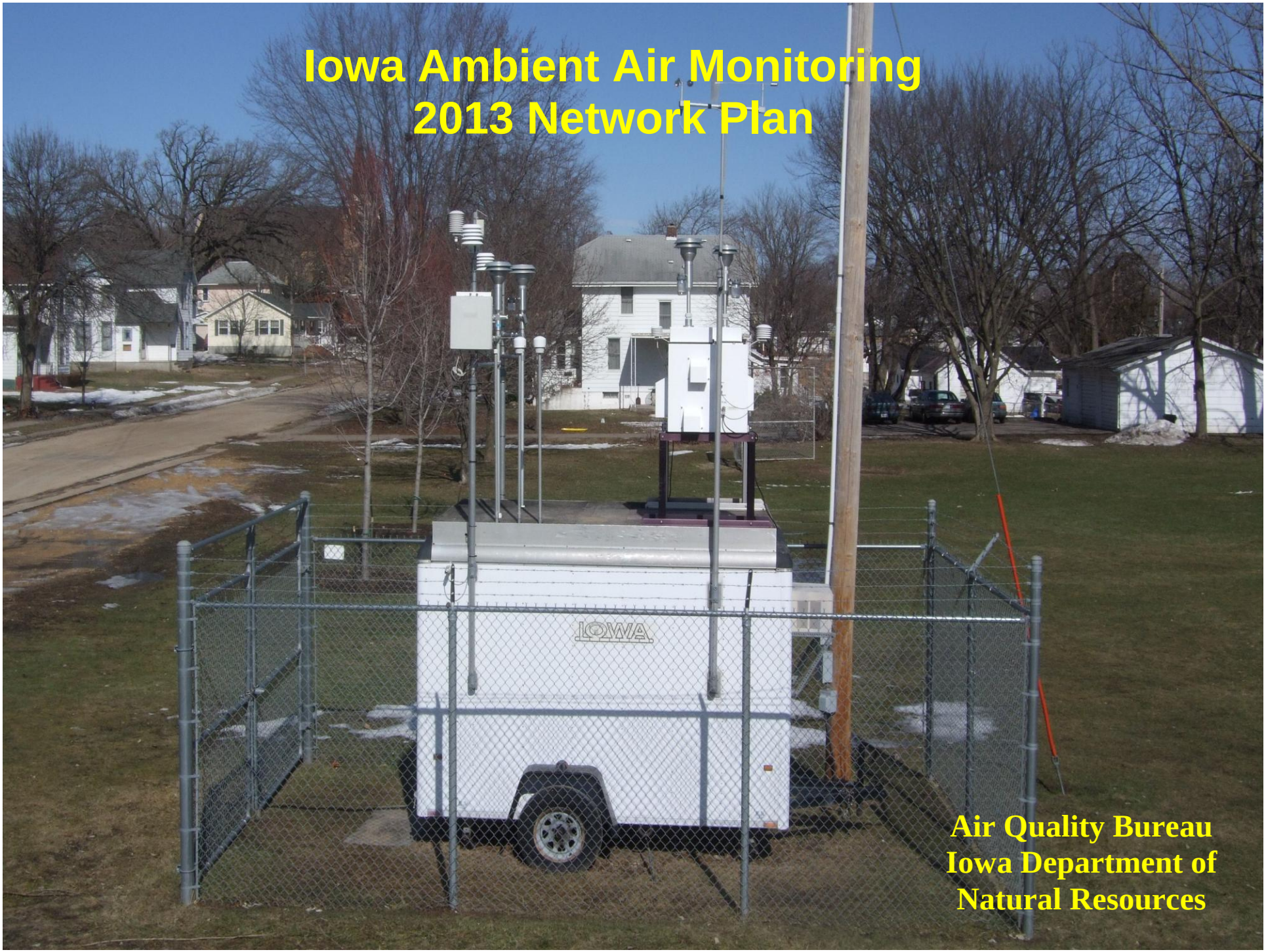
Iowa Ambient Air Monitoring
2013 Network Plan
IOWA
Air Quality Bureau
Iowa Department of
Natural Resources

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Introduction

States and other agencies delegated to perform air monitoring under the Clean Air Act are required to examine their networks annually to insure that they meet federal requirements (Appendix A). These requirements[1] include the number and type of monitors operated and the frequency of sampling. Certain monitors in the network, known as State and Local Air Monitoring Stations (SLAMS) are required by federal regulations, and discontinuing a SLAMS monitor requires concurrence from EPA (Appendix B). Special purpose monitors (SPMs) provide important additional air quality information (such as background concentrations for permitting activities[2,3]) but changes to the SPM network do not require concurrence from EPA.

One of the requirements of the annual network plan is to provide specific information for monitors that produce data that may be compared with federal air standards. This information, along with information concerning various types of monitors operated in the Iowa air monitoring network, is contained in Appendix C and Appendix D.

Ozone Monitoring Network Analysis

EPA's population-based monitoring requirements for ozone are reproduced in Appendix E. These requirements apply to metropolitan statistical areas (MSAs) (more recently denoted as core based statistical areas (CBSAs) by the census bureau) and depend on the population of the MSA (Appendix F) and the ozone levels monitored in or downwind of the MSA over the past three years (Appendix G). Based on this information, the minimum number of population-based SLAMS ozone monitors is indicated below:

MSA	Number of Monitors Required
Omaha-Council Bluffs, NE-IA	2
Des Moines-West Des Moines, IA	2
Davenport-Moline-Rock Island, IA-IL	2
Cedar Rapids, IA	1
Sioux City, IA-NE-SD	1
Waterloo-Cedar Falls, IA	1

[1] For the convenience of the reader, relevant CFR sections are included in the appendices of this document. The CFR is updated continuously, for the latest version of the CFR see: http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?sid=27d0dad4dd3d4c1969aad205b798e315&c=ecfr&tpl=/ecfrbrowse/Title40/40tab_02.tpl

[2] For examples of the way monitoring data is used to develop background concentrations for permitting activities, see the discussions of $PM_{2.5}$, NO_2 and SO_2 at: http://www.epa.gov/ttn/scram/guidance_clarificationmemos.htm

[3] The federal statute that requires baseline ambient air quality data in an area before initiating construction of a new "major source" of air pollution is available here: http://www.law.cornell.edu/uscode/html/uscode42/usc_sec_42_00007475----000-.html .

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In Iowa, there is one SLAMS monitor for the Omaha-Council Bluffs MSA, two SLAMS monitors for the Des Moines MSA, two SLAMS monitors for the Davenport-Moline-Rock Island MSA, one SLAMS monitor for the Cedar Rapids MSA, and one SLAMS monitor for the Waterloo-Cedar Falls MSA. The state of Iowa shares the responsibility for ozone monitoring in the Omaha-Council Bluffs MSA with Nebraska agencies, in the Sioux City MSA with South Dakota and Nebraska agencies, and in the Davenport-Moline-Rock Island MSA with Illinois agencies (Appendix H). Currently, Nebraska agencies operate three SLAMS ozone sites in Omaha, Nebraska and one SLAMS ozone site is operated in Rock Island, Illinois. South Dakota operates one SLAMS site in the Sioux City, IA-NE-SD MSA.

In addition to population-based requirements, each State is required to operate one multi-pollutant NCore site. Year-round ozone monitoring is required at an NCore site. Iowa operates an ozone analyzer at its NCore site in Davenport to meet this requirement.

Iowa's ozone monitoring network meets the minimum federal requirements. The total number of ozone monitoring sites needed to support the basic monitoring objectives of public data reporting, air quality mapping, compliance, and understanding ozone related atmospheric processes includes more sites than these minimum numbers. All Iowa ozone monitors are listed in Appendix D and displayed in Appendix I. There are no anticipated reductions to the SLAMS ozone monitoring network prior to the submission of the next network plan. Changes to the SPM network that are expected to occur before the submission of the next network plan are indicated in Appendix J.

$PM_{2.5}$ Monitoring Network Analysis

EPA's population-based monitoring requirements for $PM_{2.5}$ are contained in 40 CFR Part 58, Appendix D (reproduced in Appendix E). These requirements apply to metropolitan statistical areas (MSAs) and depend on the population of the MSA (Appendix F) and the $PM_{2.5}$ levels monitored in the MSA over the past three years (Appendix K). Based on this information, the minimum number of required population-based SLAMS $PM_{2.5}$ monitors is indicated below:

MSA	Number of Monitors Required
Omaha-Council Bluffs, NE-IA	2
Des Moines-West Des Moines, IA	1
Davenport-Moline-Rock Island, IA-IL	1
Cedar Rapids, IA	1
Waterloo-Cedar Falls, IA	1
Iowa City, IA	1

Iowa operates two SLAMS $PM_{2.5}$ monitoring sites (filter samplers) in Des Moines, two in Davenport, one in Cedar Rapids, one in Waterloo, and one in Iowa City. Iowa shares the responsibility for $PM_{2.5}$ monitoring in the Omaha-Council Bluffs MSA with Nebraska agencies,

and in the Davenport-Moline-Rock Island MSA with Illinois agencies (Appendix H). Currently, four SLAMS $PM_{2.5}$ monitoring sites were operated by Nebraska in the Omaha-Council Bluffs MSA; and one SLAMS $PM_{2.5}$ monitor was operated by Illinois in the Davenport-Moline-Rock Island MSA (Appendix H).

In addition to population-based minimum requirements, 40 CFR Part 58 also specifies that each state operate at least one $PM_{2.5}$ monitor to measure background concentrations, and at least one site to measure regional transport of $PM_{2.5}$. A SLAMS background monitor is located at Emmetsburg in northwest Iowa, and SLAMS transport monitors are located at Lake Sugema in Southeast Iowa and Viking Lake in Southwest Iowa.

40 CFR Part 58 indicates that population-oriented monitoring sites near industrial sources produce data that may be compared to the 24-hour $PM_{2.5}$ NAAQS, but not to the annual $PM_{2.5}$ NAAQS. The $PM_{2.5}$ monitoring sites near Chancy Park in Clinton, and Musser Park in Muscatine, are adjacent to industrial sources and are not comparable to the annual $PM_{2.5}$ NAAQS. The department has operated a $PM_{2.5}$ monitor for several years at a site near the Blackhawk foundry. The foundry ceased operation in the first quarter of 2010. The first three year period where the site data is unaffected by the foundry emissions is 2011-2013, and the annual standard will apply for the first time over this time period.

In MSAs where a single $PM_{2.5}$ monitor is required, 40 CFR Part 58 requires that an additional continuous $PM_{2.5}$ monitor is operated at the same monitoring location. A continuous $PM_{2.5}$ monitor for the Omaha-Council Bluffs MSA is operated by a Nebraska agency. Continuous $PM_{2.5}$ monitors are currently operated in Des Moines, Davenport, Cedar Rapids, Waterloo, and Iowa City.

40 CFR Part 58 specifies that the minimum frequency for manual $PM_{2.5}$ sampling at required SLAMS sites is one sample every three days. Required SLAMS sites with a 24-hour design value within 5% of the 24-hour $PM_{2.5}$ NAAQS (34 $\mu g/m^3$ to 36 $\mu g/m^3$) must assume a daily sampling schedule. All $PM_{2.5}$ samplers recording design values in this range are currently operating on a daily sampling schedule.

In addition to these $PM_{2.5}$ monitoring requirements, EPA requires that each State operate at least one multi-pollutant NCore site (Appendix L). Continuous and filter-based $PM_{2.5}$ monitors as well as $PM_{2.5}$ chemical speciation samplers are required at each NCore site. Iowa operates these three types of $PM_{2.5}$ samplers at its NCore site in Davenport to meet this requirement.

EPA will also require CBSAs with a population of 1,000,000 or more persons to collocate at least one $PM_{2.5}$ monitor at a near-road NO_2 station (Appendix M). Iowa does not contain or share any MSAs with populations this large, so additional near-road monitors are not required.

The $PM_{2.5}$ chemical speciation monitor operated at Iowa's NCore site is needed to meet federal requirements; the remaining four chemical speciation monitors in the Iowa network are Special Purpose Monitors.

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Iowa's $PM_{2.5}$ monitoring network meets the minimum federal requirements. The total number of $PM_{2.5}$ monitoring sites needed to support the basic monitoring objectives of public data reporting, air quality mapping, compliance, and understanding $PM_{2.5}$-related atmospheric processes includes more sites than these minimum numbers. Iowa's complete $PM_{2.5}$ monitoring network is listed in Appendix D and displayed in Appendix I**.** The only anticipated change to the SLAMS $PM_{2.5}$ monitoring network prior to the submission of the next network plan is the decommissioning of the SLAMs $PM_{2.5}$ monitor at the Blackhawk Foundry (pursuant to a request for site closure after shutdown of the foundry) and the designation of the filter-based $PM_{2.5}$ monitor at the nearby Hayes School monitoring site as SLAMS. Changes to monitors in the SPM $PM_{2.5}$ network that are expected to occur before the submission of the next network plan are detailed in Appendix J**.**

PM_{10} Monitoring Network Analysis

EPA's population-based monitoring requirements for PM_{10} are reproduced in Appendix E. These requirements apply to metropolitan statistical areas (MSAs) and depend on the population of the MSA (Appendix F) and PM_{10} levels in the MSA (Appendix N). Based on this information, the minimum numbers of population-based SLAMS PM_{10} monitors is indicated below:

MSA	Number of Monitors Required
Omaha-Council Bluffs, NE-IA	4-8
Des Moines-West Des Moines, IA	1-2
Davenport-Moline-Rock Island, IA-IL	1-2
Cedar Rapids, IA	0-1

Iowa operates two SLAMS PM_{10} monitors in the Des Moines-West Des Moines MSA, three in the Davenport-Moline-Rock Island MSA, and one in the Cedar Rapids MSA. Iowa shares the responsibility for PM_{10} monitoring in the Omaha-Council Bluffs MSA with Nebraska agencies, and in the Davenport-Moline-Rock Island MSA with Illinois agencies (Appendix H). Currently, six SLAMS PM_{10} sites were operated by Nebraska in the Omaha MSA; and no SLAMS PM_{10} monitors were operated by Illinois in the Davenport-Moline-Rock Island MSA.

In addition to population-oriented PM_{10} monitoring requirements, EPA requires that each State operate at least one multi-pollutant NCore site (Appendix L). PM_{10} samplers are required at each NCore site. Iowa operates a PM_{10} sampler at its NCore site in Davenport to meet this requirement.

Iowa's PM_{10} monitoring network meets the minimum federal requirements. Additional PM_{10} monitors are operated in order to support compliance activities and to compute background levels for air dispersion modeling. Iowa's complete PM_{10} monitoring network is listed in Appendix D and displayed in Appendix I**.** The only anticipated change to the SLAMS PM_{10}

monitoring network prior to the submission of the next network plan is the decommissioning of the SLAMs PM_{10} monitor at the Blackhawk Foundry (pursuant to a request for site closure after shutdown of the foundry) and the designation of the filter-based PM_{10} monitor at the nearby Hayes School monitoring site as SLAMS. Changes to monitors in the SPM network that are expected to occur before the submission of the next network plan are detailed in Appendix J.

Sulfur Dioxide Monitoring Network Analysis

Federal requirements for SO_2 monitoring are reproduced in Appendix O. These rules require monitors in populated areas with high SO_2 emissions. To implement these requirements EPA uses the population weighted emissions index (PWEI) to determine if SO_2 monitoring is required in an MSA. The PWEI is calculated by multiplying the population of the MSA by the total SO_2 emissions in the MSA and dividing by 1,000,000. The PWEI for Iowa Metropolitan Statistical Areas is computed in Appendix P. Based on this information, the minimum numbers of SLAMS SO_2 monitors for Iowa MSAs where monitors are required are indicated below:

MSA	Number of Monitors Required
Omaha-Council Bluffs, NE-IA	1
Sioux City, IA-NE	1

Currently, Nebraska operated two SLAMS SO_2 sites in the Omaha-Council Bluffs MSA and South Dakota operated two SLAMS SO_2 monitors in the Sioux City MSA. Iowa operates an additional SLAMs SO_2 site near MidAmerican's George Neal North Generating Station in Sergeant Bluff.

In addition to the PWEI-based monitoring requirements, sulfur dioxide is included in the suite of pollutants to be monitored at EPA National Core (NCore) monitoring sites. Iowa operates a sulfur dioxide analyzer at its NCore site in Davenport to meet this requirement.

Iowa's SO_2 monitoring network meets the minimum federal requirements. Existing SO_2 monitors are listed in Appendix D and displayed in Appendix I. There are no planned reductions to the SLAMS monitoring network for sulfur dioxide scheduled before submission of the next network plan. Changes to SPM monitors in the SO_2 network (including a relocation of source oriented SO_2 monitor in Linn County) that are anticipated before the submission of the next network plan are indicated in Appendix J.

Nitrogen Dioxide Monitoring Network Analysis

On January 22, 2010, the U.S. Environmental Protection Agency revised the nitrogen dioxide (NO_2) NAAQS. The new NAAQS included population-based monitoring requirements and traffic-based (near road) monitoring requirements.

EPA's population-based NO_2 monitoring requirements are reproduced in Appendix E. EPA requires one monitor in any CBSA with a population of more than 1 million in order to measure community-wide concentrations. Iowa does not contain or share any MSAs with populations this large and these monitors are not required.

The rule requires a near road monitor to be installed in CBSA's with a population of greater than 500,000 but less than one million. The Des Moines and Omaha CBSAs both have populations in this range.

In addition, the rule requires an additional monitor in CBSAs with a population greater than 500,000 that contain roadway segments with annual average daily traffic counts of more than 250,000. The rule also requires another near-road monitor in CBSAs with populations of more than 2,500,000. Iowa does not contain or share any CBSAs that meet these criteria[4,5] and the additional near-road monitors are not required.

Working with the Polk County Local Program, the department submitted a siting plan for a near road monitor in the Des Moines CBSA to EPA, and began operating a new near road NO_2 monitor along interstate 235, on January 1, 2013.

On March 7, 2013, the EPA made revisions to the monitor deployment requirements contained in the NO_2 NAAQS. In the Des Moines and Omaha CBSAs, the new deadline for deployment of near road SLAMs monitors is January 1, 2017.

At NCore sites, EPA requires NO_y instead NO_2 monitoring in order to quantify more of the oxidation products of NO. These additional oxidation products are relevant to secondary formation of ozone and $PM_{2.5}$.

There are currently no minimum federal requirements for NO_2 monitors applicable to Iowa, and there are no monitors designated as SLAMs in the Iowa network. Several SPM NO_2 monitors are operated to provide a general knowledge of pollutant levels and to support permitting activities.

Iowa's NO_2 monitoring network meets the minimum federal requirements. NO_2 monitors are listed in Appendix D and displayed in Appendix I. Changes to SPM monitors that are anticipated before the submission of the next network plan are indicated in Appendix J.

[4] http://www.iowadot.gov/about/traffic.html
[5] http://www.fhwa.dot.gov/policyinformation/tables/02.cfm

Carbon Monoxide Monitoring Network Analysis

EPA requires that each State operate at least one multi-pollutant NCore site (Appendix L). Carbon monoxide monitoring is required at each NCore site. Iowa operates a carbon monoxide monitor at its NCore site in Davenport to meet this requirement.

EPA also requires CBSA's with a population of 1,000,000 or more persons to collocate at least one CO monitor at a near-road NO_2 station (Appendix M). Iowa does not contain or share any MSAs with populations this large, so these near-road CO monitors are not required.

Iowa's carbon monoxide monitoring network meets the minimum federal requirements. Iowa's carbon monoxide monitors are listed in Appendix D and displayed in Appendix I. There are no planned reductions to the SLAMS monitoring network for carbon monoxide scheduled before submission of the next network plan. Changes to SPM monitors in the CO network that are anticipated before the submission of the next network plan are indicated in Appendix J.

Toxics Monitoring Network Analysis

There are no federal requirements for minimum numbers of air toxics sites contained in 40 CFR Part 58.

Iowa currently operates three SPM air toxics sites. Details concerning Iowa's air toxics network are contained in Appendix D and displayed in Appendix I. Iowa intends to add TO-11A protocol monitors to measure formaldehyde and other carbonyl compounds at the Clinton, Chancy Park and Muscatine, Musser Park sites on January 1, 2014.

NCore Monitoring Network Analysis

Requirements for a multi-pollutant "NCore" site are contained in 40 CFR Part 58, and reproduced in Appendix L. The department operates an NCore site at Jefferson School in Davenport (AQS ID 191630015) to meet this requirement.

Lead Monitoring Network Analysis

EPA requires source-oriented SLAMS lead monitoring near industries that emit over 0.5 tons per year (tpy) of lead. The rule allows for a waiver of monitoring requirements if air dispersion modeling predicts ambient air concentrations less than half the NAAQS. These waivers must be renewed as an element of each State's five year network assessment. Current federal lead monitoring rules are reproduced in Appendix Q.

According to the department's latest (2011 NEI) emissions estimates, two facilities in Iowa have emissions that round to 0.5 tpy or greater (Appendix R). Grain Processing Corporation (GPC) in Muscatine has emissions of 3.089 tpy, MidAmerican Energy, Walter Scott Jr. Energy Center (WSEC) in Council Bluffs has emissions of 0.499 tpy.

EPA has previously approved waivers of the monitoring requirements for both of these facilities; the GPC waiver was granted with EPA approval of Iowa's five year network assessment, and the WSEC waiver was granted with the approval of Iowa's 2012 network plan. Dispersion modeling of the most recent emissions estimates suggests that these waivers are appropriate, as the predicted lead levels are considerably less than half the NAAQS. These dispersion modeling results are contained in Appendix S.

The department sited a SLAMs lead monitor near Griffin Pipe in 2009. The monitor recorded levels over the National Ambient Air Quality Standard (NAAQS) for lead in 2010, and new bag houses were installed by Griffin Pipe in January 2011. No NAAQS violations were recorded in 2011, but NAAQS violations were recorded again in 2012. The area around Griffin Pipe has been declared non-attainment area by EPA and the department continues to investigate the accuracy of its lead emissions estimates at Griffin Pipe and other potential sources.

Iowa's lead monitoring network meets the minimum federal requirements. The location of Iowa's lead monitor is listed in Appendix D and displayed in Appendix I.

There are no planned reductions to the SLAMS monitoring network for lead scheduled before submission of the next network plan. Changes to SPM monitors in the lead network that are anticipated before the submission of the next network plan are indicated in Appendix J.

Appendix A: Federal Requirements for Annual Network Plans & Completion

40 CFR Part 58, § 58.10 Annual monitoring network plan and periodic network assessment.

(a)(1) Beginning July 1, 2007, the State, or where applicable local, agency shall adopt and submit to the Regional Administrator an annual monitoring network plan which shall provide for the establishment and maintenance of an air quality surveillance system that consists of a network of SLAMS monitoring stations including FRM, FEM, and ARM monitors that are part of SLAMS, NCore stations, STN stations, State speciation stations, SPM stations, and/or, in serious, severe and extreme ozone nonattainment areas, PAMS stations, and SPM monitoring stations. The plan shall include a statement of purposes for each monitor and evidence that siting and operation of each monitor meets the requirements of appendices A, C, D, and E of this part, where applicable. The annual monitoring network plan must be made available for public inspection for at least 30 days prior to submission to EPA.

(2) Any annual monitoring network plan that proposes SLAMS network modifications (including new monitoring sites, new determinations that data are not of sufficient quality to be compared to the NAAQS, and changes in identification of monitors as suitable or not suitable for comparison against the annual $PM_{2.5}$ NAAQS) is subject to the approval of the EPA Regional Administrator, who shall provide opportunity for public comment and shall approve or disapprove the plan and schedule within 120 days. If the State or local agency has already provided a public comment opportunity on its plan and has made no changes subsequent to that comment opportunity, and has submitted the received comments together with the plan, the Regional Administrator is not required to provide a separate opportunity for comment.

(3) The plan for establishing required NCore multipollutant stations shall be submitted to the Administrator not later than July 1, 2009. The plan shall provide for all required stations to be operational by January 1, 2011.

(4) A plan for establishing source-oriented Pb monitoring sites in accordance with the requirements of appendix D to this part for Pb sources emitting 1.0 tpy or greater shall be submitted to the EPA Regional Administrator no later than July 1, 2009, as part of the annual network plan required in paragraph (a)(1) of this section. The plan shall provide for the required source-oriented Pb monitoring sites for Pb sources emitting 1.0 tpy or greater to be operational by January 1, 2010. A plan for establishing source-oriented Pb monitoring sites in accordance with the requirements of appendix D to this part for Pb sources emitting equal to or greater than 0.50 tpy but less than 1.0 tpy shall be submitted to the EPA Regional Administrator no later than July 1, 2011. The plan shall provide for the required source-oriented Pb monitoring sites for Pb sources emitting equal to or greater than 0.50 tpy but less than 1.0 tpy to be operational by December 27, 2011.

(5)(i) A plan for establishing or identifying an area-wide NO_2 monitor, in accordance with the requirements of Appendix D, section 4.3.3 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2012. The plan shall provide for these required monitors to be operational by January 1, 2013.

(ii) A plan for establishing or identifying any NO_2 monitor intended to characterize vulnerable and susceptible populations, as required in Appendix D, section 4.3.4 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2012. The plan shall provide for these required monitors to be operational by January 1, 2013.

(iii) A plan for establishing a single near-road NO_2 monitor in CBSAs having 1,000,000 or more persons, in accordance with the requirements of Appendix D, section 4.3.2 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2013. The plan shall provide for these required monitors to be operational by January 1, 2014.

(iv) A plan for establishing a second near-road NO_2 monitor in any CBSA with a population of 2,500,000 or more persons, or a second monitor in any CBSA with a population of 500,000 or more persons that has one or more roadway segments with 250,000 or greater AADT counts, in accordance with the requirements of Appendix D, section 4.3.2 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2014. The plan shall provide for these required monitors to be operational by January 1, 2015.

(v) A plan for establishing a single near-road NO_2 monitor in all CBSAs having 500,000 or more persons, but less than 1,000,000, not already required by paragraph (a)(5)(iv) of this section, in accordance with the requirements of Appendix D, section 4.3.2 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2016. The plan shall provide for these monitors to be operational by January 1, 2017.

(6) A plan for establishing SO_2 monitoring sites in accordance with the requirements of appendix D to this part shall be submitted to the EPA Regional Administrator by July 1, 2011 as part of the annual network plan required in paragraph

(a) (1). The plan shall provide for all required SO_2 monitoring sites to be operational by January 1, 2013.

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(7) A plan for establishing CO monitoring sites in accordance with the requirements of appendix D to this part shall be submitted to the EPA Regional Administrator. Plans for required CO monitors shall be submitted at least six months prior to the date such monitors must be established as required by section 58.13.

(8)(i) A plan for establishing near-road $PM_{2.5}$ monitoring sites in CBSAs having 2.5 million or more persons, in accordance with the requirements of appendix D to this part, shall be submitted as part of the annual monitoring network plan to the EPA Regional Administrator by July 1, 2014. The plan shall provide for these required monitoring stations to be operational by January 1, 2015.

(ii) A plan for establishing near-road $PM_{2.5}$ monitoring sites in CBSAs having 1 million or more persons, but less than 2.5 million persons, in accordance with the requirements of appendix D to this part, shall be submitted as part of the annual monitoring network plan to the EPA Regional Administrator by July 1, 2016. The plan shall provide for these required monitoring stations to be operational by January 1, 2017.

(b) The annual monitoring network plan must contain the following information for each existing and proposed site:

(1) The AQS site identification number.

(2) The location, including street address and geographical coordinates.

(3) The sampling and analysis method(s) for each measured parameter.

(4) The operating schedules for each monitor.

(5) Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.

(6) The monitoring objective and spatial scale of representativeness for each monitor as defined in appendix D to this part.

(7) The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$ NAAQS as described in § 58.30.

(8) The MSA, CBSA, CSA or other area represented by the monitor.

(9) The designation of any Pb monitors as either source-oriented or non-source-oriented according to Appendix D to 40 CFR part 58.

(10) Any source-oriented monitors for which a waiver has been requested or granted by the EPA Regional Administrator as allowed for under paragraph 4.5(a)(ii) of Appendix D to 40 CFR part 58.

(11) Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the EPA Regional Administrator for the use of Pb-PM_{10} monitoring in lieu of Pb-TSP monitoring as allowed for under paragraph 2.10 of Appendix C to 40 CFR part 58.

(12) The identification of required NO_2 monitors as near-road, area-wide, or vulnerable and susceptible population monitors in accordance with Appendix D, section 4.3 of this part.

(13) The identification of any $PM_{2.5}$ FEMs and/or ARMs used in the monitoring agency's network where the data are not of sufficient quality such that data are not to be compared to the NAAQS. For required SLAMS where the agency identifies that the $PM_{2.5}$ Class III FEM or ARM does not produce data of sufficient quality for comparison to the NAAQS, the monitoring agency must ensure that an operating FRM or filter-based FEM meeting the sample frequency requirements described in § 58.12 or other Class III $PM_{2.5}$ FEM or ARM with data of sufficient quality is operating and reporting data to meet the network design criteria described in appendix D to this part.

(c) The annual monitoring network plan must document how state and local agencies provide for the review of changes to a $PM_{2.5}$ monitoring network that impact the location of a violating $PM_{2.5}$ monitor. The affected state or local agency must document the process for obtaining public comment and include any comments received through the public notification process within their submitted plan.

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(d) The state, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby states and tribes or health effects studies. The state, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every five years beginning July 1, 2010.

(e) All proposed additions and discontinuations of SLAMS monitors in annual monitoring network plans and periodic network assessments are subject to approval according to § 58.14.[71 FR 61298, Oct. 17, 2006, as amended at 72 FR 32210, June 12, 2007; 73 FR 67059, Nov. 12, 2008; 73 FR 77517, Dec. 19, 2008; 75 FR 6534, Feb. 9, 2010; 75 FR 35601, June 22, 2010; 75 FR 81137, Dec. 27, 2010; 76 FR 54341, Aug. 31, 2011; 78 FR 16188, Mar. 14, 2013; 78 FR 3282, Jan. 15, 2013]

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40 CFR Part 58, § 58.13 Monitoring network completion.

(a) The network of NCore multipollutant sites must be physically established no later than January 1, 2011, and at that time, operating under all of the requirements of this part, including the requirements of appendices A, C, D, E, and G to this part. NCore sites required to conduct Pb monitoring as required under 40 CFR part 58 appendix D paragraph 3(b), or approved alternative non-source-oriented Pb monitoring sites, shall begin Pb monitoring in accordance with all of the requirements of this part, including the requirements of appendices A, C, D, E, and G to this part no later than December 27, 2011.

(b) Not withstanding specific dates included in this part, beginning January 1, 2008, when existing networks are not in conformance with the minimum number of required monitors specified in this part, additional required monitors must be identified in the next applicable annual monitoring network plan, with monitoring operation beginning by January 1 of the following year. To allow sufficient time to prepare and comment on Annual Monitoring Network Plans, only monitoring requirements effective 120 days prior to the required submission date of the plan (i.e., 120 days prior to July 1 of each year) shall be included in that year's annual monitoring network plan.

(c) The NO_2 monitors required under Appendix D, section 4.3 of this part must be physically established and operating under all of the requirements of this part, including the requirements of appendices A, C, D, and E to this part, no later than:

(1) January 1, 2013, for area-wide NO_2 monitors required in Appendix D, section 4.3.3;

(2) January 1, 2013, for NO_2 monitors intended to characterize vulnerable and susceptible populations that are required in Appendix D, section 4.3.4;

(3) January 1, 2014, for an initial near-road NO_2 monitor in CBSAs having 1,000,000 million or more persons that is required in Appendix D, section 4.3.2;

(4) January 1, 2015, for a second near-road NO_2 monitor in CBSAs that have a population of 2,500,000 or more persons or a second monitor in any CBSA with a population of 500,000 or more persons that has one or more roadway segments with 250,000 or greater AADT counts that is required in Appendix D, section 4.3.2;

(5) January 1, 2017, for a near-road NO_2 monitor in CBSAs having 500,000 or more persons, but less than 1,000,000, not already required by paragraph (c)(4) of this section, that is required in Appendix D, section 4.3.2.

(d) The network of SO_2 monitors must be physically established no later than January 1, 2013, and at that time, must be operating under all of the requirements of this part, including the requirements of appendices A, C, D, and E to this part.

(e) The CO monitors required under Appendix D, section 4.2 of this part must be physically established and operating under all of the requirements of this part, including the requirements of appendices A, C, D, and E to this part, no later than:

(1) January 1, 2015 for CO monitors in CBSAs having 2.5 million persons or more; or

(2) January 1, 2017 for other CO monitors.

(f) $PM_{2.5}$ monitors required in near-road environments as described in appendix D to this part, must be physically established and operating under all of the requirements of this part, including the requirements of appendices A, C, D, and E to this part, no later than:

(1) January 1, 2015 for $PM_{2.5}$ monitors in CBSAs having 2.5 million persons or more; or

(2) January 1, 2017 for $PM_{2.5}$ monitors in CBSAs having 1 million or more, but less than 2.5 million persons.

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Appendix B: SLAMS Network Modification

40 CFR Part 58, § 58.14 System modification.

(a) The State, or where appropriate local, agency shall develop and implement a plan and schedule to modify the ambient air quality monitoring network that complies with the findings of the network assessments required every 5 years by §58.10(e). The State or local agency shall consult with the EPA Regional Administrator during the development of the schedule to modify the monitoring program, and shall make the plan and schedule available to the public for 30 days prior to submission to the EPA Regional Administrator. The final plan and schedule with respect to the SLAMS network are subject to the approval of the EPA Regional Administrator. Plans containing modifications to NCore Stations or PAMS Stations shall be submitted to the Administrator. The Regional Administrator shall provide opportunity for public comment and shall approve or disapprove submitted plans and schedules within 120 days.

(b) Nothing in this section shall preclude the State, or where appropriate local, agency from making modifications to the SLAMS network for reasons other than those resulting from the periodic network assessments. These modifications must be reviewed and approved by the Regional Administrator. Each monitoring network may make or be required to make changes between the 5-year assessment periods, including for example, site relocations or the addition of PAMS networks in bumped-up ozone nonattainment areas. These modifications must address changes invoked by a new census and changes due to changing air quality levels. The State, or where appropriate local, agency shall provide written communication describing the network changes to the Regional Administrator for review and approval as these changes are identified.

(c) State, or where appropriate, local agency requests for SLAMS monitor station discontinuation, subject to the review of the Regional Administrator, will be approved if any of the following criteria are met and if the requirements of appendix D to this part, if any, continue to be met. Other requests for discontinuation may also be approved on a case-by-case basis if discontinuance does not compromise data collection needed for implementation of a NAAQS and if the requirements of appendix D to this part, if any, continue to be met.

(1) Any $PM_{2.5}$, O_3, CO, PM_{10}, SO_2, Pb, or NO_2 SLAMS monitor which has shown attainment during the previous five years, that has a probability of less than 10 percent of exceeding 80 percent of the applicable NAAQS during the next three years based on the levels, trends, and variability observed in the past, and which is not specifically required by an attainment plan or maintenance plan. In a nonattainment or maintenance area, if the most recent attainment or maintenance plan adopted by the State and approved by EPA contains a contingency measure to be triggered by an air quality concentration and the monitor to be discontinued is the only SLAMS monitor operating in the nonattainment or maintenance area, the monitor may not be discontinued.

(2) Any SLAMS monitor for CO, PM_{10}, SO_2, or NO_2 which has consistently measured lower concentrations than another monitor for the same pollutant in the same county (or portion of a county within a distinct attainment area, nonattainment area, or maintenance area, as applicable) during the previous five years, and which is not specifically required by an attainment plan or maintenance plan, if control measures scheduled to be implemented or discontinued during the next five years would apply to the areas around both monitors and have similar effects on measured concentrations, such that the retained monitor would remain the higher reading of the two monitors being compared.

(3) For any pollutant, any SLAMS monitor in a county (or portion of a county within a distinct attainment, nonattainment, or maintenance area, as applicable) provided the monitor has not measured violations of the applicable NAAQS in the previous five years, and the approved SIP provides for a specific, reproducible approach to representing the air quality of the affected county in the absence of actual monitoring data.

(4) A $PM_{2.5}$ SLAMS monitor which EPA has determined cannot be compared to the relevant NAAQS because of the siting of the monitor, in accordance with §58.30.

(5) A SLAMS monitor that is designed to measure concentrations upwind of an urban area for purposes of characterizing transport into the area and that has not recorded violations of the relevant NAAQS in the previous five years, if discontinuation of the monitor is tied to start-up of another station also characterizing transport.

(6) A SLAMS monitor not eligible for removal under any of the criteria in paragraphs (c)(1) through (c)(5) of this section may be moved to a nearby location with the same scale of representation if logistical problems beyond the State's control make it impossible to continue operation at its current site

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Appendix C: 2012 Iowa Ambient Air Monitoring Sites

City	Site	Address	County	MSA	Latitude	Longitude	AQS Site ID	Responsible Agency
Buffalo	Linwood Mining	11100 110th Ave.	Scott	DMR	41.46724	-90.68845	191630017	DNR
Cedar Rapids	Kirkwood College	6301 Kirkwood Blvd SW	Linn	CDR	41.91056	-91.65194	191130028	Linn Local Prog.
	Scottish Rite Temple	616 A Ave.	Linn	CDR	41.98333	-91.66278	191130031	Linn Local Prog.
	Public Health	500 11th St. NW	Linn	CDR	41.97677	-91.68766	191130040	Linn Local Prog.
Clinton	Chancy Park	23rd & Camanche	Clinton	-	41.82328	-90.21198	190450019	DNR
	Rainbow Park	Roosevelt St.	Clinton	-	41.87500	-90.17757	190450021	DNR
Clive	Indian Hills Jr. High School	9401 Indian Hills	Polk	DSM	41.60352	-93.74790	191532510	Polk Local Prog.
Coggon	Coggon Elementary School	408 E Linn St.	Linn	CDR	42.28056	-91.52694	191130033	Linn Local Prog.
Council Bluffs	Franklin School	3130 C Ave.	Pottawattamie	OMC	41.26417	-95.89612	191550009	DNR
	Griffin Pipe	8th Avenue and 27th St	Pottawattamie	OMC	41.25425	-95.88725	191550011	DNR
Davenport	Jefferson School	10th St. & Vine St.	Scott	DMR	41.53001	-90.58761	191630015	DNR
	Adams School	3029 N Division St.	Scott	DMR	41.55001	-90.60012	191630018	DNR
	Blackhawk Foundry	300 Wellman St.	Scott	DMR	41.51777	-90.61876	191630019	DNR
	Hayes School	622 South Concord St	Scott	DMR	41.51208	-90.62404	191630020	DNR
Des Moines	Health Dept.	1907 Carpenter	Polk	DSM	41.60318	-93.64330	191530030	Polk Local Prog.
	Near Road NO2	6011 Rollins Avenue	Polk	DSM	41.59257	-93.70014	191536011	Polk Local Prog.
Emmetsburg	Iowa Lakes College	Iowa Lakes Community College	Palo Alto	-	43.12370	-94.69352	191471002	DNR
Indianola	Lake Ahquabi State Park	1650 118th Ave.	Warren	DSM	41.28553	-93.58398	191810022	DNR
Iowa City	Hoover School	2200 East Court	Johnson	IAC	41.65723	-91.50348	191032001	DNR
Keokuk	Fire Station	111S. 13th St.	Lee	-	40.40096	-91.39101	191110008	DNR
Mason City	Holcim Cement	17th St. & Washington St.	Cerro Gordo	-	43.16944	-93.20243	190330018	DNR
	Washington School	700 N. Washington Avenue	Cerro Gordo	-	43.15856	-93.20301	190330020	DNR
Muscatine	Muscatine HS, East Campus Roof	1409 Wisconsin	Muscatine	-	41.40095	-91.06781	191390015	DNR
	Greenwood Cemetary	Fletcher St. & Kimble St.	Muscatine	-	41.41943	-91.07098	191390016	DNR
	Franklin School	210 Taylor St.	Muscatine	-	41.41439	-91.06261	191390018	DNR
	Muscatine HS, East Campus Trailer	1409 Wisconsin	Muscatine		41.40146	-91.06845	191390019	DNR
	Musser Park	Oregon St. & Earl Ave.	Muscatine	-	41.40780	-91.06265	191390020	DNR
Pisgah	Forestry Office	206 Polk St.	Harrison	OMC	41.83226	-95.92819	190850007	DNR
	Highway Maintenance Shed	1575 Hwy 183	Harrison	OMC	41.78026	-95.94844	190851101	DNR
Sergeant Bluff	George Neal North	2761 Port Neal Circle	Woodbury	SXC	42.32767	-96.36807	191930020	DNR
Sioux City	Bryant School	821 30th St.	Woodbury	SXC	42.52236	-96.40021	191930019	DNR
Slater	City Hall	105 Greene	Story	DSM	41.88287	-93.68780	191690011	Polk Local Prog.
Waterloo	Water Tower	Vine St. & Steely	Black Hawk	WTL	42.50154	-92.31602	190130009	DNR
Waverly	Waverly Airport	Waverly Airport	Bremer	WTL	42.74306	-92.51306	190170011	DNR
-	Scott County Park	Scott County Park	Scott	DMR	41.69917	-90.52194	191630014	DNR
-	Backbone State Park	Backbone State Park	Delaware	-	42.60083	-91.53833	190550001	DNR
-	Viking Lake State Park	2780 Viking Lake Road	Montgomery	-	40.96911	-95.04495	191370002	DNR
-	Lake Sugema	24430 Lacey Trl, Keosauqua	Van Buren	-	40.69508	-92.00632	191770006	DNR

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Site Table Definitions:

City – the city closest to the monitor location.

Site – the name of the monitoring site.

Address – an intersection or street address close to the monitoring site.

County – the county where the monitoring site resides.

MSA – Metropolitan Statistical Area. Iowa's Metropolitan Statistical Areas (MSAs) according to July, 2012 U.S. Census Bureau estimates:

U.S. Census Geographic area	Abbreviation
Omaha-Council Bluffs, NE-IA	OMC
Des Moines-West Des Moines, IA	DSM
Davenport-Moline-Rock Island, IA-IL	DMR
Cedar Rapids, IA	CDR
Sioux City, IA-NE-SD	SXC
Waterloo-Cedar Falls, IA	WTL
Iowa City, IA	IAC
Dubuque, IA	-
Ames, IA	-

From: http://www.census.gov/popest/data/metro/totals/2012/index.html Annual Estimates of the Population of Metropolitan and Micropolitan Statistical Areas: April 1, 2010 to July 1, 2012 (CBSA-EST2012-01).

Maximum ozone concentrations are typically measured 10-30 miles downwind of an MSA. The site intended to record the maximum ozone concentration resulting from a given MSA may be located outside the MSA boundaries. Sites intended to measure background levels of pollutants for an MSA may also be located upwind and outside of that particular MSA.

Latitude – the latitude of a monitoring site**,** given in decimal degrees using the WGS (World Geodetic System) 84 datum.

Longitude – the longitude of a monitoring site, given in decimal degrees using the WGS (World Geodetic System) 84 datum.

AQS Site ID – The identifier of a monitoring site used in the US EPA Air Quality System (AQS) database. It has the form XX-XXX-XXXX where the first two digits specify the state (19 for Iowa), the next set of three digits the county, and the last four digits the site.

Responsible Agency – The agency responsible for performing ambient air monitoring at a monitoring site. The Polk County Local Program operates sites in or near Polk County. The Linn County Local Program operates sites in or near Linn County. The Department of Natural Resources (DNR) contracts with the State Hygienic Laboratory at the University of Iowa (SHL) to operate monitoring sites not operated by the Polk or Linn County Local Programs.

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Appendix D: Iowa Ambient Air Monitors

Site Name	Pollutants Measured	Monitor Type	Design Value 10-12	High Design Value?	Sampling Method	Analysis	Operating Schedule	Primary Monitoring Objective	Spatial Scale	NAAQS Comparable?
Backbone State Park	PM2.5	SPM			Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Backbone State Park	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Buffalo, Linwood Mining	PM10	SLAMS			Low Volume FRM	Gravimetric	Daily	Source Oriented	Middle	Yes
Cedar Rapids, Kirkwood College	Ozone	SPM	66	Yes	UV Absorbtion		Continuous	Regional Transport	Urban	Yes
Cedar Rapids, Public Health	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Cedar Rapids, Public Health	PM2.5	SLAMS	27 / 10.3	Yes	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Cedar Rapids, Public Health	PM2.5 Speciation	Supplemental Speciation			PM2.5 Speciation	CSN Protocol	1/6 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	Filter NO3	SPM			Low Volume	Ion Chromatography	1/6 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	CO	SPM			Non-Dispersive Infrared		Continuous	Population Exposure	Neighborhood	Yes
Cedar Rapids, Public Health	Filter SO4	SPM			Low Volume	Ion Chromatography	1/6 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	Ozone	SPM	64	Yes	UV Absorbtion		Continuous	Population Exposure	Neighborhood	Yes
Cedar Rapids, Public Health	PM2.5 Continuous	SLAMS			PM2.5 Continuous	BAM 1020	Continuous	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	SO2	SPM			UV Fluorescent		Continuous	Population Exposure	Neighborhood	Yes
Cedar Rapids, Public Health	Toxics	SPM			Canister	TO-15, GC-FID	1/12 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	Toxics	SPM			Cartridge	TO-11A	1/12 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Scottish Rite Temple	SO2	SPM			UV Fluorescent		Continuous	Source Oriented	Middle	Yes
Clinton, Chancy Park	PM2.5	SPM	28 / na	No	Low Volume FRM	Gravimetric	Daily	Source Oriented	Middle	24 Hour Only
Clinton, Chancy Park	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM 1020	Continuous	Source Oriented	Middle	No
Clinton, Chancy Park	SO2	SPM			UV Fluorescent		Continuous	Source Oriented	Middle	Yes
Clinton, Rainbow Park	Ozone	SLAMS	68	Yes	UV Absorbtion		Continuous	Population Exposure	Urban	Yes
Clinton, Rainbow Park	PM2.5	SPM	28 / 10.7	Yes	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Clinton, Rainbow Park	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM 1020	Continuous	Population Exposure	Neighborhood	No
Clive, Indian Hills Jr. High Sch.	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Clive, Indian Hills Jr. High Sch.	PM2.5	SLAMS	25 / 9.6	No	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Coggon, Coggon Sch.	Ozone	SLAMS	65	Yes	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Council Bluffs, Franklin Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Council Bluffs, Franklin Sch.	PM2.5	SPM	27 / 11.1	Yes	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Council Bluffs, Griffin Pipe	Pb	SLAMS			High Volume FRM	GFAA or ICP-MS	1/3 Day	Source Oriented	Middle	Yes
Davenport, Adams Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Davenport, Adams Sch.	PM2.5	SPM	28 / 11.2	Yes	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Davenport, Blackhawk Foundry	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Davenport, Blackhawk Foundry	PM2.5	SLAMS	29 / na	No	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Davenport, Blackhawk Foundry	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM 1020	Continuous	Population Exposure	Neighborhood	No
Davenport, Hayes Sch.	PM2.5	SPM	27 / 11.3	Yes	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Davenport, Hayes Sch.	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM 1020	Continuous	Population Exposure	Neighborhood	No

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Site Name	Pollutants Measured	Monitor Type	Design Value 10-12	High Design Value?	Sampling Method	Analysis	Operating Schedule	Primary Monitoring Objective	Spatial Scale	NAAQS Comparable?
Davenport, Jefferson Sch.	CO	NCORE			Non-Dispersive Infrared		Continuous	Population Exposure	Neighborhood	Yes
Davenport, Jefferson Sch.	NO2	SPM			Chemiluminescence		Continuous	Population Exposure	Neighborhood	Yes
Davenport, Jefferson Sch.	Ozone	NCORE	67	Yes	UV Absorbtion		Continuous	Population Exposure	Urban	Yes
Davenport, Jefferson Sch.	PM10	NCORE			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Davenport, Jefferson Sch.	PM2.5	NCORE	27 / 11.0	Yes	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Davenport, Jefferson Sch.	SO2	NCORE			UV Fluorescent		Continuous	Population Exposure	Urban	Yes
Davenport, Jefferson Sch.	Filter NO3	SPM			Low Volume	Ion Chromatography	1/3 Day	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	Filter SO4	SPM			Low Volume	Ion Chromatography	1/3 Day	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	NOy	NCORE			Chemiluminescence		Continuous	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	PM2.5 Continuous	NCORE			PM2.5 Continuous	BAM 1020	Continuous	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	PM2.5 Speciation	NCORE			PM2.5 Speciation	CSN Protocol	1/3 Day	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	Toxics	SPM			Canister	TO-15, GC-FID	1/12 Day	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	Toxics	SPM			Cartridge	TO-11A	1/12 Day	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	CO	SPM			Non-Dispersive Infrared		Continuous	Population Exposure	Neighborhood	Yes
Des Moines, Health Dept.	NO2	SPM			Chemiluminescence		Continuous	Population Exposure	Neighborhood	Yes
Des Moines, Health Dept.	Ozone	SLAMS	61	No	UV Absorbtion		Continuous	Population Exposure	Urban	Yes
Des Moines, Health Dept.	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Des Moines, Health Dept.	PM2.5	SLAMS	25 / 9.7	No	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Des Moines, Health Dept.	PM2.5 Continuous	SLAMS			PM2.5 Continuous	BAM 1020	Continuous	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	PM2.5 Speciation	Supplemental Speciation			PM2.5 Speciation	CSN Protocol	1/6 Day	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	Filter NO3	SPM			Low Volume	Ion Chromatography	1/6 Day	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	Filter SO4	SPM			Low Volume	Ion Chromatography	1/6 Day	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	SO2	SPM			UV Fluorescent		Continuous	Population Exposure	Urban	Yes
Des Moines, Health Dept.	Toxics	SPM			Canister	TO-15, GC-FID	1/12 Day	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	Toxics	SPM			Cartridge	TO-11A	1/12 Day	Population Exposure	Neighborhood	No
Des Moines, Near Road NO2	NO2	SPM			Chemiluminescence		Continuous	Source Oriented	Micro	Yes
Emmetsburg, Iowa Lakes Coll.	Ozone	SLAMS	68	Yes	UV Absorbtion		Continuous	Regional Transport	Regional	Yes
Emmetsburg, Iowa Lakes Coll.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Emmetsburg, Iowa Lakes Coll.	PM2.5	SLAMS	22 / 8.8	No	Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Emmetsburg, Iowa Lakes Coll.	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM 1020	Continuous	General/Background	Regional	No
Indianola, Lake Ahquabi	Ozone	SPM	65	Yes	UV Absorbtion		Continuous	Upwind Background	Regional	Yes
Iowa City, Hoover Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Iowa City, Hoover Sch.	PM2.5	SLAMS	27 / 10.5	Yes	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Iowa City, Hoover Sch.	PM2.5 Continuous	SLAMS			PM2.5 Continuous	BAM 1020	Continuous	Population Exposure	Neighborhood	No

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Site Name	Pollutants Measured	Monitor Type	Design Value 10-12	High Design Value?	Sampling Method	Analysis	Operating Schedule	Primary Monitoring Objective	Spatial Scale	NAAQS Comparable?
Keokuk, Fire Station	PM2.5	SPM	26 / 11.4	Yes	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Keosauqua, Lake Sugema	IMPROVE Speciation	IMPROVE			IMPROVE Sampler	IMPROVE Protocol	1/3 Day	Regional Transport	Regional	No
Keosauqua, Lake Sugema	Ozone	SLAMS	68	Yes	UV Absorbtion		Continuous	Regional Transport	Regional	Yes
Keosauqua, Lake Sugema	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Keosauqua, Lake Sugema	PM2.5	SLAMS	25 / 9.6	No	Low Volume FRM	Gravimetric	1/3 Day	Regional Transport	Regional	Yes
Keosauqua, Lake Sugema	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM 1020	Continuous	Regional Transport	Regional	No
Keosauqua, Lake Sugema	SO2	SPM			UV Fluorescent		Continuous	General/Background	Regional	Yes
Keosauqua, Lake Sugema	NO2	SPM			Chemiluminescence		Continuous	General/Background	Regional	Yes
Mason City, Holcim Cement	PM10	SLAMS			Low Volume FRM	Gravimetric	Daily	Source Oriented	Middle	Yes
Mason City, Washington Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/2 Day	Population Exposure	Neighborhood	Yes
Muscatine, Franklin Sch.	PM2.5	SPM	28 / 11.8	Yes	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Muscatine HS, East Campus Rooftop	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Muscatine HS, East Campus Rooftop	PM2.5	SLAMS	32 / 12.2	Yes	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Muscatine HS, East Campus Trailer	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM 1020	Continuous	Population Exposure	Neighborhood	No
Muscatine HS, East Campus Trailer	SO2	SPM			UV Fluorescent		Continuous	Population Exposure	Neighborhood	Yes
Muscatine, Greenwood Cemetery	PM2.5	SPM	28 / 11.1	Yes	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Muscatine, Greenwood Cemetery	SO2	SPM			UV Fluorescent		Continuous	Population Exposure	Neighborhood	Yes
Muscatine, Musser Park	SO2	SLAMS			UV Fluorescent		Continuous	Source Oriented	Middle	Yes
Muscatine, Musser Park	PM2.5	SPM			Low Volume FRM	Gravimetric	1/3 Day	Source Oriented	Middle	24 Hour Only
Pisgah, Forestry Office	Ozone	SPM	68	Yes	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Pisgah, Highway Maintenance	Ozone	SLAMS	69	Yes	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Scott County Park	Ozone	SLAMS	66	Yes	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Sergeant Bluff, George Neal North	SO2	SLAMS			UV Fluorescent		Continuous	Source Oriented	Middle	Yes
Sioux City, Bryant Sch.	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Sioux City, Bryant Sch.	PM2.5	SPM	27 / 9.9	No	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Slater, City Hall	Ozone	SLAMS	62	No	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Viking Lake State Park	IMPROVE Speciation	IMPROVE			IMPROVE Sampler	IMPROVE Protocol	1/3 Day	Regional Transport	Regional	No
Viking Lake State Park	Ozone	SLAMS	67	Yes	UV Absorbtion		Continuous	Regional Transport	Regional	Yes
Viking Lake State Park	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Viking Lake State Park	PM2.5	SLAMS	23 / 9.2	No	Low Volume FRM	Gravimetric	1/3 Day	Regional Transport	Regional	Yes
Viking Lake State Park	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM 1020	Continuous	Regional Transport	Regional	No
Waterloo, Water Tower	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Waterloo, Water Tower	PM2.5	SLAMS	27 / 10.4	Yes	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Waterloo, Water Tower	PM2.5 Continuous	SLAMS			PM2.5 Continuous	BAM 1020	Continuous	Population Exposure	Neighborhood	No
Waverly, Airport	Ozone	SLAMS	65	Yes	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes

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Monitor Table Definitions:

Site Name – a combination of the city and site name from the previous table

Pollutants Measured – indicates the pollutant, or set of pollutants, measured by each monitor

- CO – carbon monoxide
- IMPROVE - Interagency Monitoring of Protected Visual Environments; a federal program to protect visibility in national parks
- IMPROVE speciation – a speciation monitor and suite of lab analysis procedures developed by the IMPROVE program to identify and quantify the chemical components of $PM_{2.5}$
- NH_3 – ammonia
- NO_2 – nitrogen dioxide
- NO_3 – the nitrate anion
- NOy – reactive nitrogen; NO and its oxidation products; a common definition is: NOy = NO + NO_2 + HNO_3 + NO_3 (aerosol) + NO_3 (radical) + N_2O_5 + HNO_4 + PAN + other organic nitrates
- Ozone – an unstable molecule consisting of three oxygen atoms
- PAN- peroxyacyl nitrates
- Pb - lead
- PM_{10} – particles with a diameter of 10 micrometers or less
- $PM_{2.5}$ – particles with a diameter of 2.5 micrometers or less, also known as “fine particles”.
- $PM_{2.5}$ speciation – a speciation monitor and suite of lab analysis procedures developed by EPA for their national speciation trends network (STN), to identify and quantify the chemical components of $PM_{2.5}$
- SO_2 – sulfur dioxide
- SO_4 – the sulfate anion
- Toxics – sampling that quantifies volatile organic compounds (VOC’s), and carbonyls, including some known urban air toxics

Monitor Type – This column indicates how the monitor is classified in the AQS database.

- IMPROVE – a speciation monitor developed by the IMPROVE program to identify and quantify the chemical components of $PM_{2.5}$. An IMPROVE monitor is a type of special purpose monitor (SPM) – see below.
- NCore – monitors operated at a site which has been accepted into EPA’s national network of long term multi-pollutant sites (NCore).
- SLAMS – State and Local Air Monitoring Stations. SLAMS make up the ambient air quality monitoring sites that are primarily needed for NAAQS comparisons, but may serve other data purposes. SLAMS exclude special purpose monitor (SPM) stations and include NCore, and all other State or locally operated stations that have not been designated as SPM stations.
- SPM – means a monitor that is designated as a special purpose monitor in the monitoring network plan and in EPA’s AQS database. SPM monitors do not count when showing compliance with minimum SLAMS requirements for monitor numbers and siting.
- Supplemental Speciation – a speciation site with monitors that are operated according to CSN protocols, but not contained in the STN Network. A supplemental speciation monitor is a type of special purpose monitor (SPM).

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Design Value – A design value is a number computed from monitoring data (see 40 CFR Part 50, Appendix N) that is used for comparisons to the National Ambient Air Quality Standards (NAAQS). For $PM_{2.5}$ and ozone, the monitoring requirements depend on these design values. For $PM_{2.5}$, there are two design values, a 24 hour design value (in $\mu g/m^3$) and an annual design value (also in $\mu g/m^3$). For $PM_{2.5}$ monitors in the table, 24 hour design value is listed first and an annual design value is listed second, i.e. 27/10.3. For ozone, there is a single design value; the 8-hour design value (in ppb) is indicated in the table.

High Design Value? – A "Yes" in this column indicates that the design value is within 85% of the NAAQS. For $_5$, 24 hour design values of 30 $\mu g/m^3$ or greater are considered greater than or equal to 85% of the 24-hour NAAQS (35 $\mu g/m^3$) and values of 10.2 $\mu g/m^3$ or greater are considered greater than or equal to the annual NAAQS (12.0 $\mu g/m^3$). For ozone, 8-hour design values of 64 ppb or greater are considered greater than or equal to 85% of the 8-hour NAAQS (75 ppb).

Sampling Method – Indicates how the sample is collected. This column also shows how the sample is analyzed, if it is analyzed on site at the time of collection.

- Continuous $PM_{2.5}$- a monitor that reports $PM_{2.5}$ levels in real time. Continuous $PM_{2.5}$ monitors typically have three components: a size selective inlet (cyclone) that knocks out all but the fine particles, a conditioning system that rapidly dries the fine particles, and a mass measurement system that determines the mass of the conditioned sample. The type of continuous $PM_{2.5}$ monitor currently used in the Iowa Network is the BAM (BAM=Beta Attenuation Monitor). This monitor conditions particles using a heater that is actuated when the relative humidity exceeds 35%. Mass measurements are made by measuring the attenuation of beta particles caused by fine particles collected on a sampling tape during the sampling period.
- Canister – Specially treated stainless steel canisters are used to collect VOC's.
- Cartridge – A 2,4-Dinitrophenylhydrazine (DNPH) cartridge is used to collect toxics that contain a carbonyl group.
- Chemiluminescence – When a nitric oxide (NO) molecule collides with an ozone molecule, a nitrogen dioxide (NO_2) molecule and an oxygen (O_2) molecule result. The NO_2 molecule is in an excited state, and subsequently emits infrared light that can be measured by a photomultiplier tube.
- IMPROVE Sampler – See IMPROVE in the "Pollutants Measured" section above.
- Low Volume – a sampler that uses a flow of 16.67 liters per minute.
- Low Volume FRM – a sampler that uses a flow of 16.67 liters per minute, which has been designated as a Federal Reference Method.
- Non-Dispersive Infrared – Carbon Monoxide absorbs infrared radiation; this property is the basis of the analytical method used by continuous CO monitors to quantify CO concentrations.
- $PM_{2.5}$ Speciation – See $PM_{2.5}$ Speciation in the "Pollutants Measured" section above.
- UV Absorption – Ozone absorbs ultraviolet light; this property is the basis of the analytical method used by continuous ozone monitors to quantify ozone concentrations.
- UV Fluorescent – When excited by ultraviolet light, SO_2 molecules emit light at a lower frequency that may be detected by a photomultiplier tube. This property is the basis for the analytical method used for continuous SO_2 gas analyzers.

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Analysis – indicates the method of post-collection analysis that is done in a lab environment.

- GFAA – Graphite Furnace Atomic Absorption is used to measure the concentration of trace metals. The sample is placed in a graphite tube and heated to atomize the sample. Light of a wavelength that is absorbed by the metal atoms of interest is directed down the tube. The amount of light absorbed is proportional to the concentration of metal atoms.
- Gravimetric – A filter is weighed before and after collecting a particulate sample.
- ICP-MS – Inductively Coupled Plasma Mass Spectrometry is a highly sensitive analytical technique capable of determining a range of metals. The metal sample is atomized and ionized by argon plasma, and the ions are separated and quantified via a mass spectrometer.
- IMPROVE Protocol – This protocol uses a suite of analytical procedures (X-Ray Fluorescence, Ion Chromatography, and Thermal Optical Reflectance) to identify and quantify the components of $PM_{2.5}$. See http://vista.cira.colostate.edu/improve/ for further details.
- Ion Chromatography – a liquid chromatography method used to analyze the extract from filters for the nitrate and sulfate anion.
- CSN Protocol – refers to EPA's chemical speciation network protocol. This protocol utilizes X-Ray Fluorescence, Ion Chromatography, and Thermal Optical Reflectance to identify and quantify the components of $PM_{2.5}$.
- Thermal Optical Reflectance- a carbon containing sample is subjected to a programmed, progressive heating in a controlled atmosphere, and the evolved carbon at each step is quantified by a flame ionization detector. Organic carbon (OC) evolves from the sample without an oxygen atmosphere for combustion, Elemental Carbon (EC) does not. A laser is used to detect charring in the sample, so that the charring of the high temperature OC component does not result in an over estimation of the EC in the sample.
- TO-11A – an EPA protocol in which carbonyl cartridge extracts are analyzed using High Performance Liquid Chromatography and an ultraviolet detector.
- TO-15, GC-FID – These analysis methods are used for air samples collected in specially treated stainless steel canisters. EPA protocol TO-15 is used for UATMP (Urban Air Toxics Monitoring Program) compounds. According to method TO-15, toxic gases are separated with a gas chromatograph, and quantified by a mass spectrometer (GCMS). The SNMOC (Speciated Non-Methane Organic Carbon) pollutants are also separated by a gas chromatograph, but are quantified by a flame ionization detector (GC-FID).
- X-Ray Fluorescence-when illuminated with x-rays, metallic atoms emit characteristic fluorescent radiation, which may be quantified with a semiconductor detector or gas proportional counter to obtain metallic concentrations in a filter sample.

Operating Schedule – Continuous monitors run constantly and measure hourly average concentrations in real time. Manual samplers, such as PM filter samplers or toxics samplers, collect a single 24 hour sample from midnight to midnight on a particular day, which is quantified later in an analytical laboratory. A fractional (e.g. 1/2, 1/3, 1/6, and 1/12) schedule for a manual samplers refers to collecting a sample every second, third, sixth, and twelfth day, respectively. Ozone monitors in Iowa (except the one at the NCore site) are operated only during ozone season (April to October) when higher temperatures favor ozone formation. Cartridges for toxic carbonyl compounds are normally collected every twelfth day, but the schedule is accelerated to 1/6 days during ozone season.

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Monitoring Objective – the primary reason a monitor is operated at a particular location.

- General Background – The objective is to establish the background levels of a pollutant.
- Highest Conc. – The objective is to measure at a site where the concentration of the pollutant is highest.
- Max. Ozone Conc. – The objective is to record the maximum ozone concentration. Because ozone is a secondary pollutant, ozone concentrations are typically highest 10-30 miles downwind of an urban area.
- Population Exposure – The objective is to monitor the exposure of individuals in the area represented by the monitor.
- Regional Transport – The objective is to assess the extent to which pollutants are transported between two regions that are separated by tens to hundreds of kilometers.
- Source Oriented – The objective is to determine the impact of a nearby source.
- Transport – The objective is to assess the extent to which pollutants are transported from one location to another.
- Upwind Background – The objective is to establish the background levels of a pollutant, typically upwind of a source or urban area.

Spatial Scale – The scale of representativeness is described in terms of the physical dimensions of the air parcel nearest to a monitoring site throughout which actual pollutant concentrations are reasonably similar. Monitors are classified according to the largest applicable scale below:

- Microscale - defines the concentrations in air volumes associated with area dimensions ranging from several meters up to about 100 meters.
- Middle scale - defines the concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometer.
- Neighborhood scale - defines concentrations within some extended area of the city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometers range. The neighborhood and urban scales listed below have the potential to overlap in applications that concern secondarily formed or homogeneously distributed air pollutants.
- Urban scale - defines concentrations within an area of city-like dimensions, on the order of 4 to 50 kilometers. Within a city, the geographic placement of sources may result in there being no single site that can be said to represent air quality on an urban scale.
- Regional scale – usually defines a rural area of reasonably homogeneous geography without large sources, and extends from tens to hundreds of kilometers.

NAAQS Comparable? - This column shows whether the data from the monitor can be compared to the National Ambient Air Quality Standards (NAAQS). Entries under this column are Yes, No, and 24 Hour Only. For a monitor's data to be eligible for comparison against the NAAQS, the type of monitor used must be defined as a federal reference method or federal equivalent method by EPA.

EPA has designated the BAM-1020 as a Federal Equivalent Method (FEM) for $PM_{2.5}$ when configured and operated as prescribed in the federal equivalence designation. Iowa operates several BAM-1020 analyzers, but they are not configured in accordance with the designation, and the data cannot be compared with the NAAQS.

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For $PM_{2.5}$, there is both an annual and a 24 hour NAAQS. To be comparable to either $PM_{2.5}$ NAAQS a site must be population-oriented. In 40 CFR Part 58, EPA defines a population-oriented monitoring site as follows:

Population-oriented monitoring (or sites) means residential areas, commercial areas, recreational areas, industrial areas where workers from more than one company are located and other areas where a substantial number of people may spend a significant fraction of their day.

Following this definition, all $PM_{2.5}$ monitoring sites in Iowa are population-oriented.

In a populated area near an industrial source, monitoring data may only be comparable to the 24 hour $PM_{2.5}$ NAAQS. According to Subpart D of 40 CFR Part 58:

$PM_{2.5}$ data that are representative, not of area wide but rather, of relatively unique population-oriented microscale, or localized hot spot, or unique population-oriented middle-scale impact sites are only eligible for comparison to the 24-hour $PM_{2.5}$ NAAQS. For example, if the $PM_{2.5}$ monitoring site is adjacent to a unique dominating local $PM_{2.5}$ source or can be shown to have average 24-hour concentrations representative of a smaller than neighborhood spatial scale, then data from a monitor at the site would only be eligible for comparison to the 24-hour $PM_{2.5}$ NAAQS.

The Blackhawk Foundry monitoring site changed from a site where only the 24 hour NAAQS applies to a site where both the 24 hour and annual NAAQS applies on 1/1/2013. A more complete discussion is contained in Appendix J*.*

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Appendix E: Population-Based Minimum Monitoring Requirements

Ozone

40 CFR Part 58 Appendix D, Table D-2 specifies the minimum number of SLAMS (State and Local Air Monitoring Stations) ozone monitors required based on population and the most recent three years of monitoring data (design value).

TABLE D–2 OF APPENDIX D TO PART 58.— SLAMS MINIMUM O_3 MONITORING REQUIREMENTS

MSA population[1,2]	Most recent 3-year design value concentrations ≥85% of any O_3 NAAQS[3]	Most recent 3-year design value concentrations <85% of any O_3 NAAQS[3,4]
>10 million	4	2
4–10 million	3	1
350,000–<4 million	2	1
50,000–<350,000[5]	1	0

[1]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
[2]Population based on latest available census figures.
[3]The ozone (O3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR Part 50.
[4]These minimum monitoring requirements apply in the absence of a design value.
[5]Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

$PM_{2.5}$

40 CFR Part 58 Appendix D, Table D-5 specifies the minimum number of SLAMS $PM_{2.5}$ monitors required based on population and 3-year design values.

TABLE D–5 OF APPENDIX D TO PART 58. $PM_{2.5}$ MINIMUM MONITORING REQUIREMENTS

MSA population[1,2]	Most recent 3-year design value ≥85% of any $PM_{2.5}$ NAAQS[3]	Most recent 3-year design value <85% of any $PM_{2.5}$ NAAQS[3,4]
>1,000,000	3	2
500,000–1,000,000	2	1
50,000–<500,000[5]	1	0

[1]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA)
[2]Population based on latest available census figures.
[3]The $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR Part 50.
[4]These minimum monitoring requirements apply in the absence of a design value.
[5]Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

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PM_{10}

40 CFR Part 58 Appendix D, Table D-4 lists the minimum requirements for the number of PM_{10} stations per MSA based on population and measured levels:

TABLE D–4 OF APPENDIX D TO PART 58. PM_{10} MINIMUM MONITORING REQUIREMENTS (Approximate NUMBER OF STATIONS PER MSA)[1]

Population category	High concentration[2]	Medium concentration[3]	Low concentration[4,5]
>1,000,000	6–10	4–8	2–4
500,000–1,000,000	4–8	2–4	1–2
250,000–500,000	3–4	1–2	0–1
100,000–250,000	1–2	0–1	0

[1]Selection of urban areas and actual numbers of stations per area will be jointly determined by EPA and the State Agency.
[2]High concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding the PM_{10} NAAQS by 20 percent or more.
[3]Medium concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding 80 percent of the PM_{10} NAAQS.
[4]Low concentration areas are those for which ambient PM_{10} data show ambient concentrations less than 80 percent of the PM_{10} NAAQS.
[5]These minimum monitoring requirements apply in the absence of a design value.

Nitrogen Dioxide

40 CFR Part 58 Appendix D, section 4.3.3 contains the minimum requirement for population-based NO_2 Monitoring:

…

(a) Within the NO_2 network, there must be one monitoring station in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected highest NO_2 concentrations representing the neighborhood or larger spatial scales. PAMS sites collecting NO_2 data that are situated in an area of expected high NO_2 concentrations at the neighborhood or larger spatial scale may be used to satisfy this minimum monitoring requirement when the NO_2 monitor is operated year round. Emission inventories and meteorological analysis should be used to identify the appropriate locations within a CBSA for locating required area-wide NO_2 monitoring stations. CBSA populations shall be based on the latest available census figures."

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Appendix F: Census Bureau Estimates for Iowa MSAs

US Census Geographic Area	US Census Population Estimate, July 1, 2012
Omaha-Council Bluffs, NE-IA	885,624
Des Moines-West Des Moines, IA	588,999
Davenport-Moline-Rock Island, IA-IL	382,630
Cedar Rapids, IA	261,761
Sioux City, IA-NE-SD	168,921
Waterloo-Cedar Falls, IA	168,747
Iowa City, IA	158,231
Dubuque, IA	95,097
Ames, IA	91,140

Source: *http://www.census.gov/popest/data/metro/totals/2012/index.html*

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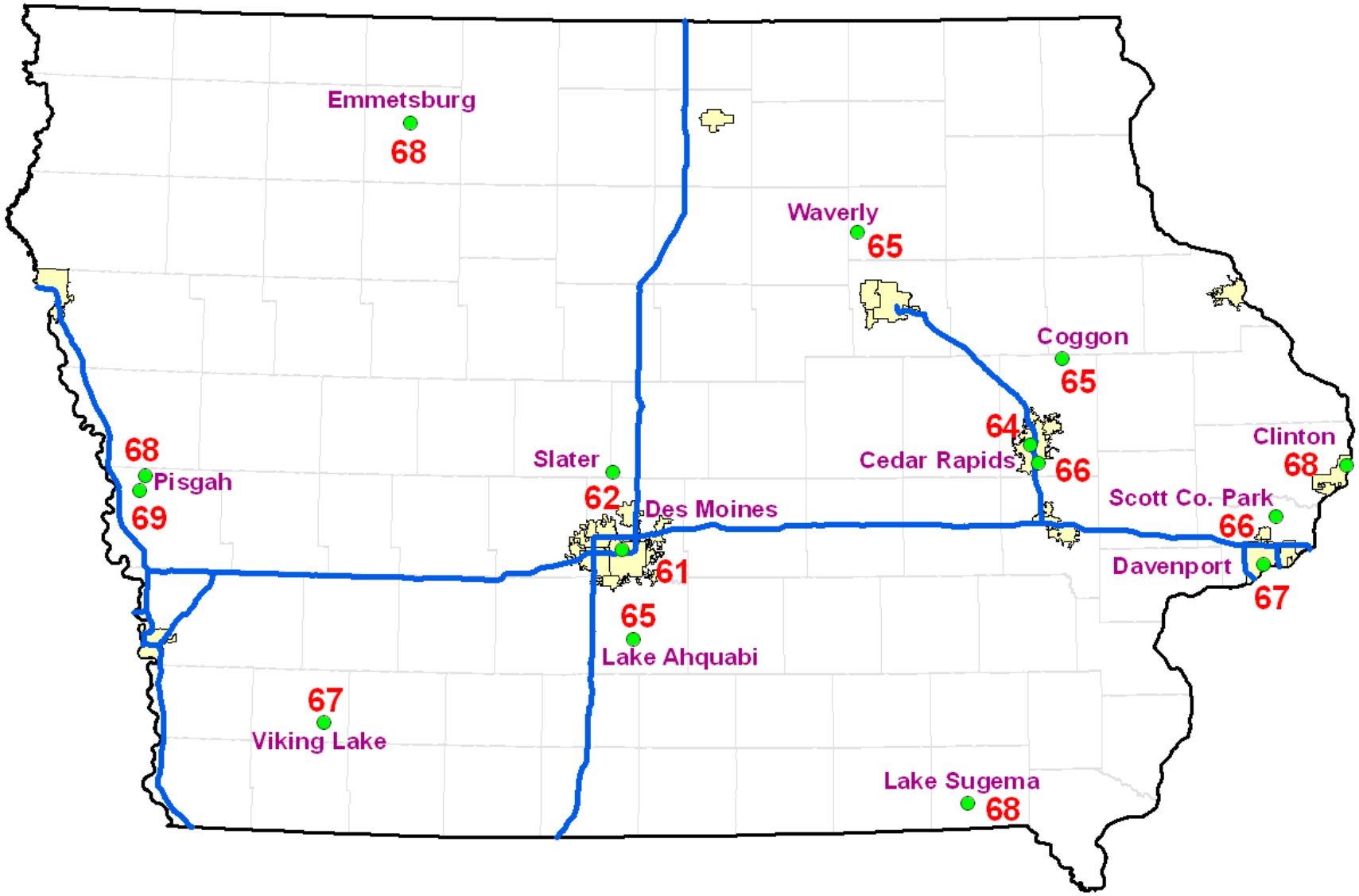
Appendix G: Design Value Map for Ozone



2010-2012 Ozone Design Values (ppb)

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Appendix H: Maps of Monitoring Locations in MSAs on the State Border

Iowa includes portions of three MSAs that it shares with other states: Davenport-Moline-Rock Island, IA-IL; Omaha-Council Bluffs, NE-IA; and Sioux City, NE-IA-SD. To estimate the SLAMs monitors operating at the time of this review, Air Quality System (AQS) reports (AMP390 and AMP600) and Network Plans from adjacent states were reviewed. The following maps show the estimated number and locations for SLAMS monitors for ozone, $PM_{2.5}$, SO_2, and PM_{10} in these MSA's.

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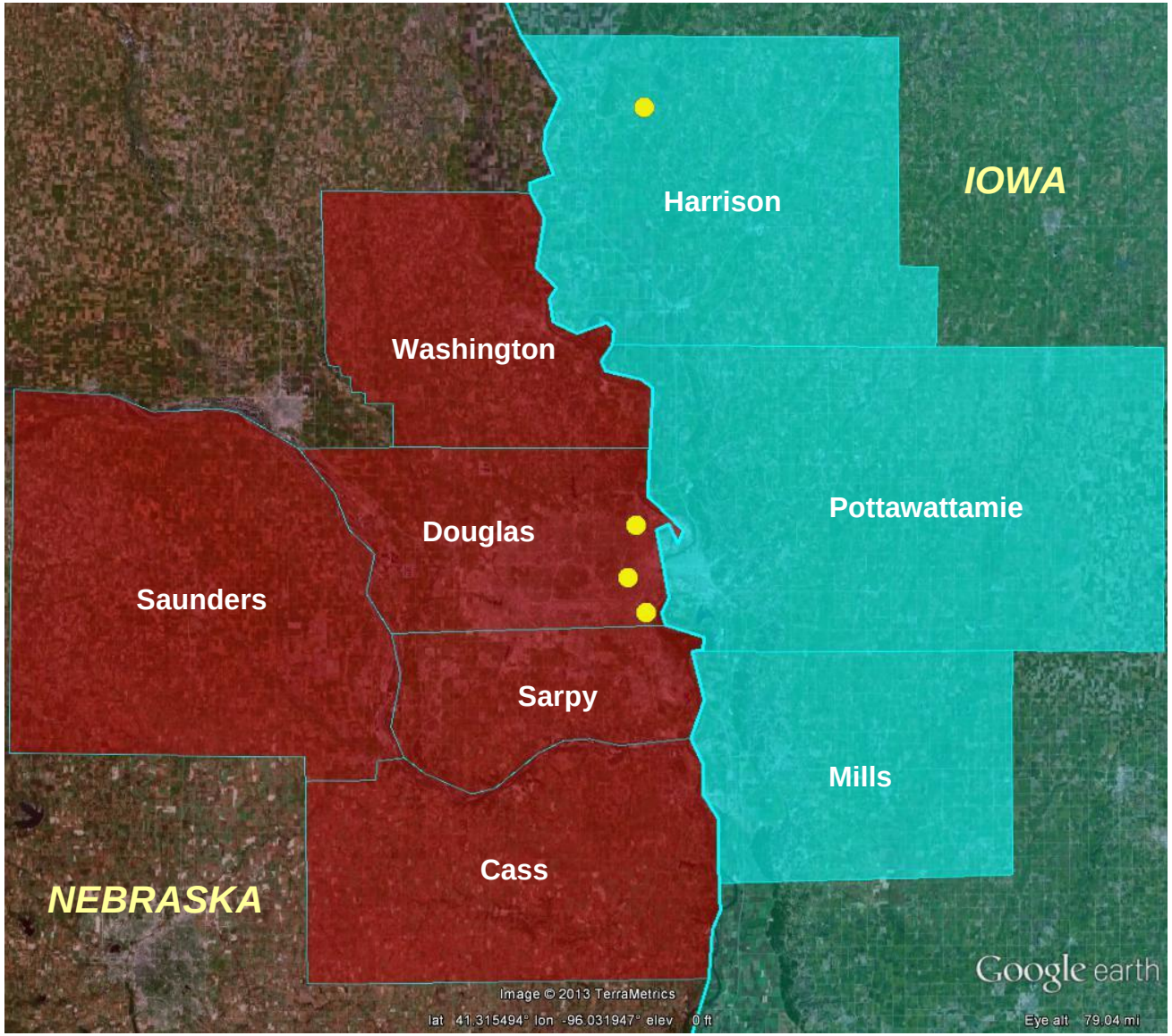

Omaha-Council Bluffs, NE-IA Ozone SLAMS Monitoring Sites

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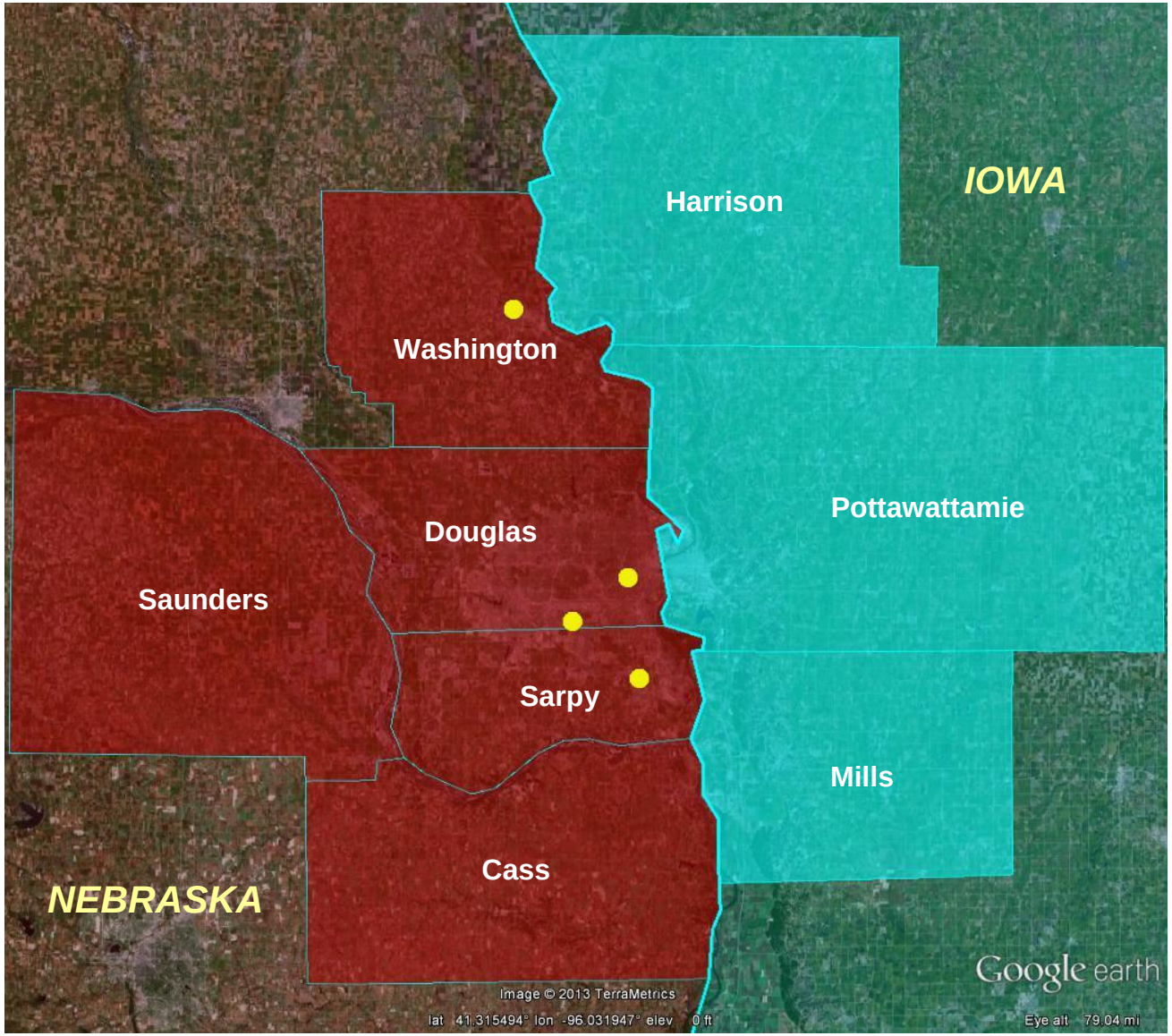

Omaha-Council Bluffs, NE-IA $PM_{2.5}$ SLAMS Monitoring Sites

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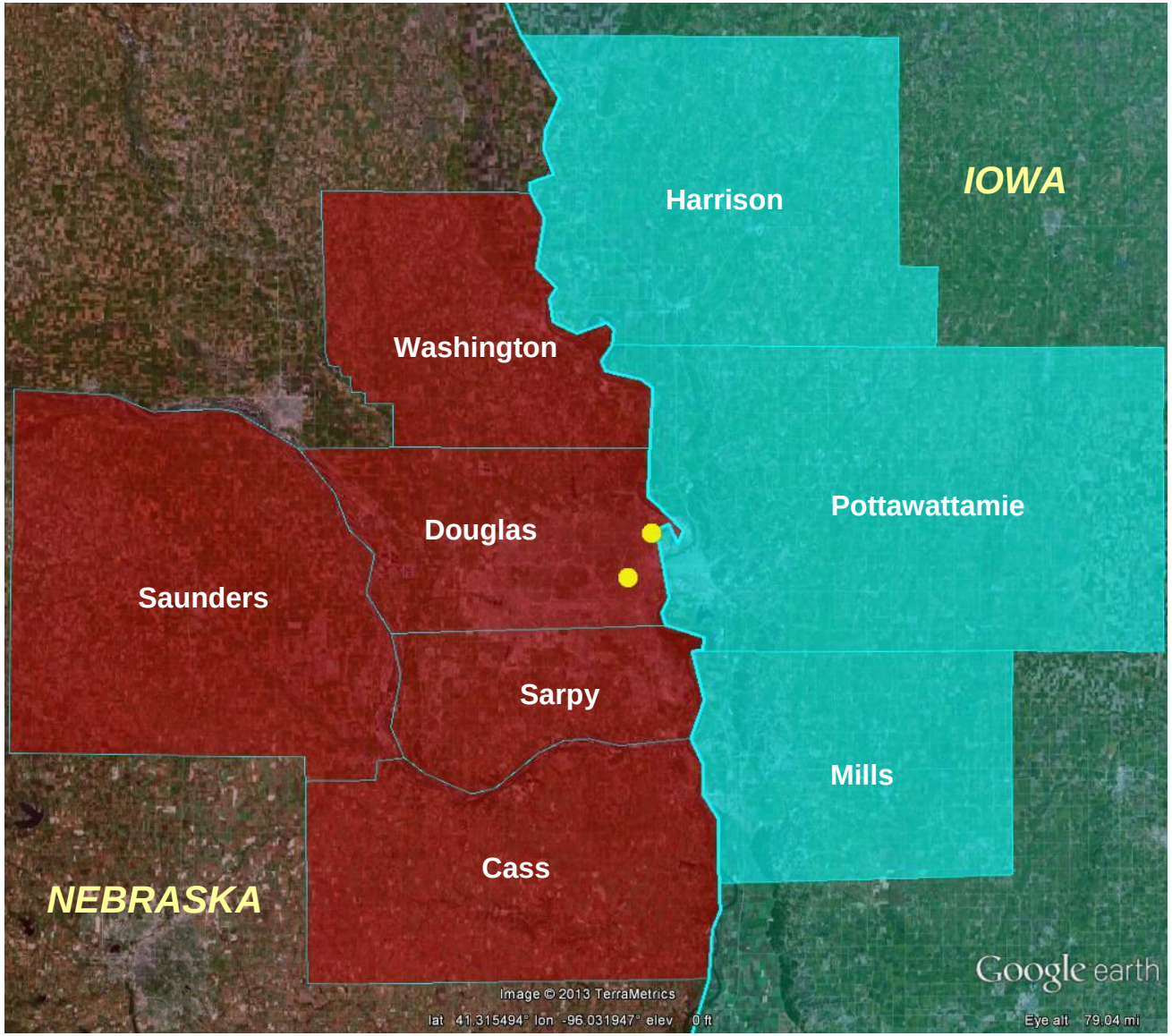

Omaha-Council Bluffs, NE-IA SO_2 SLAMS Monitoring Sites

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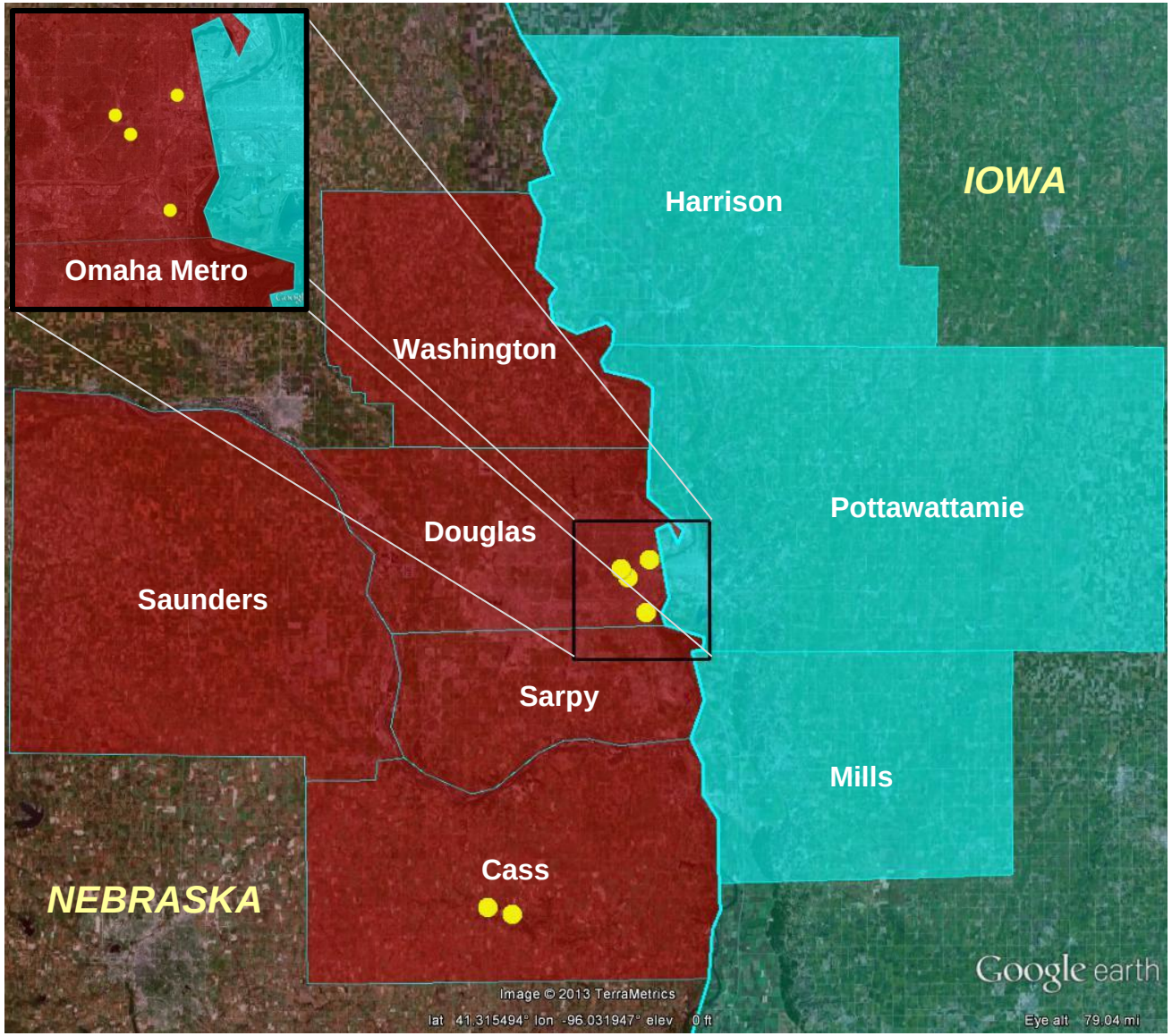

Omaha-Council Bluffs, NE-IA PM_{10} SLAMS Monitors

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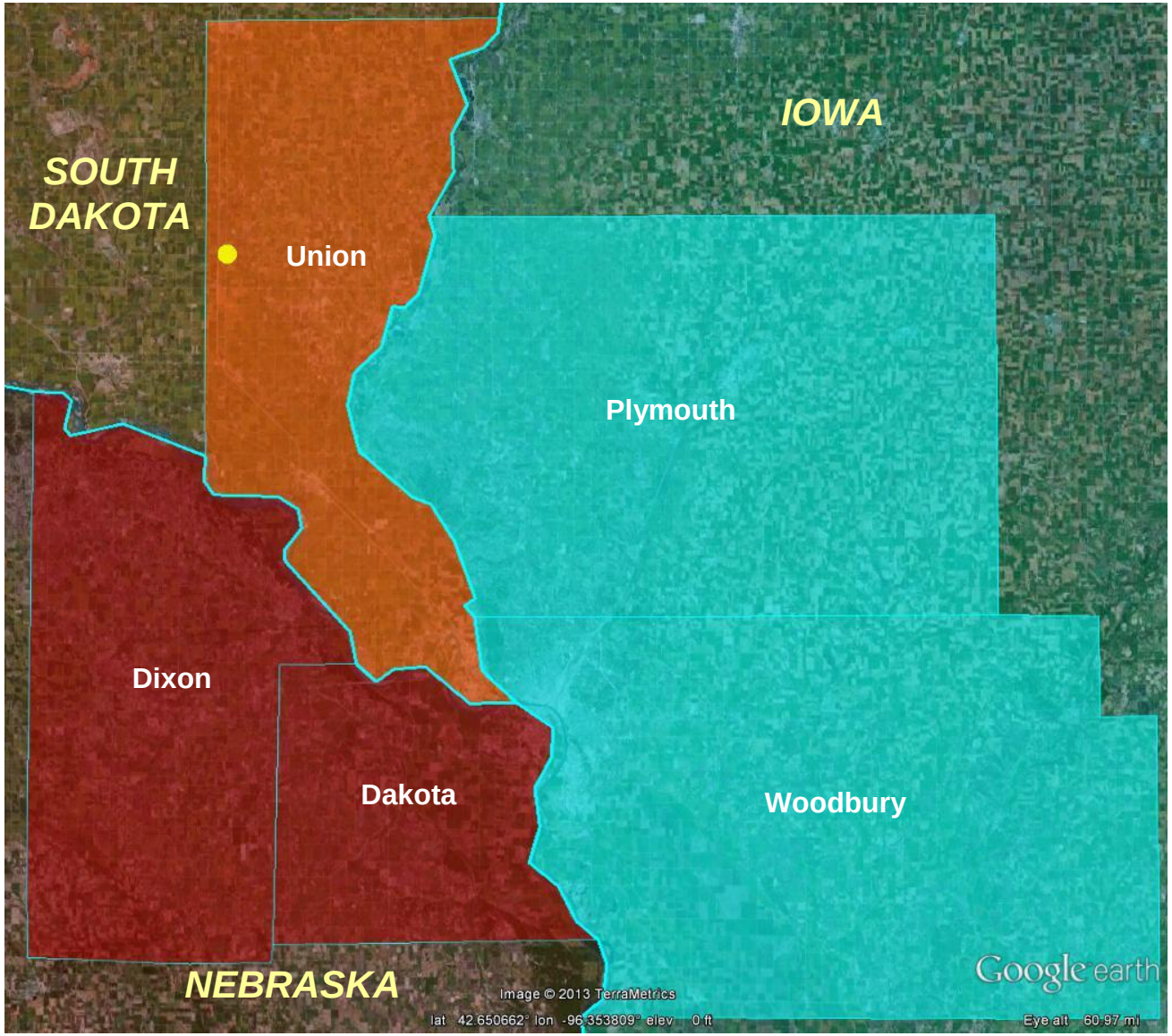

Sioux City, IA-NE-SD Ozone SLAMS Monitors

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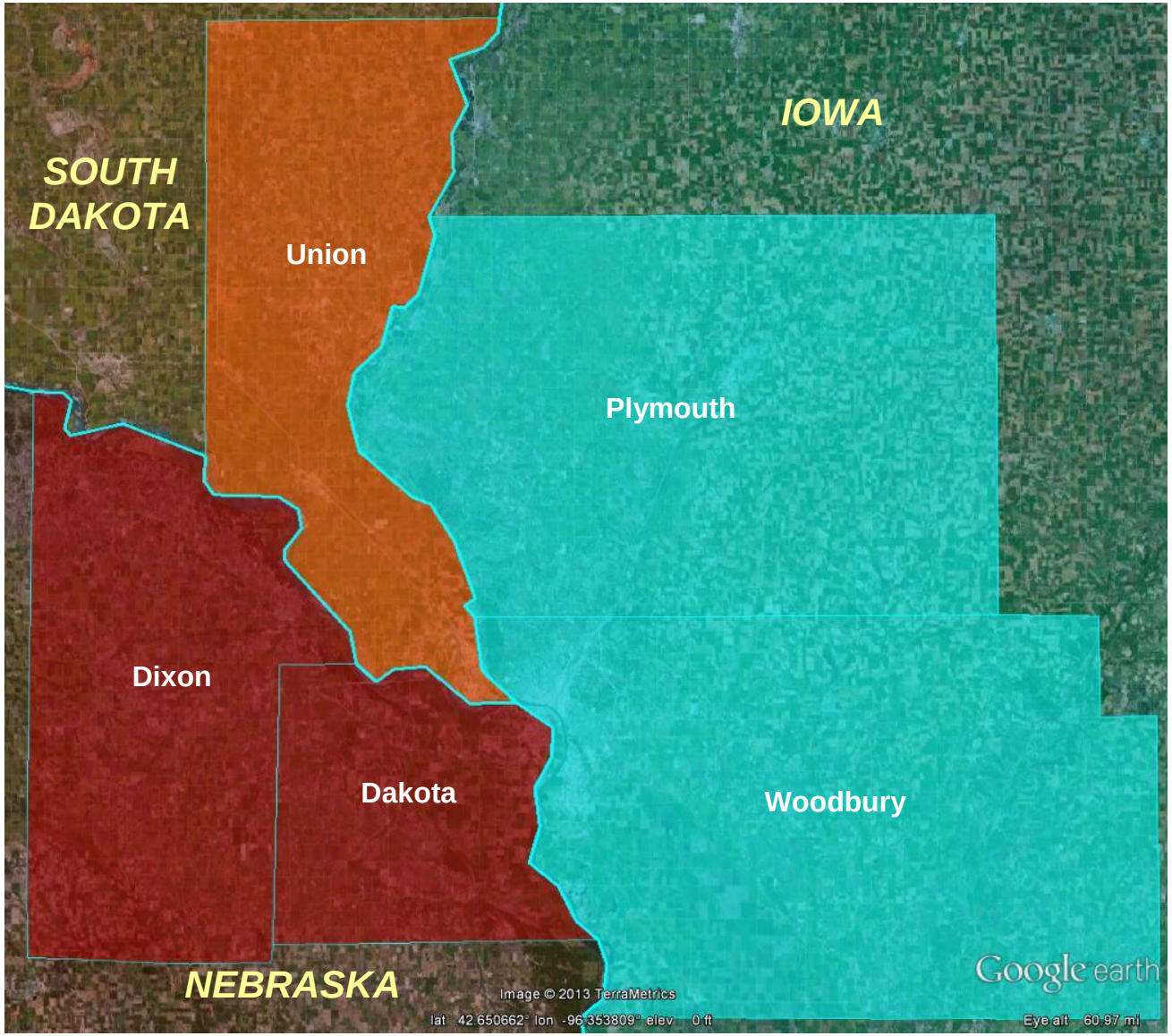

Sioux City, IA-NE-SD $PM_{2.5}$ SLAMS Monitors

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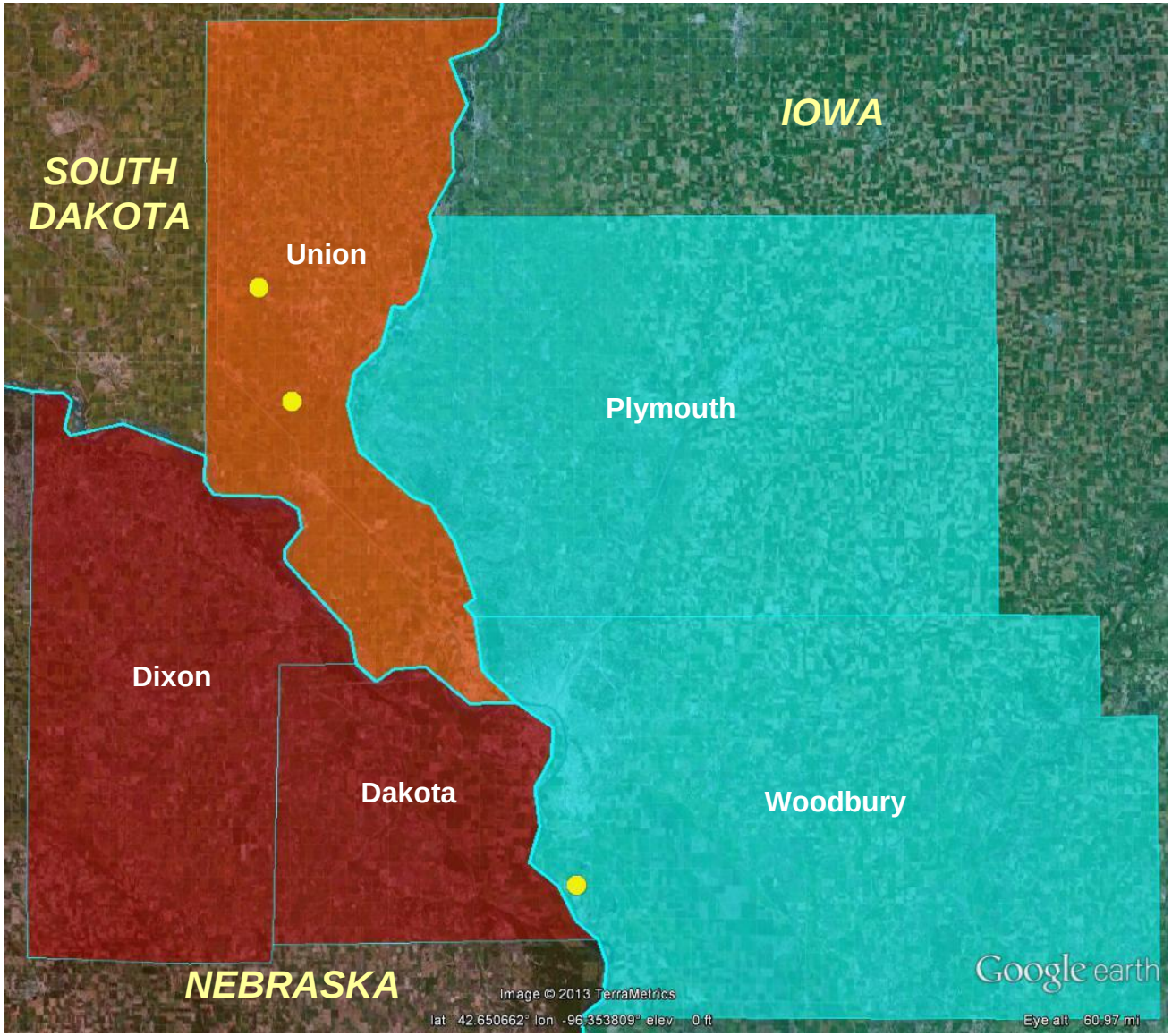

Sioux City, IA-NE-SD SO_2 SLAMS Monitors

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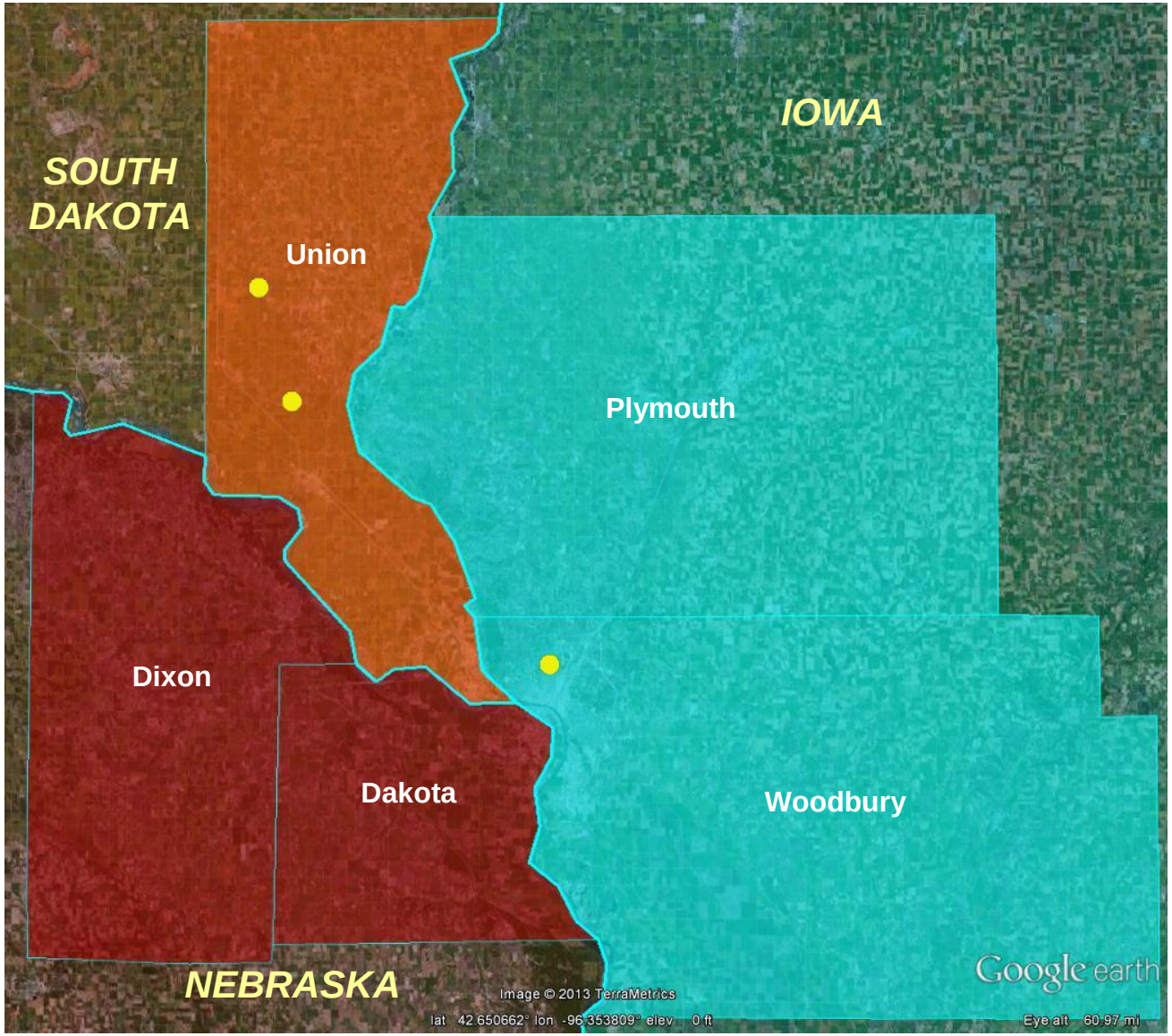

Sioux City, IA-NE-SD PM_{10} SLAMS Monitors

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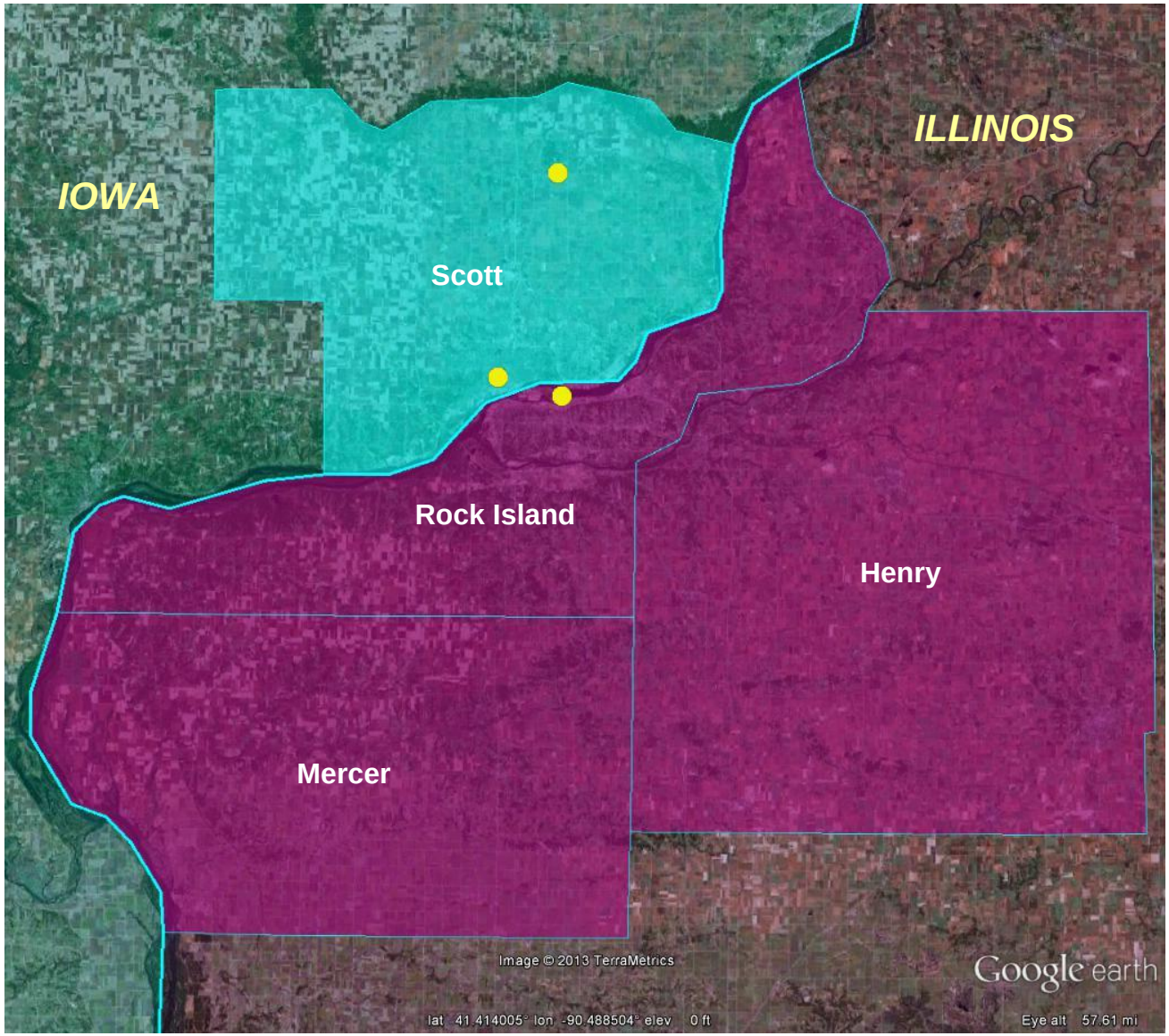

Davenport-Moline-Rock Island, IA-IL Ozone SLAMS Monitors

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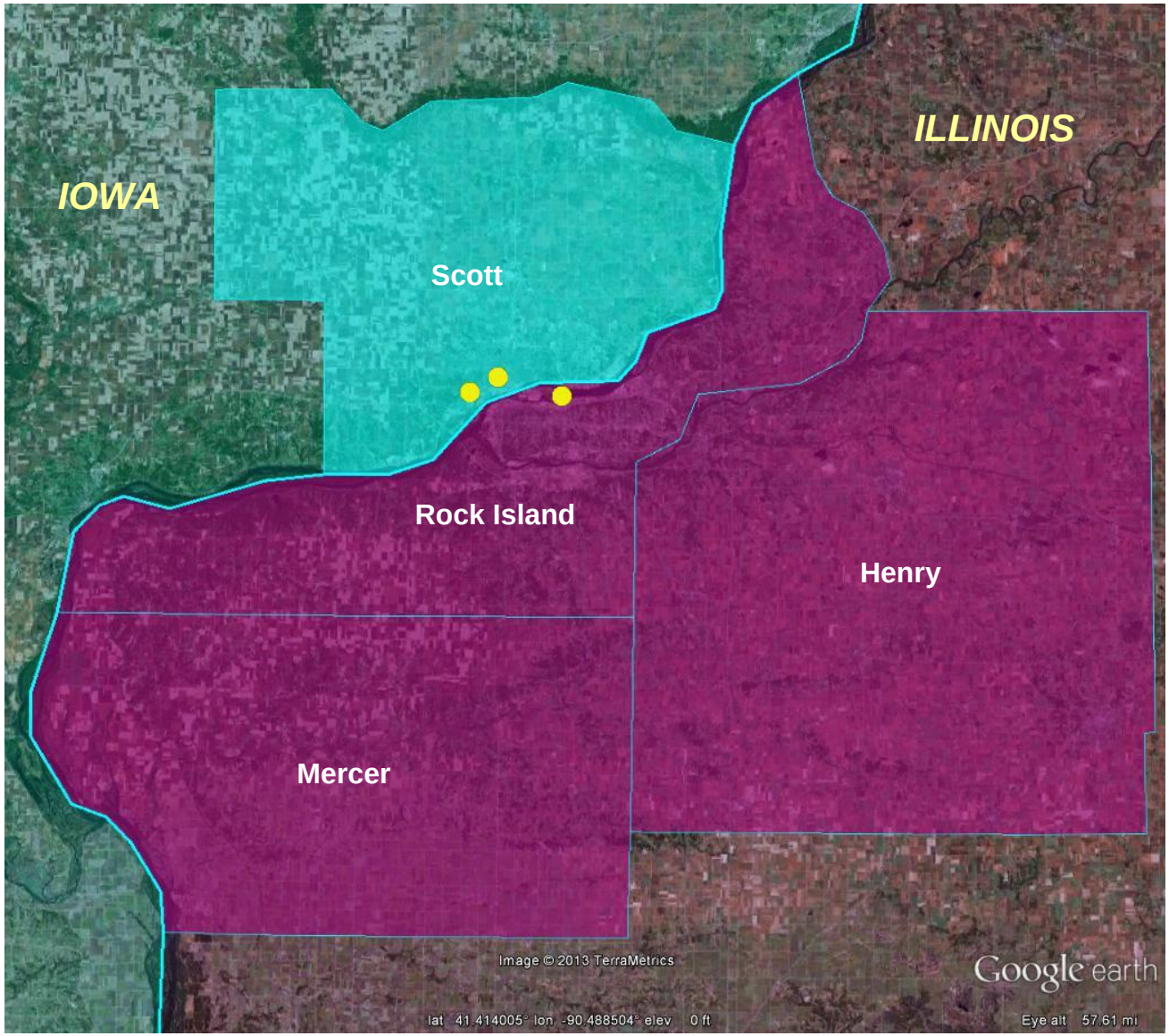

Davenport-Moline-Rock Island, IA-IL $PM_{2.5}$ SLAMS Monitors

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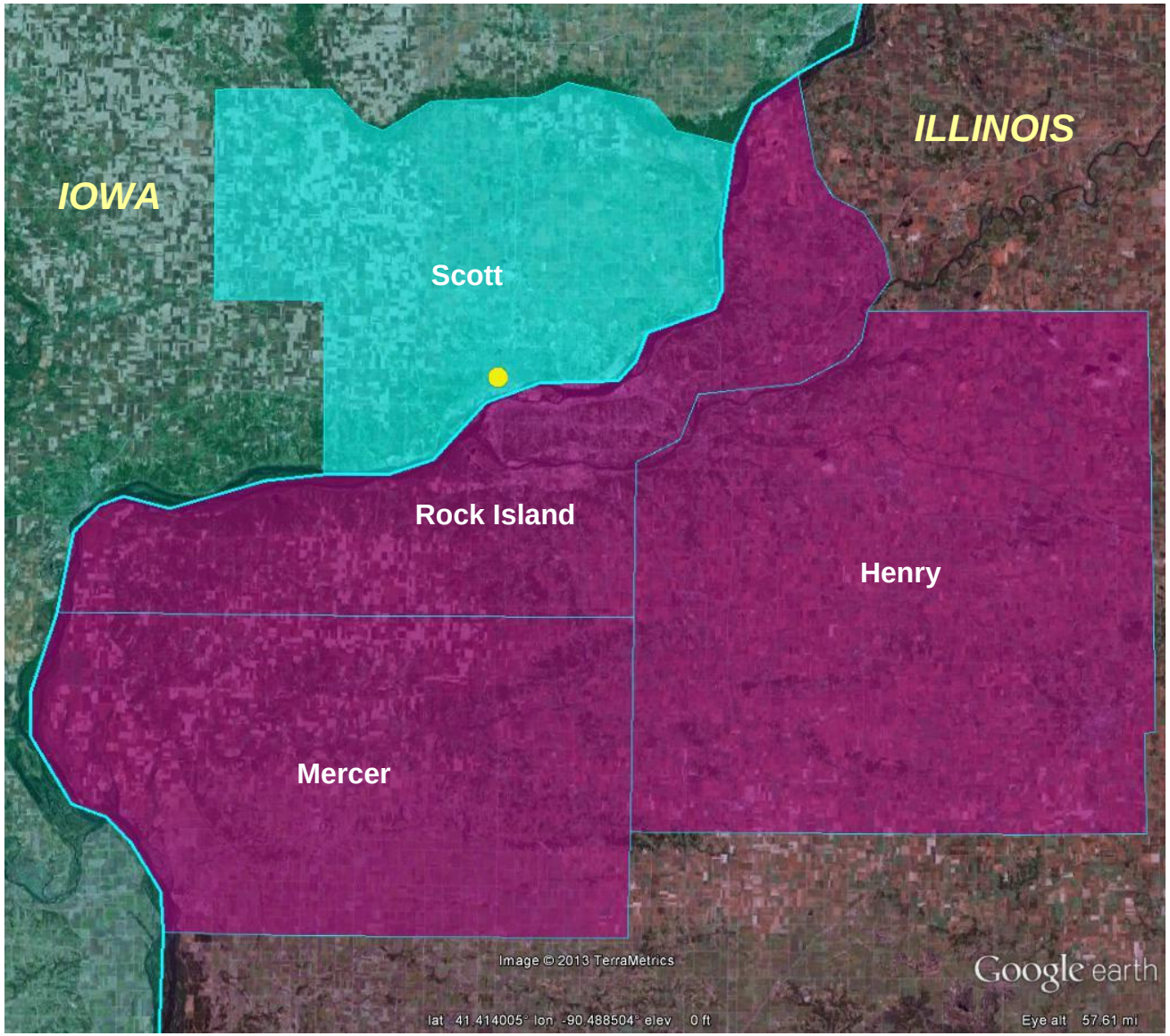

Davenport-Moline-Rock Island, IA-IL SO_2 SLAMS Monitors

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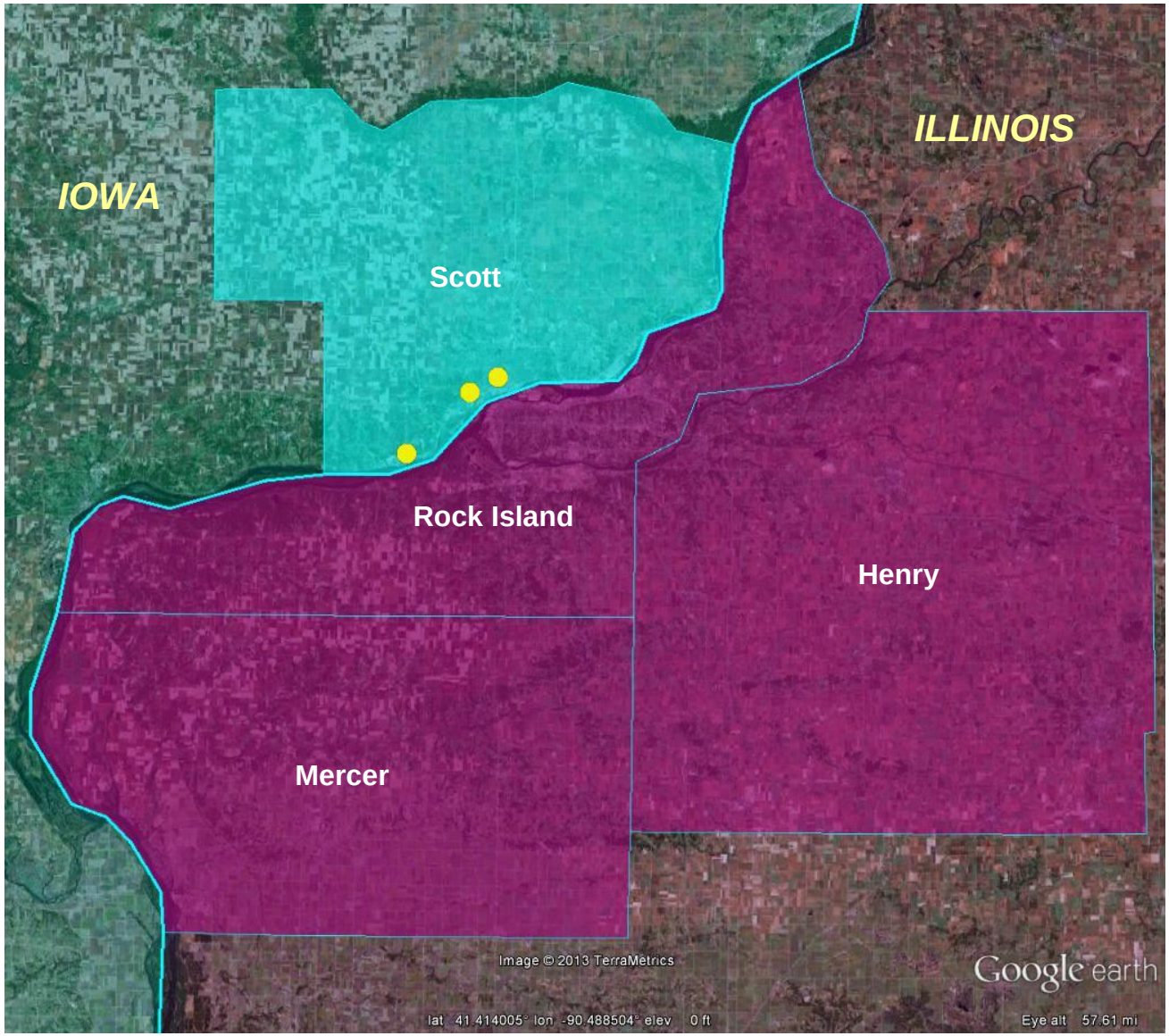

Davenport-Moline-Rock Island, IA-IL PM_{10} SLAMS Monitors

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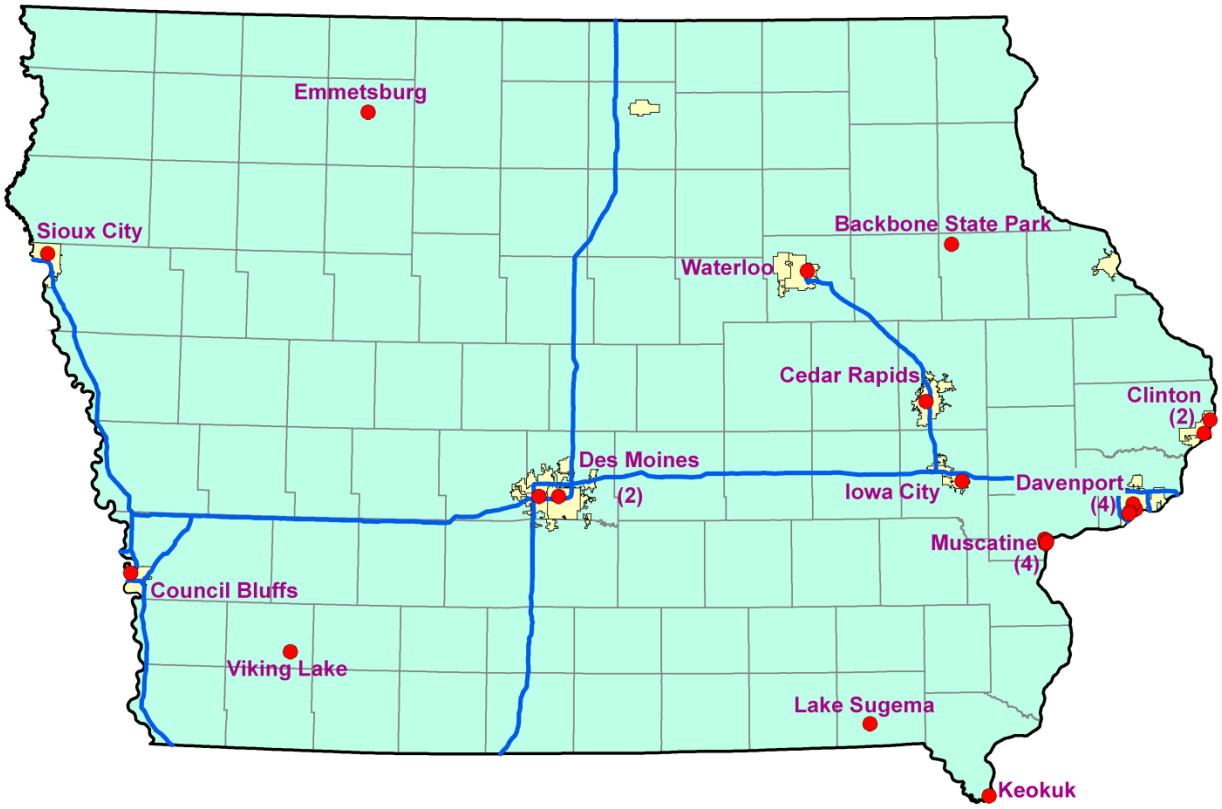
Appendix I: Iowa Ambient Air Monitoring Network Maps

The following maps show the locations for the criteria pollutant monitors in the state of Iowa, which are current as of June 1, 2013. Non-criteria pollutant maps are also included for the continuous $PM_{2.5}$ monitoring network and the Toxics and Speciation monitoring networks.



Manual $PM_{2.5}$ (FRM) Monitoring Sites

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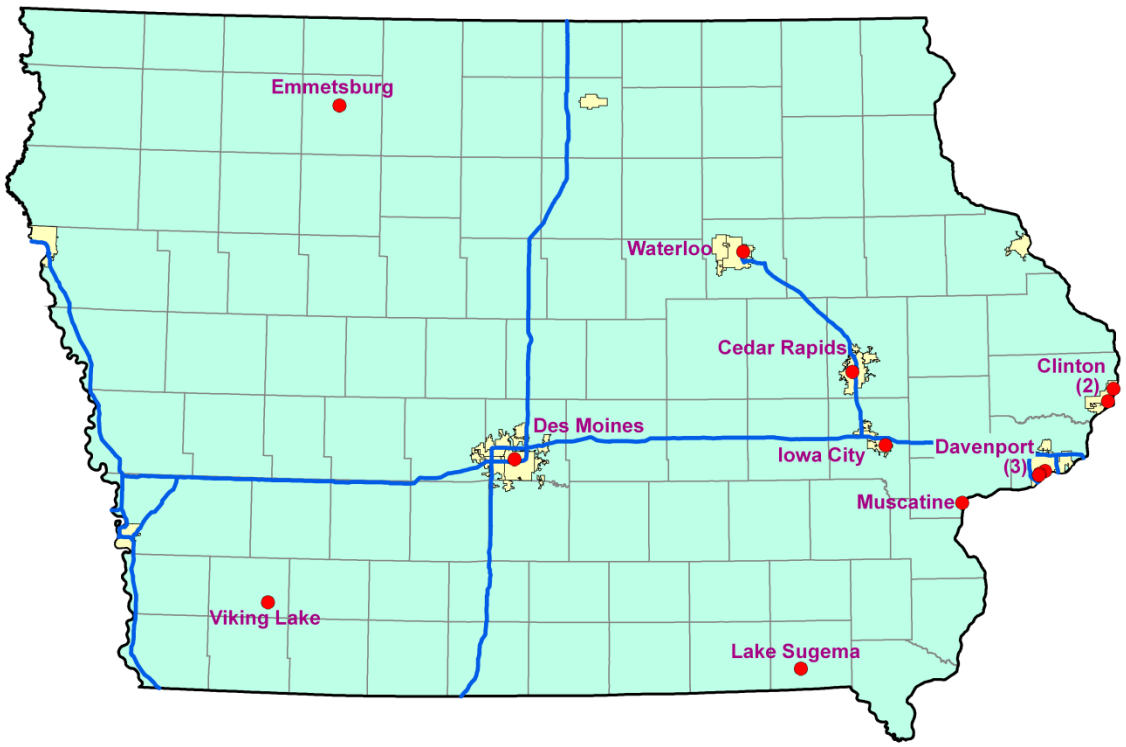
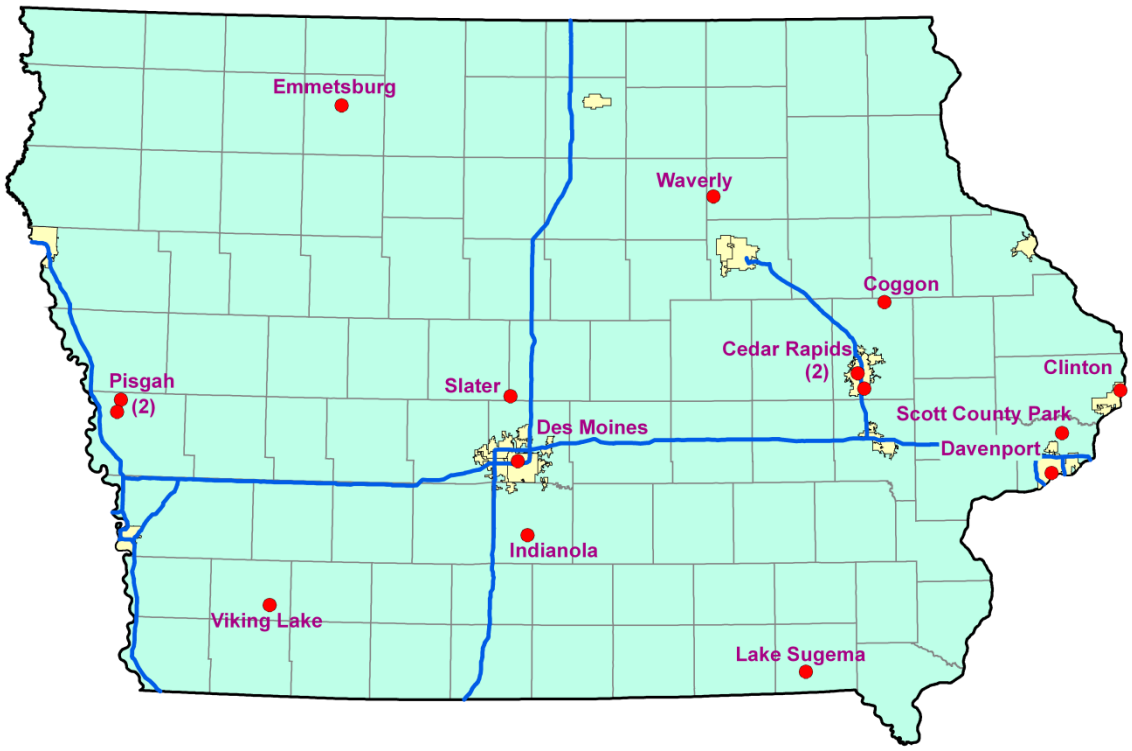


Continuous $PM_{2.5}$ (non-FRM) Monitoring Sites



Ozone Monitoring Sites

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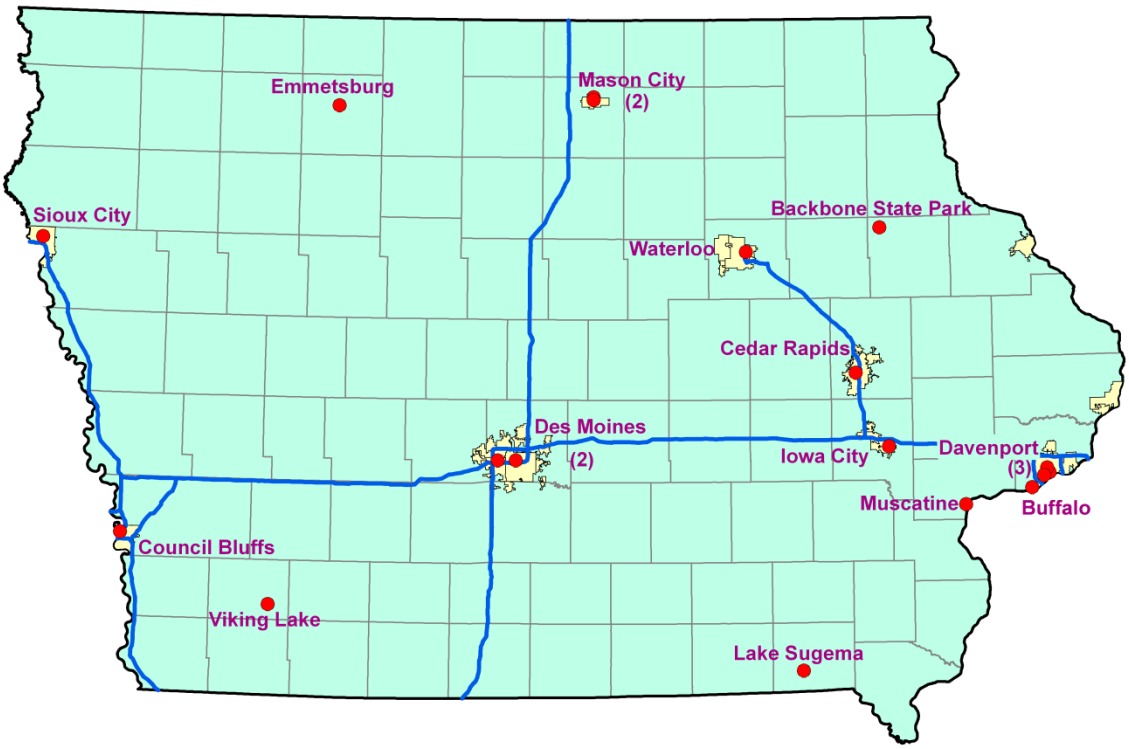
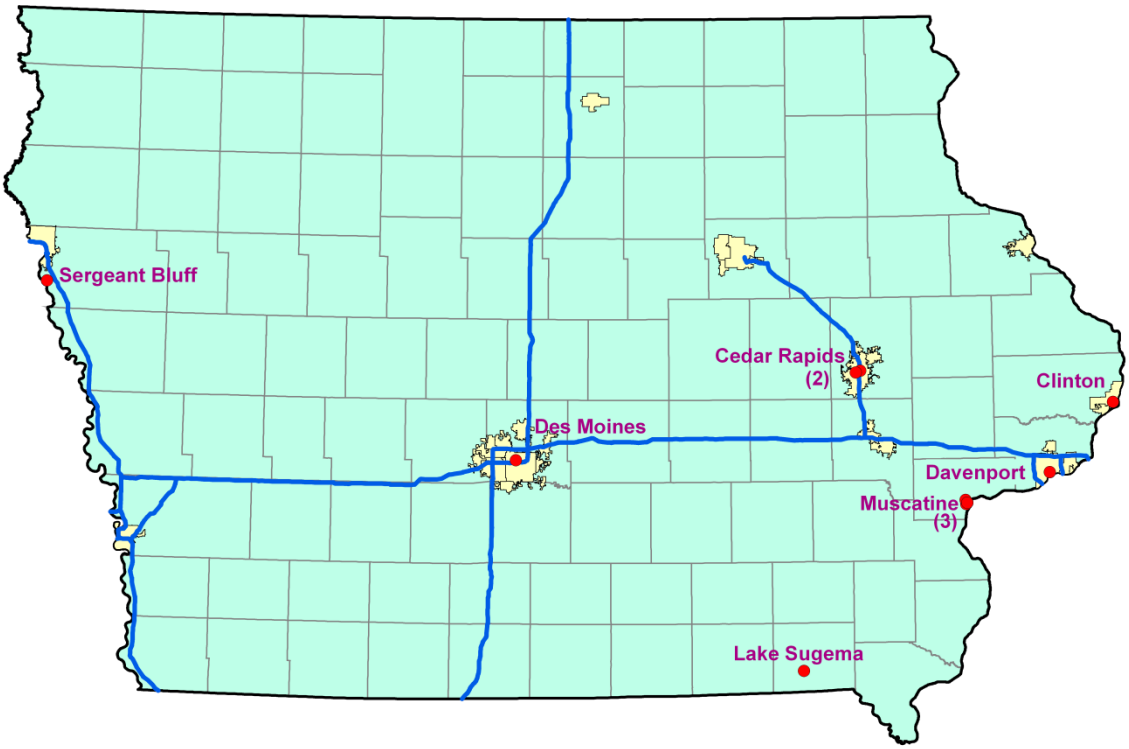


PM_{10} Monitoring Sites



SO_2 Monitoring Sites

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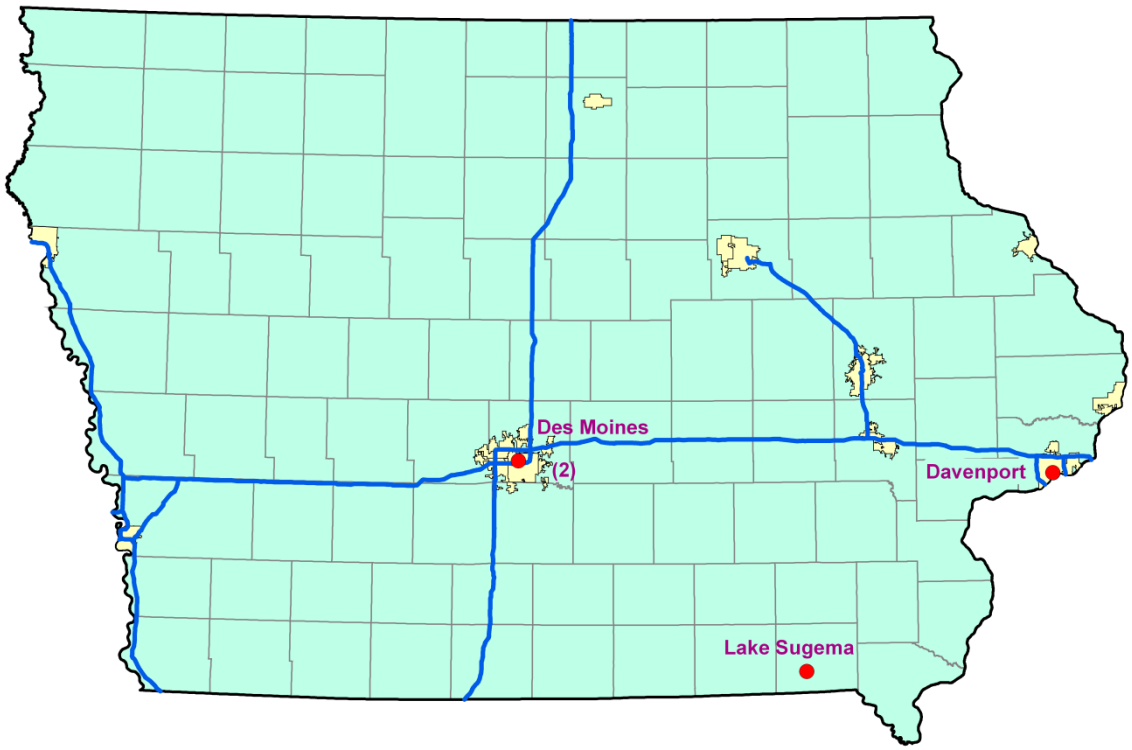
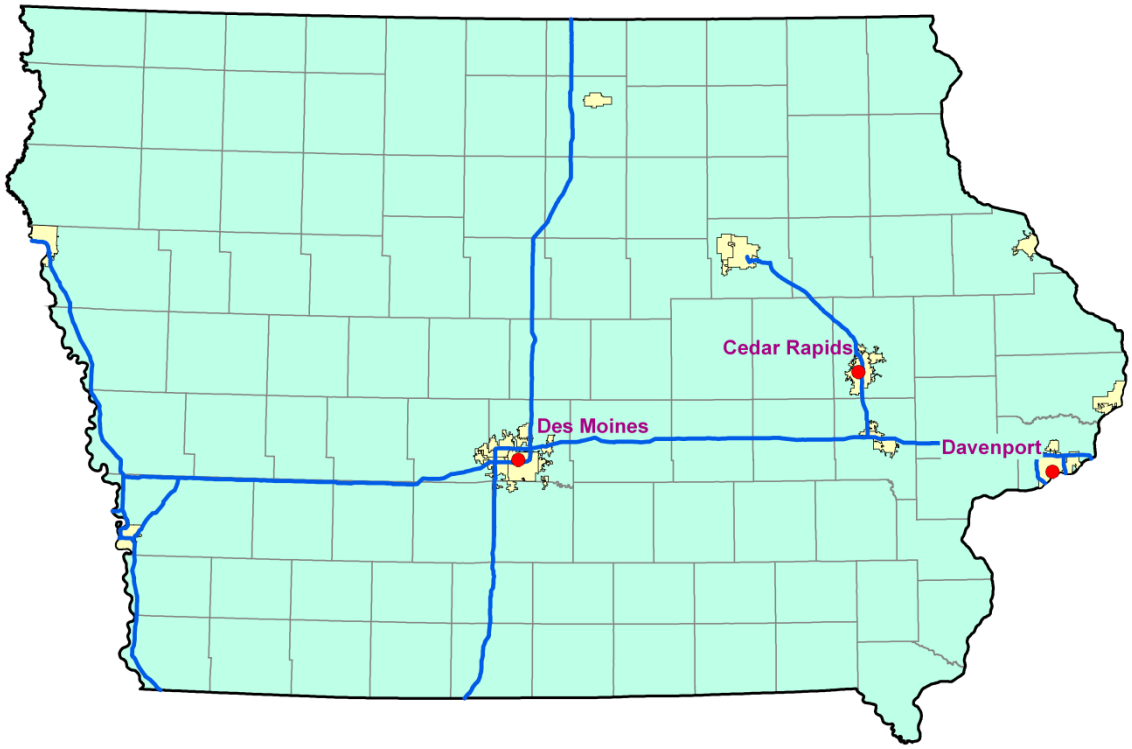


NO_2 Monitoring Sites



CO Monitoring Sites

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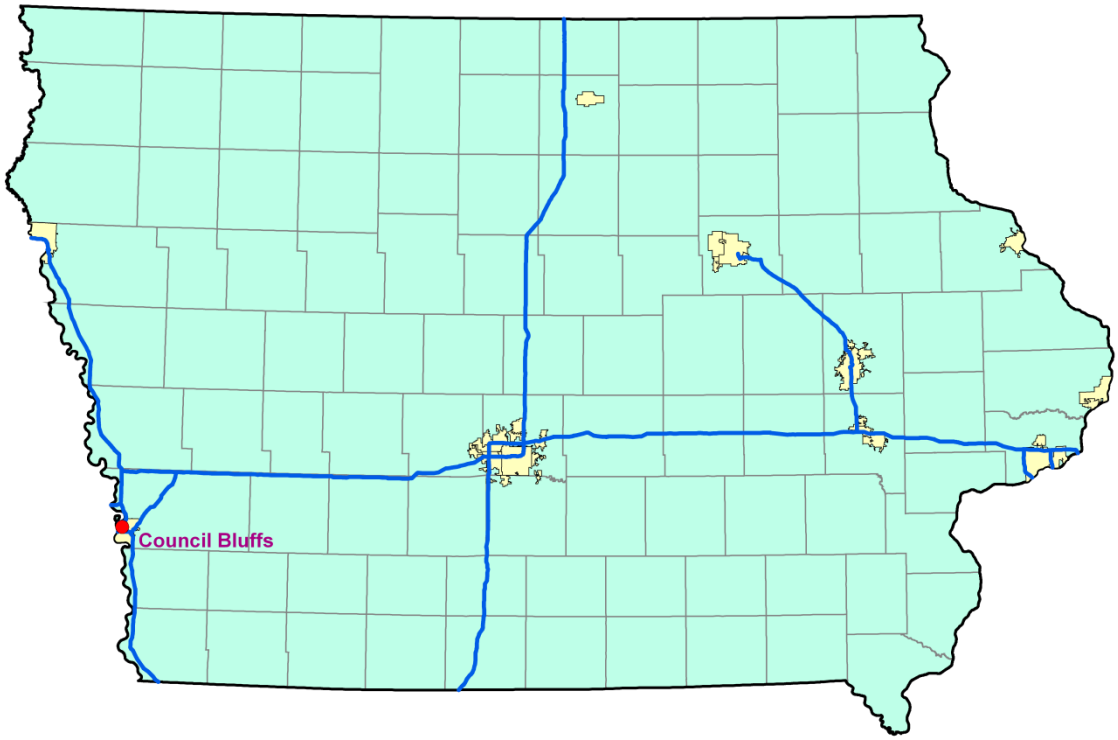
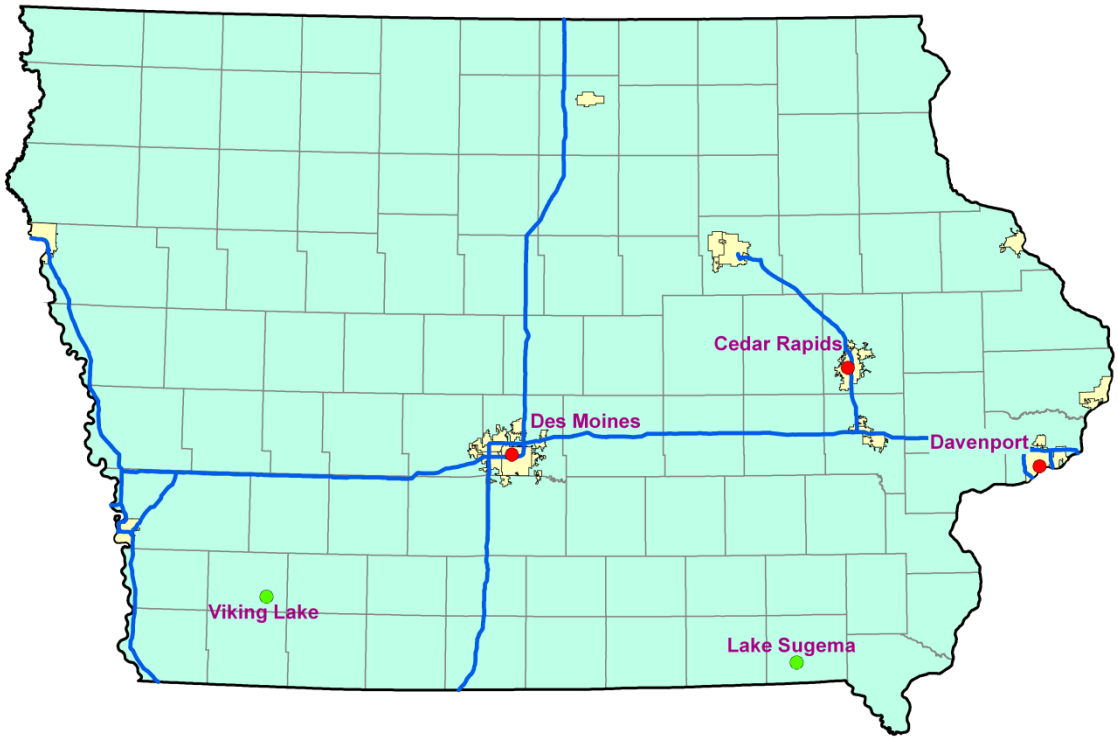


Lead (Pb) Monitoring Sites



Speciation Monitors; CSN Speciation samplers are located at the red dots, IMPROVE speciation samplers are located at the green dots.

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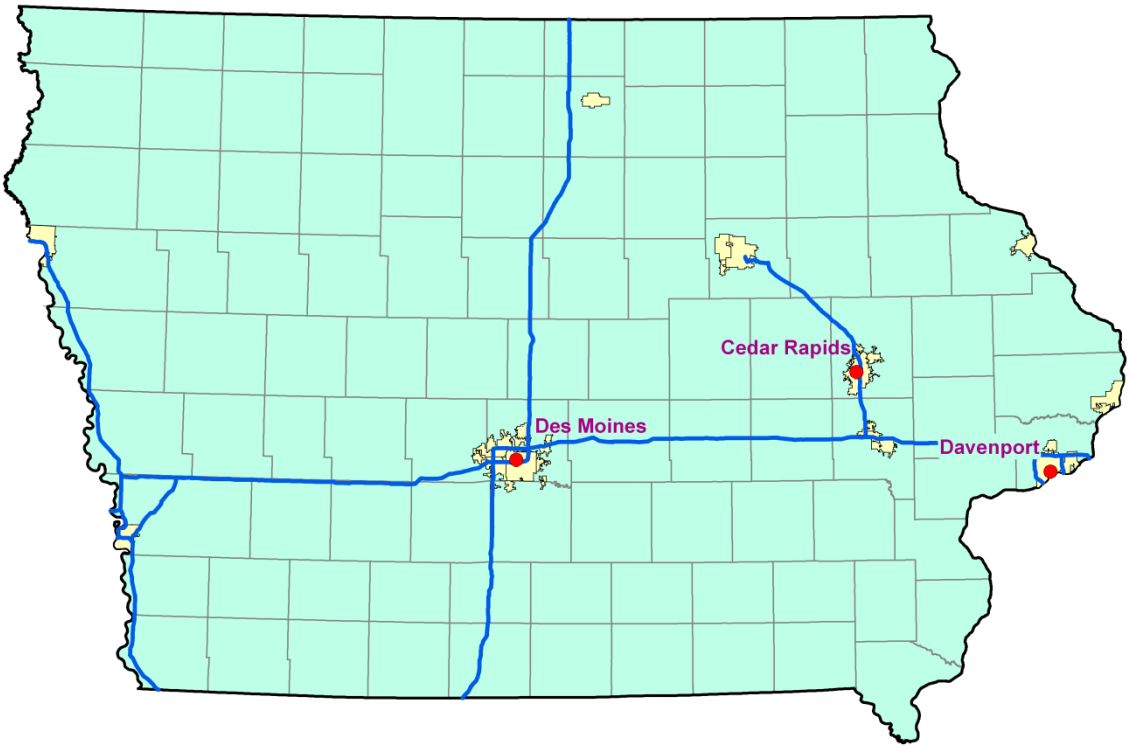

Toxics Monitoring Sites

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Appendix J: Network Changes

Relocation of SLAMs PM monitoring from the Blackhawk Foundry Monitoring Site to Existing Hayes Elementary Monitoring Site

On 4/30/13, the department received a request to vacate its Davenport, Blackhawk Foundry monitoring site (19-163-0019). The request came from a realtor seeking to sell the property where the monitor is located. The agreement DNR has with the property owner allows the owner to request DNR to leave the property after 30 days' notice. The department asked for permission to continue the monitor until the end of the year, and the realtor indicated that he thought it would be possible to accommodate this request.

The department currently operates SLAMs PM_{10} and $PM_{2.5}$ monitors at the Blackhawk Foundry monitoring site. Under the provisions of the federal monitoring rules, SLAMS monitors may be moved to a nearby location with the same scale of representation, if logistical problems beyond the State's control make it impossible to continue operation at its current site. The department proposes to reestablish the SLAMs monitoring conducted at the Blackhawk Foundry monitoring site at its Hayes monitoring site (19-163-0020), located about one-half mile SSW of the foundry site. The department anticipates that the change will be made on January 1, 2014. As argued previously in this document, the number of SLAMs PM_{10} and $PM_{2.5}$ monitors currently operating in the Davenport-Moline-Rock Island MSA is adequate to meet federal requirements. As the number of SLAMs monitors will remain the same before and after the change, the network in the MSA will continue to meet these federal requirements.

Historically there have been problems maintaining the PM_{10} and $PM_{2.5}$ NAAQS in the vicinity of the Blackhawk Foundry. However, in February of 2010, the Blackhawk Foundry ceased operation. The foundry equipment was sold, and the foundry buildings were razed to prevent vandalism. Only vacant storage buildings remain on the property.[6]

$PM_{2.5}$ design values are calculated over a three year period. The first three year period where the site data is unaffected by the foundry emissions is 2011-2013. The site monitoring scale was changed from middle scale to neighborhood scale, and the primary monitoring objective was changed from source oriented to population exposure, effective 1/1/2013. The Hayes School monitor is a neighborhood scale monitor with a monitoring objective of population exposure. The monitoring scale and objective of the Blackhawk Foundry FRM monitors will be identical to those at Hayes elementary at the time the change is made. The department believes that in the absence of the foundry emissions, the air quality at the two sites should be essentially identical.

[6] http://qctimes.com/news/local/vandalism-prompts-blackhawk-foundry-demolition/article_abc66b16-3dbd-11e2-b32a-001a4bcf887a.html (accessed 5/29/13)

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Relocation of SPM SO_2 monitoring from the Scottish Rite Temple Site to New Prairie Creek Site

The source impacting the Scottish Rite Temple site (6th Street Power Station) is no longer in operation. The proposal is to remove the Scottish Rite SO_2 Site and begin sulfur dioxide monitoring at the new Prairie Creek site in January, 2014. The Prairie Creek site is well suited to monitor the point source of the coal fired Prairie Creek Generating Station. This site will be listed as a source oriented middle scale monitoring site for SO_2.

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Network Change Tables

The changes proposed for monitoring sites in the Iowa network are detailed in the table below:

Site Name	Address	County	MSA	Latitude	Longitude	AQS Site ID	Responsible Agency	Action
Davenport, Blackhawk Foundry	300 Wellman St.	Scott	DMR	41.51777	-90.61876	191630019	DNR	Deletion
Cedar Rapids, Prairie Creek	3000 C Street SW	Linn	CDR	41.94867	-91.63954	191130041	Linn Local Prog.	Addition
Cedar Rapids, Scottish Rite Temple	616 A Ave.	Linn	CDR	41.98333	-91.66278	191130031	Linn Local Prog.	Deletion

See Appendix C for definitions of the elements in this table.

The changes proposed for monitoring in the Davenport-Moline-Rock Island MSA are indicated in the table below:

Site Name	Pollutants Measured	Monitor Type	Sampling Method	Operating Schedule	Primary Monitoring Objective	Spatial Scale	NAAQS Comparable?	Action
Davenport, Blackhawk Foundry	PM10	SLAMS	Low Volume FRM	1/3 Day	Population Exposure	Neighborhood	Yes	Delete Monitoring Site
	PM2.5	SLAMS	Low Volume FRM	Daily	Population Exposure	Neighborhood	Yes	
	PM2.5 Continuous	SPM	PM2.5 Continuous	Continuous	Population Exposure	Neighborhood	No	
Davenport, Hayes Sch.	PM2.5	SPM	Low Volume FRM	1/3 Day	Population Exposure	Neighborhood	Yes	Deletion
Davenport, Hayes Sch.	PM10	SLAMS	Low Volume FRM	1/3 Day	Population Exposure	Neighborhood	Yes	Addition
Davenport, Hayes Sch.	PM2.5	SLAMS	Low Volume FRM	Daily	Population Exposure	Neighborhood	Yes	Addition

See Appendix D for definitions of the elements in this table.

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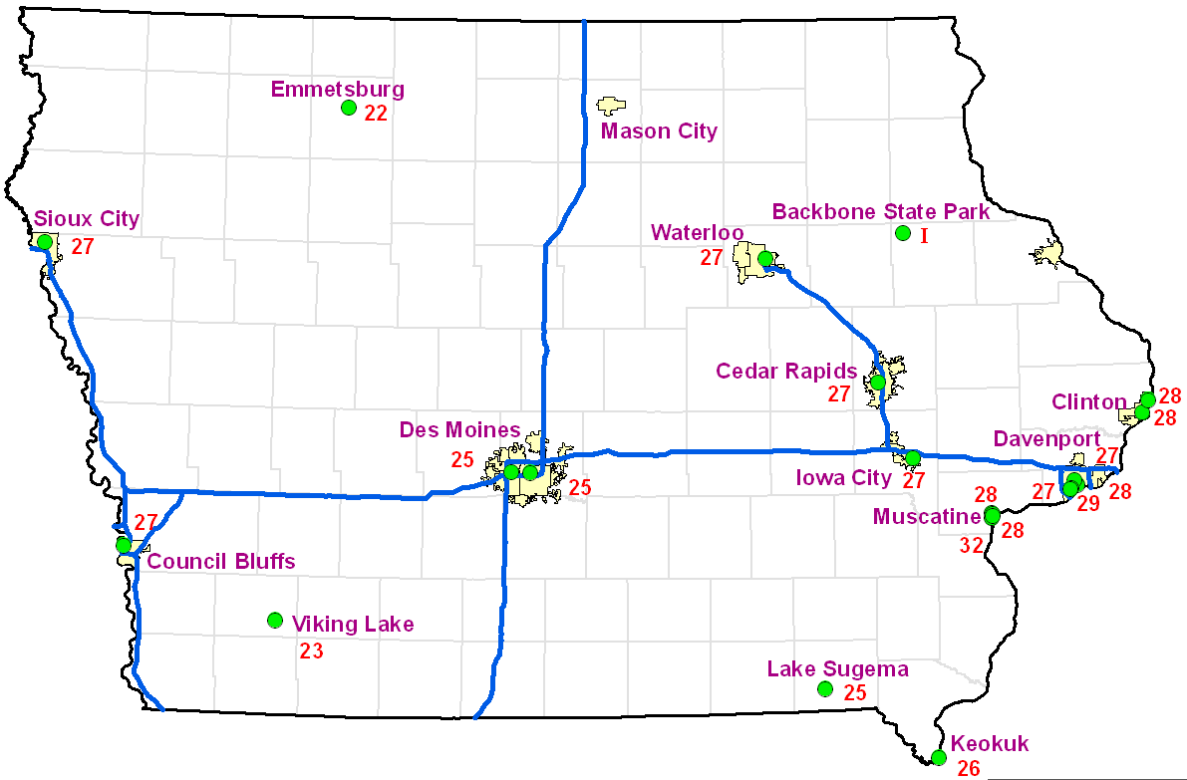
The changes proposed for monitoring in the Iowa network outside the Davenport MSA are indicated in the table below:

Site Name	Pollutants Measured	Monitor Type	Sampling Method	Operating Schedule	Primary Monitoring Objective	Spatial Scale	NAAQS Comparable?	Action
Cedar Rapids, Prairie Creek	SO2	SPM	UV Fluorescent	Continuous	Source Oriented	Middle	Yes	New Site
Cedar Rapids, Scottish Rite Temple	SO2	SPM	UV Fluorescent	Continuous	Source Oriented	Middle	Yes	Deletion
Clinton, Chancy Park	Toxics	SPM	Cartridge	1/12 Day	Population Exposure	Neighborhood	No	Addition
Muscatine, Musser Park	Toxics	SPM	Cartridge	1/12 Day	Population Exposure	Neighborhood	No	Addition

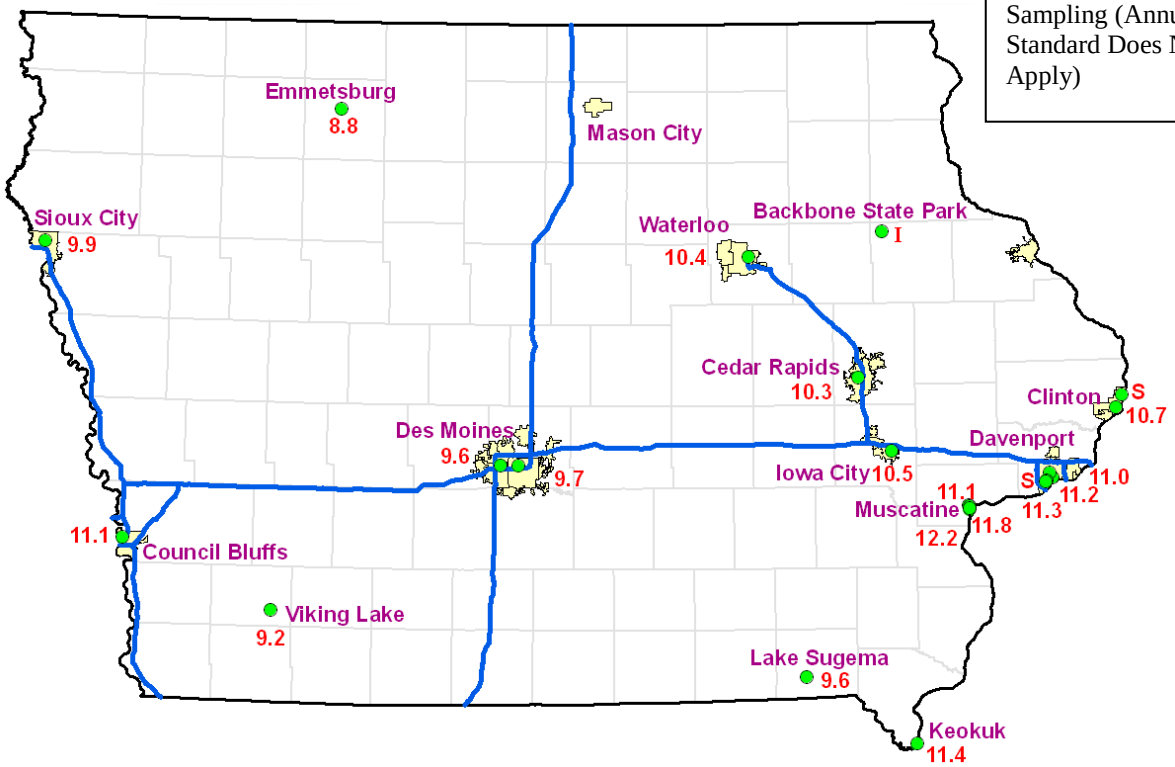
See Appendix D for definitions of the elements in this table.

Appendix K: Design Value Maps for $PM_{2.5}$



2010-2012 $PM_{2.5}$ 24-hr Design Values ($\mu g/m^3$)

I = Incomplete Data
S = Source Oriented Sampling (Annual Standard Does Not Apply)



2010-2012 $PM_{2.5}$ Annual Design Values ($\mu g/m^3$)

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Appendix L: Federal Requirements for NCore Sites

40 CFR Part 58 Appendix D, Section 3: Design Criteria for NCore Sites.

(a) Each State (i.e. the fifty States, District of Columbia, Puerto Rico, and the Virgin Islands) is required to operate at least one NCore site. States may delegate this requirement to a local agency. States with many MSAs often also have multiple air sheds with unique characteristics and, often, elevated air pollution. These States include, at a minimum, California, Florida, Illinois, Michigan, New York, North Carolina, Ohio, Pennsylvania, and Texas. These States are required to identify one to two additional NCore sites in order to account for their unique situations. These additional sites shall be located to avoid proximity to large emission sources. Any State or local agency can propose additional candidate NCore sites or modifications to these requirements for approval by the Administrator. The NCore locations should be leveraged with other multipollutant air monitoring sites including PAMS sites, National Air Toxics Trends Stations (NATTS) sites, CASTNET sites, and STN sites. Site leveraging includes using the same monitoring platform and equipment to meet the objectives of the variety of programs where possible and advantageous.

(b) The NCore sites must measure, at a minimum, $PM_{2.5}$ particle mass using continuous and integrated/filter-based samplers, speciated $PM_{2.5}$, $PM_{10\text{-}2.5}$ particle mass, speciated $PM_{10\text{-}2.5}$, O_3, SO_2, CO, NO/NOy, wind speed, wind direction, relative humidity, and ambient temperature. NCore sites in CBSA with a population of 500,000 people (as determined in the latest Census) or greater shall also measure Pb either as Pb-TSP or Pb-PM_{10}. The EPA Regional Administrator may approve an alternative location for the Pb measurement where the alternative location would be more appropriate for logistical reasons and the measurement would provide data on typical Pb concentrations in the CBSA.

(1) Although the measurement of NOy is required in support of a number of monitoring objectives, available commercial instruments may indicate little difference in their measurement of NOy compared to the conventional measurement of NOx, particularly in areas with relatively fresh sources of nitrogen emissions. Therefore, in areas with negligible expected difference between NOy and NOX measured concentrations, the Administrator may allow for waivers that permit NOx monitoring to be substituted for the required NOy monitoring at applicable NCore sites.

(2) EPA recognizes that, in some cases, the physical location of the NCore site may not be suitable for representative meteorological measurements due to the site's physical surroundings. It is also possible that nearby meteorological measurements may be able to fulfill this data need. In these cases, the requirement for meteorological monitoring can be waived by the Administrator.

(c) [Reserved]

(d) Siting criteria are provided for urban and rural locations. Sites with significant historical records that do not meet siting criteria may be approved as NCore by the Administrator. Sites with the suite of NCore measurements that are explicitly designed for other monitoring objectives are exempt from these siting criteria (e.g., a near-roadway site).

(1) Urban NCore stations are to be generally located at urban or neighborhood scale to provide representative concentrations of exposure expected throughout the metropolitan area; however, a middle-scale site may be acceptable in cases where the site can represent many such locations throughout a metropolitan area.

(2) Rural NCore stations are to be located to the maximum extent practicable at a regional or larger scale away from any large local emission source, so that they represent ambient concentrations over an extensive area.

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Appendix M: Federal Requirements for Near-Road Sites

Appendix D to Part 58—Network Design Criteria for Ambient Air Quality Monitoring

4.3 Nitrogen Dioxide (NO_2) Design Criteria

4.3.1 General Requirements

(a) State and, where appropriate, local agencies must operate a minimum number of required NO_2 monitoring sites as described below.

4.3.2 Requirement for Near-road NO_2 Monitors

(a) Within the NO_2 network, there must be one microscale near-road NO_2 monitoring station in each CBSA with a population of 500,000 or more persons to monitor a location of expected maximum hourly concentrations sited near a major road with high AADT counts as specified in paragraph 4.3.2(a)(1) of this appendix. An additional near-road NO_2 monitoring station is required for any CBSA with a population of 2,500,000 persons or more, or in any CBSA with a population of 500,000 or more persons that has one or more roadway segments with 250,000 or greater AADT counts to monitor a second location of expected maximum hourly concentrations. CBSA populations shall be based on the latest available census figures.

(1) The near-road NO_2 monitoring stations shall be selected by ranking all road segments within a CBSA by AADT and then identifying a location or locations adjacent to those highest ranked road segments, considering fleet mix, roadway design, congestion patterns, terrain, and meteorology, where maximum hourly NO_2 concentrations are expected to occur and siting criteria can be met in accordance with appendix E of this part. Where a State or local air monitoring agency identifies multiple acceptable candidate sites where maximum hourly NO_2 concentrations are expected to occur, the monitoring agency shall consider the potential for population exposure in the criteria utilized to select the final site location. Where one CBSA is required to have two near-road NO_2 monitoring stations, the sites shall be differentiated from each other by one or more of the following factors: fleet mix; congestion patterns; terrain; geographic area within the CBSA; or different route, interstate, or freeway designation.

(b) Measurements at required near-road NO_2 monitor sites utilizing chemiluminescence FRMs must include at a minimum: NO, NO_2 , and NOX .

40 CFR Part 58 Appendix D—Network Design Criteria for Ambient Air Quality Monitoring

4.2 Carbon Monoxide (CO) Design Criteria

4.2.1 General Requirements.

(a) Except as provided in subsection (b), one CO monitor is required to operate collocated with one required near-road NO_2 monitor, as required in Section 4.3.2 of this part, in CBSAs having a population of 1,000,000 or more persons. If a CBSA has more than one required near-road NO2 monitor, only one CO monitor is required to be collocated with a near-road NO_2 monitor within that CBSA.

(b) If a state provides quantitative evidence demonstrating that peak ambient CO concentrations would occur in a near-road location which meets microscale siting criteria in Appendix E of this part but is not a near-road NO_2 monitoring site, then the EPA Regional Administrator may approve a request by a state to use such an alternate near-road location for a CO monitor in place of collocating a monitor at near-road NO_2 monitoring site.

40 CFR Part 58 Appendix D—Network Design Criteria for Ambient Air Quality Monitoring

4.7 Fine Particulate Matter ($PM_{2.5}$) Design Criteria.

4.71 General Requirements.

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(b)(2) For CBSAs with a population of 1,000,000 or more persons, at least one $PM_{2.5}$ monitor is to be collocated at a near-road NO_2 station required in section 4.3.2(a) of this appendix.

4.3.3 Requirement for Area-wide NO_2 Monitoring

(a) Within the NO_2 network, there must be one monitoring station in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected highest NO_2 concentrations representing the neighborhood or larger spatial scales. PAMS sites collecting NO_2 data that are situated in an area of expected high NO_2 concentrations at the neighborhood or larger spatial scale may be used to satisfy this minimum monitoring requirement when the NO_2 monitor is operated year round. Emission inventories and meteorological analysis should be used to identify the appropriate locations within a CBSA for locating required area-wide NO_2 monitoring stations. CBSA populations shall be based on the latest available census figures.

4.3.4 Regional Administrator Required Monitoring

(a) The Regional Administrators, in collaboration with States, must require a minimum of forty additional NO_2 monitoring stations nationwide in any area, inside or outside of CBSAs, above the minimum monitoring requirements, with a primary focus on siting these monitors in locations to protect susceptible and vulnerable populations. The Regional Administrators, working with States, may also consider additional factors described in paragraph (b) below to require monitors beyond the minimum network requirement.

(b) The Regional Administrators may require monitors to be sited inside or outside of CBSAs in which:

(i) The required near-road monitors do not represent all locations of expected maximum hourly NO_2 concentrations in an area and NO_2 concentrations may be approaching or exceeding the NAAQS in that area;

(ii) Areas that are not required to have a monitor in accordance with the monitoring requirements and NO_2 concentrations may be approaching or exceeding the NAAQS; or

(iii) The minimum monitoring requirements for area-wide monitors are not sufficient to meet monitoring objectives.

(c) The Regional Administrator and the responsible State or local air monitoring agency should work together to design and/or maintain the most appropriate NO_2 network to address the data needs for an area, and include all monitors under this provision in the annual monitoring network plan.

4.3.5 NO_2 Monitoring Spatial Scales

(a) The most important spatial scale for near-road NO_2 monitoring stations to effectively characterize the maximum expected hourly NO_2 concentration due to mobile source emissions on major roadways is the microscale. The most important spatial scales for other monitoring stations characterizing maximum expected hourly NO_2 concentrations are the microscale and middle scale. The most important spatial scale for area-wide monitoring of high NO_2 concentrations is the neighborhood scale.

(1) Microscale —This scale represents areas in close proximity to major roadways or point and area sources. Emissions from roadways result in high ground level NO_2 concentrations at the microscale, where concentration gradients generally exhibit a marked decrease with increasing downwind distance from major roads. As noted in appendix E of this part, near-road NO_2 monitoring stations are required to be within 50 meters of target road segments in order to measure expected peak concentrations. Emissions from stationary point and area sources, and non-road sources may, under certain plume conditions, result in high ground level concentrations at the microscale. The microscale typically represents an area impacted by the plume with dimensions extending up to approximately 100 meters.

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(2) Middle scale —This scale generally represents air quality levels in areas up to several city blocks in size with dimensions on the order of approximately 100 meters to 500 meters. The middle scale may include locations of expected maximum hourly concentrations due to proximity to major NO_2 point, area, and/or non-road sources.

(3) Neighborhood scale —The neighborhood scale represents air quality conditions throughout some relatively uniform land use areas with dimensions in the 0.5 to 4.0 kilometer range. Emissions from stationary point and area sources may, under certain plume conditions, result in high NO_2 concentrations at the neighborhood scale. Where a neighborhood site is located away from immediate NO_2 sources, the site may be useful in representing typical air quality values for a larger residential area, and therefore suitable for population exposure and trends analyses.

(4) Urban scale —Measurements in this scale would be used to estimate concentrations over large portions of an urban area with dimensions from 4 to 50 kilometers. Such measurements would be useful for assessing trends in area-wide air quality, and hence, the effectiveness of large scale air pollution control strategies. Urban scale sites may also support other monitoring objectives of the NO_2 monitoring network identified in paragraph 4.3.4 above.

4.3.6 NOy Monitoring

(a) NO/NOy measurements are included within the NCore multi-pollutant site requirements and the PAMS program. These NO/NOy measurements will produce conservative estimates for NO_2 that can be used to ensure tracking continued compliance with the NO_2 NAAQS. NO/NOy monitors are used at these sites because it is important to collect data on total reactive nitrogen species for understanding O_3 photochemistry.

Appendix N: Highest PM_{10} Values in Iowa MSAs 2010-2012

The following table shows the highest values recorded by PM_{10} monitors in Iowa Metropolitan Statistical Areas, including those shared with Illinois, South Dakota and Nebraska.

Table D-4 of Appendix D to Part 58 of the Code of Federal Regulations, specifies different minimum monitoring requirements for PM_{10}, depending on whether the concentrations are high, medium, or low. High concentrations are defined as exceeding the PM_{10} NAAQS by 20% or more (186 $\mu g/m^3$ or greater). Medium levels are defined as concentrations exceeding 80% of the NAAQS (between 124 and 186 $\mu g/m^3$). If ambient concentrations are less than 80% of the PM_{10} NAAQS, the levels are characterized as low. These categories are reflected in the last column of the following table.

MSA	2010 Max ($\mu g/m^3$)	2011 Max ($\mu g/m^3$)	2012 Max ($\mu g/m^3$)	3 Year Max ($\mu g/m^3$)	High, Medium, Low Classification
Omaha-Council Bluffs, NE-IA	306	172	199	306	High
Des Moines-West Des Moines, IA	58	49	62	62	Low
Davenport-Moline-Rock Island, IA-IL	132	149	141	149	Medium
Cedar Rapids, IA	69	48	55	69	Low
Sioux City, IA-NE-SD	102	74	101	102	Low
Waterloo-Cedar Falls, IA	84	60	68	84	Low
Iowa City, IA	118	52	83	118	Low

PM_{10} Values in MSAs (3 year maximum)

Source: *http://www.epa.gov/airdata/ad_rep_mon.html*

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Appendix O: Federal Requirements for SO_2 Sites

40 CFR Part 58 Appendix D —Network Design Criteria for Ambient Air Quality Monitoring

4.4 Sulfur Dioxide (SO_2) Design Criteria.
4.4.1 General Requirements. (a) State and, where appropriate, local agencies must operate a minimum number of required SO_2 monitoring sites as described below.

4.4.2 Requirement for Monitoring by the Population Weighted Emissions Index. (a) The population weighted emissions index (PWEI) shall be calculated by States for each core based statistical area (CBSA) they contain or share with another State or States for use in the implementation of or adjustment to the SO_2 monitoring network. The PWEI shall be calculated by multiplying the population of each CBSA, using the most current census data or estimates, and the total amount of SO_2 in tons per year emitted within the CBSA area, using an aggregate of the most recent county level emissions data available in the National Emissions Inventory for each county in each CBSA. The resulting product shall be divided by one million, providing a PWEI value, the units of which are million persons-tons per year. For any CBSA with a calculated PWEI value equal to or greater than 1,000,000, a minimum of three SO_2 monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 100,000, but less than 1,000,000, a minimum of two SO_2 monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 5,000, but less than 100,000, a minimum of one SO_2 monitor is required within that CBSA.

(1) The SO_2 monitoring site(s) required as a result of the calculated PWEI in each CBSA shall satisfy minimum monitoring requirements if the monitor is sited within the boundaries of the parent CBSA and is one of the following site types (as defined in section 1.1.1 of this appendix): population exposure, highest concentration, source impacts, general background, or regional transport. SO_2 monitors at NCore stations may satisfy minimum monitoring requirements if that monitor is located within a CBSA with minimally required monitors under this part. Any monitor that is sited outside of a CBSA with minimum monitoring requirements to assess the highest concentration resulting from the impact of significant sources or source categories existing within that CBSA shall be allowed to count towards minimum monitoring requirements for that CBSA.

4.4.3 Regional Administrator Required Monitoring. (a) The Regional Administrator may require additional SO_2 monitoring stations above the minimum number of monitors required in 4.4.2 of this part, where the minimum monitoring requirements are not sufficient to meet monitoring objectives. The Regional Administrator may require, at his/her discretion, additional monitors in situations where an area has the potential to have concentrations that may violate or contribute to the violation of the NAAQS, in areas impacted by sources which are not conducive to modeling, or in locations with susceptible and vulnerable populations, which are not monitored under the minimum monitoring provisions described above. The Regional Administrator and the responsible State or local air monitoring agency shall work together to design and/or maintain the most appropriate SO_2 network to provide sufficient data to meet monitoring objectives.

4.4.4 SO_2 Monitoring Spatial Scales. (a) The appropriate spatial scales for SO_2 SLAMS monitors are the microscale, middle, neighborhood, and urban scales. Monitors sited at the microscale, middle, and neighborhood scales are suitable for determining maximum hourly concentrations for SO_2. Monitors sited at urban scales are useful for identifying SO_2 transport, trends, and, if sited upwind of local sources, background concentrations.

(1) Microscale —This scale would typify areas in close proximity to SO_2 point and area sources. Emissions from stationary point and area sources, and non-road sources may, under certain plume conditions, result in high ground level concentrations at the microscale. The microscale typically represents an area impacted by the plume with dimensions extending up to approximately 100 meters.

(2) Middle scale —This scale generally represents air quality levels in areas up to several city blocks in size with dimensions on the order of approximately 100 meters to 500 meters. The middle scale may include locations of

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expected maximum short-term concentrations due to proximity to major SO_2 point, area, and/or non-road sources.

(3) Neighborhood scale —The neighborhood scale would characterize air quality conditions throughout some relatively uniform land use areas with dimensions in the 0.5 to 4.0 kilometer range. Emissions from stationary point and area sources may, under certain plume conditions, result in high SO_2 concentrations at the neighborhood scale. Where a neighborhood site is located away from immediate SO_2 sources, the site may be useful in representing typical air quality values for a larger residential area, and therefore suitable for population exposure and trends analyses.

(4) Urban scale —Measurements in this scale would be used to estimate concentrations over large portions of an urban area with dimensions from 4 to 50 kilometers. Such measurements would be useful for assessing trends in area-wide air quality, and hence, the effectiveness of large scale air pollution control strategies. Urban scale sites may also support other monitoring objectives of the SO_2 monitoring network such as identifying trends, and when monitors are sited upwind of local sources, background concentrations.

4.4.5 NCore Monitoring. (a) SO_2 measurements are included within the NCore multipollutant site requirements as described in paragraph (3)(b) of this appendix. NCore-based SO_2 measurements are primarily used to characterize SO_2 trends and assist in understanding SO_2 transport across representative areas in urban or rural locations and are also used for comparison with the SO_2 NAAQS. SO_2 monitors at NCore sites that exist in CBSAs with minimum monitoring requirements per section 4.4.2 above shall be allowed to count towards those minimum monitoring requirements.
* * * * *

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Appendix P: Sulfur Dioxide Population Weighted Emissions Index

The new SO_2 rule requires monitoring in or near Core Based Statistical Areas (CBSA's) based on the population weighted emissions index (PWEI). The PWEI is calculated using the most recent census data or estimates, and the most recent county level emissions data available in the National Emissions Inventory.

The PWEI is calculated by multiplying the population of the CBSA by the total tons of SO_2 emissions inventories from counties that make up the CBSA and dividing by one million. The PWEI is expressed in units of million person-tons per year.

The final monitoring regulations require monitors to be placed in Core Based Statistical Areas (CBSA's) based on the PWEI for the area. The final rule requires:

- 3 monitors in CBSAs with index values of 1,000,000 or more;
- 2 monitors in CBSAs with index values less than 1,000,000 but greater than 100,000; and
- 1 monitor in CBSAs with index values greater than 5,000.

Iowa has chosen to use the 2008 National Emissions Inventory (NEI) data[7] as the most complete and accessible data to use for SO_2 emissions information. U.S. Census Bureau population estimates from Appendix F have been used for population data. The PWEI for Iowa MSAs are listed in the table below.

US Census Geographic Area	US Census Population Estimate, July, 2012	SO_2 Emissions, tons per year	SO_2 Population Weighted Emissions Index	SO_2 Monitors Required
Omaha-Council Bluffs, NE-IA	885,624	38,960	34,504	1
Sioux City, IA-NE	168,921	35,793	6,046	1
Davenport-Moline-Rock Island, IA-IL	382,630	7,504	2,871	0
Cedar Rapids, IA	261,761	8,159	2,136	0
Des Moines-West Des Moines, IA	588,999	876	516	0
Ames, IA	91,140	4,316	393	0
Dubuque, IA	95,097	3,883	369	0
Iowa City, IA	158,231	2,091	331	0
Waterloo-Cedar Falls, IA	168,747	579	98	0

7 http://www.epa.gov/ttn/chief/net/2008inventory.html

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Appendix Q: Federal Requirements for Lead Sites

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3. (b) The NCore sites must measure, at a minimum, $PM_{2.5}$ particle mass using continuous and integrated/filter-based samplers, speciated $PM_{2.5}$, $PM_{10–2.5}$ particle mass, speciated $PM_{10–2.5}$, O_3, SO_2, CO, NO/NOy, wind speed, wind direction, relative humidity, and ambient temperature. NCore sites in CBSA with a population of 500,000 people (as determined in the latest Census) or greater shall also measure Pb either as Pb-TSP or Pb- PM_{10}. The EPA Regional Administrator may approve an alternative location for the Pb measurement where the alternative location would be more appropriate for logistical reasons and the measurement would provide data on typical Pb concentrations in the CBSA.
* * * * *
(c) [Reserved.]
* * * * *
4.5 * * * (a) State and, where appropriate, local agencies are required to conduct ambient air Pb monitoring near Pb sources which are expected to or have been shown to contribute to a maximum Pb concentration in ambient air in excess of the NAAQS, taking into account the logistics and potential for population exposure. At a minimum, there must be one source-oriented SLAMS site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year and from each airport which emits 1.0 or more tons per year based on either the most recent National Emission Inventory (http://www.epa.gov/ttn/chief/eiinformation.html) or other scientifically justifiable methods and data (such as improved emissions factors or site-specific data) taking into account logistics and the potential for population exposure.

(i) One monitor may be used to meet the requirement in paragraph 4.5(a) for all sources involved when the location of the maximum Pb concentration due to one Pb source is expected to also be impacted by Pb emissions from a nearby source (or multiple sources). This monitor must be sited, taking into account logistics and the potential for population exposure, where the Pb concentration from all sources combined is expected to be at its maximum.

(ii) The Regional Administrator may waive the requirement in paragraph 4.5(a) for monitoring near Pb sources if the State or, where appropriate, local agency can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50 percent of the NAAQS (based on historical monitoring data, modeling, or other means). The waiver must be renewed once every 5 years as part of the network assessment required under § 58.10(d).

(iii) State and, where appropriate, local agencies are required to conduct ambient air Pb monitoring near each of the airports listed in Table D-3A for a period of 12 consecutive months commencing no later than December 27, 2011. Monitors shall be sited to measure the maximum Pb concentration in ambient air, taking into account logistics and the potential for population exposure, and shall use an approved Pb-TSP Federal Reference Method or Federal Equivalent Method. Any monitor that exceeds 50 percent of the Pb NAAQS on a rolling 3-month average (as determined according to 40 CFR part 50, Appendix Q) shall become a required monitor under paragraph 4.5(c) of this Appendix, and shall continue to monitor for Pb unless a waiver is granted allowing it to stop operating as allowed by the provisions in paragraph 4.5(a)(ii) of this appendix. Data collected shall be submitted to the Air Quality System database according to the requirements of 40 CFR part 58.16.

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Table D-3A Airports to be Monitored for Lead

Airport	County	State
Merrill Field	Anchorage	AK
Pryor Field Regional	Limestone	AL
Palo Alto Airport of Santa Clara County	Santa Clara	CA
McClellan-Palomar	San Diego	CA
Reid-Hillview	Santa Clara	CA
Gillespie Field	San Diego	CA
San Carlos	San Mateo	CA
Nantucket Memorial	Nantucket	MA
Oakland County International	Oakland	MI
Republic	Suffolk	NY
Brookhaven	Suffolk	NY
Stinson Municipal	Bexar	TX
Northwest Regional	Denton	TX
Harvey Field	Snohomish	WA
Auburn Municipal	King	WA

(b) State and, where appropriate, local agencies are required to conduct non-source-oriented Pb monitoring at each NCore site required under paragraph 3 of this appendix in a CBSA with a population of 500,000 or more.

(c) The EPA Regional Administrator may require additional monitoring beyond the minimum monitoring requirements contained in paragraphs 4.5(a) and 4.5(b) where the likelihood of Pb air quality violations is significant or where the emissions density, topography, or population locations are complex and varied. EPA Regional Administrators may require additional monitoring at locations including, but not limited to, those near existing additional industrial sources of Pb, recently closed industrial sources of Pb, airports where piston-engine aircraft emit Pb, and other sources of re-entrained Pb dust.

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Appendix R: Lead (Pb) Emissions Estimates

Facilities with 2011 NEI lead emissions over 0.25 tpy are indicated below:

Facility Name	*Lead Emissions (tpy)*
Grain Processing Corporation - Muscatine	3.089
MidAmerican Energy (Walter Scott Jr. Energy Center) - Council Bluffs	0.499
MidAmerican Energy (George Neal North) - Sergeant Bluff	0.351
Griffin Pipe Products Company - Council Bluffs	0.269

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Appendix S: Lead Modeling for Facilities in Iowa with Lead Emissions Over 0.5 Tons

IOWA DEPARTMENT OF NATURAL RESOURCES
Environmental Services Division
Air Quality Bureau
Modeling Group

M E M O R A N D U M

DATE: **29-JAN-2013**

TO: **SEAN FITZSIMMONS**

FROM: **DON PETERSON, PETER ZAYUDIS**

RE: **LEAD MODELING FOR 2011 EMISSIONS**

CC: **BRIAN HUTCHINS, JIM MCGRAW, JASON MARCEL, LORI HANSON, NICK PAGE**

INTRODUCTION

On January 12, 2009, the EPA's new and more stringent NAAQS standard for airborne lead (Pb) became effective. The primary standard for lead is 0.15 µg/m^3 based on the maximum (not to be exceeded) 3-month rolling average. On December 23, 2009 EPA proposed to decrease the emissions threshold for ambient monitoring to 0.5 tons/yr. Each year the Department will evaluate sources of lead emissions in the state to determine if any facilities meet or exceed this value.

During 2011, MidAmerican Energy's Walter Scott Jr. Energy Center (WSEC) and Grain Processing Corporation (GPC) in Muscatine had lead emissions that exceeded 0.45 tons/yr. In 2011, estimated actual lead emissions from Griffin Pipe Products Company located in Council Bluffs fell below 0.45 tons/yr due to the installation and operation of additional emission controls. However, the Department continues to gather information to develop an accurate lead emissions profile from Griffin Pipe Products Company and surrounding activities. Once completed, this lead emission data will be used to assist the Department in better characterizing lead ambient air impacts in the vicinity of Griffin Pipe Products Company.

Therefore the Department has decided to model the impacts from lead emissions from these facilities. Monitoring may, at the EPA Regional Administrator's discretion, be waived if modeled concentrations do not exceed 50% of the standard. The purposes of the current modeling are to evaluate ambient concentrations around these facilities for aid in determining if a monitoring waiver can be issued and, if necessary, where to site monitors.

ANALYSIS SUMMARY

Previous lead modeling for each facility was used as a base on which to build the current analysis. The analysis was evaluated using the newest version of AERMOD (version 12345) and the new 2005 – 2009 meteorological data pre-processed using a recently issued revision of AERMET (version 12345). The sources at each facility were modeled using the stack parameters and emission rates listed in Table 1. Sources were modeled using the most recent actual

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emission rates approved by the construction permit engineering staff. No stack parameters or emission rates were changed from the previously modeled values.

Table 1: Modeled Emission Rates and Stack Parameters

Emission Point	PM_{10} (lb/hr)	Stack Height (ft)	Stack Gas Exit Temperature (°F)	Stack Tip Diameter (in)	Stack Gas Flow Rate (acfm)
MidAmerican Energy – Walter Scott Energy Center					
1 (Boiler 1)	1.17	250	287	144	220,270
2 (Boiler 2)	1.65	250	316	144	446,200
3 (Boiler 3)	0.14	550	180	300	2,619,890
4 (Boiler 4)	0.025	551	207	296	2,447,050
Grain Processing Corporation					
EP001 (GEP Boilers)	0.97	219	379	180	402,340

MODEL RESULTS

Since the dispersion model AERMOD does not provide the ability to directly compute the 3-month rolling averages, results must go through a post-processing procedure. EPA's "leadpost" tool was used to determine the highest 3-month rolling average lead concentration, the receptor location, and the period of time.

According to the results from the AMS/EPA Regulatory Model (AERMOD, dated 12345), as post-processed by leadpost (dated 12114), the Pb emissions from these facilities will cause predicted concentrations that are less than 50% of the Pb NAAQS. All sources were assumed to operate 24 hours/day, 8760 hours/year.

The Pb modeling result for the worst case calendar quarter and year is listed in Tables 2 and 3. Visual displays of isopleths are provided in Figures 1 and 2. The isopleths are based on the highest 3-month rolling average concentrations at each receptor. The coordinates for both facilities are based on UTM zone 15, NAD27. The location of the maximum concentration is marked with either a red dot or red contour line. This will facilitate a determination of where the highest predicted impacts are and where monitors may best be located, if monitoring will be required.

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Table 2: Worst Case Modeling Results for Pb – MidAmerican – WSEC

Averaging Period	Year in which event occurred	Predicted Concentration* ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Rolling 3-month	2009 (May – July)	0.028	0	0.028	0.15

* The rolling 3-month concentration is the highest predicted value.

Figure 1: Concentration Profile – MidAmerican – WSEC

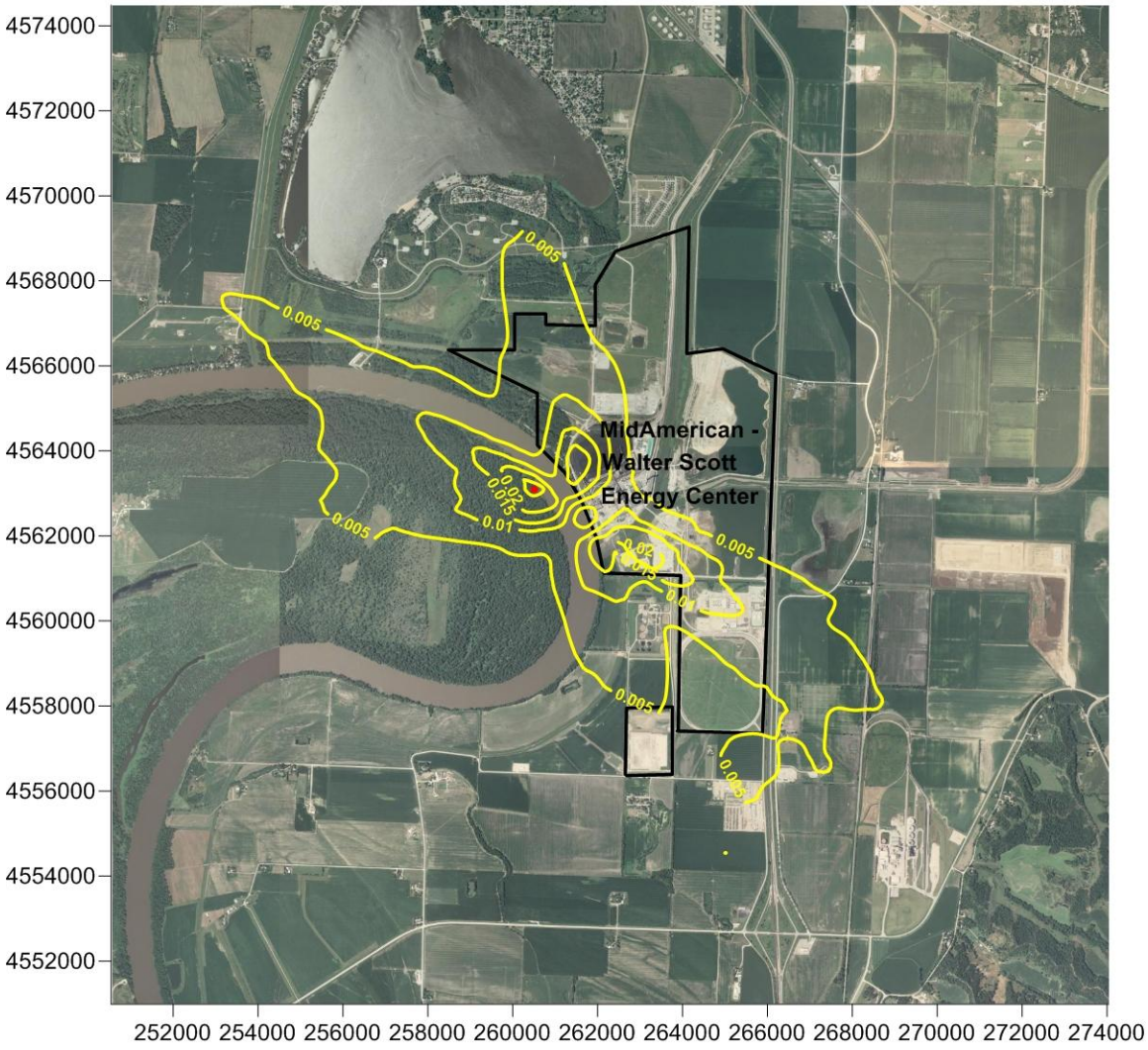

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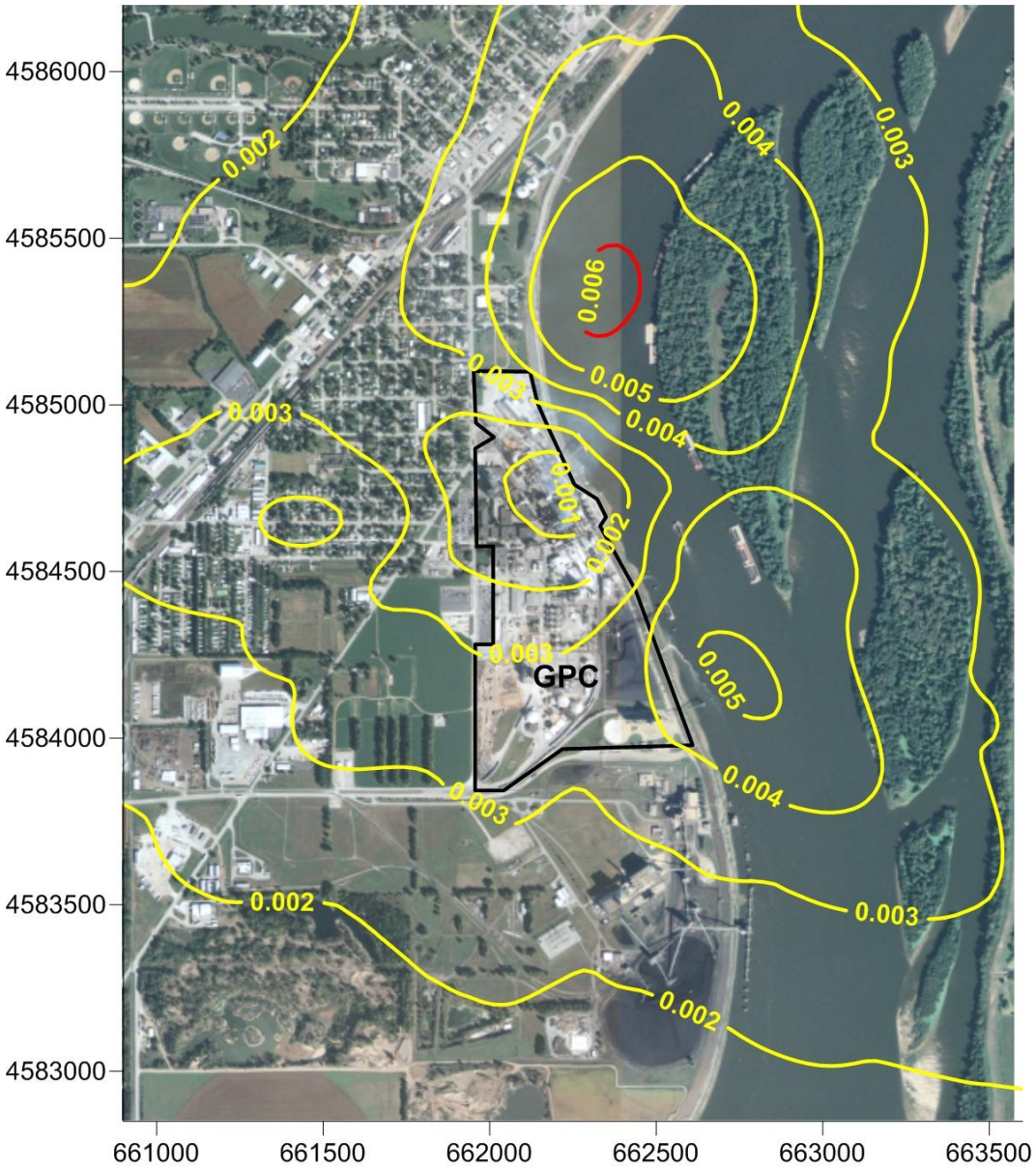
Table 3: Worst Case Modeling Results for Pb – GPC

Averaging Period	Year in which event occurred	Predicted Concentration* ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Rolling 3-month	2005 (August – October)	0.0063	0	0.0063	0.15

* The rolling 3-month concentration is the highest predicted value.

Figure 2: Concentration Profile – GPC



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