Appendix M

Description of the Sources and Methods Used to Support Q/d Analysis for the 2nd Regional Haze Planning Period, October 14, 2020

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LADCO | LAKE MICHIGAN AIR DIRECTORS CONSORTIUM

TECHNICAL MEMORANDUM

To: LADCO Regional Haze Workgroup

Date: October 14, 2020

Subject: Description of the Sources and Methods Used to Support Q/d Analysis for the 2nd Regional Haze Planning Period

This memo describes the data and methods used by LADCO to screen emissions source impacts on Class I areas for the 2nd regional haze planning period. The surrogate analysis of tons/year emissions (Q) divided by distance in kilometers (d) from the Class I areas, known as Q/d, is used to screen emissions source impacts at downwind receptors in lieu of air quality modeling results. LADCO created Q/d results for industrial point sources using preliminary 2016 emissions inventory data. LADCO completed the Q/d calculations in March 2018 using the best available inventories at that time.

Inventory Sources

Starting in 2017 LADCO began producing Q/d analyses for use by the LADCO member states for round 2 regional haze planning. The first Q/d versions used 2011-based emissions inventories and included 2011, 2018, and 2028 data. LADCO also computed Q/d values for point sources from different versions of inventories for Canada and Mexico. As LADCO and the LADCO member states learned of new electricity generating unit (EGU) shutdown announcements that were made since the release of the 2011 inventories, the LADCO members requested that the Q/d analyses be redone with newer data.

In January 2018, state and federal participants in the LADCO regional haze technical workgroup agreed to use the latest available 2016 inventory for a new Q/d analysis by LADCO. The National Emissions Inventory Collaborative 2016 alpha inventory represented the best estimate of 2016 point emissions at the time[1]. Table 1 shows the point source components of the 2016 alpha inventory that LADCO used for the Q/d analysis.

[1]https://www.epa.gov/air-emissions-modeling/2016v71-alpha-platform

Table 1. Point source inventory components used for the 2016 alpha Q/d analysis

Sector	Filename	Description
Electricity Generating Unit (EGU) point	ptegu_2016NEIv2_composite.csv	2016 emissions from the National Emissions Inventory (NEI) along with integration with CEM (continuous emissions monitoring) hourly data.
Non-EGU industrial point	ptnonipm_2016alpha_POINT_ 03apr2018_nf_v3.csv	2016 emissions of non-EGU industrial point sources.
Point oil and gas	2028el_marama_pt_oilgas_2011neiv2_ point_20140913_02dec2016_v1.csv	2028 emissions for oil and gas sources. In April of 2018 no 2016 oil and gas inventory was available. We chose to use MARAMA's 2011-based projected 2028 oil and gas inventory that included many new oil and gas fields and sites.
Non-US point	canada_mexico.ff10.csv	2013 and 2025 point inventories from Environment and Climate Change Canada were interpolated to year 2016. 2008 inventories for Mexico were projected to the years 2014 and 2018, and then those emissions were interpolated to the year 2016.

Control Information Spreadsheet

LADCO developed a utility in R (QD_2028_V2.1.R) to extract the inventory data, calculate Q/d for each facility, and format the data for Microsoft Excel. The emissions totals extracted included SO2, NOX, NH3, and PM2.5 and filtered out all facilities with emissions lower than .1 Tons/Year of any of the pollutants. The program calculated the kilometer distance from each facility to a single point at the center of the class 1 area and then selected the distance to the class 1 area that was closest to the facility. To better evaluate the emissions contributions to each Class I area, LADCO modified the Q/d analysis in June 2019. Because a four factor analysis requires a list of sources at the process (Source Classification Code) level, LADCO updated the Q/d utility to generate a list of all facilities that have 80% of the cumulative Q/d values for each Class 1 area. From those top 80% facilities, the program further filters out those processes with emissions less than 1 ton/year.

LADCO created an Excel spreadsheet from the new report and tagged the facility processes with four factor analysis group codes. LADCO used facility NAICS codes to generate a list of facilities that belong to

each of 7 four factor groups with help from the LADCO member states and stakeholders. Table 2 shows the NAICS codes and the four factor groups with counts of facilities and units in each group.

Table 2. Four factor groups used for the LADCO Q/d analysis

Proposed 4-factor group	naics	naics name	number_of_facilities	facility_tot_qd	Number_of_units
1	221112	Fossil Fuel Electric Power Generation	81	2690	210
2	212210	Iron Ore Mining	9	374	58
3	322121	Paper (except Newsprint) Mills	16	182	36
3	311221	Wet Corn Milling	5	45	13
3	311313	Beet Sugar Manufacturing	3	14	6
3	322110	Pulp Mills	2	9	4
3	322130	Paperboard Mills	3	7	3
4	327310	Cement Manufacturing	10	104	28
4	327410	Lime Manufacturing	8	45	13
5	331110	Iron and Steel Mills and Ferroalloy Manufacturing	9	77	33
6	486210	Pipeline Transportation of Natural Gas	16	77	40
6	221210	Natural Gas Distribution	2	4	2
7	324199	All Other Petroleum and Coal Products Manufacturing	6	47	12
7	324110	Petroleum Refineries	5	9	6

The spreadsheets and emissions data files used for the Q/d analysis are available on the LADCO Regional Haze webpage.

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