



**STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL**

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312 Rosa L. Parks Avenue
Nashville, TN 37243

January 13, 2021

Paul Miller,
Lead Manager
MANE-VU
89 South Street, Suite 602
Boston, MA 02111

Subject: MANE-VU Inter-RPO Ask for the Regional Haze Second Planning Period

Dear Mr. Miller,

The Tennessee Department of Environment and Conservation, Air Pollution Control Division (TDEC-APC) received the Mid-Atlantic/Northeast Visibility Union (MANE-VU) Inter-RPO Ask, dated August 25, 2017. The Visibility Improvement -State and Tribal Association of the Southeast (VISTAS) sent a letter, dated January 2, 2018, to MANE-VU with some preliminary responses to the Inter-RPO Ask. Now that the VISTAS technical work is complete, TDEC-APC is now in a position to fully respond to the Inter-RPO Ask.

The Inter-RPO Ask identifies emissions from Tennessee as reasonably anticipated to contribute to visibility impairment in MANE-VU Class I areas. MANE-VU made this determination from the results of a weight-of-evidence approach based on emissions divided by distance (Q/d) calculations, CALPUFF modeling, and HYSPLIT back trajectories. It appears that MANE-VU used 2015 emissions for electric generating units (EGUs) and 2011 emissions for other sources. States that contributed greater than or equal to 2% of the visibility impairment to a Class I area and had an average mass impact of over 1 % (0.01 microgram per cubic meter), were identified for consultation, and included in the Inter-RPO Ask. Tennessee was identified in the Inter-RPO Ask as one of the states meeting these criteria.

TDEC-APC participated in the consultation calls MANE-VU held with states included in the Inter-RPO Ask. TDEC-APC believes that the MANE-VU methodologies resulted in inaccurate conclusions that emissions from Tennessee are contributing to visibility impairment in MANE-VU Class I areas. This is due in part to the use of CALPUFF at distances greater than 300 km, which is not recommended since beyond this range the model tends to overestimate pollutant concentrations at receptor sites.¹

¹ Documentation of the Evaluation of CALPUFF and Other Long Range Transport Models Using Tracer Field Experiment Data, p. 141 (https://www3.epa.gov/scram001/reports/EPA-454_R-12-003.pdf)

Historically, the largest source of sulfur dioxide (SO₂) and nitrogen oxides (NO_x) emissions in Tennessee is EGU's, which are all owned by the Tennessee Valley Authority (TVA). TVA entered into a court settlement in 2011 for previous violations of the Clean Air Act. This settlement resulted in TVA making changes at a number of facilities, including shut down, new controls, and a switch from coal to natural gas at certain facilities. MANE-VU's use of 2015 emissions for EGUs did not capture many of these reductions in emissions at TVA's facilities. Tennessee's EGU SO₂ emissions were 59,697 tons in 2015 and 11,224 tons in 2019 and NO_x emissions were 18,180 tons in 2015 and 8,301 tons in 2019.

MANE-VU completed Community Multiscale Air Quality (CMAQ) photochemical grid modeling for 2011 and 2028 for regional haze but did not conduct zero-out runs to evaluate upwind state contributions to MANE-VU Class I areas. VISTAS completed regional haze modeling using the Comprehensive Air Quality Model with Extensions (CAMx) photochemical grid model. For each VISTAS state, VISTAS also conducted Particulate Matter Source Apportionment Technology (PSAT) source apportionment modeling for sulfate and nitrate to evaluate statewide contributions of emissions to visibility impairment in Class I areas. Sulfate and nitrate were evaluated because these two pollutants currently account for the majority of the visibility impairment associated with anthropogenic sources in the VISTAS and MANE-VU regions. TDEC-APC believes that 2028 (not 2015 or 2011) is the appropriate year to evaluate state contributions to visibility impairment in Class I areas. This is supported by EPA's regional haze guidance, which recommends the use of 2028 year emissions for calculating baseline visibility impacts before selecting sources for further analysis.²

The Table below shows the combined impact of sulfate and nitrate on visibility impairment for each of the MANE-VU Class 1 areas in 2028. As these results show, Tennessee's total sulfate and nitrate contribution to visibility impairment in 2028 is at or below 0.24% for the 20% most impaired days and at or below 0.03% for the 20% clearest days for all of the MANE-VU Class I areas.

Tennessee 2028 Contribution of all sources to light extinction (Mm⁻¹) from Sulfate + Nitrate

Class 1 Area	20% Clearest Days		20% Most Impaired Days	
	Extinction (Mm ⁻¹)	Percentage (%)	Extinction (Mm ⁻¹)	Percentage (%)
Brigantine Wilderness, NJ	0.009	0.03	0.109	0.16
Acadia National Park, ME	0.000	0.00	0.038	0.08
Great Gulf Wilderness, NH	0.002	0.01	0.074	0.19
Lye Brook Wilderness, VT	0.001	0.01	0.113	0.24
Moosehorn Wilderness, ME	0.000	0.00	0.019	0.04
Presidential Range Dry River Wilderness, NH	0.002	0.01	0.074	0.19
Roosevelt Campobello International Park ME/NB	0.000	0.00	0.019	0.04

² Guidance on Regional Haze State Implementation Plans for the Second Implementation Period, EPA-457/B-19-003, August 2019.

TDEC-APC believes that use of photochemical and source apportionment models such as CAMx/PSAT provide more accurate estimates of statewide contributions to visibility impairment in Class I areas than the methodologies used by MANE-VU to identify contributing states. Based on the CAMx/PSAT modeling conducted by the VISTAS states, Tennessee's statewide contribution to visibility impairment at all of the MANE-VU Class I areas is significantly below the 2% contribution threshold that the MANE-VU states used to identify upwind states as contributing to visibility impairment in MANE-VU Class I areas. TDEC-APC believes that MANE-VU's screening methodologies are less accurate in several areas and overstate upwind contributions to downwind state Class I areas. Thus, TDEC-APC will not be taking the measures outlined in the Inter-RPO Ask.

VISTAS hired a contractor for much of its technical work. Many of the project reports can be found at the following website: <https://www.metro4-sesarm.org/content/vistas-regional-haze-program>. Should your staff have any questions about this letter or on Tennessee's regional haze state implementation plan development, please contact Jimmy Johnston at (615) 253-7319 or via email at james.johnston@tn.gov.

Sincerely,

A handwritten signature in blue ink that reads "Michelle W. Owenby". The signature is written in a cursive style.

Michelle W. Owenby
Director
Division of Air Pollution Control