

February 28, 2011

MEMORANDUM

To: Toxics Rule Docket
From:
Subject: Review of Proximity Analysis

1.0 INTRODUCTION

This memorandum transmits the methods and results of the proximity-based demographic assessment conducted in support of Section J. of the Toxics Rule which regulates coal- and oil-fired electrical generation units (EGUs) greater than 25 megawatts (MWs). The objective of the assessment is to determine the demographics of populations located in the vicinity of these EGUs. These populations have the potential to be significantly affected by the emissions of this source category. However, these EGUs usually have very tall emission stacks that tend to disperse pollutants fairly far from the source. In addition, several of the pollutants emitted by this source category (e.g., mercury (Hg) and sulfur dioxide (SO₂)) are known to travel long distances and can cause harm to both the environment and human health as far as hundreds or even thousands of miles from where they were first emitted into the atmosphere. Therefore, while this analysis gives some indication of populations that may be exposed to levels of pollution that can cause concern, it does NOT identify the demographic characteristics of the people or communities most affected by the pollutants from this source category or the emissions reductions that would result from this proposed rule.

2.0 ANALYTICAL APPROACH

The following analysis uses the “proximity-to-a-source” approach as a surrogate for potential exposure to identify those populations living in designated “study areas” around affected sources. The site location data for the sources subject to the Toxics Rule were taken from the Office of Air and Radiation’s Clean Air Markets Division’s (CAMD) NEEDSv410_NODA database.

Data collected by EPA from potentially affected sources in 2010 under the Information Collection Rule (ICR) indicated that numerous EGUs identified as oil-fired listed in the CAMD database don't fire oil unless they absolutely have to (e.g., when natural gas service is interrupted due to cold weather, hurricanes, etc.). The ICR data also indicated that, given the price differential between natural gas and oil, some “oiled-fired” EGUs had not fired oil in years. In addition, the responses to the ICR revealed that the data on oil-fired EGUs contain multiple miscoding, for example several "oil-fired boilers" were really "combustion turbines" with heat recovery steam generators. As a result of the uncertainties in data on the oil-fired EGUs, we

decided to focus the proximity analysis only on coal-fired EGUs greater than 25 MWs. Therefore the resulting analysis represents approximately 97% of likely affected sources (i.e., coal- and oil-fired EGUs) contained in the CAMD data base.

The demographic data for this analysis are based on census block level data extracted from the 2000 US census which was provided to the EPA by the US Census Bureau. The socio-demographic parameters used in the analysis include the following categories: Racial (White, African American, Native American, Other or Multiracial, All Other Races); Ethnicity (Hispanic, non-Hispanic); and Other (Number of people below the poverty line).

This proximity analysis determined the demographic composition for two study areas around each emissions source. The first study area consisted of those census blocks whose centroids lay within a 5 km (approximately 3 miles) radius of the affected sources. This radius has been used in previous demographic analyses focused on areas around industrial sources^{1,2}. While a 5 km radius has been used in previous rulemakings, in the case of EGUs it is potentially a poor estimate of the affected area. As noted above, power plants have very tall emissions stacks that are known to disperse pollutants broadly across a large area.

Therefore, this proximity analysis also included a second study area that consisted of those census blocks whose centroids lay within a 50 km (approximately 31.1 miles) radius of the affected sources. The radius of 50 km was used to approximate the distance from a source where elevated levels of non-mercury hazardous air pollutants such as arsenic and cadmium are most likely to occur. This radius also coincides with the maximum dispersion modeling radius used in the 16 case studies contained in Section III of the preamble for this rule. It should be noted that neither of these study areas (i.e., the 5 km or the 50 km radii circles) necessarily describe the individuals or communities with the greatest risk of exposure to mercury from the consumption of fish contaminated by the emissions from EGUs.

During the course of the analysis, we determined that the centroids of some census blocks were within 5 km or 50 km of more than one coal-fired power plant. This meant that the analysis ran the risk of “double counting.” This was particularly problematic as the study areas expanded from 5 km to 50 km. We resolved this issue by counting each census block only once when aggregating the summary data for each study radius. The summary data presented in Table 3.1 are based on “absolute” numbers that eliminate any double counting.

3.0 SUMMARY OF THE DEMOGRAPHIC ANALYSES

The proximity analyses indicate that All Other Races’ share of the population living within a 5 km of coal-fired EGUs is higher than the national average. For these same areas, the percent of African Americans and the percent of the population below the poverty line are also

1 Mohai P, Saha R. “Reassessing Racial and Socio-economic Disparities in Environmental Justice Research.” *Demography*. 2006; 43(2): 383–399.

2 Mohai P, Saha R. “Reassessing Racial and Socio-economic Disparities in Environmental Justice Research.” *Demography*. 2006; 43(2): 383–399.

slightly higher than their respective national averages. The specific values for these demographic variables compared to their respective national averages are as follows: All Other Races - 29.2% v 24.9% respectively; African American - 15.8% v. 12.3% respectively; Hispanic - 15.5% v. 13.7%, respectively, and number below poverty level - 15.6% v. 13.1% respectively.

The demographic characteristics of the population living within 50 km of coal-fired EGUs is different. Although the percent of All Other Races remains slightly above the national average (i.e., 25.5% v. 24.9%, respectively) as does percent African Americans (i.e., 15.2% v. 12.3% respectively), the percent of Other and Multiracial (including Native Americans), and the percent of the population living below the poverty line decrease below their respective national averages. In addition, it should be noted that the analysis indicates that 75% of Americans live within 50 km of at least one coal-fired EGU. (See Table 3.1 below.)

Table 3.1 COMPARATIVE SUMMARY OF THE DEMOGRAPHICS WITHIN 5 KM (3 MILES) AND 50 KM (31 MILES) RADII OF THE AFFECTED SOURCES

	Nationwide	5 Km (3 mile) Study Area	50 Km (31.1 mile) Study Area
Total population	285,339,125	6,558,259	214,108,152
Race by percent			
White	75.1	70.8	74.5
All Other Races	24.9	29.2	25.5
Race by percent			
White	75.1	70.8	74.5
African American	12.3	15.8	15.2
Native American	0.9	0.7	0.5
Other and Multiracial	11.7	12.7	9.7
Ethnicity by percent			
Hispanic	13.7	15.5	9.9
Non-Hispanic	86.3	84.5	90.1
Below Poverty Line by percent			
Below poverty level	13.1	15.6	11.6
Above poverty level	86.9	84.4	88.4