

Appendix F-2d

VISTAS Consultation with OH Division of Air Pollution Control

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Correspondence Record

Date	From	To	Description
June 22, 2020	VISTAS	OH DAPC	Request for Regional Haze Reasonable Progress Analyses for Ohio Sources Impacting VISTAS Class I Areas
October 29, 2020	OH DAPC	VISTAS	Response to VISTAS Request for Regional Haze Reasonable Progress Analyses for Ohio Sources Impacting VISTAS Class I Areas



Visibility Improvement State and Tribal Association of the Southeast

June 22, 2020

Robert F. Hodanbosi, Chief
Ohio Division of Air Pollution Control
122 South Front Street
Columbus, Ohio 43215-3425

RE: Request for Regional Haze Reasonable
Progress Analyses for Ohio Sources
Impacting VISTAS Class I Areas

Dear Mr. Hodanbosi:

The Regional Haze Regulation 40 CFR § 51.308(d) requires each state to “address regional haze in each mandatory Class I Federal area located within the State and in each mandatory Class I Federal area located outside the State which may be affected by emissions from within the State.” 40 CFR § 51.308(f) requires states to submit a regional haze implementation plan revision by July 31, 2021. As part of the plan revision, states must establish a reasonable progress goal that provides for reasonable progress towards achieving natural visibility conditions for each mandatory Class I Federal area (Class I area) within their state. 40 CFR § 51.308(d)(1) requires that reasonable progress goals “must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period.”

In establishing reasonable progress goals, states must consider the four factors specified in § 169A of the Federal Clean Air Act and in 40 CFR § 51.308(f)(2)(i). The four factors are: 1) the cost of compliance, 2) the time necessary for compliance, 3) the energy and non-air quality environmental impacts of compliance, and 4) the remaining useful life of any potentially affected sources. Consideration of these four factors is frequently referenced as the “four-factor analysis.”

To assist its member states, the Visibility Improvement State and Tribal Association of the Southeast¹ (VISTAS) and its contractors conducted technical analyses to help states identify

¹ The VISTAS states are Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia.

sources that significantly impact visibility impairment for Class I areas within and outside of the VISTAS region. VISTAS initially used an Area of Influence (AoI) analysis to identify the areas and sources most likely contributing to poor visibility in Class I areas. This AoI analysis involved running the HYSPLIT Trajectory Model to determine the origin of the air parcels affecting visibility within each Class I area. This information was then spatially combined with emissions data to determine the pollutants, sectors, and individual sources that are most likely contributing to the visibility impairment at each Class I area. This information indicated that the pollutants and sector with the largest impact on visibility impairment were sulfur dioxide (SO₂) and nitrogen oxides (NO_x) from point sources. Next, VISTAS states used the results of the AoI analysis to identify sources to “tag” for PM (Particulate Matter) Source Apportionment Technology (PSAT) modeling. PSAT modeling uses “reactive tracers” to apportion particulate matter among different sources, source categories, and regions. PSAT was implemented with the Comprehensive Air Quality Model with extensions photochemical model (CAMx Model) to determine visibility impairment due to individual sources. PSAT results showed that in 2028 the majority of visibility impairment at VISTAS Class I areas will continue to be from point source SO₂ and NO_x emissions. Using the PSAT data, VISTAS states identified, for reasonable progress analysis, sources shown to have a sulfate or nitrate impact on one or more Class I areas greater than or equal to 1.00 percent of the total sulfate plus nitrate point source visibility impairment on the 20 percent most impaired days for each Class I area. This analysis has identified the following sources in Ohio that meet this criterion:

- Ohio Valley Electric Corp., Kyger Creek Station (39053-7983011)
- Cardinal Power Plant - Cardinal Operating Company (39081-8115711)
- General James M. Gavin Power Plant (39053-8148511)
- Duke Energy Ohio, Wm. H. Zimmer Station (39025-8294311)

Information regarding projected 2028 SO₂ and NO_x emissions and visibility impacts on VISTAS Class I areas is shown in the tables attached to this letter (Attachment 1).

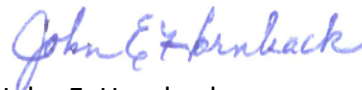
As required in 40 CFR § 51.308(d)(1)(i)(A), VISTAS, on behalf of Alabama, Georgia, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia, requests that Ohio conduct, or require that the sources in question initiate, and share when completed, the results of a reasonable progress analysis for each noted source with VISTAS. This will be helpful to the VISTAS states as they begin the formal Federal Land Manager consultation process for their individual draft Regional Haze Plans in early 2021. So that the VISTAS states can include the results of your state's reasonable progress analyses in developing the long-term strategies for Class I areas in their states, we request that you submit this information to VISTAS no later than October 30, 2020. If any reasonable progress analyses cannot be completed by this date, please provide, no later than this date, notice of an attainable date for completion of the analysis. If you determine that a four-factor analysis is not warranted for one or more of the identified sources, please provide the rationale for this determination by the requested date.

In developing projected 2028 emissions for these sources, VISTAS utilized ERTAC_16.1 emissions projections with additional input from LADCO. Please review these projections to verify that they are reasonable. Should you be aware of significantly different emission projections for 2028 for any of the sources or pollutants, please provide revised estimates within thirty (30) days of the date of this letter. The applicable VISTAS states will review any revised emission estimates, determine if reasonable progress analyses are not needed to meet their regional haze obligations, and notify you accordingly.

Updated 2028 emission projections, if necessary, the results of your state's reasonable progress analyses for the requested sources, and any necessary ongoing communications should be sent via email to vistas@metro4-sesarm.org.

Should you have any questions concerning this request, please contact me through September 30, 2020, at 404-361-4000 or hornback@metro4-sesarm.org.

Sincerely,



John E. Hornback
Executive Director
Metro 4/SESARM/VISTAS

Attachment

Copies: Ron Gore, Alabama Air Division
Karen Hays, Georgia Air Protection Branch
Mike Abraczinskas, North Carolina Division of Air Quality
Rhonda Thompson, South Carolina Bureau of Air Quality
Michelle Walker Owenby, Tennessee Division of Air Pollution Control
Mike Dowd, Virginia Air and Renewable Energy Division
Laura Crowder, West Virginia Division of Air Quality
Zac Adelman, Lake Michigan Air Directors Consortium

Attachment 1: Projected 2028 SO₂ and NO_x Emissions and VISTAS Class I Area Impacts

Table 1. Ohio Valley Electric Corp., Kyger Creek Station (39053-7983011)

Modeled SO₂ = 4,278.0 tpy, Modeled NO_x = 6,267.3 tpy

Impacted VISTAS Class I Areas	Sulfate PSAT (Mm ⁻¹)	Nitrate PSAT (Mm ⁻¹)	Total EGU & non-EGU Sulfate + Nitrate (Mm ⁻¹)	Sulfate PSAT % Impact	Nitrate PSAT % Impact
Otter Creek Wilderness	0.242	0.004	19.077	1.27%	0.02%
Dolly Sods Wilderness	0.229	0.003	19.349	1.18%	0.02%
James River Face Wilderness	0.170	0.006	14.404	1.18%	0.04%
Shenandoah NP	0.155	0.009	15.375	1.01%	0.06%

Table 2. Cardinal Power Plant - Cardinal Operating Company (39081-8115711)

Modeled SO₂ = 9,891.9 tpy, Modeled NO_x = 4,044.8 tpy

Impacted VISTAS Class I Areas	Sulfate PSAT (Mm ⁻¹)	Nitrate PSAT (Mm ⁻¹)	Total EGU & non-EGU Sulfate + Nitrate (Mm ⁻¹)	Sulfate PSAT % Impact	Nitrate PSAT % Impact
Shenandoah NP	0.692	0.018	15.375	4.50%	0.12%
Dolly Sods Wilderness	0.778	0.007	19.349	4.02%	0.03%
Otter Creek Wilderness	0.727	0.008	19.077	3.81%	0.04%
James River Face Wilderness	0.520	0.008	14.404	3.61%	0.06%
Swanquarter Wilderness Area	0.203	0.007	10.894	1.86%	0.06%

Table 3. General James M. Gavin Power Plant (39053-8148511)

Modeled SO₂ = 21,838.6 tpy, Modeled NO_x = 7,982.6 tpy

Impacted VISTAS Class I Areas	Sulfate PSAT (Mm ⁻¹)	Nitrate PSAT (Mm ⁻¹)	Total EGU & non-EGU Sulfate + Nitrate (Mm ⁻¹)	Sulfate PSAT % Impact	Nitrate PSAT % Impact
Otter Creek Wilderness	1.001	0.011	19.077	5.25%	0.06%
Dolly Sods Wilderness	0.945	0.009	19.349	4.88%	0.05%
James River Face Wilderness	0.582	0.016	14.404	4.04%	0.11%
Shenandoah NP	0.576	0.022	15.375	3.75%	0.14%
Great Smoky Mountains NP	0.520	0.003	13.916	3.73%	0.02%
Linville Gorge Wilderness Area	0.446	0.002	12.884	3.46%	0.02%
Joyce Kilmer-Slickrock Wilderness	0.473	0.002	13.694	3.45%	0.01%
Cohutta Wilderness Area	0.322	0.009	13.229	2.44%	0.07%
Shining Rock Wilderness Area	0.297	0.001	12.313	2.41%	0.01%
Cape Romain Wilderness	0.305	0.005	14.028	2.17%	0.04%
Swanquarter Wilderness Area	0.219	0.005	10.894	2.01%	0.05%
Sipsey Wilderness Area	0.327	0.021	16.370	1.99%	0.13%
Wolf Island Wilderness	0.224	0.003	12.957	1.73%	0.02%
Okefenokee Wilderness Area	0.203	0.002	13.400	1.51%	0.01%

Table 4. Duke Energy Ohio, Wm. H. Zimmer Station (39025-8294311)
Modeled SO₂ = 10,346.3 tpy, Modeled NO_x = 5,864.1 tpy

Impacted VISTAS Class I Areas	Sulfate PSAT (Mm⁻¹)	Nitrate PSAT (Mm⁻¹)	Total EGU & non- EGU Sulfate + Nitrate (Mm⁻¹)	Sulfate PSAT % Impact	Nitrate PSAT % Impact
Otter Creek Wilderness	0.302	0.012	19.077	1.58%	0.06%
Dolly Sods Wilderness	0.288	0.010	19.349	1.49%	0.05%
Cohutta Wilderness Area	0.173	0.005	13.229	1.31%	0.04%
Shining Rock Wilderness Area	0.129	0.002	12.313	1.05%	0.01%
Joyce Kilmer-Slickrock Wilderness	0.137	0.002	13.694	1.00%	0.01%



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

October 29, 2020

Chad LaFontaine
Executive Director
Metro 4/SESARM
1252 W Government St Unit 1375
Brandon MS 39043-6054

Re: Response to VISTAS Request for Regional Haze Reasonable Progress Analyses for Ohio Sources Impacting VISTAS Class I Areas

Dear Mr. LaFontaine:

On June 22, 2020, the Visibility Improvement State and Tribal Association of the Southeast (VISTAS), on behalf of Alabama, Georgia, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia, requested that Ohio conduct a reasonable progress analysis for four Ohio sources that were identified by VISTAS to have an impact on visibility in Class I areas located in VISTAS' states: Kyger Creek Station, Cardinal Power Plant, General James M. Gavin Power Plant and Zimmer Power Station. In this letter, it was also requested that if it is determined that a four-factor analysis is not warranted for one or more of the identified sources, rationale for this determination be provided.

Ohio's analysis for each of the sources identified by VISTAS is provided in detail below. In summary:

- Kyger Creek Station – effectively controlled for SO₂ and NO_x
- Cardinal Power Plant – effectively controlled for SO₂ and NO_x
- Gavin Power Plant – four-factor analysis for SO₂ requested; effectively controlled for NO_x
- Zimmer Power Station – recently announced a planned shut down in 2027; currently in discussions regarding an enforceable commitment for the shutdown such that a four-factor analysis is not warranted.

U.S. EPA's Regional Haze Guidance provides example scenarios for sources that would be considered "effectively controlled" in which U.S. EPA believes it may be reasonable for a state not to select a particular source for further analysis. One of the example scenarios provided by U.S. EPA which Ohio finds most pertinent is:

"For the purposes of SO₂ and NO_x control measures, a combustion source (e.g., an EGU or industrial boiler or process heater) that, during the first implementation period, installed a **FGD system that operates year-round with an effectiveness of at least 90 percent** or by the installation of a **selective catalytic reduction system that operates year-round with an overall effectiveness of at least 90 percent** (in both cases calculating the effectiveness as

the total for the system, including any bypassed flue gas), on a pollutant-specific basis.” A pair of footnotes add that “For purposes of this consideration, the first regional haze implementation period started when SIPs were due on December 17, 2007.” and “While a 90 percent control effectiveness is used in this example, we expect that any FGD system installed to meet CAA requirements since 2007 would have an effectiveness of 95 percent or higher. This does not apply to a source that has recently achieved a higher level of control efficiency without the installation of a control system, for example if it has merely increased the flow rate of a reagent. In such a situation, the four factors should be fully considered. The outcome may still be that the current level of control is the measure that is necessary to make reasonable progress. (Emphasis added)

For ease of reference, this example will be referred to as “FGD/SCR with at least 90% effectiveness”.

However, U.S. EPA’s Regional Haze Guidance clearly indicates that the examples are meant to be illustrative but not exhaustive. Using the general principle established in the Regional Haze Guidance that a source may be excluded from four-factor analysis where it is “reasonable to assume for the purposes of efficiency and prioritization that a full four-factor analysis would likely result in the conclusion that no further controls are necessary”, Ohio interprets the “FGD/SCR with at least 90% effectiveness” example slightly broader than written in the Regional Haze Guidance.

Specifically, although the example only references controls installed in the first implementation period (i.e. after December 17, 2007), Ohio does not believe the installation date is pertinent to whether the source is effectively controlled, so long as the device is getting sufficient removal. Ohio believes that conducting a four-factor analysis on a source with an FGD or SCR with 90% control efficiency, regardless of the date installed, would likely result in the conclusion that no further controls are necessary. Therefore, Ohio considered control devices installed prior to the first implementation period to meet our interpretation of this example.

Kyger Creek Station

Kyger Creek Station (Facility ID 0627000003) operates five coal-fired boilers (B001, B002, B003, B004 and B005), which are considered effectively controlled for SO₂ and NO_x in accordance with the “FGD/SCR with at least 90% effectiveness” example in the Regional Haze Guidance.

FGDs with 98% control efficiency were installed March 19, 2012 on B001 and B002, and November 4, 2011 on B003, B004 and B005. Each of these controls operate year-round. Each of the five units have a federally enforceable SO₂ emissions limits of 1.2 lb/MMBtu based on a rolling, 30-day average (permit no. P0104412, effective 02/17/2011). As shown in Table 1, recent SO₂ emission rates are 0.16 lb/MMBtu or less.

SCRs with 90% control efficiency were installed October 1, 2002 on B001, December 1, 2002 on B002, February 1, 2003 on B003, April 1, 2003 on B004 and June 1, 2003 on B005. Each of these controls operate year-round. As shown in Table 1, recent NO_x emission rates are 0.24 lb/MMBtu or less.

Table 1. Kyger Creek B001, B002, B003, B004 and B005 emissions (2016 to 2019)

Unit ID	Year	SO ₂ (tons)	SO ₂ rate (lb/MMBtu)	NOx (tons)	NOx Rate (lb/MMBtu)	PM25-PRI (tons)	NH3 (tons)
B001	2016	755	0.14	1,197	0.22	112	0
	2017	1,025	0.15	970	0.15	141	0
	2018	1,157	0.16	1,385	0.20	144	1
	2019	675	0.12	997	0.19	112	0
B002	2016	700	0.14	1,109	0.24	104	0
	2017	844	0.15	687	0.13	113	0
	2018	1,144	0.16	1,404	0.20	142	0
	2019	718	0.11	1,245	0.20	128	0
B003	2016	853	0.15	1,848	0.23	120	0
	2017	867	0.15	729	0.13	127	0
	2018	914	0.15	1,100	0.18	129	0
	2019	744	0.13	1,043	0.18	127	0
B004	2016	828	0.16	1,793	0.22	117	0
	2017	982	0.15	968	0.15	144	0
	2018	880	0.15	1,102	0.19	124	0
	2019	823	0.13	1,086	0.17	140	0
B005	2016	845	0.15	1,831	0.22	120	0
	2017	964	0.15	885	0.14	142	0
	2018	876	0.15	1,001	0.18	125	0
	2019	787	0.13	1,003	0.17	130	0

None of the units are significant sources of PM_{2.5} or ammonia.

Cardinal Power Plant

Cardinal Power Plant (Facility ID 0641050002) operates three coal-fired boilers (B001, B002 and B009), each of which is considered effectively controlled for SO₂ and NOx in accordance with the “FGD/SCR with at least 90% effectiveness” example in the Regional Haze Guidance.

FGDs with 95% control efficiency were installed March 1, 2008 on B001, December 1, 2007 on B002, and December 30, 2011 on B009. The FGDs must be continuously operated on and after December 31, 2008 for B001 and B002, and December 31, 2012 for B009, in accordance with the requirements of a federal Consent Decree in *United States, et al. v. American Electric Power Service Corp., et al.*, Civil Action Nos. C2-99-1182 and C2-99-1250 and *United States, et al. v. American Electric Power Service Corp., et al.*, Civil Action Nos. C2-04-1098 and C2-05-360 (Consent Decree).

B001 and B002 each have federally enforceable SO₂ emissions limits of 1.056 lb/MMBtu based on a rolling, 30-day average (permit no. P0104412, effective February 17, 2011). B003 has a federally enforceable SO₂ emissions limit of 0.66 lb/MMBtu based on a rolling, 30-day average (permit no. P0104411, effective February 17, 2011). As shown in Table 2, recent SO₂ emission rates are 0.27 lb/MMBtu or less.

SCRs with 90% control efficiency were installed June 1, 2003 on B001, and May 1, 2003 on B002 and B009. The SCRs must be continuously operated on and after January 1, 2009 in accordance with the requirements of the Consent Decree. As shown in Table 2, recent NOx emission rates are below 0.1 lb/MMBtu.

Table 2. Cardinal Power Plant B001, B002 and B009 emissions (2016 to 2019)

Unit ID	Year	SO ₂ (tons)	SO ₂ rate (lb/MMBtu)	NOx (tons)	NOx Rate (lb/MMBtu)	PM25-PRI (tons)	NH3 (tons)
B001	2016	3,885	0.22	1,497	0.09	54	1
	2017	3,796	0.24	1,166	0.08	50	1
	2018	3,794	0.22	1,348	0.08	74	1
	2019	3,685	0.18	1,479	0.08	92	1
B002	2016	3,986	0.27	1,146	0.08	73	1
	2017	5,205	0.25	1,446	0.07	247	0
	2018	3,103	0.22	1,024	0.08	38	1
	2019	3,714	0.23	1,242	0.08	43	1
B009	2016	1,325	0.10	1,112	0.09	969	1
	2017	2,256	0.13	1,272	0.08	88	1
	2018	2,807	0.14	1,468	0.08	166	1
	2019	2,053	0.15	1,157	0.09	118	1

B001 and B002 are not significant sources of PM_{2.5}. Although B009 is reported to have emitted 969 tons of PM_{2.5} in 2016, emissions have dropped substantially in more recent years. This decrease may likely be due in part to more recent stack testing, along with new requirements for condensable stack testing under U.S. EPA's Method 202 established in March 2016¹, which forms the basis of the emissions estimates for the condensable fraction of PM. Further, B009 is equipped with an Electrostatic Precipitator (ESP) with 99.5% control efficiency installed September 1, 1977.

None of the units are significant sources of ammonia.

General James M. Gavin Power Plant

General James M. Gavin Power Plant (Facility ID 0627010056) operates two coal-fired boilers (B003 and B004).

FGDs with 95% control efficiency were installed December 1, 1994 on B003 and March 1, 1995 on B004. The FGDs must be continuously operated in accordance with the requirements of a federal Consent Decree in *United States of America and the State of New York, et. al and Ohio Citizen Action et al. v. American Electric Power Service Corp. et al*, (S.D. Ohio Case No. 2:99-CV-01182), lodged on October 9, 2007 and entered on December 10, 2007, as amended on April 5, 2010, December 28, 2010, May 14, 2013, and January 23, 2017 (hereinafter "Consent Decree").

¹ <https://www.epa.gov/emc/method-202-condensable-particulate-matter>

B003 and B004 each have federally enforceable SO₂ emissions limits of 7.41 lb/MMBtu (permit no. P0089258, effective April 15, 2020). As shown in Table 3, recent SO₂ emissions rates are 0.39 lb/MMBtu or less. Although the FGDs operate year-round with a 95% control efficiency, Ohio has requested a four-factor analysis with respect to SO₂.

B003 and B004 are considered effectively controlled for NO_x in accordance with the with the “FGD/SCR with at least 90% effectiveness” example in the Regional Haze Guidance. SCRs with 90% control efficiency were installed May 1, 2001 on B003 and B004. The SCRs must be continuously operated in accordance with the requirements of the Consent Decree. As shown in Table 3, recent NO_x emission rates are 0.11 lb/MMBtu or less.

Table 3. Gavin Power Plant B003 and B004 emissions (2016 to 2019)

Unit ID	Year	SO ₂ (tons)	SO ₂ rate (lb/MMBtu)	NO _x (tons)	NO _x Rate (lb/MMBtu)	PM _{2.5} -PRI (tons)	NH ₃ (tons)
B003	2016	9,039	0.27	3,572	0.11	608	1
	2017	13,785	0.32	4,441	0.10	650	1
	2018	13,172	0.38	3,495	0.10	567	1
	2019	12,161	0.37	3,485	0.11	219	1
B004	2016	10,990	0.29	3,757	0.10	1,007	1
	2017	11,640	0.36	3,382	0.11	518	1
	2018	14,420	0.34	4,553	0.11	644	1
	2019	14,313	0.39	3,857	0.11	403	1

Although B003 and B004 are reported to have emitted higher emissions of PM_{2.5} in 2016, as shown in Table 3, emissions have dropped substantially in more recent years. These differences are due to updated stack testing in 2017 which forms the basis of the emissions estimates for the condensable fraction of PM_{2.5}. Thus, the recent emissions based on more recent data are expected to more accurately reflect current conditions. Ohio EPA does not consider B003 or B004 to be a significant source of PM_{2.5} based on recent reported emissions.

In addition, B003 and B004 each are equipped with an Electrostatic Precipitator (ESP) for particulate control with greater than 99% control efficiency of particulates. B003 and B004 each have federally enforceable particulate emissions limits of 0.1 lb/MMBtu (permit no. P0089258, effective 04/15/2020).

Neither unit is a significant source of ammonia.

Zimmer Power Station

Zimmer Power Station (1413090154) operates one coal-fired boiler (B006). Zimmer recently announced a planned shut down in 2027. Ohio and Zimmer are currently in discussions regarding an enforceable commitment for the shutdown such that a four-factor analysis is not warranted.

² The 2016 and 2017 emissions are based on stack testing conducted 02/26/09, whereas the 2018 and 2019 emissions are based on a stack test conducted on 08/23/2017.

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

Sincerely,



Robert F. Hodanbosi
Chief, Division of Air Pollution Control, Ohio EPA