

Appendix J

Muskingum River, OH Nonattainment Area Background Analysis

Ohio EPA conducted an analysis to determine an appropriate and conservative background for the Muskingum River, OH nonattainment area. The major source of emissions in the area is the Muskingum River Power Plant, comprising 99% of the area's SO₂ emissions and believed to be the source of nonattainment. Located directly adjacent, on contiguous property, is a smaller SO₂ source, Globe Metallurgical. There are no other sources nearby that could impact the violating monitor, ID 39-115-0004. Muskingum River Power Plant and Globe Metallurgical are located in a very rural portion of Washington/Morgan County. Therefore, Ohio EPA believes that the background SO₂ concentration in the Muskingum River nonattainment area will be largely comprised of rural background. With respect to the rural background, Ohio EPA is relying on an analysis conducted by the Lake Michigan Air Directors Consortium (LADCO) in conjunction with the U.S. EPA Region 5 states contained in the "Modeling Protocol: Dispersion Modeling to Demonstrate Attainment of SO₂ Primary NAAQS", July 25, 2011. An analysis of background options was explored in this document and ultimately LADCO recommended a default regional background concentration of 8 ppb using a weight-of-evidence approach. Ohio EPA is using LADCO's suggested 8 ppb regional SO₂ background recommendation as the rural background for this analysis. However, to be conservative, Ohio EPA is performing an analysis to determine any contribution to background that may be realized from Globe Metallurgical since it is largely located on the same footprint as Muskingum River Power Plant.

In this analysis, hourly ambient SO₂ concentrations recorded at the violating monitor for years 2011 to 2014 were compiled from U.S. EPA's Air Quality System (AQS). (Appendix A)¹ Hourly emissions from Muskingum River Power Plant for the same period were obtained from U.S. EPA's Clean Air Markets Division (<http://ampd.epa.gov/ampd/>).

For each year of the 2011 to 2014 period, Ohio EPA identified the periods during which the hourly emissions from Muskingum River Power Plant were zero for a continuous 24 hour or longer period. Hourly monitor values corresponding to these periods of non-operation by Muskingum River Power Plant were identified and then sorted from the largest to the smallest. Selecting this data set would allow Ohio EPA to determine a background concentration that considers all sources of SO₂, such as rural contributions and contributions from Globe Metallurgical or other more distant point sources.

To be conservative, Ohio EPA selected the highest 1% of SO₂ values recorded at the violating monitor when Muskingum River Power Plant was not operating. To get the highest 1% of SO₂ value, total numbers of hours when Muskingum River Power Plant was not operating for 24 hours or longer for each year were determined, and multiplying these numbers by 1% gave the ranks of the monitor value, from largest to smallest, corresponding to the highest 1% value in the data set. The highest 1% of SO₂ monitor

¹ The Appendix provides the AQS retrieval sheet information but not the full data because of the size. Data can be retrieved directly from AQS or be made available upon request.

concentration for each year was then identified. Likewise, the same analysis was performed for the combined data from 2011 to 2014. Table 1 below indicates the threshold value of the highest 1% concentrations for each of the four years analyzed and the combined four-years. Detailed data are contained in Appendix B.

| Year(s) | Total hours with no operation of Muskingum River Power Plant for continuous 24 hrs or longer | Rank of the highest monitor value corresponding to the highest 1% value | Highest 1% SO ₂ threshold concentration (ppb) |
|------------|--|---|--|
| 2011 | 116 | 1 | 24 |
| 2012 | 2387 | 24 | 11 |
| 2013 | 1916 | 19 | 10 |
| 2014 | 1625 | 16 | 8 |
| 2011- 2014 | 6044 | 60 | 10 |

Table 1: Highest 1% monitored SO₂ concentrations

The average of the highest 1% SO₂ threshold concentration for 2011 to 2014 was calculated to be 13.25 ppb. This is slightly higher than 10 ppb, the highest 1% threshold SO₂ monitor value for the combined four-year data set. These values are also higher than the 8 ppb rural background from LADCO. In order to maintain conservatism, the background concentration for Muskingum River nonattainment area is estimated to be 13.25 ppb.