Technical Support Document:

Chapter 3 Final Round 4 Area Designations for the 2010 1-Hour SO₂ Primary National Ambient Air Quality Standard for Kentucky

1. Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA, we, or us) must designate areas as either "nonattainment," "attainment," or "unclassifiable" for the 2010 1-hour sulfur dioxide (SO₂) primary national ambient air quality standard (NAAQS) (2010 SO₂ NAAQS). On or about August 13, 2020, EPA sent states our responses to certain designation recommendations for the 2010 SO₂ NAAQS. On August 21, 2020, EPA published a notice of availability (NOA) in the *Federal Register* (*see* 85 FR 51694), initiating a 30-day public comment period. The NOA and the technical support document (TSD) for EPA's intended designations provided background on the relevant CAA definitions and the history of the designations for this NAAQS. The TSD for EPA's intended designations also described Kentucky's recommended designations and EPA's assessment of the available information.

This TSD for EPA's final Round 4 area designations for Kentucky addresses any change in Kentucky's recommended designations since EPA communicated its intended designations in August 2020 and provides our assessment of additional relevant information that was submitted by Kentucky or other parties since the publication of the NOA. This TSD does not repeat information contained in the TSD for EPA's intended designations except as needed to explain our assessment of the newer information and to make clear the final action we are taking and its basis, but that information is incorporated as part of our final designations. If the assessment of the information that was already considered in the TSD for EPA's intended designations has changed based on new information and we are finalizing a designation based on such change in our assessment, this TSD also explains that change. For areas of Kentucky that are not explicitly addressed in this chapter, we are finalizing the designations described in our 120-day letters and Chapter 2 of the TSD for EPA's intended Round 4 area designations as explained in those documents.

In letters dated October 16, 2020, and November 12, 2020, Kentucky responded to EPA's intended designations and superseded its July 7, 2020, recommendation, by providing additional information including alternative designation recommendations and additional technical information to support its November 12, 2020, recommendation. EPA also received public comments regarding the intended designation for the Henderson-Webster, Kentucky area. These comments are addressed in the Response to Comments document associated with this final action.

Table 1 identifies Kentucky's current designation recommendations, EPA's final Round 4 designations, and the areas in Kentucky to which those designations apply. Chapter 1 of this

TSD for EPA's final designations explains the definitions we are applying in the final designations process.

Area/County	Kentucky's	Kentucky's	EPA's	EPA's Final	EPA's Final
	Recommended	Recommended	Intended	Area Definition	Designation
	Area Definition	Designation	Designation		
Henderson-	Henderson	Nonattainment	Nonattainment	Same as	Nonattainment
Webster,	County (partial);			Commonwealth's	
Kentucky Area	Webster County			Revised	
	(partial)			Recommendation	
Remaining	Henderson	Attainment/	Attainment/	Same as	Attainment/
portion of	County (partial)	Unclassifiable	Unclassifiable	Commonwealth's	Unclassifiable
Henderson				Revised	
County				Recommendation	
Remaining	Webster County	Attainment/	Attainment/	Same as	Attainment/
portion of	(partial)	Unclassifiable	Unclassifiable	Commonwealth's	Unclassifiable
Webster				Revised	
County				Recommendation	
-					

 Table 1. Summary of EPA's Final Designations and the Designation Recommendations by

 Kentucky

Areas that EPA previously designated in Round 1 (*see* 78 FR 47191), Round 2 (*see* 81 FR 45039 and 81 FR 89870), and Round 3 (*see* 83 FR 1098 and 83 FR 14597) are not affected by the designations in Round 4 unless otherwise noted.

2. Technical Analysis for the Henderson-Webster, Kentucky Area

2.1. Introduction

EPA must designate the Henderson-Webster, Kentucky area by December 31, 2020, because the area has not been previously designated, and Kentucky began operating a new EPA-approved monitor pursuant to EPA's SO₂ Data Requirements Rule (DRR).¹ This section presents all the available air quality information for the portions of Henderson and Webster Counties that include the following SO₂ sources around which the DRR required the Commonwealth to characterize air quality:

- The Century Aluminum Sebree LLC (Century Aluminum) facility emits 2,000 tons or more of SO₂ annually. Specifically, Century Aluminum emitted 4,739 tons of SO₂ in 2014. This source meets the DRR criteria and thus is on the SO₂ DRR Source list, and Kentucky has chosen to characterize it via monitoring.
- The Big Rivers Electric Corporation's Robert A. Reid Station/Henderson Municipal Power and Light (HMP&L) Station 2 (BREC Reid/HMP&L Station 2) facility emits 2,000 tons or more of SO₂ annually. Specifically, BREC Reid/HMP&L Station 2 emitted 12,202 tons of SO₂ in 2014. This source meets the DRR criteria and thus is on the SO₂ DRR Source list, and Kentucky has chosen to characterize it via monitoring.
- The Big Rivers Electric Corporation's Robert D. Green Station (BREC Green Station) emits 2,000 tons or more of SO₂ annually. Specifically, BREC Green Station emitted 3,999 tons of SO₂ in 2014. This source meets the DRR criteria and thus is on the SO₂ DRR Source list, and Kentucky has chosen to characterize it via monitoring.

The Sebree DRR monitor (AQS ID: 21-101-1011) was sited to characterize the maximum 1-hour SO₂ concentrations in the area surrounding all three DRR sources mentioned above. As seen in Figure 1 and Figure 2 below, all 3 facilities are located less than 2 kilometers (km) from the violating monitor in Henderson County, Kentucky. Century Aluminum is located to the northeast of the violating monitor in Henderson County. The BREC Reid/HMP&L Station 2 and the BREC Green Station are both located in Webster County to the southeast of the monitor and both facilities are owned by the Big Rivers Electric Corporation (BREC). Additionally, the Robert A. Reid Station/HMP&L Station 2 is a single stationary source with one operating permit, however two of the coal-fired units at the facility are owned by HMP&L and operated by BREC.

¹ See 80 FR 51052 (August 21, 2015), codified at 40 CFR part 51 subpart BB.

Figure 1. Map of the Henderson-Webster, Kentucky Area Addressing Century Aluminum, BREC Reid/HMP&L Station 2, and BREC Green Station



Figure 2. Close-up Image of the Henderson-Webster County, Kentucky Area, including Century Aluminum, BREC Reid/HMP&L Station 2, and BREC Green Station



2.2. Summary of Information Reviewed in the TSD for the Intended Round 4 Area Designations

In its July 7, 2020, recommendation letter, Kentucky recommended that a portion of Henderson County be designated as nonattainment for the 2010 SO₂ NAAQS, based on monitored air quality from 2017-2019. Kentucky recommended that the remainder of Henderson County and all of Webster County be designated attainment for the 2010 1-hour SO₂ NAAQS. Specifically, the Commonwealth's recommended nonattainment boundary for Henderson County consisted of the area located between Edward T. Breathitt Pennyrile Parkway (to the west) and the Green River (to the east), south of Moss and Moss Road, and north of the Century Aluminum railroad spur and Big Rivers Electric coal haul road which included the ambient air DRR monitor (AQS ID: 21-101-1011) and only one of three DRR source Century Aluminum as shown in Figure 3. EPA's intended designation did not agree with Kentucky's recommendation as to the designation category, in part because Kentucky's original recommended boundary excluded some of the sources contributing to the violating monitor, and EPA intended to designate a portion of Henderson County, Kentucky and Webster County, Kentucky, as described in the intended designations TSD, as nonattainment for the 2010 SO₂ NAAQS based upon currently available

monitoring information for the 2017-2019 period. Our intended boundaries were different than the Commonwealth's recommended boundaries.





Kentucky provided a discussion and figures of a dispersion modeling analysis performed to evaluate the SO₂ impacts from the BREC Green Station; however, the modeling files were not provided to EPA for review. Kentucky concluded from the dispersion modeling analysis that BREC Green Station is not causing a violation of the 2010 1-hour SO₂ NAAQS. Kentucky did not provide EPA sufficient information to agree with that conclusion, and EPA instead believes the modeling results provided by Kentucky on July 7, 2020, showed that BREC Green Station was likely contributing to violations of the 2010 1-hour SO₂ NAAQS at the Sebree monitor in Henderson County.

In addition to the dispersion modeling analysis performed to evaluate the BREC Green Station, EPA reviewed modeling that Kentucky provided in 2016 which was conducted to support the location of the Sebree ambient air quality monitor in order to characterize all three DRR sources (rather than install and operate separate monitors for each source). As this modeling was not conducted for the purpose of air quality designations, EPA was unable to use this information specifically in determining the exact geographic extent of the 2010 SO₂ NAAQS violations that occurred during the 2017-2019 monitoring period; however, EPA determined that this modeling indicates the potential for elevated SO₂ concentrations extending well beyond the nonattainment boundary proposed by Kentucky, including a larger portion of Henderson County and a portion of Webster County.

Kentucky provided an analysis of the meteorology for the Henderson-Webster, Kentucky Area. EPA preliminarily agreed with Kentucky's conclusion that the HYSPLIT trajectories indicate that the Century Aluminum facility contributes to the monitored violation; however, EPA also believes that other back trajectories, the level of emissions from BREC Green Station, and the fact that it is located approximately 1.25 km from the Sebree monitor, indicate that the facility is potentially contributing to the measured violations of the 2010 1-hour SO₂ NAAQS at the Sebree monitor. Additionally, EPA evaluated wind patterns in the area based on wind rose created from for the nearest NWS meteorological station which indicate that winds blow from all directions, but most commonly from southwest, and, also from the northeast and northwest significant amounts of time. The highest frequency of slow wind speeds (1-4 knots) blow from the northeast, but also a significant amount of time from the southeast, which is the direction of the two BREC facilities.

As a result of evaluation of all the available information, including EPA's qualitative assessment of the modeling conducted to support the location of the ambient air quality monitor, EPA modified Kentucky's July 2020, recommendation for the nonattainment boundary for Henderson County, as well as modified the Commonwealth's designation and boundary determination for a portion of Webster County. EPA believed that the intended nonattainment area, bounded by the portions of Henderson and Webster Counties contained within census block groups 211010209001, 211010208001, 211010208003, 212339601002, 212339601004, 212339601003, and 212339601001. EPA's intended boundary was appropriate to characterize the geographical extent of impacts from all DRR sources based on the available information at the time of intended designations (i.e. the magnitude of the monitoring concentrations coupled with the emissions from the SO₂ sources and the information available for Henderson County and, the boundary and therefore justified the consideration of a bigger boundary than recommended by the Commonwealth absent additional technical support.

EPA intended to designate the remaining portions of Henderson and Webster Counties as attainment/unclassifiable due to a lack of SO₂ emissions sources or any other information that indicates those areas do not meet the 2010 1-hour SO₂ NAAQS. Based on the factors discussed above, EPA believed that the remaining undesignated area neither has violations nor contains any sources that could contribute to air quality in an area that violates the NAAQS. Therefore, we intended to designate the remainder of Henderson and Webster Counties as attainment/unclassifiable.

2.3. Air Quality Monitoring Data for the Henderson-Webster, Kentucky Area

In the TSD for the intended area designations, EPA considered design values for air quality monitors in the Henderson-Webster, Kentucky area. Specifically, EPA determined that the Sebree DRR monitor (AQS ID# 21-101-1011) violated the 2010 SO₂ NAAQS with a 2017-2019 design value of 98 ppb. EPA has no new monitoring information of any other type that warrants revising our prior analysis of available monitoring data.

2.4. Assessment of New Technical Information for the Henderson-Webster, Kentucky Area Addressing Century Aluminum, BREC Reid/HMP&L Station 2, and BREC Green Station

On November 12, 2020, superseding an October 16, 2020, submission, Kentucky submitted new modeling analyzing air quality in the area surrounding the Century Aluminum, BREC Reid/HMP&L Station 2, and BREC Green Station facilities in the Henderson-Webster, Kentucky area to inform the extent of the nonattainment boundary. This assessment and characterization were performed using air dispersion modeling software, i.e., AERMOD, analyzing a mixture of actual and allowable emissions. The Commonwealth's analysis supports a different designation boundary than its original July 7, 2020, recommended boundary and EPA's intended designation boundary for this area. EPA's intended designation for a portion of Henderson-Webster County area was nonattainment, and Kentucky's analysis supports a nonattainment designation, but with a boundary that is larger than its original recommended boundary and smaller than EPA's intended boundary. After careful review of Kentucky's new October and November 2020 assessments, supporting documentation, and all available data, EPA is relying on Kentucky's November 12, 2020, modeling analysis and agrees with the Commonwealth's updated nonattainment boundary recommendation. Our reasoning for this conclusion is explained in a later section of this TSD, after all the available information is presented.

The discussion and analysis that follows below will reference the "SO₂ NAAQS Designations Modeling Technical Assistance Document" (Modeling TAD) and the factors for evaluation contained in EPA's September 5, 2019, guidance, July 22, 2016, guidance and March 20, 2015, guidance, as appropriate.²

For this area, EPA received two modeling assessments from Kentucky (submitted October 16, 2020, and November 12, 2020); however, the November 12, 2020, submission supersedes the October information. To avoid confusion in referring to these assessments, the following table lists them, indicates when they were received, provides an identifier for the assessment that is used in the discussion of the assessments that follow, and identifies any distinguishing features of the modeling assessments.

² https://www.epa.gov/sites/production/files/2016-04/documents/so2modelingtad.pdf.

Assessment	Date of the	Identifier Used in	Distinguishing or
Submitted by	Assessment	this TSD	Otherwise Key
			Features
Commonwealth of	October 16, 2020	October 2020	No background
Kentucky		Modeling	concentrations
			included in the
			modeling
Commonwealth of	November 12, 2020	November 2020	Modeling includes
Kentucky		Modeling	representative
			background
			concentrations

Table 2. Modeling Assessments for the Henderson-Webster Area

2.4.1. Modeling Analysis Provided by the Commonwealth

2.4.1.1.Differences Between and Relevance of the Modeling Assessments Submitted by the Commonwealth

As discussed in EPA's TSD for the intended designation for the Henderson-Webster County, Kentucky Area, in the July 7, 2020, recommendation letter, Kentucky provided the results of two limited modeling analyses to support the boundary recommendation: (1) HYSPLIT (Hybrid Single Particle Lagrangian Integrated Trajectory) trajectory modeling, and (2) limited dispersion modeling for the BREC Green Station DRR facility. Neither of these limited modeling analyses provided a comprehensive air modeling analysis that could be used to fully evaluate the ambient SO₂ concentration impacts resulting from emissions from the Century Aluminum, BREC Reid/HMP&L Station 2, and the BREC Green Station facilities.

The following sections provide the details of Kentucky's November 12, 2020, comprehensive AERMOD modeling analysis that were used to evaluate ambient SO₂ concentrations in the area and determine an appropriate nonattainment area boundary.

2.4.1.2. Model Selection and Modeling Components

EPA's Modeling TAD notes that for area designations under the 2010 SO₂ NAAQS, the AERMOD modeling system should be used, unless use of an alternative model can be justified. The AERMOD modeling system contains the following components:

- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD
- AERMET: the meteorological data processor for AERMOD
- BPIPPRM: the building input processor
- AERMINUTE: a pre-processor to AERMET incorporating 1-minute automated surface observation system (ASOS) wind data
- AERSURFACE: the surface characteristics processor for AERMET
- AERSCREEN: a screening version of AERMOD

The Commonwealth used AERMOD version 19191, the most recent version of the model. A discussion of the Commonwealth's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

2.4.1.3. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the determination of whether a source area is "urban" or "rural" is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO₂ modeling, the urban/rural determination is also important because AERMOD invokes a 4-hour half-life for urban SO₂ sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source area is urban or rural based on land use or population density.

For the purpose of performing the modeling for the area of analysis, the Commonwealth determined that it was most appropriate to run the model in rural mode.

Kentucky used the Auer method to determine the land use status of the area around the facilities. Kentucky used a 3-km radius centered on the Sebree SO₂ Monitor to evaluate land use surrounding the Century Aluminum and BREC facilities, based on the Auer land use categories (USGS NLCD 2016). The results of the Auer land use analysis are presented in Figure 4 (Figure 1 of Kentucky's November 12, 2020, submittal). The analysis indicates that the majority of land use can be categorized as undeveloped, pasture, and farmland.







Therefore, the Commonwealth determined that it was most appropriate to run the model with rural dispersion coefficients, and EPA agrees with this determination.

2.4.1.4. Modeling Parameter: Area of Analysis (Receptor Grid)

The Modeling TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO₂ emission sources or facilities considered for modeling; the extent of significant concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO₂ concentrations.

The sources of SO₂ emissions subject to the DRR in this area are described in the introduction to this section. For the Henderson-Webster, Kentucky area, the Commonwealth has included no other emitters of SO₂ within or outside the modeling domain that consists of EPA's intended nonattainment boundary. The Commonwealth determined that this was the appropriate distance to adequately characterize air quality through modeling to include the potential extent of any SO₂ NAAQS violations in the area of analysis and any potential impact on SO₂ air quality from other sources in nearby areas.

EPA has evaluated the need to include in the modeling analysis any additional SO₂ emissions sources within 50 km of the Century Aluminum and BREC DRR facilities. Figure 5 shows the large SO₂ sources within 50 km. Based upon the levels of emissions and distance from the DRR facilities, EPA agrees that no additional SO₂ sources need to be included in the modeling analysis. EPA believes that the background concentrations from the Evansville, Indiana background monitor adequately account for any potential SO₂ impacts from these sources in the modeling domain.



Figure 5. Large SO₂ Emissions Sources within 50 km of the Century Aluminum and BREC DRR facilities

The grid receptor spacing for the area of analysis chosen by the Commonwealth is as follows:

- A cartesian receptor grid with 250 meters spacing between receptors within EPA's intended non-attainment boundary
- Cartesian boundary receptors with 50 meter spacing along EPA's intended nonattainment area boundary.

The receptor network contained 12,160 receptors, and the network covered portions of Henderson and Webster Counties in Kentucky. EPA believes that the 250-meter spacing in the receptor grid is adequate to detect significant gradients in concentrations in the area. As shown in Figure 10 in Section 2.4.1.10, Kentucky's recommended nonattainment area boundary provides an adequate buffer around the receptors with modeled violations of the NAAQS, especially areas with elevated terrain to the southwest of the Century Aluminum and BREC facilities, to account for any areas that could potentially show modeled violations with a denser receptor grid spacing (e.g., 100-meter spacing). Therefore, we believe the 250-meter spacing is adequate for the purposes of defining the nonattainment boundary.

Figure 6, included in the Commonwealth's recommendation, show the Commonwealth's chosen area of analysis surrounding the three facilities, as well as the receptor grid for the area of analysis.

Consistent with the Modeling TAD, the Commonwealth placed receptors for the purposes of this designation effort in locations that would be considered ambient air relative to each modeled facility. With the exception of the areas within the Century Aluminum and BREC facilities' fencelines, the Commonwealth included receptors in all areas within EPA's intended nonattainment boundary, including areas where it would not be feasible to place a monitor. The Commonwealth did not provide any information to substantiate the ambient air boundaries of the Century Aluminum and BREC facilities. However, since the purpose of the modeling is to inform the selection of nonattainment area boundaries, and the modeling results show violations of the NAAQS surrounding each of the facilities, and the facilities are fully encompassed within the Commonwealth's recommended nonattainment boundary, EPA does not believe that it is necessary to precisely delineate the ambient air boundaries at the facilities for this analysis.



Figure 6. Receptor Grid for the Henderson-Webster, Kentucky Area

EPA believes that Kentucky's receptor grid is appropriate for the characterization of the area, considering the impacts of SO₂ emissions from the DRR facilities. Also, EPA believes that the receptor grid used in Kentucky's modeling is adequate to determine the extent of the modeled violations of the 1-hour SO₂ NAAQS in the area and thus can be used to inform selection of the nonattainment boundary. However, in future attainment state implementation plan (SIP) development, the State's modeling will need to include all ambient air receptors.

2.4.1.5. Modeling Parameter: Source Characterization

Section 6 of the Modeling TAD offers recommendations on source characterization including source types, use of accurate stack parameters, inclusion of building dimensions for building downwash (if warranted), and the use of actual stack heights with actual emissions.

Kentucky included the three DRR facilities, Century Aluminum, BREC Reid/HMP&L Station 2, and BREC Green Station, and no other facilities in the modeling demonstration. The BREC facilities have six total emission points that were modeled: two at BREC Green Station: Green Station Boiler 1 and Green Station Boiler 2; two at BREC Reid: Reid Station Unit 1 and Reid Combustion Turbine; and two at HMP&L Station 2: Henderson Station Unit 1 and Henderson Station Unit 2. Century Aluminum consists of an anode bake furnace and potlines as well as a number of smaller and insignificant SO₂ sources. The modeling parameters for these facilities' SO₂ emissions units can be found in Appendix A of Kentucky's November 12, 2020, submittal. As discussed in Section 2.4.1.4 of this TSD, the Commonwealth determined that no other SO₂ emissions sources in the area of analysis needed to be included in the modeling.

The Commonwealth characterized these sources within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, the Commonwealth used actual stack heights in conjunction with actual emissions. The Commonwealth also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRM was used to assist in addressing building downwash.

EPA agrees the Commonwealth's characterization of sources in the area. Additionally, the Commonwealth used appropriate parameters for modeling the SO₂ emissions from the sources.

2.4.1.6. Modeling Parameter: Emissions

EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data.

EPA believes that continuous emissions monitoring systems (CEMS) data provide acceptable historical emissions information, when they are available. These data are available for many electric generating units. In the absence of CEMS data, EPA's Modeling TAD highly encourages the use of AERMOD's hourly varying emissions keyword HOUREMIS or the use of AERMOD's variable emissions factors keyword EMISFACT. When choosing one of these methods, EPA recommends using detailed throughput, operating schedules, and emissions information from the impacted sources.

As previously noted, the Commonwealth included Century Aluminum, BREC Reid/HMP&L Station 2, and BREC Green Station and no other emitters of SO₂ within in the area of analysis. For this area of analysis, the Commonwealth has opted to use a hybrid approach, where emissions from certain units at the facilities are expressed as actual emissions, and other units are expressed as potential to emit (PTE) rates. All sources were modeled using actual stack heights. All stack heights for those sources modeled using PTE rates are below the calculated formula Good Engineering Practice (GEP) stack height. The facilities in the Commonwealth's modeling analysis and their associated actual or PTE rates are summarized below.

For BREC Reid/HMP&L Station 2 and BREC Green Station, the Commonwealth provided annual actual SO₂ emissions between 2017 and 2019. The Commonwealth also provided annual

actual SO₂ emissions for the anode bake furnace and potlines at Century Aluminum. This information is summarized in Table 3. A description of how the Commonwealth obtained hourly emission rates is given below this table.

Table 3. Actual SO₂ Emissions Between 2017 – 2019 from Facilities in the Area of Analysis for the Henderson-Webster, Kentucky Area

Facility Nama		SO ₂ Emissions (tpy)		
Facility Name	2017	2018	2019	
HMP&L Station 2	1,408	847	17	
BREC Reid	1	2	3	
BREC Green Station	3,108	4,114	2,916	
Century Aluminum	4,489	4,489	4,489	
Total Emissions from All Modeled Facilities in the Commonwealth's Area of Analysis	9,006	9,452	7,425	

For BREC Reid/HMP&L Station 2 and BREC Green Station, actual hourly-varying emissions measured with CEMS were used in the AERMOD modeling. The Commonwealth obtained the hourly CEMS data from the U.S. EPA's Air Markets Division (CAMD) database³. EPA compared annual emissions values from CAMD to the summed hourly emissions values used in the AERMOD modeling for each of these sources. This comparison confirmed that the modeled emissions match the emissions from CAMD.

Hourly-varying CEMS SO₂ emissions data are not available from the Century Aluminum facility, so the Commonwealth used the most recent stack test data and monthly production records to produce temporally variable actual emissions for the anode bake furnace and potlines. The documentation provided by the Commonwealth contains a spreadsheet that shows the calculations of the monthly-varying emissions. EPA reviewed these calculations and confirmed that they were performed correctly. Also, EPA compared the sum of the emissions used in the modeling to the annual emissions reported for this facility in EPA's Emissions Inventory System (EIS). This comparison showed a small difference between the annual tons per year emissions levels (4,489 tons/year modeled emissions versus 4,629 tons/year reported in the 2017 and 2018 EIS data. EPA believes that the emissions data used in the modeling that is based upon monthly production information and recent stack tests is appropriate for the AERMOD modeling.

For the smaller sources of SO_2 at Century Aluminum, the Commonwealth provided PTE values. This information is summarized in Table 4. A description of how the Commonwealth obtained potential emission rates is given below this table.

³ https://ampd.epa.gov/ampd/

Table 4. SO ₂ Emissions based on PTE from Select Units at Century Aluminum in the Area
of Analysis for the Henderson-Webster, Kentucky Area

Facility Name	SO ₂ Emissions (tpy, based on PTE)
Century Aluminum Remelt Furnace	0.17
Century Aluminum Holding Furnaces	0.32
Century Aluminum Homogenizing Furnaces	0.14
Century Aluminum Electrode Boiler	0.03
Century Aluminum Indirect Heat Exchanger	0.03
Total Emissions from Facilities in the Area of Analysis Modeled Based on PTE	0.69

The PTE in tons per year for Century Aluminum's natural gas-fired emissions units listed in Table 4 were provided to the Commonwealth by Century Aluminum in previous modeling performed for siting the Sebree DRR monitor in 2016. The Commonwealth used PTE emissions rates (grams/second) in the modeling corresponding to hourly emissions representative of worstcase operations. Emissions were assumed to be the same in each modeled year.

EPA agrees with Kentucky's use of actual hourly-varying emissions for BREC Reid/HMP&L Station 2 and BREC Green Station from CEMS at the facilities. EPA also agrees with using the most recent stack test data and monthly production records to produce temporally variable actual emissions for the anode bake furnace and potlines at Century Aluminum. Additionally, EPA agrees with modeling the smaller, natural gas-fired units at Century Aluminum using potential emissions.

2.4.1.7. Modeling Parameter: Meteorology and Surface Characteristics

As noted in the Modeling TAD, the most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data, for sources modeled with actual emissions) should be used in designations efforts. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data is determined based on: 1) the proximity of the meteorological monitoring site to the area under consideration, 2) the complexity of terrain, 3) the exposure of the meteorological site, and 4) the period of time during which data are collected. Sources of meteorological data include National Weather Service (NWS) stations, site-specific or onsite data, and other sources such as universities, Federal Aviation Administration, and military stations.

For the area of analysis for the Henderson-Webster, Kentucky area, the Commonwealth selected the surface meteorology from the Evansville Regional Airport NWS station in Evansville, Indiana, located at 38.044 N, 87.521 W, approximately 43 km to the north of the facilities, and coincident upper air observations from a different NWS station, at Nashville International Airport in Nashville, Tennessee, located at 36.126 N, 86.677 W, approximately 185 km to the southeast of the facilities as best representative of meteorological conditions within the area of analysis.

The Commonwealth used AERSURFACE version 20060 using data from the Evansville NWS station to estimate the surface characteristics of the area of analysis. The Commonwealth estimated values for twelve 30° spatial sectors out to 1 km at a monthly temporal resolution for average conditions. The Commonwealth also estimated values for albedo (the fraction of solar energy reflected from the earth back into space), the Bowen ratio (the method generally used to calculate heat lost or heat gained in a substance), and the surface roughness (sometimes referred to as "Zo" and is related to the height of obstacles to the wind flow, which is an important factor in determining the magnitude of mechanical turbulence and the stability of the boundary layer).

In the figure below, generated by EPA, the locations of these NWS stations are shown relative to the area of analysis.





EPA generated a surface wind rose for the Evansville, Indiana NWS station for the 2017-2019 period using Lakes Environmental's WRPLOT-View software with the AERMET surface data file provided by Kentucky for the modeled period. In Figure 8, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. This wind rose indicates that the predominant wind direction in the Evansville area is winds blowing from the southwest along with winds blowing from the northeast a significant amount of time.



Figure 8. Henderson-Webster, Kentucky Cumulative Annual Wind Rose for Years 2017 – 2019

WRPLOT View - Lakes Environmental Software

Meteorological data from the above surface and upper air NWS stations were used in generating AERMOD-ready files with the AERMET processor (version 19191). The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. The Commonwealth followed the methodology and settings

presented in the SO₂ Modeling TAD and the AERMET User's Guide in the processing of the raw meteorological data into an AERMOD-ready format and used AERSURFACE to best represent surface characteristics.

Hourly surface meteorological data records are read by AERMET and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In order to better represent actual wind conditions at the meteorological tower, wind data of 1minute duration was provided from the Evansville NWS station, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE (version 15272). These data were subsequently integrated into the AERMET processing to produce final hourly wind records of AERMOD-ready meteorological data that better estimate actual hourly average conditions and that are less prone to over-report calm wind conditions. This allows AERMOD to apply more hours of meteorology to modeled inputs, and therefore produce a more complete set of concentration estimates. As a guard against excessively high concentrations that could be produced by AERMOD in very light wind conditions, the Commonwealth set a minimum threshold of 0.5 meters per second in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data. In addition, the "Ice-Free Winds Group" AERMINUTE option was selected for processing and the meteorological data was processed by applying Adjust Surface Friction Velocity (ADJ U*).

EPA believes that the surface and upper air meteorological data selected by the Commonwealth of Kentucky for use in this modeling analysis is acceptable and was processed in a manner consistent with the SO₂ modeling TAD. EPA believes that the meteorological data shows that impacts from Century Aluminum, BREC Reid/HMP&L Station 2, and BREC Green Station are reasonably expected to most frequently occur generally northeast of each respective facility, but as shown in Figure 12 in Section 2.4.1.10, the maximum modeled concentrations occur south and west of the facilities.

2.4.1.8.Modeling Parameter: Geography, Topography (Mountain Ranges or Other Air Basin Boundaries) and Terrain

The terrain in the area of analysis is best described as gently rolling with some hills above the stack heights of the BREC and Century Aluminum facilities. To account for these terrain changes, the AERMAP (version 18081) terrain program within the AERMOD Modeling System was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model is from the USGS National Elevation Database (NED).

EPA agrees with the Commonwealth's use of the USGS NED database and AERMAP terrain processor for AERMOD to account for the changes in elevation of the area to obtain a more accurate modeling result.

2.4.1.9. Modeling Parameter: Background Concentrations of SO2

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO₂ that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the Commonwealth chose to use a tier 2 approach with background concentrations varying by season and by hour of day from the Evansville-Buena Vista monitor (AQS ID# 18-163-0021), located in Evansville, Indiana, approximately 40 km north of the Century Aluminum and BREC DRR facilities. The background concentrations for this area of analysis were determined by the Commonwealth to vary from 3.06 micrograms per cubic meter (μ g/m³), equivalent to 1.17 ppb when expressed in three significant figures, to 17.5 μ g/m³ (6.70 ppb), with an average value of 8.73 μ g/m³ (3.34 ppb). Table 5 provides the complete set of season-hour of day varying background data.

The Commonwealth chose to use the Evansville-Buena Vista monitor because it is representative of the Sebree area background and accounts for potential influences of distant, large SO2 sources in the area. The Evansville SO2 monitor is located approximately 16 km northeast of the Vectren-A. B. Brown Generating Station. The monitor is also approximately 25 km northwest of the Vectren-F. B. Culley Generating Station, Alcoa-Vectren-Warrick Generating Station, and the Alcoa Warrick aluminum smelter operation in Newburgh, IN. The Evansville monitor is closer to these facilities than the facilities are to the Century Aluminum and BREC facilities. The Commonwealth determined that the Evansville monitor is likely impacted by the above-named facilities and that it is an appropriate and representative background monitor for the modeling analysis.

AERMOD ready format (MET HOUR 0 = AERMOD HOUR 1				
Hour (Ending of Hour Period)	Winter	Spring	Summer	Fall
01:00	2.67	2.57	2.63	2.03
02:00	3.83	2.90	2.00	1.83
03:00	2.77	2.57	1.97	1.60
04:00	2.70	2.77	2.13	1.37
05:00	2.53	2.83	2.07	1.27
06:00	2.53	3.03	2.03	1.47
07:00	2.57	3.37	2.27	1.17
08:00	2.83	4.00	4.13	1.73
09:00	3.97	4.33	5.03	3.73
10:00	4.07	6.40	5.17	3.30
11:00	4.50	5.53	5.20	3.73
12:00	4.70	4.57	4.27	3.83
13:00	6.70	4.53	3.77	3.47
14:00	6.13	5.77	3.67	4.53
15:00	5.30	5.60	3.57	3.27
16:00	4.13	4.77	3.50	3.83
17:00	4.10	3.87	3.40	3.83
18:00	2.97	4.23	3.43	2.47
19:00	3.33	3.97	4.47	1.70
20:00	3.73	3.13	3.70	1.70
21:00	3.10	3.30	3.67	1.57
22:00	3.20	2.70	3.10	2.03
23:00	3.53	2.37	3.00	2.23
24:00	2.83	2.37	2.67	1.87

Table 5. Seasonal Hourly SO₂ Concentrations at the Evansville-Buena Vista Monitor

EPA agrees with the Commonwealth's use of a time-varying season by hour of day tier 2 approach with background concentration data from the Evansville-Buena Vista ambient SO_2 monitor. EPA also agrees with the Commonwealth's rationale for selection of the Evansville-

Buena Vista monitor as it likely accounts for potential long-range impacts for large SO₂ emissions sources located over 30 km from the Century Aluminum and BREC facilities.

2.4.1.10. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Henderson-Webster, Kentucky area of analysis are summarized below in Table 6.

Table 6. Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Henderson-Webster, Kentucky Area

Input Parameter	Value
AERMOD Version	19191
Dispersion Characteristics	Rural
Modeled Sources	3
	28 point sources and 1 buoyant
Modeled Stacks	line source with 6 lines
Modeled Structures	79
Modeled Fencelines	2
Total receptors	12,160
Emissions Type	Mixed/Hybrid
Emissions Years	2017-2019 Actual Emissions
	from the BREC sources and
	the large sources at Century
	Aluminum. PTE for small
	natural-gas fired sources at
	Century Aluminum.
Meteorology Years	2017-2019
NWS Station for Surface	
Meteorology	Evansville, IN
NWS Station Upper Air	
Meteorology	Nashville, TN
NWS Station for Calculating	
Surface Characteristics	Evansville, IN
Methodology for Calculating	Tier 2, monitored
Background SO ₂ Concentration	concentrations varying by
	season and by hour of day,
	from the Evansville-Buena
	Vista monitor (AQS ID# 18-
	163-0021), located in
	Evansville, Indiana
Calculated Background SO ₂	Varying between 1.17 ppb and
Concentration	6.70 ppb

The results presented below in Table 7 and Figure 9 show the geographic extent of the predicted modeled violations based on the input parameters. The Commonwealth's receptor grid is also shown in Figure 9.

Over three rears for the Area of Analysis for the fielder son-webster, Kentucky Area						
				99 th percentile daily		
		Receptor Location		Receptor Location maximum 1-hour SO		ur SO2
		UTM zone 16		Concentration (µg/m ³)		
				Modeled		
				concentration		
Averaging	Data	UTM	UTM	(including	NAAQS	
Period	Period	Easting (m)	Northing (m)	background)	Level	
99th Percentile						
1-Hour Average	2017-2019	455638.75	4161842.75	1119.0	196.4*	

 Table 7. Predicted 99th Percentile Daily Maximum 1-Hour SO2 Concentration Averaged

 Over Three Years for the Area of Analysis for the Henderson-Webster, Kentucky Area

*Equivalent to the 2010 SO₂ NAAQS of 75 ppb using a 2.619 μ g/m³ conversion factor





The modeling submitted by the Commonwealth indicates that the 1-hour SO₂ NAAQS is violated at the receptor with the highest modeled concentration. The modeling results also include the area in which a NAAQS violation was modeled, information that is relevant to the selection of the boundaries of the area that will be designated. Figure 10 was included as part of the Commonwealth's recommendation and indicates that the predicted modeled violations are fully contained within the state's recommended nonattainment area boundary.

Figure 10. Kentucky's Recommended Nonattainment Boundary Encompassing All Areas of Modeled Violations for the Henderson-Webster, Kentucky Area



The Commonwealth used roadways and landmarks to define the nonattainment boundary and provided Figure 11 and Table 8 to clearly described the boundary and identify the UTM coordinates of the vertices of the nonattainment area polygon.



Figure 11. Kentucky's Recommended Nonattainment Boundary

Point ID	Recommended NAA B	Recommended NAA Boundary Point Pathway		Y Coord. (UTM)
01	KY 520, Upper Delaware Rd	The Green River boundary	463979.00	4171000.03
02	The Green River boundary	JZ Shelton Rd	459058.03	4160832.96
03	JZ Shelton Rd	KY 370	457811.00	4159192.96
04	KY 370	Pennyrile Parkway I-69	457089.96	4159452.95
05	Pennyrile Parkway I-69	Sassafras Grove Rd	457675.35	4156244.55
06	Sassafras Grove Rd	US 41	456236.68	4156125.75
07	US 41	Slaughters Elmwood Rd	457442.82	4153425.68
08	Slaughters Elmwood Rd	Railroad Track (NW)	456589.41	4153424.43
09	Railroad Track (NW)	Breton Rd	453677.09	4155992.29
10	Breton Rd	KY 1835	453079.74	4154924.00
11	KY 1835	KY 138	450702.89	4153141.51
12	KY 138	Crowder Rd	452587.06	4152032.38
13	Crowder Rd	KY 120	453030.14	4149175.08
14	KY 120	Gooch Jones Rd	447528.25	4147663.88
15	Gooch Jones Rd	John Roach Rd	446551.75	4150042.51
16	John Roach Rd	Old Dixon Slaughters Rd	447462.17	4151329.04
17	Old Dixon Slaughters Rd	Old Dixon Rd	446532.28	4152143.23
18	Old Dixon Rd	KY 138	446849.49	4152437.09
19	KY 138	Carnel Brooks Rd	450196.38	4153305.18

 Table 8. Detailed Description of Kentucky's Recommended Nonattainment Boundary

20	Carnel Brooks Rd	Rakestraw Bottoms Rd	450079.34	4154326.39
21	Rakestraw Bottoms Rd	KY 132	447141.40	4157145.04
22	KY 132	KY 283	444025.55	4156172.90
23	KY 283	Beckley Osbourne Rd	444300.82	4158111.35
24	Beckley Osbourne Rd	Dixon Wanamaker Rd	442067.07	4158641.90
25	Dixon Wanamaker Rd	KY 191	441887.88	4161614.33
26	KY 191	D Melton Rd	442743.25	4161250.11
27	D Melton Rd	Knoblick Creek Rd	443688.82	4162093.08
28	Knoblick Creek Rd	US 41A	442319.35	4163220.45
29	US 41A	Dixon l Rd	443500.62	4170518.52
30	Dixon l Rd	GF Sights Rd	443094.58	4170166.59
31	GF Sights Rd	Cairo Dixie Rd	441341.46	4170978.60
32	Cairo Dixie Rd	Liles Cairo Rd	442919.00	4173140.24
33	Liles Cairo Rd	US 41A	443124.23	4173204.51
34	US 41A	Cairo Hickory Grove Rd	442860.28	4174017.18
35	Cairo Hickory Grove Rd	Pruitt Agnew Rd	446056.06	4175740.98
36	Pruitt Agnew Rd	KY 1299	447662.11	4180049.93
37	KY 1299	Anthoston Frog Island Rd	448905.37	4176327.31
38	Anthoston Frog Island Rd	KY 136	452613.63	4179047.02
39	KY 136	Upper Delaware Rd	454451.59	4177687.26
40	Upper Delaware Rd	Barren Church Rd S	456153.23	4177723.20
41	Barren Church Rd S	Barren Church Rd N	457912.85	4180247.83
42	Barren Church Rd N	KY 1078	458542.52	4181615.55
43	KY 1078	Jones Brothers Rd	461322.00	4179952.85

44	Jones Brothers Rd	KY 416	461209.84	4177755.55
45	KY 416	KY 1078	463492.08	4178026.50
46	KY 1078	Onionville Rd	464177.31	4177054.13
47	Onionville Rd	Work Road	465476.34	4176076.78
48	Work Road	Upper Delaware Rd	462529.15	4173036.52

The Commonwealth also provided Figure 12, which indicates that the greatest SO_2 impacts are within 9 km of the sources under consideration.



Figure 12. Greatest Potential Impact Distance from Modeled Sources

2.4.1.11. EPA's Assessment of the Modeling Information Provided by the Commonwealth

EPA agrees with the modeling methodology used by Kentucky to characterize the area surrounding the Century Aluminum and BREC DRR facilities in the final November 12, 2020, modeling submittal. The Commonwealth performed the modeling using AERMOD version 19191, which is the current version of EPA's preferred regulatory model. The modeling was performed using default regulatory options and following the guidance provided in EPA's Modeling TAD and Guideline on Air Quality Models (40 CFR Part 51, Appendix W).

The following discussion provides a brief summary of EPA's assessment of the major components of the modeling. EPA agrees with the Commonwealth's area of analysis and source characterization components of the modeling. EPA has evaluated the need to include in the

modeling analysis any additional SO₂ emission sources within 50 km of the facilities and agrees that no additional SO₂ sources need to be included in the modeling analysis based upon the levels of emissions and distance from the DRR facilities. All other nearby sources not included in the modeling were addressed with the background concentrations used in the modeling. With regards to the background concentrations, the Commonwealth chose the Evansville-Buena Vista monitor to account for potential influences of distant, large SO₂ sources in the area that were not included in the modeling. EPA agrees with the monitor chosen for background concentrations and the 2017-2019 data period. With regards to the receptor grid, EPA believes that Kentucky's receptor grid is appropriate for the characterization of the area, considering the impacts of SO₂ emissions from the DRR facilities. The receptor grid used in Kentucky's modeling is adequate to determine the extent of the modeled violations of the 1-hour SO₂ NAAQS in the area and thus can be used to inform selection of the nonattainment boundary.

EPA also agrees with Commonwealth's selection of meteorology, terrain, and emissions data for the modeling assessment. The surface and upper air meteorological data used in the modeling analysis is appropriate for performing a valid modeling assessment. The Commonwealth appropriately used the AERMET, AERMINUTE, and AERSURFACE meteorology preprocessors to prepare the meteorological data for use in AERMOD. The Commonwealth also appropriately used the AERMAP pre-processor to account for the terrain in the modeling domain and appropriately classified the area as rural using the Auer method to evaluate land-use. The Commonwealth has addressed EPA's original comments in the 120-day intended designation letter that the modeling be revised to include the emissions from all three DRR facilities that are characterized by the Sebree SO₂ Monitor. EPA agrees with Kentucky's use of actual hourlyvarying emissions from 2017-2019 for BREC Reid/HMP&L Station 2 and BREC Green Station from CEMS at the facilities. EPA also agrees with using the most recent stack test data and monthly production records to produce temporally variable actual emissions for the anode bake furnace and potlines at Century Aluminum. Additionally, EPA agrees with modeling the smaller, natural gas-fired units at Century Aluminum using potential emissions.

Considering all the data and modeling procedures described in Sections 2.4.1.1 through 2.4.1.10 of this final designations TSD, EPA agrees that Kentucky's November 12, 2020, modeling captures the geographic extent of the violations and can be used to establish the corresponding nonattainment boundary.

2.5. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Henderson-Webster, Kentucky Area

These factors have been incorporated into the air quality modeling efforts and results discussed above. EPA is giving consideration to these factors by considering whether they were properly incorporated and by considering the air quality concentrations predicted by the modeling.

2.6. Jurisdictional Boundaries in the Henderson-Webster, Kentucky Area

Kentucky provided an analysis of the jurisdictional boundaries to establish the geographic extent of the nonattainment area in Henderson and Webster Counties. EPA considers existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions for the area. Our goal is to base designations on clearly defined legal boundaries that align with existing administrative boundaries when reasonable. Existing jurisdictional boundaries used to define a nonattainment area must encompass the area that has been identified as meeting the nonattainment definition.

After assessing the five factors outlined above, the Commonwealth recommended the nonattainment boundary illustrated in Figure 11 above, which utilizes permanent and readily identifiable jurisdictional boundaries, roadways, and geographical landmarks to inform the Henderson-Webster partial nonattainment boundary. The Commonwealth's November 12, 2020, nonattainment boundary includes those undesignated portions of Henderson and Webster Counties encompassed by the polygon bounded by 48 vertices using UTM coordinates as described in Table 8 above. Kentucky's boundary includes the violating DRR monitor and all three DRR sources: Century Aluminum, BREC Reid/HMP&L Station 2 and Robert D. Green Station. Table 8 above provides a description of the vertices (*i.e.*, UTM geographical extent of the partial nonattainment boundary. EPA believes the Commonwealth's boundary recommendation provides for a clear, legally defined boundary and encompasses an area identified as meeting the nonattainment definition. The Commonwealth also recommends attainment/unclassifiable for the remaining undesignated areas in Henderson and Webster County not included in the Commonwealth's nonattainment boundary described above. See Figure 13.

2.7. Other Information Relevant to the Designation of the Henderson-Webster, Kentucky Area

Kentucky's November 12, 2020, response to EPA's August 13, 2020, intended designations includes an updated nonattainment boundary recommendation based on a modeling analysis for the undesignated portions of Henderson-Webster Area. EPA's assessment of the Commonwealth's modeling analysis and updated nonattainment boundary recommendation is provided in sections 2.4.1, 2.5 and 2.6 above. EPA received comments from the Sierra Club regarding the intended designation for the Henderson-Webster area. These comments are addressed in the Response to Comments document associated with this final action.

2.8. EPA's Assessment of the Available Information for the Henderson-Webster, Kentucky Area

A monitor in the Henderson-Webster area is violating the NAAQS based on the 2017-2019 design value. Kentucky submitted air dispersion modeling to demonstrate the extent of the NAAQS violations and to establish a nonattainment boundary.

Kentucky submitted additional air dispersion modeling on November 12, 2020, superseding an October 16, 2020, submission to define the extent of the nonattainment area for the Henderson-Webster Area. The Commonwealth's modeling supports the Commonwealth's updated nonattainment boundary recommendation of a nonattainment boundary that includes undesignated portions of Henderson and Webster Counties. EPA believes Kentucky's air dispersion modeling accurately characterizes the extent of the nonattainment boundary based on more recent emissions from both power plants (Robert Reid Station/Henderson Municipal Power and Light (HMP&L) Station 2, and Robert D. Green Station) and the aluminum plant (Century Aluminum), and considered the most recent meteorology data, current background concentrations from nearby monitors, and the current version of AERMOD.⁴

EPA believes that this updated modeling is more representative of the area than the modeling used to site the monitor that was used to develop the intended nonattainment boundary and it accounts for all modeled impacts above the SO₂ standard. EPA believes that our final nonattainment area, bounded by the UTM coordinates listed in Table 8 above, will have clearly defined legal boundaries, and we find these boundaries to be a suitable basis for defining our final nonattainment area.

EPA has no evidence to suggest that violations are occuring in the remainder of Henderson or Webster Counties or that there are sources outside the nonattainment area that are contributing to the violations in the nonattainment area. Specifically, the remainder of Henderson and Webster counties do not contain any sources that emitted greater than 2,000 tpy of SO₂ in 2017 - 2019. For these reasons, EPA is designating the remainder of Henderson and Webster Counties as attainment/unclassifiable.

2.9. Summary of EPA's Final Designation for the Henderson-Webster, Kentucky Area

After careful evaluation of the Commonwealth's recommendation and supporting information, as well as all available relevant information, EPA is designating a portion of the Henderson-Webster, Kentucky area as nonattainment for the 2010 SO₂ NAAQS. Specifically, the boundaries are comprised of the portions of Henderson County and Webster County contained within the area bounded by the UTM coordinates listed in Table 8 above.

Additionally, EPA is designating the remainder of Henderson County and Webster County as attainment/unclassifiable. Figure 13 shows the boundary of this final designated area.

⁴ EPA's assessment of the modeling for the Henderson-Webster area to inform our nonattainment boundary for 2010 SO₂ NAAQS designations does not imply that the modeling is appropriate for other purposes, such as new source review, interstate transport, or state implementation plan demonstrations.



Figure 13. Boundary of the Final Henderson-Webster Nonattainment Area