



Mike DeWine, Governor
Jon Husted, Lt. Governor
Laurie A. Stevenson, Director

JUN 19 2019

Ms. Cathy Stepp
Regional Administrator
U.S. EPA, Region 5
77 West Jackson Blvd.
Chicago, Illinois 60604

Re: Ohio's 2019 Annual SO₂ Emissions Review

Dear Administrator Stepp:

I am writing to submit Ohio's 2019 Annual SO₂ Emissions Review, in accordance with Data Requirements Rule for the 2010 SO₂ standard [80 FR 51052, August 21, 2015]. This rule established ongoing data review requirements including, for areas where modeling of actual SO₂ emissions served as the basis for an unclassifiable/attainment designation, an annual review of emissions data and submittal of a report recommending whether updated modeling is necessary due to emissions increases.

Ohio's annual SO₂ emissions review for 2019, based on a review of emissions data reported through 2018, indicates that updated modeling is not necessary, with the exception of the Carmeuse Lime Maple Grove facility in Seneca County where updated modeling is recommended due to an increase of SO₂ emissions. Ohio EPA is in the process of preparing updated modeling for this facility which will be submitted under separate cover. This updated modeling will also be included in the 2020 Annual SO₂ Emissions Review to provide for public comment.

Ohio EPA notified the public of the availability of the draft emissions review on May 2, 2019. No comments were received during the public comment period.

This submittal consists of one (1) hard copy of the required documentation. An exact duplicate electronic version of the submittal in PDF format is available at <http://epa.ohio.gov/dapc/SIP/so2.aspx> under the heading "Annual Emissions Review."

If you have questions, please contact Jennifer Van Vlerah in our Division of Air Pollution Control at (614) 644-3696.

Sincerely,

A handwritten signature in blue ink, appearing to read "L. Stevenson", is written over a white background.

Laurie A. Stevenson
Director



State of Ohio Environmental Protection Agency
Division of Air Pollution Control

Ohio's 2019 Annual Sulfur Dioxide (SO₂) Emissions Review

Prepared by:
The Ohio Environmental Protection Agency
Division of Air Pollution Control

June 2019

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Background

The United States Environmental Protection Agency (U.S. EPA) promulgated the revised National Ambient Air Quality Standard (NAAQS) for sulfur dioxide (SO₂) on June 2, 2010. U.S. EPA replaced the 24-hour and annual standards with a new short-term 1-hour standard of 75 parts per billion (ppb). The new 1-hour SO₂ standard was published on June 22, 2010 (75 FR 35520) and became effective on August 23, 2010. The standard is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations.

On August 15, 2013, U.S. EPA published (78 FR 47191) the initial, first round, SO₂ nonattainment area designations for the 1-hour SO₂ standard across the country based upon areas with monitored violations (effective October 4, 2013). On March 2, 2015, the U.S. District Court for the Northern District of California accepted as an enforceable order an agreement between the U.S. EPA and Sierra Club and the Natural Resources Defense Council to resolve litigation concerning the deadline for completing designations. As explained in U.S. EPA's March 20, 2015 memorandum *Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard*, the court's order directs U.S. EPA to complete the remaining designations in three steps: round two by July 2, 2016; round three by December 31, 2017 and round four by December 31, 2020.

As part of round two of designations, U.S. EPA identified areas with newly monitored violations of the standard, or areas that contain stationary sources that emitted more than 16,000 tons of SO₂ in 2012 or emitted more than 2,600 tons of SO₂ and had an emission rate of at least 0.45 lbs SO₂/MMBtu in 2012. The U.S. EPA identified two facilities in Ohio as meeting one or more of the emissions thresholds: the General James M. Gavin Plant and the W.H. Zimmer Generating Station. On July 12, 2016, U.S. EPA published (81 FR 45039) final second round designations for these source areas.

Ohio submitted recommendations for round three designations on January 13, 2017. U.S. EPA finalized designations for these areas on January 9, 2018 (83 FR 1098). Round 3 and 4 designations are informed by U.S. EPA's August 21, 2015 *Data Requirements Rule for the 2010 1-hr Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standard (NAAQS); Final Rule [80 FR 51052]* (herein referred to as the DRR), which required characterization of sources with actual emissions greater than 2,000 tons per year (TPY) of SO₂ through either modeling or monitoring.

The DRR also established ongoing data review requirements including, for areas where modeling of actual SO₂ emissions served as the basis for an unclassifiable/attainment designation, an annual review of emissions data and submittal of a report recommending whether updated modeling is necessary due to emissions increases. The annual emissions review is due to U.S. EPA Region 5 by July 1, annually, beginning the calendar year after the effective date of designation. This document is Ohio's 2019 annual emissions review and recommendations for whether updated modeling is necessary. The

2019 review is due to U.S. EPA by July 1, 2019 and uses emissions data available through 2018.

Ongoing data requirements apply to all areas for which the initial modeling was based on actual emissions and the area was designated as attaining. Ongoing data requirements do not apply to sources where designations were based on 1) modeling using allowable emissions, or 2) enforceable emissions limits providing for an unclassifiable/attainment designation using modeling with updated allowable emissions limits.

The 2019 annual emissions review includes the following areas:

- William H. Zimmer facility (in the portion of Clermont County excluding Pierce Township), designated unclassifiable/attainment under round two designations.
- Carmeuse Lime Maple Grove (Seneca County), designated unclassifiable/attainment under round three designations.
- Miami Fort Station (Hamilton County) designated unclassifiable/attainment under round three designations.
- Bay Shore Power Plant (Lucas County) designated unclassifiable/attainment under round three designations.
- Dayton Power and Light J.M. Stuart and Killen Stations (Adams County) designated unclassifiable/attainment under round three designations.

An emissions review for facilities designated under round one is not required as designations were based on monitored violations not modeling. The area surrounding the General James M. Gavin and Kyger Creek Power Plants (Gallia County in its entirety and the portion of Meigs County including Bedford, Columbia, Rutland, Salem, Salisbury, and Scipio Townships), which was designated unclassifiable under Round 2, is not included in this review as it will be monitored and designated under Round 4. The areas surrounding First Energy W.H. Sammis (the portion of Jefferson County including Brush Creek, Island Creek, Knox, Mount Pleasant, Ross, Salem, Saline, Smithfield, Springfield, and Wayne Townships) and American Electric Power Conesville Power Plant (Coshocton County) are not included in this review as the ongoing data review requirements were terminated on April 18, 2018.

Analytical Methodology

1. Determining if emissions have increased

To determine if an emissions increase has occurred since the initial modeling, Ohio EPA compared the total annual sum of modeled hourly actual emissions to more recent annual SO₂ emissions data obtained from the Clean Air Markets Division (CAMD) where available, and from the state inventory database (i.e., Ohio's EIS database which serves as the basis for the National Emissions Inventory).

For the initial modeling, Ohio EPA attempted to use variable emissions at the finest temporal scale available for each unit. As described in Ohio's designation modeling protocol (Appendices to Ohio's Recommended Source Area Designation submittals), and

in accordance with U.S. EPA's February 2016 draft SO₂ NAAQS Designations Modeling Technical Assistance Document (Modeling TAD), Part 75 emissions reporting data was used for the majority of hourly emissions, with data substitutions for some hours.

The Modeling TAD recognizes the unique and case-by-case nature of modeling analyses conducted for the purposes of designations. With respect to emissions, Section 5.2.1 of the Modeling TAD recommends that the reviewing authority work closely with each facility to determine the accuracy of emissions data. The guidance is not prescriptive with respect to substitution methodologies, but suggests averages of surrounding non-missing hours, peak emissions substitutions, use of emission factors, and others. Ohio EPA understands that data substitutions performed for the fulfillment of Part 75 monitoring and reporting requirements are in many instances conservative. To ensure that modeling presents the most accurate surrogate to monitoring for the purposes of designation, Ohio EPA used a case-by-case approach to data substitution, including, but not limited to, Part 75 substitutions, valid hour-before hour-after averaging, mathematical interpolation across valid surrounding hours, and engineering methods.

Ohio EPA's initial analysis to determine if emissions increased compares the modeled emissions to more recent annual SO₂ emissions data obtained from the Clean Air Markets Division (CAMD) where available, and from the state inventory database (i.e., Ohio's EIS database which serves as the basis for the National Emissions Inventory). Data reported to CAMD is done so for the accounting of emission allowance consumption, in accordance with Part 75 monitoring and reporting requirements. Accordingly, the data tends to overstate emissions when there are errors in the monitoring equipment or periods of missing data, as described in the Part 75 monitoring and reporting requirements. The data substitution methodologies employed via Part 75 requirements can lead to overestimations of emissions data. Therefore, this will provide a conservative estimate of the change in emissions, without necessitating the extensive analysis and substitution of variable emissions performed for the modeling. If it appeared based on this conservative analysis that emissions have increased and updated modeling may be warranted, Ohio EPA more closely evaluated the actual variable emissions and performed appropriate substitutions.

Ohio EPA also reviewed SO₂ emissions for any new sources and existing sources not explicitly modeled within 50 kilometers of the modeled source to determine if additional analysis is warranted.

2. Determining if updated modeling is warranted

If an emissions increase occurred, Ohio EPA describes the reason for emissions increases from the previous year and recommends whether the emissions increase warrants updated modeling. Whether an emissions increase necessitates modeling is determined on case-by-case basis.

U.S. EPA *generally recommends* updated modeling if:

- Original modeling was greater than or equal to 90% of standard ($\geq 176.58 \mu\text{g}/\text{m}^3$) and there is any increase in emissions; or
- Original modeling is 50-90% of standard ($98.1-176.58 \mu\text{g}/\text{m}^3$) and emissions increased by 15% or more.

Some additional considerations noted by U.S. EPA include:

- If the emissions increase is substantial and previous modeling was just under the standard, modeling should be updated; and
- If the emissions increased only slightly and previous modeling was well below the standard, judgment may be exercised.

There are other factors that might be considered on a case-by-case basis. For example, Ohio EPA relied upon other factors for an analysis in Ohio's Recommended Area Designations for Round 3, for Dayton Power and Light J.M. Stuart and Killen Stations (p 63-66). These included:

- Which year's emissions would dominate the three-year design value, and how the increased emissions are relative to that year (i.e., whether replacement of the current year's data with data used in the modeling would be likely to lead to significant increase in modeled design values); and
- Assessing the sensitivity of modeled impacts to changes in emissions (i.e., estimate how much the maximum design value would be increased by the increase in emissions).

William H. Zimmer facility

The area surrounding the William H. Zimmer facility (the portion of Clermont County excluding Pierce Township) was designated unclassifiable/attainment under round two designations by U.S. EPA effective September 12, 2016 (81 FR 45039) based on modeling using actual emissions, and is therefore subject to the ongoing data requirements of the DRR.

Modeling was based on hourly variable emissions data for the 2012-2014 period submitted to Ohio EPA by Dynegy Zimmer, LLC for all SO₂ sources at the William H. Zimmer facility. Modeled SO₂ emissions for 2012 to 2014, and reported SO₂ emissions from 2016 to 2018 are shown in Table 1 and Figure 1. The vast majority of emissions are contributed by Unit 1 (B006). As shown in Table 2, facility total emissions decreased slightly (9%) for the 2016-2018 time period compared to the 2012-2014 modeled emissions.

Table 1. William H. Zimmer Annual SO₂ Emissions (TPY)

Unit	Modeled SO ₂ Emissions			Reported SO ₂ Emissions		
	2012	2013	2014	2016	2017	2018
1 (B006)	10,094.79	18,399.83	13,516.86	9,972.51	14,067.80	14,359.90
Aux A (B007)	18.53	6.73	0.16	0.02	0.04	0.04
Aux B (B008)				0.02	0.03	0.05
Facility total	10,113.32	18,406.56	13,517.02	9,972.55	14,067.87	14,359.99

Figure 1. William H. Zimmer Annual SO₂ Emissions (TPY)

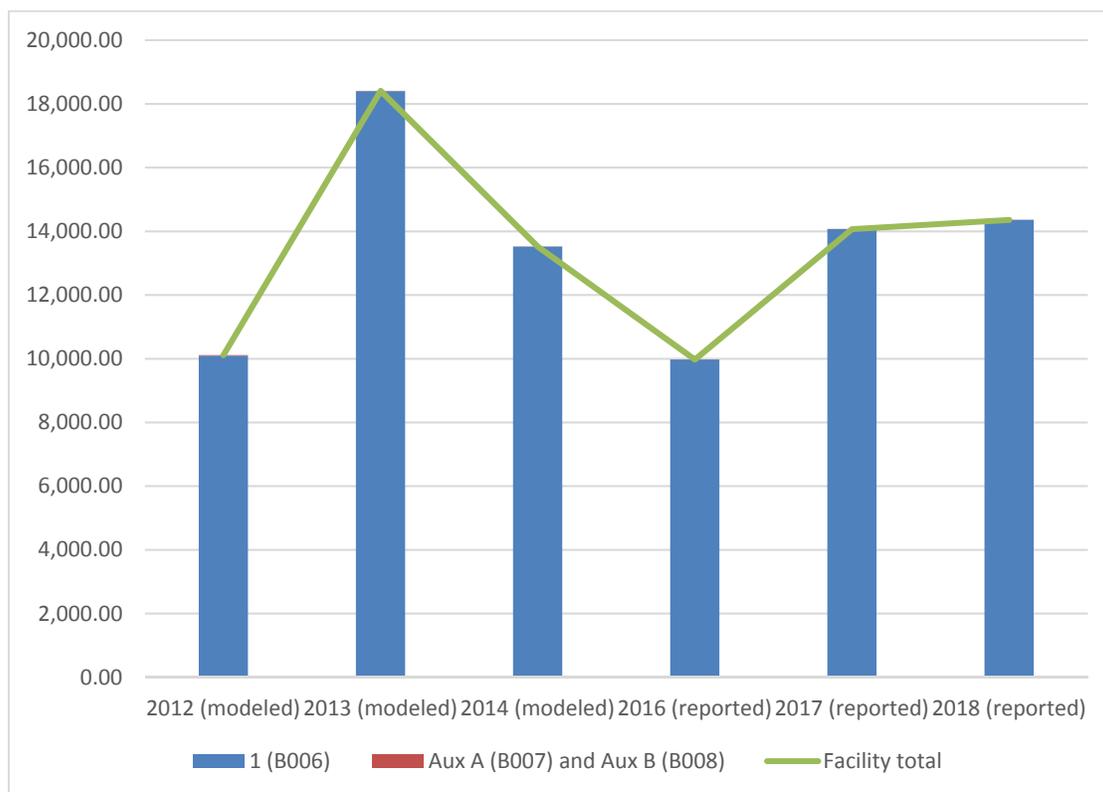


Table 2. Percent Change in Annual SO₂ Emissions

Unit	2012-2014 Total modeled emissions (Tons)	2016-2018	
		Total emissions (Tons)	% change
1 (B006)	42,011.49	38,400.21	-9%
Aux A (B007) and Aux B (B008)	25.42	0.20	-99%
Facility total	42,036.91	38,400.41	-9%

In the original modeling, the maximum modeled 3-year design value for 2012-2014 was 118.2265 $\mu\text{g}/\text{m}^3$ (147.0025 $\mu\text{g}/\text{m}^3$, with background). An area meets the standard of 75 ppb if a concentration of 196.2 $\mu\text{g}/\text{m}^3$ or lower is modeled. Therefore, the original modeling was 75% of the standard. For original modeling results between 50 and 90% of the standard, U.S. EPA generally recommends updated modeling if emissions increase by 15% or more. Emissions have not increased by 15% or more for any individual unit or for the facility as a whole.

The original analysis showed a design value of 25 percent below the standard. Lower 2016-2018 emissions means that any new modeling would likely show even lower concentrations. The source configuration and release characteristics at the Zimmer facility have not changed significantly from those modeled. Additionally, there were no new sources or changes in existing sources not explicitly modeled within 50 kilometers that warrant additional analysis, with the exception of Carmeuse Lime (Facility ID 2119100002) located 3.5 km from Zimmer in Pendleton County, KY. Emissions at this facility increased from 651.31 tons in 2014 to 1,301.20 tons in 2017 (2018 emissions are not yet available). Emissions from this facility were accounted for in the background concentration. Dispersion modeling of a similar facility, the Carmeuse Lime Maple Grove facility in Seneca County indicated a maximum impact of 146 $\mu\text{g}/\text{m}^3$ occurred 850 meters away from the source (see Appendix P of Ohio's 2010 Revised Sulfur Dioxide National Ambient Air Quality Standard Recommended Area Designations Round 3, submitted January 13, 2017). The Carmeuse Lime facility in Pendleton County, KY that is in question here is approximately 2 to 3 times smaller than the source modeled in Seneca county, based on actual emissions, indicating that the maximum impact of the Pendleton County facility would roughly be in the 52 $\mu\text{g}/\text{m}^3$ range. As noted above, emissions from the Zimmer facility decreased by 9%, which scales to a maximum impact of roughly 134 $\mu\text{g}/\text{m}^3$. Even if the maximum impact from these two facilities coincide at the same location, which is unlikely given the size of the Carmeuse Lime facility and distance between the two facilities, updated modeling would still not likely model an exceedance. The tallest stack at the Carmeuse Facility in Pendleton County, KY is 36 meters high. Ohio EPA's experience indicates that the maximum SO_2 1-hour impacts occur within a distance of approximately 10 times the tallest stack height. Thus, the maximum impact would likely occur within approximately 400 meters of the Carmeuse facility, well short of the point of Zimmer's maximum impact.

Therefore, Ohio does not believe this small increase in emissions would cause the modeling results to show nonattainment, given the significant decrease in emissions at the Zimmer facility and the initial modeling 25% below the standard. Therefore, Ohio EPA does not recommend updated modeling.

Carmeuse Lime Maple Grove

The area surrounding the Carmeuse Lime Maple Grove facility (Seneca County) was designated unclassifiable/attainment under round three designations by U.S. EPA effective April 9, 2018 (83 FR 1098) based on modeling using actual emissions, and is therefore subject to the ongoing data requirements of the DRR.

Modeling was based on hourly variable emissions data for the 2012-2014 period submitted to Ohio EPA by Carmeuse for all SO₂ sources at the facility. Appendix A describes the methodology used by Carmeuse for estimating hourly emissions used in the modeling, as well as the annual emissions reported to the state EIS inventory database (referred to as “Fee Report SO₂ Emissions” in Appendix A). While the methodology used for modeling provides the most accurate estimations of emissions, this method is quite burdensome. Carmeuse uses a simplified process for estimating emissions for the purposes of the annual emissions report. In past Annual Emission Reviews, Ohio EPA has adjusted annual reported emissions using the average ratio of modeled to reported emissions for the modeled years (2012-2014) in order to accurately compare reported to modeled emissions. For the 2016-2018 time period however, the difference between total reported emissions and total modeled emissions is no longer significant (see Table 1 in Appendix A). Therefore, Ohio EPA has determined this adjustment is no longer appropriate.

Modeled SO₂ emissions for 2012 to 2014, and reported SO₂ emissions from 2016 to 2018 are shown in Table 3 and Figure 2. Both units (P003 and P004) share a combined stack, so were not modeled individually. As shown in Table 4, facility total emissions increased for the 2016-2018 time period (61%) compared to the 2012-2014 modeled emissions.

Table 3. Carmeuse Lime Maple Grove Annual SO₂ Emissions (TPY)

Unit	Modeled SO ₂ Emissions			Reported SO ₂ Emissions		
	2012	2013	2014	2016	2017	2018
P003				2,528.00	3,071.00	3,589.00
P004				2,346.00	2,690.00	3,456.00
Facility total	3,959.12	3,451.94	3,556.12	4,874.00	5,761.00	7,045.00

Figure 2. Carmeuse Lime Maple Grove Annual SO₂ Emissions (TPY)

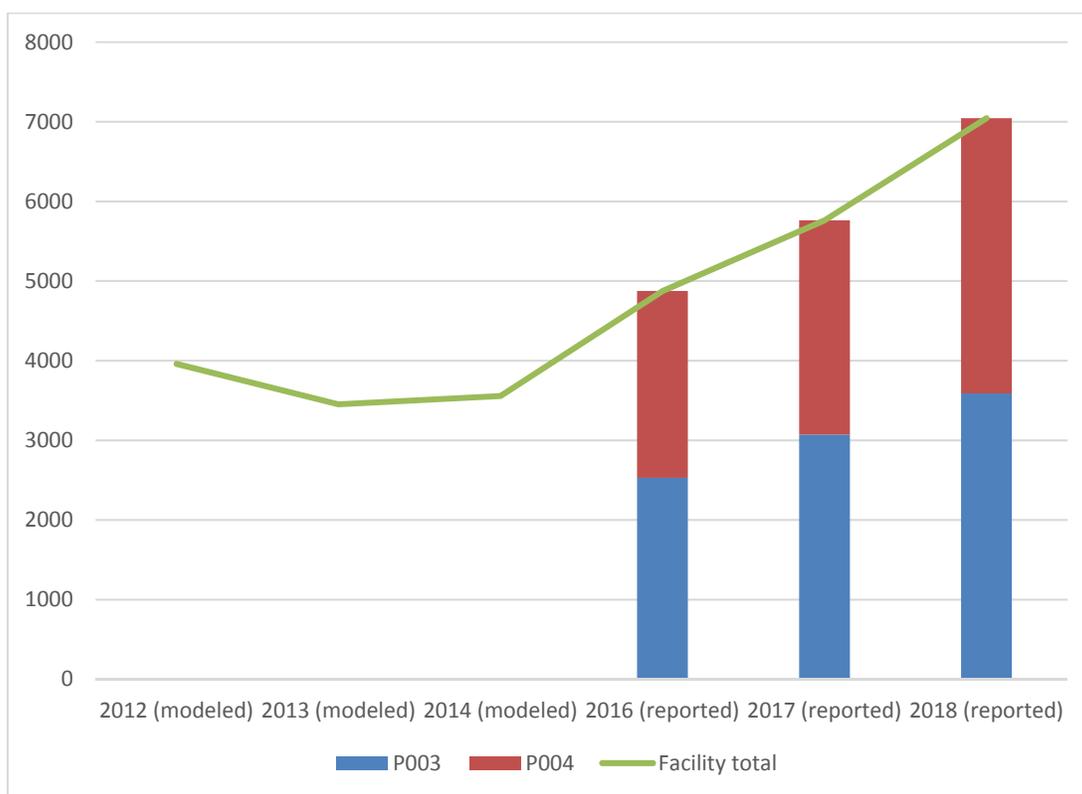


Table 4. Percent Change in Annual SO₂ Emissions

Unit	2012-2014 Total modeled emissions (Tons)	2016-2018	
		Adjusted Total emissions (Tons)	% change
Facility total	10,967.18	17,680.00	61%

In the original modeling, the maximum modeled 3-year design value for 2012-2014 was 146.01914 $\mu\text{g}/\text{m}^3$, including background. An area meets the standard of 75 ppb if a concentration of 196.2 $\mu\text{g}/\text{m}^3$ or lower is modeled. Therefore, the original modeling was 74% of the standard. For original modeling results between 50 and 90% of the standard, U.S. EPA generally recommends updated modeling if emissions increase by 15% or more.

The source configuration and release characteristics at the Carmeuse Lime facility have not changed significantly from those modeled. Additionally, there were no new sources or changes in existing sources not explicitly modeled within 50 kilometers that warrant additional analysis. However, since emissions have increased by 61% from those modeled, Ohio EPA recommends updated modeling. The DRR indicates that U.S. EPA will consider this recommendation and may require submittal of updated modeling within 12 months. Ohio EPA is currently in the process of preparing updated modeling in anticipation of this requirement.

Miami Fort Station

The area surrounding Miami Fort Station (Hamilton County) was designated unclassifiable/attainment under round three designations by U.S. EPA effective April 9, 2018 (83 FR 1098) based on modeling using actual emissions, and is therefore subject to the ongoing data requirements of the DRR.

Modeling was based on hourly variable emissions data for the 2012-2014 period submitted to Ohio EPA by Miami Fort for two SO₂ sources at the facility: Unit 7 (B015) and Unit 8 (B016) coal fired boilers. A third unit at the facility, Unit 6 (B007), was shutdown on June 1, 2015 and therefore, following U.S. EPA guidance, not included in the modeling analysis. Modeled SO₂ emissions for 2012 to 2014, and reported SO₂ emissions from 2016 to 2018 are shown in Table 5 and Figure 3. As shown in Table 6, facility total emissions decreased in the 2016-2018 time frame (6%) compared to the 2012-2014 modeled emissions.

Table 5. Miami Fort Station Annual SO₂ Emissions (TPY)

Unit	Modeled SO ₂ Emissions			Reported SO ₂ Emissions		
	2012	2013	2014	2016	2017	2018
Unit 7 (B015)	6,103.65	5,186.72	4,691.39	5,609.60	5,258.07	4,417.00
Unit 8 (B016)	4,476.85	6,648.96	4,847.37	4,603.63	5,255.58	4,858.50
Facility total (excluding Unit 6)	10,580.51	11,835.67	9,538.76	10,213.23	10,513.65	9,275.50

Figure 3. Miami Fort Station Annual SO₂ Emissions (TPY)

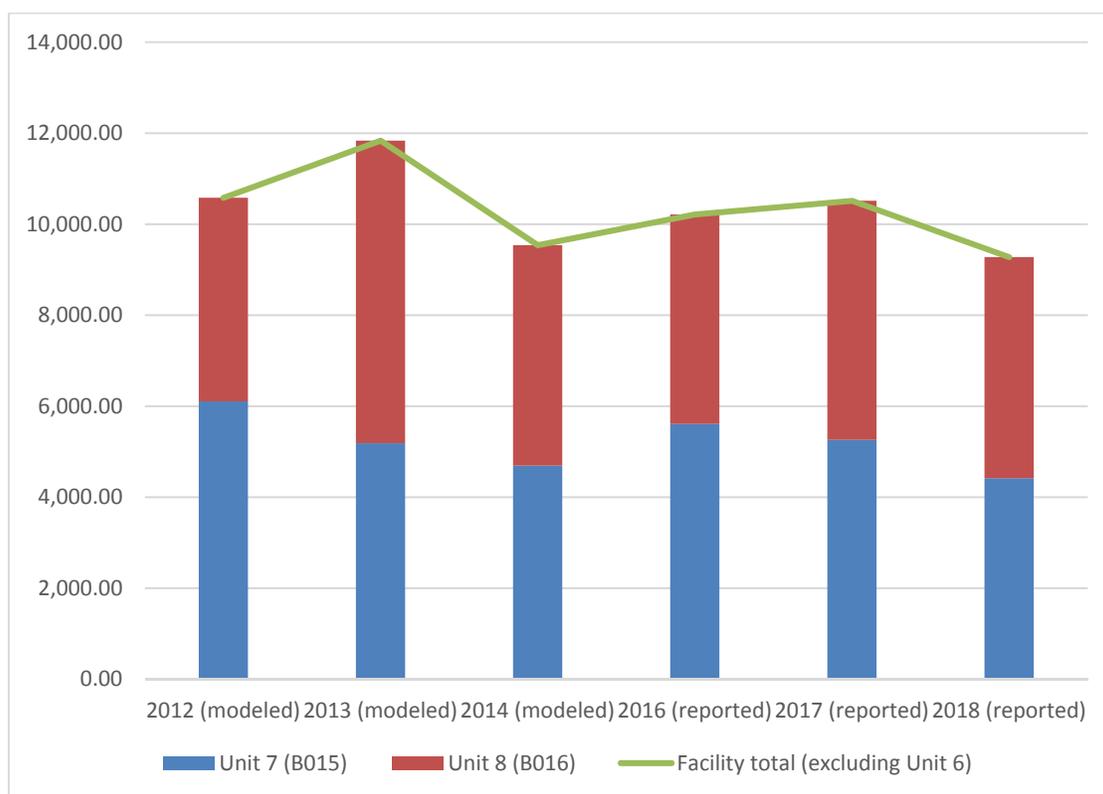


Table 6. Percent Change in Annual SO₂ Emissions

Unit	2012-2014 Total modeled emissions (Tons)	2016-2018	
		Total emissions (Tons)	% change
Unit 7 (B015)	15,981.76	15,284.67	-4%
Unit 8 (B016)	15,973.18	14,717.71	-8%
Facility total (excluding Unit 6)	31,954.94	30,002.38	-6%

In the original modeling, the maximum modeled 3-year design value for 2012-2014 was 159.08418 $\mu\text{g}/\text{m}^3$, including background. An area meets the standard of 75 ppb if a concentration of 196.2 $\mu\text{g}/\text{m}^3$ or lower is modeled. Therefore, the original modeling was 81% of the standard. For original modeling results between 50 and 90% of the standard, U.S. EPA generally recommends updated modeling if emissions increase by 15% or more. Emissions have not increased by 15% or more for any individual unit or for the facility as a whole.

The original analysis showed a design value of 19 percent below the standard. Lower 2016-2018 emissions means that any new modeling would likely show even lower concentrations. The source configuration and release characteristics at the Miami Fort facility have not changed significantly from those modeled. Additionally, there were no new sources or changes in existing sources not explicitly modeled within 50 kilometers

that warrant additional analysis, with the exception of Duke Energy East Bend (Facility ID 2101500029) located 23.5 km from Miami Fort in Boone County, KY. Emissions at this facility increased from 2,102.76 tons in 2014 to 2,630.59 tons in 2017 (2018 emissions are not yet available). Ohio does not believe this small increase in emissions would cause the modeling results to show nonattainment, as there was a decrease in emissions at the Miami Fort facility and the initial modeling was 19% below the standard. Therefore, Ohio EPA does not recommend updated modeling.

Bay Shore Power Plant

The area surrounding the Bay Shore Power Plant (Lucas County) was designated unclassifiable/attainment under round three designations by U.S. EPA effective April 9, 2018 (83 FR 1098) based on modeling using actual emissions, and is therefore subject to the ongoing data requirements of the DRR.

Modeling was based on hourly variable emissions data for the 2012-2014 period submitted to Ohio EPA by First Energy for the single SO₂ source at the facility (B006 circulating fluidized bed pet-coke fired boiler). The coal fired boilers located at the Bay Shore plant permanently ceased operation in September of 2012, and were therefore not included in Ohio EPA’s modeling analysis. The modeling also included two nearby sources: the BP Husky facility, located approximately 2.5 kilometers to the southwest of the Bay Shore plant and an additional source, Chemtrade Refinery Solutions, which is co-located with the BP Husky facility.

Modeled SO₂ emissions for 2012 to 2014, and reported SO₂ emissions from 2016 to 2018 are shown in Table 7 and Figure 4. As shown in Table 8, facility total emissions at the Bay Shore Power Plan decreased in the 2016-2018 time frames (2%) compared to the 2012-2014 modeled emissions. Area-wide total emissions for all facilities included in the modeling decreased (20%) in the 2016-2018 time period compared to modeled emissions, despite an increase in emissions from the Chemtrade facility.

Table 7. Bay Shore Power Plant, BP Husky, and Chemtrade Refinery Solutions Annual SO₂ Emissions (TPY)

Unit	Modeled SO ₂ Emissions			Reported SO ₂ Emissions		
	2012	2013	2014	2016	2017	2018
Bay Shore Power Plant (B006)	2,546.78	2,824.60	1,998.52	2,100.34	2,309.25	2,786.73
BP Husky (Facility Total)	1,016.80	1,436.69	1,599.69	749.22	552.879	566.91
Chemtrade Refinery Solutions (Facility Total)	34.57	34.57	34.57	23.11	47.34	59.03
Area total	3,598.15	4,295.86	3,632.78	2,872.67	2,909.47	3,412.68

Figure 4. Bay Shore Power Plant, BP Husky, and Chemtrade Refinery Solutions Annual SO₂ Emissions (TPY)

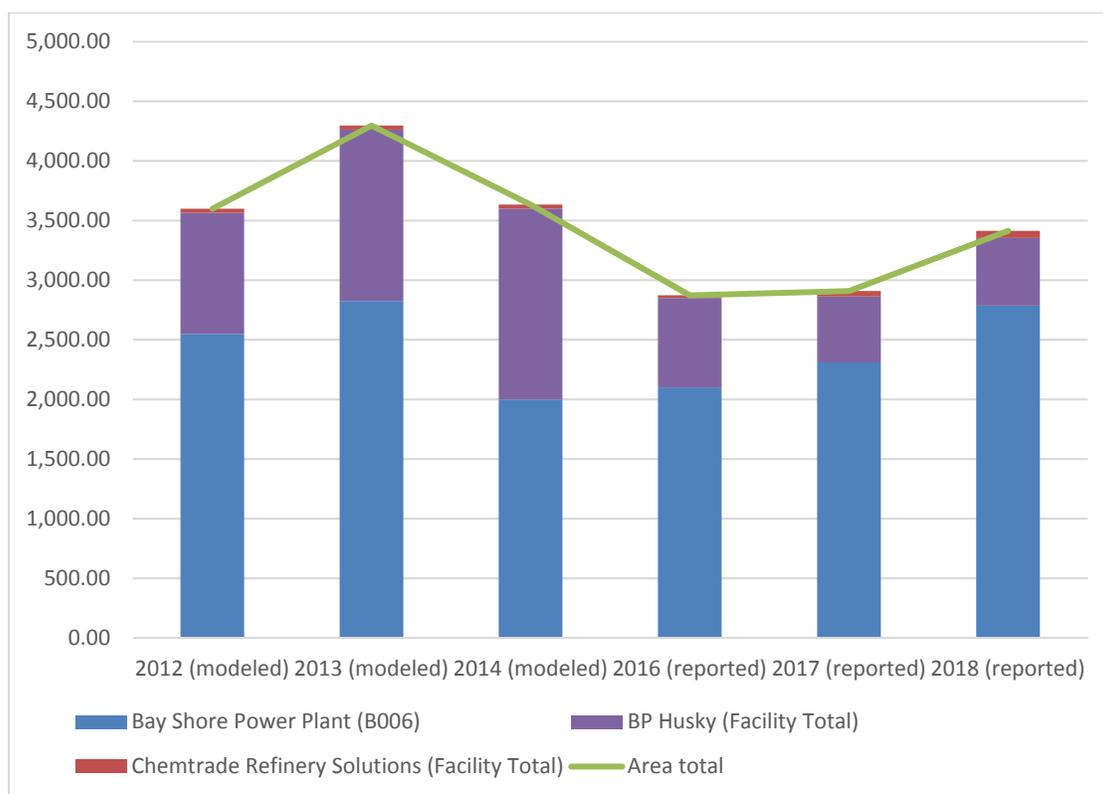


Table 8. Percent Change in Annual SO₂ Emissions

Unit	2012-2014 Total modeled emissions (Tons)	2016-2018	
		Total emissions (Tons)	% change
Bay Shore Power Plant (B006)	7,369.90	7,196.33	-2%
BP Husky (Facility Total)	4,053.18	1,869.01	-54%
Chemtrade Refinery Solutions (Facility Total)	103.71	129.48	25%
Area total	11,526.79	9,194.81	-20%

In the original modeling, the maximum modeled 3-year design value for 2012-2014 was 175.29812 µg/m³, including background. An area meets the standard of 75 ppb if a concentration of 196.2 µg/m³ or lower is modeled. Therefore, the original modeling was 89% of the standard. For original modeling results between 50 and 90% of the standard, U.S. EPA generally recommends updated modeling if emissions increase by 15% or more. Emissions have not increased by 15% or more for the area as a whole.

The original analysis showed a design value of 11 percent below the standard. Lower 2016-2018 emissions means that any new modeling would likely show even lower concentrations. Although emissions from the Chemtrade facility increased on a percent basis, Ohio EPA does not expect the small magnitude of the increase to cause a

significant change in the modeling. The primary contributor to the maximum design value was emissions from the Bay Shore Power Plant. The Chemtrade facility is a minor contributor to the maximum design value, as modeling showed emissions from both the Chemtrade and BP Husky facilities combined was less than $1 \mu\text{g}/\text{m}^3$. Scaling this proportionally to the emissions increase at Chemtrade and attributing all of the contribution to Chemtrade, which is conservative, shows the maximum impact could be expected to be approximately less than $1.3 \mu\text{g}/\text{m}^3$ following the increase in emissions. Decreasing emissions from Bay Shore Power Plant and BP Husky should easily offset this small increase.

The source configuration and release characteristics at the Bay Shore Power Plant, BP Husky or Chemtrade facilities have not changed significantly from those modeled. Additionally, there were no new sources or changes in existing sources not explicitly modeled within 50 kilometers that warrant additional analysis, with the exception of the Evergreen Recycling and Disposal Facility (Facility ID 387000259). Evergreen Recycling, located 12 km from the Bay Shore facility, experienced an increase in SO_2 emissions to 87 tpy in 2017 compared to 2 tpy in 2014. Emissions from this facility were accounted for in the background concentration. Given the distance and small magnitude of this increase relative to the total modeled emissions, Ohio EPA does not expect this small emissions increase to result in significantly different modeled results. Therefore, Ohio EPA does not recommend updated modeling.

Dayton Power and Light J.M. Stuart and Killen Stations

The area surrounding the Dayton Power and Light J.M. Stuart and Killen Stations (Adams County) was designated unclassifiable/attainment under round three designations by U.S. EPA effective April 9, 2018 (83 FR 1098) based on modeling using actual emissions, and is therefore subject to the ongoing data requirements of the DRR.

Modeling was based on hourly variable emissions data for the 2012-2014 period submitted to Ohio EPA by Dayton Power and Light, now part of AES Corporation (AES) in association with their air quality contractor, Trinity Consultants (Trinity) for all SO_2 sources at both the Stuart and Killen Generating Stations. The modeling also included the nearby source Spurlock Station, located approximately 29 kilometers to the northwest of the Stuart and Killen facilities. Hourly emissions from Spurlock Station were taken from the U.S. EPA's Clean Air Markets Database.

All coal-fired boilers at the J.M. Stuart and Killen facilities were permanently shutdown by June 1, 2018. Modeled SO_2 emissions for 2012 to 2014, and reported SO_2 emissions from 2016 to 2018 are shown in Table 9 and Figure 5. As shown in Table 10, facility total emissions from J.M. Stuart decreased significantly in the 2016-2018 time frame (50%) compared to the 2012-2014 modeled emissions. Emissions from Killen Station also decreased (16%) compared to modeled emissions. Area-wide total emissions for all facilities included in the modeling decreased in the 2016-2018 time frames (32%) compared to the 2012-2014 modeled emissions.

Table 9. J.M. Stuart, Killen and Spurlock Station Annual SO₂ Emissions (TPY)

Unit	Modeled SO ₂ Emissions			Reported SO ₂ Emissions		
	2012	2013	2014	2016	2017	2018
J.M. Stuart (Facility Total)	10,324.83	13,840.45	11,959.88	9,004.25	6,675.43	2,325.67
Killen Station (Unit 2_K)	5,295.74	7,827.17	12,566.71	10,127.20	6,215.43	5,257.54
Spurlock Station (Facility Total)	5,131.20	4,468.82	4,689.16	4,702.60	3,700.47	3,737.76
Area total	20,751.77	26,136.44	29,215.75	23,834.05	16,591.33	11,320.97

Figure 5. Stuart, Killen and Spurlock Station Annual SO₂ Emissions (TPY)



Table 9. Percent Change in Annual SO₂ Emissions

Unit	2012-2014 Total modeled emissions (Tons)	2016-2018	
		Total emissions (Tons)	% change
J.M. Stuart (Facility Total)	36,125.16	18,005.35	-50%
Killen Station (Unit 2_K)	25,689.62	21,600.16	-16%
Spurlock Station (Facility Total)	14,289.17	12,140.83	-15%
Area total	76,103.95	51,746.35	-32%

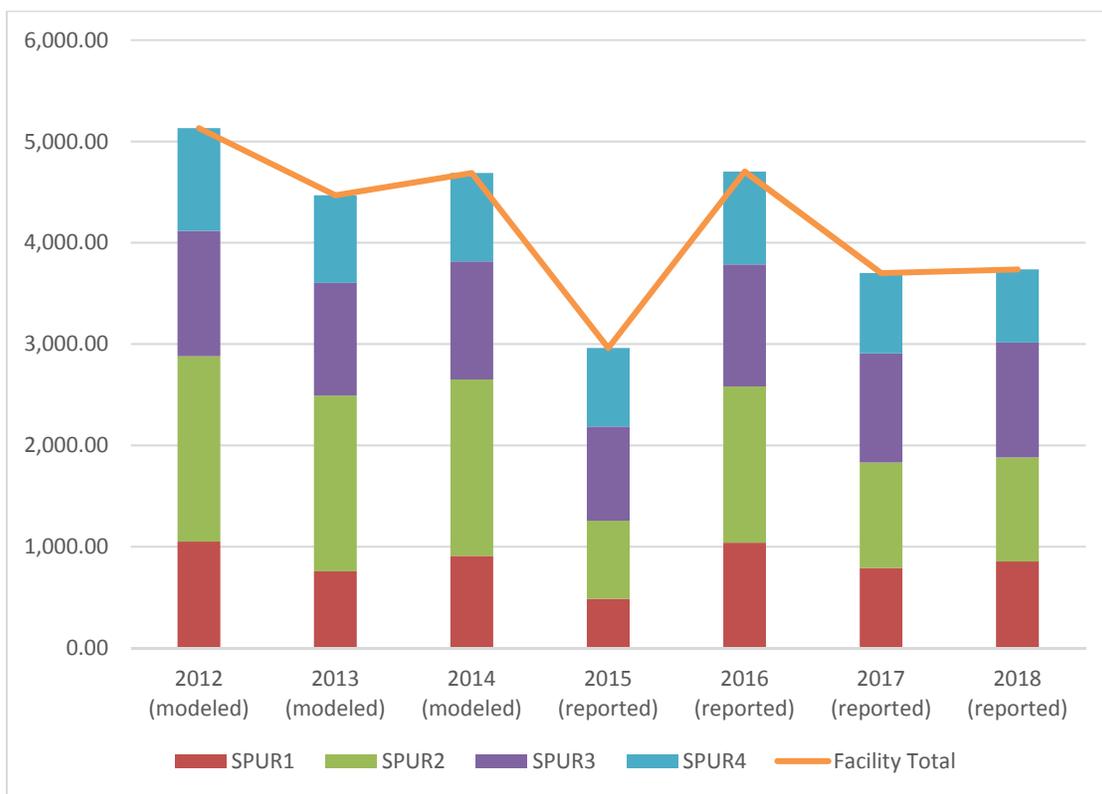
In the original modeling, the maximum modeled 3-year design value for 2012-2014 was 186.26472 $\mu\text{g}/\text{m}^3$, including background. An area meets the standard of 75 ppb if a concentration of 196.2 $\mu\text{g}/\text{m}^3$ or lower is modeled. Therefore, the original modeling was 95% of the standard. For original modeling results greater than or equal to 90% of the standard, U.S. EPA generally recommends updated modeling if there is any increase in emissions. Emissions have decreased for each individual facility and for the area as a whole.

The original analysis showed a design value of 5 percent below the standard. Lower 2016-2018 emissions means that any new modeling would likely show even lower concentrations. The source configuration and release characteristics at the Stuart, Killen and Spurlock facilities have not changed significantly from those modeled. Additionally, there were no new sources or changes in existing sources not explicitly modeled within 50 kilometers that warrant additional analysis. Therefore, Ohio EPA does not recommend updated modeling.

Only the Spurlock Station facility in Kentucky remains in this modeled area following the shutdown of the coal-fired boilers at the Stuart and Killen facilities. U.S. EPA's Data Requirements Rule indicates that a State can request termination of the ongoing data requirements in accordance with 40 CFR 51.1205(b)(2) for any sources that modeled below 50% of the standard. As noted above, total modeled emissions among the three facilities resulted in a maximum modeled 3-year design value for 2012-2014 of 186.26472 $\mu\text{g}/\text{m}^3$, including background (95% of the standard). As part of this initial modeling, Ohio EPA separately identified the contribution from each facility in addition to the total. This modeling showed a maximum modeled 3-year design value from the Spurlock Station of 42.64376 $\mu\text{g}/\text{m}^3$, including background, in the Ohio portion of the modeled area (22% of the standard). Therefore, Ohio EPA expects if modeling were to be conducted today with only the Spurlock Station included, the area would model at approximately 22% of the standard or less, and would certainly be well below 50% of the standard.

As shown in Table 10 above, Spurlock Station accounted for 14,289.17 tons of the 76,103.95 tons of total modeled 2012-2014 emissions (19%). While emissions from Spurlock Station have varied in the years since the modeling was conducted, no single year's emissions has exceeded the highest modeled year (2012 at 5,131.20 tons), as shown in Figure 6. Therefore, Ohio EPA requests the ongoing data requirements in accordance with 40 CFR 51.1205(b)(2) for this area be terminated.

Figure 6. Spurlock Station Annual SO₂ Emissions (TPY)



Public Participation

Ohio published solicitation for public comment concerning the draft 2019 Annual Sulfur Dioxide (SO₂) Emissions Review in the widely distributed county publications on May 2, 2019. No comments were received during the public comment period which closed on June 7, 2019. Appendix B includes a copy of the public notice.

Appendix A:

Carmeuse Lime Maple Grove SO₂ Emissions Calculation Methodology

SO₂ Emissions Estimates for Maple Grove

There are two methods, which are used to estimate SO₂ emissions from the Carmeuse Maple Grove facility from the kilns:

- 1) Actual emissions based on the calculation method set forth in the operating permit. Carmeuse is required to calculate the daily emissions of SO₂ based on the fuel burned (tons/day), fuel sulfur content (%), and an SO₂ capture factor. The capture factor is based on the SO₂ capture for the most recent stack test results. The daily SO₂ value is tabulated and reported for each month and then summed for the year. The daily SO₂ values are then used to generate the actual hourly SO₂ emission values (lb/hr) used for modeling. That type of emissions approach is described in the SO₂ Data Requirements Rule (DRR) Modeling Technical Assistance Document (TAD). The annual *actual* emissions are provided in Table 1 below.
- 2) SO₂ emissions reported for fee purposes. Emissions for permit fee purposes are calculated using the most recent stack test for SO₂ reduced to an emission factor (lb/ton lime product) and then multiplied by the annual lime production rate (tons/yr). The annual *reported* SO₂ emissions are provided in the spreadsheet included with this summary email.

The annual SO₂ emissions from these two methods of calculation yield different results due to the calculation methodology. The first method is considered the most accurate because it uses the actual fuel sulfur content and fuel burning rate for each day. The second method is based on the fuel firing rate and fuel sulfur content from the performance test, and assumes those values remain constant over the entire year. In reality, those parameters vary from the kilns for the balance of the year.

The annual SO₂ emissions have varied between 2012 and 2018 due to the following factors.

- 1) The annual production of the kilns (ton/yr) is market driven and increases or decreases in annual production depend on market. The kilns produce two primary products: metallurgical (MET) lime and a product for a specific customer (MM).
- 2) Coke fuel is required for production of the MM product, which has a higher sulfur content than coal fuel.
- 3) The SO₂ capture factor was reduced in 2017 and 2018 based on a stack test completed in 2016, which increased the estimated actual SO₂ emissions per ton of lime.
- 4) A higher use of coke occurred in 2017 and 2018.
- 5) The sulfur content of fuels did not exceed the maximum limit specified the permit.
- 6) Annual lime production did not exceed the maximum production specified in the permit.
- 7) The SO₂ emission factor (lb/ton) allowed by the permit was not exceeded.
- 8) No physical changes or changes in method of operation have occurred.

Table 1. Actual SO₂ Emissions Summary

Year	Modeled SO₂ Emissions (tpy)	Fee Report SO₂ Emissions (tpy)	SO₂ Capture Factor (%)	Lime Production (tpy)	Coal Burned (tpy)	Coke Burned (tpy)
2012	3,959.0	4,902.0	62.12	317,277	17,697	77,852
2013	3,451.9	4,212.0	62.12	272,590	12,296	71,456
2014	3,556.1	4,438.0	62.12	287,253	10,791	74,589
2015	4,901.9	4,117.0	62.12	266,452	13,608	66,011
2016	5,247.9	4,874.0	62.12	270,104	5,806	75,824
2017	6,361.3	5,761.0	43.80	240,216	6,244	84,389
2018	6,227.9	7,045.0	43.80	352,656	10,534	94,411

Appendix B:

Public Notice

Public Notice
Ohio Environmental Protection Agency
Annual Review of Sulfur Dioxide (SO₂) Data Requirements Rule Source Emissions

The Ohio Environmental Protection Agency (Ohio EPA) is soliciting comments on the draft 2019 Annual Sulfur Dioxide (SO₂) Emissions Review. On August 21, 2015, the United States Environmental Protection Agency (U.S. EPA) finalized the Data Requirements Rule for the 2010 SO₂ standard [80 FR 51052]. This rule established ongoing data review requirements including, for areas where modeling of actual SO₂ emissions served as the basis for an unclassifiable/attainment designation, an annual review of emissions data and submittal of a report recommending whether updated modeling is necessary due to emissions increases. The annual emissions review is due to U.S. EPA Region 5 by July 1, annually, beginning the calendar year after the effective date of designation.

Ohio EPA is now soliciting comments on the draft annual SO₂ emissions review for 2019. Preliminary results based on a review of emissions data reported through 2018 indicate that updated modeling is not necessary, with the exception of the Carmeuse Lime Maple Grove facility in Seneca County where updated modeling is recommended due to an increase of SO₂ emissions. The comments received will be used to formulate the State's formal recommendation to U.S. EPA.

These actions must be noticed to allow public comment and to satisfy U.S. EPA requirements for public involvement in state implementation plan related activities. Comments should be submitted on or before **Friday, June 7, 2019** at the following address:

E-mail: holly.kaloz@epa.ohio.gov

Mailing address: Holly Kaloz
Ohio Environmental Protection Agency, DAPC
Lazarus Government Center
P.O. Box 1049
Columbus, Ohio 43216-1049

Phone: (614) 644-3632

All comments submitted by the close of business on June 7, 2019, will be considered by Ohio EPA prior to submittal of this annual review. Comments submitted after June 7, 2019, may be considered as time and circumstances permit, but will not be part of the official record.

The draft 2018 Annual Sulfur Dioxide (SO₂) Emissions Review is available on Ohio EPA DAPC's web page for electronic downloading at: <http://epa.ohio.gov/dapc/SIP/so2.aspx>.

Questions regarding accessing the web site should be directed to Paul Braun at 614-644-3734; other questions or comments about this document should be directed to either Holly Kaloz at (614) 644-3632, holly.kaloz@epa.ohio.gov or Jennifer Van Vlerah at (614) 644-3696, Jennifer.VanVlerah@epa.ohio.gov or mailed to Holly Kaloz or Jennifer Van Vlerah at the above address.