LDEQ Source Selection Summary for Regional Haze Planning Period II

Area of Influence Analysis

The states in the Central States Air Resources Agencies (CENSARA) organization, which includes Louisiana, contracted with Ramboll US Corporation (Ramboll) to produce a study examining the impact of stationary sources of nitrogen oxides (NO_X) and sulfur dioxide (SO_2) on each Class I area in the central region of the United States. For each Class I area, the study took into account light extinction-weighted wind trajectory residence times, SO_2 and NO_x facility emissions, and distance from sources of NO_x and SO_2 to Class I areas. The study produced an area of influence (AOI), which identifies the geographic areas with a high probability of contributing to anthropogenic visibility impairment for each Class I area.

Visibility trend and monitoring data from the Interagency Monitoring of Protected Visual Environments (IMPROVE) program was used to identify the 20% most anthropogenically impaired days in 2012-2016. The IMPROVE data was also used to identify the pollutants of concern for the study, NO_x and SO_2. Ammonium sulfate and ammonium nitrate make up the majority of the anthropogenic emissions measured at Class 1 areas. Volatile organic compounds (VOC) and ammonia emissions were eliminated from consideration based on the expectation that anthropogenic VOC emissions make only a small contribution to visibility impairment and that formation of nitrate and sulfate particulate matter (PM) is most effectively reduced by reducing emissions of NO_x and SO_2 rather than by anthropogenic emissions of ammonia.

Using National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory (ARL) meteorological model forecast and reanalysis datasets as inputs for the Hybrid-Single Particle Lagrangian Integrated Trajectory (HYSPLIT) back-trajectory model, Ramboll created back trajectories for the 20% most anthropogenically impaired days in 2012-2016 to develop residence time plots for each Class I area. The residence time is the cumulative time that trajectories reside in a specific geographical area.

Extinction Weighted Residence Times (EWRT) were calculated separately for sulfates (SO_4) and nitrates (NO_3) by combining the residence times with the extinction coefficient attributed to each pollutant measured at the IMPROVE monitor. The higher the value of the EWRT, the more likely that the air parcels passing over a specific geographic location would cause higher light extinction.

Distance weighted values (emissions/distance or Q/d) values were calculated for each Class I area using point source emissions inventory data for SO_2 and NO_x. The facility emissions (Q, in tons per year) were then divided by the distance (d, in kilometers) from the facility to the Class I area. The higher the value of Q/d, the greater likelihood the facility's emissions will impact visibility at the Class I area.

Finally, the distance weighted value for each facility was multiplied by the facility's sulfate or nitrate EWRT grid values (i.e., EWRT *Q/d). Next, the sulfate and nitrate EWRT *(Q/d) values were summed for all point sources at each Class I area and used to normalize the sulfate and

nitrate contributions from each individual source. This information allows the individual facilities to be ranked from highest to lowest based on sulfate and/or nitrate contributions

Louisiana Source Selection

The Ramboll study provided results based on facility-specific emissions from the 2016NEI version alpha and the 2011NEI modeling case 2028el for future year emissions. Regulation changes as well as more recent data sets became available which would provide a more accurate representation of current emissions for source selection. Therefore, Louisiana conducted the AOI, using the python scripts provided by Ramboll, with point source emissions and facility location data from the 2017 NEI (December 2019) to provide AOIs for Class I areas that is more up to date.

In order to select the sources for further review, LDEQ established the following thresholds and applied them to all Class I areas included in the AOI:

1. Any facility with a SO_4 or NO_3 EWRT less than 0.05% of the total domain EWRT was excluded. This eliminated those facilities in geographical areas with an extremely low probability of influencing visibility from either NO_x or SO_2.
2. The EWRT*Q/d for SO_4 and NO_3 were summed and sorted from highest to lowest to rank the combined SO_4 and NO_3 light extinction contribution for each facility. A cumulative combined EWRT*Q/d percent contribution threshold of 75% was set to ensure that a significant portion of the overall light extinction would be addressed.
3. A final 1% combined EWRT*Q/d contribution threshold eliminated individual facilities that do not significantly contribute to the overall light extinction.

16 of the 18 facilities that received information collection requests were identified due to their impact on the Breton Class I area. The two additional sources were identified as significant contributors to the Caney Creek and Upper Buffalo Class I areas in Arkansas using the same criteria.

Revised Source Selection

On April 10, 2020, EPA Region 6 provided comments (EDMS Document 12133509) on the source selection documentation and determination for Louisiana's impact on the Caney Creek and Upper Buffalo Class 1 areas. EPA recommended that the analysis be revised to include certain emissions reductions and facility shut downs in Oklahoma and Texas. These facilities include three large Electric Generating Units (EGUs) in Texas (Sandow, Big Brown, and Monticello) permanently shut down in early 2018 and two Oklahoma facilities (Muskogee and Sooner Station) that completed installation of controls or converted to natural gas in 2018 to satisfy BART requirements in the first Regional Haze planning period (12/28/2011 FIP, 76 FR 81727). EPA advised that 2019 annual emissions reported to the Clean Air Markets Division (CAMD) be substituted for the 2017 NEI data for these facilities in the Louisiana analysis.

In accordance with the recommendations by EPA Region 6, 2019 CAMD Air Markets Program Data (AMPD) data (https://ampd.epa.gov/ampd/) was substituted in the Caney Creek and Upper

Buffalo Class 1 area data sets where the 2019 data showed reductions in emissions. See the table below for the data updates included in the revision.

	Version 1		Version 2 Revised	
FacilityName	**NOx_tpy**	**SO_2_tpy**	**NOx_tpy**	**SO_2_tpy**
BIG BROWN STEAM ELECTRIC STATION	5806.245	47632.47	0	0
MONTICELLO STEAM ELECTRIC STATION	7636.935	29412.16	0	0
SANDOW STEAM ELECTRIC STATION	1468.12	17447.48	0	0
Entergy LA LLC - Nelson Industrial Steam Co (NISCO)	1222.104	6195.078	991.652	6195.078
Entergy Louisiana LLC - Roy S Nelson Plant	2601.433	10220.24	2427.044	7673.783
MUSKOGEE GENERATING STATION	7054.319	18502.85	1752.946	1695.862
SOONER GENERATING STATION	2443.329	9356.317	2582.528	587.131
SANDOW 5 GENERATING PLANT	1588.087	2452.135	0	0

The reduction in emissions included in the dataset results in a smaller Combined EWRT*Q/d SO_4 & NO_3 which increases the relative contribution of each contributing source. As a result, two additional Louisiana facilities meet the thresholds for impacting Caney Creek and one source at Upper Buffalo.