



ANDY BESHEAR
GOVERNOR

REBECCA W. GOODMAN
SECRETARY

**ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION**

TONY HATTON
COMMISSIONER

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601
TELEPHONE: 502-564-2150
TELEFAX: 502-564-4245

April 26, 2021

Ms. Caroline Freeman, Director
Air and Radiation Division
U.S. Environmental Protection Agency, Region IV
61 Forsyth Street
Atlanta, Georgia 30303-8960

Dear Ms. Freeman:

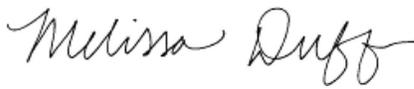
The Kentucky Division for Air Quality (Division) respectfully submits an addendum to the 2020 Annual Ambient Air Monitoring Network Plan for your approval. The addendum outlines the removal of the Louisville Metro Air Pollution Control District's (LMAPCD) Kosmosdale site (21-111-0065) from the document. The site was never physically established.

A public comment period on the proposed addendum was held from March 15, 2021, through April 14, 2021. A public notice detailing the comment process, the location of the addendum, and recommended changes to the network was sent to nine individuals or agencies on the Division's regulatory notification list and mailed electronically to 421 interested individuals or agencies. No comments were received. LMAPCD's request to remove the site from the 2020 Annual Ambient Air Monitoring Network Plan and supporting documents are attached for review.

Thank you for your consideration of this addendum to the Division's 2020 Annual Ambient Air Monitoring Network Plan. If you have any questions about the network or this plan, please contact Ms. Jenna Nall, Environmental Scientist, at (502) 782-7353.

Sincerely,

 Recoverable Signature

X 

Melissa Duff, Director
Kentucky Division for Air Quality
Signed by: Melissa Duff

MKD/jn
Attachments

Ms. Caroline Freeman

April 26, 2021

Page 2

Electronic cc:

-Gregg Worley, US EPA Region IV

-Daniel Garver, US EPA Region IV

-Rachael Hamilton, LMAPCD

-Billy DeWitt, LMAPCD

**NOTICE OF PUBLIC COMMENT PERIOD
KENTUCKY DIVISION FOR AIR QUALITY
AMBIENT AIR MONITORING NETWORK ADDENDUM**

In accordance with 40 C.F.R. 58.10(a)(1), the Kentucky Energy and Environment Cabinet will make the annual monitoring network plan available for public inspection for at least 30 days prior to submission to the U.S. EPA. The annual monitoring network plan details the operation and location of ambient air monitors operated by the Kentucky Division for Air Quality, Louisville Metro Air Pollution Control District, and the National Park Service.

The Louisville Metro Air Pollution Control District in Jefferson County, KY is proposing a modification to the 2020 annual monitoring network plan, which was originally published for a 30-day public comment period on May 15, 2020, and subsequently submitted to the U.S. EPA on July 1, 2020.

The public comment period relating to this proposed addendum to the annual monitoring network will begin March 15, 2021, and will conclude April 14, 2021. Copies of the annual monitoring plan and this proposed addendum are available for public inspection at the locations listed below. Any individual requiring copies may submit a request to the Division for Air Quality in writing, by telephone, or by electronic mail. Requests for copies should be directed to the contact person. In addition, electronic versions of this proposed addendum and relevant attachments can be downloaded from the Division for Air Quality's website at:

<https://eec.ky.gov/Environmental-Protection/Air/Pages/Public-Notices.aspx>

Again, to be considered part of the record, comments must be received by April 14, 2021. Comments should be sent directly to the contact person.

CONTACT PERSON: Ms. Jenna Nall, Environmental Scientist, Division for Air Quality, 300 Sower Boulevard, 2nd Floor, Frankfort, Kentucky 40601. Phone: (502) 782-7353; Email: jenna.nall@ky.gov

The Energy and Environment Cabinet does not discriminate on the basis of race, color, national origin, sex, age, religion, or disability and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford an individual with a disability an equal opportunity to participate in all services, programs, and activities.

LMAPCD
701 W. Ormsby Ave., Suite 303
Louisville, KY 40203

Ashland Regional Office
1550 Wolohan Drive, Suite 1
Ashland, KY 41102

Bowling Green Regional Office
2642 Russellville Road
Bowling Green, KY 42101

Frankfort Regional Office
300 Sower Boulevard, 1st Floor
Frankfort, KY 40601

Hazard Regional Office
233 Birch Street, Suite 2
Hazard, KY 41701

London Regional Office
875 S. Main Street
London, KY 40741

Paducah Regional Office
130 Eagle Nest Drive
Paducah, KY 42003

Florence Regional Office
8020 Veterans Mem Dr, Suite 110
Florence, KY 41042

Owensboro Regional Office
3032 Alvey Park Dr, Suite 700
Owensboro, KY 42303



AIR POLLUTION CONTROL DISTRICT
LOUISVILLE, KENTUCKY

GREG FISCHER
MAYOR

KEITH H. TALLEY, SR.
DIRECTOR

Caroline Freeman, Director
Air and Radiation Division
U.S. Environmental Protection Agency, Region IV
61 Forsyth Street
Atlanta, Georgia 30303-8960

March 15, 2021

**Re: Addendum to the Kentucky Annual Ambient Air Monitoring Network Plan;
Request to Remove the Kosmosdale Monitor AQS Site ID: 21-111-0065**

Dear Ms. Freeman:

The Louisville Metro Air Pollution Control District (LMAPCD) and the Kentucky Division for Air Quality (KDAQ) submit this addendum to the 2020 Kentucky Annual Ambient Air Monitoring Network Plan, submitted to the U.S. Environmental Protection Agency (EPA) on July 1, 2020, and approved by EPA on October 27, 2020. In accordance with 40 CFR §58.14, we respectfully request that the Kosmosdale air monitoring site, which was never constructed, operated, or produced any ambient monitoring data, be discontinued and removed from the Kentucky Annual Ambient Air Monitoring Network Plan since the company has agreed to raise its stack in lieu of monitoring as discussed below. This addendum will be made available for public inspection as outlined in 40 CFR § 58.10(a)(2).

On August 5, 2013, EPA designated a portion of the southwestern Louisville Metro area roughly bounded by Ethan Allen Way, Dixie Highway, the southern boundary of the Louisville Gas & Electric Company (LG&E) Mill Creek Electric Generating Station (Mill Creek) property, and the Ohio River as nonattainment for the 2010 1-hour Primary SO₂ National Ambient Air Quality Standard (NAAQS) of 75 parts per billion (ppb), effective October 4, 2013. *Air Quality Designations for the 2010 Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standard*, 78 Fed. Reg. 47191 at 47200 (August 5, 2013) (codified at 40 CFR 81.318).

Mill Creek is the sole source of SO₂ emissions within the nonattainment area described above. LG&E recently completed substantial improvements to the air pollution control equipment at Mill Creek. The KDAQ and LMAPCD conducted modeling of Mill Creek in accordance with the *Guidance for 1-Hour SO₂ Nonattainment Area SIP Submissions* Memorandum from Stephen D. Page, Director, Office of Air Quality Planning and Standards, U.S. EPA to Regional Air Division Directors, Regions 1-10 (April 23, 2014), that, with the improvements, did not predict emissions in excess of the 1-hour SO₂ NAAQS. All other sources impacting the nonattainment area were

modeled and accounted for in background ambient monitoring data. On June 23, 2017, a 1-Hour SO₂ Plan for the Louisville/Jefferson County, Kentucky nonattainment area, which further discusses this modeling, was proposed to address emissions from Mill Creek and demonstrate that the area will timely attain the 1-hour SO₂ NAAQS. EPA published final approval of the 1-hour SO₂ Plan for the area in the June 28, 2019 Federal Register (84 FR 30920). On December 9, 2019, LMAPCD submitted a request to redesignate the Louisville/Jefferson County, KY nonattainment area to attainment for the 2010 1-hour SO₂ NAAQS. On August 6, 2020, EPA determined that the Jefferson County area had attained the 2010 1-hour SO₂ NAAQS and redesignating the area to attainment effective September 8, 2020.

LMAPCD Regulation 3.01, *Ambient Air Quality Standards*, Section 4 prohibits the emission of any air contaminant at levels or in such a way as would interfere with the maintenance of an ambient air quality standard. As a result of earlier modeling of the Kosmos Cement Company by KDAQ and LMAPCD, which was conducted in accordance with *Guidance for 1-Hour SO₂ Nonattainment Area SIP Submissions*, LMAPCD determined that it is necessary to conduct ambient air quality monitoring to better characterize the ambient concentrations of SO₂ in the vicinity of Company's facility and determine whether those SO₂ emissions violate the SO₂ NAAQS outside the nonattainment area. At its April 19, 2017 meeting, the Board approved entry of an Agreed Board Order between Company and LMAPCD that called for the parties to implement an SO₂ Monitoring Plan and certain other related requirements in accordance with 40 CFR Part 58 and EPA's non-binding technical assistance document titled, "SO₂ NAAQS Designations Source-Oriented Monitoring Technical Assistance Document" (Monitoring TAD February 2016) as appropriate and in the professional judgment of LMAPCD ("2017" Agreed Board Order"). A copy of the 2017 Agreed Board Order is included as Attachment 1 to this addendum.¹ Due to the need for additional characterization of ambient air quality in the southwestern Jefferson County, a new site to measure ambient concentrations of SO₂ was proposed by LMAPCD at a location approved by EPA on February 1, 2018. LMAPCD continued to work with EPA, KDAQ, and Kosmos to install the necessary monitoring equipment as expeditiously as possible, with anticipated operation of the site by January 1, 2020.

In 2019, prior to operation of the Kosmosdale monitoring site, Kosmos submitted a proposal to LMAPCD requesting to amend the 2017 Agreed Board Order to include construction of a new kiln stack as an alternative to implementation of the SO₂ Monitoring Plan. At the same time, Kosmos notified LMAPCD of its intent to transfer substantially all of its assets, including the Louisville Plant located at 15301 Dixie Highway, and "Kosmos Parcel" described herein, to Kosmos Cement Company LLC, an unrelated third party and subsidiary of Eagle Materials Inc.

At its February 19, 2020, meeting, the Board entered into an Amended Agreed Board Order with Kosmos that required the company to either (1) comply with the SO₂ Monitoring Plan and Public Access Control Plan as approved as part of the 2017 Agreed Board Order or (2) elect to construct a new kiln stack with an above grade height equal to or greater than 155 feet but no more than 170 feet within 36 months of the Amended Agreed Board Order in compliance with requirements as

¹ A copy of the 2017 Agreed Board Order is also available at <https://louisvilleky.gov/document/20170413-agreed-board-order-kosmospdf>.

Addendum: Kosmosdale Monitor AQS Site ID: 21-111-0065

March 15, 2021

Page 2 of 3

outlined in the Amended Agreed Board Order, and (3) notify LMAPCD of its choice of options by March 31, 2020 (2020 Amended Agreed Board Order). A copy of the 2020 Amended Agreed Board Order is included as Attachment 2 to this addendum.² Supplemental air dispersion modeling for SO₂ NAAQS demonstration is included as Attachment 3.

Dispersion modeling detailed in Attachment 3 was performed utilizing AERMOD, the formally adopted preferred dispersion model for many regulatory applications. The modeling also considered background SO₂ concentrations measured at the LMAPCD Watson Lane air monitoring site (21-111-0051) and the New Albany-Green Valley site (18-043-1004) operated by the Indiana Department of Environmental Management. Actual emissions from the Kosmos Cement Company from 2013 to 2017 were used as an input for assessing ambient air quality impacts for the modified stack heights. Meteorological data for 2013-2017 provided by LMAPCD was used to characterize the atmosphere. This meteorological data includes hourly surface data from the Standiford International Airport and upper air data from Wilmington Airborn Park. Complete details on modeling protocols are included in Attachment 4 and a supplemental report discussing background concentrations is included as Attachment 5.

On March 13, 2020, Kosmos Cement Company LLC notified LMAPCD via registered letter of its purchase of Kosmos on March 6, 2020, and its intent to construct a new kiln stack in lieu of monitoring in accordance with the Amended Agreed Board Order. On October 2, 2020, counsel for Kosmos Cement Company LLC notified LMAPCD that it would construct a new kiln stack with a stack height of 170 feet. A copy of this notification is included as Attachment 6.

Based on the information provided herein, LMAPCD and KDAQ respectfully request that the proposed Kosmosdale site, AQS Site ID 21-111-0065, be discontinued as an ambient air monitoring site and removed from subsequent Annual Air Monitoring Network Plans. As always, if you have any questions or need any additional information, please contact me at 502-574-7274.

Sincerely,



Billy DeWitt
Air Monitoring Program Manager
Louisville Metro Air Pollution Control

cc: Melissa Duff, Director, KDAQ
Keith Talley, Director, LMAPCD
Stacy Dott, JCAO

²A copy of the 2020 Amended Agreed Board Order is also available at <https://louisvilleky.gov/document/20200219-abo-kosmospdf>.

AGREED BOARD ORDER

LOUISVILLE METRO AIR POLLUTION CONTROL BOARD

Kosmos Cement Company

This Order is issued by the Louisville Metro Air Pollution Control Board (Board) pursuant to Kentucky Revised Statutes Chapter 77 (Air Pollution Control). This Agreement is made by and between the Board and Kosmos Cement Company (Company), a Kentucky general partnership, and is effective on the date of its adoption by the Board.

COMPANY: Kosmos Cement Company - Louisville Plant
15301 Dixie Highway
Louisville, Kentucky 40272

REGULATIONS INVOLVED:

District Regulation 1.06, Stationary Source Self Monitoring
District Regulation 3.01, Ambient Air Quality Standards

BACKGROUND AND DISCUSSION:

On August 5, 2013, the United States Environmental Protection Agency (U.S. EPA) designated a portion of the southwestern Louisville Metro area roughly bounded by Ethan Allen Way, Dixie Highway, the southern boundary of the Louisville Gas & Electric Company (LG&E) Mill Creek Electric Generating Station (Mill Creek) property, and the Ohio River as nonattainment for the 2010 1-hour Primary SO₂ National Ambient Air Quality Standard (NAAQS) of 75 parts per billion (ppb), effective October 4, 2013. *Air Quality Designations for the 2010 Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standard*, 78 Fed. Reg. 47191 at 47200 (August 5, 2013) (codified at 40 CFR 81.318).

Mill Creek is the sole source of SO₂ emissions within the nonattainment area described above. LG&E recently completed substantial improvements to the air pollution control equipment at Mill Creek. The Kentucky Division for Air Quality (DAQ) and the Louisville Metro Air Pollution Control District (District) conducted modeling of Mill Creek in accordance with the *Guidance for 1-Hour SO₂ Nonattainment Area SIP Submissions* Memorandum from Stephen D. Page, Director, Office of Air Quality Planning and Standards, U.S. EPA to Regional Air Division Directors, Regions 1-10 (April 23, 2014), that, with the improvements, did not predict emissions in excess of the 1-hour SO₂ NAAQS. All other sources impacting the nonattainment area were modeled and accounted for in background ambient monitoring data. A 1-Hour SO₂ Plan for the Louisville/Jefferson County, Kentucky nonattainment area, which further discusses this modeling, has been proposed to address emissions from Mill Creek and demonstrate that the area will timely attain the 1-hour SO₂ NAAQS.

District Regulation 3.01, *Ambient Air Quality Standards*, Section 4 prohibits the emission of any air contaminant at levels or in such a ways as would interfere with the maintenance of an ambient air quality standard. As a result of earlier modeling of the Kosmos Cement Company (Company) by DAQ and the District, which was conducted in accordance with *Guidance for 1-Hour SO₂ Nonattainment Area SIP Submissions*, the District has determined it is necessary to conduct ambient air quality monitoring to better characterize the ambient concentrations of SO₂ in the vicinity of the Company's facility and determine whether those SO₂ emissions violate the SO₂ NAAQS outside the nonattainment area. The ambient air quality monitoring shall be in accordance with 40 CFR Part 58 and U.S. EPA's non-binding technical assistance document titled, "SO₂ NAAQS Designations Source-Oriented Monitoring Technical Assistance Document" (Monitoring TAD February 2016) as appropriate and in the professional judgment of the District.

NOW THEREFORE BE IT ORDERED THAT:

1. Company shall comply with the SO₂ Monitoring Plan included as Attachment A and Public Access Control Plan included as Attachment B.
 2. Nothing in this Order affects, limits or waives any permitting requirement to which Company is subject. If any of the measures that Company has undertaken or will undertake in accordance with this Order are subject to any permit requirement under federal or state law or District regulations, such measures shall remain subject to such permitting requirements.
 3. Nothing in this Order affects, limits or waives the District's legal rights, remedies or causes of action based on statutes, regulations or permit conditions within the jurisdiction of the District, and Company reserves its rights and defenses thereto. The District expressly reserves its right to seek enforcement of this Order or to take further action through administrative orders or other means at any time and to take any other action it deems necessary, including the right to order all necessary remedial measures and assess penalties for proven violations of applicable laws or regulations, and Company reserves its defenses thereto. Nothing in this Order affects, limits or waives Company's legal rights, including Company's right to administrative or judicial review of any action by the District.
 4. Neither this Order nor the actions taken hereunder shall constitute an admission by Company of any wrongdoing regarding any of the matters referenced in this Order.
 5. Company has reviewed this Order and consents to all its requirements and terms.
-

6. In the event that it is necessary for the District to seek a court order to enforce this Order, Company agrees to pay filing fees and costs of such action.

Dated this 19 day of April, 2017.

Louisville Metro Air Pollution Control Board

By: Robert W Powell M.D.
Robert W. Powell, M.D.
Chairman

Kosmos Cement Company

By: Dave Burfis
Dave Burfis
Manager, Kosmos Cement Co.

Louisville Metro Air Pollution Control District

By: Paul Aud 4-18-17
Paul Aud, P.E.
Air Pollution Control Officer

Approved as to form and legality:

By: Stacy Fritze Dott
Stacy Fritze/Dott
Assistant County Attorney

Attachment A

SO₂ Monitoring Plan

1. This SO₂ Monitoring Plan described herein shall be conducted in accordance with 40 CFR Part 58 and U.S. EPA's non-binding technical assistance document titled, "SO₂ NAAQS Designations Source-Oriented Monitoring Technical Assistance Document" (Monitoring TAD February 2016) as appropriate in the professional judgment of the District.
 2. Company shall submit a siting and operation costs agreement to establish an air monitoring site for SO₂ and meteorological data to be located on the Kosmos parcel generally indicated on Attachment C to the District by June 1, 2017. The Company agrees to pay the costs of establishing the monitoring site and associated equipment not to exceed \$75,000. The Company shall also pay costs associated with establishing any necessary access roads and electrical power, including monthly costs for electricity thereafter. The air monitoring site shall be operated as a State and Local Air Monitoring Station (SLAMS) or equivalent, for the collection of SO₂ and meteorological data to begin January 1, 2018 or 6 months from the date the site monitor location is approved by U.S. EPA, whichever is later.
 3. In the event U.S. EPA disapproves of site location of the monitoring site on the Kosmos parcel, the Company agrees to pay the costs of establishing the monitoring site and associated equipment not to exceed \$75,000 in costs at an alternate location. The Company shall also pay costs associated with establishing any necessary access roads and electrical power, including monthly costs for electricity thereafter. The air monitoring site shall be operated as a State and Local Air Monitoring Station (SLAMS) or equivalent, for the collection of SO₂ and meteorological data to begin January 1, 2018 or 6 months from the date the site monitor location is approved by U.S. EPA, whichever is later.
 4. Company shall submit an air monitoring site access agreement, including ingress and egress, to the District no later than June 1, 2017, for physical access to the air monitoring site located on the Kosmos parcel.
 5. The District shall develop all plans and submittals required for necessary approvals to site and operate the monitor under 40 CFR Part 58 with review and opportunity for written comment from the Company prior to submission to U.S. EPA. The District shall be responsible for all costs associated with this matter except as otherwise specifically provided in this Plan.
-

6. The District shall operate the air monitoring site to monitor SO₂ and meteorological data as necessary to obtain 3 years of quality-assured data, which shall be reported to the U.S. EPA's Air Quality System. Monitoring data shall be shared with the Company on a monthly basis.
 7. Company shall take all steps necessary to remedy any impacts needed to meet the SO₂ NAAQS as identified by the District's ambient air monitoring as provided for in Paragraph 8 below.
 8. If, at the conclusion of the three-year monitoring period, the three-year average of the annual (99th percentile) of the daily maximum 1-hour average concentrations exceeds the 1-hour SO₂ NAAQS as provided for under 40 CFR §50.17(b) and as determined in accordance with Appendix T of Part 50, Company shall submit a written plan of necessary remedial measures to the District for approval within 6 months of the conclusion of the three-year monitoring period and a final regulatory determination that the monitor is not in compliance. The plan shall include a list of remedial measures and a schedule of milestones, including the timely submittal of permit applications, leading to compliance with the SO₂ NAAQS within 30 months of submitting its written plan.
 9. District monitoring shall continue until the end of the three year monitoring period. The monitor may be shut down according to the generally applicable criteria of 40 CFR 58.14 upon approval from U.S.EPA.
 10. Following completion of the monitoring period, Company shall retain ownership of all monitoring equipment Company purchased described herein. The District shall retain ownership of all District equipment, supplies, and similar items that are utilized at the site.
-

Attachment B
Public Access Control Plan

Kosmos Cement Plant Public Access Control Plan

1. The Company shall implement the Public Access Control Plan described herein by June 1, 2017.

Purpose

The purpose of this document is to describe the Public Access Control Plan that will be used to protect the general public from health and safety hazards incident to the industrial activities at the Kosmos Cement Company cement manufacturing plant ("Kosmos"). Kosmos operates a cement manufacturing plant on 1,100 acres pursuant to a Title V permit issued by the Louisville Metro Air Pollution Control District (LMAPCD) (the "Property"). This plan describes the access control plan that will be used to implement access restrictions to the Property.

Kosmos is fully committed to meeting the applicable ambient air quality standards (AAQS) at the ambient air quality boundary of the Property. A primary purpose of this plan is to delineate the area to be protected and controlled for occupational health and safety within the Property boundary that is subject to unrestricted, general public access where the AAQS are applicable). A secondary purpose is to ensure that measures are in place to restrict public access within the Property boundary.

General Information

The Property is located at 15301 Dixie Highway, Louisville, Kentucky. Kosmos operates kilns at the Property to produce Portland Cement. Currently, access to the Property is by three paved roads from Dixie Highway. There is a fence blocking access to the Property from the north, a natural barrier to the west of the Property (see shadows on attached Google picture), and limited access via fenced neighboring property to the south. The Property's western portion is bordered by Dixie Highway, a major thoroughfare where traffic conditions and absence of sidewalk prevent pedestrian access to the Property from the west.



Kosmos Cement manufacturing facility aerial view. Fence Lines (in red) and Natural Barriers

Public Access Control Measures

Physical Barriers

The Property encompasses approximately 1,100 acres. (See Figure 1). At the Dixie Highway intersection, public access to the Property via roads will be controlled by gates that will be locked when the road is not in use.

Posting

In addition to the physical barriers cited above, public access to the Property will be restricted using strategically located signs. Signs restricting public access and warning of potential health hazards will be posted at intersection of Dixie Highway and the gravel road. The sign specifications will be as follows:

- Each sign will be 2 feet by 4 feet and will be mounted on posts.
- Each sign will be inspected semi-annually and will be repaired or replaced, as necessary.
- Each sign will be free of visible obstructions.
- Each sign will read:

CAUTION
RESTRICTED ACCESS
AMBIENT AIR QUALITY BOUNDARY
AUTHORIZED PERSONNEL ONLY
PLEASE CHECK IN WITH SECURITY

Proposed Surveillance

There are surveillance cameras at the main entrances to the Property which are monitored 24 hours per day. For all operations, all on-site Kosmos employees will be informed of the air permitting requirements to maintain an exclusion zone at the Property. Employees will be asked to observe the location perimeter as they conduct their regular duties. Any suspected violation of the exclusion zone by unauthorized persons will be immediately reported to Kosmos management.

Kosmos employees will periodically observe the perimeter of the Property. If unauthorized person(s) are observed, a log of the time and date of the observation will be recorded on the attached form. A record of the completed logs will be maintained on location in the Kosmos office.

Trespass Individuals

If an employee observes unauthorized person(s) within the Property boundary, appropriate measures will be taken by the employee to address potential health and safety concerns. If safety is not of immediate concern, employees will be instructed to use the following protocol when dealing with unauthorized entry. A log of the incident will be recorded on the attached form and maintained on location by Kosmos.

- Approach the unauthorized individual(s) and from a safe distance request that they leave the Property immediately.
- If the unauthorized individual(s) refuse to leave the Property after the above request, the individual(s) will be informed that the police will be notified. Kosmos shall notify the police. If the individual is apprehended by the police employee will request the name or names of the unauthorized individual(s) from the police officer. The employee will promptly log the encounter with the unauthorized individual(s) on the surveillance form. The data to be logged in such a situation will include:
 1. Day and time;
 2. The name of the individual(s) (if known or otherwise provided);
 3. The method of entry into the Property (e.g. by foot, snow machine, etc.);
 4. Duration of unauthorized presence within the ambient air boundary; and
 5. Other pertinent information as appropriate.

The employee will also report such incidents to Kosmos management.

Attachment C

“KOSMOS PARCEL” MAP



AMENDED AGREED BOARD ORDER

LOUISVILLE METRO AIR POLLUTION CONTROL BOARD

Kosmos Cement Company

This Amended Order is issued by the Louisville Metro Air Pollution Control Board (Board) pursuant to Kentucky Revised Statutes Chapter 77 (Air Pollution Control). This Agreement is made by and between the Board and Kosmos Cement Company (Company), a Kentucky general partnership, and is effective on the date of its adoption by the Board.

COMPANY: Kosmos Cement Company - Louisville Plant
15301 Dixie Highway
Louisville, Kentucky 40272

REGULATIONS INVOLVED:

District Regulation 1.06: Stationary Source Self –Monitoring
District Regulation 3.01: Ambient Air Quality Standards

BACKGROUND AND DISCUSSION:

On August 5, 2013, the United States Environmental Protection Agency (U.S. EPA) designated a portion of the southwestern Louisville Metro area roughly bounded by Ethan Allen Way, Dixie Highway, the southern boundary of the Louisville Gas & Electric Company (LG&E) Mill Creek Electric Generating Station (Mill Creek) property, and the Ohio River as nonattainment for the 2010 1-hour Primary SO₂ National Ambient Air Quality Standard (NAAQS) of 75 parts per billion (ppb), effective October 4, 2013. *Air Quality Designations for the 2010 Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standard*, 78 Fed. Reg. 47191 at 47200 (August 5, 2013) (codified at 40 CFR 81.318).

Mill Creek is the sole source of SO₂ emissions within the nonattainment area described above. LG&E recently completed substantial improvements to the air pollution control equipment at Mill Creek. The Kentucky Division for Air Quality (DAQ) and the Louisville Metro Air Pollution Control District (District) conducted modeling of Mill Creek in accordance with the *Guidance for 1-Hour SO₂ Nonattainment Area SIP Submissions* Memorandum from Stephen D. Page, Director, Office of Air Quality Planning and Standards, U.S. EPA to Regional Air Division Directors, Regions 1-10 (April 23, 2014), that, with the improvements, did not predict emissions in excess of the 1-hour SO₂ NAAQS. All other sources impacting the nonattainment area were modeled and accounted for in background ambient monitoring data. On June 23, 2017, a 1-Hour SO₂ Plan for the Louisville/Jefferson County, Kentucky nonattainment area, which further discusses this modeling, was proposed to address emissions from Mill Creek and demonstrate that the area will

timely attain the 1-hour SO₂ NAAQS. U.S. EPA published final approval of the 1-hour SO₂ Plan for the area in the June 28, 2019 Federal Register (84 FR 30920). On October 3, 2019, the District released for public comment a Redesignation Request requesting that the nonattainment area be redesignated as attainment by U.S. EPA based on monitoring.

District Regulation 3.01, *Ambient Air Quality Standards*, Section 4 prohibits the emission of any air contaminant at levels or in such a way as would interfere with the maintenance of an ambient air quality standard. As a result of earlier modeling of the Kosmos Cement Company (Company) by DAQ and the District, which was conducted in accordance with *Guidance for 1-Hour SO₂ Nonattainment Area SIP Submissions*, the District has determined it is necessary to conduct ambient air quality monitoring to better characterize the ambient concentrations of SO₂ in the vicinity of Company's facility and determine whether those SO₂ emissions violate the SO₂ NAAQS outside the nonattainment area. At its April 19, 2017 meeting, the Board approved entry of an Agreed Board Order between Company and the District that called for the parties to implement an SO₂ Monitoring Plan and certain other related requirements in accordance with 40 CFR Part 58 and U.S. EPA's non-binding technical assistance document titled, "SO₂ NAAQS Designations Source-Oriented Monitoring Technical Assistance Document" (Monitoring TAD February 2016) as appropriate and in the professional judgment of the District ("2017" Agreed Board Order").

In 2019, the Company submitted a proposal to the District requesting agreement to amend the 2017 Agreed Board Order to include construction of a new kiln stack as an alternative to implementation of the SO₂ Monitoring Plan.

In November 2019, Company notified the District of its intent to transfer substantially all of its assets, including the Louisville Plant located at 15301 Dixie Highway, and "Kosmos Parcel" described herein, to Kosmos Cement Company LLC, an unrelated third party and subsidiary of Eagle Materials Inc. (the "Transferee"). This transaction is scheduled to close by March 31, 2020.

NOW THEREFORE BE IT ORDERED THAT:

1. Company shall comply with the SO₂ Monitoring Plan included as Attachment A and Public Access Control Plan included as Attachment B. The referenced Plans being the same plans approved as part of the 2017 Agreed Board Order.
2. In lieu of the requirements in Paragraph 1, Company may elect to construct a new kiln stack with an above grade height equal to or greater than 155 feet but not more than 170 feet with an inside stack exit diameter of 10.5 feet or less ("Kiln Stack") and shall comply with Attachment D. Company shall notify the District of its intent to construct a new kiln

stack in writing no later than March 31, 2020. The District may extend the deadline for a reasonable length of time for good cause as determined by the District.

3. This Order amends, supersedes and otherwise replaces the 2017 Agreed Board Order.
4. Upon closing of the sale of Company's Louisville Plant, including the "Kosmos Parcel" described herein to Transferee and transfer of the Company's District-issued Title V permit to Transferee, Transferee shall be substituted as the "Company" under this Order and all obligations and responsibilities hereunder shall immediately become binding upon Transferee, and Company shall be relieved of further responsibility or liability under this Order. Transferee has executed this Order for the sole purpose of acknowledging its agreement to be substituted as the "Company" hereunder and to be bound by the terms hereof upon closing of the sale of Company's Louisville Plant to Transferee and transfer of the Company's District-issued permit to Transferee. No other substitution of parties or transfer of responsibilities or obligations hereunder is authorized without the express approval of the District, and nothing herein shall be deemed to constitute advance approval of any permit transfer, all such transfers being subject to all applicable federal and state law or District regulations.
5. Nothing in this Order affects, limits or waives any permitting requirement to which Company is subject. If any of the measures that Company has undertaken or will undertake in accordance with this Order are subject to any permit requirement under federal or state law or District regulations, such measures shall remain subject to such permitting requirements.
6. Nothing in this Order affects, limits or waives the District's legal rights, remedies or causes of action based on statutes, regulations or permit conditions within the jurisdiction of the District, and Company reserves its rights and defenses thereto. The District expressly reserves its right to seek enforcement of this Order or to take further action through administrative orders or other means at any time and to take any other action it deems necessary, including the right to order all necessary remedial measures and assess penalties for proven violations of applicable laws or regulations, and Company reserves its defenses thereto. Nothing in this Order affects, limits or waives Company's legal rights, including Company's right to administrative or judicial review of any action by the District.
7. Neither this Order nor the actions taken hereunder shall constitute an admission by Company of any wrongdoing regarding any of the matters referenced in this Order.
8. Company has reviewed this Order and consents to all its requirements and terms.

9. In the event that it is necessary for the District to seek a court order to enforce this Order, Company agrees to pay filing fees and costs of such action.

Dated this 19th day of February, 2020.

Louisville Metro Air Pollution Control Board

Kosmos Cement Company

By: Carl E. Hilton
Carl E. Hilton
Chairman

By: _____
Dave Burris
Manager

Louisville Metro Air Pollution Control District

By: Keith H. Talley Sr.
Matt King, P.E. Keith H. Talley Sr.
Air Pollution Control Officer Director

Transferee (Kosmos Cement Company LLC) is executing this Order below for the sole purpose of acknowledging its agreement to be substituted as the "Company" hereunder and to be bound by the terms hereof upon closing of the sale of Company's Louisville Plant to Transferee and transfer of the Company's District-issued Title V permit to Transferee:

Kosmos Cement Company LLC

By: William R. Devlin
William R. Devlin
Vice President

Approved as to form and legality:

By: Stacy Fritze Dott
Stacy Fritze Dott
Assistant County Attorney

9. In the event that it is necessary for the District to seek a court order to enforce this Order, Company agrees to pay filing fees and costs of such action.

Dated this ___ day of _____, 2020.

Louisville Metro Air Pollution Control Board

Kosmos Cement Company

By: _____
Carl E. Hilton
Chairman

By: 
Dave Burris
Manager

Louisville Metro Air Pollution Control District

By: _____
Matt King, P.E.
Air Pollution Control Officer

Transferee (Kosmos Cement Company LLC) is executing this Order below for the sole purpose of acknowledging its agreement to be substituted as the "Company" hereunder and to be bound by the terms hereof upon closing of the sale of Company's Louisville Plant to Transferee and transfer of the Company's District-issued Title V permit to Transferee:

Kosmos Cement Company LLC

By: _____
William R. Devlin
Vice President

Approved as to form and legality:

By: _____
Stacy Fritze Dott
Assistant County Attorney

Attachment A

SO₂ Monitoring Plan

1. This SO₂ Monitoring Plan described herein shall be conducted in accordance with 40 CFR Part 58 and U.S. EPA's non-binding technical assistance document titled, "SO₂ NAAQS Designations Source-Oriented Monitoring Technical Assistance Document" (Monitoring TAD February 2016) as appropriate in the professional judgment of the District.
2. Company shall submit a siting and operation costs agreement to establish an air monitoring site for SO₂ and meteorological data to be located on the Kosmos parcel generally indicated on Attachment C to the District by June 1, 2017. Company agrees to pay the costs of establishing the monitoring site and associated equipment not to exceed \$75,000. Company shall also pay costs associated with establishing any necessary access roads and electrical power, including monthly costs for electricity thereafter. The air monitoring site shall be operated as a State and Local Air Monitoring Station (SLAMS) or equivalent, for the collection of SO₂ and meteorological data to begin January 1, 2018 or 6 months from the date the site monitor location is approved by U.S. EPA, whichever is later.
3. In the event U.S. EPA disapproves of site location of the monitoring site on the Kosmos parcel, Company agrees to pay the costs of establishing the monitoring site and associated equipment not to exceed \$75,000 in costs at an alternate location. Company shall also pay costs associated with establishing any necessary access roads and electrical power, including monthly costs for electricity thereafter. The air monitoring site shall be operated as a State and Local Air Monitoring Station (SLAMS) or equivalent, for the collection of SO₂ and meteorological data to begin January 1, 2018 or 6 months from the date the site monitor location is approved by U.S. EPA, whichever is later.
4. Company shall submit an air monitoring site access agreement, including ingress and egress, to the District no later than June 1, 2017, for physical access to the air monitoring site located on the Kosmos parcel.
5. The District shall develop all plans and submittals required for necessary approvals to site and operate the monitor under 40 CFR Part 58 with review and opportunity for written comment from the Company prior to submission to U.S. EPA. The District shall be responsible for all costs associated with this matter except as otherwise specifically provided in this Plan.
6. The District shall operate the air monitoring site to monitor SO₂ and meteorological data as necessary to obtain 3 years of quality-assured data, which shall be reported to the U.S.

EPA's Air Quality System. Monitoring data shall be shared with Company on a monthly basis.

7. Company shall take all steps necessary to remedy any impacts needed to meet the SO₂ NAAQS as identified by the District's ambient air monitoring as provided for in Paragraph 8 below.
8. If, at the conclusion of the three-year monitoring period, the three-year average of the annual (99th percentile) of the daily maximum 1-hour average concentrations exceeds the 1-hour SO₂ NAAQS as provided for under 40 CFR §50.17(b) and as determined in accordance with Appendix T of Part 50, Company shall submit a written plan of necessary remedial measures to the District for approval within 6 months of the conclusion of the three-year monitoring period and a final regulatory determination that the monitor is not in compliance. The plan shall include a list of remedial measures and a schedule of milestones, including the timely submittal of permit applications, leading to compliance with the SO₂ NAAQS within 30 months of submitting its written plan.
9. District monitoring shall continue until the end of the three-year monitoring period. The monitor may be shut down according to the generally applicable criteria of 40 CFR 58.14 upon approval from U.S.EPA.
10. Following completion of the monitoring period, Company shall retain ownership of all monitoring equipment Company purchased described herein. The District shall retain ownership of all District equipment, supplies, and similar items that are utilized at the site.

Attachment B

Public Access Control Plan

Kosmos Cement Plant Public Access Control Plan

1. The Company shall implement the Public Access Control Plan described herein by June 1, 2017.

Purpose

The purpose of this document is to describe the Public Access Control Plan that will be used to protect the general public from health and safety hazards incident to the industrial activities at the Kosmos Cement Company cement manufacturing plant ("Kosmos"). Kosmos operates a cement manufacturing plant on 1,100 acres pursuant to a Title V permit issued by the Louisville Metro Air Pollution Control District (LMAPCD) (the "Property"). This plan describes the access control plan that will be used to implement access restrictions to the Property.

Kosmos is fully committed to meeting the applicable ambient air quality standards (AAAQS) at the ambient air quality boundary of the Property. A primary purpose of this plan is to delineate the area to be protected and controlled for occupational health and safety within the Property boundary that is subject to unrestricted, general public access where the AAAQS are applicable). A secondary purpose is to ensure that measures are in place to restrict public access within the Property boundary.

General Information

The Property is located at 15301 Dixie Highway, Louisville, Kentucky. Kosmos operates kilns at the Property to produce Portland Cement. Currently, access to the Property is by three paved roads from Dixie Highway. There is a fence blocking access to the Property from the north, a natural barrier to the west of the Property (see shadows on attached Google picture), and limited access via fenced neighboring property to the south. The Property's western portion is bordered by Dixie Highway, a major thoroughfare where traffic conditions and absence of sidewalk prevent pedestrian access to the Property from the west.



Kosmos Cement manufacturing facility aerial view. Fence Lines (in red) and Natural Barriers

Public Access Control Measures

Physical Barriers

The Property encompasses approximately 1,100 acres. (See Figure 1). At the Dixie Highway intersection, public access to the Property via roads will be controlled by gates that will be locked when the road is not in use.

Posting

In addition to the physical barriers cited above, public access to the Property will be restricted using strategically located signs. Signs restricting public access and warning of potential health hazards will be posted at intersection of Dixie Highway and the gravel road. The sign specifications will be as follows:

- Each sign will be 2 feet by 4 feet and will be mounted on posts.
- Each sign will be inspected semi-annually and will be repaired or replaced, as necessary.
- Each sign will be free of visible obstructions.
- Each sign will read:

**CAUTION
RESTRICTED ACCESS
AMBIENT AIR QUALITY BOUNDARY
AUTHORIZED PERSONNEL ONLY
PLEASE CHECK IN WITH SECURITY**

Proposed Surveillance

There are surveillance cameras at the main entrances to the Property which are monitored 24 hours per day. For all operations, all on-site Kosmos employees will be informed of the air permitting requirements to maintain an exclusion zone at the Property. Employees will be asked to observe the location perimeter as they conduct their regular duties. Any suspected violation of the exclusion zone by unauthorized persons will be immediately reported to Kosmos management.

Kosmos employees will periodically observe the perimeter of the Property. If unauthorized person(s) are observed, a log of the time and date of the observation will be recorded on the attached form. A record of the completed logs will be maintained on location in the Kosmos office.

Trespass Individuals

If an employee observes unauthorized person(s) within the Property boundary, appropriate measures will be taken by the employee to address potential health and safety concerns. If safety is not of immediate concern, employees will be instructed to use the following protocol when dealing with unauthorized entry. A log of the incident will be recorded on the attached form and maintained on location by Kosmos.

- Approach the unauthorized individual(s) and from a safe distance request that they leave the Property immediately.
- If the unauthorized individual(s) refuse to leave the Property after the above request, the individual(s) will be informed that the police will be notified. Kosmos shall notify the police. If the individual is apprehended by the police employee will request the name or names of the unauthorized individual(s) from the police officer. The employee will promptly log the encounter with the unauthorized individual(s) on the surveillance form. The data to be logged in such a situation will include:
 1. Day and time;
 2. The name of the individual(s) (if known or otherwise provided);
 3. The method of entry into the Property (e.g. by foot, snow machine, etc.);
 4. Duration of unauthorized presence within the ambient air boundary; and
 5. Other pertinent information as appropriate.

The employee will also report such incidents to Kosmos management.

Attachment C

“KOSMOS PARCEL” MAP



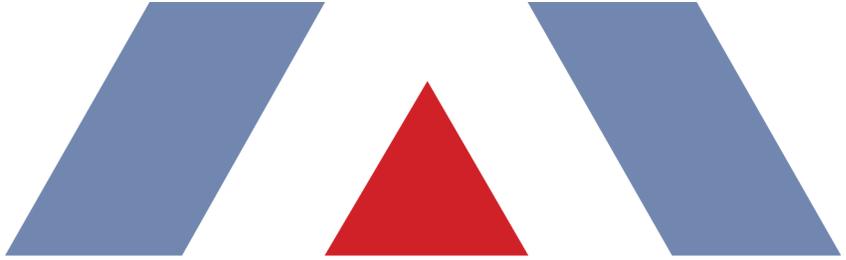
Attachment D

Construction of Kiln Stack

1. In lieu of Paragraph 1 of the Amended Agreed Board Order, Company may construct a new Kiln Stack with an above grade height equal to or greater than 155 feet but no more than 170 feet with an inside stack exit diameter of 10.5 feet or less.
2. The Kiln Stack shall be constructed and in operation no later than 36 months following the adoption of the Amended Agreed Board Order by the Board (Operational Deadline).
3. On October 18, 2019, Company submitted modeling for a new Kiln Stack that demonstrated compliance with the NAAQS. If for any reason Company elects to construct a Kiln Stack with a different height than that used in the modeling submitted on this date, Company shall submit updated modeling that demonstrates compliance with the NAAQS for approval in writing from the District prior to construction. Any such submission shall not affect the Operational Deadline without good cause as determined by the District.
4. If construction or operation of the Kiln Stack is prevented, restricted or interfered with by reason of any act or condition beyond the reasonable control of Company, including but not limited to delays or circumstances preventing timely issuance of necessary permits or other authorizations, or third party challenges to a necessary authorization or other litigation or challenge relating to this matter, Company shall notify the District within 30 days of knowledge of such act or condition. Upon such notice, the District may approve an extension of the Operational Deadline in writing for a reasonable length of time or require Company to comply with Paragraph 1 of the Amended Agreed Board Order.
5. If the District approves an extension of the Operational Deadline pursuant to Paragraph 4 of this Attachment and construction or operation of the Kiln Stack remains prevented, restricted or interfered with by reason of any act or condition beyond the reasonable control of Company, including but not limited to delays or circumstances preventing timely issuance of necessary permits or other authorizations, or third party challenges to a necessary authorization or other litigation or challenge relating to this matter, Company shall notify the District within 30 days of knowledge of such act or condition. Upon such notice, the District may seek further amendment of the Amended Agreed Board Order or require Company to comply with Paragraph 1 of the Amended Agreed Board Order.
6. If construction or operation of the Kiln Stack is prevented, restricted or interfered with by reason of any act or condition within the reasonable control of Company, or Company fails to provide any required notice pursuant to this Attachment, the District may require Company to comply with Paragraph 1 of the Amended Agreed Board Order.

7. If the District requires Company to comply with Paragraph 1 of the Amended Agreed Board Order, pursuant to paragraphs 4, 5, or 6, the District shall inform Company in writing and Company agrees the air monitoring site described in Attachment A shall be in operation within 12 months of such notice. The District may extend the air monitoring site operational deadline for a reasonable length of time for good cause as determined by the District.

8. Upon adoption of the Amended Agreed Board Order, the District shall seek U.S. EPA approval to amend the Jefferson County portion of the Kentucky Ambient Air Monitoring Network Plan to remove the Kosmosdale monitor. Should the District require Company to comply with Paragraph 1 of the Amended Agreed Board Order after the Kosmosdale monitor has been removed, the District shall seek U.S. EPA approval to add the Kosmosdale monitor.



**AIR DISPERSION MODELING RESULTS
KOSMOS CEMENT COMPANY
SO₂ NAAQS DEMONSTRATION**

Prepared for:

Laura Myers
Environmental Engineer
Kosmos Cement Company
15301 Dixie Highway
Louisville, Kentucky 40272

Prepared through:

Kelly D. Bartley
Of Counsel
Bingham Greenebaum Doll LLP
300 West vine Street, Suite 1200
Lexington, Kentucky 40507

Prepared By:

TRINITY CONSULTANTS
1717 Dixie Highway, Suite 900
Covington, Kentucky 41011

September 6, 2019



Environmental solutions delivered uncommonly well

1. DISPERSION MODELING RESULTS

In response to the District’s letter request dated August 15, 2019, this submittal presents the requested dispersion modeling following the September 6, 2019 modeling protocol submitted coincidentally to the District. The dispersion modeling demonstrates that all concentrations are well below the form of the SO₂ 1-hour National Ambient Air Quality Standard (NAAQS).

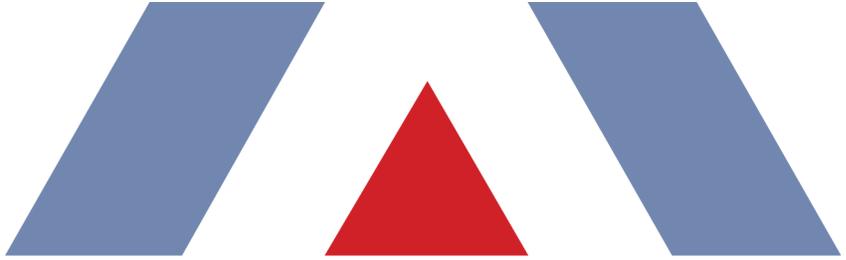
Table 1 below shows the highest ten concentrations in the form of the NAAQS, i.e., the 99th percentile of the yearly distribution of 1-hour daily maximum concentrations averaged over five years (as per EPA guidance to represent the three year averaging form of the NAAQS averaging period for a monitor). Both the ALL group totaling Kosmos with the background as well as the highest ten from Kosmos-only are presented. All SO₂ concentrations were well below the 1-hour SO₂ NAAQS of 196 µg/m³ (75 ppb). All maximum concentrations were along the property boundary just to the north of the main kin area on the plant site as shown in Figure 1.

Table 1. Maximum 4th-Highest 1-Hr SO₂ Concentrations Averaged Over Five Years (µg/m³)

NAAQS Form	Group ID	Receptor Rank	SO ₂ Concentration (µg/m ³)	UTM		Elevation (m)	Hill Ht (m)
				East (m)	North (m)		
4TH-Highest	ALL	1ST	127.197	596002.9	4210591.2	136.25	136.25
		2ND	125.390	596026.7	4210624.3	136.26	136.26
		3RD	123.363	596055.9	4210664.9	136.19	136.19
		4TH	120.499	596085.1	4210705.5	136.09	136.09
		5TH	118.308	595995.1	4210596.2	136.28	136.28
		6TH	112.484	595638.2	4209539.1	135.69	135.69
		7TH	110.989	596114.3	4210746.1	136.05	136.05
		8TH	109.281	595738.2	4209639.1	136.47	136.47
		9TH	107.601	595638.2	4209639.1	134.28	134.28
		10TH	106.693	596172.6	4210827.3	134.33	134.33
	KOSMOS	1ST	111.421	596055.9	4210664.9	136.19	136.19
		2ND	110.603	596002.9	4210591.2	136.25	136.25
		3RD	110.175	596026.7	4210624.3	136.26	136.26
		4TH	106.979	596085.1	4210705.5	136.09	136.09
		5TH	106.633	595638.2	4209539.1	135.69	135.69
		6TH	102.613	595738.2	4209639.1	136.47	136.47
		7TH	101.940	595995.1	4210596.2	136.28	136.28
		8TH	100.858	595638.2	4209639.1	134.28	134.28
		9TH	99.671	595638.2	4209439.1	135.73	135.73
		10TH	98.645	595538.2	4209639.1	132.91	132.91

Figure 2. Location of Maximum 4th-Highest 1-Hr SO₂ Concentrations at Kosmos (µg/m³)





**AIR DISPERSION MODELING PROTOCOL
KOSMOS CEMENT COMPANY
SO₂ NAAQS DEMONSTRATION**

Prepared for:

Laura Myers
Environmental Manager
Kosmos Cement Company
15301 Dixie Highway
Louisville, Kentucky 40272

Prepared through:

Kelly D. Bartley
Of Counsel
Bingham Greenebaum Doll LLP
300 West vine Street, Suite 1200
Lexington, Kentucky 40507

Prepared By:

TRINITY CONSULTANTS
1717 Dixie Highway, Suite 900
Covington, Kentucky 41011

September 6, 2019



Environmental solutions delivered uncommonly well

TABLE OF CONTENTS

1. INTRODUCTION	1-1
1.1. Background	1-1
1.2. Kosmos Background	1-1
2. MODELING PROTOCOL	2-1
2.1. Model Selection	2-1
2.2. Meteorological Data.....	2-2
2.3. Coordinate System	2-2
2.4. Receptor Locations	2-2
2.5. Terrain Elevations.....	2-4
2.6. Kosmos Emission Sources.....	2-5
2.7. Other Sources Inventory	2-6
2.8. Building Influences	2-6
2.9. Source Contributions.....	2-7
2.10. Background Concentrations	2-7
2.11. Modeling Files	2-8

LIST OF FIGURES

Figure 1-1. Location of Kosmos Facility in Jefferson County, KY	1-2
Figure 2-1. Innermost Portion of the Proposed Modeling Receptor Grid for Kosmos	2-3
Figure 2-2. Full Proposed Modeling Receptor Grid for Kosmos	2-4
Figure 2-3. Relief Map of Area within 20 km of Kosmos	2-5
Figure 2-4. AERMOD-Derived Map Showing the Buildings and Structures at Kosmos	2-7

LIST OF TABLES

Table 2-1. Kosmos Source Characterization	2-6
Table 2-2. 2016–2018 99 th Percentile 3-Year Average SO ₂ Concentrations by Hour of Day and Season at the New Albany (Green Valley, No. 18-43-1004) Monitor	2-9

1. INTRODUCTION

1.1. BACKGROUND

On August 15, 2019 the Louisville Metro Air Pollution Control District (the District) responded to a proposal by the Kosmos Cement Company plant (Kosmos) via letter to Lillian DePrimo (Cemex)¹ to seek Agreed Amendment of an April 2017 Agreed Board Order (ABO) entered between Kosmos and the District. The ABO resolved certain claims by the District stemming from modeling of potential SO₂ emissions from the Kosmos facility conducted in 2014 under U.S. EPA Guidance for 1-hour SO₂ Nonattainment Area SIP Submissions and, among other things, required implementation of a monitoring plan to further investigate or characterize air quality in the area near the Kosmos facility.

Further review by Kosmos of operations at the facility along with existing physical characteristics led to the consideration of the construction and operation of a new kiln stack as an alternate method by which to address the District's concerns reflected in the 2017 ABO. To accommodate the existing operations, the new kiln stack was proposed to have a stack height of not less than 155 ft above grade with other physical parameters similar to the existing stack, including flow rate, temperature, location, and diameter. In response to the District's letter request dated August 15, 2019, this submittal presents additional modeling along with a modeling protocol that shows compliance with the 1-hour SO₂ NAAQS in the vicinity of Kosmos at the proposed new minimum stack height. This protocol outlines all elements required to perform the dispersion modeling following the U.S. EPA *Guideline on Air Quality Models*², previous modeling performed for the facility, and a recent telephone conversation with the District.³

1.2. KOSMOS BACKGROUND

The Kosmos facility is located in the extreme southwest corner of Jefferson County, Kentucky. Figure 1-1 shows the general area around the facility southwest of Jefferson County just east of the shore of the Ohio River and Indiana. Bullitt, Hardin, and Meade Counties in Kentucky lie just to the south and southwest of Kosmos (all within 10 km) with Harrison County, Indiana to the west across the Ohio River. The area is characterized by the low rolling hills of the Ohio River Valley with the Louisville metropolitan area located to the northeast. The LG&E-KU Mill Creek Station is located north of Kosmos. Ground cover includes cropland, forest, commercial roads and operations, and water.

¹ Letter from Keith Talley, Sr. (Director, District) to Lillian DePrimo (Cemex), re: *Proposal to Seek Agreed Amendment of April 2017 Agreed Board Order*, August 15, 2019.

² *Guideline on Air Quality Models*. Appendix W to 40 CFR Parts 51 and 52. Federal Register, November 9, 2005. pp. 68217-68261.

³ Matt King, Billy DeWitt, and Craig Butler (District) with Kori Andrews and Lillian DePrimo (Cemex) and Laura Myers (Kosmos) and George Schewe (Trinity) via conference telephone on August 29, 2019.

Figure 1-1. Location of Kosmos Facility in Jefferson County, KY



2. MODELING PROTOCOL

Where applicable, the Data Requirements Rule⁴, Technical Assistance Document for modeling⁵, provides that dispersion modeling can be used in place of ambient monitoring to evaluate the attainment status of an area in the vicinity of a specific source. U.S. EPA's rationale for this is the distinction that SO₂ sources are limited in terms of the distance to where ambient concentration impacts occur. In preparation for providing modeling guidance for designation analysis, U.S. EPA reviewed SO₂ ambient monitoring and modeling of concentrations around and near SO₂ sources and found that most of the highest impacts fall within a few kilometers from smaller sources. Also, one note was that the gradient of these concentrations falls off significantly after the maximum is reached. Thus, the modeling focuses on the use of near-field computational methods such that U.S. EPA's primary preferred industrial source model, the AERMOD Model⁶, is the primary model recommended for use and is proposed here. In addition to AERMOD and to allow the best representation of simulated ambient air concentrations, the modeling proposed in this protocol recommends:

- Using actual emissions as an input for assessing ambient air quality impacts to provide results that reflect calculated actual air quality for the new proposed stack height;
- Using five years of model simulations to meet the requirements of the *Guideline on Air Quality Models* and allow the modeling results to be calculated using the model generated design value (DV) consistent with the 3-year monitoring period required to develop a monitor design value for comparison to the NAAQS; the years 2013-2017 will be used in this modeling analysis;
- Placing receptors for the modeling at the Kosmos facility public access boundary as identified in the Kosmos public access plan approved as part of the April 2017 ABO and at various distances out to 20 km around the facility to insure compliance at all locations; and
- Using background ambient monitoring data from the Green Valley monitor located in Indiana which will be representative of background concentrations in the vicinity of Kosmos.

Following these modeling points, the remainder of this protocol provides an overview of the modeling recommended for application to Kosmos that will be consistent to that which the District prefers and would use.

2.1. MODEL SELECTION

Modeling will be performed for 1-hour SO₂ analysis following the modeling guidance described above. The AERMOD Model in the District-preferred version as released by U.S. EPA will be used to perform the dispersion modeling. The results of this modeling will be submitted to the District on or about coincidentally with this modeling protocol on September 6, 2019. The applicable version of the AERMOD Model that will be used in this analysis is Version 18081. No LOWWIND or other experimental options as provided in the version of AERMOD will be used in this proposed Kosmos modeling, but rather all AERMOD default values as recommended by U.S. EPA will be used.

⁴ *Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standards (NAAQS): Final Rule*, Federal Register Vol. 80 No. 162, pages 51051-51088, August 21, 2015.

⁵ *SO₂ NAAQS Designations Modeling Technical Assistance Document*, U.S. EPA, Office of Air Quality Planning and Standards, Air Quality Assessment Division, February 2016.

⁶ *User's Guide for the AMS/EPA Regulatory Model – AERMOD*, EPA-454/B-18-001, U. S. Environmental Protection Agency, Research Triangle Park, NC, April 2018.

The pollutant identification will be set to “SO₂” in AERMOD, which will allow additional internal model options to be available and used, thus enabling the output options to be configured properly in the format of the 1-hour SO₂ NAAQS. Because of the probabilistic form of the 1-hour NAAQS, selecting these correct input options will allow AERMOD to properly calculate an SO₂ design value based on the 5-year average of the 99th percentile of the annual distribution of the daily maximum 1-hour concentrations for comparison with the 1-hour SO₂ NAAQS of 196 µg/m³ (75 ppb). The use of five years of meteorological data is recommended by the *Guideline* and EPA’s inclusion of post-processor functions in AERMOD for SO₂ allow this derivation of the appropriate values for comparison to the NAAQS.

2.2. METEOROLOGICAL DATA

Meteorological data is required as input to the AERMOD model to allow the characterization of the transport and dispersion of the Kosmos SO₂ emissions in the atmosphere. As per previous modeling performed for Kosmos as well as the concurrence of the District, this modeling will use the District available meteorological data sets.⁷ As required by the *Guideline* and confirmed by the District, the years 2013-2017 will be used in the modeling. This data as indicated on the District website were derived using the AERMET Version 18081 processor and the AERMINUTE Version 15272 processor. The meteorological data were derived from Integrated Surface Hourly Data (ISHD), hourly surface data from Standiford International Airport (WBAN 93821)⁸, upper air from the Wilmington Airborn Park (WBAN 13841)⁹, and one-minute data from the National Oceanic and Atmospheric Administration (NOAA)¹⁰. The District indicated that the AERMET default wind speed was used (if no threshold wind speed is selected in AERMET, the default in AERMOD is 0.28 m/s) and ADJ_U* was not used. The resulting five-year data set that will be used is:

- Louisville-Wilmington_13-17_APCD_sdf.SFC
- Louisville-Wilmington_13-17_APCD_sdf.PFL

where the SFC file represents the surface data for input to AERMOD and the PFL file represents the upper air data for AERMOD.

2.3. COORDINATE SYSTEM

In all modeling input and output files, the locations of emission sources, structures, and receptors will be represented in the appropriate Zone of the Universal Transverse Mercator (UTM) coordinate system using the North American Datum 1983 (NAD83). The Kosmos plant and the surrounding area lies within Zone 16.

2.4. RECEPTOR LOCATIONS

The dispersion modeling will follow the *Guideline* in terms of receptor density and extent (taking into account the steep gradient of concentration decreases as a function of distance from Kosmos) as well as potential high impact areas from previous modeling studies performed in the area.

The proposed receptor grid for the modeling of the Kosmos Station will combine a multi-nested, Cartesian grid of receptors at various spacing intervals centered on the Kosmos Station new U945 stack along with receptor points along the facility’s public access boundary. For the air dispersion modeling analyses, ground-level

⁷ <https://louisvilleky.gov/government/air-pollution-control-district/meteorological-data-dispersion-modeling>

⁸ <ftp.ncdc.noaa.gov/pub/data/noaa>

⁹ <Ruc//noaa.gov/raobs>

¹⁰ <ftp.ncdc.noaa.gov/pub/data/asos-onemin>

concentrations will be calculated from the public access boundary out to the location and magnitude of the significant concentration gradient but no further than 20 km unless maximum impacts are at or near that distance. If the initial modeling results in the highest ambient concentrations beyond the extent of the 100 m grid spacing, additional receptors will be placed around this location. For the purposes of this protocol and to accommodate the possible farthest extent of this modeling domain and receptor grid, the proposed receptors are a series of nested grids as proposed below:

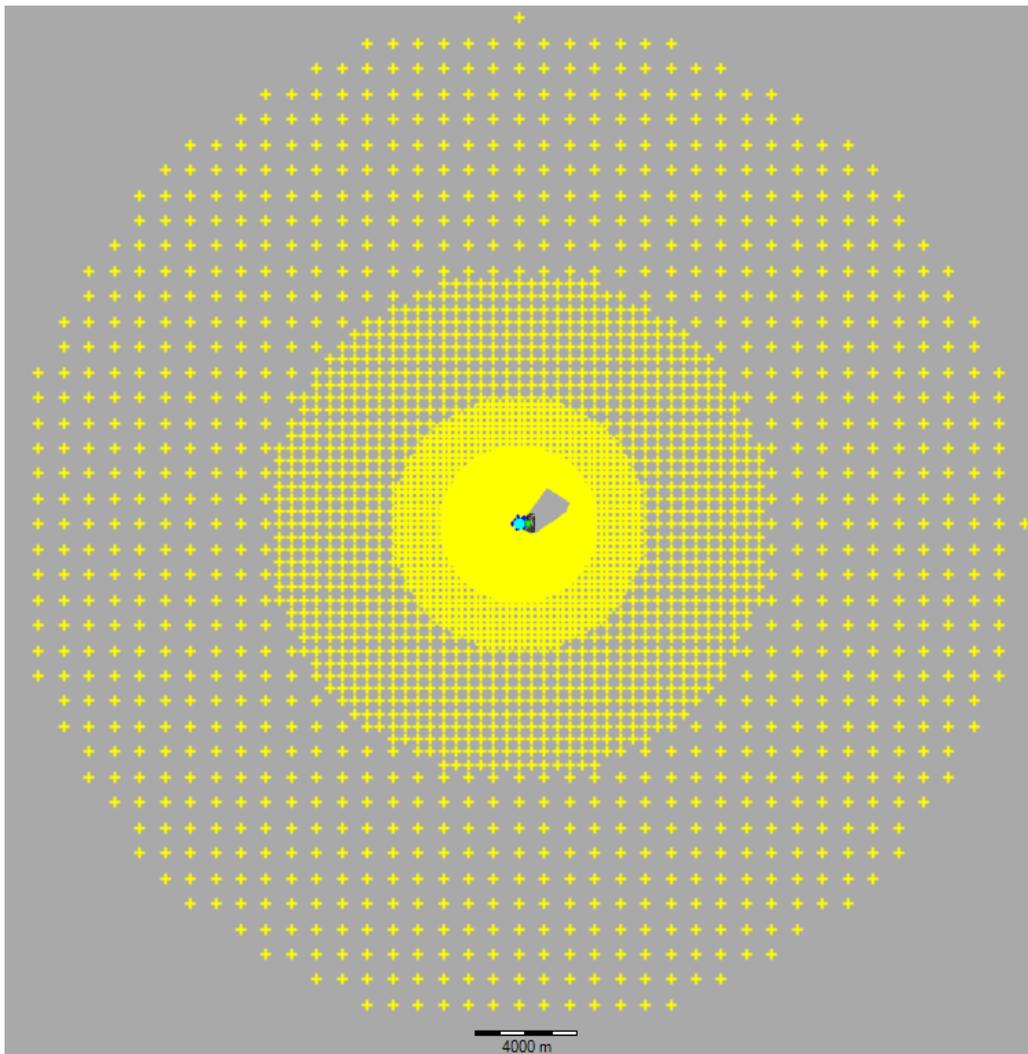
- **Public Access Boundary Grid:** A “public access boundary” grid consisting of evenly-spaced receptors 50 meters apart placed along the main Kosmos facility public access boundary,
- **Fine Cartesian Grid:** A “fine” grid containing 100-meter spaced receptors extending to 3 km from the U945 stack beyond the public access boundary ,
- **Medium-Fine Cartesian Grid:** A “medium-fine” grid containing 250-meter spaced receptors extending from 3 km to 5 km from the center of the facility, exclusive of receptors on the fine grid,
- **Medium-Coarse Cartesian Grid:** A “medium-coarse” grid containing 500-meter spaced receptors extending from 5 km to 10 km from the center of the facility, exclusive of receptors on the fine and medium-fine grids,
- **Coarse Cartesian Grid:** A “coarse grid” containing 1,000-meter spaced receptors extending from 10 km to 20 km from the center of the facility, exclusive of receptors on the fine, medium-fine, and medium-coarse grids.

Figure 2-1 shows the innermost grids of the proposed receptors to be used in the modeling. As can be seen, this includes receptors in the Ohio River. Also shown is the current public access boundary of the facility (innermost line of yellow receptors).

Figure 2-1. Innermost Portion of the Proposed Modeling Receptor Grid for Kosmos



Figure 2-2. Full Proposed Modeling Receptor Grid for Kosmos



2.5. TERRAIN ELEVATIONS

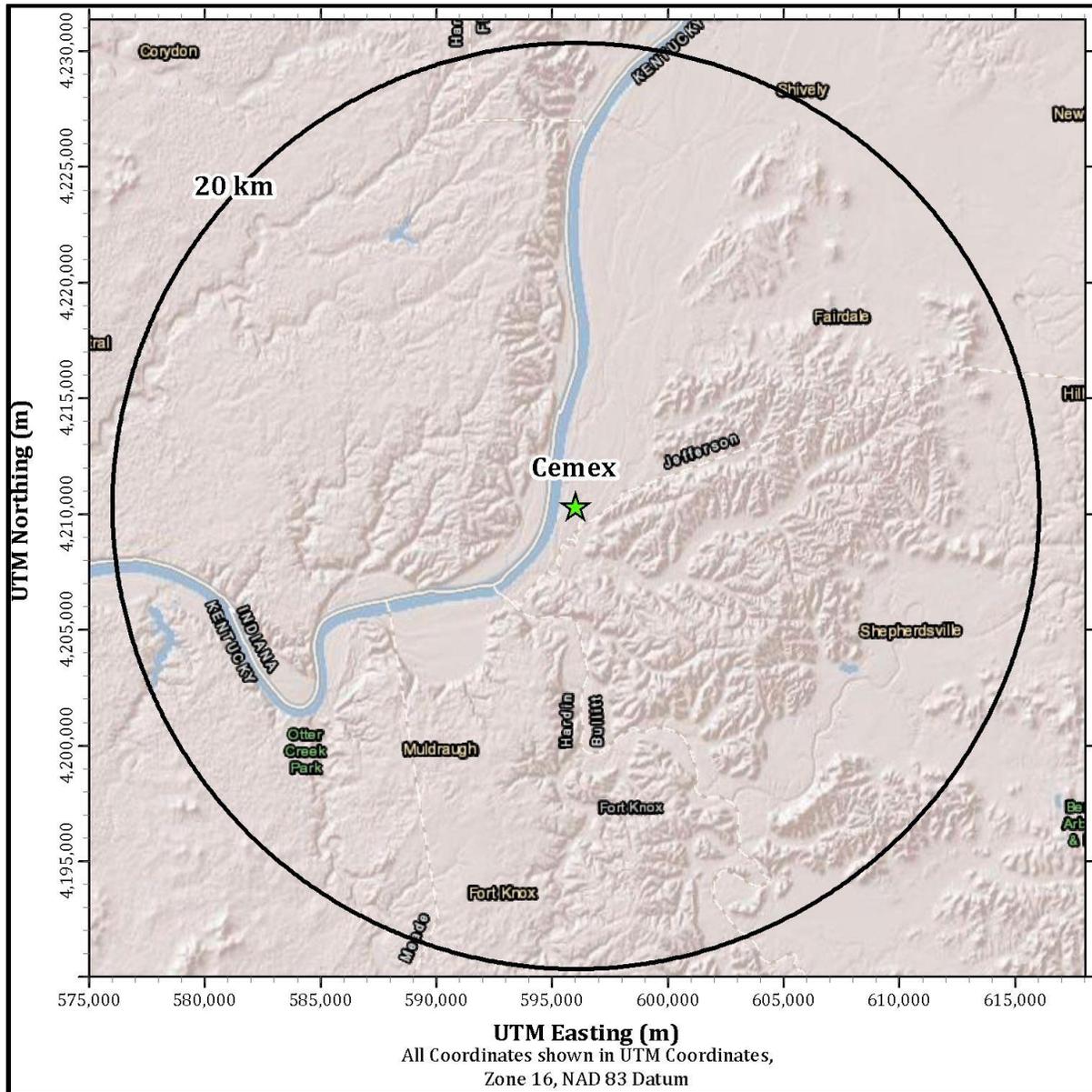
The terrain elevation for each receptor, building, and emission source will be determined using USGS 1 arc-second National Elevation Data (NED). The NED, obtained from the USGS through ArcGIS¹¹, has terrain elevations at 30-meter intervals. Using the AERMOD terrain processor, AERMAP (Version 18081), the terrain height for each receptor, the K945 Stack, and buildings included in the model will be determined by assigning the interpolated height from the digital terrain elevations in the NED file. These base elevations will be used directly in the AERMOD model.

In addition, AERMAP will be used to compute the hill height scales associated with each elevated receptor located above the Kosmos plant source base elevation. This computation enables the model to determine the effect that terrain will have on plumes from K945. AERMAP searches all nearby elevation points for the terrain

¹¹ <https://www.arcgis.com/home/item.html?id=0383ba18906149e3bd2a0975a0afdb8e>

height and location that has the greatest influence on each receptor to determine the hill height scale for that receptor. AERMOD then uses the hill height scale in order to select the point where a plume may divide between going around a terrain feature and lofting over the feature or a combination of the two. Initial review of the area indicates that nearby hills exist near Kosmos and thus, the inclusion of terrain elevations in the modeling is paramount. Figure 2-3 shows a relief map of the area.

Figure 2-3. Relief Map of Area within 20 km of Kosmos



2.6. KOSMOS EMISSION SOURCES

The Kosmos plant only has one major source of SO₂ emissions, namely, the kiln stack currently identified as K945. This designation will remain the same for the new adjacent stack that was proposed by Kosmos on June 19, 2019 to the District and for which this modeling analysis is presented. The stack and SO₂ emission

characteristics for the new stack will remain the same as those for the existing stack except for its new location, just southwest of the existing stack and its height which is proposed at 155 ft (47.24 m). The new stack will remain at an inside diameter of 10 ft (3.048 m). The stack gas temperature and flow rate will remain a function of kiln and raw mill operations with a combined flow and flow-weighted temperature from the Main Baghouse and from the In-Line Raw Mill Baghouse. The only change will be new ducting to the new stack.

The Data Requirements Rule (to which Kosmos was not subject) preferred modeling approach for establishing modeled emission rates is the use of CEMS data. Such hourly data from 2011 through 2017 are available for K945 and will provide hour-by-hour modeled emission rates, stack gas temperatures, and stack flow rates which will be the most accurate representation of the actual emissions history of the Kosmos operations. To be coincidental with the most recent five-year data set of meteorology available from the District, namely, 2013-2017, the hourly CEMS data for this same time period will be used. To this end, for the modeling analysis Kosmos will rely on CEMS and other monitoring data to construct the most representative five-year SO₂ emissions dataset for K945. Table 2-1 below summarizes the stack parameters that will be used in the modeling of the new K945 stack.

Table 2-1. Kosmos Source Characterization

Stack Identification	X Coordinate (m)^a	Y Coordinate (m)^a	Stack Height (ft)	Stack Diameter (ft)	Exit Velocity (ft/s)	Flow Rate (acfm)	Exit Temperature (°F)	Emission Rate (lb/hr)
K945	595,933.6	4,210,240.6	155	10	CEMS	CEMS	CEMS	CEMS

^a UTM Zone 16, NAD 83; base elevation = 445.1 ft MSL.

2.7. OTHER SOURCES INVENTORY

As per our August 29, 2019 discussions with the District, all other sources of SO₂ emissions in the area surrounding Kosmos will be included as part of the background concentrations included in the modeling (see Section 2.10 below).

2.8. BUILDING INFLUENCES

The U.S. EPA's Building Profile Input Program (BPIP) with Plume Rise Model Enhancements (PRIME) (version 04274), will be used to account for building downwash influences on the K945 kiln stack. The purpose of a building downwash analysis is to determine if the plume discharged from a stack will be influenced by the turbulent wake of any onsite buildings or other structures, resulting in downwash of the plume. The downwash of the plume can result in elevated ground-level concentrations in the near wake of a building and is required for consideration in the modeling. For this analysis all significant buildings and structures at the Kosmos site will be considered. The total number after confirming any recent construction or tear downs that will be considered is 81 structures. Figure 2-4 shows the layout of the buildings and structures as well as the location of the new kiln stack, K945. Labels were not added to the figure as many of them overlap and are difficult to read. All buildings and structures will be detailed in the modeling files to be provided to the District.

Figure 2-4. AERMOD-Derived Map Showing the Buildings and Structures at Kosmos



2.9. SOURCE CONTRIBUTIONS

A number of output options are available in AERMOD to tabulate and display the concentration estimates made. The output that will be of best use is one called by keyword in the AERMOD code as “MAXDCONT”. The use of MAXDCONT tells the model to generate output that indicates both the cumulative concentrations as well as individual contributions from each modeled source, in this case, only K945 and background. The output from this computation is in the format and over the time period that is commensurate with the form of the NAAQS.

2.10. BACKGROUND CONCENTRATIONS

The inclusion of background ambient monitored concentrations as part of the modeled concentrations is important in determining and deciphering the cumulative ambient air impacts. As discussed with the District, the use of a regional monitoring site is appropriate for use to characterize the background concentrations. The selected site should not be directly influenced by Kosmos but rather should be characteristic of the overall

impacts of regionwide sources. As with previous District and U.S. EPA modeling, the monitors in the vicinity (within about 35 km) were reviewed including:

- 21-111-0051, Watson Lane, 2.9 km north of Kosmos
- 21-111-1041, Fire Arms Training, 22.9 km north northeast of Kosmos
- 21-111-0067, Cannons Lane, 30.8 km northeast of Kosmos
- 18-043-1004, New Albany-Green Valley, 31.0 km north of Kosmos

Of these, the New Albany-Green Valley monitor was selected to represent the background SO₂ concentrations in the dispersion modeling analysis for Kosmos. Data for the current period of 2016-2018 were obtained from EPA's AirData now website and a three-year average background concentration by hour of day (24 hours) and season (four seasons) derived. The values to be used in the current modeling are presented in Table 2-2. The values shown are based on the highest monitored concentrations by hour of day and season¹². For example, each season has a 24-hour sequence of concentrations used for every hour and day in the appropriate season.

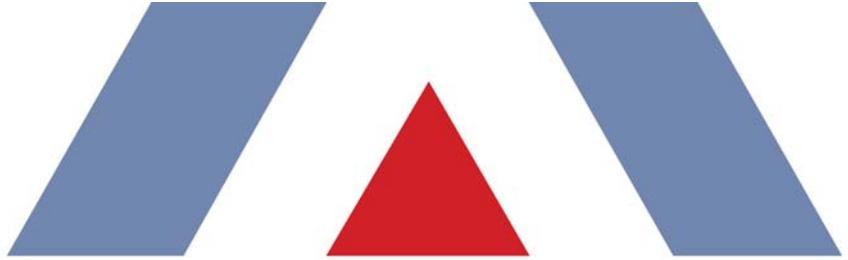
2.11. MODELING FILES

All modeling files will be provided to the District in electronic format on a compact disk, uploaded via an ftp site, or other as requested by the District. Model and processor input, output, and data files will be provided. Spreadsheets tabulating source, emission, and other input data sets will also be provided.

¹² Tyler Fox (Air Quality Modeling Group) to Regional Air Division Directors, *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO₂ National Ambient Air Quality Standard*, U.S. Environmental Protection Agency, Research Triangle Park, NC, March 1, 2011, pp19-20.

Table 2-2. 2016–2018 99th Percentile 3-Year Average SO₂ Concentrations by Hour of Day and Season at the New Albany (Green Valley, No. 18-43-1004) Monitor

Season	Hour	Background Concentration (µg/m ³)	Season	Hour	Background Concentration (µg/m ³)
1	1	8.4	3	1	5.7
1	2	6.4	3	2	5.0
1	3	6.9	3	3	4.8
1	4	8.3	3	4	5.0
1	5	10.1	3	5	5.0
1	6	10.7	3	6	5.0
1	7	15.2	3	7	5.2
1	8	11.6	3	8	6.0
1	9	12.1	3	9	8.2
1	10	11.7	3	10	18.4
1	11	16.8	3	11	37.6
1	12	23.4	3	12	25.7
1	13	24.2	3	13	21.8
1	14	17.6	3	14	27.8
1	15	11.7	3	15	23.6
1	16	24.6	3	16	15.3
1	17	20.3	3	17	18.9
1	18	12.4	3	18	11.6
1	19	9.7	3	19	6.9
1	20	7.7	3	20	5.7
1	21	6.8	3	21	5.1
1	22	15.7	3	22	5.1
1	23	16.7	3	23	5.0
1	24	11.0	3	24	10.0
2	1	6.1	4	1	6.7
2	2	5.6	4	2	6.6
2	3	5.9	4	3	6.1
2	4	6.2	4	4	6.3
2	5	6.4	4	5	6.0
2	6	6.3	4	6	6.1
2	7	6.3	4	7	6.5
2	8	7.5	4	8	7.0
2	9	9.7	4	9	7.5
2	10	10.8	4	10	7.7
2	11	15.1	4	11	10.0
2	12	12.9	4	12	12.9
2	13	13.1	4	13	17.7
2	14	13.9	4	14	15.1
2	15	16.1	4	15	13.6
2	16	16.0	4	16	15.2
2	17	11.7	4	17	17.1
2	18	7.9	4	18	9.5
2	19	8.8	4	19	7.4
2	20	6.7	4	20	6.4
2	21	6.2	4	21	6.4
2	22	7.7	4	22	6.5
2	23	6.6	4	23	5.9
2	24	6.2	4	24	7.0



AIR DISPERSION MODELING RESULTS
KOSMOS CEMENT COMPANY
SO₂ NAAQS DEMONSTRATION

Prepared for:

Laura Myers
Environmental Engineer
Kosmos Cement Company
15301 Dixie Highway
Louisville, Kentucky 40272

Prepared through:

Kelly D. Bartley
Of Counsel
Bingham Greenebaum Doll LLP
300 West vine Street, Suite 1200
Lexington, Kentucky 40507

Prepared By:

TRINITY CONSULTANTS
1717 Dixie Highway, Suite 900
Covington, Kentucky 41011

October 18, 2019



Environmental solutions delivered uncommonly well

1. DISPERSION MODELING RESULTS

In response to the District's letter request dated August 15, 2019, this supplemental submittal presents the results of the requested dispersion modeling following the September 6, 2019 (electronically dated October 4, 2019) modeling protocol submitted to the District except as noted below. The District's August 15, 2019 letter was a response to a proposal by the Kosmos Cement Company plant (Kosmos) via letter to Lillian DePrimo (Cemex)¹ to seek Agreed Amendment of an April 2017 Agreed Board Order (ABO) entered between Kosmos and the District. This report and the protocol address the request of the District to provide dispersion modeling for proposed stack heights of a new Kiln stack at Kosmos. The September 6, 2019 protocol proposed a 155 ft stack height for a new kiln stack. Since that time, Kosmos has considered an alternate stack height of 170 ft. The modeling results considering both stack heights are reported herein.

For background concentrations of SO₂ to account for other sources, a regional monitoring site is appropriate for use as recommended and approved by the District. As described in the protocol, a selected site should not be directly influenced by Kosmos but rather should be characteristic of the overall impacts of regionwide sources. As described in the protocol, monitors in the vicinity of Kosmos (within about 35 km) were reviewed including:

- 21-111-0051, Watson Lane, 2.9 km north of Kosmos
- 21-111-1041, Fire Arms Training, 22.9 km north northeast of Kosmos
- 21-111-0067, Cannons Lane, 30.8 km northeast of Kosmos
- 18-043-1004, New Albany-Green Valley, 31.0 km north of Kosmos

The protocol described the selection of the New Albany-Green Valley monitor to represent the background SO₂ concentrations in the dispersion modeling analysis for Kosmos. The District later recommended the consideration of the Watson Lane monitor. Although Kosmos believes the New Albany-Green Valley monitor sufficiently represents the background SO₂ concentrations, Kosmos has respectfully agreed to consider both monitors pursuant to the District's request. This report considers both sites with modeled Kosmos SO₂ concentrations combined. Data for the current period of 2016-2018 were obtained from EPA's AirData website and a three-year average background concentration by hour of day (24 hours) and season (four seasons) was derived. The values used in the current modeling are presented in Tables 1 and 2 for New Albany-Green Valley and Watson Lane, respectively. The values shown are based on the highest monitored concentrations by hour of day and season². For example, each season has a 24-hour sequence of concentrations used for every hour of day in the appropriate season.

¹ Letter from Keith Talley, Sr. (Director, District) to Lillian DePrimo (Cemex), re: *Proposal to Seek Agreed Amendment of April 2017 Agreed Board Order*, August 15, 2019.

² Tyler Fox (Air Quality Modeling Group) to Regional Air Division Directors, *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO₂ National Ambient Air Quality Standard*, U.S. Environmental Protection Agency, Research Triangle Park, NC, March 1, 2011, pp19-20.

Table 1. 2016–2018 99th Percentile 3-Year Average SO₂ Concentrations by Hour of Day and Season at the New Albany (Green Valley, No. 18-043-1004) Monitor

Season	Hour	Background Concentration (µg/m ³)	Season	Hour	Background Concentration (µg/m ³)
1	1	8.4	3	1	5.7
1	2	6.4	3	2	5.0
1	3	6.9	3	3	4.8
1	4	8.3	3	4	5.0
1	5	10.1	3	5	5.0
1	6	10.7	3	6	5.0
1	7	15.2	3	7	5.2
1	8	11.6	3	8	6.0
1	9	12.1	3	9	8.2
1	10	11.7	3	10	18.4
1	11	16.8	3	11	37.6
1	12	23.4	3	12	25.7
1	13	24.2	3	13	21.8
1	14	17.6	3	14	27.8
1	15	11.7	3	15	23.6
1	16	24.6	3	16	15.3
1	17	20.3	3	17	18.9
1	18	12.4	3	18	11.6
1	19	9.7	3	19	6.9
1	20	7.7	3	20	5.7
1	21	6.8	3	21	5.1
1	22	15.7	3	22	5.1
1	23	16.7	3	23	5.0
1	24	11.0	3	24	10.0
2	1	6.1	4	1	6.7
2	2	5.6	4	2	6.6
2	3	5.9	4	3	6.1
2	4	6.2	4	4	6.3
2	5	6.4	4	5	6.0
2	6	6.3	4	6	6.1
2	7	6.3	4	7	6.5
2	8	7.5	4	8	7.0
2	9	9.7	4	9	7.5
2	10	10.8	4	10	7.7
2	11	15.1	4	11	10.0
2	12	12.9	4	12	12.9
2	13	13.1	4	13	17.7
2	14	13.9	4	14	15.1
2	15	16.1	4	15	13.6
2	16	16.0	4	16	15.2
2	17	11.7	4	17	17.1
2	18	7.9	4	18	9.5
2	19	8.8	4	19	7.4
2	20	6.7	4	20	6.4
2	21	6.2	4	21	6.4
2	22	7.7	4	22	6.5
2	23	6.6	4	23	5.9
2	24	6.2	4	24	7.0

Table 2. 2016–2018 99th Percentile 3-Year Average SO₂ Concentrations by Hour of Day and Season at the Watson Lane (No. 21-111-0051) Monitor

Background Concentration			Background Concentration		
Season	Hour	(µg/m ³)	Season	Hour	(µg/m ³)
1	1	32.9	3	1	5.4
1	2	11.7	3	2	11.6
1	3	18.3	3	3	7.8
1	4	12.6	3	4	2.7
1	5	19.5	3	5	6.2
1	6	8.4	3	6	5.7
1	7	20.1	3	7	8.5
1	8	22.0	3	8	12.8
1	9	21.8	3	9	14.8
1	10	16.8	3	10	23.1
1	11	20.4	3	11	26.8
1	12	15.9	3	12	32.7
1	13	17.1	3	13	38.4
1	14	28.0	3	14	38.0
1	15	34.0	3	15	34.8
1	16	34.6	3	16	28.9
1	17	34.3	3	17	21.1
1	18	31.3	3	18	12.8
1	19	32.8	3	19	8.6
1	20	26.0	3	20	6.7
1	21	21.1	3	21	6.5
1	22	24.4	3	22	5.3
1	23	21.1	3	23	5.7
1	24	15.2	3	24	6.9
2	1	10.0	4	1	10.9
2	2	14.1	4	2	10.6
2	3	21.9	4	3	8.7
2	4	5.6	4	4	7.7
2	5	11.4	4	5	11.3
2	6	16.3	4	6	10.3
2	7	16.7	4	7	10.1
2	8	22.0	4	8	11.7
2	9	19.3	4	9	11.7
2	10	30.5	4	10	12.4
2	11	34.7	4	11	15.4
2	12	27.8	4	12	27.8
2	13	32.1	4	13	25.4
2	14	27.7	4	14	18.4
2	15	35.3	4	15	18.7
2	16	39.9	4	16	24.2
2	17	31.1	4	17	19.9
2	18	32.5	4	18	12.8
2	19	14.3	4	19	8.0
2	20	13.1	4	20	9.0
2	21	13.3	4	21	11.6
2	22	33.8	4	22	10.5
2	23	18.8	4	23	12.6
2	24	11.6	4	24	13.4

The dispersion modeling demonstrates that all concentrations for each stack height and background concentration site combined are well below the form of the SO₂ 1-hour National Ambient Air Quality Standard (NAAQS). The results are described below.

Tables 3 through 6 show the highest ten concentrations for each stack height (155 and 170 ft) combined with each of the regional background concentration sites, respectively. Each table shows the modeling results in the form of the NAAQS, i.e., the 99th percentile of the yearly distribution of 1-hour daily maximum concentrations averaged over five years (as per EPA guidance to represent the three-year averaging form of the NAAQS averaging period for a monitor). Both the ALL group totaling Kosmos with the background as well as the highest ten from Kosmos-only are presented. All SO₂ concentrations were well below the 1-hour SO₂ NAAQS of 196 µg/m³ (75 ppb).

Table 3. Kosmos Kiln at 155 ft with Green Valley Background Maximum 4th-Highest 1-Hr SO₂ Concentrations Averaged Over Five Years (µg/m³)

NAAQS Form	Group ID	Receptor Rank	SO ₂ Concentration (µg/m ³)	UTM		Elevation (m)	Hill Ht (m)
				East (m)	North (m)		
4TH-Highest	ALL	1ST	127.20	596002.9	4210591.2	136.25	136.25
		2ND	125.39	596026.7	4210624.3	136.26	136.26
		3RD	123.36	596055.9	4210664.9	136.19	136.19
		4TH	120.50	596085.1	4210705.5	136.09	136.09
		5TH	118.31	595995.1	4210596.2	136.28	136.28
		6TH	112.48	595638.2	4209539.1	135.69	135.69
		7TH	110.99	596114.3	4210746.1	136.05	136.05
		8TH	109.28	595738.2	4209639.1	136.47	136.47
		9TH	107.60	595638.2	4209639.1	134.28	134.28
		10TH	106.69	596172.6	4210827.3	134.33	134.33
	KOSMOS	1ST	111.42	596055.9	4210664.9	136.19	136.19
		2ND	110.60	596002.9	4210591.2	136.25	136.25
		3RD	110.18	596026.7	4210624.3	136.26	136.26
		4TH	106.98	596085.1	4210705.5	136.09	136.09
		5TH	106.63	595638.2	4209539.1	135.69	135.69
		6TH	102.61	595738.2	4209639.1	136.47	136.47
		7TH	101.94	595995.1	4210596.2	136.28	136.28
		8TH	100.86	595638.2	4209639.1	134.28	134.28
		9TH	99.67	595638.2	4209439.1	135.73	135.73
		10TH	98.64	595538.2	4209639.1	132.91	132.91

Table 4. Kosmos Kiln at 155 ft with Watson Lane Background Maximum 4th-Highest

1-Hr SO₂ Concentrations Averaged Over Five Years (µg/m³)

NAAQS Form	Group ID	Receptor Rank	SO ₂ Concentration (µg/m ³)	UTM		Elevation	Hill Ht
				East (m)	North (m)	(m)	(m)
4TH-Highest	ALL	1ST	139.51	596002.90	4210591.20	136.25	136.25
		2ND	138.17	596026.70	4210624.30	136.26	136.26
		3RD	133.13	596055.90	4210664.90	136.19	136.19
		4TH	130.55	596085.10	4210705.50	136.09	136.09
		5TH	129.41	595995.10	4210596.20	136.28	136.28
		6TH	123.66	596114.30	4210746.10	136.05	136.05
		7TH	119.52	596172.60	4210827.30	134.33	134.33
		8TH	118.58	596143.40	4210786.70	135.52	135.52
		9TH	117.93	595638.20	4209539.10	135.69	135.69
		10TH	117.17	596038.20	4210739.10	136.46	136.46
	KOSMOS	1ST	111.42	596055.90	4210664.90	136.19	136.19
		2ND	110.60	596002.90	4210591.20	136.25	136.25
		3RD	110.18	596026.70	4210624.30	136.26	136.26
		4TH	106.98	596085.10	4210705.50	136.09	136.09
		5TH	106.63	595638.20	4209539.10	135.69	135.69
		6TH	102.61	595738.20	4209639.10	136.47	136.47
		7TH	101.94	595995.10	4210596.20	136.28	136.28
		8TH	100.86	595638.20	4209639.10	134.28	134.28
		9TH	99.67	595638.20	4209439.10	135.73	135.73
		10TH	98.64	595538.20	4209639.10	132.91	132.91

Table 5. Kosmos Kiln at 170 ft with Green Valley Background Maximum 4th-Highest 1-Hr SO₂ Concentrations Averaged Over Five Years (µg/m³)

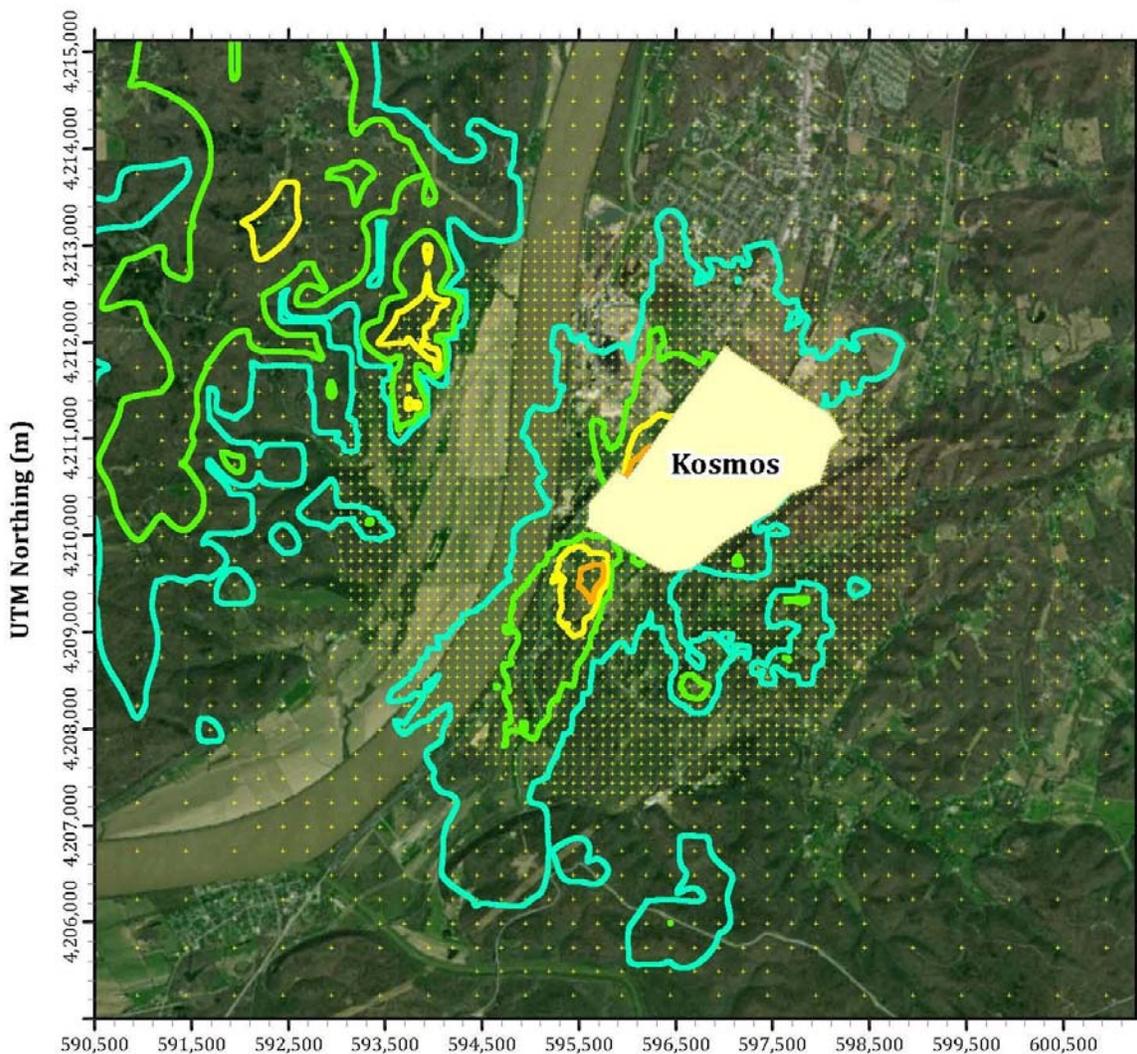
NAAQS Form	Group ID	Receptor Rank	SO ₂ Concentration (µg/m ³)	UTM		Elevation	Hill Ht
				East (m)	North (m)	(m)	(m)
4TH-Highest	ALL	1ST	116.08	596002.90	4210591.20	136.25	136.25
		2ND	113.72	596026.70	4210624.30	136.26	136.26
		3RD	112.62	596055.90	4210664.90	136.19	136.19
		4TH	111.15	596085.10	4210705.50	136.09	136.09
		5TH	107.95	595995.10	4210596.20	136.28	136.28
		6TH	99.48	596114.30	4210746.10	136.05	136.05
		7TH	96.01	595638.20	4209539.10	135.69	135.69
		8TH	95.83	596038.20	4210739.10	136.46	136.46
		9TH	90.23	596143.40	4210786.70	135.52	135.52
		10TH	90.18	595638.20	4209639.10	134.28	134.28
	KOSMOS	1ST	98.99	596002.90	4210591.20	136.25	136.25
		2ND	98.77	596026.70	4210624.30	136.26	136.26
		3RD	97.38	596055.90	4210664.90	136.19	136.19
		4TH	93.17	596085.10	4210705.50	136.09	136.09
		5TH	90.20	595638.20	4209539.10	135.69	135.69
		6TH	88.87	595995.10	4210596.20	136.28	136.28
		7TH	84.71	596114.30	4210746.10	136.05	136.05
		8TH	83.19	595638.20	4209639.10	134.28	134.28
		9TH	82.64	595538.20	4209539.10	134.11	134.11
		10TH	82.19	595538.20	4209639.10	132.91	132.91

Table 6. Kosmos Kiln at 170 ft with Watson Lane Background Maximum 4th-Highest 1-Hr SO₂ Concentrations Averaged Over Five Years (µg/m³)

NAAQS Form	Group ID	Receptor Rank	SO ₂ Concentration (µg/m ³)	UTM		Elevation	Hill Ht
				East (m)	North (m)	(m)	(m)
4TH-Highest	ALL	1ST	126.31	596002.90	4210591.20	136.25	136.25
		2ND	124.48	596026.70	4210624.30	136.26	136.26
		3RD	123.11	596055.90	4210664.90	136.19	136.19
		4TH	121.81	596085.10	4210705.50	136.09	136.09
		5TH	116.70	595995.10	4210596.20	136.28	136.28
		6TH	109.70	596114.30	4210746.10	136.05	136.05
		7TH	107.20	596038.20	4210739.10	136.46	136.46
		8TH	102.15	596143.40	4210786.70	135.52	135.52
		9TH	100.88	595638.20	4209539.10	135.69	135.69
		10TH	100.02	596138.20	4210839.10	134.90	134.90
	KOSMOS	1ST	98.99	596002.90	4210591.20	136.25	136.25
		2ND	98.77	596026.70	4210624.30	136.26	136.26
		3RD	97.38	596055.90	4210664.90	136.19	136.19
		4TH	93.17	596085.10	4210705.50	136.09	136.09
		5TH	90.20	595638.20	4209539.10	135.69	135.69
		6TH	88.87	595995.10	4210596.20	136.28	136.28
		7TH	84.71	596114.30	4210746.10	136.05	136.05
		8TH	83.19	595638.20	4209639.10	134.28	134.28
		9TH	82.64	595538.20	4209539.10	134.11	134.11
		10TH	82.19	595538.20	4209639.10	132.91	132.91

Figures 1 through 4 show concentration contours of the 1-hour highest fourth high SO₂ concentrations for each stack height and regional background monitor combination. For each case the highest values are immediately to the north of the plant and to the southwest. All maximum concentrations in all cases were along the property boundary just to the north of the main kiln area as shown in the figures.

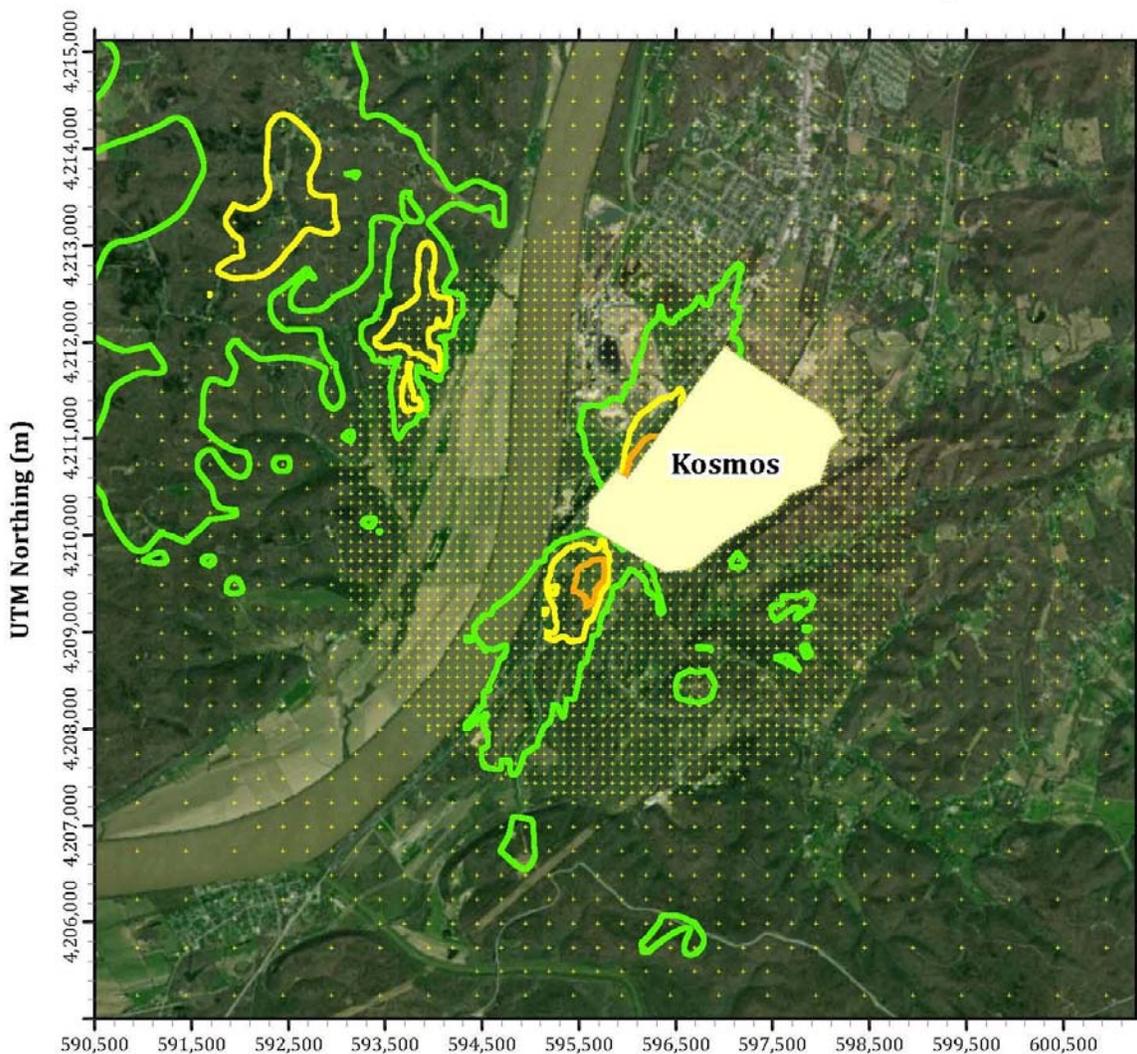
Figure 1. Five-Year Average 4th-High Daily Maximum 1-hr SO₂ Concentrations (µg/m³) for 155 ft Kiln Stack at Kosmos with Green Valley Background



UTM Easting (m)
 All Coordinates shown in UTM Coordinates,
 Zone 16, NAD 83 Datum

SO₂ Concentration (µg/m ³)	
	40
	50
	75
	100
Legend	
	Property Area
	Receptors

Figure 2. Five-Year Average 4th-High Daily Maximum 1-hr SO₂ Concentrations (µg/m³) for 155 ft Kiln Stack at Kosmos with Watson Lane Background



UTM Easting (m)
 All Coordinates shown in UTM Coordinates,
 Zone 16, NAD 83 Datum

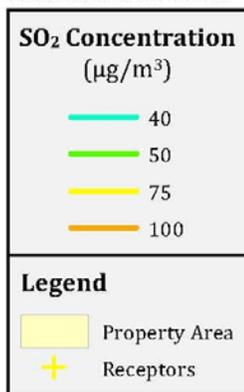
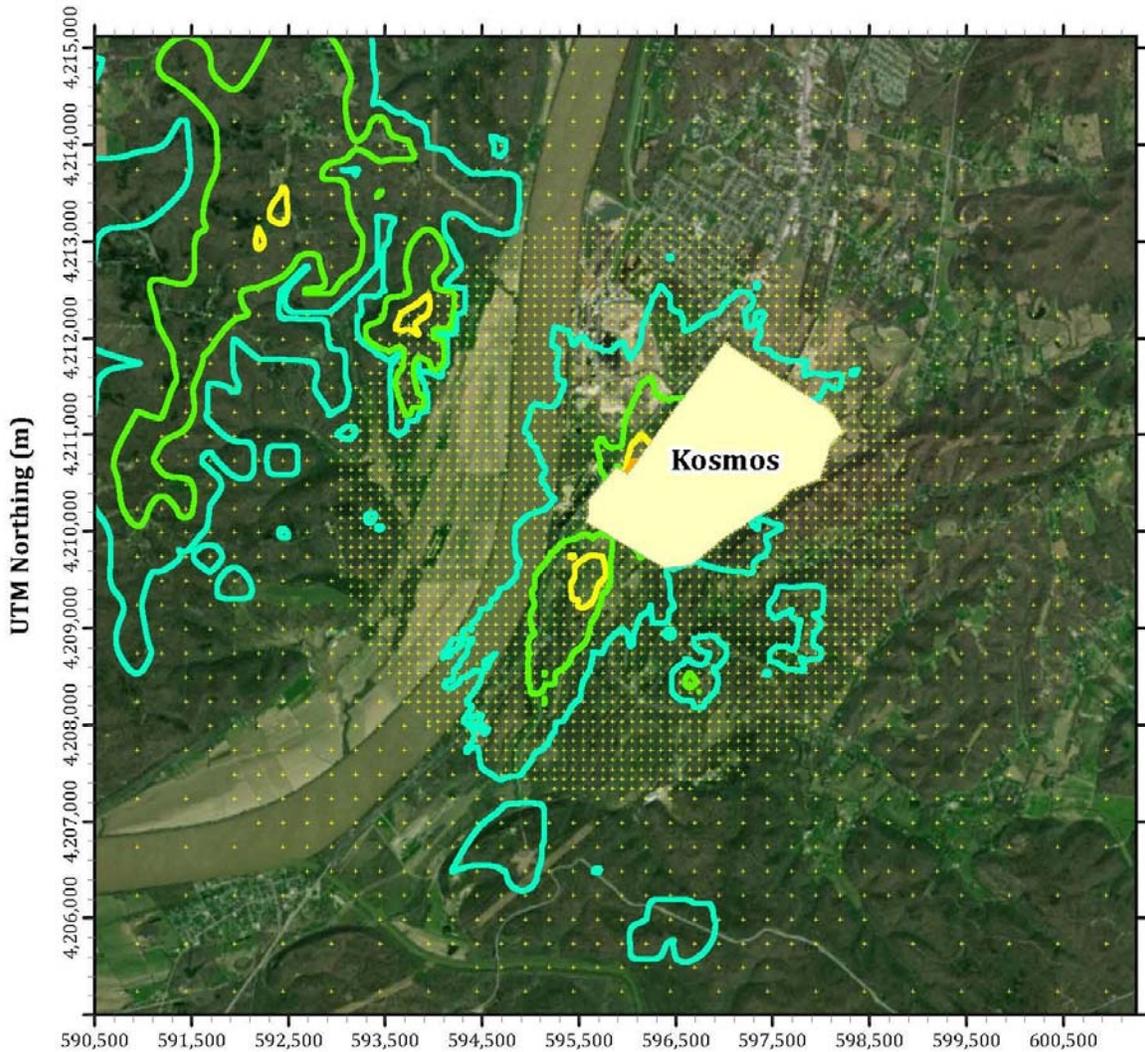


Figure 3. Five-Year Average 4th-High Daily Maximum 1-hr SO₂ Concentrations (µg/m³) for 170 ft Kiln Stack at Kosmos with Green Valley Background



UTM Easting (m)
 All Coordinates shown in UTM Coordinates,
 Zone 16, NAD 83 Datum

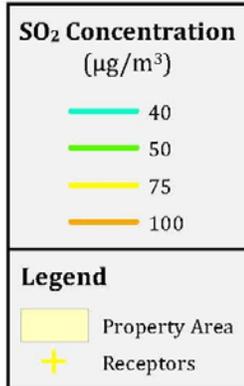
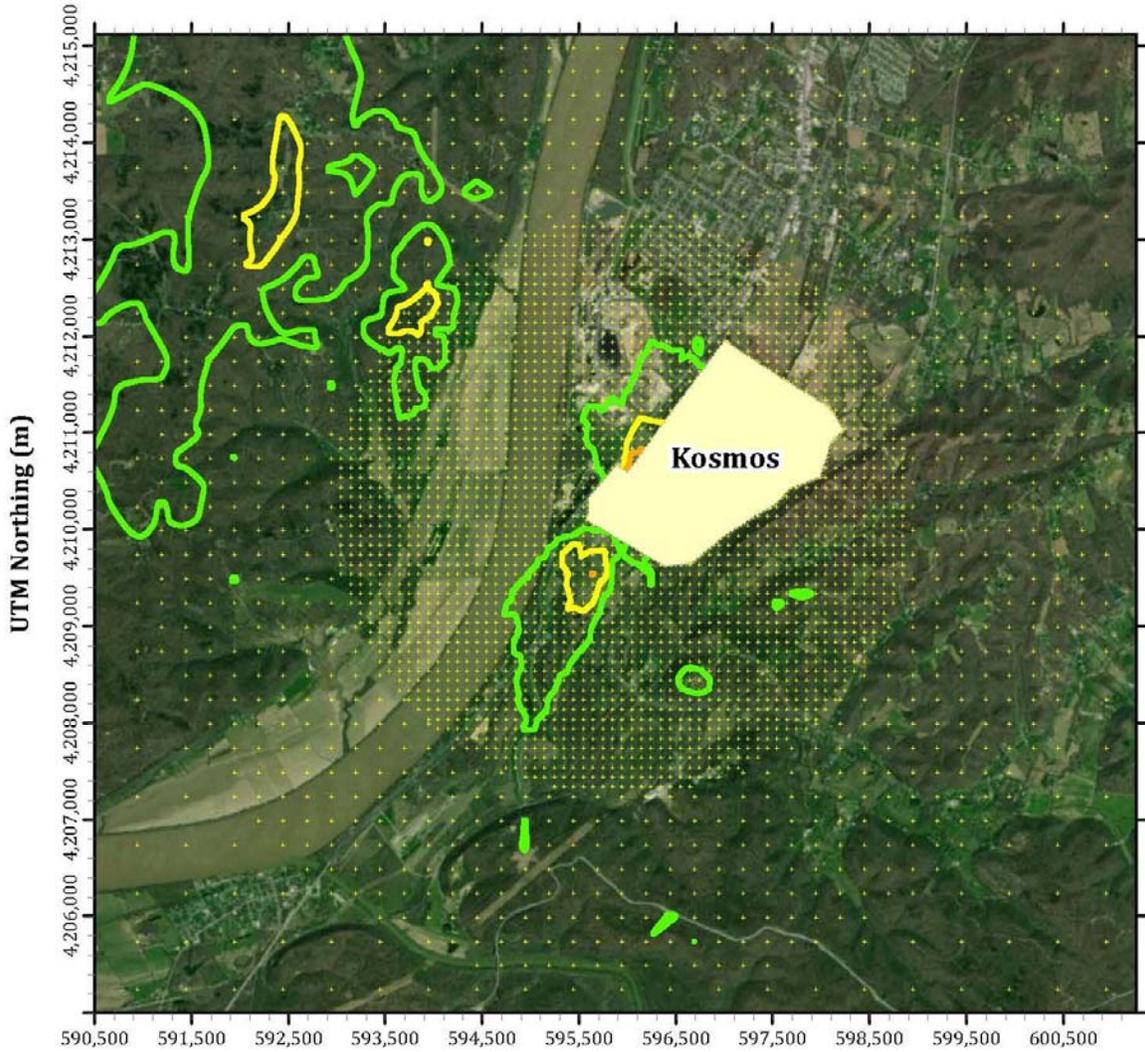
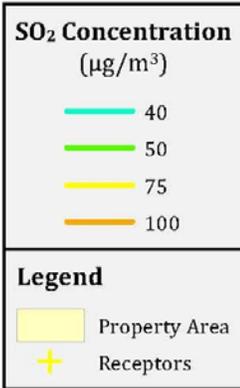


Figure 4. Five-Year Average 4th-High Daily Maximum 1-hr SO₂ Concentrations (µg/m³) for 170 ft Kiln Stack at Kosmos with Watson Lane Background



UTM Easting (m)
 All Coordinates shown in UTM Coordinates,
 Zone 16, NAD 83 Datum



BAKER BOTTS LLP

98 SAN JACINTO BLVD.
SUITE 1500
AUSTIN, TEXAS
78701-4078

TEL +1 512.322.2500
FAX +1 512.322.2501
BakerBotts.com

AUSTIN

BEIJING
BRUSSELS
DALLAS
DUBAI
HONG KONG
HOUSTON

LONDON

MOSCOW
NEW YORK
PALO ALTO
RIYADH
SAN FRANCISCO
WASHINGTON

December 17, 2020

006910.0831

Aileen M. Hooks
TEL: 512.322.2616
FAX: 512.322.8314
aileen.hooks@bakerbotts.com

VIA E-MAIL (STACY.DOTT@LOUISVILLEKY.GOV)

Stacy Fritze Dott
Assistant Jefferson County Attorney
Office of Mike McConnell - Jefferson County Attorney
600 West Jefferson Street, Suite 2086
Louisville, KY 40202

Re: Kosmos Cement Company LLC Stack Height Confirmation

Dear Ms. Dott:

This letter is being sent on behalf of our client, Kosmos Cement Company LLC. By letter to the Louisville Metropolitan Air Pollution Control District (LMAPCD) dated March 13, 2020, Kosmos Cement Company LLC notified the District, pursuant to Paragraph 2 of the LMAPCD-Kosmos Agreed Board Order, of the company's intent to construct a new kiln stack. As a follow-up to that notification, and as previously relayed to you in early October, this letter confirms that Kosmos Cement Company LLC plans to proceed with a stack height of 170 feet.

Sincerely,



Aileen M. Hooks