**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 NOx facility emissions, and distance from sources of NOx 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, NOx 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 NOx 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 NOx. 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 NOx or SO2.
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 Breton NWR. 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.