AMERICAN CEMENT CORPORATION
ALBUQUERQUE TERMINAL
CONSTRUCTION PERMIT MODIFICATION

Prepared by:

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Project 083701.0040

Trinity Consultants

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American Cement Corporation, a wholly-owned subsidiary of GCC Rio Grande, Inc. (GCC) owns and operates the Albuquerque Terminal (facility). The facility consists of five cement and cement additive silos with numerous bulk materials unloading and loading areas. The site is engaged in the storage and delivery of bulk cement and fly ash under Standard Industrial Classification (SIC) Code is 3272. Trinity Consultants conducted an air quality compliance review that noted several discrepancies in the equipment and emissions listed in the facility's current air permit (0902-M1). This application provides updated information on the equipment and emissions rates for the facility. An air quality analysis for the project has also been completed and is included in Section 6.

1.1 FACILITY DESCRIPTION

American Cement operates a bulk terminal located at 4702 Carlton Street NW in Albuquerque. The terminal receives bulk cement and fly ash via truck and rail, stores the material in various silos, and loads trucks for distribution to the local market. The truck and railcar unloading activities are controlled with high efficiency cartridge type dust collectors located on the top of the silos. The silo unloading spouts are also controlled with high efficiency cartridge type dust collectors. The haul roads within the facility are paved and the Terminal performs routine vacuum sweeping of the roads to mitigate emissions of fugitive dust. The facility has also replaced the baghouses previously used to control the silos and loading points with high efficiency cartridge-type dust collectors. The new controls substantially increase collection efficiency (i.e., 99.95 or 99.99% for the new devices vs. 99.5% for the previous devices).

The higher efficiency control equipment on the silos and unloading points has reduced overall facility emissions to less than currently permitted levels, even if the equipment is operated at its full potential (i.e., maximum capacity at 8,760 hours per year). Because of the high collection efficiency of the dust collectors, the facility could also handle other types of material (with similar composition) with no substantial change in emissions. A site diagram is provided in Figure 1-1 and a site location map in Figure 1-2. A block flow diagram is shown in Figure 1-3.

Operational Plan

The pressure drop across each baghouse shall remain within the range required by the manufacturer to achieve a 99.95% control efficiency. Material loading and unloading shall cease if the dust collector is not operating in compliance with the permit conditions.

1.2 DESCRIPTION OF MODIFICATION

Per the Terms (3.B.) of Compliance Agreement, Trinity has prepared this Construction Permit Modification to address the changes in equipment as listed in the current permit (0902-M1) and the equipment as installed at the facility. Trinity has also included several changes intended to streamline compliance with applicable standards. Substantial changes in this application include:

- Air Permit No. 0902-M1 identifies twelve emissions sources, including rail and truck unloading points. The Facility actually emits air contaminants through nine separate particulate dust collectors. The emissions from the cement unloading point actually vent through the silo dust collectors, so the Process Equipment Table has been amended to reflect actual sources of emissions.
- The current permit indicates that the rated capacity for certain sources (i.e., truck unloading points, rail connectors, and loading spouts) are substantially less than the actual equipment capacity. For example, the cement bulk loader spouts are rated at 150 tons per hour, not 44.6 tons per hour (as listed in the current permit). This application corrects the rated capacities of the equipment based on manufacturer and/or facility data.
- Air Permit No. 0902-M1 identifies separate conditions and limits for silos that store cement and those that store fly ash (a cement additive). Since the emissions of particulate from the silo control devices (i.e., dust collectors) is the same for both cement and additive (fly ash), this application removes the distinction between cement and cement additives by requesting approval to store either material in any silo.
- The current permit indicates that the rated control efficiency for the dust collectors is 99.5%. The manufacturer has stated that the control efficiency is 99.95%. Emissions in this application are calculated based on the manufacturer's stated control efficiency with a 30% confidence factor.
- Air Permit No. 0902-M1 limits the hours of operation and daily throughput of cement and fly ash. The ambient air quality modeling submitted with this application demonstrates that all sources can operate continuously (8,760 hours per year) at maximum throughput without violating New Mexico or National Ambient Air Quality Standards. This application removes the hour and throughput limits of the previous permit.

Table 1-1 (below) identifies the sources parameters and emission rates for the Terminal.

TABLE 1-1 FACILITY EMISSIONS SUMMARY

Source	Height (m)	Diameter (m)	Exit Velocity (m/sec)	Temp (K)	TSP (g/s)	PM_{10} (g/s)	$PM_{2.5}$ (g/s)
Silo 1 Dust Collector	27.1	1.0	0.001	Amb.	0.015	0.012	0.005
Silo 2 Dust Collector	27.1	1.0	0.001	Amb.	0.015	0.012	0.005
Silo 3 Dust Collector	27.1	1.0	0.001	Amb.	0.015	0.012	0.005
Silo 4 Dust Collector	22.9	1.0	0.001	Amb.	0.015	0.012	0.005
Silo 5 Dust Collector 1	22.9	1.0	0.001	Amb.	0.015	0.012	0.005
Silo 5 Dust Collector 2	22.9	1.0	0.001	Amb.	0.015	0.012	0.005
Loadout (Silos 1-3)	6.3	-	-	-	0.009	0.007	0.003
Loadout (Silo 4)	6.1	1.0	0.001	Amb.	0.015	0.012	0.005
Loadout (Silo 5)	6.1	1.0	0.001	Amb.	0.015	0.012	0.005

[A] Emission rates are based on the manufacturer's guaranteed rate, 0.0075 Gr. Cu. Ft., and the actual flow rate, 1400 CFM. See DCL Dust Collector Efficiency Statement.
[B] An engineering factor of 1.3 was used for all sources to ensure the hourly limits were not exceeded.
[C] A correction factor of 0.6 was used for Loadout (Silos 1-3) since the outlet for the loadout dust collector exhausts inside the silo (per City of Albuquerque, Air Dispersion Modeling Guidelines).
[D] PM_{10} emission rates are 80% of the above TSP rates and $PM_{2.5}$ emission rates are 31% of the above TSP rates per cement industry information and AP-42 Section 13.2.4.

Figure 1-1. Plot Plan
American Cement Corp
Albuquerque Terminal

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January 2009

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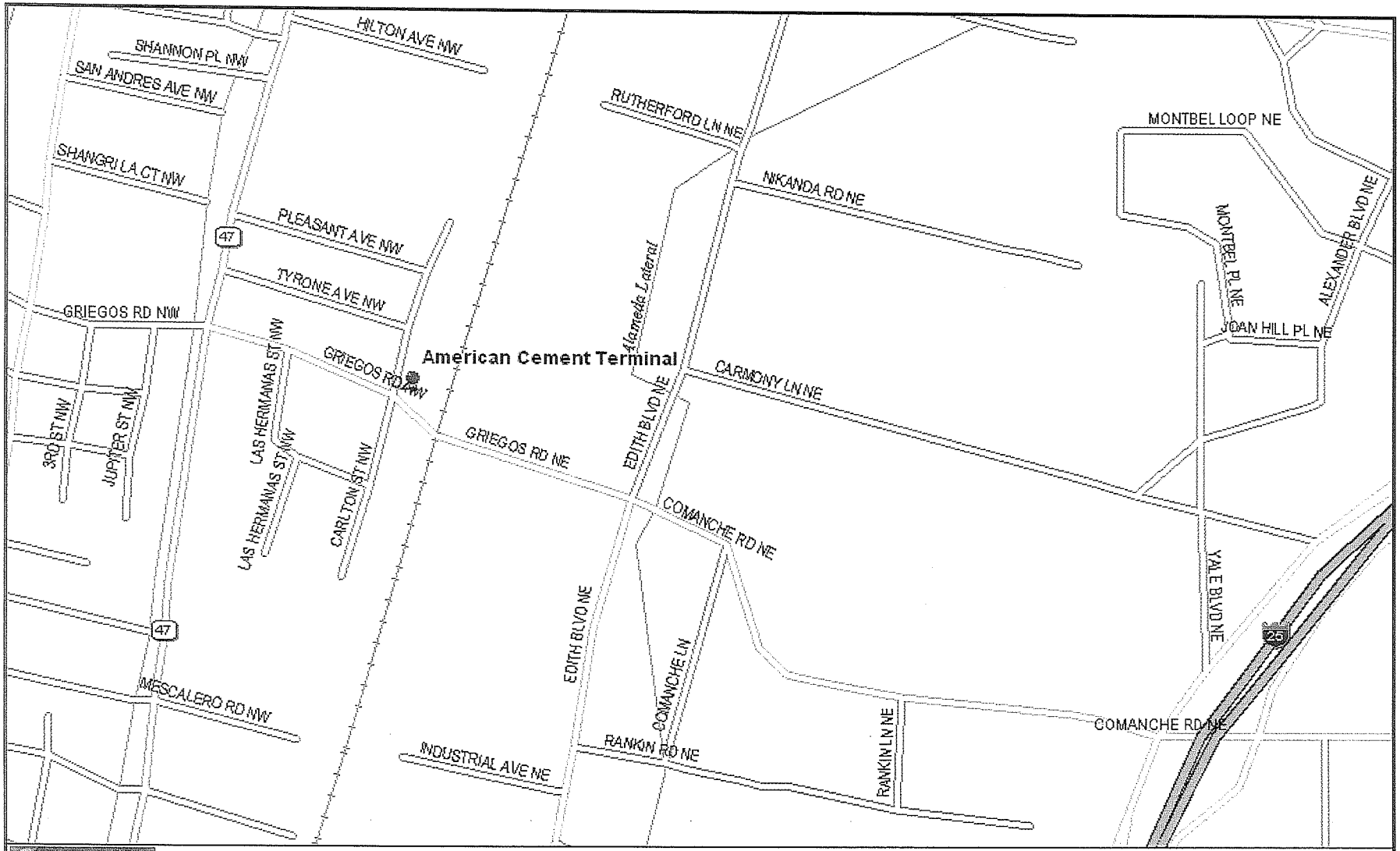
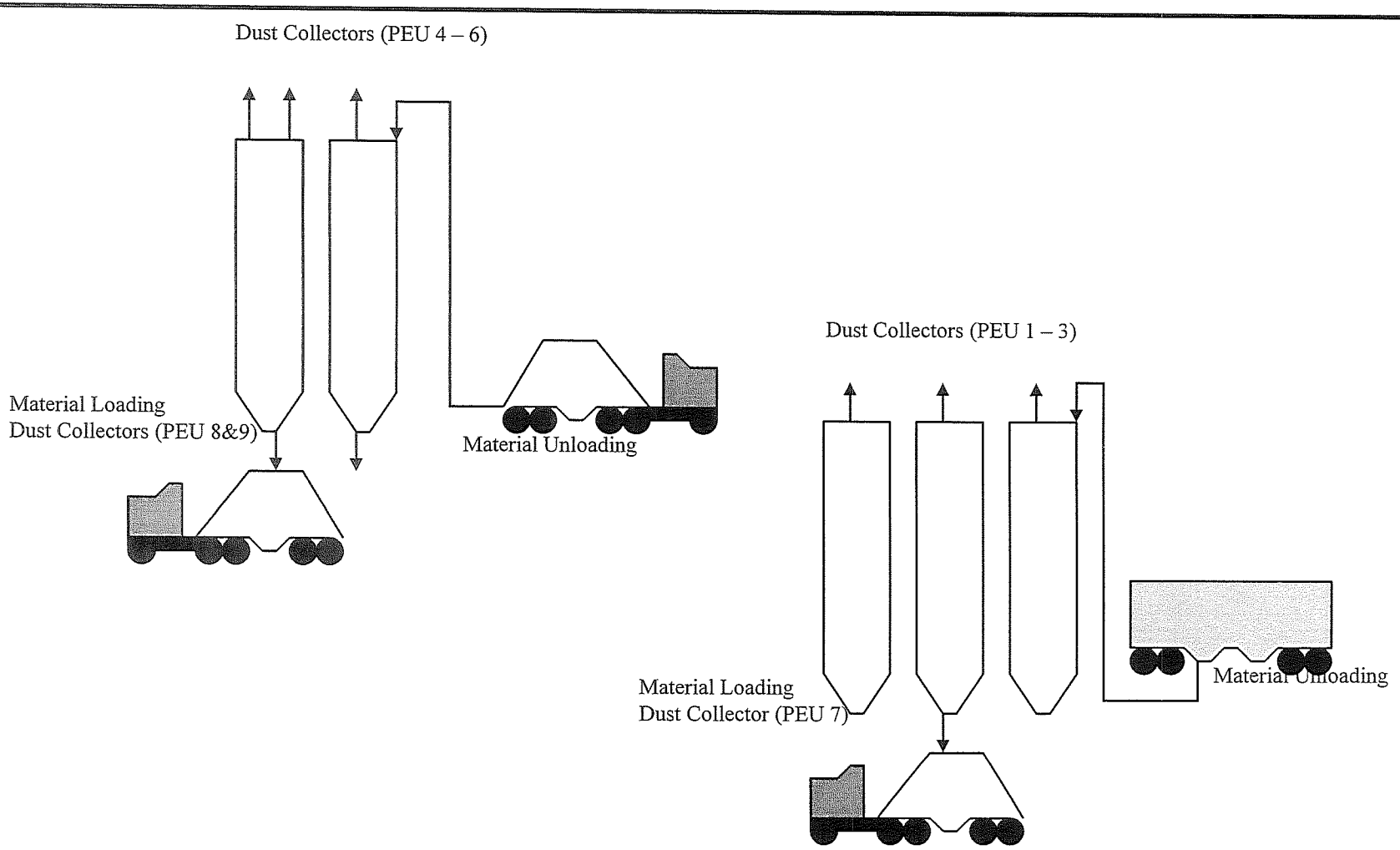


Area Map **American Cement Corporation** **American Cement Terminal**	Trinity Consultants	January 2009 083701.0040



American Cement Albuquerque Terminal
Figure 1-3 - Process Flow Diagram

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2. Application Forms and Checklist

City of Albuquerque

Environmental Health Department
Air Quality Division
Permit Application Review Fee Checklist

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

I. Company Information

Company Name	American Cement Corporation	
Company Address	1340 N. Riverside Drive, Espanola, NM 87532	
Facility Name	American Cement Terminal	
Facility Address	4702 Carlton Street, Albuquerque, NM 87107	
Contact Person	Doug Roark	
Contact Person Phone Number	(303)739-5910	
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 #0902-M1**	
Is this application review fee for a Qualified Small Business as defined in 20 NMAC 11.02?	Yes	(No)

II. **Please check the category that applies to the facility and permit application. If any of the following source categories do not apply to the facility, proceed to section III.**

Check One	Application Type	Review Fee
	Auto Body Repair and Painting	$ 500.00
	Dry Cleaners	$ 500.00
	Emergency Generators	$ 500.00
	Generic Coating and Abrasive Operations	$ 500.00
	Other Fueling Facilities Receiving fuel by truck or rail (Non-NSPS)	$ 1,000.00
	Non-NSPS Boilers (Greater than 10 million Btu/hr)	$ 500.00
	Printing and packaging operations	$ 500.00
	Retail and fleet gasoline service stations	$ 500.00
	Soil/Water Remediation Systems	$ 1,000.00
X	*Not Applicable*	*See Section III*

III. **If section II does not apply to the facility and permit application, please determine the New Source Case-by-Case Review Fees. The application review fees are based on the potential to emit (PTE) of any air pollutant as defined in 20 NMAC 11.02 (effective July 1, 2001). If this application is for a modification please see Section V.**

Check One	New Source (Based on PTE)	Review Fee
	Air Pollutant Equal to and less than 5 tpy	$ 500.00
	Air Pollutant Equal to or greater than 5 tpy and less than 25 tpy	$ 1,000.00
	Air Pollutant Equal to or greater than 25 tpy and less than 50 tpy	$ 2,000.00
	Air Pollutant Equal to or greater than 50 tpy and less than 75 tpy	$ 3,000.00
	Air Pollutant Equal to or greater than 75 tpy and less than 100 tpy	$ 4,000.00
	Air Pollutant Equal to or greater than 100 tpy	$ 5,000.00
X	*Not Applicable*	*See Section II or V*

IV. Please check all the Federal Air Programs and State Toxic Air Pollutant Programs that apply to the facility and permit application.

Check	Type of Program	Review Fee
	40 CFR 60 "New Source Performance Standards" (NSPS)	$ 1,000.00
	40 CFR 61 "Emission Standards for Hazardous Air Pollutants (NESHAPs)	$ 1,000.00
	40 CFR 63 (NESHAPs) Promulgated Standards	$ 2,000.00
	40 CFR 63 (NESHAPs) Case-by-Case MACT Review	$ 10,000.00
	Prevention of Significant Deterioration (PSD) Permit Or Non-Attainment Permit	$ 5,000.00
	Acid Rain Permit	$ 5,000.00
	State Toxic Air Pollutant Review	$ 500.00
X	*Not Applicable*	*Not Applicable*

V. If the permit application is for modification to an existing permit or is for a portable source relocation, please check one that applies.

Check One	Modification Type	Review Fee
	Pollution Prevention Modifications	No Charge
X	Minor/Flexible Permit Modifications	$ 1,000.00
	Major Modifications	$ 5,000.00
	Administrative Modifications	$ 100.00
	Portable Source Relocation	$ 250.00
	Not Applicable	*See Section II or III*

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

Modification Type	Review Fee Amount
Section II Total	$0
Section III Total	$0
Section IV Total	$0
Section V Total	$1,000.00
Total Application Review Fee	**$1,000.00**

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 23 day of Feb 20 05

Ron Hedrick
Print Name

V.P Operations
Print Title

Signature

GCC RIO GRANDE, INC.

PAYEE: CITY OF ALBUQUERQUE
103059

CHECK NUMBER: 2369
CHECK DATE: 02/20/09
Stub 1 of 1

DATE	INVOICE NO.	REMARKS	AMOUNT	DISCOUNT	NET AMOUNT
02/20/09	022009 APP FEE	Application fee-Am Cement	1,000.00		1,000.00
Add'l Remarks:			TOTAL		1,000.00

GCC RIO GRANDE, INC.
P.O. BOX 100
TIJERAS NM 87059-0100

WELLS FARGO BANK NA

ONE THOUSAND AND 00/100**********

PAYEE	CHECK DATE	CHECK NUMBER	AMOUNT
103059	02/20/09	00002369	$*****1,000.00

Pay to the order of:
CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT
PO BOX 1293

ALBUQUERQUE NM 87103

⑈000002369⑈ ⑆121000248⑆4950638 24⑈

City of Albuquerque

Environmental Health Department
Air Quality Division

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 applications shall:

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

2. ☑ 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.

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

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

5. ☑ indicate the date the application was completed and submitted

6. ☑ contain the company name, which identifies this particular site.

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

8. ☑ 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.

9. ☑ 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

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

11. ☑ 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.

12. ☑ contain the UTM zone and UTM coordinates.

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

14. ☑ contain the types and **potential uncontrolled** 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.

15. ☑ 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.

16. ☑ 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).

17. ☑ contain all calculations used to estimate **potential uncontrolled** and **controlled** emissions.

18. ☑ 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).

19. ☑ contain fuel data for each existing and/or proposed piece of fuel burning equipment.

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

21. ☑ contain the stack and exhaust gas parameters for all existing and proposed emission stacks.

22. ☑ 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.

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

24. ✓ 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.

25. ✓ 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.

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

27. ✓ 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.

Emissions from the facility will be exclusively the dust created from loading and unloading drop points and fugitive dust from traffic. For permitting purposes, Trinity assumed that all sources operate continuously (8,760 hours per year). Potential uncontrolled and controlled emissions for each source type are discussed in the following subsections.

3.1 UNCONTROLLED EMISSIONS FOR MATERIALS HANDLING SYSTEMS

The five cement and cement additive silos have numerous loadout areas for loading and unloading the bulk materials via truck and rail car. For calculation purposes, one loadout area has been established for Silos 1-3, Silo 4, and Silo 5 for a total of three loadout areas. Particulate emissions associated with the transfer of cement and fly ash are estimated using the uncontrolled emission factors from AP-42 Section 11.12 for Concrete Batching. -Emission estimates for the five silos and loadout areas are shown in Table 3-1. Equation 1 and a sample calculation are shown below.

$$E = E_f \times P$$

Where:
E = PM or TSP Emissions (lb/hr)
E_f = Emission Factor (lb/ton), AP-42 Table 11.12-2
P = Cement or fly ash process rate (ton/hr)

$$PM\left(\frac{lb}{hr}\right) = 0.72\left(\frac{lb}{ton}\right) \times 200\left(\frac{ton}{hr}\right) = 144.0\left(\frac{lb}{hr}\right) = TSP\left(\frac{lb}{hr}\right)$$

$$PM(tpy) = \frac{144.0\left(\frac{lb}{hr}\right) \times 8{,}760\left(\frac{hr}{yr}\right)}{2{,}000\left(\frac{lb}{ton}\right)} = 630.7(tpy) = TSP(tpy)$$

Materials handling emissions for the site are shown in Table 3-1.

TABLE 3-1 MATERIALS HANDLING EMISSIONS

Source	Process Rate (ton/hr)	Total PM (Uncontrolled) Emission Factor[D]	TSP (lb/hr)	TSP (ton/yr)
Silo 1[A]	200	0.72	144.0	630.7
Silo 2[A]	200	0.72	144.0	630.7
Silo 3[A]	200	0.72	144.0	630.7
Silo 4	60	3.14	188.4	825.2
Silo 5	60	3.14	188.4	825.2
Loadout (Silos 1-3)[B]	150	0.995	149.3	653.7
Loadout (Silo 4)[C]	150	0.995	149.3	653.7
Loadout (Silo 5)[C]	150	0.995	149.3	653.7
Roadways			30.1	143.7
Total			**1286.6**	**5647.4**

[A] The rated capacity of the bucket elevator (serving Silos 1-3) is 200 tons per hour.

[B] The loadout rate for silos 1-3 is 150 tons per hour.

[C] The loadout rate for silos 4 and 5 is 150 tons per hour, but only one silo can be unloaded at a time.

[D] Emission Factors are in units of lb of PM per ton of material loaded and were obtained from AP-42 (6/06), Section 11.12.

[E] Emission Factors are in units of lb of PM per ton of material loaded and were obtained from AP-42 (6/06), Section 11.12.

3.2 EMISSIONS FROM DUST COLLECTORS

Emissions were calculated using the manufacturer's grain loading guarantee (Section 4) at the outlet and the exhaust fan volume. Trinity applied an engineering factor of 1.3 to the estimated emissions to ensure the hourly limits are not exceeded. The outlet for the cement loadout dust collector exhausts inside the silo, so a 0.6 factor was applied to the emissions for Loadout (Silos 1-3) per the Division's Modeling Guidelines[1]. An example PM_{10} emission calculation is shown below.

Sample Emissions calculation for Terminal Dust Collectors

$$\frac{0.0075 gr\ PM}{dscf} * \frac{1{,}400\ acf}{min} * \frac{60\ min}{hr} * \frac{lb}{7{,}000\ gr} * 1.3 = \frac{0.117\ lb\ PM}{hr}$$

[1] Air Dispersion Modeling Guidelines for Air Quality Permitting, City of Albuquerque Environmental Health Department, Air Quality Division Permitting & Technical Analysis Section, July 16, 2008, Page 10.

3.3 FACILITY HAUL ROADS

The roads at the facility are paved and therefore emissions are estimated using AP-42 Section 13.2.1, *Paved Roads* (3/06). Road emissions are estimated by calculating an emission factor in pounds per vehicle mile traveled (lb/VMT). The following equations are used to determine the emission factors for paved and unpaved roads inside the facility.

For paved roads:

$$E\left(\frac{lb}{VMT}\right)=\left[k\times\left(\frac{sL}{2}\right)^{0.65}\times\left(\frac{W}{3}\right)^{1.5}-C\right]\times\left[1-\frac{p}{4\times N}\right]$$

Where:
k = particle size multiplier
sL = silt loading of paved surface (g/m^2)
W = mean vehicle weight (tons)
C = emission factor for exhaust, brake wear and tire wear (lb/VMT)
p = number of days with measurable precipitation
N = number of days in averaging period

Roadway emissions are presented in Table 3-2.

TABLE 3-2 ROADWAY EMISSIONS

PM_{10} Emissions		
Vehicle Type	Cement Trucks (paved)	
S	12.00	(mph)
W	45.00	(tons)
P[a]	80	(days)
k[b]	0.016	(lb/VMT)
sL[c]	12.0	
C[c]	0.00047	(lb/VMT)
N	365	
E (uncontrolled)	2.82	(lb/VMT)
E (controlled)[e]	0.28	(lb/VMT)
Distance Traveled	0.25	(mile/trip)
Trips/yr[f]	73,000	trips/yr
PM_{10} Emissions	**0.59**	**(lb/hr)**
	2.80	**(tpy)**

[a] Average number of days with sufficient rainfall/snow cover based upon conservative estimate from AP-42 (11/06), Figure 13.2.1-2

[b] Constants based upon AP-42 (11/06), Table 13.2.1-1 and 13.2.2-2, Industrial Roads

[c] Constants based upon AP-42 (11/06), Table 13.2.1-4 (Concrete Batching)

[d] Constants based upon AP-42 (11/06), Table 13.2.1-3 and 13.2.1-2

[e] 90% control based on biweekly sweeping.

[f] Based on 200 trucks per day, 365 days per year.

Dust Control and Loading Systems

DUST COLLECTOR EFFICIENCY STATEMENT

Dust Collector Efficiency:	99.95% (with Polyester filters)
Approximate Dust Loading:	15 Grains per Cubic Foot (dirty air)
Emissions:	.0075 Grains per Cubic Foot. At 1400 -CFM exhaust rate, this would equal .09 lbs. per hour.
Opacity:	(At exhaust) .1%

FIND EXHAUST EMMISSIONS IN LB./HR AND LB./MIN				
CFM	GR. LOADING	EFFIC.	LB./HR./Exhaust	LB./MIN./Exhaust
1400	15	99.95	0.09	0.0015
	EMMISSION %	0.05		
0.0005	EMMISSION GR.CU.FT.	0.0075		

11.12 CONCRETE BATCHING

11.12-1 Process Description [1-5]

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

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

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

11.12-2 Emissions and Controls [6-8]

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

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

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

11.12-3 Updates since the 5th Edition.

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

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

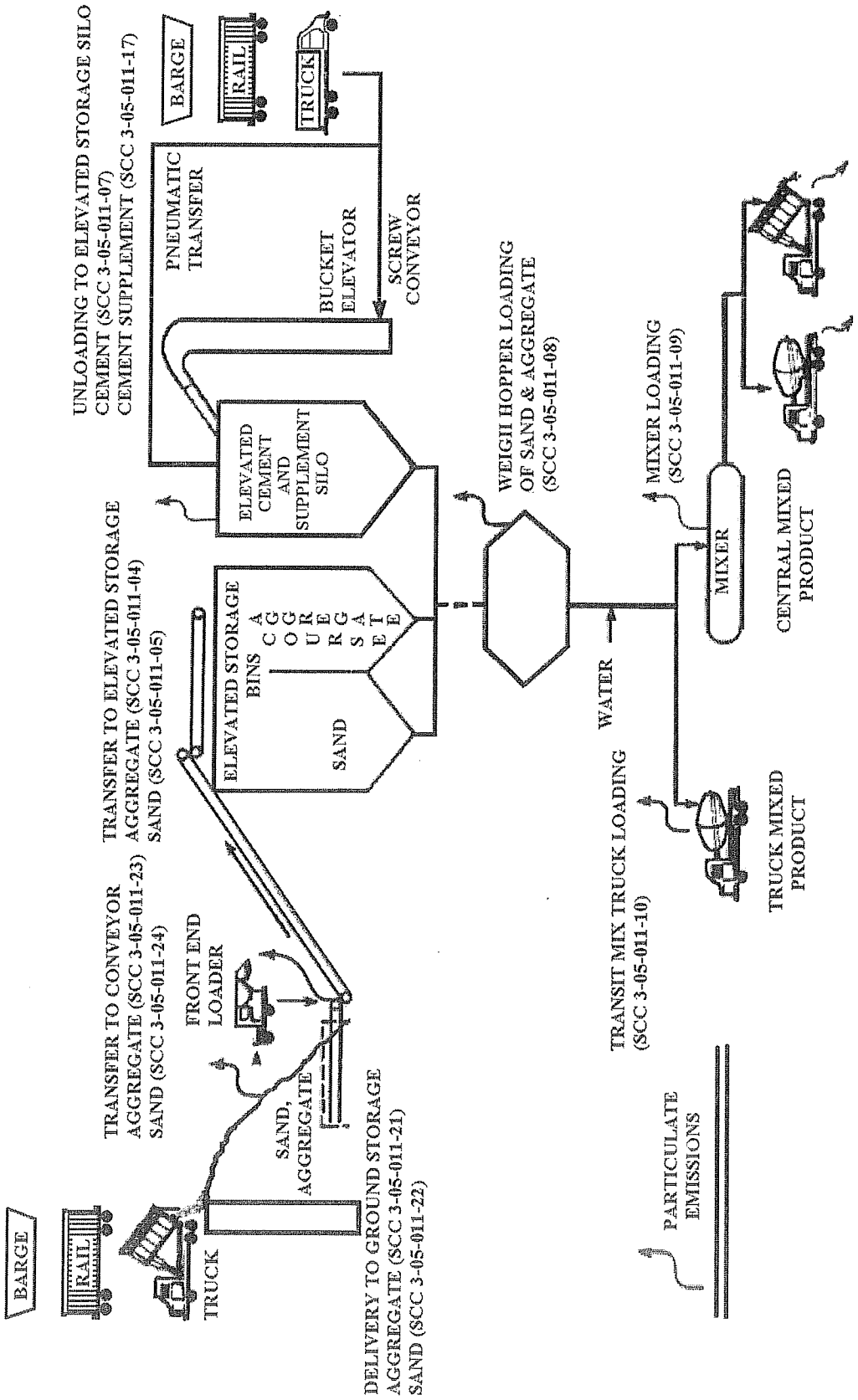

Figure 11.12-1. Typical Concrete Batching Process.

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

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

ND = No data

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

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

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

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

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

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

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

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

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

ND = No data

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

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

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

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

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

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

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

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

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

E	=	Emission factor in lbs./ton of cement and cement supplement
k	=	Particle size multiplier (dimensionless)
U	=	Wind speed 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

emissions of PM, PM-10, PM-10-2.5, and PM-2.5 are calculated by multiplying the emission factor calculated using Equation 11.12-2 by a factor of 0.282 to convert from emissions per ton of cement and cement supplement to emissions per yard of concrete. This equation is based on a typical concrete formulation of 564 pounds of cement and cement supplement in a total of 4,024 pounds of material (including aggregate, sand, and water). This calculation is summarized in Equation 11.12-2.

$$\text{PM, PM10, PM10-2.5, PM2.5 emissions}\left(\frac{\text{pounds}}{\text{yd}^3 \text{ of concrete}}\right) = 0.282\ (\text{Equation } 11.12\text{-}1 \text{ factor or Table } 11.12\text{-}2 \text{ Factor})$$

Equation 11.12-2

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

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

Equation 11.12-3

Where:

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

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

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

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

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

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

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

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

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

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

ND=No data

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

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

[c] Reference 10.

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

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

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

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

ND=No data

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

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

[c] Reference 10.

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

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

5. STATE AND FEDERAL REGULATORY APPLICABILITY

This section provides a summary demonstration that the facility meets applicable Federal and State air regulations.

5.1 NEW MEXICO AIR POLLUTION CONTROL RULES

20.2.1 NMAC (General Provisions) **[Applicable]**

This section includes statutory authority, provisions for confidential business information, and other provisions; but there are no regulatory requirements.

20.2.2 NMAC (Definitions) **[Applicable]**

This section includes definitions, but there are no regulatory requirements.

20.2.3 NMAC (Air Quality Standards) **[Applicable]**

This section enumerates the state's ambient air quality standards (AAQS) for Total Suspended Particulate (TSP), sulfur dioxide (SO_2), carbon monoxide (CO) and nitrogen dioxide (NO_2). Ambient air quality modeling for this construction project demonstrates that the source does not cause or contribute to a violation of the state AAQS.

20.2.5 NMAC (Source Surveillance) **[Applicable]**

Part 5 requires sources of air contaminants to maintain records of emissions and report emissions for the department if requested. This facility will keep records of emissions and submit emissions data as required.

20.2.7 NMAC (Excess Emissions During Malfunction, Startup, Shutdown, or Scheduled Maintenance) **[Applicable]**

In the event of any release which results in excess emissions, the owner or operator of the facility shall notify the Department verbally as soon as possible, but no later than 24 hours after the start of the next regular business day, and shall submit written notification within the next regular business day, and shall submit written notification within 10 days after the start of the next regular business day following the initial occurrence of the excess emissions. The facility shall comply with these provisions.

20.2.7 NMAC (Emissions Leaving New Mexico) **[Applicable]**

This Part ensures that emissions crossing state boundaries do not exceed the standards and regulations of the receiving state. Ambient air quality modeling for this construction project demonstrates that the source does not exceed neighboring state standards.

20.2.10-32 NMAC (Emissions from Specified Equipment) **[Not Applicable]**

These Parts specify emissions limits for Woodwaste Burners, Asphalt Process Equipment, Cement Kilns, Gypsum Processing Plants, and other sources. The facility is not subject to these provisions because it does not employ the equipment specified in the regulations.

20.2.10-33 NMAC (Gas Burning Equipment – Nitrogen Dioxide) **[Not Applicable]**

Part 33 specifies that new gas burning equipment having a heat input of greater than 1,000,000 million British Thermal Units per year per unit shall not emit nitrogen dioxide in excess of 0.2 pounds per million British Thermal Units of heat input. The units do not burn gas. Therefore, the requirement does not apply.

20.2.34-43 NMAC (Emissions from Specified Equipment) **[Not Applicable]**

These Parts specify emissions limits for Oil Burning Equipment, Natural Processing Plants, Petroleum Refineries, and other sources. The facility is not subject to these provisions because it does not employ the equipment specified in the regulations.

20.2.60 (Open Burning) **[Not Applicable]**

The Part places restrictions on open burning except as authorized. Open burning is not performed at the facility.

20.2.61 (Smoke and Visible Emissions) **[Applicable]**

No discharge of greater than 20% opacity is allowed except for equipment regulated under Parts 20.2.10 NMAC through 20.2.18 NMAC, 20.2.37 NMAC, and 20.2.42 NMAC, and any other Part of Chapter 2 which specifically limits particulate emissions. The equipment shall comply with this Part.

20.2.62-63 (Municipal/Biomedical Waste Combustion) **[Not Applicable]**

These Parts set emission limits for equipment that is used to dispose of municipal or biomedical waste. The facility is not subject to these regulations because it does not dispose of municipal or biomedical waste.

20.2.65 (Smoke Management) **[Not Applicable]**

This Part applies to prescribed fires. The facility is not subject to these regulations because it does utilize prescribed fires as defined in the regulation.

20.2.70 (Operating Permits) **[Not Applicable]**

This Part requires major sources to obtain an operating permit. This facility meets the conditions for a Part 70 permit because the current and project increase of potential emissions of certain regulated pollutants are greater than 100 TPY. Therefore, this facility will apply for a Part 70 operating permit within 12 months of the startup date.

20.2.71 (Operating Permit Emission Fees) **[Not Applicable]**

This Part requires sources subject to the Operating Permit program to pay emissions fees. Therefore, this facility will comply with the fee schedule shown in the regulation.

20.2.72 (Construction Permits) **[Applicable]**

This Part requires sources that emit more than 10 pounds per hour or 25 tons per year of any regulated air contaminant to undergo an air permit review. This application satisfies the requirement.

20.2.73 (Notice of Intent and Emissions Inventory Requirements) **[Applicable]**

This Part requires sources that emit more than 10 tons per year of any regulated air contaminant to submit a Notice of Intent and file and Emissions Inventory. This source will comply with the applicable requirements.

20.2.74 (Prevention of Significant Deterioration) **[Not Applicable]**

This Part requires new sources that emit more than 250 tons per year of any regulated air contaminant (100 tons per year if one of the 26 listed sources) to submit a Prevention of Significant Deterioration (PSD) permit application. This project does not require a PSD major permit because it is not one of the 26 listed sources and emissions of each pollutant is less than the major source thresholds.

20.2.75 (Construction Permit Fees) **[Applicable]**

The Department shall refuse to accept any permit application without payment of the filing fee at the time the application is received by the Department. A Permit fee of $1,000 for a construction permit and accelerated review are enclosed with the application.

20.2.77 (New Source Performance Standards) **[Not Applicable]**

Federal regulations in 40 CFR Part 60 are incorporated by reference as they exist on November 30, 2006, except for the following: Subpart A (Sections 60.2), Subpart AAA, and Subpart HHHH. There are no applicable New Source Performance Standards that apply to this facility.

20.2.78 (Hazardous Air Pollutants) **[Not Applicable]**

Part 78 addresses hazardous air contaminants. NESHAP, as found in 40 CFR Part 61, are adopted by reference as they exist on November 30, 2006. This Part does not apply because the facility does not contain equipment listed in the Federal Regulation.

20.2.79 (Permits – Nonattainment Areas) **[Not Applicable]**

This Part requires new sources that are located in located within a nonattainment area to obtain a permit from the department. This Part does not apply because the project area is classified as "in attainment" for all pollutants.

20.2.80 (Stack Heights) **[Applicable]**

This Part indicates that no credit will be given to new sources whose stack exceeds good engineering practice (GEP). The stacks at this source do not exceed GEP standards as prescribed by the regulation.

20.2.81 (Western Backstop Sulfur Dioxide Trading Program) **[Not Applicable]**

The Western Regional Air Partnership (WRAP) set stepped sulfur dioxide emissions reduction milestones though the year 2018 for large industrial sources, including PSD sources. This does not emit sulfur dioxide, so this Part does not apply.

20.2.82 (MACT Standards for Source Categories of Hazardous Air Pollutants) **[Not Applicable]**

The national emissions standards for hazardous for source categories, as found in 40 CFR Part 63, are adopted by reference as they exist on November 30, 2006. This Part does not apply because the facility does not emit HAPs in excess of the 10/25 TPY threshold.

5.2 FEDERAL REGULATIONS

PSD, 40 CFR Part 52 **[Not Applicable]**

Total project emissions are below the significant emissions rate (SER) for a major modification at a listed PSD source for several pollutants. The Vado Renewable Energy Station does not fire fossil fuels as a part of routine operations or during startup (the units are started on a combination of renewable non-fossil fuels). The project is not included in one of the 26 source categories that set the PSD major threshold at 100 TPY because no fossil fuels are fired. Therefore, the project does not require a PSD major source permit.

NSPS, 40 CFR Part 60 **[Not Applicable]**

The facility does not have any sources subject to a source-specific NSPS, so this Part does not apply.

NESHAP, 40 CFR Part 61 **[Not Applicable]**

This facility is not an affected source under any of the Subparts of Part 61.

NESHAP, 40 CFR Part 63 **[Not Applicable]**

Section 112 of the Clean Air Act identifies and establishes the regulations of Hazardous Air Pollutants (HAPs). HAP emissions from the facility will not exceed the 10/25 TPY threshold. Therefore, none of the MACT standards listed in CFR Part 63 apply.

CAM, 40 CFR Part 64 **[Not Applicable]**

Compliance Assurance Monitoring (CAM) applies to any pollutant-specific emission unit at a major source that is required to obtain a Title V permit. The facility is not a major source, so CAM does not apply.

Stratospheric Ozone Protection, 40 CFR Part 82 **[Not Applicable]**

The facility does not produce, consume, recycle, import, or export any controlled substances or controlled products as defined in this Part; nor will the facility perform service that involves ozone-depleting substances on motor (fleet) vehicles. Therefore, as currently operated, the facility is not subject to these requirements. However, to the extent that the facility has air-conditioning units that apply, compliance with Part 82 will be required.

A Class II ambient air quality analysis was conducted for particulate matter (PM), including PM less than or equal to ten microns (PM_{10}) and PM less than or equal to 2.5 microns ($PM_{2.5}$).

6.1 SOURCE PARAMETERS

As shown in the permit application, the Terminal emits air contaminants through nine separate particulate dust collectors: six (6) dust collectors are located on top of the five silos, and three (3) dust collectors are located at the silo unloading points. Silos 1-4 (currently storing cement) are each controlled with a single dust collector, whereas Silo 5 (currently used to store fly ash) is equipped with two dust collectors; the second collector for Silo 5 is used when multiple tank trucks are simultaneously unloading material into the silo. The emissions from the unloading (loadout) points actually vent through dust collectors located near the silo unloading spouts. The loadout point for Silos 1-3 share one dust collector; the loadout for Silos 4 and 5 each have separate dust collectors.

The dust collectors and loadout sources were modeled for continuous operation (8,760 hours per year) using DCL's guaranteed hourly emission rates with a 30% safety factor applied. Actual emissions are considerably less, because the Facility has restricted hours of operation. Table 6-1 (on the following page) identifies the sources of emissions at the Terminal.

TABLE 6-1: TERMINAL EMISSIONS SOURCE PARAMETERS

Source	Height (m)	Diameter (m)	Exit Velocity (m/sec)	Temp (K)	Process Rate (ton/hr)	TSP (lb/hr)	TSP (g/s)	PM_{10} (lb/hr)	PM_{10} (g/s)	$PM_{2.5}$ (lb/hr)	$PM_{2.5}$ (g/s)
Silo 1 Dust Collector	27.1	1.0	0.001	Amb.	200.0	0.117	0.015	0.094	0.012	0.036	0.005
Silo 2 Dust Collector	27.1	1.0	0.001	Amb.	200.0	0.117	0.015	0.094	0.012	0.036	0.005
Silo 3 Dust Collector	27.1	1.0	0.001	Amb.	200.0	0.117	0.015	0.094	0.012	0.036	0.005
Silo 4 Dust Collector	22.9	1.0	0.001	Amb.	60.0	0.117	0.015	0.094	0.012	0.036	0.005
Silo 5 Dust Collector 1	22.9	1.0	0.001	Amb.	60.0	0.117	0.015	0.094	0.012	0.036	0.005
Silo 5 Dust Collector 2	22.9	1.0	0.001	Amb.	60.0	0.117	0.015	0.094	0.012	0.036	0.005
Loadout (Silos 1-3)	6.3	-	-	-	150.0	0.117	0.009	0.094	0.007	0.036	0.003
Loadout (Silo 4)	6.1	1.0	0.001	Amb.	150.0	0.117	0.015	0.094	0.012	0.036	0.005
Loadout (Silo 5)	6.1	1.0	0.001	Amb.	150.0	0.117	0.015	0.094	0.012	0.036	0.005
Holly Haul Road 1-74	2.5	-	-	-	-	0.013	0.001	-	-	-	-

[A] Emission rates are based on the manufacturer's guaranteed rate, 0.0075 Gr. Cu. Ft., and the actual flow rate, 1400 CFM. See DCL Dust Collector Efficiency Statement.

[B] An engineering factor of 1.3 was used for the dust collectors and loadout to ensure the hourly limits were not exceeded.

[C] A correction factor of 0.6 was used for Loadout (Silos 1-3) and for the Holly Haul Road. Per City of Albuquerque's Air Dispersion Modeling Guidelines (07/16/08), a correction factor of 0.6 is appropriate for fugitive emission sources with release heights less than 10m.

[D] PM_{10} emission rates are 80% of the above TSP rates and $PM_{2.5}$ emission rates are 31% of the above TSP rates per cement industry information and AP-42 Section 13.2.4.

[E] The uncontrolled TSP emission rate for the Holly Asphalt haul road is 0.95 lb/hr (see Road Emissions Spreadsheet); the Holly Haul Road was modeled using 74 volume sources.

[F] The rated capacity of the bucket elevator (serving Silos 1-3) is 200 tons per hour. The modeled silo loading rate is 4,800 tons per day.

[G] The loadout for Silos 1-3 is rated at 150 tons per hour. The modeled unloading rate is 3,600 tons per day.

[H] The Silo 4 and/or Silo 5 load out rate is 150 tons per hour, but only one loadout can operate at a time. However, the modeled load out rate for each source is 3,600 tons per day.

All sources (except the loadout for Silos 1-3 and Holly Haul Road) were modeled as point sources. Since the exit stacks are horizontal, the stack diameter was set at 1.0 meters and exit velocity was set at 0.001 meters, per second (m/sec) per New Mexico Environment Department Air Quality Bureau modeling guidelines (http://www.nmenv.state.nm.us/aqb/modeling/modelingfaq.html). The unloading spout for silos 1-3 is actually enclosed within the truck loading building located under the silos. The emissions, subsequently, are not directly emitted to the atmosphere; therefore, the loadout for silos 1-3 is considered a fugitive source and was modeled as a volume source.

As noted earlier, dust collector and loadout emissions were based on the manufacturer's guaranteed rate, 0.0075 Grains per cubic foot, the actual flow rate (1400 CFM) and a 30% safety factor. Trinity assumed all sources operated continuously for 8,760 hours per year at maximum hourly emission rates for modeling purposes. In reality, the dust collectors only operate when the terminal is loading or unloading individual silos. The haul roads within the facility were not modeled because they are paved and the Terminal performs routine vacuum sweeping of the roads and mitigates spills as soon as possible. The dispersion modeling for PM_{10} and $PM_{2.5}$ was conducting using the sources as described above.

Since the haul road for the adjacent Holly Asphalt property is a source of large (>10 microns) particles, cumulative modeling for TSP was performed as required by division's modeling guidelines[1]. Therefore, the sources listed in Table 6-1 plus the Holly Asphalt haul road were included in the TSP model run. The fence line for the Holly Asphalt property was drawn according to property ownership which was obtained from Albuquerque's GIS website (http://vistagrande.cabq.gov/website/newgen/viewer.htm). The total emission rate for the haul road was determined to be 0.95 g/s using the uncontrolled emission factors from AP-42 Section 13.2.1 and by using the number of trips per year (based on 56 trucks per day at 365 days per year). The total emission rate (0.95 g/s) was divided by the 74 adjacent volume sources representing the haul road. Thus, the modeled emission rate for each volume source was 0.001 g/s. Plume depletion was also incorporated. The modeled parameters for the Holly Asphalt haul road are shown below in Table 6-2.

TABLE 6-2: HOLLY ASPHALT HAUL ROAD - VOLUME SOURCE PARAMETERS

Release Height[A] (m)	Horizontal Sigma[B] (m)	Vertical Sigma[C] (m)	TSP[D] (g/s)
2.5	2.79	2.32	0.001

[A] Height of the volume source (5m) divided by 2.
[B] Length of the volume source (6m) divided by 2.15.
[C] Height of the volume source (5m) divided by 2.15.
[D] Determined by dividing the total emission rate (0.95 g/s) by the number of volume sources (74). Total emission rate (0.05 g/s) was calculated using the uncontrolled emission factors from AP-42 Section 13.2.1.
[E] Parameters characterize each one of the seventy-four adjacent volume sources for the haul road.

6.2 MODEL METHODOLOGY

The modeling will be conducted in accordance with the New Mexico Air Quality Bureau's Air Dispersion Modeling Guidelines (April 2007) and *Guideline on Air Quality Models* (GAQM) in 40 CFR 51, Appendix W, where applicable.

Model Selection

The analysis for comparison to the NMAAQS and NAAQS for PM_{10}/TSP was conducted using the Industrial Source Complex PRIME (ISC3 PRIME) version dated September 26, 2004, per the division's modeling guidelines[2]. Regulatory default modeling settings for options such as stack-tip downwash, dry deposition, and missing data processing were utilized in the modeling.

Background Concentrations

Monitoring data from the City of Albuquerque were used for TSP, PM_{10}, and $PM_{2.5}$ background values, as shown in Table 6-3.

TABLE 6-3. BACKGROUND PARTICULATE MATTER CONCENTRATIONS

Averaging Period	TSP ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
24-hour	31	31	6.5
Annual	31	31	6.5

Receptor Grids

Ground-level concentrations are calculated for receptors located on the fence line and two Cartesian grids covering a region that extends 5 km from all edges of the Terminal. The grids are defined as follows:

- A Fence Line Grid containing 50 meter-spaced receptors located along the facility fence line;
- A Fine Grid containing 100 meter-spaced receptors, extending approximately to 500 m from the fence line; and
- A Medium Grid containing 500 meter spacing beginning 500 m beyond the fence line to 5 km.

These grids are displayed in the model as discrete receptors so that the receptors s~~o that the receptors~~ that are within the property boundary can be removed by the BREEZE modeling software.

Terrain

Receptor terrain elevations were entered into the model using the highest elevations extracted from USGS 7.5-minute digital elevation model (DEM) data of the area surrounding the proposed site. For

[2] Air Dispersion Modeling Guidelines for Air Quality Permitting, City of Albuquerque Environmental Health Department, Air Quality Division Permitting & Technical Analysis Section, June 1, 2007

each receptor elevation, the maximum terrain elevation associated with the four DEM points surrounding the receptor was selected.

Meteorological Data

The model runs were performed using the 1986 to 1990 meteorological data taken from Albuquerque surface station and upper air station. The meteorological data is the data set that was pre-processed by the City of Albuquerque and posted on their website.

Building Wake Effects (Downwash)

In order to account for building wake effects, direction-specific building dimensions used as input to the model were calculated using the algorithms of the U.S. EPA-sanctioned Building Profile Input Program (BPIP). BPIP is designed to incorporate the concepts and procedures expressed in the GEP Technical Support document, and the Building Downwash Guidance document while incorporating the enhancements to improve prediction of ambient impacts in building cavities and wake regions.

Plume Depletion

Plume depletion was used in the cumulative TSP model run for the Holly Asphalt haul road by selecting dry deposition in the control options. The particle size distribution (see Table 6-4) for supercoarse particles was obtained from City of Albuquerque Air Quality Division via e-mail and modeled for each of the 74 volume sources.

TABLE 6-4. PARTICLE SIZE DISTRIBUTION

Particle Size Category	Mass Mean Diameter	Fraction	Density
10-30	21.54	1.0	2.5

6.3 MODEL RESULTS

Table 6-5 summarizes the maximum 24-hour concentration from the period 1986 to 1990. Based upon these results, the source emission rates as listed in Table 6-1 do not impact ambient air quality surrounding the Terminal. Trinity believes these results to be conservative, because all sources emitted continuously at their maximum permitted operating rates in the model.

TABLE 6-5. TSP, PM_{10}, AND $PM_{2.5}$ ANALYSIS RESULTS

Pollutant	Background Concentration	24-hour			Annual			24-hour Modeled + Background ($\mu g/m^3$)	Annual Modeled + Background ($\mu g/m^3$)	In compliance with the Standard?
		Max. Concentration ($\mu g/m^3$)	UTM	Ambient Standard ($\mu g/m^3$)	Max. Concentration ($\mu g/m^3$)	UTM	Ambient Standard ($\mu g/m^3$)			
$PM_{2.5}$	6.5	7.67	351030.59E 3888677.5N	65	1.77	351030.59E 3888677.5N	15	14.17	8.27	YES
PM_{10}	31	18.32	351030.59E 3888677.5N	150	4.22	351030.59E 3888677.5N	50	49.32	35.22	YES
TSP	31	25.49	351171.56E 3888800.5N	150	8.3	351213.5E 3888693.5N	60	56.49	39.3	YES

APPENDIX A

EMISSION CALCULATIONS

Note: Attached are the uncontrolled/controlled emissions calculations for the Facility as well as the emissions calculations for American Cement's roadway.

Uncontrolled TSP Emissions

Source	Process Rate (ton/hr)	Total PM (Uncontrolled) Emission Factor[D]	TSP (lb/hr)	TSP (ton/yr)	PM_{10}[E] (lb/hr)	PM_{10}[E] (tons/yr)	$PM_{2.5}$[E] (lb/hr)	$PM_{2.5}$[E] (tons/yr)
Silo 1[A]	200	0.72	144.0	630.7	115.2	504.6	44.6	195.5
Silo 2[A]	200	0.72	144.0	630.7	115.2	504.6	44.6	195.5
Silo 3[A]	200	0.72	144.0	630.7	115.2	504.6	44.6	195.5
Silo 4	60	3.14	188.4	825.2	150.7	660.2	58.4	255.8
Silo 5	60	3.14	188.4	825.2	150.7	660.2	58.4	255.8
Loadout (Silos 1-3)[B]	150	0.995	149.3	653.7	119.4	523.0	46.3	202.7
Loadout (Silo 4)[C]	150	0.995	149.3	653.7	119.4	523.0	46.3	202.7
Loadout (Silo 5)[C]	150	0.995	149.3	653.7	119.4	523.0	46.3	202.7
Roadways			30.1	143.7	5.9	28.0	0.9	4.2
Total			**1286.6**	**5647.4**	**1005.2**	**4403.0**	**389.5**	**1706.1**

[A] The rated capacity of the bucket elevator (serving Silos 1-3) is 200 tons per hour.

[B] The loadout rate for silos 1-3 is 150 tons per hour.

[C] The loadout rate for silos 4 and 5 is 150 tons per hour, but only one silo can be unloaded at a time.

[D] Emission Factors are in units of lb of PM per ton of material loaded and were obtained from AP-42 (6/06), Section 11.12.

[E] Emission Factors are in units of lb of PM per ton of material loaded and were obtained from AP-42 (6/06), Section 11.12.

Controlled TSP Emissions

Source	Guaranteed Emission Rate[A] (gr/dscf)	Flow Rate (acfm)	Factor[B]	TSP (lb/hr)	TSP (tons/yr)	PM10[C] (lb/hr)	PM10[C] (tons/yr)	PM2.5[C] (lb/hr)	PM2.5[C] (tons/yr)
Silo 1	0.0075	1400	1.3	0.12	0.51	0.09	0.41	0.04	0.16
Silo 2	0.0075	1400	1.3	0.12	0.51	0.09	0.41	0.04	0.16
Silo 3	0.0075	1400	1.3	0.12	0.51	0.09	0.41	0.04	0.16
Silo 4	0.0075	1400	1.3	0.12	0.51	0.09	0.41	0.04	0.16
Silo 5 Dust Collector 1	0.0075	1400	1.3	0.12	0.51	0.09	0.41	0.04	0.16
Silo 5 Dust Collector 2	0.0075	1400	1.3	0.12	0.51	0.09	0.41	0.04	0.16
Loadout (Silos 1-3)	0.0075	1400	0.78	0.07	0.31	0.06	0.25	0.02	0.10
Loadout (Silo 4)	0.0075	1400	1.3	0.12	0.51	0.09	0.41	0.04	0.16
Loadout (Silo 5)	0.0075	1400	1.3	0.12	0.51	0.09	0.41	0.04	0.16
Roadways				3.01	14.37	0.59	2.80	0.09	0.42
Total				**4.01**	**18.78**	**1.39**	**6.33**	**0.40**	**1.79**

[A] Guaranteed emission rate obtained from DCL Dust Collector Efficiency Statement.

[B] An engineering factor of 1.3 was used to ensure the hourly limits are not exceeded. A factor of 0.6 was then applied to Loadout (Silos 1-3) emissions per Division's Modeling Guidelines.

[C] PM_{10} emission rates are 80% of the above TSP rates and $PM_{2.5}$ emission rates are 31% of the above TSP rates per cement industry information and AP-42 Section 13.2.4.

Road Emissions

$$E_{ext} = \left[k \left(\frac{sL}{2} \right)^{0.65} \left(\frac{W}{3} \right)^{1.5} - C \right] \left(1 - \frac{P}{4N} \right)$$

Based upon AP-42 13.2.1.3 (11/06), Equation 2 Where:

E_{ext} = annual or other long-term average emission factor in the same units as k *(E_{ext} denoted E below)*
k = particle size multiplier for particle size range and units of interest
sL = road surface silt loading (g/m^2)
W = mean vehicle weight (tons)
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear
P = number of days with precipitation or snow covering 0.01" of roadway
N = number of days in the averaging period

PM_{30} Emissions

Vehicle Type	Cement Trucks (paved)	
S	12.00	(mph)
W	45.00	(tons)
P[a]	80	(days)
k[b]	0.082	(lb/VMT)
sL[c]	12.0	
C[c]	0.00047	(lb/VMT)
N	365	
E (uncntrl)	14.43	(lb/VMT)
E (ctrl)[e]	1.44	(lb/VMT)
Distance Traveled	0.25	(mile/trip)
Trips/yr[f]	73,000	
Uncontrolled PM_{30}	30.06	(lb/hr)
	143.70	**(tpy)**
Controlled PM_{30}	3.01	(lb/hr)
	14.37	**(tpy)**

PM_{10} Emissions

Vehicle Type	Cement Trucks (paved)	
S	12.00	(mph)
W	45.00	(tons)
P[a]	80	(days)
k[b]	0.016	(lb/VMT)
sL[c]	12.0	
C[c]	0.00047	(lb/VMT)
N	365	
E (uncntrl)	2.82	(lb/VMT)
E (ctrl)[e]	0.28	(lb/VMT)
Distance Traveled	0.25	(mile/trip)
Trips/yr[f]	73,000	
Uncontrolled PM_{10}	5.87	(lb/hr)
	28.03	**(tpy)**
Controlled PM_{10}	0.59	(lb/hr)
	2.80	**(tpy)**

$PM_{2.5}$ Emissions

Vehicle Type	Cement Trucks (paved)	
S	12.00	(mph)
W	45.00	(tons)
P[a]	80	(days)
k[b]	0.002	(lb/VMT)
sL[c]	12.0	
C[c]	0.00047	(lb/VMT)
N	365	
E (uncntrl)	0.42	(lb/VMT)
E (ctrl)[e]	0.04	(lb/VMT)
Distance Traveled	0.25	(mile/trip)
Trips/yr[f]	73,000	
Uncontrolled $PM_{2.5}$	0.88	(lb/hr)
	4.20	**(tpy)**
Controlled $PM_{2.5}$	0.09	(lb/hr)
	0.42	**(tpy)**

[a] Average number of days with sufficient rainfall/snow cover based upon conservative estimate from AP-42 (11/06), Figure 13.2.1-2

[b] Constants based upon AP-42 (11/06), Table 13.2.1-1 and 13.2.2-2, Industrial Roads

[c] Constants based upon AP-42 (11/06), Table 13.2.1-4 (Concrete Batching)

[d] Constants based upon AP-42 (11/06), Table 13.2.1-3 and 13.2.1-2

[e] 90% control based on biweekly sweeping

[f] Based on 200 trucks per day, 365 days per year.

APPENDIX B

MODELING FILES (CD)