877-5777
E-Mail Address: miles@dukecityredimix.com

If you have any comments about the construction or operation of the above facility, and you want your comments to be made as part of the permit review process, you must submit your comments in writing to the address below:

Environmental Health Manager

Permitting Division

Albuquerque Environmental Health Department

Air Quality Program

PO Box 1293

Albuquerque, New Mexico 87103

(505) 768-1972

Other comments and questions may be submitted verbally.

Please refer to the company name and facility name, as used in this notice or send a copy of this notice along with your comments, since the Department may not have received the permit application at the time of this notice. Please include a legible mailing address with your comments. Once the Department has performed a preliminary review of the application and its air quality impacts, if required, the Department's notice will be published on the City of Albuquerque's website, https://www.cabq.gov/airquality/air-quality-permits and mailed to neighborhood associations and neighborhood coalitions near the facility location or near the facility proposed location.

MONTROSE ENVIRONMENTAL

Paul Wade <pwade@montrose-env.com>

Duke City Redi-Mix, LLC Permit #1638-M2 Revision Public Notice

1 message

Paul Wade <pwade@montrose-env.com> Fri, Dec 27, 2019 at 4:12 PM
To: 4district6@gmail.com, paulsanchez7771@gmail.com, ngarcia49@yahoo.com, julian vargas <javargasconst@gmail.com>, Marla Painter <marladesk@gmail.com>, josiemlopez@gmail.com, Sara Newton Juarez <snjart@yahoo.com>, zoe Economou <zoecon@unm.edu>, rroibal@comcast.net, Marcia Fernandez <mbfernandez1@gmail.com>, katharine.boyer@hollyfrontier.com, sjna1@live.com, stevenabeyta@gmail.com, acmebrettengel@gmail.com, jennifer_owenwhite@fws.gov, aryn@friendsofvalledeoro.org, wmonette@unm.edu
Cc: "Eyerman, Regan V." <reyerman@cabq.gov>, Miles Shiver <miles@dukecityredimix.com>

You are receiving this notice in accordance with New Mexico Administrative Code (NMAC) 20.11.41.13.B(1) which requires any applicant seeking an Air Quality Construction Permit pursuant to 20.11.41 NMAC to provide public notice by certified mail or electronic mail to the designated representative(s) of the recognized neighborhood associations and recognized coalitions that are within one-half mile of the exterior boundaries of the property on which the source is or is proposed to be located.

Thank You

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MEG Logo_Signature

Paul Wade

Sr. Engineer

Montrose Air Quality Services, LLC

3500 G Comanche Rd. NE, Albuquerque, NM 87107

T: 505.830.9680 x6 | F: 505.830.9678

PWade@montrose-env.com

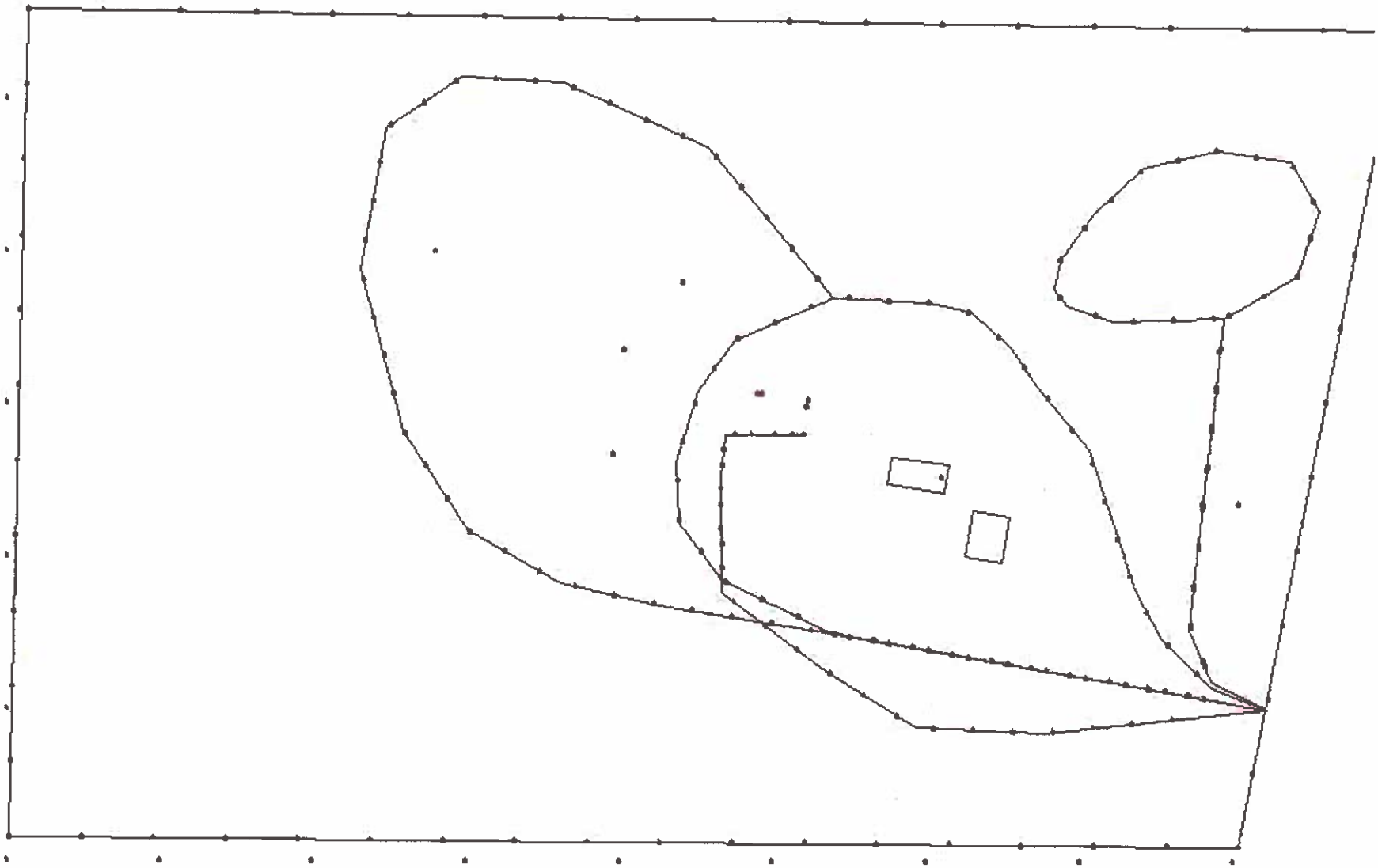
www.montrose-env.com

2 attachments

Duke City CBP Cover Letter.pdf
63K

Duke City CBP NOI.pdf
68K


PROPOSED AIR QUALITY CONSTRUCTION PERMIT
1 Applicant's Name Duke Cary Materials, LLC Address
Owner or Operator's Name Duke Cary Materials, LLC
Owner or Operator's Address
Actual or Estimated Date the Application will be Submitted to the Department
2 Exact Location of the Source or Proposed Source:
UTM Coordinate: N 848,100 Easting, 3,932,450 Northing, NAD 83, Zone 13
3 Description of the Source:
Nature of the Business Concrete batch plant to produce concrete at a maximum rate of 300 cubic yards per hour
Process or Change for which the permit is being requested
Preliminary Estimate of the Maximum Quantities of each regulated air contaminant the source will emit.
Initial Construction Permit
Net Changes in Emissions
(for permit Modifications or Technical Revisions)
Pounds Per Hour (lbs/hr)
Tons Per Year (tpy)
Estimated Total Tons Per Year
CO
NOx
SO2
VOC
TSP
PM10
PM2.5
VHAP
4 Maximum Operating Schedule
Normal Operating Schedule
5 Current Contact information for Comments and Inquiries
Name
Address
Phone Number
E-Mail Address
City of Albuquerque - Environmental Health Department - Air Quality Program - Preliminary Source Permitting
Phone Number (505) 768-1972 - Web Address: cabq.gov/air
THIS SIGN SHALL REMAIN POSTED UNTIL THE DEPARTMENT TAKES FINAL ACTION ON THE PERMIT APPLICATION



Duke City Redi-Mix Permit 1638 Modification\D[illegible]\Duke City Redi-Mix 1638-M3\review\CIA\PM\DukeCity1638CIAPMS1.BST

Scale: 1" = 49.7 Meters