

Davenport-Moline-Rock Island, IL-IA
Area Designation for the
2012 Primary Annual PM_{2.5} National Ambient Air Quality Standard
Technical Support Document

Summary

In accordance with Section 107(d) of the Clean Air Act (CAA), the EPA must promulgate designations for all areas of the country. In particular, the EPA must identify as “nonattainment” those areas that are violating a National Ambient Air Quality Standard (NAAQS) or contributing to a violation of the NAAQS in a nearby area. Additionally, through the designation process, the EPA identifies areas that are meeting the NAAQS and those areas without sufficient data for the Agency to make a determination. The EPA uses a designation category of “unclassifiable/attainment” for areas where air quality monitoring data indicate attainment of the NAAQS and for areas that do not have monitors but for which the EPA has reason to believe are likely to be in attainment and are not contributing to nearby violations. The EPA reserves the category of “unclassifiable” for areas where the EPA cannot determine based on available information whether the area is meeting or not meeting the NAAQS or where the EPA has not determined that the area contributes to a nearby violation. The EPA must complete this process within 2 years of promulgating a new or revised NAAQS, or may do so within 3 years under circumstances not relevant to these designations.¹

This technical support document (TSD) describes the basis for EPA’s decision to designate the Scott County portion of the Davenport area in Iowa as unclassifiable/attainment and the Rock Island, Henry, and Mercer County portions of the Davenport area in Illinois as unclassifiable for the 2012 primary annual fine particle NAAQS (2012 annual PM_{2.5} NAAQS).²

Consistent with section 107(d), states were required to submit area designation recommendations to the EPA for the 2012 annual PM_{2.5} NAAQS no later than 1 year following promulgation of the standard, or by December 13, 2013. On December 12, 2013, Illinois recommended that Rock Island, Henry and Mercer Counties be designated as unclassifiable/attainment for the 2012 annual PM_{2.5} NAAQS, based on air quality data from 2010 to 2012. On April 30, 2014, Iowa recommended a designation of unclassifiable/attainment for Scott County.

After considering these recommendations and based on EPA’s technical analysis as described in this TSD, the EPA is designating Scott County in Iowa as “unclassifiable/attainment” and Rock Island, Henry, and Mercer Counties in Illinois as “unclassifiable” for the 2012 annual PM_{2.5}

¹ Section 107(d) of the CAA requires the EPA to complete the initial designation process within 2 years of promulgation of a new or revised NAAQS, unless the Administrator has insufficient information to make initial designation decisions in the 2-year time frame. In such circumstances, the EPA may take up to 1 additional year to make initial area designation decisions (i.e., no later than 3 years after promulgation of the standard).

² On December 14, 2012, the EPA promulgated a revised primary annual PM_{2.5} NAAQS (78 FR 3086, January 15, 2013). In that action, the EPA revised the primary annual PM_{2.5} standard, strengthening it from 15.0 micrograms per cubic meter (µg/m³) to 12.0 µg/m³.

standards. These designations for the four counties in the Davenport area are listed in Table 1. The EPA must designate an area nonattainment if it has an air quality monitoring site³ that is violating the standard or if it has sources of emissions that are contributing to a violation of the NAAQS in a nearby area. No monitoring data indicate nonattainment of the 2012 annual PM_{2.5} standards in the Davenport area.

A recent EPA-conducted technical systems audit of the weighing of PM_{2.5} samples in Illinois revealed that the Cook County Department of Environmental Control, which weighs all of the filters in Illinois' monitoring network, did not have appropriate equipment for determining whether the laboratory conditions met the temperature and humidity criteria in 40 CFR 50 Appendix L for proper conditioning of filters, and the instantaneous temperature and humidity information suggested that many of the weighings failed to meet these criteria.⁴ As a result, the EPA believes that no monitoring site in Illinois has sufficient valid data to support a determination of either nonattainment or attainment, and therefore, the EPA cannot rely directly upon analysis/recommendations the states performed/provided which partially rely upon this invalid monitoring data. Thus, the EPA cannot determine whether any area in Illinois is meeting or not meeting the NAAQS.

Table 1. Illinois' and Iowa's Recommended Designations and EPA's Designations for the Davenport Area for the 2012 annual PM_{2.5} NAAQS

Area of Analysis	Illinois' and Iowa's Unclassifiable/attainment Recommendations	EPA's Designations
Davenport-Moline-Rock Island, IL-IA	Illinois: Rock Island, Henry and Mercer Counties Iowa: Scott County	Illinois: Rock Island – Unclassifiable Henry – Unclassifiable Mercer – Unclassifiable Iowa: Scott County – Unclassifiable/attainment

Illinois' recommendations for other counties in the state outside of the Davenport area are addressed in a separate TSD.⁵ The EPA agrees with Iowa's recommendations that all counties

³ In accordance with 40 CFR 50 Appendix N, PM_{2.5} measurements from the primary monitor and suitable collocated PM_{2.5} FRM, FEM or ARMs may be used in a "combined site data record" to establish a PM_{2.5} design value to determine whether the NAAQS is met or not met at a particular PM_{2.5} monitoring site.

⁴ Memorandum from Liz P. Naess, Air Quality Assessment Division, US EPA Office of Air Quality Planning and Standards, to EPA Docket EPA-HQ-OAR-2012-0918, Air Quality Designations for the 2012 PM_{2.5} Standards, titled, "Data Issues in Illinois Affecting Air Quality Designations for the 2012 PM_{2.5} National Ambient Air Quality Standards."

⁵ Technical Support Document, December 2014, titled, "Illinois Unclassifiable Area Designations for the 2012 Primary Annual PM_{2.5} National Ambient Air Quality Standards," prepared by US EPA.

and portions of counties in Iowa should be designated as “unclassifiable/attainment,” including those in the Davenport area.⁶

Technical Analysis for Davenport-Moline-Rock Island, IA-IL

The Davenport-Moline-Rock Island, IA-IL MSA includes Rock Island, Henry and Mercer Counties in Illinois and Scott County in Iowa. Both Illinois and Iowa recommended a designation of unclassifiable/attainment for their counties within this area. The core of the urban area of Davenport, where the majority of the emissions and emissions activities are located, consists of Scott County, Iowa and Rock Island County, Illinois. As explained above, the EPA is designating all of Illinois unclassifiable. However, the EPA evaluated whether the Iowa portion of the Davenport-Moline-Rock Island, IA-IL MSA could be contributing to a potential violation of the NAAQS in the Illinois portion of this MSA. As part of this analysis, the EPA considered information relevant to a five factor analysis for the Iowa portion of the MSA. Below is a discussion of the factor-related information generally considered for evaluating appropriate boundaries for a nonattainment area. These factors include: Air Quality Data; Emissions and Emissions-related Data; Meteorology; Geography/Topography; and Jurisdictional Boundaries.

For the first factor, the EPA considers air quality information for the area. As shown in Figure 1, the Iowa portion of the Davenport area currently has four PM_{2.5} monitors located in Scott County, Iowa. All four monitors have complete and valid data showing attainment of the 2012 PM_{2.5} NAAQS, with 2011-2013 design values ranging from 10.2 to 10.7 µg/m³. As noted above, although the monitor located in Rock Island County, Illinois does not have current, reliable monitoring data, this monitor has historically measured annual values below the Scott County, Iowa monitors (see historical design value trend chart in Figure 2), suggesting that it is unlikely there is a current violation of the NAAQS in the area. However, given the questions concerning the validity of the monitor data the EPA cannot exclusively rely on this fact, but this information can add to the weight of evidence supporting the EPA’s conclusions regarding appropriate designations for the area. Table 2 shows the recent design value history for the four valid, attaining monitors located in Scott County, Iowa.

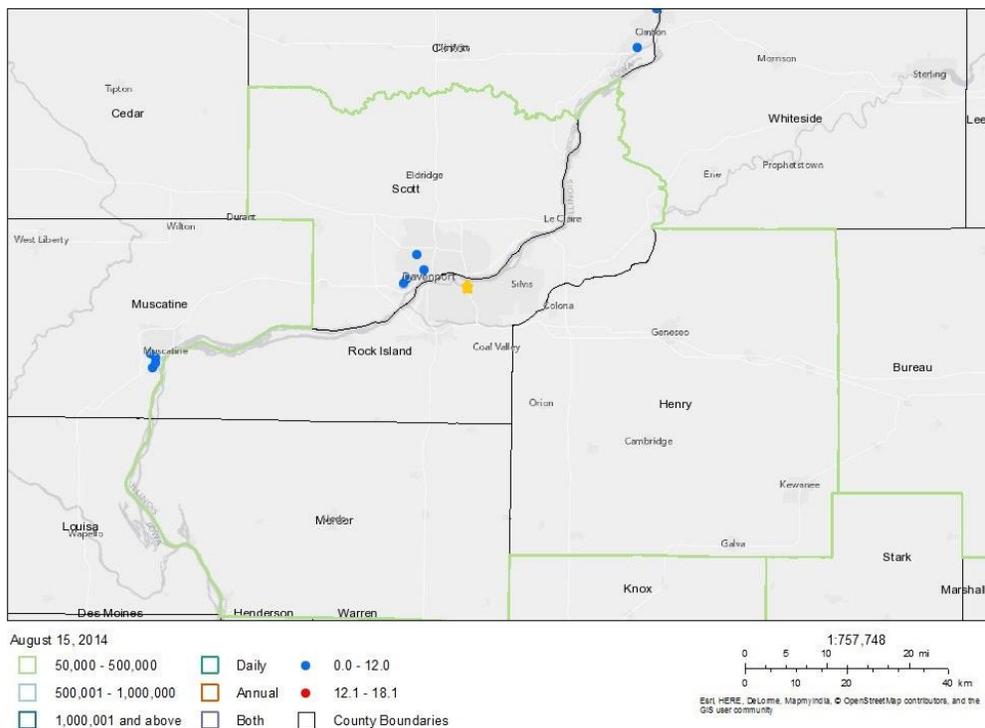
⁶ Unless a state or tribe has specifically identified jurisdictional boundaries in their area recommendations, when determining “remainder of the state,” the EPA will use Federal Information Processing Standard (FIPS) codes maintained by the National Institute of Standards and Technology (NIST), which are used to identify counties and county equivalents (e.g., parishes, boroughs) of the United States and its unincorporated territories (e.g., American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and the US Virgin Islands). Available on EPA’s Envirofacts website at <http://www.epa.gov/envirofw/html/codes/state.html>.

Table 2. Air Quality Data collected at Regulatory Monitors in Davenport (all DV levels in $\mu\text{g}/\text{m}^3$)

State	County	Monitor ID	State Recommended Nonattainment?	PM _{2.5} Annual Design Value 2009-2011	PM _{2.5} Annual Design Value 2010-2012	PM _{2.5} Annual Design Value 2011-2013
Iowa	Scott	191630015	No	11.4	11.0	10.2
Iowa	Scott	191630018	No	11.5	11.2	10.4
Iowa	Scott	191630020	No		11.3	10.7
Iowa	Scott	191630019	No			10.6

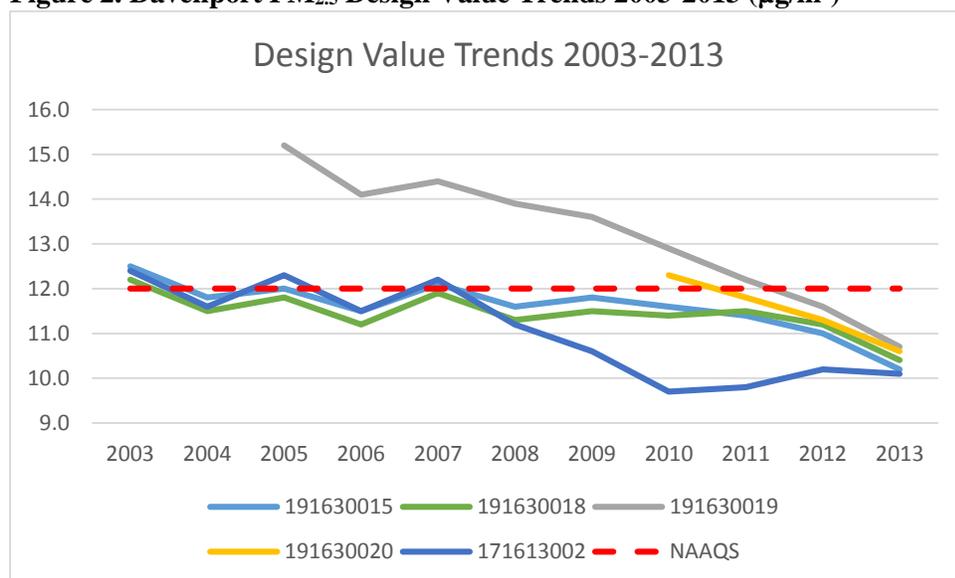
Historically, the Davenport area has not violated any annual PM_{2.5} standards, and thus the EPA has not previously established a nonattainment boundary for this area. In the absence of a previously established nonattainment boundary, the EPA has considered relevant information to assess the possibility of contribution to a potential violation of the NAAQS in the Illinois portion of the MSA, and whether that contribution is likely to be significantly different from the contribution to the valid, attaining monitors in Scott County. Figure 1 shows the Davenport area MSA along with the locations of area monitors. The valid monitors in Scott County, Iowa are shown with blue dots, while the location of the invalid Rock Island, Illinois monitor is depicted by an orange star.

Figure 1. Map of MSA Boundary for Davenport with monitor locations



Note: Rock Island PM_{2.5} monitor 171613002 location is shown as a star in Figure 1.

Figure 2. Davenport PM_{2.5} Design Value Trends 2003-2013 (µg/m³)



Note: Monitor ID 171613002 – All recent design values at this site in Illinois are invalid.

Recent population data for the Davenport area indicate similar population in Illinois and Iowa, with 2010 Rock Island County population of 147,612 and 2010 Scott County population of 165,781. While Henry and Mercer Counties in Illinois have an additional population of 66,850 combined, the population density in these counties is much less than the two core counties of Rock Island and Scott. Table 3 shows Davenport area population and population density for both 2000 and 2010.

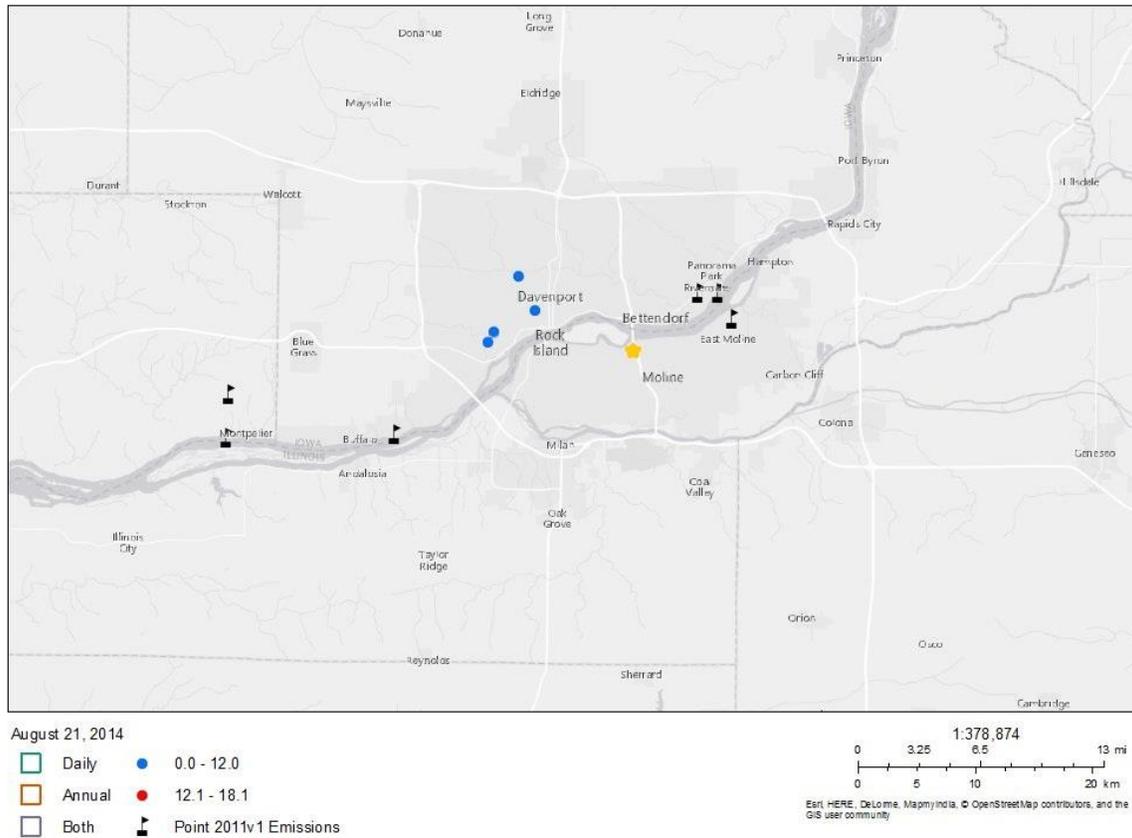
Table 3. Population Growth and Population Density.

State	County	FIPS Code	Population 2000	Population 2010	% Change from 2000	Land Area (Sq. Miles)	Population Density (per Sq. Mile)
IL	Henry	17073	51,020	50,424	-1.2%	823.2	61.3
IL	Mercer	17131	16,957	16,428	-3.1%	561.0	29.3
IL	Rock Island	17161	149,374	147,612	-1.2%	426.8	345.9
IA	Scott	19163	158,668	165,781	4.5%	457.9	362.0

Several industrial facilities are located in the Davenport area: the MidAmerican Energy Riverside Station (located in the eastern portion of Scott County near the Mississippi River), Alcoa (located east of monitors in Scott County and east-northeast of the Rock Island County monitor), Lafarge North America, Inc. (located in the Southwest portion of Scott County and to the southwest of all area monitors), and John Deere Harvester Works (located in Rock Island County south of the MidAmerican Energy plant noted above and generally east of all area monitors). Figure 3 shows the location of these point sources in relation to the monitoring site locations (blue dots represent the valid, attaining Scott County, Iowa monitors, while the orange

star represents the Rock Island, Illinois monitor with invalid data). Table 4 summarizes the 2011 reported emissions from these point sources. Emissions from each of these stationary sources is relatively low, with the highest being approximately 1,511 tons per year of NO_x and 3,694 tons per year of SO₂ from the MidAmerican Energy Riverside Station.

Figure 3. Point Sources Located in the Davenport Area



Note: Rock Island PM_{2.5} monitor 171613002 location is shown as a star in Figure 3.

Table 4. NEI 2011 v1 Point Source Emissions (tons/year)

State	County	Facility Name	NH ₃	NO _x	PM _{2.5}	SO ₂	VOC
IL	Henry	ANR Pipeline Co*	0	1,007	11	0	54
IL	Rock Island	John Deere Harvester Works	8	172	6	978	119
IA	Scott	MIDAMERICAN ENERGY CO - RIVERSIDE STATION	1	1,511	95	3,694	18
IA	Scott	ALCOA INC	6	159	156	5	240
IA	Scott	LAFARGE NORTH AMERICA, INC	5	1,605	57	1,527	130

* Located in Illinois outside the core Davenport area view in Figure 3 and not further assessed here.

Overall emissions are similar in the Iowa and Illinois counties in the Davenport area with population-related and mobile source emissions in the core areas at the same order of magnitude. Table 5 provides a summary of the overall direct PM_{2.5} and PM_{2.5} precursor emissions in 2011. The aggregate emissions of direct PM_{2.5} and precursor pollutants from the Davenport area point sources are slightly higher in Scott County and comprise a significant portion of Scott County's NO_x and SO₂ emissions, but are from sources generally located in an area which would be no more likely to impact the Rock Island monitor portion of the Davenport area than the four Scott County monitors, based on the meteorological data.

Table 5. County-Level Emissions of Directly Emitted PM_{2.5} and Precursors (tons/year)

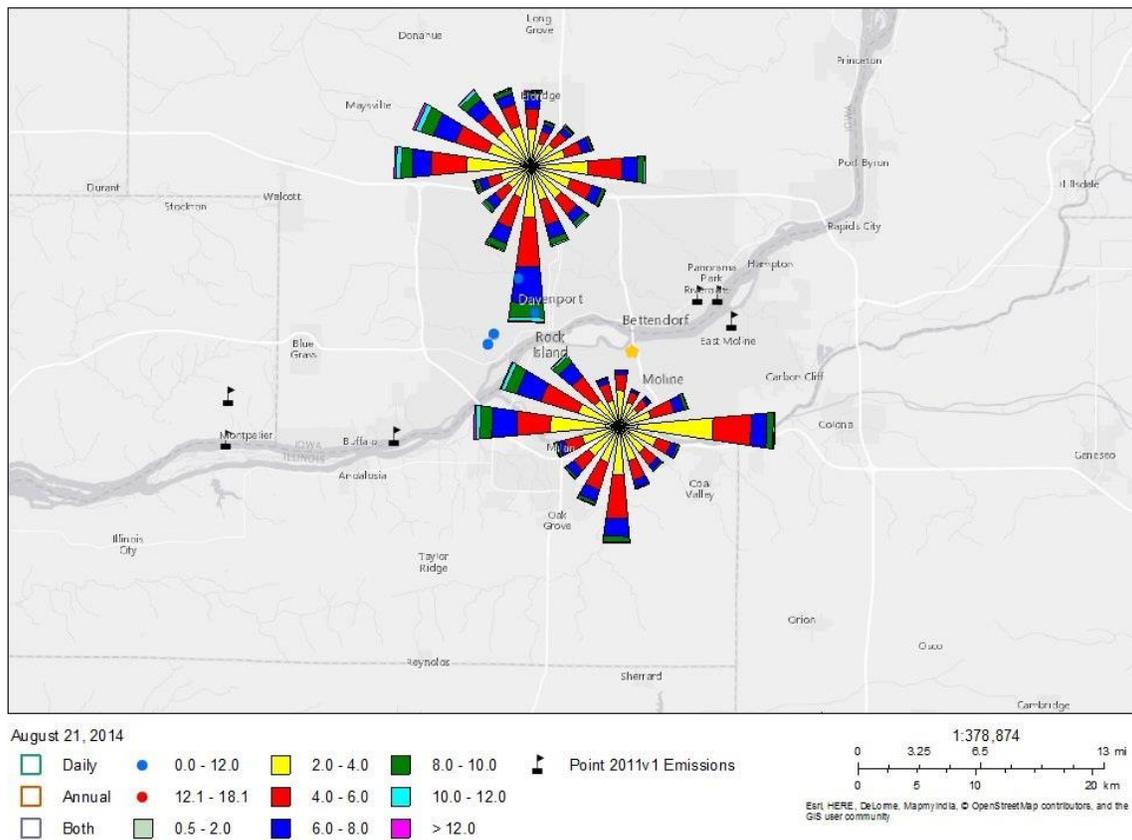
State	County	NH ₃	NO _x	VOC	SO ₂	PM _{2.5}
Illinois	Henry Co	2,557	4,382	2,319	60	1,720
Illinois	Mercer Co	1,311	687	953	33	910
Illinois	Rock Island Co	779	4,237	4,339	1,433	1,051
Illinois	<i>Rock Island Co % from single point source in Table 4</i>	<1%	4%	<1%	68%	11%
Iowa	Scott Co	1,935	7,124	5,884	5,349	2,233
Iowa	<i>Scott Co % from the three point sources in Table 4</i>	<1%	46%	5%	98%	17%

A review of the meteorological data for the Davenport area indicates winds most frequently from the south, east and west with a smaller northwest component. Figure 4 shows wind roses that the EPA generated from the Davenport Municipal Airport located in the northern portion of the urban area and the Quad City International Airport in the southern portion of the urban area using 2009-2012 data from National Weather Service locations archived at the National Climate Data Center.⁷ The most frequent wind directions are from the west-northwest, the south and the east. The least frequent winds are from the north, northeast and southwest.

Although the wind data suggest that there could be some contribution from sources in Scott County to the Rock Island portion of the Davenport area, much of the emissions and emissions activity in Scott County, including key point sources identified in Table 4, comes from sources located to the north and northeast of the monitor in Rock Island and thus there is less likely to be contribution from such sources. Given these wind direction frequencies, the Scott County sources would not likely differentially impact the Rock Island monitor (relative to the Scott County monitors that currently indicate attainment of the 2012 PM_{2.5} NAAQS by a significant margin). The historical PM_{2.5} data in Figure 2 lends additional support to this notion.

⁷ <ftp.ncdc.noaa.gov/pub/data/noaa> or <http://gis.ncdc.noaa.gov/map/viewer/#app=cdo&cfg=cdo&theme=hourly&layers=1&node=gis>. Quality assurance of the National Weather Service data is described here: <http://www1.ncdc.noaa.gov/pub/data/inventories/ish-qc.pdf>

Figure 4. Wind Roses Representing the Area of Analysis for the Davenport Area.



Note: Rock Island PM_{2.5} monitor 171613002 location is shown as a star in Figure 4.

Conclusion

Based on this technical analysis, the EPA agrees with Iowa’s recommendation and is designating Scott County, Iowa as unclassifiable/attainment with the remaining three counties in the Illinois portion of the MSA (Rock Island, Henry and Mercer) designated as unclassifiable. The EPA is designating all other counties in Iowa as unclassifiable/attainment as recommended by Iowa.