January 20, 2023

City of Albuquerque
Environmental Health Department
Air Quality Program, and
Albuquerque/Bernalillo County
Air Quality Control Board

GCC Rio Grande, Inc.
Tijeras Portland Cement Manufacturing Facility
11783 State Highway 337 South
Tijeras, New Mexico

To whom it may concern,

GCC Rio Grande, Inc. (GCC) owns and operates a Portland cement manufacturing facility located at 11783 State Highway 337 South, Tijeras, New Mexico, referred to as the Facility. The Tijeras Plant currently operates under Title V Operating Permit #0532-RN1 (AIRS#NM/001/00008) issued by the AQCB on July 28, 2017 and was set to expire on July 28, 2022.

GCC submitted a timely and administrative complete Title V permit renewal application for Title V operating permit #0532-RN1 on July 28, 2021, twelve months before the date of expiration, pursuant to 20.11.42.A.(2).(a).(ii) New Mexico Administrative Code (NMAC). On October 4, 2021, Ms. Carina G. Munoz-Dyer from the AQP sent a letter titled, Air Quality Title V Permit Application to Renew #0532-RN1 Application Incompleteness Determination (Incompleteness Determination) and requested that additional technical information be provided to supplement the original application. GCC and AQP coordinated responses to that technical Incompleteness Determination and an updated application was submitted in August 2022 in response to that letter and subsequent responses received from the AQP.

On November 22, 2022, Ms. Carina G. Munoz-Dyer from the AQP sent a letter titled, Air Quality Operating Permit Application to Renew #0532-RN1 Deliverables Request Letter and requested that an updated submittal be provided to supplement the original and updated applications. GCC and AQP coordinated responses to the letter and an updated application is being submitted in response to that letter and subsequent responses received from the AQP.

Updated facility-wide dispersion modeling was also conducted to demonstrate compliance with National Ambient Air Quality Standards (NAAQS) and New Mexico Ambient Air Quality Standards (NMAAQS). A dispersion modeling report is attached to this application.

This application provides the necessary information for a timely and complete application in accordance with 20.11.42.12.A. GCC will provide any additional information or clarifications as requested by the department.

Sincerely,

Samantha Kretz
Environmental Engineer
GCC Tijeras

CC:
Ramses Maldonado, GCC
Sarah Vance, GCC
Vineet Masuraha, Trinity Consultants

UPDATED APPLICATION FOR TITLE V OPERATING PERMIT RENEWAL

Title V Operating Permit No. 0532-RN1
GCC Rio Grande, Inc. > Tijeras Facility

Submitted to City of Albuquerque Environmental Health Department, Air Quality Program

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Project 210501.0138

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY 1-1
  1.1 REQUEST FOR PERMIT SHIELD 1-2
  1.2 APPLICATION CONTENTS 1-2

2. PROPOSED UPDATES TO THE OPERATING PERMIT 2-1
  2.1 UPDATES TO UNPAVED ROAD LOCATIONS AND TRAFFIC 2-1
  2.2 BLASTING SOURCES PARTICULATE AND GASEOUS EMISSIONS 2-1
  2.3 REMOVAL OF RAW MATERIAL DRYERS 2-2
  2.4 UPDATES TO KILN SHORT-TERM EMISSION LIMITS 2-2
  2.5 BLENDED CEMENT PROJECT 2-2

3. APPLICATION COMPLETENESS DETERMINATIONS 3-1
  3.1 COMPLETENESS OF APPLICATION 3-1
  3.2 CONTENT OF APPLICATION 3-2

4. PROCESSES AND SOURCE DESCRIPTION 4-1

5. EMISSION QUANTIFICATION 5-1
  5.1 UPDATES TO UNPAVED ROADS 5-1
  5.2 BLASTING PARTICULATE AND GASEOUS POLLUTANT EMISSION RATES 5-2
  5.3 UPDATED SHORT-TERM KILN EMISSION LIMITS 5-3
    5.3.1 Proposed NO_x Short-Term Limit 5-5
    5.3.2 Proposed SO_2 Short-Term Limit 5-8
    5.3.3 Proposed CO Short-Term Limit 5-9

6. REGULATORY APPLICABILITY 6-1
  6.1 LIST OF CURRENT APPLICABLE RULES 6-1
  6.2 TIRE DERIVED FUEL 6-2
  6.3 NSPS PERMIT SHIELD 6-2

7. COMPLIANCE ASSURANCE MONITORING 7-1
  7.1 CAM PLAN 7-5
    7.1.1 Background 7-5
    7.1.2 Monitoring Approach 7-18

8. FEES 8-1

APPENDIX A. TITLE V OPERATING PERMIT APPLICATION FORM A-1

APPENDIX B. UPDATED SITE PLANS B-1

APPENDIX C. UPDATED EMISSION CALCULATIONS C-1

APPENDIX D. AIR DISPERSION MODELING REPORT D-1

APPENDIX E. BLASTING REFERENCE E-1

APPENDIX F. ANNUAL COMPLIANCE CERTIFICATION F-1

APPENDIX G. 40 CFR 63 SUBPART LLL O&M MANUAL G-1

APPENDIX H. CO SHORT TERM EMISSION RATE SUPPORTING DATA (ATTACHED ELECTRONICALLY) H-1

LIST OF TABLES

Table 2-1. Blended Cement Equipment and Emissions 2-3

Table 4-1. Sources, Control Equipment, and Operating Schedule 4-2

Table 4-2. List of Insignificant Sources 4-6

Table 5-1. Truck Parameters for Emissions Quantification 5-1

Table 5-2. Current and Proposed Emission Limits for Kilns 5-4

Table 5-3. Updates being requested to Section 5.1.1 of permit 5-5

Table 5-4. NO_x Stack Test Data 5-7

Table 5-5. U.S. EPA Published NO_x Emissions Data for Long-Dry Kilns 5-7

Table 5-6. SO_2 Stack Test Data 5-8

Table 5-7. U.S. EPA Published SO_2 Emissions Data for Long-Dry Kilns 5-9

Table 5-8. CO Stack Test Data 5-11

Table 5-9. GCC South Dakota Kiln Yearly CO lb/ton Summary Data 5-11

Table 5-10. GCC South Dakota Kiln CO Emissions Frequency Distribution 5-12

Table 5-11. Current and Proposed Emission Limits 5-12

Table 6-1. Applicable Regulatory Requirements for the Facility 6-1

Table 7-1. Summary of Potential CAM Subject Sources 7-1

Table 7-2. Summary of Emission Sources subject to CAM 7-3

Table 7-3. Emission Limitations 7-5

Table 7-4. Equipment Limits and Indicator 7-5

Table 7-5. Control Device Information for CAM Subject Sources 7-17

Table 7-6. Monitoring Approach for CAM 7-19

1. EXECUTIVE SUMMARY

GCC Rio Grande, Inc. (GCC) owns and operates a Portland cement manufacturing facility located at 11783 State Highway 337 South, Tijeras, New Mexico, referred to as the Facility. The Standard Industrial Classification (SIC) code for the Facility is 3241 (Portland Cement Manufacturing). The Facility operates under the jurisdiction of Air Quality Program (AQP) of the City of Albuquerque Environmental Health Department, Air Quality Program (Department) and the Bernalillo County Air Quality Control Board (AQCB).

Bernalillo County is currently in attainment or unclassifiable status for all criteria pollutants. The Facility is an existing major source with respect to Prevention of Significant Deterioration (PSD) and Title V permitting requirements. The Tijeras Plant currently operates under Title V Operating Permit #0532-RN1 (AIRS #NM/001/00008) issued by the AQCB on July 28, 2017. The Tijeras Plant is also an existing major source of Hazardous Air Pollutants (HAPs) and is subject to Portland Cement Maximum Achievable Control Technology (PC MACT) Standards under 40 Code of Federal Regulations (40 CFR) Part 63, Subpart LLL[1]. The operations and maintenance (O&M) manual required by Subpart LLL is included as an appendix to this application. Except for a few operations at the Facility, most of the operations at the Facility are not subject to New Source Performance Standards (NSPS) under 40 CFR Part 60.

The Facility is a source of air pollutants including nitrogen oxides (NO_x), carbon monoxide (CO), total suspended particulate matter (TSP), particulate matter with an aerodynamic diameter of ten microns or less (PM_{10}), particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), volatile organic compounds (VOC), sulfur dioxide (SO_2), and hazardous air pollutants (HAPs).

The current Title V permit issued on July 28, 2017, was set to expire on July 28, 2022. GCC submitted a timely and administrative complete Title V permit renewal application for Title V operating permit #0532-RN1 on July 28, 2021, twelve months before the date of expiration, pursuant to 20.11.42.A.(2).(a).(ii) New Mexico Administrative Code (NMAC). On October 4, 2021, Ms. Carina G. Munoz-Dyer from the AQP sent a letter titled, Air Quality Title V Permit Application to Renew #0532-RN1 Application Incompleteness Determination (Incompleteness Determination), and requested that additional technical information be provided to supplement the original application. GCC and AQP have been coordinating responses to that technical Incompleteness Determination and this updated application includes relevant updates in response to that letter and subsequent responses received from the AQP.

Per 40 CFR 64.5(a)(3), the Tijeras Facility is also required to address Compliance Assurance Monitoring (CAM) applicability and submit a CAM plan as part of this Title V permit renewal. CAM applicability determination and applicable CAM plan is discussed in the later section of renewal application.

[1] 40 CFR 63.1340 and 40 CFR 63.2

1.1 REQUEST FOR PERMIT SHIELD

Pursuant to NMAC 20.11.42.12(C)(9)(d), the permit shield shall remain in effect if the permit terms and conditions are extended past the expiration date of the permit pursuant to Paragraph (4), of Subsection A of 20.11.42.13 NMAC.

Since GCC submitted a timely application for the Title V renewal on July 28, 2021, and with this updated application, GCC requests that the AQP grant a permit shield.

Pursuant to NMAC 20.11.42.12(C)(9), AQCB should include in a Title V permit, a provision stating that compliance with the conditions of the permit shall be deemed compliant with any applicable requirements as of the date of permit issuance, provided that:

i) such applicable requirements are included and are specifically identified in the permit; or
ii) the department, in acting on the permit application or significant permit modification, determines in writing that other requirements specifically identified are not applicable to the source, and the permit includes the determination or a concise summary thereof.

With the original July 2021 submittal and this updated submittal and consistent with the regulation, GCC is requesting that the AQP provide a permit shield to the Tijeras Facility. Therefore, in addition to providing a summary of all of the applicable regulatory requirements, this application will also provide non-applicability determinations for certain regulations to assist AQP in determining in writing that identified regulations are not applicable to Facility operations. Please note that the non-applicability review provided in this submittal is limited to those potential applicable regulations that there may be some question of applicability, specific to the sources at the Facility. Section 6 of this report discusses the regulatory applicability and non-applicability of potentially applicable regulations for which GCC is requesting a permit shield.

1.2 APPLICATION CONTENTS

Consistent with the NMAC 20.11.42.12(A)(4) - content of application requirements, this Title V permit renewal application for Tijeras's Facility is organized as follows:

Section 2 lists the revisions requested for Title V permit under this renewal application
Section 3 discusses application completeness determination
Section 4 provides a description of sources and processes
Section 5 summarizes emission quantification
Section 6 provides a regulatory applicability analysis
Section 7 summarizes the Facility's CAM applicability and plan
Section 8 discusses applicable fees
Appendix A provides Title V permit application form
Appendix B provides updated Facility site plans
Appendix C provides updated emission calculations for applicable sources
Appendix D provides the air dispersion modeling report
Appendix E provides the reference documentation for blasting emission factors
Appendix F provides the annual compliance certification
Appendix G provides the O&M manual for 40 CFR Part 63 Subpart LLL
Appendix H provides the CEMS and production data from the GCC South Dakota kiln

2. PROPOSED UPDATES TO THE OPERATING PERMIT

With this updated Title V permit renewal application, GCC is also submitting an updated air quality impact analyses demonstrating compliance with the applicable National and New Mexico Ambient Air Quality Standards. As a part of the impact analyses, GCC modeled emissions from the existing operations. Note that as part of the updated modeling analysis completed for the Title V renewal, upon the direction of the AQP, GCC also included sources associated with the blended cement project, for which an authority to construct application was submitted to the Department on June 17, 2022. GCC proposes following updates to Operating Permit No. 532 as detailed in this section. Note that quarries 1, 2, 6, 18, 19N, and 20 as shown in site maps in Appendix B are planned to be inactive, therefore, potential emissions related to these quarries are not accounted for.

2.1 UPDATES TO UNPAVED ROAD LOCATIONS AND TRAFFIC

Unpaved road emissions have been updated based on current and future operational locations as well as the frequency and nature of vehicle travel. This results in an increase in potential to emit (PTE) for unpaved roads emissions in order to accurately represent operations. The potential vehicle miles traveled that form the basis for annual PTE calculations have also increased for the water trucks and bottom ash hauling.

Updated haul road locations are shown in Figure 4-1. Travel of water trucks on unpaved roads has also been added to the Facility PTE based on an assumption of two 6,000-gallon capacity water truck traveling on all Facility unpaved roads in the span of one hour, occurring once per hour, 365 days per year. Additionally, in response to the incompleteness item numbers 8 and 9, GCC has adjusted the following:

- Reduced the control efficiency for all haul roads from 90% to 86%[2].
- Reduced silt content to the default value of 4.8%[3].
- Updated days of precipitation > 0.01 inches to 70 days consistent with AQP guidance.
- Reduced maximum hourly sandstone trucks to 1 per hour (35.4 tph from 93 tph), note the annual throughput remains unchanged.

Additional detailed descriptions of emissions calculations for unpaved roads are included in Section 5.

2.2 BLASTING SOURCES PARTICULATE AND GASEOUS EMISSIONS

Quarry blasting emissions of NO_x, SO_2, and CO are accounted for in the current Title V permit and are based on 1 blast per hour and 48 blasts per year. This application also accounts for PM_{10} and $PM_{2.5}$ emissions from blasting based on the same potential number of blasts. Additionally, an assumption of 25,000 ft^2 for the horizontal area of each blast is applied for estimation of PM_{10} and $PM_{2.5}$ potential emissions.

GCC is also requesting an update to the NO_x, SO_2 and CO hourly emission rates for blasting to reflect maximum daily blast usage along with appropriate emission factors. The currently permitted number of

[2] Per the August 19, 2022 email from Kyle Tumpane (CABQ), the 86% control efficency is derived from a speed limit of 35 mph, watering, and effective blading performed on the unpaved haul road representing base course conditions. Default NMED's silt loading of 4.8% is also used. Reference: https://www.env.nm.gov/wp-content/uploads/sites/2/2019/10/GuidanceforAggregatePilesandHaulRoadCalcs.pdf
[3] Ibid.

blasts is not proposed to be changed on an hourly or annual basis. Additional detailed descriptions of emissions calculations for blasting emission rates are included in Section 5.

2.3 REMOVAL OF RAW MATERIAL DRYERS

Sources 3-1 #1 raw mill material dryer and 3-3 #2 raw mill material dryer no longer operate at the Facility nor are anticipated to operate in the future. Therefore, no gaseous emissions are associated with these emissions sources. The raw mills themselves, without drying capability, and air separator baghouses remain operational; therefore, the particulate matter emissions from these baghouses will be retained. The emissions proposed to be removed from the Title V permit and have been removed from PTE calculations as well as air quality modeling analyses.

2.4 UPDATES TO KILN SHORT-TERM EMISSION LIMITS

GCC also proposes to update the short-term emission limits for NO_x, SO_2, and CO for both kilns at the Facility. Current emission limits in Permit Condition 5.1.1 of the Title V Permit are based on an average hourly emission limit derived from the annual emission limits and were established previously as a part of the air quality impact analyses performed for the first Title V permit issuance in 2012 that did not evaluate the 1-hour National Ambient Air Quality Standards (NAAQS). Short-term emissions from cement kilns can vary significantly.[4,5] Factors that affect emissions are combustion temperature, fuel content and feed rate, raw material content and feed rate, and excess oxygen required for the clinker production.[6] Because these parameters are not in a steady state, corresponding formation of emissions can change rapidly during clinker production causing significant variability in short-term emissions. Therefore, currently permitted average hourly emission limits need to incorporate inherent variability of cement kilns for the proposed 1-hour emission limits. Based on a review of available facility's stack test data, published U.S. Environmental Protection Agency (EPA) and Portland Cement Association (PCA) emissions data, and data specific to GCC's other kilns in Texas (TX), South Dakota (SD), Montana (MT), Colorado (CO); short-term emission limits are proposed to incorporate variability of NO_x, SO_2, and CO hourly emissions for Tijeras kilns. These proposed limits also demonstrate and ensure compliance with the applicable air quality standards. Additional details are provided in Section 5.3. There are no physical changes in kiln operations or currently permitted long-term emission rates.

2.5 BLENDED CEMENT PROJECT

On June 17, 2022, GCC submitted an air quality permit application to the AQP and AQCB to authorize the use of more additive materials in three existing Finish Mills (the blended cement project). The project involved the installation of minor new equipment and the modification of existing equipment. The project only increased the emissions of PM, PM_{10}, and $PM_{2.5}$. Upon the direction of the AQP, GCC is including sources associated with the blended cement project as part of the site-wide modeling demonstration completed for the Title V renewal. A summary of the equipment and emissions associated with the blended cement project are below, detailed emission calculation and equipment descriptions can be found in the June 2022 application.[7]

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[4] Walter Greer and Curtis Lesslie, Variability of NO_x Emissions from Precalciner Cement Kiln Systems, 2004.
[5] Walters, May, Johnson, Macmann, and Woodward, Time-Variability of NO_x Emissions from Portland Cement Kilns, 1999.

[7] Note that 9-5, 9-6, 9-7 listed in the current TV Permit no longer exist; therefore these emission units are being used to reflect three of the new sources in the blended cement application submitted in June 2022. Furthermore, the June 2022 application applied 90% control to the release point 2-12 and 8-8 due to the release point being located completly in a building and not vented to the atmosphere (i.e., full building enclosure), however to be conservative and based on discussions with the AQP, only a 50% control is reflected for these sources.

Table 2-1. Blended Cement Equipment and Emissions

Release Point/ Control Device	Description	New or Modified	Capacity	PM Emissions		PM_{10} Emissions		$PM_{2.5}$ Emissions	
				(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
2-12	Baghouse for Additives Silos	New	8,760 hr/yr	0.056	0.244	0.056	0.244	0.0084	0.0370
8-8	Finish Mill 3 FK Pump Dust Collector	New	8,760 hr/yr	0.056	0.244	0.056	0.244	0.0084	0.0370
9-5	Loadout Spout Dust Collector	New	8,760 hr/yr	0.0084	0.037	0.0084	0.037	0.0013	0.0056
9-6	Loadout Spout Dust Collector	New	8,760 hr/yr	0.0084	0.037	0.0084	0.037	0.0013	0.0056
9-7	Loadout Spout Dust Collector	New	8,760 hr/yr	0.0084	0.037	0.0084	0.037	0.0013	0.0056
9-8	Loadout Spout Dust Collector	New	8,760 hr/yr	0.0084	0.037	0.0084	0.037	0.0013	0.0056
9-9	Loadout Spout Dust Collector	New	8,760 hr/yr	0.0084	0.037	0.0084	0.037	0.0013	0.0056
9-10	Loadout Spout Dust Collector	New	8,760 hr/yr	0.0084	0.037	0.0084	0.037	0.0013	0.0056
9-11	Loadout Spout Dust Collector	New	8,760 hr/yr	0.0084	0.037	0.0084	0.037	0.0013	0.0056
9-12	Loadout Spout Dust Collector	New	8,760 hr/yr	0.0084	0.037	0.0084	0.037	0.0013	0.0056
9-13	Loadout Spout Dust Collector	New	8,760 hr/yr	0.0084	0.037	0.0084	0.037	0.0013	0.0056
2-5	Additive Dump Hopper	Modified	120 tph	0.36	0.20	0.13	0.07	0.019	0.010
2-6	Additive Handling Baghouse	Modified	120 tph	0.067	0.04	0.022	0.012	0.006	0.003
2-7	Additive Handling Baghouse	Modified	120 tph	0.12	1.32	0.041	0.46	0.007	0.070

Release Point/ Control Device	Description	New or Modified	Capacity	PM Emissions		PM_{10} Emissions		$PM_{2.5}$ Emissions	
				(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
2-8	Additive Handling Baghouse	Modified	120 tph	0.002	0.001	0.006	0.003	0.002	0.001
8-5	Finish Mill #3 Transfer from Storage Control	Modified	8,760 hr/yr	0.15	0.66	0.050	0.23	0.010	0.030
8-6	#3 Finish Mill Control	Modified	8,760 hr/yr	0.19	0.83	0.070	0.29	0.010	0.040
8-7	#3 Finish Mill Air Separator	Modified	8,760 hr/yr	0.59	2.58	0.21	0.90	0.030	0.14
Paved	Paved Roads	New	5,200 Trucks/yr	0.69	0.34	0.14	0.070	0.030	0.020
Total Emissions				2.37	6.80	0.85	2.86	0.15	0.44

1. Outlet grain loading values (gr/dscf) and flow rates (acfm) based on manufacturer specifications for the new proposed units.
2. Assumes all dust collectors will operate 8760 hours per year
3. $PM_{2.5}$/PM_{10} Ratio based on particle size multiplier from AP-42 Section 13.4.2 (0.053/0.35)
4. The new additive handling baghouse and FK Pump dust collector will be located inside buildings and vented to the building, not to the atmosphere. Per TCEQ's 2002 Rock Crushing Guidance Document, a 90% control is appropriate for the building enclosure however based on discussions with the AQP (post submittal of the blended cement ATC application) only a 50% control has been applied conservatively. The new loadout spout dust collectors are located underneath the loadout silos and will vent to the area under the silos, not directly to the atmosphere. Trucks will enter on one side and leave through the other. As such, a 50% control is claimed for two-sided enclosure.

Please note that once AQP approves ATC for the blended cement permit application and GCC finishes construction of these sources, GCC will incorporate these sources into Title V permit upon start-up of operations of these new sources.

3. APPLICATION COMPLETENESS DETERMINATIONS

Consistent with the complete application requirements of NMAC 20.11.42.12, GCC's July 2021 submittal furnished all necessary information and data required by AQP to evaluate the Title V permit renewal application and to make its completeness determination in accordance with NMAC 20.11.42.12(A)(3) including, but not limited to the items detailed below. The requested permit modifications will not affect the existing compliance plans or schedules, related progress reports, or certification of compliance requirements. This section addresses the requirements pursuant to NMAC 20.11.42.12(A) and demonstrates that a complete application is being submitted as required for a Title V renewal application. Requirements of the Paragraphs (3) and (4), NMAC 20.11.42.12(A) are outlined in italicized font below:

3.1 COMPLETENESS OF APPLICATION

NMAC 20.11.42.12(A)(3)(a): To be deemed complete, an application must provide all information required pursuant to Paragraph (4), of Subsection A of NMAC 20.11.42.12, except that applications for permit modifications need supply such information only if it is related to the proposed change.

The required information pursuant to Paragraph (4) of NMAC 20.11.42.12 is addressed below for the proposed changes identified in this permit renewal application.

(b) If, while processing an application, regardless of whether it has been determined or deemed to be complete, the department determines that additional information is necessary to evaluate or take final action on that application, it may request such information in writing and set a reasonable deadline for a response.

GCC will continue to respond to any requests for additional information in a timely manner by the deadlines set forth by the AQP.

€ Any applicant who fails to submit any relevant facts or who has submitted incorrect information in a permit application or in a supplemental submittal shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information. In addition, an applicant shall provide further information as necessary to address any requirements that become applicable to the source after the date it filed a complete application but prior to release of a draft permit.

GCC will continue to promptly provide any corrected information, as needed, on the permit application if it is determined that submitted information needs to be updated. Additionally, if any additional requirements become applicable to the Facility after the date of submittal, GCC will ensure these requirements are met and provide further information, as necessary.

(d) The applicant's ability to operate without a permit, as set forth in Subparagraph (b), of Paragraph (1), of Subsection B of NMAC 20.11.42.2, shall be in effect from the date a timely application is submitted until the final permit is issued or disapproved, provided that the applicant adequately submits any requested additional information by the deadline specified by the department.

GCC recognizes this requirement and will continue to provide any additional information requested by the AQP in a timely manner.

3.2 CONTENT OF APPLICATION

NMAC 20.11.42.12(A)(4): Any person seeking a permit under 20.11.42 NMAC shall do so by filing a written application with the department. The applicant shall submit three copies of the permit application, or more, as requested by the department. An applicant may not omit information needed to determine the applicability of, or to impose, any applicable requirement, or to evaluate the fee amount required under 20.11.2 NMAC, Fees. Fugitive emissions shall be included in the permit application in the same manner as stack emissions, regardless of whether the source category in question is included in the list of sources contained in the definition of major source.

GCC is submitting three copies of this application to the AQP (two hard copies and one electronic). Additionally, all relevant information as applicable to the renewal application noted above have been and will continue to be included in the submittal.

(a) All applications shall be made on forms furnished by the department, which for the acid rain portions of permit applications and compliance plans shall be on nationally-standardized forms to the extent required by regulations promulgated under Title IV of the federal act;

Refer to Appendix A which includes a copy of the AQP's Title V permit application form.

(b) state the company's name and address (and, if different, plant name and address), together with the names and addresses of the owner(s), responsible official and the operator of the source, any subsidiaries or parent companies, the company's state of incorporation or principal registration to do business and corporate or partnership relationship to other permittee's subject to 20.11.42 NMAC, and the telephone numbers and names of the owners' agent(s) and the site contact(s) familiar with plant operations;

This information has been provided in Title V permit application form included in Appendix A.

(c) state the date of the application;

This application was originally submitted on July 28, 2021; and is now being updated based on discussions with the AQP with this submittal.

(d) include a description of the source's processes and products (by standard industrial classification code) including any associated with alternative scenarios identified by the applicant, and a map, such as the 7.5 minute topographic quadrangle map published by the United States geological survey or the most detailed map available showing the exact location of the source; the location shall be identified by latitude and longitude or by UTM coordinates;

Section 4 of this application provides an overview of Facility operations and a topographical map of the Facility is contained in Figure 4-1.

(e) for all emissions of all air pollutants for which the source is major and all emissions of regulated air pollutants, provide all emissions information, calculations and computations for

the source and for each emissions unit, except for insignificant activities (as defined in Subsection R of 20.11.42.7 NMAC); this shall include:

(i) a process flow sheet of all components of the facility which would be involved in routine operations and emissions;
(ii) identification and description of all emission points in sufficient detail to establish the basis for fees and applicability of requirements of the state and federal acts;
(iii) emissions rates in tons per year, pounds per hour and other terms necessary to establish compliance consistent with the applicable standard reference test method;
(iv) specific information such as that regarding fuels, fuel use, raw materials, or production rates, to the extent it is needed to determine or regulate emissions;
(v) identification and full description, including all calculations and the basis for all control efficiencies presented, of air pollution control equipment and compliance monitoring devices or activities;
(vi) the maximum and standard operating schedules of the source, as well as any work practice standards or limitations on source operation which affect emissions of regulated pollutants;
(vii) an operational plan defining the measures to be taken to mitigate source emissions during startups, shutdowns and emergencies;
(viii) other relevant information as the department may reasonably require or which are required by any applicable requirements (including information related to stack height limitations developed pursuant to Section 123 of the federal act); and
(ix) for each alternative operating scenario identified by the applicant, all of the information required in Items (i) through (viii) above, as well as additional information determined to be necessary by the department to define such alternative operating scenarios;

Information regarding item (i) through (viii) are provided in Sections 4 and 5 of this application. There are no substantial changes in all the information submitted to AQP as a part of the initial permit application and subsequent submittals. Consistent with NMAC 20.11.42.12(A)(3)(a), all information related to the proposed changes being requested as part of this renewal application has been provided as part of this submittal (as well as the original July 2021 submittal). GCC currently does not have any alternative operating scenarios in place.

(f) provide a list of insignificant activities (as defined in Subsection R of 20.11.42.7 NMAC) at the source, their emissions, to the extent required by the department, and any information necessary to determine applicable requirements;

A list of insignificant sources is included in Section 4.

(g) provide a citation and description of all applicable air pollution control requirements, including:

(i) sufficient information related to the emissions of regulated air pollutants to verify the requirements that are applicable to the source; and
(ii) a description of or reference to any applicable test method for determining compliance with each applicable requirement;

All applicable requirements along with their citations and descriptions, as they pertain to the extent of the proposed changes being requested in this renewal application, have been included in this submittal under Section 6.

(h) provide an explanation of any proposed exemptions from otherwise applicable requirements;

GCC is not proposing or seeking any exemptions from otherwise applicable requirements.

(i) provide other specific information that may be necessary to implement and enforce other requirements of the state or federal acts or to determine the applicability of such requirements, including information necessary to collect any fees owed under 20.11.2 NMAC, Fees;

Relevant information to inform the AQP of any changes to the facility wide pollutant totals (as it relates to the annual fees outlined in Section 6.11 of the operating permit) can be found in Appendix C of this updated submittal..

(j) for applications which:

> ***(i) are required pursuant to the transition schedule in Subparagraph (b), of Paragraph (2), of Subsection A of 20.11.42.12 NMAC; or***
> ***(ii) for subsequent applications or modifications, where emissions or anticipated emissions have increased since modeling for a modification or new source construction was reviewed under 20.11.41 NMAC or 20.11.42 NMAC: submit a dispersion modeling analysis, using EPA approved models and procedures, showing whether emissions from the source would cause air pollutant concentrations in excess of any New Mexico ambient air quality standard for nitrogen oxides, sulfur oxides, total suspended particulates or non-methane hydrocarbons, or any national ambient air quality standard; air pollutants that are not emitted in significant amounts (as defined in 40 CFR 52.21(b)(23)(i)) during routine operations need not be modeled; the department may waive modeling with respect to ozone if the department determines that emissions from the source are not likely to cause ozone concentrations in excess of the national ambient air quality standard;***

A dispersion modeling analysis was conducted for Facility-wide emissions and demonstrated compliance with the National and New Mexico Ambient Air Quality Standards. The details of the updated dispersion modeling analysis are contained in the attached dispersion modeling report in Appendix D.

(k) provide certification of compliance, including:

> ***(i) a certification, by a responsible official consistent with Paragraph (5), of Subsection A of 20.11.42.12 NMAC of the source's compliance status for each applicable requirement;***
> ***(ii) a statement of methods used for determining compliance, including a description of monitoring, record keeping, and reporting requirements and test methods;***
> ***(iii) a statement that the source will continue to be in compliance with applicable requirements for which it is in compliance, and will, in a timely manner or at such schedule expressly required by the applicable requirement, meet additional applicable requirements that become effective during the permit term;***
> ***(iv) a schedule for submission of compliance certifications during the permit term, to be submitted no less frequently than annually, or more frequently if specified by the underlying applicable requirement or by the department; and***

(v) a statement indicating the source's compliance status with any enhanced monitoring and compliance certification requirements of the federal act;

Section 11 of the Title V permit application form provided in Appendix A includes a certification for the application. Appendix F of this application also contains the Annual Compliance Certification which demonstrates the methods of compliance and the compliance status.

(l) for sources that are not in compliance with all applicable requirements at the time of permit application, provide a compliance plan that contains:

(i) a description of the compliance status of the source with respect to all applicable requirements;

(ii) a narrative description of how the source will achieve compliance with such requirements for which it is not in compliance;

(iii) a schedule of remedial measures, including an enforceable sequence of actions with milestones, leading to compliance with such applicable requirements; the schedule of compliance shall be at least as stringent as that contained in any consent decree or administrative order to which the source is subject, and the obligations of any consent decree or administrative order shall not be in any way diminished by the schedule of compliance; any such schedule of compliance shall be supplemental to, and shall not prohibit the department from taking any enforcement action for noncompliance with, the applicable requirements on which it is based;

(iv) a schedule for submission of certified progress reports no less frequently than every six months; and

(v) for the portion of each acid rain source subject to the acid rain provisions of Title IV of the federal act, the compliance plan content requirements specified in this paragraph, except as specifically superseded by regulations promulgated under Title IV of the federal act with regard to the schedule and method(s) the source will use to achieve compliance with the acid rain emissions limitations.

At the time of the permit renewal application (in July 2021) and this submittal, GCC believes that all sources are in compliance with applicable requirements except where GCC has been granted an extension for compliance.

4. PROCESSES AND SOURCE DESCRIPTION

The Facility is a Portland cement manufacturing plant owned and operated by GCC Rio Grande, Inc. The Facility is equipped with several dust collectors throughout the Facility which provide control of particulate emissions for various processes. Fugitive particulate emissions are also limited through Facility design, procedures, and best operating practices that have been implemented at the Facility.

Pursuant to requirements set forth in NMAC 20.11.42.12(A)(4)(a), (b) and (c) a Title V operating permit application form is furnished in Appendix A which provides the details associated with company's name, address, responsible official, any subsidiaries or parent companies as applicable, and the date of the application;

Note that information associated with permit application requirements pursuant to NMAC 20.11.42.12(A)(4)(e)(i) and (vii) have not changed since the initial Title V application or subsequent submittal in 2011 or 2016. Pursuant to NMAC 20.11.42.12(A)(4)(d) and 20.11.42.12(A)(4)(e)(ii), a description of the processes and products and emission sources at the Facility can be found in the section below.

The Tijeras Facility has several systems used in manufacturing of Portland cement. These systems include an onsite limestone mining operation, a crushing and screening system, ball-type raw mills used for grinding raw materials into raw meal (kiln feed), a blending system used for homogenization of raw meal, a raw meal metering system, a raw meal metering feed system, pyroprocessing systems used to convert raw materials into clinker (an intermediate product), and ball-type finish mills used to grind clinker into various Portland cement products. In addition, there are many auxiliary systems and equipment associated with the Facility including storage silos and buildings, various conveying systems including belt, screw, pneumatic and airslide conveyors as well as bucket elevators. There are also many auxiliary support systems and equipment associated with the Facility including storage silos used for processing and storing various raw materials, intermediate and final products. The transferring of materials throughout the Facility is carried out by various conveying systems including belt, screw, and airslide conveyors, as well as bucket elevators. Additionally, insignificant activities on-site include processes associated with stockpiles (load-in and load-out, wind erosion), dust dumps (load-in and load-out, wind erosion), and wind erosion from quarries.

The Tijeras Plant operates two preheater rotary kilns and associated clinker coolers. Both kilns currently use coal as the primary fuel while natural gas is utilized as fuel during startup and as a supplemental back-up fuel. The kilns are also permitted to use tire derived fuel (TDF). Limestone and other raw materials are homogenized and fired in the preheater kilns to produce clinker. The clinker is cooled and conveyed to intermediate storage, then to finish mills where it is mixed with additive materials and milled into finished cement product. Cement manufacturing operations at the Tijeras Plant include on-site quarries, crushing and screening, raw material receiving, transfer, preparation, and storage, additive and finished materials transfer and storage, fuel preparation and storage, kiln system consisting of pyro-processing rotary preheater kilns, coal mills, clinker coolers, finish mills, cement transfer, storage, and shipping.

The Facility is a source of air pollutants including NO_x, CO, TSP, PM_{10}, $PM_{2.5}$, VOC, SO_2, and HAPs.

Pursuant to NMAC 20.11.42.12(A)(4)(e)(vi), the operating schedules of each source are summarized in the table below. Table 4-1 includes a detailed description of sources, control equipment, and operating schedules.

Table 4-1. Sources, Control Equipment, and Operating Schedule

Emission Unit ID	Emission Unit Description	Control Device[1]	Hourly Throughput[2]	Annual Throughput/ Hours
Quarry	Drilling	--	800	883,394
	Blasting	--	1 blast	48 blasts/yr
	Bulldozing operations	--	--	5,840 hours/yr
	Overburden activities and roads	--	420	1,839,600
	Material stockpiles	--	--	12.3 acres
	CKD stockpiles	--	--	1.5 acres
	Material handling and roads	--	800	982,259
Material Receiving, Hauling, and Handling	Sandstone	--	35	33,794
	Bottom Ash	--	70	27,569
	Iron	--	80	12,794
	Coal and TDF	--	300	96,436
	Gypsum	--	120	44,839
	CKD[4]	--	71	32,850
	Clinker Reclaim	--	120	25,000
	Outdoor material stockpiles	--	--	1.49 acres
	Indoor material stockpiles	--	--	NA
	Calcium Cake[5]	--	28	245,280
1-1	Crusher Dump Hopper	--	800	1,043,623
1-2	Primary Crusher	Fabric Filter Baghouse	800	8,760 hours/yr
1-3	Secondary Crusher	Fabric Filter Baghouse	800	8,760 hours/yr
1-4	Screens	Fabric Filter Baghouse	800	8,760 hours/yr
2-1	Rock Storage - #1	Fabric Filter Baghouse	800	1,043,623
2-2	Rock Storage - #2	Fabric Filter Baghouse	800	1,043,623
2-3	Rock Storage - #3	Fabric Filter Baghouse	800	1,043,623
2-4	Rock Storage - #4	Fabric Filter Baghouse	800	1,043,623
2-5	Additive dump hopper (Iron and Gypsum)	--	120	57,633
2-6	#1 Additive Baghouse	Fabric Filter Baghouse	120	57,633
2-7	#1A Additive Baghouse	Fabric Filter Baghouse	120	57,633
2-8	Additive Storage	Fabric Filter Baghouse	120	57,633

Emission Unit ID	Emission Unit Description	Control Device[1]	Hourly Throughput[2]	Annual Throughput/ Hours
2-9	#1 Raw Mill Feedoweight	Fabric Filter Baghouse	63.25	8,760 hours/yr
2-10	#2 Raw Mill Feedoweight	Fabric Filter Baghouse	63.25	8,760 hours/yr
2-11	Clinker reclaim dump hopper	--	120	25,000
3-1	#1 Raw Mill Air Separator	Fabric Filter Baghouse	63.25	8,760 hours/yr
3-2	#1 Raw Mill	Fabric Filter Baghouse	63.25	8,760 hours/yr
3-3	#2 Raw Mill Air Separator	Fabric Filter Baghouse	63.25	8,760 hours/yr
3-4	#2 Raw Mill	Fabric Filter Baghouse	63.25	8,760 hours/yr
4-1	Blending Silo #1 and #3	Fabric Filter Baghouse	112	8,760 hours/yr
4-2	Blending Silo #2 and #4	Fabric Filter Baghouse	112	8,760 hours/yr
4-3	Kiln Feed Bucket Elevator #1	Fabric Filter Baghouse	112	8,760 hours/yr
4-4	Kiln Feed Bucket Elevator #2	Fabric Filter Baghouse	112	8,760 hours/yr
4-5	#1 Kiln Feed Elevator	Fabric Filter Baghouse	102	8,760 hours/yr
4-6	#2 Kiln Feed Elevator	Fabric Filter Baghouse	102	8,760 hours/yr
5-1	#1 Clinker Cooler Drag Conveyor	Fabric Filter Baghouse	33.7	295,212
5-2	#2 Clinker Cooler Drag Conveyor and outdoor clinker reclaim	Fabric Filter Baghouse	153.7	320,212
5-3[3]	#1 Clinker Cooler	Fabric Filter Baghouse	33.7	8,760 hours/yr
5-4[3]	#1 Clinker Cooler	Fabric Filter Baghouse		289,308
5-5[3]	#1 Clinker Cooler	Fabric Filter Baghouse		
5-6[3]	#1 Clinker Cooler	Fabric Filter Baghouse		
5-7[3]	#2 Clinker Cooler	Fabric Filter Baghouse	33.7	8,760 hours/yr
5-8[3]	#2 Clinker Cooler	Fabric Filter Baghouse		289,308
5-9[3]	#2 Clinker Cooler	Fabric Filter Baghouse		
5-10[3]	#2 Clinker Cooler	Fabric Filter Baghouse		

Emission Unit ID	Emission Unit Description	Control Device[1]	Hourly Throughput[2]	Annual Throughput/ Hours
5-12	Outdoor coal dump hopper	--	300	96,436
5-13	Coal Crusher	Fabric Filter Baghouse	300	96,436
5-14	Coal Conveyor Transfer Tower	Fabric Filter Baghouse	300	96,436
5-15	Coal Storage Silo	Fabric Filter Baghouse	300	96,436
6-1[3]	#1 Kiln	Fabric Filter Baghouse	33.7	289,308
6-2[3]	#2 Kiln	Fabric Filter Baghouse	33.7	289,308
6-3	#1 Baghouse Dust Bin	Fabric Filter Baghouse	14	61,344
6-5				
6-4	#2 Baghouse Dust Bin	Fabric Filter Baghouse	7	60,094
6-6				
6-7	Dust Pellets From Pelletizer	Fabric Filter Baghouse	14	3,125
7-1	Clinker Bucket Elevator Tower	Fabric Filter Baghouse	187	603,616
7-2	Clinker Primary Distribution	Fabric Filter Baghouse	187	530,964
7-3	Clinker Storage Silo and Transfer	Fabric Filter Baghouse	67	70,809
7-4	Clinker Storage Silos	Fabric Filter Baghouse	67	141,618
7-5	Clinker Storage Silo and Transfer	Fabric Filter Baghouse	67	70,809
7-6	Clinker Storage Silos	Fabric Filter Baghouse	67	141,618
7-7	Clinker Secondary Distribution	Fabric Filter Baghouse	127	346,734
7-8	Clinker Storage Silo and Transfer	Fabric Filter Baghouse	67	70,809
7-9	Clinker Storage Silos	Fabric Filter Baghouse	67	260,051
7-10	Clinker Storage Silo and Transfer	Fabric Filter Baghouse	67	70,809
7-11	Clinker Storage Silos	Fabric Filter Baghouse	67	260,051
7-12	#1 Finish Mill Transfer	Fabric Filter Baghouse	67	8,760 hours/yr
7-13	#2 Finish Mill Transfer	Fabric Filter Baghouse	67	8,760 hours/yr
7-14	Clinker Transfer	--	120	15,000
8-1	#1 Finish Mill Air Separator	Fabric Filter Baghouse	44	8,760 hours/yr
8-2	#1 Finish Mill	Fabric Filter Baghouse	44	8,760 hours/yr

Emission Unit ID	Emission Unit Description	Control Device[1]	Hourly Throughput[2]	Annual Throughput/ Hours
8-3	#2 Finish Mill Air Separator	Fabric Filter Baghouse	44	8,760 hours/yr
8-4	#2 Finish Mill	Fabric Filter Baghouse	44	8,760 hours/yr
8-5	#3 Finish Mill Transfer Points	Fabric Filter Baghouse	35	8,760 hours/yr
8-6	#3 Finish Mill	Fabric Filter Baghouse	35	8,760 hours/yr
8-7	#3 Finish Mill Air Separator	Fabric Filter Baghouse	35	8,760 hours/yr
9-1	Primary Cement Storage Silos #1 - North	Fabric Filter Baghouse	192	311,383
9-2	Primary Cement Storage Silos #2 - Middle	Fabric Filter Baghouse	192	311,383
9-3	Primary Cement Storage Silos #3 - South	Fabric Filter Baghouse	192	311,383
9-4	#2 Cement Storage	Fabric Filter Baghouse	105	112,098
Shipping	Cement Haul Roads	--	--	747,320
Gen-1	Kiln Emergency Generator #1	--	150 kW	500 hours/yr
Gen-2	Kiln Emergency Generator #2	--	150 kW	500 hours/yr
Tank 1	Diesel Storage Tank #1	--	--	--
Tank 2	Gasoline Storage Tank #1 (1,000 gallon)	--	--	--
Tank 3	Diesel Storage Tank #2	--	--	--
Tank 4	Diesel Storage Tank #3	--	--	--

1. All baghouses are permitted to operate at 8,760 hours per year.
2. Units are in tons per hour unless specified otherwise in the table.
3. Consistent with Authority to Construct Permit No. 2197, exhausts from Clinker Cooler #1 and #2, Kiln #1 and #2 have been combined.
4. Pellet unloading into the CKD repository (Emission Unit 10-11) hourly and annual throughput was reduced to reflect two max hourly CKD trucks.
5. Calcium cake is added at a relatively small rate of typically 5 tons (28 tons per hour reflected in permit for operational flexibility) to the raw feed mixture. The purpose of the calcium cake material is to aid regulation of temperature in the kiln. When incorporated in the system, less coal is used. The use of calcium cake offsets the use of other raw materials that would have higher particulate emissions (due to lower moisture content), therefore any use of calcium cake would produce lower emissions than represented for other material usages. Note that any amount being stored and handled on-site is in the cake form due to which no emissions are expected during storage or handling of this cake material given its wet nature and high moisture content.

As required pursuant to NMAC 20.11.42.12(A)(4)(e)(iv), fuels, fuel use, raw materials, and productions rates for the Facility are not included as part of this submittal if there have been no changes to the previously submitted information in the original Title V application and subsequent submittal in 2011 or 2016. Proposed changes to Facility sources are outlined in Section 2 of this application. Pursuant to NMAC 20.11.42.12(A)(4)(f), Table 4-2 outlines insignificant sources at the Facility.

Table 4-2. List of Insignificant Sources

Emission Units	Process	Pollutant/Parameter
Tanks 4-19	Storage tanks	VOC <1 tpy
Quarry 1 Limestone Handling*	Load-In and Load-Out	TSP < 1 tpy PM_{10} < 1 tpy $PM_{2.5}$ < 1 tpy
5-11	Indoor hopper	TSP < 1 tpy PM_{10} < 1 tpy $PM_{2.5}$ < 1 tpy
Miscellaneous	Wind Erosion and Paved Road Activities	TSP < 1 tpy PM_{10} < 1 tpy $PM_{2.5}$ < 1 tpy
Kiln Emergency Generators (constructed in 1959)	Generators	Criteria Pollutants <1 tpy Operating Hours <500 hours
ACI System	Hg Control System	TSP < 1 tpy PM_{10} < 1 tpy $PM_{2.5}$ < 1 tpy
Various storage piles	Throughout the plant	TSP < 1 tpy PM_{10} < 1 tpy $PM_{2.5}$ < 1 tpy
Portable conveyor	Throughout the plant	TSP < 1 tpy PM_{10} < 1 tpy $PM_{2.5}$ < 1 tpy

* Note that activities at Quarry 1, if any, are still considered insignificant in nature. Limestone is no longer being pulled out of this quarry for cement processing. Minimal movement of limestone material (if at all) is reflected here to preserve any future activities.

A topographical map of the site and a plant layout are provided in the Figures below:

Figure 4-1. GCC Tijeras Topographical Map

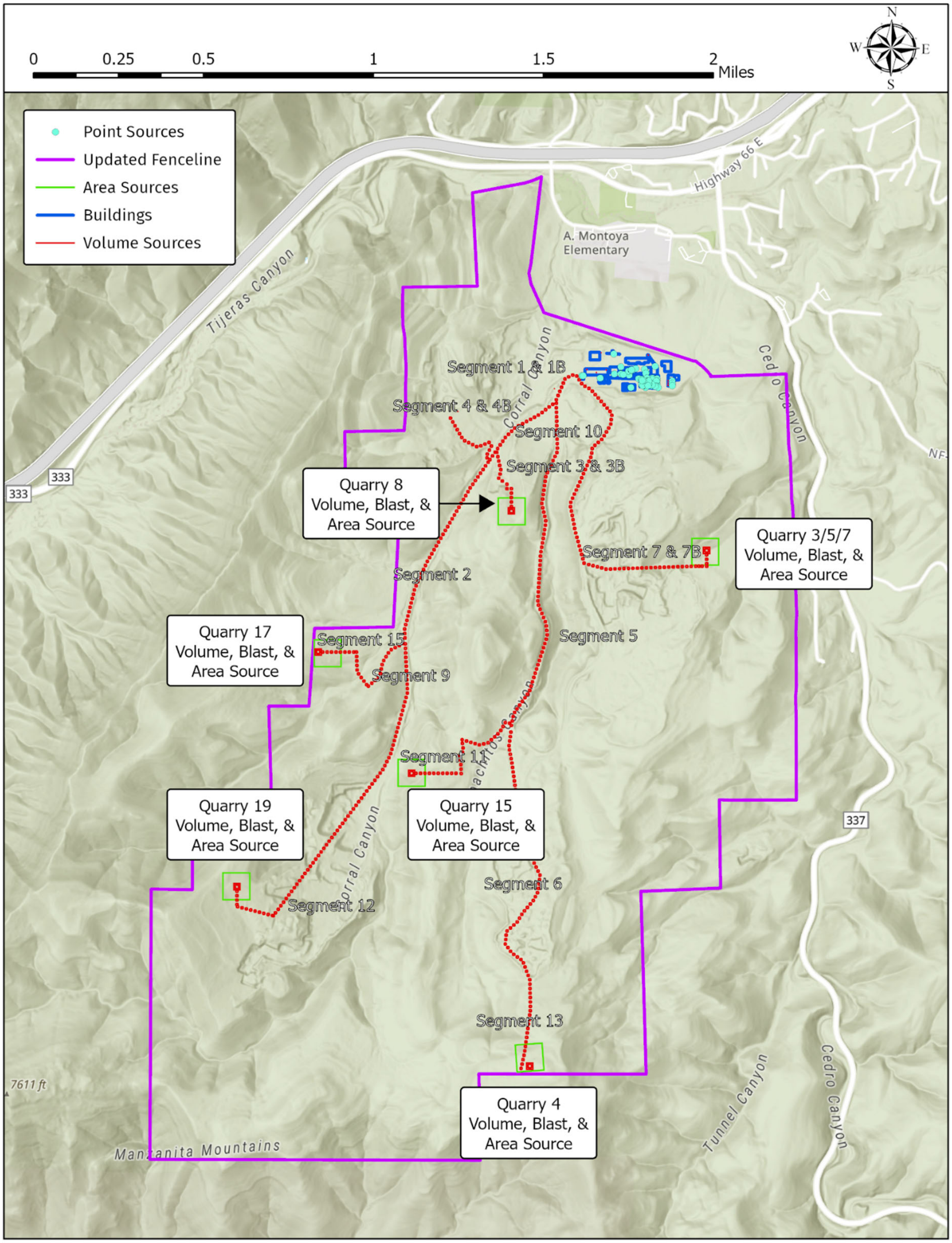
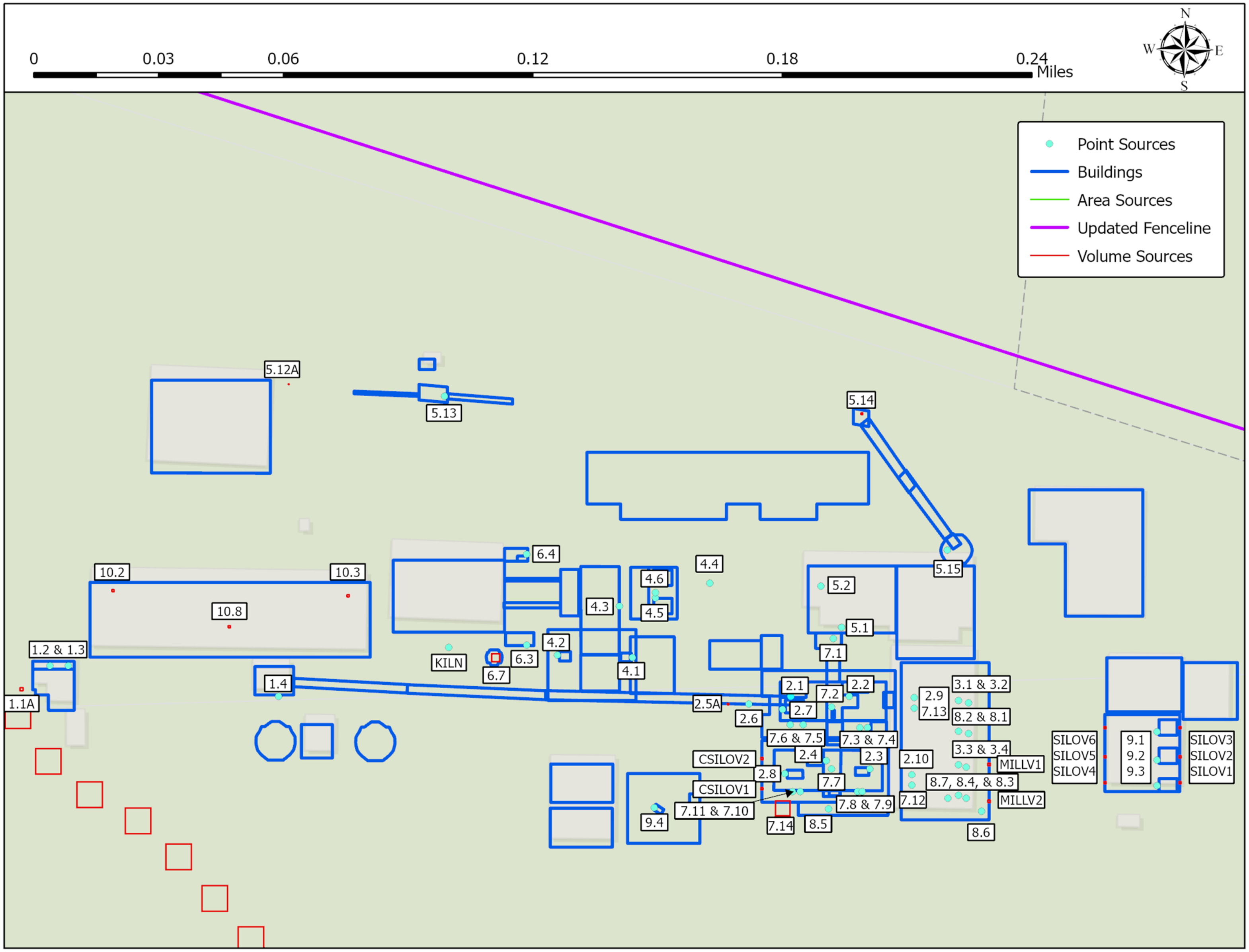


Figure 4-2. GCC Tijeras Plant Layout



5. EMISSION QUANTIFICATION

This section details emissions calculation changes for sources with proposed updates as part of this application. Emissions calculations are only described for Facility sources where emission calculations changes impact the proposed permitted emission rate.

5.1 UPDATES TO UNPAVED ROADS

As discussed in Section 2.1, Particulate matter emissions from the unpaved roads have been updated based on current and future operational locations and the frequency and nature of vehicle travel. Updated haul road locations are shown in Figure 4-1. Travel of water trucks on unpaved roads has also been added to the Facility PTE based on an assumption of two 6,000-gallon capacity water truck traveling on all Facility unpaved roads in the span of one hour, occurring once per hour, 365 days per year.

The Facility is proposing six active quarry areas: quarries 4, 19, 3-5-7, 8, 17, and 15. Limestone hauling emissions utilize the single quarry scenario with the maximum PTE, assuming that only one quarry will be active at a time. This is conservative, because rationing operations among other quarries with less than maximum PTE results in lower estimated emissions. Emissions estimates for each quarry scenario use the full potential operational throughputs allocated to each single quarry. The quarry scenario with the maximum PTE is quarry 4, which allocates limestone hauling to road segments 1, 5, and 6. The quarry scenario with maximum emissions is determined by the sum of emissions from limestone hauling and overburden hauling, as all other types of unpaved road activity are identical among each quarry scenario Note that the water truck hauling only occurs on the same segments as limestone hauling for each quarry as well as occurring on segments 1B, 3B, 4B, 7B, and 10B for all quarries as these segments are operational regardless of which quarry is operational. Quarry 4 has the greatest limestone plus overburden hauling emissions among all quarry scenarios. Other types of non-limestone and non-overburden vehicles and hauling use various road segments, of which the PTE is incorporated regardless of the quarry scenario.

The following truck capacities, weights, and throughputs in Table 5-1 below were used in development of the unpaved road emissions for each material type hauled.

Table 5-1. Truck Parameters for Emissions Quantification

Material	Truck Capacity (tons)	Truck Empty Weight (tons)	Annual Production Throughput (tons)
Limestone	35.41	34.45	982,259
Sandstone	35.41	34.45	33,794
Bottom Ash	35.41	34.45	27,569
CKD	18.00	19.50	5 trucks per day x 365 days per year
Water	30 tons for mean vehicle weight conservatively assuming truck is always full of water		8760 hours x 2 trucks per hour
Overburden	35.41	34.45	1,839,600

Overburden hauling is refined for quarry-specific road segment lengths based on the anticipated maximum travel distance. Only quarries with anticipated future overburden disturbance have potential emissions quantified, and the maximum PTE of these is used for Facility-wide calculations.

In response to incompleteness item number 9, GCC has also revised the control efficiency for unpaved haul roads to 86% from 90% and reduced silt content to the default value of 4.8%.[8] This control efficiency was also applied to the overburden truck movement as the overburden truck segments are watered/bladed similar to other road segments and are subject to the same speed restrictions. Additionally, in response to incompleteness item number 8, the days of precipitation > 0.01 inches was updated to 70 days, consistent with the 2019 NMED Guidance: *Department Accepted Values for Aggregate Handling, Storage Piles, and Haul Road Emissions.* Other methodology for estimating unpaved haul road emissions is unchanged from the methodology used to develop the PTE in the current permit. Further details of roads emission calculations are contained in Appendix C.

5.2 BLASTING PARTICULATE AND GASEOUS POLLUTANT EMISSION RATES

As discussed in Section 2.2, GCC is proposing to update PTE for NO_x, SO_2, and CO from blasting activities to more accurately represent current activities and emissions characterization. GCC is also proposing to add PTE for PM_{10} and $PM_{2.5}$ to the Title V permit, as blasting emissions for these pollutants are not included in the current Title V permit. Blasting PTE is calculated based on the following assumptions and calculation methodologies:

1 blast per day, taking place within a 1 hour period
48 blasts per year
17 tons of ANFO per blast
25,000 ft^2 of horizontal area per blast
NO_x emission factor of 1.8 lbs/ton of ANFO[9]

$$NO_x\left(\frac{lb}{ton}\right) = \left[Avg.NO_x\left(0.9\,\frac{kg}{metric\ ton}\right) * \left(2.2\frac{lb}{kg}\right) * 0.907\frac{metric\ ton}{ton}\right]$$

CO emission factor of 42.51 lbs/ton of ANFO[10]

$$CO\left(\frac{lb}{ton}\right) = \left[Avg.CO\left(17.00\,\frac{L}{kg}\right) * CO\ Molecular\ Weight\left(28.01\frac{g}{mol}\right)\right] / [\frac{[Universal\ Gas\ Constant\ (0.082\ L * Atm * Mol^{-1} * K^{-1}) * 273\ K]}{1\ Atm}] * \frac{0.002205}{0.001102}\frac{\frac{lb}{g}}{\frac{ton}{kg}}$$

SO_2 emission factor of 0.0036 lbs/ton of ANFO[11]

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[8] Per the August 19, 2022 email from Kyle Tumpane (CABQ), the 86% control efficency is derived from a speed limit of 35 mph, watering, and effective blading performed on the unpaved haul road representing base course conditions. Default NMED's silt loading of 4.8% is also used. Reference: https://www.env.nm.gov/wp-content/uploads/sites/2/2019/10/GuidanceforAggregatePilesandHaulRoadCalcs.pdf

[9] NO_x emission factor is the average of measurements from the paper "NO_x Emissions from Blasting Operations in Open-Cut Coal Mining" by Moetaz I. Attalla, Stuart J. Day, Tony Lange, William Lilley, and Scott Morgan (2008) contained in Appendix E.

[10] CO emission factor is the average of the measurements in Rowland J.H., Mainiero R., Hurd D.A. "Factors Affecting Fumes Production of an Emulsion and ANFO/Emulsion Blends." 2001 - NIOSH. Figures 12-13. Use of average emission factor from any watering condition and maximum of results from steel or galvenized steel pipe and converted from CO Liters per Kg ANFO to lb/ton.

[11] SO_2 emissions are based on a diesel sulfur content of 15 ppm assuming complete conversion to SO_2.

$$\frac{lb\ SO_2}{ton} = \ Fuel\ Oil\ Content\ (6\ \%) * \frac{S\ Content\ (15\ PPM)}{10^6} * \frac{64}{32} \left(\frac{SO_2 \frac{g}{mol}}{S \frac{g}{mol}} \right) * 2000 \frac{lb}{ton}$$

PM_{10} emission factor of 28.78 lb/blast[12]

$$PM_{10} \left(\frac{lb}{ton} \right) = 0.52 * 0.000014 * Horizontal\ Blast\ Area\ (25{,}000\ ft^2)^{1.5}$$

$PM_{2.5}$ emission factor of 1.66 lb/blast[12]

$$PM_{2.5} \left(\frac{lb}{ton} \right) = 0.03 * 0.000014 * Horizontal\ Blast\ Area\ (25{,}000\ ft^2)^{1.5}$$

The lb/ton value for each respective pollutant was multiplied by the annual (816 tons per year) and hourly (17 tons per blast assuming one blast per day within an hour) ANFO blasted to determine the annual and hourly emissions respectively.

Further details of blasting emission calculations are contained in Appendix C and Appendix E.

5.3 UPDATED SHORT-TERM KILN EMISSION LIMITS

There are no physical change or change in method of operations of both kilns as part of this request as well as there are no changes in the currently permitted long-term emission limits of both kilns. The proposed short-term emission limits for the kilns are based on available variability data for 1-hour emissions of NOx, SO_2, and CO from cement kilns. Proposed limits also ensure compliance with the applicable air quality standards, as shown in the air quality dispersion modeling analysis report provided in Appendix D. The proposed short-term emission limits for the kilns are provided in Table 5-2 and Table 5-3 below.

[12] Particulate emission factors from blasting of coal or overburden in AP-42 Table 11.9-1 (7/98)

Table 5-3 below.

Table 5-2. Current and Proposed Emission Limits for Kilns

	Current Limit (lb/hr)	Proposed Limit (lb/hr)	Change (lb/hr)
NO_x	353.85	975	621.15
SO_2	330.26	193.60	-136.66
CO	337	1,348	1,011

Table 5-3. Updates being requested to Section 5.1.1 of permit

Emission Unit	NO_x lb/hr	NO_x tpy	CO lb/hr	CO tpy	SO_2 lb/hr	SO_2 tpy
5-3[1]	~~353.85~~ **975**	1,518.87	~~337~~ **1,348.00**	1,446.54	~~330.26~~ **193.60**	1,417.61
5-4[1]						
5-5[1]						
5-6[1]						
5-7[1]						
5-8[1]						
5-9[1]						
5-10[1]						
6-1[1]						
6-2[1]						

1. Consistent with current Title V permit #0532-RN1, exhausts from Clinker Cooler #1 and #2, Kiln #1 and #2 have been combined. Compliance with Kiln (lb/hr) limits for NOx, CO, and SO_2 shall be demonstrated with annual emission testing in accordance with Condition 5.8.8.

In order to develop and propose short-term emission rate limits for 1-hour averaging period, inherent variability in NO_x, SO_2, and CO emissions from cement kilns was reviewed as a part of this request. These proposed limits provide adequate operational flexibility to Tijeras kilns and ensure compliance with the applicable federal and state air quality standards. There are no physical change or change in method of operations of both kilns because of this request. GCC will continue demonstrating compliance with the proposed short-term emission limits for NO_x, CO, SO_2 by performing annual emission testing in accordance with the Permit Condition 5.8.8.

5.3.1 Proposed NO_x Short-Term Limit

NO_x Emissions from cement kilns can vary significantly.[13] U.S. EPA and PCA have published many papers documenting inherent variability of NO_x emissions from cement kilns. Factors that affect NO_x emissions are combustion temperature, fuel content and feed rate, raw material content and feed rate, and excess oxygen required for the clinker production.[14] Because these parameters are not in a steady state, corresponding formation of emissions can change rapidly during clinker production causing significant variability in short-term emissions.

GCC reviewed historical NOx emission data available from 2016-2020 annual stack tests;

[13] Walter Greer and Curtis Lesslie, Variability of NO_x Emissions from Precalciner Cement Kiln Systems, 2004.

[14] Walters, May, Johnson, Macmann, and Woodward, Time-Variability of NO_x Emissions from Portland Cement Kilns, 1999.

Table 5-4 below summarizes emissions observed during the tests on a pounds per hour (lb/hr) basis. As shown in the tables, NO_x emissions are highly variable, which is typical for cement kilns as noted in U.S. EPA and PCA documents.

Table 5-4. NO_x Stack Test Data

	Hourly Emissions (lb/hr)			
	Min	**Max**	**Average**	**Limit**
2016	244.6	302.1	268.0	353.85
2017	245.3	345.6	300.3	353.85
2018	200.1	208.8	204.5	353.85
2019	235.1	417.7	309.8	353.85
2020	193.4	287.2	236.6	353.85
Minimum Value	193.4			
Maximum Value		417.7		

As shown above in the table, GCC only has 15-20 short-term NO_x emission data points for Tijeras Kilns. Stack testing is typically performed during stable kiln operating conditions. These operating conditions do not reflect higher NOx emissions that may typically be observed during the start-up, shutdown, other unstable operating conditions, which are inherent to any older kilns similar to Tijeras kilns. Therefore, GCC also reviewed available NO_x emission data from other publicly available sources, shown in Table 5-5.[15] [16]

Table 5-5. U.S. EPA Published NO_x Emissions Data for Long-Dry Kilns

	NO_x Emissions (lb/ton)		
Data Source	**Min**	**Max**	**Average**
AP-42	1.9	3.8	2.9
AP-42	14	15	14
AP-42	4.5	14	9.2
AP-42	NA	NA	5.8
AP-42	3.4	5.8	4.3
AP-42	4.5	7.3	5.5
AP-42	6	6.6	6.3
AP-42	6.5	6.9	6.7
AP-42	3.4	10	6.7
2007 ACT	6.1	10.5	8.6
		Average (lb/ton)	**7.0**
		Standard Deviation (lb/ton)	**3.1**

To develop a 1-hour emission limit, the average emission factors shown above must incorporate a value of variability added to the average emission factors. The appropriate hourly limit for NO_x emissions over a 1-hour period can be determined by adding three times the estimated standard deviation to the average emission factors published by the US. EPA. Addition of three standard deviations typically provide 99.7% confidence for all values within a data set.[17] GCC proposes to use 2.43 standard deviation or a short-term

[15] The U.S. EPA AP-42 Chapter 11 Emission Factor Background Information document for the Portland Cement Manufacturing: https://www.epa.gov/sites/default/files/2020-10/documents/b11s06.pdf
[16] The U.S. EPA Alternative Control Techniques Document Update - NO_x Emissions from New Cement Kilns: https://www3.epa.gov/ttncatc1/dir1/cement_updt_1107.pdf

[17] Standard deviation and confidence intervals: https://en.wikipedia.org/wiki/68%E2%80%9395%E2%80%9399.7_rule

emission factor of 14.47 lb/ton (7 lb/ton + 2.43*3.1 lb/ton). Using permitted clinker production rate of 67.4 tons per hour and this short-term emission factor of 14.47 lb/ton results in a proposed short-term emission limit of 975 lb/hr. Please note that the currently long-term permitted emission limit 353.9 lb/hr is based on an emission factor of 5.25 lb/ton, which is lower than the average of available emission factors.

Based on the results from the air quality impact analyses performed to support this updated Title V permit renewal, the proposed short-term emission limit for NO_x, also ensures compliance with the applicable air quality standards.

5.3.2 Proposed SO_2 Short-Term Limit

Similar to NO_x emissions from cement kilns, SO_2 can vary significantly.[18] U.S. EPA and Portland Cement Association (PCA) have published many papers documenting inherent variability of SO_2 emissions from cement kilns. Sulfur in cement kilns is derived from both kiln feed and kiln fuel. Depending on the temperature, excess oxygen (O_2) level, alkali level, chloride level, presence of carbon monoxide (CO) and/or other reducing species, and a number of other controlling factors, the forms of sulfur in the various zones of the cement kiln system can be highly variable. The fate of sulfur in a cement kiln system is dictated both by energy considerations (thermodynamics) and also by reaction rates (kinetics).[19] Because these parameters are not in a steady state, corresponding formation of emissions can change rapidly during clinker production causing significant variability in short-term emissions.

GCC reviewed historical SO_2 emission data available from 2016-2020 annual stack tests and Table 5-6 below summarizes emissions observed during the tests on a pounds per hour (lb/hr) basis. As shown in the tables, SO_2 emissions are highly variable, which is typical for cement kilns as noted in U.S. EPA and PCA documents.

Table 5-6. SO_2 Stack Test Data

	Hourly Emissions (lb/hr)			
	Min	**Max**	**Average**	**Limit**
2016	19.0	22.3	20.6	330.26
2017	66.1	124.0	88.8	330.26
2018	26.2	38.3	31.5	330.26
2019	0.5	2.0	1.1	330.26
2020	1.4	2.3	1.9	330.26
Minimum Value	0.5			
Maximum Value		124.0		

As shown above in the table, GCC only has 15-20 short-term SO_2 emission data points for Tijeras Kilns. Stack testing is typically performed during stable kiln operating conditions. These operating conditions do not reflect higher SO_2 emissions typically observed during the start-up, shutdown, other unstable operating

[18] Formation and Techniques for Control of Sulfur Dioxide and Other Sulfur Compounds in Portland Cement Kiln Systems: https://www.penta.net/wp-content/uploads/2021/07/Sulfur_Control_Techniques_In_Cement_Kilns.pdf.
[19] Ibid.

conditions, which are inherent to any older kilns similar to Tijeras kilns. Therefore, GCC also reviewed available SO_2 emission data from other publicly available sources.[20] [21]

Table 5-7. U.S. EPA Published SO_2 Emissions Data for Long-Dry Kilns

	SO_2 Emissions (lb/ton)		
Data Source	**Min**	**Max**	**Average**
AP-42	22	33	27
AP-42	0.16	0.022	0.092
AP-42	3.7	7	5.4
AP-42	0.16	0.81	0.38
AP-42	0.26	0.54	0.4
AP-42	3.8	10	6.7
AP-42	0.019	0.9	0.24
		Average (lb/ton)	**5.74**
		Standard Deviation (lb/ton)	**9.77**

To develop a 1-hour emission limit, the average emission factors shown above must incorporate a value of variability added to the average emission factors. The appropriate hourly limit for SO_2 emissions over a 1-hour period can be determined by adding three times the estimated standard deviation to the average emission factors published by the US. EPA. Addition of three standard deviations typically provide 99.7% confidence for all values within a data set.[22]

GCC would have proposed to use a minimum standard deviation of 2.43 or a short-term emission factor of 29 lb/ton or ~2,000 lb/hr emission limit, which would be higher than the currently permitted long-term emission factor of 4.9 lb/ton or 330.3 lb/hr. However, GCC proposes a reduction in the short-term emission limit for SO_2 with a new limit of 193.6 lb/hr based on the results from the air quality impact analyses performed to support this updated Title V permit renewal.

5.3.3 Proposed CO Short-Term Limit

CO emissions from a kiln system are a combination of CO generated during the combustion of fuel and CO generated from partial oxidation of organics in the raw material. Excess air above the stoichiometric ratio of oxygen to fuel in combustion reactions reduces CO emissions by oxidizing CO to CO_2. Cement kilns require a large amount of excess air for proper operation. Oxidizing conditions in the burning zone of the kiln are necessary for producing quality clinker, because high levels of O_2 and low levels of CO tend to stabilize alkali and calcium sulfates.[23] Figure 5-1 shows the relation between percent oxygen in the kiln and concentrations of CO and NO_x in the kiln. It can be seen from this figure that as the percent oxygen increases in the kiln, concentration of CO decreases, while concentration of NO_x increases significantly.

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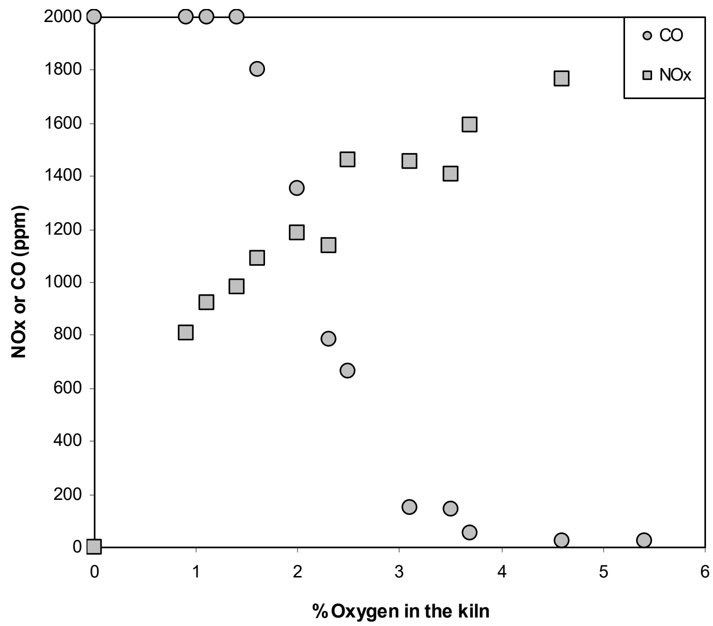
[20] The U.S. EPA AP-42 Chapter 11 Emission Factor Background Information document for the Portland Cement Manufacturing: https://www.epa.gov/sites/default/files/2020-10/documents/b11s06.pdf

[21] The U.S. EPA Alternative Control Techniques Document Update - NO_x Emissions from New Cement Kilns: https://www3.epa.gov/ttncatc1/dir1/cement_updt_1107.pdf

[22] Standard deviation and confidence intervals: https://en.wikipedia.org/wiki/68%E2%80%9395%E2%80%9399.7_rule

[23] Miller, F. M., Young, G. L., and von Seebach, M. "Formation and Techniques for Control of Sulfur Dioxide and Other Sulfur Compounds in Portland Cement Kilns." Portland Cement Association, Skokie, IL, 2001.

Figure 5-1. Effects of Excess Oxygen on Concentrations of CO and NOx in Cement Kilns[24]



Therefore, similar to NO_x emissions from cement kilns, CO emission can vary significantly as well. U.S. EPA and PCA have not published many papers documenting inherent variability of CO emissions from cement kilns.

GCC reviewed historical CO emission data available from 2016-2020 annual stack tests and Table 5-8 below summarizes emissions observed during the tests on a pounds per hour (lb/hr) basis. As shown in the tables, CO emissions are highly variable, which is typical for cement kilns.

[24] Hansen E., "The use of carbon monoxide and other gases for process control", IEEE Transactions on Industrial Applications, v IA-22, n 2, pp 338-344, 1986.

Table 5-8. CO Stack Test Data

	Hourly Emissions (lb/hr)			
	Min	Max	Average	Limit
2016	64.7	69.1	67.3	337
2017	196.7	324.9	271.4	337
2018	37.9	49.4	42.6	337
2019	19.6	21.5	20.6	337
2020	29.1	32.6	31.1	337
Minimum Value	19.6			
Maximum Value		324.9		

As shown above in the table, GCC only has 15-20 short-term CO emission data points for Tijeras Kilns. Stack testing is typically performed during stable kiln operating conditions. These operating conditions do not reflect higher CO emissions typically observed during the start-up, shutdown, other unstable operating conditions, which are inherent to any older kilns similar to Tijeras kilns. As noted earlier, the U.S. EPA and PCA have not published a lot of CO emission data. Therefore, GCC reviewed available CO emission data from GCC's own kilns in Texas, South Dakota, Montana, and Colorado.

GCC's South Dakota kiln is an older kiln with a 1-hour emission limit of 3,250 lb/hr for CO which was established based on allowable CO short-term emissions levels to demonstrate compliance with the National Ambient Air Quality Standards for CO. Note that this is the only GCC kiln in North America with a CO CEMS that has a short-term hourly CO limit. Hourly clinker production rate for this SD kiln is approximately 162.5 tons/hr. This provides a 1-hour emission factor of 20 lb/ton. GCC proposes to apply this same 20 lb/ton emission factor to the Tijeras kilns.

The South Dakota kiln is equipped with CEMS that monitor and record the actual lb/hr emission rates of CO each hour. The hourly clinker production is also recorded. CEMS and production data from May 1, 2016 through June 8, 2021 is included in Appendix H with this application. The South Dakota kiln data shows wide variability in the CO lb/ton of clinker emissions, which is expected because of unstable conditions during startup, shutdown, and kiln upset conditions. Table 5-9 summarizes CO CEMS data from the GCC South Dakota kiln.

Table 5-9. GCC South Dakota Kiln Yearly CO lb/ton Summary Data

Year	Valid hours	CO lb/ton of clinker			
		Min.	Max.	Average	SD
2016	5,117	0.011	18.8	1.84	0.878
2017	7,603	0.005	155.3	2.48	2.967
2018	5,051	0.002	94.7	2.81	3.027
2019	6,071	0.002	590.6	2.85	8.467
2020	4,831	0.007	409.3	3.23	9.429
2021	2,423	0.003	173.1	3.03	4.897

This demonstrates that although the average CO lb/ton emissions are relatively stable there is significant variation in the maximum CO lb/ton emissions observed, as well as high standard deviation in relation to the average (high coefficient of variation). The frequency of high CO lb/ton emissions is also relevant to justify the ongoing nature of variability, which is detailed in Table 5-10 below.

Table 5-10. GCC South Dakota Kiln CO Emissions Frequency Distribution

CO lb/ton of clinker		Number of Occurrences						
Bin Min.	**Bin Max.**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
1000	100	0	3	0	2	7	1	13
100	75	0	0	2	1	1	2	6
75	50	0	0	2	1	1	3	7
50	25	0	8	7	5	26	3	49
25	20	0	0	6	6	1	0	13
20	15	3	5	13	9	2	5	37
15	10	4	17	25	16	18	5	85
10	5	49	167	275	182	119	68	860
5	0	5,061	7,403	4,721	5,849	4,656	2,336	30,026

The above distribution demonstrates that the South Dakota kiln consistently experiences a wide range of variability in CO lb/ton of clinker emissions. Using the currently permitted clinker production rate of 67.4 tons per hour for Tijeras kilns and the GCC South Dakota calculated short-term emission factor of 20 lb/ton results in a proposed short-term CO emission limit of 1,348 lb/hr. Please note that the currently short-term permitted emission limit 337 lb/hr is based on an emission factor of 5 lb/ton, which is not reflective of variability in the short-term CO emissions from the kiln. GCC proposes to use a CO emission factor of 20 lb/ton of clinker due to the variable nature actual CO emissions. Data from the South Dakota kiln may justify a higher factor, but this 20 lb/ton factor is proposed for Tijeras because the resulting 1,348 lb/hr CO emission rate allows for compliance with New Mexico Ambient Air Quality Standards.

Considering inherent variability in cement kilns to allow GCC operational variability in 1-hour period, GCC is proposing emission rates shown in Table 5-11 as new short-term emission limits for the kilns. As shown below in the table, GCC requests an increase in short-term emissions of NO_x and CO but a decrease in short-term emissions of SO_2.

Table 5-11. Current and Proposed Emission Limits

	Current Limit (lb/hr)	Proposed Limit (lb/hr)	Change (lb/hr)
NO_x	353.85	975	621.15
SO_2	330.26	193.6	-136.66
CO	337	1,348	1,011

6. REGULATORY APPLICABILITY

Pursuant to NMAC 20.11.42.12(A)(4)(g), applicable requirements are outlined below. Pursuant to NMAC 20.11.42.12(A)(4)(h), GCC is not proposing or seeking any exemptions from otherwise applicable requirements. Below are the applicable regulatory requirements for Facility. A summary of the updated applicable requirements for the Facility is provided in Table 6-1 below, and further source-specific detail is given in Sections 2 and 3 of the Title V Operating Permit Forms in Appendix A. Conditions of the Title V permit shall be deemed to be in compliance with all applicable requirements existing as of the date of permit issuance. There have not been any changes in the applicability status of these regulations except as noted later in this section.

6.1 LIST OF CURRENT APPLICABLE RULES

Table 6-1. Applicable Regulatory Requirements for the Facility

Applicable Requirements	Federally Enforceable	Entire Facility
20.11.02 NMAC Permit Fees	X	X
20.11.05 NMAC Visible Air Contaminants	X	X
20.11.08 NMAC Ambient Air Quality Standards		X
20.11.20 NMAC Fugitive Dust Control	X	X
20.11.40 NMAC Source Registration	X	X
20.11.42 NMAC Operating Permits		X
20.11.67 NMAC Equipment, Emissions, Limitations	X	
20.11.90 NMAC Administration, Enforcement, Inspection	X	X
40 CFR 50 National Ambient Air Quality Standards	X	X
40 CFR 51 Requirements for Preparation, Adoption, and Submittal of Implementation Plans	X	X
40 CFR 60, Subpart F	X	
40 CFR 60.62 Standards	X	
40 CFR 60.63 Monitoring of Operations	X	
40 CFR 60.64 Test Methods and Procedures	X	
40 CFR 60.65 Recordkeeping and Reporting Requirements	X	
40 CFR 60, Subpart Y	X	
40 CFR 60.254 Standards for Coal Processing and Conveying Equipment, Coal Storage Systems, Transfer and Loading Systems, and Open Storage Piles		
40 CFR 60.255 Performance Tests and Other Compliance Requirements.		
40 CFR 60.256 Continuous Monitoring Requirements.		
40 CFR 60.257 Test Methods and Procedures.		
40 CFR 60.258 Reporting and Recordkeeping.		
40 CFR 63, Subpart LLL	X	
40 CFR 63.1343 What Standards Apply to my Kilns, Clinker Coolers, Raw Material; Dryers, and Open Clinker Storage Piles?	X	
40 CFR 63.1345 Emissions Limits for Affected Sources Other than Kilns; Clinker Coolers; New and Reconstructed Raw Material Dryers	X	
40 CFR 63.1346 Operating Limits for Kilns	X	
40 CFR 63.1347 Operation and Maintenance Plan Requirements	X	
40 CFR 63.1348 Compliance Requirements	X	
40 CFR 63.1349 Performance Testing Requirements	X	

Applicable Requirements	Federally Enforceable	Entire Facility
40 CFR 63.1350 Monitoring Requirements	X	
40 CFR 63.1351 Compliance Dates	X	
40 CFR 63.1353 Notification Requirements	X	
40 CFR 63.1354 Reporting requirements	X	
40 CFR 63.1355 Recordkeeping requirements	X	
40 CFR 63, Subpart CCCCCC	*	
40 CFR 63.11116 Requirements for Facilities with Monthly Throughput of Less than 10,000 Gallons of Gasoline	X	
PSD Permit PSD-NM-12	X	
Authority to Construct Permits #0043, #0044, and #2197	X	
Source Registration #2195	X	
Fugitive Dust/Particulate Emissions Control Plan for Mining and Processing Activities	X	X
20.11.23 NMAC Stratospheric Ozone Protection		X
20.11.41 NMAC Construction Permits	X	X
20.11.46 NMAC Sulfur Dioxide Emissions Inventory Requirements: Western Backstop Sulfur Dioxide Trading Program		X
20.11.47 NMAC Emissions Inventory Requirements		X
20.11.61 NMAC Prevention of Significant Deterioration	X	X
20.11.63 NMAC New Source Performance Standards for Stationary Sources	X	X
20.11.64 NMAC Emission Standards for Hazardous Air Pollutants for Stationary Sources	X	X
20.11.65 NMAC Volatile Organic Compounds	X	X
20.11.66 NMAC Process Equipment	X	X
40 CFR 64 Compliance Assurance Monitoring	X	X
40 CFR 82 Stratospheric Ozone Protection	X	X
40 CFR 98 Subpart H – Cement Production (GHG Reporting)	X	X

*NESHAP CCCCCC is not applicable (since this only applies to area sources of HAPs). As such, GCC is requesting the requirements be removed from the Permit (including Condition 5.1.9 for Tank #2).

6.2 TIRE DERIVED FUEL

The TDF System #1 and #2 will continue to operate as permitted in Condition 5.1.8 of the current Title V permit. Regulatory applicability and/or compliance requirements with regards to 40 CFR 60 Subpart F, 40 CFR 241 Subpart B, and Commercial and Industrial Solid Waste Incineration Units regulations under 40 CFR Part 60 have not changed since the issuance of the current Title V permit in 2017.

6.3 NSPS PERMIT SHIELD

NSPS requires new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except as noted. 40 CFR Part 60, the NSPS, applies to sources that were either originally constructed by the effective date specified in each NSPS, modified, or reconstructed. The potentially applicable NSPS subparts are mentioned below.

Most of the operations at the Facility are not subject to NSPS Subpart F includes standards for Portland cement plants that commence construction or modification after August 17, 1971.

- Operations subject to Subpart F are Emission Units 8-5, 8-6, and 8-7.
- For all other sources, GCC requests a permit shield.

Most of the operations at the Facility are not subject to NSPS Subpart Y includes standards for coal preparation and processing plants that commence construction, reconstruction, or modification after October 27, 1974.

- Operations subject to Subpart Y are a coal storage barn/storage pile and emission units 5-13, 5-14, and 5-15.
- For all other sources, GCC requests a permit shield.

Kilns are not subject to NSPS Subpart CCCC for CISWI Units. Therefore, GCC requests a permit shield.

Engines are not subject to NSPS Subpart IIII includes standards for stationary compression ignition internal combustion engines that commence construction, or are modified or reconstructed after July 11, 2005. Therefore, GCC requests a permit shield. Engines are not subject to NSPS Subpart JJJJ includes standards for stationary spark ignition internal combustion engines that commence construction, or are modified or reconstructed after June 12, 2006. Therefore, GCC requests a permit shield.

The Facility is also not subject to 40 CFR Part 68, Risk Management Program requirements. Therefore, GCC requests a permit shield.

The subparts listed above do not apply to the Facility due to applicability dates. Therefore, the Facility requests a permit shield from the requirements of the subparts listed above.

7. COMPLIANCE ASSURANCE MONITORING

The requirements of the CAM program, as set forth in 40 CFR Part 64, were reviewed and assessed for applicability as part of the Facility's July 2021 Title V renewal application. Per 40 CFR 64.5, GCC is required to submit a CAM plan during its Title V application renewal. Per the applicability criteria in 40 CFR 64.2(a), CAM applies to any pollutant specific emission unit (PSEU) that:

- Has a Potential-to-Emit (PTE), without taking into account the control device, for one or more regulated pollutants in an amount (in tons per year) equal to or greater than 100 percent of the major source threshold;
- Is subject to an emission limitation or standard for the applicable air pollutant; and
- Uses a control device to comply with any such emission limitation or standard.

CAM requirements do not apply to the following:

Emission limitations or standards proposed by U.S. EPA after November 15, 1990 under the New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR 64.2(b)(1)(i)).

NSPS, NESHAP, NMAC regulations, and the current Title V permit establish the emission limitations and standards that apply to each source. Federal regulations and permit requirements are more stringent than NMAC PM and opacity standards. Because CAM requirements are not applicable to emission limits or standards proposed after November 15, 1990, under NSPS or NESHAP, only the limitations and standards established by the Title V or ATC permits are subject to CAM.

GCC reviewed pre-control emissions of emission sources at the Facility and determined that all equipment equipped with a control device will be potentially subject to CAM requirements for the permit related emission limitations or standards such as emission rates. All other sources have no add-on control devices; therefore, are not included in the CAM plan. For example, Kiln #1 (6-1) has NO_x, VOC, CO, and SO_2 emission limitations listed on the permit. However, these emissions are not controlled by a control device and therefore these pollutants are not subject to CAM.

A list of all emission units at the Facility that are equipped with a control device have been provided in Table 7-1 below as potentially CAM subject sources:

Table 7-1. Summary of Potential CAM Subject Sources

Unit ID	Equipment Description	Pollutant(s) Controlled	Uncontrolled PTE ≥ 100 TPY (Y/N)	CAM Applicability (Y/N)
1-2	Primary Crusher	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
1-3	Secondary Crusher	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
1-4	Screens	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
2-1	Rock Storage #1	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
2-2	Rock Storage #2	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
2-3	Rock Storage #3	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
2-4	Rock Storage #4	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
2-6	#1 Additive Baghouse	TSP/PM_{10}/$PM_{2.5}$	No	No
2-7	#1A Additive Baghouse	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
2-8	Additive Storage	TSP/PM_{10}/$PM_{2.5}$	No	No

Unit ID	Equipment Description	Pollutant(s) Controlled	Uncontrolled PTE ≥ 100 TPY (Y/N)	CAM Applicability (Y/N)
2-9	#1 Raw Mill Feedoweight	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
2-10	#2 Raw Mill Feedoweight	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
3-1	#1 Raw Mill Air Separator	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
3-2	#1 Raw Mill	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
3-3	#2 Raw Mill Air Separator	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
3-4	#2 Raw Mill	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
4-1	Blending Silo #1 and #3	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
4-2	Blending Silo #2 and #4	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
4-3	Kiln Feed Bucket Elevator #1	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
4-4	Kiln Feed Bucket Elevator #2	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
4-5	#1 Kiln Feed Elevator	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
4-6	#2 Kiln Feed Elevator	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
5-1	#1 Clinker Cooler Drag Conveyor	TSP/PM_{10}/$PM_{2.5}$	No	No
5-2	#1 Clinker Cooler Drag Conveyor and outdoor clinker reclaim	TSP/PM_{10}/$PM_{2.5}$	No	No
5-3	#1 Clinker Cooler, Baghouse #1	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
5-4	#1 Clinker Cooler, Baghouse #2	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
5-5	#1 Clinker Cooler, Baghouse #3	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
5-6	#1 Clinker Cooler, Baghouse #4	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
5-7	#2 Clinker Cooler, Baghouse #1	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
5-8	#2 Clinker Cooler, Baghouse #2	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
5-9	#2 Clinker Cooler, Baghouse #3	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
5-10	#2 Clinker Cooler, Baghouse #4	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
5-13	Coal Crusher	TSP/PM_{10}/$PM_{2.5}$	No	No
5-14	Coal Conveyor Transfer Tower	TSP/PM_{10}/$PM_{2.5}$	No	No
5-15	Coal Storage Silo	TSP/PM_{10}/$PM_{2.5}$	No	No
6-1	#1 Kiln Baghouse	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
6-2	#2 Kiln Baghouse	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
6-3	#1 Baghouse Dust Bin	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
6-4	#2 Baghouse Dust Bin	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
6-7	Dust Pellets from Pelletizer	TSP/PM_{10}/$PM_{2.5}$	No	No
7-1	Clinker Bucket Elevator Tower	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
7-2	Clinker Primary Distribution	TSP/PM_{10}/$PM_{2.5}$	No	No
7-3	Clinker Storage Silo and Transfer	TSP/PM_{10}/$PM_{2.5}$	No	No
7-4	Clinker Storage Silos	TSP/PM_{10}/$PM_{2.5}$	No	No
7-5	Clinker Storage Silo and Transfer	TSP/PM_{10}/$PM_{2.5}$	No	No
7-6	Clinker Storage Silos	TSP/PM_{10}/$PM_{2.5}$	No	No
7-7	Clinker Secondary Distribution	TSP/PM_{10}/$PM_{2.5}$	No	No
7-8	Clinker Storage Silo and Transfer	TSP/PM_{10}/$PM_{2.5}$	No	No
7-9	Clinker Storage Silos	TSP/PM_{10}/$PM_{2.5}$	No	No
7-10	Clinker Storage Silo and Transfer	TSP/PM_{10}/$PM_{2.5}$	No	No
7-11	Clinker Storage Silos	TSP/PM_{10}/$PM_{2.5}$	No	No
7-12	#1 Finish Mill Transfer	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
7-13	#2 Finish Mill Transfer	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
8-1	#1 Finish Mill Air Separator	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
8-2	#1 Finish Mill	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
8-3	#2 Finish Mill Air Separator	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
8-4	#2 Finish Mill	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
8-5	#3 Finish Mill Transfer Points	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes

Unit ID	Equipment Description	Pollutant(s) Controlled	Uncontrolled PTE ≥ 100 TPY (Y/N)	CAM Applicability (Y/N)
8-6	#3 Finish Mill	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
8-7	#3 Finish Mill Air Separator	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
9-1	Primary Cement Storage Silos #1 - North	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
9-2	Primary Cement Storage Silos #2 - Middle	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
9-3	Primary Cement Storage Silos #3 - South	TSP/PM_{10}/$PM_{2.5}$	Yes	Yes
9-4	#2 Cement Storage	TSP/PM_{10}/$PM_{2.5}$	No	No

GCC performed an evaluation of pre-control emissions (i.e., uncontrolled emissions) and determined that emission units equipped with baghouses that have permitted controlled PM/PM_{10}/$PM_{2.5}$ emissions rates greater than or equal to 0.1 ton per year (tpy) trigger CAM requirements. This evaluation is based on the following methodology.

Per 40 CFR Part 64, CAM uncontrolled emissions threshold is 100 tpy for all pollutants.
Baghouse PM/PM10/PM2.5 control efficiency is assumed to be 99.9%.
CAM trigger threshold for PM/PM10/PM2.5 post-control emissions of 0.1 tpy is determined using following equation:

$$\text{CAM Trigger Controlled Emissions (tpy)} = \text{Uncontrol led Emissions of } 100\left(\frac{\text{tons}}{\text{yr}}\right) \times \text{Control Efficiency } of\left(1 - 0.999\right)$$

Therefore, all emission units equipped with a baghouse that have a permitted controlled emission limit of less than 0.1 tpy of PM/PM_{10}/$PM_{2.5}$ are not included in the CAM plan. CAM requirements for emission units and associated baghouses that have a PTE for PM/PM_{10}/$PM_{2.5}$ greater than 0.1 tpy are addressed with this submittal and are listed below in Table 7-2.

Table 7-2. Summary of Emission Sources subject to CAM

Unit ID	Equipment Description
1-2	Primary Crusher
1-3	Secondary Crusher
1-4	Screens
2-1	Rock Storage - #1
2-2	Rock Storage - #2
2-3	Rock Storage - #3
2-4	Rock Storage - #4
2-7	#1A Additive Baghouse
2-9	#1 Raw Mill Feedoweight
2-10	#2 Raw Mill Feedoweight
3-1	#1 Raw Mill Air Separator
3-2	#1 Raw Mill
3-3	#2 Raw Mill Air Separator
3-4	#2 Raw Mill
4-1	Blending Silo #1 and #3
4-2	Blending Silo #2 and #4
4-3	Kiln Feed Bucket Elevator #1
4-4	Kiln Feed Bucket Elevator #2

Unit ID	Equipment Description
4-5	#1 Kiln Feed Elevator
4-6	#2 Kiln Feed Elevator
5-3	#1 Clinker Cooler, Baghouse #1
5-4	#1 Clinker Cooler, Baghouse #2
5-5	#1 Clinker Cooler, Baghouse #3
5-6	#1 Clinker Cooler, Baghouse #4
5-7	#2 Clinker Cooler, Baghouse #1
5-8	#2 Clinker Cooler, Baghouse #2
5-9	#2 Clinker Cooler, Baghouse #3
5-10	#2 Clinker Cooler, Baghouse #4
6-1	#1 Kiln Baghouse
6-2	#2 Kiln Baghouse
6-3	#1 Baghouse Dust Bin
6-4	#2 Baghouse Dust Bin
7-1	Clinker Bucket Elevator Tower
7-12	#1 Finish Mill Transfer
7-13	#2 Finish Mill Transfer
8-1	#1 Finish Mill Air Separator
8-2	#1 Finish Mill
8-3	#2 Finish Mill Air Separator
8-4	#2 Finish Mill
8-5	#3 Finish Mill Transfer Points
8-6	#3 Finish Mill
8-7	#3 Finish Mill Air Separator
9-1	Primary Cement Storage Silos #1 - North
9-2	Primary Cement Storage Silos #2 - Middle
9-3	Primary Cement Storage Silos #3 - South

For CAM applicable sources shown in Table 7-2, a detailed CAM plan is provided below in Section 7.1, which addresses monitoring to meet the requirements of 40 CFR 64.

7.1 CAM PLAN

7.1.1 Background

7.1.1.1 Facility Description:

The GCC Rio Grande Facility produces Portland cement. Emissions of PM, PM_{10}, and $PM_{2.5}$ from raw material and product handling are controlled by baghouses.

7.1.1.2 Applicable Regulations, Emission Limits, Monitoring Requirements

Table 7-3 below outlines the general emission limitations found in the permit and whether the limitations are potentially applicable to CAM. Limitations and standards proposed by U.S. EPA after November 15, 1990 under the NSPS or NESHAPs are not applicable to CAM per 40 CFR 64.2(b)(1)(i).

Table 7-3. Emission Limitations

Parameter	Limit	Reference	CAM Applicability[1]
NO_x	Varies	Title V Permit Section 5.1.1	No
CO	Varies	Title V Permit Section 5.1.1	No
SO_2	Varies	Title V Permit Section 5.1.1	No
VOC	Varies	Title V Permit Section 5.1.1	No
TSP	Varies	Title V Permit Section 5.1.1	Yes
PM_{10}	Varies	Title V Permit Section 5.1.1	Yes
$PM_{2.5}$	Varies	Title V Permit Section 5.1.1	Yes
PM	230 mg/cubic meter	Title V Permit Section 5.1.2	Yes
PM	0.07 lbs/ton of clinker	Title V Permit Section 5.1.2	No
D/F	0.2 ng/dscm	Title V Permit Section 5.1.2	No
PM	0.07 lbs/ton of clinker	Title V Permit Section 5.1.3	No
Opacity	10%	Title V Permit Section 5.1.5	No
Opacity	20%	Title V Permit Section 5.1.7	No
Opacity	20%	Title V Permit Section 6.1	Yes

1. CAM requirements do not apply to emission limitations or standards proposed by EPA after November 15, 1990 under the New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR 64.2(b)(1)(i)).

Table 7-4 includes individual equipment emission limits that are subject to CAM. The associated indicator for each emission limit are also included in the table.

Table 7-4. Equipment Limits and Indicator

Emission Units	Emission Unit Description	Pollutant	Emission Limit - Permit (tpy)	Emission Limit - Citation	Indicator
1-2	Primary Crusher	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.79	Title V Permit 532 5.1.1	Visible Emissions

Emission Units	Emission Unit Description	Pollutant	Emission Limit - Permit (tpy)	Emission Limit - Citation	Indicator
		PM_{10}	0.28	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.04	Title V Permit 532 5.1.1	Visible Emissions
1-3	Secondary Crusher	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	1.05	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.37	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.06	Title V Permit 532 5.1.1	Visible Emissions
1-4	Screens	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	2.67	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.97	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.15	Title V Permit 532 5.1.1	Visible Emissions
2-1	Rock Storage - #1	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.37	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.12	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.04	Title V Permit 532 5.1.1	Visible Emissions
2-2	Rock Storage - #2	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.37	Title V Permit 532 5.1.1	Visible Emissions

Emission Units	Emission Unit Description	Pollutant	Emission Limit - Permit (tpy)	Emission Limit - Citation	Indicator
		PM_{10}	0.12	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.04	Title V Permit 532 5.1.1	Visible Emissions
2-3	Rock Storage - #3	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.29	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.12	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.04	Title V Permit 532 5.1.1	Visible Emissions
2-4	Rock Storage - #4	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.29	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.10	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.03	Title V Permit 532 5.1.1	Visible Emissions
2-7*	#1A Additive Baghouse	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.88	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.31	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.05	Title V Permit 532 5.1.1	Visible Emissions
2-9*	#1 Raw Mill Feedoweight	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	3.24	Title V Permit 532 5.1.1	Visible Emissions

Emission Units	Emission Unit Description	Pollutant	Emission Limit - Permit (tpy)	Emission Limit - Citation	Indicator
		PM_{10}	1.92	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.17	Title V Permit 532 5.1.1	Visible Emissions
2-10*	#2 Raw Mill Feedoweight	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	3.24	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	1.92	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.17	Title V Permit 532 5.1.1	Visible Emissions
3-1*	#1 Raw Mill Air Separator	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	9.01	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	3.31	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.48	Title V Permit 532 5.1.1	Visible Emissions
3-2*	#1 Raw Mill	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	2.32	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	1.91	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.12	Title V Permit 532 5.1.1	Visible Emissions
3-3*	#2 Raw Mill Air Separator	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	9.01	Title V Permit 532 5.1.1	Visible Emissions

Emission Units	Emission Unit Description	Pollutant	Emission Limit - Permit (tpy)	Emission Limit - Citation	Indicator
		PM_{10}	3.31	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.48	Title V Permit 532 5.1.1	Visible Emissions
3-4*	#2 Raw Mill	PM2.5	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	2.32	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	1.91	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.12	Title V Permit 532 5.1.1	Visible Emissions
4-1*	Blending Silo #1 and #3	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	1.58	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.55	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.08	Title V Permit 532 5.1.1	Visible Emissions
4-2*	Blending Silo #2 and #4	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	1.58	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.55	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.08	Title V Permit 532 5.1.1	Visible Emissions
4-3*	Kiln Feed Bucket Elevator #1	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.55	Title V Permit 532 5.1.1	Visible Emissions

Emission Units	Emission Unit Description	Pollutant	Emission Limit - Permit (tpy)	Emission Limit - Citation	Indicator
		PM_{10}	0.19	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.03	Title V Permit 532 5.1.1	Visible Emissions
4-4*	Kiln Feed Bucket Elevator #2	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.55	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.19	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.03	Title V Permit 532 5.1.1	Visible Emissions
4-5*	#1 Kiln Feed Elevator	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	2.23	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.78	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.04	Title V Permit 532 5.1.1	Visible Emissions
4-6*	#2 Kiln Feed Elevator	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	2.23	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.78	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.04	Title V Permit 532 5.1.1	Visible Emissions
5-3* [1]	#1 Clinker Cooler, Baghouse #1	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	57.8	Title V Permit 532 5.1.1	Visible Emissions

Emission Units	Emission Unit Description	Pollutant	Emission Limit - Permit (tpy)	Emission Limit - Citation	Indicator
		PM_{10}	48.58	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	26.03	Title V Permit 532 5.1.1	Visible Emissions
5-4* [1]	#1 Clinker Cooler, Baghouse #2	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	57.8	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	48.58	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	26.03	Title V Permit 532 5.1.1	Visible Emissions
5-5* [1]	#1 Clinker Cooler, Baghouse #3	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	57.8	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	48.58	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	26.03	Title V Permit 532 5.1.1	Visible Emissions
5-6* [1]	#1 Clinker Cooler, Baghouse #4	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	57.8	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	48.58	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	26.03	Title V Permit 532 5.1.1	Visible Emissions
5-7* [1]	#2 Clinker Cooler, Baghouse #1	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	57.8	Title V Permit 532 5.1.1	Visible Emissions

Emission Units	Emission Unit Description	Pollutant	Emission Limit - Permit (tpy)	Emission Limit - Citation	Indicator
		PM_{10}	48.58	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	26.03	Title V Permit 532 5.1.1	Visible Emissions
5-8* [1]	#2 Clinker Cooler, Baghouse #2	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	57.8	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	48.58	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	26.03	Title V Permit 532 5.1.1	Visible Emissions
5-9* [1]	#2 Clinker Cooler, Baghouse #3	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	57.8	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	48.58	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	26.03	Title V Permit 532 5.1.1	Visible Emissions
5-10* [1]	#2 Clinker Cooler, Baghouse #4	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	57.8	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	48.58	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	26.03	Title V Permit 532 5.1.1	Visible Emissions
6-1* [1]	#1 Kiln Baghouse	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	57.8	Title V Permit 532 5.1.1	Visible Emissions

Emission Units	Emission Unit Description	Pollutant	Emission Limit - Permit (tpy)	Emission Limit - Citation	Indicator
		PM_{10}	48.58	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	26.03	Title V Permit 532 5.1.1	Visible Emissions
6-2* [1]	#2 Kiln Baghouse	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	57.8	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	48.58	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	26.03	Title V Permit 532 5.1.1	Visible Emissions
6-3*	#1 Baghouse Dust Bin	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.22	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.14	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.07	Title V Permit 532 5.1.1	Visible Emissions
6-4*	#2 Baghouse Dust Bin	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.22	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.14	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.07	Title V Permit 532 5.1.1	Visible Emissions
7-1*	Clinker Bucket Elevator Tower	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.45	Title V Permit 532 5.1.1	Visible Emissions

Emission Units	Emission Unit Description	Pollutant	Emission Limit - Permit (tpy)	Emission Limit - Citation	Indicator
		PM_{10}	0.16	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.024	Title V Permit 532 5.1.1	Visible Emissions
7-12*	#1 Finish Mill Transfer	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	2.27	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.79	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.12	Title V Permit 532 5.1.1	Visible Emissions
7-13*	#2 Finish Mill Transfer	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	2.27	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.79	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.12	Title V Permit 532 5.1.1	Visible Emissions
8-1*	#1 Finish Mill Air Separator	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	1.10	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.39	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.06	Title V Permit 532 5.1.1	Visible Emissions
8-2*	#1 Finish Mill	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	5.72	Title V Permit 532 5.1.1	Visible Emissions

Emission Units	Emission Unit Description	Pollutant	Emission Limit - Permit (tpy)	Emission Limit - Citation	Indicator
		PM_{10}	2.00	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.30	Title V Permit 532 5.1.1	Visible Emissions
8-3*	#2 Finish Mill Air Separator	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	1.10	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.39	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.06	Title V Permit 532 5.1.1	Visible Emissions
8-4*	#2 Finish Mill	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	5.72	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	2.00	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.30	Title V Permit 532 5.1.1	Visible Emissions
8-5*	#3 Finish Mill Transfer Points	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.66	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.23	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.03	Title V Permit 532 5.1.1	Visible Emissions
8-6*	#3 Finish Mill	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.83	Title V Permit 532 5.1.1	Visible Emissions

Emission Units	Emission Unit Description	Pollutant	Emission Limit - Permit (tpy)	Emission Limit - Citation	Indicator
		PM_{10}	0.29	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.04	Title V Permit 532 5.1.1	Visible Emissions
8-7*	#3 Finish Mill Air Separator	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	2.58	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.90	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.14	Title V Permit 532 5.1.1	Visible Emissions
9-1*	Primary Cement Storage Silos #1 - North	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.15	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.05	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.008	Title V Permit 532 5.1.1	Visible Emissions
9-2*	Primary Cement Storage Silos #2 - Middle	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.15	Title V Permit 532 5.1.1	Visible Emissions
		PM_{10}	0.05	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.008	Title V Permit 532 5.1.1	Visible Emissions
9-3*	Primary Cement Storage Silos #3 - South	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.15	Title V Permit 532 5.1.1	Visible Emissions

Emission Units	Emission Unit Description	Pollutant	Emission Limit - Permit (tpy)	Emission Limit - Citation	Indicator
		PM_{10}	0.05	Title V Permit 532 5.1.1	Visible Emissions
		$PM_{2.5}$	0.008	Title V Permit 532 5.1.1	Visible Emissions
9-4*	#2 Cement Storage	Opacity	20%	Title V Permit 532 6.1	Visible Emissions
		TSP	0.06	Title V Permit 532 5.1.1	Visible Emissions
		PM10	0.02	Title V Permit 532 5.1.1	Visible Emissions
		PM2.5	0.003	Title V Permit 532 5.1.1	Visible Emissions

* Sources also subject to National Emission Standards for Hazardous Air Pollutants (NESHAPs) standards. However, NESHAPs are not applicable to CAM based on 40 CFR 64.2(b)(1)(i).

[1] Consistent with Title V Operating Permit No #532 (07/2017), exhausts from Clinker Cooler #1 and #2, Kiln #1 and #2 have been combined.

7.1.1.3 Control Technology

The pollution control device information for each equipment subject to CAM is outlined in Table 7-5 below.

Table 7-5. Control Device Information for CAM Subject Sources

GCC Equipment ID	Equipment Description	Pollution Control Device
1-2	Primary Crusher	Fabric Filter Baghouse
1-3	Secondary Crusher	Fabric Filter Baghouse
1-4	Screens	Fabric Filter Baghouse
2-1	Rock Storage - #1	Fabric Filter Baghouse
2-2	Rock Storage - #2	Fabric Filter Baghouse
2-3	Rock Storage - #3	Fabric Filter Baghouse
2-4	Rock Storage - #4	Fabric Filter Baghouse
2-7	#1A Additive Baghouse	Fabric Filter Baghouse
2-9	#1 Raw Mill Feedoweight	Fabric Filter Baghouse
2-10	#2 Raw Mill Feedoweight	Fabric Filter Baghouse
3-2	#1 Raw Mill	Fabric Filter Baghouse
3-4	#2 Raw Mill	Fabric Filter Baghouse
4-1	Blending Silo #1 and #3	Fabric Filter Baghouse
4-2	Blending Silo #2 and #4	Fabric Filter Baghouse
4-3	Kiln Feed Bucket Elevator #1	Fabric Filter Baghouse
4-4	Kiln Feed Bucket Elevator #2	Fabric Filter Baghouse
4-5	#1 Kiln Feed Elevator	Fabric Filter Baghouse

GCC Equipment ID	Equipment Description	Pollution Control Device
4-6	#2 Kiln Feed Elevator	Fabric Filter Baghouse
5-3	#1 Clinker Cooler, Baghouse #1	Fabric Filter Baghouse
5-4	#1 Clinker Cooler, Baghouse #2	Fabric Filter Baghouse
5-5	#1 Clinker Cooler, Baghouse #3	Fabric Filter Baghouse
5-6	#1 Clinker Cooler, Baghouse #4	Fabric Filter Baghouse
5-7	#2 Clinker Cooler, Baghouse #1	Fabric Filter Baghouse
5-8	#2 Clinker Cooler, Baghouse #2	Fabric Filter Baghouse
5-9	#2 Clinker Cooler, Baghouse #3	Fabric Filter Baghouse
5-10	#2 Clinker Cooler, Baghouse #4	Fabric Filter Baghouse
6-1	#1 Kiln Baghouse	Fabric Filter Baghouse
6-2	#2 Kiln Baghouse	Fabric Filter Baghouse
6-3	#1 Baghouse Dust Bin	Fabric Filter Baghouse
6-4	#2 Baghouse Dust Bin	Fabric Filter Baghouse
7-1	Clinker Bucket Elevator Tower	Fabric Filter Baghouse
7-12	#1 Finish Mill Transfer	Fabric Filter Baghouse
7-13	#2 Finish Mill Transfer	Fabric Filter Baghouse
8-1	#1 Finish Mill Air Separator	Fabric Filter Baghouse
8-2	#1 Finish Mill	Fabric Filter Baghouse
8-3	#2 Finish Mill Air Separator	Fabric Filter Baghouse
8-4	#2 Finish Mill	Fabric Filter Baghouse
8-5	#3 Finish Mill Transfer Points	Fabric Filter Baghouse
8-6	#3 Finish Mill	Fabric Filter Baghouse
8-7	#3 Finish Mill Air Separator	Fabric Filter Baghouse
9-1	Primary Cement Storage Silos #1 - North	Fabric Filter Baghouse
9-2	Primary Cement Storage Silos #2 - Middle	Fabric Filter Baghouse
9-3	Primary Cement Storage Silos #3 - South	Fabric Filter Baghouse
9-4	#2 Cement Storage	Fabric Filter Baghouse

7.1.2 Monitoring Approach

The monitoring approach found in Table 7-6 will be used for each control device listed above. The kilns and clinker coolers are required to install and operate continuous parameter monitoring systems (CPMS) per 40 CFR Part 63.1350(b)(1). Raw mills and finish mills are required to conduct daily visible emission inspections and all other sources are required to conduct monthly visible emission inspections per 40 CFR Part 63.1350(f)(2) and 63.1350(f)(1). Due to the existing Facility monitoring requirements imposed by the MACT standards, emission units, which are not subject to CAM will follow same monitoring provisions as MACT and no additional monitoring requirements are being proposed for the Facility.

CAM applicable emission units are only subject to particulate matter and opacity monitoring requirements. Consistent with the MACT requirements, visible emissions measurement will be used as a surrogate monitoring method for particulate matter emissions. The exception to this are the kilns and clinker coolers, which use the CPMS systems to comply with PM and opacity requirements.

Table 7-6. Monitoring Approach for CAM

	Indicator		
	Visible Emissions		
	Kilns / Clinker Coolers	Raw Mills / Finish Mills	All Other Sources
I. Indicator Measurement Approach	Consistent with the MACT requirements, visible emissions from the kiln and clinker cooler stacks shall be monitored using the continuous parameter monitoring systems (CPMS) which are already in place for each of these emission units.	Consistent with the MACT requirements, visible emissions from each baghouse will be monitored on a daily basis by conducting a visible emission observation. If emissions are observed, corrective actions will be conducted.	Consistent with the MACT requirements, visible emissions from each baghouse will be monitored on a monthly basis by conducting a visible emission observation. If emissions are observed, corrective actions will be conducted.
II. Indicator Range	An excursion is identified as any reading from the CPMS beyond the established range of 0-0.2 based on allowable emission limits.	An excursion is identified as any visible emissions. Excursions require the source to investigate the baghouse performance and make any repairs or adjustments necessary. A log of any repairs shall be maintained and made available upon request.	An excursion is identified as any visible emissions. Excursions require the source to investigate the baghouse performance and make any repairs or adjustments necessary. A log of any repairs shall be maintained and made available upon request.
a. Data Representativeness	The CPMS measurement is made in the kiln and clinker cooler common stack	Visual observations are being made at each emission point (baghouse exhaust stack).	Visual observations are being made at each emission point (baghouse exhaust stack).
b. QA/QC Practices and Criteria	The CPMS is subject to the requirements in 40 CFR Part 63, Subpart A and Subpart LLL.	Certification is not required for visual emission observations, but personnel shall be trained in general procedures for the determination of visible emissions. A list of observers trained to perform the visible emission observations shall be maintained.	Certification is not required for visual emission observations, but personnel shall be trained in general procedures for the determination of visible emissions. A list of observers trained to perform the visible emission observations shall be maintained.
c. Monitoring Frequency	Continuously.	Visible emission observations are conducted daily. Results of visible emissions shall be recorded in a log book.	Visible emission observations are conducted monthly. Results of visible emissions shall be recorded in a log book.
		Consistent with the MACT provisions, failure to either conduct a visible emission observation on any day/month for any emission unit shall be reported as an excursion. If the emission unit is not operating on a given day/month, visible emission observations and recording of pressure drop is not required for that day/month.	

7.1.2.1 Background

As described above, the Facility is a Portland cement manufacturing plant. Specific emission units and control devices that are subject to the provisions of CAM have been identified and listed above along with the relevant emission limitation or standard that requires additional monitoring per the requirements of CAM.

7.1.2.2 Rationale for Selection of Performance Indicator

One performance indicator, visible emissions, was selected in order to address CAM for the listed emission units. It is believed that visible emissions monitoring is an indicator of baghouse performance and the absence of any such emissions (or its detection at a minimal level) indicates that the baghouse is performing properly.

7.1.2.3 Rationale for Selection of Indicator Ranges

The kiln and clinker cooler have the potential to emit higher Particulate Matter emissions than other emission units subject to CAM. Therefore, since the kiln and clinker cooler have more stringent emission limitations, monitoring is performed on a continuous basis using the CPMS. An indicator range of 0-0.2 of CPMS is based on permit limits chosen for these units. This range is based on allowable emission limits for equipment. The CPMS system has an automated check cycle that is activated every 24 hours.

For all other CAM emission units, an indicator range of no visible emissions was selected. Since the particulate matter emission limitations for these emission units are much lower, any increase in visible emissions is treated as an indication of potential failure of the control device. Corrective action will be initiated whenever visible emissions are detected. This will include reporting the excursion to maintenance. Corrective action will be initiated according to manufacturer's recommendations and any corrective action taken will be recorded.

8. FEES

Pursuant to NMAC 20.11.2 - Fees, there are no fee requirements for Title V permit renewal applications.

APPENDIX A. TITLE V OPERATING PERMIT APPLICATION FORM

City of Albuquerque
Environmental Health Department
Air Quality Division
One Civic Plaza NW
3rd Floor, Room 3023
Albuquerque, New Mexico 87102
Telephone: (505) 768-1972 Fax: (505) 768-1977
20.11.42 NMAC
Operating Permit Application Form

Please answer all questions applicable to your specific business, operation and products. Use the abbreviation "N.A." for "not applicable" wherever appropriate.

SECTION 1 - GENERAL INFORMATION (20.11.42.12.A.(4) NMAC)
{Specific instructions corresponding to numbers in brackets are included in the application package.}

1. Company Name: {1} GCC Rio Grande, Inc.
2. Application Date: July 28, 2021 (original) and August 26, 2022 (updated)
3. Company Mailing Address: P.O Box 100, Tijeras, NM 87059 4. Phone: 505-281-3311
5. Owner's Name: {2} GCC Rio Grande, Inc. 6. Phone: 303-739-5900
7. Owner's Address: 600 S Cherry Street, 10th Floor, Glendale, Colorado 80246
8. Plant Name: {3} {if different from 1.} GCC Rio Grande. Inc. – Tijeras Plant 9. Phone: 505-281-3311
10. Plant Address: {if different from 3.} 11783 State Hwy 337, Tijeras, NM 87059
11. Operator of Plant: {4} Ramses Maldonado, Plant Manager 12. Phone: 505-286-6000
13. Plant Operator Address: P.O Box 100, Tijeras, NM 87059
14. Responsible Official {5}: Ramses Maldonado, Plant Manager 15. Phone: 505-286-6000
16. Address of Responsible Official: 11783 State Hwy 337, Tijeras, NM 87059
17. Person to Contact at Site {6}: Samantha Kretz 18. Title: Environmental Engineer 19. Phone: 505-286-6026
20. Owner's Agent(s): {7} Samantha Kretz 21. Phone: 505-286-6026
22. Company's State of Incorporation or Registration to do Business: Delaware
23. Company's Corporate or Partnership Relationship to any other Air Quality Permittee: {8} None
24. Name of Parent Company: {9} GCC America
25. Address of Parent Company: 600 S Cherry Street, 10th Floor, Glendale, Colorado 80246
26. Names of Subsidiary Companies: {10} N/A
27. Air Quality Permits for this Source Already Received: (Permit Number(s)) #43, #44 and #2197 (including M-1)
28. Other Air Quality Permits Issued to this Applicant: (Permit Number(s)) PSD-NM-12
29. Reason this source must have a Part 42 operating permit: {11} A major source as designated in 20.11.42.7 NMAC
30. Is U.S.G.S. quadrangular map or equivalent attached? {12} Yes

31. Ownership of land at plant site (private, State, Federal, Indian, etc.): __Private__
NOTE: If the land at the plant site is Indian land, contact the Air Quality Division staff for assistance.

32. Distance, in meters, of plant site to nearest residence, school or occupied structure:{13} __Plant site is 378 m south of Roosevelt Middle School__

33. Location of Plant:

33A. City or County: __Bernalillo__ 33B. Direction and distance from nearest town: __½ mile south of Tijeras, NM__

33C. UTM Zone: __13__ UTME: __373.180__ km UTMN: __3881.650__ km

33D. Range: __5E__ Township: __10N__ Section: __22__ 30E. Latitude: __35° 4' 20"__ Longitude: __106°23' 23"__

34. Plant Elevation __6,300__ ft above mean sea level

35. Describe briefly type of plant and nature of processes (or modification) and products, including primary and secondary SIC codes: {14}

SIC Code 3241 - Manufacture of various portland cement products in coal fired rotary kilns using various raw materials including limestone, iron, alumina, sandstone, and gypsum

36. Describe briefly any processes or products associated with any alternative operating scenarios described in this application, including primary and secondary SIC codes {15}: Natural gas (secondary backup fuel) is used to fire the rotary kilns. Also, various raw material additives such as iron, sandstone, alumina, and gypsum may take different forms.

37. Plant's Maximum Allowable Hourly and Annual Capacities (specify units) {16}: Hourly: __67.4 tons/hour clinker prod.; 90 tons/hour cement prod.__

Annual __578,616 tons/year clinker production; 747,320 tons/year cement production__

38. Permit Renewals or Significant Modifications

38A. Is this an application for an operating permit renewal or significant modification? Yes __X__ No ______.

38B. If yes, when does the current operating permit expire? __July 28, 2022__

39. Is this a portable or temporary source {17}? Yes _____ No __X__.

39A. If yes, provide identifying numbers (e.g. serial numbers): __N/A__

39B. If yes, date of anticipated startup: __N/A__ 40C. If yes, date of anticipated relocation: __N/A__

40. Operational Periods: (20 NMAC 11.42.II.1.1.D.5.f.)

40A. Specify **standard** operational periods:

__24__ hours per day, _____ am to _____ pm, __7__ days per week, __4.33__ weeks per month, __12__ months per year.

40B. Specify **maximum** operational periods:

__24__ hours per day, ______ am to ______ pm, __7__ days per week, __4.33__ weeks per month, __12__ months per year.

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
1-1	Fugitive emissions generated from unloading of limestone and other raw materials into the Dump Hopper of the Primary Crusher.	PM2.5	0.13	lb/hr	TSP and PM10 Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2, uncontrolled conveyor transfer point. PM2.5 emission factor derived from the TSP emission factor using particle size multipliers (PM2.5/PM Emission Factor = 0.053) per AP-42 Section 13.2.4.	
			0.08	tn/yr		
		PM10	0.88	lb/hr		
			0.57	tn/yr		
		TSP	2.40	lb/hr		
			1.57	tn/yr		
1-2	Dust Collector controlling emissions from the Primary Crusher By-Pass, and associated material Transfer Points	PM2.5	9.54	lb/hr	TSP from emission testing - [redacted] respectively. Results for each multiplied by a [redacted]. PM10 assumed to be 0.35 of TSP. PM2.5 assumed to be 0.053 times TSP, per particle size multipliers for drop operations listed in AP-42 Section 13.2.4, Equation 1). Uncontrolled emissions calculated assuming a dust collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM)
			41.79	tn/yr		
		PM10	63.00	lb/hr		
			275.94	tn/yr		
		TSP	180.00	lb/hr		
			788.40	tn/yr		
1-3	Dust Collector controlling emissions from Secondary Crushing as well as material transfer points associated with the Primary and Secondary Crushers.	PM2.5	12.72	lb/hr	TSP from emission testing - [redacted] respectively. Results for each multiplied by a [redacted]. PM10 assumed to be 0.35 of TSP. PM2.5 assumed to be 0.053 times TSP, per particle size multipliers for drop operations listed in AP-42 Section 13.2.4, Equation 1). Uncontrolled emissions calculated assuming a dust collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM)
			55.71	tn/yr		
		PM10	84.00	lb/hr		
			367.92	tn/yr		
		TSP	240.00	lb/hr		
			1,051.20	tn/yr		
1-4	Dust Collector controlling emissions from Screening and the associated material transfer points.	PM2.5	33.39	lb/hr	TSP from emission testing - [redacted] respectively. Results for each multiplied by a [redacted] PM10 assumed to be 0.35 of TSP. PM2.5 assumed to be 0.053 times TSP, per particle size multipliers for drop operations listed in AP-42 Section 13.2.4, Equation 1). Uncontrolled emissions calculated assuming a dust collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM)
			146.25	tn/yr		
		PM10	220.50	lb/hr		
			965.79	tn/yr		
		TSP	630.00	lb/hr		
			2,759.40	tn/yr		
2-1	DC controlling emissions. from the transfer of material from Belt 1-3 to Belt 2-1 or Silo #4 and the transfer of material from Belt 2-1 to Belt 2-2 or Silo #3.	PM2.5	0.51	lb/hr	TSP, PM10 and PM2.5 Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2 dated August 2004, uncontrolled conveyor transfer point. PM2.5 emission factor derived from the TSP emission factor using particle size multipliers (PM2.5/PM Emission Factor = 0.053) per AP-42 Section 13.2.4. Pounds per hour emission reflects that only four out of five transfer points are in operation at a time because hourly throughput is bounded by the capacity of the equipment. Ton per year emission calculations	40 CFR Part 64 (CAM)
			0.42	tn/yr		
		PM10	3.52	lb/hr		
			2.87	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
		TSP	9.60	lb/hr	conservatively use all five transfer points operating and throughput is based on facility-wide throughput of raw materials handled instead of the maximum equipment capacity.	
			7.83	tn/yr		
2-2	DC controlling emissions from the transfer of material from Belt 2-2 to Belt 2-3 or Silo #2 and the transfer of material from Belt 2-3 to Belt 2-4 or Silo #1.	PM2.5	0.51	lb/hr	TSP, PM10 and PM2.5 Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2 dated August 2004, uncontrolled conveyor transfer point. PM2.5 emission factor derived from the TSP emission factor using particle size multipliers (PM2.5/PM Emission Factor = 0.053) per AP-42 Section 13.2.4. Pounds per hour emission reflects that only four out of five transfer points are in operation at a time because hourly throughput is bounded by the capacity of the equipment. Ton per year emission calculations conservatively use all five transfer points operating and throughput is based on facility-wide throughput of raw materials handled instead of the maximum equipment capacity.	40 CFR Part 64 (CAM)
			0.42	tn/yr		
		PM10	3.52	lb/hr		
			2.87	tn/yr		
		TSP	9.60	lb/hr		
			7.83	tn/yr		
2-3	DC controlling emissions from the transfer of material from Belt 2-4 to Belt 2-5 or Silo #9 and the transfer of material from Belt 2-5 to Belt 2-6 or Silo #10.	PM2.5	0.51	lb/hr	TSP, PM10 and PM2.5 Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2 dated August 2004, uncontrolled conveyor transfer point. PM2.5 emission factor derived from the TSP emission factor using particle size multipliers (PM2.5/PM Emission Factor = 0.053) per AP-42 Section 13.2.4. Pounds per hour emission reflects that only four out of five transfer points are in operation at a time because hourly throughput is bounded by the capacity of the equipment. Ton per year emission calculations conservatively use all five transfer points operating and throughput is based on facility-wide throughput of raw materials handled instead of the maximum equipment capacity.	40 CFR Part 64 (CAM)
			0.33	tn/yr		
		PM10	3.52	lb/hr		
			2.31	tn/yr		
		TSP	9.60	lb/hr		
			6.30	tn/yr		
2-4	DC controlling emissions from the transfer of material from Belt 2-6 to Belt 2-7 or Silo #11 and the transfer of material from Belt 2-7 to Silo #12.	PM2.5	0.51	lb/hr	TSP, PM10 and PM2.5 Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2 dated August 2004, uncontrolled conveyor transfer point. PM2.5 emission factor derived from the TSP emission factor using particle size multipliers (PM2.5/PM Emission Factor = 0.053) per AP-42 Section 13.2.4.	40 CFR Part 64 (CAM)
			0.33	tn/yr		
		PM10	3.52	lb/hr		
			2.30	tn/yr		
		TSP	9.60	lb/hr		
			6.26	tn/yr		
2-5	Fugitive emissions generated from loading Iron, Gypsum, and Pumice raw materials into Additive System feed hopper.	PM2.5	0.0191	lb/hr	TSP and PM10 Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2, dated August 2004, uncontrolled conveyor transfer point. PM2.5 emission factor derived from TSP emission factor using particle size multipliers per AP-42 Section 13.2.4, dated November 2006.	
			0.0100	tn/yr		
		PM10	0.13	lb/hr		
			0.07	tn/yr		
		TSP	0.36	lb/hr		
			0.20	tn/yr		
2-6	DC controlling emissions from the transfer of material from Belt 2-8 of the raw material Additive system.	PM2.5	0.0763	lb/hr	TSP, PM10 and PM2.5 Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2 dated August 2004, uncontrolled conveyor transfer point. PM2.5 emission factor derived from the TSP emission factor using particle size multipliers (PM2.5/PM Emission Factor = 0.053) per AP-42 Section 13.2.4.	40 CFR 63 Subpart LLLL
			0.042	tn/yr		
		PM10	0.528	lb/hr		
			0.287	tn/yr		
		TSP	1.440	lb/hr		
			0.784	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
2-7	DC controlling emissions from material transfer points associated with Elevator 2-1 and Storage Silos #17, #18, and #19 of the raw material Additive system.	PM2.5	0.175	lb/hr	The Elevator emission factor is based on results of emission testing of a similar unit [redacted]. TSP was assumed to be [redacted]. Transfer point emission factor is based on AP-42 Chapter 11.19.2, Table 11.19.2-2 dated August 2004, uncontrolled conveyor transfer point. PM10 and PM2.5 emission factors derived from the TSP emission factor using the PM10/PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 96.6%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			2.06	tn/yr		
		PM10	1.16	lb/hr		
			13.60	tn/yr		
		TSP	3.30	lb/hr		
			38.84	tn/yr		
2-8	DC controlling emissions from material transfer points associated with Storage Silos #20, #21, and #22 of the raw material Additive system.	PM2.5	0.0191	lb/hr	TSP, PM10 and PM2.5 Emission Factor based on AP42 Chapter 11.19.2, Table 11.19.2-2, dated August 2004, uncontrolled conveyor transfer point. At any given time, only iron or gypsum can be transferred, therefore, for the short-term basis, the maximum hourly emissions associated with the transfer of either gypsum or iron is assumed.	40 CFR 63 Subpart LLLL
			0.0104	tn/yr		
		PM10	0.1320	lb/hr		
			0.072	tn/yr		
		TSP	0.360	lb/hr		
			0.196	tn/yr		
2-9	DC controlling emissions from material transfer points associated with raw material distribution from Silos #1, #2, #3, #4, and #17 to #1 Raw Mill System.	PM2.5	39.22	lb/hr	Results of Emission Testing on #2 Raw Mill Feed System at a processing rate [redacted]. Results used for #1 Raw Mill Feed System as well. 2-10 Test Results [redacted] each for 2-9 and 2-10. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. These hourly emission rates were then scaled up to a raw mill feed rate o[redacted]. Uncontrolled emissions calculated assuming a Dust Collector Efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			171.76	tn/yr		
		PM10	438.93	lb/hr		
			1,922.53	tn/yr		
		TSP	739.92	lb/hr		
			3,240.83	tn/yr		
2-10	DC controlling emissions from material transfer points associated with raw material distribution from Silos #9, #10, #11, #12, and #20 to #2 Raw Mill System	PM2.5	39.22	lb/hr	Results of Emission Testing on #2 Raw Mill Feed System at a processing rate of [redacted]. Results used for #1 Raw Mill Feed System as well. 2-10 Test Results = [redacted] each for 2-9 and 2-10. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. These hourly emission rates were then scaled up to a raw mill feed rate of [redacted]. Uncontrolled emissions calculated assuming a Dust Collector Efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			171.76	tn/yr		
		PM10	438.93	lb/hr		
			1,922.53	tn/yr		
		TSP	739.92	lb/hr		
			3,240.83	tn/yr		
2-11	Fugitive emissions generated from loading Clinker materials into Reclaim System feed hopper.	PM2.5	0.0191	lb/hr	TSP and PM10 Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2, dated August 2004, uncontrolled conveyor transfer point. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006.	
			0.0020	tn/yr		
		PM10	0.1320	lb/hr		
			0.0138	tn/yr		
		TSP	0.3600	lb/hr		
			0.0380	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
3-1	DC controlling emissions from Air Seperator 3-1 of #1 Raw Mill as well as vent from pneumatic raw material pumps. Also emissions from #1 Raw Mill natural gas fired raw material dryer are vented from this unit.	PM2.5	108.98	lb/hr	Results of Emission Testing on #2 Raw Mill System at a processing rate of [redacted] Results assumed to represent #1 Raw Mill System as well. 3-3 Test Results = [redacted] each for 3-1 and 3-3. These hourly emission rate values were then scaled-up based on [redacted] processing rate for the Raw Mill system. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Raw mill dryers (units 3-1 and 3-3) are no longer operating as of June 2021 but baghouses associated with these units are in operation. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			477.33	tn/yr		
		PM10	755.35	lb/hr		
			3,308.44	tn/yr		
		TSP	2,056.23	lb/hr		
			9,006.30	tn/yr		
3-2	Dust Collector controlling emissions from #1 Raw Mill.	PM2.5	28.04	lb/hr	Results of Emission Testing on #2 Raw Mill System at a processing rate of [redacted]. Results assumed to represent #1 Raw Mill System as well. 3-4 Test Results = [redacted] each for 3-2 and 3-4. These hourly emission rate values were then scaled-up based on [redacted] processing rate for the Raw Mill system. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 99.9%; No control for NOx or CO --obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			122.80	tn/yr		
		PM10	436.43	lb/hr		
			1,911.54	tn/yr		
		TSP	529.00	lb/hr		
			2,317.02	tn/yr		
3-3	DC controlling emissions from Air Seperator 3-1 of #1 Raw Mill. Also emissions from #1 Raw Mill natural gas fired raw material dryer are vented from this unit.	PM2.5	108.98	lb/hr	Results of Emission Testing on #2 Raw Mill System at a processing rate of [redacted] Results assumed to represent #1 Raw Mill System as well. 3-3 Test Results = [redacted] each for 3-1 and 3-3. These hourly emission rate values were then scaled-up based on [redacted] processing rate for the Raw Mill system. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Raw mill dryers (units 3-1 and 3-3) are no longer operating as of June 2021 but baghouses associated with these units are in operation. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			477.33	tn/yr		
		PM10	755.35	lb/hr		
			3,308.44	tn/yr		
		TSP	2,056.23	lb/hr		
			9,006.30	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}: Pollutant {4}	Quantity {5}		Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
3-4	Dust Collector controlling emissions from #2 Raw Mill.	PM2.5	28.04	lb/hr	Results of Emission Testing on #2 Raw Mill System at a processing rate of [redacted] Results assumed to represent #1 Raw Mill System as well. 3-4 Test Results = [redacted] each for 3-2 and 3-4. These hourly emission rate values were then scaled-up based on [redacted] processing rate for the Raw Mill system. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			122.80	tn/yr		
		PM10	436.43	lb/hr		
			1,911.54	tn/yr		
		TSP	529.00	lb/hr		
			2,317.02	tn/yr		
4-1	DC controlling emissions from venting of Blending Silos #1 and #3 and associated Air Slide Conveyors.	PM2.5	19.15	lb/hr	Results of TSP Emission Testing on 4-1 indicate [redacted] at a processing rate of approximately [redacted]. Results assumed to represent emissions for 4-2 as well. Results [redacted] These hourly emission rate values were then scaled-up based on [redacted] for the Kiln Feed Blending system. PM10 and PM2.5 emission factors derived from the TSP emission factor using the PM10/PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			83.87	tn/yr		
		PM10	126.45	lb/hr		
			553.86	tn/yr		
		TSP	361.29	lb/hr		
			1,582.45	tn/yr		
4-2	DC controlling emissions from venting of Blending Silos #2 and #4 and associated Air Slide Conveyors.	PM2.5	19.15	lb/hr	Results of TSP Emission Testing on 4-1 indicate [redacted] at a processing rate of [redacted]. Results assumed to represent emissions for 4-2 as well. Results [redacted] These hourly emission rate values were then scaled-up based on [redacted] for the Kiln Feed Blending system. PM10 and PM2.5 emission factors derived from the TSP emission factor using the PM10/PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			83.87	tn/yr		
		PM10	126.45	lb/hr		
			553.86	tn/yr		
		TSP	361.29	lb/hr		
			1,582.45	tn/yr		
4-3	DC controlling emissions from Elevator 4-1 and associated Air Slide Conveyors and material transfer points.	PM2.5	6.60	lb/hr	Results of TSP Emission Testing on 4-4 indicate [redacted] at a processing rate of approximately [redacted]. Results assumed to represent emissions for 4-3 as well. Results [redacted]. These hourly emission rate values were then scaled-up based on [redacted] for the Kiln Feed Metering system. PM10 and PM2.5 emission factors derived from the TSP emission factor using the PM10/PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			28.89	tn/yr		
		PM10	43.56	lb/hr		
			190.77	tn/yr		
		TSP	124.44	lb/hr		
			545.07	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
4-4	DC controlling emissions from Elevator 4-2 and associated Air Slide Conveyors and material transfer points.	PM2.5	6.60	lb/hr	Results of TSP Emission Testing on 4-4 indicate [redacted] at a processing rate of approximately [redacted] Results assumed to represent emissions for 4-3 as well. Results [redacted] These hourly emission rate values were then scaled-up based on [redacted] for the Kiln Feed Metering system. PM10 and PM2.5 emission factors derived from the TSP emission factor using the PM10/PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			28.89	tn/yr		
		PM10	43.56	lb/hr		
			190.77	tn/yr		
		TSP	124.44	lb/hr		
			545.07	tn/yr		
4-5	DC controlling emissions from Elevator 4-3 (#1 Kiln Feed Elevator) or Elevator 4-4 (Back-up Feed Elevator).	PM2.5	9.46	lb/hr	Results of TSP Emission Testing on 4-5 indicate [redacted] at a processing rate of approximately [redacted]. Results assumed to represent emissions for 4-6 as well and [redacted]. These hourly emission rate values were then scaled-up based on [redacted] for the Kiln Feed system. PM10 and PM2.5 emission factors derived from the TSP emission factor using the PM10/PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			41.44	tn/yr		
		PM10	178.50	lb/hr		
			781.83	tn/yr		
		TSP	510.00	lb/hr		
			2,233.80	tn/yr		
4-6	DC controlling emissions from Elevator 4-5 (#2 Kiln Feed Elevator) or Elevator 4-4 (Back-up Feed Elevator).	PM2.5	9.46	lb/hr	Results of TSP Emission Testing on 4-5 indicate [redacted] at a processing rate of approximately [redacted]. Results assumed to represent emissions for 4-6 as well and [redacted] These hourly emission rate values were then scaled-up based on [redacted] for the Kiln Feed system. PM10 and PM2.5 emission factors derived from the TSP emission factor using the PM10/PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			41.44	tn/yr		
		PM10	178.50	lb/hr		
			781.83	tn/yr		
		TSP	510.00	lb/hr		
			2,233.80	tn/yr		
5-1	DC controlling emissions from transfer of clinker from Undergrate Drag Conveyor 5-1 to Drag Conveyor 5-3 or 5-4.	PM2.5	0.005	lb/hr	TSP and PM10 Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2, uncontrolled conveyor transfer point. PM2.5 emission factor derived from the TSP emission factor using particle size multipliers (PM2.5/PM Emission Factor = 0.053) per AP-42 Section 13.2.4.	40 CFR 63 Subpart LLLL
			0.023	tn/yr		
		PM10	0.04	lb/hr		
			0.16	tn/yr		
		TSP	0.10	lb/hr		
			0.44	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3} Pollutant {4}	Quantity {5}		Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
5-2	DC controlling emissions from transfer of clinker from Undergrate Drag Conveyor 5-2 to Drag Conveyor 5-3 or 5-4.	PM2.5	0.024	lb/hr	TSP and PM10 Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2, uncontrolled conveyor transfer point. PM2.5 emission factor derived from the TSP emission factor using particle size multipliers (PM2.5/PM Emission Factor = 0.053) per AP-42 Section 13.2.4.	40 CFR 63 Subpart LLLL
			0.025	tn/yr		
		PM10	0.17	lb/hr		
			0.18	tn/yr		
		TSP	0.46	lb/hr		
			0.48	tn/yr		
5-3 to 5-10 6-1 and 6-2	DC Sub-Unit 1-1, 1-2, 1-3, and 1-4 controlling emissions from #1 Clinker Cooler; DC Sub-Unit 2-1, 2-2, 2-3, and 2-4 controlling emissions from #2 Clinker Cooler	PM2.5	7,804.21	lb/hr	PM10 hourly emissions are calculated to demonstrate compliance with the MACT limit of 0.1 lb PM10 per ton of kiln feed from each clinker cooler system. Each clinker cooler system is controlled by four DC sub-units (5-3 through 5-6 for Clinker Cooler #1 and 5-7 through 5-10 for Clinker Cooler #2). Typically, only three out of four units are operated at a time, therefore estimated hourly emissions are divided by three for each of the four DC sub-units corresponding to a given clinker cooler. A [redacted]. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			25,636.83	tn/yr		
		PM10	14,828.00	lb/hr		
			48,709.98	tn/yr		
		TSP	37,038.75	lb/hr		
			121,672.31	tn/yr		
5-12	Fugitive emissions from loading coal into outdoor drive-over coal belt feed hopper.	PM2.5	0.034	lb/hr	TSP, PM10, and PM2.5 emission factors were calculated from AP-42 Section 13.2.4, equation (1), dated November 2006, [redacted] and coal moisture content of 4.7%. No control is assumed under uncontrolled scenario.	
			0.006	tn/yr		
		PM10	0.23	lb/hr		
			0.036	tn/yr		
		TSP	0.48	lb/hr		
			0.077	tn/yr		
5-13	DC controlling emissions from coal transfer from Belt 5-9, subsequent crushing in the coal crusher, and transfer to Belt 5-10.	PM2.5	0.09	lb/hr	TSP, PM10, and PM2.5 emission factors were calculated from AP-42 Section 13.2.4, equation (1), dated November 2006, assuming windspeed of 1 mph and coal moisture content of 4.7%. Dust collector efficiency assumed to be 99.9% for material transfer processes, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	NSPS Subpart Y
			0.014	tn/yr		
		PM10	0.75	lb/hr		
			0.120	tn/yr		
		TSP	1.67	lb/hr		
			0.27	tn/yr		
5-14	DC controlling emissions from transfer of coal from Belt 5-10 to Belt 5-11.	PM2.5	0.0038	lb/hr	TSP, PM10, and PM2.5 emission factors were calculated from AP-42 Section 13.2.4, equation (1), dated November 2006, assuming windspeed of 1 mph and coal moisture content of 4.7%. Dust collector efficiency assumed to be 99.9% for material transfer processes, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	NSPS Subpart Y
			0.0006	tn/yr		
		PM10	0.0251	lb/hr		
			0.0040	tn/yr		
		TSP	0.0530	lb/hr		
			0.0085	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}: Pollutant {4}	Quantity {5}		Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
5-15	DC controlling emissions from transfer of coal from Belt 5-11 to the Coal Storage Silo and from this Silo to Belts 5-12 and 5-13	PM2.5	0.0039	lb/hr	TSP, PM10, and PM2.5 emission factors were calculated from AP-42 Section 13.2.4, equation (1), dated November 2006, assuming windspeed of 1 mph and coal moisture content of 4.7%. Dust collector efficiency assumed to be 99.9% for material transfer processes, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	NSPS Subpart Y
			0.0009	tn/yr		
		PM10	0.0255	lb/hr		
			0.0059	tn/yr		
		TSP	0.0539	lb/hr		
			0.0124	tn/yr		
6-3	DC controlling emissions from transfer of kiln dust from #1 kiln baghouse (Emiss. Unit 6-1) to kiln dust collection bins.	PM2.5	0.005	lb/hr	Emission factor From AP-42 Section 11.12, Table 11.12-2, Cement unloading to elevated storage silo (pneumatic) (uncontrolled). PM2.5 is 0.053 * TSP, from the particle size multipliers for drop operations per AP-42 Section 13.2.4, Equation 1.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			0.01	tn/yr		
		PM10	0.07	lb/hr		
			0.14	tn/yr		
		TSP	0.10	lb/hr		
			0.22	tn/yr		
6-4	DC controlling emissions from transfer of kiln dust from #2 kiln baghouse (Emiss. Unit 6-2) to kiln dust collection bins.	PM2.5	0.003	lb/hr	Emission factor From AP-42 Section 11.12, Table 11.12-2, Cement unloading to elevated storage silo (pneumatic) (uncontrolled). PM2.5 is 0.053 * TSP, from the particle size multipliers for drop operations per AP-42 Section 13.2.4, Equation 1.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			0.01	tn/yr		
		PM10	0.03	lb/hr		
			0.14	tn/yr		
		TSP	0.05	lb/hr		
			0.22	tn/yr		
6-7	Fugitive Emissions generated from the unloading of pelletized kiln dust from the pelletizer into dust haul trucks.	PM2.5	0.0022	lb/hr	TSP and PM10 Emission Factor from AP-42 Section 11.19.2, Table 11.19.2-2, dated August 2004, uncontrolled conveyor transfer point. PM2.5 is 0.053 * TSP, from the particle size multipliers for drop operations per AP-42 Section 13.2.4, Equation 1)	
			0.0002	tn/yr		
		PM10	0.0154	lb/hr		
			0.0017	tn/yr		
		TSP	0.0420	lb/hr		
			0.0047	tn/yr		
7-1	DC controlling emissions from Elevators 5-1 and 5-2 and the transfer of clinker to Belts 7-1 and 7-2.	PM2.5	0.46	lb/hr	The Elevator emission factor is based on results of emission testing of a similar unit having [redacted] TSP was assumed to be [redacted] Transfer point emission factor is based on AP-42 Chapter 11.19.2, Table 11.19.2-2 dated August 2004, uncontrolled conveyor transfer point. PM10 and PM2.5 emission factors derived from the TSP emission factor using the PM10/PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 96.6%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			0.75	tn/yr		
		PM10	3.07	lb/hr		
			4.94	tn/yr		
		TSP	8.74	lb/hr		
			14.08	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
7-2	DC controlling emiss. from transferring clinker from Belt 7-1 to either Belt 7-3, 7-5 or 7-7 AND transferring clinker from Belt 7-2 to either Belt 7-3, 7-5 or 7-8.	PM2.5	0.09	lb/hr	TSP, and PM10 emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for an uncontrolled conveyor transfer point. Assumed PM2.5 = 0.053 *TSP. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006.	40 CFR 63 Subpart LLLL
			0.09	tn/yr		
		PM10	0.62	lb/hr		
			0.58	tn/yr		
		TSP	1.69	lb/hr		
			1.60	tn/yr		
7-3	DC controlling emissions from the transfer of clinker from Belt 7-3 to Belt 7-4.	PM2.5	0.02	lb/hr	TSP, and PM10 emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for an uncontrolled conveyor transfer point. Assumed PM2.5 = 0.053 *TSP. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006.	40 CFR 63 Subpart LLLL
			0.01	tn/yr		
		PM10	0.15	lb/hr		
			0.08	tn/yr		
		TSP	0.40	lb/hr		
			0.21	tn/yr		
7-4	DC controlling emissions from the transfer of clinker from Belt 7-4 to clinker Storage Silos #6 and #5.	PM2.5	0.01	lb/hr	TSP, and PM10 emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for an uncontrolled conveyor transfer point. Assumed PM2.5 = 0.053 *TSP. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006.	40 CFR 63 Subpart LLLL
			0.01	tn/yr		
		PM10	0.07	lb/hr		
			0.08	tn/yr		
		TSP	0.20	lb/hr		
			0.21	tn/yr		
7-5	DC controlling emissions from the transfer of clinker from Belt 7-5 to Belt 7-6.	PM2.5	0.02	lb/hr	TSP, and PM10 emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for an uncontrolled conveyor transfer point. Assumed PM2.5 = 0.053 *TSP. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006.	40 CFR 63 Subpart LLLL
			0.01	tn/yr		
		PM10	0.15	lb/hr		
			0.08	tn/yr		
		TSP	0.40	lb/hr		
			0.21	tn/yr		
7-6	DC controlling emissions from the transfer of clinker from Belt 7-6 to clinker Storage Silos #7 and #8.	PM2.5	0.01	lb/hr	TSP, and PM10 emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for an uncontrolled conveyor transfer point. Assumed PM2.5 = 0.053 *TSP. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006.	40 CFR 63 Subpart LLLL
			0.01	tn/yr		
		PM10	0.07	lb/hr		
			0.08	tn/yr		
		TSP	0.20	lb/hr		
			0.21	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
7-7	DC controlling emiss. from transferring clinker from Belt 7-7 to Belt 7-9 or 7-11 AND transferring clinker from Belt 7-8 to Belt 7-9 or 7-11.	PM2.5	0.04	lb/hr	TSP, and PM10 emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for an uncontrolled conveyor transfer point. Assumed PM2.5 = 0.053 *TSP. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006.	40 CFR 63 Subpart LLLL
			0.06	tn/yr		
		PM10	0.28	lb/hr		
			0.38	tn/yr		
		TSP	0.76	lb/hr		
			1.04	tn/yr		
7-8	DC controlling emissions from the transfer of clinker from Belt 7-9 to Belt 7-10.	PM2.5	0.02	lb/hr	TSP, and PM10 emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for an uncontrolled conveyor transfer point. Assumed PM2.5 = 0.053 *TSP. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006.	40 CFR 63 Subpart LLLL
			0.01	tn/yr		
		PM10	0.15	lb/hr		
			0.08	tn/yr		
		TSP	0.40	lb/hr		
			0.21	tn/yr		
7-9	DC controlling emissions from the transfer of clinker from Belt 7-10 to clinker Storage Silos #14 and #13.	PM2.5	0.011	lb/hr	Material Transfer Points: TSP, and PM10 emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for an uncontrolled conveyor transfer point. Assumed PM2.5 = 0.053 *TSP. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006.	40 CFR 63 Subpart LLLL
			0.021	tn/yr		
		PM10	0.07	lb/hr		
			0.14	tn/yr		
		TSP	0.20	lb/hr		
			0.39	tn/yr		
7-10	DC controlling emissions from the transfer of clinker from Belt 7-11 to Belt 7-12.	PM2.5	0.021	lb/hr	Material Transfer Points: TSP, and PM10 emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for an uncontrolled conveyor transfer point. Assumed PM2.5 = 0.053 *TSP. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006.	40 CFR 63 Subpart LLLL
			0.011	tn/yr		
		PM10	0.15	lb/hr		
			0.08	tn/yr		
		TSP	0.40	lb/hr		
			0.21	tn/yr		
7-11	DC controlling emissions from the transfer of clinker from Belt 7-12 to clinker Storage Silos #15 and #16.	PM2.5	0.011	lb/hr	Material Transfer Points: TSP, and PM10 emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for an uncontrolled conveyor transfer point. Assumed PM2.5 = 0.053 *TSP. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006.	40 CFR 63 Subpart LLLL
			0.021	tn/yr		
		PM10	0.07	lb/hr		
			0.14	tn/yr		
		TSP	0.20	lb/hr		
			0.39	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3} Pollutant {4}	Quantity {5}		Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
7-12	DC controlling emiss. from clinker/ gypsum distribution from Silos #5, #6, #7 #8, #18, and #19 to #1 Finish Mill System.	PM2.5	27.43	lb/hr	Results of Emission Testing on #2 Finish Mill System. Results assumed to represent #1 Finish Mill System as well. Test Results = [redacted] PM10 and PM2.5 emission factors derived from the TSP emission factor using the PM10/PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM)
			120.13	tn/yr		
		PM10	181.13	lb/hr		
			793.33	tn/yr		
		TSP	517.50	lb/hr		
			2266.65	tn/yr		
7-13	DC controlling emiss. from clinker/ gypsum distribution from Silos #13, #14, #15, and #16 and #22 to #2 Finish Mil. System.	PM2.5	27.43	lb/hr	Results of Emission Testing on #2 Finish Mill System. Results assumed to represent #1 Finish Mill System as well. Test Results = [redacted] PM10 and PM2.5 emission factors derived from the TSP emission factor using the PM10/PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			120.13	tn/yr		
		PM10	181.13	lb/hr		
			793.33	tn/yr		
		TSP	517.50	lb/hr		
			2266.65	tn/yr		
7-14	Fugitive Emissions generated from the transferring of clinker from storage silos to outside storage via haul truck.	PM2.5	0.019	lb/hr	TSP and PM10 emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for uncontrolled conveyor transfer point. Assumed PM2.5 = 0.053 *TSP. PM2.5 emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006.	
			0.001	tn/yr		
		PM10	0.13	lb/hr		
			0.01	tn/yr		
		TSP	0.36	lb/hr		
			0.02	tn/yr		
8-1	DC controlling emissions from Elevators 8-1 and 8-3, transfer of clinker from Elevator 8-1 to Belt 8-1, from Belt 8-1 to #1 Finish Mill and emissions from Air Seperator 8-1.	PM2.5	13.33	lb/hr	Results of Emission Testing on #2 Finish Mill System operating at a production rate of [redacted] used for #1 Finish Mill; These hourly emission rate values were scaled-up based on [redacted] PM10 and PM2.5 emission factors derived from the TSP emission factor using the particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions PM calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form. Maximum VOC hourly emissions from grinding of material in Finish Mill per plant specific information and conservative emission factors.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			58.37	tn/yr		
		PM10	88.00	lb/hr		
			385.44	tn/yr		
		TSP	251.43	lb/hr		
			1101.26	tn/yr		
		VOC	0.45	lb/hr		
			1.97	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
8-2	DC controlling emissions from #1 Finish Mill.	PM2.5	69.27	lb/hr	Results of Emission Testing on #2 Finish Mill System operating at a production rate of [redacted] used for #1 Finish Mill; These hourly emission rate values were scaled-up based on [redacted]. Test Results = [redacted]. PM10 and PM2.5 emission factors derived from the TSP emission factor using the particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions PM calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form. Maximum VOC hourly emissions from grinding of material in Finish Mill per plant specific information and conservative emission factors.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			303.39	tn/yr		
		PM10	457.43	lb/hr		
			2003.52	tn/yr		
		TSP	1306.93	lb/hr		
			5724.36	tn/yr		
		VOC	0.45	lb/hr		
			1.97	tn/yr		
8-3	DC controlling emissions from Elevators 8-2 and 8-4, transfer of clinker from Elevator 8-2 to Belt 8-2, from Belt 8-2 to #2 Finish Mill and emissions from Air Seperator 8-2.	PM2.5	13.33	lb/hr	Results of Emission Testing on #2 Finish Mill System operating at a production rate of [redacted] used for #1 Finish Mill; These hourly emission rate values were scaled-up based on [redacted] processing rate. Test Results = [redacted]. PM10 and PM2.5 emission factors derived from the TSP emission factor using the particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions PM calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form. Maximum VOC hourly emissions from grinding of material in Finish Mill per plant specific information and conservative emission factors.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			58.37	tn/yr		
		PM10	88.00	lb/hr		
			385.44	tn/yr		
		TSP	251.43	lb/hr		
			1101.26	tn/yr		
		VOC	0.45	lb/hr		
			1.97	tn/yr		
8-4	DC controlling emissions from #2 Finish Mill.	PM2.5	69.27	lb/hr	Results of Emission Testing on #2 Finish Mill System operating at a production rate of [redacted]. These hourly emission rate values were scaled-up based on [redacted] processing rate. Test Results = [redacted] PM10 and PM2.5 emission factors derived from the TSP emission factor using particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions PM calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form. Maximum VOC hourly emissions from grinding of material in Finish Mill per plant specific information and conservative emission factors.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			303.39	tn/yr		
		PM10	457.43	lb/hr		
			2003.52	tn/yr		
		TSP	1306.93	lb/hr		
			5724.36	tn/yr		
		VOC	0.45	lb/hr		
			1.97	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
8-5	DC controlling emissions from clinker/ gypsum distribution from Silos #14, #15, and #21 to #3 Finish Mill System.	PM2.5	7.95	lb/hr	TSP Emissions based on results on the PSD permit for Finish Mill #3. PM10 and PM2.5 emission factors derived from the TSP emission factor using the PM10/PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions PM calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			34.82	tn/yr		
		PM10	52.50	lb/hr		
			229.95	tn/yr		
		TSP	150.00	lb/hr		
			657.00	tn/yr		
8-6	DC controlling emissions from #3 Finish Mill.	PM2.5	10.07	lb/hr	TSP Emissions based on results on the PSD permit for Finish Mill #3. PM10 and PM2.5 emission factors derived from the TSP emission factor using the PM10/PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions PM calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form. Maximum VOC hourly emissions from grinding of material in Finish Mill per plant specific information and conservative emission factors.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			44.11	tn/yr		
		PM10	66.50	lb/hr		
			291.27	tn/yr		
		TSP	190.00	lb/hr		
			832.20	tn/yr		
		VOC	0.45	lb/hr		
			1.97	tn/yr		
8-7	DC controlling emissions from Elevator 8-5 and Air Seperator 8-3.	PM2.5	31.27	lb/hr	TSP Emissions based on results on the PSD permit for Finish Mill #3. PM10 and PM2.5 emission factors derived from the TSP emission factor using the PM10/PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Uncontrolled emissions PM calculated assuming a Dust Collector efficiency of 99.9%, obtained from reported control efficiency in July 13, 2004 Title V Operating Permit Application Form. Maximum VOC hourly emissions from grinding of material in Finish Mill per plant specific information and conservative emission factors.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			136.96	tn/yr		
		PM10	206.50	lb/hr		
			904.47	tn/yr		
		TSP	590.00	lb/hr		
			2584.20	tn/yr		
		VOC	0.45	lb/hr		
			1.97	tn/yr		
9-1	DC controlling emissions from venting of Primary Cement Storage Silos #1, #2, #3 #10, and #11, AND bulk loading from Truck Scale "A".	PM2.5	12.110	lb/hr	Emission Factors (uncontrolled cement unloading to elevated storage silo) for PM10 and TSP are from AP-42 Section 11.12, Table 11.12-2, dated June 2006. PM2.5 is assumed to be 0.053*TSP.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			12.05	tn/yr		
		PM10	147.11	lb/hr		
			146.35	tn/yr		
		TSP	228.49	lb/hr		
			227.31	tn/yr		
9-2	DC controlling emissions from venting of Primary Cement Storage Silos #4, #5, and #6 AND bulk loading from Truck Scale "B"	PM2.5	12.110	lb/hr	Emission Factors (uncontrolled cement unloading to elevated storage silo) for PM10 and TSP are from AP-42 Section 11.12, Table 11.12-2, dated June 2006. PM2.5 is assumed to be 0.053*TSP.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			12.05	tn/yr		
		PM10	147.11	lb/hr		
			146.35	tn/yr		
		TSP	228.49	lb/hr		
			227.31	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
9-3	DC controlling emissions from venting of Primary Cement Storage Silos #7, #8, #9 #12, and #13, AND bulk loading from Truck Scale "C".	PM2.5	12.110	lb/hr	Emission Factors (uncontrolled cement unloading to elevated storage silo) for PM10 and TSP are from AP-42 Section 11.12, Table 11.12-2, dated June 2006. PM2.5 is assumed to be 0.053*TSP.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
			12.05	tn/yr		
		PM10	147.11	lb/hr		
			146.35	tn/yr		
		TSP	228.49	lb/hr		
			227.31	tn/yr		
9-4	DC controlling emissions from venting of Secondary Cement Storage Silos #14, #15, #16, #17, and #18 as cement is transferred to Secondary Storage.	PM2.5	8.13	lb/hr	Emission Factors (uncontrolled cement unloading to elevated storage silo) for PM10 and TSP are from AP-42 Section 11.12, Table 11.12-2, dated June 2006. PM2.5 is assumed to be 0.053*TSP.	40 CFR 63 Subpart LLLL
			4.34	tn/yr		
		PM10	98.70	lb/hr		
			52.69	tn/yr		
		TSP	153.30	lb/hr		
			81.83	tn/yr		
10-2 Bottom Ash Stockpile Handling	Bottom Ash Stockpile fugitive emissions generated from stockpile Load-In and Load-Out	PM2.5	0.0012	lb/hr	E = k * 0.0032 * (U/5)^1.3 / (M/2)^1.4 where E = Emission factor , k = Particle size multiplier (0.74 for PM, 0.35 for PM10, and 0.053 for PM2.5), U = Mean wind speed, M = Moisture content; Control efficiency assumed to be zero for all sources enclosed in buildings; Hourly Emissions (lb/hr) = (Emission Factor) * (Hourly Material Throughput) * (100 - Control Factor) / 100;	
			0.0003	tn/yr		
		PM10	0.0078	lb/hr		
			0.0015	tn/yr		
		TSP	0.0165	lb/hr		
			0.0033	tn/yr		
10-3 Iron Stockpile Handling	Iron Stockpile fugitive emissions generated from stockpile Load-In and Load-Out	PM2.5	0.0051	lb/hr	E = k * 0.0032 * (U/5)^1.3 / (M/2)^1.4 where E = Emission factor , k = Particle size multiplier (0.74 for PM, 0.35 for PM10, and 0.053 for PM2.5), U = Mean wind speed, M = Moisture content; Control efficiency assumed to be zero for all sources enclosed in buildings; Hourly Emissions (lb/hr) = (Emission Factor) * (Hourly Material Throughput) * (100 - Control Factor) / 100;	
			0.0003	tn/yr		
		PM10	0.0333	lb/hr		
			0.0027	tn/yr		
		TSP	0.0702	lb/hr		
			0.0057	tn/yr		
10-4 Sandstone Stockpile Handling	Sandstone Stockpile fugitive emissions generated from stockpile Load-In and Load-Out	PM2.5	0.0228	lb/hr	E = k * 0.0032 * (U/5)^1.3 / (M/2)^1.4 where E = Emission factor, k = Particle size multiplier (0.74 for PM, 0.35 for PM10, and 0.053 for PM2.5), U = Mean wind speed, M = Moisture content; Control efficiency assumed to be zero for all sources enclosed in buildings; Hourly Emissions (lb/hr) = (Emission Factor) * (Hourly Material Throughput) * (100 - Control Factor) / 100	
			0.0108	tn/yr		
		PM10	0.1503	lb/hr		
			0.0717	tn/yr		
		TSP	0.3177	lb/hr		
			0.1515	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
10-4A Sandstone Stockpile Wind Erosion	Sandstone Stockpile fugitive emissions generated from stockpile Wind Erosion	PM2.5	0.09	lb/hr	Equation 2-12 from the EPA document "Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures", where E30 = PM30 emission factor, s = silt content of road surface, p = number of days with at least 0.01 in of precipitation, f = % of time wind speed exceeds 12 mph at 10m height from current met data; PM10 is estimated as 50 % of TSP/PM. PM2.5 is assumed to be 0.053*TSP. PM2.5 emission factor derived using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006; No control efficiency assumed for stockpiles; Hourly emissions = Annual Emission (tpy) * (2,000 lbs/ton) / (Total hours with wind > 12 mph); Annual emissions calculated using emission factor and multiplying this by the acres exposed area and 365 days/yr.	
			0.10	tn/yr		
		PM10	0.82	lb/hr		
			0.92	tn/yr		
		TSP	1.64	lb/hr		
			1.84	tn/yr		
10-8 Clinker Stockpile Handling	Clinker Stockpile fugitive emissions generated from stockpile Load-In and Load-Out	PM2.5	0.0717	lb/hr	E = k * 0.0032 * (U/5)^1.3 / (M/2)^1.4 where E = Emission factor, k = Particle size multiplier (0.74 for PM, 0.35 for PM10, and 0.053 for PM2.5), U = Mean wind speed, M = Moisture content; Control efficiency assumed to be zero for all sources enclosed in buildings; Hourly Emissions = (Emission Factor) * (Hourly Material Throughput) * (100 - Control Factor) / 100; Annual Emissions = (Emission Factor) * (Annual Material Throughput) / (2000 lb/ton) * (100 - Control Factor) / 100	
			0.0075	tn/yr		
		PM10	0.4737	lb/hr		
			0.0492	tn/yr		
		TSP	1.0014	lb/hr		
			0.1044	tn/yr		
10-11 CKD Handling	Pellets unloading into CKD repository	PM2.5	0.0014	lb/hr	E = k * 0.0032 * (U/5)^1.3 / (M/2)^1.4 where E = Emission factor, k = Particle size multiplier (0.74 for PM, 0.35 for PM10, and 0.053 for PM2.5), U = Mean wind speed, M = Moisture content; Control efficiency assumed to be zero for all sources enclosed in buildings; Hourly Emissions = (Emission Factor) * (Hourly Material Throughput) * (100 - Control Factor) / 100; Annual Emissions = (Emission Factor) * (Annual Material Throughput) / (2000 lb/ton) * (100 - Control Factor) / 100	
			0.0003	tn/yr		
		PM10	0.0091	lb/hr		
			0.0021	tn/yr		
		TSP	0.0193	lb/hr		
			0.0045	tn/yr		
Coal Reject Pile	Coal Reject Stockpile fugitive emissions generated from stockpile Wind Erosion	PM2.5	0.0006	lb/hr	Equation 2-12 from the EPA document (mentioned in 10-4A), where E30 = PM30 emission factor, s = silt content of road surface, p = number of days with at least 0.01 in of precipitation, f = % of time wind speed exceeds 12 mph at 10m height from current met data; PM10 is estimated as 50 % of TSP/PM. PM2.5 is assumed to be 0.053*TSP. PM2.5 emission factor derived using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006; No control efficiency assumed for stockpiles; Hourly emissions = Annual Emission (tpy) * (2,000 lbs/ton) / (Total hours with wind > 12 mph)	
			0.0007	tn/yr		
		PM10	0.0123	lb/hr		
			0.0137	tn/yr		
		TSP	0.0245	lb/hr		
			0.0275	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
11 Blasting	Gaseous and Particulate associated with detonation of explosives	NOx	30.59	lb/hr	NOx emission factor is the average of measurements from "NOx Emissions from Blasting Operations in Open-Cut Coal Mining" by Attalla et al. (2008). Uses 0.9 kg per metric ton, converted to lb/ton; CO emission factor is the average of the measurements in Rowland J.H., Mainiero R., Hurd D.A. "Factors Affecting Fumes Production of an Emulsion and ANFO/Emulsion Blends." (2001). Use of maximum emission factor from steel or galvanized steel pipe and converted from CO; SO2 emissions are based on a diesel sulfur content of 15 ppm assuming complete conversion to SO2. Assuming ANFO contains 6% fuel oil (diesel); calculated as follows: lb/ton = 6% Fuel Oil x 15 ppm S / 10^6 * 64 lb/lbmol SO2 / 32 lb/lb-mol S * 2000 lb/ton; Maximum amount of ANFO needed on a daily basis for most pits is based on review of historical trends and the expected number of blasts/year, the average amount of 17 tons/blast is used. Blasting particulate emission factors from blasting of coal or overburden in AP-42 Table 11.9-1	
			0.73	tn/yr		
		CO	722.63	lb/hr		
			17.34	tn/yr		
		SO2	0.061	lb/hr		
			0.0015	tn/yr		
		PM2.5	1.66	lb/hr		
			0.04	tn/yr		
		PM10	28.78	lb/hr		
			0.69	tn/yr		
		TSP	55.34	lb/hr		
			1.33	tn/yr		
EGEN01	Emergency Generator No. 1	NOx	2.59	lb/hr	Emission factors in lb/hr for particulate, NOx, CO, TOC obtained from manufacturer specifications. Sulfur emission factor from AP-41 Section 3.3 in lb/hp-hr and use of 201.15 engine horsepower maximum. Annual emissions based on 500 hours per year. Emissions from emergency generators have no control, thus are equal for controlled and uncontrolled.	
			0.65	tn/yr		
		CO	0.50	lb/hr		
			0.13	tn/yr		
		SOx	0.41	lb/hr		
			0.10	tn/yr		
		PM2.5	0.16	lb/hr		
			0.04	tn/yr		
		PM10	0.16	lb/hr		
			0.04	tn/yr		
		TSP	0.16	lb/hr		
			0.04	tn/yr		
		VOC	0.11	lb/hr		
			0.03	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
EGEN02	Emergency Generator No. 2	NOx	2.59	lb/hr	Emission factors in lb/hr for particulate, NOx, CO, TOC obtained from manufacturer specifications. Sulfur emission factor from AP-41 Section 3.3 in lb/hp-hr and use of 201.15 engine horsepower maximum. Annual emissions based on 500 hours per year. Emissions from emergency generators have no control, thus are equal for controlled and uncontrolled.	
			0.65	tn/yr		
		CO	0.50	lb/hr		
			0.13	tn/yr		
		SOx	0.41	lb/hr		
			0.10	tn/yr		
		PM2.5	0.16	lb/hr		
			0.04	tn/yr		
		PM10	0.16	lb/hr		
			0.04	tn/yr		
		TSP	0.16	lb/hr		
			0.04	tn/yr		
		VOC	0.11	lb/hr		
			0.03	tn/yr		
Roads (Unpaved)	Maximum Unpaved Road Emissions	PM2.5	14.83	lb/hr	Emission factors per U.S. EPA, Unpaved Roads, AP-42 Section 13.2.2, November 2006, Equations 1a and 2: E = [k * (s/12)a * (W/3)b] * [(365-P) / 365]; Hourly emissions adjusted to not take into account natural mitigation effects such as rainfall by dividing the estimated emissions by [(365-P) / 365]; Constant "a" and "b" per U.S. EPA, industrial Roads; Hourly Vehicle Miles Traveled VMT = Max. number of trucks per hour x [One-way Road Segment Length x 2]; Annual Vehicle Miles Traveled VMT = Max. number of trucks per year x [One-way Road Segment Length x 2]; Hourly Emissions = E * CF * Road segment length * 2 * No. of trucks/hr / [(365-P) / 365]; Annual Emissions (tpy) = E * CF * (VMT/year) * (ton/2,000 lb); assuming 0% control for unpaved road; P = number of days with at least 0.01 in of precipitation per year	
			25.70	tn/yr		
		PM10	148.27	lb/hr		
			257.00	tn/yr		
		TSP	569.88	lb/hr		
			987.81	tn/yr		

Section 2 Air Pollutant Emissions Rates Prior to Control Or Abatement Equipment Or To Atmosphere If Uncontrolled

Unit No. {1}	Emissions Unit, Process or Operation {2}	Uncontrolled Air Pollutant Emission Rates {3}			Measurement or Estimation Method {6}	Applicable Requirement(s) {7}
		Pollutant {4}	Quantity {5}			
Quarry Sources	Total Emissions for Each Quarry (with overburden activities)	PM2.5	1.79	lb/hr	Emission factor per AP-42 Section 11.9, October 1998, Emission factor equations for uncontrolled open dust sources at Western Surface Coal Mining: EPM = 5.7 x (s)^1.2 / (M)^1.3; EPM10 = 0.75 x (s)^1.5 / (M)^1.4; EPM2.5 = 0.105 x 5.7 x (s)^1.2 / (M)^1.3, where s = Material silt content and M = material moisture content; topsoil removed by scraper (PM10/TSP and PM2.5/PM10 ratios of 0.35 and 0.15 respectively taken from WRAP Chapter 11, Mineral Products Industry), Assuming 0% control for all uncontrolled scenario, Hourly emissions = Emission factor x hourly throughput x (1 - control efficiency %), Annual emissions = Emission factor x annual throughput x (1 - control efficiency %) x 1 ton/2000 lb; Emission factor for drop operation calculated per AP-42 Section 13.2.4, November 2006, Equation 1, E = k * (0.0032) * (U/5)^1.3 / (M/2)^1.4; k = particle size multiplier; U = mean wind speed; M = material moisture content, Hourly emissions calculated as Emission factor x (1-control %) x Hourly throughput, Annual emissions = Emission factor x (1-control %) x Annual throughput / 2000 lb/ton; It is assumed that PM10 Emission Factor/PM Emission Factor = 0.35 and the PM2.5/PM Emission Factor = 0.053 (from AP-42 Section 13.2.4, Equation 1), Hourly throughput is assumed to be equal to maximum hourly overburden rate, Hourly emissions = Emission factor x (1-control %) x Hourly throughput, Annual emissions = Emission factor (lb/ton) x (1-control %) x Annual throughput / 2000 lb/ton; Emission factor for drilling calculated per AP-42 Section 11.19.2, August 2004, Wet Drilling - PM10. Used control efficiency of 97% for wet vs. dry drilling to back-calculate uncontrolled emissions. Hourly emissions = Emission factor x hourly throughput, Annual emissions = Emission factor x annual throughput / 2000 lbs/ton; Emission factor for truck unloading of fragmented stone per AP-42 Section 11.19.2, Hourly throughput = crusher maximum capacity (800 tons/hr), Hourly emissions = Emission factor x (1-control %) x Hourly throughput, Annual emissions = Emission factor x (1-control %) x Annual throughput / 2000 lb/ton	
			3.27	tn/yr		
		PM10	12.10	lb/hr		
			22.27	tn/yr		
		TSP	35.70	lb/hr		
			66.61	tn/yr		

Section 3 Emissions From Air Pollution Control Equipment And From Uncontrolled Process Equipment

Emission Unit Nos. (1)	Control Equipment			Air Pollutants Emitted (4)				Control Efficiency		Applicable Requirements (8)
	Unit No (2)	Type (3)	Manufacturer and Model Number	Pollutant (5)	Quantity (6)			& by Weight	Method of Determination (7)	
					Actual	Unit	Allowable			
1-1				PM2.5	0.083	tpy	0.083			
1-1	Not Specified	Not Specified	Not Specified	PM10	0.574	tpy	0.574	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2. PM2.5 * 20. TSP is 2.1 * PM10. High Rock, Trans Rock, Low Rock, and Sandstone emissions reduced by 75%, 60%, 75%, and 75% respectively due to large rock fragments.	
1-1				TSP	1.565	tpy	1.565			
1-2				PM2.5	0.040	tpy	0.040			
1-2	0201-045	DUST COLL, PRIMARY CRUSHER(WEST)	6" X 8'2" DACRON SEAMLESS BAG SAP# 1035938	PM10	0.280	tpy	0.280	99.90%	TSP Emissions Testing, [redacted].	40 CFR Part 64 (CAM)
1-2				TSP	0.790	tpy	0.790			
1-3				PM2.5	0.060	tpy	0.060			
1-3	0201-026	DUST COLL, SECONDARY CRUSHER(EAST)	6" X 8'2" DACRON SEAMLESS BAG SAP# 1035938 NO SAP# 1035935	PM10	0.370	tpy	0.370	99.90%	TSP Emissions Testing, [redacted].	40 CFR Part 64 (CAM)
1-3				TSP	1.050	tpy	1.050			
1-4				PM2.5	0.150	tpy	0.150			
1-4	0201-027	DUST COLL, SCREEN BLDG	Not Specified	PM10	0.970	tpy	0.970	99.90%	TSP Emissions Testing, [redacted].	40 CFR Part 64 (CAM)
1-4				TSP	2.760	tpy	2.760			
2-1				PM2.5	0.035	tpy	0.035			
2-1	0201-013	DUST COLL #1, ROCK STORAGE(NORTH)	2007- CONVERTED TO PULSE PLEAT BAG # 04002126	PM10	0.120	tpy	0.120	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR Part 64 (CAM)
2-1				TSP	0.365	tpy	0.365			
2-2				PM2.5	0.035	tpy	0.035			
2-2	0201-012	DUST COLL #2, ROCK STORAGE(NORTH)	2004- CONVERTED TO PULSE PLEAT BAG # 04002144	PM10	0.120	tpy	0.120	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR Part 64 (CAM)
2-2				TSP	0.365	tpy	0.365			
2-3				PM2.5	0.028	tpy	0.028			
2-3	0201-014	DUST COLL #3, ROCK STORAGE(SOUTH)	BAGS: 3195-FW0820-STO SAP# 1035938	PM10	0.097	tpy	0.097	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR Part 64 (CAM)
2-3				TSP	0.294	tpy	0.294			
2-4				PM2.5	0.028	tpy	0.028			
2-4	0201-015	DUST COLL #4, ROCK STORAGE(SOUTH)	BAGS: 3195-FW0820-STO SAP# 1035938	PM10	0.096	tpy	0.096	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR Part 64 (CAM)
2-4				TSP	0.292	tpy	0.292			
2-5				PM2.5	0.010	tpy	0.010			
2-5	Not Specified	Not Specified	Not Specified	PM10	0.072	tpy	0.072	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 5. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	
2-5				TSP	0.196	tpy	0.196			
2-6				PM2.5	0.003	tpy	0.003			
2-6	0201-011	DUST COLL, ADDITIVE CRUSHER	Not Specified	PM10	0.012	tpy	0.012	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR 63 Subpart LLLL
2-6				TSP	0.037	tpy	0.037			
2-7				PM2.5	0.069	tpy	0.069			
2-7	0201-001	DUST COLL , #1,(NORTH)	Not Specified	PM10	0.459	tpy	0.459	96.60%	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
2-7				TSP	1.314	tpy	1.314			

Section 3 Emissions From Air Pollution Control Equipment And From Uncontrolled Process Equipment

Emission Unit Nos. (1)	Control Equipment			Air Pollutants Emitted (4)				Control Efficiency		Applicable Requirements (8)
	Unit No (2)	Type (3)	Manufacturer and Model Number	Pollutant (5)	Quantity (6)			& by Weight	Method of Determination (7)	
					Actual	Unit	Allowable			
2-8	0201-003	DUST COLL, #1A,(SOUTH)	Not Specified	PM2.5	0.001	tpy	0.001	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR 63 Subpart LLLL
2-8				PM10	0.003	tpy	0.003			
2-8				TSP	0.009	tpy	0.009			
2-9	0201-030	DUST COLL, F.O.W.s, #1 RAW	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM2.5	0.172	tpy	0.172	99.90%	Emissions Testing for TSP and PM10. [redacted].	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
2-9				PM10	1.923	tpy	1.923			
2-9				TSP	3.241	tpy	3.241			
2-10	Not Specified	Not Specified	Not Specified	PM2.5	0.172	tpy	0.172	99.90%	Emissions Testing for TSP and PM10. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
2-10				PM10	1.923	tpy	1.923			
2-10				TSP	3.241	tpy	3.241			
2-11	Not Specified	Not Specified	Not Specified	PM2.5	0.002	tpy	0.002	N/A	PM10 from AP-42 Section 11.19-2. TSP is 2.1*PM10. Factors multiplied by 5. PM2.5 from proposed revisions to 11.19-2 for controlled conveyor transfer point and multiplied by factor of 20. [redacted]	
2-11				PM10	0.014	tpy	0.014			
2-11				TSP	0.038	tpy	0.038			
3-1	0201-034	DUST COLL, AIR SEPARATOR, #1 RAW	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM2.5	0.480	tpy	0.480	99.90%	Emissions Testing for TSP and PM10. Average of test results + 15%. PM2.5 assumed to be 0.25 of PM10. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
3-1				PM10	3.310	tpy	3.310			
3-1				TSP	9.010	tpy	9.010			
3-2	0201-016	DUST COLL, MILL D.C., #1 RAW	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM2.5	0.120	tpy	0.120	99.90%	Emissions Testing for TSP and PM10. [redacted].	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
3-2				PM10	1.910	tpy	1.910			
3-2				TSP	2.320	tpy	2.320			
3-3	0201-035	DUST COLL, AIR SEPARATOR, #2 RAW	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM2.5	0.480	tpy	0.480	99.90%	Emissions Testing for TSP and PM10. [redacted].	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
3-3				PM10	3.310	tpy	3.310			
3-3				TSP	9.010	tpy	9.010			
3-4	0201-017	DUST COLL, MILL D.C., #2 RAW	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM2.5	0.120	tpy	0.120	99.90%	Emissions Testing for TSP and PM10. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
3-4				PM10	1.910	tpy	1.910			
3-4				TSP	2.320	tpy	2.320			
4-1	0201-005	DUST COLL, BLENDING SILO #1	156AMS SER 39	PM2.5	0.080	tpy	0.080	99.90%	TSP Emission Testing. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
4-1				PM10	0.550	tpy	0.550			
4-1				TSP	1.580	tpy	1.580			
4-2	0201-006	DUST COLL, BLENDING SILO #2	156AMS SER 39	PM2.5	0.080	tpy	0.080	99.90%	TSP Emission Testing. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
4-2				PM10	0.550	tpy	0.550			
4-2				TSP	1.580	tpy	1.580			
4-3	0201-009	DUST COLL #1, 5th FLOOR KF BLDG	Not Specified	PM2.5	0.030	tpy	0.030	99.90%	TSP Emission Testing. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
4-3				PM10	0.190	tpy	0.190			
4-3				TSP	0.550	tpy	0.550			

Section 3 Emissions From Air Pollution Control Equipment And From Uncontrolled Process Equipment

Emission Unit Nos. (1)	Control Equipment: Unit No (2)	Control Equipment: Type (3)	Control Equipment: Manufacturer and Model Number	Air Pollutants Emitted (4): Pollutant (5)	Quantity (6): Actual	Quantity (6): Unit	Quantity (6): Allowable	Control Efficiency: & by Weight	Control Efficiency: Method of Determination (7)	Applicable Requirements (8)
4-4				PM2.5	0.030	tpy	0.030			
4-4	0201-010	DUST COLL #2, 5th FLOOR KF BLDG	Not Specified	PM10	0.190	tpy	0.190	99.90%	TSP Emission Testing. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
4-4				TSP	0.550	tpy	0.550			
4-5				PM2.5	0.040	tpy	0.040			
4-5	0201-062	DUST COLL, PREHEATER	Not Specified	PM10	0.780	tpy	0.780	99.90%	TSP Emission Testing. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
4-5				TSP	2.230	tpy	2.230			
4-6				PM2.5	0.040	tpy	0.040			
4-6	0201-063	DUST COLL, #2 PREHEATER	Not Specified	PM10	0.780	tpy	0.780	99.90%	TSP Emission Testing. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
4-6				TSP	2.230	tpy	2.230			
5-1				PM2.5	0.002	tpy	0.002			
5-1	0504-106	SCREW CONV #1, COOLER DC #1	Not Specified	PM10	0.007	tpy	0.007	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR 63 Subpart LLLL
5-1				TSP	0.021	tpy	0.021			
5-2				PM2.5	0.002	tpy	0.002			
5-2	0504-107	SCREW CONV #2, COOLER DC #2	Not Specified	PM10	0.007	tpy	0.007	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR 63 Subpart LLLL
5-2				TSP	0.022	tpy	0.022			
5-12				PM2.5	0.002	tpy	0.002			
5-12	Not Specified	Not Specified	Not Specified	PM10	0.015	tpy	0.015	N/A	TSP, PM10, and PM2.5 emission factors from AP-42 13.2.4 with a windspeed of 3 mph and moisture content of 4%. Low wind speed is due to this emission unit being protected by a structure from prevailing winds.	
5-12				TSP	0.031	tpy	0.031			
5-13				PM2.5	0.005	tpy	0.005			
5-13	0201-053	DUST COLL, COAL CRUSHER	Not Specified	PM10	0.026	tpy	0.026	99.90%	Uncontrolled TSP emission factor from Table 2-1 of "Fugitive Emissions From Coal Fired Power Plants". PM10 is 0.48 of TSP. PM2.5 is 0.25 *PM10.	NSPS Subpart Y
5-13				TSP	0.058	tpy	0.058			
5-14				PM2.5	0.0000006	tpy	0.0000006			
5-14	0201-054	DUST COLL, TRANSFER TOWER	Not Specified	PM10	0.0000040	tpy	0.0000040	99.90%	Uncontrolled TSP emission factor from Table 2-1 of "Fugitive Emissions From Coal Fired Power Plants". PM10 is 0.48 of TSP. PM2.5 is 0.25 *PM10.	NSPS Subpart Y
5-14				TSP	0.0000085	tpy	0.0000085			
5-15				PM2.5	0.0000009	tpy	0.0000009			
5-15	0201-055	DUST COLL, COAL SILO	Not Specified	PM10	0.0000059	tpy	0.0000059	99.90%	Uncontrolled TSP emission factor from Table 2-1 of "Fugitive Emissions From Coal Fired Power Plants". PM10 is 0.48 of TSP. PM2.5 is 0.25 *PM10.	NSPS Subpart Y
5-15				TSP	0.0000124	tpy	0.0000124			
5-3 to 5-10 6-1 and 6-2				PM2.5	26.027	tpy	26.027			
5-3 to 5-10 6-1 and 6-2				PM10	48.584	tpy	48.584			
5-3 to 5-10 6-1 and 6-2				TSP	57.838	tpy	57.838			
5-3 to 5-10 6-1 and 6-2	0201-042 0201-043	#1 BAGHOUSE, GLASS,1280 BAGS #2 BAGHOUSE, GLASS,1280 BAGS	Not Specified	NOx	1518.866	tpy	1518.866	N/A	See Application for a discussion on the determination of each pollutants emission rate.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
5-3 to 5-10 6-1 and 6-2				CO	1446.539	tpy	1446.539			
5-3 to 5-10 6-1 and 6-2				SO2	848.178	tpy	848.178			
5-3 to 5-10 6-1 and 6-2				VOC	66.541	tpy	66.541			

Section 3 Emissions From Air Pollution Control Equipment And From Uncontrolled Process Equipment

Emission Unit Nos. (1)	Control Equipment: Unit No (2)	Control Equipment: Type (3)	Control Equipment: Manufacturer and Model Number	Air Pollutants Emitted (4): Pollutant (5)	Quantity (6): Actual	Quantity (6): Unit	Quantity (6): Allowable	Control Efficiency: & by Weight	Control Efficiency: Method of Determination (7)	Applicable Requirements (8)
6-3	0201-092	DUST COLL, DUST BIN,	BHA BAG,180,NX004,6.25X120,SBDI	PM2.5	0.007	tpy	0.007	N/A	AP-42 Emission Factor. From 11-12.2 times a factor of 2. PM10 is 0.48 of TSP. PM2.5 is 0.25 of PM10.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
6-3				PM10	0.144	tpy	0.144			
6-3				TSP	0.224	tpy	0.224			
6-4	0201-093	DUST COLL, #2KILN DUST BIN	299-4766BHA BAG,180,NX004,6.25X120,SBDI 311-2378 Cage,046,GV001,5.875X119.5,10W,SPR	PM2.5	0.007	tpy	0.007	N/A	AP-42 Emission Factor. From 11-12.2 times a factor of 2. PM10 is 0.48 of TSP. PM2.5 is 0.25 of PM10.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
6-4				PM10	0.141	tpy	0.141			
6-4				TSP	0.219	tpy	0.219			
6-7	Not Specified	Not Specified	Not Specified	PM2.5	0.000	tpy	0.000	N/A	PM10 Emission Factor from AP-42 Section 11.19-2. TSP is 2.1*PM10. PM2.5 Emission Factor from proposed revisions to 11.19-2 for controlled conveyor transfer point and multiplied by [redacted]	
6-7				PM10	0.002	tpy	0.002			
6-7				TSP	0.005	tpy	0.005			
7-1	0201-080	DUST COLL, CLINKER TOWER	100-S8-TRB 4-1/2x8'4" Nomex SAP#1035932 menards#A100377	PM2.5	0.028	tpy	0.028	96.60%	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
7-1				PM10	0.170	tpy	0.170			
7-1				TSP	0.490	tpy	0.490			
7-2	0201-085	DUST COLL, #1 DIV VALVE	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.006	tpy	0.006	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-2				PM10	0.020	tpy	0.020			
7-2				TSP	0.070	tpy	0.070			
7-3	0201-081	DUST COLL, #5 CLK BELT	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.001	tpy	0.001	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-3				PM10	0.003	tpy	0.003			
7-3				TSP	0.010	tpy	0.010			
7-4	0201-076	DUST COLL, #5 CLK SILO	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.001	tpy	0.001	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted] e.	40 CFR 63 Subpart LLLL
7-4				PM10	0.003	tpy	0.003			
7-4				TSP	0.010	tpy	0.010			
7-5	0201-082	DUST COLL, #8 CLK BELT	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.001	tpy	0.001	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-5				PM10	0.003	tpy	0.003			
7-5				TSP	0.010	tpy	0.010			
7-6	0201-077	DUST COLL, #8 CLK SILO	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.001	tpy	0.001	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-6				PM10	0.003	tpy	0.003			
7-6				TSP	0.010	tpy	0.010			

Section 3 Emissions From Air Pollution Control Equipment And From Uncontrolled Process Equipment

Emission Unit Nos. (1)	Control Equipment: Unit No (2)	Control Equipment: Type (3)	Control Equipment: Manufacturer and Model Number	Air Pollutants Emitted (4): Pollutant (5)	Quantity (6): Actual	Quantity (6): Unit	Quantity (6): Allowable	Control Efficiency: & by Weight	Control Efficiency: Method of Determination (7)	Applicable Requirements (8)
7-7				PM2.5	0.004	tpy	0.004			
7-7	0201-086	DUST COLL, #1A CLK DIV VALVE	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM10	0.020	tpy	0.020	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-7				TSP	0.060	tpy	0.060			
7-8				PM2.5	0.001	tpy	0.001			
7-8	0201-083	DUST COLL, #13 CLK BELT	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM10	0.003	tpy	0.003	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-8				TSP	0.010	tpy	0.010			
7-9				PM2.5	0.002	tpy	0.002			
7-9	0201-078	DUST COLL, #13 CLK SILO	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM10	0.010	tpy	0.010	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-9				TSP	0.030	tpy	0.030			
7-10				PM2.5	0.001	tpy	0.001			
7-10	Not Specified	Not Specified	Not Specified	PM10	0.003	tpy	0.003	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-10				TSP	0.010	tpy	0.010			
7-11				PM2.5	0.002	tpy	0.002			
7-11	0201-079	DUST COLL, #16 CLK SILO	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM10	0.010	tpy	0.010	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2[redacted]	40 CFR 63 Subpart LLLL
7-11				TSP	0.010	tpy	0.010			
7-12				PM2.5	0.120	tpy	0.120			
7-12	0201-032	DUST COLL, FOWs D.C., #1 F.M.	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM10	0.793	tpy	0.793	99.90%	Average of TSP emissions testing results [redacted]	40 CFR Part 64 (CAM)
7-12				TSP	2.267	tpy	2.267			
7-13				PM2.5	0.120	tpy	0.120			
7-13	0201-033	DUST COLL, FOWs D.C., #2 F.M.	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM10	0.793	tpy	0.793	99.90%	Average of TSP emissions testing results[redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
7-13				TSP	2.267	tpy	2.267			
7-14				PM2.5	0.001	tpy	0.001			
7-14	Not Specified	Not Specified	Not Specified	PM10	0.010	tpy	0.010	N/A	PM10 from AP-42 Section 11.19-2. TSP is 2.1*PM10. Factors multiplied by 5. PM2.5 from proposed revisions to 11.19-2 for controlled[redacted]	
7-14				TSP	0.020	tpy	0.020			
8-1				PM2.5	0.060	tpy	0.060			
8-1	0201-037	DUST COLL, AIR SEP, #1 F.M.	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM10	0.390	tpy	0.390	99.90%	Average of results from TSP testin[redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-1				TSP	1.100	tpy	1.100			
8-1				VOC	1.971	tpy	1.971	N/A	N/A	
8-2				PM2.5	0.300	tpy	0.300			
8-2	0201-018	DUST COLL, MILL D.C., #1 F.M.	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM10	2.000	tpy	2.000	99.90%	Average of results from TSP testing[redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-2				TSP	5.720	tpy	5.720			
8-2				VOC	1.971	tpy	1.971	N/A	N/A	
8-3				PM2.5	0.060	tpy	0.060			
8-3	0201-036	DUST COLL, AIR SEP, #2 F.M.	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM10	0.390	tpy	0.390	99.90%	Average of results from TSP testing[redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-3				TSP	1.100	tpy	1.100			
8-3				VOC	1.971	tpy	1.971	N/A	N/A	
8-4				PM2.5	0.300	tpy	0.300			
8-4	0201-019	DUST COLL, MILL D.C., #2 F.M.	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM10	2.000	tpy	2.000	99.90%	Average of results from TSP testin[redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-4				TSP	5.720	tpy	5.720			
8-4				VOC	1.971	tpy	1.971	N/A	N/A	
8-5				PM2.5	0.030	tpy	0.030			
8-5	0201-050	DUST COLL, FOWs D.C., #3 F.M.	2004- CONVERTED TO TOP LOAD PULSE PLEAT. #3195-400-2144. 6.13 X 41.50	PM10	0.230	tpy	0.230	99.90%	TSP emissions as allowed by permit. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-5				TSP	0.660	tpy	0.660			
8-6				PM2.5	0.040	tpy	0.040			
8-6	0201-051	DUST COLL, MILL D.C., #3 F.M.	2009- CONVERTED TO TOP LEAD PULSE PLEAT. #3195-400-2144. 6.13 X 41.50	PM10	0.290	tpy	0.290	99.90%	TSP emissions as allowed by permit. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-6				TSP	0.830	tpy	0.830			
8-6				VOC	1.971	tpy	1.971	N/A	N/A	

Section 3 Emissions From Air Pollution Control Equipment And From Uncontrolled Process Equipment

Emission Unit Nos. (1)	Control Equipment: Unit No (2)	Control Equipment: Type (3)	Control Equipment: Manufacturer and Model Number	Air Pollutants Emitted (4): Pollutant (5)	Quantity (6): Actual	Quantity (6): Unit	Quantity (6): Allowable	Control Efficiency: & by Weight	Control Efficiency: Method of Determination (7)	Applicable Requirements (8)
8-7	0201-052	DUST COLL, AIR SEP D.C., #3 F.M.	POLYESTER # 02985761 SAP# 1035920 membrane 4.625x100	PM2.5	0.140	tpy	0.140	99.90%	TSP emissions as allowed by permit. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-7				PM10	0.900	tpy	0.900			
8-7				TSP	2.580	tpy	2.580			
8-7				VOC	1.971	tpy	1.971	N/A	N/A	
9-1	0201-020	DUST COLL #1, P.H. ROOF	THE NORTHERN BLOWER CO (NORBLO) REVERSE DAMPER SERIAL 958-141 TRU 143	PM2.5	0.016	tpy	0.016	N/A	Emission Factors for PM10 and TSP are from AP-42 Section 11.12-2. PM2.5 is assumed to be 0.25*PM10.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
9-1				PM10	0.110	tpy	0.110			
9-1				TSP	0.310	tpy	0.310			
9-2	0201-021	DUST COLL #2, P.H. ROOF	Not Specified	PM2.5	0.016	tpy	0.016	N/A	Emission Factors for PM10 and TSP are from AP-42 Section 11.12-2. PM2.5 is assumed to be 0.25*PM10.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
9-2				PM10	0.110	tpy	0.110			
9-2				TSP	0.310	tpy	0.310			
9-3	0201-022	DUST COLL #3, P.H. ROOF	Not Specified	PM2.5	0.016	tpy	0.016	N/A	Emission Factors for PM10 and TSP are from AP-42 Section 11.12-2. PM2.5 is assumed to be 0.25*PM10.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
9-3				PM10	0.110	tpy	0.110			
9-3				TSP	0.310	tpy	0.310			
9-4	0201-002	DUST COLL, #2 CEM STORAGE ROOF	Not Specified	PM2.5	0.006	tpy	0.006	N/A	Emission Factors for PM10 and TSP are from AP-42 Section 11.12-2. PM2.5 is assumed to be 0.25*PM10.	40 CFR 63 Subpart LLLL
9-4				PM10	0.040	tpy	0.040			
9-4				TSP	0.110	tpy	0.110			
10-2	Not Specified	Not Specified	Not Specified	PM2.5	0.000	tpy	0.000	N/A	PM10 emissions are based on AP-42 11.19-2 (Uncontrolled Conveyor Transfer Point). TSP is 2.1 of PM10. PM2.5 emissions are based on AP-42 11.19.2-2 (Controlled Conveyor Transfer Point) [redacted]	
10-2				PM10	0.002	tpy	0.002			
10-2				TSP	0.003	tpy	0.003			
10-3	Not Specified	Not Specified	Not Specified	PM2.5	0.000	tpy	0.000	N/A	PM10 emissions are based on AP-42 11.19-2 (Uncontrolled Conveyor Transfer Point). TSP is 2.1 of PM10. PM2.5 emissions are based on AP-42 11.19.2-2 (Controlled Conveyor Transfer Point) [redacted]	
10-3				PM10	0.003	tpy	0.003			
10-3				TSP	0.006	tpy	0.006			
10-4	Not Specified	Not Specified	Not Specified	PM2.5	0.005	tpy	0.005	N/A	PM10 emissions from AP-42 11.19-2. TSP is 2.1 of PM10. PM2.5 emissions from AP-42 11.19.2-2 (Controlled Convey Trans Pnt) multiplied by 20. Emissions reduced by 75% due to large rock fragments.	
10-4				PM10	0.036	tpy	0.036			
10-4				TSP	0.076	tpy	0.076			
10-4A	Not Specified	Not Specified	Not Specified	PM2.5	0.098	tpy	0.098	N/A	For wind erosion related emissions Equation 4-9 of "Open Fugitive Dust Sources" was used to calculate PM10 emissions. TSP is 2.1 of PM10. PM2.5 is 0.25 of PM10.	
10-4A				PM10	0.920	tpy	0.920			
10-4A				TSP	1.840	tpy	1.840			
10-8	Not Specified	Not Specified	Not Specified	PM2.5	0.008	tpy	0.008	N/A	PM2.5, PM10, and TSP emissions are based on AP-42 13.2.4 Equation 1. Wind speed is assumed to be [redacted] A 95% control factor is used due to stockpile being inside a covered storage building.	
10-8				PM10	0.049	tpy	0.049			
10-8				TSP	0.104	tpy	0.104			
10-11A	Not Specified	Not Specified	Not Specified	PM2.5	0.000	tpy	0.000	N/A	For wind erosion emissions Equation 4-9 of "Open Fugitive Dust Sources" was used to calculate PM10 emissions. PM10 is 0.5 of TSP. PM2.5 is 0.25 of PM10. Emissions were reduced by 50% due to topo. related windbreak.	
10-11A				PM10	0.002	tpy	0.002			
10-11A				TSP	0.005	tpy	0.005			
Coal Reject Pile	Not Specified	Not Specified	Not Specified	PM2.5	0.001	tpy	0.001	N/A	N/A	
Coal Reject Pile				PM10	0.014	tpy	0.014			
Coal Reject Pile				TSP	0.027	tpy	0.027			
11	Not Specified	Not Specified	Not Specified	PM2.5	0.040	tpy	0.040	N/A	N/A	
11				PM10	0.691	tpy	0.691			
11				TSP	1.328	tpy	1.328			
11				NOx	0.734	tpy	0.734			
11				CO	17.343	tpy	17.343			
11				SO2	0.001	tpy	0.001			
EGEN01	Not Specified	Not Specified	Not Specified	PM2.5	0.040	tpy	0.040	N/A	N/A	
EGEN01				PM10	0.040	tpy	0.040			
EGEN01				TSP	0.040	tpy	0.040			
EGEN01				NOx	0.647	tpy	0.647			
EGEN01				CO	0.125	tpy	0.125			
EGEN01				SO2	0.103	tpy	0.103			
EGEN01				VOC	0.028	tpy	0.028			

Section 3 Emissions From Air Pollution Control Equipment And From Uncontrolled Process Equipment

Emission Unit Nos. (1)	Control Equipment: Unit No (2)	Control Equipment: Type (3)	Control Equipment: Manufacturer and Model Number	Air Pollutants Emitted (4): Pollutant (5)	Quantity (6): Actual	Quantity (6): Unit	Quantity (6): Allowable	Control Efficiency: & by Weight	Control Efficiency: Method of Determination (7)	Applicable Requirements (8)
EGEN02				PM2.5	0.040	tpy	0.040			
EGEN02				PM10	0.040	tpy	0.040			
EGEN02				TSP	0.040	tpy	0.040			
EGEN02	Not Specified	Not Specified	Not Specified	NOx	0.647	tpy	0.647	N/A	N/A	
EGEN02				CO	0.125	tpy	0.125			
EGEN02				SO2	0.103	tpy	0.103			
EGEN02				VOC	0.028	tpy	0.028			
Quarry Sources				PM2.5	0.579	tpy	0.579			
Quarry Sources	Not Specified	Not Specified	Not Specified	PM10	4.319	tpy	4.319	N/A	AP-42 Emission Factors	
Quarry Sources				TSP	15.319	tpy	15.319			
Unpaved Roads				PM2.5	3.598	tpy	3.598			
Unpaved Roads	Not Specified	Not Specified	Not Specified	PM10	35.980	tpy	35.980	86%	2022-0819 Email from Kyle Tumpane (CABQ) based on watering, blading, speed limit 35 mph	
Unpaved Roads				TSP	138.293	tpy	138.293			
Paved Roads				PM2.5	0.061	tpy	0.061			
Paved Roads	Not Specified	Not Specified	Not Specified	PM10	0.247	tpy	0.247	N/A	AP-42 Emission Factors	
Paved Roads				TSP	1.274	tpy	1.274			
Tanks 1-4	Not Specified	Not Specified	Not Specified	VOC	0.320	tpy	0.320	N/A	N/A	
1-1				PM2.5	0.127	lb/hr	0.127			
1-1	Not Specified	Not Specified	Not Specified	PM10	0.880	lb/hr	0.880	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2. PM2.5 * 20. TSP is 2.1 * PM10. High Rock, Trans Rock, Low Rock, and Sandstone emissions reduced by 75%, 60%, 75%, and 75% respectively due to large rock fragments.	
1-1				TSP	2.400	lb/hr	2.400			
1-2				PM2.5	0.010	lb/hr	0.010			
1-2	0201-045	DUST COLL, PRIMARY CRUSHER(WEST)	6" X 8'2" DACRON SEAMLESS BAG SAP# 1035938	PM10	0.063	lb/hr	0.063	99.90%	TSP Emissions Testing [redacted].	40 CFR Part 64 (CAM)
1-2				TSP	0.180	lb/hr	0.180			
1-3				PM2.5	0.013	lb/hr	0.013			
1-3	0201-026	DUST COLL, SECONDARY CRUSHER(EAST)	6" X 8'2" DACRON SEAMLESS BAG SAP# 1035938 NO SAP# 1035935	PM10	0.084	lb/hr	0.084	99.90%	TSP Emissions Testing [redacted]	40 CFR Part 64 (CAM)
1-3				TSP	0.240	lb/hr	0.240			
1-4				PM2.5	0.033	lb/hr	0.033			
1-4	0201-027	DUST COLL, SCREEN BLDG	Not Specified	PM10	0.221	lb/hr	0.221	99.90%	TSP Emissions Testing [redacted].	40 CFR Part 64 (CAM)
1-4				TSP	0.630	lb/hr	0.630			
2-1				PM2.5	0.042	lb/hr	0.042			
2-1	0201-013	DUST COLL #1, ROCK STORAGE(NORTH)	2007- CONVERTED TO PULSE PLEAT BAG # 04002126	PM10	0.147	lb/hr	0.147	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR Part 64 (CAM)
2-1				TSP	0.448	lb/hr	0.448			
2-2				PM2.5	0.042	lb/hr	0.042			
2-2	0201-012	DUST COLL #2, ROCK STORAGE(NORTH)	2004- CONVERTED TO PULSE PLEAT BAG # 04002144	PM10	0.147	lb/hr	0.147	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR Part 64 (CAM)
2-2				TSP	0.448	lb/hr	0.448			
2-3				PM2.5	0.042	lb/hr	0.042			
2-3	0201-014	DUST COLL #3, ROCK STORAGE(SOUTH)	BAGS: 3195-FW0820-STO SAP# 1035938	PM10	0.147	lb/hr	0.147	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR Part 64 (CAM)
2-3				TSP	0.448	lb/hr	0.448			
2-4				PM2.5	0.042	lb/hr	0.042			
2-4	0201-015	DUST COLL #4, ROCK STORAGE(SOUTH)	BAGS: 3195-FW0820-STO SAP# 1035938	PM10	0.147	lb/hr	0.147	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR Part 64 (CAM)
2-4				TSP	0.448	lb/hr	0.448			
2-5				PM2.5	0.019	lb/hr	0.019			
2-5	Not Specified	Not Specified	Not Specified	PM10	0.132	lb/hr	0.132	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 5. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	
2-5				TSP	0.360	lb/hr	0.360			
2-6				PM2.5	0.006	lb/hr	0.006			
2-6	0201-011	DUST COLL, ADDITIVE CRUSHER	Not Specified	PM10	0.022	lb/hr	0.022	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR 63 Subpart LLLL
2-6				TSP	0.067	lb/hr	0.067			
2-7				PM2.5	0.005	lb/hr	0.005			
2-7	0201-001	DUST COLL , #1,(NORTH)	Not Specified	PM10	0.035	lb/hr	0.035	96.60%	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
2-7				TSP	0.100	lb/hr	0.100			

Section 3 Emissions From Air Pollution Control Equipment And From Uncontrolled Process Equipment

Emission Unit Nos. (1)	Control Equipment: Unit No (2)	Control Equipment: Type (3)	Control Equipment: Manufacturer and Model Number	Air Pollutants Emitted (4): Pollutant (5)	Quantity (6): Actual	Quantity (6): Unit	Quantity (6): Allowable	Control Efficiency: & by Weight	Control Efficiency: Method of Determination (7)	Applicable Requirements (8)
2-8				PM2.5	0.002	lb/hr	0.002			
2-8	0201-003	DUST COLL, #1A,(SOUTH)	Not Specified	PM10	0.006	lb/hr	0.006	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR 63 Subpart LLLL
2-8				TSP	0.017	lb/hr	0.017			
2-9				PM2.5	0.039	lb/hr	0.039			
2-9	0201-030	DUST COLL, F.O.W.s, #1 RAW	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM10	0.439	lb/hr	0.439	99.90%	Emissions Testing for TSP and PM10. [redacted].	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
2-9				TSP	0.740	lb/hr	0.740			
2-10				PM2.5	0.039	lb/hr	0.039			
2-10	Not Specified	Not Specified	Not Specified	PM10	0.439	lb/hr	0.439	99.90%	Emissions Testing for TSP and PM10. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
2-10				TSP	0.740	lb/hr	0.740			
2-11				PM2.5	0.019	lb/hr	0.019			
2-11	Not Specified	Not Specified	Not Specified	PM10	0.132	lb/hr	0.132	N/A	PM10 from AP-42 Section 11.19-2. TSP is 2.1*PM10. Factors multiplied by 5. PM2.5 from proposed revisions to 11.19-2 for controlled conveyor transfer point and multiplied by factor of 20. [redacted]	
2-11				TSP	0.360	lb/hr	0.360			
3-1				PM2.5	0.109	lb/hr	0.109			
3-1	0201-034	DUST COLL, AIR SEPARATOR, #1 RAW	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM10	0.755	lb/hr	0.755	99.90%	Emissions Testing for TSP and PM10. [redacted] Average test results for NOx [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
3-1				TSP	2.056	lb/hr	2.056			
3-2				PM2.5	0.028	lb/hr	0.028			
3-2	0201-016	DUST COLL, MILL D.C., #1 RAW	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM10	0.436	lb/hr	0.436	99.90%	Emissions Testing for TSP and PM10. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
3-2				TSP	0.529	lb/hr	0.529			
3-3				PM2.5	0.109	lb/hr	0.109			
3-3	0201-035	DUST COLL, AIR SEPARATOR, #2 RAW	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM10	0.755	lb/hr	0.755	99.90%	Emissions Testing for TSP and PM10. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
3-3				TSP	2.056	lb/hr	2.056			
3-4				PM2.5	0.028	lb/hr	0.028			
3-4	0201-017	DUST COLL, MILL D.C., #2 RAW	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM10	0.436	lb/hr	0.436	99.90%	Emissions Testing for TSP and PM10. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
3-4				TSP	0.529	lb/hr	0.529			
4-1				PM2.5	0.019	lb/hr	0.019			
4-1	0201-005	DUST COLL, BLENDING SILO #1	156AMS SER 39	PM10	0.126	lb/hr	0.126	99.90%	TSP Emission Testing. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
4-1				TSP	0.361	lb/hr	0.361			
4-2				PM2.5	0.019	lb/hr	0.019			
4-2	0201-006	DUST COLL, BLENDING SILO #2	156AMS SER 39	PM10	0.126	lb/hr	0.126	99.90%	TSP Emission Testing. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
4-2				TSP	0.361	lb/hr	0.361			
4-3				PM2.5	0.007	lb/hr	0.007			
4-3	0201-009	DUST COLL #1, 5th FLOOR KF BLDG	Not Specified	PM10	0.044	lb/hr	0.044	99.90%	TSP Emission Testing [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
4-3				TSP	0.124	lb/hr	0.124			
4-4				PM2.5	0.007	lb/hr	0.007			
4-4	0201-010	DUST COLL #2, 5th FLOOR KF BLDG	Not Specified	PM10	0.044	lb/hr	0.044	99.90%	TSP Emission Testing. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
4-4				TSP	0.124	lb/hr	0.124			
4-5				PM2.5	0.009	lb/hr	0.009			
4-5	0201-062	DUST COLL, PREHEATER	Not Specified	PM10	0.179	lb/hr	0.179	99.90%	TSP Emission Testing. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
4-5				TSP	0.510	lb/hr	0.510			
4-6				PM2.5	0.009	lb/hr	0.009			
4-6	0201-063	DUST COLL, #2 PREHEATER	Not Specified	PM10	0.179	lb/hr	0.179	99.90%	TSP Emission Testing. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
4-6				TSP	0.510	lb/hr	0.510			
5-1				PM2.5	0.000	lb/hr	0.000			
5-1	0504-106	SCREW CONV #1, COOLER DC #1	Not Specified	PM10	0.002	lb/hr	0.002	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR 63 Subpart LLLL
5-1				TSP	0.005	lb/hr	0.005			
5-2				PM2.5	0.002	lb/hr	0.002			
5-2	0504-107	SCREW CONV #2, COOLER DC #2	Not Specified	PM10	0.007	lb/hr	0.007	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2	40 CFR 63 Subpart LLLL
5-2				TSP	0.022	lb/hr	0.022			
5-12				PM2.5	0.014	lb/hr	0.014			
5-12	Not Specified	Not Specified	Not Specified	PM10	0.092	lb/hr	0.092	N/A	TSP, PM10, and PM2.5 emission factors from AP-42 13.2.4 with a windspeed of 3 mph and moisture content of 4%. Low wind speed is due to this emission unit being protected by a structure from prevailing winds.	
5-12				TSP	0.194	lb/hr	0.194			

Section 3 Emissions From Air Pollution Control Equipment And From Uncontrolled Process Equipment

Emission Unit Nos. (1)	Control Equipment: Unit No (2)	Control Equipment: Type (3)	Control Equipment: Manufacturer and Model Number	Air Pollutants Emitted (4): Pollutant (5)	Quantity (6): Actual	Quantity (6): Unit	Quantity (6): Allowable	Control Efficiency: & by Weight	Control Efficiency: Method of Determination (7)	Applicable Requirements (8)
5-13	0201-053	DUST COLL, COAL CRUSHER	Not Specified	PM2.5	0.030	lb/hr	0.030	99.90%	Uncontrolled TSP emission factor from Table 2-1 of "Fugitive Emissions From Coal Fired Power Plants". PM10 is 0.48 of TSP. PM2.5 is 0.25 *PM10.	NSPS Subpart Y
5-13				PM10	0.162	lb/hr	0.162			
5-13				TSP	0.360	lb/hr	0.360			
5-14	0201-054	DUST COLL, TRANSFER TOWER	Not Specified	PM2.5	0.000	lb/hr	0.000	99.90%	Uncontrolled TSP emission factor from Table 2-1 of "Fugitive Emissions From Coal Fired Power Plants". PM10 is 0.48 of TSP. PM2.5 is 0.25 *PM10.	NSPS Subpart Y
5-14				PM10	0.000	lb/hr	0.000			
5-14				TSP	0.000	lb/hr	0.000			
5-15	0201-055	DUST COLL, COAL SILO	Not Specified	PM2.5	0.000	lb/hr	0.000	99.90%	Uncontrolled TSP emission factor from Table 2-1 of "Fugitive Emissions From Coal Fired Power Plants". PM10 is 0.48 of TSP. PM2.5 is 0.25 *PM10.	NSPS Subpart Y
5-15				PM10	0.000	lb/hr	0.000			
5-15				TSP	0.000	lb/hr	0.000			
5-3 to 5-10 6-1 and 6-2	0201-042 0201-043	#1 BAGHOUSE, GLASS,1280 BAGS #2 BAGHOUSE, GLASS,1280 BAGS	Not Specified	PM2.5	17.880	lb/hr	17.880	N/A	See Application for a discussion on the determination of each pollutants emission rate.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
5-3 to 5-10 6-1 and 6-2				PM10	33.363	lb/hr	33.363			
5-3 to 5-10 6-1 and 6-2				TSP	83.337	lb/hr	83.337			
5-3 to 5-10 6-1 and 6-2				NOx	975.000	lb/hr	975.000			
5-3 to 5-10 6-1 and 6-2				CO	1348.000	lb/hr	1348.000			
5-3 to 5-10 6-1 and 6-2				SO2	193.600	lb/hr	193.600			
5-3 to 5-10 6-1 and 6-2				VOC	15.502	lb/hr	15.502			
6-3	0201-092	DUST COLL, DUST BIN,	BHA BAG,180,NX004,6.25X120,SBDI	PM2.5	0.003	lb/hr	0.003	N/A	AP-42 Emission Factor. From 11-12.2 times a factor of 2. PM10 is 0.48 of TSP. PM2.5 is 0.25 of PM10.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
6-3				PM10	0.066	lb/hr	0.066			
6-3				TSP	0.102	lb/hr	0.102			
6-4	0201-093	DUST COLL, #2KILN DUST BIN	299-4766BHA BAG,180,NX004,6.25X120,SBDI 311-2378 Cage,046,GV001,5.875X119.5,10W,SPR	PM2.5	0.002	lb/hr	0.002	N/A	AP-42 Emission Factor. From 11-12.2 times a factor of 2. PM10 is 0.48 of TSP. PM2.5 is 0.25 of PM10.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
6-4				PM10	0.033	lb/hr	0.033			
6-4				TSP	0.051	lb/hr	0.051			
6-7	Not Specified	Not Specified	Not Specified	PM2.5	0.002	lb/hr	0.002	N/A	PM10 Emission Factor from AP-42 Section 11.19-2. TSP is 2.1*PM10. PM2.5 Emission Factor from proposed revisions to 11.19-2 for controlled [redacted]	
6-7				PM10	0.015	lb/hr	0.015			
6-7				TSP	0.042	lb/hr	0.042			
7-1	0201-080	DUST COLL, CLINKER TOWER	100-S8-TRB 4-1/2x8'4" Nomex SAP#1035932 menards#A100377	PM2.5	0.017	lb/hr	0.017	96.60%	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
7-1				PM10	0.110	lb/hr	0.110			
7-1				TSP	0.300	lb/hr	0.300			
7-2	0201-085	DUST COLL, #1 DIV VALVE	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.007	lb/hr	0.007	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-2				PM10	0.030	lb/hr	0.030			
7-2				TSP	0.080	lb/hr	0.080			
7-3	0201-081	DUST COLL, #5 CLK BELT	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.002	lb/hr	0.002	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-3				PM10	0.010	lb/hr	0.010			
7-3				TSP	0.030	lb/hr	0.030			
7-4	0201-076	DUST COLL, #5 CLK SILO	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.001	lb/hr	0.001	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-4				PM10	0.003	lb/hr	0.003			
7-4				TSP	0.010	lb/hr	0.010			
7-5	0201-082	DUST COLL, #8 CLK BELT	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.002	lb/hr	0.002	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-5				PM10	0.010	lb/hr	0.010			
7-5				TSP	0.030	lb/hr	0.030			
7-6	0201-077	DUST COLL, #8 CLK SILO	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.001	lb/hr	0.001	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-6				PM10	0.003	lb/hr	0.003			
7-6				TSP	0.010	lb/hr	0.010			
7-7	0201-086	DUST COLL, #1A CLK DIV VALVE	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.003	lb/hr	0.003	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to [redacted]	40 CFR 63 Subpart LLLL
7-7				PM10	0.012	lb/hr	0.012			
7-7				TSP	0.050	lb/hr	0.050			
7-8	0201-083	DUST COLL, #13 CLK BELT	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.002	lb/hr	0.002	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-8				PM10	0.010	lb/hr	0.010			
7-8				TSP	0.030	lb/hr	0.030			

Section 3 Emissions From Air Pollution Control Equipment And From Uncontrolled Process Equipment

Emission Unit Nos. (1)	Control Equipment			Air Pollutants Emitted (4)				Control Efficiency		Applicable Requirements (8)
	Unit No (2)	Type (3)	Manufacturer and Model Number	Pollutant (5)	Quantity (6)			& by Weight	Method of Determination (7)	
					Actual	Unit	Allowable			
7-9	0201-078	DUST COLL, #13 CLK SILO	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.001	lb/hr	0.001	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-9				PM10	0.003	lb/hr	0.003			
7-9				TSP	0.010	lb/hr	0.010			
7-10	Not Specified	Not Specified	Not Specified	PM2.5	0.002	lb/hr	0.002	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-10				PM10	0.010	lb/hr	0.010			
7-10				TSP	0.030	lb/hr	0.030			
7-11	0201-079	DUST COLL, #16 CLK SILO	BHA # 0300080S 4.625 X 100 14 OZ NOMEX	PM2.5	0.001	lb/hr	0.001	N/A	PM2.5, PM10, TSP - AP-42, Section 11.19-2 - Material Transfer Point multiplied by a factor of 2. TSP is 2.1 * PM10. PM2.5 factor is proposed 2006 revisions to 11.19-2. [redacted]	40 CFR 63 Subpart LLLL
7-11				PM10	0.003	lb/hr	0.003			
7-11				TSP	0.010	lb/hr	0.010			
7-12	0201-032	DUST COLL, FOWs D.C., #1 F.M.	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM2.5	0.027	lb/hr	0.027	99.90%	Average of TSP emissions testing results [redacted]	40 CFR Part 64 (CAM)
7-12				PM10	0.181	lb/hr	0.181			
7-12				TSP	0.518	lb/hr	0.518			
7-13	0201-033	DUST COLL, FOWs D.C., #2 F.M.	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM2.5	0.027	lb/hr	0.027	99.90%	Average of TSP emissions testing results [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
7-13				PM10	0.181	lb/hr	0.181			
7-13				TSP	0.518	lb/hr	0.518			
7-14	Not Specified	Not Specified	Not Specified	PM2.5	0.019	lb/hr	0.019	N/A	PM10 from AP-42 Section 11.19-2. TSP is 2.1*PM10. Factors multiplied by 5. PM2.5 from proposed revisions to 11.19-2 for controlled conveyor transfer point and multiplied by [redacted]	
7-14				PM10	0.130	lb/hr	0.130			
7-14				TSP	0.360	lb/hr	0.360			
8-1	0201-037	DUST COLL, AIR SEP, #1 F.M.	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM2.5	0.013	lb/hr	0.013	99.90%	Average of results from TSP testing multiplied by [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-1				PM10	0.088	lb/hr	0.088			
8-1				TSP	0.251	lb/hr	0.251			
8-1				VOC	0.450	lb/hr	0.450	N/A	N/A	
8-2	0201-018	DUST COLL, MILL D.C., #1 F.M.	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM2.5	0.069	lb/hr	0.069	99.90%	Average of results from TSP [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-2				PM10	0.457	lb/hr	0.457			
8-2				TSP	1.307	lb/hr	1.307			
8-2				VOC	0.450	lb/hr	0.450	N/A	N/A	
8-3	0201-036	DUST COLL, AIR SEP, #2 F.M.	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM2.5	0.013	lb/hr	0.013	99.90%	Average of results from TSP [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-3				PM10	0.088	lb/hr	0.088			
8-3				TSP	0.251	lb/hr	0.251			
8-3				VOC	0.450	lb/hr	0.450	N/A	N/A	
8-4	0201-019	DUST COLL, MILL D.C., #2 F.M.	Bag # 3195-2991775, compression band top snap band bottom, 9 oz singed polyester 6" x 99" SAP # 1035925 WALLS: PS-1 BOTTOM: PS-2 TOP: AP-3 CENTER: AP-4L LEFT: AP-4R RIGHT	PM2.5	0.069	lb/hr	0.069	99.90%	Average of results from TSP [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-4				PM10	0.457	lb/hr	0.457			
8-4				TSP	1.307	lb/hr	1.307			
8-4				VOC	0.450	lb/hr	0.450	N/A	N/A	
8-5	0201-050	DUST COLL, FOWs D.C., #3 F.M.	2004- CONVERTED TO TOP LOAD PULSE PLEAT. #3195-400-2144. 6.13 X 41.50	PM2.5	0.008	lb/hr	0.008	99.90%	TSP emissions as allowed by permit. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-5				PM10	0.053	lb/hr	0.053			
8-5				TSP	0.150	lb/hr	0.150			
8-6	0201-051	DUST COLL, MILL D.C., #3 F.M.	2009- CONVERTED TO TOP LEAD PULSE PLEAT. #3195-400-2144. 6.13 X 41.50	PM2.5	0.010	lb/hr	0.010	99.90%	TSP emissions as allowed by permit. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-6				PM10	0.067	lb/hr	0.067			
8-6				TSP	0.190	lb/hr	0.190			
8-6				VOC	0.450	lb/hr	0.450	N/A	N/A	
8-7	0201-052	DUST COLL, AIR SEP D.C., #3 F.M.	POLYESTER # 02985761 SAP# 1035920 membrane 4.625x100	PM2.5	0.031	lb/hr	0.031	99.90%	TSP emissions as allowed by permit. [redacted]	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
8-7				PM10	0.207	lb/hr	0.207			
8-7				TSP	0.590	lb/hr	0.590			
8-7				VOC	0.450	lb/hr	0.450	N/A	N/A	
9-1	0201-020	DUST COLL #1, P.H. ROOF	THE NORTHERN BLOWER CO (NORBLO) REVERSE DAMPER SERIAL 958-141 TRU 143	PM2.5	0.016	lb/hr	0.016	N/A	Emission Factors for PM10 and TSP are from AP-42 Section 11.12-2. PM2.5 is assumed to be 0.25*PM10.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
9-1				PM10	0.106	lb/hr	0.106			
9-1				TSP	0.310	lb/hr	0.310			
9-2	0201-021	DUST COLL #2, P.H. ROOF	Not Specified	PM2.5	0.016	lb/hr	0.016	N/A	Emission Factors for PM10 and TSP are from AP-42 Section 11.12-2. PM2.5 is assumed to be 0.25*PM10.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
9-2				PM10	0.106	lb/hr	0.106			
9-2				TSP	0.310	lb/hr	0.310			
9-3	0201-022	DUST COLL #3, P.H. ROOF	Not Specified	PM2.5	0.016	lb/hr	0.016	N/A	Emission Factors for PM10 and TSP are from AP-42 Section 11.12-2. PM2.5 is assumed to be 0.25*PM10.	40 CFR Part 64 (CAM), 40 CFR 63 Subpart LLLL
9-3				PM10	0.106	lb/hr	0.106			
9-3				TSP	0.310	lb/hr	0.310			

Section 3 Emissions From Air Pollution Control Equipment And From Uncontrolled Process Equipment

Emission Unit Nos. (1)	Control Equipment: Unit No (2)	Control Equipment: Type (3)	Control Equipment: Manufacturer and Model Number	Air Pollutants Emitted (4): Pollutant (5)	Quantity (6): Actual	Quantity (6): Unit	Quantity (6): Allowable	Control Efficiency: & by Weight	Control Efficiency: Method of Determination (7)	Applicable Requirements (8)
9-4	0201-002	DUST COLL, #2 CEM STORAGE ROOF	Not Specified	PM2.5	0.011	lb/hr	0.011	N/A	Emission Factors for PM10 and TSP are from AP-42 Section 11.12-2. PM2.5 is assumed to be 0.25*PM10.	40 CFR 63 Subpart LLLL
9-4				PM10	0.071	lb/hr	0.071			
9-4				TSP	0.210	lb/hr	0.210			
10-2	Not Specified	Not Specified	Not Specified	PM2.5	0.001	lb/hr	0.001	N/A	PM10 emissions are based on AP-42 11.19-2 (Uncontrolled Conveyor Transfer Point). TSP is 2.1 of PM10. PM2.5 emissions are based on AP-42 11.19.2-2 (Controlled Conveyor Transfer Point) [redacted]	
10-2				PM10	0.008	lb/hr	0.008			
10-2				TSP	0.017	lb/hr	0.017			
10-3	Not Specified	Not Specified	Not Specified	PM2.5	0.005	lb/hr	0.005	N/A	PM10 emissions are based on AP-42 11.19-2 (Uncontrolled Conveyor Transfer Point). TSP is 2.1 of PM10. PM2.5 emissions are based on AP-42 11.19.2-2 (Controlled Conveyor Transfer Point) [redacted]	
10-3				PM10	0.033	lb/hr	0.033			
10-3				TSP	0.070	lb/hr	0.070			
10-4	Not Specified	Not Specified	Not Specified	PM2.5	0.011	lb/hr	0.011	N/A	PM10 emissions from AP-42 11.19-2. TSP is 2.1 of PM10. PM2.5 emissions from AP-42 11.19.2-2 (Controlled Convey Trans Pnt) multiplied by 20. Emissions reduced by 75% due to large rock fragments.	
10-4				PM10	0.075	lb/hr	0.075			
10-4				TSP	0.159	lb/hr	0.159			
10-4A	Not Specified	Not Specified	Not Specified	PM2.5	0.087	lb/hr	0.087	N/A	For wind erosion related emissions Equation 4-9 of "Open Fugitive Dust Sources" was used to calculate PM10 emissions. TSP is 2.1 of PM10. PM2.5 is 0.25 of PM10.	
10-4A				PM10	0.821	lb/hr	0.821			
10-4A				TSP	1.642	lb/hr	1.642			
10-8	Not Specified	Not Specified	Not Specified	PM2.5	0.072	lb/hr	0.072	N/A	PM2.5, PM10, and TSP emissions are based on AP-42 13.2.4 Equation 1. Wind speed is assumed to [redacted] 95% control factor is used due to stockpile being inside a covered storage building.	
10-8				PM10	0.474	lb/hr	0.474			
10-8				TSP	1.001	lb/hr	1.001			
10-11A	Not Specified	Not Specified	Not Specified	PM2.5	0.001	lb/hr	0.001	N/A	For wind erosion emissions Equation 4-9 of "Open Fugitive Dust Sources" was used to calculate PM10 emissions. PM10 is 0.5 of TSP. PM2.5 is 0.25 of PM10. Emissions were reduced by 50% due to topo. related windbreak.	
10-11A				PM10	0.009	lb/hr	0.009			
10-11A				TSP	0.019	lb/hr	0.019			
Coal Reject Pile	Not Specified	Not Specified	Not Specified	PM2.5	0.001	lb/hr	0.001	N/A	N/A	
Coal Reject Pile				PM10	0.012	lb/hr	0.012			
Coal Reject Pile				TSP	0.025	lb/hr	0.025			
11	Not Specified	Not Specified	Not Specified	PM2.5	1.660	lb/hr	1.660	N/A	N/A	
11				PM10	28.777	lb/hr	28.777			
11				TSP	55.340	lb/hr	55.340			
11				NOx	30.594	lb/hr	30.594			
11				CO	722.634	lb/hr	722.634			
11				SO2	0.061	lb/hr	0.061			
EGEN01	Not Specified	Not Specified	Not Specified	PM2.5	0.159	lb/hr	0.159	N/A	N/A	
EGEN01				PM10	0.159	lb/hr	0.159			
EGEN01				TSP	0.159	lb/hr	0.159			
EGEN01				NOx	2.588	lb/hr	2.588			
EGEN01				CO	0.500	lb/hr	0.500			
EGEN01				SO2	0.412	lb/hr	0.412			
EGEN01				VOC	0.110	lb/hr	0.110			
EGEN02	Not Specified	Not Specified	Not Specified	PM2.5	0.159	lb/hr	0.159	N/A	N/A	
EGEN02				PM10	0.159	lb/hr	0.159			
EGEN02				TSP	0.159	lb/hr	0.159			
EGEN02				NOx	2.588	lb/hr	2.588			
EGEN02				CO	0.500	lb/hr	0.500			
EGEN02				SO2	0.412	lb/hr	0.412			
EGEN02				VOC	0.110	lb/hr	0.110			
Quarry Sources	Not Specified	Not Specified	Not Specified	PM2.5	0.322	lb/hr	0.322	N/A	AP-42 Emission Factors	
Quarry Sources				PM10	2.355	lb/hr	2.355			
Quarry Sources				TSP	7.844	lb/hr	7.844			
Unpaved Roads	Not Specified	Not Specified	Not Specified	PM2.5	2.076	lb/hr	2.076	86%	2022-0819 Email from Kyle Tumpane (CABQ) based on watering, blading, speed limit 35 mph	
Unpaved Roads				PM10	20.757	lb/hr	20.757			
Unpaved Roads				TSP	79.783	lb/hr	79.783			
Paved Roads	Not Specified	Not Specified	Not Specified	PM2.5	0.043	lb/hr	0.043	N/A	AP-42 Emission Factors	
Paved Roads				PM10	0.175	lb/hr	0.175			
Paved Roads				TSP	0.885	lb/hr	0.885			
Tanks 1-4	Not Specified	Not Specified	Not Specified	VOC	0.070	lb/hr	0.070	N/A	N/A	

Section 3 Emissions From Air Pollution Control Equipment And From Uncontrolled Process Equipment

Emission Unit Nos. (1)	Control Equipment			Air Pollutants Emitted (4)				Control Efficiency		Applicable Requirements (8)
	Unit No (2)	Type (3)	Manufacturer and Model Number	Pollutant (5)	Quantity (6)			& by Weight	Method of Determination (7)	
					Actual	Unit	Allowable			

Assumes allowable and actual emissions are equal.

Section 4 Compliance Monitoring Devices And Equipment (AQCR 42.03.A.4.)

Emission Unit No. {1}	Pollutant Monitored or Measured	Type Of Instrument {2}	Manufacturer And Model No.	Range {3}	Sensitivity	Accuracy	Emission Units {4}	Location Of Monitor {5}
5-3	Visible Emissions	COM	Dusthunter SP100 Continuous Opacity Monitor	Complies with Performance Specification 1 (PS-1) found in 40 CFR Part 60 Appendix B			5-3	In-Stack Monitor
5-4	Visible Emissions	COM	Dusthunter SP100 Continuous Opacity Monitor	Complies with Performance Specification 1 (PS-1) found in 40 CFR Part 60 Appendix B			5-4	In-Stack Monitor
5-5	Visible Emissions	COM	Dusthunter SP100 Continuous Opacity Monitor	Complies with Performance Specification 1 (PS-1) found in 40 CFR Part 60 Appendix B			5-5	In-Stack Monitor
5-6	Visible Emissions	COM	Dusthunter SP100 Continuous Opacity Monitor	Complies with Performance Specification 1 (PS-1) found in 40 CFR Part 60 Appendix B			5-6	In-Stack Monitor
5-7	Visible Emissions	COM	Dusthunter SP100 Continuous Opacity Monitor	Complys with Performance Specification 1 (PS-1) found in 40 CFR Part 60 Appendix B			5-7	In-Stack Monitor
5-8	Visible Emissions	COM	Dusthunter SP100 Continuous Opacity Monitor	Complys with Performance Specification 1 (PS-1) found in 40 CFR Part 60 Appendix B			5-8	In-Stack Monitor
5-9	Visible Emissions	COM	Dusthunter SP100 Continuous Opacity Monitor	Complys with Performance Specification 1 (PS-1) found in 40 CFR Part 60 Appendix B			5-9	In-Stack Monitor
5-10	Visible Emissions	COM	Dusthunter SP100 Continuous Opacity Monitor	Complys with Performance Specification 1 (PS-1) found in 40 CFR Part 60 Appendix B			5-10	In-Stack Monitor
6-1	Baghouse Inlet Temperature	Two (2) Type J Thermocouples	Furnace Parts LLC Type J Thermocouple	0 - 700 F	0.1 F	+/- 3.9 F or 0.75% of Range	6-1	Inlet Duct To #1 Kiln Baghouse
6-2	Baghouse Inlet Temperature	Two (2) Type J Thermocouples	Furnace Parts LLC Type J Thermocouple	0 - 700 F	0.1 F	+/- 3.9 F or 0.75% of Range	6-2	Inlet Duct To #2 Kiln Baghouse

Section 4 Compliance Monitoring Devices And Equipment (AQCR 42.03.A.4.)

Emission Unit No. {1}	Pollutant Monitored or Measured	Type Of Instrument {2}	Manufacturer And Model No.	Range {3}	Sensitivity	Accuracy	Emission Units {4}	Location Of Monitor {5}
6-1	Baghouse Inlet Temperature	Two (2) Type J Thermocouples	Furnace Parts LLC Type J Thermocouple	0 - 700 F	0.1 F	+/- 3.9 F or 0.75% of Range	6-1	Inlet Duct To #1 Kiln Baghouse
6-1	Baghouse Inlet Temperature	Two (2) Type J Thermocouples	Furnace Parts LLC Type J Thermocouple	0 - 700 F	0.1 F	+/- 3.9 F or 0.75% of Range	6-1	Inlet Duct To #1 Kiln Baghouse
6-1	Sulfur Content In Coal	Analytical Testing Of Coal	N/A	N/A	N/A	N/A	6-1	N/A
6-2	Visible Emissions	Visual Method	Daily 30-minute EPA Method 9 Visible Emissions Determination	N/A	N/A	N/A	6-2	45 yards NW of Emission Unit On Top Of Blending Silo #2
6-2	Baghouse Inlet Temperature	Two (2) Type J Thermocouples	Furnace Parts LLC Type J Thermocouple	0 - 700 F	0.1 F	+/- 3.9 F or 0.75% of Range	6-2	Inlet Duct To #2 Kiln Baghouse
6-2	Sulfur Content In Coal	Analytical Testing Of Coal	N/A	N/A	N/A	N/A	6-2	N/A
8-1	Visible Emissions	Visual Method	Daily 6-minute EPA Method 22 Visible Emissions Determination	N/A	N/A	N/A	8-1	Variable Depending on Time of Day
8-2	Visible Emissions	Visual Method	Daily 6-minute EPA Method 22 Visible Emissions Determination	N/A	N/A	N/A	8-2	Variable Depending on Time of Day
8-3	Visible Emissions	Visual Method	Daily 6-minute EPA Method 22 Visible Emissions Determination	N/A	N/A	N/A	8-3	Variable Depending on Time of Day
8-4	Visible Emissions	Visual Method	Daily 6-minute EPA Method 22 Visible Emissions Determination	N/A	N/A	N/A	8-4	Variable Depending on Time of Day
8-6	Visible Emissions	Visual Method	Daily 6-minute EPA Method 22 Visible Emissions Determination	N/A	N/A	N/A	8-6	Variable Depending on Time of Day
8-7	Visible Emissions	Visual Method	Daily 6-minute EPA Method 22 Visible Emissions Determination	N/A	N/A	N/A	8-7	Variable Depending on Time of Day

Section 5 Fuels And Fuel Usage

Emission Unit No. {1}	Equipment Type {2}	Equipment Manufacturer	Rated Capacity {3}	Fuel Data {4}				
				Fuel Type {5}	Amount Per Year {6}	Heating Value (State Units) {7}	Percent Sulfur {8}	Percent Ash {9}
'6-1 & 6-2	#1 and #2 Kiln Systems	Two (2) Allis - Chalmer Dry Process Rotary Kilns each having an inside diameter of 11 feet and a length of 305 feet. Each kiln is equipped with a two-stage preheater	Each kiln has a rated heat input capcity of 180 MMBtu/hr	Primary Fuel Low Sulfur Coal	82,345 TPY combined annual coal consumption for both kilns.	Assumed Lower Heating Value of 12,000 Btu / lb Coal	0.81 10-yr average (1994 - 2003)	9.84 10-yr average (1994 - 2003)
				Secondary Fuel Pipe-Line Quality Natural Gas	46,700 MCF/yr combined annual natural gas consumption for both kilns.	Assumed Lower Heating Value of 0.95 MM Btu / MCF of natural gas.	N/A	N/A
Emergency Generator No. 1 and 2	Emergency Generator	Caterpillar D337F Electric Set	150 kW	ULSD	Based on 500 hours per year of operation	N/A	0.0015%	N/A

Section 6 Materials Processing

Emission Unit No. {1}	Material {2}	Composition {3}	Condition {4}	Quantity Used (Specify Units) {5}
1-1	Crushing And Screening of raw mtrl. including High Rock, Trans Rock, Low Rock, Sandstone, and Alumina. Also, certain other plant waste material including used refractory brick from the kilns. Material is crushed and screened to a 3/4" minus size.	High, Trans, and Low Rock - Calcium Carbonate, Calcium Oxide, Silica, Alumina, Iron, Sodium, Potassium, and other trace elements associated with the earth's crust.	All raw materials processed through this system are crushed and screened to approximately 3/4" minus size.	Approximate Amounts Include: High Rock - 416,365 TPY Trans Rock - 291,463 TPY Low Rock - 87,607 TPY Sandstone - 16,848 TPY Alumina - 33,695 TPY
1-2				
1-3				
1-4				
2-1	Crushed And Screened raw materials transferred to Raw Material Storage Silos. High Rock transferred to Silos #4 and #12, Trans Rock transferred to Silos #3 and #11, Low Rock and Sandstone transferred to Silos #2 and #10, and Alumina transferred to Silos #1 and #9.	High, Trans, and Low Rock - Calcium Carbonate, Calcium Oxide, Silica, Alumina, Iron, Sodium, Potassium, and other trace elements associated with the earth's crust.	All raw materials processed through this system are crushed and screened to approximately 3/4" minus size.	Approximate Amounts Include: High Rock - 416,365 TPY Trans Rock - 291,463 TPY Low Rock - 87,607 TPY Sandstone - 16,848 TPY Alumina - 33,695 TPY
2-2				
2-3				
2-4				
2-5	Iron and Gypsum raw materials transferred to Raw Material Storage Silos. Iron transferred to Silos #17 and #20, Gypsum transferred to	Iron - Iron and other ferrous materials. Gypsum - Calcium Sulfate.	Material Size is variable but usually is 3" in size and smaller.	Approximate Amounts Include: Iron - 12,636 TPY Gypsum - 33,535 TPY
2-6				
2-7	Silos #18, #19, #21, and #22, and			
2-8				
2-9	Various raw mtrl.'s including High Rock, Trans Rock, Low Rock, Sandstone, Alumina and Iron transferred to the #1 and #2 Raw Mill Systems	Composition of these materials is same as indicated above.	Raw Material Size is the same as listed above.	Approximately 421,190 TPY of Raw Materials will be transferred to each of the two Raw Mill systems each year.
2-10				
2-11	Clinker transferred to Clinker Storage Silos #5 - #8, and #13 - #14.	Clinker - Various Cementuous Minerals	Clinker nodules are typically 1" minus in size.	Upto 15,000 TPY of clinker may be reclaimed from the covered storage building to silo storage.

Section 6 Materials Processing

Emission Unit No. {1}	Material {2}	Composition {3}	Condition {4}	Quantity Used (Specify Units) {5}
3-1 3-2	Various raw mtrl.'s including High Rock, Trans Rock, Low Rock, Sandstone, Alumina, and Iron processed through the #1 Raw Mill System.	Composition of these materials will be a weighted composite average of the material compositions indicated above.	Raw Mtrl size is reduced to a particle size of approx. 80% passing a -200 mesh.	The #1 Raw Mill System will process approximately 421,190 TPY of Raw Materials each year.
3-3 3-4	Various raw mtrl.'s including High Rock, Trans Rock, Low Rock, Sandstone, Alumina, and Iron processed through the #1 Raw Mill System.	Composition of these materials will be a weighted composite average of the material compositions indicated above for these Raw Materials.	Raw Mtrl size is reduced to a particle size of approx. 80% passing a -200 mesh.	The #2 Raw Mill System will process approximately 421,190 TPY of Raw Materials each year.
4-1 4-2	Kiln Feed Blending System. Kiln Feed produced from processing Raw Mtrls through the #1 and #2 Raw Mill Systems.	Composition of materials to be blended will be a weighted composite average of the Raw Material compositions indicated above for High, Trans, and Low Rock, Sandstone, Alumina, and Iron.	Particle Size of Kiln Feed is approx. 80% passing -200 mesh.	The #1, #2, #3, and #4 Blending Silos will process approximately 842,380 TPY of Kiln Feed each year.
4-3 4-4	Kiln Feed Metering System. Blended Kiln Feed produced from processing Kiln Feed through the Kiln Feed Blending Silos.	Composition of blended Kiln Feed will be a weighted composite average of the Raw Material compositions indicated above for High, Trans, and Low Rock, Sandstone Alumina, and Iron.	Particle Size of Kiln Feed is approx. 80% passing -200 mesh.	The Kiln Feed Metering System will process approximately 842,380 TPY of Kiln Feed each year.
4-5 4-6	#1 and #2 Kiln Feed Systems. Blended Kiln Feed produced from processing material through the Kiln Feed Metering System. Recycled Kiln Dust captured by Emiss. Units 6-1 and 6-2.	Composition of blended Kiln Feed will be a weighted composite average of the Raw Material compositions indicated above for High, Trans, and Low Rock, Sandstone Alumina, and Iron. Composition of Kiln Dust will essentially be the same but with the exception of higher concentrations of volatile constituents (ie Na, K,)	Particle Size of Kiln Feed is approx. 80% passing -200 mesh. Kiln Dust - 90%+ passing -200 mesh, 0.1% Moisture.	The Kiln Feed System will process approximately 842,380 TPY of Kiln Feed and upto 116,5082 TPY of recycled Kiln Dust each year.
5-1 5-2	Clinker Handling and Conveying. Clinker is the mateiral that is produced from processing Kiln Feed through the #1 and #2 Kiln and Clinker Cooler Systems.	Clinker is composed of various hydraulicaly active minerals present in the following approx. quantities: Tricalcium Silicate (Ca_3SiO_5) - 45%; Lime (CaO) - <2%; Dicalcium Silicate (Ca_2SiO_4) - 27%; Sulfur (S) - <1%; Tricalcium Aluminate ($Ca_3Al_2O_6$) - 11%; Na, K - 1.5%; Tetracalcium aluminoferrite $Ca_4Al_2Fe_2O_{10}$) - 8%	Clinker nodules are variable in size but generally range from 1" in size down to small particles.	The #1 and #2 Kiln and Clinker Cooler Systems will produce upto 515,964 TPY of Clinker.

Section 6 Materials Processing

Emission Unit No. {1}	Material {2}	Composition {3}	Condition {4}	Quantity Used (Specify Units) {5}
5-3 - 5-6 5-7 - 5-10	Clinker Dust Capture and Recycling. Clinker dust is produced from the #1 and #2 Clinker Cooler Systems. This material is captured by the dust coll. associated with each system and conveyed to the clinker storage silos.	Clinker dust is composed of various hydraulicaly active minerals present in the following approx. quantities: Tricalcium Silicate (Ca_3SiO_5) - 45%; Lime (CaO) - <2%; Dicalcium Silicate (Ca_2SiO_4) - 27%; Sulfur (S) - <1%; Tricalcium Aluminate ($Ca_3Al_2O_6$) - 11%; Na, K - 1.5%; Tetracalcium aluminoferrite $Ca_4Al_2Fe_2O_{10}$) - 8%	Clinker dust is a finely divided particulate.	The #1 and #2 Kiln and Clinker Cooler Systems will produce upto 515,964 TPY of Clinker.
5-11/5-12 5-13 - 5-15	Coal Handling, Crushing, Strge, and Distribution Coal is crushed to approx. 3/4" minus size.	Coal	Delivered Coal is approx. 2" minus in size. After crushing material is approx. 3/4" size	The Coal Handling, Crushing, Storage and Distribution system will process approximately 82,345 TPY Coal.
6-1 6-2	Kiln Dust Handling and Recycling System. Kiln dust is captured by the Dust Collectors associated with the #1 and #2 Kiln Systems.	Composition of Kiln Dust will be approximately the same as the composition of the Kiln Feed.	Kiln Dust - Approx. 90%+ passing a -200 mesh.	Approx. 116,508 TPY of Kiln Dust may be captured and recycled or otherwise processed.
6-3 6-4	Kiln Dust Bins associated with Handling and Recycling System. Each of #1 and #2 Kiln Dust Collection systems has an associated Dust Bin.	Composition of Kiln Dust will be approximately the same as the composition of the Kiln Feed.	Kiln Dust - Approx. 90%+ passing a -200 mesh.	Approx. 116,508 TPY of Kiln Dust may be processed through the #1 and #2 Kiln Dust Bins.
6-5 6-6	Kiln Dust disposal from Dust Bins associated with Kiln Dust Handling and Recycling System.	Composition of Kiln Dust will be approximately the same as the composition of the Kiln Feed.	Kiln Dust - Approx. 90%+ passing a -200 mesh.	Approx. 422 TPY of Kiln Dust may be disposed of from the #1 and #2 Kiln Dust Bins. This activity will only happen in the event of mechanical breakdown assc. with the pelletizer.
6-7	Kiln Dust disposal from Pelletizer associated with Kiln Dust Handling and Recycling System.	Composition of Kiln Dust will be approximately the same as the composition of the Kiln Feed.	Kiln Dust - Approx. 90%+ passing a -200 mesh.	Approx. 8,010 TPY of pelletized Kiln Dust may be disposed of from the Pelletizer.

Section 6 Materials Processing

Emission Unit No. {1}	Material {2}	Composition {3}	Condition {4}	Quantity Used (Specify Units) {5}
7-1 through 7-11	Clinker transferred to Clinker Storage Silos #5 - #8, and #13 - #14.	Clinker is composed of various hydraulicaly active minerals present in the following approx. quantities: Tricalcium Silicate (Ca_3SiO_5) - 45%; Lime (CaO) - <2%; Dicalcium Silicate (Ca_2SiO_4) - 27%; Sulfur (S) - <1%; Tricalcium Aluminate ($Ca_3Al_2O_6$) - 11%; Na, K - 1.5%; Tetracalcium aluminoferrite $Ca_4Al_2Fe_2O_{10}$) - 8%	Clinker nodules are variable in size but generally range from 1" in size down to small particles.	The #1 and #2 Kiln and Clinker Cooler Systems will produce upto 515,964 TPY of Clinker. In addition, another 15,000 TPY of Clinker may be reclaimed from outside covered storage. This quantity of Clinker will be transferred to silo storage.
7-12 7-13	Clinker, Gypsum, and Limestone transferred to the #1 and #2 Finish Mill Systems.	Composition of these materials is the same as indicated above.	Clinker, Gypsum, and Limestone Size is the same as listed above.	Approximately 412,972 TPY of Clinker, Gypsum and Limestone Materials may be transferred to the #1 and #2 Finish Mill Systems.
7-14	Clinker transferred to covered storage building.	Composition of Clinker is the same as indicated above.	Clinker Size is same as listed above.	Upto 15,000 TPY of Clinker may be transferred to the covered storage building.
8-1 8-2	Clinker, Gypsum, Limestone, and Grinding Aids processed through the #1 Finish Mill System.	Composition of Clinker, Gypsum, and Limestone is same as indicated above. Non-Air Entrained Grinding Aid Air Entrained Grinding Aid	Clinker, Gypsum, and Limestone size is the same as listed above. Grinding Aid is a viscous liquid.	Approximately 206,486 TPY of Clinker, Gypsum and Limestone Materials may be processed the #1 Finish Mill System.
8-3 8-4	Clinker, Gypsum, Limestone, and Grinding Aids processed through the #2 Finish Mill System.	Composition of Clinker, Gypsum, and Limestone is same as indicated above. Non-Air Entrained Grinding Aid Air Entrained Grinding Aid	Clinker, Gypsum, and Limestone size is the same as listed above. Grinding Aid is a viscous liquid.	Approximately 206,486 TPY of Clinker, Gypsum and Limestone Materials may be processed the #2 Finish Mill System.

Section 6 Materials Processing

Emission Unit No. {1}	Material {2}	Composition {3}	Condition {4}	Quantity Used (Specify Units) {5}
8-5	Clinker, Gypsum, and Limestone transferred to the #3 Finish Mill System.	Composition of these materials is the same as indicated above.	Clinker, Gypsum, and Limestone Size is the same as listed above.	Approximately 176,988 TPY of Clinker, Gypsum and Limestone Materials may be processed the #3 Finish Mill System.
8-6 8-7	Clinker, Gypsum, and Grinding Aids processed through the #3 Finish Mill System.	Composition of Clinker and Gypsum is the same as indicated above. Non-Air Entrained Grinding Aid Air Entrained Grinding Aid	Clinker, Gypsum, and Limestone size is the same as listed above. Grinding Aid is a viscous liquid.	Approximately 176,988 TPY of Clinker, Gypsum and Limestone Materials may be processed the #3 Finish Mill System.
9-1 9-2 9-3	Transfer of Portland Cement and Masonry from the Finish Mills and Secondary Storage to Silos #1 - #13 for storage. Transfer of these products from Storage Silos #1 - #13 to Bulk Haul Trucks and Sacking for shipping.	Portland Cement Masonry Cement	Portland Cement particle size is optimally 92% passing a -380 mesh. Masonry particle size is optimally 99% passing a -380 mesh.	Upto 589,960 TPY of Portland Cement and Masonry products will be transferred to And transferred from Primary Silos #1 - #13.
9-4	Transfer of Portland Cement and from the Finish Mills to Secondary Storage Silos #14 - #18 for storage. Transfer of these products from Storage Silos #14 - #18 to the Primary Storage Silos #1 - #13.	Portland Cement	Portland Cement particle size is optimally 92% passing a -325 mesh.	Approximately 88,494 TPY of Portland Cement may be transferred to And transferred from Secondary Storage Silos #14 - #18.

Section 6 Materials Processing

Emission Unit No. {1}	Material {2}	Composition {3}	Condition {4}	Quantity Used (Specify Units) {5}
9-5 9-6 9-7	Transfer of Portland Cement and Masonry from Silos #1 - #13 to Cement Sacking. Processing of these products through the Sacking system	Portland Cement Masonry Cement	Portland Cement particle size is optimally 92% passing a -380 mesh. Masonry particle size is optimally 99% passing a -380 mesh.	Upto approximately 44,247 TPY of Portland Cement and Masonry products may be transferred to and processed by the Sacking System.
Coal reject pile	Coal Reject Stockpile Wind Erosion	Coal - See attached MSDS	Coal Reject 6.2% Silt.	0.01 acres
10-2	Bottom Ash (Alumina) Stockpile Load-In and Load-Out	Bottom Ash (Alumina)	Delivered Alumina is typically a fine particulate having 80% Silt and 15.3% Moisture.	Approximately 27,569 TPY of Alumina will be loaded into and out of the Bottom Ash (Alumina) Stockpile located in the covered storage building.
10-2A	Bottom Ash (Alumina) Stockpile Wind Erosion Negligible due to covered storage.	Bottom Ash (Alumina)	Same as indicated above.	N/A
10-3	Iron Stockpile Load-In and Load-Out	Iron - See attached MSDS	Delivered Iron is typically a fine particulate haviing 77% Silt and 2.9% Moisture.	Approximately 12,794 TPY of Iron will be loaded into and out of the Iron Stockpile located in the covered storage building.
10-3A	Iron Stockpile Wind Erosion Negligible due to covered storage.	Iron - See attached MSDS	Same as indicated above.	N/A
10-4	Sandstone Stockpile Load-In and Load-Out	Sandstone - See attached MSDS	Delivered sandstone is typically contains 3% Silt and 2.8% Moisture.	Approximately 33,794 TPY of sandstone will be loaded into and out of the Sandstone Stockpile.
10-4B	Sandstone Stockpile Wind Erosion	Sandstone - See attached MSDS	Same as indicated above.	N/A

Section 6 Materials Processing

Emission Unit No. {1}	Material {2}	Composition {3}	Condition {4}	Quantity Used (Specify Units) {5}
10-8	Clinker Stockpile Load-In and Load-Out	Clinker - Tricalcium Silicate - 45%; Lime - <2% Dicalcium Silicate (Ca_2SiO_4) - 27%; Sulfur (S) - <1%; Tricalcium Aluminate ($Ca_3Al_2O_6$) - 11%; Na, K - < 1.5%; Tetracalcium aluminoferrite $Ca_4Al_2Fe_2O_{10}$) - 8%	Clinker is assumed to have 10% Silt and a 0.4% Moisture Content.	Approximately 25,000 TPY of Clinker may be loaded into and out of the Clinker Stockpile located in the covered storage building.
10-8A	Clinker Stockpile Wind Erosion Negligible due to covered storage.	Same as indicated above.	Same as indicated above.	N/A

Section 6 Materials Processing

Emission Unit No. {1}	Material {2}	Composition {3}	Condition {4}	Quantity Used (Specify Units) {5}
10-11	West Cap Quarry Kiln Dust Dump Load-In	Composition of Kiln Dust will essentially be the same as the composition of the Kiln Feed but with the exception of higher concentrations of volatile constituents including sodium and potassium compounds.	Raw Dust - 90% Silt, 0.1% Moisture Content. Pelletized Dust - 10% Silt, 10% Mois. Content.	Possible 32,850 TPY may be loaded into the West Cap Quarry Dust Dump.
10-11A	West Cap Quarry Dust Dump Wind Erosion Negligible due to covered storage.	Same as indicated above.	Same as indicated above.	N/A
Paved Roads	Fugitive Dust associated with the Paved Haul Road.	Fugitive Dust typically composed of Calcium Carbonate, Calcium Oxide, Alumina, Iron, Sodium, Potassium, and other trace elements associated with the earth's crust.	Paved Road	N/A
Jnpaved Road	Fugitive Dust associated with the Unpaved Haul Roads.	Fugitive Dust typically composed of Calcium Carbonate, Calcium Oxide, Alumina, Iron, Sodium, Potassium, and other trace elements associated with the earth's crust.	Haul Road contains 4.8% Silt.	298,604 Vehicle Miles Traveled based on the worst-case quarry operating.
Calcium Cake	Calcium Cake Load-In	Calcium Cake	N/A	Possible 245,280 TPY may be loaded into the Calicium Cake Pile

Section 7 Stack Parameters

Emission Unit	Emission Type	Stack Height (ft) {3}	Stack Exit Diameter (ft) {4}	Exit Gas Conditions			Sampling Ports		
				Temperature F	Velocity (ft/sec) {6}	Moisture % By Vol.	Number	Size (inches)	Location {7}
1-2	Point Source Cap	32.5	1.5	Ambient	62.1	Variable	None	N/A	N/A
1-3	Point Source Cap	32.5	1.5	Ambient	60.2	Varialble	None	N/A	N/A
1-4	Point Source Horizontal	36.0	1.5 x 1.5	Ambient	91.6	Variable	None	N/A	N/A
2-1	Point Source Horizontal	114.0	1.17 x 1.17	Ambient	0.003	Unknown	None	N/A	N/A
2-2	Point Source Horizontal	113.0	1.17 x 1.17	Ambient	0.003	Unknown	None	N/A	N/A
2-3	Point Source Horizontal	114.0	1.17 x 1.17	Ambient	0.003	Unknown	None	N/A	N/A
2-4	Point Source Horizontal	113.0	1.0 x 1.0	Ambient	0.003	Unknown	None	N/A	N/A
2-5A	Fugitive Dust Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
2-6	Point Source Horizontal	14.5	1.17 x 1.17	Ambient	0.003	Unknown	None	N/A	N/A
2-7	Point Source Horizontal	111.0	1.17 x 1.17	Ambient	0.003	Unknown	None	N/A	N/A
2-8	Point Source Horizontal	111.0	1.08 x 1.08	Ambient	0.003	Unknown	None	N/A	N/A
2-9	Point Source Cap	94.5	2.0	Ambient	41.4	Variable	Two	4"	N/A
2-10	Point Source Cap	96.0	2.0	Ambient	41.4	Variable	None	N/A	90 degrees apart 1 foot from top
3-1	Point Source Cap	96.7	2.5	153.9	64.9	Variable	None	N/A	N/A
3-2	Point Source Cap	95.5	1.7	137.9	65.2	Variable	None	N/A	N/A

Section 7 Stack Parameters

Emission Unit	Emission Type	Stack Height (ft) {3}	Stack Exit Diameter (ft) {4}	Exit Gas Conditions			Sampling Ports		
				Temperature F	Velocity (ft/sec) {6}	Moisture % By Vol.	Number	Size (inches)	Location {7}
3-3	Point Source Cap	95.5	2.5	153.9	64.9	Variable	Two	4"	90 degrees apart 1 foot from top
3-4	Point Source Cap	95.5	1.7	137.9	65.2	Variable	Two	4"	90 degrees apart 1 foot from top
4-1	Point Source Horizontal	80.0	1.0 x 1.0	Ambient	53.8	Variable	Two	4"	90 degrees apart 1 foot from end
4-2	Point Source Horizontal	80.0	1.0 x 1.0	Ambient	53.8	Variable	None	N/A	N/A
4-3	Point Source Horizontal	93.7	1.33 x 1.33	Ambient	33.0	Variable	None	N/A	N/A
4-4	Point Source Horizontal	93.7	1.33 x 1.33	Ambient	33.0	Variable	Two	4"	90 degrees apart 6 feet from end
4-5	Point Source Horizontal	130.4	1.33 x 1.33	Ambient	31.4	Variable	Two	4"	90 degrees apart 2 feet from top
4-6	Point Source Horizontal	130.4	1.33 x 1.33	Ambient	31.4	Variable	None	N/A	N/A
5-1	Point Source	28.0	0.96 x 1.08	116.3	0.003	Unknown	None	N/A	N/A
5-2	Point Source	19.0	0.96 x 1.08	116.3	0.003	Unknown	None	N/A	N/A
5-12A	Fugitive Dust Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
5-13	Point Source Cap	29.5	1.1	Ambient	0.003	Unknown	None	N/A	N/A
5-14	Fugitive Dust Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	None	N/A	N/A
5-15	Point Source Cap	97.0	1.3	Ambient	0.003	Unknown	None	N/A	N/A
6-3	Point Source Cap	48.0	1.2	Ambient	0.003	Unknown	None	N/A	N/A
6-4	Point Source Cap	50.0	1.2	Ambient	0.003	Unknown	None	N/A	N/A
6-7	Fugitive Dust Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A

Section 7 Stack Parameters

Emission Unit	Emission Type	Stack Height (ft) {3}	Stack Exit Diameter (ft) {4}	Exit Gas Conditions			Sampling Ports		
				Temperature F	Velocity (ft/sec) {6}	Moisture % By Vol.	Number	Size (inches)	Location {7}
7-1	Point Source Cap	127.5	1.6	117.0	0.003	Unknown	Two	4"	90 degrees apart 1 feet from top
7-2	Point Source	114.5	1.3	111.0	0.003	Unknown	None	N/A	N/A
7-3	Point Source Horizontal	81.0	0.91 x 0.79	Ambient	0.003	Unknown	None	N/A	N/A
7-4	Point Source Horizontal	81.0	0.91 x 0.79	Ambient	0.003	Unknown	None	N/A	N/A
7-5	Point Source Horizontal	81.0	0.91 x 0.79	Ambient	0.003	Unknown	None	N/A	N/A
7-6	Point Source Horizontal	81.0	0.91 x 0.79	Ambient	0.003	Unknown	None	N/A	N/A
7-7	Point Source	114.5	1.3	100.0	0.003	Unknown	None	N/A	N/A
7-8	Point Source Horizontal	82.0	0.91 x 0.79	Ambient	0.003	Unknown	None	N/A	N/A
7-9	Point Source Horizontal	82.0	0.91 x 0.79	Ambient	0.003	Unknown	None	N/A	N/A
7-10	Point Source Horizontal	82.0	0.91 x 0.79	Ambient	0.003	Unknown	None	N/A	N/A
7-11	Point Source Horizontal	82.0	0.91 x 0.79	Ambient	0.003	Unknown	None	N/A	N/A
7-12	Point Source Cap	94.5	2.0	Ambient	72.2	variable	None	N/A	N/A
7-13	Point Source Cap	96.5	2.0	Ambient	72.2	variable	Two	4"	90 degrees apart 10 feet from top
7-14	Fugitive Dust Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
8-1	Point Source Cap	95.5	1.7	112.0	50.7	variable	None	N/A	N/A
8-2	Point Source Cap	96.7	2.5	141.0	51.8	variable	None	N/A	N/A
8-3	Point Source Cap	96.0	1.7	112.0	50.7	variable	Two	4"	90 degrees apart 10 feet from top

Section 7 Stack Parameters

Emission Unit	Emission Type	Stack Height (ft) {3}	Stack Exit Diameter (ft) {4}	Exit Gas Conditions			Sampling Ports		
				Temperature F	Velocity (ft/sec) {6}	Moisture % By Vol.	Number	Size (inches)	Location {7}
8-4	Point Source Cap	95.3	2.5	141.0	51.8	variable	Two	4"	90 degrees apart 2 feet from top
8-5	Point Source Cap	25.0	1.2	Ambient	76.1	variable	Two	4"	90 degrees apart 3 feet from top
8-6	Point Source Cap	96.7	1.00 x 1.67	143.8	91.8	variable	Two	4"	90 degrees apart 2 feet from top
8-7	Point Source Cap	96.7	1.00 x 4.50	134.1	77.5	variable	Two	4"	90 degrees apart 2 feet from top
9-1	Point Source Horizontal	156.5	1.25 x 1.25	Ambient	0.003	Unknown	None	N/A	N/A
9-2	Point Source Horizontal	156.5	1.25 x 1.25	Ambient	0.003	Unknown	None	N/A	N/A
9-3	Point Source Horizontal	156.5	1.25 x 1.25	Ambient	0.003	Unknown	None	N/A	N/A
9-4	Point Source Horizontal	173.5	1.17 x 1.17	Ambient	0.003	Unknown	None	N/A	N/A
10-2	Fugitive Dust Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
10-3	Fugitive Dust Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
10-4	Fugitive Dust Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
10-8	Fugitive Dust Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
10-11	Fugitive Dust Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
Kiln Stack EUs 5-3 to 5-10 6-1 and 6-2	Point Source	175	11	333	70	Variable	Four	3"	Muliple Ports on side of Inlet Duct
QUA47T6	Area Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
QUA8	Area Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
QUA357	Area Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
QUA15	Area Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
QUA177T5	Area Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
QUA19	Area Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A

Section 7 Stack Parameters

Emission Unit	Emission Type	Stack Height (ft) {3}	Stack Exit Diameter (ft) {4}	Exit Gas Conditions			Sampling Ports		
				Temperature F	Velocity (ft/sec) {6}	Moisture % By Vol.	Number	Size (inches)	Location {7}
Q4VOL	Volume Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
Q19VOL	Volume Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
Q17VOL	Volume Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
Q15VOL	Volume Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
Q37VOL	Volume Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
Q8VOL	Volume Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
Blasting EU 11	Volume Source	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A
Emergency Generator No. 1 and 2.	Point Sources	14	0.5	1157	53.11	Unknown	N/A	N/A	N/A
Unpaved Roads	Multiple Volume Sources	N/A Fugitive	N/A Fugitive	N/A	N/A	Unknown	N/A	N/A	N/A

Section 8A Liquid Storage Tanks - Material Data

Tank No. {1}	Material Name {2}	Composition {3}	Liquid Density (lb/gal)	Vapor Mol. Weight (lb/lb-mol)	Average Storage Temp. Tav (F)	True Vapor Pressure at Tav (psia)	Maximum Storage Temp. Tmax (F)	True Vapor Pressure at Tmax (psia)
1	Diesel (6,000 Gal)	Hydrocarbon Mixture	0.7	N/A Mixture	70	Unknown	90	Unknown
2	Diesel	Hydrocarbon Mixture	0.7	N/A Mixture	70	Unknown	90	Unknown
2	Regular Unleaded Gasoline	Hydrocarbon Mixture	6	N/A Mixture	70	Unknown	80	Unknown
Note: Tank #2 is a two compartment, partitioned tank with one compartment containing 5,000 gal. of diesel and the other compartment containing 1,000 gal. of Regular Unleaded Gasoline.								
3	Non-Air Entraining Grinding Aid	Hydrocarbon Mixture	9.7	N/A Mixture	70	Unknown	90	Unknown
4	Non-Air Entraining Grinding Aid	Hydrocarbon Mixture	9.7	N/A Mixture	70	Unknown	80	Unknown
Note: Tank #3 is located outside on the south side of the Mill Building. Tank #4 is located inside the Mill Building.								
5A	Air Entraining Grinding Aid	Hydrocarbon Mixture	7.9	N/A Mixture	70	Unknown	90	Unknown
5B	Air Entraining Grinding Aid	Hydrocarbon Mixture	7.9	N/A Mixture	70	Unknown	90	Unknown
6	Oil And Grease Lubricants	Hydrocarbon Mixture	Variable	N/A Mixture	70	Unknown	90	Unknown
7	Oil And Grease Lubricants	Hydrocarbon Mixture	Variable	N/A Mixture	70	Unknown	90	Unknown
8	Oil And Grease Lubricants	Hydrocarbon Mixture	Variable	N/A Mixture	70	Unknown	90	Unknown
9	Waste Oil	Hydrocarbon Mixture Of Used Lubrication Oil	Unknown	N/A Mixture	70	Unknown	90	Unknown
10	Tank is empty and unused	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Note: Tank #7 was drained and taken out of service in 1978 after the rotary kilns were equipped with coal firing systems. As part of the decomissioning process, most of the piping system associated with Tank #7 was also removed. GCC does not anticipate that this tank will be in used in the future.								

Section 8B Liquid Storage Tanks - Tank Data

Tank No. {1}	Date Installed or Modified {2}	Material(s) Stored {3}	Roof Type {4}	Seal Type {5}	Capacity (gal)	Diameter (ft)	Vapor Space Height (ft) {6}	Roof/Shell Color {7}	Paint Condition {8}	Annual Throughput (gal/yr) {9}	Turnovers Per Year {10}
1	1995	Diesel	FX	Welded Steel	6,000	8'D x 16'L	4'	WH	Good	72,750	12
2	1995	Diesel	FX	Welded Steel	5,000	8'D x 16'L	4'	WH	Good	60,625	12
2	1995	Regular Unleaded Gasoline		Welded Steel	1,000		4'	WH	Good	10,000	10
Note: Tank #2 is a two compartment, partitioned tank with one compartment containing 5,000 gal. of diesel and the other compartment containing 1,000 gal. of Regular Unleaded Gasolone											
3	1994	Non - Air Entrained Grinding Aid	FX	Welded Steel	8,800	10'D x 15'H	8'	LG	Good	40,625	4.6
4	1959	Non - Air Entrained Grinding Aid	FX	Welded Steel	1,727	7'D x 6'H	3'	Blue	Good	40,625	23.5
Note: Tank #3 is located outside on the south side of the Mill Building. Tank #4 is located inside the Mill Building.											
5A	1996	Air Entrained Grinding Aid	FX	Welded Steel	2,879	7'D x 10'H	5'	Red	Good	3,119	1
5B	1996	Air Entrained Grinding Aid	FX	Welded Steel	2,879	7'D x 10'H	5'	Red	Good	3,119	1
6	Unknown	Oil And Grease Lub.	FX	Welded Steel	300	3'D x 5'L	2'	Red	Good	Unknown	Unknown
7	Unknown	Oil And Grease Lub.	FX	Welded Steel	500	4'D x 5'L	2'	Red	Good	Unknown	Unknown
8	Unknown	Oil And Grease Lub.	FX	Welded Steel	600	4'D x 6'L	2'	Red	Good	Unknown	Unknown
9	Approximately 1975	Waste Oil	FX	Welded Steel	500	4'D x 6'L	2'	Red	Good	2,000	4
10	1959	Bunker C Fuel Oil	FX	Reinforced Concrete	400,000	51'D x 26'H	N/A Decomissioned	Light Tan	Poor	N/A Decomiss.	N/A Decomiss.
Note: Tank #7 was drained and taken out of service in 1978 after the rotary kilns were equipped with coal firing systems. As part of the decomissioning process, most of the piping system associated with Tank #7 was also removed. GCC does not anticipate that this tank will be in used in the future.											

Section 9A   Solid Material Storage - Material Data

Storage Unit No. {1}	Material Name	Emissions Unit, Process or Operation Served {2}	Storage Type {3}	Composition {4}	Date Installed or Modified (Mo./Yr)
Rock Silo #4	High Rock	Material Dispensed To #1 Raw Mill Feed System Or To #1 Finish Mill Feed System (Emission Unit 2-9).	Silo Storage	High Rock - Calcium Carbonate, Calcium Oxide, Silica, Alumina, Iron, Sodium, Potassium, and other trace elements associated with the earth's crust.	1959
Rock Silo #3	Trans Rock	Material Dispensed To #1 Raw Mill Feed System (Emission Unit 2-9).	Silo Storage	Trans Rock - Calcium Carbonate, Calcium Oxide, Silica, Alumina, Iron, Sodium, Potassium, and other trace elements associated with the earth's crust.	1959
Rock Silo #2	Low Rock and Sandstone	Material Dispensed To #1 Raw Mill Feed System (Emission Unit 2-9).	Silo Storage	Low Rock - Calcium Carbonate, Calcium Oxide, Silica, Alumina, Iron, Sodium, Potassium, and other trace elements associated with the earth's crust. Sandstone - See attached MSDS.	1959
Rock Silo #1	Bottom Ash and Clay (Alumina)	Material Dispensed To #1 Raw Mill Feed System (Emission Unit 2-9).	Silo Storage	Bottom Ash and Clay (Varying Alumina Percentages)	1959
Rock Silo #9	Bottom Ash and Clay (Alumina)	Material Dispensed To #2 Raw Mill Feed System (Emission Unit 2-10).	Silo Storage	Bottom Ash and Clay (Varying Alumina Percentages)	1959
Rock Silo #10	Low Rock and Sandstone	Material Dispensed To #2 Raw Mill Feed System (Emission Unit 2-10).	Silo Storage	Low Rock - Calcium Carbonate, Calcium Oxide, Silica, Alumina, Iron, Sodium, Potassium, and other trace elements associated with the earth's crust. Sandstone - See attached MSDS.	1959
Rock Silo #11	Trans Rock	Material Dispensed To #2 Raw Mill Feed System (Emission Unit 2-10).	Silo Storage	Trans Rock - Calcium Carbonate, Calcium Oxide, Silica, Alumina, Iron, Sodium, Potassium, and other trace elements associated with the earth's crust.	1959

Section 9A Solid Material Storage - Material Data

Storage Unit No. {1}	Material Name	Emissions Unit, Process or Operation Served {2}	Storage Type {3}	Composition {4}	Date Installed or Modified (Mo./Yr)
Rock Silo #12	High Rock	Material Dispensed To #2 Raw Mill Feed System Or To #2 Finish Mill Feed System (Emission Unit 2-10).	Silo Storage	High Rock - Calcium Carbonate, Calcium Oxide, Silica, Alumina, Iron, Sodium, Potassium, and other trace elements associated with the earth's crust.	1959
Additive Silo #17	Iron	Material Dispensed To #1 Raw Mill Feed System (Emission Unit 2-9).	Silo Storage	Iron - See attached MSDS	1959
Additive Silo #18	Gypsum	Material Dispensed To #1 Finish Mill Feed System (Emission Unit 7-12).	Silo Storage	Gypsum - See attached MSDS	1959
Additive Silo #19	Gypsum Pumicite	Material Dispensed To #1 Finish Mill Feed System (Emission Unit 7-12).	Silo Storage	Gypsum - See attached MSDS Pumicite	1959
Additive Silo #20	Iron	Material Dispensed To #2 Raw Mill Feed System (Emission Unit 2-10).	Silo Storage	Iron - See attached MSDS	1959
Additive Silo #21	Gypsum	Material Dispensed To #3 Finish Mill Feed System (Emission Unit 8-5).	Silo Storage	Gypsum - See attached MSDS	1959
Additive Silo #22	Gypsum	Material Dispensed To #2 Finish Mill Feed System (Emission Unit 7-13).	Silo Storage	Gypsum - See attached MSDS	1959

Section 9A Solid Material Storage - Material Data

Storage Unit No. {1}	Material Name	Emissions Unit, Process or Operation Served {2}	Storage Type {3}	Composition {4}	Date Installed or Modified (Mo./Yr)
Blending Silo #1	Blended Kiln Feed	Material Dispensed To Kiln Feed Metering System (Emission Unit 4-3 or 4-4).	Silo Storage	Composition of materials to be blended will be a weighted composite avg of the Raw Material compositions indicated above for High, Trans, and Low Rock, Sandstone, Alumina, and Iron.	Original Cons. 1959 Modification in 1986
Blending Silo #2	Blended Kiln Feed	Material Dispensed To Kiln Feed Metering System (Emission Unit 4-3 or 4-4).	Silo Storage	Composition of materials to be blended will be a weighted composite avg of the Raw Material compositions indicated above for High, Trans, and Low Rock, Sandstone, Alumina, and Iron.	Original Cons. 1959 Modification in 1986
Blending Silo #3	Blended Kiln Feed	Material Dispensed To Kiln Feed Metering System (Emission Unit 4-3 or 4-4).	Silo Storage	Composition of materials to be blended will be a weighted composite avg of the Raw Material compositions indicated above for High, Trans, and Low Rock, Sandstone, Alumina, and Iron.	Original Cons. 1959 Modification in 1986
Blending Silo #4	Blended Kiln Feed	Material Dispensed To Kiln Feed Metering System (Emission Unit 4-3 or 4-4).	Silo Storage	Composition of materials to be blended will be a weighted composite avg of the Raw Material compositions indicated above for High, Trans, and Low Rock, Sandstone, Alumina, and Iron.	Original Cons. 1959 Modification in 1986
Coal Storage Silo	Coal	Material Dispensed To Coal Firing System Associated With Each Kiln. (Emiss. Unit 5-15, DCP's 5.11 and 5.12)	Silo Storage	Coal - See attached analytical analysis.	1976
#1 Kiln Dust Bin	Kiln Dust	Material Dispensed To Kiln Feed System (Emission Unit 4-5 and 6-1). See Figures 4-2, 4-3, 6-1, and 6-2.	Surge Bin	Kiln Dust - See attached MSDS.	1959
#2 Kiln Dust Bin	Kiln Dust	Material Dispensed To Kiln Feed System (Emission Unit 4-6 and 6-2). See Figures 4-2, 4-3, 6-1, and 6-2.	Surge Bin	Kiln Dust - See attached MSDS.	1959

Section 9A   Solid Material Storage - Material Data

Storage Unit No. {1}	Material Name	Emissions Unit, Process or Operation Served {2}	Storage Type {3}	Composition {4}	Date Installed or Modified (Mo./Yr)
Pelletizer Bin	Kiln Dust	Material Dispensed To Haul Trucks (Emission Unit 6-7) For Disposal In Kiln Dust Dump (Emission Unit 10-11).	Storage Bin	Kiln Dust - See attached MSDS.	1992 Modification in 2017
Clinker Silo #5	Clinker	Material Dispensed To #1 Finish Mill Feed System (Emission Unit 7-12).	Silo Storage	Clinker is composed of various hydraulicaly active minerals present in the following approx. quantities: Tricalcium Silicate ($Ca3SiO5$) - 45%; Lime (CaO) - <2%; Dicalcium Silicate ($Ca2SiO4$) - 27%; Sulfur (S) - <1%; Tricalcium Aluminate ($Ca3Al2O6$) - 11%; Na, K - 1.5%; Tetracalcium aluminoferrite $Ca4Al2Fe2O10$) - 8%	1959
Clinker Silo #6	Clinker	Material Dispensed To #1 Finish Mill Feed System (Emission Unit 7-12).	Silo Storage	Clinker - Same as indicated above.	1959
Clinker Silo #7	Clinker	Material Dispensed To #1 Finish Mill Feed System (Emission Unit 7-12).	Silo Storage	Clinker - Same as indicated above.	1959
Clinker Silo #8	Clinker	Material Dispensed To #1 Finish Mill Feed System (Emission Unit 7-12).	Silo Storage	Clinker - Same as indicated above.	1959
Clinker Silo #13	Clinker	Material Dispensed To #2 Finish Mill Feed System (Emission Unit 7-13).	Silo Storage	Clinker - Same as indicated above.	1959

Section 9A Solid Material Storage - Material Data

Storage Unit No. {1}	Material Name	Emissions Unit, Process or Operation Served {2}	Storage Type {3}	Composition {4}	Date Installed or Modified (Mo./Yr)
Clinker Silo #14	Clinker	Material Dispensed To Either #2 Or #3 Finish Mill Feed Systems (Emiss. Units 7-13 or 8-5).	Silo Storage	Clinker - Same as indicated above.	1959
Clinker Silo #15	Clinker	Material Dispensed To Either #2 Or #3 Finish Mill Feed Systems (Emiss. Units 7-13 or 8-5).	Silo Storage	Clinker - Same as indicated above.	1959
Clinker Silo #16	Clinker	Material Dispensed To #2 Finish Mill Feed System Or To Outside Storage (Emission Units 7-13 and 7-14).	Silo Storage	Clinker - Same as indicated above.	1959
Cement Silo #1	Portland Cement Masonry	Material Dispensed To Haul Trucks on Truck Scale A (Emiss Unit 9-1) or to #1 or #3 Packing Machines (Emission Units 9-5 or 9-7).	Silo Storage	Portland Cement - See attached MSDS	1959
Cement Silo #2	Portland Cement Masonry	Material Dispensed To Haul Trucks on Truck Scale A (Emiss Unit 9-1) or to #1 or #3 Packing Machines (Emission Units 9-5 or 9-7).	Silo Storage	Portland Cement - See attached MSDS	1959
Cement Silo #3	Portland Cement Masonry	Material Dispensed To Haul Trucks on Truck Scale A (Emiss Unit 9-1) or to #1 or #3 Packing Machines (Emission Units 9-5 or 9-7).	Silo Storage	Portland Cement - See attached MSDS	1959
Cement Silo #4	Portland Cement Masonry	Material Dispensed To Haul Trucks on Truck Scale B (Emiss Unit 9-2) or to #1 or #3 Packing Machines (Emission Units 9-5 or 9-7).	Silo Storage	Portland Cement - See attached MSDS	1959

Section 9A Solid Material Storage - Material Data

Storage Unit No. {1}	Material Name	Emissions Unit, Process or Operation Served {2}	Storage Type {3}	Composition {4}	Date Installed or Modified (Mo./Yr)
Cement Silo #5	Portland Cement Masonry	Material Dispensed To Haul Trucks on Truck Scale B (Emiss Unit 9-2) or to #1 or #3 Packing Machines (Emission Units 9-5 or 9-7).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959
Cement Silo #6	Portland Cement Masonry	Material Dispensed To Haul Trucks on Truck Scale B (Emiss Unit 9-2) or to #1 or #3 Packing Machines (Emission Units 9-5 or 9-7).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959
Cement Silo #7	Portland Cement Masonry	Material Dispensed To Haul Trucks on Truck Scale C (Emiss Unit 9-3) or to #1 or #3 Packing Machines (Emission Units 9-5 or 9-7).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959
Cement Silo #8	Portland Cement Masonry	Material Dispensed To Haul Trucks on Truck Scale C (Emiss Unit 9-3) or to #1 or #3 Packing Machines (Emission Units 9-5 or 9-7).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959
Cement Silo #9	Portland Cement Masonry	Material Dispensed To Haul Trucks on Truck Scale C (Emiss Unit 9-3) or to #1 or #3 Packing Machines (Emission Units 9-5 or 9-7).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959
Cement Silo #10	Portland Cement Masonry	Material Dispensed To Haul Trucks on Truck Scale A (Emiss Unit 9-1) or to #1 or #3 Packing Machines (Emission Units 9-5 or 9-7).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959
Cement Silo #11	Portland Cement Masonry	Material Dispensed To #2 Packing Machine (Emission Unit 9-6).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959

Section 9A Solid Material Storage - Material Data

Storage Unit No. {1}	Material Name	Emissions Unit, Process or Operation Served {2}	Storage Type {3}	Composition {4}	Date Installed or Modified (Mo./Yr)
Cement Silo #12	Portland Cement Masonry	Material Dispensed To Haul Trucks on Truck Scale C (Emiss Unit 9-3) or to #1 or #3 Packing Machines (Emission Units 9-5 or 9-7).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959
Cement Silo #13	Portland Cement Masonry	Material Dispensed To Haul Trucks on Truck Scale C (Emiss Unit 9-3) or to #1 or #3 Packing Machines (Emission Units 9-5 or 9-7).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959
Cement Silo #14	Portland Cement Masonry	Material Dispensed To Any Of Cement Storage Silos #1 - #13 (Emission Units 9-1 - 9-3).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959
Cement Silo #15	Portland Cement Masonry	Material Dispensed To Any Of Cement Storage Silos #1 - #13 (Emission Units 9-1 - 9-3).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959
Cement Silo #16	Portland Cement Masonry	Material Dispensed To Any Of Cement Storage Silos #1 - #13 (Emission Units 9-1 - 9-3).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959
Cement Silo #17	Portland Cement Masonry	Material Dispensed To Any Of Cement Storage Silos #1 - #13 (Emission Units 9-1 - 9-3).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959
Cement Silo #18	Portland Cement Masonry	Material Dispensed To Any Of Cement Storage Silos #1 - #13 (Emission Units 9-1 - 9-3).	Silo Storage	Portland Cement - See attached MSDS Masonry	1959

Section 9A Solid Material Storage - Material Data

Storage Unit No. {1}	Material Name	Emissions Unit, Process or Operation Served {2}	Storage Type {3}	Composition {4}	Date Installed or Modified (Mo./Yr)
Coal Reject Stockpile Emission Unit 10-4A	Coal Reject	Coal Reject Storage	Open Stockpile	Coal Reject	2021
Bottom Ash Handling Stockpile Emission Unit 10-2	Bottom Ash Located in Covered Storage Building	Material Dispensed To Crusher Dump Hopper (Emission Unit 1-1).	Open Stockpile	Bottom Ash - See attached MSDS	1988
Iron Stockpile Emission Unit 10-3	Iron Located in Covered Storage Building	Material Dispensed To Additive System Dump Hopper (Emission Unit 2-5).	Open Stockpile	Iron - See attached MSDS	1988
Sandstone Stockpile Emission Unit 10-4	Sandstone	Material Dispensed To Crusher Dump Hopper (Emission Unit 1-1).	Open Stockpile	Sandstone - See attached MSDS	N/A

Section 9A Solid Material Storage - Material Data

Storage Unit No. {1}	Material Name	Emissions Unit, Process or Operation Served {2}	Storage Type {3}	Composition {4}	Date Installed or Modified (Mo./Yr)
Clinker Stockpile Emission Unit 10-8	Clinker Located in Covered Storage Building	Clinker Storage	Covered Storage Building	Clinker is composed of various hydraulicaly active minerals present in the following approx. quantities: Tricalcium Silicate (Ca_3SiO_5) - 45%; Lime (CaO) - <2%; Dicalcium Silicate (Ca_2SiO_4) - 27%; Sulfur (S) - <1%; Tricalcium Aluminate ($Ca_3Al_2O_6$) - 11%; Na, K - 1.5%; Tetracalcium aluminoferrite $Ca_4Al_2Fe_2O_{10}$) - 8%	1988
West Cap Quarry Dust Dump Emiss. Unit 10-11	Kiln Dust	This is a landfill area with no material being removed at this time.	Dust Dump	Kiln Dust - See attached MSDS.	N/A
Calcium Cake	Calcium Cake	Stockpile	Open pile	Calcium Cake - See attached MSDS	N/A

Section 9B   Solid Material Storage - Storage Data

Storage Unit No. {1}	Transfer or Transport Method {2}		Maximum Hourly Throughput (specify units)	Annual Throughput (specify units)	Dust Control Method (Storage or Transfer) {3}
	Incoming	Outgoing			
Rock Silo #4	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 800 TPH Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Rock Silo #3	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 800 TPH Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Rock Silo #2	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 800 TPH Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Rock Silo #1	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 250 TPH Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: Rock Silos #4 - #1 have a variable Maximum Hourly Throughput. The combined throughput for all four silos depends on several factors and will range from 40 TPH to 80 TPH. The Annual Throughput for all four silos is equivalent to the annual throughput of the #1 Raw Mill System minus the amount of Iron raw material processed by this system. This is equivalent to approximately 421,190 TPY.					
Rock Silo #9	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 250 TPH Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Rock Silo #10	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 800 TPH Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Rock Silo #11	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 800 TPH Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Rock Silo #12	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 800 TPH Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: Rock Silos #9 - #12 have a variable Maximum Hourly Throughput. The combined throughput for all four silos depends on several factors and will range from 40 TPH to 80 TPH. The Annual Throughput for all four silos is equivalent to the annual throughput of the #2 Raw Mill System minus the amount of Iron raw material processed by this system. This is equivalent to approximately 421,190 TPY.					

Section 9B Solid Material Storage - Storage Data

Storage Unit No. {1}	Transfer or Transport Method {2}		Maximum Hourly Throughput (specify units)	Annual Throughput (specify units)	Dust Control Method (Storage or Transfer) {3}
	Incoming	Outgoing			
Additive Silo #17	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 40 TPH Outgoing - Variable	Approx. 6,318 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: Additive Silo #17 has a variable Maximum Hourly Throughput. The combined throughput of this silo and Rock Silos #4 - #1 depends on several factors and will range from 40 TPH to 80 TPH.					
Additive Silo #18	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 60 TPH Outgoing - Variable	Approx. 12,911 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: Additive Silo #18 has a variable Maximum Hourly Throughput. The combined throughput of this silo and Clinker Silos #5 - #8 depends on several factors and will range from 10 TPH to 35 TPH.					
Additive Silo #19	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 60 TPH Outgoing - Variable	Approx. 12,911 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: Additive Silo #19 has a variable Maximum Hourly Throughput. The combined throughput of this silo and Clinker Silos #5 - #8 depends on several factors and will range from 10 TPH to 35 TPH.					
Additive Silo #20	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 40 TPH Outgoing - Variable	Approx. 6,318 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: Additive Silo #20 has a variable Maximum Hourly Throughput. The combined throughput of this silo and Rock Silos #9 - #12 depends on several factors and will range from 40 TPH to 80 TPH.					
Additive Silo #21	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 60 TPH Outgoing - Variable	Approx. 11,067 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: Additive Silo #21 has a variable Maximum Hourly Throughput. The combined throughput of this silo and Clinker Silos #14 and #15 depends on several factors and will range from 10 TPH to 35 TPH.					
Additive Silo #22	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 60 TPH Outgoing - Variable	Approx. 12,911 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: Additive Silo #22 has a variable Maximum Hourly Throughput. The combined throughput of this silo and Clinker Silos #13 - #16 depends on several factors and will range from 10 TPH to 35 TPH.					

Section 9B Solid Material Storage - Storage Data

Storage Unit No. {1}	Transfer or Transport Method {2}		Maximum Hourly Throughput (specify units)	Annual Throughput (specify units)	Dust Control Method (Storage or Transfer) {3}
	Incoming	Outgoing			
Blending Silo #1	Pneumatic Transfer Line	Airslide Conveyor	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Blending Silo #2	Pneumatic Transfer Line	Airslide Conveyor	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Blending Silo #3	Pneumatic Transfer Line	Airslide Conveyor	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Blending Silo #4	Pneumatic Transfer Line	Airslide Conveyor	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: Blending Silos #1 - #4 have a variable Maximum Hourly Throughput. The combined transfer rate to these four silos depends on several factors and will range from 40 TPH to 160 TPH. The Hourly Rate at which material is transferred from these silos is also variable and can range from 61 TPH to 112 TPH. The Annual Throughput for all four silos is equivalent to the annual consumption of Kiln Feed. This amount is assumed to be aprroximately 842,379 TPY.					
Coal Storage Silo	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - 300 TPH Outgoing - Variable	Upto 82,345 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: The hourly rate at which coal is transferred from the Coal Storage Silo is variable and ranges from approximately 5 TPH - 10 TPH.					
#1 Kiln Dust Bin	Screw Conveyor and Bucket Elevator	Material Metering Device And Screw Conveyor OR Load-Out Chute	Incoming - Upto 7 TPH Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
#2 Kiln Dust Bin	Screw Conveyor and Bucket Elevator	Material Metering Device And Screw Conveyor OR Load-Out Chute	Incoming - Upto 7 TPH Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: The hourly rate at which Kiln Dust is transferred from the #1 and #2 Kiln Dust Bins depends upon whether this material is being transferred back to the Kiln Systems or to a Dust Dump. The Annual Throughput of material through the Dust Bins is assumed to be upto approximately 116,508 TPY.					
Pelletizer Bin	Screw Conveyor and Bucket Elevator	Load-Out Chute To Haul Truck	Incoming - Variable Outgoing - Variable	Upto 8,900 TPY	Fugitive Emission Source
Note: The hourly rate at which Kiln Dust is transferred to the Pelletizer Bin depends upon whether this material is being transferred from the #1 or #2 Kiln Dust Bins. It is assumed that Pelletized Kiln Dust is transferred from the Pelletizer Bin at a rate of 26.6 TPH.					

Section 9B   Solid Material Storage - Storage Data

Storage Unit No. {1}	Transfer or Transport Method {2}		Maximum Hourly Throughput (specify units)	Annual Throughput (specify units)	Dust Control Method (Storage or Transfer) {3}
	Incoming	Outgoing			
Clinker Silo #5	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - Variable Outgoing - Variable	Upto 70,809 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Clinker Silo #6	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - Variable Outgoing - Variable	Upto 70,809 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Clinker Silo #7	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - Variable Outgoing - Variable	Upto 70,809 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Clinker Silo #8	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - Variable Outgoing - Variable	Upto 70,809 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: The rate at which Clinker can be transferred to any of Clinker Silos #5 - #8 is variable and will range from 31 TPH to 62 TPH. The rate at which Clinker is transferred from these silos is also variable. The hourly output from each silo can range from a few tons per hour to 35 TPH.					
Clinker Silo #13	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - Variable Outgoing - Variable	Upto 70,809 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Clinker Silo #14	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - Variable Outgoing - Variable	Upto 189,242 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Clinker Silo #15	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - Variable Outgoing - Variable	Upto 189,242 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Clinker Silo #16	Belt Conveyor	Material Metering Device And Belt Conveyor	Incoming - Variable Outgoing - Variable	Upto 70,809 TPY	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: The rate at which Clinker can be transferred to any of Clinker Silos #13 - #16 is variable and will range from 31 TPH to 62 TPH. The rate at which Clinker is transferred from these silos is also variable. The hourly output from each silo can range from a few tons per hour to 35 TPH.					

Section 9B Solid Material Storage - Storage Data

Storage Unit No. {1}	Transfer or Transport Method {2}		Maximum Hourly Throughput (specify units)	Annual Throughput (specify units)	Dust Control Method (Storage or Transfer) {3}
	Incoming	Outgoing			
Cement Silo #1	Pneumatic Transfer Line	Load-Out Chute To Haul Truck Or Airslide Conveyor To Packing Mach.	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #2	Pneumatic Transfer Line	Load-Out Chute To Haul Truck Or Airslide Conveyor To Packing Mach.	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #3	Pneumatic Transfer Line	Load-Out Chute To Haul Truck Or Airslide Conveyor To Packing Mach.	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #10	Pneumatic Transfer Line	Load-Out Chute To Haul Truck Or Airslide Conveyor To Packing Mach.	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #11	Pneumatic Transfer Line	Load-Out Chute To Haul Truck Or Airslide Conveyor To Packing Mach.	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: The hourly rate at which cement can be transferred to this group of silos depends on several factors but can range from around 17 TPH to 121 TPH. The hourly rate at which cement can be transferred from these silos to Haul Trucks is assumed to be 192 TPH. The annual amount of cement processed through this group of silos is assumed to be Upto 232,879 TPY.					
Cement Silo #4	Pneumatic Transfer Line	Load-Out Chute To Haul Truck Or Airslide Conveyor To Packing Mach.	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #5	Pneumatic Transfer Line	Load-Out Chute To Haul Truck Or Airslide Conveyor To Packing Mach.	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #6	Pneumatic Transfer Line	Load-Out Chute To Haul Truck Or Airslide Conveyor To Packing Mach.	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: The hourly rate at which cement can be transferred to this group of silos depends on several factors but can range from around 17 TPH to 121 TPH. The hourly rate at which cement can be transferred from these silos to Haul Trucks is assumed to be 192 TPH. The annual amount of cement processed through this group of silos is assumed to be Upto 232,879 TPY.					

Section 9B Solid Material Storage - Storage Data

Storage Unit No. {1}	Transfer or Transport Method {2}		Maximum Hourly Throughput (specify units)	Annual Throughput (specify units)	Dust Control Method (Storage or Transfer) {3}
	Incoming	Outgoing			
Cement Silo #7	Pneumatic Transfer Line	Load-Out Chute To Haul Truck Or Airslide Conveyor To Packing Mach.	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #8	Pneumatic Transfer Line	Load-Out Chute To Haul Truck Or Airslide Conveyor To Packing Mach.	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #9	Pneumatic Transfer Line	Load-Out Chute To Haul Truck Or Airslide Conveyor To Packing Mach.	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #12	Pneumatic Transfer Line	Load-Out Chute To Haul Truck Or Airslide Conveyor To Packing Mach.	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #13	Pneumatic Transfer Line	Load-Out Chute To Haul Truck Or Airslide Conveyor To Packing Mach.	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: The hourly rate at which cement can be transferred to this group of silos depends on several factors but can range from around 17 TPH to 121 TPH. The hourly rate at which cement can be transferred from these silos to Haul Trucks is assumed to be 192 TPH. The annual amount of cement processed through this group of silos is assumed to be upto 232,879 TPY.					
Cement Silo #14	Pneumatic Transfer Line	Pneumatic Transfer Line	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #15	Pneumatic Transfer Line	Pneumatic Transfer Line	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #16	Pneumatic Transfer Line	Pneumatic Transfer Line	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #17	Pneumatic Transfer Line	Pneumatic Transfer Line	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Cement Silo #18	Pneumatic Transfer Line	Pneumatic Transfer Line	Incoming - Variable Outgoing - Variable	Variable - See Note Below	For Both Storage And Transfer, Dust Is Controlled With Baghouse
Note: The hourly rate at which cement can be transferred to this group of silos depends on several factors but can range from around 17 TPH to 90 TPH. The hourly rate at which cement can be transferred from these silos is assumed to be 32 TPH. The annual amount of cement processed through this group of silos is assumed to be upto approximately 83,836 TPY.					

Section 9B   Solid Material Storage - Storage Data

Storage Unit No. {1}	Transfer or Transport Method {2}		Maximum Hourly Throughput (specify units)	Annual Throughput (specify units)	Dust Control Method (Storage or Transfer) {3}
	Incoming	Outgoing			
Bottom Ash (Alumina) Stockpile Emiss Unit 10-2	Belly Dump Haul Truck / Frontend Loader	Frontend Loader	70 TPH	Approx. 27,569 TPY	Covered Storage Building
Iron Stockpile Emiss Unit 10-3	Belly Dump Haul Truck / Frontend Loader	Frontend Loader	80 TPH	Approx. 12,794 TPY	Covered Storage Building
Silica Sand Stock. Emiss Unit 10-4	End Dump Haul Truck / Frontend Loader	Frontend Loader	35 TPH	Approx. 33,794 TPY	Fugitive Dust Source

Section 9B Solid Material Storage - Storage Data

Storage Unit No. {1}	Transfer or Transport Method {2}		Maximum Hourly Throughput (specify units)	Annual Throughput (specify units)	Dust Control Method (Storage or Transfer) {3}
	Incoming	Outgoing			
Clinker Stockpile Emission Unit 10-8	End Dump Haul Truck / Frontend Loader	Frontend Loader	120 TPH	Approx. 25,000 TPY	Covered Storage Building
West Cap Quarry Dust Dump Emiss. Unit 10-11	End Dump Haul Truck / Frontend Loader	N/A	71 TPH	Approx. 32,850 TPY	Covered Storage Building
Calcium Cake	End Dump Haul Truck / Frontend Loader	N/A No Load-Out	28 TPH	245,280 TPY	Fugitive Dust Source

Section 10 Waste Product Disposal (Solid And Liquid Wastes That Do Not Result In Air Emissions)

Equipment Unit No. {1}	WASTE MATERIAL Type {2}	Amount {3}		METHOD OF DISPOSAL {4}
N/A	Waste Oils and Lubricants	Unknown	lb/hr	Waste Oils are temporarily stored in either a 500 gallon Waste Oil Tank (Tank 6) or designated 55 gallon drums. Waste Antifreeze and Solvents are also stored in designated 55 gallon drums. These materials are stored until picked up by a recycler.
		5,000	gal/yr	
	Waste Antifreeze	Unknown	lb/hr	
		500	gal/yr	
	Waste Solvent	Unknown	lb/hr	
		Unknown	gal/yr	
	Painting Activities	Unknown	lb/hr	
		Unknown	gal/yr	
N/A	Solid Waste (Paper, Garbage, Trash, Miscellaneous Plant Debris)	Unknown	lb/hr	These types of materials are disposed of in numerous dumpsters located around the plant. Dumpsters are emptied by contract hauler.
		Unknown	ton/yr	

SECTION 11 CERTIFICATION – (20.11.42.12.A.(5) NMAC)

I, Ramses Maldonado, hereby certify that the information and data submitted in this application package are as complete, true and accurate as possible, to the best of my personal knowledge and professional expertise and experience.

Signed this 19 day of January, 2023, upon my oath of affirmation, before a notary of the State of New Mexico

[signature] 02/19/2023

SIGNATURE (Responsible Official) DATE

Ramses Maldonado Plant Manager

PRINTED NAME TITLE

Subscribed and sworn to before me on this 19 day of January, 2023

My authorization as a Notary of the State of New Mexico expires on the 30 day of March, 2023.

[signature] Jan. 19, 2023

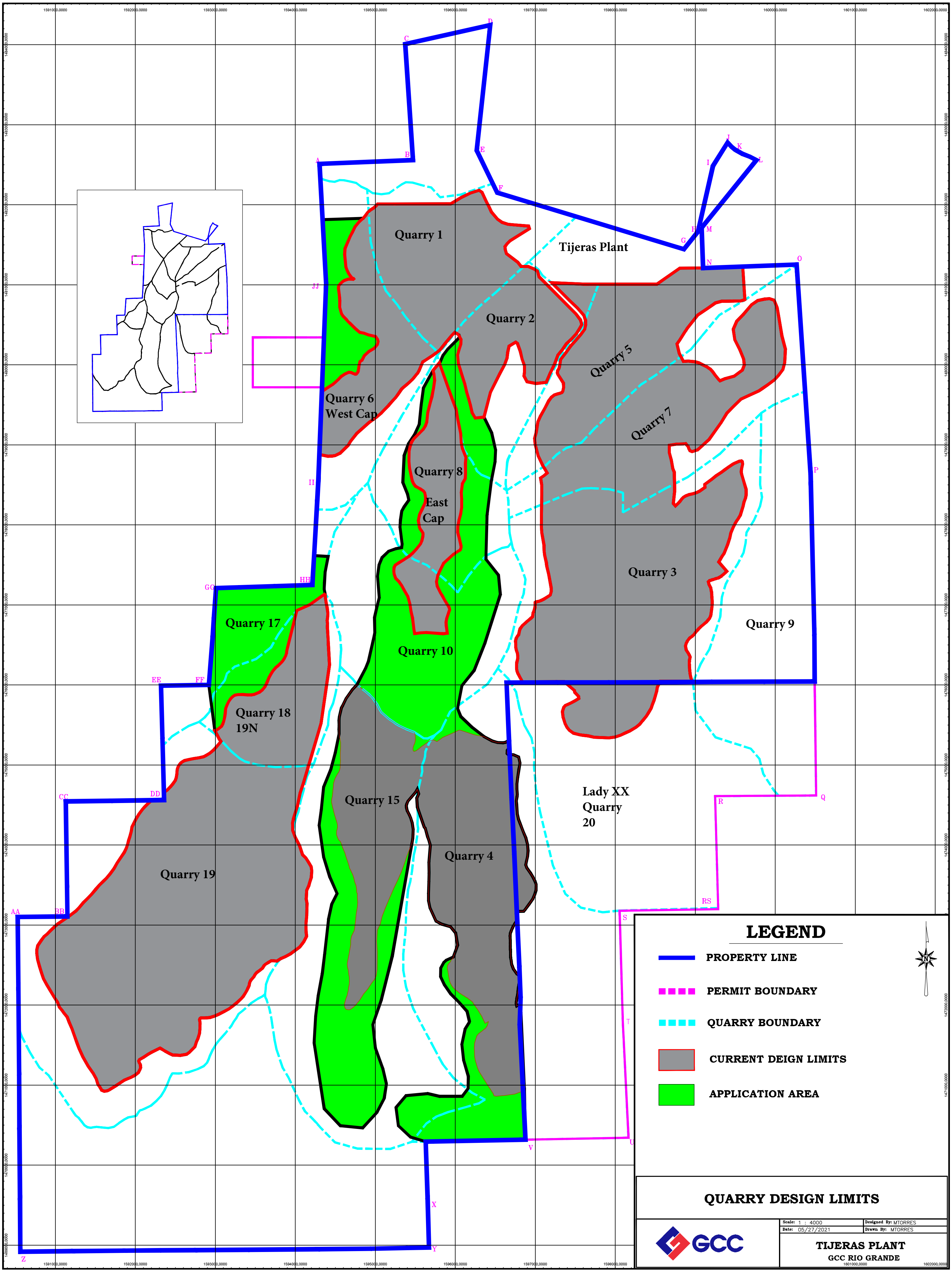
NOTARY'S SIGNATURE DATE

Samantha J. Kretz

NOTARY'S PRINTED NAME

SAMANTHA J KRETZ
Notary Public - State of New Mexico
Commission # 1111869
My Comm. Expires Mar 30, 2023

APPENDIX B. UPDATED SITE PLANS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Tijeras Plant
Quarry 2
Quarry 5
Quarry 7
Quarry 6
West Cap
Quarry 8
East
Cap
Quarry 3
Quarry 9
Quarry 17
Quarry 10
Quarry 18
19N
Quarry 15
Quarry 4
Lady XX
Quarry
20
Quarry 19
A
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AA
BB
CC
DD
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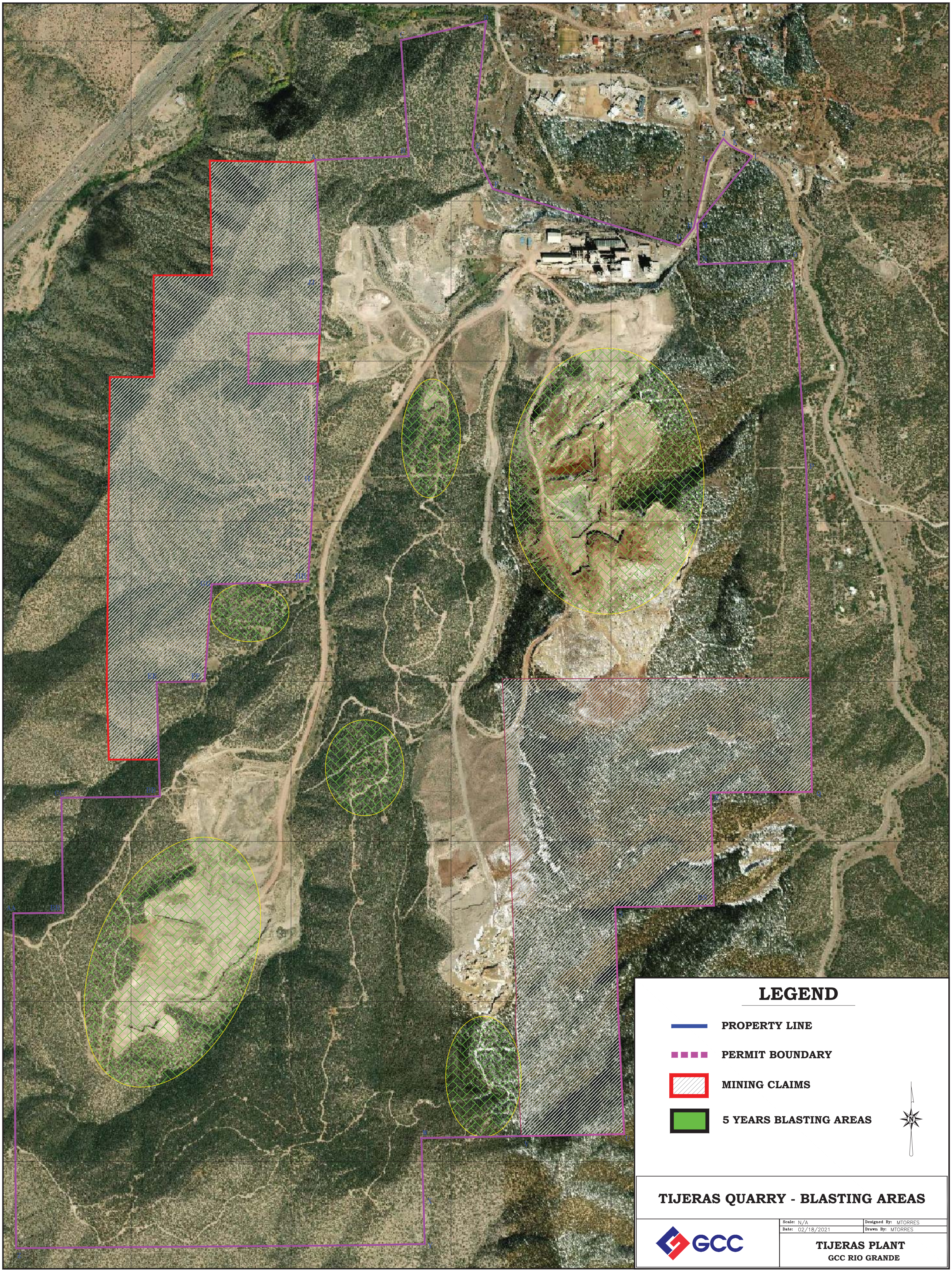
FF
GG
HH
II
JJ
LEGEND
PROPERTY LINE
PERMIT BOUNDARY
QUARRY BOUNDARY
CURRENT DEIGN LIMITS
APPLICATION AREA
N
QUARRY DESIGN LIMITS
GCC
Scale: 1 : 4000
Date: 05/27/2021
Designed By: MTORRES
Drawn By: MTORRES
TIJERAS PLANT
GCC RIO GRANDE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PROPERTY LINE
PERMIT BOUNDARY
MINING CLAIMS
5 YEARS BLASTING AREAS
N
TIJERAS QUARRY - BLASTING AREAS
GCC
Scale: N/A
Date: 02/18/2021
Designed By: MTORRES
Drawn By: MTORRES
TIJERAS PLANT
GCC RIO GRANDE

APPENDIX C. UPDATED EMISSION CALCULATIONS

Table 1. Summary of Site Wide Potential Emissions

Emission Units	Potential Emissions													
	(lb/hr)							(tpy)						
	$PM_{2.5}$	PM_{10}	TSP	NO_x	CO	SO_2	VOC	$PM_{2.5}$	PM_{10}	TSP	NO_x	CO	SO_2	VOC
1-1	0.13	0.88	2.40	--	--	--	--	0.083	0.57	1.57	--	--	--	--
1-2	0.0095	0.063	0.18	--	--	--	--	0.040	0.28	0.79	--	--	--	--
1-3	0.013	0.084	0.24	--	--	--	--	0.060	0.37	1.05	--	--	--	--
1-4	0.033	0.22	0.63	--	--	--	--	0.15	0.97	2.76	--	--	--	--
2-1	0.042	0.15	0.45	--	--	--	--	0.035	0.12	0.37	--	--	--	--
2-2	0.042	0.15	0.45	--	--	--	--	0.035	0.12	0.37	--	--	--	--
2-3	0.042	0.15	0.45	--	--	--	--	0.028	0.097	0.29	--	--	--	--
2-4	0.042	0.15	0.45	--	--	--	--	0.028	0.096	0.29	--	--	--	--
2-5**	0.019	0.13	0.36	--	--	--	--	0.010	0.072	0.20	--	--	--	--
2-6**	0.0062	0.022	0.067	--	--	--	--	0.0034	0.012	0.037	--	--	--	--
2-7**	0.0053	0.035	0.10	--	--	--	--	0.069	0.46	1.31	--	--	--	--
	0.0016	0.0055	0.017	--	--	--	--	0.00090	0.0030	0.0090	--	--	--	--
2-8**	0.0016	0.0055	0.017	--	--	--	--	0.00090	0.0030	0.0090	--	--	--	--
2-9	0.039	0.44	0.74	--	--	--	--	0.17	1.92	3.24	--	--	--	--
2-10	0.039	0.44	0.74	--	--	--	--	0.17	1.92	3.24	--	--	--	--
2-11	0.019	0.13	0.36	--	--	--	--	0.0020	0.014	0.038	--	--	--	--
2-12*	0.0084	0.056	0.056	--	--	--	--	0.037	0.24	0.24	--	--	--	--
3-1	0.11	0.76	2.06	--	--	--	--	0.48	3.31	9.01	--	--	--	--
3-2	0.028	0.44	0.53	--	--	--	--	0.12	1.91	2.32	--	--	--	--
3-3	0.11	0.76	2.06	--	--	--	--	0.48	3.31	9.01	--	--	--	--
3-4	0.028	0.44	0.53	--	--	--	--	0.12	1.91	2.32	--	--	--	--
4-1	0.019	0.13	0.36	--	--	--	--	0.080	0.55	1.58	--	--	--	--
4-2	0.019	0.13	0.36	--	--	--	--	0.080	0.55	1.58	--	--	--	--
4-3	0.0066	0.044	0.12	--	--	--	--	0.030	0.19	0.55	--	--	--	--
4-4	0.0066	0.044	0.12	--	--	--	--	0.030	0.19	0.55	--	--	--	--
4-5	0.0095	0.18	0.51	--	--	--	--	0.040	0.78	2.23	--	--	--	--
4-6	0.0095	0.18	0.51	--	--	--	--	0.040	0.78	2.23	--	--	--	--
5-1	0.00044	0.0016	0.0047	--	--	--	--	0.0019	0.0068	0.02	--	--	--	--
5-2	0.0020	0.0071	0.022	--	--	--	--	0.0021	0.0074	0.02	--	--	--	--
5-12	0.014	0.092	0.19	--	--	--	--	0.0022	0.015	0.03	--	--	--	--

Table 1. Summary of Site Wide Potential Emissions

Emission Units	Potential Emissions													
	(lb/hr)							(tpy)						
	$PM_{2.5}$	PM_{10}	TSP	NO_x	CO	SO_2	VOC	$PM_{2.5}$	PM_{10}	TSP	NO_x	CO	SO_2	VOC
5-13	0.030	0.16	0.36	--	--	--	--	0.0048	0.03	0.06	--	--	--	--
5-14	0.0000038	0.000025	0.000053	--	--	--	--	0.00000061	0.0000040	0.0000085	--	--	--	--
5-15	0.0000039	0.000025	0.000054	--	--	--	--	0.00000089	0.0000059	0.000012	--	--	--	--
5-3 to 5-10 6-1 and 6-2	17.88	33.36	83.34	975.00	1,348.00	193.60	15.50	26.03	48.58	57.84	1,518.87	1,446.54	848.18	66.54
6-3	0.0035	0.066	0.10	--	--	--	--	0.0074	0.14	0.22	--	--	--	--
6-4	0.0017	0.033	0.051	--	--	--	--	0.0070	0.14	0.22	--	--	--	--
6-5	0	0	0	--	--	--	--	0	0	0	--	--	--	--
6-6	0	0	0	--	--	--	--	0	0	0	--	--	--	--
6-7	0.0022	0.015	0.042	--	--	--	--	0.00025	0.0017	0.0047	--	--	--	--
7-1	0.017	0.11	0.30	--	--	--	--	0.028	0.17	0.49	--	--	--	--
7-2	0.0070	0.030	0.080	--	--	--	--	0.0060	0.020	0.070	--	--	--	--
7-3	0.0020	0.010	0.030	--	--	--	--	0.0010	0.0033	0.010	--	--	--	--
7-4	0.0010	0.0030	0.010	--	--	--	--	0.0010	0.0030	0.010	--	--	--	--
7-5	0.0020	0.010	0.030	--	--	--	--	0.0010	0.0033	0.010	--	--	--	--
7-6	0.0010	0.0030	0.010	--	--	--	--	0.0010	0.0033	0.010	--	--	--	--
7-7	0.0030	0.012	0.050	--	--	--	--	0.0040	0.020	0.060	--	--	--	--
7-8	0.0020	0.010	0.030	--	--	--	--	0.0010	0.0033	0.010	--	--	--	--
7-9	0.0010	0.0030	0.010	--	--	--	--	0.0020	0.010	0.030	--	--	--	--
7-10	0.0020	0.010	0.030	--	--	--	--	0.0010	0.0033	0.010	--	--	--	--
7-11	0.0010	0.0030	0.010	--	--	--	--	0.0020	0.010	0.010	--	--	--	--
7-12	0.027	0.18	0.52	--	--	--	--	0.12	0.79	2.27	--	--	--	--
7-13	0.027	0.18	0.52	--	--	--	--	0.12	0.79	2.27	--	--	--	--
7-14	0.019	0.13	0.36	--	--	--	--	0.0010	0.010	0.020	--	--	--	--
8-1	0.013	0.088	0.25	--	--	--	0.45	0.060	0.39	1.10	--	--	--	1.97
8-2	0.069	0.46	1.31	--	--	--	0.45	0.30	2.00	5.72	--	--	--	1.97
8-3	0.013	0.088	0.25	--	--	--	0.45	0.060	0.39	1.10	--	--	--	1.97
8-4	0.069	0.46	1.31	--	--	--	0.45	0.30	2.00	5.72	--	--	--	1.97
8-5**	0.0080	0.053	0.15	--	--	--	--	0.030	0.23	0.66	--	--	--	--
8-6**	0.010	0.067	0.19	--	--	--	0.45	0.040	0.29	0.83	--	--	--	1.97
8-7**	0.031	0.21	0.59	--	--	--	0.45	0.14	0.90	2.58	--	--	--	1.97
8-8*	0.008	0.056	0.06	--	--	--	--	0.037	0.24	0.24	--	--	--	--
9-1	0.016	0.11	0.31	--	--	--	--	0.016	0.11	0.31	--	--	--	--
9-2	0.016	0.11	0.31	--	--	--	--	0.016	0.11	0.31	--	--	--	--
9-3	0.016	0.11	0.31	--	--	--	--	0.016	0.11	0.31	--	--	--	--
9-4	0.011	0.071	0.21	--	--	--	--	0.0060	0.040	0.11	--	--	--	--
9-5*	0.0013	0.0084	0.0084	--	--	--	--	0.0056	0.037	0.037	--	--	--	--
9-6*	0.0013	0.0084	0.0084	--	--	--	--	0.0056	0.037	0.037	--	--	--	--
9-7*	0.0013	0.0084	0.0084	--	--	--	--	0.0056	0.037	0.037	--	--	--	--
9-8*	0.0013	0.0084	0.0084	--	--	--	--	0.0056	0.037	0.037	--	--	--	--
9-9*	0.0013	0.0084	0.0084	--	--	--	--	0.0056	0.037	0.037	--	--	--	--

Table 1. Summary of Site Wide Potential Emissions

Emission Units	Potential Emissions													
	(lb/hr)							(tpy)						
	$PM_{2.5}$	PM_{10}	TSP	NO_x	CO	SO_2	VOC	$PM_{2.5}$	PM_{10}	TSP	NO_x	CO	SO_2	VOC
9-10*	0.0013	0.0084	0.0084	--	--	--	--	0.0056	0.037	0.037	--	--	--	--
9-11*	0.0013	0.0084	0.0084	--	--	--	--	0.0056	0.037	0.037	--	--	--	--
9-12*	0.0013	0.0084	0.0084	--	--	--	--	0.0056	0.037	0.037	--	--	--	--
9-13*	0.0013	0.0084	0.0084	--	--	--	--	0.0056	0.037	0.037	--	--	--	--
10-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-2	0.0012	0.0078	0.017	--	--	--	--	0.00030	0.0015	0.0033	--	--	--	--
10-3	0.0051	0.033	0.070	--	--	--	--	0.00030	0.0027	0.0057	--	--	--	--
10-4	0.011	0.075	0.16	--	--	--	--	0.0054	0.036	0.076	--	--	--	--
10-4A	0.087	0.82	1.64	--	--	--	--	0.10	0.92	1.84	--	--	--	--
10-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-5A	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-6	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-6A	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-7A	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-8	0.072	0.47	1.00	--	--	--	--	0.0075	0.049	0.10	--	--	--	--
10-9	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-11A	0.0014	0.0091	0.019	--	--	--	--	0.00030	0.0021	0.0045	--	--	--	--
Coal reject pile	0.00065	0.012	0.025	--	--	--	--	0.00073	0.014	0.027	--	--	--	--
11	1.66	28.78	55.34	30.59	722.63	0.061	--	0.040	0.69	1.33	0.73	17.34	0.0015	--
11-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-9	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-1A	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-2A	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-3A	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-4A	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-9A	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 1. Summary of Site Wide Potential Emissions

Emission Units	Potential Emissions													
	(lb/hr)							(tpy)						
	$PM_{2.5}$	PM_{10}	TSP	NO_x	CO	SO_2	VOC	$PM_{2.5}$	PM_{10}	TSP	NO_x	CO	SO_2	VOC
11-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-6	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-8	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EGEN01	0.16	0.16	0.16	2.59	0.50	0.41	0.11	0.04	0.04	0.04	0.65	0.13	0.10	0.03
EGEN02	0.16	0.16	0.16	2.59	0.50	0.41	0.11	0.04	0.04	0.04	0.65	0.13	0.10	0.03
Quarry Sources	0.32	2.36	7.84	--	--	--	--	0.58	4.32	15.32	--	--	--	--
Unpaved Roads	2.08	20.76	79.78	--	--	--	--	3.60	35.98	138.29	--	--	--	--
Paved Roads**	0.043	0.18	0.88	--	--	--	--	0.061	0.25	1.27	--	--	--	--
Tanks 1-4	--	--	--	--	--	--	0.07	--	--	--	--	--	--	0.32
Facility Totals	23.77	96.37	253.38	1,010.77	2,071.64	194.49	18.49	34.31	121.02	288.56	1,520.89	1,464.13	848.39	78.74

* These are new emission units from the June 2022, Blended Cement Project submitted by GCC. Note that 9-5, 9-6, 9-7 listed in the current TV Permit no longer exist; therefore these emission units are being used to reflect three of the new sources in the blended cement application submitted in June 2022.

** These are existing emission units from the June 2022, Blended Cement Project submitted by GCC with an increase in emissions. Note that the paved road emission estimates reflected in the current Title V permit appeared to have incorrectly reflected PM10 emissions greater than TSP. These have been adjusted in the values reflected above.

Table C-1. Blasting PTE Basis

Hourly throughput (blasts)	1
Annual Throughput (blasts/yr)	48
Horizontal Area of Blast (ft^2)	25,000

Table C-2a. Gaseous Emissions associated with detonation of explosives

Scenario	Pollutant	Emission Factor ANFO lb/ton of usage[a]	ANFO explosive needed (tons/yr)	ANFO explosive needed on a daily basis (tons/day)[b]	Hourly emissions (lb/hr)[b]	Annual emissions (tons/yr)
ANFO	NO_x	1.80	[redacted]	[redacted]	30.59	0.73
	CO	42.51			722.63	17.34
	SO_2	0.0036			0.061	0.0015

a. NOx emission factor is the average of measurements from "NOx Emissions from Blasting Operations in Open-Cut Coal Mining" by Moetaz I. Attalla, Stuart J. Day, Tony Lange, William Lilley, and Scott Morgan (2008). Uses 0.9 kg per metric ton based on reported average on page 7881 of the reference, converted to lb/ton as follows: lb/ton = 0.9 kg/tonne x 2.20462 lb/kg x 0.907 tonne/ton.

CO emission factor is the average of the measurements in Rowland J.H., Mainiero R., Hurd D.A. "Factors Affecting Fumes Production of an Emulsion and ANFO/Emulsion Blends." 2001 - NIOSH. Figures 12-13. Use of maximum emission factor from steel or galvenized steel pipe and converted from CO Liters per Kg ANFO to lb/ton.

SO_2 emissions are based on a diesel sulfur content of 15 ppm assuming complete conversion to SO_2. Assuming ANFO contains 6% fuel oil (diesel); calculated as follows: lb/ton = 6% Fuel Oil x 15 ppm S / 10^6 * 64 lb/lbmol SO2 / 32 lb/lb-mol S * 2000 lb/ton.

b. Maximum amount of ANFO needed on a daily basis for most pits is based on review of historical trends and the expected number of blasts/year, the average amount of [redacted] is used.

Table C-2b. Particulate Emissions associated with detonation of explosives

Pollutant	Emission Factor[a] (lb/blast)	Potential Emissions	
		(lb/hr)	(tons/yr)
TSP	55.3	55.3	1.33
PM_{10}	28.78	28.8	0.69
$PM_{2.5}$	1.66	1.7	0.04

a. Blasting particulate emission factors from blasting of coal or overburden in AP-42 Table 11.9-1 (7/98)

Table C-3. Emulsion CO Emission Factors by water exposure and pipe type[1]

Blasting Mix	Water Exposur	Carbon Monoxide Detonation Velocity - Steel Pipe (m/s)	Carbon Monoxide Production - Steel Pipe (CO L/kg at STP)	Carbon Monoxide Detonation Velocity - Galvanized Sheet Metal Pipe (m/s)	Carbon Monoxide Production - Galvanized Sheet Metal Pipe (CO L/kg at STP)
Emulsion Shot	No water	6967	14	6633	14
	Water Same Day	5831	13.8	6553	17.5
	Water 1 Week	6816	12.5	5657	20.5
	Water 1 Month	5509	12.5	6433	15.5
	Water 2 Months	6131	12	5956	17.5
	Average	6250.8	12.96	6246.4	17.00
	Average CO L/kg for maximum of steel or galvenized steel pipe				17.00
	CO L/kg converted to g/kg				21.24
	CO g/kg converted to lb/ton				**42.51**

1. Data from Rowland J.H., Mainiero R., Hurd D.A. "Factors Affecting Fumes Production of an Emulsion and ANFO/Emulsion Blends." 2001 - NIOSH. Figures 12-13.

Table C-4. Unpaved Roads Potential Emissions

Description	Segment Type	Segment contribution[i]	Particle Size Multiplier [k][a] PM (lb/VMT)	PM$_{10}$ (lb/VMT)	PM$_{2.5}$ (lb/VMT)	Surface Material Silt Content [s][b] (%)	Mean Vehicle Weight [W][c] (tons)	Constant "a"[d] PM	PM$_{10}$	PM$_{2.5}$	Constant "b"[e]	No. of days with at least 0.01 inches of rain[f] [P]
Limestone Handling Trucks	Unpaved	1	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	2	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	3	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	5	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	6	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	7	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	9	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	10	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	11	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	12	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Total		--	--		---	--	---	---	---	---	--
Sandstone Hauling	Unpaved	4B	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Total		--	--		---	--	---	---	---	---	--
Bottom Ash Hauling	Unpaved	7B	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Total		--	--		---	--	---	---	---	---	--
CKD Hauling	Unpaved	1B	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	3B	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	10B	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	4B	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Total		--	--		---	--	---	---	---	---	--
Water Trucks	Unpaved	1	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	2	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	3	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	4	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	5	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	6	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	7	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	9	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	10	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	11	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Unpaved	12	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
	Total		--	--		---	--	---	---	---	---	--
Quarry 4 Overburden Hauling	Unpaved	13	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
Quarry 8 Overburden Hauling	Unpaved	3B	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
Quarry 17 Overburden Hauling	Unpaved	15	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
Quarry 15 Overburden Hauling	Unpaved	17	4.8	1.5	0.15	4.8	[redacted]	0.7	0.9	0.9	0.45	70
Maximum Unpaved Road Emissions												

a. Particle Size Multipliers for the unpaved road segment per U.S. EPA, *Unpaved Roads,* AP-42 Section 13.2.2, November 2006, Table 13.2.2-2, Industrial Roads.

b. Silt content per NMED default.

c. Average Weight of on-site haul trucks as provided by GCC.

d. Constant "a" per U.S. EPA, *Unpaved Roads,* AP-42 Section 13.2.2, November 2006, Table 13.2.2-2, Industrial Roads.

e. Constant "b" per U.S. EPA, *Unpaved Roads,* AP-42 Section 13.2.2, November 2006, Table 13.2.2-2, Industrial Roads.

f. The number of days with at least 0.01 inches of precipitation per year per U.S. EPA, *Unpaved Roads*, AP-42 Section 13.2.2, November 2006, Figure 13.2.2-1.

g. Annual Emission factor for unpaved roads calculated per U.S. EPA, *Unpaved Roads*, AP-42 Section 13.2.2, November 2006, Equations 1a and 2.
$E\ (lb/VMT) = [k * (s/12)^a * (W/3)^b] * [(365-P) / 365]$

Hourly emissions adjusted to not take into account natural mitigation effects such as rainfall by dividing the estimated emissions by [(365-P) / 365].

h. Control factors calculated by assuming 86% control for unpaved roads as detailed in 2022 Title V renewal application.

i. Road segment lengths per site maps provided by GCC. Segments with "B" added represent non-limestone travel on the same road segments.

j. Hourly Vehicle Miles Traveled VMT = Max. number of trucks per hour x [One-way Road Segment Length (miles) x 2]
Annual Vehicle Miles Traveled VMT = Max. number of trucks per year x [One-way Road Segment Length (miles) x 2]

k. Hourly Emissions (lb/hr) based on (E [lb/VMT]) * CF * Road segment length * 2 * No. of trucks/hr / [(365-P) / 365]

l. Annual Emissions (tpy) = (E [lb/VMT]) * CF * (VMT/year) * (ton/2,000 lb)

Table C-4. Unpaved Roads Potential Emissions

Description	Segment Type	Segment contribution[i]	Annual Emission Factor (E)[g] PM (lb/VMT)	PM$_{10}$ (lb/VMT)	PM$_{2.5}$ (lb/VMT)	Control Factor[h] [CF]	One-Way Road Segment Length[i] (miles)	Max. number of trucks/hr (trucks/hr)	Max. number of trucks/yr (trucks/yr)	Hourly Vehicle Miles Traveled [VMT][j] (miles/hr)	Annual Vehicle Miles Traveled [VMT][j] (miles/year)	Hourly Emissions[k] PM (lb/hr)	PM$_{10}$ (lb/hr)	PM$_{2.5}$ (lb/hr)	Annual Emissions[l] PM (tpy)	PM$_{10}$ (tpy)	PM$_{2.5}$ (tpy)
Limestone Handling Trucks	Unpaved	1	7.38	1.92	0.19	0.14	0.11	10	27,740	2.1	5,857.7	2.70	0.70	0.07	3.03	0.79	0.08
	Unpaved	2	7.38	1.92	0.19	0.14	0.59	10	27,740	11.9	32,949.5	15.19	3.95	0.40	17.03	4.43	0.44
	Unpaved	3	7.38	1.92	0.19	0.14	0.20	10	27,740	4.0	10,983.2	5.06	1.32	0.13	5.68	1.48	0.15
	Unpaved	5	7.38	1.92	0.19	0.14	1.00	10	27,740	20.1	55,648.0	25.66	6.68	0.67	28.76	7.48	0.75
	Unpaved	6	7.38	1.92	0.19	0.14	1.08	10	27,740	21.6	60,041.2	27.68	7.20	0.72	31.03	8.07	0.81
	Unpaved	7	7.38	1.92	0.19	0.14	1.06	10	27,740	21.1	58,576.8	27.01	7.03	0.70	30.28	7.88	0.79
	Unpaved	9	7.38	1.92	0.19	0.14	0.41	10	27,740	8.2	22,698.5	10.47	2.72	0.27	11.73	3.05	0.31
	Unpaved	10	7.38	1.92	0.19	0.14	0.26	10	27,740	5.3	14,644.2	6.75	1.76	0.18	7.57	1.97	0.20
	Unpaved	11	7.38	1.92	0.19	0.14	0.42	10	27,740	8.4	23,430.7	10.80	2.81	0.28	12.11	3.15	0.32
	Unpaved	12	7.38	1.92	0.19	0.14	1.11	10	27,740	22.2	61,505.7	28.36	7.38	0.74	31.79	8.27	0.83
		Total	--	--	--	--	--	--	--	--	--	56.04	14.58	1.46	62.83	16.35	1.63
Sandstone Hauling	Unpaved	4B	7.38	1.92	0.19	0.14	0.22	1	954	0.4	428.3	0.57	0.15	0.01	0.22	0.06	<0.01
		Total	--	--	--	--	--	--	--	--	--	0.57	0.15	0.01	0.22	0.06	<0.01
Bottom Ash Hauling	Unpaved	7B	7.38	1.92	0.19	0.14	1.06	1	779	2.1	1,644.1	2.70	0.70	0.07	0.85	0.22	0.02
		Total	--	--	--	--	--	--	--	--	--	2.70	0.70	0.07	0.85	0.22	0.02
CKD Hauling	Unpaved	1B	5.63	1.46	0.15	0.14	0.11	2	1,825	0.4	385.4	0.41	0.11	0.01	0.15	0.04	<0.01
	Unpaved	3B	5.63	1.46	0.15	0.14	0.20	2	1,825	0.8	722.6	0.77	0.20	0.02	0.28	0.07	<0.01
	Unpaved	10B	5.63	1.46	0.15	0.14	0.26	2	1,825	1.1	963.4	1.03	0.27	0.03	0.38	0.10	<0.01
	Unpaved	4B	5.63	1.46	0.15	0.14	0.22	2	1,825	0.9	818.9	0.87	0.23	0.02	0.32	0.08	<0.01
		Total	--	--	--	--	--	--	--	--	--	3.09	0.80	0.08	1.14	0.30	0.03
Water Trucks	Unpaved	1	5.76	1.50	0.15	0.14	0.11	2	17,520	0.4	3,700	0.42	0.11	0.01	1.49	0.39	0.04
	Unpaved	2	5.76	1.50	0.15	0.14	0.59	2	17,520	2.4	20,810	2.37	0.62	0.06	8.39	2.18	0.22
	Unpaved	3	5.76	1.50	0.15	0.14	0.20	2	17,520	0.8	6,937	0.79	0.21	0.02	2.80	0.73	0.07
	Unpaved	4	5.76	1.50	0.15	0.14	0.22	2	17,520	0.9	7,862	0.90	0.23	0.02	3.17	0.82	0.08
	Unpaved	5	5.76	1.50	0.15	0.14	1.00	2	17,520	4.0	35,147	4.00	1.04	0.10	14.16	3.69	0.37
	Unpaved	6	5.76	1.50	0.15	0.14	1.08	2	17,520	4.3	37,921	4.32	1.12	0.11	15.28	3.98	0.40
	Unpaved	7	5.76	1.50	0.15	0.14	1.06	2	17,520	4.2	36,996	4.21	1.10	0.11	14.91	3.88	0.39
	Unpaved	9	5.76	1.50	0.15	0.14	0.41	2	17,520	1.6	14,336	1.63	0.42	0.04	5.78	1.50	0.15
	Unpaved	10	5.76	1.50	0.15	0.14	0.26	2	17,520	1.1	9,249	1.05	0.27	0.03	3.73	0.97	0.10
	Unpaved	11	5.76	1.50	0.15	0.14	0.42	2	17,520	1.7	14,799	1.68	0.44	0.04	5.96	1.55	0.16
	Unpaved	12	5.76	1.50	0.15	0.14	1.11	2	17,520	4.4	38,846	4.42	1.15	0.12	15.66	4.07	0.41
		Total	--	--	--	--	--	--	--	--	--	25.80	6.71	0.67	91.32	23.76	2.38
Quarry 4 Overburden Hauling	Unpaved	13	7.38	1.92	0.19	0.14	0.33	2	51,951	1.3	34,283	1.69	0.44	0.04	17.72	4.61	0.46
Quarry 8 Overburden Hauling	Unpaved	3B	7.38	1.92	0.19	0.14	0.20	2	51,951	0.8	20,570	1.01	0.26	0.03	10.63	2.77	0.28
Quarry 17 Overburden Hauling	Unpaved	15	7.38	1.92	0.19	0.14	0.22	2	51,951	0.9	23,312	1.15	0.30	0.03	12.05	3.13	0.31
Quarry 15 Overburden Hauling	Unpaved	17	7.38	1.92	0.19	0.14	0.18	2	51,951	0.7	19,198	0.95	0.25	0.02	9.92	2.58	0.26
Maximum Unpaved Road Emissions												79.78	20.76	2.08	138.29	35.98	3.60

a. Particle Size Multipliers for the unpaved road segment per U.S. EPA, Unpaved Roads, AP-42 Section 13.2.2, November 2006, Table 13.2.2-2, Industrial Roads.
b. Silt content per NMED default.
c. Average Weight of on-site haul trucks as provided by GCC.
d. Constant "a" per U.S. EPA, Unpaved Roads, AP-42 Section 13.2.2, November 2006, Table 13.2.2-2, Industrial Roads.
e. Constant "b" per U.S. EPA, Unpaved Roads, AP-42 Section 13.2.2, November 2006, Table 13.2.2-2, Industrial Roads.
f. The number of days with at least 0.01 inches of precipitation per year per U.S. EPA, Unpaved Roads, AP-42 Section 13.2.2, November 2006, Figure 13.2.2-1.
g. Annual Emission factor for unpaved roads calculated per U.S. EPA, Unpaved Roads, AP-42 Section 13.2.2, November 2006, Equations 1a and 2.
E (lb/VMT) = [k * (s/12)a * (W/3)b] * [(365-P) / 365]
Hourly emissions adjusted to not take into account natural mitigation effects such as rainfall by dividing the estimated emissions by [(365-P) / 365].
h. Control factors calculated by assuming 86% control for unpaved roads as detailed in 2022 Title V renewal application.
i. Road segment lengths per site maps provided by GCC. Segments with "B" added represent non-limestone travel on the same road segments.
j. Hourly Vehicle Miles Traveled VMT = Max. number of trucks per hour x [One-way Road Segment Length (miles) x 2]
Annual Vehicle Miles Traveled VMT = Max. number of trucks per year x [One-way Road Segment Length (miles) x 2]
k. Hourly Emissions (lb/hr) based on (E [lb/VMT]) * CF * Road segment length * 2 * No. of trucks/hr / [(365-P) / 365]
l. Annual Emissions (tpy) = (E [lb/VMT]) * CF * (VMT/year) * (ton/2,000 lb)

Table C-5. Kilns emission summary

Pollutant	Emissions levels for each kiln lb/ton of clinker produced		Total kiln emissions	
	Short-term maximum	Annualized	(lb/hr)	(tpy)
NOx	--	[redacted]	975.00	1,518.87
SO_2	--	[redacted]	193.60	848.18
CO	--	[redacted]	1,348.00	1,446.54
TSP	[redacted]	[redacted]	83.34	57.84
PM_{10}	[redacted]	[redacted]	33.36	48.58
$PM_{2.5}$	[redacted]	[redacted]	17.88	26.03
THC	[redacted]	[redacted]	15.5	66.5

1. NOx, SO_2, CO, THC emission limits based on GCC plant-specific data and operations to account for operational variability. Short term emissions based on kiln emission rate variability instead of lb/ton emission factor.

2. Short-term maximum PM_{10} (filterable) lb/ton emissions calculated compliant with MACT limit (as effective during original Title V permit application in 1998) of 0.3 lb PM_{10} per ton of kiln feed from each kiln. A kiln feed to clinker ration of 1.65 was used.

TSP to PM_{10} ratio is based on site-specific kiln stack testing results = [redacted]

Annual TSP (PM) lb/ton clinker produced is based off of the PM_{alt} formula given in 40 CFR 63.1343(b)(2)

PM lb/hr	*13.21*
Exhaust concentration (gr/dscf)	*0.006*
Historic Maximum Stack Flowrate (dscfm)	*256,766*
Hour to Minute conversion	*60*
Conversion from grains to pounds	*7000*

3. Assumed that PM10/TSP per AP-42 Table 11.6-5 (1995) is: 84%
4. Assumed that PM2.5/TSP per AP-42 Table 11.6-5 (1995) is: 45%
5. Consistent with Authority to Construct Permit No. 2197-M1, exhausts from Clinker Cooler #1 and #2, Kiln #1 and #2 have been combined.
6. Hourly emissions estimated using the lb/ton emission rate and [redacted] as combined maximum hourly clinker production from the kilns at the facility.
7. Total annual kiln emissions calculated based on lb/ton emission level and a maximum clinker production of [redacted]

Table C-6. Overburden activities inputs

Density of topsoil =	103	lb/ft^3	
Quarry overburden area =	174,241	ft^2	4 acres of active disturbance maximum per 6/30/21 call with Sam Kretz (GCC)
	16,187.49	m^2	
Depth of overburden removal =	50	ft	
Hourly mass of overburden material removed =	420	tons/hr	[calculated as capacity of overburden trucks x 2 (conservatively accounts for two quarry locations) / time taken to load an overburden truck]
Daily amount of overburden material removed =	5,040	tons/day	[calculated as, hourly throughput (tons/hr) x daily operational hours (hrs/day)]
Annual mass of topsoil removed =	1,839,600	tons/yr	[calculated as, hourly throughput (tons/hr) x yearly operational hours (hrs/yr)]

Table C-7. Bulldozing overburden emissions

Description	Silt content s (%)	Moisture content, M (%)	Emission factor[a] PM[b] (lb/hr)	PM_{10}[c] (lb/hr)	$PM_{2.5}$[c] (lb/hr)	Annual hours (hrs/yr)	Annual Emissions[d] PM (ton/yr)	PM_{10} (ton/yr)	$PM_{2.5}$ (ton/yr)
Bulldozing operations in the quarry to remove overburden material in quarry area	7.5	9	3.68	0.71	0.07	4,380	8.05	1.56	0.16

a. Emission factor for bull dozing operations calculated per AP-42 Section 11.9, October 1998, Table 11.9-1, Western Surface Coal Mining

b. E_{PM} (lb/hr) = $5.7 \times (s)^{1.2} / (M)^{1.3}$

c. $E_{PM10} = 0.75 \times (s)^{1.5} / (M)^{1.4}$; $E_{PM2.5} = 0.105 \times 5.7 \times (s)^{1.2} / (M)^{1.3}$

where s = Material silt content (%) (mean silt content for overburden per AP42 Table 13.2.4-1) and M = material moisture content (%) (per plant data)

d. Annual emissions calculated as hourly emissions x 4380 hrs/yr of overburden operations.

Table C-8. Emissions estimate for overburden removal material handling

Description	Emission factor[a] PM (lb/ton)	PM_{10}[b] (lb/ton)	$PM_{2.5}$[b] (lb/ton)	Throughput Hourly (tons/hr)	Annual (tons/yr)	Control[c] (%)	Hourly Emissions[d] PM (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	Annual Emissions[e] PM (ton/yr)	PM_{10} (ton/yr)	$PM_{2.5}$ (ton/yr)
Removal of overburden topsoil material	0.058	0.020	0.003	420.00	1,839,600	90%	2.44	0.85	0.13	5.33	1.87	0.28

a. Emission factor from AP-42, Section 11.9, Table 11.9-4, dated 10/1998, topsoil removed by scraper

b. PM10/TSP and PM2.5/PM10 ratios of 0.35 and 0.15 respectively taken from WRAP Chapter 11, Mineral Products Industry (Page 3) http://www.wrapair.org/forums/dejf/fdh/content/Ch11-MineralProductsIndustry_Rev06.pdf

c. RBLC web page maintained by the EPA indicates that wet suppression will provide between 70-90% control efficiency. Upper bound of 90% control efficiency is assumed due to high moisture content of overburden material (9%)

d. Hourly emissions = lb/ton Emission factor x hourly throughput in tons/hr x (1 - control efficiency %)

e. Annual emissions = lb/ton Emission factor x annual throughput in tons/yr x (1 - control efficiency %) x 1 ton/2000 lb

Table C-9. Emissions estimate for loading of overburden into CAT 988/Komatsu 600 loader bucket

Description	Particle Size Multiplier[k][a] (dimensionless) PM	PM_{10}	$PM_{2.5}$	Emission factor[b] PM (lb/ton)	PM_{10} (lb/ton)	$PM_{2.5}$ (lb/ton)	Throughput Hourly[c] (tons/hr)	Annual (tons/yr)	Control[d] (%)	Hourly Emissions[e] PM (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	Annual Emissions[f] PM (ton/yr)	PM_{10} (ton/yr)	$PM_{2.5}$ (ton/yr)
Loading of CAT 988/Komatsu 600 loader with overburden	0.74	0.35	0.053	0.0006	0.0003	0.00005	420	1,839,600	0%	0.27	0.13	0.02	0.59	0.28	0.04

a. Particle Size Multipliers for the drop operations per AP-42 Section 13.2.4, November 2006, Equation 1.

b. Emission factor for drop operation calculated per AP-42 Section 13.2.4, November 2006, Equation 1

E (lb/ton) = $k \times (0.0032) \times (U/5)^{1.3} / (M/2)^{1.4}$; k = particle size multiplier; U = mean wind speed (miles per hour); M = material moisture content (%)

c. Hourly throughput is assumed to be equal to overburden maximum hourly throughput (=420 tons/hr)
d. Control for this loading operation is assumed to be 0%
e. Hourly emissions calculated as Emission factor (lb/ton) x (1-control %) x Hourly throughput (tons/hr)
f. Annual emissions calculated as Emission factor (lb/ton) x (1-control %) x Annual throughput (tons/yr) / 2000 lb/ton

Table C-10. Emissions estimate for unloading of overburden from CAT 988/Komatsu 600 loader bucket

Description	Particle Size Multiplier[k][a] (dimensionless)			Emission factor[b]			Throughput		Control[d]	Hourly Emissions[e]			Annual Emissions[f]		
	PM	PM_{10}	$PM_{2.5}$	PM (lb/ton)	PM_{10} (lb/ton)	$PM_{2.5}$ (lb/ton)	Hourly[c] (tons/hr)	Annual (tons/yr)	(%)	PM (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	PM (ton/yr)	PM_{10} (ton/yr)	$PM_{2.5}$ (ton/yr)
Unloading of overburden from CAT 988/Komatsu 600 loader to trucks	0.74	0.35	0.053	0.0006	0.0003	0.00005	420	1,839,600	0%	0.27	0.13	0.02	0.59	0.28	0.04

a. Particle Size Multipliers for the drop operations per AP-42 Section 13.2.4, November 2006, Equation 1.
b. Emission factor for drop operation calculated per AP-42 Section 13.2.4, November 2006, Equation 1
E (lb/ton) = k * (0.0032) * $(U/5)^{1.3}$ / $(M/2)^{1.4}$; k = particle size multiplier; U = mean wind speed (miles per hour); M = material moisture content (%)
c. Hourly throughput is assumed to be equal to overburden maximum throughput (=420 tons/hr)
d. Control for this loading operation is assumed to be 0%.
e. Hourly emissions calculated as Emission factor (lb/ton) x (1-control %) x Hourly throughput (tons/hr)
f. Annual emissions calculated as Emission factor (lb/ton) x (1-control %) x Annual throughput (tons/yr) / 2000 lb/ton

Table C-11. Emissions estimate for unloading of overburden from trucks to pit floor

Description	Emission factor[a]			Throughput		Control[d]	Hourly Emissions[e]			Annual Emissions[f]		
	PM[b] (lb/ton)	PM_{10} (lb/ton)	$PM_{2.5}$[b] (lb/ton)	Hourly[c] (tons/hr)	Annual (tons/yr)	(%)	PM (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	PM (ton/yr)	PM_{10} (ton/yr)	$PM_{2.5}$ (ton/yr)
Unloading of overburden from trucks	0.00005	0.000016	0.000002	420	1,839,600	0%	0.02	0.01	0.0010	0.042	0.015	0.002

a. Emission factor for truck unloading of fragmented stone per AP-42 Section 11.19.2, August 2004, Table 11.19.2-2
b. It is assumed that PM10 Emission Factor/PM Emission Factor =0.35 and the PM2.5/PM Emission Factor = 0.053 (from the ratio of particle size multipliers for drop operations per AP-42 Section 13.2.4, Equation 1)
c. Hourly throughput is assumed to be equal to maximum hourly overburden rate.
d. Control for this unloading operation is assumed to be 0%.
e. Hourly emissions calculated as Emission factor (lb/ton) x (1-control %) x Hourly throughput (tons/hr)
f. Annual emissions calculated as Emission factor (lb/ton) x (1-control %) x Annual throughput (tons/yr) / 2000 lb/ton

Table C-12. Drilling

Description	Source ID for modeling	Emission factor[a]			Annual throughput (tons/yr)	Hourly throughput (tons/hr)	Hourly Emissions[c]			Annual Emissions[d]		
		PM[b] (lb/ton)	PM_{10} (lb/ton)	$PM_{2.5}$[b] (lb/ton)			PM (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	PM (ton/yr)	PM_{10} (ton/yr)	$PM_{2.5}$ (ton/yr)
Drilling for limestone	DRILLING	0.00023	0.00008	0.00001	883,394	800	0.18	0.06	0.010	0.10	0.04	0.005

a. Emission factor for drilling calculated per AP-42 Section 11.19.2, August 2004, Table 11.19.2-2, Wet drilling - unfragmented stone
b. It is assumed that PM10 Emission Factor/PM Emission Factor =0.35 and the PM2.5/PM Emission Factor = 0.053 (from the ratio of particle size multipliers for drop operations per AP-42 Section 13.2.4, Equation 1)
c. Hourly emissions = lb/ton Emission factor x hourly throughput (ton/hr)
d. Annual emissions = lb/ton Emission factor x annual throughput (ton/yr) / 2000 lbs/ton

Table C-13. Emissions estimate for loading of limestone into CAT 988 or Komatsu 600 loader bucket

Description	Particle Size Multiplier[k][a] (dimensionless)			Emission factor[b]			Throughput		Control[d]	Hourly Emissions[e]			Annual Emissions[f]		
	PM	PM_{10}	$PM_{2.5}$	PM (lb/ton)	PM_{10} (lb/ton)	$PM_{2.5}$ (lb/ton)	Hourly[c] (tons/hr)	Annual (tons/yr)	(%)	PM (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	PM (ton/yr)	PM_{10} (ton/yr)	$PM_{2.5}$ (ton/yr)
Loading of CAT 988/ Komatsu 600 loader with limestone	0.74	0.35	0.053	0.0012	0.0006	0.00009	800	982,259	0%	0.97	0.46	0.07	0.60	0.28	0.04

a. Particle Size Multipliers for the drop operations per AP-42 Section 13.2.4, November 2006, Equation 1.
b. Emission factor for drop operation calculated per AP-42 Section 13.2.4, November 2006, Equation 1
$E\ (lb/ton) = k * (0.0032) * (U/5)^{1.3} / (M/2)^{1.4}$; k = particle size multiplier; U = mean wind speed (miles per hour); M = material moisture content (%)
Mean wind speed is assumed to be reduced by a factor of 50% to account for reduction in wind speed due to pit.
c. Hourly throughput is assumed to be equal to crusher's maximum throughput (=800 tons/hr)
d. Control for this loading operation is assumed to be 0%.
e. Hourly emissions calculated as Emission factor (lb/ton) x (1-control %) x Hourly throughput (tons/hr)
f. Annual emissions calculated as Emission factor (lb/ton) x (1-control %) x Annual throughput (tons/yr) / 2000 lb/ton

Table C-14. Emissions estimate for unloading of quarried limestone from CAT 988 or Komatsu 600 loader bucket to trucks

Description	Emission factor[a]			Throughput		Control[d]	Hourly Emissions[e]			Annual Emissions[f]		
	PM[b] (lb/ton)	PM_{10} (lb/ton)	$PM_{2.5}$ (lb/ton)	Hourly[c] (tons/hr)	Annual (tons/yr)	(%)	PM (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	PM (ton/yr)	PM_{10} (ton/yr)	$PM_{2.5}$ (ton/yr)
Unloading of quarried LS into	0.00005	0.000016	0.000002	800	982,259	50%	0.02	0.01	0.001	0.01	0.004	0.001

a. Emission factor for truck unloading of fragmented stone per AP-42 Section 11.19.2, August 2004, Table 11.19.2-2
b. It is assumed that PM10 Emission Factor/PM Emission Factor =0.35 and the PM2.5/PM Emission Factor = 0.053 (from the ratio of particle size multipliers for drop operations per AP-42 Section 13.2.4, Equation 1)
c. Hourly throughput is assumed to be equal to crusher maximum capacity (= 800 tons/hr)
d. Control for this unloading operation is assumed to be 50% based on reduction assumed for below-grade activity.
e. Hourly emissions calculated as Emission factor (lb/ton) x (1-control %) x Hourly throughput (tons/hr)
f. Annual emissions calculated as Emission factor (lb/ton) x (1-control %) x Annual throughput (tons/yr) / 2000 lb/ton

Table C-15. Total emissions for each quarry

Description	$PM_{2.5}$ (lb/hr)	PM_{10} (lb/hr)	PM (lb/hr)	$PM_{2.5}$ (tpy)	PM_{10} (tpy)	PM (tpy)
Quarry below grade	0.07	0.47	1.01	0.05	0.30	0.65
Quarry sub surface - with overburden activities	0.25	1.88	6.83	0.53	4.02	14.67
Quarry sub surface - without overburden activities	0.01	0.06	0.18	0.005	0.04	0.10
Total - with overburden activitie	**0.32**	**2.36**	**7.84**	**0.58**	**4.32**	**15.32**

Emission Unit 1-1 - $PM_{2.5}$, PM_{10}, and TSP Hourly And Annual Emissions

				Emission Factor[a]			Throughput[b]							
Emission Unit	DCP	Material	Process	$PM_{2.5}$ Emission Factor (lb/ton)	PM_{10} Emission Factor (lb/ton)	TSP Emission Factor (lb/ton)	Hourly Throughput (TPH)	Annual Throughput (TPY)	$PM_{2.5}$ Emissions (lb/hr)	$PM_{2.5}$ Emissions (TPY)	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (TPY)	TSP Emissions (lb/hr)	TSP Emissions (TPY)
1-1	Fugitive	Limestone, Sandstone and Bottom Ash	Dump Hopper	0.000159	0.001100	0.00300	800	1,043,623	0.127	0.083	0.88	0.57	2.40	1.57
Emission Unit 1-1 Total Emissions:								**1,043,623**	**0.13**	**0.08**	**0.88**	**0.57**	**2.40**	**1.57**

Notes:
a. TSP and PM_{10} Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2, uncontrolled conveyor transfer point. $PM_{2.5}$ emission factor derived from the TSP emission factor using particle size multipliers per AP-42 Section 13.2.4.
b. Hourly throughput is assumed to be equal to the maximum design capacity of the primary crusher. Annual throughput accounts for the sum of Limestone, Sandstone and Bottom Ash fed annually to the crusher.

Emission Units 1-2 through 1-4 - $PM_{2.5}$, PM_{10}, and TSP Hourly And Annual Emissions

				Basis For Emission Calculation				$PM_{2.5}$	PM_{10}	TSP
Emission Unit	DCP's	Material	Process	$PM_{2.5}$ Emission Rate (lb/hr)	PM_{10} Emission Rate (lb/hr)	TSP Emission Rate (lb/hr)	Annual Hours (hour/year)	Controlled Emissions (TPY)	Controlled Emissions (TPY)	Controlled Emissions (TPY)
1-2	1.1 - 1.3A	Limestone, Sandstone and Bottom Ash	Primary Crusher	0.01	0.06	0.18	8,760	0.04	0.28	0.79
1-3	1.3B, 1.7, 1.8	Limestone, Sandstone and Bottom Ash	Secondary Crusher	0.01	0.08	0.24	8,760	0.06	0.37	1.05
1-4	1.4, 1.5A/B, 1.6A/B, 1.9A/B	Limestone, Sandstone and Bottom Ash	Screens	0.03	0.22	0.63	8,760	0.15	0.97	2.76
Emission Units 1-2 through 1-4 Total Emissions:							**8,760**	**0.25**	**1.62**	**4.60**

Notes:
Emission Units 1-2, 1-3, and 1-4: TSP from emission testing - [redacted] respectively. Results for each multiplied [redacted]. PM_{10} assumed to be 0.35 of TSP. $PM_{2.5}$ assumed to be 0.053 times TSP, per particle size multipliers for drop operations listed in AP-42 Section 13.2.4, Equation 1).

Annual baghouse operating hours assumed to be = 8760 hrs/yr

Emission Unit 2-1 - $PM_{2.5}$, PM_{10} and TSP Hourly And Annual Emissions

Emission Unit	DCP	Material	Process	Basis For Emission Calculation[a] $PM_{2.5}$ Emission Factor (lb/ton)	PM_{10} Emission Factor (lb/ton)	TSP Emission Factor (lb/ton)	Throughput[b] Hourly Throughput (TPH)	Annual Throughput (TPY)	$PM_{2.5}$ Controlled Emissions (lb/hr)	$PM_{2.5}$ Controlled Emissions (TPY)	PM_{10} Controlled Emissions (lb/hr)	PM_{10} Controlled Emissions (TPY)	TSP Controlled Emissions (lb/hr)	TSP Controlled Emissions (TPY)
2-1	2.1	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
	2.2	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
	2.3	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
	2.4	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
	2.5	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
Emission Unit 2-1 Total Emissions:									**0.042**	**0.04**	**0.147**	**0.12**	**0.448**	**0.37**

Notes:

a. TSP, PM_{10} and $PM_{2.5}$ Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2 dated August 2004, controlled conveyor transfer point. Pounds per hour emission reflects that only four out of five transfer points are in operation at a time because hourly throughput is bounded by the capacity of the equipment. Ton per year emission calculations conservatively use all five transfer points operating and throughput is based on facility-wide throughput of raw materials handled instead of the maximum equipment capacity.

b. Hourly throughput is assumed to be equal to the maximum design capacity of the primary crusher. Annual throughput accounts for the sum of Limestone, Sandstone and Bottom Ash annual throughputs.

Emission Unit 2-2 - $PM_{2.5}$, PM_{10} and TSP Hourly And Annual Emissions

Emission Unit	DCP	Material	Process	Basis For Emission Calculation[a] $PM_{2.5}$ Emission Factor (lb/ton)	PM_{10} Emission Factor (lb/ton)	TSP Emission Factor (lb/ton)	Throughput[b] Hourly Throughput (TPH)	Annual Throughput (TPY)	$PM_{2.5}$ Controlled Emissions (lb/hr)	$PM_{2.5}$ Controlled Emissions (TPY)	PM_{10} Controlled Emissions (lb/hr)	PM_{10} Controlled Emissions (TPY)	TSP Controlled Emissions (lb/hr)	TSP Controlled Emissions (TPY)
2-2	2.6	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
	2.7	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
	2.8	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
	2.9	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
	2.10	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
Emission Unit 2-2 Total Emissions:									**0.042**	**0.035**	**0.147**	**0.120**	**0.448**	**0.365**

Notes:

a. TSP, PM_{10} and $PM_{2.5}$ Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2 dated August 2004, controlled conveyor transfer point. Pounds per hour emission reflects that only four out of five transfer points are in operation at a time because hourly throughput is bounded by the capacity of the equipment. Ton per year emission calculations conservatively use all five transfer points operating and throughput is based on facility-wide throughput of raw materials handled instead of the maximum equipment capacity.

b. Hourly throughput is assumed to be equal to the maximum design capacity of the primary crusher. Annual throughput accounts for the sum of Limestone, Sandstone and Bottom Ash annual throughputs.

Emission Unit 2-3 - $PM_{2.5}$, PM_{10} and TSP Hourly And Annual Emissions

Emission Unit	DCP	Material	Process	Basis For Emission Calculation[a]			Throughput[b]		$PM_{2.5}$ Controlled Emissions (lb/hr)	$PM_{2.5}$ Controlled Emissions (TPY)	PM_{10} Controlled Emissions (lb/hr)	PM_{10} Controlled Emissions (TPY)	TSP Controlled Emissions (lb/hr)	TSP Controlled Emissions (TPY)
				$PM_{2.5}$ Emission Factor (lb/ton)	PM_{10} Emission Factor (lb/ton)	TSP Emission Factor (lb/ton)	Hourly Throughput (TPH)	Annual Throughput (TPY)						
2-3	2.11	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
	2.12	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
	2.13	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
	2.14	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.04	0.02	0.11	0.07
	2.15	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	27,569	0.010	0.000	0.04	0.00	0.11	0.00
Emission Unit 2-3 Total Emissions:									**0.042**	**0.028**	**0.147**	**0.097**	**0.448**	**0.294**

Notes:

a. TSP, PM_{10} and $PM_{2.5}$ Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2 dated August 2004, controlled conveyor transfer point. Pounds per hour emission reflects that only four out of five transfer points are in operation at a time because hourly throughput is bounded by the capacity of the equipment. Ton per year emission calculations conservatively use all five transfer points operating and throughput is based on facility-wide throughput of raw materials handled instead of the maximum equipment capacity.

b. Hourly throughput is assumed to be equal to the maximum design capacity of the primary crusher. Annual throughput accounts for the sum of Limestone, Sandstone and Bottom Ash annual throughputs.

Emission Unit 2-4 - $PM_{2.5}$, PM_{10} and TSP Hourly And Annual Emissions

Emission Unit	DCP	Material	Process	Basis For Emission Calculation[a]			Throughput[b]		$PM_{2.5}$ Controlled Emissions (lb/hr)	$PM_{2.5}$ Controlled Emissions (TPY)	PM_{10} Controlled Emissions (lb/hr)	PM_{10} Controlled Emissions (TPY)	TSP Controlled Emissions (lb/hr)	TSP Controlled Emissions (TPY)
				$PM_{2.5}$ Emission Factor (lb/ton)	PM_{10} Emission Factor (lb/ton)	TSP Emission Factor (lb/ton)	Hourly Throughput (TPH)	Annual Throughput (TPY)						
2-4	2.16	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.037	0.024	0.11	0.07
	2.17	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.037	0.024	0.11	0.07
	2.18	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.037	0.024	0.11	0.07
	2.19	LS/ Sandstone/ Bottom Ash	Transfer Point	0.000013	0.000046	0.00014	800	1,043,623	0.010	0.007	0.037	0.024	0.11	0.07
Emission Unit 2-4 Total Emissions:									**0.042**	**0.028**	**0.147**	**0.096**	**0.448**	**0.292**

Notes:

a. TSP, PM_{10} and $PM_{2.5}$ Emission Factor based on AP42 Chapter 11.19.2, Table 11.19.2-2 dated August 2004, controlled conveyor transfer point.

b. Hourly throughput is assumed to be equal to the maximum design capacity of the primary crusher. Annual throughput accounts for the sum of Limestone, Sandstone and Bottom Ash annual throughputs.

Emission Unit 2-5 - $PM_{2.5}$, PM_{10} and TSP Hourly And Annual Emissions

				Basis For Emission Calculation[a]			Throughput[b]							
Emission Unit	DCP	Material	Process Description	$PM_{2.5}$ Emission Factor (lb/ton)	PM_{10} Emission Factor (lb/ton)	TSP Emission Factor (lb/ton)	Hourly Throughput (TPH)	Annual Throughput (TPY)	$PM_{2.5}$ Emissions (lb/hr)	$PM_{2.5}$ Emissions (TPY)	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (TPY)	TSP Emissions (lb/hr)	TSP Emissions (TPY)
2-5	Fugitive	Iron	Transfer Point	0.00016	0.0011	0.00300	80	12,794	0.0127	0.0010	0.088	0.0070	0.24	0.0192
		Gypsum	Transfer Point	0.00016	0.0011	0.00300	120	44,839	0.0191	0.0036	0.132	0.0247	0.36	0.0673
		Pumice	Transfer Point	0.00016	0.0011	0.00300	120	73,000	0.0191	0.0058	0.132	0.0402	0.36	0.1095
Emission Unit 2-5 Total Emissions:								**130,633**	**0.019**	**0.010**	**0.132**	**0.072**	**0.360**	**0.196**

Notes:

a. TSP and PM_{10} Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2, dated August 2004, uncontrolled conveyor transfer point. $PM_{2.5}$ emission factor derived from TSP emission factor using particle size multipliers per AP-42 Section 13.2.4, dated November 2006.

b. Hourly and annual throughputs for Iron and Gypsum additive systems used to calculate hourly and annual emissions. At any given time, only iron or gypsum can be transferred, therefore, for the short-term basis, the maximum hourly emissions associated with the transfer of either gypsum or iron is assumed.

Emission Unit 2-6 - $PM_{2.5}$, PM_{10} and TSP Hourly And Annual Emissions

				Basis For Emission Calculation[a]			Throughput[b]		$PM_{2.5}$	$PM_{2.5}$	PM_{10}	PM_{10}	TSP	TSP
Emission Unit	DCP	Material	Process Description	$PM_{2.5}$ Emission Factor (lb/ton)	PM_{10} Emission Factor (lb/ton)	TSP Emission Factor (lb/ton)	Hourly Throughput (TPH)	Annual Throughput (TPY)	Controlled Emissions (lb/hr)	Controlled Emissions (TPY)	Controlled Emissions (lb/hr)	Controlled Emissions (TPY)	Controlled Emissions (lb/hr)	Controlled Emissions (TPY)
2-6	2.20	Gypsum	Transfer Point	0.000013	0.000046	0.00014	120	44,839	0.0016	0.00029	0.006	0.001	0.017	0.003
		Iron	Transfer Point	0.000013	0.000046	0.00014	80	12,794	0.0010	0.000083	0.004	0.00029	0.011	0.00090
		Pumice	Transfer Point	0.000013	0.000046	0.00014	120	73,000	0.0016	0.000475	0.006	0.00168	0.017	0.00511
						DCP 2.20 Total:		***130,633***	***0.0016***	***0.0008***	***0.006***	***0.003***	***0.017***	***0.009***
	2.21	Gypsum	Transfer Point	0.000013	0.000046	0.00014	120	44,839	0.0016	0.0003	0.006	0.001	0.017	0.003
		Iron	Transfer Point	0.000013	0.000046	0.00014	80	12,794	0.0010	0.000083	0.004	0.00029	0.011	0.00090
		Pumice	Transfer Point	0.000013	0.000046	0.00014	120	73,000	0.0016	0.000475	0.006	0.00168	0.017	0.00511
						DCP 2.21 Total:		***130,633***	***0.0016***	***0.0008***	***0.006***	***0.003***	***0.017***	***0.009***
	2.22	Gypsum	Transfer Point	0.000013	0.000046	0.00014	120	44,839	0.0016	0.0003	0.006	0.0010	0.017	0.003
		Iron	Transfer Point	0.000013	0.000046	0.00014	80	12,794	0.0010	0.000083	0.004	0.00029	0.011	0.00090
		Pumice	Transfer Point	0.000013	0.000046	0.00014	120	73,000	0.0016	0.000475	0.006	0.00168	0.017	0.00511
						DCP 2.22 Total:		***130,633***	***0.0016***	***0.0008***	***0.006***	***0.003***	***0.017***	***0.009***
	2.23	Gypsum	Transfer Point	0.000013	0.000046	0.00014	120	44,839	0.0016	0.0003	0.006	0.001	0.017	0.003
		Iron	Transfer Point	0.000013	0.000046	0.00014	80	12,794	0.0010	0.000083	0.004	0.00029	0.011	0.00090
		Pumice	Transfer Point	0.000013	0.000046	0.00014	120	73,000	0.0016	0.000475	0.006	0.00168	0.017	0.00511
						DCP 2.23 Total:		***130,633***	***0.0016***	***0.0008***	***0.006***	***0.003***	***0.017***	***0.009***
Emission Unit 2-6 Total Emissions:								**522,532**	***0.0062***	***0.00340***	***0.022***	***0.0120***	***0.067***	***0.037***

Notes:

a. TSP, PM_{10} and $PM_{2.5}$ Emission Factor based on AP42 Chapter 11.19.2, Table 11.19.2-2, dated August 2004, controlled conveyor transfer point.

b. Hourly and annual throughputs for Iron and Gypsum additive systems used to calculate hourly and annual emissions. At any given time, only iron or gypsum can be transferred, therefore, for the short-term basis, the maximum hourly emissions associated with the transfer of either gypsum or iron is assumed.

Emission Unit 2-7 - $PM_{2.5}$, PM_{10} and TSP Hourly And Annual Emissions

Emission Unit	DCP	Material	Process Description	Basis For Emission Calculation: $PM_{2.5}$ Emission Rate (lb/hr)	PM_{10} Emission Rate (lb/hr)	TSP Emission Rate (lb/hr)	Annual Hours (hour/year)	$PM_{2.5}$ Controlled Emissions (TPY)	PM_{10} Controlled Emissions (TPY)	TSP Controlled Emissions (TPY)
2-7	2.24	Gypsum	Elevator/Trans.	0.0053	0.0350	0.10	8,760	0.023	0.153	0.438
		Iron	Elevator/Trans.	0.0053	0.0350	0.10	8,760	0.023	0.153	0.438
		Pumice	Elevator/Trans.	0.0053	0.0350	0.10	8,760	0.023	0.153	0.438
							DCP 2.24 Total:	***0.069***	***0.459***	***1.314***

Emission Unit	DCP	Material	Process Description	Basis For Emission Calculation: $PM_{2.5}$ Emission Factor (lb/ton)	PM_{10} Emission Factor (lb/ton)	TSP Emission Factor (lb/ton)	Hourly Throughput (ton/hr)	Annual Throughput (TPY)	$PM_{2.5}$ Controlled Emissions (lb/hr)	$PM_{2.5}$ Controlled Emissions (TPY)	PM_{10} Controlled Emissions (lb/hr)	PM_{10} Controlled Emissions (TPY)	TSP Controlled Emissions (lb/hr)	TSP Controlled Emissions (TPY)
2-7	2.25	Gypsum	Transfer Point	0.000013	0.000046	0.00014	120	44,839	0.0016	0.0003	0.0055	0.0010	0.017	0.003
		Iron	Transfer Point	0.000013	0.000046	0.00014	80	12,794	0.0010	0.0001	0.0037	0.0003	0.011	0.001
		Pumice	Transfer Point	0.000013	0.000046	0.00014	120	73,000	0.0016	0.0005	0.0055	0.0017	0.017	0.005
						DCP 2.25 Total:		***130,633***	***0.0016***	***0.0009***	***0.0055***	***0.0030***	***0.0168***	***0.009***
						Emission Unit 2-7 Total Emissions:			**0.0069**	**0.0700**	**0.04**	**0.46**	**0.12**	**1.32**

Notes:

DCP 2.24: Emission Factor Derivation

1. Elevator Emission Factor - The Elevator emission factor is based on results of emission testing of a simular unit having [redacted]. PM_{10} emissions were derived by multiplying TSP results by [redacted]. These results were then muliplied by a conservative factor of [redacted]. $PM_{2.5}$ was assumed to be [redacted]. TSP was assumed to be [redacted]. PM_{10} and $PM_{2.5}$ emission factors derived from the TSP emission factor using the $PM_{10}/PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.

2. Hourly and annual throughputs for Iron and Gypsum additive systems used to calculate hourly and annual emissions. At any given time, only iron or gypsum can be transferred, therefore, for the short-term basis, the maximum hourly emissions associated with the transfer of either gypsum or iron is assumed.

3. Annual hours of operation for DCP 2.24 assumed to be = 8760

DCP 2.25: Emission Factor Derivation

1. TSP, PM_{10} and $PM_{2.5}$ Emission Factor based on AP42 Chapter 11.19.2, Table 11.19.2-2, dated August 2004, controlled conveyor transfer point.

Emission Unit 2-8 - $PM_{2.5}$, PM_{10} and TSP Hourly And Annual Emissions

Emission Unit	DCP	Material	Process Description	Basis For Emission Calculation[a] $PM_{2.5}$ Emission Factor (lb/ton)	PM_{10} Emission Factor (lb/ton)	TSP Emission Factor (lb/ton)	Hourly Throughput (TPH)	Annual Throughput (TPY)	$PM_{2.5}$ Controlled Emissions (lb/hr)	$PM_{2.5}$ Controlled Emissions (TPY)	PM_{10} Controlled Emissions (lb/hr)	PM_{10} Controlled Emissions (TPY)	TSP Controlled Emissions (lb/hr)	TSP Controlled Emissions (TPY)
2-8	2.26	Gypsum	Transfer Point	0.000013	0.000046	0.00014	120	44,839	0.0016	0.0003	0.006	0.001	0.017	0.003
		Iron	Transfer Point	0.000013	0.000046	0.00014	80	12,794	0.0010	0.0001	0.004	0.000	0.011	0.001
		Pumice	Transfer Point	0.000013	0.000046	0.00014	120	73,000	0.0016	0.0005	0.006	0.002	0.017	0.005
						DCP 2.26 Total:		***130,633***	***0.0016***	***0.0009***	***0.0055***	***0.0030***	***0.0168***	***0.0090***
						Emission Unit 2-8 Total Emissions:			***0.0016***	***0.0009***	***0.0055***	***0.0030***	***0.0168***	***0.0090***

Notes: a. TSP, PM_{10} and $PM_{2.5}$ Emission Factor based on AP42 Chapter 11.19.2, Table 11.19.2-2, dated August 2004, controlled conveyor transfer point. At any given time, only iron or gypsum can be transferred, therefore, for the short-term basis, the maximum hourly emissions associated with the transfer of either gypsum or iron is assumed.

Emission Units 2-9 and 2-10 - $PM_{2.5}$, PM_{10} and TSP Hourly And Annual Emissions

Emission Unit	DCP's	Material	Process Description	Basis For Emission Calculation[a] $PM_{2.5}$ Emission Rate (lb/hr)	PM_{10} Emission Rate (lb/hr)	TSP Emission Rate (lb/hr)	Annual Hours (hour/year)	$PM_{2.5}$ Controlled Emissions (TPY)	PM_{10} Controlled Emissions (TPY)	TSP Controlled Emissions (TPY)
2-9	2.27 - 2.33	Raw Mill Feed	Transfer Points	0.04	0.44	0.74	8,760	0.17	1.92	3.24
2-10	2.34 - 2.40	Raw Mill Feed	Transfer Points	0.04	0.44	0.74	8,760	0.17	1.92	3.24
Emission Units 2-9 and 2-10 Total Emissions:								**0.34**	**3.85**	**6.48**

Notes: a. Emission Units 2-9 and 2-10: Results of Emission Testing on #2 Raw Mill Feed System at a [redacted] Results used for #1 Raw Mill Feed System as well. 2-10 Test Results = [redacted]. $PM_{2.5}$ emission factor derived from the TSP emission factor using the $PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006. These hourly emission rates were then scaled up to a raw mill feed rate of 63.25 tons/hr.

Emission Unit 2-11 - $PM_{2.5}$, PM_{10} and TSP Hourly And Annual Emissions

Emission Unit	DCP	Material	Process Description	Basis For Emission Calculation: $PM_{2.5}$ Emission Factor (lb/ton)	PM_{10} Emission Factor (lb/ton)	TSP Emission Factor (lb/ton)	Hourly Throughput (TPH)	Annual Throughput (TPY)	$PM_{2.5}$ Controlled Emissions (lb/hr)	$PM_{2.5}$ Controlled Emissions (TPY)	PM_{10} Controlled Emissions (lb/hr)	PM_{10} Controlled Emissions (TPY)	TSP Controlled Emissions (lb/hr)	TSP Controlled Emissions (TPY)
2-11	Fugitive	Clinker	Dump Hopper	0.00016	0.0011	0.0030	120	25,000	0.0191	0.0020	0.1320	0.0138	0.3600	0.0380
Emission Unit 2-11 Total Emissions:									***0.0191***	***0.0020***	***0.1320***	***0.0138***	***0.3600***	***0.0380***

Notes: a. TSP and PM_{10} Emission Factor based on AP-42 Chapter 11.19.2, Table 11.19.2-2, dated August 2004, uncontrolled conveyor transfer point. $PM_{2.5}$ emission factor derived from the TSP emission factor using the $PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.

Emission Units 3-1 through 3-4 - $PM_{2.5}$, PM_{10}, TSP, NOx, And CO Hourly And Annual Emissions

Emission Unit	DCP's	Material	Process	Basis For Emission Calculation: $PM_{2.5}$ Emission Rate (lb/hr)	PM_{10} Emission Rate (lb/hr)	TSP Emission Rate (lb/hr)	NOx Emiss. Rate (lb/hr)	CO Emiss. Rate (lb/hr)	Annual Hours (hour/year)	$PM_{2.5}$ Controlled Emissions (TPY)	PM_{10} Controlled Emissions (TPY)	TSP Controlled Emissions (TPY)	NOx Controlled Emissions (TPY)	CO Controlled Emissions (TPY)
3-1	3.1A/B, 3.2A/B	Raw Mill Feed	#1 Raw Mill Air Seperator	0.11	0.76	2.06	0.00	0.00	8,760	0.48	3.31	9.01	0.00	0.00
3-2	3.3	Raw Mill Feed	#1 Raw Mill	0.03	0.44	0.53	0.00	0.00	8,760	0.12	1.91	2.32	0.00	0.00
3-3	3.4A/B	Raw Mill Feed	#2 Raw Mill Air Seperator	0.11	0.76	2.06	0.00	0.00	8,760	0.48	3.31	9.01	0.00	0.00
3-4	3.5	Raw Mill Feed	#2 Raw Mill	0.03	0.44	0.53	0.00	0.00	8,760	0.12	1.91	2.32	0.00	0.00
Emission Units 3-1 through 3-4 Total Emissions:										**1.20**	**10.44**	**22.66**	**0.00**	**0.00**

Notes:

- Emission Units 3-1 and 3-3: Results of Emission Testing on #2 Raw Mill System at a processing rate [redacted]. Results assumed to represent #1 Raw Mill System as well. 3-3 Test Results = [redacted] These hourly emission rate values were then scaled-up based [redacted]. $PM_{2.5}$ emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006. Raw mill dryers (units 3-1 and 3-3) are no longer operating as of June 2021 but baghouses associated with these units are in operation. Therefore the NOx and CO emissions are set to zero but no change is claimed for particulate emissions.

- Emission Units 3-2 and 3-4: Results of Emission Testing on #2 Raw Mill System at a processing rate [redacted]. Results assumed to represent #1 Raw Mill System as well. 3-4 Test Results = [redacted]4. These hourly emission rate values were then scaled-up based [redacted]. $PM_{2.5}$ emission factor derived from the TSP emission factor using the PM2.5 particle size multiplier per AP-42, Section 13.2.4 dated November 2006.

- Annual raw mill hours assumed to be 8,760 hrs/yr.

Emission Units 4-1 through 4-6 - PM2.5, PM10, And TSP Hourly And Annual Emissions

Emission Unit	DCP's	Material	Process	Basis For Emission Calculation: PM2.5 Emiss. Rate (lb/hr)	Basis For Emission Calculation: PM10 Emiss. Rate (lb/hr)	Basis For Emission Calculation: TSP Emiss. Rate (lb/hr)	Basis For Emission Calculation: Annual Hours (hour/year)	PM2.5 Controlled Emissions (TPY)	PM10 Controlled Emissions (TPY)	TSP Controlled Emissions (TPY)
4-1	4.1	Kiln Feed	Blending Silos #1, #3	0.02	0.13	0.36	8,760	0.08	0.55	1.58
4-2	4.2	Kiln Feed	Blending Silos #2,#4	0.02	0.13	0.36	8,760	0.08	0.55	1.58
4-3	4.3, 4.4	Kiln Feed	Kiln Feed Elevator 4-1	0.01	0.04	0.12	8,760	0.03	0.19	0.55
4-4	4.5, 4.6	Kiln Feed	Kiln Feed Elevator 4-2	0.01	0.04	0.12	8,760	0.03	0.19	0.55
4-5	4.7/4.8	Kiln Feed	#1 Kiln Feed Elevator	0.01	0.18	0.51	8,760	0.04	0.78	2.23
4-6	4.9/4.8	Kiln Feed	#2 Kiln Feed Elevator	0.01	0.18	0.51	8,760	0.04	0.78	2.23
Emission Units 4-1 through 4-6 Total Emissions:								**0.30**	**3.04**	**8.72**

Notes:

- Emission Units 4-1 and 4-2: Results of TSP Emission Testing on 4-1 indicate [redacted]. Results assumed to represent emissions for 4-2 as well. [redacted] These hourly emission rate values were then scaled-up [redacted]. PM_{10} and $PM_{2.5}$ emission factors derived from the TSP emission factor using the $PM_{10}/PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.
- Emission Units 4-3 and 4-4: Results of TSP Emission Testing on 4-4 indicate [redacted]. Results assumed to represent emissions for 4-3 as well. [redacted]. These hourly emission rate values were then scaled-up [redacted]. PM_{10} and $PM_{2.5}$ emission factors derived from the TSP emission factor using the $PM_{10}/PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.
- Emission Units 4-5 and 4-6: Results of TSP Emission Testing on 4-5 indicate [redacted]. Results assumed to represent emissions for 4-6 as well and [redacted] These hourly emission rate values were then scaled-up [redacted]. PM_{10} and $PM_{2.5}$ emission factors derived from the TSP emission factor using the $PM_{10}/PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.

Emission Units 5-1 and 5-2 - PM2.5, PM10, And TSP Hourly And Annual Emissions

Emission Unit	DCP	Material	Process	Basis For Emission Calculation: PM2.5 Emiss. Factor (lb/ton)	PM10 Emiss. Factor (lb/ton)	TSP Emiss. Factor (lb/ton)	Hourly Throughput (TPH)	Annual Throughput (TPY)	PM2.5 Controlled Emissions (lb/hr)	PM2.5 Controlled Emissions (TPY)	PM10 Controlled Emissions (lb/hr)	PM10 Controlled Emissions (TPY)	TSP Controlled Emissions (lb/hr)	TSP Controlled Emissions (TPY)
5-1	5.3A/B	Clinker	Material Transfer	0.000013	0.000046	0.00014	33.7	295,212	0.000	0.002	0.002	0.01	0.00	0.02
5-2	5.4A/B	Clinker	Material Transfer	0.000013	0.000046	0.00014	153.7	320,212	0.002	0.002	0.007	0.01	0.02	0.02
Emission Units 5-1 and 5-2 Total Emissions:									**0.002**	**0.004**	**0.009**	**0.014**	**0.026**	**0.043**

Notes:

-TSP, PM10, and PM2.5 emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for a controlled conveyor transfer point.

- The throughput of material through each emission unit is based on the output of clinker from each kiln system assuming **33.7** TPH production rate and 8,760 hours/year utilization. In addition, emission unit 5-2 is assumed to provide dust collection for reclaiming an additional 25,000 TPY of clinker from outside storage (at a maximum hourly rate of 120 tons/hr).

Emission Units 5-3 through 5-10 -PM2.5, PM10, And TSP Hourly And Annual Emissions

Emission Unit	DCP's	Material	Process	Basis For Emission Calculation: PM2.5 Emiss. Rate (lb/hr)	PM10 Emiss. Rate (lb/hr)	TSP Emiss. Rate (lb/hr)	Annual Hours (hour/year)	PM2.5 Controlled Emissions (TPY)	PM10 Controlled Emissions (TPY)	TSP Controlled Emissions (TPY)
5-3	5.1	Clinker	#1 Clinker Cooler	0.98	1.85	4.63				
5-4	5.1	Clinker	#1 Clinker Cooler	0.98	1.85	4.63	8,760	12.82	24.35	60.84
5-5	5.1	Clinker	#1 Clinker Cooler	0.98	1.85	4.63				
5-6	5.1	Clinker	#1 Clinker Cooler	0.98	1.85	4.63				
5-7	5.2	Clinker	#2 Clinker Cooler	0.98	1.85	4.63				
5-8	5.2	Clinker	#2 Clinker Cooler	0.98	1.85	4.63	8,760	12.82	24.35	60.84
5-9	5.2	Clinker	#2 Clinker Cooler	0.98	1.85	4.63				
5-10	5.2	Clinker	#2 Clinker Cooler	0.98	1.85	4.63				
Emission Units 5-3 through 5-10 Total Emissions:								**25.64**	**48.71**	**121.67**

Notes:

- Emission Units 5-3 through 5-6 (#1 Clinker Cooler) and Emission Units 5-7 through 5-10 (#2 Clinker Cooler): PM$_{10}$ hourly emissions are calculated to demonstrate compliance with the MACT limit of 0.1 lb PM$_{10}$ per ton of kiln feed from each clinker cooler system. Each clinker cooler system is controlled by four DC sub-units (5-3 through 5-6 for Clinker Cooler #1 and 5-7 through 5-10 for Clinker Cooler #2). Typically, only three out of four units are operated at a time, therefore estimated hourly emissions are divided by three for each of the four DC sub-units corresponding to a given clinker cooler. A kiln feed to clinker ratio of 1.65 was used.

[redacted] [redacted] [redacted] [redacted]

Per AP42 Section 11.6, Table 11.6-6 (average particle size distribution for Portland Cement clinker coolers), PM$_{2.5}$/PM$_{10}$ = 0.53

Emission Units 5-11 through 5-15 - PM2.5, PM10, And TSP Hourly And Annual Emissions

Emission Unit	DCP	Material	Process	Basis For Emission Calculation: PM2.5 Emiss. Factor (lb/ton)	PM10 Emiss. Factor (lb/ton)	TSP Emiss. Factor (lb/ton)	Hourly Throughput (TPH)	Annual Throughput (TPY)	PM2.5 Controlled Emissions (lb/hr)	PM2.5 Controlled Emissions (TPY)	PM10 Controlled Emissions (lb/hr)	PM10 Controlled Emissions (TPY)	TSP Controlled Emissions (lb/hr)	TSP Controlled Emissions (TPY)
5-12	Fugitive	Coal	Drive Over Hopper	4.64E-05	3.06E-04	6.48E-04	300	96,436	0.014	0.002	0.092	0.015	0.19	0.031
			Emission Unit 5-12 Total Emissions:					**96,436**	**0.014**	**0.002**	**0.092**	**0.015**	**0.194**	**0.031**
5-13	5.5	Coal	Material Transfer	6.33E-06	4.18E-05	8.84E-05	300	96,436	1.90E-06	3.05E-07	1.25E-05	2.01E-06	2.65E-05	4.26E-06
	5.6	Coal	Coal Crushing	1.00E-04	5.40E-04	1.20E-03	300	96,436	3.00E-02	4.82E-03	1.62E-01	2.60E-02	3.60E-01	5.79E-02
	5.6	Coal	Material Transfer	6.33E-06	4.18E-05	8.84E-05	300	96,436	1.90E-06	3.05E-07	1.25E-05	2.01E-06	2.65E-05	4.26E-06
			Emission Units 5-13 Total Emissions:					**96,436**	**3.00E-02**	**4.82E-03**	**1.62E-01**	**2.60E-02**	**3.60E-01**	**5.79E-02**
5-14	5.7	Coal	Material Transfer	6.33E-06	4.18E-05	8.84E-05	300	96,436	1.90E-06	3.05E-07	1.25E-05	2.01E-06	2.65E-05	4.26E-06
	5.8	Coal	Material Transfer	6.33E-06	4.18E-05	8.84E-05	300	96,436	1.90E-06	3.05E-07	1.25E-05	2.01E-06	2.65E-05	4.26E-06
			Emission Unit 5-14 Total Emissions:					**96,436**	**3.80E-06**	**6.10E-07**	**2.51E-05**	**4.03E-06**	**5.30E-05**	**8.52E-06**
5-15	5.9	Coal	Material Transfer	6.33E-06	4.18E-05	8.84E-05	300	96,436	1.90E-06	3.05E-07	1.25E-05	2.01E-06	2.65E-05	4.26E-06
	5.10	Coal	Material Transfer	6.33E-06	4.18E-05	8.84E-05	300	96,436	1.90E-06	3.05E-07	1.25E-05	2.01E-06	2.65E-05	4.26E-06
	5.11	Coal	Material Transfer	6.33E-06	4.18E-05	8.84E-05	5	43,800	3.16E-08	1.39E-07	2.09E-07	9.15E-07	4.42E-07	1.93E-06
	5.12	Coal	Material Transfer	6.33E-06	4.18E-05	8.84E-05	5	43,800	3.16E-08	1.39E-07	2.09E-07	9.15E-07	4.42E-07	1.93E-06
			Emission Unit 5-15 Total Emissions:					**96,436**	**3.86E-06**	**8.87E-07**	**2.55E-05**	**5.86E-06**	**5.39E-05**	**1.24E-05**
		Emission Units 5-11 through 5-15 Total Emissions:							**4.39E-02**	**7.06E-03**	**2.54E-01**	**4.08E-02**	**5.55E-01**	**8.91E-02**

Notes:

- Emission Unit 5-11 is an indoor hopper, therefore no emissions are estimated from this source.
- For Emission Unit 5-12 TSP, PM10, and PM2.5 emission factors were calculated from AP-42 Section 13.2.4, dated November 2006, assuming windspeed of 9.3 mph and coal moisture content of 4.7%. 50% control is assumed because this emission unit is protected by a structure from prevailing winds.
- For Emission Units 5-13, 5-14, 5-15 TSP, PM10, and PM2.5 emission factors were calculated from AP-42 Section 13.2.4, dated November 2006, assuming windspeed of 1 mph and coal moisture content of 4.7%. Dust collector efficiency assumed to be 99.9% for material transfer processes.
- For Crushing, emission factors per AP-42, Section 11.19.2.Table 11.19.2-2, (August 2004). The crusher is completely enclosed, therefore emissions from these equipment are believed to be controlled.
- Emissions collected by dust collection points 5.11 and 5.12 are based upon the hourly and annual quantity of coal consumed by each kiln system.

Emission Unit 6-3 Through 6-7 - PM2.5, PM10, and TSP Hourly And Annual Emissions

Emission Unit	DCP	Material	Process	Basis For Emission Calculation: PM2.5 Emiss. Factor (lb/ton)	PM10 Emiss. Factor (lb/ton)	TSP Emiss. Factor (lb/ton)	Hourly Throughput (TPH)	Annual Throughput (TPY)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (TPY)	PM10 Emissions (lb/hr)	PM10 Emissions (TPY)	TSP Emissions (lb/hr)	TSP Emissions (TPY)
6-3	6.3	Emission Unit 6-1 Kiln Dust To Pelletizer	Elevator	0.025	0.47	0.73	7	1,250	0.002	0.0002	0.033	0.003	0.051	0.005
		Emission Unit 6-2 Kiln Dust To Pelletizer	Elevator	0.025	0.47	0.73	14	1,250	0.003	0.0002	0.066	0.003	0.102	0.005
		Kiln Dust From #1 Dust Bin To Dust Dump	Elevator	0.025	0.47	0.73	0	0	0.000	0.0000	0.000	0.0000	0.000	0.000
		Recycled Dust From Emission Unit 6-1	Elevator	0.025	0.47	0.73	7	58,844	0.002	0.007	0.033	0.138	0.051	0.215
			Emission Unit 6-3 Total Emissions:					**61,344**	**0.003**	**0.01**	**0.066**	**0.14**	**0.102**	**0.22**
6-4	6.5	Kiln Dust From #2 Dust Bin To Dust Dump	Elevator	0.025	0.47	0.73	0	0	0.000	0.0000	0.000	0.0000	0.000	0.000
		Recycled Dust From Emission Unit 6-2	Elevator	0.025	0.47	0.73	7	60,094	0.002	0.007	0.033	0.141	0.051	0.219
			Emission Unit 6-4 Total Emissions:					**60,094**	**0.002**	**0.01**	**0.033**	**0.14**	**0.051**	**0.22**
6-5	Fugitive	Kiln Dust From #1 Dust Bin						EMISSION UNIT DOES NOT EXIST						
			Emission Unit 6-5 Total Emissions:					**0**	**0.000**	**0.00000**	**0.00**	**0.0000**	**0.00**	**0.0000**
6-6	Fugitive	Kiln Dust From #2 Dust Bin						EMISSION UNIT DOES NOT EXIST						
			Emission Unit 6-6 Total Emissions:					**0**	**0.000**	**0.00000**	**0.00**	**0.0000**	**0.00**	**0.0000**
6-7	Fugitive	Dust Pellets From Pelletizer	Transfer	0.00016	0.0011	0.0030	14	3,125	0.002	0.0002	0.02	0.002	0.04	0.005
			Emission Unit 6-7 Total Emissions:					**3,125**	**0.002**	**0.0002**	**0.02**	**0.002**	**0.04**	**0.005**

Notes:

- Emission Units 6-3 and 6-4: AP-42 Emiss Fac. From AP-42 Section 11.12, Table 11.12-2, Cement unloading to elevated storage silo (pneumatic). PM2.5 is 0.053 * PM, from the particle size multipliers for drop operations per AP-42 Section 13.2.4, Equation 1). Emission Units are assumed to have 99% Control Efficiency.

- Modeling assumed that both 6-3 and 6-4 were in operation. If dust is being transferred to the pelletizer from 6-2, then 6-4 is not in operation and 6-3 would have 2x emissions. This is equivalent in emissions to having both 6-3 and 6-4 in operation.

- Emission Unit 6-7: TSP and PM10 Emission Factor from AP-42 Section 11.19.2, Table 11.19.2-2, dated August 2004, uncontrolled conveyor transfer point. PM2.5 is 0.053 * PM, from the particle size multipliers for drop operations per AP-42 Section 13.2.4, Equation 1)

Emission Units 7-1 through 7-11 And 7-14 - PM2.5, PM10, And TSP Hourly And Annual Emissions

				Basis For Emission Calculation										
Emission Unit	DCP	Material	Process	PM2.5 Emiss. Factor (lb/ton)	PM10 Emiss. Factor (lb/ton)	TSP Emiss. Factor (lb/ton)	Hourly Throughput (TPH)	Annual Throughput (TPY)	PM2.5 Contrld (lb/hr)	PM2.5 Contrld (TPY)	PM10 Contrld (lb/hr)	PM10 Contrld (TPY)	TSP Contrld (lb/hr)	TSP Contrld (TPY)
7-1	7.1, 7.2	Clinker	Elevator	[redacted]	[redacted]	[redacted]	187	603,616	0.015	0.024	0.10	0.16	0.28	0.45
	7.3, 7.4	Clinker	Trans. Pt.	0.000013	0.000046	0.00014	187	603,616	0.002	0.004	0.01	0.01	0.03	0.04
			Emission Unit 7-1 Total Emissions:					**603,616**	**0.017**	**0.028**	**0.11**	**0.17**	**0.30**	**0.49**
7-2	7.5, 7.6	Clinker	Trans. Pt.	0.000013	0.000046	0.00014	187	530,964	0.002	0.003	0.01	0.01	0.03	0.04
	7.7, 7.8	Clinker	Trans. Pt.	0.000013	0.000046	0.00014	187	346,734	0.002	0.002	0.01	0.01	0.03	0.02
	7.9, 7.10	Clinker	Trans. Pt.	0.000013	0.000046	0.00014	187	188,824	0.002	0.001	0.01	0.00	0.03	0.01
			Emission Unit 7-2 Total Emissions:				**187**	**530,964**	**0.007**	**0.006**	**0.03**	**0.02**	**0.08**	**0.07**
7-3	7.11	Clinker	Two Trans. Pts.	0.000013	0.000046	0.00020	67	70,809	0.002	0.001	0.01	0.00	0.03	0.01
			Emission Unit 7-3 Total Emissions:				**67**	**70,809**	**0.002**	**0.001**	**0.01**	**0.00**	**0.03**	**0.01**
7-4	7.12	Clinker	Vent For Two Silos	0.000013	0.000046	0.00020	67	141,618	0.001	0.001	0.00	0.003	0.01	0.01
			Emission Unit 7-4 Total Emissions:				**67**	**141,618**	**0.001**	**0.001**	**0.003**	**0.003**	**0.01**	**0.01**
7-5	7.13	Clinker	Two Trans. Pts.	0.000013	0.000046	0.00020	67	70,809	0.002	0.001	0.01	0.00	0.03	0.01
			Emission Unit 7-5 Total Emissions:				**67**	**70,809**	**0.002**	**0.001**	**0.01**	**0.003**	**0.03**	**0.01**
7-6	7.14	Clinker	Vent For Two Silos	0.000013	0.000046	0.00020	67	141,618	0.001	0.001	0.00	0.003	0.01	0.01
			Emission Unit 7-6 Total Emissions:				**67**	**141,618**	**0.001**	**0.001**	**0.003**	**0.00**	**0.01**	**0.01**
7-7	7.15, 7.16	Clinker	Trans. Pt.	0.000013	0.000046	0.00020	127	346,734	0.002	0.002	0.01	0.01	0.03	0.03
	7.17, 7.18	Clinker	Trans. Pt.	0.000013	0.000046	0.00020	127	346,734	0.002	0.002	0.01	0.01	0.03	0.03
			Emission Unit 7-7 Total Emissions:				**127**	**346,734**	**0.003**	**0.004**	**0.01**	**0.02**	**0.05**	**0.06**
7-8	7.19	Clinker	Two Trans. Pts.	0.000013	0.000046	0.00020	67	70,809	0.002	0.001	0.01	0.00	0.03	0.01
			Emission Unit 7-8 Total Emissions:				**67**	**70,809**	**0.002**	**0.001**	**0.01**	**0.00**	**0.03**	**0.01**
7-9	7.20	Clinker	Vent For Two Silos	0.000013	0.000046	0.00020	67	260,051	0.001	0.002	0.00	0.01	0.01	0.03
			Emission Unit 7-9 Total Emissions:				**67**	**260,051**	**0.001**	**0.002**	**0.003**	**0.01**	**0.01**	**0.03**
7-10	7.21	Clinker	Two Trans. Pts.	0.000013	0.000046	0.00020	67	70,809	0.002	0.001	0.01	0.00	0.03	0.01
			Emission Unit 7-10 Total Emissions:				**67**	**70,809**	**0.002**	**0.001**	**0.01**	**0.00**	**0.03**	**0.01**
7-11	7.22	Clinker	Vent For Two Silos	0.000013	0.000046	0.00020	67	260,051	0.001	0.002	0.00	0.01	0.01	0.03
			Emission Unit 7-11 Total Emissions:				**67**	**260,051**	**0.001**	**0.002**	**0.003**	**0.01**	**0.01**	**0.03**
7-14	Fugitive	Clinker	Trans. Pt.	0.00016	0.0011	0.0030	120	15,000	0.019	0.001	0.13	0.01	0.36	0.02
			Emission Unit 7-14 Total Emissions:				**120**	**15,000**	**0.019**	**0.001**	**0.13**	**0.01**	**0.36**	**0.02**

Notes:

- Emission Unit 7-1 Elevator: The emission factor is based on results of emission testing of a simular unit having [redacted]. PM10 emissions were derived by multiplying [redacted] The emission rate was then divided by [redacted] so that the emission factor could be expressed as pounds of emissions per ton of material. Lastly, the emission factor was multiplied by a [redacted] $PM_{2.5}$ is assumed to be 0.053*TSP. PM_{10} and $PM_{2.5}$ emission factors derived from the TSP emission factor using the $PM_{10}/PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.

- Emission Units 7-1 through 7-11: Material Transfer Points: TSP, PM_{10}, and $PM_{2.5}$ emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for a controlled conveyor transfer point.

- Emission Units 7-14: TSP and PM_{10} emission factors provided in AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004 for uncontrolled conveyor transfer point. Assumed $PM_{2.5}$ = 0.053 *TSP. $PM_{2.5}$ emission factor derived from the TSP emission factor using the $PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.

Emission Units 7-12 And 7-13 - PM2.5, PM10, And TSP Hourly And Annual Emissions

Emission Unit	DCP's	Material	Process Description	Basis For Emission Calculation: PM2.5 Emiss. Rate (lb/hr)	PM10 Emiss. Rate (lb/hr)	TSP Emiss. Rate (lb/hr)	Annual Hours (hour/year)	PM2.5 Controlled Emissions (TPY)	PM10 Controlled Emissions (TPY)	TSP Controlled Emissions (TPY)
7-12	7.23 - 7.30	Clinker	Transfer Points	0.03	0.18	0.52	8,760	0.12	0.79	2.27
7-13	7.31 - 7.37	Clinker	Transfer Points	0.03	0.18	0.52	8,760	0.12	0.79	2.27
Emission Units 7-12 and 7-13 Total Emissions:								**0.24**	**1.59**	**4.53**

Notes:
- Emission Units 7-12 and 7-13: Results of Emission Testing on #2 Finish Mill System. Results assumed to represent #1 Finish Mill System as well. 7-13 Test Results = [redacted] PM_{10} and $PM_{2.5}$ emission factors derived from the TSP emission factor using the $PM_{10}/PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.

Emission Units 8-1 Through 8-7 - PM2.5, PM10, And TSP Hourly And Annual Emissions

Emission Unit	DCP's	Material	Process	Basis For Emission Calculation: PM2.5 Emiss. Rate (lb/hr)	PM10 Emiss. Rate (lb/hr)	TSP Emiss. Rate (lb/hr)	Annual Hours (hour/year)	PM2.5 Controlled Emissions (TPY)	PM10 Controlled Emissions (TPY)	TSP Controlled Emissions (TPY)
8-1	8.4	Clinker, Gypsum, Limestone	#1 Finish Mill Air Seperator	0.013	0.09	0.25	8,760	0.06	0.39	1.10
8-2	8.6A/B	Clinker, Gypsum, Limestone	#1 Finish Mill	0.07	0.46	1.31	8,760	0.30	2.00	5.72
8-3	8.10	Clinker, Gypsum, Limestone	#2 Finish Mill Air Seperator	0.01	0.09	0.25	8,760	0.06	0.39	1.10
8-4	8.12A/B	Clinker, Gypsum, Limestone	#2 Finish Mill	0.07	0.46	1.31	8,760	0.30	2.00	5.72
8-5	8.13, 8.14, 8.15	Clinker, Gypsum	Transfer Points	0.01	0.05	0.15	8,760	0.03	0.23	0.66
8-6	8.17	Clinker, Gypsum	#3 Finish Mill	0.01	0.07	0.19	8,760	0.04	0.29	0.83
8-7	8.16, 8.18, 8.19A/B	Clinker, Gypsum	#3 Finish Mill Air Seperator	0.03	0.21	0.59	8,760	0.14	0.90	2.58
			Emission Units 8-1 through 8-7 Total Emissions:					**0.93**	**6.20**	**17.71**

Notes:

- Emission Units 8-1 and 8-3: Results of Emission Testing on #2 Finish Mill System operating at a [redacted]. Results assumed to represent #1 Finish Mill System as well. These hourly emission rate values were then scaled-up based on [redacted] for the Finish Mill system. 8-3 Test Results = [redacted] PM_{10} and $PM_{2.5}$ emission factors derived from the TSP emission factor using the $PM_{10}/PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.

- Emission Units 8-2 and 8-4: Results of Emission Testing on #2 Finish Mill System operating at a [redacted]. Results assumed to represent #1 Finish Mill System as well. These hourly emission rate values were then scaled-up based on [redacted] for the Finish Mill system. 8-4 Test Results = [redacted] PM_{10} and $PM_{2.5}$ emission factors derived from the TSP emission factor using the $PM_{10}/PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.

- Emission Units 8-5 through 8-7: TSP Emissions based on results on the PSD permit for Finish Mill #3. PM_0 and $PM_{2.5}$ emission factors derived from the TSP emission factor using the $PM_{10}/PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.

Emission Units 8-1 And 8-2 - Hourly and Annual VOC

Emissions

Emission Unit	DCP	Material	Process	VOC Emiss. Rate (lb/hr)	Annual Hours (hour/year)	VOC Emissions (TPY)
	Total VOC Emissions From Emission Unit 8-1:			0.45	8,760.0	1.97
	Total VOC Emissions From Emission Unit 8-2:			0.45	8,760.0	1.97
		Total VOC Emissions From Emission Unit 8-1:				1.97
		Total VOC Emissions From Emission Unit 8-2:				1.97
Notes:	- Maximum VOC hourly emissions from grinding of material in Finish Mill per plant specific information and conservative emission factors.					

Emission Units 8-3 And 8-4 - Hourly and Annual VOC

Emissions

Emission Unit	DCP	Material	Process	VOC Emiss. Rate (lb/hr)	Annual Hours (hour/year)	VOC Emissions (TPY)
	Total VOC Emissions From Emission Unit 8-3:			**0.45**	**8,760.0**	**1.97**
	Total VOC Emissions From Emission Unit 8-4:			**0.45**	**8,760.0**	**1.97**
		Total VOC Emissions From Emission Unit 8-3:				**1.97**
		Total VOC Emissions From Emission Unit 8-4:				**1.97**

Notes:

- Maximum VOC hourly emissions from grinding of material in Finish Mill per plant specific information and conservative emission factors.

Emission Units 8-6 And 8-7 - Hourly and Annual VOC Emissions

Emission Unit	DCP	Material	Process	VOC Emiss. Rate (lb/hr)	Annual Hours (hour/year)	VOC Emissions (TPY)
	Total VOC Emissions From Emission Unit 8-6:			**0.45**	**8,760.0**	**1.97**
	Total VOC Emissions From Emission Unit 8-7:			**0.45**	**8,760.0**	**1.97**
		Total VOC Emissions From Emission Unit 8-6:				**1.97**
		Total VOC Emissions From Emission Unit 8-7:				**1.97**
Notes:	- Maximum VOC hourly emissions from grinding of material in Finish Mill per plant specific information and conservative emission factors.					

Emission Units 9-1 through 9-4 - PM2.5, PM10, and TSP Hourly and Annual Emissions

Emission Unit	DCP	Material	Process	Basis For Emission Calculation					PM2.5 Controlled Emissions (lb/hr)	PM2.5 Controlled Emissions (TPY)	PM10 Controlled Emissions (lb/hr)	PM10 Controlled Emissions (TPY)	TSP Controlled Emissions (lb/hr)	TSP Controlled Emissions (TPY)
				PM2.5 Emiss. Factor (lb/ton)	PM10 Emiss. Factor (lb/ton)	TSP Emiss. Factor (lb/ton)	Hourly Throughput (TPH)	Annual Throughput (TPY)						
9-1	9.1 or 9.2	Cement	Cement Transfer To Storage Silos #'s 1-3, 10, 11	0.00005	0.00034	0.00099	121	311,383	0.006	0.0082	0.04	0.05	0.12	0.154
	9.3	Cement	Cement Bulk Shipping From Storage Silos #'s 1-3, 10, 1	0.00005	0.00034	0.00099	192	311,383	0.010	0.0082	0.07	0.05	0.19	0.154
			Emission Unit 9-1 Total Emissions:						**0.016**	**0.016**	**0.11**	**0.11**	**0.31**	**0.31**
9-2	9.4	Cement	Cement Transfer To Storage Silos #'s 4-6	0.00005	0.00034	0.00099	121	311,383	0.006	0.0082	0.04	0.05	0.12	0.154
	9.5	Cement	Cement Bulk Shipping From Storage Silos #'s 4-6	0.00005	0.00034	0.00099	192	311,383	0.010	0.0082	0.07	0.05	0.19	0.154
			Emission Unit 9-2 Total Emissions:						**0.016**	**0.016**	**0.11**	**0.11**	**0.31**	**0.31**
9-3	9.6	Cement	Cement Transfer To Storage Silos #'s 7-9, 12, 13	0.00005	0.00034	0.00099	121	311,383	0.006	0.0082	0.04	0.05	0.12	0.154
	9.7	Cement	Cement Bulk Shipping From Storage Silos #'s 7-9, 12, 1:	0.00005	0.00034	0.00099	192	311,383	0.010	0.0082	0.07	0.05	0.19	0.154
			Emission Unit 9-3 Total Emissions:						**0.016**	**0.016**	**0.11**	**0.11**	**0.31**	**0.31**
9-4	9.8	Cement	Cement Transfer To Storage Silos #'s 14-18	0.00005	0.00034	0.00099	105	112,098	0.006	0.0029	0.04	0.02	0.10	0.055
	9.8A	Cement	Surge Bin For Pneumatic Cement Pump 9-1	0.00005	0.00034	0.00099	105	112,098	0.006	0.0029	0.04	0.02	0.10	0.055
			Emission Unit 9-4 Total Emissions:						**0.011**	**0.006**	**0.07**	**0.04**	**0.21**	**0.11**
			Emission Units 9-1 through 9-4 Total Emissions:						**0.059**	**0.054**	**0.39**	**0.37**	**1.14**	**1.04**

Notes:

- Emission Units 9-1 - 9-4: Emission Factors for PM_{10} and TSP are from AP-42 Section 11.12, Table 11.12-2, dated June 2006. $PM_{2.5}$ is assumed to be 0.053*TSP. $PM_{2.5}$ emission factor derived from the TSP emission factor using the $PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.
- Annual throughput for the secondary cement storage silos controlled by Emission Unit 9-4 is assumed to be 15% of annual cement production (747,320 TPY).

Emission Units 9-5 through 9-7 - PM2.5, PM10, and TSP Hourly and Annual Emissions

Emission Unit	DCP	Material	Process	Basis For Emission Calculation: PM2.5 Emiss. Factor (lb/ton)	PM10 Emiss. Factor (lb/ton)	TSP Emiss. Factor (lb/ton)	Hourly Throughput (TPH)	Annual Throughput (TPY)	PM2.5 Controlled Emissions (lb/hr)	PM2.5 Controlled Emissions (TPY)	PM10 Controlled Emissions (lb/hr)	PM10 Controlled Emissions (TPY)	TSP Controlled Emissions (lb/hr)	TSP Controlled Emissions (TPY)
9-5	9.9	Cement	Vent For Elevator 9-1	0.00005	0.00034	0.00099	0.0	0	0.0000	0.00000	0.000	0.000	0.000	0.000
	9.10	Cement	Material Transfer To Scalping Screen	0.00005	0.00034	0.00099	0.0	0	0.0000	0.00000	0.000	0.000	0.000	0.000
	9.11	Cement	Material Transfer To Cement Holding Bin	0.00005	0.00034	0.00099	0.0	0	0.0000	0.00000	0.000	0.000	0.000	0.000
	9.12	Cement	Dispensing Cement Into Sacks	0.00005	0.00034	0.00099	0.0	0	0.0000	0.00000	0.000	0.000	0.000	0.000
			Emission Unit 9-5 Total Emissions:				**0.0**	**0**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
9-6	9.13	Cement	Vent For Elevator 9-2	0.00005	0.00034	0.00099	0.0	0	0.0000	0.00000	0.000	0.000	0.000	0.000
	9.14	Cement	Material Transfer To Scalping Screen	0.00005	0.00034	0.00099	0.0	0	0.0000	0.00000	0.000	0.000	0.000	0.000
	9.15	Cement	Material Transfer To Cement Holding Bin	0.00005	0.00034	0.00099	0.0	0	0.0000	0.00000	0.000	0.000	0.000	0.000
	9.16	Cement	Dispensing Cement Into Sacks	0.00005	0.00034	0.00099	0.0	0	0.0000	0.00000	0.000	0.000	0.000	0.000
			Emission Unit 9-6 Total Emissions:				**0.0**	**0**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
9-7	9.17	Cement	Vent For Elevator 9-3	0.00005	0.00034	0.00099	0.0	0	0.0000	0.00000	0.000	0.000	0.000	0.000
	9.18	Cement	Material Transfer To Scalping Screen	0.00005	0.00034	0.00099	0.0	0	0.0000	0.00000	0.000	0.000	0.000	0.000
	9.19	Cement	Material Transfer To Cement Holding Bin	0.00005	0.00034	0.00099	0.0	0	0.0000	0.00000	0.000	0.000	0.000	0.000
	9.2	Cement	Dispensing Cement Into Sacks	0.00005	0.00034	0.00099	0.0	0	0.0000	0.00000	0.000	0.000	0.000	0.000
			Emission Unit 9-7 Total Emissions:				**0.0**	**0**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
			Emission Units 9-5 through 9-7 Total Emissions:						**0.000**	**0.00000**	**0.00**	**0.00**	**0.00**	**0.00**

Notes:
- Emission Units 9-5 - 9-6: Emission Factors for PM_{10} and TSP are from AP-42 Section 11.12, Table 11.12-2, dated June 2006. PM2.5 is assumed to be 0.053*TSP. $PM_{2.5}$ emission factor derived from the TSP emission factor using the $PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.
- Total annual throughput for sacked cement is assumed to be 1% of annual cement production or 7,473 TPY. For purposes of operational flexibility, it is assumed that each of the three sacking machings will process half this amount or 3,737 TPY each.

Stockpiles - PM2.5, PM10, and TSP Hourly and Annual Emissions

Stockpile	Emission Unit ID	Silt content s (%)	f (%)	Emission factor [a] PM (lbs/acre-day)	PM_{10} (lb/acre-day)	$PM_{2.5}$ (lb/acre-day)	Area (acres)	Control[b] (%)	Wind Speed is ≥12 mph (hrs/year)	Hourly Emissions[c] PM (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	Annual Emissions[d] PM (ton/yr)	PM_{10} (ton/yr)	$PM_{2.5}$ (ton/yr)
Sandstone	10-4A	3.9	25.59	9.5	4.7	0.50	1.07	0	2,242	1.64	0.82	0.09	1.84	0.92	0.10
LS pile near Quarry 1	NA	Incorporated in Quarry sources tab													
Coal reject pile	Coal reject pile	6.2	25.59	15.0	7.5	0.4	0.0100	0	2,242	0.02	0.01	0.00	0.03	0.01	0.00

a. Emissions for stockpiles are calculated by using Equation 2-12 from the EPA document "Fugitive Dust Background Document and Teschnical Information Document for Best Available Control Measures" dated 9/1992

where: E_{30} = PM_{30} emission factor, lbs/acre-day
s = silt content of road surface, %
p = number of days with at least 0.01 in of precipitation, AP-42 Figure 13.2.2-1 = 70 days
f = % of time wind speed exceeds 12 mph at the mean pile height, from current met data @ 10 m level

Per EPA document "Fugitive Dust Background Document and Teschnical Information Document for Best Available Control Measures" dated 9/1992, Page 2-25, PM_{10} is estimated as 50 % of TSP/PM. $PM_{2.5}$ is assumed to be 0.053*TSP. $PM_{2.5}$ emission factor derived from the TSP emission factor using the $PM_{2.5}$ particle size multiplier per AP-42, Section 13.2.4 dated November 2006.

b. No control efficiency assumed for stockpiles.

c. Hourly emissions are calculated by dividing the annual emissions by the total hours when the wind speed exceeds 12 mph.
Hourly emissions = Annual Emission (tpy) * (2,000 lbs/ ton) / (Hours with wind > 12 mph per year)

d. Annual emissions calculated using emission factor and multiplying this by the acres exposed area and 365 days/yr.

Emission Unit	Description[1]	Hourly (tph)[a]	Annual (tpy)[a]	Particle Size Multiplier [k] PM	PM_{10}	$PM_{2.5}$	Wind speed (u)[b] (mph)	Moisture Content [m][c] (%)	Emission Factor[d] PM (lb/ton)	PM_{10} (lb/ton)	$PM_{2.5}$ (lb/ton)	Control Factor[e] (%)	Hourly Emissions[f] PM (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	Annual Emissions[g] PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Sandstone material handling																		
Emission Unit 10-4	Unloading of SS from truck to pile	**35**	**33,794**	0.74	0.35	0.053	[redacted]	[redacted]	2.99E-03	1.41E-03	2.14E-04	50.0	0.0530	0.0250	0.0038	0.0253	0.0120	0.0018
	Loading of SS from pile to loader	**35**	**33,794**	0.74	0.35	0.053	[redacted]	[redacted]	2.99E-03	1.41E-03	2.14E-04	50.0	0.0530	0.0250	0.0038	0.0253	0.0120	0.0018
	Unloading of SS from loader to LS truck	**35**	**33,794**	0.74	0.35	0.053	[redacted]	[redacted]	2.99E-03	1.41E-03	2.14E-04	50.0	0.0530	0.0250	0.0038	0.0253	0.0120	0.0018
	Emission Unit 10-4 Sub Total												**0.1590**	**0.0750**	**0.0114**	**0.0759**	**0.0360**	**0.0054**
Bottom ash handling																		
Emission Unit 10-2	Unloading of bottom ash into pile inside building	**70**	**27,569**	0.74	0.35	0.053	1.00	[redacted]	7.88E-05	3.73E-05	5.64E-06	0.0	0.0055	0.0026	0.0004	0.0011	0.0005	0.0001
	Loading of bottom ash from pile to loader	**70**	**27,569**	0.74	0.35	0.053	1.00	[redacted]	7.88E-05	3.73E-05	5.64E-06	0.0	0.0055	0.0026	0.0004	0.0011	0.0005	0.0001
	Unloading of bottom ash from loader into truck	**70**	**27,569**	0.74	0.35	0.053	1.00	[redacted]	7.88E-05	3.73E-05	5.64E-06	0.0	0.0055	0.0026	0.0004	0.0011	0.0005	0.0001
	Emission Unit 10-2 Sub Total												**0.0165**	**0.0078**	**0.0012**	**0.0033**	**0.0015**	**0.0003**
Iron handling																		
Emission Unit 10-3	Unloading of Iron into pile inside building	**80**	**12,794**	0.74	0.35	0.053	1.00	[redacted]	2.92E-04	1.38E-04	2.09E-05	0.0	0.0234	0.0111	0.0017	0.0019	0.0009	0.0001
	Loading of iron from pile to loader	**80**	**12,794**	0.74	0.35	0.053	1.00	[redacted]	2.92E-04	1.38E-04	2.09E-05	0.0	0.0234	0.0111	0.0017	0.0019	0.0009	0.0001
	Unloading of iron from loader to truck	**80**	**12,794**	0.74	0.35	0.053	1.00	[redacted]	2.92E-04	1.38E-04	2.09E-05	0.0	0.0234	0.0111	0.0017	0.0019	0.0009	0.0001
	Emission Unit 10-3 Sub Total												**0.0702**	**0.0333**	**0.0051**	**0.0057**	**0.0027**	**0.0003**
CKD handling																		
Emission Unit 10-11	Pellets unloading into CKD repository	**71**	**32,850**	0.74	0.35	0.053	1.00	[redacted]	2.73E-04	1.29E-04	1.95E-05	0.0	0.0193	0.0091	0.0014	0.0045	0.0021	0.0003
Clinker handling																		
Emission Unit 10-8	Clinker transfer from truck to pile inside building	**120**	**25,000**	0.74	0.35	0.053	1.00	[redacted]	2.78E-03	1.32E-03	1.99E-04	0.0	0.3338	0.1579	0.0239	0.0348	0.0164	0.0025
	Clinker transfer from pile in building to loader	**120**	**25,000**	0.74	0.35	0.053	1.00	[redacted]	2.78E-03	1.32E-03	1.99E-04	0.0	0.3338	0.1579	0.0239	0.0348	0.0164	0.0025
	Clinker transfer from loader to truck	**120**	**25,000**	0.74	0.35	0.053	1.00	[redacted]	2.78E-03	1.32E-03	1.99E-04	0.0	0.3338	0.1579	0.0239	0.0348	0.0164	0.0025
	Emission Unit 10-8 Sub Total												**1.0014**	**0.4737**	**0.0717**	**0.1044**	**0.0492**	**0.0075**

[a] Hourly and Annual throughputs based on facility-specific information.

[b] The mean outdoor wind speed used is [redacted] (based on met data applicable for the facility). The wind speed inside buildings is estimated as 1 mph.

[c] Moisture values per best available values from GCC on-site personnel.

[d] Per AP-42, Section 13.2.4, 5th edition (November 2006), material handling emissions are calculated using the following equation:

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

where,
E = Emission factor (lb/ton)
k = Particle size multiplier (0.74 for PM, 0.35 for PM_{10}, and 0.053 for $PM_{2.5}$)
U = Mean wind speed (miles per hour)
M = Moisture content (%)

[e] Control efficiency assumed to be zero for all sources enclosed in buildings. A 50% reduction was used for sandstone related transfers due to natural barriers due to the location where sandstone is stored and handled at the facility.

[f] Hourly Emissions (lb/hr) = (Emission Factor [lb/ton]) * (Hourly Material Throughput [tph]) * (100 - Control Factor) / 100

[g] Annual Emissions (tpy) = (Emission Factor [lb/ton]) * (Annual Material Throughput [tpy]) / (2000 lb / ton) * (100 - Control Factor) / 100

Release Point/Control Device	Description	PTE Flow Rate	Moisture by Volume	Discharge Pressure	Discharge Temperature	PTE Flow Rate	Grain Loading (gr/dscf)	PM/PM_{10} Uncontrolled Emissions		$PM_{2.5}$ Uncontrolled Emissions		PM/PM_{10} Controlled Emissions		$PM_{2.5}$ Controlled Emissions	
		(acfm)	(%)	(mmHg)	(°R)	(dscfm)	(gr/dscf)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
2-12	Baghouse for Additives Silos	2,600.00	0%	760.00	527.67	2,601.63	0.005	0.11	0.49	0.017	0.074	0.056	0.244	0.0084	0.0370
8-8	Finish Mill 3 FK Pump Dust Collector	2,600.00	0%	760.00	527.67	2,601.63	0.005	0.11	0.49	0.017	0.074	0.056	0.244	0.0084	0.0370
9-5	Loadout Spout Dust Collector	1,400.00	0%	760.00	527.67	1,400.88	0.0014	0.017	0.074	0.0025	0.011	0.0084	0.037	0.0013	0.0056
9-6	Loadout Spout Dust Collector	1,400.00	0%	760.00	527.67	1,400.88	0.0014	0.017	0.074	0.0025	0.011	0.0084	0.037	0.0013	0.0056
9-7	Loadout Spout Dust Collector	1,400.00	0%	760.00	527.67	1,400.88	0.0014	0.017	0.074	0.0025	0.011	0.0084	0.037	0.0013	0.0056
9-8	Loadout Spout Dust Collector	1,400.00	0%	760.00	527.67	1,400.88	0.0014	0.017	0.074	0.0025	0.011	0.0084	0.037	0.0013	0.0056
9-9	Loadout Spout Dust Collector	1,400.00	0%	760.00	527.67	1,400.88	0.0014	0.017	0.074	0.0025	0.011	0.0084	0.037	0.0013	0.0056
9-10	Loadout Spout Dust Collector	1,400.00	0%	760.00	527.67	1,400.88	0.0014	0.017	0.074	0.0025	0.011	0.0084	0.037	0.0013	0.0056
9-11	Loadout Spout Dust Collector	1,400.00	0%	760.00	527.67	1,400.88	0.0014	0.017	0.074	0.0025	0.011	0.0084	0.037	0.0013	0.0056
9-12	Loadout Spout Dust Collector	1,400.00	0%	760.00	527.67	1,400.88	0.0014	0.017	0.074	0.0025	0.011	0.0084	0.037	0.0013	0.0056
9-13	Loadout Spout Dust Collector	1,400.00	0%	760.00	527.67	1,400.88	0.0014	0.017	0.074	0.0025	0.011	0.0084	0.037	0.0013	0.0056
							Total Emissions	0.37	1.64	0.057	0.25	0.19	0.82	0.028	0.124

1. Outlet grain loading values (gr/dscf) and flow rates (acfm) based on manufacturer specifications for the new proposed units.
2. Assumes all dust collectors will operate 8,760 hours per year
3. $PM_{2.5}/PM_{10}$ Ratio based on particle size multiplier from AP-42 Section 13.4.2 (0.053/0.35) 0.151
4. The new additive handling baghouse and FK Pump dust collector will be located inside buildings and vented to the building, not to the atmosphere. As such, a 90% control is appropriate for the building enclosure but only a 50% control is claimed for conservatism.
4. The new loadout spout dust collectors are located underneath the loadout silos and will vent to the area under the silos, not directly to the atmosphere. Trucks will enter on one side and leave through the other. As such, a 50% control is claimed for two-sided enclosure.

Release Point/Control Device	Emissions	Controlled Emissions		
		PM	PM_{10}	$PM_{2.5}$
Paved	Hourly emissions (lb/hr)	0.69	0.14	0.034
	Annual Emissions (tpy)	0.34	0.069	0.017

Total Emissions from New Sources (PTE)			
PM	PM_{10}	$PM_{2.5}$	Unit
0.88	0.33	0.062	lb/hr
1.16	0.89	0.14	tpy

Emergency Generators

Pollutant	AP-42 Emission Factors [1]	AP-42 Emission Factors [1]	D337 Emission Factors [2]	Generator No. 1 Emissions		Generator No. 2 Emissions		Total Emissions	
	(lb/hp-hr)	(lb/hr)	(lb/hr)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
NO_x	0.031	6.24	2.59	2.59	0.65	2.59	0.65	5.18	1.29
CO	6.68E-03	1.34	0.50	0.50	0.13	0.50	0.13	1.00	0.25
SO_x	2.05E-03	0.41	NA	0.41	0.10	0.41	0.10	0.82	0.21
PM_{10} [3]	2.20E-03	0.44	0.16	0.16	0.04	0.16	0.04	0.32	0.08
$PM_{2.5}$ [3]	2.20E-03	0.44	0.16	0.16	0.04	0.16	0.04	0.32	0.08
TOC	2.51E-03	0.51	0.11	0.11	0.03	0.11	0.03	0.22	0.06

Sample Calculation:

$$\frac{150\ (kW)}{} \times \frac{(hp)}{0.7457\ (kW)} \times \frac{Emission\ Factor\ (lb)}{(hp\text{-}hr)} = \frac{Emissions\ (lbs)}{(hr)}$$

$$\frac{Emissions\ (lbs)}{(hr)} \times \frac{(ton)}{2{,}000\ (lbs)} \times \frac{500\ (hr)}{(yr)} = \frac{Emissions\ (tons)}{(yr)}$$

Kiln Emergency Generator Information

	Manufacturer	Model	Serial Number	Rating (kW) [4]	Horsepower [5]	Maximum Annual Operating Hours [6]
Generator No. 1	Caterpillar	D337F Electric Set	37B1866	150	201.15	500
Generator No. 2	Caterpillar	D337F Electric Set	37B2404	150	201.15	500

[1] Emission factors obtained from AP-42 Tables 3.3-1 and 3.3-2.
[2] Emission factors obtained from D337 engine specification sheet.
[3] Per AP-42 Table 3.3-1 - all particulate is assumed to be less than or equal to 1 um in size.
[4] Engine ratings provided [redacted]
[5] Conversion of kW to hp was done by using the conversion factor of 745.7 x 10 KW/hp.
[6] Maximum annual operating hours for each engine assumed to be 500 hours per year for emergency generators.

APPENDIX D. AIR DISPERSION MODELING REPORT

UPDATED AIR QUALITY DISPERSION MODELING ANALYSIS

GCC RIO GRANDE, INC. / Tijeras Cement Manufacturing Facility

GCC / Tijeras

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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY 1-1
1.1 Summary of Modeling Results 1-1

2. AIR DISPERSION MODELING APPROACH 2-1

3. MODEL SELECTION OPTIONS 3-1
3.1 Dispersion Model Selection 3-1
3.2 Meteorological Data 3-1
3.3 Upper Air Data Processing 3-3
3.4 Land Use Analysis 3-3
3.5 Terrain 3-4
3.6 Building Wake Effects (Downwash) 3-4
3.7 Ambient Air Boundary 3-1
3.8 Receptor Grids 3-1
3.9 Rural and Urban Considerations 3-3
3.10 Off-Site Nearby Sources 3-4
3.11 Air Quality Background 3-4
3.12 Secondary Ozone and $PM_{2.5}$ Formation 3-6
3.13 Modeling for the NO_2 Design Value 3-7
3.14 Particle Deposition 3-8

4. EMISSION SOURCE PARAMETERS 4-1
4.1 Plant Sources 4-1
4.2 Quarry Sources 4-2
4.2.1 Haul Roads 4-5
4.2.2 Overburden Hauling 4-6
4.2.3 Blasting 4-6
4.2.4 Emergency Generators 4-11

5. INDIVIDUAL QUARRY SCENARIOS 5-1

6. MODELED AIR QUALITY ANALYSIS RESULTS 6-1
6.1 PM_{10} and $PM_{2.5}$ 6-1
6.2 SO_2, 8-hr CO, and Annual NO_2 6-2
6.4 1-hr CO and 1-hr NO_2 6-3
6.5 Model Files Directory 6-4

ATTACHMENT A. SOURCE PARAMETERS AND EMISSION RATES 1

ATTACHMENT B. HAUL ROADS KMZ FILE 1

ATTACHMENT C. MAXIMUM MODELED IMPACT LOCATIONS MAPS 1

ATTACHMENT D. PLANT LAYOUT AND EMISSION UNIT PHOTOS 1

LIST OF FIGURES

Figure 3-1. Wind Rose 3-2

Figure 3-2. GCC Structures and Kiln Emission Point 3-5

Figure 3-3. Receptors – Wide View 3-2

Figure 3-4. Receptors – Close View 3-3

Figure 4-1. Modeled Quarry Source Locations 4-4

Figure 4-2. Quarry Blasting Locations 4-8

Figure 4-3. Modeled Blasting Source Locations 4-9

LIST OF TABLES

Table 1-1. Summary of Modeling Results 1-2

Table 2-1. Applicable Ambient Air Quality Standards 2-1

Table 3-1. Hourly Seasonal Background Values 3-5

Table 3-2. Particulate Matter Background Values 3-6

Table 3-3. Secondary Particulate and Ozone Contributions 3-7

Table 3-4 Particle Deposition Parameters 3-8

Table 4-1. Quarry Activities in Area and Volume Sources 4-3

Table 4-2. Blasting Parameters 4-7

Table 4-3. Worst-Case Blasting Locations 4-10

Table 6-8. Modeling Files 6-5

1. EXECUTIVE SUMMARY

GCC Rio Grande (GCC) owns and operates the Tijeras Portland cement manufacturing facility located at 11783 State Highway 337, Tijeras, Bernalillo County, New Mexico 87059 (the "Facility"). The Facility is classified under Standard Industrial Classification (SIC) code 3241 (Portland Cement Manufacturing). The Facility operates under a Title V Permit (Permit No. 532, RN#1, dated July 28, 2017) issued by the City of Albuquerque Environmental Health Department (Department) and the Albuquerque/Bernalillo County Air Quality Control Board (A/BCAQCB) Regulation Title 20, New Mexico Administrative Code (NMAC), Chapter 11, Part 42 (20.11.42 NMAC).

The current Title V permit issued on July 28, 2017, was set to expire on July 28, 2022. GCC submitted a timely and administrative complete Title V permit renewal application for Title V operating permit #0532-RN1 on July 28, 2021, twelve months before the date of expiration, pursuant to 20.11.42.A.(2).(a).(ii) New Mexico Administrative Code (NMAC). On October 4, 2021, Ms. Carina G. Munoz-Dyer from the AQP sent a letter titled, Air Quality Title V Permit Application to Renew #0532-RN1 Application Incompleteness Determination (Incompleteness Determination), and requested that additional technical information be provided to supplement the original application and modeling report. GCC and AQP have been coordinating responses to that technical Incompleteness Determination and this updated modeling report includes relevant updates in response to that letter and subsequent responses received from the AQP. This updated modeling report is being included as an appendix to the updated renewal application being submitted under this cover. As required under the 20.11.42 NMAC regulations, GCC performed air quality dispersion modeling analysis for all criteria pollutants and averaging periods to support the Title V renewal application. A modeling protocol was submitted to the Department on June 1, 2021 and the Department issued comments on the protocol on July 13, 2021. The Department's comments are addressed in this report. The updated modeling analysis included in this report demonstrates that the Tijeras Facility will not cause or contribute to an exceedance of the applicable New Mexico Ambient Air Quality Standards (NMAAQS) or National Ambient Air Quality Standards (NAAQS).

The modeling procedures described in this report serve as the basis for the dispersion modeling analyses that is performed to support the permit renewal application. Applicable source parameters and emission rates are contained in Attachment A. As a part of the first Title V permit issuance in 2012, GCC performed a detailed air quality dispersion modeling analyses. Most of emission sources and parameters modeled in 2012 have remain unchanged. With this submittal, GCC has updated the quarry emission sources. Updated site maps detailing information required for modeling are contained in Appendix B of the updated Title V renewal application, which include topographic maps of the entire facility and a close up of the plant area. A KMZ file showing all of the haul road modeled sources is included electronically as Attachment B. A map of maximum modeled impact locations is included as Attachment C. Photos of the plant and emission sources are included as Attachment D to provide additional context and justification of source characterization.

1.1 Summary of Modeling Results

Table 1-1 below provides a summary of applicable modeling ambient air quality standards (AAQS) and modeling results.

Table 1-1. Summary of Modeling Results

Pollutant	Averaging Period	NAAQS (μg/m^3)	NMAAQS (μg/m^3)	Form of More Stringent Standard	Project Modeled Concentration including Background[1,2] (μg/m^3)
PM_{10}	24-hour	150	--	Not to be exceeded more than once per year on average over 3 years	127.40
$PM_{2.5}$	Annual	12	--	Annual mean, averaged over 3 years	7.93
	24-hour	35	--	98th percentile, averaged over 3 years	25.06
NO_2	Annual	99.66	94.02	Annual arithmetic mean, not to be exceeded	47.58
	24-hour	--	188.03	Not to be exceeded	See 1-hour NO_2 Results[3]
	1-hour	188.03	--	3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour concentrations	See Section 6.3
SO_2	24-hour	--	261.9	Not to be exceeded	195.76
	3-hour	1,309.3	--	Not to be exceeded more than once per calendar year	195.76[4]
	1-hour	196.4	--	3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour concentrations	195.76
CO	8-hour	10,303.6	9,960.1	Not to be exceeded	7,410.82
	1-hour	40,069.6	14,997.5	Not to be exceeded	See Section 6.3

1. Concentration shown is the maximum of any single quarry operating scenario, which is discussed in further detail in Section 5
2. $PM_{2.5}$ modeled concentration plus background includes secondary particulate formation, which is discussed further in Section 3.12
3. According to NMAQB Dispersion Modeling Guidelines, NO_2 1-hr modeling may be used as a surrogate for NO_2 24-hr modeling as they share the same form of the standard.
4. Model results for 1-hr SO_2 is conservatively used to compare to 3-hr SO_2 and 24-hr SO_2 in lieu of specific modeling for these AAQS.

2. AIR DISPERSION MODELING APPROACH

The technical approach to completing the dispersion modeling for the Facility followed the guidance outlined in the Department's Air Dispersion Modeling Guidelines for Air Quality Permitting (October 2020), City of Albuquerque, New Mexico Air Quality Bureau's Air Dispersion Modeling Guidelines (October 2019), and the U.S. Environmental Protection Agency's (EPA's) Guideline on Air Quality Models (Revised) (EPA 2017). For modeling analyses, the Department requires that pollutant emissions be modeled and compared with AAQS, shown in Table 2-1.[1,2]

Table 2-1. Applicable Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)	NMAAQS ($\mu g/m^3$)	Form of More Stringent Standard
PM_{10}	24-hour	150	--	Not to be exceeded more than once per year on average over 3 years
$PM_{2.5}$	Annual	12	--	Annual mean, averaged over 3 years
	24-hour	35	--	98th percentile, averaged over 3 years
NO_2	Annual	99.66	94.02	Annual arithmetic mean, not to be exceeded
	24-hour	--	188.03	Not to be exceeded
	1-hour	188.03	--	3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour concentrations
SO_2	24-hour	--	261.9	Not to be exceeded
	3-hour	1,309.3	--	Not to be exceeded more than once per calendar year
	1-hour	196.4	--	3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour concentrations
CO	8-hour	10,303.6	9,960.1	Not to be exceeded
	1-hour	40,069.6	14,997.5	Not to be exceeded

1. Per the November 22, 2022 Deliverables Request Letter from Carina G. Munoz-Dyer an annual SO_2 model is not required.

[1] The City of ABQ, EHD, Air Quality Modeling Guidance: http://documents.cabq.gov/environmental-health/airquality/ADM/final%20COA%20Oct2019%20guidelines.pdf

[2] The New Mexico Environment Department (NMED), Modeling Guidance, October 26, 2020: https://www.env.nm.gov/air-quality/modeling-publications/

3. MODEL SELECTION OPTIONS

This section contains a description of the model selection, meteorological data, terrain, building wake effects, and the receptors inputs used in the analysis presented in this report.

3.1 Dispersion Model Selection

The U.S. EPA approved American Meteorological Society / Environmental Protection Agency Regulatory Model [3] (AERMOD) version 22112 was used in conducting the refined modeling analysis for the GCC Facility.

Modeling was performed using the regulatory default settings, which includes:

- Stack-tip downwash;
- A routine for processing averages when calm wind conditions occur or when meteorological data is missing.

In accordance with U.S. EPA requirements, direction-specific building dimensions are used for the Schulman downwash algorithms. The current version of AERMOD contains algorithms for modeling the effects of aerodynamic downwash on point source emissions due to nearby buildings. The downwash algorithm is discussed in Section 3.6.

3.2 Meteorological Data

U.S. EPA modeling guidance (EPA Guidelines) allows the use of five years of off-site meteorological data or at least 12 months of site-specific meteorological data.[22] The U.S. EPA Guidelines provide a detailed discussion related to the use of "representative" meteorological data for air dispersion modeling purposes. Site-specific data is preferred in the Guidelines as stated in Section 8.3.3.1 but must be deemed "representative" and have been quality assured.

A site-specific meteorological monitoring station at GCC Tijeras has been in operation since September 1, 2018. The tower location is:

- Latitude: 35.068839° North
- Longitude: 106.392° West
- Elevation: 1,996 meters

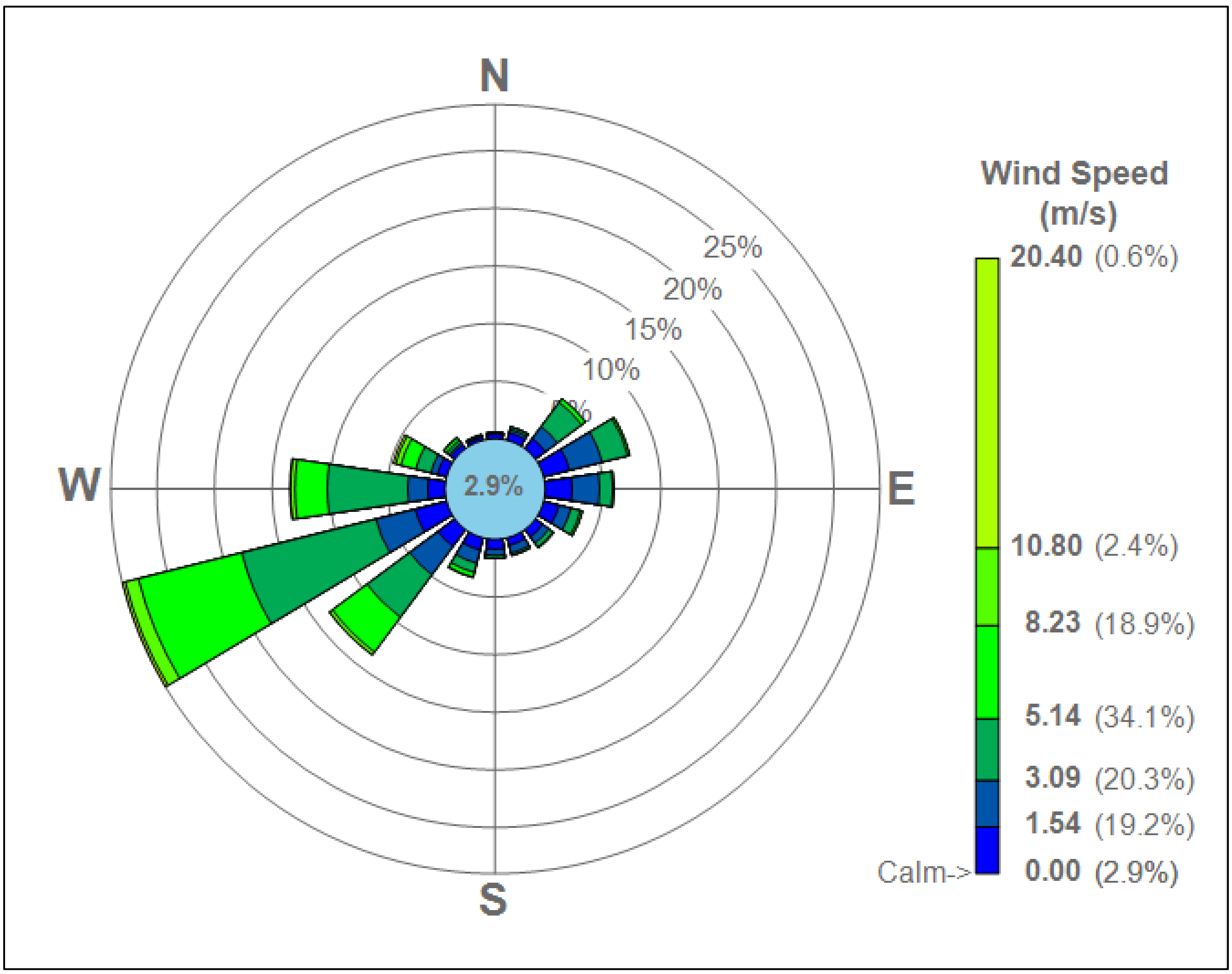
Data used in this analysis comprise of the 24-month period from September 1, 2018 through August 31, 2020. The meteorological station is operated under a Quality Assurance Project Plan (QAPP) [4] to meet U.S. EPA PSD requirements for meteorological monitoring for permit applications. The QAPP was reviewed and approved by the City of Albuquerque Environmental Health Department on June 7, 2018.[5] The station location and probe placement were selected based on U.S. EPA guidelines to ensure "representativeness" of the localized meteorology effects from surrounding complex terrain and land characteristics and proximity to the facility emission activities.

[3] U.S. EPA, User's Guide for the AMS/EPA Regulatory Model-AERMOD, EPA-454/B-16-011, December, 2016.
[4] Meteorological QAPP – GCC Rio Grande Tijeras Monitoring Station, Revision: 1, April 6, 2018.
[5] Further approval of the meterological data set was received on January 18, 2022 from the AQD.

The EPA AERMOD program requires meteorological data preprocessed with the AERMET program. AERMET (version 19191) was used in the processing of the meteorological data and is a three-stage meteorological data processor that reads in data observations, performs quality checks, and derives additional micrometeorological parameters required by AERMOD. In addition to the traditional wind and temperature data, AERMOD uses a combination of data observations and theory to characterize the turbulence in the atmosphere, both at the surface and aloft. By providing raw surface and upper air station observation data to AERMET along with land use parameters, AERMOD model-ready data is created.

AERMET uses the direct measurements, along with micrometeorological parameters based on the land use surrounding a meteorological site to estimate several parameters used to construct vertical profiles of the atmosphere. AERMET generates both a surface file and vertical profile file to pass meteorological observations and turbulence parameters to AERMOD.

Figure 3-1. Wind Rose



3.3 Upper Air Data Processing

AERMET requires morning (12 GMT) sounding data from a representative upper air site to calculate mechanical mixing height and vertical potential temperature gradient. The nearest upper air sounding location to GCC is the Albuquerque station, Site ID 23050. The Albuquerque upper air station is considered to be the most representative upper air station as it is the closest upper air station to the GCC meteorological tower in an arid region with similar landcover characteristics. As such, concurrent upper air data from 23050 was used in generating the meteorological files needed for this analysis. GCC's proposed met data set was reviewed and approved by CAEHD on January 18, 2022 with one correction requested with regard to the time conversion value used in the processing of upper-air data (incompleteness item #49). This has been corrected in the updated modeling analysis.

3.4 Land Use Analysis

When applying the AERMET meteorological processor to prepare the meteorological data for AERMOD, the values for three surface characteristics must be determined: surface roughness, albedo, and Bowen ratio. The surface roughness relates the height of obstacles to the wind flow and is, in principle, the height at which the mean horizontal wind speed is zero. The surface roughness length influences the surface shear stress and is an important factor in determining the magnitude of mechanical turbulence and the stability of the boundary layer. The albedo is the fraction of total incident solar radiation reflected by the surface back to space without absorption. The daytime Bowen ratio, an indicator of surface moisture, is the ratio of sensible heat flux to latent heat flux and is used for determining planetary boundary layer parameters for convective conditions driven by the surface sensible heat flux.

A land use analysis was conducted for the area surrounding the site-specific meteorological station using the AERSURFACE program to determine the surface roughness, albedo, and Bowen ratio values to be input to AERMET. National Land Cover and tree canopy data 2016 obtained from the U.S. Geological Survey for the state of New Mexico was input to AERSURFACE. The U.S. EPA AERSURFACE guidance released on January 9, 2008 indicates that the upwind fetch used to determine the surface roughness length should be 1 km. Further, the guidance states that the surface roughness should be evaluated based on an inverse distance-weighted geometric mean, where the distance is the distance from the meteorological tower. Additionally, the albedo and Bowen ratio should be evaluated as the weighted average of the land use types over a 10 km by 10 km (6 mile by 6 mile) domain centered on the meteorological tower. To run AERSURFACE the user must provide 2016 NLCD data and information about the area surrounding the meteorological tower. In addition to the 2016 NLCD data for New Mexico, the following inputs to AERSURFACE for the GCC site-specific meteorological station were used:

- Study radius for surface roughness (km) – 1 km (0.6 miles)
- Number of sectors – 12
- Temporal resolution – MONTHLY
- Continuous snow cover for at least one month? – NO
- Meteorological tower at an airport? – NO
- Characterization of surface moisture at site: AVERAGE
- Typical climate of the region: ARID

The surface moisture input is based on a comparison of 30-year climatological average of annual precipitation for Mountain Air, NM. For each month in 2018-2020, the precipitation value was compared to the 1989-2018 climatological record. Per U.S. EPA guidance for AERSURFACE, "Dry" surface moisture values were used for the year if the 30-year average precipitation was below the 30th percentile of the 30-year climate record, "Wet" values were used for the year if the 2018 - 2020 precipitation was above the 70th percentile of the 30-year climate record, and "Average" values were used for the year if the 2018 precipitation was between the 30th and 70th percentiles. A "composite" AERSURFACE output file was generated for both the site-specific and NWS stations using the AERSURFACE data corresponding to precipitation conditions for each month.

AERMET was run using the site-specific, upper air, and AERSURFACE data to produce AERMOD-ready meteorological data files.

3.5 Terrain

The base elevation in the area of the Facility is approximately 1,991 meters above mean sea level. The terrain information (terrain elevation and hill height) for the receptors, buildings, and sources was determined using United States Geological Survey (USGS) National Elevation Dataset (NED) with a scale of 1/3 arc second which extends at least 53 km from the facility fenceline.[6]

The NED is a seamless dataset composed of the best available raster elevation data of the conterminous United States, Alaska, Hawaii, and territorial islands. NED data are available nationally (except partially for Alaska) at resolutions of 1 arc-second (approx. 30 meters) and 1/3 arc-second (approx. 10 meters), and in limited areas at 1/9 arc-second (approx. 3 meters). The terrain height for each modeled receptor was calculated using the AERMOD terrain preprocessor (AERMAP version 18081). AERMAP computes the terrain height and hill height scale from the national elevation data surrounding the modeled receptors, and terrain height for modeled sources, and buildings. The hill height scale does not represent the critical dividing streamline height itself, but supplies the computational algorithms with an indication of the relative relief within the modeling domain for the determination of the critical dividing streamline height for each hour of meteorological data. The hill height for each modeled receptor was also calculated using the AERMOD terrain preprocessor (AERMAP version 18081).

3.6 Building Wake Effects (Downwash)

Emissions sources at the Facility are evaluated in terms of their proximity to nearby structures. The purpose of this evaluation is to determine if stack discharges may become caught in the turbulent wakes generated by these structures. AERMOD incorporates the Plume Rise Model Enhancements (PRIME) algorithms for estimating enhanced plume growth and restricted plume rise for plumes affected by building wakes. [7]

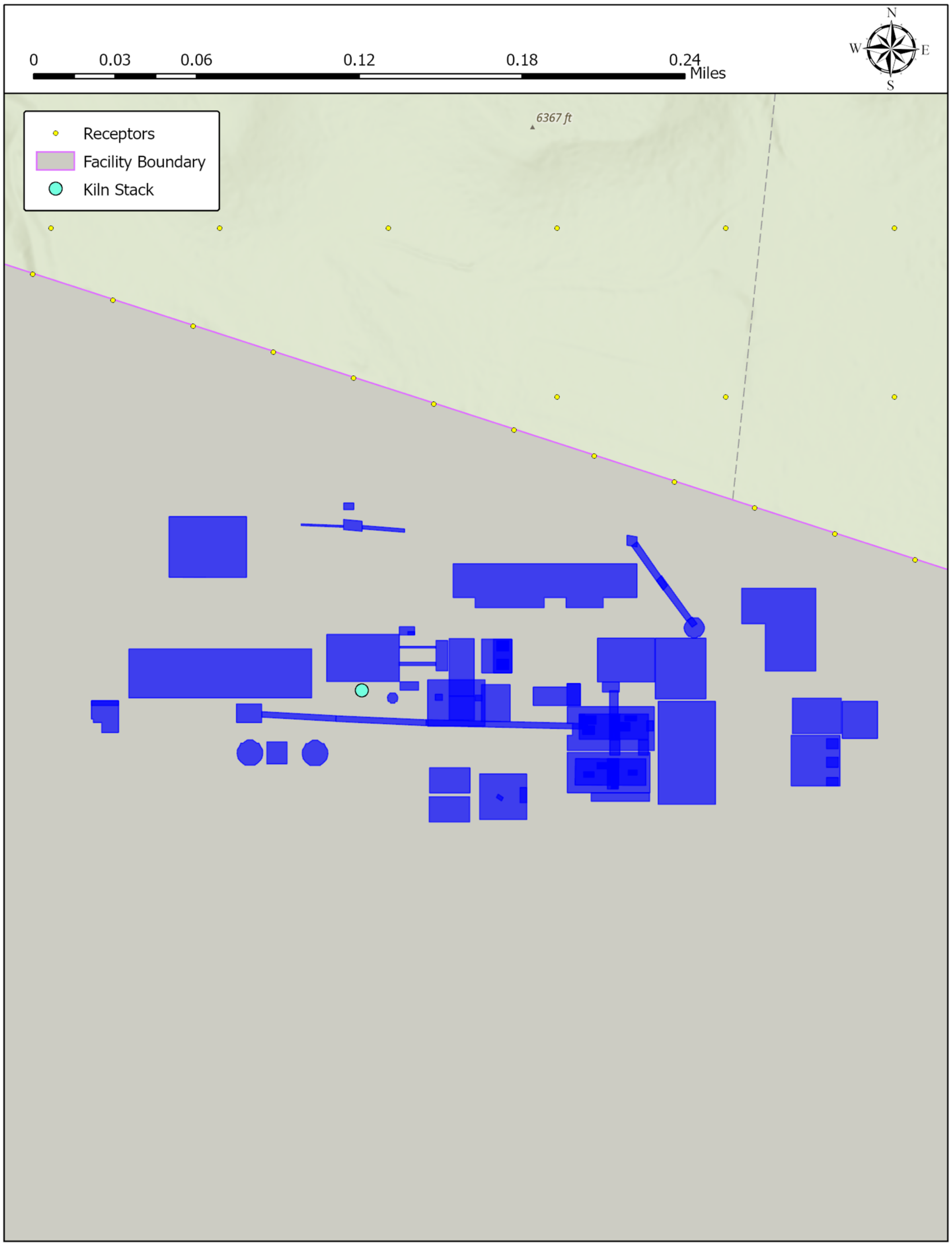
Direction-specific structure dimensions and the dominant downwash structure parameters used as input to AERMOD were determined using the *BREEZE®* BPIPP software, developed by Trinity Consultants, Inc. The software incorporates the algorithms of the U.S. EPA's sanctioned *BREEZE®* BPIP PRIME (BPIPP) version 04274.[8]

The output from the BPIPP downwash analysis lists the names and dimensions of the structures generating wake effects and the locations and heights of the affected emission sources (i.e., stacks). In addition, the output contains a summary of the dominant structure for each emissions source (considering all wind directions) and the actual structure height and projected widths for all wind directions. This information is incorporated into the AERMOD data input files. No offsite structures are close enough to affect the stack

[6] National Elevation Dataset was accessed from - https://www.usgs.gov/core-science-systems/ngp/3dep/about-3dep-products-services.
[7] L.L. Schulman, D.G. Strimaitis, and J.S. Scire, *Development and Evaluation of the Prime Plume Rise and Building Downwash Model*, *AWMA,* 50:378-390, 2000.
[8] U S. EPA, *User's Guide to the Building Profile Input Program*, Research Triangle Park, NC, EPA-454/R-93-038.

downwash. There are no changes proposed to historical representations of buildings proposed. Modeled locations of plant buildings are consistent with coordinates physically verified onsite at the facility. These locations match aerial imagery that has been georeferenced with the site in reference to all sources, buildings, and the facility fenceline. Georeferencing used coordinates verified physically onsite, rather than Google Earth, therefore there may be slight discrepancies between modeled building locations and apparent Google Earth locations. All modeled buildings used a height equal to the peak height of the structure, which is a conservative approach for any sloped structures. Onsite buildings are shown in Figure 3-2 below.

Figure 3-2. GCC Structures and Kiln Emission Point



3.7 Ambient Air Boundary

The ambient air boundary was defined at the Facility property boundary since the boundary of the site is completely fenced.

The exception is the entrance road to the plant which, though owned and controlled by GCC, has been included in ambient air per the direction of the Department. The end of the plant entrance road passes through a gate and by a large sign indicating private property and prohibition of access by unauthorized individuals. The December 2019 U.S. EPA Guidance on Ambient Air[9] includes provisions for fencing and clear signage as means for precluding public access. The presence of clear signage and a gate at the end of the plant entrance road adequately precludes public access and the ambient air boundary is set at this point on the entrance road.

The ambient air boundary is shown in Figure 3-4 on the following pages.

3.8 Receptor Grids

The modeling was completed using a receptor grid consistent with the Department and NMED's modeling guidelines that will ensure that the maximum estimated impacts are identified. Following U.S. EPA guidelines, receptor locations were identified with sufficient density and spatial coverage to isolate the area with the highest impacts. Receptors consisted of fenceline receptors at the ambient air boundary and a dense Cartesian receptor grid beginning at the fenceline and extending outward. In accordance with the NMAQB and CAEHD's requirements, the receptors were constructed as follows:

- Fenceline receptors along the perimeter of the facility with 50 meter spacing (Fenceline);
- 100 meter spacing in a grid centered at the facility center with dimensions of 5,100 meters east/west and 6,700 meters north/south (Fine Grid);
- 1000 meter spacing beyond the Fine Grid to 50,000 meters from the facility center (Coarse Grid).

Figure 3-3 and Figure 3-4 show the receptor grids used for the modeling.

[9] Revised Policy on Exclusions from "Ambient Air" (December 2, 2019) From: Andrew R. Wheeler, To: Regional Administrators

Figure 3-3. Receptors – Wide View

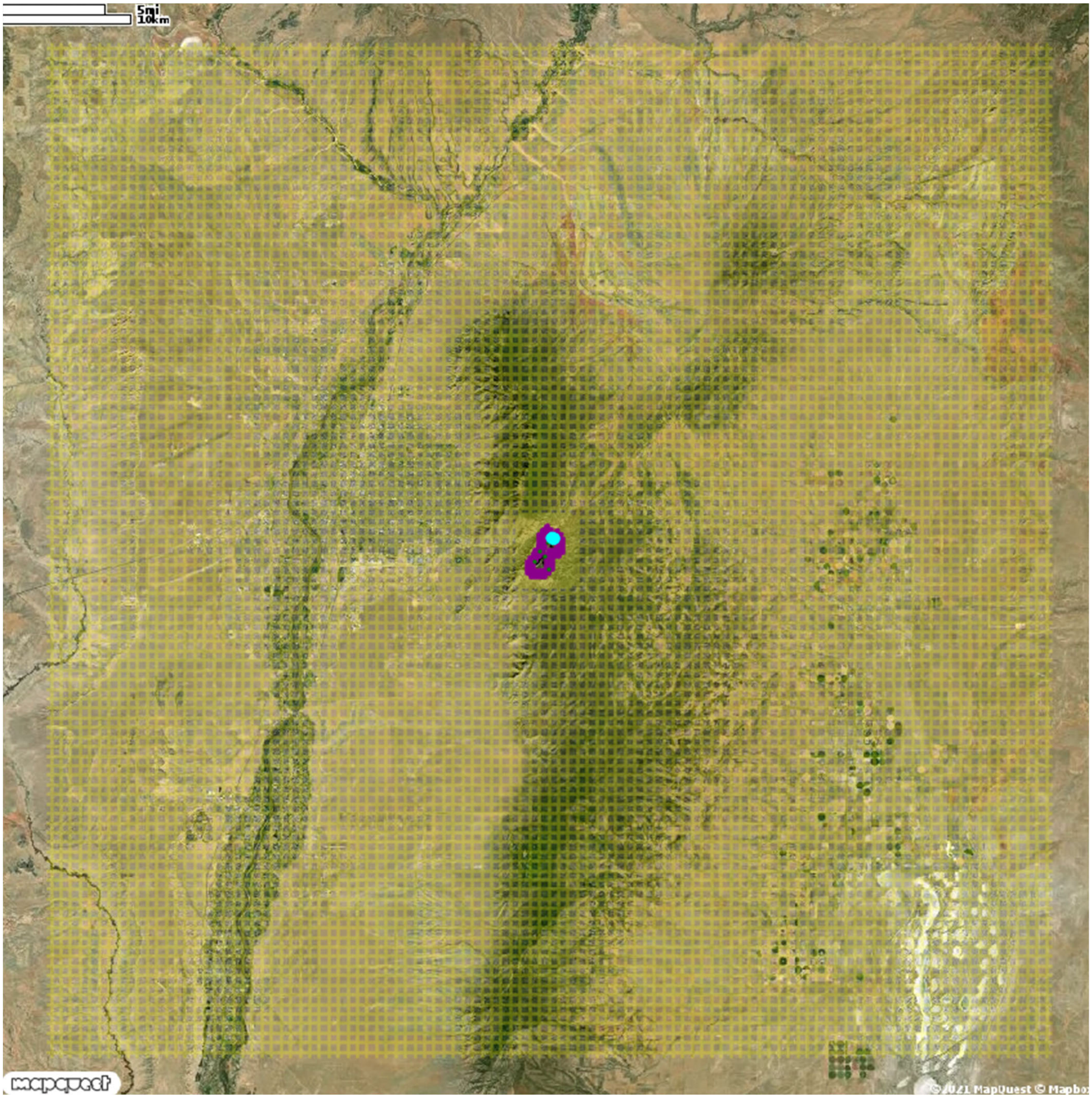
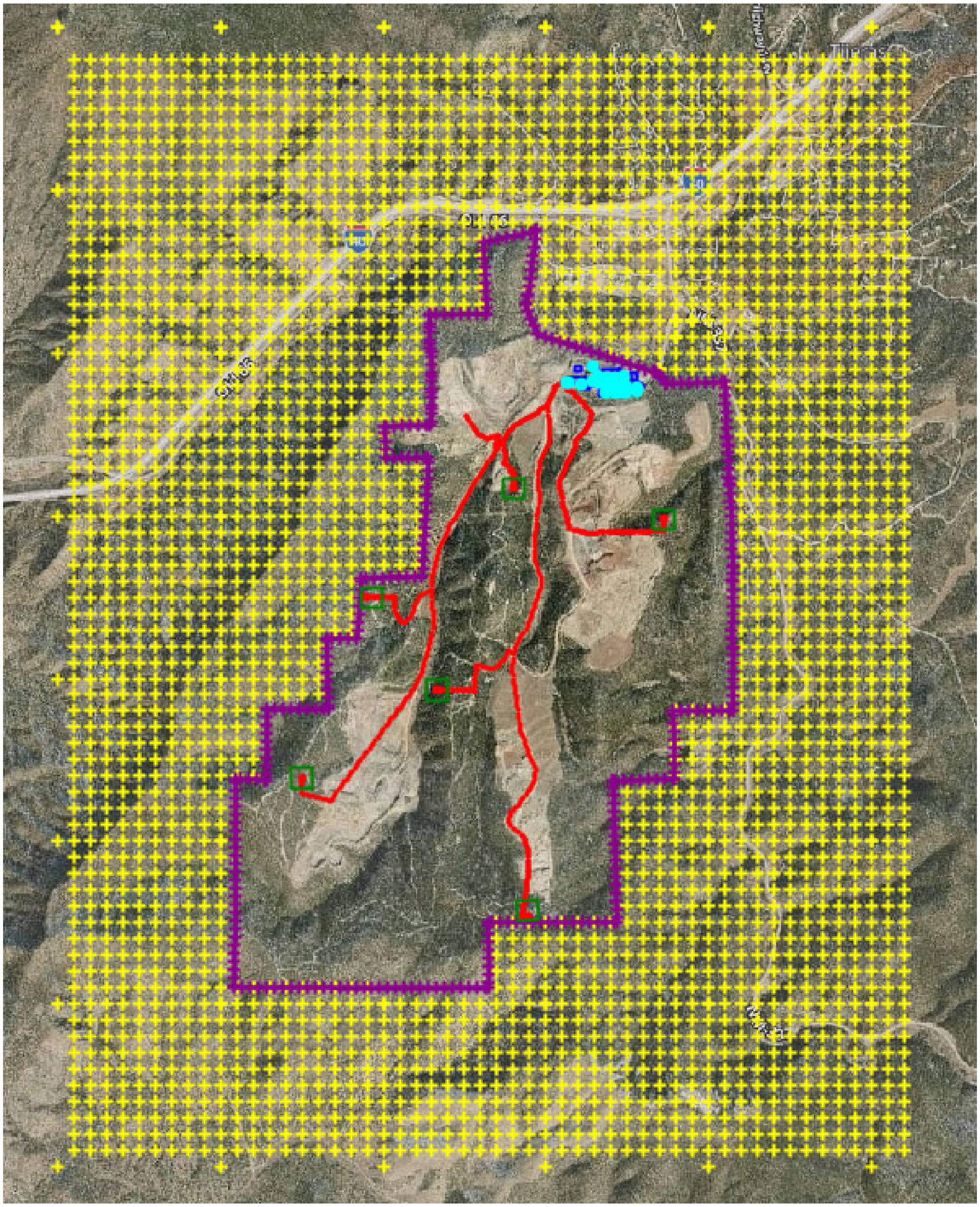


Figure 3-4. Receptors – Close View



3.9 Rural and Urban Considerations

The AERMOD model allows the user to incorporate the effects of increased surface heating from an urban area on pollutant dispersion under stable atmospheric conditions. The Tijeras Facility area does not have sufficient population or urban land use to be considered "urban" for modeling purposes. Therefore, none of the sources included in the model utilize the URBANOPT alternative.

3.10 Off-Site Nearby Sources

Pertaining to gaseous pollutant modeling, the Department on March 24, 2020 recommended to not include nearby sources.[10] In addition to gaseous pollutants, there are no other nearby sources of particulate emissions that would be reasonably anticipated to contribute to impacts above an AAQS in conjunction with the Tijeras Facility. No off-site nearby sources were included in modeling for any pollutant.

To account for transport from City of Albuquerque as well as emissions from traffic on Interstate 40, the background concentration discussed under Section 3.11 will be added to the modeled impacts.

3.11 Air Quality Background

Ambient background concentrations represent the contribution of pollutant sources not included in the modeling analysis, including naturally occurring sources. The ambient background concentrations for gaseous pollutants were determined based on three years of monitoring data from the Del Norte High School (also referred to as Del Norte North) monitor (EPA ID 35-001-0023). The Del Norte High School site is a neighborhood scale monitor located within two miles of the two Albuquerque freeways. This monitor captures the influence of pollutants from both freeways and accounts for the freeway emissions expected at the Tijeras site. The data was analyzed to determine the seasonal hourly backgrounds for each pollutant. The method to determine seasonal hourly backgrounds is consistent with U.S. EPA Memorandum Subject: Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard, dated March 1, 2011. NO_2 background concentrations are calculated as the 3rd highest monitored result for each year averaged over three years for the specified hour and season during 2017-2019 monitored data. SO_2 data is the 2nd highest concentration based on 2017-2019 monitored data. CO background concentrations are calculated by averaging the 2017, 2018 and 2019 maximum one-hour concentration that occurs during each season and hour of the day. This methodology is consistent with, but more conservative than the procedure described Section 4.4.1.3 of the NMED Modeling Guidance, as the three-year average, maximum one-hour concentration is determined and applied to the full season. These values were then incorporated into the AERMOD model thereby adding the appropriate hourly seasonal value to the modeled concentration. Data from 2020 is not used in the development of the background dataset for gaseous pollutants because, due to the COVID-19 pandemic, data from 2020 is not expected to be representative of typical ambient conditions in future years. Table 3-1 below shows the seasonal hourly background for each pollutant used in the modeling.

Hourly ozone background data is used in AERMOD for NO_2 scavenging, applicable to use of Plume Volume Molar Ratio Method (PVMRM) in NO_2 NAAQS modeling. Ozone data from the foothills monitor (35-001-1012) is the preferred monitor for ozone per communication from NMED. Only one year of ozone data from NMED was available at the time modeling was performed so Trinity processed two years of ozone data covering the modeling period, concurrent with the meteorological data. Hourly ozone data for the Foothills monitor was downloaded from U.S. EPA. NMED modeling guidelines do not specify the method for filling the missing ozone values, so guidelines from Arizona specifying the maximum seasonal values was used to substitute for any missing hourly ozone values.[11]

[10] Email Communication – Email from Jeff Stonesifer, ABQ to Samantha Kretz, GCC.

[11] Arizona Department of Environmental Quality, Air Quality Modeling Guidelines for Arizona Air Quality Permits, 11/1/2019.

Table 3-1. Hourly Seasonal Background Values

Hour	NO_2 (ppb)				CO (ppm)				SO_2 (ppb)			
	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer
00:00	33.2	38.1	26.4	14.9	0.7	1.2	0.6	0.4	1.1	2.2	0.5	0.7
01:00	32.7	38.3	22.1	15.1	0.7	1.2	0.5	0.3	1.2	2.2	0.5	0.7
02:00	32.4	37.1	24.5	11.8	0.7	0.9	0.4	0.3	1.3	2.1	0.5	0.7
03:00	31.8	37.2	24.1	13.4	0.7	0.9	0.4	0.3	1.4	2.2	0.6	0.7
04:00	32.0	38.8	28.1	16.7	0.6	0.8	0.4	0.3	1.3	2.2	0.6	0.7
05:00	33.4	40.7	33.4	22.0	0.6	0.8	0.7	0.4	1.4	2.3	0.8	0.8
06:00	35.2	41.4	36.0	23.5	0.9	1.2	0.9	0.7	1.9	2.8	1.8	1.0
07:00	36.3	42.5	33.9	24.0	1.1	1.5	0.9	0.5	2.7	3.4	2.0	1.1
08:00	32.5	42.9	29.8	16.6	1.2	1.4	0.7	0.9	3.5	3.9	1.8	0.9
09:00	24.0	40.5	16.9	12.4	0.9	1.4	0.5	0.3	2.2	3.9	0.8	0.8
10:00	19.0	35.0	12.6	8.2	0.5	0.9	0.3	0.4	1.3	2.6	0.7	0.8
11:00	12.8	26.3	10.7	6.2	0.4	0.6	0.4	0.3	1.0	1.8	0.6	0.9
12:00	13.1	19.6	8.6	5.6	0.4	0.5	0.4	0.2	0.9	1.4	0.6	0.8
13:00	11.6	16.5	6.9	5.2	0.3	0.4	0.4	0.2	0.9	0.9	0.5	0.9
14:00	9.7	16.9	6.7	5.6	0.3	0.4	0.3	1.0	0.8	1.0	0.5	0.8
15:00	11.3	19.4	7.3	6.5	0.4	0.4	0.2	0.3	0.8	0.9	0.5	0.8
16:00	16.3	25.3	8.2	7.4	0.4	0.5	0.3	0.3	0.8	1.0	0.5	0.8
17:00	35.3	38.3	9.3	7.4	0.7	0.8	0.3	0.3	0.9	1.2	0.5	0.8
18:00	41.1	41.6	17.2	11.3	0.9	1.0	0.3	0.3	1.4	1.9	0.6	0.7
19:00	38.8	42.5	22.5	14.3	0.9	1.3	0.4	0.3	1.5	2.2	0.5	0.8
20:00	38.5	42.6	25.9	18.7	0.8	1.2	0.5	0.4	1.2	2.6	0.6	0.9
21:00	35.9	41.6	27.7	16.6	0.8	1.5	0.5	0.4	1.1	2.3	0.5	1.3
22:00	36.4	41.0	31.4	19.5	0.8	1.6	0.6	0.4	1.3	2.5	0.5	0.7
23:00	34.3	40.3	26.2	15.7	0.8	1.3	0.6	0.4	1.1	2.4	0.5	0.7

1. Background data uses hours 0-23, which corresponds to the beginning time of the recording hour. AERMOD meteorology is showing Hours 1-24, which represents the end of the recording hour. Therefore hour 0 here = hour 1 in met data.
2. NO_2 background concentrations are the 3rd highest monitored result for each year averaged over three years for the specified hour and season during 2017-2019 monitored data. SO_2 data is the 2nd highest concentration based on 2017-2019 data. This method is consistent with EPA Memorandum Subject: Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard, March 1, 2011.

3. CO background concentrations are the highest monitored result for the specified season and hour during 2017-2019.

Ambient background data for particulate was obtained from the Foothills monitor. The Department supplied single background values for PM_{10} and $PM_{2.5}$ AAQS[12]. These values are applied for this Title V renewal modeling analysis and are shown in Table 3-2 below

Table 3-2. Particulate Matter Background Values

AAQS Pollutant	Background Concentration ($\mu g/m^3$)
24-hr PM_{10}	16.0
24-hr $PM_{2.5}$	15.0
Annual $PM_{2.5}$	5.1

3.12 Secondary Ozone and $PM_{2.5}$ Formation

Emissions of primary NO_x and SO_2 can undergo a transformation in the ambient atmosphere to form particulate matter, particularly $PM_{2.5}$. A similar case is true for ozone, of which NO_x and volatile organic compounds (VOC) are precursors. U.S. EPA released guidance[13] in 2022 (the Modeled Emission Rates for Precursors [MERPs] guidance) describing a methodology for accounting for this secondary formation of $PM_{2.5}$ and ozone. Secondary formation of $PM_{2.5}$ and ozone is accounted for in this analysis according to the MERPs guidance.

Representative data was based on the nearby McKinley MERP obtained from the U.S. EPA ViewQlik website.[14] Secondary particulate formation is based on annual site-wide potential primary NO_x, SO_2, and VOC emissions and AAQS-specific impacts are calculated according to Table 3-3 below. These MERP concentrations are added to modeled impacts of Facility-wide $PM_{2.5}$ sources. Primary ozone impacts are not modeled, and secondary ozone impacts are below applicable AAQS.

[12] City of Albuquerque Environmental Health Department Air Quality Program Background Values for Air Dispersion Modeling as of November 18, 2022

[13] EPA July 29, 2022 *Guidance for Ozone and Fine Particulate Matter Permit Modeling*

[14] Obtained from EPA MERPS ViewQlik website on July 15, 2021 (https://www.epa.gov/scram/merps-view-qlik)

Table 3-3. Secondary Particulate and Ozone Contributions

Precursor	Emissions (tpy)	MERP			SIL			Secondary contribution		
		24-hr PM2.5	Annual PM2.5	8-hr Ozone	24-hr PM2.5 (ug/m3)	Annual PM2.5 (ug/m3)	8-hr Ozone (ppb)	24-hr PM2.5 (ug/m3)	Annual PM2.5 (ug/m3)	8-hr Ozone (ppb)
NO_x	1,520.9	42,498	130,260	543	1.2	0.2	1	0.043	0.0023	2.80
SO_2	848.4	9,753	53,898	--				0.104	0.0031	--
VOC	78.7	--	--	20,698				--	--	0.0038
							Total:	**0.1473**	**0.0055**	**2.805**

Secondary contribution based on methodology in EPA July 29, 2022 *Guidance for Ozone and Fine Particulate Matter Permit Modeling*, including Significant Impact Limits (SILs)

Modeled Emission Rate for Precursor (MERP) based on McKinley MERP for most conservative of any stack height or emission rate. Obtained from EPA MERPS ViewQlik website on December 30, 2022 (https://www.epa.gov/scram/merps-view-qlik)

Calculation: Secondary Contribution (μg/m^3) = SIL (μg/m3) × PTE (tpy) ÷ MERP (tpy)
Based on the minimum McKinley MERP available for each pollutant (500 - 1000 tons emissions and 10-90 m stack height). Obtained from EPA MERPS ViewQlik website on July 15, 2021 (https://www.epa.gov/scram/merps-view-qlik)

3.13 Modeling for the NO_2 Design Value

Modeling for NO_2 is a two-step process for GCC Tijeras. A Tier 3, Plume Volume Molar Ratio Method (PVMRM) method was applied for the final NO_2 modeling once the worst-case blasting location was determined. PVMRM uses the total volume of the plume by the time it reaches the receptor to calculate how much ozone is available for reaction. This method cannot be used with multiple source groups that model scenarios occurring at the same time. The model applies the PVMRM to all sources modeled irrespective of source grouping and carries from hour to hour. As fully described in Section 4.2.3, several potential locations for blasting were modeled, though only one location would emit on any given day in any given hour. Therefore, to determine the worst-case location, GCC Tijeras applied a Tier 1, Total Conversion technique for NO_2 (with a unit emission rate) to run as a single model instead of multiple separate models to account for each location and hour. With the worst-case location and time determined for each individual quarry blasting area, a NO_2 model for each averaging period using the Tier 3 method is included to confirm the modeled impact from GCC for any potential blasting operating hour or quarry blasting location will not cause or contribute to an exceedance of the AAQS.

The PVMRM requires the equilibrium NO_2/NO_X ratio and the in-stack NO_2/NO_X ratio. In cement kilns, most of NO_X is emitted as NO (90-95%), remaining NO_X is in from of N_2O or NO_2. An in-stack NO_2/NO_X ratio of 0.1 is used for the kiln, as supported by U.S. EPA studies of cement kiln emissions and controls.[15,16] An in-stack ratio of 0.1 is used for the blasting sources based on field testing data presented in a scientific paper in *Atmosphere Environment* [17] and approved by the Arizona Department of Environmental Quality for a similar site using ANFO for blasting.[18]

[15] Alternative Control Techniques Document Update - NOx Emissions from New Cement Kilns, EPA-453/R-07-006, Nov 2007, page 47.
[16] NOx Control Technologies for the Cement Industry: Final Report, EPA-457/R-00-002, Sept 2000, page 29.
[17] Attalla, et al, 2008. NOx emissions from blasting operations in open-cut coal mining. Atmosphere Environment, 42:7874–7883.
[18] ADEQ Technical Review and Evaluation of Application for Air Quality Permit No. 67001, Rosemont Copper Company. Page 16 of 21. Accessed on July 23, 2021 at https://static.azdeq.gov/pn/draft_tsd_rosemont67001.pdf

3.14 Particle Deposition

The dry plume depletion option may be used in AERMOD per Section 4.2 of NMAQB Modeling Guidelines to account for the gravity-driven settling and deposition of suspended particulate matter. The dry plume depletion option requires source-specific data for particle mass median diameter size distributions and density. These deposition parameters were obtained from the NMED website.[19] Parameters for source types of limestone and gypsum handling, cement handling, coal handling, combustion stack, fly ash handling, and vehicle fugitive dust were used in the analysis. The designation of deposition parameters for each source is tabulated in 0.

Deposition was accounted for only in PM_{10} modeling. The particle deposition parameters used are contained in Table 3-4 below.

Table 3-4 Particle Deposition Parameters

Pollutant	**$PM_{2.5}$**	**PM_{10}**	**TSP**
Source Type	**Limestone and Gypsum Handling**		
Material Density (g/cm^3)	2.7		
Mass Mean Particle Diameter (µm)	1.57	3.88	7.77
Mass Weighted Size Fraction	0.078	0.27	0.652
Source Type	**Coal Handling**		
Material Density (g/cm^3)	1.5		
Mass Mean Particle Diameter (µm)	1.57	3.88	7.77
Mass Weighted Size Fraction	0.078	0.27	0.652
Source Type	**Vehicle Fugitive Dust**		
Material Density (g/cm^3)	2.5		
Mass Mean Particle Diameter (µm)	1.57	6.91	
Mass Weighted Size Fraction	0.25	0.75	
Source Type	**Cement Handling**		
Material Density (g/cm^3)	2.85		
Mass Mean Particle Diameter (µm)	1.5	3	6
Mass Weighted Size Fraction	0.26	0.25	0.48
Source Type	**Combustion Stack**		
Material Density (g/cm^3)	1.5		
Mass Mean Particle Diameter (µm)	1.57		
Mass Weighted Size Fraction	1		
Source Type	**Fly Ash Handling**		
Material Density (g/cm^3)	1.04		
Mass Mean Particle Diameter (µm)	1.57	3.88	7.77
Mass Weighted Size Fraction	0.14	0.33	0.53

[19] Sample particle sizes for plume depletion, obtained July 15, 2021 from: https://www.env.nm.gov/wp-content/uploads/sites/2/2017/01/ParticlesizedistributionforplumedepletionApr252007.xls

4. EMISSION SOURCE PARAMETERS

All Facility sources of pollutants subject to an AAQS were included in the modeling analysis. The sections below detail modeled emission parameters for all included sources. The Title V permit renewal application discusses emission rates included in the site-wide Potential to Emit (PTE) calculations. Note that as part of the updated modeling analysis completed for the Title V renewal, upon the direction of the AQP, GCC also included sources associated with the blended cement project, for which an authority to construct application was submitted to the Department on June 17, 2022. These emission rates are used in the modeling analysis with additional clarifications described below, as applicable. A complete inventory of modeled emission rates, as well as release parameters, is included in 0.

4.1 Plant Sources

The Tijeras Facility consists of a cement manufacturing plant located on the north side of the site and roads and quarries distributed throughout the site. The majority of plant sources are modeled as point sources because of control with baghouses.

Modeled locations of plant sources are consistent with coordinates physically verified onsite at the facility. These locations match aerial imagery that has been georeferenced with the site in reference to all sources, buildings, and the facility fenceline. Georeferencing used coordinates verified physically onsite, rather than Google Earth, therefore there may be slight discrepancies between modeled source locations and apparent Google Earth locations.

The two kilns are modeled as a single vertical point source and utilize release parameters (temperature, velocity, release height, and diameter) consistent with current engineering understanding and ongoing data collection. In addition to the two kilns sharing a single stack, the emissions from the clinker coolers are also routed through the kiln stack; therefore, the release parameters are characteristic of emissions from all three emission units. This is consistent with the combined emissions limit for units 5.3-5.10 and 6.1-6.2. For the annual averaging period the permitted annual emission rate was used for the kiln stack. For the short-term averaging period (1-hr through 24-hr), the proposed (in the case of NO_2, CO, and SO_2) or permitted (e.g., PM_{10}/$PM_{2.5}$) short term emission rate was used. Other plant source release parameters are based on available engineering information from the Facility, which includes information on the orientation of release (vertical, capped, or horizontal). Various horizontal and point sources were updated based on available engineering information; however, the stack flow rate is unknown for older dust collectors with limited documentation. In these scenarios GCC has conservatively assumed a stack velocity of 0.001 m/s.

Clinker Transfer 7.14 is the clinker drop test which occurs very infrequently. This would only occur for an hour in any given day, therefore, it was assumed it would operate during the worst-case hour determined in the blasting analysis discussed in Section 4.2.3. Clinker handling source 7.1 has a higher modeled temperature than other clinker handling sources because it is the first source immediately downstream of the clinker coolers, and clinker exits the coolers at a temperature significantly above ambient conditions.

Many sources, such as crushers, screens, and material transfer points are controlled by baghouses. Baghouses are considered point sources, as they produce plumes with an initial momentum driven by the baghouse's blower fan. These vertical, capped, and horizontal baghouse stacks were modeled consistent with Section 5.2 of NMAQB Modeling Guidelines.

An off-permit facility change was submitted to the Department on November 28, 2018 to authorize a replacement to the Finish Mill #3 dust collector. This replacement dust collector/baghouse includes a larger flow rate fan but a reduction in grain loading, such that a change to the permitted emission rate was not required. However, the new flow rate for this source (Unit 8-6) has been accounted for in modeling using the new design flow rate of 9,200 acfm.

In June 2022, GCC submitted and air quality permit application to the AQP and AQCB to authorize the use of more additive materials in three existing Finish Mills (the blended cement project). The project involved the installation of minor new equipment and the modification of existing equipment. The project only increased the emissions of PM, PM_{10}, and $PM_{2.5}$. A summary of the equipment and emissions associated with the blended cement project is contained in the June 2022 modeling report and a summary of the source parameters and emissions are in Attachment A.[20] Upon the direction of the AQP, GCC is including sources associated with the blended cement project as part of this modeling demonstration. Since the blended cement sources are within a building they are modeled as a volume source.

A portion of plant sources are more appropriately characterized as volume sources and are modeled as such. Examples include dump hoppers and material transfers to storage piles (including the sandstone pile). Release parameters for these volume sources are based on the physical dimensions of the sources and determined according to Section 5.3.2 of NMAQB Modeling Guidelines.

All plant sources conservatively use the short-term maximum permitted $PM_{2.5}$ emission rate for annual $PM_{2.5}$ modeling, with the only exception being the kiln stack. The kiln stack is reflective of emissions from units 5.3-5.10 and 6.1-6.2, therefore the annual $PM_{2.5}$ combined limit for these sources is used for annual $PM_{2.5}$ modeling.

This application seeks to revise short term limits of emissions of NO_2, SO_2, and CO from the kiln stack. The determination of these proposed emission rates is detailed in the updated Title V permit renewal application text.

4.2 Quarry Sources

Material handing activities occur within quarry areas of the site that are sub-surface and below grade. These material handling activities result in fugitive emissions, which were aggregated for modeling quarry pit emissions. Quarry activities are based on a horizontal area of approximately 4 acres of disturbance in each quarry. This represents the area of disturbance that may take place in a single day when accounting for all sources of fugitive dust in the pit. Modeling of annual $PM_{2.5}$ also used this 4 acre disturbance conservatively despite dynamic and changing locations of quarry activities throughout the year. The annual disturbance area for all fugitive dust sources in the quarries would be greater than 4 acres, therefore condensing the larger annual footprint to a 4 acre modeled area is considered conservative.

Emissions from aggregate handling operations within quarry pits were estimated using the drop equation per AP-42 Section 13.2.4 (November 2006) Equation 1 or factors presented in Section 11.19.2 (August 2004) Table 11.19.2-2, depending on the nature of the operation. The short-term rate for each source in

[20] Note that the June 17, 2022 blended cement application listed the first three new loadout spout dust collector as release point 9-5 to 9-7 while these release points already existed but were not operational and therefore not included in this modeling report. Therefore Table 2-1 was updated to correct the release point IDs. Furthermore, the June 2022 application applied 90% control to the release point 2-12 and 8-8 due to the release point being located completly in a building and not vented to the atmosphere (i.e., full building enclosure), however to be conservative and based on discussions with the AQP, only a 50% control is reflected for these sources.

each pit was summed and then converted into a modeling g/s rate for each quarry pit. Detailed emission calculations for quarry sources are included in Appendix C of the Title V permit renewal application.

Below grade activities include limestone handling and overburden unloading within the quarry. These sources were modeled as area sources because emissions would be mixed within the air in the quarry below grade before being emitted at the surface level. The area source dimensions are based on single squares with an area of approximately 4 acres consistent with the annual area disturbance.

Sub-surface activities include overburden removal and drilling. These activities were modeled as volume sources consistent with Section 5.3.1 of NMAQB Modeling Guidelines. The release height and initial vertical dimension were conservatively based on the physical dimensions of a bulldozer. The horizontal dimension was based on the horizontal distance of the below grade area sources and divided by 4.3.

The designation of quarry activities and inclusion in modeled area or volume sources is detailed below in Table 4-1.

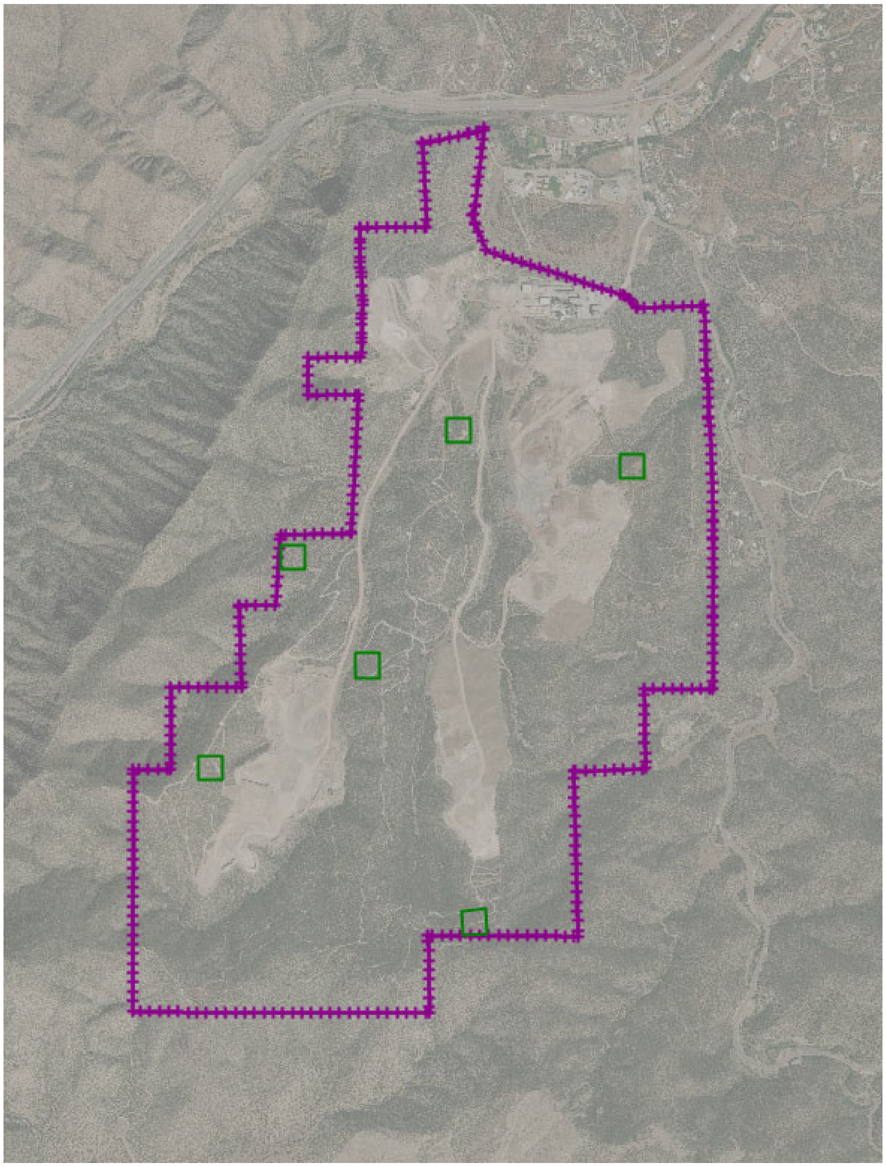
Table 4-1. Quarry Activities in Area and Volume Sources

Activity	Modeled Source Type Inclusion
Unloading of overburden from trucks to pit floor	Area
Loading of limestone into loader buckets	Area
Unloading of quarried limestone into trucks	Area
Bulldozer operations	Volume
Removal of overburden topsoil material	Volume
Loading of overburden into loaders	Volume
Unloading of overburden into trucks	Volume
Drilling	Volume

Quarry area sources were modeled at the location within quarries consistent with the worst-case blasting location for the 24-hr averaging period in order to represent locations with worst-case plume dispersion. Quarry active areas are detailed in site maps in Appendix B of the updated Title V renewal application[21] and specific locations of modeled quarry sources are shown in Figure 4-1 below. Quarry volume source locations were set to the center of quarry area sources.

[21] Modeling included quarries that are planned to be active in the next five years. This includes quarries: 4, 19, 3-5-7, 8, 17, and 15. Site maps in Appendix B of the updated Title V renewal application show a Southern Application Area adjacent to Quarry 15. GCC does not plan to extend operations to this Southern Application Area in the next five years, therefore it is not included in emissions calculations or modeling. Quarries 1, 2, 6, 18, 19N, and 20 as shown in site maps are planned to be inactive in the next five years, therefore, these quarries are not included in the modeling analysis.

Figure 4-1. Modeled Quarry Source Locations



Some existing quarries will not require any overburden removal. This is applicable to quarries 19 and 3-5-7. These quarries did not include overburden activities emission rates in modeled sources.

Quarry sources were limited in hours of operation from 6 am to 6 pm based on Facility operations schedules. This was accounted for by modeling the maximum lb/hr emission rate from 6 am to 6 pm and an emission rate of zero for all other hours. Quarries 4 and 17 have additional hours restrictions, which were determined in order to facilitate compliance with AAQS. Quarry 4 was limited to 8 am to 6 pm operation and quarry 17 was limited to operations between 7 am to 6 pm.

Per Section 5.3.1 of NMAQB Modeling Guidelines, modeling of wind erosion of stockpiles is not required because the equations for emissions quantification do not apply in a steady state model. Therefore, stockpile wind erosion sources within quarry pits were excluded from modeling. Emissions calculations in

Appendix C of the Title V permit renewal application show calculated emissions from wind erosion of stockpiles although these emissions were not included in models.

4.2.1 Haul Roads

Material is transported via trucks on existing paved and unpaved haul roads. Consistent with CAEHD General Air Dispersion Modeling Guidelines "Haul Roads" Section, paved haul roads can be conditionally excluded from modeling. Permit enforceable conditions that prevent visible emissions of fugitive dust from being generated provide sufficient control to exclude the paved road sources from the model.[22]

The traffic from unpaved haul roads was modeled as volume sources consistent with NMAQB Modeling Guidelines Section 5.3.3 and the EPA Haul Road Workgroup Final Report[23]. The following parameters were utilized:

- Height of the Volume Source - Calculated as 1.7 times the height of the vehicle
- Release Height – Calculated as half of the height of the volume source
- Initial Vertical Dimension (sigma σ_z) – Calculated as the height of the volume source divided by 2.15
- Adjusted Road Width – Calculated as the road width plus six meters, as all unpaved roads are two-way roads
- Initial Lateral Dimension (sigma σ_y) – Calculated as the adjusted width of the road divided by 2.15
- Number of Volume Sources – Calculated as the total length of road segment divided by adjusted road width (these are considered adjacent sources)

This modeling analysis also accounted for emissions from travel of water trucks, which were added to modeled emission rates for haul roads. Haul road release parameters were set based on dimensions of haul trucks, consistent with historical modeling. Any difference in release parameters between haul trucks and water trucks is not considered to be significant and would have a negligible effect on modeled impacts.

Haul road locations were based on site maps in Appendix B of the updated Title V renewal application. Updated air dispersion modeling considered haul roads extending within the modeled active areas of the quarry locations noted in site maps, which represent the furthest extent where haul trucks would be loaded with material extracted from quarries. Haul roads correspond to road segments 1-12.

Haul road emission calculations have a different basis for hourly and annual rates. Hourly rates are based on the maximum possible truck trips as limited by the number of trucks onsite and road travel distances. Annual rates are based on annual material hauling throughputs and truck capacities to determine annual number of trips. All modeled haul road emission rates were adjusted accordingly for maximum hourly and annual emissions, therefore the emission rate for the short-term standards are higher than the emission rates for the annual models, as the annual models represent lower average daily emissions because of the difference in basis for calculations. GCC is not requesting an annual traffic limit, as the annual traffic is inherently limited by material throughputs. A KMZ file showing all of the haul road modeled sources is included electronically as Attachment B.

All unpaved haul roads and overburden hauling (described below) are limited in operation from 6 am to 8 pm and this was accounted for using hourly variable emission rates in particulate models. This may result in modeling of road activities beyond permitted hours for quarry operations, which is not realistic but is

[22] Understanding of guidance was confirmed via e-mail communication between Jeff Stonesifer, Environmental Health Department, and Vineet Masuraha, Trinity Consultants, on May 10, 2021
[23] EPA Haul Road Workgroup Final Report Submission to EPA-OAQPS, dated March 2, 2012 – Accessed May 13, 2021

conservative. Modeled emission rates for roads do not change based on the number of daily operating hours, therefore any additional modeled hours for road activity only increase modeled impacts.

4.2.2 Overburden Hauling

Quarries that include overburden activities also include overburden hauling. Overburden hauling for quarries 4, 17, 8, and 15 was modeled as unpaved roads consistent in methodology with Section 4.2.1 above. The location of these roads spans from the worst-case quarry locations described in Section 4.2 to the beginning point of the associated haul road for each quarry. Quarries 19 and 3-5-7 did not have included overburden hauling because they do not have overburden activities, as described in Section 4.2 above.

4.2.3 Blasting

Blasting sources were represented as volume type sources in AERMOD. Volume source parameters were determined by utilizing the Open Burn/Open Detonation Dispersion Model (OBODM) to obtain the characteristics of the initial blast cloud.

Blasting releases are quasi-instantaneous events and U.S. EPA adopted the Open Burn/Open Detonation Dispersion Model (OBODM) to determine blasting impacts on air quality. OBODM is the only EPA approved model that can estimate the plume rise and plume diameter from open burning or detonation events. OBODM calculates the buoyant rise of the cloud from a detonation or burn of duration less than 15 s using equations from the Rocket Exhaust Effluent Diffusion Model (REEDM) (Bjorklund et al., 1982). These equations were derived by Dumbauld et al. (1973) following the same reasoning as used by Briggs (1971) in the derivation of his rise equations for a continuous source.

The dispersion algorithms in the OBODM model are antiquated and many states prefer AERMOD be used to model the dispersion from blasting events. The OBODM model is still often utilized to determine the initial source parameters of the blast. Blast events are then represented as a volume source in AERMOD with volume source parameters determined from the OBODM model.

GCC uses 100% ANFO for blasting. OBODM uses user inputs of air temperature, air pressure, and fuel heat content along with default fuel burn rate and fuel burn time to determine the initial plume diameter and plume height. Physical properties for ANFO are built into the model. Tijeras applied the average ambient temperature and pressure determined from the AERMET surface file. Finally, with the OBODM output information regarding the initial diameters and release height, parameters for AERMOD are calculated following the AERMOD user guide for volume source parameters. Table 4-2 summarizes OBODM input, output, and calculated AERMOD parameters.

Table 4-2. Blasting Parameters

Blasting Parameters	Value
Maximum ANFO Use (kg/blast)	17
Heat Content (cal/g)	836
Average Temperature (K)	284.7
Average Pressure (mbar)	805.3
OBODM Output - Initial Diameter (m)	65.06
OBODM Output - Release Height (m)	32.5
Volume Source Release Height (m) [1]	16.25
Volume Source Sigma y (m) [2]	15.13
Volume Source Sigma z (m) [3]	15.12

1. Volume source release height = ½ the OBODM release height.
2. Sigma y = Initial diameter / 4.3
3. Sigma z = OBODM release height / 2.15

Modeling for 24-hr averaged standards uses blasting emission rates for 1 blast per hour modeled at the worst-case hour. The emission rates used in the model is based on the blasting of coal or overburden emission factor from AP-42 Table 11.9-1 and one blast per hour.

4.2.3.1 Worst Case Quarry Location Analysis

GCC may blast in any of the quarry areas shown in Figure 4-2 below. The blasting in any quarry would maximally occur once per day and take less than a minute. Only one blast will occur per day at any pit between 10 am and 5 pm. Each quarry used four to eight representative blasting locations along the outer edge of blasting areas to determine the worst-case location and time of day for blasting at each blasting area, as shown in Figure 4-3. Blasting sources in Figure 4-3 are numbered in clockwise order with only selected source numbers shown.

Figure 4-2. Quarry Blasting Locations

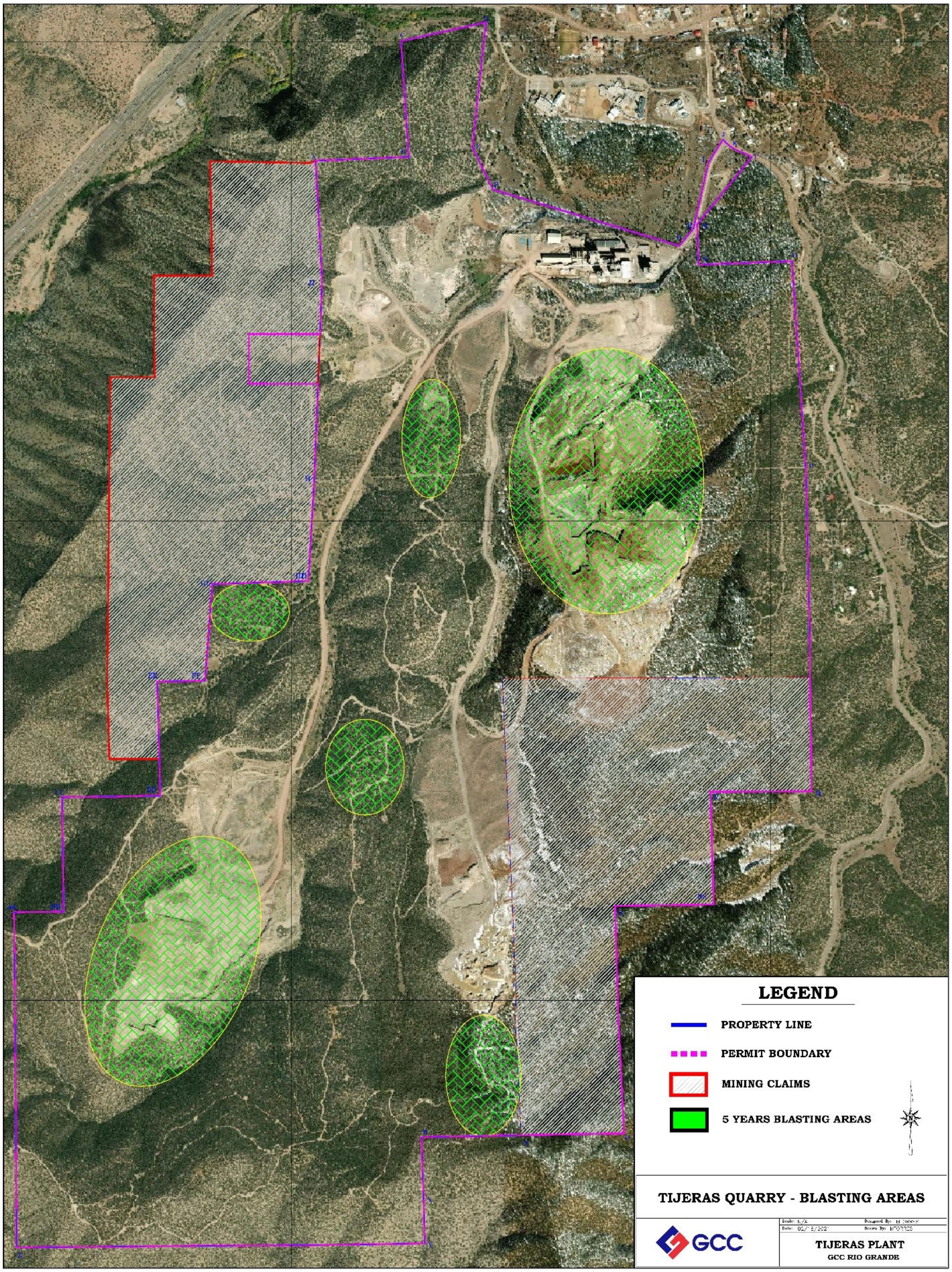
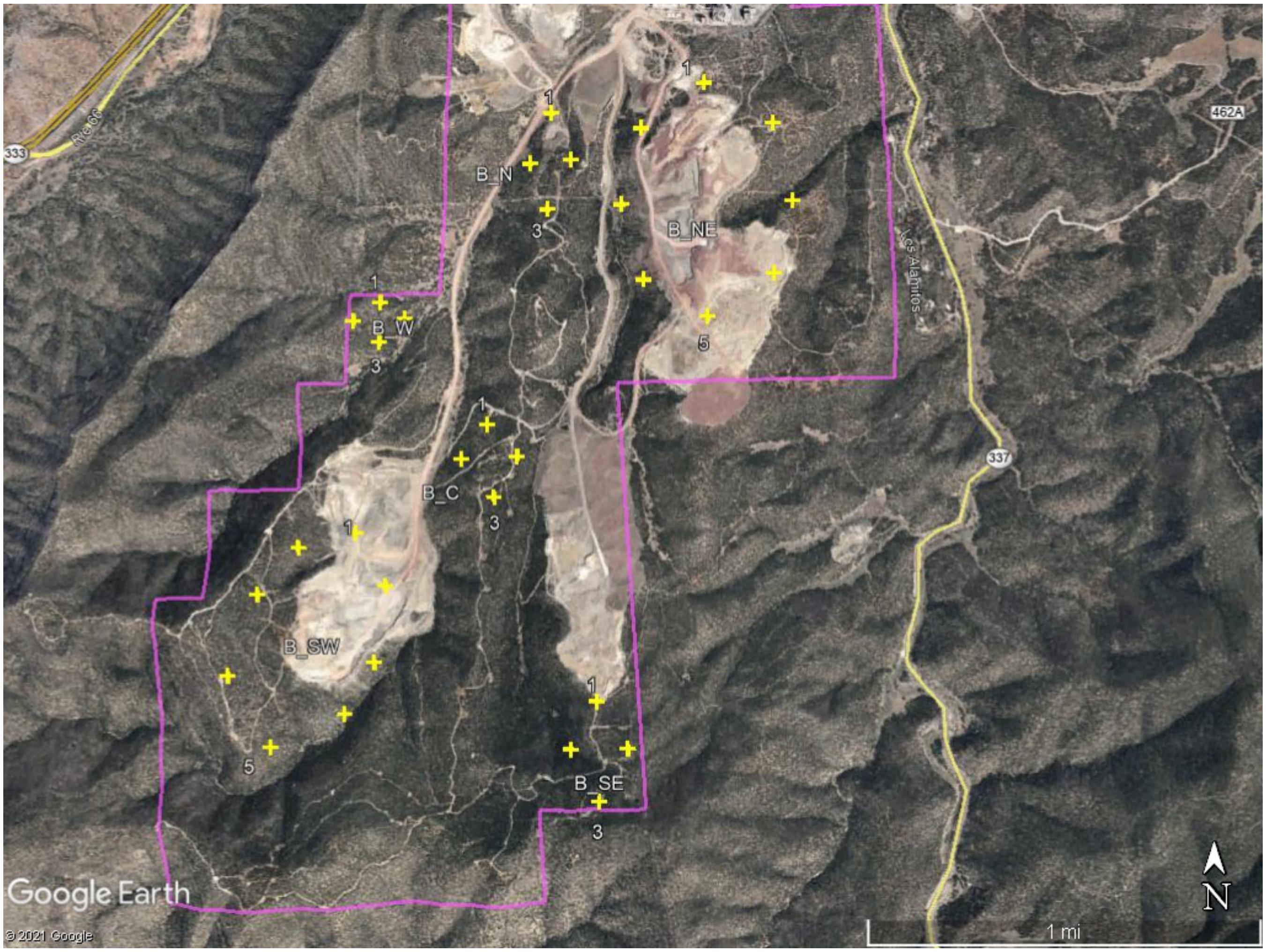


Figure 4-3. Modeled Blasting Source Locations



A screening analysis was conducted for maximum (highest 1st high) 1-hr and 24-hr averaged impacts for each blasting location within each quarry. The screening modeling used a unit emission rate and single model run representative for NO_2, SO_2, and PM_{10}/$PM_{2.5}$. For CO, the expected CO emission rates and season/hour background concentrations were used. Individual source groups were designated for each location and for each individual hour from 10 am – 5 pm. The blasting location within each quarry with the highest modeled impacts was used for subsequent AAQS modeling. The worst-case blasting locations for each quarry are shown in Table 4-3 below.

Table 4-3. Worst-Case Blasting Locations

Quarry	Blasting Source	UTM X (m)	UTM Y (m)	Elevation (m)
4	B_SE_3	372,584.4	3,878,541.6	2,196.32
19	B_SW_7	371,198.5	3,879,391.5	2,155.77
3-5-7	B_NE_3	373,422	3,880,988.6	2,015.18
8	B_N_3 (1-hr) B_N_2 (24-hr)	372,394.9 372,497.3	3,880,965.4 3,881,175.5	2,013.84 1,991.33
17	B_E_4	371,582.8	3,880,506.8	2,034.26
15	B_C_4	372,024.9	3,879,930.7	2,032.79

The worst-case blasting locations represent the worst-case dispersion characteristics for blasting operations, regardless of modeled pollutant, because the results represent the highest 1st high impacts and only individual blasts and hours without any other onsite sources are modeled. While the CO sensitivity analysis results could vary from the unit emission rate sensitivity analysis given the temporally varying background concentrations, the sensitivity analysis results indicate that the worst-case blasting locations for CO emissions are the same as those for other pollutants. Therefore, these worst-case blasting locations are used in the modeling for all included pollutants.

The blasting sensitivity analysis results for 24-hr averaging showed the worst-case blasting location if blasting occurred once each hour from 10 am to 5 pm. The worst-case single hour of blasting for each location used in 24-hr PM_{10} and $PM_{2.5}$ modeling was assumed to be hour 17 (4 pm – 5 pm) due to the hour being closest to morning and evening hours typically associated with poor dispersion characteristics. The blasting sensitivity analysis results for the 1-hr averaging included the worst-case hour for each blasting location. This was hour 17 for all blasting locations and these hours were used in the final analyses for CO, NO_2, and SO_2 modeling.

Blasting emissions are excluded from the annual $PM_{2.5}$ and NO_2 models because the blasting operations do not result in continuous emissions across the entirety of a given year. Consistent with discussions with CAEHD, emissions from blasting are excluded from the annual models. Modeling the worst-case blasting location for annual AAQS is conservative because realistic operations will blast at a variety of locations throughout each quarry.

Blasting modeling for the 1-hr NO_2 AAQS involves a more detailed analysis. As Tier 3 PVMRM scavenges available ozone among all modeled sources, the source grouping approach could not be used for the NO_2 analysis. Instead, the individual blasting hour at the worst-case location was run separately. A final Tier 3 NO_2 modeling analysis was completed to determine the worst-case impact for NO_2. Separate runs including the kiln and worst-case blasting locations were run for the worst-case hour of blasting. The final analysis included the background and was then compared against applicable AAQS.

4.2.4 Emergency Generators

Emergency generators exist at the Facility for emergency backup power generation purposes only and operate less than 500 hours per year. These characteristics exempt the emergency generators from inclusion in the modeling analysis per the Modeling Waivers section of the CAEHD air dispersion modeling guidance.[24]

[24] *Air Dispersion Modeling Guidelines for Air Quality Permitting*, City of Albuquerque, Environmental Health Department, Air Quality Program, Permitting Division, October 2019.

5. INDIVIDUAL QUARRY SCENARIOS

The Tijeras Facility is proposing six active quarry areas: quarries 4, 3-5-7, 8, 15, 17, and 19. Emission calculations for PTE utilize the worst-case emissions from any single quarry operating at a given time. This is conservative, because rationing operations among other quarries with less than maximum PTE results in lower estimated emissions. Emissions estimates for each quarry scenario use the full potential operational throughputs allocated to each single quarry. This same methodology is used for the modeling analysis in order to capture maximum potential impacts and applied by using source groups for each quarry.

Each quarry scenario has specific quarry sub-surface and below grade emissions, blasting, overburden removal, and limestone hauling road emissions allocated to the applicable source groups. The specific blasting and road segment sources for each source group are detailed in Table 5-1 below

Table 5-1. Limestone and Overburden Hauling and Blasting Sources for Specific Quarries

Quarry	4	19	3-5-7	8	17	15
Blasting Source	B_SE_3	B_SW_7	B_NE_3	B_N_3 (1-hr) B_N_2 (24-hr)	B_E_4	B_C_4
Road Segments	1, 1B, 3B, 4B, 5, 6, 7B, 10B, 13	1, 1B, 2, 3B, 4B, 7B, 10, 10B, 12	1B, 3B, 4B, 7, 7B, 10B	1, 1B, 3, 3B, 4B, 7B, 10, 10B	1, 1B, 2, 3B, 4B, 7B, 9, 10, 10B, 15	1, 1B, 3B, 4B, 5, 7B, 10, 10B, 11, 17

Many sources are operational for all quarry scenarios and are added to each quarry source group. These include plant-related sources and non-limestone, non-overburden unpaved road emissions. Overburden hauling for Quarry 8 is conducted on road segment 3B. Emissions from segment 3B are included in all quarry scenarios because segment 3B also facilitates CKD hauling, which is not specific to the operation of any quarry. This results in overstated emissions from segment 3B for modeled scenarios other than quarry 8, however these effects are insignificant to overall model results and conservative.

6. MODELED AIR QUALITY ANALYSIS RESULTS

The modeled ground-level concentrations obtained using the described modeling methodologies, in the form of each relevant air quality standard, are presented in this section.

6.1 PM_{10} and $PM_{2.5}$

The results of the NAAQS and NMAAQ Analysis modeling for PM_{10} and $PM_{2.5}$ compared to the applicable AAQS are detailed in Table 6-1. The PM_{10} form of the standard is the highest 3rd high concentration due to the use of two years of meteorological data. As discussed in Section 3.14, deposition was accounted for only in PM_{10} modeling. An initial model run without deposition was conducted, then any receptors exceeding an AAQS were used for a final run that accounted for deposition. Model results presented in this report are from the final run accounting for deposition.

Table 6-1. Model Results – PM_{10} and $PM_{2.5}$

Pollutant	Averaging Period	Form of Standard	NAAQS ($\mu g/m^3$)	NMAAQS ($\mu g/m^3$)	Project Modeled Concentration[1] ($\mu g/m^3$)	UTM Coordinate (m) East/West	UTM Coordinate (m) North/South
PM_{10}	24-hour	H3H	150	--	127.40	371,553.10	3,880,446.20
$PM_{2.5}$	Annual	Max	12	--	7.93	373,074.40	3,881,980.20
$PM_{2.5}$	24-hour	H8H	35	--	25.06	373,074.40	3,881,980.20

1. Project modeled concentration is the maximum for any individual quarry scenario and includes background. $PM_{2.5}$ also includes secondary pollutant formation.

The results for each individual quarry operating scenario for PM_{10} and $PM_{2.5}$ are shown in Table 6-2 below using the same form of the standard in Table 6-1 above.

Table 6-2. Quarry-Specific PM_{10} and $PM_{2.5}$ Modeled Concentrations

Quarry	Project Modeled Concentration[1] ($\mu g/m^3$)		
	PM_{10} 24-hr	$PM_{2.5}$ 24-hr	$PM_{2.5}$ Annual
4	75.67	25.05	7.92
19	69.58	24.77	7.91
3-5-7	72.84	25.06	7.93
8	69.66	24.70	7.92
17	127.40	24.76	7.91
15	70.67	25.01	7.92

1. Project modeled concentration includes background. $PM_{2.5}$ also includes secondary pollutant formation.

6.2 SO_2, 8-hr CO, and Annual NO_2

The results of the NAAQS and NMAAQ Analysis modeling for SO_2, CO, and annual NO_2 compared to the applicable AAQS are detailed in Table 6-3.

Table 6-3. Model Results – SO_2, CO, and Annual NO_2

Pollutant	Averaging Period	Form of Standard	NAAQS (µg/m³)	NMAAQS (µg/m³)	Project Modeled Concentration[1] (µg/m³)	UTM Coordinate (m) East/West	UTM Coordinate (m) North/South
SO_2	1-hr	H4H	196.4	--	195.76	370,900.00	3,880,600.00
SO_2	3-hr	H2H	1,309.3	--	195.76[2]	370,900.00	3,880,600.00
SO_2	24-hr	H2H	--	261.9	195.76[2]	370,900.00	3,880,600.00
CO	8-hr	H1H	10,303.6	9,960.1	7,410.82	371,500.00	3,880,500.00
NO_2	Annual	Max	--	94.02	47.58	374,200.00	3,882,500.00

1. Project modeled concentration is the maximum for any individual quarry scenario and includes background.
2. Model results for 1-hr SO_2 is conservatively used to compare to 3-hr SO_2 and 24-hr SO_2 in lieu of specific modeling for these AAQS.

The results for each individual quarry operating scenario for SO_2, CO, and annual NO_2 are shown in Table 6-4 below using the same form of the standard in Table 6-3 above.

Table 6-4. Quarry-Specific SO_2 CO, and Annual NO_2 Modeled Concentrations

Quarry	Project Modeled Concentration[1] (µg/m³)		
	SO_2 1-hr	CO 8-hr	NO_2 Annual
4	195.76	6,413.15	47.58
19	195.76	4,331.48	47.58
3-5-7	195.76	2,261.80	47.58
8	195.76	2,492.46	47.58
17	195.76	7,410.82	47.58
15	195.76	2,542.16	47.58

6.4 1-hr CO and 1-hr NO_2

The applicable AAQS for 1-hr CO and 1-hr NO_2 are detailed in Table 6-5below.

Table 6-5. AAQS – 1-hr CO and 1-hr NO_2

Pollutant	Averaging Period	Form of More Stringent Standard	NAAQS (µg/m³)	NMAAQS (µg/m³)	Project Modeled Concentration (µg/m³)	UTM Coordinate (m) East/West	UTM Coordinate (m) North/South
CO	1-hr	H1H	40,069.6	14,997.5	45,419.14	372,616.00	3,878,504.10
NO_2	1-hr	H8H	188.03	--	260.89	372,566.00	3,878,504.30
NO_2	24-hr	H8H[1]	--	188.03	260.89	372,566.00	3,878,504.30

1. According to NMAQB Dispersion Modeling Guidelines, NO_2 1-hr modeling may be used as a surrogate for NO_2 24-hr modeling as they share the same form of the standard.

The results for each individual quarry operating scenario for 1-hr CO and 1-hr NO_2 are shown in Table 6-6 below using the same form of the standard in Table 6-5 above.

Table 6-6. Quarry-Specific 1-hr CO and 1-hr NO_2 Modeled Concentrations

Quarry	Project Modeled Concentration[1] (µg/m³)	
	CO 1-hr	NO_2 1-hr
4[2]	45,419.14	260.89
19[2]	20,149.16	181.92
3-5-7	8,187.60	177.81
8	10,020.33	177.81
17[2]	38,091.99	226.14
15	8,882.33	177.81

1. Project modeled concentration includes background.
2. Quarries 4, 17, and 19 show an exceedance of the applicable CO AAQS and Quarries 4 and 17 show an exceedance of the applicable NO_2 AAQS on the Facility fenceline where, if blasting occurs, measures will be taken to ensure public does not have access.

The only modeled sources of CO and NO_2 at the Tijeras Facility are the kilns and blasting. The emission rate and modeled characteristics of the kilns are the same for all individual quarry scenarios, therefore, the exceedances of the AAQS are due to differences in modeled results from blasting activities. Model results for the kiln alone substantiate this conclusion as shown in Table 6-7 below. Figures in Attachment C show the receptors for each individual quarry scenario that are above the 1-hr CO and 1-hr NO_2 AAQS, marked in yellow. For scale, the yellow colored fine grid receptors away from the boundary are spaced at 100 meters.

Table 6-7. Kiln-Specific 1-hr CO and 1-hr NO_2 Modeled Concentrations

Emission Unit	Project Modeled Concentration (µg/m³)		
	CO 1-hr	NO_2 1-hr, Quarry 4	NO_2 1-hr, Quarry 17
Kiln	**4,355.55**	**65.95**	**61.09**

The figures show the only exceedances of the 1-hr CO and 1-hr NO_2 AAQS to be at the Facility property boundary or at receptors less than 190 meters from the blasting location. Any blasting by GCC is conducted by first clearing the surrounding area of people for safety reasons. Any blasting near the property line is not conducted if there are suspected to be people within an unsafe distance on the outer side of the fence line. This unsafe distance is set to no less than 250 meters from the blast location, which is conservatively above the greatest distance from blasting to any modeled AAQS exceedance (roughly 190 meters). This blasting exclusion plan setting 250 meters as the unsafe distance from the blast will apply to all blasting locations, regardless of the proximity to the modeled worst case blasting location. Blasts occur within a few seconds or less and the blast plume disperses rapidly in the following moments, meaning that any person entering within 250 meters after the blast would experience a much lower CO and NO_2 ambient concentration with each passing minute. Additionally, the locations of Quarries 4, 17 and 19 are far from any populated or frequently trafficked area, which limits the likelihood and frequency of any potential public access.

Each blast is followed by a post blast inspection which is a critical step in the blasting process to ensure all explosive products have detonated prior to allowing any people within the unsafe distance of the blast. The post blast inspection is conducted by two specially trained individuals that carefully walk around the edge of the blast pattern and within the blasted area. If the post blast inspection finds that all explosive products have detonated, then mining operations resume and GCC would no longer ensure that unauthorized persons are excluded from the unsafe distance from the blast. The post blast inspection takes several minutes, such that gaseous plumes from a blast are significantly dispersed and ground level concentrations of air pollutants are much lower after the inspection than at the time of the blast. Therefore, excluding unauthorized persons from entering the unsafe area of the blast during the post blast inspection serves to reduce potential impacts of blasting gaseous pollutants on members of the public.

The December 2019 U.S. EPA Guidance on Ambient Air[25] includes provisions for both practical ability to access and the presence of rugged terrain as means for precluding public access. Given the site circumstances and facility procedures and U.S. EPA guidance, GCC believes it is reasonable to conclude that no members of the public would be near enough to a blast during the blast or in the few moments following to experience ambient concentrations in excess of the 1-hr CO and 1-hr NO_2 AAQS.

6.5 Model Files Directory

Electronic files used to complete the air dispersion modeling analysis are provided electronically with this submittal. These include:

- Model input files,
- Model output files,
- Meteorological data files,
- Downwash files,
- Ozone background data, and
- Terrain and AERMAP data files.

A directory of electronic files provided is included in Table 6-8 below. Note that Quarry 17 blasting sources in the model may be denoted as B_E_# or B_W_# interchangeably but refer to the same sources regardless of if "E" or "W" is used.

[25] Revised Policy on Exclusions from "Ambient Air" (December 2, 2019) From: Andrew R. Wheeler, To: Regional Administrators

Table 6-8. Modeling Files

Folder Name [1]	SubFolder Name	Description [1]
AERMAP	Run 1 through 18 and Boundary	AERMAP Terrain Input/Output Files for receptors
	Sources_Bldgs	AERMAP Terrain Input/Output Files for sources and buildings
BPIP		BPIP input, output, and summary files for downwash
OBODM	N/A	Blasting OBODM run
CO	N/A	AERMOD input (AMI), output (AML), and zipped files including plot files (PLT)
NO_2	PVMRM	AERMOD input (AMI), output (AML), and zipped files including plot files (PLT)
	Worst Case Blasting	AERMOD input (AMI), output (AML), and zipped files including plot files (PLT) for the NO2 Tier 1 worst case location and hour blasting scenario.
SO_2	N/A	AERMOD input (AMI), output (AML), and zipped files including plot files (PLT)
PM_{10}	N/A	AERMOD input (AMI), output (AML), and zipped files including plot files (PLT)
$PM_{2.5}$	N/A	AERMOD input (AMI), output (AML), and zipped files including plot files (PLT)
AERMET		AERMET 2 year SFC and PFL files and zipped AERSURFACE data files
	2018	2018 - 2019 AERMET files
	2019	1 - 2020 AERMET files

ATTACHMENT A. SOURCE PARAMETERS AND EMISSION RATES

Table A-1. All Blasting Sources

Associated Quarry	Source ID	UTM		Elev.
		East (m)	North (m)	(m)
Quarry 3-5-7	B_NE_1	373058.8	3881485.7	1993.13
	B_NE_2	373341.7	3881309.8	2024.31
	B_NE_3	373422	3880988.6	2015.18
	B_NE_4	373337.9	3880682.8	2045.6
	B_NE_5	373058.8	3880506.9	2049.32
	B_NE_6	372795	3880667.5	2004.47
	B_NE_7	372707	3880988.6	1974.5
	B_NE_8	372791.2	3881302.2	1990.8
Quarry 8	B_N_1	372416.5	3881380.2	1956.81
	B_N_2	372497.3	3881175.5	1991.33
	B_N_3	372394.9	3880965.4	2013.84
	B_N_4	372324.9	3881164.7	1976.64
Quarry 17	B_E_1	371691.1	3880588	2008.34
	B_E_2	371790.9	3880518.9	2002.58
	B_E_3	371685.7	3880420.2	2012.8
	B_E_4	371582.8	3880506.8	2034.26
Quarry 15	B_C_1	372135.1	3880073.7	2048.61
	B_C_2	372259.4	3879935.8	2054.37
	B_C_3	372162.1	3879770.5	2069.7
	B_C_4	372024.9	3879930.7	2032.79
Quarry 19	B_SW_1	371582.8	3879629.8	2057.8
	B_SW_2	371707.4	3879413.2	2060.49
	B_SW_3	371658.6	3879099.2	2074.97
	B_SW_4	371528.7	3878888	2068.54
	B_SW_5	371236.4	3878763.5	2128.37
	B_SW_6	371079.4	3879066.7	2171.46
	B_SW_7	371198.5	3879391.5	2155.77
	B_SW_8	371360.9	3879575.6	2116.6
Quarry 4	B_SE_1	372579	3878936.8	2140.4
	B_SE_2	372703.5	3878747.3	2168.79
	B_SE_3	372584.4	3878541.6	2196.32
	B_SE_4	372470.7	3878741.9	2131.3

Note: Volume Source ID (B_XXX_##): B = blasting source, XXX = quarry location, ## = location within quarry

Table A-2. Particulate Source Locations and Emission Rates – Point Sources

Source ID	Description	X Coordinate	Y Coordinate	Elevation	$PM_{2.5}$ Emission Rate	PM_{10} Emission Rate
		(m)	(m)	(m)	(g/s)	(g/s)
1.2	PRIMARY CRUSHER	372830.6	3881817.8	1947.09	1.202E-03	7.938E-03
1.3	SECONDARY CRUSHER	372837.6	3881817.8	1947.05	1.603E-03	1.058E-02
1.4	SCREENS	372919.0	3881806.0	1944.97	4.207E-03	2.778E-02
2.10	RAW MATERIAL HANDLING	373164.1	3881775.5	1946.20	4.941E-03	5.530E-02
2.1	CRUSHED RAW MATERIAL HANDLING	373116.0	3881806.0	1946.15	5.292E-03	1.852E-02
2.2	CRUSHED RAW MATERIAL HANDLING	373140.0	3881806.0	1946.2	5.292E-03	1.852E-02
2.3	CRUSHED RAW MATERIAL HANDLING	373148.0	3881778.0	1946.18	5.292E-03	1.852E-02
2.4	CRUSHED RAW MATERIAL HANDLING	373131.0	3881781.0	1946.22	5.292E-03	1.852E-02
2.6	ADDITIVE HANDLING	373101.0	3881803.0	1946.07	7.862E-04	2.782E-03
2.7	ADDITIVE HANDLING	373114.0	3881801.0	1946.16	8.643E-04	5.166E-03
2.8	ADDITIVE HANDLING	373115.0	3881776.0	1946.25	1.966E-04	6.955E-04
2.9	RAW MATERIAL HANDLING	373165.1	3881805.5	1946.2	4.941E-03	5.530E-02
3.1	RAW MILL AIR SEPARATOR	373182.1	3881804.5	1946.09	1.373E-02	9.517E-02
3.2	#1 RAW MILL	373186.1	3881803.5	1946.1	3.533E-03	5.499E-02
3.3	RAW MILL AIR SEPARATOR	373182.1	3881779.5	1946.07	1.373E-02	9.517E-02
3.4	#2 RAW MILL	373185.1	3881778.5	1946.06	3.533E-03	5.499E-02
4.1	KILN FEED BLENDING	373056.0	3881821.0	1946.1	2.413E-03	1.593E-02
4.2	KILN FEED BLENDING	373027.0	3881822.0	1946.18	2.413E-03	1.593E-02
4.3	KILN FEED	373051.0	3881841.0	1946.12	8.310E-04	5.488E-03
4.4	KILN FEED	373086.0	3881850.0	1945.97	8.310E-04	5.488E-03
4.5	KILN FEED	373065.0	3881844.2	1946.02	1.192E-03	2.249E-02
4.6	KILN FEED	373065.0	3881846.2	1946.01	1.192E-03	2.249E-02
5.1	CLINKER COOLER	373137.0	3881832.8	1946.01	5.520E-05	1.953E-04
5.13	COAL CRUSHING	372983.2	3881922.3	1944.75	3.780E-03	2.041E-02

Source ID	Description	X Coordinate	Y Coordinate	Elevation	$PM_{2.5}$ Emission Rate	PM_{10} Emission Rate
		(m)	(m)	(m)	(g/s)	(g/s)
5.15	COAL SILO	373177.8	3881862.6	1945.99	4.864E-07	3.212E-06
5.2	CLINKER COOLER	373129.0	3881848.8	1946.03	2.518E-04	8.908E-04
6.3	KILN DUST COLLECTION	373015.1	3881826.0	1945.88	4.394E-04	8.291E-03
6.4	KILN DUST COLLECTION	373015.1	3881861.0	1945.55	2.197E-04	4.145E-03
7.1	CLINKER HANDLING	373133.7	3881828.3	1946.01	2.142E-03	1.386E-02
7.10	CLINKER HANDLING	373121.0	3881769.0	1946.27	2.520E-04	1.260E-03
7.11	CLINKER HANDLING	373118.0	3881769.0	1946.28	1.260E-04	3.780E-04
7.12	CLINKER HANDLING	373164.1	3881771.5	1946.19	3.456E-03	2.282E-02
7.13	CLINKER HANDLING	373165.1	3881801.5	1946.14	3.456E-03	2.282E-02
7.2	CLINKER HANDLING	373133.0	3881802.0	1946.2	8.820E-04	3.780E-03
7.3	CLINKER HANDLING	373144.0	3881794.0	1946.17	2.520E-04	1.260E-03
7.4	CLINKER HANDLING	373147.0	3881794.0	1946.19	1.260E-04	3.780E-04
7.5	CLINKER HANDLING	373122.0	3881795.0	1946.19	2.520E-04	1.260E-03
7.6	CLINKER HANDLING	373117.0	3881795.0	1946.19	1.260E-04	3.780E-04
7.7	CLINKER HANDLING	373133.0	3881778.0	1946.22	3.780E-04	1.477E-03
7.8	CLINKER HANDLING	373143.0	3881769.0	1945.98	2.520E-04	1.260E-03
7.9	CLINKER HANDLING	373145.0	3881769.0	1946.07	1.260E-04	3.780E-04
8.1	FINISH MILL	373186.1	3881791.5	1946.1	1.679E-03	1.109E-02
8.2	FINISH MILL	373182.1	3881792.5	1946.11	8.728E-03	5.763E-02
8.3	FINISH MILL	373185.1	3881766.5	1945.97	1.679E-03	1.109E-02
8.4	FINISH MILL	373182.1	3881767.5	1946.02	8.728E-03	5.763E-02
8.5	FINISH MILL	373132.0	3881762.3	1946.07	1.002E-03	6.615E-03
8.6	FINISH MILL	373191.1	3881761.5	1945.92	1.269E-03	8.379E-03
8.7	FINISH MILL	373178.1	3881766.5	1946.09	3.940E-03	2.602E-02
9.1	CEMENT STORAGE	373258.9	3881792.3	1946.86	2.016E-03	1.336E-02
9.2	CEMENT STORAGE	373258.9	3881781.3	1946.93	2.016E-03	1.336E-02
9.3	CEMENT STORAGE	373258.9	3881771.3	1946.82	2.016E-03	1.336E-02
9.4	CEMENT STORAGE	373064.4	3881762.7	1946.23	1.386E-03	8.946E-03

Source ID	Description	X Coordinate	Y Coordinate	Elevation	$PM_{2.5}$ Emission Rate	PM_{10} Emission Rate
		(m)	(m)	(m)	(g/s)	(g/s)
KILN	KILN BAGHOUSE	372985.0	3881825.0	1945.48	2.253E-00	4.203E+00

1. Source ID Kiln includes the sum of the emissions from Source IDs 5.3 – 5.10, as these sources are routed through the kiln stack. Additionally, an emission rate of 0.7488 g/s (26.03 tpy) was used for the annual $PM_{2.5}$ model as the Kiln stack has an annual $PM_{2.5}$ limit.

Table A-3. Particulate Source Locations and Emission Rates – Area Sources

Source ID	Description	X Coordinate	Y Coordinate	Elevation	$PM_{2.5}$ Emission Rate	PM_{10} Emission Rate
		(m)	(m)	(m)	($g/s/m^2$)	($g/s/m^2$)
QUA48T6	Quarry 4 8 am to 6 pm hour restrictions	372524.5	3878513.3	2195.30	5.57E-07	3.68E-06
QUA8	Quarry 8	372435.3	3881110.4	2006.11	5.57E-07	3.68E-06
QUA357	Quarry 3-5-7	373351.6	3880918.5	2027.82	5.57E-07	3.68E-06
QUA15	Quarry 15	371961.1	3879869.2	2025.75	5.57E-07	3.68E-06
QUA177T6	Quarry 17 7 am to 6 pm hour restrictions	371563.8	3880436.6	2038.72	5.57E-07	3.68E-06
QUA19	Quarry 19	371131.5	3879330.6	2172.07	5.57E-07	3.68E-06

Table A-4. Particulate Source Locations and Emission Rates – Volume Sources

Source ID	Description	X Coordinate	Y Coordinate	Elevation	Short Term $PM_{2.5}$ Emission Rate[3]	Annual $PM_{2.5}$ Emission Rate[4]	PM_{10} Emission Rate
		(m)	(m)	(m)	(g/s)	(g/s)	(g/s)
7.14	Clinker Transfer	373114.2	3881762.6	1945.98	2.39E-03		1.64E-02

Source ID	Description	X Coordinate	Y Coordinate	Elevation	Short Term $PM_{2.5}$ Emission Rate[3]	Annual $PM_{2.5}$ Emission Rate[4]	PM_{10} Emission Rate
		(m)	(m)	(m)	(g/s)	(g/s)	(g/s)
2.5A[1]	Additive dump hopper (Iron and Gypsum) and clinker reclaim hopper (EU 2.11)	373093.0	3881803.0	1946.04	4.81E-03		3.33E-02
5.12A	Coal dump hopper	372923.0	3881927.0	1946.67	1.75E-03		1.16E-02
1.1A	Crusher Dump Hopper	372819.6	3881808.8	1947.27	1.60E-02		1.11E-01
5.14	Coal Conveyor	373144.8	3881915.6	1945.59	4.78E-07		3.16E-06
6.7	Dust Pellets From Pelletizer	373003.1	3881821.0	1945.74	2.80E-04		1.94E-03
10.2	Bottom ash pile material transfers	372855.0	3881847.0	1945.78	1.51E-04		9.83E-04
10.3	Iron pile material transfers	372946.0	3881845.0	1944.89	6.43E-04		4.20E-03
10.4	Sandstone pile material transfers	372701.0	3881756.0	1946.95	1.44E-03		9.45E-03
10.8	Clinker pile material transfers	372900.0	3881833.0	1944.76	9.03E-03		5.97E-02
10.11	CKD repository material transfers	372244.0	3881648.0	1962.18	1.76E-04		1.15E-03
Q4VOL	Quarry 4 Volume Source	372642.2	3878588.1	2194.39	3.16E-02		2.37E-01
Q19VOL	Quarry 19 Volume Source	371170.1	3879354.0	2160.95	1.22E-03		8.06E-03
Q17VOL	Quarry 17 Volume Source	371643.9	3880551.9	2019.57	3.16E-02		2.37E-01
Q15VOL	Quarry 15 Volume Source	372284.6	3879948.0	2047.41	3.16E-02		2.37E-01
Q37VOL	Quarry 3-7 Volume Source	373202.7	3881384.1	2021.60	1.22E-03		8.06E-03
Q8VOL	Quarry 8 Volume Source	372468.7	3881371.8	1959.57	3.16E-02		2.37E-01
SILOV1	Loadout Silo Bin Vent Fugitive Emissions 1	373267.9	3881772.4	1946.87	2.41E-04		1.59E-03
SILOV2	Loadout Silo Bin Vent Fugitive Emissions 2	373267.9	3881782.6	1946.92	2.41E-04		1.59E-03
SILOV3	Loadout Silo Bin Vent Fugitive Emissions 3	373267.9	3881793.9	1946.7	2.41E-04		1.59E-03
SILOV4	Loadout Silo Bin Vent Fugitive Emissions 4	373238.9	3881772.4	1946.88	2.41E-04		1.59E-03
SILOV5	Loadout Silo Bin Vent Fugitive Emissions 5	373238.9	3881782.6	1946.93	2.41E-04		1.59E-03

Source ID	Description	X Coordinate	Y Coordinate	Elevation	Short Term $PM_{2.5}$ Emission Rate[3]	Annual $PM_{2.5}$ Emission Rate[4]	PM_{10} Emission Rate
		(m)	(m)	(m)	(g/s)	(g/s)	(g/s)
SILOV6	Loadout Silo Bin Vent Fugitive Emissions 6	373238.9	3881793.9	1946.96	2.41E-04		1.59E-03
CSILOV1	Clinker/Raw Meal Bin Vent Fugitive Emissions 1	373106.1	3881770.1	1946.21	5.32E-04		3.51E-03
CSILOV2	Clinker/Raw Meal Bin Vent Fugitive Emissions 2	373106.1	3881781.9	1946.18	5.32E-04		3.51E-03
MILLV1	Mill Building Fugitive Emissions 1	373194	3881765.3	1945.97	5.32E-04		3.51E-03
MILLV2	Mill Building Fugitive Emissions 2	373194	3881779.6	1946.06	5.32E-04		3.51E-03
Blasting – Individual Source Emission Rates, Various Locations[2]					0.2092[2,3]		3.6258
Road Segment 1 – Individual Source Emission Rates, Various Locations					1.28E-03	4.23E-04	1.28E-02
Road Segment 2 – Individual Source Emission Rates, Various Locations					1.28E-03	4.23E-04	1.28E-02
Road Segment 3 – Individual Source Emission Rates, Various Locations					1.28E-03	4.23E-04	1.28E-02
Road Segment 4 – Individual Source Emission Rates, Various Locations					1.73E-04	1.39E-04	1.73E-03
Road Segment 5 – Individual Source Emission Rates, Various Locations					1.28E-03	4.23E-04	1.28E-02
Road Segment 6 – Individual Source Emission Rates, Various Locations					1.28E-03	4.23E-04	1.28E-02
Road Segment 7 – Individual Source Emission Rates, Various Locations					1.28E-03	4.23E-04	1.28E-02
Road Segment 9 – Individual Source Emission Rates, Various Locations					1.28E-03	4.23E-04	1.28E-02
Road Segment 10 – Individual Source Emission Rates, Various Locations					1.28E-03	4.23E-04	1.28E-02
Road Segment 11 – Individual Source Emission Rates, Various Locations					1.28E-03	4.23E-04	1.28E-02
Road Segment 12 – Individual Source Emission Rates, Various Locations					1.28E-03	4.23E-04	1.28E-02
Road Segment 1B[3] – Individual Source Emission Rates, Various Locations					1.69E-04	1.42E-05	1.69E-03
Road Segment 3B[3] – Individual Source Emission Rates, Various Locations					3.90E-04	5.45E-04	3.90E-03
Road Segment 4B[3] – Individual Source Emission Rates, Various Locations					2.79E-04	2.39E-05	2.79E-03
Road Segment 7B[3] – Individual Source Emission Rates, Various Locations					1.11E-04	7.95E-06	1.11E-03
Road Segment 10B[3] – Individual Source Emission Rates, Various Locations					1.69E-04	1.42E-05	1.69E-03
Road Segment 13 – Individual Source Emission Rates, Various Locations					2.21E-04	5.30E-04	2.21E-03
Road Segment 15 – Individual Source Emission Rates, Various Locations					2.21E-04	5.30E-04	2.21E-03

Source ID	Description	X Coordinate	Y Coordinate	Elevation	Short Term $PM_{2.5}$ Emission Rate[3]	Annual $PM_{2.5}$ Emission Rate[4]	PM_{10} Emission Rate
		(m)	(m)	(m)	(g/s)	(g/s)	(g/s)
Road Segment 17 – Individual Source Emission Rates, Various Locations					2.21E-04	5.30E-04	2.21E-03

1. Source ID 2.5A includes emissions from Source ID 2.11 since 2.11 is vented through this release point.
2. Per AQP guidance, no blasting emission were included in annual $PM_{2.5}$ modeling.
3. Emission rate for $PM_{2.5}$ 24-hr modeling
4. Emission rate for $PM_{2.5}$ Annual modeling
5. Road segments with "B" in the name are for non-limestone material hauling activities and are included in all source groups for individual quarries

Table A-5. Particulate Source Parameters – Point Sources

Source ID	Description	Stack Height	Stack Temp	Stack Velocity	Stack Diameter	Release Orientation	Source Type for Deposition
		(m)	(K)	(m/s)	(m)		
1.2	PRIMARY CRUSHER	9.91	0	18.928	0.46	Cap	Limestone and Gypsum Handling
1.3	SECONDARY CRUSHER	9.91	0	18.349	0.46	Cap	Limestone and Gypsum Handling
1.4	SCREENS	10.97	0	27.920	0.52	Horizontal	Limestone and Gypsum Handling
2.10	RAW MATERIAL HANDLING	29.26	0	12.619	0.40	Cap	Limestone and Gypsum Handling
2.1	CRUSHED RAW MATERIAL HANDLING	34.75	0	0.001	0.40	Horizontal	Limestone and Gypsum Handling
2.2	CRUSHED RAW MATERIAL HANDLING	34.44	0	0.001	0.40	Horizontal	Limestone and Gypsum Handling

Source ID	Description	Stack Height	Stack Temp	Stack Velocity	Stack Diameter	Release Orientation	Source Type for Deposition
		(m)	(K)	(m/s)	(m)		
2.3	CRUSHED RAW MATERIAL HANDLING	34.75	0	0.001	0.40	Horizontal	Limestone and Gypsum Handling
2.4	CRUSHED RAW MATERIAL HANDLING	34.44	0	0.001	0.34	Horizontal	Limestone and Gypsum Handling
2.6	ADDITIVE HANDLING	4.42	0	0.001	0.40	Horizontal	Limestone and Gypsum Handling
2.7	ADDITIVE HANDLING	33.83	0	0.001	0.40	Horizontal	Limestone and Gypsum Handling
2.8	ADDITIVE HANDLING	33.83	0	0.001	0.37	Horizontal	Limestone and Gypsum Handling
2.9	RAW MATERIAL HANDLING	28.80	0	12.619	0.61	Cap	Limestone and Gypsum Handling
3.1	RAW MILL AIR SEPARATOR	29.47	340.87	19.782	0.76	Cap	Limestone and Gypsum Handling
3.2	#1 RAW MILL	29.11	331.98	19.873	0.51	Cap	Limestone and Gypsum Handling
3.3	RAW MILL AIR SEPARATOR	29.11	340.87	19.782	0.76	Cap	Limestone and Gypsum Handling
3.4	#2 RAW MILL	29.11	331.98	19.873	0.51	Cap	Limestone and Gypsum Handling
4.1	KILN FEED BLENDING	24.38	0	16.398	0.34	Horizontal	Limestone and Gypsum Handling
4.2	KILN FEED BLENDING	24.38	0	16.398	0.34	Horizontal	Limestone and Gypsum Handling

Source ID	Description	Stack Height (m)	Stack Temp (K)	Stack Velocity (m/s)	Stack Diameter (m)	Release Orientation	Source Type for Deposition
4.3	KILN FEED	28.55	0	10.058	0.46	Horizontal	Limestone and Gypsum Handling
4.4	KILN FEED	28.55	0	10.058	0.46	Horizontal	Limestone and Gypsum Handling
4.5	KILN FEED	39.75	0	9.570	0.36	Horizontal	Limestone and Gypsum Handling
4.6	KILN FEED	39.75	0	9.570	0.36	Horizontal	Limestone and Gypsum Handling
5.1	CLINKER COOLER	8.53	320	0.001	0.35	Vertical	Cement Handling
5.13	COAL CRUSHING	8.99	0	0.001	0.33	Cap	Coal Handling
5.15	COAL SILO	29.57	0	0.001	0.38	Cap	Coal Handling
5.2	CLINKER COOLER	5.79	320	0.001	0.35	Vertical	Cement Handling
6.3	KILN DUST COLLECTION	14.63	0	0.001	0.36	Cap	Cement Handling
6.4	KILN DUST COLLECTION	15.24	0	0.001	0.36	Cap	Cement Handling
7.1	CLINKER HANDLING	38.86	320.37[1]	0.001	0.48	Cap	Cement Handling
7.10	CLINKER HANDLING	24.99	0	0.001	0.29	Horizontal	Cement Handling
7.11	CLINKER HANDLING	24.99	0	0.001	0.29	Horizontal	Cement Handling
7.12	CLINKER HANDLING	28.80	0	22.007	0.61	Cap	Cement Handling
7.13	CLINKER HANDLING	29.41	0	22.007	0.61	Cap	Cement Handling
7.2	CLINKER HANDLING	34.90	317.04[1]	0.001	0.41	Vertical	Cement Handling
7.3	CLINKER HANDLING	24.69	0	0.001	0.29	Horizontal	Cement Handling

Source ID	Description	Stack Height (m)	Stack Temp (K)	Stack Velocity (m/s)	Stack Diameter (m)	Release Orientation	Source Type for Deposition
7.4	CLINKER HANDLING	24.69	0	0.001	0.29	Horizontal	Cement Handling
7.5	CLINKER HANDLING	24.69	0	0.001	0.29	Horizontal	Cement Handling
7.6	CLINKER HANDLING	24.69	0	0.001	0.29	Horizontal	Cement Handling
7.7	CLINKER HANDLING	34.90	310.93[1]	0.001	0.41	Vertical	Cement Handling
7.8	CLINKER HANDLING	24.99	0	0.001	0.29	Horizontal	Cement Handling
7.9	CLINKER HANDLING	24.99	0	0.001	0.29	Horizontal	Cement Handling
8.1	FINISH MILL	29.11	317.59	15.453	0.51	Cap	Cement Handling
8.2	FINISH MILL	29.47	333.71	15.789	0.76	Cap	Cement Handling
8.3	FINISH MILL	29.26	317.59	15.453	0.51	Cap	Cement Handling
8.4	FINISH MILL	29.06	333.71	15.789	0.76	Cap	Cement Handling
8.5	FINISH MILL	7.62	0	23.195	0.37	Cap	Cement Handling
8.6	FINISH MILL	29.47	335.26	28.00	0.44	Cap	Cement Handling
8.7	FINISH MILL	29.47	329.87	23.622	0.73	Cap	Cement Handling
9.1	CEMENT STORAGE	47.70	0	0.001	0.40	Horizontal	Cement Handling
9.2	CEMENT STORAGE	47.70	0	0.001	0.40	Horizontal	Cement Handling
9.3	CEMENT STORAGE	47.70	0	0.001	0.40	Horizontal	Cement Handling
9.4	CEMENT STORAGE	52.88	0	0.001	0.40	Horizontal	Cement Handling
KILN	KILN BAGHOUSE	53.34	440.37	21.34	3.35	Vertical	Combustion Stack

Source ID	Description	Stack Height	Stack Temp	Stack Velocity	Stack Diameter	Release Orientation	Source Type for Deposition
		(m)	(K)	(m/s)	(m)		

1. Note that Clinker Handling 7.1, 7.2, and 7.7 are the sources immediately after the clinker coolers which is at 344.87 K, thus these sources' exhausts are at a higher temperature than the other clinker handling sources (e.g., 7.12, 7.13, 7.3, 7.5 and 7.8).

Table A-6. Particulate Source Parameters – Area Sources

Source ID	Description	Release Height	X Length	Y Length	Angle	Init. Vert. Dim.	Source Type for Deposition
		(m)	(m)	(m)	(degrees)	(m)	
QUA4	Quarry 4	0	127.23	127.23	-4	0	Limestone and Gypsum Handling
QUA8	Quarry 8	0	127.23	127.23	0	0	Limestone and Gypsum Handling
QUA357	Quarry 3-5-7	0	127.23	127.23	0	0	Limestone and Gypsum Handling
QUA15	Quarry 15	0	127.23	127.23	0	0	Limestone and Gypsum Handling
QUA17	Quarry 17	0	127.23	127.23	0	0	Limestone and Gypsum Handling
QUA19	Quarry 19	0	127.23	127.23	0	0	Limestone and Gypsum Handling

Table A-7. Particulate Source Parameters – Volume Sources

Source ID	Description	Release Height	Initial Lateral Dimension	Initial Vertical Dimension	Source Type for Deposition
		(m)	(m)	(m)	
7.14	Clinker Transfer	3.66	5.67	0.85	Cement Handling
2.5A	Additive dump hopper (Iron and Gypsum) and clinker reclaim hopper	1.52	0.532	1.42	Limestone and Gypsum Handling
5.12A	Coal dump hopper	1.52	0.325	1.42	Coal Handling

Source ID	Description	Release Height	Initial Lateral Dimension	Initial Vertical Dimension	Source Type for Deposition
		(m)	(m)	(m)	
1.1A	Crusher Dump Hopper	1.52	1.244	1.42	Limestone and Gypsum Handling
5.14	Coal Conveyor	14.78	0.71	0.71	Coal Handling
6.7	Dust Pellets From Pelletizer	6.5	3.05	0.70	Cement Handling
10.2	Bottom ash pile material transfers	1.59	0.85	2.01	Fly Ash Handling
10.3	Iron pile material transfers	1.59	0.85	2.01	Limestone and Gypsum Handling
10.4	Sandstone pile material transfers	1.59	0.85	2.01	Limestone and Gypsum Handling
10.8	Clinker pile material transfers	1.59	0.85	2.01	Cement Handling
10.11	CKD repository material transfers	0.43	0.7	2.74	Cement Handling
Q4VOL	Quarry 4 Volume Source	0.53	29.59	0.5	Limestone and Gypsum Handling
Q19VOL	Quarry 19 Volume Source	0.53	29.59	0.5	Limestone and Gypsum Handling
Q17VOL	Quarry 17 Volume Source	0.53	29.59	0.5	Limestone and Gypsum Handling
Q15VOL	Quarry 15 Volume Source	0.53	29.59	0.5	Limestone and Gypsum Handling
Q37VOL	Quarry 3-7 Volume Source	0.53	29.59	0.5	Limestone and Gypsum Handling
Q8VOL	Quarry 8 Volume Source	0.53	29.59	0.5	Limestone and Gypsum Handling
SILOV1	Loadout Silo Bin Vent Fugitive Emissions 1	2.82	0.85	2.62	Cement Handling
SILOV2	Loadout Silo Bin Vent Fugitive Emissions 2	2.82	0.85	2.62	Cement Handling
SILOV3	Loadout Silo Bin Vent Fugitive Emissions 3	2.82	0.85	2.62	Cement Handling
SILOV4	Loadout Silo Bin Vent Fugitive Emissions 4	2.82	0.85	2.62	Cement Handling
SILOV5	Loadout Silo Bin Vent Fugitive Emissions 5	2.82	0.85	2.62	Cement Handling
SILOV6	Loadout Silo Bin Vent Fugitive Emissions 6	2.82	0.85	2.62	Cement Handling
CSILOV1	Clinker/Raw Meal Bin Vent Fugitive Emissions 1	2.82	0.85	2.62	Limestone and Gypsum Handling
CSILOV2	Clinker/Raw Meal Bin Vent Fugitive Emissions 2	2.82	0.85	2.62	Limestone and Gypsum Handling
MILLV1	Milll Building Fugitive Emissions 1	2.13	0.99	1.98	Cement Handling
MILLV2	Milll Building Fugitive Emissions 2	2.13	0.99	1.98	Cement Handling

Source ID	Description	Release Height	Initial Lateral Dimension	Initial Vertical Dimension	Source Type for Deposition
		(m)	(m)	(m)	
Various	Blasting	16.25	15.13	15.12	Limestone and Gypsum Handling
Various	Segment 1	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 2	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 3	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 4	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 5	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 6	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 7	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 9	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 10	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 11	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 12	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 1B	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 3B	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 4B	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 7B	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 10B	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 13	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 15	4	9.88	3.72093	Vehicle Fugitive Dust
Various	Segment 17	4	9.88	3.72093	Vehicle Fugitive Dust

Table A-8. Gaseous Pollutant Emission Rates and Locations – Point Sources

Source ID	Description	X Coordinate	Y Coordinate	Elevation	Short Term NO_X Emission Rate	Annual NO_X Emission Rate	SO_2 Emission Rate	CO Emission Rate
		(m)	(m)	(m)	(g/s)	(g/s)	(g/s)	(g/s)
KILN	KILN BAGHOUSE	372985.0	3881825.0	1945.48	122.85	43.69	24.39	169.85

1. An annual emission rate of 43.69 g/s (1518.87 tpy) was used for the annual NO_X model as the Kiln stack has an annual NO_2 limit.

Table A-9. Gaseous Pollutant Emission Rates and Locations – Volume Sources

Source ID	Description	X Coordinate	Y Coordinate	Elevation	NO_X Emission Rate	SO_2 Emission Rate	CO Emission Rate
		(m)	(m)	(m)	(g/s)	(g/s)	(g/s)
Blasting – Individual Source Emission Rates, Various Locations – Annual Averaging Period					-	-	-
Blasting – Individual Source Emission Rates, Various Locations – Short Term Averaging Period					3.855	7.71E-03	91.05

Table A-10. Gaseous Pollutant Source Parameters – Point Sources

Source ID	Description	Stack Height	Stack Temp	Stack Velocity	Stack Diameter	Release Orientation
		(m)	(K)	(m/s)	(m)	
KILN	KILN BAGHOUSE	53.34	440.37	21.34	3.35	Vertical Point

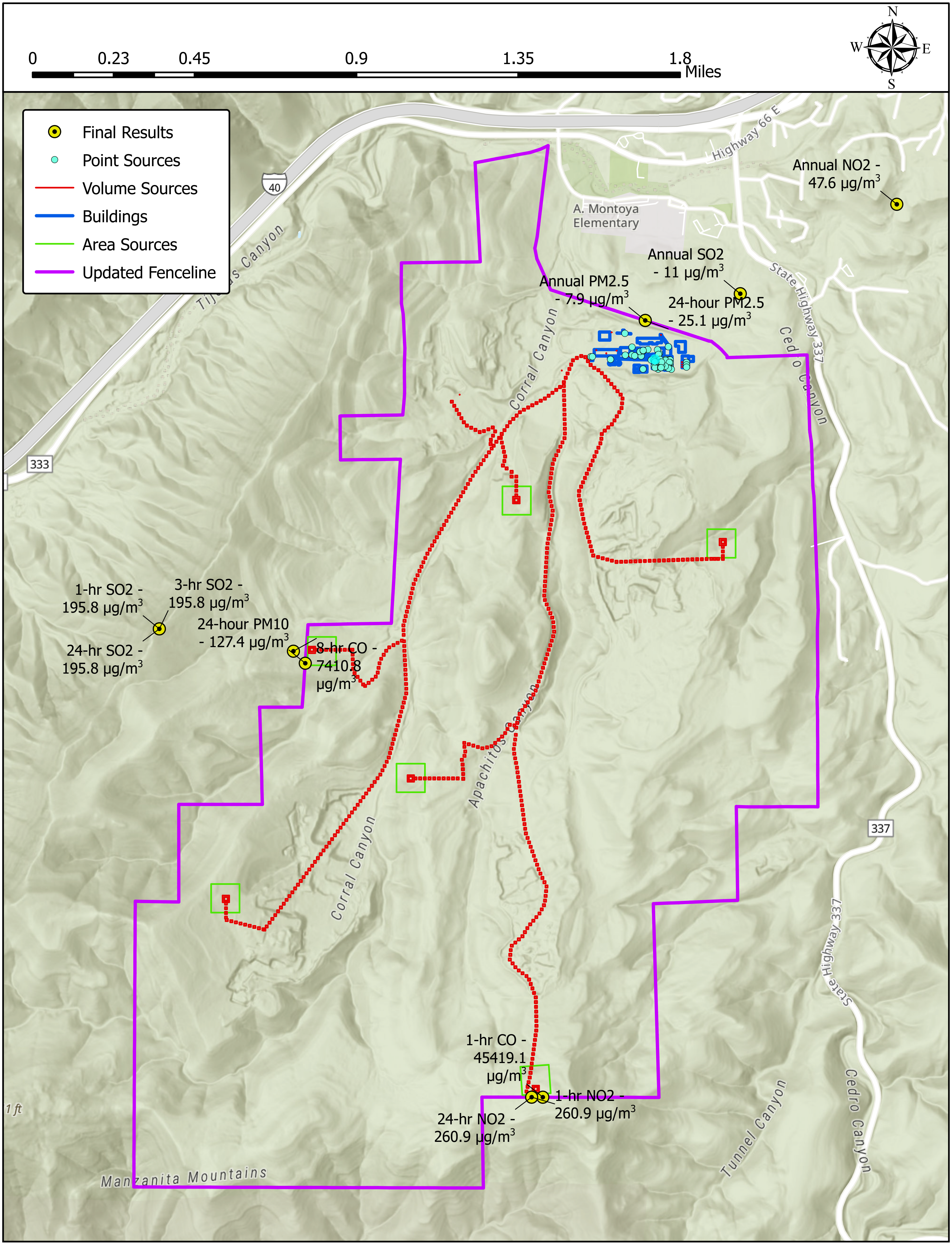
Table A-11. Gaseous Pollutant Source Parameters – Volume Sources

Source ID	Description	Release Height	Initial Lateral Dimension	Initial Vertical Dimension
		(m)	(m)	(m)
Various	Blasting	16.25	15.13	15.12

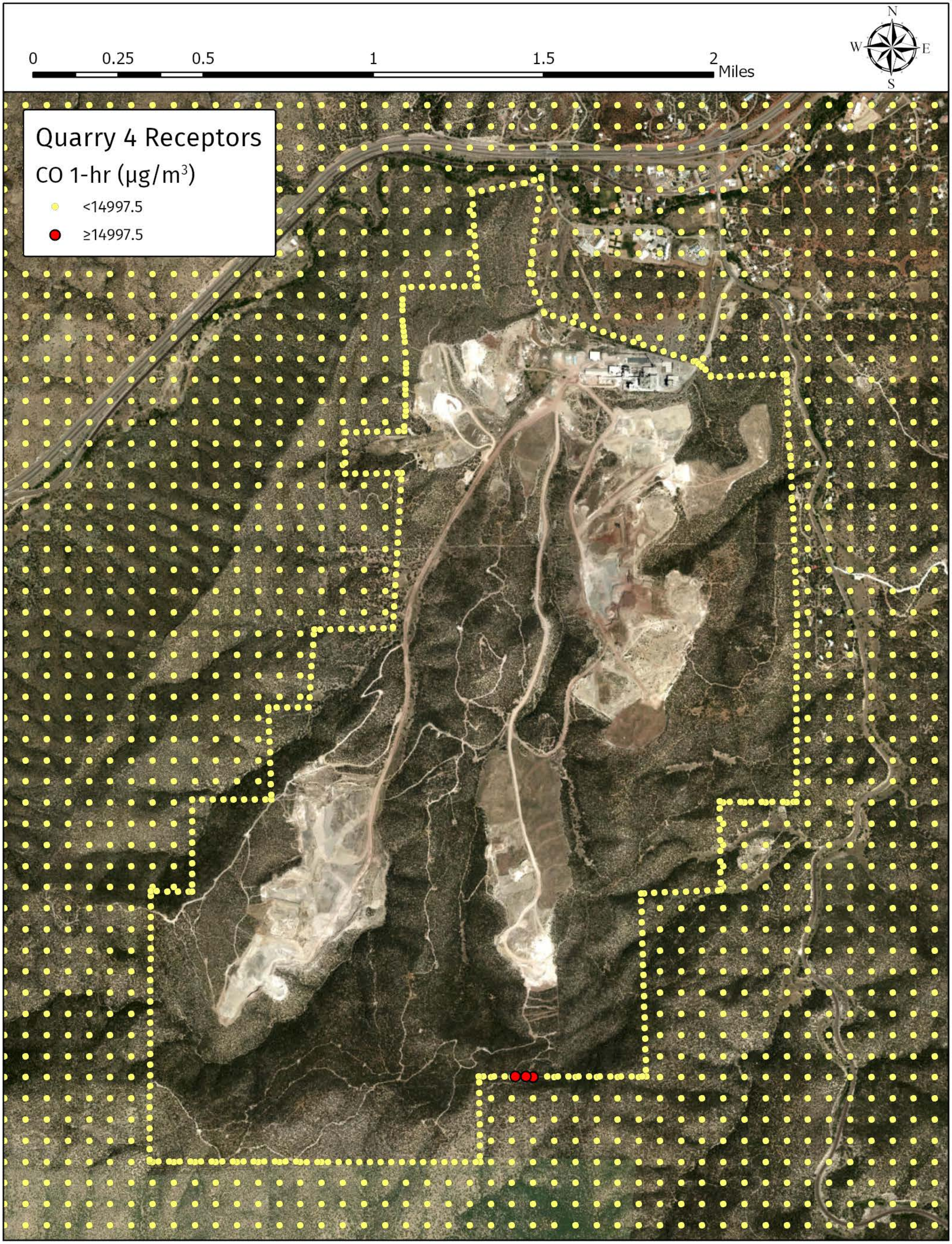
ATTACHMENT B. HAUL ROADS KMZ FILE

Attached electronically.

ATTACHMENT C. MAXIMUM MODELED IMPACT LOCATIONS MAPS



0
0.23
0.45
0.9
1.35
1.8
Miles
N
W
E
S
Final Results
Point Sources
Volume Sources
Buildings
Area Sources
Updated Fenceline
Highway 66 E
40
A. Montoya Elementary
Annual NO2 - 47.6 μg/m3
Annual SO2 - 11 μg/m3
Annual PM2.5 - 7.9 μg/m3
24-hour PM2.5 - 25.1 μg/m3
State Highway 337
Cedro Canyon
Corral Canyon
Tijeras Canyon
333
1-hr SO2 - 195.8 μg/m3
3-hr SO2 - 195.8 μg/m3
24-hour PM10 - 127.4 μg/m3
8-hr CO - 7410.8 μg/m3
24-hr SO2 - 195.8 μg/m3
Apachitos Canyon
337
1-hr CO - 45419.1 μg/m3
1-hr NO2 - 260.9 μg/m3
24-hr NO2 - 260.9 μg/m3
Tunnel Canyon
Manzanita Mountains
1 ft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0.25
0.5
1
1.5
2
Miles
N
S
E
W
Quarry 4 Receptors
CO 1-hr (µg/m³)
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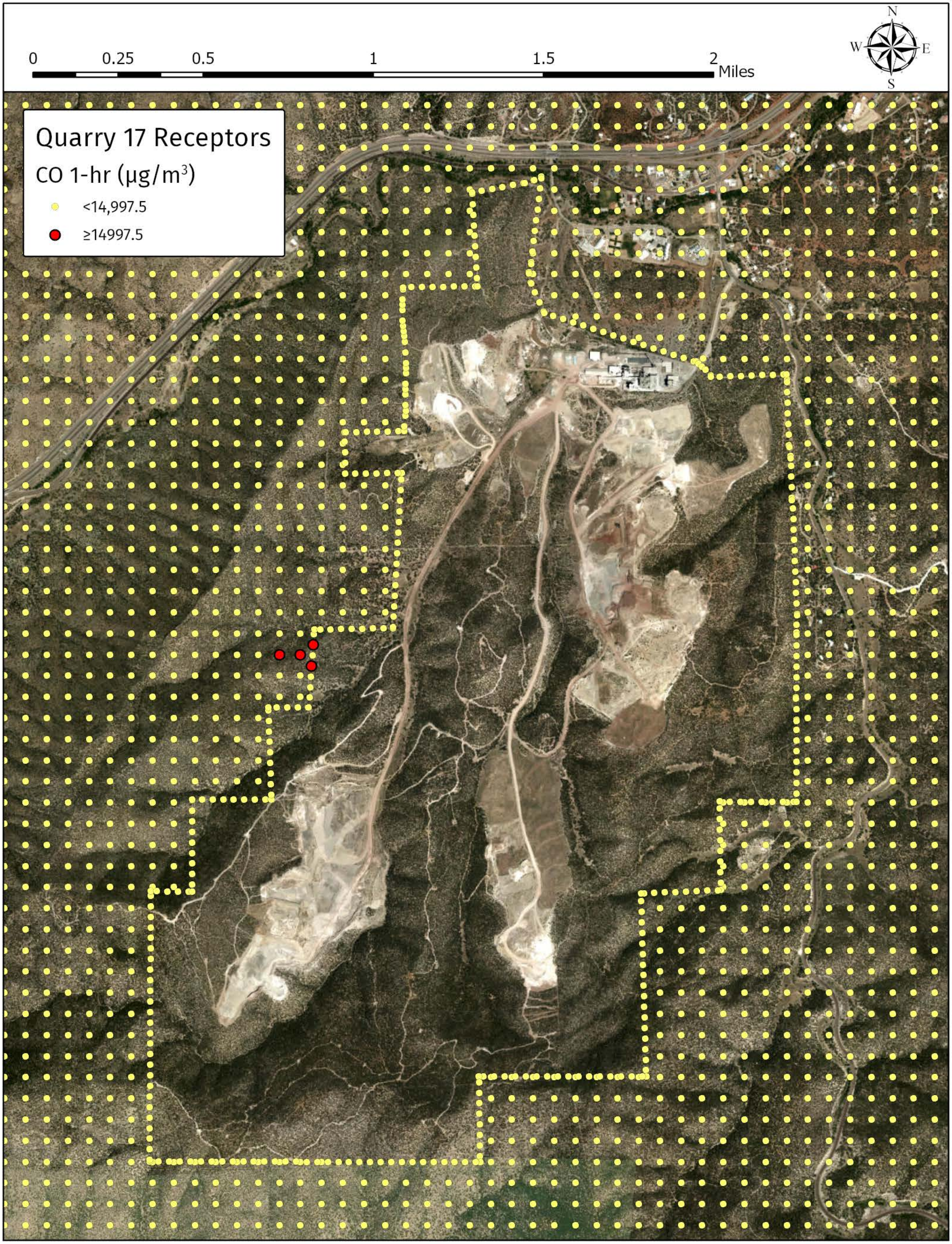
≥14997.5



0
0.25
0.5
1
1.5
2
Miles
N
W
E
S
Quarry 17 Receptors
CO 1-hr (µg/m³)
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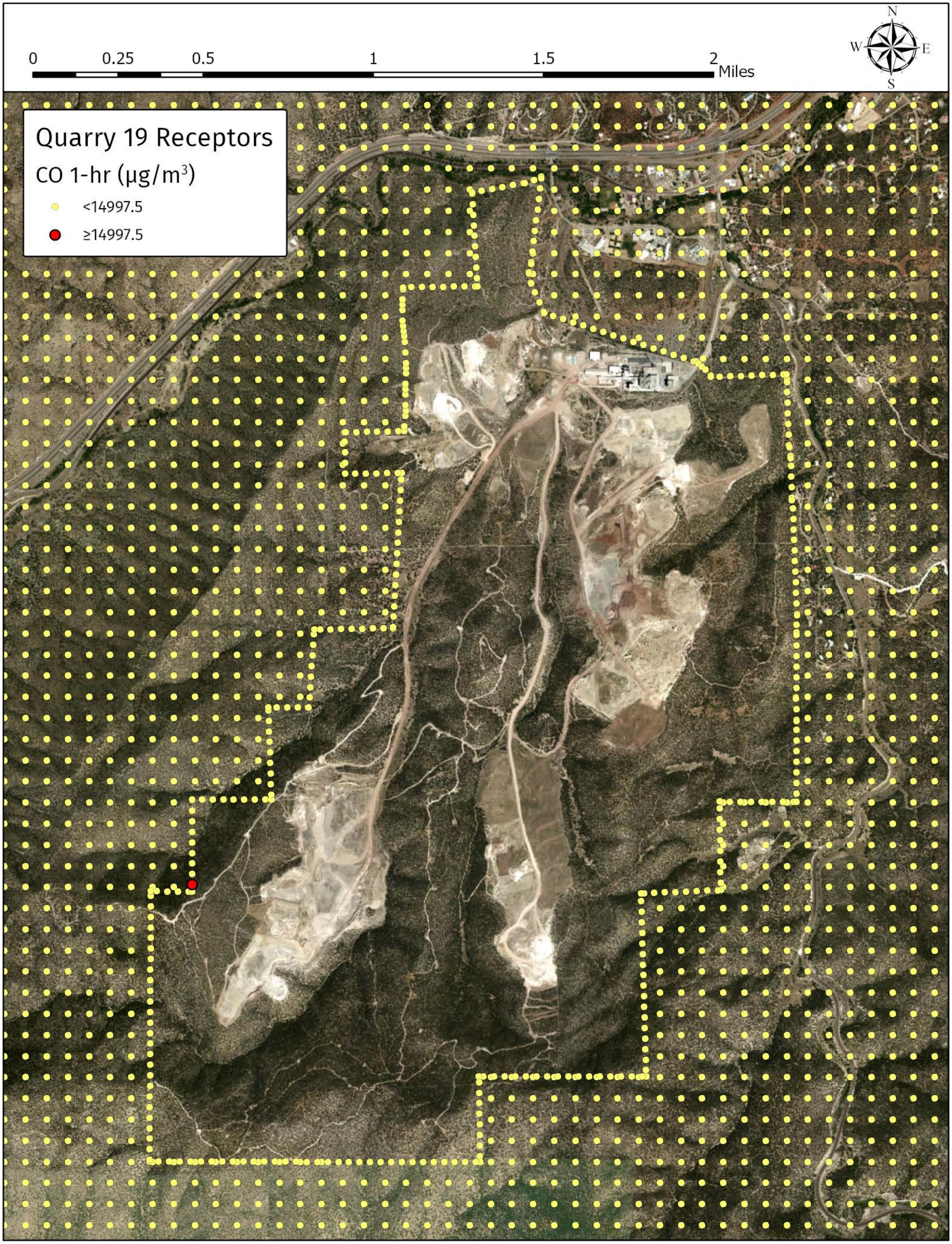
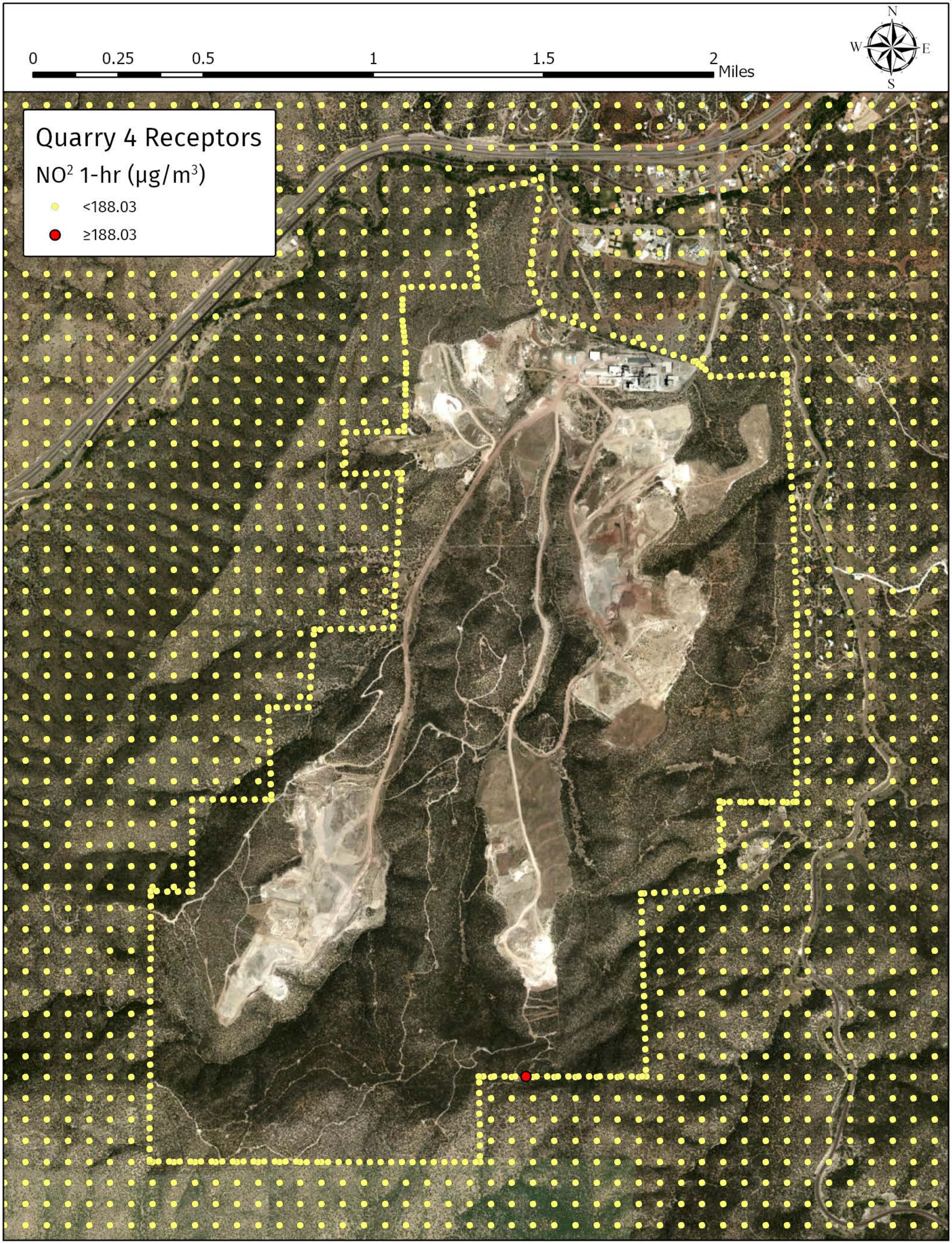
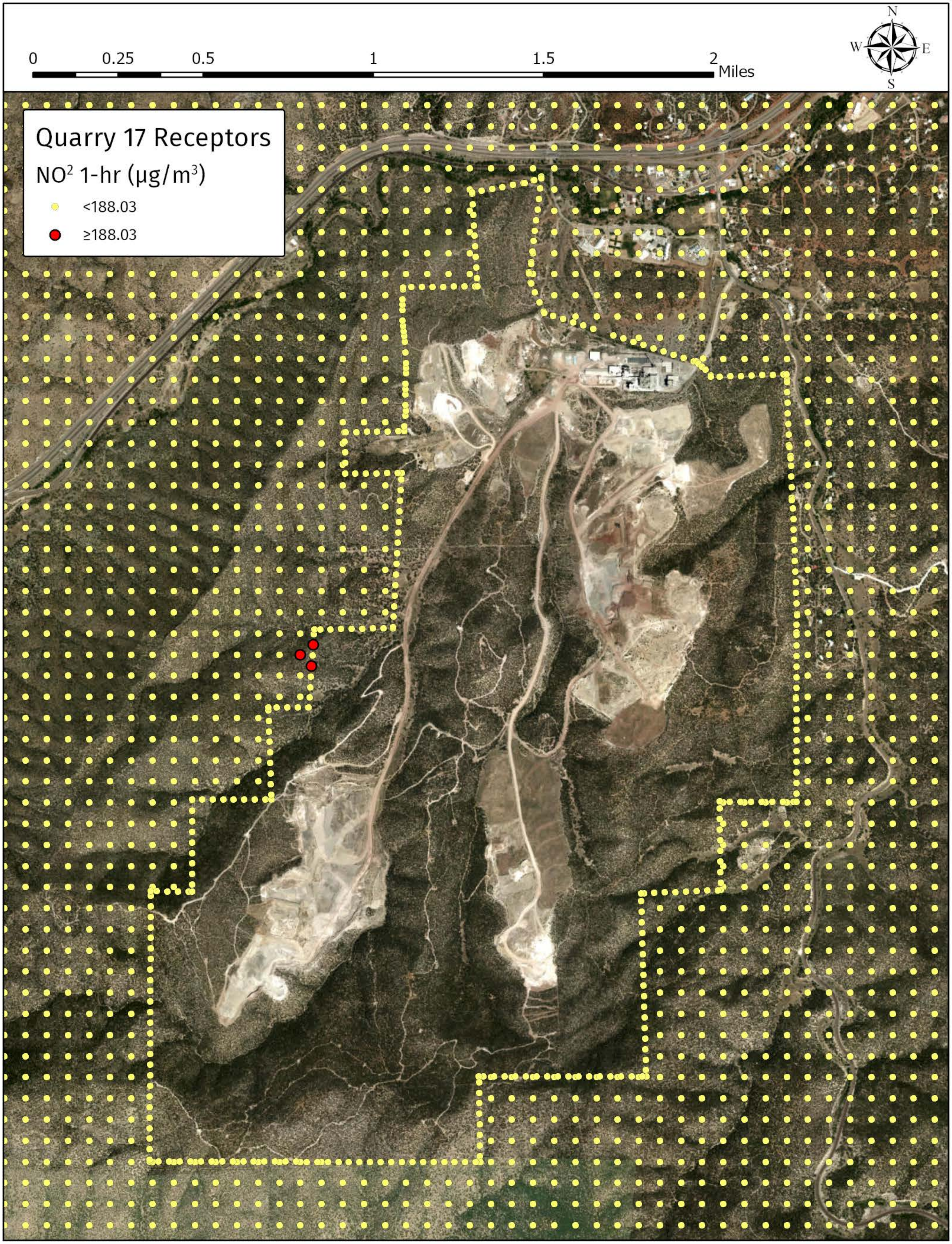
≥14997.5


0
0.25
0.5
1
1.5
2
Miles
N
W
E
S
Quarry 19 Receptors
CO 1-hr (µg/m³)
<14997.5
≥14997.5

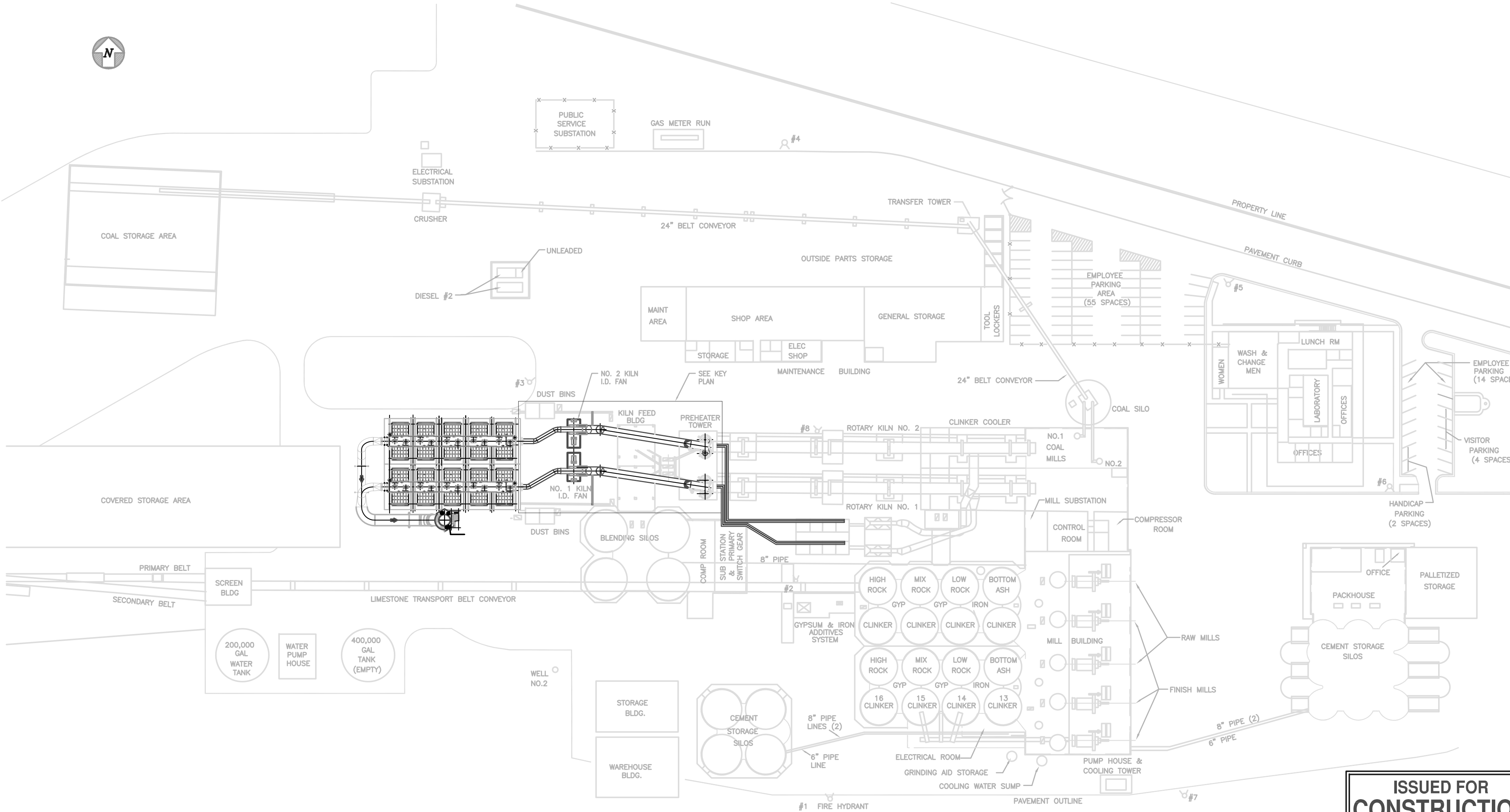

0
0.25
0.5
1
1.5
2
Miles
N
W
E
S
Quarry 4 Receptors
NO2 1-hr (µg/m3)
<188.03
≥188.03


0
0.25
0.5
1
1.5
2
Miles
N
S
E
W
Quarry 17 Receptors
NO2 1-hr (µg/m3)
<188.03
≥188.03

ATTACHMENT D. PLANT LAYOUT AND EMISSION UNIT PHOTOS

0 08JAN02 ISSUED FOR BID ONLY CGS

1 05FEB02 ISSUED FOR CONSTRUCTION JAE



ISSUED FOR
CONSTRUCTION
DATE: 05FEB02 BY: C. SCHNEIDER

5301101004 GENERAL ARRANGEMENT PENTA
5301101003 GENERAL ARRANGEMENT PENTA
5301101002 GENERAL ARRANGEMENT PENTA
5301101001 GENERAL ARRANGEMENT PENTA

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(AREA OF WORK)

PREHEATER TOWER
GENERAL ARRANGEMENT
PLOT PLAN

RJN 21SEP2001
DEC 24JAN02

FEET 1"=50'
1101101001.DWG

110-11-01-001 1

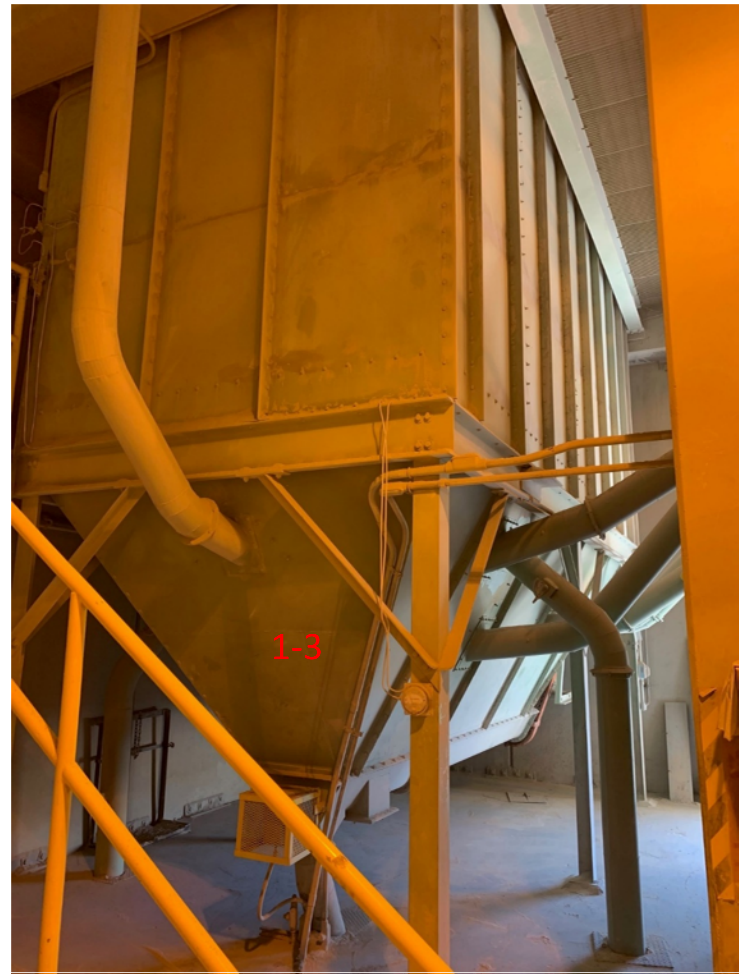
H:\RIO GRANDE\20010912\MECH\ISSUED\16-05FEB02 ISSUED FOR CONSTRUCTION\1101101001.DWG 02-06-02 08:00 CSCHNEIDER ©PENTA ENG.CORP.

GCC Tijeras

Emission Units

Raw Material Barn

Emission Units:
1-1 Crusher Dump Hopper
1-2 Primary Crusher
1-3DC Secondary Crusher



Emission Points:
1-1 Crusher Dump Hopper
1-2 Primary Crusher
1-3 Secondary Crusher

Emission Unit and Point 1-4: Screens

Emission Point Unit- Screens

Emission Point Screens

Limestone transport belt Loading to Rock Silos 2-1 through 2-4

Limestone transport belt

Rock Silos Emission Units 2-1,2-2, 2-3 and 2-4

Emission Point-
2-1 Rock Silo Storage 1
2-2 Rock Silo Storage 2

Emission Point
2-3 Rock Storage 3
2-4 Rock Storage 4

Emission Units 2-5 Additive Dump Hopper

Emission Point: 2-6 #1 Additive Baghouse

Emission Unit 2-5 connection to Emission Unit 2-6 ;Transport Belt and Loading to Silos

Emission Point:
2-7 1A Additive Baghouse
2-8 Additive Storage

Emission Units:
3-2 Raw Mill 1
3-4 Raw Mill 2

Emission Dust Collection
3-2 Raw Mill 1
3-4 Raw Mill 2

Raw Mill 1

Raw Mill 2

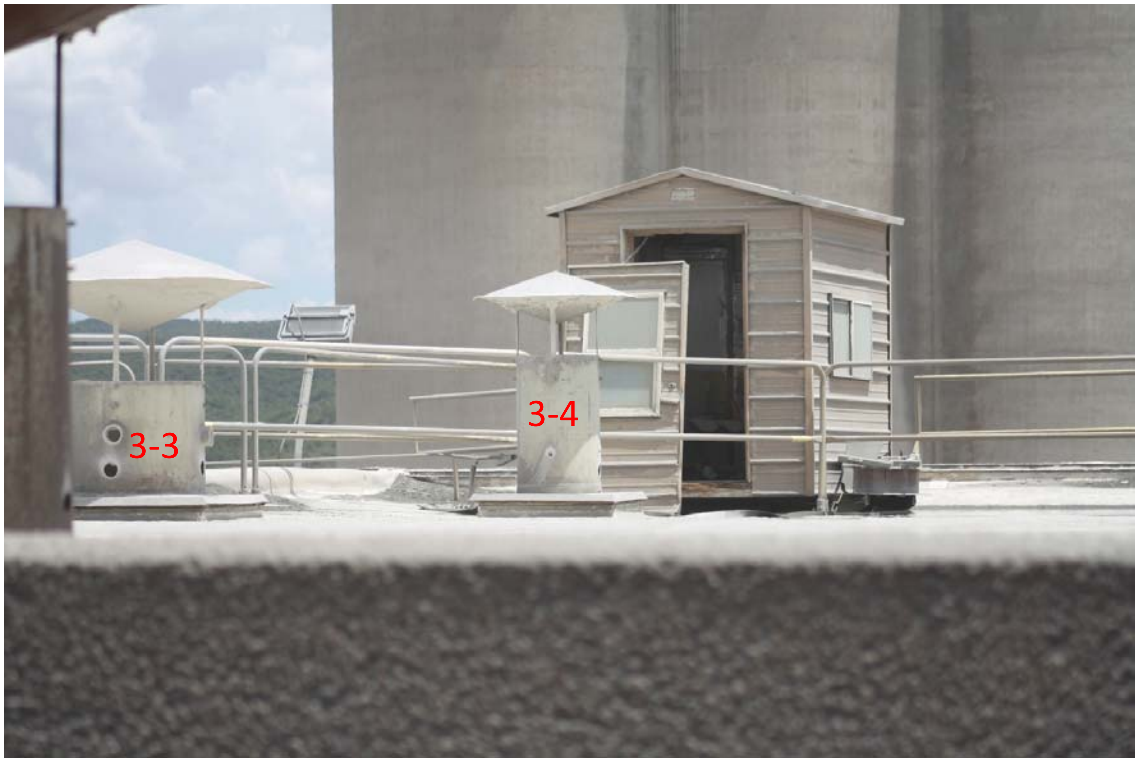
Emission Dust Collection
3-1 #1 Raw Mill Air Separator
3-3 #2 Raw Mill Air Separator

Raw Mill 1

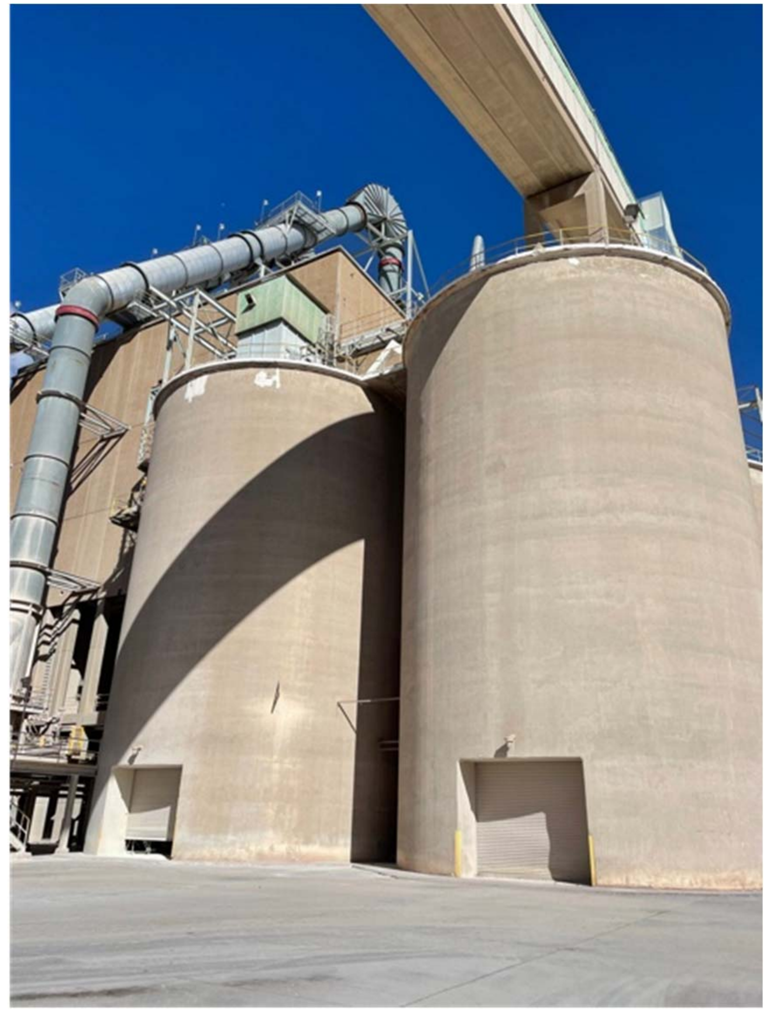
Raw Mill 2

Emission Point:
3-1 #1 Raw Mill Air Separator
3-2 #1 Raw Mill

Emission Points
3-3 Raw Mill Air Separator
3-4 Raw Mill 2



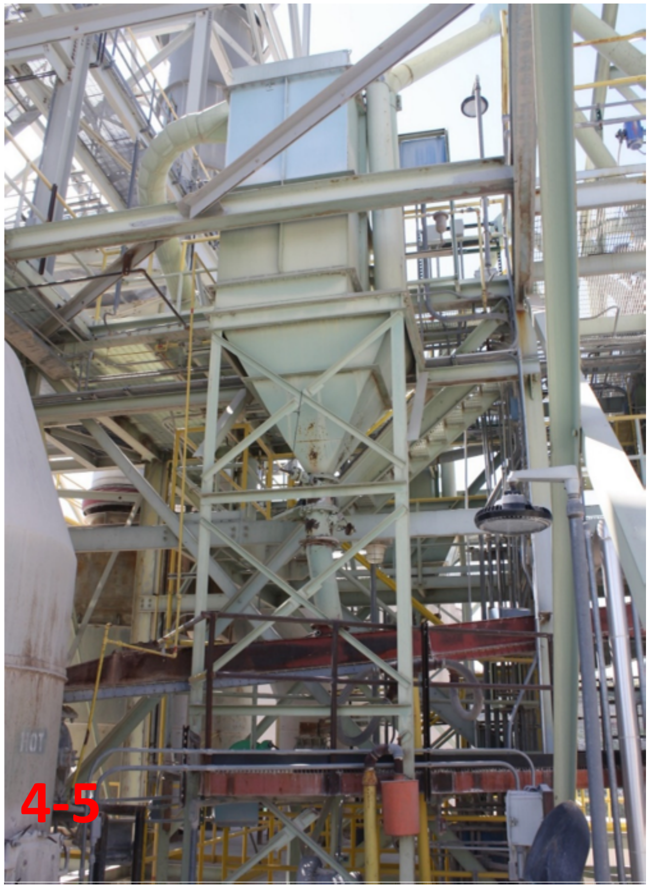
Emission Units:
4-1 Blending Silos 1 and 3
4-2 Blending Silo 2 and 4



Emission Points:
4-1 Blending Silos 1 & 3
4-2 Blending Silos 2 &4

Emission Point:
4-3 Kiln Feed Bucket Elevator #1
4-4 Kiln Feed Bucket Elevator #2

Emission Point:
4-5 #1 Kiln Feed Elevator
4-6 #2 Kiln Feed Elevator



Clinker Coolers

Clinker Cooler Drag Conveyors- Clinker Transport step from Kilns to Silos

Emission Point:
5-1 #1 Clinker Cooler Drag Conveyor
5-2 #2 Clinker Cooler Conveyor and 2-11 Reclaimed Clinker point

Clinker Coolers Dust Collectors Emission Units:5-3,5-4,5-5,5-6,5-7,5-8,5-9,and 5-10

Emission Point: Main Stack

Coal Barn

Emission Unit 5-12
Outdoor Coal Dump Hopper

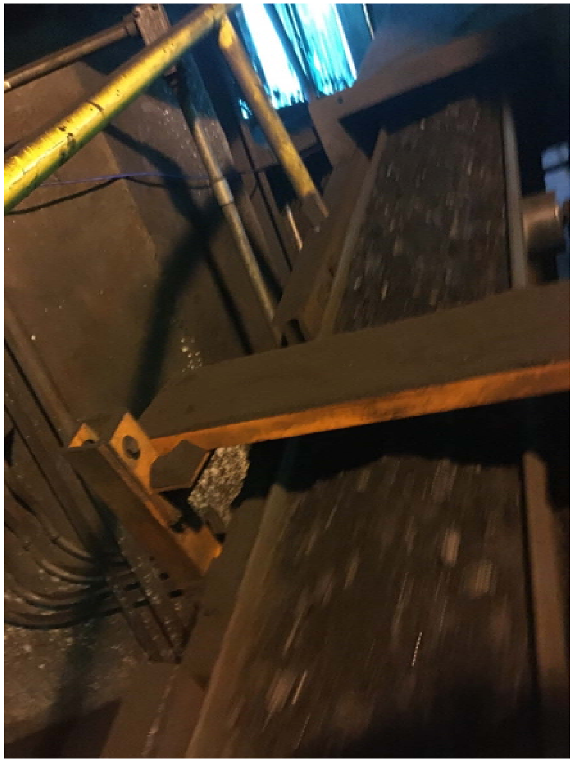
Emission Unit and Point: 5-13 Coal Crusher

Emission Unit and Point: 5-14 Coal Conveyor Transfer Tower

Coal Transfer Belt to Coal Silo

Emission Unit and Point: 5-15 Coal Storage Silo

Coal Unloading to kilns



2 Stage Preheater Tower

Emission Point: 6-1 and 6-2

Dust Collector Compartments in main baghouse

Main Stack: Kilns and Clinker Coolers

Main Stack combined Emission Units Point
6-1,6-2, 5-3,5-4,5-5,5-6,5-7,5-8,5-9 and 5-10

Kiln 1 and 2 Downcomer

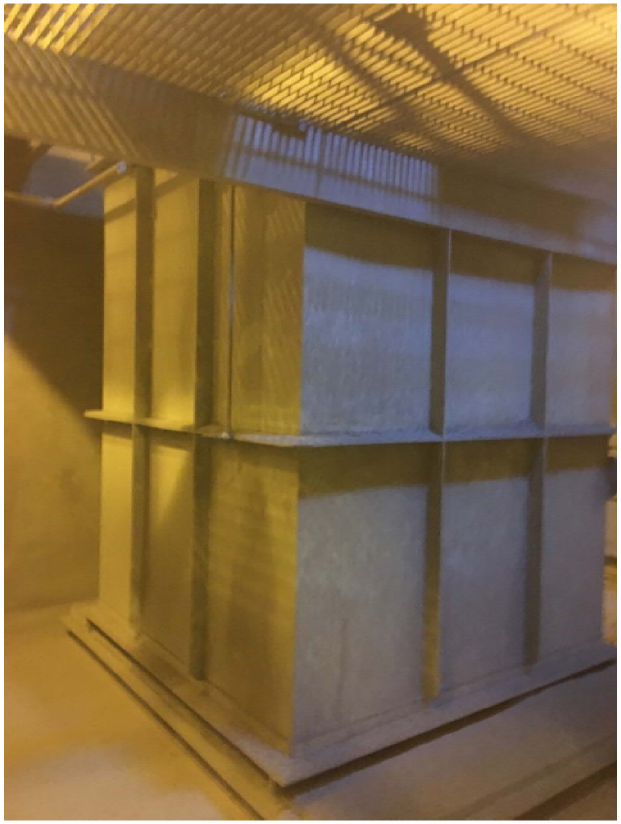
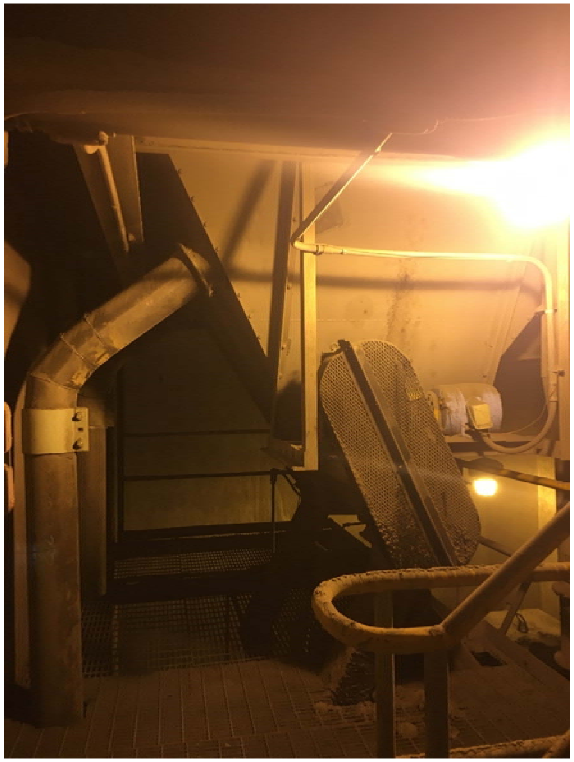
Emission Units and Points:
6-5 and 6-3 #1 Baghouse Dust Bin

Emission Units and Points:
6-4 and 6-6 #2 Baghouse Dust Bin

Dust Pellets from Pelletizer Emission Unit 6-7

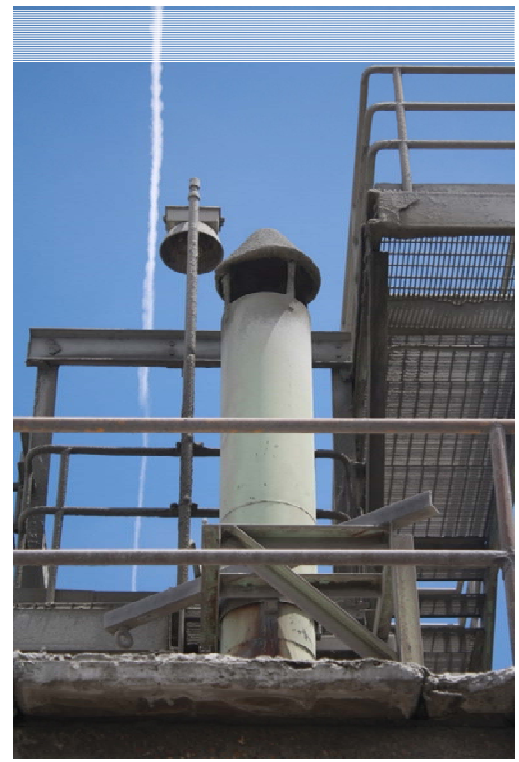
Emission Point: 7-1 Clinker Bucket Elevator Tower

Emission Unit 7-1 Clinker Bucket Elevator Tower DC

Clinker Belts

Emission Units/Points:
7-2 Clinker Primary Distribution
7-7 Clinker Secondary Distribution



Emission Points
7-5Clinker Storage Silo and Transfer
7-6 Clinker Storage
7-3 Clinker Storage Silo and Transfer
7-4 Clinker Storage Silo

Emission Unit 7-3 and 7-4

Emission Unit 7-5 and 7-6

Transport belt system dust collection system

Emission Points:
7-11 Clinker Storage Silo
7-10 Clinker Storage Silo and Transfer
7-8 Clinker Storage Silo and Transfer
7-9 Clinker Storage Silo

Emission Unit 7-8 and 7-9

Transport belt system dust collection system

Emission Units 7-10 and 7-11: Transport belt dust collection system

Finish Mill 1
Finish Mill 2
Finish Mill 3

FM2

FM1

FM3

Finish Mill 1, 2 and 3 Dust Collection

Finish Mill 1, 2 and 3 Dust Collection Continued

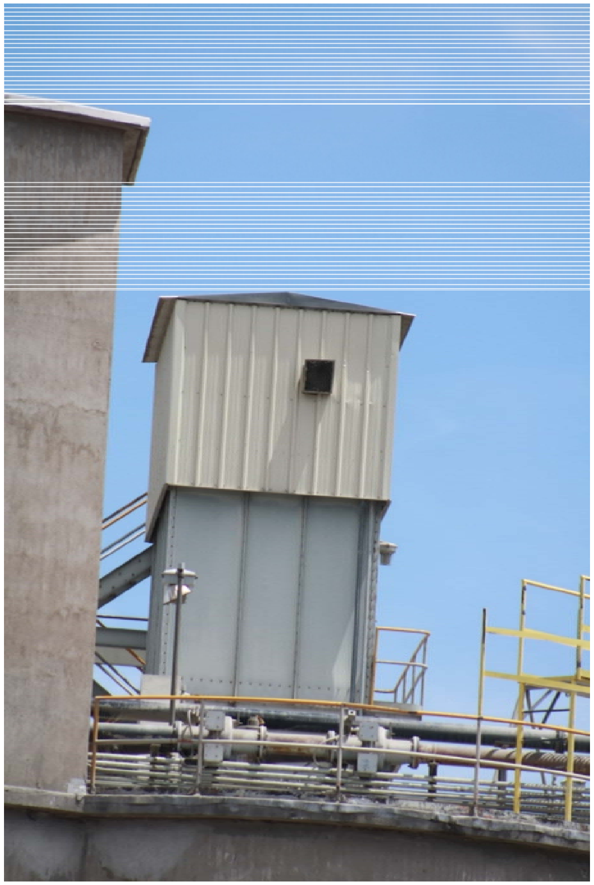
Emission Point 7-14: Clinker Transfer

Emission Point 8-5
#3 Finish Mill
Transfer Point

Loading Transfer Piping for Emission Units 9-1,9-2 and 9-3

9-1, 9-2 and 9-3

Emission Points 9-1, 9-2 and 9-3

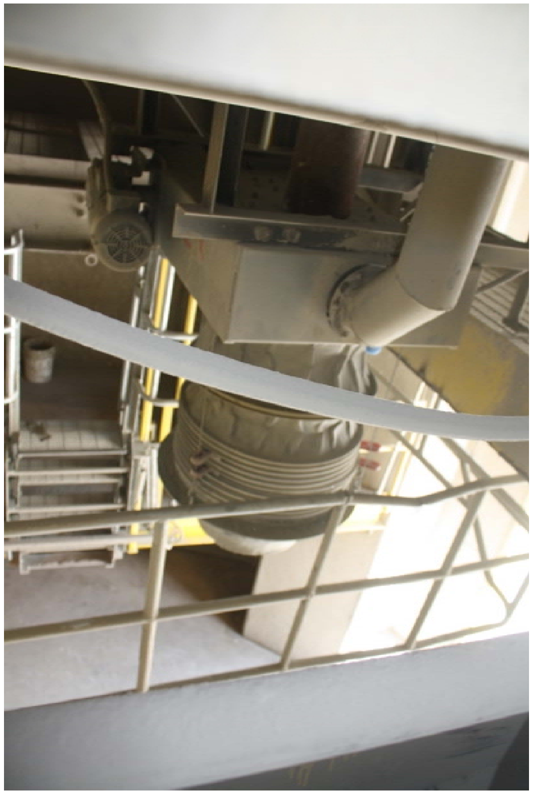


Unloading Spouts 9-1 connect to dust collector baghouse

3 Spouts Per Emission Unit

9-2 and 9-3 Unloading Spouts connected to dust collection baghouses

- 3 spouts per emission unit



Emission Unit 9-4 and Loading and Unloading Pipping

Loading 9-4

Emission Point 2-10 and 7-13

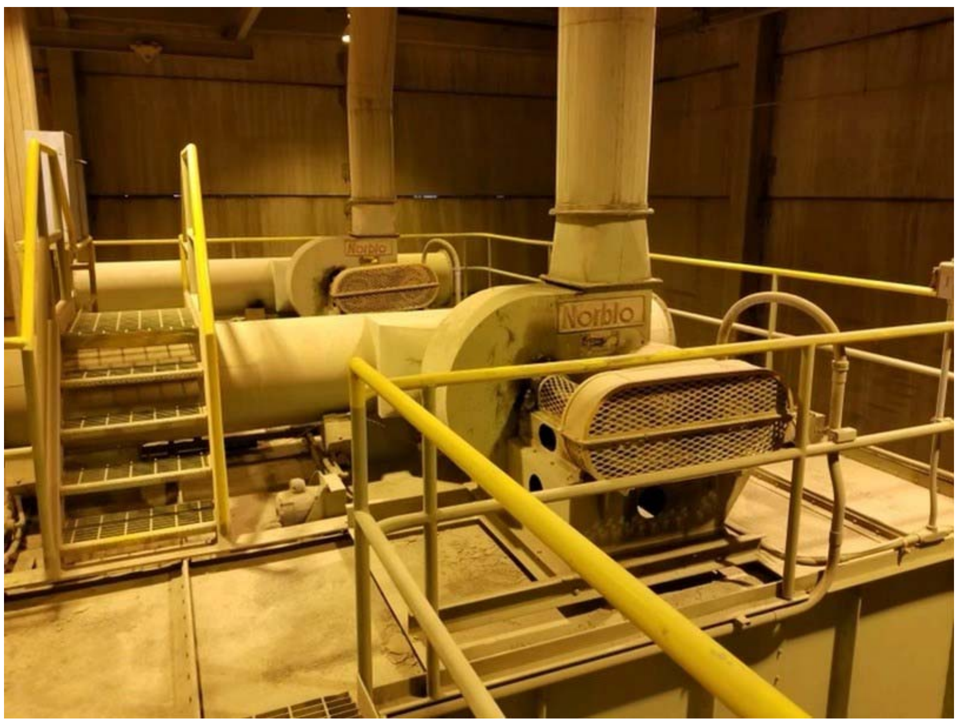
Emission Point 2-9 and 7-12

Emission Point 8-1 and 8-2

Emission Point 8-3,8-4,8-6 and 8-7

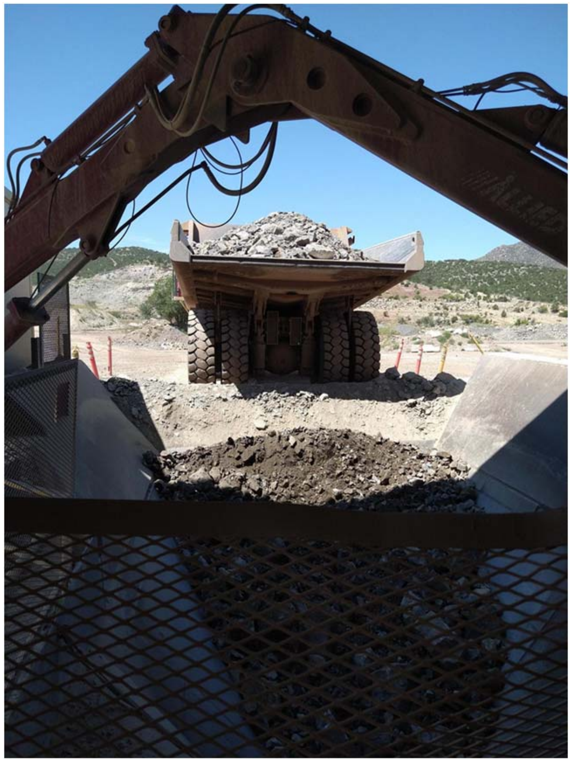
Emission Units/Points 9-5, 9-6 and 9-7 NOT IN USE

Emission Units 9-5,9-6 and 9-7 DC Continued



Quarry Activity

Limestone into crusher loading point



Road watering/dust control

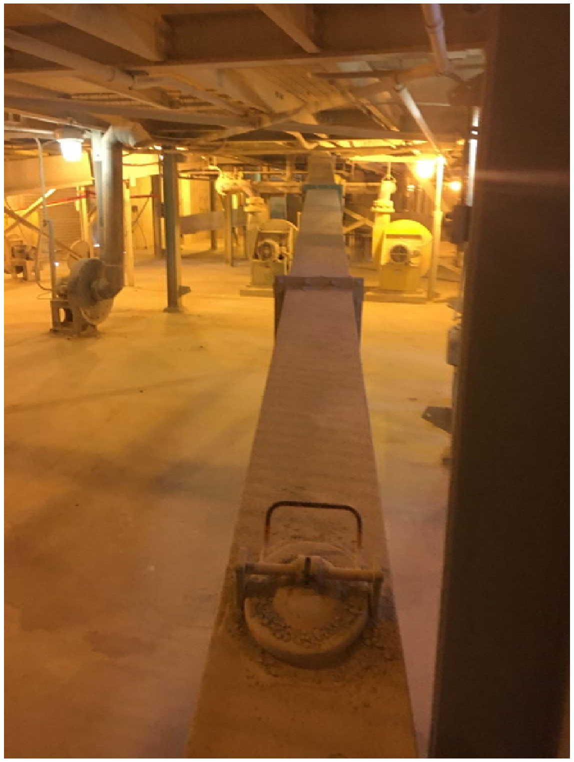
Loader loading Haul trucks

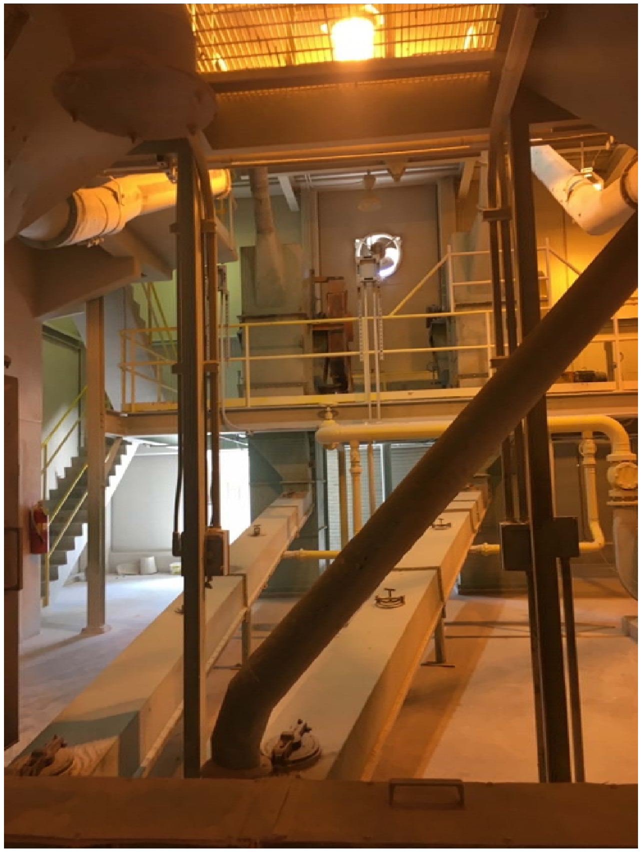
Dozer

Silo loading and unloading piping

Silo loading and unloading belts and screws

Additional screw type/transfers for loading and unloading





APPENDIX E. BLASTING REFERENCE

11.9 Western Surface Coal Mining

11.9.1 General[1]

There are 12 major coal fields in the western states (excluding the Pacific Coast and Alaskan fields), as shown in Figure 11.9-1. Together, they account for more than 64 percent of the surface minable coal reserves in the United States.[2] The 12 coal fields have varying characteristics that may influence fugitive dust emission rates from mining operations including overburden and coal seam thicknesses and structure, mining equipment, operating procedures, terrain, vegetation, precipitation and surface moisture, wind speeds, and temperatures. The operations at a typical western surface mine are shown in Figure 11.9-2. All operations that involve movement of soil or coal, or exposure of erodible surfaces, generate some amount of fugitive dust.

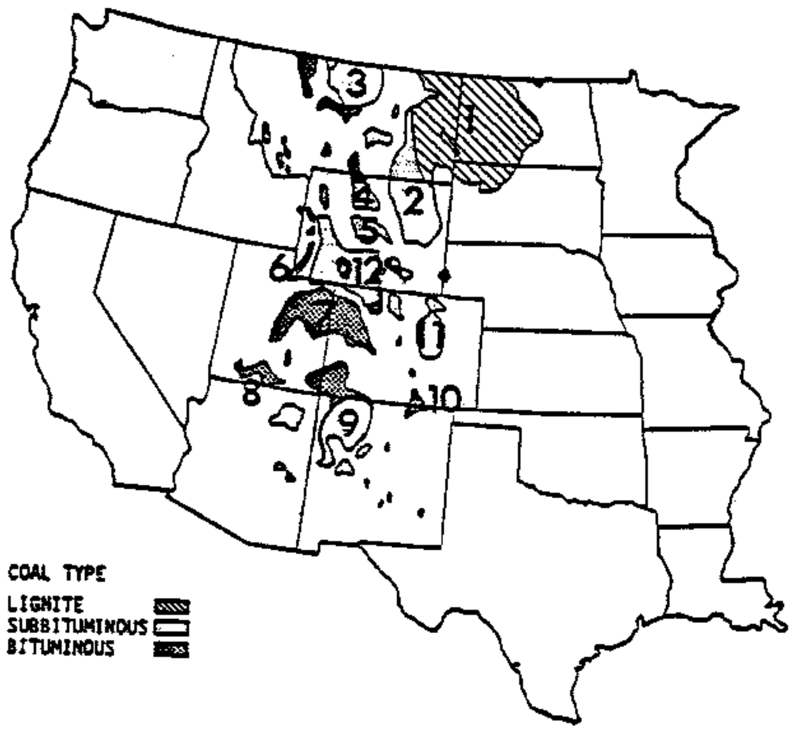
The initial operation is removal of topsoil and subsoil with large scrapers. The topsoil is carried by the scrapers to cover a previously mined and regraded area as part of the reclamation process or is placed in temporary stockpiles. The exposed overburden, the earth that is between the topsoil and the coal seam, is leveled, drilled, and blasted. Then the overburden material is removed down to the coal seam, usually by a dragline or a shovel and truck operation. It is placed in the adjacent mined cut, forming a spoils pile. The uncovered coal seam is then drilled and blasted. A shovel or front end loader loads the broken coal into haul trucks, and it is taken out of the pit along graded haul roads to the tipple, or truck dump. Raw coal sometimes may be dumped onto a temporary storage pile and later rehandled by a front end loader or bulldozer.

At the tipple, the coal is dumped into a hopper that feeds the primary crusher, then is conveyed through additional coal preparation equipment such as secondary crushers and screens to the storage area. If the mine has open storage piles, the crushed coal passes through a coal stacker onto the pile. The piles, usually worked by bulldozers, are subject to wind erosion. From the storage area, the coal is conveyed to a train loading facility and is put into rail cars. At a captive mine, coal will go from the storage pile to the power plant.

During mine reclamation, which proceeds continuously throughout the life of the mine, overburden spoils piles are smoothed and contoured by bulldozers. Topsoil is placed on the graded spoils, and the land is prepared for revegetation by furrowing, mulching, etc. From the time an area is disturbed until the new vegetation emerges, all disturbed areas are subject to wind erosion.

11.9.2 Emissions

Predictive emission factor equations for open dust sources at western surface coal mines are presented in Tables 11.9-1 and 11.9-2. Each equation applies to a single dust-generating activity, such as vehicle traffic on haul roads. The predictive equation explains much of the observed variance in emission factors by relating emissions to three sets of source parameters: (1) measures of source activity or energy expended (e. g., speed and weight of a vehicle traveling on an unpaved road); (2) properties of the material being disturbed (e. g., suspendable fines in the surface material of an unpaved road); and (3) climate (in this case, mean wind speed).



	Coal field	Strippable reserves (10^6 tons)
1	Fort Union	23,529
2	Powder River	56,727
3	North Central	All underground
4	Bighorn Basin	All underground
5	Wind River	3
6	Hams Fork	1,000
7	Uinta	308
8	Southwestern Utah	224
9	San Juan River	2,318
10	Raton Mesa	All underground
11	Denver	All underground
12	Green River	2,120

Figure 11.9-1. Coal fields of the western United States.[3]

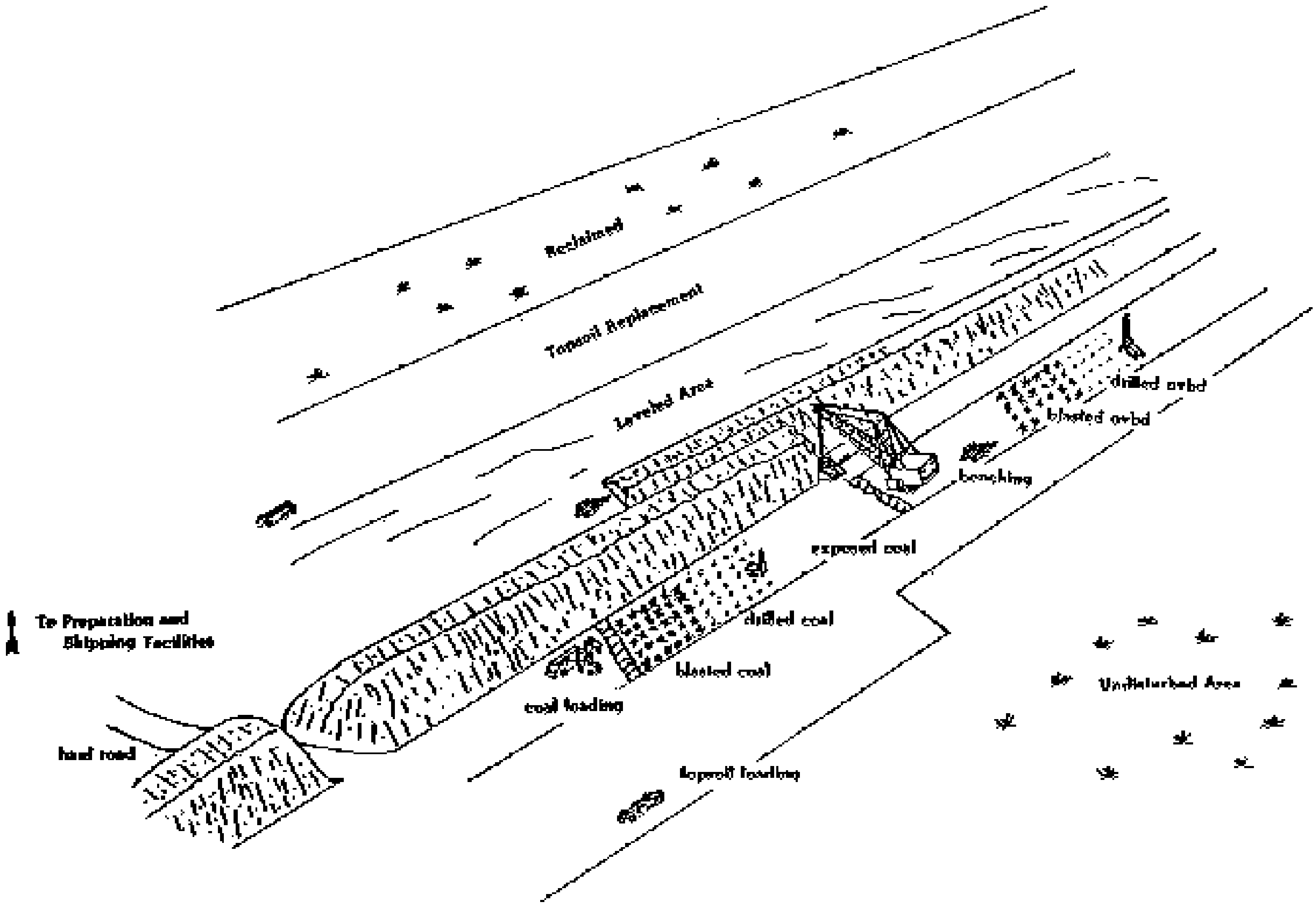


Figure 11.9-2. Operations at typical western surface coal mines.

The equations may be used to estimate particulate emissions generated per unit of source extent or activity (e. g., distance traveled by a haul truck or mass of material transferred). The equations were developed through field sampling of various western surface mine types and are thus applicable to any of the surface coal mines located in the western United States.

In Tables 11.9-1 and 11.9-2, the assigned quality ratings apply within the ranges of source conditions that were tested in developing the equations given in Table 11.9-3. However, the equations should be derated 1 letter value (e. g., A to B) if applied to eastern surface coal mines.

In using the equations to estimate emissions from sources found in a specific western surface mine, it is necessary that reliable values for correction parameters be determined for the specific sources of interest if the assigned quality ratings of the equations are to be applicable. For example, actual silt content of coal or overburden measured at a facility should be used instead of estimated values. In the event that site-specific values for correction parameters cannot be obtained, the appropriate geometric mean values from Table 11.9-3 may be used, but the assigned quality rating of each emission factor equation should be reduced by 1 level (e. g., A to B).

Emission factors for open dust sources not covered in Table 11.9-3 are in Table 11.9-4. These factors were determined through source testing at various western coal mines.

The factors in Table 11.9-4 for mine locations I through V were developed for specific geographical areas. Tables 11.9-5 and 11.9-6 present characteristics of each of these mines (areas). A "mine-specific" emission factor should be used only if the characteristics of the mine for which an emissions estimate is needed are very similar to those of the mine for which the emission factor was developed. The other (nonspecific) emission factors were developed at a variety of mine types and thus are applicable to any western surface coal mine.

As an alternative to the single valued emission factors given in Table 11.9-4 for train or truck loading and for truck or scraper unloading, two empirically derived emission factor equations are presented in Section 13.2.4 of this document. Each equation was developed for a source operation (i. e., batch drop and continuous drop, respectively) comprising a single dust-generating mechanism that crosses industry lines.

Because the predictive equations allow emission factor adjustment to specific source conditions, the equations should be used in place of the single-valued factors in Table 11.9-4 for the sources identified above, if emission estimates for a specific western surface coal mine are needed. However, the generally higher quality ratings assigned to the equations are applicable only if: (1) reliable values of correction parameters have been determined for the specific sources of interest, and (2) the correction parameter values lie within the ranges tested in developing the equations. Caution must be exercised so that only the unbound (sorbed) moisture (i. e., not any bound moisture) is used in determining the moisture content for input to the Chapter 13 equations.

Table 11.9-1 (English Units). EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES[a]

Operation	Material	Emissions By Particle Size Range (Aerodynamic Diameter)[b,c]				Units	EMISSION FACTOR RATING
		Emission Factor Equations		Scaling Factors			
		TSP ≤30 µm	≤15 µm	≤10 µm[d]	≤2.5 µm/TSP[e]		
Blasting[f]	Coal or overburden	$0.000014(A)^{1.5}$	ND	0.52[e]	0.03	lb/blast	C_DD
Truck loading	Coal	$\frac{1.16}{(M)^{1.2}}$	$\frac{0.119}{(M)^{0.9}}$	0.75	0.019	lb/ton	BBCC
Bulldozing	Coal	$\frac{78.4\ (s)^{1.2}}{(M)^{1.3}}$	$\frac{18.6\ (s)^{1.5}}{(M)^{1.4}}$	0.75	0.022	lb/hr	CCDD
	Overburden	$\frac{5.7\ (s)^{1.2}}{(M)^{1.3}}$	$\frac{1.0\ (s)^{1.5}}{(M)^{1.4}}$	0.75	0.105	lb/hr	BCDD
Dragline	Overburden	$\frac{0.0021\ (d)^{1.1}}{(M)^{0.3}}$	$\frac{0.0021\ (d)^{0.7}}{(M)^{0.3}}$	0.75	0.017	lb/yd^3	BCDD
Vehicle traffic[g]							
Grading		$0.040\ (S)^{2.5}$	$0.051\ (S)^{2.0}$	0.60	0.031	lb/VMT	CCDD
Active storage pile[h] (wind erosion and maintenance)	Coal	0.72 u	ND	ND	ND	$\frac{lb}{(acre)(hr)}$	C[i]_ _ _

[a] Reference 1, except as noted. VMT = vehicle miles traveled. ND = no data. Quality ratings coded where "Q, X, Y, Z" are ratings for ≤30 µm, ≤15 µm, ≤10 µm, and ≤2.5 µm, respectively. See also note below.

[b] Particulate matter less than or equal to 30 µm in aerodynamic diameter is sometimes termed "suspendable particulate" and is often used as a surrogate for TSP (total suspended particulate). TSP denotes what is measured by a standard high volume sampler (see Section 13.2).

[c] Symbols for equations:

- A = horizontal area (ft^2), with blasting depth ≤ 70 ft. Not for vertical face of a bench.
- M = material moisture content (%)
- s = material silt content (%)
- u = wind speed (mph)
- d = drop height (ft)
- W = mean vehicle weight (tons)
- S = mean vehicle speed (mph)
- w = mean number of wheels

Table 11.9-1 (cont.).

[d] Multiply the $\leq$15-µm equation by this fraction to determine emissions, except as noted.
[e] Multiply the TSP predictive equation by this fraction to determine emissions.
[f] Blasting factor taken from a reexamination of field test data reported in Reference 1. See Reference 4.
[g] To estimate emissions from traffic on unpaved surfaces by vehicles such as haul trucks, light-to-medium duty vehicles, or scrapers in the travel mode, see the unpaved road emission factor equation in AP-42 Section 13.2.2.
[h] Coal storage pile factor taken from Reference 5. To estimate emissions on a shorter time scale (e. g., worst-case day), see the procedure presented in Section 13.2.5.
[i] Rating applicable to mine types I, II, and IV (see Tables 11.9-5 and 11.9-6).

Note: Section 234 of the Clean Air Act of 1990 required EPA to review and revise the emission factors in this Section (and models used to evaluate ambient air quality impact), to ensure that they did not overestimate emissions from western surface coal mines. Due to resource and technical limitations, the haul road emission factors were isolated to receive the most attention during these studies, as the largest contributor to emissions. Resultant model evaluation with revised emission factors have improved model prediction for total suspended particulate (TSP); however, there is still a tendency for overprediction of particulate matter impact for PM-10, for as yet undetermined causes, prompting the Agency to make a policy decision not to use them for regulatory applications to these sources. However, the technical consideration exists that no better alternative data are currently available and the information should be made known. Users should accordingly use these factors with caution and awareness of their likely limitations.

Table 11.9-2 (Metric Units). EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES[a]

		Emissions By Particle Size Range (Aerodynamic Diameter)[b,c]					
		Emission Factor Equations		Scaling Factors			
Operation	Material	TSP ≤30 µm	≤15 µm	≤10 µm[d]	≤2.5 µm/TSP[e]	Units	EMISSION FACTOR RATING
Blasting[f]	Coal or overburden	$0.00022(A)^{1.5}$	ND	0.52[e]	0.03	kg/blast	C_DD
Truck loading	Coal	$\frac{0.580}{(M)^{1.2}}$	$\frac{0.0596}{(M)^{0.9}}$	0.75	0.019	kg/Mg	BBCC
Bulldozing	Coal	$\frac{35.6\ (s)^{1.2}}{(M)^{1.3}}$	$\frac{8.44\ (s)^{1.5}}{(M)^{1.4}}$	0.75	0.022	kg/hr	CCDD
	Overburden	$\frac{2.6\ (s)^{1.2}}{(M)^{1.3}}$	$\frac{0.45\ (s)^{1.5}}{(M)^{1.4}}$	0.75	0.105	kg/hr	BCDD
Dragline	Overburden	$\frac{0.0046\ (d)^{1.1}}{(M)^{0.3}}$	$\frac{0.0029\ (d)^{0.7}}{(M)^{0.3}}$	0.75	0.017	kg/m^3	BCDD
Vehicle traffic[g]							
Grading		$0.0034\ (S)^{2.5}$	$0.0056\ (S)^{2.0}$	0.60	0.031	kg/VKT	CCDD
Active storage pile[h] (wind erosion and maintenance)	Coal	1.8 u	ND	ND	ND	$\frac{kg}{(hectare)(hr)}$	C[i]_ _ _

[a] Reference 1, except as noted. VKT = vehicle kilometers traveled. ND = no data. Quality ratings coded as "QXYZ", where Q, X, Y, and Z are quality ratings for ≤30 µm, ≤15 µm, ≤10 µm, and ≤2.5 µm, respectively. See also note below.

[b] Particulate matter less than or equal to 30 µm in aerodynamic diameter is sometimes termed "suspendable particulate" and is often used as a surrogate for TSP (total suspended particulate). TSP denotes what is measured by a standard high volume sampler (see Section 13.2).

[c] Symbols for equations:

A = horizontal area (m^2), with blasting depth ≤ 21 m. Not for vertical face of a bench.
M = material moisture content (%)
s = material silt content (%)
u = wind speed (m/sec)
d = drop height (m)
W = mean vehicle weight (Mg)
S = mean vehicle speed (kph)
w = mean number of wheels

Table 11.9-2 (cont.).

[d] Multiply the ≤ 15-µm equation by this fraction to determine emissions, except as noted.
[e] Multiply the TSP predictive equation by this fraction to determine emissions.
[f] Blasting factor taken from a reexamination of field test data reported in Reference 1. See Reference 4.
[g] To estimate emissions from traffic on unpaved surfaces by vehicles such as haul trucks, light-to-medium duty vehicles, or scrapers in the travel mode, see the unpaved road emission factor equation in AP-42 Section 13.2.2
[h] Coal storage pile factor taken from Reference 5. To estimate emissions on a shorter time scale (e. g., worst-case day), see the procedure presented in Section 13.2.5.
[i] Rating applicable to mine types I, II, and IV (see Tables 11.9-5 and 11.9-6).

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Table 11.9-3 (Metric And English Units). TYPICAL VALUES FOR CORRECTION FACTORS APPLICABLE TO THE PREDICTIVE EMISSION FACTOR EQUATIONS[a]

Source	Correction Factor	Number Of Test Samples	Range	Geometric Mean	Units
Blasting	Area blasted	17	100 – 6,800	1,590	m^2
	Area blasted	17	1100 – 73,000	17,000	ft^2
Coal loading	Moisture	7	6.6 - 38	17.8	%
Bulldozers					
Coal	Moisture	3	4.0 - 22.0	10.4	%
	Silt	3	6.0 - 11.3	8.6	%
Overburden	Moisture	8	2.2 - 16.8	7.9	%
	Silt	8	3.8 - 15.1	6.9	%
Dragline	Drop distance	19	1.5 - 30	8.6	m
	Drop distance	19	5 - 100	28.1	ft
	Moisture	7	0.2 - 16.3	3.2	%
Scraper	Silt	10	7.2 - 25.2	16.4	%
	Weight	15	33 - 64	48.8	Mg
	Weight	15	36 - 70	53.8	ton
Grader	Speed	7	8.0 - 19.0	11.4	kph
	Speed		5.0 - 11.8	7.1	mph
Haul truck	Silt content	61	1.2 – 19.2	4.3	%
	Moisture	60	0.3 – 20.1	2.4	%
	Weight	61	20.9 – 260	110	mg
	Weight	61	23.0 – 290	120	ton

[a] Reference 1,6.

Table 11.9-4 (English And Metric Units). UNCONTROLLED PARTICULATE EMISSION FACTORS FOR OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES

Source	Material	Mine Location[a]	TSP Emission Factor[b]	Units	EMISSION FACTOR RATING
Drilling	Overburden	Any	1.3 0.59	lb/hole kg/hole	C C
	Coal	V	0.22 0.10	lb/hole kg/hole	E E
Topsoil removal by scraper	Topsoil	Any	0.058 0.029	lb/ton kg/Mg	E E
		IV	0.44 0.22	lb/ton kg/Mg	E E
Overburden replacement	Overburden	Any	0.012 0.0060	lb/ton kg/Mg	C C
Truck loading by power shovel (batch drop)[c]	Overburden	V	0.037 0.018	lb/ton kg/Mg	E E
Train loading (batch or continuous drop)[c]	Coal	Any	0.028 0.014	lb/ton kg/Mg	E E
		III	0.0002 0.0001	lb/ton kg/Mg	E E
Bottom dump truck unloading (batch drop)[c]	Overburden	V	0.002 0.001	lb/ton kg/Mg	E E
	Coal	IV	0.027 0.014	lb/ton kg/Mg	E E
		III	0.005 0.002	lb/ton kg/Mg	E E
		II	0.020 0.010	lb/ton kg/Mg	E E
		I	0.014 0.0070	lb/T kg/Mg	E E
		Any	0.066 0.033	lb/T kg/Mg	D D

Table 11.9-4 (cont.).

Source	Material	Mine Location[a]	TSP Emission Factor[b]	Units	EMISSION FACTOR RATING
End dump truck unloading (batch drop)[c]	Coal	V	0.007 0.004	lb/T kg/Mg	E E
Scraper unloading (batch drop)[c]	Topsoil	IV	0.04 0.02	lb/T kg/Mg	E E
Wind erosion of exposed areas[d]	Seeded land, stripped overburden, graded overburden	Any	0.38	$\frac{T}{(acre)(yr)}$	C
			0.85	$\frac{Mg}{(hectare)(yr)}$	C

[a] Roman numerals I through V refer to specific mine locations for which the corresponding emission factors were developed (Reference 5). Tables 11.9-4 and 11.9-5 present characteristics of each of these mines. See text for correct use of these “mine-specific” emission factors. The other factors (from Reference 7, except for overburden drilling from Reference 1) can be applied to any western surface coal mine.
[b] Total suspended particulate (TSP) denotes what is measured by a standard high volume sampler (see Section 13.2).
[c] Predictive emission factor equations, which generally provide more accurate estimates of emissions, are presented in Chapter 13.
[d] To estimate wind erosion on a shorter time scale (e. g., worst-case day), see Section 13.2.5.

Table 11.9-5 (Metric And English Units). GENERAL CHARACTERISTICS OF SURFACE COAL MINES REFERRED TO IN TABLE 11.9-4[a]

Mine	Location	Type Of Coal Mined	Terrain	Vegetative Cover	Surface Soil Type And Erodibility Index	Mean Wind Speed		Mean Annual Precipitation	
						m/s	mph	cm	in.
I	N.W. Colorado	Subbitum.	Moderately steep	Moderate, sagebrush	Clayey loamy (71)	2.3	5.1	38	15
II	S.W. Wyoming	Subbitum.	Semirugged	Sparse, sagebrush	Arid soil with clay and alkali or carbonate accumulation (86)	6.0	13.4	36	14
III	S.E. Montana	Subbitum.	Gently rolling to semirugged	Sparse, moderate, prairie grassland	Shallow clay loamy deposits on bedrock (47)	4.8	10.7	28 - 41	11 - 16
IV	Central North Dakota	Lignite	Gently rolling	Moderate, prairie grassland	Loamy, loamy to sandy (71)	5.0	11.2	43	17
V	N.E. Wyoming	Subbitum.	Flat to gently rolling	Sparse, sagebrush	Loamy, sandy, clayey, and clay loamy (102)	6.0	13.4	36	14

[a] Reference 4.

Table 11.9-6 (English Units). OPERATING CHARACTERISTICS OF THE COAL MINES REFERRED TO IN TABLE 11.9-4[a]

Parameter	Required Information	Units	Mine I	Mine II	Mine III	Mine IV	Mine V
Production rate	Coal mined	10^6 ton/yr	1.13	5.0	9.5	3.8	12.0[b]
Coal transport	Avg. unit train frequency	per day	NA	NA	2	NA	2
Stratigraphic data	Overburden thickness	ft	21	80	90	65	35
	Overburden density	lb/yd^3	4000	3705	3000	ND	ND
	Coal seam thicknesses	ft	9,35	15,9	27	2,4,8	70
	Parting thicknesses	ft	50	15	NA	32,16	NA
	Spoils bulking factor	%	22	24	25	20	ND
	Active pit depth	ft	52	100	114	80	105
Coal analysis data	Moisture	%	10	18	24	38	30
	Ash	%, wet	8	10	8	7	6
	Sulfur	%, wet	0.46	0.59	0.75	0.65	0.48
	Heat content	Btu/lb	11000	9632	8628	8500	8020
Surface disposition	Total disturbed land	acre	168	1030	2112	1975	217
	Active pit	acre	34	202	87	ND	71
	Spoils	acre	57	326	144	ND	100
	Reclaimed	acre	100	221	950	ND	100
	Barren land	acre	ND	30	455	ND	ND
	Associated disturbances	acre	12	186	476	ND	46
Storage	Capacity	ton	NA	NA	ND	NA	48000
Blasting	Frequency, total	per week	4	4	3	7	7[b]
	Frequency, overburden	per week	3	0.5	3	NA	7[b]
	Area blasted, coal	ft^2	16000	40000	ND	30000	ND
	Area blasted, overburden	ft^2	20000	ND	ND	NA	ND

[a] Reference 5. NA = not applicable. ND = no data.
[b] Estimate.

FACTORS AFFECTING FUMES PRODUCTION OF AN EMULSION AND ANFO/EMULSION BLENDS

James H. Rowland III, Richard Mainiero, and Donald A. Hurd Jr.

ABSTRACT

In previous conferences the authors have reported on toxic fumes generated by the detonation of ANFO. The research reported here extends the earlier work to include an emulsion blasting agent and ANFO/emulsion blends. Explosive mixtures were shot in 4-inch Schedule 80 steel pipe in a chamber in the experimental mine at the Pittsburgh Research Laboratory (PRL). Following each shot, the fumes in the chamber were analyzed using on-line instrumentation.

A major goal of the research was to gain a better understanding of the factors that lead to the generation of toxic fumes in blasting operations. Earlier studies have suggested that the high nitrogen dioxide and nitric oxide concentrations in product clouds might be the result of the poor confinement provided by relatively weak ground strata or the exposure of the explosive to ground water prior to shooting the shot.

Various mixtures of ANFO and emulsion were detonated in schedule 80 steel pipe and galvanized sheet metal pipe to evaluate the effect of confinement. Explosive mixtures were also allowed to soak in water for less than one day, one week, one month, and two months to determine which explosive mixtures would be degraded and observe what effect this degradation had on fume production. Results indicated that the production of nitrogen dioxide increased with low confinement of the detonating explosive and with exposure of the explosive to water.

INTRODUCTION

In February 1997 the authors presented a paper entitled "A Technique for Measuring Toxic Gases Produced by Blasting Agents" at the 23rd Annual Conference on Explosives & Blasting Technique in Las Vegas, Nevada. That paper discussed a method for measuring toxic fumes produced by detonation of blasting agents. In February of 2000 the authors followed up with a paper entitled "Factors Affecting ANFO Fumes Production" which investigated the effects of confinement and water contamination on ANFO's production of toxic fumes. The research reported here extends this study to include an emulsion blasting agent and ANFO/emulsion blends.

The generation of carbon monoxide and nitrogen oxides in blasting operations is a concern to blasters. Some mines have encountered problems with the generation of excessive nitrogen dioxide. It is unknown which blasting parameters favor the production of excessive nitrogen oxides, however, two factors that have been suggested are poor confinement of the blasting agent when blasting in poorly consolidated soils and allowing the blasting agent to soak in water for an extended period prior to the blast. The research reported here centers on these two factors.

In 1996 Schettler and Brashear[1] conducted a study of the water resistance of ANFO/emulsion blends. They found that an ANFO/emulsion blend had to contain at least 40 pct emulsion to be considered water resistant, and suggested that 50 pct may be required to insure a water-proof product. In that research, all products were tested after immersion in water for at least one hour. In reality, blasting agents in the field may be loaded into wet boreholes up to a month or two prior to detonation. Further research is needed to determine whether the "water-proof" 50/50 ANFO/emulsion blend and other blends can resist the effects of degradation by water for a month or more.

EXPERIMENTAL APPROACH

Detonating large blasting agent charges and confining the fumes requires a larger experimental chamber than was employed in past work on cap-sensitive explosives. Towards this end, a chamber was created in the experimental mine at PRL. The facility consists of a portion of mine entry enclosed between two explosion proof bulkheads. Each bulkhead is 40 inches (1 m) thick, constructed of solid concrete block hitched 1 foot (30 cm) into the roof, ribs, and floor. On the intake side, the bulkhead is fitted with a submarine mandoor and a small port for control and sampling lines. On the return side, the bulkhead is fitted with two sealed ventilation ports. Total volume of the chamber is 9,666 ft^3 (274 m^3). The chamber volume was determined by releasing a known quantity of carbon monoxide into the chamber and sampling the atmosphere after it had mixed. Following the shot, a fan mounted at one end of the chamber mixes the chamber atmosphere at 3,500 ft^3/min, after which the chamber is vented using the mine's airflow. The layout of the chamber is illustrated in Figure 1. Up to 10 pound (4.54 kg) explosive charges can be detonated in the chamber using a variety of confinements.

EXPERIMENTAL

A 28-inch (71-cm) length of 4-inch Schedule 80 seamless steel pipe (inner diameter 3.83 inch (9.72 cm)), and a 28-inch (71-cm) length of 4-inch (20-cm) diameter galvanized sheet metal pipe were chosen to provide confinement of the blasting agents. Prior to loading the pipe with explosives, a continuous velocity probe 30-inch (76-cm) in length is secured to the inner surface of the pipe along its length, as described by Santis[2]. The test fixture is water-proofed by sealing one end with plastic and caulking, after the velocity probe is secured. To expose the explosive to water, 1.36 liters of water is poured into the Schedule 80 steel pipe, after which 10 lb (4.54 kg) of the commercial blasting agent minus its wrapper, or premixed ANFO/emulsion blend, is loaded into the pipe. The same procedure is used for the galvanized sheet metal pipe with the exception that 1.68 liters of water is poured into the pipe before loading the blasting agent; the quantity of water was chosen such that the explosive plus the water filled the pipe. Initiation was provided by a 2-inch (5-cm) diameter, 2-inch (5-cm) thick cast pentolite booster, initiated by a number 8 strength instantaneous electric detonator.

Following detonation of an explosive in the chamber, the fan was turned on to uniformly mix the chamber atmosphere before fumes samples were taken out of the chamber through 1/4-inch (0.6-cm) Teflon or polyethylene tubes for analysis. Teflon sample lines were used for nitrogen oxides and ammonia to minimize loss of these constituents to absorption on the tube surface. Vacutainer* samples were taken and sent to the analytical laboratory for analysis; this technique was appropriate for components that were stable in the Vacutainer, namely hydrogen, carbon monoxide, and carbon dioxide. Nitrogen oxides and ammonia were not amenable to analysis by the Vacutainer technique and were instead monitored with a chemiluminescence analyzer for nitrogen oxides, and a Chillgard Analyzer* for ammonia. Test samples were taken for seventy-three minutes after detonation of the explosive. An electrochemical carbon monoxide monitor was also employed to act as a backup to the analytical lab's carbon monoxide analysis of the Vacutainer and to allow monitoring of the mixing of the chamber atmosphere.

RESULTS

Figures 2, 3, 4, and 5 report on the generation of carbon monoxide and nitrogen oxides for a 70/30 ANFO/emulsion blend shot in steel and galvanized sheet metal pipes following immersion in water for less than one day, one week, one month, and two months. For comparison, the blend was also tested in steel pipes and sheet metal galvanized pipe that contained no water. Results for shots in steel pipe indicate that, in most cases, the blend failed to detonate when loaded in the pipe with water for one week or longer. For the shots in galvanized sheet metal pipe, immersion of the blend in water for less than a day was sufficient to cause detonation failure. One cause for failure of the blend to detonate can be understood by examination of Figure 6, a photo of the blend loaded in a 4-inch (10-cm) diameter plexiglass tube with water. The 70/30-blend floats on top of the water, leaving a 5½-inch (14-cm) layer of water between the booster and the explosive. The blend shot in the steel pipe without water yielded a velocity of 3,985 m/s, while the corresponding shot in galvanized sheet metal yielded a velocity of 2,857 m/s. The 3,985-m/sec velocity in steel pipe agrees well with the 4,230-m/s velocity reported by Schetler and Brashear for this blend. The lower velocity in the galvanized sheet metal pipe is to be expected since the confinement is insufficient to provide for good detonation.

The shots of 70/30 ANFO/emulsion blend in steel pipe produce about the same quantity of CO, 17-20 l/kg, when shot dry and immersed in water for less than a day. Immersion of the blend in water had a detrimental effect as evidenced by the lower detonation velocity, 3,394 m/s versus 3,985 m/s, and the higher NO_x

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*Reference to specific products is for informational purposes and does not imply endorsement by NIOSH.

production, 14 l/kg versus 8.5 l/kg. Only the dry blend shot in the galvanized sheet metal pipe, yielding a velocity of 2,860 m/sec, CO of 27 l/kg, and NO_x of 9.5 l/kg. It is surprising to note that the blend immersed in water for less than a day yields a higher velocity than the dry blend shot in galvanized sheet metal, while at the same time producing more NO_x. Normally one would expect that a higher velocity would represent better detonation reaction, hence less NO_x. Apparently the water has more of an effect on the blend than just lowering its velocity.

Figures 7, 8, 9, and 10 report on the generation of carbon monoxide and nitrogen oxides for a 50/50 ANFO/emulsion blend shot in steel and galvanized sheet metal pipes following immersion in water for less than one day, one week, one month, and two months. For comparison, the blend was also tested in steel pipes and sheet metal galvanized pipe that contained no water. Figure 7 shows that the 50/50 blend yielded identical velocities and fumes when shot in a steel pipe without water or exposed to water for less than a day. When the 50/50 blend was loaded in the steel pipe containing water for a week or more, the results were mixed. In some cases the explosive detonated at a low velocity and in others no detonation was observed. In cases where no detonation was observed, the steel pipe was in one piece following the shot but the bottom section was bulged out from detonation of the booster. The question arises as to whether the measured fumes were produced by the booster alone, or were a combination of those from the booster and fumes from deflagrating explosive. Previously, tests shots were conducted to measure the fume production of a single booster; the fumes produced were much less than those measured after the shots of blasting agent. The booster by itself could not have produced the observed fumes. Detection of significant CO and NO_x fumes following each blasting agent shot indicated that the explosive burned, even if it did not detonate. Similar results were observed for the corresponding shots in sheet metal pipe. These results were significantly different from those for the 70/30 blend. The 70/30 blend either detonated, yielding CO and NO_x or it failed to detonate, yielding little CO and NO_x. Figure 11 shows the 50/50 blend loaded in a plexiglass tube with water for four weeks.

Figures 12, 13, 14, and 15 report on the generation of carbon monoxide and nitrogen oxides for the emulsion blasting agent shot in steel and galvanized sheet metal pipes following immersion in water for less than one day, one week, one month, and two months. For comparison, the emulsion was also tested in steel pipes and sheet metal galvanized pipe that contained no water. In all cases, for loading in steel and galvanized sheet metal pipes without water and containing water, the emulsion detonated with a velocity in excess of 5,500 m/s, ie the emulsion detonated well under all test conditions. The emulsion shot in steel pipe consistently produced CO in the neighborhood of 13 l/kg, while the shots in galvanized sheet metal yielded 14 to 21 l/kg. Examination of the results for production of NO, NO_2, and NO_x yields very interesting results. The shots of emulsion loaded in steel pipe without water and loaded in the pipe with water for less than a day yielded NO_x production at the low level of 1½ l/kg. Similarly, the shots of emulsion loaded in galvanized sheet metal pipe without water and loaded in the pipe with water for less than a day yielded NO_x production at the relatively low level of 3 l/kg. The emulsion loaded in steel pipe and galvanized sheet metal pipe with water for a week or more produced much higher levels of NO_x, about 6 l/kg for both. This result is very surprising when considering that the velocities for all shots of emulsion were about the same, in the neighborhood of 6,000 m/s (see Figure 17), and examination of the emulsion loaded in the plexiglass tube with water showed no apparent degradation of the emulsion.

DISCUSSION

Some of the results of this study are expected and some are unexpected. Schettler and Brashear had reported that 30 percent emulsion was not sufficient to make an ANFO/emulsion blend water resistant; they reported that a minimum of 50 pct emulsion was needed to make the blend water resistant; in their study," water resistant" meant that the blend was unaffected when immersed in water for an hour. The study of 70/30 ANFO/emulsion blend reported here indicated that the blend would not detonate in the steel pipe when exposed to water for more than a day and would not detonate in the galvanized sheet metal pipe when exposed to any water. Consistent with the results of Shettler and Brashear, the 50/50 blend is water resistant for short exposures (one hour in their case and less than one day here), but is not resistant for exposures of a week or more.

The results for shots of the emulsion are very surprising. When the emulsion was loaded in a pipe with water for up to 2 months, there was no visible effect on the emulsion and the detonation velocity looked very good, yet the NO_x production was very high. Normally, one would expect that if an explosive detonates well, its NO_x production will be low; excessive NO_x production is normally associated with blasting agents that do not detonate properly, either through degradation by water or some other mechanism. A blaster who normally loads blastholes with ANFO or a blend may switch to loading with 100 pct emulsion when wet boreholes are encountered, in the belief that the water won't degrade the emulsion. The emulsion in the wet holes will detonate at the expected velocity leading the blaster to believe that the water exposure had no effect. However, the water may have degraded the emulsion such that it produces higher NO_x without the blaster realizing it. This could explain why blasts loaded with emulsion may perform well from shot to shot without regard to the presence of water in the blastholes, yet occasionally produce excessive NO_2 production.

1. Schettler, L and S Brashear, Effect of Water on ANFO/Emulsion Blends in Surface Mine Blasting, Proceedings of the Twenty-Second Annual Conference on Explosives and Blasting Technique, Orlando, FL, February 4-8, 1996.

2. Santis, L.D. and R.A. Cortese, A Method of Measuring Continuous Detonation Rates Using Off-the-Shelf Items, Proceedings of the Twenty-Second Annual Conference on Explosives and Blasting Technique, Orlando, FL, February 4-8, 1996.

Acknowledgments

The authors would like acknowledge the people who worked on this project over the past year. It would not have been possible to complete this research with out the dedication and professionalism of our coworkers: Eugene Bazala, Paul Kolarosky, and Richard Sobeck.

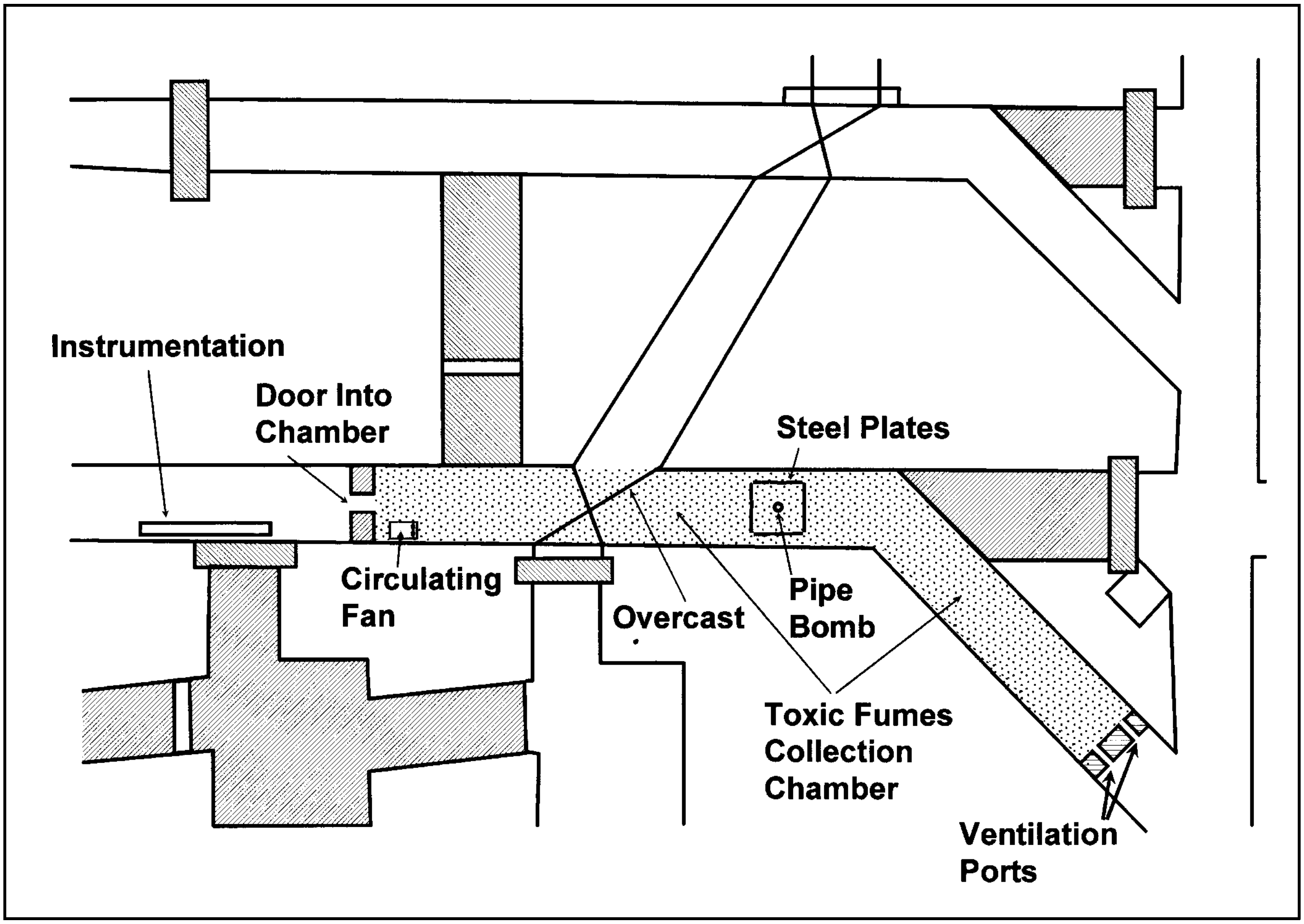

Figure 1. Research was conducted in a chamber in the underground mine at the NIOSH Pittsburgh Research Lab.

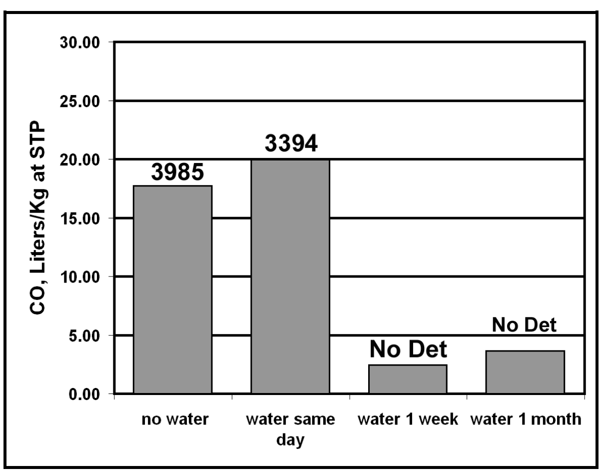

Figure 2. Carbon monoxide production of 70/30 ANFO/emulsion blend shot in steel pipe following exposure to water for up to a month. Numbers above bars are detonation velocity in m/s.

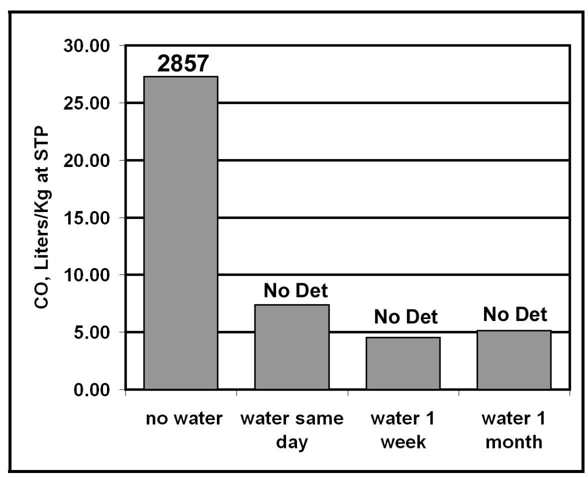

Figure 3. Carbon monoxide production of 70/30 ANFO/emulsion blend shot in galvanized sheet metal pipe following exposure to water for up to a month. Numbers above bars are detonation velocity in m/s.

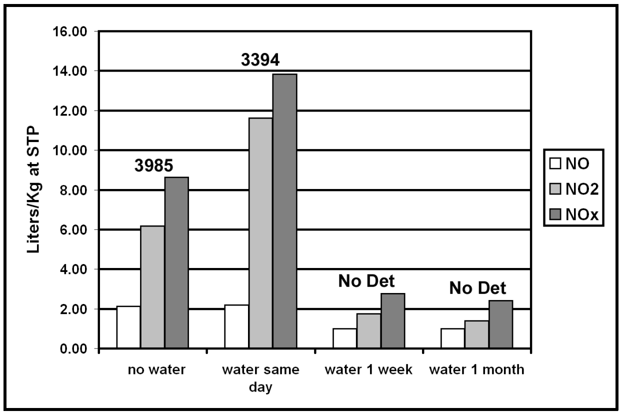

Figure 4. Nitrogen oxides production for 70/30 ANFO/emulsion blend shot in steel pipe following exposure to water for up to a month. Numbers above bars are detonation velocity in m/s.

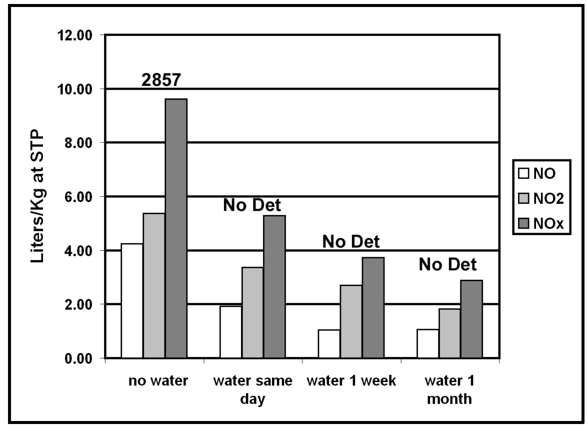

Figure 5. Nitrogen oxides production for 70/30 ANFO/emulsion blend shot in galvanized sheet metal pipe following exposure to water for up to a month. Numbers above bars are detonation velocity in m/s.

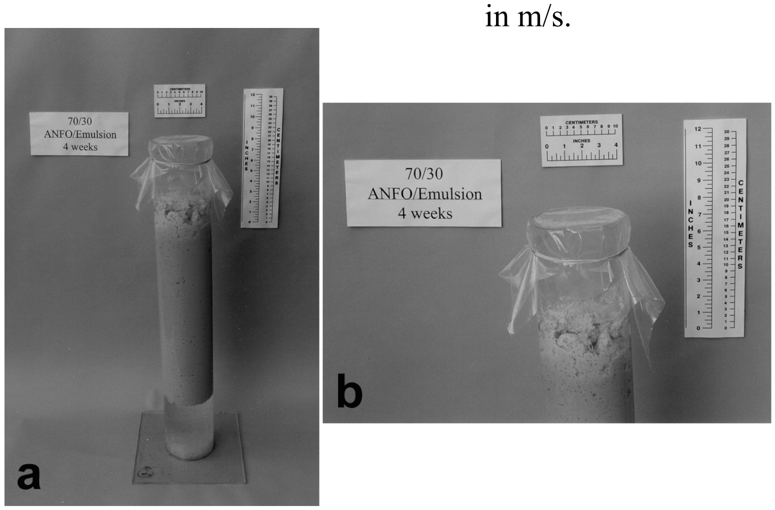

Figure 6. Figure shows the 70/30 ANFO/emulsion blend loaded in a 4-inch (10-cm) diameter plexiglass tube following exposure to water for four weeks.

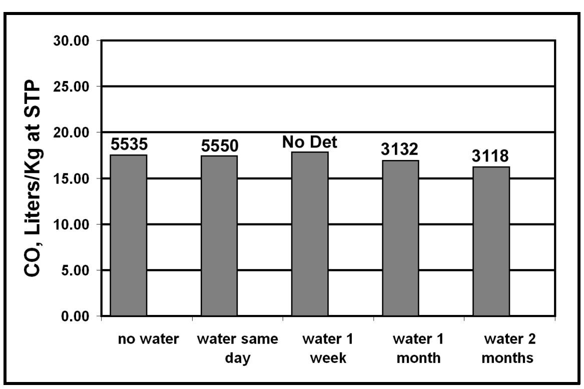

Figure 7. Carbon monoxide production of 50/50 ANFO/emulsion blend shot in steel pipe following exposure to water for up to two months. Numbers above bars are detonation velocity in m/s.

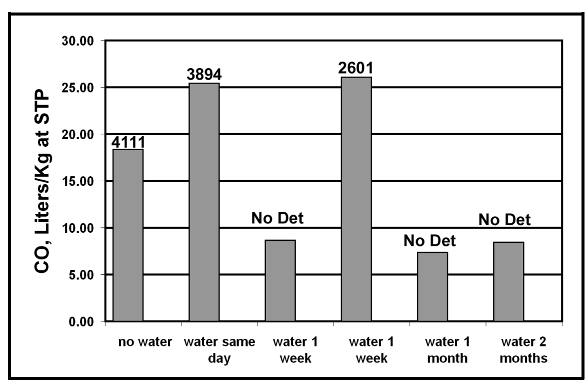

Figure 8. Carbon monoxide production of 50/50 ANFO/emulsion blend shot in galvanized sheet metal pipe following exposure to water for up to two months. Numbers above bars are detonation velocity in m/s.

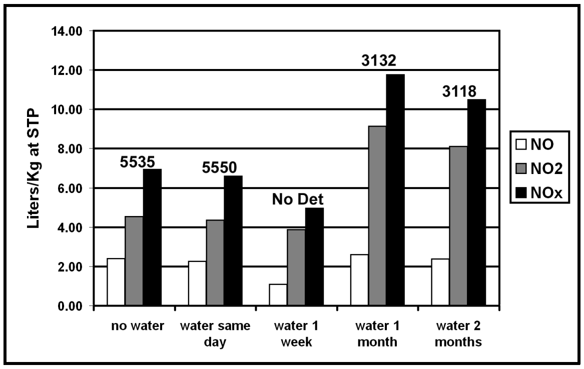

Figure 9. Nitrogen oxides production for 50/50 ANFO/emulsion blend shot in steel pipe following exposure to water for up to two months. Numbers above bars are detonation velocity in m/s.

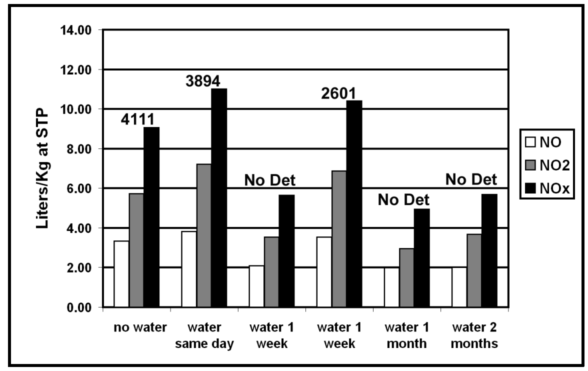

Figure 10. Nitrogen oxides production for 50/50 ANFO/emulsion blend shot in galvanized sheet metal pipe following exposure to water for up to two months. Numbers above bars are detonation velocity in m/s.

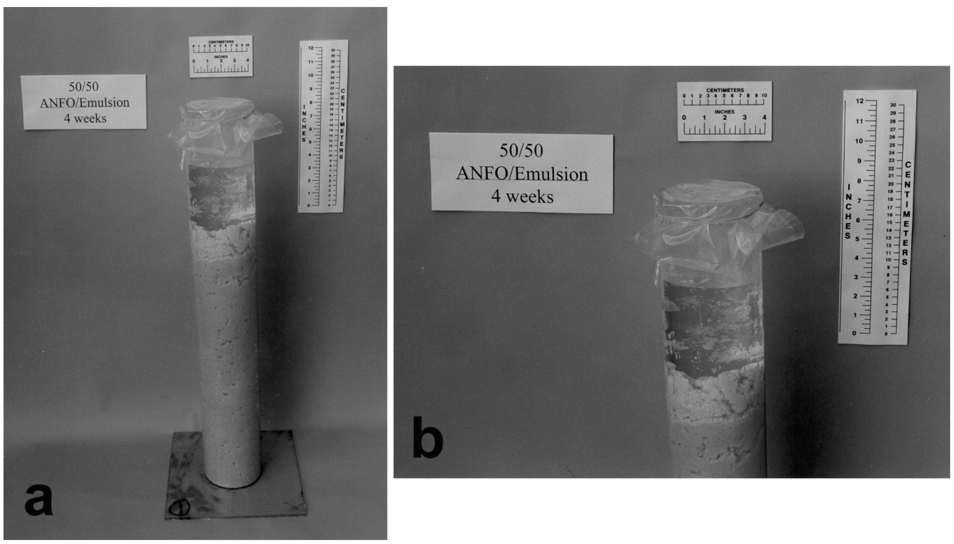

Figure 11. Figure shows the 50/50 ANFO/emulsion blend loaded in a 4-inch (10-cm) diameter plexiglass tube following exposure to water for four weeks.

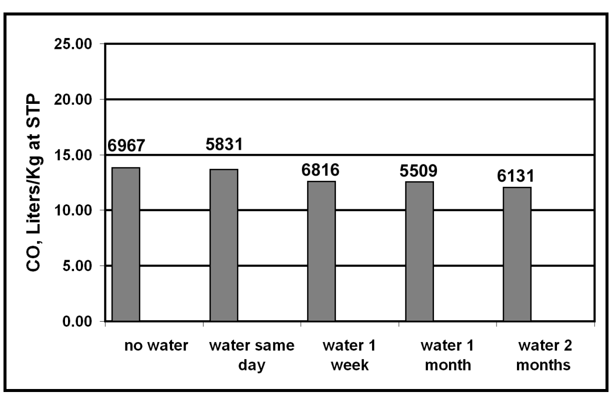

Figure 12. Carbon monoxide production of emulsion shot in steel pipe following exposure to water for up to two months. Numbers above bars are detonation velocity in m/s.

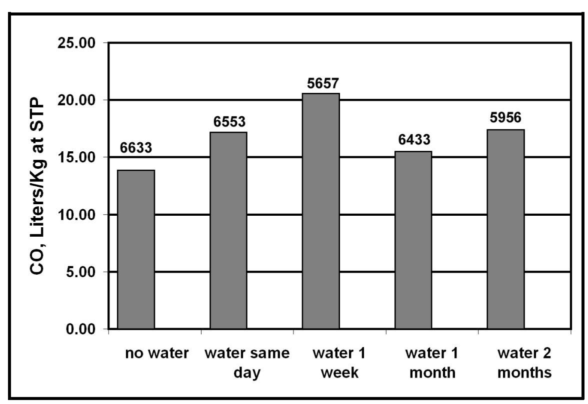

Figure 13. Carbon monoxide production of emulsion shot in galvanized sheet metal pipe following exposure to water for up to two months. Numbers above bars are detonation velocity in m/s.

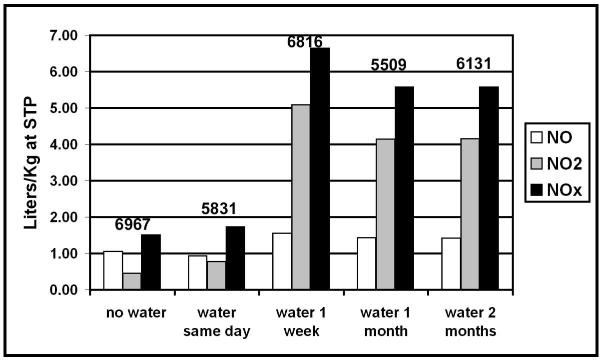

Figure 14. Nitrogen oxides production for emulsion shot in steel pipe following exposure to water for up to two months. Numbers above bars are detonation velocity in m/s.

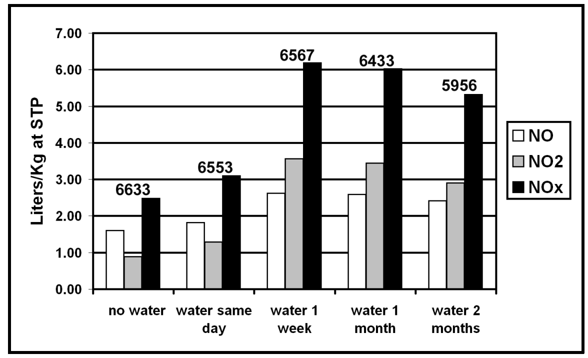

Figure 15. Nitrogen oxides production for emulsion shot in galvanized sheet metal pipe following exposure to water for up to two months. Numbers above bars are detonation velocity in m/s.

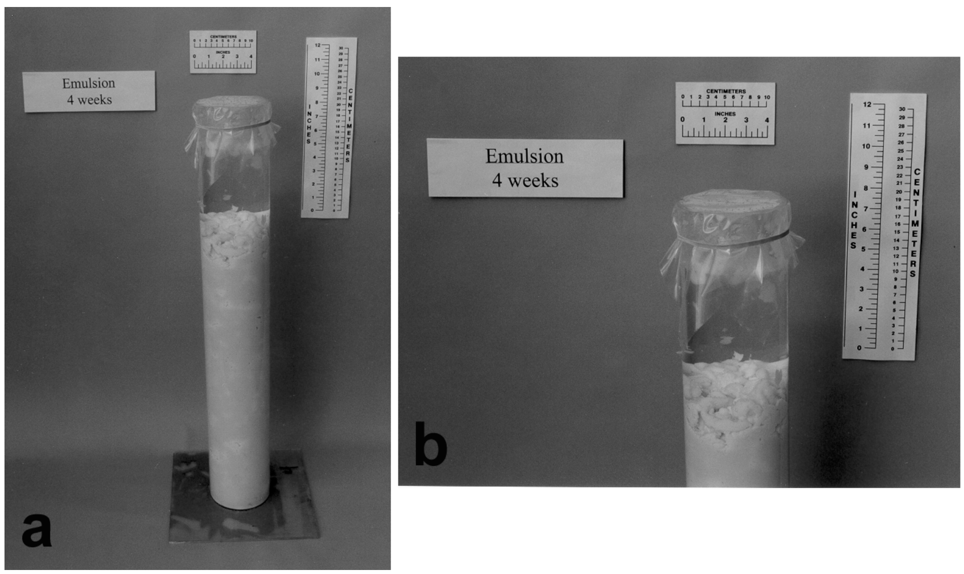

Figure 16. Figure shows the emulsion loaded in a 4-inch (10-cm) diameter plexiglass tube following exposure to water for four weeks.

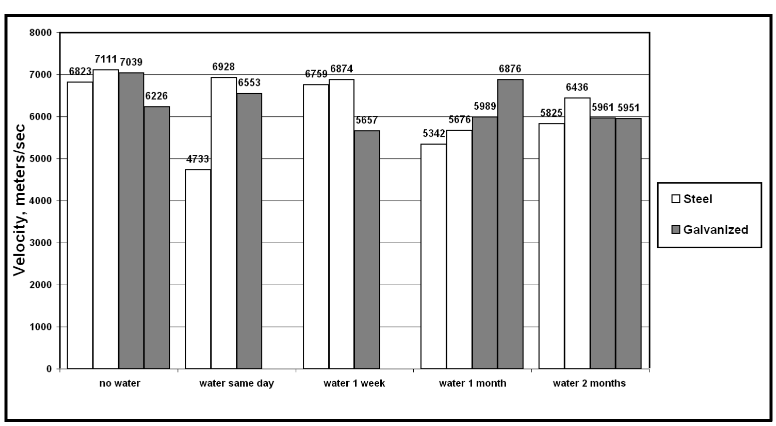

Figure 17. Detonation velocities for emulsion in steel pipe and galvanized sheet metal pipe.

11.9.3 Updates Since the Fifth Edition

The Fifth Edition which was released in January 1995 reformatted the section that was dated September 1988. Revisions to this section since these dates are summarized below. For further detail, consult the memoranda describing each supplement or the background report for this section. These and other documents can be found on the CHIEF WEB site (home page http://www.epa.gov/ttn/chief/).

Supplement E

- The predictive equations for emission factors for haul trucks and light/medium duty vehicles were removed and replaced with a footnote refering users to the recently revised unpaved road section in the Miscellaneous Sources chapter.

- The emission factor quality ratings were revised based upon a revised predictive equation and single value criteria.

- The typographical errors for the TSP equation and the omission of the PM-2.5 scaling factor for blasting were corrected.

References For Section 11.9

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NO_x emissions from blasting operations in open-cut coal mining

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ABSTRACT

The Australian coal mining industry, as with other industries is coming under greater constraints with respect to their environmental impacts. Emissions of acid gases such as NO_x and SO_x to the atmosphere have been regulated for many years because of their adverse health effects. Although NO_x from blasting in open-cut coal mining may represent only a very small proportion of mining operations' total NO_x emissions, the rapid release and high concentration associated with such activities may pose a health risk. This paper presents the results of a new approach to measure these gas emissions by scanning the resulting plume from an open-cut mine blast with a miniaturised ultraviolet spectrometer. The work presented here was undertaken in the Hunter Valley, New South Wales, Australia during 2006. Overall this technique was found to be simpler, safer and more successful than other approaches that in the past have proved to be ineffective in monitoring these short lived plumes. The average emission flux of NO_x from the blasts studied was about 0.9 kt t^{-1} of explosive. Numerical modelling indicated that NO_x concentrations resulting from the blast would be indistinguishable from background levels at distances greater than about 5 km from the source.

1. Introduction

Open-cut coal mining is widespread in the upper Hunter Valley in New South Wales (NSW) with several large mines operating within close proximity to the towns of Muswellbrook and Singleton. Consequently, there is community concern about the potential environmental impacts of mining on nearby populations.

Blasting, in particular, has the potential to affect areas outside the mine boundary and accordingly, vibration and dust emission limits are set in each mine's environmental licence. However, gaseous emissions of environmental concern, such as nitrogen dioxide (NO_2) may also be released during blasting operations. Currently, there are very little quantitative data relating to the magnitude of these emissions and it is not yet possible to determine if they contribute significantly to ambient levels in the main population centres.

The explosive ammonium nitrate/fuel oil (ANFO) is used almost universally throughout the open-cut coal mining industry. Under ideal conditions, the only gaseous products from the explosion are carbon dioxide (CO_2), water (H_2O) and nitrogen (N_2).

$$3NH_4NO_3 + CH_2 \rightarrow 3N_2 + CO_2 + 7H_2O \quad (1)$$

However, even quite small changes in the stoichiometry (either in the bulk material or caused by localised conditions such as moisture in the blast hole, mineral matter or other factors) can lead to the formation of substantial amounts of the toxic gases carbon monoxide (CO) and nitric oxide (NO) as shown.

$$2NH_4NO_3 + CH_2 \rightarrow 2N_2 + CO + 5H_2O \quad (2)$$

$$5NH_4NO_3 + CH_2 \rightarrow 4N_2 + 2NO + CO_2 + 7H_2O \quad (3)$$

In addition, some of the NO formed may oxidise in the presence of oxygen (O_2) to produce NO_2.

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$$2NO + O_2 \rightarrow 2NO_2 \quad (4)$$

Often in practice, large quantities of NO_2 are released from blasts which are observed as intense orange plumes.

Although these gases are not considered in their environmental licences, each mine is required to estimate annual emissions of CO, NO_x and SO_2 for the National Pollutant Inventory (NPI), compiled each year by the Australian government. These estimates are made by multiplying the amount of explosive consumed by an emission factor which is currently 8 kg t^{-1} for NO_x, 34 kg t^{-1} for CO and 1 kg t^{-1} for SO_2 (National Pollutant Inventory, 1999). These emission factors, however, are based on limited overseas data and are subject to high uncertainty.

Most of the studies which have examined NO_x formation from blasting have used blast chambers. The results from these studies do not necessarily correlate with what is observed during actual blasts. Few studies have attempted to measure NO_x emissions under actual field conditions, presumably because of the practical difficulties involved. Plumes from blasting lack confinement, can be very large in size and are affected by prevailing weather conditions. There is also a large quantity of dust associated with the blast and these factors combine to make physical sampling of the plume very difficult. There are also the obvious safety implications which restrict access to blast sites. Consequently, quantitative measurements of plume characteristics are generally unavailable. Nevertheless, it is important for mine operators, particularly when their operations are close to residential areas, to have some method for assessing NO_x formation and more importantly, predicting the severity of the NO_x plume. At present predictions of NO_x formation are subjective and are based on the blast engineer's knowledge of the area to be blasted (e.g. rock type, area of the mine, presence of water in the holes, etc.) and the ratings obtained from blasts performed under similar conditions. Quantitative flux estimations of NO_x released from a blast require measurement of concentration through the plume in both the horizontal and vertical axes.

Some of the options available to make these measurements are given in the following sections.

1.1. Physical sampling

Sampling of blasting fumes involves taking a sample of gas from the plume for subsequent analysis, which could be either on site or in an off site laboratory. Although physical sampling could in principle provide sufficient information to characterise a plume, there are a number of serious logistical problems with this approach:

- The size of the plume means that a large number of sample points would be required to sample across the width and height of the plume.
- The force of the explosion and the resulting debris would restrict the proximity of any sampling packages to the initial gas release.
- The potential toxicity of the plume; personnel cannot move through it to take samples, hence sampling stations must be fixed prior to the blast. This means that the path of the plume must be anticipated before the blast.

1.2. Continuous analysis

Another option is to use portable analysers to measure NO_x concentrations in real time. There are, however, disadvantages with this approach since a sample of the plume must be presented to the instrument for analysis. Usually a pump draws air through a small diameter tube into the instrument, but to achieve the necessary spatial characterisation of the plume, sample tubes would need to be positioned at various points throughout the plume. Thus many of the problems identified for the physical sampling would also apply to the use of continuous analysers.

1.3. Optical methods

There are several optical methods of analysis currently available that may be applicable to field measurements of NO_x. These include open-path Fourier Transform Infra-Red Spectroscopy (FT-IR), Correlation Spectroscopy (COSPEC) and Differential Optical Absorption Spectroscopy (DOAS). FT-IR has often been used in air pollution studies (e.g. Levine and Russwurm, 1994). It has also been used in mine situations to measure fugitive methane emissions. Kirchgessner et al. (1993) used open-path FT-IR (op-FT-IR) to estimate methane emissions from open-cut coal mines in the United States. The technique relies on passing a collimated infrared beam through ambient air over a path length of up to several hundred metres. In the Kirchgessner et al. (1993) study, the concentration of methane across the plume was measured then wind speed data and a Gaussian plume dispersion model were used to estimate the methane emission rate from the mine. These authors subsequently developed a modification of their method which improved its accuracy (Piccot et al., 1994, 1996). The improved method was essentially the same as described above except that methane concentrations were measured at several elevations to better characterise the plume.

In principle, open-path FT-IR could be used to measure NO_x in blast plumes since it is sensitive to NO, NO_2, and CO along with other gases. Infrared radiation is also strongly absorbed in many parts of the spectrum by both CO_2 and water which are very likely to be present in high concentrations in blast plumes and this may tend to obscure the NO_x signal. High resolution instruments may resolve at least some of the NO_x absorption lines, however, a more serious drawback with op-FT-IR is that the infrared beam would be substantially attenuated by the dust thrown up by the blast. In the period immediately after the blast when the dust level is very high it is likely that the IR beam would be completely blocked thus making measurements impossible.

Another well established optical method is Correlation Spectroscopy (COSPEC). The system was first described by Moffat and Milan (1971) and was designed to measure point source emissions of SO_2 and NO_2 from industrial plants but found a niche application in the measurement of SO_2 fluxes from volcanoes (Galle et al., 2002). The COSPEC system utilises a "mask correlation" spectrometer and was designed to measure vertical or slant columns using sky-scattered sunlight. By traversing beneath plumes with the mobile instrument, the concentration of the column is calculated and, once multiplied by the plume velocity, produces a source emission rate. These instruments are limited to detecting only those species where masks are available. They also suffer from interferences from other atmospheric gases and light scattering from clouds or aerosols that can produce errors in column densities (Chalmers Radio and Space Science, website).

The DOAS technique is a relatively new technique that is gaining widespread acceptance as an air pollution monitoring method. Like the open-path FT-IR method, the DOAS can simultaneously measure concentrations of a number of species over path lengths which typically range from hundreds of metres to kilometres.

A DOAS, configured as an 'active system', Fig. 1, has three main parts – a light emitter, a light receiver and a spectrometer. The emitter sends a beam of light to the receiver (in some cases the emitter and receiver are contained in the same unit and the light beam is reflected off a remotely located passive reflector). The light beam contains a range of wavelengths, from ultraviolet to visible, although instruments are now available with an infrared source, which extends the range of compounds that can be detected. Different pollutant molecules absorb light at different wavelengths along the path between the emitter and receiver. The receiver is connected to the spectrometer which measures the intensity of the different wavelengths over the entire light path and through the data system converts this signal into concentrations for each of the species being monitored.

DOAS instruments are routinely used to measure SO_2, NO_2 and O_3.

More recently, advances in miniaturising UV–vis spectrometers has lead to the development of much more compact DOAS units, configured as a passive system (Fig. 1), which have come to be known as "mini-DOAS". The mini-DOAS system has so far been used mainly in the study of SO_2 fluxes in volcanic emissions (McGonigle et al., 2003).

2. Methodology

2.1. Field measurements

A portable DOAS (mini-DOAS) manufactured by Resonance Ltd was used in this study. The instrument covers a spectral range of 280–420 nm and can measure sub-part per million levels of NO_2 and SO_2. The unit, which comprises a telescope, scanning mirrors, calibration cells and a miniature CCD array spectrometer (Ocean Optics USB2000 spectrometer), is housed in a small package which is mounted on a tripod. Calibration of the instrument was carried out using the internal calibration cell. The concentration of the cell was equivalent 50 ppm m. No SO_x measurements were undertaken.

Data collection and processing were performed by Ocean Optics OOIBase32 software loaded in a laptop computer. This results in a more compact system that is easier to deploy at mine sites and provides greater flexibility in positioning the instrument in relation to the blast plume.

Prior to each monitored blast, a dark spectrum was collected by blocking light from entering the spectrometer and a scan was performed. To produce a reference spectrum, a further scan was performed in a clear sky background which contained background absorption from NO_2. The reference spectrum was required in order to determine the increase in concentration of NO_2 above ambient levels in the blast plumes.

The plume resulting from each blast was tracked with the spectrometer until the NO_2 concentration was indistinguishable from the surrounding sky. During each field measurement, the mini-DOAS and a video camera were positioned a safe operating distance from the blast at all times.

NO_2 concentrations in the plume were calculated by subtracting the dark spectrum from the measured spectrum and the reference spectrum using the supplied software.

The results obtained from the mini-DOAS are a path-averaged NO_2 concentration profile measured in units of parts per million metre (ppm m). The mini-DOAS results must be divided by the path length through the plume to yield a concentration. To estimate the amount of NO_2 released from each blast it was necessary to multiply the concentration by the volume of the plume. Hence it was necessary to estimate the dimensions of each plume.

All of the blasts monitored were video-taped using at least one, and sometimes two, video recorders. The distances between the cameras and the blast were measured by locating their positions with a handheld GPS receiver.

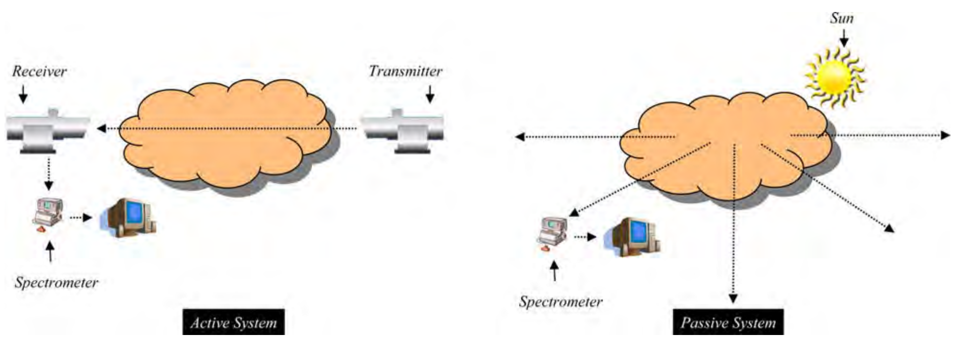

Fig. 1. Schematic diagram of DOAS systems operating in both active and passive modes.

Wind speed and directional data used to plot the directional path of the plume were obtained from a series of meteorological stations located around the mining lease. Simple trigonometry was employed to determine the distance from the video camera to the plume at the corresponding time intervals.

A rudimentary method of photogrammetry was then used to estimate the size of the plume based on still images extracted from the videos. Ratios of the plume to picture size in both the vertical and horizontal planes were made.

Once the plume to camera distance and the constraining angle for the plume is known, a crude three-dimensional estimate of the plume dimension was calculated using basic trigonometric functions. An example of the dimensions determined for a plume using this method is shown in Fig. 2.

Ground level measurements were carried out using a Greenline 8000 portable gas analyser. This instrument is capable of continuous, simultaneous analysis of O_2, CO_2, CO, SO_2, NO and NO_2. It is battery powered and can operate unattended for up to about 2 h. The instrument was calibrated against a standard gas mixture before each use. Data were logged on a laptop computer connected to the instrument.

For each experiment, the instrument was set up downwind of the blast in a location where the plume was expected to pass, but far enough away to avoid flying debris. The inlet probe was fixed at about 2 m above ground level.

It must be noted that selecting an appropriate location for the instrument was often difficult. In many cases, the wind conditions were quite variable, especially within the pit so it was not always possible to correctly anticipate the path of the blast plume. As well, the layout of the mine pit and safety considerations imposed constraints on where the instrument could be placed. Because of these problems, the plumes from many of the blasts did not pass over the analyser and data was not recorded.

2.2. Modelling

A simple modelling exercise was undertaken for this study to determine if the release of NO_2 from a blast could be of detriment to persons exposed to the plume within 5 km of the release. The results of this study are indicative and based on the assumption that the model used is appropriate. Modelling generally relies on local observational data to confirm the performance of the model. The difficulty in measuring emissions from mining blasts has meant that in this case the model is used as an indicator relying on the verifications used in the development of the chosen model. For this reason we have modelled concentrations directly downwind of theoretical blasts with AFTOX (Kunkel, 1991), a USEPA approved dispersion model (http://www.epa.gov/scram001/dispersion_alt.htm#aftox). The original DOS based QuickBasic code was transformed into Excel macros to enable many scenarios to be run.

AFTOX is a Gaussian Puff model developed for the United States Air Force to assess real time toxic chemical releases. The model uses information from US Air Weather Service (AWS) stations to calculate dispersion based on measured atmospheric conditions. As for all Gaussian models, the spread of pollutants is governed by dispersion coefficients in the horizontal (σ_y) and vertical (σ_z) directions. These coefficients depend on the atmospheric stability derived from the AWS data. In this study, the scenarios were modelled by predefining the wind speed and atmospheric stability classes. The wind speeds modelled ranged from very low ($0.5\ m\ s^{-1}$) to moderate ($10\ m\ s^{-1}$). Stability was modelled in six steps representing the standard Pasquill-Gifford stability classes, i.e. A–F, where A, B and C represent unstable conditions (where A is the most unstable), D is neutral and E and F are stable conditions. These stability classes are used to categorise the rate at which a plume will disperse. Unstable conditions might be found on a sunny day with light winds leading to rapid plume dispersion while the stable conditions may occur in clear skies with light winds and perhaps a temperature inversion present. Plume spread is slow in these circumstances.

AFTOX is operated by assuming an emission release from a single location. The emissions can be either continuous or instantaneous. In this study AFTOX was used to describe an area source by representing it as a large number of individual points. The area of the emission (i.e. the area over which the explosives were distributed) was

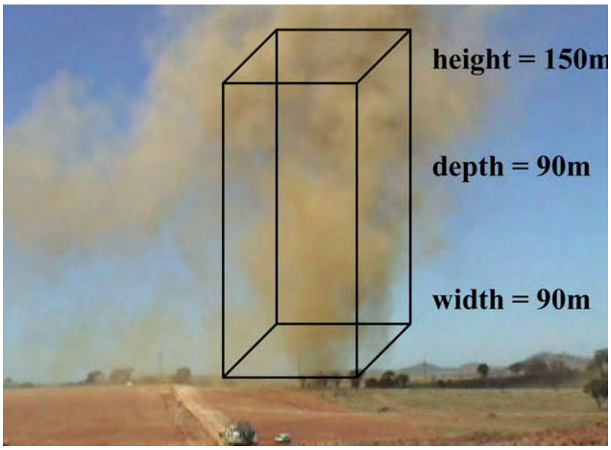

Fig. 2. Blast plume with estimated dimensions.

assumed to be 100 m × 200 m based upon sizes commonly observed during the field measurements. The area was subdivided into 10 m × 10 m units. Each square was represented by a point source with its source at the centre. In total, the area was modelled as 231 separate point sources (see Fig. 3). The total flux of emissions for the source was set at 100 kg. To estimate the maximum concentration and pollutant exposure values, the values should be multiplied by an appropriate scaling factor.

One hundred and twenty scenarios were modelled in which the 100 kg of emissions were spread randomly throughout the source area. A multi-stage process was employed for this task. In the first step, the total maximum number of points emitting was determined. This was defined by a random number between 20% and 80% of the maximum number of sources (in this case 231). The range chosen was an estimate from the portion of blasts that appeared to fume in conditions witnessed during this study. The total emission was then divided by this number. Each portion of the total emission was then placed randomly within the emission area. This process allowed certain points to receive multiple portions of the total emissions enabling the formation of hot spots. An example of one emission grid (Scenario 1 of 120) is displayed in Fig. 4.

Concentrations were determined for each of the 120 emission scenarios at distances of 200 m, 300 m, 400 m, 500 m, 750 m, 1 km, 1.25 km, 1.5 km, 2 km, 2.5 km, 3 km, 4 km and 5 km from the origin of the source. A concentration was determined for a number of discrete times that encompassed the complete plume travelling past the receptor. Further the concentrations were determined at 21 locations 10 m apart in a plane parallel and directly downwind of the source area (see Fig. 3). An average concentration from each of the receptors was determined; in this case with N equal to 21.

$$C^{*} = \frac{1}{N}\sum_{i=1}^{N} C_i \tag{5}$$

The average for each scenario was then used to create an ensemble average and standard deviation for the entire run (i.e. $N = 120$).

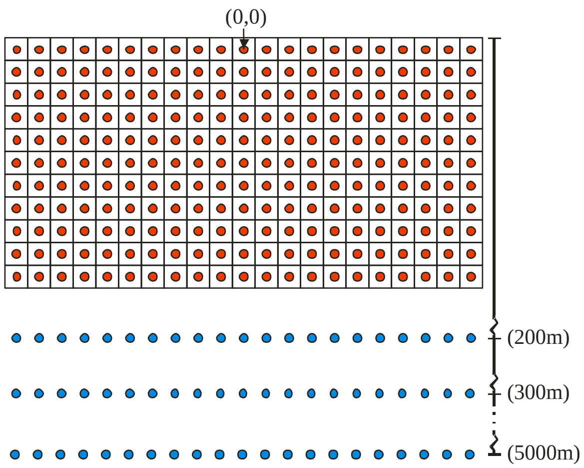

Fig. 3. Emission grid and receptor array setup.

$$\overline{C} = \frac{1}{N}\sum_{j=1}^{N} C_j^{*} \tag{6}$$

$$\sigma_{\overline{C}} = \frac{1}{N}\sum_{j=1}^{N}\left(C_j^{*} - \overline{C}\right)^2 \tag{7}$$

$$C_{\max} = \max_{k=1}^{N}[\overline{C}_k] \tag{8}$$

A dosage expressed in ppm s was determined from the times when the ensemble average plume travelled past the receptors located at each distance downwind of the source. Again N represents each discrete time step (dt) where $C' \neq 0$.

$$C_{\text{dose}} = \sum_{k=1}^{N}(\overline{C}_k)\text{d}t \tag{9}$$

The relative variation for the dosage is provided by similarly treating the ensemble standard deviation.

$$\sigma_{\text{dose}} = \sum_{k=1}^{N}(\sigma_{\overline{C}k})\text{d}t \tag{10}$$

3. Results and discussion

3.1. Field measurements

Plume measurements were made using the mini-DOAS spectrometer at two open-cut mine sites located in the Hunter Valley. The combination of the spectral analysis and the plume estimation technique allowed for NO_2 concentration and mass flux estimates to be made remotely, totally eliminating the requirement of physical sampling.

An example of the spectral output produced by the mini-DOAS is shown in Fig. 5. The spectral output consists of the NO_2 concentration (ppm m) as a function of time. The figure also contains a series of photographs depicting the formation of a blast plume at time intervals of 70, 110, 163, 250 and 350 s post-blast initiation. It is worth noting the change in intensity of the colour of plume and size as a function of time.

Reliable concentration measurements with the mini-DOAS may only be made when the spectrometer is aimed into a sky background above the horizon from the point of observation. In this example, a peak concentration of 580 ppm m was achieved in 163 s post-blast initiation (third image from the left). At this time the plume has risen above the horizon from the point of observation. The plume to mini-DOAS distance at this stage is approximately 500 m, with an estimated plume depth of 105 m. This results in a NO_2 concentration of 5.6 ppm at that particular stage of the plumes' dispersion.

After 350 s, the plume is barely visible and is now estimated to be approximately 650 m from the mini-DOAS unit. The plume depth has increased to 125 m with

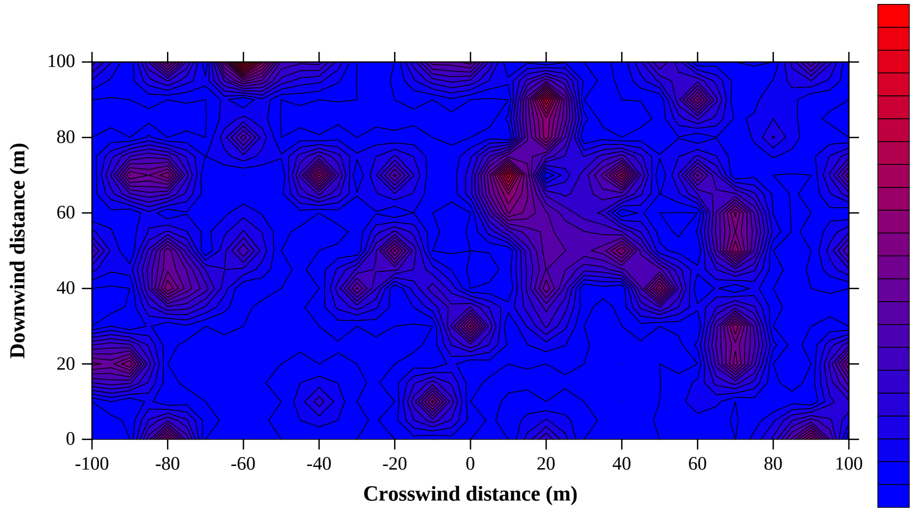

Fig. 4. Example of emission grid for 1 of the 120 scenarios modelled (the scale on the right hand side refers to NO_2 concentration in ppm).

a corresponding increase in plume volume by a factor of two. This expansion of the plume corresponds to a decrease in NO_2 concentration to 2.8 ppm.

At 360 s the plume was no longer visible to the eye and was lost for a short period of time to the mini-DOAS. This, however, was rectified with scanning of the sky with the spectrometer until the invisible plume was tracked for a further period.

Results for all plumes monitored during field work at both mine sites are given in Table 1. The table gives the peak NO_2 concentration as measured by the mini-DOAS above the horizon. Also given in the table is the plume volume at peak concentration and the calculated mass of NO_2 released from the blast. The mass of ANFO typically used in a blast was on average 210 tonnes, ranging from 60 to 565 tonnes. The explosive was distributed over an area of typically 200 m × 100 m containing approximately 200 bole holes with 200 mm diameter and to a depth of 25 m.

From the table the maximum NO_2 concentrations were found to range from 0 to about 7 ppm. This range of concentrations translated to 0–63.3 kg of NO_2 in the plume. However, no correlation can be made between blast charge and NO_2 levels.

During the measurements with the mini-DOAS ground level measurements were also carried out using a portable combustion gas analyser (Greenline 8000) to augment the airborne measurements made by the mini-DOAS. For NO_2 the ground level measures were higher than those observed using the mini-DOAS at higher altitudes. When the results of both measurement methods were applied to

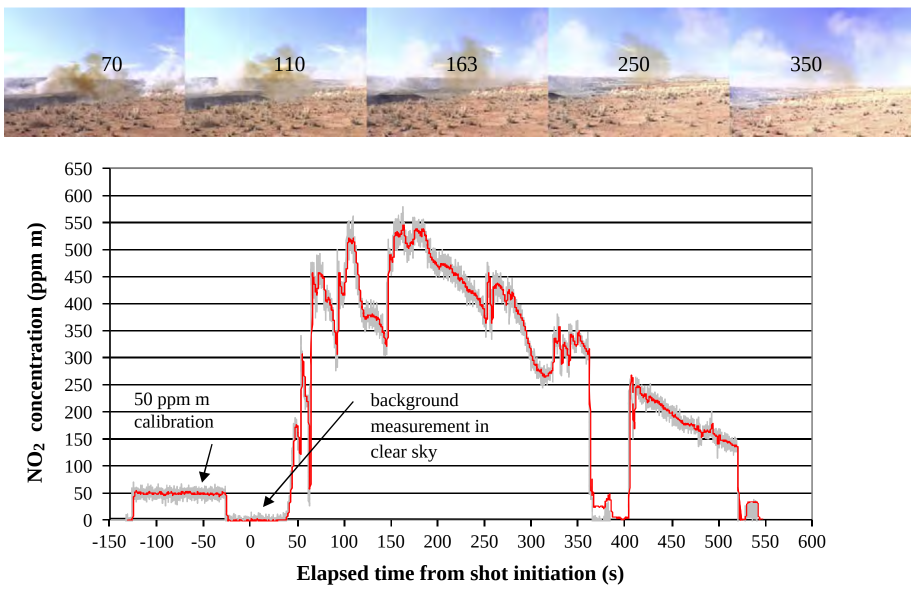

Fig. 5. Typical NO_2 spectrum demonstrating plume colour characteristics relative to concentration level.

Table 1
Through plume measurement results

Date	Total ANFO charge (t)	Peak NO_2 Conc (ppm)	Plume volume ($m^3 \times 10^{-6}$)	Mass of NO_2 (kg)	Emission flux ($kg\,t^{-1}$ ANFO)		
					NO	NO_2	NO_x
12/12/2005	281	3.7	1.4	9.9	0.5	0.03	0.6
13/12/2005	150	0.4	5.3	3.7	0.4	0.03	0.4
14/12/2005	119	0.0	0.0	0.0	0.0	0.00	0.0
21/12/2005	229	1.0	4.4	7.9	0.6	0.04	0.6
22/12/2005	211	0.0	0.0	0.0	0.0	0.00	0.0
23/12/2005	222	0.0	0.0	0.0	0.0	0.00	0.0
5/01/2006	177	1.0	0.2	0.4	0.0	0.00	0.0
6/01/2006	275	1.1	15.3	30.6	1.8	0.12	1.9
12/01/2006	225	1.6	6.2	18.3	1.3	0.08	1.4
18/01/2006	169	1.3	1.7	0.2	0.4	0.02	0.4
23/01/2006	139	2.1	4.2	16.7	1.9	0.12	2.0
25/01/2006	155	0.4	4.4	2.9	0.3	0.02	0.4
30/01/2006	132	0.7	5.3	7.1	0.8	0.05	0.9
22/02/2006	224	0.0	0.00	0.0	0.0	0.00	0.0
1/03/2006	194	1.6	20.6	63.3	5.0	0.32	5.3
12/05/2006	362	6.5	1.9	23.3	1.0	0.06	1.1
15/05/2006	131	0.3	3.2	1.7	0.2	0.01	0.2
19/05/2006	168	0.0	0.00	0.0	0.0	0.00	0.0
30/05/2006	100	0.8	0.00	1.0	0.0	0.00	0.0
1/06/2006	365	0.7	3.5	4.9	0.2	0.01	0.2
6/06/2006	145	0.8	11.5	17.5	1.9	0.12	2.0
15/06/2006	60	0.0	0.00	0.0	0.0	0.00	0.0
26/06/2006	254	4.3	0.3	2.1	0.1	0.01	0.2
27/06/2006	212	5.6	0.9	10.0	0.7	0.04	0.7
28/06/2006	241	0.0	0.00	0.0	0.0	0.00	0.0
6/07/2006	565	2.8	2.7	14.0	0.4	0.03	0.4
13/07/2006	184	7.0	1.0	12.6	1.1	0.07	1.2

dispersion modelling techniques strong agreement was observed.

Point measurements which were made on Greenline 8000 indicated that a loose relationship existed between NO and NO_2 concentration. Although a strong correlation was not found, there is a general trend of increasing NO_2 with increasing NO. It was generally found that the relative proportion of NO to NO_2 from our data set was 27 to 1. This

Table 2
Maximum calculated NO_2 concentrations downwind of source

	200 m	300 m	400 m	500 m	750 m	1000 m	1250 m	1500 m	2000 m	2500 m	3000 m	4000 m	5000 m
WSPD = 0.5 $m\,s^{-1}$													
Stab A	83.0	30.0	14.4	7.9	2.5	0.9	0.4	0.2	0.1	0.0	0.0	0.0	0.0
Stab B	145.8	69.3	40.8	25.4	10.1	4.8	2.6	1.6	0.7	0.4	0.2	0.1	0.1
Stab C	219.4	122.0	80.8	55.9	26.8	14.3	8.6	5.6	2.8	1.6	1.0	0.5	0.3
Stab D	321.1	201.5	146.0	113.1	64.6	40.2	26.1	18.6	10.5	6.7	4.5	2.4	1.4
Stab E	390.2	267.4	204.3	165.5	109.6	75.9	54.6	41.3	26.4	17.9	12.7	7.1	4.5
Stab F	464.1	339.8	269.0	222.6	154.5	114.9	88.6	69.7	50.4	37.0	27.8	16.7	11.0
WSPD = 3 $m\,s^{-1}$													
Stab A	78.5	29.1	14.2	7.7	2.4	0.9	0.4	0.2	0.1	0.0	0.0	0.0	0.0
Stab B	137.6	67.7	39.7	25.1	10.0	4.8	2.6	1.6	0.7	0.4	0.2	0.1	0.1
Stab C	211.6	118.7	77.6	55.2	26.0	14.0	8.6	5.6	2.8	1.6	1.0	0.5	0.3
Stab D	312.5	197.9	143.2	110.0	62.5	39.3	26.1	18.2	10.5	6.7	4.5	2.4	1.4
Stab E	383.0	267.0	202.1	162.6	106.3	73.7	54.1	40.3	26.1	17.7	12.5	7.2	4.5
Stab F	461.5	344.6	268.4	220.8	151.1	112.3	86.1	67.6	48.9	36.4	27.5	16.6	11.0
WSPD = 7.5 $m\,s^{-1}$													
Stab A	62.5	25.5	13.0	7.3	2.3	0.9	0.4	0.2	0.1	0.0	0.0	0.0	0.0
Stab B	111.9	56.1	34.2	22.6	9.4	4.6	2.6	1.6	0.7	0.4	0.2	0.1	0.1
Stab C	173.3	100.4	66.5	47.7	23.8	13.2	8.2	5.4	2.7	1.6	1.0	0.5	0.3
Stab D	261.2	167.9	122.1	92.3	54.8	35.3	23.7	17.2	10.1	6.5	4.4	2.3	1.4
Stab E	325.9	232.2	175.8	139.6	89.5	63.8	46.7	36.0	23.9	16.8	12.1	7.0	4.4
Stab F	394.6	302.7	237.0	194.3	132.2	96.1	73.3	59.0	43.6	33.3	25.7	15.8	10.5
WSPD = 10 $m\,s^{-1}$													
Stab A	53.0	22.6	11.9	6.9	2.3	0.9	0.4	0.2	0.1	0.0	0.0	0.0	0.0
Stab B	92.3	49.7	31.0	20.9	9.0	4.5	2.5	1.5	0.7	0.4	0.2	0.1	0.1
Stab C	140.1	84.2	57.7	42.1	21.7	12.6	7.9	5.3	2.7	1.6	1.0	0.5	0.3
Stab D	205.5	138.3	102.4	79.9	48.6	31.8	22.1	16.4	9.7	6.4	4.3	2.3	1.4
Stab E	254.0	184.0	143.0	116.4	78.0	56.2	42.6	33.1	22.7	16.0	11.6	6.9	4.4
Stab F	306.8	235.8	189.6	157.9	109.9	82.8	64.5	52.2	40.0	30.9	24.0	15.2	10.2

relationship enabled the estimation of the NO fluxes in the blast plume with a reasonable level of confidence.

The results obtained in this study are the only published quantitative data available on blast plume gas composition that the authors are aware of and it is useful to compare them to the emission factors currently used for NPI estimates.

Based on the NO_2 measurements and estimates of NO, the flux for NO_x was calculated to be in the range of 0.04–5.3 kg t^{-1} ANFO. The average flux level for all the blast plumes measured was 0.9 kg t^{-1}. This figure is considerably lower than the current NPI emission factor which is 8 kg t^{-1}.

3.2. Modelling

Results of the modelling runs are summarised in Table 2 and show the peak NO_2 concentrations (ppm) at various points downwind of the blast for the six atmospheric stability classes considered.

Examples of the modelled data are plotted in Fig. 6 and Fig. 7. In Fig. 6 a plot is displayed for the concentration estimate of one scenario at a distance of 200 m from the source origin and for a wind speed of 2 m s^{-1} and a stability class C. In this plot 21 lines are shown representing the dose received directly downwind of the source at the locations displayed in Fig. 3. In this figure it is apparent that there is a considerable difference in the concentration predicted at each of the 21 receptors. It should be noted that the distance of 200 m is defined from the origin of the source area (0, 0) as displayed in Fig. 3. At this distance emission sources at 100 m will cause significantly higher concentrations than those occurring at positions toward the origin. In comparison the concentrations predicted at the receptor array 1 km from the source show more normally defined distributions with maxima occurring towards the middle receptors as a result of crosswind diffusion. Receptors toward the edge of the sample array receive less crosswind influence and are, therefore, smaller in concentration. Also apparent in these two figures is the considerable difference in the predicted peak concentrations with the values at 1 km up to 25 times lower than at 200 m. When viewing Table 2, the peak values at 5 km approach ambient levels for all but the most stable conditions which are quite commonly over predicted with Gaussian models. For future studies it is recommended that a long path technique on a mining lease boundary may provide both a measure of the model accuracy as well as a direct measure of the impact in areas directly surrounding the mining area.

The data presented in this study represent a dose directly downwind of the source and as such are a worst case scenario for exposure. The averages of the 21 receptors (i.e. the average concentration directly downwind of the source) for each of the 120 scenarios modelled were used to determine the selected data. The number of scenarios modelled was arbitrarily chosen to allow 10 scenarios to be run on each machine in a cluster of 12 computers. The maximum concentration in Table 2 is the maximum ensemble average obtained from the average of the 21 receptors for the 120 scenarios modelled. Maximum concentrations at individual locations directly downwind of hot spots are obviously higher than the values reported in this table.

When viewing Table 2 it is apparent that the peak concentrations drop dramatically as the receptor moves away from the source. It is also apparent that the peak concentrations vary little as a function of wind speed although the plume width will vary. In AFTOX a downwind concentration is determined in two steps. In the first step the size of the initial plume envelope is estimated. In its default mode AFTOX determines the size of the envelope (assumed to be a cylinder of equal height and width) from the magnitude of the emission rate. In this report the size is set at 10 m to match the grid structure used for the area

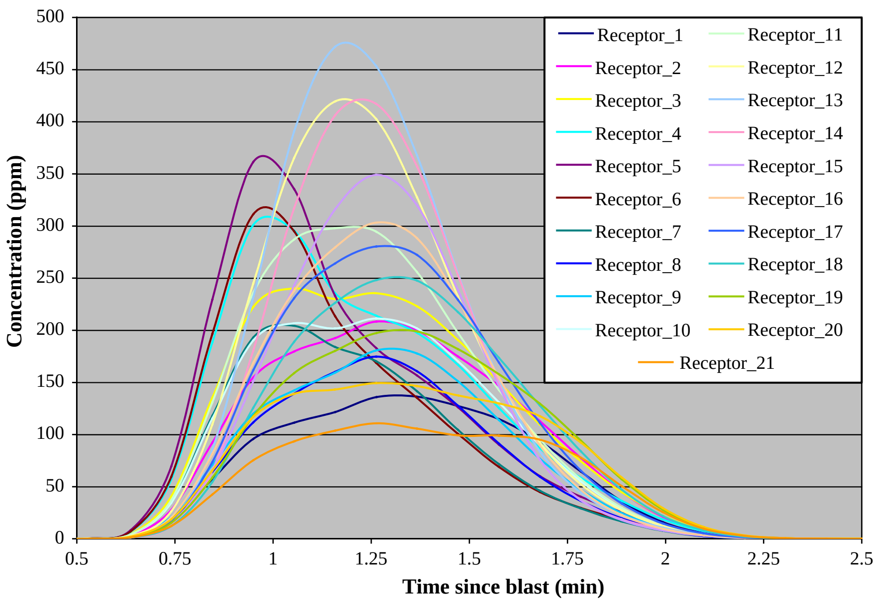

Fig. 6. Calculated NO_2 concentration profiles 200 m from source.

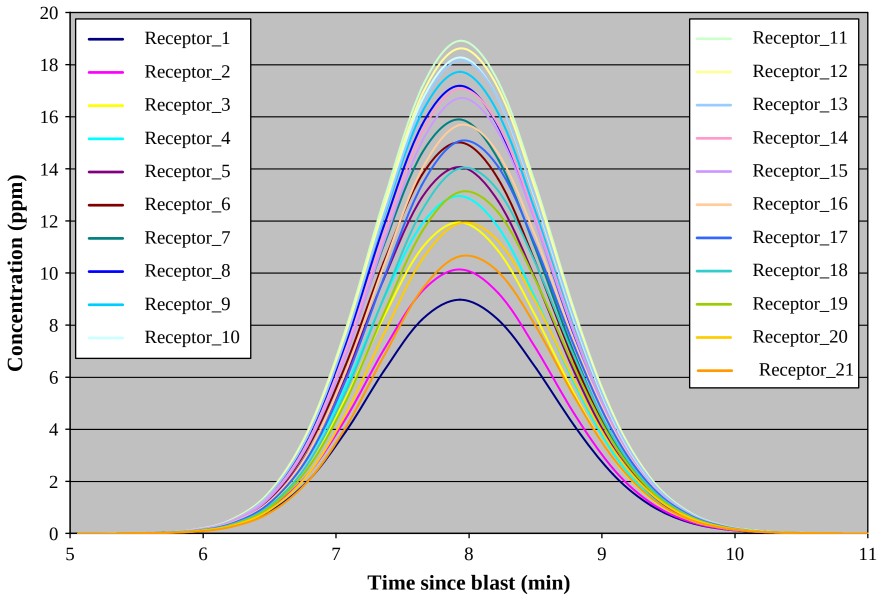

Fig. 7. Calculated NO_2 concentration profiles 1 km from source.

source. AFTOX in this regard ignores the effect of wind speed on the size of the initial envelope and as such the initial concentration of the plume is identical irrespective of wind speed by ignoring longitudinal (i.e. downwind) spread of the initial release. In the second step the concentration downwind of the initial release is determined by estimating the growth of a puff in three dimensions which in this case explicitly includes longitudinal plume spread which is assumed to be equal to the degree of crosswind spread. The degree of this spread is determined solely from the prescribed atmospheric stability class which ignores any wind speed dependence.

While the peak concentrations are similar, the dose received at a receptor is linearly dependent on wind speed. Emissions released into an atmosphere with higher wind speeds result in a receptor receiving doses for a smaller period of time. It should be noted that some of the differences in the peak concentrations displayed in Table 2 result from the number of discrete time steps used to calculate the concentrations. This was set at 25 intervals between the onset and finish of a plume as it passes by the receptor. This time is dependent on atmospheric stability and the distance from the source. In AFTOX, the puffs are assumed to disperse in the direction of plume travel proportionally with the degree of crosswind spread. As such, portions of the plume arrive before and after the main bulk of the emissions and the effect clearly demonstrated in Figs. 6 and 7. The moderate number of discrete times modelled to capture this effect while generally adequate may have led to a degree of variation particularly at larger distances from the source.

Again it should be noted that the modelled figures assume an area wide flux of 100 kg which is larger than observed in the blast recorded during this study. It should also be noted that while some of the concentrations are high close to the source the concentration at a particular location occurs for a brief period of time which is determined by the wind speed.

4. Conclusions

A portable open-path spectroscopic method was found to be effective for measuring NO_2 emissions from blasting. Overall this technique was found to be simpler, safer and more successful than other approaches that in the past have proved to be ineffective in monitoring these short lived plumes.

Quantitative measurements of NO_2 in plumes from blasting were made at two open-cut mines. The results showed that NO_2 was present in most of the plumes but in relatively low concentrations (typically ranging between 0 and 7 ppm). The highest concentration measured during all the field campaigns was about 17 ppm at ground level.

Based on field measurements, the emission factor currently used in compiling the Australian National Pollutant Inventory was found to be approximately eight times greater than that observed in our investigation. This would suggest that an over estimation of NO_x is made if the current factor is used.

Numerical modelling of the behaviour of plumes resulting from blasting was made to assess the possible downwind concentrations of NO_2. These results were compared to ambient NO_x measurements made in Muswellbrook.

- Modelling results were consistent with concentration measurements within the plumes at relatively short distances from the blast (i.e. up to about 1 km).
- Ambient monitoring did not detect NO_x events that could be attributed to individual blasts. Modelling suggested that these emissions would be very low at

distances greater than 5 km from the blast and may be indistinguishable from background levels; typically of the order of several parts per billion, in most cases.

Acknowledgements

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APPENDIX F. ANNUAL COMPLIANCE CERTIFICATION

City of Albuquerque Environmental Health Department Air Quality Division

Annual Compliance Certification Report Form
(20.11.42.12.C.(5).(c) NMAC)

PART 1

Identifying Information

Source Name: GCC Rio Grande, Inc. County: Bernalillo

Source Address: 11783 Hwy 337 South; PO Box 100

City: Tijeras State: NM Zip Code: 87059-0100

Responsible Official: Ramses Maldonado Ph No. 505-286-6038 Fax No. 505-281-9126
Technical Contact: Samantha Kretz Ph No. 505-286-6081 Fax No. 505-283-8272

Principal Company Product or Business: Cement Manufacturing Primary SIC Code: 327310

Permit No. 0532-RN1 Permit Issued Date: 28 July, 2017

Reporting Period The reporting period should be the one-year, or shorter period, required by your operating permit. It will be assumed that the beginning date begins and ends at Midnight (12 A.M.), unless you specify otherwise.

Period beginning 28 / July / 2020 Period ending 27 / July / 2021

Certification of Truth, Accuracy, and Completeness

I, (Responsible Official) Ramses Maldonado certify that, based on information and belief formed after reasonable inquiry, the statements and information contained in the attached annual compliance certification are true, accurate, and complete.

Signature [signature] Date: 8/25/2021

Title: Plant Manager

City of Albuquerque Environmental Health Department Air Quality Division

Annual Compliance Certification Report Form (20.11.42.12.C.(5).(c) NMAC)

PART 1

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Period beginning 28 / July / 2020 Period ending 27 / July / 2021

Certification of Truth, Accuracy, and Completeness

I, (Responsible Official) Ramses Maldonado certify that, based on information and belief formed after reasonable inquiry, the statements and information contained in the attached annual compliance certification are true, accurate, and complete.

Signature________________________ Date: ____________

Title: Plant Manager

Parts 2 & 3 Instructions for Operating Permit Annual Compliance Certification

Data Elements:

1. Identify each Permit Term or Condition Identification No. that is the basis of certification. The responsible official may restate permit terms and emission units or cross-reference the relevant terms and conditions of the permit, previous compliance reports, or other applicable documentation in order to satisfy this requirement.

2. Identify method(s) or other information used to determine compliance status of each term and condition of a permit. The responsible official is to identify monitoring and/or testing methods for each emission unit and its associated applicable requirement. The certification may cross-reference the permit, previous compliance reports, or other applicable documentation in order to satisfy this requirement. The cross-reference should be clear as to what the unit's requirements and methods used to determine compliance status are. The certification should identify other material information that has been assessed in relation to how the information potentially affects the source's compliance status during the certification period.[1]

3. Identify whether the method(s) or other means identified above provide continuous or intermittent data. The responsible official must identify whether the methods or other means used for determining the compliance status provide continuous or intermittent data. If the owner or operator uses cross-referencing to identify the methods or other information used to determine the source's compliance status, the certification must clearly indicate whether the cross-referenced information provides continuous or intermittent data.

4. Identify the compliance status of each term and condition of the permit using the method(s) or other means identified in data element 2. In data element 2, the responsible official identified whether the compliance determination methods provide continuous or intermittent data. Based on those methods and other material information, the responsible must identify the compliance status of each permit term and condition. The certification requires the responsible official to certify compliance with each permit term or condition. If the facility or emissions unit has been in compliance with the permit term or condition, type in yes in the box. If however, the facility or emission unit(s) have deviated from the permit term or condition type "Dev" and complete the next table entitled "Deviation Reporting" **(Part 3)**.
   In identifying the compliance status of each term and condition of the permit, a source shall certify intermittent compliance when basing its certification on methods or other information providing intermittent data, and on methods or other information providing continuous or intermittent data which identifies any deviation, exceedance or excursion. A source may certify continuous compliance when basing its certification on methods or other information providing continuous data but not indicating deviations, exceedances or excursions from those permit terms or conditions. EPA does not interpret a certification of intermittent compliance to necessarily mean that the responsible official is certifying periods of noncompliance.

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[1] If a source becomes aware of other material information that indicates that an emission unit has experienced deviations (as that term is defined in State programs) or may otherwise be out of compliance with an applicable requirement even though the unit's permit-identified data indicates compliance, the source must consider this information, identify and address it in the compliance certification, and certify accordingly. <u>See</u>, <u>e.g.</u>, 62 FR 8314, 8320 (Feb. 24, 1997). Sources may not ignore obvious relevant information and risk making a false certification, omitting material information, or otherwise violating prohibitions on fraud.

PART 2

Annual Compliance Certification Data for Operating Permit No. Title V # 532				
		Method(s) or other information or other facts used to determine the compliance status	*Data Collection Frequency Continuous , (C) or Intermittent (I)*	*Compliance? (Yes/NO if "No" Completed Deviation Report (Part 3)*
	Applicable Requirements Permit Section 5:			
5.1	Emission Limits			
5.1.1	All units except Kilns and Clinker Coolers are subject to the emissions limits shown in the table in Section 3.1.1 during normal operation. In accordance with the Authority to Construct Permit No. 2197, the permittee will combine the clinker cooler exhaust with the kiln exhaust and new stack will be subject to the combined emission limits shown in Section 5.1.1.			
5.1.2	Kilns			
5.1.2.1	In accordance with 20.11.66.13 NMAC, Kiln #1 (EU #6-1) and Kiln #2 (EU #6-2) shall not cause to be discharged into the atmosphere particulate emissions of 230 mg per cubic meter or more of exhaust gas for each kiln.	Emission rate for the stack on June 23, 2021 was 2.47 mg/m3. The PM CPMS shows that emissions from the stack have remained similar to what was measured during the stack test.	C	YES
5.1.2.2	In accordance with Table 1 of 40 CFR 63.1343(b)(1), Kiln #1 (Emission Unit (EU) #6-1) and Kiln #2 (EU #6-2) are subject to the emission limits shown in the table under this section.	PC MACT amendments published in 2012 changed the PM limit to 0.07 lb/ton of clinker. See Table 1 referenced in the condition.	C	YES
5.1.3	Compliance with Hg and HCl Related Emissions Limits			
5.1.3.1	In accordance with Table 1 of 40 CFR 63.1343(b)(1), Clinker Cooler #1 (EU #5-3, #5-4, #5-5, and #5-6) and Clinker Cooler #2 (EU #5-7, #5-8, #5-9, and #5-10) are subject to the emission limits shown in the table under this section.	PC MACT amendments published in 2012 changed the PM limit to 0.07 lb/ton of clinker. See Table 1 of 63.1343 referenced in the condition.	C	YES
5.1.4	Alternate combined limit for kilns and coolers			
5.1.4.1	In accordance with the Authority to Construct Permit No. 2197, the permittee will combine the clinker cooler exhaust with the kiln exhaust for	The construction for this project was completed at the end of April	C	YES

	energy efficiency purposes and will send the combined exhaust to the PM control device as a single stream. As such the permittee may meet an alternative PM emissions limit. This limit is calculated using the equation 1 of this section.	2015. The site specific limit per equation 1 for the Tijeras facility is 0.20 lb PM/ton clinker.		
5.1.5	Raw Mills, Finish Mills, Storage Bins, Conveyor Transfer Points, Bagging Systems, Loading and Unloading			
5.1.5.1	In accordance with Table 1 of 40 CFR 63.1343(b)(1), Raw Mill #1 (EU #3-2), Raw Mill #2 (EU #3-4), Finish Mill #1 (#8-1, and #8-2), Finish Mill #2 (EU #8-3, and #8-4), and Finish Mill #3 (EU #8-6, and #8-7) are subject to 10% Opacity emission limit	Daily opacity observations were performed for each mill unit, when in operation, with the exception of the deviations reported under conditions 5.8.9.1.1. All units met the <10% opacity limit from 28-July- 20 to 27-Jul-21.	C	YES
5.1.5.2	In accordance with PSD-NM-12, dated May 9, 1977, and the modification of PSD-NM-12 dated November 16, 1978, the total suspended particulate matter emissions limit for EU #8-5, #8-6, and #8-7 shall be limited to 0.15, 0.19, and 0.59 pounds per hour, respectively. To be in compliance with this condition, EU #8-5, #8-6, and #8-7 shall demonstrate compliance with the 10% opacity standard.	Daily opacity observations were performed for each mill unit, when in operation, with the exception of the deviations reported under conditions 5.8.9.1.1. All units met the <10% opacity limit from 28-July- 20 to 27-Jul-21.	C	YES
5.1.5.3	In accordance with 40 CFR 63.1345, sources shown in the table of this section are also subject to 10% opacity limit.	Daily opacity observations were performed for each mill unit, when in operation, with the exception of the deviations reported under conditions 5.8.9.1.1. All units met the <10% opacity limit from 28-July- 20 to 27-Jul-21.	C	YES
5.1.5	To establish the affirmative defense for the emission limits set forth in Section 5.1 above, that is caused by a malfunction, the permittee shall comply with the affirmative defense requirements specified in 40 CFR 63.1344.	Not applicable	C	YES
5.1.6	Clinker Material Storage and Handling			
5.1.6.1	If the permittee stores and handles clinker in open clinker piles, those activities must conform with the provisions set forth in 40 CFR 63.1343(c)	The onsite open clinker storage pile location is identified in the	C	YES

	and (d).	O&M Plan and kept covered with a tarp.		
5.1.7	Coal Processing System			
5.1.7.1	In accordance with 40 CFR 60.252, Coal Crusher (EU #5-13), Coal Conveyor Transfer Tower (EU #5-14), Coal Storage Silo (EU #5-15), and the Coal Storage Building shall not cause to be discharged into the atmosphere any gases which exhibit opacity greater than 20%.	All coal processing emission units tested when in operation at required frequency met <20% Opacity requirement during the period of 28-Jul-20 to 27-Jul-21.	C	YES
5.1.8	Tire Derived Fuel System			
	TDF System # 1 and TDF System #2 are not considered as affected facilities under 40 CFR 60 subpart F.			
5.1.8.1	Tires should be managed, stored, and handled at the facility under the requirements of NMED SWB's Tire Management Program.	Not applicable/ Not in use at this time	C	YES
5.1.8.2	Tires used at the facility should be nonhazardous and should meet the provisions of 40 CFR 241 Subpart B.	Not applicable/ Not in use at this time	C	YES
5.1.8.3	TDF #1 and TDF #2 are not subject to Commercial and Industrial Solid Waste Incinerations Units regulations under 40 CFR Part 60.	Not applicable/ Not in use at this time	C	YES
5.1.8.4	Combined coal and TDF usage or total fuel excluding natural gas for both kilns shall be limited to 96,346 tons per year.	Not applicable/ Not in use at this time	C	YES
5.1.9	Gasoline Storage Tank (1,000 Gallon Capacity)			
	Tank #2 is subjected to 40 CFR 63 Subpart CCCCCC. The permittee shall comply with the following requirements for gasoline throughput of 10,000 gallons per month or less:			
5.1.9.1	In accordance with 40 CFR 63.11116, the permittee must not allow gasoline to be handled in a manner that would result in vapor release to the atmosphere for extended periods of time.	Facility maintains good handling practices to prevent vapor release to the atmosphere for extended periods of time.	C	YES
5.1.9.2	In accordance with 40 CFR 63.11116 (a), measure to be taken include, but are not limited to the following: a. Minimize gasoline spills b. Clean up spills as expeditiously as practicable c. Cover all open gasoline containers and all gasoline storage tank fill pipes with a gasketed seal when not in use. Portable gasoline containers that meet the requirements of 40 CFR 59 Subpart F are considered acceptable compliance with this requirement, and d. Minimize gasoline sent to open waste collection systems that collect and transport gasoline to reclamation or recycling devices such as oil/water	Facility performs routine inspection of tank system to prevent any vapor release.	C	YES

	separators.			
5.2	Operating Limits for Kilns			
	In accordance with 40 CFR 63.1346(a), Kiln #1 (EU #6-1) and Kiln #2 (EU #6-2) shall be operated such that the temperature of the gas at the inlet to the kiln particulate matter control device (PMCD), does not exceed the applicable temperature limit established in the most recent performance test. Kiln #1 (EU #6-1) and Kiln #2 (EU #6-2) shall each be limited to 33.7 tons/hour of clinker production. During period of start-up and shutdown, Kiln #1(EU # 6-1) and Kiln #2 (EU#6-2) must meet 40 CFR 63.1346(g) requirements.	Facility sets alarms for operators that will activate if the temperature is above limit. Facility monitors hourly feed rate maintaining kiln feed rate to below 33.7 s-tons/hour of produced clinker. There was one exceedance of the Kiln 1 baghouse maximum inlet temperature on October 18, 2020. Details on cause and corrective actions are included in Part 4 of this report.	C	NO
5.3	Operations and Maintenance Plan			
	An Operations and Maintenance Plan (OMP) shall be written for every affected source under 40 CFR 63 Subpart LLL and include the following information:			
5.3.1	Procedures for proper operation and maintenance of the affected source and air pollution control devices in order to meet the emission limits and operating limits;	GCC maintains a site O&M Plan with the specified information.	C	YES
5.3.2	Corrective actions to be taken;	GCC maintains a site O&M Plan with the specified information.	C	YES
5.3.3	Procedures to be used during an annual inspection of the components of the combustion system of each kiln.	GCC maintains a site O&M Plan with the specified information.	C	YES
5.3.4	Control measures to be used to minimize fugitive dust from open clinker storage piles required under 40 CFR 63.1343, 16.1345, and 63.1346.	GCC maintains a site O&M Plan with the specified information.	C	YES
5.4	Initial Compliance Requirements			
5.4.1	Kilns			

5.4.1.1	PM, THC, Hg, and HCl: Initial compliance shall be determined based on the first 30 operating days of the CEMS.	Initial compliance for PM, THC, Hg and HCl was established prior to this compliance period.	C	YES
5.4.1.2	D/F: Initial compliance shall be demonstrated conducting a performance test using Method 23 of Appendix A of Part 60.	Initial compliance for D/F was established prior to this compliance period.	C	YES
5.4.2	Raw Mills, Finish Mills, Storage bins, conveyor transfer points, bagging systems, loading and unloading			
	Initial compliance will be determined with three-hour Method 9. Test time can be reduced to one hour if no individual readings are greater 10% or there are no more than three readings of 10% for the first 1-hour period. The maximum 6-minute average opacity during the performance test is used to determine whether the affected source is in compliance with the standard.	Initial compliance with the 10% opacity requirement was demonstrated prior this compliance period.	C	YES
5.5	Continuous Compliance Requirements			
	The permittee must operate the monitoring system and collect data at all required intervals at all times the affected source is operating except for periods of monitoring system malfunctions, repairs associated with monitoring system malfunctions as defined in 40 CFR 63.1348(b)(1)(iii), and required monitoring system quality assurance or quality control activities (including, as applicable, calibration checks and required zero and span adjustments).	GCC operates CEMS as required by 63.1348 and completes the prescribed quality assurance and quality control activities on daily/weekly/quarterly/annual basis.	C	YES
	The permittee must operate and maintain affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions.	The facility uses CO and O2 sensors to help facilitate good combustion practices during operation and completes manufacturer prescribed preventative maintenance of air pollution control and monitoring equipment.	C	YES
5.5.1	Kilns			
5.5.1.1	Clinker Production: In order to determine compliance with PM (lb/ton of clinker) and Hg (lb/MM tons of clinker) emission limits, the permittee shall determine hourly clinker production rate.	Clinker production and kiln feed is monitored on an hourly basis and that information is stored in the data acquisition system (DAS).	C	YES
5.5.1.2	PM, THC, Hg, and HCl: Continuous compliance shall be demonstrated with	The Data Acquisition System	C	YES

	CEMS by a 30-day rolling average except for the periods of startup and shutdown, where the compliance is demonstrated based on a 7-day rolling average.	calculates the rolling averages on a daily basis. Amendments to PC MACT no longer require the 7-day rolling tracking of emissions during startup and shutdown.		
5.5.1.3	D/F: Continuous compliance with the temperature operating limits shall be demonstrated by installing, operating, and maintaining a continuous monitor to record the temperature of specified gas streams. Continuous compliance is demonstrated by a 3-hour rolling average temperature.	The 180 minute rolling average is calculated by the DAS each minute.	C	YES
5.5.2	Clinker Coolers			
	PM: Continuous compliance shall be demonstrated via quality-assured hourly average data collected by PM CPMS for all operating hours to calculate the arithmetic average operating parameter in units of the operating limit on a 30 operating day rolling basis, updated at the end of each new kiln operating day.	The clinker cooler emissions exhaust to the Main Stack which is shared with the kilns. A combined 30 day rolling average is calculated daily.	C	YES
5.6	Compliance Requirements for Change in Operations			
	Change in Operations: If the permittee plans to undertake a change in operations that may adversely affect compliance with an applicable standard or operating limit under this subpart, the source shall conduct a performance test. A permittee may operate under the planned operational change conditions for a period not to exceed 360 hours, provided that the conditions specified in 40 CFR 63.1348(c) are met.	No changes in operations that adversely affect compliance during the compliance period.	C	YES
5.7	Performance Testing Requirements			
5.7.1	Performance tests results shall be documented and reported as specified in 40 CFR §63.1349(a) and (d).	All performance testing was documented and reported per the requirements.	C	YES
5.7.2	PM: Performance tests results shall be conducted as specified in 40 CFR §63.1349(b)(1).	Testing was completed using Method 5.	C	YES
5.7.3	D/F: Performance tests results shall be conducted as specified in 40 CFR §63.1349(b)(3)(i)-(iv).	Testing was completed using Method 23.	C	YES
5.7.4	THC: Performance tests results shall be conducted as specified either in 40 CFR §63.1349(b)(4)(i). Alternatively, the permittee can demonstrate compliance with organic HAP limit using 40 CFR §63.1349(b)(4)(ii)-(iv).	Testing completed using PS8A.	C	YES
5.7.5	Hg: Performance tests results shall be conducted as specified in 40 CFR §63.1349(b)(5).	Testing was completed using Method 30B.	C	YES

5.7.6	HCl: Performance tests results shall be conducted as specified in 40 CFR §63.1349(b)(6)(ii).	Testing was completed using Procedure 1 of Appendix F.	C	YES
5.7.7	Frequency: performance tests for pollutants shall be repeated every 30 months for pollutants utilizing stack tests for compliance demonstration.	Tests are repeated using the prescribed frequencies.	C	YES
5.8	Monitoring Requirements			
5.8.1	General Requirements			
5.8.1.1	If the permittee elects to submit an application to the Administrator for approval of alternate monitoring requirements to demonstrate compliance with the emission standards for this subpart except for emission standards for THC, the permittee will comply with the requirements of 40 CFR §63.1350(o).	No alternate monitoring requirements have been requested.	C	YES
5.8.1.2	The permittee must install, operate, calibrate, and maintain the flow rate monitoring system according to the requirements of 40 CFR §63.1350(n).	A flow rate monitoring system is maintained per 63.1350(n)	C	YES
5.8.1.3	Operating limits that require the use of a CMS, the permittee shall install, operate, and maintain a continuous parameter monitoring system (COMS according to the procedures in the paragraphs 40 CFR 63.1350(m)(1) through (4) of this section by the compliance date specified in 63.151. The permittee shall also meet the applicable specific parameter monitoring requirements in 40 CFR 63.1350 (m)(5) though (11).	CPMS are maintained according the required procedures and requirements.	C	YES
5.8.1.4	For each continuous monitoring system (CMS) using an approved alternate monitoring requirement, a monitoring plan must be developed and submitted as required by 40 CFR §63.1350(p).	Not applicable, no alternate monitoring is currently being used.	C	YES
5.8.2	PM			
	The permittee shall monitor in accordance with 40 CFR 63.1350(b) including:			
5.8.2.1	The permittee shall install and operate CEMS in accordance with Performance Specification (PS) 11. The performance test method and correlation test method for PS-11 must be Method 5 or Method 5i.	Per 63.1349b (1), a PM CPMS (continuous parameter monitoring system) has been installed and PS 11 is no longer applicable. Method 5 was used for performance testing.	C	YES
5.8.3	Clinker Production			
	The permittee shall determine hourly clinker production in accordance with 40 CFR 63.1350(d) including:			
5.8.3.1	The permittee shall determine hourly clinker production by a permanent weigh scale system to measure either amount of clinker produced or amount of feed to the kiln with a specific feed to clinker ratio, which must	The facility uses a permanent weigh system to directly measure hourly clinker production.	C	YES

	be updated monthly.			
5.8.3.2	Either method of determining clinker production rate must be maintained within ±5% accuracy.	Checks of the clinker weigh belts are completed quarterly. Accuracy was within ±5% from 28-Jul-20 to 27-Jul-21.	C	YES
5.8.4	D/F			
	The permittee shall monitor in accordance with 40 CFR 63.1350(g) including:			
5.8.4.1	The permittee shall install, calibrate, maintain, and continuously operate a continuous monitor to record the temperature of the exhaust gases from the kiln at the inlet or upstream of the kiln PM Control Device (PMCD).	Facility has installed, calibrated, maintains, and continuously operates a thermocouple upstream of each baghouse to control inlet temperature below prescribed limits.	C	YES
5.8.4.2	The recorder response range must include zero and 1.5 times the average temperature established during the performance test.	Recorder includes required response range.	C	YES
5.8.4.3	The reference method must be a National Institute of Standards and Technology calibrated reference thermocouple.	Facility calibrates thermocouples with a NIST traceable Fluke 744 Calibrator. The unit was certified from 06 May-2020 to 06 May-2021 and 24 May-2021 to 24-May- 2022.	C	YES
5.8.4.4	The permittee shall calibrate all thermocouples and other temperature sensors at least once every three months.	Thermocouples are calibrated every three months.	C	YES
5.8.4.5	The permittee shall monitor and continuously record the temperature of the exhaust gases from the kiln at the inlet to the kiln PMCD at a minimum frequency of one minute.	The DAS monitors and records all data continuously.	C	YES
5.8.4.6	The three-hour rolling average temperature shall be calculated as the average of previous 3 hours of process operation using all of one-minute data available.	The DAS calculates the 3-hour rolling average using 180 consecutive 1-minute average temperatures.	C	YES
5.8.5	THC			
	The permittee shall monitor in accordance with 40 CFR 63.1350(i) including:			
5.8.5.1	The permittee shall install and operate CEMS in accordance with Performance Specification 8.	The THC CEMS is operated and maintained in accordance with PS8A which was not available	C	YES

		when this permit was originally issued.		
5.8.5.2	The permittee shall operate and maintain CEMS according to QA requirements in Procedure 1 of Appendix F of Part 60.	PS8A does not require the use of Procedure 1 of Appendix F.	C	YES
5.8.5.3	The permittee shall conduct the relative accuracy test audits required under Procedure 1in accordance with Performance Specification 8, section 8and 11 using Method 25A in appendix A to 40 CFR part 60; shall meet criteria of Performance Specification 8, Section 13.2	Relative accuracy test was completed on June 22, 2021.	C	Yes
5.8.5.4	If the compliance is determined using the total organic HAP emission limit, the permittee shall monitor in accordance with 40 CFR 63.1350(j).	Not applicable	C	YES
5.8.6	Mercury			
	The permittee shall monitor in accordance with 40 CFR 63.1350(k) including:			
5.8.6.1	The permittee shall install and operate CEMS in accordance with Performance Specification 12A, or a sorbent trap-based integrated monitoring system in accordance with Performance Specification 12B of Appendix B of Part 60.	An Hg CEMS has been installed and is operated in accordance with PS 12A.	C	YES
5.8.6.2	The span value for any Hg CEMS should be at least equivalent to approximately two times the emissions standard and it may be rounded to the nearest multiple of 5 $\mu g/m^3$ of total mercury.	The span is set per these guidelines.	C	YES
5.8.6.3	Span value shall meet quality assurance requirements using one of the three option in 40 CFR 63.1350(k)(2)(i) through(iii)	Span Value has been met in accordance with 40 CFR 63.1350 (k)(2)(i) through(iii).	C	YES
5.8.6.4	You must operate and maintain each Hg CEMS or sorbent trap-based integrated monitoring system according to the quality assurance requirements in Procedure 5 of appendix F to part 60 of this chapter.	An Hg CEMS is operated and maintained per Procedure 5.	C	YES
5.8.6.5	Relative accuracy testing of mercury monitoring systems under Performance Specification 12A, Performance Specification 12B, or Procedure 5 must be at normal operating conditions.	Relative accuracy testing of the Hg CEMS was completed per PS 12B under normal operating conditions on June 22, 2021.	C	YES
5.8.6.6	The permittee shall install, operate, calibrate and maintain an instrument for continuously measuring and recording the gas exhaust flow rate to the atmosphere in according with paragraphs 40 CFR 63.1350 (n)(1) through (10).	Instruments for continual measurement and recording of flow rate are maintained and operated with in accordance to 40 CFR 63.1350(n)(1) though (10)	C	YES
5.8.6.7	The permittee operates an integrated sorbent trap monitoring system conforming to PS 12B, a monitoring period at least 24 hours but no longer	Not applicable	C	YES

	than 168 hours in length maybe used. Permittee can monitor in period of multiple 24 hours (except during relative accuracy testing as allowed in PS 12B)			
5.8.7	HCl			
	The permittee shall monitor in accordance with 40 CFR 63.1350(l) including operation of a continuous emission monitor in accordance with Performance Specification 15 of appendix B to part 60 of this chapter. The permittee must operate and maintain each CEMS according to the quality assurance requirements in Procedure 1 of 40 CFR of appendix F to part 60 of this chapter except that the Relative Accuracy Test Audit requirements of Procedure 1 must be replaced with the validation requirements and criteria of sections 11.1.1 and 12.0 of Performance Specification 15.	The facility has installed the monitor in accordance with PS 15 and has operated and maintained that monitor per the QA requirements of Procedure 1.	C	YES
5.8.8	Other Pollutants			
	The permittee shall demonstrate compliance with lb/hr NO_x, CO, and SO_2, emission limits by conducting annual emission tests on EU #6-1 (#1 Kiln), and EU #6-2 (#2 Kiln). The permittee may submit to the Division for review, a written request for shorter sampling times, minor changes in the reference method, use of an equivalent method, or a request to waive the annual compliance test requirement. The written request to relax testing or waive annual testing requirements is reserved only for this condition in demonstrating compliance with the lb/hr NO_x, CO, and SO_2, emission limits for the #1 and #2 Kilns. The emission tests shall be conducted in accordance with EPA Methods contained in 40 CFR 60, Appendix A and 40 CFR 51, Appendix M, and with the requirements of Subpart A, General Provisions.	The facility completed annual testing on June 23, 2021 for the 2021 annual period. All pollutants were below permit limits.	I	YES
5.8.8.1	The permittee shall provide for the Department's approval a written test protocol at least thirty (30) days prior to the performance test date. The protocol shall describe the test methods to be used (including sampling methods and calibration procedures), shall list the equipment or devices to be tested (including sample locations), and shall describe data reduction procedures. Any variation from established sampling and analytical procedures or from facility operating conditions shall be presented for Department approval. The permittee shall allow a representative of the Department to be present at the test. When requested by the Department, the permittee shall provide schedules of testing and monitoring activities. Unless otherwise identified elsewhere in this permit,	Test protocols are submitted in accordance with these requirements.	C	YES

	all monitoring requirements are effective 120 days after the date of permit issuance.			
5.8.9	Opacity Monitoring Storage Bins, Conveyor Transfer Points, Bagging Systems, Loading and Unloading Systems, and Raw Material Dryers			
	Monitoring shall be conducted as specified in 40 CFR 63.1350(f)(1) including:			
5.8.9.1	The permittee must conduct a monthly 10-minute visible emissions test of each affected source in accordance with Method 22 of appendix A-7 to Part 60. The performance test must be conducted while the affected source is in operation.	All units tested when in operation at required frequency during the period of 28-Jul-20 to 27-Jul-21.	C	YES
5.8.9.2	The frequency of visible emissions tests can be reduced in accordance with 40 CFR 63.1350(f)(ii) and (iii).	No visible emission have been observed during any monthly observations so frequency has been reduced to a semi-annual basis.	C	YES
5.8.9.3	If visible emissions are observed during any Method 22 performance test of Appendix A-7 to Part 60, the permittee must conduct five 6-minute averages of opacity in accordance with Method 9.	No visible emissions observed from 28-Jul-20 to 27-Jul-21.	C	YES
5.8.9.4	The Method 9 performance test must begin within 1 hour of any observation of visible emissions.	No VE so no Method 9 required.	C	YES
5.8.9.5	The requirement to conduct Method 22 visible emissions monitoring under this paragraph do not apply to any totally enclosed conveying system transfer point.	No M22 completed on totally enclosed conveying system transfer point.	C	YES
5.8.9.6	If any partially enclosed or unenclosed conveying system transfer point is located in a building, the permittee has the option to conduct a Method 22 performance test for each such conveying system transfer point located within the building, or for the building itself. If visible emissions from a building are monitored, the permittee must also test visible emissions from each side, roof, and vent of the building for at least 10 minutes.	Observations of any transfer points inside a building completed as required.	C	YES
5.8.9.1	Raw Mills and Finish Mills:			
	Monitoring shall be conducted as specified in 40 CFR 63.1350(f)(2) including:			
5.8.9.1.1	For a raw mill or finish mill, the permittee must monitor opacity by conducting daily visual emissions observations of the mill sweep and air separator particulate matter control devices (PMCD) of these affected sources in accordance with the procedures of Method 22 of appendix A-7 to part 60 of this chapter. The duration of the Method 22 performance test must be 6 minutes.	Daily 6-minute Method 22's are performed for each Mill when units are in operation. All observations were completed during the compliance period except for the following instances:	C	NO

		RM1: 10/23/20, 1/16/21, 2/26/21,2/12/21,3/17/21,4/19/21 RM2: 10/23/20, 1/16/21, 2/26/21, 2/12/21, 3/17/21, 4/19/21 FM1: 10/23/20, 1/16/21, 2/26/21,4/19/21 FM2: 10/23/20, 1/16/21, 2/26/21, 2/12/21,3/17/21, 4/19/21 FM3: 10/23/20, 1/16/21, 2/26/21,4/19/21		
5.8.9.1.2	Within 24 hours of the end of the Method 22 performance test in which visible emissions were observed, the permittee must conduct a follow up Method 22 performance test of each stack from which visible emissions were observed during the previous Method 22 performance test.	No Visible Emissions observed during any Method 22 test.	C	YES
5.8.9.1.3	If visible emissions are observed during the follow-up Method 22 performance test from any stack from which visible emissions were observed during the previous Method 22 performance test, the permittee must conduct a visual opacity test of each stack from which emissions were observed during the follow up Method 22 performance test in accordance with Method 9. The duration of the Method 9 test must be 30 minutes.	No visible emissions observed during any Method 22 test.	C	YES
5.8.9.1.4	The requirements of this section to conduct daily Method 22 testing do not apply to any specific raw mill or finish mill equipped with a continuous opacity monitoring system (COMS) or bag leak detection system (BLDS). This alternate compliance method must meet the requirements of 40 CFR 63.1350(f)(4).	Raw mills and finish mills are not equipped with COMS or BLDS.	C	YES
5.8.9.1.5	Compliance with Conditions above for the Finish Mill #2 (EU #8-3, and #8-4), and Finish Mill #3 (EU #8-6, and #8-7) will also deemed to be in compliance with PSD-NM-12 Permit.	No visible emissions observed during any Method 22 test.	C	YES
5.8.9.2	Corrective Actions		C	YES
	If visible emissions are observed during any Method 22 visible emissions test conducted under Permit Condition 5.8.1, you must initiate, within one-hour, the corrective actions specified in the site specific operating and maintenance plan provisions in § 63.1347.	No visible emissions observed from 28-Jul-20 to 27-Jul-21 during any Method 22 test	C	YES
5.8.9.3	Coal Handling System			

	Affected sources include Coal Crusher (EU #5-13), Coal Conveyor Transfer Tower (EU #5-14), and Coal Storage Silo (EU #5-15). Periodic Method 9 opacity readings in accordance with 40 CFR Part 60, Appendix A, may be imposed if inspections of the source indicate non-compliance with the permit conditions.	No Method 22 failures were reported from 28-Jul-20 to 27-Jul-21.	C	YES
5.8.9.4	Other sources to Continuous Compliance Assurance Requirements (CAM)			
	In addition to kilns, clinker coolers, raw mills, and other sources listed in Permit Condition #5.1.5, the following additional sources are required to monitor visible emissions monthly basis as CAM applicable sources. Visible emission monitoring will be performed using the same procedure as listed in Permit Condition #5.8.9. Additional CAM applicable sources subject to monthly VE: Emission Units # 1-2,1-3, 1-4,2-1,2-2,2-3, and 2-4.	Visible emissions observations conducted as required.	C	YES
5.9	Recordkeeping			
5.9.1	Recordkeeping Requirements			
	The permittee shall follow the record keeping requirements set forth in 40 CFR 63.1355 and provide any other information the Department may request to demonstrate the accuracy of the monitoring. Files should be retained for at least five years and at a minimum, the most recent two years of data shall be retained on site. These requirements include:			
5.9.1.1	The permittee shall maintain files of information suitable and readily available for inspection and review as required by 40 CFR 63.10(b)(1) – (3) including all records required for initial notifications and notifications of compliance status under § 63.9 and supporting information for the waiver under § 63.8(f)(6).	Records are maintained onsite for at least 5 years.	C	YES
5.9.1.2	Affected source equipped with a continuous monitoring system shall maintain all records required by § 63.10(c).	Records are maintained onsite.	C	YES
5.9.1.3	The permittee must keep annual records of the amount of CKD which is removed from the kiln system and either disposed of as solid waste or otherwise recycled for a beneficial use outside of the kiln system.	GCC records annual CKD removal.	C	YES
5.9.1.4	The permittee must keep records of the daily clinker production rates and kiln feed rates.	Daily clinker production rates and kiln feed rates are maintained onsite.	C	YES
5.9.1.5	The permittee must keep records of the occurrence and duration of each startup or shutdown.	Startup and shutdown records are maintained as needed.	C	YES
5.9.1.6	The permittee must keep records of the occurrence and duration of each malfunction of operation (*i.e.*, process equipment) or the air pollution	Malfunctions of air pollution control and monitoring	C	YES

	control and monitoring equipment.	equipment are recorded as required.		
5.9.1.7	The permittee shall maintain records of the fuels fired for each kiln on a daily basis and record shall be made available to the Department upon request.	Records are maintained for fuels fired and will be submitted upon request	C	YES
5.9.1.8	The permittee shall maintain records of the number of TDF trucks and amount of tires received at the facility on a daily basis and record should be made to the Department upon request.	None have been received	C	YES
5.9.1.9	The permittee must keep records of actions taken during periods of malfunction to minimize emissions in accordance with § 63.1348(d) including corrective actions to restore malfunctioning process and air pollution control and monitoring equipment to its normal or usual manner of operation.	Records of actions taken during malfunctions are also maintained.	C	YES
5.9.1.10	For each exceedance from an emissions standard or established operating parameter limit, the permittee must keep records of the date, duration and description of each exceedance and the specific action taken for exceedance including inspections, corrective action and repeat performance test and the results of those actions.	Records are maintained for date, duration, description, and corrective actions of any exceedance from an emission standard.	C	YES
5.9.1.11	In accordance with 40 CFR 63.11116(b), the permittee shall make records available within 24 hours of a request by the Department to document the throughput of Tank #2.	Records are made available as required.	C	YES
5.10	Reporting			
5.10.1	The permittee shall comply with the reporting requirements specified in the general provisions of Part 63 and NESHAP Subpart LLL, as follows:			
5.10.1.1	The permittee shall report the results of the performance test to the Department before the close of business on the 60th day following the completion of the performance test.	All performance testing was reported to Department within the 60-days.	C	YES
5.10.1.2	The permittee shall report the opacity or visible emission results required by §63.1349 before the close of business on the 30th day following the completion of the opacity or visible emission observations.	Opacity observations of all emission units in operation were completed on 23-Aug-12 and reported on 11-Sep-12.	C	YES
5.10.1.3	If actions taken by the permittee during a SSM of an affected source (including actions taken to correct a malfunction) are consistent with the procedures specified in the SSMP specified in §63.6(e)(3), the permittee shall state such information in a semiannual report. Reports shall only be required if a SSM occurred during the reporting period. The SSM report may be submitted simultaneously with the excess emissions and	Not applicable.	C	N/A

	continuous monitoring system performance reports.			
5.10.1.4	Any time an action taken by the permittee during a SSM (including actions taken to correct a malfunction) is not consistent with the procedures in the SSMP, the owner or operator shall make an immediate report of the actions taken for that event within 2 working days, by telephone call or facsimile (FAX) transmission. The immediate report shall be followed by a letter, certified by the owner or operator or other responsible official, explaining the circumstances of the event, the reasons for not following the startup, shutdown, and malfunction plan, and whether any excess emissions and/or parameter monitoring exceedances are believed to have occurred.	Not applicable.	C	N/A
5.10.1.5	As required by §63.10(e)(2), the permittee shall submit a written report of the results of the performance evaluation for the continuous monitoring system required by §63.8(e). The owner or operator shall submit the report simultaneously with the results of the performance test.	The results of the performance evaluation of the CEMS are included in the performance test report.	C	YES
5.10.1.6	As required by §63.10(e)(3), the owner or operator of an affected source equipped with a continuous emission monitor shall submit an excess emissions and continuous monitoring system performance report for any event when the continuous monitoring system data indicate the source is not in compliance with the applicable emission limitation or operating parameter limit.	Not applicable, the facility was in compliance with applicable emission limits from 28-Jul-20 to 27-Jul-21.	C	YES
5.10.1.7	The owner or operator shall submit a summary report semiannually which contains the information specified in §63.10(e)(3)(vi).	Semi-annual reports were submitted on: 30-Jul-20 for 1st half of compliance period 2020-2021and 12-Feb-21 for 2nd half of compliance period 2020-2021.	C	YES
5.10.1.7.1	All exceedances of maximum control device inlet gas temperature limits specified in § 63.1344(a) and (b). All failures to calibrate thermocouples and other temperature sensors as required under § 63.1350(f)(7).	There was one exceedance of the Kiln 1 baghouse maximum inlet temperature on October 18, 2020. The exceedance was detailed in the semi-annual report submitted on January 30, 2021.	C	YES
5.10.1.7.2	The results of any combustion system component inspections conducted within the reporting period as required under § 63.1350(i).	Included in semi-annual reports	C	YES
5.10.1.7.3	All failures to comply with any provision of the operation and maintenance plan developed in accordance with § 63.1350(a).	Included in semi-annual reports	C	YES

5.10.1.8	Monthly rolling average mercury, THC, PM, and HCl (if applicable) emissions levels in the units of the applicable emissions limit for each kiln, clinker cooler, and raw material dryer.	Included in semi-annual reports	C	YES
5.10.1.19	If the total continuous monitoring system downtime for any CEM or any continuous monitoring system (CMS) for the reporting period is ten percent or greater of the total operating time for the reporting period, the permittee shall submit an excess emissions and continuous monitoring system performance report along with the summary report.	Included in semi-annual reports	C	YES
5.10.1.10	The semiannual report must include the number, duration, and a brief description for each type of malfunction which occurred during the reporting period and which caused or may have caused any applicable emission limitation to be exceeded. The report must also include a description of actions taken by an owner or operator during a malfunction of an affected source to minimize emissions including actions taken to correct a malfunction.	Included in semi-annual reports	C	YES
	Applicable Requirements Permit Section 6:			
6.1.1	In accordance with 20.11.5.12 NMAC, the Tijeras facility shall not cause to be discharged into the atmosphere any emissions in excess of 20%, 6-minute time averaged.	Facility performs prescribed emission unit emissions testing. None of the tests performed between 28-Jul-20 to 27-Jul-21 had Opacity readings higher than 20%.	C	YES
6.1.2	In accordance with 20.11.5.13.C NMAC, GEN-1 (Kiln Emergency Generator #1) and GEN-2 (Kiln Emergency Generator #2) shall not cause to be discharged into the atmosphere any emissions in excess of 20%, 6-minute time averaged. During the first 20 minutes of cold startup the visible emissions shall not exceed 40 percent opacity, 6-minute time-averaged. Additionally, no increase of load shall be applied so as to cause an emission having an opacity greater than 40 percent during any time interval.	Facility only uses the emergency generators for emergency backup power during power failures and bi-weekly for testing.	I	YES

6.1.3	In accordance with 20.11.08 NMAC, the Tijeras facility shall not cause to be discharged into the atmosphere any emissions that exceed the standards shown in the table provided in 20.11.8.13 NMAC.	Facility permitted discharge rates were based on conservative emissions rates below NMAC 20.11.13 allowed levels for CO, O3, SO2, PM2.5, PM10, Pb, HS, Reduced Sulfur and TSP. These emission rates were modeled and substantiated in the Title V 0532 operating permit.	C	YES
6.1.4	In accordance with 20.11.66.12 NMAC, all sources except for the kiln are subject to a maximum weight of discharge of particulate matter per hour based on the table located in 20.11.66.18 NMAC. [Requirement is 230 mg/M^3]	Emission rate for the stack on June 23, 2021 was 2.47 mg/m3. The PM CPMS shows that emissions from the stack have remained in a similar to what was seen during the stack test	C	YES
6.1.5	In accordance with 20.11.67.16.A NMAC, no person owning or operating coal burning equipment shall permit, cause, suffer or allow:			
6.1.5.a	Particulate matter emission to the atmosphere in excess of 0.05 pounds per million BTUs of heat input, or	Facility kilns are rated at 180 MMBTU/Hr. Performance testing in June 2021 measured an emission rate of 1.5 lbs/hr which is well below the 9 lbs/hr limited in this condition.	C	YES

6.1.5.b	Fine particulate matter emissions of less than two equivalent aerodynamic diameter and unit density to the atmosphere in excess of 0.02 pounds per million BTUs of heat input.	Facility kilns are rated at 180 MMBTU/Hr. Emission rate during June 2021 stack test was 1.5 lbs/hr for total PM, well below 3.6 lbs/hr for PM2.5.	C	YES
6.1.6	In accordance with 20.11.67.16.B NMAC, fine particulate matter emissions shall be collected and measured at stack conditions and in such a manner that no condensation of gaseous material is included with the sample.	PM testing is completed using Method 5. This method only collects solid particulates which were included in the calculated emission rate.	C	YES
6.2	Other Operational Requirements			
6.2.1	In accordance with 20.11.20.12.A NMAC, available control measures or any other effective control measure shall be used during active operations or on inactive disturbed surface areas, as necessary, to prevent the release of fugitive dust. The permittee shall not allow fugitive dust, track out, or transported material from any active operation, open storage pile, stockpile, paved or unpaved roadway disturbed surface area, or inactive disturbed surface area to cross or be carried beyond the property line, right-of-way, easement or any other area under control of the person generating or allowing the fugitive dust if the fugitive dust may:			
6.2.1.a	with reasonable probability injure human health or animal or plant life;	The Facility applies controls on unpaved roads to reduce fugitive emissions. Paved roadways are maintained with sweeper system as needed.	C	YES

6.2.1.b	unreasonably interfere with the public welfare, visibility or the reasonable use of property; or	Quarry access roads are compacted dirt. They are watered during low moisture cycles to reduce fugitive emissions. The Facility has dedicated resources to address this concern. Blasting operations are only visible for approximately 5 to 10 minutes when no wind is present. When wind is present the visible emissions are observed for less than 5 minutes.	C	YES
6.2.1.c	be visible for a total of 15 minutes or more during any consecutive one hour observation period using the visible fugitive dust detection method in 20.11.20.26 NMAC or an equivalent method approved in writing by the department.	Facility blasting operations are only visible for approximately 5 to 10 minutes when no wind is present. When wind is present the visible emissions are observed for less than 5 minutes.	C	YES
6.2.2	In accordance with 20.11.20.12.E NMAC, stockpiles shall be no higher than 15 feet above the existing natural or man-made grade that abuts the stockpile, unless otherwise approved in advance and in writing by the department.	Facility stockpiles are typically less than 10 feet in height.	C	YES
6.2.3	In accordance with 20.11.23.12.B NMAC, the permittee shall not repair, attempt to repair, service, or attempt to service automotive air conditioning systems unless approved motor vehicle refrigerant recycling or recovery equipment is used.	Facility personnel do not perform air conditioning repairs on-site. Repairs are performed by a licensed AC contractor.	C	YES
6.2.4	In accordance with 20.11.66.17 NMAC, the permittee shall operate process equipment which emits fugitive dust under reasonable effective precautions to prevent emissions of fugitive dust.	Fugitive dust is minimized with use of dust suppression systems when practicable.	C	YES

6.2.5	The facility shall operate in accordance with the administration, enforcement, and inspection regulations of 20.11.90 NMAC.	The facility strives to comply with all regulatory requirements and comply with applicable 20.11.90 NMAC requests from ABQ Air Quality.	C	YES
6.3	Data Recording Requirements			
	All sampling and measured data required by this permit for the emissions units in this facility shall be recorded. Per 20.11.42.C.(4).(a) NMAC, the minimum information to be included in these records is:			
	the date, place as defined in the permit, and time of sampling or measurements;	Performance testing reporting complies with requirement.	C	YES
	the date(s) analyses were performed;	Performance testing reporting complies with requirement.	C	YES
	the company or entity that performed the analyses;	Performance testing reporting complies with requirement.	C	YES
	the analytical techniques or methods used;	Performance testing reporting complies with requirement.	C	YES
	the results of such analyses; and	Performance testing reporting complies with requirement.	C	YES
	the operating conditions existing at the time of sampling or measurement.	Performance testing reporting complies with requirement.	C	YES
6.3.1	Maintenance of Records			
	The permittee shall keep copies of all monitoring and measurement data, equipment calibration and maintenance records, original strip charts for Continuous Emission Monitoring instruments if used, other supporting information, and reports required by this permit for at least five (5) years from the time the data was gathered or the reports written. Each record shall show clearly to which emissions unit and/or piece of monitoring equipment it applies, and the date the data was gathered. This condition is pursuant to 20.11.42.12.C.(4).(b) NMAC.	The Facility maintains 5 years of calibration and maintenance records and reports on-site or in electronic format.	C	YES
6.3.2	Off Permit Changes			

	The permittee shall keep a record describing off permit changes made at this source that result in emissions of a regulated air pollutant subject to an applicable requirement, but not otherwise regulated under this permit, and the emissions resulting from those changes. This condition is pursuant to 20.11.42.12.C.(8).(b) NMAC.	The Facility did not pursue off-permit conditions for any activities during the reporting cycle 28-Jul-20 to 27-Jul-21.	C	YES
6.4	Reporting			
6.4.1	Reporting Schedule			
6.4.1.1	In accordance with the 20.11.42.12.C.(3) NMAC, the permittee shall provide for the Department's approval a written test protocol at least thirty (30) days prior to the anticipated test date. The protocol shall describe the test methods to be used (including sampling methods and calibration procedures), shall list the equipment or devices to be tested (including sample locations), and shall describe data reduction procedures. Any variation from established sampling and analytical procedures or from facility operating conditions shall be presented for Department approval. The permittee shall allow a representative of the Department to be present at the test. When requested by the Department, the permittee shall provide schedules of testing and monitoring activities. Unless otherwise identified elsewhere in this permit, all monitoring requirements are effective 120 days after the date of permit issuance.	Facility notified Department on 2-Feb-21 of performance testing scheduled for 21 June-21.	C	YES
6.4.1.2	In accordance with 20.11.42.12.C.(5)(a) NMAC, the permittee shall submit reports for all required monitoring at least every six (6) months. These reports shall be due to the department within forty-five (45) days at the end of the reporting period. All instances of deviations from permit requirements, including emergencies, shall be clearly identified in such reports. All required reports shall be certified by a responsible official.	The Facility submitted semi-annual reports as required for 2020-2021 period.	C	YES

6.4.1.3	In accordance with 20.11.42.C.(5)(c) NMAC, the permittee shall submit compliance certification reports certifying the compliance status of this facility with respect to all applicable requirements. These reports shall be made on copies of the Compliance Certification Report Form (attached to this permit) and submitted to the Department and to EPA every 12 months, commending 12 months following the date of issuance of this permit. This report is due no later than 30 days after each anniversary of the date of permit issuance and shall include:	The previous report for the period of 28-Jul-19 to 27-Jul-20 was submitted on 26-Aug-20.	C	YES
	The identification of each term or condition of the permit that is the basis of the certification,	Included in this report.	C	YES
	The compliance status of the source,	Included in this report.	C	YES
	Whether compliance was continuous or intermittent,	Included in this report.	C	YES
	The method(s) used for determining the compliance status of the source, currently and during the reporting period identified in the permit, and	Included in this report.	C	YES
	Such other facts as the department may require to determine the compliance status of the source.	Included in this report.	C	YES
6.4.2	Reporting Deviations			
	In accordance with 20.11.42.12.C.(5).(b) NMAC, the permittee shall submit reports of all deviations (including emergencies) from permit requirements to the Department when deviations occur. The permittee shall communicate initial notice of the deviation to the Department within twenty-four (24) hours of the start of the first business day following the start of the occurrence via telephone or facsimile. Within ten (10) calendar days of the start of the first business day following the start of the occurrence, written notice using the "Excess Emissions Form To Be Used for Emergencies, Failures, Deviations and Malfunctions" (attached to this permit) shall be submitted to the Department. This condition is pursuant to 20.11.42.12.c.(5).(b) NMAC.	For the reporting period there were 8 malfunction events that had the potential to result in deviations from permit conditions. In each case the initial report met the 24-hr and 10-day requirements.	C	YES
6.4.3	Additional Reporting Requirements			
6.4.3.1	Sulfur Dioxide Emissions Inventory Requirements; Western Backstop Sulfur Dioxide Trading Program Under 20.11.46 NMAC			

6.4.3.1.1	In accordance with 20.11.46.9.A.(1) NMAC, the permittee shall submit an annual sulfur dioxide emissions inventory.	The Facility submits an annual Emissions Inventory (EI) which includes sulfur dioxide emissions. The 2020 EI was submitted on 15-Mar-21.	C	YES
6.4.3.1.2	In accordance with 20.11.46.9.A.(2) NMAC, the permittee shall document the emissions monitoring and estimation methodology used and demonstrate that the selected methodology is acceptable under the inventory program.	The Facility estimates sulfur dioxide emissions using emission rates measured during previous annual stack tests.	C	YES
6.4.3.1.3	In accordance with 20.11.46.9.A.(3) NMAC, the permittee shall include emissions during startup, shutdown, and upset conditions events in the inventory.	The Facility estimates that sulfur dioxide emission rates do not change during start-up or shut down.	C	YES
6.4.3.1.4	In accordance with 20.11.46.9.A.(5) NMAC, the permittee shall maintain all records used in the calculation of the emissions that includes, but is not limited to amount of fuel consumed, percent sulfur content of fuel and how the content was determined, quantity of product produced, emissions monitoring data, operating data, and how the emissions are calculated.	These records are kept on site and are available for inspection.	I	YES
6.4.3.1.5	In accordance with 20.11.46.9.A.(6) NMAC, the permittee shall maintain records of any physical changes to facility operations or equipment, or any other changes that may affect the emissions projections.	These records are kept on site and are available for inspection.	I	YES
6.4.3.1.6	In accordance with 20.11.46.9.A.(7) NMAC, the permittee shall retain records for a minimum of 10 years from the date of establishment, or if the record was the basis for an adjustment to the milestone, five years after the date of an implementation plan revision, whichever is longer.	Records are maintained per requirement.	I	YES
6.4.3.1.7	In accordance with 20.11.46.9.B NMAC, the permittee shall submit the sulfur dioxide emission report by April 1st of each year.	The Facility submitted an annual Emissions Inventory with sulfur dioxide emissions for 2020. The report was prepared and submitted on 15-Mar-21.	C	YES

6.4.3.1.8	In accordance with 20.11.46.9.C NMAC, the permittee shall submit the sulfur dioxide emissions report that includes all the required contents in 20.11.46.9C.(1) through (5) NMAC as listed below:	Included in the annual emission inventory.	C	YES
6.4.3.1.8.a	the stationary source permit number or source registration number;	Included in the annual emission inventory.	C	YES
6.4.3.1.8.b	the name, address, and physical location of the stationary source;	Included in the annual emission inventory.	C	YES
6.4.3.1.8.c	the name and telephone number of the person to contact regarding the emissions report;	Included in the annual emission inventory.	C	YES
6.4.3.1.8.d	a certification signed by the owner, or operator, or a responsible official as defined in 20.11.42 NMAC attesting that the statements and information contained in the emissions report are true and accurate to the best knowledge and belief of the certifying official, and including the full name, title, signature, date of signature, and telephone number of the certifying official;;	Included in the annual emission inventory.	C	YES
6.4.3.1.8.e	for each emission point, include the following in the format required by the department:	Included in the annual emission inventory.	C	YES
6.4.3.1.8.f	stack and exhaust gas parameters;	Included in the annual emission inventory.	C	YES
6.4.3.1.8.g	type of control equipment and estimated control efficiency;	Included in the annual emission inventory.	C	YES
6.4.3.1.8.h	schedule of operation;	Included in the annual emission inventory.	C	YES
6.4.3.1.8.i	estimated actual emissions, including fugitive emissions and emissions occurring during maintenance, start-ups, shutdowns, upsets, and downtime, of sulfur oxides, in tons per year, and a description of the methods utilized to make such estimates, including calculations;	Included in the annual emission inventory.	I	YES

6.4.3.1.8.j	the annual process or fuel combustion rates; and	Included in the annual emission inventory.	I	YES
6.4.3.1.8.k	the fuel heat, sulfur, and ash content.	This information is included in the coal reports submitted on a quarterly basis.	I	YES
6.4.3.2	Emissions Inventory Requirements Under 20.11.47 NMAC			
6.4.3.2.1	In accordance with 20.11.47.14(B) NMAC, the permittee shall annually submit an emissions inventory in a format approved by the department reported by March 15 for the previous calendar year.	Facility submits Annual Emissions Inventories with required information. Report for 2020 EI was submitted on 15-March-2021 using the ABQ Air Quality required SLEIS program.	I	YES
6.4.3.2.2	The permittee shall submit the required content in the inventory per 20.11.47.14(C) and (D) NMAC.	Facility submitted Annual Emissions Inventories for 2020 on 15-March-2021 with required information.	I	YES
6.5	Compliance			
6.5.1	Compliance Certification			
6.5.1.1	The permittee shall submit compliance certification reports certifying the compliance status of this facility with respect to all applicable requirements. These reports shall be made on copies of the Compliance Certification Report Form (attached to this permit) and submitted to the Department and to EPA every 12 months, commencing 12 months following the date of issuance of this permit. This report is due no later than 30 days after each anniversary of the date of permit issuance. This condition is pursuant to 20.11.42.12.C.(5).(c) NMAC.	The Facility is submitting this report for 28-Jul-20 to 27-Jul-21 compliance period.	I	YES

6.5.1.2	For sources that have submitted air dispersion modeling that demonstrates compliance with state and federal standards in accordance with section 300.D.10 of 20.2.70 NMAC, compliance with the terms and conditions of this permit regarding source emissions and operation shall be deemed to be compliance with state and federal ambient air quality standards (20.11.8 NMAC Ambient Air Quality Standards and 40 CFR 50 NAAQS). This condition is pursuant to 20.2.70.302.E.3 NMAC.	Facility supplied required modeling during Title V application process resulting in current permit, issued 28 July 2017	I	YES
6.5.2	Inspections			
	The permittee shall allow representatives of the Department, upon presentation of credentials and other documents as may be required by law, to do the following:			
	enter the permit tee's premises where a source or emission unit is located, or where records that are required by this permit to be maintained are kept,	The Facility complied with this condition in every request for inspection during the reporting period of 28-Jul-20 to 27-Jul-21.	C	YES
	have access to and copy, at reasonable times, any records that are required by this permit to be maintained,	The Facility complied with this condition in every request for inspection during the reporting period of 28-Jul-20 to 27-Jul-21.	C	YES
	inspect any facilities, equipment (including monitoring and air pollution control equipment), work practices or operation regulated or required under the permit,	The Facility complied with this condition in every request for inspection during the reporting period of 28-Jul-20 to 27-Jul-21.	C	YES
	sample or monitor any substances or parameters for the purpose of assuring compliance with this permit or applicable requirements or as otherwise authorized by the federal Act.	The Facility complied with this condition in every request for inspection during the reporting period of 28-Jul-20 to 27-Jul-21.	C	YES

6.5.3	Posting of Permit: A copy of this permit shall be kept at the permitted facility and shall be made available to Department personnel for inspection upon request. This condition is pursuant to 20.11.42.12.C.(6).(c) NMAC.	The Facility complied with this condition during the reporting period.	C	YES
6.6	Emergencies			
6.6.1	Emergency Provision: An "emergency" means any situation arising from sudden and reasonably unforeseeable events beyond the control of the permittee, including acts of God, which situation requires immediate corrective action to restore normal operation of the facility or emissions unit, and that causes exceedances of emissions limits specified in this permit. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventive maintenance, or careless or improper operation. Conditions of 6.6.1 are pursuant to 20.11.42.12.E.(1) and (4) NMAC.			
6.6.1.1	This provision is in addition to any emergency or upset provision contained in any applicable requirement.	N/A	C	YES
6.6.1.2	The permittee shall identify and report all emergencies to the Department in accordance with Condition 5.2 of this permit.	The facility did not experience emergencies applicable to condition 5.2 of this permit.	C	YES
6.6.1.3	In any enforcement proceeding, the permittee has the burden of proof in seeking to establish the occurrence of an emergency. Condition of 6.6.1 are pursuant to 20.11.42.12.E(1) and (4) NMAC	N/A	C	YES
6.7	Permit Reopening and Revocation			
	This permit will be reopened and revised when any one of the following conditions occurs, and may be revoked and reissued when either provisions under 2 or 3 occurs:			

	1. Additional requirements under the federal Act become applicable to this source three (3) or more years before the expiration date of this permit. If the effective date of the requirement is later than the expiration date of this permit, then the permit is not required to be reopened unless the original permit or any of its terms and conditions has been extended due to the Department's failure to take timely action on a request by the permittee to renew this permit.	N/A	C	YES
	2. The Department or the Administrator determines that the permit contains a material mistake or that inaccurate statements were made in establishing the terms and conditions of the permit.	N/A	C	YES
	3. The Department or the Administrator determines that the permit must be revised or revoked and reissued to assure compliance with an applicable requirement.	N/A	C	YES
	Conditions of 6.7 are pursuant to 20.11.42.13.F.(1).(a) NMAC.			
6.7.1	Proceedings to reopen or revoke this permit shall affect only those parts of this permit for which cause to reopen or revoke exists. Emissions units for which permit conditions have been revoked shall not be operated until new permit conditions have been issued for them. This condition is pursuant to 20.11.42.13.F.(1).(b) NMAC.	N/A	C	YES
6.8	Stratospheric Ozone			
	The permittee shall comply with the standards for recycling and emissions reductions pursuant to 40 CFR 82, Subpart F:			
6.8.a	Persons opening appliances for maintenance, service, repair, or disposal must comply with the required practices pursuant to subsection 82.156.	The Facility does not perform maintenance of ozone depleting containing equipment. An authorized contractor performs such maintenance when needed.	C	YES
6.8.b	Equipment used during the maintenance, service, repair, or disposal of appliances must comply with the standards for recycling and recovery equipment pursuant to subsection 82.158.	The Facility does not perform maintenance of ozone depleting containing equipment. A certified contractor performs such maintenance when needed.	C	YES

6.8.c	Persons performing maintenance, service, repair, or disposal of appliances must be certified by an approved technician certification program pursuant to subsection 82.161. This condition is pursuant to 20.11.42.12.C.(1).(a) NMAC.	Certified contractors perform such recovery and recycling of ozone depleting materials when needed.	C	YES
6.9	Certification			
	A responsible official, as defined in 20.11.42 NMAC shall certify the accuracy, truth, and completeness of every report and compliance certification submitted to the Division or to the EPA as required by any permit condition or applicable requirement. This condition is pursuant to 20.11.42.12.A.(5) NMAC.	The Annual Compliance Certification is signed by the Plant Manager of GCC Rio Grande Tijeras Plant, a Responsible Official. The signature certifies to the accuracy, truthfulness, and completeness of the report.	C	YES

PART 3

Deviation Reporting	
Question	**(Yes/No)**
Are there any deviations being reported with this annual compliance certification? If yes complete the table entitled "Deviation Summary Report" **(Part 4)**.	Yes
Have there been any previous deviation reports (ie. "Region 6 Operating Permits Deviation Summary Report") forwarded to the EPA. If yes, attach the Deviation Summary Report to this annual compliance certification or complete the table entitled "Deviation Summary Report" (Part 4).	No
Have all quarter or semiannual deviation reports been submitted to AEHD? If yes Part 4 does not need to include on your submittal to state. However it is required for the EPA's review.	N/A

PART 4

Deviation Report for Operating Permit No._532____						
No	Emission Unit ID	Poll	Applicable Requirement (Include Rule Citation)	Monitoring Method (Include Rule Citation)	Monitoring Frequency	Total # of Deviations
1	(#8-1 and #8-2) (#8-3 and #8-4) (EU #'s 3-1, 3-2, 3-3, 3-4, 8-1, 8-2, 8-3, 8-4, 8-6 and 8-7)		Permit Condition 5.1.5 and NEHSAP 40 CFR 63.1343(b)(1)	The visual emissions observations for these sources shall be conducted with the procedures of Method 22 of Appendix A to Part 60.	Daily when units are in operation	7
2	6-1		Permit Condition 5.2.1 and NESHAP 40 CFR 63.1346(a)	Exceedance of Kiln 1 Baghouse inlet temperature 180 minute rolling average	180-minute rolling average	1

No.	Deviation Start		Deviation End		No. of Days	Cause of Deviation	Corrective Action Taken
	Date	Time	Date	Time			
1	23 Oct. 2020		23 Oct. 2020		1	Facility failed to perform Method 22 daily observations on finish mills and their associated separators baghouses (EU #'s 3-1, 3-2, 3-3, 3-4, 8-1, 8-2, 8-3, 8-4, 8-6 and 8-7).	Facility retrained operators on daily VEO rules to ensure that operator(s) schedules are arranged to accommodate the requirements.
2	16 Jan. 2021		16 Jan. 2021		1	Facility failed to perform Method 22 daily observations on finish mills and their associated separators baghouses (EU #'s 3-1, 3-2, 3-3, 3-4,	Facility retrained operators on daily VEO rules to ensure that operator(s) schedules are arranged

						8-1, 8-2, 8-3, 8-4, 8-6 and 8-7).	to accommodate the requirements. The supervisor on shift was re-trained on how to obtain additional support.
3	12 Feb. 2021		12 Feb. 2021		1	Facility failed to perform Method 22 daily observations on finish mills and their associated separators baghouses (EU #'s 3-1, 3-2, 3-3, 3-4, 8-3 and 8-4,).	The facility has experienced excessive turnover in the last 12 months and additional opacity reader training has been conducted for better coverage to complete the daily observations.
4	16. Feb. 2021		16 Feb. 2021		1	Facility performed Method 22 daily observations on finish mills and their associated separators baghouses (EU #'s 3-1, 3-2, 3-3, 3-4, 8-1, 8-2, 8-3 and 8-4).However the recordkeeping could not be located.	Facility experienced excessive turnover within the last 12 months. Additional opacity reader training has been conducted for daily observation and the requirement of keeping track of the paperwork.
5	26 Feb. 2021		26 Feb. 2021		1	Facility failed to perform Method 22 daily observations on finish mills and their associated separators baghouses (EU #'s 3-1, 3-2, 3-3, 3-4, 8-1, 8-2, 8-3, 8-4, 8-6 and 8-7).	Facility retrained operators on daily VEO rules to ensure that operator(s) schedules are arranged to accommodate the requirements. The supervisor on shift was re-trained on how to obtain additional support.
6	17 Mar. 2021		17 Mar. 2021		1	Facility failed to perform Method 22 daily observations on finish mills and their associated separators baghouses (EU #'s 3-1, 3-2, 3-3, 3-4, 8-1, 8-2, 8-3, 8-4, 8-6 and 8-7)	The facility has experienced excessive turnover in the last 12 months and additional opacity reader training has been conducted for better coverage to complete the daily observations.
7	19 Apr. 2021		19 Apr. 2021		1	Facility failed to perform Method 22 daily observations on finish mills and their associated separators baghouses (EU #'s 3-1, 3-2, 3-3, 3-4, 8-1, 8-2, 8-3, 8-4, 8-6 and 8-7).	Facility retrained operators on daily VEO rules to ensure that operator(s) schedules are arranged to accommodate the

							requirements. The supervisor on shift was re-trained on how to obtain additional support.
8	18 Oct. 2020		18 Oct. 2020			There was one exceedance of the Kiln 1 baghouse maximum inlet temperature on October 18, 2020. A severe temperature change in the pyroprocess during fuel switching caused a reversal of airflow in the kiln hood resulting in hot gases being sent directly to main baghouse via the clinker cooler circuit instead of through the kiln. The kiln went down once the issue was identified and fuel addition on startup was slowed to control the temperature.	Operators were provided additional training on kiln fuel switching procedures and interlocks on ID fans temperature alarms were adjusted to prevent the exceedance of the baghouse inlet temperature in future.

APPENDIX G. 40 CFR 63 SUBPART LLL O&M MANUAL

OPERATIONS AND MAINTENANCE PLAN
AS REQUIRED BY 40 CFR PART 63 SUBPART LLL
FOR
GCC RIO GRANDE, INC.
TIJERAS PLANT
PART 70 OPERATING PERMIT NO. 532
TIJERAS, NM

FEBRUARY 2020

CONTENTS

1.0 Purpose 1
2.0 Plant Description and Scope 2
2.1 PLANT DESCRIPTION 2
2.2 SCOPE 2
3.0 Definitions 11
4.0 General 13
5.0 Kilns 14
5.1 KILN OPERATION PLAN 15
5.2 KILN MAINTENANCE PLAN 19
5.3 KILN RECORDS 21
6.0 Clinker Cooler 23
6.1 CLINKER COOLER OPERATION PLAN 24
6.2 CLINKER COOLER MAINTENANCE PLAN 26
6.3 CLINKER COOLER RECORDS 27
7.0 Raw Mills 28
7.1 RAW MILL OPERATION PLAN 29
7.2 RAW MILL MAINTENANCE PLAN 33
7.3 RAW MILL RECORDS 34
8.0 Finish Mill 36
8.1 FINISH MILL OPERATION PLAN 37
8.2 FINISH MILL MAINTENANCE PLAN 43
8.3 FINISH MILL RECORDS 45
9.0 Open Clinker Storage Pile 48
9.1 OPEN CLINKER STORAGE PILE OPERATION PLAN 49
9.2 OPEN CLINKER STORAGE PILE MAINTENANCE PLAN 50
9.3 OPEN CLINKER STORAGE PILE RECORDS 51
10.0 All Other Affected Sources 52
10.1 ALL OTHER AFFECTED SOURCES OPERATION PLAN 53
10.2 ALL OTHER AFFECTED SOURCES MAINTENANCE PLAN 55
10.3 ALL OTHER AFFECTED SOURCES RECORDS 56

APPENDIX I

1. All Other Affected Sources, 40 CFR Part 63 Subpart LLL
2. Baghouse Preventive Maintenance Procedures
3. Procedure for Daily Visible Emissions (VE) Monitoring
    a. Directions for Daily Method 22 Observations
    b. Daily Emissions Monitoring Flowchart
    c. Corrective Action Plan for Daily VE Observation
    d. Daily Method 22 VE Observation Forms
4. Procedure for Monthly Visible Emissions Monitoring
    a. Directions for Monthly Method 22 Observations
    b. Monthly Method 22 VE Observation Forms
5. Method 9 Form
6. Annual Combustion System Inspection Procedure
7. Open Clinker Storage Pile Location Map

1.0 PURPOSE

This document establishes an Operations and Maintenance Plan for certain particulate emission sources and air pollution control equipment at the GCC Rio Grande, Inc. (GCC) Tijeras Plant. The Tijeras Plant is a major source of hazardous air pollutants (HAPs). For each affected source at the plant subject to the provisions of 40 CFR 63 Subpart LLL (PC MACT), 40 CFR 63.1347 requires preparation of an Operations and Maintenance Plan (O&M Plan) that incorporates the following:

1. Procedures for proper operation and maintenance of affected sources and air pollution control devices in order to meet applicable emissions limits and operating limits, during periods of normal conditions, as well as, startup and shutdown;
2. Corrective actions to be taken when visible emissions are observed during any Method 22 test undertaken as a requirement of the subpart; and
3. Procedures to be used during an annual inspection of the components of the combustion system of each kiln located at a facility.

Covered equipment, applicable limits, and associated air pollution control equipment are summarized in Section 2 of this document. Relevant operating and maintenance procedures and associated records for covered equipment are described in subsequent sections of this document. Information, procedures and records are considered to be relevant for purposes of this Plan if the information, procedure, or record could reasonably be expected to impact compliance, or demonstration of compliance, with a PC MACT requirement.

2.0 PLANT DESCRIPTION AND SCOPE

2.1 PLANT DESCRIPTION

GCC owns and operates a Portland cement manufacturing facility located at 11783 State Highway 337, Tijeras, NM, which is is approximately 8 miles east of Albuquerque, NM in the East Mountain area of Bernalillo County. It is an existing source, as defined in 40 CFR 63.2. Portland cement manufacturing involves the crushing, grinding, and blending of limestone and other raw materials into a chemically proportioned mixture, which is then heated in a preheater rotary kiln at extremely high temperatures to produce clinker. The clinker is cooled and ground with gypsum and other additives to produce the finished Portland cement product. The Tijeras Plant consists of quarry operations, crushing systems, raw material receiving and storage areas, raw mill systems, fuel receiving and storage areas, two preheater kiln systems, two clinker coolers, three finish mill systems, and cement storage and shipping

The Tijeras Plant is considered a major source with respect to PC MACT compliance.

2.2 SCOPE

The following covered equipment is addressed in this Operations and Maintenance Plan.

Affected Source	Covered Equipment	Emission Source			Air Pollution Control Equipment	
		Description	Emission Source ID	PC MACT Applicable Standard or Operating Limit	ID	Description
Kiln #1	General • Kiln temperature monitor • Kiln burner fuel control	Existing Dry Preheater Kiln	Kiln #1 Emission Point: Main stack	Work practices: 1. All dry sorbent and activated carbon systems that control HAPs must be turned on and operating when the gas stream to the APCD reaches 300°F during startup. They can be turned off during shutdown. Particulate control must be operating during both startup and shutdown. 2. Use clean fuel(s) until the kiln reaches 1200 °F.	Emission Unit ID: 6-1	Kiln #1 Baghouse Exhausts to single comingled main stack for both kilns and clinker coolers
Kiln #1	PM • Clinker hourly production rate monitoring system • PM CPMS • Baghouse	Existing Dry Preheater Kiln	Kiln #1 Emission Point: Main stack	PM: 0.07 lb/ton clinker - basis performance (stack) testing on kiln PM CPMS OPL – Operating Parameter Limits established during compliant stack test and based on PM_{alt} = Alternative PM emission limit for commingled sources.	Emission Unit ID: 6-1	Kiln #1 Baghouse Exhausts to single comingled main stack for both kilns and clinker coolers

Affected Source	Covered Equipment	Emission Source			Air Pollution Control Equipment	
		Description	Emission Source ID	PC MACT Applicable Standard or Operating Limit	ID	Description
Kiln #1	D/F • Baghouse inlet temperature continuous monitoring system (CMS)	Existing Dry Preheater Kiln	Kiln #1 Emission Point: Main stack	D/F: 1. 0.2 ng/dscm (TEQ) corrected to 7% oxygen (when T>400 °F) 2. Run average temperatures determined in accordance with the D/F Emissions performance test	Emission Unit ID: 6-1	Kiln #1 Baghouse Exhausts to single comingled main stack for both kilns and clinker coolers
Kiln #1	THC • THC CEMs • O_2 CMS	Existing Dry Preheater Kiln	Kiln #1 Emission Point: Main stack	THC: 24 ppmvd corrected to 7% oxygen	Emission Unit ID: 6-1	Kiln #1 Baghouse Exhausts to single comingled main stack for both kilns and clinker coolers
Kiln #1	Mercury (Effective Date 9/9/16) • Hg CEMs • Stack flow CMS • Clinker hourly production rate monitoring system	Existing Dry Preheater Kiln	Kiln #1 Emission Point: Main stack	Mercury: 55 lb/MM tons clinker	Emission Unit ID: 6-1	Kiln #1 Baghouse Exhausts to single comingled main stack for both kilns and clinker coolers
Kiln #1	HCl (Effective Date 9/9/16) • HCl CEMs • O_2 CMS	Existing Dry Preheater Kiln	Kiln #1 Emission Point: Main stack	HCl: 3 ppmvd corrected to 7% oxygen	Emission Unit ID: 6-1	Kiln #1 Baghouse Exhausts to single comingled main stack for both kilns and clinker coolers

Affected Source	Covered Equipment	Emission Source			Air Pollution Control Equipment	
		Description	Emission Source ID	PC MACT Applicable Standard or Operating Limit	ID	Description
Kiln #2	General • Kiln temperature monitor • Kiln burner fuel control	Existing Dry Preheater Kiln	Kiln #2 Emission Point: Main stack	Work practices: 1. All dry sorbent and activated carbon systems that control HAPs must be turned on and operating when the gas stream to the APCD reaches 300°F during startup. They can be turned off during shutdown. Particulate control must be operating during both startup and shutdown. 2. Use clean fuel(s) until the kiln reaches 1200 °F.	Emission Unit ID: 6-2	Kiln #2 Baghouse Exhausts to single comingled main stack for both kilns and clinker coolers
Kiln #2	PM • Clinker houly production rate monitoring system • PM CPMS • Baghouse	Existing Dry Preheater Kiln	Kiln #2 Emission Point: Main stack	PM: 0.07 lb/ton clinker - basis performance (stack) testing on kiln PM CPMS OPL – Operating Parameter Limits established during compliant stack test and based on PM_{alt} = Alternative PM emission limit for commingled sources.	Emission Unit ID: 6-2	Kiln #2 Baghouse Exhausts to single comingled main stack for both kilns and clinker coolers

Affected Source	Covered Equipment	Emission Source			Air Pollution Control Equipment	
		Description	Emission Source ID	PC MACT Applicable Standard or Operating Limit	ID	Description
Kiln #2	D/F • Kiln baghouse inlet temperature continuous monitoring system (CMS)	Existing Dry Preheater Kiln	Kiln #2 Emission Point: Main stack	D/F: 1. 0.2 ng/dscm (TEQ) corrected to 7% oxygen (when T>400 ^{o}F) 2. Run average temperatures determined in accordance with the D/F Emissions performance test.	Emission Unit ID: 6-2	Kiln #2 Baghouse Exhausts to single comingled main stack for both kilns and clinker coolers
Kiln #2	THC • THC CEMs • O_2 CMS	Existing Dry Preheater Kiln	Kiln #2 Emission Point: Main stack	THC: 24 ppmvd corrected to 7% oxygen	Emission Unit ID: 6-2	Kiln #2 Baghouse Exhausts to single comingled main stack for both kilns and clinker coolers
Kiln #2	Mercury (Effective Date 9/9/16) • Hg CEMs • Stack flow CMS • Clinker hourly production rate monitoring system	Existing Dry Preheater Kiln	Kiln #2 Emission Point: Main stack	Mercury: 55 lb/MM tons clinker	Emission Unit ID: 6-2	Kiln #2 Baghouse Exhausts to single comingled main stack for both kilns and clinker coolers
Kiln #2	HCl (Effective Date 9/9/16) • HCl CEMs • O_2 CMS	Existing Dry Preheater Kiln	Kiln #2 Emission Point: Main stack	HCl: 3 ppmvd corrected to 7% oxygen	Emission Unit ID: 6-2	Kiln #2 Baghouse Exhausts to single comingled main stack for both kilns and clinker coolers

Affected Source	Covered Equipment	Emission Source			Air Pollution Control Equipment	
		Description	Emission Source ID	PC MACT Applicable Standard or Operating Limit	ID	Description
Clinker Cooler #1	PM • PM CPMS • Baghouse	Existing clinker cooler	Clinker Cooler #1 Emission Point: Main stack	PM: 0.07 lb/ton clinker: basis performance (stack) testing on Clinker Cooler. PM CPMS OPL – Operating Parameter Limits established during compliant stack test and based on PM_{alt} = Alternative PM emission limit for commingled sources. *Work practice:* The APCD and monitoring must be operating during startup and shutdown	Emission Unit IDs: 5-3, 5-4, 5-5, and 5-6	Clinker Cooler #1 Baghouses Exhaust to single comingled main stack for both kilns and clinker coolers
Clinker Cooler #2	PM • PM CPMS • Baghouse	Existing clinker cooler	Clinker Cooler #2 Emission Point: Main stack	PM: 0.07 lb/ton clinker: basis performance (stack) testing on Clinker Cooler. PM CPMS OPL – Operating Parameter Limits established during compliant stack test and based on PM_{alt} = Alternative PM emission limit for commingled sources. *Work practice:* The APCD and monitoring must be operating during startup and shutdown	Emission Unit IDs: 5-7, 5-8, 5-9, and 5-10	Clinker Cooler #1 Baghouses Exhaust to single comingled main stack for both kilns and clinker coolers
Raw Mill #1	Opacity • Baghouse	Existing ball mill #1	Raw Mill #1 Emission Point 3.2	Opacity: 10% Daily VE check	Emission Unit ID: 3-2	Baghouse

Affected Source	Covered Equipment	Emission Source			Air Pollution Control Equipment	
		Description	Emission Source ID	PC MACT Applicable Standard or Operating Limit	ID	Description
Raw Mill #1	Opacity • Baghouse	Existing ball mill #1 air separator	Raw Mill #1 Emission Point 3.1	Opacity: 10% Daily VE check	Emission Unit ID: 3-1	Baghouse
Raw Mill #2	Opacity • Baghouse	Existing ball mill #2	Raw Mill #2 Emission Point 3.4	Opacity: 10% Daily VE check	Emission Unit ID: 3-4	Baghouse
Raw Mill #2	Opacity • Baghouse	Existing ball mill #2 air separator	Raw Mill #2 Emission Point 3.3	Opacity: 10% Daily VE check	Emission Unit ID: 3-3	Baghouse
Finish Mill #1	Opacity • Baghouse	Existing finish mill #1	Finish Mill #1 Emission Point 8.1	Opacity: 10% Daily VE check	Emission Unit ID: 8-1	Baghouse
Finish Mill #1	Opacity • Baghouse	Existing finish mill #1 air separator	Finish Mill #1 Emission Point 8.2	Opacity: 10% Daily VE check	Emission Unit ID: 8-2	Baghouse
Finish Mill #2	Opacity • Baghouse	Existing finish mill #2	Finish Mill #2 Emission Point 8.3	Opacity: 10% Daily VE check	Emission Unit ID: 8-3	Baghouse

Affected Source	Covered Equipment	Emission Source			Air Pollution Control Equipment	
		Description	Emission Source ID	PC MACT Applicable Standard or Operating Limit	ID	Description
Finish Mill #2	Opacity • Baghouse	Existing finish mill #2 air separator	Finish Mill #2 Emission Point 8.4	Opacity: 10% Daily VE check	Emission Unit ID: 8-4	Baghouse
Finish Mill #3	Opacity • Baghouse	Existing finish mill #3	Finish Mill #3 Emission Point 8.7	Opacity: 10% Daily VE check	Emission Unit ID: 8-6	Baghouse
Finish Mill #3	Opacity • Baghouse	Existing finish mill #3 air separator	Finish Mill #3 Emission Point 8.7	Opacity: 10% Daily VE check	Emission Unit ID: 8-7	Baghouse
Clinker Storage Piles	Fugitive dust control equipment	Short-Term Open clinker storage pile	See Appendix I for pile location information	Fugitive dust emissions control measures, most appropriate for site conditions	See Appendix I for pile location information	Controls may include: • Use of tarpaulin or other equally effective cover

Affected Source	Covered Equipment	Emission Source			Air Pollution Control Equipment	
		Description	Emission Source ID	PC MACT Applicable Standard or Operating Limit	ID	Description
All Other Affected Sources	Opacity • Baghouse	Existing raw material, clinker or finished product storage bin; conveying system transfer point; bagging system; bulk loading or unloading system	See Summary of "All Other Affected Sources, 40 CFR Part 63 Subpart LLL" in Appendix I	Opacity: 10% Monthly VE check	See Summary of "All Other Affected Sources, 40 CFR Part 63 Subpart LLL" in Appendix I	Baghouses

3.0 DEFINITIONS

The following definitions apply throughout this document.

Clean Fuel means natural gas, synthetic natural gas, propane, distillate oil, synthesis gas (syngas), and ultra-low sulfur diesel (ULSD).

Continuous Monitoring means the sampling of the regulated parameter specified in 40 CFR §63.150 at least every 15 seconds, and the recording the average value of the regulated parameter at least every 60 seconds, except during allowable periods of calibration and except as defined otherwise by an applicable performance specification.

Covered Equipment means equipment or equipment components that could reasonably impact compliance with an applicable requirement in PC MACT. Covered equipment is specified in Section 2.2.

Excess Emissions means, results of any required measurements outside the applicable range (e.g., emissions limitations, parametric operating limits) that is permitted by PC MACT.

Kiln means a device, including any associated preheater or precalciner devices, inline raw mills, inline coal mills or alkali bypasses that produces clinker by heating limestone and other materials for subsequent production of portland cement. Because the inline raw mill and inline coal mill are considered an integral part of the kiln, for purposes of determining the appropriate emissions limit, the term kiln also applies to the exhaust of the inline raw mill and the inline coal mill.

Kiln Temperature Monitor is the backend temperature monitor.

Malfunction means failure of air pollution controls, monitoring equipment or a process to operate in a normal manner and which has the potential to cause non-compliance with a PC MACT emission limitation or monitoring requirement.

Open Clinker Storage Pile means a clinker storage pile on the ground for more than three days that is not completely enclosed in a building or structure.

Operating day means any 24-hour period beginning at 12:00 midnight during which the kiln produces any amount of clinker. For calculating the 30 day rolling average emissions, kiln operating days do not included the hours of operation during startup or shutdown.

Shutdown means the cessation of kiln operation. Shutdown begins when feed to the kiln is halted and ends when continuous kiln rotation ceases.

Startup means the time from when a shutdown kiln first begins firing fuel until it begins producing clinker. Startup begins when a shutdown kiln turns on the induced draft fan and begins firing fuel in the main burner. Startup ends when feed is being continuously introduced into the kiln for at least 120 minutes or when the feed rate exceeds 60 percent of the kiln design limitation rate, whichever occurs first.

4.0 GENERAL

This Operations and Maintenance Plan satisfies the requirements of 40 C.F.R. § 63.1350(a). Pursuant to 40 C.F.R. § 63.1350 (a), this plan is incorporated into the Tijeras Facility's operating permit application. Only the provisions of this operation and maintenance plan which are required by 40 C.F.R. § 63.1350(a) are enforceable under both 40 C.F.R. §63.1350(b) or any operating permit which may be ultimately approved by the permitting authority. This operation and maintenance plan shall be implemented by the facility upon the initial compliance date of the NESHAP.

This plan may be updated and revised. Changes to this plan may be required because of changes in source designations, changes in affected sources, equipment and process changes, and experience implementing the NESHAP. Revisions to this operations and maintenance plan would not alter any emissions limit or monitoring requirement under the NESHAP. Therefore, revisions to this plan will be processed as either an update to the facility's operating permit, or an administrative amendment to an existing operating permit for the facility. GCC may initiate such an administrative change to the operation and maintenance plan using a written notice to the permitting agency.

Beyond what is covered in Sections 5 through 10 of this document, emissions from fugitive sources will also be limited. All personnel have been trained to identify potential problems with instructions to communicate visible emissions to Supervisors, Managers, and Environmental Engineer for immediate action.

The plant maintains replacement and spare parts as current inventory. In the unexpected case of a part or parts not being available, it is likely that other GCC plants in the region would have the necessary replacement parts.

Clinker piles resulting from spills are cleaned up as soon as practicable, but no later than three days after they occur.

5.0 KILNS

This section contains operating instructions for normal operation, preventive maintenance and repair instructions, and required records for covered equipment under the Kilns #1 and #2. Instructions apply to each covered piece of equipment including each kiln, control device, or monitoring device as applicable during each operation mode. The scope of these instructions is limited to actions equipment operators must take to maintain compliance, or mitigate non-compliance, with PC MACT requirements. The instructions do not address aspects of plant operation that do not pertain to PC MACT compliance, such as safety, production and product quality.

Recordkeeping associated with notifications, applicability, or performance testing, unless associated with emission standards or operating limits, is not covered. Retain files for at least 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent 2 years of data shall be retained on site. The remaining 3 years of data may be retained off site.

5.1 KILN OPERATION PLAN

Kiln	Kiln #1 and Kiln #2 Emission Point: Main Stack Emission Unit ID's: 6-1 and 6-2
Startup	1. General a. Verify a clean fuel is used until the kiln reaches a temperature of 1200°F b. Verify kiln temperature monitor is operational 2. Particulate Emissions Control and Monitoring a. Check clinker hourly production rate monitoring system status b. Check PM CPMS status c. Verify baghouse is operational d. Check baghouse for proper operation 3. D/F Emissions Control and Monitoring a. Check temperature CMS status 4. THC Emissions Monitoring a. Check THC CEMs status b. Check O_2 CMS status 5. Mercury Emissions Control and Monitoring (Effective Date 9/9/16) a. Check Hg CEMs status b. Check stack flow CMS status c. Check clinker hourly production rate monitoring system status 6. HCl Emissions Control and Monitoring (Effective Date 9/9/16) a. Check HCl CEMs status b. Check O_2 CMS status

Kiln	**Kiln #1 and Kiln #2 Emission Point: Main Stack** **Emission Unit ID's: 6-1 and 6-2**
Normal Operation	1. General a. Inspect burner for proper operation General duty to minimize emissions: Maintain affected source and associated APCD and monitoring equipment in a manner consistent with safety and good air pollution control practices 2. Particulate Emissions Control and Monitoring a. Monitor the hourly clinker production rate in accordance with clinker production rate monitoring requirements b. Continuously monitor particulate emissions with the PM CPMS in accordance with PM monitoring requirements c. Maintain baghouse operation as necessary to comply with PM limits 3. D/F Emissions Control and Monitoring a. Continuously monitor baghouse inlet temperature with baghouse inlet temperature CMS in accordance with D/F monitoring requirements 4. THC Emissions Monitoring a. Continuously monitor THC emissions with THC CEMs in accordance with THC monitoring requirements b. Continuously monitor O_2 with O_2 CMS in accordance with parameter monitoring requirements 5. Mercury Emissions Control and Monitoring (Effective Date 9/9/16) a. Continuously monitor mercury emissions with Hg CEMs in accordance with mercury monitoring requirements b. Continuously monitor stack gas flow rate with stack flow CMS in accordance with continuous flow rate monitoring system requirements c. Monitor the hourly clinker production rate in accordance with clinker production rate monitoring requirements 6. HCl Emissions Control and Monitoring (Effective Date 9/9/16) a. Continuously monitor HCl emissions with HCl CEMs in accordance with HCl monitoring requirements b. Continuously monitor O_2 with O_2 CMS in accordance with parameter monitoring requirements

Kiln	Kiln #1 and Kiln #2 Emission Point: Main Stack Emission Unit ID's: 6-1 and 6-2
Shutdown	1. Verify baghouse is operational until the kiln completes shutdown
Malfunctions	1. General a. Failure to monitor kiln temperature 2. Particulate Emissions Control and Monitoring a. Failure to monitor the hourly clinker production rate in accordance with clinker production rate monitoring requirements b. Failure to continuously monitor PM parameter with the PM CPMS c. Exceedance of the PM parameter operating limit (milliamps) d. Failure to operate baghouse properly 3. D/F Emissions Control and Monitoring a. Failure to continuously monitor kiln baghouse inlet temperature with kiln baghouse inlet temperature CMS in accordance with D/F monitoring requirements 4. THC Emissions Monitoring a. Failure to continuously monitor THC emissions with THC CEMs in accordance with THC monitoring requirements b. Exceedance of the THC limit c. Failure to continuously monitor O_2 with O_2 CMS in accordance with parameter monitoring requirements 5. Mercury Emissions Control and Monitoring (Effective Date 9/9/16) a. Exceedance of the mercury limit b. Failure to continuously monitor mercury emissions with Hg CEMs in accordance with mercury monitoring requirements c. Failure to continuously monitor stack gas flow rate with stack flow CMS in accordance with continuous flow rate monitoring system requirements d. Failure to monitor the hourly clinker production rate in accordance with clinker production rate monitoring requirements

Kiln	Kiln #1 and Kiln #2 Emission Point: Main Stack Emission Unit ID's: 6-1 and 6-2
	6. HCl Emissions Control and Monitoring (Effective Date 9/9/16) a. Exceedance of HCl limit b. Failure to continuously monitor HCl emissions with HCl CEMs in accordance with HCl monitoring requirements c. Failure to continuously monitor O_2 with O_2 CMS in accordance with parameter monitoring requirements
Malfunctions – Corrective Actions	1. General a. Repair kiln temperature monitor 2. Particulate Emissions Control and Monitoring Equipment a. Repair malfunctioning clinker measuring system b. Repair malfunctioning PM CPMS c. Repair malfunctioning baghouse components d. Re-establish baghouse operation within the acceptable operating range(s) 3. D/F Emissions Control and Monitoring Equipment a. Repair malfunctioning kiln baghouse inlet temperature CMS 4. THC Emissions Monitoring Equipment a. Repair malfunctioning THC CEMs b. Repair malfunctioning O_2 CMS 5. Mercury Emissions Control and Monitoring (Effective Date 9/9/16) a. Repair malfunctioning Hg CEMs b. Repair malfunctioning stack flow CMS c. Repair malfunctioning clinker measuring system 6. HCl Emissions Control and Monitoring (Effective Date 9/9/16) a. Repair malfunctioning HCl CEMs b. Repair malfunctioning O_2 CMS

5.2 KILN MAINTENANCE PLAN

Kiln	Kiln #1 and Kiln #2 Emission Point: Main Stack Emission Unit ID's: 6-1 and 6-2
Maintenance	1. General a. Check calibration of kiln temperature monitoring system and recalibrate if out of tolerance b. Inspect kiln burner per preventive maintenance schedule c. Perform annual kiln combustion system inspection (See Appendix I) 2. Particulate Emissions Control and Monitoring Equipment a. Check calibration of clinker monitoring system and recalibrate if out of tolerance b. Perform PM CPMS QA/QC activities c. Inspect baghouse per preventive maintenance schedule d. Repair malfunctioning baghouse components as necessary 3. D/F Emissions Control and Monitoring Equipment a. Check calibration of kiln baghouse inlet temperature CMS monitoring system (e.g., thermocouples and other temperature sensors) b. Perform temperature CMS QA/QC activities 4. THC Monitoring Equipment a. Check calibration of THC CEMs and recalibrate if out of tolerance b. Check calibration of O_2 CMS and recalibrate if out of tolerance c. Perform THC CEMs QA/QC activities 5. Mercury Control and Monitoring Equipment (Effective Date 9/9/16) a. Check calibration of Hg CEMs and recalibrate if out of tolerance b. Perform Hg CEMs QA/QC activities c. Check calibration of clinker monitoring system and recalibrate if out of tolerance d. Check calibration of stack flow CMS and recalibrate if out of tolerance 6. HCl Control and Monitoring Equipment (Effective Date 9/9/16) a. Check calibration of HCl CEMS and recalibrate if out of tolerance

Kiln	**Kiln #1 and Kiln #2 Emission Point: Main Stack** **Emission Unit ID's: 6-1 and 6-2**
	b. Perform HCl CEMs QA/QC activities c. Check calibration of O_2 CMS and recalibrate if out of tolerance

For each affected source category, verify what preventive maintenance activity (elements) and records may be redundant with the CMS QA/QC Plan and CMS Site Specific Monitoring Plans. If left in O&M Plan, they must be checked for consistency with other plans.

5.3 KILN RECORDS

Kiln	Kiln #1 and Kiln #2 Emission Point: Main Stack Emission Unit ID's: 6-1 and 6-2
Recordkeeping	1. General Kiln Records a. Record of each startup or shutdown period in accordance with recordkeeping requirements b. Record of the type of fuel used until the kiln reached a temperature of 1200°F c. Record of the primary kiln fuel used once the kiln temperature reached 1200°F d. Continuous kiln temperature monitoring record e. Calibration and repair records for kiln temperature monitor f. Burner Inspection and preventive maintenance record g. Record of each malfunction that causes the kiln to fail to meet an applicable standard in accordance with recordkeeping requirements h. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements i. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements j. Retain records of daily clinker production and/or kiln feed rates. 2. Particulate Related Records a. Continuous PM CPMS monitoring record b. PM CPMS QA/QC and repair record c. Baghouse preventive maintenance and repair record 3. D/F Related Records a. Continuous inlet to kiln APCD temperature CMS monitoring record b. Temperature CMS QA/QC and repair record c. Calibration record for the inlet to kiln APCD temperature CMS

Kiln	Kiln #1 and Kiln #2 Emission Point: Main Stack Emission Unit ID's: 6-1 and 6-2
	4. THC Related Records a. Continuous O_2 CMS monitoring record b. Calibration record for the O_2 CMS c. Continuous THC CEMs monitoring records d. Calibration record for the THC CEMs e. THC CEMs QA/QC and repair record 5. Mercury Related Records a. Continuous Hg CEMs monitoring record b. Calibration record for Hg CEMs c. Continuous stack flow CMS monitoring record d. Calibration record for the stack flow CMS e. Record of the clinker production rate f. Calibration record for the clinker production rate monitoring system g. Hg CEMs QA/QC and repair record 6. HCl Related Records a. Continuous HCl CEMs monitoring record b. HCl CEMs QA/QC and repair record c. Calibration record for the HCl CEMS d. Continuous O_2 CMS monitoring record e. Calibration record for the O_2 CMS

6.0 CLINKER COOLER

This section contains operating instructions for normal operation, preventive maintenance and repair instructions, and required records for covered equipment under Clinker Cooler #1 and Clinker Cooler #2. Instructions apply to each covered piece of equipment including each clinker cooler, control device, or monitoring device as applicable during each operation mode. The scope of these instructions is limited to actions equipment operators must take to maintain compliance, or mitigate non-compliance, with PC MACT requirements. The instructions do not address aspects of plant operation that do not pertain to PC MACT compliance, such as safety, production and product quality.

Recordkeeping associated with notifications, applicability, or performance testing, unless associated with emission standards or operating limits, is not covered. Retain files for at least 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent 2 years of data shall be retained on site. The remaining 3 years of data may be retained off site.

6.1 CLINKER COOLER OPERATION PLAN

Clinker Cooler
Startup
Normal Operation
Shutdown
Malfunctions

Clinker Cooler
Malfunctions –Corrective Actions

6.2 CLINKER COOLER MAINTENANCE PLAN

Clinker Cooler	**Clinker Cooler #1 and Clinker Cooler #2 Emission Point: Main Stack** **Emission Unit ID's: 5-3, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, and 5-10**
Maintenance	1. Check calibration of clinker monitoring system and recalibrate if out of tolerance 2. Perform PM CPMS QA/QC activities 3. Inspect baghouse per preventive maintenance schedule 4. Repair malfunctioning baghouse components as necessary

6.3 CLINKER COOLER RECORDS

Clinker Cooler	Clinker Cooler #1 and Clinker Cooler #2 Emission Point: Main Stack Emission Unit ID's: 5-3, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, and 5-10
Recordkeeping	1. General Clinker Cooler Records a. Record of each startup or shutdown period in accordance with recordkeeping requirements b. Record of each malfunction that causes the clinker cooler to fail to meet an applicable standard in accordance with recordkeeping requirements c. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements d. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements 2. Particulate Related Records a. Record of the clinker production rate b. Continuous PM CPMS monitoring record c. PM CPMS QA/QC and repair record d. Baghouse preventive maintenance and repair record

7.0 RAW MILLS

This section contains operating instructions for normal operation, preventive maintenance and repair instructions, and required records for covered equipment under Raw Mill #1 and Raw Mill #2. The scope of these instructions is limited to actions equipment operators must take to maintain compliance, or mitigate non-compliance, with PC MACT requirements. The instructions do not address aspects of plant operation that do not pertain to PC MACT compliance, such as safety, production and product quality.

Recordkeeping associated with notifications, applicability, or performance testing, unless associated with emission standards or operating limits, is not covered. Retain files for at least 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent 2 years of data shall be retained on site. The remaining 3 years of data may be retained off site.

7.1 RAW MILL OPERATION PLAN

Raw Mill
Startup
Normal Operation
Shutdown
Malfunctions
Malfunctions –Corrective Actions

Raw Mill	**Raw Mill #1 Air Separator Emission Point 3.1; Emission Unit ID: 3-1**
Startup	

Raw Mill	Raw Mill #1 Air Separator Emission Point 3.1; Emission Unit ID: 3-1
	1. Check baghouse status
Normal Operation	1. Opacity Monitoring a. Maintain baghouse operation to ensure compliance with opacity limits b. Monitor opacity by performing daily visible emissions observations as per "Procedure for Daily Visible Emissions Monitoring" in Appendix I 2. General duty to minimize emissions: Maintain affected source and associated APCD and monitoring equipment in a manner consistent with safety and good air pollution control practices
Shutdown	1. Check baghouse status
Malfunctions	1. Failure to operate baghouse properly 2. Exceedance of opacity limit
Malfunctions – Corrective Actions	1. Repair malfunctioning baghouse components 2. Re-establish baghouse operation within the acceptable operating range(s)

Raw Mill	Raw Mill #2 Emission Point 3.4; Emission Unit ID: 3-4
Startup	1. Check baghouse status
Normal Operation	1. Opacity Monitoring a. Maintain baghouse operation to ensure compliance with opacity limits b. Monitor opacity by performing daily visible emissions observations as per “Procedure for Daily Visible Emissions Monitoring” in Appendix I 2. General duty to minimize emissions: Maintain affected source and associated APCD and monitoring equipment in a manner consistent with safety and good air pollution control practices
Shutdown	1. Check baghouse status
Malfunctions	1. Failure to operate baghouse properly 2. Exceedance of opacity limit
Malfunctions – Corrective Actions	1. Repair malfunctioning baghouse components 2. Re-establish baghouse operation within the acceptable operating range(s)

Raw Mill	**Raw Mill #2 Air Separator Emission Point 3.3; Emission Unit ID: 3-3**
Startup	1. Check baghouse status
Normal Operation	1. Opacity Monitoring a. Maintain baghouse operation to ensure compliance with opacity limits b. Monitor opacity by performing daily visible emissions observations as per "Procedure for Daily Visible Emissions Monitoring" in Appendix I 2. General duty to minimize emissions: Maintain affected source and associated APCD and monitoring equipment in a manner consistent with safety and good air pollution control practices
Shutdown	1. Check baghouse status
Malfunctions	1. Failure to operate baghouse properly 2. Exceedance of opacity limit
Malfunctions – Corrective Actions	1. Repair malfunctioning baghouse components 2. Re-establish baghouse operation within the acceptable operating range(s)

7.2 RAW MILL MAINTENANCE PLAN

Raw Mill	**Raw Mill #1 Emission Point 3.2; Emission Unit ID: 3-2**
Maintenance	1. Inspect baghouse per preventive maintenance schedule 2. Repair malfunctioning baghouse components as necessary

Raw Mill	**Raw Mill #1 Air Separator Emission Point 3.1; Emission Unit ID: 3-1**
Maintenance	1. Inspect baghouse per preventive maintenance schedule 2. Repair malfunctioning baghouse components as necessary

Raw Mill	**Raw Mill #2 Emission Point 3.4; Emission Unit ID: 3-4**
Maintenance	1. Inspect baghouse per preventive maintenance schedule 2. Repair malfunctioning baghouse components as necessary

Raw Mill	**Raw Mill #2 Air Separator Emission Point 3.3; Emission Unit ID: 3-3**
Maintenance	1. Inspect baghouse per preventive maintenance schedule 2. Repair malfunctioning baghouse components as necessary

7.3 RAW MILL RECORDS

Raw Mill	Raw Mill #1 Emission Point 3.2; Emission Unit ID: 3-2
Recordkeeping	1. General Raw Mill Records a. Record of each malfunction that causes the raw mill to fail to meet an applicable standard in accordance with recordkeeping requirements b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements 2. Opacity Related Records a. Baghouse preventive maintenance and repair record b. Visible emissions inspection record

Raw Mill	Raw Mill #1 Air Separator Emission Point 3.1; Emission Unit ID: 3-1
Recordkeeping	1. General Raw Mill Records a. Record of each malfunction that causes the raw mill to fail to meet an applicable standard in accordance with recordkeeping requirements b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements 2. Opacity Related Records a. Baghouse preventive maintenance and repair record b. Visible emissions inspection record

Raw Mill	**Raw Mill #2 Emission Point 3.4; Emission Unit ID: 3-4**
Recordkeeping	1. General Raw Mill Records a. Record of each malfunction that causes the raw mill to fail to meet an applicable standard in accordance with recordkeeping requirements b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements 2. Opacity Related Records a. Baghouse preventive maintenance and repair record b. Visible emissions inspection record

Raw Mill	**Raw Mill #2 Air Separator Emission Point 3.3; Emission Unit ID: 3-3**
Recordkeeping	1. General Raw Mill Records a. Record of each malfunction that causes the raw mill to fail to meet an applicable standard in accordance with recordkeeping requirements b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements 2. Opacity Related Records a. Baghouse preventive maintenance and repair record b. Visible emissions inspection record

8.0 FINISH MILL

This section contains operating instructions for normal operation, preventive maintenance and repair instructions, and required records for covered equipment under Finish Mill #1, Finish Mill #2, and Finish Mill #3. The scope of these instructions is limited to actions equipment operators must take to maintain compliance, or mitigate non-compliance, with PC MACT requirements. The instructions do not address aspects of plant operation that do not pertain to PC MACT compliance, such as safety, production and product quality.

Recordkeeping associated with notifications, applicability, or performance testing, unless associated with emission standards or operating limits, is not covered. Retain files for at least 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent 2 years of data shall be retained on site. The remaining 3 years of data may be retained off site.

8.1 FINISH MILL OPERATION PLAN

Finish Mill
Startup
Normal Operation
Shutdown
Malfunctions
Malfunctions –Corrective Actions

Finish Mill	**Finish Mill #1 Air Separator Emission Point 8.1; Emission Unit ID: 8-1**
Startup	

Finish Mill	**Finish Mill #1 Air Separator Emission Point 8.1; Emission Unit ID: 8-1**
	1. Check baghouse status
Normal Operation	1. Opacity Monitoring a. Maintain baghouse operation to ensure compliance with opacity limits b. Monitor opacity by performing daily visible emissions observations as per “Procedure for Daily Visible Emissions Monitoring” in Appendix I 2. General duty to minimize emissions: Maintain affected source and associated APCD and monitoring equipment in a manner consistent with safety and good air pollution control practices
Shutdown	1. Check baghouse status
Malfunctions	1. Failure to operate baghouse properly 2. Exceedance of opacity limit
Malfunctions – Corrective Actions	1. Repair malfunctioning baghouse components 2. Re-establish baghouse operation within the acceptable operating range(s)

Finish Mill	**Finish Mill #2 Emission Point 8.4; Emission Unit ID: 8-4**
Startup	1. Check baghouse status
Normal Operation	1. Opacity Monitoring a. Maintain baghouse operation to ensure compliance with opacity limits b. Monitor opacity by performing daily visible emissions observations as per “Procedure for Daily Visible Emissions Monitoring” in Appendix I 2. General duty to minimize emissions: Maintain affected source and associated APCD and monitoring equipment in a manner consistent with safety and good air pollution control practices
Shutdown	1. Check baghouse status
Malfunctions	1. Failure to operate baghouse properly 2. Exceedance of opacity limit
Malfunctions – Corrective Actions	1. Repair malfunctioning baghouse components 2. Re-establish baghouse operation within the acceptable operating range(s)

Finish Mill	Finish Mill #2 Air Separator Emission Point 8.3; Emission Unit ID: 8-3
Startup	1. Check baghouse status
Normal Operation	1. Opacity Monitoring a. Maintain baghouse operation to ensure compliance with opacity limits b. Monitor opacity by performing daily visible emissions observations as per "Procedure for Daily Visible Emissions Monitoring" in Appendix I 2. General duty to minimize emissions: Maintain affected source and associated APCD and monitoring equipment in a manner consistent with safety and good air pollution control practices
Shutdown	1. Check baghouse status
Malfunctions	1. Failure to operate baghouse properly 2. Exceedance of opacity limit
Malfunctions – Corrective Actions	1. Repair malfunctioning baghouse components 2. Re-establish baghouse operation within the acceptable operating range(s)

Finish Mill	**Finish Mill #3 Emission Point 8.6; Emission Unit ID: 8-6**
Startup	1. Check baghouse status
Normal Operation	1. Opacity Monitoring a. Maintain baghouse operation to ensure compliance with opacity limits b. Monitor opacity by performing daily visible emissions observations as per "Procedure for Daily Visible Emissions Monitoring" in Appendix I 2. General duty to minimize emissions: Maintain affected source and associated APCD and monitoring equipment in a manner consistent with safety and good air pollution control practices
Shutdown	1. Check baghouse status
Malfunctions	1. Failure to operate baghouse properly 2. Exceedance of opacity limit
Malfunctions – Corrective Actions	1. Repair malfunctioning baghouse components 2. Re-establish baghouse operation within the acceptable operating range(s)

Finish Mill	**Finish Mill #3 Air Separator Emission Point 8.7; Emission Unit ID: 8-7**
Startup	1. Check baghouse status
Normal Operation	1. Opacity Monitoring a. Maintain baghouse operation to ensure compliance with opacity limits b. Monitor opacity by performing daily visible emissions observations as per "Procedure for Daily Visible Emissions Monitoring" in Appendix **I** 2. General duty to minimize emissions: Maintain affected source and associated APCD and monitoring equipment in a manner consistent with safety and good air pollution control practices
Shutdown	1. Check baghouse status
Malfunctions	1. Failure to operate baghouse properly 2. Exceedance of opacity limit
Malfunctions – Corrective Actions	1. Repair malfunctioning baghouse components 2. Re-establish baghouse operation within the acceptable operating range(s)

8.2 FINISH MILL MAINTENANCE PLAN

Finish Mill	**Finish Mill #1 Emission Point 8.2; Emission Unit ID: 8-2**
Maintenance	1. Inspect baghouse per preventive maintenance schedule 2. Repair malfunctioning baghouse components as necessary

Finish Mill	**Finish Mill #1 Air Separator Emission Point 8.1; Emission Unit ID: 8-1**
Maintenance	1. Inspect baghouse per preventive maintenance schedule 2. Repair malfunctioning baghouse components as necessary

Finish Mill	**Finish Mill #2 Emission Point 8.4; Emission Unit ID: 8-4**
Maintenance	1. Inspect baghouse per preventive maintenance schedule 2. Repair malfunctioning baghouse components as necessary

Finish Mill	**Finish Mill #2 Air Separator Emission Point 8.3; Emission Unit ID: 8-3**
Maintenance	1. Inspect baghouse per preventive maintenance schedule 2. Repair malfunctioning baghouse components as necessary

Finish Mill	**Finish Mill #3 Emission Point 8.6; Emission Unit ID: 8-6**
Maintenance	1. Inspect baghouse per preventive maintenance schedule 2. Repair malfunctioning baghouse components as necessary

Finish Mill	**Finish Mill #3 Air Separator Emission Point 8.7; Emission Unit ID: 8-7**
Maintenance	1. Inspect baghouse per preventive maintenance schedule 2. Repair malfunctioning baghouse components as necessary

8.3 FINISH MILL RECORDS

Finish Mill	**Finish Mill #1 Emission Point 8.2; Emission Unit ID: 8-2**
Recordkeeping	1. General Finish Mill Records a. Record of each malfunction that causes the finish mill to fail to meet an applicable standard in accordance with recordkeeping requirements b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements 2. Opacity Related Records a. Baghouse preventive maintenance and repair record b. Visible emissions inspection record

Finish Mill	**Finish Mill #1 Air Separator Emission Point 8.1; Emission Unit ID: 8-1**
Recordkeeping	1. General Finish Mill Records a. Record of each malfunction that causes the finish mill to fail to meet an applicable standard in accordance with recordkeeping requirements b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements 2. Opacity Related Records a. Baghouse preventive maintenance and repair record b. Visible emissions inspection record

Finish Mill	**Finish Mill #2 Emission Point 8.4; Emission Unit ID: 8-4**
Recordkeeping	1. General Finish Mill Records a. Record of each malfunction that causes the finish mill to fail to meet an applicable standard in accordance with recordkeeping requirements b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements 2. Opacity Related Records a. Baghouse preventive maintenance and repair record b. Visible emissions inspection record

Finish Mill	**Finish Mill #2 Air Separator Emission Point 8.3; Emission Unit ID: 8-3**
Recordkeeping	1. General Finish Mill Records a. Record of each malfunction that causes the finish mill to fail to meet an applicable standard in accordance with recordkeeping requirements b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements 2. Opacity Related Records a. Baghouse preventive maintenance and repair record b. Visible emissions inspection record

Finish Mill	**Finish Mill #3 Emission Point 8.6; Emission Unit ID: 8-6**
Recordkeeping	1. General Finish Mill Records a. Record of each malfunction that causes the finish mill to fail to meet an applicable standard in accordance with recordkeeping requirements b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements 2. Opacity Related Records a. Baghouse preventive maintenance and repair record b. Visible emissions inspection record

Finish Mill	**Finish Mill #3 Air Separator Emission Point 8.7; Emission Unit ID: 8-7**
Recordkeeping	1. General Finish Mill Records a. Record of each malfunction that causes the finish mill to fail to meet an applicable standard in accordance with recordkeeping requirements b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements 2. Opacity Related Records a. Baghouse preventive maintenance and repair record b. Visible emissions inspection record

9.0 OPEN CLINKER STORAGE PILE

This section contains operating instructions for normal operation, preventive maintenance and repair instructions, and required records for covered equipment under Open Clinker Storage Piles. The scope of these instructions is limited to actions equipment operators must take to maintain compliance, or mitigate non-compliance, with PC MACT requirements. The instructions do not address aspects of plant operation that do not pertain to PC MACT compliance, such as safety, production and product quality.

Recordkeeping associated with notifications, applicability, or performance testing, unless associated with emission standards or operating limits, is not covered. Retain files for at least 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent 2 years of data shall be retained on site. The remaining 3 years of data may be retained off site.

9.1 OPEN CLINKER STORAGE PILE OPERATION PLAN

Open Clinker Storage Pile	Open Clinker Storage Pile
Normal Operation	1. See pile location information in Appendix I. Controls may include: o Use of tarpaulin or other equally effective cover, 2. Inspect for fugitive dust emissions and control as necessary
Malfunctions	1. Failure of fugitive dust control equipment
Malfunctions – Corrective Actions	1. Repair malfunctioning fugitive dust control equipment

9.2 OPEN CLINKER STORAGE PILE MAINTENANCE PLAN

Open Clinker Storage Piles
Maintenance

9.3 OPEN CLINKER STORAGE PILE RECORDS

Open Clinker Storage Piles	Open Clinker Storage Pile
Recordkeeping	1. General Open Clinker Storage Pile Records a. Record of each malfunction that causes the open clinker storage pile(s) to fail to meet an applicable standard in accordance with recordkeeping requirements b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements d. Records of control measures used 2. Fugitve control equipment preventive maintenance and repair record (as necessary)

10.0 ALL OTHER AFFECTED SOURCES

This section contains operating instructions for normal operation, preventive maintenance and repair instructions, and required records for covered equipment under all other affected sources. The scope of these instructions is limited to actions equipment operators must take to maintain compliance, or mitigate non-compliance, with PC MACT requirements. The instructions do not address aspects of plant operation that do not pertain to PC MACT compliance, such as safety, production and product quality.

Recordkeeping associated with notifications, applicability, or performance testing, unless associated with emission standards or operating limits, is not covered. Retain files for at least 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent 2 years of data shall be retained on site. The remaining 3 years of data may be retained off site.

10.1 ALL OTHER AFFECTED SOURCES OPERATION PLAN

Other
Startup
Normal Operation
Shutdown
Malfunctions

Other
Malfunctions –Corrective Actions

10.2 ALL OTHER AFFECTED SOURCES MAINTENANCE PLAN

Other	**See Summary of "All Other Affected Sources" in Appendix I**
Maintenance	1. Inspect baghouse per preventive maintenance schedule 2. Repair malfunctioning baghouse components as necessary

10.3 ALL OTHER AFFECTED SOURCES RECORDS

Other	**See Summary of "All Other Affected Sources" in Appendix I**
Recordkeeping	1. General Affected Source Records a. Record of each malfunction that causes the affected source to fail to meet an applicable standard in accordance with recordkeeping requirements b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements 2. Opacity Related Records a. Baghouse preventive maintenance and repair record b. Visible emissions inspection record

APPENDIX I

GCC Tijeras Plant

Section 1 – All Other Affected Sources, 40 CFR 63 Subpart LLL

Emission Point	Description
2.6	Additive system conveyor baghouse
2.7	Additive system elevator/silo baghouse
2.8	Additive system silo baghouse
2.9	#1 raw mill feed system baghouse
2.10	#2 raw mill feed system baghouse
4.1	Blending silos #1 and #3 baghouse
4.2	Blending silos #2 and #4 baghouse
4.3	Kiln feed metering elev. 4-1 baghouse
4.4	Kiln feed metering elev. 4-2 baghouse
4.5	Kiln feed elev. 4-3/4-4 baghouse
4.6	Kiln feed elev. 4-5/4-4 baghouse
5.1	#1 clinker cooler drag conv. Baghouse
5.2	#2 clinker cooler drag conv. Baghouse
6.3	#1 kiln dust bin baghouse
6.4	#2 kiln dust bin baghouse
7.1	Clinker tower elevator baghouse
7.2	Clinker primary conveyor baghouse
7.3	Clinker conveyor baghouse
7.4	Clinker storage silos #5 and #6 baghouse
7.5	Clinker conveyor baghouse
7.6	Clinker storage silos #7 and #8 baghouse
7.7	Clinker primary conveyor baghouse
7.8	Clinker conveyor baghouse
7.9	Clinker storage silos #13 and #14 baghouse
7.10	Clinker conveyor baghouse
7.11	Clinker storage silos #15 and #16 baghouse
7.12	#1 finish mill feed system baghouse
7.13	#2 finish mill feed system baghouse
8.5	#3 finish mill feed system baghouse
9.1	Cement Storage Silos #'s 1-3, 10, 11
9.2	Cement Storage Silos #'s 4-6
9.3	Cement Storage Silos #'s 7-9, 12, 13
9.4	Cement Storage Silos #'s 14-18
9.5	#1 Packing Machine
9.6	#2 Packing Machine
9.7	#3 Packing Machine

GCC, Tijeras Plant

Section 2. Baghouse Preventative Maintenance Procedures for 40 CFR 63 Subpart LLL Affected Sources

Pursuant to 40 CFR §63.1347(a), this section outlines preventative maintenance performed on baghouses/dust collectors at the facility.

On kiln baghouses, the following preventative maintenance procedures take place throughout the year:

- Non-running inspection once per year during maintenance outages
- Thermocouple verification quarterly
- Temperature transmitter checks quarterly

On other affected baghouses, the following preventative maintenance procedures take place throughout the year.

- Timer inspection
- Non-running inspection during maintenance downtime

If the completion of these procedures indicates that any of the baghouse system components require further maintenance, repair, or replacement, those activities will be performed and documented.

GCC, Tijeras Plant

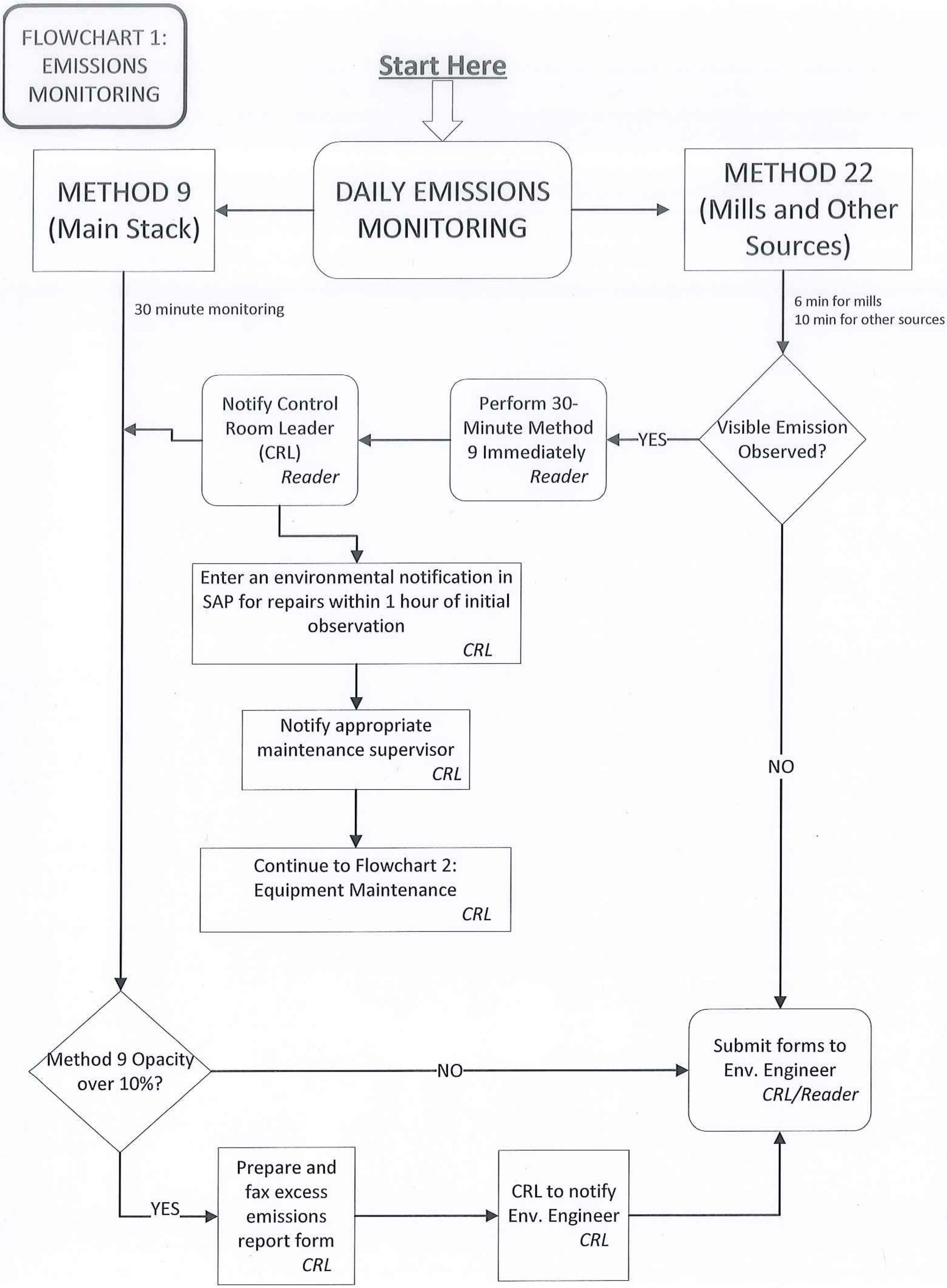
Section 3a. Directions for Daily Method 22 Observations Required by 40 CFR 63 Subpart LLL

GCC is required to monitor visible emissions from the affected raw and finish grinding systems. Visible emissions will be monitored by conducting daily 6-minute EPA Method 22 observations of the mill sweep and air separator emission points associated with each of the affected raw and finish mill systems. These daily observations will occur during representative operating conditions and will be conducted in accordance with the EPA procedures for Method 22 found in Appendix A, 40 CFR Part 60.

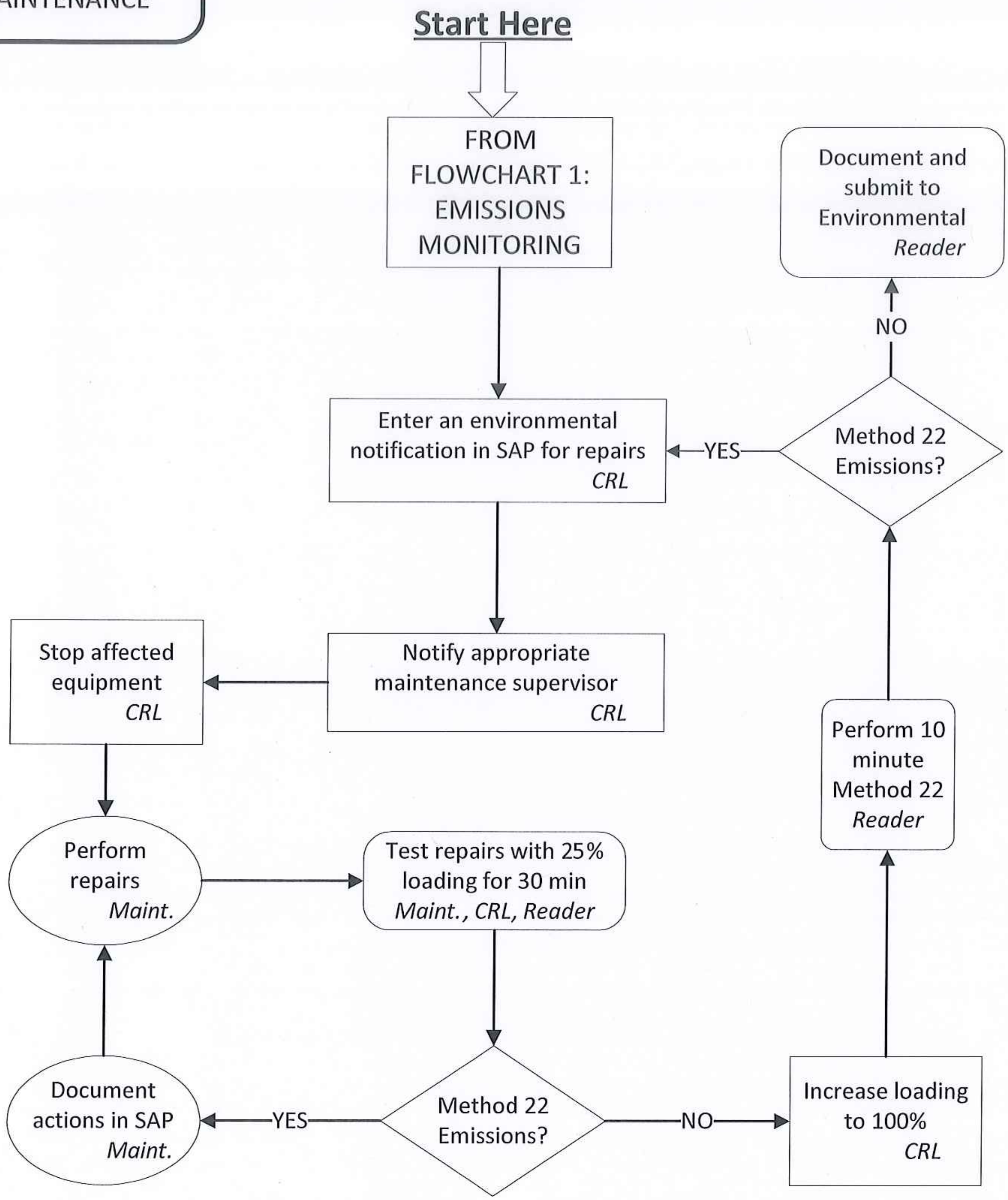
As per § 63.1350 (f)(2),(3), if visible emissions are observed during any Method 22 test, GCC shall initiate, within one hour, the corrective actions described in this plan. Within 24 hours of the end of the Method 22 test in which visible emission were observed, GCC will conduct a follow up 6-minute Method 22 test of each stack from which visible emissions were observed during the previous Method 22 test. If visible emissions are observed during the follow up Method 22 test, GCC will perform a 30-minute Method 9 visible emissions test of the source(s) in question.

GCC Tijeras Plant

Section 3b. Daily and/or Monthly Emissions Monitoring Flowcharts 1 and 2 for 40 CFR 63 Subpart LLL compliance


FLOWCHART 1: EMISSIONS MONITORING
Start Here
DAILY EMISSIONS MONITORING
METHOD 9 (Main Stack)
METHOD 22 (Mills and Other Sources)
30 minute monitoring
6 min for mills
10 min for other sources
Visible Emission Observed?
YES
Perform 30-Minute Method 9 Immediately
Reader
Notify Control Room Leader (CRL)
Reader
Enter an environmental notification in SAP for repairs within 1 hour of initial observation
CRL
Notify appropriate maintenance supervisor
CRL
Continue to Flowchart 2: Equipment Maintenance
CRL
NO
Method 9 Opacity over 10%?
NO
Submit forms to Env. Engineer
CRL/Reader
YES
Prepare and fax excess emissions report form
CRL
CRL to notify Env. Engineer
CRL

FLOWCHART 2: CORRECTIVE ACTIONS/EQUIPMENT MAINTENANCE



GCC, Tijeras Plant

Section 3c. Corrective Action Plan for Daily VE Observation

GCC is required to develop corrective action procedures to be applied to the affected raw and finish mill systems in the event that daily 6-minute Method 22 visible emissions observations indicate visible emissions from the mill sweeps or air separators associated with these systems. In the event that the Method 22 test indicates visible emissions, the following procedures shall be initiated.

(1) Within one hour following the end of the Method 22 test in which visible emissions are indicated, corrective action shall be initiated. The Opacity Reader (OR) will notify the Control Room Leader (CRL) of the system involved (e.g. air separator of the #1 raw mill system).

(2) The Opacity Reader (OR) will perform a 6-minute Method 9 test of opacity, on unit where visible emissions were observed. The Method 9 field report must be attached to the Method 22 log and submitted to the Environmental Specialist for review.

(3) CRL will submit an Environmental Work Request via SAP to appropriate department. CRL will shut down equipment for repairs.

(4) Notification of the visible emissions event to the Control Room Leader will be considered to be the initiation of corrective action.

(5) If the Method 9 average was 10% or higher the Control Room Operator will ALSO fill out and fax an excess emissions report form to the Albuquerque Air Quality.

Within 24-hours of the end of Method 22 test that indicated visible emissions, the following corrective actions will occur:

(1) The Control Room Leader shall notify the appropriate personnel, which may include, but is not limited to the:
- Mill Team Supervisor;
- Maintenance Supervisor;
- Control Room Manager;
- Electrical Team Supervisor;
- Process Control Manager / Supervisor;
- Maintenance Technician.

The notification will be entered into SAP and will include the need for an environmental corrective action and identification of the system involved. This

Section 3c. Corrective Action Plan for Daily VE Observation, Cont.

notification must be made as soon as practicably possible in order to observe the 24-hour timeframe for taking corrective action.

(2) After the problem has been diagnosed, the appropriate action, including repairs and/or adjustments will be implemented and recorded on the notification in SAP. This action will occur within 24-hours of the end of the initial Method 22 test that indicated visible emissions. The process will be shutdown to accommodate corrective action repairs and/or adjustments.

(3) Once repairs are completed, the CRL will load the respective unit at 25% capacity and a test Method 22 will be performed, if no emissions are observed, the unit is fully loaded and unrestricted operations will start. The test Method 22 document will be delivered to Environmental Specialist for filing.

(4) If emissions are observed, the unit will again be shut down and further repairs performed. These must be documented in the SAP system. Copies of repairs performed will be submitted to the Environmental Specialist with all Method 22's and Method 9's performed to correct this incident. Repeat steps 4 and 5 as needed documenting progress with repairs.

(5) If the impacted source was shut down to facilitate corrective action, and it is not possible to restart the process within 24-hours of the initial Method 22 test that indicated visible emissions, then the follow up Method 22 test and, if necessary, the 30-minute Method 9 test will be performed at first opportunity after the system is restarted.

(6) It will be the responsibility of the Control Room Supervisor to initiate a Root Cause Analysis within 72 hours of event. With help from the personnel listed above (1), the team will identify root cause and corrective actions to be implemented.

The appropriate Supervisor shall summarize the nature of the problem and the corrective action steps that were taken on the notification in SAP. A copy of this summary along with other relevant documentation (copies of shift logs, work orders, etc.) will be submitted to the Environmental Specialist for record keeping and reporting in accordance with applicable requirements.

GCC, Tijeras Plant

Section 3d. Daily Method 22 VE Observation Form Example

GCC Rio Grande

Emission Inspection Field Log
EPA Part 60, Appendix A, Method 22
Outdoor Location

Company: GCC Rio Grande, Inc.	
Location: Tijeras Plant	
Source Type: Circular Stack - Vertical Discharge	
Source Description: #1 Raw Mill Air Seperator Baghouse Emission Unit 3-1	Affiliation: GCC Rio Grande, Inc.
Wind Direction:	Wind Speed:
Sky Conditions: Clear Pt. Cloudy Cloudy Overcast	
Background Description:	Background Color:
Other Information:	

Sketch of Observed Process Unit

Indicate observer position relative to the source and sun, indicate potential emission points and/or actual emission points.

Draw North Arrow

Observers Location

Sun Location Line

Observations

	Clock Time	Observation Period Duration (min:sec)	Accumulated Emission Time (min:sec)
Begin Observation			
End Observation			
UNIT IN OPERATION:	YES / NO	EMISSIONS OBSERVED (SECS.)	

Observation Date:	
Observers Name:	
Observers Signature:	
Source Description: #1 Raw Mill Baghouse Emission Unit 3-2	Affiliation: GCC Rio Grande, Inc.
Wind Direction:	Wind Speed:
Sky Conditions: Clear Pt. Cloudy Cloudy Overcast	
Background Description:	Background Color:
Other Information:	

Sketch of Observed Process Unit

Indicate observer position relative to the source and sun, indicate potential emission points and/or actual emission points.

Draw North Arrow

Observers Location

Sun Location Line

Observations

	Clock Time	Observation Period Duration (min:sec)	Accumulated Emission Time (min:sec)
Begin Observation			
End Observation			
UNIT IN OPERATION:	YES / NO	EMISSIONS OBSERVED (SECS.)	

NOTE: IF EMISSIONS ARE OBSERVED, PERFORM A 6-MINUTE METHOD 9 AND NOTIFY CONTROL ROOM LEADER WITHIN THE HOUR.

GCC, Tijeras Plant

Section 4a. Directions for Monthly, Semi-Annual or Annual Method 22 Observations, 40 CFR Part 63 Subpart LLL

GCC is required to monitor visible emissions from affected sources listed in Section 1 of this plan. Visible emissions will be monitored by conducting monthly 10-minute EPA Method 22 observations of each affected source. These monthly observations will occur during representative operating conditions and will be conducted in accordance with the EPA procedures for Method 22 found in Appendix A, 40 CFR Part 60.

If visible emissions are observed during any Method 22 test, GCC shall initiate, within one hour, a 6-minute Method 9 visible emissions test and determine opacity of the affected unit and corrective actions will be initiated by the Control Room Leader (CRL). If no visible emissions are observed during six consecutive monthly tests, the frequency of testing may decrease from monthly to semi-annually. If visible emissions are observed during any semi-annual test, monthly testing will resume until no visible emissions are observed in six consecutive monthly tests. If no visible emissions are observed during the semi-annual test, the frequency of the testing may decrease from semi-annually to annually. If visible emissions are observed during any annual test, monthly testing will be resumed until no visible emissions are observed in six consecutive monthly tests.

GCC, Tijeras Plant

Section 4b. Monthly Method 22 VE Observation Form Example

GCC Rio Grande

Fugitive or Smoke Emission Inspection Field Log

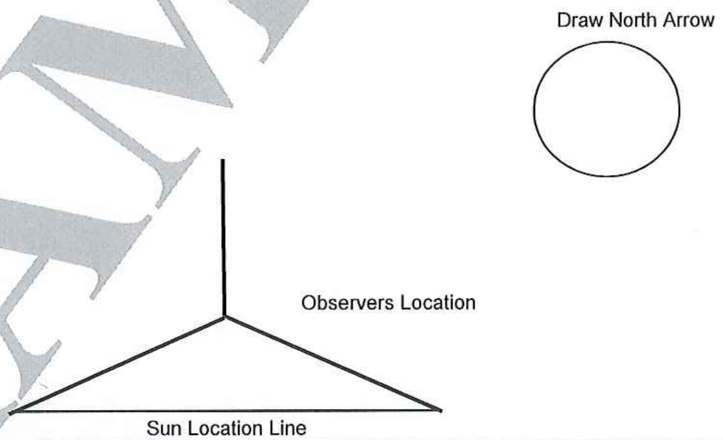
EPA Part 60, Appendix A, Method 22

Outdoor Location-10 Minute Observation

Company:	GCC Rio Grande, Inc.			Observation Date:	
Location:	Tijeras Plant			Observers Name:	
Emission Point Number:	**9.4**			Observers Signature:	
Source Description:	Cem. Storage Silos #'s 14-18 DC			Affiliation:	
Wind Direction:				Wind Speed:	
Sky Conditions:	Clear	Pt. Cloudy	Cloudy	Overcast	Other:
Background Description:				Background Color:	
Additional Information:					

Sketch of Observed Process Unit

Indicate observer position relative to the source and sun, indicate potential emission points and/or actual emission points.



Observations

	Clock Time	Observation Period Duration (min:sec)	Accumulated Emission Time (seconds)
Begin Observation:			
End Observation:			

EQUIPMENT OPERATING:		YES	NO	EMISSIONS (SECONDS):	

NOTE: IF EMISSIONS ARE OBSERVED, PERFORM A 30-MINUTE METHOD 9 AND NOTIFY CONTROL ROOM LEADER IMMEDIATELY.

GCC, Tijeras Plant

Section 5. Method 9 Form

Visual Determination of Opacity
Field Log

GCC Rio Grande

Company Name: GCC Rio Grande Inc.	
Facility Name: Tijeras Plant	
Location: 11783 State Highway 337	
City: Tijeras	State: New Mexico
Source Type: Cement Kilns	Operating Mode: On
Control Type: Fabric Filter Dust Collectors	Operating Mode: On
Emission Pt. Description: Common Stack Emission Units: 6-1, 6-2	
Emission Pt. Height: 175 feet	Rel Ht To Observer: 81 feet
Dist. from Observer: Apprx 550 ft	Direction from Observer: Northeast

Describe Plume:

Lofting Trapping Looping Fumigation Fanning Coning — Start:

Lofting Trapping Looping Fumigation Fanning Coning — End:

Plume Type: Continuous Fugitive Intermittent

Emission Color: Start: End:	Water Droplet Plume: Attached Detached None
Describe Plume Background: Start:	End:
Background Color: Start: End:	Sky Conditions: Start: End:
Wind Speed: Start: End:	Wind Direction: Start: End:
Ambient Temperature: Start: End:	Wet Bulb Temp. / %RH

Comments:

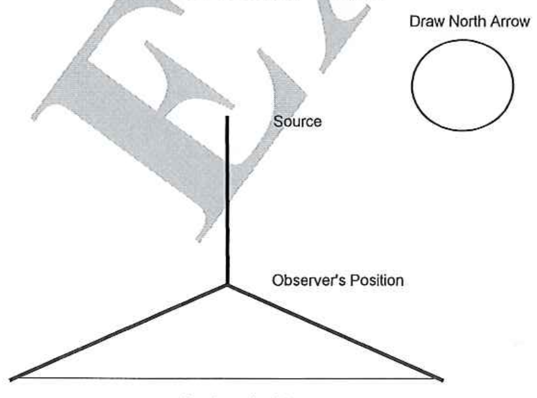
Observation Date:

Start Time: Stop Time:

Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Average Opacity:	Opacity Range: Min. Max.
Observer Name (Print):	Certification Date:
Observer Signature:	Date:
Company: GCC Rio Grande Inc.	Page ____ of ____

Source Location Sketch



IMPORTANT: Please indicate the following by sketch:

Section 6. Annual Combustion System Inspection as Required by 40 CFR 63 Subpart LLL

Pursuant to 40 CFR §63.1347(a)(3) this section addresses procedures to be used during an annual inspection of the components of the in-line kiln/raw mill combustion systems.

These inspections typically are performed during the annual major maintenance outage of the kiln system and may include:

- Inspecting and verifying feed-o-weight flow rates to the mill;
- Inspecting the coal mill and transfer line;
- Inspecting combustion air fan and dampers;
- Inspecting cyclone and duct work;
- Inspecting refractory for excessive wear;
- Inspecting burner pipe and verifying alignment;
- Calibrating gas flow meter;

If the inspection indicates that any of the combustion system components require maintenance or repair, those activities will be performed and documented prior to startup of the kiln system. A copy of the results of this inspection is maintained at the facility.

GCC, Tijeras Plant

Appendix I: Section 7: Open Clinker Storage Pile Location

APPENDIX H. CO SHORT TERM EMISSION RATE SUPPORTING DATA (ATTACHED ELECTRONICALLY)