October 5, 2020

Ms. Mary Walker  
Regional Administrator  
US EPA Region 4  
Atlanta Federal Center  
61 Forsyth Street, SW  
Atlanta, GA 30303-8960

RE: Ongoing Reporting Requirements for 2010 1-hour Sulfur Dioxide National Ambient Air Quality Standard

Dear Ms. Walker:

On behalf of the Commonwealth of Kentucky, the Energy and Environment Cabinet’s Division for Air Quality (Division) respectfully submits the following documentation to comply with the United States Environmental Protection Agency (EPA) Data Requirements Rule (DRR) ongoing reporting requirement for the 2010 1-hour Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standard (NAAQS).

As required by 40 CFR 51.1205(b), each state must submit an annual report to the EPA Regional Administrator that documents the annual SO₂ emissions of each source designated as unclassifiable/attainment, which utilized modeling as the basis for designation. The report must include a recommendation by the state regarding the need for additional modeling to assure that each area continues to meet the 2010 SO₂ NAAQS.

The attached report details the Division’s review of the sources subject to the ongoing reporting requirements under the DRR. The Division recommends that no additional modeling is required at this time.

In accordance with 40 CFR 51.102, the proposed annual report was available for public review and comment beginning on August 10, 2020 and ending on September 8, 2020. A copy of the public notice is included with the report.
If you have any questions or concerns, please contact Ms. Kelly Lewis, Program Planning and Administrative Branch Manager, Division for Air Quality at (502) 782-6687 or kelly.lewis@ky.gov.

Sincerely,

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

Cc: Caroline Freeman, Region 4 US EPA
Lynorae Benjamin, Region 4 US EPA
Sulfur Dioxide Ongoing Data Requirements Rule
2020 Annual Report for Modeled Sources

Prepared by the
Kentucky Division for Air Quality

Submitted by the
Kentucky Energy and Environment Cabinet

October 2020
# Table of Contents

I. Introduction ............................................................................................................................. 1  
II. Emissions Data Summary ....................................................................................................... 1  
III. Conclusion ............................................................................................................................... 7  
IV. Public Notice ........................................................................................................................... 7  

## Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Counties with Sources Subject to the DRR</td>
<td>2</td>
</tr>
<tr>
<td>Table 2</td>
<td>Annual SO₂ Emissions for Sources using MY 2012-2014 (tpy)</td>
<td>2</td>
</tr>
<tr>
<td>Table 3</td>
<td>Annual SO₂ Emissions for Sources using MY 2014-2016 (tpy)</td>
<td>3</td>
</tr>
<tr>
<td>Table 4</td>
<td>SO₂ Emissions Comparisons (tpy)</td>
<td>3</td>
</tr>
<tr>
<td>Table 5</td>
<td>Duke Energy – East Bend, KU – Ghent, Dynegy – Miami Fort Annual SO₂ Emissions (tpy)</td>
<td>4</td>
</tr>
<tr>
<td>Table 6</td>
<td>Duke Energy – East Bend Modeled Area Percent Change in SO₂ Emissions</td>
<td>5</td>
</tr>
<tr>
<td>Table 7</td>
<td>NKU SO₂ Monitor 99th Percentile (ppb)</td>
<td>5</td>
</tr>
<tr>
<td>Table 8</td>
<td>LG&amp;E – Trimble County, KU – Ghent, IKEC – Clifty Creek Annual SO₂ Emissions (tpy)</td>
<td>5</td>
</tr>
<tr>
<td>Table 9</td>
<td>LG&amp;E – Trimble County Area Percent Change in SO₂ Emissions</td>
<td>6</td>
</tr>
<tr>
<td>Table 10</td>
<td>Green Valley SO₂ Monitor 99th Percentile (ppb)</td>
<td>6</td>
</tr>
</tbody>
</table>

## Figures

- Figure 1: Duke Energy - East Bend and KU – Ghent Annual SO₂ Emissions (tpy) | 4
- Figure 2: LG&E – Trimble County and KU – Ghent Annual SO₂ Emissions (tpy) | 6

## Appendices

- Appendix A – Shawnee Fossil Plant – Modeling Results 1-Hour SO₂ NAAQS Designation
- Appendix B – Duke Energy – East Bend Response
- Appendix C – LG&E – Trimble County Response
- Appendix D – Public Notice
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I. Introduction

The Kentucky Energy and Environment Cabinet (Cabinet) submits this report to the U.S. Environmental Protection Agency (EPA) for the Annual Ongoing Data Requirement Rule (DRR) for the 2010 1-hour Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standard (NAAQS). This report is intended to fulfill the annual reporting requirements of 40 CFR Part 51 Subpart BB.

On August 21, 2015, the EPA promulgated the DRR for the 2010 1-hour SO₂ Primary NAAQS of 75 parts per billion (ppb).¹ The DRR requires areas that are in attainment to characterize ambient air quality for facilities that emit more than 2,000 tons per year (tpy) of SO₂. Characterization of air quality can occur by choosing one of three methods: (1) ambient air monitoring; (2) air dispersion modeling of either actual or allowable emissions; or (3) demonstration of enforceable emissions limitations below the 2,000 tpy threshold.

On January 6, 2017, the Cabinet submitted a letter and air dispersion modeling analyses to EPA characterizing nine sources subject to the DRR. The letter also detailed Kentucky sources that chose the monitoring or federally enforceable limitation options, as well as sources that permanently shut down. Two of the nine sources are not included in this report, Big Rivers – D. B. Wilson and TVA – Paradise. D. B. Wilson was designated unclassifiable and is not subject to ongoing verification. TVA – Paradise was modeled using potential to emit (PTE) emissions and is not subject to ongoing verification.

In accordance with 40 CFR 51.1205(b), areas designated as attainment/unclassifiable and characterized using air dispersion modeling of actual SO₂ emissions are subject to ongoing data requirements. Annual emissions reports for those areas must be submitted to EPA by July 1 of each year.

II. Emissions Data Summary

On January 9, 2018, EPA designated seven Kentucky counties containing the sources characterized by modeled actual emissions as attainment/unclassifiable.² Table 1 identifies the seven Kentucky counties and their respective DRR sources subject to ongoing emissions data verification.

¹ 80 FR 51052
² 83 FR 1098
Table 1: Counties with Sources Subject to the DRR

<table>
<thead>
<tr>
<th>Source</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Century Aluminum - Hawesville</td>
<td>Hancock</td>
</tr>
<tr>
<td>Duke Energy - East Bend</td>
<td>Boone</td>
</tr>
<tr>
<td>EKPC - H. L. Spurlock</td>
<td>Mason</td>
</tr>
<tr>
<td>KU - Ghent</td>
<td>Carroll</td>
</tr>
<tr>
<td>LG&amp;E - Trimble County</td>
<td>Trimble</td>
</tr>
<tr>
<td>OMU - Elmer Smith</td>
<td>Daviess</td>
</tr>
<tr>
<td>TVA – Shawnee</td>
<td>McCracken</td>
</tr>
</tbody>
</table>

Table 2 displays the five electric generating units (EGUs) that chose to model actual SO2 emissions for the model years (MY) 2012-2014. The actual SO2 emissions modeled for 2012-2014 are compared to 2017-2019 actual SO2 emissions. Emissions decreased in 2019 for three of the five sources. Of these three, LG&E – Trimble County had a slight decrease in SO2 emissions from 2018 to 2019. Emissions from LG&E – Trimble County are discussed later in this report.

TVA – Shawnee’s SO2 emissions increased from 2018; however, emissions have still significantly decreased in comparison to its modeled emissions of 2012-2014.

Sulphur dioxide emissions decreased by 36% at Ameren - Joppa Steam Plant, Joppa, IL, a nearby source included in TVA – Shawnee’s modeling, when comparing SO2 emissions from 2017-2019 (32,814 tons)3 to 2012 – 2014 (51,814 tons)4. Plant emission reductions have resulted in significant SO2 concentration reductions in the area of TVA – Shawnee. Additional information can be found in TVA – Shawnee’s modeling report under Appendix A.

Duke Energy – East Bend SO2 emissions data shows an increase since 2012; however, its SO2 emissions have fluctuated annually, both increasing and decreasing over the past three years. SO2 emissions from East Bend were higher in 2017 than they were in 2019.

Table 2: Annual SO2 Emissions for Sources Using MY 2012-2014 (tpy)

<table>
<thead>
<tr>
<th>Source</th>
<th>Modeled Years</th>
<th>Subsequent Years (actual emissions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2012</td>
<td>2013</td>
</tr>
<tr>
<td>Duke Energy – East Bend</td>
<td>1,496.63</td>
<td>2,197.72</td>
</tr>
<tr>
<td>EKPC – H. L. Spurlock</td>
<td>5,131.11</td>
<td>4,468.75</td>
</tr>
<tr>
<td>KU – Ghent</td>
<td>10,772.18</td>
<td>13,421.85</td>
</tr>
<tr>
<td>LG&amp;E – Trimble County</td>
<td>2,895.83</td>
<td>3,521.39</td>
</tr>
<tr>
<td>TVA – Shawnee</td>
<td>27,114.87</td>
<td>27,210.73</td>
</tr>
</tbody>
</table>

Emissions data acquired from the Air Markets Program Data database - https://ampd.epa.gov/ampd/

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3 Emissions data acquired from the Air Markets Program Data database
4 Emissions data acquired from the Air Markets Program Data database
Table 3 displays the emissions for OMU – Elmer Smith and Century Aluminum – Hawesville, which both modeled actual SO₂ emissions from 2014-2016. The comparison is to the most recent available actual SO₂ emissions. OMU – Elmer Smith had a slight increase in 2018 SO₂ emissions, as compared to 2017, and emissions dropped again in 2019. The facility has continued making significant reductions since 2014. Century Aluminum – Hawesville’s SO₂ emissions increased in 2019, but the average SO₂ emissions over 2017-2019 are 32% less than the average SO₂ emissions over 2014-2016.

Table 3: Annual SO₂ Emissions for Sources Using MY 2014-2016 (tpy)

<table>
<thead>
<tr>
<th>Source</th>
<th>Modeled Years</th>
<th>Subsequent Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Century Aluminum – Hawesville*</td>
<td>2,223.56</td>
<td>1,604.46</td>
</tr>
<tr>
<td>OMU – Elmer Smith**</td>
<td>5,741.38</td>
<td>3,901.59</td>
</tr>
</tbody>
</table>

*Emissions data acquired from the Kentucky Division for Air Quality Emissions Inventory
**Emissions data acquired from the Air Markets Program Data database - https://ampd.epa.gov/ampd/

Table 4 compares the averaged modeled emissions, the averaged emissions of subsequent years, and the percent change in averaged emissions of modeled years. Duke Energy – East Bend increased its emissions by 21.54% and LG&E – Trimble County increased its emissions by 19.67%. The other facilities show significant decreases in average percent changes in SO₂ emissions

Table 4: SO₂ Emissions Comparisons (tpy)

<table>
<thead>
<tr>
<th>Source</th>
<th>Average 2012-2014 (MY)</th>
<th>Current 3 Year Average (2017-2019)</th>
<th>Average Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duke Energy – East Bend**</td>
<td>1,932.35</td>
<td>2,348.60</td>
<td>21.54%</td>
</tr>
<tr>
<td>EKPC – H. L. Spurlock**</td>
<td>4,762.98</td>
<td>3,470.30</td>
<td>-27.14%</td>
</tr>
<tr>
<td>KU – Ghent**</td>
<td>13,015.10</td>
<td>9,266.91</td>
<td>-28.8%</td>
</tr>
<tr>
<td>LG&amp;E – Trimble County**</td>
<td>3,157.81</td>
<td>3,778.95</td>
<td>19.67%</td>
</tr>
<tr>
<td>TVA – Shawnee**</td>
<td>28,053.38</td>
<td>17,329.73</td>
<td>-38.23%</td>
</tr>
<tr>
<td>Century Aluminum – Hawesville*</td>
<td>1,445.02</td>
<td>982.58</td>
<td>-32.00%</td>
</tr>
<tr>
<td>OMU – Elmer Smith**</td>
<td>4,030.58</td>
<td>1,973.03</td>
<td>-51.05%</td>
</tr>
</tbody>
</table>

*Emissions data acquired from the Kentucky Division for Air Quality Emissions Inventory
**Emissions data acquired from the Air Markets Program Data database - https://ampd.epa.gov/ampd/

As part of the ongoing reporting, Kentucky must perform an annual review of SO₂ emissions for facilities and, if necessary, provide a recommendation for updated modeling due to increases in SO₂ emissions. As mentioned, both Duke Energy – East Bend and LG&E – Trimble County have an increase in SO₂ emissions. However, as demonstrated in the following sections, the total SO₂ emissions in the modeled areas have decreased.
Duke Energy – East Bend

The initial modeling characterization for Duke Energy – East Bend includes KU – Ghent in Kentucky, and Dynegy – Miami Fort in Ohio. The resulting modeled emissions and actual emissions of SO₂ for the three facilities are shown in Table 5 and Figure 1. Since the modeling analysis, Duke Energy – East Bend has seen an increase in SO₂ emissions. Duke Energy – East Bend identifies an increased utilization at East Bend as the cause for the increase in SO₂ emissions. Appendix B contains Duke Energy – East Bend’s explanation for the increase, which was submitted to the Cabinet for review.

Table 5: Duke Energy – East Bend, KU – Ghent, Dynegy – Miami Fort Annual SO₂ Emissions (tpy)

<table>
<thead>
<tr>
<th>Facility</th>
<th>Modeled Years</th>
<th>Subsequent Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2012</td>
<td>2013</td>
</tr>
<tr>
<td>Duke Energy – East Bend</td>
<td>1,496.63</td>
<td>2,197.72</td>
</tr>
<tr>
<td>KU – Ghent</td>
<td>10,772.18</td>
<td>13,421.85</td>
</tr>
<tr>
<td>Dynegy – Miami Fort</td>
<td>26,406.88</td>
<td>31,843.92</td>
</tr>
<tr>
<td>Area Total</td>
<td>38,675.69</td>
<td>47,463.49</td>
</tr>
</tbody>
</table>


Figure 1: Duke Energy - East Bend, KU – Ghent, and Dynegy – Miami Fort Annual SO₂ Emissions (tpy)

The KU – Ghent and Dynegy – Miami Fort facilities had decreases in emissions in the years following the initial modeling analysis. As seen in Table 6, although Duke Energy – East Bend had an increase in average emissions of 1,278.74 tons, there was a 48% overall decrease of SO₂ emissions in the area from these two nearby facilities, which greatly offset the increase at East Bend.
Table 6: Duke Energy – East Bend Modeled Area Percent Change in SO₂ Emissions

<table>
<thead>
<tr>
<th>Facility</th>
<th>2012-2014 Total Emissions (Tons)</th>
<th>2017-2019 Total Emissions (Tons)</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duke Energy – East Bend</td>
<td>5,797.06</td>
<td>7,045.80</td>
<td>22%</td>
</tr>
<tr>
<td>KU – Ghent</td>
<td>39,045.31</td>
<td>27,800.73</td>
<td>-29%</td>
</tr>
<tr>
<td>Dynegy – Miami Fort</td>
<td>86,729.47</td>
<td>34,185.66</td>
<td>-61%</td>
</tr>
<tr>
<td>Area Total</td>
<td>131,571.84</td>
<td>69,032.19</td>
<td>-48%</td>
</tr>
</tbody>
</table>

Emissions data acquired from the Air Markets Program Data database – https://ampd.epa.gov/ampd

Table 7 demonstrates the reduction in SO₂ concentrations in the area around Duke Energy – East Bend. The NKU monitoring data (site ID 21-037-3002) was used as background in the modeling analysis for East Bend. The latest complete three year design value (2017-2019) shows an 84% decrease since the three year design value from 2012-2014. The 2017-2019 SO₂ design value for the East Bend background monitor is 11 ppb, which is well below 75 ppb. Due to the significant reduction of SO₂, the Division does not recommend updated modeling.

Table 7: NKU SO₂ Monitor 99th Percentile (ppb)

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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>85</td>
<td>71</td>
<td>61</td>
<td>72</td>
<td>16</td>
<td>9</td>
<td>8</td>
<td>11</td>
<td>-84%</td>
</tr>
</tbody>
</table>

Data retrieved from EPA Outdoor Air Quality Monitor Values Report

LG&E – Trimble County

The initial modeling characterization for LG&E – Trimble County included Indiana-Kentucky Electric Corporation (IKEC) – Clifty Creek station and KU – Ghent. Figure 2 contains the area emissions from the modeled years and the recent three year actual emissions of SO₂ for the three facilities. For 2017 – 2019, LG&E – Trimble County had an average increase in SO₂ emissions over the modeled years. Based on the information provided by LG&E, found in Appendix C, the increase in SO₂ emissions was due to an increase in utilization at the facility.

On February 1, 2016, Indiana issued Commissioner’s Order 2016-02 to establish a combined emission limit for the six coal-fired boilers at Clifty Creek, which have reduced SO₂ concentrations in the area. The boilers were limited to a total of “2,624.5 lbs of SO₂ per hour as a 720 operating hour rolling average when any of Units No.1 through No. 6, or any combination thereof, is operating.”

Table 8: LG&E – Trimble County, KU – Ghent, IKEC – Clifty Creek Annual SO₂ Emissions (tpy)

<table>
<thead>
<tr>
<th>Facility</th>
<th>Modeled Years</th>
<th>Subsequent Years</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LG&amp;E – Trimble County</td>
<td>2,895.83</td>
<td>3,521.39</td>
<td>3,056.20</td>
<td>3,362.15</td>
<td>4,008.35</td>
<td>3,966.34</td>
<td></td>
</tr>
<tr>
<td>KU – Ghent</td>
<td>10,772.18</td>
<td>13,421.85</td>
<td>14,851.28</td>
<td>8,633.70</td>
<td>10,620.65</td>
<td>8,546.38</td>
<td></td>
</tr>
<tr>
<td>IKEC – Clifty Creek</td>
<td>52,838.92</td>
<td>19,562.58</td>
<td>3,731.23</td>
<td>4,860.01</td>
<td>5,126.57</td>
<td>4,191.13</td>
<td></td>
</tr>
<tr>
<td>Area Total</td>
<td>66,506.93</td>
<td>36,505.82</td>
<td>21,638.71</td>
<td>16,855.86</td>
<td>19,755.57</td>
<td>16,703.85</td>
<td></td>
</tr>
</tbody>
</table>

Emissions data acquired from the Air Markets Program Data database - https://ampd.epa.gov/ampd/

5 81 FR 27331
Figure 2: LG&E – Trimble, KU – Ghent Annual, and IKEC – Clifty Creek SO₂ (tpy)

Table 9 demonstrates that although LG&E – Trimble County had an increase in average SO₂ emissions of 1,863.42 tons, there has been a significant decrease of SO₂ emissions in the area. Despite the SO₂ emissions increase at LG&E – Trimble County, KU – Ghent and IKEC – Clifty Creek decreased emissions which overall resulted in a 57% decrease within the modeled area.

Table 9: LG&E – Trimble County Area Percent Change in SO₂ Emissions

<table>
<thead>
<tr>
<th>Facility</th>
<th>2012-2014 Area Emissions (Tons)</th>
<th>2017-2019 Area Emissions (Tons)</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>LG&amp;E - Trimble County</td>
<td>9,473.42</td>
<td>11,336.84</td>
<td>20%</td>
</tr>
<tr>
<td>KU – Ghent</td>
<td>39,045.31</td>
<td>27,800.73</td>
<td>-29%</td>
</tr>
<tr>
<td>IKEC – Clifty Creek</td>
<td>76,132.73</td>
<td>14,177.71</td>
<td>-81%</td>
</tr>
<tr>
<td>Area Total</td>
<td>124,651.46</td>
<td>53,315.28</td>
<td>-57%</td>
</tr>
</tbody>
</table>

Emissions data acquired from the Air Markets Program Data database – https://ampd.epa.gov/ampd

The overall emissions reductions are also evident at the background monitor used for the original modeling characterization. Table 10 shows a 77% reduction in SO₂ between the 2012 – 2014 design value and the 2017-2019 design value at the Green Valley Elementary monitor.

Table 10: Green Valley SO₂ Monitor 99th Percentile (ppb)

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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>32</td>
<td>21</td>
<td>44</td>
<td>32.3</td>
<td>8</td>
<td>9</td>
<td>5</td>
<td>7.3</td>
<td>-77%</td>
</tr>
</tbody>
</table>

Data retrieved from EPA Outdoor Air Quality Monitor Values Report
The design value for the LGE – Trimble County cumulative modeling analysis was 188 μg/m³ (Trimble’s contribution was 0.3 μg/m³), which was below the NAAQS value of 196 μg/m³. The ambient air data from the Green Valley monitor indicates the 2017-2019 design value of 7.3 ppb, which is well below 75 ppb. Given the significant decrease of the monitor design value, as well as the significant reduction of SO₂ emissions in the area, Kentucky does not recommend updated modeling for LG&E – Trimble County.

III. Conclusion

The Cabinet determines that five of the seven sources requiring evaluation for the annual report have decreased SO₂ emissions since the original modeling characterization, and do not require additional modeling to characterize ambient air quality. Although SO₂ emissions at Duke Energy – East Bend and LG&E – Trimble County have increased since the initial modeling characterization, those increases are offset by the significant SO₂ emissions reductions of the other modeled sources. Additionally, the ambient air monitoring data design values for the nearby air monitoring stations have also dropped significantly. Therefore, the Cabinet recommends no additional modeling for the remaining two sources.

IV. Public Notice

In accordance with 40 CFR 51.102, the Cabinet made this report available for public inspection and provided the opportunity for comments. The comment period was from August 10, 2020 through September 8, 2020. A copy of the public notice is available in Appendix D.
Appendix A

TVA - Shawnee SO₂ Modeling Report
July 7, 2016

Mr. Sean Alteri
Director
Kentucky Division for Air Quality
200 Fair Oaks Lane, 1st Floor
Frankfort, Kentucky 40601

Dear Mr. Alteri:

TENNESSEE VALLEY AUTHORITY (TVA) – SHAWNEE FCSSIL PLANT (SHF) – 1-HOUR SO₂ MODELING REPORT

Please find enclosed a report that describes the air dispersion modeling methodology and presents modeling results that demonstrate attainment with the 1-hour SO₂ NAAQS for designation purposes in the area surrounding SHF. Also enclosed is a disc containing the data referenced in the report.

If you have any questions or comments, please contact Cassi Wylie in Knoxville at 865-632-7933.

Sincerely,

[Signature]

J. Thomas Waddell
Senior Manager
Air Permits, Compliance and Monitoring

Enclosures
SHAWNEE FOSSIL PLANT

MODELING RESULTS
1-HOUR SO₂ NAAQS DESIGNATION

PADUCAH, KENTUCKY
JULY 2016
CONTENTS

Section                                                                 Page
1.0  Purpose and Background ......................................................... 1
2.0  Source Description ................................................................. 1
3.0  Modeling Analysis ................................................................. 1
    3.1  Emissions ........................................................................ 1
    3.2  Downwash........................................................................ 3
    3.3  Nearby Sources .................................................................. 5
    3.4  Model Selection and Options Used ...................................... 8
    3.5  Meteorology ..................................................................... 9
    3.6  Modeling Domain and Receptors ........................................ 10
    3.7  Background Air Quality .................................................... 10
4.0  Modeling Results and Conclusion ............................................... 12
5.0  References  ............................................................................. 12

TABLES

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SHF Coal-Fired Boilers Routine-Operation Stack Parameters</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Comparison of Modeled and Measured Stack-Exit Temperatures</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>BPPIPROM Input Structures for SHF01-05 and SHF06-09</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>GEP Stack Height Results for SHF01-05 and SHF06-09</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Nearby Sources of at Least Five (5) Tons per Year (tpy) Excluded from Modeling</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>Nearby Sources Included in the Modeling Analysis</td>
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<td>Stack Parameters for Nearby Sources</td>
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<tr>
<td>8</td>
<td>Auer Land Use Percentages by Category: SHF Study Area</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>Receptor Grid Size and Spacing</td>
<td>10</td>
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<td>10</td>
<td>Seasonal Hourly Concentrations Measured at Powell Street</td>
<td>11</td>
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<tr>
<td>11</td>
<td>Maximum Modeled Impacts of Actual Emissions (2012-2014)</td>
<td>12</td>
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FIGURES

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Page</th>
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<tbody>
<tr>
<td>1</td>
<td>Site Locality Map ..............................................................................</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>Topographical Map ..........................................................................</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Building Locations for Stack Downwash Analysis</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>SO\textsubscript{2} Sources Greater than Five (5) Tons per Year (tpy) in the Vicinity of SHF ................................</td>
<td>17</td>
</tr>
<tr>
<td>5</td>
<td>Locations of SHF, Nearby Sources Included in the Modeling, and the SO\textsubscript{2} Monitor .........................</td>
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<td>Auer Land Use Analysis - SHF Study Area  ..........................................................................................</td>
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<tr>
<td>7</td>
<td>SHF Receptor Elevation Plot ........................................................................</td>
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<tr>
<td>8</td>
<td>Second High 1-hour SO\textsubscript{2} Concentration (ppb) by Season Measured at the Powell Street Monitor ........</td>
<td>21</td>
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<tr>
<td>9</td>
<td>99\textsuperscript{th} Percentile 1-hour SO\textsubscript{2} Concentration Plot using Onsite Surface Characteristics</td>
<td>22</td>
</tr>
<tr>
<td>10</td>
<td>99\textsuperscript{th} Percentile 1-hour SO\textsubscript{2} Concentration Plot using NWS Surface Characteristics</td>
<td>23</td>
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</table>
1.0 PURPOSE AND BACKGROUND

The purpose of this document is to present the dispersion modeling results that were performed to assess compliance with the 1-hour SO2 NAAQS for designation purposes. The primary objective of the modeling analysis was to demonstrate that SO2 emissions from TVA Shawnee Fossil Plant (SHF) did not cause or contribute to a violation of the 1-hour SO2 NAAQS. This analysis was performed to characterize the designation status of McCracken County, Kentucky, and surrounding areas. The modeling analysis was performed following the recommendations outlined in the SO2 NAAQS Designations Modeling Technical Assistance Document (TAD), with reliance on all other applicable USEPA guidance documents (USEPA, 2016). Modeling methods and assumptions – such as model selection and options, source parameters, and meteorological data – used were presented in the SHF modeling protocol for review by the Kentucky Department of Air Quality (KDAQ) in December 2015. An earlier modeling report was submitted to KDAQ on March 24, 2016, prior to receiving comments on the SHF modeling protocol. This report presents revised modeling which incorporates changes in response to USEPA Region 4 and KDAQ’s comments on the modeling protocol.

2.0 SOURCE DESCRIPTION

SHF is located on the south bank of the Ohio River approximately 13 miles northwest of the mouth of the Tennessee River at Paducah, Kentucky. The facility consists of 10 coal-fired boilers and one (1) telecommunications emergency diesel engine in addition to coal, limestone, ash and hydrated lime handling facilities. Nine (9) of the 10 coal-fired boilers are currently operating. AFBC Boiler Unit 10 was idled in 2010 and retired June 30, 2014.

A site locality map (Figure 1) and a topographic map (Figure 2) provide details of the location and property boundaries.

Construction is underway for boilers 1 and 4 where dry scrubbers are being added to reduce sulfur dioxide (SO2) emissions. These air pollution controls will be in operation by December 31, 2017. The nine (9) coal-fired boilers combust a low-sulfur (less than two weight-percent) coal blend and ultra-low sulfur (15 parts per million by weight) fuel oil.

3.0 MODELING ANALYSIS

To determine maximum design impacts on 1-hour ambient SO2 levels for McCracken County, Kentucky, and surrounding areas, the modeling analysis focused on the contributions of SO2 from the nine (9) coal-fired boilers at SHF and other nearby sources (TVA, 2015). The inputs used in the modeling analysis are detailed in the subsequent sections.

3.1 EMISSIONS

Actual-hourly emissions for the three-year period from 2012 to 2014 were modeled for SHF. The coal fired boilers’ hourly continuous emissions monitoring system (CEMS) data were obtained from an EPA website supporting 1-hour SO2 modeling. Volumetric flow rates provided therein were reported in standard cubic feet per hour (scfh). Assuming pressure found at the stack exit is equal to pressure at standard conditions, the volumetric flow rates in scfh were converted to actual cubic feet per hour (acfh) as follows:

---

1 July 2, 2014 TVA letter to KDAQ, A60 140702 002.
2 https://www.epa.gov/air-emissions-modeling/state-level-hourly-sulfur-dioxide-so2-data.
3 40 CFR Part 72 Subpart A (Acid Rain Program General Provisions) defines standard conditions as 68°F and 29.92 inches of mercury (i.e., 29.92 in Hg). This definition is applicable to data collected under 40 CFR Part 75 (Continuous Emission Monitoring) [see Part 75, Subpart A, §75.3].
\[ V_a = V_s \times \frac{(T_a + 459.67^\circ F)}{(T_s + 459.67^\circ F)} \]  

where \( V_a \) is the stack-exit volumetric flow in acfh, \( V_s \) is the stack-exit volumetric flow at standard conditions, \( T_a \) is the actual stack-exit temperature (\(^\circ\)F), and \( T_s \) is the stack-exit temperature at standard conditions (68\(^\circ\)F). The hourly stack-exit velocities were subsequently calculated from the actual volumetric flow rates using stack cross-sectional area. Utilizing acfh more accurately represents stack-exit volumetric flow. Static stack parameters (height, diameter, and exit temperature) are provided in Table 1.

SHF’s April 2014 Title V permit renewal application stack-exit temperatures were used because stack-exit temperatures are not recorded by the CEMS. Averaged actual stack-exit temperatures recorded by unit-specific process thermocouples indicate less than two (2) percent difference from the Title V values. Therefore, the Title V permit application stack-exit temperatures were deemed representative of actual temperatures operations from 2012-2014 (Table 2).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>SHF01-05</th>
<th>SHF06-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTM Zone 16 Easting (NAD83)</td>
<td>m</td>
<td>342378</td>
<td>342059</td>
</tr>
<tr>
<td>UTM Zone 16 Northing (NAD83)</td>
<td>m</td>
<td>4113171</td>
<td>4113372</td>
</tr>
<tr>
<td>Base Elevation</td>
<td>m</td>
<td>106.7</td>
<td>106.7</td>
</tr>
<tr>
<td>Stack Height</td>
<td>m</td>
<td>243.8</td>
<td>243.8</td>
</tr>
<tr>
<td>Stack Inside Diameter</td>
<td>m</td>
<td>8.5</td>
<td>8.5</td>
</tr>
<tr>
<td>Stack-Exit Temperature</td>
<td>K</td>
<td>430</td>
<td>422</td>
</tr>
</tbody>
</table>

Notes:
1. SHF has two stack: Boiler Units 1 through 5 exhaust out one stack designated as SHF01-05, and Boiler Units 6 through 9 exhaust out of another stack designated SHF06-09.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Stack-Exit Temperature SHF01-05</th>
<th>Stack-Exit Temperature SHF06-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title V Permit App. Stack-Exit Temp. (^{[1]})</td>
<td>K</td>
<td>430.0</td>
<td>422.0</td>
</tr>
<tr>
<td>2012-2014 Avg. Actual Stack-Exit Temp. (^{[2]})</td>
<td>K</td>
<td>431.4</td>
<td>430.0</td>
</tr>
<tr>
<td>Difference</td>
<td>K</td>
<td>1.4</td>
<td>8.0</td>
</tr>
<tr>
<td>Percent Difference</td>
<td>%</td>
<td>0.3</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Notes:
1. Modeled stack-exit temperature; Title V Permit Renewal Application, Shawnee Fossil Plant, West Paducah, Kentucky, April 2014
2. Stack-exit temperatures measured by process thermocouples.

The one ancillary combustion source – a 99 horsepower diesel engine used to provide emergency power for an on-site telecommunications tower – was excluded from the modeling. This ancillary source is permitted to intermittently operate only 100 hours per year. According to Section 5.5 of the TAD, only

Shawnee Fossil Plant Modeling Report
1-Hour SO₂ NAAQS Designation

2
sources that are continuous or frequent enough to contribute significantly to the annual distribution of maximum daily 1-hour concentrations should be considered. Because the ancillary source operates infrequently, it is not expected to contribute to the annual distribution of daily maximum 1-hour SO₂ concentrations, so it was not included in the modeling.

3.2 DOWNWASH

Actual stack heights were used for the SHF modeling analysis in accordance with the SO₂ TAD (USEPA, 2016). In addition, building downwash was included in the modeling, with building parameters calculated using the USEPA’s Building Profile Input Program for PRIME, BIPPPRM, Dated 04274 (USEPA, 2004d). According to the GEP technical support document, a structure is considered nearby if it is within 5L of the emissions source, where L is the lesser dimension (height or projected width) of the nearby structure (USEPA, 1985). The nearby major structures within the SHF boundary are:

- Baghouse buildings;
- Powerhouse;
- Ancillary structures.

The direction-specific effective building widths and heights required by AERMOD were calculated using BIPPPRM. The BIPPPRM input stack and building parameters for SHF01-05 and SHF06-09 are provided in Table 3, and building locations are shown in Figure 3.

<table>
<thead>
<tr>
<th>Building Description</th>
<th>BPIP ID</th>
<th>Building ID #</th>
<th>Height (feet)</th>
<th>Height (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powerhouse Turbo-Generator Bay Ventilation</td>
<td>PWRHSEVent</td>
<td>1</td>
<td>17.8</td>
<td>5.4</td>
</tr>
<tr>
<td>Plenum/Room</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Powerhouse Turbo-Generator Bay</td>
<td>PWRHSEGenBay</td>
<td>2</td>
<td>58.1</td>
<td>17.7</td>
</tr>
<tr>
<td>Powerhouse Service Bay (Loading/Unloading</td>
<td>PWRHSEServBay</td>
<td>3</td>
<td>21.5</td>
<td>6.6</td>
</tr>
<tr>
<td>Area Bldg)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Powerhouse Service Bay A</td>
<td>PWRHSEServBayA</td>
<td>4</td>
<td>18.2</td>
<td>5.5</td>
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<tr>
<td>Powerhouse Office Wing</td>
<td>PWRHSEOffWing</td>
<td>5</td>
<td>28.5</td>
<td>8.7</td>
</tr>
<tr>
<td>Powerhouse Service Bay B</td>
<td>PWRHSEServBayB</td>
<td>6</td>
<td>24.5</td>
<td>7.5</td>
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<tr>
<td>Powerhouse Boiler-Bunker Bay</td>
<td>PWRHSEBBBay</td>
<td>7</td>
<td>104.2</td>
<td>31.7</td>
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<tr>
<td>UNIT 1 Precipitator</td>
<td>U1Prec</td>
<td>8</td>
<td>59.5</td>
<td>18.1</td>
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<tr>
<td>UNIT 2 Precipitator</td>
<td>U2Prec</td>
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<td>59.5</td>
<td>18.1</td>
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<tr>
<td>UNIT 3 Precipitator</td>
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<td>59.5</td>
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<tr>
<td>UNIT 6 Precipitator</td>
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<tr>
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<td>18.1</td>
</tr>
<tr>
<td>UNIT 9 Precipitator</td>
<td>U9Prec</td>
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<td>29.0</td>
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<td>UNIT 1 West Duct to Baghouse</td>
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(Continued on Next Page)

Shawnee Fossil Plant Modeling Report
1-Hour SO₂ NAAQS Designation
Table 3 (Continued)
BPIPPRM Input Structures for SHF01-05 and SHF06-09

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<th>Building ID</th>
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<th>Height (m)</th>
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<td>U9WDuctBag</td>
<td>34</td>
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<td>UNIT 10 East Duct to Baghouse</td>
<td>U10EDuctBag</td>
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<td>25.9</td>
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<td>UNIT 3 Baghouse Penthouse (Tier 4)</td>
<td>U1-10BH</td>
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<tr>
<td>UNIT 4 Baghouse Penthouse (Tier 5)</td>
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<td>UNIT 5 Baghouse Penthouse (Tier 6)</td>
<td>U1-10BH</td>
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<td>85.0</td>
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<tr>
<td>UNIT 6 Baghouse Penthouse (Tier 7)</td>
<td>U1-10BH</td>
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<td>85.0</td>
<td>25.9</td>
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<tr>
<td>UNIT 7 Baghouse Penthouse (Tier 8)</td>
<td>U1-10BH</td>
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<td>UNIT 8 Baghouse Penthouse (Tier 9)</td>
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<td>UNIT 9 Baghouse Penthouse (Tier 10)</td>
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<tr>
<td>Partner Office Building</td>
<td>PtnrOffBldg</td>
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<td>13.0</td>
<td>4.0</td>
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<tr>
<td>Duct to SHF 1-5 Chimney</td>
<td>DuctSHF1-5Chim</td>
<td>50</td>
<td>51.0</td>
<td>15.5</td>
</tr>
<tr>
<td>Partner Insulators &amp; Abatement Worker Bldg</td>
<td>PtnrInsAbtWkrBldg</td>
<td>51</td>
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<td>Duct to SHF 6-10 Chimney</td>
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<td>Training Center Building A</td>
<td>TrainCentBldgA</td>
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<td>TrainCentBldgB</td>
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<tr>
<td>Painters Offices and Break Room</td>
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</tr>
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</table>

(Continued on Next Page)
Table 3 (Continued)

<table>
<thead>
<tr>
<th>Building</th>
<th>BPIP ID</th>
<th>Building ID #</th>
<th>Height (feet)</th>
<th>Height (m)</th>
</tr>
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<tbody>
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</tr>
<tr>
<td>AFBC Boiler Building (Tier 4)</td>
<td>AFBCCBB</td>
<td>65</td>
<td>164.7</td>
<td>50.2</td>
</tr>
<tr>
<td>AFBC Pipe Chase</td>
<td>AFBCCPipeCh</td>
<td>66</td>
<td>33.0</td>
<td>10.1</td>
</tr>
<tr>
<td>AFBC Control Building</td>
<td>AFBCCConBldg</td>
<td>67</td>
<td>18.5</td>
<td>5.6</td>
</tr>
<tr>
<td>Coal Transfer Station</td>
<td>CoalTranSta</td>
<td>68</td>
<td>97.5</td>
<td>29.7</td>
</tr>
<tr>
<td>Crusher Building A</td>
<td>CrusherBldgA</td>
<td>69</td>
<td>14.6</td>
<td>4.4</td>
</tr>
<tr>
<td>Crusher Building (Tier 1)</td>
<td>CrusherBldgB</td>
<td>70</td>
<td>57.1</td>
<td>17.4</td>
</tr>
<tr>
<td>Crusher Building (Tier 2)</td>
<td>CrusherBldgB</td>
<td>71</td>
<td>63.3</td>
<td>19.3</td>
</tr>
</tbody>
</table>

The results from BPIPPRM showed that the AFBC Boiler Building and the Powerhouse Boiler-Bunker Bay were the influencing structures affecting dispersion and plume rise in the stacks. An overall GEP summary table for the coal-fired boilers is provided in Table 4.

Table 4

<table>
<thead>
<tr>
<th>Stack</th>
<th>Actual Stack Height (m)</th>
<th>GEP Stack Height (m)</th>
<th>GEP Building Height (m)</th>
<th>GEP Projected Building Width (m)</th>
<th>GEP Equation Height (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHF01-05</td>
<td>243.80</td>
<td>79.38</td>
<td>31.75</td>
<td>159.05</td>
<td>79.38</td>
</tr>
<tr>
<td>SHF06-09</td>
<td>243.80</td>
<td>118.62</td>
<td>47.45</td>
<td>63.41</td>
<td>118.62</td>
</tr>
</tbody>
</table>

3.3 NEARBY SOURCES

In addition to SHF’s contribution to the impacts of the 1-hr SO₂ NAAQS, emissions from nearby sources were evaluated. Emission inventories provided by KDAQ and Illinois Environmental Protection Agency (IEPA) were evaluated using the following criteria to determine which nearby sources needed to be modeled: 1) sources located within 10 km of SHF with emissions of at least one (1) ton per year; and 2) sources located between 10 km and 50 km of SHF with a Q/D (annual emissions in tons / distance in km) greater than 20. Sources with a Q/D less than 20 and sources beyond 50 km were indirectly accounted for in the background monitored concentration. As discussed in Section 3.7, the SO₂ observations from the Powell Street monitor (AIRS ID 21-145-1024 POC 1) in McCracken County (Paducah), Kentucky, were used to account for the potential impacts of other natural sources, nearby small sources, and distant major sources.

Nearby sources with emissions greater than five (5) tons per year (tpy) are shown in Figure 4. Sources that were not included in the modeling are listed in Table 5. These sources did not meet the screening criteria or had recent plant modifications that significantly reduced or eliminated major sources of SO₂.
emissions. The ISP Chemicals, LLC, facility retired their coal-fired boiler on September 7, 2014, and replaced it with three natural-gas fired boilers. The Fluor Federal Services Inc. - Paducah Gas Plant officially removed their three coal-fired boilers from service on January 31, 2016. They were replaced with five natural-gas fired boilers.

Most of the excluded sources fell below the Q/D threshold or were located beyond 50 km. While the Q/D for the CC Metals and Alloys, LLC, facility is slightly greater than 20, it is located approximately 40 km away which is distant enough that impacts would be significantly reduced in terms of overlapping with those of SHF. Therefore, its SO₃ impacts were treated as regional in nature and assumed to be captured by the ambient monitor. Additionally, since the monitor is influenced by several large SO₂ sources which were included in the modeling, background concentrations are high enough to adequately capture any possible impact from CC Metals and Alloys, LLC.

Table 5
Nearby Sources of at Least Five (5) Tons per Year (tpy) Excluded from Modeling

<table>
<thead>
<tr>
<th>Nearby Source</th>
<th>Location</th>
<th>Distance (km)</th>
<th>2012 Total Emissions (tons)</th>
<th>2013 Total Emissions (tons)</th>
<th>2014 Total Emissions (tons)</th>
<th>Max Q/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bunge North America Inc.</td>
<td>IL</td>
<td>38.8</td>
<td>19.9</td>
<td>0.2</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>CC Metals and Alloys, LLC</td>
<td>KY</td>
<td>39.4</td>
<td>923.6</td>
<td>751.3</td>
<td>810.5</td>
<td>23.7</td>
</tr>
<tr>
<td>Clyde L Choate Mental Health Center</td>
<td>IL</td>
<td>54.8</td>
<td>788.0</td>
<td>728.7</td>
<td>656.1</td>
<td>14.4</td>
</tr>
<tr>
<td>ET Simonds Construction Co.</td>
<td>IL</td>
<td>54.0</td>
<td>5.6</td>
<td>4.6</td>
<td>4.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Fluor Federal Services Inc. - Paducah Gaseous Diffusion Plant</td>
<td>KY</td>
<td>6.1</td>
<td>398.6</td>
<td>851.5</td>
<td>302.5</td>
<td>140.3</td>
</tr>
<tr>
<td>ISP Chemicals, LLC [2]</td>
<td>KY</td>
<td>39.0</td>
<td>1,891.6</td>
<td>2,087.1</td>
<td>1,349.4</td>
<td>53.5</td>
</tr>
<tr>
<td>Mounds Production Co., LLC</td>
<td>IL</td>
<td>38.4</td>
<td>9.3</td>
<td>8.2</td>
<td>7.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Murray Paving Inc.</td>
<td>KY</td>
<td>73.8</td>
<td>6.8</td>
<td>6.1</td>
<td>5.9</td>
<td>0.1</td>
</tr>
<tr>
<td>Rogers Group Inc. - Marion Quarry Asphalt Plant</td>
<td>KY</td>
<td>74.6</td>
<td>5.2</td>
<td>4.5</td>
<td>3.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Southern Illinois Power Coop</td>
<td>IL</td>
<td>54.2</td>
<td>5,846.9</td>
<td>8,365.7</td>
<td>8,650.9</td>
<td>159.6</td>
</tr>
<tr>
<td>Vienna Correctional Center</td>
<td>IL</td>
<td>27.7</td>
<td>169.3</td>
<td>184.9</td>
<td>200.0</td>
<td>7.2</td>
</tr>
<tr>
<td>Wickliffe Paper Company</td>
<td>KY</td>
<td>35.4</td>
<td>580.4</td>
<td>552.5</td>
<td>560.5</td>
<td>16.4</td>
</tr>
</tbody>
</table>

Notes:
1. Annual emissions reflect facility-wide total of all SO₂ emission sources.
2. SO₂ Sources at these facilities have been retired.

Sources meeting the screening criteria and included in the modeling analysis are shown in Table 6 and Figure 5. If one SO₂ source at a facility met the screening criteria, then all other significant SO₂ sources associated with the facility were included in the modeling. There were no clusters of sources within 50 km which, when combined, would potentially have an impact on the concentrations in the area.

---

4 November 30, 2015, KDAQ Statement of Basis for Source ID: 21-157-00003 (Permit: V-12-039-R1).
5 August 11, 2015, KDAQ Statement of Basis for Source ID: 21-145-00074 (Permit: V-14-012-R1).

Shawnee Fossil Plant Modeling Report
1-Hour SO₂ NAAQS Designation

6
<table>
<thead>
<tr>
<th>Nearby Source</th>
<th>Distance from SHF (km)</th>
<th>2012 Annual Emissions (tons)</th>
<th>2013 Annual Emissions (tons)</th>
<th>2014 Annual Emissions (tons)</th>
<th>Max Source Q/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honeywell International Inc., Stack 0062</td>
<td>2.7</td>
<td>163.1</td>
<td>58.7</td>
<td>144.1</td>
<td>60</td>
</tr>
<tr>
<td>Lafarge Midwest Inc. - Portland Cement, Stack 0052</td>
<td>11.9</td>
<td>108.3</td>
<td>0.0</td>
<td>1.9</td>
<td>9</td>
</tr>
<tr>
<td>Lafarge Midwest Inc. - Portland Cement, Stack 0066</td>
<td>12.0</td>
<td>385.5</td>
<td>551.0</td>
<td>487.6</td>
<td>46</td>
</tr>
<tr>
<td>Electric Energy Inc. - Joppa, Stack 0001, Boiler 1</td>
<td>9.7</td>
<td>2,998.1</td>
<td>2,837.4</td>
<td>3,081.6</td>
<td>316</td>
</tr>
<tr>
<td>Electric Energy Inc. - Joppa, Stack 0001, Boiler 2</td>
<td>9.7</td>
<td>2,925.2</td>
<td>2,747.6</td>
<td>3,093.0</td>
<td>317</td>
</tr>
<tr>
<td>Electric Energy Inc. - Joppa, Stack 0002, Boiler 3</td>
<td>9.8</td>
<td>2,714.3</td>
<td>2,609.6</td>
<td>2,939.2</td>
<td>300</td>
</tr>
<tr>
<td>Electric Energy Inc. - Joppa, Stack 0002, Boiler 4</td>
<td>9.8</td>
<td>3,022.7</td>
<td>2,793.7</td>
<td>3,150.4</td>
<td>322</td>
</tr>
<tr>
<td>Electric Energy Inc. - Joppa, Stack 0003, Boiler 5</td>
<td>9.8</td>
<td>2,512.5</td>
<td>2,791.3</td>
<td>2,860.1</td>
<td>291</td>
</tr>
<tr>
<td>Electric Energy Inc. - Joppa, Stack 0003, Boiler 6</td>
<td>9.8</td>
<td>2,818.2</td>
<td>2,761.1</td>
<td>3,162.5</td>
<td>322</td>
</tr>
</tbody>
</table>

Notes:
1. Provided by KDAQ and IEPA.

CEMS data with hourly varying emissions for Electric Energy Inc. - Joppa (Joppa) were downloaded from the USEPA State-Level Hourly Sulfur Dioxide (SO₂) Data website. Hourly varying stack-exit velocities and stack-exit temperatures were provided by the IEPA AERMOD emission file. All other Joppa stack parameters came from the IEPA emissions inventory.

The IEPA AERMOD emissions file also provided hourly varying emissions, stack-exit velocities, and stack-exit temperatures for the Lafarge Midwest Inc. (Lafarge) sources; and hourly emissions for the Honeywell International, Inc. (Honeywell) source. The corresponding IEPA AERMOD input file provided all other stack parameters for Lafarge and Honeywell. The hourly AERMOD emissions file, the AERMOD input file, and the emissions inventory furnished by IEPA are included on the enclosed optical disc.

Stack parameters for the nearby sources included in the modeling are shown in Table 7. No building downwash was performed for these sources. For the Joppa plant, two boilers exhaust out of one stack; the boilers are paired by identical stack parameters. Therefore, the CEMs-based emission rates for each pair of identical boilers were combined for each of the three (3) stacks and modeled.

---

6 [https://www.epa.gov/air-emissions-modeling/state-level-hourly-sulfur-dioxide-so2-data/](https://www.epa.gov/air-emissions-modeling/state-level-hourly-sulfur-dioxide-so2-data/)
7 HOURLY_EMISSIONS_Joppa_Study_Area_SO2_Phase_II_2012-2014.txt provided by IEPA
8 Joppa_Study_Area_SO2_Phase_II_2012-2014_FINAL_3yrs_SO2.DTA provided by IEPA
Table 7
Stack Parameters for Nearby Sources [1]

<table>
<thead>
<tr>
<th>Source</th>
<th>UTM 16 Easting (NAD83)</th>
<th>UTM 16 Northing (NAD83)</th>
<th>Base Elevation (m)</th>
<th>Stack Height (m)</th>
<th>Stack Inside Diameter (m)</th>
<th>Stack Exit Velocity (m)</th>
<th>Stack Exit Temp. (K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honeywell International Inc., Stack 0062 [2]</td>
<td>344073</td>
<td>4115307</td>
<td>114.0</td>
<td>47.2</td>
<td>2.1</td>
<td>2.64</td>
<td>462.6</td>
</tr>
<tr>
<td>Lafarge Midwest Inc. - Portland Cement, Stack 0052 [2]</td>
<td>332959</td>
<td>4120524</td>
<td>108.2</td>
<td>76.2</td>
<td>2.6</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>Lafarge Midwest Inc. - Portland Cement, Stack 0066 [2]</td>
<td>332967</td>
<td>4120560</td>
<td>108.3</td>
<td>45.7</td>
<td>3.7</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>Electric Energy Inc. - Joppa, Stack 0001, Boilers 1 and 2</td>
<td>335067</td>
<td>4119613</td>
<td>104.5</td>
<td>167.6</td>
<td>5.5</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>Electric Energy Inc. - Joppa, Stack 0002, Boilers 3 and 4</td>
<td>335109</td>
<td>4119720</td>
<td>105.5</td>
<td>167.6</td>
<td>5.5</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>Electric Energy Inc. - Joppa, Stack 0003, Boilers 5 and 6</td>
<td>335154</td>
<td>4119837</td>
<td>106.3</td>
<td>167.6</td>
<td>5.5</td>
<td>Variable</td>
<td>Variable</td>
</tr>
</tbody>
</table>

Notes:
1. Provided by IEPA emissions inventory unless noted.
2. Provided by IEPA AERMOD input file.
3. Provided by IEPA AERMOD emissions file.

3.4 MODEL SELECTION AND OPTIONS USED

For area designations under the 1-hour SO₂ primary NAAQS, the American Meteorological Society / Environmental Protection Agency Regulatory Model (AERMOD) should be used unless use of an alternative model can be justified (USEPA, 2005). Air quality dispersion modeling was performed using AERMOD (Version 15181) to obtain estimates of maximum ambient impacts (USEPA, 2004a; USEPA, 2015b).

The options used within the model were the recommended default regulatory options, which included the following:

- Appropriate treatment of calms and use of missing meteorological data routines;
- Inclusion of actual receptor elevations;
- Incorporation of complex / intermediate terrain algorithms;
- Calculations of stack tip downwash and direction-specific building downwash.

According to the SO₂ TAD, the “urban” or “rural” determination of a source is important in determining the boundary layer characteristics that affect AERMOD’s prediction of downwind concentrations as well as the possible invocation of the 4-hour half-life for urban SO₂ sources (USEPA, 2016). In order to determine the rural / urban characterization of a modeling study area and the dispersion coefficients to use in AERMOD, a land use analysis is required (USEPA, 2005). The USEPA guidance recommends the use of the Auer land use scheme within three (3) kilometers of a source to classify the predominant dispersion regime (USEPA, 2005). If the percentage of land-use types that are characteristic of heavy industrial,
light-moderate industrial, commercial, or compact residential account for 50 percent or more within the three kilometers, the modeling area is classified as urban, and the urban dispersion options in AERMOD should be used. Otherwise, the area is classified and modeled as rural.

The Auer method was used to determine the land use status of the area around SHF. A three-kilometer radius was centered on the SHF01-05 stack, and the land use was categorized based on the Auer classifications (Auer, 1978). The data source for the land cover was the 2011 National Land Cover Database (NLCD), with a data cell size (raster) of 30 meters by 30 meters. The results of the Auer land use analysis for the SHF study area are presented in Figure 6 and Table 8. The analysis indicates that the SHF study area is approximately 97.6% rural and 2.5% urban. Therefore, the rural option was used in AERMOD.

<table>
<thead>
<tr>
<th>SO2 Modeling</th>
<th>Auer's Analysis - NLCD 2011</th>
<th>Shawnee - 3 km Ring</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLCD Value</td>
<td>NLCD 2011 Descriptions</td>
<td>Auer's Code</td>
</tr>
<tr>
<td>23</td>
<td>Developed, Medium Intensity</td>
<td>R2/R3</td>
</tr>
<tr>
<td>24</td>
<td>Developed, High Intensity</td>
<td>H11/2/CI</td>
</tr>
<tr>
<td>11</td>
<td>Open Water</td>
<td>A5</td>
</tr>
<tr>
<td>21</td>
<td>Developed, Open Space</td>
<td>A1/R4</td>
</tr>
<tr>
<td>22</td>
<td>Developed, Low Intensity</td>
<td>R1</td>
</tr>
<tr>
<td>31</td>
<td>Barren Land (Rock/Sand/Clay)</td>
<td>A3</td>
</tr>
<tr>
<td>41</td>
<td>Deciduous Forest</td>
<td>A4</td>
</tr>
<tr>
<td>42</td>
<td>Evergreen Forest</td>
<td>A4</td>
</tr>
<tr>
<td>71</td>
<td>Grassland/Herbaceous</td>
<td>A3</td>
</tr>
<tr>
<td>81</td>
<td>Pasture/Hay</td>
<td>A3</td>
</tr>
<tr>
<td>82</td>
<td>Cultivated Crops</td>
<td>A2</td>
</tr>
<tr>
<td>90</td>
<td>Wood Wetlands</td>
<td>A4</td>
</tr>
<tr>
<td>95</td>
<td>Emergent Herbaceous Wetlands</td>
<td>A3</td>
</tr>
<tr>
<td></td>
<td>(Analyis based on 30 meter by 30 meter raster cells extracted for each area.)</td>
<td></td>
</tr>
</tbody>
</table>

Table 8
Auer Land Use Percentages by Category: SHF Study Area

3.5 METEOROLOGY

Given that site-specific meteorological data is not available for the SHF site, surface data collected by the NWS at the Paducah Barkley Regional Airport (PAH) in Paducah, Kentucky, were used. Data for the three-year period from 2012 to 2014 were used. Twice daily soundings for the same time period from the NWS at the Nashville International Airport (BNA) in Nashville, Tennessee, were used for the upper air data.

The data were processed using the AERMET (Version 15181) meteorological data preprocessor for AERMOD (USEPA, 2004b; USEPA, 2015a). In addition, 1-minute ASOS wind data available from the National Climatic Data Center (NCDC) for the PAH NWS site were processed with AERMINUTE (Version 15272) to generate hourly averaged wind speed and wind direction to supplement the standard hourly NWS observations. Because the PAH NWS site is an Ice Free Wind (IFW) station with a commission date of February 22, 2007, AERMINUTE flagged the 2012-2014 winds as non-calm. The wind speeds were converted from knots to meters per second (m/s) because the threshold for sonic anemometers is effectively zero. No minimum wind speed threshold values were set in AERMET.

Two sets of meteorology were modeled, with one set using the onsite surface characteristics and another set using the surface characteristics of the NWS station. Details of the meteorological processing are
provided in the modeling protocol (TVA, 2015). The AERMET input and output files are included on the enclosed optical disc.

3.6 MODELING DOMAIN AND RECEPTORS

For the purposes of 1-hour SO₂ designation determination, the modeling domain was a Cartesian grid centered at the SHF site and extended out 20 km in each direction. The extent of this grid was expected to be sufficient to capture maximum impacts from SHF and all nearby sources.

The modeling was performed using a series of nested gridded receptor sets around SHF and the Joppa plant. Boundary receptors were also placed along the perimeter of the fenced area of the SHF property and spaced 50 meters (m) apart. These boundary receptors corresponded to a permanent fence surrounding the property.

The nested receptor grids surrounded the facility sites with the exception of those falling inside the SHF fenced boundary area, which were removed. Because concentration gradients are most pronounced near a source, the receptor spacing varied with distance from the SHF and Joppa sites with those nearest the sites more closely spaced than those further away. The origin of each grid was located in the southwest corner. The receptor spacing is provided in Table 9.

<table>
<thead>
<tr>
<th>Source</th>
<th>Receptor Spacing (m)</th>
<th>Grid Size (km)</th>
<th>Grid Origin (km south and west of site)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHF</td>
<td>100</td>
<td>6 x 6</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>10 x 10</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>500</td>
<td>40 x 40</td>
<td>20</td>
</tr>
<tr>
<td>Joppa</td>
<td>100</td>
<td>6 x 6</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>10 x 10</td>
<td>5</td>
</tr>
</tbody>
</table>

Elevations for all receptors were extracted from U.S. Geological Survey (USGS) National Elevation Dataset (NED) files using the AERMAP terrain processor (Version 11103) of the AERMOD modeling system (http://nationalmap.gov/elevation.html) (USEPA, 2004c). A receptor elevation plot is presented in Figure 7. The AERMAP input and output files are included on the enclosed optical disc.

3.7 BACKGROUND AIR QUALITY

The SO₂ TAD states that the inclusion of ambient monitored background concentrations in the model results is important in determining the cumulative impact of the target source and other contributing nearby sources impacts (USEPA, 2016).

Therefore, in order to capture the impact of natural sources, minor nearby sources, and distant major sources which were not included in the modeling, ambient SO₂ concentrations measured at the nearby monitoring site at Powell Street (AIRS ID 21-145-1024 POC 1) in McCracken County (Paducah), Kentucky, were used. This monitor is located approximately 13 miles southeast of SHF (Figure 1). It is located just outside of the urban core of Paducah and is influenced by the heavier industrial and urban-related sources. The Powell Street monitor was determined to be the best choice for representing background SO₂ concentrations, because it is close to SHF, meets the data completeness requirements for 2012-2014, and it is representative of the air quality in the vicinity of SHF. This monitor is located close
to the large SO\textsubscript{2} sources which were included in the modeling analysis; therefore, these background concentrations are conservative and likely “double count” some impacts of the modeled sources.

Specifically, the 2\textsuperscript{nd} highest measured 1-hour SO\textsubscript{2} concentration for each hour of the day by season averaged across the 2012-2014 period was used to capture the impact of sources in the vicinity of SHF which were not included in the modeling (Table 10 and Figure 4). No wind directions were excluded to remove the impacts of SHF or other modeled sources on the monitor.

Table 10
Seasonal Hourly Concentrations Measured at Powell Street\textsuperscript{[1,2,3]}

<table>
<thead>
<tr>
<th>Hour</th>
<th>Background SO\textsubscript{2} Concentration (ppb)\textsuperscript{[4]}</th>
<th>Winter</th>
<th>Spring</th>
<th>Summer</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4.7</td>
<td>3.0</td>
<td>2.3</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5.0</td>
<td>4.0</td>
<td>1.3</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4.7</td>
<td>2.0</td>
<td>1.3</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>6.0</td>
<td>3.0</td>
<td>1.0</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4.7</td>
<td>3.0</td>
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Notes:
1. USEPA Air Quality System (AQS) Data Mart: http://www3.epa.gov/airquality/airdata/
2. 2\textsuperscript{nd} highest measured 1-hour SO\textsubscript{2} concentration for each hour of the day and each season were averaged across the 2012-2014 period.
3. No wind directions were excluded to remove the impact of SHF or other modeled sources on the monitor.
4.0 MODELING RESULTS AND CONCLUSION

The modeling analysis of actual emissions for SHF demonstrates compliance with the 1-hour SO$_2$ NAAQS. The maximum modeled impact was 68.9 ppb, indicating that SHF did not cause or contribute to a violation of the 1-hour SO$_2$ NAAQS (Table 11). These results include the impact of actual hourly emissions from the Joppa, Honeywell, and Lafarge sources, with background concentrations from the Powell Street monitor.

<table>
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<th>Met Surface Characteristics</th>
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<td>UTM Northing (m)</td>
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Notes:
1. Modeled impacts include the impact of actual hourly emissions from Joppa, Honeywell, and Lafarge; and seasonal hourly background concentrations from the Powell Street monitor in Paducah, Kentucky.
2. 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour SO$_2$ concentrations.

Plots showing the spatial distribution of modeled impacts for each set of meteorological surface characteristics are presented in Figures 9 and 10. The distance from SHF to the receptor with the highest concentration was 12.66 km for both the onsite and NWS surface characteristics. For both scenarios, the maximum predicted concentration occurred at receptors that fell inside a 100-meter spaced receptor grid.

The input and output files for the AERMOD model runs provide additional details on the dispersion modeling and are included on the enclosed optical disc.

These modeling results show that maximum predicted impacts of actual SO$_2$ emissions from SHF and nearby sources during 2012-2014 result were below the 1-hour SO$_2$ NAAQS, indicating that SHF did not cause or contribute to a violation of the NAAQS. Based on this and the consideration of other SO$_2$ sources in the area, an attainment designation for McCracken County is recommended.

5.0 REFERENCES


Figure 2
Topographical Map
Figure 3
Building Locations for Stack Downwash Analysis
Figure 4
SO2 Sources Greater than Five (5) Tons per Year in the Vicinity of SHF

Shawnee Fossil Plant Modeling Report
1-Hour SO2 NAAQS Designation
Figure 7
SHF Receptor Elevation Plot
Seasonal Mean 2\textsuperscript{nd} Highest 1-hour SO\textsubscript{2} by Hour

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure8}
\caption{Second High 1-hour SO\textsubscript{2} Concentration (ppb) by Season Measured at the Powell Street Monitor}
\end{figure}
Figure 9
99th Percentile 1-hour SO₂ Concentration Plot using
Onsite Surface Characteristics

SHF and Nearby Sources - 2012-14 Actual Hourly Emissions
with Powell Street Seasonal Background
3-yr Average of the 4th High Max Daily 1-hr SO₂ Concentrations
Paducah, KY NMS Data / SHF-Site Surface Characteristics

Maximum Impact:
65.1 ppb
NAAQS = 75 ppb

Concentration Levels:
- 21.7 to 32.5 ppb
- 32.5 to 43.4 ppb
- 43.4 to 54.2 ppb
- 54.2 to 65.1 ppb

Northing (m)
4130000 4125000 4120000 4115000 4110000 4105000 4100000 4095000
Easting (m)
3190000 3195000 3200000 3205000 3210000 3215000 3220000 3225000
Figure 10
99th Percentile 1-hour SO₂ Concentration Plot using NWS Surface Characteristics

Shawnee Fossil Plant Modeling Report
1-Hour SO₂ NAAQS Designation
23
Appendix B

Duke Energy - East Bend Response
APPENDIX B

Duke Energy is providing this response to KDAQ’s inquiry into the relative increase in SO2 emissions from East Bend Generating Station between the model base year of 2012-2014 and 2017-2019.

The 22% increase in SO2 emissions at East Bend Generating Station can be attributed to the following factors:

- An increase in the unit dispatch due to demand growth during 2017-2019. The increase in unit dispatch is reflected in a 3% increase in the Gross Megawatt output between 2012-2014 and 2017-2019.

- A lower SO2 emissions rate during 2012, the first year of baseline modeling. The SO2 emission rate during 2012 averaged 0.09 lbs/MMBtu, but was 0.12 and 0.13 lbs/MMBtu in 2013 and 2014. The annual average SO2 lbs/MMBtu emissions rate has remained relatively consistent between years 2013 to 2019 with a range between 0.11 and 0.13 lb/MMBtu.

- Flow data is used to calculate the SO2 mass emissions. A review of the flow data shows a step change in the flow rate occurred in 2014. In 2014, the CEMS flow monitor was replaced with a new monitoring device intended to provide more reliable and accurate flow measurement. While both the old monitor and the new monitor have been demonstrated to meet all EPA certification and operational requirements under 40 CFR 75 and 40 CFR 60, some of the apparent increase in emissions may be attributed to a step change in reported flow values after installation and certification of the new monitoring system.

Duke Energy does not believe the increase in the SO2 emissions between 2012-2014 compared to 2017-2019 should trigger remodeling due to following modeled impacts:

- East Bend’s contribution to the modeled design value, used to demonstrate attainment with the SO2 NAAQS of 196.5 ug/m³, was negligible. The modeled design value was 169.84 ug/m³, which includes background concentrations and impacts from Ghent, Miami Fort and East Bend Generating Stations. East Bend’s contribution to the modeled design value was only 0.05 ug/m³.

- East Bend’s impacts over the modeling domain was not significant. East Bend’s 4th high daily max concentration, averaged over 3 years, at any one receptor, was only 23.707 ug/m³.

- The background concentrations used in the initial modeling analysis were significantly impacted by nearby sources, resulting in overly conservative impacts. The SO2 modeling analysis included background concentrations from the Northern Kentucky SO2 monitoring site over the period from 2013-2015. The average background concentrations reflected in the annual 4th high daily max concentration, averaged over 3 years, was 86 ug/m³. The 2017-2019 design value for the Northern Kentucky SO2 monitor is 28.8 ug/m3 or 11 ppb.

Let me know if you have any questions or concerns.

Thanks
Appendix C

LG&E - Trimble Response
APPENDIX C

Mr. Cordes,

Louisville Gas & Electric (LG&E) Trimble County Generating Station’s variation in SO₂ emissions is largely attributed to an increase in utilization. Due to retirements of units in the LG&E and KU Energy (LKE) fleet, we are shifting our generation to newer units within our fleet. Individual unit utilization varies annually based on electricity usage rates, fuel costs, planned outages, etc. Planned outages for compliance with new or revised regulations requiring installation of new equipment such as emission controls and dry ash handling systems has increased utilization to displace the loss of generation from other units within the fleet during this time period. Trimble County Unit 1 has seen the largest increase in utilization since Trimble County Unit 2 is historically a base load unit.

In addition, the submitted modeling results also included contributions from the LKE Ghent Generating Station. In the time periods specified below, the Ghent SO₂ emissions decreased by 28.8%. Combining emissions from both LKE sources, data shows there is a 19.34% decrease in SO₂ emissions from the LKE sources when comparing the 2012-2014 modeled time period to the 2017-2019 time period. Thus, further validating the modeled results in demonstrating attainment with the 1 hr SO₂ NAAQS.

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Brandan Burfict
Appendix D

Public Hearing
KENTUCKY DIVISION FOR AIR QUALITY
PUBLIC NOTICE FOR
THE SULFUR DIOXIDE DATA REQUIREMENTS RULE 2020 ANNUAL REPORT

The Kentucky Energy and Environment Cabinet (Cabinet) is proposing this annual report for the Sulfur Dioxide (SO₂) Data Requirements Rule (DRR) for the 2010 1-Hour SO₂ National Ambient Air Quality Standards (NAAQS). The United States Environmental Protection Agency (EPA) established this rule for air agencies to annually characterize current air quality in areas with large sources of SO₂ emissions.

In accordance to 40 CFR 51.102, the Cabinet is making this proposed plan available for public inspection and provides the opportunity for public comment. The proposed plan can be found at https://eec.ky.gov/Environmental-Protection/Air/Pages/Public-Notices.aspx. The public comment period will be open from August 10, 2020 through September 8, 2020. Comments should be submitted in writing to the contact person by either mail or email.

CONTACT PERSON: Ashlee Whisman, Environmental Scientist I, Evaluation Section, Division for Air Quality, 300 Sower Boulevard, Frankfort, Kentucky 40601. Phone: (502) 782-4716; Email: ashlee.whisman@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.
Statement of Consideration

From August 10, 2020 until September 8, 2020, the Kentucky Energy and Environment Cabinet provided an opportunity for public comments on the proposed 2020 annual report for the Sulfur Dioxide (SO$_2$) Data Requirements Rule (DRR) for the 2010 1-Hour SO$_2$ National Ambient Air Quality Standards (NAAQS). During the public comment period, the only comments received were from the U.S. Environmental Protection Agency (EPA). The comments from EPA and the responses from the Kentucky Division for Air Quality (Division) are listed below.

1. **Comment: LG&E Trimble County** (pages 5-6) - Due to an increase in emissions at LG&E Trimble for two consecutive reporting periods, the EPA recommends that Kentucky provide additional justification for why the DRR source would not need to remodel. One potential option could include discussing the facility’s contribution to the Round 3 designations modeled concentration like the analysis in Appendix B for Duke Energy - East Bend. Another option could include assessing the hourly emissions data from LG&E Trimble to provide a better indicator of continued compliance with the national ambient air quality standards (NAAQS) during times when annual emissions increased. If Kentucky would be interested in supplementing their analysis with an evaluation of the hourly emissions data, the EPA is available for further discussion of how to conduct this analysis.

   Response: The Division acknowledges this comment. Additional justification to address why the DRR source does not require updated modeling has been included in the report on pages 5-7 under LG&E – Trimble County.

2. **Comment: LG&E Trimble County** (pages 5-6) - The EPA recommends Kentucky consider assessing any changes to Indiana-Kentucky Electric Corporation – Clifty Creek station’s potential to emit since the 2012-2014 modeling analysis as part of the Commonwealth’s comprehensive assessment of emission data trends for the area for this reporting period.

   Response: The Division acknowledges this comment. Information concerning the emissions data trends for IKEC – Clifty Creek have been added to pages 5 and 6 the report.

3. **Comment: Duke Energy – East Bend** (pages 3-4) - The EPA notes the Commonwealth’s 2019 DRR report assessed SO$_2$ emissions data for the Dynergy - Miami Fort facility nearby source in as part of the comprehensive emission review in the area. The EPA recommends Kentucky provide emission trends data for the Dynergy - Miami Fort facility or provide clarification why a discussion of the facility’s recent emission trends was not included in the 2020 DRR emissions report.
Response: The Division acknowledges this comment. Information concerning the emissions data trends for Dynegy – Miami Fort have been added to pages 4 and 5 of the report.

4. Comment: **Table 6 - Duke Energy – East Bend Modeled Area Percent Change in SO2 Emissions** (page 4) - The EPA recommends Kentucky review the 2017-2019 total emissions and percent change provided in Table 6 for Duke Energy-East Bend and Kentucky Utility – Ghent facilities. The sum of 2017-2019 total emissions for the Duke Energy – East Bend and Kentucky Utilities – Ghent facilities is 34,846.53 tons which results in an area total percent change of -22 percent. Additionally, the reference to the overall decrease in SO2 emissions from East Bend and Ghent is 9,995.84, rather than the 9,291.04 tons indicated in the text above Table 6.

Response: The Division acknowledges this comment. The information has been corrected on pages 4 and 5 of the report.

5. Comment: **Section II. Emissions Data Summary** (page 2) - “The Joppa Steam plant, a nearby source included in TVA – Shawnee’s modeling, has experienced a large decrease in SO2 emissions since the 2012 – 2014 MY. Additional information can be found in TVA – Shawnee’s modeling report under Appendix A.” The EPA recommends Kentucky assess the current emission trends for the Joppa Steam Plant nearby source in Illinois as part of the state’s comprehensive SO2 emission review of the area.

Response: The Division acknowledges this comment. The emissions trend for the Ameren – Joppa Steam Plant have been included on page 2 of the report.

6. Comment: **Section II. Emissions Data Summary** (pages 2-3) states, “Century Aluminum – Hawesville’s SO2 emissions have doubled each year since 2017; however, the facility remains under the 2,000 tpy threshold.” The EPA notes that the 2,000 ton per year DRR threshold is not considered an emission level that indicates modeled attainment of the SO2 NAAQS for a specific source. The EPA recommends Kentucky remove the reference to the DRR emission threshold. The EPA is available for further discussion regarding the DRR emission threshold.

Response: The Division acknowledges this comment. The statement on page 3 of the report concerning the 2,000 tpy threshold has been removed.

7. Comment: **Section II. Emissions Data Summary** (page 1) states, “On January 9, 2018, EPA designated the nine Kentucky counties containing the sources characterized by modeled actual emissions as attainment/unclassifiable. Table 1 identifies the seven Kentucky counties and their respective DRR sources subject to ongoing emissions data verification.” Please clarify why the first sentence reference nine counties and the second sentence reference seven counties. From Table 1, it seems that seven of the counties were designated based on actual emissions, rather than nine counties. The portion of the first sentence that states “…containing the sources characterized by modeled actual emissions as attainment/unclassifiable” seems inaccurate. To minimize confusion, the EPA
recommends Kentucky only reference those sources subject to the DRR ongoing emission data verification.

Response: The Division acknowledges this comment. Only the sources subject to the DRR ongoing emission data verification are now addressed in the report.

8. Comment: Section II. Emissions Data Summary (page 2) states, “Additional information can be found in TVA – Shawnee’s modeling report under Appendix A. Duke Energy – East Bend SO₂ emissions data shows an increase since 2012; however, its SO₂ emissions have fluctuated annually, both increasing and decreasing over the past three years. SO₂ emissions from TVA- Shawnee were higher in 2017 than they were in 2019.” The EPA recommends Kentucky review the narrative in Section II to ensure the relevant discussion references the correct DRR source. The last sentence seems out of place because it follows the Duke Energy – East Bend statement. Please clarify if the last sentence should refer to Duke Energy – East Bend TVA – Shawnee. If it is meant to refer to TVA – Shawnee, the EPA recommends moving it up to follow that discussion.

Response: The Division acknowledges this comment. The correction has been made on page 2 of the report.

9. Comment: Section III. Conclusion (page 6) states, “Additionally, the ambient air monitoring data design values for the nearby air monitoring stations have also dropped significantly.” The background monitor was discussed for the LG&E – Trimble County facility, but not for the Duke Energy – East Bend facility. However, the background monitor for the Duke Energy – East Bend facility is discussed in Appendix B. The 2019 report included a background monitor discussion for both facilities in the body of the report. The EPA recommends Kentucky include the background monitor discussion for both facilities in the 2020 report and mention that the background monitor is discussed in Appendix B.

Response: The Division acknowledges this comment. The data from the background monitor used in the DRR modeling for Duke Energy – East Bend has been included on page 5 of the report.

10. Comment: Table 3 (page 3) - The footnote below Table 3 indicates that, “Emissions data acquired from Kentucky Division for Air Quality Emissions Inventory & Air Markets Program Data database - https://ampd.epa.gov/ampd/”. The EPA recommends Kentucky specify, in the footnote, the source of the emissions data for each source listed in Table 3.

Response: The Division acknowledges this comment. Specific footnotes have been added for each emission source included in Table 3 of the report.